DESIGN	FED.RD. DIV.NO.	FEDERAL AID		HIGHWAY NO.
BMCD	6	BR 2021(460), ETC		TEEGE, ETC
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
BMCD	TEXAS	PHARR	CAMERON, ETC	1
CHECK	CONTROL	SECTION	JOB	
BMCD	0921	06	302, ETC	

INDEX OF SHEETS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	INDEX OF SHEETS

FINAL PLAN DATA

DATE OF LETTING: _____
DATE WORK BEGAN: _____
DATE WORK COMPLETED: _____
DATE WORK ACCEPTED: _____
FINAL CONTRACT COST: _____
CONTRACTOR: _____
LIST OF APPROVED FIELD CHANGES, CHANGE ORDERS & SUPPLEMENTAL AGREEMENTS:

THIS IS TO CERTIFY THAT ALL CONSTRUCTION SUBSTANTIAL WORK WAS PERFORMED IN ACCORDANCE WITH THE PLANS SPECIFICATIONS AND CONTRACT. ALL PROPOSED CONSTRUCTION WAS COMPLETED UNLESS OTHERWISE NOTED.

_____ _____
RENE GARZA, P.E. DATE
PHARR AREA ENGINEER

_____ _____
ANDRES ESPINOZA, P.E. DATE
SAN BENITO AREA ENGINEER

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

FEDERAL AID PROJECT: BR 2021(460), ETC

TEEGE ROAD
CAMERON COUNTY
CSJ: 0921-06-302
LIMITS: FROM: ON TEEGE RD., 0.30 MI W OF JCT IH-69E TO: STR#: AA16-48-001 @ DRAINAGE DITCH (LOCATION #1)

DOOLITTLE ROAD
HIDALGO COUNTY
CSJ: 0921-02-387
LIMITS: FROM: DOOLITTLE RD., 1.71 MI N OF FM 1925 TO: STR#: AA01-82-001 @ N MAIN DITCH (LOCATION #2)

FOR THE CONSTRUCTION OF BRIDGE REPLACEMENT
CONSISTING OF REPLACE BRIDGE & RECONSTRUCT APPROACHES

HIGHWAY	CSJ	NBI	ROADWAY		BRIDGES		TOTAL LENGTH	
			FEET	MILES	FEET	MILES	FEET	MILES
TEEGE	0921-06-302	N/A	220.05	0.042	0.00	0.000	220.05	0.042
DOOLITTLE	0921-02-387	21-109-0-AA25-01-001	315.00	0.060	140.00	0.027	455.00	0.086

TEEGE RD.
CSJ: 0921-06-302
DESIGN SPEED = 30 MPH
FUNCTIONAL CLASSIFICATION = LOCAL

HWY	YEAR	ADT
TEEGE	2018	1,400
	2038	1,900

DOOLITTLE RD.
CSJ: 0921-02-387
DESIGN SPEED = 30 MPH
FUNCTIONAL CLASSIFICATION = LOCAL

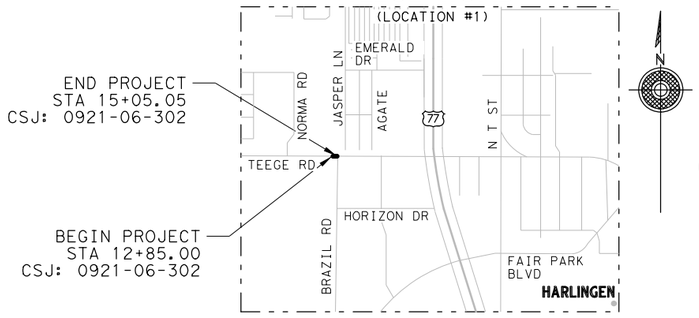
HWY	YEAR	ADT
DOOLITTLE	2019	3,513
	2039	4,918

BURNS McDONNELL
13737 NOEL ROAD
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

SUBMITTED FOR LETTING: DECEMBER 07, 2022

_____, P.E.
DESIGN ENGINEER/PROJECT MANAGER
BURNS & McDONNELL ENGINEERING CO, INC

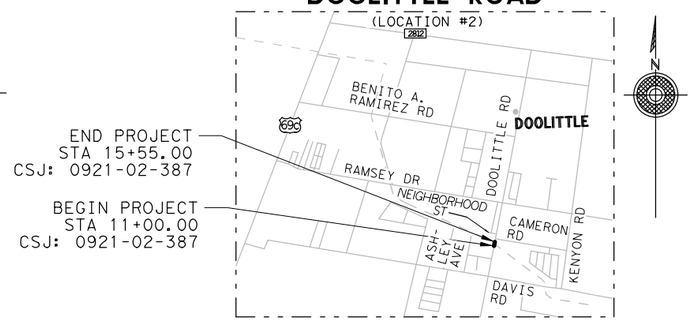
TEEGE ROAD



LOCATION MAP NOT TO SCALE

EXCEPTIONS: NONE
EQUATIONS: NONE
RAILROAD CROSSINGS: NONE

DOOLITTLE ROAD



LOCATION MAP NOT TO SCALE

EXCEPTIONS: NONE
EQUATIONS: NONE
RAILROAD CROSSINGS: NONE

VOLUME 1

RECOMMENDED FOR LETTING: 1/4/2023
DocuSigned by: Romualdo Mena Jr
8D395A956F70440...
DISTRICT CENTRAL DESIGN SUPERVISOR

APPROVED FOR LETTING: 1/4/2023
DocuSigned by: Pedro R. Alvarez
EABA335C2D7F4E5...
DISTRICT ENGINEER

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, NOVEMBER 1, 2014 AND SPECIFICATION ITEMS LISTED AND DATED AS FOLLOWS, SHALL GOVERN ON THIS PROJECT: REQUIRED CONTRACT PROVISIONS FOR ALL FEDERAL-AID CONSTRUCTION CONTRACTS (FORM FHWA 1273, JULY 2022).

® 100% PLANS
TEXAS DEPARTMENT OF TRANSPORTATION

I. GENERAL

1	TITLE SHEET
2	INDEX OF SHEETS
3	DOOLITTLE ROAD TYPICAL SECTIONS
4–6	TEEGE ROAD TYPICAL SECTIONS
7, 7A–7H	GENERAL NOTES
8, 8A–8B	ESTIMATE AND QUANTITY SHEETS
9–11	SUMMARY OF QUANTITIES
12	CRASH CUSHION SUMMARY SHEET
13	SUMMARY OF SMALL SIGNS
14	SEAL COAT MATERIAL SELECTION TABLE "UNDERSEAL"

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17	DOOLITTLE ROAD DETOUR ROUTE
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70	TEEGE ROAD RIPRAP GRADING LAYOUT

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72	* (S) CH–PW–S
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75	* (S) SETP–PD
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119	* (S) PM(3)–20
120	* (S) PM(4)–22
121	* (S) TSR(3)–13
122	* (S) TSR(4)–13
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130	TxDOT STORM WATER POLLUTION PREVENTION PLAN (SW3P)
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138	* (S) EC(3)–16
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(D): DISTRICT STANDARD DETAIL
(S): STATEWIDE STANDARD DETAIL

STATE OF TEXAS
RYAN W. FRITZ
112568
LICENSED
PROFESSIONAL ENGINEER

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

RYAN W. FRITZ, P.E. — P.E. — 12/07/2022 DATE

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

AARON DEBORD, P.E. — P.E. — 12/07/2022 DATE

STATE OF TEXAS
AARON DEBORD
96578
LICENSED
PROFESSIONAL ENGINEER

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL RD,
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

Texas Department of Transportation
© 2022

INDEX OF SHEETS

SCALE = None

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
RWF	6	SEE TITLE SHEET	TEEGE, ETC
DRAWN RWF	STATE	DISTRICT	COUNTY / SHEET NO.
CHECK SPC	TEXAS	PHARR	CAMERON, ETC / 2
CHECK SPC	CONTROL	SECTION	JOB
	0921	06	302, ETC

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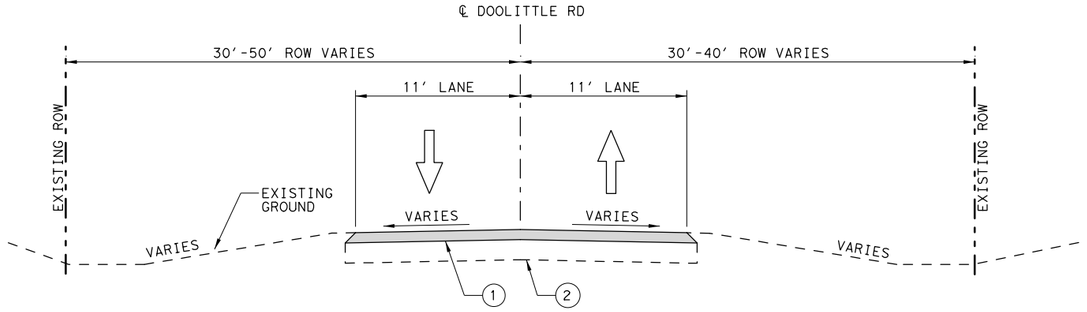

EXISTING DOOLITTLE RD

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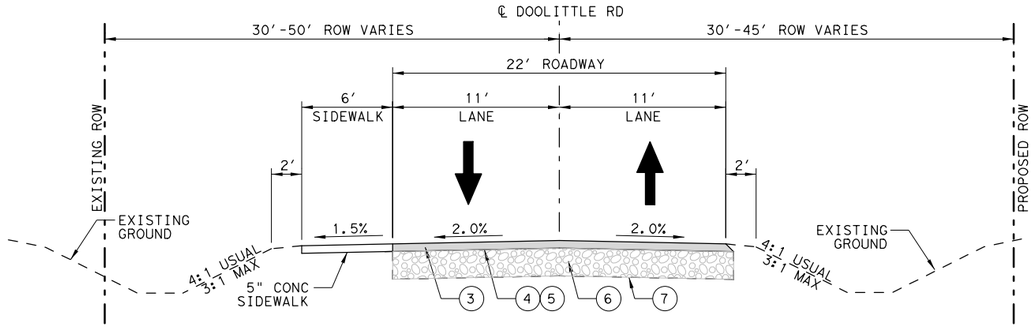
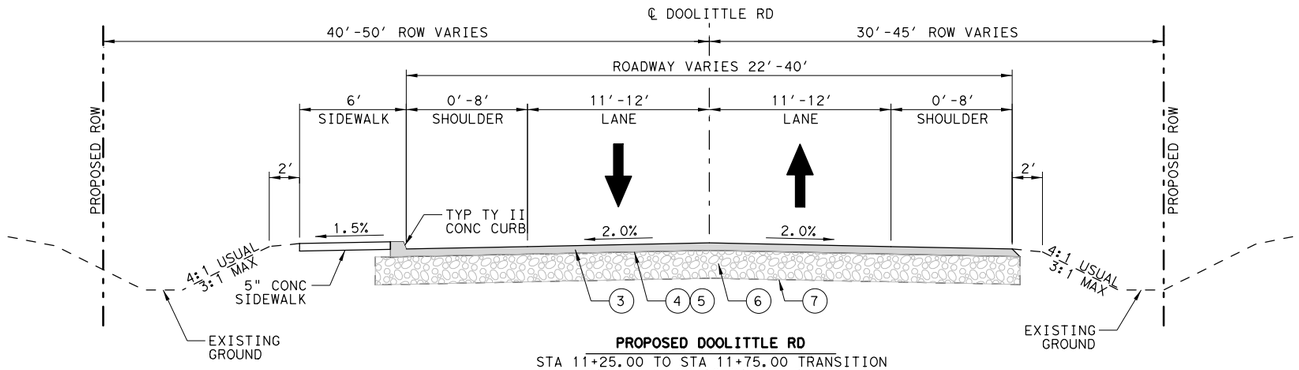
NTS



PROPOSED DOOLITTLE RD

STA 11+00.00 TO STA 11+25.00
STA 14+85.00 TO STA 15+55.00

NTS



PROPOSED DOOLITTLE RD

STA 11+25.00 TO STA 11+75.00 TRANSITION
STA 11+75.00 TO STA 14+35.00
STA 14+35.00 TO STA 14+85.00 TRANSITION

NTS

LEGEND

1. 6" SINGLE ASPHALT SURFACE
2. 6" COMP. FLEXIBLE BASE
3. 3" HMA TY-D SAC A (PG 76-22)
4. ONE COURSE SURFACE TREATMENT
   AGGR (TY D GR-4P)(SAC-B)
   ASPHALT (TIER II)
5. PRIME COAT (MC-30)
6. 11" CEMENT TREATED BASE
   FLEXIBLE BASE (TY E GR 4)(2% CEMENT)
7. GEOGRID BASE REINFORCEMENT (TY II)

NOTES:

1. EXISTING TYPICAL BASED ON TOPO SURVEY.
2. STATION LIMITS SHOWN ARE APPROXIMATE FOR NORMAL ROADWAY CONDITIONS. FOR TRANSITIONS AND PROPOSED ROW LOCATIONS, SEE PLAN AND PROFILE SHEETS.
3. REFERENCE TXDOT STD TE(HMAC)-11 FOR ASPHALT EDGE CONDITION.
4. NOT TO SCALE.

STATE OF TEXAS
RYAN W. FRITZ
112568
LICENSED
PROFESSIONAL ENGINEER

12/07/2022

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL RD,
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

Texas Department of Transportation

DOOLITTLE ROAD

TYPICAL SECTIONS

SCALE = None

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	TEEGE, ETC
DRAWN LEH	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	PHARR	CAMERON, ETC	3
CHECK	CONTROL	SECTION	JOB	
	0921	06	302, ETC	

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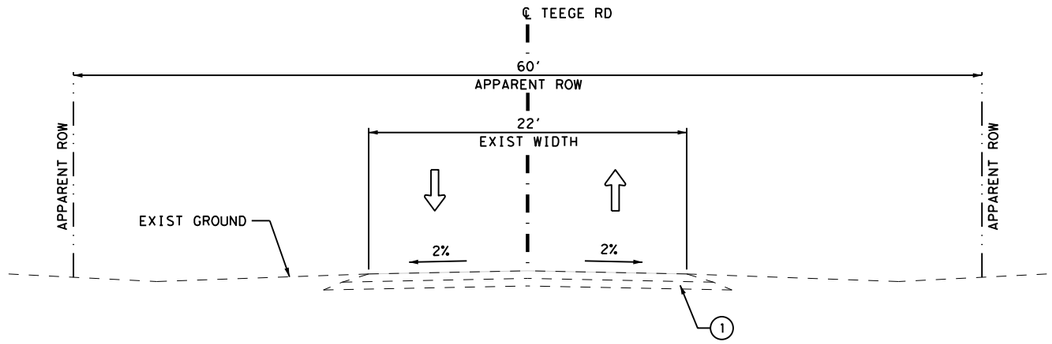

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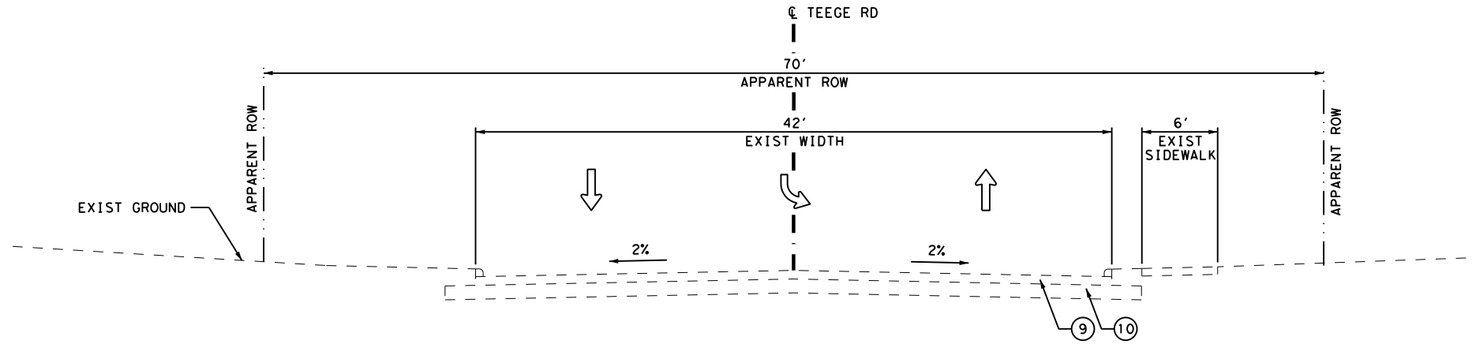
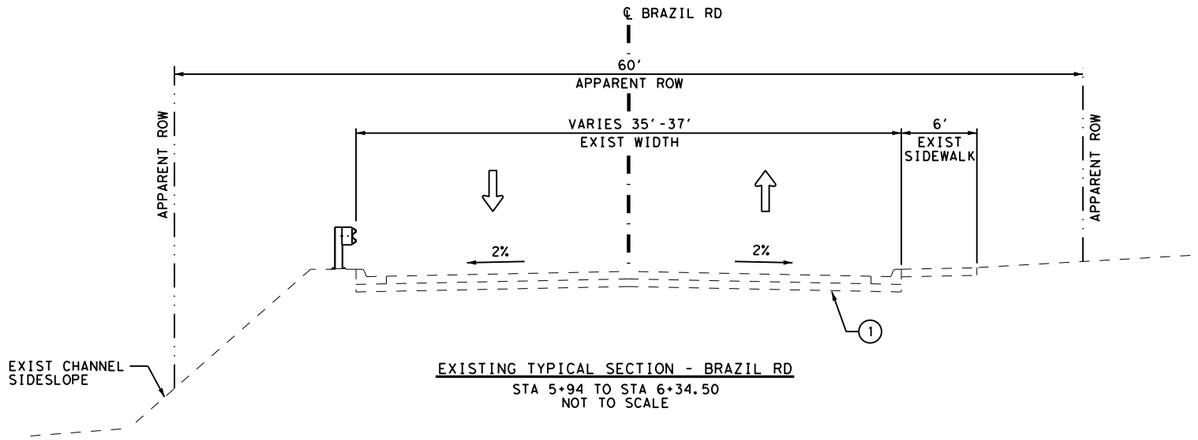
STA 12+85 TO STA 13+80



EXISTING TYPICAL SECTION - TEEGE RD
STA 14+20 TO END PROJECT
NOT TO SCALE



EXISTING TYPICAL SECTION - BRAZIL RD
STA 5+94 TO STA 6+34.50
NOT TO SCALE

LEGEND

1. EXISTING ASSUMED 6" HMA, 6" SUBGRADE
2. 3" HMA TY-D SAC A (PG 76-22)
3. ONE COURSE SURFACE TREATMENT AGGR (TY PD GR-4P) SAC-B ASPHALT (TIER II)
4. PRIME COAT (MC-30)
5. 11" FLEXIBLE BASE (TY E GR 4) (2% CEMENT)
6. GEOGRID BASE REINFORCMENT (TY II)
7. 7" CONCRETE PAVEMENT
8. 6" LIME TREAT SUBGRADE (3% LIME)
9. EXISTING ASSUMED 7" CONCRETE PAVEMENT
10. EXISTING ASSUMED 6" LIME TREAT SUBGRADE

NOTES:

1. EXISTING TYPICAL BASED ON TOPO SURVEY.
2. STATION LIMITS SHOWN ARE APPROXIMATE FOR NORMAL ROADWAY CONDITIONS. FOR TRANSITIONS AND PROPOSED ROW LOCATIONS, SEE PLAN AND PROFILE SHEETS.
3. REFERENCE TXDOT STD TE(HMAC)-11 FOR ASPHALT EDGE CONDITION.
4. NOT TO SCALE.

STATE OF TEXAS
AARON DEBORD
96578
LICENSED
PROFESSIONAL ENGINEER

12/7/2022

REV	BY	DESCRIPTION	DATE

AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TBPE FIRM REGISTRATION #739

2021
Texas Department of Transportation

TEEGE ROAD

EXISTING TYPICAL SECTIONS

DESIGN	FED.RD. DIV.NO.	PROJECT NO.			HIGHWAY NO.
ASD	6	SEE TITLE SHEET			TEEGE,ETC
DESIGN CK	STATE	DISTRICT	COUNTY		SHEET NO.
HLT	TEXAS	PHARR	CAMERON, ETC		4
GRAPHICS	CONTROL	SECTION NO.	JOB		
AJG	0921	06	302, ETC		
GRAPHICS CK					
TJR					

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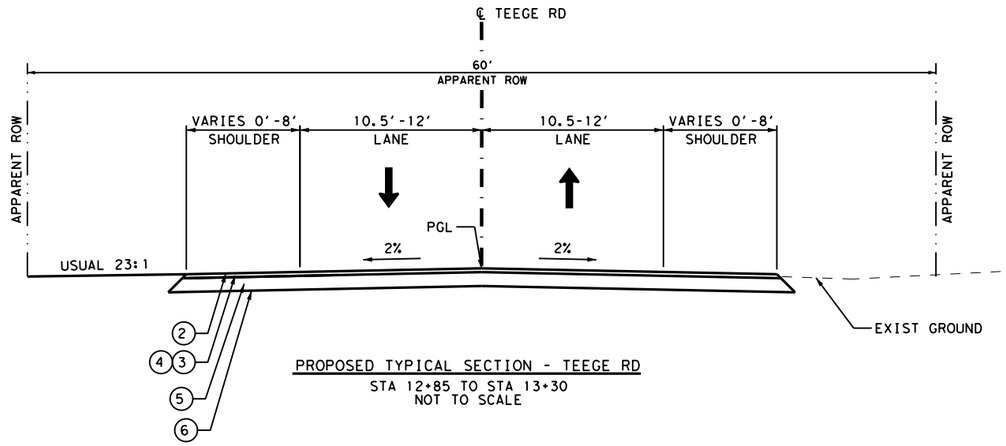
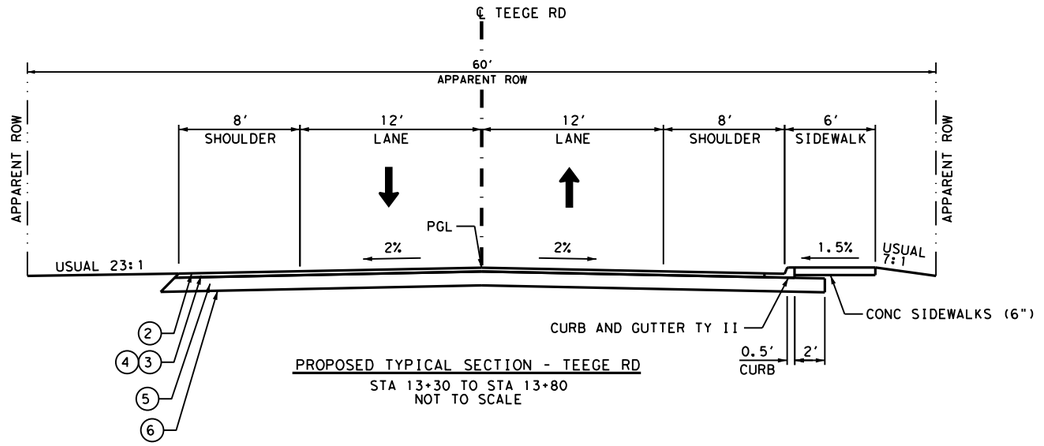


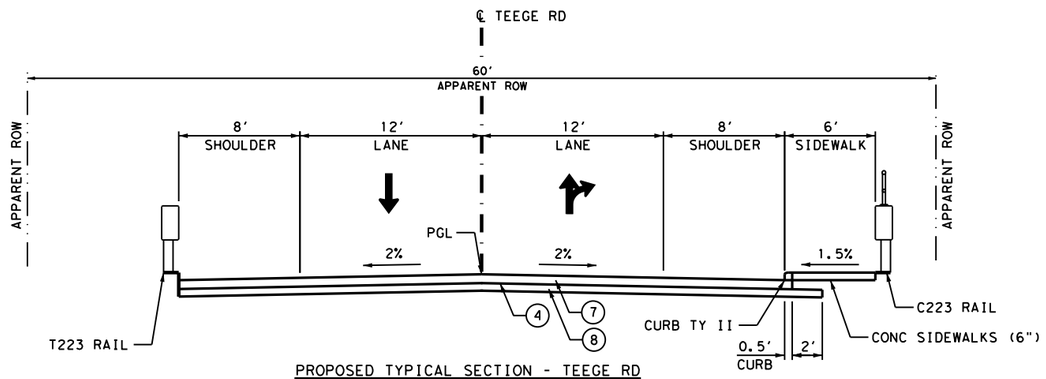
PROPOSED TYPICAL SECTION - TEEGE RD

STA 12+85 TO STA 13+30
NOT TO SCALE



PROPOSED TYPICAL SECTION - TEEGE RD

STA 13+30 TO STA 13+80
NOT TO SCALE



PROPOSED TYPICAL SECTION - TEEGE RD

STA 13+80 TO 14+31
NOT TO SCALE

LEGEND

1. EXISTING ASSUMED 6" HMA, 6" SUBGRADE
2. 3" HMA TY-D SAC A (PG 76-22)
3. ONE COURSE SURFACE TREATMENT AGGR (TY PD GR-4P) SAC-B ASPHALT (TIER II)
4. PRIME COAT (MC-30)
5. 11" FLEXIBLE BASE (TY E GR 4) (2% CEMENT)
6. GEOGRID BASE REINFORCMENT (TY II)
7. 7" CONCRETE PAVEMENT
8. 6" LIME TREAT SUBGRADE (3% LIME)
9. EXISTING ASSUMED 7" CONCRETE PAVEMENT
10. EXISTING ASSUMED 6" LIME TREAT SUBGRADE

NOTES:

1. EXISTING TYPICAL BASED ON TOPO SURVEY.
2. STATION LIMITS SHOWN ARE APPROXIMATE FOR NORMAL ROADWAY CONDITIONS. FOR TRANSITIONS AND PROPOSED ROW LOCATIONS, SEE PLAN AND PROFILE SHEETS.
3. REFERENCE TXDOT STD TE(HMAC)-11 FOR ASPHALT EDGE CONDITION.
4. NOT TO SCALE.

12/7/2022

STATE OF TEXAS
AARON DEBORD
96578
LICENSED
PROFESSIONAL ENGINEER

REV	BY	DESCRIPTION	DATE

AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TBPE FIRM REGISTRATION #739

2021 Texas Department of Transportation

TEEGE ROAD

PROPOSED TYPICAL SECTIONS

SHEET 1 OF 2

DESIGN	FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
ASD	6	SEE TITLE SHEET		TEEGE,ETC
DESIGN CK	STATE	DISTRICT	COUNTY	SHEET NO.
HLT	TEXAS	PHARR	CAMERON, ETC	
GRAPHICS	CONTROL	SECTION NO.	JOB	5
AJG	0921	06	302, ETC	
GRAPHICS CK				
TJR				

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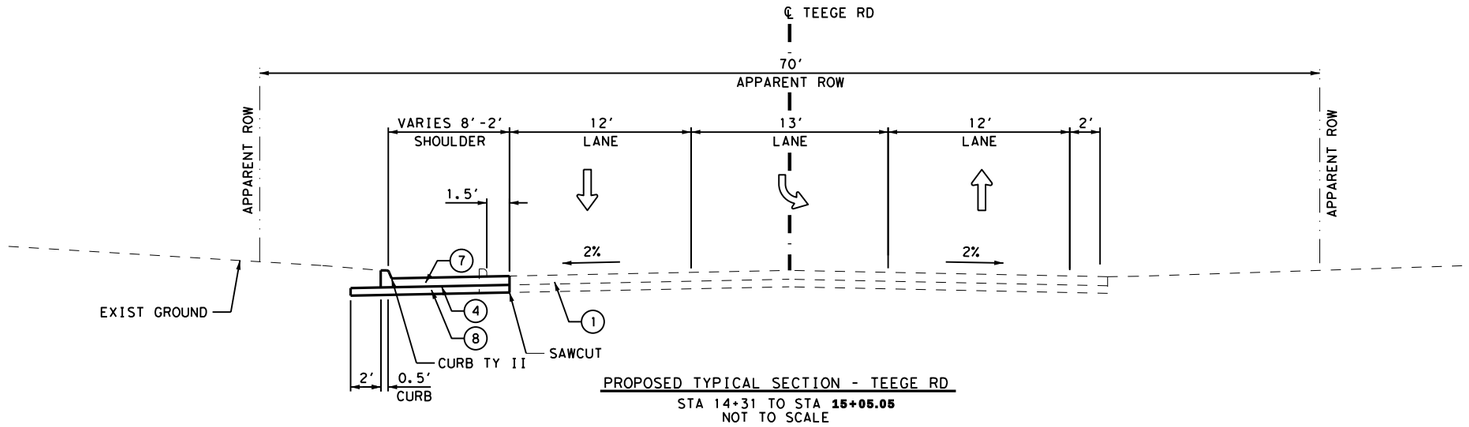

PROPOSED TYPICAL SECTION - TEEGE RD

STA 14+31 TO STA **15+05.05**

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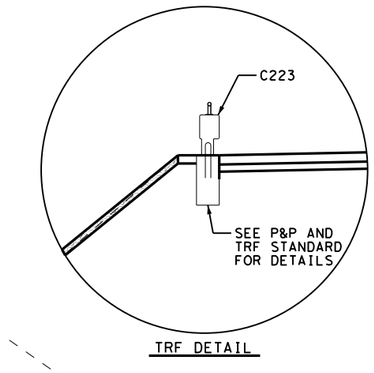

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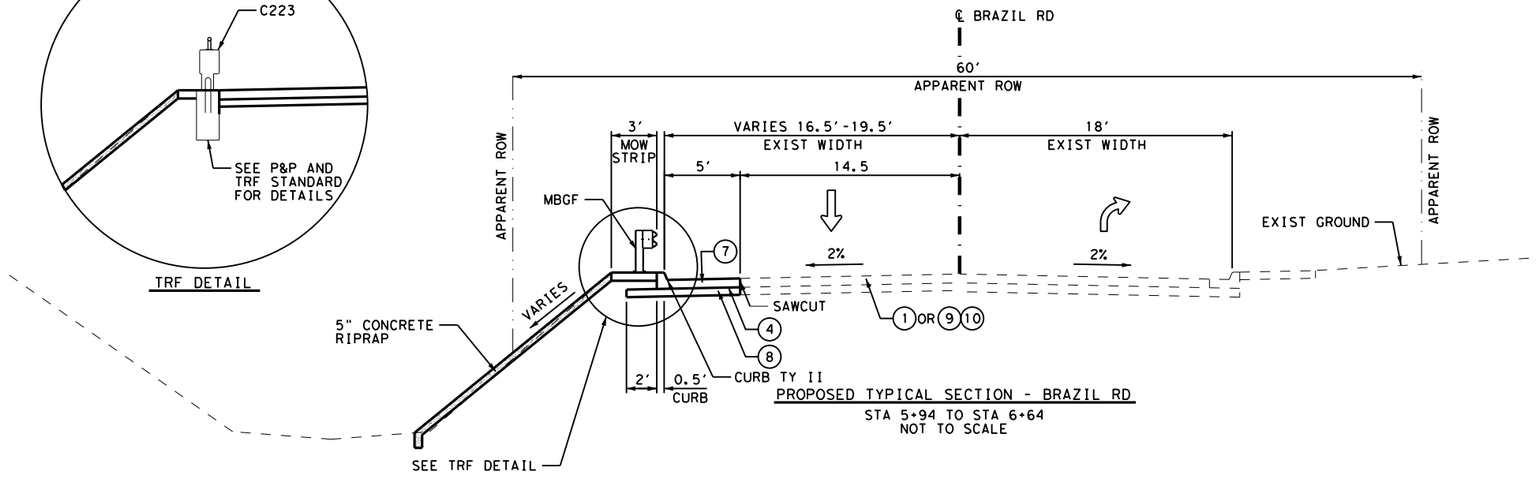

PROPOSED TYPICAL SECTION - BRAZIL RD

STA 5+94 TO STA 6+64

NOT TO SCALE

LEGEND

1. EXISTING ASSUMED 6" HMA, 6" SUBGRADE
2. 3" HMA TY-D SAC A (PG 76-22)
3. ONE COURSE SURFACE TREATMENT AGGR (TY PD GR-4P) SAC-B ASPHALT (TIER II)
4. PRIME COAT (MC-30)
5. 11" FLEXIBLE BASE (TY E GR 4) (2% CEMENT)
6. GEOGRID BASE REINFORCMENT (TY II)
7. 7" CONCRETE PAVEMENT
8. 6" LIME TREAT SUBGRADE (3% LIME)
9. EXISTING ASSUMED 7" CONCRETE PAVEMENT
10. EXISTING ASSUMED 6" LIME TREAT SUBGRADE

NOTES:

1. EXISTING TYPICAL BASED ON TOPO SURVEY.
2. STATION LIMITS SHOWN ARE APPROXIMATE FOR NORMAL ROADWAY CONDITIONS. FOR TRANSITIONS AND PROPOSED ROW LOCATIONS, SEE PLAN AND PROFILE SHEETS.
3. REFERENCE TXDOT STD TE(HMAC)-11 FOR ASPHALT EDGE CONDITION.
4. NOT TO SCALE.

12/7/2022

STATE OF TEXAS
AARON DEBORD
96578
LICENSED
PROFESSIONAL ENGINEER

REV	BY	DESCRIPTION	DATE

AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TBPE FIRM REGISTRATION #739

2021 Texas Department of Transportation

TEEGE ROAD

PROPOSED TYPICAL SECTIONS

SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
ASD	6	SEE TITLE SHEET		TEEGE,ETC
DESIGN CK	STATE	DISTRICT	COUNTY	SHEET NO.
HLT	TEXAS	PHARR	CAMERON, ETC	6
GRAPHICS	CONTROL	SECTION NO.	JOB	
AJG	0921	06	302, ETC	
GRAPHICS CK				
TJR				

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2014 SPECS GENERAL NOTES:

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General Requirements and Covenants to ITEMS 1 thru 9:

For all pits or quarries, comply with the "Texas Aggregate Quarry and Pit Safety Act."

Provide on a weekly basis a list of equipment, including idle equipment, utilized on the project that week.

The 1-800 call services for utility locations do not include TxDOT facilities. Contact the Pharr District Signal Section (956-702-6225) for coordination regarding TxDOT underground lines.

ITEM 2: Instructions to Bidders

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

Andres Espinoza, P.E., San Benito Area Engineer; Andres.Espinoza@txdot.gov
Hector Siller, P.E., Assist. Area Engineer; Hector.Siller@txdot.gov

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

All Contractor questions will be reviewed by the Engineer. Once a response is developed, it will be posted to TxDOT's Public FTP at the following Address:

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

All questions submitted that generate a response will be posted through this site. The site is organized by District, Project Type (Construction or Maintenance), Letting Date, and CCSJ/Project Name.

ITEM 5: Control of the Work

The responsibility for the construction surveying on this contract will be in accordance with Article 5.9.3., "Method C".

Prior to contract letting, bidders may obtain a free computerized transfer of files (from the Engineer's office) that contains the earthwork information. If copies of the actual cross-sections in additional to, or instead of the electronic files are requested, they will be available at the Engineer's office for borrowing by copying companies for the purpose of making copies for the bidder at the bidder's expense.

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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: Control of Materials

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

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

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

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

ITEM 7: Legal Relations and Responsibilities

No significant traffic generator events identified.

404 Permit Requirements:

The Contractor shall note that discharge of permanent or temporary fill material into the waters of the United States (U.S.), including jurisdictional wetlands, as necessary for construction, will require specific approval of the U.S. Army Corps of Engineers (USACE) under Section 404 of the Clean Water Act.

TxDOT will obtain the appropriate nationwide or individual permit(s) when necessary, as dictated by project specific conditions and the potential to affect USACE jurisdictional areas to address the work detailed in the plans. The Contractor may review the permitted plans at the office of the Area Engineer in charge of construction. TxDOT will hold the Contractor responsible for following all conditions of the approved permit. If the Contractor cannot work within the limits or scope of this permit(s), then it becomes the Contractor's entire responsibility to consult with the USACE on the need for changes or amendments to the conditions of the existing permit(s) as originally obtained by TxDOT. However, the Contractor may request

TxDOT to assist in this process by providing complete and specific revised details for TxDOT review and submittal to the USACE. For off project right of way coordination, the Contractor or his agent shall handle all activities directly with the USACE.

It is essential that any impacts to USACE jurisdictional waters of the U.S., including jurisdictional wetlands, be the minimum necessary to complete the proposed work. If the Contractor needs further explanation of the conditions of the permit, including means of compliance, they may contact the Pharr District Environmental Coordinator.

Project Specific Locations (PSL's) Coordination

The Contractor shall not initiate activities in a project specific location (PSL) associated with a U.S. Army Corps of Engineers (USACE) permit area that has not been previously evaluated by the USACE as part of the permitting for this project. Such activities include, but are not limited to, haul roads, equipment staging areas, borrow and disposal sites. Associated defined here includes materials delivered to or from the PSL. The permit area includes all waters of the U.S. or associated wetlands affected by activities associated with this project. Special restrictions may be required for such work. The Contractor shall be responsible for any and all consultations with the USACE regarding activities, including project specific locations (PSLs) that have not been previously evaluated by the USACE.

The Contractor shall provide the department with a copy of all consultation(s), or approval(s), from the USACE prior to initiating activities.

The Contractor may proceed with activities in PSLs that do not affect a USACE permit area if a self-determination has been made that the PSL is non-jurisdictional or proper USACE clearances have been obtained in jurisdictional areas or have been previously evaluated by the USACE as part of the permit review of this project. The Contractor is solely responsible for documenting any determination(s) that their activities do not affect a USACE permit area. The Contractor shall maintain copies of their determination(s) for review by the department or any regulatory agency.

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

In order to expedite the approval process for PSL's or to eliminate or minimize potential impacts to project progress, initiate coordination efforts with the USACE **within 30 days from the date of**

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"authorization to begin work". If this is not done, the Contractor waives the right to request any contract time considerations if project progress is impacted and PSL'S approval is still pending.

Requests submitted to the Area Engineer will be evaluated on this basis and will require documentation showing substantial early coordination efforts to expedite the approval process as herein stated. The request shall include a detailed chronological summary status with dates of coordination activities with the resource agencies, including those occurring after the initial coordination, to be reviewed and confirmed by the district's environmental section.

ITEM 8: Prosecution and Progress

Where road closures or detours around structures are necessary to accomplish proposed work, the removal of existing structures and/or cutting of existing pavement will not be permitted until all precast members for the proposed structure have been cast, tested, and approved for use.

TxDOT is required to provide 10 working days advanced written notice of all proposed bridge widening, rehabilitation, or demolition work to the Texas Department of State Health Services (TDSHS) to allow them the opportunity to both verify information provided regarding asbestos containing materials and abatement and observe the demolition/renovation work. Considering that this notice will be provided TDSHS at the beginning of the project for all affected bridge work based on start and finish dates included in the Contractor's original submitted work schedule, any schedule changes proposed by the Contractor shall be submitted to TxDOT at least 15 days prior to the revised or original start date to accommodate the required coordination with TDSHS.

Working days will be computed and charged in accordance with Article 8.3.1.6. defined as follows:

Work and time charges will continue until the start of the bird nesting season. Upon the start of the bird nesting season, work and time charges will stop for a maximum period of 120-Working days for the bird nesting season delay to be completed. Time charges in accordance with Article 8.3.1.4. will resume at the end of the 120-day bird nesting season delay or earlier if mutually agreed in writing by the Engineer and Contractor.

Prepare progress schedules using the Critical Path Method (CPM).

ITEM 100: Preparing Right of Way

Preparation of right of way will be done in accordance with the construction phasing shown on the Traffic Control Plans. Performance of this item will not be allowed outside of the project's current construction phase without prior approval by the Engineer.

Removal of all existing vegetation and trees within the ROW will be subsidiary to prep ROW.

ITEM 132: Embankment

Embankment (DENS CONT) shall be Type C with a max. PI of 40. Material used as embankment material in the top two feet below the bottom of Flexible Base shall meet the following requirements based on preliminary tests and such other tests found necessary by the Engineer.

1. The material shall be such as to produce a well-bonded embankment and shall have a minimum PI of 8 and a maximum PI of 30.

It is the Contractor's responsibility to advise the Engineer of the location of the source sufficiently in advance to avoid delay.

ITEM 134: Backfilling Pavement Edges

Areas to be backfilled shall extend approximately 3-ft out from the edges of the proposed overlay. Final slopes shall be uniform and smooth. The 100-foot station payment includes backfilling of both sides.

Backfill Ty A shall not contain particles more than two inches in size and shall have a minimum PI of 10 and a maximum PI of 20.

Any additional backfill material necessary due to pre-existing edge conditions or to replace existing fill removed during blading operations will not be paid for directly. It will be considered subsidiary to this bid Item.

ITEM 160: Topsoil

Use topsoil as needed and directed by the Project Engineer for select problem areas. Unless otherwise approved by the Project Engineer, use topsoil from approved sources outside the right of way as per standard specifications. Existing topsoil is to be salvaged and retained for re-use on the project as topsoil.

ITEM 164: Seeding for Erosion Control

During drill seeding operations, application methods shall be in accordance with the method shown in the Standard Specification Book.

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SS-1 Tacking Agent shall be a ratio of 2:1, two (Emulsion) to one (water) and applied at a rate of 0.05 gallons per square yard. The SS-1 Tacking Agent required for Drill Seed operations, will not be paid for directly, but will be subsidiary to Item 164 “Drill Seeding.” Watering shall not be used with the Drill Seed Method. A biodegradable tacking agent may be used in lieu of the SS-1 tacking agent in accordance with the manufacturer’s recommendations when approved by the Engineer.

Cool Season or Warm Season Grasses shall be included as part of Item 164 (See Table 3 and/or Table 4 in the Standard Specification Book or dates and seed type).

Seed mixture shall be as specified under Item 164.

ITEM 166: Fertilizer

Fertilizer rate is based on a rate of 100 Lbs. of Nitrogen per acre. The Nitrogen-Phosphorous Potassium (NPK) ratio shall include a minimum of 5% Phosphorous and 5% Potassium.

Fertilizer shall be homogenized.

ITEM 169: Soil Retention Blankets

In areas designated for soil retention blankets (SRB) in the plans, furnish only spray-on products listed on the Approved Product List for Erosion Control Products based upon the Class and Type specified in the plans or from the following list: AEC Premier Straw Double Net Fibrenet, American Excelsior Curlex I Fibrenet, Erosion Control Blanket S31BD, Curlex II Fibrenet, Koirmat 700, AEC Premier Coconut Fibrenet, and AEC Premier Straw-Coconut Fibrenet.

ITEM 247: Flexible Base

Flexible Base Type E will be composed of caliche (argillaceous Limestone, calcareous or calcareous clay particles) and may contain stone, conglomerate, gravel, sand, or granular materials when these materials are in situ with the caliche.

Flexible Base (TY E GR 4) caliche shall conform to the following requirements:

Retained on Sq. Sieve:	Percent Retained
2”	0
½”	20-60
No. 4	40-75
No. 40	70-90
Max. PI	15
Max. Wet Ball PI	15
Wet Ball Mill Max. Amount	50
Min. Comp. Strength PSI	150 at 15 PSI lateral pressure
Triaxial Test	Tex-117-E

The Wet Ball Test (Tex-116-E) shall be run and the Plasticity Index of the material passing the No.40 sieve shall be determined (Wet Ball PI).

The percent of density as determined by Compaction Ratio (Tex-113-E) for the new Flexible Base shall be a minimum of 98%.

The Contractor's attention is called to the fact that certain existing and/or proposed structures may be within the limits of the Flexible Base. It shall be the Contractor's responsibility to perform construction operations without damage to these structures.

For water added under Item 247, the sulfate content will not exceed 3000-ppm and the chloride content will not exceed 3000-ppm.

ITEM 251: Reworking Base Courses

Quantities of Flexible Base to be salvaged, shown on the typical sections, are for estimating purposes only. All acceptable base material encountered in existing base is to be salvaged as directed by the Engineer regardless of the quantities involved.

Salvaged base shall be used in the bottom course on any of the proposed roadway and/or turnout sections.

Salvaged base may be used on any of the proposed driveway sections.

All surplus salvage base not used on the project will remain the property of the Contractor, unless otherwise directed by Engineer.

Proof roll the roadbed in accordance with Item 216, “Proof Rolling.” Correct soft spots as directed.

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ITEM 260: Lime Treatment (Road-Mixed)

The Contractor's attention is called to the fact that certain existing and/or proposed structures are within the limits of the lime-treated Subgrade. Unless otherwise directed by the Engineer, these structures shall be installed before the final rolling of this Subgrade. It shall be the Contractor's responsibility to perform the proper lime treating operation without damage to these structures.

The slurry method of applying lime will be required, except when the lime is to be added to naturally wet materials as directed by the Engineer.

For this project, the Engineer will direct a random number of lime trucks to be check weighed.

The percent of density as determined by Tex-121-E for the new and salvage Flexible Base shall be a minimum of 98% for all courses.

In order to avoid damaging the Geogrid, add lime to the first lift of new base and/or salvage base at a central mixing site or mixing plant away from the construction area. The Engineer shall approve the site or plant location and method of mixing.

Proof roll all constructed lime treated subgrade and bases courses in accordance with Item 216, “Proof Rolling.” Correct soft spots as directed. Correction of soft spots in the subgrade or base courses will be at the Contractor’s expense.

Contractor is to place an underseal and/or pavement course as indicated on plans within 14 calendar days of initial prime coat application. Otherwise, reapply prime coat as directed by the Engineer. Reapplication of the prime coat will be at the Contractor’s expense.

Allow the mixture to mellow for a minimum period of 48 hours for all types of lime utilized. Additional time might be required due to sulfate and organic testing requirements, as directed by Engineer.

ITEM 275: Cement Treatment (Road-Mixed)

The Contractor's attention is called to the fact that certain existing and/or proposed structures are within the limits of the cement-treated Subgrade. Unless otherwise directed by the Engineer, these structures shall be installed before the final rolling of this Subgrade. It shall be the Contractor's responsibility to perform the proper cement treating operation without damage to these structures.

The percent of density as determined by Tex-120-E for the new and salvage Flexible Base shall be a minimum of 98% for all courses.

Proof roll all constructed cement treated subgrade and bases courses in accordance with Item 216, "Proof Rolling." Correct soft spots as directed. Correction of soft spots in the subgrade or base courses will be at the Contractor's expense.

In order to avoid damaging the Geogrid, add cement to the first lift of new base and/or salvage base at a central mixing site or mixing plant away from the construction area. The Engineer shall approve the site or plant location and method of mixing.

Contractor is to place an underseal and/or pavement course as indicated on plans within 14 calendar days of initial prime coat application. Otherwise, reapply prime coat as directed by the Engineer. Reapplication of the prime coat will be at the Contractor's expense.

ITEM 3096: Asphalts, Oils, and Emulsions

Temporary ramps/detours and driveways may use Performance Grade Binder 64-22.

ITEM 301: Asphalt Antistripping Agents

Hydrated Lime shall be added as an Antistripping additive between the rates of 1% minimum and 2.0% maximum by weight for Items 292, 3076, 3077, and 3080. If the Hamburg Wheel Test cannot be met within these limits, Liquid Antistripping agents as approved by the Engineer may be used in conjunction with lime for Items 3076, 3077, and 3080.

ITEM 302: Aggregates for Surface Treatments

Loc.	County	CSJ	Highway	Binder	SAC
1	Cameron	0921-06-302	Teege Rd.	SPG 79-13	B
2	Hidalgo	0921-02-387	Doolittle Rd.	SPG 79-13	B

The aggregate for the surface treatment shall be surface dry before application unless otherwise directed by the Engineer.

ITEM 310: Prime Coat

The Contractor shall exercise diligence in the application of asphalt by the use of flagging and rolling procedures to keep from spraying or splattering the traveling public with asphaltic material.

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Do not apply subsequent courses over the initial prime coat no earlier than 12 hours after the prime coat was applied, unless otherwise authorized or directed by the Engineer.

ITEM 316: Seal Coat

In addition to cleaning by brooming of paved surfaces to be sealed as required by this Item, blading may also be necessary to clean dirt and grass from edges of the pavement and/or turnout areas. The cost of this blading will not be paid for directly but will be considered subsidiary to the various bid Items of the project.

The one or two-course surface treatment shall be in place for a sufficient period of time in the opinion of the Engineer, for the surface treatment to properly dry and cure before placing the Asphaltic Concrete Pavement.

Traffic will not be permitted on the surface treatment unless authorized by the Engineer.

When emulsified asphalt is used, do not apply subsequent courses over the surface treatment any earlier than the day after the surface treatment was applied, unless otherwise authorized or directed by the Engineer.

Contractor is to place ACP layer(s) as indicated on plans within 14-calendar days of seal coat placement unless otherwise directed by the Engineer.

ITEM 3076: Dense-Graded Hot-Mix Asphalt

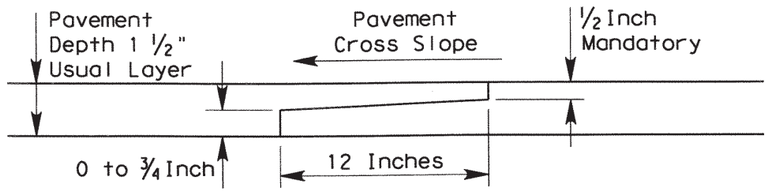
The Contractor shall exercise diligence in the application of "Bonding Course" by the use of flagging and rolling procedures to keep from spraying or splattering the traveling public with asphaltic material.

Blading (not to exceed more than 3-ft from the pavement edge) may also be necessary to clean dirt and grass from pavement edges and turnout areas as work under this bid Item. The cost of this blading will not be paid for directly but shall be considered subsidiary to this bid Item.

The Contractor shall exercise diligence during milling operations in order to avoid contamination.

Level-up will be placed before the surface course. An asphaltic concrete spreading and finishing machine and/or motor graders; when approved by the Engineer may be used to place the ACP level-up.

All unconfined longitudinal joints shall be constructed with a joint maker providing a maximum ½-inch vertical edge and a minimum 6:1 edge taper or as approved by the Engineer. The Engineer may waive this requirement when no impacts to the traveling public are foreseen.



NOTCHED WEDGE JOINT

The engineer may allow for variances to the dimensions shown.

The Hamburg Wheel Test requirement for PG 64 binder will be 5,000 passes @ 0.5-inch rut depth.

Design mixture using a Superpave Gyratory Compactor.

Public and private driveways need to have a smooth vertical transition between the edge of pavement and the existing driveways. The Contractor is to add a vertical taper if needed which will be subsidiary to Item 3076.

The use of RAP and RAS (recycled asphalt shingles) will not be allowed as part of the mix design for the final riding surface.

Use a release agent from the Department's MPL to clean and to coat the inside of truck beds for hauling equipment. Hauling equipment shall be cleaned prior to hauling material to job site. Submit a copy of the bill of lading to the Engineer as part of the QCP. Ensure the pavement is free from any spillage of hydraulic oil or diesel from construction equipment. The Department may reject trucks that contain any foreign material and suspend production if the pavement is contaminated by any pollutants mentioned above.

When SAC B aggregate is used, material properties are required to be 10 or less on the magnesium sulfate soundness test and 20 or less on the Micro-Deval test.

ITEM 400: Excavation and Backfill for Structures

If the Contractor elects to cut pavement (existing/detour) for structural work beyond that required by the construction phasing shown in the plans and approved by the Engineer, it shall be

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restored at his expense and backfilled to its original condition or better in accordance with Item 400.

ITEM 416: Drilled Shaft Foundations

Payment for furnishing and installing anchor bolts mounted in drill shafts will be included in the unit price bid for the various diameter drill shafts.

The Contractor shall coordinate with the utility companies to verify utility locations before drilling foundations.

The Contractor shall form, or provide a smooth finish, the portions of drilled shaft that project above the ground line. Place a ¾ inch chamfer on the top edge of each pole foundation. This work will not be paid for directly but will be considered subsidiary to this bid Item.

All drilled shaft foundations will be based on the lengths shown on the plans or those established in writing. Adequate calculations for measurements of foundations have been made in accordance with Article 9.1. of the Standard Specifications. Increases or decreases in the quantities required by change in design will be measured as specified and the revised quantities will be the basis for payment.

In the presence of excess ground water and/or unstable conditions in sub-grade soils prevents excavation to the line and depths indicated on the plans for "Drilled Shaft Foundation", other proposed methods of foundation installation such as casing, etc. shall be submitted for review and approved by the Engineer.

ITEM 420: Concrete Substructures

Pay bent concrete as plan quantity.

ITEM 421: Hydraulic Cement Concrete

Provide equipment at the batch plant for determining the free moisture and/or absorption of aggregates in accordance with applicable TXDOT Test.

Provide the following items for concrete batch inspection in accordance with specifications outlined in DMS-10101, "Computer Equipment":

(1) One Desktop Microcomputer or One Laptop Microcomputer
(2) One Integrated Printer/Scanner/Copier/Fax Unit

(3) Contractor-Furnished Software
(4) Hardware

Submit to the Engineer for approval the project locations for all Portland Cement concrete washout areas prior to starting any concrete work.

Fiber Reinforced Concrete is not permitted.

ITEM 427: Surface Finishes for Concrete

Provide surface finishes for concrete as follows:

(1) Bridge overpass and underpass structures – surface area I, opaque sealer coating (color to be determined by the Engineer).

(2) Bridge waterway crossings and bridge class box culvert structures – surface area II, opaque sealer coating (color to be determined by the Engineer).

Concrete traffic barrier/railing (roadway and bridge) and retaining wall coping - opaque sealer coating (color to be determined by the Engineer) to all exposed surfaces.

ITEM 432: Riprap

Provide Class "A" concrete minimum for riprap aprons placed around all box culvert and pipe safety end treatments. Provide ¼-inch thick dummy joints at least every 15-ft for riprap aprons placed around box and pipe culverts.

Do not use fiber reinforced concrete RIPRAP on side slopes equal to or steeper than 6:1 unless approved by the Engineer.

ITEM 462: Concrete Box Culverts and Drains

Provide joints in pre-cast concrete box culverts using any of the methods specified in Item 464, except mortar joints.

Provide pre-cast concrete boxes to expedite traffic handling unless otherwise shown on the plans.

Provide the Area Engineer with the casting schedule of all pre-cast concrete boxes prior to beginning any fabrication.

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ITEM 464: Reinforced Concrete Pipe

Use tongue and groove pipe where the RCP extends into the lime treated subgrade. The 4-foot depth restriction for heavy equipment passage over pipe structures is voided. The Contractor will be responsible for any construction damage to these facilities.

Do not use mortar joints.

All reinforced concrete pipe shall include rubber gaskets unless shown otherwise on the plans or directed by the Engineer.

ITEM 466: Headwalls and Wingwalls

Do not use pre-cast headwalls/wingwalls.

ITEM 467: Safety End Treatment

All Type II SET's shall have riprap, Class "A" minimum, aprons as shown on the plans. The Contractor may submit an alternate precast SET design for approval by the Engineer.

ITEM 502: Barricades, Signs, and Traffic Handling

Replace/relocate all regulatory signs removed due to construction operations with the same sign on fixed support(s) immediately upon its removal. First obtain Project Engineer approval before removing any regulatory roadway sign. Required flaggers are to be available to direct traffic during sign intermediate down time.

Relocate any Directional Sign Assemblies removed during construction operations immediately upon their removal.

These signs shall be relocated to a location in accordance with the Latest Version of the "Texas Manual on Uniform Traffic Control Devices". In no case will a sign be removed without a replacement sign and support(s) being readily available and a location established. Removal and relocation of these signs required for traffic control will not be paid for directly but shall be considered subsidiary to Item 502.

From the beginning to the end of the project, all traffic control devices need to be in acceptable condition as per the Texas Quality Guidelines for Work Zone Traffic Control Devices.

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 "Safety Contingency" is not intended to be used in lieu of bid Items established by the contract.

Remove and dispose of all litter, debris, objectionable material, excess materials that accumulate at the base of all traffic control devices as directed by the Engineer.

ITEM 504: Field Office and Laboratory

Furnish (1) Field Office (Type C).

The Contractor will furnish a Type D Structure (Asphalt Mix Laboratory) modified by the following.

Laboratory room:

The other room of this building will be used as a laboratory and will include access to a bathroom facility from the interior. The laboratory and bathroom facility will have the walls, ceiling and floor insulated such that the air temperature can be maintained at 76 degrees Fahrenheit at all times.

Furnish for the Department's use in the asphalt laboratory one (1) desktop computer.

ITEM 506: Temporary Erosion, Sedimentation, and Environmental Controls

Before starting each phase of construction, review with the Engineer the SW3P used for temporary erosion control as outlined on the plans. Before construction, place the temporary erosion and sedimentation control features as shown on the SW3P. Location of Construction Exits are to be approved by the Engineer. After completing earthwork operations, restore and reseed the disturbed areas in accordance with the Department's specifications for permanent or temporary erosion control. Before starting grading operations and during the project duration, place the temporary or permanent erosion control measures to prevent sediment from leaving the right of way.

The Contractor Force Account "Erosion Control Maintenance" that has been established for this project is intended to be utilized for work zone Best Management Practice (BMP) maintenance, to improve the effectiveness of the Environmental Controls that may need maintenance attention and/or require replacement while the project is still under the construction stage. These procedures will be mutually agreed upon by the Engineer and the Contractor's Responsible Person based on

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weekly or more frequent BMP management reviews on the project. The "Erosion Control Maintenance" is not intended to be used in lieu of bid Items established by the contract.

ITEM 529: Concrete Curb, Gutter, and Combined Curb and Gutter

Before final acceptance of the project, remove discoloration caused by tire marks, mud, asphalt, paint, or other similar material by any method satisfactory to the Engineer to achieve a uniform color and texture of the finished surface exposed to view.

Curb attached to the MBGF thrie-beam transition section will be subsidiary to the MBGF transition.

ITEM 530: Intersections, Driveways, and Turnouts

Prime coat shall meet the requirements of Item 310.

Public and private driveways need to have a smooth vertical transition tie-in between the proposed driveway and the existing driveway. The Contractor is to add a vertical taper if needed which will be subsidiary to Item 530.

ITEM 531: Sidewalks

Construct ¼-inch thick score joints at a maximum 6-foot spacing and expansion joints at a maximum 18 foot spacing. Construct a joint in the center of the sidewalk if it is over 15-feet wide. For steel reinforcement, use 6x6-inch spacing with #3 bars or 6x6 – D6 welded wire fabric.

ITEM 540: Metal Beam Guard Fence

The optional terminal anchor post with the terminal connector will be required as shown on the Metal Beam Guard Fence Standard.

Galvanize the rail elements supplied for this project using a Type II Zinc Coating.

ITEM 542: Removing Metal Beam Guard Fence

Dispose all metal beam guard fence materials unless shown otherwise in the plans.

ITEM 544: Guardrail End Treatments

Label “end treatment type” on backside of unit at time of installation.

ITEM 644: Small Roadside Sign Assemblies

All signs shall be installed as shown in the plans and in accordance with the current edition of the "Texas Manual on Uniform Traffic Control Devices" and the “Sign Crew Field Book” (SCFB).

All signs shall be erected according to the locations shown on the signing layout sheets except that a sign may be shifted in order to secure a more desirable location. All sign locations will be staked as shown in the plans and as approved. It is the intent of the plans to erect all roadside traffic signs with the sign edge a minimum of 6 feet from the edge of the shoulder, or if none, 12 feet from the edge of the travel lane. In curb and gutter sections, the sign edge shall be a minimum of 2 feet from the face of the curb.

For this project, aluminum type sign blanks as provided for under Item 636 will be required for all proposed signing installed under Item 644. Aluminum sign blanks less than 7.5 square feet shall be 0.08-inch-thick, sign blanks 7.5 to 15 square feet shall be 0.100-inch-thick and sign blanks greater than 15 square feet shall be 0.125 inch thick.

All excess excavation shall be spread uniformly inside the right of way as directed and shall be included in the price of these Items.

Sign types which design details are not shown on the plans shall conform with the latest edition of the Department's "Standard Highway Sign Design for Texas" Manual.

Signs shown to be removed shall include the complete sign installation and separate the sign post at the concrete foundation. The concrete foundation shall be disposed in accordance with this bid Item. Except for concrete foundations, all removed sign panels, sign posts, and hardware shall remain then property of the Department. All removed sign installations shall be completely disassembled. All salvageable sections of sign panels shall be recycled by TxDOT. The removed sign material will be required to be hauled to the maintenance yard closest to the project. No signs shall be removed without prior approval.

Existing signs shown to be removed and relocated within this project shall first be identified in the field before they are removed and relocated to their new installation position as determined in the plans. The complete sign assembly shall be removed and the sign with post shall be separated at the concrete foundation. The concrete foundation shall be disposed of in accordance with this bid Item. No sign shall be removed without prior approval.

Project Number: **Sheet 7H**

County: Cameron, Etc. **Control:** 0921-06-302, Etc.

Highway: Teege Rd., Etc.

All excess excavation shall be spread uniformly inside the right of way as directed and shall be included in the price of this Item.

ITEM 658: Delineator and Object Marker Assemblies

Delineator assemblies shall be installed 8 feet from the edge of the shoulder unless restricted by some obstruction, in which case, the delineator assembly shall be placed between 2 and 8 feet from the edge of the shoulder.

Bi-directional object markers shall be in accordance with the D&OM standard sheets. The Contractor is directed to the standards when instructed where and how to install the object markers.

ITEMS 662 and 666: Work Zone Pavement Markings and Retroreflectorized Pavement Markings

All permanent pavement markings and work zone pavement markings for this project under these Items shall be 0.100 inches (100 mil) thick thermoplastic.

Any permanent pavement markings or non-removal work zone pavement markings lacking reflectivity in accordance with the requirements of Tex 828-B, or that fail to meet minimum retro reflectivity requirements for longitudinal pavement markings when required, will be addressed per the requirements of the specification. The roadway will be re-striped at no additional compensation.

Pavement surface preparation for markings and markers will not be paid for directly but shall be considered subsidiary to Item 666.

Prior to any striping operations, an on-site coordination meeting between all the parties involved will be required to review striping details and requirements to ensure quality work.

The beads used on this project shall meet the requirements of Departmental Materials Specification DMS-8290, Glass Traffic Beads Texas Type II & III. Use a 50% Type II/ 50% Type III mix utilizing a double drop system with Type III beads dropped first.

ITEM 5001: Geogrid Base Reinforcement

Provide a construction plan to the Engineer detailing how the base will be lime treated without damaging the Geogrid Base Reinforcement placed on top of the subgrade.

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0921-06-302 **DISTRICT** Pharr **COUNTY** Cameron, Hidalgo
HIGHWAY CR 2501, TEEGE

			CONTROL SECTION JOB	**0921-02-387**		**0921-06-302**		TOTAL EST.	TOTAL FINAL
			PROJECT ID	**A00123073**		**A00123993**			
			COUNTY	**Hidalgo**		**Cameron**			
			HIGHWAY	**CR 2501**		**TEEGE**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL		
	100-6002	PREPARING ROW	STA	4.550		2.200		6.750	
	104-6001	REMOVING CONC (PAV)	SY			61.000		61.000	
	104-6009	REMOVING CONC (RIPRAP)	SY			17.000		17.000	
	104-6022	REMOVING CONC (CURB AND GUTTER)	LF			167.000		167.000	
	104-6067	REMOVING CONC (SAWCUT)	LF			196.000		196.000	
	105-6043	REMOVING STAB BASE & ASPH PAV (0-6")	SY	872.000		124.000		996.000	
	110-6001	EXCAVATION (ROADWAY)	CY	102.000		50.000		152.000	
	110-6002	EXCAVATION (CHANNEL)	CY	60.000		30.000		90.000	
	132-6006	EMBANKMENT (FINAL)(DENS CONT)(TY C)	CY	418.000		200.000		618.000	
	160-6003	FURNISHING AND PLACING TOPSOIL (4")	SY	1,250.000		303.000		1,553.000	
	164-6023	CELL FBR MLCH SEED(PERM)(RURAL)(CLAY)	SY	1,250.000		303.000		1,553.000	
	164-6029	CELL FBR MLCH SEED(TEMP)(WARM)	SY			303.000		303.000	
	168-6001	VEGETATIVE WATERING	MG	50.000		8.000		58.000	
	169-6005	SOIL RETENTION BLANKETS (CL 2) (TY E)	SY	120.000				120.000	
	247-6060	FL BS (CMP IN PLC)(TY E GR 4)(FNAL POS)	CY	554.000		116.000		670.000	
	260-6043	LIME (HYD, COM OR QK)(SLURRY)	TON			4.000		4.000	
	260-6079	LIME TRT (SUBGRADE)(6")	SY			412.000		412.000	
	275-6001	CEMENT	TON	14.000		3.000		17.000	
	275-6046	CEMENT TREAT (NEW BASE)(11")	SY	1,734.000		380.000		2,114.000	
	310-6009	PRIME COAT (MC-30)	GAL	347.000		158.000		505.000	
	316-6005	ASPH (TIER II)	GAL	347.000		137.000		484.000	
	316-6462	AGGR (TY-PD GR-4P)(SAC-B)	CY	14.000		2.000		16.000	
	360-6001	CONC PVMT (CONT REINF - CRCP) (7")	SY			372.000		372.000	
	400-6005	CEM STABIL BKFL	CY	52.000		100.000		152.000	
	416-6002	DRILL SHAFT (24 IN)	LF	882.000				882.000	
	420-6013	CL C CONC (ABUT)	CY	39.000				39.000	
	420-6029	CL C CONC (CAP)	CY	27.000				27.000	
	420-6037	CL C CONC (COLUMN)	CY	12.600				12.600	
	420-6066	CL C CONC (RAIL FOUNDATION)	CY			5.000		5.000	
	422-6007	REINF CONC SLAB (SLAB BEAM)	SF	6,720.000				6,720.000	
	422-6013	BRIDGE SIDEWALK	SF	980.000				980.000	
	425-6011	PRESTR CONC SLAB BEAM (4SB15)	LF	415.310				415.310	
	425-6012	PRESTR CONC SLAB BEAM (5SB15)	LF	969.050				969.050	
	432-6002	RIPRAP (CONC)(5 IN)	CY			65.000		65.000	
	432-6031	RIPRAP (STONE PROTECTION)(12 IN)	CY	148.000				148.000	
	432-6046	RIPRAP (MOW STRIP)(5 IN)	CY	3.000		6.000		9.000	
	442-6007	STR STEEL (MISC NON - BRIDGE)	LB	186.000				186.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0921-06-302 **DISTRICT** Pharr **COUNTY** Cameron, Hidalgo
HIGHWAY CR 2501, TEEGE

			CONTROL SECTION JOB		**0921-02-387**		**0921-06-302**		TOTAL EST.	TOTAL FINAL
			PROJECT ID		**A00123073**		**A00123993**			
			COUNTY		**Hidalgo**		**Cameron**			
			HIGHWAY		**CR 2501**		**TEEGE**			
ALT	**BID CODE**	**DESCRIPTION**		**UNIT**	EST.	FINAL	EST.	FINAL		
	450-6006	RAIL (TY T223)		LF			32.000		32.000	
	450-6030	RAIL (TY C221)		LF	154.000				154.000	
	450-6032	RAIL (TY C223)		LF			56.000		56.000	
	450-6054	RAIL (TY SSTR) (W/DRAIN SLOTS)		LF	154.000				154.000	
	454-6020	SEALED EXPANSION JOINT (4 IN) (SEJ - B)		LF	94.000				94.000	
	462-6028	CONC BOX CULV (9 FT X 9 FT)		LF			96.000		96.000	
	464-6002	RC PIPE (CL III)(15 IN)		LF	93.000				93.000	
	464-6003	RC PIPE (CL III)(18 IN)		LF			152.000		152.000	
	464-6005	RC PIPE (CL III)(24 IN)		LF	56.000				56.000	
	464-6007	RC PIPE (CL III)(30 IN)		LF			16.000		16.000	
	466-6130	HEADWALL (CH - PW - S) (DIA= 24 IN)		EA	4.000				4.000	
	466-6199	WINGWALL (SW - 0) (HW=11 FT)		EA			2.000		2.000	
	467-6337	SET (TY II) (15 IN) (RCP) (3: 1) (P)		EA	4.000				4.000	
	467-6363	SET (TY II) (18 IN) (RCP) (6: 1) (P)		EA			2.000		2.000	
	496-6006	REMOV STR (HEADWALL)		EA	6.000				6.000	
	496-6007	REMOV STR (PIPE)		LF	304.000		126.000		430.000	
	496-6009	REMOV STR (BRIDGE 0 - 99 FT LENGTH)		EA			1.000		1.000	
	496-6010	REMOV STR (BRIDGE 100 - 499 FT LENGTH)		EA	1.000				1.000	
	500-6001	MOBILIZATION		LS			1.000		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING		MO	7.000		6.000		13.000	
	506-6020	CONSTRUCTION EXITS (INSTALL) (TY 1)		SY			78.000		78.000	
	506-6024	CONSTRUCTION EXITS (REMOVE)		SY			78.000		78.000	
	506-6038	TEMP SEDMT CONT FENCE (INSTALL)		LF	1,000.000		205.000		1,205.000	
	506-6039	TEMP SEDMT CONT FENCE (REMOVE)		LF	1,000.000		205.000		1,205.000	
	506-6041	BIODEG EROSN CONT LOGS (INSTL) (12")		LF			145.000		145.000	
	506-6043	BIODEG EROSN CONT LOGS (REMOVE)		LF			145.000		145.000	
	529-6002	CONC CURB (TY II)		LF	210.000		152.000		362.000	
	529-6008	CONC CURB & GUTTER (TY II)		LF			51.000		51.000	
	530-6005	DRIVEWAYS (ACP)		SY	253.000				253.000	
	531-6003	CONC SIDEWALKS (6")		SY	255.000		47.000		302.000	
	531-6013	CURB RAMPS (TY 10)		EA	2.000		2.000		4.000	
	540-6002	MTL W-BEAM GD FEN (STEEL POST)		LF			50.000		50.000	
	540-6007	MTL BEAM GD FEN TRANS (TL2)		EA			1.000		1.000	
	542-6001	REMOVE METAL BEAM GUARD FENCE		LF	202.000		25.000		227.000	
	544-6003	GUARDRAIL END TREATMENT (REMOVE)		EA			1.000		1.000	
	545-6006	CRASH CUSH ATTEN (INSTL)(L)(N)(TL2)		EA	4.000		2.000		6.000	
	550-6015	REMOVE AND INSTALL EXISTING GATE		EA	2.000				2.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0921-06-302 **DISTRICT** Pharr **COUNTY** Cameron, Hidalgo
HIGHWAY CR 2501, TEEGE

			CONTROL SECTION JOB	**0921-02-387**		**0921-06-302**		TOTAL EST.	TOTAL FINAL
			PROJECT ID	**A00123073**		**A00123993**			
			COUNTY	**Hidalgo**		**Cameron**			
			HIGHWAY	**CR 2501**		**TEEGE**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL		
	644-6027	IN SM RD SN SUP&AM TYS80(1)SA(P)	EA	2.000		2.000		4.000	
	644-6030	IN SM RD SN SUP&AM TYS80(1)SA(T)	EA	1.000		1.000		2.000	
	644-6076	REMOVE SM RD SN SUP&AM	EA	3.000		3.000		6.000	
	658-6014	INSTL DEL ASSM (D-SW)SZ (BRF)CTB (BI)	EA	6.000		5.000		11.000	
	658-6062	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2(BI)	EA			2.000		2.000	
	658-6092	INSTL DEL ASSM (D-DW)SZ 1(WFLX)GND	EA	12.000				12.000	
	658-6099	INSTL OM ASSM (OM-2Z)(WFLX)GND	EA	2.000				2.000	
	666-6006	REFL PAV MRK TY I (W)4"(DOT)(100MIL)	LF			24.000		24.000	
	666-6042	REFL PAV MRK TY I (W)12"(SLD)(100MIL)	LF	115.000				115.000	
	666-6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF			121.000		121.000	
	666-6057	REFL PAV MRK TY I(W)(DBL ARROW)(100MIL)	EA			2.000		2.000	
	666-6303	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	LF	910.000		355.000		1,265.000	
	666-6312	RE PM W/RET REQ TY I (Y)4"(BRK)(100MIL)	LF	115.000				115.000	
	666-6315	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF			240.000		240.000	
	672-6009	REFL PAV MRKR TY II-A-A	EA	6.000		6.000		12.000	
	3076-6049	D-GR HMA TY-D SAC-A PG76-22	TON	215.000		63.000		278.000	
	5001-6002	GEOGRID BASE REINFORCEMENT (TY II)	SY	1,734.000		380.000		2,114.000	
	6001-6001	PORTABLE CHANGEABLE MESSAGE SIGN	DAY	28.000		28.000		56.000	
	18	EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS			1.000		1.000	
		SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS			1.000		1.000	

SUMMARY OF ROADWAY AND DRAINAGE ITEMS																			
LOCATION	100 6002	110 6001	110 6002	132 6006	247 6060	260 6043	260 6079	275 6001	275 6046	310 6009	316 6005	316 6462	3076 6049	360 6001	400 6005	420 6066	432 6002	432 6046	450 6006	450 6032
	PREPARING ROW	EXCAVATION (ROADWAY)	EXCAVATION (CHANNEL)	EMBANKMENT (FINAL) (DENS CONT) (TY C)	FL BS (CMP IN PLC) (TY E GR 4) (FNAL POS)	LIME (HYD, COM OR QK) (SLURRY)	LIME TRT (SUBGRADE) (6")	CEMENT	CEMENT TREAT (NEW BASE) (11")	PRIME COAT (MC-30)	ASPH (TIER II)	AGGR (TY-PD GR-4P) (SAC-B)	D-GR HMA(SQ) TY-D SAC-A PG76-22	CONC PVMT (CONT REINF - CRCP) (7")	CEM STABIL BKFL	CL C CONC (RAIL FOUNDATION)	RIPRAP (CONC) (5 IN)	RIPRAP (MOW STRIP) (5 IN)	RAIL (TY T223)	RAIL (TY C223)
	STA	CY	CY	CY	CY	TON	SY	TON	SY	GAL	GAL	CY	TON	SY	CY	CY	CY	CY	LF	LF
TEEGE ROAD CSJ 0921-06-302	2.20	50	30	200	116	4	412	3	380	158	137	2	63	372	100	5	65	6	32	56
DOOLITTLE ROAD CSJ: 0921-02-387	4.55	102	60	418	554			14	1,734	347	347	14	215					3		
PROJECT TOTALS	6.75	152	90	618	670	4	412	17	2,114	505	484	16	278	372	100	5	65	9	32	56

SUMMARY OF ROADWAY AND DRAINAGE ITEMS																			
LOCATION	462 6028	464 6002	464 6003	464 6005	464 6007	466 6130	466 6199	467 6337	467 6363	529 6002	529 6008	530 6005	531 6003	531 6013	540 6002	540 6007	545 6006	550 6015	5001 6002
	CONC BOX CULV (9 FT X 9 FT)	RC PIPE (CL III) (15 IN)	RC PIPE (CL III) (18 IN)	RC PIPE (CL III) (24 IN)	RC PIPE (CL III) (30 IN)	HEADWALL (CH-PW-S) (DIA= 24 IN)	WINGWALL (SW - 0) (HW=11 FT)	SET (TY II) (15 IN) (RCP) (3: 1)(P)	SET (TY II) (18 IN) (RCP) (6:1)(P)	CONC CURB (TY II)	CONC CURB & GUTTER (TY II)	DRIVEWAYS (ACP)	CONC SIDEWALKS (6")	CURB RAMPS (TY 10)	MTL W-BEAM GD FEN (STEEL POST)	MTL BEAM GD FEN TRANS (TL2)	CRASH CUSH ATTEN (INSTL) (L)(N)(TL2)	REMOVE AND INSTALL EXISTING GATE	GEOGRID BASE REINFORCEMENT (TY II)
	LF	LF	LF	LF	LF	EA	EA	EA	EA	LF	LF	SY	SY	EA	LF	EA	EA	EA	SY
TEEGE ROAD CSJ 0921-06-302	96		152		16		2		2	152	51		47	2	50	1	2		380
DOOLITTLE ROAD CSJ: 0921-02-387		93		56		4		4		210		253	255	2			4	2	1,734
PROJECT TOTALS	96	93	152	56	16	4	2	4	2	362	51	253	302	4	50	1	6	2	2,114

SUMMARY OF REMOVAL ITEMS											
LOCATION	104 6001	104 6009	104 6022	104 6067	105 6043	496 6006	496 6007	496 6009	496 6010	542 6001	544 6003
	REMOVING CONC (PAV)	REMOVING CONC (RIPRAP)	REMOVING CONC (CURB AND GUTTER)	REMOVING CONC (SAWCUT)	REMOVING STAB BASE & ASPH PAV (0-6")	REMOV STR (HEADWALL)	REMOV STR (PIPE)	REMOV STR (BRIDGE 0 - 99 FT LENGTH)	REMOV STR (BRIDGE 100 - 499 FT LENGTH)	REMOVE METAL BEAM GUARD FENCE	GUARDRAIL END TREATMENT (REMOVE)
	SY	SY	LF	LF	SY	EA	LF	EA	EA	LF	EA
TEEGE ROAD CSJ 0921-06-302	61	17	167	196	124		126	1		25	1
DOOLITTLE ROAD CSJ: 0921-02-387					872	6	304		1	202	
PROJECT TOTALS	61	17	167	196	996	6	430	1	1	227	1

SUMMARY OF TCP ITEMS		
LOCATION	502 6001	6001 6001
	BARRICADES, SIGNS AND TRAFFIC HANDLING	PORTABLE CHANGEABLE MESSAGE SIGN
	MO	DAY
TEEGE ROAD CSJ 0921-06-302	6	28
DOOLITTLE ROAD CSJ: 0921-02-387	7	28
PROJECT TOTALS	13	56

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL RD,
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

SUMMARY OF QUANTITIES

SHEET 1 OF 3

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
RWF	6	SEE TITLE SHEET	TEEGE, ETC
DRAWN RWF	STATE	DISTRICT	COUNTY
CHECK SPC	TEXAS	PHARR	CAMERON, ETC
CHECK SPC	CONTROL	SECTION	JOB
	0921	06	302, ETC

SHEET NO. 9

PENTABLE: CSJ 092x02-33x (Charles Green Rd).tbl
SCALE: 1:0
PLOT DRIVER: TXDOT_PDF_BW.WO RASTERS).plt
FILE NAME: ...\Summaries\CHGRD-BMCD-SUM01.dgn
USER: rwfritz
TIME: 3:49:58 PM
DATE: 1/31/2023

SUMMARY OF SIGNING ITEMS							
LOCATION	644 6027	644 6030	644 6076	658 6014	658 6062	658 6092	658 6099
	IN SM RD SN SUP&AM TYS80(1) SA(P)	IN SM RD SN SUP&AM TYS80(1) SA(T)	REMOVE SM RD SN SUP&AM	INSTL DEL ASSM (D-SW)SZ (BRF)CTB (BI)	INSTL DEL ASSM (D-SW)SZ 1(BRF) GF2(BI)	INSTL DEL ASSM (D-DW)SZ 1(WFLX) GND	INSTL OM ASSM (OM-2Z) (WFLX) GND
	EA	EA	EA	EA	EA	EA	EA
TEEGE ROAD CSJ 0921-06-302	2	1	3	5	2		
DOOLITTLE ROAD CSJ: 0921-02-387	2	1	3	6		12	2
PROJECT TOTALS	4	2	6	11	2	12	2

SUMMARY OF PAVEMENT MARKING ITEMS								
LOCATION	666 6006	666 6042	666 6048	666 6057	666 6303	666 6312	666 6315	672 6009
	REFL PAV MRK TY I (W)4"(DOT) (100MIL)	REFL PAV MRK TY I (W)12"(SLD) (100MIL)	REFL PAV MRK TY I (W)24"(SLD) (100MIL)	REFL PAV MRK TY I (W) (DBL ARROW) (100MIL)	RE PM W/RET REQ TY I (W)4"(SLD) (100MIL)	RE PM W/RET REQ TY I (Y)4"(BRK) (100MIL)	RE PM W/RET REQ TY I (Y)4"(SLD) (100MIL)	REFL PAV MRKR TY II-A-A
	LF	LF	LF	EA	LF	LF	LF	EA
TEEGE ROAD CSJ 0921-06-302	24		121	2	355		240	6
DOOLITTLE ROAD CSJ: 0921-02-387		115			910	115		6
PROJECT TOTALS	24	115	121	2	1,265	115	240	12

SUMMARY OF EROSION CONTROL ITEMS											
LOCATION	160 6003	164 6023	164 6029	168 6001	169 6005	506 6020	506 6024	506 6038	506 6039	506 6041	506 6043
	FURNISHING AND PLACING TOPSOIL (4")	CELL FBR MLCH SEED (PERM) (RURAL) (CLAY)	CELL FBR MLCH SEED (TEMP) (WARM)	VEGETATIVE WATERING	SOIL RETENTION BLANKETS (CL 2) (TY E)	CONSTRUCTION EXITS (INSTALL) (TY 1)	CONSTRUCTION EXITS (REMOVE)	TEMP SEDMT CONT FENCE (INSTALL)	TEMP SEDMT CONT FENCE (REMOVE)	BIODEG EROSN CONT LOGS (INSTL) (12")	BIODEG EROSN CONT LOGS (REMOVE)
	SY	SY	SY	MG	SY	SY	SY	LF	LF	LF	LF
TEEGE ROAD CSJ 0921-06-302	303	303	303	8		78	78	205	205	145	145
DOOLITTLE ROAD CSJ: 0921-02-387	1,250	1,250		50	120			1,000	1,000		
PROJECT TOTALS	1,553	1,553	303	58.0	120	78	78	1,205	1,205	145	145

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL RD,
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

SUMMARY OF QUANTITIES

SHEET 2 OF 3

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
RWF	6	SEE TITLE SHEET	TEEGE, ETC
DRAWN RWF	STATE	DISTRICT	COUNTY
CHECK SPC	TEXAS	PHARR	CAMERON, ETC
CHECK SPC	CONTROL	SECTION	JOB
	0921	06	302, ETC

SHEET NO. 10

PENTABLE: CSJ 0921-02-331(Charles Green Rd).tbl
SCALE: 1:0
PLOT DRIVER: TXDOT_PDF_BWNO RASTERS1.plt
DATE: 12/7/2022
TIME: 9:57:15 AM
USER: rwfritz
FILE NAME: ...\Summaries\CHGRD-BMCD-SUM02.dgn

BRIDGE SUMMARY																		
LOCATION	400 6005	416 6002	420 6013	420 6029	420 6037	422 6007	422 6013	425 6009	425 6010	425 6011	425 6012	432 6002	432 6031	442 6007	450 60C6	450 6030	450 6054	454 6020
	CEM STABIL BKFL	DRILL SHAFT (24 IN)	CL C CONC (ABUT)	CL C CONC (CAP)	CL C CONC (COLUMN)	REINF CONC SLAB (SLAB BEAM)	BRIDGE SIDEWALK	PRESTR CONC SLAB BEAM (4SB12)	PRESTR CONC SLAB BEAM (5SB12)	PRESTR CONC SLAB BEAM (4SB15)	PRESTR CONC SLAB BEAM (5SB15)	RIPRAP (CONC) (5 IN)	RIPRAP (STONE PROTECTION) (12 IN)	STR STEEL (MISC NON BRIDGE)	RAIL (TY T223)	RAIL (TY C221)	RAIL (TY SSTR) (W/DRAIN SLOTS)	SEALED EXPANSION (4 IN) (SEJ-B)
	CY	LF	CY	CY	CY	SF	SF	LF	LF	LF	LF	CY	CY	LB	LF	LF	LF	LF
DOOLITTLE ROAD CSJ: 0921-02-387	52	882	39.0	27.0	12.6	6,720	980	0.00	0.00	415.31	969.05	0	148	186	0.0	154.0	154.0	94
PROJECT TOTALS	**52**	**882**	**39.0**	**27.0**	**12.6**	**6,720**	**980**			**415.31**	**969.05**		**148**	**186**		**154.0**	**154.0**	**94**

SUMMARY OF EARTHWORK QUANTITIES (CSJ 0921-06-302)			
℄ TEEGE ROAD STATION		110	132
		6001	6006
FROM	TO	EXCAVATION (ROADWAY)	EMBANKMENT (FINAL) (DENS CONT) (TY C)
		CY	CY
12+85.00	13+00.00	21	0
13+00.00	13+50.00	79	3
13+50.00	14+00.00	72	221
14+00.00	14+50.00	66	226
14+50.00	15+00.00	23	0
15+00.00	15+05.05	1	0
PROJECT TOTAL		262	450

SUMMARY OF EARTHWORK QUANTITIES (CSJ 0921-06-302)			
℄ BRAZIL ROAD STATION		110	132
		6001	6006
FROM	TO	EXCAVATION (ROADWAY)	EMBANKMENT (FINAL) (DENS CONT) (TY C)
		CY	CY
5+94.54	6+00.00	5	2
6+00.00	6+50.00	38	26
6+50.00	7+00.00	50	175
PROJECT TOTAL		93	203

SUMMARY OF EARTHWORK QUANTITIES (CSJ 0921-02-387)			
℄ DOOLITTLE ROAD STATION		110	132
		6001	6006
FROM	TO	EXCAVATION (ROADWAY)	EMBANKMENT (FINAL) (DENS CONT) (TY C)
		CY	CY
11+00.00	11+50.00	39	9
11+50.00	12+00.00	14	80
12+00.00	12+50.00	0	194
12+50.00	13+00.00	0	0
13+00.00	13+50.00	0	0
13+50.00	14+00.00	0	103
14+00.00	14+50.00	11	5
14+50.00	15+00.00	12	16
15+00.00	15+50.00	26	11
15+50.00	15+55.00	3	1
PROJECT TOTAL		102	418

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL RD,
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

Texas Department of Transportation

SUMMARY OF QUANTITIES

SHEET 3 OF 3

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
RWF	6	SEE TITLE SHEET	TEEGE, ETC
DRAWN RWF	STATE	DISTRICT	COUNTY
CHECK SPC	TEXAS	PHARR	CAMERON, ETC
CHECK SPC	CONTROL	SECTION	JOB
	0921	06	302, ETC

SHEET NO. 11

DATE: 12/7/2022
TIME: 9:57:27 AM
USER: rwfritz
FILE NAME: ...\Summaries\CHGRD-BMCD-SUM03.dgn
PENTABLE: CSJ 092-02-331(Charles Green Rd).tbl
SCALE: 1:0
PLOT DRIVER: TxDOT_PDF_BMtNO RASTERS1.plt

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
		37	NB DOOLITTLE ROAD	12+16.16	TL2	UNI	CONCRETE RIPRAP	5"	TYPE SSTR TRAFFIC RAIL	15.5"	32"		X				X					
		37	NB DOOLITTLE ROAD	13+70.16	TL2	UNI	CONCRETE RIPRAP	5"	TYPE SSTR TRAFFIC RAIL	15.5"	32"		X				X					
		37	SB DOOLITTLE ROAD	12+43.30	TL2	UNI	CONCRETE RIPRAP	5"	TYPE C221 TRAFFIC RAIL	15.5"	32"		X				X					
		37	SB DOOLITTLE ROAD	13+97.30	TL2	UNI	CONCRETE RIPRAP	5"	TYPE C221 TRAFFIC RAIL	15.5"	32"		X				X					
		39	EB TEEGE ROAD	13+72.61	TL2	UNI	CONCRETE RIPRAP	5"	TYPE C223 TRAFFIC RAIL	15.5"	32"		X				X					
		39	WB TEEGE ROAD	14+06.09	TL2	UNI	CONCRETE RIPRAP	5"	TYPE T223 TRAFFIC RAIL	15.5"	32"		X				X					
												TOTALS	6	0	0							

LEGEND:

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

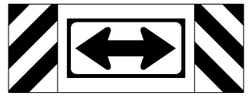
FOR DEFINITIONS SEE THE "CRASH CUSHION CATEGORIZATION CHART.PDF" AT THE DESIGN DIVISION (ROADWAY STANDARDS) WEBSITE. USE QUICK LINKS TO ACCESS ATTENUATORS / CRASH CUSHIONS SECTION.
http://www.dot.state.tx.us/insdtdot/orgchart/cmd/cserve/standard/rdwylse.htm

CRASH CUSHION SUMMARY SHEET

FILE: ccss.dgn	DN:TxDOT	CK:	CK:
© TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	302,ETC	TEEGE,ETC
	DIST	COUNTY	
	PHARR	CAMERON,ETC	
	FEDERAL AID PROJECT		SHEET NO.
	SEE TITLE SHEET		12

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	R1-1 R1-3P		36 X 36 18 X 6	✓ ✓		S80	1	SA	P		
	2	W1-7T		96 X 36	✓		S80	1	SA	T		
	3	R1-1 R1-3P		36 X 36 18 X 6	✓ ✓		S80	1	SA	P		

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

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

http://www.txdot.gov/

NOTE:

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

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		0921	06	302, ETC	TEEGE, ETC
4-16		DIST	COUNTY		SHEET NO.
8-16		PHR	CAMERON, ETC		13

DATE: 12/6/2022 1:32:59 PM
FILE: c:\pw-af\pw-af-prod\grace traweek\d0106930\TEEGE_AF_SPM_SUM_01.dgn

SEAL COAT MATERIAL SELECTION TABLE

Contractor:
1) Provide materials according to the alternates selected for the roadway tier designations specified at various roadway locations shown on the plans;
2) Alternately supply selected binders from a higher tier, but only if the type of material is allowed for the designated tier; payment will only be made for the tier designated for the pavement;
3) Supply the aggregate type, grade and surface aggregate class that is shown to be allowed with the binder used; and
4) Adhere to the application season selected.

☒ Tier 1: Heavy Use (>5,000 ADT) Use only the selected materials.

	Asphalt Rubber (A-R)	Asphalt Cement (A-C)
Type	☐ A-R Only	☐ A-C Only
Asphalt	☐ A-R Ty II ☐ SP 300-016&039 ☐ A-R Ty III	☐ AC-20-5TR ☐ AC-20XP ☐ AC-15P
Aggregate Type	☐ Ty PA ☐ Ty PB ☐ Ty PC ☐ Ty PD ☐ Ty PE ☐ Ty PL	☐ Ty PA ☐ Ty PB ☐ Ty PC ☐ Ty PD ☐ Ty PE ☐ Ty PL
Aggregate Grade	☐ 3S ☐ 3non-lw ☐ 3 lw ☐ 4S ☐ 4P ☐ SP 302-013	☐ 3S ☐ 4S ☐ 5 ☐ 3non-lw ☐ 4P ☐ 5S ☐ 3 lw ☐ SP 302-1
Aggregate SAC	☐ *A* ☐ *B*	☐ *A* ☐ *B*

☒ Tier 2: Moderate Use (500-5,000 ADT)

Use this materials or any selected Tier 1 materials combinations of the allowed types

	Asphalt Cement (A-C)	Asphalt Emulsion
Type	☒ A-C Only	☐ Emulsion Only
Asphalt	☒ AC-10-2TR ☒ AC-5 W/2% SBR ☒ AC-10 ☒ AC-10 W/2% SBR ☐ AC-15P	☐ CHFRS-2P ☐ CRS-2P ☐ HFRS-2P ☐ SP 300-016&039
Aggregate Type	☐ Ty PA ☐ Ty PB ☐ Ty PC ☐ Ty PD ☐ Ty PE ☐ Ty PL ☒ Allow uncoated aggregate	☐ Ty A ☐ Ty B ☐ Ty C ☐ Ty D ☐ Ty E ☐ Ty L
Aggregate Grade	☐ 3S ☐ 4S ☐ 5 ☐ 3non-lw ☒ 4P ☐ 5S ☐ 3 lw ☒ SP 302-008	☐ 3S ☐ 4S ☐ 5S ☐ 3non-lw ☐ 4P ☐ 5 ☐ 3 lw ☐ SP 302-013
Aggregate SAC	☐ *A* ☒ *B*	☐ *A* ☐ *B*

☐ Tier 3: Moderate Use (<500 ADT) Use this materials or any selected Tier 1 or Tier 2 materials combinations of the allowed types

	Asphalt Cement (A-C)	Asphalt Emulsion
Type	☐ A-C Only	☐ Emulsion Only
Asphalt	☐ AC-10-2TR ☐ AC-5 W/2% SBR ☐ AC-20XP ☐ SP 300-016&039 ☐ AC-10 W/2% SBR ☐ AC-15P	☐ CRS-2 ☐ CRS-2H ☐ HFRS-2 ☐ SP 300-016&039
Aggregate Type	☐ Ty PA ☐ Ty PB ☐ Ty PC ☐ Ty PD ☐ Ty PE ☐ Ty PL	☐ Ty A ☐ Ty B ☐ Ty C ☐ Ty D ☐ Ty E ☐ Ty L
Aggregate Grade	☐ 3S ☐ 4S ☐ 5 ☐ 3non-lw ☐ 4P ☐ 5S ☐ 3 lw ☐ SP 302-013	☐ 3S ☐ 4S ☐ ☐ 3non-lw ☐ 4P ☐ 5 ☐ 3 lw ☐ SP 302-013
Aggregate SAC	☐ *A* ☐ *B*	☐ *A* ☐ *B*

Seasonal Alternates: Use these materials for work in cooler conditions as directed.

☒ CRS-2 ☒ HFRS-2 ☐ CRS-1P ☐ RS-1P ☐ RC-250 ☐ MC-800 ☐ AC-12-5-TR ☐ SP 300-016&032

Seal Coat Seasons: Refer to Item 316 for temperature and weather restrictions.

☒ Season 4: CRP, LRD, PHR	Apr 1 to Sept 30

STATE OF TEXAS
RYAN W. FRITZ
112568
LICENSED
PROFESSIONAL ENGINEER
12/07/2022

Texas Department of Transportation
Design Division (Roadway)

SEAL COAT MATERIAL SELECTION TABLE "UNDERSEAL"

FILE: sctable.dgn	DN: TxDOT	CK: AM	DW: BGD	CK:	
©TxDOT June 2011	DIST	FEDERAL AID PROJECT			SHEET
REVISIONS	PHARR	SEE TITLE SHEET			14
September 2020	COUNTY		CONTROL	SECT	JOB	HIGHWAY
	CAMERON, ETC		0921	06	302, ETC	TEEGE, ETC

FILE: sctable-UNDERSEAL11x17.dgn
DATE: 12/7/2022 9:57:48 AM

GENERAL NOTES AND SPECIFICATIONS DATA:

USE A POWER-BROOM WHEN CLEANING THE ROADWAY AS NEEDED.

REMOVE & DISPOSE ALL MATERIAL NOT DEEMED SALVAGEABLE BY THE ENGINEER, UNLESS OTHERWISE SHOWN ON THE PLANS.

ON EXISTING PAVEMENT THAT WILL REMAIN IN PLACE, SAND BLAST OR SURFACE TREAT IN ORDER TO REMOVE EXISTING STRIPING.

DO NOT BLOCK DRAINAGE WHEN HANDLING & STOCKPILING EXCAVATED MATERIAL.

MAINTAIN ACCESS TO DRIVEWAYS AND INTERSECTIONS THROUGH ALL PHASES OF CONSTRUCTION.

MAINTAIN POSITIVE DRAINAGE DURING ALL PHASES OF CONSTRUCTION.

ALWAYS COMPLETE THE PROPOSED DRIVEWAYS DURING THEIR TCP PHASE BEFORE SWITCHING TRAFFIC TO A NEW PHASE UNLESS DIRECTED BY THE ENGINEER.

TRAFFIC CONTROL DEVICES:

AT THE COMMENCEMENT OF THE PROJECT, ALL TRAFFIC CONTROL DEVICES SHALL BE IN ACCEPTABLE CONDITION, AND MAINTAINED THROUGHOUT THE DURATION OF THE PROJECT, AS PER GUIDELINES FOR TEMPORARY TRAFFIC CONTROL DEVICES AND FEATURES.

NOTIFY THE AREA ENGINEER(AE) IN WRITING(E-MAIL IS ACCEPTABLE) ONCE THE TRAFFIC CONTROL PLAN(TCP) AND ALL TRAFFIC CONTROL DEVICES HAVE BEEN INSTALLED AS PER PLANS ON THE PROJECT SO THAT THE DEPARTMENT'S RESPONSIBLE PERSON ACCOMPANIED BY THE CONTRACTOR'S RESPONSIBLE PERSON CAN CONDUCT A NIGHT INSPECTION ON THE SAID TCP AND TRAFFIC CONTROL DEVICES. COMMENCEMENT OF WORK WILL NOT BE AUTHORIZED NOR ALLOWED UNTIL THE AE NOTIFIES THE CONTRACTOR IN WRITING(E-MAIL IS ACCEPTABLE) TO PROCEED WITH THE WORK.

CONTRACTOR SHALL HAVE A SUFFICIENT AMOUNT OF TRAFFIC CONTROL DEVICES IN ACCEPTABLE CONDITION TO REPLACE ANY DAMAGED TRAFFIC CONTROL DEVICE WITHIN 24 HOURS OF NOTIFICATION.

PROVIDE ADDITIONAL SIGNS AND BARRICADES AS NECESSARY TO ADDRESS FIELD CONSTRUCTIBILITY & VISIBILITY. THESE ADDITIONAL SIGNS WILL BE CONSIDERED SUBSIDIARY TO ITEM 502.

REMOVE OR COMPLETELY COVER ALL EXISTING SIGNS WHICH ARE IN CONFLICT WITH THE TRAFFIC CONTROL PLAN.

ADJUST STOP SIGNS AS NEEDED ON INTERSECTING STREETS DURING THE VARIOUS CONSTRUCTION PHASES. DO NOT REMOVE ANY EXISTING STOP SIGNS UNTIL TEMPORARY SIGNS ARE IN PLACE.

COORDINATE THE TRAFFIC CONTROL PLAN AND THE VARIOUS SEQUENCES OF CONSTRUCTION WITH ADJACENT CONSTRUCTION PROJECTS IF APPLICABLE, TO ENSURE THE UNINTERRUPTED AND SAFE FLOW OF TRAFFIC.

NOTIFY THE ENGINEER IN WRITING WHEN MAJOR TRAFFIC CHANGES ARE TO BE MADE. NOTIFICATIONS MUST BE GIVEN A MINIMUM OF THREE WORKING DAYS PRIOR TO THE CHANGE.

ALL WORK ZONE PAVEMENT MARKINGS FOR THIS PROJECT SHALL BE 0.100 INCHES (100 MIL) THICK THERMOPLASTIC.

SAFETY:

PROTECT EXPOSED PITS THAT MUST REMAIN OPEN DURING NON-WORKING HOURS AS PER OSHA REQUIREMENTS.

PROJECT SPECIFIC NOTES:

EXAMPLES:

1. DRAINAGE & IRRIGATION CROSSING WORK DESCRIPTION AND APPLICABLE TCP STATE STANDARDS.

2. TREATMENT OF PAVEMENT DROP-OFF IN WORK ZONE NOTES AS APPLICABLE.

ADD PROJECT SPECIFIC NOTES AS NEEDED. SIGN & SEAL STANDARD WHEN USING PROJECT SPECIFIC NOTES

(USE AND MODIFY AS NEEDED FOR HIGH ADT PROJECTS. COORDINATE USE WITH THE AREA OFFICE)

THE PORTION OF THIS PROJECT WHICH COINCIDES WITH EXISTING ROADS AND/OR PRIVATE DRIVES SHALL BE KEPT OPEN TO TRAFFIC AT ALL TIMES, UNLESS OTHERWISE PROVIDED FOR OR APPROVED BY THE ENGINEER. THE CONTRACTOR WILL BE REQUIRED TO MAINTAIN, AT ALL TIMES, TWO LANES OF _____ AND _____*SURFACED MAINLANE ROADWAYS, DURING MAINLANE RECONSTRUCTION, UNLESS OTHERWISE NOTED ON THE PLANS OR AS DIRECTED BY THE ENGINEER.

*INCLUDE TRAVEL DIRECTION (NORTHBOUND, SOUTHBOUND, EASTBOUND OR WESTBOUND)

CONSTRUCTION REQUIRING TEMPORARY LANE CLOSURES OF MAIN LANES RESULTING IN LESS THAN THE MINIMUM NUMBER OF LANES AS SPECIFIED IN PREVIOUS NOTE, SHALL BE DURING OFF-PEAK HOURS. DURING THE PEAK HOURS THE CONTRACTOR SHALL MAINTAIN THE MINIMUM REQUIRED NUMBER OF LANES OPEN TO TRAFFIC.

FOR THE PURPOSES OF THIS TRAFFIC CONTROL PLAN, THE FOLLOWING DEFINITIONS SHALL APPLY:

PEAK HOURS
MON.-FRI. 6:00 A.M. TO 8:30 A.M.
MON.-FRI. 4:00 P.M. TO 7:00 P.M.

OFF-PEAK HOURS
MON.-FRI. 9:00 A.M. TO 4:00 P.M.

NIGHTTIME HOURS
MON.-FRI. 7:00 P.M. TO 6:00 A.M.

WEEKEND HOURS
FRI. 9:00 A.M. TO MON. 6:00 A.M.

TRAFFIC CONTROL PLAN NOTES

SHEET 1 OF 1 SHEETS

PHARR DISTRICT STANDARD

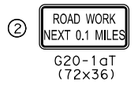
Texas Department of Transportation

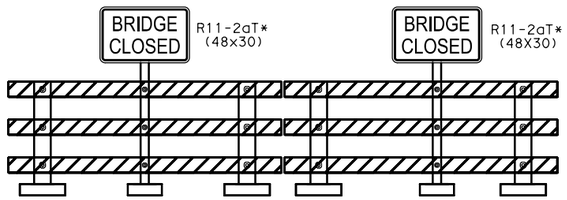
Rev 03/22/2017

STATE	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.			SHEET NO.
TEXAS	6	SEE TITLE SHEET			15
DIST.	COUNTY	CONT.	SECT.	JOB	HIGHWAY NO.
PHR	CAMERON, ETC	0921	06	302, ETC	TEEGE, ETC

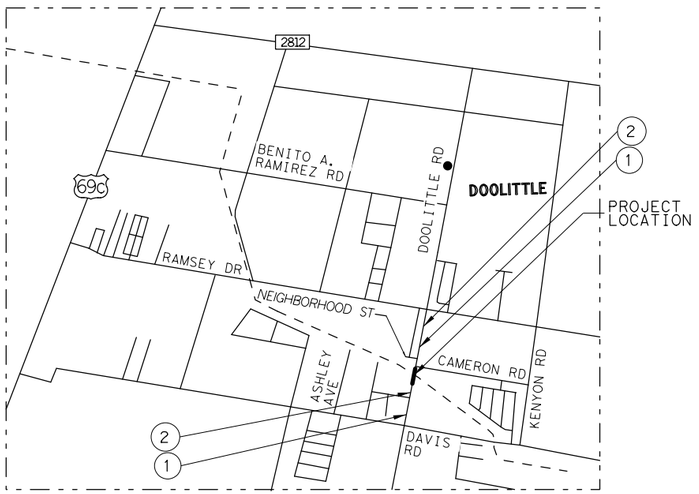
NOTES:

1. SIGNS G20-1 WITH PLAQUE OR G20-5T, G20-6T, G20-2, G20-2bT, CW20-1D, R20-3T, R20-5T, G20-9TP, AND R20-5aTP WILL BE REQUIRED AT PROJECT LIMITS.
2. CW20-1D AND G20-2 WILL BE REQUIRED AT ALL CROSSROADS ADJACENT TO PROJECT ROADWAY.
3. G20-1aT WILL BE REQUIRED AT ALL MAJOR CROSSROADS.



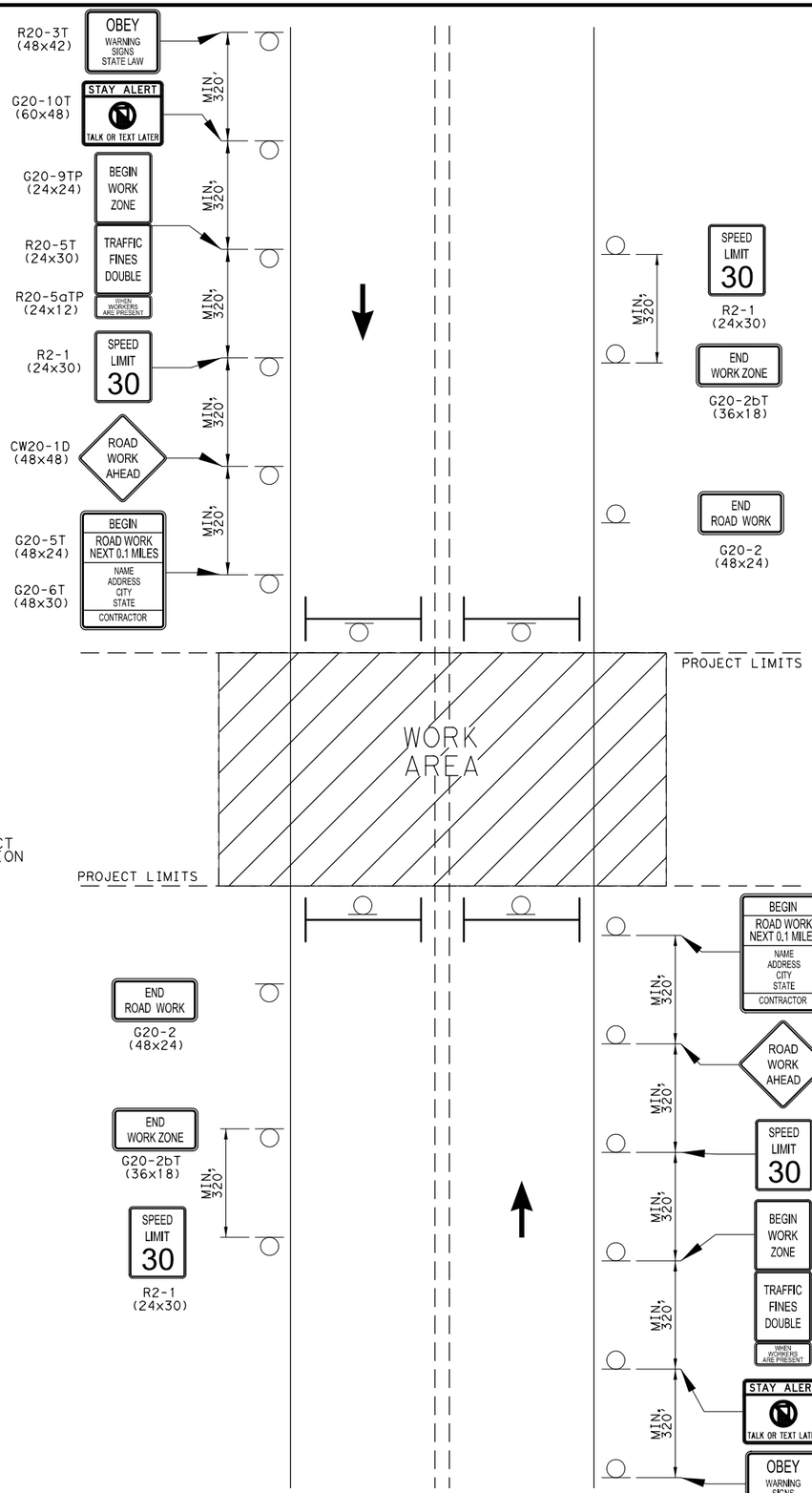


*TY-3 BARRICADES
NOTE: CLOSURE SIGN(S)
INDEPENDENTLY MOUNTED



PROJECT LIMIT SIGNAGE
DOOLITTLE @ SANTA CRUZ MAIN CANAL

① M PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)



TRAFFIC CONTROL PLAN

A. INSTALL ALL SIGNS AND TRAFFIC CONTROL DEVICES AS SHOWN AND IN ACCORDANCE WITH THE TRAFFIC CONTROL PLAN AND STANDARD BC SHEETS AS DIRECTED.

B. ADDITIONAL SIGNS, BARRICADES, AND TRAFFIC CONTROL DEVICES OTHER THAN THOSE SPECIFIED MAY BE REQUIRED FOR THE SAFE MOVEMENT OF TRAFFIC THROUGH THE PROJECT. PAYMENT FOR ALL SUCH SIGNS, BARRICADES, OR TRAFFIC CONTROL DEVICES SHALL BE CONSIDERED SUBSIDARY TO THE ITEM 502-6001, "BARRICADES, SIGNS, AND TRAFFIC HANDLING".

C. WORK SITES SHOULD BE CAREFULLY MONITORED TO ENSURE THAT TRAFFIC CONTROL MEASURES ARE OPERATING EFFECTIVELY AND THAT ALL DEVICES USED ARE CLEARLY VISIBLE, CLEAN, AND IN GOOD REPAIR.

D. THE CONTRACTOR WILL PROVIDE SAFE ACCESS TO AND FROM ALL PRIVATE PROPERTY AT ALL TIMES AND IN ALL WEATHER CONDITIONS.

E. THE CONTRACTOR WILL BE REQUIRED TO SUBMIT A DETAILED SCHEDULE OF WORK TO THE PROJECT ENGINEER PRIOR TO THE BEGINNING OF CONSTRUCTION WHICH GENERALLY CONFORMS TO THE SEQUENCE SHOWN IN THE SEQUENCE OF CONSTRUCTION.

F. COMPLETE ALL WORK ON THE PROJECT AS SHOWN ON THE VARIOUS PLAN SHEETS AND IN COMPLIANCE WITH THE GENERAL NOTES OF THIS CONTRACT.

G. ANY REQUEST TO ALTER THE SEQUENCE OF CONSTRUCTION OR TRAFFIC CONTROL PLAN WILL BE SUBMITTED TO THE ENGINEER FOR WRITTEN APPROVAL.

SEQUENCE OF CONSTRUCTION

THE CONTRACTOR WILL PROVIDE A WRITTEN NOTICE TO TxDOT AREA OFFICE AT LEAST 2 WEEKS PRIOR TO CLOSURE OF ANY ROADS.

1. SET DETOUR SIGNAGE IN ACCORDANCE TO THE TRAFFIC CONTROL PLAN AND PROJECT BARRICADES AS SHOWN AND IN ACCORDANCE WITH STANDARD BC SHEETS.
2. INSTALL REQUIRED TEMPORARY EROSION CONTROL DEVICES AS DIRECTED.
3. CLOSE ROAD TO ALL TRAFFIC TO REMOVE EXISTING STRUCTURE. CONSTRUCT PROPOSED STRUCTURE. THE MINIMUM SIGNING FOR CLOSURE WILL CONSIST OF TYPE 3 BARRICADES, R11-2aT BRIDGE CLOSED SIGNS, AND ADVANCED SIGNING AS APPROVED.
4. CONSTRUCT APPROACH ROADWAY AND ROADWAY OVER STRUCTURE.
5. COMPLETE ALL OTHER WORK AS SHOWN ON THE PLANS.
6. CLEAN UP PROJECT AND REMOVE TEMPORARY EROSION CONTROL DEVICES AND PROJECT BARRICADES.

A PORTABLE CHANGEABLE MESSAGE SIGN WILL BE PLACED FOR ADVANCED NOTIFICATIONS SEVEN (7) DAYS BEFORE ROAD AND BRIDGE ARE CLOSED. SIGNS WILL REMAIN IN PLACE FOR SEVEN (7) DAYS AFTER CLOSURE. LOCATIONS ARE SHOWN ON PROJECT LIMITS SIGNAGE MAPS OR PLACEMENT WILL BE DIRECTED.

MAINTENANCE FOR LOCAL ACCESS IS REQUIRED.

SIGNAGE LEGEND

- TRAFFIC SIGN
- TY-3 BARRICADE
- DIRECTION OF TRAFFIC

STATE OF TEXAS
RYAN W. FRITZ
112568
LICENSED
PROFESSIONAL ENGINEER
12/07/2022

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL RD,
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

Texas Department of Transportation
© 2022

DOOLITTLE ROAD
TCP NARRATIVE

SCALE = None SHEET 1 OF 1

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	TEEGE, ETC
DRAWN LEH	STATE	DISTRICT	COUNTY
CHECK MAW	TEXAS	PHARR	CAMERON, ETC
CHECK RWF	CONTROL 0921	SECTION 06	JOB 302, ETC

SHEET NO. 16

PENTABLE: CSJ 0921-02-331/Charles Green Rd1.tbl
SCALE: 1:1
PLOT DRIVER: TXDOT_PDF_BW.NO RASTERS1.pltt
DATE: 12/7/2022
TIME: 9:57:59 AM
USER: rwfritz
FILE NAME: ...\DLR-BMCD-NAR-01.dgn

① DETOUR AHEAD CW20-2D 48x48

② M4-12T VARX12 — Doolittle Rd / DETOUR ← — M4-9L 30X24

③ M4-12T VARX12 — Doolittle Rd / DETOUR → — M4-9R 30X24

④ M4-12T VARX12 — Doolittle Rd / DETOUR ↑ — M4-9S 30X24

⑤ M4-12T VARX12 — Doolittle Rd / DETOUR ↰ — M4-9TL 30X30

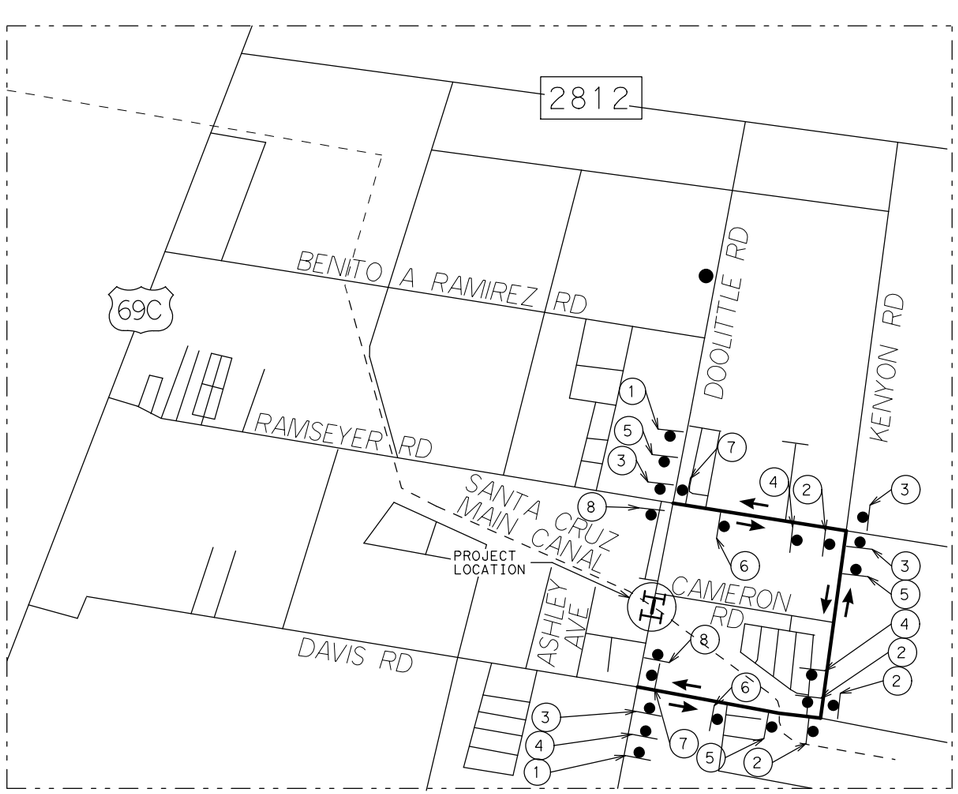
⑥ M4-12T VARX12 — Doolittle Rd / DETOUR ↱ — M4-9TR 30X30

⑦ END DETOUR M4-8a 24x18

⑧ BRIDGE OUT AHEAD LOCAL TRAFFIC ONLY — R11-4 60"X30"

LEGEND

- DIRECTION OF TRAFFIC
- TYPE 3 BARRICADE
- SIGN



NOTES:

1. ALL SIGNS, DEVICES, LOCATIONS AND SPACING SHALL CONFORM TO THE TMUTCD, THE BC, WZ, AND TCP STANDARD DRAWINGS.
2. SEE "DOOLITTLE ROAD TCP NARRATIVE" SHEET FOR DETAILS.

STATE OF TEXAS
RYAN W. FRITZ
112568
LICENSED
PROFESSIONAL ENGINEER
12/07/2022

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL RD,
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

Texas Department of Transportation

DOOLITTLE ROAD
DETOUR ROUTE

SCALE = None — SHEET 1 OF 1

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	TEEGE, ETC
DRAWN LEH	STATE	DISTRICT	COUNTY — SHEET NO.
CHECK MAW	TEXAS	PHARR	CAMERON, ETC — 17
CHECK RWF	CONTROL	SECTION	JOB
	0921	06	302, ETC

DATE: 12/7/2022
TIME: 9:56:40 AM
USER: rwfritz
FILE NAME: ...\DLR-BMCD-DET-01.dgn
PENTABLE: CSJ 0921-02-331 (Charles Green Rd).tbl
SCALE: 1:1
PLOT DRIVER: TXDOT_PDF_BW.INO RASTERS).pltf

TRAFFIC CONTROL PLAN

A. INSTALL ALL SIGNS AND TRAFFIC CONTROL DEVICES AS SHOWN AND IN ACCORDANCE WITH THE STANDARD BC SHEETS AND AS DIRECTED BY THE ENGINEER.

B. ADDITIONAL SIGNS, BARRICADES, AND TRAFFIC CONTROL DEVICES OTHER THAN THOSE SPECIFIED MAY BE REQUIRED FOR THE SAFE MOVEMENT OF TRAFFIC THROUGH THE PROJECT. PAYMENT FOR ALL SUCH SIGNS, BARRICADES, OR TRAFFIC CONTROL DEVICES SHALL BE CONSIDERED SUBSIDARY TO THE ITEM 502-6001, "BARRICADES, SIGNS, AND TRAFFIC HANDLING".

C. WORK SITES SHOULD BE CAREFULLY MONITORED TO ENSURE THAT TRAFFIC CONTROL MEASURES ARE OPERATING EFFECTIVELY AND THAT ALL DEVICES USED ARE CLEARLY VISIBLE, CLEAN, AND IN GOOD REPAIR.

D. THE CONTRACTOR WILL PROVIDE SAFE ACCESS TO AND FROM ALL PRIVATE PROPERTY AT ALL TIMES AND IN ALL WEATHER CONDITIONS.

E. THE CONTRACTOR WILL BE REQUIRED TO SUBMIT A DETAILED SCHEDULE OF WORK TO THE PROJECT ENGINEER PRIOR TO THE BEGINNING OF CONSTRUCTION WHICH GENERALLY CONFORMS TO THE SEQUENCE SHOWN IN THE SEQUENCE OF CONSTRUCTION.

F. COMPLETE ALL WORK ON THE PROJECT AS SHOWN ON THE VARIOUS PLAN SHEETS AND IN COMPLIANCE WITH THE GENERAL NOTES OF THIS CONTRACT.

G. ANY REQUEST TO ALTER THE SEQUENCE OF CONSTRUCTION OR TRAFFIC CONTROL PLAN WILL BE SUBMITTED TO THE ENGINEER FOR WRITTEN APPROVAL.

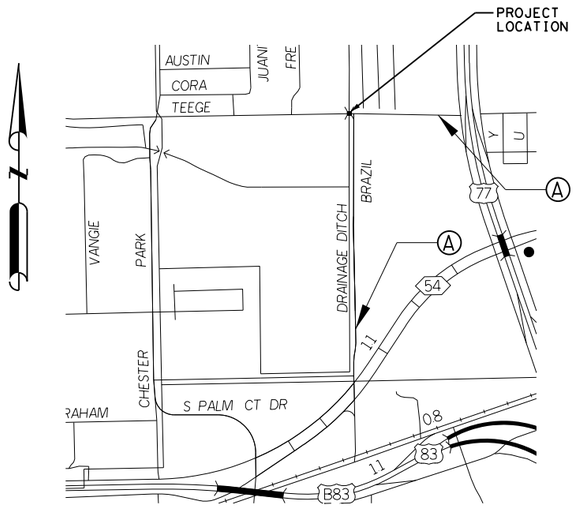
SEQUENCE OF CONSTRUCTION

THE CONTRACTOR WILL PROVIDE A WRITTEN NOTICE TO TxDOT AREA OFFICE AT LEAST 2 WEEKS PRIOR TO CLOSURE OF ANY ROADS.

1. SET PROJECT BARRICADES.
2. INSTALL REQUIRED TEMPORARY EROSION CONTROL DEVICES AS DIRECTED.
3. CLOSE ROAD TO ALL TRAFFIC TO REMOVE EXISTING STRUCTURE. CONSTRUCT PROPOSED STRUCTURE. THE MINIMUM SIGNING FOR CLOSURE WILL CONSIST OF TYPE III BARRICADES, R11-2aT BRIDGE CLOSED SIGNS, AND ADVANCED SIGNING AS APPROVED.
4. CONSTRUCT APPROACH ROADWAY AND ROADWAY OVER STRUCTURE.
5. COMPLETE ALL OTHER WORK AS SHOWN ON THE PLANS.
6. CLEAN UP PROJECT AND REMOVE TEMPORARY EROSION CONTROL DEVICES AND PROJECT BARRICADES.

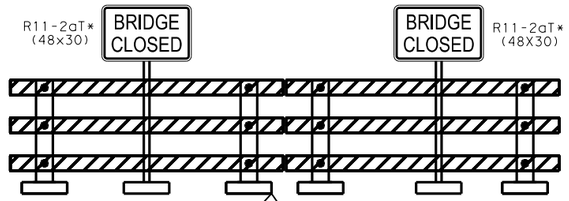
A PORTABLE CHANGEABLE MESSAGE SIGN WILL BE PLACED FOR ADVANCED NOTIFICATIONS SEVEN (7) DAYS BEFORE ROAD AND BRIDGE ARE CLOSED. SIGNS WILL REMAIN IN PLACE FOR SEVEN (7) DAYS AFTER CLOSURE. LOCATIONS ARE SHOWN ON PROJECT LIMITS SIGNAGE MAPS OR PLACEMENT WILL BE DIRECTED BY THE ENGINEER.

MAINTENANCE FOR LOCAL ACCESS IS REQUIRED.



VICINTY MAP
TEEGE RD OVER DRAINAGE DITCH

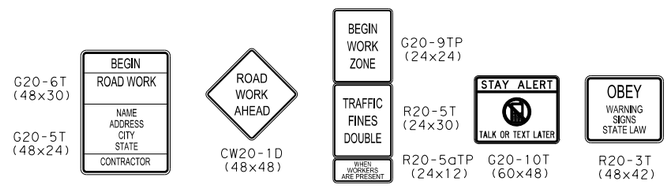
PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)



*TY-III BARRICADES
NOTE: CLOSURE SIGN(S) INDEPENDENTLY MOUNTED

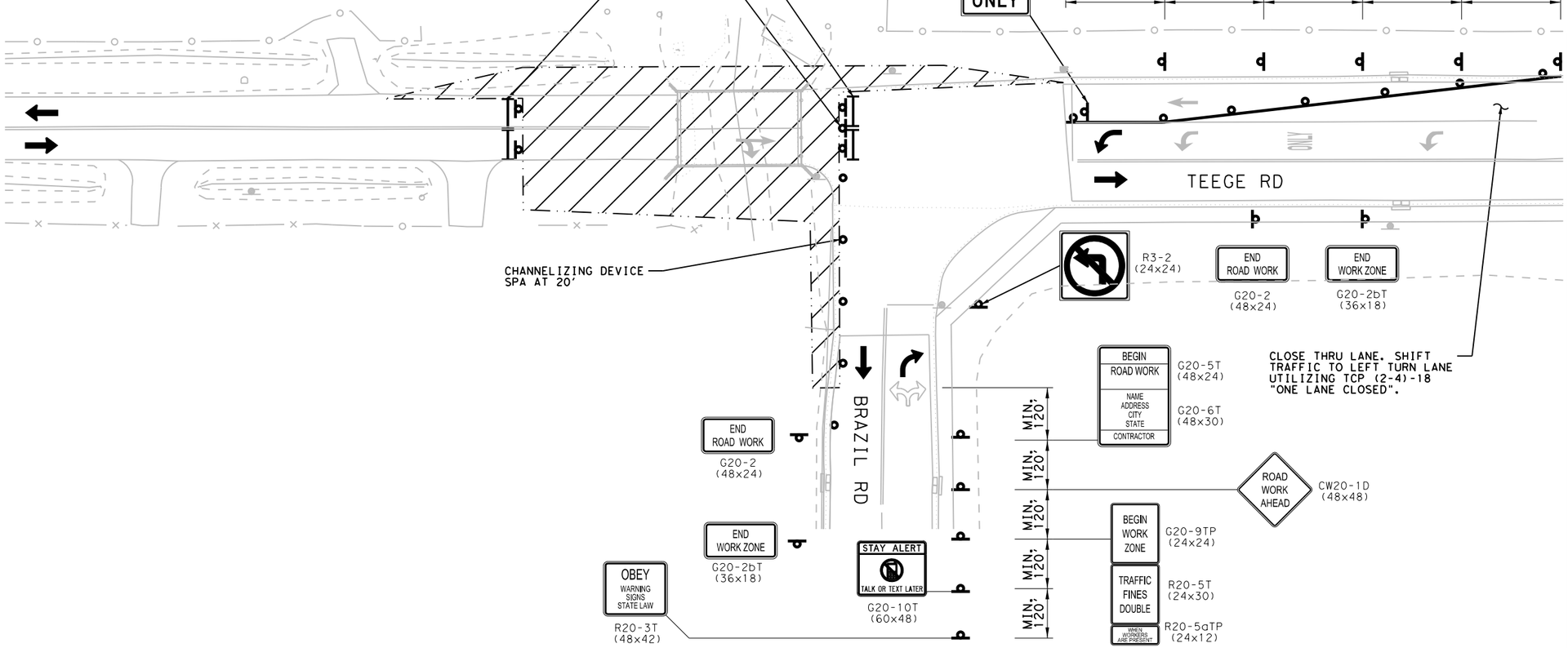
NOTES:

1. SIGNS G20-1 WITH PLAQUE OR G20-5T, G20-6T, G20-2, G20-2bT, CW20-1D, R20-3T, R20-5T, G20-9TP, AND R20-5aTP WILL BE REQUIRED AT PROJECT LIMITS.
2. CW20-1D AND G20-2 WILL BE REQUIRED AT ALL CROSSROADS ADJACENT TO PROJECT ROADWAY.
3. G20-1aT WILL BE REQUIRED AT ALL MAJOR CROSSROADS.



LEGEND

- TYPE 3 BARRICADE
- SIGN
- TRAFFIC FLOW
- CHANNELIZING DEVICES
- WORK AREA



12/7/2022

STATE OF TEXAS
AARON DEBORD
96578
LICENSED
PROFESSIONAL ENGINEER

REV	BY	DESCRIPTION	DATE

AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TBPE FIRM REGISTRATION #739

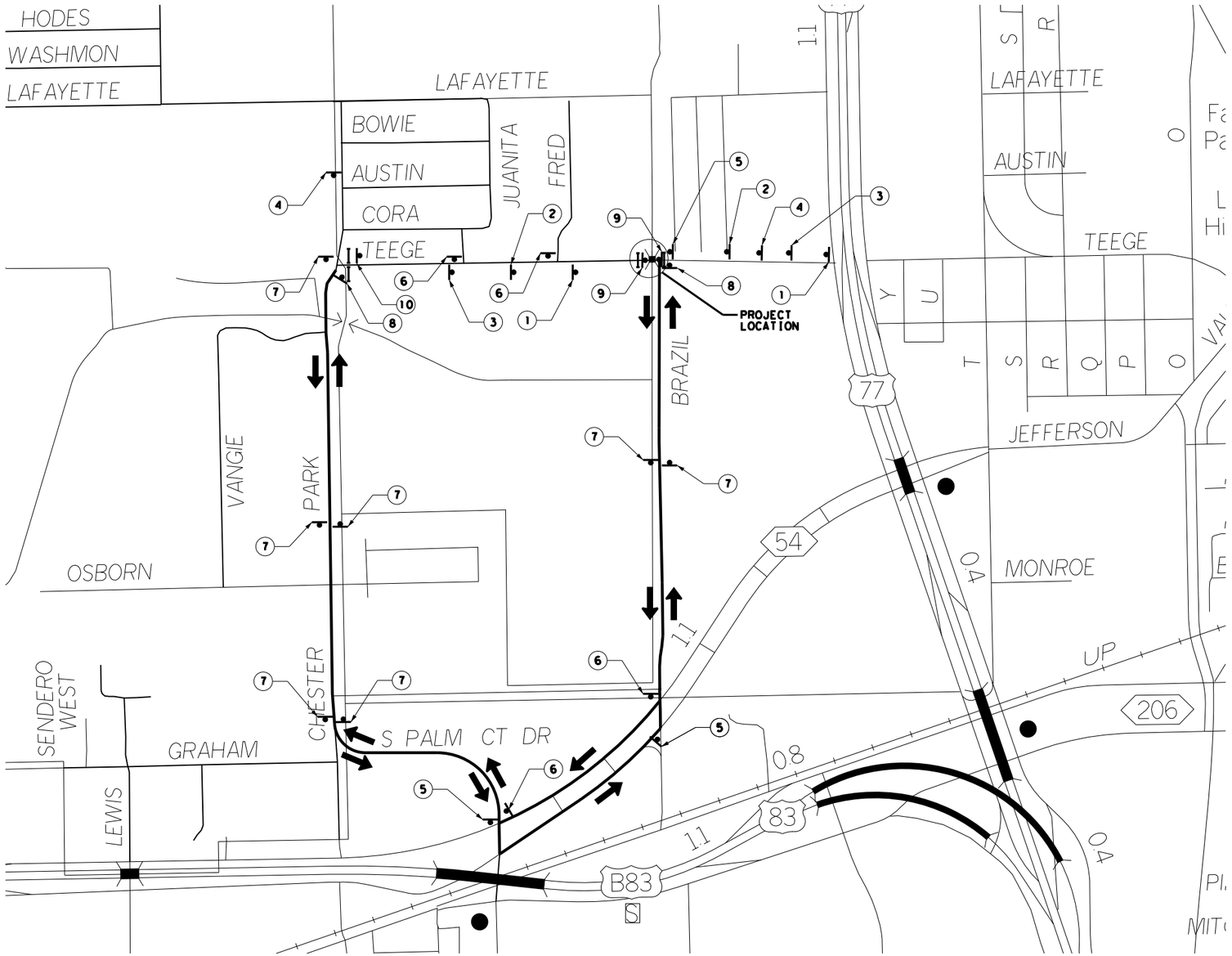
2021 Texas Department of Transportation

TEEGE ROAD

TCP NARRATIVE AND ADVANCED WARNING SIGNS

DESIGN	FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
ASD	6	SEE TITLE SHEET		TEEGE,ETC
DESIGN CK	STATE	DISTRICT	COUNTY	SHEET NO.
HLT	TEXAS	PHARR	CAMERON, ETC	18
GRAPHICS	CONTROL	SECTION NO.	JOB	
AJG	0921	06	302, ETC	
GRAPHICS CK				
TJR				

Design Filename: c:\pw-af\pw-af-prod\grace troweek\d0106912\TEEGE*AF*TCP*TCN*01.dgn
Plotted on: 12/6/2022 1:33:10 PM gtroweek



N

LEGEND

- TYPE 3 BARRICADE
- EXISTING BRIDGE
- SIGN
- TRAFFIC FLOW

0 500′ 1000′
SCALE: 1"=1000′

NOTES:

1. ALL SIGNS, DEVICES, LOCATION AND SPACING SHALL CONFORM TO THE TMUTCD, THE BC, WZ AND TCP STANDARD DRAWINGS.
3. SEE "TEEGE RD TRAFFIC CONTROL NARRATIVE" SHEET.

1	ROAD CLOSED AHEAD	CW20-3D1 (36x36)
2	ROAD CLOSED 500 FT	CW20-3A (48X48)
3	ROAD CLOSED 1000 FT	CW20-3A (48X48)
4	DETOUR AHEAD	CW20-2D (36x36)
5	TEEGE RD / DETOUR ←	M4-12T (VARx12) / M4-9L (30x24)
6	TEEGE RD / DETOUR →	M4-12T (VARx12) / M4-9R (30x24)
7	TEEGE RD / DETOUR ↑	M4-12T (VARx12) / M4-9S (30x24)
8	TEEGE RD / END DETOUR	M4-12T (VARx12) / M4-8a (24x18)
9	BRIDGE CLOSED	R11-2aT (48x30)
10	ROAD CLOSED TO THRU TRAFFIC	R11-4 (60x30)

12/7/2022

STATE OF TEXAS
AARON DEBORD
96578
LICENSED
PROFESSIONAL ENGINEER

REV	BY	DESCRIPTION	DATE

AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TBPE FIRM REGISTRATION #739

2021 Texas Department of Transportation

TEEGE ROAD

DETOUR LAYOUT

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
ASD	6	SEE TITLE SHEET		TEEGE,ETC
DESIGN CK	STATE	DISTRICT	COUNTY	SHEET NO.
HLT	TEXAS	PHARR	CAMERON, ETC	19
GRAPHICS	CONTROL	SECTION NO.	JOB	
AJG	0921	06	302, ETC	
GRAPHICS CK				
TJR				

Design Filename: c:\pw-of\pw-of-prod\grace traweek\d0106912\TEEGE*AF*TCP*TDT*01.dgn
Plotted on: 12/6/2022 1:33:18 PM gtraweek

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DATE:
FILE:

BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

WORKER SAFETY NOTES:

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

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

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

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

Texas Department of Transportation

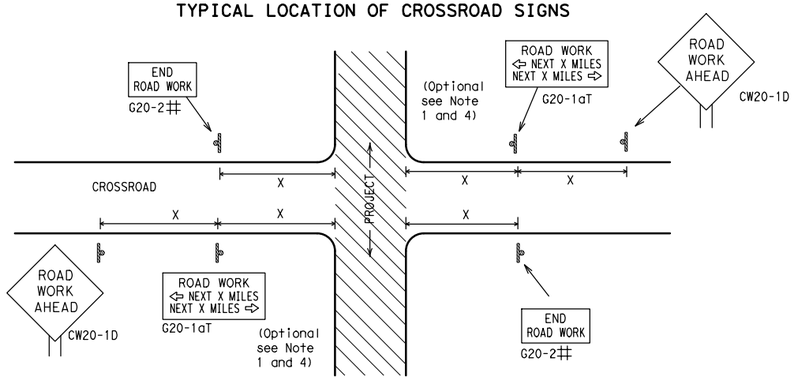
Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-03 7-13	0921	06	302,ETC	TEEGE,ETC
9-07 8-14	DIST	COUNTY		SHEET NO.
5-10 5-21	PHARR	CAMERON,ETC		20

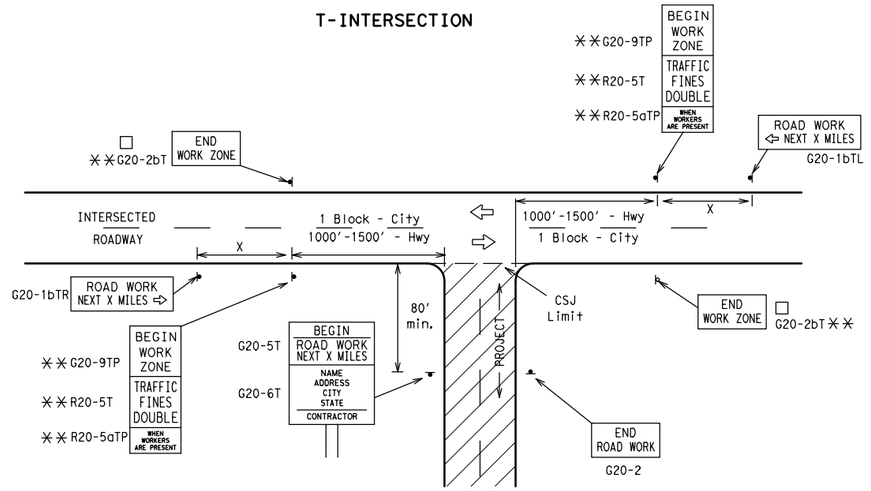
TYPICAL LOCATION OF CROSSROAD SIGNS



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.

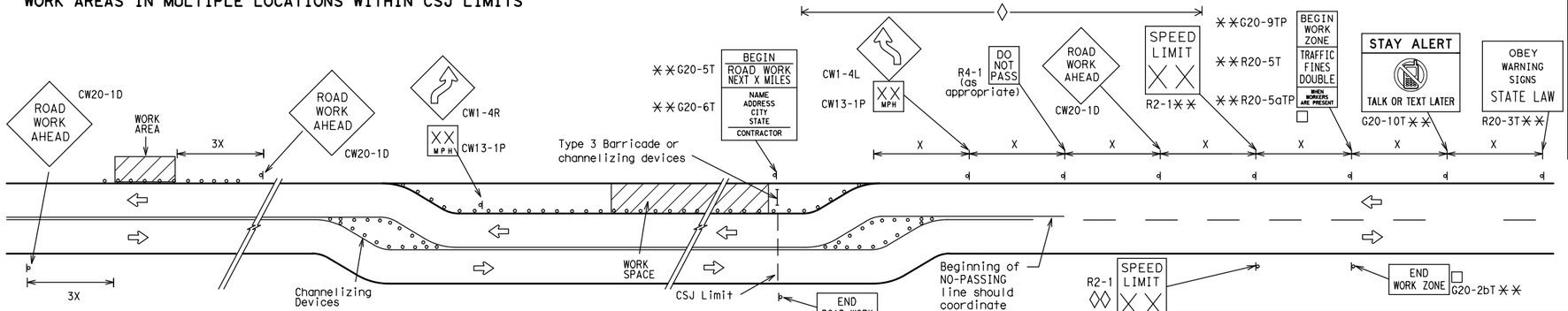
△ Minimum distance from work area to first Advance Warning sign nearest the work area and/or distance between each additional sign.

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.

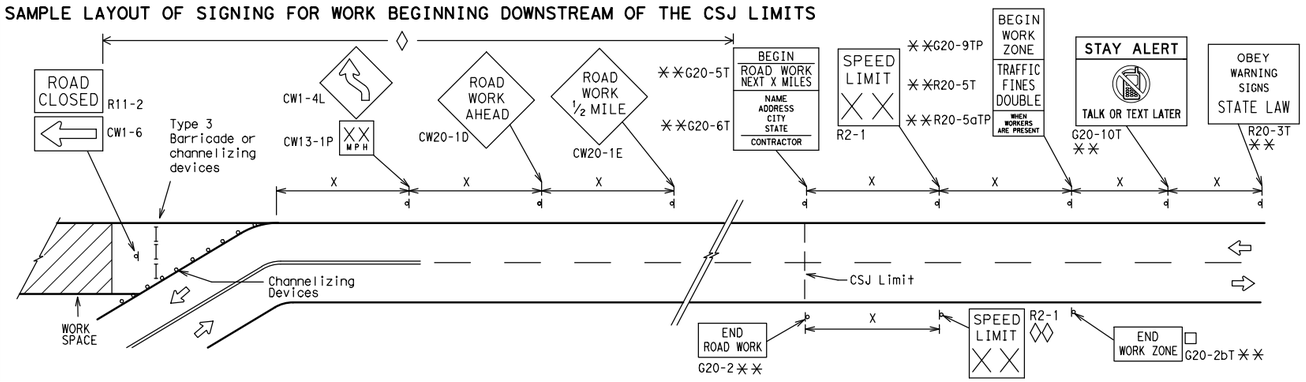
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS



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

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



NOTES

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

□ The "BEGIN WORK ZONE"(G20-9TP) and "END WORK ZONE" (G20-2bT) shall be used as shown on the sample layout when advance signs are required outside the CSJ Limits. They inform the motorist of entering or leaving a part of the work zone lying outside the CSJ Limits where traffic fines may double if workers are present.

✳✳ CSJ limit signing is required for highway construction and maintenance work, with the exception of mobile operations.

◊ Area for placement of "ROAD WORK AHEAD" (CW20-1D)sign and other signs or devices as called for on the Traffic Control Plan.

◊◊ Contractor will install a regulatory speed limit sign at the end of the work zone.

LEGEND

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

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	0921	06	302,ETC	TEEGE,ETC
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	PHARR	CAMERON,ETC		21

DATE:
FILE:

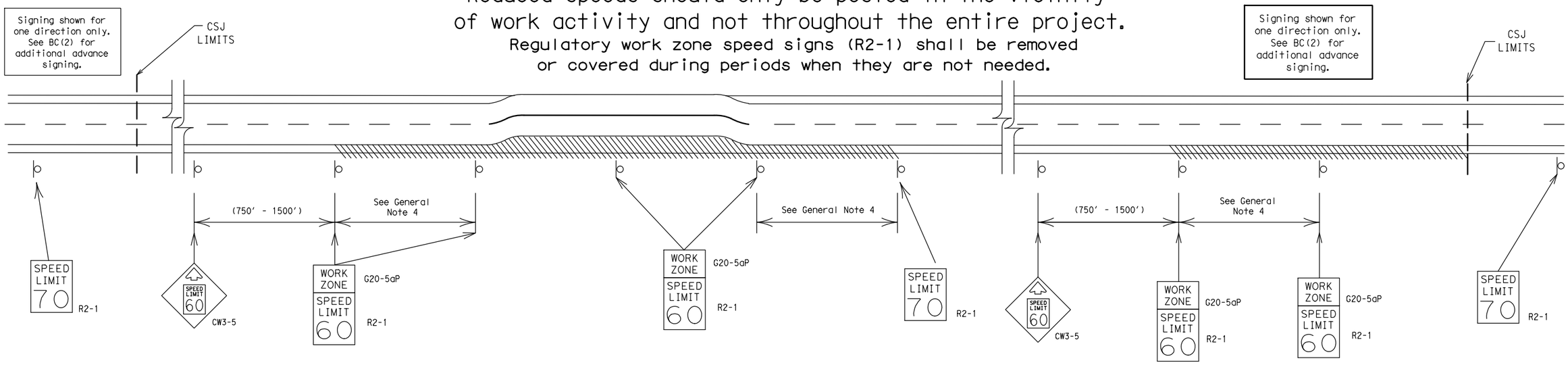
DATE:
FILE:

TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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

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



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Safety Division Standard

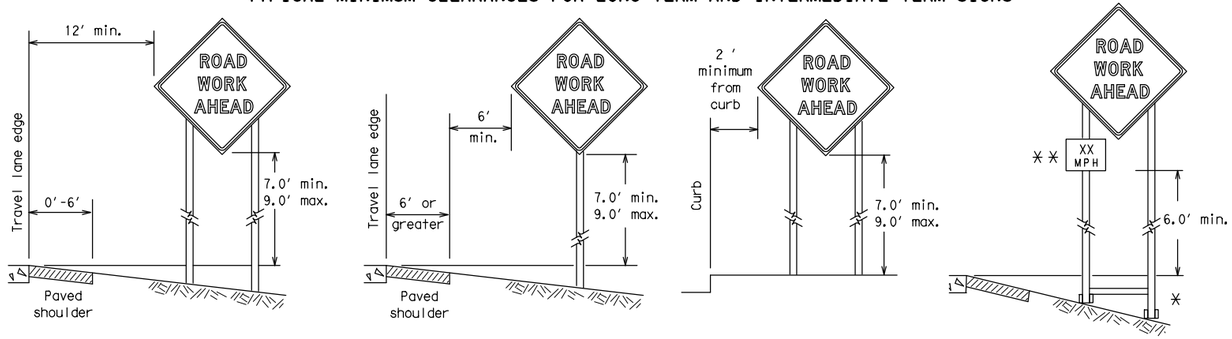
BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 9-07 8-14 7-13 5-21	0921	06	302,ETC	TEEGE,ETC
	DIST	COUNTY		SHEET NO.
	PHARR	CAMERON,ETC		22

DATE:
FILE:

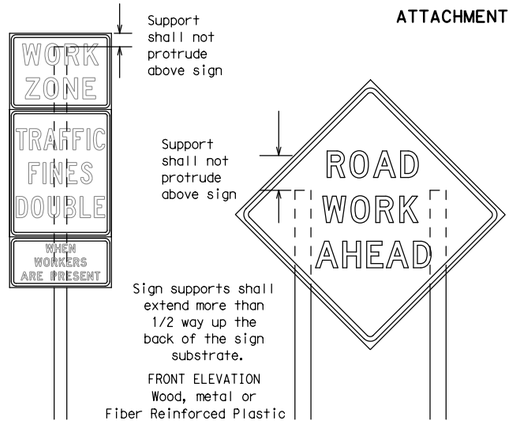
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

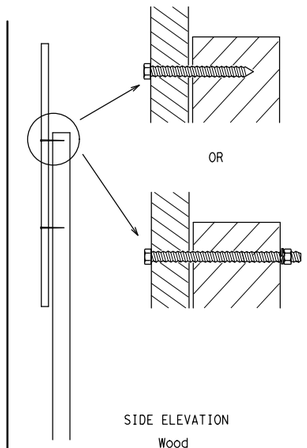


⚹ When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

⚹⚹ 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





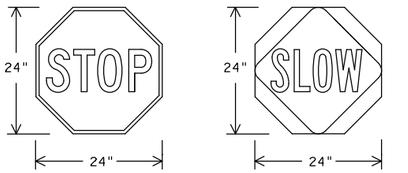
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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.



Background - Red
Legend & Border - White

Background - Orange
Legend & Border - Black

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

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

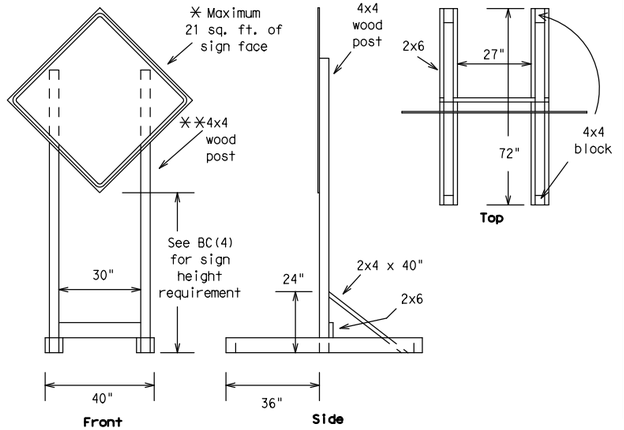
Texas Department of Transportation

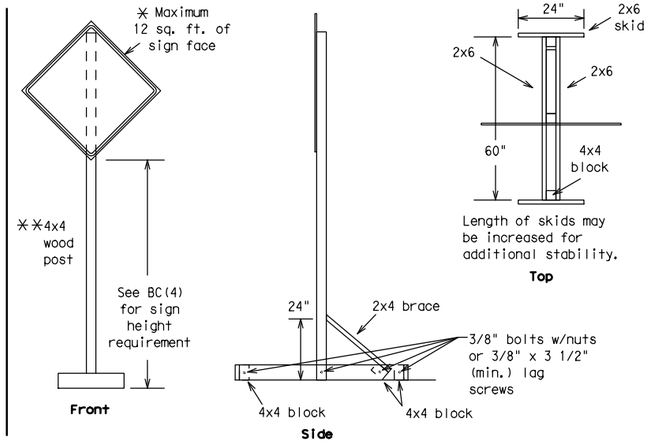
Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

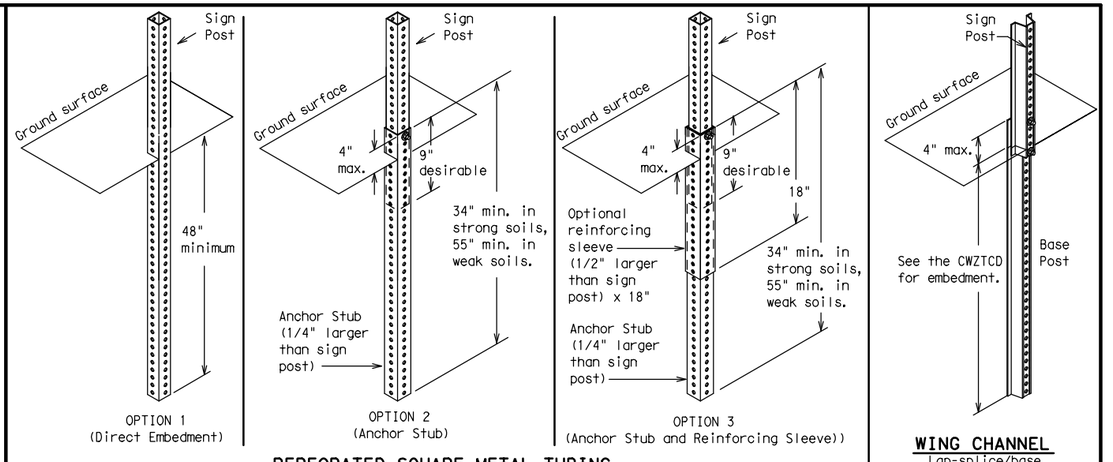
FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	302,ETC	TEEGE,ETC
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	PHARR	CAMERON,ETC		23





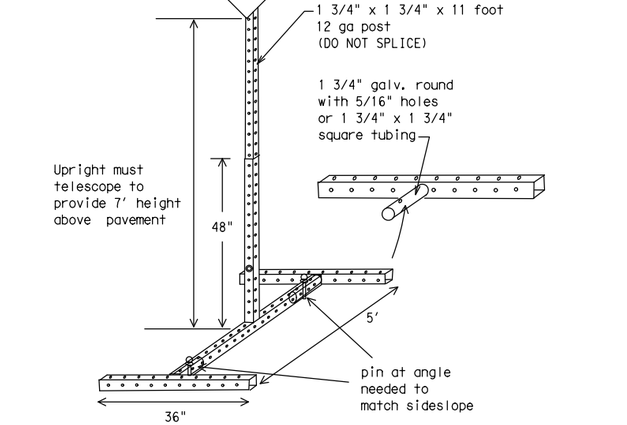
SKID MOUNTED WOOD SIGN SUPPORTS

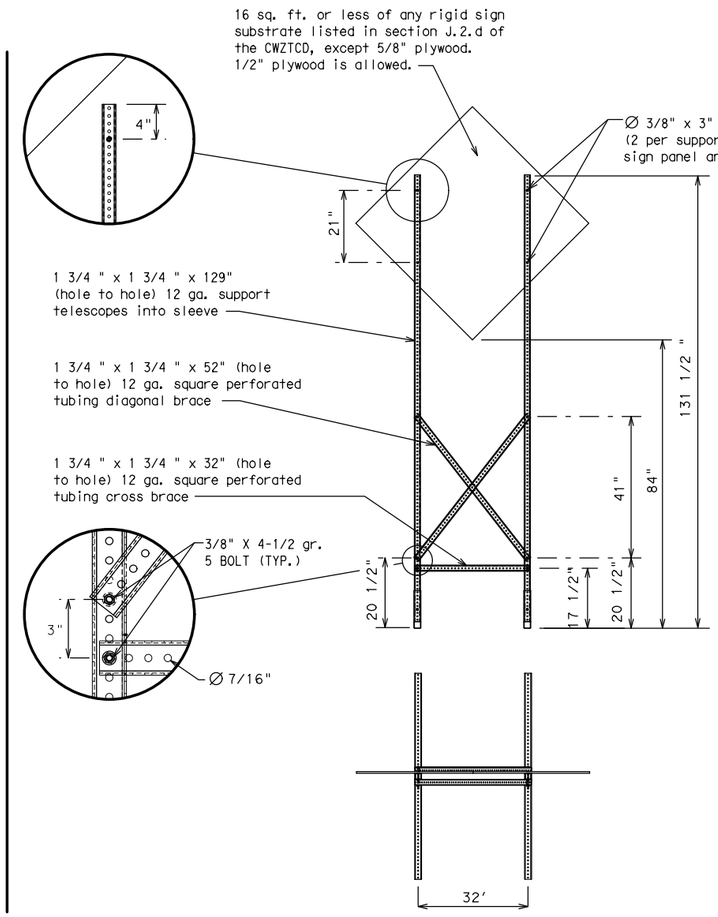
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

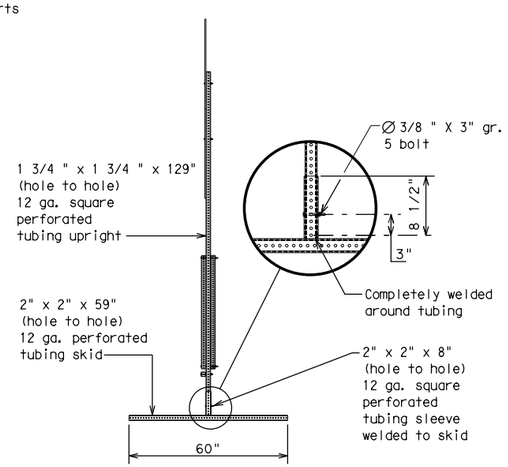


GROUND MOUNTED SIGN SUPPORTS

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.

Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	302,ETC	TEEGE,ETC
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	PHARR	CAMERON,ETC		24

DATE:
FILE:

DATE:
FILE:

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

PORTABLE CHANGEABLE MESSAGE SIGNS

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

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

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

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

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

Other Condition List

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

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

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

- 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 *

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

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

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9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	PHARR	CAMERON,ETC		25

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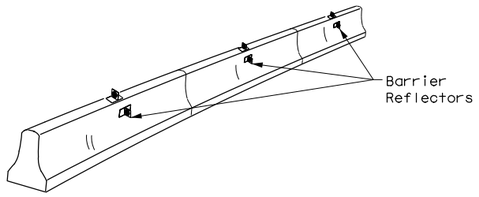
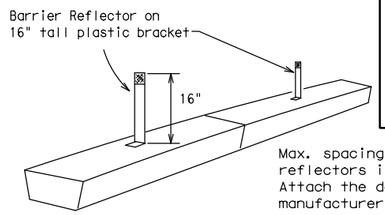
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost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



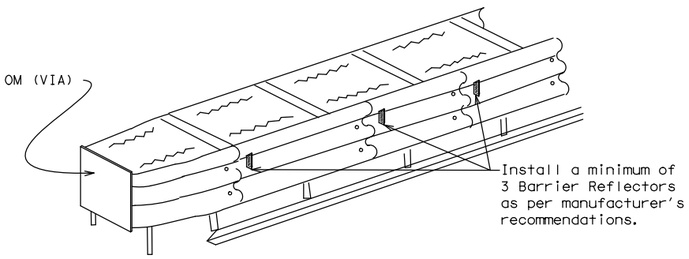
CONCRETE TRAFFIC BARRIER (CTB)

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

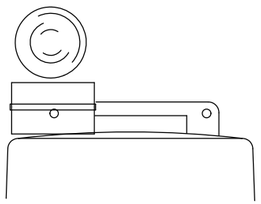
LPCB is approved for use in work zone locations, where the posted speed is 45mph, or less. See Roadway Standard Sheet LPCB.

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

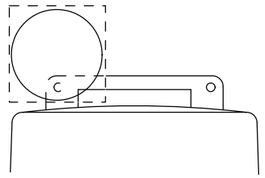
WARNING LIGHTS



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



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

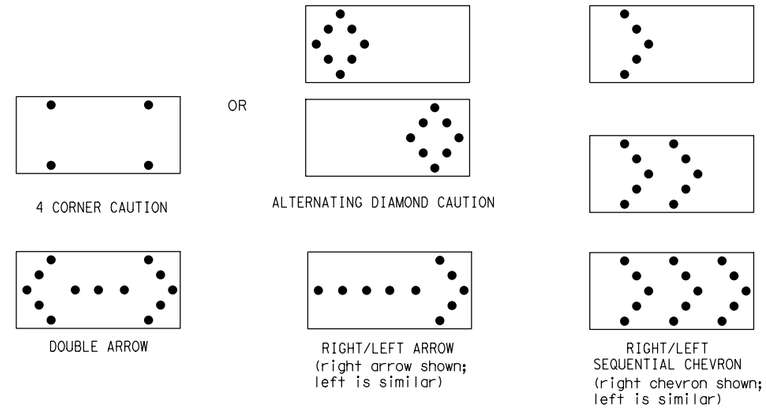
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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

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

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

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

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



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

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

ATTENTION

Flashing Arrow Boards shall be equipped with automatic dimming devices.

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

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

Texas Department of Transportation

Traffic Safety Division Standard

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

BC(7)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	302,ETC	TEEGE,ETC
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	PHARR	CAMERON,ETC		26

101

DATE:
FILE:

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:

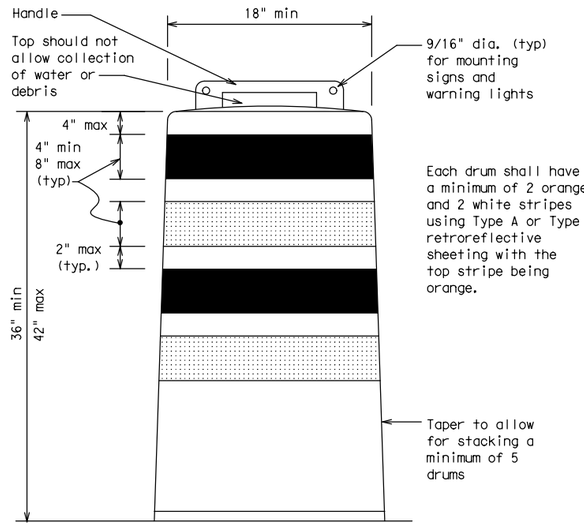
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

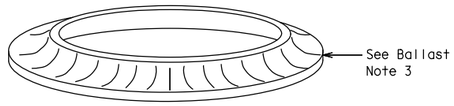
RETROREFLECTIVE SHEETING

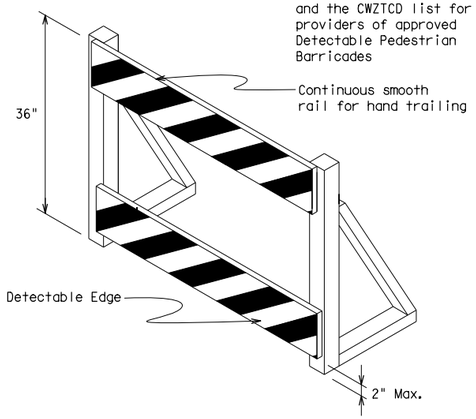
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials," Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

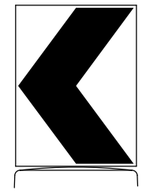




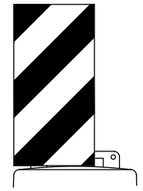


DETECTABLE PEDESTRIAN BARRICADES

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	0921	06	302,ETC	TEEGE,ETC
4-03 8-14	DIST	COUNTY		SHEET NO.
9-07 5-21	PHARR	CAMERON,ETC		27
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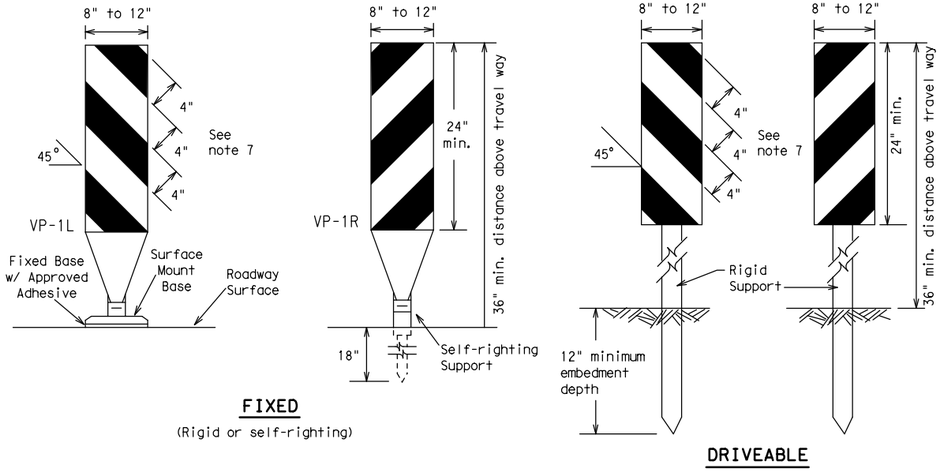
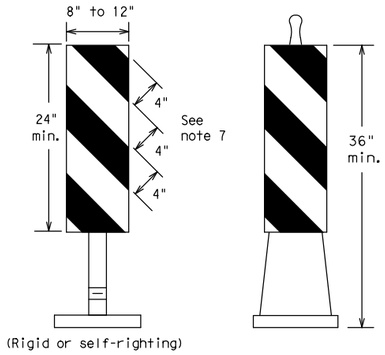


FIXED
(Rigid or self-righting)

DRIVEABLE

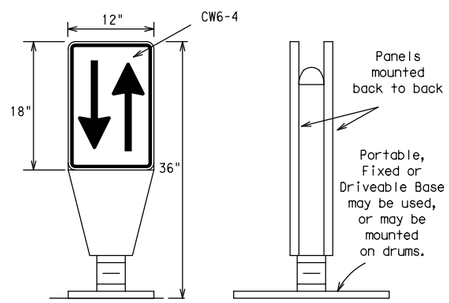


(Rigid or self-righting)

PORTABLE

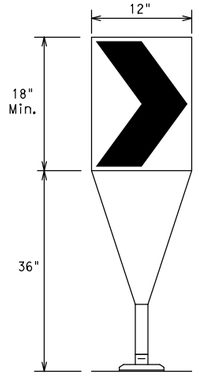
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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



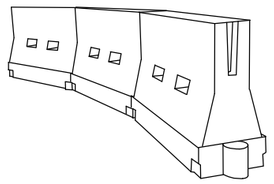
Fixed Base w/ Approved Adhesive
(Driveable Base, or Flexible Support can be used)

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 ✻✻			Suggested Maximum Spacing of Channelizing Devices	
		10′ Offset	11′ Offset	12′ Offset	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

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Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

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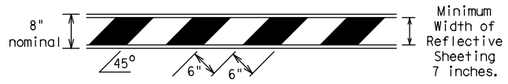
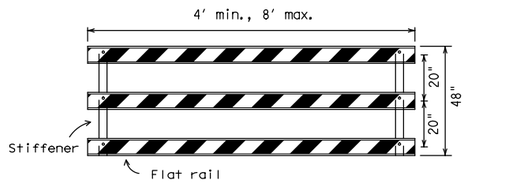
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



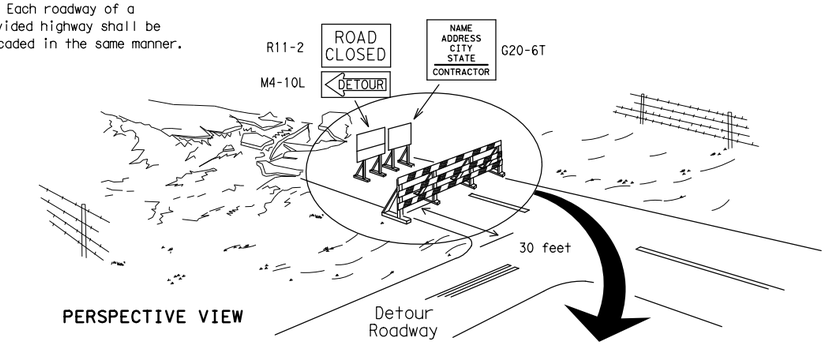
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

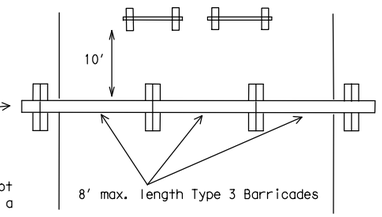
Each roadway of a divided highway shall be barricaded in the same manner.



PERSPECTIVE VIEW

The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.

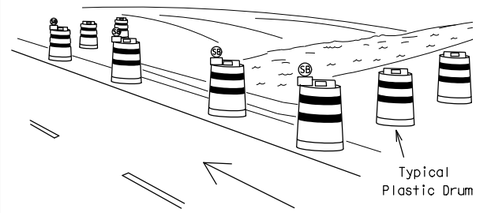
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

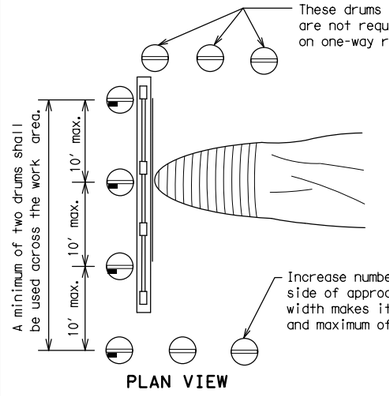
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

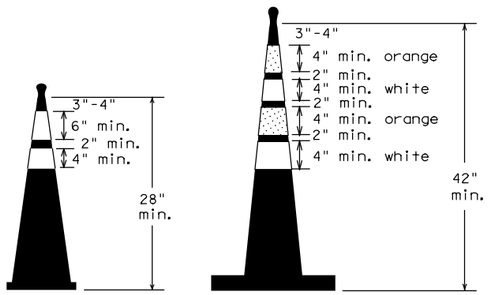
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



PLAN VIEW

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

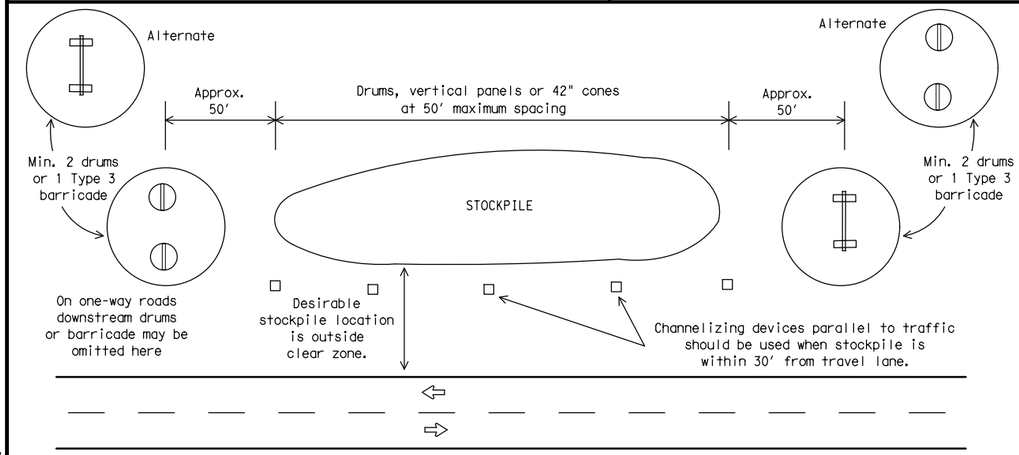
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



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

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

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

DATE:
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SHEET 10 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

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

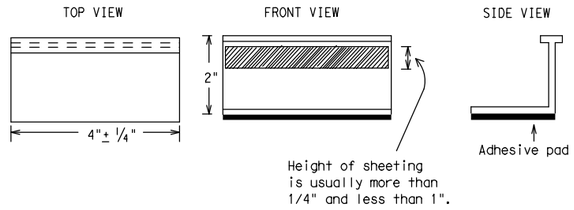
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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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11-02 8-14	PHARR	CAMERON, ETC		30

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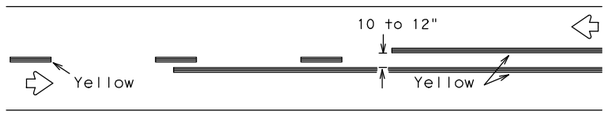
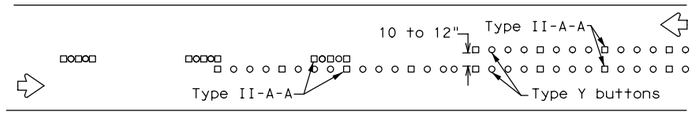
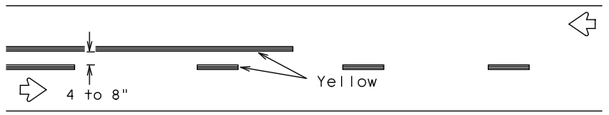
PAVEMENT MARKING PATTERNS



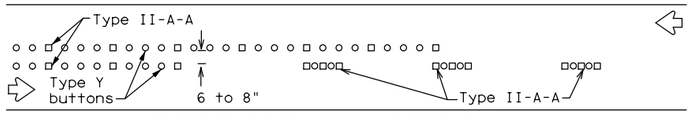
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



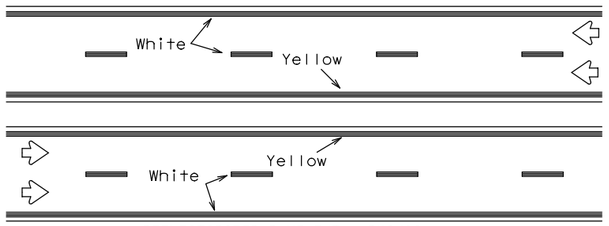
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



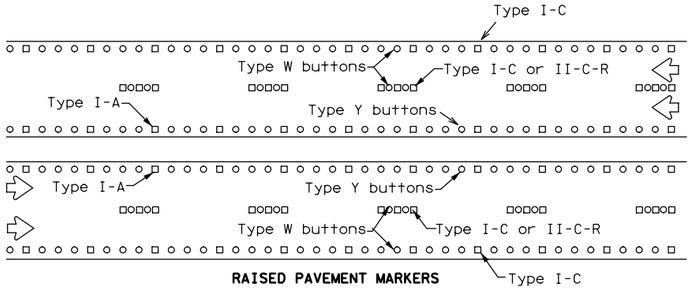
RAISED PAVEMENT MARKERS - PATTERN B

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



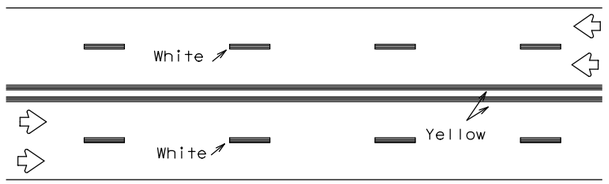
REFLECTORIZED PAVEMENT MARKINGS



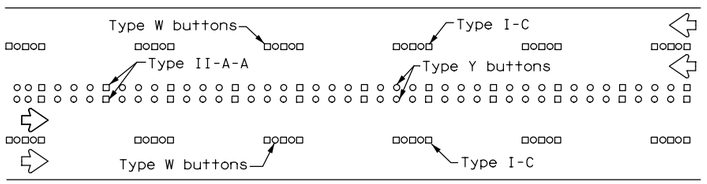
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



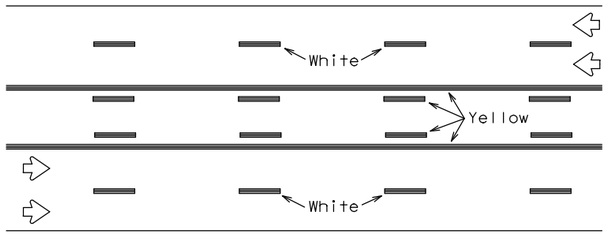
REFLECTORIZED PAVEMENT MARKINGS



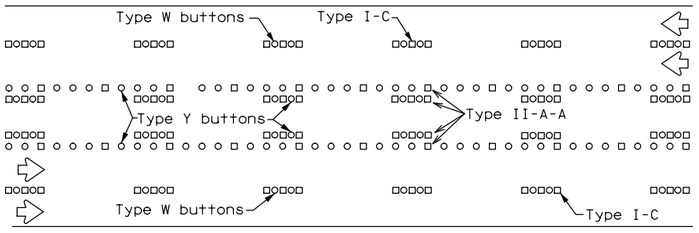
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

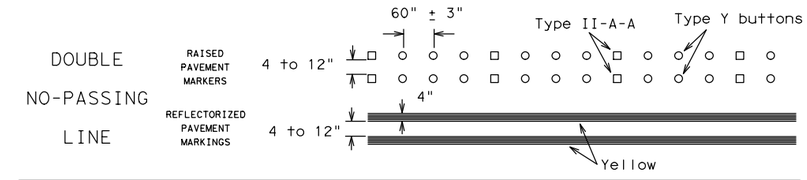
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

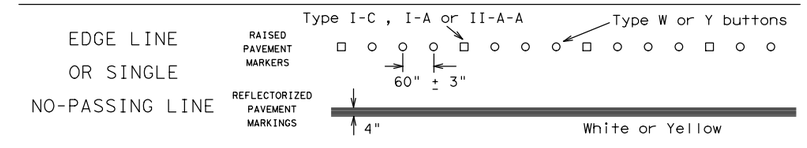
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

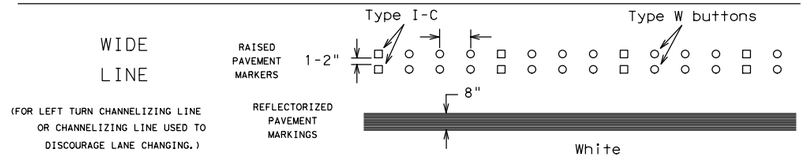


EDGE LINE OR SINGLE NO-PASSING LINE



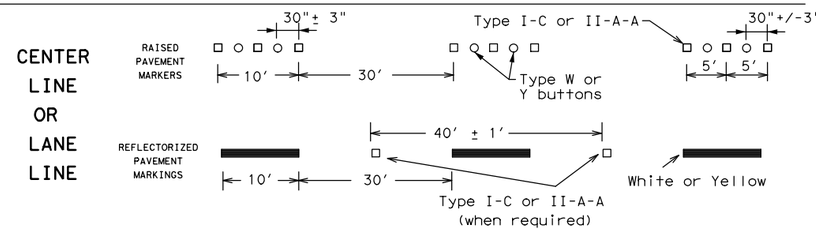
WIDE LINE

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

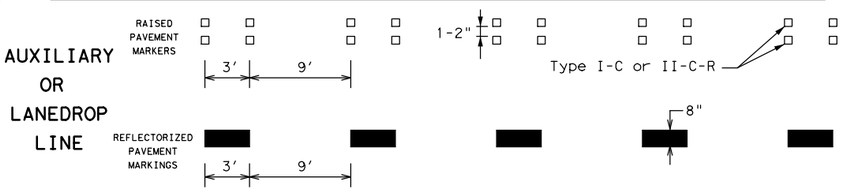


BROKEN LINES

CENTER LINE OR LANE LINE

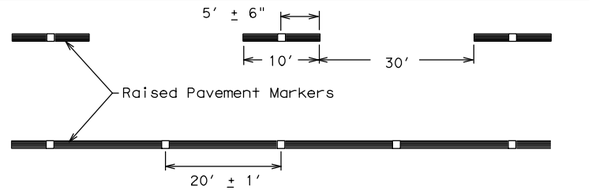


AUXILIARY OR LANEDROP LINE



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."

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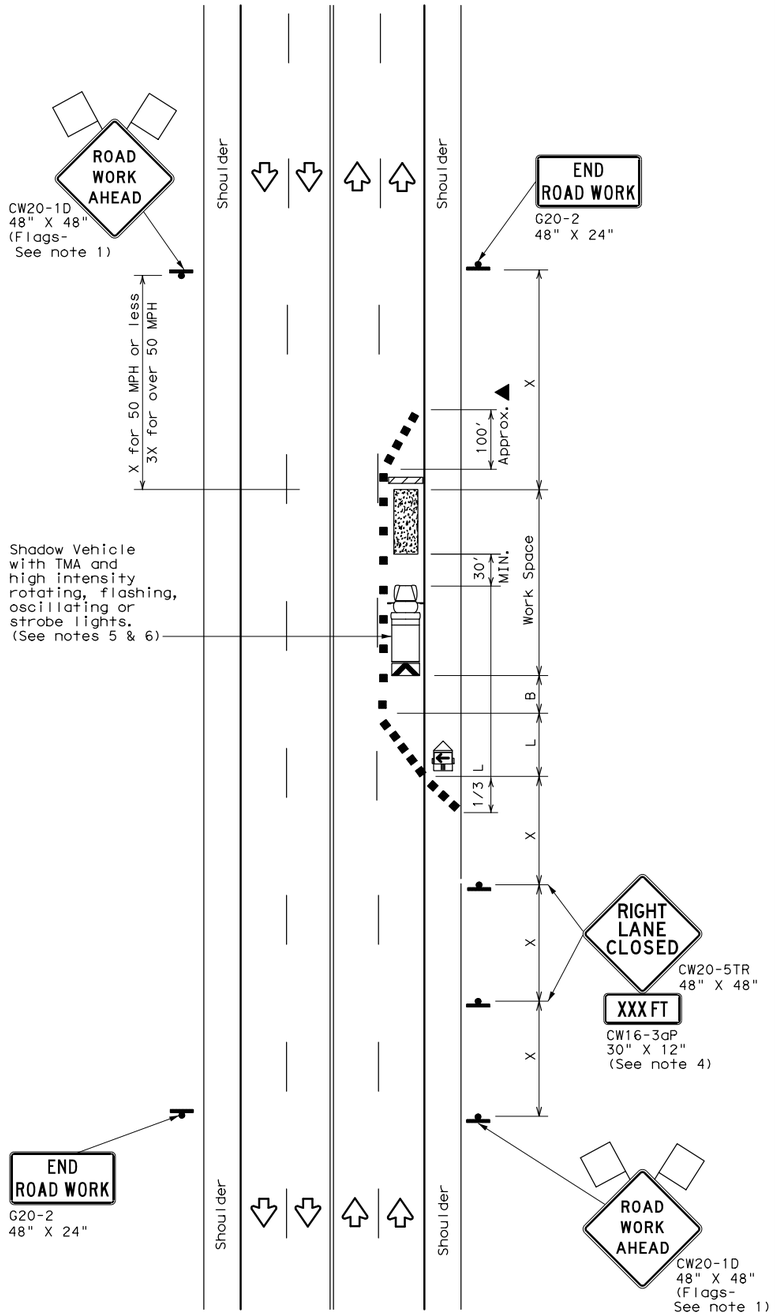
BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

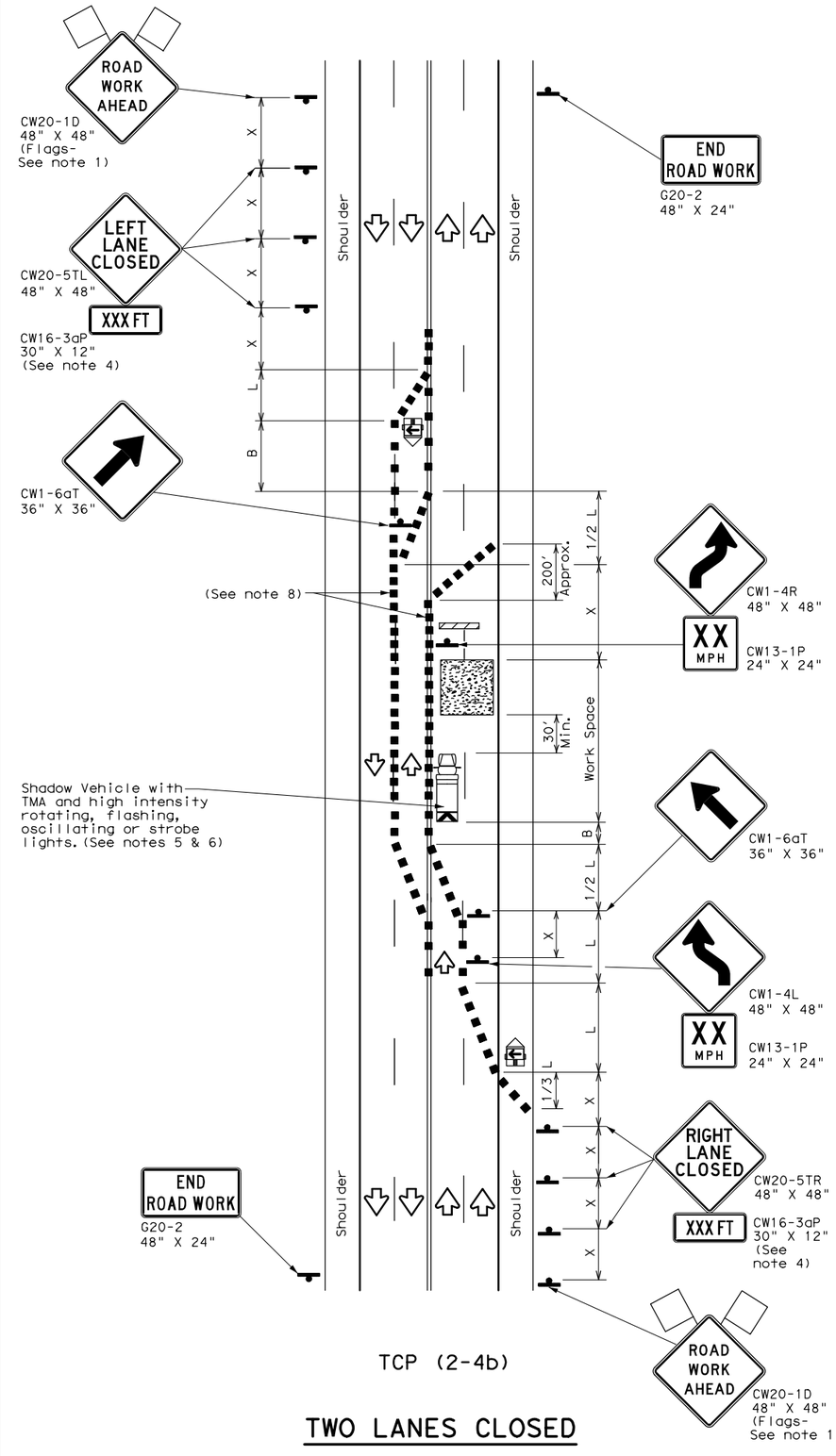
BC(12)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 1-97 9-07 5-21 2-98 7-13 11-02 8-14	0921	06	302,ETC	TEEGE,ETC
	DIST	COUNTY		SHEET NO.
	PHARR	CAMERON,ETC		31



TCP (2-4a)

ONE LANE CLOSED



TCP (2-4b)

TWO LANES CLOSED

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. The downstream taper is optional. When used, it should be 100 feet minimum length per lane.
4. For short term applications, when post mounted signs are not used, the distance legend may be shown on the sign face rather than on a CW16-3aP supplemental plaque.
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 in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.

TCP (2-4a)

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

TCP (2-4b)

8. 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 devices spacing is intended for the area of conflicting markings, not the entire work zone.

Texas Department of Transportation

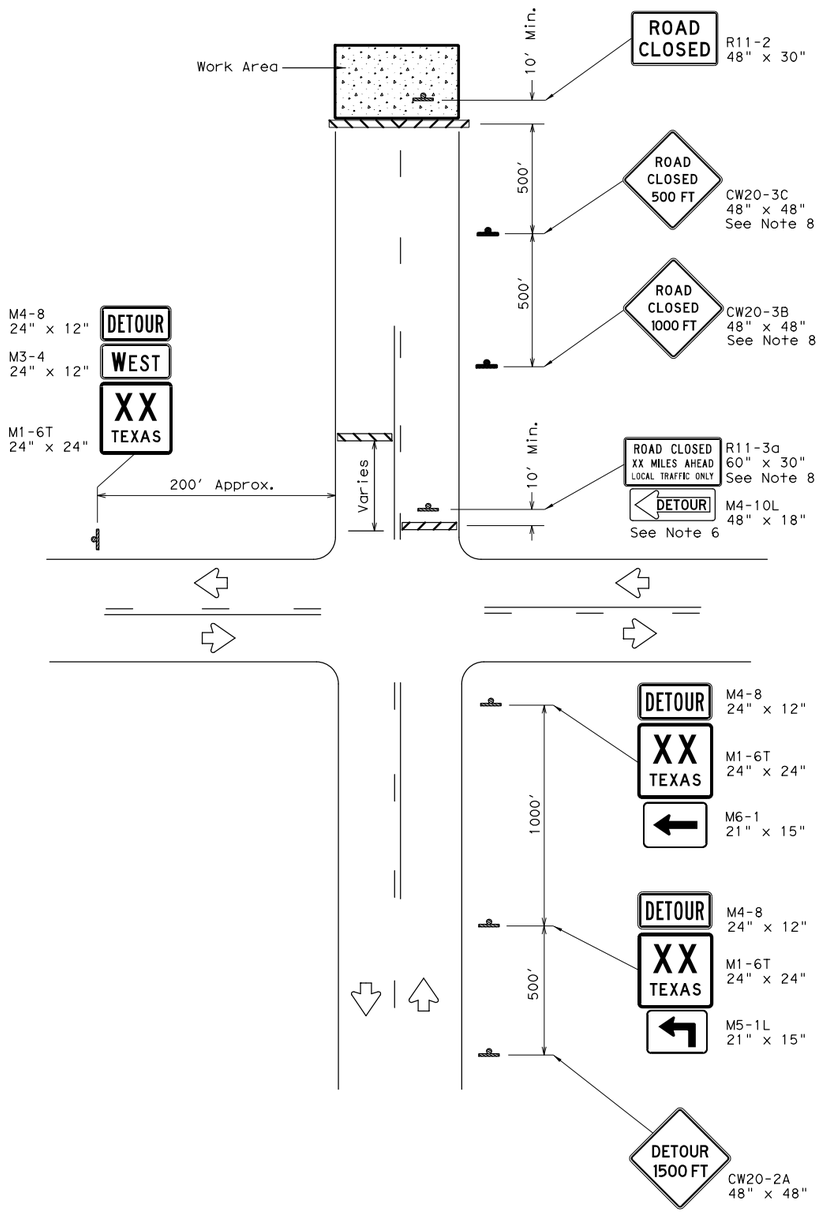
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

TCP(2-4)-18

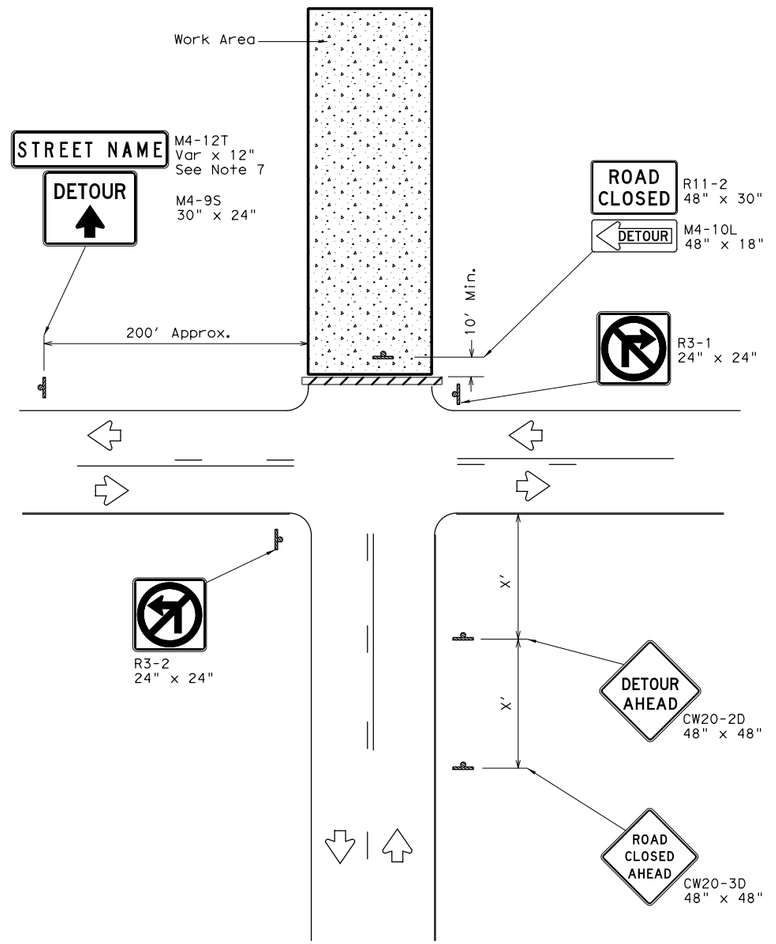
FILE: tcp2-4-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03	0921	06	302,ETC	TEEGE,ETC
1-97 2-12	DIST	COUNTY		SHEET NO.
4-98 2-18	PHARR	CAMERON,ETC		32

DATE: 12/7/2022 9:58:35 AM
FILE: ...\Standards\TCP\tcp2-4-18.dgn



ROAD CLOSURE BEYOND THE INTERSECTION

Signing for a Numbered Route with an Off-Site Detour



ROAD CLOSURE AT THE INTERSECTION

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

LEGEND	
	Type 3 Barricade
	Sign

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

* Conventional Roads Only

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

WORK ZONE ROAD CLOSURE DETAILS

WZ(RCD)-13

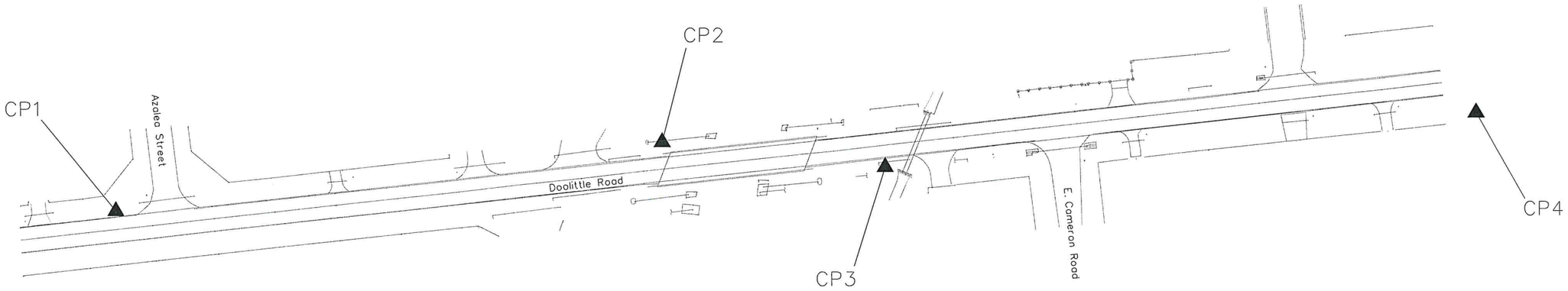
FILE: wzrcd-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 1995	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	302, ETC	TEEGE, ETC
1-97 4-98 7-13	DIST	COUNTY		SHEET NO.
2-98 3-03	PHARR	CAMERON, ETC		33

DATE: 12/7/2022 9:58:45 AM
FILE: ...\Standards\TCP\wzrcd-13.dgn

GRAPHIC SCALE

0' 50' 100' 200'

1" = 100'



POINT	NORTHING	EASTING	ELEVATION	DESCRIPTION
CP1	16,655,416.346	1,109,002.816	82.85	5/8" CIRS Stamped "TNP RANDOM", located 19.5' south of the south edge asphalt of Azalea Street, 18' west of the west edge asphalt of Doolittle Road, and 13' northeast from a 5' chain link fence.
CP2	16,655,888.552	1,109,067.354	83.80	5/8" CIRS Stamped "TNP RANDOM", located 376' north of the north edge asphalt of Azalea Street, 31.5' west of the west edge asphalt of Doolittle Road, and 60' southerly from the south edge of a concrete wingwall.
CP3	16,656,069.503	1,109,137.819	83.94	5/8" CIRS Stamped "TNP RANDOM", located 12' east of the east edge asphalt of Doolittle Road, 128' south of the south edge asphalt of East Cameron Road, and 75' northeast from the north edge of a concrete wingwall.
CP4	16,656,575.724	1,109,224.617	85.79	5/8" CIRS Stamped "TNP RANDOM", located 10' east of the centerline of Doolittle Road, 361' north of the north edge asphalt of East Cameron Road, and 25' west of a 5' chain link fence.

▲ 5/8" IRON ROD WITH CAP STAMPED "TNP RANDOM"

STATE OF TEXAS
REGISTERED
MARVIN KING
5581
PROFESSIONAL
LAND SURVEYOR

Marvin King 04/16/2020

MARVIN KING, DATE
REGISTERED PROFESSIONAL LAND SURVEYOR
TEXAS REGISTRATION NO. 5581

NOTES:

1. BEARINGS OF LINES SHOWN HEREON REFER TO GRID NORTH OF THE TEXAS COORDINATE SYSTEM OF 1983 (SOUTH ZONE 4205; NAD83(2011) EPOCH 2010) AS DERIVED LOCALLY FROM TXDOT'S CONTINUOUSLY OPERATING REFERENCE STATIONS (CORS) VIA REAL TIME KINEMATIC (RTK) METHODS. AN AVERAGE COMBINATION FACTOR OF 1.00004 WAS USED TO SCALE GRID COORDINATES AND DISTANCES TO SURFACE. ALL COORDINATES SHOWN ARE SURFACE.

2. THE ELEVATIONS SHOWN ARE NAVD88 AND WERE DERIVED FROM THE ABOVE RTK OBSERVATIONS. ORTHOMETRIC HEIGHTS WERE CALCULATED BY APPLYING THE GEOID12B MODEL TO THE ELLIPSOID HEIGHTS.

3. FIELD SURVEYS WERE CONDUCTED BY TEAGUE NALL & PERKINS, INC., APRIL 2020

DRAWING DATE: 03/16/2020

Texas Department of Transportation

TBPELS FIRM No. 10011600

tnp
teague nall & perkins

DOOLITTLE ROAD HORIZONTAL & VERTICAL SURVEY CONTROL

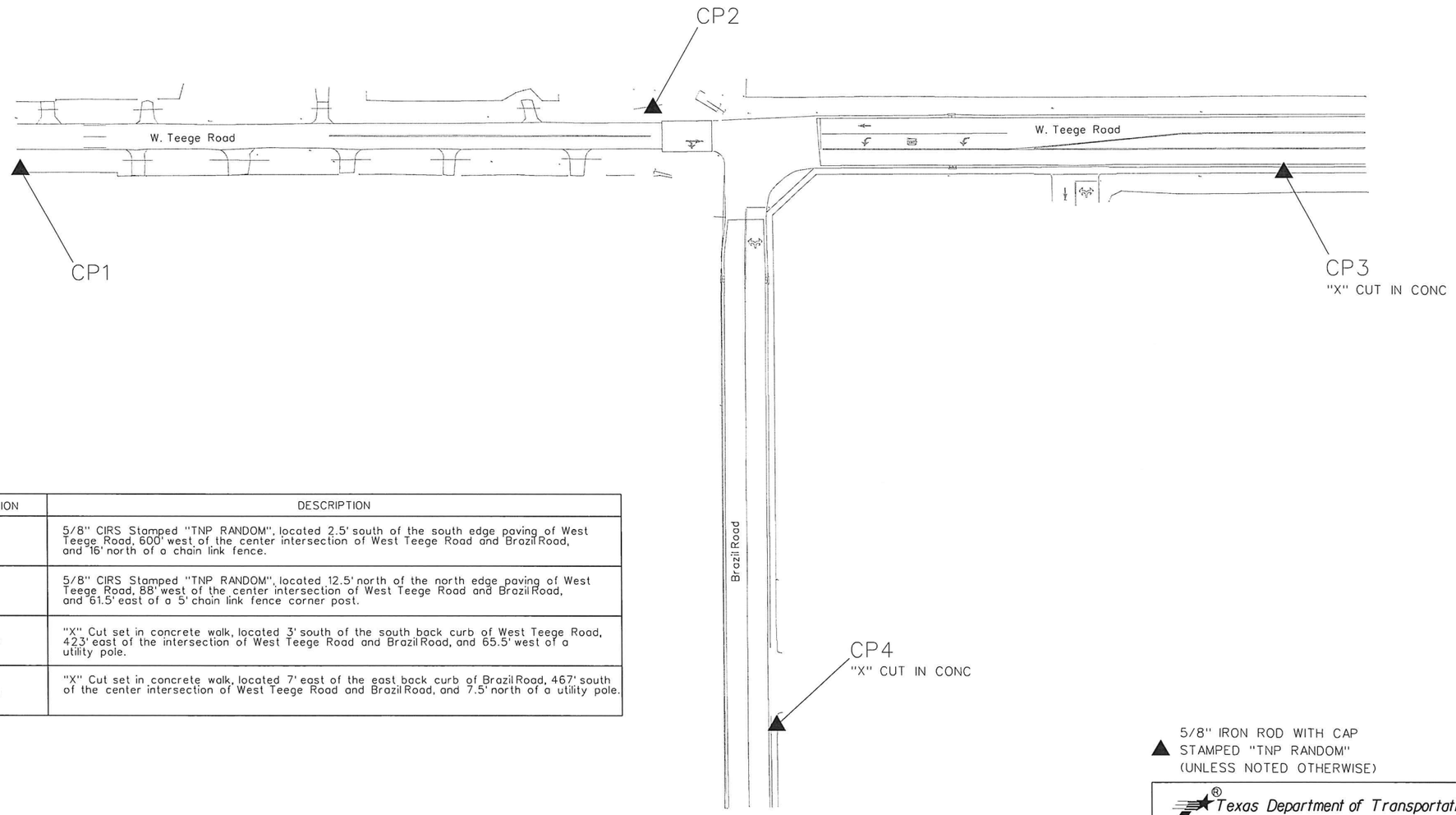
SHEET 1 OF 1

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
6			TEEGE, ETC.
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	PHARR	CAMERON, ETC.	34
CONTROL	SECTION	JOB	
0921	02	302, ETC.	

GRAPHIC SCALE

0' 50' 100' 200'

1" = 100'



POINT	NORTHING	EASTING	ELEVATION	DESCRIPTION
CP1	16,598,190.020	1,237,489.444	40.41	5/8" CIRS Stamped "TNP RANDOM", located 2.5' south of the south edge paving of West Teege Road, 600' west of the center intersection of West Teege Road and Brazil Road, and 16' north of a chain link fence.
CP2	16,598,239.815	1,237,999.223	39.16	5/8" CIRS Stamped "TNP RANDOM", located 12.5' north of the north edge paving of West Teege Road, 88' west of the center intersection of West Teege Road and Brazil Road, and 61.5' east of a 5' chain link fence corner post.
CP3	16,598,187.974	1,238,507.095	38.29	"X" Cut set in concrete walk, located 3' south of the south back curb of West Teege Road, 423' east of the intersection of West Teege Road and Brazil Road, and 65.5' west of a utility pole.
CP4	16,597,743.854	1,238,095.909	38.95	"X" Cut set in concrete walk, located 7' east of the east back curb of Brazil Road, 467' south of the center intersection of West Teege Road and Brazil Road, and 7.5' north of a utility pole.

STATE OF TEXAS
REGISTERED
MARVIN KING
5581
PROFESSIONAL
LAND SURVEYOR

Marvin King 04/16/2020

MARVIN KING, DATE
REGISTERED PROFESSIONAL LAND SURVEYOR
TEXAS REGISTRATION NO. 5581

DRAWING DATE: 04/16/2020

NOTES:

1. BEARINGS OF LINES SHOWN HEREON REFER TO GRID NORTH OF THE TEXAS COORDINATE SYSTEM OF 1983 (SOUTH ZONE 4205; NAD83(2011) EPOCH 2010) AS DERIVED LOCALLY FROM TXDOT'S CONTINUOUSLY OPERATING REFERENCE STATIONS (CORS) VIA REAL TIME KINEMATIC (RTK) METHODS. AN AVERAGE COMBINATION FACTOR OF 1.00004 WAS USED TO SCALE GRID COORDINATES AND DISTANCES TO SURFACE. ALL COORDINATES SHOWN ARE SURFACE.

2. THE ELEVATIONS SHOWN ARE NAVD88 AND WERE DERIVED FROM THE ABOVE RTK OBSERVATIONS. ORTHOMETRIC HEIGHTS WERE CALCULATED BY APPLYING THE GEOID12B MODEL TO THE ELLIPSOID HEIGHTS.

3. FIELD SURVEYS WERE CONDUCTED BY TEAGUE NALL & PERKINS, INC., APRIL 2020

▲ 5/8" IRON ROD WITH CAP STAMPED "TNP RANDOM" (UNLESS NOTED OTHERWISE)

Texas Department of Transportation

TBPELS FIRM No. 10016-00

tnp
teague nall & perkins

W. TEEGE ROAD HORIZONTAL & VERTICAL SURVEY CONTROL

SHEET 1 OF 1

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
6			TEEGE, ETC.
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	PHARR	CAMERON, ETC	35
CONTROL	SECTION	JOB	
0921	06	302, ETC	

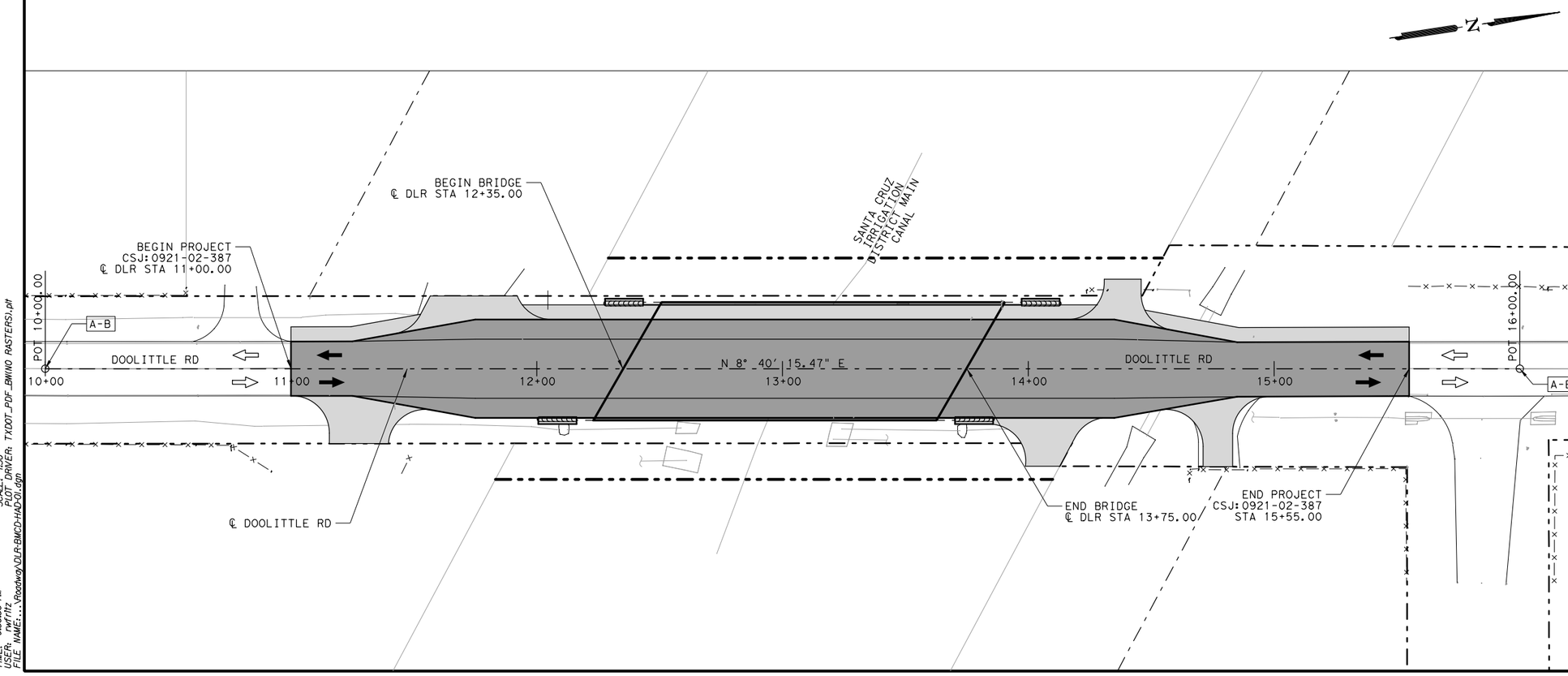
DOOLITTLE RD CENTERLINE

Beginning chain DLR description
==========
(A-B)

Point DLR01	N	16,655,646.17	E	1,109,054.14	Sta 10+00.00
Course from DLR01 to DLR02 N 8° 40′ 15.47" E Dist 600.00					
Point DLR02	N	16,656,239.31	E	1,109,144.60	Sta 16+00.00

==========
(A-E)
Ending chain DLR description

HORIZ: 0 25 50
SCALE IN FEET



STATE OF TEXAS
RYAN W. FRITZ
112568
LICENSED
PROFESSIONAL ENGINEER
12/07/2022

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL RD,
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

Texas Department of Transportation

DOOLITTLE ROAD
HORIZONTAL ALIGNMENT DATA

SCALE = 1"=50′

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	TEEGE, ETC
DRAWN LEH	STATE	DISTRICT	COUNTY
CHECK SPC	TEXAS	PHARR	CAMERON, ETC
CHECK SPC	CONTROL	SECTION	JOB
	0921	06	302, ETC

SHEET NO. 36

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DATE: 12/7/2022
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USER: rwfritz
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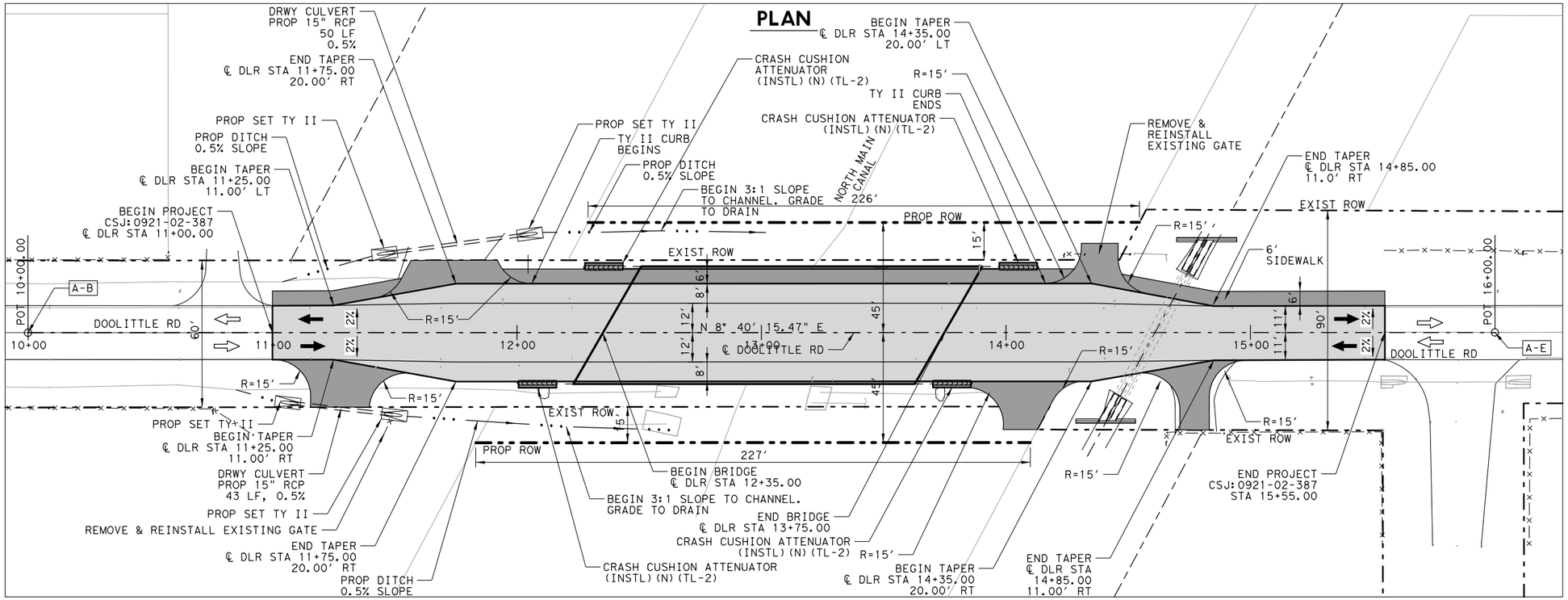
PLAN



HORIZ: 0 50 100 — SCALE IN FEET

VERT: 0 5 10 — SCALE IN FEET

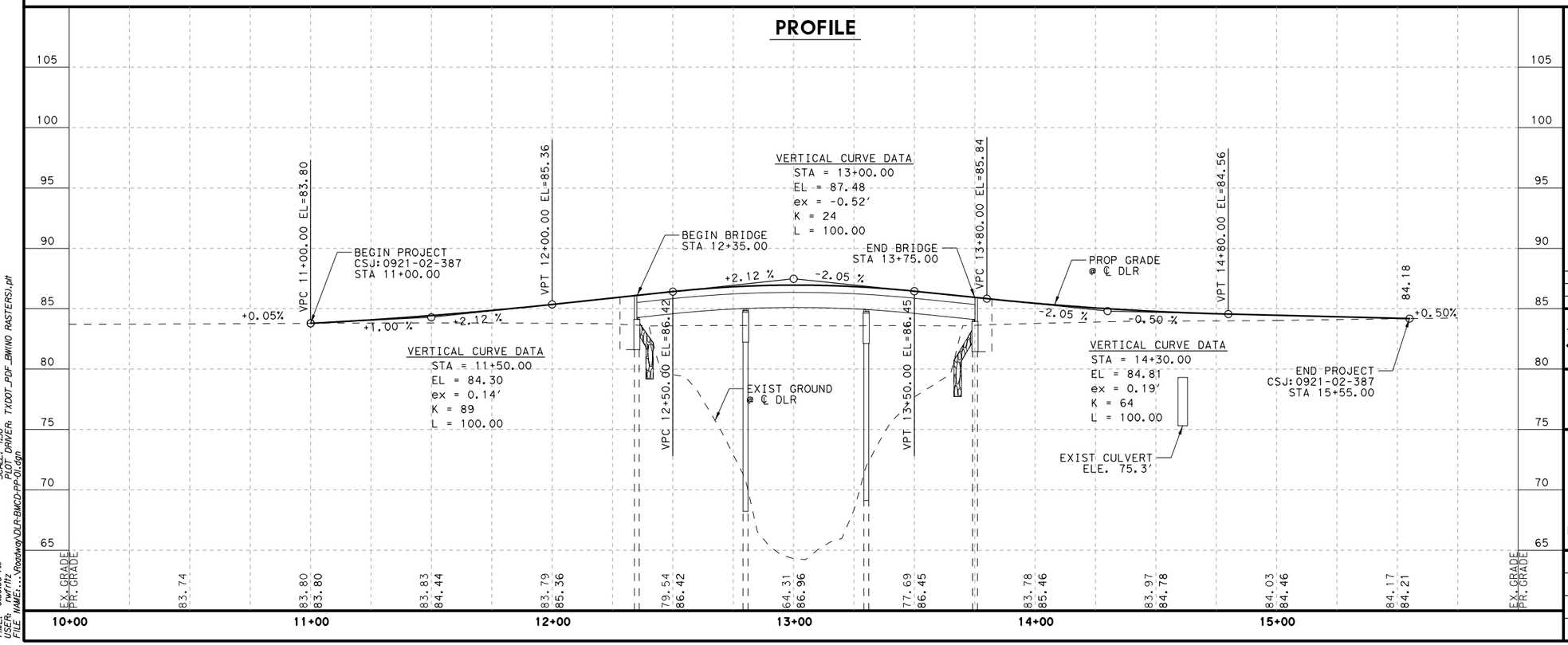
LEGEND

- EXISTING FENCE/ASSUMED ROW
- ASSUMED ROW
- PROPOSED ROW
- EXISTING EASEMENT
- PROPOSED ROADWAY
- PROPOSED SIDEWALK/DRIVEWAY
- PROPOSED TRAFFIC
- EXISTING TRAFFIC
- PROPOSED DITCH

NOTES:

1. SEE HORIZONTAL ALIGNMENT DATA SHEET FOR MORE INFORMATION.
2. ALL UTILITIES TO BE RELOCATED. SEE UTILITY MAP FOR REFERENCE.

PROFILE



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NAME:...\Roadway\DLR-BMCD-PP-01.dgn
USER: rwfritz
TIME: 955906 AM
DATE: 12/7/2022

STATE OF TEXAS
RYAN W. FRITZ
112568
LICENSED
PROFESSIONAL ENGINEER
12/07/2022

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL RD, SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

DOOLITTLE ROAD
PLAN AND PROFILE

HORIZONTAL = 1"=50'
VERTICAL = 1"=5'

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	TEEGE, ETC
DRAWN LEH	STATE	DISTRICT	COUNTY
CHECK SPC	TEXAS	PHARR	CAMERON, ETC
CHECK SPC	CONTROL	SECTION	JOB
	0921	06	302, ETC

SHEET NO. 37

HORIZONTAL ALIGNMENT DATA

Beginning chain PRTEEGE description

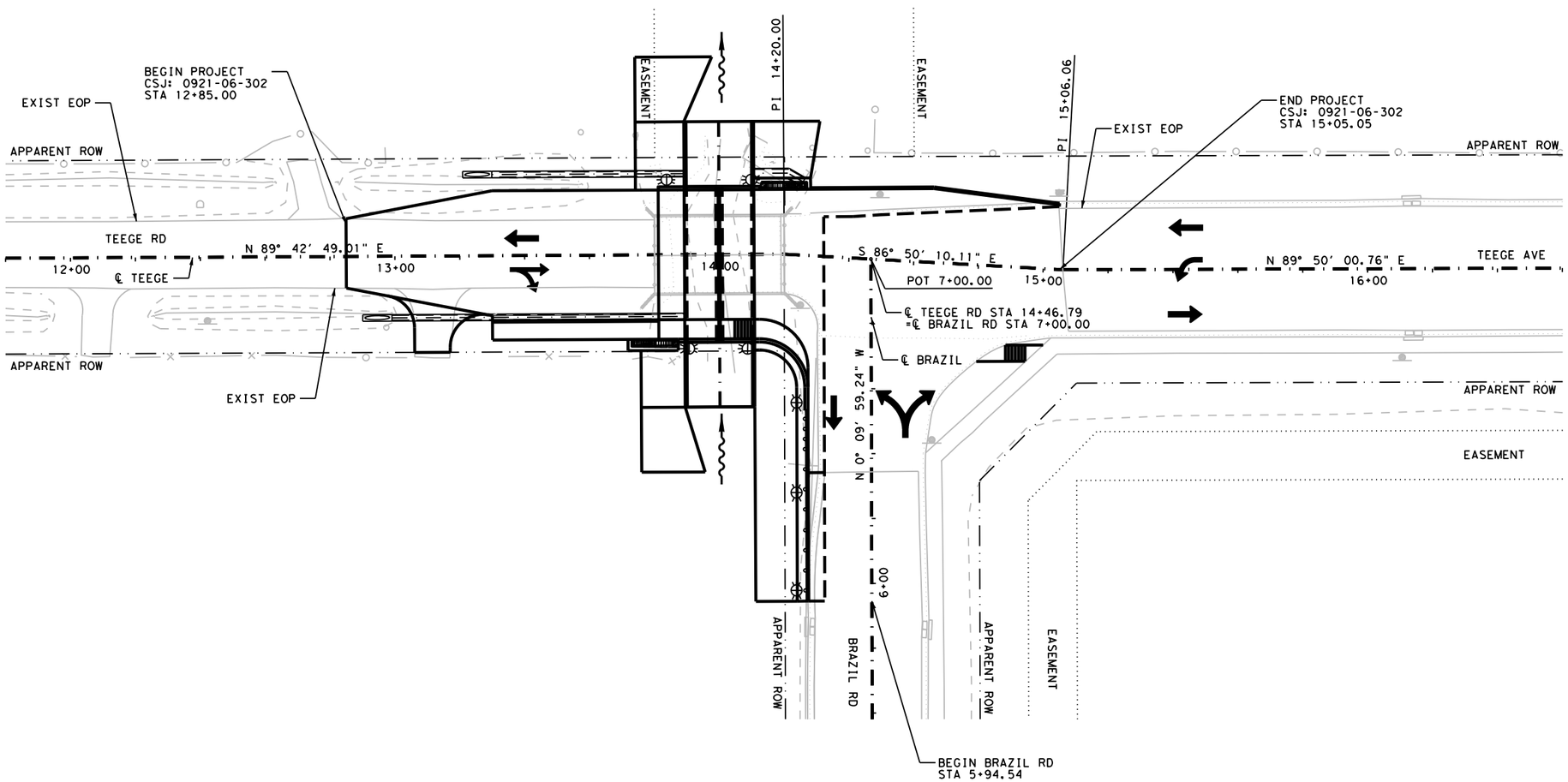
Point PRTEEGE1	N 16,598,210.7099	E 1,236,726.2527	Sta	1+00.00
Course from PRTEEGE1 to PRTEEGE2 N 89° 42' 49.01" E Dist 1,320.0000				
Point PRTEEGE2	N 16,598,217.3078	E 1,238,046.2363	Sta	14+20.00
Course from PRTEEGE2 to PRTEEGE3 S 86° 50' 10.11" E Dist 86.0620				
Point PRTEEGE3	N 16,598,212.5579	E 1,238,132.1670	Sta	15+06.06
Course from PRTEEGE3 to PRTEEGE4 N 89° 50' 00.76" E Dist 598.9381				
Point PRTEEGE4	N 16,598,214.2979	E 1,238,731.1026	Sta	21+05.00

Ending chain PRTEEGE description

Beginning chain PRBRAZIL description

Point PRBRAZIL1	N 16,597,675.8327	E 1,238,074.5563	Sta	1+60.00
Course from PRBRAZIL1 to PRBRAZIL2 N 0° 09' 59.24" W Dist 540.0000				
Point PRBRAZIL2	N 16,598,215.8304	E 1,238,072.9875	Sta	7+00.00

Ending chain PRBRAZIL description



0 20' 40'

SCALE: 1"=40'

12/7/2022

STATE OF TEXAS
AARON DEBORD
96578
LICENSED
PROFESSIONAL ENGINEER

REV	BY	DESCRIPTION	DATE

AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TBPE FIRM REGISTRATION #739

2021
Texas Department of Transportation

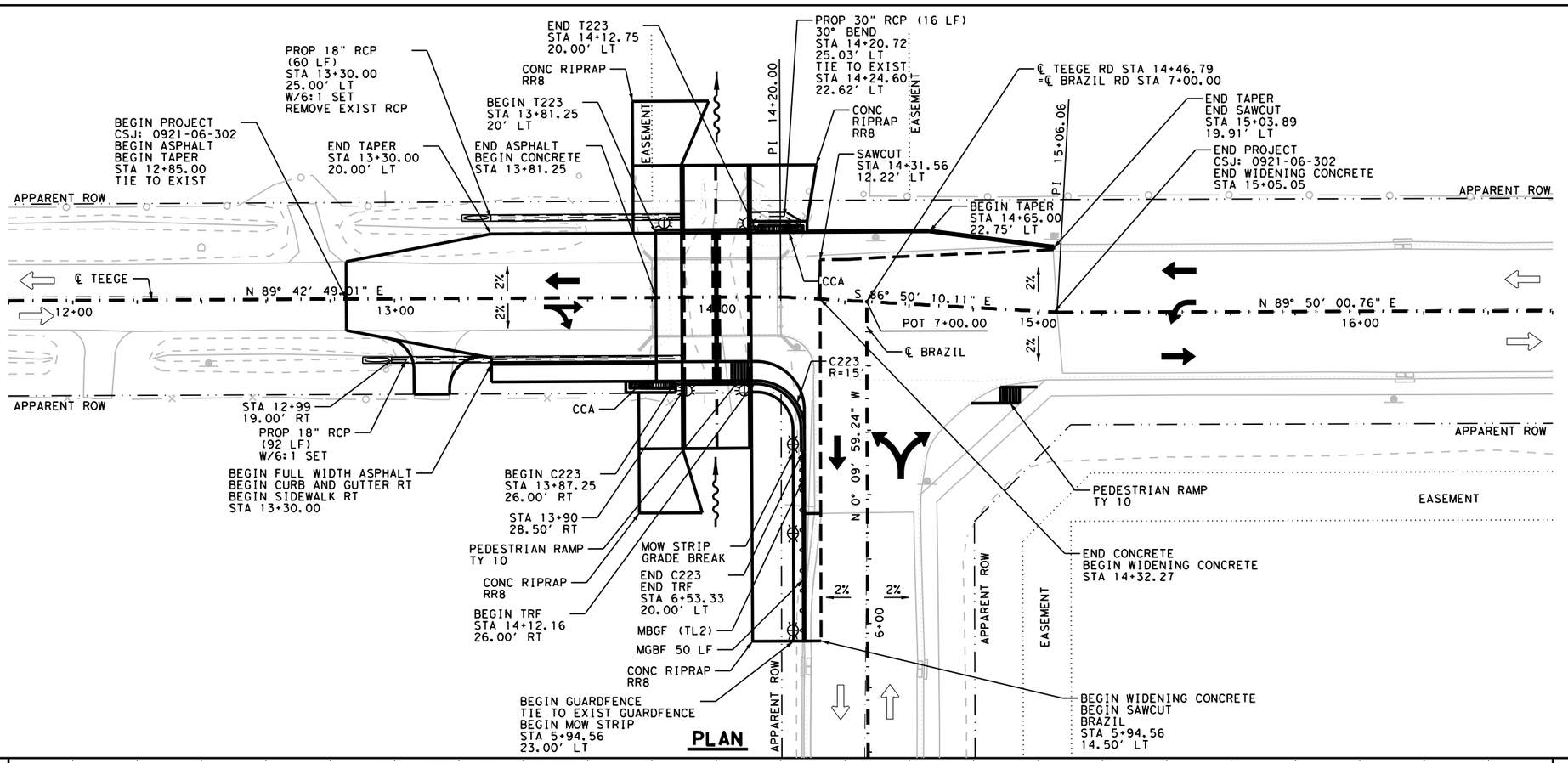
TEEGE ROAD

PROJECT LAYOUT AND HORIZONTAL ALIGNMENT DATA

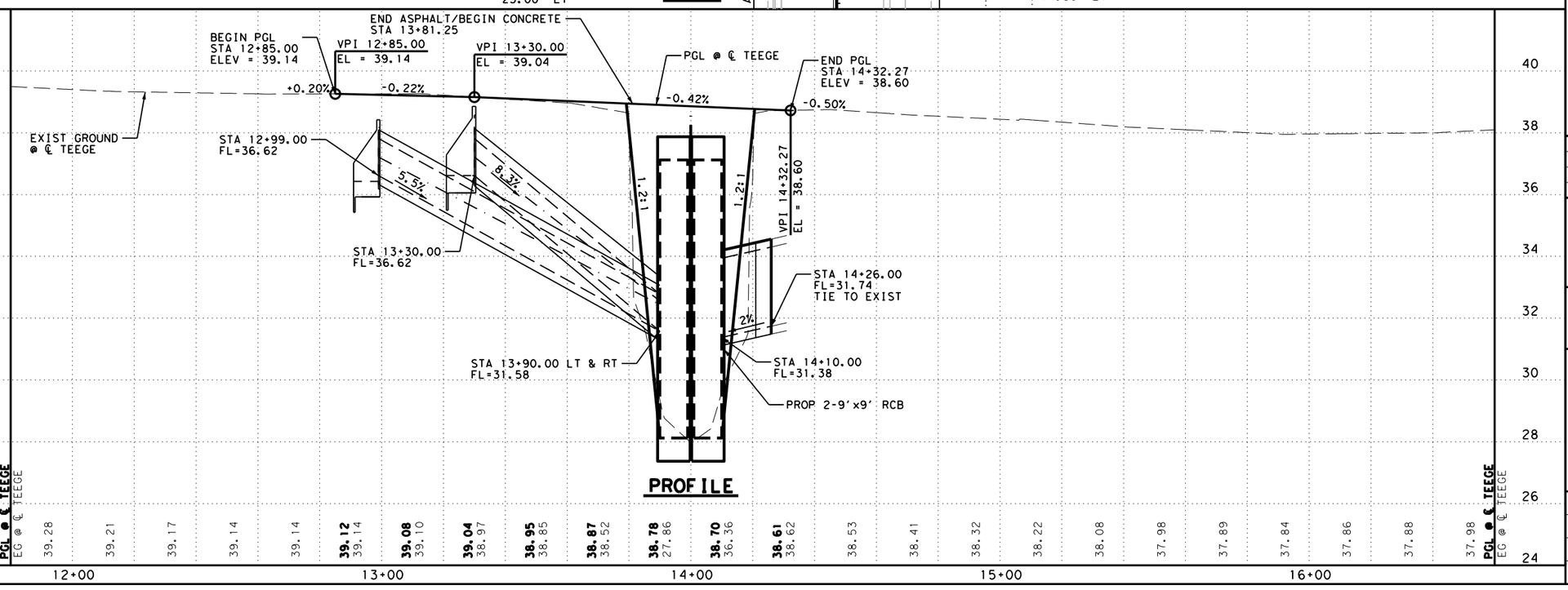
DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
ASD	6	SEE TITLE SHEET		TEEGE,ETC
DESIGN CK	STATE	DISTRICT	COUNTY	SHEET NO.
HLT	TEXAS	PHARR	CAMERON, ETC	38
GRAPHICS	CONTROL	SECTION NO.	JOB	
AJG	0921	06	302, ETC	
GRAPHICS CK				
TJR				

Design Filename: c:\pw-af\pw-af-prod\grace traweek\d0106911\TEEGE*AF*GEN*LAYOUT*01.dgn

Plotted on: 12/6/2022 1:34:14 PM gtraweek



PLAN



PROFILE

LEGEND

- APPARENT ROW
- DIRECTION OF FLOW
- PROPOSED TRAFFIC
- EXISTING TRAFFIC
- CRASH CUSHION ATTENUATOR (INSTL) (N) (TL-2)

NOTES:

1. SEE HORIZONTAL ALIGNMENT DATA SHEET FOR MORE INFORMATION.

SCALE: 1"=40'H
1"= 4'V

12/7/2022

AARON DEBORD
96578
LICENSED
PROFESSIONAL ENGINEER

REV	BY	DESCRIPTION	DATE

AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TBPE FIRM REGISTRATION #739

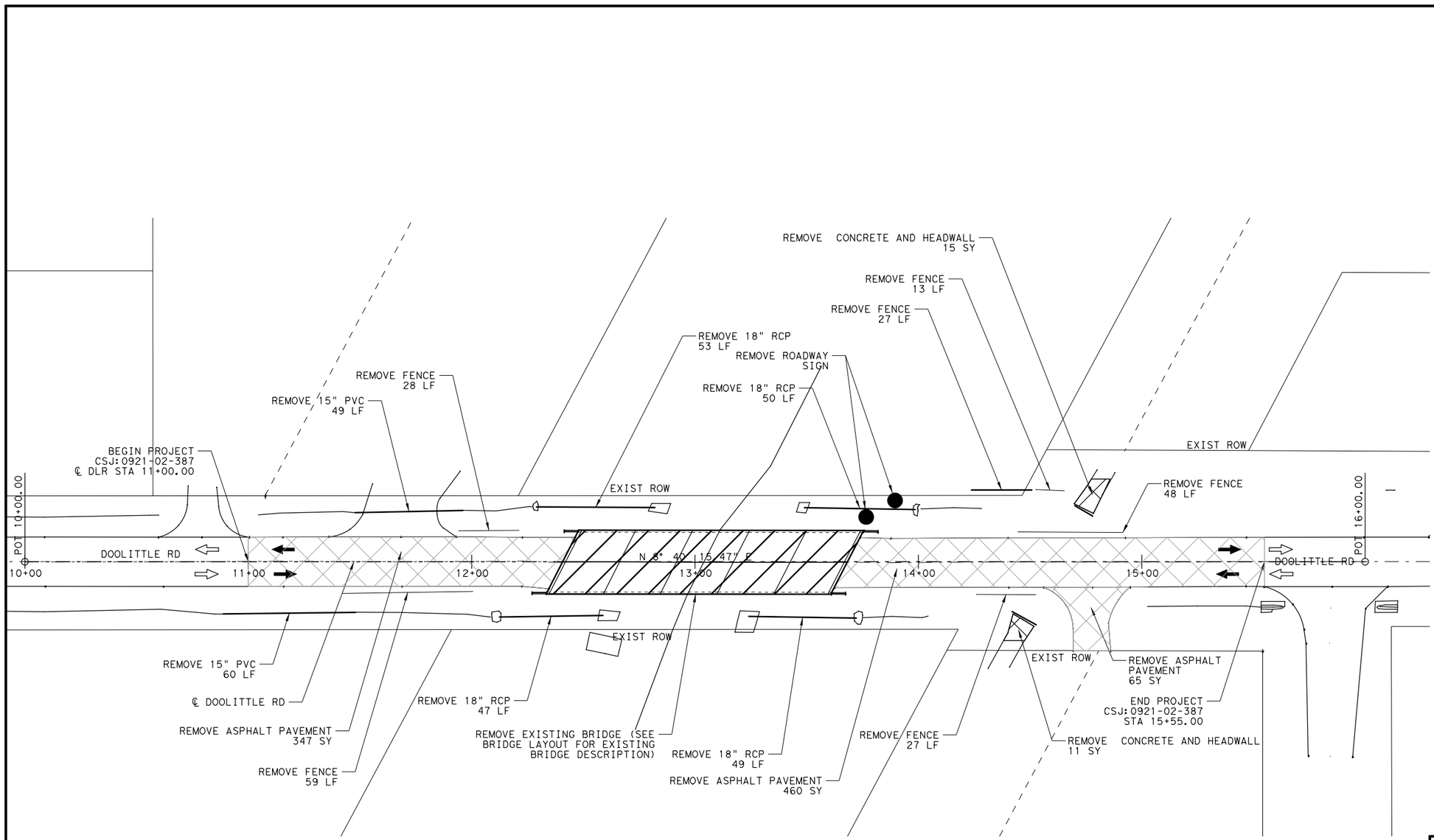
2021
Texas Department of Transportation

TEEGE ROAD

PLAN & PROFILE

DESIGN	FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
ASD	6	SEE TITLE SHEET		TEEGE,ETC
DESIGN CK	STATE	DISTRICT	COUNTY	SHEET NO.
HLT	TEXAS	PHARR	CAMERON, ETC	39
GRAPHICS	CONTROL	SECTION NO.	JOB	
AJG	0921	06	302, ETC	
GRAPHICS CK				
TJR				

Design Filename: c:\pw-of\pw-of-prod\grace troweek\d0106914\TEEGE*AF*RDW*P&P*01.dgn
Plotted on: 12/6/2022 1:34:21 PM gtroweek



STATE OF TEXAS
RYAN W. FRITZ
112568
LICENSED
PROFESSIONAL ENGINEER

12/07/2022

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL RD,
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

Texas Department of Transportation

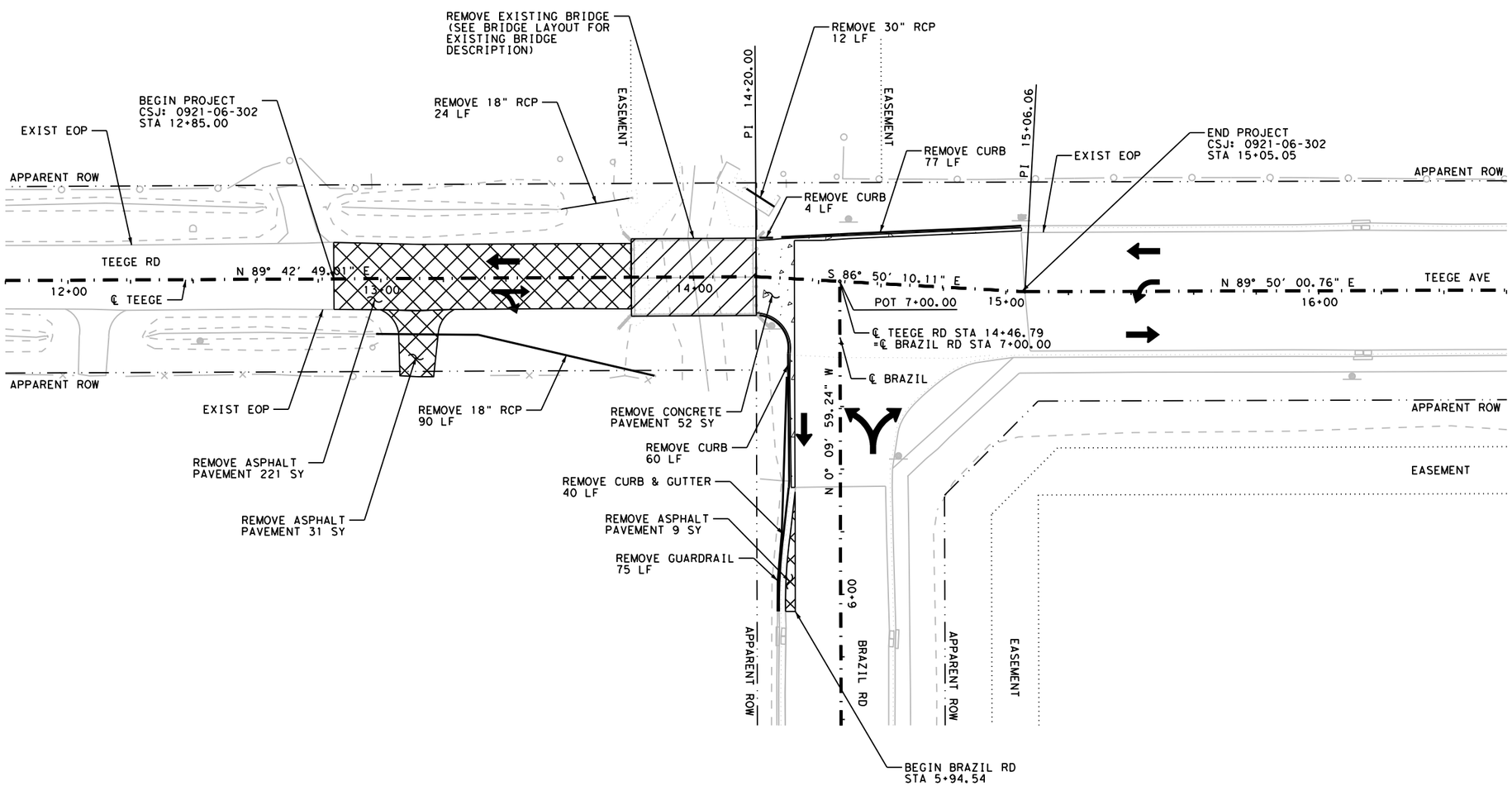
DOOLITTLE ROAD
REMOVAL LAYOUT

SCALE = 1"=50'

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	TEEGE, ETC
DRAWN LEH	STATE	DISTRICT	COUNTY
CHECK BKB	TEXAS	PHARR	CAMERON, ETC
CHECK BKB	CONTROL	SECTION	JOB
	0921	06	302, ETC

SHEET NO. 40

DATE: 12/7/2022
TIME: 9:59:43 AM
USER: rwfritz
FILE NAME: ...\Roadway\DLR-BMCD-REM-01.dgn
PENTABLE: CSJ 0921-02-331(Charles Green Rd).tbl
SCALE: 1:50
PLOT DRIVER: TXDOT_PDF_BW.INO RASTERS).pltf



LEGEND

- REMOVING STAB BASE & ASPH PAV (0-6")
- REMOVING CONC (PAV)
- REMOV STR (BRIDGE 0-99 FT LENGTH)

0 20' 40'
SCALE: 1"=40'

12/7/2022

STATE OF TEXAS
AARON DEBORD
96578
LICENSED
PROFESSIONAL ENGINEER

REV	BY	DESCRIPTION	DATE

AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TBPE FIRM REGISTRATION #739

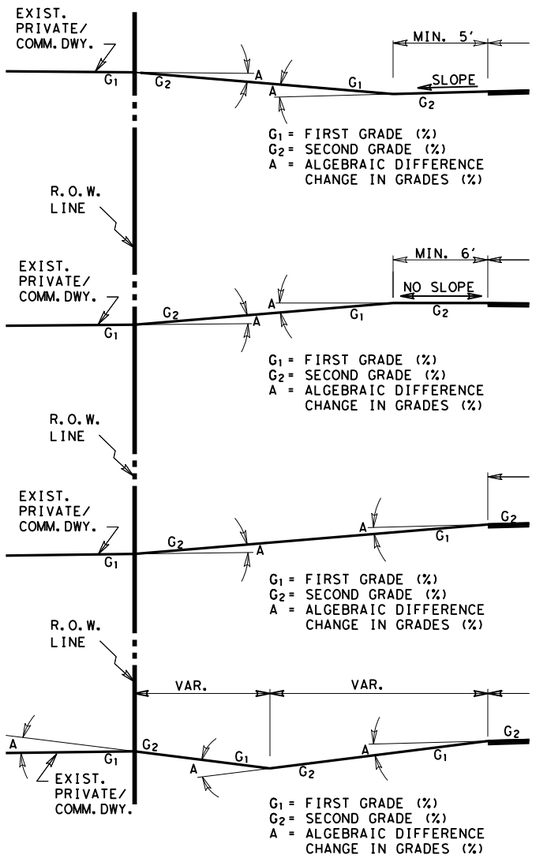
2021
Texas Department of Transportation

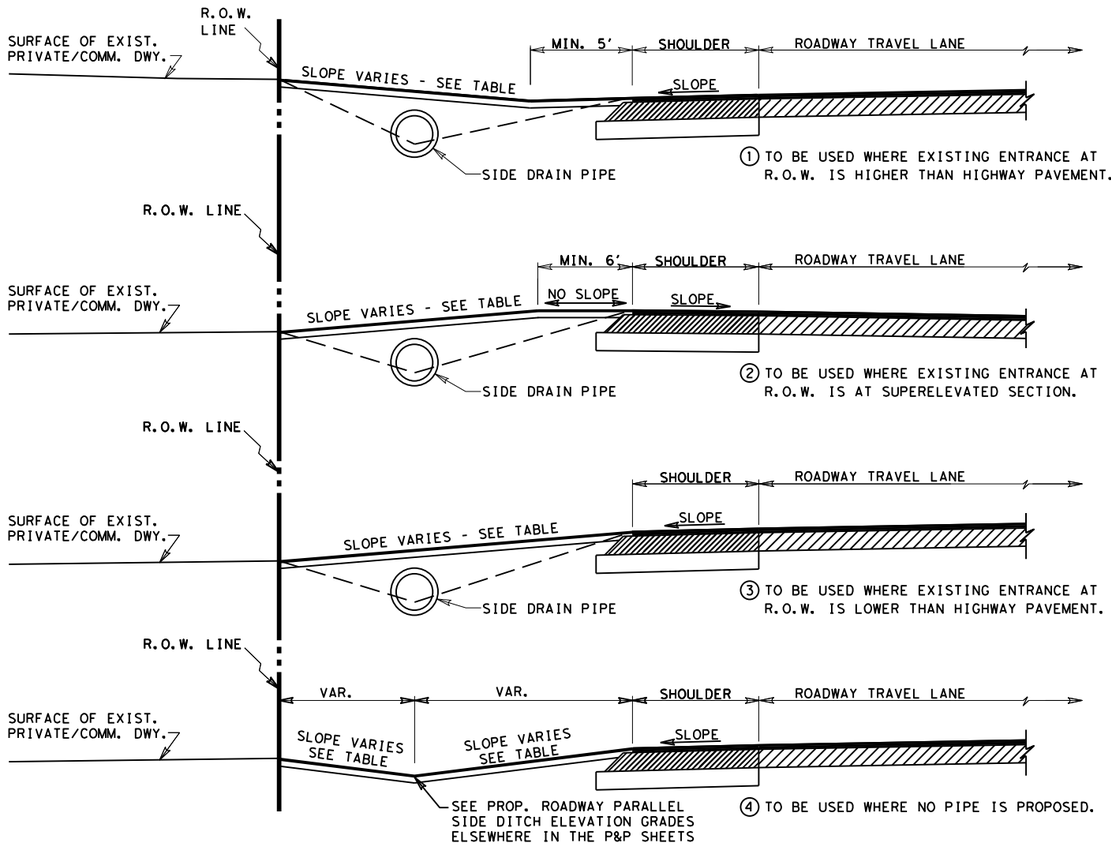
TEEGE ROAD

REMOVAL LAYOUT

DESIGN	FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
ASD	6	SEE TITLE SHEET		TEEGE,ETC
DESIGN CK: HLT	STATE	DISTRICT	COUNTY	SHEET NO.
GRAPHICS: AJG	TEXAS	PHARR	CAMERON, ETC	41
GRAPHICS CK: TJR	CONTROL	SECTION NO.	JOB	
	0921	06	302, ETC	

Design Filename: c:\pw-of\pw-of-prod\grace traweek\d0106914\TEEGE*AF*ROW*RML*01.dgn
Plotted on: 12/6/2022 1:34:28 PM gtraweek

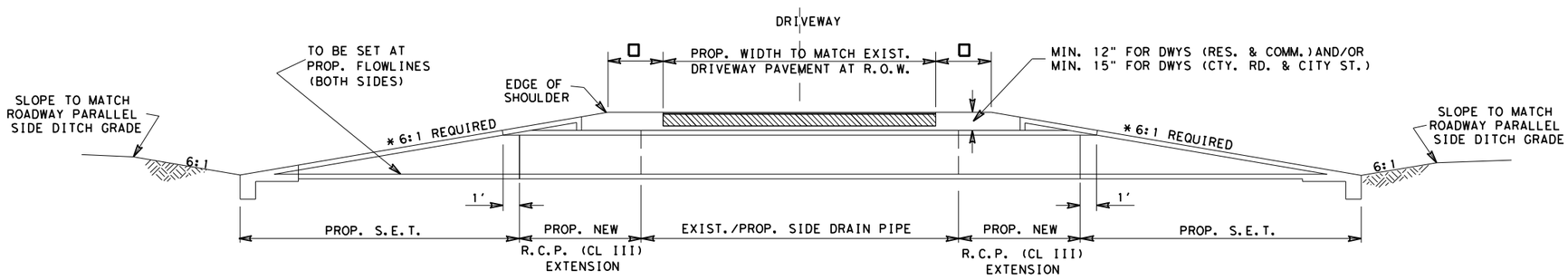




TYPICAL ENTRANCE PROFILE FOR DRIVEWAYS W/OUT C&G

PROPOSED DRIVEWAY SLOPE TABLE
COMMERCIAL DRIVEWAYS @ 12:1 MAX.
RESIDENTIAL DRIVEWAYS @ 8:1 MAX.

PROP. DWY ALGEBRAIC DIFFERENCE TABLE
COMMERCIAL DRIVEWAYS @ A = 6% DESIRABLE
RESIDENTIAL DRIVEWAYS @ A = 8% DESIRABLE
FORMULA, A=G2-G1



□ - 1' MIN. ON DRIVEWAYS (RES. & COMM.)
2' MIN. ON DRIVEWAYS (COUNTY RD. & CITY ST.)

* - 6:1 SLOPE REQUIRED

NOTES:

ALL ENTRANCES CONSTRUCTED ON THIS PROJECT ARE SUBJECT TO CONCURRENCE WITH EXISTING GOVERNING REGULATIONS AS SET OUT BY THE STATE - TEXAS TRANSPORTATION COMMISSION.

ENTRANCE'S BASE AND SURFACING MAY BE EXTENDED BEYOND R.O.W. LINE AS REQUIRED TO MEET EXISTING DRIVEWAY GRADE IN A SATISFACTORY MANNER OF WHICH NO STEEPER THAN 12:1 FOR COMMERCIAL DRIVEWAY AND 8:1 FOR RESIDENTIAL DRIVEWAY SLOPE WILL BE CONSTRUCTED.

ALL FLEXIBLE BASE USED FOR PRIVATE DRIVES & COMMERCIAL DRIVES WILL NOT REQUIRE LIME TREATMENT.

EXACT LOCATIONS, DIMENSIONS, AND TYPE TO BE ESTABLISHED DURING CONSTRUCTION BY THE ENGINEER.

PROP. WIDTH OF DRIVEWAYS TO MATCH EXISTING WIDTH AT R.O.W. LINE.

114 #/SY ACP (COMPACTED) IS EQUAL TO 1 IN. DEPTH,
171 #/SY ACP (COMPACTED) IS EQUAL TO 1½ IN. DEPTH.

SIDE DRAIN PIPES TO BE INSTALLED WHERE ROADWAY DITCH DRAINAGE IS NECESSARY, AS INDICATED ON PLANS AND/OR AS DIRECTED BY THE ENGINEER.

SIDE DRAIN PIPES TO BE INSTALLED WITH A MINIMUM OF 12" COVER WITH PROPOSED RESIDENTIAL & COMMERCIAL DRIVEWAY MATERIAL OR 15" COVER WITH PROPOSED COUNTY ROAD & CITY STREET ROADWAY MATERIAL.

AVERAGE DRIVEWAY DIMENSIONS SHOWN ON TABLE OF DRIVEWAYS (ELSEWHERE IN PLANS) ARE FOR ESTIMATING PURPOSES ONLY. ACTUAL DRIVEWAY DIMENSIONS MAY BE CHANGED BY THE ENGINEER BASED ON EXISTING FIELD CONDITIONS.

THE RATE OF PRIME COAT SHALL BE 0.10 GAL/SY FOR PRIVATE AND/OR COMMERCIAL DRIVEWAYS AND 0.20 GAL/SY FOR PUBLIC DRIVEWAYS (COUNTY ROADS AND/OR CITY STREETS).

TYPICALLY A CHANGE IN GRADE OF THREE PERCENT (3%) OR LESS AND A DISTANCE BETWEEN CHANGES IN GRADE OF AT LEAST ELEVEN FEET (11') ACCOMMODATES MOST VEHICLES. HOWEVER, LITERATURE SUGGESTS THAT A SIX PERCENT (6%) TO EIGHT PERCENT (8%) CHANGE IN GRADE MAY OPERATE EFFECTIVELY. INDIVIDUAL SITE CONDITIONS SHOULD BE EVALUATED TO ACCOMMODATE THE VEHICLE FLEET USING THE DRIVEWAY.

PHARR DISTRICT STANDARD

TEXAS DEPARTMENT OF TRANSPORTATION

DRIVEWAY PROFILE DETAILS

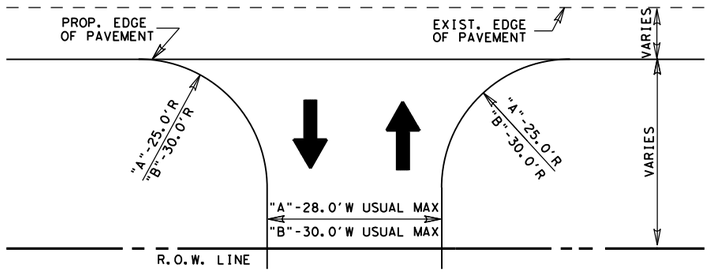
REV. 3/2020

DRIVEWAY1.DGN

FED. RD. DIV. NO.	STATE AID PROJECT NO.	FILE NO.	SHEET NO.
6	SEE TITLE SHEET		42

STATE	STATE DIST. NO.	COUNTY	CONT.	SECT.	JOB	HIGHWAY NO.
TEXAS	21	CAMERON, ETC	0921	06	302, ETC	TEEGE,ETC

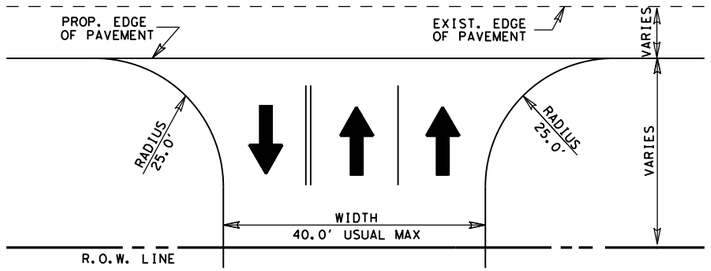
DESIGNS FOR TWO-WAY COMMERCIAL DRIVEWAYS



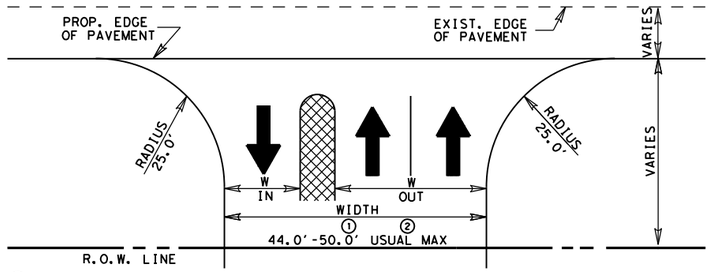
"A"- ONE ENTRY LANE AND ONE EXIT LANE, FEWER THAN 4 LARGE VEHICLES PER HOUR

"B"- ONE ENTRY LANE AND ONE EXIT LANE, 4 OR MORE SINGLE UNIT VEHICLES① PER HOUR

① - *DRIVEWAY DESIGNS FOR LARGER VEHICLES WILL BE CONSIDERED ON A CASE BY CASE BASIS*

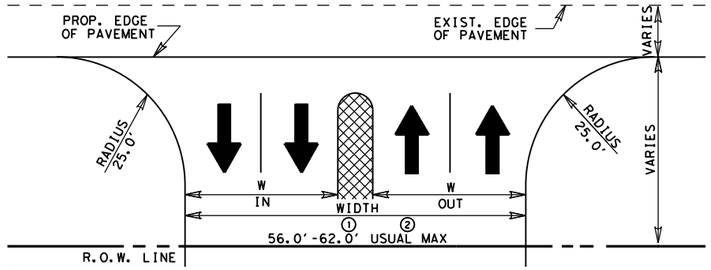


ONE ENTRY LANE AND TWO EXIT LANES (WITHOUT DIVIDERS)



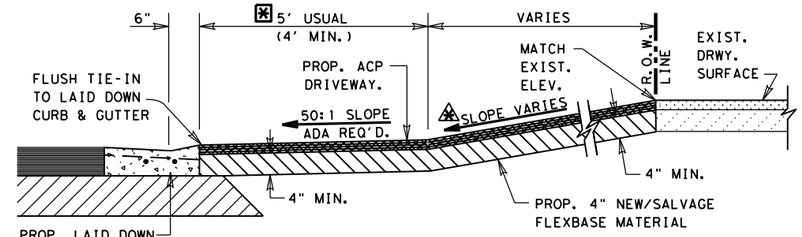
① - *4.0' WIDE DIVIDER, FACE-TO-FACE CURBS*
② - *10.0' WIDE DIVIDER, FACE-TO-FACE-CURBS*

ONE ENTRY LANE AND TWO EXIT LANES (WITH A DIVIDER)



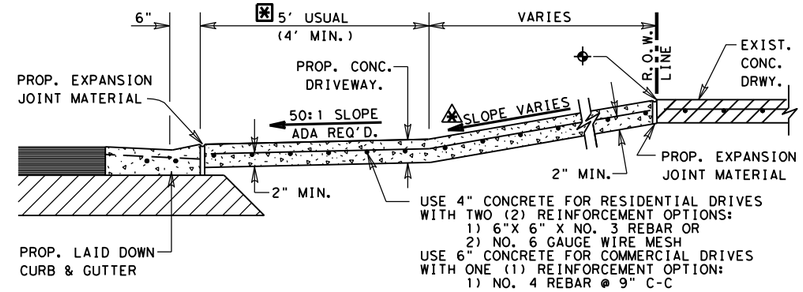
① - *4.0' WIDE DIVIDER, FACE-TO-FACE CURBS*
② - *10.0' WIDE DIVIDER, FACE-TO-FACE-CURBS*

TWO ENTRY LANES AND TWO EXIT LANES (WITH A DIVIDER)



TYPICAL ASPH. CONC. PVM'T. DRIVEWAY SECTION

N.T.S.



TYPICAL CONCRETE DRIVEWAY SECTION

N.T.S.

⊕ CONCRETE SHALL BE SAW CUT TO THE LIMITS OF REMOVAL WHERE APPLICABLE.

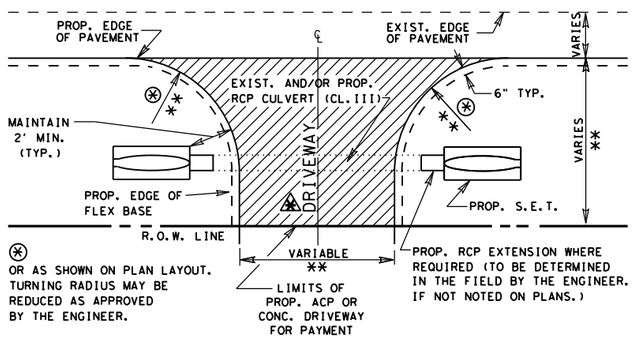
⊠ PROP./FUTURE SIDEWALK CROSSING LOCATION UNLESS SHOWN ELSEWHERE ON P&P SHEETS. SEE P&P SHEETS FOR PROP. SIDEWALK LOCATION IF SIDEWALKS ARE INCLUDED AS PART OF PROJECT. REFER TO STATE STANDARDS - PEDESTRIAN FACILITIES - FOR ADDITIONAL REQUIREMENTS.

⚠ ENTRANCE'S BASE AND SURFACING MAY BE EXTENDED BEYOND R.O.W. LINE AS REQUIRED TO MEET EXISTING GRADE IN A SATISFACTORY MANNER OF WHICH NO STEEPER THAN 12:1 FOR COMMERCIAL DRIVEWAY AND 8:1 FOR RESIDENTIAL DRIVEWAY SLOPE WILL BE CONSTRUCTED.

PROP. DWY ALGEBRAIC DIFFERENCE TABLE
COMMERCIAL DRIVEWAYS @ A = 6% MAX.
RESIDENTIAL DRIVEWAYS @ A = 8% MAX.

PROPOSED DRIVEWAY SLOPE TABLE
COMMERCIAL DRIVEWAYS @ 12:1 MAX.
RESIDENTIAL DRIVEWAYS @ 8:1 MAX.

PRIVATE AND COMMERCIAL DRIVES WITHOUT CURB & GUTTER

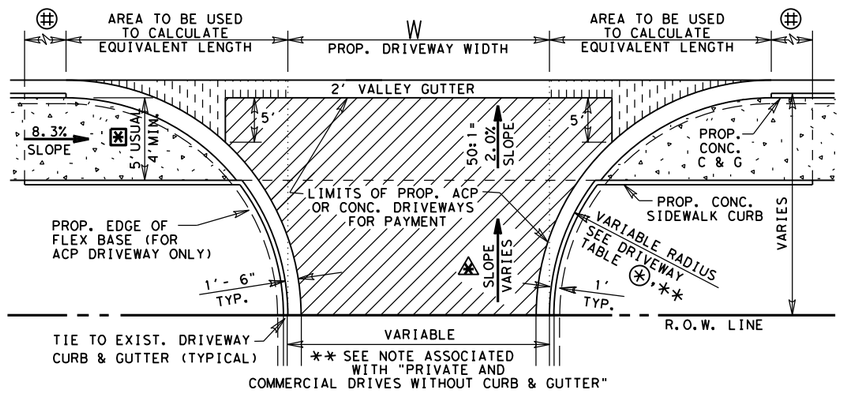


PLAN OF PRIVATE AND COMMERCIAL DRIVES

** FOR PRIVATE RESIDENTIAL DRIVES, TRY TO MATCH EXISTING WITH A MINIMUM WIDTH OF 12 FT. AND A MAXIMUM WIDTH OF 24 FT. WITH 15 FT. USUAL RADIUS. FOR COMMERCIAL DRIVES, USE ABOVE COMMERCIAL DRIVEWAY DETAILS.

⚠ SEE TYPICAL DRIVEWAY SECTIONS NOTES FOR DRIVEWAY SLOPE CRITERIA.

PRIVATE AND COMMERCIAL DRIVES WITH CURB & GUTTER



PLAN OF PRIVATE AND COMMERCIAL DRIVES

SEE P&P SHEETS FOR LOCATIONS OF DRIVES
N.T.S.

⊠ PROP./FUTURE CONC. SIDEWALK LOCATION UNLESS SHOWN ELSEWHERE ON P&P SHEETS. REFER TO STATE STANDARDS - PEDESTRIAN FACILITIES - FOR ADDITIONAL REQUIREMENTS.

⊕ LIMITS OF SLOPE FOR PROP. CONC. CURB BASED ON 8.3% SLOPE FOR SIDEWALK.

⚠ SEE TYPICAL DRIVEWAY SECTIONS NOTES FOR DRIVEWAY SLOPE CRITERIA.

LF EQUIVALENT TABLE FOR PAYMENT LIMITS OF 2' VALLEY GUTTER

LF OF VALLEY GUTTER= W + X1 + X2

WHERE X1 AND X2 MAY VARY DEPENDING ON RADIUS

Prop. Driveway Radius	X1 or X2 (Sq Ft Area / 2') Equivalent LF Length
5'	1
8'	2
10'	4
12'	6
15'	9
18'	12
20'	15
22'	18
25'	24
28'	30
30'	34

SEE DRIVEWAY TABLE FOR LIMITS OF LAID DOWN CURB TO BE PAID FOR AS CURB AND GUTTER

DRIVEWAY TYPES

TY PB-1
EXIST. PRIVATE OR COMMERCIAL DRIVEWAYS TO BE CONSTRUCTED AS SHOWN WITH 4" NEW AND/OR SALVAGE FLEX. BASE, PRIMED AND SURFACED WITH 171#/SY ACP. (HMA-D PG 64-22 SAC B MEETING ITEM 340)

CONCRETE (RESIDENTIAL)
EXIST. PRIVATE DRIVEWAYS TO BE CONSTRUCTED AS SHOWN WITH 4" CONCRETE. TO BE PAID FOR BY THE SQ.YD.

CONCRETE (COMMERCIAL)
EXIST. BUSINESS DRIVEWAYS TO BE CONSTRUCTED AS SHOWN WITH 6" CONCRETE. TO BE PAID FOR BY THE SQ.YD.

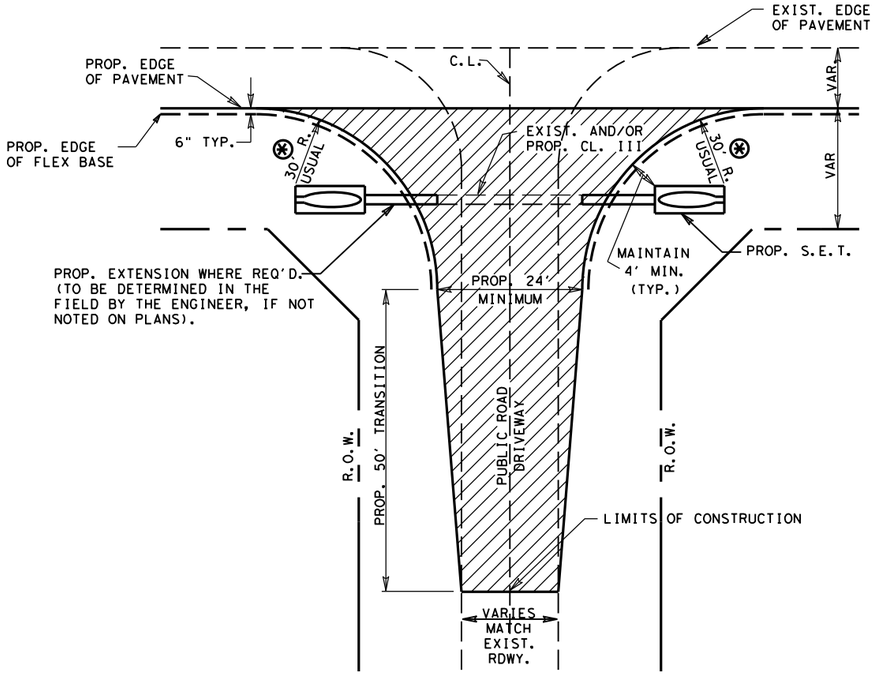
 PHARR DISTRICT STANDARD

TEXAS DEPARTMENT OF TRANSPORTATION

DRIVEWAY DETAILS PRIVATE (RESIDENTIAL-COMMERCIAL)

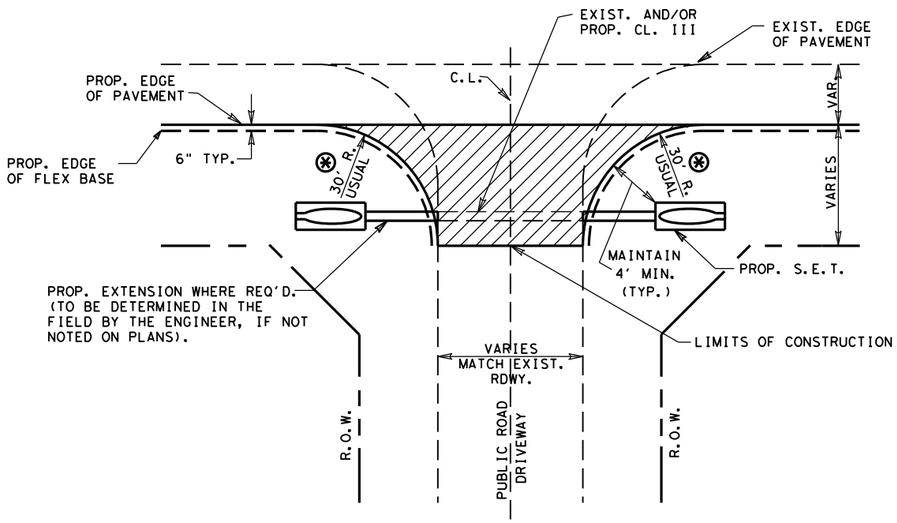
REV. 08/22 DRIVEWAY2.DGN

FED. RD. DIV. NO.	PROJECT NO.		FILE NO.			SHEET NO.
6	SEE TITLE SHEET					43
STATE	STATE DIST. NO.	COUNTY	CONT.	SECT.	JOB	HIGHWAY NO.
TEXAS	21	CAMERON, ETC	0921	06	302, ETC	TEEGE,ETC



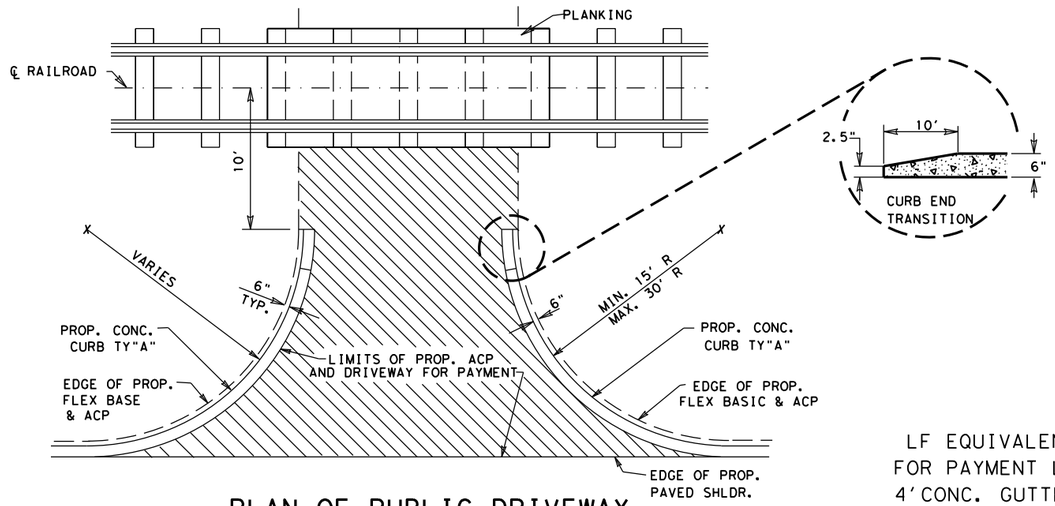
TYPICAL DETAIL

(WHEN EXIST. ROADWAY WIDTH LESS THAN 24'.)

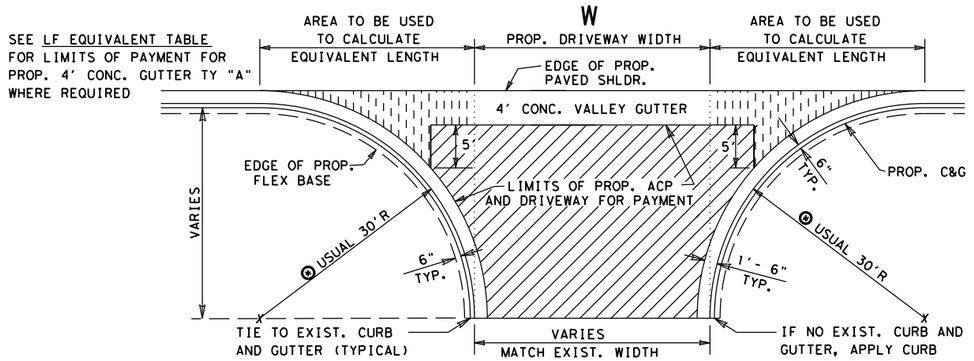


TYPICAL DETAIL

(WHEN EXIST. ROADWAY WIDTH EQUAL TO OR GREATER THAN 24'.)



PLAN OF PUBLIC DRIVEWAY ADJACENT TO R.R. CROSSING



PLAN OF PUBLIC DRIVEWAY

LF EQUIVALENT TABLE FOR PAYMENT LIMITS OF 4'CONC. GUTTER TY."A"

LF OF VALLEY GUTTER= W + X1 + X2

WHERE X1 AND X2 MAY VARY DEPENDING ON RADIUS

Prop. Driveway Radius	X1 or X2 (Sq Ft Area / 4') Equivalent LF Length
10	3
15	7
20	12
25	19
30	27
35	37
40	48
45	61
50	75
55	91
60	109
65	127
70	148
75	170

TY PBS1

EXIST. UNPAVED PUBLIC DRIVEWAYS TO BE CONSTRUCTED AS SHOWN WITH 12" LIME TREAT. SUBGRADE, 8" FLEX. BASE 1% LIME, THEN PRIMED AND SURFACED WITH 171#/SY ACP. (HMA-D PG 64-22 SAC B MEETING ITEM 340)

TY PBS2

EXIST. DRIVEWAY TO BE CONSTRUCTED SAME AS PROPOSED ROADWAY.

GENERAL NOTES:

AVERAGE DIMENSIONS SHOWN ON TABLE OF DRIVEWAYS ARE FOR ESTIMATING PURPOSES ONLY.

LOCATIONS LISTED ON THE TABLE ARE APPROXIMATE, EXACT LOCATIONS, DIMENSIONS, AND TYPE TO BE ESTABLISHED DURING CONSTRUCTION BY THE ENGINEER AS REQUIRED.

⊛ SEE DRIVEWAY TABLE, TURNING RADIUS MAY BE REDUCED AS APPROVED BY THE ENGINEER.

SEE TABLE OF DRIVEWAYS FOR TOTAL LENGTH OF PROP. 4' CONC. VALLEY GUTTER FOR EACH LOCATION.

PHARR DISTRICT STANDARD

TEXAS DEPARTMENT OF TRANSPORTATION

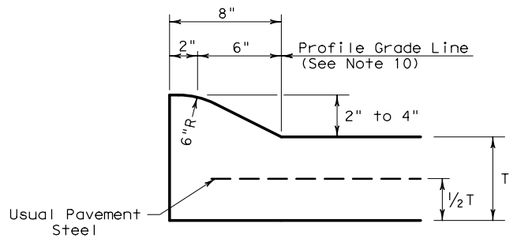
DRIVEWAY DETAILS PUBLIC (COUNTY ROAD-CITY STREET)

REV. 8/22

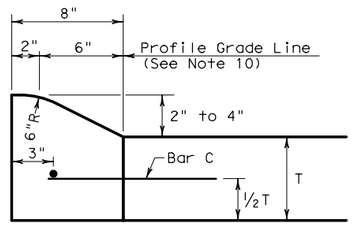
DRIVEWAY3.DGN

FED.RD. DIV.NO.	STATE AID PROJECT NO.		FILE NO.			SHEET NO.
6	SEE TITLE SHEET					44
STATE	STATE DIST.NO.	COUNTY	CONT.	SECT.	JOB	HIGHWAY NO.
TEXAS	21	CAMERON, ETC	0921	06	302, ETC	TEEGE,ETC

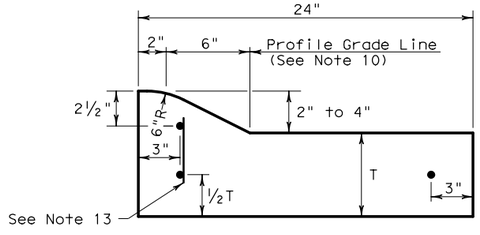
DATE:
FILE:



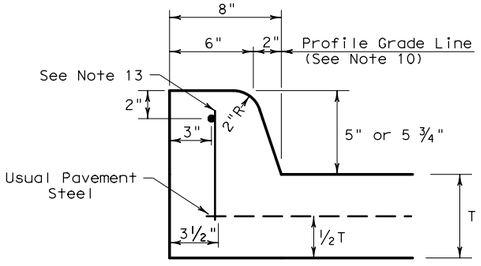
TYPE I CURB (MONOLITHIC)
2" - 4" HEIGHT



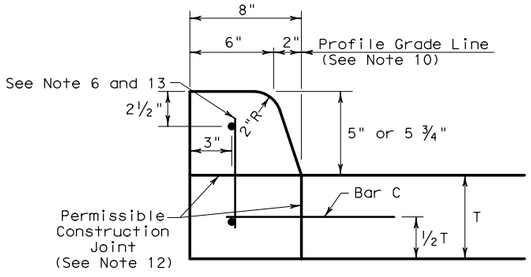
TYPE I CURB
2" - 4" HEIGHT



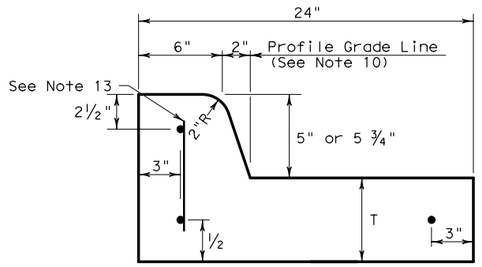
TYPE I CURB AND GUTTER
2" - 4" HEIGHT



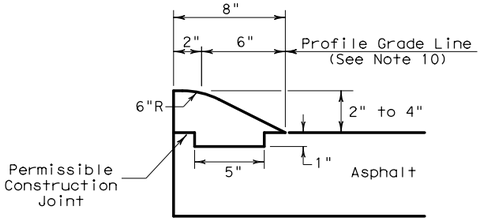
TYPE II CURB (MONOLITHIC)
5" - 5 ¾" HEIGHT



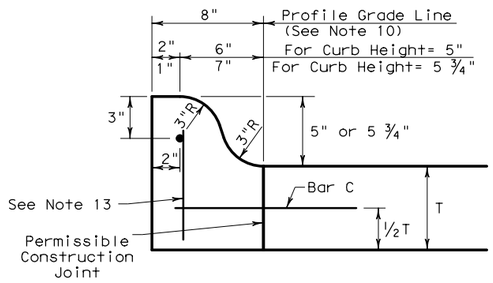
TYPE II CURB
5" - 5 ¾" HEIGHT



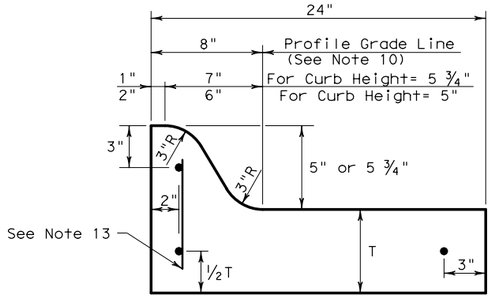
TYPE II CURB AND GUTTER
5" - 5 ¾" HEIGHT



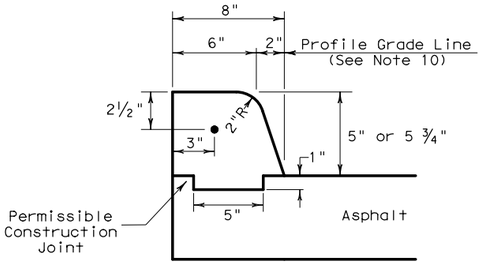
TYPE III CURB (KEYED)
2" - 4" HEIGHT



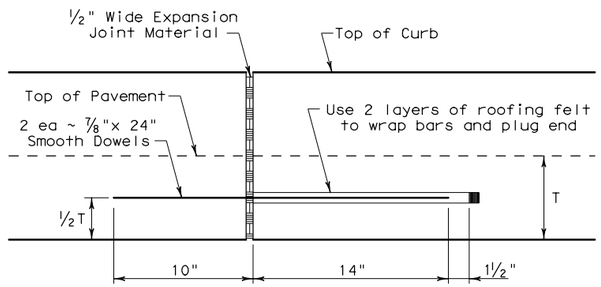
TYPE IIa CURB
5" - 5 ¾" HEIGHT



TYPE IIa CURB AND GUTTER
5" - 5 ¾" HEIGHT

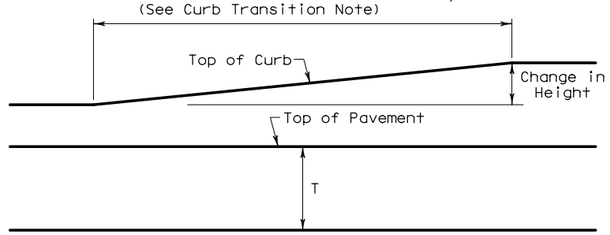


TYPE IV CURB (KEYED)
5" - 5 ¾" HEIGHT



EXPANSION JOINT DETAIL

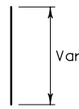
CURB TRANSITION NOTE:
Field conditions may require a longer or shorter transition, and shall be shown elsewhere in the plans, or as directed by the Engineer.



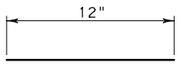
CURB TRANSITION
Note: To be paid for as Highest Curb

GENERAL NOTES

1. All materials and construction shall be in accordance with Item 529, "Concrete Curb, Gutter, and Combined Curb and Gutter."
2. Concrete shall be Class A.
3. When reinforcing bars are used, they shall be No.4 unless otherwise shown. The use of fiber reinforced concrete in lieu of reinforcing steel is acceptable. Use fibers meeting the requirements of DMS 4550, "Fibers for Concrete," and dose fibers in accordance with Material Producers List (MPL) "Fibers for Class A and B Concrete Applications."
4. Round exposed sharp edges with a rounding tool, to a minimum radius of ¼ inch.
5. All existing curbs and driveways to be removed shall be sawed or removed at existing joints.
6. Where concrete curb is to be placed on existing concrete pavement, Bar B may be drilled and grouted in place, or may be inserted into fresh concrete.
7. Expansion and contraction joints shall be constructed to match pavement joints in all curbs and curb and gutter adjacent to jointed concrete pavement. Where placement of curb or curb and gutter is not adjacent to concrete pavement, expansion joints shall be provided at structures, curb returns at streets, and at locations directed by The Engineer.
8. Vertical and horizontal dowel bars and transverse reinforcing bars shall be placed at four feet C~C.
9. Dimension 'T' shown is the thickness of concrete pavement. When curb is installed adjacent to flexible pavement dimension 'T' is 8" maximum.
10. Usual profile grade line. Refer to typical sections and plan-profile sheets for exact locations.
11. One-half inch expansion joint material shall be provided where curb or curb and gutter is adjacent to sidewalk or riprap.
12. When horizontal permissible construction joints are used, the longitudinal pavement steel shall be placed in accordance with pavement details shown elsewhere in the plans. Reinforcing steel for curb section shall then conform to that required for concrete curb.
13. Bar B placement as needed (typically at four ft. C-C) to support curb reinforcing steel during concrete placement.



BAR B



BAR C

Texas Department of Transportation

Design Division Standard

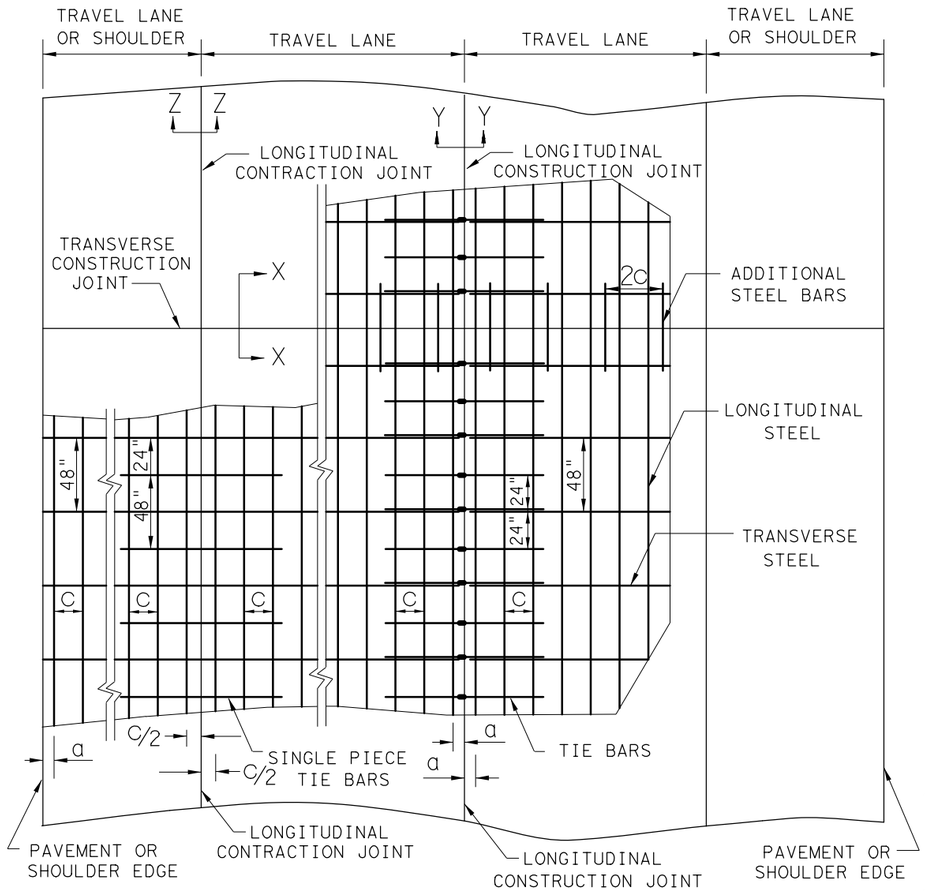
CONCRETE CURB AND CURB AND GUTTER

CCCG-22

FILE: cccg21.dgn	DN: TXDOT	CK: AN	DW: CS	CK: KM
© TxDOT: JUNE 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	302, ETC	TEEGE, ETC
	DIST	COUNTY		SHEET NO.
	PHARR	CAMERON, ETC		45

TABLE NO. 1 LONGITUDINAL STEEL					
SLAB THICKNESS AND BAR SIZE		REGULAR STEEL BARS	FIRST SPACING AT EDGE OR JOINT	ADDITIONAL STEEL BARS AT TRANSVERSE CONSTRUCTION JOINT (SECTION X-X)	
T (IN.)	BAR SIZE	SPACING C (IN.)	SPACING a (IN.)	SPACING 2 X C (IN.)	LENGTH L (IN.)
7.0	#5	6.5	3 TO 4	13	50
7.5	#5	6.0	3 TO 4	12	50
8.0	#6	9.0	3 TO 4	18	50
8.5	#6	8.5	3 TO 4	17	50
9.0	#6	8.0	3 TO 4	16	50
9.5	#6	7.5	3 TO 4	15	50
10.0	#6	7.0	3 TO 4	14	50
10.5	#6	6.75	3 TO 4	13.5	50
11.0	#6	6.5	3 TO 4	13	50
11.5	#6	6.25	3 TO 4	12.5	50
12.0	#6	6.0	3 TO 4	12	50
12.5	#6	5.75	3 TO 4	11.5	50
13.0	#6	5.5	3 TO 4	11	50

TABLE NO. 2 TRANSVERSE STEEL AND TIE BARS						
SLAB THICKNESS (IN.)	TRANSVERSE STEEL		TIE BARS AT LONGITUDINAL CONTRACTION JOINT (SECTION Z-Z)		TIE BARS AT LONGITUDINAL CONSTRUCTION JOINT (SECTION Y-Y)	
	BAR SIZE	SPACING (IN.)	BAR SIZE	SPACING (IN.)	BAR SIZE	SPACING (IN.)
7.0 - 7.5	#5	48	#5	48	#5	24
8.0 - 13.0	#5	48	#6	48	#6	24

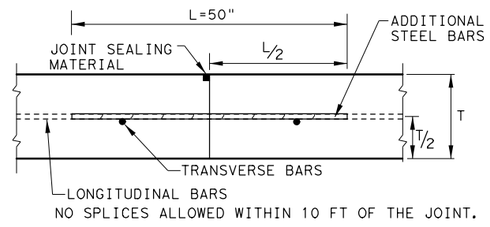


TYPICAL PAVEMENT LAYOUT

PLAN VIEW (NOT TO SCALE)

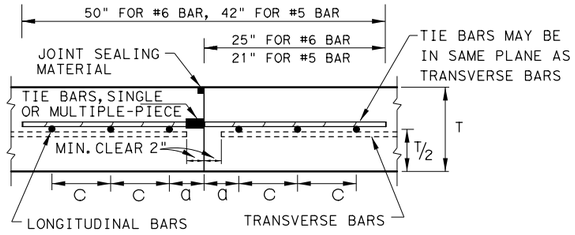
GENERAL NOTES

1. DETAILS FOR PAVEMENT WIDTH, PAVEMENT THICKNESS AND THE CROWN CROSS-SLOPE SHALL BE SHOWN ELSEWHERE IN THE PLANS. PAVEMENTS WIDER THAN 100 FT. WITHOUT A FREE LONGITUDINAL JOINT ARE NOT COVERED BY THIS STANDARD.
2. USE COARSE AGGREGATES WITH A RATED COEFFICIENT OF THERMAL EXPANSION (CoTE) OF NOT MORE THAN 5.5 X 10^{-6} IN/IN/ °F AS LISTED IN THE CONCRETE RATED SOURCE QUALITY CATALOG (CRSQC).
3. ALL THE REINFORCING STEEL AND TIE BARS SHALL BE DEFORMED STEEL BARS CONFORMING TO ASTM A 615 (GRADE 60) OR ASTM A 996 (GRADE 60) OR ABOVE. STEEL BAR SIZES AND SPACINGS SHALL CONFORM TO TABLE NO.1 AND TABLE NO.2.
4. STEEL BAR PLACEMENT TOLERANCE SHALL BE +/- 1 IN. HORIZONTALLY AND +/- 0.5 IN. VERTICALLY. CALCULATED AVERAGE BAR SPACING (CONCRETE PLACEMENT WIDTH / NUMBER OF LONGITUDINAL BARS) SHALL CONFORM TO TABLE NO.1
5. PAVEMENT WIDTHS OF MORE THAN 15 FT. SHALL HAVE A LONGITUDINAL JOINT (SECTION Z-Z OR SECTION Y-Y). THESE JOINTS SHALL BE LOCATED WITHIN 6 IN. OF THE LANE LINE UNLESS THE JOINT LOCATION IS SHOWN ELSEWHERE ON THE PLANS.
6. THE SAW CUT DEPTH FOR THE LONGITUDINAL CONTRACTION JOINT (SECTION Z-Z) SHALL BE ONE THIRD OF THE SLAB THICKNESS (T/3).
7. WHEN TYING CONCRETE GUTTER AT A LONGITUDINAL JOINT, THE TIE BAR LENGTH OR POSITION MAY BE ADJUSTED. PROVIDE 3 IN. OF CONCRETE COVER FROM THE BACK OF GUTTER TO THE END OF TIE BAR.
8. REPLACE MISSING OR DAMAGED TIE BARS WITHOUT ADDITIONAL COMPENSATION BY DRILLING MIN.10 IN. DEEP AND GROUTING TIE BARS WITH TYPE III, CLASS C EPOXY. MEET THE PULL-OUT TEST REQUIREMENTS IN ITEM 361.
9. OMIT TIE BARS LOCATED WITHIN 18-IN. OF THE TRANSVERSE CONSTRUCTION JOINTS (SECTION X-X). USE HAND-OPERATED IMMERSION VIBRATORS TO CONSOLIDATE THE CONCRETE ADJACENT TO ALL FORMED JOINTS.
10. LONGITUDINAL REINFORCING STEEL SPLICES SHALL BE A MINIMUM OF 25 IN. STAGGER THE LAP LOCATIONS SO THAT NO MORE THAN 1/3 OF THE LONGITUDINAL STEEL IS SPLICED IN ANY GIVEN 12-FT. WIDTH AND 2-FT. LENGTH OF THE PAVEMENT.
11. THE DETAIL FOR THE JOINT SEALANT AND RESERVOIR IS SHOWN ON STANDARD SHEET "CONCRETE PAVING DETAILS, JOINT SEALS."



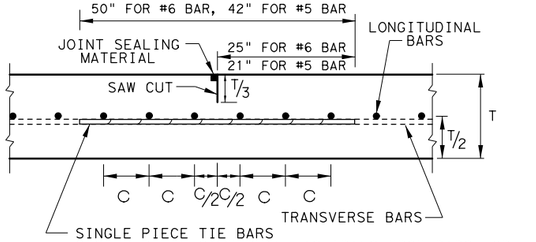
TRANSVERSE CONSTRUCTION JOINT

SECTION X - X



LONGITUDINAL CONSTRUCTION JOINT

SECTION Y - Y



LONGITUDINAL CONTRACTION JOINT

SECTION Z - Z

Texas Department of Transportation

Design Division Standard

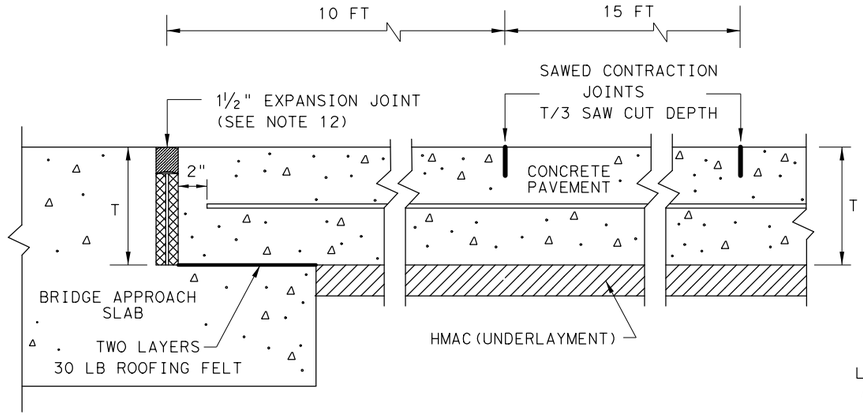
CONTINUOUSLY REINFORCED CONCRETE PAVEMENT

ONE LAYER STEEL BAR PLACEMENT T - 7 to 13 INCHES

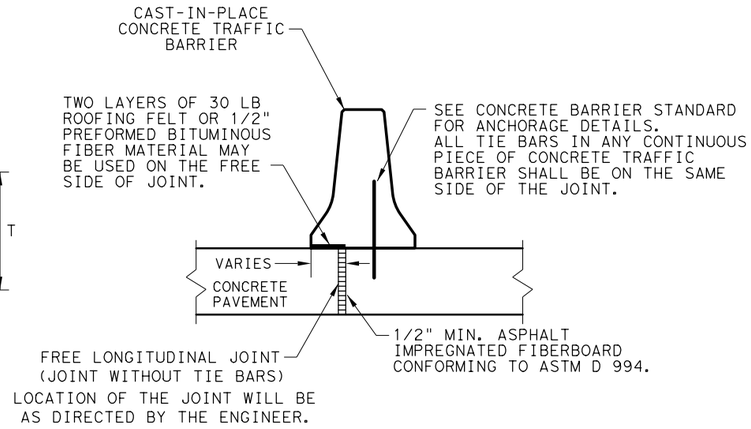
CRCP(1)-20

FILE: crcp120.dgn	DN: TxDOT	CK:KM	DW: AN	CK:VP
© TxDOT: APRIL 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS 10/10/2011 ADD GN #12 04/09/2013 REMOVE 6" AND 6.5" ADD CTE REQUIREMENTS 05/05/2017 CoTE AS RATED 4.3	0921	06	302, ETC	TEEGE, ETC
	DIST	COUNTY		SHEET NO.
	PHARR	CAMERON, ETC		46

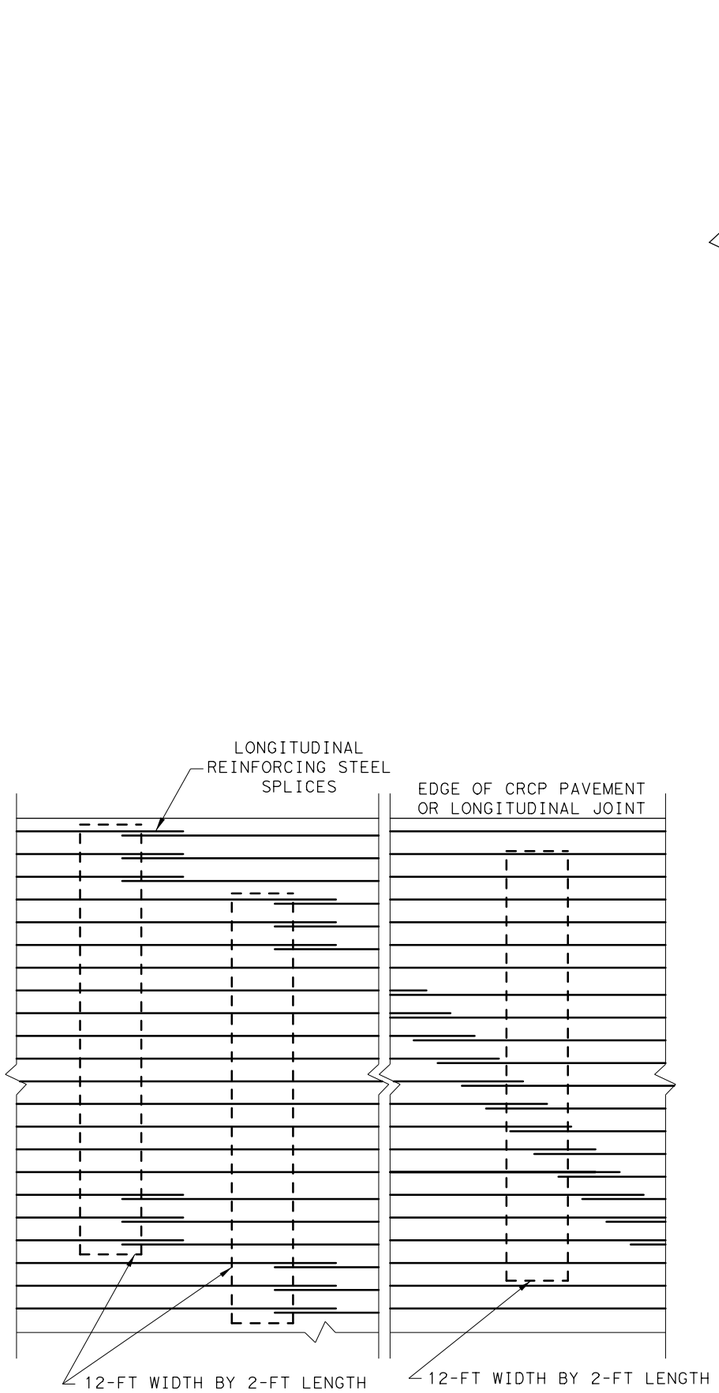
DATE: 12/7/2022 9:59:26 AM
FILE: ...\Standards\Roadway\crcp120.dgn



TRANSVERSE EXPANSION JOINT DETAIL
AT BRIDGE APPROACH

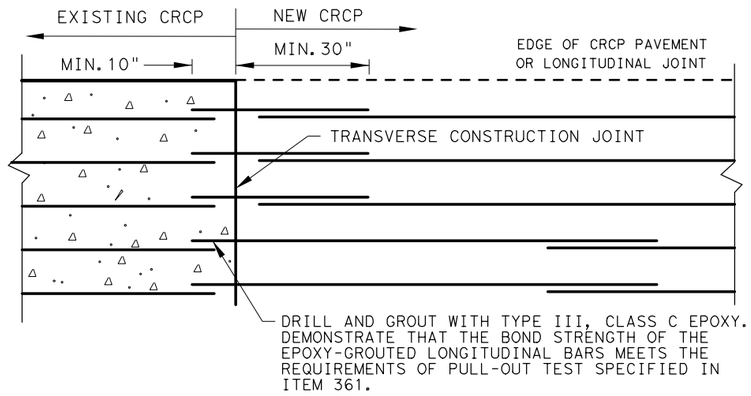


FREE LONGITUDINAL JOINT DETAIL

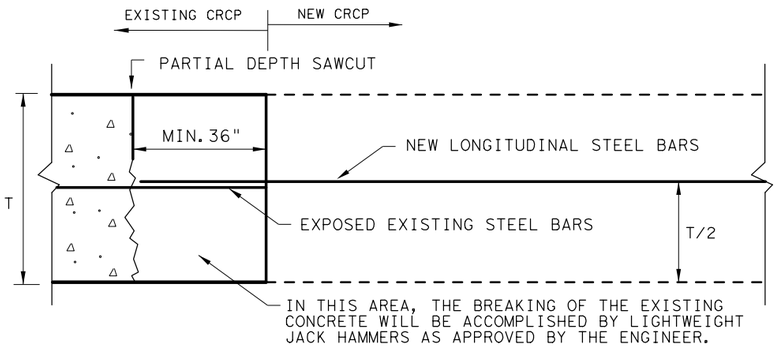


STAGGER THE LAP LOCATIONS SO THAT NO MORE THAN 1/3 OF THE LONGITUDINAL STEEL IS SPLICED IN ANY GIVEN 12-FT. WIDTH AND 2-FT. LENGTH OF THE PAVEMENT. ANY OTHER LAP CONFIGURATION MEETING THIS REQUIREMENT WILL BE ALLOWED.

EXAMPLES OF LAP CONFIGURATION
PLAN VIEW (NOT TO SCALE)

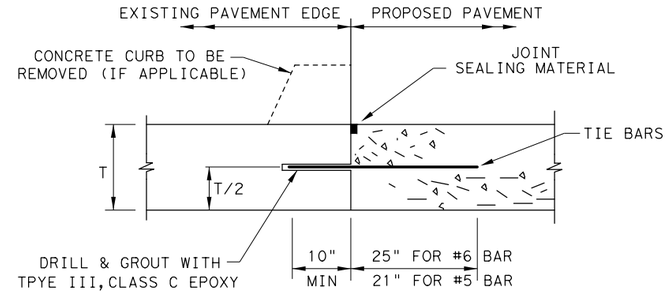


OPTION A: DRILL AND EPOXY
PLAN VIEW (NOT TO SCALE)



OPTION B: BREAKBACK AND LAP

TRANSVERSE TIE JOINT DETAIL
EXISTING CRCP TO NEW CRCP



1. BEFORE WIDENING WORK, DEMONSTRATE THAT THE BOND STRENGTH OF THE EPOXY-GROUTED TIE BARS MEETS THE REQUIRMENTS OF PULL-OUT TEST SPECIFIED IN ITEM 361.
2. SPACE TIE BARS AT 24" SPACING. USE #6 TIE BARS FOR 8" AND THICKER SLABS, USE #5 TIE BARS FOR LESS THAN 8" THICK SLABS.

LONGITUDINAL WIDENING JOINT DETAIL

Texas Department of Transportation — Design Division Standard

CONTINUOUSLY REINFORCED CONCRETE PAVEMENT
ONE LAYER STEEL BAR PLACEMENT
T - 7 to 13 INCHES
CRCP(1)-20

FILE: crcp120.dgn	DN: TxDOT	CK: KM	DW: AN	CK: VP
© TxDOT: APRIL 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS 03/16/2020 REMOVED TABLE 1A	0921	06	302, ETC	TEEGE, ETC
	DIST	COUNTY		SHEET NO.
	PHARR	CAMERON, ETC		47

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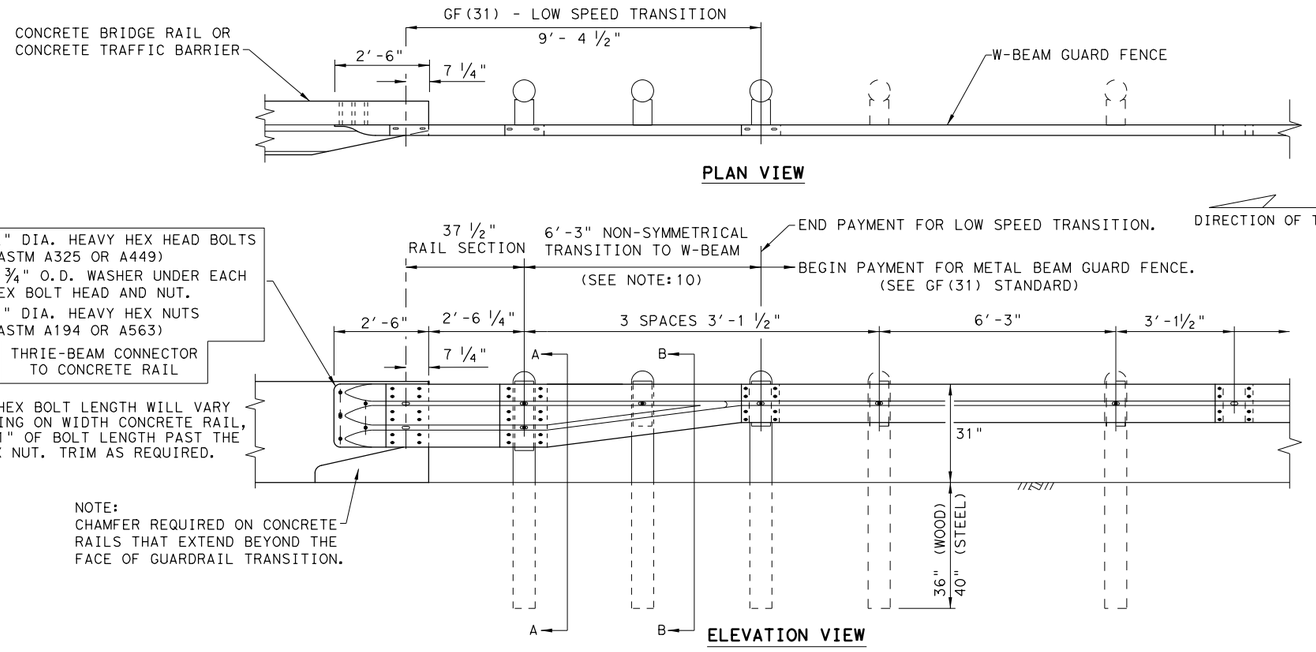


GENERAL NOTES

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 TRANSITIONS SHALL BE AS SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. REFER TO GF(31)STANDARD SHEET.
2. RAIL ELEMENT SHALL MEET THE REQUIREMENTS OF ITEM 540, "METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED IN THE PLANS.
3. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING." FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM REQUIRING CONSTRUCTION OF THE TRANSITION.
4. BUTTON HEAD "POST BOLTS & NUTS" SHALL MEET THE REQUIREMENTS OF (ASTM A307), AND SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND ⅝" WASHER (FWC16a) AND NOT MORE THAN 1" BEYOND IT. TRIM BOLT LENGTH TO MEET REQUIRED LENGTH.
5. POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
6. CROWN SHALL BE WIDENED TO ACCOMMODATE TRANSITIONS.
7. WHERE SOLID ROCK IS ENCOUNTERED, CONTACT THE DESIGN DIVISION FOR ADDITIONAL GUIDANCE. (512) 416-2678
8. 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 CAN FURNISH COMPOSITE MATERIAL BLOCKS.
9. REFER TO GF(31)STANDARD SHEET & BRIDGE RAILING DETAILS FOR ADDITIONAL DETAILS.
10. FOR ROUND WOOD POSTS SYSTEMS, ALL ROUND WOOD POSTS SHALL BE 7 ½" DIA. MINIMUM THROUGHOUT THE TRANSITION.

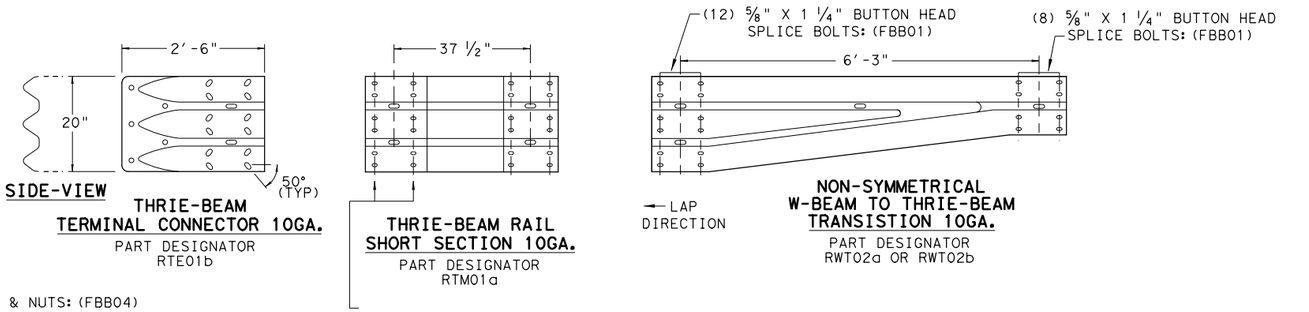
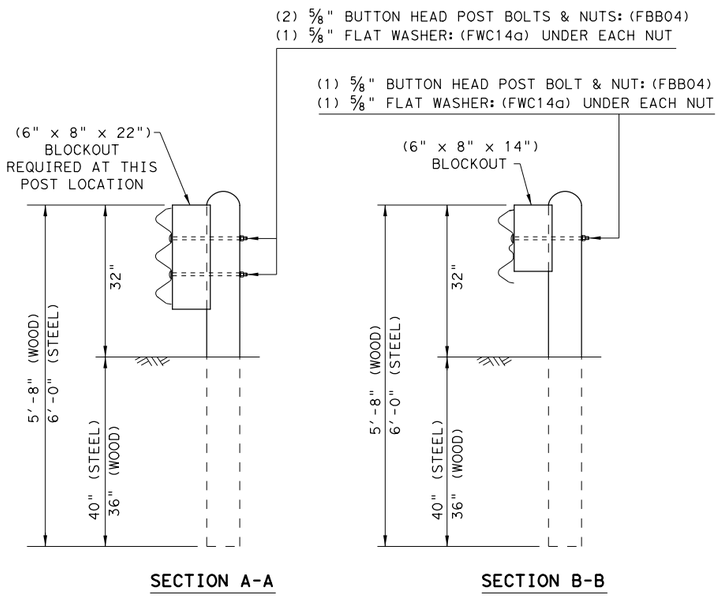
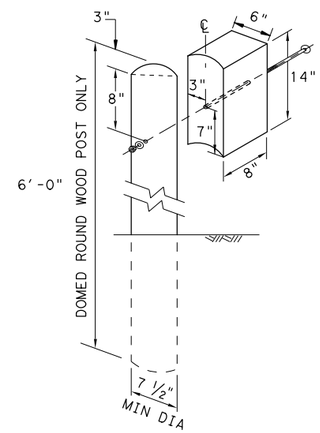


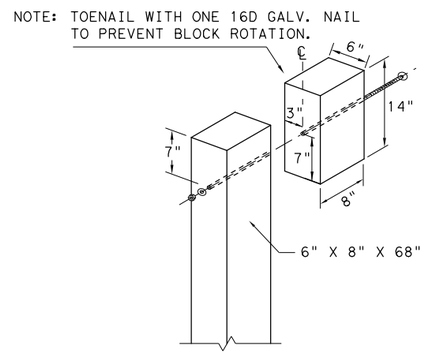
PLATE WASHER INSTRUCTIONS

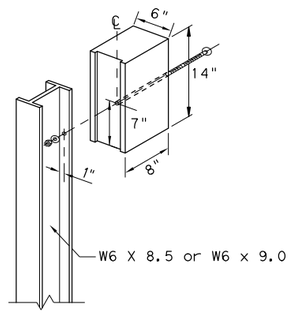
BRIDGE APPROACH - UPSTREAM: THE SHORT RAIL LAPS OVER THE TERMINAL CONNECTOR. PLATE WASHERS ARE INSTALLED UNDER THE SPLICE NUTS AGAINST INSIDE OF CONNECTOR.
BRIDGE EXIT - DOWNSTREAM: THE TERMINAL CONNECTOR LAPS OVER THE NESTED RAIL. PLATE WASHERS ARE INSTALLED UNDER THE BOLT HEAD AGAINST OUTSIDE OF CONNECTOR.



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







LOW-SPEED TRANSITION

Texas Department of Transportation — Design Division Standard

METAL BEAM GUARD FENCE THRIE-BEAM TRANSITION TL-2 MASH COMPLIANT

GF(31)TR TL2-19

FILE: gf31trtl219.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	302, ETC	TEEGE, ETC
	DIST	COUNTY		SHEET NO.
	PHARR	CAMERON, ETC		48

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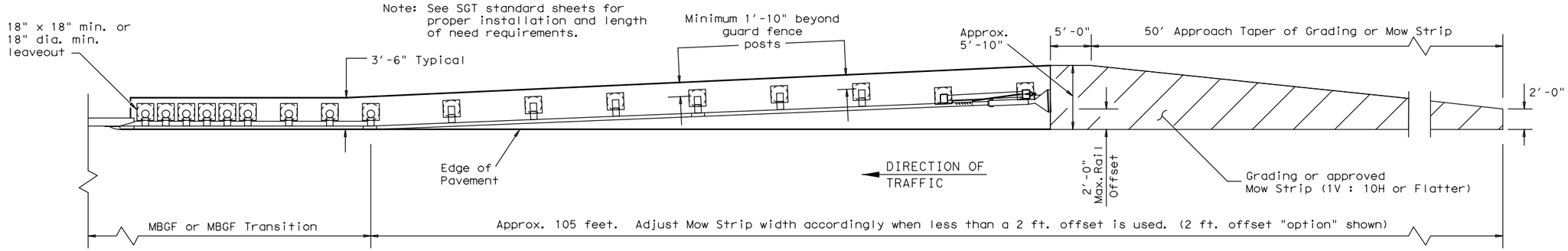
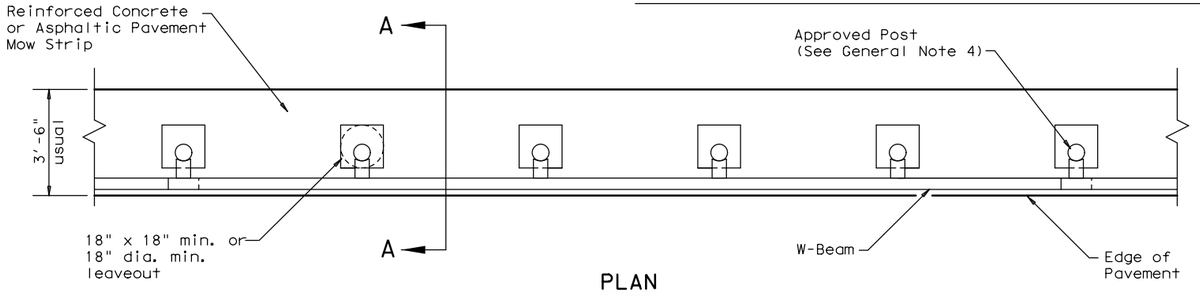
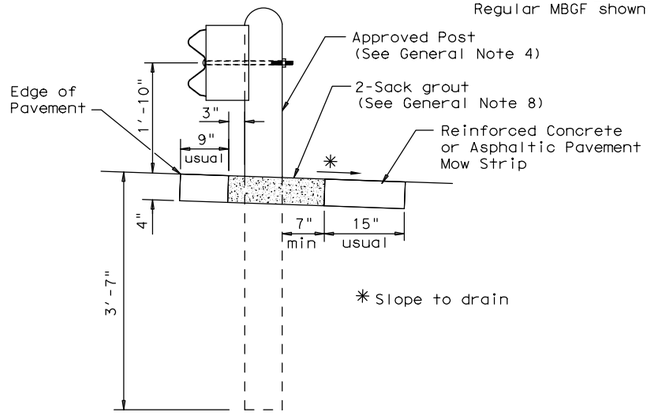


GRADING AND MOW STRIP AT GUARDRAIL END TREATMENTS



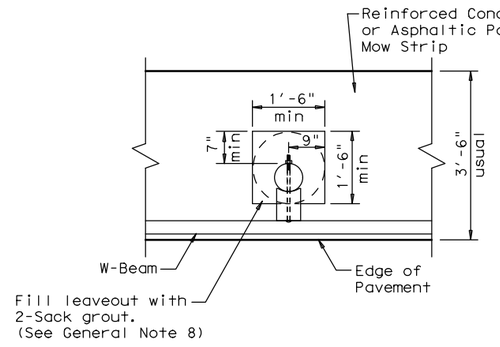
PLAN

Regular MBGF shown with Mow Strip



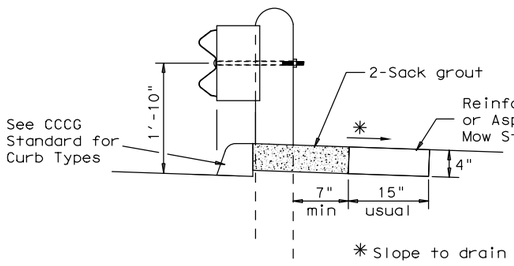
SECTION A-A

Typical



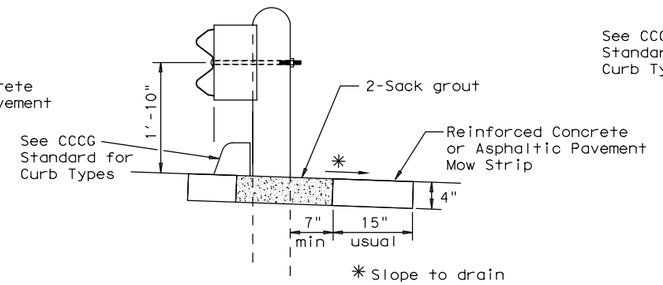
MOW STRIP DETAIL

Reinforced Concrete or Asphaltic Pavement Mow Strip with 18" x 18" or 18" dia. minimum leaveout.



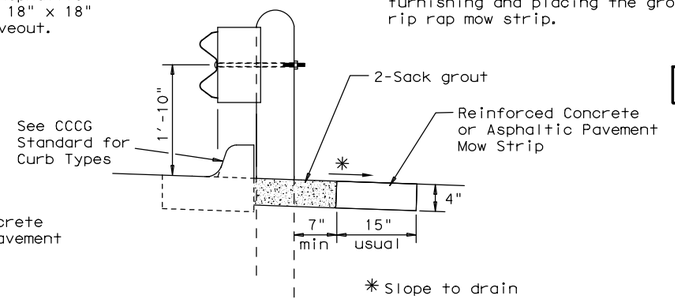
CURB OPTION (1)

This option will increase the post embedment through out 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 SGT standards for proper SGT installation).
2. Mow strips shall be asphaltic pavement or reinforced concrete (wire mesh or synthetic fiber), as shown on the plans and will be paid for under the pertinent bid item of work. Asphaltic pavement shall meet the requirements of the item, and be placed in accordance with the pertinent bid item as shown on the plans. 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 leaveout behind the post shall be a minimum of 7".
4. The type of approved post will be shown elsewhere in the plans. See the applicable standard sheets for additional details and information.
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. Depth of mow strip will be 4".
7. The limits of payment for asphaltic pavement or reinforced concrete will include leaveouts for posts.
8. The leave-outs shall be filled with no more than a 2-sack grout mixture (1 part cement, 5 parts water, and 14 parts sand by volume) with a 28-day compressive strength of approximately 120 psi or less. Provide grout of a consistency that will flow into and completly 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 rip rap mow strip.

ONLY FOR USE IN MAINTENANCE REPAIRS.

Texas Department of Transportation | Design Division Standard

METAL BEAM GUARD FENCE

(MOW STRIP)

MBGF(MS)-19

FILE: mbgfms19.dgn	DN: TxDOT	CK: KM	DW: TXDOT	CK: CL
© TxDOT NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	302,ETC	TEEGE,ETC
	DIST	COUNTY		SHEET NO.
	PHARR	CAMERON,ETC		49

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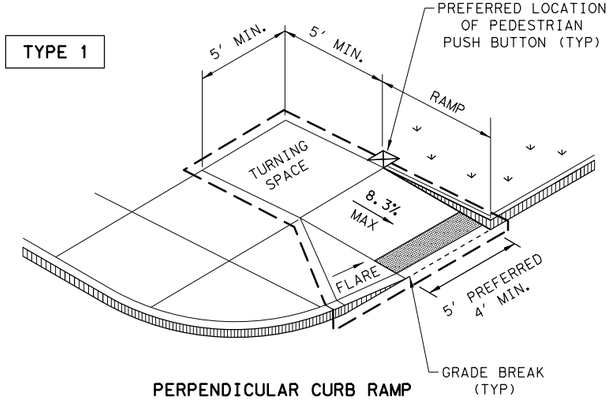
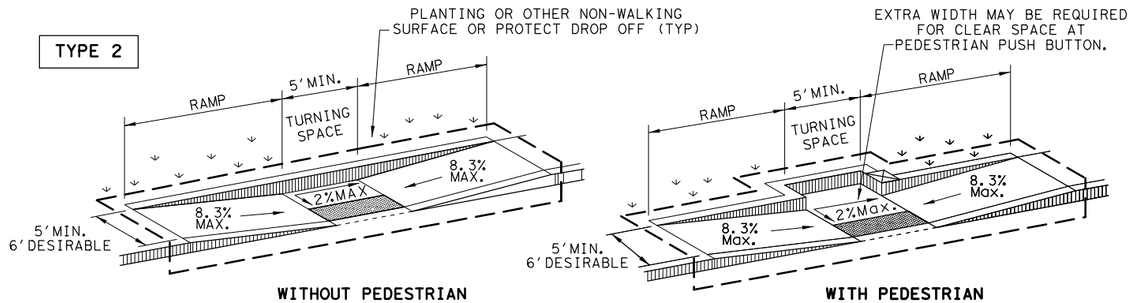
TYPE 1



PERPENDICULAR CURB RAMP

TYPE 2

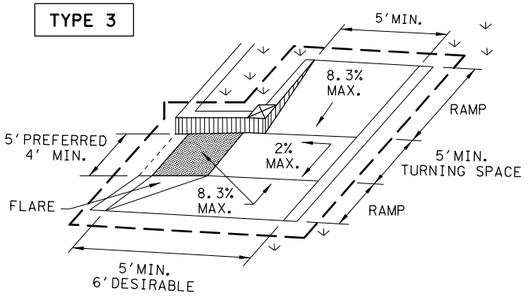


WITHOUT PEDESTRIAN PUSH BUTTON

WITH PEDESTRIAN PUSH BUTTON

PARALLEL CURB RAMP

TYPE 3



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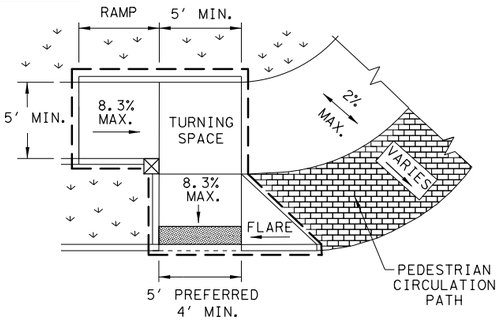
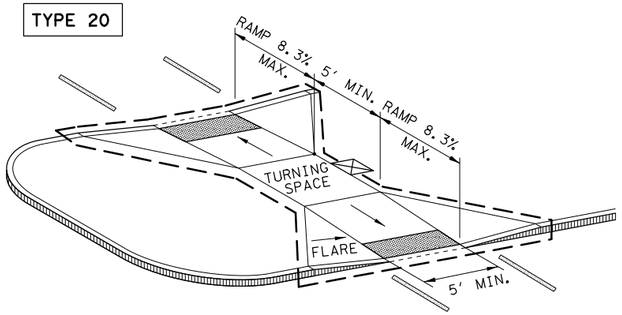


COMBINATION CURB RAMPS

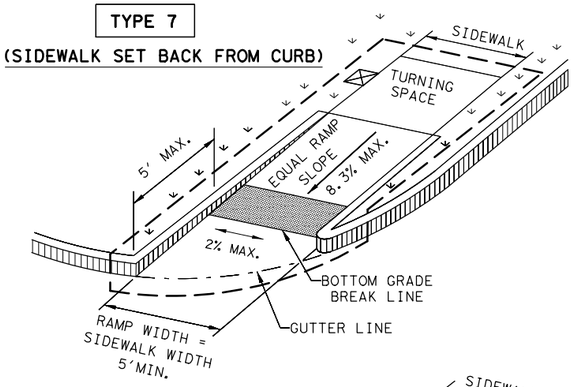
TYPE 20



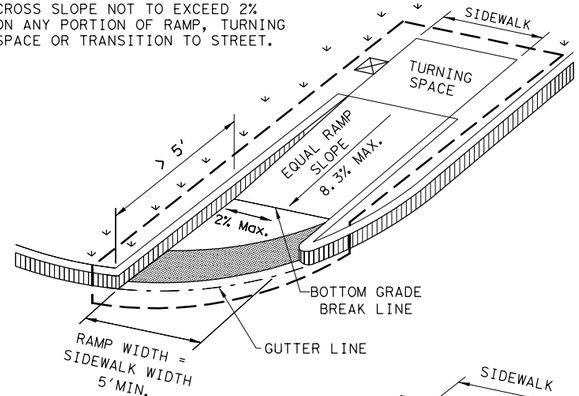
CURB RAMPS AT MEDIAN ISLANDS

TYPE 7

(SIDEWALK SET BACK FROM CURB)

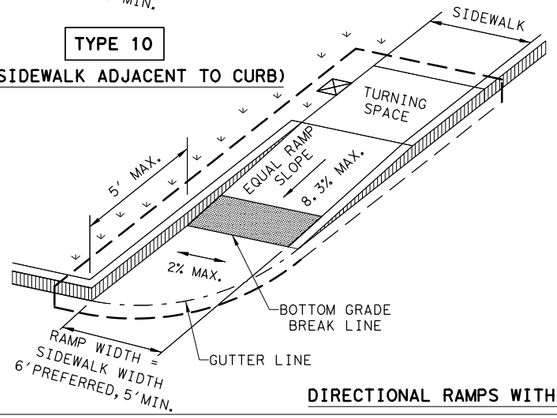


CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP, TURNING SPACE OR TRANSITION TO STREET.

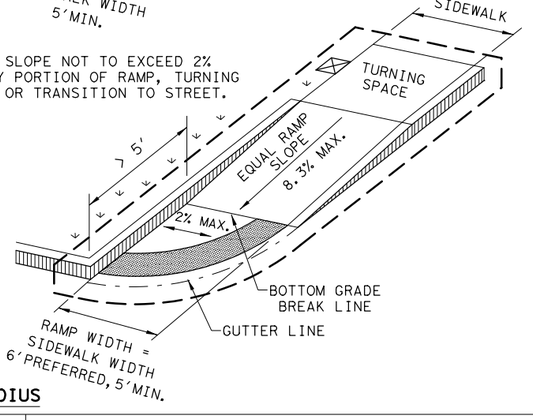


TYPE 10

(SIDEWALK ADJACENT TO CURB)

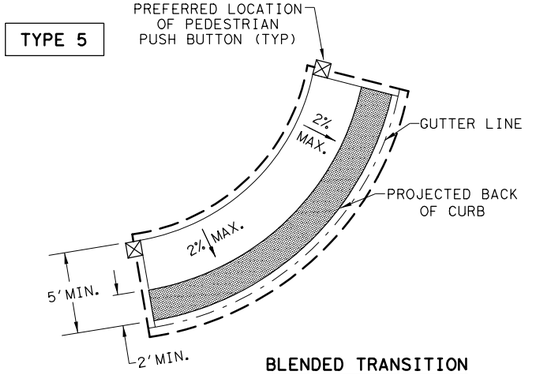


CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP, TURNING SPACE OR TRANSITION TO STREET.



DIRECTIONAL RAMPS WITHIN RADIUS

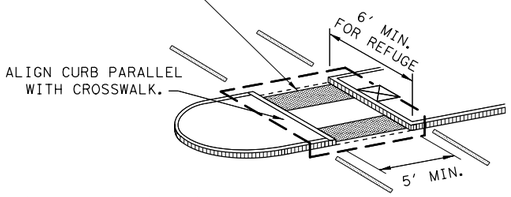
TYPE 5



BLENDED TRANSITION
(FLUSH LANDING)

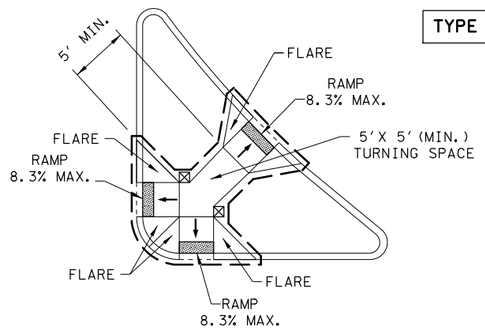
TYPE 21

INSTALL DETECTABLE WARNING SURFACE AT EACH END OF THE CUT-THROUGH RAMP WITH A MINIMUM 2' USUAL SIDEWALK SURFACE BETWEEN. IF MEDIAN IS LESS THAN 6' WIDE, ELIMINATE DETECTABLE WARNING SURFACES.



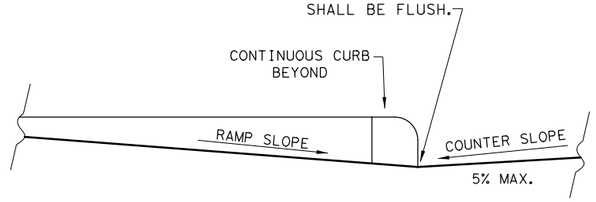
NOTE: CURB DETAILS ARE SHOWN ELSEWHERE IN THE PLANS.

TYPE 22



COMBINATION ISLAND RAMPS

BOTTOM GRADE BREAK OF CURB RAMP WILL NORMALLY BE AT GUTTER LINE. SURFACE SLOPES AT GRADE BREAKS SHALL BE FLUSH.



TYPICAL SECTION OF PERPENDICULAR CURB RAMP AT CONNECTION TO ROADWAY

NOTES / LEGEND:

SEE GENERAL NOTES ON SHEET 2 OF 4 FOR MORE INFORMATION.

DENOTES PLANTING OR NON-WALKING SURFACE NOT PART OF PEDESTRIAN CIRCULATION PATH.

DETECTABLE WARNING SURFACE

DENOTES PREFERRED LOCATION OF PEDESTRIAN PUSH BUTTON IF APPLICABLE.

GUTTER LINE

GRADE BREAK

RAMP LIMITS OF PAYMENT

Texas Department of Transportation

Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-18

FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	302, ETC	TEEGE, ETC
REVISED 08, 2005 REVISED 06, 2012 REVISED 01, 2018	DIST	COUNTY		SHEET NO.
	PHARR	CAMERON, ETC		50

DATE: 12/7/2022 9:59:47 AM
FILE: ...\Standards\Roadway\ped18.dgn

GENERAL NOTES

CURB RAMPS

1. Install a curb ramp or blended transition at each pedestrian street crossing.
2. All slopes shown are maximum allowable. Cross slopes of 1.5% and lesser running should be used. Adjust curb ramp length or grade of approach sidewalks as directed.
3. Maximum allowable cross slope on sidewalk and curb ramp surfaces is 2%.
4. The minimum sidewalk width is 5′. Where the sidewalk is adjacent to the back of curb, a 6′ sidewalk width is desirable. Where a 5′ sidewalk cannot be provided due to site constraints, sidewalk width may be reduced to 4′ for short distances. 5′x 5′ passing areas at intervals not to exceed 200′ are required.
5. Turning Spaces shall be 5′x 5′ minimum. Cross slope shall be maximum 2%.
6. Clear space at the bottom of curb ramps shall be a minimum of 4′x 4′ wholly contained within the crosswalk and wholly outside the parallel vehicular travel path.
7. Provide flared sides where the pedestrian circulation path crosses the curb ramp. Flared sides shall be sloped at 10% maximum, measured parallel to the curb. Returned curbs may be used only where pedestrians would not normally walk across the ramp, either because the adjacent surface is planted, substantially obstructed, or otherwise protected.
8. Additional information on curb ramp location, design, light reflective value and texture may be found in the latest draft of the Proposed Guidelines for Pedestrian Facilities in the Public Right of Way (PROWAG) as published by the U.S. Architectural and Transportation Barriers Compliance Board (Access Board).
9. To serve as a pedestrian refuge area, the median should be a minimum of 6′ wide, measured from back of curbs. Medians should be designed to provide accessible passage over or through them.
10. Small channelization islands, which do not provide a minimum 5′x 5′ landing at the top of curb ramps, shall be cut through level with the surface of the street.
11. Crosswalk dimensions, crosswalk markings and stop bar locations shall be as shown elsewhere in the plans. At intersections where crosswalk markings are not required, curb ramps shall align with theoretical crosswalks unless otherwise directed.
12. Provide curb ramps to connect the pedestrian access route at each pedestrian street crossing. Handrails are not required on curb ramps.
13. Curb ramps and landings shall be constructed and paid for in accordance with Item 531 "Sidewalks".
14. Place concrete at a minimum depth of 5" for ramps, flares and landings, unless otherwise directed.
15. Furnish and install No. 3 reinforcing steel bars at 18" o.c. both ways, unless otherwise directed.
16. Provide a smooth transition where the curb ramps connect to the street.
17. Curbs shown on sheet 1 within the limits of payment are considered part of the curb ramp for payment, whether it is concrete curb, gutter, or combined curb and gutter.
18. Existing features that comply with applicalble standards may remain in place unless otherwise shown on the plans.

DETECTABLE WARNING MATERIAL

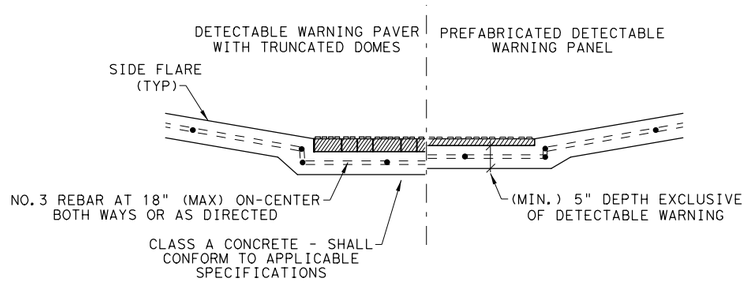
19. Curb ramps must contain a detectable warning surface that consists of raised truncated domes complying with PROWAG. The surface must contrast visually with adjoining surfaces, including side flares. Furnish and install an approved cast-in-place dark brown or dark red detectable warning surface material adjacent to uncolored concrete, unless specified elsewhere in the plans.
20. Detectable Warning Materials must meet TxDOT Departmental Materials Specification DMS 4350 and be listed on the Material Producer List. Install products in accordance with manufacturer's specifications.
21. Detectable warning surfaces must be firm, stable and slip resistant.
22. Detectable warning surfaces shall be a minimum of 24 inches in depth in the direction of pedestrian travel, and extend the full width of the curb ramp or landing where the pedestrian access route enters the street.
23. Detectable warning surfaces shall be located so that the edge nearest the curb line is at the back of curb and neither end of that edge is greater than 5 feet from the back of curb. Detectable warning surfaces may be curved along the corner radius.
24. Shaded areas on Sheet 1 of 4 indicate the approximate location for the detectable warning surface for each curb ramp type.

DETECTABLE WARNING PAVERS (IF USED)

25. Furnish detectable warning paver units meeting all requirements of ASTM C-936, C-33. Lay in a two by two unit basket weave pattern or as directed.
26. Lay full-size units first followed by closure units consisting of at least 25 percent (25%) of a full unit. Cut detectable warning paver units using a power saw.

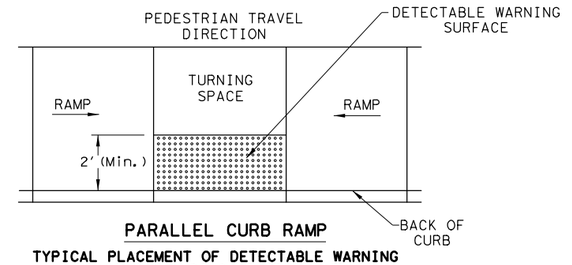
SIDEWALKS

27. Provide clear ground space at operable parts, including pedestrian push buttons. Operable parts shall be placed within unobstructed reach range specified in PROWAG section R406.
28. Place traffic signal or illumination poles, ground boxes, controller boxes, signs, drainage facilities and other items so as not to obstruct the pedestrian access route or clear ground space.
29. Street grades and cross slopes shall be as shown elsewhere in the plans.
30. Changes in level greater than 1/4 inch are not permitted.
31. The least possible grade should be used to maximize accessibility. The running slope of sidewalks and crosswalks within the public right of way may follow the grade of the parallel roadway. Where a continuous grade greater than five percent (5%) must be provided, handrails may be desirable to improve accessibility. Handrails may also be needed to protect pedestrians from potentially hazardous conditions. If provided, handrails shall comply with PROWAG R409.
32. Handrail extensions shall not protrude into the usable landing area or into intersecting pedestrian routes.
33. Driveways and turnouts shall be constructed and paid for in accordance with Item "Intersections, Driveways and Turnouts". Sidewalks shall be constructed and paid for in accordance with Item, "Sidewalks".
34. Sidewalk details are shown elsewhere in the plans.

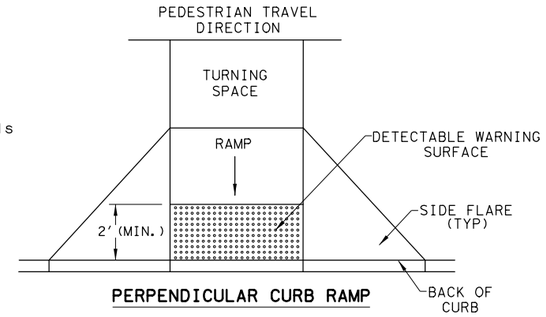


SECTION VIEW DETAIL
CURB RAMP AT DETECTIBLE WARNINGS

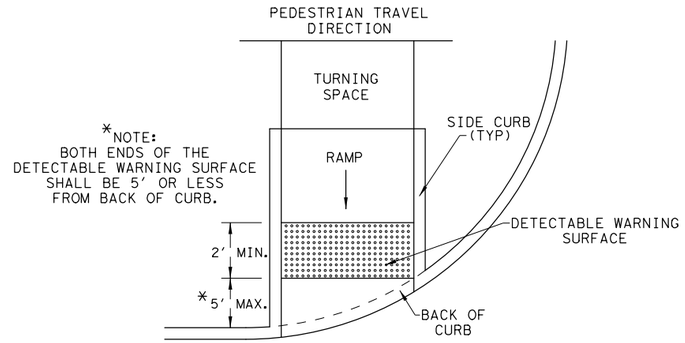
DETECTABLE WARNING SURFACE DETAILS



PARALLEL CURB RAMP
TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON LANDING AT STREET EDGE.



PERPENDICULAR CURB RAMP
TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON SLOPING RAMP RUN.



DIRECTIONAL CURB RAMP
TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON SLOPING RAMP RUN.

Texas Department of Transportation | Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-18

FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	302, ETC	TEEGE, ETC
REVISED 08, 2005 REVISED 06, 2012 REVISED 01, 2018	DIST	COUNTY		SHEET NO.
	PHARR	CAMERON, ETC		51

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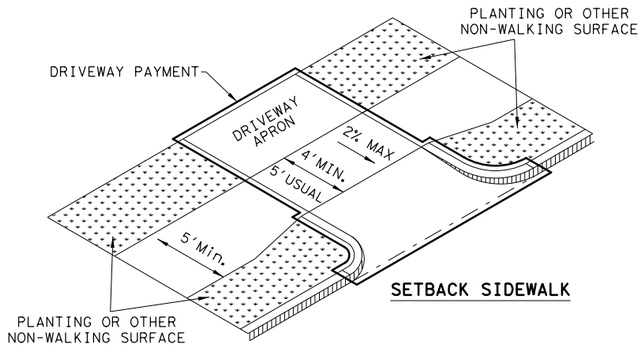
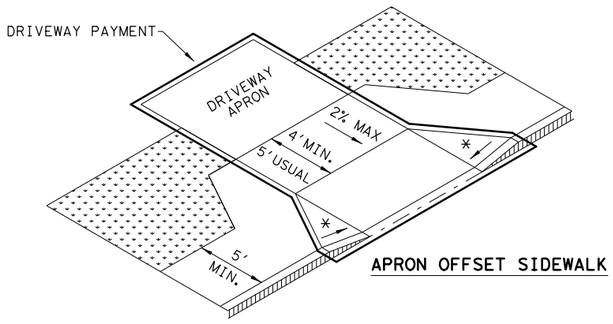
FILE: ...\Standards\Roadway\ped18.dgn

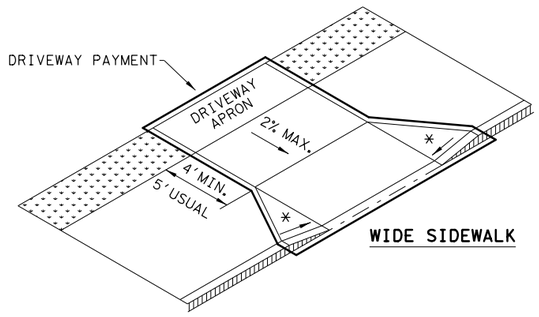
SIDEWALK TREATMENT AT DRIVEWAYS



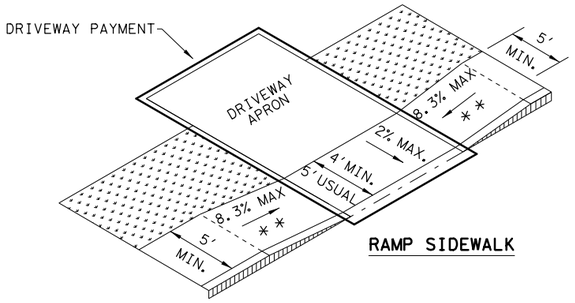
SETBACK SIDEWALK



APRON OFFSET SIDEWALK



WIDE SIDEWALK

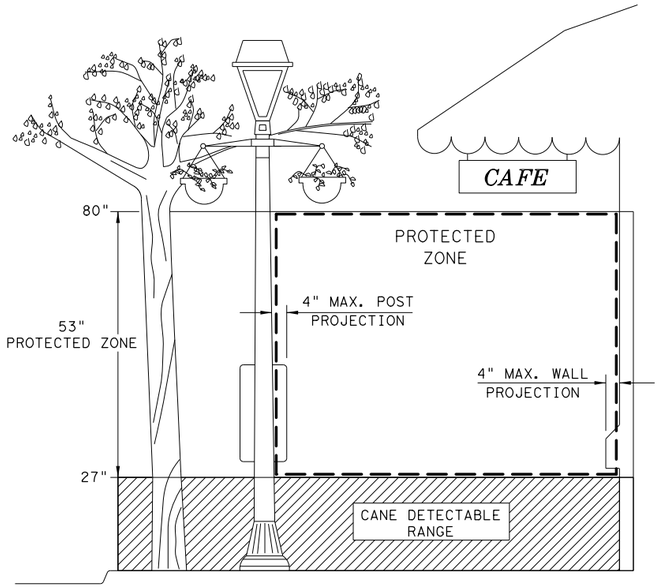


RAMP SIDEWALK

NOTES:

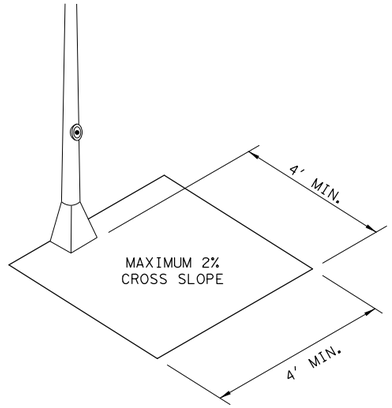
* WHERE DRIVEWAYS CROSS THE PEDESTRIAN ROUTE, SIDES SHALL BE FLARED AT 10% MAX SLOPE.

* * IF CURB HEIGHT IS GREATER THAN 6 INCHES, USE GRADE LESS THAN OR EQUAL TO 5%. HANDRAIL AND DETECTABLE WARNING ARE NOT REQUIRED.

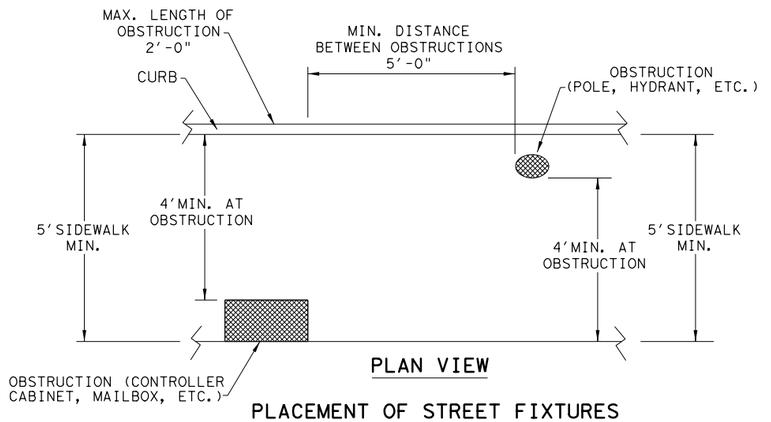


PROTECTED ZONE

NOTE: IN PEDESTRIAN CIRCULATION AREA, MAXIMUM 4" PROJECTION FOR POST OR WALL MOUNTED OBJECTS BETWEEN 27" AND 80" ABOVE THE SURFACE.



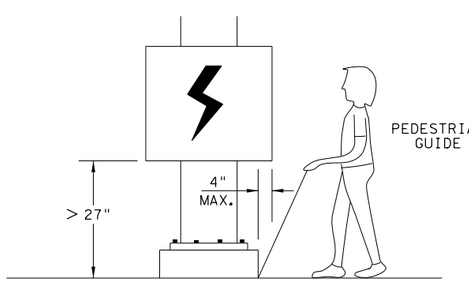
CLEAR SPACE ADJACENT TO PEDESTRIAN PUSH BUTTON



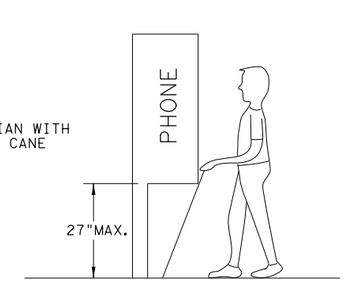
PLAN VIEW

PLACEMENT OF STREET FIXTURES

NOTE: ITEMS NOT INTENDED FOR PUBLIC USE. MINIMUM 4' X 4' CLEAR GROUND SPACE REQUIRED AT PUBLIC USE FIXTURES.



WHEN AN OBSTRUCTION OF A HEIGHT GREATER THAN 27" FROM THE SURFACE WOULD CREATE A PROTRUSION OF MORE THAN 4" INTO THE PEDESTRIAN CIRCULATION AREA, CONSTRUCT ADDITIONAL CURB OR FOUNDATION AT THE BOTTOM TO PROVIDE A MAXIMUM 4" OVERHANG.



PROTRUDING OBJECTS OF A HEIGHT ≤27" ARE DETECTABLE BY CANE AND DO NOT REQUIRE ADDITIONAL TREATMENT.

DETECTION BARRIER FOR VERTICAL CLEARANCE < 80"

Texas Department of Transportation | Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-18

FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG
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REVISIONS	0921	06	302, ETC	TEEGE, ETC
REVISED 08, 2005 REVISED 06, 2012 REVISED 01, 2018	DIST	COUNTY		SHEET NO.
	PHARR	CAMERON, ETC		52

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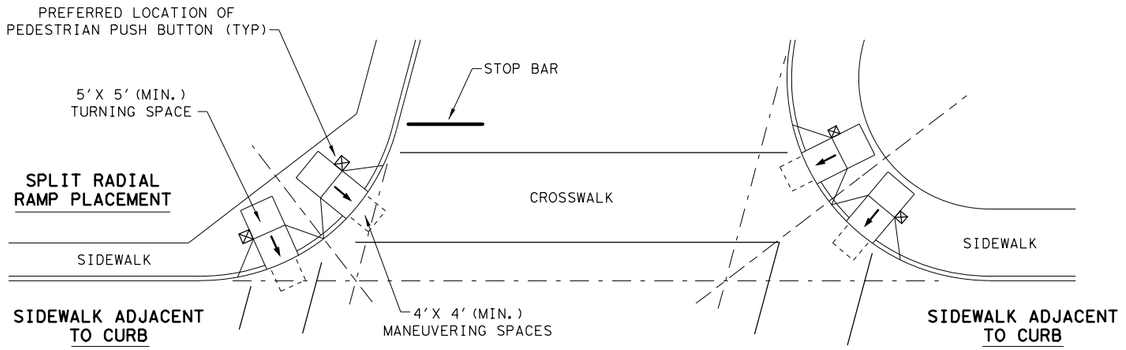
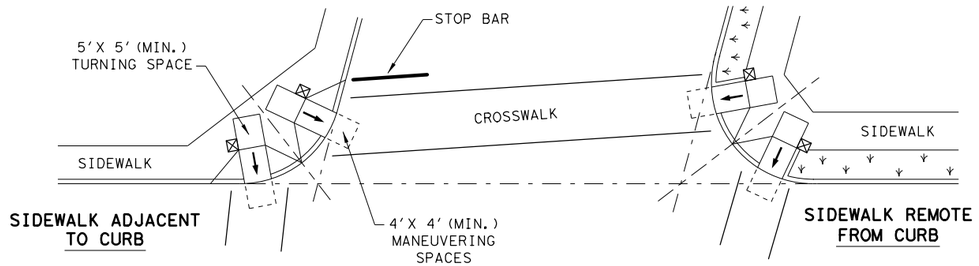
TYPICAL CROSSING LAYOUTS

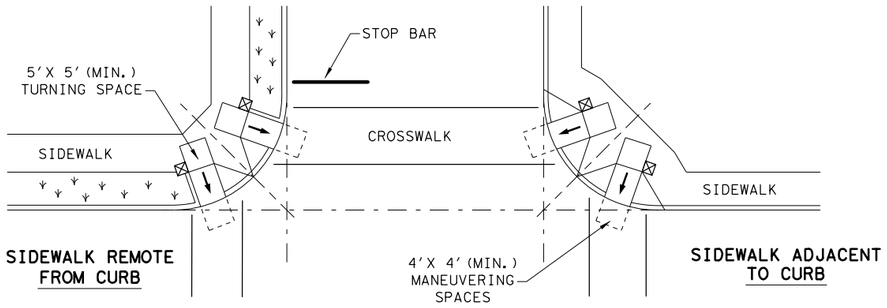
SEE SHEET 1 OF 4 FOR DETAILS AND DIMENSIONS



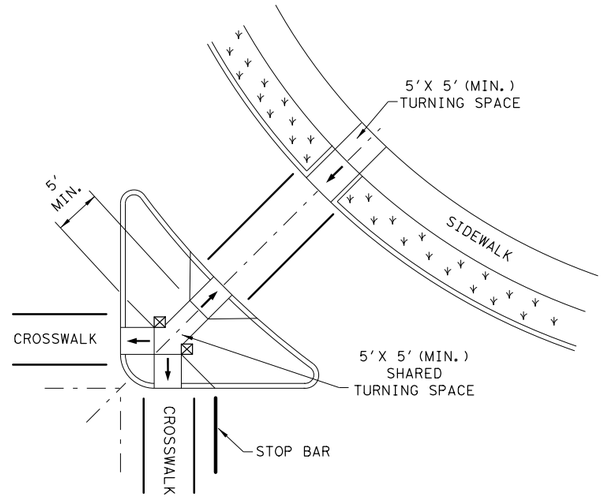
SKEWED INTERSECTION WITH "LARGE" RADIUS



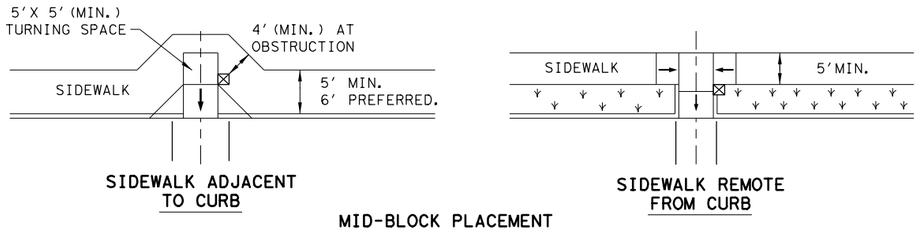
SKEWED INTERSECTION WITH "SMALL" RADIUS



NORMAL INTERSECTION WITH "SMALL" RADIUS



AT INTERSECTION
W/FREE RIGHT TURN & ISLAND



MID-BLOCK PLACEMENT
PERPENDICULAR RAMPS

LEGEND:

SHOWS DOWNWARD SLOPE. →

DENOTES PREFERRED LOCATION OF PEDESTRIAN PUSH BUTTON (IF APPLICABLE). ☒

DENOTES PLANTING OR NON-WALKING SURFACE NOT PART OF PEDESTRIAN CIRCULATION PATH.

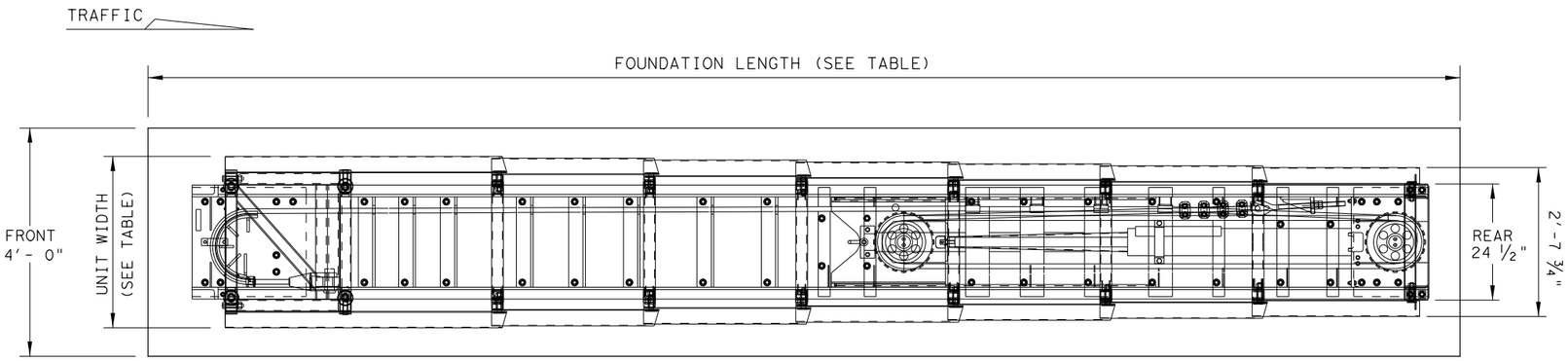
SHEET 4 OF 4

Texas Department of Transportation — Design Division Standard

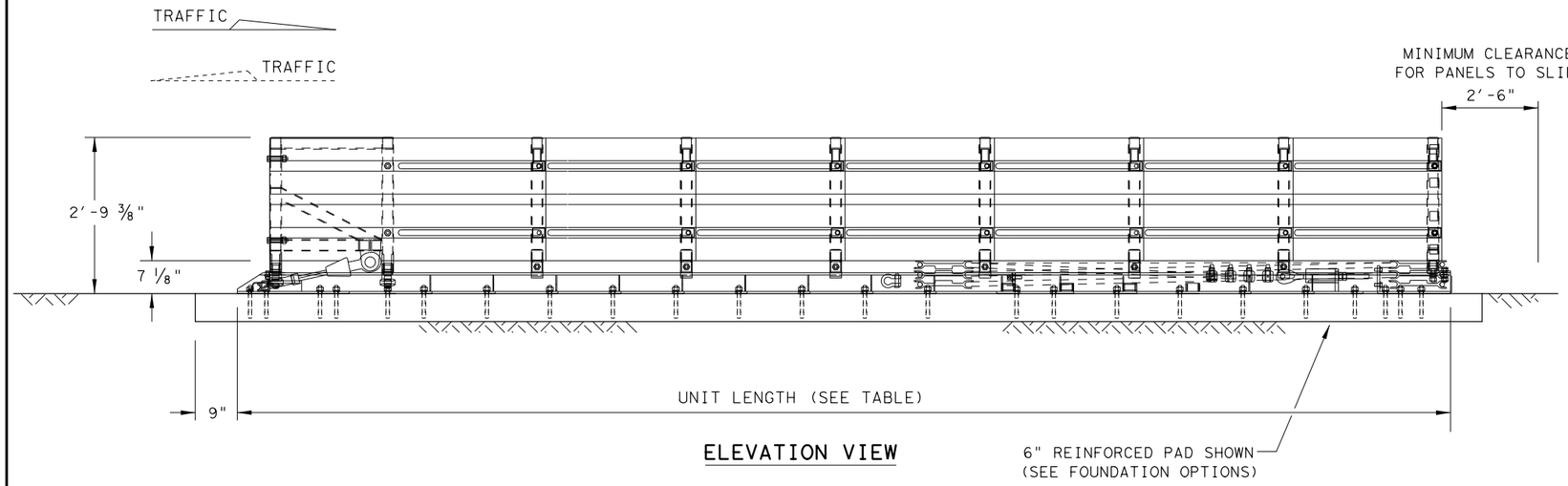
PEDESTRIAN FACILITIES CURB RAMPS

PED-18

FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	302, ETC	TEEGE, ETC
REVISED 08, 2005 REVISED 06, 2012 REVISED 01, 2018	DIST	COUNTY		SHEET NO.
	PHARR	CAMERON, ETC		53



PLAN VIEW



ELEVATION VIEW

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.

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.

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 REVISED 06, 2013 (VP) REVISED 03, 2016 (VP)	0921	06	302, ETC	TEEGE, ETC
	DIST	COUNTY		SHEET NO.
	PHARR	CAMERON, ETC		54

LOW MAINTENANCE

DATE: 12/7/2022 9:59:55 AM
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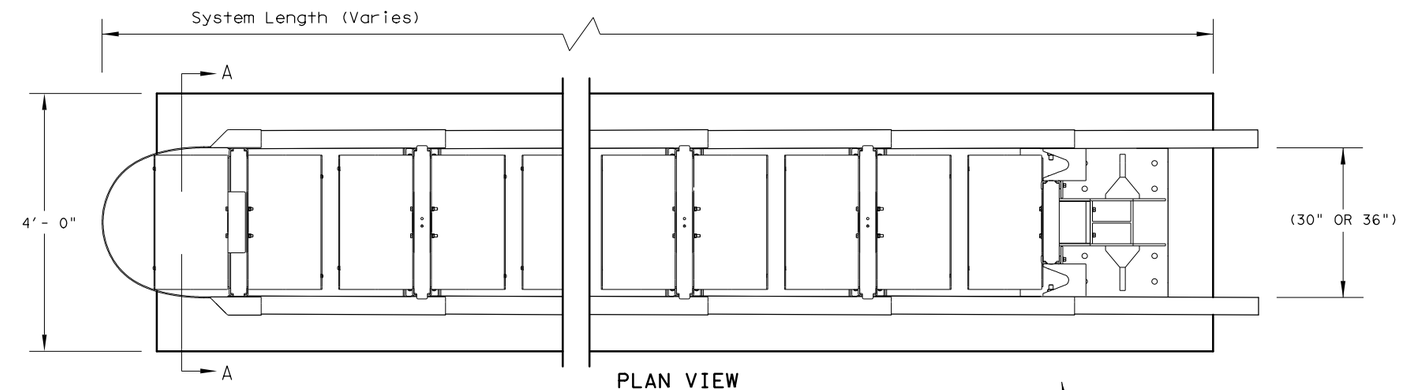
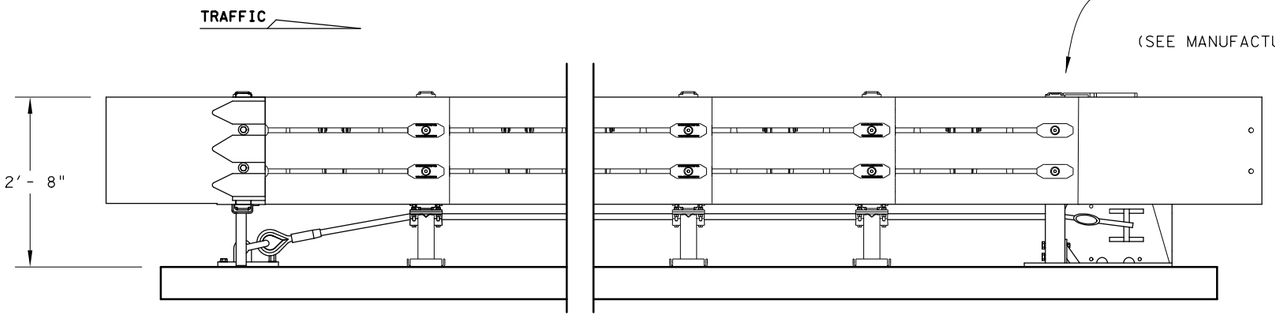


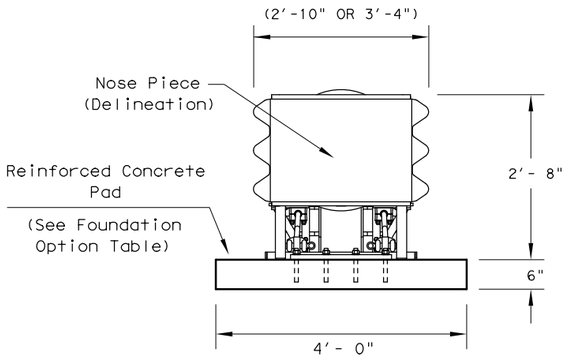
PLAN VIEW

Attachments and transitions to various barrier shapes, barrier railings and bi-directional traffic flows are available.

(SEE MANUFACTURER'S PRODUCT MANUAL)



ELEVATION VIEW



SECTION A-A

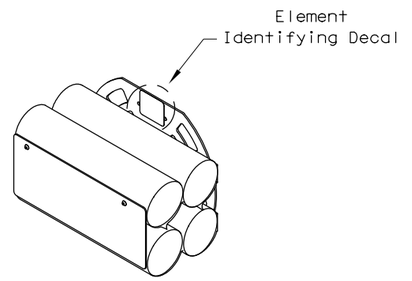
Nose Piece delineation orientation, is shown elsewhere on the plans.

TRANSITION OPTIONS
Vertical Wall
Concrete Traffic Barriers
W-Beam Guardrail
Thrie Beam Guardrail

For bi-directional transition panel and end shoe details. (See manufacturer's product manual.)

FOUNDATION OPTIONS
6" Reinforced Concrete
8" Unreinforced Concrete
Asphalt over Concrete with Minimum 6" Embedment in Concrete
6" Asphalt over 6" Compact Subbase
8" Minimum Asphalt

For steel placement in concrete foundations. (See manufacturer's product manual)



ENERGY ABSORBING ELEMENTS (EAE)

BACKUP SUPPORT OPTIONS
Compact(Stand Alone)
Flush Mount
PCB (Concrete Barrier)

TAU-II-R (NARROW) SYSTEM LENGTHS			
BACKSTOP	TL-2	TL-3	70 mph
PCB	13'-7"	27'-10"	30'-7"
Flush Mount	14'-0"	28'-3"	31'-0"
Compact	15'-3"	29'-6"	32'-3"

Backup and Transition types are shown elsewhere on the plans, (i.e. Attenuator location details or in the general notes).

Note: System lengths are ± 2"

GENERAL NOTES

1. For specific information regarding installation and technical guidance of the system, contact: Lindsay Transportation Solutions - Barrier Systems, Inc. at (707) 374-6800. 180 River Road, Rio Vista, CA 94571
2. For bi-directional traffic, appropriate transition panels will be required.
3. Additional details for the backup support option, transition options 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 TAU-II-R system should be approximately parallel with the barrier or center of merging barriers.
8. Refer to Universal TAU-II-R configuration chart for specific systems configuration number and location of each type of energy absorbing element.
9. 30-inch (30") model shown, also available in 36-inch (36") configuration.

BILL OF MATERIAL

PRODUCT CODE	QTY	DESCRIPTION
B030704	1	Front Support
B030703	TBD	Mid Support
TBD	1	Backstop Assembly (See Table)
TBD	1	Front Cable Anchor
TBD	1	Nose Assembly
B010202	TBD	Sliding Panel
B010659	2	End Panel
K001003	1	Slider Assembly Kit
BSI-1202006-KT	TBD	TAU-II-R Slider Kit
BSI-1107131-KT	TBD	TAU-II-R EAE Mounting Hw Kit
BSI-1012069-00	TBD	Energy Absorbing Element, Type 1
BSI-1012070-00	TBD	Energy Absorbing Element, Type 2
BSI-1012071-00	TBD	Energy Absorbing Element, Type 3
BSI-1110009-00	TBD	Energy Absorbing Element, Type 3N
TBD	TBD	Cable Assembly
K001004	TBD	Cable Guide Kit
K001005	2	Front Support Leg Kit
B010651	4	Pipe Panel Mount
TBD	1	Anchoring Package

(TBD) = To Be Determined, depending on Backup Type and System Length.

(See manufacturer's product manual for details)

LOW MAINTENANCE

Texas Department of Transportation

Design Division Standard

LTS-BARRIER SYSTEMS CRASH CUSHION (R-NARROW)

TAU-II-R(N)-16

FILE: tauiirn16.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL
©TxDOT: January 2013	CONT	SECT	JOB	HIGHWAY
REVISIONS REVISED 06,2013 (VP) REVISED 03,2016 (VP)	0921	06	302,ETC	TEEGE,ETC
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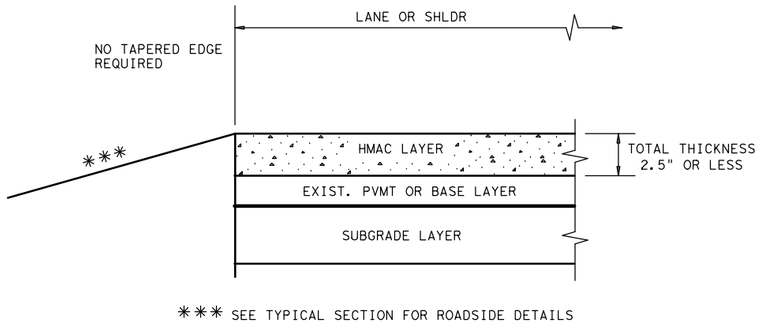
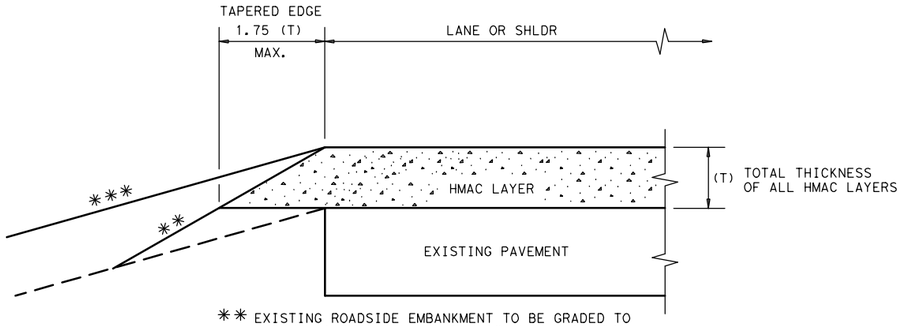


*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

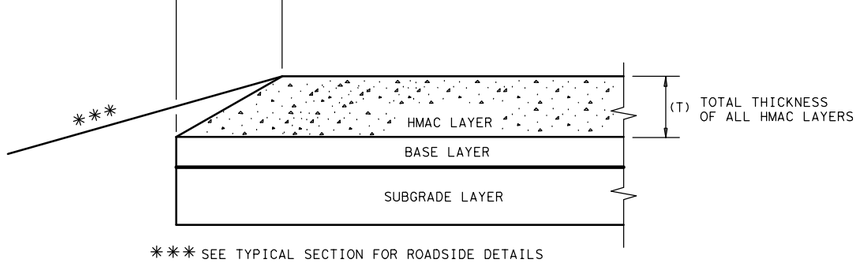
CONDITION - 1
THIN HMAC SURFACES OR HMAC OVERLAY
WITH THICKNESS OF 2.5" OR LESS



** 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.

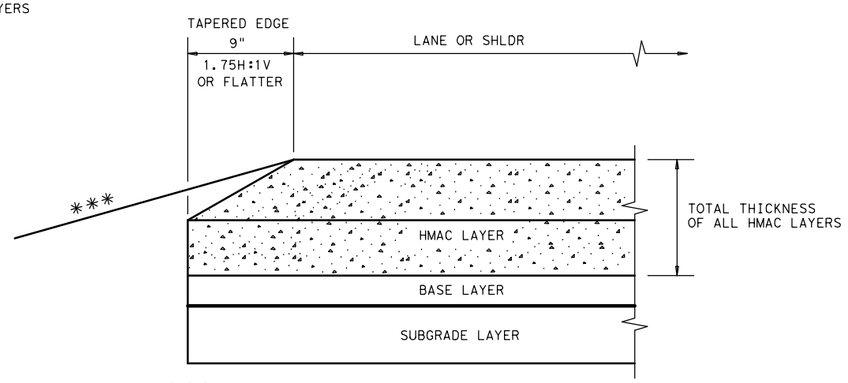
*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

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		
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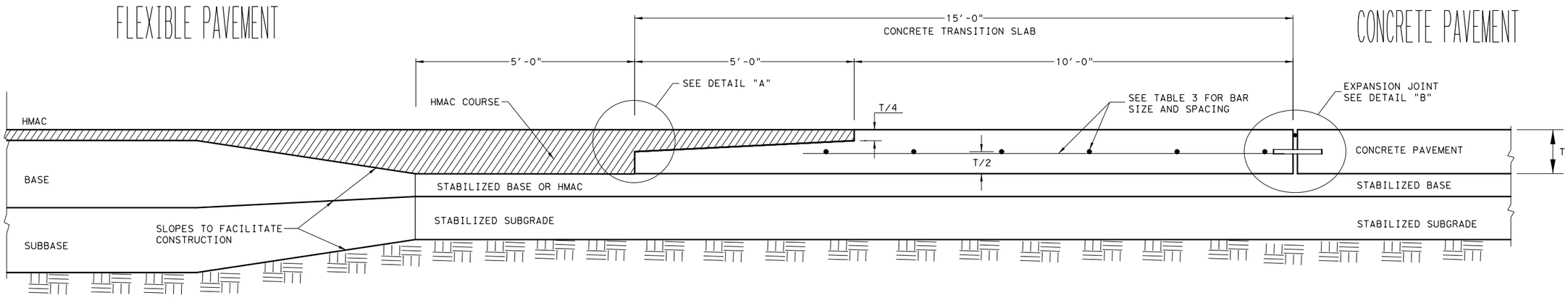
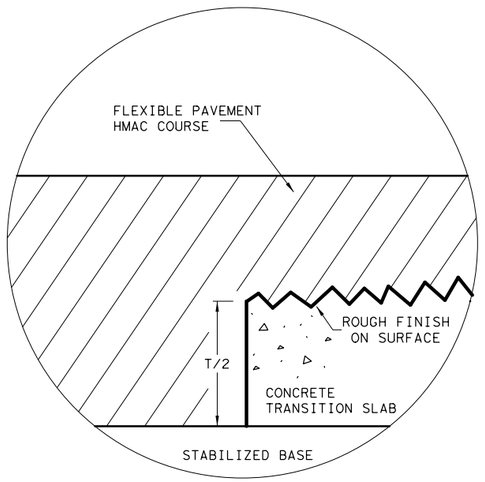
	PHARR	CAMERON,ETC			56		

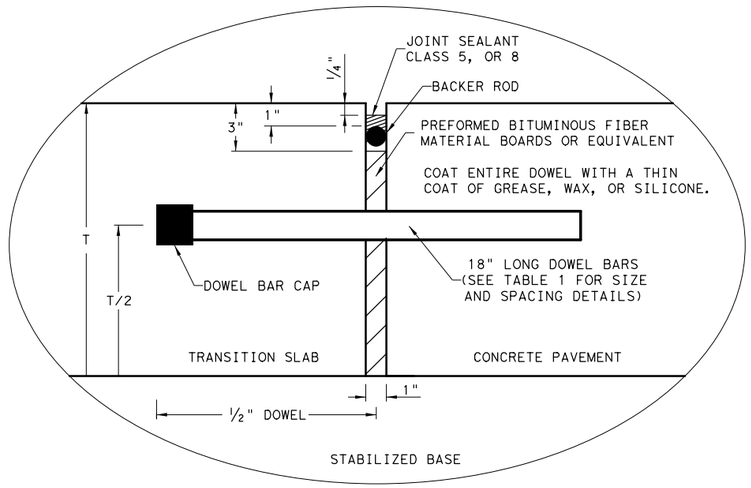


TYPICAL JUNCTION OF CONCRETE PAVEMENT WITH FLEXIBLE PAVEMENT

(NOT TO SCALE)



DETAIL "A"



DETAIL "B"

GENERAL NOTES

1. FOR FURTHER INFORMATION REGARDING THE PLACEMENT OF CONCRETE AND LOAD TRANSFER DEVICES REFER TO THE GOVERNING SPECIFICATIONS FOR "CONCRETE PAVEMENT" AND "REINFORCING STEEL."
2. DETAILS FOR PAVEMENT WIDTH AND THE CROWN CROSS-SLOPE SHALL BE SHOWN ELSEWHERE IN THE PLANS.
3. MATCH THE LONGITUDINAL JOINTS OF THE CONCRETE TRANSITION SLAB WITH ADJOINING CONCRETE PAVEMENT. PROVIDE EQUIVALENT TIEBARS OR TRANSVERSE BARS AT THESE LONGITUDINAL JOINTS, SEE TABLE NO. 2.
4. REFER TO DMS-6310, "JOINT SEALANTS AND FILLERS" FOR THE CLASSIFICATIONS.
5. TRANSITION SLABS WILL BE PAID UNDER ITEM 360, "CONCRETE PAVEMENTS."

TABLE NO.1 DOWELS (SMOOTH BARS)

SLAB THICKNESS T (IN.)	BAR DIA. AND LENGTH	SPACING (IN.)
7 TO 7.5	1" X 18"	12
8 TO 10	1 1/4" X 18"	12
10 TO 13	1 1/2" X 18"	12

TABLE NO.2 TIE BARS (DEFORMED BARS)

SLAB THICKNESS T (IN.)	BAR SIZE	SPACING (IN.)
7 TO 7.5	#5	24
8 TO 13	#6	24

TABLE NO.3 TRANSITION SLAB STEEL (DEFORMED BARS)

SLAB THICKNESS T (IN.)	BAR SIZE	SPACING (IN.) TRANSVERSE DIRECTION	SPACING (IN.) LONGITUDINAL DIRECTION
7 TO 7.5	#5	24	12
8 TO 13	#6	24	12

ADJUST SPACING OF LONGITUDINAL BARS AS NEEDED TO ACCOMDATE DOWEL BAR SPACING.

Texas Department of Transportation

Design Division Standard

CONCRETE PAVEMENT DETAILS TRANSITION SLAB

T-7 to 13 INCHES

TRANS-20

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©TxDOT: NOVEMBER 2020	CONT	SECT	JOB	HIGHWAY
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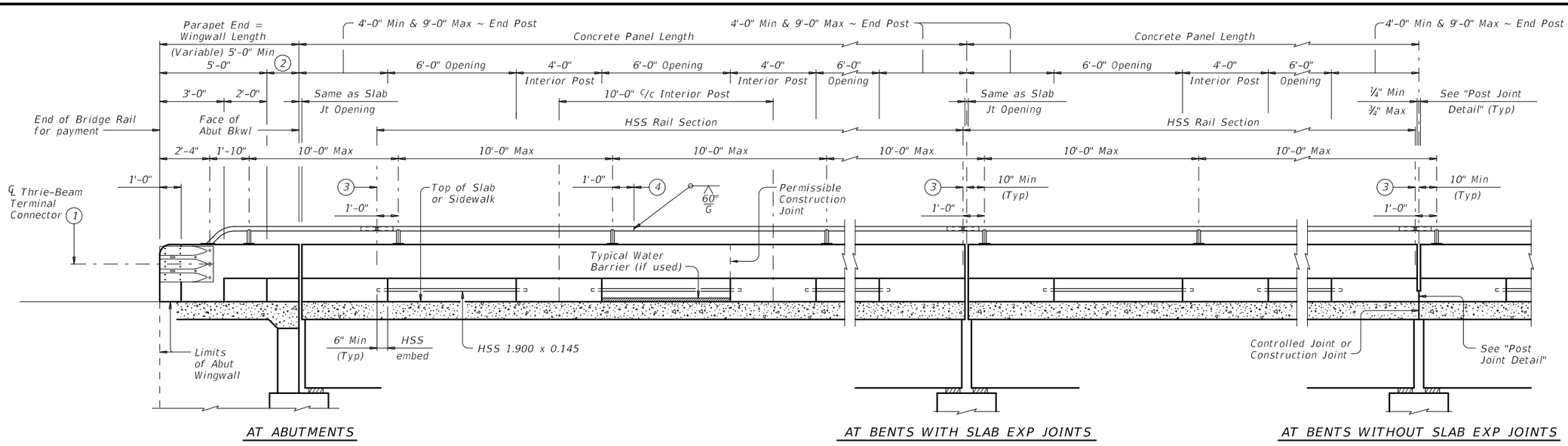


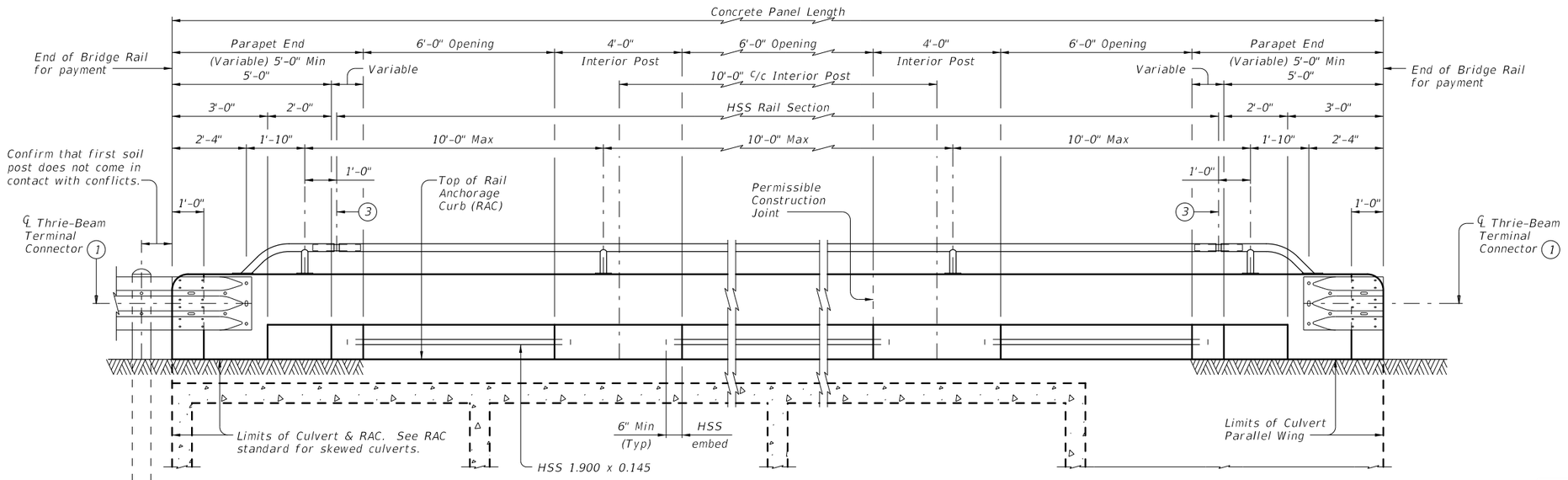
AT ABUTMENTS

AT BENTS WITH SLAB EXP JOINTS

AT BENTS WITHOUT SLAB EXP JOINTS

ROADWAY ELEVATION OF RAIL ON BRIDGE

(Showing without raised sidewalk)



AT STRAIGHT OR FLARED WINGS

AT PARALLEL WINGS

ROADWAY ELEVATION OF RAIL ON BOX CULVERTS

Showing 0° skew culvert. Skewed culverts similar. See RAC standard for details not shown. Vertical joints in concrete rail are not required, unless shown elsewhere.

(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) Wingwall Length minus 5'-0" (Varies)

(3) ℄ Splice Jt or Exp Jt

(4) One shop splice per HSS rail section is permitted with minimum 85 percent penetration. The weld may be square groove or single vee groove. Grind smooth.

SHEET 1 OF 4

Texas Department of Transportation

Bridge Division Standard

COMBINATION RAIL

TYPE C223

FILE: rlstd019-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: AES			
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY			
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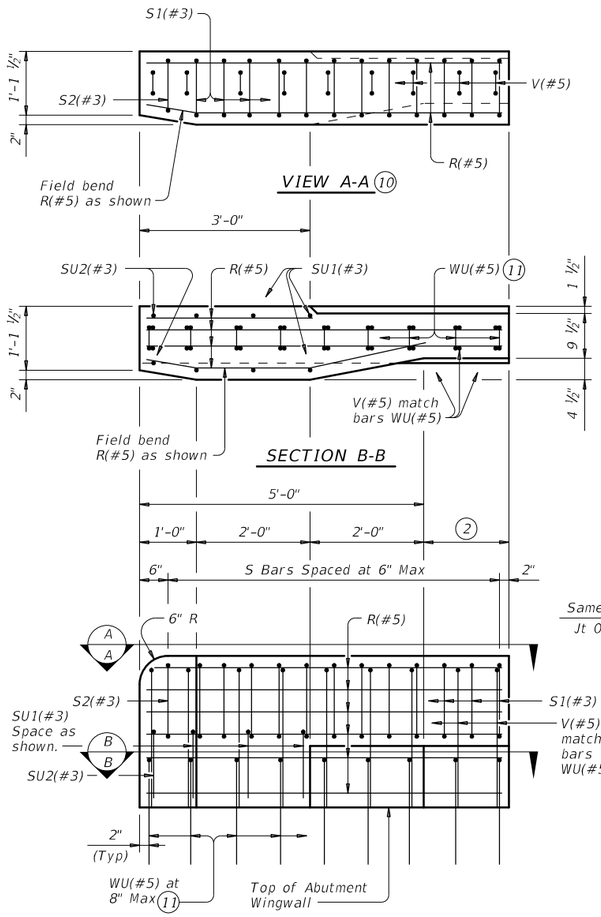
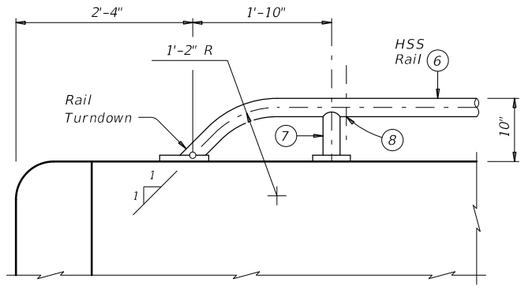
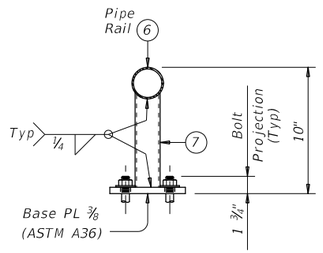


PARAPET END AT ABUT WINGWALL (11)

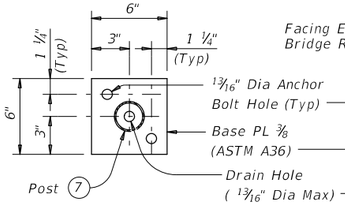


Note that at least two anchor points (as shown) are required for the Bridge Rail on the Abutment Wingwall. Longer Wingwalls may require more than two Rail anchorages.

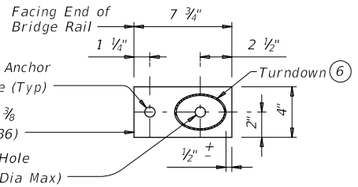
HSS RAIL TERMINAL DETAIL



TRANSVERSE SECTION

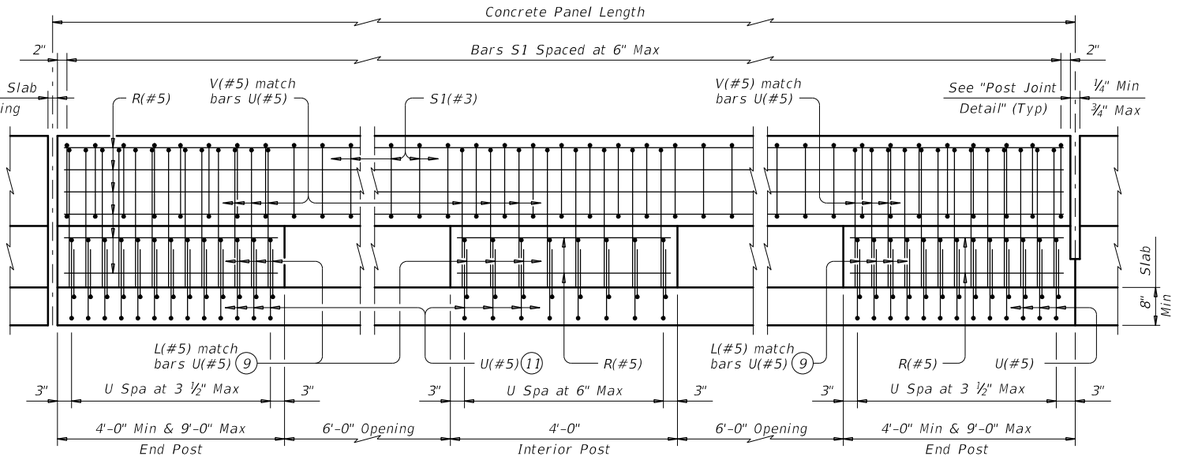


POST BASE PLATE PLAN



RAIL TURNDOWN BASE PLATE PLAN

HSS RAIL DETAILS



AT BENTS WITH SLAB EXP JOINTS

AT 4' INTERIOR POST

AT BENTS WITHOUT SLAB EXP JOINTS

ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT

Showing rail on slab and without raised sidewalk. Rail on box culvert similar. HSS not shown for clarity.

(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) Wingwall Length minus 5'-0" (Varies)

(5) Increase 2" for structures with overlay.

(6) HSS 2.875 x 0.203

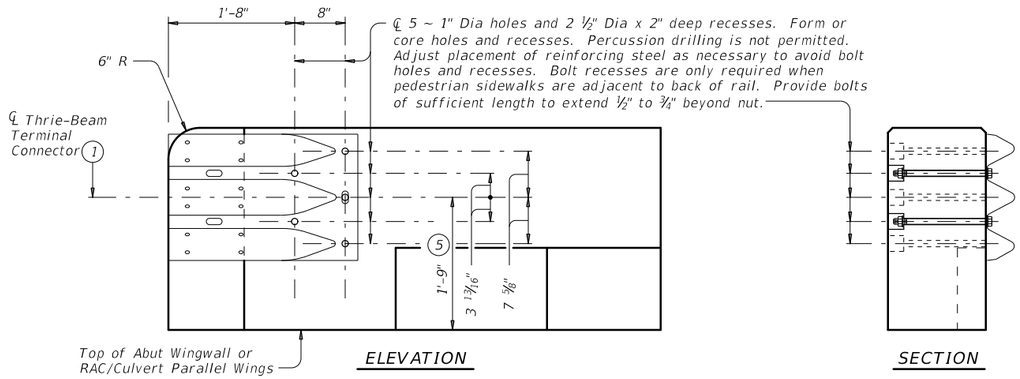
(7) HSS 2.375 x 0.154

(8) ⅜" Dia Hole in bottom of HSS rail (Minimum 1 hole between posts ~ Typ)

(9) Bars L(#5) are part of rail reinforcing and are included in unit price bid for railing. Space with Bars U. Bars L match slab bar cover. Bars L may be bundled with top slab reinforcing if spacing is equivalent.

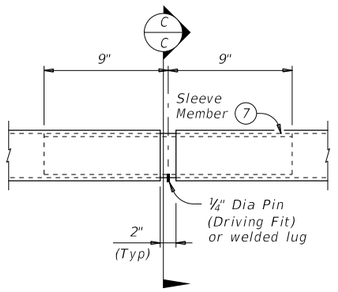
(10) Bars SU1(#3), SU2(#3) and WU(#5) not shown for clarity.

(11) Substitute Bars U(#5) for Bars WU(#5) when parapet end is located on anchorage curb over culvert top slab. Use Bars WU(#5) in culvert parallel wings.

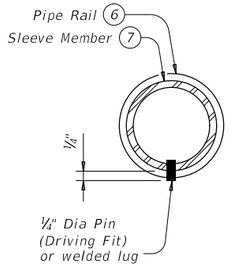


ELEVATION

SECTION



AT SPLICE OR EXP JTS



SECTION C-C

TERMINAL CONNECTION DETAILS

PIPE SPLICE DETAILS

SHEET 2 OF 4

Texas Department of Transportation

Bridge Division Standard

COMBINATION RAIL

TYPE C223

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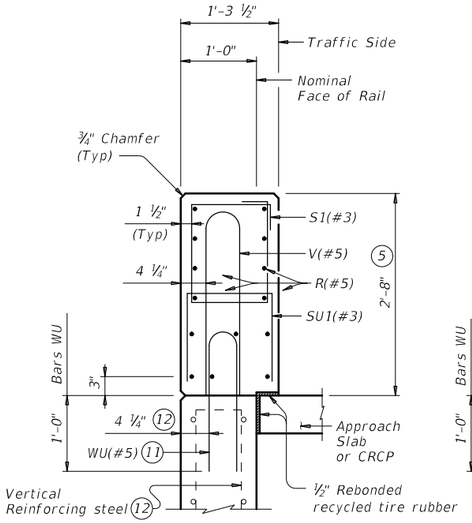
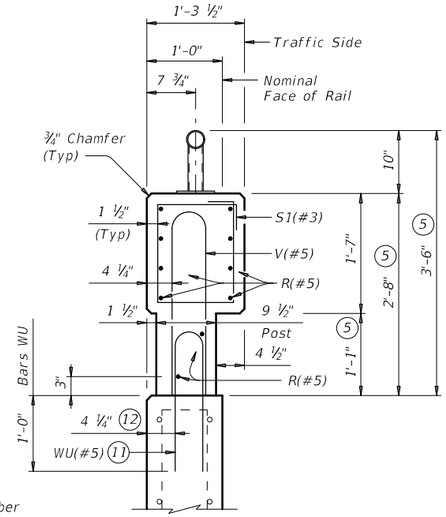
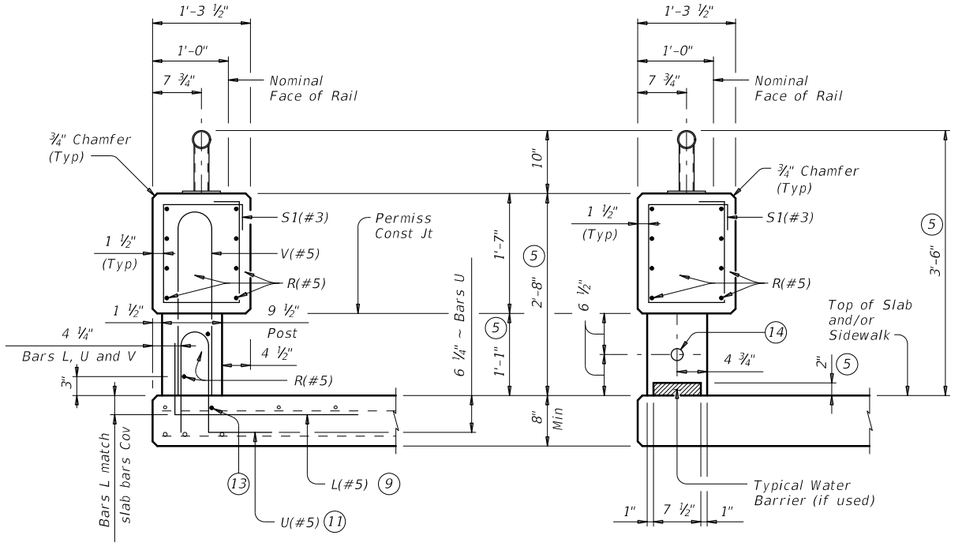


SECTION D-D
ON ABUTMENT WINGWALLS
OR CIP RETAINING WALLS

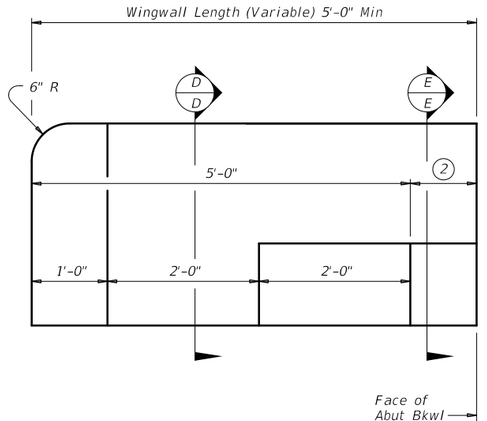


SECTION E-E
ON ABUTMENT WINGWALLS
OR CIP RETAINING WALLS



AT POST
ON BRIDGE SLAB

AT OPENING
ON BRIDGE SLAB



ELEVATION AT ABUTMENT WINGWALL

Box culvert parallel wings or rail anchorage curb similar.
HSS rail not shown for clarity.

SECTIONS THRU RAIL WITHOUT RAISED SIDEWALK

Sections on box culvert similar.

SECTION D-D
ON ABUTMENT WINGWALLS
OR CIP RETAINING WALLS

SECTION E-E
ON ABUTMENT WINGWALLS
OR CIP RETAINING WALLS

AT POST
ON BRIDGE SLAB

AT OPENING
ON BRIDGE SLAB

POST JOINT DETAIL

(Showing without raised sidewalk)
Provide at all interior bents without slab expansion joints.

SECTIONS THRU RAIL WITH RAISED SIDEWALK

Sections on box culvert similar.

(2) Wingwall Length minus 5'-0" (Varies)

(5) Increase 2" for structures with overlay.

(9) Bars L(#5) are part of rail reinforcing and are included in unit price bid for railing. Space with Bars U. Bars L match slab bar cover. Bars L may be bundled with top slab reinforcing if spacing is equivalent.

(11) Substitute Bars U(#5) for Bars WU(#5) when parapet end is located on anchorage curb over culvert top slab. Use Bars WU(#5) in culvert parallel wings.

(12) When vertical reinforcing has closer clear cover over horizontal reinforcing in abutment wingwalls on traffic side of wall, move the horizontal wingwall/retaining wall reinforcing to the inside of Bars WU where bars conflict.

(13) Top longitudinal slab bar may be adjusted laterally 3" plus or minus to tie reinforcing.

(14) HSS 1.900 x 0.145

(15) Raised Sidewalk.

Texas Department of Transportation

Bridge Division Standard

COMBINATION RAIL

TYPE C223

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©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
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	DIST	COUNTY		SHEET NO.
	PHARR	CAMERON,ETC		60

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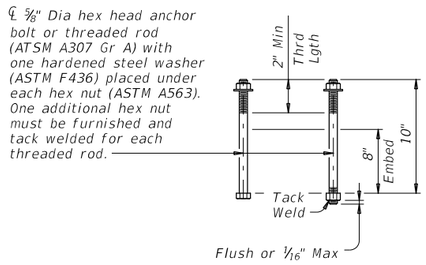
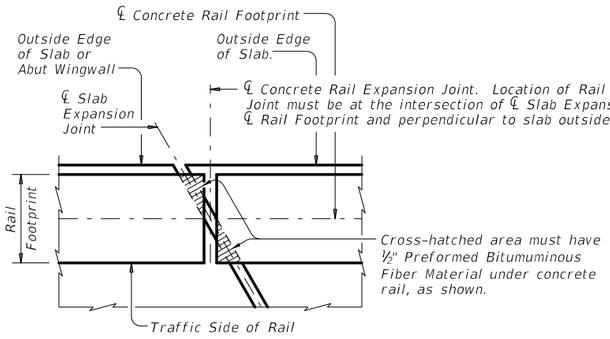
RAIL DATA FOR HORIZONTAL CURVES

	RADIUS TO FACE OF RAIL	MAX CHORD LENGTH	CONSTRUCT OR FABRICATE
HSS Rail	Over 2800'	29'-0"	Straight rail sections
	Over 1400' thru 2800'	14'-6"	To required radius or to chords shown
	Over 700' thru 1400'	7'-3"	
	Thru 700'	Zero	To required radius



CAST-IN-PLACE ANCHOR BOLT OPTIONS (16)



PLAN OF RAIL AT EXPANSION JOINTS

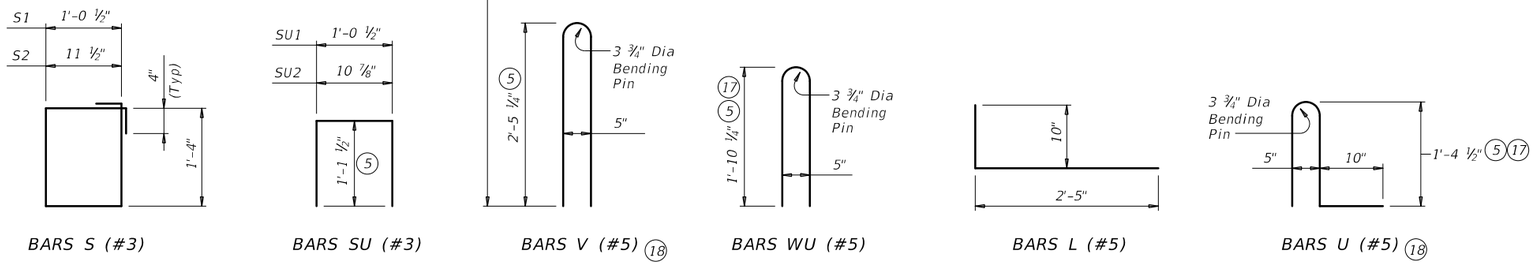
Example showing Slab Expansion Joints without breakbacks.

(5) Increase 2" for structures with overlay.

(16) See "Material Notes" for anchor bolt information.

(17) For raised sidewalks, add sidewalk height to total bar height. Use sidewalk height at rail's location.

(18) At the Contractor's option, Bars V may be replaced by extending Bars U to 2'-5 ¼" above the roadway/sidewalk surface without overlay.



CONSTRUCTION NOTES:

Face of rail, posts and parapet must be vertical transversely unless otherwise approved by the Engineer. HSS rail posts and opening end faces must be perpendicular to top of adjacent concrete parapet grade. Use epoxy mortar under HSS rail post base plates if gaps larger than 1/16" exist.

Provide water barriers at openings draining onto undercrossing roadways and sidewalks. They may be cast-in-place or precast in convenient lengths and bonded to the bridge deck with an approved epoxy cement.

HSS rail sections must not include less than two posts, and no more than four (except at Abutments).

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

Test adhesive anchors in accordance with Item 450.3.3, "Tests". Test 3 anchors per 100 anchors installed. Perform corrective measures to provide adequate capacity if any of the tests do not meet the required test load. Repair damage from testing as directed.

At the Contractor's option anchor bolts may be cast with the parapet. See "Material Notes".

Chamfer all exposed corners.

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.

Provide ASTM A1085, A500 Gr B or A53 Gr B for all HSS.

Galvanize all metal components of steel rail system. Apply additional coatings when shown elsewhere on the plans. When plans require paint over gavanizing, follow the requirements for painting galvanized steel in Item 445, "Galvanizing" and when field painting, Item 446, "Field Cleaning and Painting Steel". Sleeve members and anchor bolts must receive galvanization prior to installation and only field paint after installation unless directed otherwise by Engineer.

Deformed Welded Wire Reinforcing (WWR) (ASTM A1064) of equal size and spacing may be substituted for Bars U, V, and WU unless noted otherwise.

Anchor bolts must be ⅝" Dia ASTM A307 Gr A fully threaded rods with one hex nut and one hardened steel washer (ASTM F436) each. Nuts must conform to ASTM A563 requirements. Embed fully threaded rods into parapet wall with a Type III, Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment depth is 3". Anchor adhesive chosen must be able to achieve a nominal bond strength in tension of a single anchor, Na, of 5 kips (edge distance must be accounted for). Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing".

Optional cast-in-place anchor bolts must be ⅝" Dia ASTM A307 Gr A bolts (or threaded rods with one tack welded hex nut each) with one hex nut and one hardened steel washer (ASTM F436) at each bolt. Nuts must conform to ASTM A563 requirements.

Provide bar laps, where required, as follows:
Uncoated or galvanized ~ #5 = 2'-0"
Epoxy coated ~ #5 = 3'-0"

GENERAL NOTES:

This rail has been evaluated by full-scale crash test to meet MASH TL-3 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.

Submit erection drawings showing panel lengths, HSS rail post spacing, and anchor bolt setting to the Engineer for approval.

Average weight of railing with no overlay:
370 plf total
358 plf (Conc)
12 plf (Steel)

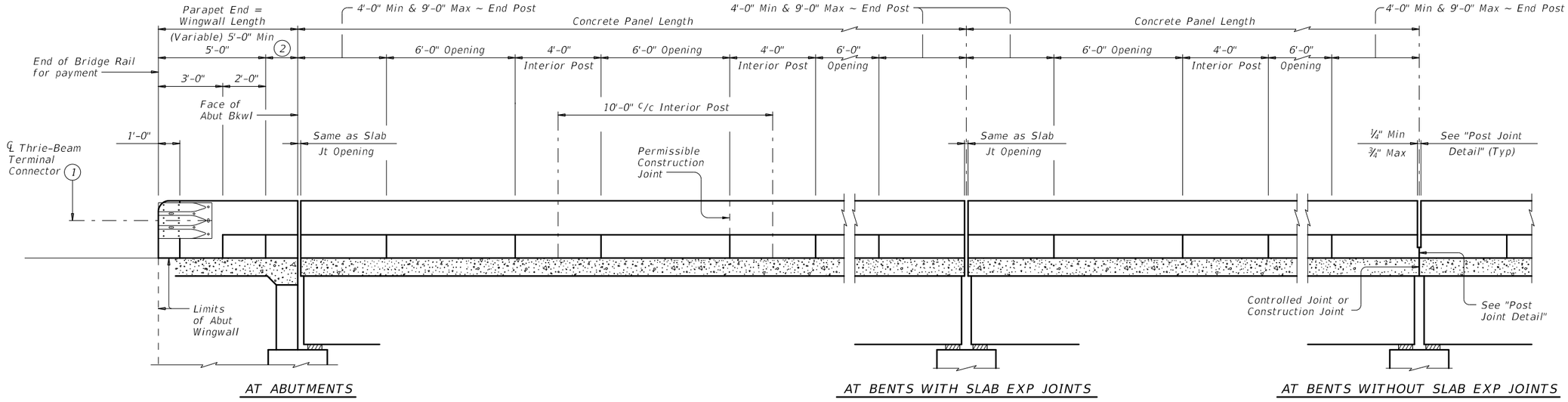
Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.

Texas Department of Transportation — Bridge Division Standard

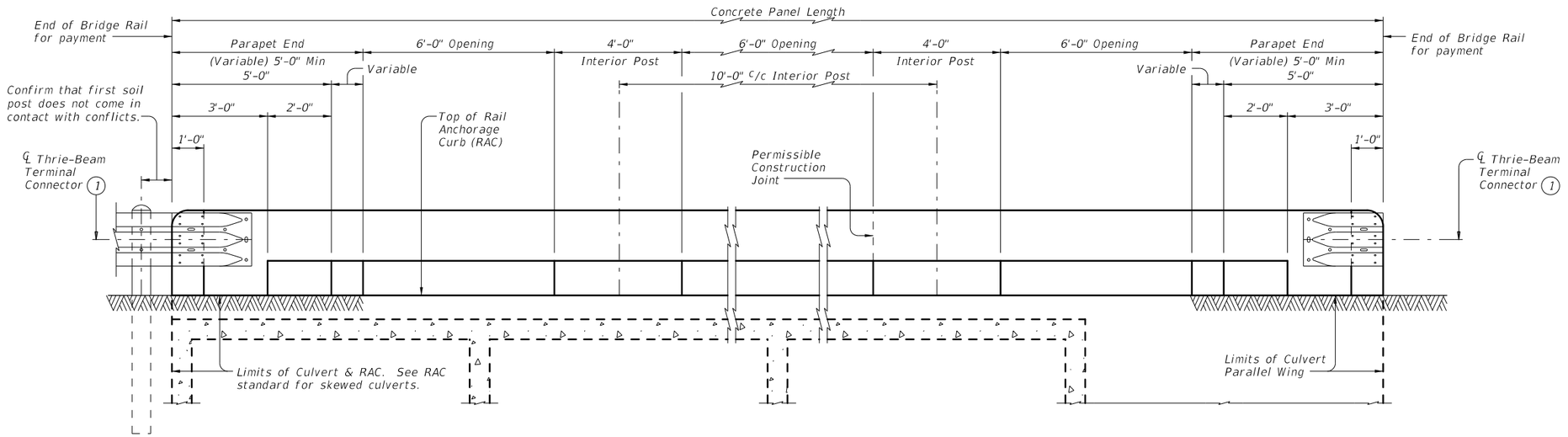
COMBINATION RAIL

TYPE C223

FILE: rlstd019-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: AES
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	302,ETC	TEEGE,ETC
	DIST	COUNTY		SHEET NO.
	PHARR	CAMERON,ETC		61



ROADWAY ELEVATION OF RAIL ON BRIDGE



ROADWAY ELEVATION OF RAIL ON BOX CULVERTS

Showing 0° skew culvert. Skewed culverts similar. See RAC standard for details not shown.
Vertical joints in concrete rail are not required, unless shown elsewhere.

(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) Wingwall Length minus 5'-0" (Varies)

DATE: 12/7/2022 10:00:35 AM
FILE: ...\Roadway\rlstd005-19.dgn

SHEET 1 OF 3

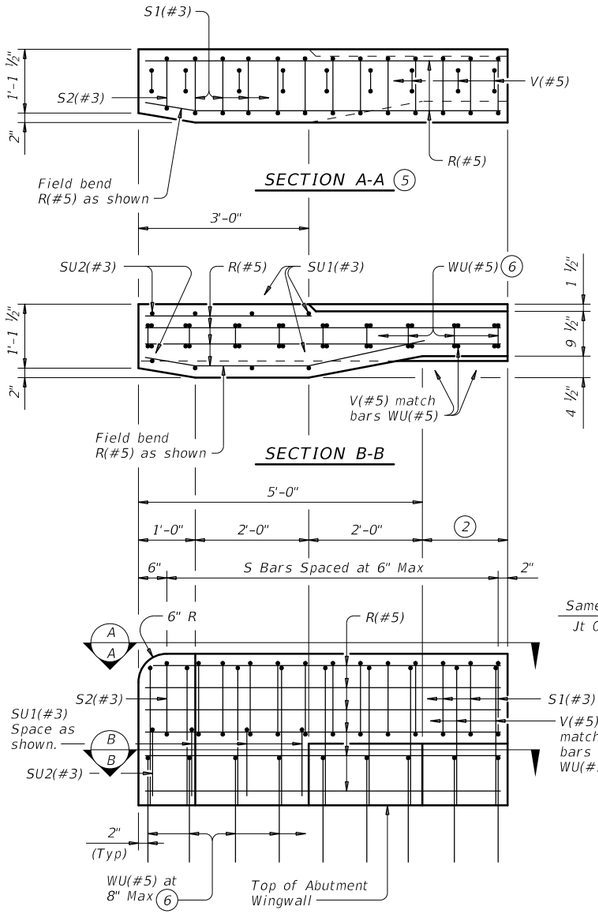
Texas Department of Transportation

Bridge Division Standard

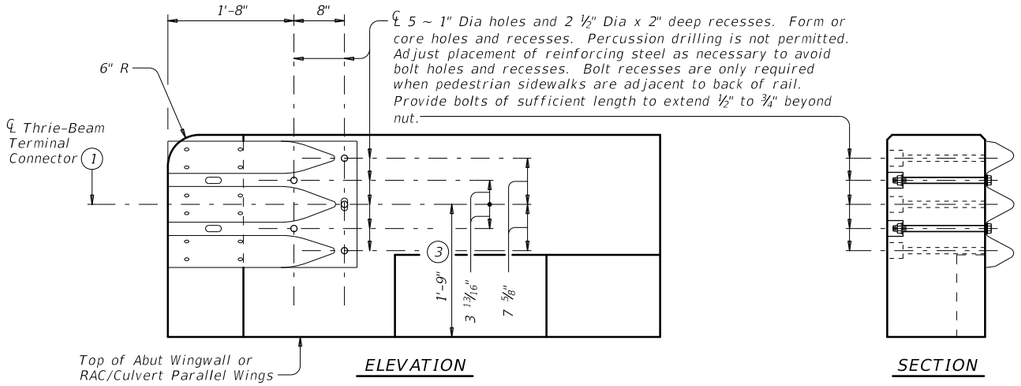
TRAFFIC RAIL

TYPE T223

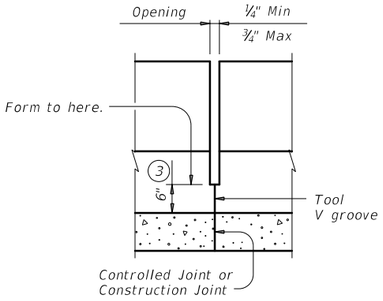
FILE: rlstd005-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK. AES
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	302,ETC	TEEGE,ETC
	DIST	COUNTY		SHEET NO.
	PHARR	CAMERON,ETC		62



PARAPET END AT ABUT WINGWALL (6)

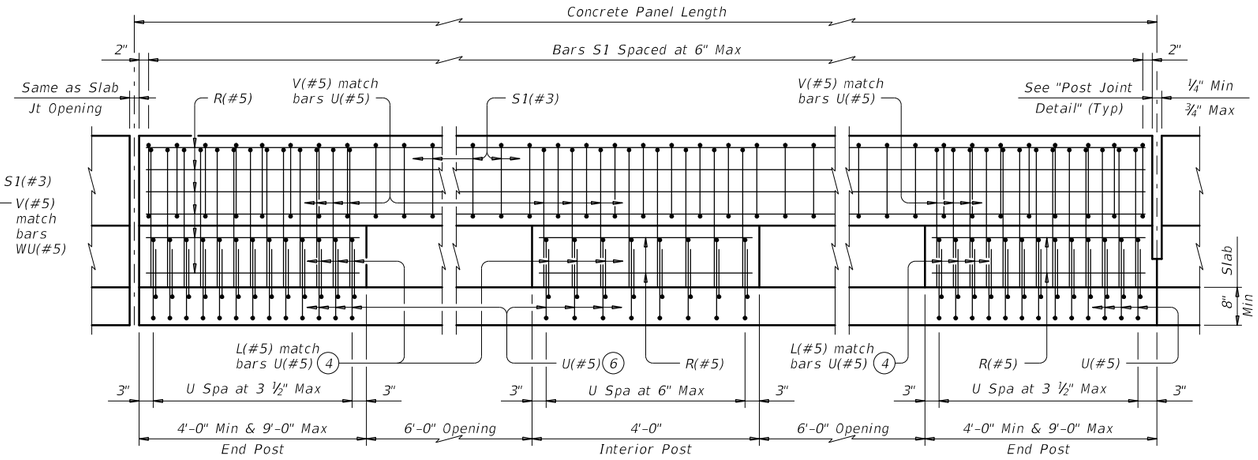


TERMINAL CONNECTION DETAILS



POST JOINT DETAIL

Provide at all interior bents without slab expansion joints.



AT SLAB EXPANSION JOINTS

AT 4' INTERIOR POST

AT BENTS WITHOUT SLAB EXPANSION JOINTS

ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT

Showing rail on slab. Rail on box culvert similar.

(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) Wingwall Length minus 5'-0" (Varies)

(3) Increase 2" for structures with overlay.

(4) Bars L(#5) are part of rail reinforcing and are included in unit price bid for railing. Space with Bars U. Bars L match slab bar cover. Bars L may be bundled with top slab reinforcing if spacing is equivalent.

(5) Bars SU1(#3), SU2(#3) and WU(#5) not shown for clarity.

(6) Substitute Bars U(#5) for Bars WU(#5) when parapet end is located on achorage curb over culvert top slab. Use Bars WU(#5) in culvert parallel wings.

Texas Department of Transportation

Bridge Division Standard

TRAFFIC RAIL

TYPE T223

FILE: rlstd005-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: AES
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	302,ETC	TEEGE,ETC
	DIST	COUNTY		SHEET NO.
	PHARR	CAMERON,ETC		63

DATE: 12/7/2022 10:00:36 AM
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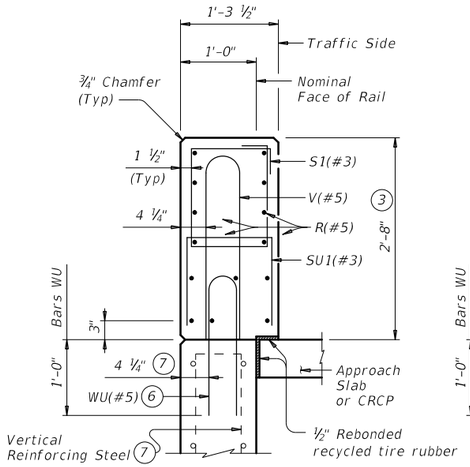
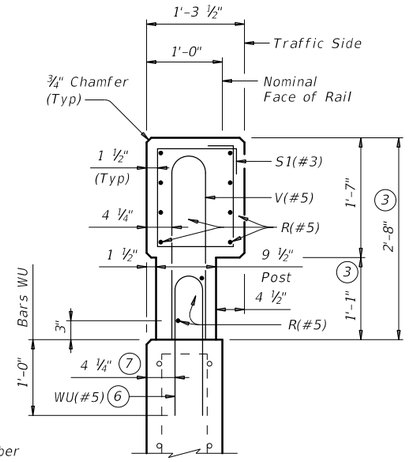
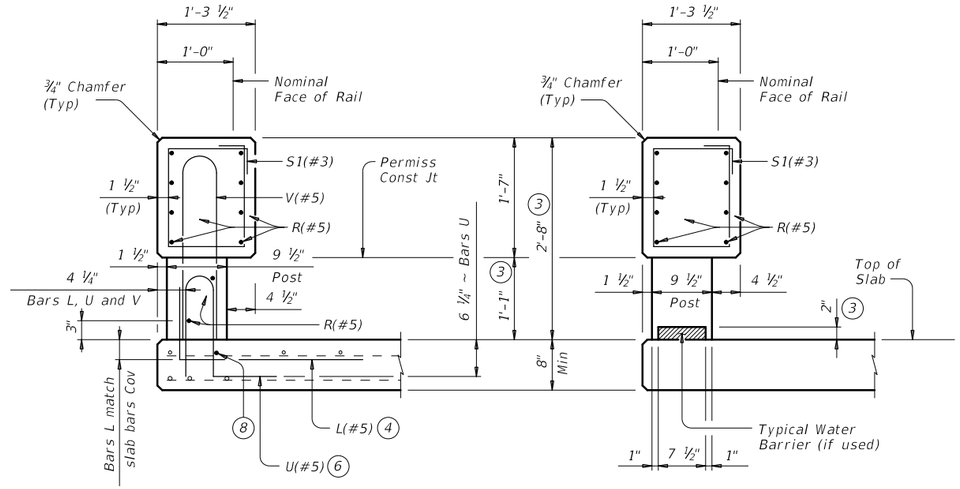


SECTION C-C
ON ABUTMENT WINGWALLS
OR CIP RETAINING WALLS



SECTION D-D
ON ABUTMENT WINGWALLS
OR CIP RETAINING WALLS

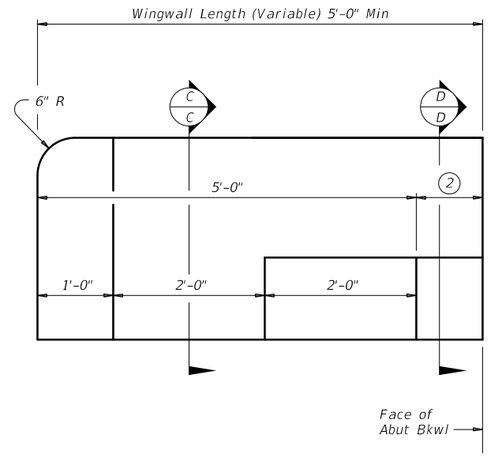


AT POST
ON BRIDGE SLAB

AT OPENING
ON BRIDGE SLAB

SECTIONS THRU RAIL

Sections on box culverts similar.



ELEVATION AT ABUTMENT WINGWALL

Box culvert parallel wings or rail anchorage curb similar.

(2) Wingwall Length minus 5'-0" (Varies)

(3) Increase 2" for structures with overlay.

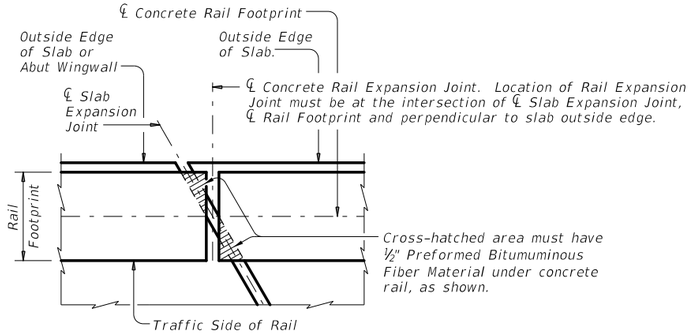
(4) Bars L(#5) are part of rail reinforcing and are included in unit price bid for railing. Space with Bars U. Bars L match slab bar cover. Bars L may be bundled with top slab reinforcing if spacing is equivalent.

(6) Substitute Bars U(#5) for Bars WU(#5) when parapet end is located on anchorage curb over culvert top slab. Use Bars WU(#5) in culvert parallel wings.

(7) When vertical reinforcing has closer clear cover over horizontal reinforcing in abutment wingwalls on traffic side of wall, move the horizontal wingwall/retaining wall reinforcing to the inside of Bars WU where bars conflict.

(8) Top longitudinal slab bar may be adjusted laterally 3" plus or minus to tie reinforcing.

(9) At the Contractor's option, Bars V may be replaced by extending Bars U to 2'-5 ¼" above the roadway surface without overlay.



PLAN OF RAIL AT EXPANSION JOINTS

Example showing Slab Expansion Joints without breakbacks.

CONSTRUCTION NOTES:

Face of rail and parapet must be vertical transversely unless otherwise shown in the plans or approved by the Engineer.

Provide water barriers at openings draining onto undercrossing roadways and sidewalks. They may be cast-in-place or precast in convenient lengths and bonded to the bridge deck with an approved epoxy cement.

Chamfer all exposed corners.

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 Reinforcing (WWR) (ASTM A1064) of equal size and spacing may be substituted for Bars U, V, and WU unless noted otherwise. Provide the same laps as required for reinforcing bars.

Provide bar laps, where required, as follows:

Uncoated or galvanized ~ #5 = 2'-0"

Epoxy coated ~ #5 = 3'-0"

GENERAL NOTES:

This rail has been evaluated by full-scale crash test to meet MASH TL-3 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.

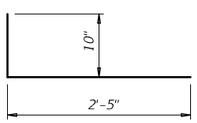
Do not use this railing on bridges with expansion joints providing more than 5" movement.

Rail anchorage details shown on this standard may require modification for select structure types. See appropriate details elsewhere in plans for these modifications.

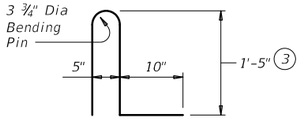
Shop drawings are not required for this rail.

Average weight of railing with no overlay is 358 plf.

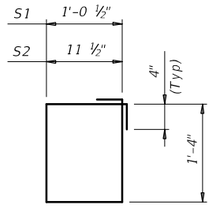
Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.



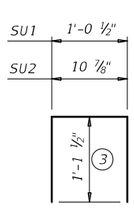
BARS L (#5)



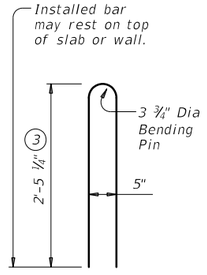
BARS U (#5) (9)



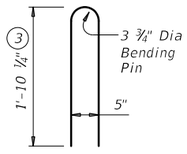
BARS S (#3)



BARS SU (#3)



BARS V (#5) (9)



BARS WU (#5)

SHEET 3 OF 3

Texas Department of Transportation

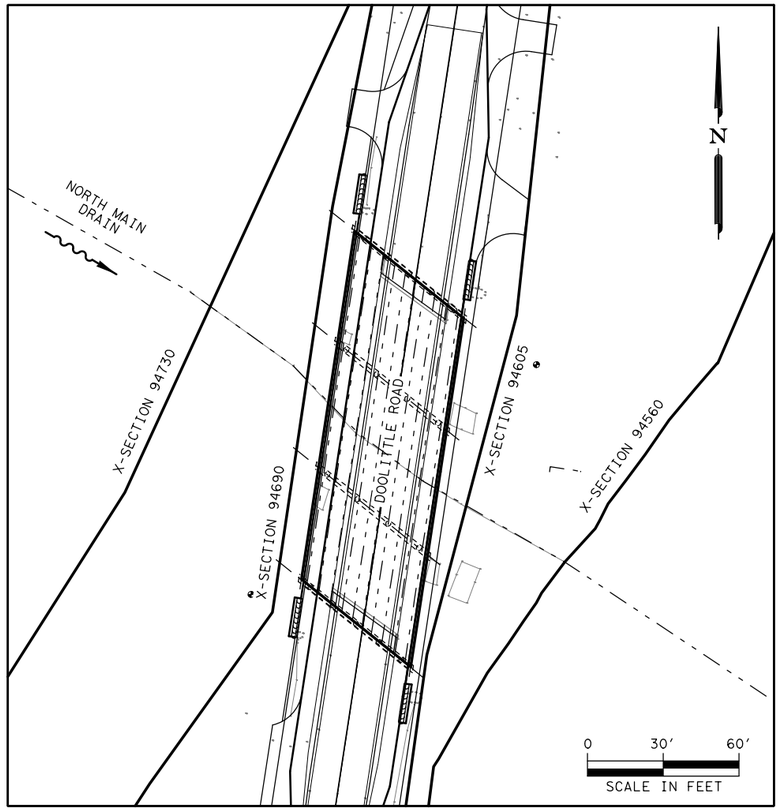
Bridge Division Standard

TRAFFIC RAIL

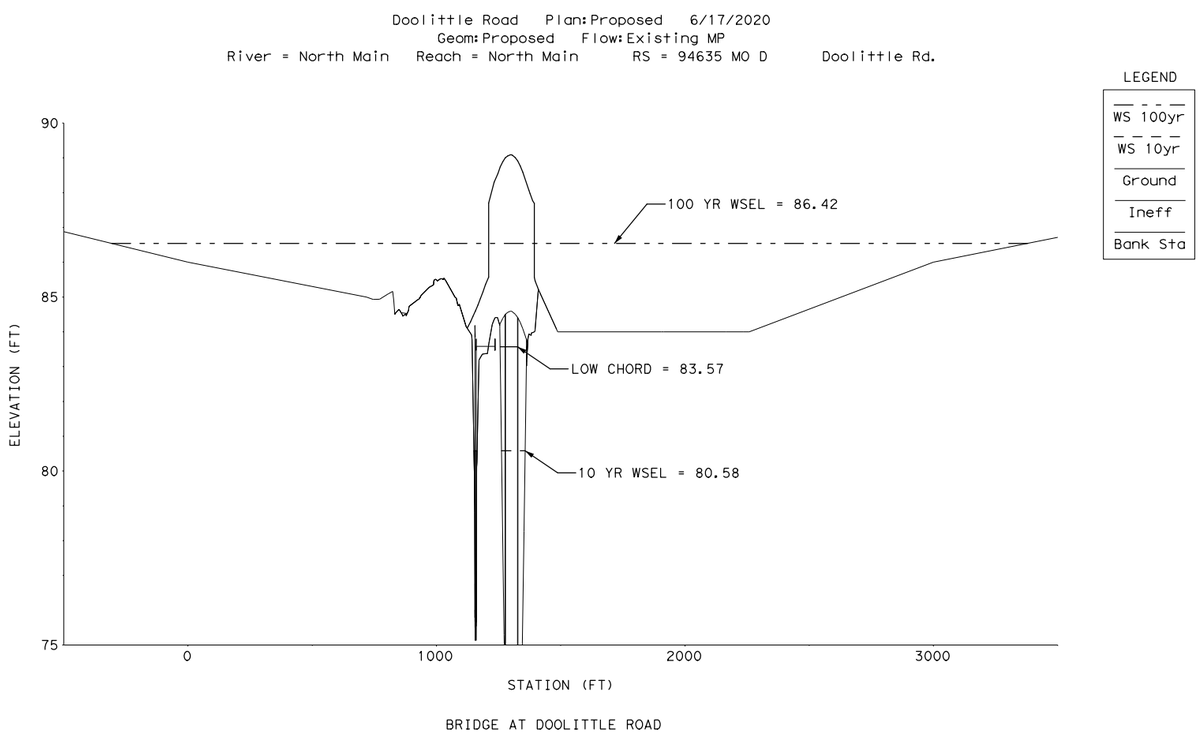
TYPE T223

FILE:	rlstd005-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: AES
©TxDOT	September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS		0921	06	302,ETC	TEEGE,ETC
		DIST	COUNTY		SHEET NO.
		PHARR	CAMERON,ETC		64

DATE: 12/7/2022 10:00:36 AM
FILE: ...\Roadway\rlstd005-19.dgn



HECRAS X-SECTION LAYOUT



BRIDGE AT DOOLITTLE ROAD

DOOLITTLE ROAD AT NORTH MAIN DRAIN												
HEC-RAS X-SECTION	LOCATION	10 YEAR						100 YEAR				
		EXISTING CONDITION			PROPOSED CONDITION			EXISTING CONDITION			PROPOSED CONDITION	
		Q TOTAL (CFS)	V CHNL (FT/S)	WSEL (FT)	Q TOTAL (CFS)	V CHNL (FT/S)	WSEL (FT)	Q TOTAL (CFS)	V CHNL (FT/S)	WSEL (FT)	Q TOTAL (CFS)	V CHNL (FT/S)	WSEL (FT)
94730	APPROACH	2605	2.12	80.75	2605	2.14	80.70	11653	4.29	86.67	11653	4.45	86.52
94690	CONTRACTION	2605	2.60	80.66	2605	2.62	80.61	11653	5.24	86.46	11653	5.47	86.28
94635 MO U	US BRIDGE	2596	2.85	80.59	2596	2.84	80.59	4319	0.95	86.49	5200	1.17	86.44
94635 MO D	DS BRIDGE	2596	2.73	80.58	2596	2.72	80.58	4319	0.86	86.47	5200	1.02	86.41
94605	EXPANSION	2605	2.52	80.59	2605	2.52	80.59	11653	4.57	86.33	11653	4.57	86.33
94560	EXIT	2605	2.63	80.57	2605	2.63	80.57	11653	5.91	86.03	11653	5.91	86.03

NOTE:

1. EFFECTIVE FEMA MODEL OBTAINED FROM THE FEMA LIBRARY. THE EFFECTIVE MODEL WAS UPDATED WITH FIELD RUN SURVEY TO FORM THE REVISED EXISTING MODEL AND THE PROPOSED MODEL WAS CREATED TO MODEL THE PROPOSED BRIDGE.
2. FLOW RATES ARE FROM THE EFFECTIVE FEMA MODEL.
3. HYDRAULIC COMPUTATIONS PERFORMED IN HEC-RAS VERSION 5.0.7.

STATE OF TEXAS
CLINT P. EVANS
122372
LICENSED
PROFESSIONAL ENGINEER

Clint P. Evans 12-7-2022

NO.	DATE	REVISION	APPROVED

FIRM REGISTRATION NO. F-230

tnp

Texas Department of Transportation
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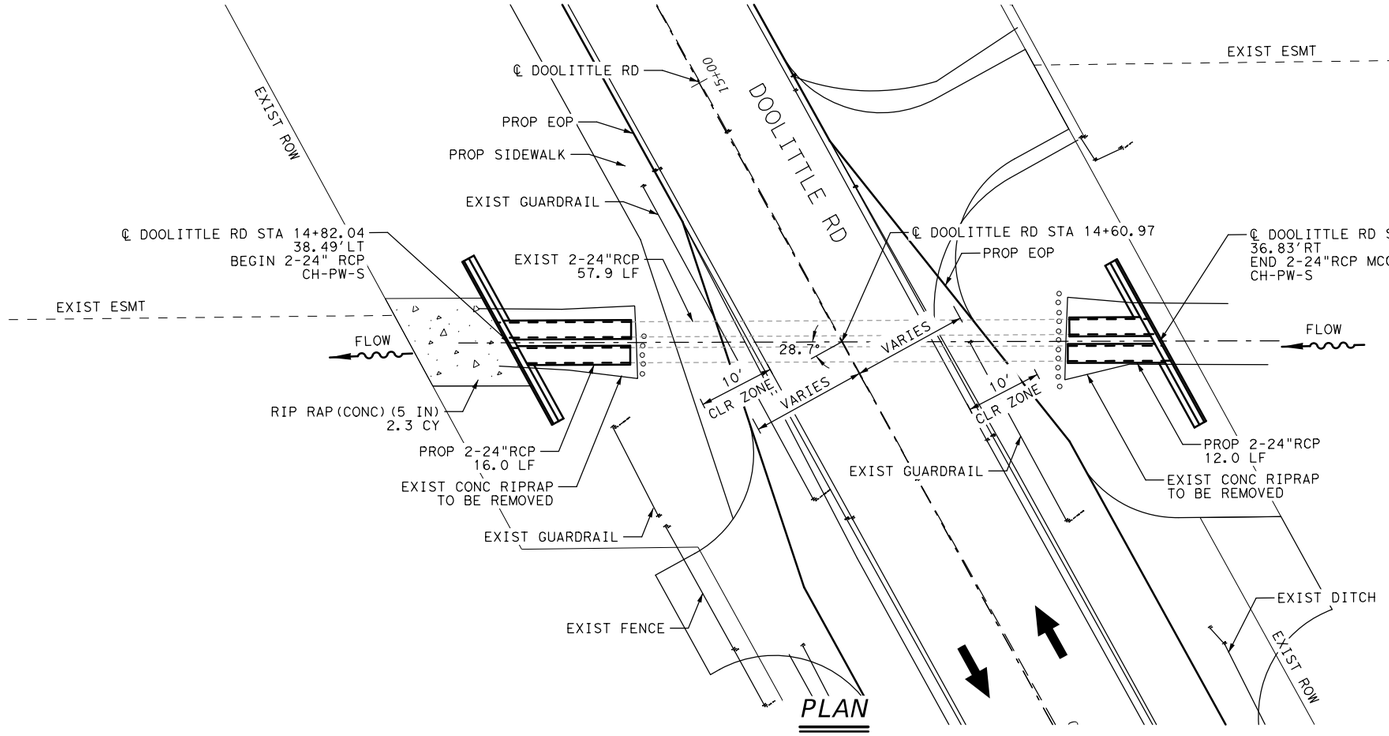
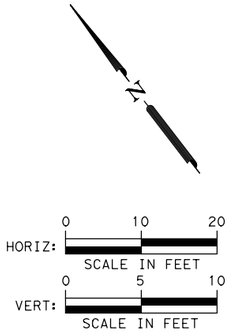
DOOLITTLE ROAD
HYDRAULIC DATA SHEET
NORTH MAIN DRAIN

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
DRAWN	6	SEE TITLE SHEET	TEEGE, ETC
CHECK	STATE: TEXAS	DISTRICT: PHARR	COUNTY: CAMERON, ETC
CHECK	CONTROL: 0921	SECTION: 06	JOB: 302, ETC

SHEET NO. 65

PENTABLE: CSJ 0921-02-331 (Charles Green Rd).tbl
SCALE: 1:60
PLOT DRIVER: TXDOT_PDF_BWING RASTERS).pit
FILE NAME: ...\Drainage\DOORD-HDS.dgn
USER: cevans
TIME: 9:16:29 AM
DATE: 12/7/2022

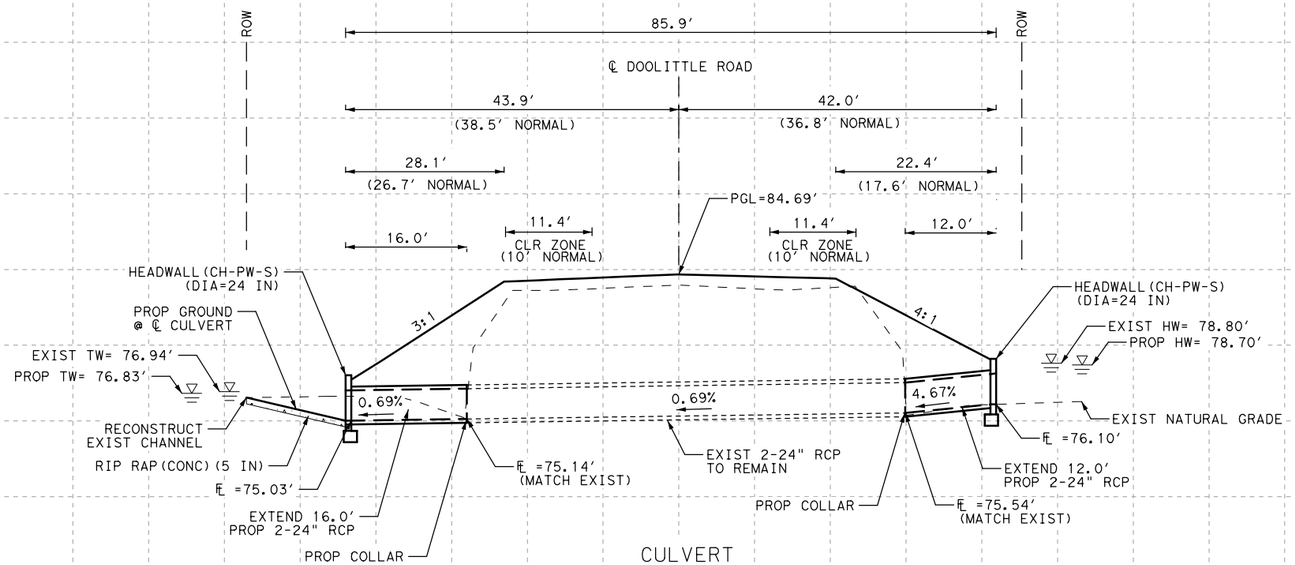




NOTE:

1. HYDRAULIC ANALYSIS COMPLETED USING HY-08 v7.6.
2. DISCHARGE SHOWN IS BASED ON PIPE FLOWING AT FULL CAPACITY.

CULVERT RESULTS						
DISCHARGE (CFS)	EXISTING VELOCITY (fps)	PROPOSED VELOCITY (fps)	EXISTING HW (ft)	PROPOSED HW (ft)	EXISTING TW (ft)	PROPOSED TW (ft)
21	3.34	3.34	78.80	78.70	76.94	76.83



CULVERT
℄ DOOLITTLE RD STA 14+60.97
EXIST 2-24"RCP X 57.9' TO REMAIN
PROP RT: EXTEND 2-24" RCP X 12.0', CH-PW-S
PROP LT: EXTEND 2-24" RCP X 16.0', CH-PW-S

ELEVATION

STATE OF TEXAS
CLINT P. EVANS
122372
LICENSED
PROFESSIONAL ENGINEER

Clint P. Evans 12-7-2022

NO.	DATE	REVISION	APPROVED

FIRM REGISTRATION NO. F-230

tnp

Texas Department of Transportation
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CULVERT LAYOUT
DOOLITTLE ROAD STA 14+60.97

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
DRAWN	6	SEE TITLE SHEET	TEEGE, ETC
CHECK	STATE	DISTRICT	COUNTY / SHEET NO.
CHECK	TEXAS	PHARR	CAMERON, ETC / 66
	CONTROL	SECTION	JOB
	0921	06	302, ETC

PENTABLE: CSJ 0921-02-331(Charles Green Rd).tbl
SCALE: 1:20
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FILE NAME: ...\Drainage\DOORD-CULV.dgn
USER: cevans
TIME: 9:35:02 AM
DATE: 12/7/2022

PEAK FLOW FOR MODEL						
PEAK DISCHARGE (CFS)						
2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
260*	315*	350	400	630	690	740

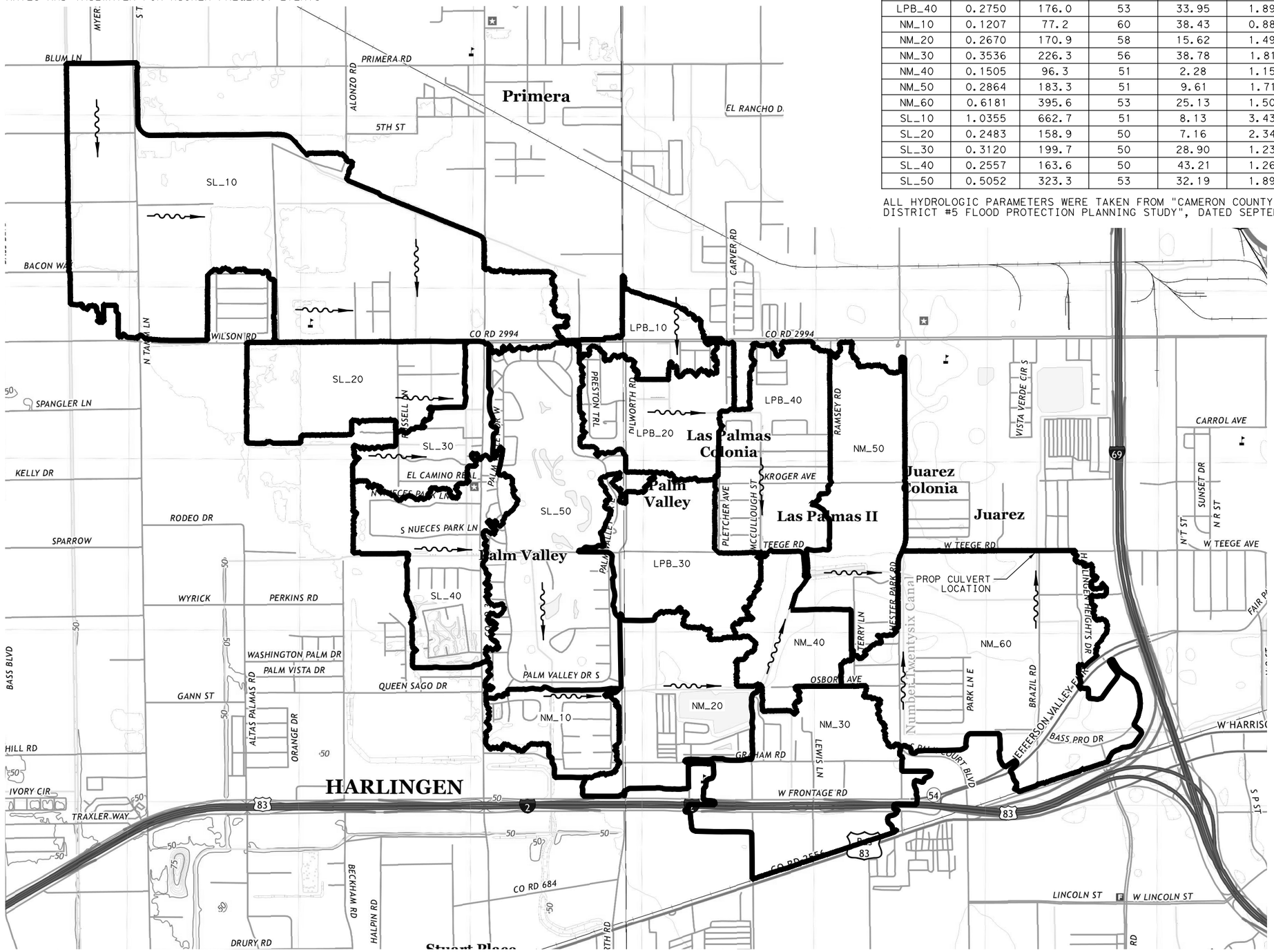
* FLOW DATA INTERPOLATED BASED ON CHANNEL FLOW RATES AND TAILWATER FOR HIGHER FREQENCY EVENTS

24-HOUR PRECIPITATION (in)						
2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
3.4	5.0	6.1	7.6	8.8	10.2	13.7

PRECIPITATION DATA DERIVED FROM "ATLAS OF DEPTH-DURATION FREQUENCY OF PRECIPITATION ANNUAL MAXIMA FOR TEXAS (SIR 2004-5041)".

DRAINAGE AREA PARAMETERS - TEEGE ROAD						
DA ID	AREA (Sq Mi)	AREA (ac.)	AMC I RCN	% IMPERV.	LAG TIME (Hr)	LAG TIME (min)
LPB_10	0.0891	57.0	48	29.55	0.74	44.23
LPB_20	0.1967	125.9	51	21.07	1.31	78.83
LPB_30	0.2344	150.0	51	7.22	1.68	101.04
LPB_40	0.2750	176.0	53	33.95	1.89	113.13
NM_10	0.1207	77.2	60	38.43	0.88	52.96
NM_20	0.2670	170.9	58	15.62	1.49	89.61
NM_30	0.3536	226.3	56	38.78	1.81	108.84
NM_40	0.1505	96.3	51	2.28	1.15	68.71
NM_50	0.2864	183.3	51	9.61	1.71	102.78
NM_60	0.6181	395.6	53	25.13	1.50	90.12
SL_10	1.0355	662.7	51	8.13	3.43	206.01
SL_20	0.2483	158.9	50	7.16	2.34	140.23
SL_30	0.3120	199.7	50	28.90	1.23	73.79
SL_40	0.2557	163.6	50	43.21	1.26	75.86
SL_50	0.5052	323.3	53	32.19	1.89	113.65

ALL HYDROLOGIC PARAMETERS WERE TAKEN FROM "CAMERON COUNTY DRAINAGE DISTRICT #5 FLOOD PROTECTION PLANNING STUDY", DATED SEPTEMBER 13, 2019



CLINT P. EVANS
122372
LICENSED
PROFESSIONAL ENGINEER
STATE OF TEXAS

Clint P. Evans 12-7-2022

NO.	DATE	REVISION	APPROVED

FIRM REGISTRATION NO. F-230

tnp

Texas Department of Transportation
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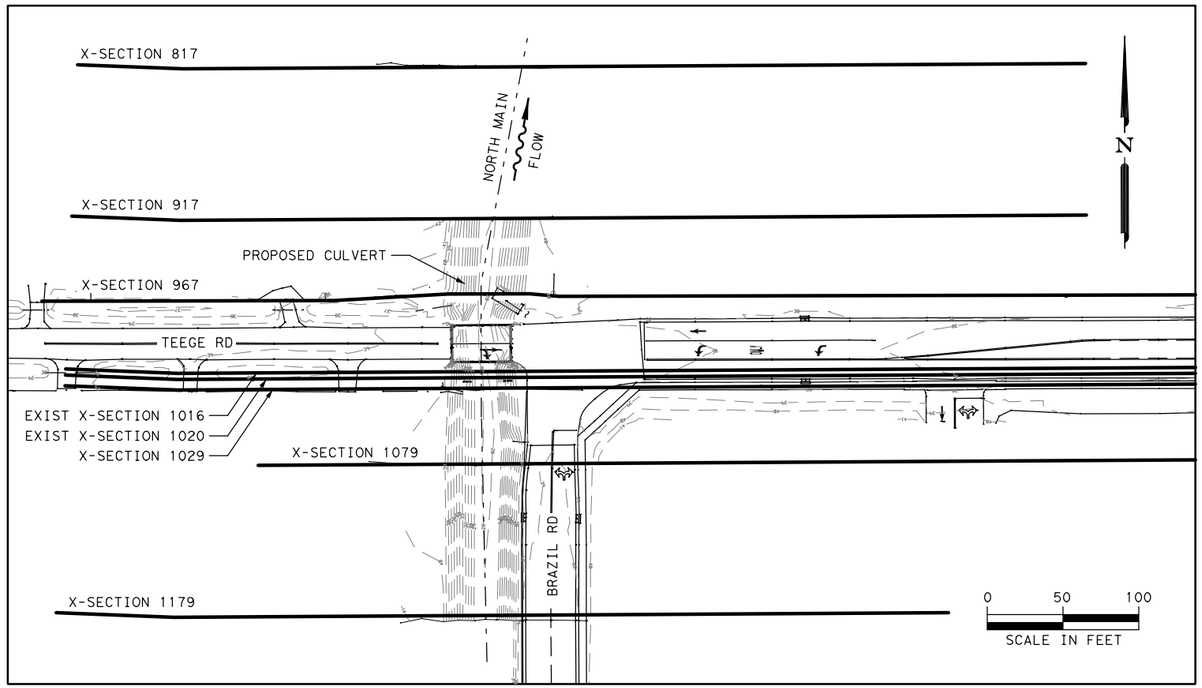
TEEGE ROAD

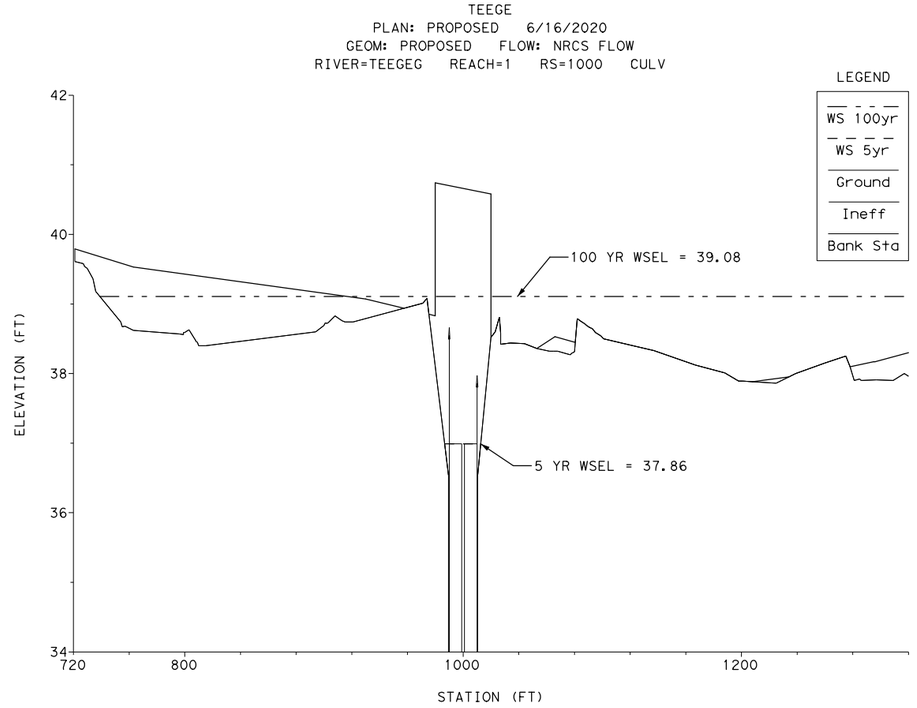
DRAINAGE AREA MAP

DESIGN MLT	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
	6	SEE TITLE SHEET		TEEGE, ETC
DRAWN CLA	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK CRC	TEXAS	PHARR	CAMERON, ETC	67
CHECK MLT	CONTROL	SECTION	JOB	
	0921	06	302, ETC	

DATE: 12/7/2022
TIME: 9:27:09 AM
USER: cevans
FILE NAME: ...\Drainage\TEERD-DA.dgn
PENTABLE: CSJ 0921-02-331 (Charles Green Rd).tbl
SCALE: 1:2000
PLOT DRIVER: TXDOT_PDF_BMWO RASTERS1.pt



HECRAS X-SECTION LAYOUT



CULVERT CROSSING AT TEEGE ROAD

TEEGE ROAD AT NORTH MAIN

HEC-RAS X-SECTION	LOCATION	5-YR						100-YR					
		EXISTING CONDITION			PROPOSED CONDITION			EXISTING CONDITION			PROPOSED CONDITION		
		Q TOTAL (CFS)	V CHNL (FT/S)	WSEL (FT)	Q TOTAL (CFS)	V CHNL (FT/S)	WSEL (FT)	Q TOTAL (CFS)	V CHNL (FT/S)	WSEL (FT)	Q TOTAL (CFS)	V CHNL (FT/S)	WSEL (FT)
1079	APPROACH	315	1.06	37.86	315	1.05	37.89	690	1.85	39.15	690	1.88	39.08
1029	CONTRACTION	315	1.19	37.85	315	1.52	37.86	690	1.67	39.16	690	1.87	39.08
1000 BR U EX/1000 CULVERT PR	US BRIDGE EX/ CULVERT PR	315	1.75	37.80	315	1.94	37.86	690	0.83	39.16	690	0.86	39.08
1000 BR D EX	DS BRIDGE EX/ CULVERT PR	315	1.65	37.79	315	1.94	37.81	690	1.90	39.01	690	0.86	39.07
967	EXPANSION	315	1.10	37.80	315	1.08	37.81	690	1.70	39.07	690	1.66	39.07
917	EXIT	315	1.09	37.80	315	1.09	37.80	690	1.70	39.07	690	1.70	39.07

Clint P. Evans 12-7-2022

NO.	DATE	REVISION	APPROVED

FIRM REGISTRATION NO. F-230

tnp

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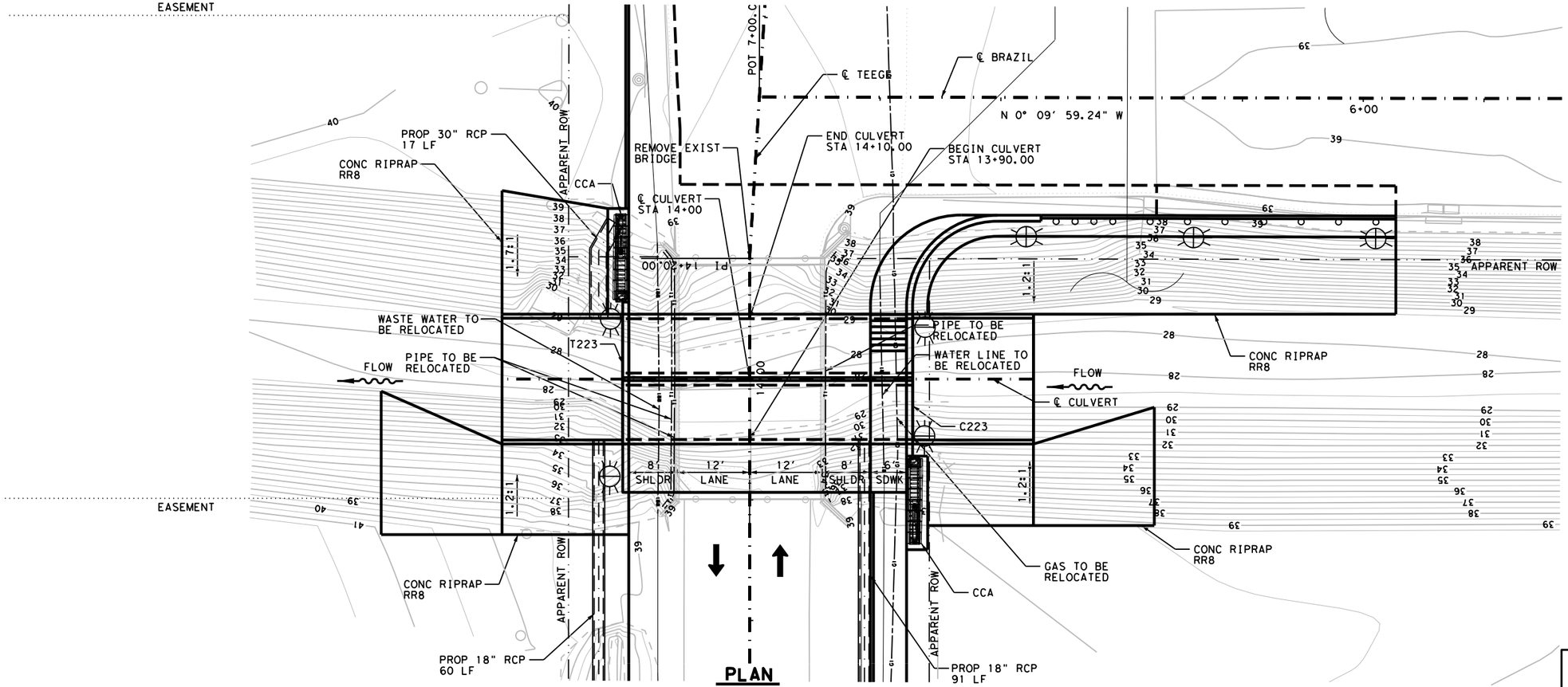
TEEGE ROAD

HYDRAULIC DATA SHEET
NORTH MAIN

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
MLT	6	SEE TITLE SHEET	TEEGE, ETC
DRAWN CLA	STATE	DISTRICT	COUNTY / SHEET NO.
CHECK CRC	TEXAS	PHARR	CAMERON, ETC / 68
CHECK MLT	CONTROL	SECTION	JOB
	0921	06	302, ETC

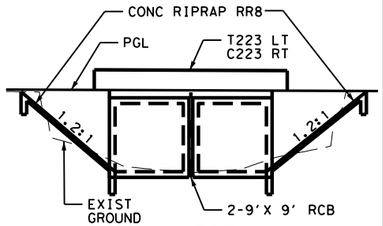
DATE: 12/7/2022
TIME: 9:28:34 AM
USER: cevans
FILE NAME: ...\Drainage\TEERD-HDS.dgn
PENTABLE: CSJ 0921-02-331(Charles Green Rd).tbl
SCALE: 1:100
PLOT DRIVER: TXDOT_PDF_BWINO RASTERS).pit



PLAN

NOTES:

1. CONTRACTOR SHALL FIELD VERIFY LOCATIONS OF ALL EXISTING STRUCTURES AND UTILITIES PRIOR TO ORDERING MATERIALS AND NOTIFY ENGINEER IN WRITING OF ANY CONFLICTS OR DISCREPANCIES.
2. REMOVE EXISITNG FOUNDATIONS TO 2'-0" BELOW THE FINAL SURFACE OR AS APPROVED BY THE ENGNIEER.



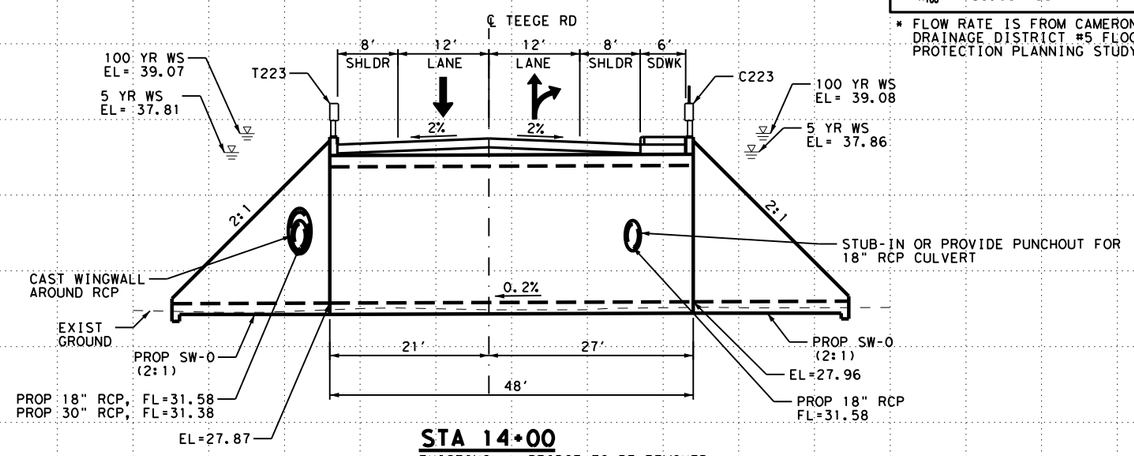
CULVERT TYPICAL SECTION

DESIGN SPEED = 30 MPH
FUNCTIONAL CLASSIFICATION = LOCAL
ADT (2018) = 1,400 ADT (2038) = 1,900

0 10' 20'
SCALE: 1"=20'H
1"=10'V

Hydraulic Data:
Drainage Area= 395.6 Sq Mi
* Q_5 = 315 cfs
V_5 = 1.52 fps
HW_5 = 37.86 feet
* Q_{100} = 690 cfs
V_{100} = 1.87 fps
HW_{100} = 39.08 feet

* FLOW RATE IS FROM CAMERON COUNTY DRAINAGE DISTRICT #5 FLOOD PROTECTION PLANNING STUDY.



STA 14+00

EXISTING: BRIDGE TO BE REMOVED

PROPOSED: 2-9'X 9'X48' RCB (PRECAST)
SW-0 (2:1) LT & RT

PROFILE

12/7/2022

STATE OF TEXAS
AARON DEBORD
96578
LICENSED
PROFESSIONAL ENGINEER

REV	BY	DESCRIPTION	DATE

AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TBPE FIRM REGISTRATION #739

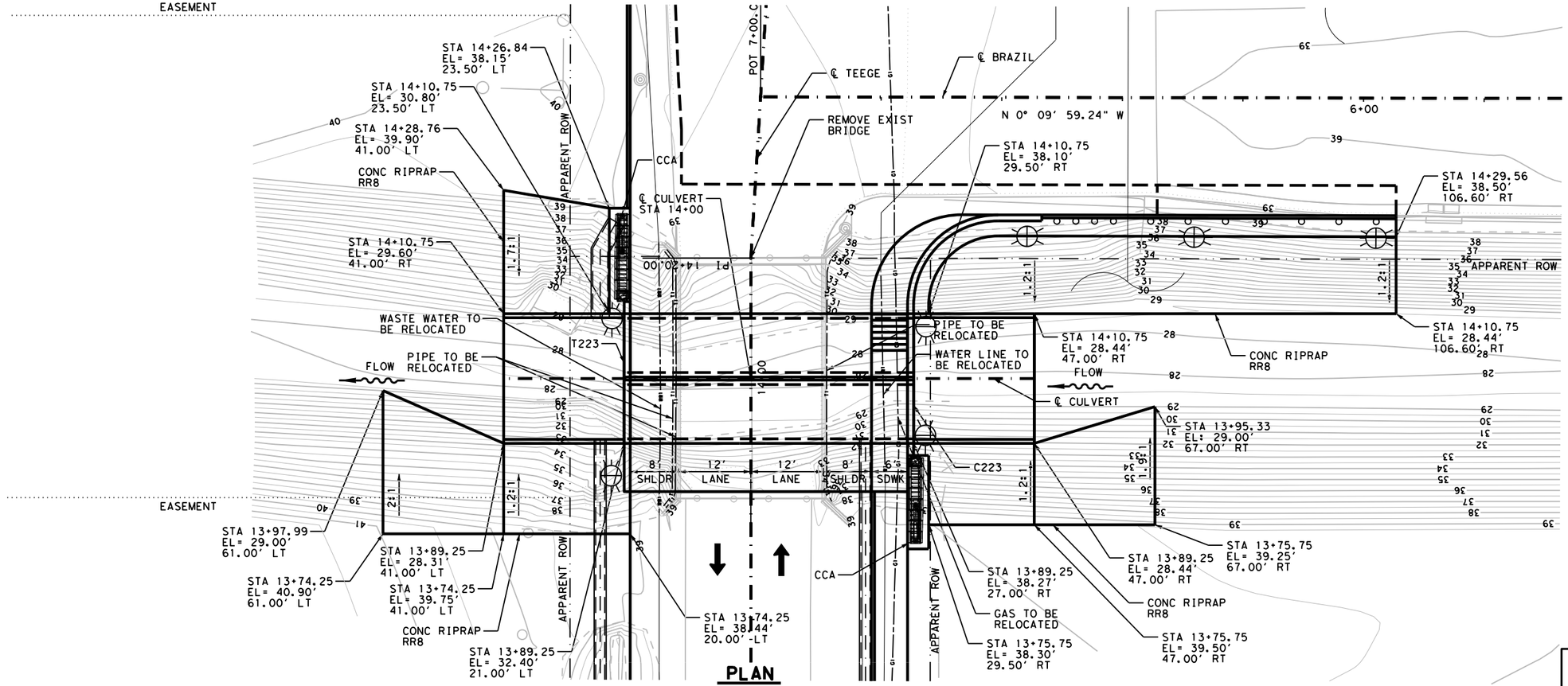
2021
Texas Department of Transportation

TEEGE ROAD

CULVERT LAYOUT AT DRAINAGE DITCH STA 13+90.00 TO 14+10.00

DESIGN	FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
ASD	6	SEE TITLE SHEET		TEEGE,ETC
DESIGN CK	STATE	DISTRICT	COUNTY	SHEET NO.
HLT	TEXAS	PHARR	CAMERON, ETC	69
GRAPHICS	CONTROL	SECTION NO.	JOB	
AJG	0921	06	302, ETC	
GRAPHICS CK				
TJR				

Design Filename: c:\pw-of\pw-of-prod\grace traweek\d0106918\TEEGE*AF*DRN*DCS*01.dgn
Plotted on: 12/6/2022 1:35:49 PM gtraweek

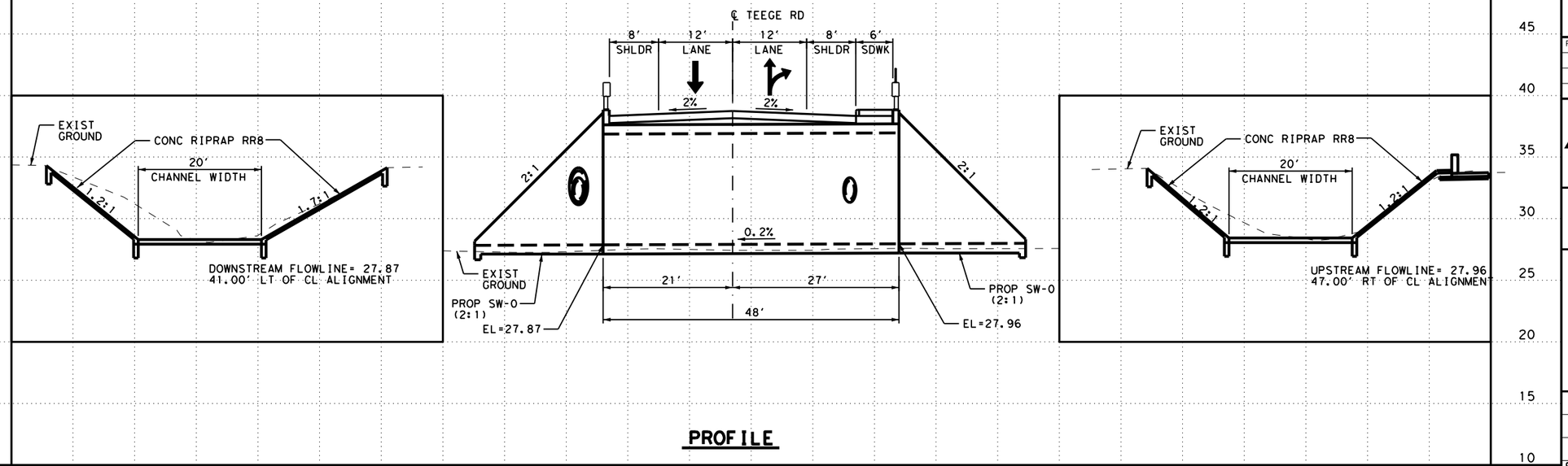


PLAN

NOTES:

1. CONTRACTOR SHALL FIELD VERIFY LOCATIONS OF ALL EXISTING STRUCTURES AND UTILITIES PRIOR TO ORDERING MATERIALS AND NOTIFY ENGINEER IN WRITING OF ANY CONFLICTS OR DISCREPANCIES.

SCALE: 1"=20'H
1"=10'V



PROFILE

12/7/2022

STATE OF TEXAS
AARON DEBORD
96578
LICENSED
PROFESSIONAL ENGINEER

REV	BY	DESCRIPTION	DATE

AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TBPE FIRM REGISTRATION #739

2021
Texas Department of Transportation

TEEGE ROAD

RIPRAP GRADING LAYOUT AT DRAINAGE DITCH

DESIGN	FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
ASD	6	SEE TITLE SHEET		TEEGE,ETC
DESIGN CK	STATE	DISTRICT	COUNTY	SHEET NO.
HLT	TEXAS	PHARR	CAMERON, ETC	70
GRAPHICS	CONTROL	SECTION NO.	JOB	
AJG	0921	06	302, ETC	
GRAPHICS CK				
TJR				

Culvert Station and/or Creek Name followed by applicable end (Lt, Rt or Both)	Description of Box Culvert No. Spans ~ Span X Height	Max Fill Height (Ft)	Applicable Box Culvert Standard (4)	Applicable Wingwall or End Treatment Standard	Skew Angle (0°,15°, 30° or 45°)	Side Slope or Channel Slope Ratio (SL:1)	T Culvert Top Slab Thickness (In)	U Culvert Wall Thickness (In)	C Estimated Curb Height (Ft)	Hw (1) Height of Wingwall (Ft)	A Curb to End of Wingwall (Ft)	B Offset of End of Wingwall (Ft)	Lw Length of Longest Wingwall (Ft)	Ltw Culvert Toewall Length (Ft)	Atw Anchor Toewall Length (Ft)	Riprap Apron (CY)	Class "C" Conc (Curb) (2) (CY)	Class "C" Conc (Wingwall) (3) (CY)	Total Wingwall Area (SF)
STA 14+00 (LT)	2~9'X9'	1.5'	SCP-9	SW-0	0	2:1	9"	9"	0.667	10.167	N/A	N/A	19.667	N/A	N/A	5.0	0.5	12.5	207
STA 14+00 (RT)	2~9'X9'	1.5'	SCP-9	SW-0	0	2:1	9"	9"	1.167	10.667	N/A	N/A	20.667	N/A	N/A	5.3	0.9	13.1	227

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

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

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

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

C = Curb height

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

Hw = Height of wingwall

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

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

Lw = Length of longest wingwall.

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

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

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

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

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

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

SPECIAL NOTE:

This sheet is a supplement to the box culvert standards. It is to be filled out by the culvert specifier and provides dimensions for the construction of the box culvert wingwalls and safety end treatments.

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

12/7/2022

STATE OF TEXAS
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Texas Department of Transportation

Bridge Division Standard

BOX CULVERT SUPPLEMENT
WINGS AND END TREATMENTS

BCS

FILE: bcsstde1-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	302, ETC	TEEGE, ETC
	DIST	COUNTY		SHEET NO.
	PHR	CAMERON, ETC		71

DATE: 12/6/2022 1:36:04 PM
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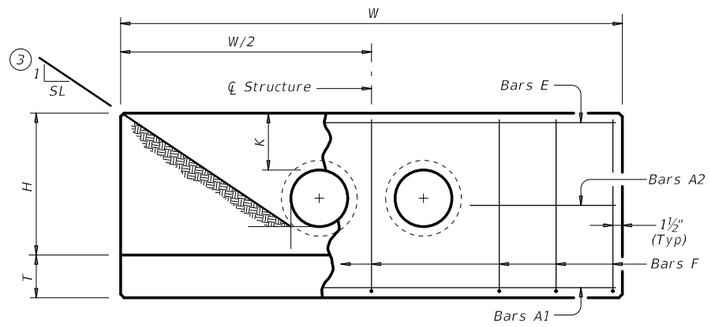
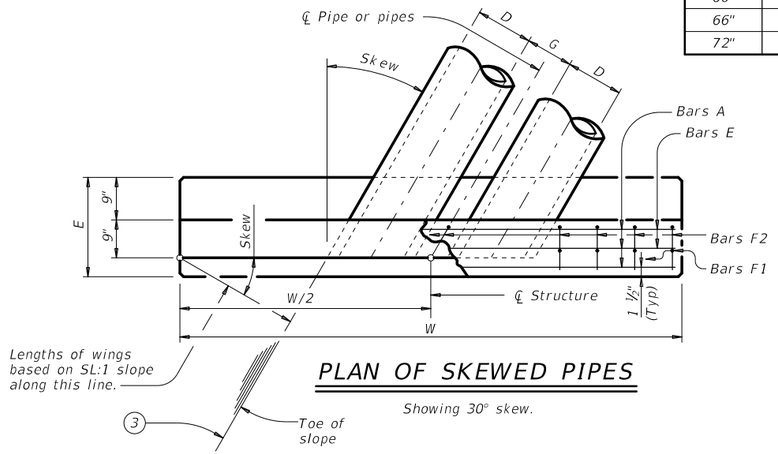
DATE: 12/7/2022 10:00:44 AM
...\Drainage\chpwsste-20.dgn

TABLE OF VARIABLE DIMENSIONS AND QUANTITIES FOR ONE HEADWALL (5)

Slope	Dia of Pipe (D)	15° Skew						30° Skew						45° Skew					
		Values for One Pipe			Values To Be Added for Each Addt'l Pipe			Values for One Pipe			Values To Be Added for Each Addt'l Pipe			Values for One Pipe			Values To Be Added for Each Addt'l Pipe		
		W	Reinf (Lbs) (1)	Conc (CY) (2)	W	Reinf (Lbs) (1)	Conc (CY) (2)	W	Reinf (Lbs) (1)	Conc (CY) (2)	W	Reinf (Lbs) (1)	Conc (CY) (2)	W	Reinf (Lbs) (1)	Conc (CY) (2)	W	Reinf (Lbs) (1)	Conc (CY) (2)
2:1	12"	9' – 4"	124	1.1	1' – 9 3/4"	15	0.2	10' – 5"	130	1.2	2' – 0"	16	0.2	12' – 9"	159	1.5	2' – 5 3/4"	17	0.3
	15"	10' – 7"	136	1.3	2' – 3"	17	0.2	11' – 10"	159	1.5	2' – 6"	18	0.2	14' – 6"	191	1.8	3' – 0 3/4"	20	0.3
	18"	11' – 11"	165	1.5	2' – 9"	19	0.3	13' – 3"	174	1.7	3' – 1"	29	0.3	16' – 3"	207	2.1	3' – 9 1/4"	33	0.4
	21"	13' – 2"	203	1.9	3' – 2 1/4"	31	0.4	14' – 9"	233	2.1	3' – 6 3/4"	33	0.4	18' – 0"	276	2.6	4' – 4 1/4"	36	0.5
	24"	14' – 6"	240	2.1	3' – 8 1/4"	34	0.4	16' – 2"	251	2.4	4' – 1 3/4"	36	0.5	19' – 10"	318	2.9	5' – 0 3/4"	39	0.6
	27"	15' – 9"	258	2.5	4' – 0 3/4"	38	0.5	17' – 7"	292	2.8	4' – 6 1/4"	39	0.6	21' – 7"	342	3.4	5' – 6 1/4"	44	0.7
	30"	17' – 1"	297	2.8	4' – 5 3/4"	40	0.6	19' – 1"	311	3.1	5' – 0"	42	0.6	23' – 4"	388	3.8	6' – 1 3/4"	47	0.8
	33"	18' – 5"	320	3.3	4' – 9 3/4"	43	0.6	20' – 6"	358	3.6	5' – 4 3/4"	46	0.7	25' – 1"	439	4.4	6' – 7 1/4"	51	0.9
	36"	19' – 8"	401	4.0	5' – 3"	47	0.9	21' – 11"	422	4.5	5' – 10 3/4"	50	0.9	26' – 10"	517	5.5	7' – 2 1/4"	55	1.2
	42"	22' – 3"	476	5.0	6' – 0 3/4"	53	1.1	24' – 10"	528	5.6	6' – 8 3/4"	56	1.2	30' – 5"	634	6.9	8' – 3"	76	1.4
	48"	25' – 11"	577	6.6	6' – 9 3/4"	60	1.3	28' – 10"	637	7.3	7' – 7 1/4"	79	1.5	35' – 4"	791	9.0	9' – 3 3/4"	88	1.8
	54"	28' – 6"	711	7.8	7' – 9"	83	1.6	31' – 9"	781	8.7	8' – 8"	81	1.8	38' – 11"	958	10.7	10' – 7 1/4"	97	2.2
	60"	31' – 1"	805	9.2	8' – 6 1/4"	91	1.9	34' – 8"	881	10.2	9' – 6 1/4"	97	2.1	42' – 5"	1,113	12.5	11' – 8"	124	2.6
	66"	33' – 8"	907	10.6	9' – 0 3/4"	98	2.1	37' – 6"	1,028	11.8	10' – 1 1/4"	102	2.4	46' – 0"	1,235	14.5	12' – 4 1/4"	132	2.9
	72"	36' – 3"	1,071	12.1	9' – 8"	105	2.4	40' – 5"	1,207	13.5	10' – 9 1/4"	110	2.6	49' – 6"	1,446	16.6	13' – 2 1/4"	141	3.2
3:1	12"	13' – 6"	178	1.6	1' – 9 3/4"	15	0.2	15' – 0"	189	1.8	2' – 0"	15	0.2	18' – 5"	237	2.2	2' – 5 3/4"	17	0.2
	15"	15' – 3"	212	1.9	2' – 3"	17	0.2	17' – 0"	223	2.1	2' – 6"	17	0.3	20' – 10"	276	2.6	3' – 0 3/4"	20	0.3
	18"	17' – 1"	231	2.3	2' – 9"	19	0.3	19' – 1"	259	2.5	3' – 1"	29	0.3	23' – 4"	318	3.1	3' – 9 1/4"	32	0.4
	21"	18' – 11"	306	2.7	3' – 2 1/4"	31	0.4	21' – 1"	339	3.0	3' – 6 3/4"	33	0.4	25' – 10"	413	3.7	4' – 4 1/4"	36	0.5
	24"	20' – 8"	345	3.1	3' – 8 3/4"	35	0.4	23' – 1"	384	3.5	4' – 1 3/4"	36	0.5	28' – 3"	462	4.2	5' – 0 3/4"	40	0.6
	27"	22' – 6"	376	3.7	4' – 0 3/4"	38	0.5	25' – 1"	438	4.1	4' – 6 1/4"	39	0.6	30' – 9"	522	5.0	5' – 6 1/4"	44	0.7
	30"	24' – 4"	422	4.1	4' – 5 3/4"	40	0.6	27' – 2"	466	4.6	5' – 0"	42	0.6	33' – 3"	578	5.6	6' – 1 3/4"	47	0.8
	33"	26' – 2"	476	4.8	4' – 10"	43	0.6	29' – 2"	522	5.3	5' – 4 3/4"	46	0.7	35' – 9"	644	6.5	6' – 7 1/4"	51	0.9
	36"	27' – 11"	590	5.9	5' – 3"	47	0.8	31' – 2"	645	6.6	5' – 10 3/4"	50	0.9	38' – 2"	787	8.0	7' – 2 1/4"	56	1.2
	42"	31' – 7"	684	7.3	6' – 0 1/4"	53	1.1	35' – 3"	776	8.2	6' – 8 3/4"	56	1.2	43' – 2"	933	10.0	8' – 3"	79	1.4
	48"	36' – 9"	880	9.6	6' – 9 3/4"	61	1.3	41' – 0"	953	10.7	7' – 7 1/4"	81	1.5	50' – 2"	1,166	13.1	9' – 3 3/4"	88	1.8
	54"	40' – 5"	1,065	11.4	7' – 9"	85	1.6	45' – 0"	1,185	12.7	8' – 8"	89	1.8	55' – 2"	1,435	15.5	10' – 7 1/4"	97	2.2
	60"	44' – 0"	1,224	13.3	8' – 6 1/4"	93	1.9	49' – 1"	1,356	14.8	9' – 6 1/4"	96	2.1	60' – 1"	1,635	18.2	11' – 8"	124	2.6
	66"	47' – 7"	1,357	15.4	9' – 1"	98	2.1	53' – 1"	1,497	17.2	10' – 1 1/4"	103	2.3	65' – 1"	1,892	21.1	12' – 4 1/4"	130	2.9
	72"	51' – 3"	1,624	17.7	9' – 8"	105	2.3	57' – 2"	1,787	19.7	10' – 9 1/4"	109	2.6	70' – 0"	2,218	24.1	13' – 2 1/4"	139	3.2
4:1	12"	17' – 7"	232	2.1	1' – 9 3/4"	15	0.2	19' – 8"	259	2.4	2' – 0"	16	0.2	24' – 0"	314	2.9	2' – 5 3/4"	18	0.2
	15"	19' – 11"	272	2.5	2' – 3"	17	0.2	22' – 3"	301	2.8	2' – 6"	18	0.3	27' – 3"	361	3.5	3' – 0 3/4"	21	0.3
	18"	22' – 3"	313	3.0	2' – 9"	19	0.3	24' – 10"	344	3.3	3' – 1"	29	0.3	30' – 5"	427	4.0	3' – 9 1/4"	32	0.4
	21"	24' – 7"	407	3.6	3' – 2 1/4"	31	0.4	27' – 5"	446	4.0	3' – 6 3/4"	33	0.4	33' – 7"	549	4.9	4' – 4 1/4"	36	0.5
	24"	26' – 11"	455	4.1	3' – 8 3/4"	35	0.4	30' – 0"	499	4.5	4' – 1 3/4"	36	0.5	36' – 9"	609	5.6	5' – 0 3/4"	40	0.6
	27"	29' – 3"	514	4.8	4' – 0 3/4"	38	0.5	32' – 7"	562	5.4	4' – 6 1/4"	40	0.6	39' – 11"	703	6.6	5' – 6 1/4"	43	0.7
	30"	31' – 7"	568	5.4	4' – 5 3/4"	40	0.6	35' – 3"	620	6.0	5' – 0"	42	0.6	43' – 2"	768	7.4	6' – 1 3/4"	49	0.8
	33"	33' – 11"	634	6.2	4' – 10"	43	0.7	37' – 10"	710	7.0	5' – 4 3/4"	46	0.7	46' – 4"	848	8.5	6' – 7 1/4"	52	0.9
	36"	36' – 3"	776	7.7	5' – 3"	48	0.9	40' – 5"	868	8.6	5' – 10 3/4"	49	0.9	49' – 6"	1,058	10.6	7' – 2 1/4"	56	1.1
	42"	40' – 11"	921	9.6	6' – 0 1/4"	53	1.0	45' – 7"	1,022	10.7	6' – 8 3/4"	57	1.2	55' – 10"	1,262	13.1	8' – 3"	78	1.4
	48"	47' – 7"	1,152	12.6	6' – 10"	61	1.3	53' – 1"	1,268	14.0	7' – 7 1/4"	80	1.5	65' – 1"	1,587	17.2	9' – 3 3/4"	86	1.8
	54"	52' – 3"	1,416	14.9	7' – 9 1/4"	86	1.6	58' – 4"	1,589	16.6	8' – 8"	89	1.8	71' – 5"	1,924	20.4	10' – 7 1/4"	95	2.2
	60"	56' – 11"	1,606	17.5	8' – 6 3/4"	92	1.9	63' – 6"	1,806	19.5	9' – 6 1/4"	95	2.1	77' – 9"	2,192	23.9	11' – 8"	122	2.6
	66"	61' – 7"	1,819	20.2	9' – 0 3/4"	97	2.1	68' – 8"	2,019	22.5	10' – 1 1/4"	101	2.4	84' – 2"	2,472	27.6	12' – 4 1/4"	131	2.9
	72"	66' – 3"	2,150	23.2	9' – 8"	104	2.4	73' – 11"	2,379	25.9	10' – 9 1/4"	108	2.6	90' – 6"	2,937	31.7	13' – 2 1/4"	138	3.2
6:1	12"	25' – 11"	342	3.1	1' – 9 3/4"	15	0.2	28' – 10"	374	3.5	2' – 0"	16	0.2	35' – 4"	456	4.3	2' – 5 3/4"	17	0.2
	15"	29' – 3"	390	3.7	2' – 3"	17	0.2	32' – 7"	442	4.2	2' – 6"	18	0.2	39' – 11"	549	5.1	3' – 0 3/4"	20	0.3
	18"	32' – 7"	459	4.4	2' – 9"	20	0.3	36' – 4"	515	4.9	3' – 1"	29	0.3	44' – 7"	629	6.0	3' – 9 1/4"	33	0.4
	21"	36' – 0"	608	5.3	3' – 2 1/4"	31	0.4	40' – 2"	660	5.9	3' – 6 3/4"	33	0.4	49' – 2"	823	7.2	4' – 4 1/4"	38	0.5
	24"	39' – 4"	672	6.0	3' – 8 3/4"	35	0.4	43' – 11"	748	6.7	4' – 1 3/4"	36	0.5	53' – 9"	920	8.2	5' – 0 3/4"	42	0.6
	27"	42' – 8"	770	7.1	4' – 0 3/4"	38	0.5	47' – 8"	852	8.0	4' – 6 1/4"	41	0.5	58' – 4"	1,039	9.7	5' – 6 1/4"	45	0.7
	30"	46' – 1"	839	8.0	4' – 5 3/4"	40	0.6	51' – 5"	949	8.9	5' – 0"	44	0.6	62' – 11"	1,162	10.9	6' – 1 3/4"	48	0.8
	33"	49' – 5"	947	9.2	4' – 10"	45	0.7	55' – 2"	1,040	10.3	5' – 4 3/4"	48	0.7	67' – 6"	1,292	12.6	6' – 7 1/4"	50	0.9
	36"	52' – 10"	1,151	11.4	5' – 3"	49	0.8	58' – 11"	1,287	12.7	5' – 10 3/4"	51	1.0	72' – 1"	1,583	15.6	7' – 2 1/4"	55	1.1
	42"	59' – 6"	1,365	14.2	6' – 0 1/4"	55	1.0	66' – 5"	1,530	15.8	6' – 8 3/4"	57	1.2	81' – 4"	1,875	19.4	8' – 3"	76	1.4
	48"	69' – 4"	1,737	18.5	6' – 10"	59	1.3	77' – 4"	1,942	20.7	7' – 7 1/4"	79	1.5	94' – 9"	2,368	25.3	9' – 3 3/4"	86	1.8
	54"	76' – 1"	2,138	22.0	7' – 9 1/4"	83	1.6	84' – 10"	2,378	24.6	8' – 8"	87	1.8	103' – 11"	2,912	30.1	10' – 7 1/4"	95	2.2
	60"	82' – 10"	2,426	25.8	8' – 6 3/4"	90	1.9	92' – 5"	2,681	28.8	9' – 6 1/4"	94	2.1	113' – 2"	3,294	35.3	11' – 8"	122	2.6
	66"	89' – 7"	2,730	29.9	9' – 0 3/4"	96	2.1	99' – 11"	3,038	33.3	10' – 1 1/4"	101	2.4	122' – 4"	3,697	40.8	12' – 4 1/4"	130	2.9
	72"	96' – 3"	3,218	34.2	9' – 8"	102	2.4	107' – 5"	3,580	38.2	10' – 9 1/4"	108	2.6	131' – 6"	4,372	46.8	13' – 2 1/4"	139	3.2

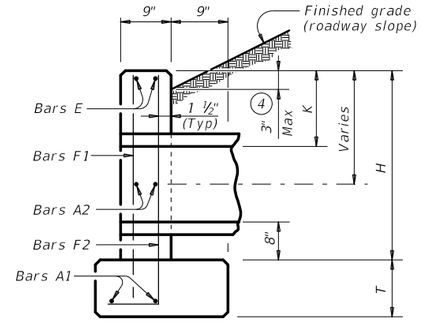


ELEVATION



PLAN OF SKEWED PIPES

Showing 30° skew.



SECTION AT CENTER OF PIPE

(1) Total quantites include one 3'–1" lap for bars over 60' in length.

(2) Quantities shown are for concrete pipe and will increase slightly for metal pipe installations.

(3) Indicated slope is perpendicular to centerline pipe or pipes.

(4) For vehicle safety, construct curbs no more than 3" above finished grade. Reduce curb heights, if necessary, to meet these requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

(5) Dimensions shown are usual and maximum.

(6) Quantities shown are for one structure end only (one headwall).

TABLE OF CONSTANT DIMENSIONS

Dia of Pipe (D)	G	K (5)	H	T	E
12"	0' – 9"	1' – 0"	2' – 8"	0' – 9"	1' – 9"
15"	0' – 11"	1' – 0"	2' – 11"	0' – 9"	1' – 9"
18"	1' – 2"	1' – 0"	3' – 2"	0' – 9"	1' – 9"
21"	1' – 4"	1' – 0"	3' – 5"	0' – 9"	2' – 0"
24"	1' – 7"	1' – 0"	3' – 8"	0' – 9"	2' – 0"
27"	1' – 8"	1' – 0"	3' – 11"	0' – 9"	2' – 3"
30"	1' – 10"	1' – 0"	4' – 2"	0' – 9"	2' – 3"
33"	1' – 11"	1' – 0"	4' – 5"	0' – 9"	2' – 6"
36"	2' – 1"	1' – 0"	4' – 8"	1' – 0"	2' – 6"
42"	2' – 4"	1' – 0"	5' – 2"	1' – 0"	2' – 9"
48"	2' – 7"	1' – 3"	5' – 11"	1' – 0"	3' – 0"
54"	3' – 0"	1' – 3"	6' – 5"	1' – 0"	3' – 3"
60"	3' – 3"	1' – 3"	6' – 11"	1' – 0"	3' – 6"
66"	3' – 3"	1' – 3"	7' – 5"	1' – 0"	3' – 9"
72"	3' – 4"	1' – 3"	7' – 11"	1' – 0"	4' – 0"

TABLE OF (6) REINFORCING STEEL

Bar	Size	Spa	No.
A1	#5	~	2
A2	#5	1' – 6"	~
E	#5	~	2
F	#5	1' – 0"	~

BARS F2

MATERIAL NOTES:
Provide Grade 60 reinforcing steel.
Provide Class C concrete (f'c = 3,600 psi).

GENERAL NOTES:
Designed according to AASHTO LRFD Bridge Design Specifications.
Do not mount bridge rails of any type directly to these culvert headwalls.
This standard may not be used for wall heights, H, exceeding the values shown.

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

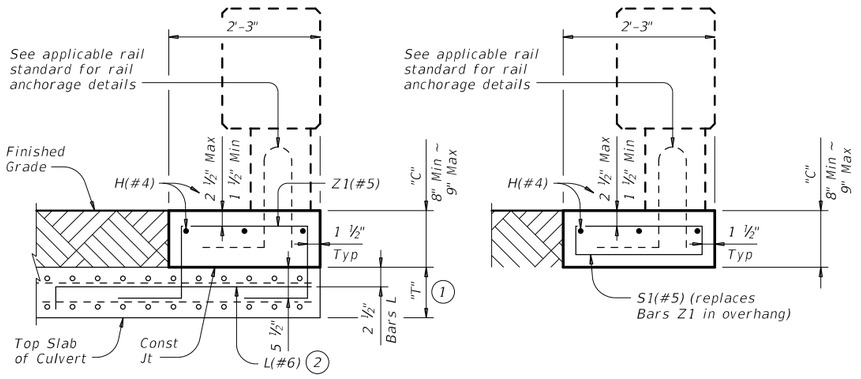
Texas Department of Transportation

Bridge Division Standard

CONCRETE HEADWALLS WITH PARALLEL WINGS FOR SKEWED PIPE CULVERTS

CH-PW-S

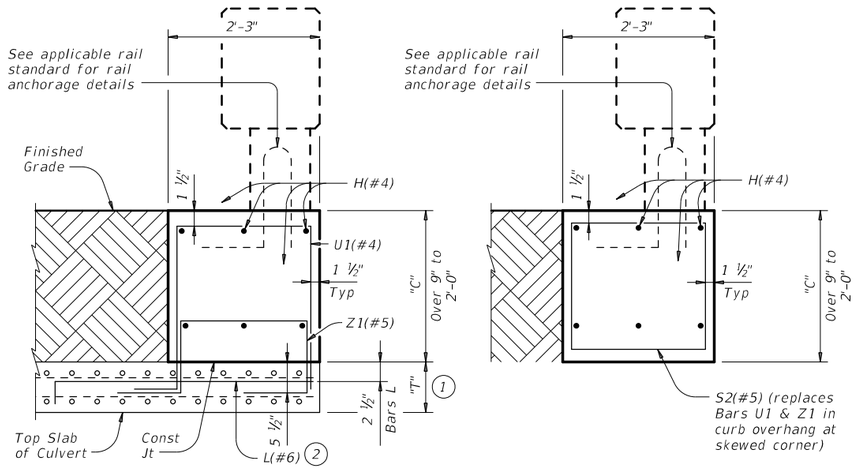
FILE: chpwsste-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	302,ETC	TEEGE,ETC
	DIST	COUNTY		SHEET NO.
	PHARR	CAMERON,ETC		72



SECTION A-A SECTION B-B

TYPE 1 CURB

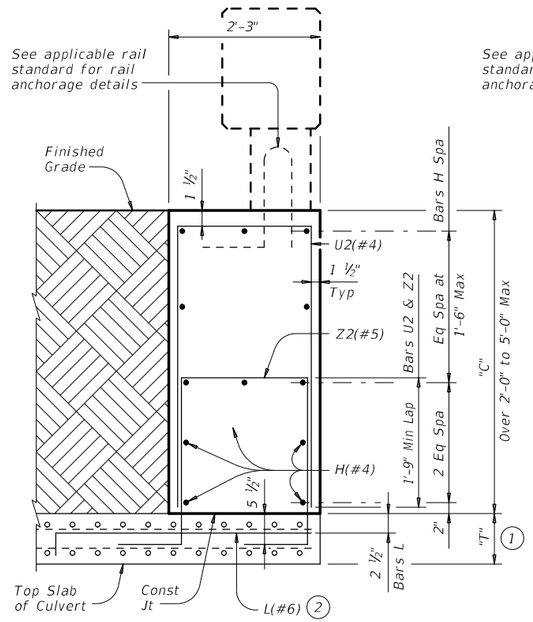
Used for curbs from 8" to 9" (Showing "C" = 9"). Showing T223 Rail, other rails similar. (Bars L(#5) on T223 and C223 Rails are not used for this structure). Bars RH(#5) required on standards T80HT, T80SS and T224 are not required when used with the RAC standard.



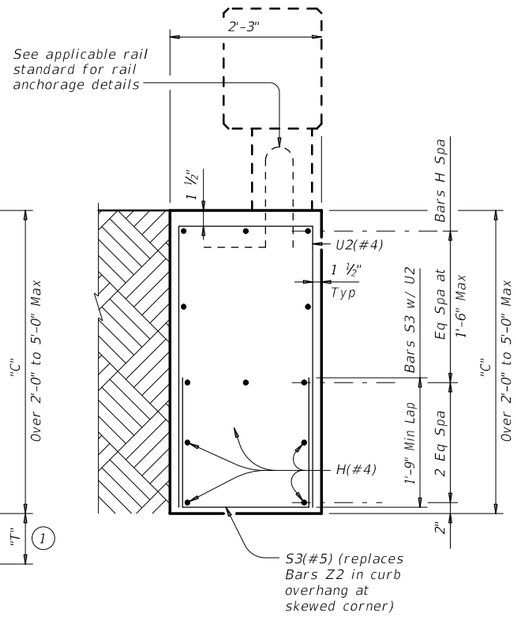
SECTION A-A SECTION B-B

TYPE 2 CURB

Used for curbs over 9" to 2'-0" (Showing "C" = 2'-0"). Showing T223 Rail, other rails similar. (Bars L(#5) on T223 and C223 Rails are not used for this structure). Bars RH(#5) required on standards T80HT, T80SS and T224 are not required when used with the RAC standard.



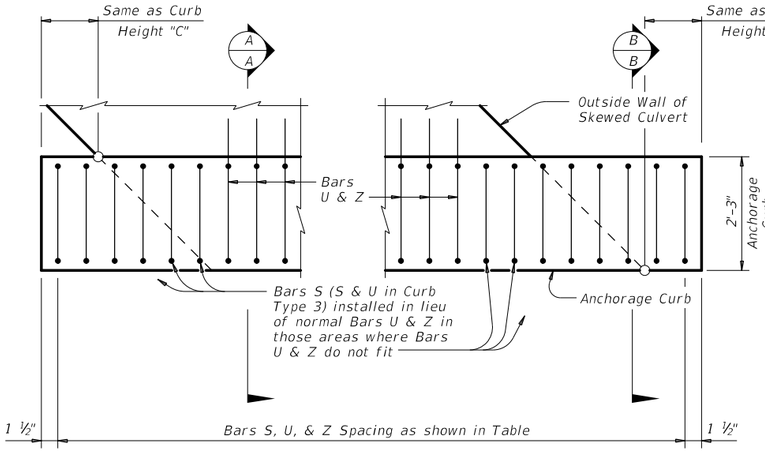
SECTION A-A



SECTION B-B

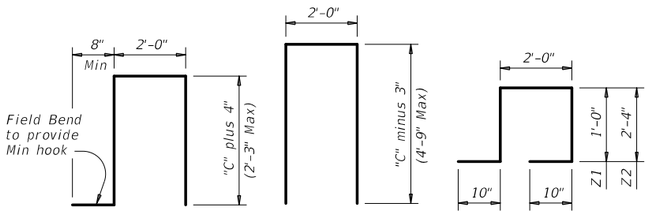
TYPE 3 CURB

Used for curbs over 2'-0" to 5'-0" (Showing "C" = 4'-0"). Showing T223 Rail, other rails similar. (Bars L(#5) on T223 and C223 Rails are not used for this structure). Bars RH(#5) required on standards T80HT, T80SS and T224 are not required when used with the RAC standard.



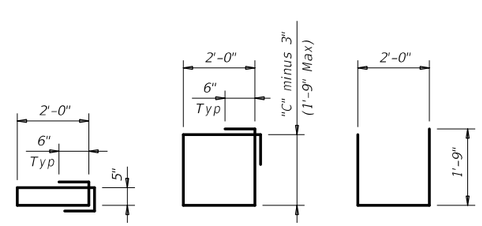
TYPICAL CURB PLAN

Showing typical installation on skewed culvert. (Bars L(#5) on T223 and C223 Rails are not used for this structure). Bars RH(#5) required on standards T80HT, T80SS and T224 are not required when used with the RAC standard.



BARS U1 (#4) BARS U2 (#4) BARS Z (#5) BARS L (#6) 2 Spaced at 6" Max

OPTIONAL BARS L (#6) 3 2 Spaced at 6" Max



BARS S1 (#5) BARS S2 (#5) BARS S3 (#5)

TABLE OF REINFORCING SPACING

Curb Height "C"	Section Type	Bars S, U, & Z Spa
8" to 9"	1	12"
Over 9" to 2'-0"	2	9"
Over 2'-0" to 3'-0"	3	7"
Over 3'-0" to 5'-0"	3	5"

TABLE OF ESTIMATED QUANTITIES (4)

Curb Height "C"	Section Type	Reinf Steel (Lb/LF)	Class "C" Concrete (CY/LF)
8"	1	21.5	0.056
9"	1	21.5	0.063
1'-0"	2	29.7	0.083
1'-6"	2	30.6	0.125
2'-0"	2	31.5	0.167
3'-0"	3	44.6	0.250
4'-0"	3	56.8	0.333
5'-0"	3	60.0	0.417

(1) "T" is equal to the culvert top slab thickness. For Precast Boxes with slabs less than 8" thick, see SCP-MD Standard for additional details.

(2) Tilt Bars L hook as necessary to maintain cover.

(3) Optional Bars L are to be used only for Precast Box Culverts with 3'-0" closure pours.

(4) Quantities shown are for Contractor's information only. Quantities are per Linear Foot of curb length. The values for each section type in table can be interpolated for intermediate values of Curb Height, "C".

CONSTRUCTION NOTES:

When using this anchorage curb, omit normal culvert curb reinforcing bars K and H shown on the culvert standard sheets.

For vehicle safety, the top of the curb must be flush with the finished grade.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.

Galvanize all reinforcing steel if required elsewhere.

Provide bar laps, where required, as follows:
Uncoated or galvanized ~ #4 = 1'-11"

Provide Class "C" concrete (f'c=3,600 psi). Provide Class "C" (HPC) concrete if shown elsewhere in the plans.

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

The rail anchorage curb details have sufficient strength for use with all standard rail types.

See appropriate rail standard for approved design speed restrictions, notes and details not shown.

This anchorage curb is considered part of the Box Culvert for payment.

These details are for use with curbs that are 8" to 5'-0" tall only. Curb heights that are less than or greater than those shown will require special design.

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

RAIL ANCHORAGE CURB
BOX CULVERT RAIL MOUNTING DETAILS
(CURBS 8" TO 5'-0" TALL ONLY)

RAC

FILE: racste01-20.dgn	DN: GAF	CK: TxDOT	DW: TxDOT	CK: GAF
©TxDOT February 2020 REVISIONS	CONT	SECT	JOB	HIGHWAY
	0921	06	302,ETC	TEEGE,ETC
	DIST	COUNTY		SHEET NO.
	PHARR	CAMERON,ETC		73

DATE: 12/7/2022 10:00:53 AM
FILE: ...\Drainage\racste01-20.dgn

DATE:
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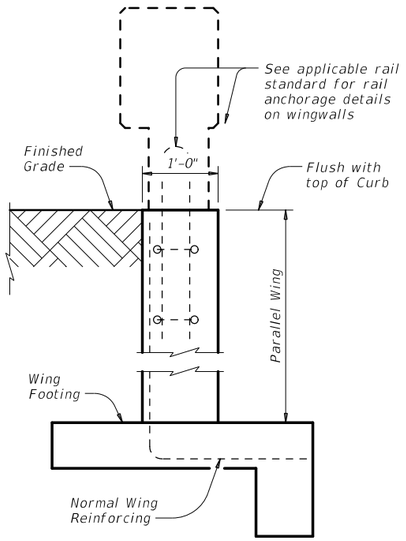
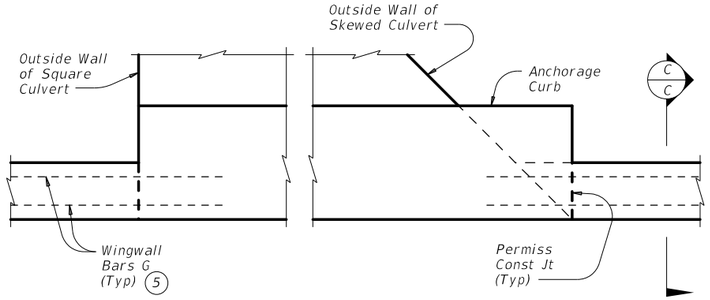


SECTION C-C



TYPICAL CURB PLAN

Curb reinforcing and footings not shown for clarity

INSTALLATION AT PARALLEL CULVERT WINGWALLS

See culvert wingwall standard for bars and details not shown.

(5) Bars G (#5), as identified on the PARALLEL WINGS PW standard sheet, must extend 1'-6" into the Anchorage Curb similar to that shown for a normal culvert curb.

Texas Department of Transportation

Bridge Division Standard

RAIL ANCHORAGE CURB

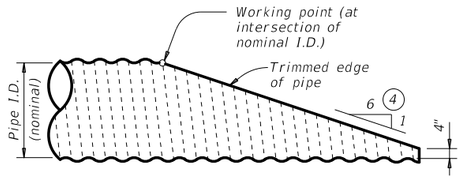
BOX CULVERT RAIL MOUNTING DETAILS

(CURBS 8" TO 5'-0" TALL ONLY)

RAC

FILE: racste01-20.dgn	DN: GAF	CK: TxDOT	DW: TxDOT	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	302,ETC	TEEGE,ETC
	DIST	COUNTY		SHEET NO.
	PHARR	CAMERON,ETC		74

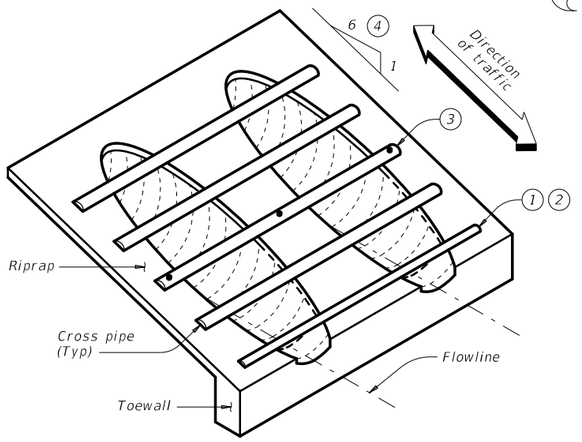
DATE:
FILE:



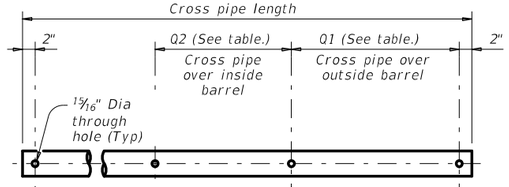
NOTE: All cross pipes, calculations, and dimensions are based on the pipe culverts mitered as shown in this detail. Alternate styles of mitered ends will require that appropriate adjustments be made to the values presented on this standard.

SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER

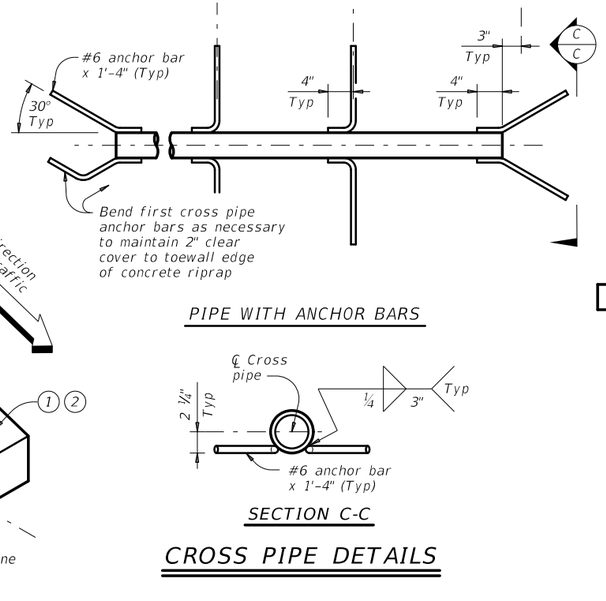
(Showing corrugated metal pipe (CMP) culvert Details at reinforced concrete pipe (RCP) culvert are similar.)



ISOMETRIC VIEW OF TYPICAL INSTALLATION



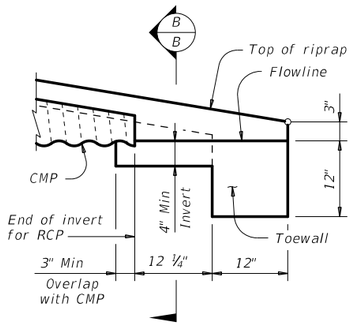
PIPE WITH BOLTED ANCHOR



PIPE WITH ANCHOR BARS

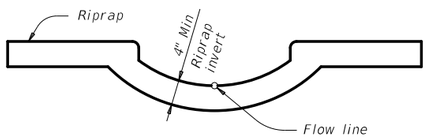
SECTION C-C

CROSS PIPE DETAILS



DETAIL "A"

(Showing invert with corrugated metal pipe (CMP) culvert. Reinforced concrete pipe (RCP) culvert details are similar. Cross pipes not shown for clarity.)



SECTION B-B

(Cross pipes not shown for clarity.)

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 ½" 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.

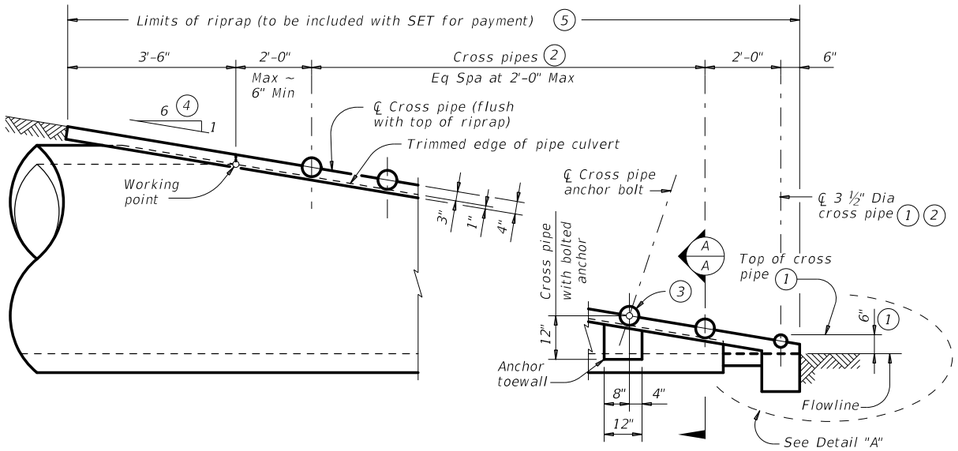
GENERAL NOTES:

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.

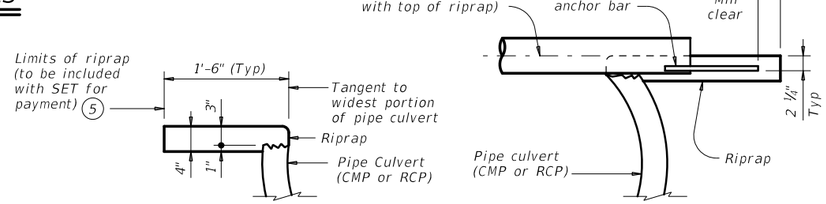
Construct concrete riprap and all necessary inverts in accordance with the requirements of Item 432, "Riprap".

Payment for riprap and toewall is included in the Price Bid for each Safety End Treatment.



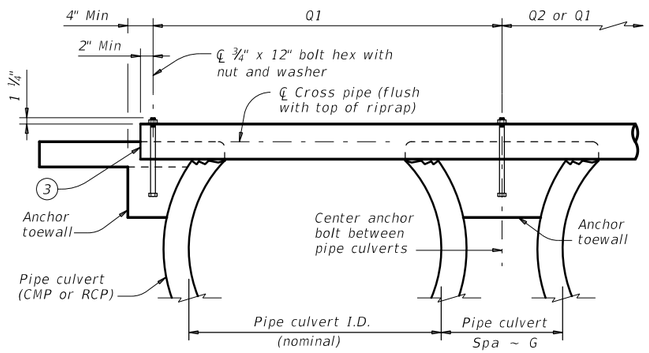
SIDE ELEVATION OF CAST-IN-PLACE CONCRETE

(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

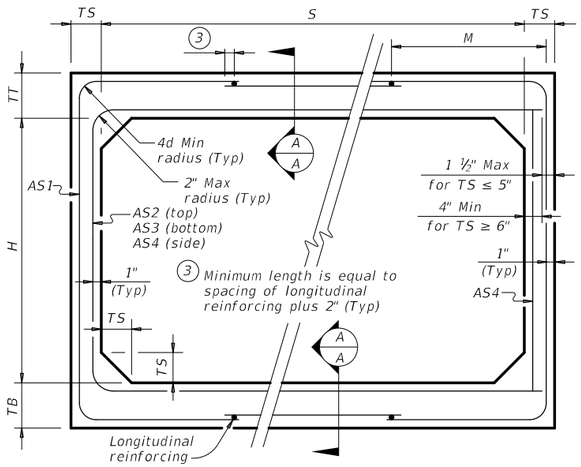
FILE: setppdse-20.dgn	DN: GAF	CK: CAT	DW: JRP	CK: GAF
©TxDOT February 2020 REVISIONS	CONT	SECT	JOB	HIGHWAY
	0921	06	302,ETC	TEEGE,ETC
	DIST	COUNTY		SHEET NO.
	PHARR	CAMERON,ETC		75

BOX DATA

SECTION DIMENSIONS					Fill Height	M (Min)	REINFORCING (sq. in. / ft.) (2)							(1) Lift Weight
S (ft.)	H (ft.)	TT (in.)	TB (in.)	TS (in.)	(ft.)	(in.)	AS1	AS2	AS3	AS4	AS5	AS7	AS8	(tons)
9	4	9	9	9	< 2	–	0.30	0.36	0.28	0.22	0.22	0.22	0.22	13.7
9	4	9	9	9	2 < 3	54	0.35	0.34	0.31	0.22	–	–	–	13.7
9	4	9	9	9	3 – 5	50	0.28	0.27	0.27	0.22	–	–	–	13.7
9	4	9	9	9	10	49	0.31	0.30	0.31	0.22	–	–	–	13.7
9	4	9	9	9	15	49	0.40	0.40	0.41	0.22	–	–	–	13.7
9	4	9	9	9	20	44	0.52	0.51	0.52	0.22	–	–	–	13.7
9	4	9	9	9	25	44	0.65	0.64	0.65	0.22	–	–	–	13.7
9	5	9	9	9	< 2	–	0.28	0.38	0.31	0.22	0.22	0.22	0.22	14.6
9	5	9	9	9	2 < 3	54	0.32	0.38	0.34	0.22	–	–	–	14.6
9	5	9	9	9	3 – 5	49	0.25	0.30	0.30	0.22	–	–	–	14.6
9	5	9	9	9	10	49	0.28	0.33	0.34	0.22	–	–	–	14.6
9	5	9	9	9	15	44	0.36	0.43	0.45	0.22	–	–	–	14.6
9	5	9	9	9	20	44	0.47	0.56	0.57	0.22	–	–	–	14.6
9	5	9	9	9	25	44	0.58	0.69	0.71	0.22	–	–	–	14.6
9	6	9	9	9	< 2	–	0.25	0.40	0.34	0.22	0.22	0.22	0.22	15.5
9	6	9	9	9	2 < 3	54	0.29	0.41	0.38	0.22	–	–	–	15.5
9	6	9	9	9	3 – 5	49	0.23	0.33	0.33	0.22	–	–	–	15.5
9	6	9	9	9	10	49	0.26	0.35	0.37	0.22	–	–	–	15.5
9	6	9	9	9	15	44	0.33	0.46	0.48	0.22	–	–	–	15.5
9	6	9	9	9	20	44	0.42	0.60	0.61	0.22	–	–	–	15.5
9	6	9	9	9	25	44	0.52	0.74	0.75	0.22	–	–	–	15.5
9	7	9	9	9	< 2	–	0.23	0.42	0.36	0.22	0.22	0.22	0.22	16.4
9	7	9	9	9	2 < 3	59	0.26	0.44	0.41	0.22	–	–	–	16.4
9	7	9	9	9	3 – 5	54	0.22	0.35	0.35	0.22	–	–	–	16.4
9	7	9	9	9	10	49	0.24	0.37	0.39	0.22	–	–	–	16.4
9	7	9	9	9	15	44	0.31	0.48	0.51	0.22	–	–	–	16.4
9	7	9	9	9	20	44	0.39	0.62	0.65	0.22	–	–	–	16.4
9	8	9	9	9	< 2	–	0.22	0.43	0.39	0.22	0.22	0.22	0.22	17.3
9	8	9	9	9	2 < 3	59	0.24	0.46	0.43	0.22	–	–	–	17.3
9	8	9	9	9	3 – 5	59	0.22	0.37	0.38	0.22	–	–	–	17.3
9	8	9	9	9	10	54	0.22	0.39	0.41	0.22	–	–	–	17.3
9	8	9	9	9	15	44	0.29	0.50	0.53	0.22	–	–	–	17.3
9	8	9	9	9	20	44	0.36	0.64	0.67	0.22	–	–	–	17.3
9	9	9	9	9	< 2	–	0.22	0.44	0.42	0.22	0.22	0.22	0.22	18.2
9	9	9	9	9	2 < 3	72	0.23	0.49	0.46	0.22	–	–	–	18.2
9	9	9	9	9	3 – 5	72	0.22	0.39	0.40	0.22	–	–	–	18.2
9	9	9	9	9	10	59	0.22	0.40	0.43	0.22	–	–	–	18.2
9	9	9	9	9	15	49	0.27	0.51	0.55	0.22	–	–	–	18.2
9	9	9	9	9	20	49	0.34	0.66	0.69	0.22	–	–	–	18.2

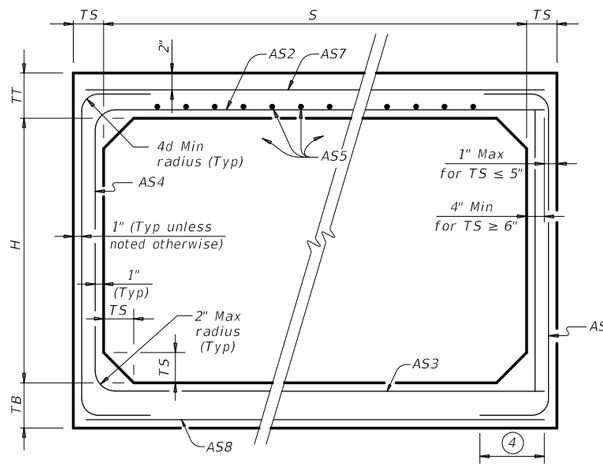
(1) For box length = 8'-0"

(2) AS1 thru AS4, AS7 and AS8 are minimum required areas of reinforcement per linear foot of box length. AS5 is minimum required area of reinforcement per linear foot of box width.



CORNER OPTION "A" CORNER OPTION "B"

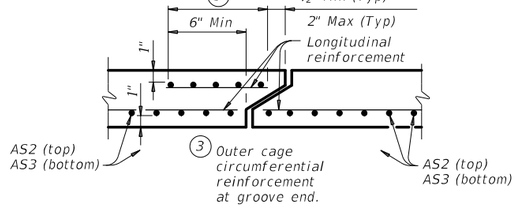
FILL HEIGHT 2 FT AND GREATER



CORNER OPTION "A" CORNER OPTION "B"

FILL HEIGHT LESS THAN 2 FT

(4) Length is equal to spacing of longitudinal reinforcing plus 2". (10" Min) (Typ)



SECTION A-A

(Showing top and bottom slab joint reinforcement.)

MATERIAL NOTES:

Provide 0.03 sq. in./ft. minimum longitudinal reinforcement at each face in slabs and walls. This minimum requirement may be met by the transverse wires when wire mesh reinforcement is used.

Provide Class H concrete (f`c = 5,000 psi).

GENERAL NOTES:

Designs shown conform to ASTM C1577. Refer to ASTM C1577 for information or details not shown.

See Box Culverts Precast Miscellaneous Details (SCP-MD) standard sheet for details and notes not shown.

In lieu of furnishing the designs shown on this sheet, the contractor may furnish an alternate design that is equal to or exceeds the box design for the design fill height in the table. Submit shop plans for alternate designs in accordance with Item "Precast Concrete Structural Members (Fabrication)".

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

SINGLE BOX CULVERTS PRECAST

9'-0" SPAN

SCP-9

FILE: scp09sts-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020 REVISIONS	CONT	SECT	JOB	HIGHWAY
	0921	06	302,ETC	TEEGE,ETC
	DIST	COUNTY		SHEET NO.
	PHARR	CAMERON,ETC		76

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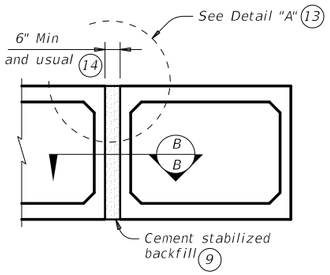
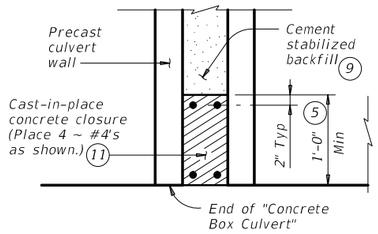
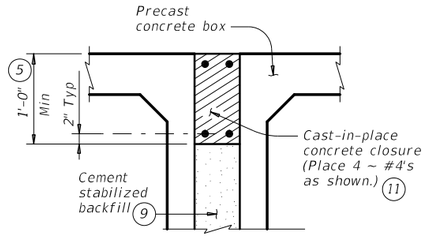


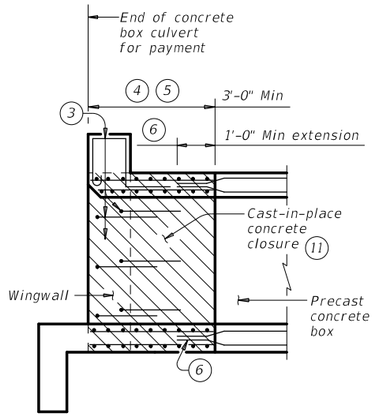
MULTIPLE UNIT PLACEMENT



SECTION B-B

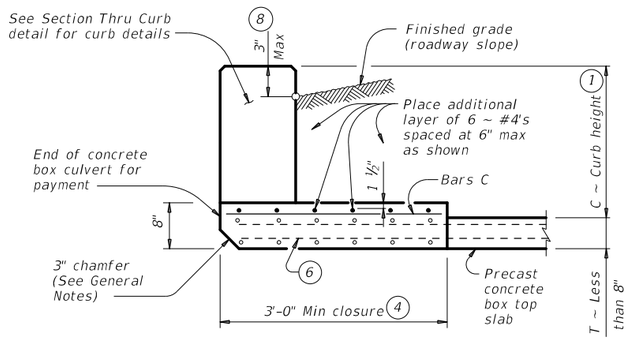


DETAIL "A" (13)

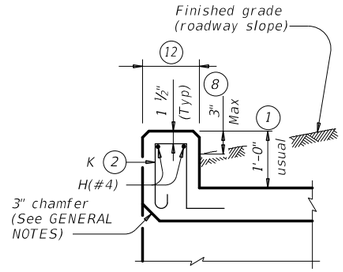


WINGWALL CONNECTION

(Also applies to safety end treatment.)

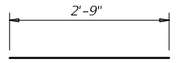


SECTION THRU TOP SLABS LESS THAN 8"

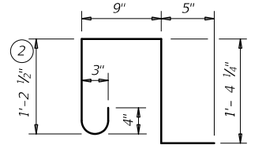


SECTION THRU CURB

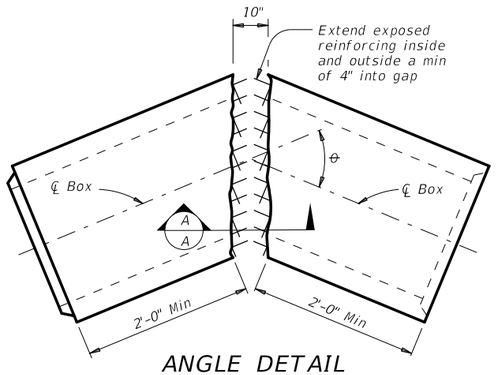
QUANTITIES PER FOOT OF CURB (10)	
Reinforcing Steel	4.12 Lb
Concrete	0.037 CY



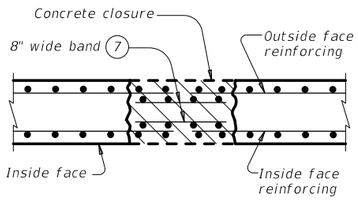
BARS C (#4)
(Spa = 1'–0" Max)



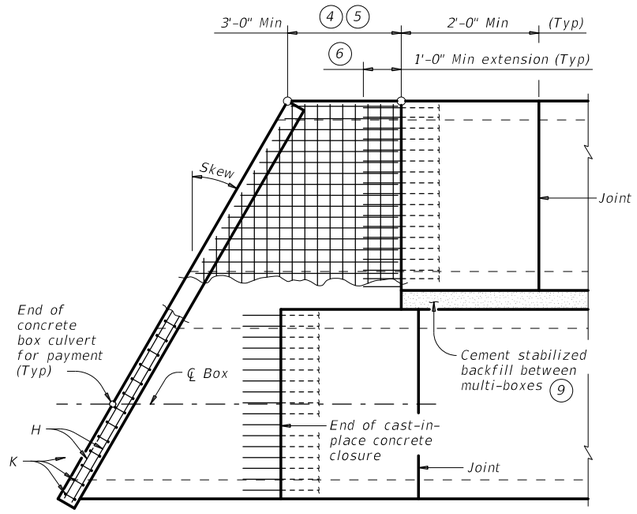
BARS K (#4)
(Spa = 1'–0" Max)
(Length = 4'–2")



ANGLE DETAIL



SECTION A-A



PLAN OF SKEWED ENDS

(Showing multi–box placement.)

1. 0" Min to 5'–0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail, bicycle rail, or curbs taller than 1'–0, refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631–CM) standard sheet. Refer to the Box Culvert Rail Mounting Details (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.
2. For curbs less than 1'–0" high, tilt Bars K or reduce bar height as necessary to maintain cover. For curbs less than 3" high, Bars K may be omitted.
3. Extend curb, wingwall, or safety end treatment reinforcing into concrete closure. Bend or trim, as necessary, any reinforcing that does not fit into closure area.
4. Provide a 3'–0" Min cast–in–place concrete closure. Break back boxes in the field or cast boxes short. Provide bands of reinforcing in the closure that are the same size and spacing as in the precast box section. Provide #4 longitudinal reinforcement spaced at 12 inches Max within the closure. Except where shown otherwise, construct the cast–in–place closure flush with the inside and outside faces of the precast box section.
5. For multiple unit placements, adjust the length of the closure for the interior walls as necessary. Provide a 3'–0" Min cast–in–place closure in the top slab, bottom slab, and exterior wall. See Section B–B detail when interior walls are cast full length.
6. Extend precast box reinforcing a minimum of 1'–0" into concrete closure (Typ).
7. Place bands of reinforcing matching the inside and outside face reinforcing in the gaps of the top and bottom slabs. Place a band matching the outside face reinforcing of the wall in the gaps of the walls (placed in the outside face only). Tack weld the bands to the exposed reinforcing at each point of contact.
8. For vehicle safety, the following requirements must be met:
   - For structures without bridge rail, construct curbs no more than 3" above finished grade.
   - For structures with bridge rail, construct curbs flush with finished grade.

   Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.
9. Cement stabilized backfill between boxes is considered part of the box culvert for payment.
10. All curb concrete and reinforcing is considered part of the box culvert for payment.
11. Any additional concrete and reinforcing required for the closures will be considered subsidiary to the box culvert for payment.
12. 1'–0" typical. 2'–3" when the Box Culvert Rail Mounting Details (RAC) standard sheet is referred to elsewhere in the plans.
13. For multiple unit placement with overlay, with 1 to 2 course surface treatment, or with the top slab as the final riding surface, provide wall closure as shown in Detail "A".
14. This dimension may be increased with approval of the Engineer to allow the precast boxes to be tunneled or jacked in accordance with Item 476, "Jacking, Boring, or Tunneling Pipe or Box". No payment will be made for any additional material in the gap between adjacent boxes.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.
Provide ASTM A1064 welded wire reinforcement.
Provide Class C concrete (f'c = 3,600 psi) for the closures.
Provide cement stabilized backfill meeting the requirements of Item 400, "Excavation and Backfill for Structures."
Any additional concrete required for the closures will be considered subsidiary to the box culvert.

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.
Refer to the Single Box Culverts Precast (SCP) standard sheets for details and notes not shown.
Chamfer the bottom edge of the top slab closure 3 inches at culvert closure ends.

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

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

BOX CULVERTS PRECAST MISCELLANEOUS DETAILS

SCP-MD

FILE: scpmdsts-20.dgn	DN: GAF	CK: LMW	DW: BWH/TxDOT	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
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	DIST	COUNTY		SHEET NO.
	PHARR	CAMERON,ETC		77

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

Dimensions					Variable Reinforcing				Estimated Quantities per ft of wing length (2~wings) (3)	
					Bars J1		Bars J2			
Maximum Wingwall Height Hw	W	X	Y	Z	Size	Spa	Size	Spa	Reinf (Lb/Ft)	Conc (CY/Ft)
2'-6"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	33.73	0.248
3'-0"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	37.07	0.261
3'-6"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	37.74	0.273
4'-0"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	38.41	0.285
4'-6"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	41.75	0.330
5'-0"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	45.09	0.343
5'-6"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	45.75	0.355
6'-0"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	46.42	0.367
7'-0"	3'-8"	1'-9"	1'-3"	7"	#4	1'-0"	#4	1'-0"	52.77	0.414
8'-0"	4'-2"	2'-0"	1'-6"	8"	#5	1'-0"	#4	1'-0"	60.19	0.486
9'-0"	4'-8"	2'-3"	1'-9"	8"	#4	6"	#4	6"	81.49	0.535
10'-0"	5'-2"	2'-6"	2'-0"	8"	#5	6"	#4	6"	97.25	0.584
11'-0"	5'-8"	2'-9"	2'-3"	8"	#6	6"	#5	6"	133.65	0.634
12'-0"	6'-2"	3'-0"	2'-6"	9"	#7	6"	#5	6"	162.29	0.721
13'-0"	6'-8"	3'-3"	2'-9"	11"	#7	6"	#5	6"	178.80	0.856
14'-0"	7'-2"	3'-6"	3'-0"	1'-0"	#8	6"	#5	6"	216.78	0.959
15'-0"	7'-8"	4'-0"	3'-0"	1'-1"	#9	6"	#6	6"	283.06	1.068
16'-0"	8'-2"	4'-6"	3'-0"	1'-3"	#9	6"	#6	6"	297.02	1.234

TABLE OF WINGWALL REINFORCING
(2~wings)

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

TABLE OF ESTIMATED CULVERT TOEWALL QUANTITIES

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

WING DIMENSION FORMULAS:

(All values are in feet.)

Hw = H + T + C – 0.250'
A = (Hw – 0.333') (SL)
B = (A) tangent (30°)
Lw = (A) ÷ cosine (30°)

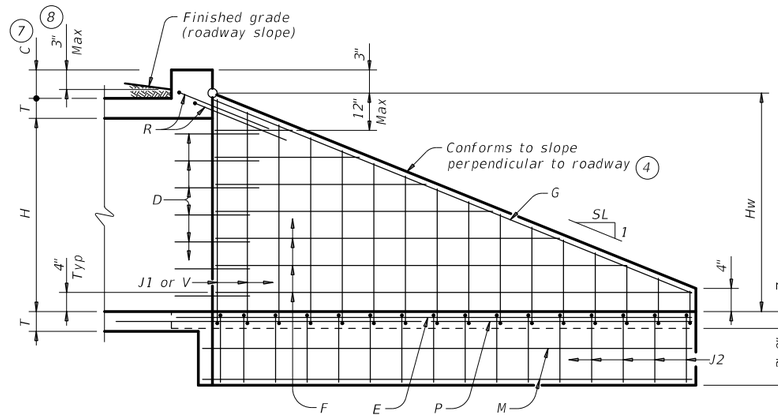
For cast–in–place culverts:
Ltw = (N) (S) + (N + 1) (U)

For precast culverts:
Ltw = (N) (2U + S) + (N – 1) (0.5')

Total Wingwall Area (two wings ~ SF) = (Hw + 0.333') (Lw)

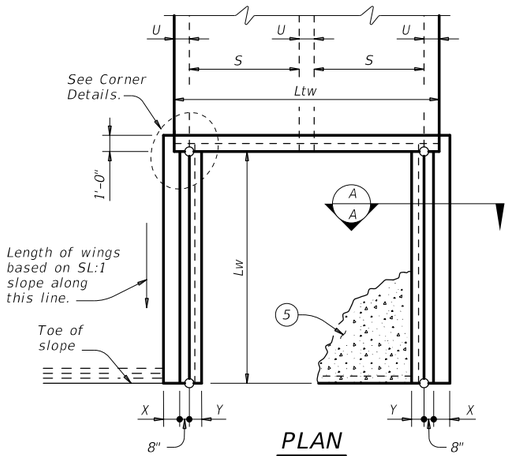
Hw = Height of wingwall
SL:1 = Side slope ratio (horizontal:1 vertical)
Lw = Length of wingwall
Ltw = Culvert toewall length
N = Number of culvert spans

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



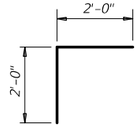
INSIDE ELEVATION

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

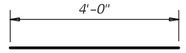


PLAN

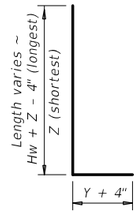
(Showing dimensions.)



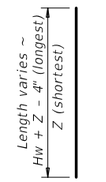
BARS R



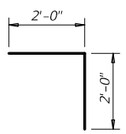
BARS D



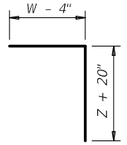
BARS J1



BARS V



BARS L



BARS J2

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

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

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

(4) Recommended values of side slope are: 2:1, 3:1, 4:1, and 6:1.

(5) When shown elsewhere on the plans, construct 5" deep concrete riprap. Payment for riprap is as required by Item 432, "Riprap". Unless otherwise shown on the plans or directed by the Engineer, provide a 6" wide by 1'–6" deep reinforced concrete toewall along all edges of the riprap adjacent to natural ground; reinforce the toewall by extending typical riprap reinforcing into the toewall; and extend construction joints or grooved joints oriented in the direction of flow across the full distance of the riprap at intervals of approximately 20'. When such riprap is provided, the culvert toewall shown in SECTION B–B will not be required.

(6) At Contractor's option, culvert toewall may be ended flush with wingwall toewall. Adjust reinforcing as needed.

(7) 0" Min to 5'–0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'–0, refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631–CM) standard sheet. Refer to the Box Culvert Rail Mounting Details (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.

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

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

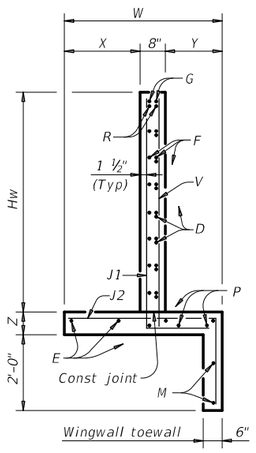
MATERIAL NOTES:

Provide Class C concrete (f'c=3,600 psi).
Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.
In riprap concrete, synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing unless noted otherwise.

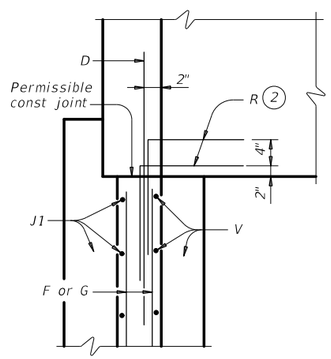
GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.
When structure is founded on solid rock, depth of toewalls for culverts and wingwalls may be reduced or eliminated as directed by the Engineer.
See Box Culvert Supplement (BCS) standard sheet for additional dimensions and information.
The quantities for concrete and reinforcing steel resulting from the formulas given on this sheet are for Contractor's information only.

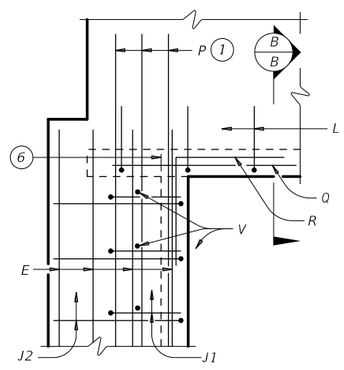
Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing dimensions are out–to–out of bars.



SECTION A-A

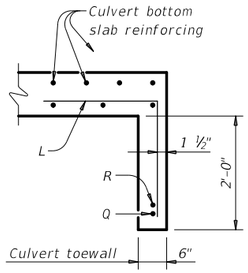


WINGWALL



FOOTING AND TOEWALL

CORNER DETAILS



SECTION B-B (5)

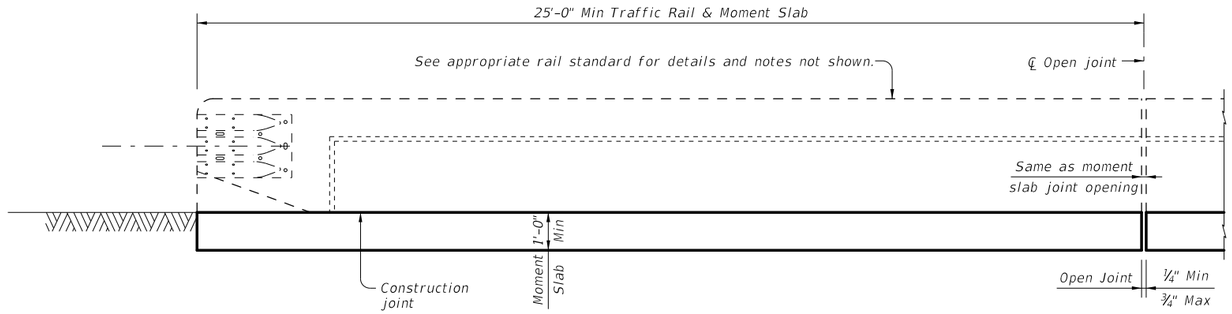
Texas Department of Transportation

Bridge Division Standard

CONCRETE WINGWALLS WITH STRAIGHT WINGS FOR 0° SKEW BOX CULVERTS

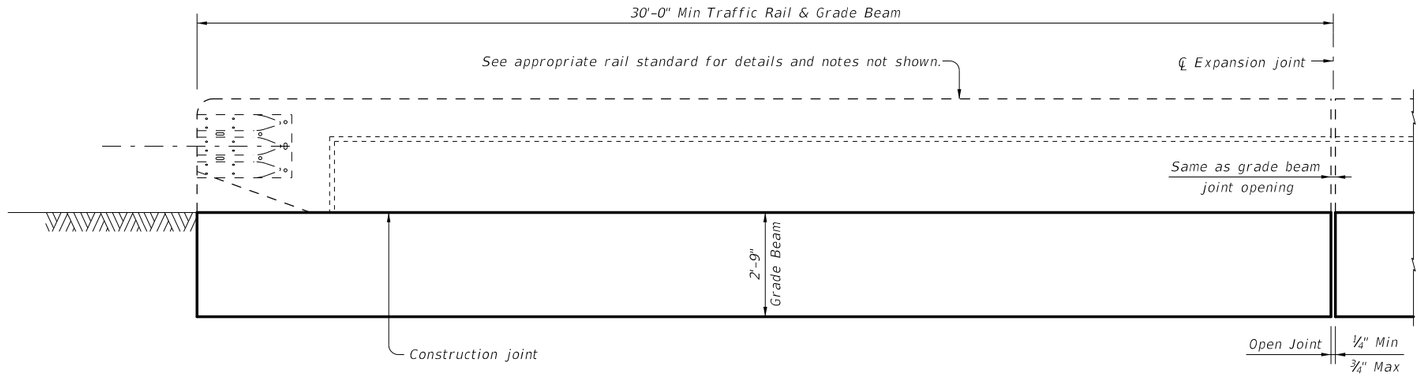
SW-O

FILE: sw-0std-20.dgn	DN: GAF	CK: CAT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	302,ETC	TEEGE,ETC
	DIST	COUNTY		SHEET NO.
	PHARR	CAMERON,ETC		78



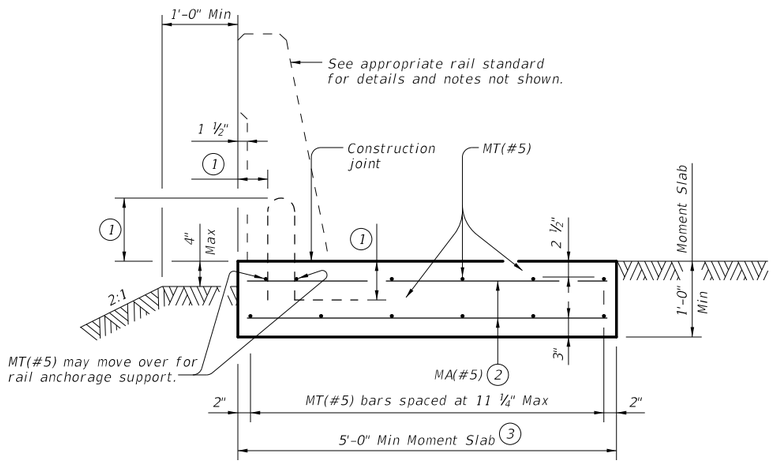
ROADWAY ELEVATION OF TRAFFIC RAIL ON MOMENT SLAB (TRF-MS)

(Showing SSTR rail other rails are similar. Reinforcing not shown for clarity.)



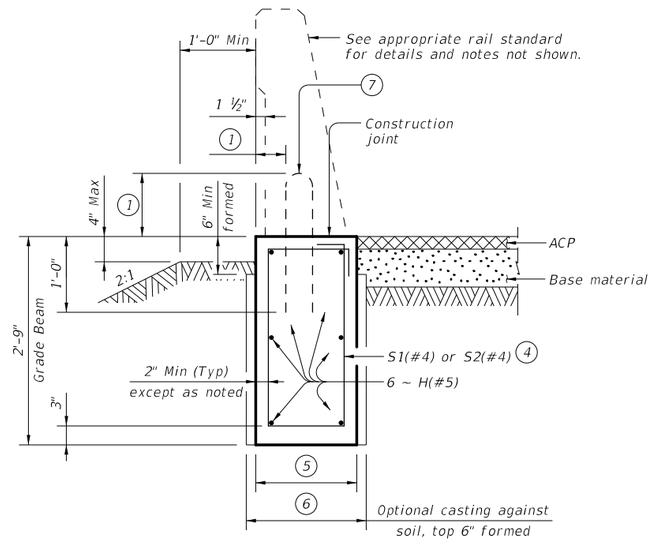
ROADWAY ELEVATION OF TRAFFIC RAIL ON GRADE BEAM (TRF-GB)

(Showing SSTR rail other rails are similar. Reinforcing not shown for clarity.)



SECTION OF TRAFFIC RAIL ON MOMENT SLAB (TRF-MS)

(Showing SSTR rail other rails are similar.)



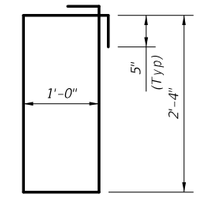
SECTION OF TRAFFIC RAIL ON GRADE BEAM (TRF-GB)

(Showing SSTR rail other rails are similar.)

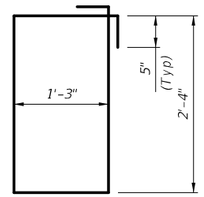
1. See applicable bridge rail standard.
2. MA(#5) space longitudinally along moment slab at 12" Max. (Spaced 2 ½" longitudinally from outside edge of moment slab).
3. Approximate moment slab concrete = 0.19 CY/LF and reinforcement = 22.4 LB/LF.
4. S1(#4) or S2(#4) spaced longitudinally along grade beam at 8" Max. (Spaced 2 ½" longitudinally from outside edge of grade beam).
5. Use bar S1(#4) with 1'-4" grade beam width and bridge rail types: All rails except for T224, C412, T66, C66, T80HT and T80SS.
   Approximate grade beam concrete = 0.14 CY/LF and reinforcement = 13.8 LB/LF.

   Use bar S2(#4) with 1'-7" grade beam width and bridge rail types: T66 and C66.
   Approximate grade beam concrete = 0.16 CY/LF and reinforcement = 14.2 LB/LF.
6. 1'-6" for bridge rail types: All rails except for T224, C412, T66, C66, T80HT and T80SS.

   1'-9" bridge rail types: T66 and C66.
7. Modify reinforcing on standard bridge rail anchorage if necessary by extending rail anchorage 12" Min, vertically into traffic rail



BARS S1(#4)



BARS S2(#4)

CONSTRUCTION NOTES:

Align moment slab (TRF-MS) or grade beam (TRF-GB) open joints with rail open joints maintaining no less than minimum rail length. Provide moment slab (TRF-MS) or grade beam (TRF-GB) with open joints at no greater than 100' spacing unless otherwise shown on 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 required elsewhere.

Deformed Welded Wire Reinforcement (WWR) (ASTM A1064) of equal size and spacing may be substituted for bars S1(#4), S2(#4) and H(#5) unless noted otherwise. Provide the same laps as required for reinforcing bars.

Provide bar laps, where required, as follows:

Uncoated or galvanized ~ #5 = 2'-4"
Epoxy coated ~ #5 = 3'-6"

GENERAL NOTES:

Use of these details will result in a moment slab (TRF-MS) or grade beam (TRF-GB) foundation that is acceptable for traffic rails which are MASH TL-2, TL-3, or TL-4 compliant.

See elsewhere in the plans for selected options between moment slab (TRF-MS) and/or grade beam (TRF-GB).

The foundation design resistance is based on the current AASHTO bridge railing requirements with the assumption of fair to good soil support conditions. Poor soil conditions will require suitably deeper and/or wider foundations.

See appropriate rail standard for details and notes not shown.

This detail is intended for use as a guide to unusual railing anchorage situations but may be included in the plans, modified as necessary to apply to specific installations required on the project.

Payment for moment slab (TRF-MS) and/or grade beam (TRF-GB) will be by Class "C" concrete or Class "C" (HPC) concrete for rail foundations.

The associated bridge railing will be paid for by the linear foot which includes the concrete and reinforcement.

Excavation will be subsidiary to other Items.

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

TRAFFIC RAIL FOUNDATIONS

FOR MASH TL-2, TL-3 & TL-4 BRIDGE RAILS

TRF

FILE: rlstd027-20.dgn	DN: TxDOT	CK: TAR	DW: JTR	CK: TAR
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS 07-20: Added moment slab with rail foundation lengths.	0921	06	302,ETC	TEEGE,ETC
	DIST	COUNTY		SHEET NO.
	PHARR	CAMERON,ETC		79

DATE: 12/7/2022 10:01:39 AM
FILE: ...\Drainage\rlstd027-20.dgn

DOOLITTLE ROAD SUMMARY OF QUANTITIES

BID ITEM DISCRIPTION / BRIDGE ELEMENT	400 6005	416 6002	420 6013	420 6029	420 6037	422 6007	422 6013	425 6011	425 6012	432 6031	442 6007	450 6030	450 6054	454 6020
	CEM STABIL BKFL	DRILL SHAFT (24 IN)	CL C CONC (ABUT)	CL C CONC (CAP)	CL C CONC (COLUMN)	REINF CONC SLAB (SLAB BEAM)	BRIDGE SIDEWALK	PRESTR CONC SLAB BEAM (4SB15)	PRESTR CONC SLAB BEAM (5SB15)	RIPRAP (STONE PROTECTION) (12 IN)	STR STEEL (MISC NON - BRIDGE)	RAIL (TY C221)	RAIL (TY SSTR) (W/DRAIN SLOTS)	SEALED EXPANSION (4 IN) (SEJ-B)
	CY	LF	CY	CY	CY	SF	SF	LF	LF	CY	LB	LF	LF	LF
2 ~ ABUTMENTS	52	550	39.0							148	186	14.0	14.0	94
2 ~ INTERIOR BENTS		332		27.0	12.6									
1 ~ 140.00' PRESTR CONC SLAB BEAM UNIT						6,720	980	415.31	969.05			140.0	140.0	
PROJECT TOTALS	**52**	**882**	**39.0**	**27.0**	**12.6**	**6,720**	**980**	**415.31**	**969.05**	**148**	**186**	**154.0**	**154.0**	**94**

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL RD,
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

Texas Department of Transportation

DOOLITTLE ROAD
SUMMARY OF QUANTITIES

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
RWF	6	SEE TITLE SHEET	TEEGE,ETC
DRAWN RWF	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK SPC	TEXAS	PHARR	CAMERON,ETC	80
CHECK SPC	CONTROL	SECTION	JOB	
	0921	06	302,ETC	

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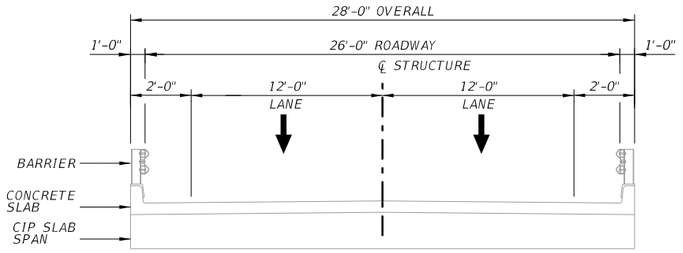
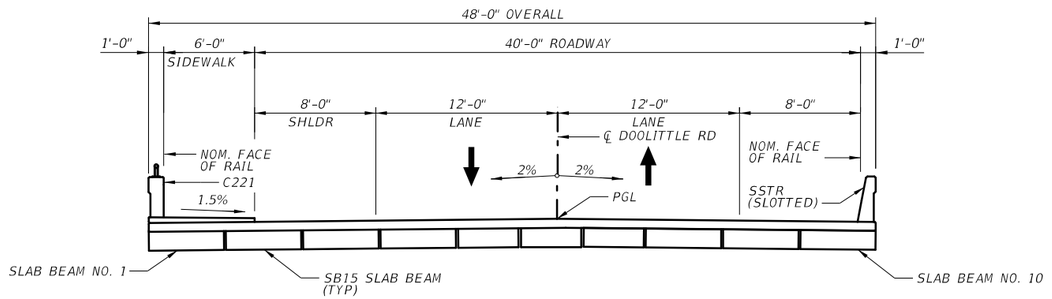


EXISTING TYPICAL SECTION



PROPOSED TYPICAL TRANSVERSE SECTION

HL93 LOADING

STATE OF TEXAS
RYAN W. FRITZ
112568
LICENSED PROFESSIONAL ENGINEER

12/07/2022

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL RD,
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

Texas Department of Transportation

DOOLITTLE ROAD
BRIDGE TYPICAL SECTIONS

SCALE = 1"=20'

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
RWF	6	SEE TITLE SHEET		TEEGE,ETC
DRAWN MLL	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK SPC	TEXAS	PHARR	CAMERON,ETC	81
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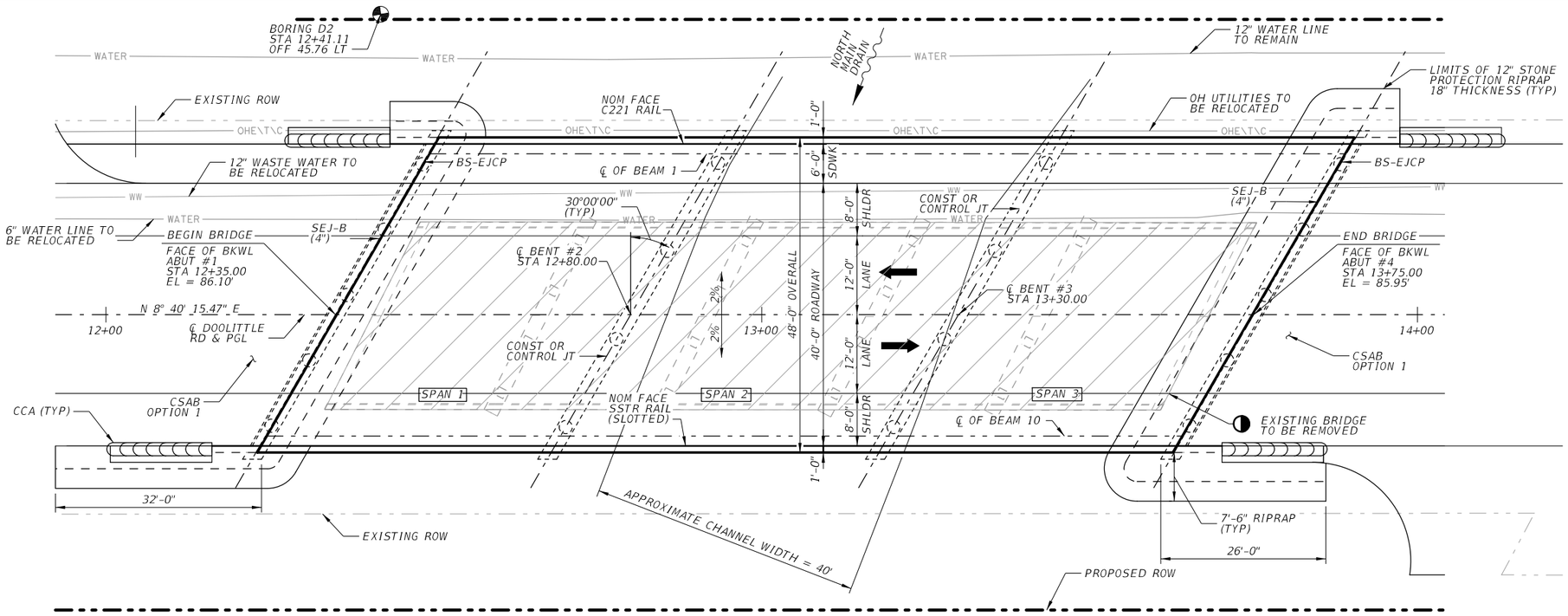


PLAN

BORING D1
STA 13+48.90
OFF 52.24 RT

EXISTING STRUCTURE
128'-0" OVERALL LENGTH, 4 SPAN CONCRETE CAPS, COLUMN AND DECK BRIDGE
APPROX. 28' OVERALL WIDTH (TO BE REMOVED).

ALL ABUTMENTS AND BENTS ON BEARING N51°19'45"W

GENERAL NOTES:

1. DESIGNED IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 8th EDITION WITH ALL INTERIM SPECIFICATIONS.
2. CONTRACTOR SHALL FIELD VERIFY LOCATIONS OF ALL EXISTING STRUCTURES AND UTILITIES PRIOR TO ORDERING MATERIALS AND NOTIFY ENGINEER IN WRITING OF ANY CONFLICTS OR DISCREPANCIES.
3. FOR BORING DATA, SEE TEST BORING SHEET.
4. THE CONTRACTOR SHALL BE ADVISED THAT GROUNDWATER AND INUNDATION MAY BE EXPERIENCED DURING DRILL SHAFT CONSTRUCTION. THE USE OF CASING AND/OR DRILLING SLURRY, IN ACCORDANCE WITH TxDOT ITEM 416 MAY BE NECESSARY. CONTRACTOR SHALL SUBMIT DRILLED SHAFT INSTALLATION PLAN FOR REVIEW NO LATER THAN ONE MONTH BEFORE DRILLED SHAFT CONSTRUCTION AS STATED IN ITEM 416. SHAFTS TO THE REQUIRED DEPTHS SHOWN.
5. REMOVE EXISTING FOUNDATIONS TO 2'-0" BELOW THE FINAL SURFACE OR AS APPROVED BY THE ENGINEER.
6. SEE CSAB STANDARD FOR CEMENT STABILIZED ABUTMENT BACKFILL DETAILS.
7. THE "H" VALUES SHOWN ARE ESTIMATED COLUMN HEIGHTS. THE CONTRACTOR IS RESPONSIBLE FOR CALCULATING ACTUAL COLUMN HEIGHTS BASED ON FIELD CONDITIONS.

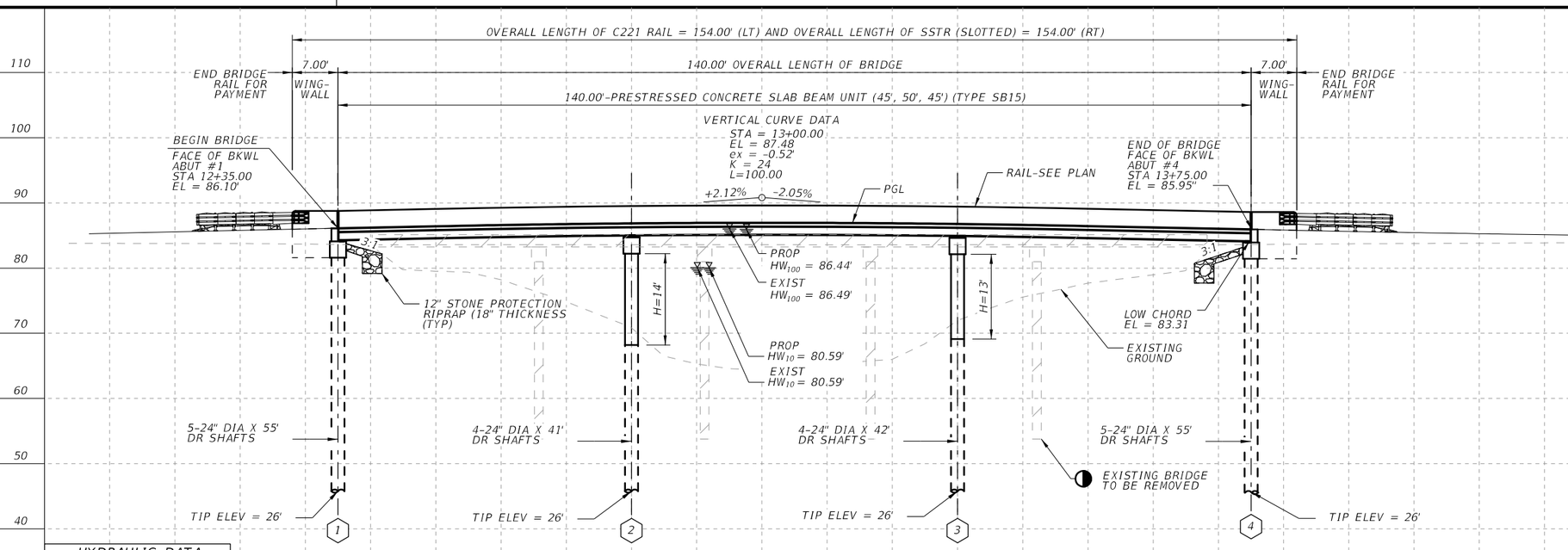
DESIGN SPEED: 30 MPH
FUNCTION CLASS: RURAL LOCAL
ADT (2019) = 3,513
ADT (2039) = 4,918

EXISTING NBI: 21-109-0-AA01-82-001
PROPOSED NBI: 21-109-0-AA25-01-001

N

0 10 20
LAYOUT SCALE IN FEET

HL93 LOADING



FOR BORING INFORMATION SEE TEST BORING SHEET

HYDRAULIC DATA

*Q_{10} = 2,596 CFS
V_{10} = 2.84 FPS

*Q_{100} = 5,200 CFS
V_{100} = 1.17 FPS

* FLOW RATES ARE FROM THE EFFECTIVE FEMA MODEL OBTAINED BY THE FEMA LIBRARY. DESIGN BASED ON MAX FLOW RATE CONDITION.

ELEVATION

STATE OF TEXAS
RYAN W. FRITZ
112568
LICENSED
PROFESSIONAL ENGINEER
12/07/2022

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL RD, SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

Texas Department of Transportation
© 2022

DOOLITTLE ROAD
BRIDGE LAYOUT

SCALE = 1"=20'

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
RWF	6	SEE TITLE SHEET	TEEGE,ETC
DRAWN MLL	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK SPC	TEXAS	PHARR	CAMERON,ETC	82
CHECK SPC	CONTROL	SECTION	JOB	
	0921	06	302,ETC	

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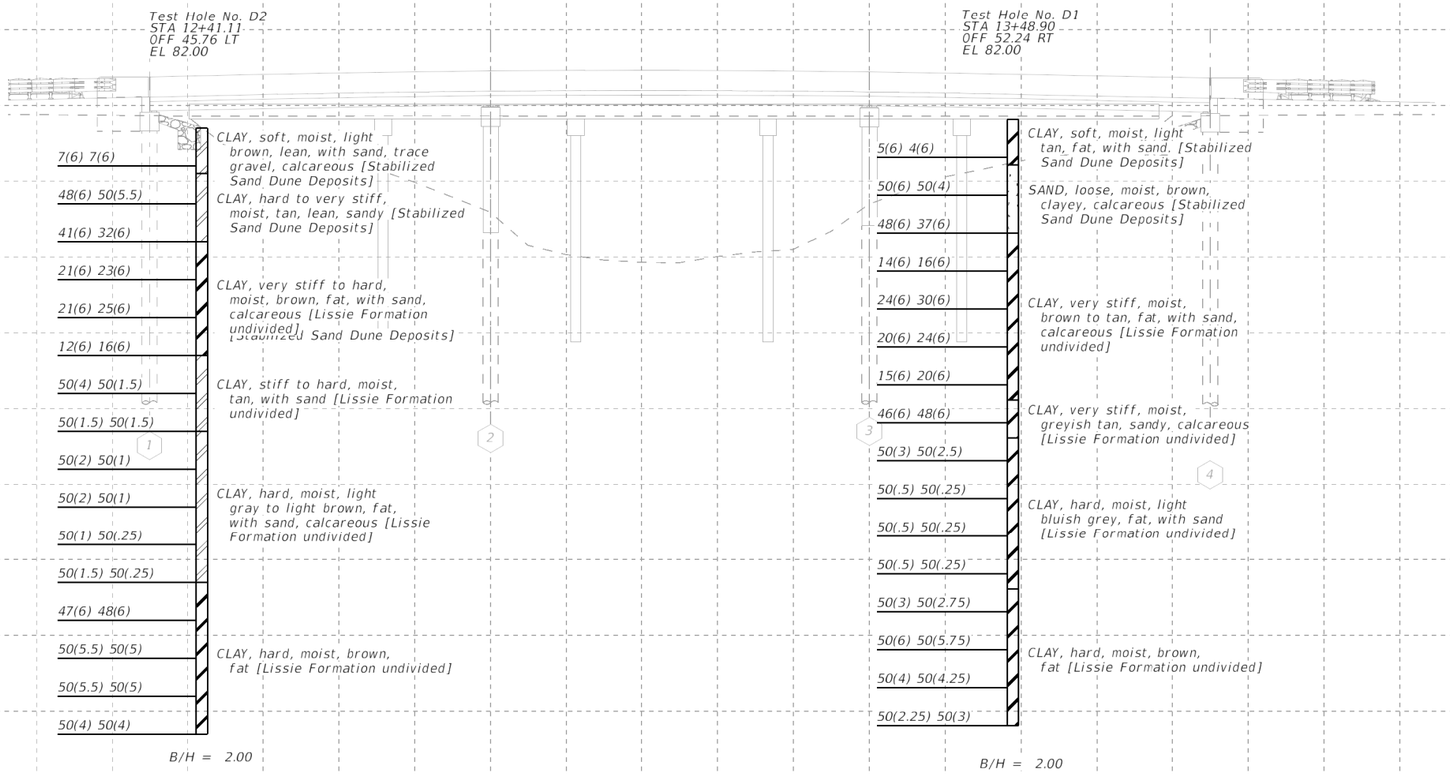

BORINGS

STATE OF TEXAS
ANIL K. RAAVI
122152
LICENSED
PROFESSIONAL ENGINEER

12/6/2022

NO.	DATE	REVISION	APPROVED

HVJ ASSOCIATES

HVJ Associates, Inc.
TBPE Firm # F-000646
6120 South Dairy Ashford Rd. Houston, TX 77072

DOOLITTLE ROAD
TEST BORING SHEET

SCALE = 1"=20'

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
RWF	6	SEE TITLE SHEET	TEEGE,ETC
DRAWN	STATE	DISTRICT	COUNTY
MLL	TEXAS	PHARR	CAMERON,ETC
CHECK	CONTROL	SECTION	JOB
SPC	0921	06	302,ETC
CHECK			
RWF			

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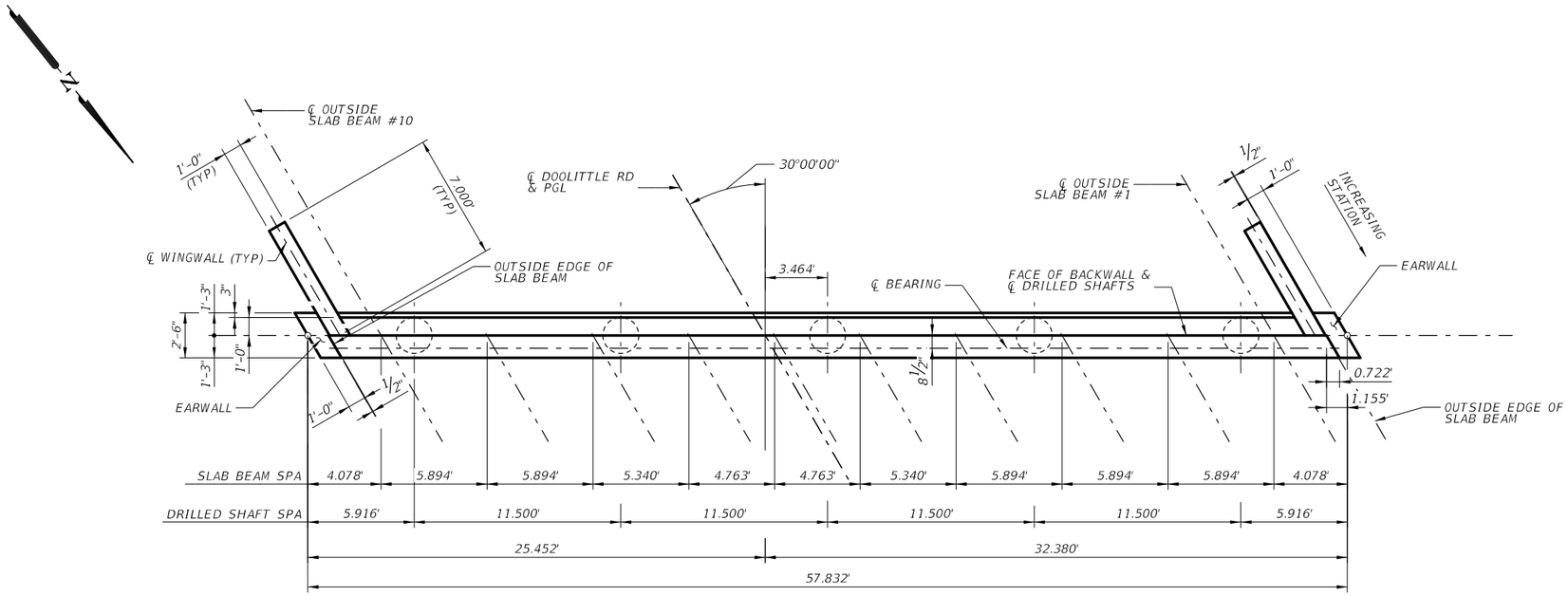
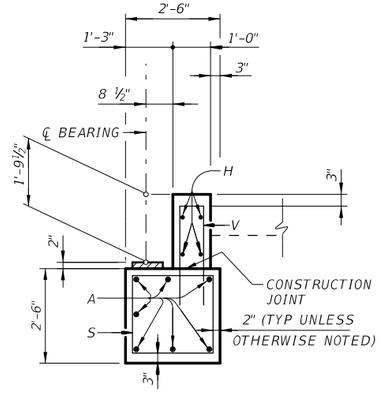
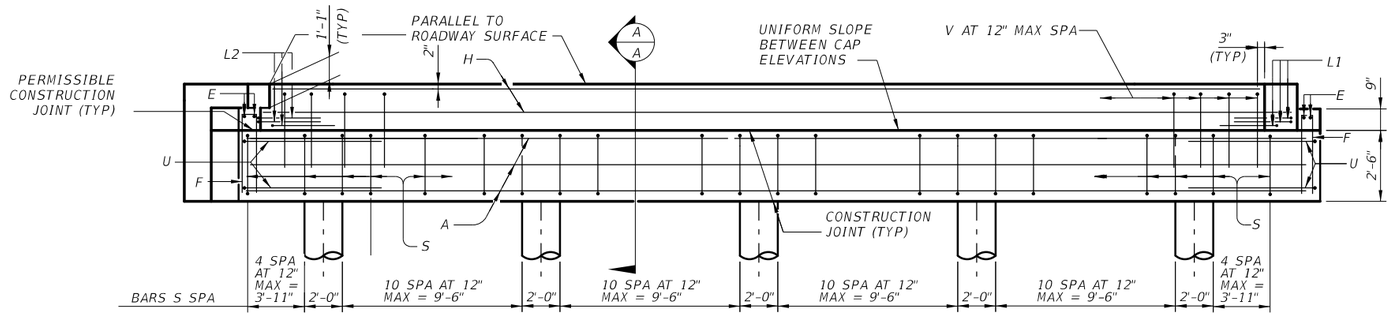


PLAN



SECTION A-A



ELEVATION

HL93 LOADING

STATE OF TEXAS
RYAN W. FRITZ
112568
LICENSED
PROFESSIONAL ENGINEER
12/07/2022

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL RD,
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

DOOLITTLE ROAD

ABUTMENT 1

SCALE = None

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
RWF	6	SEE TITLE SHEET	TEEGE,ETC
DRAWN MLL	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK SPC	TEXAS	PHARR	CAMERON,ETC	84
CHECK SPC	CONTROL	SECTION	JOB	
	0921	06	302,ETC	

DATE: 12/7/2022
TIME: 10:02:43 AM
USER: rwfritz
FILE NAME: ..\Bridge\DOORD-BMCD-SUB01.dgn
PENTABLE: CSJ 0921-02-331 (Charles Green Rd).tbl
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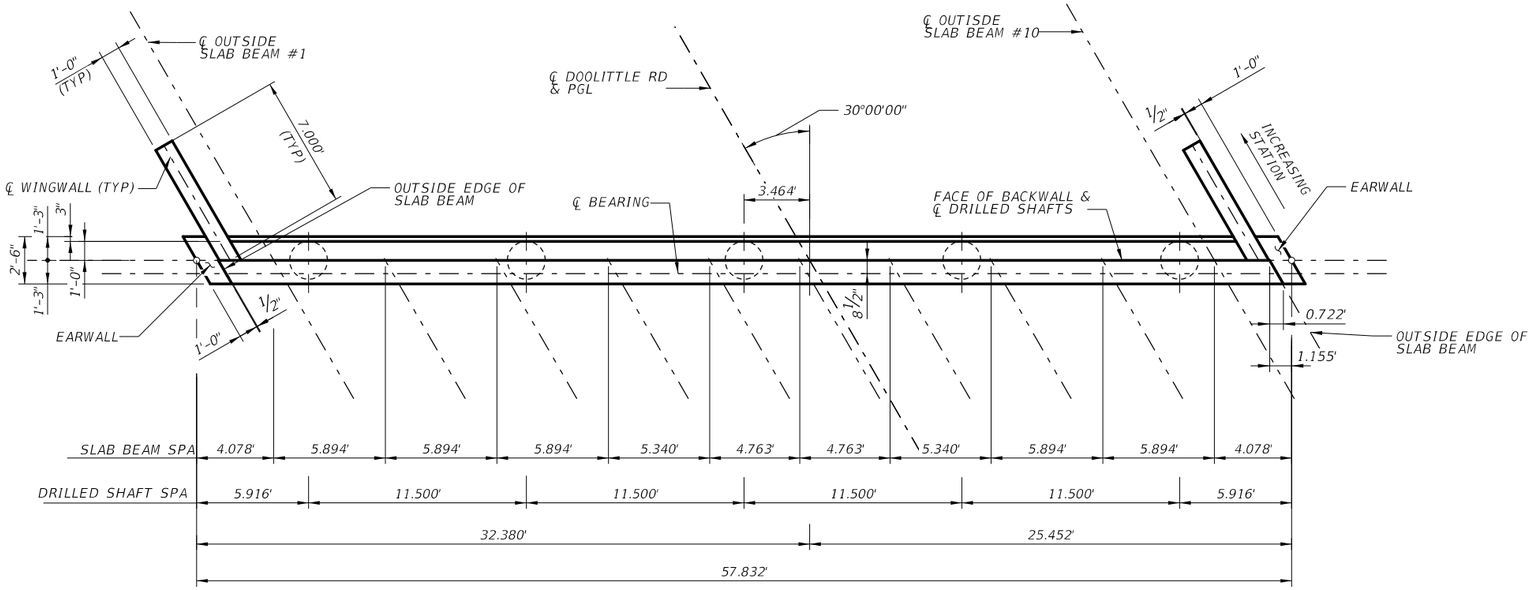

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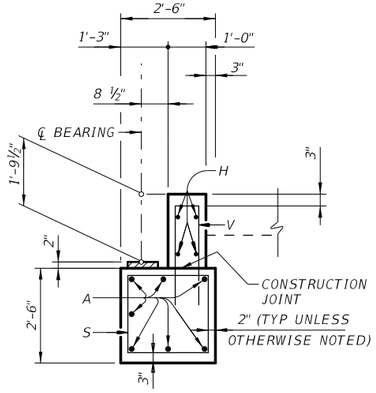
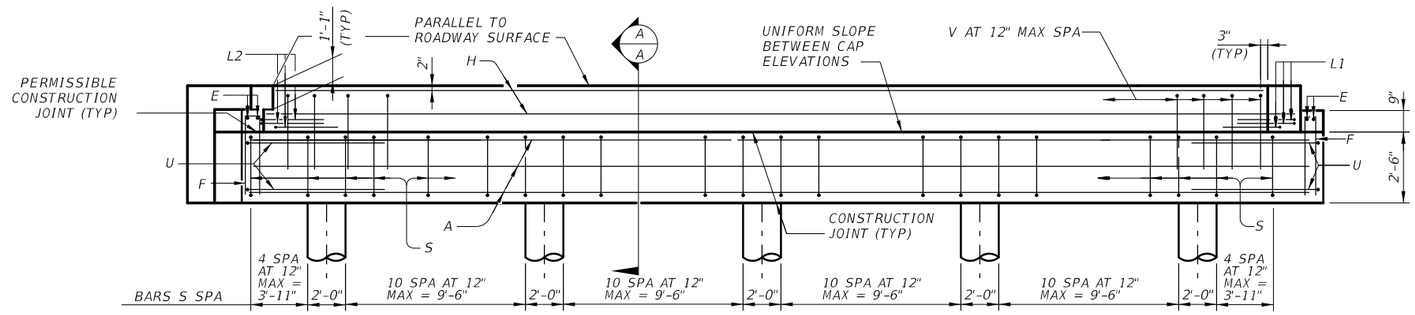


SECTION A-A



ELEVATION

HL93 LOADING

STATE OF TEXAS
RYAN W. FRITZ
112568
LICENSED
PROFESSIONAL ENGINEER
12/07/2022

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL RD, SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

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DOOLITTLE ROAD
ABUTMENT 4

SCALE = None

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
RWF	6	SEE TITLE SHEET	TEEGE,ETC
DRAWN MLL	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK SPC	TEXAS	PHARR	CAMERON,ETC	85
CHECK SPC	CONTROL	SECTION	JOB	
	0921	06	302,ETC	

DATE: 12/7/2022
TIME: 10:02:51 AM
USER: rwfritz
FILE NAME: ..\Bridge\DOORD-BMCD-SUB02.dgn
PENTABLE: CSJ 0921-02-331 (Charles Green Rd).tbl
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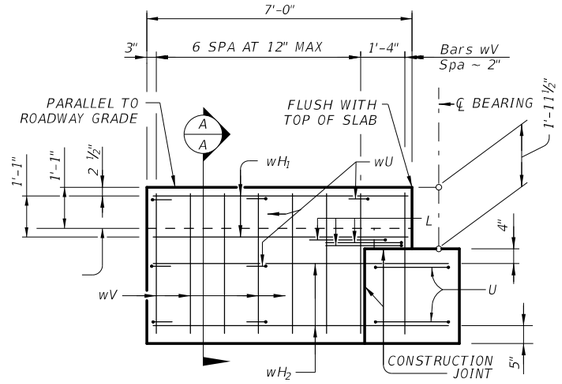
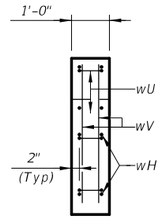
PLOT DRIVER: TXDOT_PDF_BW(NO RASTERS).plt



WINGWALL ELEVATION

(EARWALL NOT SHOWN FOR CLARITY.)



SECTION A-A

TABLE OF ESTIMATED QUANTITIES (2)

Bar	No.	Size	Length	Weight
A	7	#11	56'-10"	2,114
E	4	#5	2'-6"	10
F	10	#5	6'-6"	68
H	4	#6	55'-1"	331
L_1	3	#6	4'-0"	18
L_2	3	#6	4'-0"	18
S	54	#4	9'-6"	343
U	4	#6	7'-5"	45
V	54	#5	7'-10"	441
wH_1	8	#6	6'-8"	80
wH_2	8	#6	7'-11"	95
wU	14	#4	1'-8"	16
wV	32	#5	4'-2"	139
*Reinforcing Steel			Lb	3,718
Cl "C" Conc (Abut)			CY	19.5

* FOR CONTRACTORS INFORMATION

GENERAL NOTES:

DESIGNED ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.
SEE BRIDGE LAYOUT FOR HEADER SLOPE, FOUNDATION TYPE, SIZE AND LENGTH.
SEE COMMON FOUNDATION DETAILS (FD) STANDARD SHEET FOR ALL FOUNDATION DETAILS AND NOTES.
SEE RIPRAP (SRR) STANDARD SHEET FOR RIPRAP ATTACHMENT DETAILS.
SEE C221 & SSTR RAIL DETAILS FOR RAIL ANCHORAGE IN WINGWALLS.
FOUNDATION LOAD IS 65 TONS/SHAFT

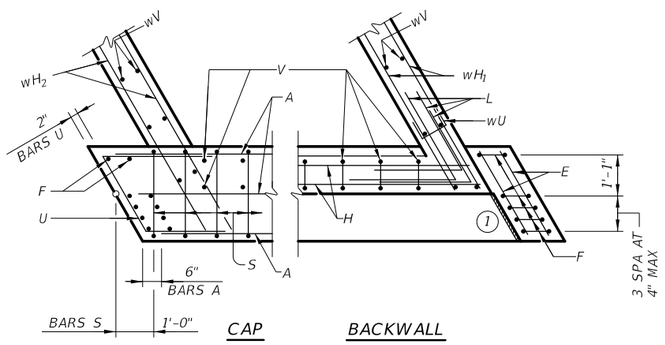
MATERIAL NOTES:

PROVIDE CLASS C CONCRETE (F'C = 3,600 PSI).
PROVIDE GRADE 60 REINFORCING STEEL.

(1) ½" PREFORMED BITUMINOUS FIBER MATERIAL BETWEEN SLAB BEAM AND EARWALL. BOND TO EARWALL WITH AN APPROVED ADHESIVE. CAST INSIDE FACE OF EARWALL PERPENDICULAR TO CAP. (TYP)

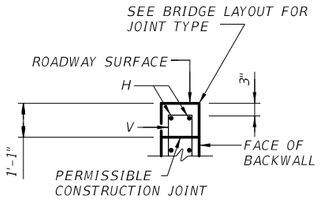
(2) QUANTITIES SHOWN ARE FOR ONE ABUTMENT ONLY.

HL93 LOADING



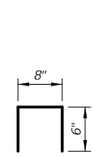
CAP BACKWALL

CORNER DETAILS

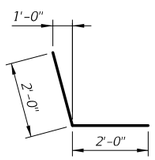


BACKWALL DETAIL

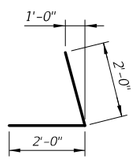
(WITHOUT APPROACH SLAB)
NOTE: AT CONTRACTOR'S OPTION, BACKWALL MAY BE CAST IN ONE LIFT TO ROADWAY SURFACE.



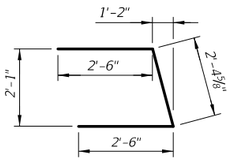
BARS wU



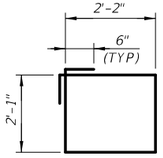
BARS L_2



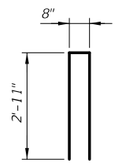
BARS L_1



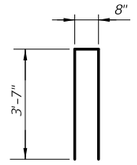
BARS U



BARS S



BARS F



BARS V

COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE.

REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.

STATE OF TEXAS
RYAN W. FRITZ
112568
LICENSED
PROFESSIONAL ENGINEER
12/07/2022

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL RD,
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

Texas Department of Transportation
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DOOLITTLE ROAD
ABUTMENT DETAILS

SCALE = None

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
RWF	6	SEE TITLE SHEET	TEEGE,ETC
DRAWN MLL	STATE	DISTRICT	COUNTY / SHEET NO.
CHECK SPC	TEXAS	PHARR	CAMERON,ETC / 86
CHECK SPC	CONTROL 0921	SECTION 06	JOB 302,ETC

DATE: 12/7/2022
TIME: 10:02:59 AM
USER: rwfritz
FILE NAME: ..\Bridge\DOORD-BMCD-SUB03.dgn
PENTABLE: CSJ 0921-02-331 (Charles Green Rd).tbl
SCALE: 1:8
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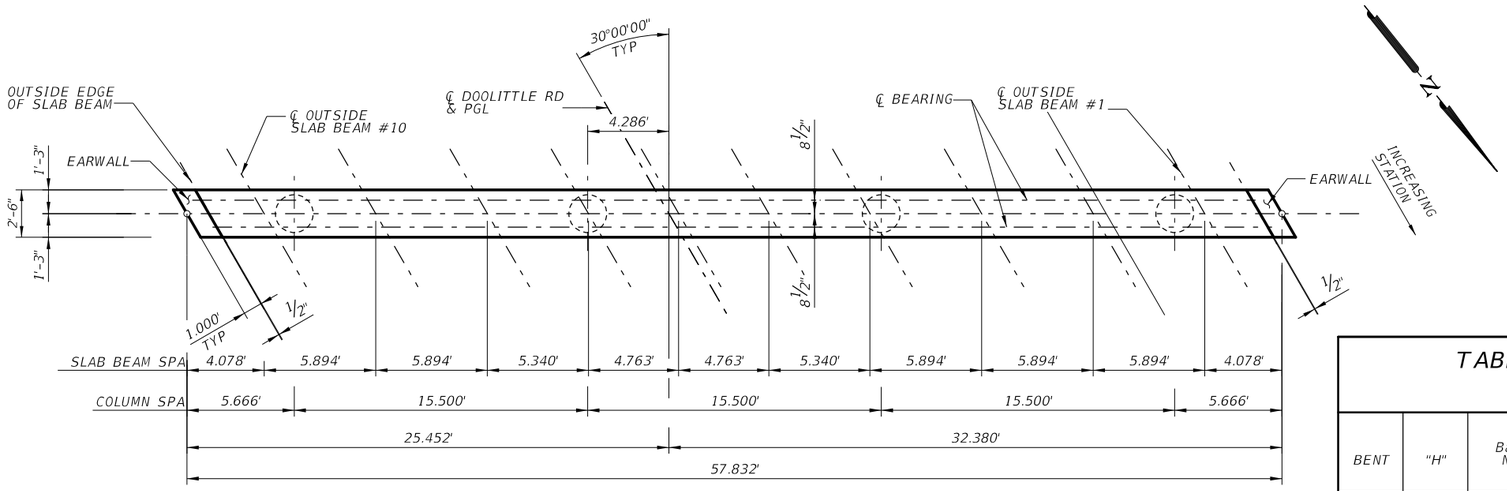
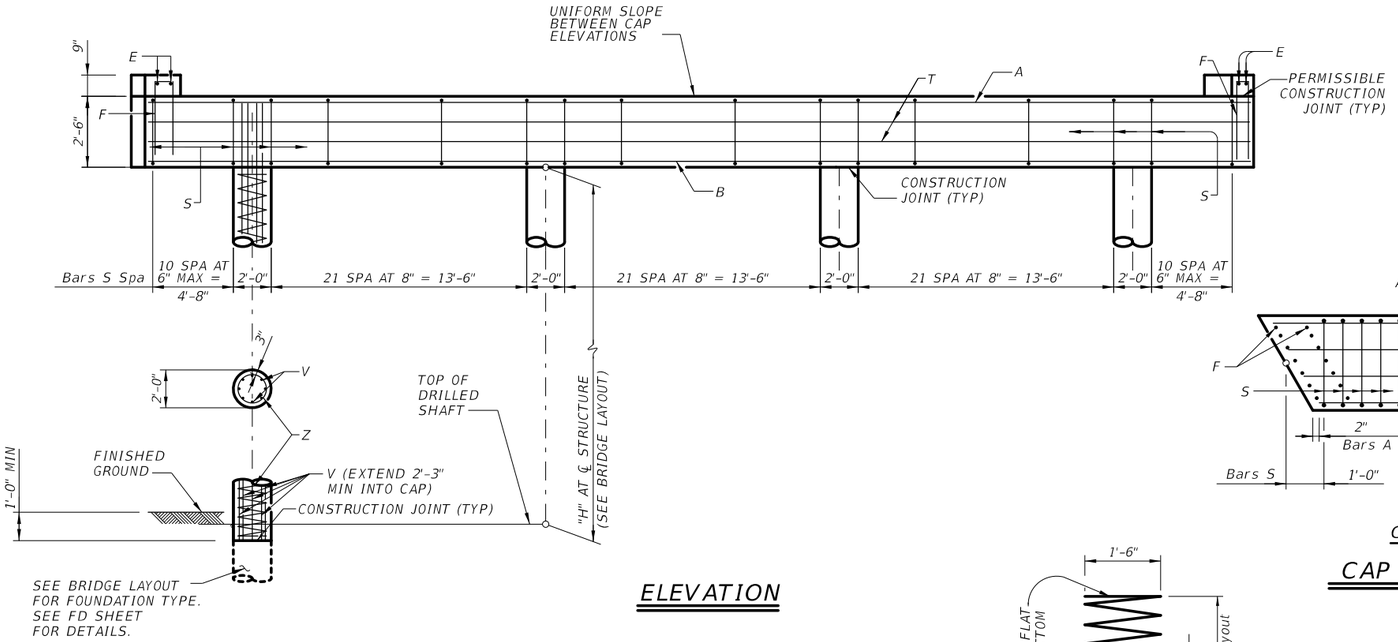
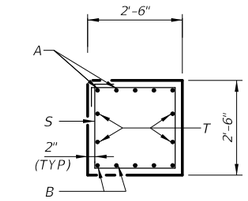


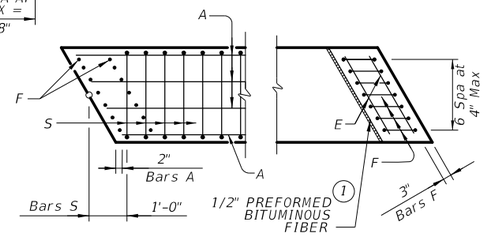
PLAN



ELEVATION

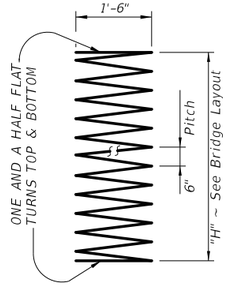


SECTION A-A

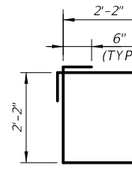


CAP EARWALL

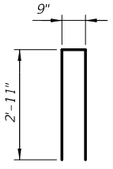
CAP END DETAIL



BARS Z



BARS S



BARS F

1 1/2" PREFORMED BITUMINOUS FIBER MATERIAL BETWEEN SLAB BEAM AND EARWALL. BOND TO EARWALL WITH AN APPROVED ADHESIVE. CAST INSIDE FACE OF EARWALL PERPENDICULAR TO CAP. (TYP)

2 QUANTITIES SHOWN ARE BASED ON AN "H" VALUE SHOWN. FOR EACH LINEAR FOOT VARIATION IN "H" VALUE, MAKE THE FOLLOWING ADJUSTMENTS:
BARS V LENGTH, 1'-0"
BARS Z LENGTH, 9'-6"
REINFORCING STEEL, 80 LBS
CLASS "C" CONC (COL), 0.47 CY

TABLE OF ESTIMATED QUANTITIES (2)

BENT	"H"	Bars V #7 No. = 32		Bars Z #3 No. = 4		Rein Steel	Cl "C" Conc (Col)
No.	Height	Length	Weight	Length	Weight	Lb	CY
2	14	16'-3"	1,063	147'-2"	221	1,284	6.5
3	13	15'-3"	997	137'-8"	207	1,204	6.1

TABLE OF ESTIMATED QUANTITIES

Bar	No.	Size	Length	Weight
A	5	#11	57'-6"	1,527
B	5	#11	57'-6"	1,527
E	4	#4	2'-6"	7
F	14	#5	6'-7"	96
S	88	#5	9'-8"	887
T	4	#5	57'-6"	240
Reinforcing Steel			Lb	4,284
Cl "C" Conc (Cap)			CY	13.5

Total	Reinforcing Steel	Lb	11,056
Total	Class "C" Concrete	CY	39.6

GENERAL NOTES:

DESIGNED ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.
SEE BRIDGE LAYOUT FOR FOUNDATION TYPE, SIZE, AND LENGTH.
SEE COMMON FOUNDATION DETAILS (FD) STANDARD SHEET FOR ALL FOUNDATION DETAILS AND NOTES.
FOUNDATION LOAD IS 115 TONS/SHAFT

MATERIAL NOTES:

PROVIDE CLASS "C" CONC (F'C = 3,600 PSI).
PROVIDE GRADE 60 REINFORCING STEEL.

HL93 LOADING

COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE. REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.

STATE OF TEXAS
RYAN W. FRITZ
112568
LICENSED
PROFESSIONAL ENGINEER
12/07/2022

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL RD, SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

DOOLITTLE ROAD

BENT #2 AND #3

SCALE = None

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
RWF	6	SEE TITLE SHEET	TEEGE,ETC
DRAWN MLL	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK SPC	TEXAS	PHARR	CAMERON,ETC	87
CHECK SPC	CONTROL	SECTION	JOB	
	0921	06	302,ETC	

DATE: 12/7/2022
TIME: 10:03:07 AM
USER: rwfritz
FILE NAME: ..\Bridge\DOORD-BMCD-SUB04.dgn
PENTABLE: CSJ 0921-02-331 (Charles Green Rd).tbl
SCALE: 1:8
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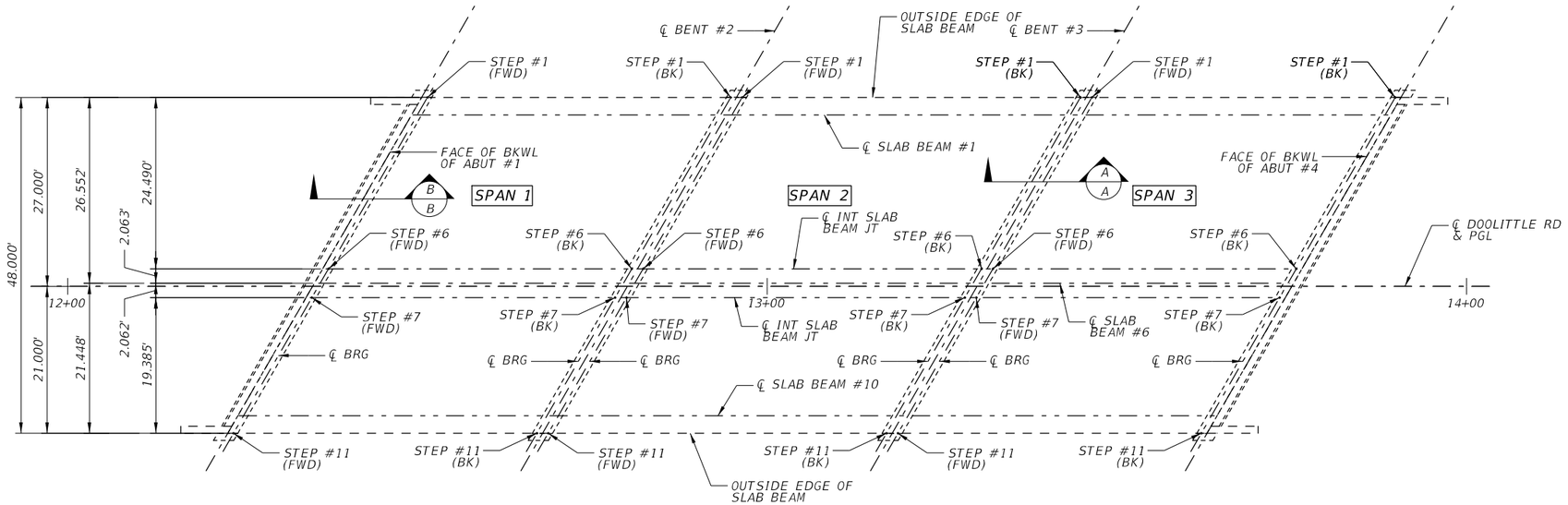
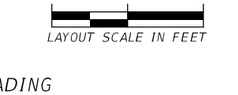
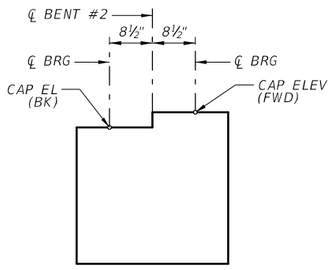


PLAN OF STEP LOCATIONS

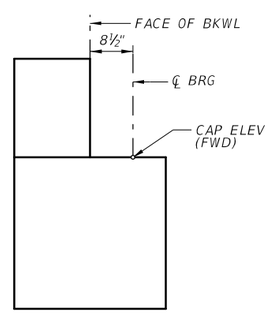


HL93 LOADING

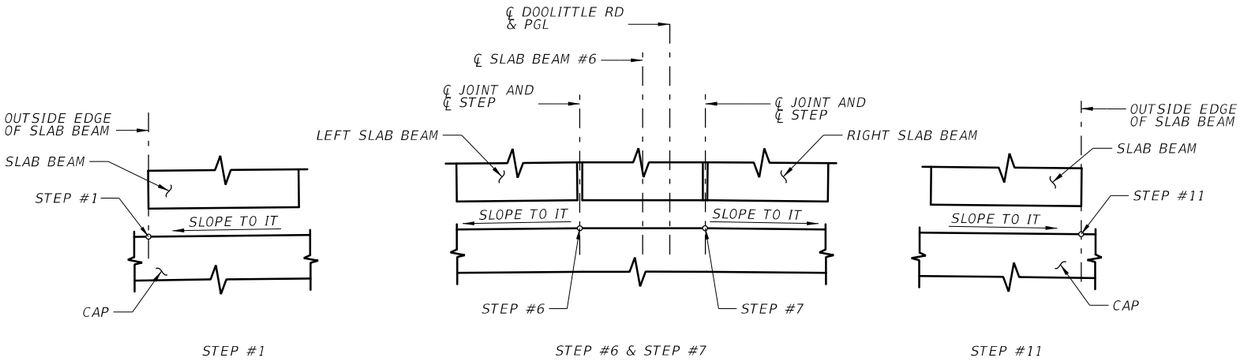
CAP ELEVATIONS						
	STEP #1	STEP #6		STEP #7		STEP #11
	(RT. SIDE)	(LT. SIDE)	(RT. SIDE)	(LT. SIDE)	(RT. SIDE)	(LT. SIDE)
ABUT #1 (FWD)	83.840	84.142	84.127	84.109	84.056	83.484
BENT #2 (BK)	84.453	84.754	84.865	84.847	84.862	84.290
BENT #2 (FWD)	84.313	84.878	84.854	84.877	84.764	84.365
BENT #3 (BK)	84.056	84.621	84.764	84.786	84.810	84.412
BENT #3 (FWD)	83.998	84.743	84.734	84.791	84.731	84.513
ABUT #4 (BK)	83.145	83.890	83.918	83.976	83.985	83.767



SECTION A-A

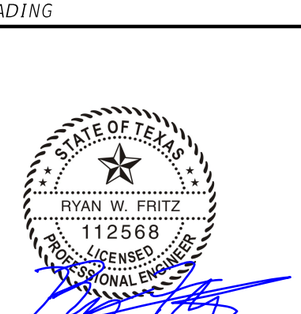


SECTION B-B



STEP #1 | STEP #6 & STEP #7 | STEP #11

COMMON TRANSVERSE SECTIONS AT STEP LOCATIONS



12/07/2022

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL RD, SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

Texas Department of Transportation
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DOOLITTLE ROAD
CAP ELEVATION DETAILS

SCALE = None

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
RWF	6	SEE TITLE SHEET	TEEGE,ETC
DRAWN MLL	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK SPC	TEXAS	PHARR	CAMERON,ETC	88
CHECK SPC	CONTROL 0921	SECTION 06	JOB 302,ETC	

DATE: 12/7/2022
TIME: 10:03:14 AM
USER: rwfritz
FILE NAME: ...\Bridge\DOORD_BMCD_MISC02.dgn
PENTABLE: CSJ 0921-02-331 (Charles Green Rd).tbl
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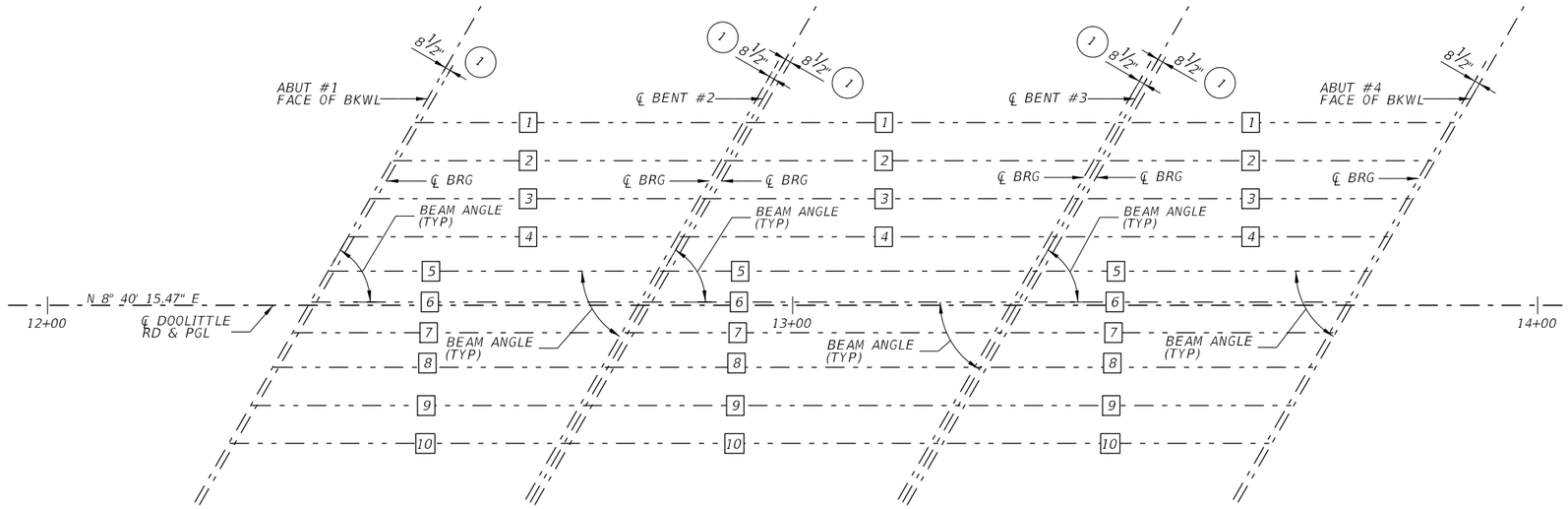
PLOT DRIVER: TXDOT_PDF_BWINO RASTERS).plt



SPAN 1
(4SB15 AND 5SB15)

SPAN 2
(4SB15 AND 5SB15)

SPAN 3
(4SB15 AND 5SB15)

FRAMING PLAN

1. SEE SLAB BEAM ELASTOMERIC BEARING DETAILS (PSBEB) STANDARD SHEET FOR ORIENTATION OF DIMENSION.
2. BEAM LENGTHS SHOWN ARE BOTTOM BEAM LENGTHS WITH ADJUSTMENTS MADE FOR BEAM SLOPE.

N

0 10 20
LAYOUT SCALE IN FEET

HL93 LOADING

BENT REPORT
ABUT NO. 1 (S 51 19 44.54 E)

DISTANCE BETWEEN STATION LINE AND STEP LINE 1, 31.1769L

BOX	STEP SPAC. (CL BENT)	BEAM ANGLE D M S
SPAN 1		
STEP 1	0.0000	60 0 0.00
STEP 2	5.8217	60 0 0.00
STEP 3	5.8937	60 0 0.00
STEP 4	5.8938	60 0 0.00
STEP 5	5.9058	60 0 0.00
STEP 6	4.7631	60 0 0.00
STEP 7	4.7631	60 0 0.00
STEP 8	4.7631	60 0 0.00
STEP 9	5.9058	60 0 0.00
STEP 10	5.8937	60 0 0.00
STEP 11	5.8217	60 0 0.00
TOTAL	55.4257	60 0 0.00

BENT REPORT
BENT NO. 2 (S 51 19 44.54 E)

DISTANCE BETWEEN STATION LINE AND STEP LINE 1, 31.1769L

BOX	STEP SPAC. (CL BENT)	BEAM ANGLE D M S
SPAN 1		
STEP 1	0.0000	60 0 0.00
STEP 2	5.8217	60 0 0.00
STEP 3	5.8937	60 0 0.00
STEP 4	5.8938	60 0 0.00
STEP 5	5.9058	60 0 0.00
STEP 6	4.7631	60 0 0.00
STEP 7	4.7631	60 0 0.00
STEP 8	4.7631	60 0 0.00
STEP 9	5.9058	60 0 0.00
STEP 10	5.8937	60 0 0.00
STEP 11	5.8217	60 0 0.00
TOTAL	55.4257	60 0 0.00

BENT REPORT
BENT NO. 2 (S 51 19 44.54 E)

DISTANCE BETWEEN STATION LINE AND STEP LINE 1, 31.1769L

BOX	STEP SPAC. (CL BENT)	BEAM ANGLE D M S
SPAN 1		
STEP 1	0.0000	60 0 0.00
STEP 2	5.8217	60 0 0.00
STEP 3	5.8937	60 0 0.00
STEP 4	5.8938	60 0 0.00
STEP 5	5.9058	60 0 0.00
STEP 6	4.7631	60 0 0.00
STEP 7	4.7631	60 0 0.00
STEP 8	4.7631	60 0 0.00
STEP 9	5.9058	60 0 0.00
STEP 10	5.8937	60 0 0.00
STEP 11	5.8217	60 0 0.00
TOTAL	55.4257	60 0 0.00

BENT REPORT
BENT NO. 3 (S 51 19 44.54 E)

DISTANCE BETWEEN STATION LINE AND STEP LINE 1, 31.1769L

BOX	STEP SPAC. (CL BENT)	BEAM ANGLE D M S
SPAN 1		
STEP 1	0.0000	60 0 0.00
STEP 2	5.8217	60 0 0.00
STEP 3	5.8937	60 0 0.00
STEP 4	5.8938	60 0 0.00
STEP 5	5.9058	60 0 0.00
STEP 6	4.7631	60 0 0.00
STEP 7	4.7631	60 0 0.00
STEP 8	4.7631	60 0 0.00
STEP 9	5.9058	60 0 0.00
STEP 10	5.8937	60 0 0.00
STEP 11	5.8217	60 0 0.00
TOTAL	55.4257	60 0 0.00

BENT REPORT
BENT NO. 3 (S 51 19 44.54 E)

DISTANCE BETWEEN STATION LINE AND STEP LINE 1, 31.1769L

BOX	STEP SPAC. (CL BENT)	BEAM ANGLE D M S
SPAN 1		
STEP 1	0.0000	60 0 0.00
STEP 2	5.8217	60 0 0.00
STEP 3	5.8937	60 0 0.00
STEP 4	5.8938	60 0 0.00
STEP 5	5.9058	60 0 0.00
STEP 6	4.7631	60 0 0.00
STEP 7	4.7631	60 0 0.00
STEP 8	4.7631	60 0 0.00
STEP 9	5.9058	60 0 0.00
STEP 10	5.8937	60 0 0.00
STEP 11	5.8217	60 0 0.00
TOTAL	55.4257	60 0 0.00

BENT REPORT
ABUT NO. 4 (S 51 19 44.54 E)

DISTANCE BETWEEN STATION LINE AND STEP LINE 1, 31.1769L

BOX	STEP SPAC. (CL BENT)	BEAM ANGLE D M S
SPAN 1		
STEP 1	0.0000	60 0 0.00
STEP 2	5.8217	60 0 0.00
STEP 3	5.8937	60 0 0.00
STEP 4	5.8938	60 0 0.00
STEP 5	5.9058	60 0 0.00
STEP 6	4.7631	60 0 0.00
STEP 7	4.7631	60 0 0.00
STEP 8	4.7631	60 0 0.00
STEP 9	5.9058	60 0 0.00
STEP 10	5.8937	60 0 0.00
STEP 11	5.8217	60 0 0.00
TOTAL	55.4257	60 0 0.00

BEAM REPORT AT CENTER OF BOX SPAN 1

	HORIZONTAL C-C BENT	DISTANCE C-C BRG.	TRUE DISTANCE BOT. BM. FLG.	BEAM SLOPE
Beam 1	45.0000	43.3642	44.4658	0.01412
Beam 2	45.0000	43.3642	44.4658	0.01412
Beam 3	45.0000	43.3642	44.4658	0.01412
Beam 4	45.0000	43.3642	44.4658	0.01412
Beam 5	45.0000	43.3642	44.4658	0.01412
Beam 6	45.0000	43.3642	44.4678	0.01702
Beam 7	45.0000	43.3642	44.4690	0.01858
Beam 8	45.0000	43.3642	44.4690	0.01858
Beam 9	45.0000	43.3642	44.4690	0.01858
Beam 10	45.0000	43.3642	44.4690	0.01858

BEAM REPORT AT CENTER OF BOX SPAN 2

	HORIZONTAL C-C BENT	DISTANCE C-C BRG.	TRUE DISTANCE BOT. BM. FLG.	BEAM SLOPE
Beam 1	50.0000	48.3642	49.5007	-0.00531
Beam 2	50.0000	48.3642	49.5007	-0.00531
Beam 3	50.0000	48.3642	49.5007	-0.00531
Beam 4	50.0000	48.3642	49.5007	-0.00531
Beam 5	50.0000	48.3642	49.5007	-0.00531
Beam 6	50.0000	48.3642	49.5001	-0.00186
Beam 7	50.0000	48.3642	49.5000	0.00097
Beam 8	50.0000	48.3642	49.5000	0.00097
Beam 9	50.0000	48.3642	49.5000	0.00097
Beam 10	50.0000	48.3642	49.5000	0.00097

BEAM REPORT AT CENTER OF BOX SPAN 2

	HORIZONTAL C-C BENT	DISTANCE C-C BRG.	TRUE DISTANCE BOT. BM. FLG.	BEAM SLOPE
Beam 1	45.0000	43.3642	44.4699	-0.01966
Beam 2	45.0000	43.3642	44.4699	-0.01966
Beam 3	45.0000	43.3642	44.4699	-0.01966
Beam 4	45.0000	43.3642	44.4699	-0.01966
Beam 5	45.0000	43.3642	44.4699	-0.01966
Beam 6	45.0000	43.3642	44.4692	-0.01881
Beam 7	45.0000	43.3642	44.4679	-0.01721
Beam 8	45.0000	43.3642	44.4679	-0.01721
Beam 9	45.0000	43.3642	44.4679	-0.01721
Beam 10	45.0000	43.3642	44.4679	-0.01721

STATE OF TEXAS
RYAN W. FRITZ
112568
LICENSED
PROFESSIONAL ENGINEER
12/07/2022

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL RD,
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

DOOLITTLE ROAD
FRAMING PLAN

SCALE = 1"=20'

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
RWF	6	SEE TITLE SHEET	TEEGE,ETC
DRAWN MLL	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK SPC	TEXAS	PHARR	CAMERON,ETC	89
CHECK SPC	CONTROL 0921	SECTION 06	JOB 302,ETC	

DATE: 12/7/2022
TIME: 10:03:22 AM
USER: rwfritz
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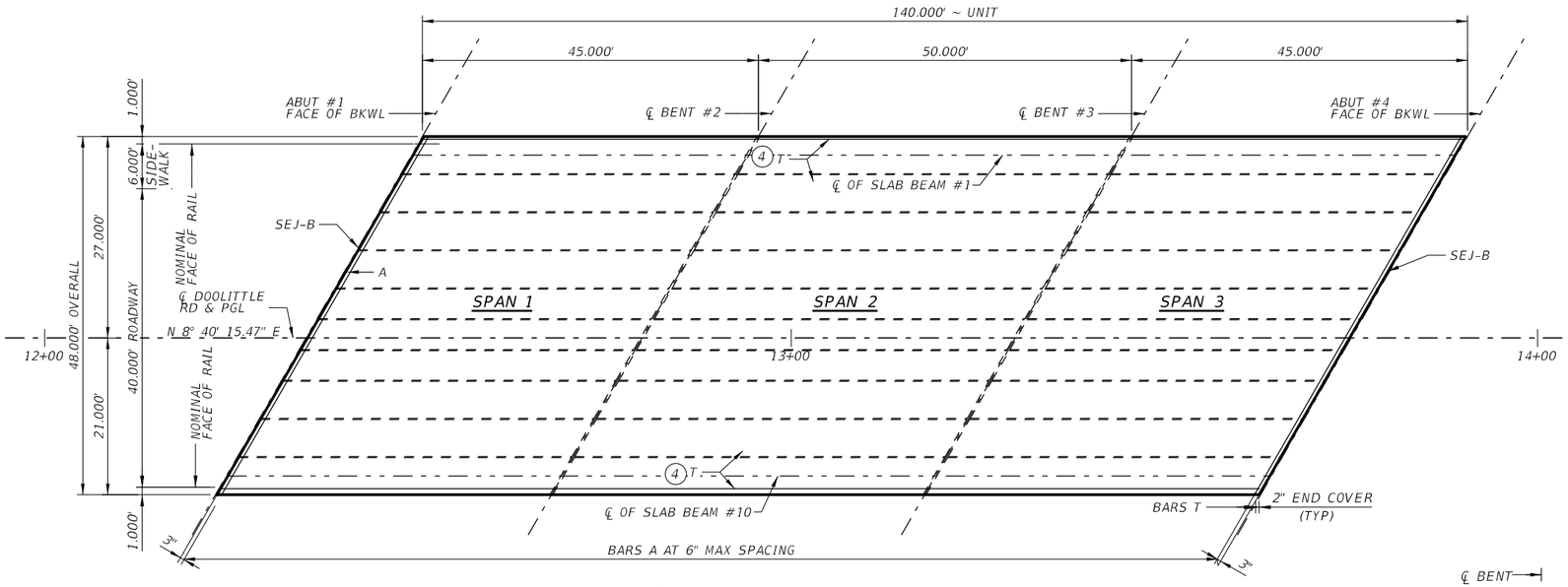
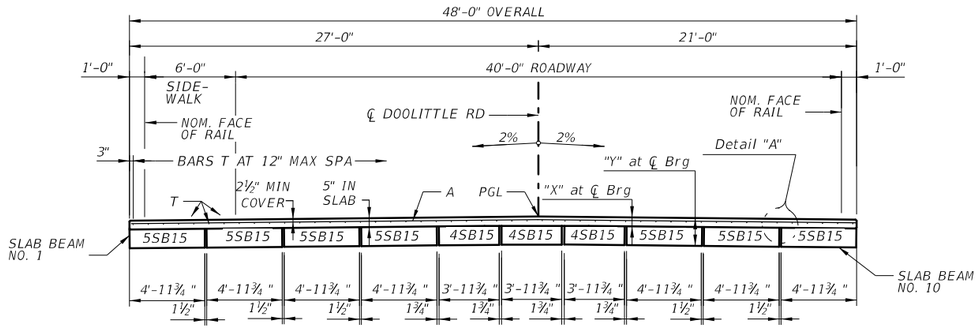


SLAB PLAN



PROPOSED TYPICAL TRANSVERSE SECTION

TABLE OF VARIABLE VALUES

SPAN	BEAM TYPE	DEAD LOAD DELFECTION		SECTION DEPTH (3)	
		"A"	"B"	"X"	"Y"
	(1)	Ft	Ft	In	Ft/In
1 & 3	ALL	0.018	0.025	6 ½"	1'-9 ½"
2	ALL	0.028	0.039	6 ½"	1'-9 ½"

TABLE OF ESTIMATED QUANTITIES

SPAN	REINF CONCRETE SLAB (SLAB BEAM)	PRESTR CONC SLAB BEAM (1)		TOTAL REINF STEEL (2)
		4SB15	5SB15	
	SF	LF	LF	Lb
1	2,160	133.40	311.27	6,048
2	2,400	148.50	346.50	6,720
3	2,160	133.41	311.28	6,048
TOTAL	6,720	415.31	969.05	18,816

(1) SEE BRIDGE LAYOUT FOR BEAM TYPE USED IN THE SUPERSTRUCTURE.

(2) REINFORCING STEEL WEIGHT IS CALCULATED USING AN APPROXIMATE FACTOR OF 2.8 LBS/SF.

(3) BASED ON THEORETICAL BEAM CAMBER, DEAD LOAD DEFLECTIONS OF 5" CAST-IN-PLACE CONCRETE SLAB AND A CONSTANT GRADE.

(4) WHERE SLAB IS CONTINUOUS OVER INTERIOR BENTS, BARS T ARE CONTINUOUS THROUGH JOINT. SEE "CONTINUOUS SLAB DETAIL".

GENERAL NOTES:

DESIGNED ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.
TWO- OR THREE-SPAN UNITS, WITH SLAB CONTINUOUS OVER INTERIOR BENTS,

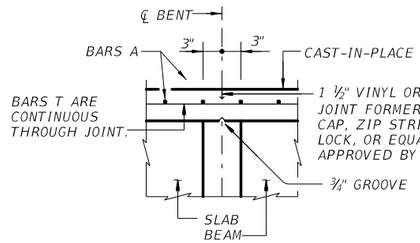
MATERIAL NOTES:

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"

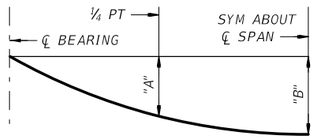
DEFORMED WELDED WIRE REINFORCEMENT (WWR) (ASTM A1064) OF EQUAL SIZE AND SPACING MAY BE SUBSTITUTED FOR BARS A OR T UNLESS NOTED OTHERWISE.

BAR TABLE

BAR	SIZE
A	#5
T	#4

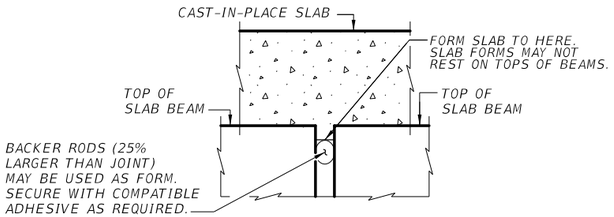


CONTINUOUS SLAB DETAIL



DEAD LOAD DEFLECTION DIAGRAM

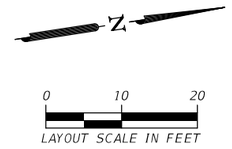
NOTE: DEFLECTIONS SHOWN ARE DUE TO CONCRETE SLAB ONLY (Ec = 5,000 KSI). CALCULATED DEFLECTIONS SHOWN ARE THEORETICAL AND ACTUAL DIMENSIONS MAY BE LESS. ADJUST BASED ON FIELD VERIFICATION.



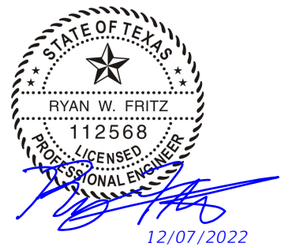
DETAIL "A"

COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE.

REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.



HL93 LOADING



12/07/2022

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL RD,
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

DOOLITTLE ROAD

SLAB PLAN

SCALE = 1"=20'

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
RWF	6	SEE TITLE SHEET	TEEGE,ETC
DRAWN	STATE	DISTRICT	COUNTY	SHEET NO.
MLL	TEXAS	PHARR	CAMERON,ETC	90
CHECK SPC	CONTROL	SECTION	JOB	
CHECK SPC	0921	06	302,ETC	

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DATE: 12/7/2022
TIME: 10:03:29 AM
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DESIGNED BEAMS (STRAIGHT STRANDS)

STRUCTURE	SPAN NO.	BEAM NO.	BEAM TYPE	PRESTRESSING STRANDS: NON-STD STRAND PATTERN	PRESTRESSING STRANDS: TOTAL NO.	PRESTRESSING STRANDS: SIZE (in)	PRESTRESSING STRANDS: STRGTH fpu (ksi)	PRESTRESSING STRANDS: "e" ℄ (in)	PRESTRESSING STRANDS: "e" END (in)	PRESTRESSING STRANDS: TOT NO. DEB	DEBONDED STRANDS PER ROW: DIST FROM BOTTOM (in)	DEBONDED STRANDS PER ROW: NO. OF STRANDS: TOTAL	DEBONDED STRANDS PER ROW: NO. OF STRANDS: DE-BONDED	DEBONDED STRANDS PER ROW: NUMBER OF STRANDS DEBONDED TO (ft from end): 3	6	9	12	15	CONCRETE: RELEASE STRGTH ① f'ci (ksi)	CONCRETE: MINIMUM 28 DAY COMP STRGTH f'c (ksi)
DOOLITTLE	1 & 3	1-4 & 8-10	5SB15	-	20	0.6	270	5.00	5.00	4	2.5	20	4	4	0	0	0	0	4.000	5.000
	1 & 3	5-7	4SB15	-	18	0.6	270	5.00	5.00	4	2.5	18	4	2	2	0	0	0	4.000	5.000
	2	1-4 & 8-10	5SB15	-	26	0.6	270	5.00	5.00	8	2.5	26	8	2	4	2	0	0	4.000	5.000
	2	5-7	4SB15	-	18	0.6	270	5.00	5.00	4	2.5	18	4	2	2	0	0	0	4.000	5.000

OPTIONAL DESIGN

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 Moment	LIVE LOAD DISTRIBUTION FACTOR ② Shear
2.271	-2.708	1,096	0.436	0.436
2.198	-2.549	838	0.373	0.373
2.765	-3.292	1,323	0.435	0.435
2.672	-3.091	1,008	0.372	0.372

LOAD RATING FACTORS

STRENGTH I Inv	STRENGTH I Opr	SERVICE III Inv
1.27	1.65	1.02

NON-STANDARD STRAND PATTERNS

PATTERN	STRAND ARRANGEMENT AT ℄ OF BEAM

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.

Prestress losses for the designed beams 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.

Use low relaxation strands, each pretensioned to 75 percent of fpu.

Full-length debonded strands are not permitted in positions "A" and "B".

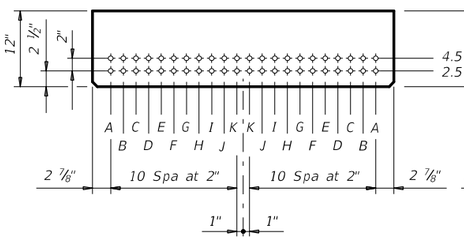
Strand debonding must comply with Item 424.4.2.2.2.4.

When shown on this sheet, the Fabricator has the option of furnishing either the designed beam or an approved optional beam design. All optional design submittals and shop drawings must be signed, sealed and dated by a Professional Engineer registered in the State of Texas.

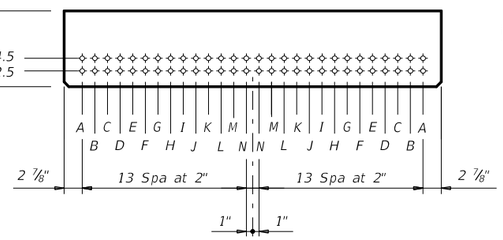
Locate strands for the designed beam as low as possible on the 2" grid system unless a non-standard strand pattern is indicated. Fill row "2.5", then row "4.5". Place strands within a row as follows:

1) Locate a strand in each "A" position.
2) Place strand symmetrically about vertical centerline of beam.
3) Space strands as equally as possible across the entire width.

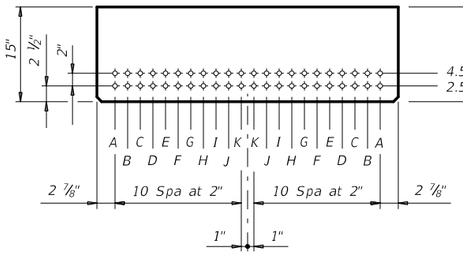
Do not debond strands in position "A". Distribute debonded strands symmetrically about the vertical centerline. Increase debonded lengths working outward, with debonding staggered in each row.



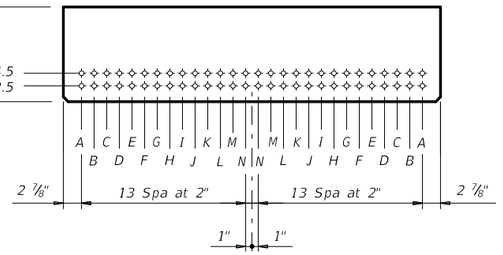
TxDOT 4SB12 SLAB BEAM



TxDOT 5SB12 SLAB BEAM



TxDOT 4SB15 SLAB BEAM



TxDOT 5SB15 SLAB BEAM

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

PRESTRESSED CONCRETE SLAB BEAM DESIGNS (NON-STANDARD SPANS)

PSBND

STATE OF TEXAS
RYAN W. FRITZ
112568
LICENSED
PROFESSIONAL ENGINEER

12/07/2022

FILE: psbsts05-22.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS 3-22: Added Load Rating.	0921	06	302,ETC	TEEGE,ETC
	DIST	COUNTY		SHEET NO.
	PHARR	CAMERON,ETC		91

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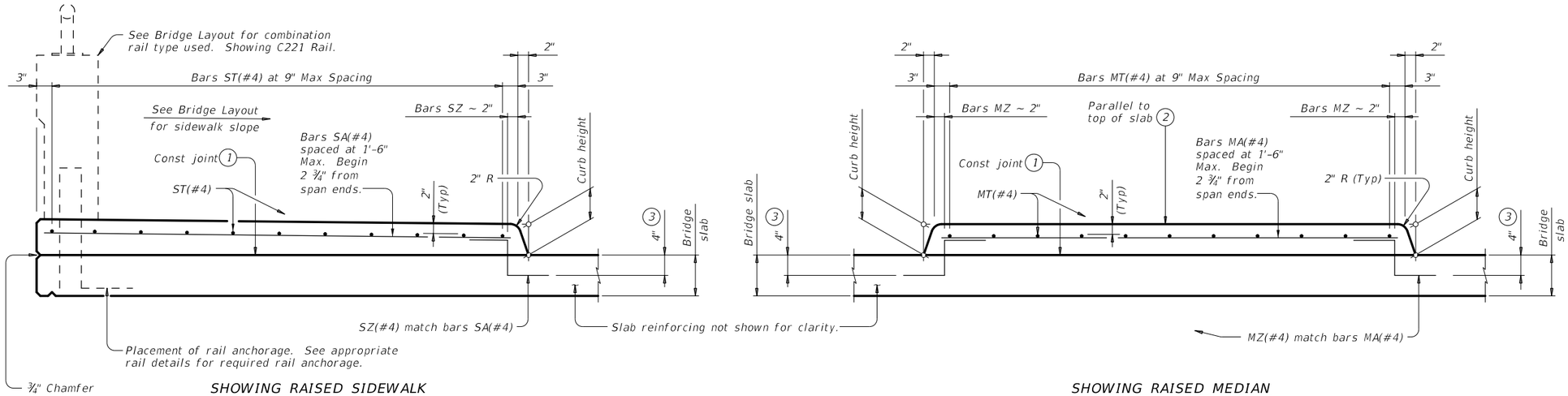


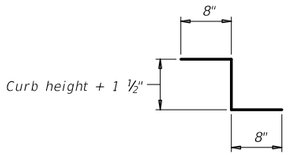
TYPICAL TRANSVERSE SECTIONS

See Span Details for dimensions not shown.

(1) Provide broom finish to top of bridge slab where raised sidewalk or raised median area is defined.

(2) Unless noted otherwise on the span details.

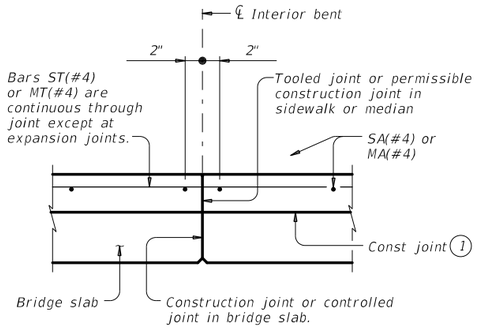
(3) Bars may rest on top of PCPs.



BARS SZ(#4) AND MZ(#4)

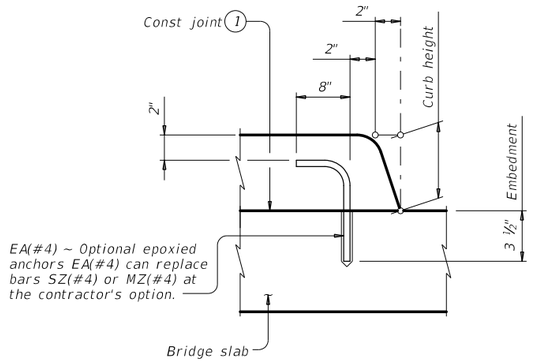
APPROVED SLIP RESISTANT PLATE	
Product	Manufacturer Website
Algrip™, Steel	www.algrip.com
Mebac® #3, Steel	www.harscoikg.com
SlipNOT® Grade 2, Steel	www.slipnot.com

Provide drain cover plates fabricated with a product from this list. No exceptions are permitted.



LONGITUDINAL SECTION AT INTERIOR BENT

At bents with expansion joints, provide an open joint in the sidewalk/median matching the deck's joint width.



OPTIONAL EPOXY ANCHORS

Embed EA(#4) bar into concrete with a Type III (Class C, D, E, or F) epoxy meeting the requirements of DMS-6100, "Epoxies and Adhesives". Follow manufacturer's directions for installing the epoxied anchor bars.

MATERIAL NOTES:

Provide the same concrete required for the bridge deck, Class S or Class S (HPC) concrete.

Provide Grade 60 reinforcing steel. Deformed welded wire reinforcement (WWR) meeting ASTM A1064 of equivalent size and spacing may be substituted for bars SA, ST, MA, and MT.

Provide epoxy coat or galvanize reinforcement if bridge deck reinforcement is required to be epoxy coated or galvanized.

Provide hot-dip galvanize slip resistant steel plate after fabrication in accordance with Item 445, "Galvanizing". Chamfer or round edges approximately 1/16" prior to galvanizing.

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

Provide the following bar or wire lap lengths when required:
- Uncoated, 1'-7" Min
- Coated, 2'-5" Min

Submittal and approval of drain cover plate shop drawings is not required if fabrication is accordance with these details.

Raised sidewalks will be paid under Item 422 by the SF of Bridge Sidewalk or Bridge Sidewalk (HPC). Raised medians will be paid under Item 422 by the SF of Bridge Median or Bridge Median (HPC).

Payment for drain cover plates will be by the pound of "Structural Steel (Misc Non-Bridge)" as per Item 442, "Metal for Structures". Weight of one drain cover plate is 48 plf.

DESIGNER NOTES:

These details do not apply for longitudinal grades exceeding 5 percent.

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

BRIDGE RAISED SIDEWALK AND MEDIAN DETAILS

BRSM

FILE: brsmste1-19.dgn	DN: JMH	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	302,ETC	TEEGE,ETC
	DIST	COUNTY		SHEET NO.
	PHARR	CAMERON,ETC		92

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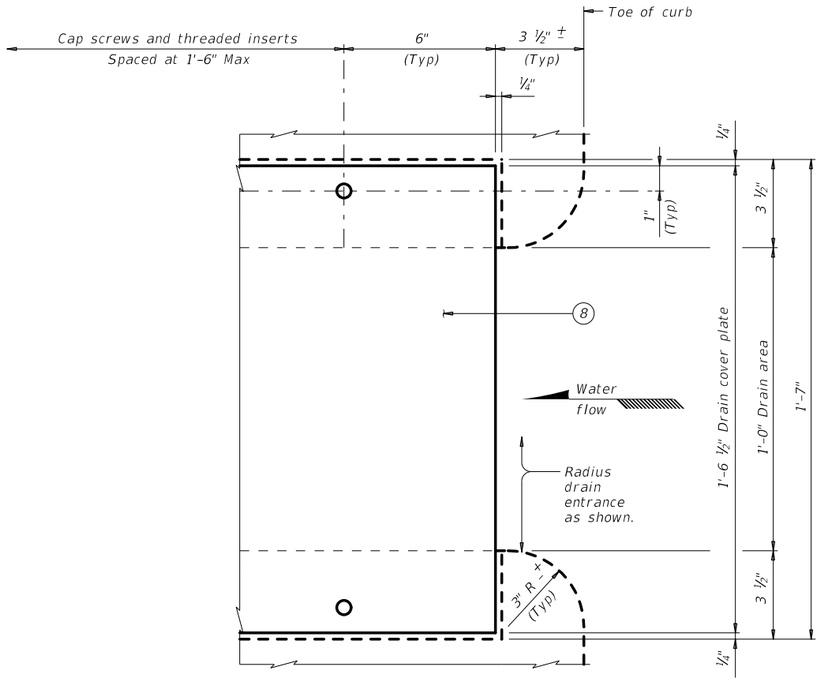
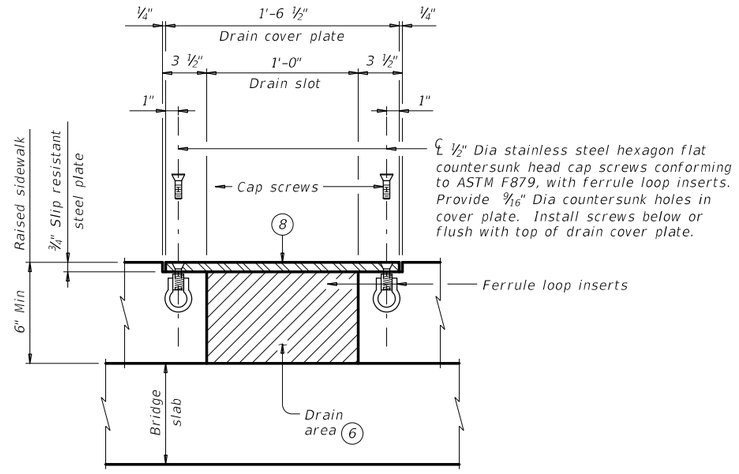
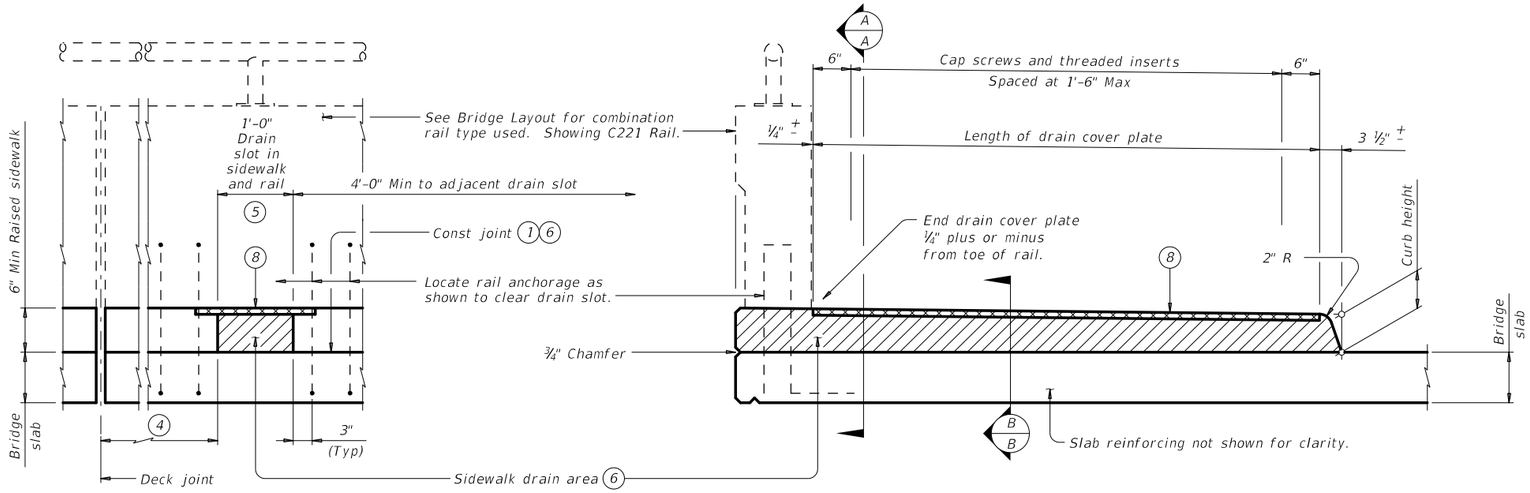


PARTIAL PLAN CURB DRAIN



SECTION B-B

Reinforcing not shown for clarity.



SECTION A-A

SHOWING RAISED SIDEWALK WITH DRAIN SLOT

OPTIONAL DRAIN DETAILS (7)

(1) Provide broom finish to top of bridge slab where raised sidewalk or raised median area is defined.

(4) 3'-0" Min at deck expansion joints, deck construction joints or controlled joints, rail intermediate wall joints or from face of substructure.

(5) For rail Type C1W, center drain slots between posts.

(6) Steel trowel top surface of bridge deck in drain locations.

(7) Provide sidewalk drains where shown elsewhere on the plans or as directed by the Engineer. Do not place drains over railroad tracks, lower roadways, or sidewalks. Place drain and cover plate perpendicular to toe of rail.

(8) Drain cover plate (PL ¾ x 18 ½ slip resistant steel plate). Install flush with top of sidewalk.

Texas Department of Transportation

Bridge Division Standard

BRIDGE RAISED SIDEWALK AND MEDIAN DETAILS

BRSM

FILE: brsmste1-19.dgn	DN: JMH	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	302,ETC	TEEGE,ETC
	DIST	COUNTY		SHEET NO.
	PHARR	CAMERON,ETC		93

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DATE:
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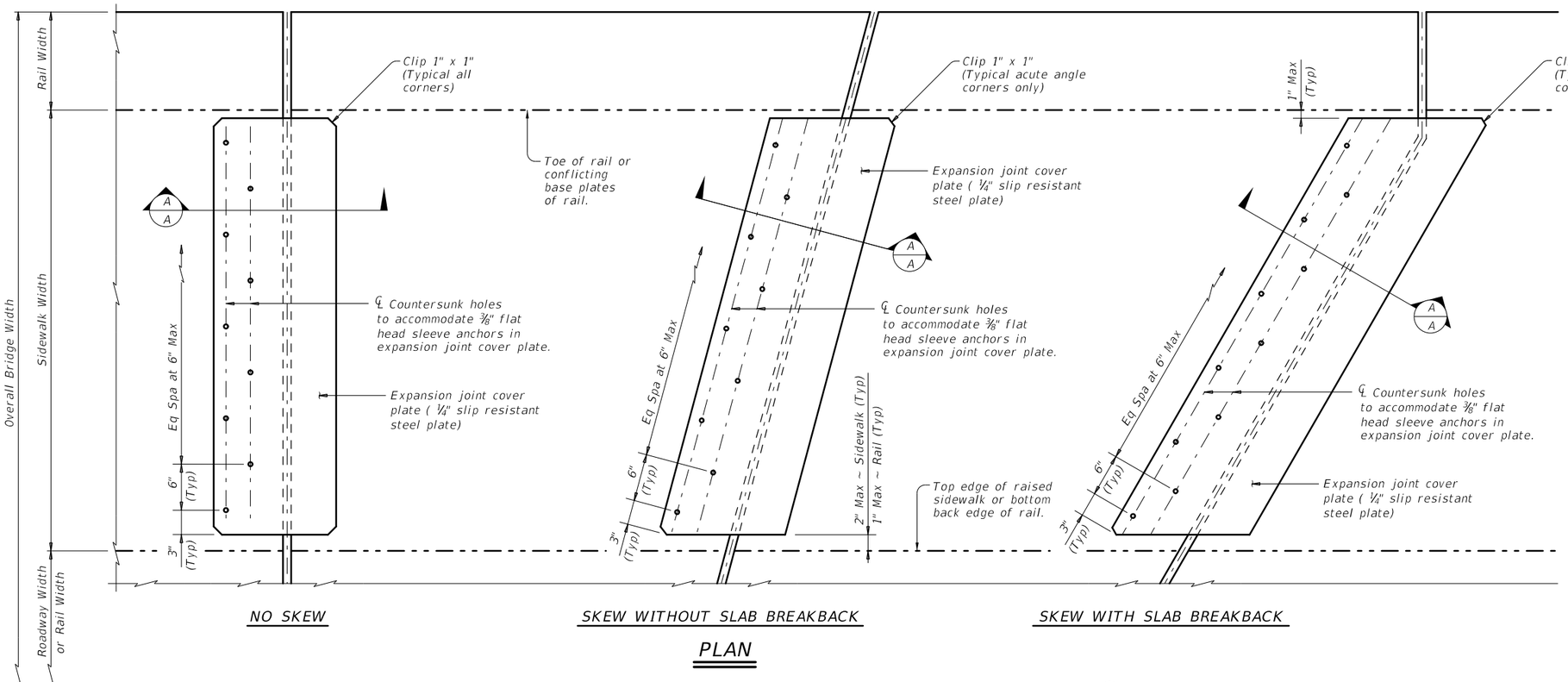
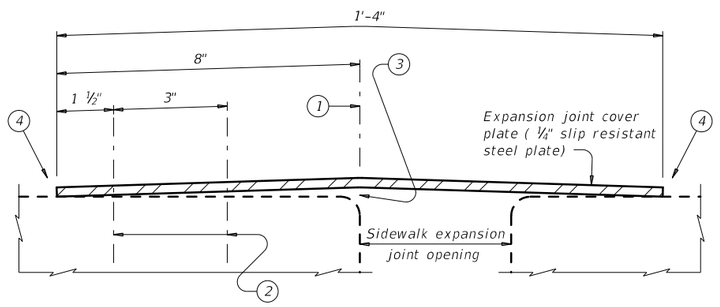
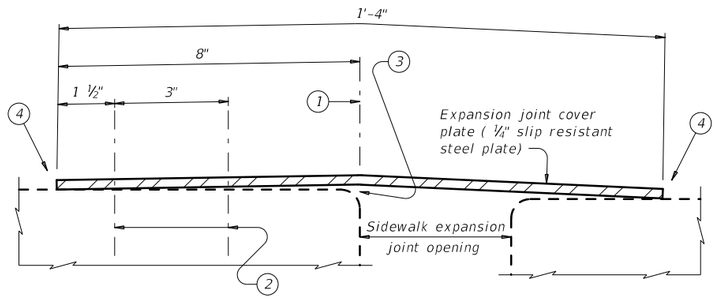


NO SKEW | SKEW WITHOUT SLAB BREAKBACK | SKEW WITH SLAB BREAKBACK

PLAN



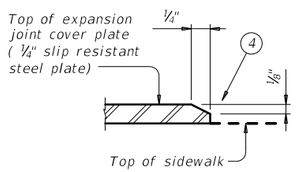
SHOWING LEVEL EXP JOINT



SHOWING UNLEVEL EXP JOINT
(Install sleeve anchors on high side of expansion joint)

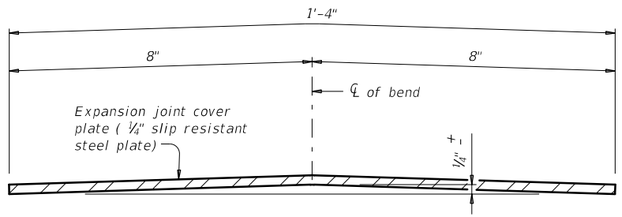
SECTION A-A

1. ℄ Expansion joint cover plate and edge of expansion joint.
2. ℄ ⅜" x 2 ½" Min, Flat Head Sleeve Anchors, Stainless Steel. Countersink Flat Head Sleeve Anchors in ¼" Slip Resistant Steel Plate.
3. It is not necessary to remove plate crown provided the plate is firmly secured to the sidewalk.
4. Transverse edges must be in contact with sidewalk surface after installation.



EXP JOINT COVER PLATE BEVEL DETAIL

Bevel all plate edges as shown.



BENDING DIAGRAM OF EXP JOINT COVER PLATE

APPROVED SLIP RESISTANT PLATE	
Product	Manufacturer Website
Algrip™, Steel	www.algrip.com
Mebac® #3, Steel	www.harscoikg.com
SlipNOT® Grade 2, Steel	www.slipnot.com

Provide cover plates fabricated with a product from this list. No exceptions are permitted.

FABRICATION NOTES:

Shop drawings for the fabrication of Bridge Sidewalk Expansion Joint Cover Plate will not require the Engineer's approval if fabrication is in accordance with the details shown on this standard.

A Bridge Sidewalk Expansion Joint Cover Plate Layout which identifies location side of sleeve anchors and orientation of all cover plate sections must be developed by the fabricator. Mark each steel section in accordance with the Bridge Sidewalk Expansion Joint Cover Plate Layout. A copy of the Bridge Sidewalk Expansion Joint Cover Plate Layout is to be provided to the Engineer.

Sidewalk expansion joint cover plates must be hot-dipped galvanized ¼" slip resistant steel plate. Checker plate or diamond plate is not allowed nor are slip resistant tapes, films and non-metallic coatings.

Minimum required yield strength of steel plate is 36 ksi.

Hot-dip galvanize slip resistant steel plate after fabrication in accordance with Item 445, "Galvanizing".

Provide stainless steel flat head sleeve anchors meeting the requirements of ASTM F 593, Group I, Alloy 304. Countersink holes in slip-resistant plate for sleeve anchors. Drill holes in sidewalk as per sleeve anchor manufacturer's recommendations. Install sleeve anchors flush with, or slightly recessed below, top surface of sidewalk expansion joint cover plate.

GENERAL NOTES:

Sidewalk expansion joint cover plates can only accommodate up to a 7" maximum expansion joint opening.

Details provided are applicable to concrete walkway surfaces only.

Payment for sidewalk expansion joint cover plates are by the pound of "Structural Steel (Misc Non-Bridge)" as per Item 442, "Metal for Structures".

Estimated weight of one sidewalk expansion joint cover plate is 14 plf.

Texas Department of Transportation

Bridge Division Standard

BRIDGE SIDEWALK EXPANSION JOINT COVER PLATE (ALL SKEWS)

BS-EJCP

FILE: bsejste1-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
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8-20: Closer tolerances on cover plate.	DIST	COUNTY		SHEET NO.
	PHARR	CAMERON,ETC		94

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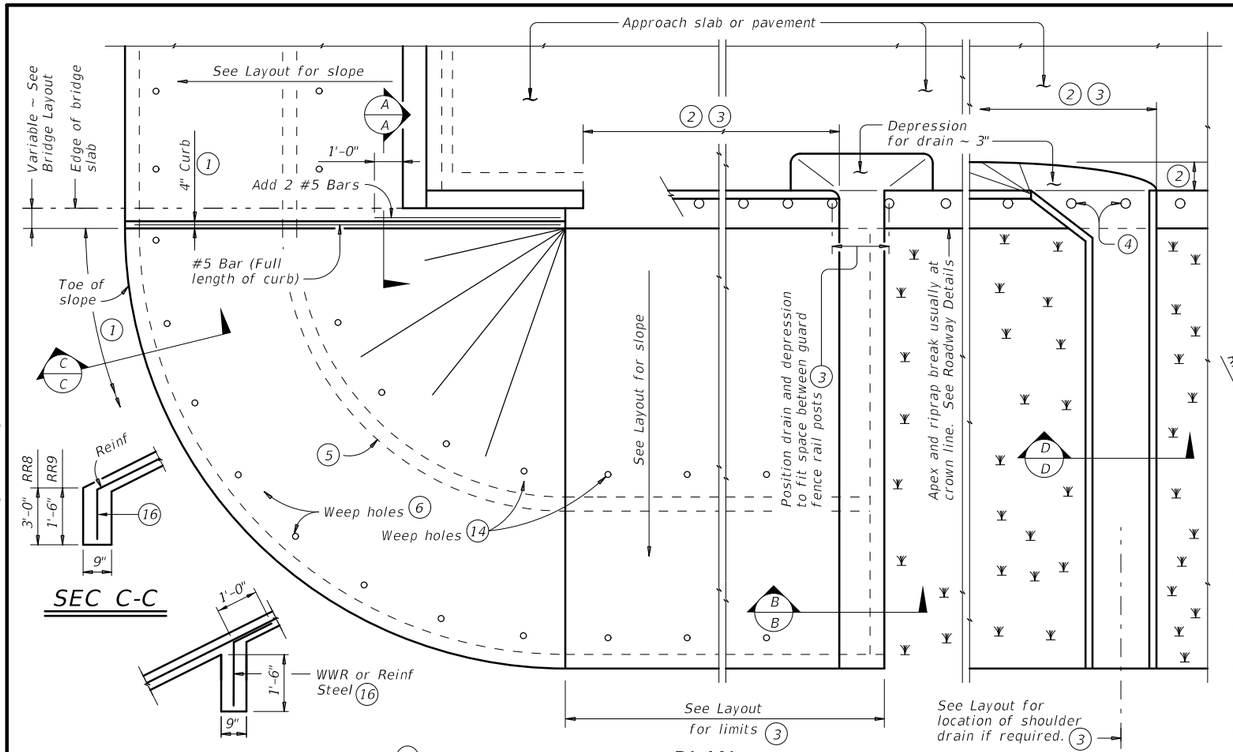
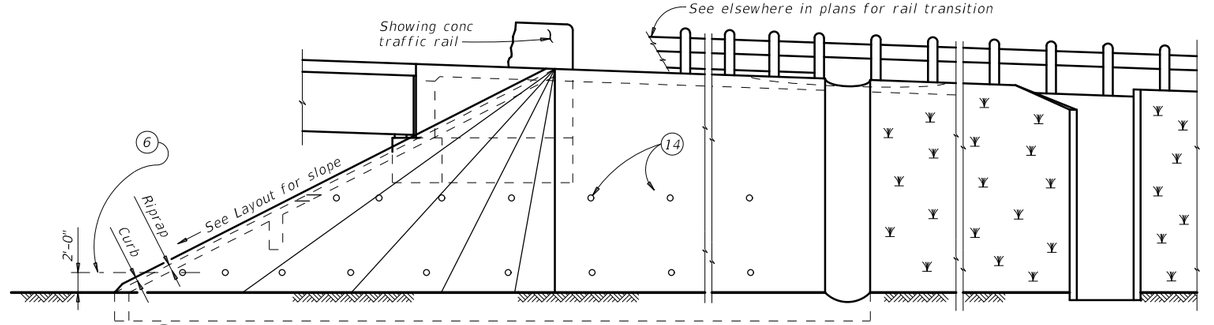


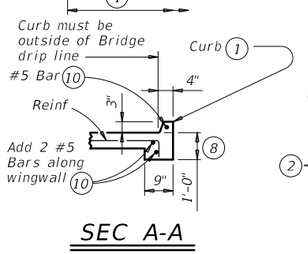
PLAN

SEC C-C

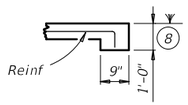
INTERMEDIATE TOEWALL (5)



ELEVATION

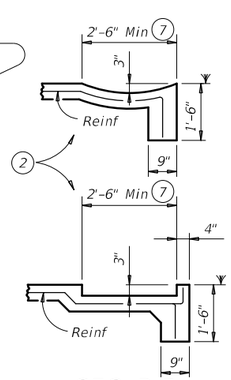


SEC A-A



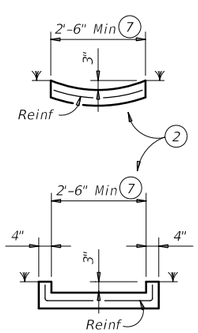
SEC B-B

(No drain)



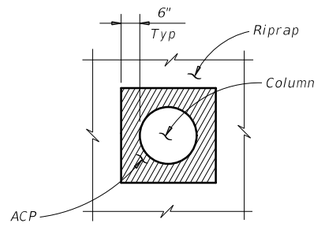
SEC B-B

(Shoulder drain integral with riprap)



SEC D-D

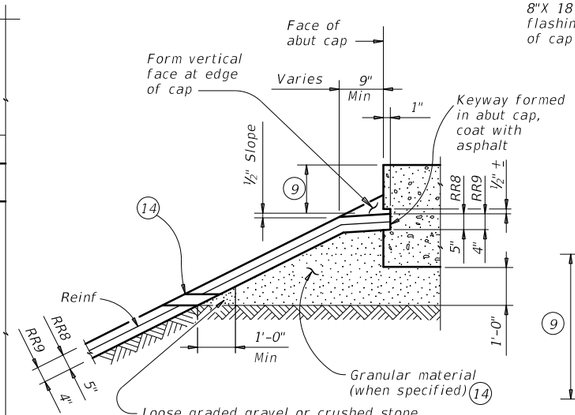
(Shoulder drain)



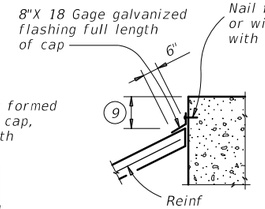
Riprap blockout to be filled with ACP. (Subsidiary to riprap)

RIPRAP DETAIL AT COLUMNS

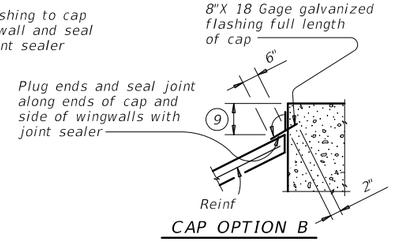
(As directed by the Engineer)



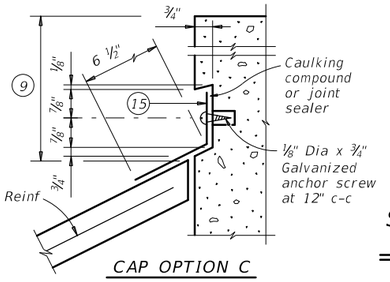
SHOWING KEYWAY OPTION



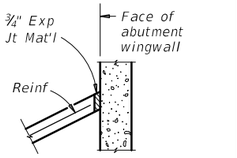
CAP OPTION A



CAP OPTION B

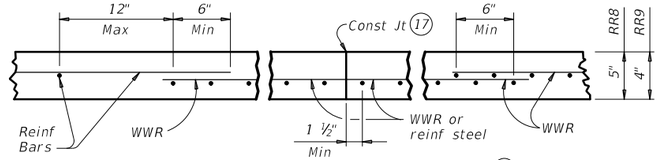


CAP OPTION C



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	0921	06	302,ETC	TEEGE,ETC
	DIST	COUNTY		SHEET NO.
	PHARR	CAMERON,ETC		95

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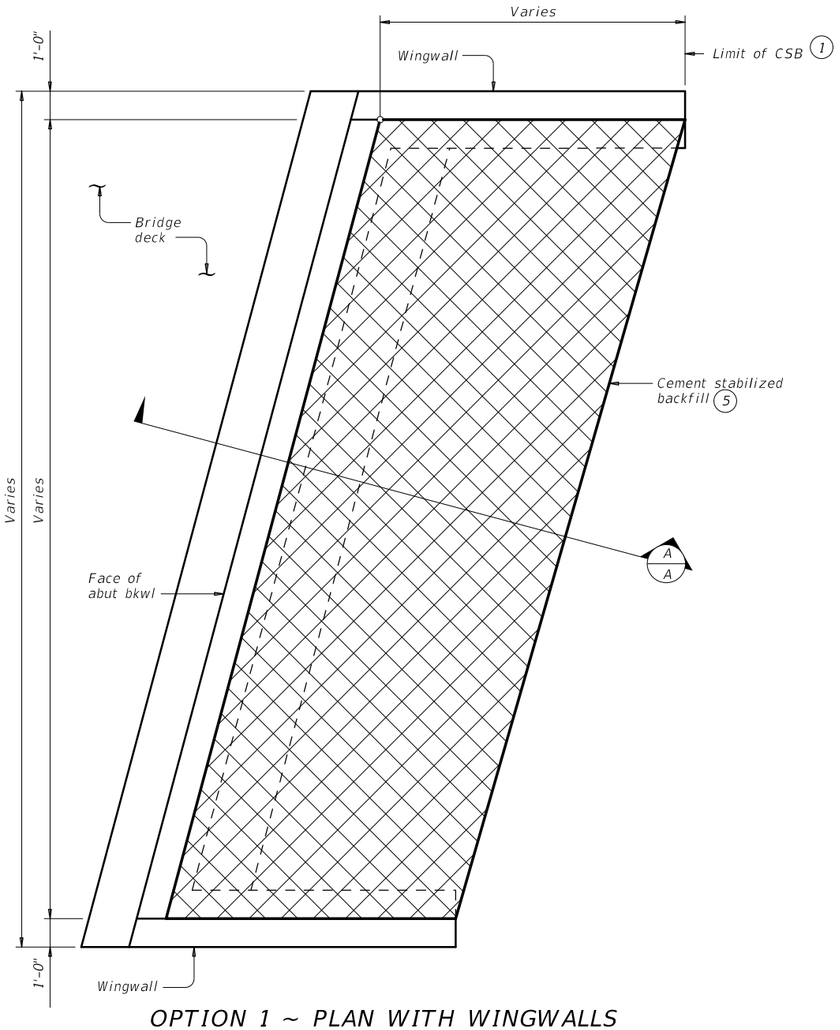
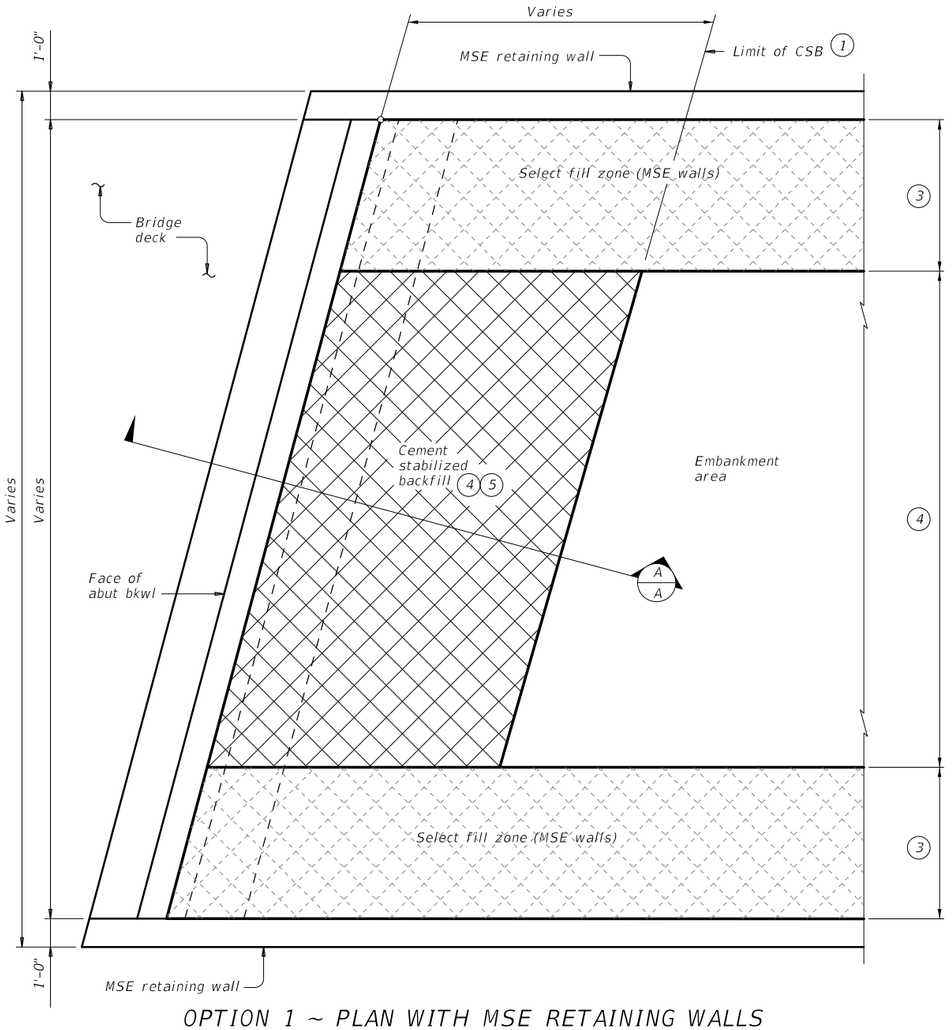
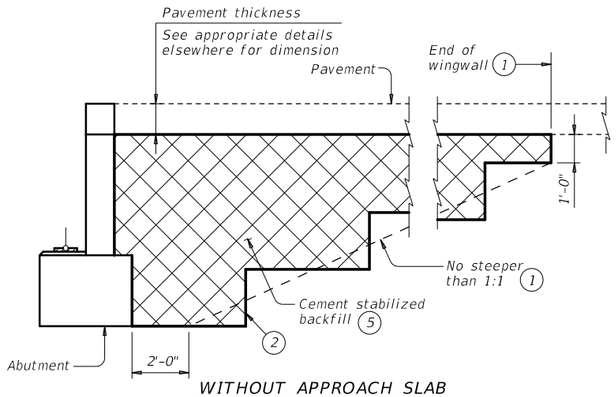


OPTION 1 ~ PLAN WITH WINGWALLS

Cast-in-place retaining walls similar.



OPTION 1 ~ PLAN WITH MSE RETAINING WALLS



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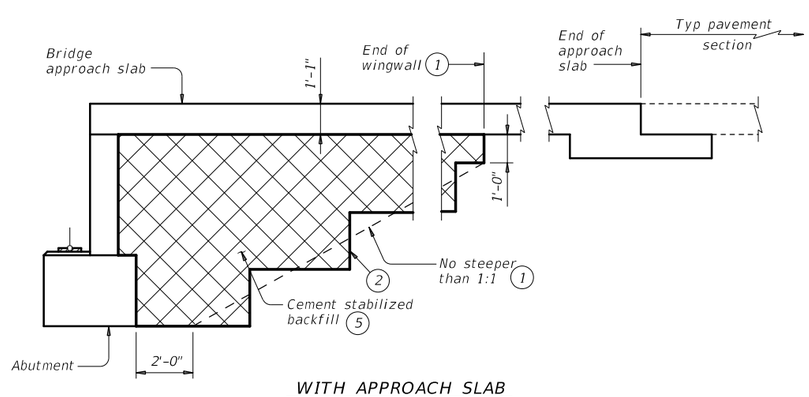

WITH APPROACH SLAB

(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 2 is intended for new construction requiring high plasticity embankment fill with a plasticity index (PI) greater than 30 or pavement built in poor native soil. Poor soils are defined as high plasticity clays or expansive clays. Option 1 is intended for construction only requiring PI controlled embankment fill or excavation in competent soils/rocks in order to construct the abutment.

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: csabste1-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	302,ETC	TEEGE,ETC
02-20: Added Option 2.	DIST	COUNTY		SHEET NO.
	PHARR	CAMERON,ETC		96

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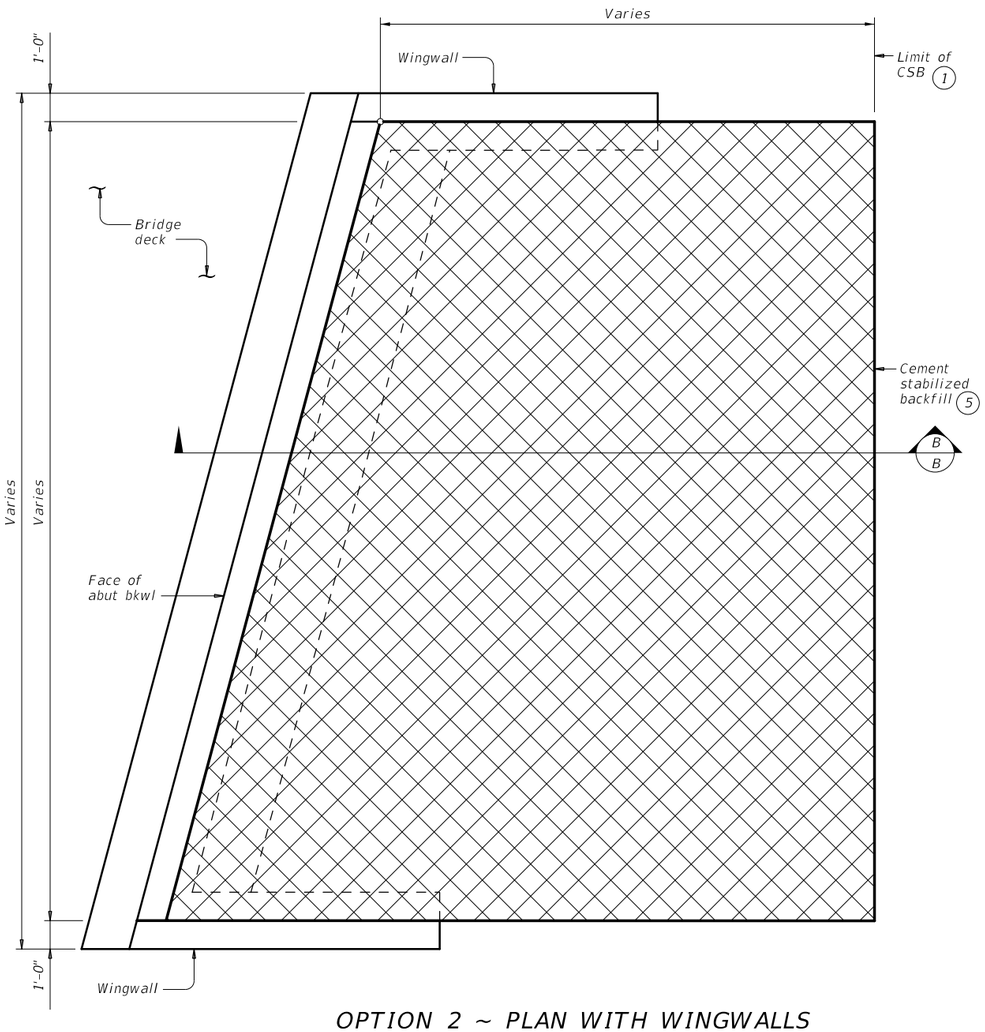
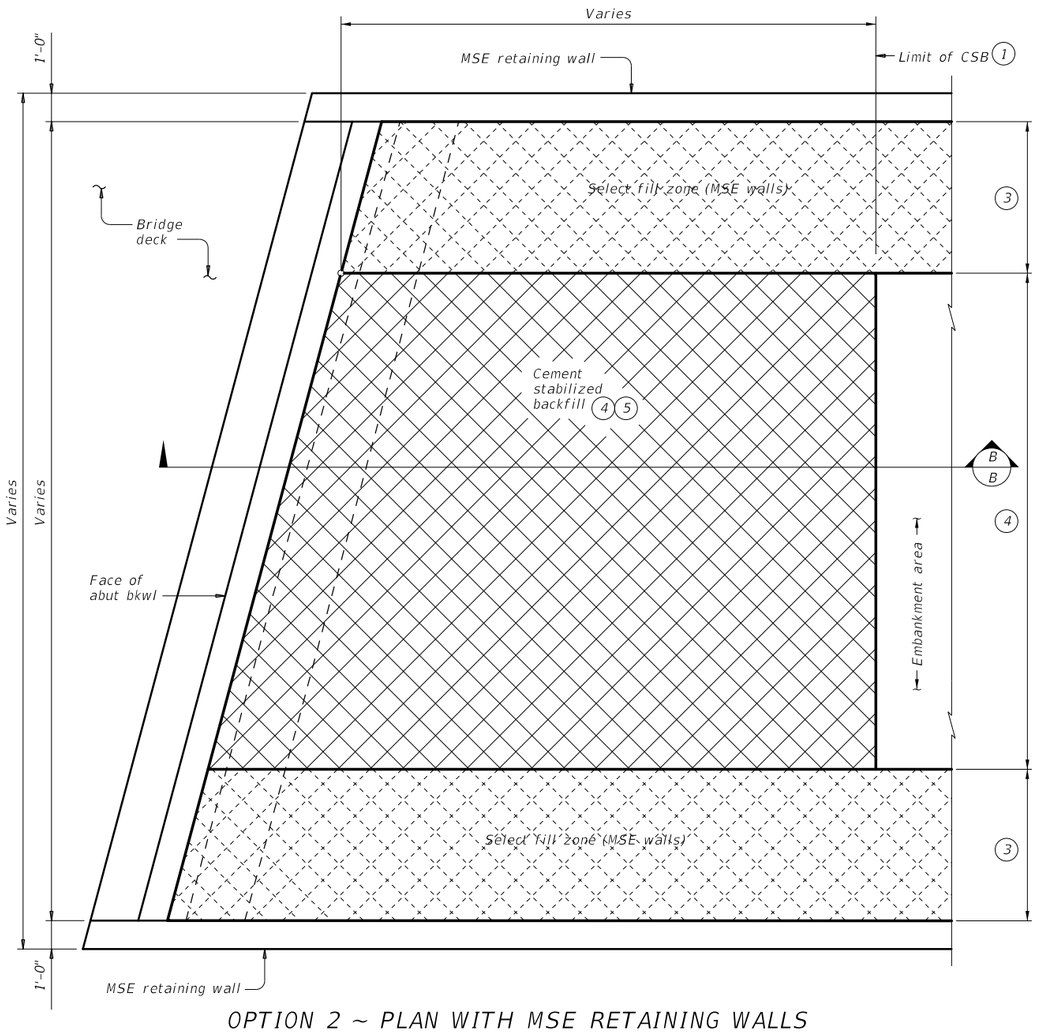


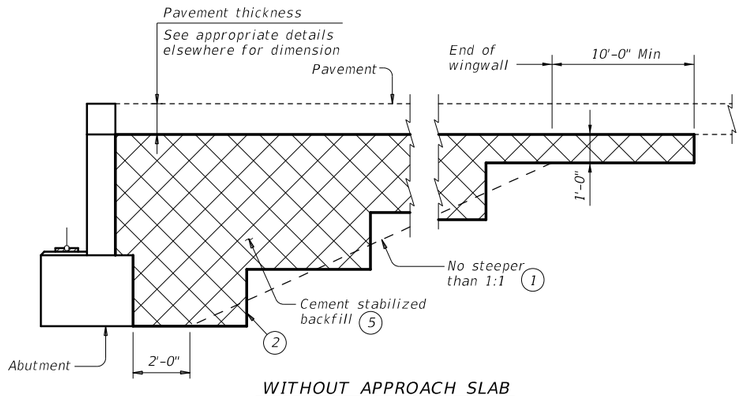
OPTION 2 ~ PLAN WITH WINGWALLS

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).



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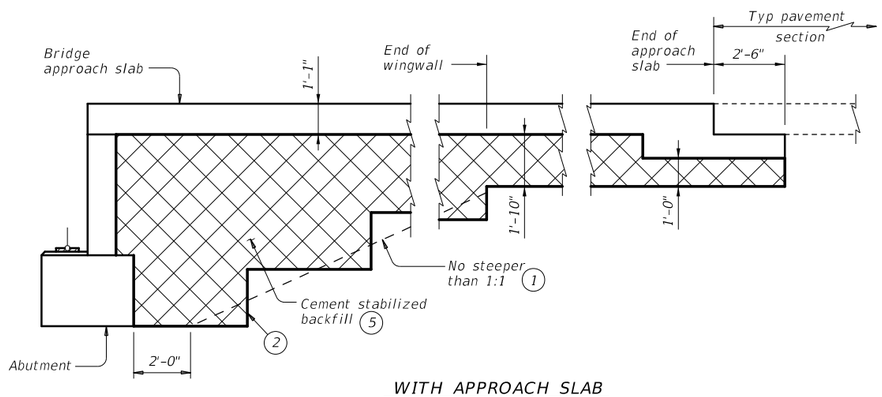

WITH APPROACH SLAB

(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: csabste1-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
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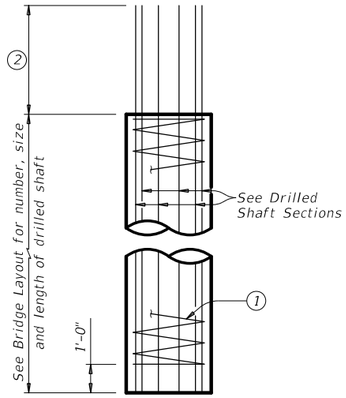
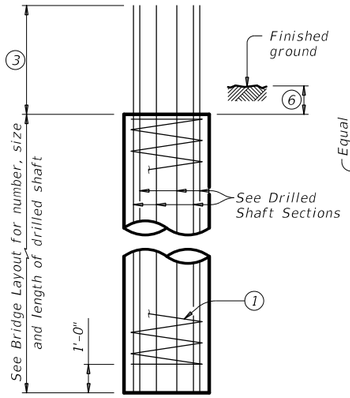
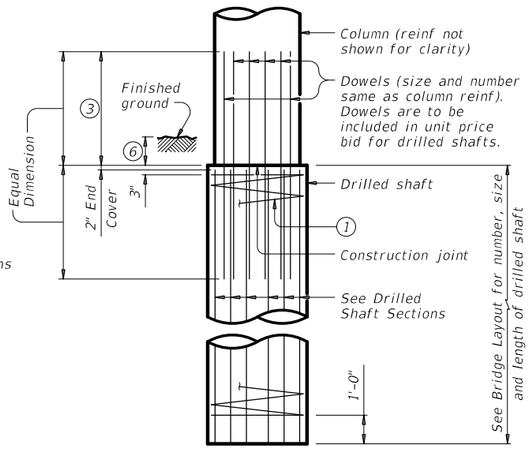
02-20: Added Option 2.	DIST	COUNTY		SHEET NO.
	PHARR	CAMERON,ETC		97



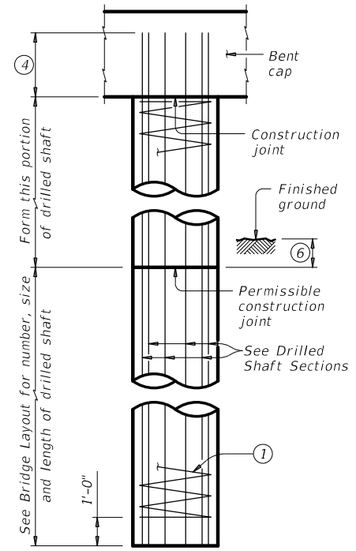
ABUTMENTS, WINGWALLS AND MULTI-DRILLED SHAFT FOOTINGS



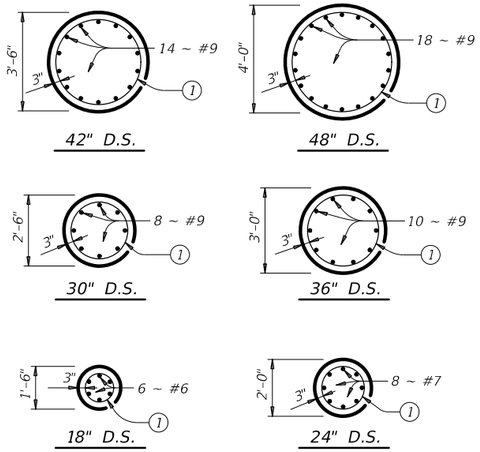
INTERIOR BENTS DRILLED SHAFT DIA EQUAL TO COLUMN DIA



INTERIOR BENTS DRILLED SHAFT DIA GREATER THAN COLUMN DIA



OPTIONAL INTERIOR BENT DRILLED SHAFT DETAIL (5)

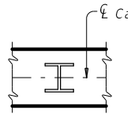


DRILLED SHAFT SECTIONS

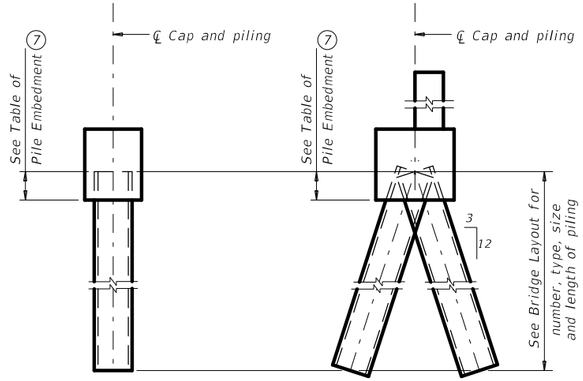
DRILLED SHAFT DETAILS

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.

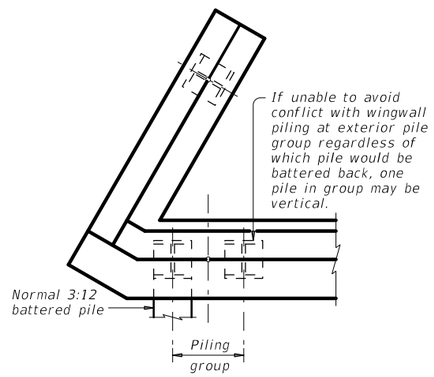


ORIENTATION OF STEEL H-PILING



PILING DETAILS

(Concrete or steel H)



DETAIL "A"

(Showing plan view of a 30° skewed abutment)

(1) #3 spiral at 6" pitch (one and a half flat turns top and bottom).

(2) Min extension into supported element:
#6 Bars = 1'-11"
#7 Bars = 2'-0"
#9 Bars = 2'-3"

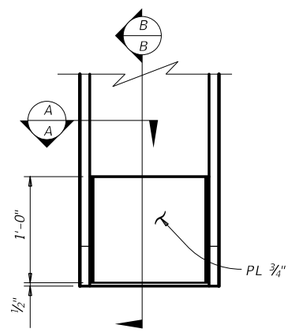
(3) Min lap with column reinf:
#7 Bars = 2'-11"
#9 Bars = 3'-9"
#11 Bars = 4'-8"

(4) Min extension into supported element:
#6 Bars = 1'-11"
#7 Bars = 2'-3"
#9 Bars = 2'-9"

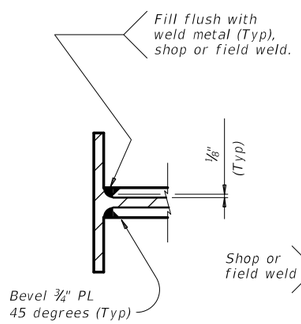
(5) Drilled shafts may extend to the bottom of bent caps for "H" heights of 6 ft and less (as shown on the Bridge Layout), if approved. This option can only be used when the drilled shaft diameter equals the column diameter. Obtain approval of the forming method above the ground line prior to construction. No adjustments in payment will be made if this option is used.

(6) 1'-0" Min, unless shown otherwise on plans.

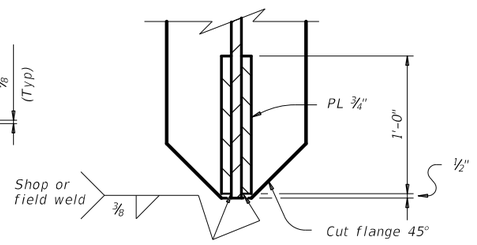
(7) Or as shown on plans.



ELEVATION



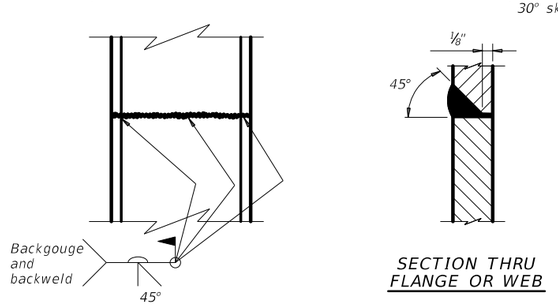
SECTION A-A



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.

SHEET 1 OF 2

Texas Department of Transportation

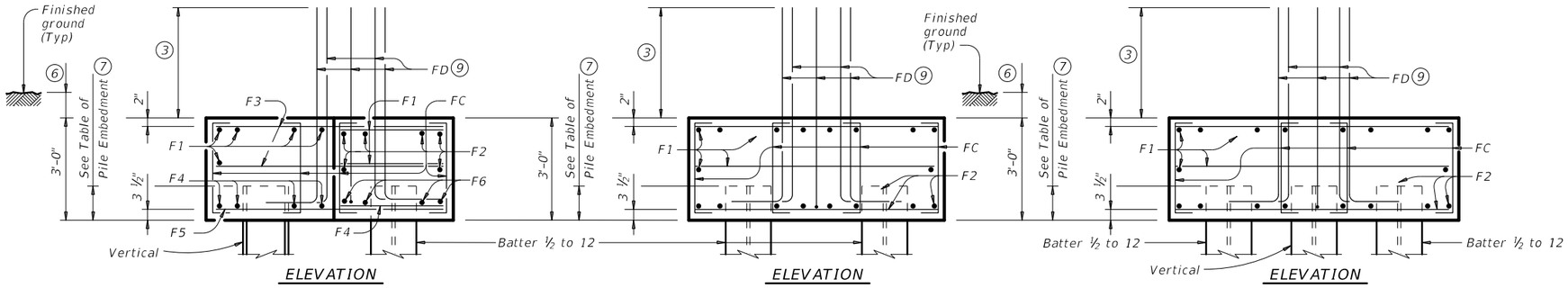
Bridge Division Standard

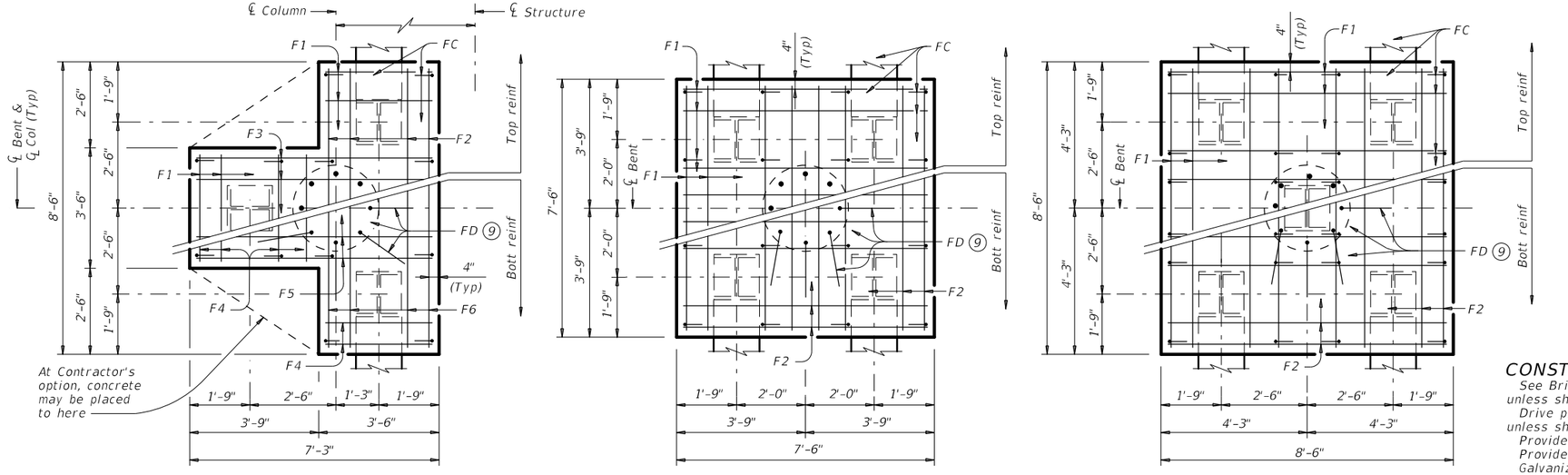
COMMON FOUNDATION DETAILS

FD

FILE: fdstde01-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	302,ETC	TEEGE,ETC
01-20: Added #11 bars to the FD bars.	DIST	COUNTY		SHEET NO.
	PHARR	CAMERON,ETC		98

DATE: 12/7/2022 10:04:21 AM
FILE: ...\Bridge\fdstde01-20.dgn





THREE PILE FOOTING (8)

For 36" Dia and smaller columns.

FOUR PILE FOOTING (8)

For 42" Dia and smaller columns.

FIVE PILE FOOTING (8)

For 42" Dia and smaller columns.

TABLE OF FOOTING QUANTITIES FOR 30" COLUMNS

ONE 3 PILE FOOTING

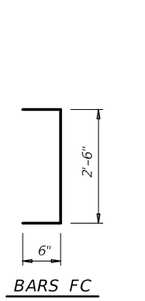
Bar	No.	Size	Length	Weight
F1	11	#4	3'- 2"	23
F2	6	#4	8'- 2"	33
F3	6	#4	6'- 11"	28
F4	8	#9	3'- 2"	86
F5	4	#9	6'- 11"	94
F6	4	#9	8'- 2"	111
FC	12	#4	3'- 6"	28
FD (10)	8	#9	8'- 1"	220
Reinforcing Steel			Lb	623
Class "C" Concrete			CY	4.8

ONE 4 PILE FOOTING

Bar	No.	Size	Length	Weight
F1	20	#4	7'- 2"	96
F2	16	#8	7'- 2"	306
FC	16	#4	3'- 6"	37
FD (10)	8	#9	8'- 1"	220
Reinforcing Steel			Lb	659
Class "C" Concrete			CY	6.3

ONE 5 PILE FOOTING

Bar	No.	Size	Length	Weight
F1	20	#4	8'- 2"	109
F2	16	#9	8'- 2"	444
FC	24	#4	3'- 6"	56
FD (10)	8	#9	8'- 1"	220
Reinforcing Steel			Lb	829
Class "C" Concrete			CY	8.0



(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.*

CONSTRUCTION NOTES:

See Bridge Layout for foundation type required. Use these foundation details unless shown otherwise.

Drive piling under abutment wingwalls to a minimum resistance of 10 Tons/Pile unless shown otherwise.

Provide Class C Concrete (f'c = 3,600 psi), unless shown otherwise.

Provide Grade 60 reinforcing steel.

Galvanize reinforcing if shown elsewhere in the plans.

Provide bar laps for drilled shaft reinforcing, where required, as follows:

Uncoated or galvanized (#6) ~ 2'-6"
Uncoated or galvanized (#7) ~ 2'-11"
Uncoated or galvanized (#9) ~ 3'-9"

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

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

DESIGNER NOTES:

Do not use the drilled shaft details shown on this standard for retaining wall, noise wall, barrier, or sign foundations without structural evaluation.

Do not use the footings shown on this standard in direct contact with salt water or exposed to salt water spray.

Maximum allowable pile loads for the footings shown are:

72 Tons/Pile with 24" Dia Columns
80 Tons/Pile with 30" Dia Columns
100 Tons/Pile with 36" Dia Columns
120 Tons/Pile with 42" Dia Columns

Texas Department of Transportation

Bridge Division Standard

COMMON FOUNDATION DETAILS

FD

FILE: fdstde01-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	302,ETC	TEEGE,ETC
01-20: Added #11 bars to the FD bars.	DIST	COUNTY		SHEET NO.
	PHARR	CAMERON,ETC		99

DATE: 12/7/2022 10:04:21 AM
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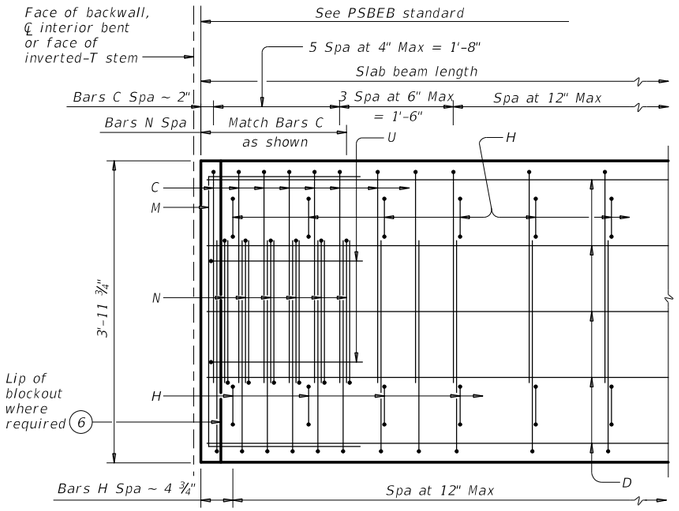
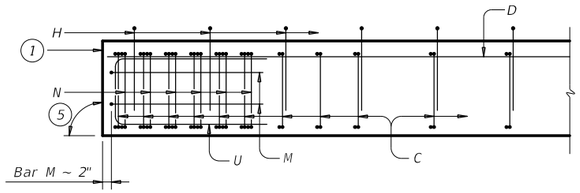
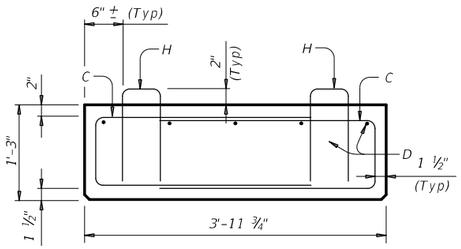


PART PLAN



ELEVATION



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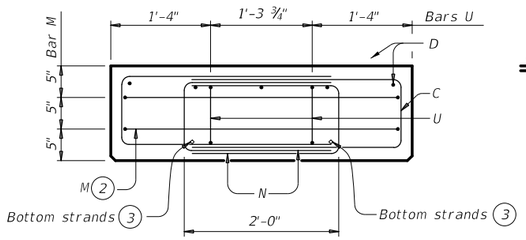
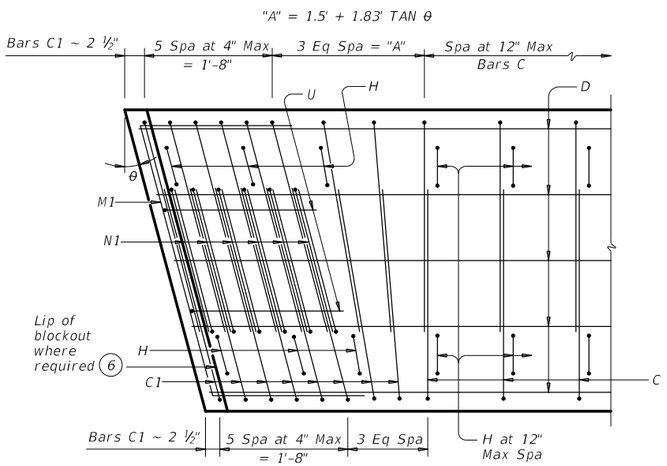


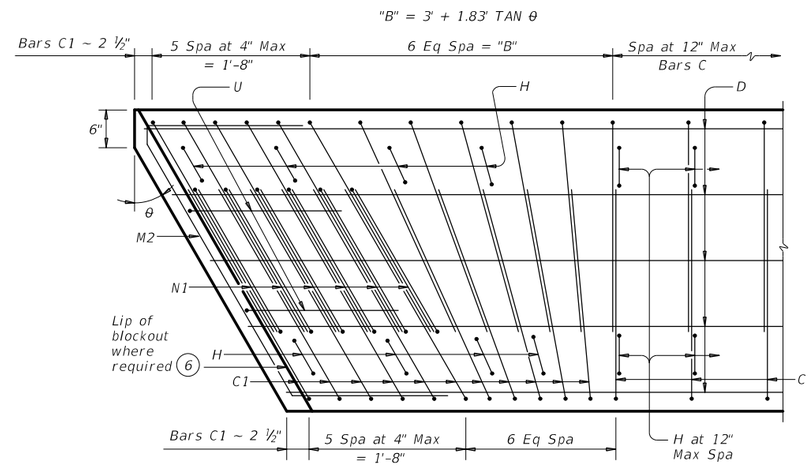
END MAT REINFORCING

Bars H not shown for clarity.



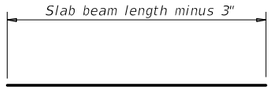
PART SKEW PLAN

(Showing θ over 0° to 15° Skew)



PART SKEW PLAN

(Showing θ over 15° to 30° Skew)



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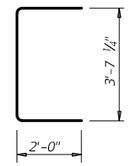

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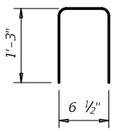

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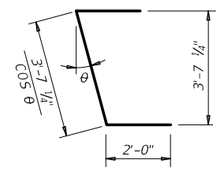

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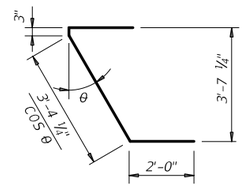

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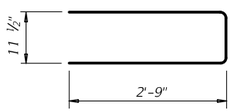

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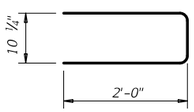

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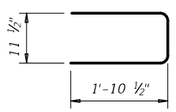

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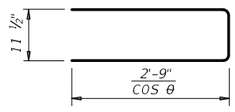

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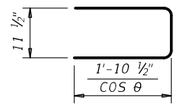

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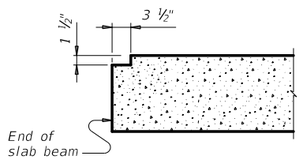


ELEVATION OF BLOCKOUT (6)

BEAM PROPERTIES		
Area	in^2	716.2
Y top	in	7.50
Y bott	in	7.50
I	in^4	13,429
Weight (4)	lb/ft	746

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.
Provide Class H concrete. Provide Class H (HPC) if shown elsewhere in the plans.
Provide Grade 60 reinforcing steel.
An equal area of welded wire reinforcement (WWR) (ASTM 1064) may be substituted for bars C and D if approved by the Engineer.
These details can be used for any skew angle up to a maximum of 30 degrees.
Chamfer all exposed corners ¾" or round to a ¾" radius.
Details are drawn showing right forward skew. See Bridge Layout for actual direction.

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

(1) See End Mat Reinforcing detail.
(2) Adjust bars M vertically to avoid strands.
(3) See sheet PSBND or PSBSD for strand locations.
(4) Assumes 150 pcf weight density of concrete.
(5) 90° at conventional interior bents. End of beam must be vertical at abutment backwall and inverted-T stem.
(6) Blockout required at armor joint (AJ) and sealed expansion joint (SEJ) locations to accommodate joint anchorage.

HL93 LOADING

Texas Department of Transportation

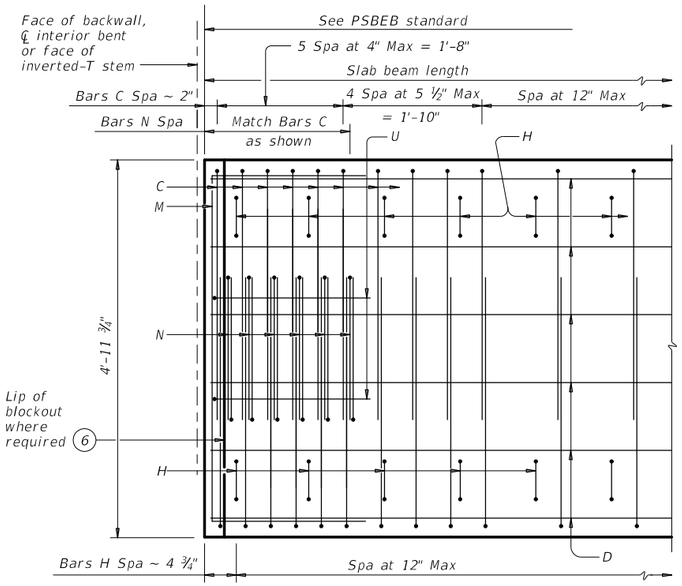
Bridge Division Standard

PRESTRESSED CONCRETE SLAB BEAM DETAILS

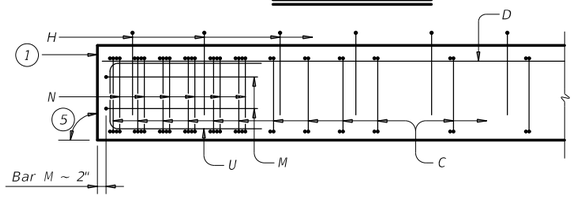
(TYPE 4SB15)

PSB-4SB15

FILE: psbsts02-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	302,ETC	TEEGE,ETC
	DIST	COUNTY		SHEET NO.
	PHARR	CAMERON,ETC		100



PART PLAN



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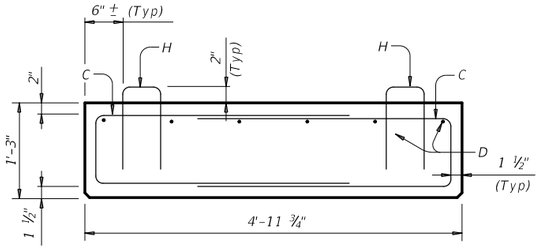

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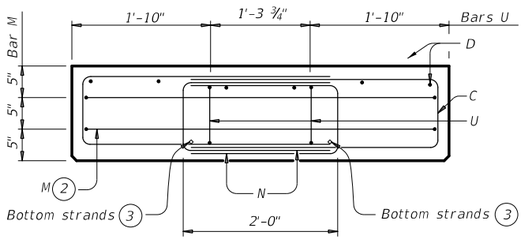
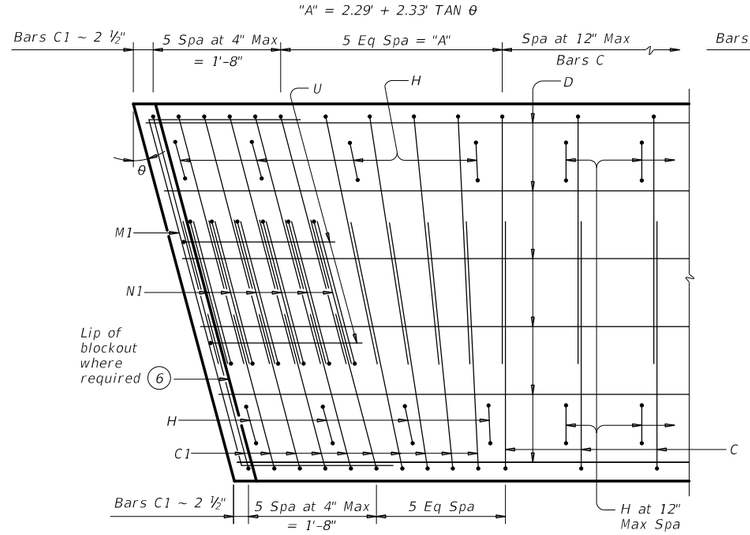


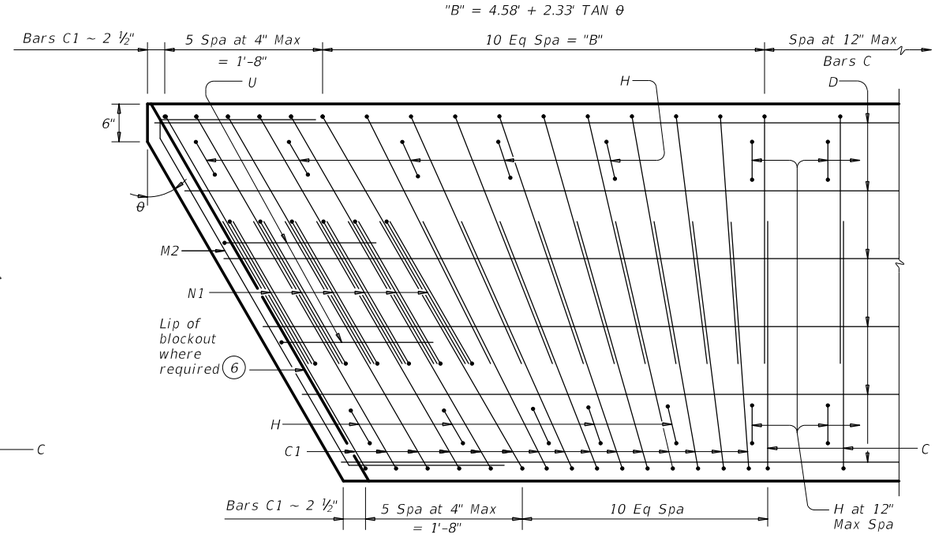
END MAT REINFORCING

Bars H not shown for clarity.



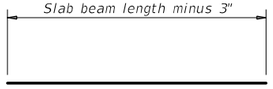
PART SKEW PLAN

(Showing θ over 0° to 15° skew)



PART SKEW PLAN

(Showing θ over 15° to 30° skew)



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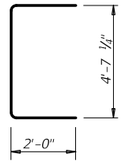

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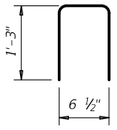

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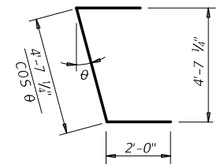

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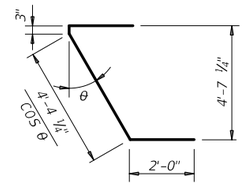

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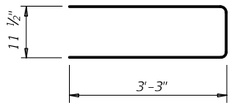

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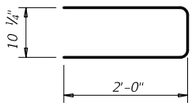

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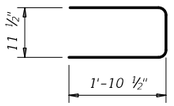

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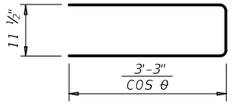

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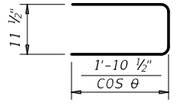

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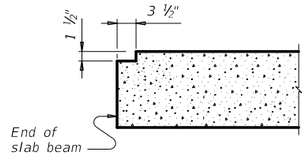

ELEVATION OF BLOCKOUT (6)

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

Provide Class H concrete. Provide Class H (HPC) if shown elsewhere in the plans.

Provide Grade 60 reinforcing steel.

An equal area of welded wire reinforcement (WWR) (ASTM 1064) may be substituted for bars C and D if approved by the Engineer.

These details can be used for any skew angle up to a maximum of 30 degrees.

Chamfer all exposed corners ¾" or round to a ¾" radius.

Details are drawn showing right forward skew. See Bridge Layout for actual direction.

Cover dimensions are clear dimensions, unless noted otherwise.

Reinforcing bar dimensions shown are out-to-out of bar.

BEAM PROPERTIES		
Area	in^2	896.2
Y top	in	7.50
Y bott	in	7.50
I	in^4	16,805
Weight (4)	lb/ft	934

(1) See End Mat Reinforcing detail.

(2) Adjust bars M vertically to avoid strands.

(3) See sheet PSBND or PSBSD for strand locations.

(4) Assumes 150 pcf weight density of concrete.

(5) 90° at conventional interior bents. End of beam must be vertical at abutment backwall and inverted-T stem.

(6) Blockout required at armor joint (AJ) and sealed expansion joint (SEJ) locations to accommodate joint anchorage.

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

PRESTRESSED CONCRETE SLAB BEAM DETAILS

(TYPE 5SB15)

PSB-5SB15

FILE: psbsts04-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	302,ETC	TEEGE,ETC
	DIST	COUNTY		SHEET NO.
	PHARR	CAMERON,ETC		101

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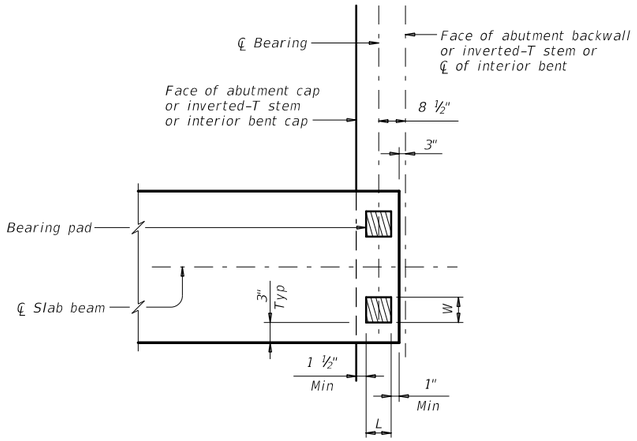
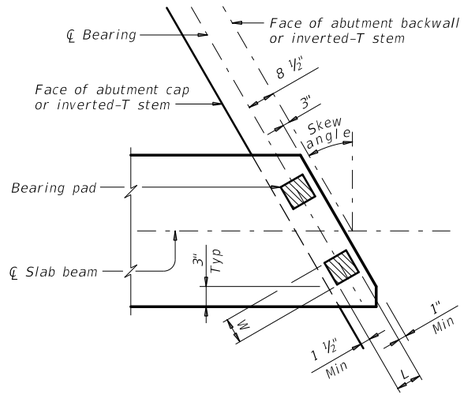
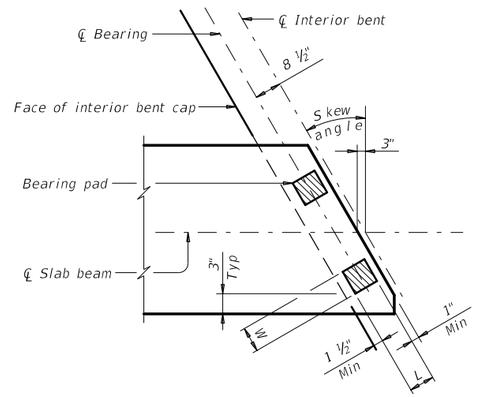


TWO-PAD DETAIL PLAN
(At abutment or inverted-T cap or at interior bent)



TWO-PAD DETAIL SKEW PLAN
(At abutment or inverted-T cap)



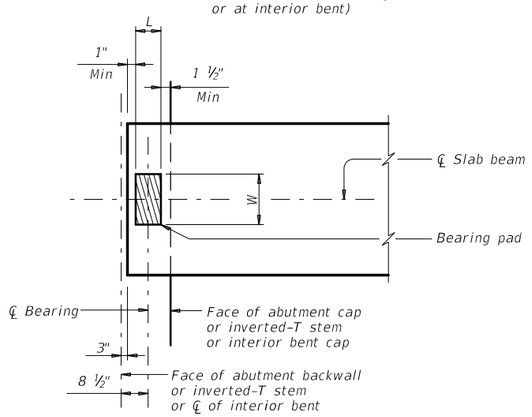
TWO-PAD DETAIL SKEW PLAN
(At interior bent)

TABLE OF BEARING PAD DIMENSIONS (ALL PRESTR CONC SLAB BM TYPES)

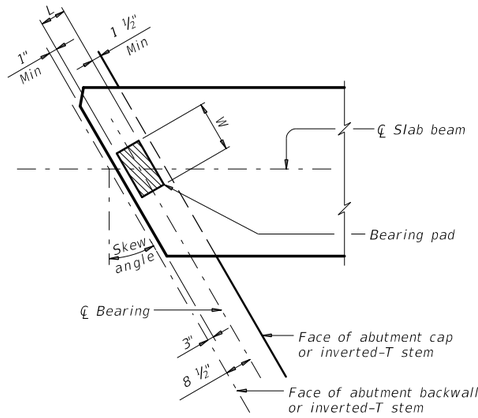
One-Pad (Ty SB1-"N") (2)			Two-Pad (Ty SB2-"N") (2)		
W	L	T	W	L	T
14"	7"	2"	7"	7"	2"

Pad sizes shown are applicable for the following conditions:

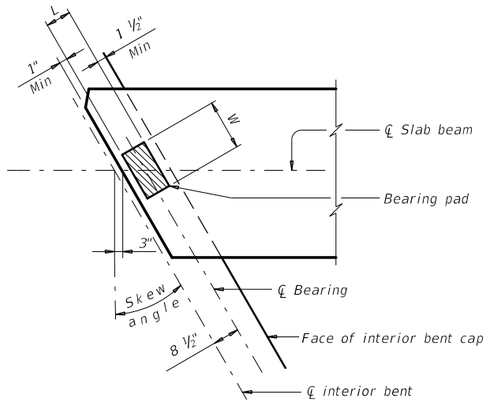
(1) All one, two and three span units where the minimum span length is not less than 25' and the maximum span is not more than 50'.
(2) Skews less than or equal to 30°.



ONE-PAD DETAIL PLAN
(At abutment or inverted-T cap or at interior bent)



ONE-PAD DETAIL SKEW PLAN
(At abutment or inverted-T cap)



ONE-PAD DETAIL SKEW PLAN
(At interior bent)

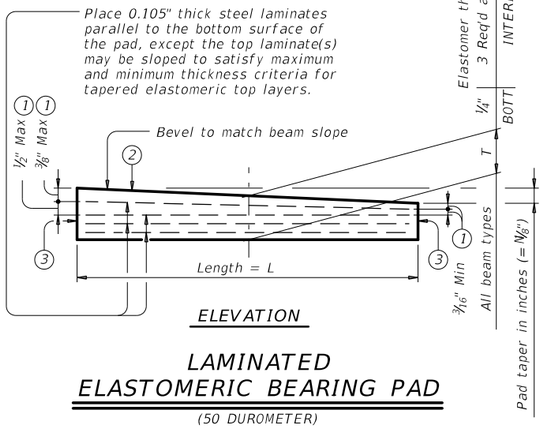
GENERAL NOTES:

These details accommodate skew angles up to 30°.

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 must be included in unit price bid for "Prestressed Concrete Slab Beams".



ELEVATION

LAMINATED ELASTOMERIC BEARING PAD

(50 DUROMETER)

ELASTOMERIC BEARING PAD PLACEMENT AND BEAM END DIAGRAMS

Place one bearing pad at forward station beam end.
Place two bearing pads at back station beam end.

(1) Maximum and minimum layer thicknesses shown are for elastomer only, on tapered layers.

(2) 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 beam slope by more than $\left(\frac{0.0625"}{Length}\right)$ IN/IN.

(3) Locate permanent mark here.

HL93 LOADING

Texas Department of Transportation | Bridge Division Standard

ELASTOMERIC BEARING AND BEAM END DETAILS

PRESTR CONCRETE SLAB BEAM

PSBEB

FILE: psbste06-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	302,ETC	TEEGE,ETC
	DIST	COUNTY		SHEET NO.
	PHARR	CAMERON,ETC		102

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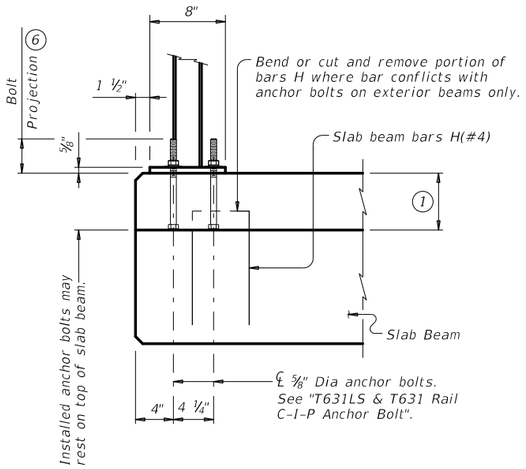
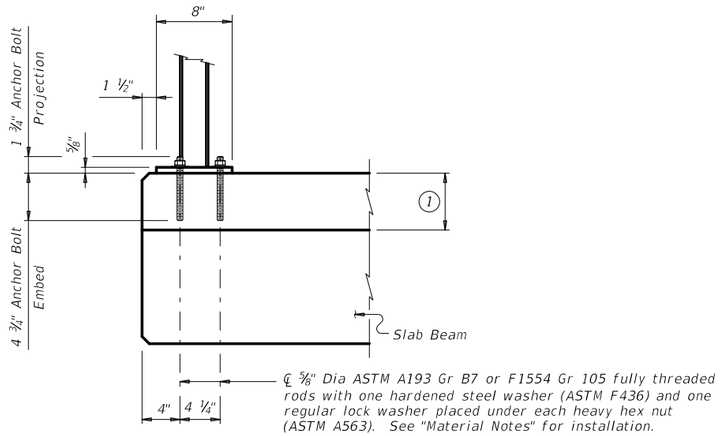


CAST-IN-PLACE ANCHORAGE OPTION



ADHESIVE ANCHORAGE OPTION

T631LS & T631 RAIL ANCHORAGE PLACEMENT (2)(7)

PART SPAN ELEVATION

SECTION

TYPICAL CONCRETE RAIL ANCHORAGE

(Showing typical concrete rail anchorage)

T631LS & T631 RAIL C-I-P ANCHOR BOLT

PLAN OF CONCRETE RAILS AT EXPANSION JOINTS

(1) Cast-in-place slab thickness varies due to beam camber (5" minimum).

(2) Replace cast-in-place anchor bolts shown on T631LS and T631 Rail standard with an adhesive anchor system or cast-in-place anchor bolts shown on this sheet.

(3) Bar length shown on rail standard, minus 1 ¼". Adjust bar length for a raised sidewalk.

(4) See rail standard for projection from finished grade or top of sidewalk.

(5) Place additional (#5) longitudinal bar.

(6) Excess bolt length has been provided to accommodate a variable slab thickness due to beam camber. If slab thickness on span details exceed 7", bolt length must be increased accordingly. After posts have been set and bolts tightened, bolt projection above nuts of more than ½" must be cut off and painted with two coats of zinc-rich paint conforming to the Item 445 "Galvanizing".

(7) Distance from end of top outside edge of slab to center of first bolt group can not be less than 9", except: 15° Skew: 1'-0" (acute corner only)
30° Skew: 1'-3" (acute corner only)

(8) Location of rail expansion joint must be at the intersection of ℄ slab expansion joint, ℄ rail footprint and perpendicular to slab outside edge.

(9) Cross-hatched area must have ½" preformed bitumuminous fiber material under concrete rail, as shown.

CONSTRUCTION NOTES:

Rail anchorage bars may be field bent as required to clear rail reinforcing or provide minimum cover shown on standard rail detail sheets.

Test adhesive anchors in accordance with Item 450.3.3, "Tests". Test 3 anchors per 100 anchors installed. Perform corrective measures to provide adequate capacity if any of the tests do not meet the required test load. Repair damage from testing as directed.

MATERIAL NOTES:

Galvanize all steel components of steel rail system.

Provide Grade 60 reinforcing steel.

Cast-in-place anchorage system for T631LS and T631 Rail must be ⅝" Dia heavy hex head anchor bolts (ASTM F3125 Gr 325 or A449) with one hardened steel washer (ASTM F436) and one regular lock washer placed under heavy hex nut. Nuts must conform to ASTM A563 requirements. Embed anchor bolts 4 ½" minimum.

Adhesive anchors for T631LS and T631 Rail must be ⅝" Dia ASTM A193 Gr B7 or F1554 Gr 105 fully threaded rods with one hardened steel washer (ASTM F436) and one regular lock washer placed under each heavy hex nut. Nuts must conform to ASTM A563 requirements. Embed fully threaded rod into slab and/or abutment wingwall using a Type III, Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment depth is 4 ¾". Anchor adhesive chosen must be able to achieve a nominal bond strength in tension of a single anchor, Na, of 8 kips (edge distance must be accounted for). Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing."

Epoxy coat or galvanize reinforcing steel shown on this standard if rail reinforcement is epoxy coated or galvanized.

GENERAL NOTES:

Designed in accordance with AASHTO LRFD Bridge Design Specifications.

This standard is for use with structures with a 5" minimum cast-in-place concrete slab.

This standard may require modification for interior rails. This standard does not apply to median barriers.

This standard does not provide details for Type T221P, T224, T80HT, T80SS, C412, PR11, PR22 and PR3 rails on slab beam bridges.

See rail standards for approved speed restrictions, notes and details not shown.

Cover dimensions are clear dimensions, unless noted otherwise.

Texas Department of Transportation

Bridge Division Standard

RAIL ANCHORAGE DETAILS

PRESTR CONCRETE SLAB BEAMS

PSBRA

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©TxDOT January 2017	CONT	SECT	JOB	HIGHWAY
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03-18: Updated adhesive anchor notes.	DIST	COUNTY		SHEET NO.
	PHARR	CAMERON,ETC		103

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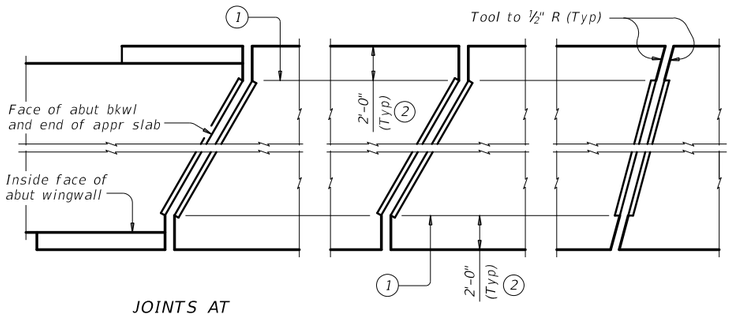
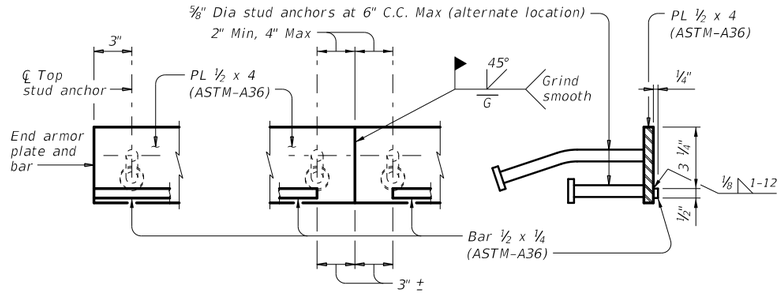


JOINTS AT ABUTMENTS | SKEWS OVER 15° | SKEWS THRU 15°

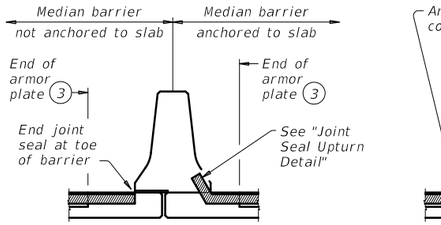
PLANS OF ARMOR PLATES



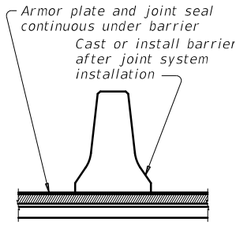
END VIEW | FIELD SPLICE | SECTION

(Studs are not shown for clarity.)

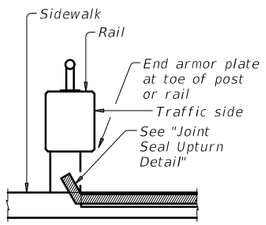
ELEVATION OF ARMOR PLATE



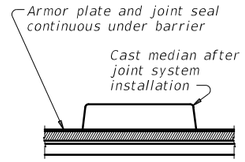
WITH OPEN DECK JOINT BELOW MEDIAN BARRIER



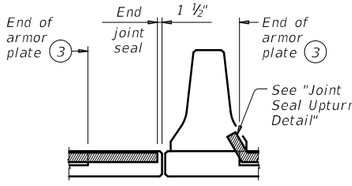
AT MEDIAN BARRIER



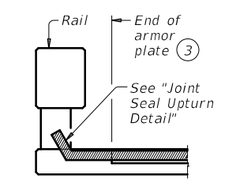
AT SIDEWALK BEHIND BRIDGE RAIL



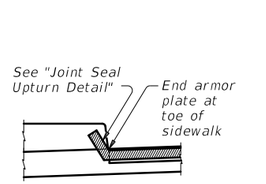
AT RAISED MEDIAN



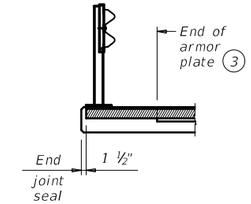
WITH OPEN DECK JOINT ADJACENT TO MEDIAN BARRIER



AT CONCRETE BRIDGE RAIL

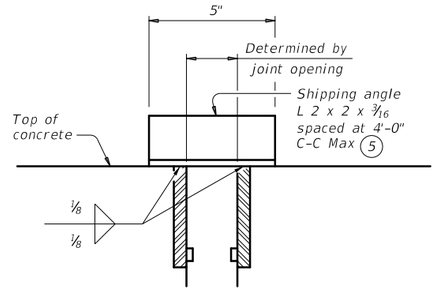


AT SIDEWALK



AT STEEL POST BRIDGE RAIL

TYPICAL SECTIONS OF ARMOR PLATES AND SEALS (4)

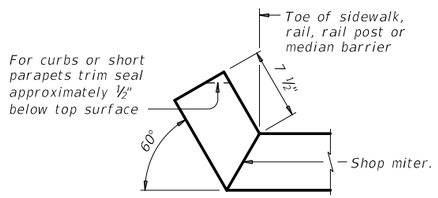


SHOWING ARMOR PLATE

(Studs not shown for clarity)

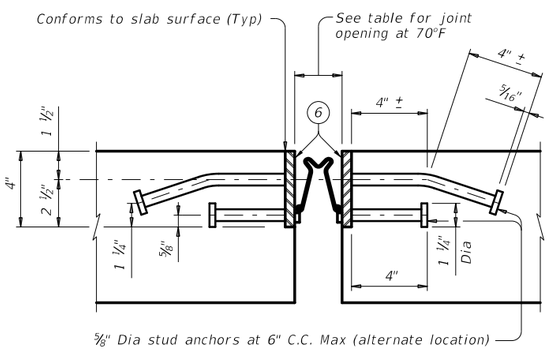
SHIPPING ANGLE

An alternate method of securing joint sections may be used if approved by the Bridge Division. Erection bolts are not allowed.



JOINT SEAL UPTURN DETAIL

Upturn seal only. Terminate armor plates as shown in "Plans of Armor Plates" and "Typical Sections of Armor Plates & Seals."



JOINT SECTION

Showing R J Watson strip seal. Other strip seals are similar.

TABLE OF SEALED EXPANSION JOINT INFORMATION

MANUFACTURER	STEEL SECTION (7)	STRIP SEAL 4" JOINT	
		Seal Type	Joint Opening (8)
D.S. Brown	As shown	V-400	2 ¼"
R.J. Watson	As shown	SF-400	2 ½"
SSI	As shown	SSS-400	2 ½"
Watson Bowman Acme	As shown	SPS-400	2"

REDUCED LONGITUDINAL MOVEMENT RANGE

SKEW (deg)	JOINT SIZE 4"
0	4.0"
15	4.0"
30	3.5"
45	2.8"

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) At Fabricator's option, armor plate may extend up to 6" beyond this point for skews through 15°.

(2) Unless shown otherwise, terminate armor plate at slab break point if break is more than 2'-0" from slab edge.

(3) See "Plans of Armor Plates".

(4) Other conditions affecting the joint profile should be noted elsewhere.

(5) Align shipping angle perpendicular to joint.

(6) Coat with Manufacturer's supplied epoxy primer above bar before installing sealant.

(7) Shape of steel section shown is typical. Variations in sections must be approved by the Engineer.

(8) These openings are also the recommended minimum installation openings.

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, "Feild Cleaning and Painting Steel." 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.

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.

Splice and install seal in accordance with the Manufacturer's directions and with the adhesive provided by the Manufacturer.

Splice in joint seal may be performed in the field.

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-B is 6 ½".

Texas Department of Transportation

Bridge Division Standard

SEALED EXPANSION JOINT TYPE B WITHOUT OVERLAY

SEJ-B

FILE: sejbste1-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
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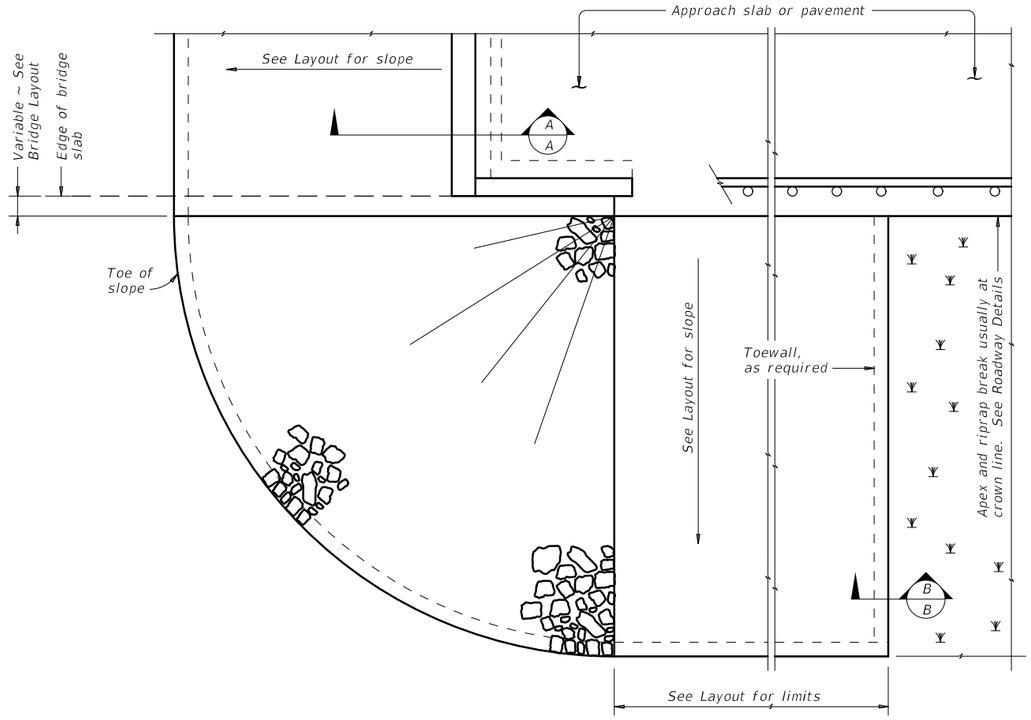
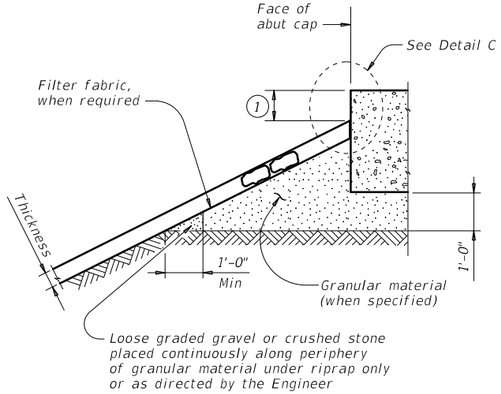
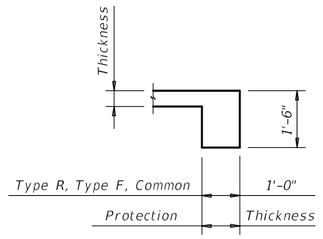
	PHARR	CAMERON,ETC		104



PLAN

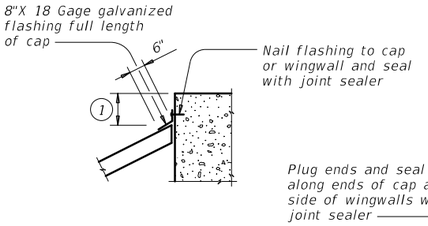


SECTION A-A AT CAP

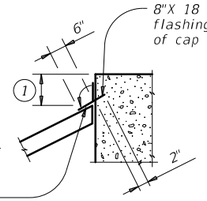


SECTION B-B

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

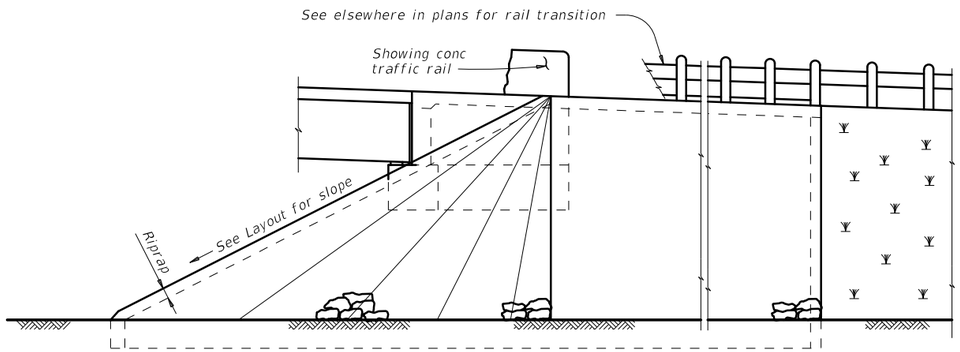


CAP OPTION A



CAP OPTION B

DETAIL C



ELEVATION

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

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

Texas Department of Transportation

Bridge Division Standard

STONE RIPRAP

SRR

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REVISIONS	0921	06	302,ETC	TEEGE,ETC
	DIST	COUNTY		SHEET NO.
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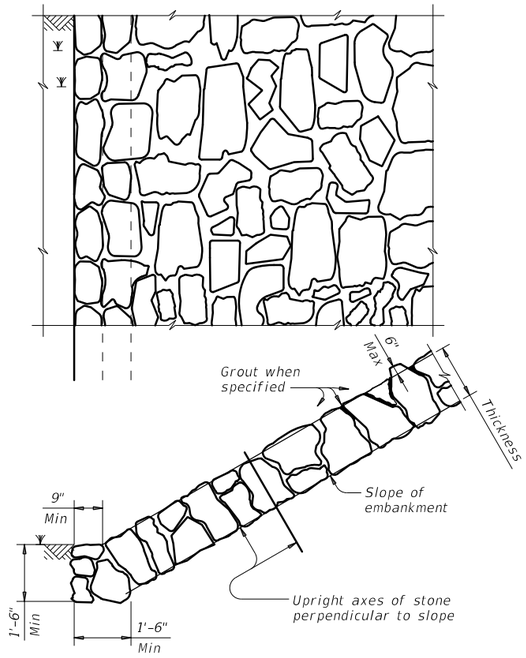


FIGURE 1 ~ TYPE R STONE RIPRAP

dry or grouted

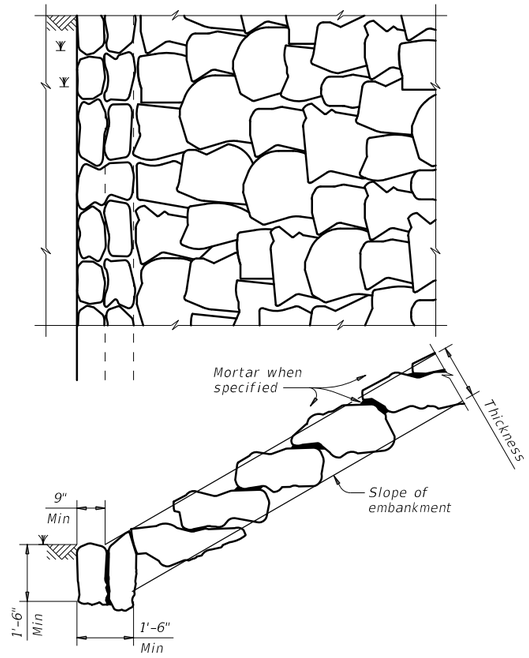


FIGURE 2 ~ TYPE F STONE RIPRAP

dry or mortared

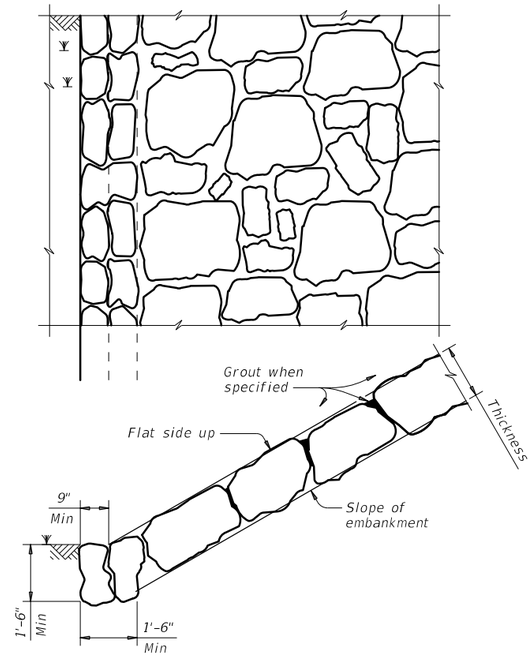


FIGURE 3 ~ TYPE F STONE RIPRAP

grouted

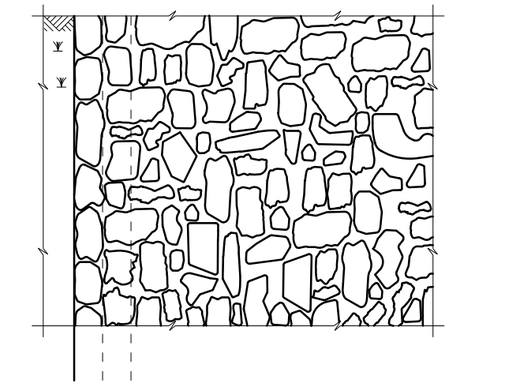


FIGURE 4 ~ COMMON STONE RIPRAP

dry or grouted

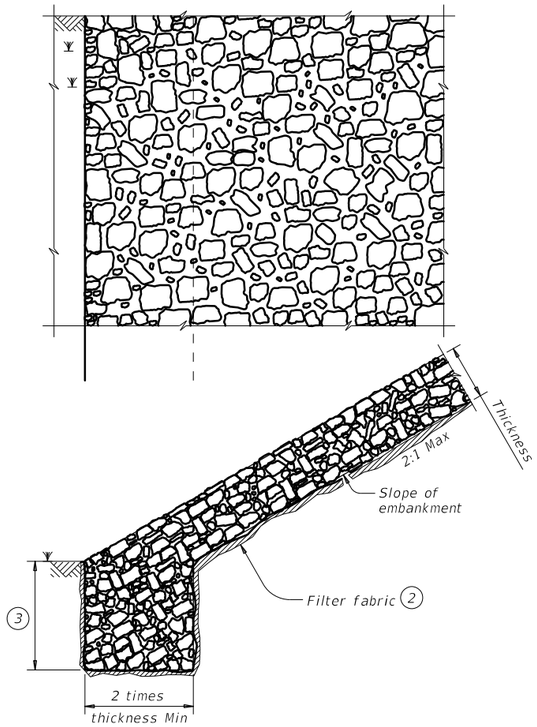


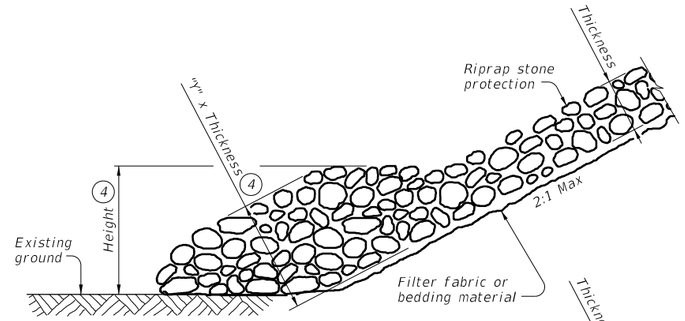
FIGURE 5 ~ PROTECTION STONE RIPRAP (5)

(2) Provide bedding material instead of filter fabric if shown elsewhere in plans. See Layout for thickness of bedding material.

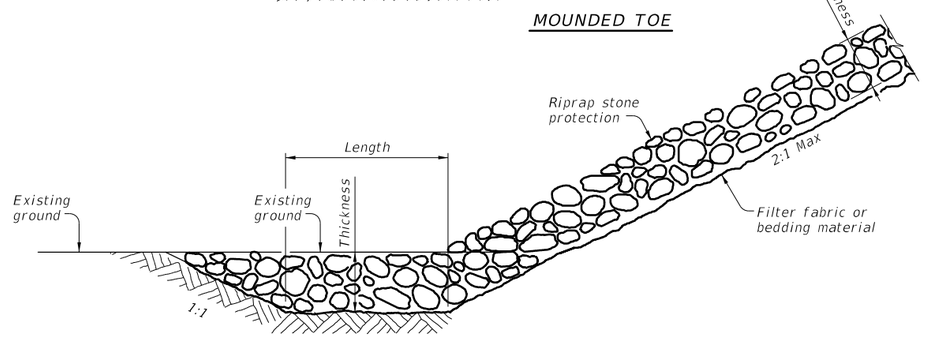
(3) Minimum toe depth is the larger of the maximum scour depth or 2 times the riprap thickness.

(4) "Y" and Height need to be defined. See layout or detail sheet for values if this option is used.

(5) List Stone Protection as size (XX inch) and thickness (YY inch) on the layout.
Example: Riprap (Stone Protection) XX inch, Thickness = YY inch.



MOUNDED TOE



EXTENDED ROCK FILLED TRENCH

PROTECTION STONE RIPRAP TOE OPTIONS (5)

Texas Department of Transportation

Bridge Division Standard

STONE RIPRAP

SRR

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	PHARR	CAMERON,ETC		106

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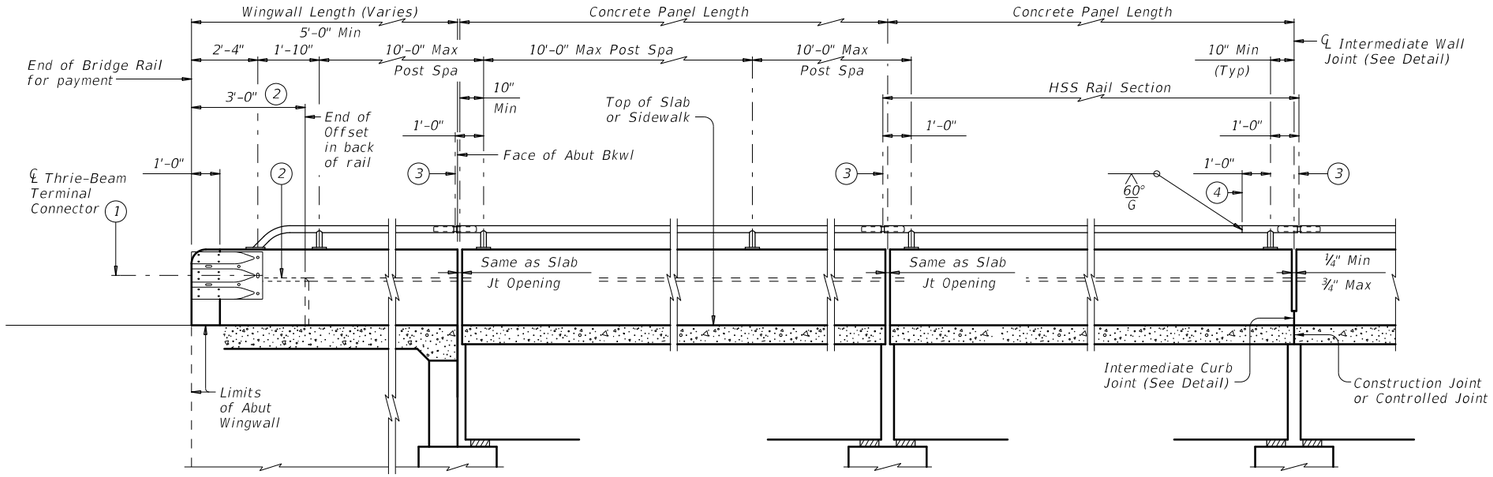
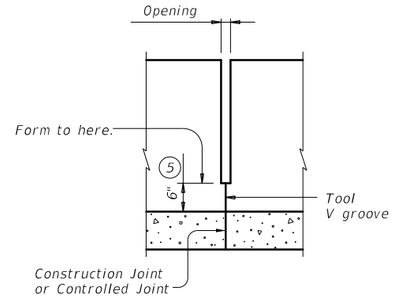


AT ABUTMENTS | AT BENTS WITH SLAB EXP JOINTS | AT BENTS WITHOUT SLAB EXP JOINTS

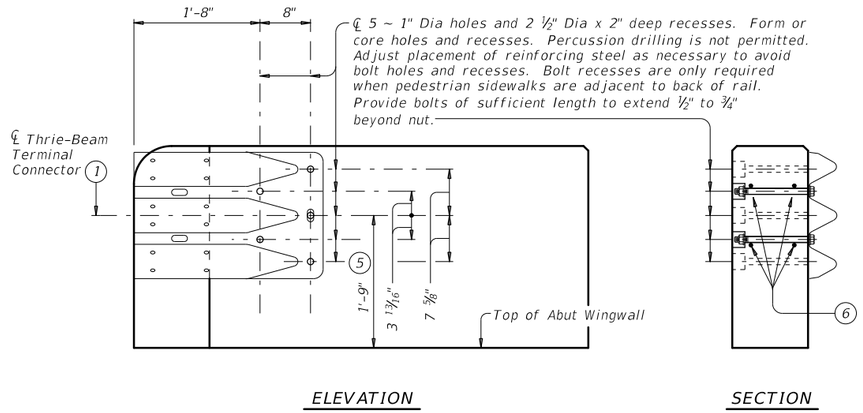
ROADWAY ELEVATION OF RAIL



INTERMEDIATE WALL JOINT DETAIL

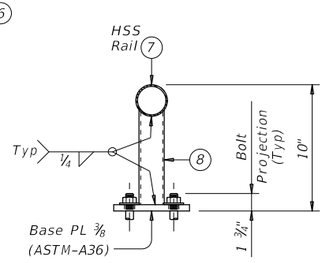
Provide at all interior bents without slab expansion joints.

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. Back of rail offset may, with Engineer's approval, be continued to the end of the railing.
3. ℄ Exp Joint or Splice Joint as required.
4. One shop splice per HSS rail section is permitted with minimum 85 percent penetration. The weld may be square groove, or single vee groove. Grind smooth.
5. Increase 2" for structures with overlay.
6. 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. Field bend as needed.
7. HSS 2.875 x 0.203
8. HSS 2.375 x 0.154
9. ⅜" Dia Hole in bottom of HSS rail (Minimum 1 hole between posts ~ Typ)

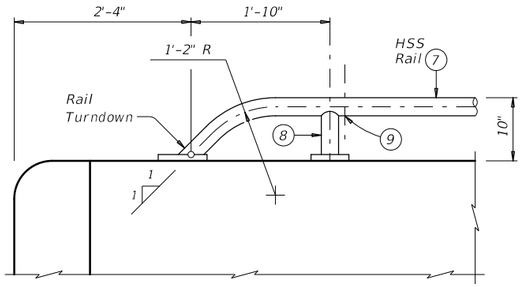


ELEVATION | SECTION

TERMINAL CONNECTION DETAILS

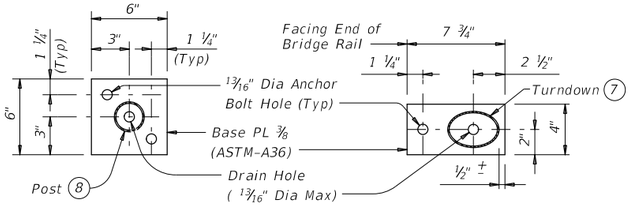


TRANSVERSE SECTION



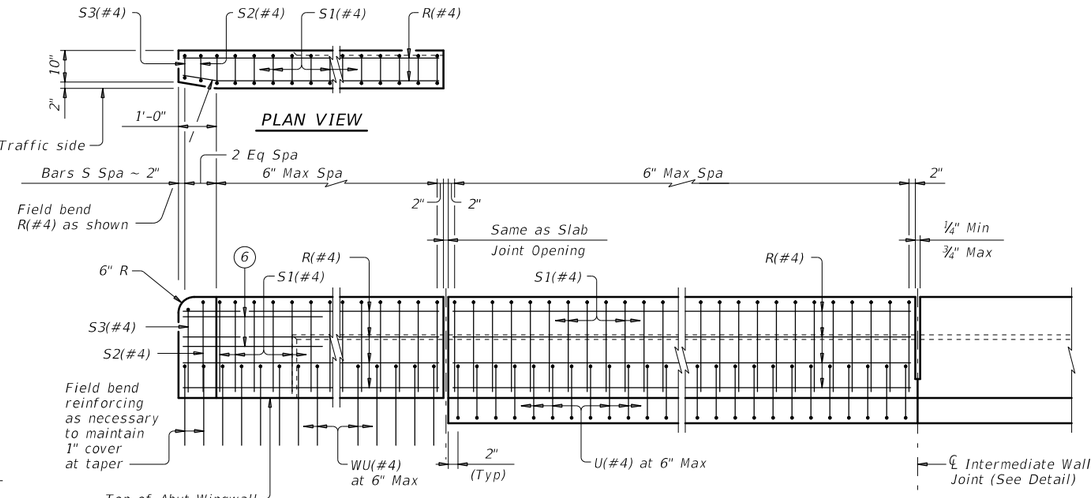
Note that at least two anchor points (as shown) are required for the Bridge Rail on the Abutment Wingwall. Longer Wingwalls may require more than two Rail anchorages.

HSS RAIL TERMINAL DETAIL



POST BASE PLATE PLAN | RAIL TURNDOWN BASE PLATE PLAN

HSS RAIL DETAILS



AT ABUT WINGWALL | AT BENTS WITH SLAB EXP JOINTS | AT SLAB | AT BENTS WITHOUT SLAB EXP JOINTS

ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT

(Showing without raised sidewalk)

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SHEET 1 OF 3

Texas Department of Transportation | Bridge Division Standard

COMBINATION RAIL

TYPE C221

FILE: rlstd018-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
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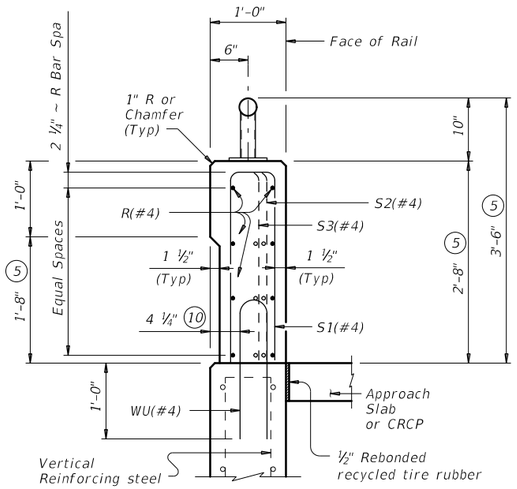
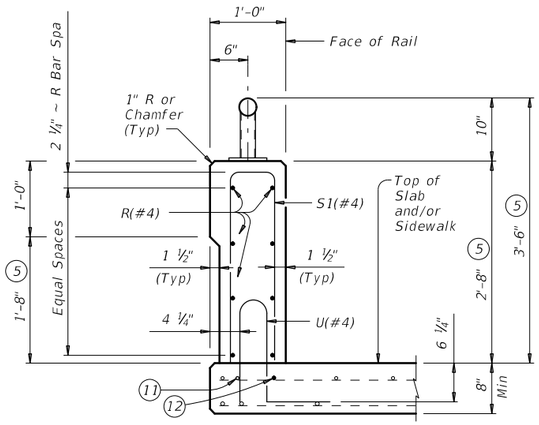
	DIST	COUNTY		SHEET NO.
	PHARR	CAMERON,ETC		107

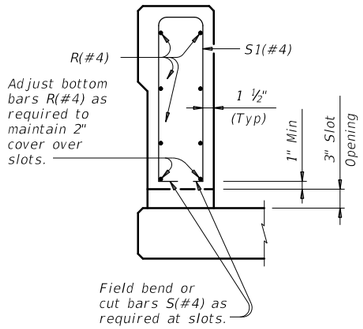


ON ABUTMENT WINGWALLS OR CIP RETAINING WALLS



ON BRIDGE SLAB

SECTIONS THRU RAIL WITHOUT RAISED SIDEWALK

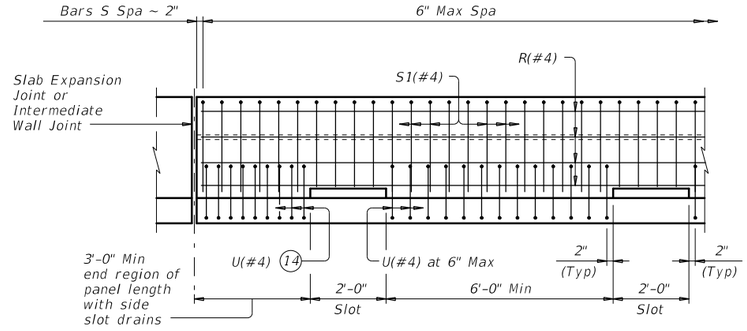


SECTION THRU OPTIONAL SIDE SLOT DRAIN

ON ABUTMENT WINGWALLS OR CIP RETAINING WALLS

ON BRIDGE SLAB

SECTIONS THRU RAIL WITH RAISED SIDEWALK



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.

(5) Increase 2" for structures with overlay.

(10) 5 ¼" when vertical reinforcing has closer clear cover over horizontal reinforcing in abutment wingwalls or retaining walls on traffic side of wall.

(11) 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 Contractors expense.

(12) Top longitudinal slab bar may be adjusted laterally 3" plus or minus to tie reinforcing.

(13) Raised Sidewalk

(14) Space U(#4) bars at 4" Max when end region of panel length is less than 6'-0" to side slot drain. Space U(#4) bars at 6" Max when end region of panel length is 6'-0" and greater to side slot drain.

Texas Department of Transportation

Bridge Division Standard

COMBINATION RAIL

TYPE C221

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		DIST	COUNTY		SHEET NO.
		PHARR	CAMERON,ETC		108

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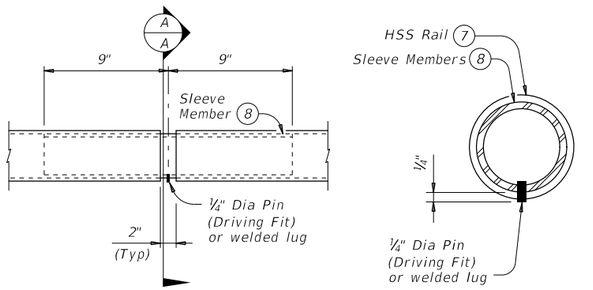
RAIL DATA FOR HORIZONTAL CURVES

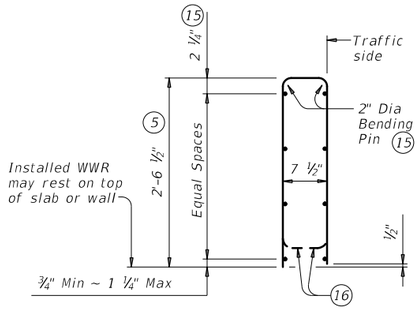
	RADIUS TO FACE OF RAIL	MAX CHORD LENGTH	CONSTRUCT OR FABRICATE
HSS Rail	Over 2800'	29'-0"	Straight rail panels
	Over 1400' thru 2800'	14'-6"	To required radius or to chords shown
	Over 700' thru 1400'	7'-3"	
	Thru 700'	Zero	To required radius



AT SPLICE OR EXP JTS

SECTION A-A

PIPE SPLICE DETAILS



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.	

CONSTRUCTION NOTES:

This railing may be constructed by the slipform process when approved by the Engineer, with equipment approved by the Engineer and when adhesive anchor bolts are used. Slipforming parapet is not allowed if anchor bolts are cast with parapet wall. 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.

Test adhesive anchors in accordance with Item 450.3.3, "Tests". Test 3 anchors per 100 anchors installed. Perform corrective measures to provide adequate capacity if any of the tests do not meet the required test load. Repair damage from testing as directed.

At the Contractor's option anchor bolts may be cast with the parapet. See "Material Notes".

Face of rail, parapet must be plumb unless otherwise approved by the Engineer. HSS rail posts must be square to the top of parapet. Use epoxy mortar under post base plates if gaps larger than 1/16" exist.

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

HSS rail sections must not include less than two posts, and no more than four (except at Abutments).

Chamfer all parapet exposed corners.

MATERIAL NOTES:

Provide Class "C" concrete. Povide 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.

Provide ASTM A1085 or A500 Gr B or A53 Gr B for all HSS.

Galvanize all metal components of steel rail system. Apply additional coatings when shown elsewhere on the plans. When plans require paint over gavanizing, follow the requirements for painting galvanized steel in Item 445, "Galvanizing" and when field painting, Item 446, "Field Cleaning and Painting Steel". Sleeve members and anchor bolts must receive galvanization prior to installation and only field paint after installation unless directed otherwise by Engineer.

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 1064) may be substituted for Bars R and S, as shown. Combinations of reinforcing steel and WWR or configurations of WWR other that shown are permitted if conditions in the table are satisfied. Provide the same laps as required for reinforcing bars.

Anchor bolts must be ⅞" Dia ASTM A307 Gr A fully threaded rods with one hex nut and one hardened steel washer (ASTM F436) each. Nuts must conform to ASTM A563 requirements. Embed fully threaded rods into parapet wall with a Type III, Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment depth is 3". Anchor adhesive chosen must be able to achieve a nominal bond strength in tension of a single anchor, Na, of 5 kips (edge distance must be accounted for). Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing".

Optional cast-in-place anchor bolts must be ⅞" Dia ASTM A307 Gr A bolts (or threaded rods with one tack welded hex nut each) with one hex nut and one hardened steel washer (ASTM F436) at each bolt. Nuts must conform to ASTM A563 requirements.

Provide bar laps, where required, as follows: Uncoated or galvanized ~ #4 = 1'-7"
Epoxy coated ~ #4 = 2'-5"

GENERAL NOTES:

This rail has been evaluated and accepted to be of equal strength to railings with like geometry, which have been crash tested to meet MASH TL-3 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.

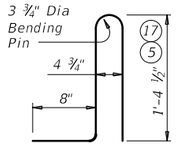
Do not use this railing on bridges with expansion joints providing more than 5" movement.

Rail anchorage details shown on this standard may require modification for select structure types. See appropriate details elsewhere in plans for these modifications.

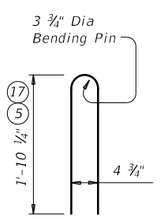
Submit erection drawings showing panel lengths, rail post spacing, and anchor bolt setting to the Engineer for approval.

Average weight of railing with no overlay: 380 plf (total)
370 plf (Conc)
10 plf (Steel)

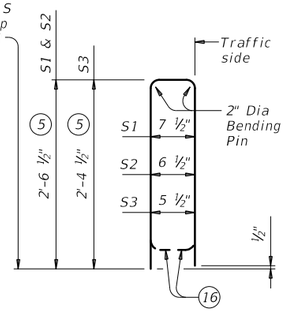
Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.



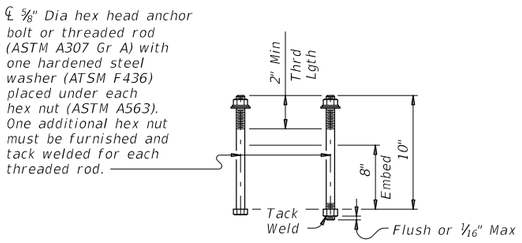
BARS U (#4)



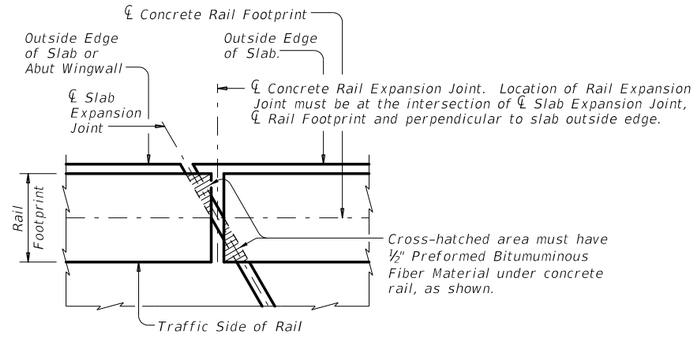
BARS WU (#4)



BARS S (#4)



CAST-IN-PLACE ANCHOR BOLT OPTIONS (18)



PLAN OF RAIL AT EXPANSION JOINTS

Example showing Slab Expansion Joints without breakbacks.

(5) Increase 2" for structures with overlay.

(7) HSS 2.875 x 0.203

(8) HSS 2.375 x 0.154

(15) No longitudinal wires may be in top center of cage.

(16) Bend or cut as required to clear drain slots.

(17) For raised sidewalks, add sidewalk height to total bar height. Use sidewalk height at rail's location.

(18) See "Material Notes" for anchor bolt information.

SHEET 3 OF 3

Texas Department of Transportation | Bridge Division Standard

COMBINATION RAIL

TYPE C221

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		PHARR	CAMERON,ETC		109

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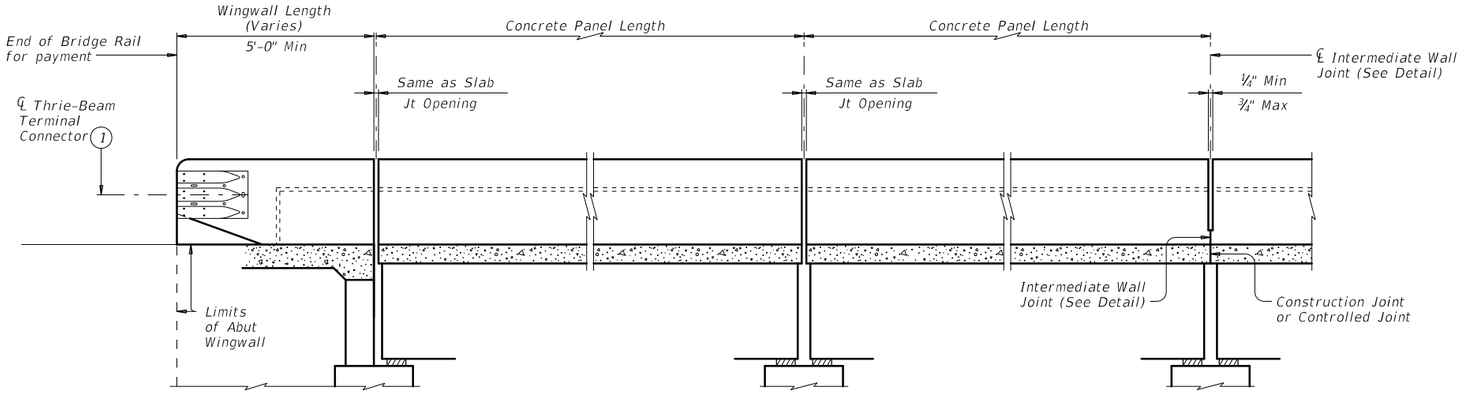
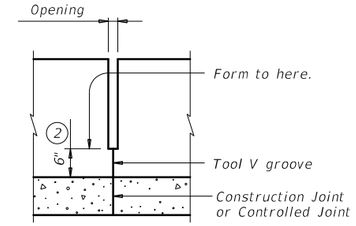


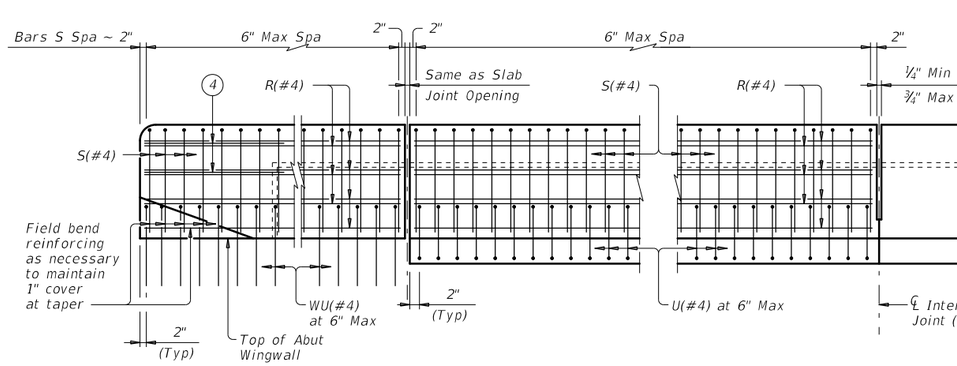
AT ABUTMENTS | AT BENTS WITH SLAB EXP JOINTS | AT BENTS WITHOUT SLAB EXP JOINTS

ROADWAY ELEVATION OF RAIL



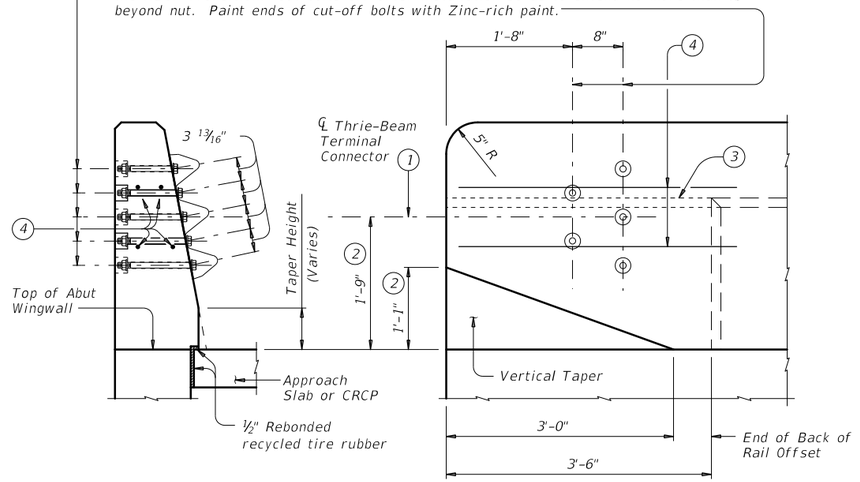
INTERMEDIATE WALL JOINT DETAIL

Provide at all interior bents without slab expansion joints.



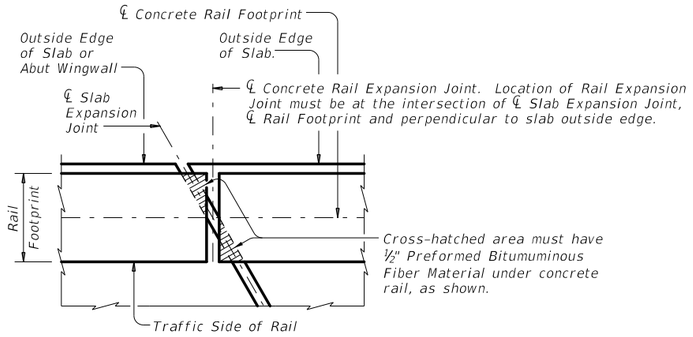
ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT

℄ 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



PLAN OF RAIL AT EXPANSION JOINTS

Example showing Slab Expansion Joints without breakbacks.

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.

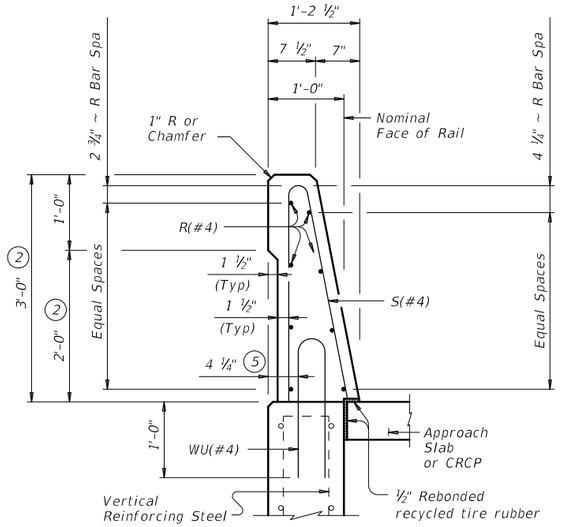
Texas Department of Transportation | Bridge Division Standard

TRAFFIC RAIL
SINGLE SLOPE

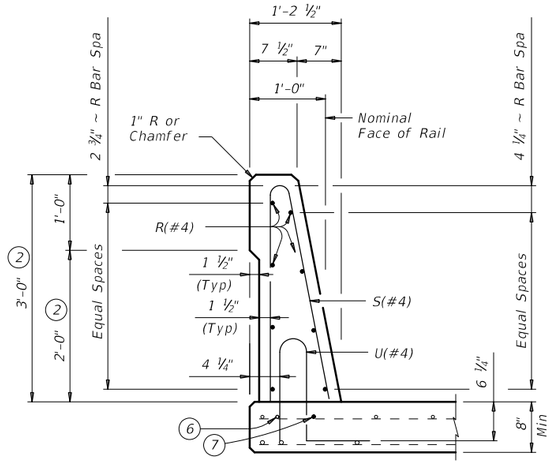
TYPE SSTR

FILE: rlstd014-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	302,ETC	TEEGE,ETC
	DIST	COUNTY		SHEET NO.
	PHARR	CAMERON,ETC		110

DATE: 12/7/2022 10:05:21 AM
FILE: ...\Bridge\rlstd014-19.dgn



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.

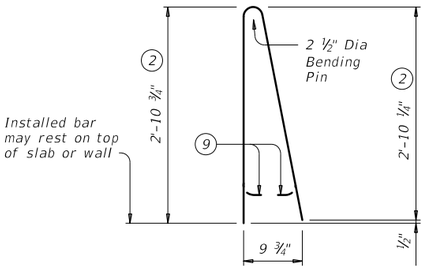
Rail anchorage details shown on this standard may require modification for select structure types. See appropriate details elsewhere in plans for these modifications.

Shop drawings will not be required for this rail.

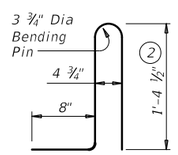
Average weight of railing with no overlay is 376 plf.

Cover dimensions are clear dimensions, unless noted otherwise.

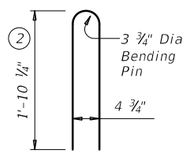
Reinforcing bar dimensions shown are out-to-out of bar.



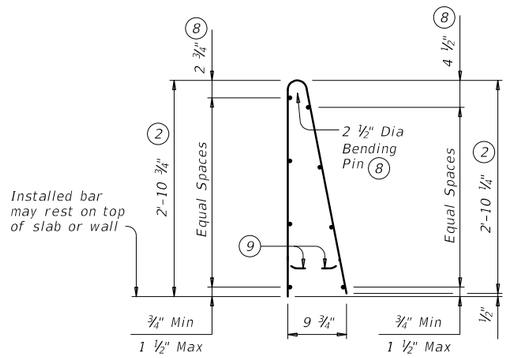
BARS S (#4)



BARS U (#4)

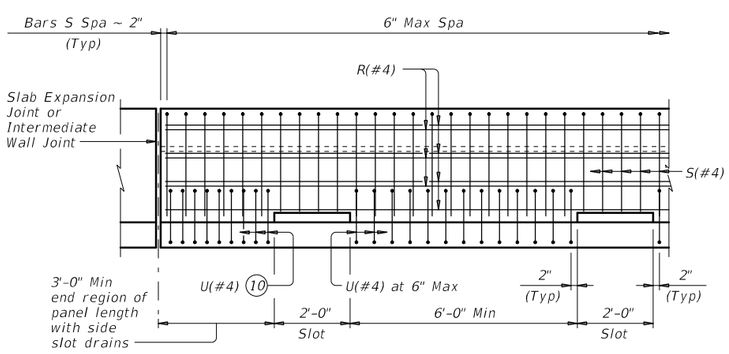


BARS WU (#4)



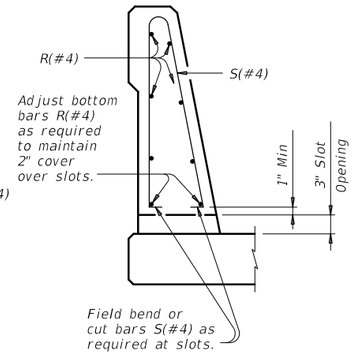
OPTIONAL WELDED WIRE REINFORCEMENT (WWR)

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

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	0921	06	302,ETC	TEEGE,ETC
	DIST	COUNTY		SHEET NO.
	PHARR	CAMERON,ETC		111

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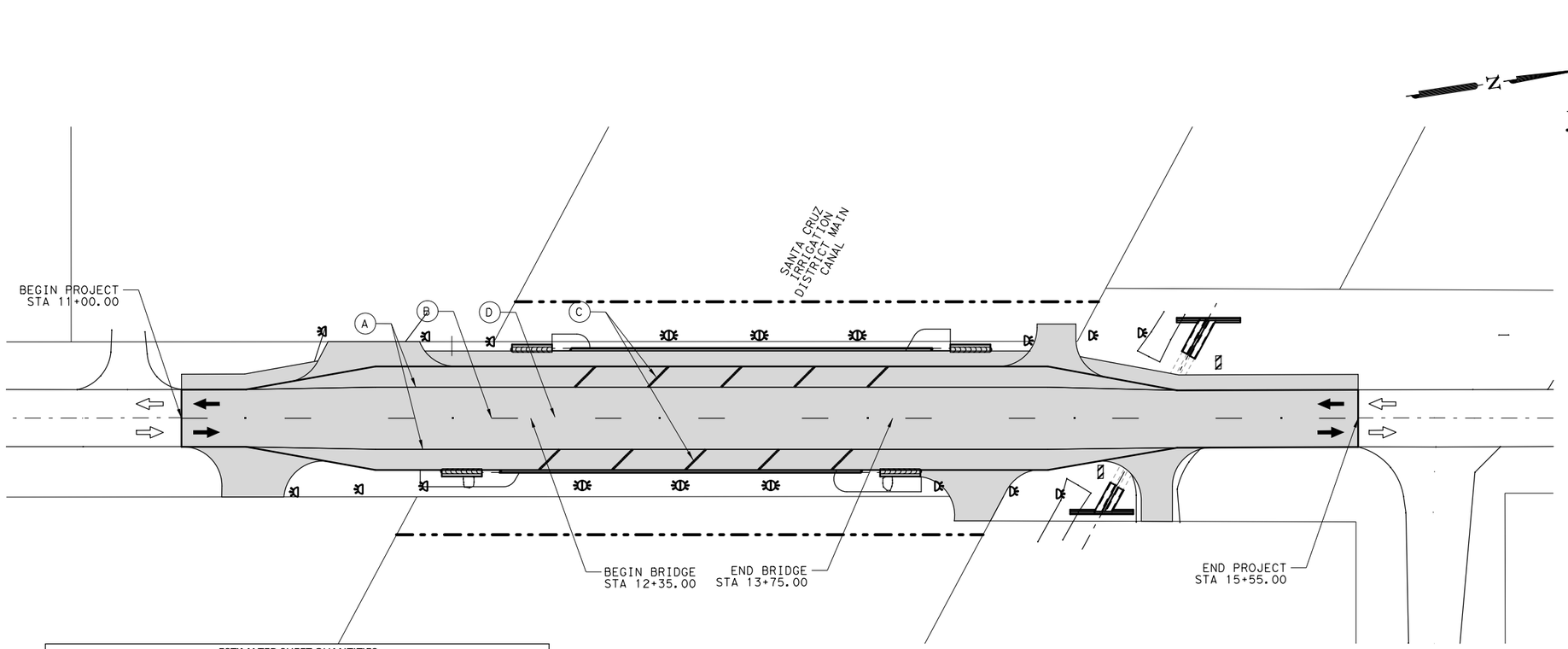

ESTIMATED SHEET QUANTITIES					
	ITEM		DESCRIPTION	UNIT	QTY
	658	6001	INSTL DEL ASSM (D-SW) SZ 1 (FLX) GND	EA	12
	658	6014	INSTL DEL ASSM (D-SW) SZ (BRF) CTB (BI)	EA	6
A	666	6303	RE PM W/RET REQ TY I (W) 4" (SLD)	LF	910
B	666	6312	RE PM W/RET REQ TY I (Y) 4" (BRK)	LF	115
C	666	6042	REFL PAVE MARK TY I W 12" (SLD)	LF	115
D	672	6009	REFL PAVE MRKR TY II-A-A	EA	11

HORIZ: 0 25 50
SCALE IN FEET

N

LEGEND

- EXISTING ROW
- PROPOSED ROW
- PROPOSED ROADWAY
- PROPOSED TRAFFIC
- EXISTING TRAFFIC
- (A) RE PM W/RET REQ TY I W 4" (SLD)
- (B) RE PM W/RET REQ TY I Y 4" (BRK)
- (C) RE PM W/RET REQ TY I Y 12"(SLD)
- (D) RAISED PAVE MARK (TY II-A-A) @ 80' C-C
- INSTL DEL ASSM (BI-DIRECTIONAL)
- INSTL DEL ASSM
- INSTL OM TY 3 ASSM

NOTES:

1. SEE HORIZONTAL ALIGNMENT DATA SHEET FOR MORE INFORMATION.
2. ALL PAVEMENT MARKINGS SHALL BE PLACED IN ACCORDANCE WITH THE TMUTCD.

STATE OF TEXAS
RYAN W. FRITZ
112568
LICENSED
PROFESSIONAL ENGINEER

12/07/2022

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL RD,
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

DOOLITTLE ROAD

SIGNING AND PAVEMENT MARKINGS LAYOUT

SCALE = 1"=50' SHEET 1 OF 1

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
LEH	6	SEE TITLE SHEET	TEEGE, ETC
DRAWN LEH	STATE	DISTRICT	COUNTY
CHECK BKB	TEXAS	PHARR	CAMERON, ETC
CHECK RWF	CONTROL	SECTION	JOB
	0921	06	302, ETC

SHEET NO. 112

DATE: 12/7/2022
TIME: 10:05:31 AM
USER: rwfritz
FILE NAME: ...Signing\DLR-BMCD-PVMRK-01.dgn

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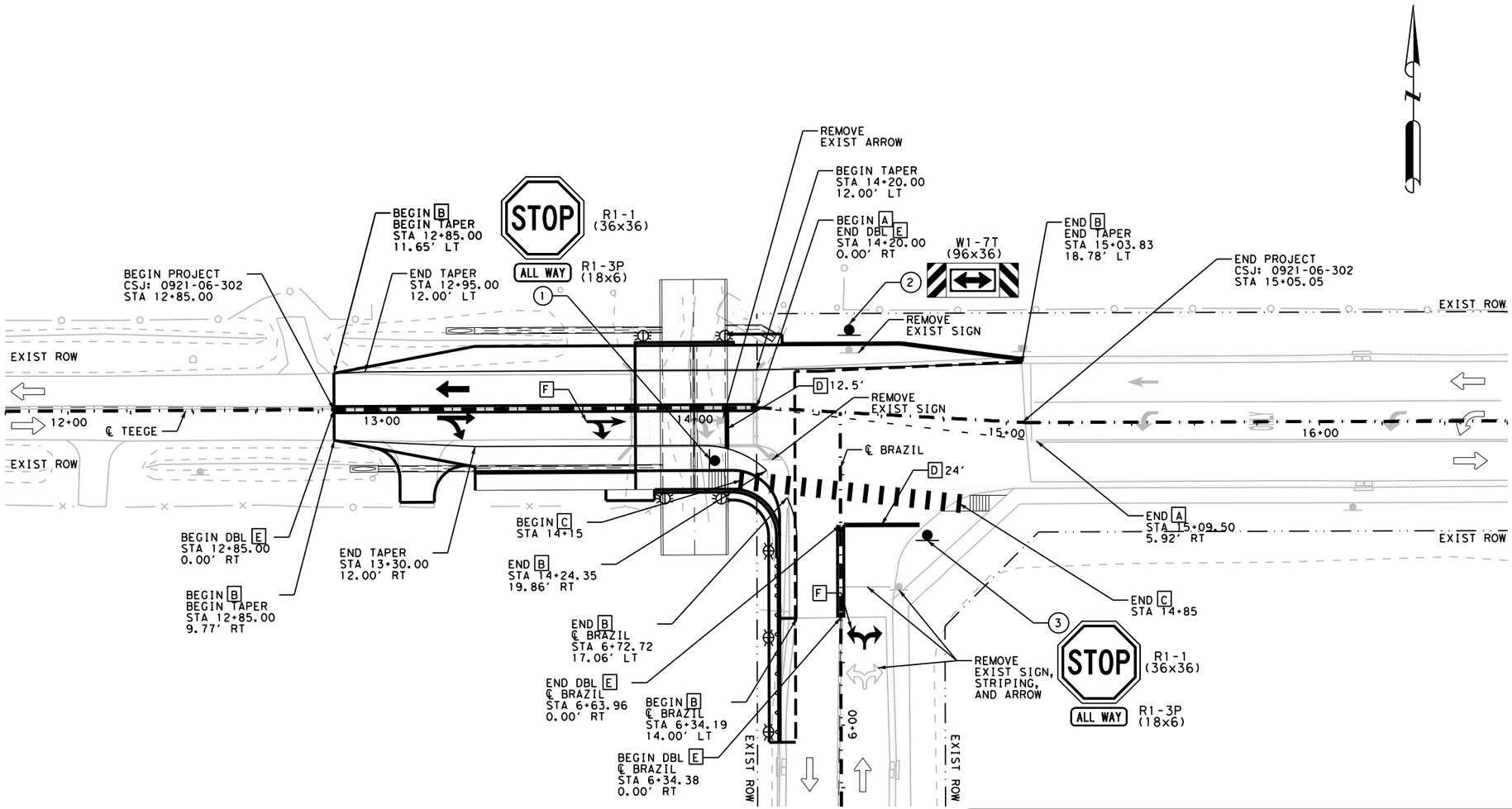
SCALE: 1:50
PLOT DRIVER: TXDOT_PDF_BW.INO RASTERS).pltt



LEGEND

- A REFL PAV MRK TY I (W)4"(DOT)(100 MIL)
- B RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)
- C REFL PAV MRK TY I (W)8"(SLD)(100 MIL)
- D REFL PAV MRK TY I (W)24"(SLD)(100 MIL)
- E RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)
- F REFL PAV MRK TY I (W) ARROW (100 MIL)
- PROP SMALL SIGN
- EXIST SMALL SIGN
- (#) PROP SIGN NUMBER
- PROP TRAFFIC
- EXIST TRAFFIC
- INSTL DEL ASSM (BI-DIRECTIONAL)

NOTES:

1. SEE HORIZONTAL DATA ALIGNMENT DATA SHEET FOR MORE INFORMATION.
2. ALL PAVEMENT MARKINGS SHALL BE PLACED IN ACCORDANCE WITH THE TEXAS MUTCD.

0 20' 40'
SCALE: 1"=40'

ESTIMATED SHEET QUANTITIES

	ITEM		DESCRIPTION	UNIT	QTY
	644	6027	IN SM RD SN SUP&AM TYS80(1)SA(P)	EA	2
	644	6030	IN SM RD SN SUP&AM TYS80(1)SA(T)	EA	1
	644	6076	REMOVE SM RD SN SUP&AM	EA	3
	658	6014	INSTL DEL ASSM (D-SW)SZ(BRF)CTB(BI)	EA	5
	658	6062	INSTL DEL ASSM (D-SW)SZ 1 (BRF)GF2(BI)	EA	2
A	666	6006	REFL PAV MRK TY I (W)4"(DOT)(100 MIL)	LF	24
B	666	6303	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	LF	355
D	666	6048	REFL PAV MRK TY I (W)24"(SLD)(100 MIL)	LF	121
E	666	6315	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF	240
F	666	6057	REFL PAV MRK TY I (W)(DBL ARROW)(100MIL)	EA	2
G	672	6009	REFL PAV MRKR TY II-A-A	EA	6

12/7/2022

STATE OF TEXAS
AARON DEBORD
96578
LICENSED
PROFESSIONAL ENGINEER

REV	BY	DESCRIPTION	DATE

AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TBPE FIRM REGISTRATION #739

2021
Texas Department of Transportation

TEEGE ROAD

SIGNING AND PAVEMENT MARKINGS LAYOUT

SHEET 01 OF 01

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
ASD	6	SEE TITLE SHEET		TEEGE,ETC
DESIGN CK HLT	STATE	DISTRICT	COUNTY	SHEET NO.
GRAPHICS AJG	TEXAS	PHARR	CAMERON, ETC	113
GRAPHICS CK TJR	CONTROL	SECTION NO.	JOB	
	0921	06	302, ETC	

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REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS

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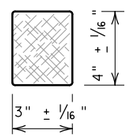
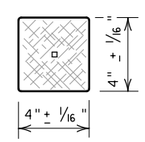
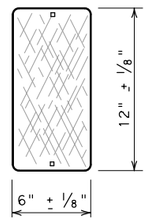
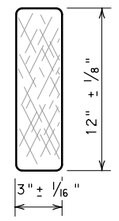
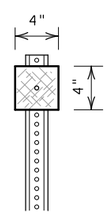
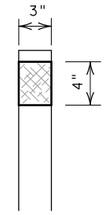
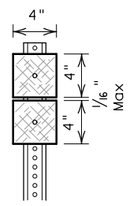
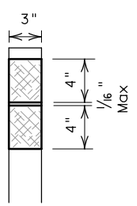
DEVICE				
SHEETING	Yellow, White or Red Type B or C reflective sheeting			

NOTE

1. Size 1 and 4 - Direct applied reflective sheeting for use on flexible post (flx).
2. Size 2 and 3 - For use on wing channel (wc) post only. Use approved metal, plastic or fiberglass backplate with 17/64" mounting holes.

DELINEATORS

	SINGLE		DOUBLE	
DEVICE				
	1-Size 2 reflector unit	1-Size 1 reflector unit	2-Size 2 reflector units	2-Size 1 reflector units
SHEETING	Yellow, White or Red Type B or C Reflective Sheeting			
POST TYPE	WC	YFLX, WFLX	WC	YFLX, WFLX
MOUNT TYPE	GND	GND, SRF	GND	GND, SRF

D & OM DESCRIPTIVE CODES

INSTL DEL ASSM (D-XX)SZ X (XXXX)XXX(XX)

NUMBER OF REFLECTORS
S = Single
D = Double

COLOR OF REFLECTORS
W = White
Y = Yellow
R = Red

REFLECTOR UNIT SIZE
1 or 2

TYPE OF POST OR DELINEATOR
WC = Wing Channel Post
YFLX = Yellow Flexible Post
WFLX = White Flexible Post
BRF = Barrier Reflector

TYPE OF MOUNT
GND = Embedded (drivable or set in concrete)
CTB = Concrete Barrier Mount
GF1 or GF2 = Guard Fence Attachment
SRF = Surface Mount

DIRECTION
If Required
BI = Bi-Directional
BR = Bi-Directional with red on back

INSTL OM ASSM (OM-XX) (XXXX)XXX(XX)

TYPE OF OBJECT MARKER
1, 2, 3, or 4

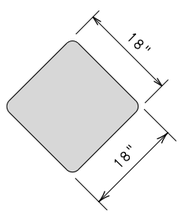
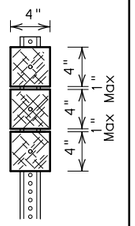
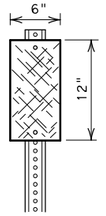
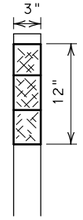
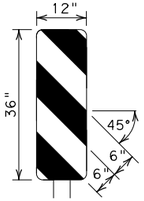
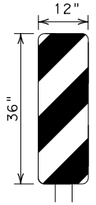
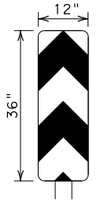
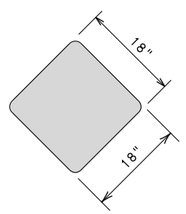
NUMBER OF REFLECTORS OR DIRECTION
X = 3-Size 2 reflector units (Type 2 only)
Y = 1-Size 3 reflector unit (Type 2 only)
Z = 3-Size 1 or 1-Size 4 reflector unit(s)(Type 2 only)
L = Left Side (Type 3 Object Marker only)
R = Right Side (Type 3 Object Marker only)
C = Center (Type 3 Object Marker only)

TYPE OF POST
WC = Wing Channel Post
WFLX = White Flexible Post
TWT = Thin Walled Tubing

TYPE OF MOUNT
GND = Embedded (drivable)
SRF = Surface Mount
WAS = Wedge Anchor Steel
WAP = Wedge Anchor Plastic

DIRECTION
If Required
BI = Bi-Directional

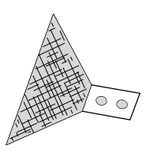
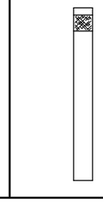
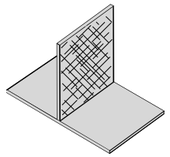
OBJECT MARKERS

	Type 1 (OM-1)	Type 2 (OM-2)			Type 3 (OM-3)			Type 4 (OM-4)
	OM-1	OM-2X	OM-2Y	OM-2Z	OM-3L	OM-3R	OM-3C	OM-4
DEVICE								
		3-Size 2 reflector units	1-Size 3 reflector unit	3-Size 1 reflector units or 1-Size 4 reflector unit				
SHEETING	Yellow-Type B_{FL} or C_{FL} Sheeting	Yellow - Type B or C Sheeting			Alternating acrylic black and retroflective yellow - Type B_{FL} or C_{FL} Sheeting			Red -Type B_{FL} or C_{FL} Sheeting
POST TYPE	TWT	WC	WC	WFLX	TWT			TWT
MOUNT TYPE	WAS, WAP	GND	GND	GND, SRF	WAS, WAP			WAS, WAP

DEPARTMENTAL MATERIAL SPECIFICATIONS

FLEXIBLE DELINEATOR & OBJECT MARKER POSTS (EMBEDDED & SURFACE MOUNT TYPES)	DMS-4400
SIGN FACE MATERIALS	DMS-8300
DELINEATORS, OBJECT MARKERS AND BARRIER REFLECTORS	DMS-8600

BARRIER REFLECTORS (BRF)

	GF1	GF2	CTB
DEVICE			

1. Barrier reflectors shall meet the requirements of DMS 8600.
2. Approved Barrier Reflectors are listed on the "Barrier Reflectors" Material Producer List at: www.txdot.gov.

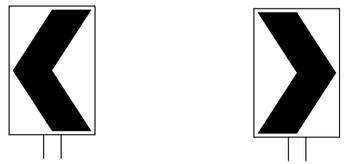
SHEETING: Yellow, White, Red

NOTE

1. Reflective sheeting shall have a minimum dimension of 3 inches and minimum surface area of 9 square inches.

CHEVRONS

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.

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	0921	06	302, ETC	TEEGE, ETC
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	PHARR	CAMERON, ETC		114

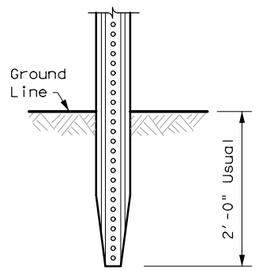
20A

DATE: 12/7/2022 10:05:39 AM
FILE: ...\Standards\Traffic\dom1-20.dgn

POST TYPE AND SUPPORT FOUNDATION DETAILS

WING CHANNEL (WC)

GND

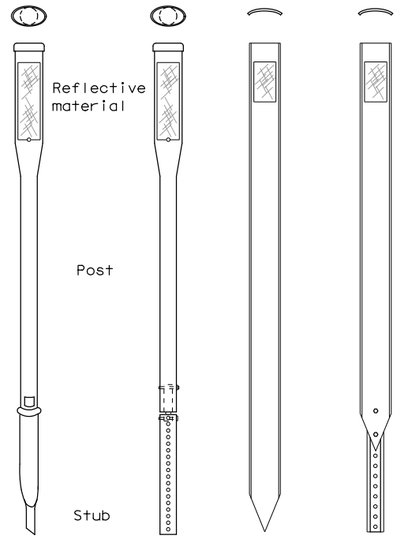


NOTES

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.

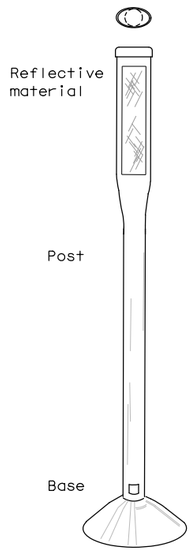
FLEXIBLE POSTS (YFLX, WFLX)

GND



EMBEDDED

SRF



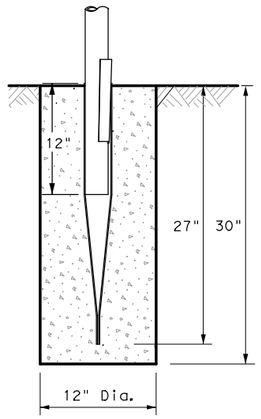
SURFACE MOUNT

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.

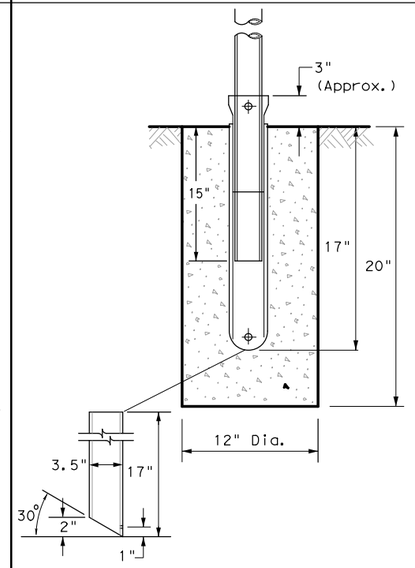
WEDGE ANCHOR SYSTEMS

WAS



STEEL

WAP



PLASTIC

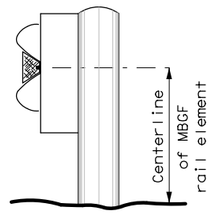
NOTE

1. Install per manufacturer's recommendations.

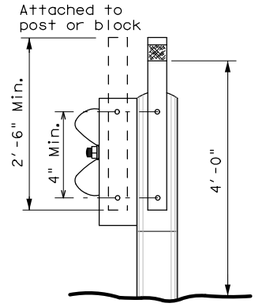
TYPE OF BARRIER MOUNTS

GUARD FENCE ATTACHMENT

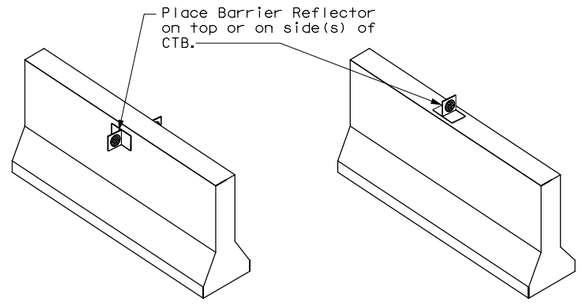
GF1



GF2



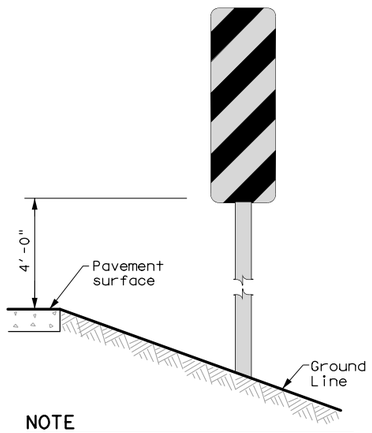
CONCRETE TRAFFIC BARRIER (CTB)



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.

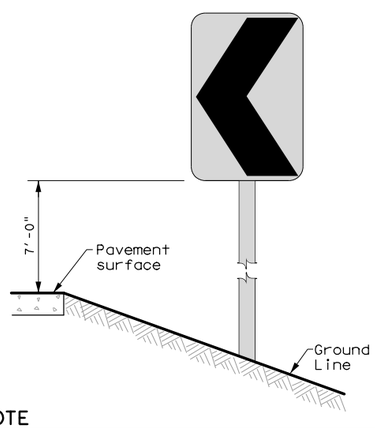
TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS



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)

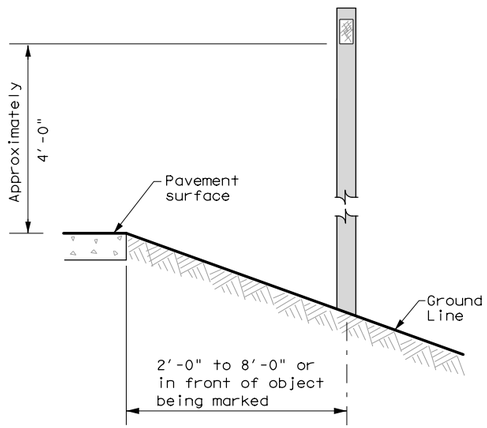
CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN



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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© TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	302,ETC	TEEGE,ETC
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	PHARR	CAMERON,ETC		115

20B

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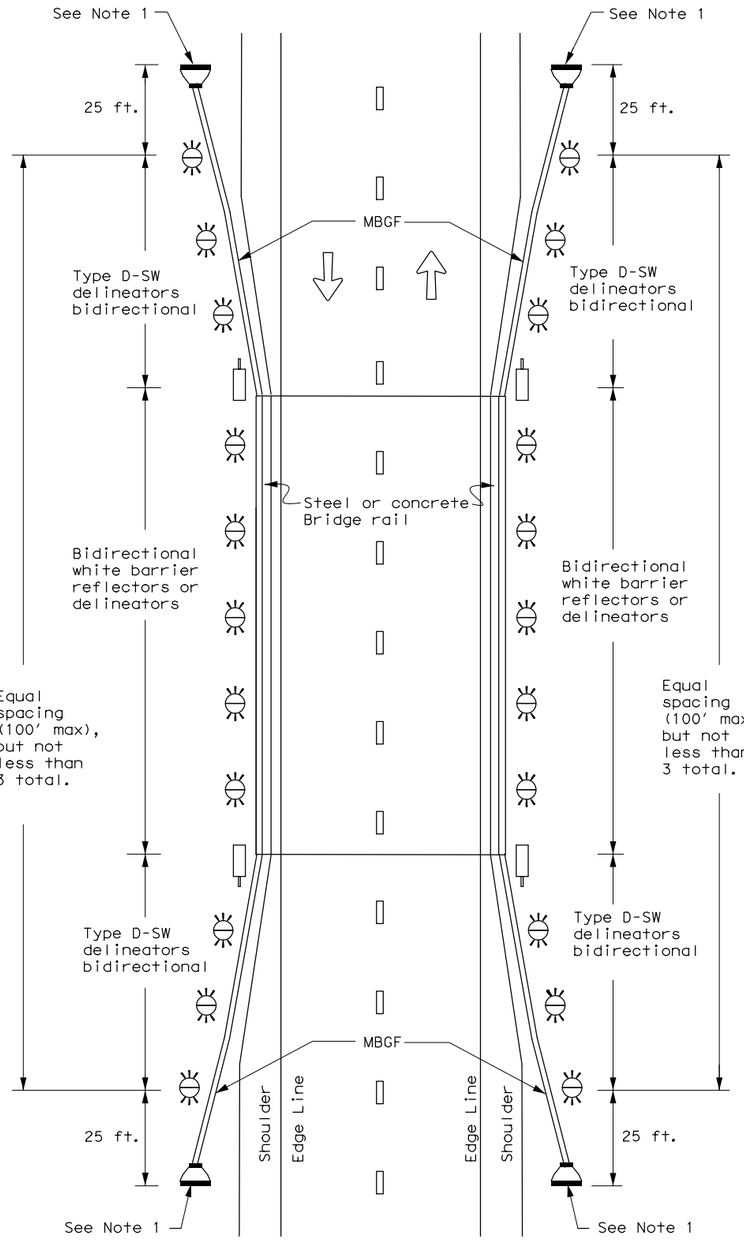
DATE: 12/7/2022 10:05:52 AM
FILE: ...\Standards\Traffic\dom5-20.dgn

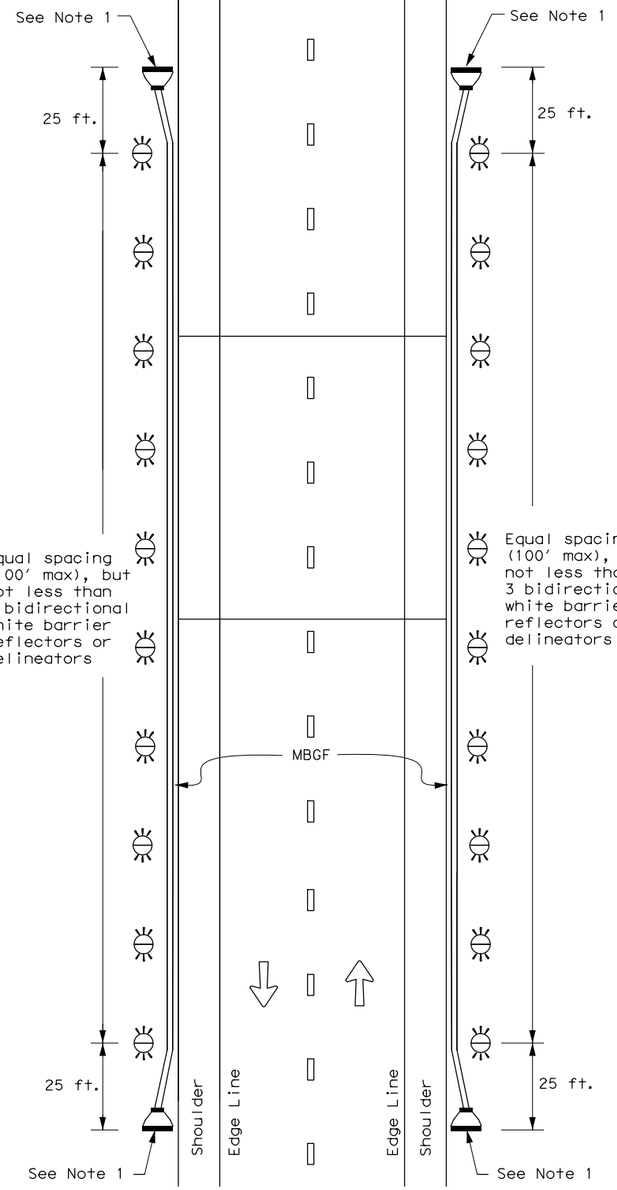
TWO-WAY, TWO LANE ROADWAY WITH REDUCED WIDTH APPROACH RAIL



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.

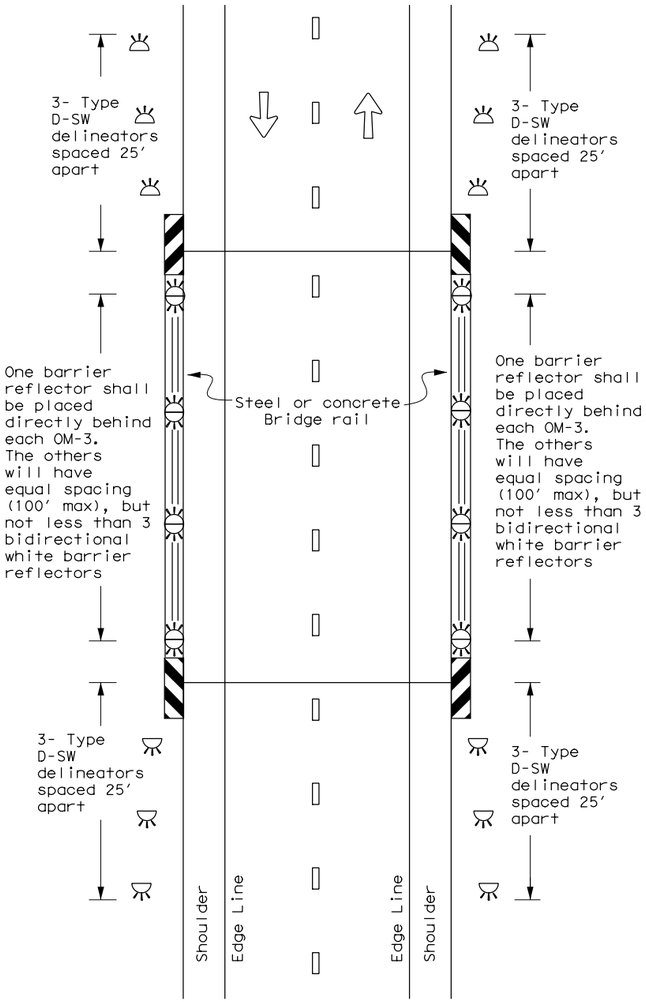
TWO-WAY, TWO LANE ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



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
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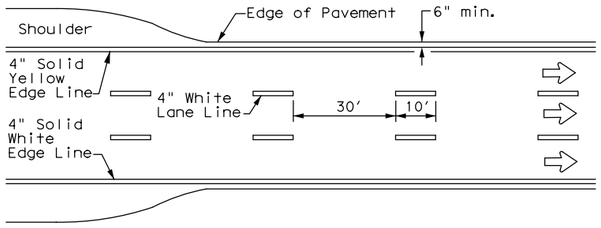
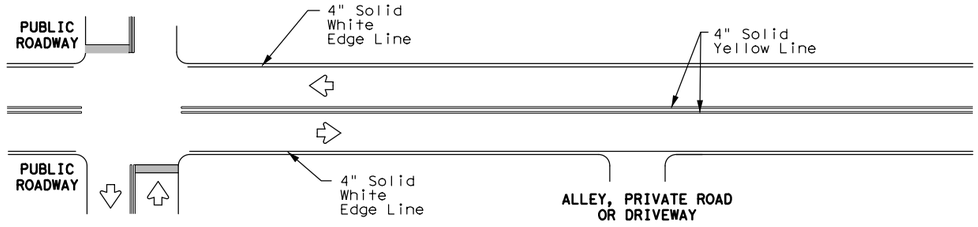
7-20	DIST	COUNTY		SHEET NO.
	PHARR	CAMERON, ETC		116

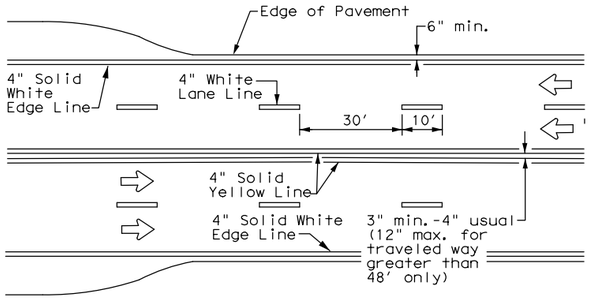
20E



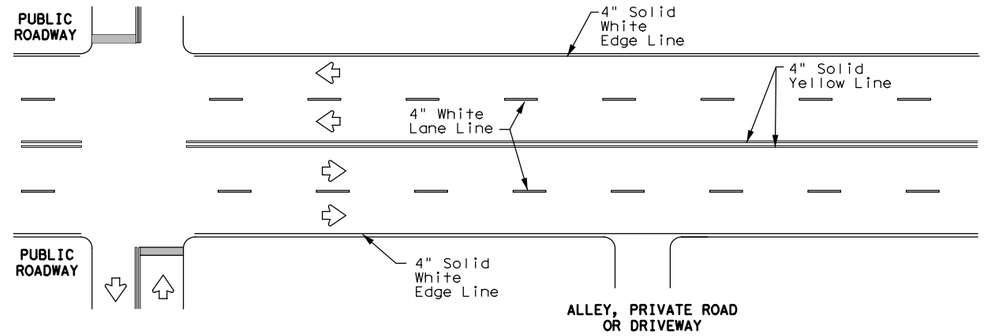
EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS



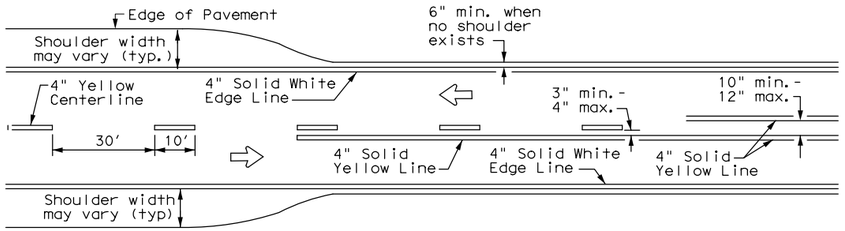
TYPICAL TWO-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS



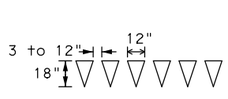
CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



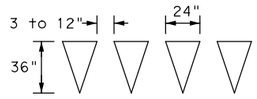
TYPICAL MULTI-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS



TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS

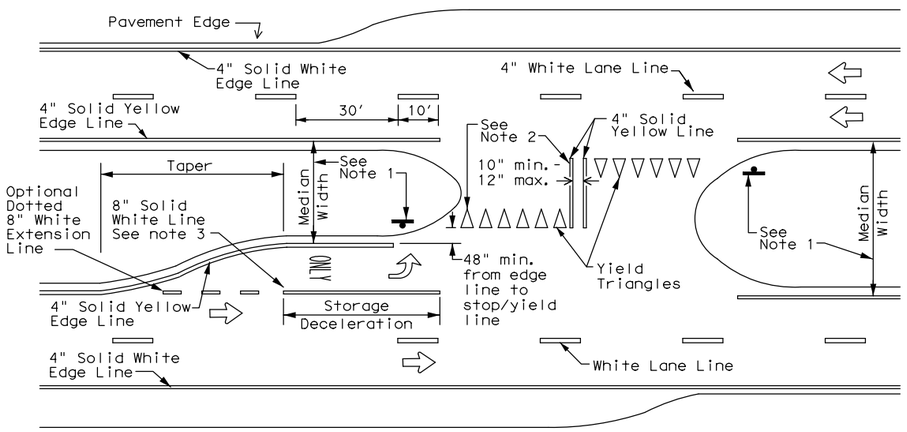


For posted speed on road being marked equal to or less than 40 MPH.



For posted speed on road being marked equal to or greater than 45 MPH.

YIELD LINES



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 are optional as determined by the Engineer.

2. Install median striping (double yellow centerlines and stop bars/yield triangles) when a 50' or greater median centerline can be placed. Stop bars shall only be used with stop signs. Yield traingles 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.

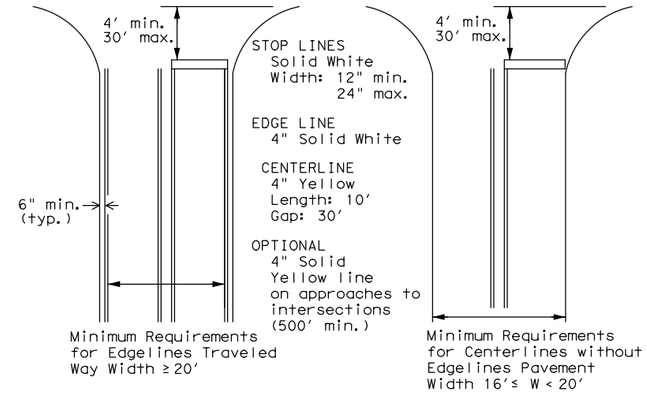
GENERAL NOTES

1. Edgeline striping shall be as shown in the plans or as directed by the Engineer. The edgeline should not be placed less less than 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edgelines are not required in curb and gutter sections of roadways.

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 inside of edgeline to the inside of edgeline of a two lane roadway.

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

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



GUIDE FOR PLACEMENT OF STOP LINES, EDGE LINE & CENTERLINE

Based on Traveled Way and Pavement Widths for Undivided Highways

Texas Department of Transportation

Traffic Safety Division Standard

TYPICAL STANDARD PAVEMENT MARKINGS

PM(1)-20

FILE: pm1-20.dgn	DN:	CK:	DW:	CK:
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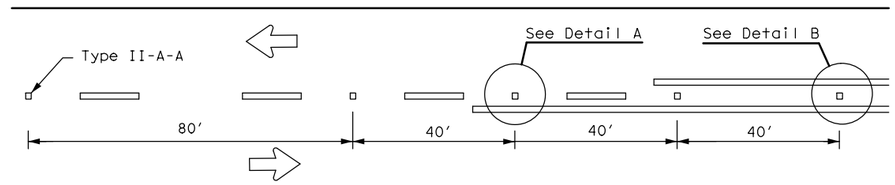
REVISIONS 8-95 3-03	0921	06	302, ETC	TEEGE, ETC
5-00 2-12	DIST	COUNTY		SHEET NO.
8-00 6-20	PHARR	CAMERON, ETC		117

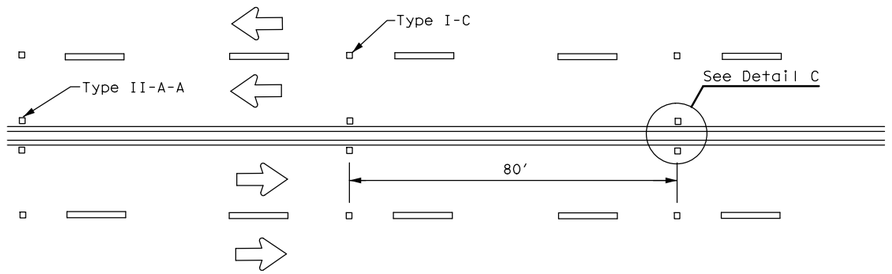
22A

DATE:
FILE:

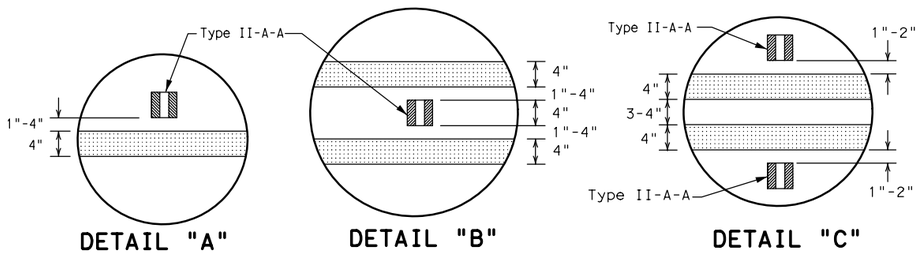
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE



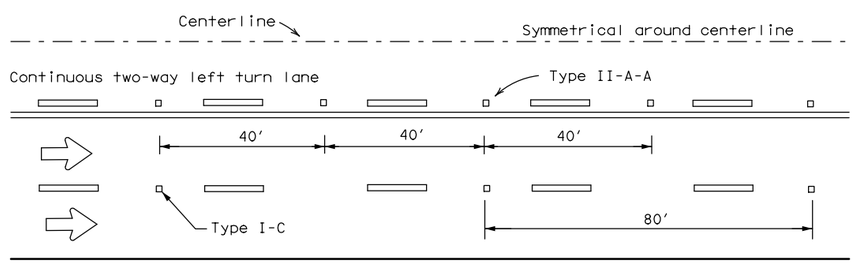
CENTERLINE FOR ALL TWO LANE ROADWAYS



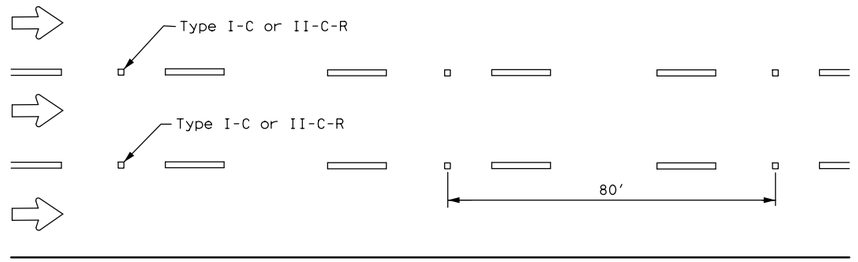
CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY HIGHWAYS



DETAIL "A" **DETAIL "B"** **DETAIL "C"**



CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE

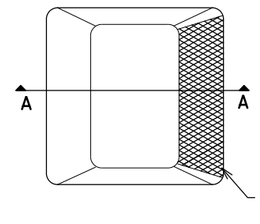


LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

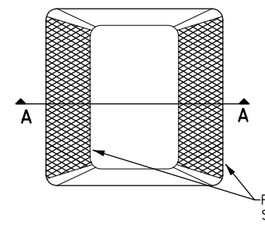
Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.

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

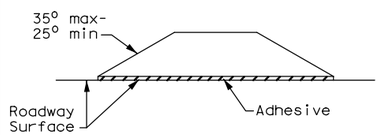
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)

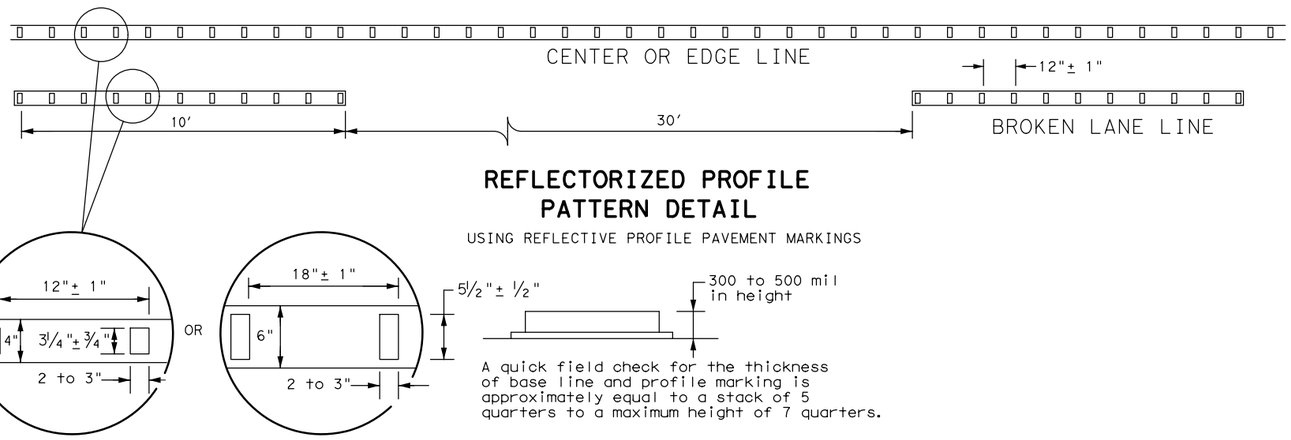


Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS



REFLECTORIZED PROFILE PATTERN DETAIL

USING REFLECTIVE PROFILE PAVEMENT MARKINGS

4" EDGE LINE, CENTER LINE OR LANE LINE

OPTIONAL 6" EDGE LINE, CENTER LINE OR LANE LINE

A quick field check for the thickness of base line and profile marking is approximately equal to a stack of 5 quarters to a maximum height of 7 quarters.

NOTE

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 in 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.

Texas Department of Transportation

Traffic Safety Division Standard

POSITION GUIDANCE USING RAISED MARKERS RELECTORIZED PROFILE MARKINGS PM(2)-20

FILE: pm2-20.dgn	DN:	CK:	DW:	CK:
©TxDOT April 1977	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-92 2-10	0921	06	302,ETC	TEEGE,ETC
5-00 2-12	DIST	COUNTY		SHEET NO.
8-00 6-20	PHARR	CAMERON,ETC		118

22B

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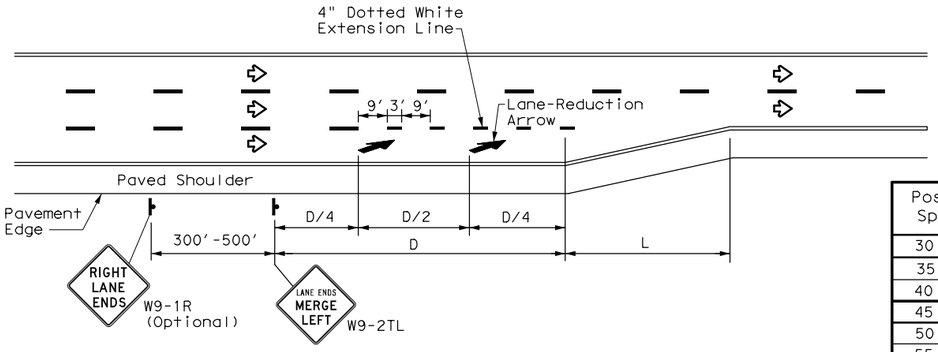
DATE:
FILE:

DATE:
FILE:

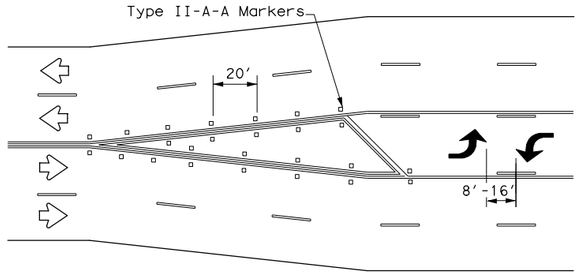


LANE REDUCTION

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	

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 W9-1R "RIGHT LANE ENDS" sign may be installed in the median aligned with the W9-1R sign on the right side of the highway.
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.



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.

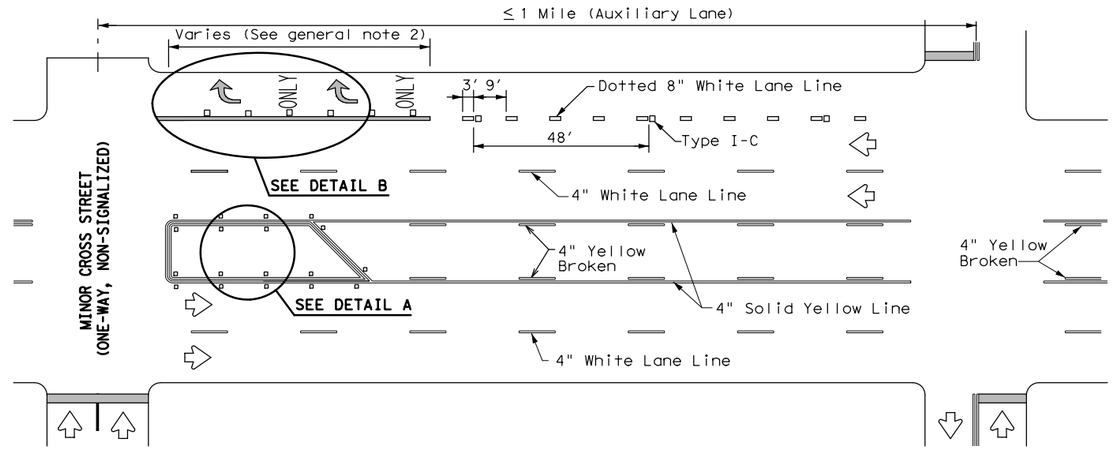
TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY

GENERAL NOTES

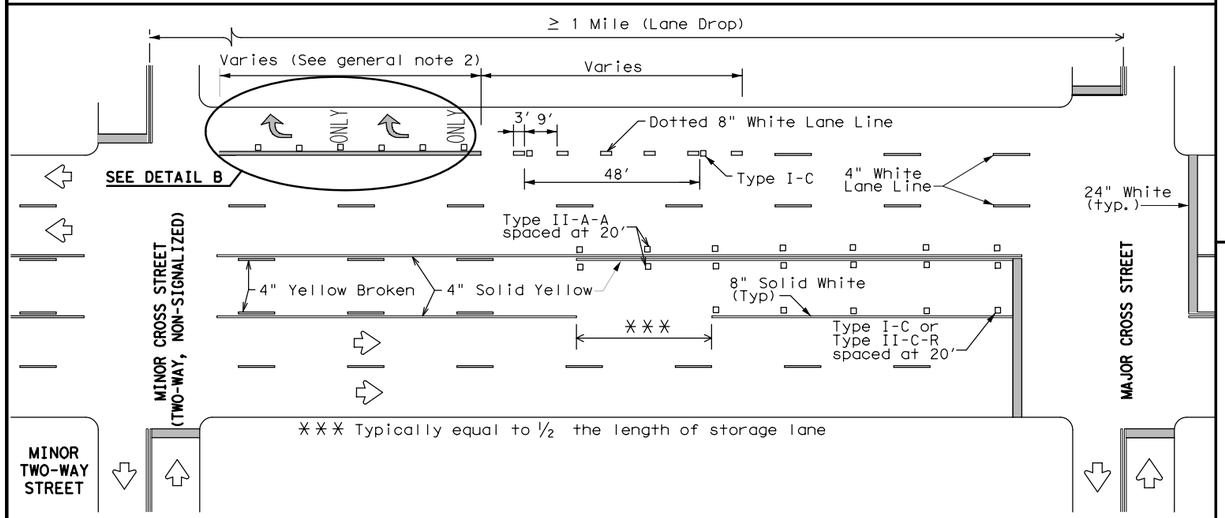
1. Lane use word and arrow markings shall be used where through lanes approaching an intersection become mandatory turn lanes. Lane use word and arrow markings should be used in auxiliary lanes of substantial length. Lane use arrow markings or word and arrow markings may be used in other lanes and turn 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.

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

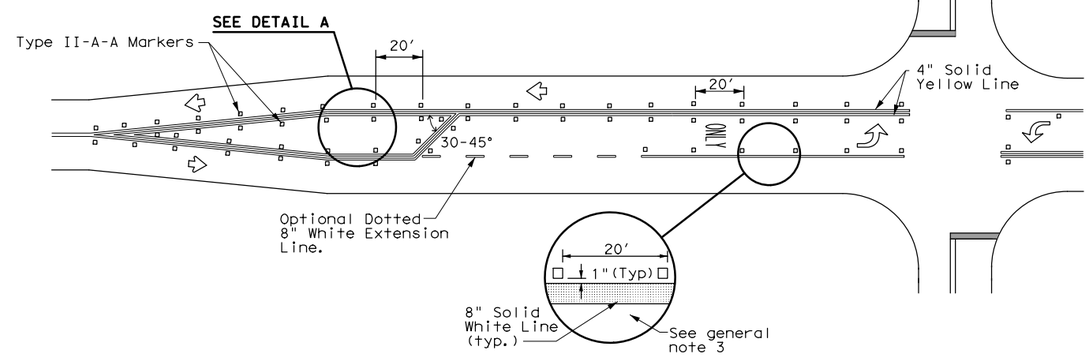
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



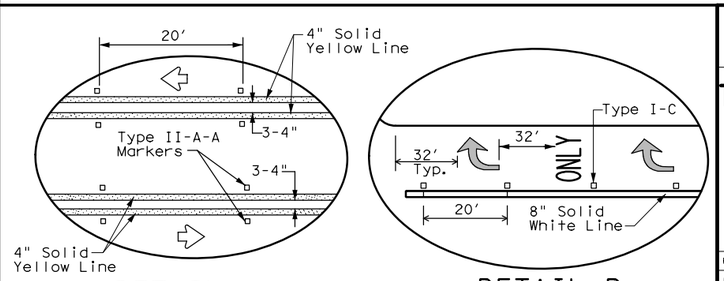
TYPICAL TWLTL AT ONE-WAY STREET AND RIGHT TURN AUXILIARY LANE



TYPICAL TWLTL AT TWO-WAY CROSS STREET AND RIGHT TURN LANE DROP



TYPICAL TWO-LANE HIGHWAY INTERSECTION WITH LEFT TURN BAYS



Texas Department of Transportation

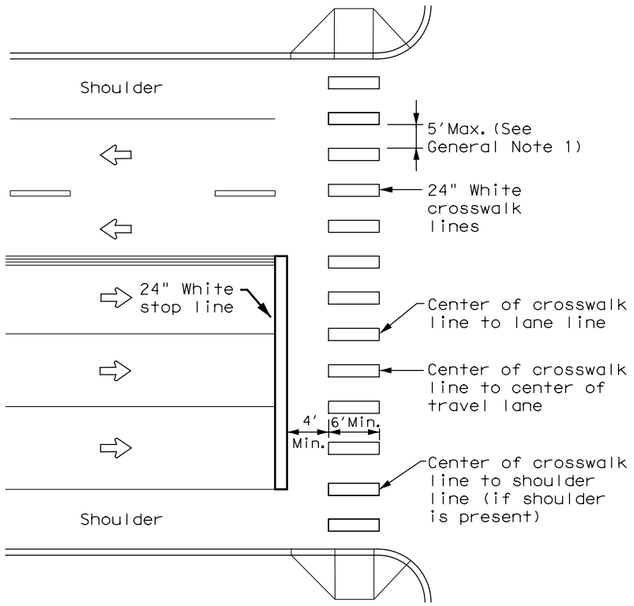
Traffic Safety Division Standard

TWO-WAY LEFT TURN LANES, RURAL LEFT TURN BAYS, AND LANE REDUCTION PAVEMENT MARKINGS PM(3)-20

FILE: pm3-20.dgn	DN:	CK:	DW:	CK:
© TxDOT April 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	302, ETC	TEEGE, ETC
5-00 2-10	DIST	COUNTY		SHEET NO.
8-00 2-12	PHARR	CAMERON, ETC		119
3-03 6-20				

22C

DATE:
FILE:



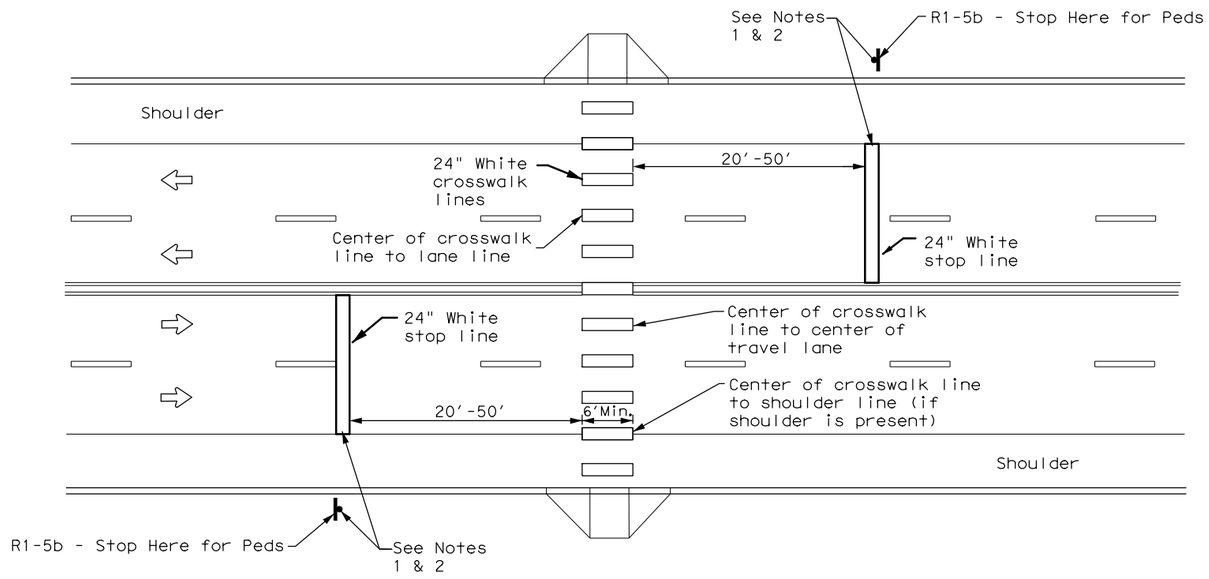
HIGH-VISIBILITY LONGITUDINAL CROSSWALK AT CONTROLLED APPROACH

GENERAL NOTES

1. Longitudinal crosswalk lines should not be placed in the wheel path of vehicles. Center the crosswalk lines on travel lanes, lane lines, and shoulder lines (if present).
2. A minimum 6" clear distance shall be provided to the curb face. If the last crosswalk line falls into this distance it must be omitted.
3. For divided roadways, adjustments in spacing of the crosswalk lines should be made in the median so that the crosswalk lines are maintained in their proper location across the travel portion of the roadway.
4. At skewed crosswalks, the crosswalk lines are to remain parallel to the lane lines.
5. Each crosswalk shall be a minimum of 6' wide.
6. The High-Visibility Longitudinal Crosswalk is the preferred crosswalk pattern on State Highways. Other crosswalk patterns as shown in the "Texas Manual on Uniform Traffic Control Devices" may be used. All crosswalk designs and dimension shall comply with the "Texas Manual on Uniform Traffic Control Devices."
7. Final placement of Stop Bar and Crosswalk shall be approved by the Engineer in the field.

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.



UNSIGNALIZED MID BLOCK HIGH-VISIBILITY LONGITUDINAL CROSSWALK

NOTES:

1. Use stop bars with "Stop Here for Pedestrians" signs at unsignalized mid block cross walks.
2. Use stop bars with "Stop Here on Red" signs at mid block crosswalks controlled by traffic signals or pedestrian hybrid beacons.

Texas Department of Transportation

Traffic Safety Division Standard

CROSSWALK PAVEMENT MARKINGS

PM(4)-22

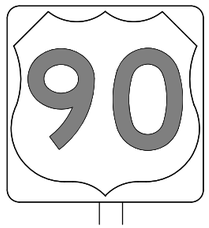
FILE: pm4-22.dgn	DN:	CK:	DW:	CK:
© TxDOT June 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS 3-22	0921	06	302,ETC	TEEGE,ETC
	DIST	COUNTY		SHEET NO.
	PHARR	CAMERON,ETC		120

22D

DATE:
FILE:

REQUIREMENTS FOR INDEPENDENT MOUNTED ROUTE SIGNS

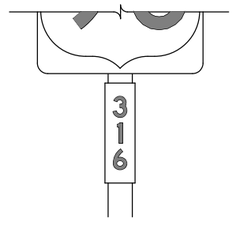
SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE A SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & BORDERS	ALL OTHERS	TYPE B or C SHEETING

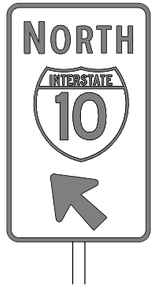


TYPICAL EXAMPLES

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

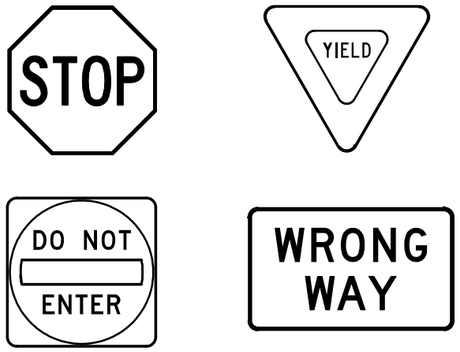
TYPICAL SIGN REQUIREMENTS

TSR(3)-13

FILE: tsr3-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	302,ETC	TEEGE,ETC
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	PHARR	CAMERON,ETC		121

DATE:
FILE:

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



REQUIREMENTS FOR FOUR SPECIFIC SIGNS ONLY

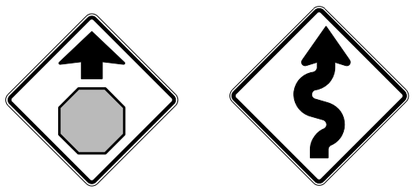
SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	WHITE	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE B OR C SHEETING
LEGEND	RED	TYPE B OR C SHEETING

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

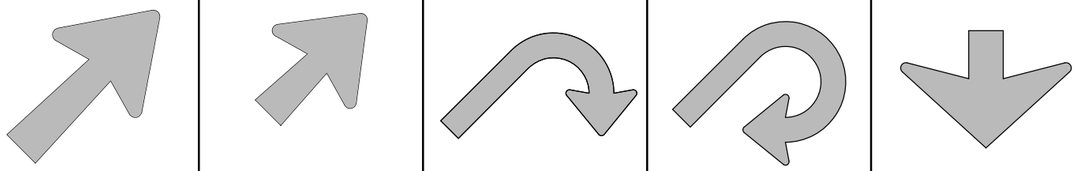
TYPICAL SIGN REQUIREMENTS

TSR(4)-13

FILE: tsr4-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS 12-03 7-13 9-08	0921	06	302, ETC	TEEGE, ETC
	DIST	COUNTY		SHEET NO.
	PHARR	CAMERON, ETC		122

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

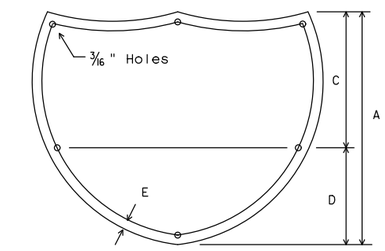
NOTE

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.

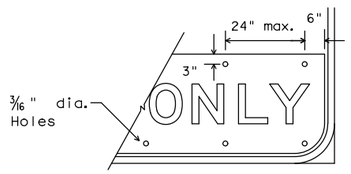
http://www.txdot.gov/

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

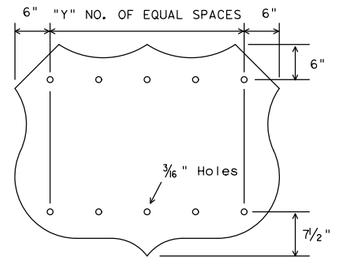


INTERSTATE ROUTE MARKERS

A	C	D	E
36	21	15	1 1/2
48	28	20	1 3/4

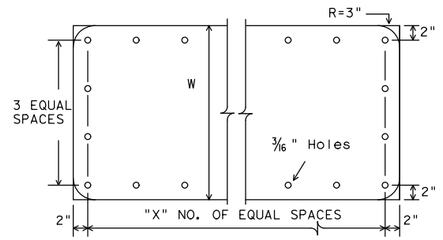


EXIT ONLY PANEL



U.S. ROUTE MARKERS

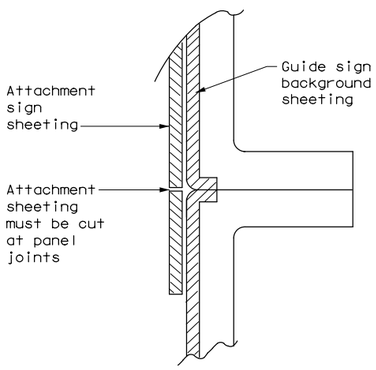
Sign Size	"Y"
24x24	2
30x24	3
36x36	3
45x36	4
48x48	4
60x48	5



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

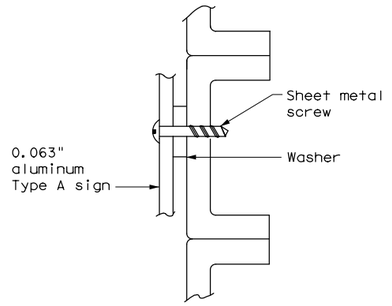
MOUNTING DETAILS OF ATTACHMENTS TO GUIDE SIGN FACE ("EXIT ONLY" AND "LEFT EXIT" PANELS, ROUTE MARKERS AND OTHER ATTACHMENTS)



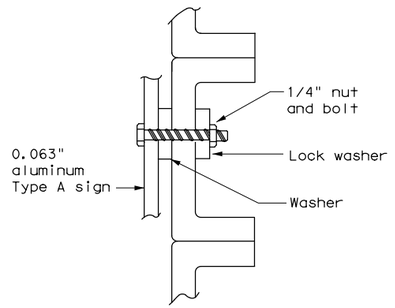
DIRECT APPLIED ATTACHMENT

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



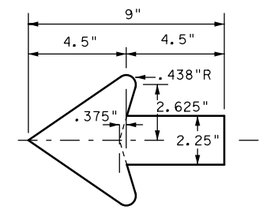
NUT/BOLT ATTACHMENT

NOTE:

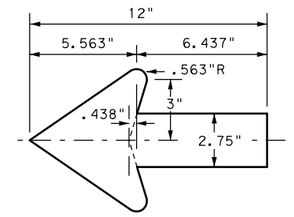
Furnish Type A aluminum sign attachments only when specified in the plans. These signs will be paid for under "Aluminum Signs".

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		0921	06	302,ETC	TEEGE,ETC
12-03 7-13		DIST	COUNTY		SHEET NO.
9-08		PHARR	CAMERON,ETC		123

DATE:
FILE:

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

SIGN SUPPORT DESCRIPTIVE CODES

(Descriptive Codes correspond to project estimate and quantities sheets)

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

Post Type

FRP = Fiberglass Reinforced Plastic Pipe (see SMD(FRP))
TWT = Thin-Walled Tubing (see SMD(TWT))
10BWG = 10 BWG Tubing (see SMD(SLIP-1) to (SLIP-3))
S80 = Schedule 80 Pipe (see SMD(SLIP-1) to (SLIP-3))

Number of Posts (1 or 2)

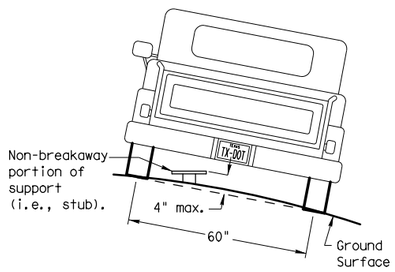
Anchor Type

UA = Universal Anchor - Concreted (see SMD(FRP) and (TWT))
UB = Universal Anchor - Bolted down (see SMD(FRP) and (TWT))
WS = Wedge Anchor Steel - (see SMD(TWT))
WP = Wedge Anchor Plastic (see SMD(TWT))
SA = Slipbase - Concreted (see SMD(SLIP-1) to (SLIP-3))
SB = Slipbase - Bolted Down (see SMD(SLIP-1) to (SLIP-3))

Sign Mounting Designation

P = Prefab. "Plain" (see SMD(SLIP-1) to (SLIP-3), (TWT), (FRP))
T = Prefab. "T" (see SMD(SLIP-1) to (SLIP-3), (TWT))
U = Prefab. "U" (see SMD(SLIP-1) to (SLIP-3))
IF REQUIRED
1EXT or 2EXT = Number of Extensions (see SMD(SLIP-1) to (SLIP-3), (TWT))
BM = Extruded Wind Beam (see SMD(SLIP-1) to (SLIP-3))
WC = 1.12 #/ft Wing Channel (see SMD(SLIP-1) to (SLIP-3))
EXAL = Extruded Aluminum Sign Panels (see SMD(SLIP-1))

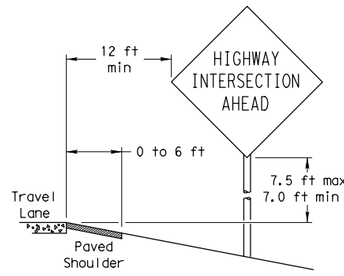
REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



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

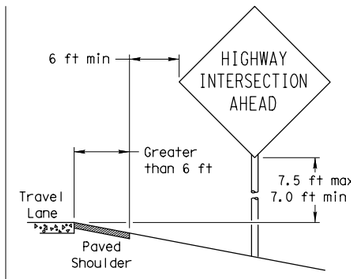
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

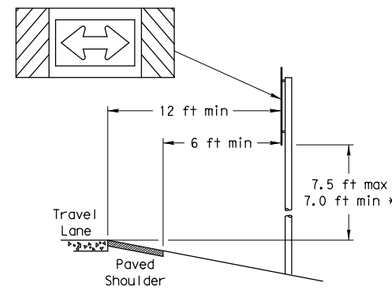
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



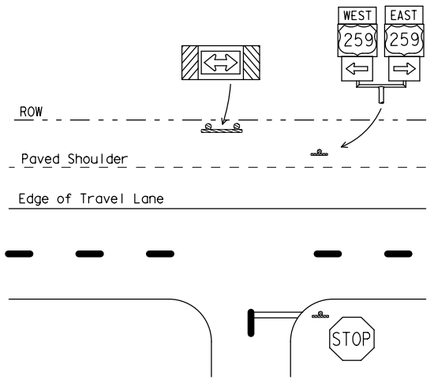
GREATER THAN 6 FT. WIDE

When the shoulder is greater than 6 ft in width, the sign must be placed at least 6 ft. from the edge of the shoulder.

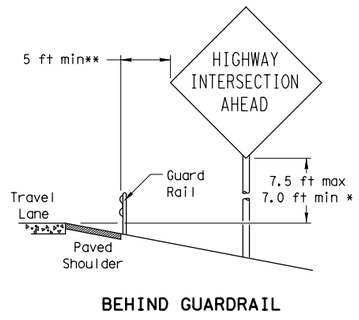
T-INTERSECTION



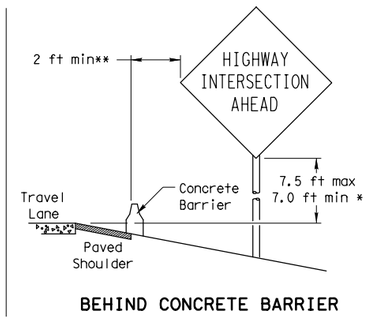
When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.



BEHIND BARRIER



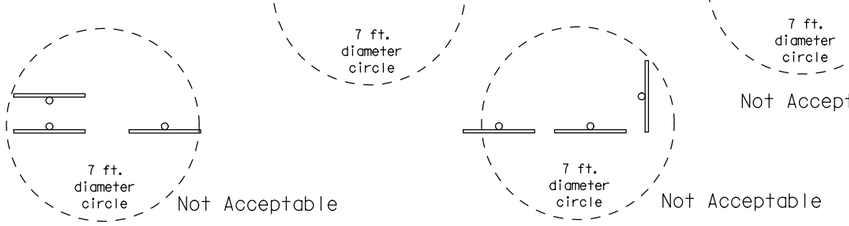
BEHIND GUARDRAIL



BEHIND CONCRETE BARRIER

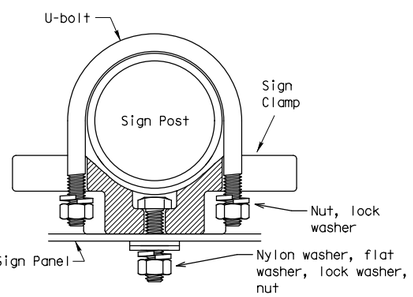
**Sign clearance based on distance required for proper guard rail or concrete barrier performance.

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

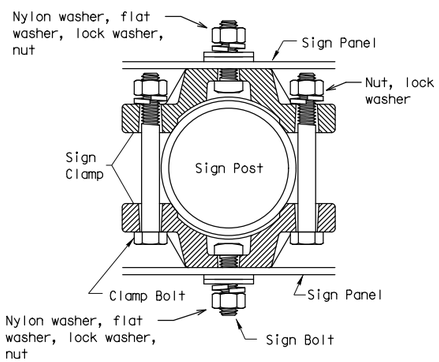


TYPICAL SIGN ATTACHMENT DETAIL

Single Signs



Back-to-Back Signs



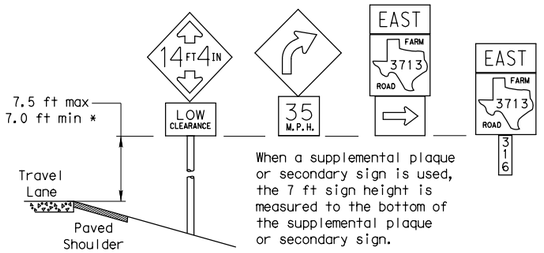
Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

When two sign clamps are used to mount signs back-to-back, use a 5/16-18 UNC galvanized hex head per ASTM A307 with nut and helical-spring lock washer. The approximate bolt lengths for various post sizes and sign clamp types are given in the table at right. The bolt length may need to be adjusted depending upon field conditions.

Sign clamps may be either the specific size clamp or the universal clamp.

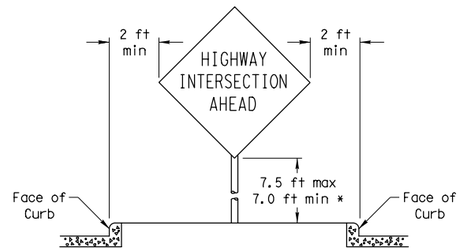
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



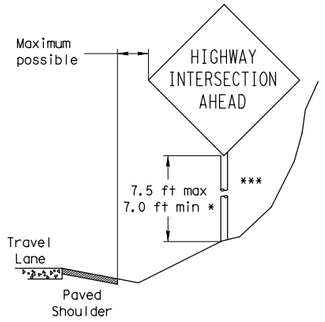
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

CURB & GUTTER OR RAISED ISLAND



RESTRICTED RIGHT-OF-WAY

(When 6 ft min. is not possible.)



Right-of-way restrictions may be created by rocks, water, vegetation, forest, buildings, a narrow island, or other factors.

In situations where a lateral restriction prevents the minimum horizontal clearance from the edge of the travel lane, signs should be placed as far from the travel lane as practical.

*** Post may be shorter if protected by guardrail or if Engineer determines the post could not be hit due to extreme slope.

* Signs shall be mounted using the following condition that results in the greatest sign elevation:

(1) a minimum of 7 to a maximum of 7.5 feet above the edge of the travel lane or

(2) a minimum of 7 to a maximum of 7.5 feet above the grade at the base of the support when sign is installed on the backslope.

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

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

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

Texas Department of Transportation
Traffic Operations Division

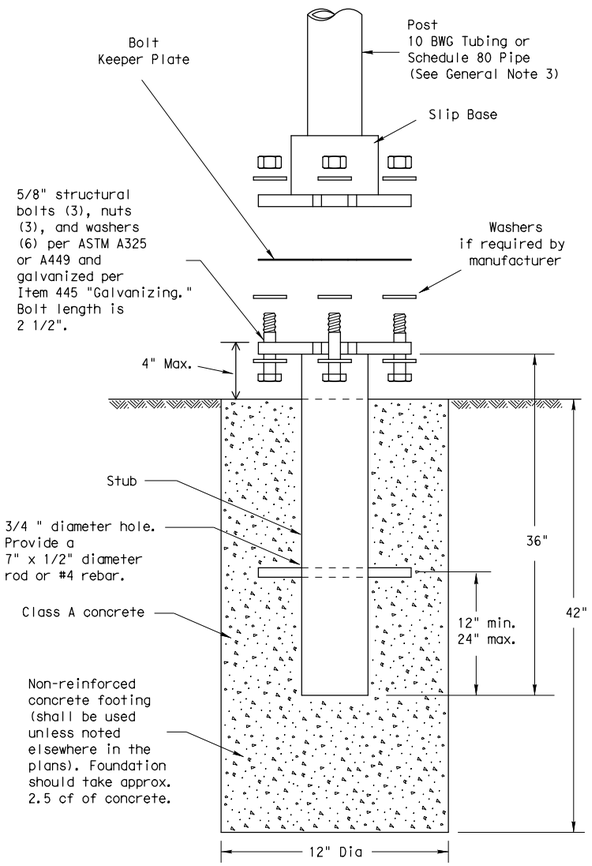
SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

SMD(GEN)-08

REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08	CONT	SECT	JOB	HIGHWAY
	0921	06	302,ETC	TEEGE,ETC
	DIST	COUNTY		SHEET NO.
	PHARR	CAMERON,ETC		124

DATE: 12/7/2022 10:06:50 AM
FILE: ...\Standards\Traffic\smdgen.dgn

TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS



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

NOTE

There are various devices approved for the Triangular Slipbase System. Please reference the Material Producer List for approved slip base systems. http://www.txdot.gov/business/producer_list.htm The devices shall be installed per manufacturers' recommendations. Installation procedures shall be provided to the Engineer by Contractor.

GENERAL NOTES:

1. Slip base shall be permanently marked to indicate manufacturer. Method, design, and location of marking are subject to approval of the TxDOT Traffic Standards Engineer.
2. Material used as post with this system shall conform to the following specifications:
   10 BWG Tubing (2.875" outside diameter)
   - 0.134" nominal wall thickness
   - Seamless or electric-resistance welded steel tubing or pipe
   - Steel shall be HSLAS Gr 55 per ASTM A1011 or ASTM A1008
   - Other steels may be used if they meet the following:
     - 55,000 PSI minimum yield strength
     - 70,000 PSI minimum tensile strength
     - 20% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of 0.122" to 0.138"
   - Outside diameter (uncoated) shall be within the range of 2.867" to 2.883"
   - Galvanization per ASTM A123 or ASTM A653 G210. For precoated steel tubing (ASTM A653), recoat tube outside diameter weld seam by metallizing with zinc wire per ASTM B833.

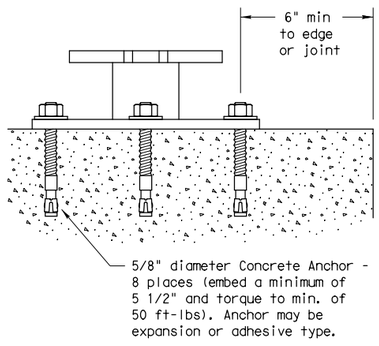
   Schedule 80 Pipe (2.875" outside diameter)
   - 0.276" nominal wall thickness
   - Steel tubing per ASTM A500 Gr C
   - Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the following:
     - 46,000 PSI minimum yield strength
     - 62,000 PSI minimum tensile strength
     - 21% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of 0.248" to 0.304"
   - Outside diameter (uncoated) shall be within the range of 2.855" to 2.895"
   - Galvanization per ASTM A123
3. See the Traffic Operations Division website for detailed drawings of sign clamps and Texas Universal Triangular Slipbase System components. The website address is: http://www.txdot.gov/publications/traffic.htm
4. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.

ASSEMBLY PROCEDURE

Foundation
1. Prepare 12-inch diameter by 42-inch deep hole. If solid rock is encountered, the depth of the foundation may be reduced such that it is embedded a minimum of 18 inches into the solid rock.
2. The Engineer may permit batches of concrete less than 2 cubic yards to be mixed with a portable, motor-driven concrete mixer. For small placements less than 0.5 cubic yards, hand mixing in a suitable container may be allowed by Engineer. Concrete shall be Class A.
3. Push the pipe end of the slip base stub into the center of the concrete. Rotate the stub back and forth while pushing it down into the concrete to assure good contact between the concrete and stub. Continue to work the stub into the concrete until it is between 2 to 4 inches above the ground.
4. Plumb the stub. Allow a minimum of 4 days to set, unless otherwise directed by the Engineer.
5. The triangular slipbase system is multidirectional and is designed to release when struck from any direction.

Support
1. Cut support so that the bottom of the sign will be 7 to 7.5 feet above the edge of the travelway (i.e., edge of the closest lane) when slip plate is below the edge of pavement or 7 to 7.5 feet above slip plate when the slip plate is above the edge of the travelway. The cut shall be plumb and straight.
2. Attach sign to support using connections shown. When multiple signs are installed on the same support, ensure the minimum clearance between each sign is maintained. See SMD(SLIP-2) for clearances based on sign types.

CONCRETE ANCHOR



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

Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. Heavy hex nut per ASTM A563, and hardened washer per ASTM F436. The stud bolt shall have a minimum yield and ultimate tensile strength of 50 and 75 KSI, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Adhesive type anchors shall have stud bolts installed with Type III epoxy per DMS-6100, "Epoxies and Adhesives." Adhesive anchors may be loaded after adequate epoxy cure time per the manufacturer's recommendations. Top of bolt shall extend at least flush with top of the nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 5 1/2" minimum embedment, shall have a minimum allowable tension and shear of 3900 and 3100 psi, respectively.

Texas Department of Transportation
Traffic Operations Division

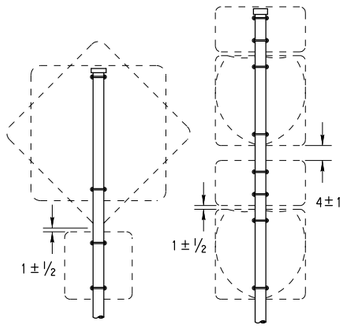
SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-1)-08

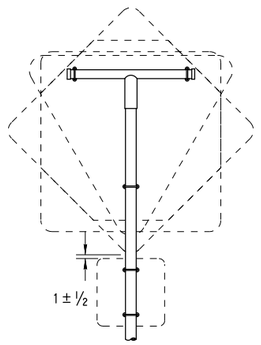
DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
REVISIONS 9-08			

CONT	SECT	JOB	HIGHWAY
0921	06	302,ETC	TEEGE,ETC
DIST	COUNTY		SHEET NO.
PHARR	CAMERON,ETC		125

DATE: 12/7/2022 10:06:57 AM
FILE: ...\Standards\Traffic\smds1.dgn



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



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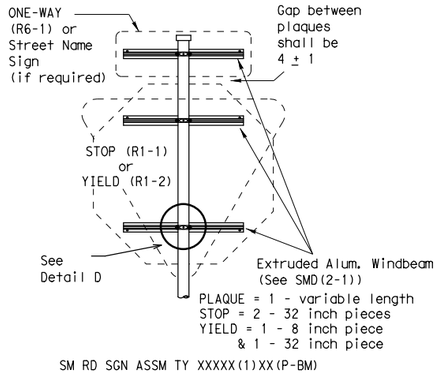
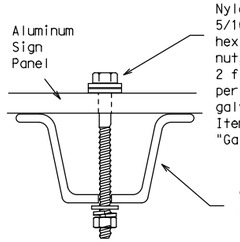
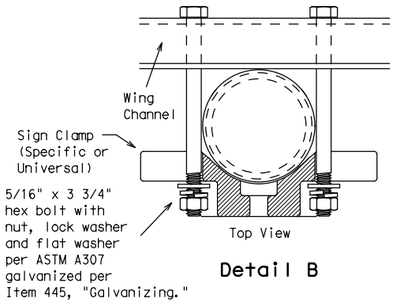


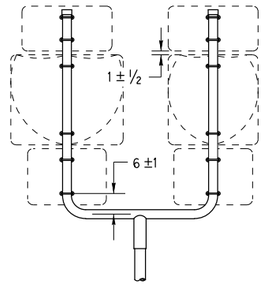
SM RD SGN ASSM TY XXXXX(1)XX(P-BM)



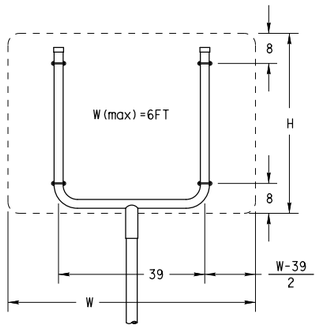
Detail A



Detail B



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



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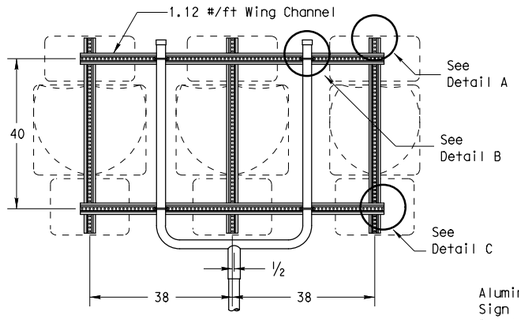
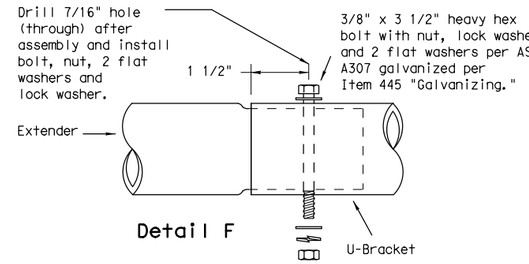
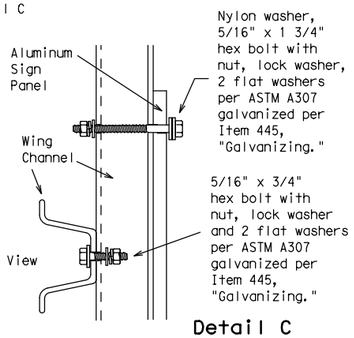


SM RD SGN ASSM TY XXXXX(1)XX(U-WC)
(See Note 11)

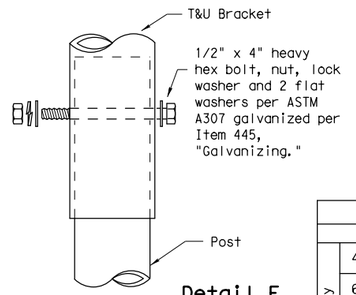


Detail F

Splices shall only be allowed behind the sign substrate.



Detail C



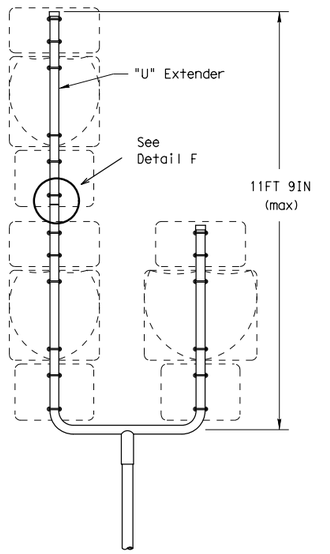
Detail E

GENERAL NOTES:

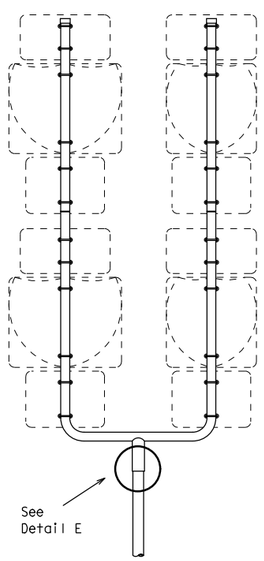
1.

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

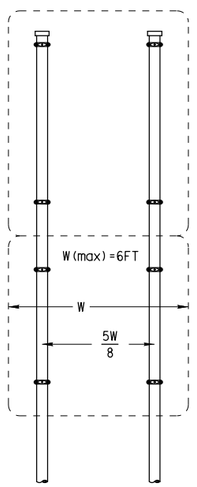
2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Additional route markers may be added vertically, provided the total sign area does not exceed the maximum allowable amount per Note 1.
11. Additional sign clamp required on the "T-bracket" post for 24 inch height signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.
13. Sign blanks shall be the sizes and shapes shown on the plans.



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

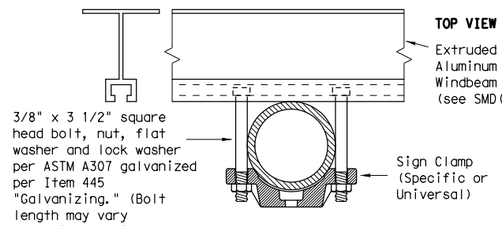


SM RD SGN ASSM TY S80(1)XX(U-2EXT)

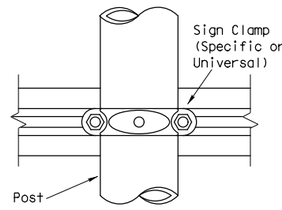


SM RD SGN ASSYM TY XXXXX(2)XX(P)

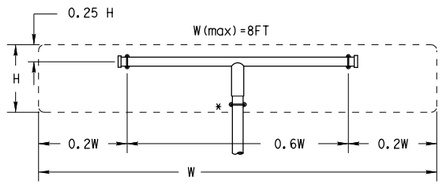
SIDE VIEW



Detail D



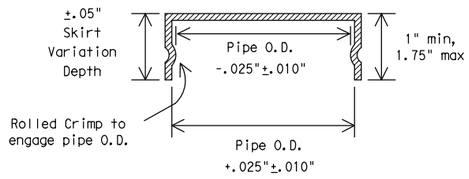
REQUIRED SUPPORT		
	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)



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

All dimensions are in english unless detailed otherwise.

FRICTION CAP DETAIL



Friction caps may be manufactured from hot rolled or cold rolled steel sheets. The minimum sheet metal thickness shall be 24 gauge for all cap sizes.

The rim edges shall be reasonably straight and smooth. Caps shall be sized and formed in such a manner as to produce a drive-on friction fit and have no tendency to rock when seated on the pipe. The depth shall be sufficient to give positive protection against entrance of rainwater. They shall be free of sharp creases or indentations and show no evidence of metal fracture.

Caps shall have an electrodeposited coating of zinc in accordance with the requirements of ASTM B633 Class FE/ZN 8.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-2)-08

REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08	CONT	SECT	JOB	HIGHWAY
	0921	06	302, ETC	TEEGE, ETC
	DIST	COUNTY		SHEET NO.
	PHARR	CAMERON, ETC		126

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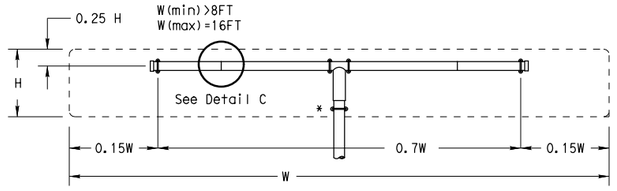
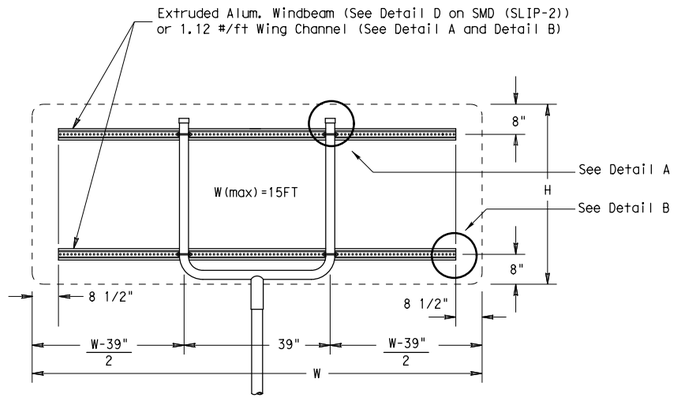
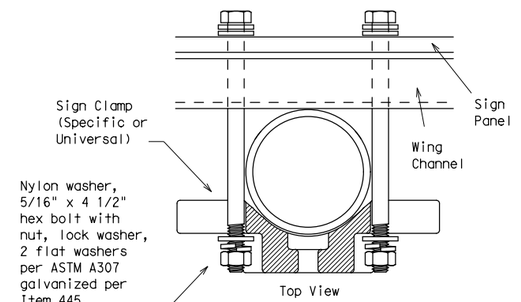


SM RD SGN ASSM TY XXXXX(1)XX(T-2EXT)

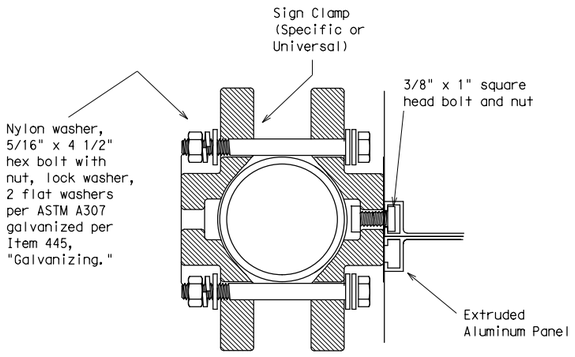
(* - See Note 12)



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

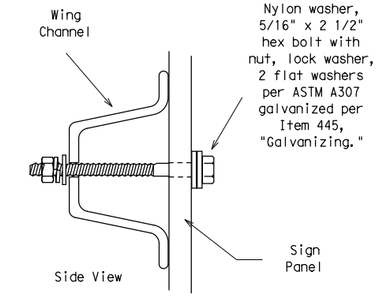


Detail A

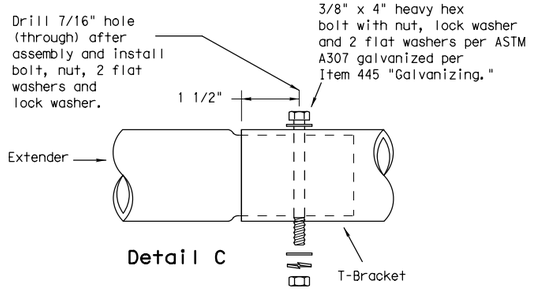


Detail D

EXTRUDED ALUMINUM SIGN WITH T BRACKET

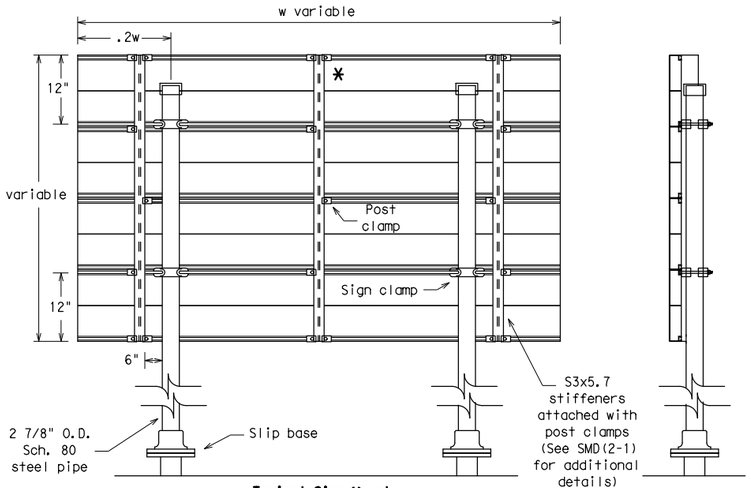


Detail B



Detail C

Splices shall only be allowed behind the sign substrate.

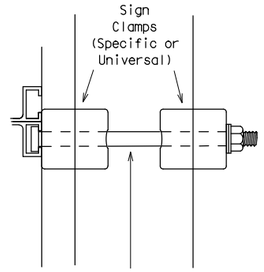


Typical Sign Mount

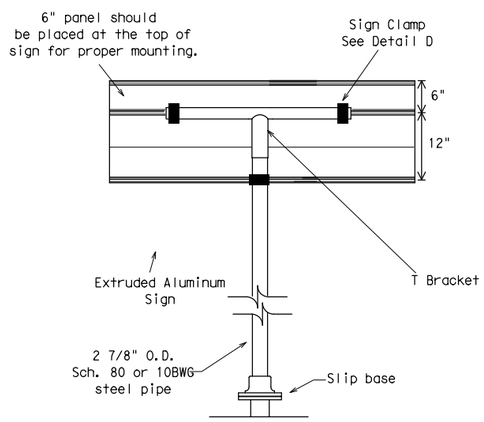
SM RD SGN ASSM TY S80(2)XX(P-EXAL)

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

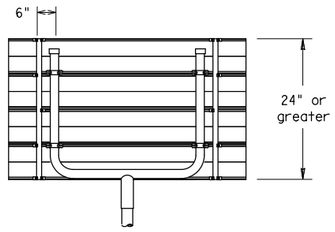
See Detail E
for clamp installation



Detail E



Extruded Aluminum Sign
With T Bracket



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

See Detail E
for clamp installation

GENERAL NOTES:

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

1. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
2. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
3. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
4. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
5. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
6. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
7. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
8. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
9. Sign blanks shall be the sizes and shapes shown on the plans.
10. Additional sign clamp required on the "T-bracket" post for 24 inch high signs. Place the clamp 3 inches above bottom of sign when possible.
11. Post open ends shall be fitted with Friction Caps.

REQUIRED SUPPORT		
	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-3)-08

REVISIONS
9-08

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

CONT	SECT	JOB	HIGHWAY
0921	06	302,ETC	TEEGE,ETC

DIST	COUNTY	SHEET NO.
PHARR	CAMERON,ETC	127

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During the planning phase of project development, the following Environmental Permits, Issues and Commitments have been developed during coordination with resource agencies, local governmental entities and the general public. Any change orders and/or deviations from the final design must be reported to the Engineer prior to the commencement of construction activities as additional environmental clearances may be required.

I. Clean Water Act, Section 402; Stormwater Pollution Prevention

Action Items Required : ☐ No Action Required

1. ☒ The contractor must implement the SW3P by installing Best Management Practices (BMPs) as indicated in the construction plans and maintained appropriately throughout construction. BMPs must be in place prior to the start of construction. The SW3P may need to be revised as necessary as construction progresses.

2. ☒ For all construction PSL's off the ROW, the contractor must certify compliance with all applicable laws, rules and regulations pertaining to the preservation of cultural resources, natural resources and the environment.

3. ☒ Based on the acreage of impact, select the appropriate box below:

   ☐ This project will disturb less than 1 acre of soil and is not part of a larger common plan of development; therefore, a NOI and TPDES Site Notice are not required for this project.

   or

   ☒ This project will disturb equal to or more than 1 acre of soil but less than 5 acres; therefore a NOI is not required but a TPDES Site Notice is required. The Construction Site Notice (CSN) is required to be posted at the construction site in a publicly accessible location for review by the public, TCEQ, EPA and other Inspectors.

   or

   ☐ This project will disturb equal to or more than 5 acres of soil and will require a NOI and TPDES Site Notice. The NOI and Site Notice are required to be posted at the construction site in a publicly accessible location.

4. ☒ Need to address MS4 requirements (Cameron & Hidalgo Counties only) ☐ MS4 requirements not needed

II. Clean Water Act, Sections 401 and 404 Compliance

Action Items Rquired : ☐ No Action Required

1. ☐ Filling, dredging or excavating in any water bodies, rivers, creeks, streams, wetlands or wet areas is prohibited unless specified in the USACE permit and approved by the Engineer. The contractor shall adhere to all agreements, mitigation plans, and BMPs required by the NWP as regulated by the USACE.

   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 (1/10th to <1/2 acre, 1/3 in tidal waters)

   ☐ Individual 404 Permit Required

   ☐ Other Nationwide Permit Required: NWP#_____

2. ☒ The contractor is responsible for obtaining new or revised Section 404 permit(s) for Contractor initiated changes in construction methods that change Impacts To Waters Of The U.S., including wetlands. The Contractor will ensure that the water quality of the State will be maintained and not degraded.

3. ☒ Best Management Practices for applicable Section 401 General Conditions:

General Condition 12 - Categories I and II BMPs required

Category I (Erosion Control)

☒ Temporary Vegetation	☐ Interceptor Swale	☒ Mulch Filter Berms and/or Socks
☐ Blankets, Matting	☐ Diversion Dike	☐ Compost Filter Berms and/or Socks
☒ Mulch	☐ Erosion Control Compost	☐ Compost Blankets
☐ Sodding		

Category II (Sedimentation Control)

☒ Silt Fence	☐ Hay (Straw) Bale Dike	☒ Mulch Filter Berms and/or Socks
☐ Rock Berm	☐ Brush Berms	☐ Compost Filter Berms and/or Socks
☐ Triangular Filter Dike	☐ Sediment Basins	☐ Stone Outlet Sediment Traps
☐ Sand Bag Berm	☒ Erosion Control Compost	

General Condition 21 - Category III BMPs required

Category III (Post-Construction TSS Control)

☒ Vegetative Filter Strips	☐ Wet Basins	☐ Mulch Filter Berms and/or Socks
☐ Retention/Irrigation	☐ Grassy Swales	☐ Compost Filter Berms and/or Socks
☐ Extended Detention Basin	☒ Vegetation-Lined Ditches	☐ Sand Filter Systems
☐ Constructed Wetlands	☐ Erosion Control Compost	☐ Sedimentation Chambers

II. Clean Water Act, Sections 401 and 404 Compliance - Continued:

4. ☒ The Contractor's designated and qualified Contractor Responsible Person Environmental (CRPe) will monitor the project site daily to ensue compliance with SW3P and TPDES General Permit TXR 150000. Daily Monitoring Reports shall be provided to TxDOT within 48 hours, in accordance with Item 506.3.1.

5. ☒ Other Project Specific Actions:

   1. Contractor must sweep roadway and remove loose aggregate upon completed daily operations.
   2. Contractor shall not place removed aggregate along adjacent grass areas.
   3. The project locations and limits are near a storm crossing. No PSL's are allowed in stream areas.
   4. Project shall have erosion control logs and/or silt fence to prevent soils from reaching stream areas.

III. Cultural Resources

Action Items Required : ☐ No Action Required

1. ☒ Refer to the 2014 TxDOT Standard Specifications For Construction And Maintenance Of Highways, Streets, And Bridges, Item 7.7.1., 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.

2. ☐ Other Project Specific Actions:

IV. Vegetation Resources

Action Items Required : ☐ No Action Required

1. ☒ In accordance with the 2014 TxDOT Standard Specifications; Item 164 - Seeding For Erosion Control; provide and install temporary or permanent seeding for erosion control as shown on the plans or as directed by the Engineer for all seeding and replanting of right of way where possible. (Required for Urban Settings)

2. ☒ In accordance with Executive Order 13112 on invasive species and the Executive Memorandum on Beneficial Landscaping, native species of plants shall be used for all seeding and replanting of right of way where possible for rural roadways. (Required for Rural Settings)

3. ☒ Preserve vegetation where possible throughout the project and minimize clearing, grubbing and excavation within stream banks, bed and approach sections.

4. ☐ Other Project Specific Actions:

Pharr District Contact No. 956-702-6100 Revised 01/30/2017

List of Abbreviations

BMP: Best Management Practice	NWP: Nationwide Permit
CGP: Construction General Permit	PCN: Pre-Construction Notification
CRPe: Contractor Responsible Person Environmental	PSL: Project Specific Location
DSHS: Texas Department of State Health Services	SPCC: Spill Prevention Control and Countermeasure
FEMA: Federal Emergency Management Agency	SW3P: Storm Water Pollution Prevention Plan
FHWA: Federal Highway Administration	TCEQ: Texas Commission on Environmental Quality
MOA: Memorandum of Agreement	THC: Texas Historical Commission
MOU: Memorandum of Understanding	TPDES: Texas Pollutant Discharge Elimination System
MS4: Municipal Separate Stormwater Sewer System	TPWD: Texas Parks and Wildlife Department
MSAT: Mobile Source Air Toxic	TxDOT: Texas Department of Transportation
MBTA: Migratory Bird Treaty Act	T&E: Threatened and Endangered Species
NOI: Notice of Intent	USACE: U.S. Army Corp of Engineers
NOT: Notice of Termination	USFWS: U.S. Fish and Wildlife Service

Texas Department of Transportation

PHARR DISTRICT

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS (EPIC)

SHEET 1 OF 2

FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		TEEGE, ETC
STATE	DISTRICT	COUNTY	
TEXAS	PHR	CAMERON, ETC	
CONTROL	SECTION	JOB	SHEET NO.
0921	06	302, ETC	128

Date Printed: $DATE$

V. Federal Listed, and Proposed Threatened and Endangered Species, Critical Habitat, State Listed Species, Candidate Species and Migratory Birds

Action Items Required : ☐ No Action Required

1. ☒ Under the Migratory Bird Treaty Act (MBTA) of 1918, codified at 16 U.S.C. § 703-712 and as enforced by the USFWS, the proposed construction work will not remove active nests from bridges, trees, ground and other structures during migratory bird nesting season, (February 1st. through October 1st.). If the Contractor needs to perform work within the right of way during nesting season, a qualified Biologist shall conduct a survey to determine if active nests are present. If present, the Contractor shall maintain a buffer zone around the nest(s) as directed by the Biologist. The buffer zone will be protected from clearing and disturbance until such time as the Biologist has determined that the nest(s) is no longer active. Prior to the nesting season, existing bridges and culverts should be treated against migratory bird nesting by utilizing Bird Exclusion Methods. Bird Exclusion Methods should be monitored and maintained throughout the nesting season. Refer to Standard Bird Exclusion Details.

2. ☒ There is the potential for the presence of state-listed species & species of concern in the project area and state law prohibits the taking (incidental or otherwise) of state-listed species. Taking is defined as the collection, hooking, hunting, netting, shooting, or share by any means or devices. If any listed species are observed, cease work in the immediate area, do not disturb species or habitat and contact the Engineer immediately.

3. ☒ Other Project Specific Actions:

   1. Federal & State Listed Species:

      Black-Spotted Newt
      Mexican Burrowing Toad
      Mexican Treefrog
      Sheep Frog
      South Texas Siren
      White-Lipped Frog
      Mexican Goby
      Texas Horned Lizard

   2. No work shall occur from dusk to dawn. Construction and maintenance activities will occur only during daylight hours.

   3. See EPIC sheet supplemental for TPWD BMP's.

VI. Hazardous Materials on Contamination Issues

Action Items Required : ☐ No Action Required

General (applies to all projects):

Comply with the Hazard Communication Act (HCA) 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 HCA.

Maintain an adequate supply of on-site spill response materials as indicated in the MSDS. In the event of a spill, take immediate action to mitigate the spill as indicated in the MSDS and in accordance with safe work practices. Contact the TxDOT Pharr 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 (identified as not normal)
- Trash piles, drums, canisters, barrels, etc.
- Undesirable smells or odors
- Evidence of leaching or seepage of contaminant substances

Any other evidence indicating possible hazardous materials or contamination discovered on site.

1. ☒ If potentially hazardous material and/or contaminated media (i.e.: soil, groundwater, surface water, sediment, building materials) are unexpectedly encountered during construction, assure that such materials and contamination are handled according to applicable federal and state regulations, cease work in the immediate area and contact the Engineer immediately.

VI. Hazardous Materials on Contamination Issues - Continued:

2. 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 required.
   If "Yes", then TxDOT is responsible for completing an asbestos assessment/inspection.

3. Are the results of the asbestos inspection positive (is asbestos present)?

   ☐ Yes ☐ No

   If "Yes", then TxDOT must retain a Texas Department of State Health Services (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 abatement activities and/or demolition.

   If "No", then TxDOT is still required to notify DSHS 15 working days prior to any scheduled demolition.

4. ☒ The Contractor is responsible for providing the date(s) for abatement activities and/or demolition with careful coordination between the Engineer and an Asbestos Consultant in order to minimize construction delays and subsequent claims.

VII. Other Environmental Issues

Action Items Required : ☐ No Action Required

1. ☒ Noise

   Contractor shall make every reasonable effort to minimize construction noise through abatement measures such as work hour controls and proper maintenance of equipment mufflers.

2. ☒ Air

   Contractor shall practice common dust control techniques such as surface chemical treatment or watering of unpaved road surfaces and vehicle speed reduction shall be implemented to minimize and prevent airborne dust during construction.

   Contractor should minimize MSAT by utilizing measures to encourage use of EPA required cleaner diesel fuels, limits on idling, increase use of cleaner burning diesel engines, and other emission limitation techniques, as appropriate.

Pharr District Contact No. 956-702-6100 Revised 01/30/2017

List of Abbreviations

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Texas Department of Transportation

PHARR DISTRICT

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS (EPIC)

SHEET 2 OF 2

FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		TEEGE, ETC
STATE	DISTRICT	COUNTY	
TEXAS	PHR	CAMERON, ETC	SHEET NO.
CONTROL	SECTION	JOB	
0921	06	302, ETC	129

Date Printed: $DATE$

SITE DESCRIPTION

PROJECT LIMITS: Teege Road (TGR)
Doolittle Road (DLR)

PROJECT SITE MAPS:
Project Location Map: See Title Sheet
Drainage Patterns: See Drainage Area Maps
Approx. Slopes Anticipated After Major Gradings and Areas of Soil Distrubance:
See Roadway Sheets.
Major Controls and Locations of Stabilization Practices:
See SW3P Sheets.
Surface Waters and Discharge Locations: Drainage and
Culvert Layout Sheets.

PROJECT DESCRIPTION:
Construction of bridge replacement consisting of replacing bridge, approaches, & riprap.

MAJOR SOIL DISTURBING ACTIVITIES:
The major soil disturbing activities for this project will consist of excavation, embankment, grading, culverts, and construction of proposed bridge and roadway.

TOTAL PROJECT AREA: Teege Road: 0.50 Acres
Doolittle Road: 0.89 Acres

TOTAL AREA TO BE DISTURBED: TGR: 0.33 Ac (66.0%); DLR: 0.60 Ac (67.4%);

WEIGHTED RUNOFF COEFFICIENT:
Before Construction: TGR: 0.62; DLR: 0.52
After Construction: TGR: 0.79; DLR: 0.61

EXISTING CONDITION OF SOIL & VEGETATIVE
Teege Road: Grassland, 60% grass coverage
Doolittle Road: Sandy Loam, 60% grass coverage

NAME OF RECEIVING WATERS:
Teege Road: San Martin Lake
Doolittle Road: North Main Drain

ENDANGERED SPECIES, DESIGNATED CRITICAL HABITAT AND HISTORICAL PROPERTY:

A. Federal and State listed species included on the EPIC sheets.

B. No critical habitat has been determined to be within the project area.

or

C. The project area is not loacted within a historical district or adjacent to a historical property.

The documentation satisfying TPDES Construction General Permit eligibility pertaining to the existence or of any protective action taken with regards to endangered species or designated critical habitat or historical property in this project area is contained in the project's Environmental Impact Study and can be viewed under the State Open Records Act at the address shown below:

TEXAS DEPARTMENT OF TRANSPORTATION
PHARR DISTRICT HEADQUARTERS
ATTN: ENVIRONMENTAL COORDINATOR
600 W. EXPRESSWAY 83
PHARR, TX 78577
PHONE: 956-702-6100

EROSION AND SEDIMENT CONTROLS

SOIL STABILIZATION PRACTICES: (Select T = Temporary or P = Permanent, as applicable)

T	TEMPORARY SEEDING		PRESERVATION OF NATURAL RESOURCES
	MULCHING (Hay or Straw)		FLEXIBLE CHANNEL LINER
	BUFFER ZONES		RIGID CHANNEL LINER
	PLANTING	T	SOIL RETENTION BLANKET
P	SEEDING		COMPOST MANUFACTURED COMPOST
	SODDING	T	BIODEGRADABLE EROSION CONTROL SOCKS
	OTHER: (Specify Practice)		

STRUCTURAL PRACTICES: (Select T = Temporary or P = Permanent, as applicable)

T	SILT FENCES
T	BIODEGRADABLE EROSION CONTROL SOCKS
	HAY BALES
T	ROCK FILTER DAMS
	DIVERSION, INTERCEPTOR, OR PERIMETER DIKES
	DIVERSION, INTERCEPTOR, OR PERIMETER SWALES
	DIVERSION DIKE AND SWALE COMBINATIONS
	PIPE SLOPE DRAINS
	PAVED FLUMES
	ROCK BEDDING AT CONSTRUCTION EXIT
	TIMBER MATTING AT CONSTRUCTION EXIT
	PIPE MATTING OR EQUAL AT CONSTRUCTION EXIT
	CHANNEL LINERS
	SEDIMENT TRAPS
	SEDIMENT BASINS
	STORM INLET SEDIMENT TRAP
	STONE OUTLET STRUCTURES
	CURBS AND GUTTERS
	STORM SEWERS
	VELOCITY CONTROL DEVICES
	OTHER: (Specify Practice)

STORM WATER MANAGEMENT:
Storm water drainage will be provided by storm sewer networks and parallel drainage ditches. The storm drain and ditch systems will carry drainage within the ROW to low points in the roadway where cross drainage may occur and ultimately to the designated outfall. Silt fence and erosion control logs will be used to trap sediment and filter toxins before drainage to designated outfalls.

STORM WATER MANAGEMENT ACTIVITIES:

1. Install perimeter controls, clear R.O.W. as needed.
2. Install BMP's: Temporary erosion control logs/silt fence as shown on the SW3P layout & details, or as directed by the Engineer.
3. Construct proposed bridge replacement and reconstruct approaches.
4. Seed each completed phase and step with temporary seeding as indicated on the SW3P layout and detail sheets or as directed by the Engineer.
5. Clean bridge construction area, and install permanent seeding on project areas according to plans or as directed by the Engineer.
6. Remove all remaining SW3P devices once permanent vegetation has established an acceptable growth coverage percentage. 70% of previous existing coverage.

NON-STORM WATER MANAGEMENT DISCHARGES:
Non-storm water discharges should be filtered, or held in retention basins, before being allowed to mix with storm water. These discharges consist of non-polluted ground water, spring water, foundation and/or footing drain water; and water used for dust control, pavement washing and vehicle wastewater containing no detergents.

OTHER REQUIREMENTS & PRACTICES

OTHER EROSION AND SEDIMENT CONTROLS:

MAINTENANCE: All erosion and sediment controls will be maintained in good working order. If a repair is necessary, it will be done at the earliest date possible, but no later than 7 calendar days after the surrounding exposed ground has dried sufficiently to prevent further damage from heavy equipment. The areas adjacent to creeks and drainage ways shall have priority followed by devices protecting storm sewer inlets.

INSPECTION: For areas of the construction site that have not been finally stabilized, area used for storage of materials, structural control measures, and locations where vehicles enter or exit the site, personnel provided by the permittee and familiar with the SW3P must inspect disturbed areas at least once every fourteen (14) calendar days and within twenty-four (24) hours of the end of a storm event 0.5 inches or greater.

WASTE MATERIALS: All waste materials will be collected and stored in a securely lidded dumpster. All trash and construction debris from the site will be deposited as necessary at a local dump. No construction waste material will be buried on site.

HAZARDOUS WASTE (INCLUDING SPILL REPORTING): At a minimum, any products in the following categories to be hazardous: Paints, Acids for cleaning masonry surfaces, Cleaning Solvents, Asphalt products, Chemical additives for soil stabilization, or Concrete curing compounds and additives. In the event of a spill which may be hazardous, the spill Coordinator should be contacted immediately. Emptying of excess concrete should not be allowed on site. Likewise, washout of concrete trucks should not be performed on site. These discharges are considered non-allowable non-storm water discharges. Concrete trucks should never be allowed to dump into storm drains or sanitary sewers.

SANITARY WASTE: All sanitary waste will be collected from the portable units as necessary or as required by local regulation by a licensed sanitary waste management contractor.

OFFSITE VEHICLE TRACKING: The Contractor shall be required, on a regular basis or as may be directed by the Engineer, to dampen haul roads for dust control, stabilize construction entrances and to remove excess dirt from the roadway.

MANAGEMENT PRACTICES: (Example Below - May be used as applicable, revised or expanded):

1. Disposal areas, stockpiles, and haul roads shall be constructed in a manner that will minimize and control the amount of sediment that may enter receiving waters. Disposal areas shall not be located in any wetland, water body or stream bed.
2. Construction staging areas and vehicle maintenance areas shall be constructed by the Contractor in a manner to minimize the runoff of pollutants.
3. All waterways shall be cleared as soon as practicable of temporary embankment, temporary bridges, matting, falsework, piling, or debris or other obstructions placed during construction operations that are not a part of the finished work.

OTHER: Contractor shall adhere to the following:

1. Construction Materials List of materials stored on job site to be provided by Contractor.
2. The project SW3P File shall be located at the project field office or within the Contractor's mobile office at all times and shall contain the N.O.I., CGP, Signature Authorization, Certification/Qualification Statements, Inspection Reports, Required Maps, and the TPDES Permit, Part II. This File to be persented to authorized State and Federal Agents upon request.

STATE OF TEXAS
RYAN W. FRITZ
112568
LICENSED
PROFESSIONAL ENGINEER
12/07/2022

Texas Department of Transportation

TxDOT STORM WATER POLLUTION PREVENTION PLAN (SW3P)

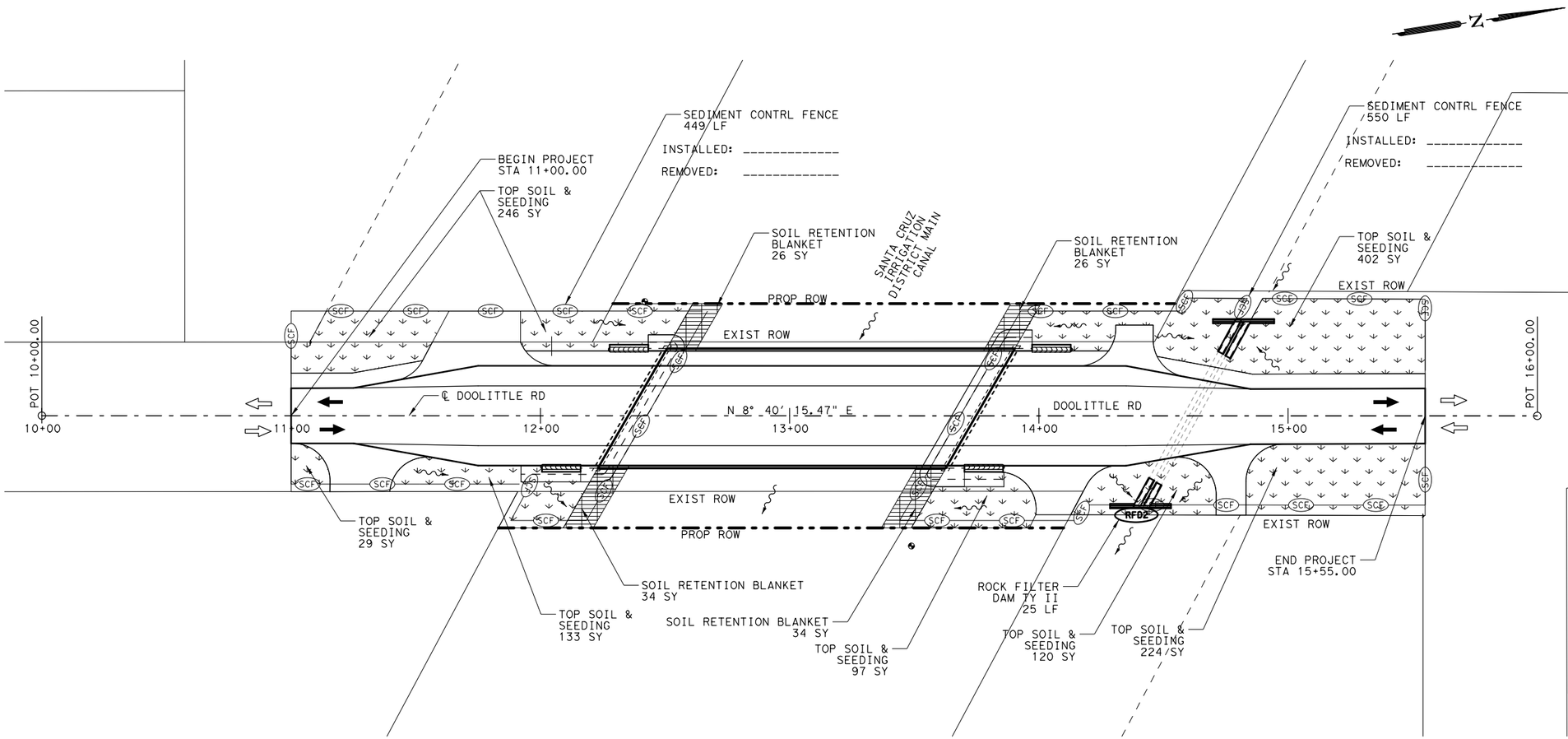
REV. 2-20-14 SW3P.DGN

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	SEE TITLE SHEET		130
STATE	DIST.	COUNTY	
TEXAS	PHARR	CAMERON, ETC	
CONT.	SECT.	JOB	HIGHWAY NO.
0921	06	302, ETC	TEEGE, ETC

LEGEND

- EXISTING ROW
- PROPOSED ROW
- PROPOSED TRAFFIC
- EXISTING TRAFFIC
- DIRECTION OF FLOW
- SCF — SEDIMENT CONTROL FENCE
- SEEDING (PERM, TEMP)
- SOIL RETENTION BLANKET
- RFD-2 — ROCK FILTER DAM (TY II)

HORIZ: 0 25 50 — SCALE IN FEET



NOTES:

1. EROSION CONTROL DEVICES SHALL BE INSTALLED PRIOR TO THE START OF CONSTRUCTION ACTIVITY AND SHALL REMAIN IN PLACE UNTIL CONSTRUCTION IS COMPLETE.
2. SEDIMENT CONTROL FENCE AND ROCK FILTER DAMS TO BE LOCATED AT DOWNSTREAM ROW LINE OR AT PROPOSED GRADING LIMITS OR AS PER DIRECTION OF THE ENGINEER.
3. PLACEMENT OF SEDIMENT CONTROL FENCE IN AREAS OTHER THAN AS SHOWN ON THESE SHEETS SHALL BE PER THE DIRECTION OF THE ENGINEER.
4. THE LOCATION OF EC AND OTHER SOIL STABILIZATION PRACTICES WILL BE BASED ON SITE SPECIFIC FIELD CONDITIONS AS NEEDED. QUANTITIES SHOWN ARE APPROXIMATE AND MAY BE ADJUSTED TO MEET FIELD CONDITIONS.
5. BEFORE CONSTRUCTION BEGINS, OUTFALL AREAS WILL BE PROTECTED IN ACCORDANCE WITH ITEM 506 AND AS SHOWN IN THE PLANS.

STATE OF TEXAS
RYAN W. FRITZ
112568
LICENSED PROFESSIONAL ENGINEER
12/07/2022

NO.	DATE	REVISION	APPROVED

BURNS McDONNELL
13737 NOEL RD,
SUITE 700
DALLAS, TX, 75240
ENGINEERING FIRM F-845

Texas Department of Transportation

DOOLITTLE ROAD

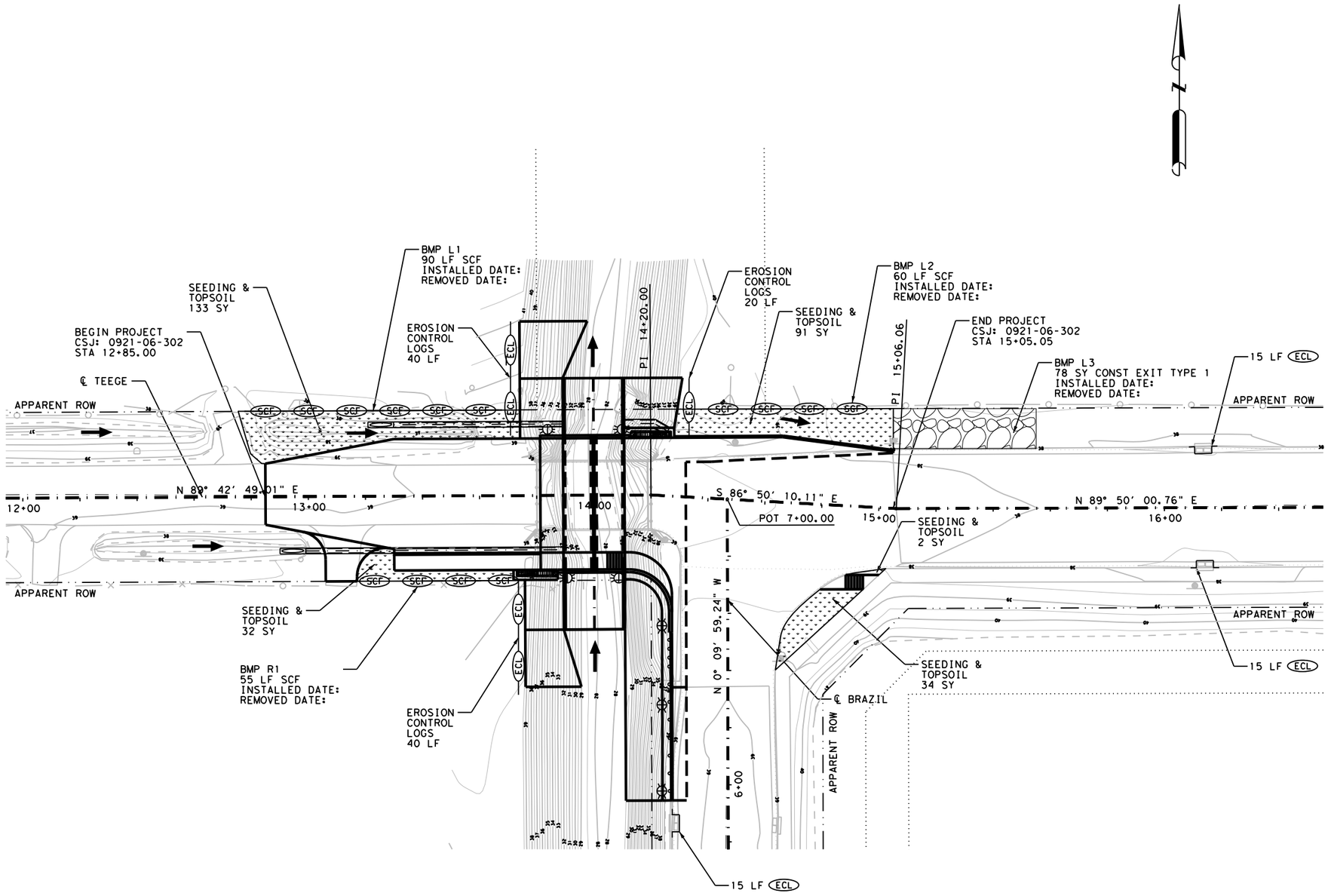
SW3P LAYOUT

SCALE = 1"=50'

SHEET 01 OF 01

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
LEH	6	SEE TITLE SHEET		TEEGE, ETC
DRAWN LEH	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK BKB	TEXAS	PHARR	CAMERON, ETC	131
CHECK BKB	CONTROL	SECTION	JOB	
	0921	06	302, ETC	

DATE: 12/7/2022
TIME: 10:07:32 AM
USER: rwfritz
FILE NAME: ...\Erosion\DLR-BMCD-SW3P-01.dgn
PENTABLE: CSJ 0921-02-331 (Charles Green Rd).tbl
SCALE: 1:50
PLOT DRIVER: TXDOT_PDF_BW.INO RASTERS).pltt



LEGEND

- SEEDING
- CONSTRUCTION EXIT TYPE 1
- ECL — EROSION CONTROL LOGS
- SCF — SEDIMENT CONTROL FENCE
- DRAINAGE FLOW

NOTES:

1. EROSION CONTROL DEVICES SHALL BE INSTALLED PRIOR TO THE START OF CONSTRUCTION ACTIVITY AND SHALL REMAIN IN PLACE UNTIL CONSTRUCTION IS COMPLETE.
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0 20' 40'
SCALE: 1"=40'

12/7/2022

STATE OF TEXAS
AARON DEBORD
96578
LICENSED
PROFESSIONAL ENGINEER

REV	BY	DESCRIPTION	DATE

AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TBPE FIRM REGISTRATION #739

2021 Texas Department of Transportation

TEEGE ROAD

SW3P LAYOUT

SHEET 01 OF 01

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
ASD	6	SEE TITLE SHEET		TEEGE,ETC
DESIGN CK	STATE	DISTRICT	COUNTY	SHEET NO.
HLT	TEXAS	PHARR	CAMERON, ETC	132
GRAPHICS	CONTROL	SECTION NO.	JOB	
AJG	0921	06	302, ETC	
GRAPHICS CK				
TJR				

Design Filename: c:\pw-of\pw-of-prod\grace traweek\d0106935\TEEGE#AF#SW3P#LAYOUT#01.dgn

Plotted on: 12/6/2022 1:37:58 PM gtraweek

TPWD BMPs

The Programmatic Agreement defines Best Management Practices (BMPs) to be implemented by Texas Department of Transportation (TxDOT) per §2.213 (Programmatic Agreements) of the 2017 Memorandum of Understanding (MOU) between TxDOT and Texas Parks and Wildlife Department (TPWD). These BMPs are measures that TxDOT and TPWD agree will result in avoidance and minimization of potential impacts to natural resources and in some cases apply to particular types of TxDOT projects.

The purpose of this section is to provide BMPs to minimize impacts to species or groups of species. Implementation of these BMPs by TxDOT eliminates the need for coordination under §2.206(1)of the MOU, except as noted.

Due diligence should be used to avoid killing or harming any wildlife species in the implementation of TxDOT projects.

☒ Bird BMPs (Required)

In addition to complying with the Migratory Bird Treaty Act (MBTA) perform the following BMPs:

- ☒ Prior to construction, perform daytime surveys for nests including under bridges and in culverts to determine if they are active before removal. Nests that are active should not be disturbed.
- ☒ Do not disturb, destroy, or remove active nests, including ground nesting birds, during the nesting season.
- ☒ Avoid the removal of unoccupied, inactive nests, as practicable.
- ☒ Prevent the establishment of active nests during the nesting season on TxDOT owned and operated facilities and structures proposed for replacement or repair.
- ☒ Do not collect, capture, relocate, or transport birds, eggs, young, or active nests without a permit.

☐ Bald Eagle *(Haliaeetus leucocephalus)*

- ☐ Bird BMPs and Bald and Golden Eagle Protection Act compliance

☐ Reddish Egret *(Egretta rufescens)* or
☐ White-faced Ibis *(Plegadis chihi)*

- ☐ Bird BMPs unless project is within 300 meters (984 feet)of a known colonial water bird rookery then coordinate with TPWD.

☐ Rookeries (Recommendations)

In general, nesting dates for herons and egrets range from early February to late August in Texas, depending on the species. Great Blue Herons (GBHE) are usually the first to nest. When GBHE get disrupted from the nest and abandon nesting, then the other species of herons and egrets may not attempt to nest at the colony that year. Breeding dates for rookery species are approximately as follows:

Species	Dates
Cattle Egret	Early April to late October
Little Blue Heron	Late March to late July
Snowy Egret	Late March to early August
Great Egret	Early March to early August
Black-crowned Night Heron	Early February to late July
Great Blue Heron	February to late August

☐ Rookeries (Recommendations) (Continued)

- ☐ Vegetation clearing in a primary buffer area of 300 meters (984 feet) from a heronry periphery should be avoided. Utilizing areas that have already been cleared within this buffer area may be acceptable depending on site-specific characteristics. Additionally, human foot-traffic or machinery use should not occur within this buffer area during the nesting season.
- ☐ Clearing activities or construction using heavy machinery in a secondary buffer area of 1,000 meters (3,281 feet) from the heronry periphery should be avoided during the breeding season (courting and nesting).

☒ Bat BMPs (Required)

To determine the appropriate BMP to avoid or minimize impacts to bats, review the habitat description for the species of interest on the TPWD Rare, Threatened, and Endangered Species of Texas by County List or other trusted resources. All bat surveys and other activities that include direct contact with bats shall comply with TPWD' recommended white-nose syndrome protocols located on the TPWD Wildlife Habitat Assessment Program website under "Project Design and Construction".

The following survey and exclusion protocols should be followed prior to commencement of construction activities. For the purposes of this document, structures are defined as bridges, culverts (concrete or metal), wells, and buildings.

- ☒ For activities that have the potential to impact structures, cliffs or caves, or trees; a qualified biologist will perform a habitat assessment and occupancy survey of the feature(s) with roost potential as early in the planning process as possible or within one year before project letting.
- ☐ For roosts where occupancy is strongly suspected but unconfirmed during the initial survey, revisit feature(s) at most four weeks prior to scheduled disturbance to confirm absence of bats.
- ☒ If bats are present or recent signs of occupation (i.e., piles of guano, distinct musky odor, or staining and rub marks at potential entry points) are observed, take appropriate measures to ensure that bats are not harmed, such as implementing non-lethal exclusion activities or timing or phasing of construction.
- ☐ Exclusion devices can be installed by a qualified individual between September 1 and March 31. Exclusion devices should be used for a minimum of seven days when minimum nighttime temperatures are above 50°F and minimum daytime temperatures are above 70°F. Prior to exclusion, ensure that alternate roosting habitat is available in the immediate area. If no suitable roosting habitat is available, installation of alternate roosts is recommended to replace the loss of an occupied roost. If alternate roost sites are not provided, bats may seek shelter in other inappropriate sites, such as buildings, in the surrounding area. See Additional Bat BMPs (Recommendations) for recommended acceptable methods for excluding bats from structures.
- ☐ If feature(s) used by bats are removed as a result of construction, replacement structures should incorporate bat-friendly design or artificial roosts should be constructed to replace these features, as practicable.
- ☐ Conversion of property containing cave or cliff features to transportation purposes should be avoided where feasible.

☐ Bat BMPs (Required)(Continued)

- ☐ Avoid unnecessary removal of dead fronds on native and ornamental palm trees in south Texas (Cameron, Hidalgo, Willacy, Kenedy, Brooks, Kleberg, Nueces, and San Patricio counties) from April 1st through October 31st. If removal of dead fronds is necessary at other times of the year, limit frond removal to extended warm periods (nighttime temperatures: 55°F for at least two consecutive nights), so bats can move away from the disturbance and find new roosts.
- ☐ Large hollow trees, snags (dead standing trees), and trees with shaggy bark should be surveyed for colonies and, if found, should not be disturbed until the bats are no longer occupying these features. Post-occupancy surveys should be conducted by a qualified biologist prior to tree removal from the landscape.
- ☐ Retain mature, large diameter hardwood forest species and native/ornamental palm trees where feasible.
- ☒ In all instances, avoid harm or death to bats. Bats should only be handled as a last resort and after communication with TPWD.

☐ Mexican Long-tongues Bat *(Choeronycteris mexicana)*

- ☐ Avoid unnecessary impacts to cacti and agave species.
- ☐ Bat BMPs.

☒ Additional Bat BMPs (Recommendations)

- ☒ Bat surveys of structures should include visual inspections of structural fissures (cracked or spalled concrete, damaged or split beams, split or damaged timber railings), crevices (expansion joints, space between parallel beams, spaces above supports piers), and alternative structures (drainage pipes, bolt cavities, open sections between support beams, swallow nests) for the presence of bats.
- ☐ Before excluding bats from any occupied structure, bat species, weather, temperature, season, and geographic location must be incorporated into any exclusion plans to avoid unnecessary harm or death to bats. Winter exclusion must entail a survey to confirm either, 1) bats are absent or 2) present but active (i.e. continuously active - not intermittently active due to arousals from hibernation).
- ☐ Avoid using materials that degrade quickly, like paper, steel wool or rags, to close holes.
- ☐ Avoid using products or making structural modifications that may block natural ventilation, like hanging plastic sheeting over an active roost entrance, thereby altering roost microclimate.
- ☐ Avoid using chemical and ultrasonic repellents.
- ☐ Avoid use of silicone, polyurethane or similar non-water-based caulk products.
- ☐ Avoid use of expandable foam products at occupied sites.
- ☐ Avoid the use of flexible netting attached with duct tape.

Pharr District Contact No. 956-702-6100

Revised 07/12/2017

List of Abbreviations

BMP: Best Management Practice
CGP: Construction General Permit
CRPe: Contractor Responsible Person Environmental
DSHS: Texas Department of State Health Services
FEMA: Federal Emergency Management Agency
FHWA: Federal Highway Administration
MOA: Memorandum of Agreement
MOU: Memorandum of Understanding
MS4: Municipal Separate Stormwater Sewer System
MSAT: Mobile Source Air Toxic
MBTA: Migratory Bird Treaty Act
NOI: Notice of Intent
NOT: Notice of Termination
NWP: Nationwide Permit
PCN: Pre-Construction Notification
PSL: Project Specific Location
SPCC: Spill Prevention Control and Countermeasure
SW3P: Storm Water Pollution Prevention Plan
TCEQ: Texas Commission on Environmental Quality
THC: Texas Historical Commission
TPDES: Texas Pollutant Discharge Elimination System
TPWD: Texas Parks and Wildlife Department
TxDOT: Texas Department of Transportation
T&E: Threatened and Endangered Species
USACE: U.S. Army Corp of Engineers
USFWS: U.S. Fish and Wildlife Service

Date Printed: $DATE$

Texas Department of Transportation

PHARR DISTRICT

EPIC SHEET SUPPLEMENTALS

TPWD BMPs

FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		TEEGE, ETC
STATE	DISTRICT	COUNTY	
TEXAS	PHR	CAMERON, ETC	SHEET NO.
CONTROL	SECTION	JOB	
0921	06	302, ETC	133

☐ Additional Bat BMPs (Recommendations) (Continued)

☐ In order to avoid entombing bats, exclusion activities should be only implemented by a qualified individual. A qualified individual or company should possess at least the following minimum qualifications:

- Experience in bat exclusion (the individual, not just the company).
- Proof of rabies pre-exposure vaccinations.
- Demonstrated knowledge of the relevant bat species, including maternity season date range and habitat requirements.
- Demonstrated knowledge of rabies and histoplasmosis in relation to bat roosts.

☐ Contact TPWD for additional resources and information to assist in executing successful bat exclusions that will avoid unnecessary harm or death in bats.

☐ Fossorial Mammal BMPs (Required)

☐ If black-tailed prairie dog (BTPD) burrows or pocket gopher mounds are to be excavated/directly impacted coordinate with TPWD WHAB.
☐ When a construction zone is adjacent to active BTPD burrows or pocket gopher mounds, erect barriers to discourage individuals moving through or into the construction area.
☐ When seeding or revegetation is planned in an area adjacent to BTPD burrows or pocket gopher mounds, a vegetative barrier should be considered in the planting to discourage dispersal into the ROW.

☐ Coues' Rice Rat *(Oryzomys couesi)*

☐ Minimize impacts to wetland, Resaca, oxbow lakes, and marsh habitats.
☐ Contractors will be advised of potential occurrence in the project area and to avoid harming the species if encountered.
☐ Water Quality BMPs.

☒ Plains Spotted Skunk *(Spilogale putorius interrupta)* or
☐ Swift Fox *(Vulpes velox)*

☒ Contractor will be advised of potential occurrence in the project area and to avoid harming the species if encountered and to avoid unnecessary impacts to dens.

☐ White nosed Coati *(Nasua narica)*/
☐ Yellow nosed Cotton Rat *(Sigmodon ochrognathus)*

☐ Contractors will be advised of potential occurrence in the project area and to avoid harming the species if encountered.

☒ Terrestrial Reptile BMPs (Required)

☒ Apply hydro mulching and/or hydro seeding in areas for soil stabilization and/or revegetation of disturbed areas where feasible. If hydro mulching and/or hydro seeding are not feasible due to site conditions, utilize erosion control blankets or mats that contain no netting or contain loosely woven,natural fiber netting is preferred. Plastic netting should be avoided to the extent practicable.
☒ 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.
☒ Inform contractors that if reptiles are found on project site allow species to safely leave the project area.
☒ Avoid or minimize disturbing or removing downed trees, rotting stumps, and leaf litter where feasible.
☒ Contractors will be advised of potential occurrence in the project area, and to avoid harming the species if encountered.

☒ Texas Tortoise *(Gopherus berlandieri)*

☒ Contractors will be advised of potential occurrence in the project area, and to avoid harming the species if encountered.
☒ Utility trenches should be covered overnight or visually inspected before filling to avoid burial of the species.
☒ Terrestrial Reptile BMPs.

☐ Texas Horned Lizard *(Phrynosoma cornutum)*

☐ Avoid harvester ant mounds in the selection of Project Specific Locations (PSLs) where feasible.
☐ Terrestrial Reptile BMPs.

☐ Additional Reptile BMPs (Recommendations)

☐ Due to increased activity (mating) of reptiles during the spring, construction activities like clearing or grading should attempt to be scheduled outside of the spring (April-May) season. Also, timing ground disturbing activities before October when reptiles become less active and may be using burrows in the project area is also encouraged.
☐ When designing roadways with curbs, consider using Type I or Type III curbs to provide a gentle slope to enable turtles and small animals to get out of roadways.
☐ If Texas Tortoises are present in a project area, they should be removed from the area. After removal of the tortoises, the area that will be disturbed during active construction and project specific locations should be fenced off to exclude tortoises and other reptiles. The exclusion fence should be constructed and maintained as follows:

a. The exclusion fence should be constructed with metal flashing or drift fence material.
b. Rolled erosion control mesh material should not be used.
c. The exclusion fence should be buried at least 6 inches deep and be at least 24 inches high.
d. The exclusion fence should be maintained for the life of the project and only removed after the construction is completed and the disturbed site has been revegetated.

☒ Amphibian and Aquatic Reptile BMPs (Required)

Unless absence of the species can be demonstrated, assume presence in suitable habitat and implement the following BMPs. Absence can only be demonstrated using TPWD-approved survey efforts (contact TPWD for minimum survey protocols for species and project site conditions).

☒ For projects within one mile of a known occupied location or observation of the species recorded from 1980 until the current year and suitable habitat is present, coordinate with TPWD.
☐ For new location roadway projects, coordinate with TPWD.
☒ For projects within existing right-of-way (ROW) when work is in water or will permanently impact a water feature and potential habitat exists for the target species complete the following:

a) Contractors will be advised of potential occurrence in the project area, and to avoid harming the species if encountered.
b) Minimize impacts to wetland, temporary and permanent open water features, including depressions, and riverine habitats.
c) Maintain hydrologic regime and connections between wetlands and other aquatic features.

Pharr District Contact No. 956-702-6100

☒ Amphibian and Aquatic Reptile BMPs (Continued)

d) Use barrier fencing to direct animal movements away from construction activities and areas of potential wildlife-vehicle collisions in construction areas directly adjacent, or that may directly impact, potential habitat for the target species.
e) 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.
f) Project specific locations (PSLs) proposed within state-owned ROW should be located in uplands away from aquatic features.
g) When work is directly adjacent to the water, minimize impacts to shoreline basking sites (e.g., downed trees, sand bars, exposed bedrock) and overwinter sites (e.g., brush and debris piles, crayfish burrows) where feasible.
h) Avoid or minimize disturbing or removing downed trees, rotting stumps, and leaf litter, which may be refugia for terrestrial amphibians, where feasible.
i) If gutters and curbs are part of the roadway design, where feasible install gutters that do not include the side box inlet and include sloped (i.e. mountable) curbs to allow small animals to leave roadway. If this modification to the entire curb system is not possible, install sections of sloped curb on either side of the storm water drain for several feet to allow small animals to leave the roadway. Priority areas for these design recommendations are those with nearby wetlands or other aquatic features.

☒ For projects that require acquisition of additional ROW and work within that new ROW is in water or will permanently impact a water feature, implement a) - i) above plus j) -l) below, where applicable:

j) For sections of roadway adjacent to wetlands or other aquatic features, install wildlife barriers that prevent climbing. Barriers should terminate at culvert openings in order to funnel animals under the road. The barriers should be of the same length as the adjacent feature or 80 feet long in each direction, or whichever is the lesser of the two.
k) For culvert extensions and culvert replacement/installation, incorporate measures to funnel animals toward culverts such as concrete wingwalls and barrier walls with overhangs.
l) When riprap or other bank stabilization devices are necessary, their placement should not impede the movement of terrestrial or aquatic wildlife through the water feature. Where feasible, biotechnical streambank stabilization methods using live native vegetation or a combination of vegetative and structural materials should be used.

Revised 07/12/2017

List of Abbreviations

BMP: Best Management Practice
CGP: Construction General Permit
CRPe: Contractor Responsible Person Environmental
DSHS: Texas Department of State Health Services
FEMA: Federal Emergency Management Agency
FHWA: Federal Highway Administration
MOA: Memorandum of Agreement
MOU: Memorandum of Understanding
MS4: Municipal Separate Stormwater Sewer System
MSAT: Mobile Source Air Toxic
MBTA: Migratory Bird Treaty Act
NOI: Notice of Intent
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T&E: Threatened and Endangered Species
USACE: U.S. Army Corp of Engineers
USFWS: U.S. Fish and Wildlife Service

Date Printed: $DATE$

Texas Department of Transportation
PHARR DISTRICT

EPIC SHEET SUPPLEMENTALS

TPWD BMPs

SHEET 2 OF 3

FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		TEEGE, ETC
STATE	DISTRICT	COUNTY	
TEXAS	PHR	CAMERON, ETC	SHEET NO.
CONTROL	SECTION	JOB	
0921	06	302, ETC	134

☒ Sheep Frog *(Hypopachus variolosus)*

- ☒ Minimize disturbance to burrows or downed woody debris.
- ☒ Water Quality BMPs.
- ☒ Amphibian BMPs.

☒ South Texas Siren (Large Form) *(Siren sp 1)*

- ☒ Minimize impacts to warm, shallow waters with vegetative cover such as ponds and ditches.
- ☒ Water Quality BMPs.
- ☒ Amphibian BMPs.

☒ Freshwater Mussel BMPs (Required)

- ☒ When work is in the water; survey project footprints for state listed species where appropriate habitat exists.
- ☒ When work is in the water and mussels are discovered during surveys; relocate state listed and SGCN mussels under TPWD authorization and implement Water Quality BMPs.
- ☐ When work is adjacent to the water; Water Quality BMPs implemented as part of the SWPPP for a construction general permit or any conditions of the Section 401 water quality certification for the project will be implemented.

☒ Fish BMPs (Required)

- ☐ For projects within the range of a SGCN or State-Listed fish and work is adjacent to water: Use Water Quality BMPs. No TPWD Coordination required.
- ☒ For projects within the range of a SGCN or State-Listed fish, and work is in the water: TPWD coordination is required.

☒ Water Quality BMPs (Required)

In addition to BMPs required for a TCEQ Storm Water Pollution Prevention Plan and/or Section 401 water quality permit:

- ☒ Minimize the use of equipment in streams and riparian areas during construction. When possible, equipment access should be from banks, bridge decks, or barges.
- ☒ When temporary stream crossings are unavoidable, remove stream crossings once they are no longer needed and stabilize banks and soils around the crossing.

☒ Additional Water Quality BMPs (Recommendations)

- ☐ Wet-Bottomed detention ponds are recommended to benefit wildlife and downstream water quality. Consider potential wildlife-vehicle interactions when siting detention ponds.
- ☒ Rubbish found near bridges on TxDOT ROW should be removed and disposed of properly to minimize the risk of pollution. Rubbish does not include brush piles or snags.

☐ Aquatic Mitigation (Recommendations)

- ☐ In-kind compensatory mitigation should be considered for all unavoidable impacts to aquatic resources including, but not limited to streams, wetlands, oysters, seagrass and mudflats, regardless of their jurisdictional status.
- ☐ Compensatory mitigation plans should be developed in consultation with TPWD Transportation Conservation Coordinator.

☒ Stream Crossings (Recommendations)

- ☐ Use spanning bridges rather than culverts when feasible.
- ☐ If using a culvert, staggered culverts that concentrate low flows but provide conveyance of higher flows through staggered culverts placed at higher elevations is recommended.
- ☐ Bottomless culverts are recommended to allow for fish and other aquatic wildlife passage in the low flow channel. If bottomless culverts are not feasible, making a low flow channel for fish passage is recommended.
- ☐ Avoid placing riprap across stream channels and instead use alternative stabilization such as biotechnical stream bank stabilization methods including live native vegetation or a combination of vegetative and structural materials. When riprap or other bank stabilization devices are necessary, their placement should not impede the movement of aquatic and terrestrial wildlife underneath the bridge. In some instances, riprap may be buried, back-filled with topsoil and planted with native vegetation.
- ☐ Incorporate bat-friendly design into bridges and culverts.
- ☒ Design bridges for adequate vertical and horizontal clearances under the roadway to allow for terrestrial wildlife to safely pass under the road.
- ☒ A span wide enough to cross the stream and allow for dry ground and a natural surface path under the roadway is encouraged. For culverts, incorporation of an artificial ledge inside the culvert on one or both sides for use by terrestrial wildlife is recommended.
- ☒ Riparian buffer zones should remain undisturbed where possible.

☒ Vegetation BMPs (Recommendations)

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

Pharr District Contact No. 956-702-6100

☒ Invasive Species BMPs (Recommendations)

- ☐ For all work in waters listed in the distribution of Zebra mussels on http://texasinvasives .org/ as well as those waters specified in 31 TAC §57.972 and any TPWD emergency orders regarding prevention of the spread of Zebra mussels all machinery, equipment, or vehicles coming in contact with such waters should follow clean/drain/dry protocols to prevent the potential spread of invasive Zebra mussels.
- ☒ Care should be taken to avoid the spread of aquatic invasive plants (such as Giant Salvinia, Hydrilla, Hyacinth, Watermilfoil, Water Lettuce, and Alligatorweed) from infested water bodies into areas not currently infested. All machinery/equipment/vehicles coming in contact with waters containing aquatic invasive plant species should follow clean/drain/dry protocols to prevent the potential spread of invasive plants.
- ☒ Colonization by invasive plants should be actively prevented on disturbed sites in terrestrial habitats. Vegetation management should include removing invasive species as soon as practical while allowing the existing native plants to revegetate the disturbed areas. If using hay bales for sediment control, use locally grown weed-free hay to prevent the spread of invasive species. Leave the hay bales in place and allow them to break down, as this acts as mulch assisting in revegetation.

☐ Wildlife Crossings (Recommendations)

- ☐ Design roadways on new location to incorporate wildlife crossings, particularly in areas that bisect wildlife travel corridors or seasonal movement routes.
- ☐ Consider using cable median barrier instead of concrete traffic barrier when feasible to increase permeability for animals encountering barriers.

Revised 07/12/2017

List of Abbreviations

BMP: Best Management Practice	MSAT: Mobile Source Air Toxic	TCEQ: Texas Commission on Environmental Quality
CGP: Construction General Permit	MBTA: Migratory Bird Treaty Act	THC: Texas Historical Commission
CRPe: Contractor Responsible Person Environmental	NOI: Notice of Intent	TPDES: Texas Pollutant Discharge Elimination System
DSHS: Texas Department of State Health Services	NOT: Notice of Termination	TPWD: Texas Parks and Wildlife Department
FEMA: Federal Emergency Management Agency	NWP: Nationwide Permit	TxDOT: Texas Department of Transportation
FHWA: Federal Highway Administration	PCN: Pre-Construction Notification	T&E: Threatened and Endangered Species
MOA: Memorandum of Agreement	PSL: Project Specific Location	USACE: U.S. Army Corp of Engineers
MOU: Memorandum of Understanding	SPCC: Spill Prevention Control and Countermeasure	USFWS: U.S. Fish and Wildlife Service
MS4: Municipal Separate Stormwater Sewer System	SW3P: Storm Water Pollution Prevention Plan	

Texas Department of Transportation

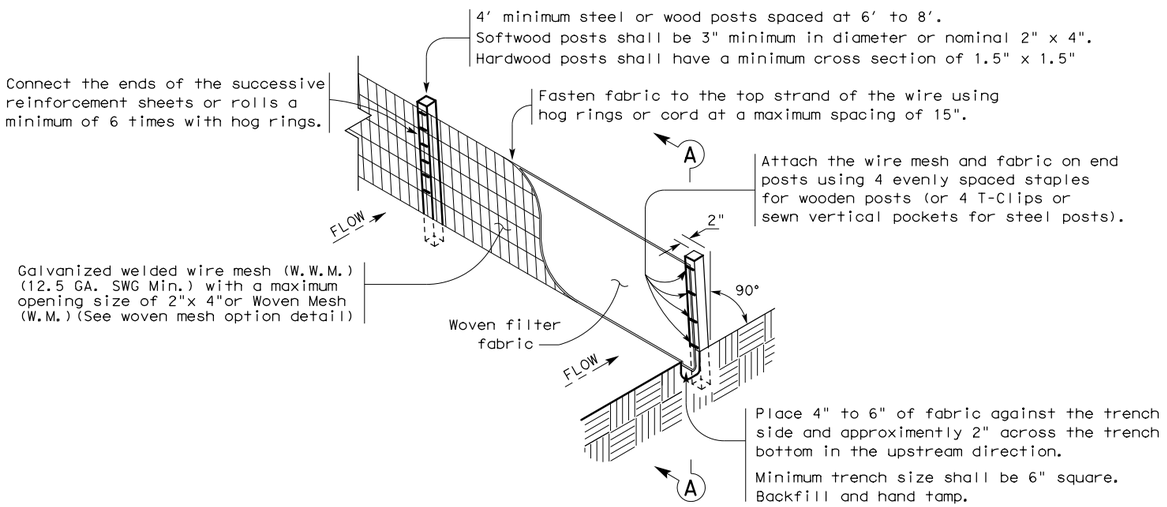
PHARR DISTRICT

EPIC SHEET SUPPLEMENTALS

TPWD BMPs

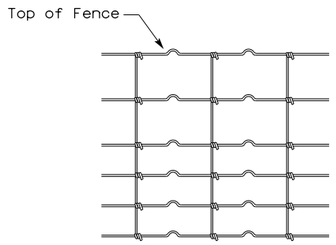
FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		TEEGE, ETC
STATE	DISTRICT	COUNTY	
TEXAS	PHR	CAMERON, ETC	SHEET NO.
CONTROL	SECTION	JOB	
0921	06	302, ETC	135

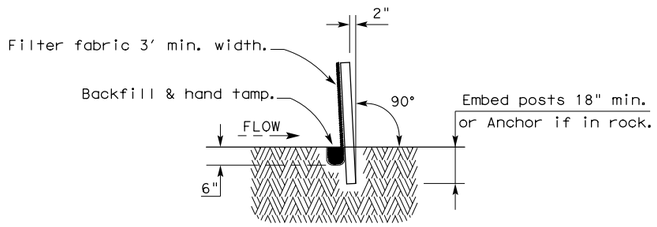
Date Printed: $DATE$



TEMPORARY SEDIMENT CONTROL FENCE

SCF





SECTION A-A

HINGE JOINT KNOT WOVEN MESH (OPTION) DETAIL

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

SEDIMENT CONTROL FENCE USAGE GUIDELINES

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

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

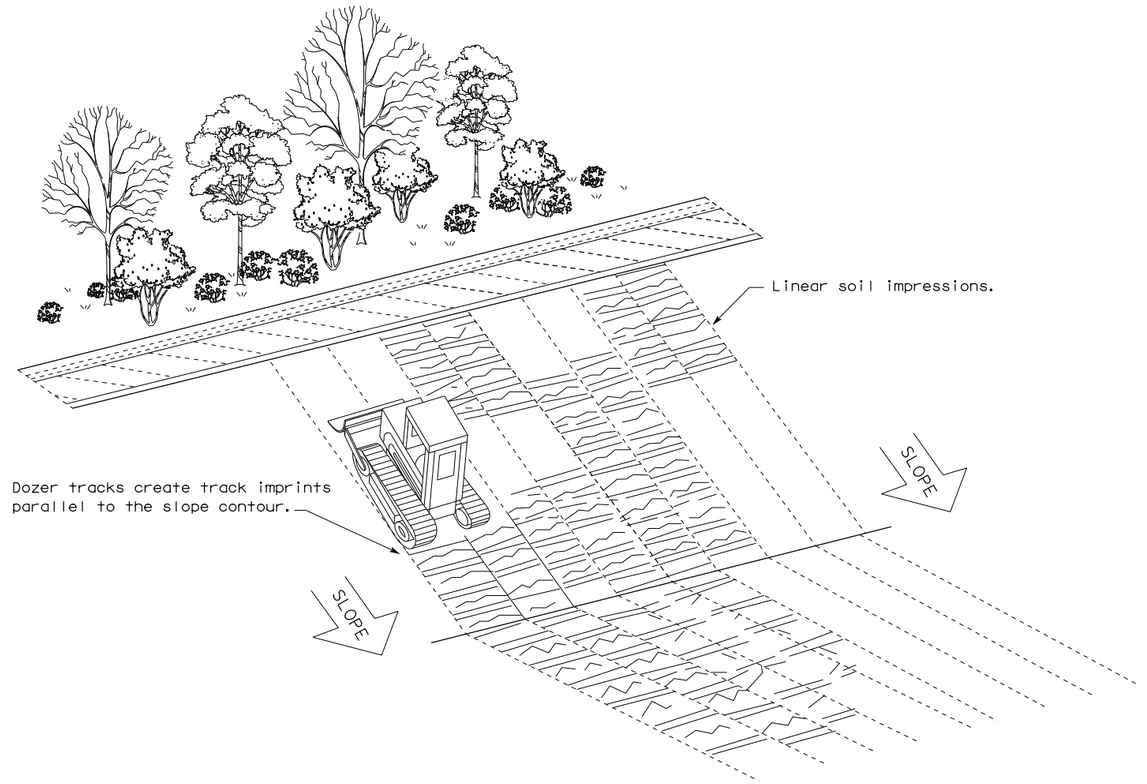
LEGEND

Sediment Control Fence

SCF

GENERAL NOTES

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



VERTICAL TRACKING

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

FENCE & VERTICAL TRACKING

EC(1)-16

FILE: ec116	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
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	PHARR	CAMERON, ETC		136

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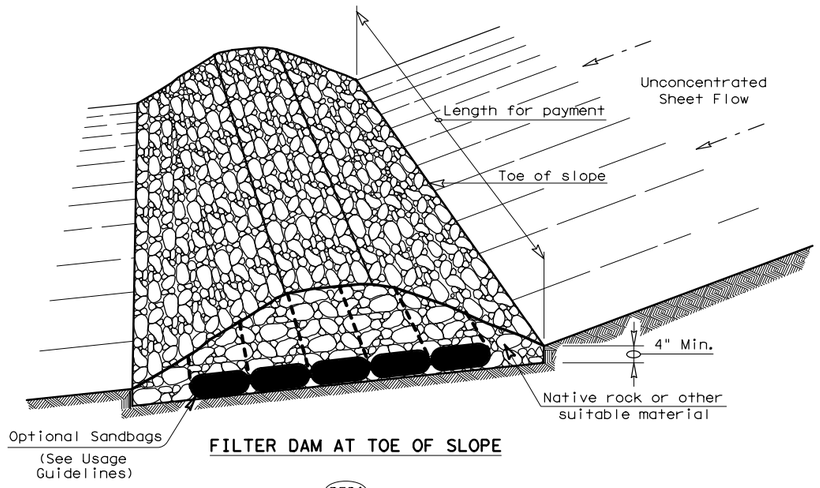
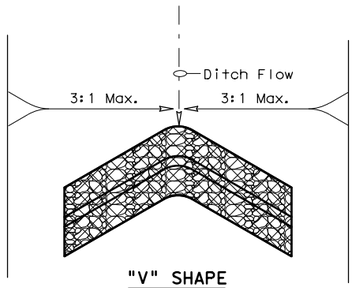
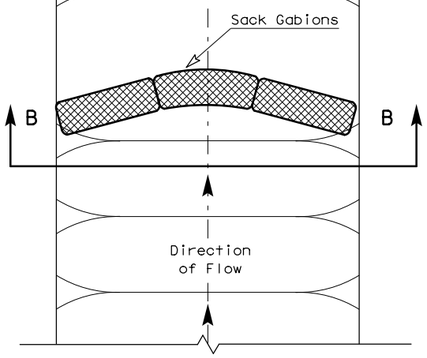


FILTER DAM AT TOE OF SLOPE

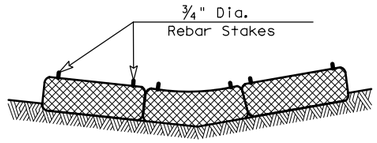
RFD1



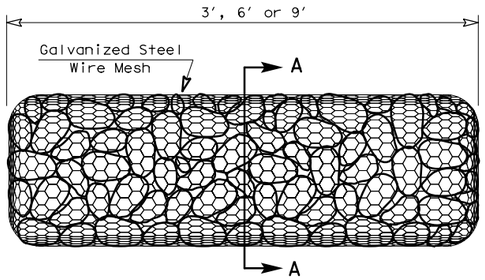
"V" SHAPE
PLAN VIEW



PLAN VIEW

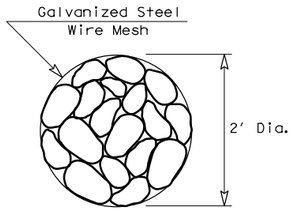


SECTION B-B

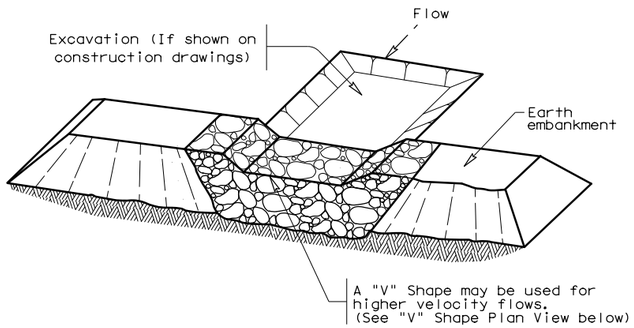


TYPE 4 (SACK GABIONS)

RFD4

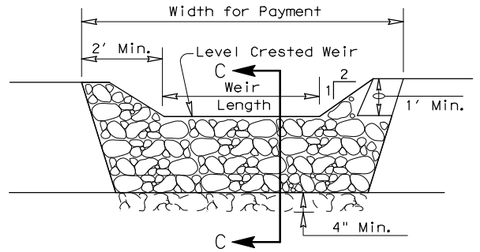


SECTION A-A



FILTER DAM AT SEDIMENT TRAP

RFD1 — OR — RFD2



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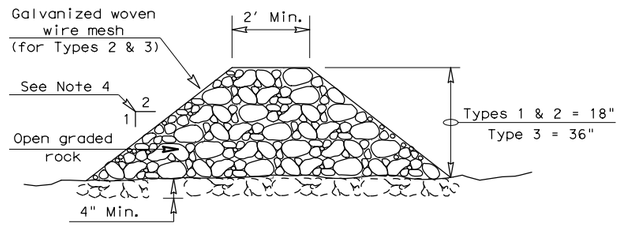
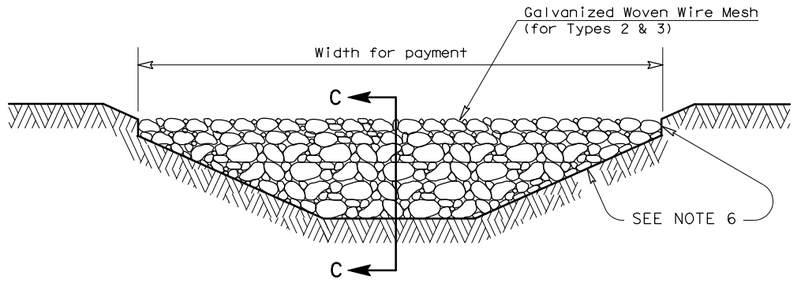


SECTION C-C



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
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	DIST	COUNTY		SHEET NO.
	PHARR	CAMERON, ETC		137

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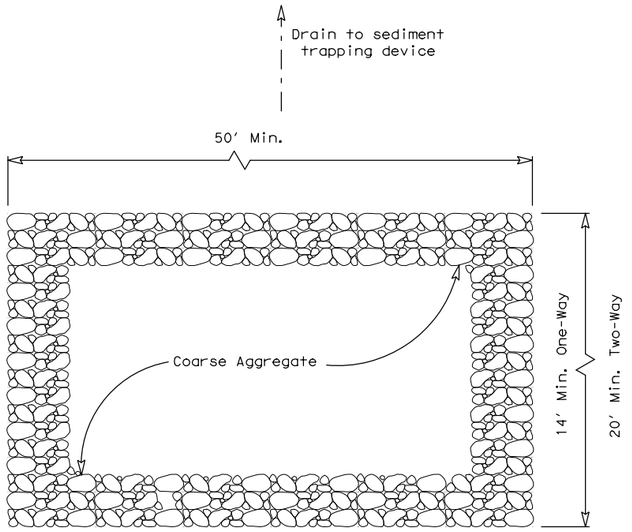
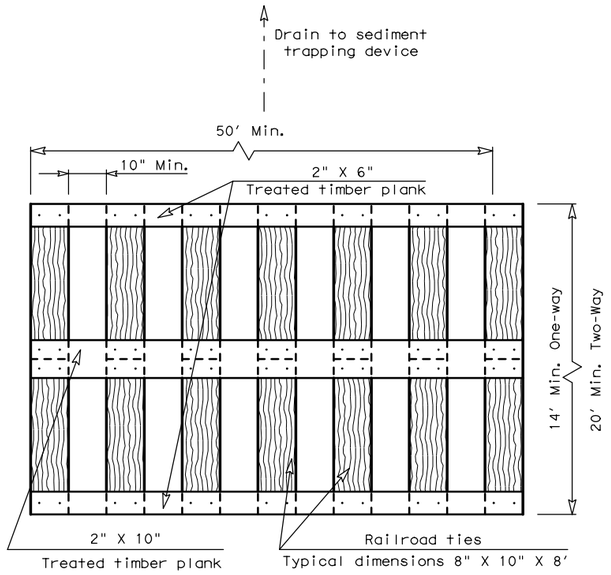


PLAN VIEW



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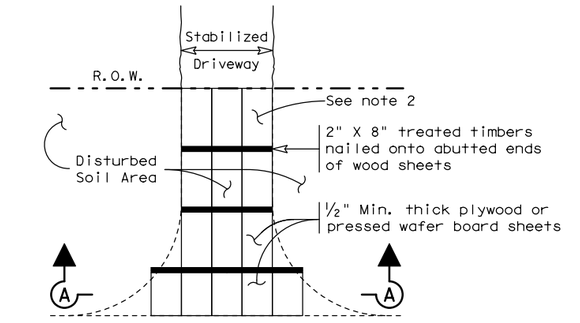

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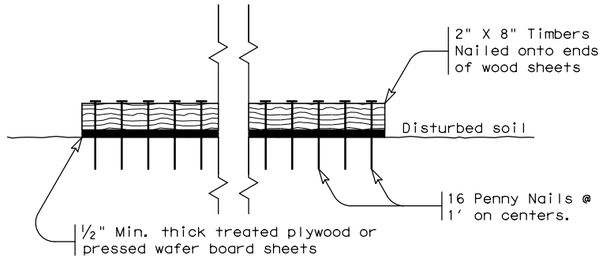
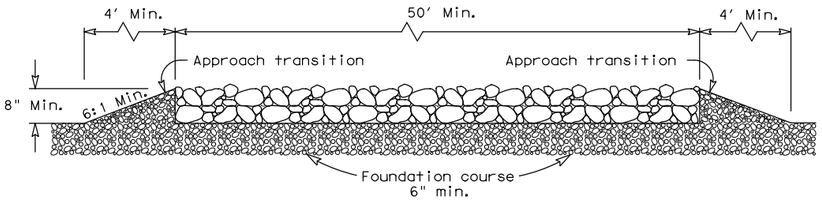


SECTION A-A

CONSTRUCTION EXIT (TYPE 3)

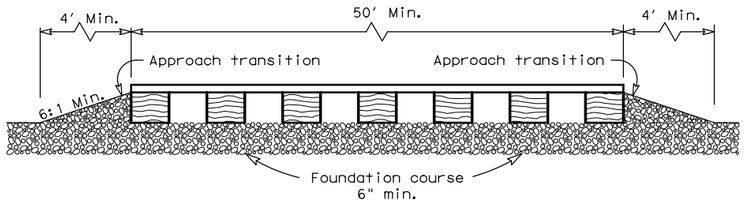
SHORT TERM



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
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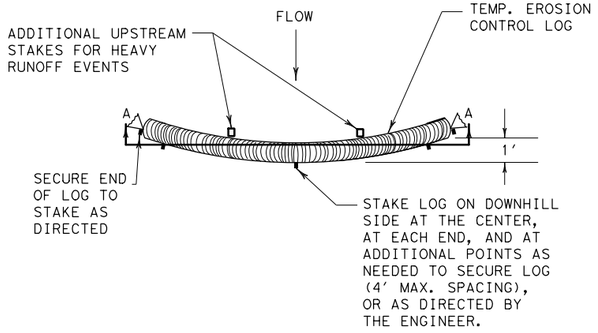
	PHARR	CAMERON,ETC		138



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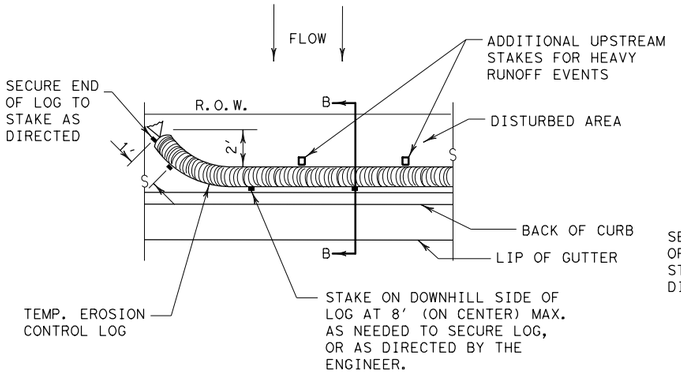

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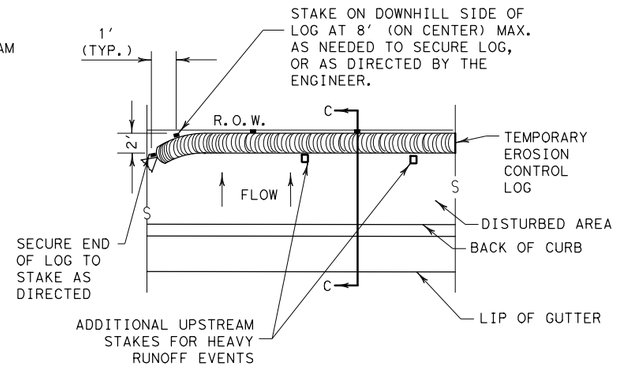

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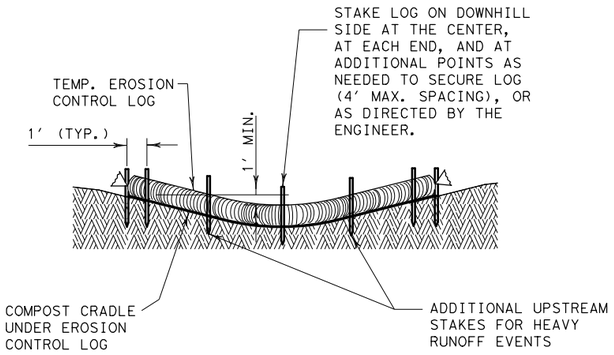
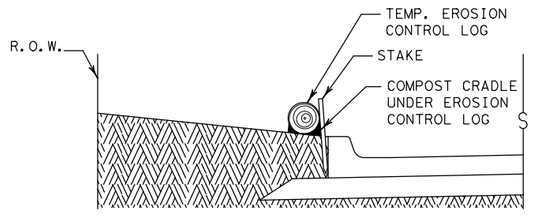


SECTION A-A

EROSION CONTROL LOG DAM

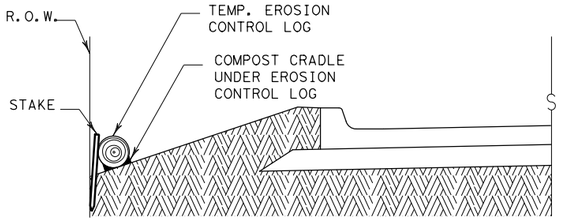
CL-D



SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

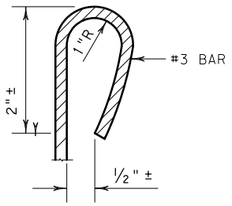
CL-BOC



SECTION C-C

EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

CL-ROW



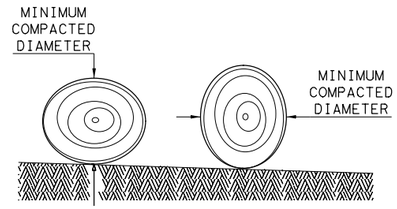
REBAR STAKE DETAIL

LEGEND

- CL-D — EROSION CONTROL LOG DAM
- CL-BOC — EROSION CONTROL LOG AT BACK OF CURB
- CL-ROW — EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY
- CL-SST — EROSION CONTROL LOGS ON SLOPES STAKE AND TRENCHING ANCHORING
- CL-SSL — EROSION CONTROL LOGS ON SLOPES STAKE AND LASHING ANCHORING
- CL-DI — EROSION CONTROL LOG AT DROP INLET
- CL-CI — EROSION CONTROL LOG AT CURB INLET
- CL-GI — EROSION CONTROL LOG AT CURB & GRATE INLET

GENERAL NOTES:

1. EROSION CONTROL LOGS SHALL BE INSTALLED IN ACCORDANCE WITH MANFACTURER'S RECOMMENDATIONS, OR AS DIRECTED BY THE ENGINEER.
2. LENGTHS OF EROSION CONTROL LOGS SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND AS REQUIRED FOR THE PURPOSE INTENDED.
3. UNLESS OTHERWISE DIRECTED, USE BIODEGRADABLE OR PHOTODEGRADABLE CONTAINMENT MESH ONLY WHERE LOG WILL REMAIN IN PLACE AS PART OF A VEGETATIVE SYSTEM. FOR TEMPORARY INSTALLATIONS, USE RECYCLABLE CONTAINMENT MESH.
4. FILL LOGS WITH SUFFICIENT FILTER MATERIAL TO ACHIEVE THE MINIMUM COMPACTED DIAMETER SPECIFIED IN THE PLANS WITHOUT EXCESSIVE DEFORMATION.
5. STAKES SHALL BE 2" X 2" WOOD OR #3 REBAR, 2'-4' LONG, EMBEDDED SUCH THAT 2" PROTRUDES ABOVE LOG, OR AS DIRECTED BY THE ENGINEER.
6. DO NOT PLACE STAKES THROUGH CONTAINMENT MESH.
7. COMPOST CRADLE MATERIAL IS INCIDENTAL & WILL NOT BE PAID FOR SEPARATELY.
8. SANDBAGS USED AS ANCHORS SHALL BE PLACED ON TOP OF LOGS & SHALL BE OF SUFFICIENT SIZE TO HOLD LOGS IN PLACE.
9. TURN THE ENDS OF EACH ROW OF LOGS UPSLOPE TO PREVENT RUNOFF FROM FLOWING AROUND THE LOG.
10. FOR HEAVY RUNOFF EVENTS, ADDITIONAL UPSTREAM STAKES MAY BE NECESSARY TO KEEP LOG FROM FOLDING IN ON ITSELF.



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS

SEDIMENT BASIN & TRAP USAGE GUIDELINES

An erosion control log sediment trap may be used to filter sediment out of runoff draining from an unstabilized area.

Log Traps: The drainage area for a sediment trap should not exceed 5 acres. The trap capacity should be 1800 CF/Acre (0.5" over the drainage area).

Control logs should be placed in the following locations:

1. Within drainage ditches spaced as needed or min. 500' on center
2. Immediately preceding ditch inlets or drain inlets
3. Just before the drainage enters a water course
4. Just before the drainage leaves the right of way
5. Just before the drainage leaves the construction limits where drainage flows away from the project.

The logs should be cleaned when the sediment has accumulated to a depth of 1/2 the log diameter.

Cleaning and removal of accumulated sediment deposits is incidental and will not be paid for separately.

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec916	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	302,ETC	TEEGE,ETC
	DIST	COUNTY		SHEET NO.
	PHARR	CAMERON,ETC		139

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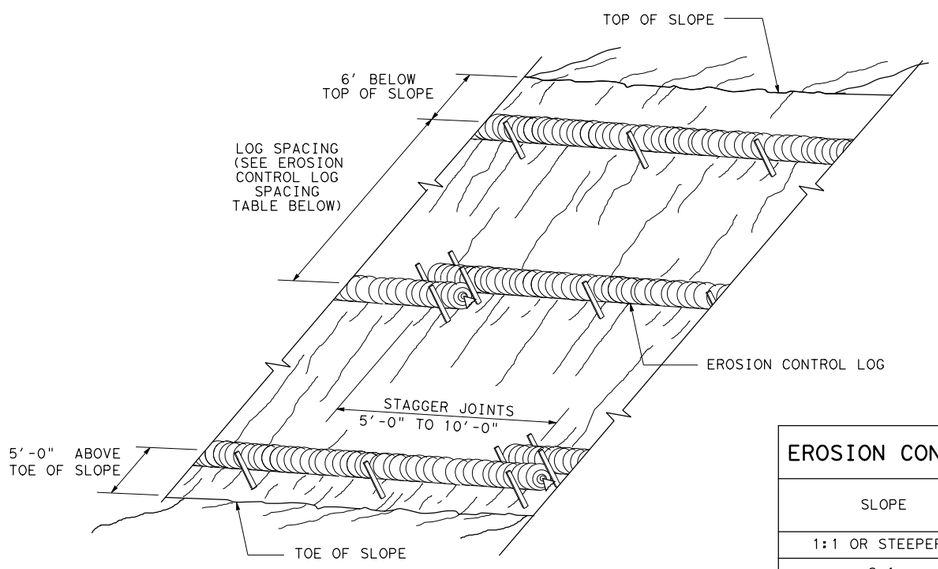
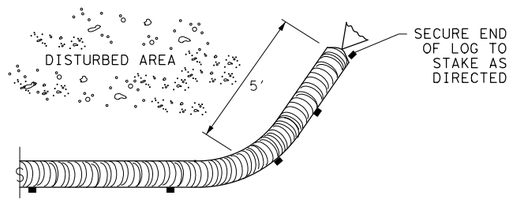


EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING

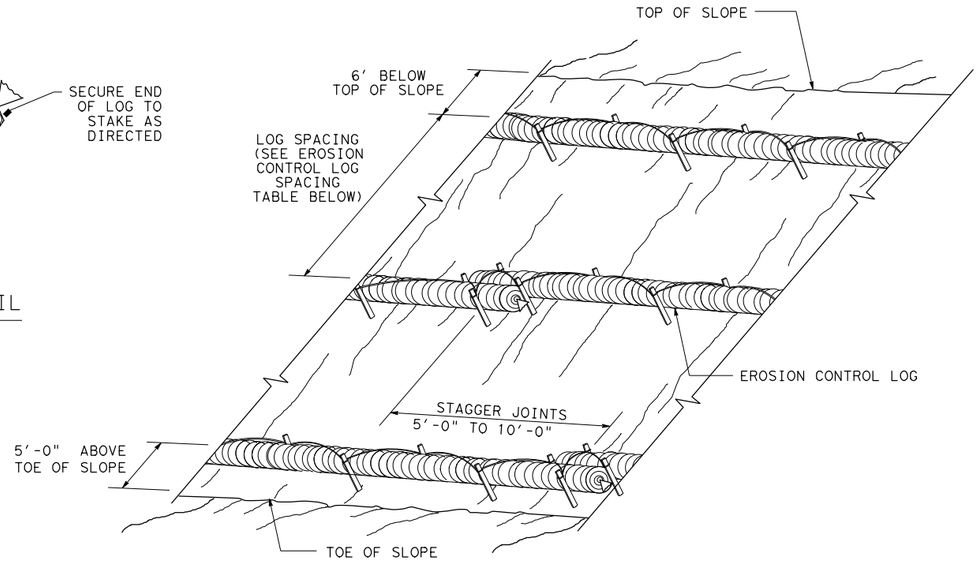
CL-SST



END SECTION RAP DETAIL

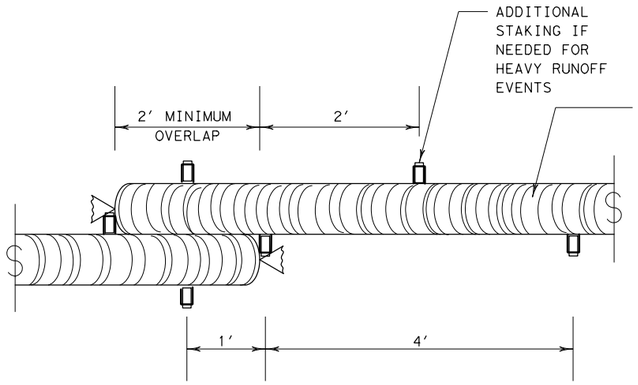
EROSION CONTROL LOG SPACING TABLE				
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5′	10′	15′	20′
2:1	10′	20′	30′	40′
3:1	15′	30′	45′	60′
4:1 OR FLATTER	20′	40′	60′	80′

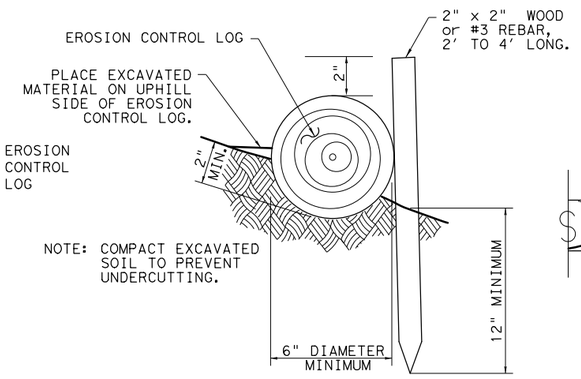
* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;
HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART



EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING

CL-SSL

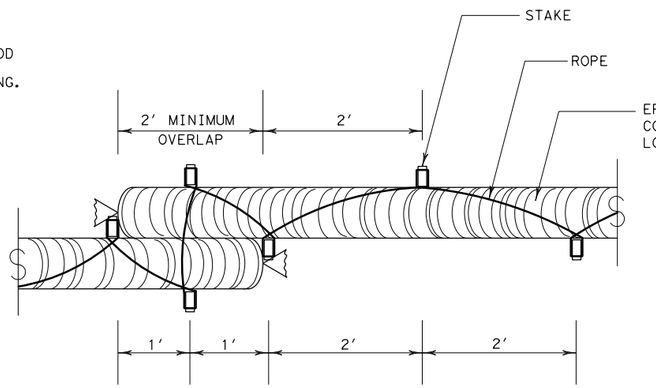


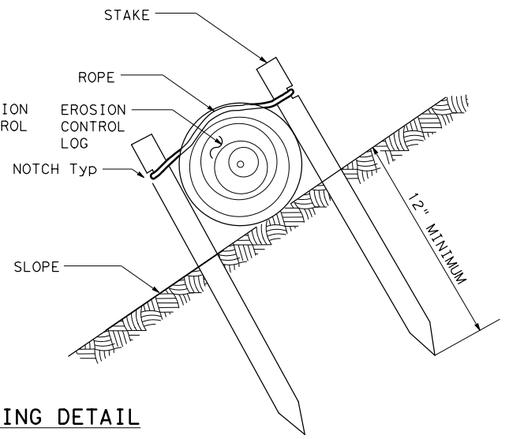


STAKE AND TRENCHING ANCHORING DETAIL

CL-SST

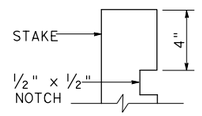
TRENCH DEPTH TABLE	
LOG DIAMETER	DEPTH
6"	2"
8"	3"
12"	4"
18"	5"





STAKE AND LASHING ANCHORING DETAIL

CL-SSL



STAKE NOTCH DETAIL

Texas Department of Transportation — Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES
EROSION CONTROL LOG
EC(9)-16

FILE: ec116	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS
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REVISIONS	0921	06	302,ETC	TEEGE,ETC
	DIST	COUNTY		SHEET NO.
	PHARR	CAMERON,ETC		140

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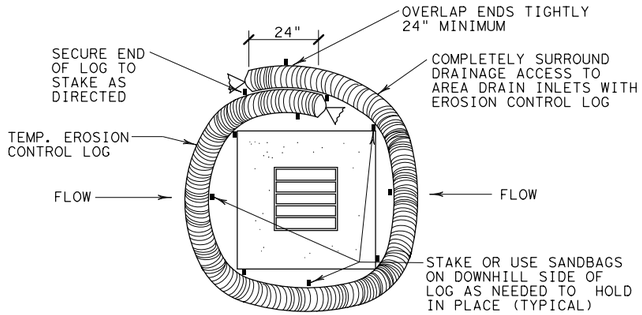
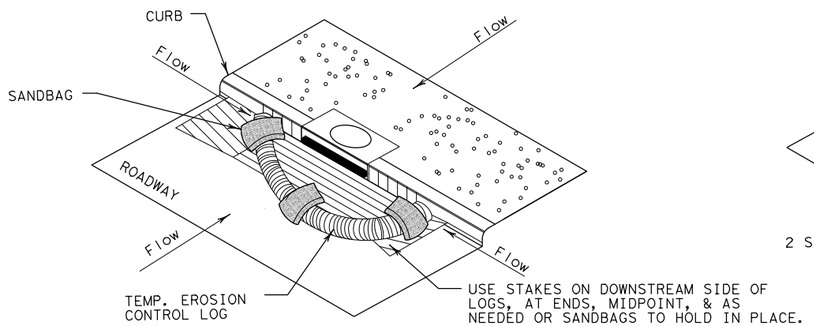


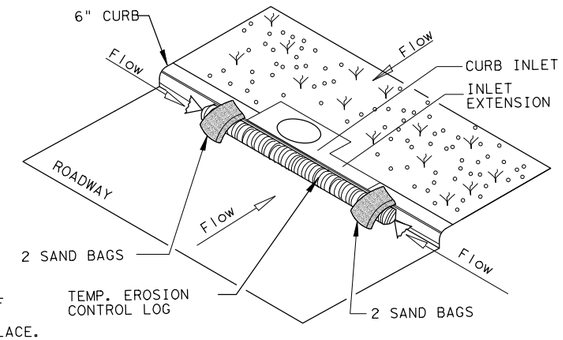
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

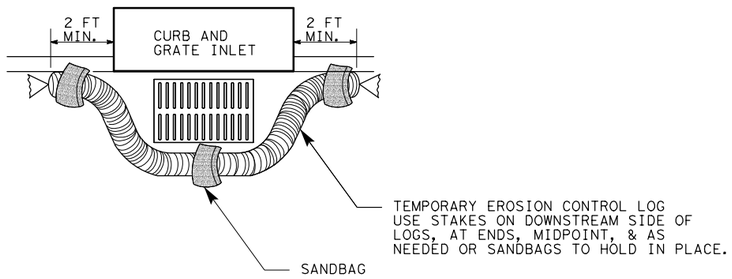
CL-CI



EROSION CONTROL LOG AT CURB INLET

CL-CI

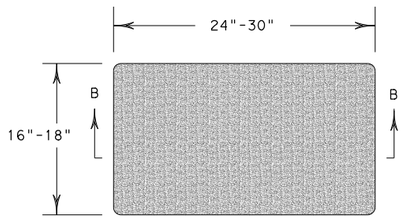
NOTE:
EROSION CONTROL LOGS USED AT CURB INLETS SHOULD ONLY BE USED IF THEY WILL NOT IMPEDE TRAFFIC OR FLOOD THE ROADWAY OR WHEN THE STORM SEWER SYSTEM IS NOT FULLY FUNCTIONAL.



EROSION CONTROL LOG AT CURB & GRADE INLET

CL-GI

SECTION B-B



SANDBAG DETAIL

Texas Department of Transportation | Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec916	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS			
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY			
REVISIONS	0921	06	302, ETC	TEEGE, ETC			
	DIST	COUNTY		SHEET NO.			
	PHARR	CAMERON, ETC		141			

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