DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
HNS	6			1
GRAPHICS: HNS	STATE	STATE DIST.	COUNTY	
CHECKED: JMS	TEXAS	WACO	CORYELL	
CHECKED: FG	CONT.	SECT.	JOB	HIGHWAY NO.
	1219	02	017, ETC.	FM 182

FM 182	
DESIGN SPEED	40 MPH
ADT (2021)	187
ADT (2041)	262

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

FEDERAL AID PROJECT NO. BR 2023(976)
CSJ: 1219-02-017, ETC.

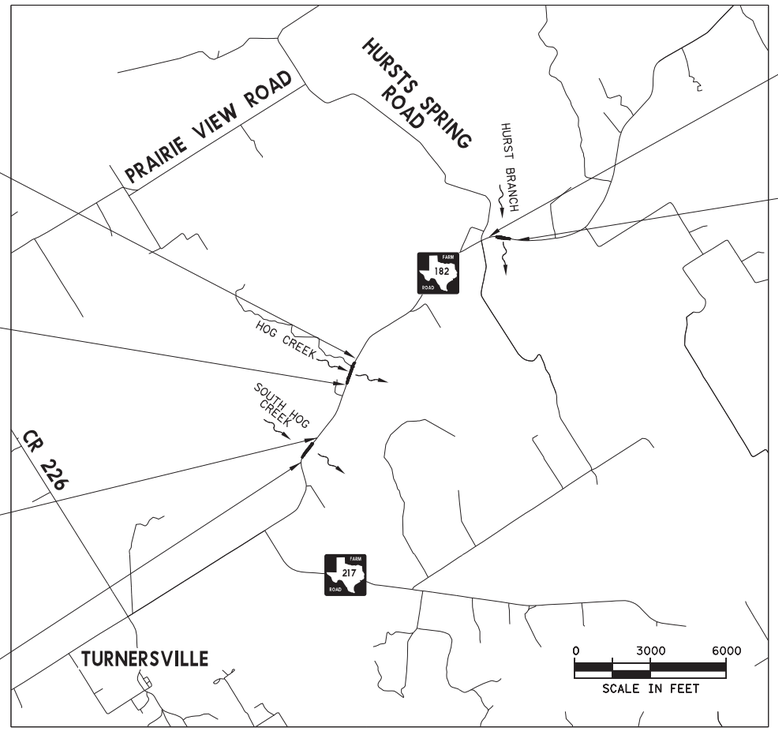
CORYELL COUNTY
FM 182

LIMITS: @ SOUTH HOG CREEK (STR #003). ETC.

FOR THE CONSTRUCTION OF BRIDGE REPLACEMENT
CONSISTING OF REPLACE BRIDGE AND APPROACHES

INDEX OF SHEETS

HIGHWAY	CSJ	ROADWAY		BRIDGES		TOTAL LENGTH	
		FEET	MILES	FEET	MILES	FEET	MILES
FM 182	1219-02-017	581.00	0.110	105.00	0.019	686.00	0.129
FM 182	1219-02-018	760.00	0.143	115.00	0.021	875.00	0.164
FM 182	1219-02-020	429.00	0.081	100.00	0.018	529.00	0.099
PROJECT TOTALS		1770.00	0.334	320.00	0.058	2090.00	0.392



END PROJECT FM 182
CSJ: 1219-02-018
℄ FM182_018
STA 646+55.00

BEGIN PROJECT FM 182
CSJ: 1219-02-018
℄ FM182_018
STA 637+80.00
FM 182 AT HOG: 346+1.67 (BEG. & END)

END PROJECT FM 182
CSJ: 1219-02-017
℄ FM182_01
STA 610+16.00

BEGIN PROJECT FM 182
CSJ: 1219-02-017
℄ FM182_01
STA 603+30.00
FM 182 AT S. HOG: 348+0.345 (BEG. & END)

BEGIN PROJECT FM 182
CSJ: 1219-02-020
℄ FM182_020
STA 724+51.00
FM 182 AT HURST: 346+0.073 (BEG. & END)

END PROJECT FM 182
CSJ: 1219-02-020
℄ FM182_020
STA 729+80.00

N

EXCEPTIONS: NONE
EQUATIONS: NONE
RAILROAD CROSSINGS: NONE

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

SUBMITTED FOR LETTING 4/5/2023
Arnulfo Gaytán
PROJECT MANAGER
AMERICAN STRUCTUREPOINT, INC.
TBPE FIRM No. F-10069

TEXAS DEPARTMENT OF TRANSPORTATION

RECOMMENDED FOR LETTING 4/11/2023
DocuSigned by: Michael Yates ED554D438C874EF...
ER

RECOMMENDED FOR LETTING 4/19/2023
DocuSigned by: Victor Hackl, P.E. 9AD8C743F95E4E3...
DIRECTOR OF TRANSPORTATION PLANNING & DEVELOPMENT

APPROVED FOR LETTING 4/19/2023
DocuSigned by: Stanley Swiatek B69BD796DD554C9...
DISTRICT ENGINEER

COUNTY CORYELL PROJ. NO.
HWY. NO. FM 182 LETTING DATE
DATE ACCEPTED

REV DATE: 4/5/2023
CSJ: 1219 02 017, ETC.
FILE LOCATION: P:\2020\00072\121902017\4 - Design\Plan Set\1. General\202000072.01.RD.TS.dgn

SHEET NO.	DESCRIPTION
	GENERAL
1	TITLE SHEET
2	INDEX OF SHEETS
3	FM 182 AT SOUTH HOG CREEK TYPICAL SECTIONS
4	FM 182 AT HOG CREEK TYPICAL SECTIONS
5	FM 182 AT HURST BRANCH TYPICAL SECTIONS
6, 6A-6J	GENERAL NOTES
7, 7A	ESTIMATE OF QUANTITIES
8 - 10	OVERALL SUMMARY OF QUANTITIES
11	FM 182 AT SOUTH HOG CREEK SUMMARY OF SMALL SIGNS
	TRAFFIC CONTROL
12	SEQUENCE OF WORK
13	FM 182 AT SOUTH HOG CREEK DETOUR LAYOUT
14	FM 182 AT HOG CREEK DETOUR LAYOUT
15	FM 182 AT HURST BRANCH DETOUR LAYOUT
	TRAFFIC CONTROL STANDARDS
16 - 27	* BC(1)-21 THRU BC(12)-21
28	* WZ(RCD)-13
	ROADWAY
29	FM 182 AT SOUTH HOG CREEK SURVEY CONTROL INDEX SHEET
30 - 31	FM 182 AT SOUTH HOG CREEK PRIMARY HORIZONTAL AND VERTICAL CONTROL
32	FM 182 AT HOG CREEK SURVEY CONTROL INDEX SHEET
33 - 34	FM 182 AT HOG CREEK PRIMARY HORIZONTAL AND VERTICAL CONTROL
35	FM 182 AT HURST BRANCH CREEK SURVEY CONTROL INDEX SHEET
36 - 37	FM 182 AT HURST BRANCH CREEK PRIMARY HORIZONTAL AND VERTICAL CONTROL
38	FM 182 AT SOUTH HOG CREEK HORIZONTAL ALIGNMENT DATA
39 - 40	FM 182 AT SOUTH HOG CREEK PLAN AND PROFILE
41	FM 182 AT SOUTH HOG CREEK DRIVEWAY 1 PLAN AND PROFILE
42 - 43	FM 182 AT HOG CREEK HORIZONTAL ALIGNMENT DATA
44 - 45	FM 182 AT HOG CREEK PLAN AND PROFILE
46	FM 182 AT HOG CREEK DRIVEWAY 1 PLAN AND PROFILE
47	FM 182 AT HOG CREEK DRIVEWAY 2 PLAN AND PROFILE
48	FM 182 AT HOG CREEK DRIVEWAY 3 PLAN AND PROFILE
49	FM 182 AT HURST BRANCH HORIZONTAL ALIGNMENT DATA
50	FM 182 AT HURST BRANCH PLAN AND PROFILE
51	FM 182 AT HURST BRANCH DRIVEWAY 1 PLAN AND PROFILE
	ROADWAY STANDARDS
52	* BED-14
53	* GF(31)-19
54	* GF(31)MS-19
55 - 56	* GF(31)TRTL3-20
57	* MBGF(SR)-19
58	* RAIL-ADJ(B)-19
59	* SGT(11S)31-18
60	* SGT(12S)31-18
61	* SGT(15)31-20
62 - 64	* SRG(TL-3)-21
	DRAINAGE
65	FM 182 AT SOUTH HOG CREEK DRAINAGE AREA MAP
66	FM 182 AT SOUTH HOG CREEK HYDRAULIC DATA SHEET
67	FM 182 AT HOG CREEK DRAINAGE AREA MAP
68	FM 182 AT HOG CREEK HYDRAULIC DATA SHEET
69	FM 182 AT HURST BRANCH DRAINAGE AREA MAP
70	FM 182 AT HURST BRANCH HYDRAULIC DATA SHEET
	DRAINAGE STANDARDS
71	** SETP-PD
72 - 73	** SETP-PD-A
74	** PSET-SP
75	** PSET-RR
	BRIDGE
76 - 77	FM 182 AT SOUTH HOG CREEK - BRIDGE LAYOUT
78	FM 182 AT SOUTH HOG CREEK - SOIL BORING LOGS
79	FM 182 AT SOUTH HOG CREEK - ESTIMATED QUANTITIES & CAP ELEVATIONS
80 - 81	FM 182 AT HOG CREEK - BRIDGE LAYOUT
82	FM 182 AT HOG CREEK - SOIL BORING LOGS
83	FM 182 AT HOG CREEK - ESTIMATED QUANTITIES & CAP ELEVATIONS
84 - 85	FM 182 AT HURST BRANCH - BRIDGE LAYOUT
86	FM 182 AT HURST BRANCH - SOIL BORING LOGS
87	FM 182 AT HURST BRANCH - ESTIMATED QUANTITIES & CAP ELEVATIONS

SHEET NO.	DESCRIPTION
	BRIDGE STANDARDS
88	*** APSB-30
89	*** APSBD-30-30
90	*** BPSB-30
91	*** BPSB-30-30
92	*** SPSB-30
93	*** SPSB-30-30
94	*** AJ
95	*** BAS-A
96	*** CSAB (MOD)
97 - 98	*** FD
99	*** PSB-4SB12
100	*** PSB-4SB15
101	*** PSBEB
102	*** PSBRA
103	*** PSBSD
104 - 105	*** SRR
106 - 107	*** SSTR
108 - 110	*** TYPE T223
	TRAFFIC
111	FM 182 AT SOUTH HOG CREEK - SIGNING AND PAVEMENT MARKINGS LAYOUT
112	FM 182 AT HOG CREEK - SIGNING AND PAVEMENT MARKINGS LAYOUT
113	FM 182 AT HURST BRANCH - SIGNING AND PAVEMENT MARKINGS LAYOUT
	TRAFFIC STANDARDS
114	* D&OM(1)-20
115	* D&OM(2)-20
116	* D&OM(3)-20
117	* D&OM(4)-20
118	* D&OM(5)-20
119	* D&OM(VIA)-20
120	* PM(1)-22
121	* PM(2)-22
122	* SMD(GEN)-08
123	* SMD(SLIP-1)-08
124	* SMD(SLIP-2)-08
125	* SMD(SLIP-3)-08
126	* SMD(FRP)-08
127	* SMD(TWT)-08
	ENVIRONMENTAL
128	EPIC
129 - 130	FM 182 AT SOUTH HOG CREEK - STORMWATER POLLUTION PREVENTION PLAN (SWP3)(Less Than 1 Acre)
131	FM 182 AT SOUTH HOG CREEK - SWP3 LAYOUT
132 - 133	FM 182 AT HOG CREEK - STORMWATER POLLUTION PREVENTION PLAN (SWP3)(Less Than 1 Acre)
134	FM 182 AT HOG CREEK - SWP3 LAYOUT
135 - 136	FM 182 AT HURST BRANCH - STORMWATER POLLUTION PREVENTION PLAN (SWP3)(Less Than 1 Acre)
137	FM 182 AT HURST BRANCH - SWP3 LAYOUT
	ENVIRONMENTAL STANDARDS
138	** EC(1)-16
139	** EC(2)-16
140	** TEMPORARY STREAM CROSSING DETAIL (WACO DISTRICT STANDARD)
141 - 150	** TA-BMP (WACO DISTRICT STANDARD)

STATE OF TEXAS
JOSE M. SANDOVAL
90593
LICENSED PROFESSIONAL ENGINEER
4/5/2023

AMERICAN STRUCTUREPOINT, INC.
FIRM NO. F-10069

THE STANDARD SHEETS IDENTIFIED WITH (*) HAVE BEEN SELECTED UNDER MY RESPONSIBLE SUPERVISION AS APPLICABLE TO THIS PROJECT.

STATE OF TEXAS
AMY L. BENNETT
123129
LICENSED PROFESSIONAL ENGINEER
4/5/2023

AMERICAN STRUCTUREPOINT, INC.
FIRM NO. F-10069

THE STANDARD SHEETS IDENTIFIED WITH (**) HAVE BEEN SELECTED UNDER MY RESPONSIBLE SUPERVISION AS APPLICABLE TO THIS PROJECT.

STATE OF TEXAS
EMILY WASON BERVER
99355
LICENSED PROFESSIONAL ENGINEER
4/5/2023

HARDESTY & HANOVER, LLC.
FIRM NO. F-3379

THE STANDARD SHEETS IDENTIFIED WITH (***) HAVE BEEN SELECTED UNDER MY RESPONSIBLE SUPERVISION AS APPLICABLE TO THIS PROJECT.

3711 SOUTH MOPAC EXPRESSWAY
BUILDING ONE, SUITE 350
AUSTIN, TX 78703
TEL 512.494.6037 FAX 317.543.0270
www.structurepoint.com

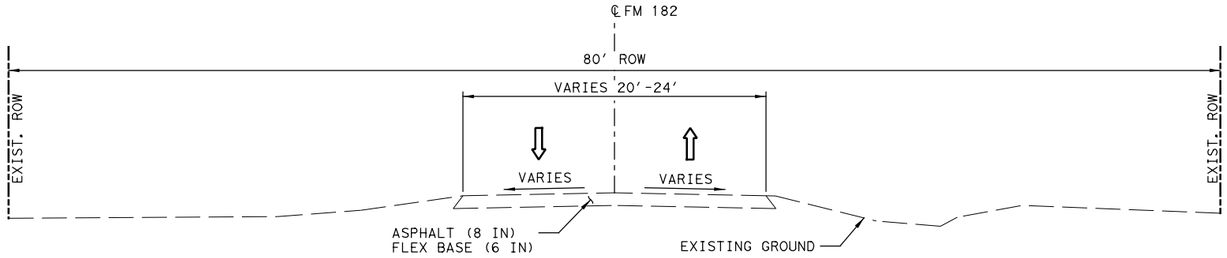
AMERICAN STRUCTUREPOINT INC.

TBPE FIRM NO. F-10069

INDEX OF SHEETS

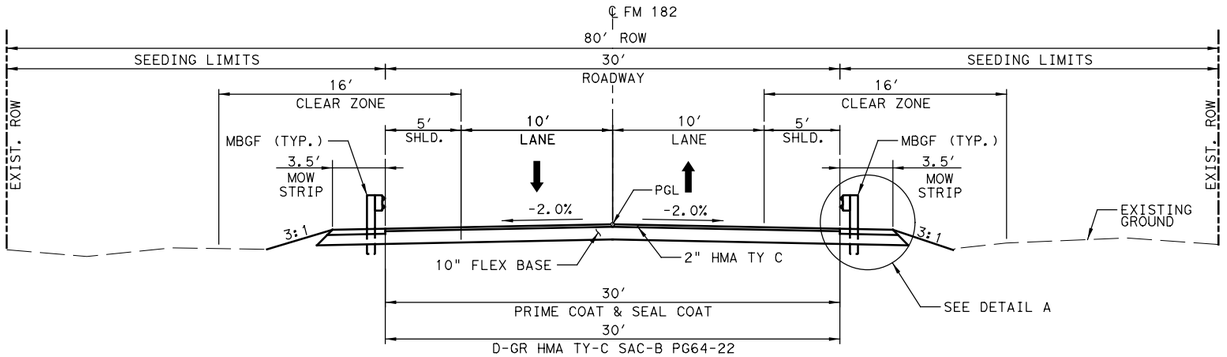
FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		FM 182
STATE	DISTRICT	COUNTY
TEXAS	WACO	CORYELL
CONTROL	SECTION	JOB / SHEET NO.
1219	02	017, ETC. / 2

REV DATE: 4/5/2023
CSJ: 1219-02-017, ETC.
FILE LOCATION: P:\2020\00072\121902017\4 - Design\Plan Set\1. General\202000072.01.RD.IND.dgn



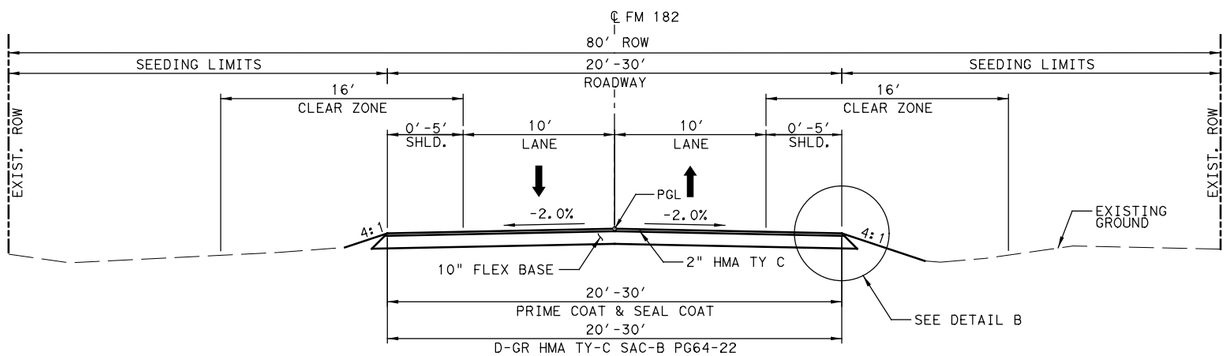
EXISTING TYPICAL SECTION

STA 603+30 TO STA 610+16



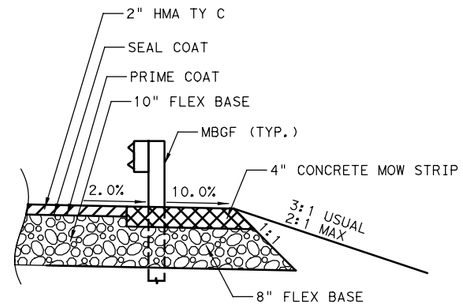
PROPOSED TYPICAL SECTION

STA 604+63 TO STA 606+50
STA 607+55 TO STA 608+92



PROPOSED TYPICAL SECTION

STA 603+30 TO STA 604+63
STA 608+92 TO STA 610+16



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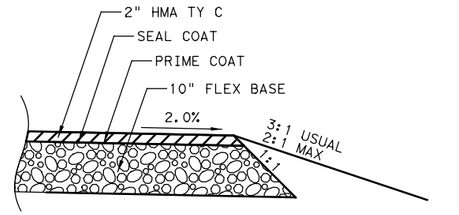

DETAIL "B"

PRINT DATE	REVISION DATE
4/5/2023	

STATE OF TEXAS
JOSE M. SANDOVAL
90593
LICENSED
PROFESSIONAL ENGINEER

JOSE M. SANDOVAL, P.E. 4/5/2023

3711 SOUTH MOPAC EXPRESSWAY
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www.structurepoint.com

AMERICAN STRUCTUREPOINT INC.

TBPE FIRM NO. F-10069

Texas Department of Transportation

FM 182 AT SOUTH HOG CREEK

TYPICAL SECTIONS

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		FM 182

STATE	DISTRICT	COUNTY	
TEXAS	WACO	CORYELL	
CONTROL	SECTION	JOB	SHEET NO.
1219	02	017, ETC.	3

REV DATE: 4/5/2023
CSJ: 1219-02-017, ETC.
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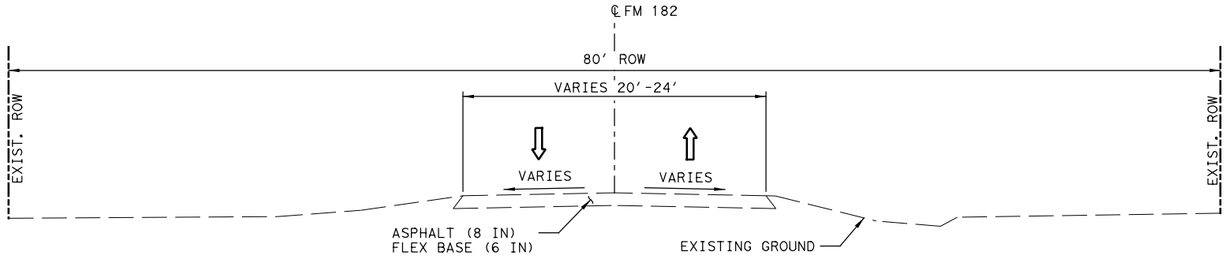
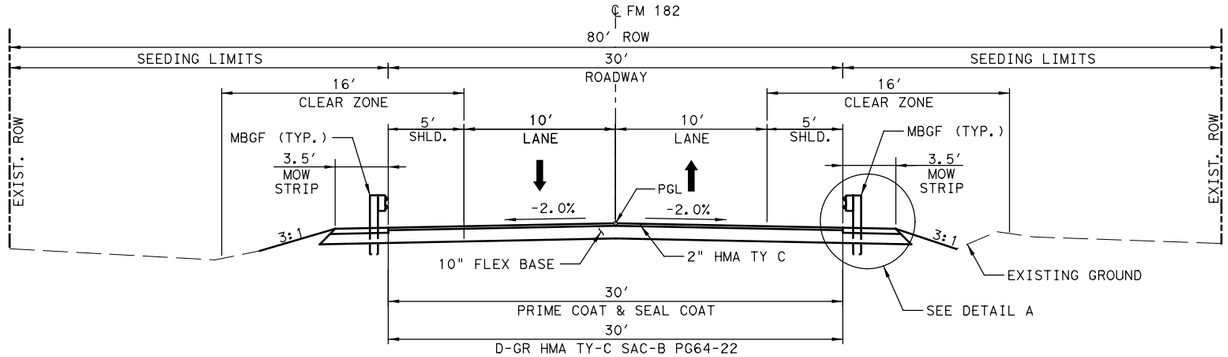


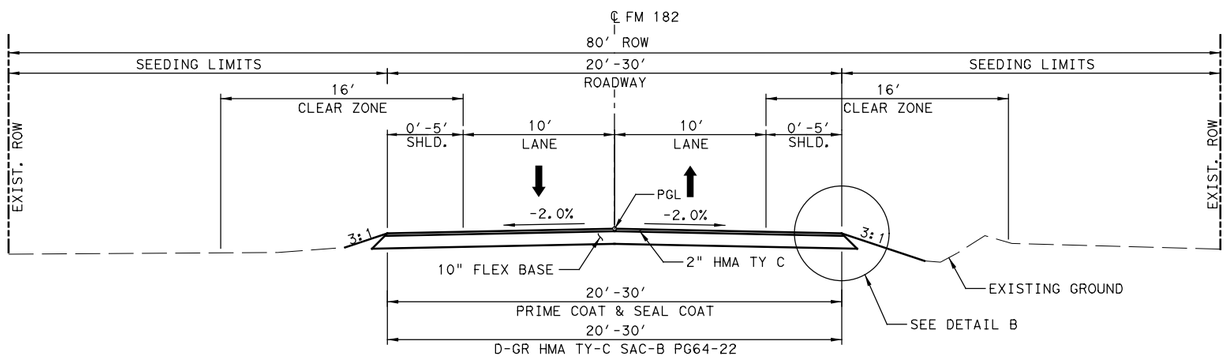
EXISTING TYPICAL SECTION

STA 637+80 TO STA 646+55



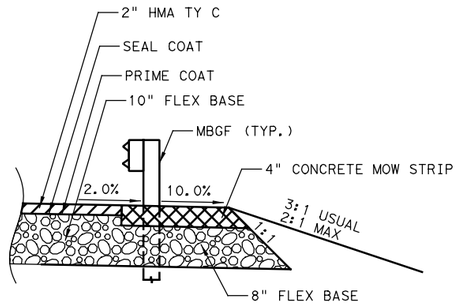
PROPOSED TYPICAL SECTION

STA 638+31 TO STA 641+56
STA 642+71 TO STA 644+20



PROPOSED TYPICAL SECTION

STA 637+80 TO STA 638+31
STA 644+20 TO STA 646+55



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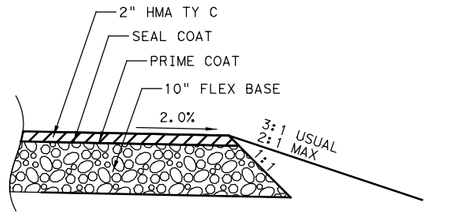

DETAIL "B"

PRINT DATE	REVISION DATE
4/5/2023	

STATE OF TEXAS
JOSE M. SANDOVAL
90593
LICENSED
PROFESSIONAL ENGINEER

JOSE M. SANDOVAL, P.E. 4/5/2023

3711 SOUTH MOPAC EXPRESSWAY
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www.structurepoint.com

AMERICAN STRUCTUREPOINT INC.

TBPE FIRM NO. F-10069

Texas Department of Transportation

FM 182 AT HOG CREEK

TYPICAL SECTIONS

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		FM 182

STATE	DISTRICT	COUNTY	
TEXAS	WACO	CORYELL	
CONTROL	SECTION	JOB	SHEET NO.
1219	02	017,ETC	4

REV DATE: 4/5/2023
CSJ: 1219-02-018
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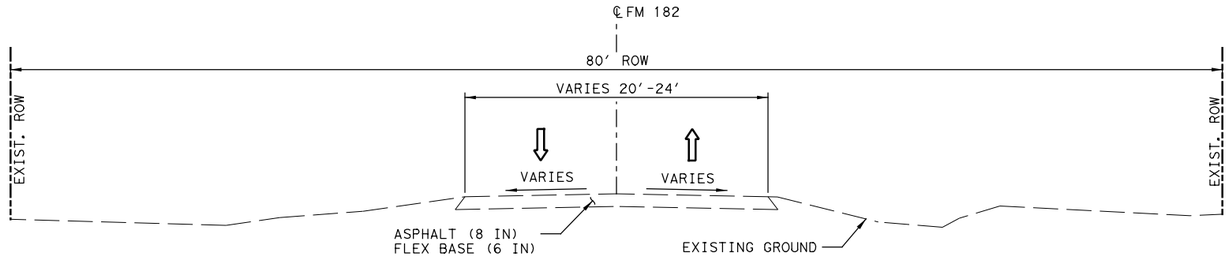
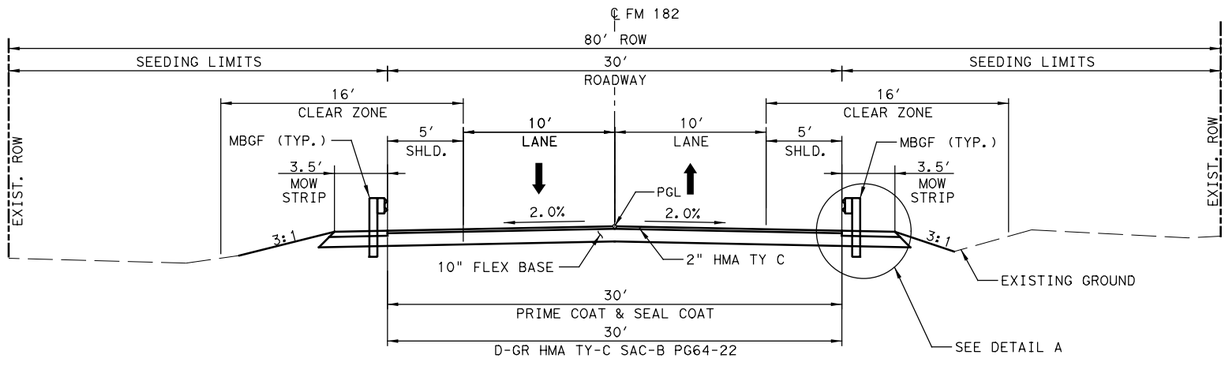


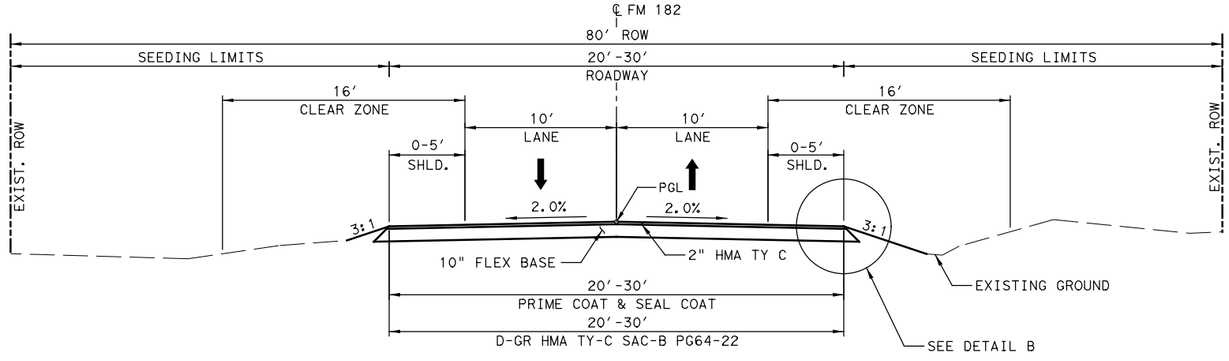
EXISTING TYPICAL SECTION

STA 724+51 TO STA 729+80



PROPOSED TYPICAL SECTION

STA 725+23 TO STA 726+43
STA 727+43 TO STA 729+45



PROPOSED TYPICAL SECTION

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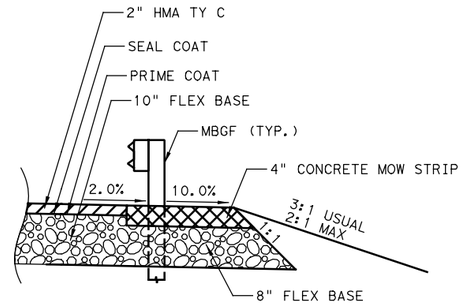
STA 729+45 TO STA 729+80



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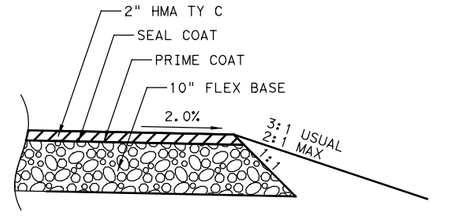

DETAIL "B"

PRINT DATE	REVISION DATE
4/5/2023	

STATE OF TEXAS
JOSE M. SANDOVAL
90593
LICENSED PROFESSIONAL ENGINEER

4/5/2023

JOSE M. SANDOVAL, P.E.

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AMERICAN STRUCTUREPOINT INC.

TBPE FIRM NO. F-10069

Texas Department of Transportation

FM 182 AT HURST BRANCH

TYPICAL SECTIONS

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		FM 182

STATE	DISTRICT	COUNTY	
TEXAS	WACO	CORYELL	
CONTROL	SECTION	JOB	SHEET NO.
1219	02	017,ETC	5

REV DATE: 4/5/2023
CSJ: 1219-02-020
FILE LOCATION: P:\2020\00072\121902020\4 - Design\Plan Set\1. General\202000072.03.RD.TYP.dgn

BASIS OF ESTIMATE TABLES

Table 1: Basis of Estimate for Erosion Control Items

Item	Description	Rate	Basis	Quantities
*166	FERTILIZER			
	FERTILIZER (20-10-10) (PERMANENT)	300 LBS / AC	1.74 AC	0.26 TON
	FERTILIZER (20-10-10) (TEMPORARY)	300 LBS / AC	1.74 AC	0.26 TON
168	VEGETATIVE WATERING			
	(3 APPLICATIONS - PERM)	13,100 GAL/AC/APP	1.74 AC	68 MG
	(3 APPLICATIONS - TEMP)	13,100 GAL/AC/APP	1.74 AC	68 MG

* FOR Contractor'S INFORMATION ONLY

Table 2: Basis of Estimate for Base Work

Item	Description	Rate	Basis	Quantities
247	FLEXIBLE BASE			
	(TY D GR 1-2 FNAL POS)	138 LB/CF	47,952 CF	1,776 CY *3,309 TON
310	PRIME COAT			
	PRIME COAT (MC-30 OR AE-P)	0.20 GAL / SY	6,263 SY	1,253 GAL

Table 3: Basis of Estimate for Seal Coats (Construction Projects)

Item	Description	Rate	Basis	Quantities
316	**SEAL COAT**			
	FIRST COURSE			
	ASPH (CRS-2P)	0.60 GAL / SY	6,263 SY	3,759 GAL
	AGGR (TY D GR 3 OR TY L GR 3)	1 CY / 95 SY	6,263 SY	67 CY

Table 4: Basis of Estimate for Asphalt Pavements

Item	Description	Rate	Basis	Quantities
3076	**DENSE-GRADED HOT MIX ASPHALT (EXEMPT)**			
	TY-C PG 64-22	110 LB / SY / IN	6,263 SY	688 TON

GENERAL

The construction, operation and maintenance of the proposed project will be consistent with the state implementation plan as prepared by the Texas Commission on Environmental Quality.

The disturbed area for this project, as shown on the plans is 1.74 acres. However, the Total Disturbed Area (TDA) will establish the required authorization for storm water discharges. The TDA of this project will be determined by the sum of the disturbed area in all project locations in the contract, and all disturbed area on all Project-Specific Locations (PSL) located in the project limits and/or within 1 mile of the project limits. The department will obtain an authorization to discharge storm water from the Texas Commission on Environmental Quality (TCEQ) for the construction site as shown on the plans, according to the TDA of the project. The Contractor will obtain any required authorization from the TCEQ for the discharge of storm water from any PSL for construction support activities on or off of the project row according to the TDA of the project. When the TDA for the project exceeds 1 acre, provide a copy of the appropriate application of permit (NOI, or Construction Site Notice) to the Engineer, for any PSL located in the project limits or within 1 mile of the project limits. Follow the directives and adhere to all requirements set forth in the TCEQ, Texas Pollution Discharge Elimination System, Construction General Permit (TPDES, CGP).

Contractor questions on this project are to be emailed to the Waco District at the following address:

Bill Compton - Wacoprebid@txdot.gov, 254-867-2770, 100 S. Loop Dr., Waco, TX
Carmen Chau - Wacoprebid@txdot.gov, 254-867-2794, 100 S. Loop Dr., Waco, TX

Or Via phone or in person to the following individual(s):
Area Engineer's: Bill Compton, P.E.(Interim),254-867-2770
Assistant Area Engineer's: Mohab Samuel, P.E., 254-865-7115

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

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

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

The Letting Pre-Bid Q&A web page for each project can be accessed by using the dashboard to navigate to the project you are interested in by scrolling or filtering the dashboard using the controls on the left. Hover over the blue hyperlink for the project you want to view the Q&A for and click on the link in the window that pops up.
Paper copies of cross-sections may be produced by using the provided .pdf file located on the above FTP Website at the bidders' expense and at copying companies. This data is for non-construction purposes only and it is the responsibility of the prospective bidder to validate the enclosed data with appropriate plans, specifications and estimate for the project(s).

GENERAL NOTES

The following standard detail sheets have been modified*:*

CSAB(MOD)

ITEM 5: CONTROL OF THE WORK

Provide the Engineer with a weekly work schedule of planned activities including anticipated quantities of materials to be placed daily (CY of each concrete placement, tons of HMAC to be placed daily, etc.). Schedules will be provided for the following week as part of each week's project meetings or by 5PM on Thursday as approved by the Engineer. Failure to provide notifications are required here may be deemed as insufficient notice per item 5.10.

Provide the Engineer Daily by 3PM the planned activities for the following day including location, quantities of materials to be placed, etc. in a format acceptable to the Engineer.

Submit all fabrication and shop drawings per TxDOT's online shop drawing submittal system and copy the Area Engineer on the email submittal, unless otherwise directed.

Where a precast or cast-in-place concrete element is shown in the plans, Contractor may submit a precast concrete alternate 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 Department. Contractor is responsible for impacts to the project schedule and cost resulting from the use of alternates.

Underground utilities owned by the Texas Department of Transportation may be present within the Right-Of-Way on this project. For signal, illumination, surveillance, and communications & control maintained by TxDOT, call the TxDOT Traffic Signal Office (254)867-2808 for locates a minimum of 48 hours in advance of excavation. For irrigation systems, call TxDOT Landscape Office (254)867-2726 for locates a minimum of 48 hours in advance of excavation. If city or town owned irrigation facilities are present, call the appropriate department of the local city or town a minimum of 48 hours in advance of excavation. The Contractor is liable for all damages when utilities are damaged due to Contractor's negligence including, but not limited to, repair or replacement at the Contractor's expense.

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.

References to manufacturer's trade name or catalog numbers are for the purpose of identification only and the Contractor will be permitted to furnish like materials of other manufacturers provided they are of equal quality and comply with specifications for this project.

This project has structures with surface coatings which contain hazardous constituents which are _LEAD_. Contractor is responsible for the health and safety of his employees and compliance with all OSHA standards and regulations.

ITEM 7: LEGAL RELATIONS AND RESPONSIBILITIES

No significant traffic generator events identified.

If utilizing private property for waste disposal sites, field office sites, equipment storage sites or for any other purpose involved with this project, provide to the Engineer written proof of the property owner's approval of the use of this property. This proof may be in the form of a letter or agreement signed by the property owner or other documents acceptable to the Engineer. Provide such proof prior to occupying the site.

Personal vehicles of the Contractor's employees will not be parked within the right of way at any time including any section closed to public traffic unless the vehicle is being utilized for construction procedures. However, the Contractor's employees may park on the right of way at the sites where the Contractor has his office, equipment, and materials storage yard.

The Contractor is alerted to the possible presence of swallows under the existing bridges or culverts. Because the migratory bird treaty act prohibits harm to swallows, their eggs or their nestlings, the Contractor will not begin potentially disturbing activities on or near the bridge until the birds have abandoned any occupied nests (approximately September 1). Active nests may not be removed regardless of the date.

Prior to the swallows returning to the nests (approximately March 1), abandoned nests will be removed from the bridge. The Contractor will prevent the establishment of new nests on any portion of the structure. Methods for preventing the establishment of new nests must be approved by the Engineer. Examples of acceptable nest prevention methods are bird-deterrent netting and bird-repelling sprays and/or gels to be applied to the structure.

This work will not be paid for directly but will be subsidiary to the various bid items. No relief or compensation will be considered for project delays due the Contractors in attention / in action to preventing nesting or for nesting already underway at the commencement of work.

Notify the Engineer in writing a minimum of 7 days in advance of opening any bridge structure to public use, to allow the Engineer an opportunity to conduct a safety assessment prior to opening.

The Contractor will submit detailed site-specific plans for work in each "water of the United States" designated on the EPIC sheet. These plans must be approved by the Engineer prior to starting any work in these areas. The plans must also describe facilities and work activities adjacent the Ordinary High-Water Marks. The plan must show actual dimensions and materials for:

- Proposed construction roads and work areas leading to or in close proximity to the Ordinary High-Water Marks
- Temporary material or equipment storage areas in close proximity to the Ordinary High-Water Marks
- Locations of proposed sediment and erosion control devices
- Identification of construction equipment and construction techniques to accomplish the work

Once this drawing and supporting information is reviewed and approved by TxDOT, all construction workers should be made aware of the limits designated on the drawings by the Contractor's supervision. Work in all waters of the US will be limited to the minimum necessary required to construct the bridge, culvert or roadway fills. Work will also include all activities needed for bridge and culvert demolitions. Working or disturbing soil in the stream channel outside the limits of the work plan will not be allowed. Orange fencing will be provided and maintained to establish the TxDOT approved boundaries in which work may be conducted between the Ordinary High-Water Marks. Orange fencing will not be paid for but will be considered subsidiary to Item 502, "Barricades, Signs and Traffic Handling".

The following Commitments must be followed during construction for Golden-cheeked Warbler (GCW) a Federally Listed Endangered Species:

- Review temporary roadside material storage locations and notify contractors of the areas with potential to support habitat for rare, threatened, and endangered species and of the conservation need to avoid these areas.

- Clearing or trimming of individual trees or shrubs at the three bridge locations would be phased so that any clearing activities would occur between September 1st and February 28th to minimize impacts to GCW.

- TxDOT personnel and project contractors, as appropriate, will be informed of these Programmatic Consultation requirements.

ITEM 8: PROSECUTION AND PROGRESS

This Project will be a Standard Workweek in accordance with Article 8.3.1.4.

Meet weekly or at intervals as agreed upon with the Engineer to notify him or her of planned work for the upcoming 3-week period.

Meet bi-weekly or at intervals as agreed upon with the Engineer to notify him or her of planned work for the upcoming 3-week period.

For this project, provide a Bar Chart progress schedule.

ITEM 100: PREPARING RIGHT OF WAY

The limits of preparing right of way will be measured at the following locations:

South Hog Creek

From STA. 603+30.00 To STA. 610+16.00

Hog Creek

From STA. 637+80.00 To STA. 646+55.00

Hurst Branch

From STA. 724+51.00 To STA. 729+80.00

along the centerline of construction.

Remove the existing roadway delineators and object markers as shown on the plans, or as directed, during construction within the right of way. Delineator and object marker removals are subsidiary to this Item.

Remove all trees within the right of way within station limits designated for Preparing Right of Way unless designated for preservation or as directed by the Engineer.

Trees to be removed near gas lines shall be cut and ground 1' below grade.

Preserve trees within temporary construction easements in accordance with Article 100.2., unless otherwise directed.

Prune trees designated for preservation as directed. All work required in preserving and pruning
trees will be included in the price bid for Item 100, "Preparing Right Of Way".

The removal of any existing fence will not be paid for directly but will be considered subsidiary to the bid Item 100, "Preparing Right Of Way".

All trees and brush removed each day will be disposed of within the same day of removal unless otherwise approved. If removed vegetation is burned, ashes from burned vegetation will not be placed or allowed to be transported by storm water into any stream. Burn locations, if approved, will be no closer than 300 feet from a stream. Earth berms must be used around burn areas to keep ash in place.

The Contractor is prohibited from removing grass vegetation throughout the entire project limits and then ceasing construction for long periods, typically over three weeks. The Contractor schedule will be developed based on staged vegetation removal, limiting disturbed soil to no more than 25 percent at one time, unless otherwise approved. Should the Contractor not be able to adequately control sediment and erosion for areas disturbed, TxDOT will substantially reduce the size of areas that the Contractor may disturb soil. Should the project be evaluated to have sediment control problems as a result of the Contractor disturbing excessive amounts of soil, the Contractor will be required to immediately re-vegetate (seed and water) those disturbed areas at no cost to TxDOT.

The following five (5) notes apply to All Oak Tree Species:

1. To avoid the spread of Oak Wilt or other disease, all species of oak trees that are damaged or cut (branches, roots and/or stumps) for any reason during this contract, must be treated with a commercial wound dressing within 20 minutes of causing the damage or cut.

2. To prevent the spread of infection from tree to tree when pruning oak trees (all species), the Contractor must disinfect all pruning tools with a solution of 70% isopropyl alcohol after all cutting is complete on each oak tree.

3. Potentially dangerous trees or limbs will be removed as soon as possible.

4. The Engineer can stop all Work operations if the dressing, cut and removal requirements are not followed.

5. Pruning shall be in accordance with ANSI A300 pruning standard.

The Contractor will be responsible for leaving the project site clean and neat in appearance upon completion and before final acceptance by the Engineer.

Wood chips may be left on the right of way no deeper than two (2) inches outside of city limits. Do not trespass on private property while performing work on this contract. Do not cut or damage timber outside the right-of-way lines.

Remove all fallen parts of trees, damaged limbs, and dead limbs. This work will not be paid for directly but will be considered subsidiary to this item.

ITEM 105: REMOVING TREATED AND UNTREATED BASE AND ASPHALT PAVEMENT

Saw existing asphalt along neat lines where portions are to be left in place temporarily or permanently. Sawing is not paid for directly but is subsidiary to this item.
Take possession of recycled asphalt pavement from the project and recycle the material.

Properly dispose of unsalvageable material at Contractor's expense.

Remove the loose material from the roadway before opening to traffic.

ITEM 110: EXCAVATION

In a cut section, when soils are encountered at subgrade depths that are unstable and are deemed unsuitable by the Engineer, undercut this material for a minimum depth of one (1.0) foot below the maximum depth as determined and replace with a material having a plasticity index less than 25 and a liquid limit of less than 50.

ITEMS 110 & 132: EXCAVATION & EMBANKMENT

Excavation and embankment for driveways, sleeper slabs, alleys and intersections will not be paid for directly, but will be considered subsidiary to these items.

The Contractor may modify side slopes from those shown in the cross section as needed to allow grades to match / tie into fixed features. In no case should slope be modified beyond the maximum grades shown on the typical section and approved by the Engineer. Additionally slope adjustments will not be allowed simply to reduce work quantities.

ITEM 160: TOPSOIL

Salvage the existing topsoil from the cut/fill areas. Topsoil not stored in small windrows will be stockpiled in locations with heights no greater than four (4) feet and dumped loose from Contractor equipment. The Contractor will minimize topsoil compaction and limit equipment being driven over stockpiled topsoil.

Avoid topsoil areas that have invasive plant species. Contain / separate topsoil from areas with identified invasive species into separate windrows / piles. Mark topsoil from invasive species areas accordingly and track and return materials to only their original areas or dispose of such materials accordingly. Invasive species will include Giant Cane,

Additional Topsoil will come from approved sources outside of the ROW. Topsoil must come from a location within six (6) inches of the natural ground surface to ensure it contains nutrients and is not sterile soil. Off ROW topsoil will contain a minimum organic content of three & one-half (3.5%) percent, based on soil test results.

ITEM 164: SEEDING FOR EROSION CONTROL

Temporary seeding mixtures (cool and warm) will also include three (3) lbs of Bermuda grass seed per acre, with all seeds being planted concurrently.

Contractor will mow or disc wheat and or oats in spring prior to vegetation going to seed.

Permanent seed mixes for both urban and rural projects including sand or clay soils in the Waco District will be bid and installed to include a minimum of one & one-half (1.5) pounds per acre Green Sprangletop seed and four (4) pounds per acre Bermudagrass seed, with other seed types also being included and quantities remaining unchanged.

ITEM 247: FLEXIBLE BASE

Construct uniform layer thickness of 6 inches, or less with the required density and moisture content. Construction no layers less than 3 inches in thickness.

Minimum PI is equal to three (3) for all grades, or a minimum Bar Linear Shrinkage of 2%.

RAP may not be incorporated into Flexbase Material

ITEM 302: AGGREGATES FOR SURFACE TREATMENTS

The pre-coated aggregate target value of residual bitumen will be in the range of 0.5 % to 1.5 % by weight from a pre-coating material.

Material produced by test method TEX-217-F Part II, passing No. 40 sieve, is restricted to no more than 1% by weight.

The coarse aggregates to be used in surface courses will have a minimum surface aggregate classification requirement of class "D" for all travel lanes and shoulders.

ITEM 310: PRIME COAT

When cutback asphalt is used, a minimum curing time of seven (7) days will be required before application of Item 316, “Seal Coat”, unless otherwise approved in writing.

ITEM 316: SEAL COAT

Rates of application and quantities shown on the plans of surface treatment are for estimating purposes only. It will be the Contractor's responsibility to verify all quantities prior to ordering and delivering materials. The asphalt rates will be adjusted as necessary to fit existing field conditions as agreed, upon by the Contractor’s designated project superintendent and the Department’s designated project manager.

For each project, intersections, ramps, and crossovers will be resurfaced prior to resurfacing the roadway unless otherwise authorized. It is TxDOT’s intent to seal from edge of pavement to edge of pavement including all transitions and widenings, regardless of plan width, unless otherwise directed.

Protect all existing bridges, curbs, and other exposed concrete surfaces within the limits of these projects from asphalt materials by any method that is approved. Remove any excessive asphalt materials deposited on these surfaces at the Contractor’s expense in a manner approved.

For this contract, wind velocities in excess of 20 mph will be construed as inclement weather and work will be suspended. Wind velocities will be determined at the nearest airport to the area.

All surface material will be broomed using a vacuum broom within city limit sections and a rotary broom in all other sections. Vacuum sweeping will be paid per pertinent bid items.

Stockpile sites for material will be approved and will be located as far as possible from the travel way and in no instance closer than 30 FT measured from pavement edge unless otherwise authorized. They will be kept clear of improved abutting property and, in general, locations at intersections will be avoided in order that sight distance will not be impaired. The Contractor will notify the Engineer at least 5 days prior to stockpiling of materials closer than 30 FT from the pavement edge provided that adequate barricades and warning signs and devices are provided by the Contractor and approved.

Stockpile sites for material will be leveled and cleared of all vegetation prior to materials being stockpiled. Stockpile sites will be kept clear of debris and vegetative growth in a manner approved.

Stockpile locations will be cleared. Sites will be re-vegetated prior to partial acceptance of

individual projects. This work will not be paid for directly, but will be considered subsidiary to the various bid items of the contract.

A water truck will be made available at all times for wetting uncoated aggregate stockpiles as directed. This work will not be paid for directly but will be considered subsidiary to the other contract items.

Repairs to flushing pavement will be made by the Contractor on a new seal coat “Before” going to the next road on the contract. The patching will be completed “Before” leaving each reference.

During application of the surface treatment, if existing conditions warrant, the lane widths, transitions, and intersection areas may be varied as directed.

Use medium pneumatic rollers meeting the requirements of Item 210, “Rolling”.

Utilize an asphalt distributor capable of providing a transversely varied asphalt rate. The Engineer will select the pavements where the transversely varied asphalt rate is required.

When a transversely varied rate is required, the asphalt rate outside of the wheel paths will be between 22 and 32% higher than the asphalt rate applied in the wheel paths.

Provide calibration documents to the Engineer that include a description of the spray bar(s) and nozzles that will be used and the percentage difference in asphalt rate achieved by each tested spray bar and nozzle arrangement. The nozzles proposed for use will be clearly stamped or marked from the factory identifying the manufacturer.

Unless otherwise approved, seal coat will not be exposed to traffic for more than 1 calendar day before application of HMAC.

ITEM 320: EQUIPMENT FOR ASPHALT CONCRETE PAVEMENT

Use a self-propelled wheel mounted MTV capable of receiving mix from the haul trucks, separate from the paver. It will have a minimum storage capacity of approximately 25 tons. It will be equipped with a pivoting discharge conveyor and will completely and thoroughly remix the material prior to placement. The effectiveness of the MTV’s remixing ability is subject to the approval of the Engineer. In addition, the paver will have a surge storage insert with a minimum capacity of 20 tons.

The use of windrow pick-up equipment is allowed with the exception of windrows to be placed on seal coat surface placed as part of this contract or instances when trackless tacks are used as optional bonding or sealing courses.

ITEM 400: EXCAVATION AND BACKFILL OF STRUCTURES

When placing concrete storm drainpipe on slopes of greater than 10 percent, provide cement stabilized backfill to a depth shown on the plans.

Aggregate for cement stabilized backfill will be coarse aggregates, GRADE 3, 4 or 5 and fine aggregate, as shown in Item 421, “Hydraulic Cement Concrete”. The ratio of course aggregate to sand should not contain more than sixty percent (60%) sand unless otherwise approved.

CLASS B bedding is required for all storm drain installations. In areas requiring Cement Stabilized Backfill, CSB will be used in lieu of Class B materials for bedding.

ITEM 416: DRILLED SHAFT FOUNDATIONS

Provide a minimum of one core per bent, regardless of placement method.

ITEM 420 CONCRETE SUBSTRUCTURES

Form columns to a point a minimum of one foot below the proposed future or existing bottom of channel elevation indicated on the bridge layouts by an acceptable method. This form work is not paid for directly but is considered subsidiary to this item.

BENT NUMBERING:
For bridges with four or more spans, number every third bent (counting the abutments) on the up-station and down-station faces of the outside column(s) at approximately the mid height of the column. For structures with three columns or less per bent, place numbers on column A. Where there are four or more columns per bent, place numbers on both outside columns. Bent numbers will be as shown on the bridge layout.

Provide block numbers with a height of 6". Place numbers using appropriate die cut stencils and black paint. All materials, labor and incidentals associated with placing bent numbers are subsidiary to the various bid items.

For bridges with aesthetic treatments, the numbering will be incorporated into the aesthetics package.

NATIONAL BRIDGE INVENTORY NUMBERS:
Provide National Bridge Inventory (NBI) numbers on all bridge structures and bridge class culverts.

Where beam types allow access to the face of abutment backwall, place NBI numbers on the face of each abutment backwall using 3" block numbers. Locate NBI numbers between the outside beams at opposite corners of the bridge.

Where beam types do not allow access to the face of abutment backwall, place NBI numbers on the face of each abutment cap using 3" block numbers. Locate NBI numbers below the outside beams at opposite corners of the bridge.

Where a bridge begins, ends or contains a bent common to multiple structures, place NBI numbers on both faces near both ends of the common bent cap. The number placed at each of the four locations will correspond to the NBI number assigned to the bridge immediately above the number. Locate NBI numbers below the outside beam. Place using 3" Block Numbers.

For Bridge Class Culverts, place National Bridge Inventory numbers at the middle of the downstream headwall using 3" block letters.

For all conditions, use appropriate die cut stencils and black paint for placement. All materials, labor and incidentals associated with placing NBI numbers are subsidiary to the various bid items.

Reduce headwall heights, if necessary, to provide a maximum of three (3) inches projection above the roadway slope. No increase or decrease will be made in plan quantities of concrete or reinforcing steel for this work.

ITEM 421: HYDRAULIC CEMENT CONCRETE

Furnish mix designs to the Engineer in a format compatible to the latest version of the Department’s Construction Management System (Site Manager). Mix Design templates will be provided by the Engineer.

Provide High Performance Concrete (HPC) of the class specified for the following bridge components: abutments, bent caps, and columns.

Provide sulfate resistant concrete for box culverts and all drilled shafts.

Supply the Engineer with a list of certified personnel and copies of their current ACI certificates before beginning production and when personnel changes are made. Supply hard copies of calibration reports for testing equipment when required by the Engineer.

ITEM 422: CONCRETE SUPERSTRUCURES

Provide Carpet Drag, burlap drag or broom finish for bridge deck, approach slabs and direct traffic culvert top slabs.

ITEM 427: SURFACE FINISHES FOR CONCRETE

Apply a rub finish to all Surface Area I within 30 days after form removal unless otherwise shown on a plan Aesthetic Detail Sheets.

ITEM 432: RIPRAP

Weep holes and granular material are required, and locations will be determined prior to placement of concrete riprap at bridge abutments.

ITEM 440: REINFORCEMENT FOR CONCRETE

All ties, chairs and other appurtenances used with epoxy coated reinforcing will be epoxy coated or non-metallic.

Fiber Reinforced Concrete (FRC) can be used as a substitute for Non-Structural Class Reinforced Concrete in Mow-Strips for MBGF and Sidewalks. FRC may also be used for other Non-Structural Class Reinforced Concrete Items as approved by the Engineer.

For rip rap slope protection wire mesh will not be allowed. Rebar reinforcing will be required per the Standard Details.

ITEMS 450: RAILING

Provide slip formed barrier and cast-in-place barrier uniform in color and texture.

ITEM 464: REINFORCED CONCRETE PIPE

The concrete collars and the connections of pipes to existing or proposed concrete boxes or pipe will not be paid for directly but will be considered subsidiary to the various bid items.

At locations where storm drains dead-end, plug with a concrete plug of a thickness equal to 1 ½ inches per foot of diameter of pipe with a minimum thickness of 3 inches. The cost of the plugs will not be paid for directly but will be considered subsidiary to the various bid items.

ITEM 467: SAFETY END TREATMENTS

Reshape embankment side slopes, provide embankment as required, and add topsoil to achieve a smooth uniform finish around the installation of the safety end treatments and culvert extensions as directed. Finishing and reshaping work will be subsidiary to this item. If such work extends beyond localized efforts within 10' of the headwall / wingwall, additional work will be paid by as agreed with the Engineer.

ITEM 496: REMOVING STRUCTURES

Submit to the Engineer for approval a detailed plan for bridge removal including methods, equipment and sequencing.

ITEM 500: MOBILIZATION

Material On Hand (MOH) will not be used in calculating partial payments for Mobilization.

ITEM 502: BARRICADES, SIGNS, AND TRAFFIC HANDLING

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

Install traffic marking signs prior to sealcoat application and remove within three days after placement of traffic markings.

Access will be provided to all business and residences at all times. Where turning radii are limited during phased construction at intersections, provide all weather surfaces such as RAP or base in turning movements to accommodate and to protect the traffic from edge drop-offs. Materials, labor, maintenance and removal for these temporary accesses and radii will not be paid for directly but will be considered subsidiary to the various bid items.

A meeting between the Contractor and Engineer to discuss upcoming changes in construction phasing and traffic switches is required at least fourteen (14) days prior to the phase change. Items to be discussed at this meeting include temporary signing, traffic control, pavement markings, the processes necessary for the phase change and subcontractor scheduling.

When excavation is required next to a pavement lane carrying traffic and the widening is not completed by the end of the workday, backfill against the edge of the pavement with at least a 3:1 slope using an acceptable material to support vehicular traffic. Carefully remove and dispose of this material when work resumes. Backfilling pavement edges, and the materials required for the work will be subsidiary to this item.

Place Barricade / long term traffic control signs with driven post / sleeve mount options for all projects with more than 9 months of project barricades. e in ground mount for project limits signs / long term signs. Upon sign removal, pull sleeve or drive to below ground line.

Place barricades and signs in locations that do not obstruct the sight distance of drivers entering the highway from driveways or side streets.

Provide rectangular shape (CW12-2P) Temporary Clearance Signs on all bridges where the existing vertical clearance has changed. Install Signs to the satisfaction of the Engineer prior to opening to traffic. Plywood sign blanks will have minimum dimensions of 84" X 12". Work performed and materials are subsidiary to this item.

The Contractor Responsible Person(s) (CRP) for Work Zone Traffic Controls will inspect and ensure any deficiencies are corrected each and every day throughout the duration of this contract. Any misaligned or damaged traffic control devices will be repaired as soon as practical after deficiency is discovered.

In addition to providing a Contractor's Responsible Person and a phone number for emergency contact, have an employee(s) available to respond on the project for emergencies and for taking corrective measures within One (1) Hour.

ITEM 504: FIELD OFFICE

Furnish one Asphalt Mix Control Laboratory (Type D) for this project.

ITEM 506: TEMPROARY EROSION, SEDIMENTATION AND ENVIRONMENTAL CONTROLS

Take all practicable precautions to prevent debris from being discharged into the Waters of Texas or a designated wetland. Install Best Management Practices before demolition begins and maintain them during the demolition. Remove any debris or construction material that escapes containment devices and are discharged into the restricted areas before the next rain event or within 24 hours of the discharge.

If temporary construction stream crossings are allowed under a Nationwide Permit, submit in writing for approval the type and location of each temporary stream crossing. Use temporary bridges, timber mats, or other structurally sound and non-eroding material for temporary stream crossings. A temporary culvert crossing will consist of storm sewer pipes and 4- to 8-inch nominal size rock. Temporary stream crossings must not cause more than minimal changes to the hydraulic flow characteristics of the stream, increase flooding, or cause more than minimal degradation of water quality. Remove the temporary stream crossings in their entirety and return the affected areas to their pre-

existing elevation. All work and materials use for temporary construction stream crossings will not be paid for directly but are subsidiary to pertinent Items.

Provide SW3P Signs. Obtain from the Engineer a copy of the project's completed TPDES Storm Water Program Construction Site Notice and Contractor Site Notice. Laminate the sheets and bond with adhesive to 36" X 36" sign blanks. Ensure the sheets remain dry. Apply Type C Blue reflective sheeting as the background and add the text "SW3P" in 5" white lettering, centered at the top. Attach the signs to approved temporary mounts and locate at each of the project limits just inside the right of way line at a readable height or as directed by the Engineer. If the sign cannot be placed outside the clear zone, it must adhere to the TMUTCD. SW3P signs, maintenance, and reposting (for replacement or as needed to ensure readability) will be subsidiary to Item 502.

Leave all right of way areas undisturbed until actual construction is to be performed in said areas.

No soil disturbing activities will begin on any section of TxDOT ROW without adequate sedimentation controls first being installed and functioning at adjacent drainage outfalls. Begin and continuously prosecute the repairs, additions and maintenance of erosion and sedimentation control devices within seven days after the Contractor receives each Form 2118, Field Inspection and Maintenance Report, from the Engineer. Failure of the Contractor to fulfill either of the above requirements places TxDOT in potential non-compliance with permit requirements and may result in withholding estimates or stopping work or both until all environmental permit requirements are fulfilled.

Concrete Washouts are required per the CGP. The Concrete Washout Area(s) structural controls must consist of temporary berms, temporary shallow pits, and/or temporary storage tanks to prevent contaminated runoff and must be lined as to prevent contamination of underlying soil. Ensure pits properly maintained including removal of concrete as not to allow overflow. The location(s) of washout area will be approved by the Engineer. When washout pits are no longer needed, they will be removed, and area will be restored to original condition. This work, materials and labor will not be measured or paid for directly but will be subsidiary to Item 506, "Temporary Erosion, Sedimentation, and Environmental Controls."

Cleaning and sweeping of open roadways due to material spillage or loss from Contractor equipment or tires will be the responsibility of the Contractor at no cost to TxDOT. This work will not be charged as Item 738, "Cleaning and Sweeping Highways". Cleaning and sweeping of roadways will be completed as directed, including multiple times per day, if necessary, to maintain acceptable roadways for the traveling public and to meet environmental regulations. Construction activities will cease when material deposited on the roadway is not properly removed or when equipment is not available as needed. Adequate construction exits will be planned, constructed, and maintained by the

Contractor per Item 506, “Temporary Erosion, Sedimentation, and Environmental Controls”.

ITEM 540: METAL BEAM GUARD FENCE

Furnish steel posts throughout the project except as specifically noted in the plans.

Wooden block out will not be allowed.

ITEM 544: GUARDRAIL END TREATMENTS

The use of wooden block-outs will not be allowed.

12-gauge galvanized tubing shall be used for Type 1 Multiple Mailbox Post.

ITEM 585: RIDE QUALITY FOR PAVEMENT SURFACES

Use Surface Test Type A on all intersections and driveways.

Use Surface Test Type B pay adjustment schedule 3 on the travel lanes.

The Contractor will ensure satisfactory profile results in the intermediate paving layers (mixture) to eliminate corrective action for excessive deviations in the final surface layers.

Milling will not be allowed as a corrective action for excessive deviations in the surface layer.

ITEM 644: SMALL ROADSIDE SIGN ASSEMBLIES

Bolt Clamp type will be used on Texas Triangular Slip Base System.

As practical with new construction, leave the existing sign assemblies in place until the proposed foundation, post and sign are installed, and then remove the old sign assemblies.

Do not leave any sign foundation holes open overnight. Ensure all holes drilled are at least the minimum required depth with no loose material remaining in the hole.

Stake proposed sign locations and received approval before installation of sign foundations.

Existing Mile Markers Signs are to be relocated to their original location(s) as they were prior to the beginning of the project.

Expanded foam foundations are not permitted.

Cut the bottom of all posts square.

For sign types which design details are not shown on these plans, fabricate according to the “STANDARD HIGHWAY SIGN DESIGNS FOR TEXAS”.

Removed material that is deemed salvageable (signs and posts) will be the property of TxDOT. Deliver salvageable material to the TxDOT Maintenance Office. Remove unsalvageable material.

The Contractor will relocate the existing double sided street name signs and furnish the post mounted brackets for the street name signs to be paid for as part of the proposed Stop Signs (R1-1). Existing street name signs will be mounted above Stop signs. If damaged while being relocated, the Contractor will furnish new double sided street name sign at their own expense.

ITEM 658: DELINEATOR AND OBJECT MARKER ASSEMBLIES

All flexible and GF2 delineators will have a tubular body.

The delineator assembly BRF Class A (D-SW) and (D-SY) are to be single delineators (Class I) attached to a flat, plastic bracket to facilitate the mounting of the delineator on top of the bridge rail at the locations shown on the plans. Submit a sample for approval before ordering materials.

ITEM 666: RETROREFLECTORIZED PAVEMENT MARKINGS

The Contractor will layout the proposed striping in accordance with TxDOT Traffic Control Plan Standards and latest version Texas Manual on Uniform Traffic Control Devices (TMUTCD) and project striping layout sheets. The Engineer will verify proposed striping layout prior to the beginning of striping operations.

The Contractor will locate the beginning and ending points of No Pass Zones.

ITEM 672: RAISED PAVEMENT MARKERS

Existing raised pavement markers to be replaced will be removed at the same time that the new markers are placed (i.e., remove and replace in one operation). Existing raised pavement markers replaced by new markers will be removed in accordance with Item 677, “Eliminating Existing Pavement Markings and Markers”. Immediately fill the damaged area in the pavement due to the removal of existing markers with an approved bituminous material. This removal and backfill work will not be paid for directly, but will be subsidiary to Item 672, "Raised Pavement Markers".

ITEM 3076: DENSE-GRADED HOT-MIX ASPHALT

Use aggregate that meets the Surface Aggregate Classification (SAC) requirement of Class B.

Maximum stripping of 0% is required.

RAP from Contractor owned sources may be used if the RAP is fractionated.

ITEM 3096: ASPHLATS, OILS, AND EMULSIONS

Latex additives or modifiers will not be allowed on this project.

ITEM 6001: PORTABLE CHANGEABLE MESSAGE SIGN

This project will require “full matrix” type portable changeable message signs.

Ensure that the Contractor’s Responsible Person for traffic control can revise messages within thirty (30) minutes of notification.

Furnish 2 portable changeable message signs. The portable changeable message sign(s) will be used for all lane closures and freeway closures as shown on the traffic control plan standard sheets.

Supply portable changeable message sign(s) in accordance with the Traffic Control Plan standard sheets and Article 6f.55 of the Texas Manual on Uniform Traffic Control Devices for Streets and Highways Part VI.

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Estimate & Quantity Sheet

CONTROLLING PROJECT ID 1219-02-017 **DISTRICT** Waco **COUNTY** Coryell
HIGHWAY FM 182

			CONTROL SECTION JOB	**1219-02-017**		**1219-02-018**		**1219-02-020**		TOTAL EST.	TOTAL FINAL
			PROJECT ID	**A00003392**		**A00003393**		**A00131283**			
			COUNTY	**Coryell**		**Coryell**		**Coryell**			
			HIGHWAY	**FM 182**		**FM 182**		**FM 182**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL	EST.	FINAL		
	100-6002	PREPARING ROW	STA	6.900		8.800		5.200		20.900	
	105-6075	REMOV STAB BASE AND ASPH PAV (10"-18")	SY	2,098.000		2,792.000				4,890.000	
	105-6168	REMOVING STAB BASE & ASP PAV (18"-24")	SY					1,506.000		1,506.000	
	110-6001	EXCAVATION (ROADWAY)	CY	114.000		639.000		78.000		831.000	
	110-6002	EXCAVATION (CHANNEL)	CY	296.000		117.000		155.000		568.000	
	132-6004	EMBANKMENT (FINAL)(DENS CONT)(TY B)	CY	1,124.000		1,427.000		833.000		3,384.000	
	160-6003	FURNISHING AND PLACING TOPSOIL (4")	SY	3,139.000		3,272.000		1,992.000		8,403.000	
	164-6003	BROADCAST SEED (PERM) (RURAL) (CLAY)	SY	3,139.000		3,272.000		1,992.000		8,403.000	
	164-6009	BROADCAST SEED (TEMP) (WARM)	SY	1,570.000		1,636.000		996.000		4,202.000	
	164-6011	BROADCAST SEED (TEMP) (COOL)	SY	1,570.000		1,636.000		996.000		4,202.000	
	168-6001	VEGETATIVE WATERING	MG	51.000		53.000		32.000		136.000	
	169-6002	SOIL RETENTION BLANKETS (CL 1) (TY B)	SY	3,139.000		3,272.000		1,992.000		8,403.000	
	247-6053	FL BS (CMP IN PLC)(TYD GR1-2)(FNAL POS)	CY	583.000		775.000		418.000		1,776.000	
	310-6027	PRIME COAT(MC-30 OR AE-P)	GAL	413.000		546.000		294.000		1,253.000	
	316-6024	ASPH (CRS-2P)	GAL	1,240.000		1,638.000		881.000		3,759.000	
	316-6453	AGGR(TY D GR 3 OR TY L GR 3)	CY	22.000		29.000		16.000		67.000	
	400-6005	CEM STABIL BKFL	CY	82.000		82.000		110.000		274.000	
	416-6002	DRILL SHAFT (24 IN)	LF	243.000		225.000		237.000		705.000	
	420-6014	CL C CONC (ABUT)(HPC)	CY	20.800		20.800		25.200		66.800	
	420-6030	CL C CONC (CAP)(HPC)	CY	16.000		16.000		9.300		41.300	
	420-6038	CL C CONC (COLUMN)(HPC)	CY	6.000		8.100		2.100		16.200	
	422-6007	REINF CONC SLAB (SLAB BEAM)	SF	3,372.000		3,694.000		3,212.000		10,278.000	
	422-6015	APPROACH SLAB	CY	48.100		48.100		69.000		165.200	
	425-6009	PRESTR CONC SLAB BEAM (4SB12)	LF	828.000		908.000				1,736.000	
	425-6011	PRESTR CONC SLAB BEAM (4SB15)	LF					791.380		791.380	
	432-6033	RIPRAP (STONE PROTECTION)(18 IN)	CY	475.000		1,205.000		660.000		2,340.000	
	432-6045	RIPRAP (MOW STRIP)(4 IN)	CY	35.000		42.000		32.000		109.000	
	450-6006	RAIL (TY T223)	LF					228.000		228.000	
	450-6023	RAIL (TY SSTR)	LF	234.000		254.000				488.000	
	454-6004	ARMOR JOINT (SEALED)	LF	56.000		56.000		66.000		178.000	
	464-6003	RC PIPE (CL III)(18 IN)	LF			50.000				50.000	
	464-6005	RC PIPE (CL III)(24 IN)	LF					80.000		80.000	
	464-6030	RC PIPE (ARCH)(CL III)(DES 1)	LF			50.000				50.000	
	467-6363	SET (TY II) (18 IN) (RCP) (6: 1) (P)	EA			2.000				2.000	
	467-6395	SET (TY II) (24 IN) (RCP) (6: 1) (P)	EA					4.000		4.000	
	467-6519	SET (TY II) (DES 1) (RCP) (6: 1) (P)	EA	2.000		2.000				4.000	
	496-6004	REMOV STR (SET)	EA	2.000						2.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 1219-02-017 **DISTRICT** Waco **COUNTY** Coryell
HIGHWAY FM 182

			CONTROL SECTION JOB		**1219-02-017**		**1219-02-018**		**1219-02-020**		TOTAL EST.	TOTAL FINAL
			PROJECT ID		**A00003392**		**A00003393**		**A00131283**			
			COUNTY		**Coryell**		**Coryell**		**Coryell**			
			HIGHWAY		**FM 182**		**FM 182**		**FM 182**			
ALT	**BID CODE**	**DESCRIPTION**		**UNIT**	EST.	FINAL	EST.	FINAL	EST.	FINAL		
	496-6007	REMOV STR (PIPE)		LF			35.000		42.000		77.000	
	496-6009	REMOV STR (BRIDGE 0 - 99 FT LENGTH)		EA	1.000				1.000		2.000	
	496-6010	REMOV STR (BRIDGE 100 - 499 FT LENGTH)		EA			1.000				1.000	
	500-6001	MOBILIZATION		LS	0.300		0.400		0.300		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING		MO	18.000						18.000	
	506-6001	ROCK FILTER DAMS (INSTALL) (TY 1)		LF	160.000		160.000		183.000		503.000	
	506-6011	ROCK FILTER DAMS (REMOVE)		LF	160.000		160.000		183.000		503.000	
	506-6038	TEMP SEDMT CONT FENCE (INSTALL)		LF	1,434.000		1,890.000		1,111.000		4,435.000	
	506-6039	TEMP SEDMT CONT FENCE (REMOVE)		LF	1,434.000		1,890.000		1,111.000		4,435.000	
	530-6005	DRIVEWAYS (ACP)		SY	52.000		268.000		46.000		366.000	
	540-6002	MTL W-BEAM GD FEN (STEEL POST)		LF	225.000		487.500		262.500		975.000	
	540-6006	MTL BEAM GD FEN TRANS (THRIE-BEAM)		EA	4.000		4.000		4.000		12.000	
	540-6014	SHORT RADIUS		LF					72.000		72.000	
	540-6015	DRIVEWAY TERMINAL ANCHOR SECTION		EA					1.000		1.000	
	540-6039	MTL BM GD FEN TRANS (31"-28")(25')		EA					1.000		1.000	
	544-6001	GUARDRAIL END TREATMENT (INSTALL)		EA	4.000		4.000		3.000		11.000	
	644-6060	IN SM RD SN SUP&AM TYTWT(1)WS(P)		EA	2.000						2.000	
	658-6014	INSTL DEL ASSM (D-SW)SZ (BRF)CTB (BI)		EA	6.000		6.000		6.000		18.000	
	658-6062	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2(BI)		EA	19.000		28.000		19.000		66.000	
	666-6309	RE PM W/RET REQ TY I (W)6"(SLD)(100MIL)		LF	1,432.000		1,750.000		1,058.000		4,240.000	
	666-6318	RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL)		LF	716.000						716.000	
	666-6321	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)		LF	716.000		1,750.000		1,058.000		3,524.000	
	672-6009	REFL PAV MRKR TY II-A-A		EA	18.000		23.000		14.000		55.000	
	3076-6069	D-GR HMA TY-C SAC-B PG64-22 (EXEMPT)		TON	227.000		301.000		161.000		689.000	
	6001-6001	PORTABLE CHANGEABLE MESSAGE SIGN		DAY	56.000		56.000		56.000		168.000	
	18	SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)		LS	1.000						1.000	
		EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)		LS	1.000						1.000	

REMOVAL SUMMARY

LOCATION	100 6002 PREPARING ROW	105 6075 REMOV STAB BASE AND ASPH PAV (10"-18")	105 6168 REMOVING STAB BASE & ASP PAV (18"-24")	496 6004 REMOV STR (SET)	496 6007 REMOV STR (PIPE)	496 6009 REMOV STR (BRIDGE 0 - 99 FT LENGTH)	496 6010 REMOV STR (BRIDGE 100 - 499 FT LENGTH)
	STA	SY	SY	EA	LF	EA	EA
CSJ: 1219-02-017	6.9	2098	0	2	0	1	0
CSJ: 1219-02-018	8.8	2792	0	0	35	0	1
CSJ: 1219-02-020	5.2	0	1506	0	42	1	0
PROJECT TOTALS	**20.9**	**4890**	**1506**	**2**	**77**	**2**	**1**

TRAFFIC SUMMARY

LOCATION	644 6060 IN SM RD SN SUP&AM TYTWT(1)WS(P)	658 6014 INSTL DEL ASSM (D-SW)SZ (BRF)CTB (BI)	658 6062 INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2(BI)
	EA	EA	EA
CSJ: 1219-02-017	2	6	19
CSJ: 1219-02-018	0	6	28
CSJ: 1219-02-020	0	6	19
PROJECT TOTALS	**2**	**18**	**66**

ROADWAY SUMMARY

LOCATION	247 6053 FL BS (CMP IN PLC)(TYD GR1-2)(FNAL POS)	310 6027 PRIME COAT(MC-30 OR AE-P)	316 6024 ASPH (CRS-2P)	316 6453 AGGR(TY D GR 3 OR TY L GR 3)	432 6045 RIPRAP (MOW STRIP)(4 IN)	464 6003 RC PIPE (CL III)(18 IN)	464 6005 RC PIPE (CL III)(24 IN)	464 6030 RC PIPE (ARCH)(CL III)(DES 1)	467 6363 SET (TY II) (18 IN) (RCP) (6: 1) (P)	467 6395 SET (TY II) (24 IN) (RCP) (6: 1) (P)	467 6519 SET (TY II) (DES 1) (RCP) (6: 1) (P)	530 6005 DRIVEWAYS (ACP)	540 6002 MTL W-BEAM GD FEN (STEEL POST)
	CY	GAL	GAL	CY	CY	LF	LF	LF	EA	EA	EA	SY	LF
CSJ: 1219-02-017	583	413	1240	22	35	0	0	0	0	0	2	52	225.0
CSJ: 1219-02-018	775	546	1638	29	42	50	0	50	2	0	2	268	487.5
CSJ: 1219-02-020	418	294	881	16	32	0	80	0	0	4	0	46	262.5
PROJECT TOTALS	**1776**	**1253**	**3759**	**67**	**109**	**50**	**80**	**50**	**2**	**4**	**4**	**366**	**975.0**

ROADWAY SUMMARY CONT.

LOCATION	540 6006 MTL BEAM GD FEN TRANS (THRIE-BEAM)	540 6014 SHORT RADIUS	540 6015 DRIVEWAY TERMINAL ANCHOR SECTION	540 6039 MTL BM GD FEN TRANS (31"-28")(25')	544 6001 GUARDRAIL END TREATMENT (INSTALL)	3076 6069 D-GR HMA TY-C SAC-B PG64-22 (EXEMPT)	6001 6001 PORTABLE CHANGEABLE MESSAGE SIGN
	EA	LF	EA	EA	EA	TON	DAY
CSJ: 1219-02-017	4	0	0	0	4	227	56
CSJ: 1219-02-018	4	0	0	0	4	301	56
CSJ: 1219-02-020	4	72	1	1	3	161	56
PROJECT TOTALS	**12**	**72**	**1**	**1**	**11**	**689**	**168**

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TBPE FIRM NO. F-10069

OVERALL

SUMMARY OF QUANTITIES

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		FM 182

STATE	DISTRICT	COUNTY	
TEXAS	WACO	CORYELL	
CONTROL	SECTION	JOB	SHEET NO.
1219	02	017, ETC.	8

REV DATE: 4/19/2023
CSJ: 1219-02-017, ETC.
FILE LOCATION: P:\2020\00072\121902017\4 - Design\Plan Set\1. General\202000072.01.RD.QTY.OVERALL.01.dgn

EROSION CONTROL SUMMARY

LOCATION	160 6003	164 6003	164 6009	164 6011	168 6001	169 6002	506 6001	506 6011	506 6038	506 6039
	FURNISHING AND PLACING TOPSOIL (4")	BROADCAST SEED (PERM) (RURAL) (CLAY)	BROADCAST SEED (TEMP) (WARM)	BROADCAST SEED (TEMP) (COOL)	VEGETATIVE WATERING	SOIL RETENTION BLANKETS (CL 1) (TY B)	ROCK FILTER DAMS (INSTALL) (TY 1)	ROCK FILTER DAMS (REMOVE)	TEMP SEDMT CONT FENCE (INSTALL)	TEMP SEDMT CONT FENCE (REMOVE)
	SY	SY	SY	SY	MG	SY	LF	LF	LF	LF
CSJ: 1219-02-017	3139	3139	1570	1570	51	3139	160	160	1434	1434
CSJ: 1219-02-018	3272	3272	1636	1636	53	3272	160	160	1890	1890
CSJ: 1219-02-020	1992	1992	996	996	32	1992	183	183	1111	1111
PROJECT TOTALS	**8403**	**8403**	**4202**	**4202**	**136**	**8403**	**503**	**503**	**4435**	**4435**

BRIDGE SUMMARY

LOCATION	400 6005	416 6002	420 6014	420 6030	420 6038	422 6007	422 6015	425 6009	425 6011	432 6033	450 6006	450 6023	454 6004
	CEM STABIL BKFL	DRILL SHAFT (24 IN)	CL C CONC (ABUT) (HPC)	CL C CONC (CAP) (HPC)	CL C CONC (COLUMN) (HPC)	REINF CONC SLAB (SLAB BEAM)	APPROACH SLAB	PRESTR CONC SLAB BEAM (4SB12)	PRESTR CONC SLAB BEAM (4SB15)	RIPRAP (STONE PROTECTION) (18 IN)	RAIL (TY T223)	RAIL (TY SSTR)	ARMOR JOINT (SEALED)
	CY	LF	CY	CY	CY	SF	CY	LF	LF	CY	LF	LF	LF
CSJ: 1219-02-017	82	243	20.8	16	6	3372	48.1	828	0	475	0	234	56
CSJ: 1219-02-018	82	225	20.8	16	8.1	3694	48.1	908	0	1205	0	254	56
CSJ: 1219-02-020	110	237	25.2	9.3	2.1	3212	69	0	791.38	660	228	0	66
PROJECT TOTALS	**274**	**705**	**66.8**	**41.3**	**16.2**	**10278**	**165.2**	**1736**	**791.38**	**2340**	**228**	**488**	**178**

TRAFFIC SUMMARY

LOCATION	666 6309	666 6318	666 6321	672 6009
	RE PM W/RET REQ TY I (W)6"(SLD)(100 MIL)	RE PM W/RET REQ TY I (Y)6"(BRK)(100 MIL)	RE PM W/RET REQ TY I (Y)6"(SLD)(100 MIL)	REFL PAV MRKR TY II-A-A
	LF	LF	LF	EA
CSJ: 1219-02-017	1432	716	716	18
CSJ: 1219-02-018	1750	0	1750	23
CSJ: 1219-02-020	1058	0	1058	14
PROJECT TOTALS	**4240**	**716**	**3524**	**55**

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OVERALL

SUMMARY OF QUANTITIES

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		FM 182

STATE	DISTRICT	COUNTY	
TEXAS	WACO	CORYELL	
CONTROL	SECTION	JOB	SHEET NO.
1219	02	017, ETC.	9

REV DATE: 4/5/2023
CSJ: 1219-02-017, ETC.
FILE LOCATION: P:\2020\00072\121902017\4 - Design\Plan Set\1. General\202000072.01.RD.QTY.OVERALL.02.dgn

EARTHWORK SUMMARY			
LOCATION	110 6001	110 6002	132 6004
	EXCAVATION (ROADWAY)	EXCAVATION (CHANNEL)	EMBANKMENT (FINAL) (DENS CONT) (TY B)
	CY	CY	CY
CSJ: 1219-02-017	114	296	1124
CSJ: 1219-02-018	639	117	1427
CSJ: 1219-02-020	78	155	833
PROJECT TOTALS	**831**	**568**	**3384**

S HOG CREEK				
	CUT		FILL	
STA	CAD AREA (SF)	VOLUME (CY)	CAD AREA (SF)	VOLUME (CY)
603+30	10.7	0	0	0
603+50	10.6	7.9	0	0
604+00	0	9.8	16.6	15.3
604+50	0.5	0.5	30.6	43.7
605+00	1.5	1.9	51.0	75.6
605+50	1.3	2.6	56.5	99.6
606+00	1.3	2.4	109.3	153.6
606+50	10.7	11.1	51.5	148.9
607+00	0	9.9	0	47.7
607+50	10.6	9	0	0
607+55	11.4	20.4	48.0	44.4
608+00	0.4	9.8	97.4	121.1
608+50	0.8	1.1	92.4	175.7
609+00	0.7	1.4	45.8	128
609+50	6.0	6.2	14.7	56
610+00	9.1	14.0	0.3	13.9
610+16	11.0	6.0	0	0.1
TOTAL		**114.0**		**1124.0**

HOG CREEK				
	CUT		FILL	
STA	CAD AREA (SF)	VOLUME (CY)	CAD AREA (SF)	VOLUME (CY)
637+80	12.0	0	6	0
638+00	45.3	21.2	5.1	3.9
638+50	91.0	126.2	4.7	9.1
639+00	100.0	176.8	7.7	11.6
639+50	49.3	138.2	18.1	23.9
640+00	10.5	55.4	93.7	103.4
640+50	0.1	9.9	148.0	223.7
641+00	0	0.1	164.4	289.2
641+50	10.8	10	74.4	221.1
641+56	0	1.2	0	8.3
642+00	0	0	0	0
642+50	0	0	0	0
642+71	13.1	5.1	55.8	21.7
643+00	0.8	7.5	97.5	82.3
643+50	1.5	2.2	66.3	151.7
644+00	8.8	9.5	58.5	115.6
644+50	7.1	14.7	29.1	81.1
645+00	3.1	9.4	14.8	40.6
645+50	8.4	10.7	8.8	21.9
646+00	11.2	18.1	3.2	11.1
646+50	11.5	21.0	3.3	6.0
646+55	11.4	2.1	3.5	0.6
TOTAL		**639.0**		**1427.0**

HURST BRANCH				
	CUT		FILL	
STA	CAD AREA (SF)	VOLUME (CY)	CAD AREA (SF)	VOLUME (CY)
724+51	7.2	0	2.6	0
725+00	3.6	9.8	55.0	52.3
725+50	1.5	4.8	67.6	113.6
726+00	2.0	3.2	69.3	126.8
726+43	8.9	8.7	78.0	117.3
726+50	0	1.2	0	10.1
727+00	0	0	0	0
727+43	0.4	0.3	46.4	36.9
727+50	9.0	1.2	87.7	17.4
728+00	4.9	12.8	84.5	159.4
728+50	4.9	9	40.1	115.3
729+00	2.7	7	16.2	52.1
729+50	8.4	10.2	7.7	22.1
729+80	9.8	10.1	9.8	9.7
TOTAL		**78.0**		**833.0**

EXCAVATION (CHANNEL)					
Location	PROFILE AREA LT (SF)	LENGTH (ABUT LT) LF	PROFILE AREA RT (SF)	LENGTH (ABUT RT) LF	FINAL QTY (CY)
CSJ: 1219-02-017	184.2	22	178.5	22	**296**
CSJ: 1219-02-018	67.9	21	82.9	21	**117**
CSJ: 1219-02-020	46.3	27	108.9	27	**155**

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Texas Department of Transportation

OVERALL

SUMMARY OF QUANTITIES

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		FM 182
STATE	DISTRICT	COUNTY
TEXAS	WACO	CORYELL
CONTROL	SECTION	JOB / SHEET NO.
1219	02	017, ETC. / 10

REV DATE: 4/5/2023
CSJ: 1219-02-017, ETC.
FILE LOCATION: P:\2020\00072\121902017\4 - Design\Plan Set\1. General\202000072.01.RD.QTY.OVERALL.03.dgn

SUMMARY OF SMALL SIGNS

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

PLAN SHEET	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
PLAN AND PROFILE	1	W1-8		18 X 24	X		TWT	1	WS	P		
	2	W1-8		18 X 24	X		TWT	1	WS	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

FM 182 AT SOUTH HOG CREEK
SUMMARY OF SMALL SIGNS

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	1219	02	017, ETC.	FM 182
4-16	DIST	COUNTY		SHEET NO.
8-16	WACO	CORYELL		11

18

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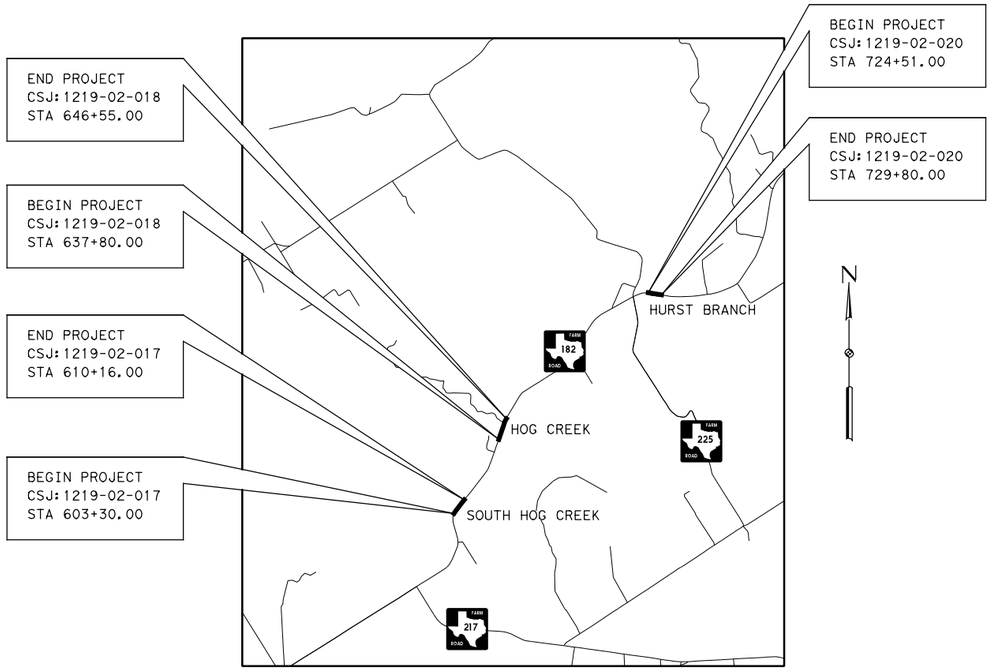

VICINITY MAP

FM 182 AT SOUTH HOG CREEK,
HOG CREEK & HURST BRANCH

0 3,000 6,000

SCALE IN FEET

SIGNS G20-10T, 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.

CW20-1D AND G20-2 WILL BE REQUIRED AT ALL CROSSROADS.

G20-1a WILL BE REQUIRED AT ALL MAJOR CROSSROADS.

REFER TO BC STANDARDS FOR SIGN R2-1 PLACEMENT.

SIGNAGE LEGEND
R20-5aTP (36X18) - WHEN WORKERS ARE PRESENT
G20-10T (60X48)- STAY ALERT TALK OR TEXT LATER
G20-5T (48X24)- BEGIN ROAD WORK NEXT X MILES
G20-6T (48X30)- NAME,ADDRESS, CITY, STATE, CONTRACTOR
G20-9TP (36X30) - BEGIN WORK ZONE
G20-2bT (36X18) - END WORK ZONE
R20-3T (48X42)- OBEY WARNING SIGNS STATE LAW
G20-1a (72X36)- ROAD WORK NEXT X MILES
CW20-1D (48X48)- ROAD WORK AHEAD
R20-5T (36X36)- TRAFFIC FINES DOUBLE
G20-2 (48X24) - END ROAD WORK
R2-1 (24X30) - SPEED LIMIT XX
CW20-3C (48X48) - ROAD CLOSED 500 FT
CW20-3B (48X48) - ROAD CLOSED 1000 FT
R11-2 (48X30) - ROAD CLOSED
R11-3A (60X30) - ROAD CLOSED LOCAL TRAFFIC ONLY

GENERAL

A. INSTALL ALL SIGNS, BARRICADES AND TRAFFIC CONTROL DEVICES AS SHOWN AND IN ACCORDANCE WITH STANDARD SHEETS BC(1)-21 THRU BC(12)-21 AND AS DIRECTED.

B. ADDITIONAL SIGNS, BARRICADES OR 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 WILL BE CONSIDERED AS SUBSIDIARY TO ITEM 502, "BARRICADES, SIGNS AND TRAFFIC HANDLING".

C. WORK SITES WILL 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 TRAFFIC CONTROL SEQUENCE OF WORK AND TRAFFIC CONTROL SHOWN ON THESE PLANS IS A SUGGESTED METHOD OF HANDLING TRAFFIC DURING CONSTRUCTION. SIGNS, BARRICADES, ETC. SHOWN IN THE PLANS ARE CONSIDERED TO BE MINIMUM REQUIRED FOR TRAFFIC HANDLING ON THIS PROJECT.

E. ADDITIONAL TRAFFIC CONTROL DEVICES AND SIGNAGE MAY BE REQUIRED BASED ON CONTRACTORS' CONSTRUCTION OR DURING SHORT-TERM OPERATIONS NOT ADDRESSED IN THESE SHEETS.

F. THE ENGINEER MAY DIRECT THE CONTRACTOR TO VARY THE NUMBER AND LOCATION OF SIGNS, BARRICADES AND CHANNELIZING DEVICES FROM THOSE INDICATED IN THE PLANS IN ORDER TO MAINTAIN SAFE AND UNITERRUPTED FLOW OF TRAFFIC, PARTICULARLY IN THOSE AREAS OF IMMEDIATE WORK.

G. THE CONTRACTOR WILL PROVIDE SAFE ACCESS TO AND FROM ALL PRIVATE PROPERTY AT ALL TIMES AND IN ALL WEATHER CONDITIONS, UNLESS OTHERWISE DIRECTED.

H. 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 ON THE TCP SEQUENCE OF OPERATION.

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

J. ANY REQUEST TO ALTER THE SEQUENCE OF OPERATION OR TRAFFIC CONTROL PLAN WILL BE SIGNED AND SEALED BY A PROFESSIONAL ENGINEER AND SUBMITTED TO THE PROJECT ENGINEER FOR HIS WRITTEN APPROVAL.

RESTRICTIONS

1) FM 182 AT SOUTH HOG CREEK CONSTRUCTION WILL BEGIN FIRST.
2) FM 182 AT HOG CREEK CONSTRUCTION WILL BEGIN AFTER SOUTH HOG CREEK CONSTRUCTION HAS BEEN COMPLETED.
3) FM 182 AT HURST BRANCH CONSTRUCTION WILL BEGIN AFTER HOG CREEK CONSTRUCTION HAS BEEN COMPLETED.
4) CONCURRENT CONSTRUCTION OF BRIDGES WILL NOT BE ALLOWED. EACH BRIDGE LOCATION MUST BE COMPLETED AND OPEN TO TRAFFIC BEFORE WORK IS ALLOWED ON THE NEXT LOCATION.

SEQUENCE OF OPERATION FOR EACH LOCATION

1) SET PROJECT BARRICADES.
2) INSTALL SW3P AND BMP'S AS SHOWN AND AS DIRECTED.
3) SET UP DETOUR SIGNING AT LOCATIONS SHOWN OR AS DIRECTED AND CLOSE ROAD TO TRAFFIC AT BRIDGE TO BE REPLACED.
4) REMOVE EXISTING BRIDGE.
5) CONSTRUCT REPLACEMENT BRIDGE AND APPROACHES INCLUDING BASE AND SURFACING.
6) INSTALL MBGF, SGT'S, SIGNS DELINEATORS AND PAVEMENT MARKING.
7) INSTALL PERMANENT SEEDING AS SHOWN.
8) PERFORM CLEANUP AND PERFORM OTHER WORK AS DIRECTED.
9) IF APPROVED, OPEN ROAD AND BRIDGE TO TRAFFIC.

NOTES

1) PLACE ONE PCMS AT THE BEGINING AND ONE AT THE END OF THE PROJECT 7 DAYS BEFORE CLOSURE TO 7 DAYS AFTER CLOSURE.

2) ALL TRAFFIC CONTROL DEVICES WILL CONFORM WITH THE TEXAS "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS" (TMUTCD), AND WILL BE MAINTAINED AS DIRECTED. ADDITIONAL GUIDELINES FOR TRAFFIC CONTROL DEVICES MAY BE FOUND IN THE TMUTCD.

3) FOR CHANNELING DEVICE PLACEMENT AND SPACING FOR ALL PHASES, REFER TO BC(1)-21 THRU BC(12)-21 STANDARDS.

PRINT DATE	REVISION DATE
4/5/2023	

STATE OF TEXAS
JOSE M. SANDOVAL
90593
LICENSED
PROFESSIONAL ENGINEER

4/5/2023

JOSE M. SANDOVAL, P.E.

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AMERICAN STRUCTUREPOINT INC.

TBPE FIRM NO. F-10069

Texas Department of Transportation

FM 182 AT SOUTH HOG CREEK

SEQUENCE OF WORK

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		FM 182

STATE	DISTRICT	COUNTY	
TEXAS	WACO	CORYELL	
CONTROL	SECTION	JOB	SHEET NO.
1219	02	017, ETC.	12

REV DATE: 4/5/2023
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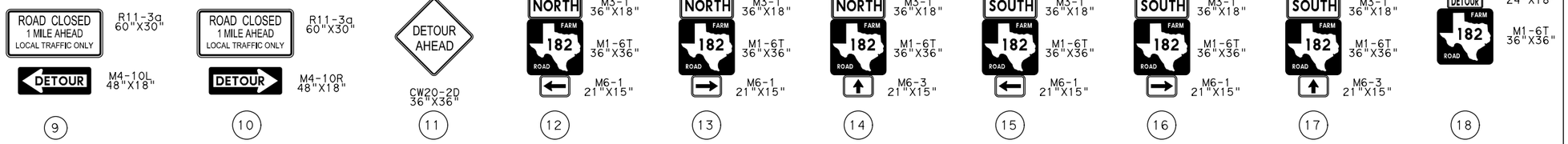

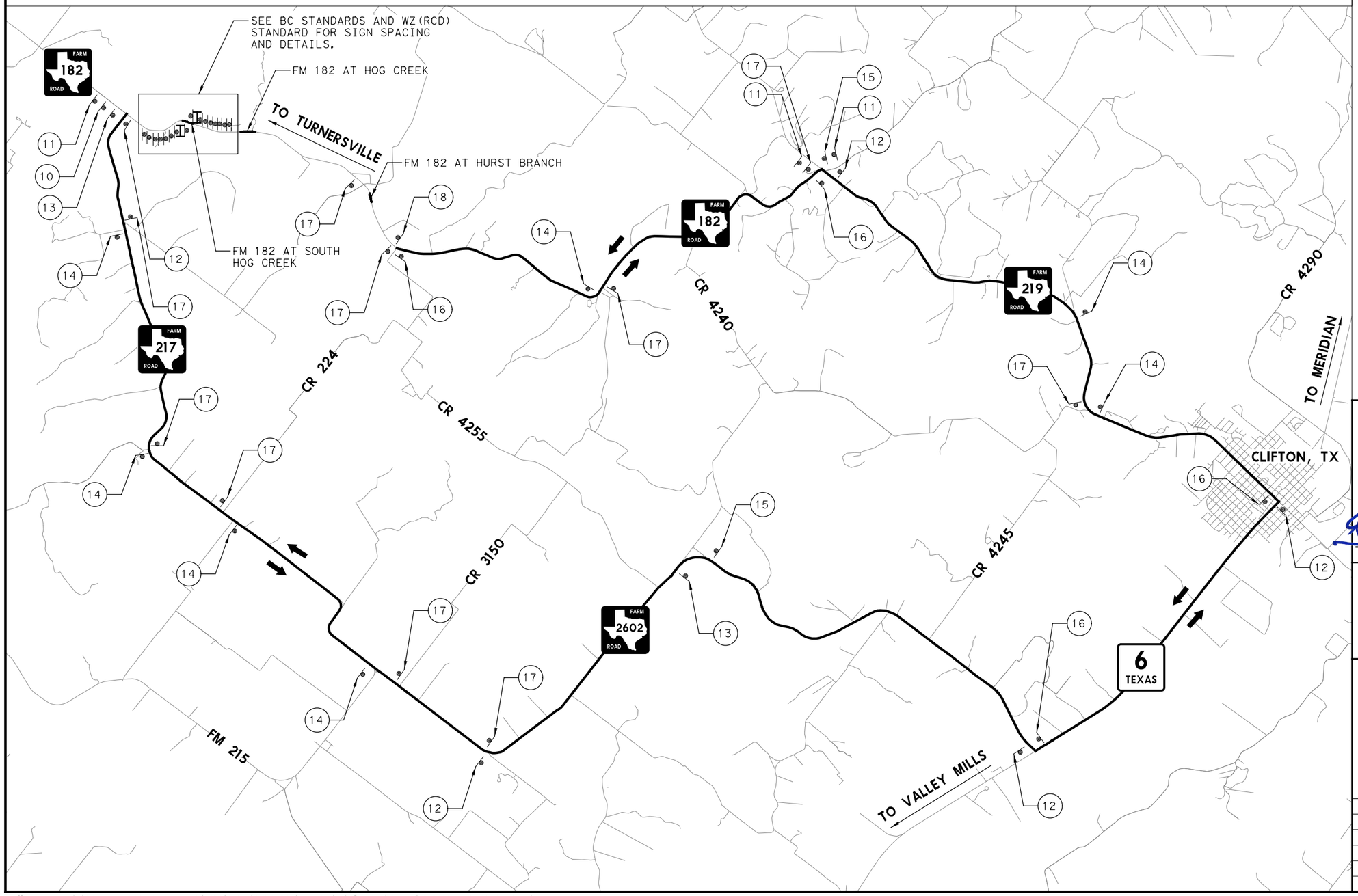

0 3000 6000
SCALE IN FEET

LEGEND

- TYPE 3 BARRICADE
- CONSTRUCTION SIGN
- DIRECTION OF DETOUR TRAFFIC

NOTES

1. DETOUR WILL REMAIN IN PLACE THROUGHOUT THE DURATION OF THE CONSTRUCTION.
2. SEE BC STANDARDS AND WZ(RCD) STANDARD FOR SIGN SPACING, DETAILS AND ADDITIONAL SIGNING NOT SHOWN. SIGNS MAY BE ADJUSTED FIT FIELD CONDITIONS OR AS DIRECTED.
3. USE EXISTING SIGNS AT INTERSECTIONS APPLICABLE FOR THIS DETOUR ROUTE. SIGNS THAT ARE IN CONFLICT WITH THESE SIGNS SHALL BE COVERED PER ENGINEER'S DIRECTION.

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Texas Department of Transportation

FM 182 AT SOUTH HOG CREEK

DETOUR LAYOUT

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		FM 182

STATE	DISTRICT	COUNTY	
TEXAS	WACO	CORYELL	
CONTROL	SECTION	JOB	SHEET NO.
1219	02	017, ETC.	13

REV DATE: 4/5/2023
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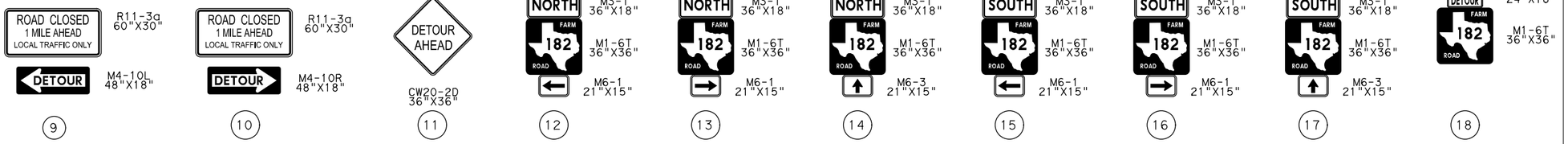

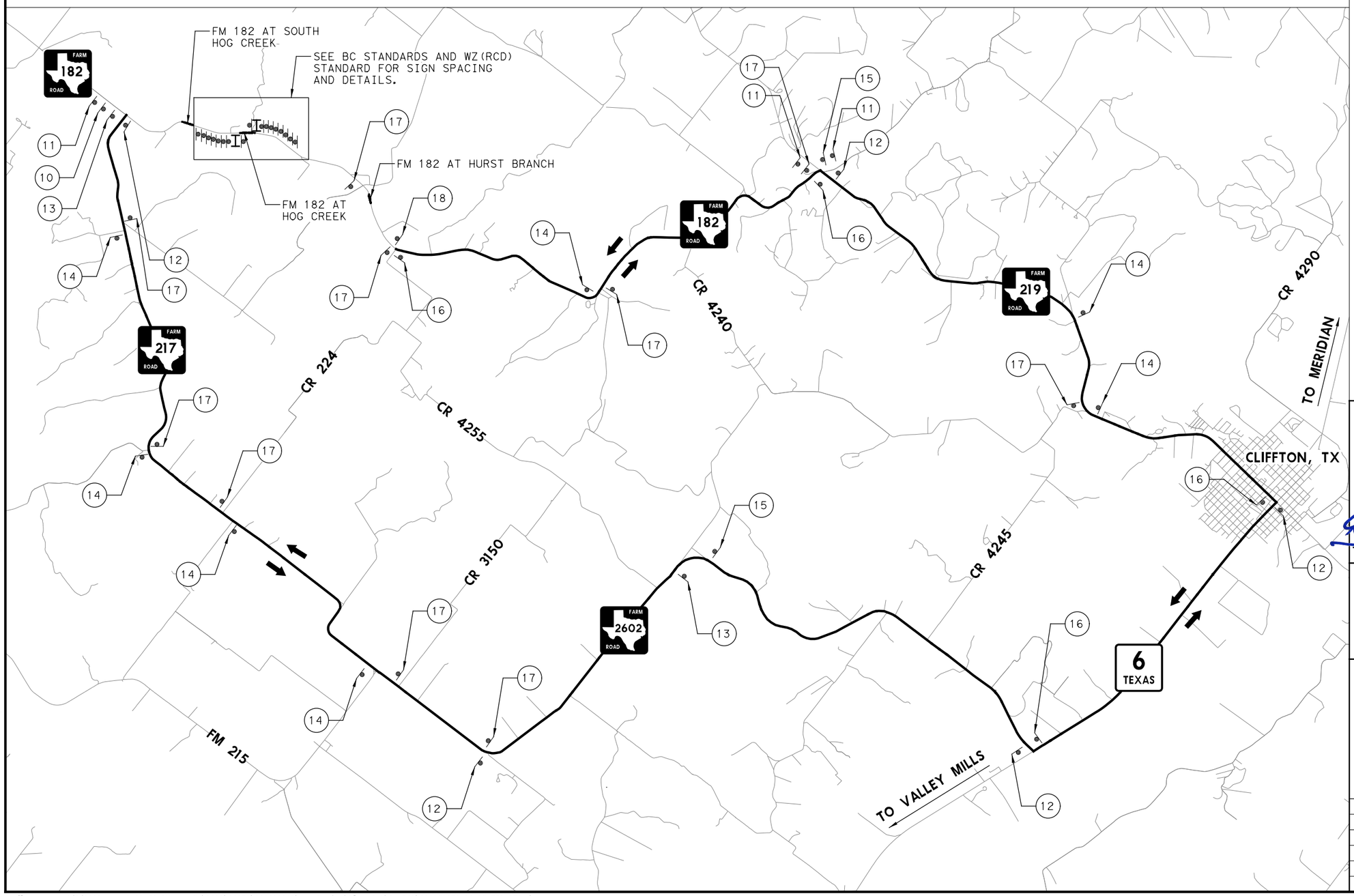

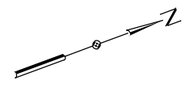

LEGEND

- TYPE 3 BARRICADE
- CONSTRUCTION SIGN
- DIRECTION OF DETOUR TRAFFIC

NOTES

1. DETOUR WILL REMAIN IN PLACE THROUGHOUT THE DURATION OF THE CONSTRUCTION.
2. SEE BC STANDARDS AND WZ(RCD) STANDARD FOR SIGN SPACING, DETAILS AND ADDITIONAL SIGNING NOT SHOWN. SIGNS MAY BE ADJUSTED FIT FIELD CONDITIONS OR AS DIRECTED.
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FM 182 AT HOG CREEK

DETOUR LAYOUT

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		FM 182

STATE	DISTRICT	COUNTY	
TEXAS	WACO	CORYELL	
CONTROL	SECTION	JOB	SHEET NO.
1219	02	017,ETC	14

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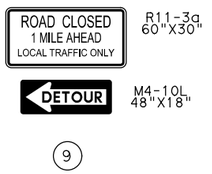

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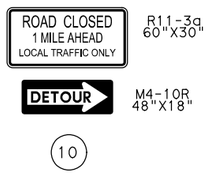

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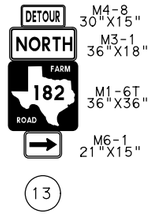

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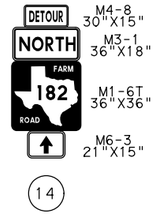

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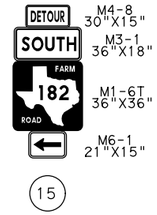

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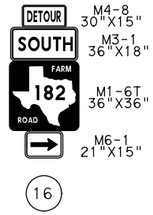

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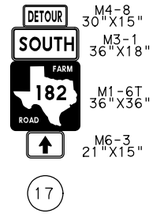

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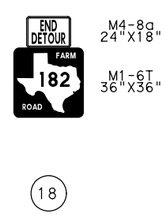

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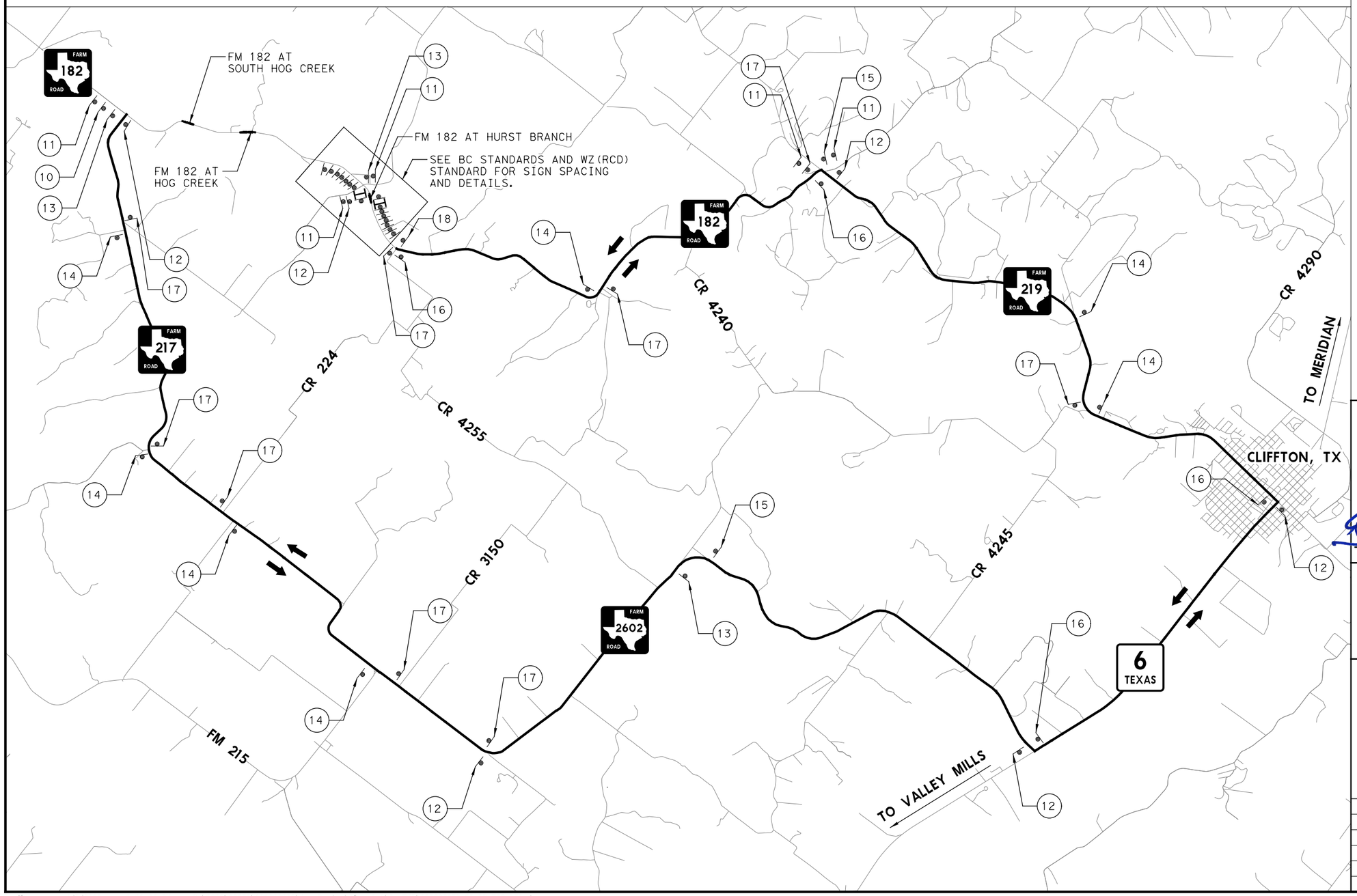

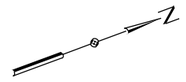

LEGEND

- TYPE 3 BARRICADE
- CONSTRUCTION SIGN
- DIRECTION OF DETOUR TRAFFIC

NOTES

1. DETOUR WILL REMAIN IN PLACE THROUGHOUT THE DURATION OF THE CONSTRUCTION.
2. SEE BC STANDARDS AND WZ(RCD) STANDARD FOR SIGN SPACING, DETAILS AND ADDITIONAL SIGNING NOT SHOWN. SIGNS MAY BE ADJUSTED FIT FIELD CONDITIONS OR AS DIRECTED.
3. USE EXISTING SIGNS AT INTERSECTIONS APPLICABLE FOR THIS DETOUR ROUTE. SIGNS THAT ARE IN CONFLICT WITH THESE SIGNS SHALL BE COVERED PER ENGINEER'S DIRECTION.

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JOSE M. SANDOVAL, P.E. 4/5/2023

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TBPE FIRM NO. F-10069

FM 182 AT HURST BRANCH

DETOUR LAYOUT

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		FM 182
STATE	DISTRICT	COUNTY
TEXAS	WACO	CORYELL
CONTROL	SECTION	JOB / SHEET NO.
1219	02	017,ETC / 15

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BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

WORKER SAFETY NOTES:

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

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

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

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

Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-03 7-13	1219	02	017, ETC.	FM 182
9-07 8-14	DIST	COUNTY		SHEET NO.
5-10 5-21	WACO	CORYELL		16

DATE: 4/5/2023 3:26:48 PM
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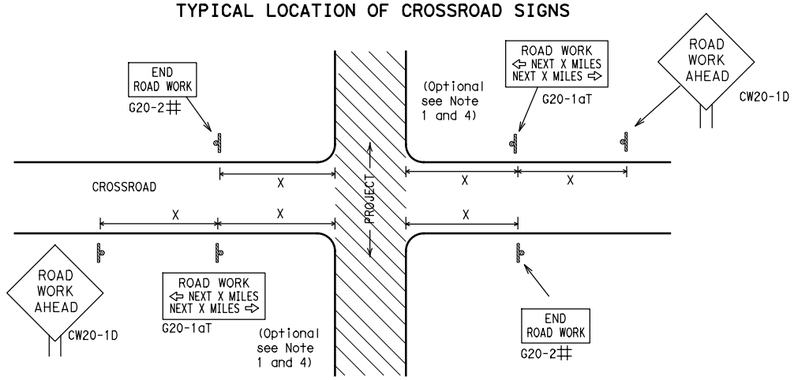
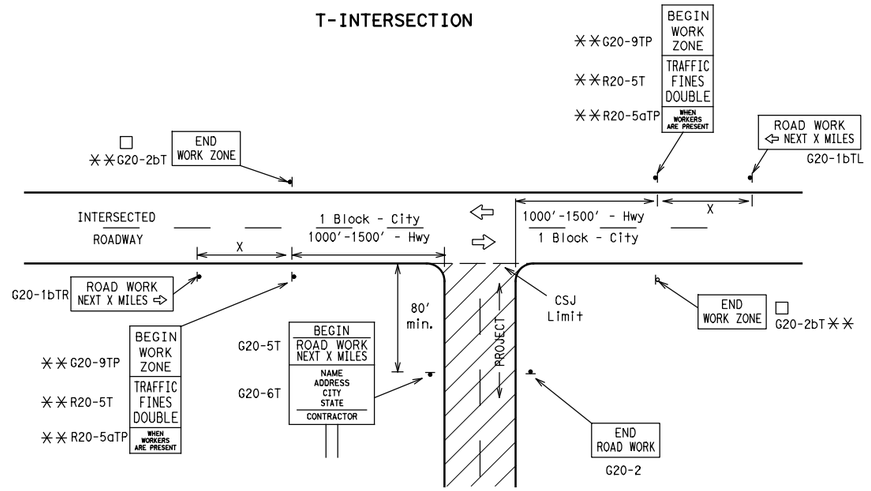
TYPICAL LOCATION OF CROSSROAD SIGNS



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.

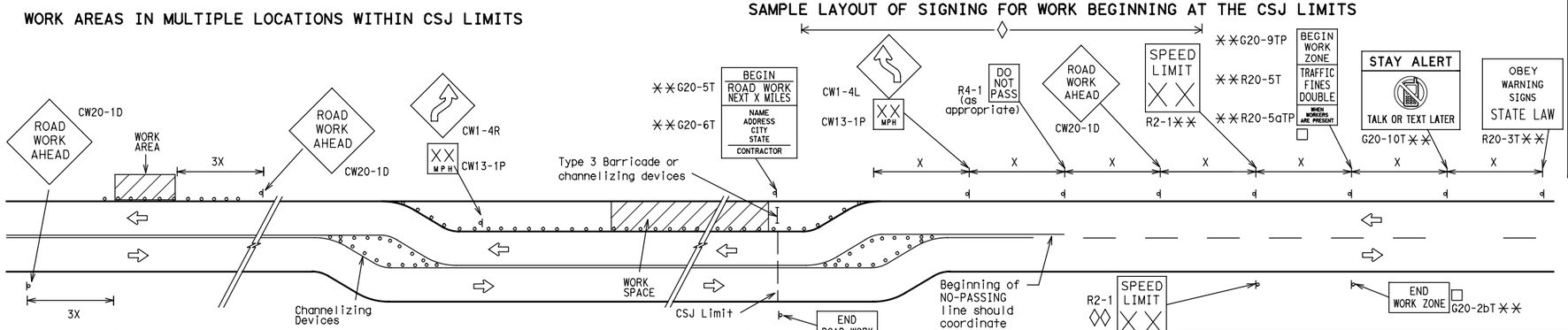
△ Minimum distance from work area to first Advance Warning sign nearest the work area and/or distance between each additional sign.

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.

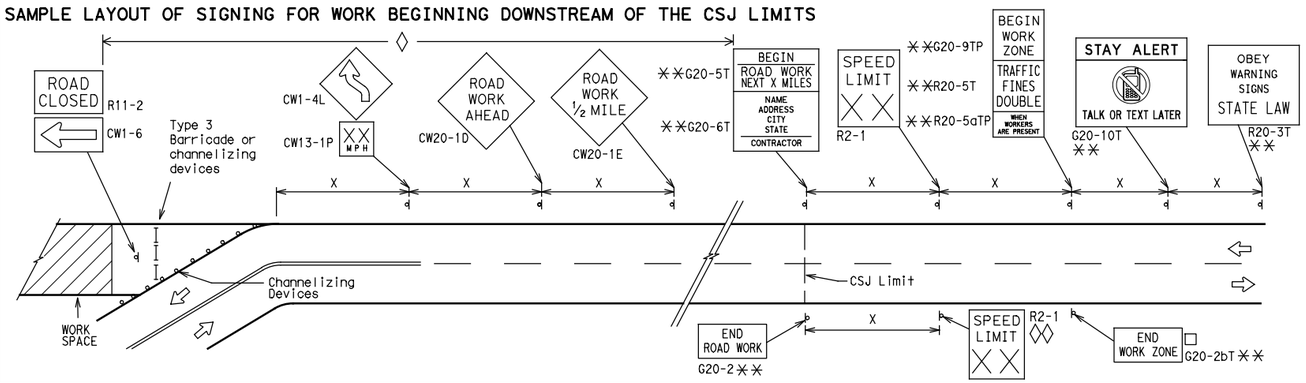
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS

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	1219	02	017, ETC.	FM 182
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	WACO	CORYELL		17

DATE: 4/5/2023 3:26:48 PM
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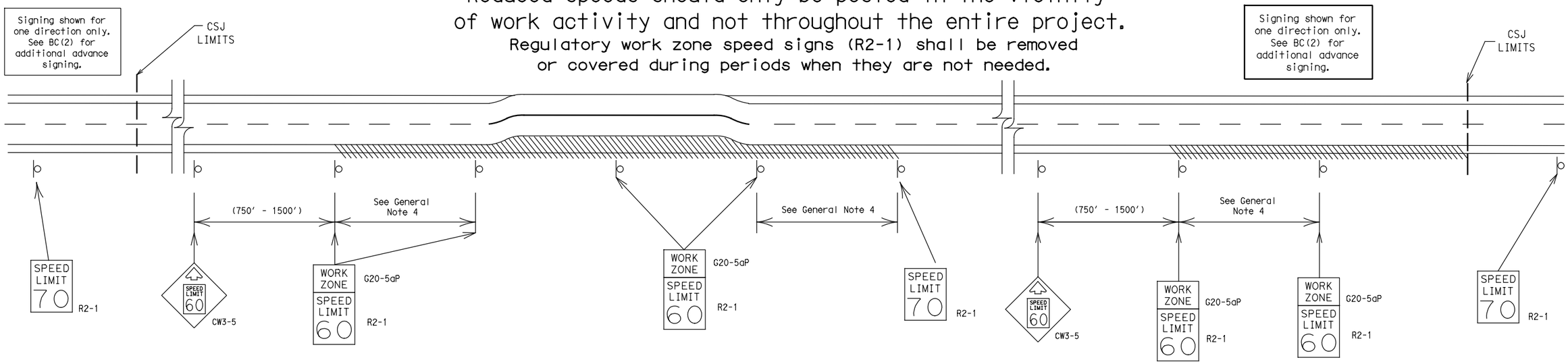
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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

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



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

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©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 9-07 8-14 7-13 5-21	1219	02	017, ETC.	FM 182
	DIST	COUNTY		SHEET NO.
	WACO	CORYELL		18

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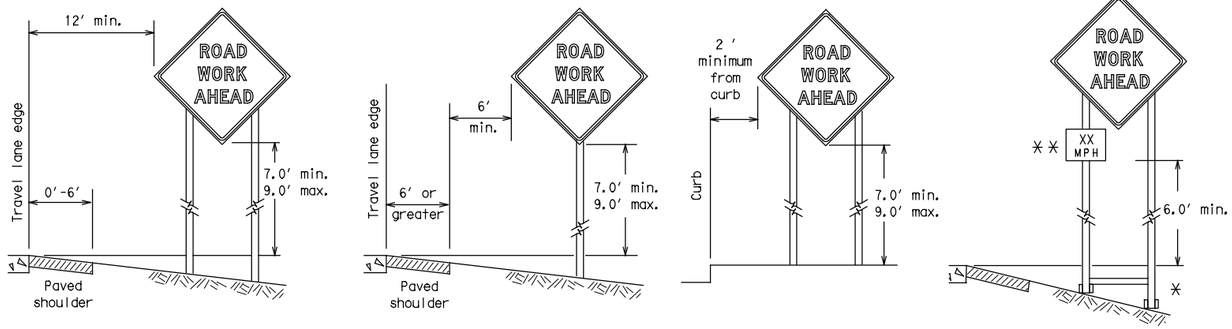
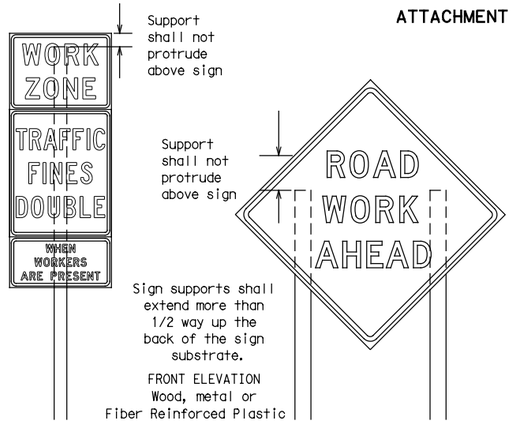
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

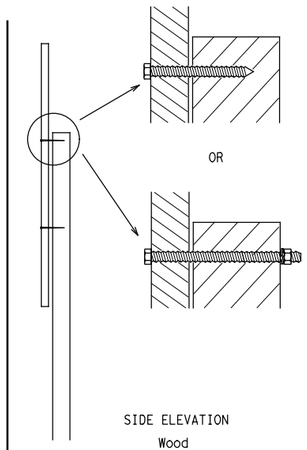


⚹ When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

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

ATTACHMENT FOR SIGN SUPPORTS





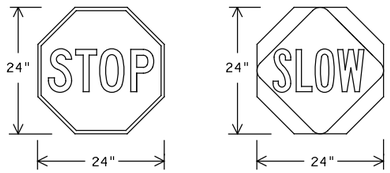
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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

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

STOP/SLOW PADDLES

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



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

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
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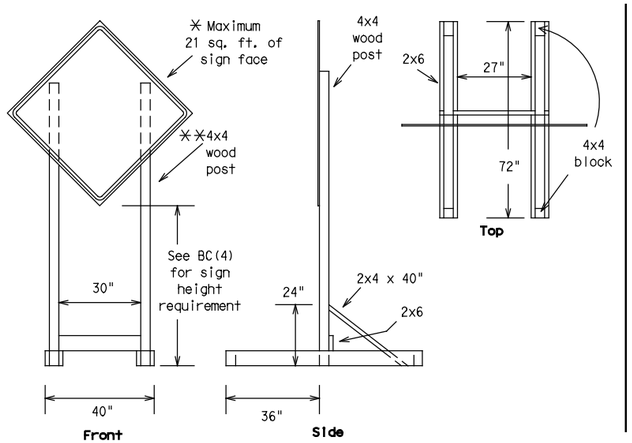
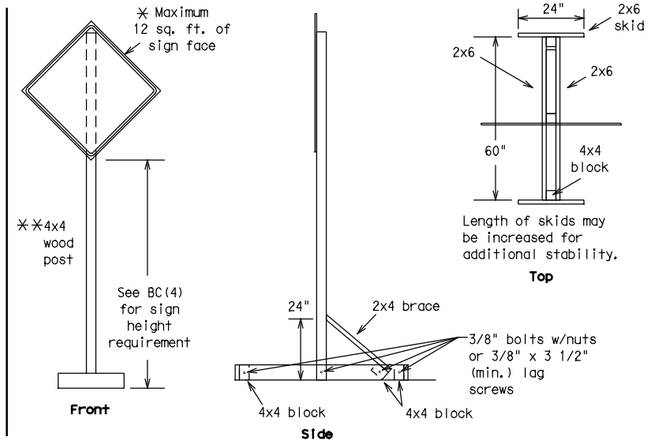
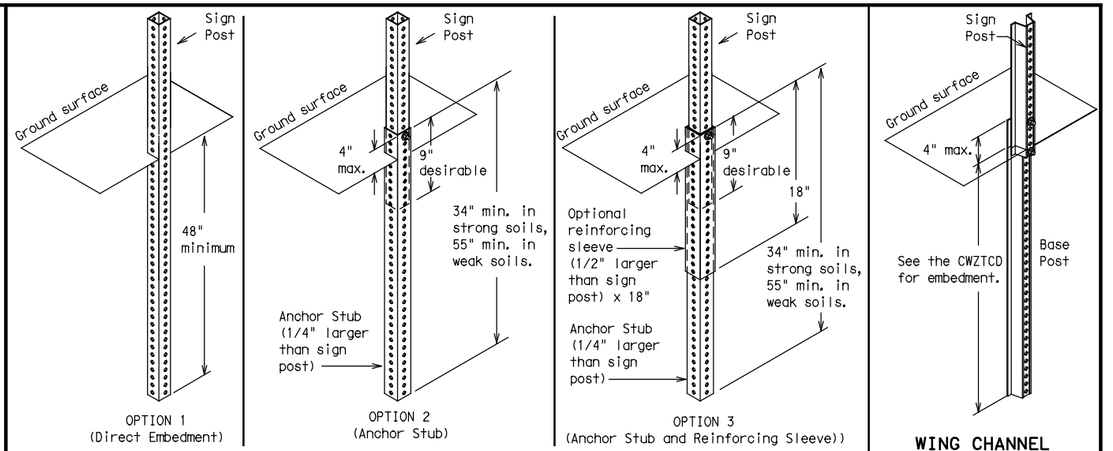




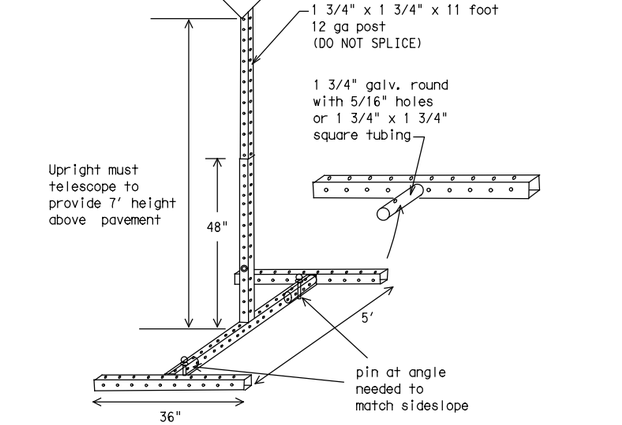
SKID MOUNTED WOOD SIGN SUPPORTS

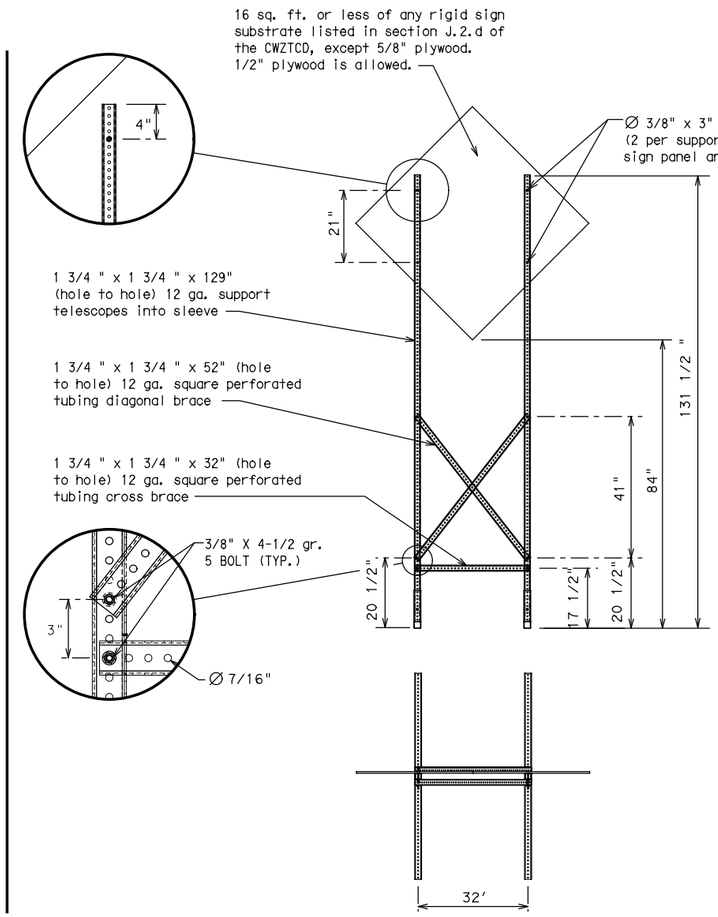
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

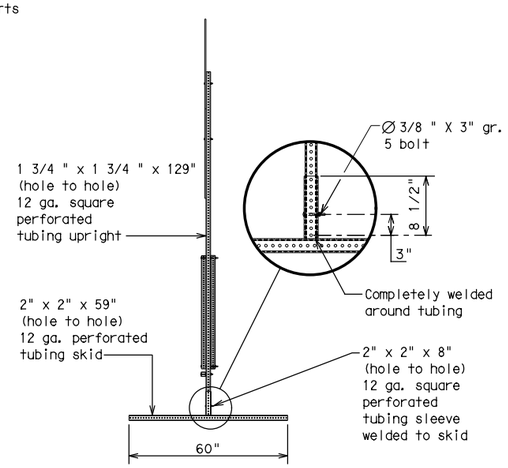


GROUND MOUNTED SIGN SUPPORTS

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







SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

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

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

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

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

Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

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REVISIONS	1219	02	017, ETC.	FM 182
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WHEN NOT IN USE, REMOVE THE PCMS FROM THE RIGHT-OF-WAY OR PLACE THE PCMS BEHIND BARRIER OR GUARDRAIL WITH SIGN PANEL TURNED PARALLEL TO TRAFFIC

PORTABLE CHANGEABLE MESSAGE SIGNS

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

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

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

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

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

Other Condition List

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

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

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

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

Location List

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

Warning List

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

✳✳ Advance Notice List

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

✳✳ See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

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

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

FULL MATRIX PCMS SIGNS

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

Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	1219	02	017, ETC.	FM 182
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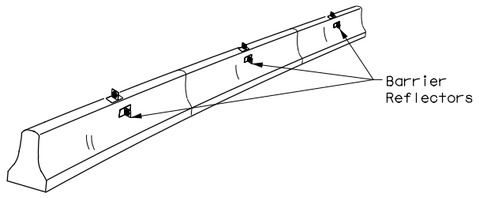
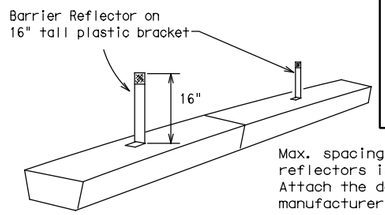
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost 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.

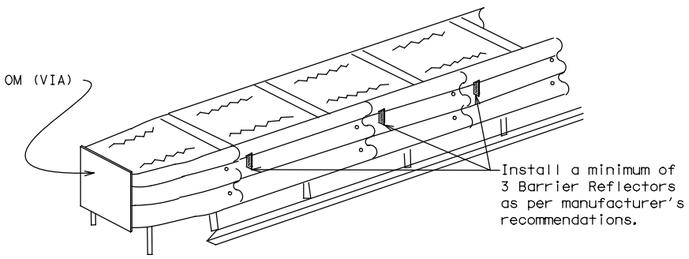


Max. spacing of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.

LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

LOW PROFILE CONCRETE BARRIER (LPCB)

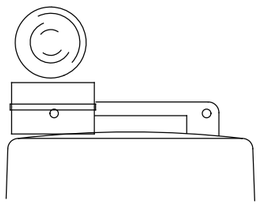


DELINEATION OF END TREATMENTS

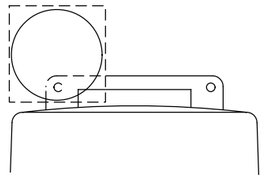
END TREATMENTS FOR CTB'S USED IN WORK ZONES

End treatments used on CTB's in work zones shall meet the apppropriate crashworthy standards as defined in the Manual for Assessing Safety Hardware (MASH). Refer to the CWZTCD List for approved end treatments and manufacturers.

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



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



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

WARNING LIGHTS

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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

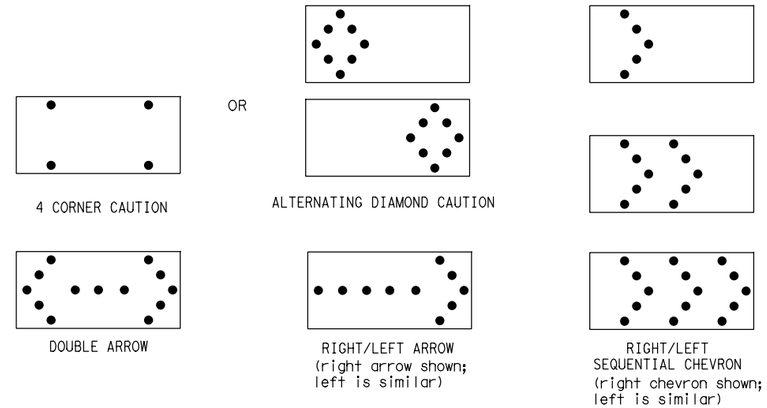
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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

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

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

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

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



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

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

ATTENTION

Flashing Arrow Boards shall be equipped with automatic dimming devices.

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

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

Texas Department of Transportation

Traffic Safety Division Standard

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

BC(7)-21

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GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

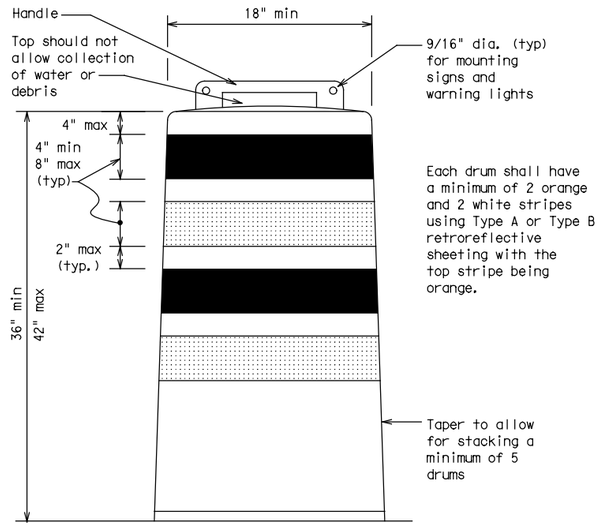
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

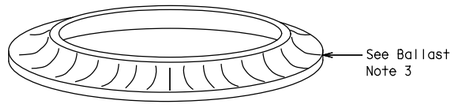
RETROREFLECTIVE SHEETING

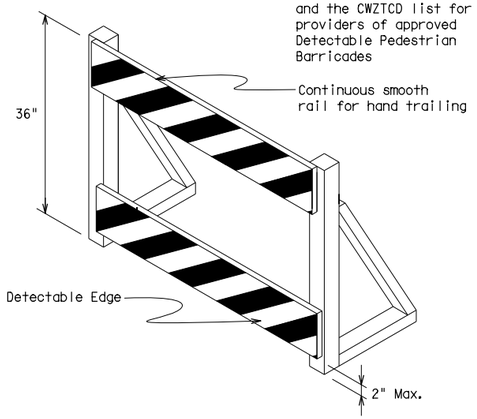
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials," Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

BALLAST

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

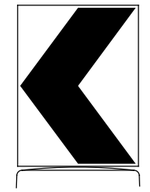




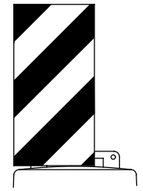


DETECTABLE PEDESTRIAN BARRICADES

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



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



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

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

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REVISIONS	1219	02	017, ETC.	FM 182
4-03 8-14	DIST	COUNTY		SHEET NO.
9-07 5-21	WACO	CORYELL		23
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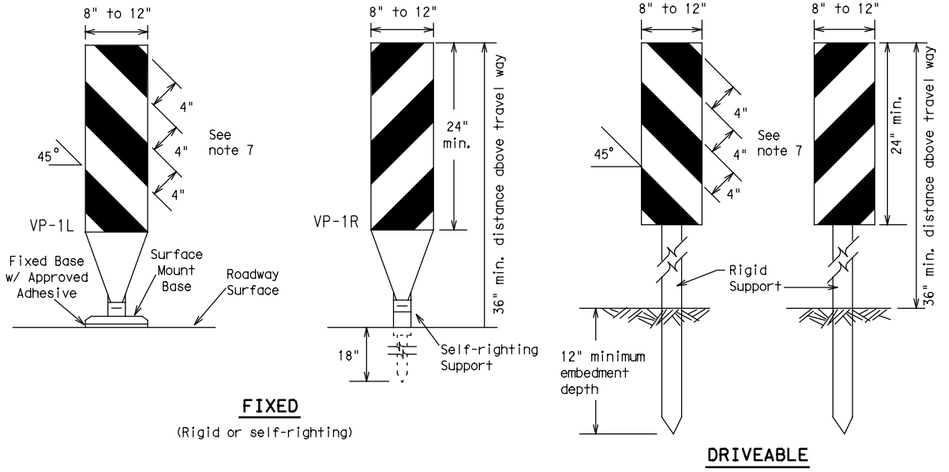
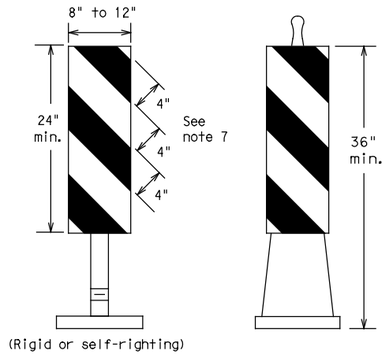


FIXED
(Rigid or self-righting)

DRIVEABLE

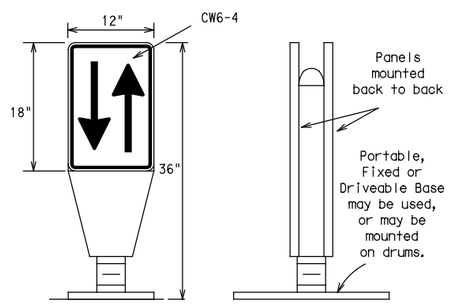


(Rigid or self-righting)

PORTABLE

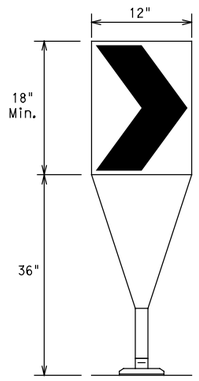
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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



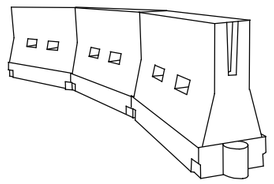
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

SHEET 9 OF 12

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

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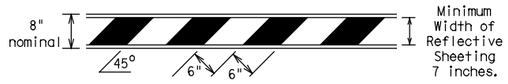
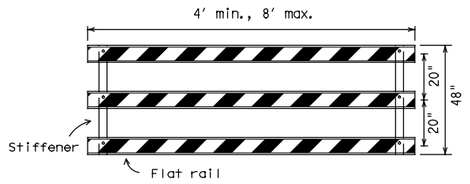
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



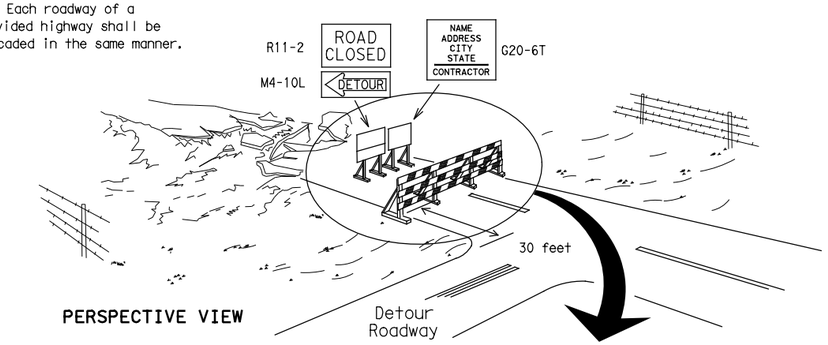
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

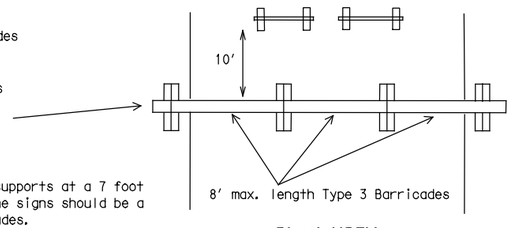
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

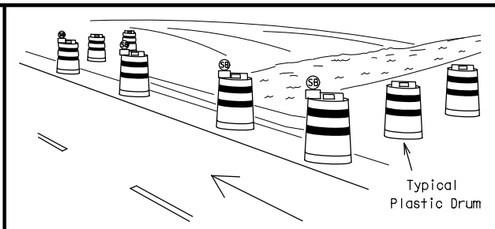
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

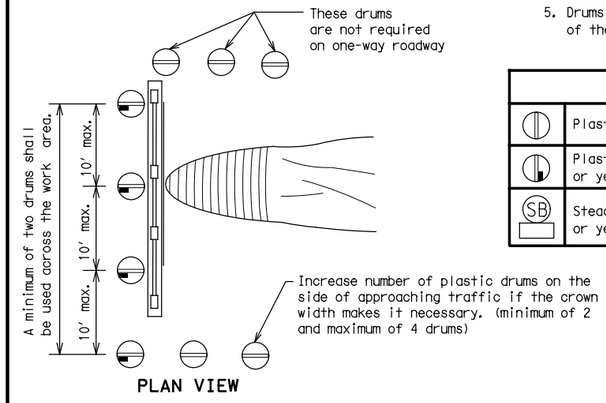
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

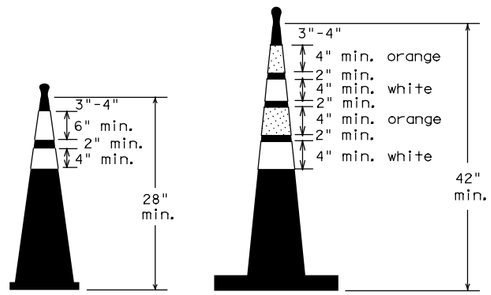
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



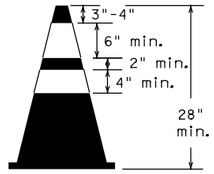
PLAN VIEW

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

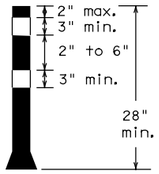
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



Two-Piece cones



One-Piece cones

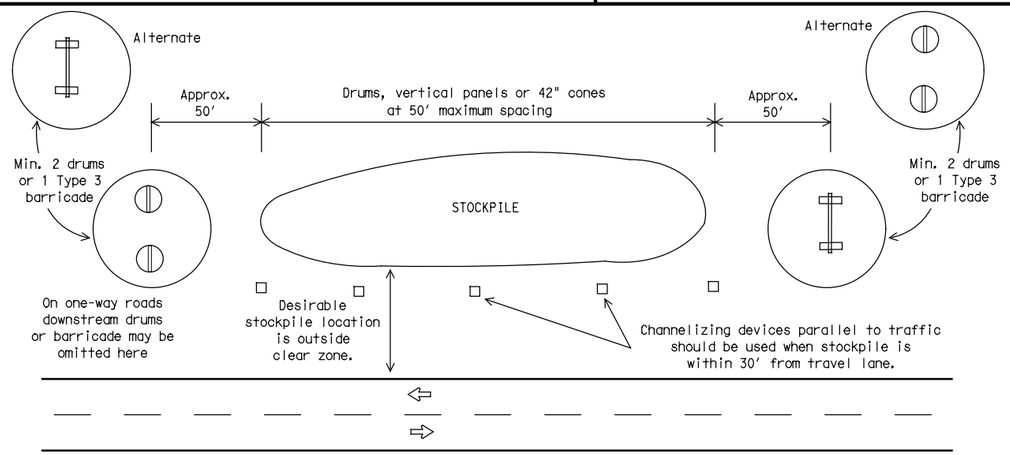


Tubular Marker

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

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

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

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9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	WACO	CORYELL		25

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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.

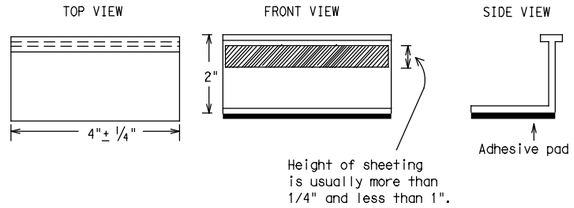
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

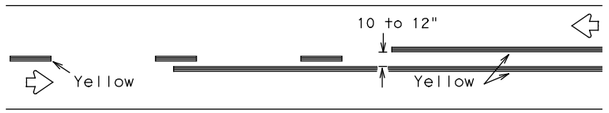
Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

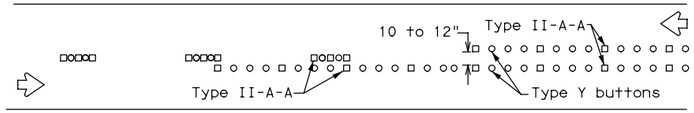
BC(11)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	1219	02	017, ETC.	FM 182
2-98 9-07 5-21	DIST	COUNTY		SHEET NO.
1-02 7-13	WACO	CORYELL		26
11-02 8-14				

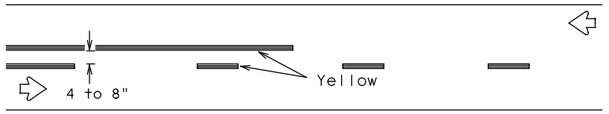
PAVEMENT MARKING PATTERNS



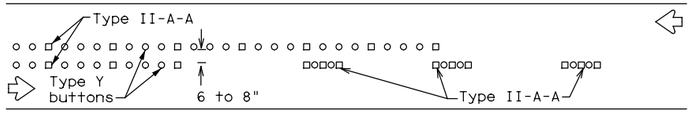
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



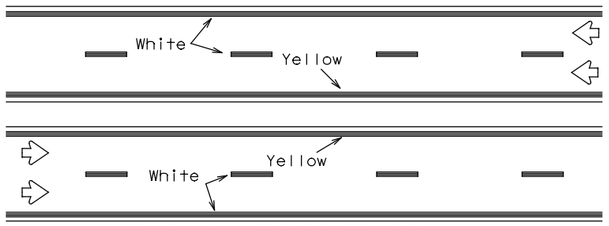
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



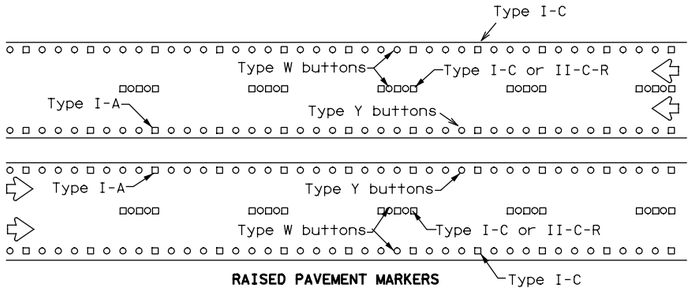
RAISED PAVEMENT MARKERS - PATTERN B

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



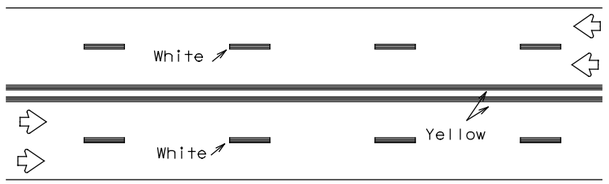
REFLECTORIZED PAVEMENT MARKINGS



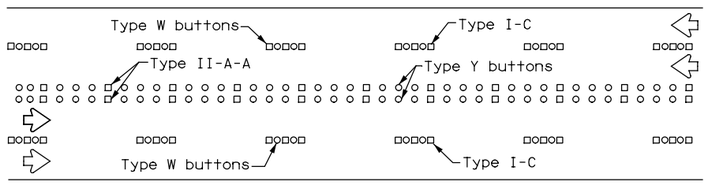
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



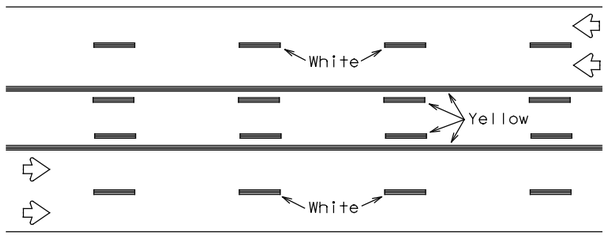
REFLECTORIZED PAVEMENT MARKINGS



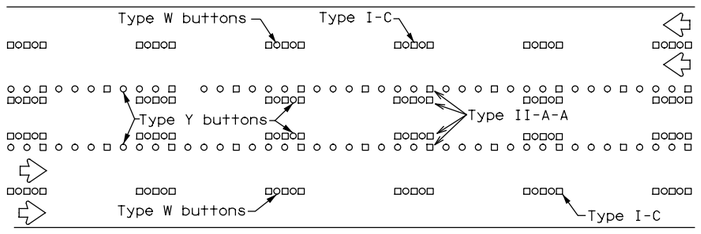
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

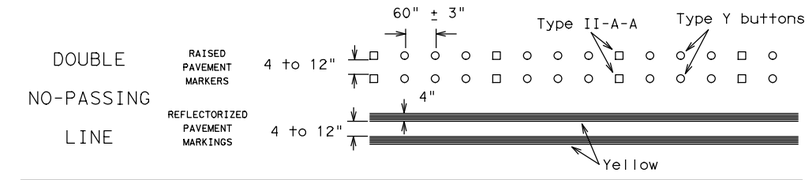
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

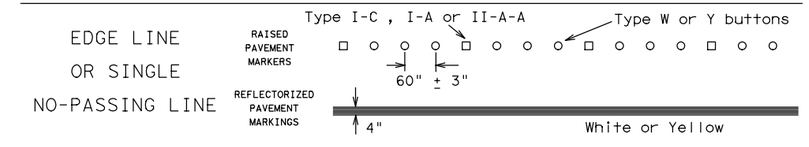
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

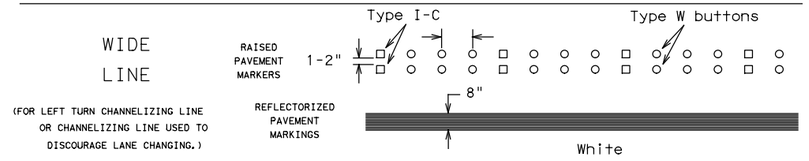


EDGE LINE OR SINGLE NO-PASSING LINE



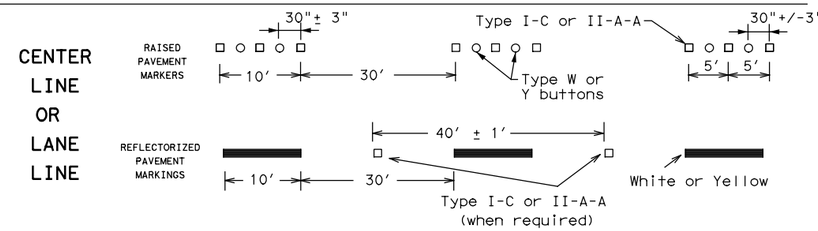
WIDE LINE

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

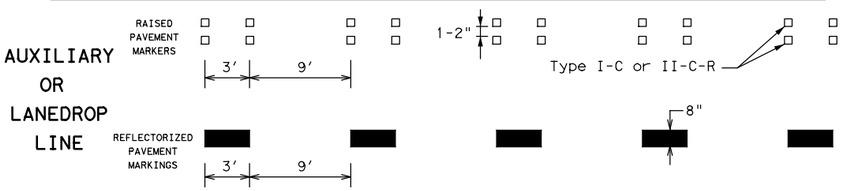


BROKEN LINES

CENTER LINE OR LANE LINE

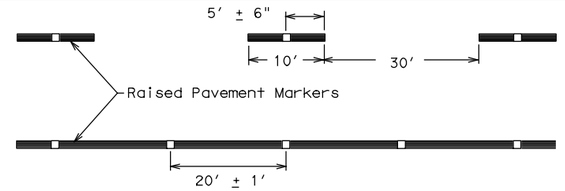


AUXILIARY OR LANEDROP LINE



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."

SHEET 12 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 1-97 9-07 5-21 2-98 7-13 11-02 8-14	1219	02	017, ETC.	FM 182
	DIST	COUNTY		SHEET NO.
	WACO	CORYELL		27

106

DATE: 4/5/2023 3:26:52 PM
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DATE: 4/5/2023 3:26:56 PM
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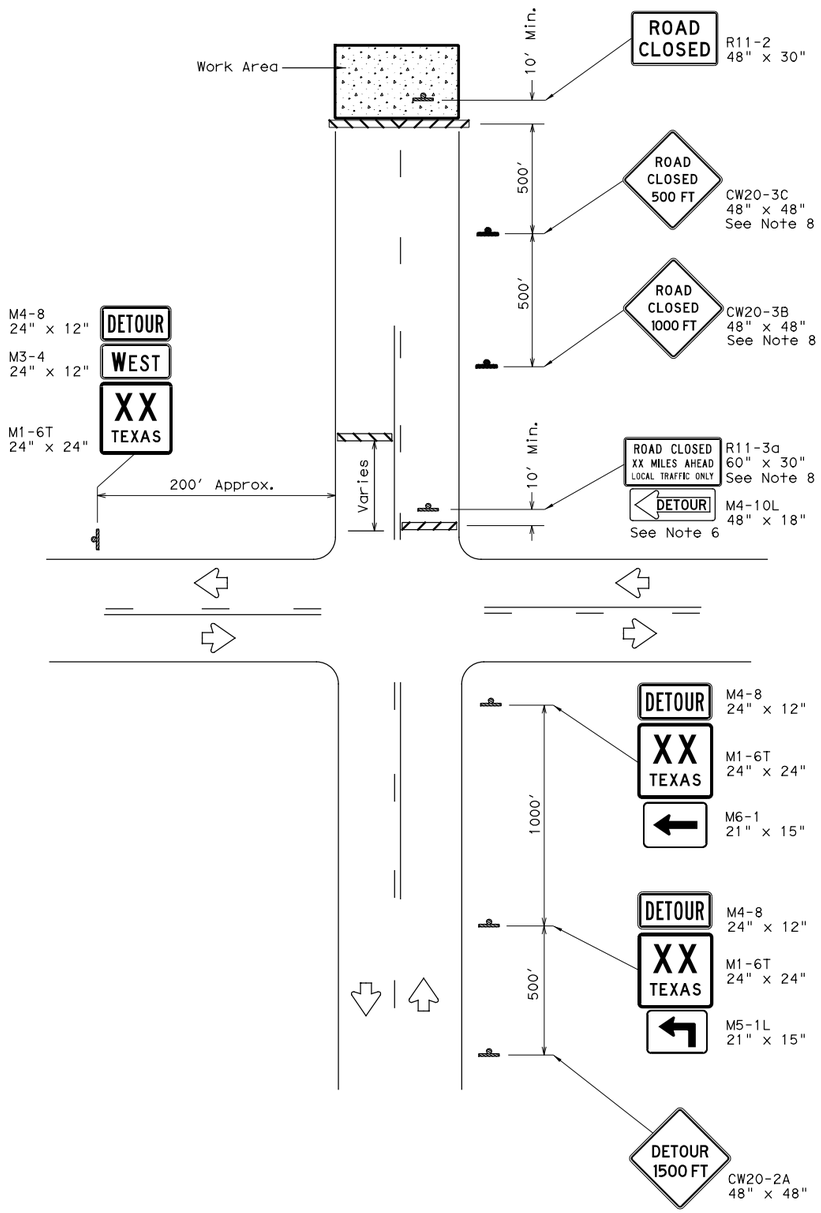
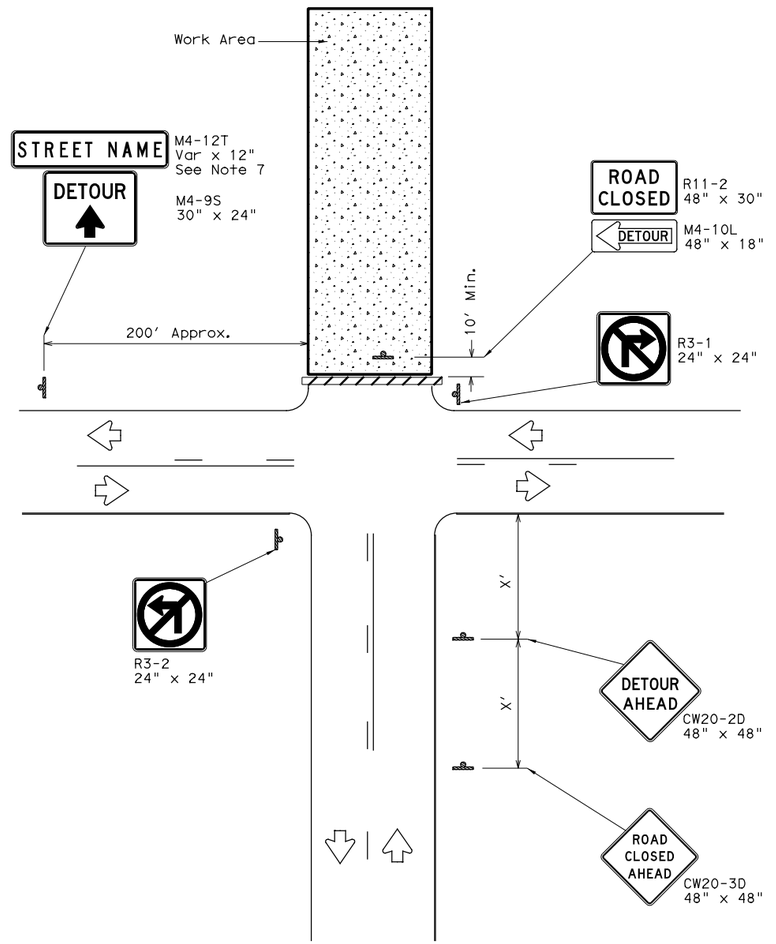


ROAD CLOSURE BEYOND THE INTERSECTION

Signing for a Numbered Route with an Off-Site Detour



ROAD CLOSURE AT THE INTERSECTION

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

LEGEND	
	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

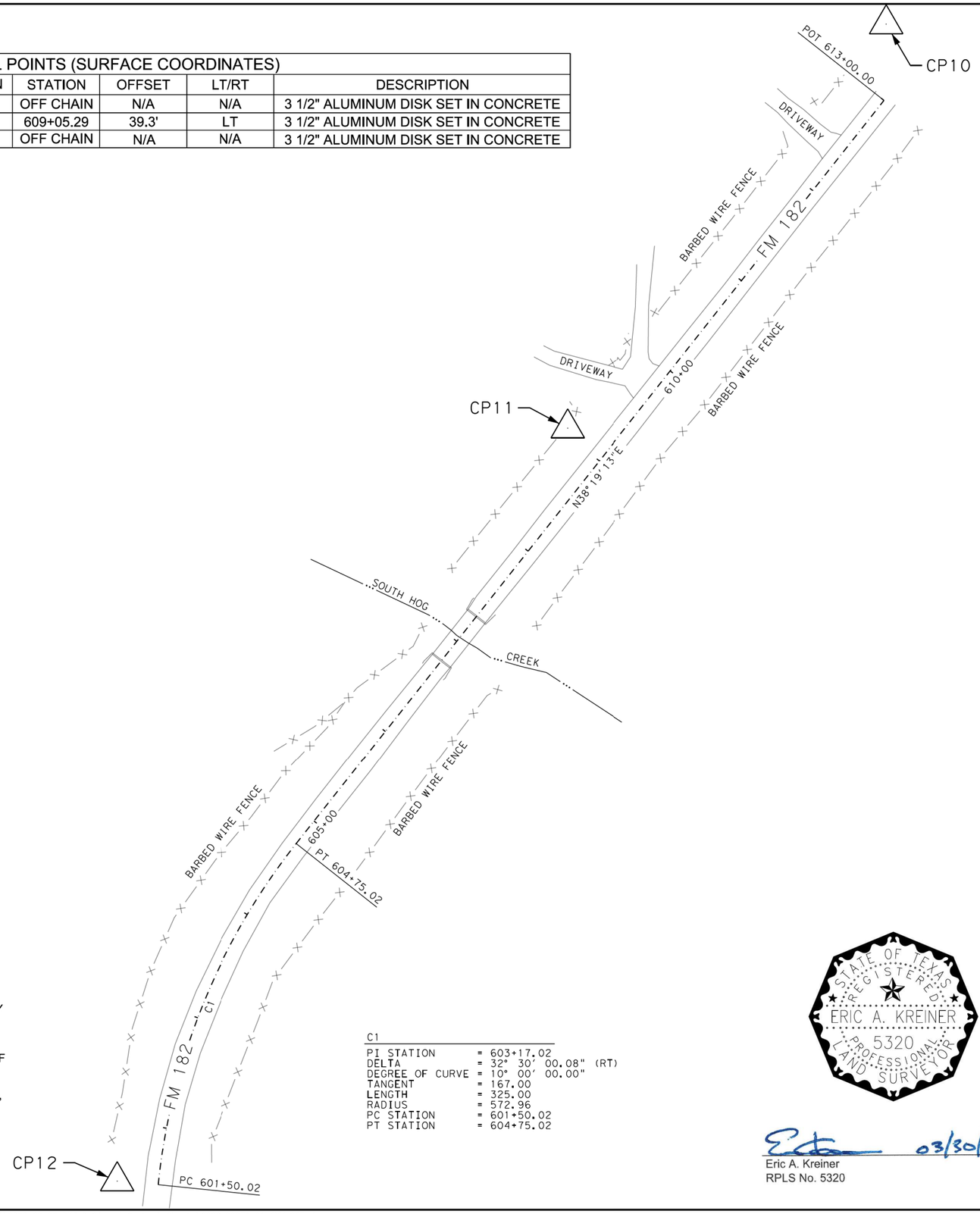
Traffic Operations Division Standard

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	1219	02	017, ETC.	FM 182
1-97 4-98 7-13 2-98 3-03	DIST	COUNTY		SHEET NO.
	WACO	CORYELL		28

CONTROL POINTS (SURFACE COORDINATES)							
POINT	NORTH	EAST	ELEVATION	STATION	OFFSET	LT/RT	DESCRIPTION
CP10	10,572,730.585	3,111,321.561	1,011.05'	OFF CHAIN	N/A	N/A	3 1/2" ALUMINUM DISK SET IN CONCRETE
CP11	10,572,378.959	3,111,044.023	1,013.63'	609+05.29	39.3'	LT	3 1/2" ALUMINUM DISK SET IN CONCRETE
CP12	10,571,722.916	3,110,651.911	1,027.42'	OFF CHAIN	N/A	N/A	3 1/2" ALUMINUM DISK SET IN CONCRETE



C1

PI STATION	= 603+17.02
DELTA	= 32° 30' 00.08" (RT)
DEGREE OF CURVE	= 10° 00' 00.00"
TANGENT	= 167.00
LENGTH	= 325.00
RADIUS	= 572.96
PC STATION	= 601+50.02
PT STATION	= 604+75.02

50 0 25 50 100

GRAPHIC SCALE
1" = 100' (11"x17")
CORYELL COUNTY, TEXAS

NOTES:

1. THE SURVEY CONTROL INFORMATION HAS BEEN ACCEPTED AND INCORPORATED INTO THIS PS&E" WHICH IS SIGNED, SEALED AND DATED BY A TEXAS PROFESSIONAL ENGINEER.

2. ALL COORDINATES SHOWN HEREON ARE BASED ON THE TEXAS COORDINATE SYSTEM, CENTRAL ZONE (4203), NORTH AMERICAN DATUM OF 1983 (2011 ADJ: EPOCH 2010.00)

3. THE VERTICAL DATUM FOR THIS PROJECT IS THE NAVD 1988 (CORS 2011), U.S. SURVEY FEET.

4. ALL COORDINATE VALUES ARE BASED UPON AN AVERAGE OF FOUR 180 EPOCH OBSERVATIONS UTILIZING THE TxDOT VRS NETWORK.

5. COORDINATES AND DISTANCES ARE U.S. SURVEY FEET. DISPLAYED IN SURFACE VALUES USING THE SURFACE ADJUSTMENT FACTOR 1.00012 (0.99988001440)

STATE OF TEXAS
REGISTERED
ERIC A. KREINER
5320
PROFESSIONAL
LAND SURVEYOR

03/30/23
Eric A. Kreiner
RPLS No. 5320
Date

PRINT DATE	REVISION DATE
3/30/2023	

CONTROL POINT LEGEND

DENOTES PRIMARY CONTROL POINT AS NOTED
(3 1/2" ALUMINUM DISK IN CONCRETE)

SAM™
Surveying and Mapping, LLC. (SAM)
1341 W. Mockingbird Lane, Suite 400W
Dallas, Tx 75247 - (214) 631-7888
FIRM REGISTRATION NO. F-1937
TBPLS REGISTRATION NO. 10064301

AMERICAN STRUCTUREPOINT INC.
3711 SOUTH MOPAC EXPRESSWAY
BUILDING ONE, SUITE 350
AUSTIN, TX 78703
TEL 512.494.6037 FAX 317.543.0270
www.structurepoint.com
TBPE FIRM NO. F-10069

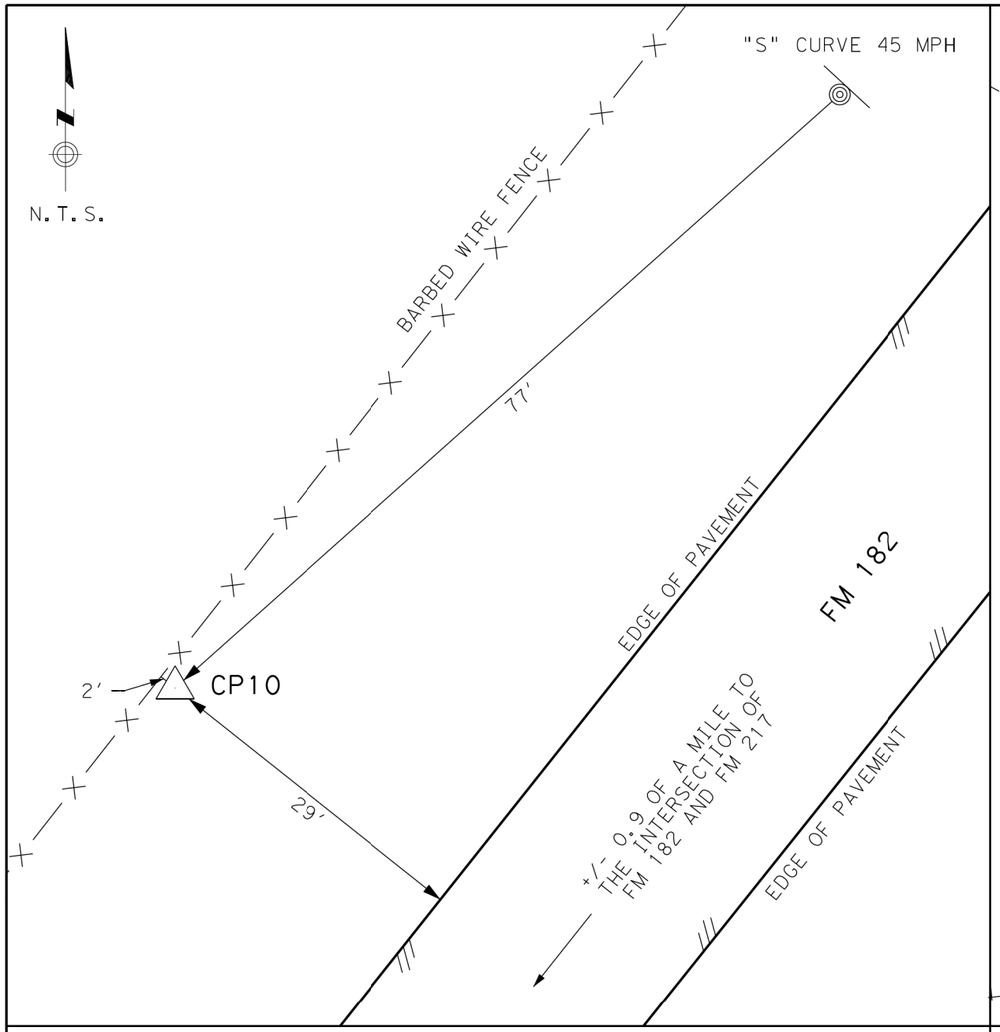
Texas Department of Transportation
Waco District

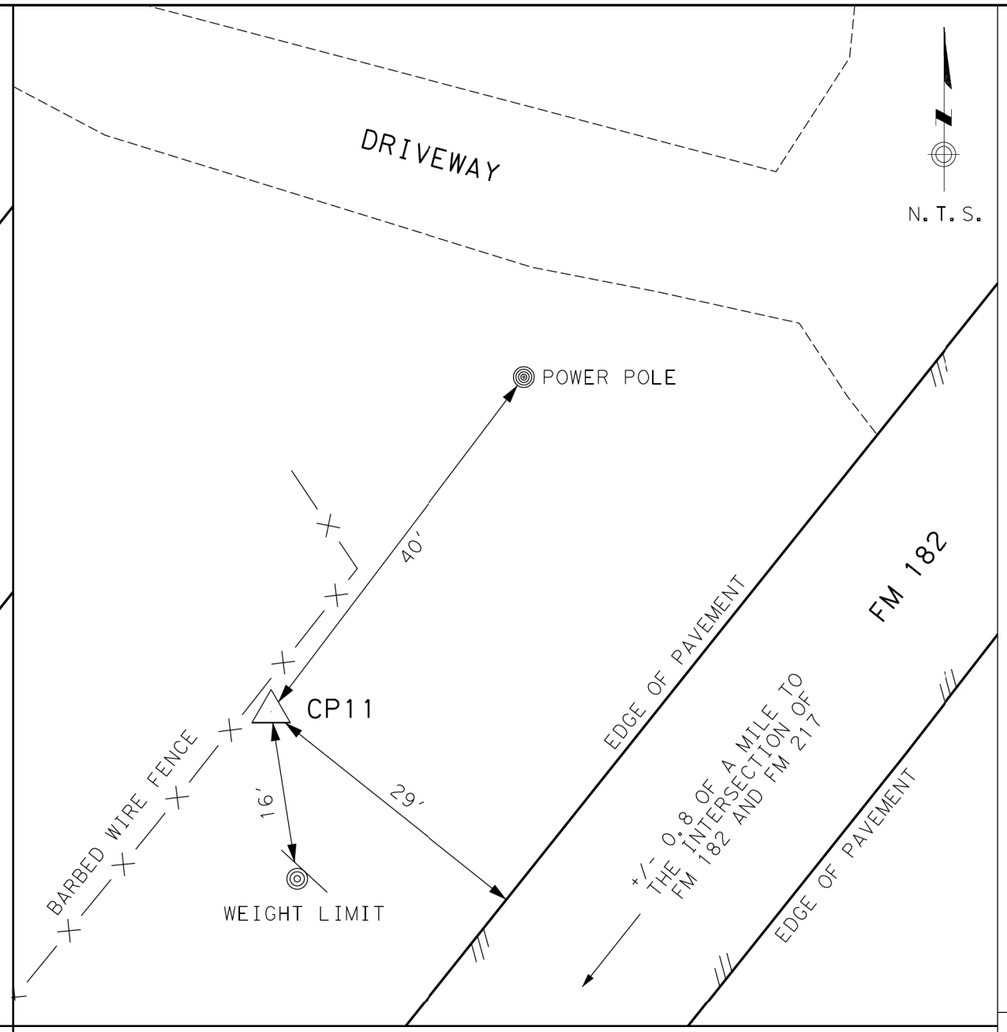
FM 182 AT SOUTH HOG CREEK
SURVEY CONTROL INDEX SHEET
CORYELL COUNTY, TEXAS

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		FM 182

STATE	DISTRICT	COUNTY	
TEXAS	WACO	CORYELL	
CONTROL	SECTION	JOB	SHEET NO.
1219	02	017, ETC.	29

REV DATE: 3/30/2023
CSJ: 1219-02-017, ETC.
FILE LOCATION: \\saminc\DAL\PROJECTS\10210661911\04Delivery\Final\2023-03-30_PKG 3 Signed Control Sheets\2020.00072.01.SVY.SCI.dgn





CONTROL POINT NO. 10:
APPROXIMATE LOCATION:

3 1/2" ALUMINUM DISK SET IN CONCRETE STAMPED "CP10", +/- 0.9 OF A MILE NORTH OF THE INTERSECTION OF FM 182 AND FM 217, 2' EAST OF A BARBED WIRE FENCE, 29' WEST OF THE WEST EDGE OF PAVING OF FM 182, AND 77' SOUTH OF A "S" CURVE 45 MPH SIGN.

US SURVEY FEET
NAVD 88 ELEVATION = 1,011.05'
DATE SET: JANUARY 31, 2022
MONUMENT: 3 1/2" ALUMINUM DISK SET IN CONCRETE STAMPED "CP10"
CORYELL COUNTY SCALE FACTOR: 1.00012
SURFACE ENGLISH CO-ORDS
NORTHING: 10,572,730.585
EASTING: 3,111,321.561
STATE PLANE ENGLISH CO-ORDS
NORTHING: 10,571,462.010
EASTING: 3,110,948.247
ELEVATIONS ARE NAVD 88 BASED UPON TXDOT VRS RTK NETWORK

CONTROL POINT NO. 11:
APPROXIMATE LOCATION:

3 1/2" ALUMINUM DISK SET IN CONCRETE STAMPED "CP11", +/- 0.8 OF A MILE NORTH OF THE INTERSECTION OF FM 182 AND FM 217, 16' NORTH OF A WEIGHT LIMIT SIGN, 29' WEST OF THE WEST EDGE OF PAVING OF FM 182, AND 40' SOUTH OF A POWER POLE.

US SURVEY FEET
NAVD 88 ELEVATION = 1,013.63'
DATE SET: JANUARY 31, 2022
MONUMENT: 3 1/2" ALUMINUM DISK SET IN CONCRETE STAMPED "CP11"
CORYELL COUNTY SCALE FACTOR: 1.00012
SURFACE ENGLISH CO-ORDS
NORTHING: 10,572,378.959
EASTING: 3,111,044.023
STATE PLANE ENGLISH CO-ORDS
NORTHING: 10,571,110.426
EASTING: 3,110,670.742
ELEVATIONS ARE NAVD 88 BASED UPON TXDOT VRS RTK NETWORK

I HEREBY CERTIFY THAT THE HORIZONTAL AND VERTICAL DATA SHOWN HEREON WAS DETERMINED BY A FIELD SURVEY ON JANUARY 31, 2022 UTILIZING THE TxDOT VIRTUAL REFERENCE SYSTEM RTK NETWORK AND IS CORRECTLY SHOWN HEREON.

STATE OF TEXAS
REGISTERED
ERIC A. KREINER
5320
PROFESSIONAL
LAND SURVEYOR

03/30/23

Eric A. Kreiner
Registered Professional Land Surveyor
No. 5320

TBPLS # 10064301

PRINT DATE	REVISION DATE
3/30/2023	

SAM™
Surveying and Mapping, LLC. (SAM)
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FIRM REGISTRATION NO. F-1937
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AUSTIN, TX 78703
TEL 512.494.6037 FAX 317.543.0270
www.structurepoint.com
TBPE FIRM NO. F-10069

Texas Department of Transportation
Waco District

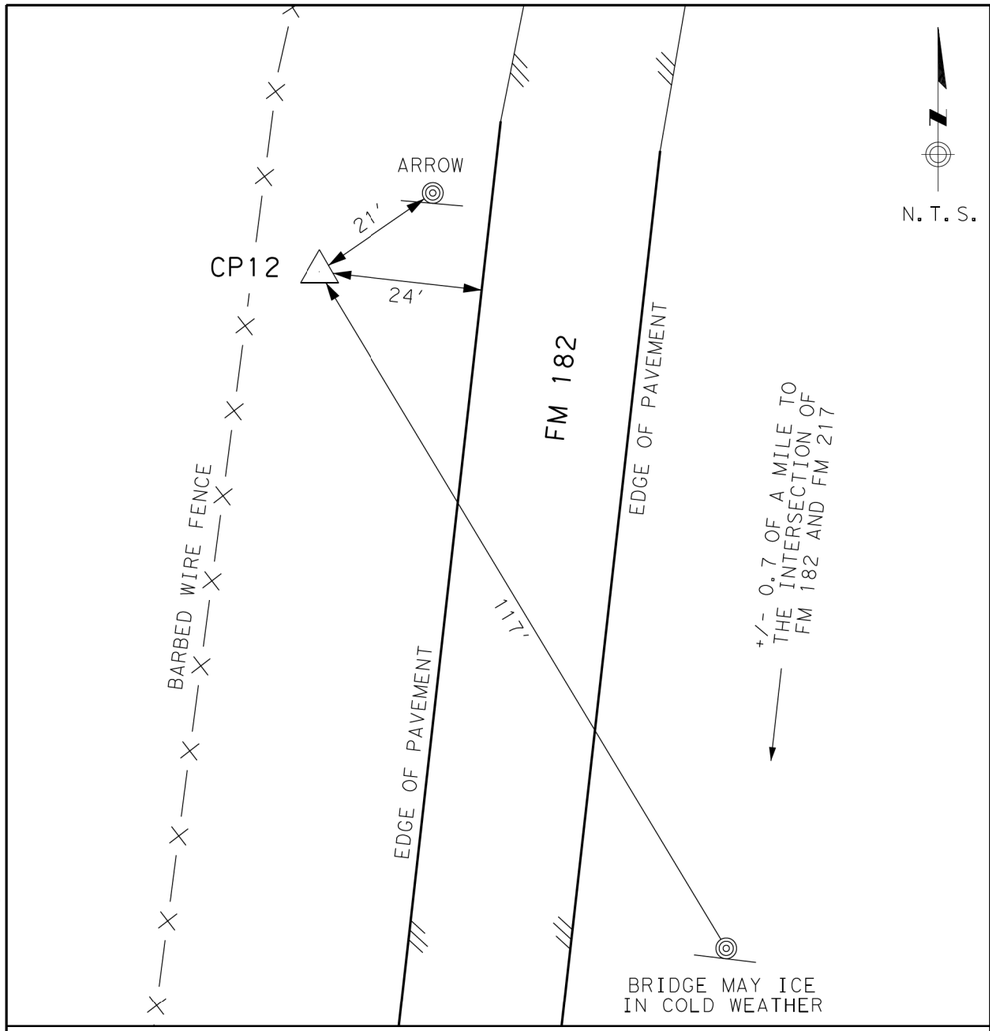
FM 182 AT SOUTH HOG CREEK
PRIMARY HORIZONTAL
AND VERTICAL CONTROL
CORYELL COUNTY, TEXAS

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		FM 182

STATE	DISTRICT	COUNTY
TEXAS	WACO	CORYELL

CONTROL	SECTION	JOB	SHEET NO.
1219	02	017, ETC.	30

REV DATE: 3/30/2023
CSJ: 1219-02-017, ETC.
FILE LOCATION: \\saminc\DAL\PROJECTS\1021066191\04Delivery\Final\2023-03-30_PKG 3 Signed Control Sheets\2020.00072.01.SVY.SCD.dgn



CONTROL POINT NO. 12:
APPROXIMATE LOCATION:

3 1/2" ALUMINUM DISK SET IN CONCRETE STAMPED "CP12", +/- 0.7 OF A MILE NORTH OF THE INTERSECTION OF FM 182 AND FM 217, 21' SOUTH OF A ARROW SIGN, 24' WEST OF THE WEST EDGE OF PAVING OF FM 182, AND 117' NORTH OF A BRIDGE MAY ICE IN COLD WEATHER SIGN.

US SURVEY FEET
NAVD 88 ELEVATION = 1,027.42'
DATE SET: JANUARY 31, 2022
MONUMENT: 3 1/2" ALUMINUM DISK SET IN CONCRETE STAMPED "CP12"
CORYELL COUNTY SCALE FACTOR: 1.00012
SURFACE ENGLISH CO-ORDS
NORTHING: 10,571,722.916
EASTING: 3,110,651.911
STATE PLANE ENGLISH CO-ORDS
NORTHING: 10,570,454.462
EASTING: 3,110,278.677
ELEVATIONS ARE NAVD 88 BASED UPON TXDOT VRS RTK NETWORK

I HEREBY CERTIFY THAT THE HORIZONTAL AND VERTICAL DATA SHOWN HEREON WAS DETERMINED BY A FIELD SURVEY ON JANUARY 31, 2022 UTILIZING THE TxDOT VIRTUAL REFERENCE SYSTEM RTK NETWORK AND IS CORRECTLY SHOWN HEREON.

STATE OF TEXAS
REGISTERED
ERIC A. KREINER
5320
PROFESSIONAL
LAND SURVEYOR

03/30/23

Eric A. Kreiner
Registered Professional Land Surveyor
No. 5320

TBPLS # 10064301

PRINT DATE	REVISION DATE
3/30/2023	

SAM™
Surveying and Mapping, LLC. (SAM)
1341 W. Mockingbird Lane, Suite 400W
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TBPLS REGISTRATION NO. 10064301

AMERICAN STRUCTUREPOINT INC.
3711 SOUTH MOPAC EXPRESSWAY
BUILDING ONE, SUITE 350
AUSTIN, TX 78703
TEL 512.494.6037 FAX 317.543.0270
www.structurepoint.com
TBPE FIRM NO. F-10069

FM 182 AT SOUTH HOG CREEK
PRIMARY HORIZONTAL AND VERTICAL CONTROL
CORYELL COUNTY, TEXAS

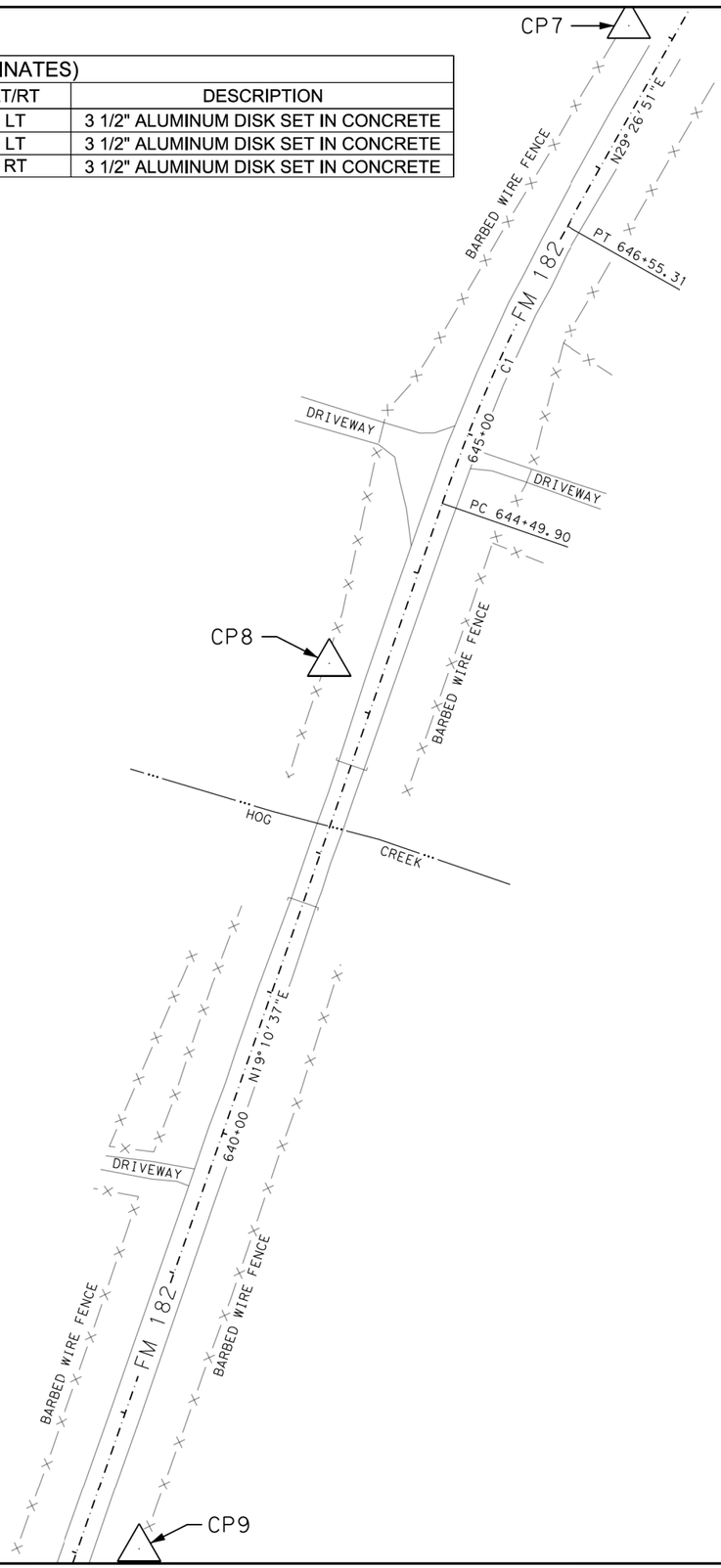
FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		FM 182

STATE	DISTRICT	COUNTY	
TEXAS	WACO	CORYELL	
CONTROL	SECTION	JOB	SHEET NO.
1219	02	017, ETC.	31

REV DATE: 3/30/2023
CSJ: 1219-02-017, ETC.
FILE LOCATION: \\saminc\DAL\PROJECTS\1021066191\04Delivery\Final\2023-03-30_PKG 3 Signed Control Sheets\2020.00072.01.SVY.SCD.dgn

Gannon.Kirkham 3/30/2023 11:10:29 AM \\saminc\DAL\PROJECTS\1021066191\04Delivery\Final\2023-03-30_PKG 3 Signed Control Sheets\2020.00072.01.SVY.SCD.dgn

CONTROL POINTS (SURFACE COORDINATES)							
POINT	NORTH	EAST	ELEVATION	STATION	OFFSET	LT/RT	DESCRIPTION
CP7	10,575,786.060	3,112,845.984	1,008.80'	647+93.40	30.1'	LT	3 1/2" ALUMINUM DISK SET IN CONCRETE
CP8	10,575,356.142	3,112,643.770	992.30'	643+22.97	36.4'	LT	3 1/2" ALUMINUM DISK SET IN CONCRETE
CP9	10,574,758.511	3,112,515.786	1,017.55'	637+16.46	39.0'	RT	3 1/2" ALUMINUM DISK SET IN CONCRETE



GRAPHIC SCALE
1" = 100' (11"x17")
CORYELL COUNTY, TEXAS

C1

PI STATION	= 645+52.88
DELTA	= 10° 16' 13.20" (RT)
DEGREE OF CURVE	= 5° 00' 00.00"
TANGENT	= 102.98
LENGTH	= 205.41
RADIUS	= 1,145.92
PC STATION	= 644+49.90
PT STATION	= 646+55.31

NOTES:

1. THE SURVEY CONTROL INFORMATION HAS BEEN ACCEPTED AND INCORPORATED INTO THIS PS&E" WHICH IS SIGNED, SEALED AND DATED BY A TEXAS PROFESSIONAL ENGINEER.

2. ALL COORDINATES SHOWN HEREON ARE BASED ON THE TEXAS COORDINATE SYSTEM, CENTRAL ZONE (4203), NORTH AMERICAN DATUM OF 1983 (2011 ADJ: EPOCH 2010.00)

3. THE VERTICAL DATUM FOR THIS PROJECT IS THE NAVD 1988 (CORS 2011), U.S. SURVEY FEET.

4. ALL COORDINATE VALUES ARE BASED UPON AN AVERAGE OF FOUR 180 EPOCH OBSERVATIONS UTILIZING THE TxDOT VRS NETWORK.

5. COORDINATES AND DISTANCES ARE U.S. SURVEY FEET. DISPLAYED IN SURFACE VALUES USING THE SURFACE ADJUSTMENT FACTOR 1.00012 (0.99988001440)

03/30/23
Eric A. Kreiner
RPLS No. 5320
Date

PRINT DATE	REVISION DATE
3/30/2023	

CONTROL POINT LEGEND

DENOTES PRIMARY CONTROL POINT AS NOTED
(3 1/2" ALUMINUM DISK IN CONCRETE)

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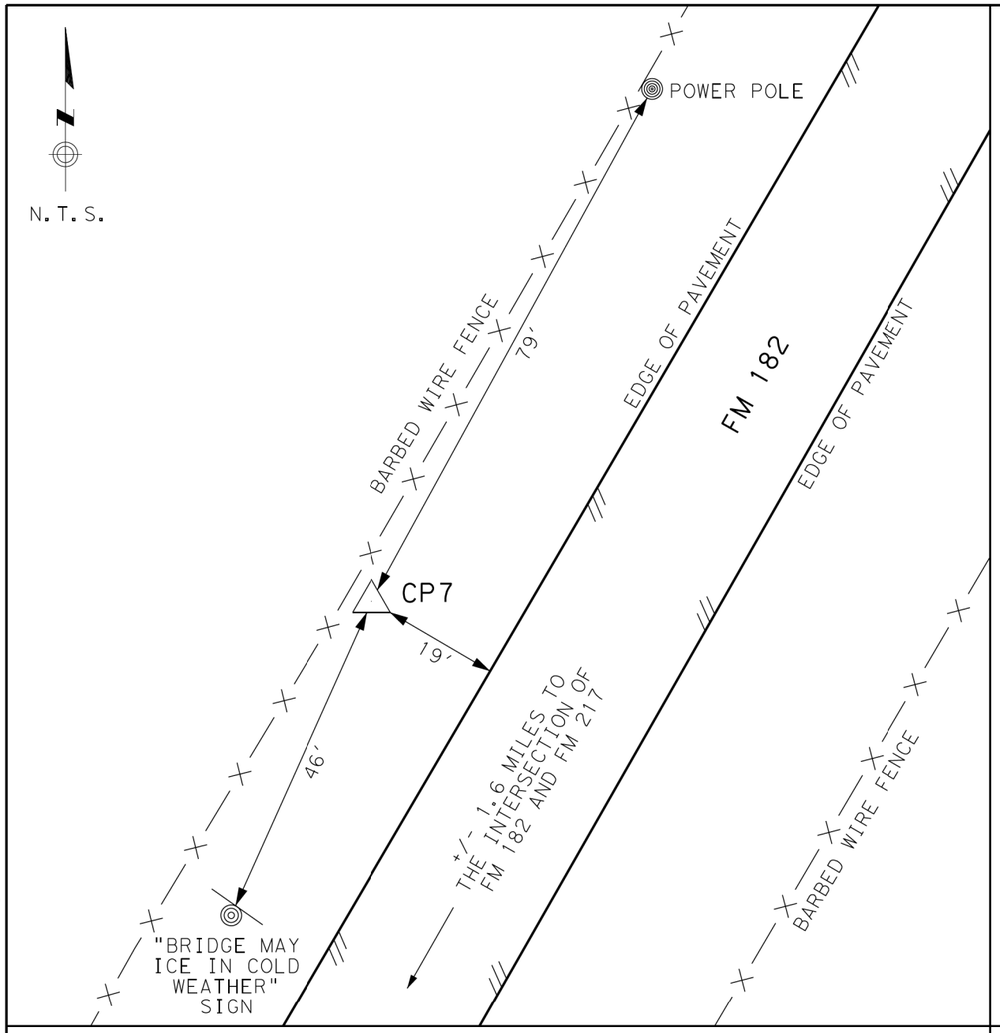
FM 182 AT HOG CREEK
SURVEY CONTROL INDEX SHEET
CORYELL COUNTY, TEXAS

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		FM 182

STATE	DISTRICT	COUNTY	
TEXAS	WACO	CORYELL	
CONTROL	SECTION	JOB	SHEET NO.
1219	02	017, ETC.	32

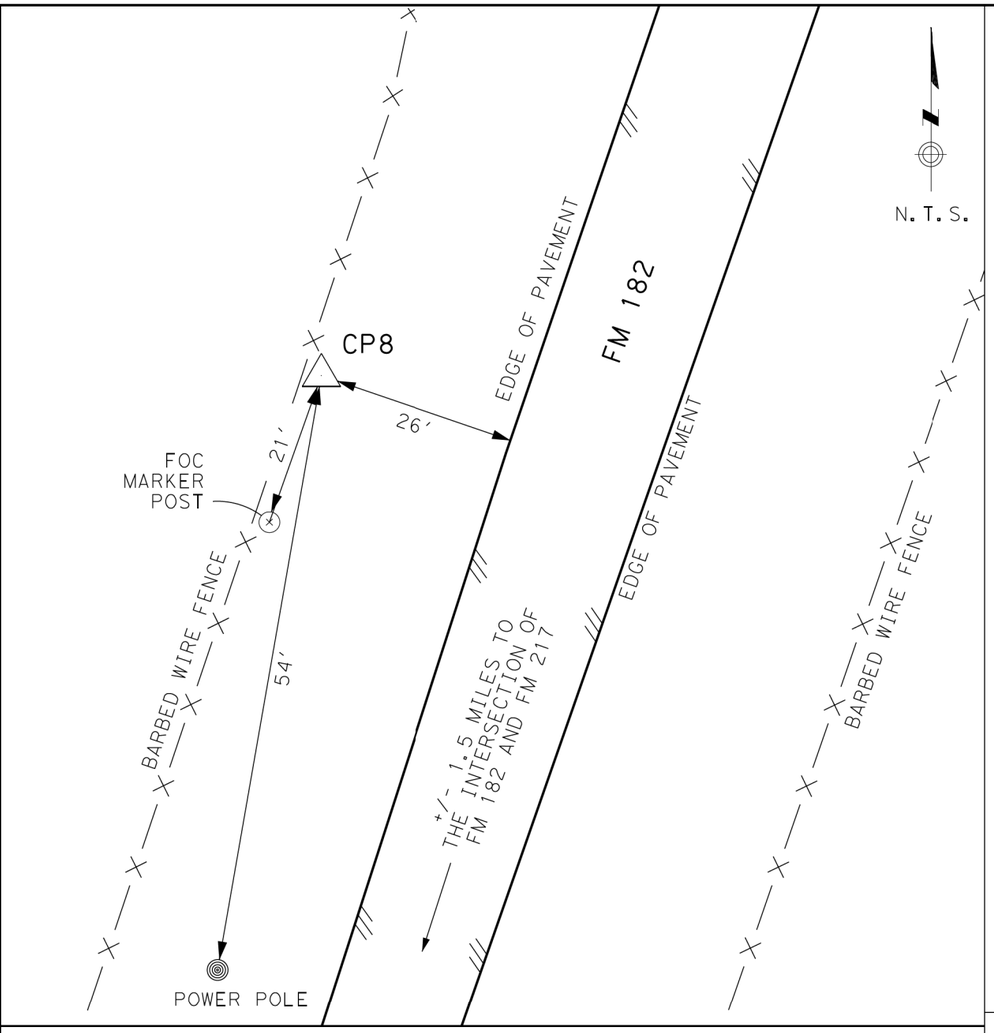
REV DATE: 3/30/2023
CSJ: 1219-02-018
FILE LOCATION: \\saminc\DAL\PROJECTS\1021066191\04Delivery\Final\2023-03-30_PKG 3 Signed Control Sheets\2020.00072.02.SVY.SCI.dgn



CONTROL POINT NO. 7:
APPROXIMATE LOCATION:

3 1/2" ALUMINUM DISK SET IN CONCRETE STAMPED "CP7", +/- 1.6 MILES NORTH OF THE INTERSECTION OF FM 182 AND FM 217, 19' WEST OF THE WEST EDGE OF PAVING OF FM 182, 46' NORTH OF A "BRIDGE MAY ICE IN COLD WEATHER" SIGN, AND 79' SOUTH OF A POWER POLE.

US SURVEY FEET
NAVD 88 ELEVATION= 1,008.80'
DATE SET: JANUARY 31, 2022
MONUMENT: 3 1/2" ALUMINUM DISK SET IN CONCRETE STAMPED "CP7"
CORYELL COUNTY SCALE FACTOR: 1.00012
SURFACE ENGLISH CO-ORDS
NORTHING: 10,575,786.060
EASTING: 3,112,845.984
STATE PLANE ENGLISH CO-ORDS
NORTHING: 10,574,517.118
EASTING: 3,112,472.487
ELEVATIONS ARE NAVD 88 BASED UPON TXDOT VRS RTK NETWORK



CONTROL POINT NO. 8:
APPROXIMATE LOCATION:

3 1/2" ALUMINUM DISK SET IN CONCRETE STAMPED "CP8", +/- 1.5 MILES NORTH OF THE INTERSECTION OF FM 182 AND FM 217, 21' NORTH OF A FOC MARKER POST, 26' WEST OF THE WEST EDGE OF PAVING OF FM 182, AND 54' NORTH OF A POWER POLE.

US SURVEY FEET
NAVD 88 ELEVATION= 992.30'
DATE SET: JANUARY 31, 2022
MONUMENT: 3 1/2" ALUMINUM DISK SET IN CONCRETE STAMPED "CP8"
CORYELL COUNTY SCALE FACTOR: 1.00012
SURFACE ENGLISH CO-ORDS
NORTHING: 10,575,356.142
EASTING: 3,112,642.770
STATE PLANE ENGLISH CO-ORDS
NORTHING: 10,574,087.252
EASTING: 3,112,270.298
ELEVATIONS ARE NAVD 88 BASED UPON TXDOT VRS RTK NETWORK

I HEREBY CERTIFY THAT THE HORIZONTAL AND VERTICAL DATA SHOWN HEREON WAS DETERMINED BY A FIELD SURVEY ON JANUARY 31, 2022 UTILIZING THE TxDOT VIRTUAL REFERENCE SYSTEM RTK NETWORK AND IS CORRECTLY SHOWN HEREON.

STATE OF TEXAS REGISTERED ERIC A. KREINER 5320 PROFESSIONAL LAND SURVEYOR

03/30/23

Eric A. Kreiner
Registered Professional Land Surveyor
No. 5320

TBPLS # 10064301

PRINT DATE	REVISION DATE
3/30/2023	

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TBPE FIRM NO. F-10069

Texas Department of Transportation

FM 182 AT HOG CREEK
PRIMARY HORIZONTAL AND VERTICAL CONTROL
CORYELL COUNTY, TEXAS

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		FM 182

STATE	DISTRICT	COUNTY	
TEXAS	WACO	CORYELL	
CONTROL	SECTION	JOB	SHEET NO.
1219	02	017, ETC.	33

REV DATE: 3/30/2023
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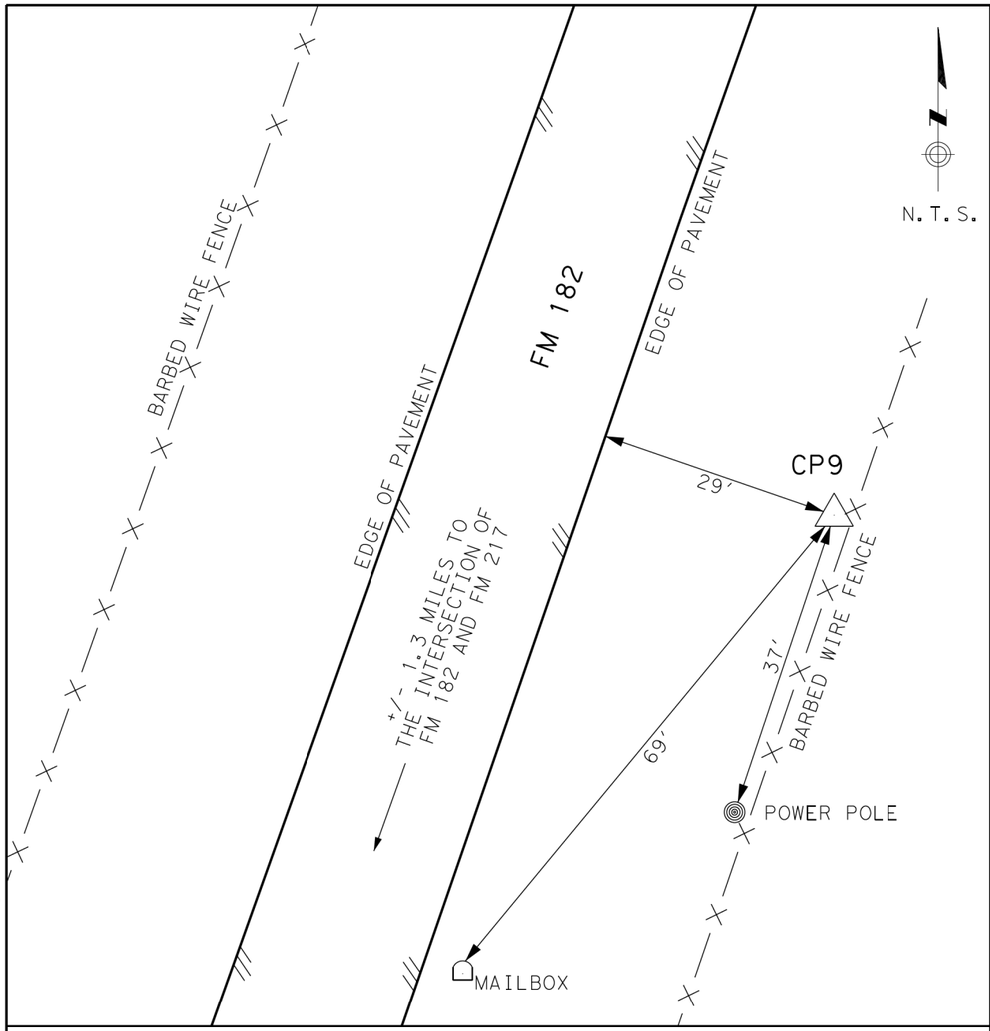

CONTROL POINT NO. 9:
APPROXIMATE LOCATION:

3 1/2" ALUMINUM DISK SET IN CONCRETE STAMPED "CP9", +/- 1.3 MILES NORTH OF THE INTERSECTION OF FM 182 AND FM 217, 29' EAST OF THE EAST EDGE OF PAVING OF FM 182, 37' NORTH OF A POWER POLE, AND 69' NORTH OF A MAILBOX.

US SURVEY FEET
NAVD 88 ELEVATION= 1,017.55
DATE SET: JANUARY 31, 2022
MONUMENT: 3 1/2" ALUMINUM DISK SET IN CONCRETE STAMPED "CP9"
CORYELL COUNTY SCALE FACTOR: 1.00012
SURFACE ENGLISH CO-ORDS
NORTHING: 10,574,758.511
EASTING: 3,112,515.786
STATE PLANE ENGLISH CO-ORDS
NORTHING: 10,573,489.692
EASTING: 3,112,142.329
ELEVATIONS ARE NAVD 88 BASED UPON TXDOT VRS RTK NETWORK

I HEREBY CERTIFY THAT THE HORIZONTAL AND VERTICAL DATA SHOWN HEREON WAS DETERMINED BY A FIELD SURVEY ON JANUARY 31, 2022 UTILIZING THE TxDOT VIRTUAL REFERENCE SYSTEM RTK NETWORK AND IS CORRECTLY SHOWN HEREON.

STATE OF TEXAS
REGISTERED
ERIC A. KREINER
5320
PROFESSIONAL
LAND SURVEYOR

03/30/23

Eric A. Kreiner
Registered Professional Land Surveyor
No. 5320

TBPLS # 10064301

PRINT DATE	REVISION DATE
3/30/2023	

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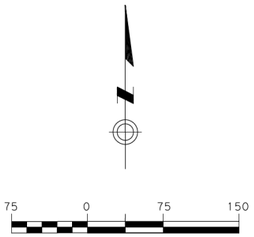
FM 182 AT HOG CREEK
PRIMARY HORIZONTAL AND VERTICAL CONTROL
CORYELL COUNTY, TEXAS

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		FM 182

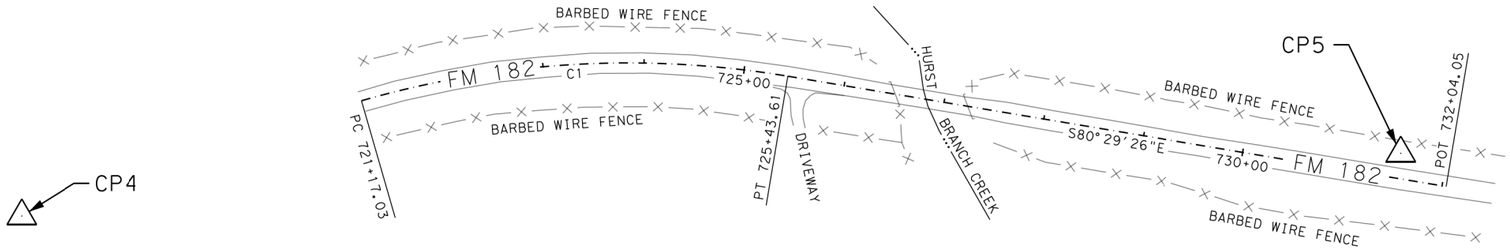
STATE	DISTRICT	COUNTY	
TEXAS	WACO	CORYELL	
CONTROL	SECTION	JOB	SHEET NO.
1219	02	017, ETC.	34

REV DATE: 3/30/2023
CSJ: 1219-02-018
FILE LOCATION: \\saminc\DAL\PROJECTS\1021066191\04Delivery\Final\2023-03-30_PKG 3 Signed Control Sheets\2020.00072.02.SVY.SCD.dgn

CONTROL POINTS (SURFACE COORDINATES)							
POINT	NORTH	EAST	ELEVATION	STATION	OFFSET	LT/RT	DESCRIPTION
CP4	10,580,480.191	3,117,759.021	1,003.09'	OFF CHAIN	N/A	N/A	3 1/2" ALUMINUM DISK SET IN CONCRETE
CP5	10,580,542.237	3,119,125.132	994.32'	731+54.37	25.0'	LT	3 1/2" ALUMINUM DISK SET IN CONCRETE
CP6	10,580,512.048	3,119,492.327	997.42'	OFF CHAIN	N/A	N/A	3 1/2" ALUMINUM DISK SET IN CONCRETE



GRAPHIC SCALE
1" = 150' (11"x17")
CORYELL COUNTY, TEXAS



C1

PI STATION	= 723+33.94
DELTA	= 25° 35' 40.40" (RT)
DEGREE OF CURVE	= 6° 00' 00.00"
TANGENT	= 216.91
LENGTH	= 426.58
RADIUS	= 954.93
PC STATION	= 721+17.03
PT STATION	= 725+43.61

NOTES:

1. THE SURVEY CONTROL INFORMATION HAS BEEN ACCEPTED AND INCORPORATED INTO THIS PS&E" WHICH IS SIGNED, SEALED AND DATED BY A TEXAS PROFESSIONAL ENGINEER.

2. ALL COORDINATES SHOWN HEREON ARE BASED ON THE TEXAS COORDINATE SYSTEM, CENTRAL ZONE (4203), NORTH AMERICAN DATUM OF 1983 (2011 ADJ: EPOCH 2010.00)

3. THE VERTICAL DATUM FOR THIS PROJECT IS THE NAVD 1988 (CORS 2011), U.S. SURVEY FEET.

4. ALL COORDINATE VALUES ARE BASED UPON AN AVERAGE OF FOUR 180 EPOCH OBSERVATIONS UTILIZING THE TxDOT VRS NETWORK.

5. COORDINATES AND DISTANCES ARE U.S. SURVEY FEET. DISPLAYED IN SURFACE VALUES USING THE SURFACE ADJUSTMENT FACTOR 1.00012 (0.99988001440)

03/30/23
Eric A. Kreiner Date
RPLS No. 5320

PRINT DATE	REVISION DATE
3/30/2023	

CONTROL POINT LEGEND

DENOTES PRIMARY CONTROL POINT AS NOTED (3 1/2" ALUMINUM DISK IN CONCRETE)

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AMERICAN STRUCTUREPOINT INC.
TBPE FIRM NO. F-10069

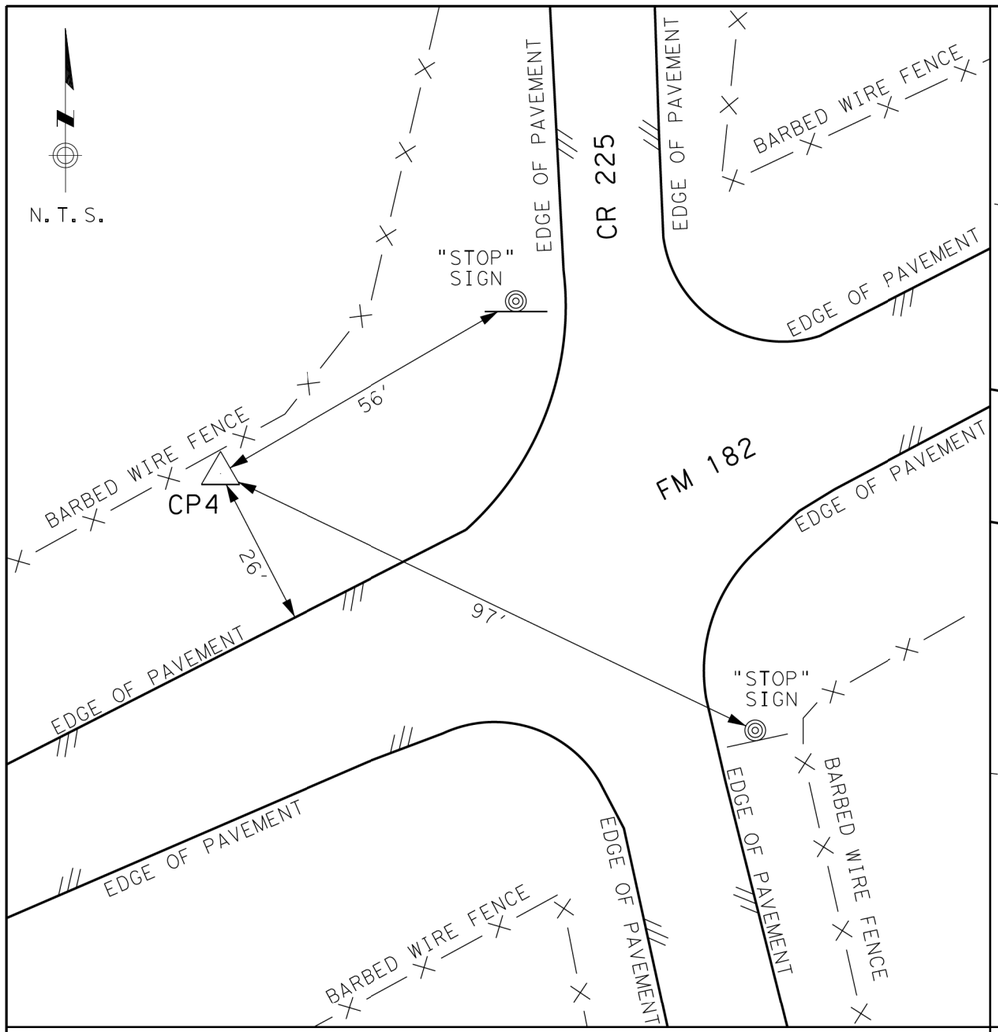
Texas Department of Transportation

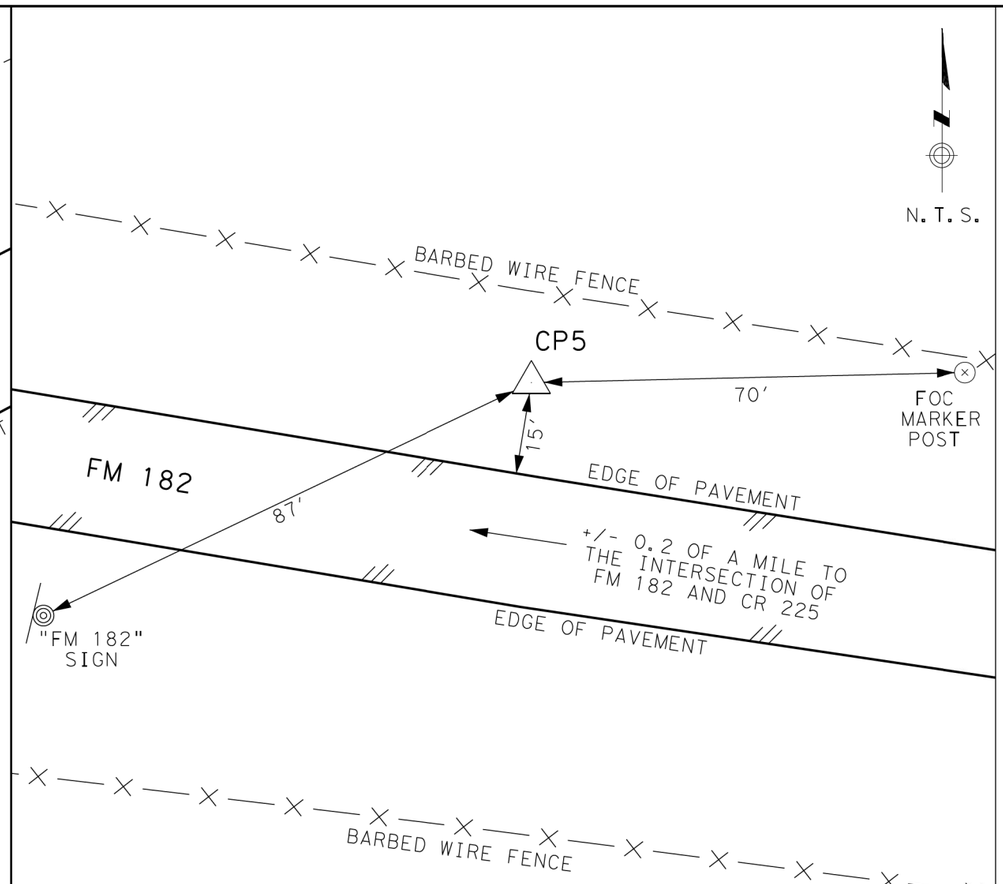
FM 182 AT HURST BRANCH CREEK
SURVEY CONTROL INDEX SHEET
CORYELL COUNTY, TEXAS

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		FM 182

STATE	DISTRICT	COUNTY	
TEXAS	WACO	CORYELL	
CONTROL	SECTION	JOB	SHEET NO.
1219	02	017,ETC	35

REV DATE: 3/30/2023
CSJ: 1219-02-020
FILE LOCATION: \\saminc\DAL\PROJECTS\10210661911\04Delivery\Final\2023-03-30_PKG 3 Signed Control Sheets\2020.00072.03.SVY.SCI.dgn





CONTROL POINT NO. 4:
APPROXIMATE LOCATION:

3 1/2" ALUMINUM DISK SET IN CONCRETE STAMPED "CP4", NEAR THE NORTHWEST CORNER OF THE INTERSECTION OF FM 182 AND CR 225, 26′ NORTH OF THE NORTH EDGE OF PAVING OF FM 182, 56′ WEST OF A "STOP" SIGN, AND 97′ NORTHWEST OF ANOTHER "STOP" SIGN.

US SURVEY FEET
NAVD 88 ELEVATION= 1,003.09′
DATE SET: JANUARY 25, 2022
MONUMENT: 3 1/2" ALUMINUM DISK SET IN CONCRETE STAMPED "CP4"
CORYELL COUNTY SCALE FACTOR: 1.00012
SURFACE ENGLISH CO-ORDS
NORTHING: 10,580,480.191
EASTING: 3,117,759.021
STATE PLANE ENGLISH CO-ORDS
NORTHING: 10,579,210.686
EASTING: 3,117,384.934
ELEVATIONS ARE NAVD 88 BASED UPON TXDOT VRS RTK NETWORK

CONTROL POINT NO. 5:
APPROXIMATE LOCATION:

3 1/2" ALUMINUM DISK SET IN CONCRETE STAMPED "CP5", +/- 0.2 OF A MILE EAST OF THE INTERSECTION OF FM 182 AND CR 225, 15′ NORTH OF THE NORTH EDGE OF PAVING OF FM 182, 70′ WEST OF A FOC MARKER POST, AND 87′ NORTHEAST OF A "FM 182" SIGN.

US SURVEY FEET
NAVD 88 ELEVATION= 994.32′
DATE SET: JANUARY 25, 2022
MONUMENT: 3 1/2" ALUMINUM DISK SET IN CONCRETE STAMPED "CP5"
CORYELL COUNTY SCALE FACTOR: 1.00012
SURFACE ENGLISH CO-ORDS
NORTHING: 10,580,542.237
EASTING: 3,119,125.132
STATE PLANE ENGLISH CO-ORDS
NORTHING: 10,579,272.725
EASTING: 3,118,750.882
ELEVATIONS ARE NAVD 88 BASED UPON TXDOT VRS RTK NETWORK

I HEREBY CERTIFY THAT THE HORIZONTAL AND VERTICAL DATA SHOWN HEREON WAS DETERMINED BY A FIELD SURVEY ON JANUARY 25, 2022 UTILIZING THE TxDOT VIRTUAL REFERENCE SYSTEM RTK NETWORK AND IS CORRECTLY SHOWN HEREON.

STATE OF TEXAS
REGISTERED
ERIC A. KREINER
5320
PROFESSIONAL
LAND SURVEYOR

03/30/23

Eric A. Kreiner
Registered Professional Land Surveyor
No. 5320

TBPLS # 10064301

PRINT DATE	REVISION DATE
3/30/2023	

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TBPE FIRM NO. F-10069

FM 182 AT HURST BRANCH CREEK
PRIMARY HORIZONTAL
AND VERTICAL CONTROL
CORYELL COUNTY, TEXAS

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		FM 182

STATE	DISTRICT	COUNTY	
TEXAS	WACO	CORYELL	
CONTROL	SECTION	JOB	SHEET NO.
1219	02	017,ETC	36

REV DATE: 3/30/2023
CSJ: 1219-02-020
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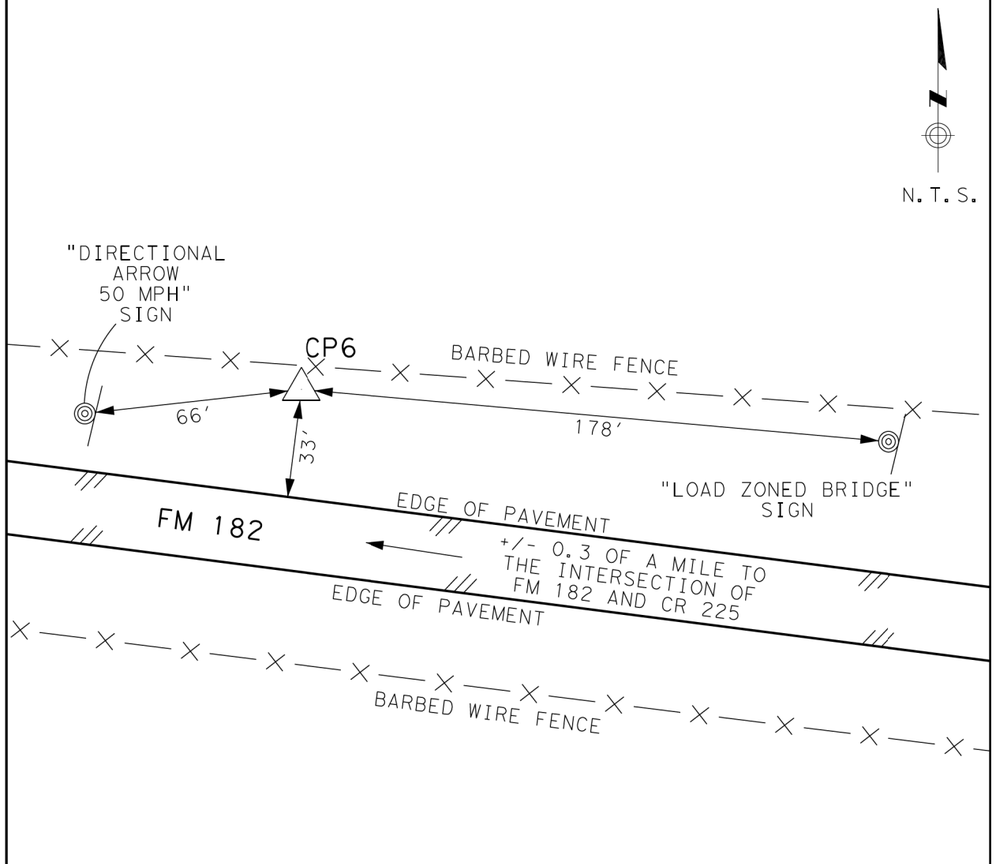

CONTROL POINT NO. 6:
APPROXIMATE LOCATION:

3 1/2" ALUMINUM DISK SET IN CONCRETE STAMPED "CP6", +/- 0.3 OF A MILE EAST OF THE INTERSECTION OF FM 182 AND CR 225, 33' NORTH OF THE NORTH EDGE OF PAVING OF FM 182, 66' EAST OF A "DIRECTIONAL ARROW 50 MPH" SIGN, AND 178' WEST OF A "LOAD ZONED BRIDGE" SIGN.

US SURVEY FEET
NAVD 88 ELEVATION= 997.42'
DATE SET: JANUARY 25, 2022
MONUMENT: 3 1/2" ALUMINUM DISK SET IN CONCRETE STAMPED "CP6"
CORYELL COUNTY SCALE FACTOR: 1.00012
SURFACE ENGLISH CO-ORDS
NORTHING: 10,580,512.048
EASTING: 3,119,492.327
STATE PLANE ENGLISH CO-ORDS
NORTHING: 10,579,242.539
EASTING: 3,119,118.033
ELEVATIONS ARE NAVD 88 BASED UPON TXDOT VRS RTK NETWORK

I HEREBY CERTIFY THAT THE HORIZONTAL AND VERTICAL DATA SHOWN HEREON WAS DETERMINED BY A FIELD SURVEY ON JANUARY 25, 2022 UTILIZING THE TxDOT VIRTUAL REFERENCE SYSTEM RTK NETWORK AND IS CORRECTLY SHOWN HEREON.

STATE OF TEXAS
REGISTERED
ERIC A. KREINER
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PROFESSIONAL
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03/30/23

Eric A. Kreiner
Registered Professional Land Surveyor
No. 5320

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FM 182 AT HURST BRANCH CREEK
PRIMARY HORIZONTAL AND VERTICAL CONTROL
CORYELL COUNTY, TEXAS

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		FM 182

STATE	DISTRICT	COUNTY	
TEXAS	WACO	CORYELL	
CONTROL	SECTION	JOB	SHEET NO.
1219	02	017,ETC	37

REV DATE: 3/30/2023
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℄ FM182_01

```
Beginning chain FM182_01 description
Feature: Geom_Centerline
================================================================================

                                    Curve Data
                                   *----------*
Curve FM182_01_1
P.I.  Station            603+17.02  X      3,110,704.5377  Y     10,571,885.9726
Delta          =      32° 30′ 00.08" (RT)
Degree         =      10° 00′ 00.00"
Tangent        =            167.0021
Length         =            325.0002
Radius         =            572.9578
External       =             23.8423
Long Chord     =            320.6607
Mid. Ord.      =             22.8898
P.C.  Station            601+50.02  X      3,110,687.6022  Y     10,571,719.8315
P.T.  Station            604+75.02  X      3,110,808.0885  Y     10,572,016.9952
C.C.                                X      3,111,257.6063  Y     10,571,661.7285
Back         = N   5° 49′ 13.10" E
Ahead        = N  38° 19′ 13.18" E
Chord Bear   = N  22° 04′ 13.14" E

Course from PT FM182_01_1 to 5 N 38° 19′ 13.18" E Dist 824.9800

Point 5               X   3,111,319.6235 Y  10,572,664.2386 Sta      613+00.00

================================================================================
Ending chain FM182_01 description
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℄ DRWY_1

```
Beginning chain DRWY_1 description
Feature: Road_Centerline
================================================================================

Point 8               X   3,111,122.4451 Y  10,572,414.7494 Sta       10+00.00

Course from 8 to PC DRWY_1_1 N 51° 40′ 46.83" W Dist 13.1227

                                    Curve Data
                                   *----------*
Curve DRWY_1_1
P.I.  Station            10+14.61  X      3,111,110.9853  Y     10,572,423.8065
Delta          =       1° 42′ 01.80" (RT)
Degree         =      57° 17′ 44.81"
Tangent        =             1.4841
Length         =             2.9679
Radius         =           100.0000
External       =             0.0110
Long Chord     =             2.9678
Mid. Ord.      =             0.0110
P.C.  Station            10+13.12  X      3,111,112.1496  Y     10,572,422.8863
P.T.  Station            10+16.09  X      3,111,109.8488  Y     10,572,424.7608
C.C.                                X      3,111,174.1554  Y     10,572,501.3419
Back         = N  51° 40′ 46.82" W
Ahead        = N  49° 58′ 45.02" W
Chord Bear   = N  50° 49′ 45.92" W

Course from PT DRWY_1_1 to 9 N 49° 58′ 45.02" W Dist 18.0823

Point 9               X   3,111,096.0012 Y  10,572,436.3889 Sta       10+34.17

================================================================================
Ending chain DRWY_1 description
```

PRINT DATE	REVISION DATE
4/5/2023	

STATE OF TEXAS
JOSE M. SANDOVAL
90593
LICENSED PROFESSIONAL ENGINEER

4/5/2023

JOSE M. SANDOVAL, P.E.

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AMERICAN STRUCTUREPOINT INC.

TBPE FIRM NO. F-10069

Texas Department of Transportation

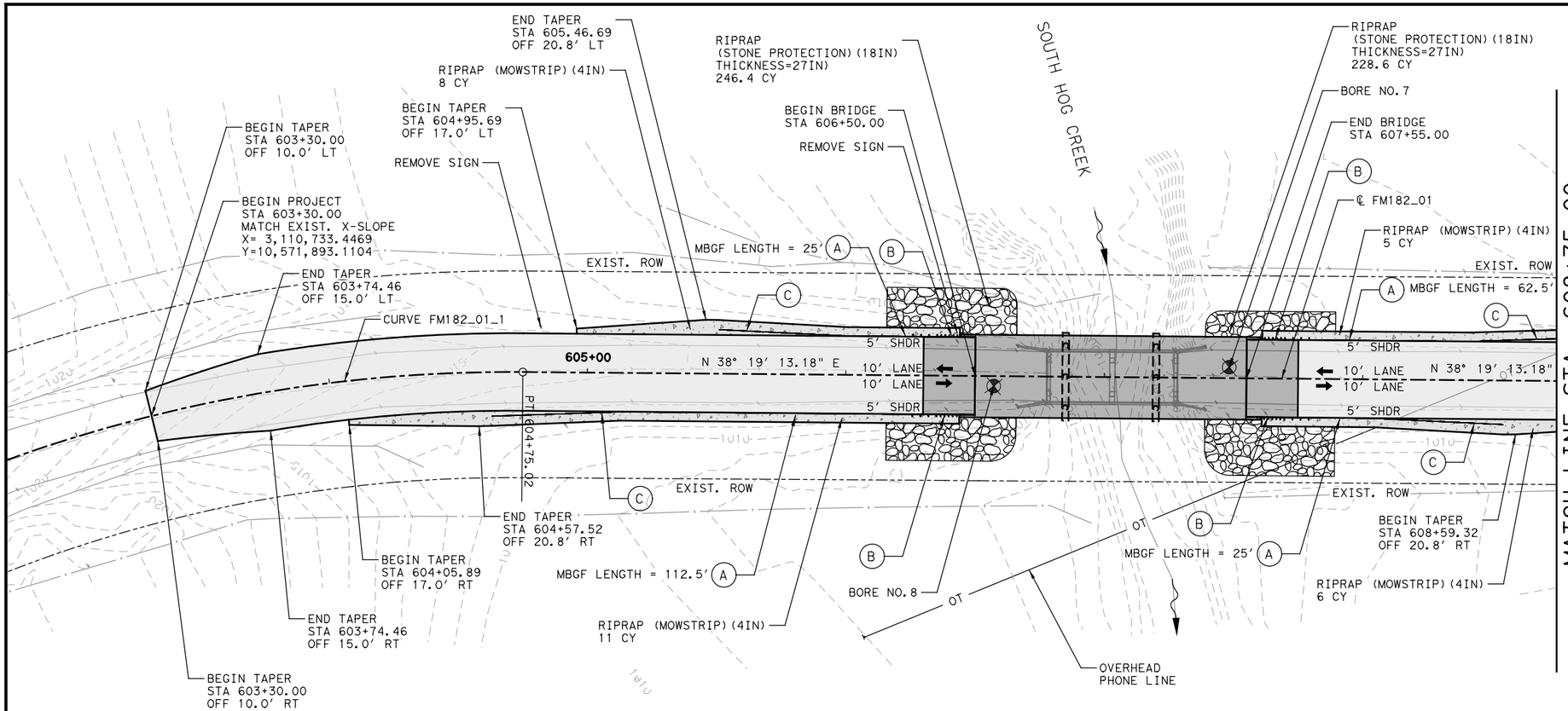
FM 182 AT SOUTH HOG CREEK

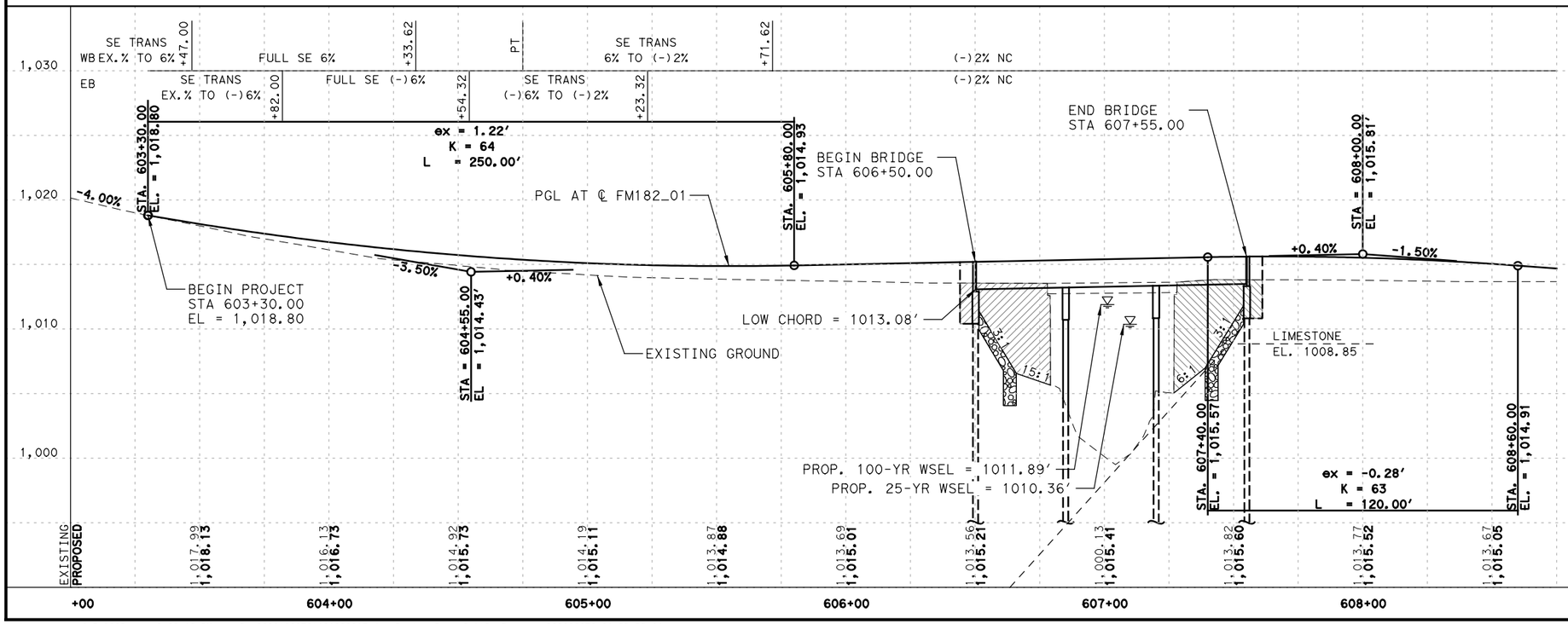
HORIZONTAL ALIGNMENT DATA

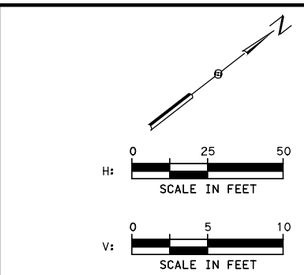
FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		FM 182

STATE	DISTRICT	COUNTY	
TEXAS	WACO	CORYELL	
CONTROL	SECTION	JOB	SHEET NO.
1219	02	017, ETC.	38

REV DATE: 4/5/2023
CSJs: 1219-02-017, ETC.
FILE LOCATION: P:\2020\00072\121902017\4 - Design\Plan Set\3. Roadway\202000072.01.RD.HD.dgn







LEGEND

- PROPOSED ROAD
- PROPOSED BRIDGE
- CHANNEL EXCAVATION
- RIPRAP (MOWSTRIP) (4IN)
- RIPRAP (STONE PROTECTION) (30 IN)
- # PROPOSED DRIVEWAY
- (A) MTL W-BEAM GD FEN (STL POST)
- (B) MTL BEAM GF TRANS (THRIE-BEAM)
- (C) GUARDRAIL END TREATMENT (INSTALL)

1. SEE HORIZONTAL ALIGNMENT DATA SHEET FOR ADDITIONAL INFORMATION
2. SEE BRIDGE LAYOUT SHEET FOR ADDITIONAL INFORMATION.
3. CONTRACTOR TO FIELD VERIFY LOCATION AND DEPTH OF ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION.
4. REMOVAL OF SIGNS WILL BE SUBSIDIARY TO ITEM 100-6002 PREPARING ROW.

PRINT DATE	REVISION DATE
4/5/2023	

STATE OF TEXAS
JOSE M. SANDOVAL
90593
LICENSED
PROFESSIONAL ENGINEER

4/5/2023

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TBPE FIRM NO. F-10069

Texas Department of Transportation

FM 182 AT SOUTH HOG CREEK

PLAN AND PROFILE

SHEET 1 OF 2

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		FM 182
STATE	DISTRICT	COUNTY
TEXAS	WACO	CORYELL
CONTROL	SECTION	JOB / SHEET NO.
1219	02	017, ETC. / 39

REV DATE: 4/5/2023
CSJ: 1219-02-017, ETC.
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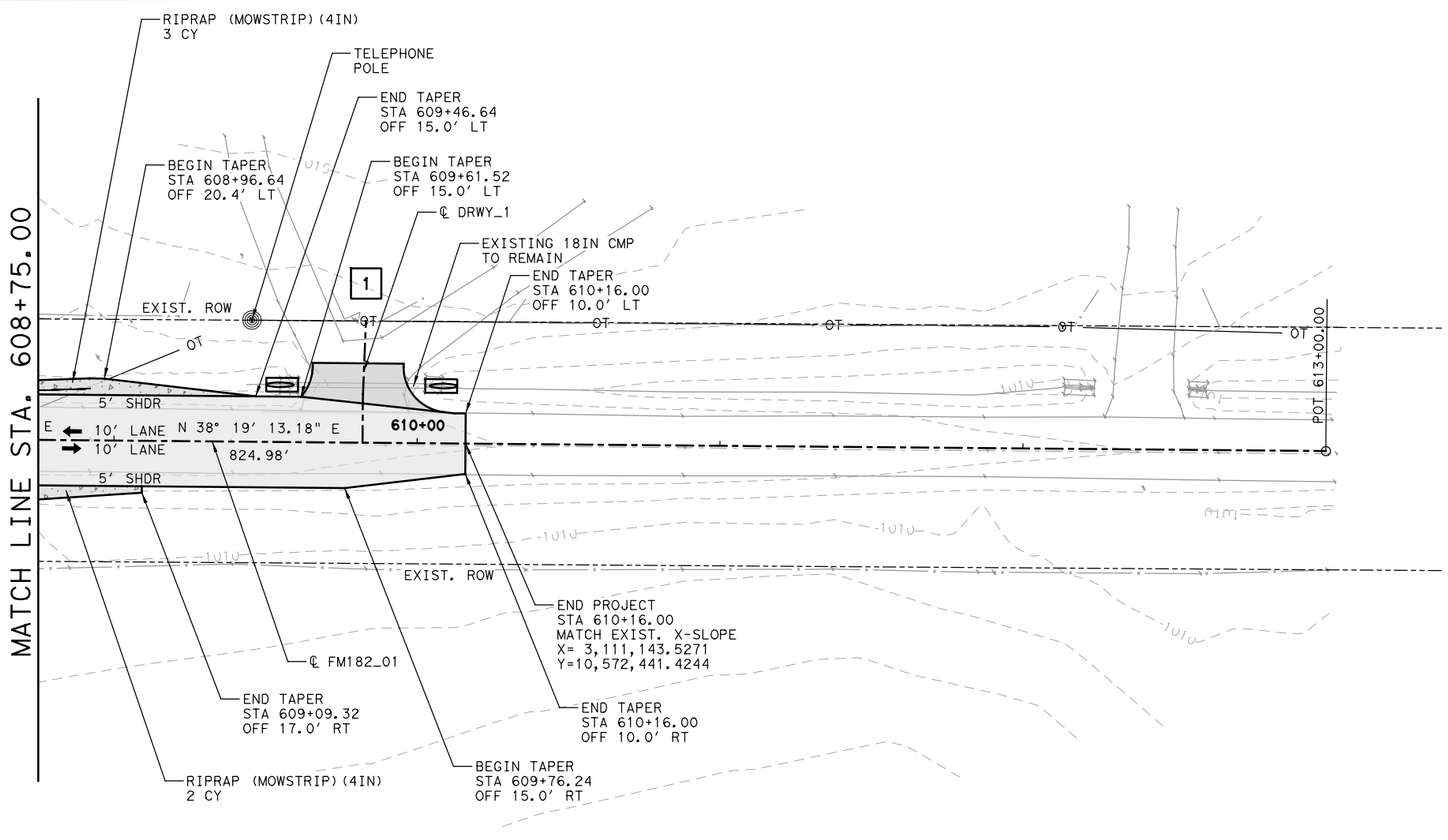

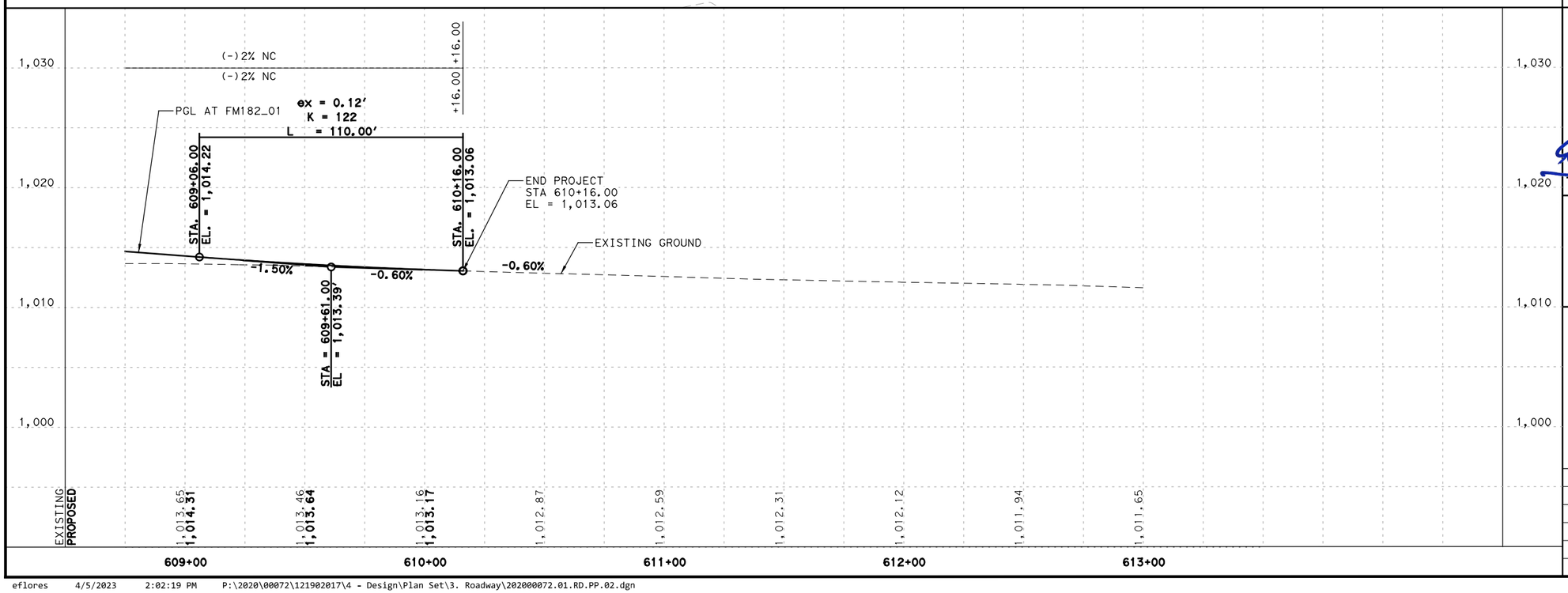

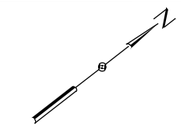

LEGEND

- PROPOSED ROAD
- PROPOSED BRIDGE
- CHANNEL EXCAVATION
- RIPRAP (MOWSTRIP)(4IN)
- RIPRAP (STONE PROTECTION)(30 IN)
- # PROPOSED DRIVEWAY
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- (B) MTL BEAM GF TRANS (THRIE-BEAM)
- (C) GUARDRAIL END TREATMENT (INSTALL)

1. SEE HORIZONTAL ALIGNMENT DATA SHEET FOR ADDITIONAL INFORMATION
2. SEE BRIDGE LAYOUT SHEET FOR ADDITIONAL INFORMATION.
3. CONTRACTOR TO FIELD VERIFY LOCATION AND DEPTH OF ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION.
4. REMOVAL OF SIGNS WILL BE SUBSIDIARY TO ITEM 100-6002 PREPARING ROW.

PRINT DATE	REVISION DATE
4/5/2023	

STATE OF TEXAS
JOSE M. SANDOVAL
90593
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JOSE M. SANDOVAL, P.E. 4/5/2023

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AMERICAN STRUCTUREPOINT INC.

TBPE FIRM NO. F-10069

Texas Department of Transportation

FM 182 AT SOUTH HOG CREEK

PLAN AND PROFILE

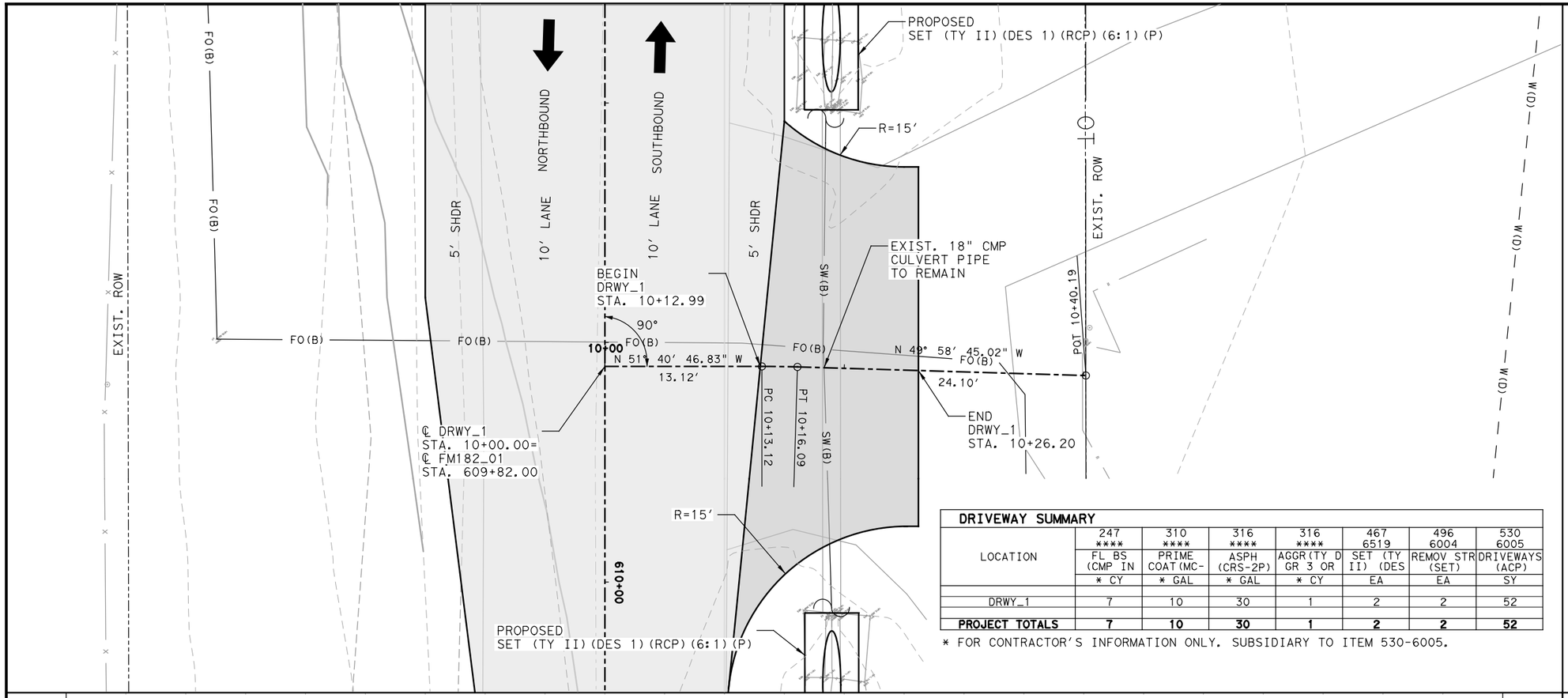
SHEET 2 OF 2

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		FM 182

STATE	DISTRICT	COUNTY
TEXAS	WACO	CORYELL

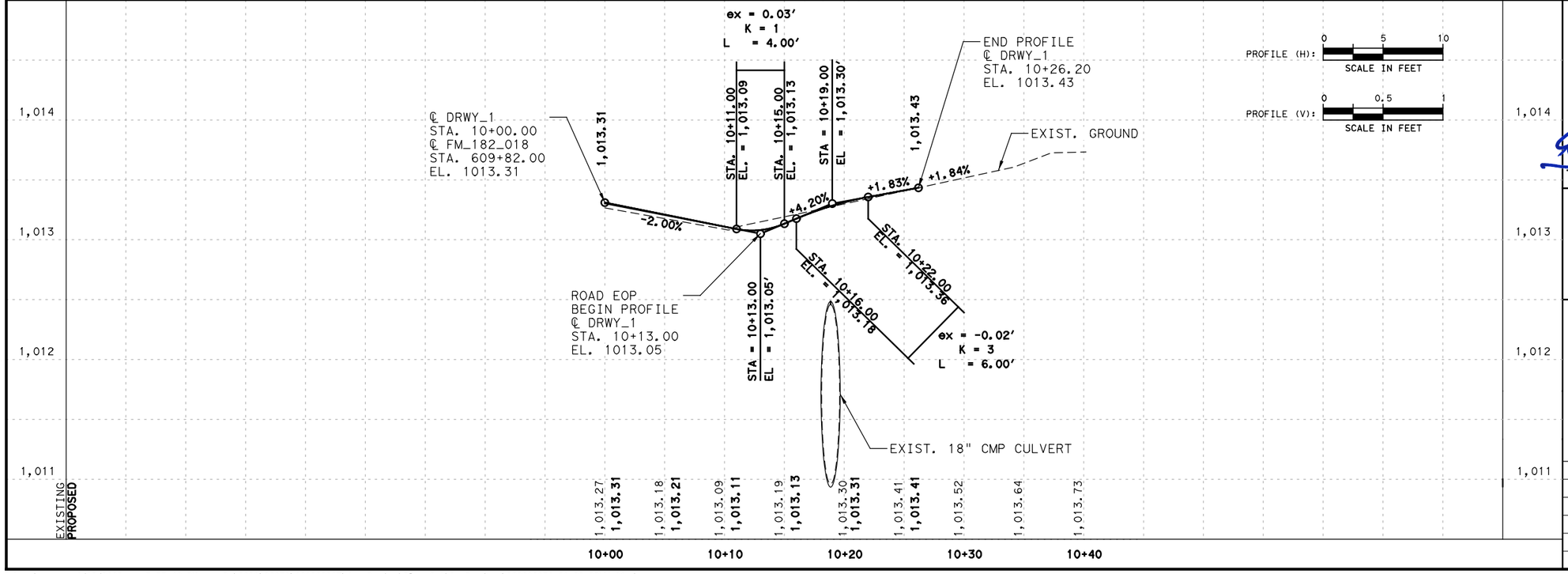
CONTROL	SECTION	JOB	SHEET NO.
1219	02	017, ETC.	40

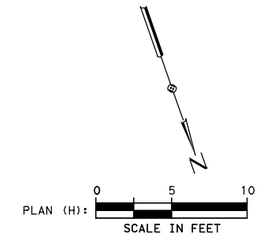
REV DATE: 4/5/2023
CSJ: 1219-02-017, ETC.
FILE LOCATION: P:\2020\00072\121902017\4 - Design\Plan Set\3. Roadway\202000072.01.RD.PP.02.dgn



DRIVEWAY SUMMARY							
LOCATION	247 **** FL BS (CMP IN	310 **** PRIME COAT(MC-	316 **** ASPH (CRS-2P)	316 **** AGGR(TY D GR 3 OR	467 6519 SET (TY II) (DES	496 6004 REMOV STR (SET)	530 6005 DRIVEWAYS (ACP)
	* CY	* GAL	* GAL	* CY	EA	EA	SY
DRWY_1	7	10	30	1	2	2	52
PROJECT TOTALS	**7**	**10**	**30**	**1**	**2**	**2**	**52**

* FOR CONTRACTOR'S INFORMATION ONLY. SUBSIDIARY TO ITEM 530-6005.





LEGEND

PROPOSED ROAD

DIRECTION OF TRAFFIC

NOTES

1. SEE HORIZONTAL ALIGNMENT DATA SHEET FOR ADDITIONAL INFORMATION
3. CONTRACTOR TO FIELD VERIFY LOCATION AND DEPTH OF ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION.

PRINT DATE	REVISION DATE
4/19/2023	

STATE OF TEXAS
JOSE M. SANDOVAL
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JOSE M. SANDOVAL, P.E. 4/19/2023

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AMERICAN STRUCTUREPOINT INC.

TBPE FIRM NO. F-10069

Texas Department of Transportation

FM 182 AT SOUTH HOG CREEK

DRIVEWAY 1
PLAN AND PROFILE

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		FM 182

STATE	DISTRICT	COUNTY	
TEXAS	WACO	CORYELL	
CONTROL	SECTION	JOB	SHEET NO.
1219	02	017, ETC.	41

REV DATE: 4/19/2023
CSJs: 1219-02-017, ETC.
FILE LOCATION: P:\2020\00072\121902017\4 - Design\Plan Set\3. Roadway\202000072.01.RD.DRWY.01.dgn

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℄ FM_182_018

Beginning chain FM_182_018 description
Feature: Geom_Centerline

Point 4 X 3,112,440.6723 Y 10,574,661.3299 Sta 636+00.00

Course from 4 to PC FM_182_018_1 N 19° 10′ 37.40" E Dist 849.9000

Curve Data

Curve FM_182_018_1						
P.I. Station	645+52.88	X	3,112,753.6821	Y	10,575,561.3319	
Delta =	10° 16′ 13.20" (RT)					
Degree =	5° 00′ 00.00"					
Tangent =	102.9792					
Length =	205.4067					
Radius =	1,145.9156					
External =	4.6179					
Long Chord =	205.1318					
Mid. Ord. =	4.5993					
P.C. Station	644+49.90	X	3,112,719.8546	Y	10,575,464.0672	
P.T. Station	646+55.31	X	3,112,804.3092	Y	10,575,651.0070	
C.C.		X	3,113,802.1811	Y	10,575,087.6472	
Back = N	19° 10′ 37.40" E					
Ahead = N	29° 26′ 50.60" E					
Chord Bear = N	24° 18′ 44.00" E					

Course from PT FM_182_018_1 to 5 N 29° 26′ 50.60" E Dist 333.0847

Point 5 X 3,112,968.0617 Y 10,575,941.0597 Sta 649+88.39

Ending chain FM_182_018 description

℄ DRWY_1

Beginning chain DRWY_1 description
Feature: Geom_Centerline

Point 6 N 10,575,004.9775 E 3,112,560.1888 Sta 10+00.00

Course from 6 to PC DRWY_1_1 N 70° 49′ 22.62" W Dist 7.5511

Curve Data

Curve DRWY_1_1						
P.I. Station	10+15.00	N	10,575,009.9048	E	3,112,546.0212	
Delta =	8° 31′ 12.21" (LT)					
Degree =	57° 17′ 44.81"					
Tangent =	7.4489					
Length =	14.8703					
Radius =	100.0000					
External =	0.2770					
Long Chord =	14.8566					
Mid. Ord. =	0.2763					
P.C. Station	10+07.55	N	10,575,007.4580	E	3,112,553.0567	
P.T. Station	10+22.42	N	10,575,011.2823	E	3,112,538.7008	
C.C.		N	10,574,913.0072	E	3,112,520.2079	
Back = N	70° 49′ 22.60" W					
Ahead = N	79° 20′ 34.82" W					
Chord Bear = N	75° 04′ 58.71" W					

Course from PT DRWY_1_1 to 7 N 79° 20′ 34.81" W Dist 17.2695

Point 7 N 10,575,014.4760 E 3,112,521.7291 Sta 10+39.69

Ending chain DRWY_1 description

PRINT DATE	REVISION DATE
4/5/2023	

STATE OF TEXAS
JOSE M. SANDOVAL
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JOSE M. SANDOVAL, P.E. 4/5/2023

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AMERICAN STRUCTUREPOINT INC.

TBPE FIRM NO. F-10069

FM 182 AT HOG CREEK

HORIZONTAL ALIGNMENT DATA

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		FM 182

STATE	DISTRICT	COUNTY	
TEXAS	WACO	CORYELL	
CONTROL	SECTION	JOB	SHEET NO.
1219	02	017,ETC	42

REV DATE: 4/5/2023
CSJ: 1219-02-018
FILE LOCATION: P:\2020\00072\121902018\4 - Design\Plan Set\3. Roadway\2020.00072.02.RD.HAD.01.dgn

℄ DRWY_2

Beginning chain DRWY_2 description
Feature: Geom_Centerline

Point 14 N 10,575,480.3085 E 3,112,725.6405 Sta 10+00.00

Course from 14 to PC DRWY_2_3 N 69° 57′ 39.17" W Dist 9.0651

Curve Data

Curve DRWY_2_3						
P.I. Station		10+14.99	N	10,575,485.4459	E	3,112,711.5557
Delta	=	22° 21′ 10.33" (RT)				
Degree	=	190° 59′ 09.35"				
Tangent	=	5.9273				
Length	=	11.7039				
Radius	=	30.0000				
External	=	0.5800				
Long Chord	=	11.6299				
Mid. Ord.	=	0.5690				
P.C. Station		10+09.07	N	10,575,483.4148	E	3,112,717.1242
P.T. Station		10+20.77	N	10,575,489.4421	E	3,112,707.1781
C.C.			N	10,575,511.5986	E	3,112,727.4040
Back	= N	69° 57′ 39.17" W				
Ahead	= N	47° 36′ 28.84" W				
Chord Bear	= N	58° 47′ 04.00" W				

Course from PT DRWY_2_3 to PC DRWY_2_6 N 47° 36′ 28.84" W Dist 23.5183

Curve Data

Curve DRWY_2_6						
P.I. Station		10+49.27	N	10,575,508.6563	E	3,112,686.1299
Delta	=	18° 51′ 14.55" (LT)				
Degree	=	190° 59′ 09.35"				
Tangent	=	4.9810				
Length	=	9.8720				
Radius	=	30.0000				
External	=	0.4107				
Long Chord	=	9.8275				
Mid. Ord.	=	0.4051				
P.C. Station		10+44.29	N	10,575,505.2981	E	3,112,689.8086
P.T. Station		10+54.16	N	10,575,510.6455	E	3,112,681.5633
C.C.			N	10,575,483.1416	E	3,112,669.5826
Back	= N	47° 36′ 28.84" W				
Ahead	= N	66° 27′ 43.39" W				
Chord Bear	= N	57° 02′ 06.11" W				

Course from PT DRWY_2_6 to 15 N 66° 27′ 43.42" W Dist 4.0088

Point 15 N 10,575,512.2464 E 3,112,677.8881 Sta 10+58.17

Ending chain DRWY_2 description

℄ DRWY_3

Beginning chain DRWY_3 description
Feature: Geom_Centerline

Point 12 N 10,575,499.3290 E 3,112,732.7697 Sta 10+00.00

Course from 12 to PC DRWY_3_1 S 68° 56′ 42.85" E Dist 13.3612

Curve Data

Curve DRWY_3_1						
P.I. Station		10+15.00	N	10,575,493.9401	E	3,112,746.7683
Delta	=	1° 52′ 39.76" (LT)				
Degree	=	57° 17′ 44.81"				
Tangent	=	1.6388				
Length	=	3.2772				
Radius	=	100.0000				
External	=	0.0134				
Long Chord	=	3.2771				
Mid. Ord.	=	0.0134				
P.C. Station		10+13.36	N	10,575,494.5288	E	3,112,745.2389
P.T. Station		10+16.64	N	10,575,493.4018	E	3,112,748.3161
C.C.			N	10,575,587.8526	E	3,112,781.1649
Back	= S	68° 56′ 42.85" E				
Ahead	= S	70° 49′ 22.60" E				
Chord Bear	= S	69° 53′ 02.73" E				

Course from PT DRWY_3_1 to 13 S 70° 49′ 22.60" E Dist 31.8794

Point 13 N 10,575,482.9298 E 3,112,778.4264 Sta 10+48.52

Ending chain DRWY_3 description

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4/5/2023	

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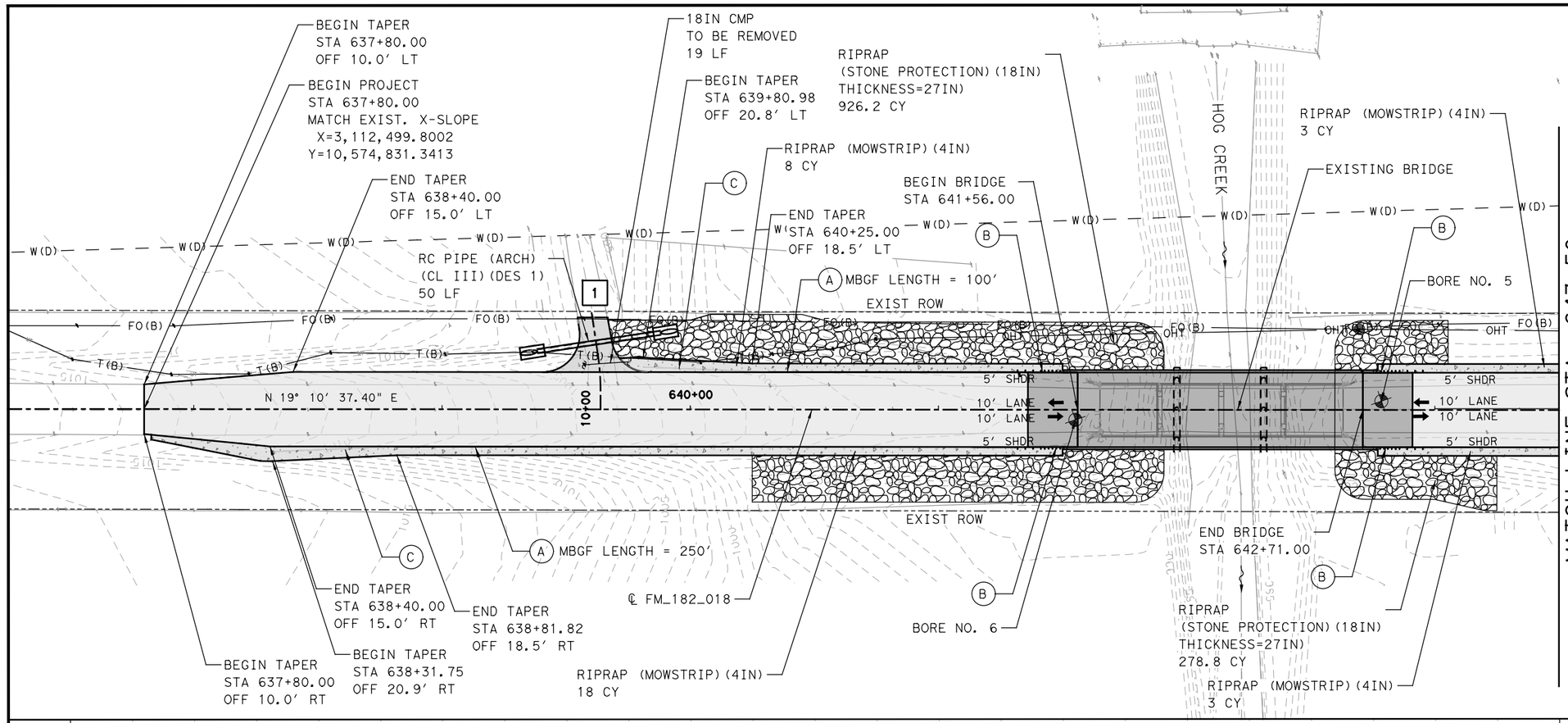
FM 182 AT HOG CREEK

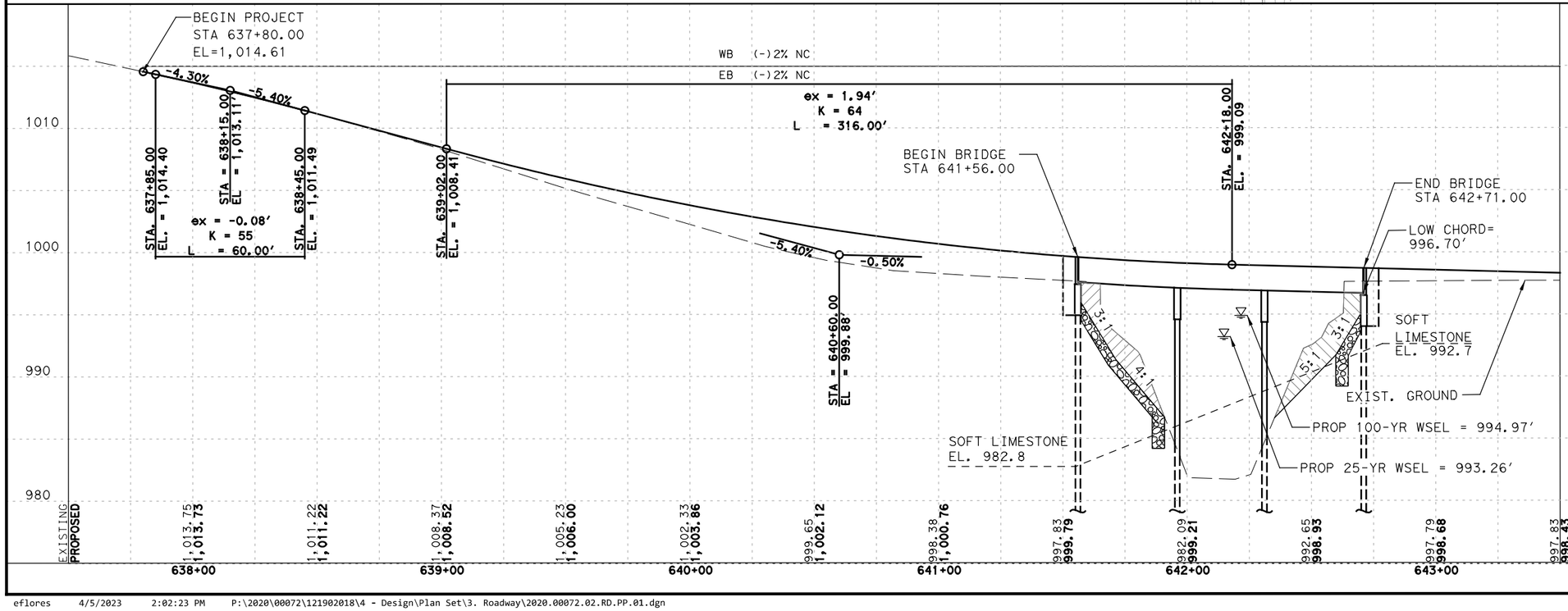
HORIZONTAL ALIGNMENT DATA

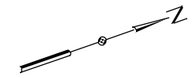
FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		FM 182

STATE	DISTRICT	COUNTY	
TEXAS	WACO	CORYELL	
CONTROL	SECTION	JOB	SHEET NO.
1219	02	017,ETC	43

REV DATE: 4/5/2023
CSJ: 1219-02-018
FILE LOCATION: P:\2020\00072\121902018\4 - Design\Plan Set\3. Roadway\2020.00072.02.RD.HAD.02.dgn







LEGEND

- PROPOSED ROAD
- PROPOSED BRIDGE
- CHANNEL EXCAVATION
- RIPRAP (MOWSTRIP)(4IN)
- RIPRAP (STONE PROTECTION)(30 IN)
- # PROPOSED DRIVEWAY
- (A) MTL W-BEAM GD FEN (STL POST)
- (B) MTL BEAM GF TRANS (THRIE-BEAM)
- (C) GUARDRAIL END TREATMENT (INSTALL)

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4/5/2023

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AMERICAN STRUCTUREPOINT INC.

TBPE FIRM NO. F-10069

Texas Department of Transportation

FM 182 AT HOG CREEK

PLAN AND PROFILE

SHEET 1 OF 2

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		FM 182

STATE	DISTRICT	COUNTY	
TEXAS	WACO	CORYELL	
CONTROL	SECTION	JOB	SHEET NO.
1219	02	017,ETC	44

REV DATE: 4/5/2023
CSJ: 1219-02-018
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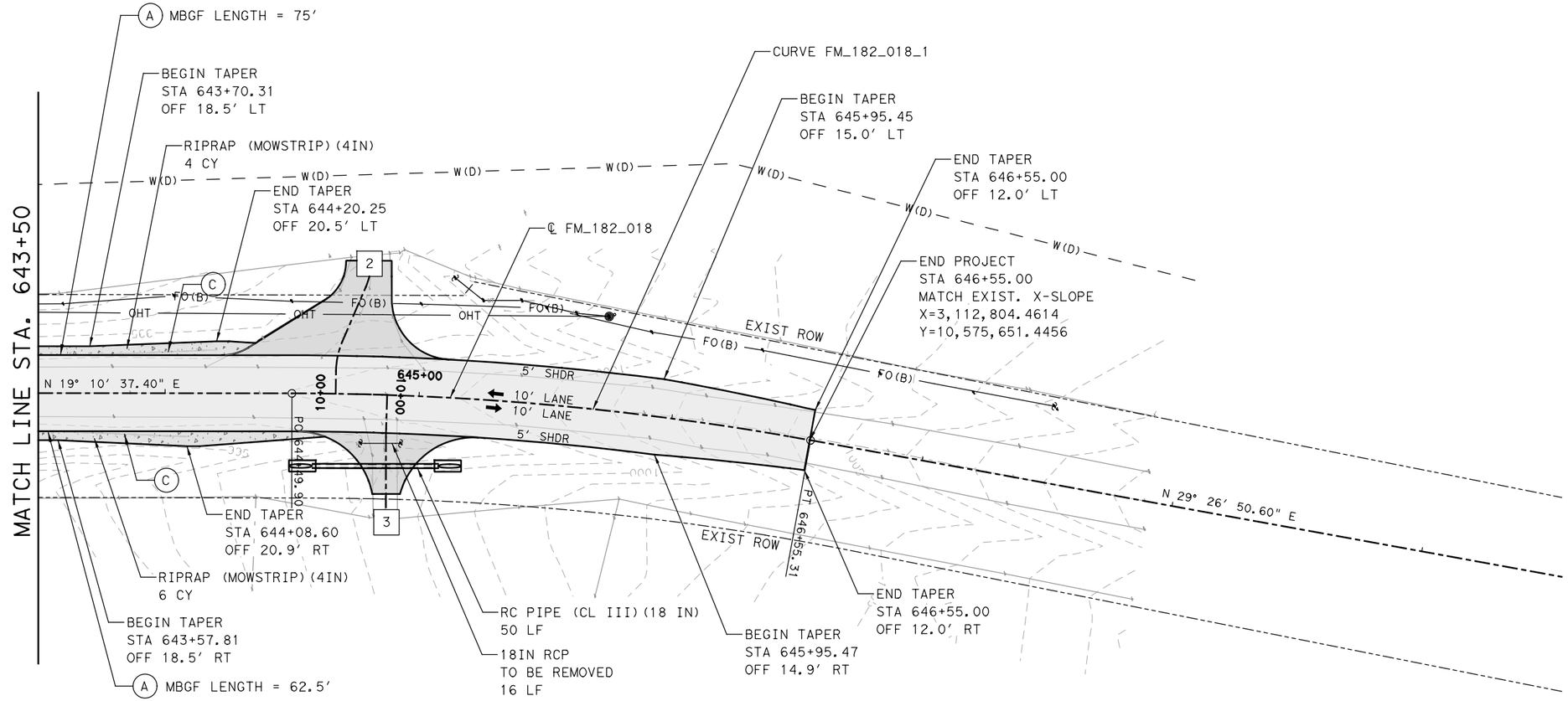

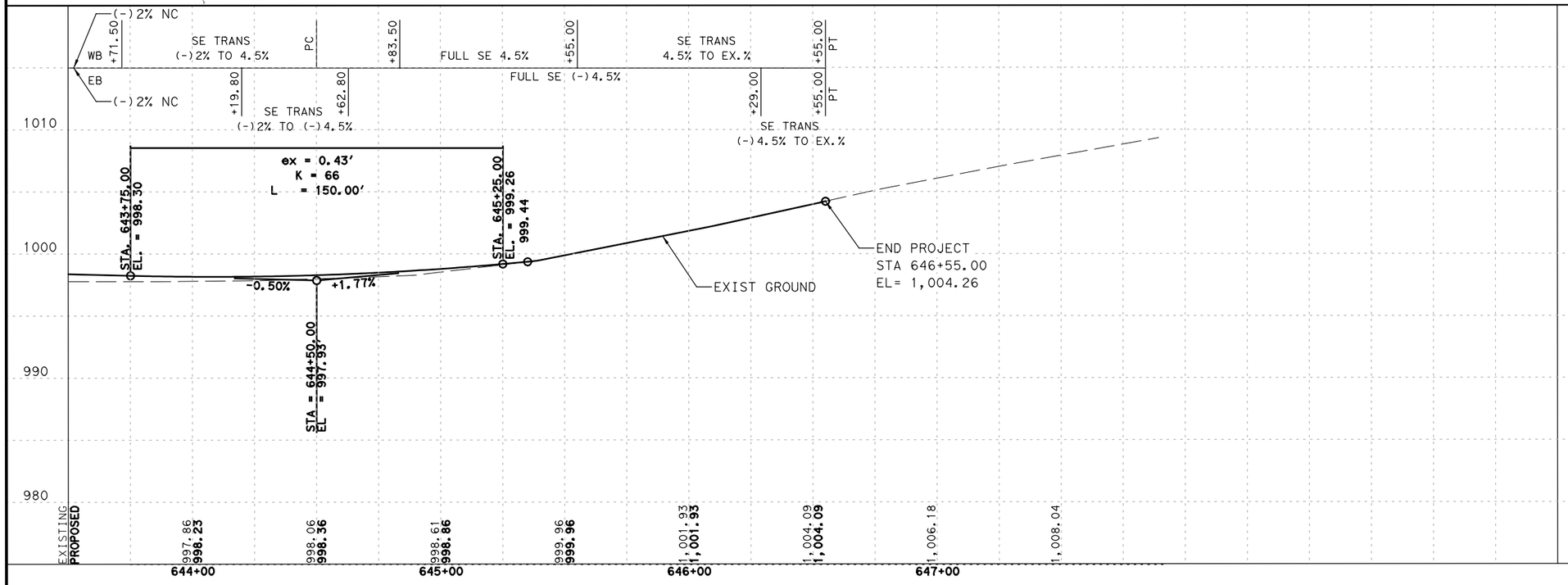

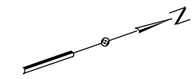

LEGEND

- PROPOSED ROAD
- PROPOSED BRIDGE
- CHANNEL EXCAVATION
- RIPRAP (MOWSTRIP)(4IN)
- RIPRAP (STONE PROTECTION)(30 IN)
- # PROPOSED DRIVEWAY
- (A) MTL W-BEAM GD FEN (STL POST)
- (B) MTL BEAM GF TRANS (THRIE-BEAM)
- (C) GUARDRAIL END TREATMENT (INSTALL)

1. SEE HORIZONTAL ALIGNMENT DATA SHEET FOR ADDITIONAL INFORMATION
2. SEE BRIDGE LAYOUT SHEET FOR ADDITIONAL INFORMATION.
3. CONTRACTOR TO FIELD VERIFY LOCATION AND DEPTH OF ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION.

PRINT DATE	REVISION DATE
4/5/2023	

STATE OF TEXAS
JOSE M. SANDOVAL
90593
LICENSED PROFESSIONAL ENGINEER

4/5/2023

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AMERICAN STRUCTUREPOINT INC.

TBPE FIRM NO. F-10069

Texas Department of Transportation

FM 182 AT HOG CREEK

PLAN AND PROFILE

SHEET 2 OF 2

FED.RD. DIV.NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		FM 182

STATE	DISTRICT	COUNTY	
TEXAS	WACO	CORYELL	
CONTROL	SECTION	JOB	SHEET NO.
1219	02	017,ETC	45

REV DATE: 4/5/2023
CSJ: 1219-02-018
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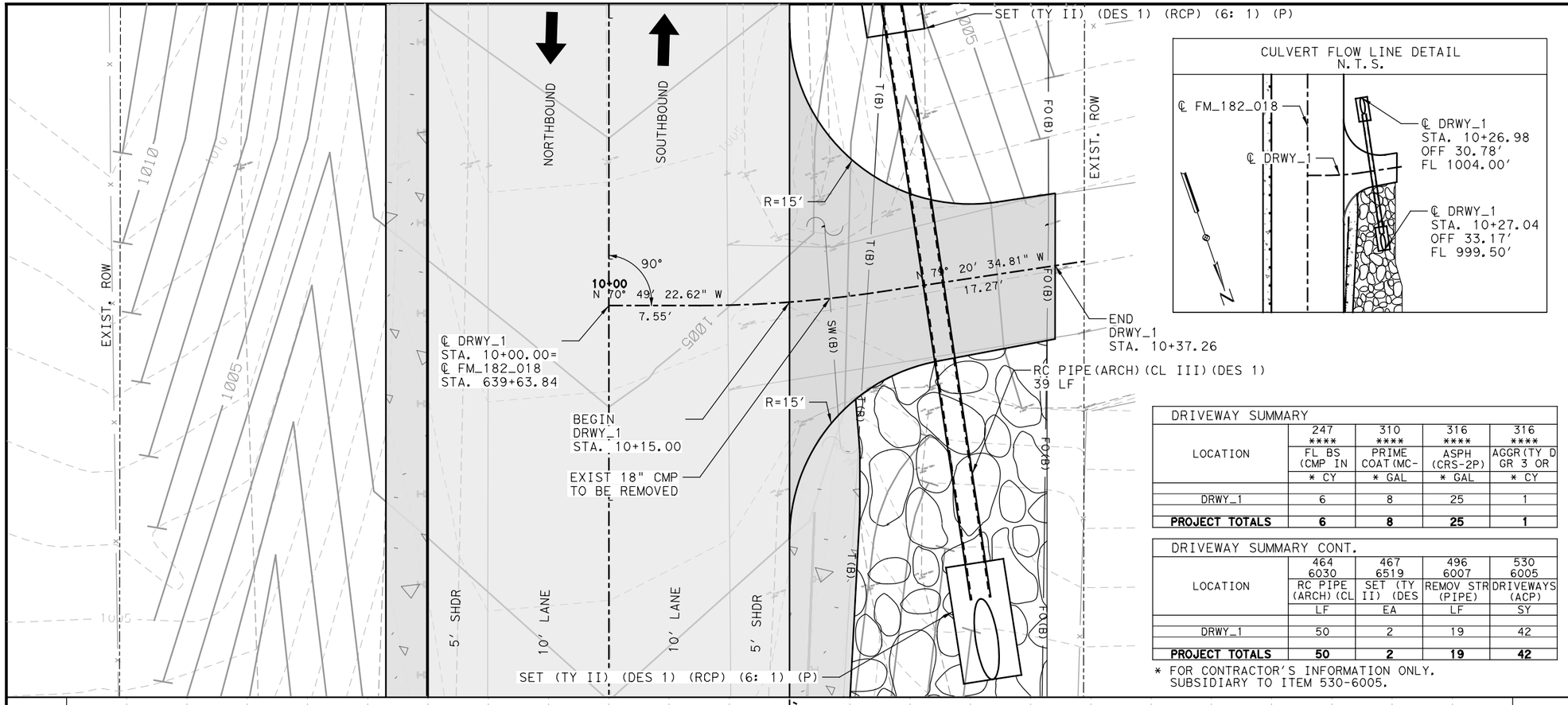
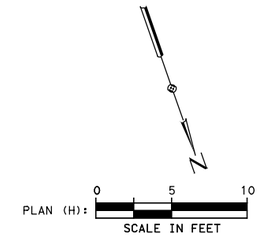


CULVERT FLOW LINE DETAIL
N. T. S.



LEGEND

PROPOSED ROAD

DIRECTION OF TRAFFIC

NOTES

1. SEE HORIZONTAL ALIGNMENT DATA SHEET FOR ADDITIONAL INFORMATION
3. CONTRACTOR TO FIELD VERIFY LOCATION AND DEPTH OF ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION.

DRIVEWAY SUMMARY

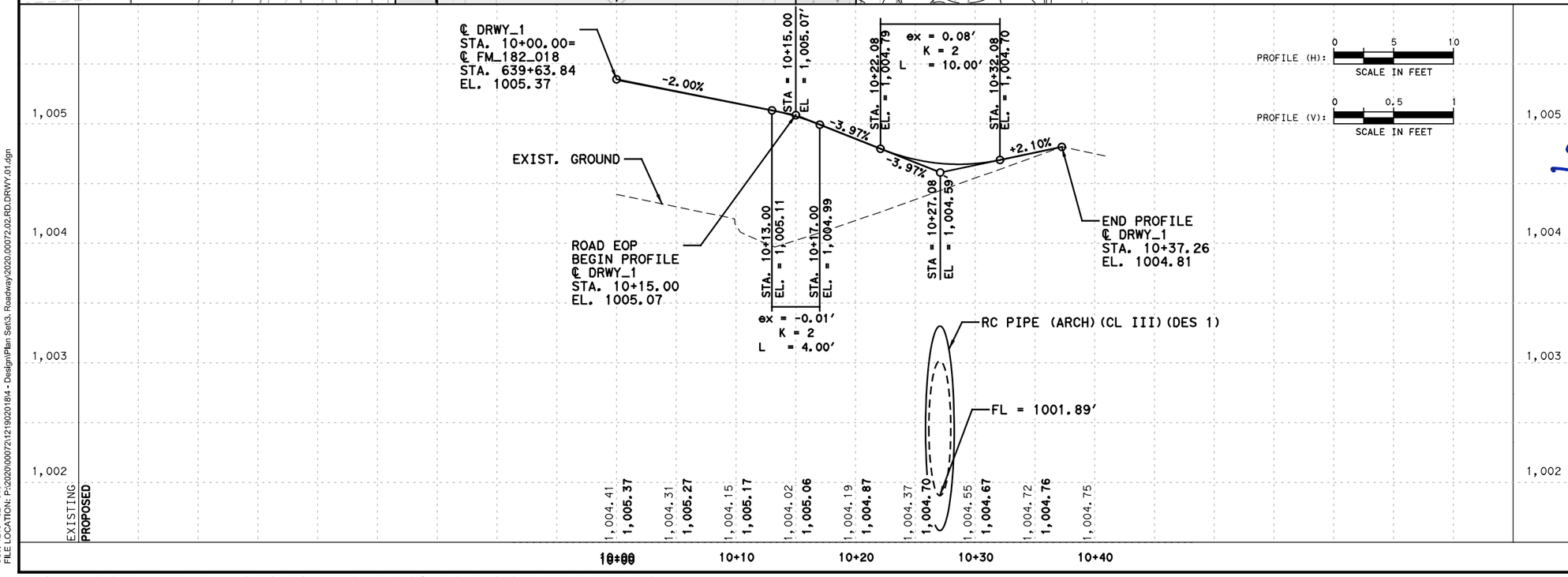
LOCATION	247 **** FL BS (CMP IN * CY	310 **** PRIME COAT (MC- * GAL	316 **** ASPH (CRS-2P) * GAL	316 **** AGGR (TY D GR 3 OR * CY
DRWY_1	6	8	25	1
PROJECT TOTALS	**6**	**8**	**25**	**1**

DRIVEWAY SUMMARY CONT.

LOCATION	464 6030 RC PIPE (ARCH) (CL LF	467 6519 SET (TY II) (DES EA	496 6007 REMOV STR (PIPE) LF	530 6005 DRIVEWAYS (ACP) SY
DRWY_1	50	2	19	42
PROJECT TOTALS	**50**	**2**	**19**	**42**

* FOR CONTRACTOR'S INFORMATION ONLY. SUBSIDIARY TO ITEM 530-6005.

PRINT DATE	REVISION DATE
4/19/2023	



4/19/2023

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TBPE FIRM NO. F-10069

Texas Department of Transportation

FM 182 AT HOG CREEK

DRIVEWAY 1 PLAN AND PROFILE

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		FM 182

STATE	DISTRICT	COUNTY	
TEXAS	WACO	CORYELL	
CONTROL	SECTION	JOB	SHEET NO.
1219	02	017,ETC	46

REV DATE: 4/19/2023
CSJ: 1219-02-018
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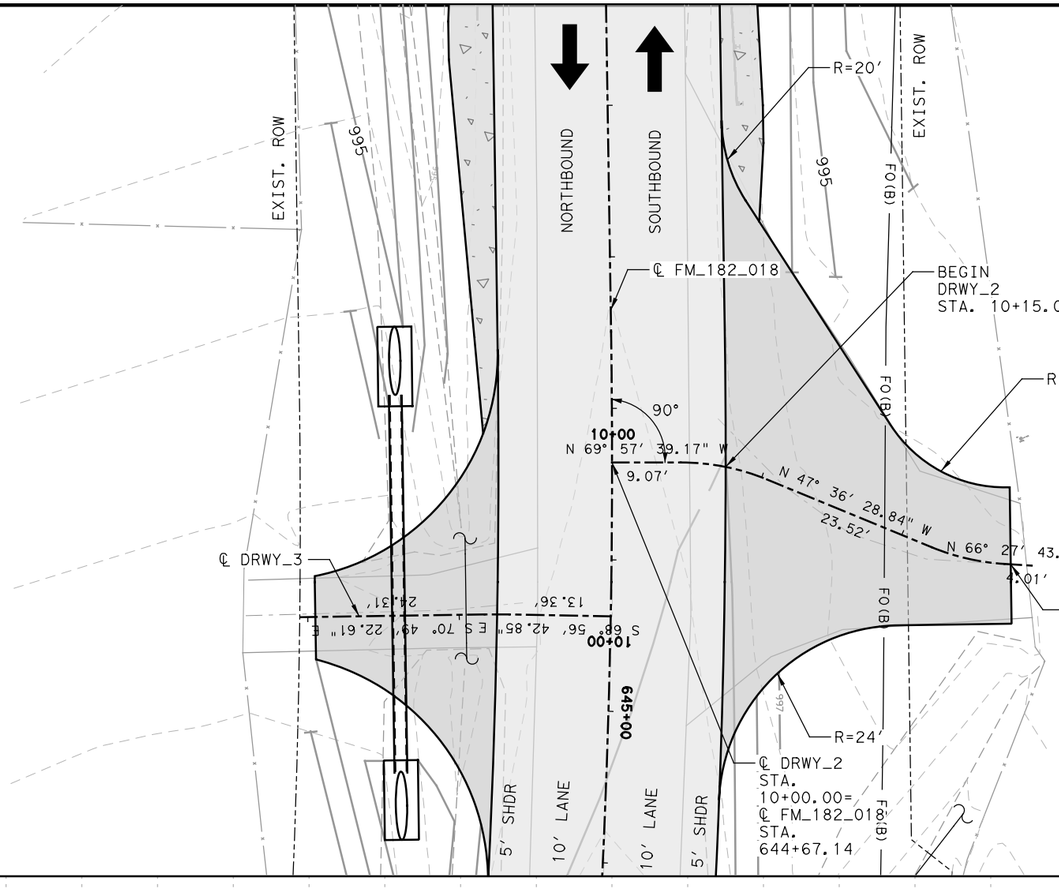

DRIVEWAY SUMMARY					
LOCATION	247 **** FL BS (CMP IN PLACE)	310 **** PRIME COAT (MC-30)	316 **** ASPH (CRS-2P)	316 **** AGGR (TY D GR 3 OR 4)	530 6005 DRIVEWAYS (ACP)
	* CY	* GAL	* GAL	* CY	SY
DRWY_2	22	31	93	2	155
PROJECT TOTALS	**22**	**31**	**93**	**2**	**155**

* FOR CONTRACTOR'S INFORMATION ONLY.
SUBSIDIARY TO ITEM 530-6005.

PLAN (H): 0 10 20 SCALE IN FEET

LEGEND

PROPOSED ROAD

DIRECTION OF TRAFFIC

NOTES

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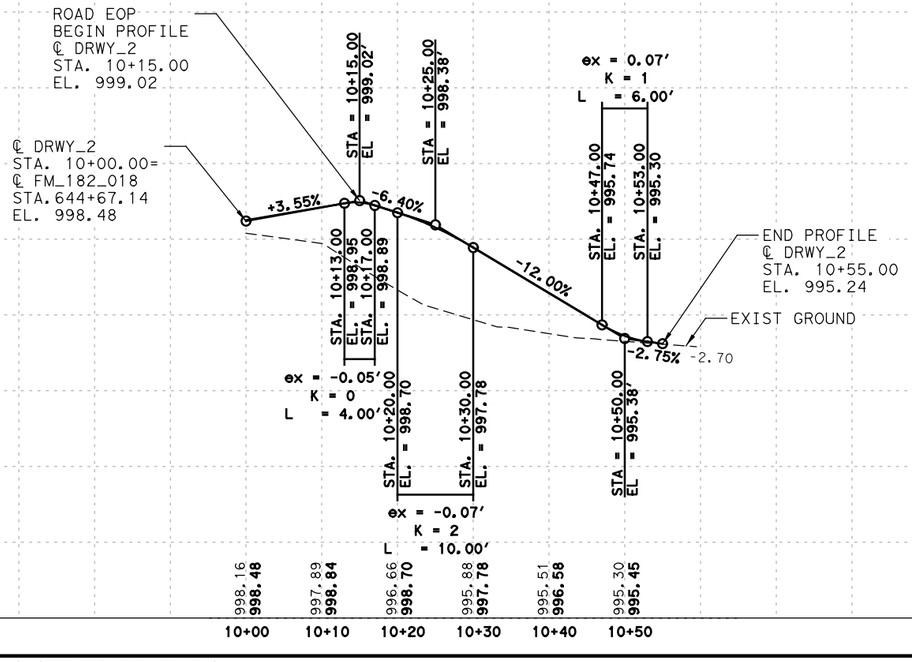
PRINT DATE	REVISION DATE
4/19/2023	



PROFILE (H): 0 10 20 SCALE IN FEET

PROFILE (V): 0 1 2 SCALE IN FEET

STATE OF TEXAS
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4/19/2023

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TBPE FIRM NO. F-10069

Texas Department of Transportation

FM 182 AT HOG CREEK

DRIVEWAY 2 PLAN AND PROFILE

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		FM 182

STATE	DISTRICT	COUNTY	
TEXAS	WACO	CORYELL	
CONTROL	SECTION	JOB	SHEET NO.
1219	02	017,ETC	47

REV DATE: 4/19/2023
CSJ: 1219-02-018
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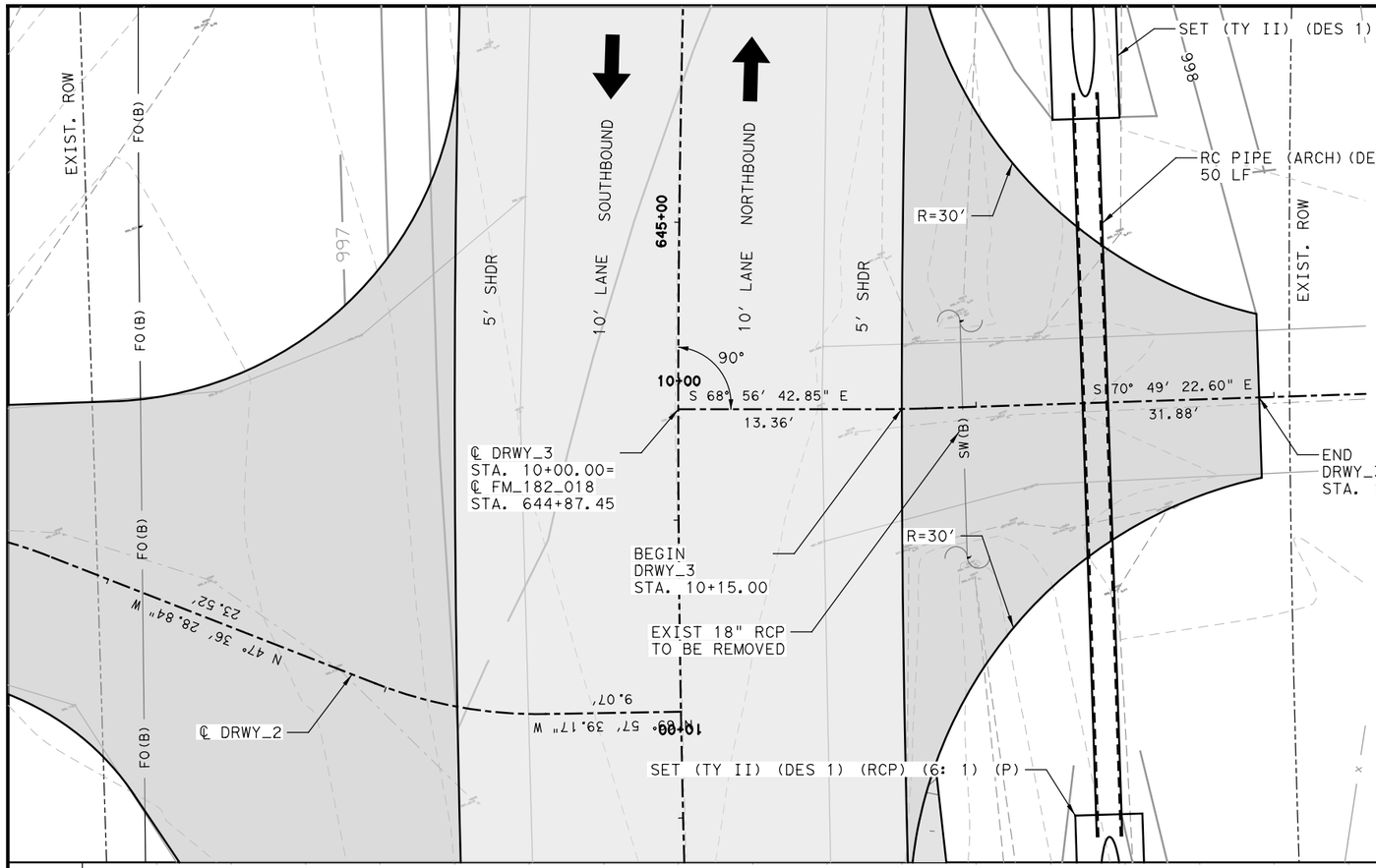
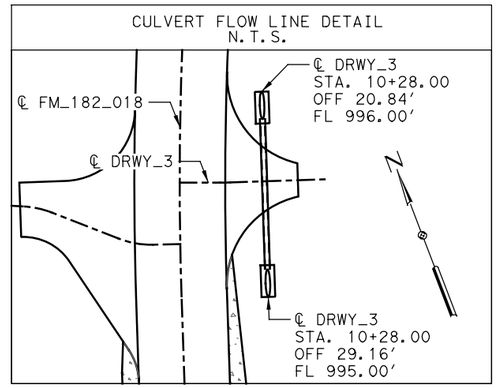


CULVERT FLOW LINE DETAIL
N. T. S.



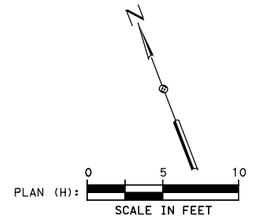
DRIVEWAY SUMMARY

LOCATION	247 **** FL BS (CMP IN * CY	310 **** PRIME COAT (MC- * GAL	316 **** ASPH (CRS-2P) * GAL	316 **** AGGR (TY D GR 3 OR * CY
DRWY_3	10	14	42	1
PROJECT TOTALS	**10**	**14**	**42**	**1**

DRIVEWAY SUMMARY CONT.

LOCATION	464 6003 RC PIPE (CL LF	467 6363 SET (TY II) (18 EA	496 6007 REMOV STR (PIPE) LF	530 6005 DRIVEWAYS (ACP) SY
DRWY_3	50	2	16	71
PROJECT TOTALS	**50**	**2**	**16**	**71**

* FOR CONTRACTOR'S INFORMATION ONLY.
SUBSIDIARY TO ITEM 530-6005.



LEGEND

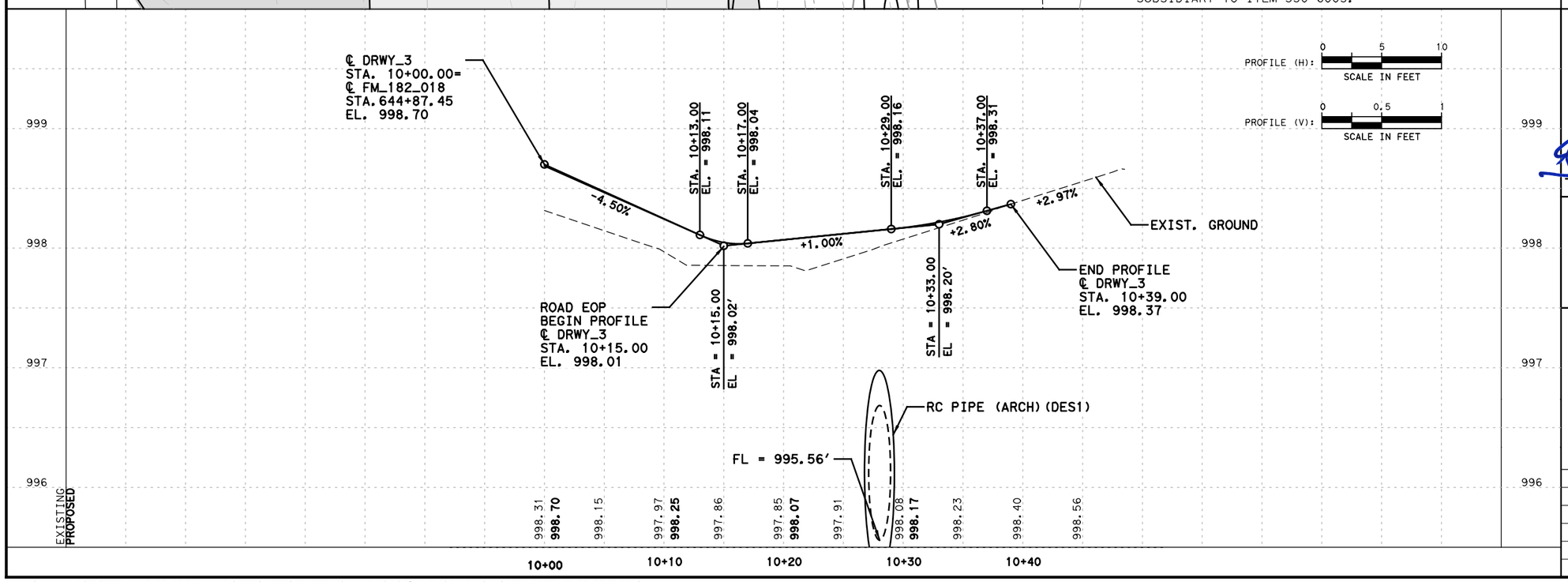
PROPOSED ROAD

DIRECTION OF TRAFFIC

NOTES

1. SEE HORIZONTAL ALIGNMENT DATA SHEET FOR ADDITIONAL INFORMATION
3. CONTRACTOR TO FIELD VERIFY LOCATION AND DEPTH OF ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION.

PRINT DATE	REVISION DATE
4/19/2023	



PROFILE (H): 0 5 10 SCALE IN FEET

PROFILE (V): 0 0.5 1 SCALE IN FEET

STATE OF TEXAS
JOSE M. SANDOVAL
90593
LICENSED PROFESSIONAL ENGINEER

4/19/2023

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AMERICAN STRUCTUREPOINT INC.

TBPE FIRM NO. F-10069

Texas Department of Transportation ©2023

FM 182 AT HOG CREEK

DRIVEWAY 3
PLAN AND PROFILE

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		FM 182
STATE	DISTRICT	COUNTY
TEXAS	WACO	CORYELL
CONTROL	SECTION	JOB / SHEET NO.
1219	02	017,ETC / 48

REV DATE: 4/19/2023
CSJ: 1219-02-018
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℄ FM182_020

```
Beginning chain FM182_020 description
Feature: Geom_Centerline
================================================================================

                                    Curve Data
                                   *----------*
Curve FM182_03_1
P.I.   Station            723+33.94  X      3,118,304.7112  Y     10,580,654.3447
Delta          =      25° 35′ 40.40" (RT)
Degree         =       6° 00′ 00.00"
Tangent        =             216.9070
Length         =             426.5760
Radius         =             954.9297
External       =              24.3248
Long Chord     =             423.0380
Mid. Ord.      =              23.7206
P.C.   Station            721+17.03  X      3,118,096.2958  Y     10,580,594.2474
P.T.   Station            725+43.61  X      3,118,518.6375  Y     10,580,618.5095
C.C.                                 X      3,118,360.8736  Y     10,579,676.7021
Back           = N  73° 54′ 53.57" E
Ahead          = S  80° 29′ 26.03" E
Chord Bear     = N  86° 42′ 43.77" E

Course from PT FM182_03_1 to 43 S 80° 29′ 26.03" E Dist 660.4400

Point 43              X   3,119,170.0020 Y  10,580,509.3982 Sta      732+04.05

================================================================================
Ending chain FM182_03 description
```

℄ DRWY_01

```
Beginning chain DRWY_01 description
Feature: Geom_Centerline
================================================================================

Point 52              X   3,118,532.0128 Y  10,580,616.2690 Sta       10+00.00

Course from 52 to PC DRWY_01_1 S 9° 30′ 33.97" W Dist 21.7729

                                    Curve Data
                                   *----------*
Curve DRWY_01_1
P.I.   Station           10+27.13  X      3,118,527.5301  Y     10,580,589.5088
Delta          =      12° 14′ 15.32" (LT)
Degree         =     114° 35′ 29.61"
Tangent        =               5.3600
Length         =              10.6793
Radius         =              50.0000
External       =               0.2865
Long Chord     =              10.6590
Mid. Ord.      =               0.2848
P.C.   Station           10+21.77  X      3,118,528.4157  Y     10,580,594.7952
P.T.   Station           10+32.45  X      3,118,527.7853  Y     10,580,584.1549
C.C.                               X      3,118,577.7286  Y     10,580,586.5347
Back           = S   9° 30′ 33.97" W
Ahead          = S   2° 43′ 41.35" E
Chord Bear     = S   3° 23′ 26.31" W

Course from PT DRWY_01_1 to 53 S 2° 43′ 41.35" E Dist 24.6400

Point 53              X   3,118,528.9581 Y  10,580,559.5429 Sta       10+57.09

================================================================================
Ending chain DRWY_01 description
```

PRINT DATE	REVISION DATE
4/5/2023	

STATE OF TEXAS
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4/5/2023

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AMERICAN STRUCTUREPOINT INC.

TBPE FIRM NO. F-10069

Texas Department of Transportation

FM 182 AT HURST BRANCH

HORIZONTAL ALIGNMENT DATA

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		FM 182

STATE	DISTRICT	COUNTY
TEXAS	WACO	CORYELL

CONTROL	SECTION	JOB	SHEET NO.
1219	02	017,ETC	49

REV DATE: 4/5/2023
CSJ: 1219-02-020
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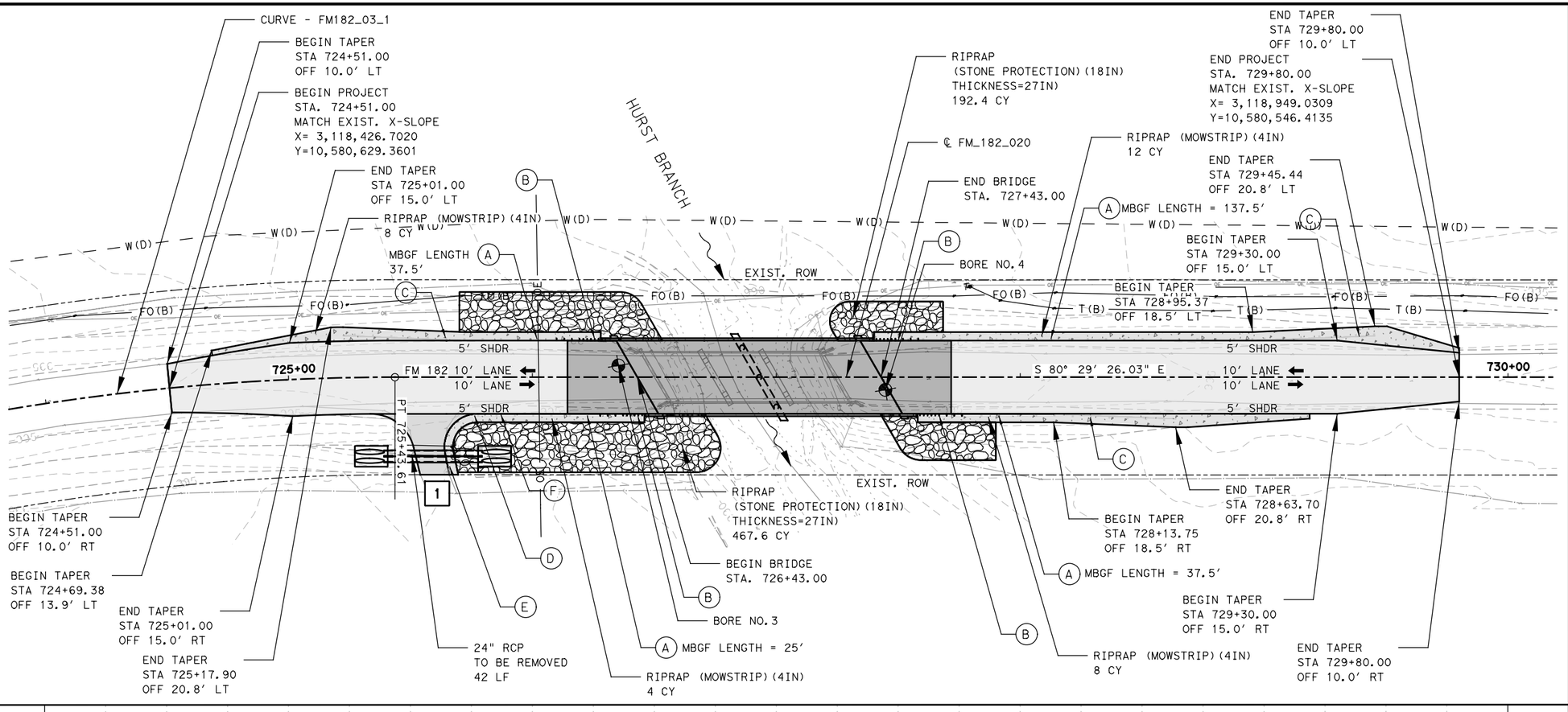

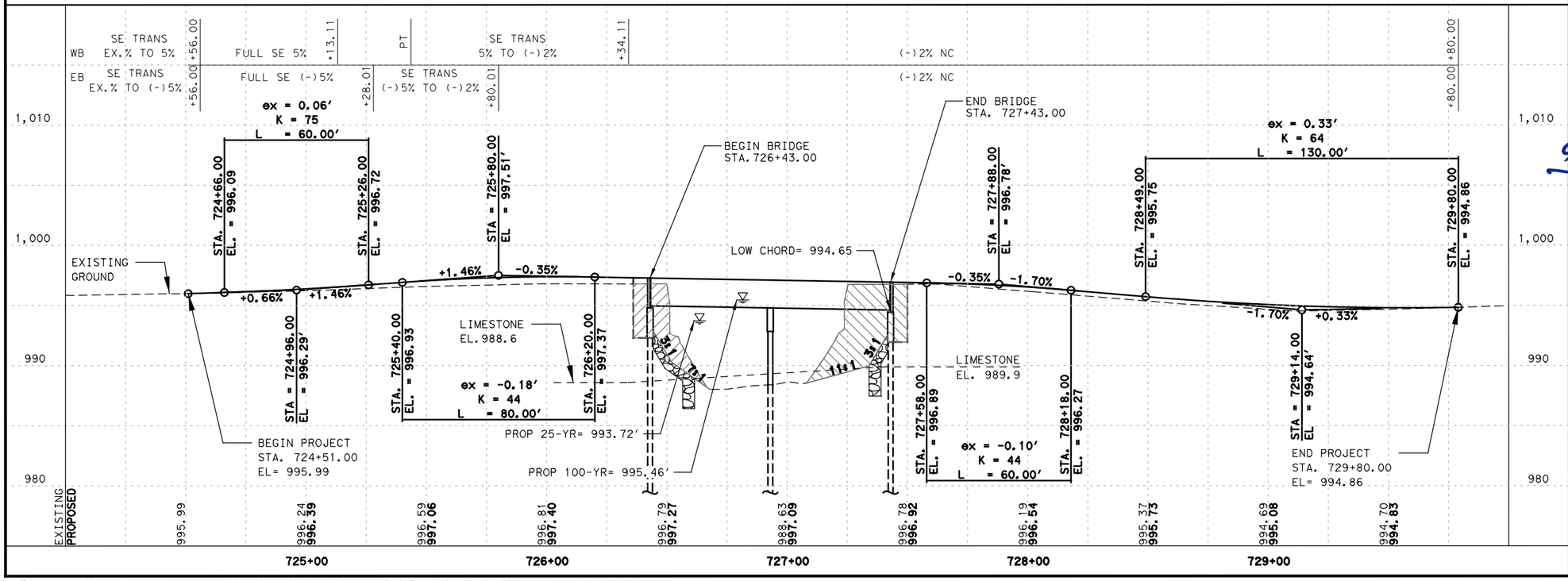

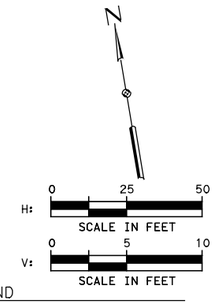

LEGEND

- PROPOSED ROAD
- PROPOSED BRIDGE
- CHANNEL EXCAVATION
- RIPRAP (MOWSTRIP) (4IN)
- RIPRAP (STONE PROTECTION) (30 IN)
- (#) PROPOSED DRIVEWAY
- (A) MTL W-BEAM GD FEN (STEEL POST)
- (B) MTL BEAM GF TRANS (THRIE-BEAM)
- (C) GUARDRAIL END TREATMENT (INSTALL)
- (D) SHORT RADIUS
- (E) DRIVEWAY TERMINAL ANCHOR SECTION
- (F) MTL BEAM GRD FEN TRANS (31"-28") (25')

1. SEE HORIZONTAL ALIGNMENT DATA SHEET FOR ADDITIONAL INFORMATION.
2. SEE BRIDGE LAYOUT SHEET FOR ADDITIONAL INFORMATION.
3. CONTRACTOR TO FIELD VERIFY LOCATION AND DEPTH OF ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION.

PRINT DATE	REVISION DATE
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4/5/2023

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TBPE FIRM NO. F-10069

Texas Department of Transportation

FM 182 AT HURST BRANCH

PLAN AND PROFILE

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		FM 182
STATE	DISTRICT	COUNTY
TEXAS	WACO	CORYELL
CONTROL	SECTION	JOB / SHEET NO.
1219	02	017,ETC / 50

REV DATE: 4/5/2023
CSJ: 1219-02-020
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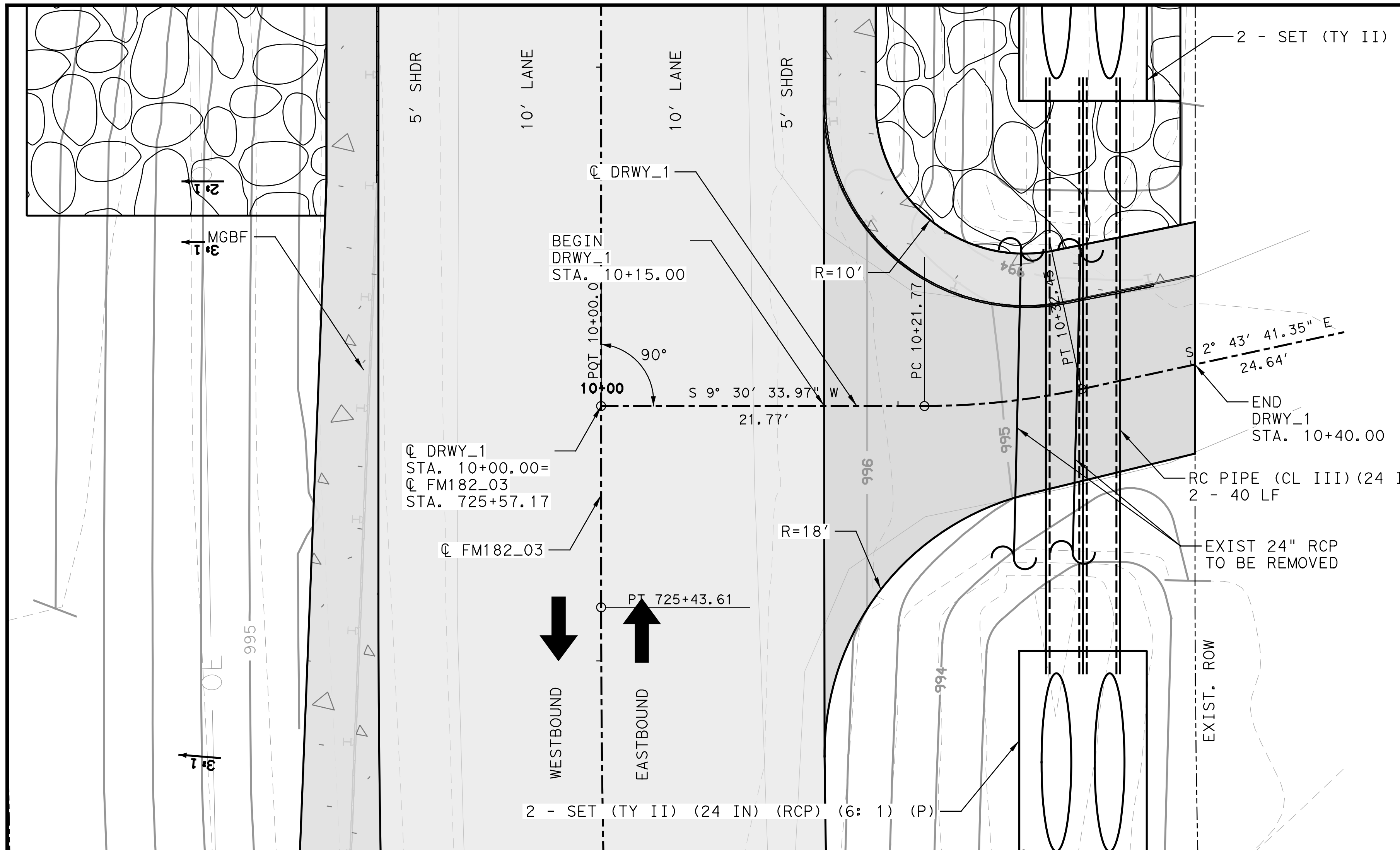
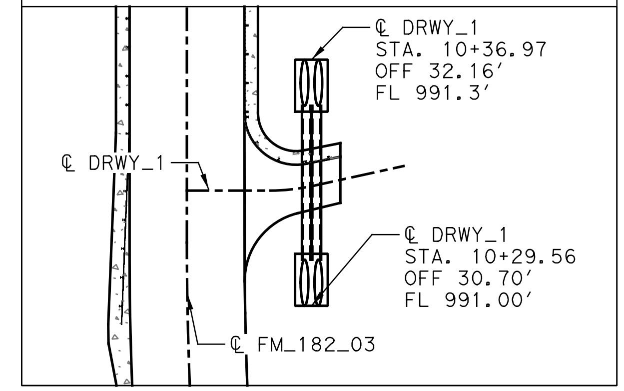
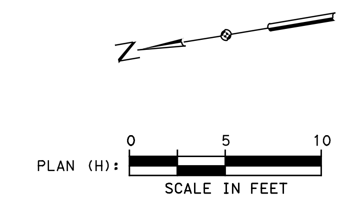


CULVERT FLOW LINE DETAIL
N.T.S.





LEGEND

PROPOSED ROAD

DIRECTION OF TRAFFIC

NOTES

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3. CONTRACTOR TO FIELD VERIFY LOCATION AND DEPTH OF ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION.

DRIVEWAY SUMMARY

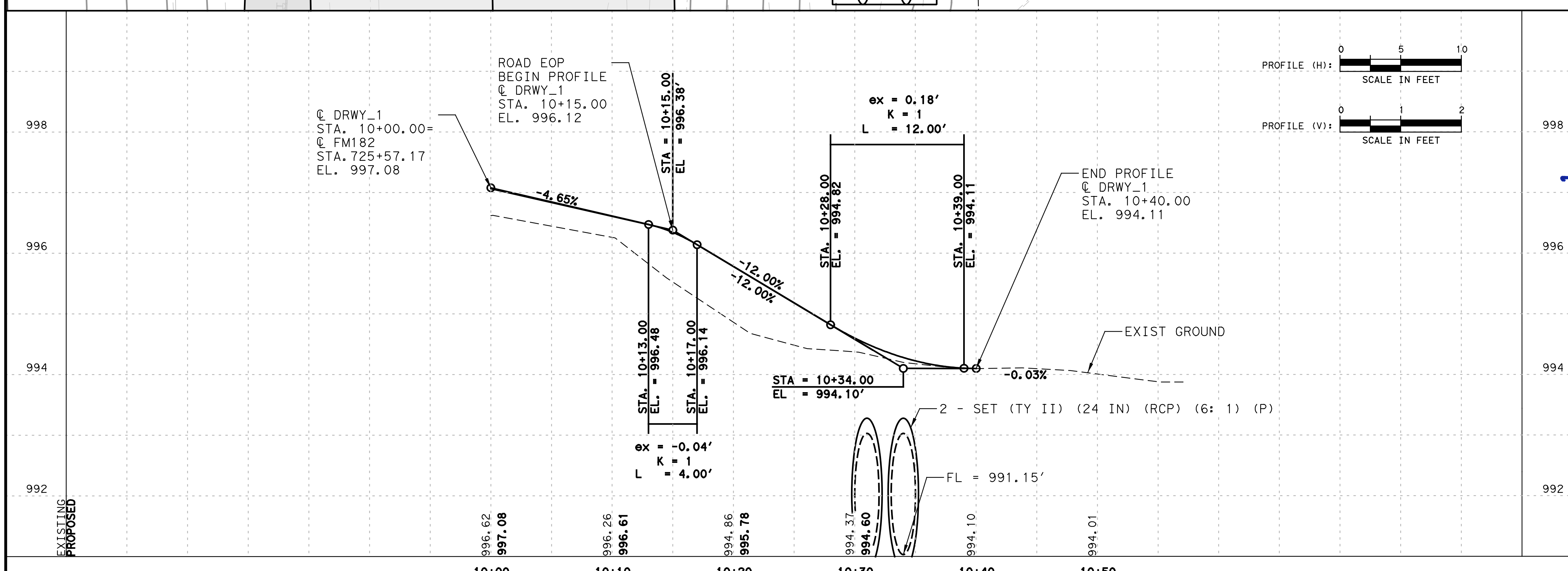
LOCATION	247 **** FL BS (CMP IN * CY	310 **** PRIME COAT(MC- * GAL	316 **** ASPH (CRS-2P) * GAL	316 **** AGGR(TY D GR 3 OR * CY
DRWY_1	7	9	28	1
PROJECT TOTALS	**7**	**9**	**28**	**1**

DRIVEWAY SUMMARY CONT.

LOCATION	464 6005 RC PIPE (CL LF	467 6395 SET (TY II) (24 EA	496 6007 REMOV STR (PIPE) LF	530 6005 DRIVEWAYS (ACP) SY
DRWY_1	80	4	42	46
PROJECT TOTALS	**80**	**4**	**42**	**46**

* FOR CONTRACTOR'S INFORMATION ONLY.
SUBSIDIARY TO ITEM 530-6005.

PRINT DATE	REVISION DATE
4/19/2023	



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4/19/2023

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FM 182 AT HURST BRANCH

DRIVEWAY 1 PLAN AND PROFILE

FED. RD. DIV. NO.	PROJECT NUMBER		HIGHWAY NUMBER
6			FM 182
STATE	DISTRICT	COUNTY	
TEXAS	WACO	CORYELL	
CONTROL	SECTION	JOB	SHEET NO.
1219	02	017,ETC	51

REV DATE: 4/19/2023
CSJ: 1219-02-020
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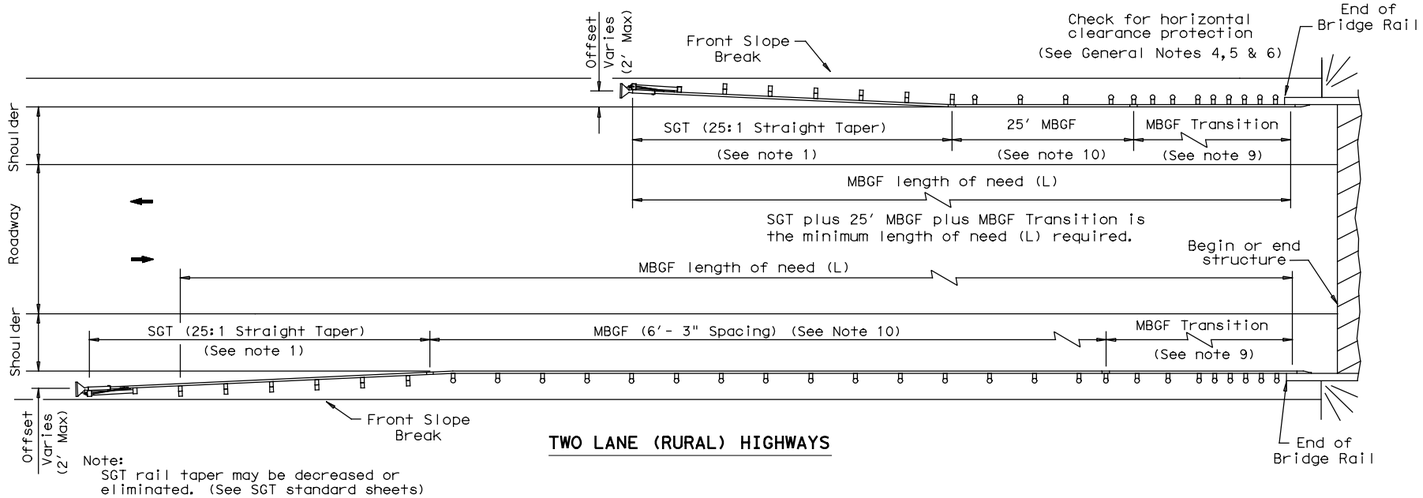
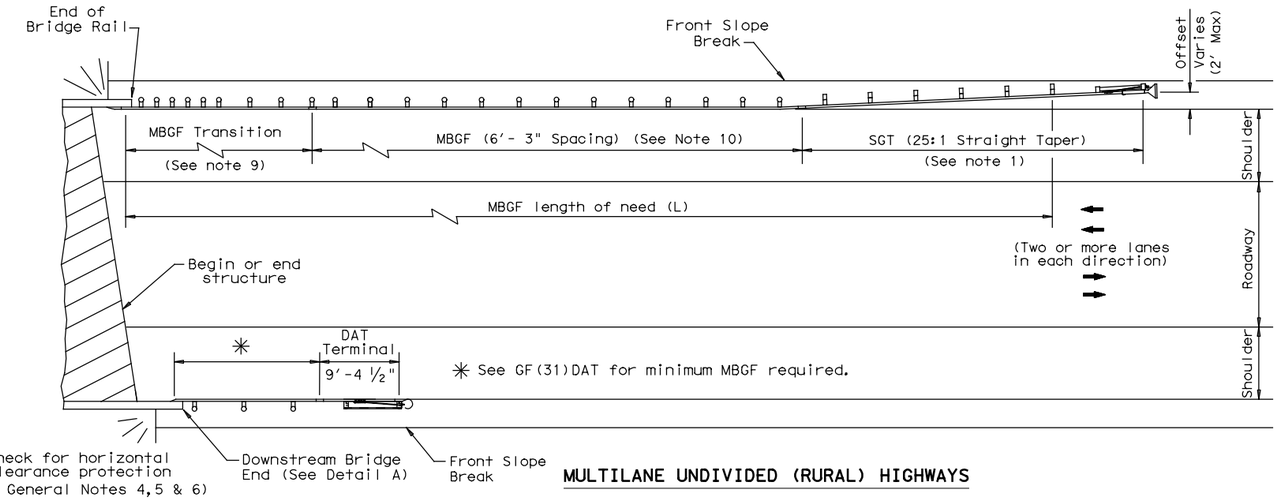
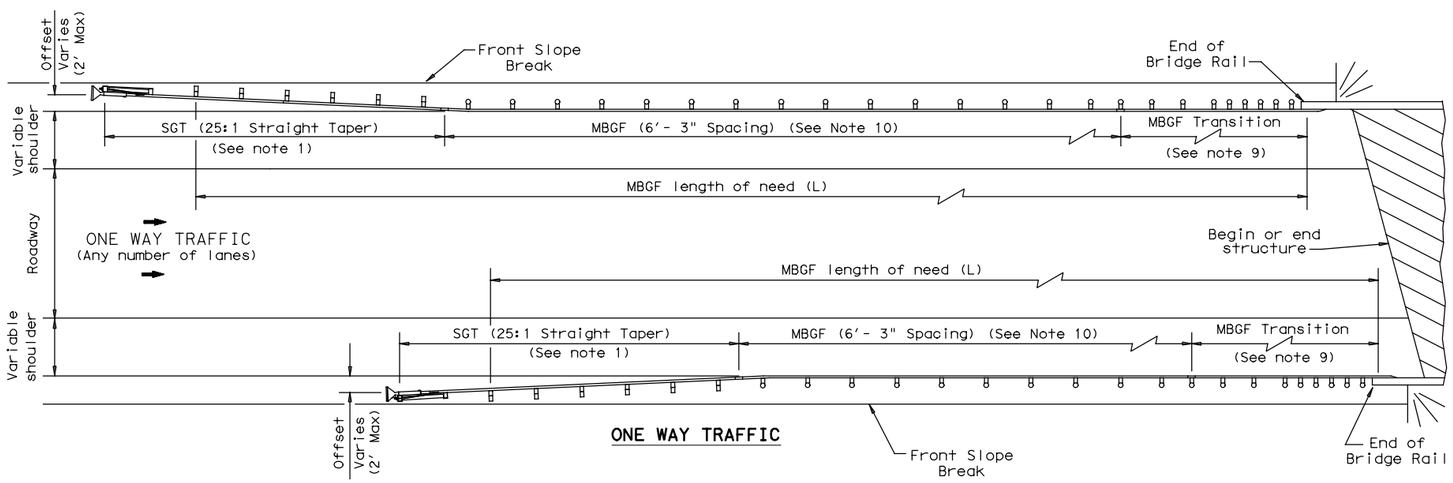


Note:
SGT rail taper may be decreased or eliminated. (See SGT standard sheets)

TWO LANE (RURAL) HIGHWAYS



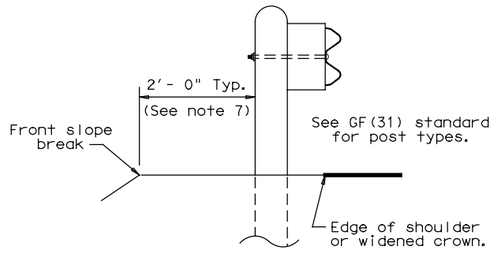
MULTILANE UNDIVIDED (RURAL) HIGHWAYS



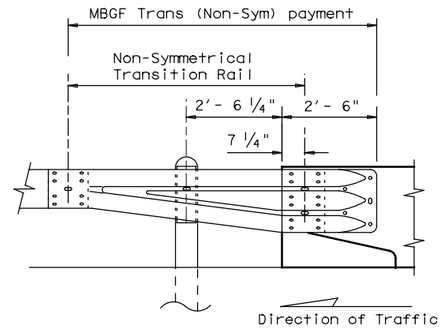
ONE WAY TRAFFIC

GENERAL NOTES

1. For more detail: See GF(31), SGT( )31, GF(31)TR, and GF(31)TL2 standard sheets.
2. Quantities of metal beam guard fence (MBGF) at individual bridge ends are as shown in the plans.
3. Use average daily traffic (ADT) for the current year to determine MBGF length of need in accordance with the Roadway Design Manual unless otherwise specified. Where significant traffic volume growth is anticipated on low volume (0-750 ADT) highways, use length determinations for the higher volume category.
4. MBGF may not be required to shield departure end of bridge unless other obstacles within the horizontal clearance limits or opposing traffic indicate a MBGF consideration.
5. Downstream anchor terminals (DAT) are only for downstream end anchorage use, outside the horizontal clearance area of opposing traffic.
6. Direct connection of MBGF to concrete rails are only for downstream rail connections outside the horizontal clearance area of opposing traffic. (This requires a minimum of three standard line posts plus the DAT terminal, See Detail A)
7. The crown shall be widened to accommodate MBGF. Typically the "front slope" break should be 2'- 0" from the back of the MBGF post. This applies to new construction on new alignment or where existing roadway cross section is to be widened to increase roadway width. This does not apply to rehabilitation work where existing roadway crown width is to be retained (See Typical Cross Section at MBGF).
8. <u>For restrictive bridge widths:</u> The MBGF should be properly transitioned from the existing bridge rail to the adjoining MBGF (See MBGF Transition Standards). Metal beam guard fence at these bridge location(s) shall be flared at the rate of 25:1 or flatter, and be of the length necessary to locate the terminal end at the 2 ft."maximum" offset from the shoulder edge in the approach direction.
9. Transition length and post spacing will vary depending on the transition type. Transition type will be shown elsewhere in the plans.
10. A minimum 25' length of MBGF will be required.



TYPICAL CROSS SECTION AT MBGF



Note:
All rail elements shall be lapped in the direction of adjacent traffic.

DETAIL A

Showing Downstream Rail Attachment

Texas Department of Transportation — Design Division Standard

BRIDGE END DETAILS

(METAL BEAM GUARD FENCE APPLICATIONS TO RIGID RAILS)

BED-14

FILE: bed14.dgn	DN: TxDOT	CK: AM	DW: BD/VP	CK: CGL
© TxDOT: December 2011	CONT	SECT	JOB	HIGHWAY
REVISIONS REVISED APRIL 2014 SEE (MEMO 0414)	1219	02	017, ETC.	FM 182
	DIST	COUNTY		SHEET NO.
	WACO	CORYELL		52

DATE: 4/5/2023
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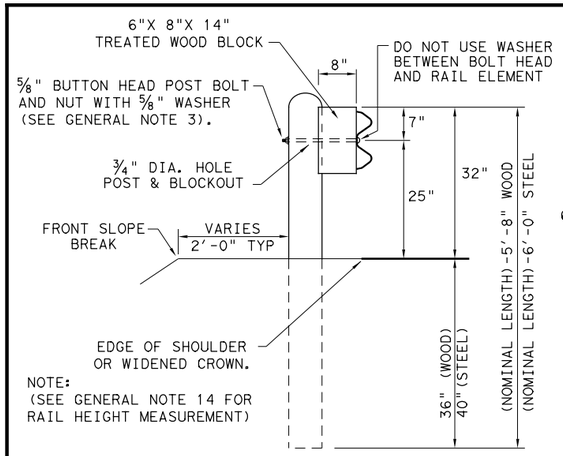
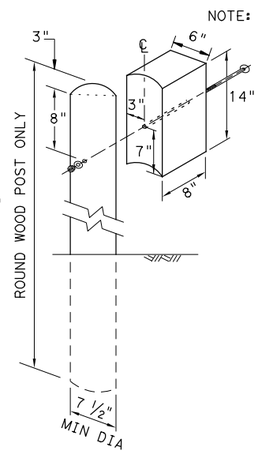
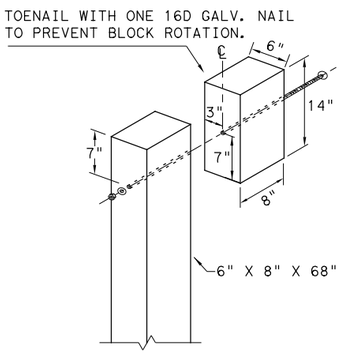


TYPICAL POST PLACEMENT

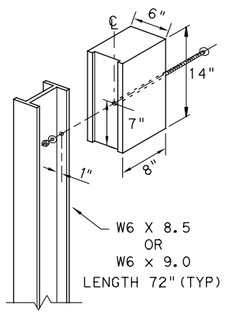


WOOD BLOCK TO ROUND WOOD POST

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

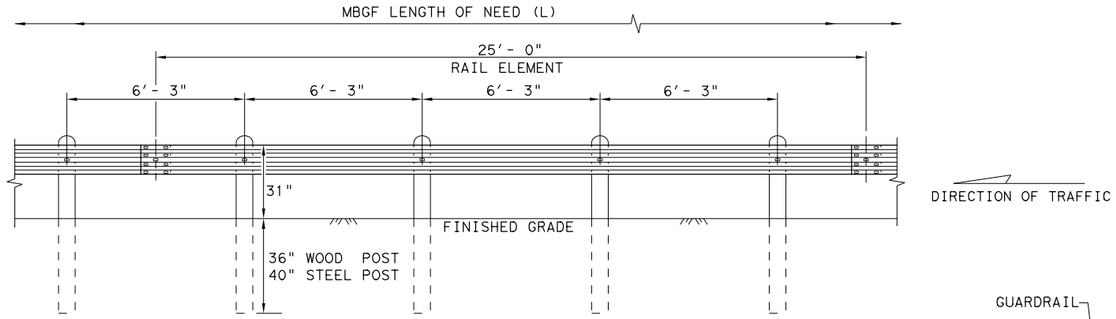


WOOD BLOCK TO RECTANGULAR WOOD POST



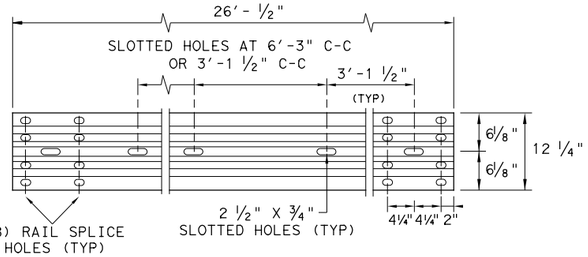
ROUTED WOOD BLOCK TO I-BEAM STEEL POST

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



ELEVATION
MID-SPAN RAIL SPLICE

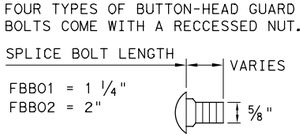
SHOWING A 25'- 0" SECTION OF W-BEAM RAIL. (SEE GENERAL NOTE 2)



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

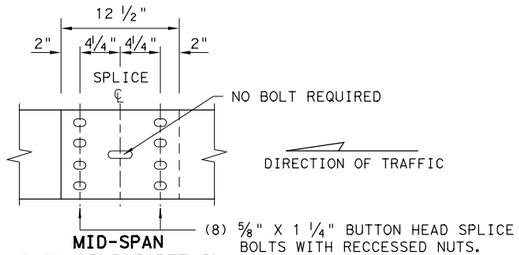
NOTES: SEE GENERAL NOTE 2 FOR ALLOWABLE RAIL TYPES.
SEE RAIL SPLICE DETAIL FOR REQUIRED HARDWARE.

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



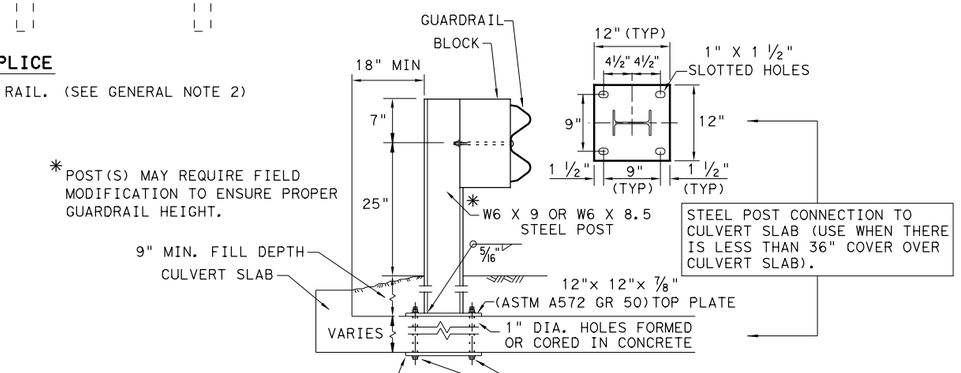
BUTTON HEAD BOLT

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



MID-SPAN RAIL SPLICE DETAIL

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



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

STEEL POST CONNECTION TO CULVERT SLAB (USE WHEN THERE IS LESS THAN 36" COVER OVER CULVERT SLAB).

LOW FILL CULVERT POST

NOTE: TWO INSTALLATION OPTIONS.

1. BOLT-THROUGH OPTION: REQUIRES A 6" MIN. SLAB THICKNESS. 7/8" DIA (ASTM A449) HEAVY HEX BOLTS WITH TWO HARDENED WASHER EACH AND HEAVY HEX NUTS.
   NOTE: BOLT LENGTH = SLAB PLUS 2 1/4" MIN.

2. EPOXY ANCHOR OPTION: THIS OPTION MAY ONLY BE USED IF THE CULVERT SLAB IS 9" MIN. THICK. THREADED ANCHOR RODS MUST BE 7/8" DIA. ASTM A449 OR A193 GRADE B7 WITH HEAVY HEX NUT, AND ONE HARDENED WASHER EACH. EMBED ANCHOR RODS 6" WITH HILTI HIT RE 500 EPOXY ADHESIVE. OTHER TYPE III CLASS C EPOXY ADHESIVES MEETING THE REQUIREMENTS OF DMS-6100, "EPOXIES AND ADHESIVES", MAY BE USED IF IT CAN BE DEMONSTRATED THAT THEY MEET OR EXCEED THE STRENGTH OF HILTI HIT RE 500 WITH THE SAME EMBEDMENT DEPTH AND THREADED ROD DIA. FOLLOW THE MANUFACTURER'S REQUIREMENTS FOR INSTALLING EPOXIED THREADED RODS. EXTEND RODS 1/4" MIN. BEYOND NUT.

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

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

GENERAL NOTES

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

Texas Department of Transportation

Design Division Standard

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

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©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY	
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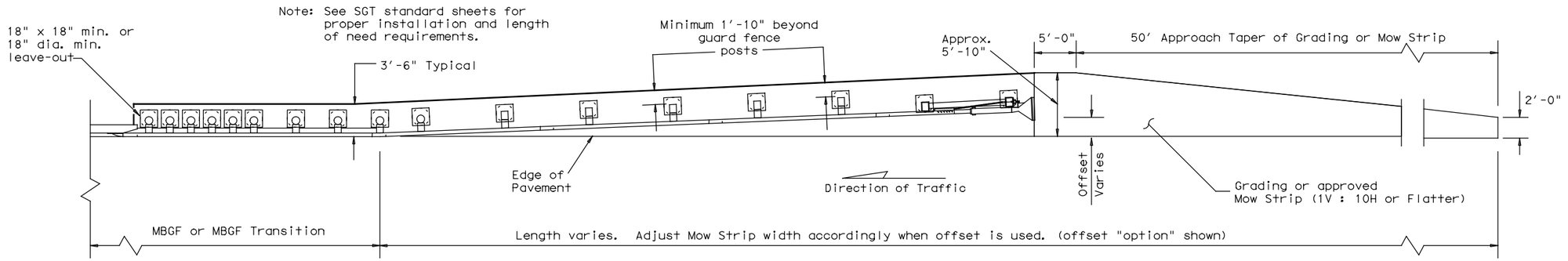
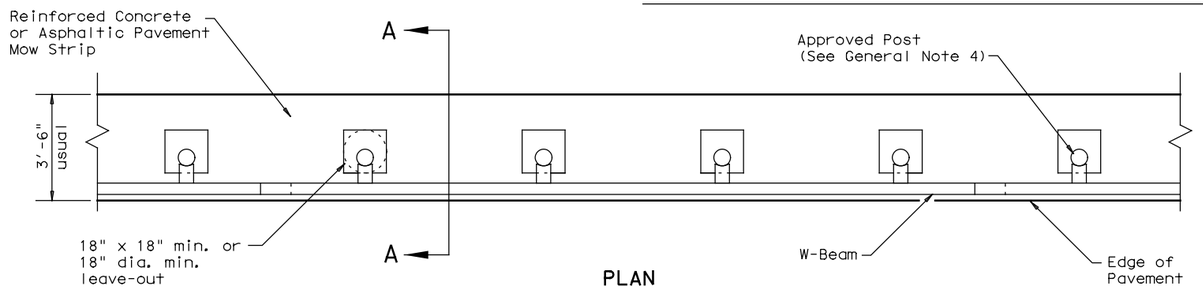


GRADING AND MOW STRIP AT GUARDRAIL END TREATMENTS



PLAN

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

SECTION A-A

Typical

MOW STRIP DETAIL

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

CURB OPTION (1)

This option will increase the post embedment throughout the system.

CURB OPTION (2)

Curb shown on top of mow strip

CURB OPTION (3)

Note: Site Condition(s)

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

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

GENERAL NOTES

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

Texas Department of Transportation — Design Division Standard

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

GF(31)MS-19

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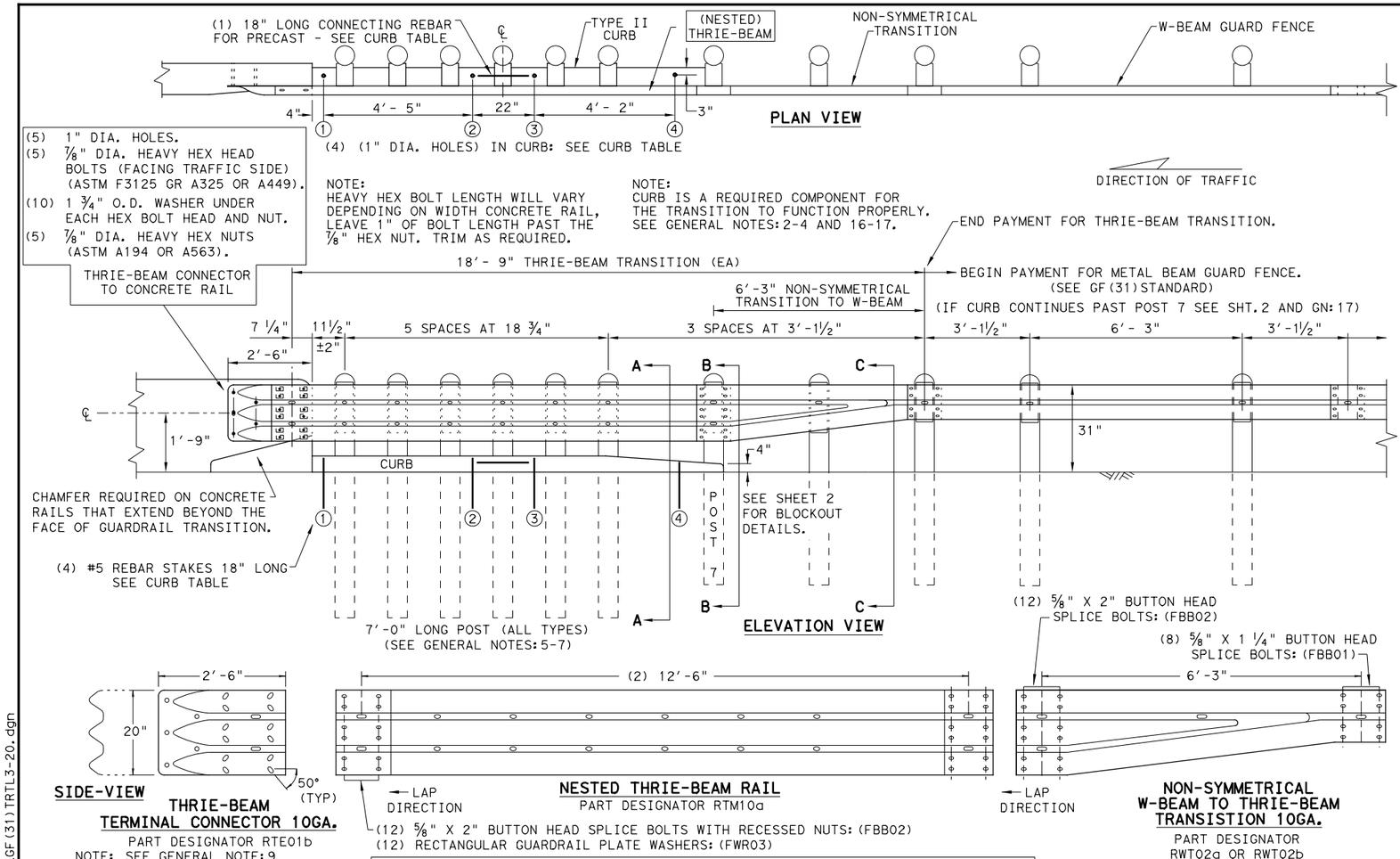
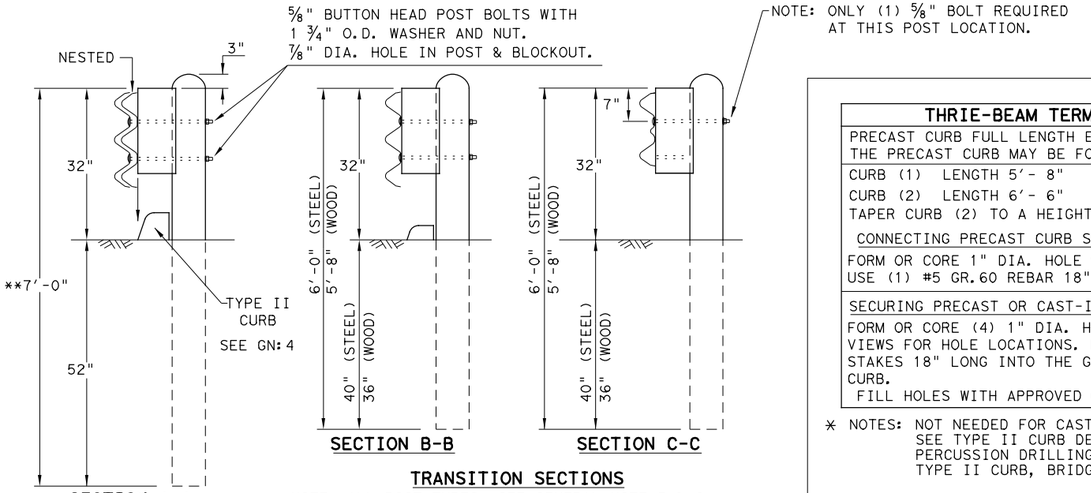
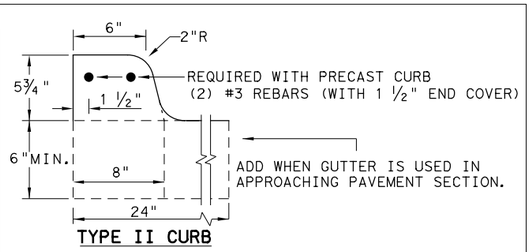




THRIE-BEAM TERMINAL - CURB TABLE
PRECAST CURB FULL LENGTH EQUALS 12'- 2" THE PRECAST CURB MAY BE FORMED INTO TWO SECTIONS.
CURB (1) LENGTH 5'- 8"
CURB (2) LENGTH 6'- 6"
TAPER CURB (2) TO A HEIGHT OF 4" AT POST 7
CONNECTING PRECAST CURB SECTIONS (1) & (2):
FORM OR CORE 1" DIA. HOLE 9" LONG INTO EACH CURB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



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

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

TYPE II CURB DETAILS

GENERAL NOTES

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

HIGH-SPEED TRANSITION

SHEET 1 OF 2

Texas Department of Transportation — Design Division Standard

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

GF(31)TR TL3-20

FILE: gf31tr-tl320.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG	
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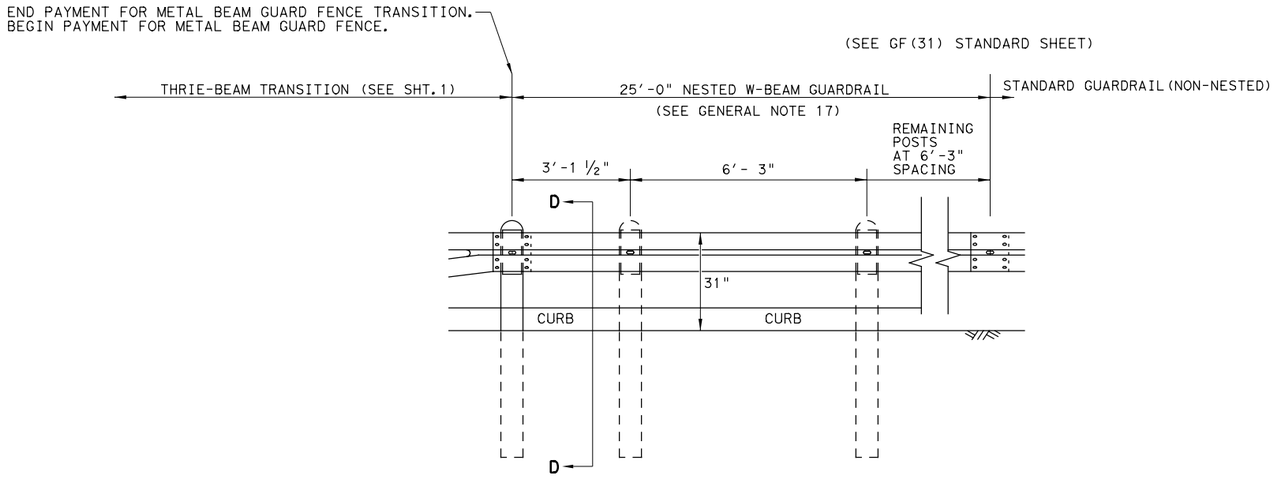
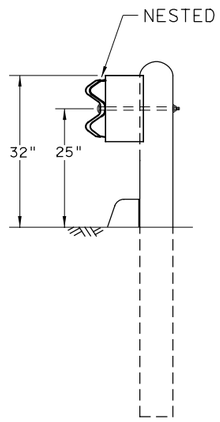
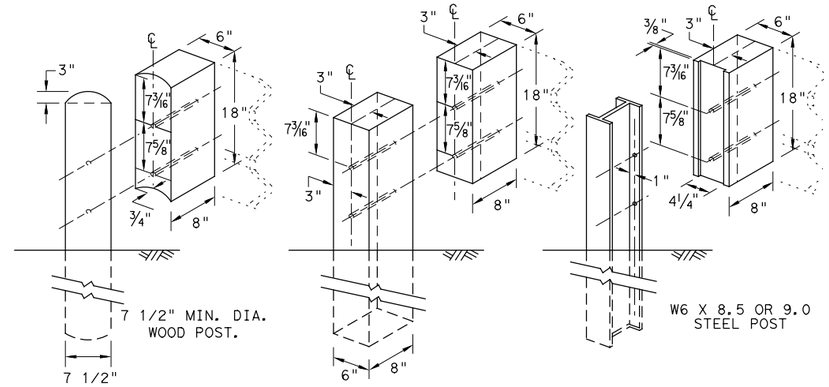
REQUIRED ALTERNATIVE FOR CONTINUOUS CURB EXTENDING PAST POST 7 (SEE SHT. 1 GENERAL NOTE 17)



ELEVATION VIEW



SECTION D-D



THRIE BEAM TRANSITION BLOCKOUT DETAILS

HIGH-SPEED TRANSITION

SHEET 2 OF 2

Texas Department of Transportation | Design Division Standard

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

GF(31)TR TL3-20

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©TxDOT: NOVEMBER 2020	CONT	SECT	JOB	HIGHWAY	
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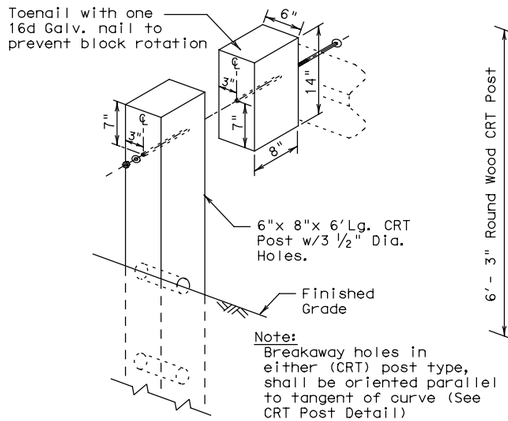
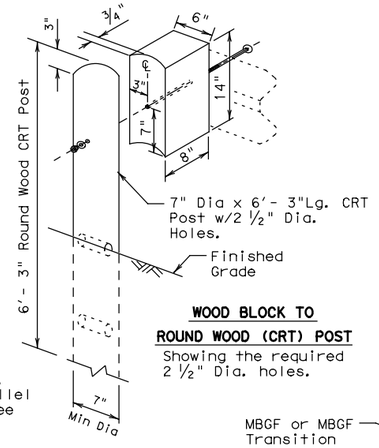
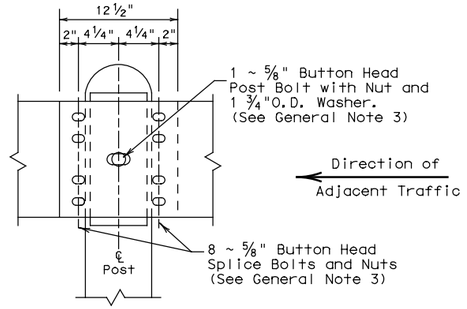


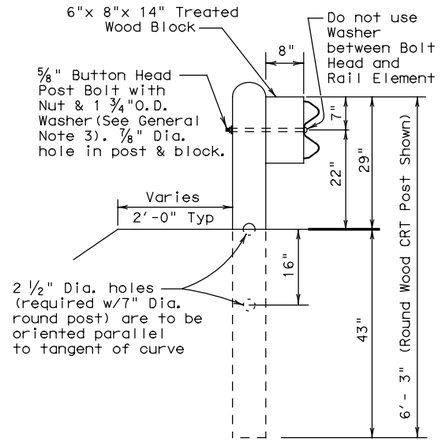
WOOD BLOCK TO RECTANGULAR WOOD (CRT) POST
Showing the required 3 1/2" Dia. holes.



WOOD BLOCK TO ROUND WOOD (CRT) POST
Showing the required 2 1/2" Dia. holes.

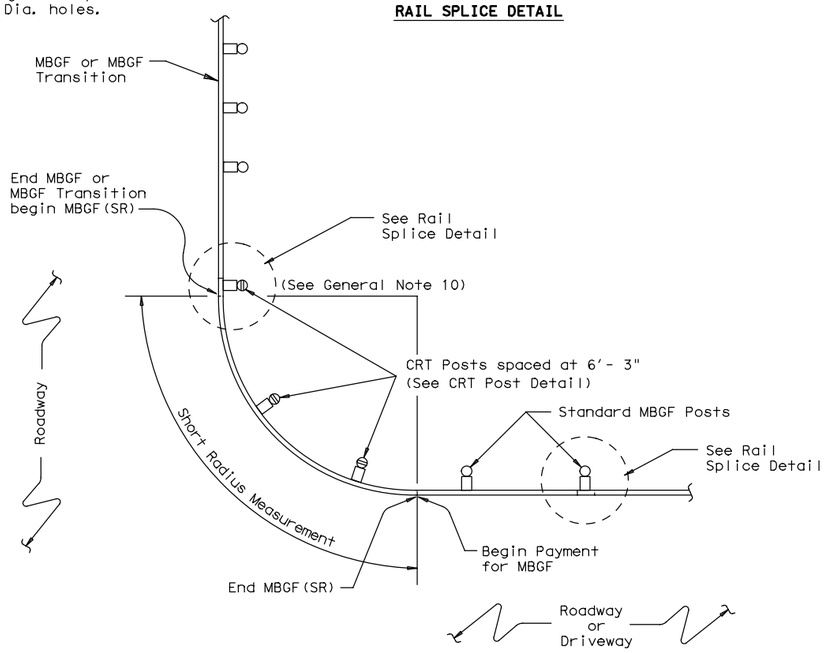


RAIL SPLICE DETAIL



(CRT) POST DETAIL
CONTROLLED RELEASE TERMINAL POST

Two or more wood CRT post(s) are required at any radius installation located at intersecting roadways or driveways.



PLAN VIEW
SHOWING TYPICAL RADIUS

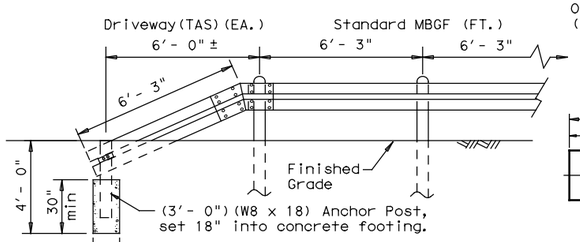
The required radius is shown elsewhere on the plans.

GENERAL NOTES

1. The type of (CRT) post (round wood post, or rectangular wood post) will be shown elsewhere in the plans. The exact position of MBGF shall be shown elsewhere in the plans or as directed by the Engineer.
2. Steel posts are not permitted at CRT post positions.
3. Rail element shall meet the requirements of Item 540,"Metal Beam Guard Fence" except as modified on the plans. The Contractor may furnish rail elements of 12 1/2 or 25 foot nominal lengths.
4. Button head "post" bolts (ASTM A307) shall be of sufficient length to extend through the full thickness of the nut (ASTM A563) and Type A (1 3/4" O.D.)washer and not more than 1" beyond it. Button head "splice" bolts (ASTM A307) are 5/8" x 1 1/4" (or 2" long at triple rail splices) with a 5/8" double recessed nut (ASTM A563).
5. Fittings (bolts, nuts, and washers) shall be galvanized in accordance with Item 445, "Galvanizing." Fittings shall be subsidiary to the bid item.
6. Crown shall be widened to accommodate the Metal Beam Guard Fence.
7. The lateral approach to the guard fence, shall have a slope rate of not more than 1V:10H.
8. Unless otherwise shown in the plans, guard fence placed in the vicinity of curbs shall be positioned so that the face of curb is located directly below or behind the face of the block. Rail placed over curbs shall be installed so that the post bolt is located approximately 21 inches above the gutter pan or roadway surface.
9. If solid rock is encountered within 0 to 18" of the finished grade, drill a 22" dia. hole, 24" into the rock, or drill two 12" dia. front to back overlapping holes, 24" into the rock. If solid rock is encountered below 18",drill a 12" dia. hole, 12" into the rock or to the standard embedment depth, whichever is less. Any excess post length, after meeting these depths, may be field cut to ensure proper guardrail mounting height. Backfill with a cohesionless material.
10. Guardrail posts shall not be set in concrete, of any depth.
11. Special rail fabrication will be required at installations having a curvature of less than 150 ft. radius. The required radius shall be shown on the plans.
12. The terminal anchor section (TAS) post shall be set in Class A concrete (unless otherwise shown in the plans) in accordance with Item 421,"Hydraulic Cement Concrete." Concrete shall be subsidiary to the bid item requiring construction of the terminal anchor section (TAS). Terminal anchor post to be galvanized in accordance with Item 445, "Galvanizing."
13. Unless otherwise shown in the plans, a composite material post and/or block that meets the requirements of DMS-7210,"Composite Material Posts and Blocks for Metal Beam Guard Fence" may be substituted for posts and/or 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 posts and/or blocks.

"DRIVEWAY" TERMINAL ANCHOR SECTION

Only for use within driveway locations, where a standard (TAS) Terminal Anchor Section can not be installed.



ELEVATION LAYOUT

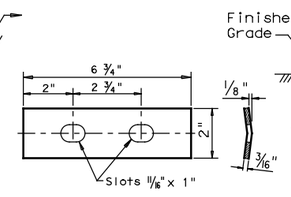
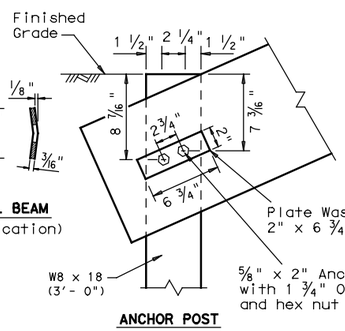
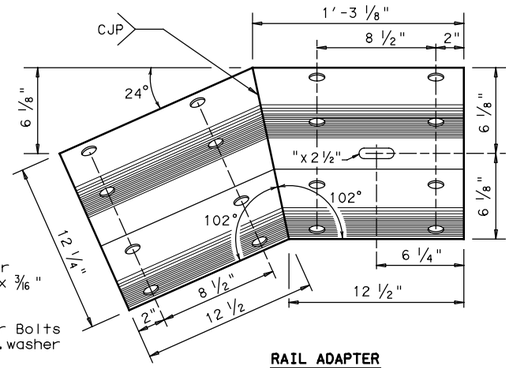


PLATE WASHER FOR METAL BEAM
(Galvanized after fabrication)



ANCHOR POST



RAIL ADAPTER
Rail - 10 gauge
(Galvanized after fabrication)

GENERAL NOTES

1. The "Driveway" Terminal Anchor Section is ONLY to be used within driveway locations, where the ROW is limited and a standard 25 ft.(TAS)Terminal Anchor Section,is too long.
2. Terminal anchor post shall be set in Class A concrete.
3. All steel shall be galvanized after fabrication in accordance with Item 445, "Galvanizing."

ONLY FOR USE IN MAINTENANCE REPAIRS OR HIGHLY CONSTRAINED SITE CONDITIONS.

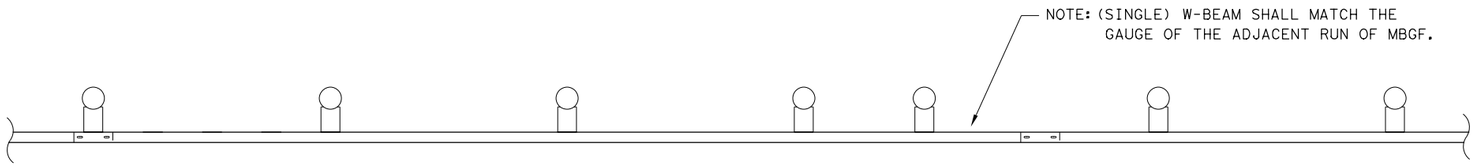
Texas Department of Transportation

Design Division Standard

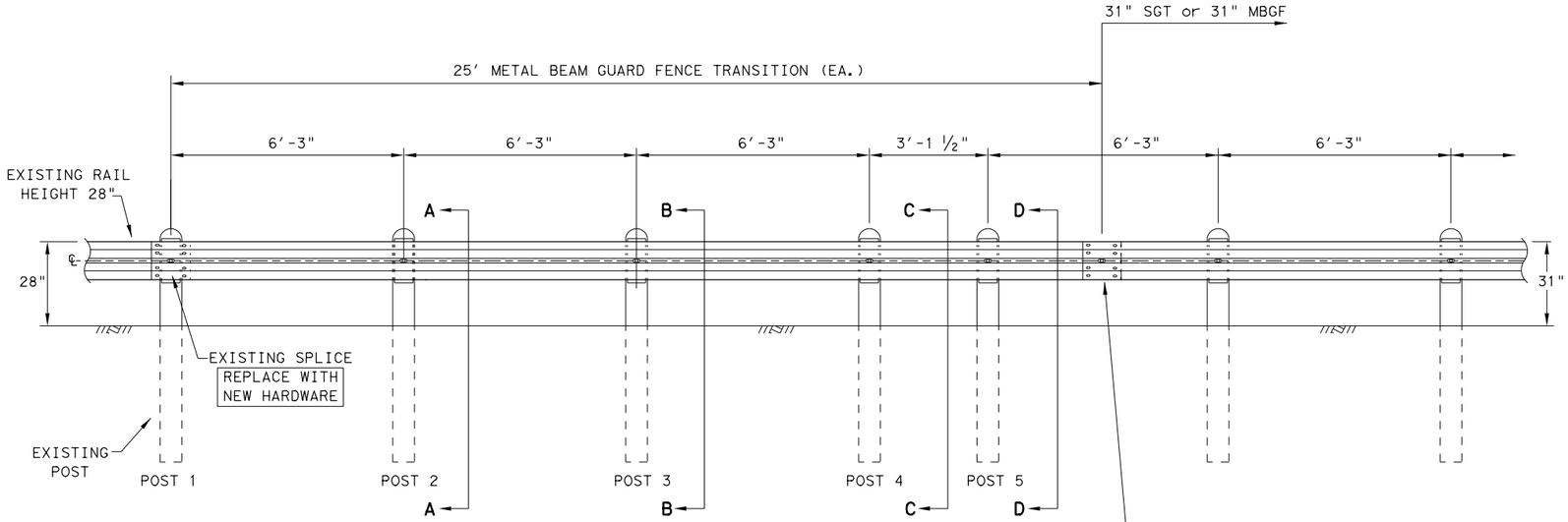
METAL BEAM GUARD FENCE
(SHORT RADIUS)
MBGF(SR)-19

FILE: mbgfsr19.dgn	DN: TxDOT	CK: KM	DW: BD	CK: VP
©TxDOT NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	1219	02	017, ETC.	FM 182
	DIST	COUNTY		SHEET NO.
	WACO	CORYELL		57

DATE:
FILE:

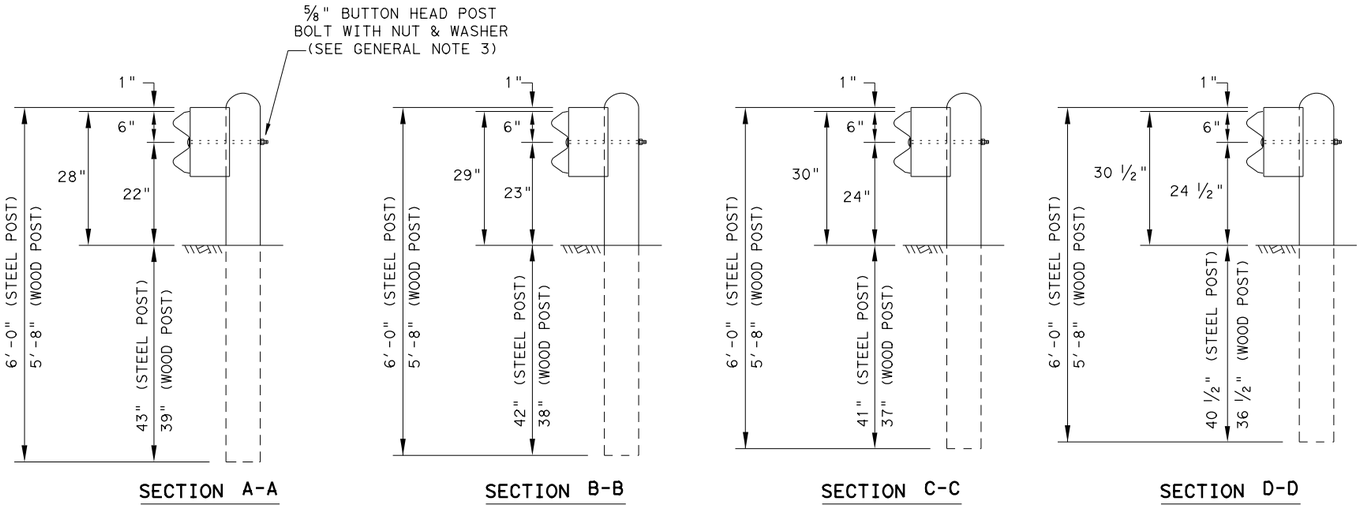


PLAN VIEW



ELEVATION VIEW

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



GENERAL NOTES

1. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST, OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. THE EXACT POSITION OF MBGF SHALL BE AS SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. STEEL POSTS TO BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING."
2. RAIL ELEMENT SHALL MEET THE REQUIREMENTS OF ITEM 540,"METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED IN THE PLANS. THE CONTRACTOR MAY FURNISH RAIL ELEMENTS OF 25'- 0", OR 12'- 6" (NOM.) LENGTHS. RAIL ELEMENTS MAY HAVE SLOTTED HOLES AT 3'- 1 1/2" C-C OR 6'-3" C-C. A SPECIAL LENGTH OF RAIL MAY BE MANUFACTURED TO ACCOMMODATE THE TRANSITION SECTIONS OF GUARDRAIL.
3. BUTTON HEAD "POST" BOLTS (ASTM A307) SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT (ASTM A563) AND 5/8" ROUND WASHER (ASTM F436) AND NOT MORE THAN 1" BEYOND IT. BUTTON HEAD "SPLICE" BOLTS (ASTM A307) ARE 5/8" X 1- 1/4" WITH 5/8" NUTS (ASTM A563).
4. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING." FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM REQUIRING CONSTRUCTION OF THE TRANSITION.
5. CROWN SHALL BE WIDENED TO ACCOMMODATE THE METAL BEAM GUARD FENCE.
6. THE LATERAL APPROACH TO THE GUARD FENCE, SHALL HAVE A MAXIMUM SLOPE OF 1V:10H.
7. IF SHOWN ELSEWHERE IN THE PLANS OR AS DIRECTED BY THE ENGINEER, THE GUARD FENCE MAY BE FLARED AT A RATE OF 25:1 OR FLATTER.
8. APPLICATIONS IN SOLID ROCK ARE ONLY ALLOWED WITH STEEL POSTS. SEE GF(31) STANDARD FOR INSTALLATION GUIDANCE.
9. POSTS SHALL NOT BE SET IN CONCRETE.
10. UNLESS OTHERWISE SHOWN IN THE PLANS, A COMPOSITE MATERIAL BLOCK THAT MEETS THE REQUIREMENTS OF DMS-7210,"COMPOSITE MATERIAL POSTS AND BLOCKS FOR METAL BEAM GUARD FENCE" MAY BE SUBSTITUTED FOR BLOCKS OF SIMILAR DIMENSIONS. THE CONSTRUCTION DIVISION, TXDOT MAINTAINS A MATERIAL PRODUCER LIST (MPL) FOR PRODUCERS OF MATERIALS CONFORMING TO DMS-7210. ONLY PRODUCERS ON THE MPL MAY FURNISH COMPOSITE MATERIAL BLOCKS.
11. REFER TO STANDARD GF(31) FOR ADDITIONAL DETAILS.
12. RAIL HEIGHT ADJUSTMENT IS ASSESSED AT TL-3 MASH COMPLIANT FOR STEEL POST HEIGHT TRANSITION TO 28" STEEL POST GUARDRAIL.

HARDWARE LIST	
QTY	DESCRIPTION
1	25'-0" W-BEAM RAIL ELEMENT 12GA. (TYP)
5	7 1/2" DIA X 6'-0" DOMED ROUND WOOD POSTS (TYP)
5	6" X 8" X 68" RECTANGULAR WOOD POSTS (TYP)
5	W6 X 8.5 OR W6 X 9 X 72" STEEL POSTS (TYP)
5	6" X 8" X 14" WOOD BLOCKS OR COMPOSITE (TYP)
5	5/8" X 18" GUARDRAIL BOLTS AND NUTS (FBB04)
5	5/8" ROUND WASHERS (ASTM F436)(FWC16a)
5	5/8" X 10" GUARDRAIL BOLTS AND NUTS (FBB03)
16	5/8" X 1- 1/4" GUARDRAIL SPLICE BOLTS WITH DOUBLE RECESSED NUTS (ASTM A563) (FBB01)

POST AND BLOCK-OUT TYPES AVAILABLE
FOR WOOD POST
FOR STEEL POST

NOTE: HARDWARE SHALL MEET THE FOLLOWING REQUIREMENTS.

GUARDRAIL POST BOLTS (ASTM A307 GR.A)
GUARDRAIL ROUND WASHERS (ASTM F436)
GUARDRAIL DOUBLE RECESSED NUTS (ASTM A563)
GUARDRAIL SPLICE BOLTS (ASTM A307 GR.A)
GUARDRAIL SPLICE NUTS (ASTM A563)

Texas Department of Transportation

Design Division Standard

METAL BEAM GUARD FENCE RAIL HEIGHT ADJUSTMENT (28" TO 31") TL-3 MASH COMPLIANT

RAIL-ADJ(B)-19

FILE: railadjb19	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	1219	02	017, ETC.	FM 182
	DIST	COUNTY		SHEET NO.
	WACO	CORYELL		58

DATE: 4/5/2023
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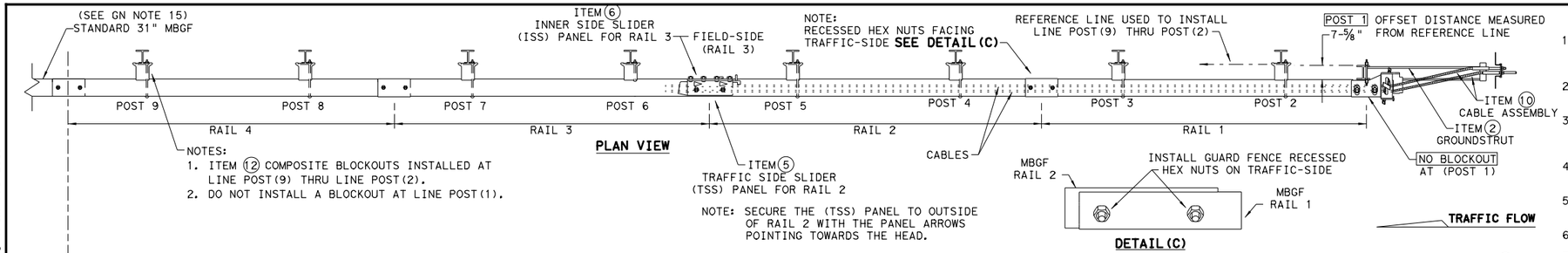
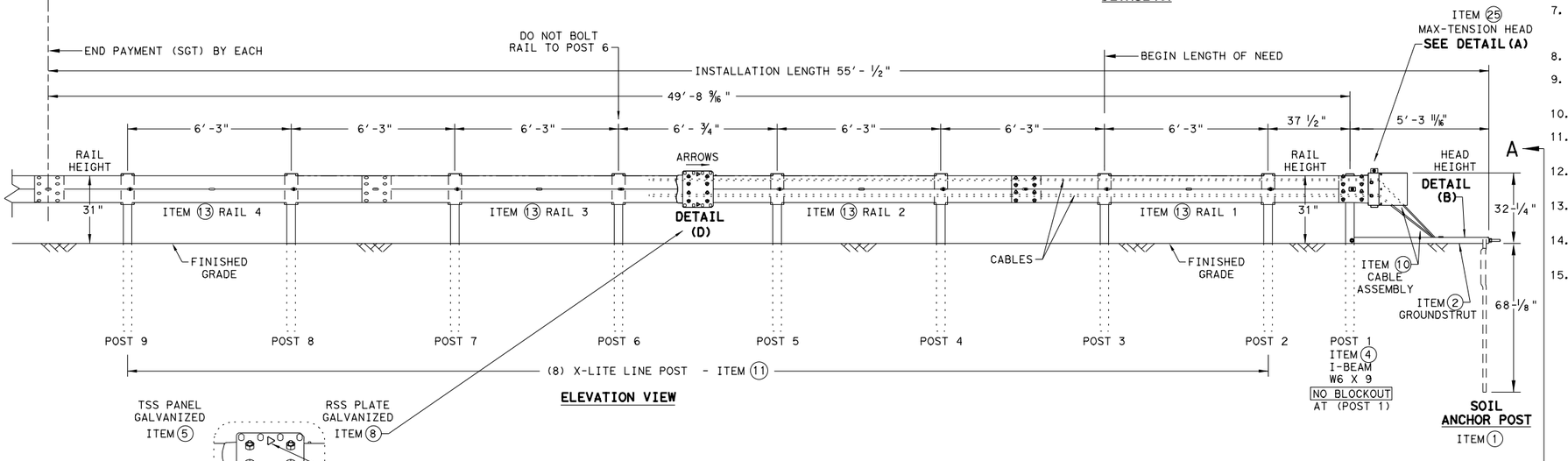


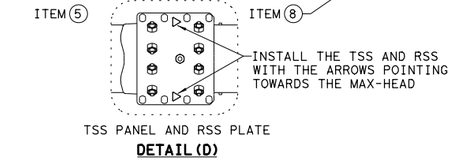
PLAN VIEW

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

DETAIL (C)

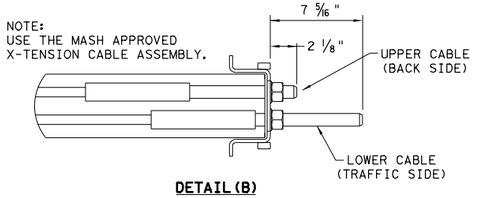


ELEVATION VIEW

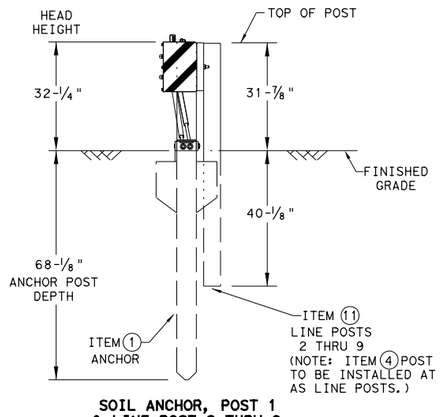


TSS PANEL AND RSS PLATE

DETAIL (D)

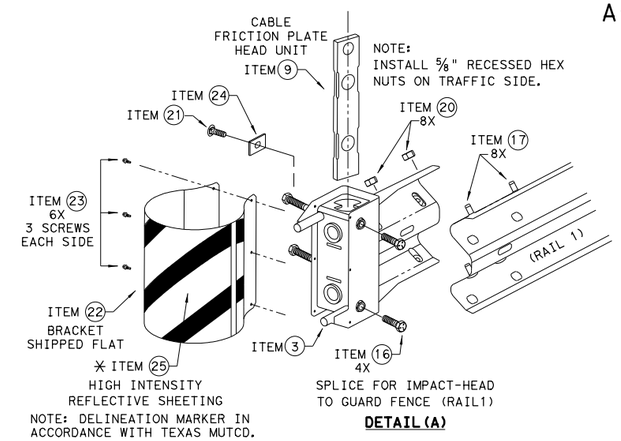


DETAIL (B)



SOIL ANCHOR, POST 1
& LINE POST 2 THRU 9

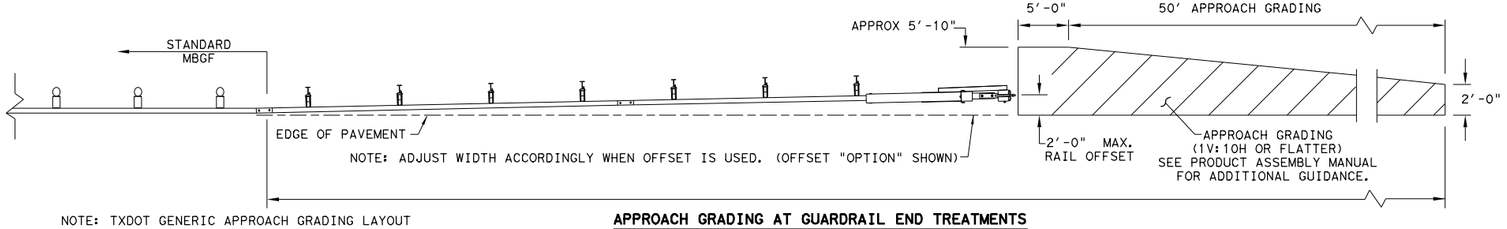
SECTION VIEW A-A



DETAIL (A)

* TO BE PROVIDED BY DISTRIBUTOR OR CONTRACTOR.

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



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

APPROACH GRADING AT GUARDRAIL END TREATMENTS

TRAFFIC FLOW

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

GENERAL NOTES

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

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

Texas Department of Transportation

Design Division Standard

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

FILE: sgt11s3118.dgn	DN: TxDOT	CK: KM	DW: TxDOT	CK: CL
© TxDOT: FEBRUARY 2018	CONT	SECT	JOB	HIGHWAY
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	DIST	COUNTY		SHEET NO.
	WACO	CORYELL		59

DATE: 4/5/2023
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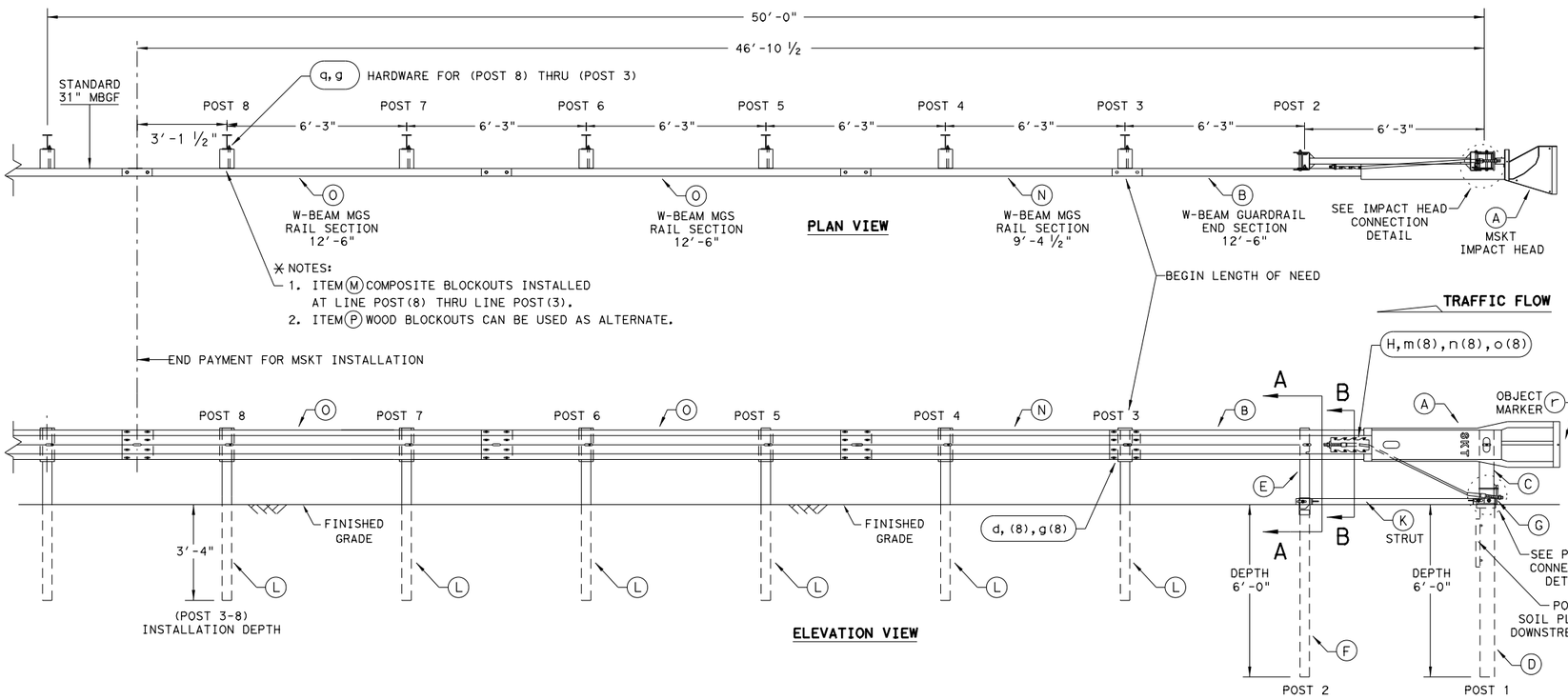


NOTE: SEE (GENERAL NOTE 14) FOR DRIVING CAP INFORMATION.

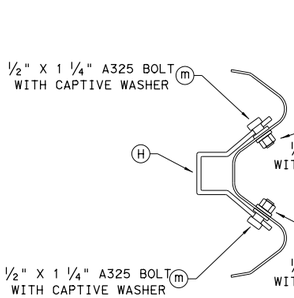
GENERAL NOTES

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

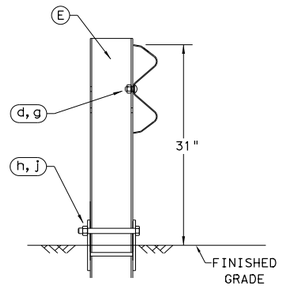
ITEM	QTY	MAIN SYSTEM COMPONENTS	ITEM NUMBERS
A	1	MSKT IMPACT HEAD	MS3000
B	1	W-BEAM GUARDRAIL END SECTION, 12 Ga.	SF1303
C	1	POST 1 - TOP (6" X 6" X 1/8" TUBE)	MTPHP1A
D	1	POST 1 - BOTTOM (6' W6X15)	MTPHP1B
E	1	POST 2 - ASSEMBLY TOP	UHP2A
F	1	POST 2 - ASSEMBLY BOTTOM (6' W6X9)	HP2B
G	1	BEARING PLATE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

SEE NOTES: ✳

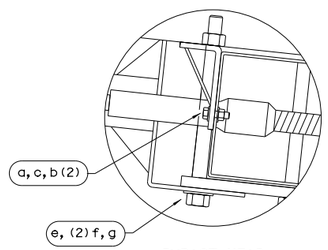
ALTERNATIVE ITEMS NOT SHOWN. ✳✳
✳ ITEM(P) 8" WOOD-BLOCKOUT
✳✳ ITEM(Q) 25'GUARD FENCE PANEL



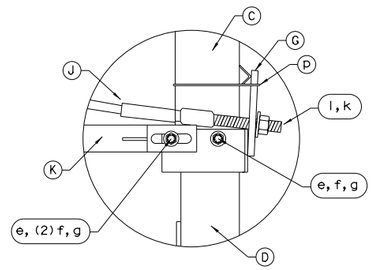
SECTION B-B
ANCHOR BRACKET



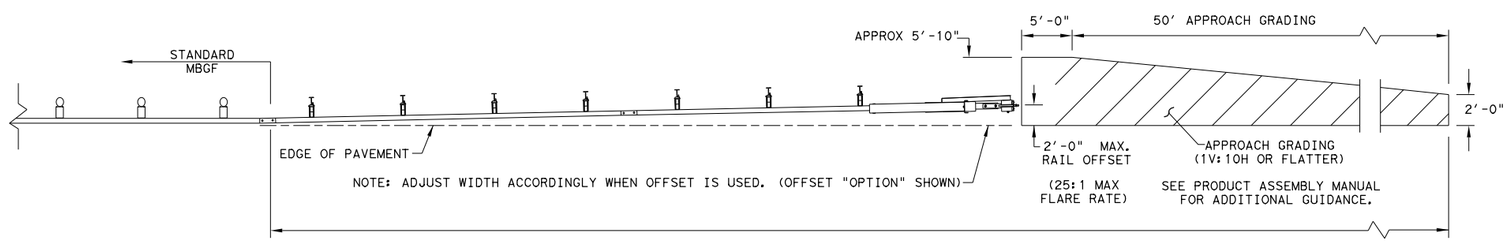
POST 2
SECTION A-A



IMPACT HEAD
CONNECTION DETAIL



POST 1
CONNECTION DETAIL



APPROACH GRADING AT GUARDRAIL END TREATMENTS

TRAFFIC FLOW

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

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

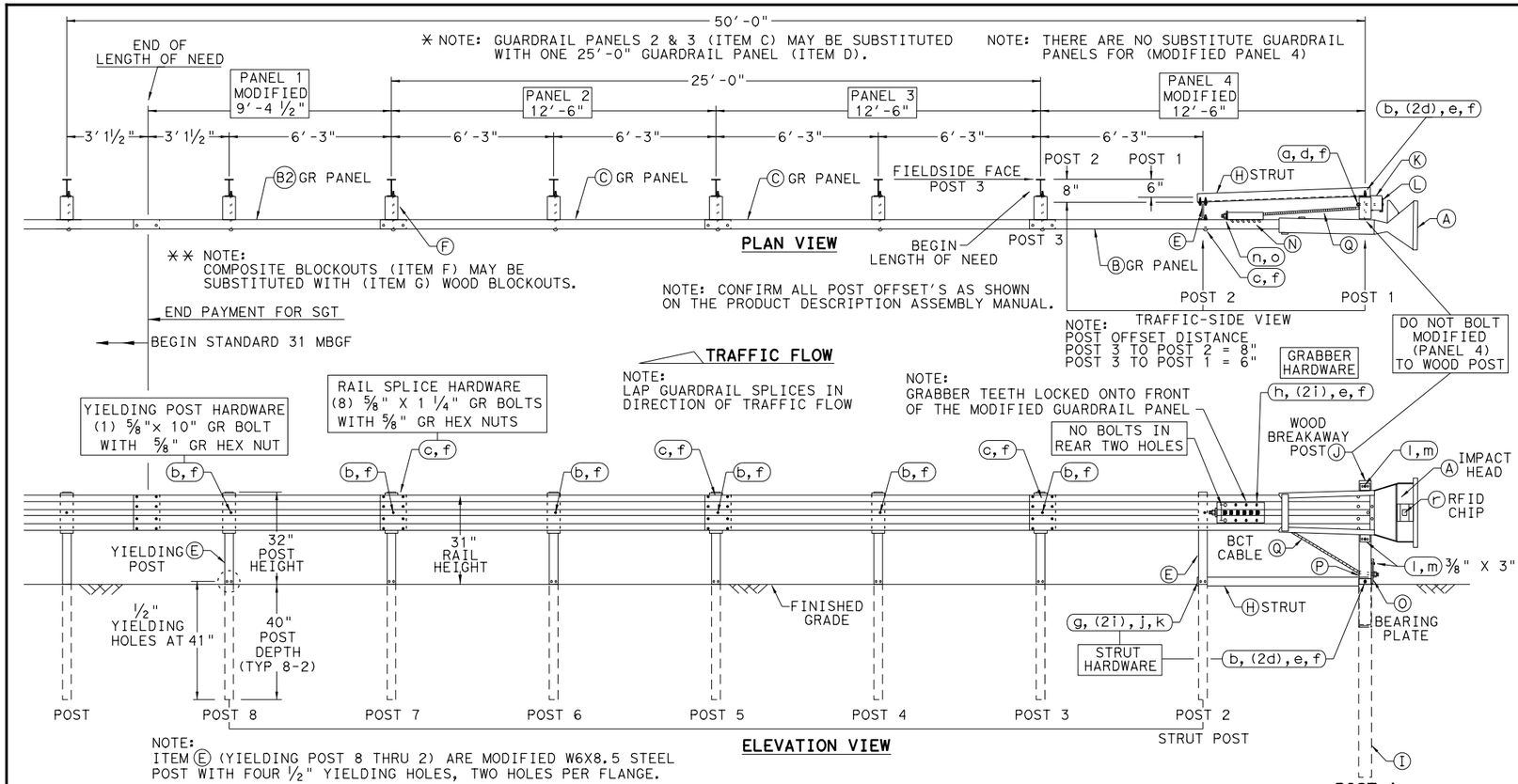
Texas Department of Transportation

Design Division Standard

SINGLE GUARDRAIL TERMINAL
MSKT-MASH-TL-3
SGT(12S)31-18

FILE: sgt12s3118.dgn	DN:TxDOT	CK:KM	DW:VP		CK:CL
© TxDOT: APRIL 2018	CONT	SECT	JOB		HIGHWAY
REVISIONS	1219	02	017, ETC.		FM 182
	DIST	COUNTY			SHEET NO.
	WACO	CORYELL			60

DATE:
FILE:

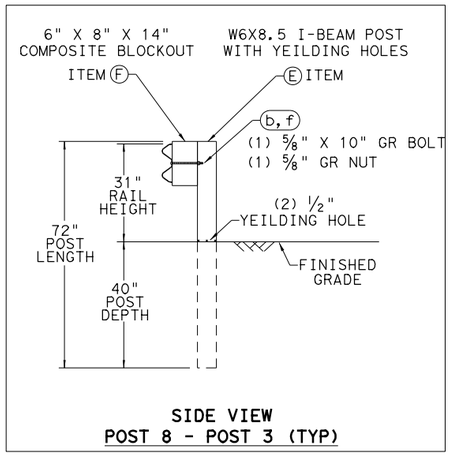


GENERAL NOTES

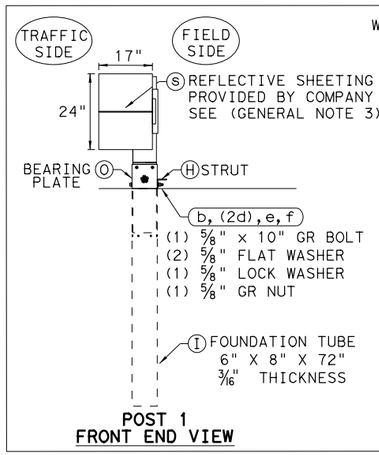
1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: SPIG INDUSTRY, INC. AT 1(267) 644-9510. 14675 INDUSTRIAL PARK RD; BRISTOL, VA 24202
2. FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO THE MANUFACTURER'S; SGET END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY MANUAL.
3. MANUFACTURER WILL APPLY HIGH INTENSITY REFLECTIVE SHEETING, "OBJECT MARKER" TO THE FACE PLATE OF THE DEVICE PER MANUFACTURER'S RECOMMENDATIONS. THE OBJECT MARKER SHALL CONFORM TO THE STANDARDS REQUIRED IN TEXAS MUTCD.
4. THE NOMINAL HEIGHT OF THE GUARDRAIL BEAM IS 31 INCHES WITH A TOLERANCE OF +/- ONE INCH.
5. FOR POST (LEAVE-OUT) INSTALLATION AND GUIDANCE SEE TXDOT'S LATEST ROADWAY MOW STRIP STANDARD.
6. (POST 2 THROUGH POST 8) ARE MODIFIED STEEL-YIELDING POSTS WITH YIELDING HOLES AT GROUND LEVEL. THERE ARE NO SUBSTITUTE POSTS.
7. POSTS SHALL NOT BE SET IN CONCRETE.
8. IF SOLID ROCK IS ENCOUNTERED FOR ANY OF THE POSTS IN THE SYSTEM, CONTACT THE MANUFACTURER FOR SPECIFIC INSTALLATION GUIDANCE.
9. HARDWARE (BOLTS, NUTS, & WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445,"GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
10. A COMPOSITE MATERIAL BLOCKOUT THAT MEETS DMS-7210 REQUIREMENTS MAY BE SUBSTITUTED FOR AN APPROVED WOOD BLOCKOUT. SEE CONSTRUCTION DIVISION MATERIAL PRODUCER LIST (MPL) FOR CERTIFIED PRODUCERS.
11. THE ENTIRE SYSTEM MUST BE INSTALLED IN A STRAIGHT LINE WITHOUT ANY CURVE. HOWEVER, THE SYSTEM CAN BE OFFSET BY TWO FEET AS SHOWN ON THE APPROACH GRADING DETAIL TO HELP OFF-SET THE IMPACT HEAD FROM SHOULDER OF THE ROAD.

ITEM	QTY	MAIN SYSTEM COMPONENTS	ITEM #
A	1	SGET IMPACT HEAD	SIH1A
B	1	MODIFIED GUARDRAIL PANEL 12'-6" 12GA	126SPZGP
B2	1	MODIFIED GUARDRAIL PANEL 9'-4 1/2" 12GA	GP94
C	2	STANDARD GUARDRAIL PANEL 12'-6" 12GA	GP126
D	1	STANDARD GUARDRAIL PANEL 25'-0" 12GA	GP25
E	7	MODIFIED YIELDING I-BEAM POST W6x8.5	YP6MOD
F	6	COMPOSITE BLOCKOUT 6" X 8" X 14"	CBO8
G	6	WOOD BLOCKOUT 6" X 8" X 14"	WBO8
H	1	STRUT 3" X 3" X 80" x 1/4" A36 ANGLE	STR80
I	1	FOUNDATION TUBE 6" X 8" X 72" x 3/16"	FNDT6
J	1	WOOD BREAKAWAY POST 5 1/2" x 7 1/2" x 50"	WBRK50
K	1	WOOD STRIKE BLOCK	WSBLK14
L	1	STRIKE PLATE 1/4" A36 BENT PLATE	SPLT8
M	1	REINFORCEMENT PLATE 12 GA. GR55	REPLT17
N	1	GUARDRAIL GRABBER 2 1/2" X 2 1/2" X 16 1/2"	GGR17
O	1	BEARING PLATE 8" X 8 5/8" X 5/8" A36	BPLT8
P	1	PIPE SLEEVE 4 1/4" X 2 3/8" O.D. (2 1/8" I.D.)	PSLV4
Q	1	BCT CABLE 3/4" X 81" LENGTH	CBL81
		SMALL HARDWARE	
a	1	5/8" X 12" GUARDRAIL BOLT 307A HDG	12GRBLT
b	7	5/8" X 10" GUARDRAIL BOLT 307A HDG	10GRBLT
c	33	5/8" X 1 1/4" GR SPLICE BOLTS 307A HDG	1GRBLT
d	3	5/8" FLAT WASHER F436 A325 HDG	58FW436
e	1	5/8" LOCK WASHER HDG	58LW
f	39	5/8" GUARDRAIL HEX NUT HDG	58HN563
g	2	1/2" X 2" STRUT BOLT A325 HDG	2BLT
h	6	1/2" X 1 1/4" PLATE BOLT A325 HDG	125BLT
i	16	1/2" FLAT WASHER F436 A325 HDG	12FWF436
j	8	1/2" LOCK WASHER HDG	12LW
k	8	1/2" HEX NUT A563 HDG	12HN563
l	4	3/8" X 3" HEX LAG SCREW GR5 HDG	38LS
m	4	3/8" FLAT WASHER F436 A325 HDG	38FW844
n	2	1" FLAT WASHER F436 A325 HDG	1FWF436
o	2	1" HEX NUT A563DH HDG	1HN563
p	1	18" TO 24" LONG ZIP TIE RATED 175-200LB	ZPT18
q	1	1 1/2" X 4" SCH-40 PVC PIPE	PSPCR4
r	1	RFID CHIP RATED MIL-STD-810F	RFID810F
s	1	IMPACT HEAD REFLECTIVE SHEETING	RS30M

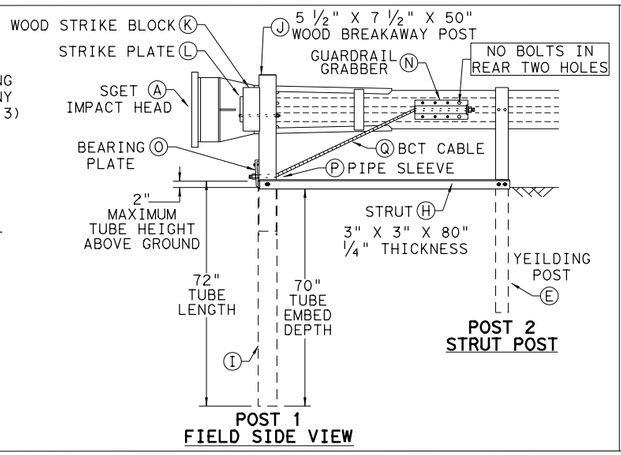
ALTERNATIVE ITEMS
NOTE: SEE PLAN VIEW
* D
** G



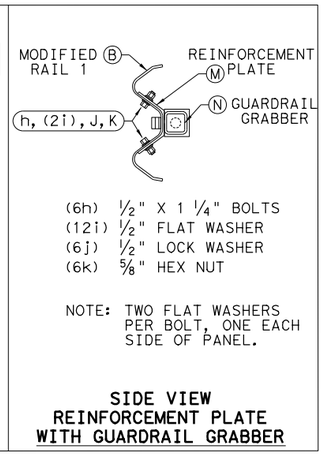
SIDE VIEW
POST 8 - POST 3 (TYP)



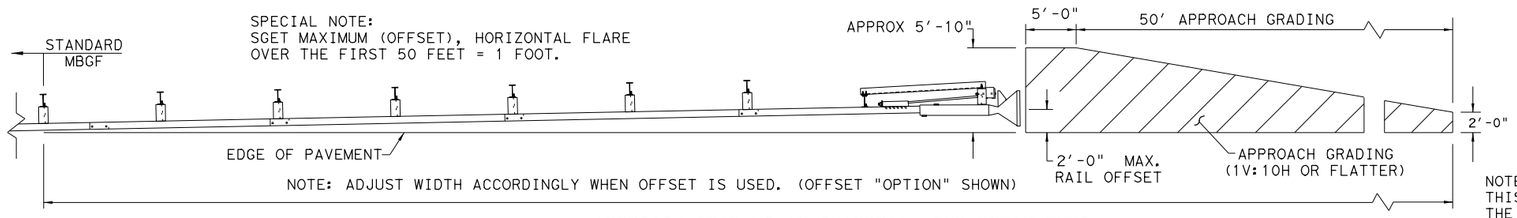
POST 1
FRONT END VIEW



POST 1
FIELD SIDE VIEW
POST 2
STRUT POST



SIDE VIEW
REINFORCEMENT PLATE
WITH GUARDRAIL GRABBER



APPROACH GRADING AT GUARDRAIL END TREATMENTS

NOTE:
THIS STANDARD IS A BASIC REPRESENTATION OF THE SGET TERMINAL SYSTEM AND IS NOT INTENDED TO REPLACE THE MANUFACTURER'S ASSEMBLY MANUAL.

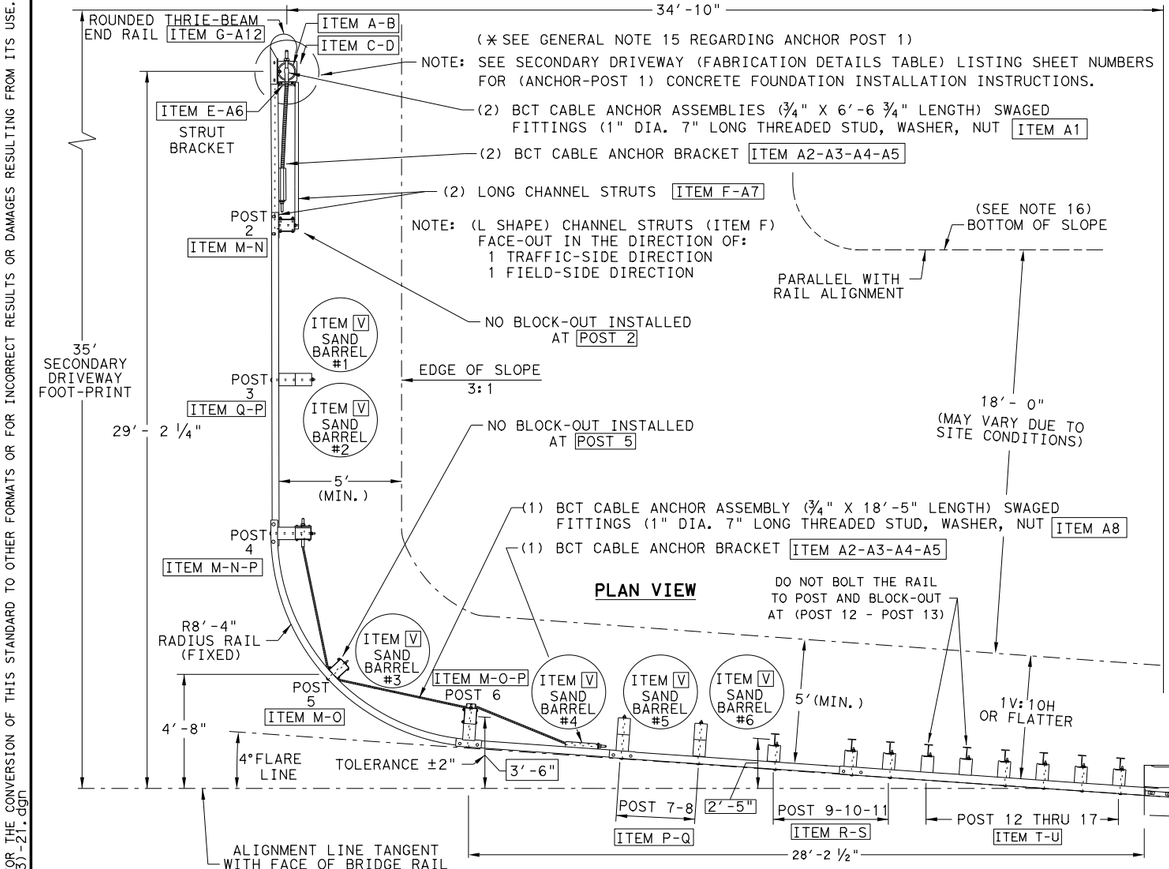
Texas Department of Transportation

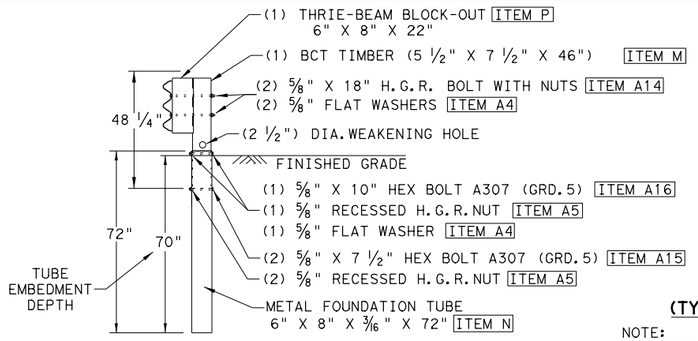
Design Division Standard

SPIG INDUSTRY, LLC
SINGLE GUARDRAIL TERMINAL
SGET - TL-3 - MASH
SGT(15)31-20

FILE: sgt15312o.dgn	DN: TxDOT	CK: KM	DW: VP	CK: VP			
© TxDOT: APRIL 2020	CONT	SECT	JOB	HIGHWAY			
REVISIONS	1219	02	017, ETC.	FM 182			
	DIST	COUNTY		SHEET NO.			
	WACO	CORYELL		61			

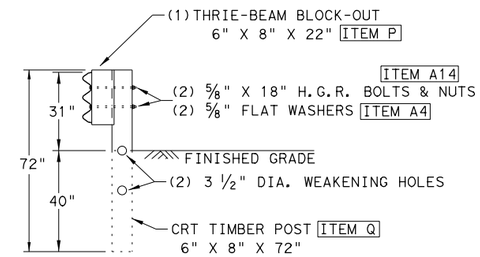
DATE: 4/5/2023
FILE: T:\Road Dept\Department\Team Texas\txdot cadd standards\roadway\SRG(TL-3)-21.dgn





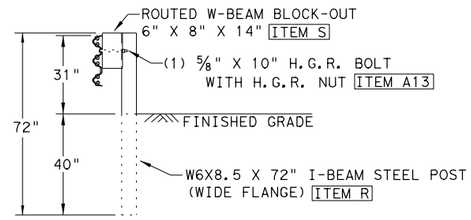
SECTION VIEW (A-A)
TIMBER POST WITH METAL FOUNDATION TUBE
(TYP) BCT POSTS 2-4-5-6

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

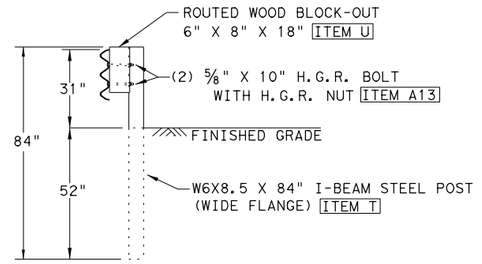


SECTION VIEW (B-B)
(TYP) CRT TIMBER POSTS 3-7-8

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



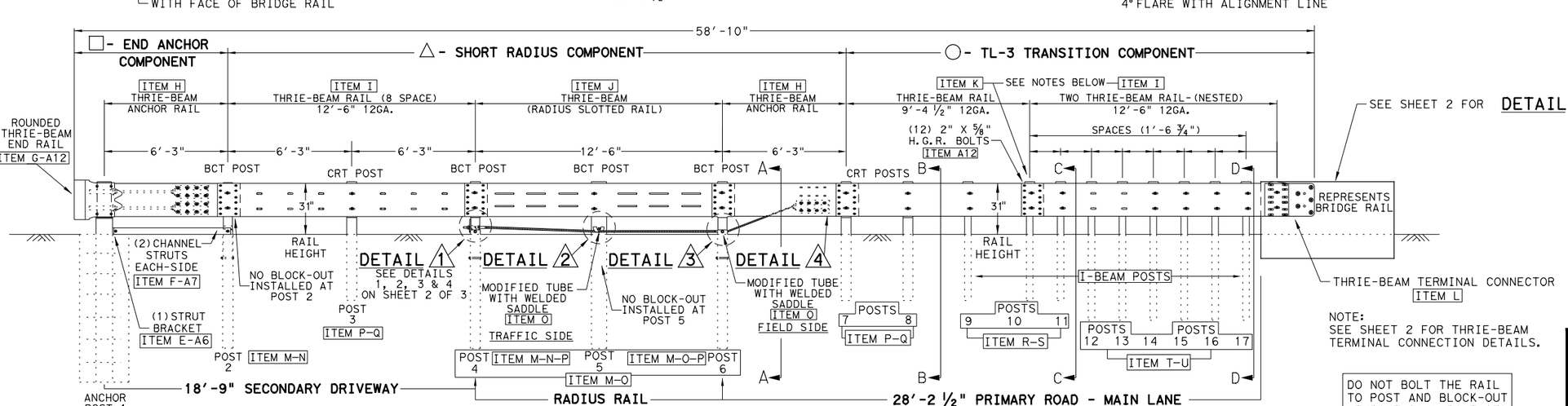
SECTION VIEW C-C
(TYP) AT POSTS 9-10-11



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

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

NOTE: FOR POST 12 & 13



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

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

NOTE: FOR POST 12 & 13

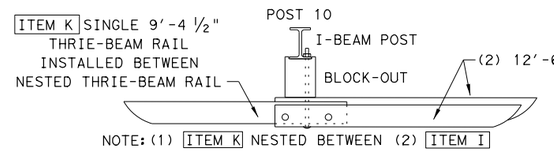
(MASH TL-3 COMPLIANT)
TESTED TO MASH TL-3 WITH A 3:1 SLOPE

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

FULL-LENGTH ELEVATION VIEW

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

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



NESTED-GUARDRAIL SPLICE AT POST 10

SHEET 1 OF 3

Texas Department of Transportation

Design Division Standard

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

FILE: srgt1321	TxDOT	CK:KM	DN: VP	CK:CGL
© TxDOT: FEBRUARY 2021	CONT	SECT	JOB	HIGHWAY
REVISIONS	1219	02	017, ETC.	FM 182
	DIST	COUNTY		SHEET NO.
	WACO	CORYELL		62

DATE: 4/5/2023
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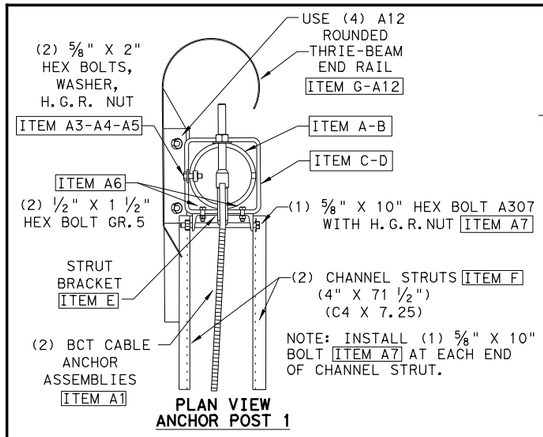
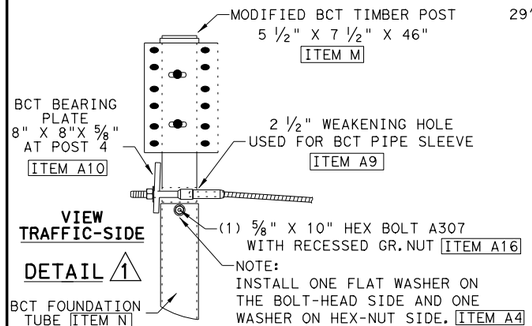
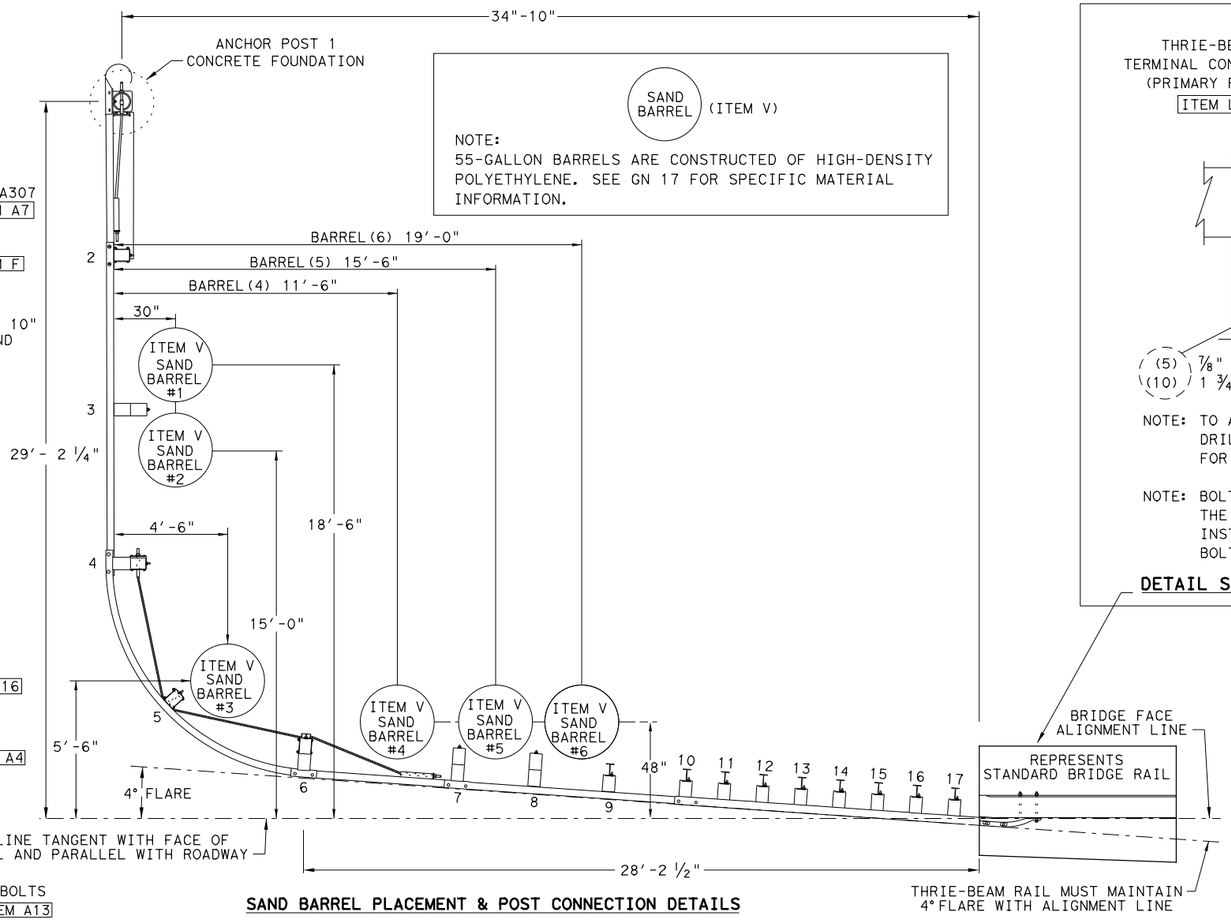


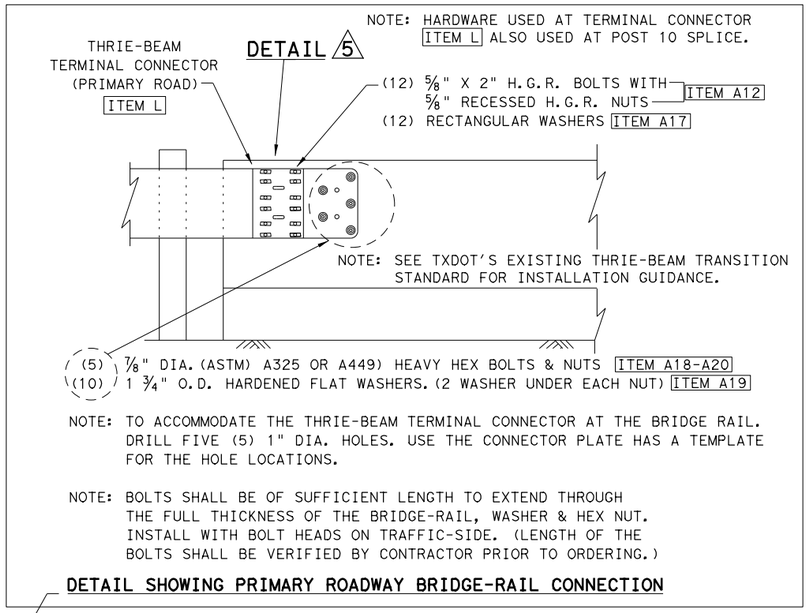
PLAN VIEW ANCHOR POST 1



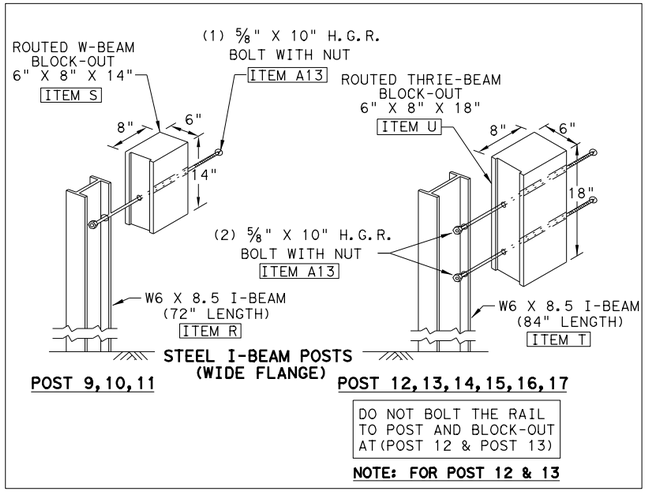
BCT (POST 4) TIMBER POST WITH METAL FOUNDATION TUBE

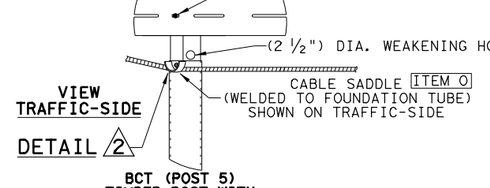


SAND BARREL PLACEMENT & POST CONNECTION DETAILS

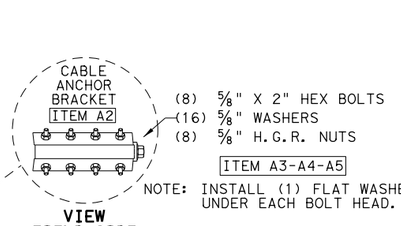


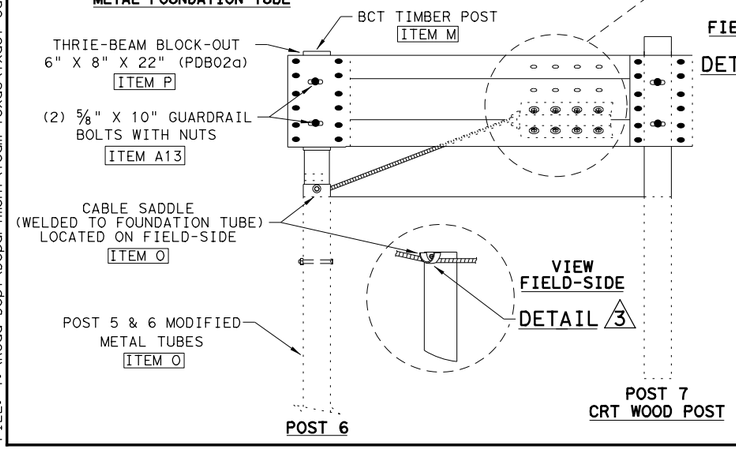
DETAIL SHOWING PRIMARY ROADWAY BRIDGE-RAIL CONNECTION

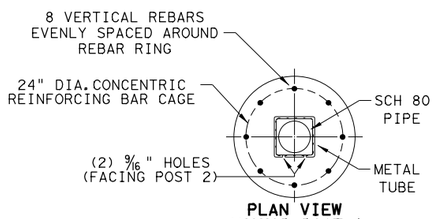




BCT (POST 5) TIMBER POST WITH METAL FOUNDATION TUBE

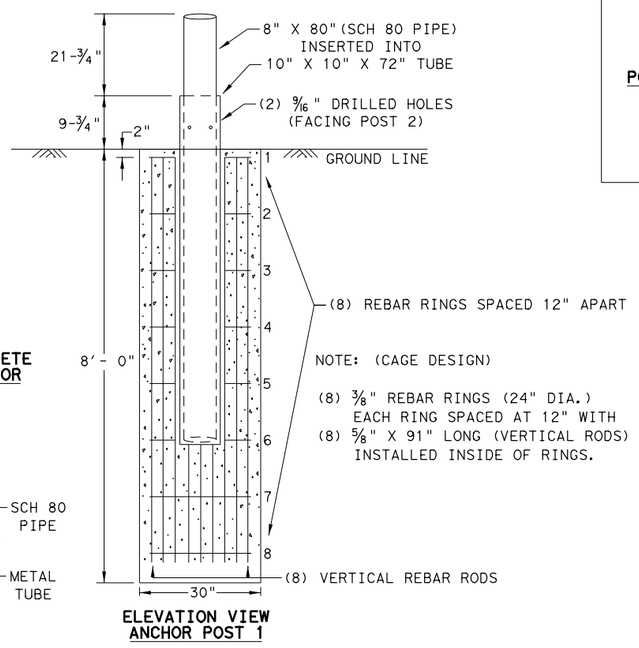






POST 1 REINFORCED CONCRETE FOUNDATION ANCHOR

PLAN VIEW ANCHOR POST 1



ELEVATION VIEW ANCHOR POST 1

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

Texas Department of Transportation — Design Division Standard

TL-3
SHORT RADIUS GUARDRAIL
MASH COMPLIANT

SRG(TL-3)-21

FILE: srgtl321	TxDOT	CK:KM	DN: VP	CK:CGL
© TxDOT: FEBRUARY 2021	CONT	SECT	JOB	HIGHWAY
REVISIONS	1219	02	017, ETC.	FM 182
	DIST	COUNTY		SHEET NO.
	WACO	CORYELL		63

DATE: 4/5/2023
FILE: T:\Road Dept\Department\Team Texas\txdot cadd standards\roadway\SRG(TL-3)-21.dgn

ITEM	ALL LARGE & SMALL COMPONENT DESCRIPTIONS	END ANCHOR (POST 1 & POST 2) □		TL-3 SHORT RADIUS (POST 2 TO POST 7) △		TL-3 TRANSITION (POST 7 TO POST 17) ○		TL-3 SHORT RADIUS GUARDRAIL COMPLETE SYSTEM	
		ITEM	QTY	ITEM	QTY	ITEM	QTY	ITEM	TOTAL QTY
A	POST 1 TOP (SCH.80 PIPE) (8" X 80" LENGTH)	A	1					A	1
B	POST 1 TOP (WELDED SUPPORT COLLAR 10" X 10" X ½" ASTM A36)	B	1					B	1
C	POST 1 TUBE (HSS 10" X 10" X ½" X 72" LENGTH) A500 GR.B	C	1					C	1
D	POST 1 (WELDED PLATE 9 ¼" X 9 ¼" X ⅛") A36	D	1					D	1
E	POST 1 STRUT BRACKET (C8 X 11.50 A36)	E	1					E	1
F	(POST 1 & 2) CHANNEL STRUTS (4" X 71 ½")(C4 X 7.25)A36	F	2					F	2
G	THRIE-BEAM RAIL (END ANCHOR - ROUNDED TYPE) 12GA. (RTE02a)	G	1					G	1
H	THRIE-BEAM RAIL (ANCHOR) (6'-3" LENGTH) 12GA. (RWM14a)	H	1	H	1			H	2
I	THRIE-BEAM RAIL (8 SPACE) (12'-6" LENGTH) 12GA. (RTM08)			I	1	I	2	I	3
J	THRIE-BEAM RAIL (RADIUS 8'-4 ½") (SLOTTED) 12GA.			J	1			J	1
K	THRIE-BEAM RAIL (3 SPACE) (9'-4 ½" LENGTH) 12GA.					K	1	K	1
L	THRIE BEAM RAIL (TERMINAL CONNECTOR) (BRIDGE-RAIL) (RTE01b)					L	1	L	1
M	POST 2,4,5,6 BCT TIMBER (5 ½" X 7 ½" X 46") (PDF04)			M	4			M	4
N	POST 2,4, BCT TUBE (6" X 8" X ⅜" X 72" LENGTH) (PTE05)			N	2			N	2
O	POST 5,6 MODIFIED BCT TUBES (FOR WELDED CABLE SADDLES)			O	2			O	2
P	POST 3,4,6,7,8 THRIE-BEAM BLOCK-OUT (6" X 8" X 22")(PDB02a)			P	4	P	1	P	5
Q	POST 3,7,8 CRT TIMBER POSTS (6" X 8" X 72" LENGTH)(PDE09)			Q	2	Q	1	Q	3
R	POST 9,10,11 I-BEAM POSTS (W6X8.5 X 72" LENGTH) (PWE01)					R	3	R	3
S	POST 9,10,11 ROUTED W-BEAM BLOCK-OUT(6" X 8" X 14")(PDB01b)					S	3	S	3
T	POST 12 THRU 17 I-BEAM POSTS (W6X8.5 X 84" LENGTH) (PWE07)					T	6	T	6
U	POST 12 THRU 17 ROUTED BLOCK-OUT (6" X 8" X 18") (PDB??)					U	6	U	6
V	SAND BARRELS 700-715 LBS							V	6
A1	BCT CABLE ANCHOR ASSEMBLIES (¾" X 6'-6 ¾" LENGTH) (FCA01)	A1	2					A1	2
A2	BCT CABLE ANCHOR BRACKET (FPA01)	A2	2	A2	1			A2	3
A3	⅝" X 2" HEX BOLT A307 GRD.5 (FOR CABLE BRACKETS)	A3	18	A3	8			A3	26
A4	⅝" FLAT WASHER A307 GRD.5 (1 WASHER UNDER BOLT HEAD & 1 NUT)	A4	36	A4	40			A4	76
A5	⅝" RECESSED H.G.R NUT (NUTS FOR HEX BOLTS)	A5	22	A5	20			A5	42
A6	STRUT BRACKET HARDWARE (½" X 1 ½") HEX BOLT A307 GRD.5	A6	2					A6	2
A7	CHANNEL STRUT HARDWARE (⅝" X 10") HEX BOLT A307 GRD.5	A7	2					A7	2
A8	BCT CABLE ANCHOR ASSEMBLY (FCA02) (¾" X 18'-5" LENGTH)			A8	1			A8	1
A9	BCT POST SLEEVE (FMM02a) (POST 4 ONLY)			A9	1			A9	1
A10	BCT CABLE BEARING PLATE (⅝" X 8" X 8" (FPB01) (POST 4 ONLY)			A10	1			A10	1
A11	⅝" X 1 ¼" H.G.R. BOLTS (FBB01) (SPLICES AT POST 2,4,6,7)			A11	48			A11	48
A12	⅝" X 2" H.G.R. BOLTS (FBB02)(ROUND TERM-POST 10-END SPLICE)	A12	4			A12	24	A12	28
A13	⅝" X 10" H.G.R. BOLTS (FBB03) (I-BEAM POSTS RAIL & BLOCKOUT)					A13	18	A13	18
A14	⅝" X 18" H.G.R. BOLTS (FBB04) (POSTS 3,4,6,7,8)			A14	8	A14	2	A14	10
A15	⅝" X 7 ½" HEX BOLTS A307 GRD.5 (BCT POSTS 2,4,5,6)			A15	8			A15	8
A16	⅝" X 10" HEX BOLTS A307 GRD.5 (BCT POSTS 2,4,5,6)			A16	4			A16	4
A17	RECTANGULAR WASHERS (FWR03) (FOR TERMINAL CONNECTOR RTE01b)					A17	12	A17	12
A18	⅞" X (LENGTH VARIES) HEX BOLTS A325 OR A449 GR.5					A18	5	A18	5
A19	1 ¾" O.D. HARDENED FLAT WASHER A325					A19	10	A19	10
A20	⅞" HEX NUT GR.5 A325					A20	5	A20	5

GENERAL NOTES

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

NOTE: SEE SHEET 1 OF 3.

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

SPECIAL APPLICATION NOTES.

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

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

SHEET 3 OF 3

Texas Department of Transportation — Design Division Standard

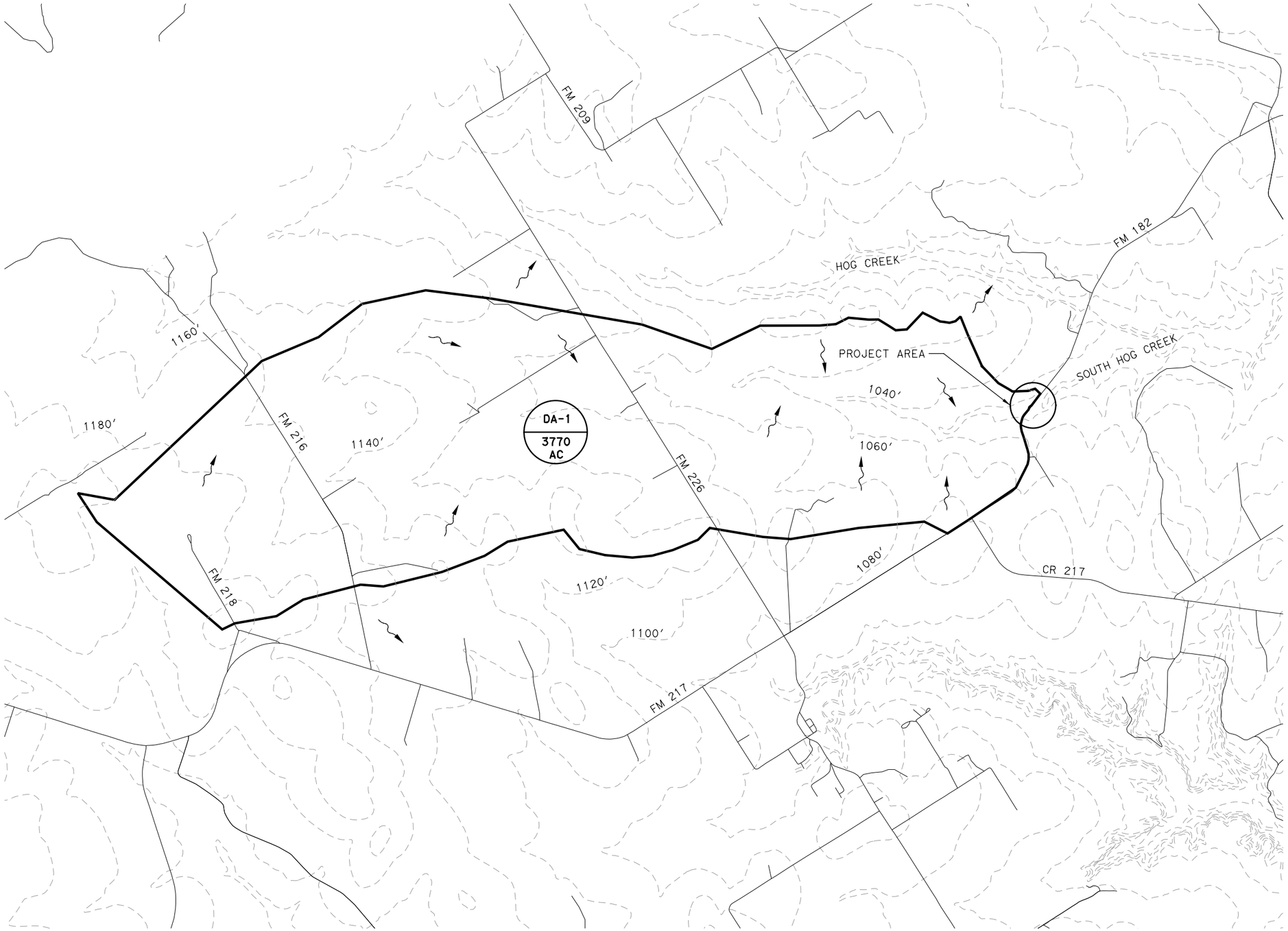
TL-3
SHORT RADIUS GUARDRAIL
MASH COMPLIANT

SRG(TL-3)-21

FILE: srgt1321	TxDOT	CK:KM	DN: VP	CK:CGL
© TxDOT: FEBRUARY 2021	CONT	SECT	JOB	HIGHWAY
REVISIONS	1219	02	017, ETC.	FM 182
	DIST	COUNTY		SHEET NO.
	WACO	CORYELL		64

RUNOFF COMPUTATIONS: HYDROGRAPH METHOD

DRAINAGE ID	AREA (AC)	AREA (SQ MI)	Tc LAG (MIN)	CN	Q 25-YEAR (CFS)	Q 100-YEAR (CFS)
1	3770	5.89	116.4	63	2643	4205



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0 1500 3000

SCALE IN FEET

LEGEND

- DRAINAGE AREA
- 20-FT CONTOURS
- FLOW ARROW
- ROADS
- A / XXXX — DA ID / DA ACRES

NOTES

1. FLOWS WERE COMPUTED USING HYDROGRAPH METHOD. REFER TO TxDOT HYDRAULIC DESIGN MANUAL CH 4.
2. FROM TXDOT HDM CH. 4 FIGURE 4-20. A CLIMATIC ADJUSTMENT FACTOR OF -12 WAS APPLIED TO CURVE NUMBER CALCULATIONS.
2. CONTOURS ARE SHOWN AT 20' INTERVALS AND WERE OBTAINED FROM TNRIS ELEVATION DATASET.

PRINT DATE	REVISION DATE
4/5/2023	

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AMERICAN STRUCTUREPOINT INC.

TBPE FIRM NO. F-10069

Texas Department of Transportation

FM 182 AT SOUTH HOG CREEK

DRAINAGE AREA MAP

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		FM 182

STATE	DISTRICT	COUNTY	
TEXAS	WACO	CORYELL	
CONTROL	SECTION	JOB	SHEET NO.
1219	02	017, ETC.	65

REV DATE: 4/5/2023
CSJ: 1219-02-017, ETC.
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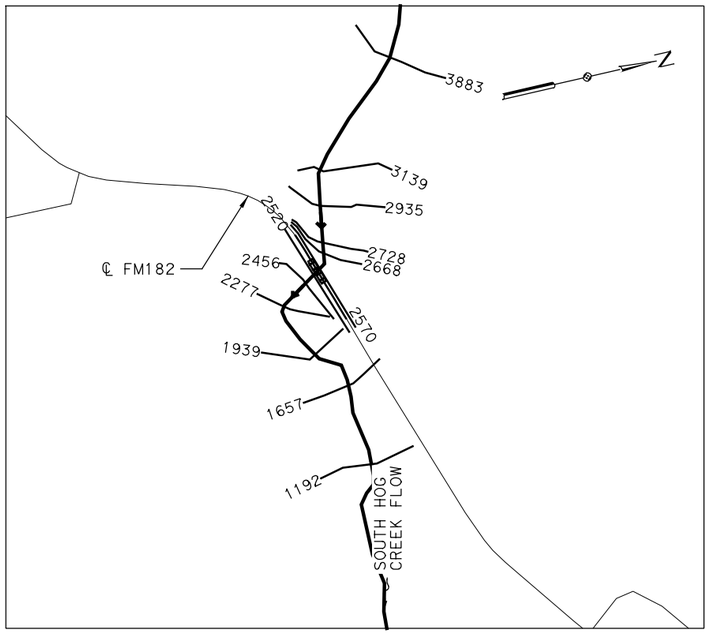


CROSS SECTION LOCATION MAP

EXISTING CONDITIONS

LOCATION OF STREAM X-SECT	CHANNEL STATION (FT)	Q (CFS)	VEL (FPS)	WSEL (FT)
CONVERGING	3655	2643	6.61	1016.74
UPSTREAM BOUNDING	2570	2643	5.26	1011.38
INSIDE OF BRIDGE	2550	2643	9.37	1012.7
DOWNSTREAM BOUNDING	2520	2643	6.86	1009.61
CONVERGING	1475	2643	7.13	1003.87
DOWNSTREAM	1192	2643	7.01	1002.14

FREQUENCY = 25 YEAR

PROPOSED CONDITIONS

LOCATION OF STREAM X-SECT	CHANNEL STATION (FT)	Q (CFS)	VEL (FPS)	WSEL (FT)
CONVERGING	3655	2643	6.62	1016.74
UPSTREAM BOUNDING	2570	2643	6.05	1010.36
INSIDE OF BRIDGE	2550	2643	5.69	1010.36
DOWNSTREAM BOUNDING	2520	2643	5.93	1009.82
CONVERGING	1475	2643	7.13	1003.87
DOWNSTREAM	1192	2643	7.01	1002.14

FREQUENCY = 25 YEAR

EXISTING CONDITIONS

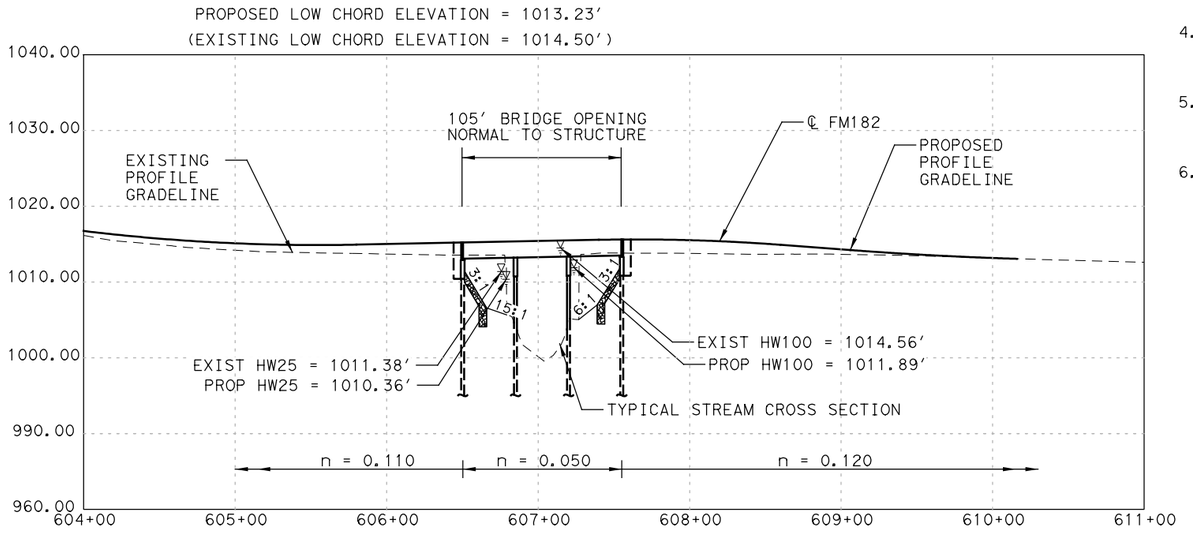
LOCATION OF STREAM X-SECT	CHANNEL STATION (FT)	Q (CFS)	VEL (FPS)	WSEL (FT)
CONVERGING	3655	4205	7.91	1017.96
UPSTREAM BOUNDING	2570	4205	3.77	1014.56
INSIDE OF BRIDGE	2550	4205	13.18	1014.5
DOWNSTREAM BOUNDING	2520	4205	5.38	1011.38
CONVERGING	1475	4205	8.79	1005.07
DOWNSTREAM	1192	4205	8.03	1003.24

FREQUENCY = 100 YEAR

PROPOSED CONDITIONS

LOCATION OF STREAM X-SECT	CHANNEL STATION (FT)	Q (CFS)	VEL (FPS)	WSEL (FT)
CONVERGING	3655	4205	7.91	1017.96
UPSTREAM BOUNDING	2570	4205	7.65	1011.89
INSIDE OF BRIDGE	2550	4205	6.9	1011.89
DOWNSTREAM BOUNDING	2520	4205	6.71	1011.39
CONVERGING	1475	4205	8.79	1005.07
DOWNSTREAM	1192	4205	8.03	1003.24

FREQUENCY = 100 YEAR



TYPICAL STREAM CROSS SECTION & ROAD PROFILE

SCALE: 1" = 100' HORIZONTAL, 1" = 20' VERTICAL

1. HEC-RAS 6.2 USED FOR HYDRAULIC ANAYLSIS AND DESIGN.
2. ALL SECTIONS ARE NORMAL TO STREAMFLOW.
3. ALL ELEMENTS ARE BASED ON NORTH AMERICAN VERTICAL DATUM 88 (NAVD88).
4. NORMAL DEPTH COMPUTATION USED FOR DOWNSTREAM BOUNDARY CONDITION. SLOPE = 0.007 FOR BOTH EXISTING AND PROPOSED CONDITIONS.
5. PROJECT IS LOCATED WITHIN THE LIMITS OF A ZONE 'A' FLOOD HAZARD AREA. (FEMA PANEL 48099C0050F EFFECTIVE DATE 2/17/2010).
6. THERE HAS BEEN COORDINATION WITH JUSTIN LATHAM OF CORYELL COUNTY ON 4/4/2023 AND ANCTICIPATE NO FURTHER COORDINATION WITH LOCAL FLOODPLAIN ADMINISTRATOR.

PRINT DATE	REVISION DATE
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STATE OF TEXAS
AMY L. BENNETT
123129
LICENSED PROFESSIONAL ENGINEER
4/5/2023

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AMERICAN STRUCTUREPOINT INC.

TBPE FIRM NO. F-10069

Texas Department of Transportation

FM 182 AT SOUTH HOG CREEK

HYDRAULIC DATA SHEET

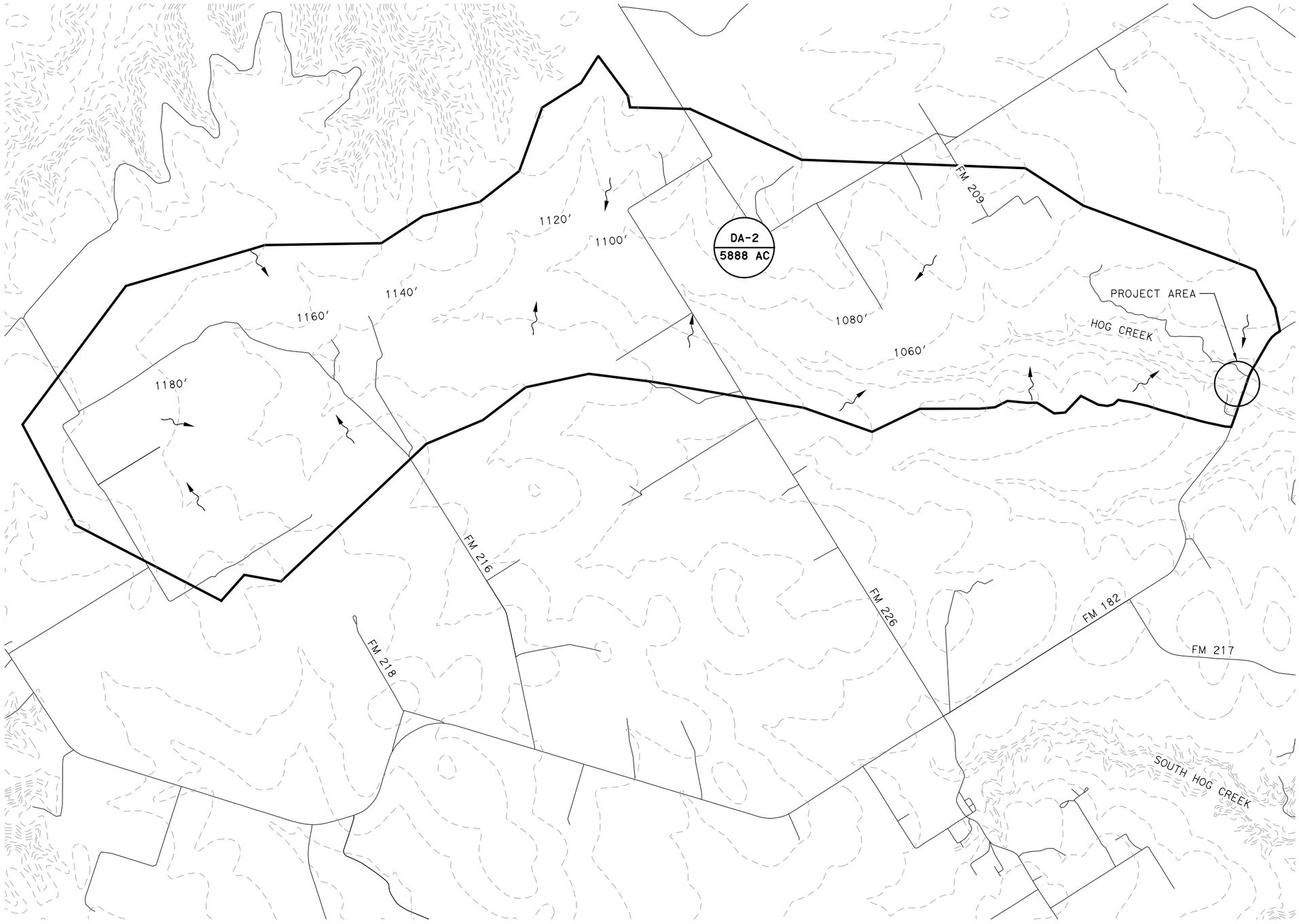
FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		FM 182

STATE	DISTRICT	COUNTY	
TEXAS	WACO	CORYELL	
CONTROL	SECTION	JOB	SHEET NO.
1219	02	017, ETC.	66

CSJs: 1219 02 017, ETC.
FILE LOCATION: P:\2020\00072\121902017\4 - Design\Plan Set\5. Drainage\2020.00072.01.DRN.HYD.dgn

RUNOFF COMPUTATIONS: HYDROGRAPH METHOD

DRAINAGE ID	AREA (AC)	AREA (SQ MI)	Tc LAG (MIN)	CN	Q 25-YEAR (CFS)	Q 100-YEAR (CFS)
2	5888	9.20	130.0	63	3800	6040



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0 1500 3000

SCALE IN FEET

LEGEND

- DRAINAGE AREA
- 20-FT CONTOURS
- FLOW ARROW
- ROADS
- A / XXXX — DA ID / DA ACRES

NOTES

1. FLOWS WERE COMPUTED USING HYDROGRAPH METHOD. REFER TO TxDOT HYDRAULIC DESIGN MANUAL CH 4.
2. FROM TXDOT HDM CH. 4 FIGURE 4-20. A CLIMATIC ADJUSTMENT FACTOR OF -12 WAS APPLIED TO CURVE NUMBER CALCULATIONS.
3. CONTOURS ARE SHOWN AT 20′ INTERVALS AND WERE OBTAINED FROM TNRIS ELEVATION DATASET.

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FM 182 AT HOG CREEK

DRAINAGE AREA MAP

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		FM 182

STATE	DISTRICT	COUNTY	
TEXAS	WACO	CORYELL	
CONTROL	SECTION	JOB	SHEET NO.
1219	02	017,ETC	67

REV DATE: 4/5/2023
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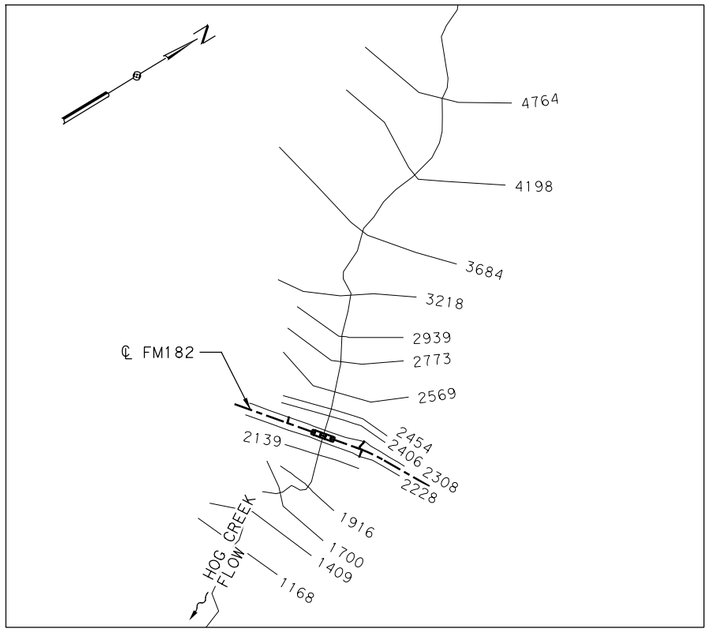


CROSS SECTION LOCATION MAP

EXISTING CONDITIONS

LOCATION OF STREAM X-SECT	CHANNEL STATION (FT)	Q (CFS)	VEL (FPS)	WSEL (FT)
UPSTREAM	4764	3800	5.57	1004.61
CONVERGING	2773	3800	6.55	996.31
UPSTREAM BOUNDING	2308	3800	5.67	993.58
INSIDE OF BRIDGE	2287	3800	7.73	993.24
DOWNSTREAM BOUNDING	2228	3800	7.45	992.46
CONVERGING	2139	3800	7.53	992.07
DOWNSTREAM	1168	3800	6.05	988.82

FREQUENCY = 25 YEAR

PROPOSED CONDITIONS

LOCATION OF STREAM X-SECT	CHANNEL STATION (FT)	Q (CFS)	VEL (FPS)	WSEL (FT)
UPSTREAM	4764	3800	5.57	1004.61
CONVERGING	2773	3800	6.56	996.31
UPSTREAM BOUNDING	2308	3800	5.7	993.26
INSIDE OF BRIDGE	2287	3800	6.58	992.96
DOWNSTREAM BOUNDING	2228	3800	7.17	992.48
CONVERGING	2139	3800	7.54	992.07
DOWNSTREAM	1168	3800	6.05	988.82

FREQUENCY = 25 YEAR

EXISTING CONDITIONS

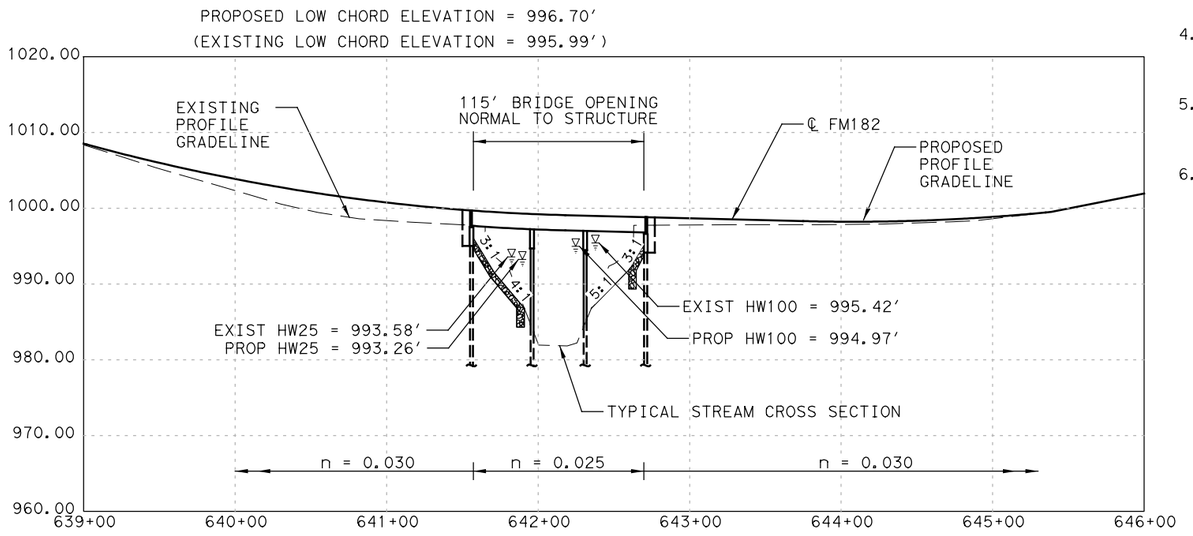
LOCATION OF STREAM X-SECT	CHANNEL STATION (FT)	Q (CFS)	VEL (FPS)	WSEL (FT)
UPSTREAM	4764	6040	6.34	1005.83
CONVERGING	3684	6040	6.14	1001.65
UPSTREAM BOUNDING	2308	6040	7.04	995.42
INSIDE OF BRIDGE	2287	6040	9.91	994.91
DOWNSTREAM BOUNDING	2228	6040	9.7	993.67
CONVERGING	2139	6040	8.83	993.40
DOWNSTREAM	1168	6040	6.72	990.22

FREQUENCY = 100 YEAR

PROPOSED CONDITIONS

LOCATION OF STREAM X-SECT	CHANNEL STATION (FT)	Q (CFS)	VEL (FPS)	WSEL (FT)
UPSTREAM	4764	6040	6.34	1005.83
CONVERGING	3684	6040	6.14	1001.65
UPSTREAM BOUNDING	2308	6040	6.91	994.97
INSIDE OF BRIDGE	2287	6040	8.51	994.45
DOWNSTREAM BOUNDING	2228	6040	9.17	993.73
CONVERGING	2139	6040	8.83	993.40
DOWNSTREAM	1168	6040	6.72	990.22

FREQUENCY = 100 YEAR



TYPICAL STREAM CROSS SECTION & ROAD PROFILE

SCALE: 1" = 100' HORIZONTAL, 1" = 20' VERTICAL

1. HEC-RAS 5.0.7 USED FOR HYDRAULIC ANAYLSIS AND DESIGN.
2. ALL SECTIONS ARE NORMAL TO STREAMFLOW.
3. ALL ELEMENTS ARE BASED ON NORTH AMERICAN VERTICAL DATUM 88 (NAVD88).
4. NORMAL DEPTH COMPUTATION USED FOR DOWNSTREAM BOUNDARY CONDITION. SLOPE = 0.0037 FOR BOTH EXISTING AND PROPOSED CONDITIONS.
5. PROJECT IS LOCATED WITHIN THE LIMITS OF A ZONE 'A' FLOOD HAZARD AREA. (FEMA PANEL 48099C0050F EFFECTIVE DATE 2/17/2010).
6. THERE HAS BEEN COORDINATION WITH JUSTIN LATHAM OF CORYELL COUNTY ON 4/4/2023 AND ANCTICIPATE NO FURTHER COORDINATION WITH LOCAL FLOODPLAIN ADMINISTRATOR.

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FM 182 AT HOG CREEK

HYDRAULIC DATA SHEET

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		FM 182

STATE	DISTRICT	COUNTY	
TEXAS	WACO	CORYELL	
CONTROL	SECTION	JOB	SHEET NO.
1219	02	017,ETC	68

CSJ: 1219 02 018
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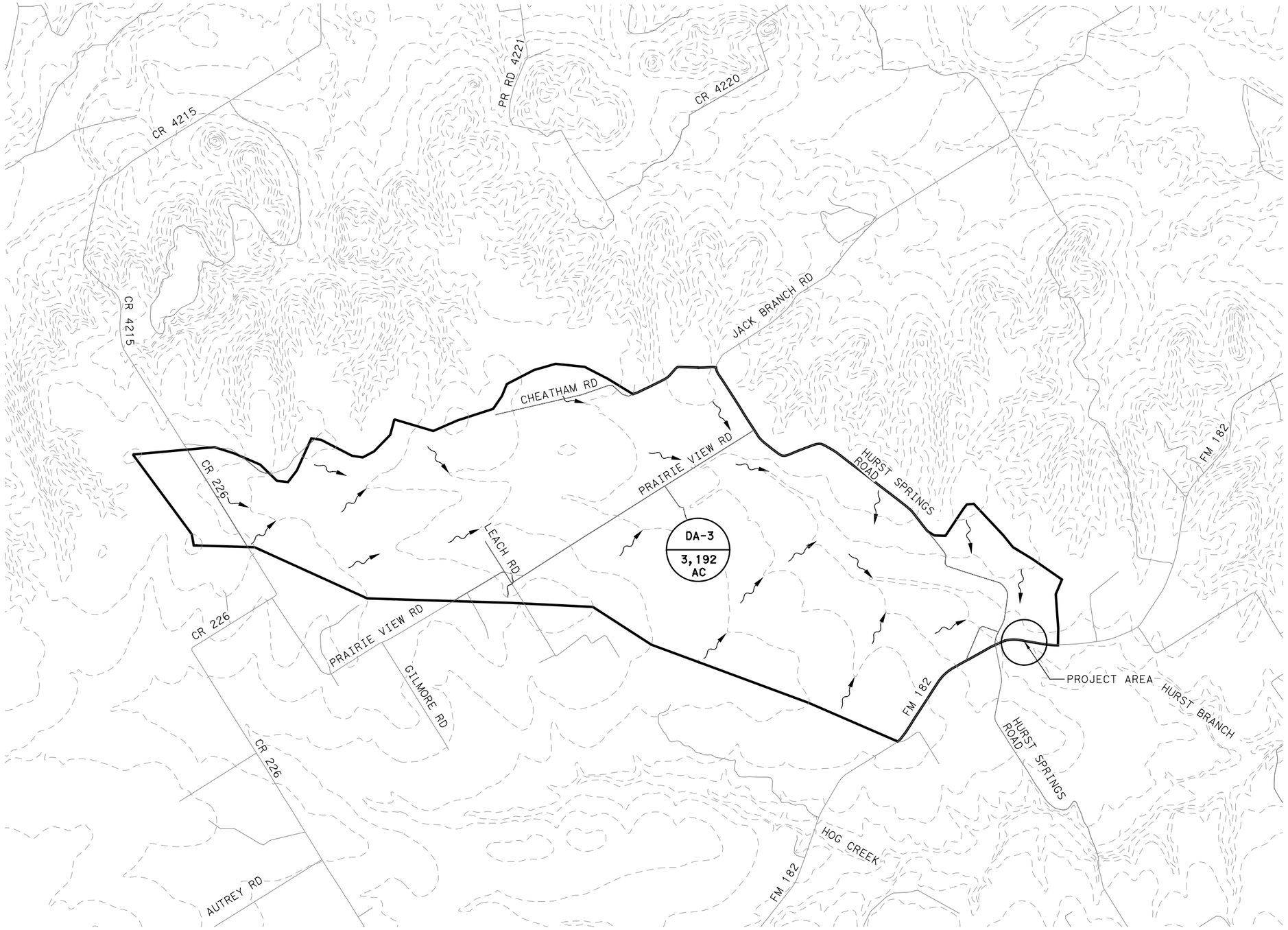
RUNOFF COMPUTATIONS: HYDROGRAPH METHOD

DRAINAGE ID	AREA (AC)	AREA (SQ MI)	Tc LAG (MIN)	CN	Q 25-YEAR (CFS)	Q 100-YEAR (CFS)
3	3192	4.99	118	64	2313	3641



N

0 1500 3000

SCALE IN FEET

LEGEND

- DRAINAGE AREA
- 20-FT CONTOURS
- FLOW ARROW
- ROADS
- A / XXXX — DA ID / DA ACRES

NOTES

1. FLOWS WERE COMPUTED USING HYDROGRAPH METHOD. REFER TO TxDOT HYDRAULIC DESIGN MANUAL CH 4.
2. FROM TXDOT HDM CH. 4 FIGURE 4-20. A CLIMATIC ADJUSTMENT FACTOR OF -12 WAS APPLIED TO CURVE NUMBER CALCULATIONS.
2. CONTOURS ARE SHOWN AT 20' INTERVALS AND WERE OBTAINED FROM TNRIS ELEVATION DATASET.

PRINT DATE	REVISION DATE
4/5/2023	

STATE OF TEXAS
AMY L. BENNETT
123129
LICENSED PROFESSIONAL ENGINEER
4/5/2023

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AMERICAN STRUCTUREPOINT INC.

TBPE FIRM NO. F-10069

Texas Department of Transportation

FM 182 AT HURST BRANCH

DRAINAGE AREA MAP

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		FM 182

STATE	DISTRICT	COUNTY	
TEXAS	WACO	CORYELL	
CONTROL	SECTION	JOB	SHEET NO.
1219	02	017,ETC	69

REV DATE: 4/5/2023
CSJ: 1219-02-(00)
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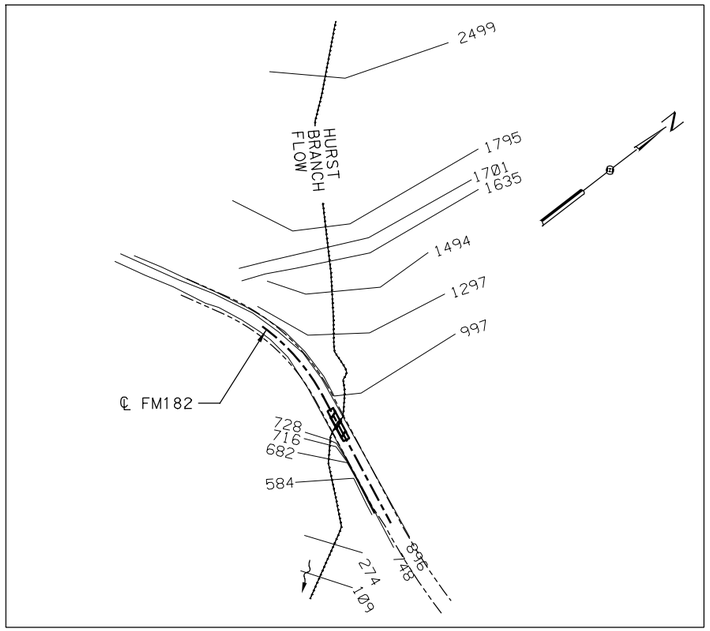


CROSS SECTION LOCATION MAP

EXISTING CONDITIONS

LOCATION OF STREAM X-SECT	CHANNEL STATION (FT)	Q (CFS)	VEL (FPS)	WSEL (FT)
CONVERGING	1494	2313	5.67	997.29
HURST SPRINGS RD CULVERT	1669	2313	15.06	1004.34
DOWNSTREAM CULVERT	1635	2313	6.89	998.07
UPSTREAM OF BRIDGE	1297	2313	4.99	996.25
UPSTREAM BOUNDING	898	2313	3.74	994.38
INSIDE OF BRIDGE	858	2313	9.87	994.38
DOWNSTREAM BOUNDING	748	2313	6.64	992.15
CONVERGING	728	2313	10.01	990.66

FREQUENCY = 25 YEAR

PROPOSED CONDITIONS

LOCATION OF STREAM X-SECT	CHANNEL STATION (FT)	Q (CFS)	VEL (FPS)	WSEL (FT)
CONVERGING	1494	2313	5.66	997.29
HURST SPRINGS RD CULVERT	1669	2313	15.06	1004.34
DOWNSTREAM CULVERT	1635	2313	5.66	997.29
UPSTREAM OF BRIDGE	1297	2313	4.95	996.27
UPSTREAM BOUNDING	898	2313	3.92	993.72
INSIDE OF BRIDGE	858	2313	6.11	993.72
DOWNSTREAM BOUNDING	748	2313	5.08	992.42
CONVERGING	728	2313	10	990.66

FREQUENCY = 25 YEAR

EXISTING CONDITIONS

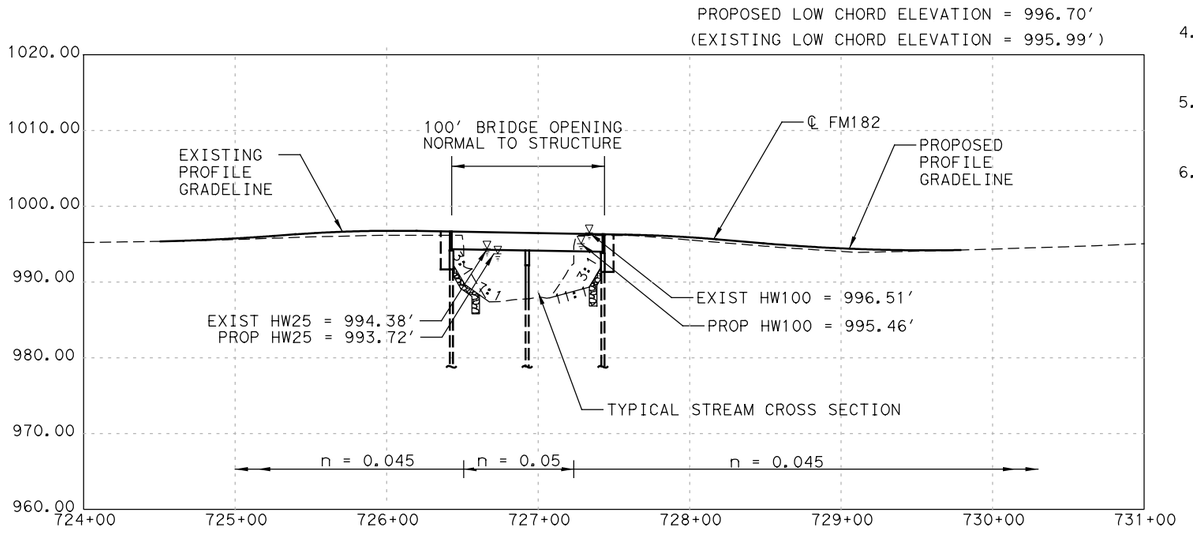
LOCATION OF STREAM X-SECT	CHANNEL STATION (FT)	Q (CFS)	VEL (FPS)	WSEL (FT)
CONVERGING	1701	3641	0.84	1005.28
HURST SPRINGS RD CULVERT	1669	2618.54	15.6	1005.28
DOWNSTREAM CULVERT	1635	3641	8.57	998.89
UPSTREAM OF BRIDGE	1297	3641	5.52	997.16
UPSTREAM BOUNDING	898	3641	1.41	996.51
INSIDE OF BRIDGE	858	3641	11.99	996.51
DOWNSTREAM BOUNDING	748	3641	9.18	992.82
CONVERGING	728	3641	10.46	991.97

FREQUENCY = 100 YEAR

PROPOSED CONDITIONS

LOCATION OF STREAM X-SECT	CHANNEL STATION (FT)	Q (CFS)	VEL (FPS)	WSEL (FT)
CONVERGING	1701	3641	0.84	1005.28
HURST SPRINGS RD CULVERT	1669	2618.54	15.6	1005.28
DOWNSTREAM CULVERT	1635	3641	8.64	998.85
UPSTREAM OF BRIDGE	1297	3641	6.17	996.85
UPSTREAM BOUNDING	898	3641	1.99	995.46
INSIDE OF BRIDGE	858	3641	7.38	995.46
DOWNSTREAM BOUNDING	748	3641	6.05	993.61
CONVERGING	728	3641	10.46	991.97

FREQUENCY = 100 YEAR



TYPICAL STREAM CROSS SECTION & ROAD PROFILE

SCALE: 1" = 100' HORIZONTAL, 1" = 20' VERTICAL

1. HEC-RAS 6.2 USED FOR HYDRAULIC ANAYLSIS AND DESIGN.
2. ALL SECTIONS ARE NORMAL TO STREAMFLOW.
3. ALL ELEMENTS ARE BASED ON NORTH AMERICAN VERTICAL DATUM 88 (NAVD88).
4. NORMAL DEPTH COMPUTATION USED FOR DOWNSTREAM BOUNDARY CONDITION. SLOPE = 0.0036 FOR BOTH EXISTING AND PROPOSED CONDITIONS.
5. PROJECT IS LOCATED WITHIN THE LIMITS OF A ZONE 'A' FLOOD HAZARD AREA. (FEMA PANEL 48099C0050F EFFECTIVE DATE 2/17/2010).
6. THERE HAS BEEN COORDINATION WITH JUSTIN LATHAM OF CORYELL COUNTY ON 4/4/2023 AND ANCTICIPATE NO FURTHER COORDINATION WITH LOCAL FLOODPLAIN ADMINISTRATOR.

PRINT DATE	REVISION DATE
4/5/2023	

STATE OF TEXAS
AMY L. BENNETT
123129
LICENSED PROFESSIONAL ENGINEER
4/5/2023

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AMERICAN STRUCTUREPOINT INC.

TBPE FIRM NO. F-10069

Texas Department of Transportation

FM 182 AT HURST BRANCH

HYDRAULIC DATA SHEET

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		FM 182

STATE	DISTRICT	COUNTY	
TEXAS	WACO	CORYELL	
CONTROL	SECTION	JOB	SHEET NO.
1219	02	017,ETC	70

CS,L: 1219 02 020
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DATE: 4/5/2023 3:28:15 PM
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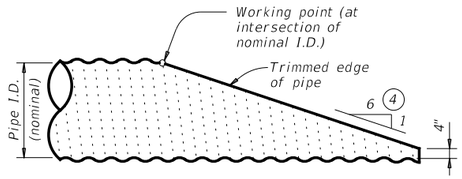
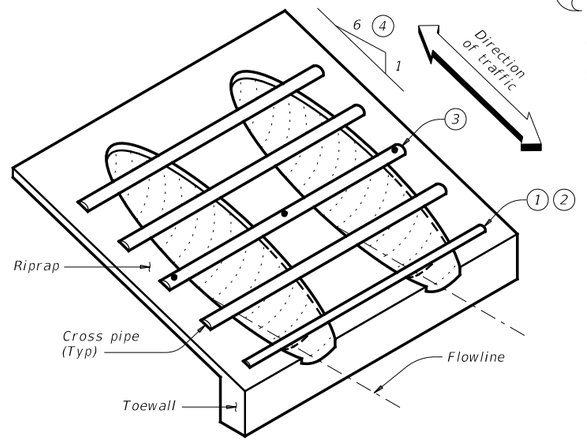


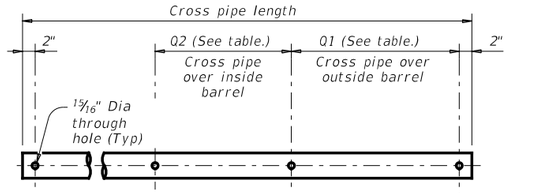
NOTE: All cross pipes, calculations, and dimensions are based on the pipe culverts mitered as shown in this detail. Alternate styles of mitered ends will require that appropriate adjustments be made to the values presented on this standard.

SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER

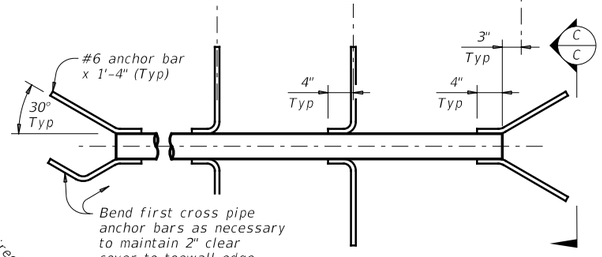
(Showing corrugated metal pipe (CMP) culvert Details at reinforced concrete pipe (RCP) culvert are similar.)



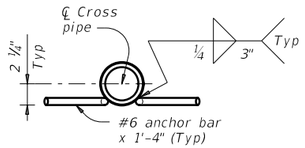
ISOMETRIC VIEW OF TYPICAL INSTALLATION



PIPE WITH BOLTED ANCHOR

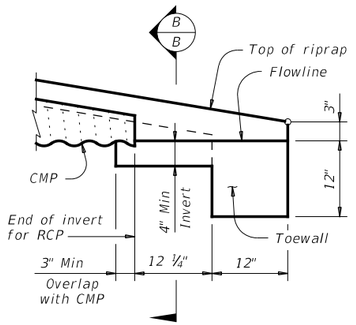


PIPE WITH ANCHOR BARS



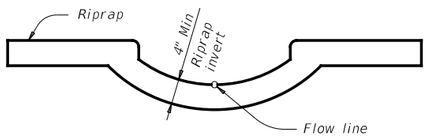
SECTION C-C

CROSS PIPE DETAILS



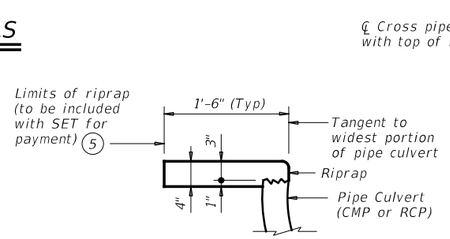
DETAIL "A"

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

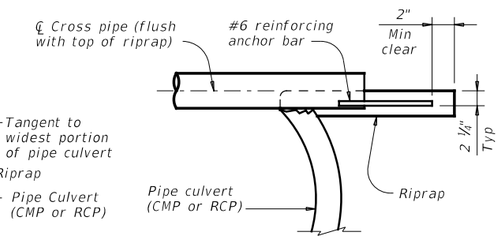


SECTION B-B

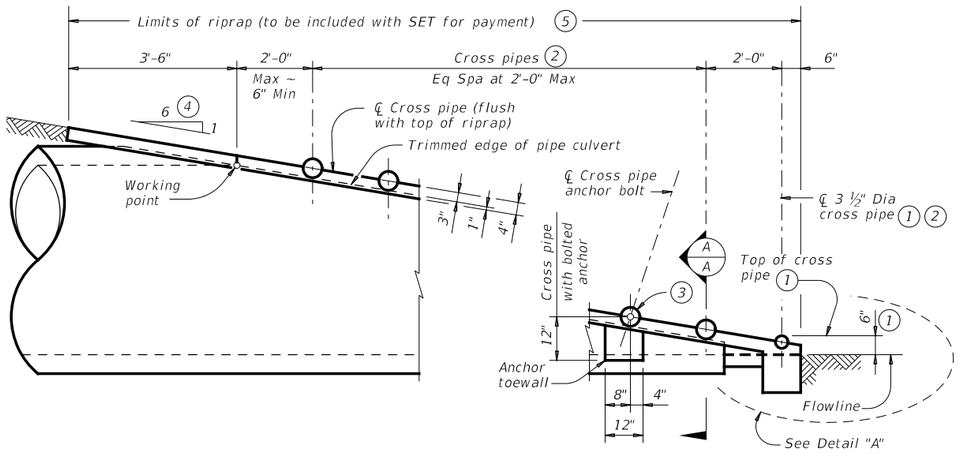
(Cross pipes not shown for clarity.)



SHOWING TYPICAL PIPE CULVERT AND RIPRAP

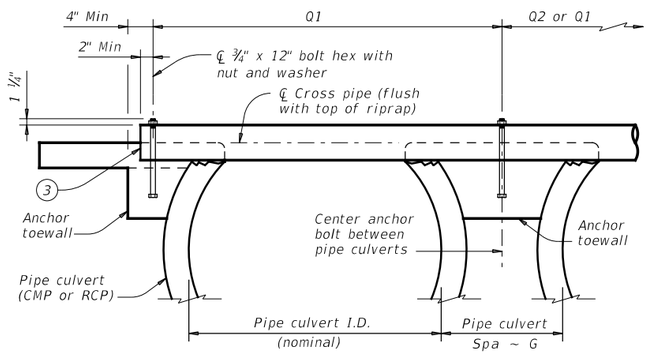


SHOWING CROSS PIPE WITH ANCHOR BAR



SIDE ELEVATION OF CAST-IN-PLACE CONCRETE

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



SHOWING CROSS PIPE WITH BOLTED ANCHOR

SECTION A-A

CROSS PIPE LENGTHS, REQUIRED PIPE SIZES, AND RIPRAP QUANTITIES (2)

Nominal Culvert I.D.	Conc Riprap (CY) (6)	Pipe Culvert Spa ~ G	Single Barrel ~ Q1	Multi-Barrel ~ Q1	Q2	Conditions for Use of Cross Pipes	Cross Pipe Sizes
12"	0.6	0' - 9"	N/A	2' - 1"	1' - 9"	3 or more pipe culverts	3" Std (3.500" O.D.)
15"	0.7	0' - 11"	N/A	2' - 5"	2' - 2"		
18"	0.8	1' - 2"	N/A	2' - 10"	2' - 8"		
21"	0.9	1' - 4"	N/A	3' - 2"	3' - 1"		
24"	0.9	1' - 7"	N/A	3' - 6"	3' - 7"		
27"	1.0	1' - 8"	N/A	3' - 10"	3' - 11"	3 or more pipe culverts	3 1/2" Std (4.000" O.D.)
30"	1.1	1' - 10"	N/A	4' - 2"	4' - 4"	2 or more pipe culverts	
33"	1.2	1' - 11"	4' - 2"	4' - 5"	4' - 8"	All pipe culverts	
36"	1.3	2' - 1"	4' - 5"	4' - 9"	5' - 1"	All pipe culverts	4" Std (4.500" O.D.)
42"	1.5	2' - 4"	4' - 11"	5' - 5"	5' - 10"		
48"	1.7	2' - 7"	5' - 5"	6' - 0"	6' - 7"	All pipe culverts	5" Std (5.563" O.D.)
54"	2.0	3' - 0"	5' - 11"	6' - 9"	7' - 6"		
60"	2.2	3' - 3"	6' - 5"	7' - 4"	8' - 3"		
66"	2.4	3' - 3"	6' - 11"	7' - 10"	8' - 9"		
72"	2.7	3' - 4"	7' - 5"	8' - 5"	9' - 4"		

(1) The proper installation of the first cross pipe is critical for vehicle safety. Place the top of the first cross pipe no more than 6" above the flow line.

(2) Provide cross pipes, except the first bottom pipe, of the size shown in the table. Provide a 3 1#2" standard pipe (4" O.D.) for the first bottom pipe.

(3) Install the third cross pipe from the bottom of the culvert using a bolted connection. Ensure that riprap concrete does not flow into the cross pipe so as to permit disassembly of the bolted connection to allow cleanout access. At the Contractor's option, install all other cross pipes using the bolted connection details.

(4) Match cross slope as shown elsewhere in the plans. Cross slope of 6:1 or flatter is required for vehicle safety.

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

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

MATERIAL NOTES:

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

Provide cross pipes that meet the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 (Gr B), or API 5LX52.

Provide ASTM A307 bolts and nuts.

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

GENERAL NOTES:

Cross pipes are designed for a traversing load of 10,000 pounds at yield as recommended by Research Report 280-2F, "Safety Treatment of Roadside Parallel-Drainage Structures", Texas Transportation Institute, March 1981.

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

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

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

Texas Department of Transportation

Bridge Division Standard

SAFETY END TREATMENT

FOR 12" DIA TO 72" DIA
PIPE CULVERTS
TYPE II ~ PARALLEL DRAINAGE

SETP-PD

FILE: setppdse-20.dgn	DN: GAF	CK: CAT	DW: JRP	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	1219	02	017, ETC.	FM 182
	DIST	COUNTY		SHEET NO.
	WACO	CORYELL		71

DATE: 4/5/2023 3:28:16 PM
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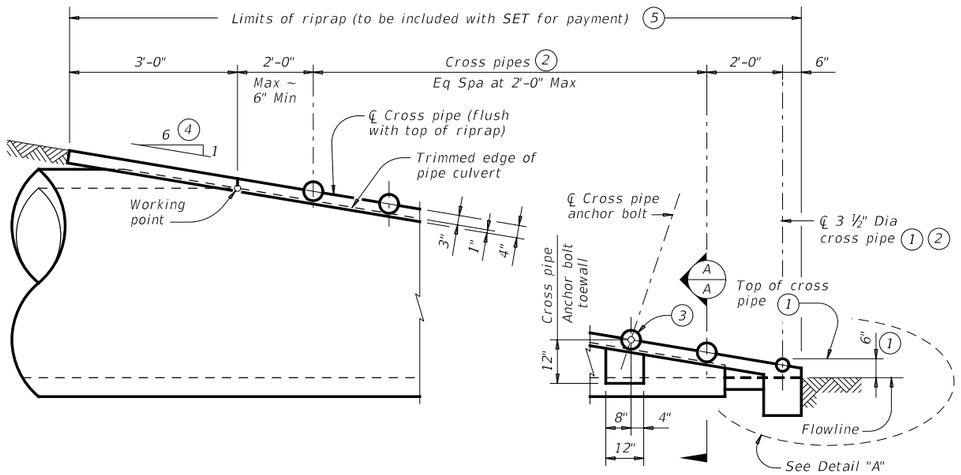


SIDE ELEVATION OF CAST-IN-PLACE CONCRETE

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

CROSS PIPE LENGTHS AND REQUIRED PIPE SIZES 2

Corrugated Metal Pipe (CMP) Culverts

Design	Conc Riprap (CY) 6	Pipe Culvert Span	Pipe Culvert Rise	Pipe Culvert Spa ~ G	Single Barrel ~ Q1	Multi-Barrel ~ Q1	Q2	Conditions for Use of Cross Pipes	Cross Pipe Sizes
1	0.6	17"	13"	1' – 0"	N/A	2' – 8"	2' – 5"	3 or more pipe culverts	3" Std (3.500" O.D.)
2	0.7	21"	15"	1' – 2"	N/A	3' – 1"	2' – 11"		
3	0.9	28"	20"	1' – 5"	N/A	3' – 9"	3' – 9"	3 or more pipe culverts	3 ½" Std (4.000" O.D.)
4	1.0	35"	24"	1' – 8"	4' – 4"	4' – 6"	4' – 7"	All pipe culverts	4" Std (4.500" O.D.)
5	1.2	42"	29"	1' – 11"	4' – 11"	5' – 2"	5' – 5"		
6	1.4	49"	33"	2' – 2"	5' – 6"	5' – 11"	6' – 3"	All pipe culverts	5" Std (5.563" O.D.)
7	1.6	57"	38"	2' – 5"	6' – 2"	6' – 8"	7' – 2"		
8	1.8	64"	43"	2' – 10"	6' – 9"	7' – 6"	8' – 2"		
9	1.9	71"	47"	3' – 2"	7' – 4"	8' – 3"	9' – 1"		

Reinforced Concrete Pipe (RCP) Culverts

Design	Conc Riprap (CY) 6	Pipe Culvert Span	Pipe Culvert Rise	Pipe Culvert Spa ~ G	Single Barrel ~ Q1	Multi-Barrel ~ Q1	Q2	Conditions for Use of Cross Pipes	Cross Pipe Sizes
1	0.6	22"	13 ½"	1' – 0"	N/A	3' – 1"	2' – 10"	3 or more pipe culverts	3" Std (3.500" O.D.)
2	0.7	26"	15 ½"	1' – 2"	N/A	3' – 6"	3' – 4"		
3	0.9	28 ½"	18"	1' – 5"	N/A	3' – 10"	3' – 9 ½"	3 or more pipe culverts	3 ½" Std (4.000" O.D.)
4	1.0	36 ¼"	22 ½"	1' – 8"	4' – 5"	4' – 7"	4' – 8 ¼"	All pipe culverts	4" Std (4.500" O.D.)
5	1.2	43 ¾"	26 5/8"	1' – 11"	5' – 1"	5' – 4"	5' – 6 ¾"		
6	1.4	51 ½"	31 5/16"	2' – 2"	5' – 8"	6' – 1"	6' – 5 ¼"	All pipe culverts	5" Std (5.563" O.D.)
7	1.6	58 ½"	36"	2' – 5"	6' – 4"	6' – 10"	7' – 3 ½"		
8	1.8	65"	40"	2' – 10"	6' – 10"	7' – 7"	8' – 3"		
9	1.9	73"	45"	3' – 2"	7' – 6"	8' – 5"	9' – 3"		

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 as concrete riprap in accordance with Item 432, "Riprap".
6. Quantities shown are for one end of one pipe culvert. For multiple Pipe 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.

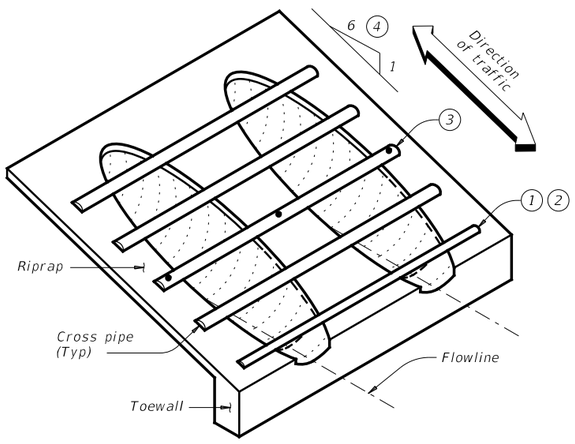
GENERAL NOTES:

Pipe runners 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.

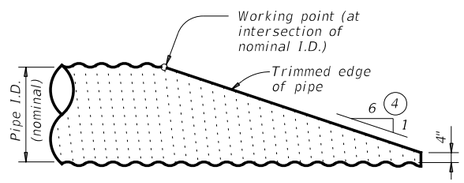
Safety end treatments (SET) shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the Pipe Runners.

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.



ISOMETRIC VIEW OF TYPICAL INSTALLATION



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 cipe (RCP) culvert are similar.)

SHEET 1 OF 2

Texas Department of Transportation — Bridge Division Standard

SAFETY END TREATMENT

FOR DESIGN 1 TO 9
ARCH PIPE CULVERTS
TYPE II ~ PARALLEL DRAINAGE

SETP-PD-A

FILE: setppase-20.dgn	DN: GAF	CK: TxDOT	DW: JRP	CK: GAF
©TxDOT February 2020 REVISIONS	CONT	SECT	JOB	HIGHWAY
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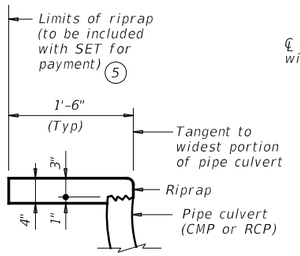
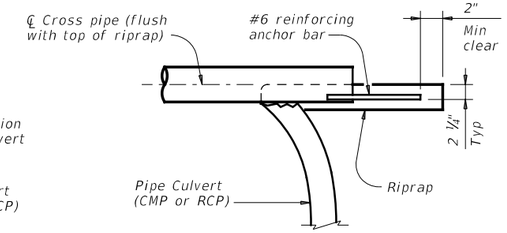
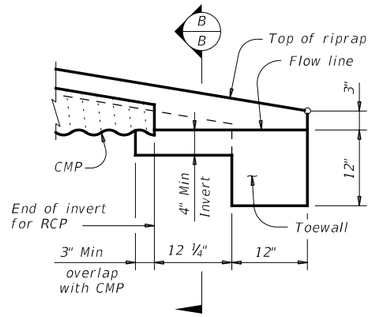
	DIST	COUNTY		SHEET NO.
	WACO	CORYELL		72



SHOWING TYPICAL PIPE CULVERT AND RIPRAP

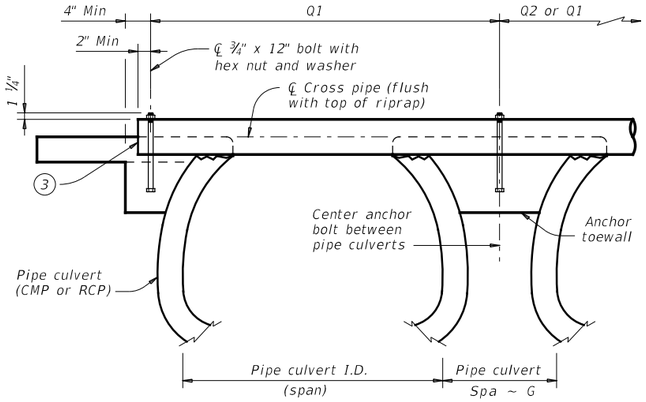


SHOWING CROSS PIPE WITH ANCHOR BAR



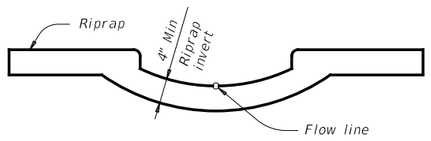
DETAIL "A"

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



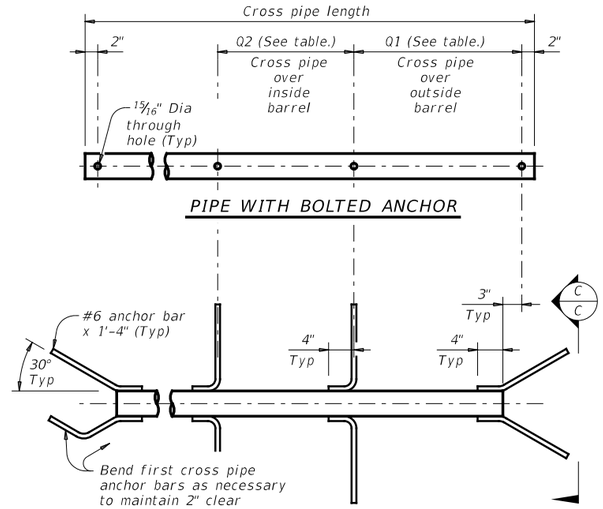
SHOWING CROSS PIPE WITH BOLTED ANCHOR

SECTION A-A



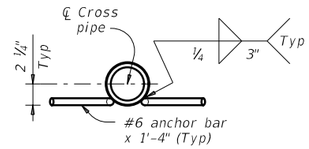
SECTION B-B

(Cross pipes not shown for clarity.)



PIPE WITH BOLTED ANCHOR

PIPE WITH ANCHOR BARS



SECTION C-C

CROSS PIPE DETAILS

DATE: 4/5/2023 3:28:17 PM
FILE: T:\Road Dept\Department\Team Texas\txdot cadd standards\drainage\SETP\setppd-a.dgn

SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

SAFETY END TREATMENT

FOR DESIGN 1 TO 9
ARCH PIPE CULVERTS
TYPE II ~ PARALLEL DRAINAGE

SETP-PD-A

FILE: setppase-20.dgn	DN: GAF	CK: TxDOT	DW: JRP	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	1219	02	017, ETC.	FM 182
	DIST	COUNTY		SHEET NO.
	WACO	CORYELL		73

DATE: 4/5/2023 3:28:18 PM
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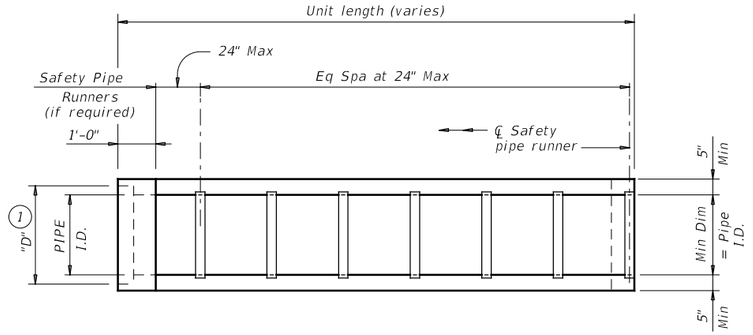
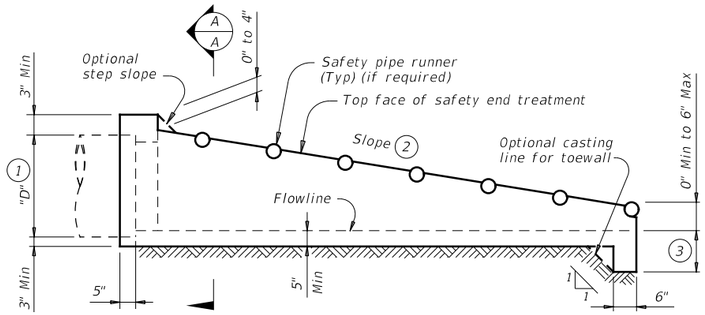


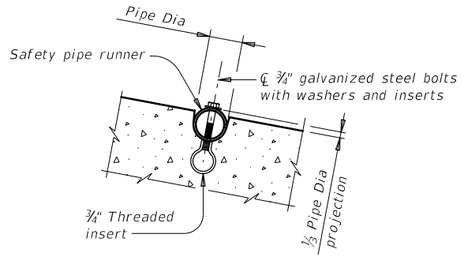
PLAN

(Showing bell end connection.)



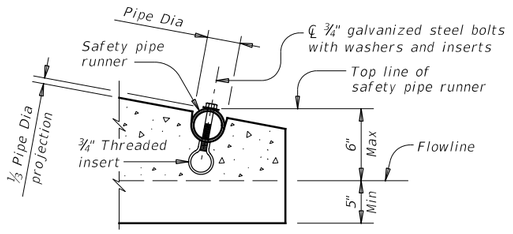
LONGITUDINAL ELEVATION

(Showing bell end connection.)

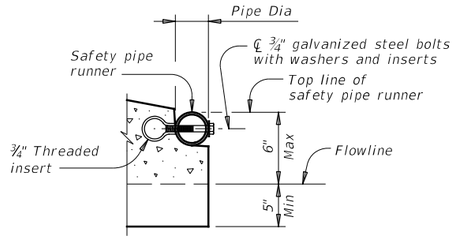


INSTALLATION DETAIL FOR SAFETY PIPE RUNNERS

(If required)



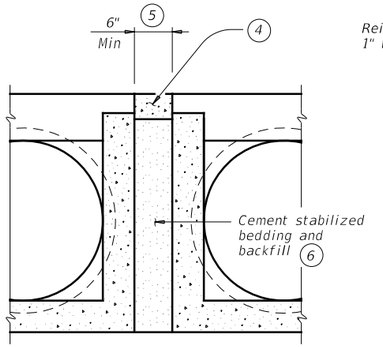
OPTION A



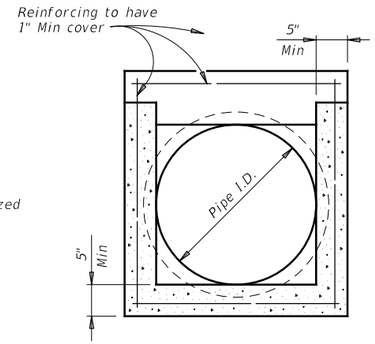
OPTION B

END DETAILS FOR INSTALLATION OF SAFETY PIPE RUNNERS

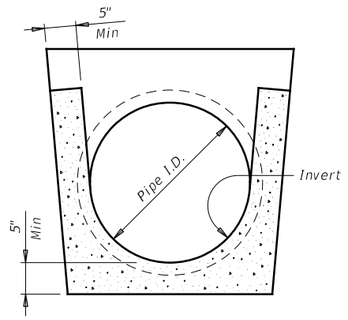
(If required)



MULTIPLE PIPE INSTALLATION

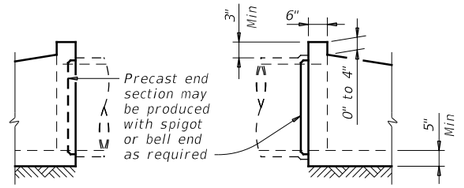


OPTION WITH SQUARE BOTTOM



OPTION WITH INVERT BOTTOM

SECTION A-A



OPTIONAL JOINT FOR RCP

(Showing joint between RCP and precast safety end treatment.)

REQUIREMENTS FOR CULVERT PIPES AND SAFETY PIPE RUNNERS

Pipe I.D.	RCP Wall "B" Thickness	TP Wall Thickness (7)	"D" (1)	Slope	Min Length	Pipe Runners Required		Required Pipe Runner Size		
						Single Pipe	Multiple Pipe	Nominal Dia.	O.D.	I.D.
12"	2"	1.15"	17.00"	6:1	4' – 9"	No	Yes, for > 2 pipes	3" STD	3.500"	3.068"
15"	2 ¼"	1.30"	20.50"	6:1	6' – 5"	No	Yes, for > 2 pipes	3" STD	3.500"	3.068"
18"	2 ½"	1.60"	24.00"	6:1	8' – 0"	No	Yes, for > 2 pipes	3" STD	3.500"	3.068"
24"	3"	1.95"	31.00"	6:1	11' – 3"	No	Yes, for > 2 pipes	3" STD	3.500"	3.068"
30"	3 ½"	2.65"	38.50"	6:1	14' – 8"	No	Yes	4" STD	4.500"	4.026"
36"	4"	2.75"	45.50"	6:1	17' – 11"	Yes	Yes	4" STD	4.500"	4.026"
42"	4 ½"	2.7"	52.50"	6:1	21' – 2"	Yes	Yes	4" STD	4.500"	4.026"

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

(2) Slope as shown elsewhere in the plans. Slope of 6:1 or flatter is required for vehicle safety.

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

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

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

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

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

GENERAL NOTES:

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

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

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

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

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

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

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

Pipe runners are designed for a traversing load of 10,000 Lbs at yield as recommended by Research Report 280-2F, "Safety Treatment of Roadside Parallel-Drainage Structures", Texas Transportation Institute, March 1981.

Provide pipe runners meeting the requirements of ASTM A53 (Type E or S, Grade B), ASTM A500 (Grade B), or API 5LX52.

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

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

Texas Department of Transportation

Bridge Division Standard

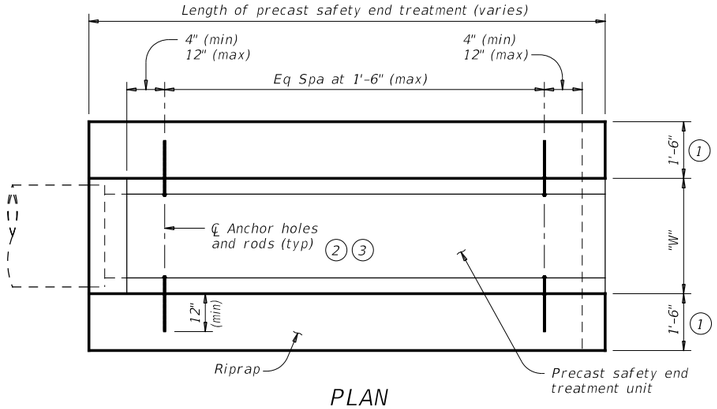
PRECAST SAFETY END TREATMENT

TYPE II ~ PARALLEL DRAINAGE

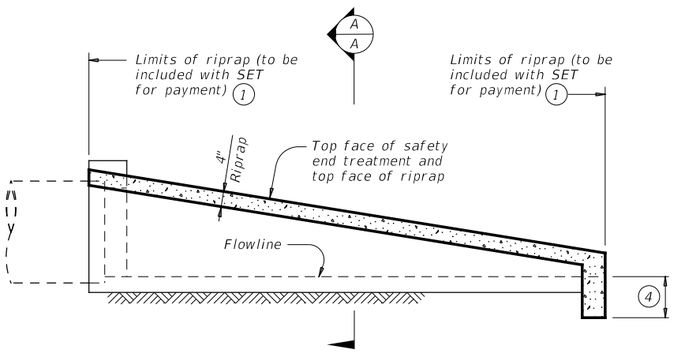
PSET-SP

FILE: psetspss-21.dgn	DN: RLW	CK: KLR	DW: JTR	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS 12-21: Added 42" TP	1219	02	017, ETC.	FM 182
	DIST	COUNTY		SHEET NO.
	WACO	CORYELL		74

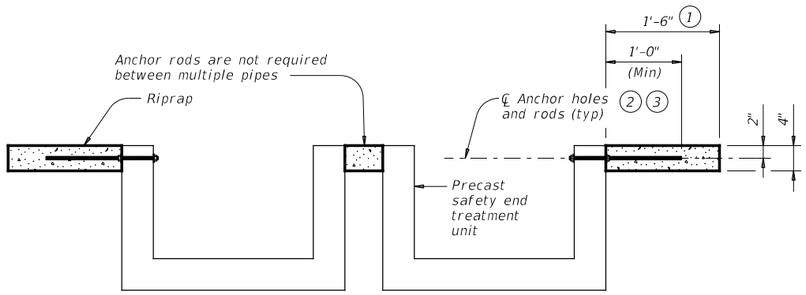
DATE: 4/5/2023 3:28:19 PM
FILE: T:\Road Dept\Department\Team Texas\txdot odd standards\drainage\PSETRR-20.dgn



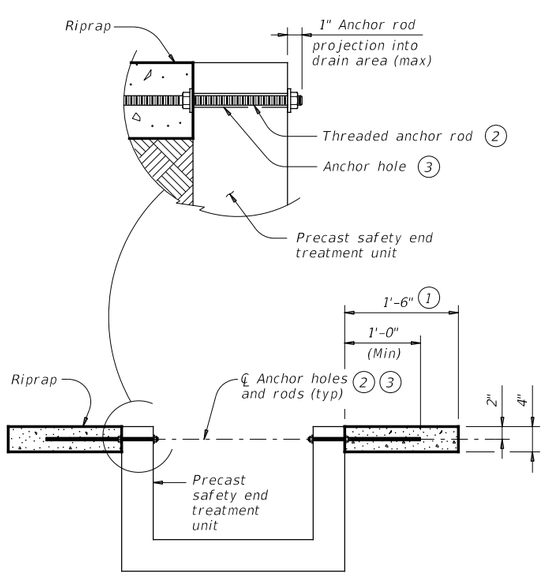
PLAN



LONGITUDINAL ELEVATION



MULTIPLE PIPE INSTALLATION



SINGLE PIPE INSTALLATION

SECTION A-A

ESTIMATED CONCRETE RIPRAP QUANTITIES (CY) 5

Nominal Culvert (Pipe) I.D.	PSET-SC and PSET-SP Standards				PSET-RC and PSET-RP Standards			
	Unit Width "W"	Side Slope			Unit Width "W"	Side Slope		
		3:1	4:1	6:1		3:1	4:1	6:1
12"	23.0"	0.1	0.2	0.2	16.0"	0.1	0.1	0.2
15"	26.5"	0.2	0.2	0.3	19.5"	0.1	0.2	0.2
18"	30.0"	0.2	0.2	0.3	23.0"	0.2	0.2	0.3
24"	37.0"	0.3	0.3	0.5	30.0"	0.2	0.3	0.4
30"	44.5"	0.3	0.4	0.6	37.0"	0.3	0.3	0.5
36"	51.5"	0.4	0.5	0.7	44.0"	0.3	0.4	0.6
42"	58.5"	0.5	0.6	0.8	51.0"	0.4	0.5	0.7

(1) Riprap placed beyond the limits shown will be paid as concrete riprap in accordance with Item 432, "Riprap". When riprap is cast integrally with the precast safety end treatment, this dimension is 1'-0" minimum.

(2) 1#2" Dia ASTM A307 Gr A threaded anchor rod with 2 nuts and 2 washers. Galvanize all components in accordance with Item 445, "Galvanizing". Repair galvanizing that is damaged during transport or construction in accordance with the specifications.

(3) 3#4" through holes in walls of safety end treatment for riprap anchor rods may be drilled with rotary (coring or masonry) type drilling equipment or may be formed. Do not use percussive (star) type drilling equipment. If holes are drilled, patch spalls in the inside face of the wall exceeding 1#2" from the holes.

(4) Provide riprap toe wall when dimension is shown elsewhere in the plans or when field conditions require a toe wall.

(5) Quantities shown are for one end of one reinforced concrete pipe culvert. For multiple pipe culverts, quantities will need to be adjusted. Riprap quantities are for Contractor's information only. Quantities are based on the minimum unit lengths shown on the Precast Saftey End Treatment (SET) standard sheets.

MATERIAL NOTES:

Provide Class "B" riprap in accordance with Item 432, "Riprap".

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. The anchor rods shown are always required.

GENERAL NOTES:

Precast safety end treatment for reinforced concrete pipe may be used for TYPE II end treatment as specified in Item 467, "Safety End Treatment".

Refer to PSET-SC or PSET-SP standard sheets for details of square safety end treatments not shown. Refer to PSET-RC or PSET-RP standard sheets for details of round safety end treatments not shown.

For precast units with integrally cast riprap, substitute reinforcing steel in the amount on 0.26 in./ft. minimum for the threaded anchor rods shown. When requested, submit sealed engineering drawings for approval prior to construction. Shop drawings will not be required. Note that a proprietary precast unit with integral riprap is available from L&R Precast Concrete Works, Inc. (956) 583-6293 or www.lrprecast.com.

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

These riprap details are only applicable when notes that require placement of riprap with precast safety end treatments are shown elsewhere in the plans.

Precast units with integrally cast riprap are permitted unless noted otherwise on the plans.

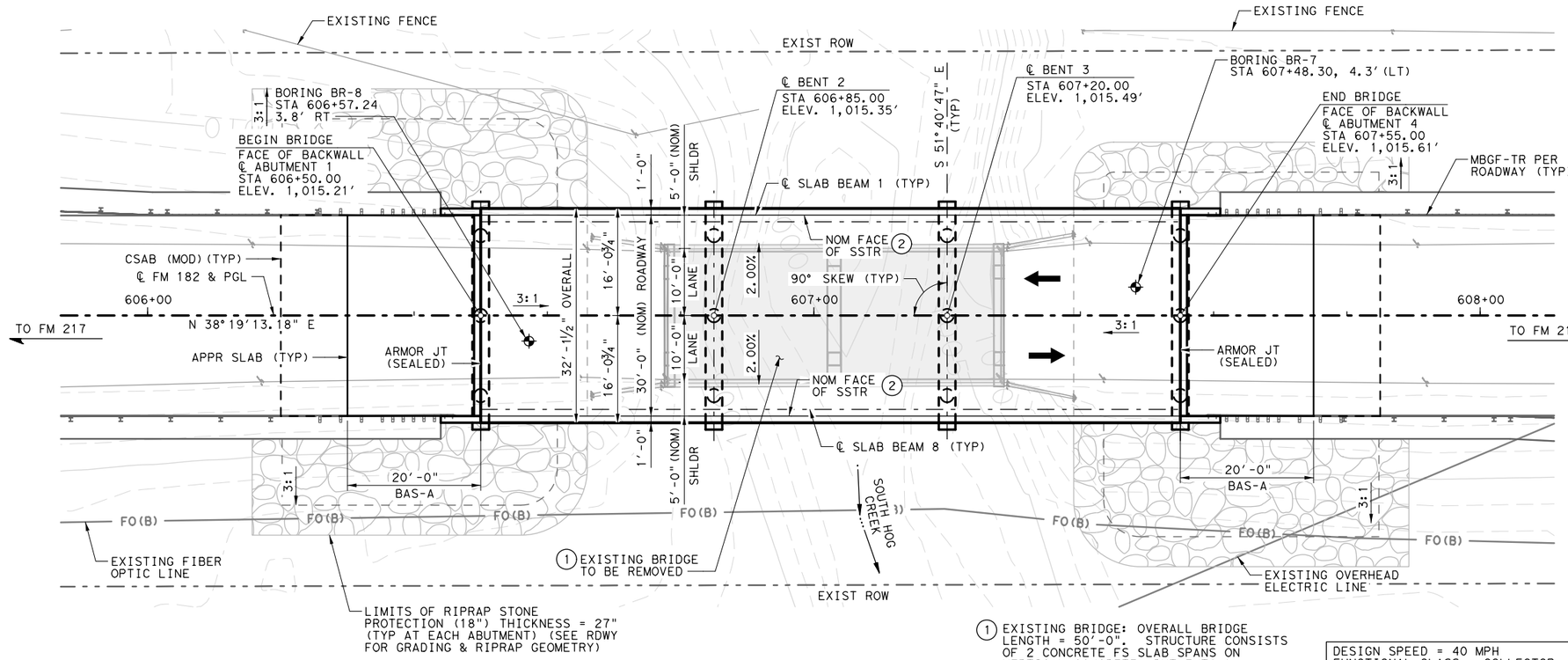
Texas Department of Transportation

Bridge Division Standard

PRECAST SAFETY END TREATMENT
TYPE II
RIPRAP DETAILS

PSET-RR

FILE: psetrrse-20.dgn	DN: GAF	CK: TxDOT	DW: JRP	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	1219	02	017, ETC.	FM 182
	DIST	COUNTY		SHEET NO.
	WACO	CORYELL		75



PLAN

(1) EXISTING BRIDGE: OVERALL BRIDGE LENGTH = 50'-0". STRUCTURE CONSISTS OF 2 CONCRETE FS SLAB SPANS ON VERTICAL CONCRETE ABUTMENTS & MULTI-COLUMN BENT, W/ CONCRETE DRILLED SHAFT FOUNDATIONS. SEE TxDOT SPEC ITEM 496.

(2) PROVIDE A MINIMUM OF 3 RAIL SLOTS EACH SPAN, TYPICAL EACH SIDE.

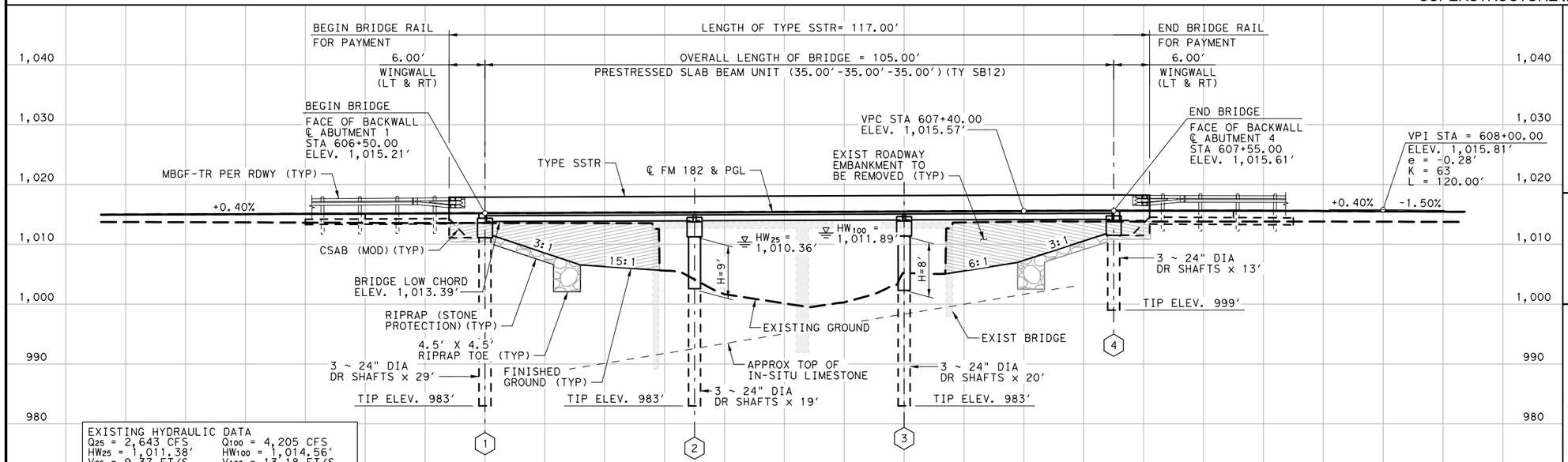
DESIGN SPEED = 40 MPH
FUNCTIONAL CLASS = COLLECTOR
ADT(2021) = 187 VPD
ADT(2041) = 262 VPD
EXIST NBI: 09-050-0-1219-02-003
NEW NBI NO: 09-050-0-1219-02-008

HL-93 LOADING
SUPERSTRUCTURE INV/OPR RATINGS: 1.08/1.60

0 10 20
SCALE IN FEET

GENERAL NOTES:

1. DESIGNED IN ACCORDANCE WITH 2020 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION WITH CURRENT INTERIM REVISIONS AND TXDOT BRIDGE DESIGN MANUAL (NOV 2021).
2. VERIFY ALL DIMENSIONS AND ELEVATIONS PRIOR TO COMMENCING WORK.
3. ALL DIMENSIONS ARE EITHER HORIZONTAL OR VERTICAL AND MUST BE CORRECTED FOR GRADE, CROWN, AND/OR SUPERELEVATION.
4. COLUMN HEIGHTS SHOWN ARE CALCULATED AT THE PROFILE GRADE LINE. ACTUAL COLUMN HEIGHT SHALL BE MEASURED IN THE FIELD PRIOR TO ORDERING MATERIALS.
5. CONTRACTOR SHALL VERIFY LOCATIONS OF ALL UTILITIES PRIOR TO EXCAVATION AND/OR DRILLING.
6. SEE SOIL BORING LOGS FOR BORING TEST HOLE PROFILES.
7. SEE ROADWAY DRAWINGS FOR RIPRAP GEOMETRY AND PROPOSED GRADING.
8. SEE STANDARD DRAWINGS FOR FOUNDATION, ABUTMENT, BENT, AND SLAB BEAM DETAILS.
9. SEE CSAB(MOD) STANDARD FOR CEMENT STABILIZED ABUTMENT BACKFILL DETAILS.
10. DRILLED SHAFTS HAVE BEEN DESIGNED WITH BOTH END BEARING AND SKIN FRICTION. SHAFTS SHALL BE FOUNDED AT THE LENGTHS SHOWN OR DEEPER AS NECESSARY TO OBTAIN 2 SHAFT DIAMETERS MINIMUM PENETRATION INTO HARD LIMESTONE.



EXISTING HYDRAULIC DATA	
Q_{25} = 2,643 CFS	Q_{100} = 4,205 CFS
HW_{25} = 1,011.38'	HW_{100} = 1,014.56'
V_{25} = 9.37 FT/S	V_{100} = 13.18 FT/S
PROPOSED HYDRAULIC DATA	
Q_{25} = 2,643 CFS	Q_{100} = 4,205 CFS
HW_{25} = 1,010.36'	HW_{100} = 1,011.89'
V_{25} = 5.69 FT/S	V_{100} = 6.90 FT/S

ELEVATION

PRINT DATE	REVISION DATE
4/5/2023	

STATE OF TEXAS
EMILY WASON BERVER
99355
LICENSED
PROFESSIONAL ENGINEER
Emily Wason Berver 4/5/2023

P.E. STRUCTURAL CONSULTANTS
8436 SPICEWOOD SPRINGS ROAD
AUSTIN, TX 78759
TEL 512.250.2500
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www.HardestyHanover.com

PESC
A Hardesty & Hanover Company

TBPE FIRM NO. F-3379

Texas Department of Transportation
Waco District

FM 182 AT SOUTH HOG CREEK
BRIDGE LAYOUT

SHEET 1 OF 2

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		FM 182
STATE	DISTRICT	COUNTY
TEXAS	WACO	CORYELL
CONTROL	SECTION	JOB / SHEET NO.
1219	02	017, ETC / 76

REV DATE: 4/5/2023
CSJ: 1219-02-017, ETC
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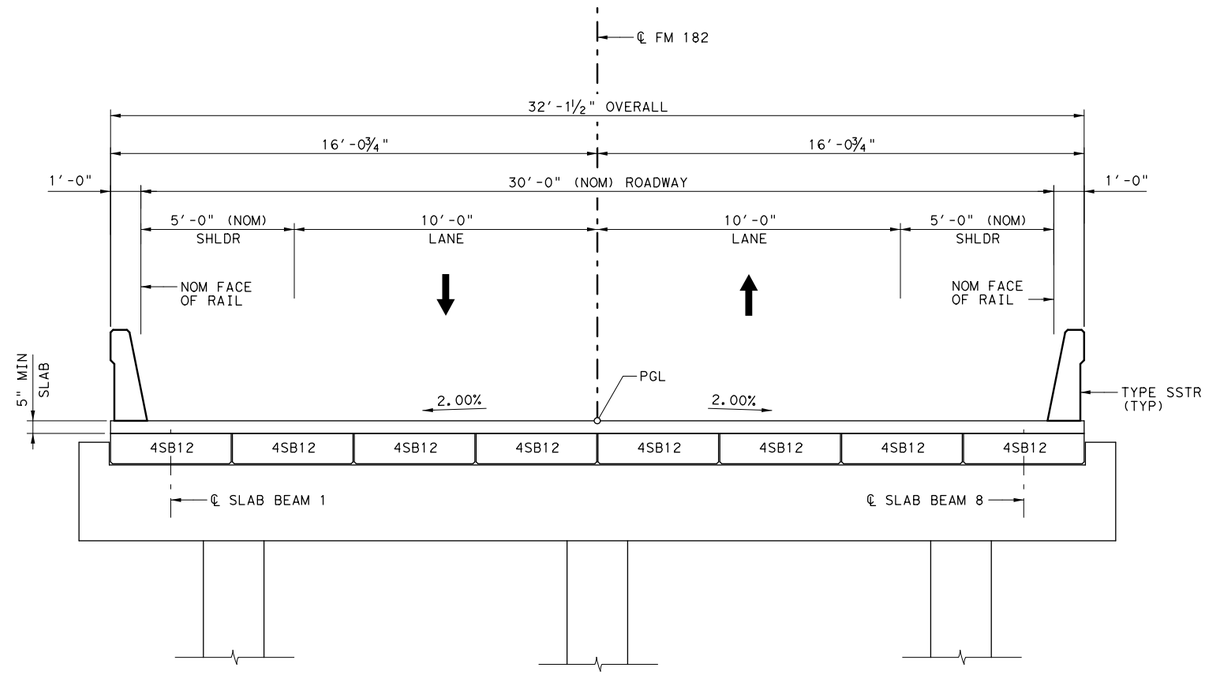

TYPICAL BRIDGE SECTION

N.T.S.

HL-93 LOADING

PRINT DATE	REVISION DATE
4/5/2023	

STATE OF TEXAS
EMILY WASON BERVER
99355
LICENSED
PROFESSIONAL ENGINEER

Emily Wason Berver 4/5/2023

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www.HardestyHanover.com

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TBPE FIRM NO. F-3379

FM 182 AT SOUTH HOG CREEK

BRIDGE LAYOUT

SHEET 2 OF 2

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		FM 182

STATE	DISTRICT	COUNTY	
TEXAS	WACO	CORYELL	
CONTROL	SECTION	JOB	SHEET NO.
1219	02	017, ETC	77

REV DATE: 4/5/2023
CSJ: 1219-02-017, ETC
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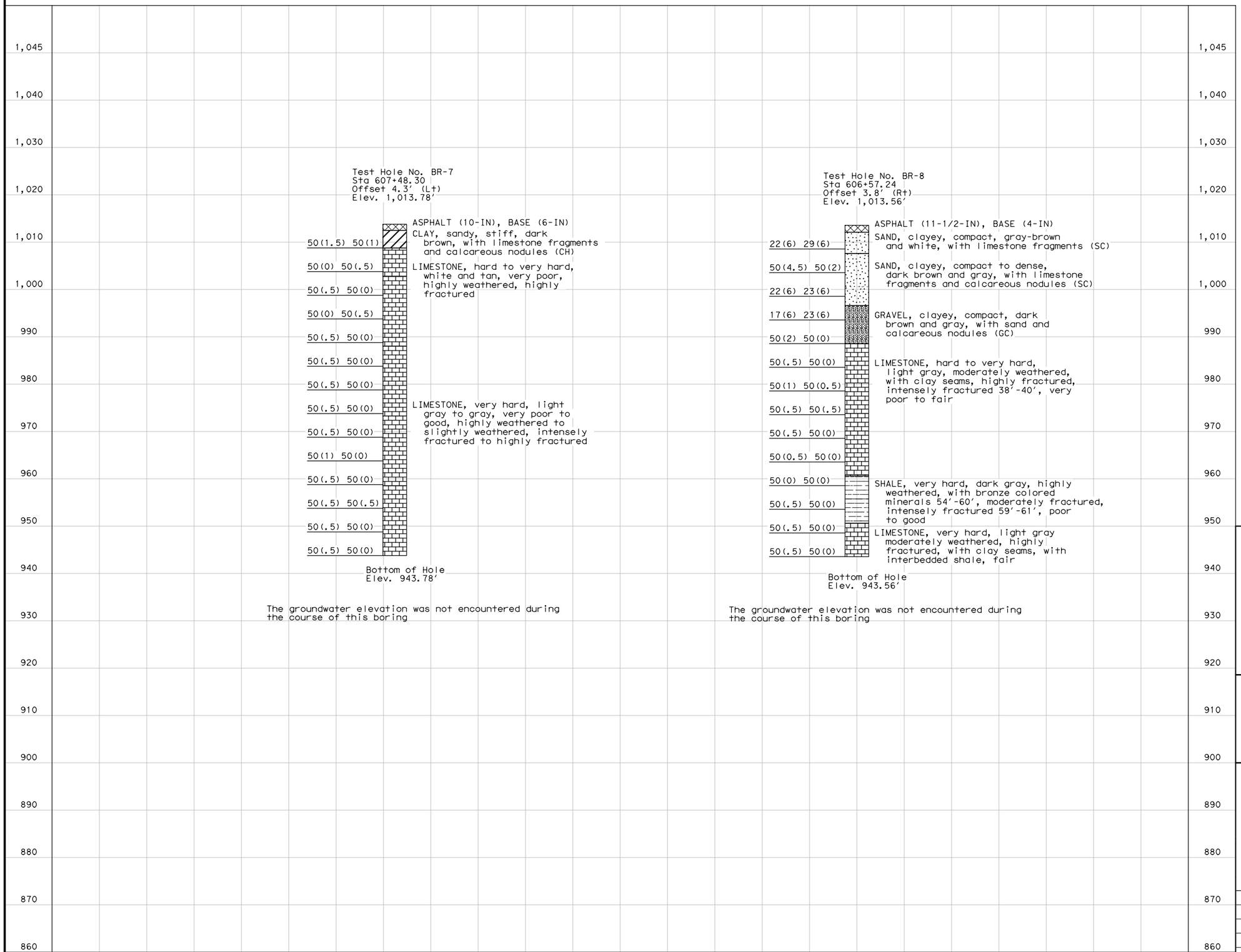
tonyb 4/5/2023 2:03:55 PM \\Pescv3\d\CURRENT\20\20026-WA1\DWG\SHT\1_FM182 at S Hog Creek\202000072.01.PESC.BR.TYP.01.dgn



PRINT DATE	REVISION DATE
4/5/2023	

STATE OF TEXAS
EMILY WASON BERVER
99355
LICENSED
PROFESSIONAL ENGINEER
Emily Wason Berver 4/5/2023

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TBPE FIRM NO. F-3379

Texas Department of Transportation
Waco District

FM 182 AT SOUTH HOG CREEK

SOIL BORING LOGS

SHEET 1 OF 1

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		FM 182

STATE	DISTRICT	COUNTY	
TEXAS	WACO	CORYELL	
CONTROL	SECTION	JOB	SHEET NO.
1219	02	017, ETC	78

REV DATE: 4/5/2023
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tonyb 4/5/2023 2:04:47 PM \\pescv3\d\CURRENT\20\20026-WA1\DWG\SHT\1_FM182 at S Hog Creek\202000072.01.PESC.BR.LAY.02.dgn

SUMMARY OF ESTIMATED QUANTITIES

BID ITEM	400 6005	416 6002	420 6014	420 6030	420 6038	422 6007	422 6015	425 6009	432 6033	450 6023	454 6004	496 6009
BID ITEM DESCRIPTION / BRIDGE ELEMENT	CEM STABIL BKFL	DRILL SHAFT (24 IN)	(1) CL C CONC (ABUT) (HPC)	CL C CONC (CAP) (HPC)	CL C CONC (COLUMN) (HPC)	REINF CONC SLAB (SLAB BEAM)	APPROACH SLAB	PRESTR CONC SLAB BEAM (4SB12)	RIPRAP (STONE PROTECTION) (18 IN)	RAIL (TY SSTR)	ARMOR JOINT (SEALED)	REMOV STR (BRIDGE 0 - 99 FT LENGTH)
	CY	LF	CY	CY	CY	SF	CY	LF	CY	LF	LF	EA
2 ~ ABUTMENTS	82	126	20.8				48.1		475	24.0		
2 ~ INTERIOR BENTS		117		16.0	6.0							
1 ~ 105.00' PRESTR CONC SLAB BEAM UNIT						3,372		828.00		210.0	56	1
TOTALS	**82**	**243**	**20.8**	**16.0**	**6.0**	**3,372**	**48.1**	**828.00**	**475**	**234.0**	**56**	**1**

(1) PAINTING PERMANENT STRUCTURE NUMBER IS SUBSIDIARY TO ITEM 420. SEE GENERAL NOTES.

TOP OF CAP ELEVATIONS

		LEFT CAP END	CENTER OF CAP	RIGHT CAP END
		FT	FT	FT
ABUT 1	FWD	1,013.225	1,013.546	1,013.225
BENT 2	BK	1,013.359	1,013.680	1,013.359
	FWD	1,013.365	1,013.686	1,013.365
BENT 3	BK	1,013.499	1,013.820	1,013.499
	FWD	1,013.505	1,013.826	1,013.505
ABUT 4	BK	1,013.623	1,013.944	1,013.623

NOTE: SEE ABUTMENT AND BENT STANDARDS FOR LOCATIONS OF CAP ELEVATIONS.

PRINT DATE	REVISION DATE
4/5/2023	

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FM 182 AT SOUTH HOG CREEK

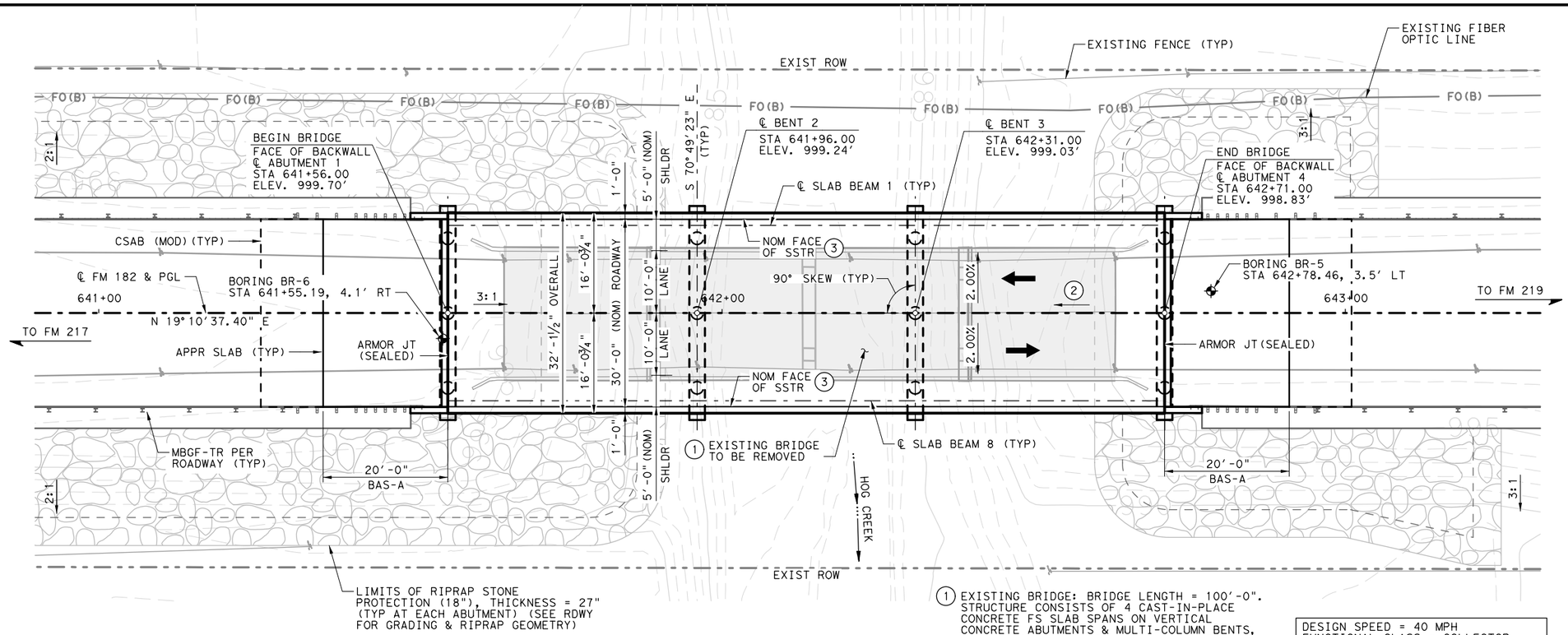
ESTIMATED QUANTITIES & CAP ELEVATIONS

SHEET 1 OF 1

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		FM 182

STATE	DISTRICT	COUNTY	
TEXAS	WACO	CORYELL	
CONTROL	SECTION	JOB	SHEET NO.
1219	02	017, ETC	79

REV DATE: 4/5/2023
CSJ: 1219-02-017, ETC
FILE LOCATION: \\Pescv3\d\CURRENT\20\20026-WA1\DWG\SHT\1_FM182 at S Hog Creek\202000072.01.PESC.BR.QTY.01.dgn



PLAN

(1) EXISTING BRIDGE: BRIDGE LENGTH = 100'-0". STRUCTURE CONSISTS OF 4 CAST-IN-PLACE CONCRETE FS SLAB SPANS ON VERTICAL CONCRETE ABUTMENTS & MULTI-COLUMN BENTS, SUPPORTED ON DRILLED SHAFT FOUNDATIONS. SEE TxDOT SPEC ITEM 496.

(2) SEE ELEVATION VIEW.

(3) PROVIDE A MINIMUM OF 3 RAIL SLOTS EACH SPAN, TYPICAL EACH SIDE.

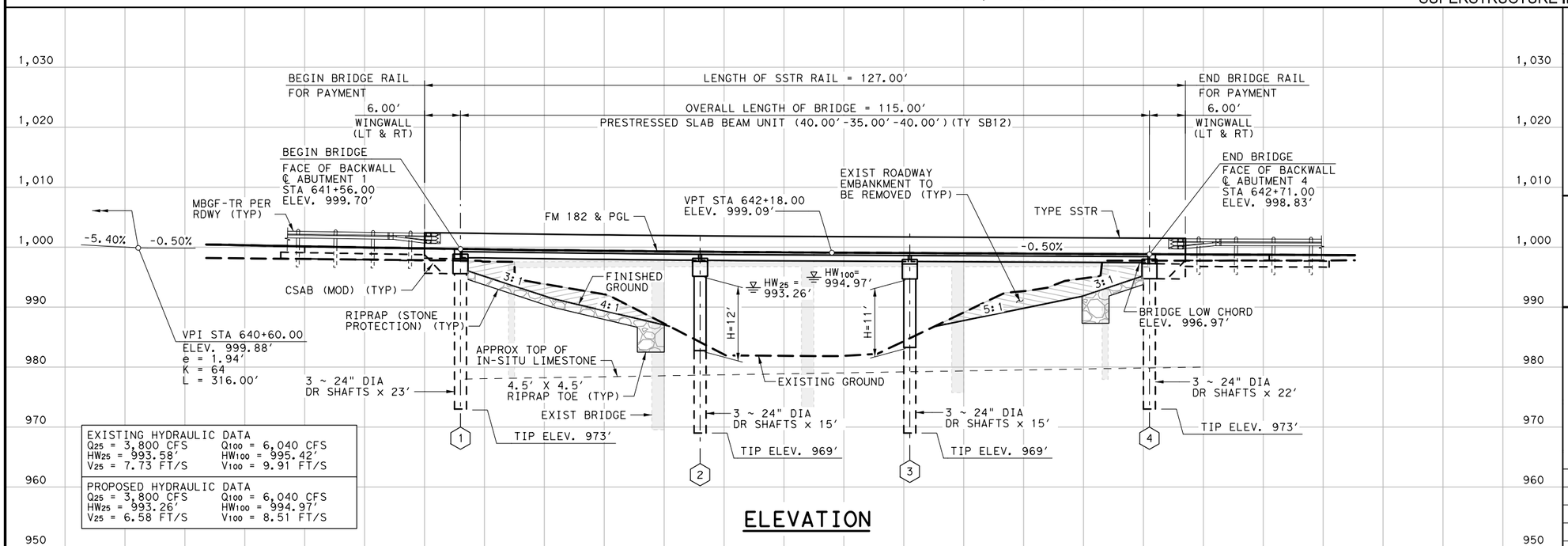
DESIGN SPEED = 40 MPH
FUNCTIONAL CLASS = COLLECTOR
ADT(2021) = 187 VPD
ADT(2041) = 262 VPD
EXIST NBI: 09-050-0-1219-02-002
NEW NBI NO: 09-050-0-1219-02-009

HL-93 LOADING
SUPERSTRUCTURE INV/OPR RATINGS: 1.08/1.60

GENERAL NOTES:

1. DESIGNED IN ACCORDANCE WITH 2020 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION WITH CURRENT INTERIM REVISIONS AND TXDOT BRIDGE DESIGN MANUAL (NOV 2021).
2. VERIFY ALL DIMENSIONS AND ELEVATIONS PRIOR TO COMMENCING WORK.
3. ALL DIMENSIONS ARE EITHER HORIZONTAL OR VERTICAL AND MUST BE CORRECTED FOR GRADE, CROWN, AND/OR SUPERELEVATION.
4. COLUMN HEIGHTS SHOWN ARE CALCULATED AT THE PROFILE GRADE LINE. ACTUAL COLUMN HEIGHT SHALL BE MEASURED IN THE FIELD PRIOR TO ORDERING MATERIALS.
5. CONTRACTOR SHALL VERIFY LOCATIONS OF ALL UTILITIES PRIOR TO EXCAVATION AND/OR DRILLING.
6. SEE SOIL BORING LOGS FOR BORING TEST HOLE PROFILES.
7. SEE ROADWAY DRAWINGS FOR RIPRAP GEOMETRY AND PROPOSED GRADING.
8. SEE STANDARD DRAWINGS FOR FOUNDATION, ABUTMENT, BENT, AND SLAB BEAM DETAILS.
9. SEE CSAB(MOD) STANDARD FOR CEMENT STABILIZED ABUTMENT BACKFILL DETAILS.
10. DRILLED SHAFTS HAVE BEEN DESIGNED WITH BOTH END BEARING AND SKIN FRICTION. SHAFTS SHALL BE FOUNDED AT THE LENGTHS SHOWN OR DEEPER AS NECESSARY TO OBTAIN 2 SHAFT DIAMETERS MINIMUM PENETRATION INTO HARD LIMESTONE.

PRINT DATE	REVISION DATE
4/5/2023	



ELEVATION

EXISTING HYDRAULIC DATA	
Q_{25} = 3,800 CFS	Q_{100} = 6,040 CFS
HW_{25} = 993.58'	HW_{100} = 995.42'
V_{25} = 7.73 FT/S	V_{100} = 9.91 FT/S

PROPOSED HYDRAULIC DATA	
Q_{25} = 3,800 CFS	Q_{100} = 6,040 CFS
HW_{25} = 993.26'	HW_{100} = 994.97'
V_{25} = 6.58 FT/S	V_{100} = 8.51 FT/S

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TBPE FIRM NO. F-3379

FM 182 AT HOG CREEK
BRIDGE LAYOUT

SHEET 1 OF 2

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		FM 182

STATE	DISTRICT	COUNTY	
TEXAS	WACO	CORYELL	
CONTROL	SECTION	JOB	SHEET NO.
1219	02	017, ETC	80

REV DATE: 4/5/2023
CSJ: 1219-02-018
FILE LOCATION: \\Pescv3\d\CURRENT\20\20026-WA1\DWG\SHT\2_FM182 at Hog Creek\202000072.02.PESC.BR.LAY.01.dgn

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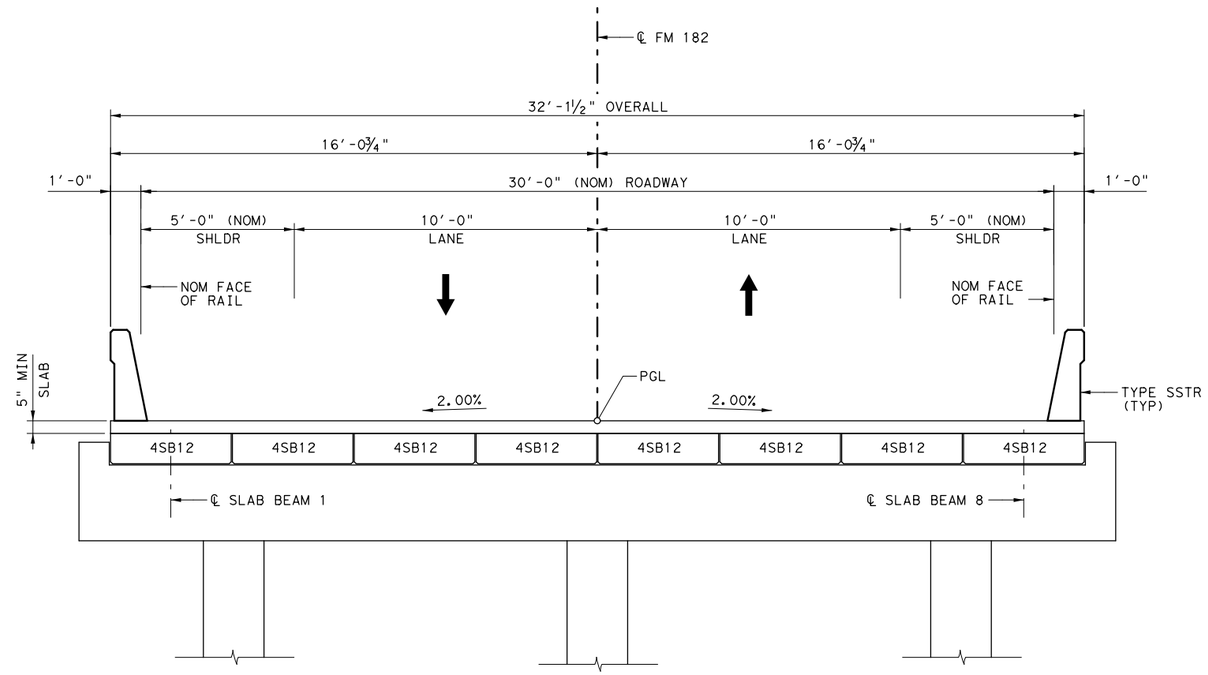

TYPICAL BRIDGE SECTION

N.T.S.

HL-93 LOADING

PRINT DATE	REVISION DATE
4/5/2023	

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Texas Department of Transportation

FM 182 AT HOG CREEK

BRIDGE LAYOUT

SHEET 2 OF 2

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		FM 182

STATE	DISTRICT	COUNTY	
TEXAS	WACO	CORYELL	
CONTROL	SECTION	JOB	SHEET NO.
1219	02	017, ETC	81

REV DATE: 4/5/2023
CSJ: 1219-02-018
FILE LOCATION: \\Pescv3\d\CURRENT\20\20026-WA1\DWG\SHT\2_FM182 at Hog Creek\202000072.02.PESC.BR.TYP.01.dgn

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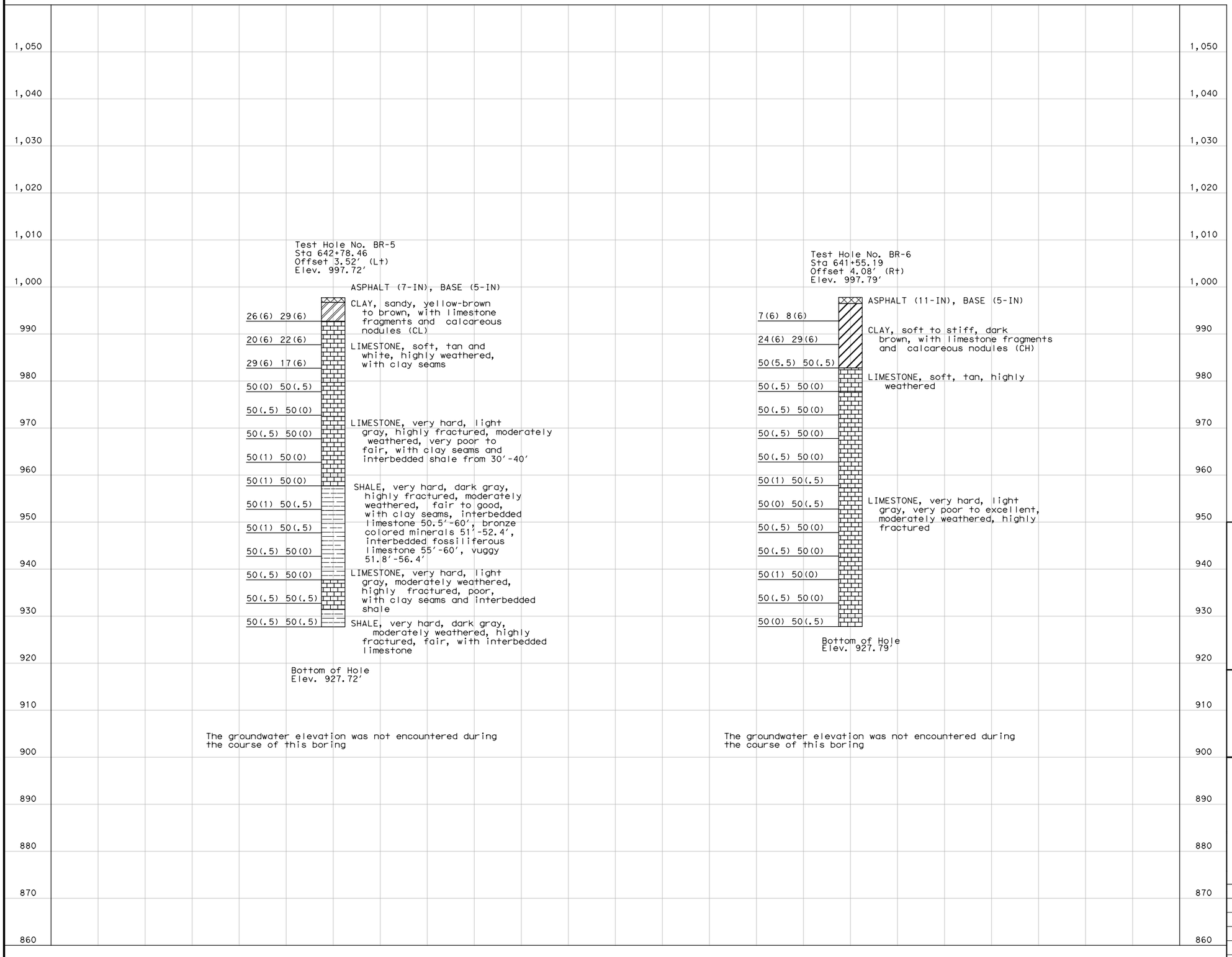

PRINT DATE	REVISION DATE
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Texas Department of Transportation

FM 182 AT HOG CREEK
SOIL BORING LOGS

SHEET 1 OF 1

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		FM 182

STATE	DISTRICT	COUNTY	
TEXAS	WACO	CORYELL	
CONTROL	SECTION	JOB	SHEET NO.
1219	02	017, ETC	82

REV DATE: 4/5/2023
CSJ: 1219-02-018
FILE LOCATION: \\Pescv3\d\CURRENT\20\20026-WA1\DWG\SHT\2_FM182 at Hog Creek\202000072.02.PESC.BR.LAY.02.dgn

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SUMMARY OF ESTIMATED QUANTITIES

BID ITEM	400 6005	416 6002	420 6014	420 6030	420 6038	422 6007	422 6015	425 6009	432 6033	450 6023	454 6004	496 6010
BID ITEM DESCRIPTION / BRIDGE ELEMENT	CEM STABIL BKFL	DRILL SHAFT (24 IN)	(1) CL C CONC (ABUT) (HPC)	CL C CONC (CAP) (HPC)	CL C CONC (COLUMN) (HPC)	REINF CONC SLAB (SLAB BEAM)	APPROACH SLAB	PRESTR CONC SLAB BEAM (4SB12)	RIPRAP (STONE PROTECTION) (18 IN)	RAIL (TY SSTR)	ARMOR JOINT (SEALED)	REMOV STR (BRIDGE 100 - 499 FT LENGTH)
	CY	LF	CY	CY	CY	SF	CY	LF	CY	LF	LF	EA
2 ~ ABUTMENTS	82	135	20.8				48.1		1,205	24.0		
2 ~ INTERIOR BENTS		90		16.0	8.1							
1 ~ 115.00' PRESTR CONC SLAB BEAM UNIT						3,694		908.00		230.0	56	1
TOTALS	**82**	**225**	**20.8**	**16.0**	**8.1**	**3,694**	**48.1**	**908.00**	**1,205**	**254.0**	**56**	**1**

(1) PAINTING PERMANENT STRUCTURE NUMBER IS SUBSIDIARY TO ITEM 420. SEE GENERAL NOTES.

TOP OF CAP ELEVATIONS

		LEFT CAP END	CENTER OF CAP	RIGHT CAP END
		FT	FT	FT
ABUT 1	FWD	997.660	997.981	997.660
BENT 2	BK	997.216	997.538	997.216
	FWD	997.246	997.567	997.246
BENT 3	BK	997.044	997.365	997.044
	FWD	996.995	997.316	996.995
ABUT 4	BK	996.803	997.124	996.803

NOTE: SEE ABUTMENT AND BENT STANDARDS FOR LOCATIONS OF CAP ELEVATIONS.

PRINT DATE	REVISION DATE
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Texas Department of Transportation

FM 182 AT HOG CREEK

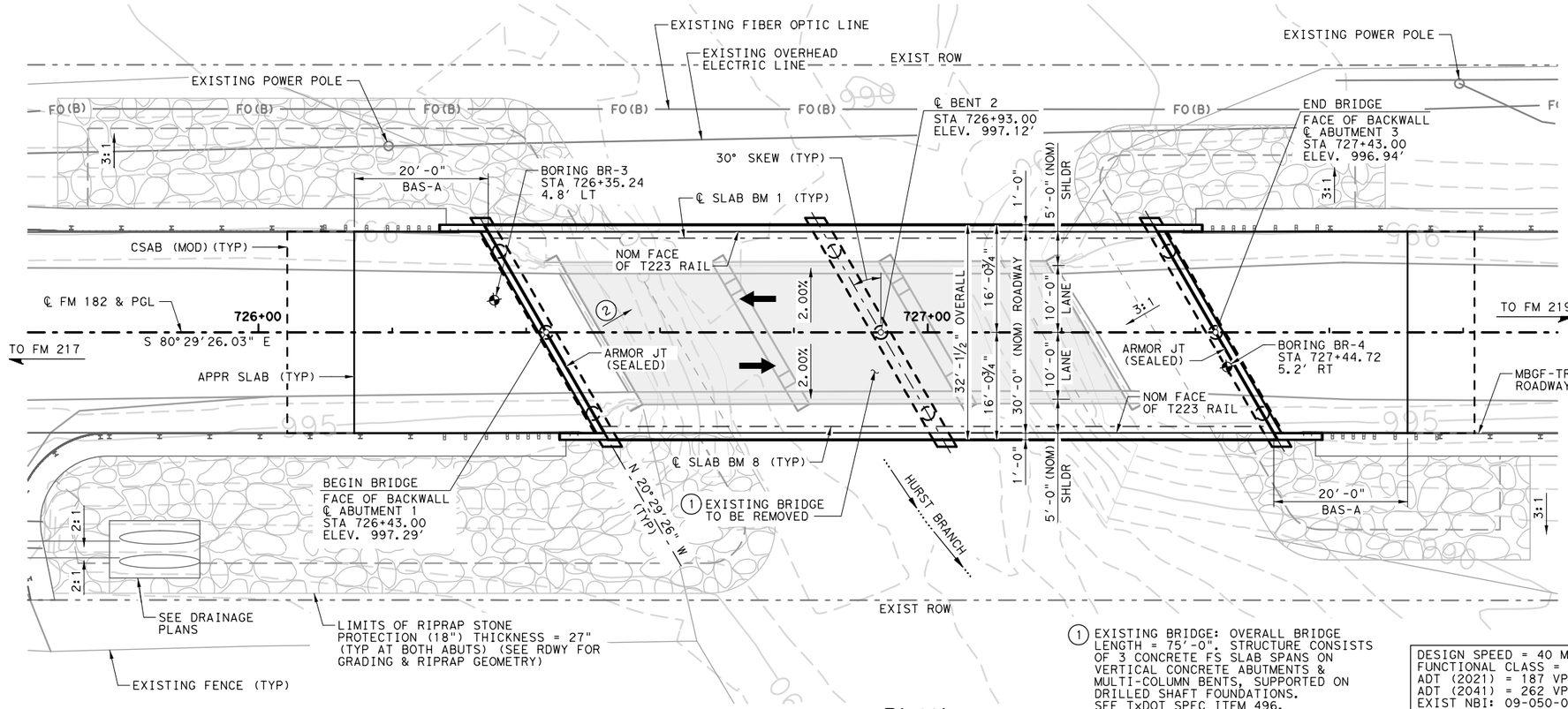
ESTIMATED QUANTITIES & CAP ELEVATIONS

SHEET 1 OF 1

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		FM 182

STATE	DISTRICT	COUNTY	
TEXAS	WACO	CORYELL	
CONTROL	SECTION	JOB	SHEET NO.
1219	02	017, ETC	83

REV DATE: 4/5/2023
CSJ: 1219-02-018
FILE LOCATION: \\Pescv3\d\CURRENT\20\20026-WA1\DWG\SHT\2_FM182 at Hog Creek\202000072.02.PESC.BR.QTY.01.dgn



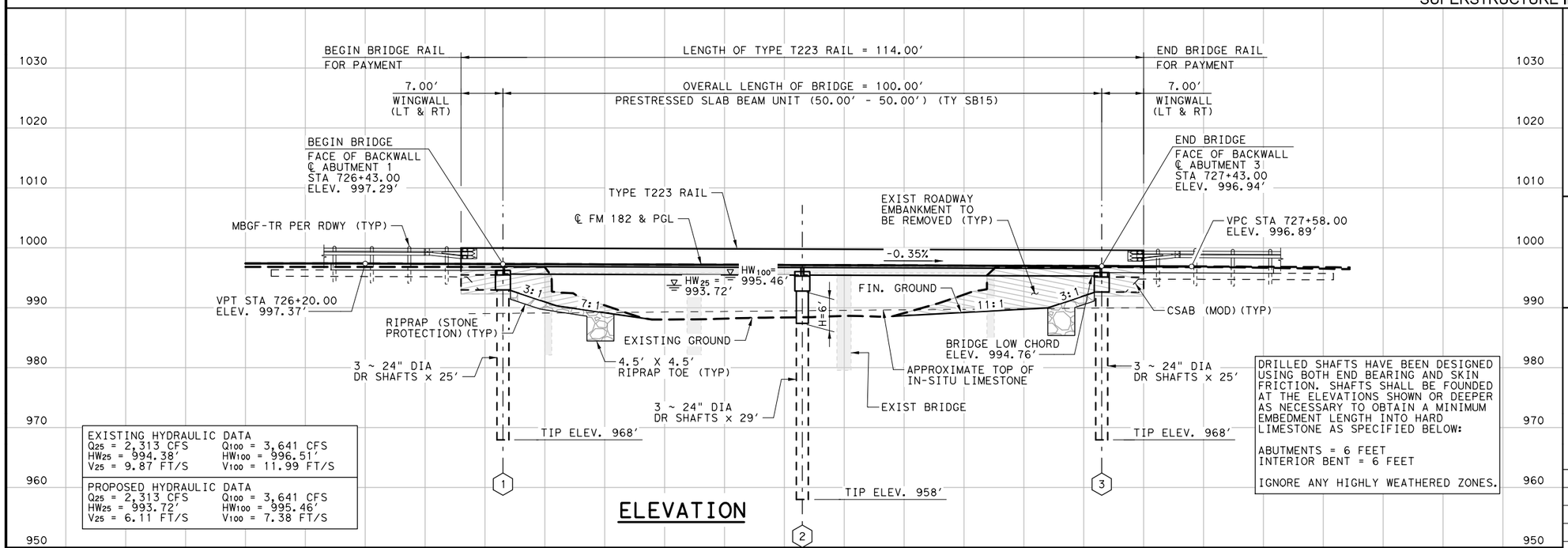
PLAN

1. EXISTING BRIDGE: OVERALL BRIDGE LENGTH = 75'-0". STRUCTURE CONSISTS OF 3 CONCRETE FS SLAB SPANS ON VERTICAL CONCRETE ABUTMENTS & MULTI-COLUMN BENTS, SUPPORTED ON DRILLED SHAFT FOUNDATIONS. SEE TxDOT SPEC ITEM 496.

2. SEE ELEVATION VIEW.

DESIGN SPEED = 40 MPH
FUNCTIONAL CLASS = COLLECTOR
ADT (2021) = 187 VPD
ADT (2041) = 262 VPD
EXIST NBI: 09-050-0-1219-02-001
NEW NBI: 09-050-0-1219-02-010

HL-93 LOADING
SUPERSTRUCTURE INV/OPR RATINGS: 1.02/1.71



ELEVATION

EXISTING HYDRAULIC DATA	
Q_{25} = 2,313 CFS	Q_{100} = 3,641 CFS
HW_{25} = 994.38'	HW_{100} = 996.51'
V_{25} = 9.87 FT/S	V_{100} = 11.99 FT/S
PROPOSED HYDRAULIC DATA	
Q_{25} = 2,313 CFS	Q_{100} = 3,641 CFS
HW_{25} = 993.72'	HW_{100} = 995.46'
V_{25} = 6.11 FT/S	V_{100} = 7.38 FT/S

DRILLED SHAFTS HAVE BEEN DESIGNED USING BOTH END BEARING AND SKIN FRICTION. SHAFTS SHALL BE FOUNDED AT THE ELEVATIONS SHOWN OR DEEPER AS NECESSARY TO OBTAIN A MINIMUM EMBEDMENT LENGTH INTO HARD LIMESTONE AS SPECIFIED BELOW:

ABUTMENTS = 6 FEET
INTERIOR BENT = 6 FEET

IGNORE ANY HIGHLY WEATHERED ZONES.

0 10 20
SCALE IN FEET

GENERAL NOTES:

1. DESIGNED IN ACCORDANCE WITH 2020 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION WITH CURRENT INTERIM REVISIONS AND TXDOT BRIDGE DESIGN MANUAL (NOV 2021).
2. VERIFY ALL DIMENSIONS AND ELEVATIONS PRIOR TO COMMENCING WORK.
3. ALL DIMENSIONS ARE EITHER HORIZONTAL OR VERTICAL AND MUST BE CORRECTED FOR GRADE, CROWN, AND/OR SUPERELEVATION.
4. COLUMN HEIGHTS SHOWN ARE CALCULATED AT THE PROFILE GRADE LINE. ACTUAL COLUMN HEIGHT SHALL BE MEASURED IN THE FIELD PRIOR TO ORDERING MATERIALS.
5. CONTRACTOR SHALL VERIFY LOCATIONS OF ALL UTILITIES PRIOR TO EXCAVATION AND/OR DRILLING.
6. SEE SOIL BORING LOGS FOR BORING TEST HOLE PROFILES.
7. SEE ROADWAY DRAWINGS FOR RIPRAP GEOMETRY AND PROPOSED GRADING.
8. SEE STANDARD DRAWINGS FOR FOUNDATION, ABUTMENT, BENT, AND SLAB BEAM DETAILS.
9. SEE CSAB(MOD) STANDARD FOR CEMENT STABILIZED ABUTMENT BACKFILL DETAILS.

PRINT DATE	REVISION DATE
4/5/2023	

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FM 182 AT HURST BRANCH
BRIDGE LAYOUT

SHEET 1 OF 2

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		FM 182
STATE	DISTRICT	COUNTY
TEXAS	WACO	CORYELL
CONTROL	SECTION	JOB / SHEET NO.
1219	02	017, ETC / 84

REV DATE: 4/5/2023
CSJ: 1219-02-020
FILE LOCATION: \\Pescv3\d\CURRENT\20\20026-WA1\DWG\SHT\3_FM182 at Hurst Branch\202000072.03.PESC.BR.LAY.01.dgn

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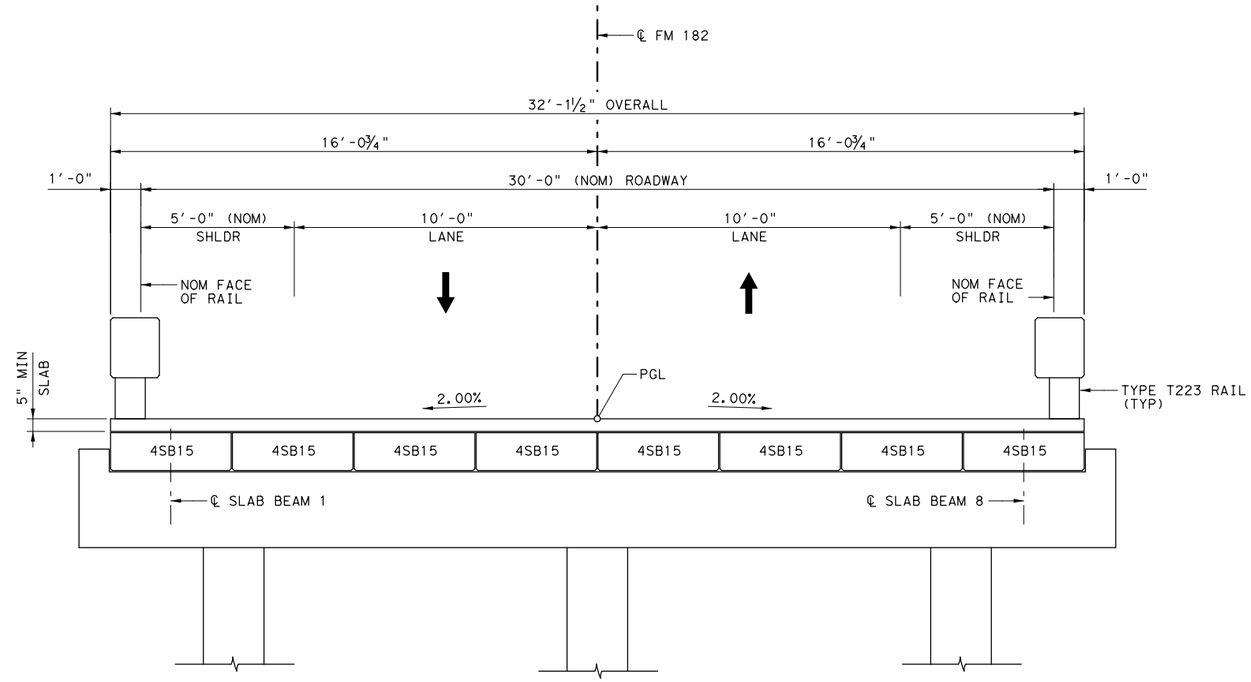

TYPICAL BRIDGE SECTION

N. T. S.

HL-93 LOADING

PRINT DATE	REVISION DATE
4/5/2023	

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FM 182 AT HURST BRANCH

BRIDGE LAYOUT

SHEET 2 OF 2

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		FM 182

STATE	DISTRICT	COUNTY	
TEXAS	WACO	CORYELL	
CONTROL	SECTION	JOB	SHEET NO.
1219	02	017, ETC	85

REV DATE: 4/5/2023
CSJ: 1219-02-020
FILE LOCATION: \\Pescv3\d\CURRENT\20\20026-WA1\DWG\SHT\3_FM182 at Hurst Branch\202000072.03.PESC.BR.TYP.01.dgn

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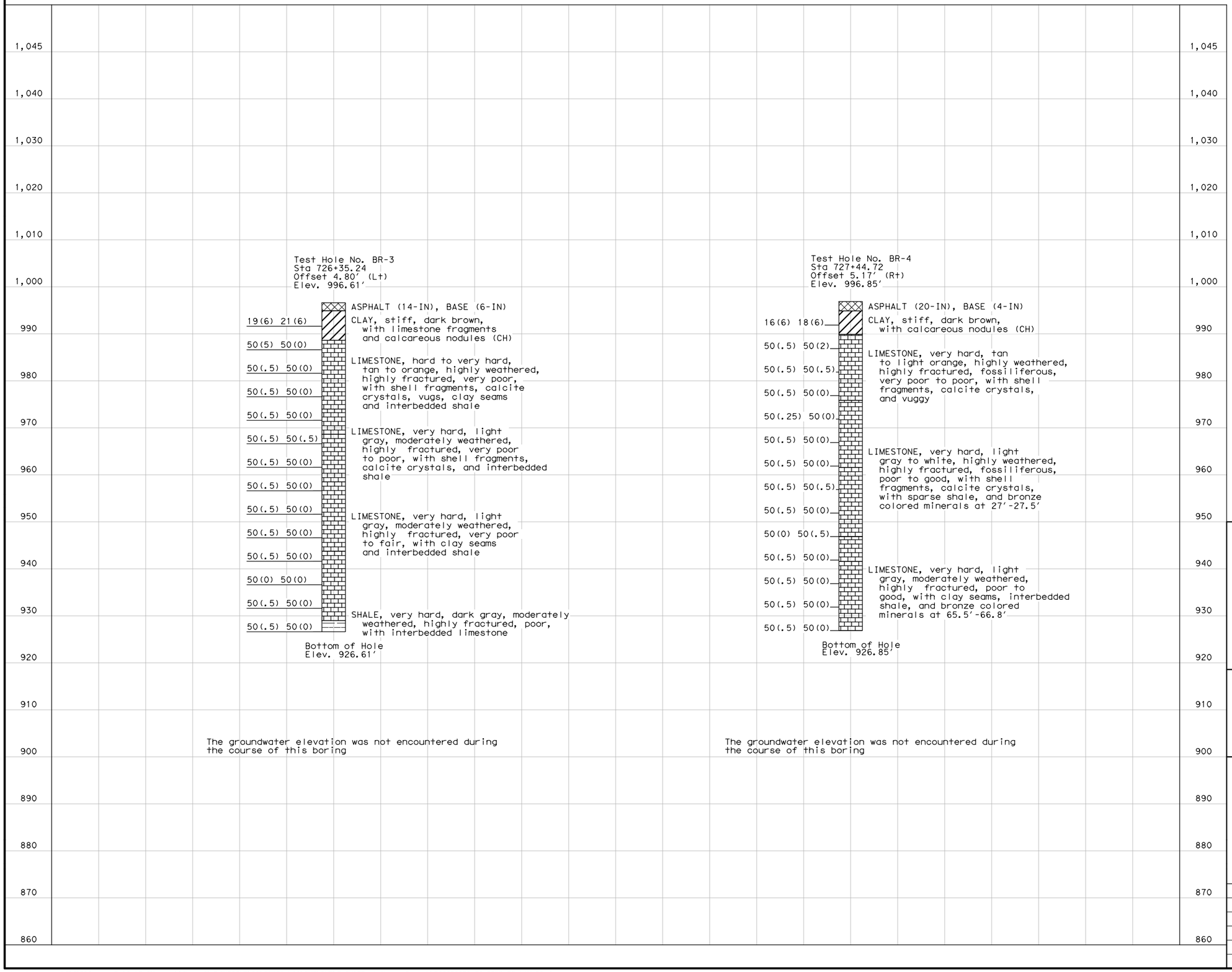

PRINT DATE	REVISION DATE
4/5/2023	

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Texas Department of Transportation

FM 182 AT HURST BRANCH
SOIL BORING LOGS

SHEET 1 OF 1

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		FM 182

STATE	DISTRICT	COUNTY	
TEXAS	WACO	CORYELL	
CONTROL	SECTION	JOB	SHEET NO.
1219	02	017, ETC	86

REV DATE: 4/5/2023
CSJ: 1219-02-020
FILE LOCATION: \\Pescv3\d\CURRENT\20\20026-WA1\DWG\SHT\3_FM182 at Hurst Branch\202000072.03.PESC.BR.LAY.02.dgn

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SUMMARY OF ESTIMATED QUANTITIES

BID ITEM	400 6005	416 6002	420 6014	420 6030	420 6038	422 6007	422 6015	425 6011	432 6033	450 6006	454 6004	496 6009
BID ITEM DESCRIPTION / BRIDGE ELEMENT	CEM STABIL BKFL	DRILL SHAFT (24 IN)	(1) CL C CONC (ABUT) (HPC)	CL C CONC (CAP) (HPC)	CL C CONC (COLUMN) (HPC)	REINF CONC SLAB (SLAB BEAM)	APPROACH SLAB	PRESTR CONC SLAB BEAM (4SB15)	RIPRAP (STONE PROTECTION) (18 IN)	RAIL (TY T223)	ARMOR JOINT (SEALED)	REMOV STR (BRIDGE 0 - 99 FT LENGTH)
	CY	LF	CY	CY	CY	SF	CY	LF	CY	LF	LF	EA
2 ~ ABUTMENTS	110	150	25.2				69.0		660	28.0		
1 ~ INTERIOR BENT		87		9.3	2.1							
1 ~ 100.00' PRESTR CONC SLAB BEAM UNIT						3,212		791.38		200.0	66	1
TOTALS	**110**	**237**	**25.2**	**9.3**	**2.1**	**3,212**	**69.0**	**791.38**	**660**	**228.0**	**66**	**1**

(1) PAINTING PERMANENT STRUCTURE NUMBER IS SUBSIDIARY TO ITEM 420. SEE GENERAL NOTES.

TOP OF CAP ELEVATIONS

		LEFT CAP END	CENTER OF CAP	RIGHT CAP END
		FT	FT	FT
ABUT 1	FWD	994.998	995.287	994.934
BENT 2	BK	994.830	995.119	994.765
	FWD	994.824	995.113	994.760
ABUT 3	BK	994.656	994.945	994.592

NOTE: SEE ABUTMENT AND BENT STANDARDS FOR LOCATIONS OF CAP ELEVATIONS.

PRINT DATE	REVISION DATE
4/5/2023	

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FM 182 AT HURST BRANCH

ESTIMATED QUANTITIES & CAP ELEVATIONS

SHEET 1 OF 1

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		FM 182

STATE	DISTRICT	COUNTY	
TEXAS	WACO	CORYELL	
CONTROL	SECTION	JOB	SHEET NO.
1219	02	017, ETC	87

REV DATE: 4/5/2023
CSJ: 1219-02-020
FILE LOCATION: \\Pescv3\d\CURRENT\20\20026-WA1\DWG\SHT\3_FM182 at Hurst Branch\202000072.03.PESC.BR.QTY.01.dgn

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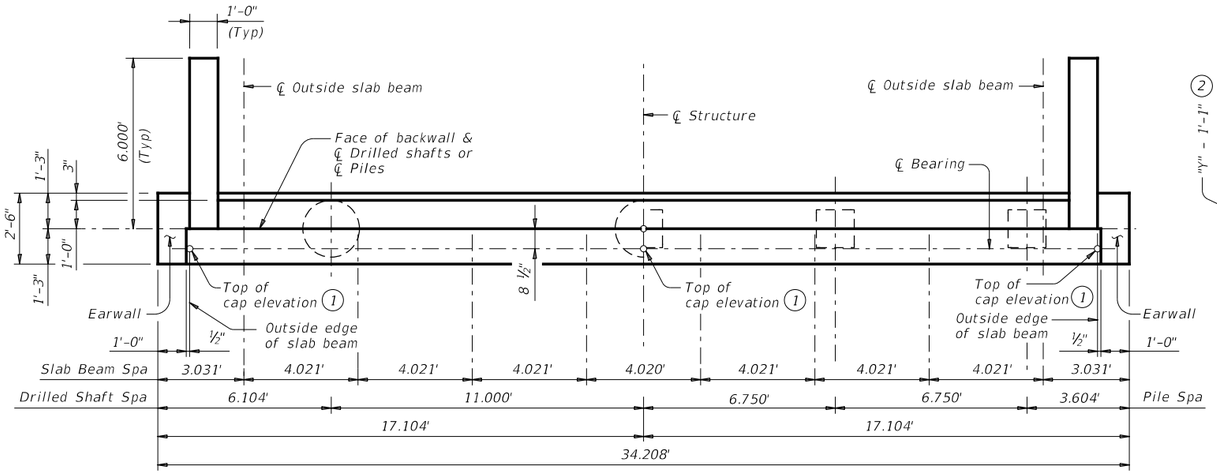
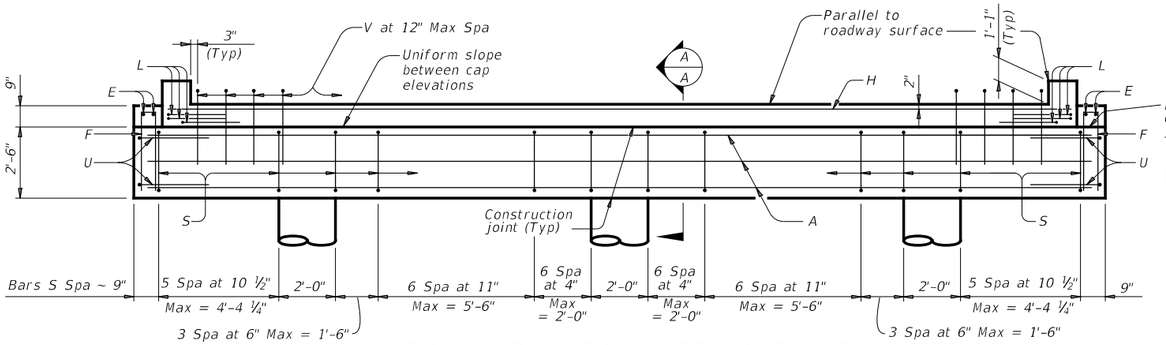
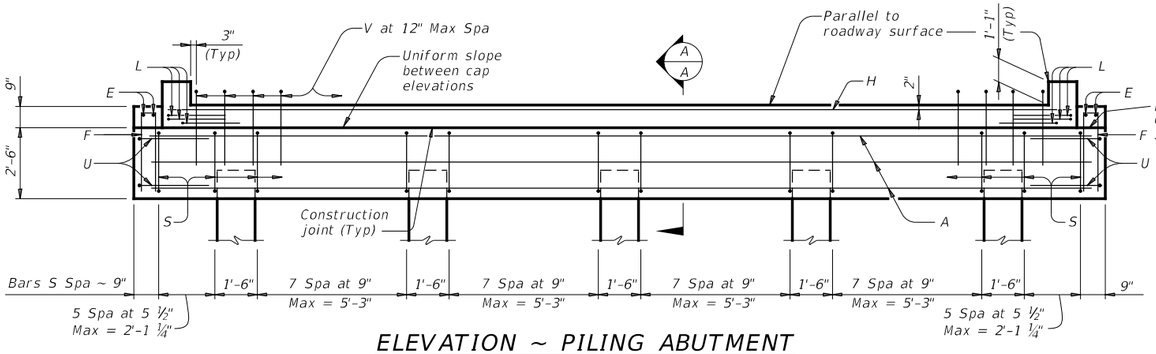


SHOWING DRILLED SHAFTS SHOWING PILES

PLAN

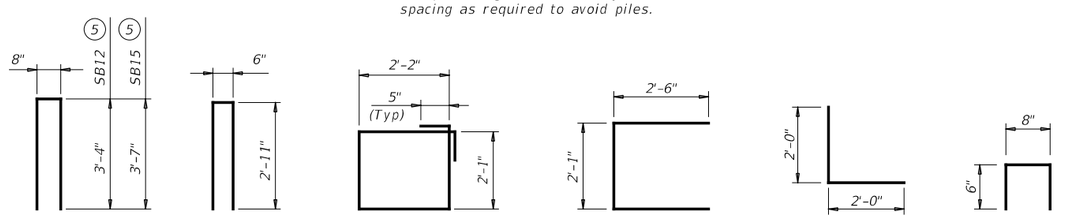


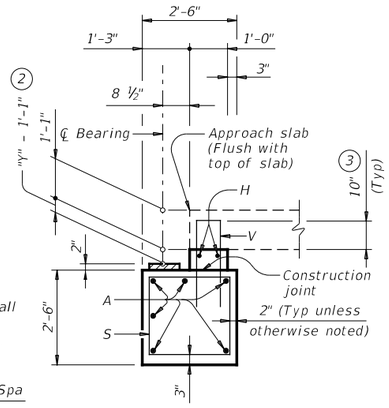
ELEVATION ~ DRILLED SHAFT ABUTMENT



ELEVATION ~ PILING ABUTMENT

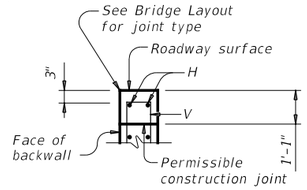
Note: For piles larger than 16", adjust Bars S spacing as required to avoid piles.





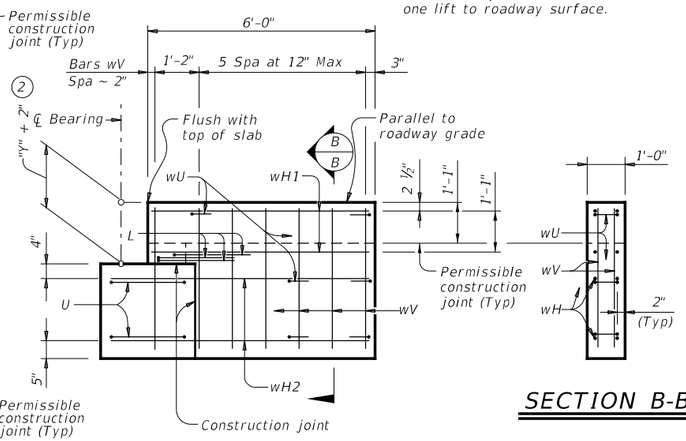
SECTION A-A (4)

(With Approach Slab)
Note: At Contractor's option, backwall may be cast with approach slab.



BACKWALL DETAIL (4)

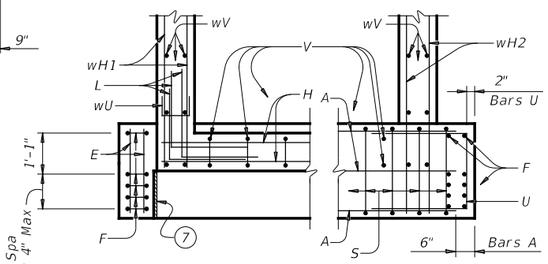
(Without Approach Slab)
Note: At Contractor's option, backwall may be cast in one lift to roadway surface.



SECTION B-B

WINGWALL ELEVATION

(Earwall not shown for clarity.)



BACKWALL CAP

CORNER DETAILS

FOUNDATION LOADS

Span Length	Drilled Shaft Loads		Vertical Pile Loads	
Ft	Tons/DS		Tons/Pile	
	4SB12	4SB15	4SB12	4SB15
25	43	46	26	28
30	48	51	29	31
35	53	57	32	34
40	57	62	34	37
45		67		40
50		71		43

TABLE OF ESTIMATED QUANTITIES (6)

Bar	No.	Size	Length (5)		Weight (5)	
			4SB12	4SB15	4SB12	4SB15
A	6	#11	33'-3"	33'-3"	1,060	1,060
E	4	#4	2'-2"	2'-2"	6	6
F	10	#4	6'-4"	6'-4"	43	43
H	2	#5	31'-10"	31'-10"	66	66
L	6	#6	4'-0"	4'-0"	36	36
S	44	#4	9'-4"	9'-4"	275	275
U	4	#6	7'-1"	7'-1"	43	43
V	31	#5	7'-4"	7'-10"	237	253
wH1	8	#6	5'-8"	5'-8"	68	68
wH2	8	#6	6'-11"	6'-11"	83	83
wU	12	#4	1'-8"	1'-8"	14	14
wV	28	#5	3'-10"	4'-1"	112	119
Reinforcing Steel				Lb	2,043	2,066
Cl "C" Conc (Abut)				CY	10.4	10.8

(1) *Top of cap elevations are based on section depths shown on Span Details.*

(2) *See Span Details for "Y".*

(3) *Increase as required to maintain 3" from finished grade.*

(4) *See Bridge Layout to determine if approach slab is present.*

(5) *See Bridge Layout for beam type used in the superstructure.*

(6) *Quantities shown are for one abutment only (with approach slab). Without approach slab, add 1.2 CY Class "C" concrete and 66 Lb reinforcing steel for 2 additional Bars H.*

(7) *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)*

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.
Designed for a normal embankment header slope of 3:1 and a maximum span length of 50 feet.
See Bridge Layout for header slope and foundation type, size, and length.
See Common Foundation Details (FD) standard sheet for all foundation details and notes.
See Concrete Riprap (CRR) standard sheet or Stone Riprap (SRR) standard sheet for riprap attachment details, if applicable.
See applicable rail details for rail anchorage in wingwalls.
These abutment details may be used with standard SPSB-30 only.

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

MATERIAL NOTES:

Provide Class C concrete (f'c = 3,600 psi).
Provide Class C (HPC) concrete if shown elsewhere in the plans.
Provide Grade 60 reinforcing steel.

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

ABUTMENTS

PRESTR CONCRETE SLAB BEAM

30' ROADWAY

APSB-30

FILE: psbste17-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	1219	02	017, ETC.	FM 182
	DIST	COUNTY		SHEET NO.
	WACO	CORYELL		88

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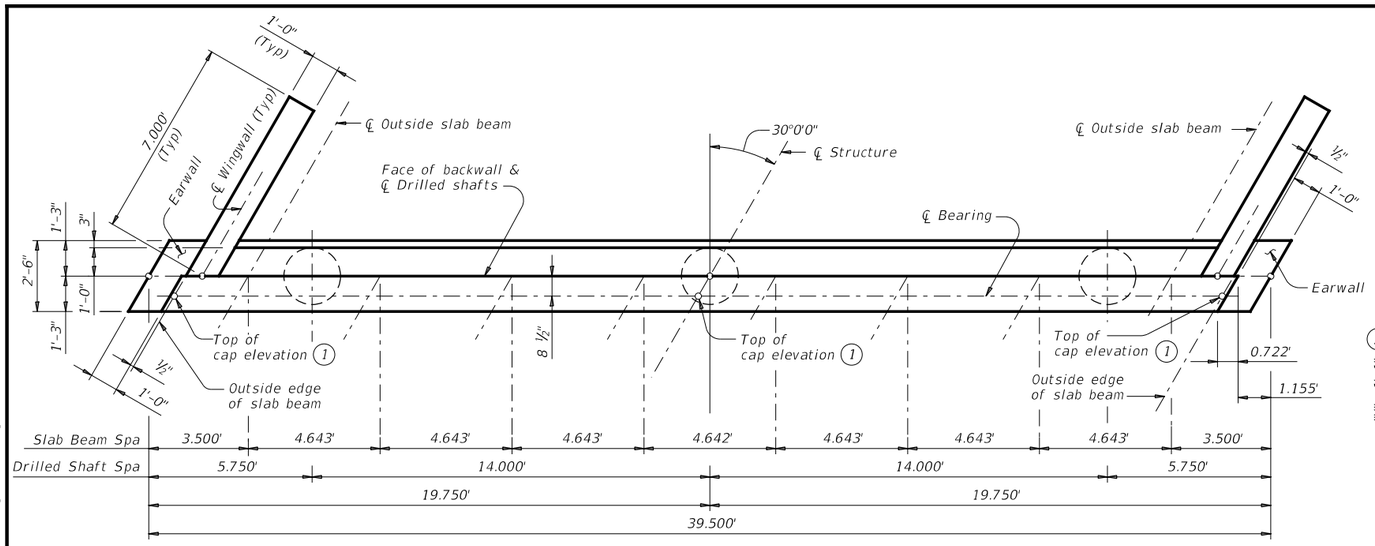
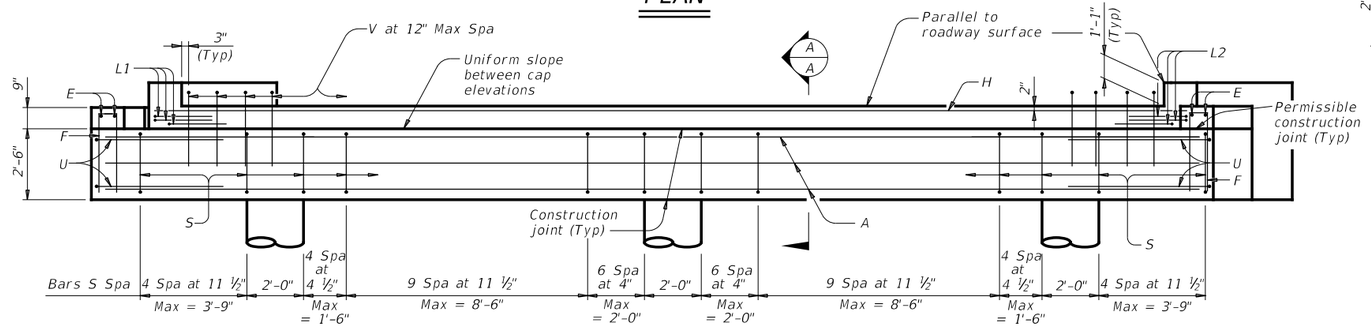
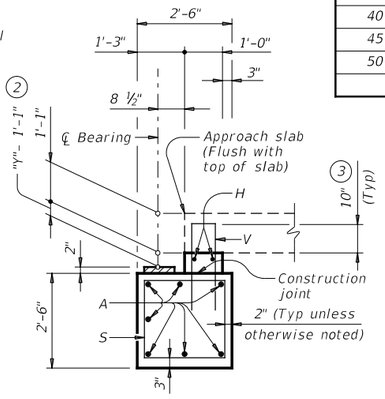


PLAN

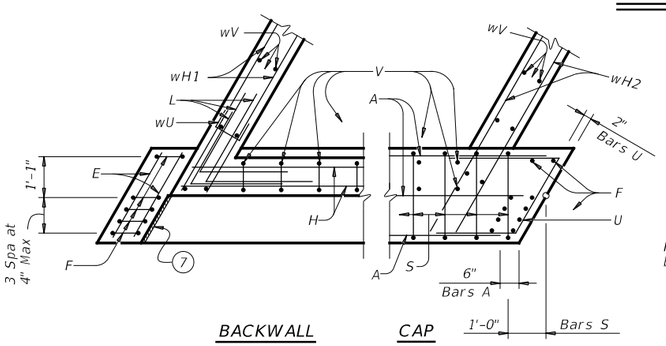


ELEVATION



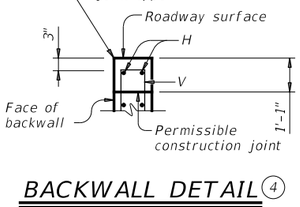
SECTION A-A (4)

(With approach slab)
Note: At Contractor's option, backwall may be cast with approach slab.



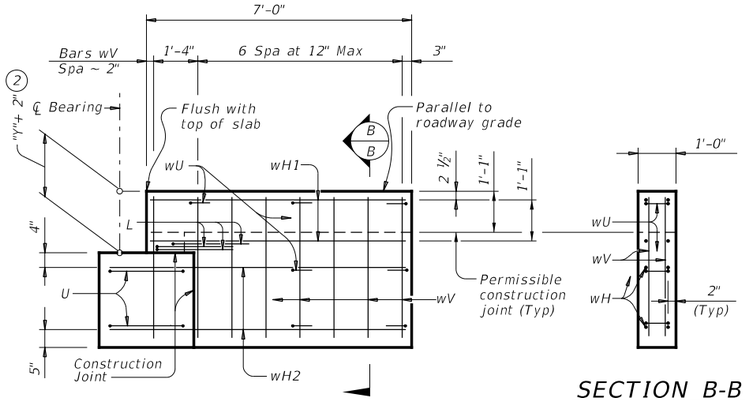
BACKWALL CAP

CORNER DETAILS



BACKWALL DETAIL (4)

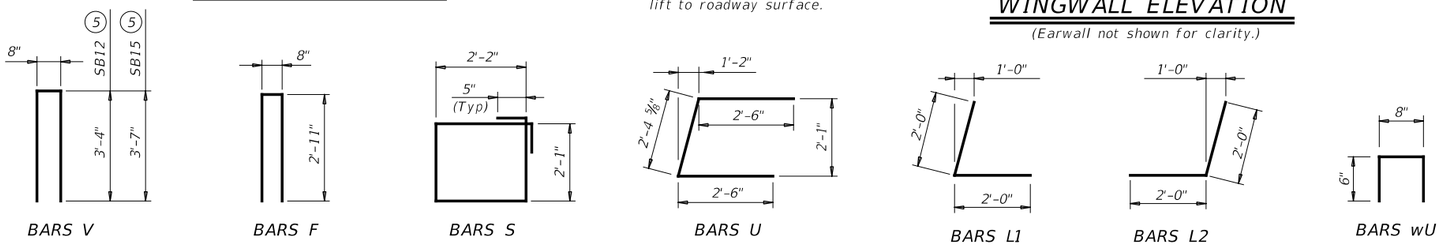
(Without approach slab)
Note: At Contractor's option, backwall may be cast in one lift to roadway surface.



WINGWALL ELEVATION

(Earwall not shown for clarity.)

SECTION B-B



FOUNDATION LOADS

Span Length	Drilled Shaft Loads	
Ft	Tons/DS	
	4SB12	4SB15
25	44	47
30	49	53
35	54	58
40	59	63
45		68
50		73

TABLE OF ESTIMATED QUANTITIES (6)

Bar	No.	Size	Length (5)		Weight (5)	
			4SB12	4SB15	4SB12	4SB15
A	7	#11	38'-6"	38'-6"	1,432	1,432
E	4	#4	2'-6"	2'-6"	7	7
F	10	#4	6'-6"	6'-6"	44	44
H	2	#5	36'-9"	36'-9"	77	77
L1	3	#6	4'-0"	4'-0"	18	18
L2	3	#6	4'-0"	4'-0"	18	18
S	50	#4	9'-4"	9'-4"	312	312
U	4	#6	7'-5"	7'-5"	45	45
V	36	#5	7'-4"	7'-10"	275	294
wH1	8	#6	6'-8"	6'-8"	80	80
wH2	8	#6	7'-11"	7'-11"	95	95
wU	14	#4	1'-8"	1'-8"	16	16
wV	32	#5	3'-10"	4'-1"	128	136
Reinforcing Steel				Lb	2,547	2,574
Cl "C" Conc (Abut)				CY	12.1	12.6

(1) Top of cap elevations are based on section depths shown on Span Details.

(2) See Span Details for "Y".

(3) Increase as required to maintain 3" from finished grade.

(4) See Bridge Layout to determine if approach slab is present.

(5) See Bridge Layout for beam type used in the superstructure.

(6) Quantities shown are for one abutment only (with approach slab). Without approach slab, add 1.4 CY Class "C" concrete and 77 Lb reinforcing steel for 2 additional Bars H.

(7) 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)

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

Designed for a normal embankment header slope of 3:1 and a maximum span length of 50 feet.

See Bridge Layout for header slope and foundation type, size, and length.

See Common Foundation Details (FD) standard sheet for all foundation details and notes.

See Concrete Riprap (CRR) standard sheet or Stone Riprap (SRR) standard sheet for riprap attachment details, if applicable.

See applicable rail details for rail anchorage in wingwalls.

Details are drawn showing right forward skew. See Bridge Layout for actual skew direction.

These abutment details may be used with standard SPSB-30-30 only.

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

MATERIAL NOTES:

Provide Class C concrete (f'c = 3,600 psi).

Provide Class C (HPC) concrete if shown elsewhere in the plans.

Provide Grade 60 reinforcing steel.

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

ABUTMENTS

PRESTR CONCRETE SLAB BEAM (DRILLED SHAFTS)

30' ROADWAY 30° SKEW

APSBD-30-30

FILE: psbste19-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2017 REVISIONS	CONT	SECT	JOB	HIGHWAY
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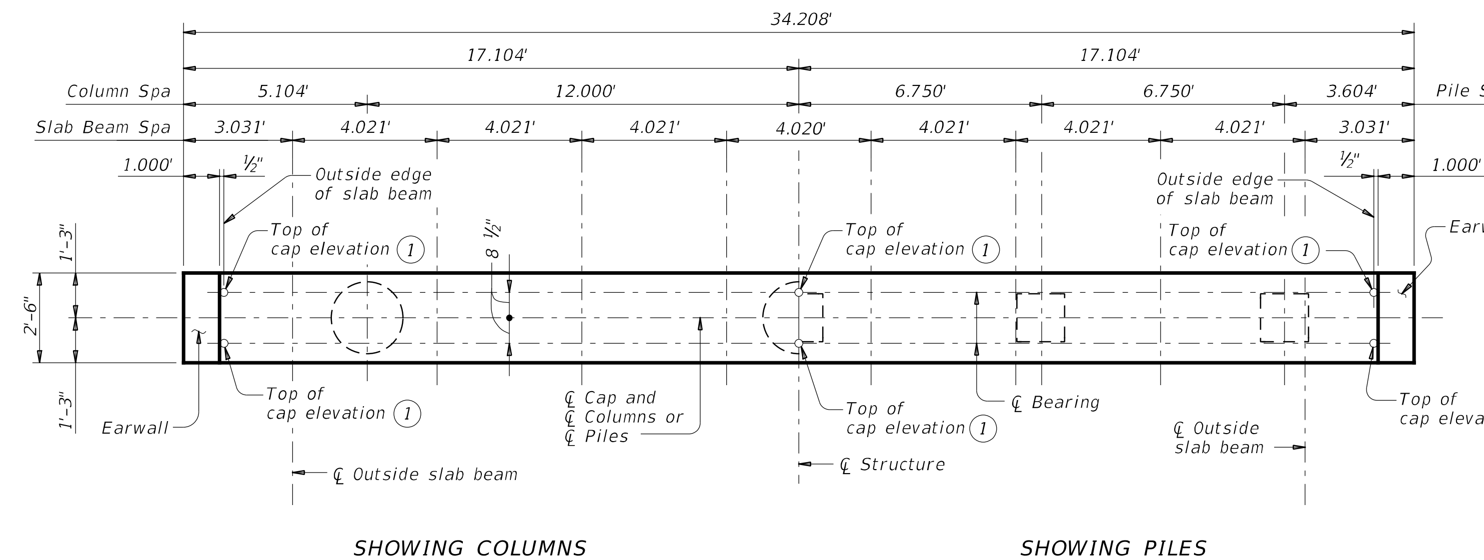
	DIST	COUNTY		SHEET NO.
	WACO	CORYELL		89



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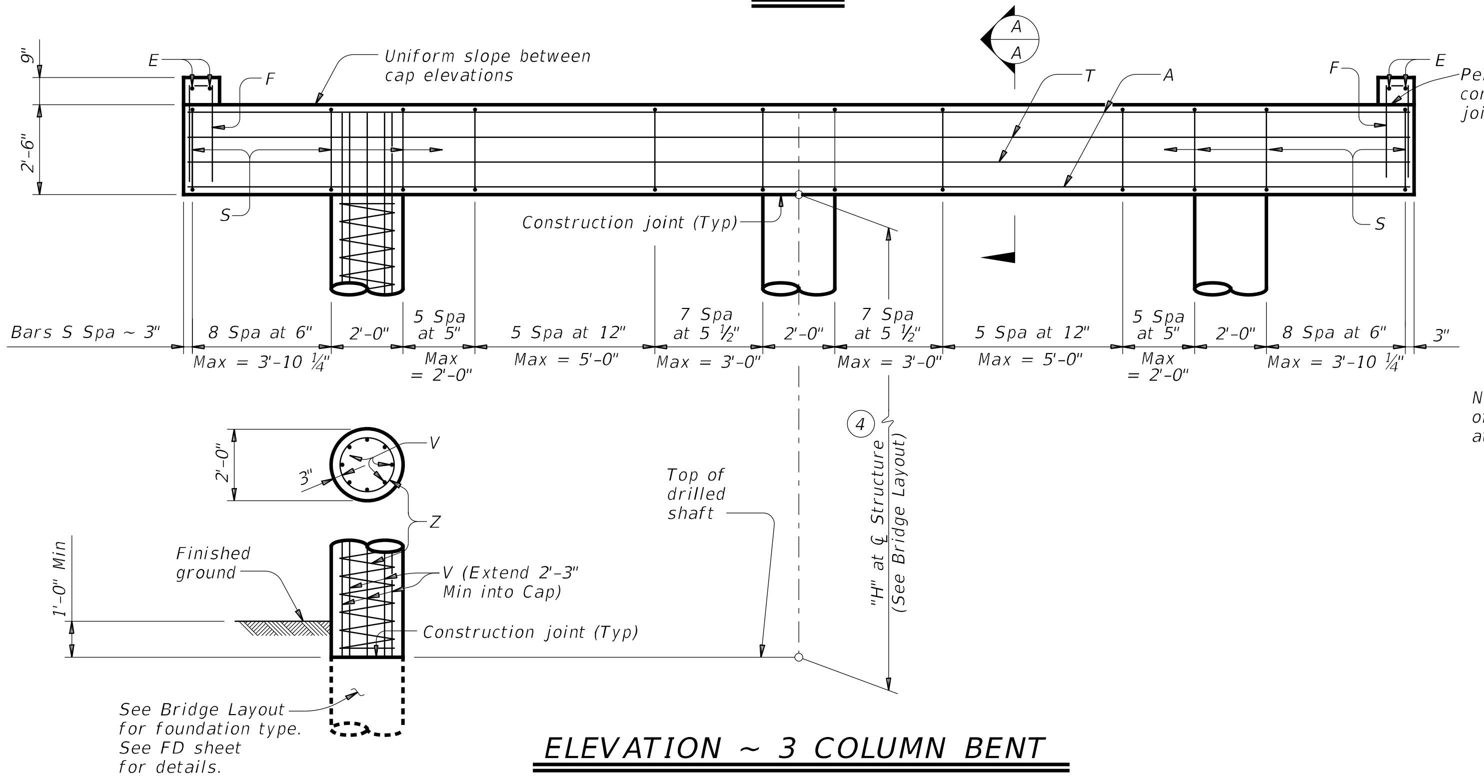
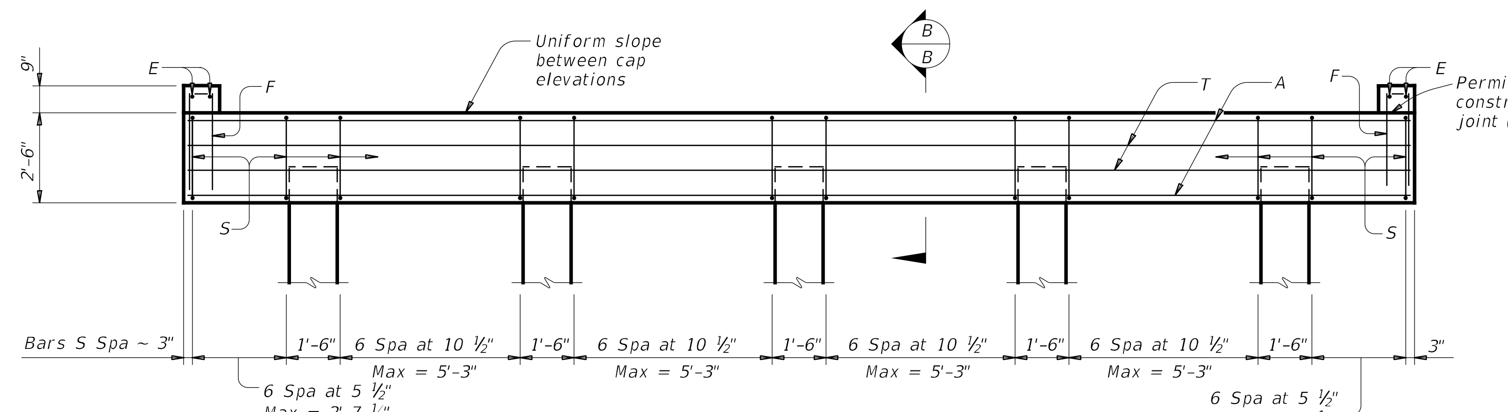
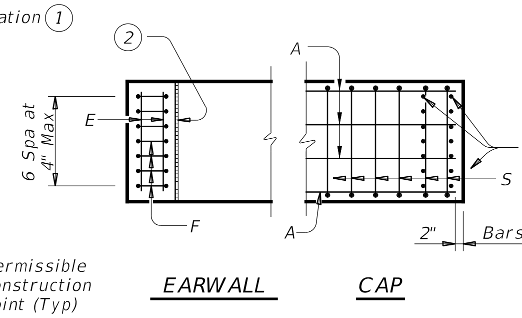


ELEVATION ~ 3 COLUMN BENT

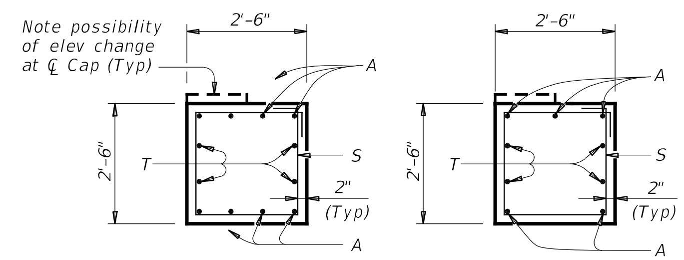


ELEVATION ~ 5 PILE BENT

Note: For piles larger than 16", adjust Bars S spacing as required to avoid piles.

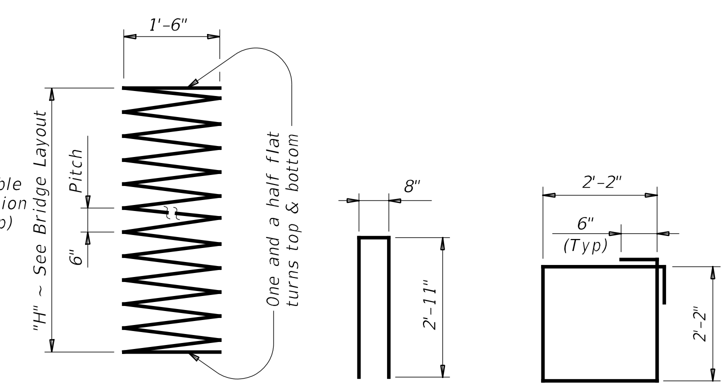


CAP END DETAIL



SECTION A-A

SECTION B-B



BARS Z BARS F BARS S

FOUNDATION LOADS

Average Span Length	Drilled Shaft Loads (5)		Vertical Pile Loads	
	Tons/DS		Tons/Pile	
Ft	4SB12	4SB15	4SB12	4SB15
25	65	70	39	42
30	75	81	45	48
35	83	90	50	54
40	91	99	55	60
45		108		65
50		117		70

TABLE OF ESTIMATED QUANTITIES (3)

3 COLUMN BENT

Bar	No.	Size	Length	Weight
A	8	#11	33'-10"	1,438
E	4	#4	2'-2"	6
F	14	#4	6'-6"	63
S	54	#5	9'-8"	545
T	4	#5	33'-10"	141
V	24	#7	26'-3"	1,288
Z	3	#3	242'-2"	273
Reinforcing Steel			Lb	3,752
Cl "C" Conc (Cap)			CY	8.0
Cl "C" Conc (Col)			CY	8.4

TABLE OF ESTIMATED QUANTITIES

5 PILE BENT

Bar	No.	Size	Length	Weight
A	5	#11	33'-10"	899
E	4	#4	2'-2"	6
F	14	#4	6'-6"	61
S	42	#5	9'-8"	424
T	4	#5	33'-10"	141
Reinforcing Steel			Lb	1,531
Cl "C" Conc (Cap)			CY	8.0

TABLE OF MAXIMUM ALLOWABLE EXPOSED PILE HEIGHTS AND PILE LOADS (4)

Pile Type		Max Ht	Max Load
Concrete	Steel	Ft	Tons/Pile
16" Sq	HP14x73	16	75
18" Sq	HP14x117 (6)	20	90

(1) Top of Cap Elevations are based on section depths shown on Span Details.

(2) 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)

(3) Quantities shown are based on an "H" value of 24 feet. For each linear foot variation in "H" value, make the following adjustments:
Bars V length, 1'-0"
Bars Z length, 9'-6"
Reinforcing Steel, 60 Lb
Class "C" conc (column), 0.35 CY

(4) This standard may not be used for "H" heights exceeding 24 feet or exposed pile heights exceeding the values shown in the table. In areas of very soft soil or where scour is anticipated, allowable "H" heights or exposed pile heights must be evaluated by the Engineer prior to the use of this standard.

(5) Foundation Loads based on "H" = 24 feet.

(6) When HP14x117 steel piling is specified in the plans, the Contractor has the option of furnishing either HP14x117 or HP16x101 steel piling.

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.
Bent selected must be based on the average span length rounded up to the next 5-foot increment.
For pile bents supporting unequal spans, the shorter span cannot be less than 80 percent of the longer span.
See Bridge Layout for foundation type, size, and length.
See Common Foundation Details (FD) standard sheet for all foundation details and notes.
These bent details do not support the use of multi-pile footings shown on the FD standard.
These bent details may be used with standard SPSB-30 only.

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

MATERIAL NOTES:

Provide Class C concrete (f'c = 3,600 psi).
Provide Class C (HPC) concrete if shown elsewhere in the plans.
Provide Grade 60 reinforcing steel.

HL93 LOADING

Texas Department of Transportation — Bridge Division Standard

INTERIOR BENTS
PRESTR CONCRETE SLAB BEAM
30' ROADWAY
BPSB-30

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©TxDOT January 2017	CONT 1219	SECT 02	JOB 017, ETC.	HIGHWAY FM 182
REVISIONS	DIST WACO	COUNTY CORYELL		SHEET NO. 90

DATE: 4/5/2023 3:28:22 PM
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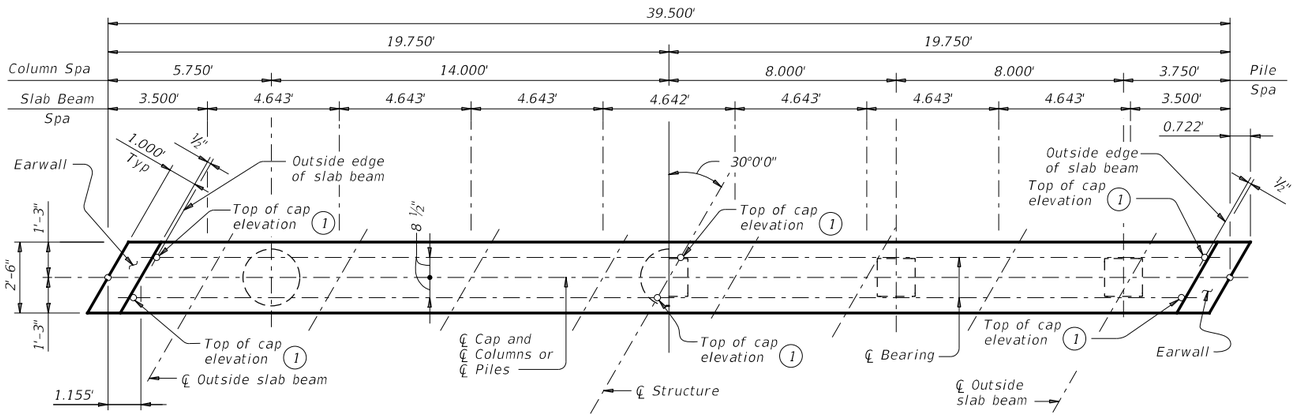
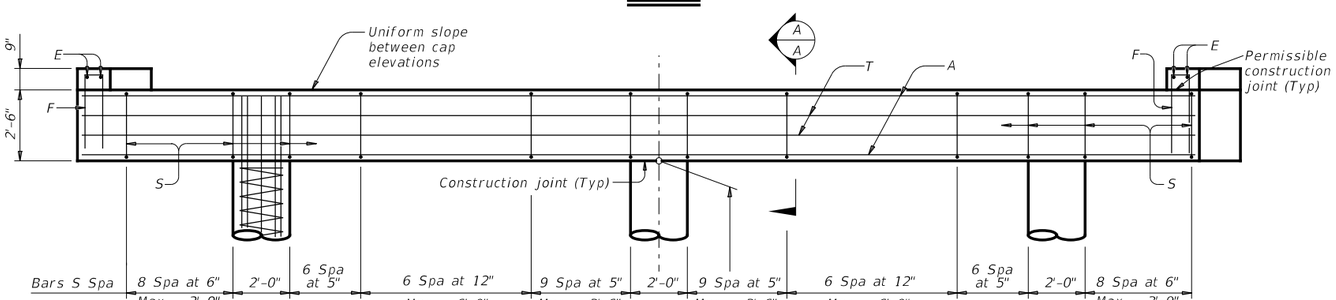
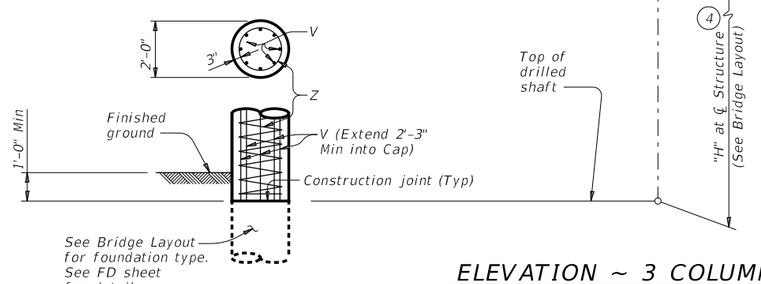


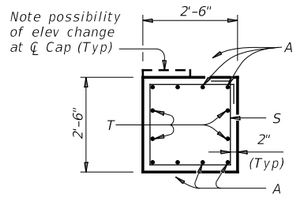
SHOWING COLUMNS SHOWING PILES

PLAN

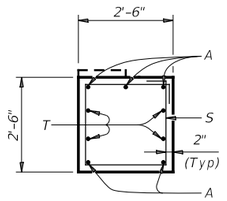




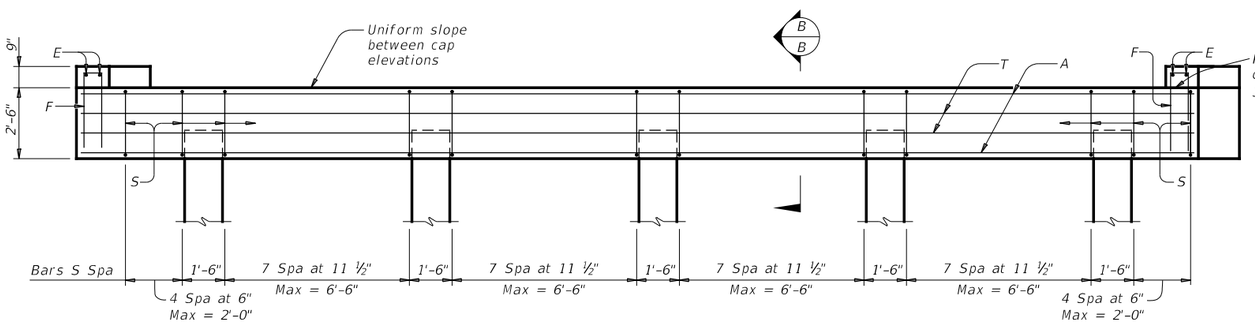
ELEVATION ~ 3 COLUMN BENT



SECTION A-A



SECTION B-B



ELEVATION ~ 5 PILE BENT

Note: For piles larger than 16", adjust Bars S spacing as required to avoid piles.

FOUNDATION LOADS

Average Span Length	Drilled Shaft Loads (5)		Vertical Pile Loads	
Ft	Tons/DS		Tons/Pile	
	4SB12	4SB15	4SB12	4SB15
25	65	70	39	42
30	75	81	45	49
35	84	91	50	55
40	92	100	55	60
45		109		66
50		118		71

TABLE OF ESTIMATED QUANTITIES (3)

3 COLUMN BENT

Bar	No.	Size	Length	Weight
A	8	#11	39'-2"	1,665
E	4	#4	2'-6"	7
F	14	#4	6'-7"	63
S	62	#5	9'-8"	626
T	4	#5	39'-2"	163
V	24	#7	26'-3"	1,288
Z	3	#3	242'-2"	273
Reinforcing Steel			Lb	4,084
Cl "C" Conc (Cap)			CY	9.3
Cl "C" Conc (Col)			CY	8.4

TABLE OF ESTIMATED QUANTITIES

5 PILE BENT

Bar	No.	Size	Length	Weight
A	5	#11	39'-2"	1,040
E	4	#4	2'-6"	7
F	14	#4	6'-7"	63
S	42	#5	9'-8"	424
T	4	#5	39'-2"	163
Reinforcing Steel			Lb	1,696
Cl "C" Conc (Cap)			CY	9.3

TABLE OF MAXIMUM ALLOWABLE EXPOSED PILE HEIGHTS AND PILE LOADS (4)

Pile Type		Max Ht	Max Load
Concrete	Steel	Ft	Tons/Pile
16" Sq	HP14x73	16	75
18" Sq	HP14x117 (6)	20	90

(1) Top of cap elevations are based on section depths shown on Span Details.

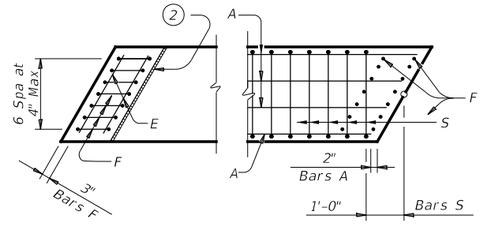
(2) ½" preformed bituminous fiber material between slab beam and earwall. Bond to earwall with an approved adhesive. Cast inside face of earwall perpendicular to cap. (Typ)

(3) Quantities shown are based on an "H" value of 24 feet. For each linear foot variation in "H" value, make the following adjustments:
Bars V length, 1'-0"
Bars Z length, 9'-6"
Reinforcing steel, 60 Lb
Class "C" conc (column), 0.35 CY

(4) This standard may not be used for "H" heights exceeding 24 feet or exposed pile heights exceeding the values shown in the table. In areas of very soft soil or where scour is anticipated, allowable "H" heights or exposed pile heights must be evaluated by the Engineer prior to the use of this standard.

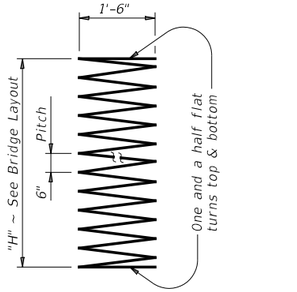
(5) Foundation Loads based on "H" = 24 feet.

(6) When HP14x117 steel piling is specified in the plans, the Contractor has the option of furnishing either HP14x117 or HP16x101 steel piling.

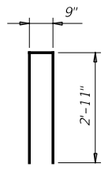


EARWALL CAP

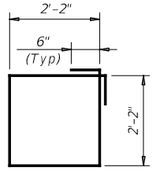
CAP END DETAIL



BARS Z



BARS F



BARS S

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

Bent selected must be based on the average span length rounded up to the next 5-foot increment.

For Pile Bents supporting unequal spans, the shorter span cannot be less than 80 percent of the longer span.

See Bridge Layout for foundation type, size, and length.

See Common Foundation Details (FD) standard sheet for all foundation details and notes.

These bent details do not support the use of multi-pile footings shown on the FD standard.

Details are drawn showning right forward skew. See Bridge Layout for actual skew direction.

These bent details may be used with standard SPSB-30-30 only.

Cover dimensions are clear dimensions, unless noted otherwise.

Reinforcing bar dimensions shown are out-to-out of bar.

MATERIAL NOTES:

Provide Class C concrete (f'c = 3,600 psi).

Provide Class C (HPC) concrete if shown elsewhere in the plans.

Provide Grade 60 reinforcing steel.

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

INTERIOR BENTS

PRESTR CONCRETE SLAB BEAM

30' ROADWAY 30° SKEW

BPSB-30-30

FILE: psbste29-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	1219	02	017, ETC.	FM 182
	DIST	COUNTY		SHEET NO.
	WACO	CORYELL		91

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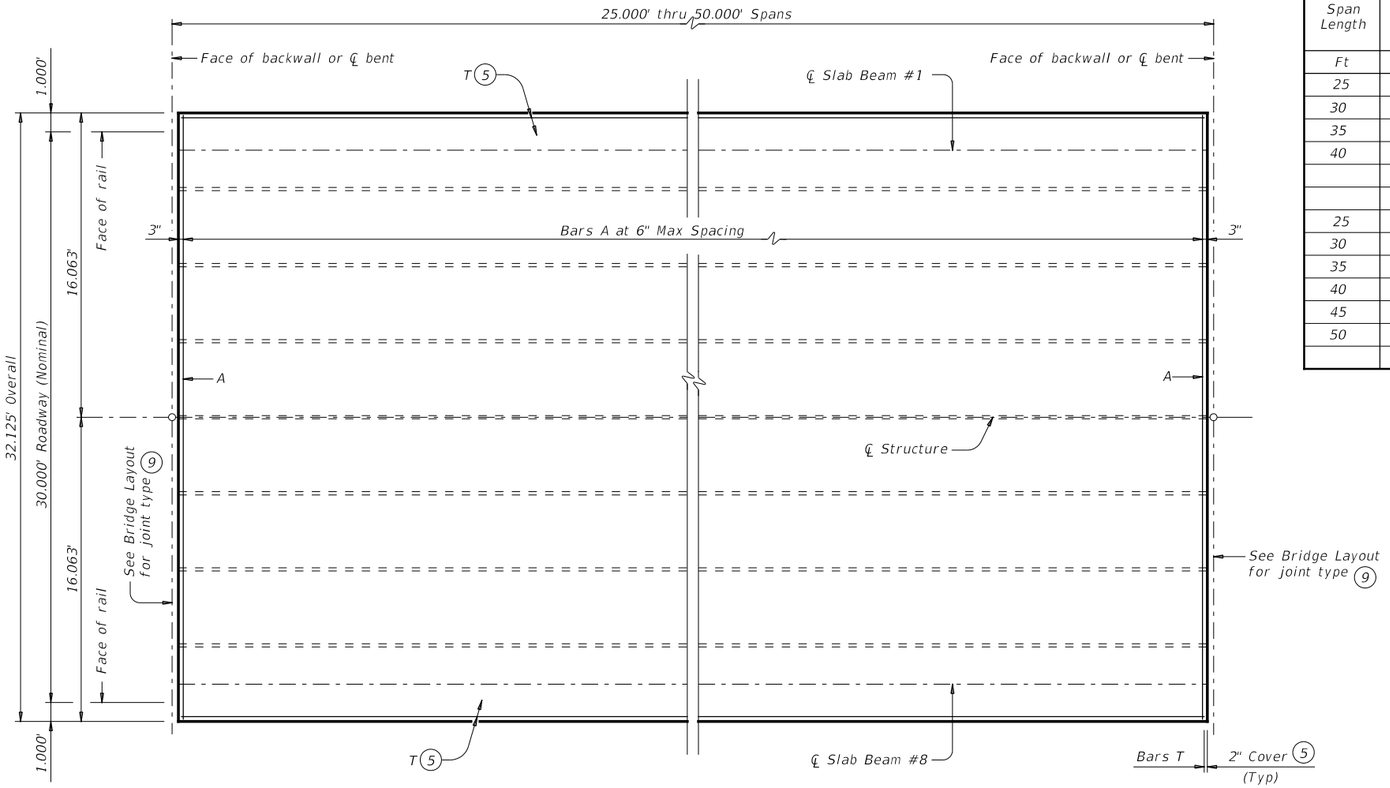
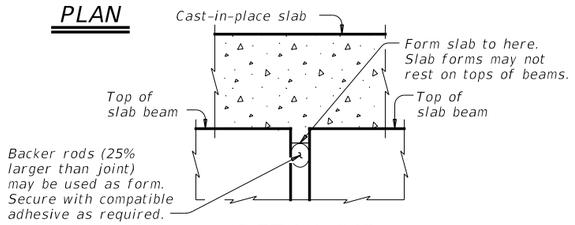
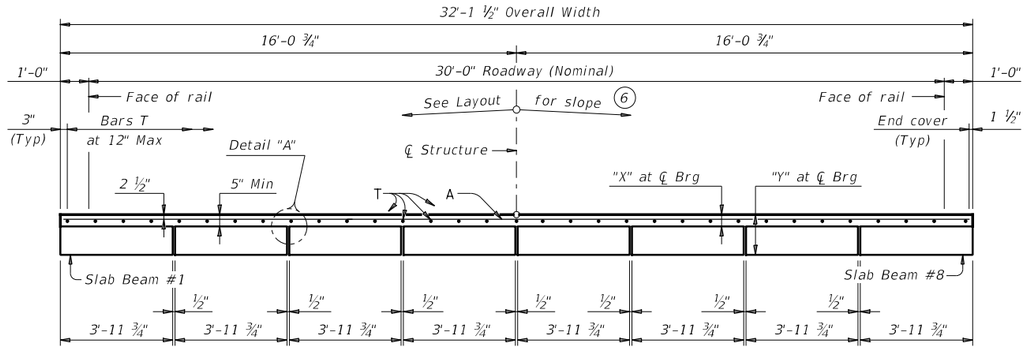


PLAN



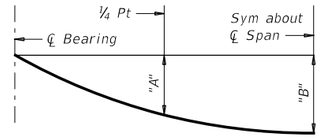
DETAIL "A"



TYPICAL TRANSVERSE SECTION

TABLE OF VARIABLE VALUES

Span Length	Beam Type	Dead Load Deflection		Section (3) Depths	
		"A"	"B"	"X"	"Y"
Ft	(1)	Ft	Ft	In	Ft/In
25	4SB12	0.003	0.005	5 ¼"	1'-5 ¼"
30	4SB12	0.007	0.010	5 ½"	1'-5 ½"
35	4SB12	0.014	0.020	6"	1'-6"
40	4SB12	0.025	0.035	6 ½"	1'-6 ½"
25	4SB15	0.002	0.003	5 ¼"	1'-8 ¼"
30	4SB15	0.004	0.005	5 ½"	1'-8 ½"
35	4SB15	0.007	0.010	5 ½"	1'-8 ½"
40	4SB15	0.013	0.018	5 ¾"	1'-8 ¾"
45	4SB15	0.021	0.029	6 ½"	1'-9 ½"
50	4SB15	0.032	0.045	7"	1'-10"

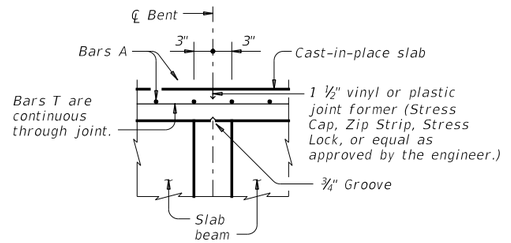


DEAD LOAD DEFLECTION DIAGRAM

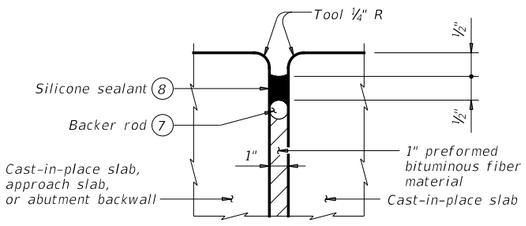
NOTE: Deflections shown are due to concrete slab only (E_C = 5,000 ksi). Calculated deflections shown are theoretical and actual dimensions may vary. Adjust based on field verification.

BAR TABLE

BAR	SIZE
A	#5
T	#4



CONTINUOUS SLAB DETAIL



TYPE A JOINT DETAIL (9)

TABLE OF ESTIMATED QUANTITIES

SPAN LENGTH	REINF CONCRETE SLAB (SLAB BEAM)	PRESTR CONC SLAB BEAM (4SB12 OR 4SB15) (1)			TOTAL (2) REINF STEEL
		ABUT TO INT BT	INT BT TO INT BT	ABUT TO ABUT	
Ft	SF	LF (4)	LF (4)	LF (4)	Lb
25	803	196.00	196.00	196.00	2,250
30	964	236.00	236.00	236.00	2,700
35	1,124	276.00	276.00	276.00	3,150
40	1,285	316.00	316.00	316.00	3,600
45	1,446	356.00	356.00	356.00	4,050
50	1,606	396.00	396.00	396.00	4,500

(1) See Bridge Layout for beam type used in the superstructure. These standards do not provide for the use of both SB12 and SB15 beams within the same structure.

(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. The Contractor will adjust these values for any vertical curve.

(4) Fabricator will adjust beam lengths for beam slopes as required.

(5) Where slab is continuous over Interior Bents, Bars T are continuous through Joint. See "Continuous Slab Detail".

(6) This standard does not provide for changes in roadway cross-slopes within the structure.

(7) 1 ¼" backer rod must be compatible with joint sealant. Use of multiple pieces to create a backer rod cross section is not permitted. Top of backer rod must be convex as shown.

(8) Class 7 silicone sealant that conforms to DMS-6310. Install when ambient temperature is between 55°F and 85°F and rising. Engineer to determine allowable hours for sealant application.

(9) See Bridge Layout for expansion joint locations. If using Type A expansion joints, the maximum distance between joints is 100 feet. Type A joints are subsidiary to Item 422, "Concrete Superstructures".

GENERAL NOTES:
Designed according to AASHTO LRFD Bridge Design Specifications.
Two- or three-span units, with slab continuous over interior bents, may be formed with the details shown on this sheet.
See applicable rail details for rail anchorage in slab.
This standard does not support the use of transition bents.

Cover dimensions are clear dimensions, unless noted otherwise.

MATERIAL NOTES:
Provide Class S concrete (f'c = 4,000 psi).
Provide Class S (HPC) concrete if shown elsewhere in the plans.
Provide Grade 60 reinforcing steel.
Provide bar laps, where required, as follows:
Uncoated ~ #4 = 1'-7"
~ #5 = 2'-0"
Epoxy coated ~ #4 = 2'-5"
~ #5 = 3'-0"
Deformed welded wire reinforcement (WWR) (ASTM A1064) of equal size and spacing may be substituted for Bars A or T unless noted otherwise.

HL93 LOADING

Texas Department of Transportation | Bridge Division Standard

PRESTRESSED CONCRETE SLAB BEAM SPANS (TY SB12 OR SB15)

30' ROADWAY

SPSB-30

FILE: psbste36-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2017 REVISIONS	CONT	SECT	JOB	HIGHWAY
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	DIST	COUNTY		SHEET NO.
	WACO	CORYELL		92

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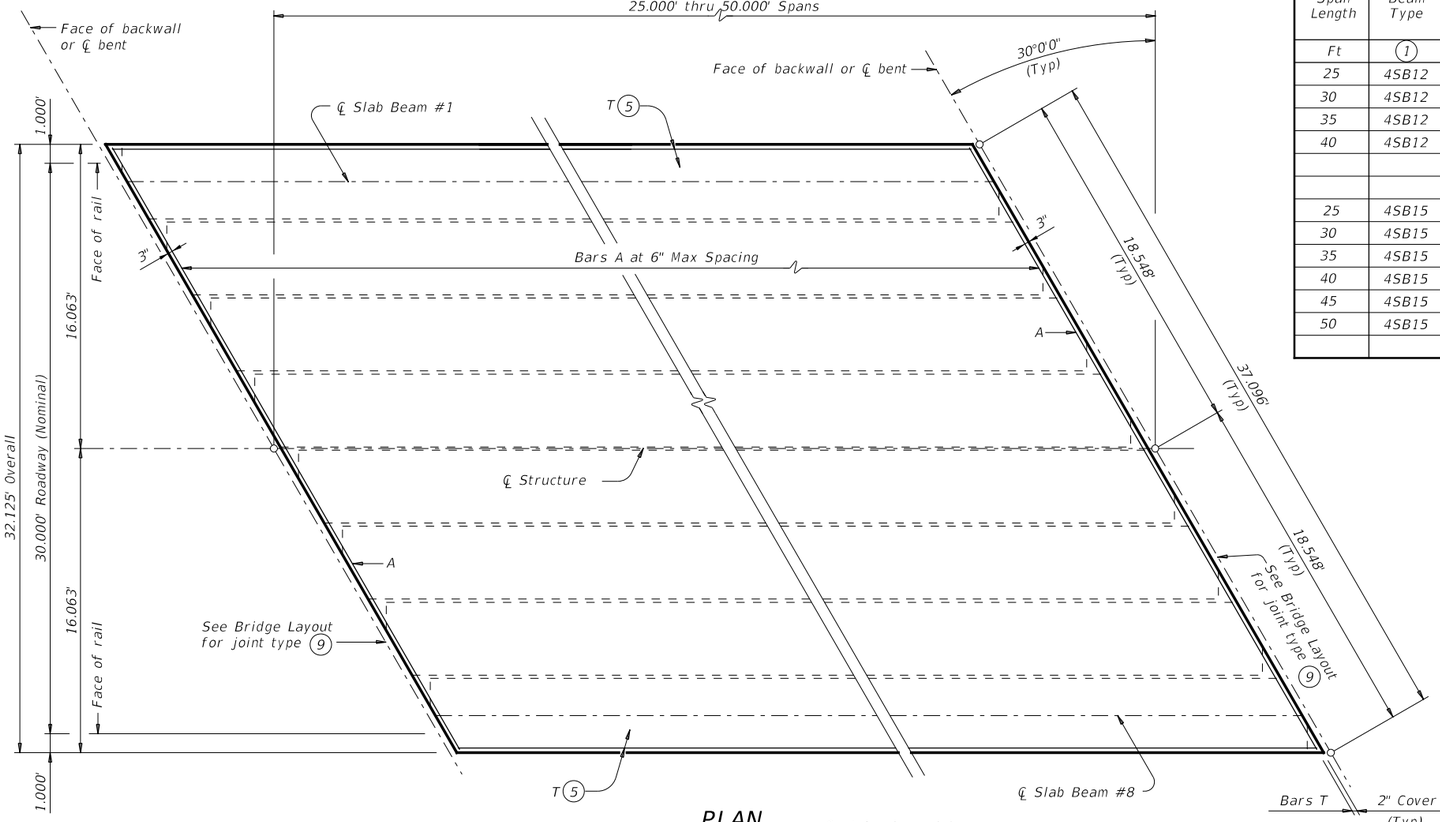
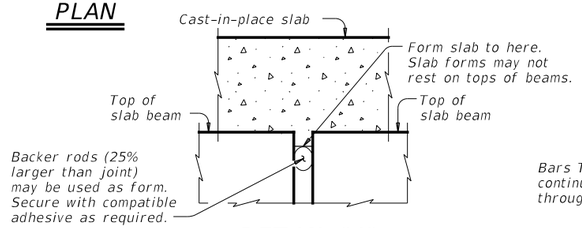
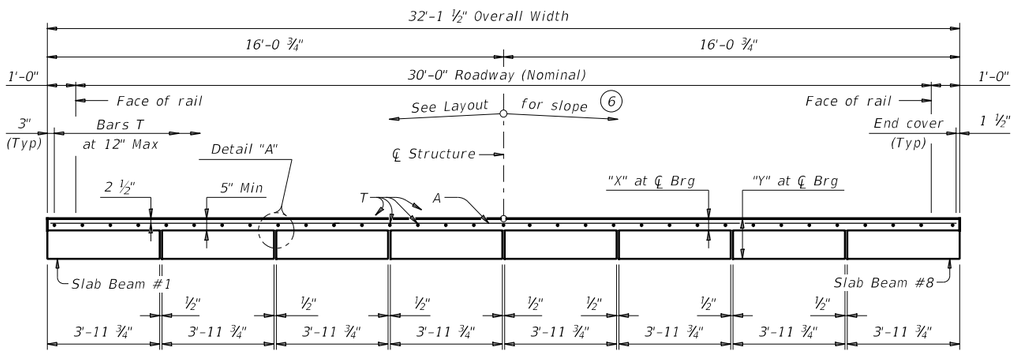


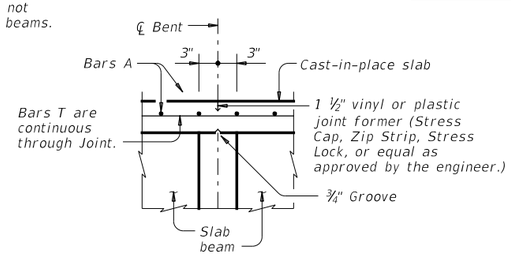
PLAN



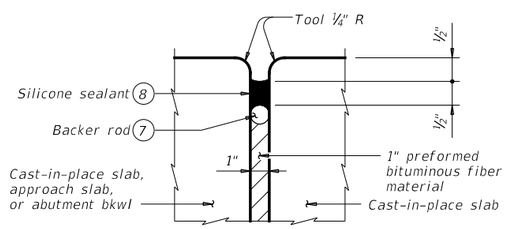
DETAIL "A"



TYPICAL TRANSVERSE SECTION



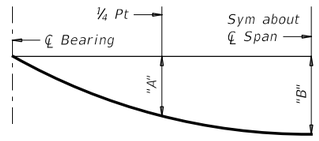
CONTINUOUS SLAB DETAIL



TYPE A JOINT DETAIL (9)

TABLE OF VARIABLE VALUES

Span Length	Beam Type	Dead Load Deflection "A"	Dead Load Deflection "B"	Section Depths (3) "X"	Section Depths (3) "Y"
Ft	(1)	Ft	Ft	In	Ft/In
25	4SB12	0.003	0.005	5 ¼"	1'-5 ¼"
30	4SB12	0.007	0.010	5 ½"	1'-5 ½"
35	4SB12	0.014	0.020	6"	1'-6"
40	4SB12	0.025	0.035	6 ½"	1'-6 ½"
25	4SB15	0.002	0.003	5 ¼"	1'-8 ¼"
30	4SB15	0.004	0.005	5 ½"	1'-8 ½"
35	4SB15	0.007	0.010	5 ½"	1'-8 ½"
40	4SB15	0.013	0.018	5 ¾"	1'-8 ¾"
45	4SB15	0.021	0.029	6 ½"	1'-9 ½"
50	4SB15	0.032	0.045	7"	1'-10"



DEAD LOAD DEFLECTION DIAGRAM

NOTE: Deflections shown are due to concrete slab only (E_C = 5,000 ksi). Calculated deflections shown are theoretical and actual dimensions may be less. Adjust based on field verification.

BAR TABLE

BAR	SIZE
A	#5
T	#4

TABLE OF ESTIMATED QUANTITIES

SPAN LENGTH	REINF CONCRETE SLAB (SLAB BEAM)	PRESTR CONC SLAB BEAM (4SB12 OR 4SB15) (1) ABUT TO INT BT	PRESTR CONC SLAB BEAM (4SB12 OR 4SB15) (1) INT BT TO INT BT	PRESTR CONC SLAB BEAM (4SB12 OR 4SB15) (1) ABUT TO ABUT	TOTAL REINF STEEL (2)
Ft	SF	LF (4)	LF (4)	LF (4)	Lb
25	803	195.69	196.00	195.38	2,250
30	964	235.69	236.00	235.38	2,700
35	1,124	275.69	276.00	275.38	3,150
40	1,285	315.69	316.00	315.38	3,600
45	1,446	355.69	356.00	355.38	4,050
50	1,606	395.69	396.00	395.38	4,500

(1) See Bridge Layout for beam type used in the superstructure. These standards do not provide for the use of both SB12 and SB15 beams within the same structure.

(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) Fabricator will adjust beam lengths for beam slopes as required.

(5) Where slab is continuous over Interior Bents, Bars T are continuous through Joint. See "Continuous Slab Detail".

(6) This standard does not provide for changes in roadway cross-slopes within the structure.

(7) 1 ¼" backer rod must be compatible with joint sealant. Use of multiple pieces to create a backer rod cross section is not permitted. Top of backer rod must be convex as shown.

(8) Class 7 silicone sealant that conforms to DMS-6310. Install when ambient temperature is between 55°F and 85°F and rising. Engineer to determine allowable hours for sealant application.

(9) See Bridge Layout for expansion joint locations. If using Type A expansion joints, the maximum distance between joints is 100 ft. Type A joints are subsidiary to Item 422, "Concrete Superstructures".

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.
This standard does not provide for vertical curves in roadway grade within the structure.
Two- or three-span units, with slab continuous over interior bents, may be formed with the details shown on this sheet.
See applicable rail details for rail anchorage in slab.
Details are drawn showing right forward skew. See Bridge Layout for actual skew direction.
This standard does not support the use of Transition Bents.

Cover dimensions are clear dimensions, unless noted otherwise.

MATERIAL NOTES:

Provide Class S concrete (f'c = 4,000 psi).
Provide Class S (HPC) concrete if shown elsewhere in the plans.
Provide Grade 60 reinforcing steel.
Provide bar laps, where required, as follows:
Uncoated ~ #4 = 1'-7"
~ #5 = 2'-0"
Epoxy coated ~ #4 = 2'-5"
~ #5 = 3'-0"
Deformed welded wire reinforcement (WWR) (ASTM A1064) of equal size and spacing may be substituted for Bars A or T unless noted otherwise.

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

PRESTRESSED CONCRETE SLAB BEAM SPANS (TY SB12 OR SB15)

30' ROADWAY 30° SKEW

SPSB-30-30

FILE: psbste38-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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	WACO	CORYELL		93

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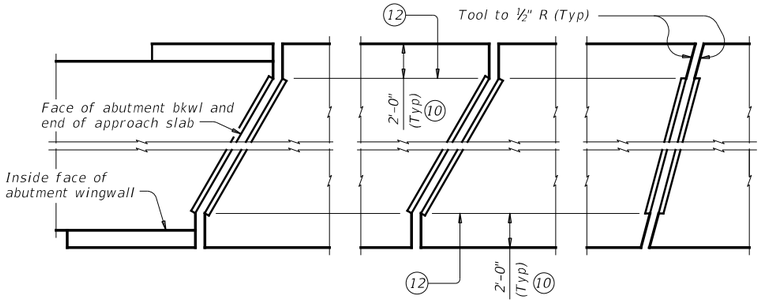
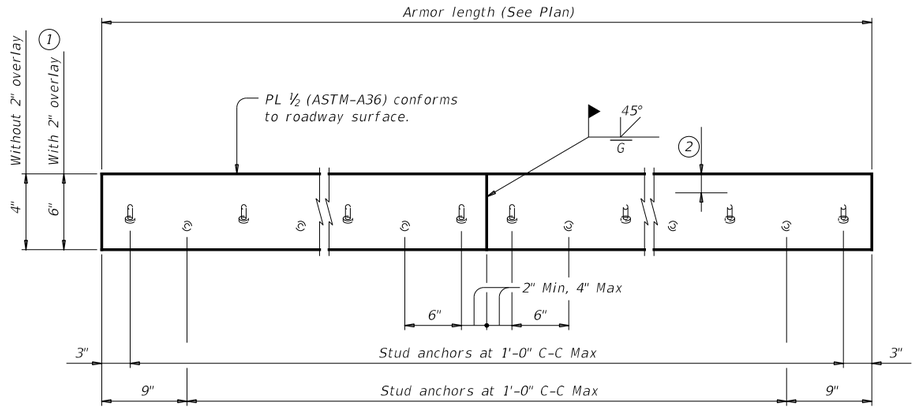


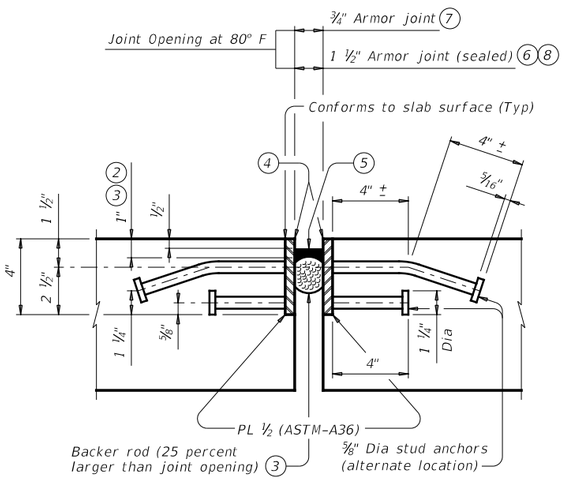
JOINTS AT ABUTMENTS | SKEWS OVER 15° | SKEWS THRU 15°

PLANS OF ARMOR PLATES

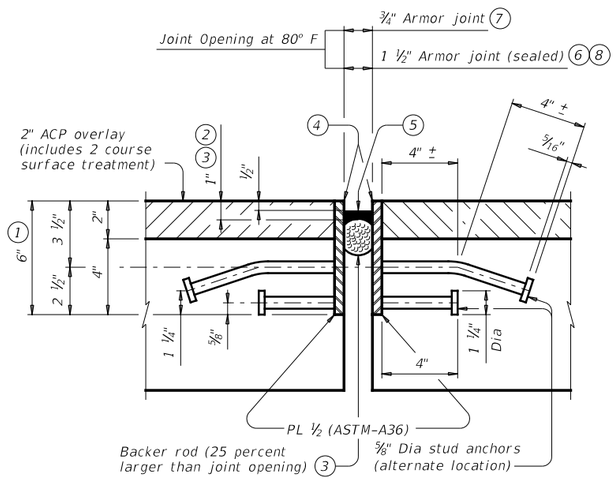


ELEVATION OF BASIC ARMOR PLATE

1. Adjust 6" plate height for overlay thicknesses other than the 2" shown. Adjust weight by 1.70 plf for each ½" variation in thickness.
2. Do not paint top 1 ½" of plate if using sealed armor joint.
3. Set top of backer rod 1" below top of armor plate. Backer rod must be compatible with joint sealant. Use of multiple pieces to create a backer rod cross section is not permitted. Top of backer rod must be convex as shown.
4. Blast clean entire contact area between sealant and plate (SSPC-SP10) before installing sealant. Light brush blast and thoroughly clean all dust and debris from concrete surfaces in contact with joint sealant before application of silicone seal.
5. Use Class 7 joint sealant that conforms to DMS-6310.
6. Place sealant while ambient temperature is between 55°F and 80°F and is rising.
7. Armor joint does not include joint sealant or backer rod.
8. Armor joint (sealed) includes Class 7 joint sealant and backer rod.
9. Form vertical leg of seal as per the Manufacturer's recommendations. Use Class 4 joint sealant if Class 7 cannot be installed correctly. Install according to Manufacturer's recommendations.
10. Unless shown otherwise, terminate armor plate at slab break point if break is more than 2'-0" from slab edge.
11. See "Plans of Armor Plates".
12. At Fabricator's option, armor plate may extend up to 6" beyond this point for skews through 15°.
13. Align shipping angle perpendicular to joint.



SHOWN WITHOUT 2" OVERLAY AT JOINT LOCATION



SHOWN WITH 2" OVERLAY AT JOINT LOCATION 1

ARMOR JOINT SECTIONS

Showing Armor Joint (Sealed)

FABRICATION NOTES:

Match mark corresponding plate sections and secure together for shipment with shipping angle. Do not use erection bolts.

Ship armor joints in convenient lengths of 10'-0" Min and 24'-0" Max unless necessary for stage 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.

Use groove welds for all shop and field butt splices. Grind smooth areas in contact with seal. Make all necessary field splice joint preparations in the shop.

Paint the entire steel section, except as stated in Note 2, with System II or IV primer in accordance with Item 446 "Field Cleaning and Painting Steel." Provide paints in accordance with Item 446.2. Prepare steel and apply paint in accordance with Items 446.4.7.3 and 446.4.7.4.

Shop drawings for the fabrication of armor joints will not require the Engineer's approval if fabrication is in accordance with the details shown on this standard.

CONSTRUCTION NOTES:

Secure armor joints in position and place to 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 Armor Joint.

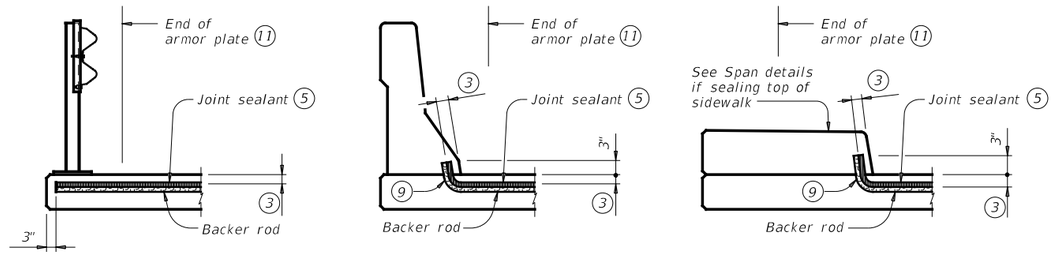
Remove shipping angle immediately after each joint half is secured in place. Grind smooth, and touch up with organic zinc-rich paint.

GENERAL NOTES:

Provide armor joints at locations shown on the plans. Provide the seal when "Armor Joint (Sealed)" is noted on the plans.

These joint details accommodate a joint movement range of 1 ⅜" (¾" opening movement and ⅜" closure movement).

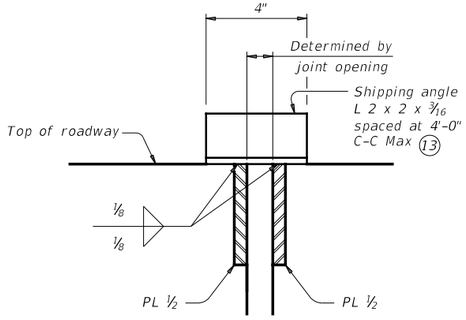
Payment for armor joint, with or without seal, is based on length of armor plate.



AT STEEL POST BRIDGE RAIL | AT CONCRETE BRIDGE RAIL | AT SIDEWALK

JOINT SEALANT TERMINATION DETAILS

Armor joint (sealed) only. Armor plate is not shown for clarity.



SHOWN WITHOUT 2" OVERLAY AT JOINT LOCATION

With overlay similar

SHIPPING ANGLE

An alternate method of securing joint sections may be used if approved by the Bridge Division. Erection bolts are not allowed.

WEIGHTS FOR ONE ARMOR JOINT (2 PLATES)	
WITHOUT OVERLAY	16.10 plf
WITH 2" OVERLAY 1	22.90 plf

Texas Department of Transportation

Bridge Division Standard

ARMOR JOINT DETAILS

AJ

FILE: ajstde01-19.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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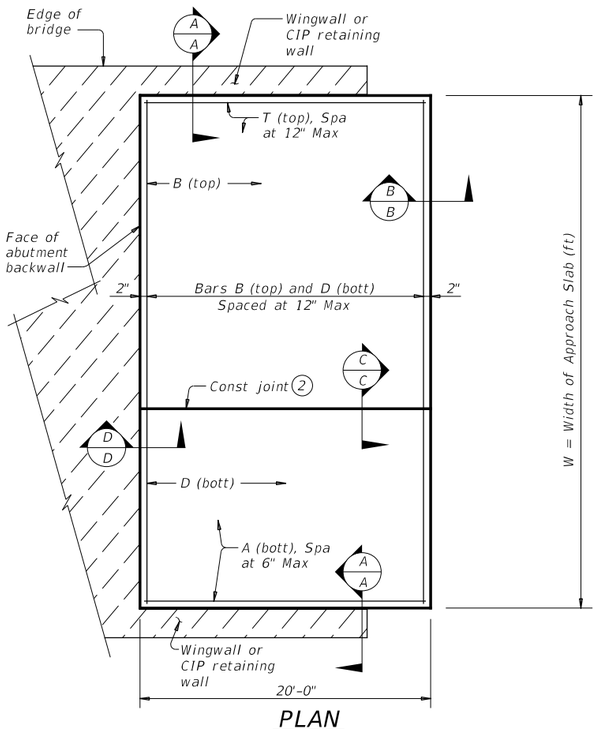
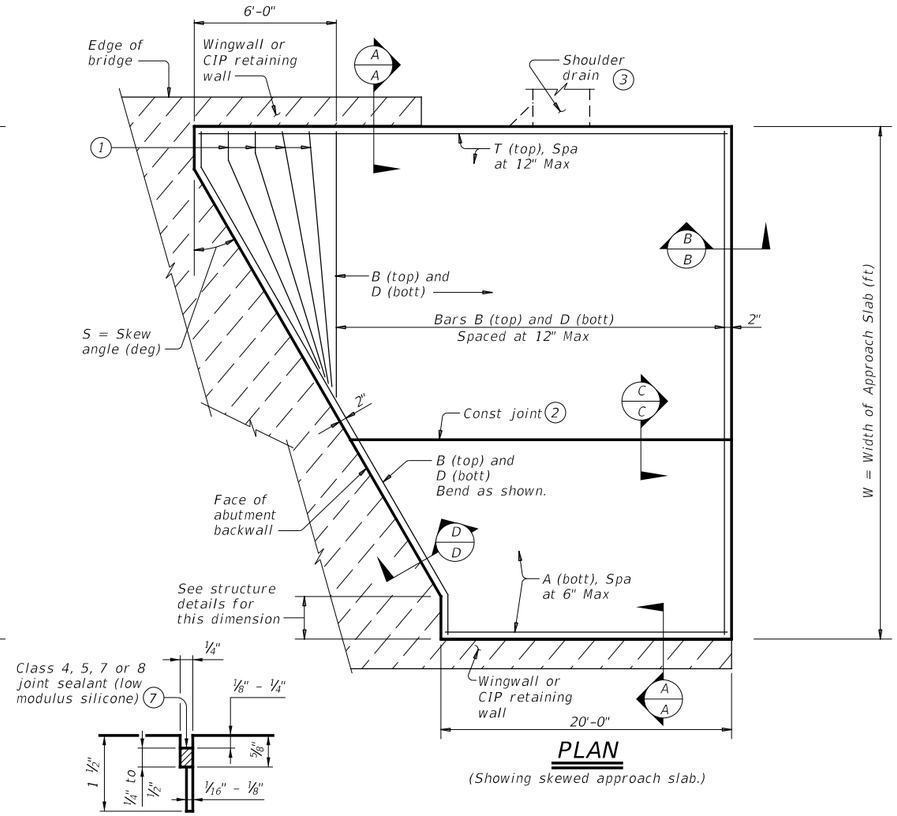


PLAN

(Showing non-skewed approach slab.)



PLAN

(Showing skewed approach slab.)

BAR TABLE

BAR	SIZE
A	#8
B	#5
D	#5
T	#5

APPROXIMATE QUANTITIES (4)

Reinf steel weight = 8.5 Lbs/SF of Approach Slab

Volume of Appr Slab Conc (CY) = $0.802W + 0.02W^2 \tan S$

W = Width of Approach Slab (ft)

S = Skew Angle (deg)

(1) Flare Bars B and D in this region (1'-6" Max Spa, 3" Min Spa). Minimum flared bar length = 2'-6". Bend bars as necessary.

(2) Provide longitudinal construction joints that align with longitudinal construction joints in the bridge slab with bridges built in stages. Other longitudinal construction joints must receive approval of the Engineer.

(3) See details elsewhere in plans for shoulder drain location and details.

(4) For Contractor's information only. Quantities shown are for one approach slab.

(5) Multiple piece tie bars are acceptable at longitudinal construction joints provided minimum laps shown are achieved.

(6) See details elsewhere in plans for required cross-slope.

(7) Place in accordance with Item 438.

(8) Provide backer rod that is 25% larger than joint opening and compatible with the sealant.

(9) If bridge rail is present at the wingwall or CIP retaining wall, place ½" rebonded recycled tire rubber between concrete railing and top of approach slab as shown when concrete railing projects over the approach slab.

GENERAL NOTES:

Construct approach slab in accordance with Item 422.

Provide Class "S" concrete with a minimum compressive strength of 4,000 psi.

Provide Grade 60 reinforcing steel.

Provide longitudinal joints as shown on the Longitudinal Saw Cut Joint Detail at lane lines and shoulders when width between longitudinal construction joints or edges of approach slab exceeds 16 feet. Saw cut joints within 24 hours of concrete placement to a depth of 1 ½" and seal in accordance with Item 438. Alternately, provide a controlled joint consisting of 1 ½" vinyl or plastic joint former (Stress Cap, Zip Strip, Stress Lock, or equal as approved by the Engineer.)

Provide rebonded recycled tire rubber joint filler that meets the requirements of DMS-6310. "Joint Sealants and Fillers."

Construct the subgrade or subbase away from the bridge for a minimum distance of 100 feet prior to the approach slab, unless otherwise indicated on the plans.

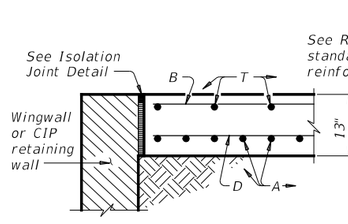
Compact and finish the subgrade or foundation for the approach slab to the typical cross-section and to the lines and grades shown on the plans.

Cure for 4 days using water or membrane curing per Item 422.

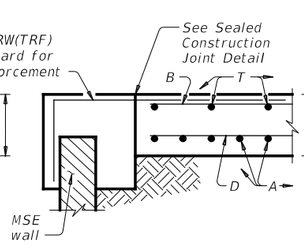
All details shown herein are subsidiary to bridge approach slab.

Cover dimensions are clear dimensions, unless noted otherwise.

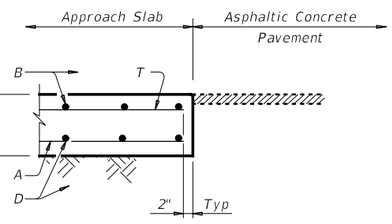
LONGITUDINAL SAW CUT JOINT DETAIL

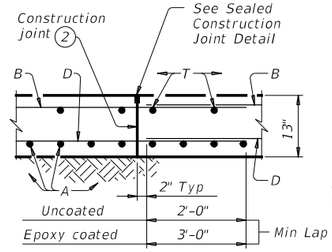


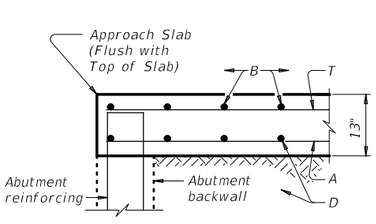
SHOWING WINGWALL OR CIP RETAINING WALL



SHOWING MSE WALL





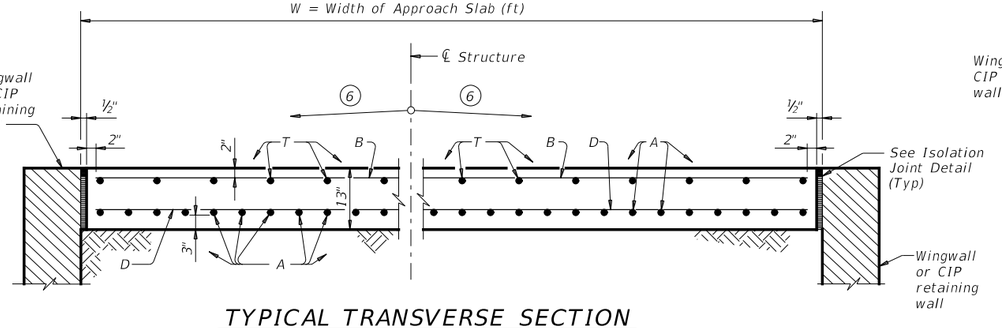


SECTION A-A

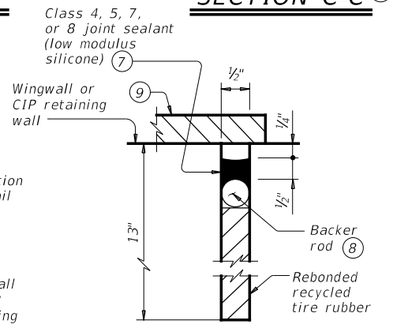
SECTION B-B

SECTION C-C (5)

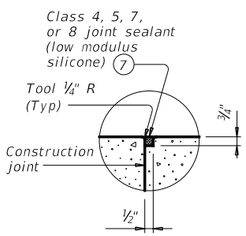
SECTION D-D



TYPICAL TRANSVERSE SECTION



ISOLATION JOINT DETAIL



SEALED CONSTRUCTION JOINT DETAIL

Texas Department of Transportation

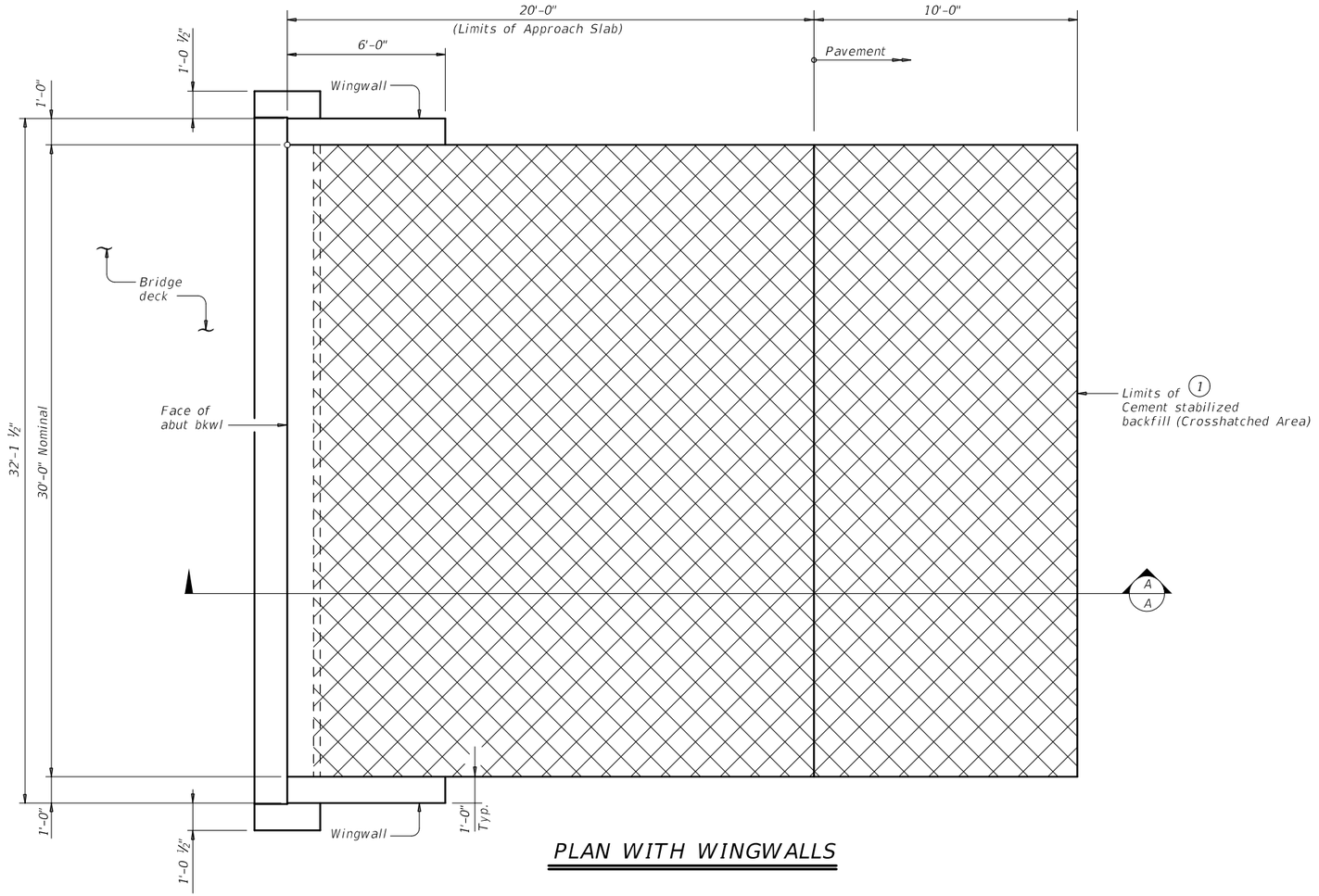
Bridge Division Standard

BRIDGE APPROACH SLAB

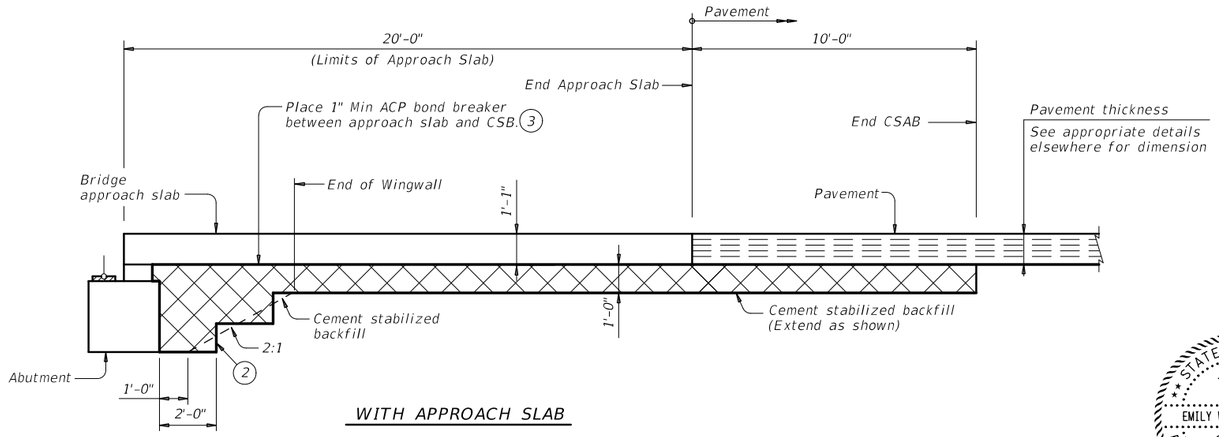
ASPHALTIC CONCRETE PAVEMENT

BAS-A

FILE: basaste1-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	1219	02	017, ETC.	FM 182
02-20: Removed stress relieving pad.	DIST	COUNTY		SHEET NO.
	WACO	CORYELL		95



PLAN WITH WINGWALLS



WITH APPROACH SLAB

SECTION A-A

(1) Limits of Cement Stabilized Backfill is 30' minimum from face of backwall. 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) Other materials can be used as a bond breaker if permitted by the Engineer. 2 layers of 30 Lb roofing felt or 2 layers of heavy mil polyethylene sheeting are examples.

GENERAL NOTES:

Provide Cement Stabilized Backfill (CSB) meeting the requirements of Item 400, "Excavation and Backfill for Structures", to the limits shown at bridge abutments. Paid for as a Bridge Item.

STATE OF TEXAS
EMILY WASON BERVER
99355
LICENSED
PROFESSIONAL ENGINEER

Emily Wason Berver
4/5/2023

Texas Department of Transportation

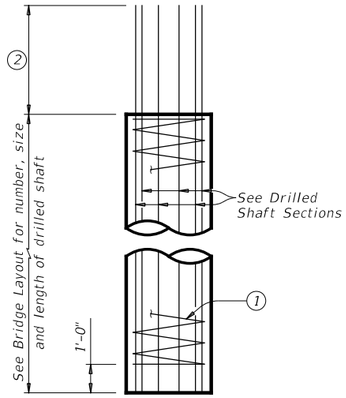
CEMENT STABILIZED ABUTMENT BACKFILL DETAILS (MOD)

BRIDGE ABUTMENT

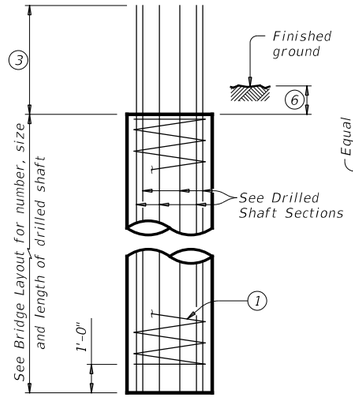
DATE:
FILE:

FILE: CSABDET.DGN	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	1219	02	017, ETC.	FM 182
	DIST	COUNTY		SHEET NO.
	WACO	CORYELL		96

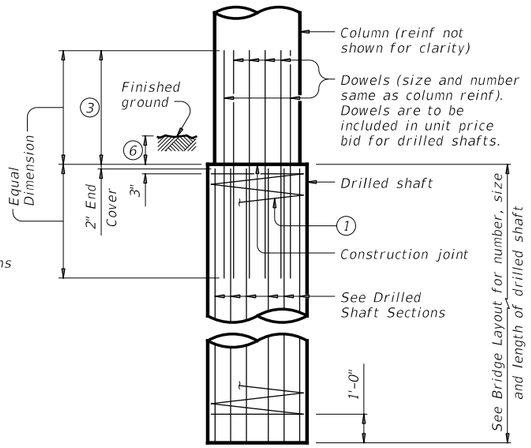
DATE:
FILE:



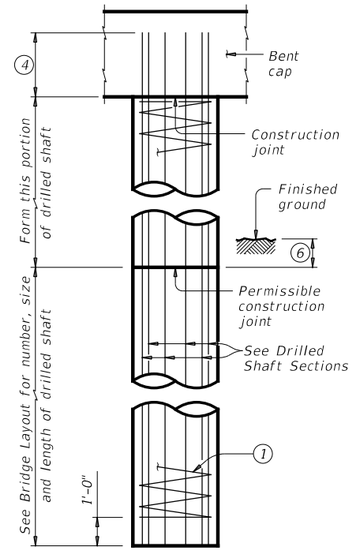
ABUTMENTS, WINGWALLS AND MULTI-DRILLED SHAFT FOOTINGS



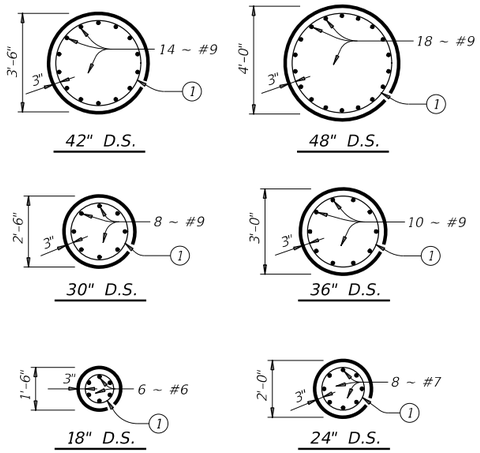
INTERIOR BENTS DRILLED SHAFT DIA EQUAL TO COLUMN DIA



INTERIOR BENTS DRILLED SHAFT DIA GREATER THAN COLUMN DIA



OPTIONAL INTERIOR BENT DRILLED SHAFT DETAIL (5)

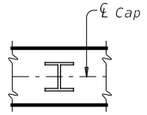


DRILLED SHAFT SECTIONS

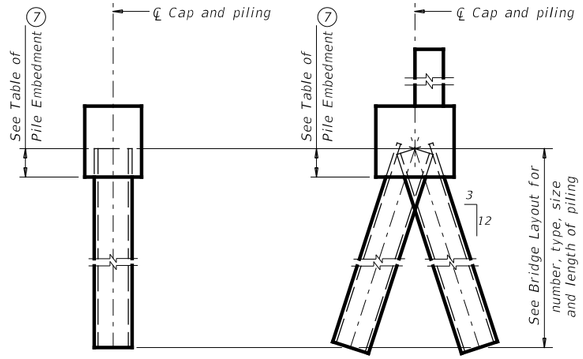
DRILLED SHAFT DETAILS

TABLE OF PILE EMBEDMENT	
Pile Type	Embedment Depth (Ft)
16" Sq Concrete 18" Sq Concrete HP14 Steel HP16 Steel	1'-0"
20" Sq Concrete 24" Sq Concrete HP18 Steel	1'-6"

See Prestressed Concrete Piling (CP) standard for additional details on concrete pile embedment.



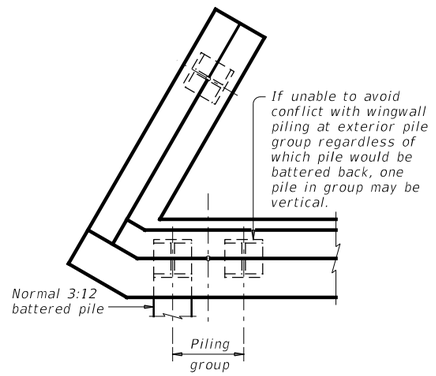
ORIENTATION OF STEEL H-PILING



VERTICAL PILE BATTERED PILE

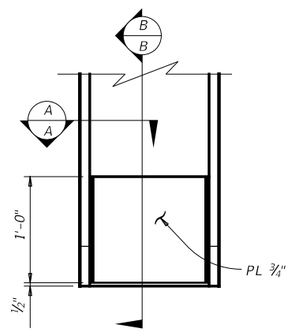
PILING DETAILS

(Concrete or steel H)

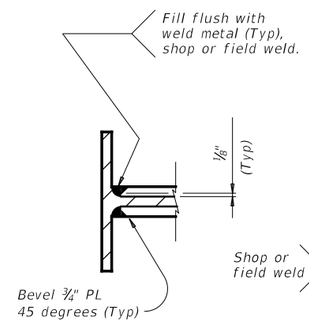


DETAIL "A"

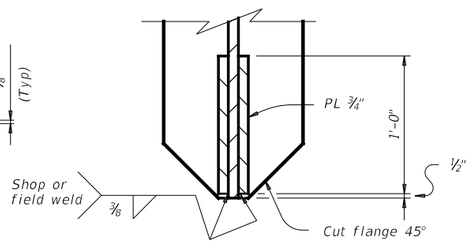
(Showing plan view of a 30° skewed abutment)



ELEVATION



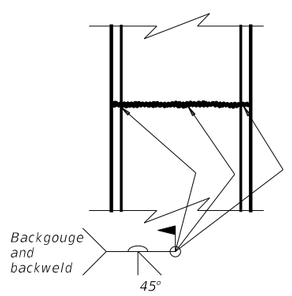
SECTION A-A

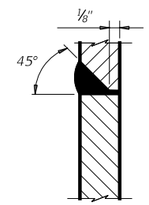


SECTION B-B

STEEL H-PILE TIP REINFORCEMENT

See Item 407 "Steel Piling" to determine when tip reinforcement is required and for options to the details shown.





SECTION THRU FLANGE OR WEB

STEEL H-PILE SPLICE DETAIL

Use when required.

(1) #3 spiral at 6" pitch (one and a half flat turns top and bottom).

(2) Min extension into supported element:
#6 Bars = 1'-11"
#7 Bars = 2'-0"
#9 Bars = 2'-3"

(3) Min lap with column reinf:
#7 Bars = 2'-11"
#9 Bars = 3'-9"
#11 Bars = 4'-8"

(4) Min extension into supported element:
#6 Bars = 1'-11"
#7 Bars = 2'-3"
#9 Bars = 2'-9"

(5) Drilled shafts may extend to the bottom of bent caps for "H" heights of 6 ft and less (as shown on the Bridge Layout), if approved. This option can only be used when the drilled shaft diameter equals the column diameter. Obtain approval of the forming method above the ground line prior to construction. No adjustments in payment will be made if this option is used.

(6) 1'-0" Min, unless shown otherwise on plans.

(7) Or as shown on plans.

Texas Department of Transportation

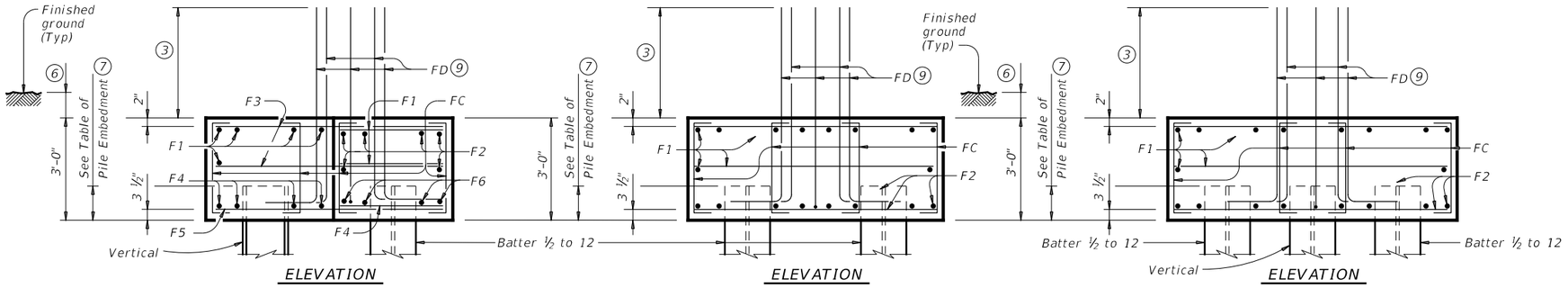
Bridge Division Standard

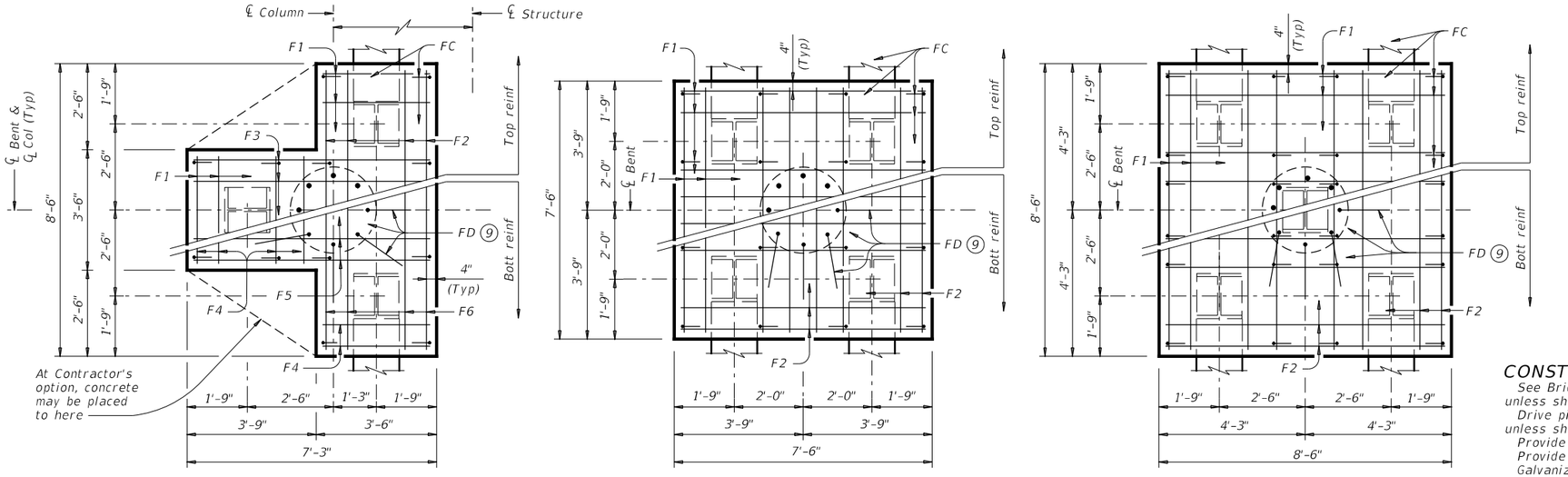
COMMON FOUNDATION DETAILS

FD

FILE: fdstde01-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS 01-20: Added #11 bars to the FD bars.	1219	02	017, ETC.	FM 182
	DIST	COUNTY		SHEET NO.
	WACO	CORYELL		97

DATE:
FILE:





THREE PILE FOOTING (8)

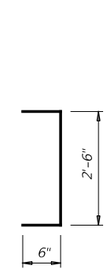
For 36" Dia and smaller columns.

FOUR PILE FOOTING (8)

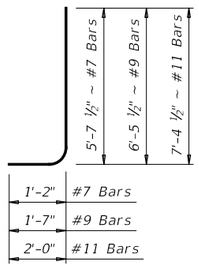
For 42" Dia and smaller columns.

FIVE PILE FOOTING (8)

For 42" Dia and smaller columns.



BARS FC



BARS FD (9)

(3) Min lap with column reinforcing:
#7 Bars = 2'-11"
#9 Bars = 3'-9"
#11 Bars = 4'-8"

(6) 1'-0" Min, unless shown otherwise on plans.

(7) Or as shown on plans.

(8) See Bridge Layout for type, size and length of piling.

(9) Number and size of FD bars must match column reinforcing. Tie FD bars to the top of the bottom reinforcing mat.

(10) Adjust FD quantity, size and weight as needed to match column reinforcing.

TABLE OF FOOTING QUANTITIES FOR 30" COLUMNS

ONE 3 PILE FOOTING

Bar	No.	Size	Length	Weight
F1	11	#4	3'- 2"	23
F2	6	#4	8'- 2"	33
F3	6	#4	6'- 11"	28
F4	8	#9	3'- 2"	86
F5	4	#9	6'- 11"	94
F6	4	#9	8'- 2"	111
FC	12	#4	3'- 6"	28
FD (10)	8	#9	8'- 1"	220
Reinforcing Steel			Lb	623
Class "C" Concrete			CY	4.8

ONE 4 PILE FOOTING

Bar	No.	Size	Length	Weight
F1	20	#4	7'- 2"	96
F2	16	#8	7'- 2"	306
FC	16	#4	3'- 6"	37
FD (10)	8	#9	8'- 1"	220
Reinforcing Steel			Lb	659
Class "C" Concrete			CY	6.3

ONE 5 PILE FOOTING

Bar	No.	Size	Length	Weight
F1	20	#4	8'- 2"	109
F2	16	#9	8'- 2"	444
FC	24	#4	3'- 6"	56
FD (10)	8	#9	8'- 1"	220
Reinforcing Steel			Lb	829
Class "C" Concrete			CY	8.0

CONSTRUCTION NOTES:

See Bridge Layout for foundation type required. Use these foundation details unless shown otherwise.

Drive piling under abutment wingwalls to a minimum resistance of 10 Tons/Pile unless shown otherwise.

Provide Class C Concrete (f'c = 3,600 psi), unless shown otherwise.

Provide Grade 60 reinforcing steel.

Galvanize reinforcing if shown elsewhere in the plans.

Provide bar laps for drilled shaft reinforcing, where required, as follows:

Uncoated or galvanized (#6) ~ 2'-6"
Uncoated or galvanized (#7) ~ 2'-11"
Uncoated or galvanized (#9) ~ 3'-9"

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	1219	02	017, ETC.	FM 182
01-20: Added #11 bars to the FD bars.	DIST	COUNTY		SHEET NO.
	WACO	CORYELL		98

DATE: 4/5/2023 3:28:30 PM
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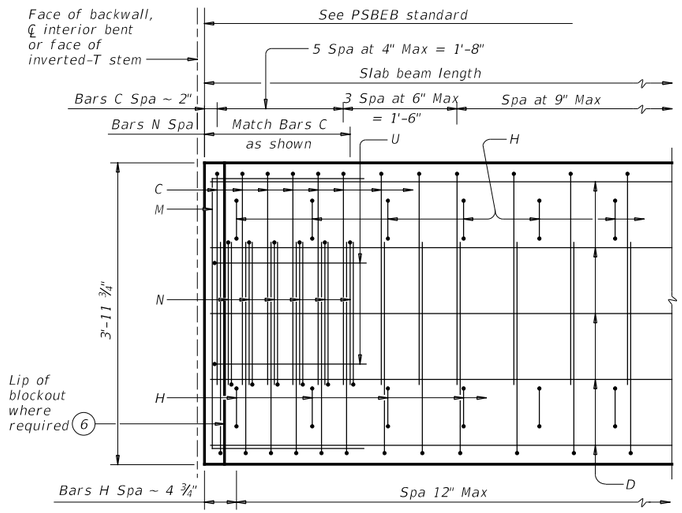
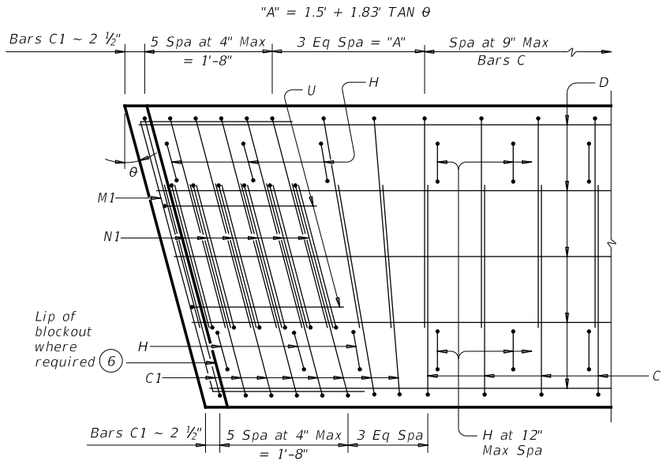
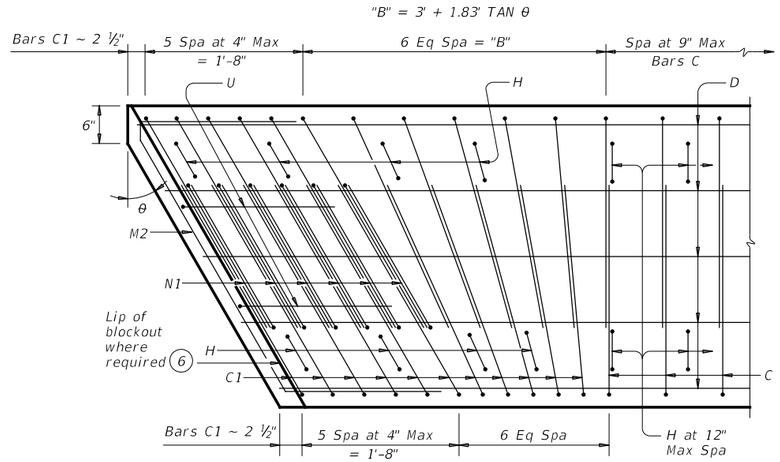


PART PLAN



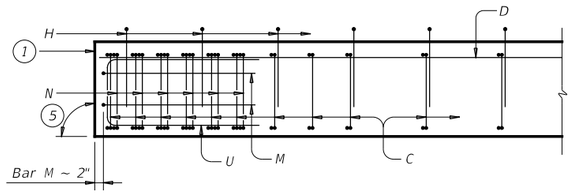
PART SKEW PLAN

(Showing θ over 0° to 15° Skew)

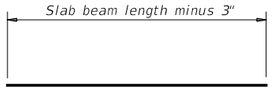


PART SKEW PLAN

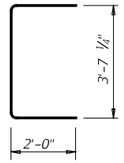
(Showing θ over 15° to 30° Skew)



ELEVATION



BARS D(#6)



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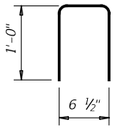
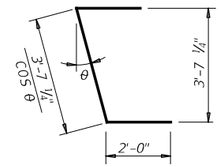
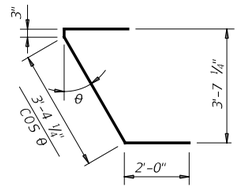


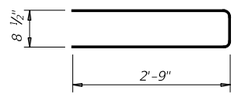
BARS H(#4)



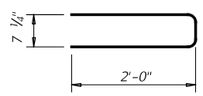
BARS M1(#4)



BARS M2(#4)



BARS C(#4)



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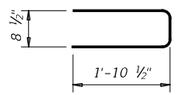
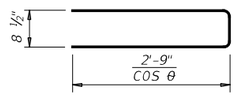


BARS N(#4)



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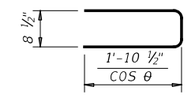

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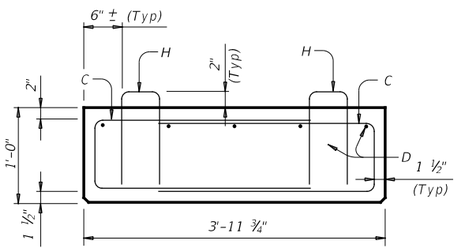
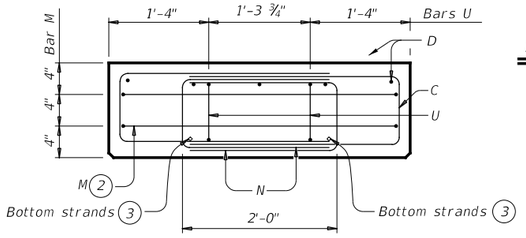
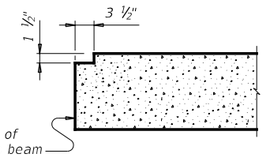


SECTION



END MAT REINFORCING

Bars H not shown for clarity.



ELEVATION OF BLOCKOUT (6)

BEAM PROPERTIES		
Area	in^2	573.0
Y top	in	6.00
Y bott	in	6.00
I	in^4	6,876
Weight (4)	lb/ft	597

(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.

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.

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

PRESTRESSED CONCRETE SLAB BEAM DETAILS

(TYPE 4SB12)

PSB-4SB12

FILE: psbsts01-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	1219	02	017, ETC.	FM 182
	DIST	COUNTY		SHEET NO.
	WACO	CORYELL		99

DATE: 4/5/2023 3:28:31 PM
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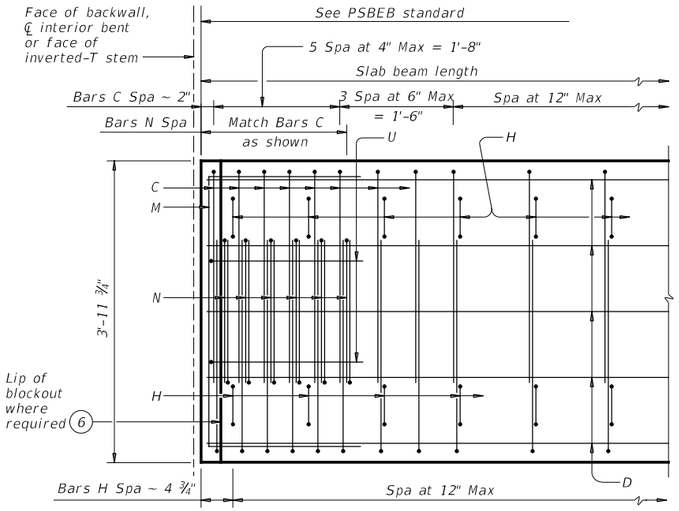
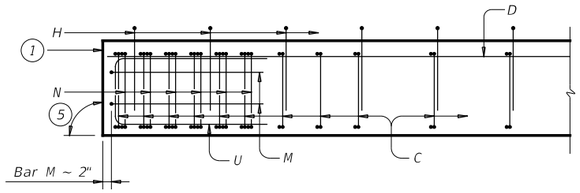
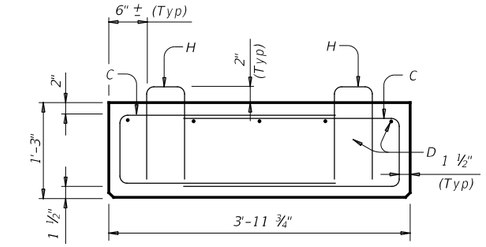


PART PLAN



ELEVATION



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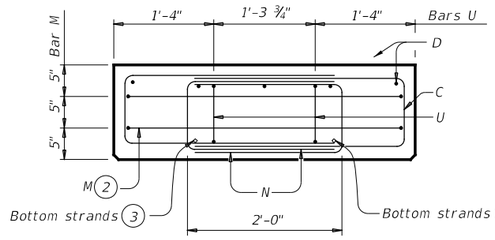
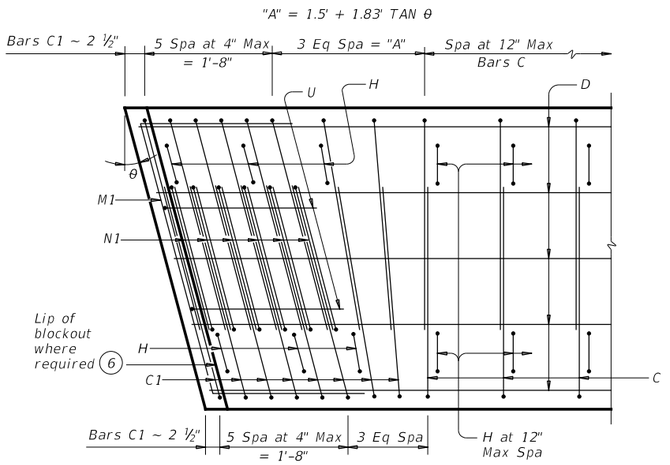


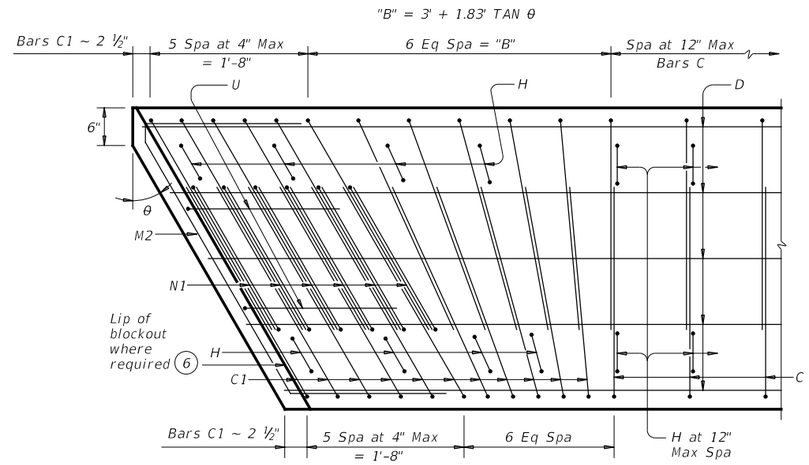
END MAT REINFORCING

Bars H not shown for clarity.



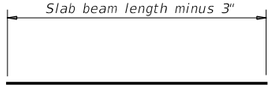
PART SKEW PLAN

(Showing θ over 0° to 15° Skew)



PART SKEW PLAN

(Showing θ over 15° to 30° Skew)



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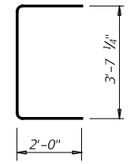

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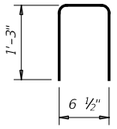

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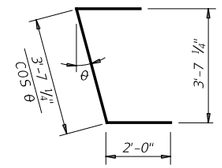

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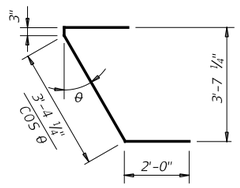
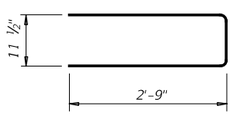
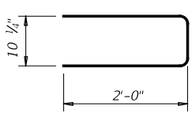


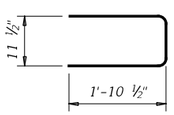
BARS M2(#4)



BARS C(#4)



BARS U(#5)



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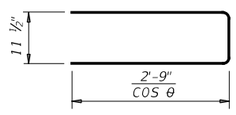

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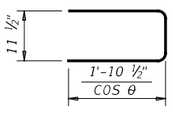

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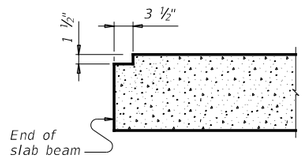

ELEVATION OF BLOCKOUT (6)

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

(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.

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.

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	1219	02	017, ETC.	FM 182
	DIST	COUNTY		SHEET NO.
	WACO	CORYELL		100

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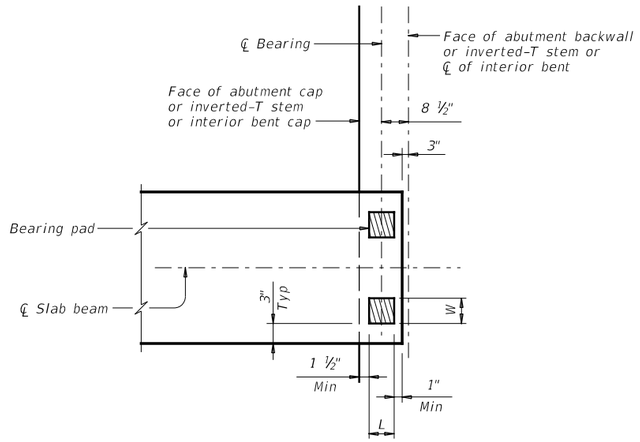
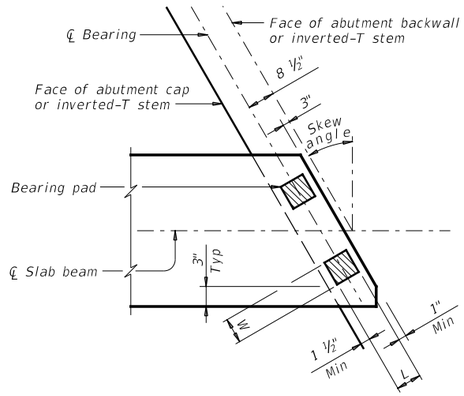
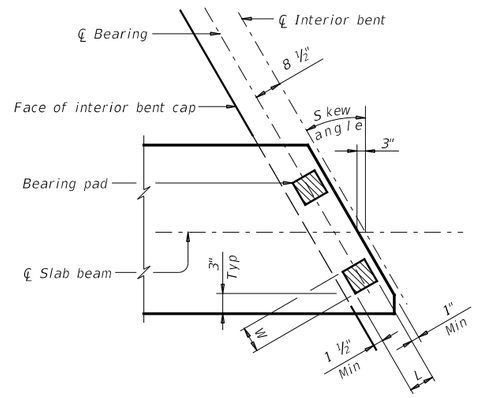


TWO-PAD DETAIL PLAN
(At abutment or inverted-T cap or at interior bent)



TWO-PAD DETAIL SKEW PLAN
(At abutment or inverted-T cap)



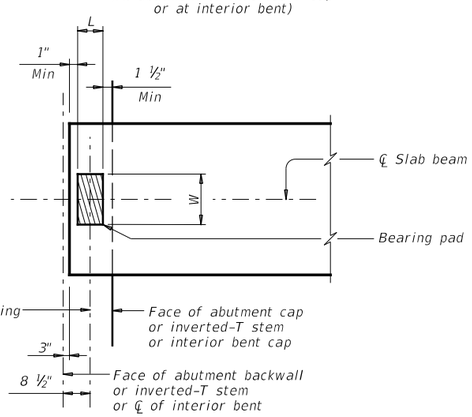
TWO-PAD DETAIL SKEW PLAN
(At interior bent)

TABLE OF BEARING PAD DIMENSIONS (ALL PRESTR CONC SLAB BM TYPES)

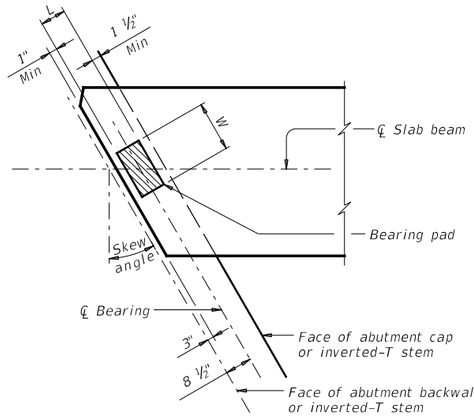
One-Pad (Ty SB1-"N") (2)			Two-Pad (Ty SB2-"N") (2)		
W	L	T	W	L	T
14"	7"	2"	7"	7"	2"

Pad sizes shown are applicable for the following conditions:

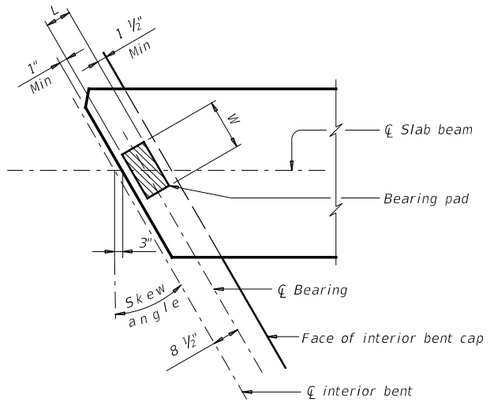
(1) All one, two and three span units where the minimum span length is not less than 25' and the maximum span is not more than 50'.
(2) Skews less than or equal to 30°.



ONE-PAD DETAIL PLAN
(At abutment or inverted-T cap or at interior bent)



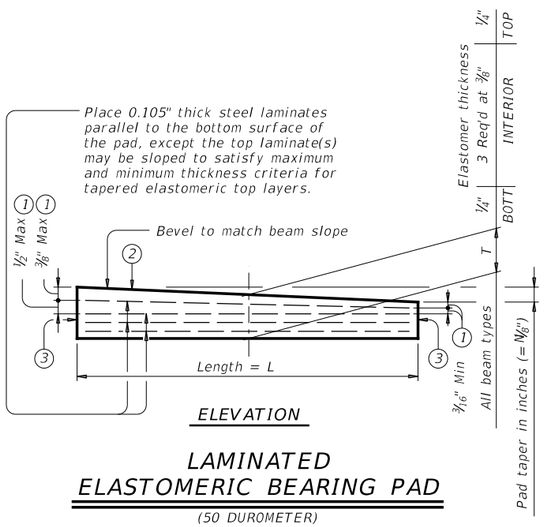
ONE-PAD DETAIL SKEW PLAN
(At abutment or inverted-T cap)



ONE-PAD DETAIL SKEW PLAN
(At interior bent)

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.



ELEVATION

LAMINATED ELASTOMERIC BEARING PAD

(50 DUROMETER)

(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.

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".

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	1219	02	017, ETC.	FM 182
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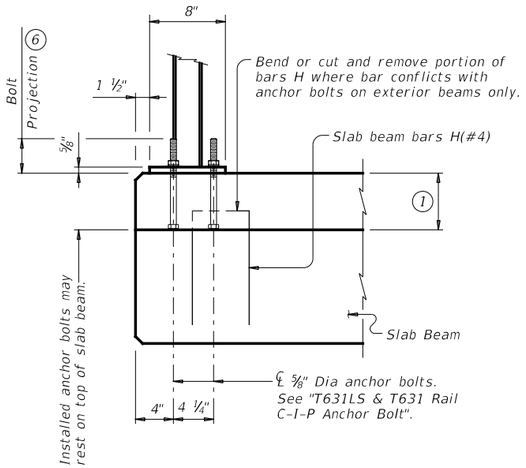
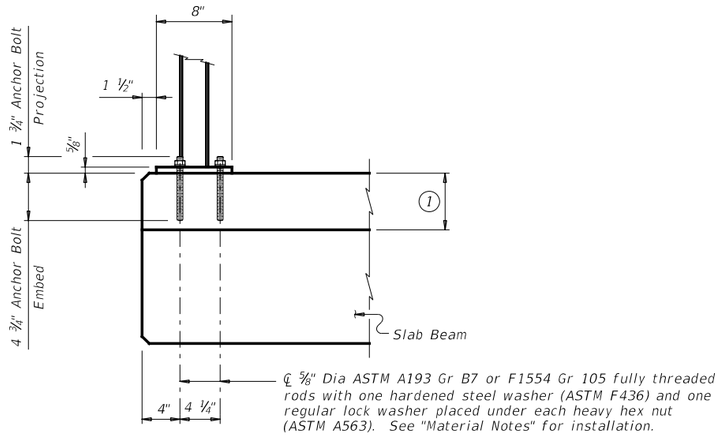
	WACO	CORYELL		101



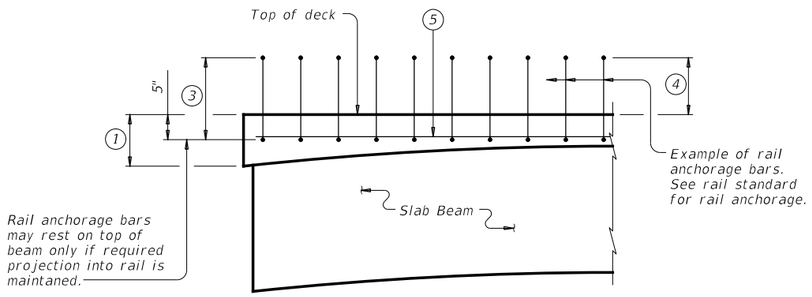
CAST-IN-PLACE ANCHORAGE OPTION



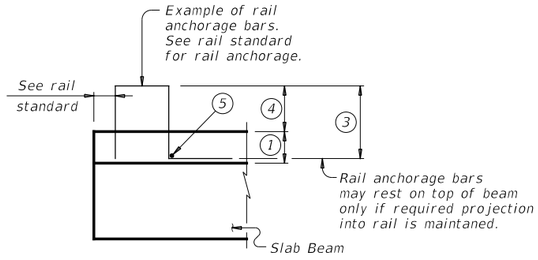
ADHESIVE ANCHORAGE OPTION

T631LS & T631 RAIL ANCHORAGE PLACEMENT (2)(7)

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.



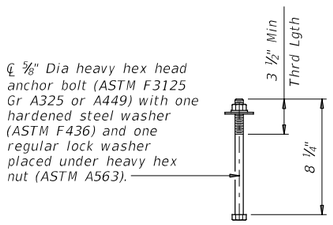
PART SPAN ELEVATION



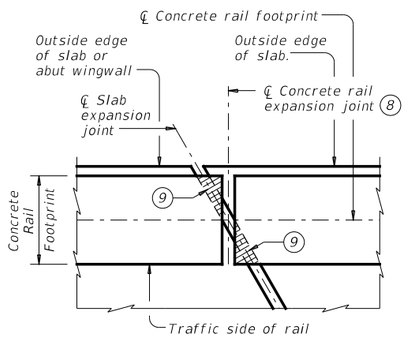
SECTION

TYPICAL CONCRETE RAIL ANCHORAGE

(Showing typical concrete rail anchorage)



T631LS & T631 RAIL C-I-P ANCHOR BOLT



PLAN OF CONCRETE RAILS AT EXPANSION JOINTS

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

FILE: psbste07-18.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT January 2017	CONT	SECT	JOB	HIGHWAY
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03-18: Updated adhesive anchor notes.	DIST	COUNTY		SHEET NO.
	WACO	CORYELL		102

DATE: 4/5/2023 3:28:33 PM
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DATE: 4/5/2023 3:28:34 PM
FILE: T:\Road Dept\Department\Team Texas\txdot cadd standards\bridge\Slab Beam\PSBSD.dgn

STRUCTURE	SPAN LENGTH (ft)	BEAM NO.	BEAM TYPE	PRESTRESSING STRANDS: NON-STD STRAND PATTERN	TOTAL NO.	SIZE (in)	STRGTH fpu (ksi)	"e" ℄ (in)	"e" END (in)	TOT NO. DEB	DEBONDED STRANDS PER ROW: DIST FROM BOTTOM (in)	NO. OF STRANDS: TOTAL	NO. OF STRANDS: DE-BONDED	NUMBER OF STRANDS DEBONDED TO (ft from end): 3	6	9	12	15	CONCRETE: RELEASE STRGTH (1) f'ci (ksi)	MINIMUM 28 DAY COMP STRGTH f'c (ksi)	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	Shear	LOAD RATING FACTORS: STRENGTH I: Inv	Opr	SERVICE III: Inv
24' ROADWAY SB12 BEAM	25	ALL	5SB12		8	0.6	270	3.50	3.50	0	2.5	8	0	0	0	0	0	0	4.000	5.000	0.914	-1.217	448	0.450	0.450	1.40	1.82	1.71
	30	ALL	5SB12		10	0.6	270	3.50	3.50	0	2.5	10	0	0	0	0	0	0	4.000	5.000	1.292	-1.685	530	0.450	0.450	1.25	1.62	1.29
	35	ALL	5SB12		14	0.6	270	3.50	3.50	0	2.5	14	0	0	0	0	0	0	4.000	5.000	1.730	-2.219	675	0.450	0.450	1.33	1.73	1.23
	40	ALL	5SB12		18	0.6	270	3.50	3.50	0	2.5	18	0	0	0	0	0	0	4.000	5.000	2.218	-2.796	820	0.440	0.440	1.34	1.74	1.12
24' ROADWAY SB15 BEAM	25	ALL	5SB15		8	0.6	270	5.00	5.00	0	2.5	8	0	0	0	0	0	0	4.000	5.000	0.725	-0.897	551	0.450	0.450	1.77	2.29	2.41
	30	ALL	5SB15		8	0.6	270	5.00	5.00	0	2.5	8	0	0	0	0	0	0	4.000	5.000	1.020	-1.244	574	0.450	0.450	1.23	1.59	1.45
	35	ALL	5SB15		10	0.6	270	5.00	5.00	0	2.5	10	0	0	0	0	0	0	4.000	5.000	1.361	-1.640	708	0.450	0.450	1.15	1.49	1.14
	40	ALL	5SB15		14	0.6	270	5.00	5.00	0	2.5	14	0	0	0	0	0	0	4.000	5.000	1.739	-2.068	864	0.440	0.440	1.32	1.71	1.19
	45	ALL	5SB15		18	0.6	270	5.00	5.00	2	2.5	18	2	2	0	0	0	0	4.000	5.000	2.179	-2.574	1054	0.440	0.440	1.34	1.73	1.08
	50	ALL	5SB15		24	0.6	270	5.00	5.00	8	2.5	24	8	4	4	0	0	0	4.000	5.000	2.680	-3.153	1276	0.440	0.440	1.33	1.72	1.11
28' ROADWAY SB12 BEAM	25	ALL	5SB12		8	0.6	270	3.50	3.50	0	2.5	8	0	0	0	0	0	0	4.000	5.000	0.903	-1.184	444	0.430	0.430	1.47	1.91	1.80
	30	ALL	5SB12		10	0.6	270	3.50	3.50	0	2.5	10	0	0	0	0	0	0	4.000	5.000	1.276	-1.639	508	0.430	0.430	1.32	1.71	1.37
	35	ALL	5SB12		12	0.6	270	3.50	3.50	0	2.5	12	0	0	0	0	0	0	4.000	5.000	1.708	-2.159	647	0.430	0.430	1.18	1.53	1.02
	40	ALL	5SB12		18	0.6	270	3.50	3.50	0	2.5	18	0	0	0	0	0	0	4.000	5.000	2.200	-2.744	799	0.430	0.430	1.37	1.78	1.17
28' ROADWAY SB15 BEAM	25	ALL	5SB15		8	0.6	270	5.00	5.00	0	2.5	8	0	0	0	0	0	0	4.000	5.000	0.716	-0.874	529	0.430	0.430	1.85	2.40	2.53
	30	ALL	5SB15		8	0.6	270	5.00	5.00	0	2.5	8	0	0	0	0	0	0	4.000	5.000	1.007	-1.212	570	0.430	0.430	1.29	1.67	1.53
	35	ALL	5SB15		10	0.6	270	5.00	5.00	0	2.5	10	0	0	0	0	0	0	4.000	5.000	1.343	-1.598	680	0.430	0.430	1.21	1.57	1.22
	40	ALL	5SB15		14	0.6	270	5.00	5.00	0	2.5	14	0	0	0	0	0	0	4.000	5.000	1.725	-2.032	842	0.430	0.430	1.36	1.76	1.24
	45	ALL	5SB15		18	0.6	270	5.00	5.00	2	2.5	18	2	2	0	0	0	0	4.000	5.000	2.149	-2.508	1013	0.420	0.420	1.41	1.82	1.16
	50	ALL	5SB15		22	0.6	270	5.00	5.00	6	2.5	22	6	4	2	0	0	0	4.000	5.000	2.643	-3.073	1227	0.420	0.420	1.33	1.72	1.01
30' ROADWAY SB12 BEAM	25	ALL	4SB12		6	0.6	270	3.50	3.50	0	2.5	6	0	0	0	0	0	0	4.000	5.000	0.904	-1.187	341	0.340	0.340	1.38	1.79	1.67
	30	ALL	4SB12		8	0.6	270	3.50	3.50	0	2.5	8	0	0	0	0	0	0	4.000	5.000	1.277	-1.646	407	0.340	0.340	1.32	1.71	1.37
	35	ALL	4SB12		10	0.6	270	3.50	3.50	0	2.5	10	0	0	0	0	0	0	4.000	5.000	1.711	-2.169	518	0.340	0.340	1.24	1.60	1.08
	40	ALL	4SB12		14	0.6	270	3.50	3.50	0	2.5	14	0	0	0	0	0	0	4.000	5.000	2.205	-2.758	640	0.340	0.340	1.34	1.73	1.11
30' ROADWAY SB15 BEAM	25	ALL	4SB15		6	0.6	270	5.00	5.00	0	2.5	6	0	0	0	0	0	0	4.000	5.000	0.723	-0.888	431	0.350	0.350	1.69	2.19	2.32
	30	ALL	4SB15		6	0.6	270	5.00	5.00	0	2.5	6	0	0	0	0	0	0	4.000	5.000	1.017	-1.231	438	0.350	0.350	1.16	1.50	1.37
	35	ALL	4SB15		8	0.6	270	5.00	5.00	0	2.5	8	0	0	0	0	0	0	4.000	5.000	1.346	-1.605	545	0.340	0.340	1.21	1.57	1.21
	40	ALL	4SB15		12	0.6	270	5.00	5.00	0	2.5	12	0	0	0	0	0	0	4.000	5.000	1.729	-2.043	675	0.340	0.340	1.47	1.91	1.38
	45	ALL	4SB15		14	0.6	270	5.00	5.00	2	2.5	14	2	2	0	0	0	0	4.000	5.000	2.166	-2.542	823	0.340	0.340	1.33	1.73	1.06
	50	ALL	4SB15		18	0.6	270	5.00	5.00	4	2.5	18	4	2	2	0	0	0	4.000	5.000	2.665	-3.115	998	0.340	0.340	1.32	1.71	1.02

(1) Based on the following allowable stresses (ksi):

Compression = 0.65 f'ci

Tension = $0.24\sqrt{f'ci}$

Optional designs must likewise conform.

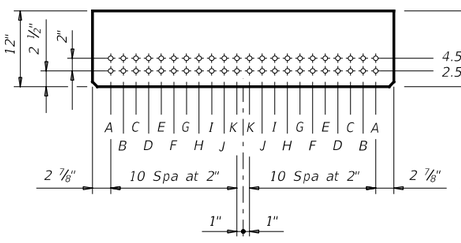
(2) Portion of full HL93.

DESIGN NOTES:

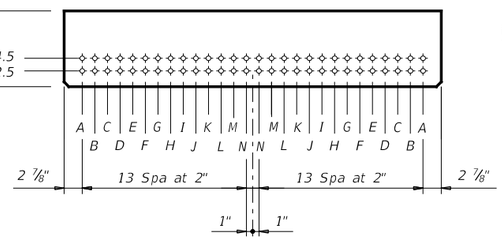
Designed according to AASHTO LRFD Bridge Design Specifications.
Load rated using Load and Resistance Factor Rating according to AASHTO Manual for Bridge Evaluation.
Prestress losses for the designed beams have been calculated for a relative humidity of 60 percent. Optional designs must likewise conform.

FABRICATION NOTES:

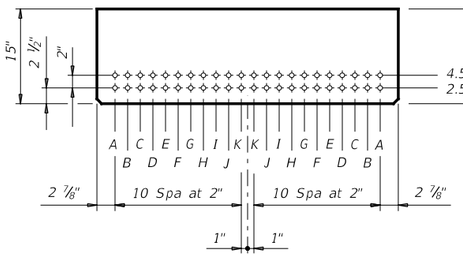
Provide Class H concrete.
Provide Grade 60 reinforcing steel.
Use low relaxation strands, each pretensioned to 75 percent of fpu.
Full-length debonded strands are not permitted in positions "A" and "B".
Strand debonding must comply with Item 424.4.2.2.2.4.
When shown on this sheet, the Fabricator has 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.



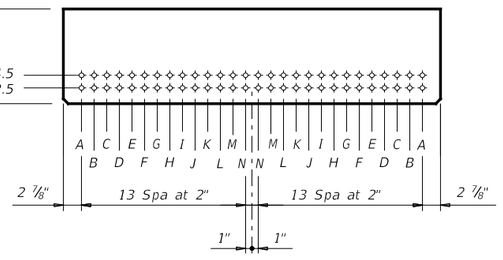
TxDOT 4SB12 SLAB BEAM



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 STD DESIGNS
(TY SB12 OR SB15)
24', 28' & 30' ROADWAY

PSBSD

FILE: psbsts08-21.dgn	DN: SRW	CK: BMP	DW: SFS	CK: SDB
©TxDOT January 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS 1-21: Added load rating.	1219	02	017, ETC.	FM 182
	DIST	COUNTY		SHEET NO.
	WACO	CORYELL		103

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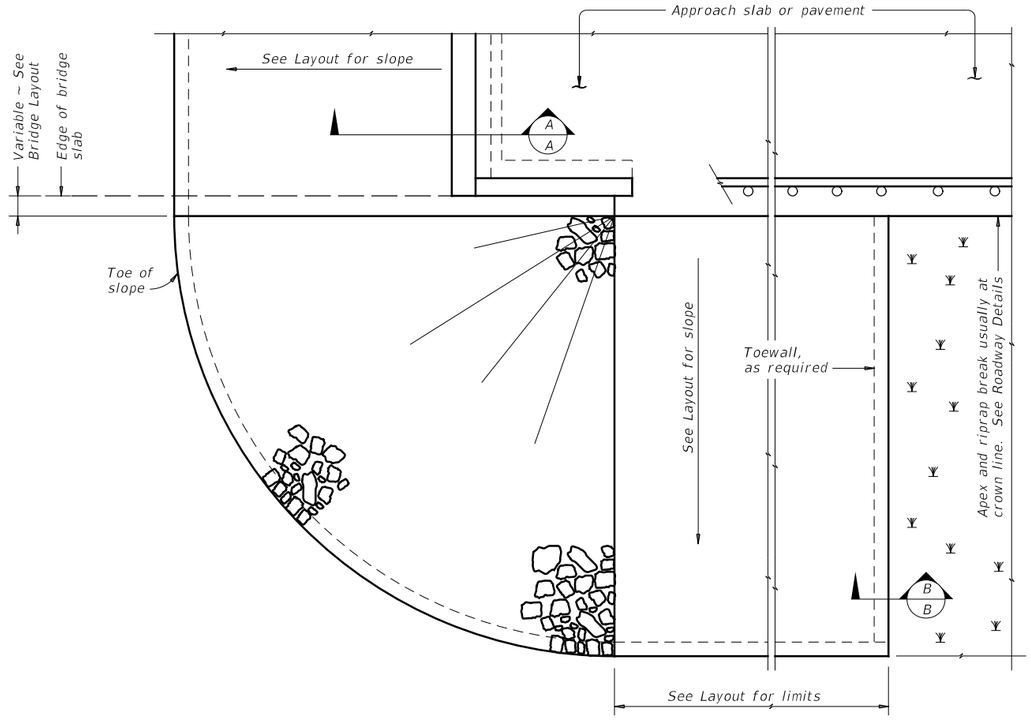
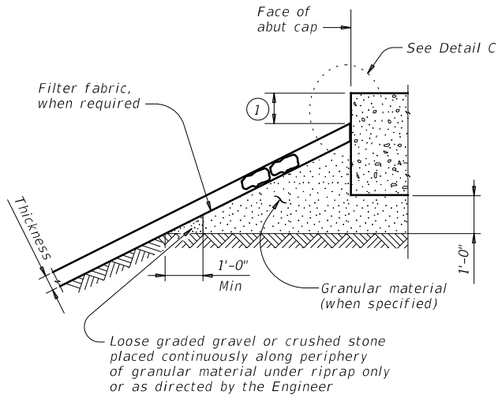
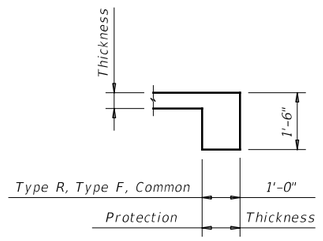


PLAN

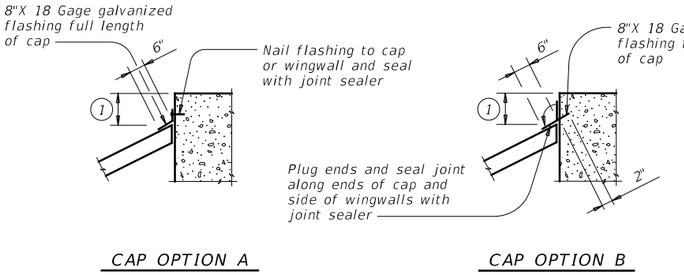


SECTION A-A AT CAP



SECTION B-B

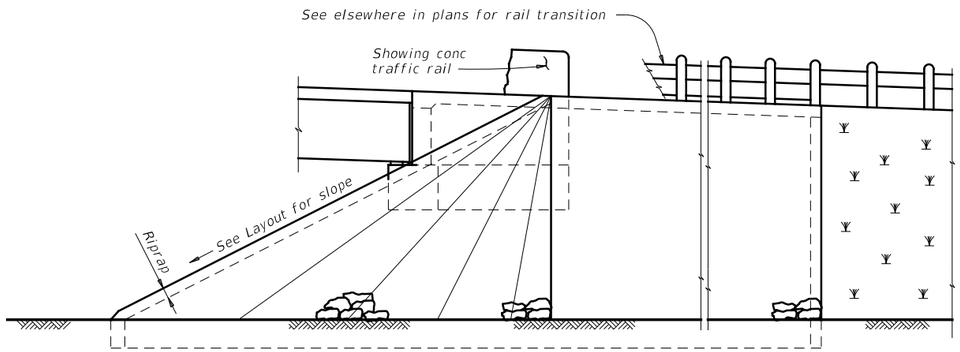
Provide toewall when shoulder drain is located adjacent to limits of stone riprap. Omit toewall when thickness of protection riprap is greater than 18".



CAP OPTION A

CAP OPTION B

DETAIL C



ELEVATION

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

GENERAL NOTES:
Refer to Item 432, "Riprap" for stone size and gradation, and construction details. See Layout for limits and thickness of riprap specified.
See elsewhere in plans for locations and details of shoulder drains.

Texas Department of Transportation

Bridge Division Standard

STONE RIPRAP

SRR

FILE: srrstde1-19.dgn	DN: AES	CK: JGD	DW: BWH	CK: AES
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	1219	02	017, ETC.	FM 182
	DIST	COUNTY		SHEET NO.
	WACO	CORYELL		104

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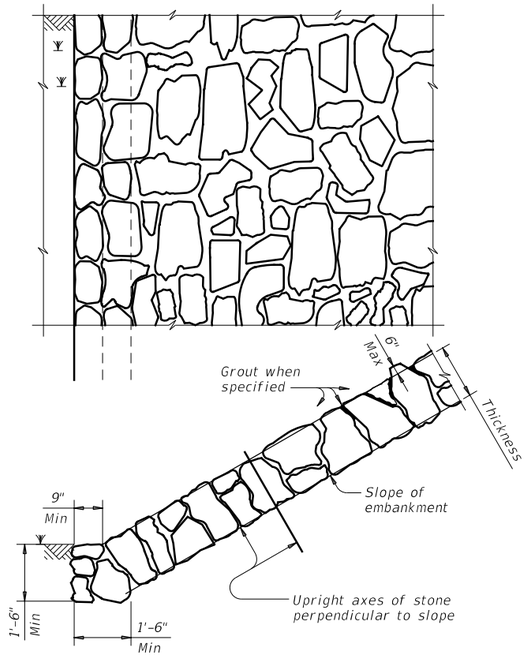


FIGURE 1 ~ TYPE R STONE RIPRAP

dry or grouted

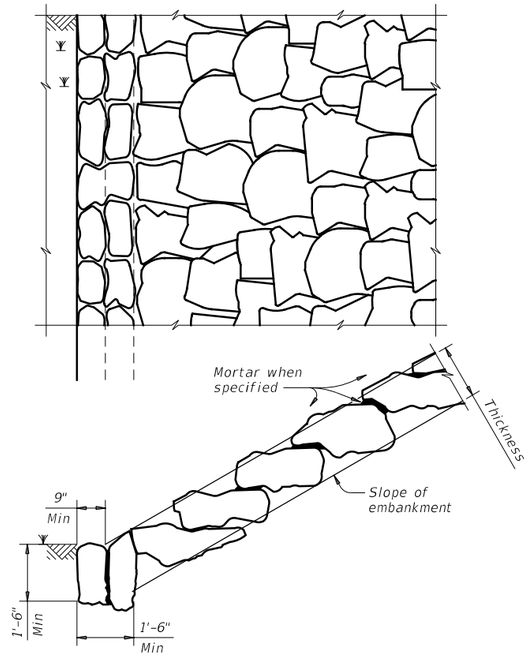


FIGURE 2 ~ TYPE F STONE RIPRAP

dry or mortared

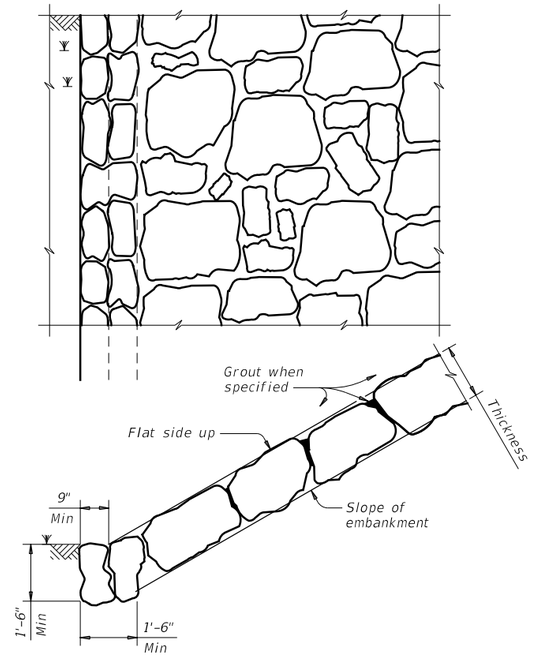


FIGURE 3 ~ TYPE F STONE RIPRAP

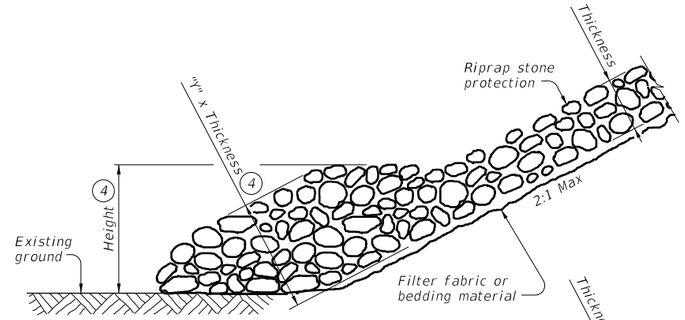
grouted

(2) Provide bedding material instead of filter fabric if shown elsewhere in plans. See Layout for thickness of bedding material.

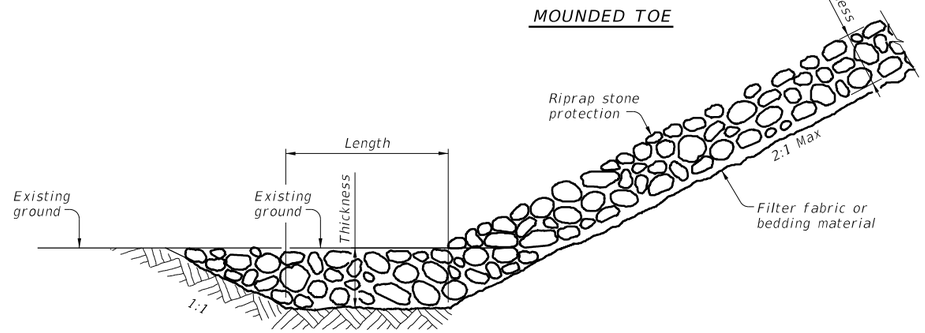
(3) Minimum toe depth is the larger of the maximum scour depth or 2 times the riprap thickness.

(4) "Y" and Height need to be defined. See layout or detail sheet for values if this option is used.

(5) List Stone Protection as size (XX inch) and thickness (YY inch) on the layout.
Example: Riprap (Stone Protection) XX inch, Thickness = YY inch.



MOUNDED TOE



EXTENDED ROCK FILLED TRENCH

PROTECTION STONE RIPRAP TOE OPTIONS (5)

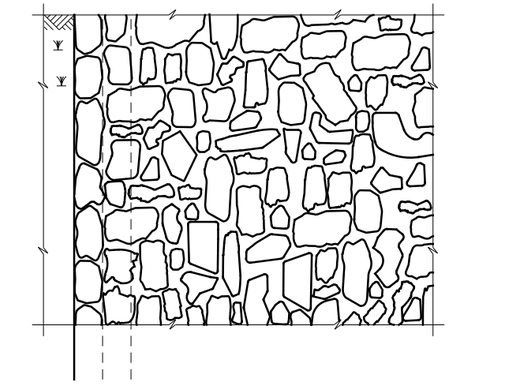


FIGURE 4 ~ COMMON STONE RIPRAP

dry or grouted

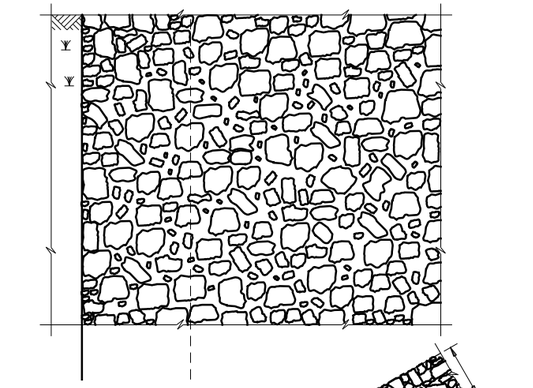


FIGURE 5 ~ PROTECTION STONE RIPRAP (5)

SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

STONE RIPRAP

SRR

FILE: srrstde1-19.dgn	DN: AES	CK: JGD	DW: BWH	CK: AES
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	1219	02	017, ETC.	FM 182
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	WACO	CORYELL		105

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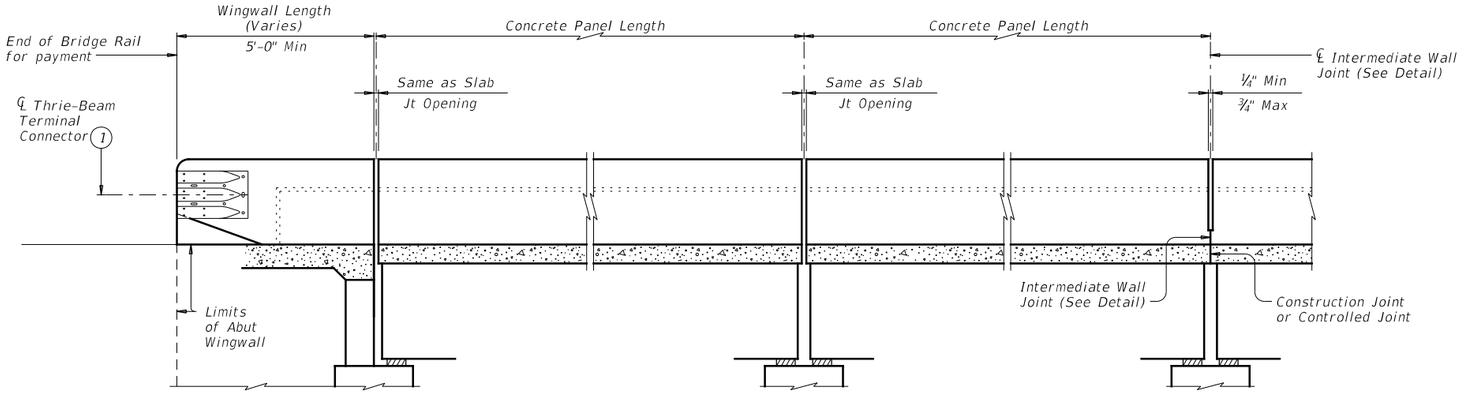
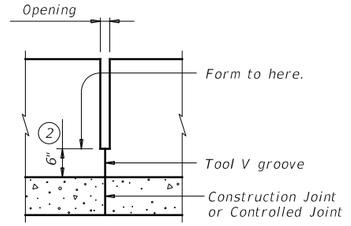


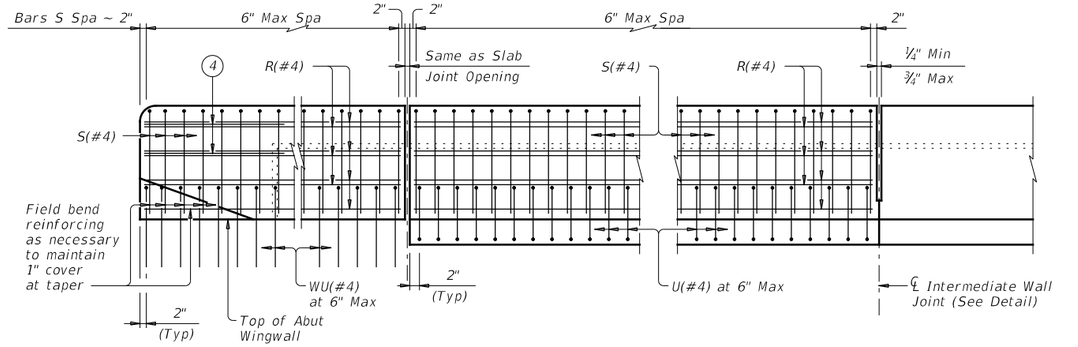
AT ABUTMENTS | AT BENTS WITH SLAB EXP JOINTS | AT BENTS WITHOUT SLAB EXP JOINTS

ROADWAY ELEVATION OF RAIL

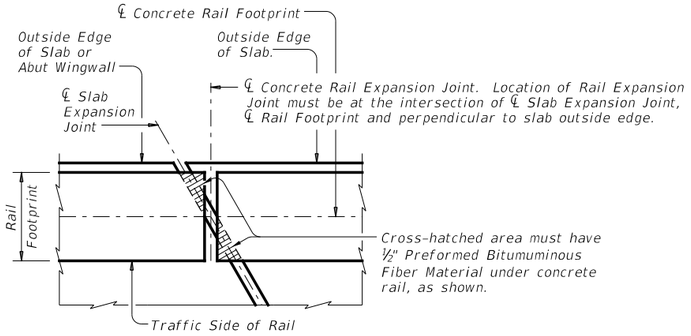


INTERMEDIATE WALL JOINT DETAIL

Provide at all interior bents without slab expansion joints.



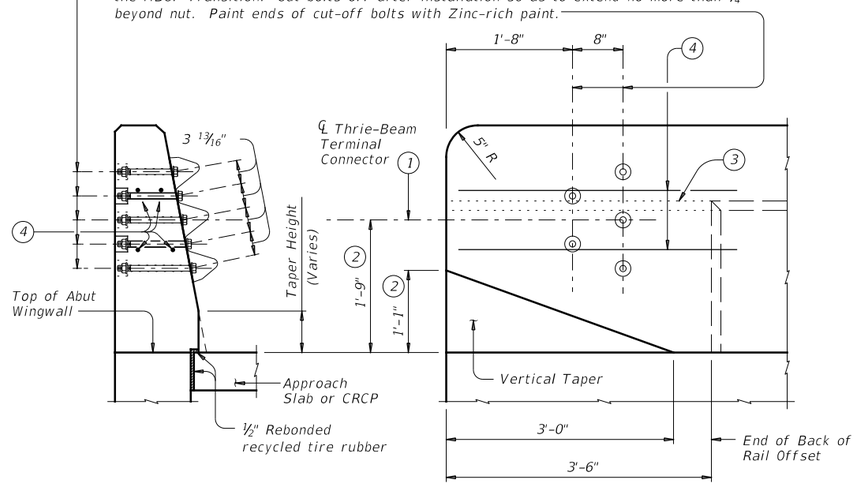
ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT



PLAN OF RAIL AT EXPANSION JOINTS

Example showing Slab Expansion Joints without breakbacks.

℄ 5 ~ 1" Dia holes and 2 ½" Dia x 2" deep recesses. Form or core holes and recesses. Percussion drilling is not permitted. Adjust placement of reinforcing steel as necessary to avoid bolt holes and recesses. Bolt recesses are only required when pedestrian sidewalks are adjacent to back of rail. Tighten the 5 Terminal Connection Bolts in a well distributed pattern so to prevent damage or distortion of the Thrie-Beam Connection and the MBGF Transition. Cut bolts off after installation so as to extend no more than ¾" beyond nut. Paint ends of cut-off bolts with Zinc-rich paint.



SECTION | ELEVATION

TERMINAL CONNECTION DETAILS

1. Terminal Connectors and associated hardware are to be paid for under the Item "Metal Beam Guard Fence". Attach Metal Beam Guard Fence Transitions to the bridge rail and extend along the embankment unless otherwise shown in the plans.
2. Increase 2" for structures with Overlay.
3. Back of rail offset may, with Engineer's approval, be continued to the end of the railing.
4. Place 4 additional Bars R(#4) 3'-8" in length inside Bars S(#4) and centered 2'-0" from end of rail when Terminal Connections are required.

Texas Department of Transportation | Bridge Division Standard

TRAFFIC RAIL
SINGLE SLOPE

TYPE SSTR

FILE: rlstd014-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	1219	02	017, ETC.	FM 182
	DIST	COUNTY		SHEET NO.
	WACO	CORYELL		106

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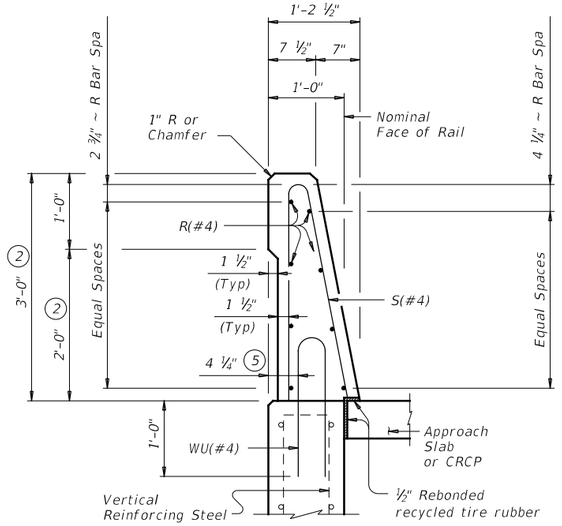
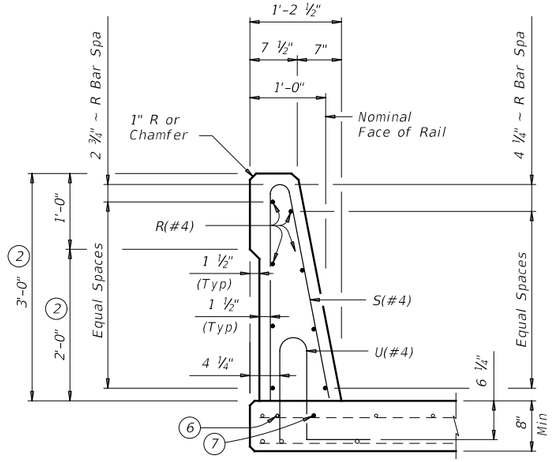


ON ABUTMENT WINGWALLS OR CIP RETAINING WALLS



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.

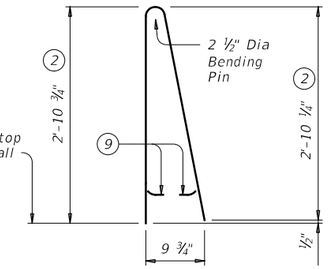
Rail anchorage details shown on this standard may require modification for select structure types. See appropriate details elsewhere in plans for these modifications.

Shop drawings will not be required for this rail.

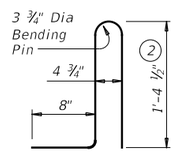
Average weight of railing with no overlay is 376 plf.

Cover dimensions are clear dimensions, unless noted otherwise.

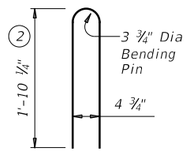
Reinforcing bar dimensions shown are out-to-out of bar.



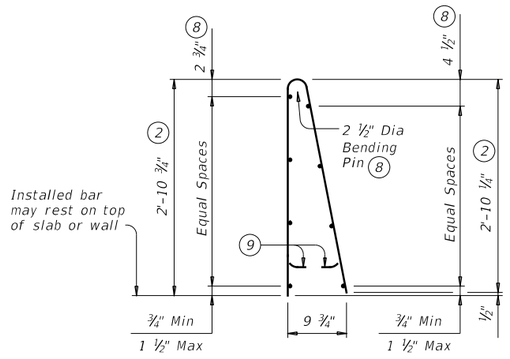
BARS S (#4)



BARS U (#4)

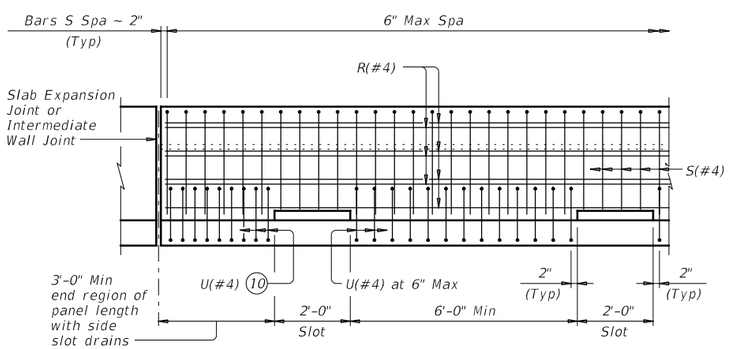


BARS WU (#4)



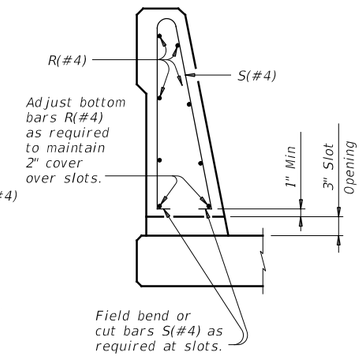
OPTIONAL WELDED WIRE REINFORCEMENT (WWR)

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

Texas Department of Transportation — Bridge Division Standard

TRAFFIC RAIL SINGLE SLOPE

TYPE SSTR

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©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	1219	02	017, ETC.	FM 182
	DIST	COUNTY		SHEET NO.
	WACO	CORYELL		107

DATE: 4/5/2023 3:28:38 PM
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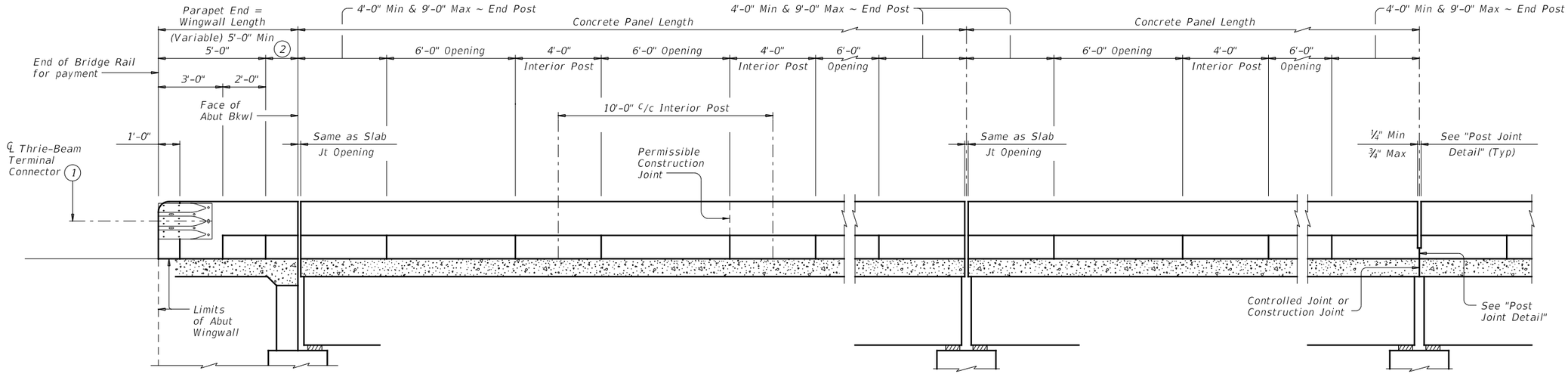
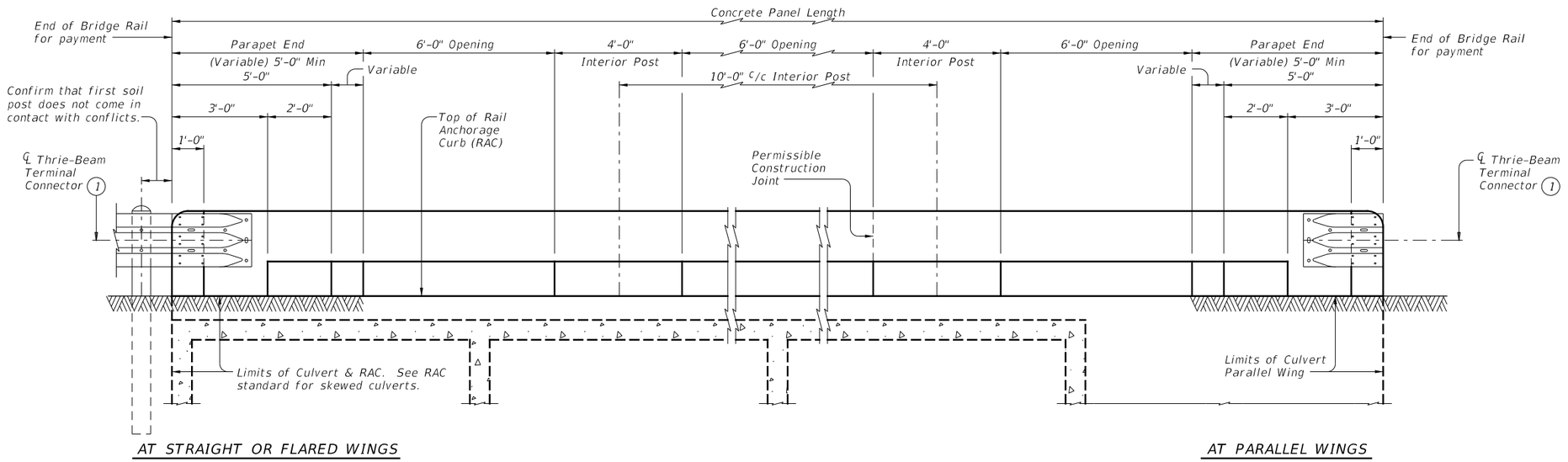


ROADWAY ELEVATION OF RAIL ON BRIDGE



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)

Texas Department of Transportation

Bridge Division Standard

TRAFFIC RAIL

TYPE T223

FILE: rlstd005-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: AES
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REVISIONS	1219	02	017, ETC.	FM 182
	DIST	COUNTY		SHEET NO.
	WACO	CORYELL		108

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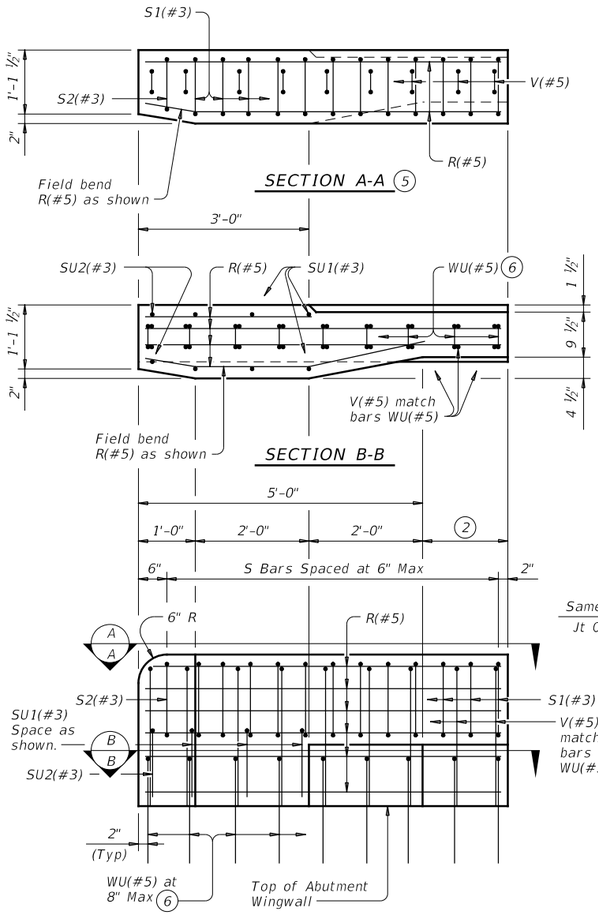
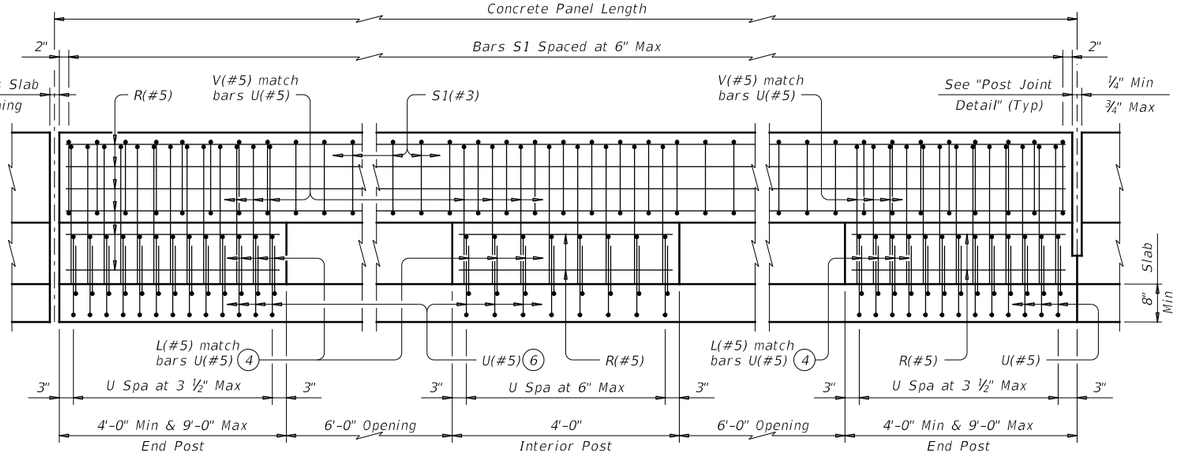


PARAPET END AT ABUT WINGWALL (6)



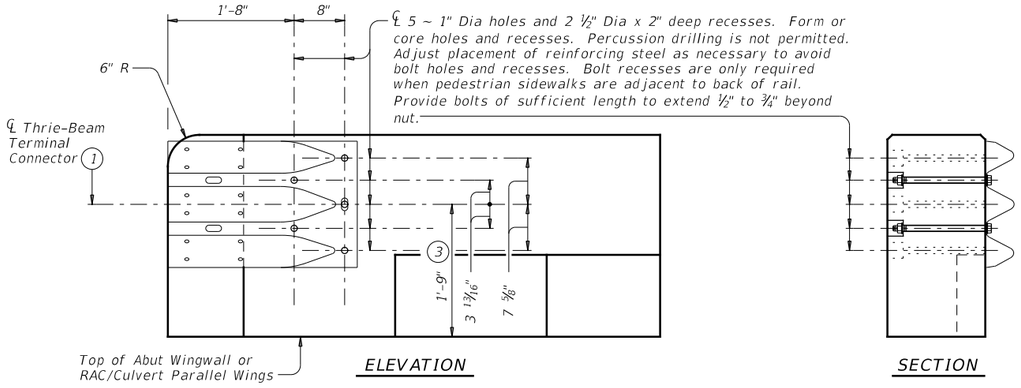
AT SLAB EXPANSION JOINTS

AT 4' INTERIOR POST

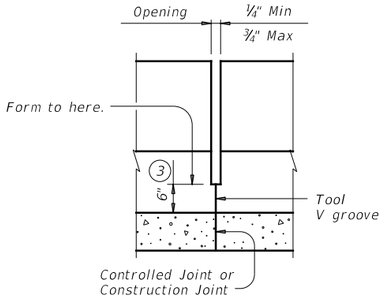
AT BENTS WITHOUT SLAB EXPANSION JOINTS

ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT

Showing rail on slab. Rail on box culvert similar.



TERMINAL CONNECTION DETAILS



POST 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) 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	1219	02	017, ETC.	FM 182
	DIST	COUNTY		SHEET NO.
	WACO	CORYELL		109

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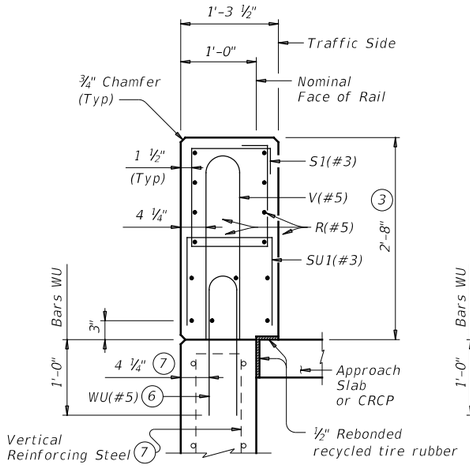
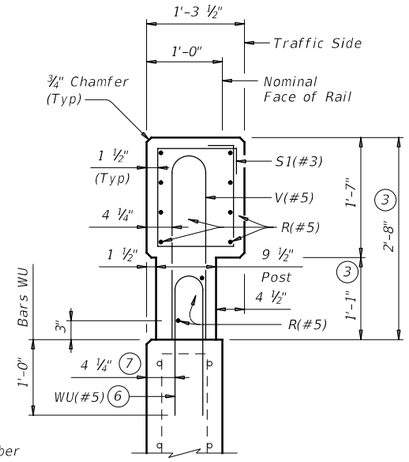
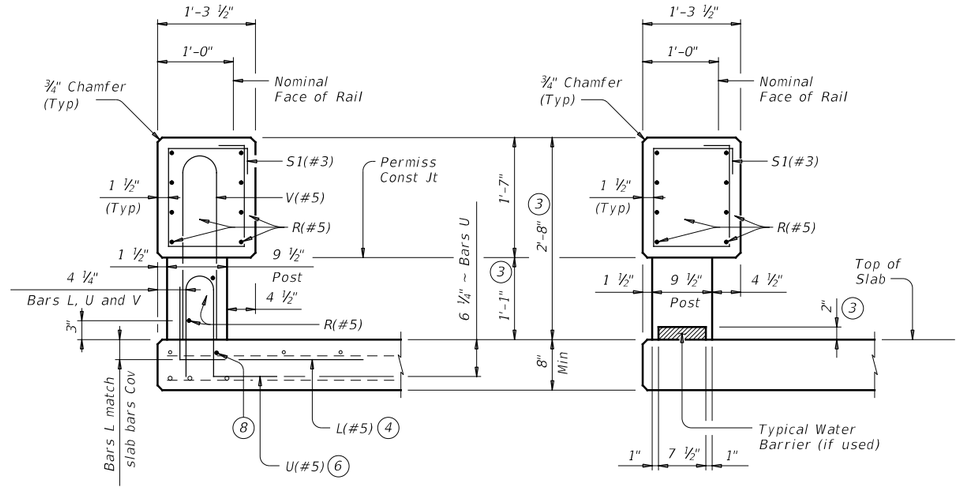


SECTION C-C
ON ABUTMENT WINGWALLS
OR CIP RETAINING WALLS



SECTION D-D
ON ABUTMENT WINGWALLS
OR CIP RETAINING WALLS

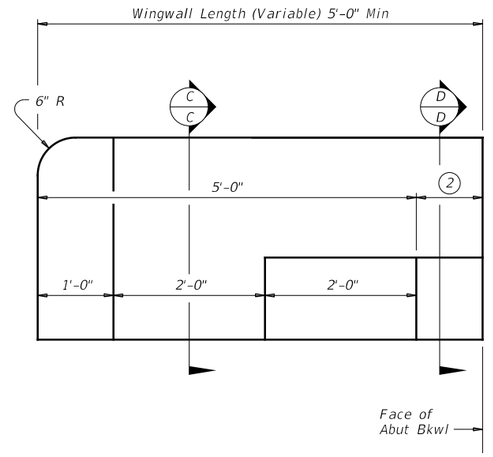


AT POST
ON BRIDGE SLAB

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.

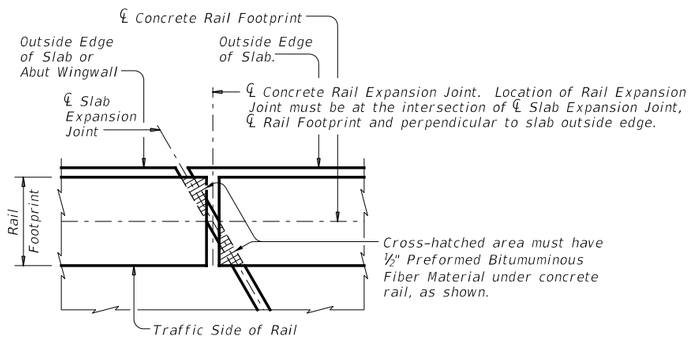
(4) Bars L(#5) are part of rail reinforcing and are included in unit price bid for railing. Space with Bars U. Bars L match slab bar cover. Bars L may be bundled with top slab reinforcing if spacing is equivalent.

(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.

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.

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.

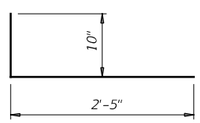
Epoxy coat or galvanize all reinforcing steel if slab bars are epoxy coated or galvanized.

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.

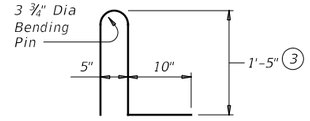
Provide bar laps, where required, as follows:

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

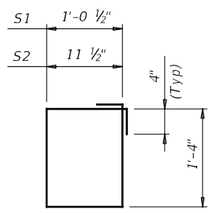
Epoxy coated ~ #5 = 3'-0"



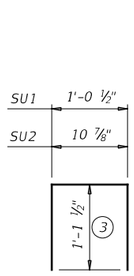
BARS L (#5)



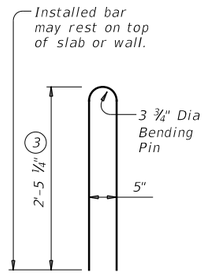
BARS U (#5) (9)



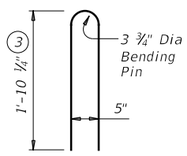
BARS S (#3)



BARS SU (#3)



BARS V (#5) (9)



BARS WU (#5)

SHEET 3 OF 3

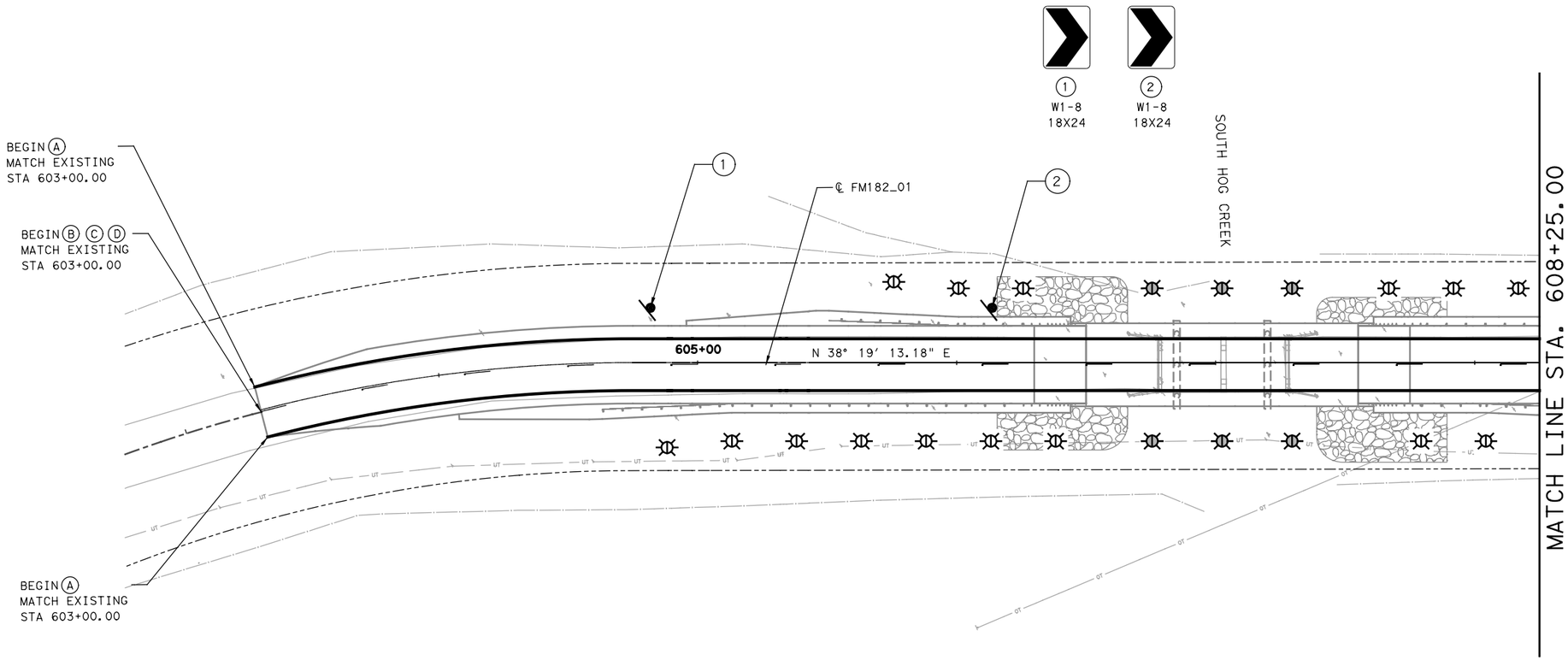
Texas Department of Transportation

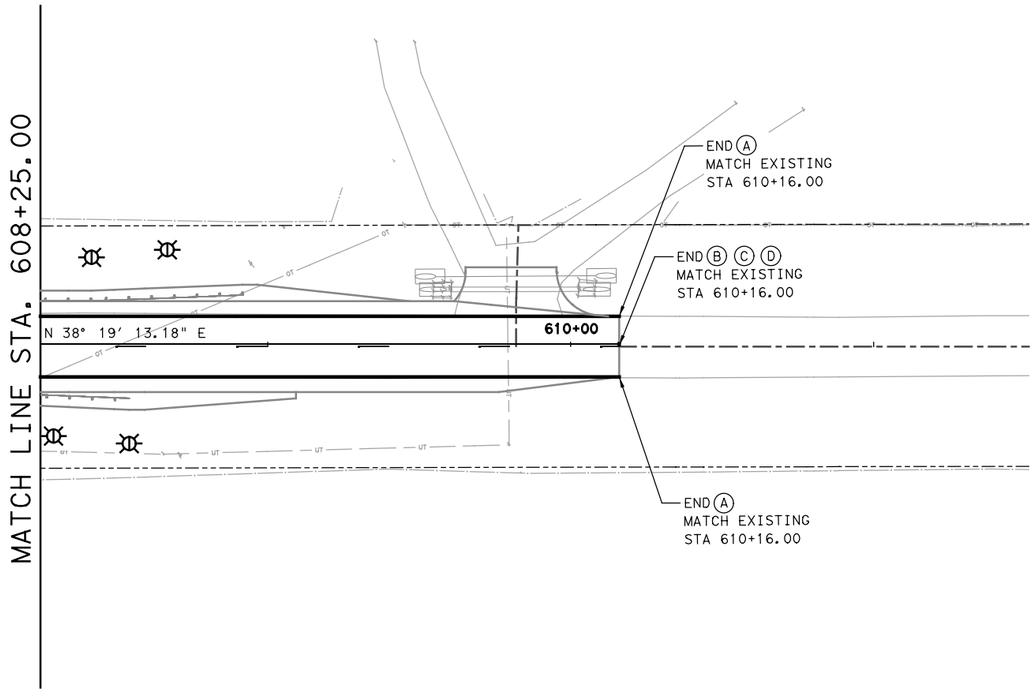
Bridge Division Standard

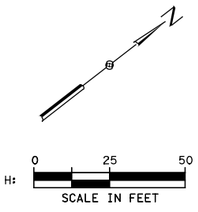
TRAFFIC RAIL

TYPE T223

FILE: rlstd005-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: AES
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	1219	02	017, ETC.	FM 182
	DIST	COUNTY		SHEET NO.
	WACO	CORYELL		110







LEGEND

- (A) RE PM W/RET REQ TY I (W) 6" (SLD) (100 MIL)
- (B) RE PM W/RET REQ TY I (Y) 6" (SLD) (100 MIL)
- (C) RE PM W/RET REQ TY I (Y) 6" (BRK) (100 MIL)
- (D) REFL PAV MRKR TY II A-A
- SMALL SIGN
- DEL ASSM (D-SW) SZ (BRF) GF2 (BI)
- DEL ASSM (D-SW) SZ (BRF) CTB (BI)

1. REFERE TO TXDOT PM(2)-22 STANDARD FOR REFLECTORIZED RAISED PAVEMENT MARKER SPACING AND D&OM(5)-20 FOR DELINEATOR AND OBJECT MARKER SPACING.

PRINT DATE	REVISION DATE
4/5/2023	

STATE OF TEXAS
JOSE M. SANDOVAL
90593
LICENSED PROFESSIONAL ENGINEER

JOSE M. SANDOVAL, P.E. 4/5/2023

3711 SOUTH MOPAC EXPRESSWAY
BUILDING ONE, SUITE 350
AUSTIN, TX 78703
TEL 512.494.6037 FAX 317.543.0270
www.structurepoint.com

AMERICAN STRUCTUREPOINT INC.

TBPE FIRM NO. F-10069

Texas Department of Transportation

FM 182 AT SOUTH HOG CREEK

SIGNING AND PAVEMENT MARKINGS LAYOUT

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		FM 182

STATE	DISTRICT	COUNTY	
TEXAS	WACO	CORYELL	
CONTROL	SECTION	JOB	SHEET NO.
1219	02	017, ETC.	111

REV DATE: 4/5/2023
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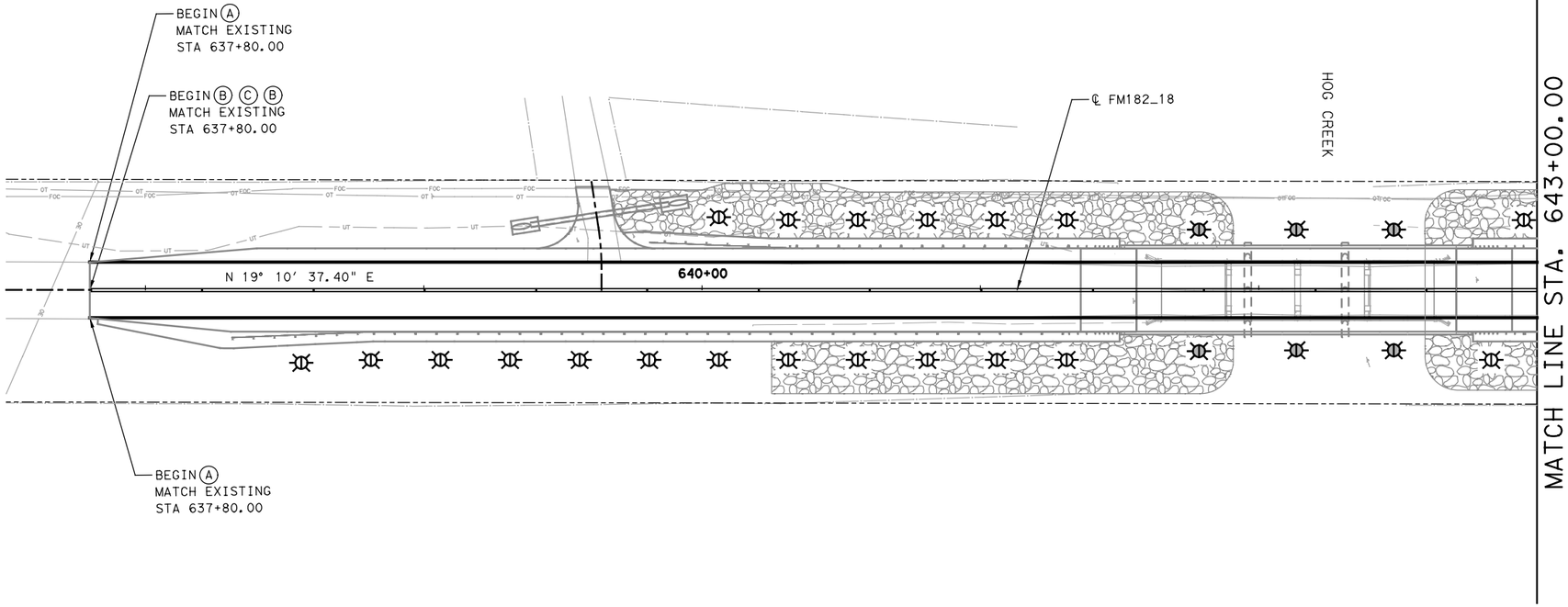

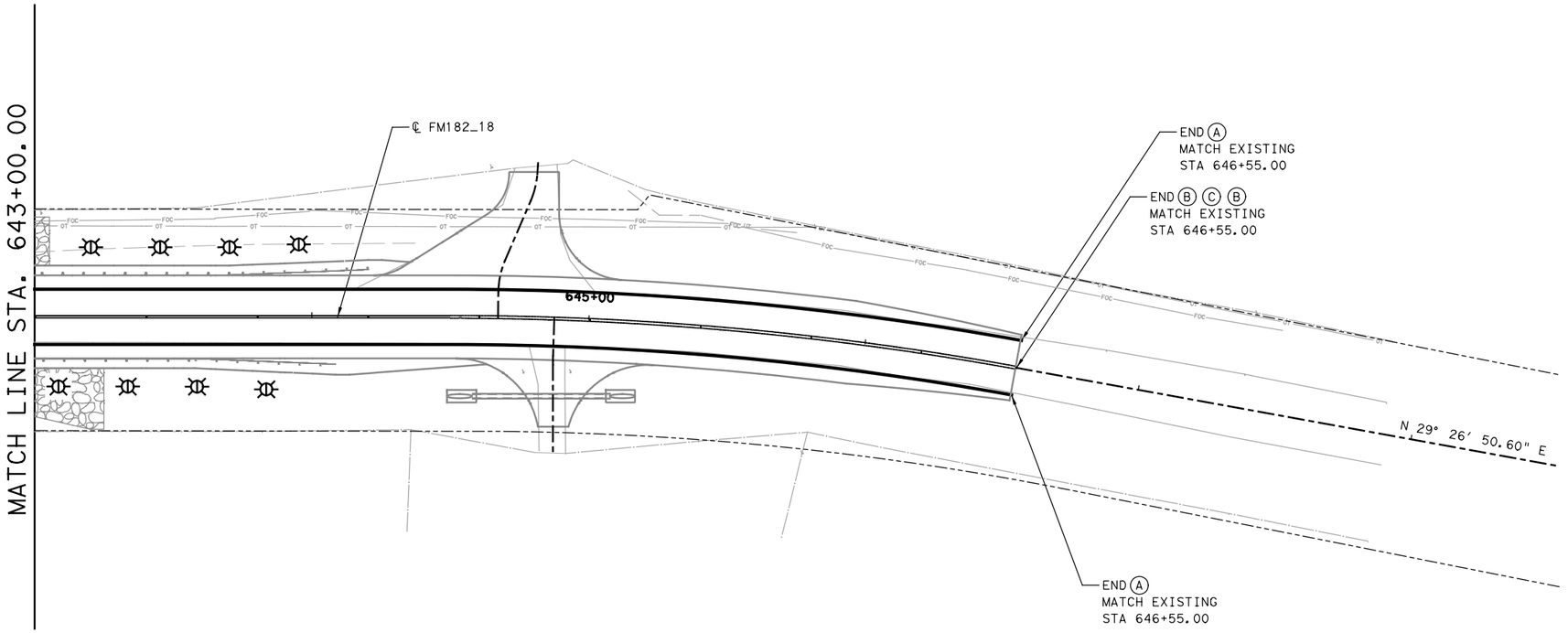

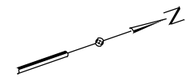

LEGEND

- (A) RE PM W/RET REQ TY I (W) 6" (SLD) (100 MIL)
- (B) RE PM W/RET REQ TY I (Y) 6" (SLD) (100 MIL)
- (C) REFL PAV MRKR TY II A-A
- SMALL SIGN
- DEL ASSM (D-SW) SZ (BRF) GF2 (BI)
- DEL ASSM (D-SW) SZ (BRF) CTB (BI)

1. REFERE TO TXDOT PM(2)-22 STANDARD FOR REFLECTORIZED RAISED PAVEMENT MARKER SPACING AND D&OM(5)-20 FOR DELINEATOR AND OBJECT MARKER SPACING.

PRINT DATE	REVISION DATE
4/5/2023	

STATE OF TEXAS
JOSE M. SANDOVAL
90593
LICENSED
PROFESSIONAL ENGINEER

4/5/2023

JOSE M. SANDOVAL, P.E.

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AMERICAN STRUCTUREPOINT INC.

TBPE FIRM NO. F-10069

Texas Department of Transportation

FM 182 AT HOG CREEK

SIGNING AND PAVEMENT MARKINGS LAYOUT

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		FM 182

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CONTROL	SECTION	JOB	SHEET NO.
1219	02	017,ETC	112

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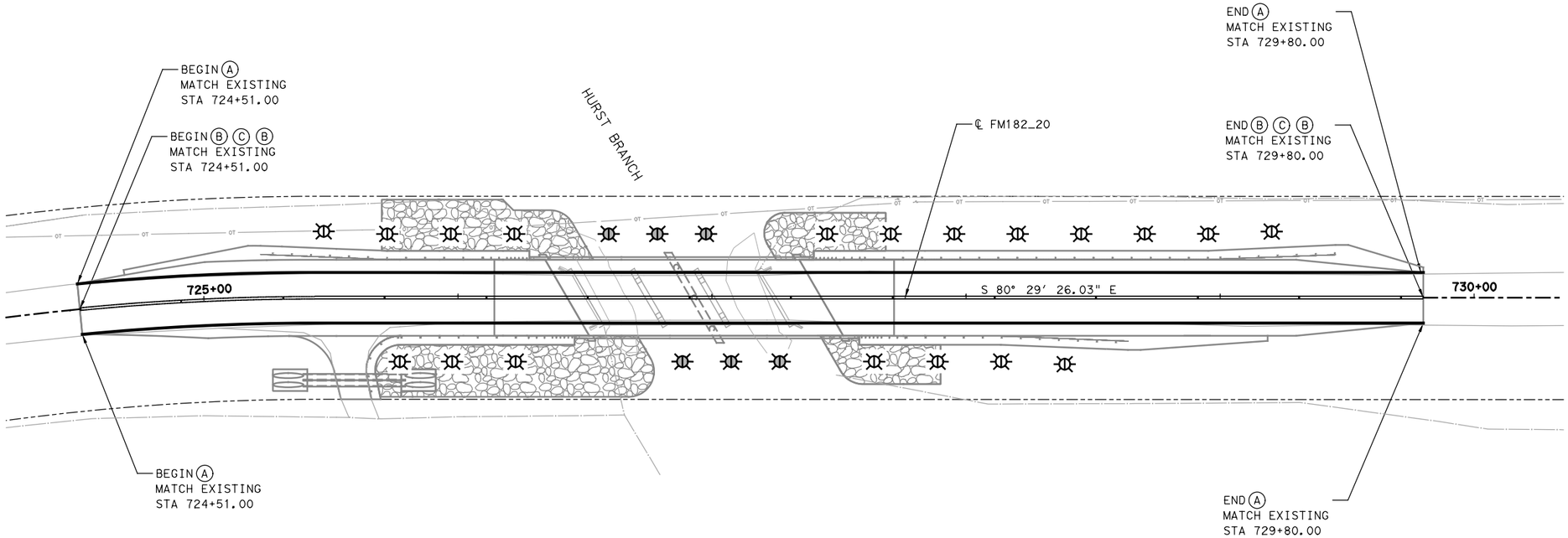

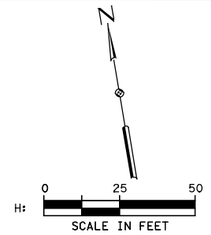

LEGEND

- (A) RE PM W/RET REQ TY I (W) 6" (SLD) (100 MIL)
- (B) RE PM W/RET REQ TY I (Y) 6" (SLD) (100 MIL)
- (C) REFL PAV MRKR TY II A-A
- SMALL SIGN
- DEL ASSM (D-SW) SZ (BRF) GF2 (BI)
- DEL ASSM (D-SW) SZ (BRF) CTB (BI)

1. REFERE TO TXDOT PM(2)-22 STANDARD FOR REFLECTORIZED RAISED PAVEMENT MARKER SPACING AND D&OM(5)-20 FOR DELINEATOR AND OBJECT MARKER SPACING.

PRINT DATE	REVISION DATE
4/19/2023	

STATE OF TEXAS
JOSE M. SANDOVAL
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LICENSED
PROFESSIONAL ENGINEER

4/19/2023

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AMERICAN STRUCTUREPOINT INC.

TBPE FIRM NO. F-10069

Texas Department of Transportation

FM 182 AT HURST BRANCH

SIGNING AND PAVEMENT MARKINGS LAYOUT

FED.RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		FM 182

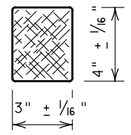
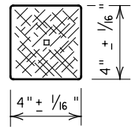
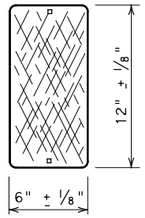
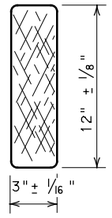
STATE	DISTRICT	COUNTY	
TEXAS	WACO	CORYELL	
CONTROL	SECTION	JOB	SHEET NO.
1219	02	017,ETC	113

REV DATE: 4/19/2023
CSJ: 1219-02-020
FILE LOCATION: P:\2020\00072\121902020\4 - Design\Plan Set\8. Traffic\2020.00072.03.RD.SPM.dgn

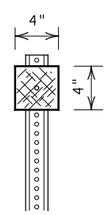
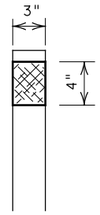
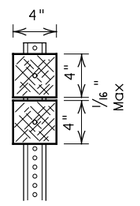
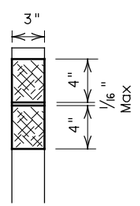
tzenko 4/19/2023 5:57:45 PM P:\2020\00072\121902020\4 - Design\Plan Set\8. Traffic\2020.00072.03.RD.SPM.dgn

DATE: 4/5/2023 3:28:50 PM
FILE: T:\Road Dept\Department\Team Texas\txdot cadd standards\signing & striping\2023\dom1-20.dgn

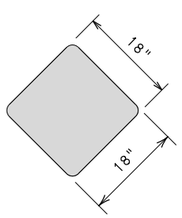
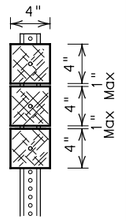
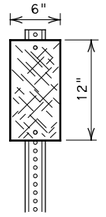
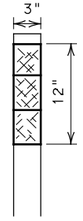
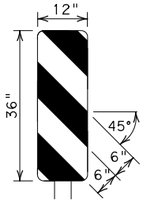
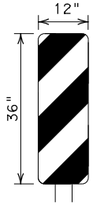
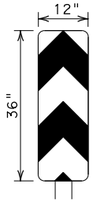
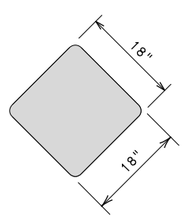
REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS

	SIZE 1	SIZE 2	SIZE 3	SIZE 4
DEVICE				
SHEETING	Yellow, White or Red Type B or C reflective sheeting			
NOTE	1. Size 1 and 4 - Direct applied reflective sheeting for use on flexible post (flx). 2. Size 2 and 3 - For use on wing channel (wc) post only. Use approved metal, plastic or fiberglass backplate with 17/64" mounting holes.			

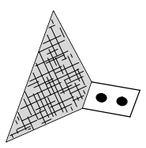
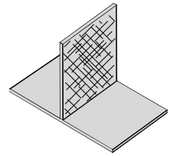
DELINEATORS

	SINGLE		DOUBLE	
DEVICE				
	1-Size 2 reflector unit	1-Size 1 reflector unit	2-Size 2 reflector units	2-Size 1 reflector units
SHEETING	Yellow, White or Red Type B or C Reflective Sheeting			
POST TYPE	WC	YFLX, WFLX	WC	YFLX, WFLX
MOUNT TYPE	GND	GND, SRF	GND	GND, SRF

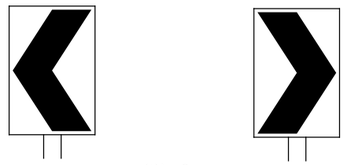
OBJECT MARKERS

	Type 1 (OM-1)	Type 2 (OM-2)			Type 3 (OM-3)			Type 4 (OM-4)
	OM-1	OM-2X	OM-2Y	OM-2Z	OM-3L	OM-3R	OM-3C	OM-4
DEVICE								
		3-Size 2 reflector units	1-Size 3 reflector unit	3-Size 1 reflector units or 1-Size 4 reflector unit				
SHEETING	Yellow-Type B_{FL} or C_{FL} Sheeting	Yellow - Type B or C Sheeting			Alternating acrylic black and retroflective yellow - Type B_{FL} or C_{FL} Sheeting			Red -Type B_{FL} or C_{FL} Sheeting
POST TYPE	TWT	WC	WC	WFLX	TWT			TWT
MOUNT TYPE	WAS, WAP	GND	GND	GND, SRF	WAS, WAP			WAS, WAP

BARRIER REFLECTORS (BRF)

	GF1	GF2	CTB
DEVICE			
	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"	

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

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

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

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	1219	02	017, ETC.	FM 182
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	WACO	CORYELL		114

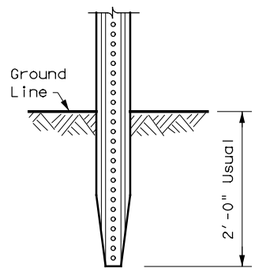
20A

DATE: 4/5/2023 3:28:51 PM
FILE: T:\Road Dept\Department\Team Texas\txdot cadd standards\signing & striping\DOM\dom2-20.dgn

POST TYPE AND SUPPORT FOUNDATION DETAILS

WING CHANNEL (WC)

GND

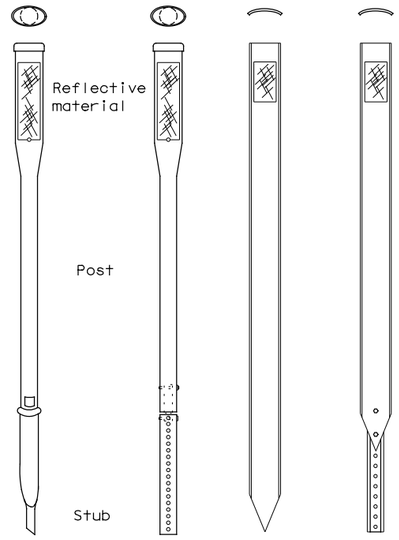


NOTES

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.

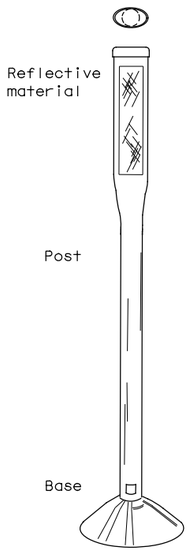
FLEXIBLE POSTS (YFLX, WFLX)

GND



EMBEDDED

SRF



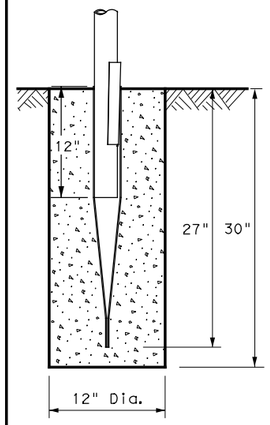
SURFACE MOUNT

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.

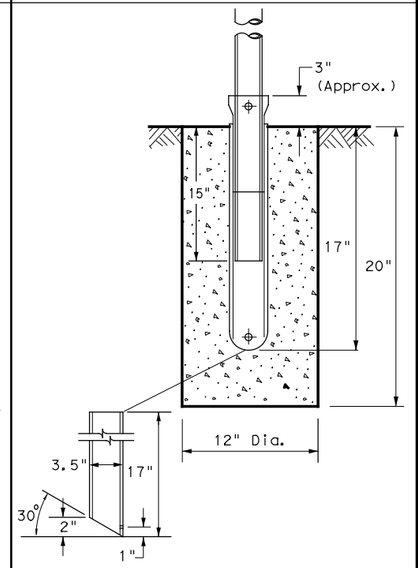
WEDGE ANCHOR SYSTEMS

WAS



STEEL

WAP



PLASTIC

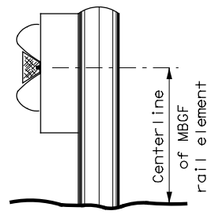
NOTE

1. Install per manufacturer's recommendations.

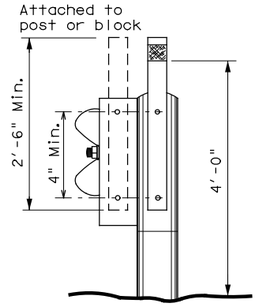
TYPE OF BARRIER MOUNTS

GUARD FENCE ATTACHMENT

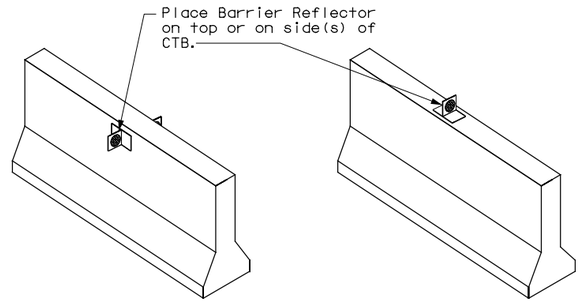
GF1



GF2



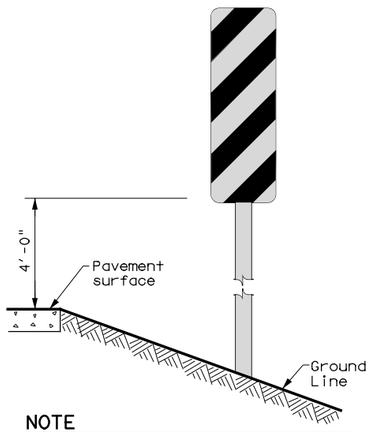
CONCRETE TRAFFIC BARRIER (CTB)



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.

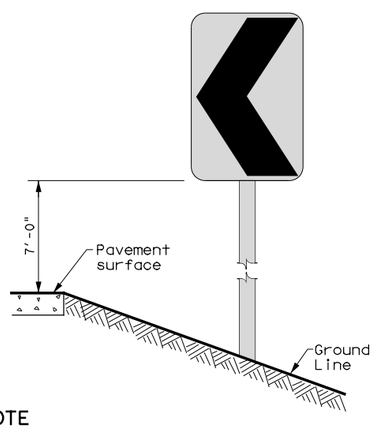
TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS



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)

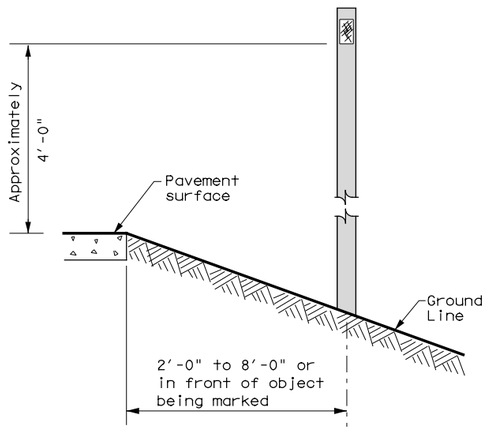
CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN



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

FILE: dom2-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	1219	02	017, ETC.	FM 182
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	WACO	CORYELL		115

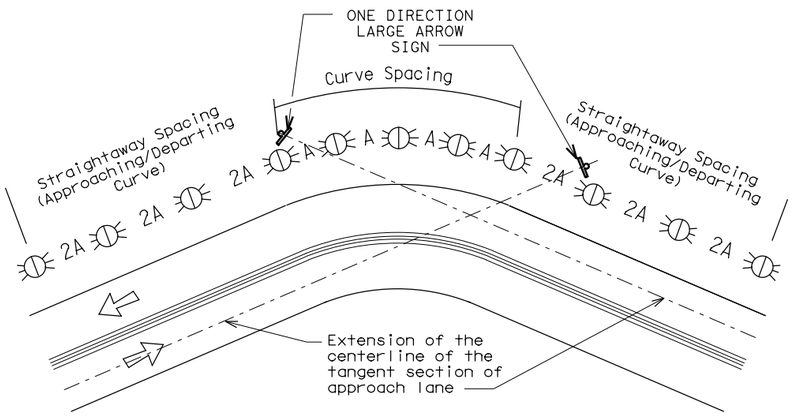
20B

DATE: 4/5/2023 3:28:54 PM
FILE: T:\Road Dept\Department\Team Texas\txdot cadd standards\signing & striping\dom3-20.dgn

MINIMUM WARNING DEVICES AT CURVES WITH ADVISORY SPEEDS

Amount by which Advisory Speed is less than Posted Speed	Curve Advisory Speed	
	Turn (30 MPH or less)	Curve (35 MPH or more)
5 MPH & 10 MPH	• RPMs	• RPMs
15 MPH & 20 MPH	• RPMs and One Direction Large Arrow sign	• RPMs and Chevrons; or • RPMs and One Direction Large Arrow sign where geometric conditions or roadside obstacles prevent the installation of chevrons.
25 MPH & more	• RPMs and Chevrons; or • RPMs and One Direction Large Arrow sign where geometric conditions or roadside obstacles prevent the installation of chevrons	• RPMs and Chevrons

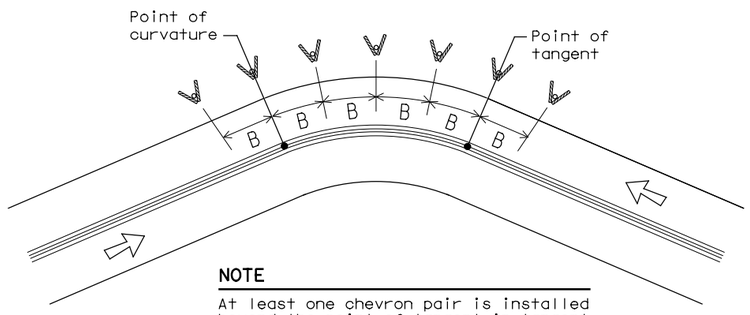
SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES



NOTE

ONE DIRECTION LARGE ARROW (W1-6) sign should be located at approximately and perpendicular to the extension of the centerline of the tangent section of approach lane.

SUGGESTED SPACING FOR CHEVRONS ON HORIZONTAL CURVES



NOTE

At least one chevron pair is installed beyond the point of tangent in tangent section.

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS KNOWN

Degree of Curve	FEET			
	Radius of Curve	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
		A	2A	B
1	5730	225	450	——
2	2865	160	320	——
3	1910	130	260	200
4	1433	110	220	160
5	1146	100	200	160
6	955	90	180	160
7	819	85	170	160
8	716	75	150	160
9	637	75	150	120
10	573	70	140	120
11	521	65	130	120
12	478	60	120	120
13	441	60	120	120
14	409	55	110	80
15	382	55	110	80
16	358	55	110	80
19	302	50	100	80
23	249	40	80	80
29	198	35	70	40
38	151	30	60	40
57	101	20	40	40

Curve delineator approach and departure spacing should include 3 delineators spaced at 2A. This spacing should be used during design preparation or when the degree of curve is known.

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS NOT KNOWN

Advisory Speed (MPH)	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
	A	2xA	B
65	130	260	200
60	110	220	160
55	100	200	160
50	85	170	160
45	75	150	120
40	70	140	120
35	60	120	120
30	55	110	80
25	50	100	80
20	40	80	80
15	35	70	40

If the degree of curve is not known, delineator spacing may be determined based on the Advisory Speed of the curve. Use the delineator curve spacing for each Advisory Speed (MPH).

DELINEATOR AND OBJECT MARKER APPLICATION AND SPACING

CONDITION	REQUIRED TREATMENT	MINIMUM SPACING
Frwy./Exp. Tangent	RPMs	See PM-series and FPM-series standard sheets
Frwy./Exp. Curve	Single delineators on right side	See delineator spacing table
Frwy/Exp.Ramp	Single delineators on at least one side of ramp (should be on outside of curves) (see Detail 3 on D&OM(4))	100 feet on ramp tangents Use delineator spacing table for ramp curves ("straightway spacing" does not apply to ramp curves)
Acceleration/Deceleration Lane	Double delineators (see Detail 3 on D&OM(4))	100 feet (See Detail 3 on D & OM (4))
Truck Escape Ramp	Single red delineators on both sides	50 feet
Bridge Rail (steel or concrete)and Metal Beam Guard Fence	Bi-Directional Delineators when undivided with one lane each direction Single Delineators when multiple lanes each direction	Equal spacing (100'max) but not less than 3 delineators
Concrete Traffic Barrier (CTB) or Steel Traffic Barrier	Barrier reflectors matching the color of the edge line	Equal spacing 100' max
Cable Barrier	Reflectors matching the color of the edge line	Every 5th cable barrier post (up to 100'max)
Guard Rail Terminus/Impact Head	Divided highway - Object marker on approach end Undivided 2-lane highways - Object marker on approach and departure end	Requires reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end See D & OM (5) and D & OM (6)
Bridges with no Approach Rail	Type 3 Object Marker (OM-3) at end of rail and 3 single delineators approaching rail	See D & OM(5)
Reduced Width Approaches to Bridge Rail	Type 2 and Type 3 Object Markers (OM-3) and 3 single delineators approaching bridge	Requires reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end See D & OM (5)
Culverts without MBGF	Type 2 Object Markers	See Detail 2 on D & OM(4)
Crossovers	Double yellow delineators and RPMs	See Detail 1 on D & OM (4)
Pavement Narrowing (lane merge) on Freeways/Expressway	Single delineators adjacent to affected lane for full length of transition	100 feet

NOTES

1. Unless indicated otherwise, the delineator or barrier reflector color shall conform to the color of the pavement edge line on the side of the road where the delineators or barrier reflectors are placed.
2. Barrier reflectors may be used to replace required delineators.
3. Single red delineators may be mounted on the back side of delineator posts for wrong way driver applications

LEGEND	
	Bi-directional Delineator
	Delineator
	Sign

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

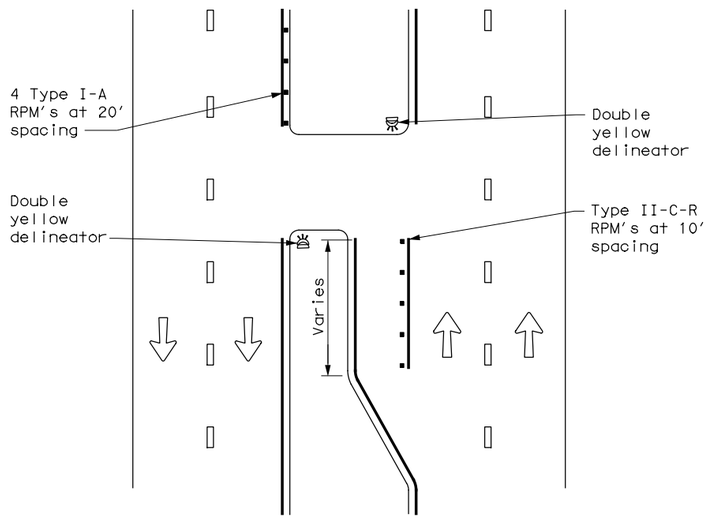
D & OM(3)-20

FILE: dom3-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	1219	02	017, ETC.	FM 182
3-15 8-15	DIST	COUNTY		SHEET NO.
8-15 7-20	WACO	CORYELL		116

20C

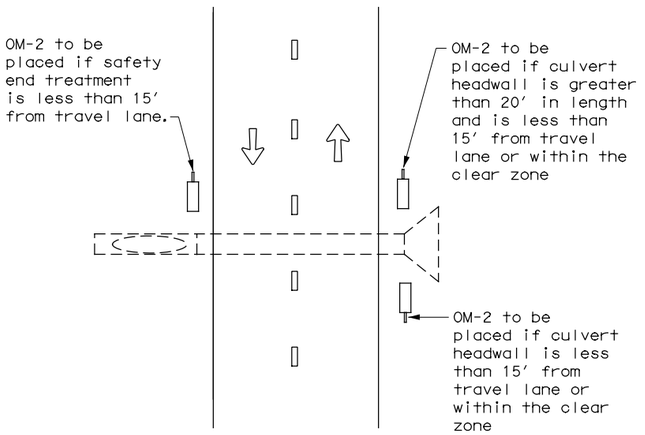
DATE: 4/5/2023 3:28:55 PM
FILE: T:\Road Dept\Department\Team Texas\txdot cadd standards\signing & striping\dom4-20.dgn

CROSSOVERS



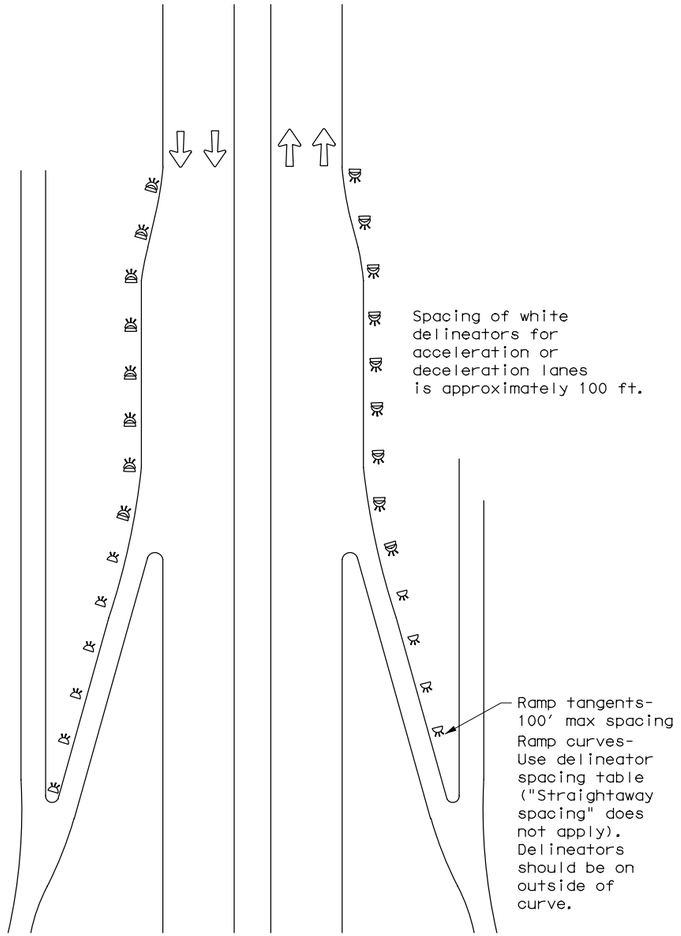
DETAIL 1

FOR CULVERTS WITHOUT MBGF



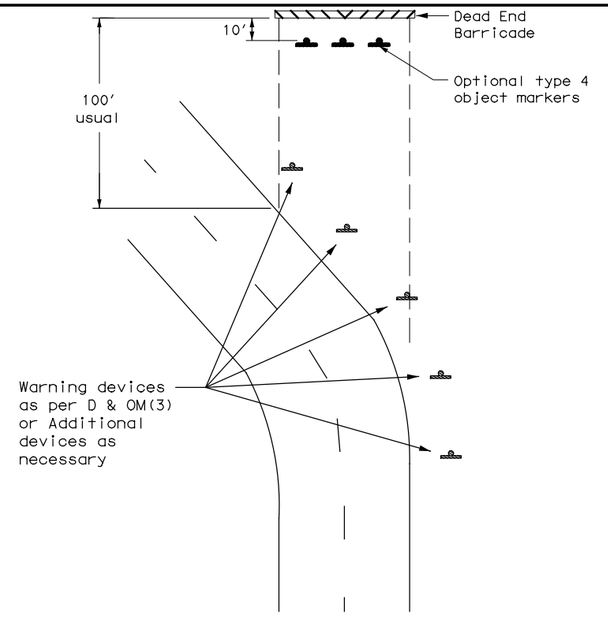
DETAIL 2

FREEWAY DELINEATION FOR RAMPS AND ACCELERATION/DECELERATION LANES



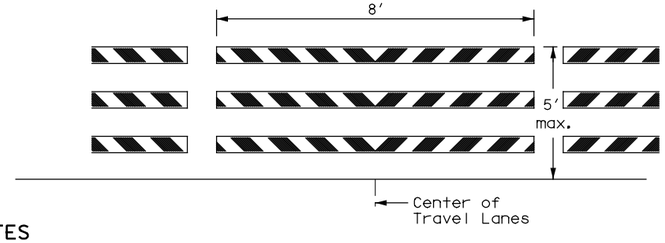
DETAIL 3

TYPICAL APPLICATION OF DEAD END BARRICADE



DETAIL 4

TYPICAL DEAD END BARRICADE INSTALLATION



NOTES

1. Barricade striping shall be red and white reflective sheeting for all permanent road closures.
2. Barricade striping is red and white sloping toward the center of the roadway.
3. Type 3 Barricade Supports should be anchored to soil or pavement as described in compliant Work Zone Traffic Control Devices List, section D.2.f and D.2.g.

DETAIL 5

LEGEND	
	Bidirectional Delineator
	Delineator
	OM-3
	Barricade
	Sign
	OM-2
	Double Delineator

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(4)-20

FILE: dom4-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
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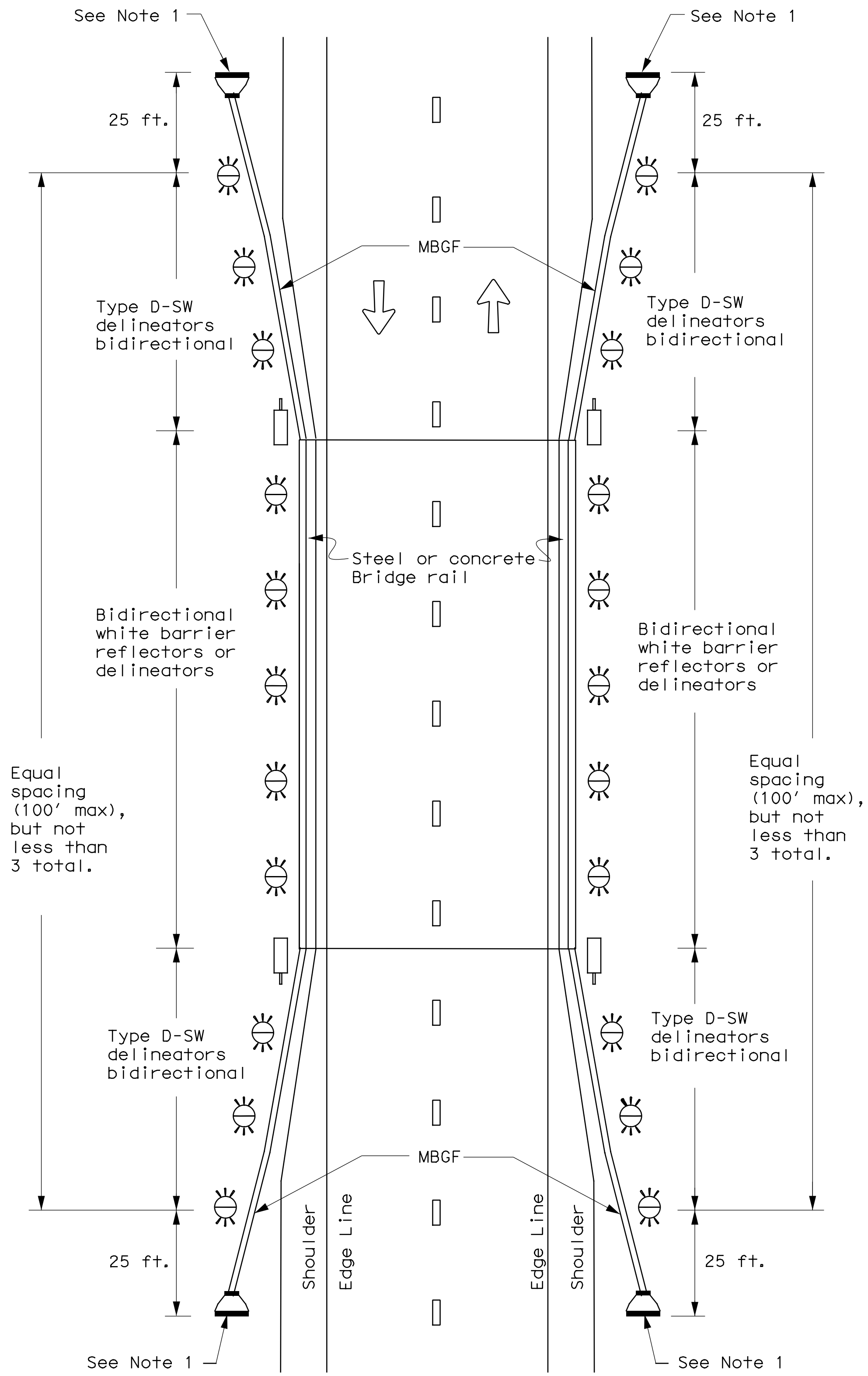
3-15	DIST	COUNTY		SHEET NO.
7-20	WACO	CORYELL		117

DATE: 4/5/2023 3:28:55 PM
FILE: T:\Road Dept\Department\Team Texas\txdot cadd standards\signing & striping\DOM(5)-20.dgn

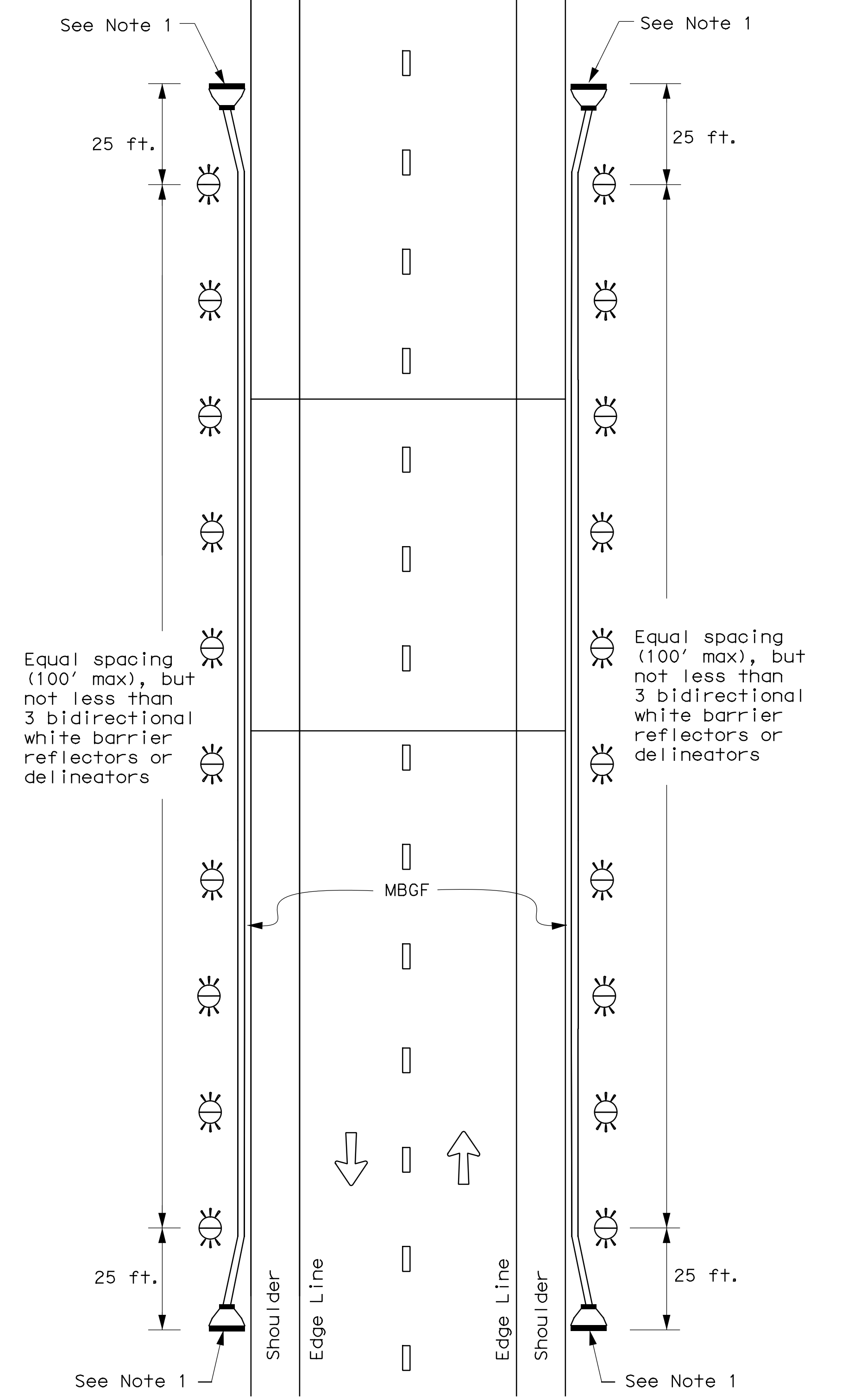
TWO-WAY, TWO LANE ROADWAY WITH REDUCED WIDTH APPROACH RAIL



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.

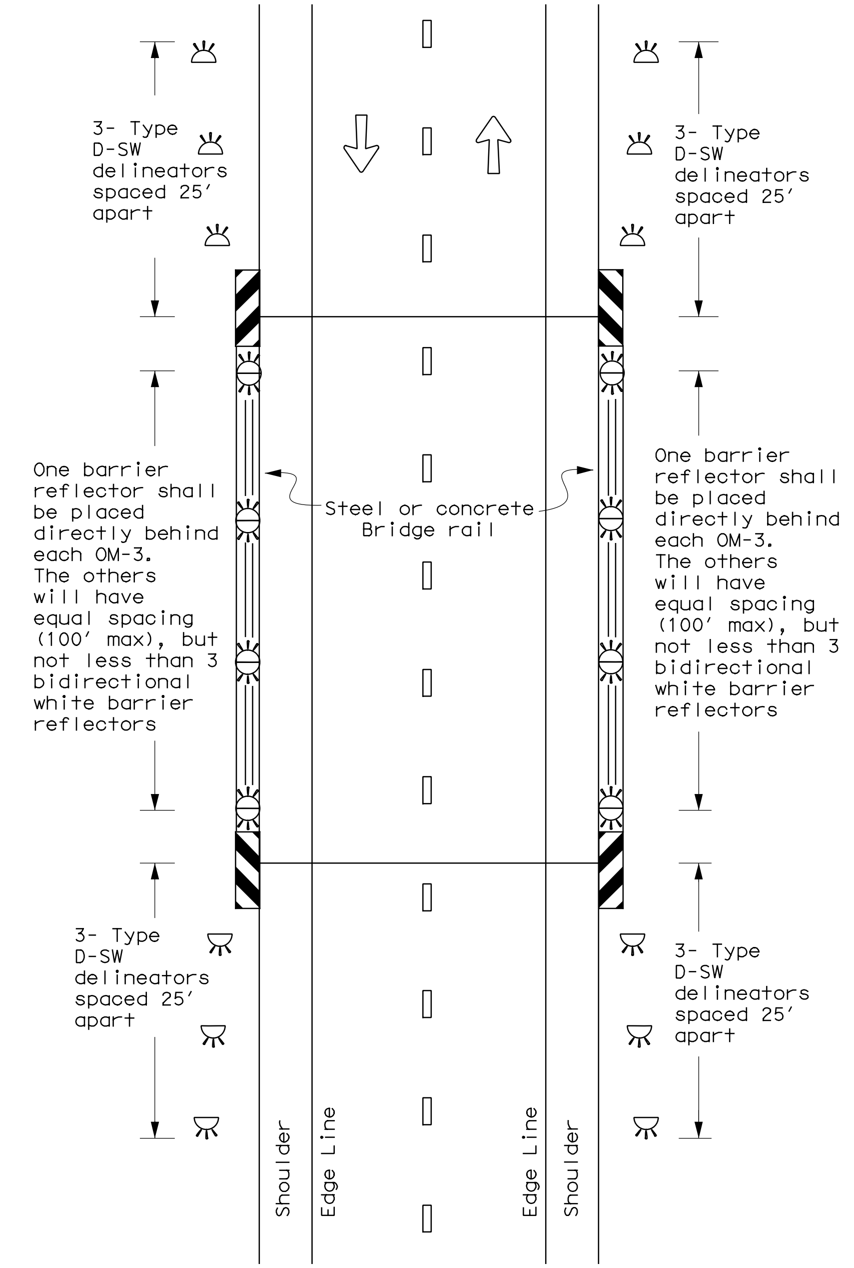
TWO-WAY, TWO LANE ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



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

Symbol	Description
(symbol)	Bidirectional Delineator
(symbol)	Delineator
(symbol)	OM-3
(symbol)	OM-2
(symbol)	Terminal End
(symbol)	Traffic Flow

Texas Department of Transportation

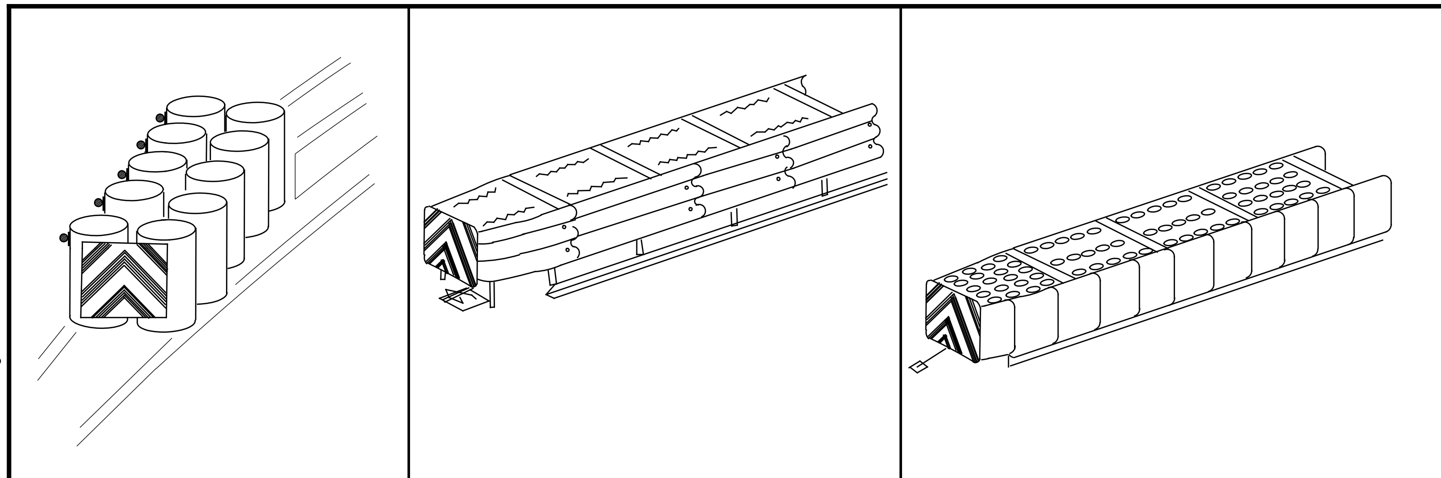
Traffic Safety Division Standard

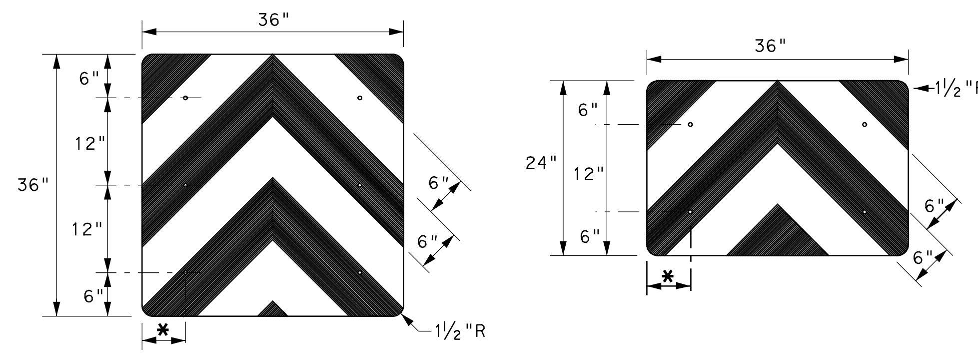
DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(5)-20

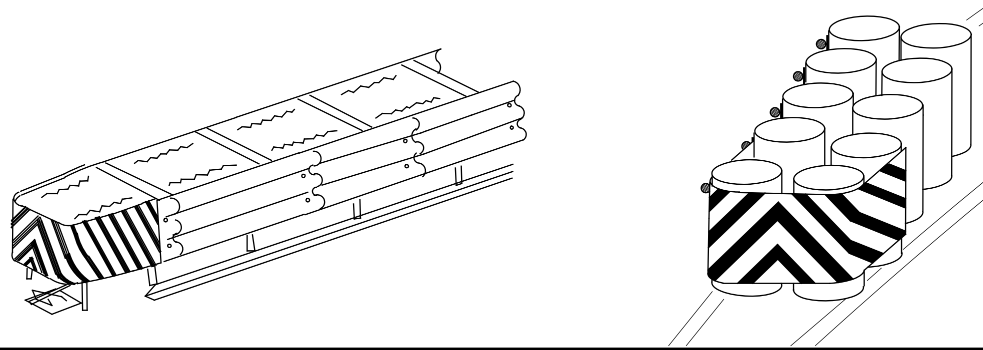
FILE: dom5-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	1219	02	017, ETC.	FM 182
7-20	DIST		COUNTY	SHEET NO.
	WACO		CORYELL	118

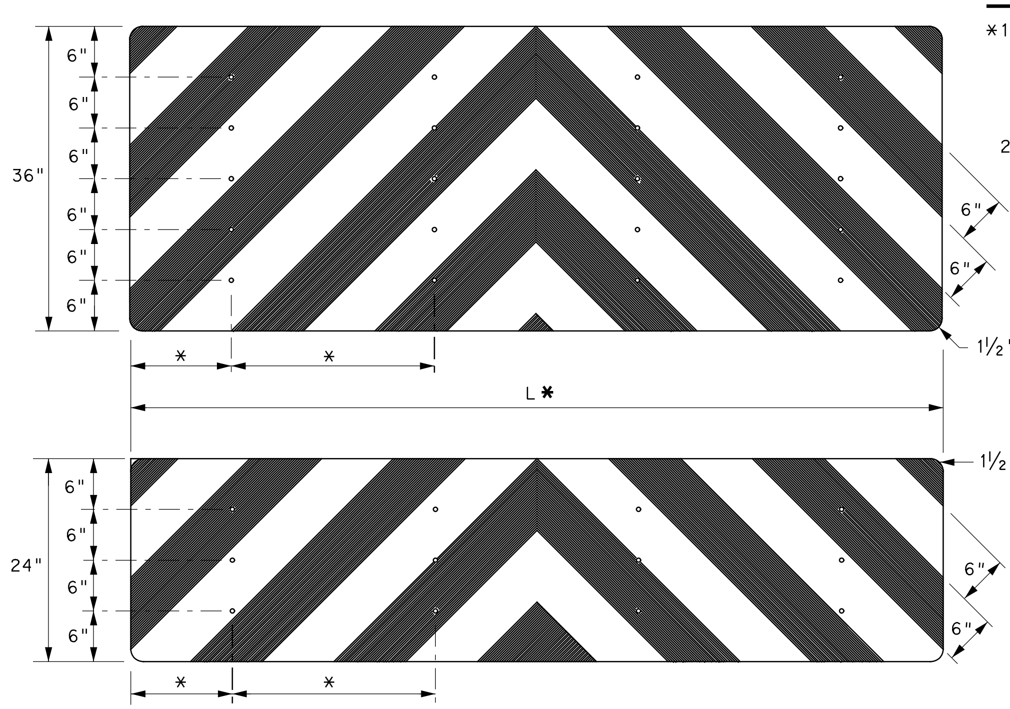
20E





* Adjust to fit attenuator per manufacturer's recommendation, or as directed by the Engineer

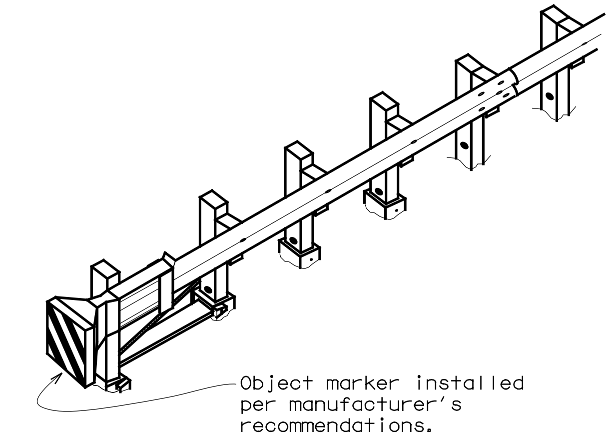


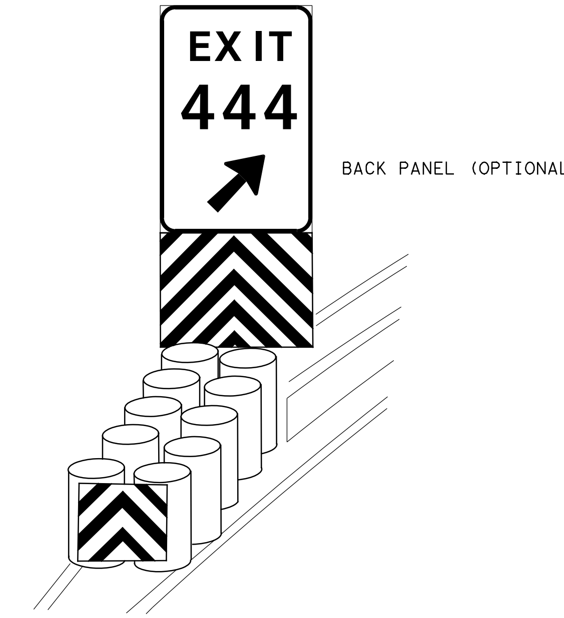


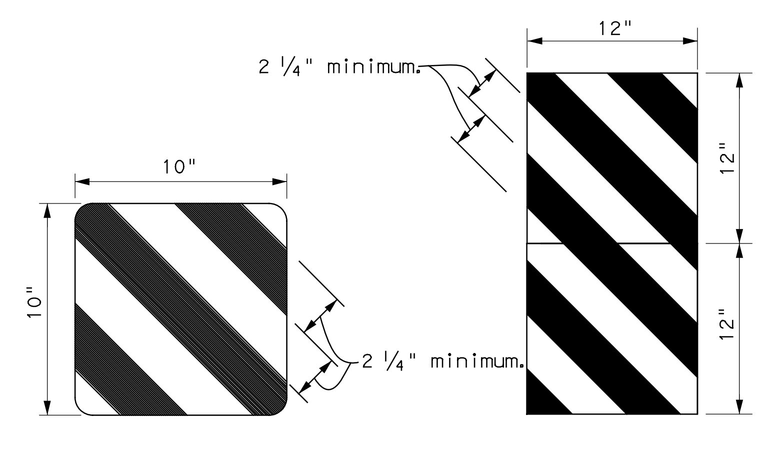
NOTES

*1. Spacing should be adjusted to attach through centerline of drum, per attenuator manufacturers recommendation, or as directed by the Engineer.

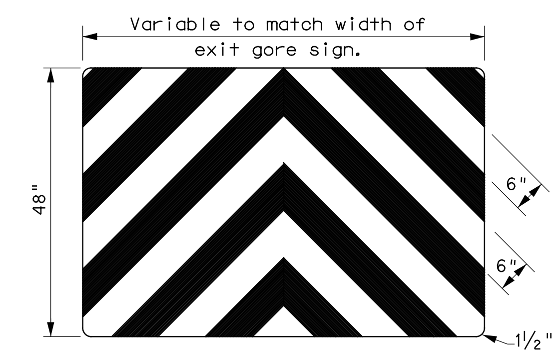
2. Mounting should be flush with top of attenuator. Minimum size 96" x 24".







OBJECT MARKERS SMALLER THAN 3 FT^2



NOTES

1. Object Markers shall conform to the Texas MUTCD and meet the color and reflectivity requirement of Department Material Specification DMS 8300. Background shall be yellow reflective sheeting (Type B or C) and Chevron shall be black.

2. Object Markers may be fabricated from adhesive backed reflective sheeting applied directly to guardrail end treatment, or applied directly to an "end cap" as per the manufacturer's recommendation. Direct applied sheeting shall provide a smooth surface and have no wrinkles, air bubbles, cuts or tears. A radius at the corners is not required for direct applied sheeting.

3. Object Marker size may be reduced to fit smaller devices. Width of alternating black and yellow stripes are typically 6". Object Markers smaller than 3ft may have reduced width stripes of a minimum of 2 ¼".

4. Pop rivets, screws, or nuts and bolts may be used to attach object markers and reflectors. Holes, slots or other openings may be cut or drilled through object markers to allow cable or other attachments.

5. Object Marker at nose of attenuator is subsidiary to the attenuator.

6. See D & OM (1-4) for required barrier reflectors.

Texas Department of Transportation — Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER FOR VEHICLE IMPACT ATTENUATORS

D & OM(VIA)-20

FILE: domvia20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TxDOT December 1989	CONT 1219	SECT 02	JOB 017, ETC.	HIGHWAY FM 182
REVISIONS 4-92 8-04 / 8-95 3-15 / 4-98 7-20	DIST WACO	COUNTY CORYELL		SHEET NO. 119

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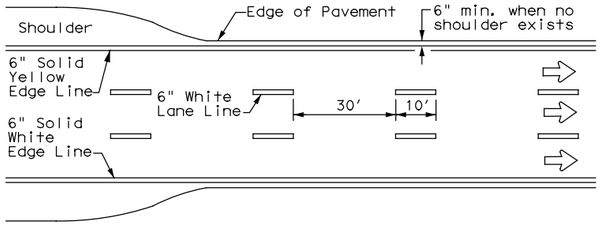
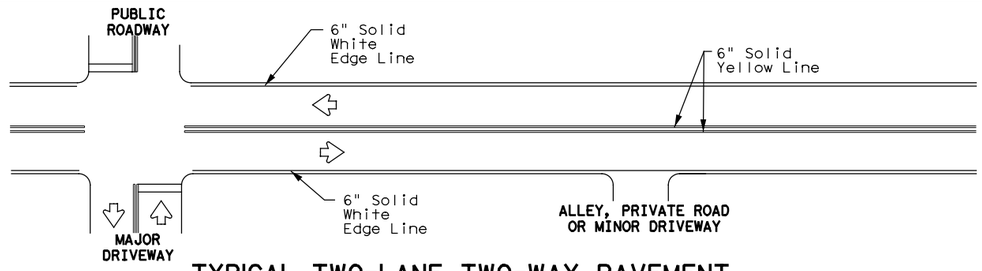
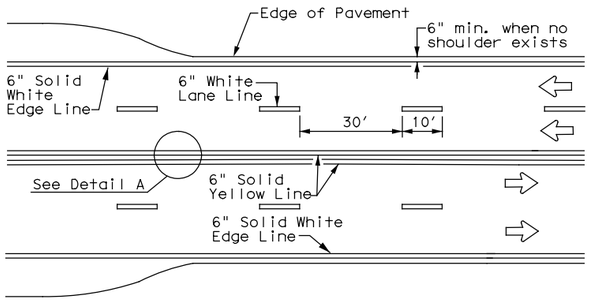
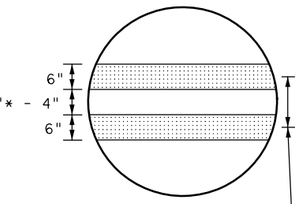


EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS



TYPICAL TWO-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS





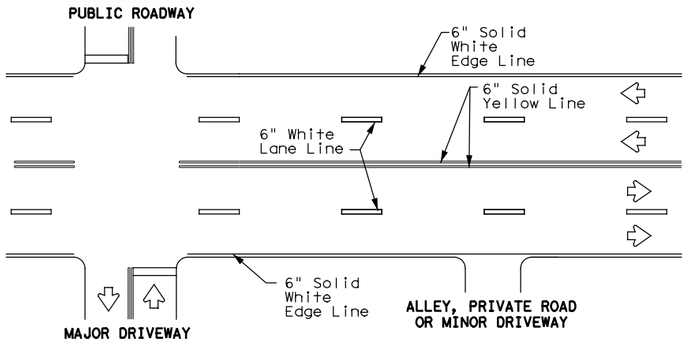
DETAIL "A"

9"** min. - 10" typ.
(18" max. for traveled way greater than 48′ only)

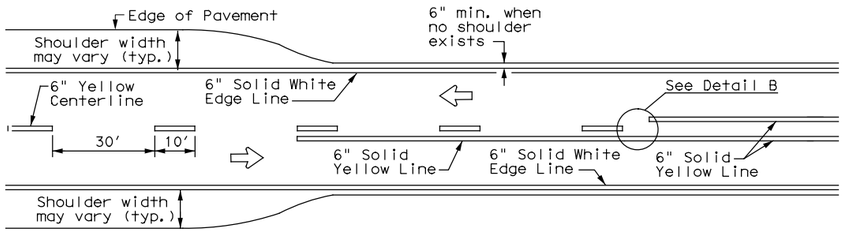
CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS

* 2" minimum for restripe projects when approved by the Engineer.

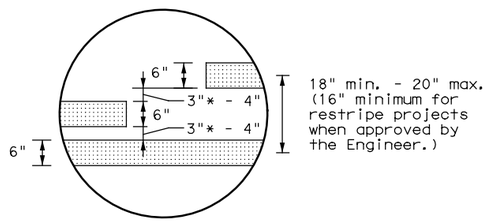
** 8" minimum for restripe projects when approved by the Engineer.



TYPICAL MULTI-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS

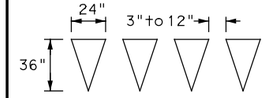


TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



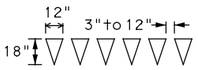
DETAIL "B"

* 2" minimum for restripe projects when approved by the Engineer.

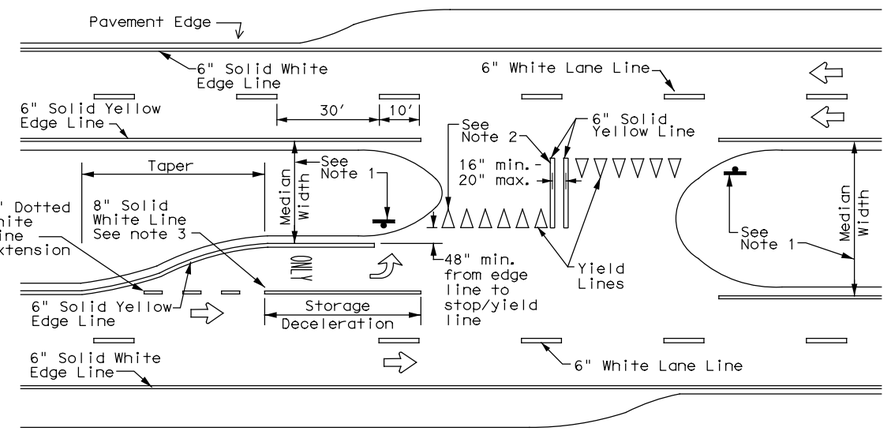


For posted speed on road being marked equal to or greater than 45 MPH.

YIELD LINES



For posted speed on road being marked equal to or less than 40 MPH.



FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

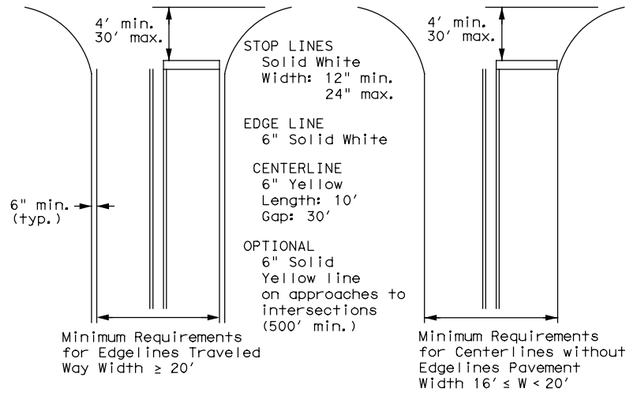
1. Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections. Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling width to determine if signs are required. Yield signs are the typical intersection control. Stop signs and stop bars are optional as determined by the Engineer.
2. Install median striping (double yellow centerlines and stop lines/yield lines) when a 50′ or greater median centerline can be placed. Stop lines shall only be used with stop signs. Yield lines shall only be used with yield signs.
3. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

GENERAL NOTES

1. Edge line striping shall be as shown in the plans or as directed by the Engineer. The edge line should not be placed less than 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edge lines are not required in curb and gutter sections of roadways.
2. The traveled way includes only that portion of the roadway used for vehicular travel. It does not include the parking lanes, sidewalks, berms and shoulders. The traveled ways shall be measured from the center of edge line to the center of edge line of a two lane roadway.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



NOTE: Traveled way is exclusive of shoulder widths. Refer to General Note 2 for additional details.

GUIDE FOR PLACEMENT OF STOP LINES, EDGE LINE & CENTERLINE

Based on Traveled Way and Pavement Widths for Undivided Roadways

Texas Department of Transportation

Traffic Safety Division Standard

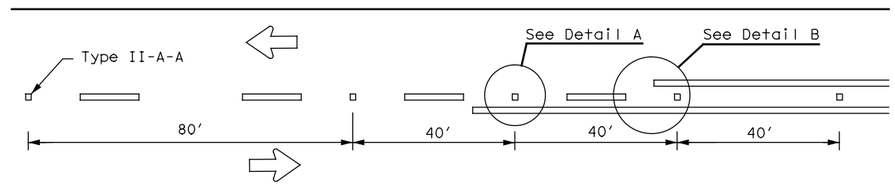
TYPICAL STANDARD PAVEMENT MARKINGS

PM(1)-22

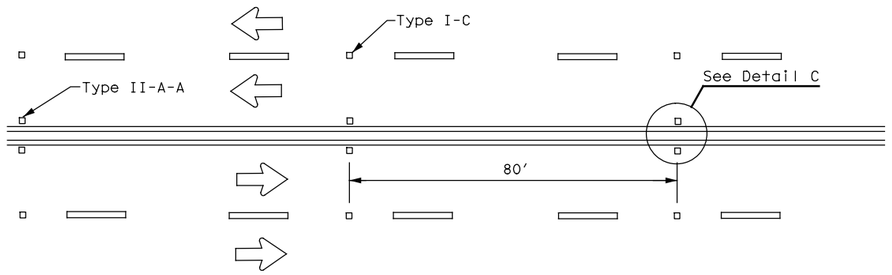
FILE: pm1-22.dgn	DN:	CK:	DW:	CK:
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 11-78 8-00 6-20 8-95 3-03 12-22 5-00 2-12	1219	02	017, ETC.	FM 182
	DIST	COUNTY		SHEET NO.
	WACO	CORYELL		120

22A

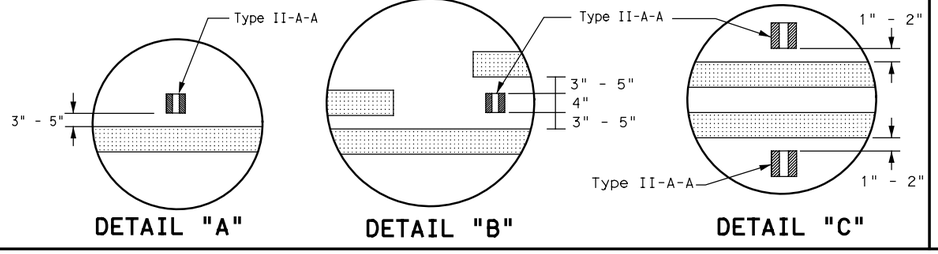
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE

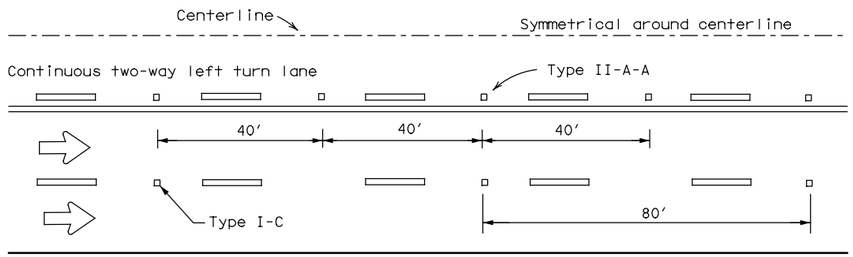


CENTERLINE FOR ALL TWO LANE TWO-WAY ROADWAYS

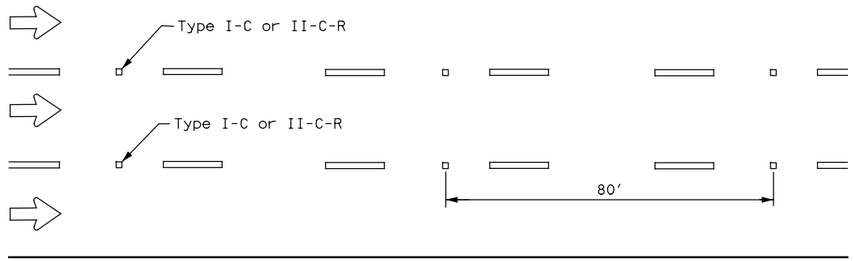


CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY ROADWAYS





CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



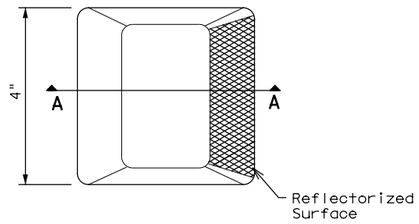
LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.

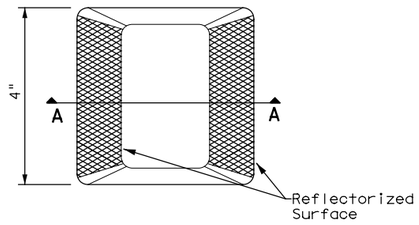
See Note 3.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

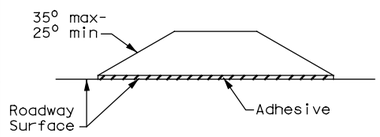
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)

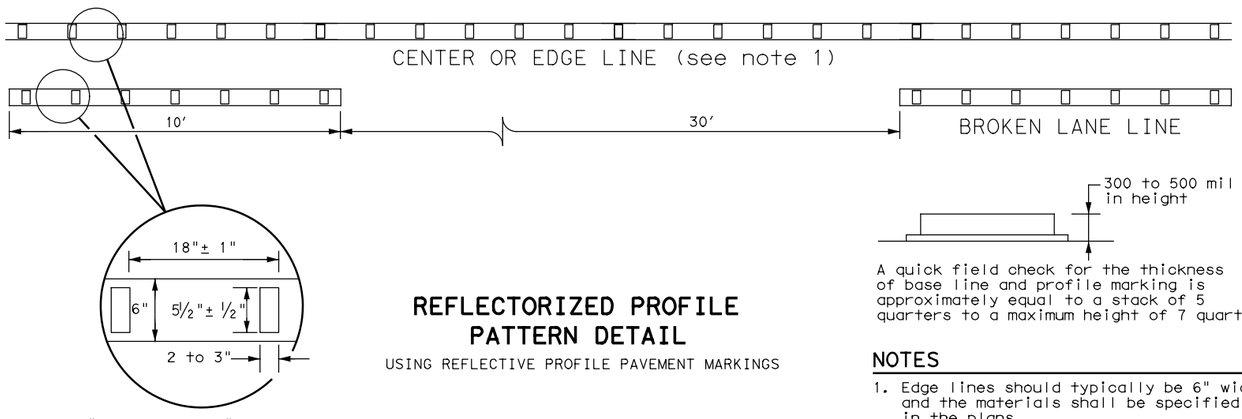


Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS



6" EDGE LINE, 6" CENTERLINE OR 6" LANE LINE

REFLECTORIZED PROFILE PATTERN DETAIL

USING REFLECTIVE PROFILE PAVEMENT MARKINGS

A quick field check for the thickness of base line and profile marking is approximately equal to a stack of 5 quarters to a maximum height of 7 quarters.

NOTES

1. Edge lines should typically be 6" wide and the materials shall be specified in the plans.
2. Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

GENERAL NOTES

1. All raised pavement markers placed along broken lines shall be placed in line with and midway between the stripes.
2. On concrete pavements the raised pavement markers should be placed to one side of the longitudinal joints.
3. Use raised pavement marker Type I-C with undivided roadways, flush medians and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.

Texas Department of Transportation

Traffic Safety Division Standard

POSITION GUIDANCE USING RAISED MARKERS RELECTORIZED PROFILE MARKINGS PM(2)-22

FILE: pm2-22.dgn	DN:	CK:	DW:	CK:
©TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-77 8-00 6-20 4-92 2-10 12-22 5-00 2-12	1219	02	017, ETC.	FM 182
	DIST	COUNTY		SHEET NO.
	WACO	CORYELL		121

22B

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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)

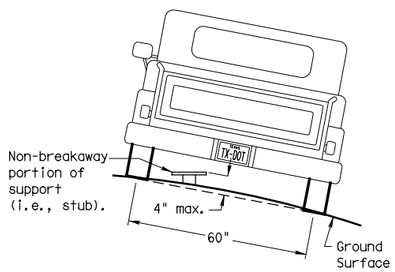
Anchor Type

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))

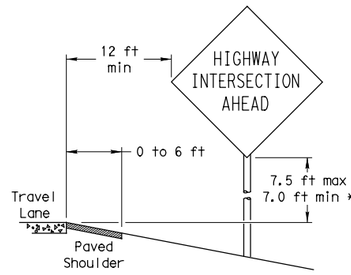
REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



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).

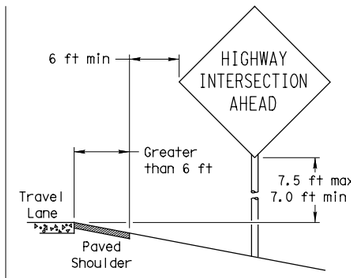
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

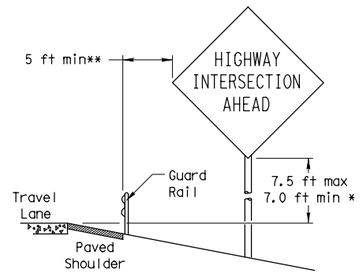
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



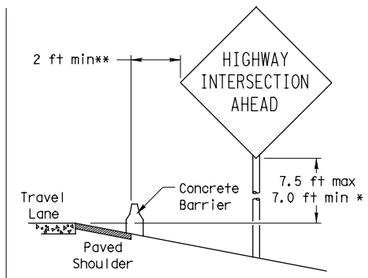
GREATER THAN 6 FT. WIDE

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.

BEHIND BARRIER



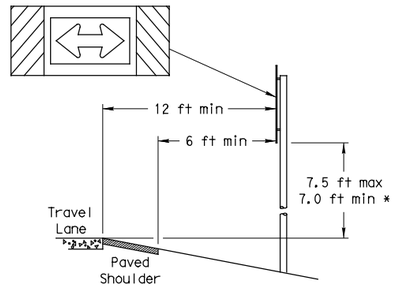
BEHIND GUARDRAIL



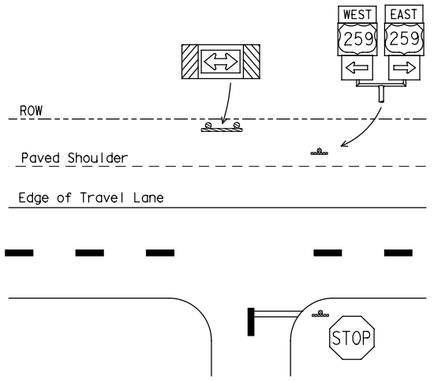
BEHIND CONCRETE BARRIER

**Sign clearance based on distance required for proper guard rail or concrete barrier performance.

T-INTERSECTION



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



* Signs shall be mounted using the following condition that results in the greatest sign elevation:

(1) a minimum of 7 to a maximum of 7.5 feet above the edge of the travel lane or

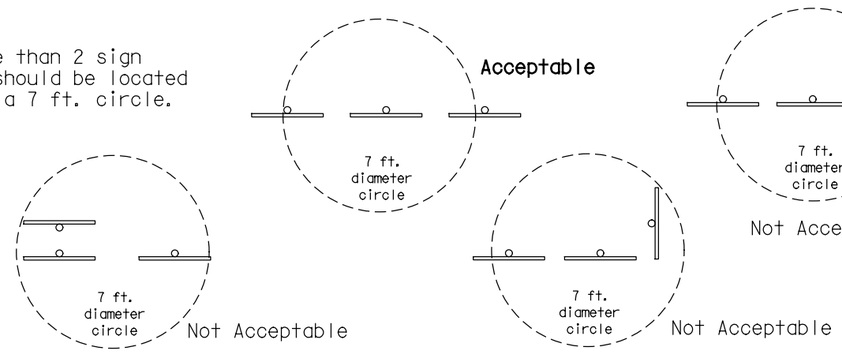
(2) a minimum of 7 to a maximum of 7.5 feet above the grade at the base of the support when sign is installed on the backslope.

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

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

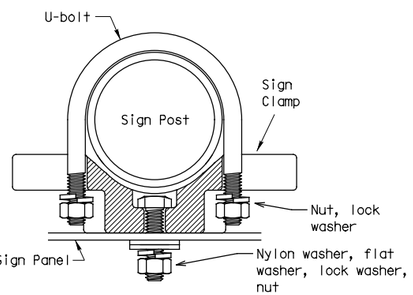
The website address is:
http://www.txdot.gov/publications/traffic.htm

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

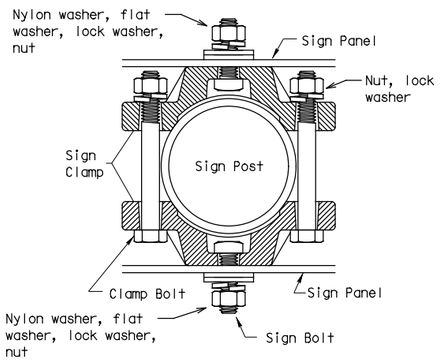


TYPICAL SIGN ATTACHMENT DETAIL

Single Signs



Back-to-Back Signs



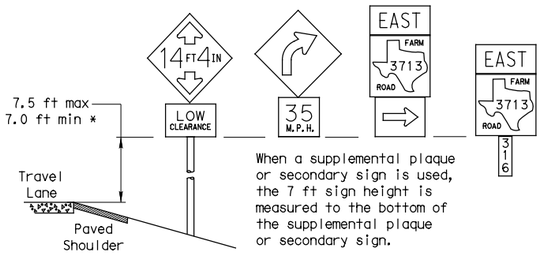
Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

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.

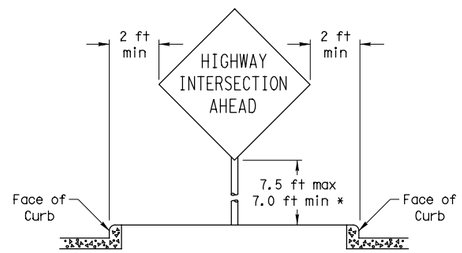
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



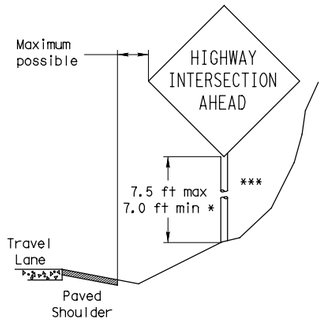
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

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.

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
	1219	02	017, ETC.	FM 182
	DIST	COUNTY		SHEET NO.
	WACO	CORYELL		122

DATE: 4/5/2023 3:28:58 PM
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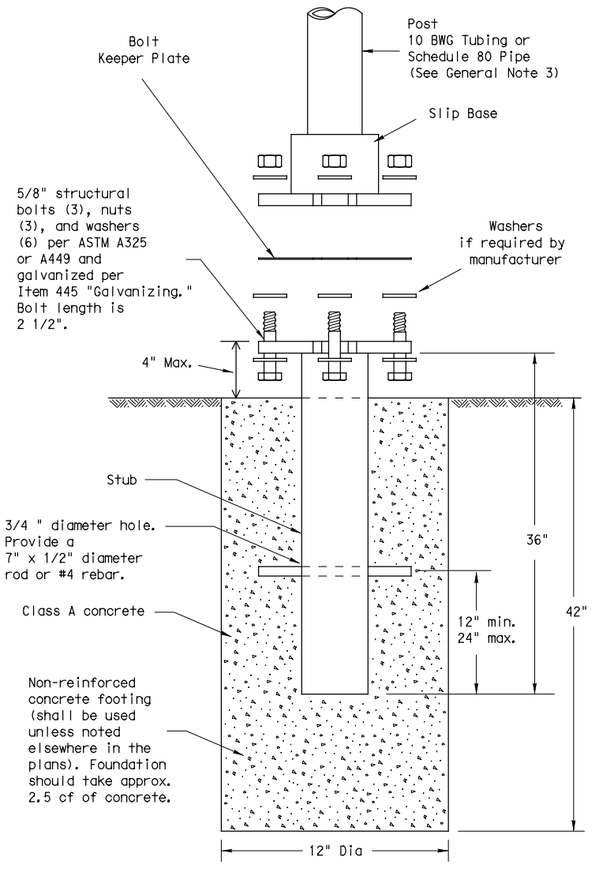
TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS



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

NOTE

There are various devices approved for the Triangular Slipbase System. Please reference the Material Producer List for approved slip base systems. http://www.txdot.gov/business/producer_list.htm The devices shall be installed per manufacturers' recommendations. Installation procedures shall be provided to the Engineer by Contractor.

GENERAL NOTES:

1. Slip base shall be permanently marked to indicate manufacturer. Method, design, and location of marking are subject to approval of the TxDOT Traffic Standards Engineer.
2. Material used as post with this system shall conform to the following specifications:
   10 BWG Tubing (2.875" outside diameter)
   - 0.134" nominal wall thickness
   - Seamless or electric-resistance welded steel tubing or pipe
   - Steel shall be HSLAS Gr 55 per ASTM A1011 or ASTM A1008
   - Other steels may be used if they meet the following:
     - 55,000 PSI minimum yield strength
     - 70,000 PSI minimum tensile strength
     - 20% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of 0.122" to 0.138"
   - Outside diameter (uncoated) shall be within the range of 2.867" to 2.883"
   - Galvanization per ASTM A123 or ASTM A653 G210. For precoated steel tubing (ASTM A653), recoat tube outside diameter weld seam by metallizing with zinc wire per ASTM B833.

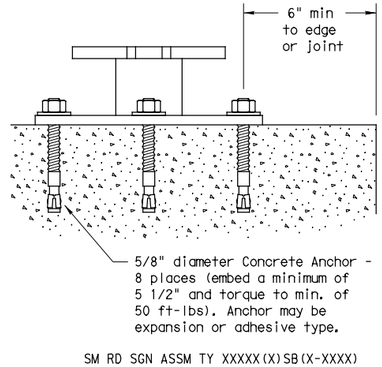
   Schedule 80 Pipe (2.875" outside diameter)
   - 0.276" nominal wall thickness
   - Steel tubing per ASTM A500 Gr C
   - Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the following:
     - 46,000 PSI minimum yield strength
     - 62,000 PSI minimum tensile strength
     - 21% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of 0.248" to 0.304"
   - Outside diameter (uncoated) shall be within the range of 2.855" to 2.895"
   - Galvanization per ASTM A123
3. See the Traffic Operations Division website for detailed drawings of sign clamps and Texas Universal Triangular Slipbase System components. The website address is: http://www.txdot.gov/publications/traffic.htm
4. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.

ASSEMBLY PROCEDURE

Foundation
1. Prepare 12-inch diameter by 42-inch deep hole. If solid rock is encountered, the depth of the foundation may be reduced such that it is embedded a minimum of 18 inches into the solid rock.
2. The Engineer may permit batches of concrete less than 2 cubic yards to be mixed with a portable, motor-driven concrete mixer. For small placements less than 0.5 cubic yards, hand mixing in a suitable container may be allowed by Engineer. Concrete shall be Class A.
3. Push the pipe end of the slip base stub into the center of the concrete. Rotate the stub back and forth while pushing it down into the concrete to assure good contact between the concrete and stub. Continue to work the stub into the concrete until it is between 2 to 4 inches above the ground.
4. Plumb the stub. Allow a minimum of 4 days to set, unless otherwise directed by the Engineer.
5. The triangular slipbase system is multidirectional and is designed to release when struck from any direction.

Support
1. Cut support so that the bottom of the sign will be 7 to 7.5 feet above the edge of the travelway (i.e., edge of the closest lane) when slip plate is below the edge of pavement or 7 to 7.5 feet above slip plate when the slip plate is above the edge of the travelway. The cut shall be plumb and straight.
2. Attach sign to support using connections shown. When multiple signs are installed on the same support, ensure the minimum clearance between each sign is maintained. See SMD(SLIP-2) for clearances based on sign types.

CONCRETE ANCHOR



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

Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. Heavy hex nut per ASTM A563, and hardened washer per ASTM F436. The stud bolt shall have a minimum yield and ultimate tensile strength of 50 and 75 KSI, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Adhesive type anchors shall have stud bolts installed with Type III epoxy per DMS-6100, "Epoxies and Adhesives." Adhesive anchors may be loaded after adequate epoxy cure time per the manufacturer's recommendations. Top of bolt shall extend at least flush with top of the nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 5 1/2" minimum embedment, shall have a minimum allowable tension and shear of 3900 and 3100 psi, respectively.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-1)-08

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

REVISIONS
9-08

CONT	SECT	JOB	HIGHWAY
1219	02	017, ETC.	FM 182

DIST	COUNTY	SHEET NO.
WACO	CORYELL	123

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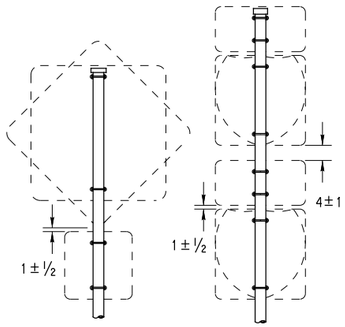
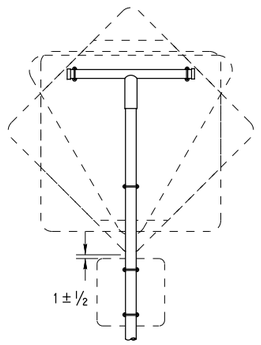


SM RD SGN ASSM TY XXXXX(1)XX(P)



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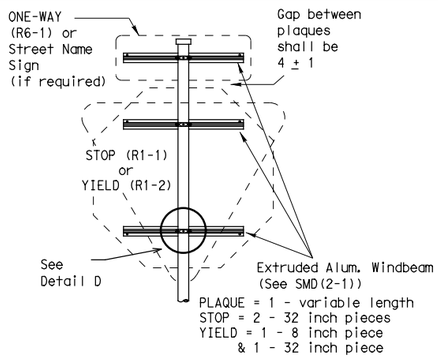

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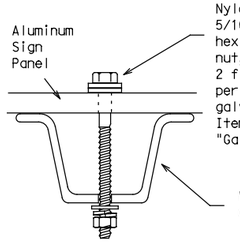
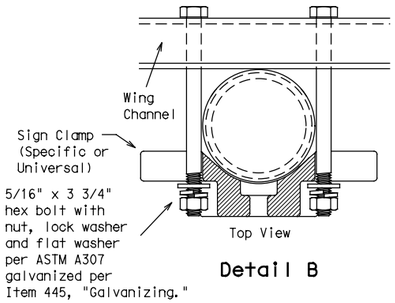
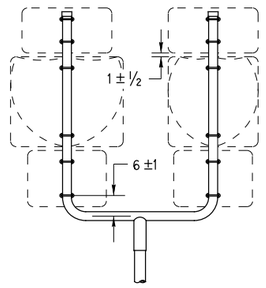


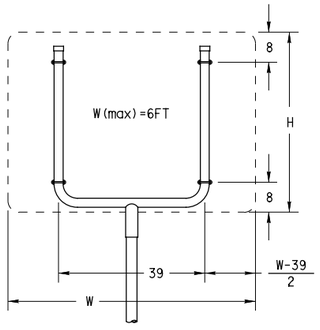
Detail A



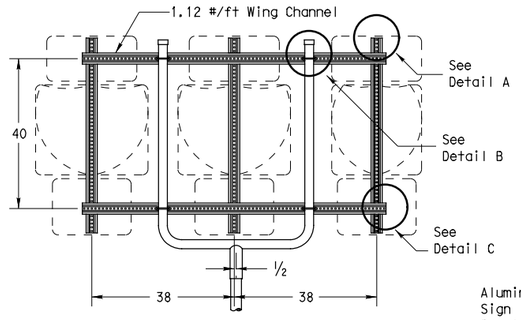
Detail B



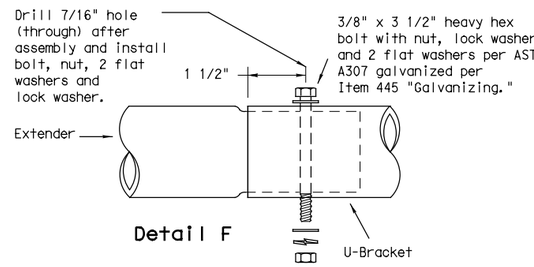
SM RD SGN ASSM TY XXXXX(1)XX(U)



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

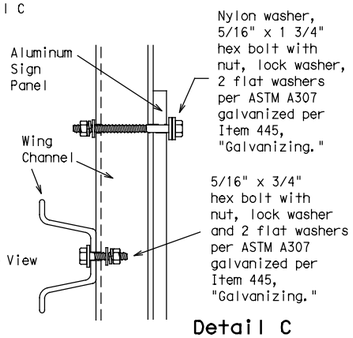


SM RD SGN ASSM TY XXXXX(1)XX(U-WC)
(See Note 11)

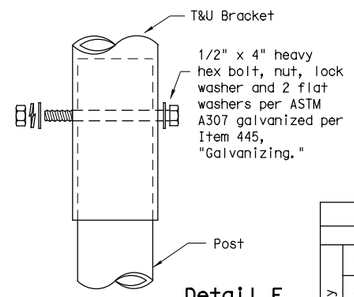


Detail F

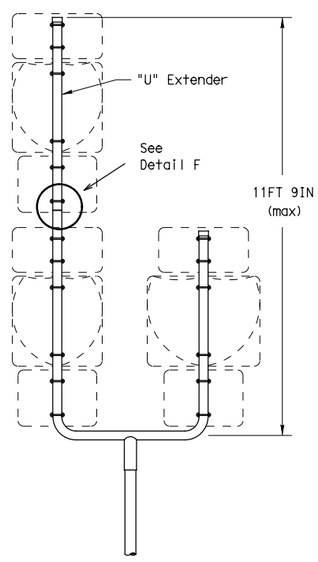
Splices shall only be allowed behind the sign substrate.



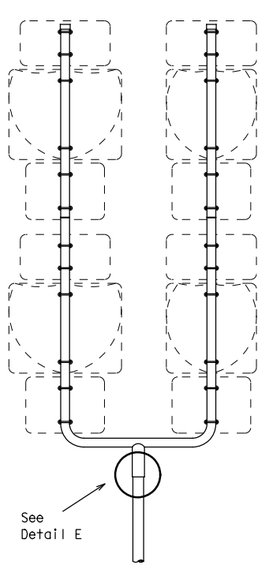
Detail C



Detail E



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



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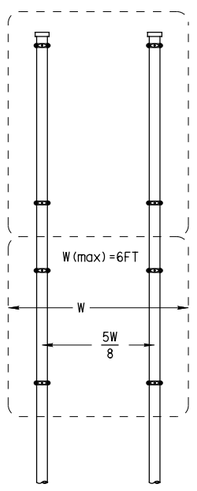
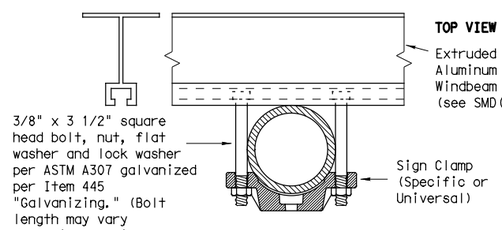
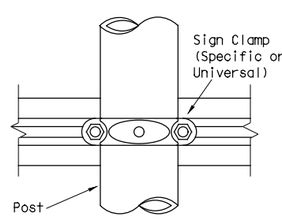


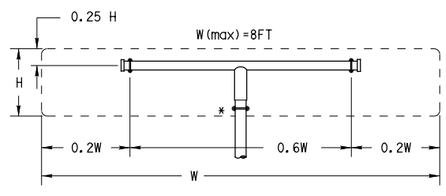
SM RD SGN ASSYM TY XXXXX(2)XX(P)

SIDE VIEW





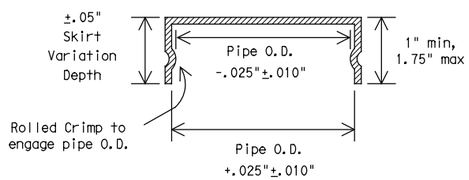
Detail D



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

All dimensions are in english unless detailed otherwise.

FRICTION CAP DETAIL



Friction caps may be manufactured from hot rolled or cold rolled steel sheets. The minimum sheet metal thickness shall be 24 gauge for all cap sizes.

The rim edges shall be reasonably straight and smooth. Caps shall be sized and formed in such a manner as to produce a drive-on friction fit and have no tendency to rock when seated on the pipe. The depth shall be sufficient to give positive protection against entrance of rainwater. They shall be free of sharp creases or indentations and show no evidence of metal fracture.

Caps shall have an electrodeposited coating of zinc in accordance with the requirements of ASTM B633 Class FE/ZN 8.

GENERAL NOTES:

1.

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Additional route markers may be added vertically, provided the total sign area does not exceed the maximum allowable amount per Note 1.
11. Additional sign clamp required on the "T-bracket" post for 24 inch height signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.
13. Sign blanks shall be the sizes and shapes shown on the plans.

REQUIRED SUPPORT

	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-2)-08

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

CONT	SECT	JOB	HIGHWAY
1219	02	017, ETC.	FM 182

DIST	COUNTY	SHEET NO.
WACO	CORYELL	124

9-08 REVISIONS

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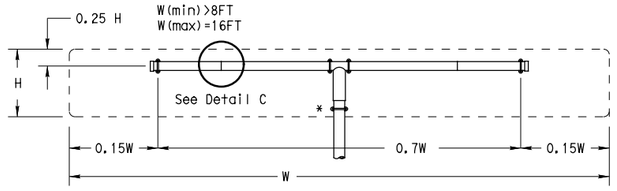
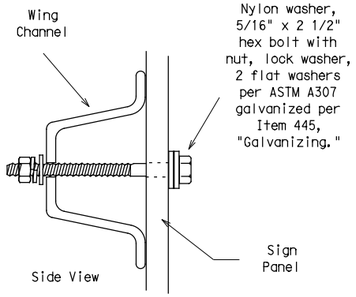
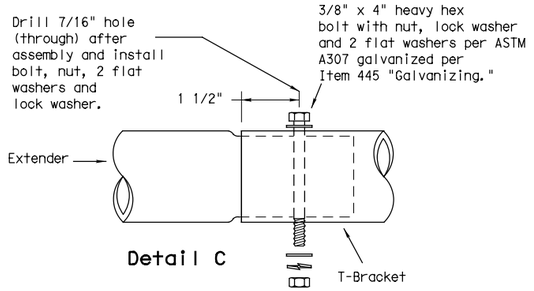


SM RD SGN ASSM TY XXXXX(1)XX(T-2EXT)
(* - See Note 12)



Detail B



Detail C

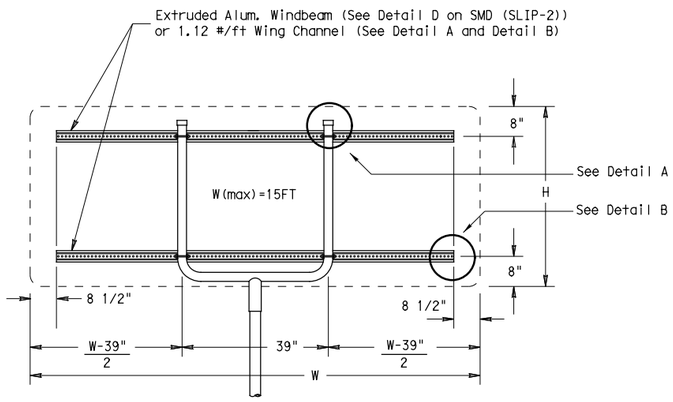
Splices shall only be allowed behind the sign substrate.

GENERAL NOTES:

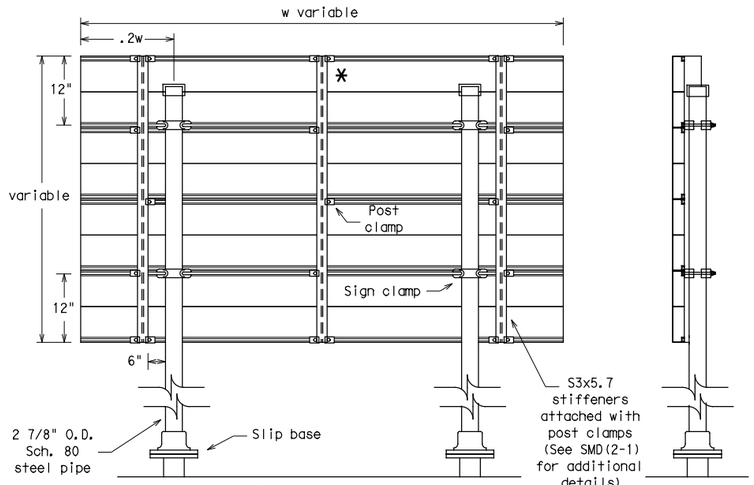
1.

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. Sign blanks shall be the sizes and shapes shown on the plans.
11. Additional sign clamp required on the "T-bracket" post for 24 inch high signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.



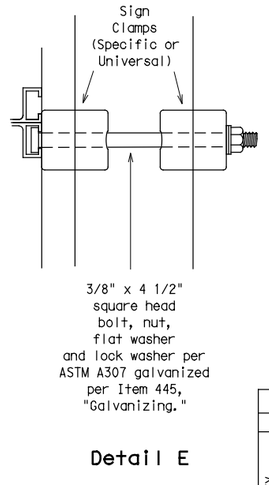
SM RD SGN ASSM TY XXXXX(1)XX(U-XX)



Typical Sign Mount

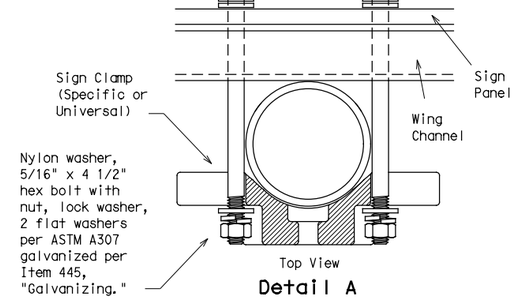
SM RD SGN ASSM TY S80(2)XX(P-EXAL)

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

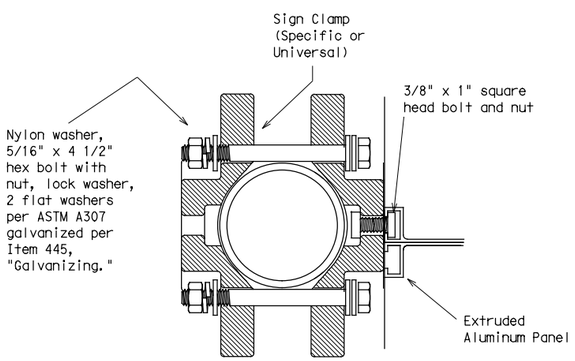


Detail E

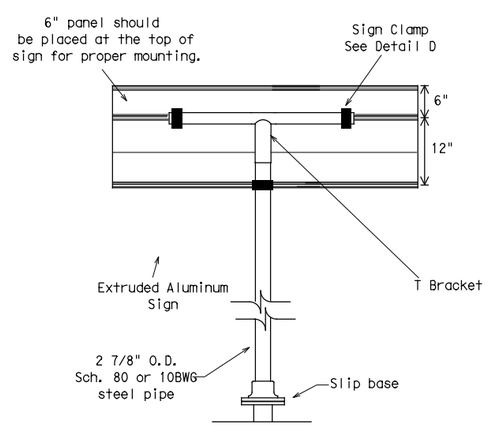
See Detail E for clamp installation



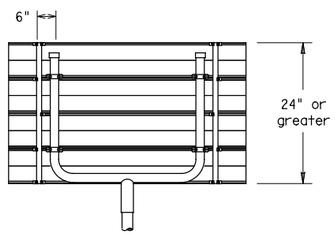
Detail A



Detail D
EXTRUDED ALUMINUM SIGN WITH T BRACKET



Extruded Aluminum Sign
With T Bracket



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

See Detail E
for clamp installation

REQUIRED SUPPORT		
	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-3)-08

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

REVISIONS
9-08

CONT	SECT	JOB	HIGHWAY
1219	02	017, ETC.	FM 182
DIST	COUNTY		SHEET NO.
WACO	CORYELL		125

DATE: 4/5/2023 3:29:00 PM
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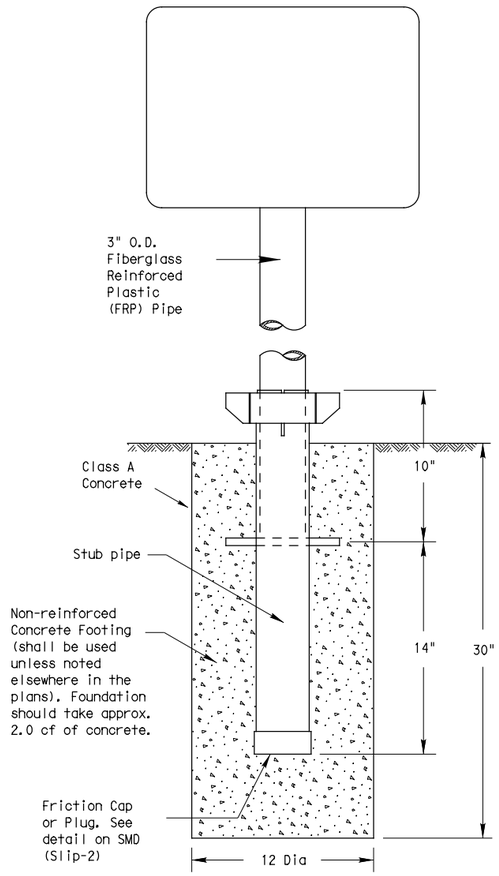
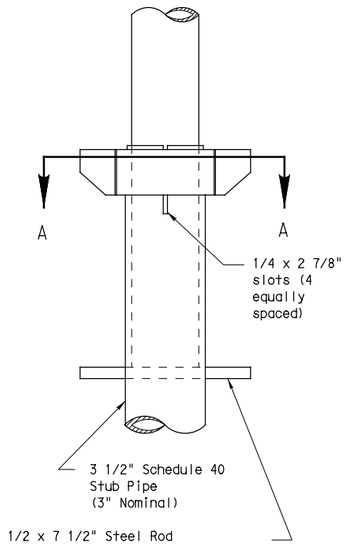
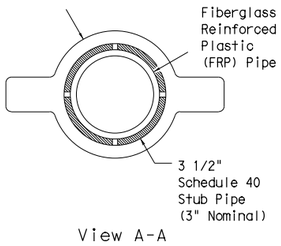
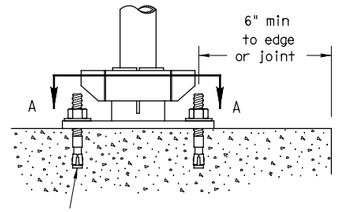
Universal Anchor System with Fiberglass Reinforced Plastic (FRP) Post





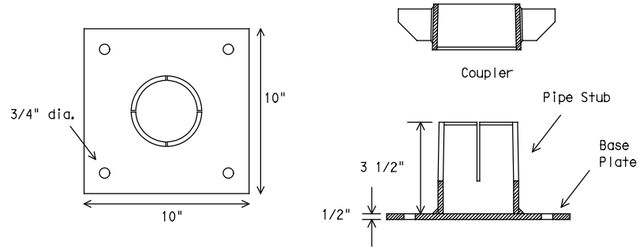


SM RD SGN ASSM TY FRP(X)UA(P)



Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. A heavy hex nut per ASTM A563 and hardened washer per ASTM F436. The stud bolt shall have minimum yield and ultimate tensile strengths of 50 and 75 ksi, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Top of bolt shall extend at least flush with top of nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 3 3/8" minimum embedment, shall have a minimum allowable tension and shear of 2450 and 1525 psi, respectively. Adhesive type anchors shall have stud bolts installed with Type III epoxy per DMS-6100, "Epoxies and Adhesives." Adhesive anchors may be loaded after adequate epoxy cure time per the manufacturer's recommendations.

BOLT-DOWN DETAILS



SM RD SGN ASSM TY FRP(X)UB(P)

GENERAL NOTES:

1. FRP sign supports for a single type sign support may be used for signs up to and including 16 square feet. Dual post installation may be used for signs up to and including 32 square feet.
2. All nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing."
3. See the Traffic Operations Division website for detailed drawings of sign clamps. The website address is: http://www.txdot.gov/publications/traffic.htm

FRP POST REQUIREMENTS

1. Materials shall conform to the requirements of Departmental Material Specification DMS-4410 and will be furnished in a yellow or gray color as specified elsewhere in the plans.
2. Thickness of FRP sign support is 0.125" + 0.031", - 0.0".
3. FRP sign supports are prequalified by the Traffic Operations Division. Prequalification procedures are obtained by writing:
   Texas Department of Transportation
   Traffic Operations Division
   125 East 11th Street
   Austin, Texas 78701-2483

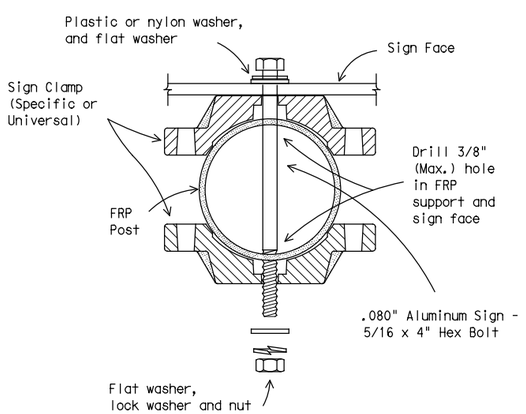
UNIVERSAL ANCHOR SYSTEM INSTALLATION PROCEDURES

1. Dig foundation hole. Where solid rock is encountered at ground level, the foundation shall be a minimum depth of 18". When solid rock is encountered below ground level, the foundation shall extend in the solid rock a minimum depth of 18" or provide a minimum foundation depth of 30". If solid rock is encountered, the socket/stub may be reduced in length as required to a minimum length of 18". Any material removed from the socket/stub shall be from the bottom and the clearance requirements given on SMD(GEN) must be followed. The inner surfaces of the socket/stub must remain free of concrete or other debris.
2. The Engineer may permit batches of concrete less than 2 cubic yards to be mixed with a portable, motor driven concrete mixer. For small placements less than 0.5 cubic yards, hand mixing in a suitable container may be allowed by Engineer. Concrete shall be Class A.
3. Insert base post in foundation hole to depths shown and fill hole with concrete. Cut base post from bottom and ensure a minimum of 18" embedment if installed in solid rock.
4. Level and plumb the base post with coupler using a torpedo level and let concrete set a minimum of 4 days, unless otherwise directed by Engineer. Bottom of base post slots shall be above the concrete footing.
5. Attach sign to FRP post.
6. Insert sign post into base post. Lower until the post comes to rest on the steel rod.
7. Use hammer to ensure the coupler is firmly seated. Top of coupler should be level with top of base post in most instances.
8. Check sign to ensure there is no twist. If loose, increase the tightening of coupler.

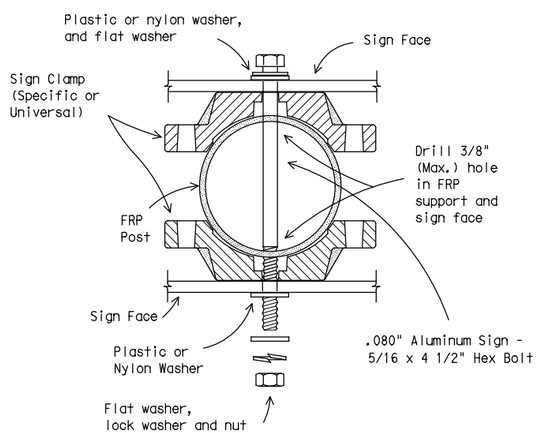
BOLT DOWN SIGN SUPPORT

1. Position base plate with coupler on existing concrete.
2. Drill holes into concrete and insert the 5/8" diameter bolts with wedge anchors, and tighten nuts.
3. Attach sign to FRP post.
4. Insert bottom of sign post into pipe stub.
5. Use hammer to ensure the coupler is firmly seated. Top of coupler should be level with top of base post in most instances.
6. Check sign to ensure there is no twist. If loose, increase the tightening of coupler.

Typical Sign Mounting Detail for FRP Support with Single Sign



Typical Sign Mounting Detail for FRP Support with Back-to-Back Signs



Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS UNIVERSAL ANCHOR SYSTEM WITH FRP POST

SMD(FRP)-08

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

REVISIONS
9-08

CONT	SECT	JOB	HIGHWAY
1219	02	017, ETC.	FM 182

DIST	COUNTY	SHEET NO.
WACO	CORYELL	126

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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.

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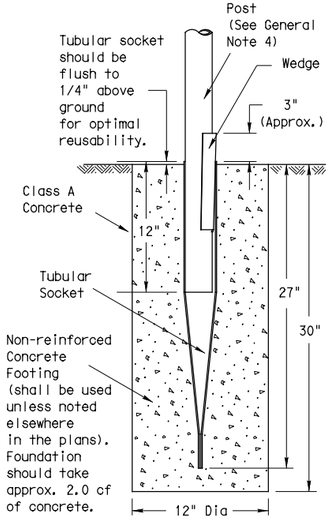
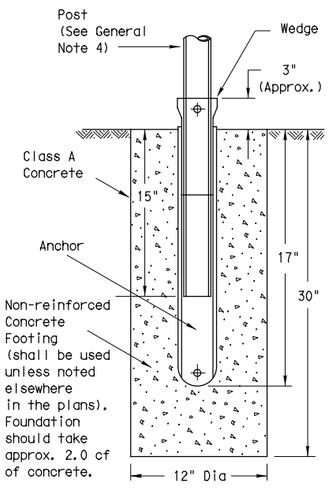
Wedge Anchor Steel System



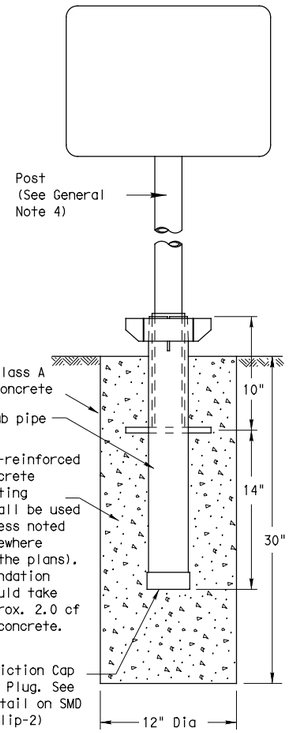
SM RD SGN ASSM TY TWT(X)WS(X)

Wedge Anchor High Density Polyethylene (HDPE) System



SMD RD SGN ASSM TY TWT(X)WP(X)

Universal Anchor System with Thin-Walled Tubing Post



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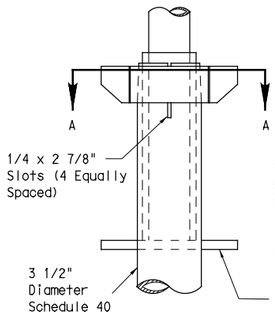
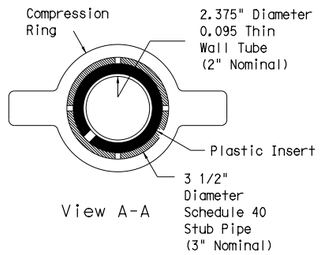
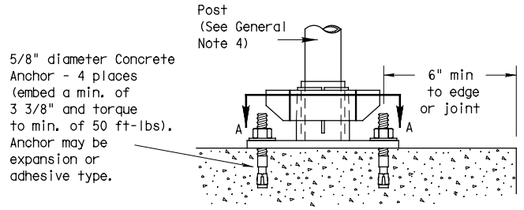


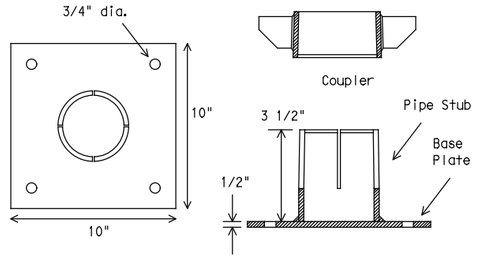


View A-A

Plastic insert must be used when using the TWT with either the Universal Anchor System or the Bolt Down Universal Anchor System. The insert should be approx. 10" long and cover the tubing from just above the top of the stub pipe to the bottom of the sign post when using the Universal Anchor System. The insert should be cut to approx. 4 1/2" when used with the Bolt Down Universal Anchor System.

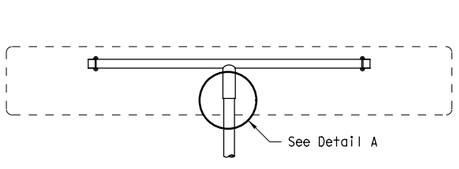


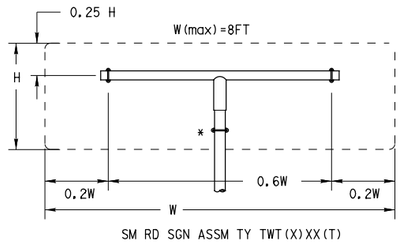
Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. A heavy hex nut per ASTM A563 and hardened washer per ASTM F436. The stud bolt shall have minimum yield and ultimate tensile strengths of 50 and 75 ksi, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Top of bolt shall extend at least flush with top of nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 3 3/8" minimum embedment, shall have a minimum allowable tension and shear of 2450 and 1525 psi, respectively. Adhesive type anchors shall have stud bolts installed with Type III epoxy per DMS-6100, "Epoxies and Adhesives." Adhesive anchors may be loaded after adequate epoxy cure time per the manufacturer's recommendations.



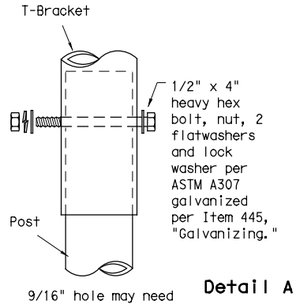
SM RD SGN ASSM TY TWT(X)UB(P)

Sign Installation Using a Prefabricated T-Bracket for Thin-Wall Tubing Post





SM RD SGN ASSM TY TWT(X)XX(T)
(* - See General Note 6)



Detail A

9/16" hole may need to be drilled through post to accommodate bolt.

NOTE

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

GENERAL NOTES:

1. The Wedge Anchor System and the Universal Anchor System with thin wall tubing post may be used to support up to 10 square feet of sign area.
2. The tubular socket, wedge and prefabricated T-bracket shall be permanently marked to indicate manufacturer. Method, design, and location of marking are subject to the approval of the TxDOT Traffic Standards Engineer.
3. Except for posts (13 BWG Tubing), clamps, nuts and bolts, all components shall be prequalified. A list of prequalified vendors may be obtained from the Material Producer List web page. The website address is: http://www.txdot.gov/business/producer list.htm
4. Material used as post with this system shall conform to the following specifications:
   13 BWG Tubing (2.375" outside diameter) (TWT)
   0.095" nominal wall thickness
   Seamless or electric-resistance welded steel tubing
   Steel shall be HSLAS Gr 55 per ASTM A1011 or ASTM A1008
   Other steels may be used if they meet the following:
   55,000 PSI minimum yield strength
   70,000 PSI minimum tensile strength
   18% minimum elongation in 2"
   Wall thickness (uncoated) shall be within the range of .083" to .099"
   Outside diameter (uncoated) shall be within the range of 2.369" to 2.381"
   Galvanization per ASTM 123 or ASTM A653 G210. For precoated steel tubing (ASTM A653), recoat tube outside diameter weld seam by metallizing with zinc wire per ASTM B833.
5. Sign blanks shall be the sizes and shapes shown on the plans.
6. Additional sign clamp required on the "T-bracket" post for 24" high signs. Place clamp at least 3" above bottom of sign when possible.
7. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
8. See the Traffic Operations Division website for detailed drawings of sign clamps and Wedge Anchor System components. The website address is: http://www.txdot.gov/publications/traffic.htm

WEDGE ANCHOR SYSTEM INSTALLATION PROCEDURE

1. Dig foundation hole. Where solid rock is encountered at ground level, the foundation shall be a minimum depth of 18". When solid rock is encountered below ground level, the foundation shall extend in the solid rock a minimum depth of 18" or provide a minimum foundation depth of 30". If solid rock is encountered, the socket/stub may be reduced in length as required to a minimum length of 18". Any material removed from the socket/stub shall be from the bottom and the clearance requirements given on SMD(GEN) must be followed. The inner surfaces of the socket/stub must remain free of concrete or other debris.
2. The Engineer may permit batches of concrete less than 2 cubic yards to be mixed with a portable, motor driven concrete mixer. For small placements less than 0.5 cubic yards, hand mixing in a suitable container may be allowed by Engineer. Place concrete into hole until it is approximately flush with the ground. Concrete shall be Class A.
3. Insert tubular socket into concrete until top of socket is approximaely 1/4 " above the concrete footing.
4. Plumb the socket. Allow a minimum 4 days for concrete to set, unless otherwise directed by Engineer..
5. Attach the sign to the sign post.
6. Insert the sign post into socket and align sign face with roadway.
7. Drive the wedge into the socket to secure post. This will leave approximately 3 inches of the wedge exposed.

UNIVERSAL ANCHOR SYSTEM INSTALLATION PROCEDURE

1. Dig foundation hole. Where solid rock is encountered at ground level, the foundation shall be a minimum depth of 18". When solid rock is encountered below ground level, the foundation shall extend in the solid rock a minimum depth of 18" or provide a minimum foundation depth of 30". If solid rock is encountered, the socket/stub may be reduced in length as required to a minimum length of 18". Any material removed from the socket/stub shall be from the bottom and the clearance requirements given on SMD(GEN) must be followed. The inner surfaces of the socket/stub must remain free of concrete or other debris.
2. Insert base post in hole to depths shown and backfill hole with concrete.
3. Level and plumb the base post using a torpedo level and allow concrete adequate time to set. The bottom of the slots provided in the stub pipe shall remain above the top of the concrete foundation.
4. Attach the sign to the sign post.
5. Install plastic insert around bottom of post.
6. Insert sign post into base post. Lower until the post comes to rest on steel rod.
7. Seat compression ring using a hammer. Typically, the top of compression ring will be approximately level with top of stub post when optimally installed.
8. Check sign post by hand to ensure it is unable to turn. If loose, increase the tightening of the compression ring.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS WEDGE & UNIVERSAL ANCHOR WITH THIN WALL TUBING POST

SMD(TWT)-08

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

REVISIONS	CONT	SECT	JOB	HIGHWAY
9-08	1219	02	017, ETC.	FM 182
	DIST	COUNTY		SHEET NO.
	WACO	CORYELL		127

DATE:
FILE:

I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

TPDES TXR 150000: Stormwater Discharge Permit or Construction General Permit required for projects with 1 or more acres disturbed soil. Projects with any disturbed soil must protect for erosion and sedimentation in accordance with Item 506.

List MS4 Operator(s) that may receive discharges from this project. They may need to be notified prior to construction activities.

1.

2.

☐ No Action Required ☒ Required Action

Action No.

1. Prevent stormwater pollution by controlling erosion and sedimentation in accordance with TPDES Permit TXR 150000
2. Comply with the SW3P and revise when necessary to control pollution or required by the Engineer.
3. Post Construction Site Notice (CSN) with SW3P information on or near the site, accessible to the public and TCEQ, EPA or other inspectors.
4. When Contractor project specific locations (PSL's) increase disturbed soil area to 5 acres or more, submit NOI to TCEQ and the Engineer.

II. WORK IN OR NEAR STREAMS, WATERBODIES AND WETLANDS CLEAN WATER ACT SECTIONS 401 AND 404

USACE Permit required for filling, dredging, excavating or other work in any water bodies, rivers, creeks, streams, wetlands or wet areas.

The Contractor must adhere to all of the terms and conditions associated with the following permit(s):

☐ No Permit Required

☒ Nationwide Permit 14 - PCN not Required (less than 1/10th acre waters or wetlands affected)

☐ Nationwide Permit 14 - PCN Required (1/10 to <1/2 acre, 1/3 in tidal waters)

☐ Individual 404 Permit Required

☐ Other Nationwide Permit Required: NWP# _____

Required Actions: List waters of the US permit applies to, location in project and check Best Management Practices planned to control erosion, sedimentation and post-project TSS.

1. South Hog Creek
2. Hog Creek
3. Hurst Branch

The elevation of the ordinary high water marks of any areas requiring work to be performed in the waters of the US requiring the use of a nationwide permit can be found on the Bridge Layouts.

Best Management Practices:

Erosion	Sedimentation	Post-Construction TSS
☒ Temporary Vegetation	☒ Silt Fence	☐ Vegetative Filter Strips
☐ Blankets/Matting	☐ Rock Berm	☐ Retention/Irrigation Systems
☐ Mulch	☐ Triangular Filter Dike	☐ Extended Detention Basin
☐ Sodding	☐ Sand Bag Berm	☐ Constructed Wetlands
☐ Interceptor Swale	☐ Straw Bale Dike	☐ Wet Basin
☐ Diversion Dike	☐ Brush Berms	☐ Erosion Control Compost
☐ Erosion Control Compost	☐ Erosion Control Compost	☐ Mulch Filter Berm and Socks
☐ Mulch Filter Berm and Socks	☐ Mulch Filter Berm and Socks	☐ Compost Filter Berm and Socks
☐ Compost Filter Berm and Socks	☐ Compost Filter Berm and Socks	☒ Vegetation Lined Ditches
	☐ Stone Outlet Sediment Traps	☐ Sand Filter Systems
	☐ Sediment Basins	☐ Grassy Swales

III. CULTURAL RESOURCES

Refer to TxDOT Standard Specifications in the event historical issues or archeological artifacts are found during construction. Upon discovery of archeological artifacts (bones, burnt rock, flint, pottery, etc.) cease work in the immediate area and contact the Engineer immediately.

☐ No Action Required ☒ Required Action

Action No.

1. SEE STATEMENT ABOVE

2.

IV. VEGETATION RESOURCES

Preserve native vegetation to the extent practical.
Contractor must adhere to Construction Specification Requirements Specs 162, 164, 192, 193, 506, 730, 751, 752 in order to comply with requirements for invasive species, beneficial landscaping, and tree/brush removal commitments.

☐ No Action Required ☒ Required Action

Action No.

1. SEE STATEMENT ABOVE

2. Trees and brush trimming and removal need to occur between September 1 and February 28..
3.

4.

☐ No Action Required ☒ Required Action

Action No.

1. See Item 7 of General Notes for Golden-Cheeked Warbler Commitments.
2. For Eastern Spotted Skunk and Plains Spotted Skunk: Contractors will be advised of potential occurence in the project area, and to avoid harming the species if encountered, and to avoid unnecessary impacts to dens.
3. Comply with Migratory Bird Treaty Act (MBTA)
4. For Texas Horned Lizard: Contractors will be advised of potential occurance in the project area, and to avoid harming the species of encountered. This should include avoiding harvester ant mounds in the selection of Project Specific Locations (PSL's)
5. SEE STATEMENT BELOW

If any of the listed species are observed, cease work in the immediate area, do not disturb species or habitat and contact the Engineer immediately. The work may not remove active nests from bridges and other structures during nesting season of the birds associated with the nests. If caves or sinkholes are discovered, cease work in the immediate area, and contact the Engineer immediately.

LIST OF ABBREVIATIONS

BMP:	Best Management Practice	SPCC:	Spill Prevention Control and Countermeasure
CGP:	Construction General Permit	SW3P:	Storm Water Pollution Prevention Plan
DSHS:	Texas Department of State Health Services	PCN:	Pre-Construction Notification
FHWA:	Federal Highway Administration	PSL:	Project Specific Location
MOA:	Memorandum of Agreement	TCEQ:	Texas Commission on Environmental Quality
MOU:	Memorandum of Understanding	TPDES:	Texas Pollutant Discharge Elimination System
MS4:	Municipal Separate Stormwater Sewer System	TPWD:	Texas Parks and Wildlife Department
MBTA:	Migratory Bird Treaty Act	TxDOT:	Texas Department of Transportation
NOT:	Notice of Termination	T&E:	Threatened and Endangered Species
NWP:	Nationwide Permit	USACE:	U.S. Army Corps of Engineers
NOI:	Notice of Intent	USFWS:	U.S. Fish and Wildlife Service

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

General (applies to all projects):

Comply with the Hazard Communication Act (the Act) for personnel who will be working with hazardous materials by conducting safety meetings prior to beginning construction and making workers aware of potential hazards in the workplace. Ensure that all workers are provided with personal protective equipment appropriate for any hazardous materials used.

Obtain and keep on-site Material Safety Data Sheets (MSDS) for all hazardous products used on the project, which may include, but are not limited to the following categories: Paints, acids, solvents, asphalt products, chemical additives, fuels and concrete curing compounds or additives. Provide protected storage, off bare ground and covered, for products which may be hazardous. Maintain product labelling as required by the Act.

Maintain an adequate supply of on-site spill response materials, as indicated in the MSDS. In the event of a spill, take actions to mitigate the spill as indicated in the MSDS, in accordance with safe work practices, and contact the District Spill Coordinator immediately. The Contractor shall be responsible for the proper containment and cleanup of all product spills.

Contact the Engineer if any of the following are detected:
* Dead or distressed vegetation (not identified as normal)
* Trash piles, drums, canister, barrels, etc.
* Undesirable smells or odors
* Evidence of leaching or seepage of substances

Does the project involve any bridge class structure rehabilitation or replacements (bridge class structures not including box culverts)?

☒ Yes ☐ No

If "No", then no further action is required.
If "Yes", then TxDOT is responsible for completing asbestos assessment/inspection.

Are the results of the asbestos inspection positive (is asbestos present)?

☐ Yes ☒ No

If "Yes", then TxDOT must retain a DSHS licensed asbestos consultant to assist with the notification, develop abatement/mitigation procedures, and perform management activities as necessary. The notification form to DSHS must be postmarked at least 15 working days prior to scheduled demolition.

If "No", then TxDOT is still required to notify DSHS 15 working days prior to any scheduled demolition.

In either case, the Contractor is responsible for providing the date(s) for abatement activities and/or demolition with careful coordination between the Engineer and asbestos consultant in order to minimize construction delays and subsequent claims.

Any other evidence indicating possible hazardous materials or contamination discovered on site. Hazardous Materials or Contamination Issues Specific to this Project:

☒ No Action Required ☐ Required Action

Action No.

VII. OTHER ENVIRONMENTAL ISSUES

(includes regional issues such as Edwards Aquifer District, etc.)

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

Texas Department of Transportation

Design Division Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

EPIC

FILE: epic.dgn	DN: TxDOT	CK: RG	DW: VP	CK: AR
©TxDOT: February 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS 12-12-2011 (DS) 05-07-14 ADDED NOTE SECTION IV. 01-23-2015 SECTION I (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.	1219	02	017etc	FM 182
	DIST	COUNTY		SHEET NO.
	09	Coryell		128

STORMWATER POLLUTION PRVENTION PLAN (SWP3):

This SWP3 has been developed in accordance with TxDOT policy for projects disturbing less than 1 acre of soil, and not part of a larger common plan of development.

For all projects with any soil disturbing activities, TxDOT will maintain a SWP3 with all pertinent records, correspondence, environmental documents, etc. at the project field office. If no field office is available, then this SWP3 shall be kept at the appropriate TxDOT Area Office.

This SWP3 is consistent with requirements specified in applicable stormwater plans, and the project's environmental permits, issues, and commitments (EPICs).

1.0 SITE/PROJECT DESCRIPTION

1.1 PROJECT CONTROL SECTION JOB (CSJ):
CSJ: 1219-02-017

1.2 PROJECT LIMITS:
From: FM 182 @ SOUTH HOG CREEK (STR 003)

To:

1.3 PROJECT COORDINATES:
BEGIN: (Lat) 31°38'32.36"N ,(Long) 97°43'5.15"W

END: (Lat) 31°38'37.69"N ,(Long) 97°43'0.26"W

1.4 TOTAL PROJECT AREA (Acres): 1.26 AC

1.5 TOTAL AREA TO BE DISTURBED (Acres): 0.65 AC

1.6 NATURE OF CONSTRUCTION ACTIVITY:
EXCAVATION, EMBANKMENT, GRADING OF ROADSIDE DITCHES, CHANNEL SIDE SLOPES AND CONSTRUCTION OF PROPOSED BRIDGE AND APPROACHES.

1.7 MAJOR SOIL TYPES:

Soil Type	Description
LIMESTONE	VERY HARD.
SAND	CLAYEY, COMPACT TO DENSE.

1.8 PROJECT SPECIFIC LOCATIONS (PSLs):
PSLs must be depicted on the Environmental Layout Sheets in Attachment 1.2 of this SWP3. PSLs may be identified during preconstruction meetings or during the construction process. Please choose from the options below:

☐ PSLs determined during preconstruction meeting
☒ PSLs determined during construction
☐ No PSLs planned for construction

Type	Sheet #s

All off-ROW PSLs required by the Contractor are the Contractor's responsibility. The Contractor shall secure all permits required by local, state, federal laws for off-ROW PSLs. The contractor shall provide diagrams, areas of disturbance, acreage, and BMPs for all off-ROW PSLs within one mile of the project.

1.9 CONSTRUCTION ACTIVITIES:
(Use the following list as a starting point when developing the Construction Activity Schedule and Ceasing Record in Attachment 2.3.)

☒ Mobilization
☒ Install sediment and erosion controls
☒ Blade existing topsoil into windrows, prep ROW, clear and grub
☐ Remove existing pavement
☒ Grading operations, excavation, and embankment
☐ Excavate and prepare subgrade for proposed pavement widening
☐ Remove existing culverts, safety end treatments (SETs)
☒ Remove existing metal beam guard fence (MBGF), bridge rail
☐ Install proposed pavement per plans
☐ Install culverts, culvert extensions, SETs
☒ Install mow strip, MBGF, bridge rail
☒ Place flex base
☒ Rework slopes, grade ditches
☒ Blade windrowed material back across slopes
☒ Revegetation of unpaved areas
☒ Achieve site stabilization and remove sediment and erosion control measures
☐ Other: _____
☐ Other: _____
☐ Other: _____

1.10 POTENTIAL POLLUTANTS AND SOURCES:

☒ Sediment laden stormwater from stormwater conveyance over disturbed area
☒ Fuels, oils, and lubricants from construction vehicles, equipment, and storage
☒ Solvents, paints, adhesives, etc. from various construction activities
☒ Transported soils from offsite vehicle tracking
☒ Construction debris and waste from various construction activities
☒ Contaminated water from excavation or dewatering pump-out water
☒ Sanitary waste from onsite restroom facilities
☒ Trash from various construction activities/receptacles
☒ Long-term stockpiles of material and waste
☐ Other: _____
☐ Other: _____
☐ Other: _____

1.11 RECEIVING WATERS:
Receiving waters must be depicted on the Environmental Layout Sheets in Attachment 1.2 of this SWP3. Include Segment # for receiving waters.

Tributaries	Classified Waterbody
SOUTH HOG CREEK	SEGMENT ID 1225A OF BRAZOS RIVER BASIN

* Add (*) for impaired waterbodies with pollutant in ().

1.12 ROLES AND RESPONSIBILITIES: TxDOT

☒ Development of plans and specifications
☒ Perform SWP3 inspections
☒ Maintain SWP3 records and update to reflect daily operations
☐ Other: _____
☐ Other: _____

1.13 ROLES AND RESPONSIBILITIES: CONTRACTOR

☒ Day To Day Operational Control
☒ Maintain schedule of major construction activities
☒ Install, maintain and modify BMPs
☐ Other: _____
☐ Other: _____
☐ Other: _____

STATE OF TEXAS
AMY L. BENNETT
123129
LICENSED PROFESSIONAL ENGINEER
4/5/2023

FM 182 AT SOUTH HOG CREEK STORMWATER POLLUTION PREVENTION PLAN (SWP3) (Less Than 1 Acre)

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
6		129

STATE	STATE DIST.	COUNTY	
TEXAS	WACO	CORYELL	
CONT.	SECT.	JOB	HIGHWAY NO.
1219	02	017, ETC.	FM 182

STORMWATER POLLUTION PRVENTION PLAN (SWP3):

2.0 BEST MANAGEMENT PRACTICES (BMPs) AND CONTROLS, INSPECTION, AND MAINTENANCE

The Contractor shall be the responsible party for implementing the BMPs described herein and for complying with the SWP3 for control of erosion and sedimentation during day-to-day operations. The Contractor shall implement changes to this SWP3 approved by TxDOT within the times specified in this SWP3 or the CGP.

2.1 EROSION CONTROL AND SOIL STABILIZATION BMPs:

T / P

- ☐ ☐ Protection of Existing Vegetation
- ☐ ☐ Vegetated Buffer Zones
- X ☐ Soil Retention Blankets
- ☐ ☐ Geotextiles
- ☐ ☐ Mulching/ Hydromulching
- ☐ ☐ Soil Surface Treatments
- X ☐ Temporary Seeding
- ☐ X Permanent Planting, Sodding or Seeding
- ☐ ☐ Biodegradable Erosion Control Logs
- X ☐ Rock Filter Dams/ Rock Check Dams
- ☐ ☐ Vertical Tracking
- ☐ ☐ Interceptor Swale
- ☐ ☐ Riprap
- ☐ ☐ Diversion Dike
- ☐ ☐ Temporary Pipe Slope Drain
- ☐ ☐ Embankment for Erosion Control
- ☐ ☐ Paved Flumes
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____

2.2 SEDIMENT CONTROL BMPs:

T / P

- ☐ ☐ Biodegradable Erosion Control Logs
- ☐ ☐ Dewatering Controls
- ☐ ☐ Inlet Protection
- X ☐ Rock Filter Dams/ Rock Check Dams
- ☐ ☐ Sandbag Berms
- X ☐ Sediment Control Fence
- ☐ ☐ Stabilized Construction Exit
- ☐ ☐ Floating Turbidity Barrier
- ☐ ☐ Vegetated Buffer Zones
- ☐ ☐ Vegetated Filter Strips
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.3 PERMANENT CONTROLS:

(Coordinate post-construction BMPs with appropriate TxDOT maintenance sections.)

BMPs To Be Left In Place Post Construction:

Type	Stationing	
	From	To
PERMANENT SEEDING	STA. 603+30.00	STA. 610+16.00

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.4 OFFSITE VEHICLE TRACKING CONTROLS:

- X Excess dirt/mud on road removed daily
- ☐ Haul roads dampened for dust control
- X Loaded haul trucks to be covered with tarpaulin
- ☐ Stabilized construction exit
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

2.5 POLLUTION PREVENTION MEASURES:

- ☐ Chemical Management
- X Concrete and Materials Waste Management
- X Debris and Trash Management
- X Dust Control
- X Sanitary Facilities
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

2.6 VEGETATED BUFFER ZONES:

Natural vegetated buffers shall be maintained as feasible to protect adjacent surface waters. If vegetated natural buffer zones are not feasible due to site geometry, the appropriate additional sediment control measures have been incorporated into this SWP3.

Type	Stationing	
	From	To

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.7 ALLOWABLE NON-STORMWATER DISCHARGES:

- X Fire hydrant flushings
- X Irrigation drainage
- X Pavement washwater (where spills or leaks have not occurred, and detergents are not used)
- X Potable water sources
- X Springs
- X Uncontaminated groundwater
- X Water used to wash vehicles or control dust
- X Other allowable non-stormwater discharges as allowed by TPDES GP TXR150000.

2.8 INSPECTIONS:

All disturbed areas and erosion and sediment control devices shall be inspected at least once every seven (7) days. Inspections shall be performed by TxDOT as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.3 of this SWP3 .

2.9 MAINTENANCE:

Control measures shall be properly installed according to specifications. If it is determined that a BMP or control measure is not operating effectively, maintenance must be accomplished as soon as possible and before the next anticipated rain event, but in no case later than 7 calendar days after being able to access the site. Maintenance shall be performed by the Contractor as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.3 of this SWP3.

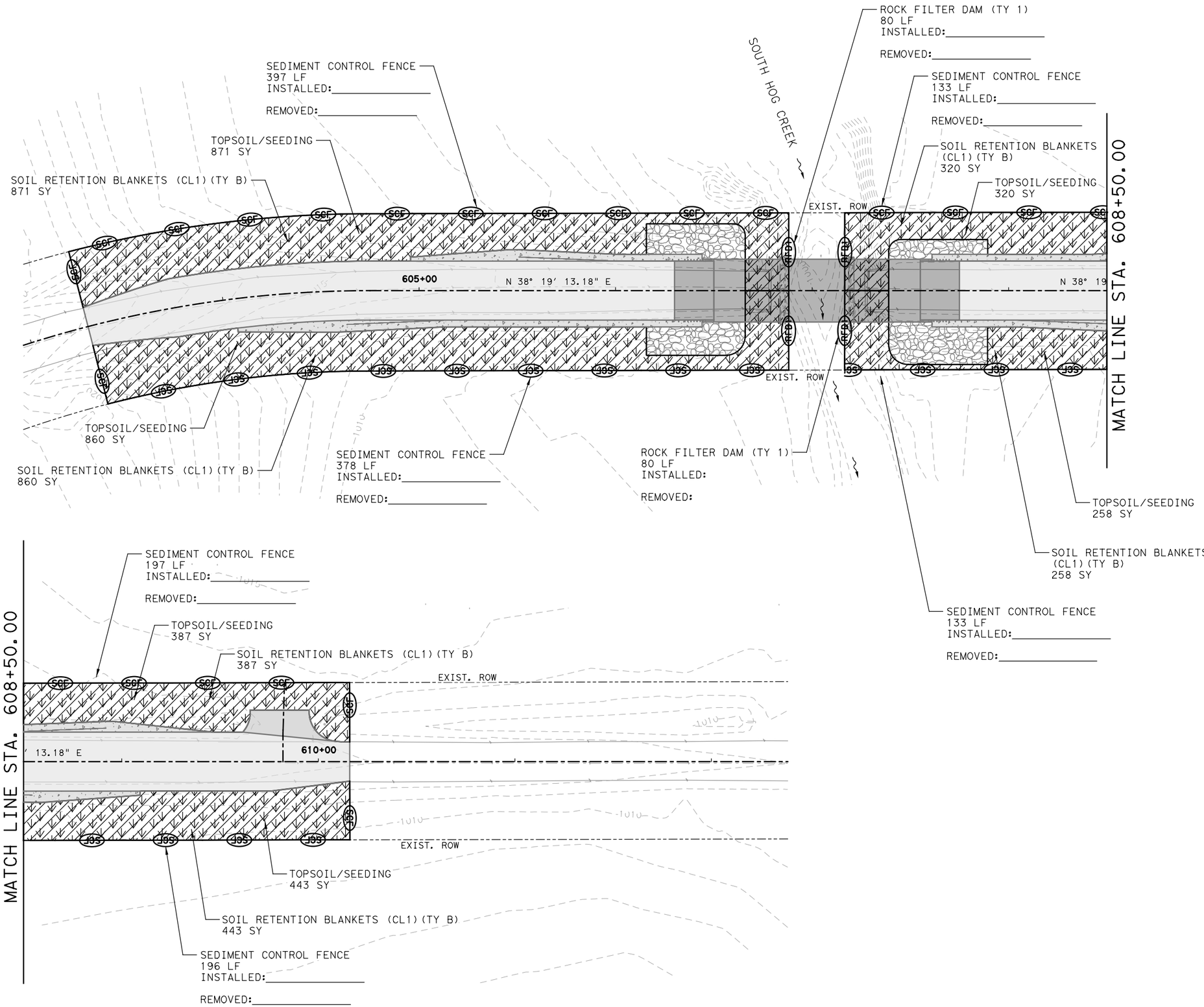
STATE OF TEXAS
AMY L. BENNETT
123129
LICENSED
PROFESSIONAL ENGINEER
4/5/2023

FM 182 AT SOUTH HOG CREEK
STORMWATER POLLUTION PREVENTION PLAN (SWP3)
(Less Than 1 Acre)

Sheet 2 of 2

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			130
STATE	STATE DIST.	COUNTY	
TEXAS	WACO	CORYELL	
CONT.	SECT.	JOB	HIGHWAY NO.
1219	02	017, ETC.	FM 182



0 25 50
SCALE IN FEET

LEGEND

- TOPSOIL/SEEDING
- SOIL RETENTION BLANKETS (CL 1)(TY B)
- SCF — SEDIMENT CONTROL FENCE
- RFD1 — ROCK FILTER DAMS (TY 1)

NOTES

1. SWP3 ITEMS SHOULD BE ADJUSTED TO ACCOMODATE ACTUAL FIELD CONDITIONS OR AS DIRECTED BY THE ENGINEER.

PRINT DATE	REVISION DATE
4/5/2023	

STATE OF TEXAS
AMY L. BENNETT
123129
LICENSED PROFESSIONAL ENGINEER
4/5/2023

3711 SOUTH MOPAC EXPRESSWAY
BUILDING ONE, SUITE 350
AUSTIN, TX 78703
TEL 512.494.6037 FAX 317.543.0270
www.structurepoint.com

AMERICAN STRUCTUREPOINT INC.

TBPE FIRM NO. F-10069

Texas Department of Transportation

FM 182 AT SOUTH HOG CREEK

SWP3 LAYOUT

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		FM 182

STATE	DISTRICT	COUNTY	
TEXAS	WACO	CORYELL	
CONTROL	SECTION	JOB	SHEET NO.
1219	02	017, ETC.	131

CSJ: 1219-02-017, ETC.
FILE LOCATION: P:\2020\00072\121902017\4 - Design\Plan Set\9. Environmental\202000072.01.RD.ERC.dgn

STORMWATER POLLUTION PRVENTION PLAN (SWP3):

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For all projects with any soil disturbing activities, TxDOT will maintain a SWP3 with all pertinent records, correspondence, environmental documents, etc. at the project field office. If no field office is available, then this SWP3 shall be kept at the appropriate TxDOT Area Office.

This SWP3 is consistent with requirements specified in applicable stormwater plans, and the project's environmental permits, issues, and commitments (EPICs).

1.0 SITE/PROJECT DESCRIPTION

1.1 PROJECT CONTROL SECTION JOB (CSJ):
CSJ: 1219-02-018

1.2 PROJECT LIMITS:
From: FM 182 @ HOG CREEK (STR 002)

To:

1.3 PROJECT COORDINATES:
BEGIN: (Lat) 31°39'1.01"N ,(Long) 97°42'43.92"W

END: (Lat) 31°39'0.05"N ,(Long) 97°42'40.18"W

1.4 TOTAL PROJECT AREA (Acres): 1.61 AC

1.5 TOTAL AREA TO BE DISTURBED (Acres): 0.68 AC

1.6 NATURE OF CONSTRUCTION ACTIVITY:
EXCAVATION, EMBANKMENT, GRADING OF ROADSIDE DITCHES, CHANNEL SIDE SLOPES AND CONSTRUCTION OF PROPOSED BRIDGE AND APPROACHES.

1.7 MAJOR SOIL TYPES:

Soil Type	Description
LIMESTONE	SOFT, TAN, HIGHLY WEATHERED.
CLAY	SOFT TO STIFF, DARK BROWN.

1.8 PROJECT SPECIFIC LOCATIONS (PSLs):
PSLs must be depicted on the Environmental Layout Sheets in Attachment 1.2 of this SWP3. PSLs may be identified during preconstruction meetings or during the construction process. Please choose from the options below:

☐ PSLs determined during preconstruction meeting
☒ PSLs determined during construction
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Type	Sheet #s

All off-ROW PSLs required by the Contractor are the Contractor's responsibility. The Contractor shall secure all permits required by local, state, federal laws for off-ROW PSLs. The contractor shall provide diagrams, areas of disturbance, acreage, and BMPs for all off-ROW PSLs within one mile of the project.

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(Use the following list as a starting point when developing the Construction Activity Schedule and Ceasing Record in Attachment 2.3.)

☒ Mobilization
☒ Install sediment and erosion controls
☒ Blade existing topsoil into windrows, prep ROW, clear and grub
☐ Remove existing pavement
☒ Grading operations, excavation, and embankment
☐ Excavate and prepare subgrade for proposed pavement widening
☐ Remove existing culverts, safety end treatments (SETs)
☒ Remove existing metal beam guard fence (MBGF), bridge rail
☐ Install proposed pavement per plans
☐ Install culverts, culvert extensions, SETs
☒ Install mow strip, MBGF, bridge rail
☒ Place flex base
☒ Rework slopes, grade ditches
☒ Blade windrowed material back across slopes
☒ Revegetation of unpaved areas
☒ Achieve site stabilization and remove sediment and erosion control measures
☐ Other: _____
☐ Other: _____
☐ Other: _____

1.10 POTENTIAL POLLUTANTS AND SOURCES:

☒ Sediment laden stormwater from stormwater conveyance over disturbed area
☒ Fuels, oils, and lubricants from construction vehicles, equipment, and storage
☒ Solvents, paints, adhesives, etc. from various construction activities
☒ Transported soils from offsite vehicle tracking
☒ Construction debris and waste from various construction activities
☒ Contaminated water from excavation or dewatering pump-out water
☒ Sanitary waste from onsite restroom facilities
☒ Trash from various construction activities/receptacles
☒ Long-term stockpiles of material and waste
☐ Other: _____
☐ Other: _____
☐ Other: _____

1.11 RECEIVING WATERS:
Receiving waters must be depicted on the Environmental Layout Sheets in Attachment 1.2 of this SWP3. Include Segment # for receiving waters.

Tributaries	Classified Waterbody
HOG CREEK	SEGMENT ID 1225A OF BRAZOS RIVER BASIN

* Add (*) for impaired waterbodies with pollutant in ().

1.12 ROLES AND RESPONSIBILITIES: TxDOT

☒ Development of plans and specifications
☒ Perform SWP3 inspections
☒ Maintain SWP3 records and update to reflect daily operations
☐ Other: _____
☐ Other: _____

1.13 ROLES AND RESPONSIBILITIES: CONTRACTOR

☒ Day To Day Operational Control
☒ Maintain schedule of major construction activities
☒ Install, maintain and modify BMPs
☐ Other: _____
☐ Other: _____
☐ Other: _____

STATE OF TEXAS
AMY L. BENNETT
123129
LICENSED
PROFESSIONAL ENGINEER
4/5/2023

FM 182 AT HOG CREEK STORMWATER POLLUTION PREVENTION PLAN (SWP3) (Less Than 1 Acre)

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			132
STATE	STATE DIST.	COUNTY	
TEXAS	WACO	CORYELL	
CONT.	SECT.	JOB	HIGHWAY NO.
1219	02	017, ETC.	FM 182

STORMWATER POLLUTION PRVENTION PLAN (SWP3):

2.0 BEST MANAGEMENT PRACTICES (BMPs) AND CONTROLS, INSPECTION, AND MAINTENANCE

The Contractor shall be the responsible party for implementing the BMPs described herein and for complying with the SWP3 for control of erosion and sedimentation during day-to-day operations. The Contractor shall implement changes to this SWP3 approved by TxDOT within the times specified in this SWP3 or the CGP.

2.1 EROSION CONTROL AND SOIL STABILIZATION BMPs:

T / P

- ☐ ☐ Protection of Existing Vegetation
- ☐ ☐ Vegetated Buffer Zones
- X ☐ Soil Retention Blankets
- ☐ ☐ Geotextiles
- ☐ ☐ Mulching/ Hydromulching
- ☐ ☐ Soil Surface Treatments
- X ☐ Temporary Seeding
- ☐ X Permanent Planting, Sodding or Seeding
- ☐ ☐ Biodegradable Erosion Control Logs
- X ☐ Rock Filter Dams/ Rock Check Dams
- ☐ ☐ Vertical Tracking
- ☐ ☐ Interceptor Swale
- ☐ ☐ Riprap
- ☐ ☐ Diversion Dike
- ☐ ☐ Temporary Pipe Slope Drain
- ☐ ☐ Embankment for Erosion Control
- ☐ ☐ Paved Flumes
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____

2.2 SEDIMENT CONTROL BMPs:

T / P

- ☐ ☐ Biodegradable Erosion Control Logs
- ☐ ☐ Dewatering Controls
- ☐ ☐ Inlet Protection
- X ☐ Rock Filter Dams/ Rock Check Dams
- ☐ ☐ Sandbag Berms
- X ☐ Sediment Control Fence
- ☐ ☐ Stabilized Construction Exit
- ☐ ☐ Floating Turbidity Barrier
- ☐ ☐ Vegetated Buffer Zones
- ☐ ☐ Vegetated Filter Strips
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.3 PERMANENT CONTROLS:

(Coordinate post-construction BMPs with appropriate TxDOT maintenance sections.)

BMPs To Be Left In Place Post Construction:

Type	Stationing	
	From	To
PERMANENT SEEDING	STA. 637+80.00	STA. 646+55.00

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.4 OFFSITE VEHICLE TRACKING CONTROLS:

- X Excess dirt/mud on road removed daily
- ☐ Haul roads dampened for dust control
- X Loaded haul trucks to be covered with tarpaulin
- ☐ Stabilized construction exit
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

2.5 POLLUTION PREVENTION MEASURES:

- ☐ Chemical Management
- X Concrete and Materials Waste Management
- X Debris and Trash Management
- X Dust Control
- X Sanitary Facilities
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

2.6 VEGETATED BUFFER ZONES:

Natural vegetated buffers shall be maintained as feasible to protect adjacent surface waters. If vegetated natural buffer zones are not feasible due to site geometry, the appropriate additional sediment control measures have been incorporated into this SWP3.

Type	Stationing	
	From	To

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.7 ALLOWABLE NON-STORMWATER DISCHARGES:

- X Fire hydrant flushings
- X Irrigation drainage
- X Pavement washwater (where spills or leaks have not occurred, and detergents are not used)
- X Potable water sources
- X Springs
- X Uncontaminated groundwater
- X Water used to wash vehicles or control dust
- X Other allowable non-stormwater discharges as allowed by TPDES GP TXR150000.

2.8 INSPECTIONS:

All disturbed areas and erosion and sediment control devices shall be inspected at least once every seven (7) days. Inspections shall be performed by TxDOT as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.3 of this SWP3 .

2.9 MAINTENANCE:

Control measures shall be properly installed according to specifications. If it is determined that a BMP or control measure is not operating effectively, maintenance must be accomplished as soon as possible and before the next anticipated rain event, but in no case later than 7 calendar days after being able to access the site. Maintenance shall be performed by the Contractor as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.3 of this SWP3.

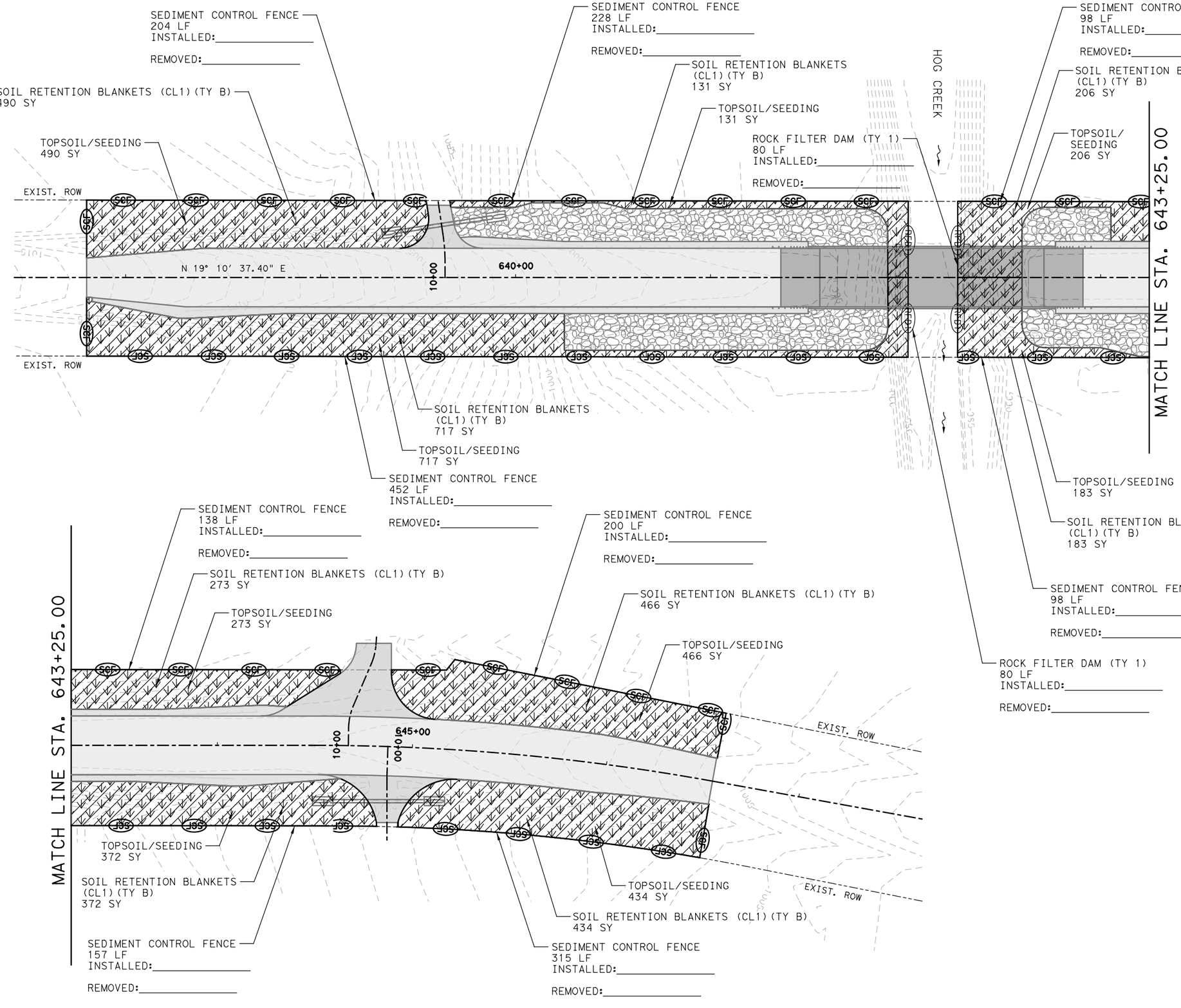
STATE OF TEXAS
AMY L. BENNETT
123129
LICENSED
PROFESSIONAL ENGINEER
4/5/2023

FM 182 AT HOG CREEK
STORMWATER POLLUTION PREVENTION PLAN (SWP3)
(Less Than 1 Acre)

Sheet 2 of 2

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			133
STATE	STATE DIST.	COUNTY	
TEXAS	WACO	CORYELL	
CONT.	SECT.	JOB	HIGHWAY NO.
1219	02	017, ETC.	FM 182



0 25 50
SCALE IN FEET

LEGEND

- TOPSOIL/SEEDING
- SOIL RETENTION BLANKETS (CL 1)(TY B)
- SCF — SEDIMENT CONTROL FENCE
- RFD1 — ROCK FILTER DAMS (TY 1)

NOTES

1. SWP3 ITEMS SHOULD BE ADJUSTED TO ACCOMODATE ACTUAL FIELD CONDITIONS OR AS DIRECTED BY THE ENGINEER.

PRINT DATE	REVISION DATE
4/5/2023	

STATE OF TEXAS
AMY L. BENNETT
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4/5/2023

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AMERICAN STRUCTUREPOINT INC.
TBPE FIRM NO. F-10069

Texas Department of Transportation

FM 182 AT HOG CREEK

SWP3 LAYOUT

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		FM 182

STATE	DISTRICT	COUNTY	
TEXAS	WACO	CORYELL	
CONTROL	SECTION	JOB	SHEET NO.
1219	02	017,ETC	134

CSJ: 1219-02-018
FILE LOCATION: P:\2020\00072\121902018\4 - Design\Plan Set\9. Environmental\2020.00072.02.RD.ERC.dgn

STORMWATER POLLUTION PRVENTION PLAN (SWP3):

This SWP3 has been developed in accordance with TxDOT policy for projects disturbing less than 1 acre of soil, and not part of a larger common plan of development.

For all projects with any soil disturbing activities, TxDOT will maintain a SWP3 with all pertinent records, correspondence, environmental documents, etc. at the project field office. If no field office is available, then this SWP3 shall be kept at the appropriate TxDOT Area Office.

This SWP3 is consistent with requirements specified in applicable stormwater plans, and the project's environmental permits, issues, and commitments (EPICs).

1.0 SITE/PROJECT DESCRIPTION

1.1 PROJECT CONTROL SECTION JOB (CSJ):
CSJ: 1219-02-020

1.2 PROJECT LIMITS:
From: FM 182 AT HURST BRANCH

To:

1.3 PROJECT COORDINATES:
BEGIN: (Lat) 31°39'56.98"N ,(Long) 97°41'33.79"W

END: (Lat) 31°39'56.04"N ,(Long) 97°41'27.77"W

1.4 TOTAL PROJECT AREA (Acres): 0.97 AC

1.5 TOTAL AREA TO BE DISTURBED (Acres): 0.41 AC

1.6 NATURE OF CONSTRUCTION ACTIVITY:
EXCAVATION, EMBANKMENT, GRADING OF ROADSIDE DITCHES, CHANNEL SIDE SLOPES AND CONSTRUCTION OF PROPOSED BRIDGE AND APPROACHES.

1.7 MAJOR SOIL TYPES:

Soil Type	Description
LIMESTONE	HARD TO VERY HARD.

1.8 PROJECT SPECIFIC LOCATIONS (PSLs):
PSLs must be depicted on the Environmental Layout Sheets in Attachment 1.2 of this SWP3. PSLs may be identified during preconstruction meetings or during the construction process. Please choose from the options below:

☐ PSLs determined during preconstruction meeting
☒ PSLs determined during construction
☐ No PSLs planned for construction

Type	Sheet #s

All off-ROW PSLs required by the Contractor are the Contractor's responsibility. The Contractor shall secure all permits required by local, state, federal laws for off-ROW PSLs. The contractor shall provide diagrams, areas of disturbance, acreage, and BMPs for all off-ROW PSLs within one mile of the project.

1.9 CONSTRUCTION ACTIVITIES:
(Use the following list as a starting point when developing the Construction Activity Schedule and Ceasing Record in Attachment 2.3.)

☒ Mobilization
☒ Install sediment and erosion controls
☒ Blade existing topsoil into windrows, prep ROW, clear and grub
☐ Remove existing pavement
☒ Grading operations, excavation, and embankment
☐ Excavate and prepare subgrade for proposed pavement widening
☐ Remove existing culverts, safety end treatments (SETs)
☒ Remove existing metal beam guard fence (MBGF), bridge rail
☐ Install proposed pavement per plans
☐ Install culverts, culvert extensions, SETs
☒ Install mow strip, MBGF, bridge rail
☒ Place flex base
☒ Rework slopes, grade ditches
☒ Blade windrowed material back across slopes
☒ Revegetation of unpaved areas
☒ Achieve site stabilization and remove sediment and erosion control measures
☐ Other: _____
☐ Other: _____
☐ Other: _____

1.10 POTENTIAL POLLUTANTS AND SOURCES:

☒ Sediment laden stormwater from stormwater conveyance over disturbed area
☒ Fuels, oils, and lubricants from construction vehicles, equipment, and storage
☒ Solvents, paints, adhesives, etc. from various construction activities
☒ Transported soils from offsite vehicle tracking
☒ Construction debris and waste from various construction activities
☒ Contaminated water from excavation or dewatering pump-out water
☒ Sanitary waste from onsite restroom facilities
☒ Trash from various construction activities/receptacles
☒ Long-term stockpiles of material and waste
☐ Other: _____
☐ Other: _____
☐ Other: _____

1.11 RECEIVING WATERS:
Receiving waters must be depicted on the Environmental Layout Sheets in Attachment 1.2 of this SWP3. Include Segment # for receiving waters.

Tributaries	Classified Waterbody
HURST BRANCH	SEGMENT ID 1225A OF BRAZOS RIVER BASIN

* Add (*) for impaired waterbodies with pollutant in ().

1.12 ROLES AND RESPONSIBILITIES: TxDOT

☒ Development of plans and specifications
☒ Perform SWP3 inspections
☒ Maintain SWP3 records and update to reflect daily operations
☐ Other: _____
☐ Other: _____

1.13 ROLES AND RESPONSIBILITIES: CONTRACTOR

☒ Day To Day Operational Control
☒ Maintain schedule of major construction activities
☒ Install, maintain and modify BMPs
☐ Other: _____
☐ Other: _____
☐ Other: _____

STATE OF TEXAS
AMY L. BENNETT
123129
LICENSED PROFESSIONAL ENGINEER
4/5/2023

FM 182 AT HURST BRANCH STORMWATER POLLUTION PREVENTION PLAN (SWP3) (Less Than 1 Acre)

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
6		135

STATE	STATE DIST.	COUNTY	
TEXAS	WACO	CORYELL	
CONT.	SECT.	JOB	HIGHWAY NO.
1219	02	017, ETC.	FM 182

STORMWATER POLLUTION PRVENTION PLAN (SWP3):

2.0 BEST MANAGEMENT PRACTICES (BMPs) AND CONTROLS, INSPECTION, AND MAINTENANCE

The Contractor shall be the responsible party for implementing the BMPs described herein and for complying with the SWP3 for control of erosion and sedimentation during day-to-day operations. The Contractor shall implement changes to this SWP3 approved by TxDOT within the times specified in this SWP3 or the CGP.

2.1 EROSION CONTROL AND SOIL STABILIZATION BMPs:

T / P

- ☐ ☐ Protection of Existing Vegetation
- ☐ ☐ Vegetated Buffer Zones
- X ☐ Soil Retention Blankets
- ☐ ☐ Geotextiles
- ☐ ☐ Mulching/ Hydromulching
- ☐ ☐ Soil Surface Treatments
- X ☐ Temporary Seeding
- ☐ X Permanent Planting, Sodding or Seeding
- ☐ ☐ Biodegradable Erosion Control Logs
- X ☐ Rock Filter Dams/ Rock Check Dams
- ☐ ☐ Vertical Tracking
- ☐ ☐ Interceptor Swale
- ☐ ☐ Riprap
- ☐ ☐ Diversion Dike
- ☐ ☐ Temporary Pipe Slope Drain
- ☐ ☐ Embankment for Erosion Control
- ☐ ☐ Paved Flumes
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____

2.2 SEDIMENT CONTROL BMPs:

T / P

- ☐ ☐ Biodegradable Erosion Control Logs
- ☐ ☐ Dewatering Controls
- ☐ ☐ Inlet Protection
- X ☐ Rock Filter Dams/ Rock Check Dams
- ☐ ☐ Sandbag Berms
- X ☐ Sediment Control Fence
- ☐ ☐ Stabilized Construction Exit
- ☐ ☐ Floating Turbidity Barrier
- ☐ ☐ Vegetated Buffer Zones
- ☐ ☐ Vegetated Filter Strips
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.3 PERMANENT CONTROLS:

(Coordinate post-construction BMPs with appropriate TxDOT maintenance sections.)

BMPs To Be Left In Place Post Construction:

Type	Stationing	
	From	To
PERMANENT SEEDING	STA. 724+51.00	STA. 729+80.00

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.4 OFFSITE VEHICLE TRACKING CONTROLS:

- X Excess dirt/mud on road removed daily
- ☐ Haul roads dampened for dust control
- X Loaded haul trucks to be covered with tarpaulin
- ☐ Stabilized construction exit
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

2.5 POLLUTION PREVENTION MEASURES:

- ☐ Chemical Management
- X Concrete and Materials Waste Management
- X Debris and Trash Management
- X Dust Control
- X Sanitary Facilities
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

2.6 VEGETATED BUFFER ZONES:

Natural vegetated buffers shall be maintained as feasible to protect adjacent surface waters. If vegetated natural buffer zones are not feasible due to site geometry, the appropriate additional sediment control measures have been incorporated into this SWP3.

Type	Stationing	
	From	To

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.7 ALLOWABLE NON-STORMWATER DISCHARGES:

- X Fire hydrant flushings
- X Irrigation drainage
- X Pavement washwater (where spills or leaks have not occurred, and detergents are not used)
- X Potable water sources
- X Springs
- X Uncontaminated groundwater
- X Water used to wash vehicles or control dust
- X Other allowable non-stormwater discharges as allowed by TPDES GP TXR150000.

2.8 INSPECTIONS:

All disturbed areas and erosion and sediment control devices shall be inspected at least once every seven (7) days. Inspections shall be performed by TxDOT as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.3 of this SWP3 .

2.9 MAINTENANCE:

Control measures shall be properly installed according to specifications. If it is determined that a BMP or control measure is not operating effectively, maintenance must be accomplished as soon as possible and before the next anticipated rain event, but in no case later than 7 calendar days after being able to access the site. Maintenance shall be performed by the Contractor as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.3 of this SWP3.

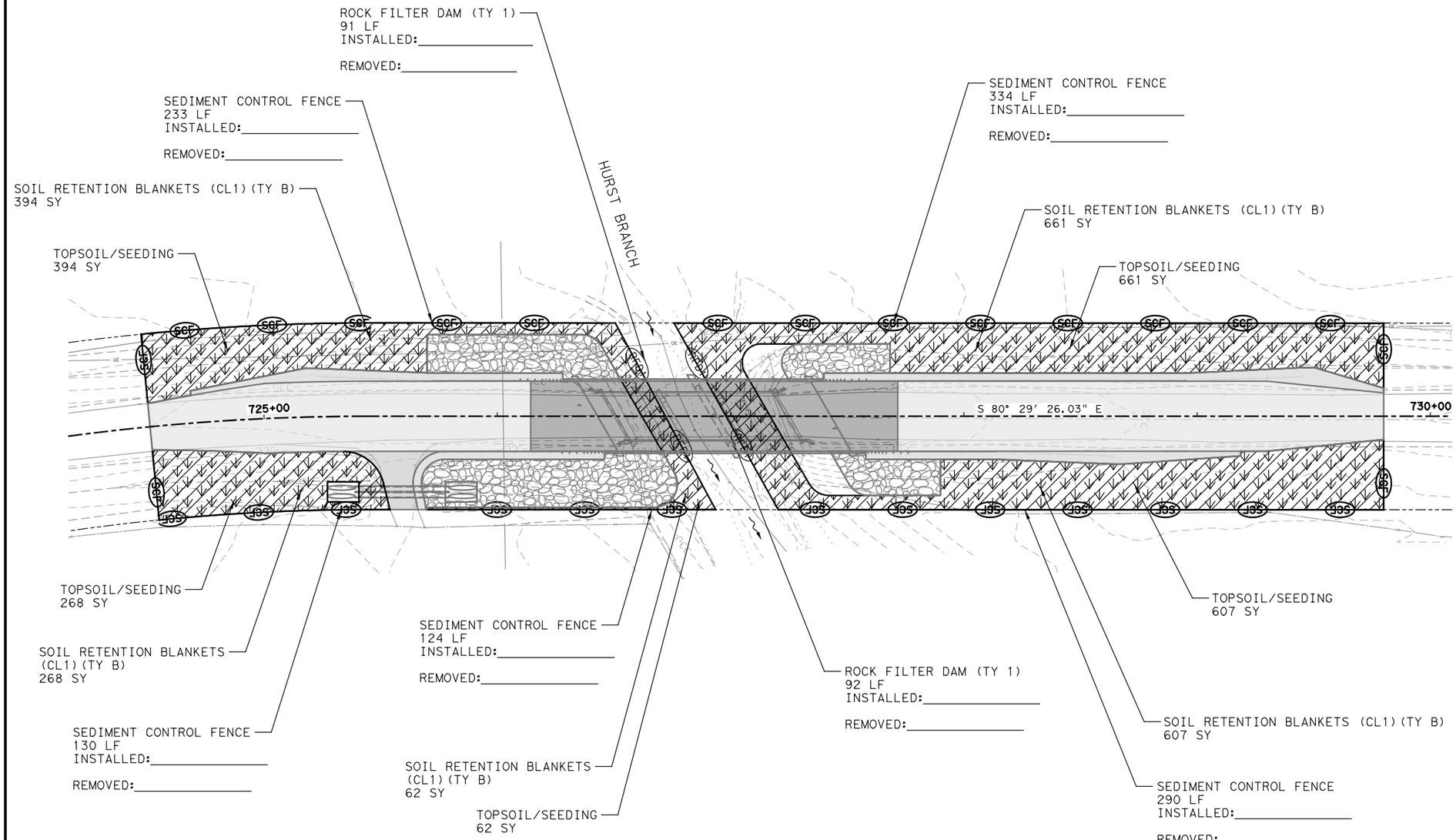
STATE OF TEXAS
AMY L. BENNETT
123129
LICENSED PROFESSIONAL ENGINEER
4/5/2023

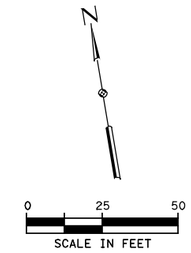
FM 182 AT HURST BRANCH STORMWATER POLLUTION PREVENTION PLAN (SWP3) (Less Than 1 Acre)

Sheet 2 of 2

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			136
STATE	STATE DIST.	COUNTY	
TEXAS	WACO	CORYELL	
CONT.	SECT.	JOB	HIGHWAY NO.
1219	02	017, ETC.	FM 182





LEGEND

- TOPSOIL/SEEDING
- SOIL RETENTION BLANKETS (CL 1)(TY B)
- SCF — SEDIMENT CONTROL FENCE
- RFD1 — ROCK FILTER DAMS (TY 1)

NOTES

1. SWP3 ITEMS SHOULD BE ADJUSTED TO ACCOMODATE ACTUAL FIELD CONDITIONS OR AS DIRECTED BY THE ENGINEER.

PRINT DATE	REVISION DATE
4/5/2023	

STATE OF TEXAS
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AMERICAN STRUCTUREPOINT INC.

TBPE FIRM NO. F-10069

FM 182 AT HURST BRANCH

PLAN & PROFILE SWP3 LAYOUT

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		FM 182

STATE	DISTRICT	COUNTY	
TEXAS	WACO	CORYELL	
CONTROL	SECTION	JOB	SHEET NO.
1219	02	017,ETC	137

REV DATE: 4/5/2023
CSJ: 1219-02-020
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DATE 4/5/2023
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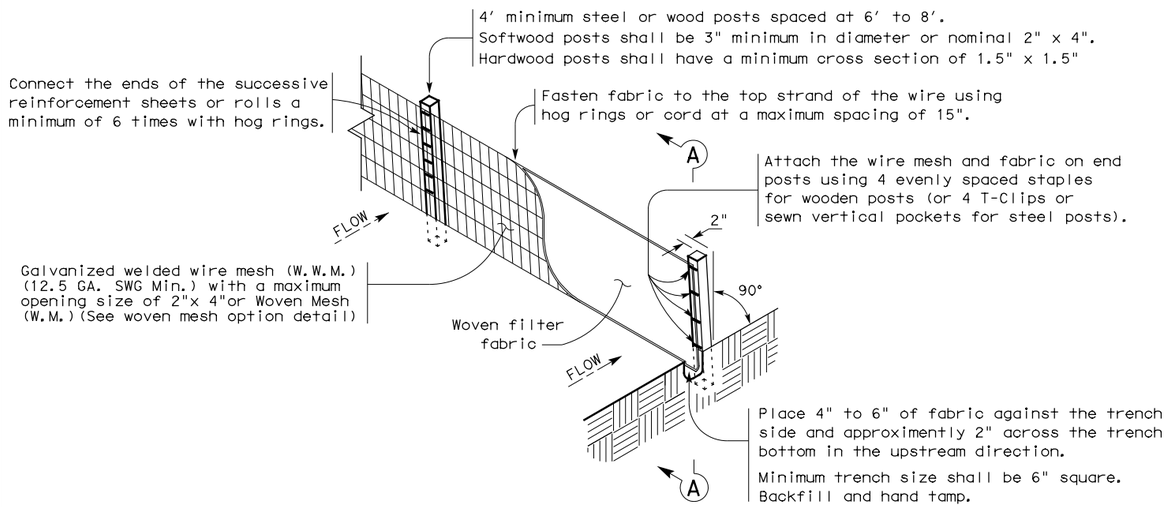
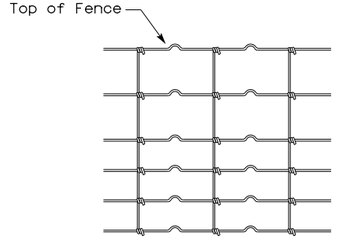
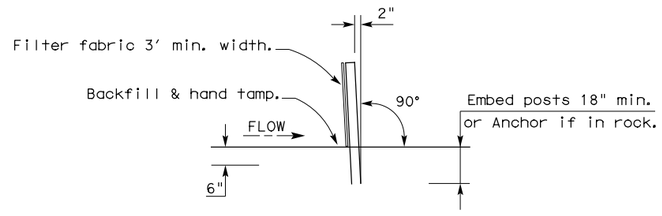


TEMPORARY SEDIMENT CONTROL FENCE

SCF





SECTION A-A

HINGE JOINT KNOT WOVEN MESH (OPTION) DETAIL

Galvanized hinge joint knot woven mesh (12.5 GA.SWG Min.) requires a minimum of five horizontal wires spaced at a maximum of 12 inches apart and all vertical wires spaced at a maximum of 12 inches apart.

SEDIMENT CONTROL FENCE USAGE GUIDELINES

A sediment control fence may be constructed near the downstream perimeter of a disturbed area along a contour to intercept sediment from overland runoff. A 2 year storm frequency may be used to calculate the flow rate to be filtered.

Sediment control fence should be sized to filter a maximum flow through rate of 100 GPM/FT^2. Sediment control fence is not recommended to control erosion from a drainage area larger than 2 acres.

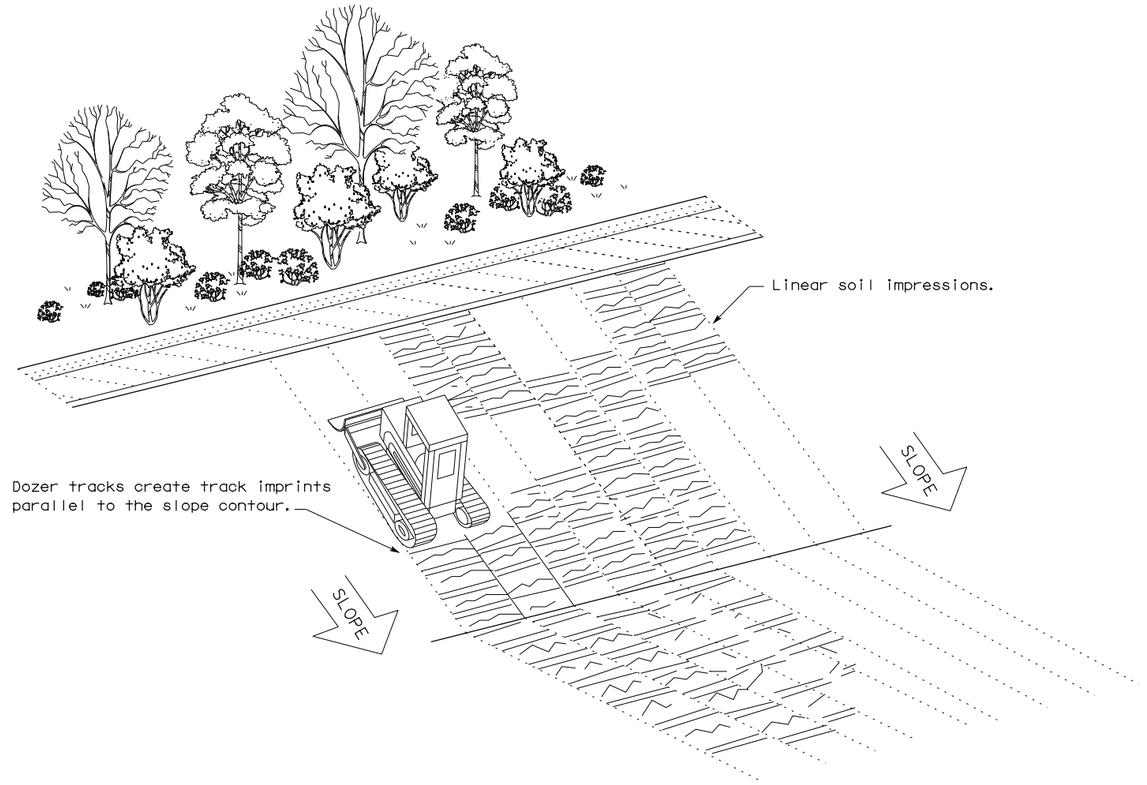
LEGEND

Sediment Control Fence

SCF

GENERAL NOTES

1. Vertical tracking is required on projects where soil distributing activities have occurred unless otherwise approved.
2. Perform vertical tracking on slopes to temporarily stabilize soil.
3. Provide equipment with a track undercarriage capable of producing linear soil impressions measuring a minimum of 12" in length by 2" to 4" in width by 1/2" to 2" in depth.
4. Do not exceed 12" between track impressions.
5. Install continous linear track impressions where the minimum 12" length impressions are perpendicular to the slope or direction of water flow.



VERTICAL TRACKING

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

FENCE & VERTICAL TRACKING

EC(1)-16

FILE: ec116	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	1219	02	017, ETC.	FM 182
	DIST	COUNTY		SHEET NO.
	WACO	CORYELL		138

DATE: 4/5/2023
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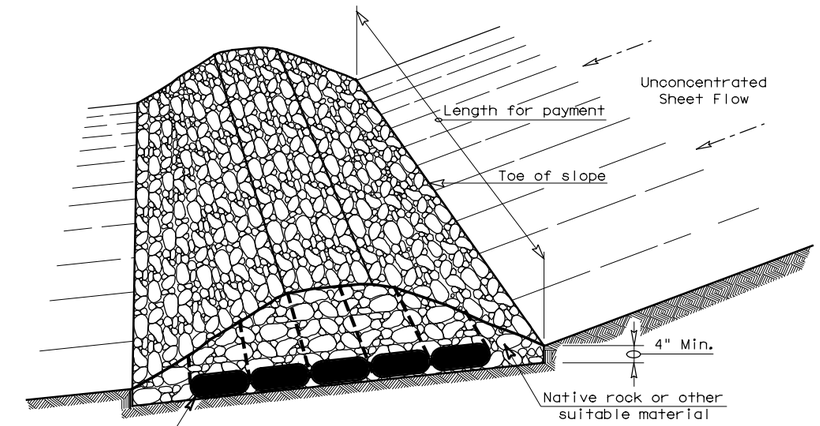
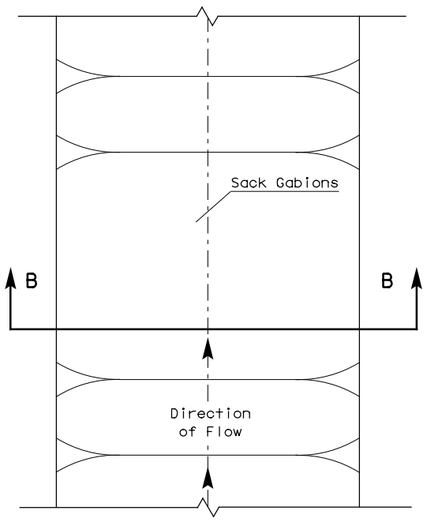
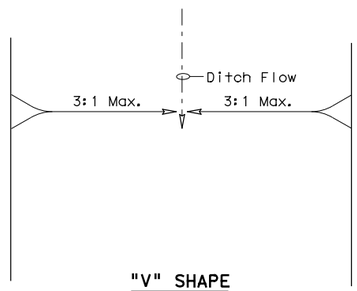


FILTER DAM AT TOE OF SLOPE

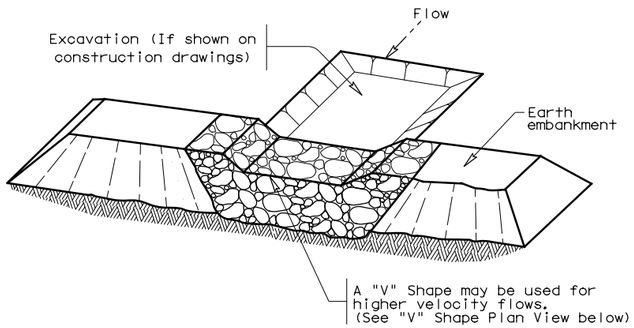
RFD1



PLAN VIEW

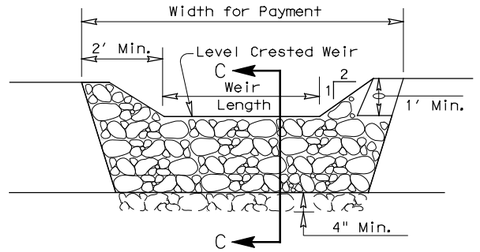


"V" SHAPE
PLAN VIEW

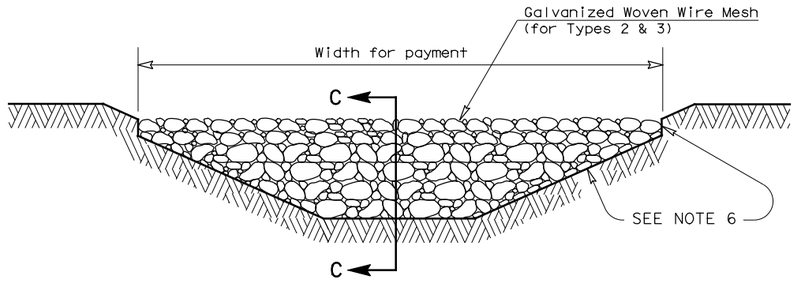


FILTER DAM AT SEDIMENT TRAP

RFD1 OR RFD2



PROFILE

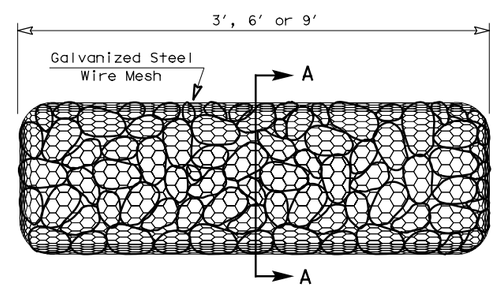


FILTER DAM AT CHANNEL SECTIONS

RFD1 OR RFD2 OR RFD3

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.

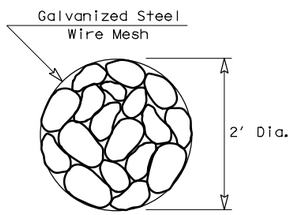


TYPE 4 (SACK GABIONS)

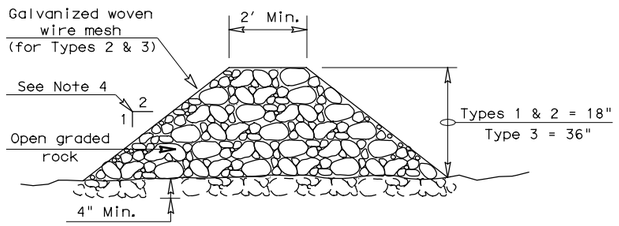
RFD4

¾" Dia.
Rebar Stakes

SECTION B-B



SECTION A-A



SECTION C-C

ROCK FILTER DAM USAGE GUIDELINES

Rock Filter Dams should be constructed downstream from disturbed areas to intercept sediment from overland runoff and/or concentrated flow. The dams should be sized to filter a maximum flow through rate of 60 GPM/FT^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.

PLAN SHEET LEGEND

Type 1 Rock Filter Dam	RFD1
Type 2 Rock Filter Dam	RFD2
Type 3 Rock Filter Dam	RFD3
Type 4 Rock Filter Dam	RFD4

Texas Department of Transportation

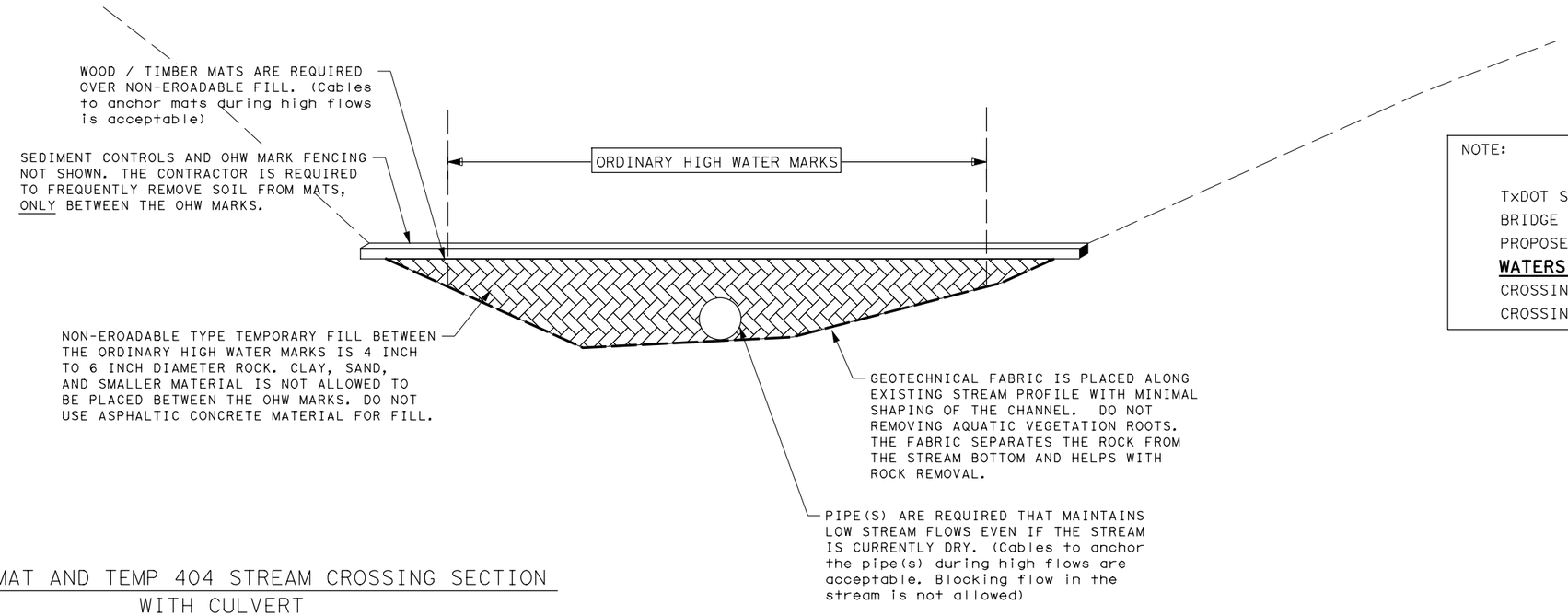
Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

ROCK FILTER DAMS

EC(2)-16

FILE: ec216	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	1219	02	017, ETC.	FM 182
	DIST	COUNTY		SHEET NO.
	WACO	CORYELL		139

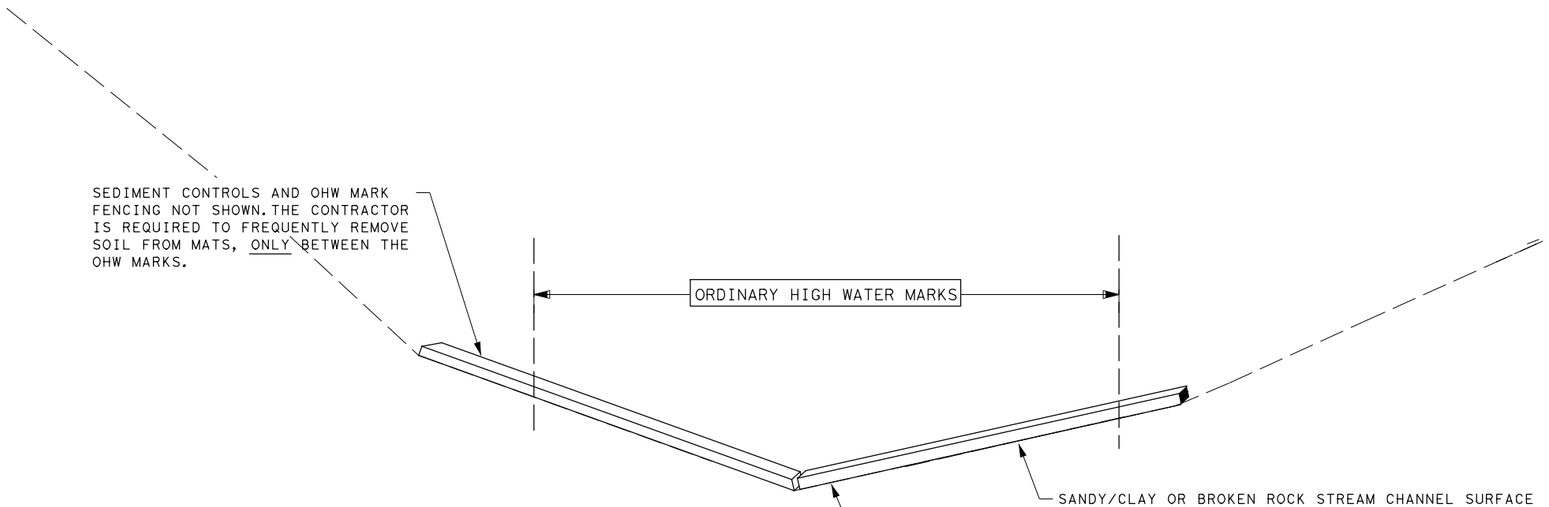


TIMBER MAT AND TEMP 404 STREAM CROSSING SECTION
WITH CULVERT

NO SOIL SHOULD BE PUSHED OR MOVED FROM ABOVE THE OHW MARKS TO BELOW THE OHW MARKS.

NOTE:

TxDOT SHOULD EVALUATE ACCROSS FROM BOTH SIDES OF THE BRIDGE / CULVERT AND ALSO EVALUATE THE CONTRACTOR'S PROPOSED DEMOLITION AND CONSTRUCTION TECHNIQUES PER **WATERS OF THE US NOTE #3** AND ALLOW A TEMPORARY CROSSING ONLY WHEN NECESSARY. TEMPORARY STREAM CROSSINGS SHOULD BE REMOVED AS SOON AS POSSIBLE.



TIMBER MAT AND TEMP 404 STREAM CROSSING SECTION
WITHOUT CULVERT

NO SOIL SHOULD BE PUSHED OR MOVED FROM ABOVE THE OHW MARKS TO BELOW THE OHW MARKS.

NOTE:

TYPICAL USE IS FOR STREAM BANKS THAT ARE VERY FLAT AND STREAM CONDITIONS THAT ARE DRY OR VERY LOW FLOW. A SINGLE RAIN EVENT MAY CAUSE THE CONTRACTOR TO CHANGE TO THE CULVERT TEMPORARY CROSSING. REMOVE STREAM CROSSINGS AS SOON AS POSSIBLE.

TIMBER MATS WILL BE ADEQUATELY SIZED FOR THE INTENDED EQUIPMENT AND WILL NOT BREAK UPON LOADING.

TEMPORARY STREAM CROSSING DETAIL

WACO DISTRICT STANDARD

NOT TO SCALE

FED. ROAD DIV. No.	FEDERAL AID PROJECT		SHEET NO.
6			140
STATE	DISTRICT		COUNTY
TEXAS	WACO		CORYELL
CONTROL	SECTION	JOB	HIGHWAY NO.
1219	02	017, ETC.	FM 182

REVISED 03/09/2015

BEST MANAGEMENT PRACTICE (BMP) GENERAL NOTES

1. Prior to TxDOT allowing the Contractor to start construction, the Contractor will provide the required storm water and 404 permit documentation and support activities, including but not limited to the following:

   - Provide a list of all chemicals, construction and waste products that will be generated, stored or brought upon TxDOT ROW. The list includes expected construction debris, sanitary wastes, construction chemicals and petroleum products used or generated by the Contractor and sub-contractors. Along with the list, the Contractor will supply a spill prevention plan and clean up procedures that will include each of these chemical products or generated waste.

   - Provide in the construction schedule the necessary line items that will comply with the schedule and planning requirements of the storm water permit.

   - Post the TxDOT storm water permit and any Contractor permits, per permit requirements.

   - Provide copies of storm water permits for Contractor PSL(s). As new PSL(s) may be obtained for the project, provide copies of new or amended permits to TxDOT. The Contractor will not disturb soil without the proper permits.

   - Provide scale drawings of off ROW PSL's within one mile of the project, for field offices, borrow sources, plant sites or other uses.

   - Provide permit information on any Contractor batch plants or concrete crushing plants to be located at a Contractor PSL(s) within one mile of the project limits or boundaries. Copies of the air and water permits are to be provided to TxDOT before materials will be used on the project. No asphalt or concrete batch plants or concrete crushing plants will be located on TxDOT ROW.

   - Provide a letter indicating a Contractor Responsible Person for environmental compliance (CRP) for the project, and maintain a CRP throughout the project duration.

   - Provide all environmental documentation including certification of compliance and EMS training documents/certificates prior to starting work. The Contractor is to provide daily BMP inspection reports that document all field BMPs needing repair or replacement. The Contractor is to clearly document specific BMPs needing repair and location each work day. The Contractor is encouraged to be proactive in fixing BMPs without TxDOT direction.

   - Provide documentation required for Waters of the US, Note #3 and submittals for Item 496 bridge removal. Bridge removal methods submitted will follow all Waters of the US note requirements. The Contractor is not to start construction within the Ordinary High Water Marks of any stream until receiving approval for stream channel construction methods from TxDOT.

   - Provide a written procedure for managing all chemicals and construction items placed in vertical containment structures. Also, provide methods to be used for the treatment, disposal, collection or release of storm water.

   - Provide an estimated date by letter, for the submittal of marked up bridge drawings, indicating cut locations for any structural steel requiring cutting or torching of steel, coated with lead containing paints.

2. Place and maintain trash cans and portable sanitary facilities at locations where there is active construction. Worker generated trash and construction debris will be kept from being transported by storm water and will be collected daily from the ground and routinely hauled from the work area.

3. Contractor will provide TxDOT copies of all correspondence with MS4s, TCEQ, EPA, DSHS and Corps of Engineers regarding activities on this project.

4. Contractor to conduct storm water inspections and develop SWPPP documents to support Contractor permits obtained for the project including PSL(s).

5. Contractor will maintain written documentation of locations of all portable sanitary facilities. The Contractor is required to document the location and disposition of all spills and cleanups from portable sanitary facilities.

6. Contractor will not store chemicals on TxDOT ROW, unless chemicals are stored following all environmental and safety regulations. Fuels for construction equipment will not be stored on TxDOT ROW.

7. The Contractor will store fuels and bulk chemicals on Contractor PSL(s) using a secondary containment method, such as double lined tanks and/or free standing containment reservoirs made of plastic or steel designed to hold bulk chemicals or drums.

8. The Contractor will not remove sediment controls without the prior approval of TxDOT, except for a sediment control that may back up water and cause safety or traffic problems.

SCALE = NTS SHEET 1 OF 10

Texas Department of Transportation
Waco District Standard

TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

TA-BMP

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	DIST	COUNTY			SHEET NO.	
	WACO	CORYELL			141	

BEST MANAGEMENT PRACTICE (BMP) GENERAL NOTES

9. Any sediment controls removed by the Contractor must be re-installed before the next rainfall event or by the end of day, as approved in advance.

10. Vegetative buffer strips may be used in place of temporary sediment controls such as silt fences and rock filter dams. The amount of disturbed soil area will be limited to 1/3 of an acre or less for a minimum of 50 feet of grassed ditch and 2/3 of an acre of disturbed soil for a minimum of 100 feet of grassed ditch.

11. Construction equipment found to be leaking oil, fuel or coolant will be immediately stopped, the leaking fluid collected and the equipment fixed. Equipment continuing to leak will be removed from the project at no cost to TxDOT. Leaking fluids from equipment will be collected and removed from the project or PSL.

12. Earth berms or mounds typically used to stockpile topsoil and used in place of boundary silt fence will be seeded upon being constructed. Long term use of earth berms or mounds will not be continued without establishing grass on the control.

13. The Contractor will inform TxDOT of new areas where soil will be disturbed to facilitate planning for new sediment controls. Areas of vegetated soil will not be disturbed by the Contractor, unless adequate sediment controls can be installed before the next rainfall event. The Contractor will assist TxDOT in keeping an accurate set of working SWPPP drawings that show the locations of all temporary sediment and erosion controls.

14. The Contractor will maintain an adequate amount of temporary sediment controls on hand at the field office or project staging area for critical SWPPP maintenance, including silt fence (minimum of 200 feet) and rock / fabric for rock filter dams (minimum for 100 feet of Type III dams).

    The requirement for BMP rock quantities on hand is waived for small projects for on and off system bridge installations. The Contractor having a BMP Subcontractor does not eliminate the requirement for the Contractor to have the required silt fence and rock on hand, typically stored at the Contractor PSL.

15. Failure of a sub-contractor to complete storm water work on time will require the Contractor to start storm water sediment control work immediately and complete the work with high priority, or be subject to stop work on the entire project.

16. Earth materials on roads as a result of soil tracking will not be allowed to be transported off ROW in storm water. Soil or rock material found on roadways deposited from Contractor equipment will be removed daily.

17. Unless approved, completed concrete curb inlets will not be blocked by sediment controls. The contractor will frequently sweep the completed or partially completed roadway to keep sediment out of drainage pipes.

18. The Contractor will be responsible for proper dust control and will route construction traffic in a manner that minimizes dust generation.

19. Water for dust control will contain no pollutants, but may be non-potable from upland stock ponds. No quantity of water to be used for construction purposes may be taken from a 404 stream, prior to the proper authorizations or permits being obtained by the Contractor.

20. Contractor is to direct workers and sub-contractors to use portable sanitary facilities provided by the Contractor and not to trespass off ROW.

21. Contractor will provide written verification to TxDOT that earth borrow pits and disposal sources meet environmental and regulatory requirements, prior to use. Excavations will meet all OSHA requirements and the current safety guidelines established for TxDOT Quarries and Pits.

22. Boundary silt fences that are terminated down slope, with one end being at the lowest elevation, will be installed with an L - hook to contain sediment. Boundary silt fences that are installed on flat ground will have L-hooks on both ends.

23. Rock filter dams across ditches will be constructed where the rock filter dam ends are embedded within the ditch side slopes and ditch bottom. The top center elevation of the rock filter dam will be at least 6 inches lower than the elevations on the rock filter dam ends.

24. Silt fence will be constructed in a U or V pattern across ditch lines and up the ditch side slope to keep storm water from flowing around the ends of the silt fence. Small silt fences that do not adequately span the ditch and allows storm water around the end(s) will not be used. Where there is adequate space, large U pattern silt fences are preferred to facilitate sediment collection and sediment removal with equipment.

25. Sediment controls (RFDs or silt fences) will be located along road ditches as marked on the SWPPP drawings. Modifications to the sediment control spacing will be adjusted during the project based on sediment control effectiveness. The installation and maintenance of sediment controls at or near outfalls, where storm water leaves TxDOT ROW, takes persistent over ditch line sediment controls.

Texas Department of Transportation
Waco District Standard

TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

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BEST MANAGEMENT PRACTICE (BMP) GENERAL NOTES

26. Storm water draining sheet flow over disturbed soil sloped towards the ROW property line, will be intercepted by a boundary silt fence typically installed with L-shaped ends.

27. For ditch grading and shoulder up work, the Contractor is limited during good weather to remove up to one mile (limited to five acres of disturbed soil) of ditch line sediment controls; on one side of the roadway. Outfall controls cannot be removed during this activity. Ditch line controls must be replaced upon completion of work and before the next rain event.

28. Sediment controls damaged by the Contractor, as defined by permit, must be fixed or replaced immediately upon discovery.

29. Notches in silt fences are not typically allowed. Specific silt fences that back up water onto lanes of traffic may be notched if approved.

30. For silt fence maintenance, the Contractor will leave approximately 4 inches of deposited sediment up stream of silt fences and not over excavate around silt fences or rock filter dams.

31. The Contractor will inform TxDOT of new construction areas and where soil is planned to be disturbed. Sediment controls will be installed at outfalls prior to the Contractor beginning soil disturbing activities up slope from the outfall.

32. Water from concrete saw cutting, concrete grinding and concrete coring activities; or fine materials from concrete chipping and salvage will not be allowed to enter storm drains or enter streams.

33. Storm water containing suspended sediment and turbidity needing to be removed from excavations or low areas will be pumped or gravity drained through vegetated buffer strips (50 foot minimum) or placed in ditches with temporary sediment controls, prior to the water being discharged into a stream.

34. Uncontaminated water from natural groundwater seepage, springs, foundations and drains that does not contain suspended sediment or any pollutants may be discharged without storm water controls.

35. Lime or cement if spilled in ditches or outside the defined limits of application is considered a pollutant and will be excavated and removed the same day, to avoid contaminating streams.

36. If located along the project ROW, RAP stockpiles will be located where there is a minimum 100 feet of vegetative buffer strip before storm water will reach a stream. RAP will not be used as a construction material within the Ordinary High Water Marks of a stream channel of a 404 designated stream.

37. If allowed on the project, concrete truck wash out areas will have adequate volume to allow 12 inch freeboard for rain and will be lined with 6 mils of plastic. No concrete will be stored higher than the 12 inch freeboard. Cleaning of truck chutes and equipment does not constitute concrete truck wash out and this activity may be completed at the concrete placement location. Wash out areas will not be located closer than 50 ft from down slope inlets or stream channels.

38. For outfalls near stock ponds closer than 50 foot from disturbed soil at the ROW line, redundant sediment controls will be provided, typically a combination of rock filter dam and a silt fence constructed in line of the flow.

39. Earth stockpiles will utilize silt fence sediment controls, positioned on the low end of the stockpile drainage area with L-hooks or silt fence installed around the entire stockpile.

40. Sediment controls including rock filter dams and silt fences will not be installed across any 404 streams. Sediment controls at 404 streams will be positioned to limit sediment entering the stream from the banks and around structures/culverts, and will allow free flow of storm water to pass through the ROW without being dammed by any sediment controls. Remove loose materials from stream channels prior to each rain event.

41. Sediment controls for non-404 streams may be constructed across the drainage channel in unlimited locations. It is appropriate to use sediment control details typically used for 404 streams for non-404 streams when flow velocities are high. Remove loose material from stream channels prior to each rain event.

42. Incomplete drainage pipe installation across the roadway does not remove the requirement for having sediment controls around the ends of the pipe. To stay within permit requirements, sediment controls should be installed over and around the terminated end and along each side of the banks as soon as construction on the pipe has been completed. Remove loose material from stream channels prior to each rain event.

43. Safety end / headwall construction temporarily will require the removal of part of the sediment control placed over and around the pipe end. Retain in place as much functioning sediment control as possible. Replace the silt fence over and around the top of the pipe, immediately upon concrete placement and form removal. Do not remove culvert sediment controls that cannot be replaced before the next rain event. Sediment control at the ends of culverts must be in place and available for any rain event until the disturbed soil areas are re-vegetated.

Texas Department of Transportation
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TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

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BEST MANAGEMENT PRACTICE (BMP) GENERAL NOTES

44. Between the Ordinary High Water Marks of a 404 stream channel, the Contractor will disturb only the minimum amount of stream channel that is necessary to complete the work.

45. Rock riprap for erosion control does not replace the requirements to maintain sediment control until vegetation is re-established. Replace sediment controls immediately after installing erosion rock.

46. At the direction of TxDOT, sediment deposited into existing and new culverts will be removed subsidiary to Item 506. Sediment to be removed is either pre-existing material before construction starts or sediment generated as a part of this project.

47. Provide treated 2X4 cross bracing for rectangular inlet silt fence, subsidiary to Item 506.

48. Loose or granular earth materials will not be used to repair silt fence undercuts. Silt fence undercut repairs will be conducted with well compacted soils or the silt fence will be reset in a nearby location.

49. Silt fence steel T posts of approximately 1.25 pounds per foot are allowed at a spacing of 8 feet or less. Silt fence steel T posts between approximately 1.25 pounds per foot and 0.85 pounds per foot are allowed for T post spacing of 5 feet or less.

50. Silt fence to be used to slow the flow of storm water down slopes will be positioned approximately horizontal (on the contour) with L hooks on the ends and limited to approximately 200 feet in length. Multiple sections and levels of silt fence may be required in addition to temporary / permanent erosion control flumes.

51. Soil retention blankets will be installed rolled down the slope with the small dimension side embedded at the top of slope, unless recommended otherwise by the manufacturer. Excess grass, rocks, trash, debris or clods will be removed before seeding and installing soil retention blankets. All installations will be by the manufacturer recommendations. Contractor equipment, including tractor mowers will be kept off areas with soil retention blankets until the grass is established.

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TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

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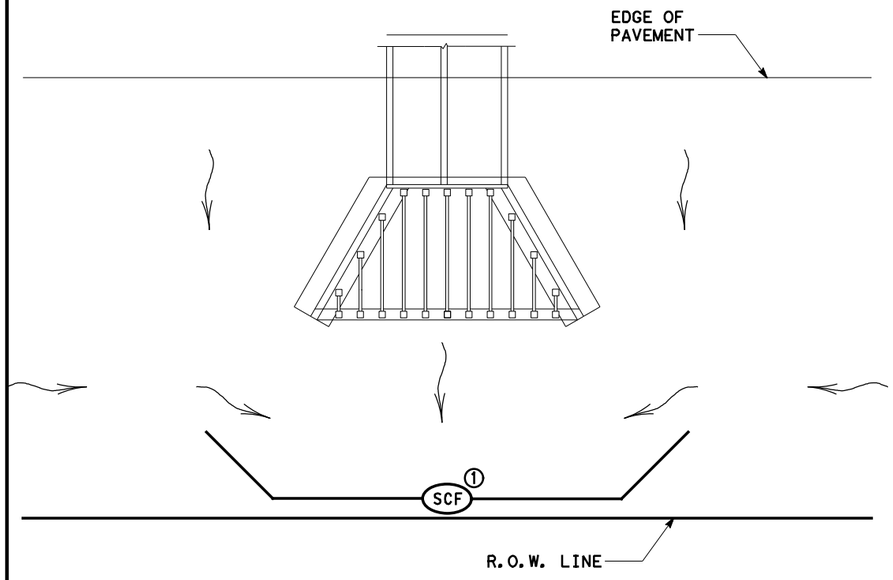
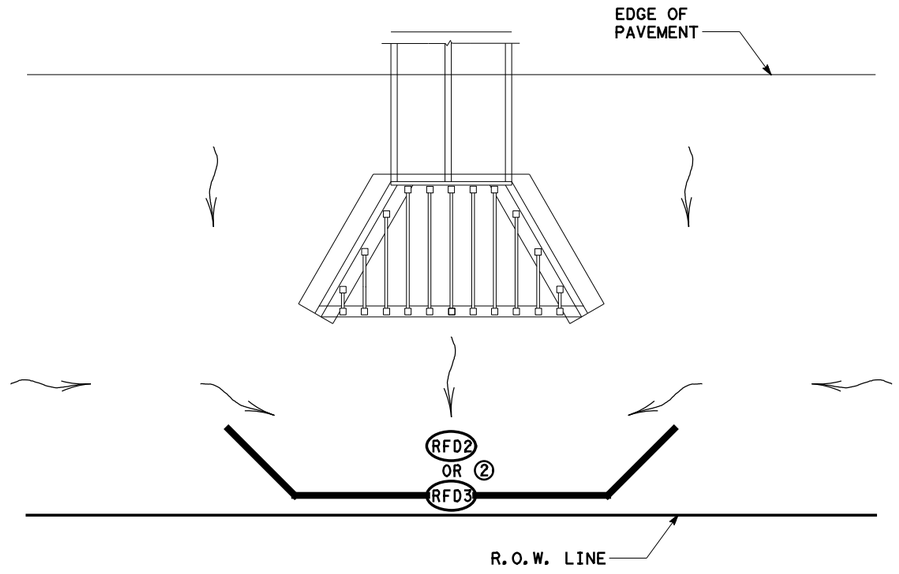


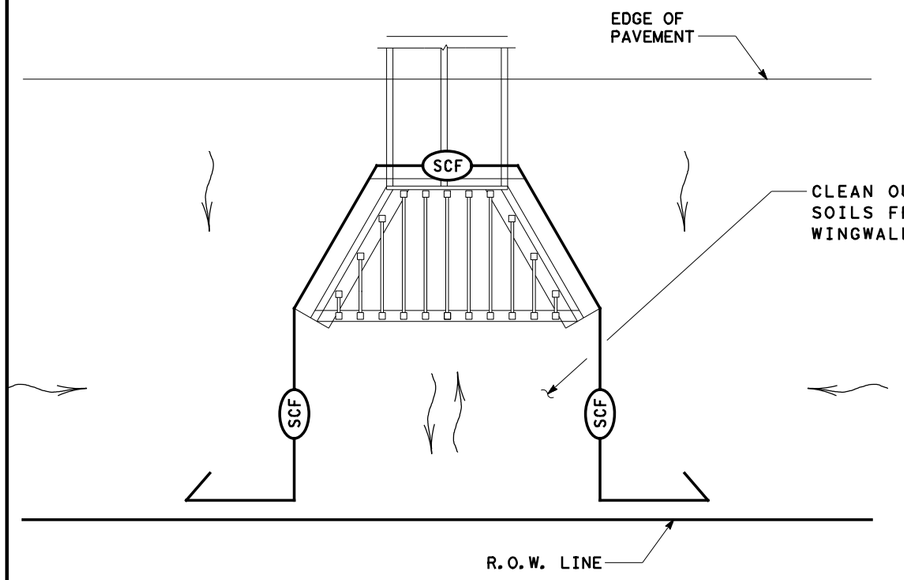
BEST MANAGEMENT PRACTICE (BMP) #1

FOR NON-404 STREAMS ONLY ~ SEDIMENT CONTROL AT EXIT OF CULVERT



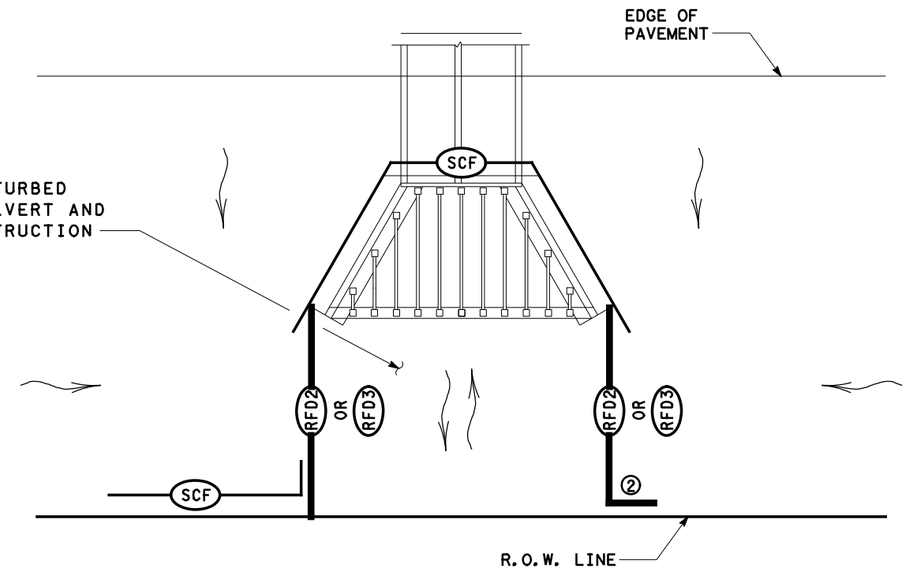
BEST MANAGEMENT PRACTICE (BMP) #2

FOR NON-404 STREAMS ONLY ~ SEDIMENT CONTROL AT EXIT OF CULVERT



BEST MANAGEMENT PRACTICE (BMP) #3

FOR 404 OR NON-404 STREAMS ~ SEDIMENT CONTROL AT EXIT OR ENTRANCE OF CULVERT



BEST MANAGEMENT PRACTICE (BMP) #4

FOR 404 OR NON-404 STREAMS ~ SEDIMENT CONTROL AT EXIT OR ENTRANCE OF CULVERT

SCF	SEDIMENT CONTROL FENCE
RFD2	ROCK FILTER DAM (TY 2)
RFD3	ROCK FILTER DAM (TY 3)
	DIRECTION OF FLOW

NOTES:

① EXTEND SILT FENCE SO STORM WATER DOES NOT GO AROUND THE ENDS. USE L-HOOKS ON ENDS AS REQUIRED.

② EXTEND ROCK FILTER DAM SO STORM WATER DOES NOT GO AROUND THE ENDS.

SCALE = NTS SHEET 5 OF 10

Texas Department of Transportation
Waco District Standard

TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

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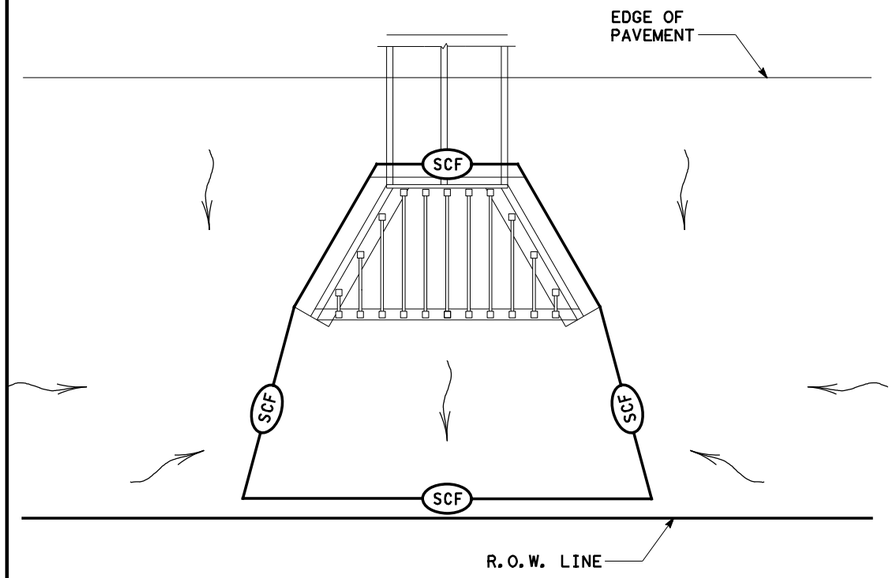
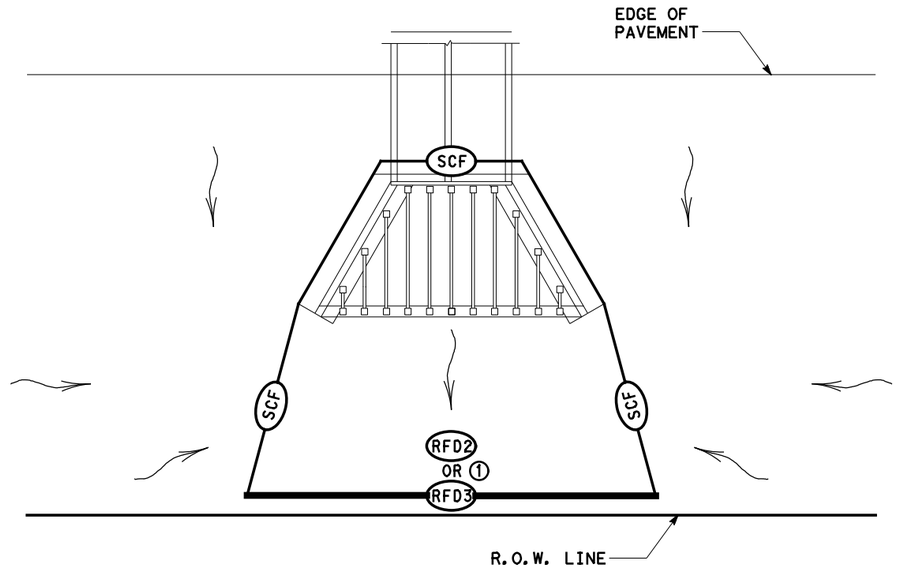


BEST MANAGEMENT PRACTICE (BMP) #5

FOR NON-404 STREAMS ONLY ~ SEDIMENT CONTROL AT EXIT OF CULVERT



BEST MANAGEMENT PRACTICE (BMP) #6

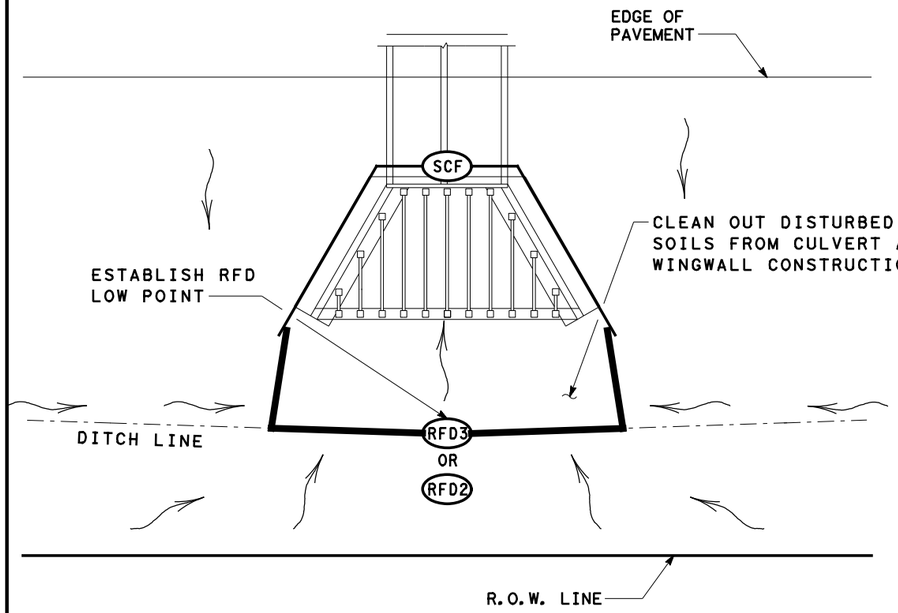
FOR NON-404 STREAMS ONLY ~ SEDIMENT CONTROL AT EXIT OF CULVERT

SCF	SEDIMENT CONTROL FENCE
RFD2	ROCK FILTER DAM (TY 2)
RFD3	ROCK FILTER DAM (TY 3)
	DIRECTION OF FLOW

NOTES:

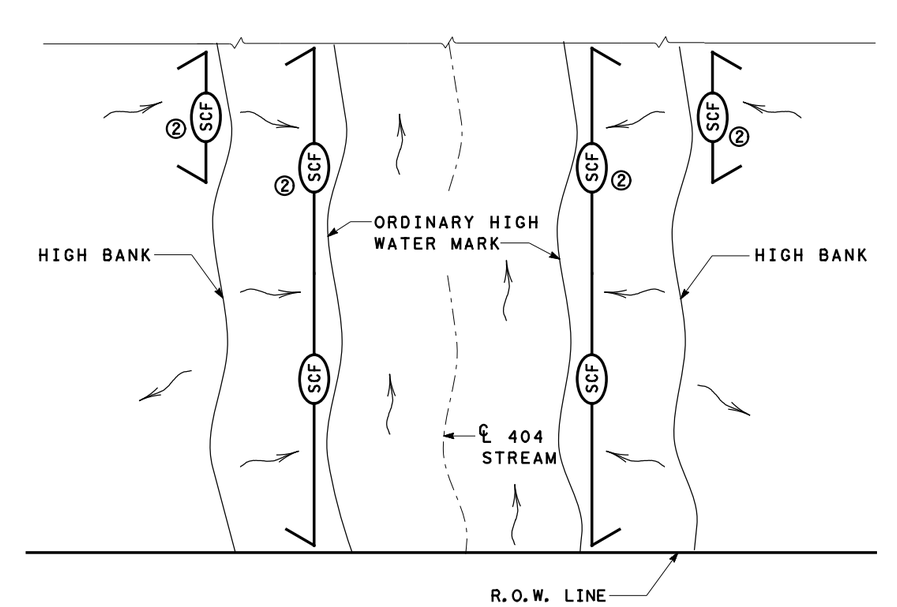
① PROVIDE OVERLAP OF SILT FENCE WITH ROCK FILTER DAM.

② USE SILT FENCE L-HOOKS ON ENDS TO BLOCK STORM WATER SEDIMENT



BEST MANAGEMENT PRACTICE (BMP) #7

FOR NON-404 STREAMS ONLY ~ SEDIMENT CONTROL AT ENTRANCE OF CULVERT



BEST MANAGEMENT PRACTICE (BMP) #8

FOR 404 STREAMS ~ SEDIMENT CONTROL DURING PROJECT CLEARING AND GRUBBING

SCALE = NTS SHEET 6 OF 10

Texas Department of Transportation
Waco District Standard

TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

TA-BMP

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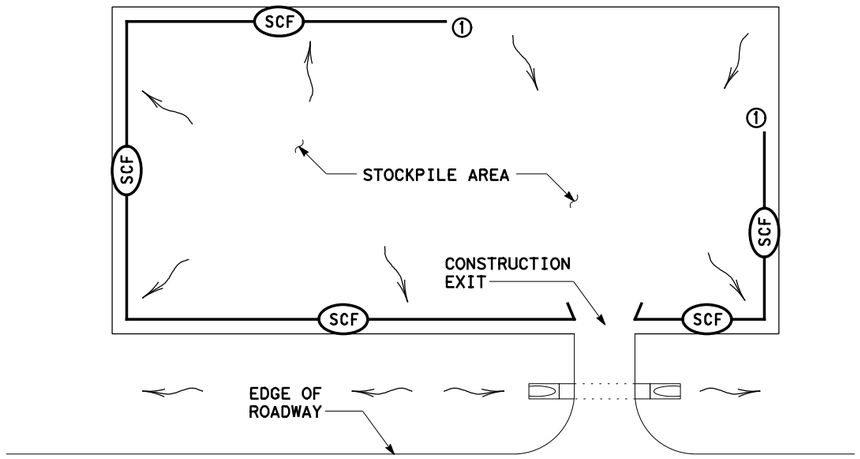
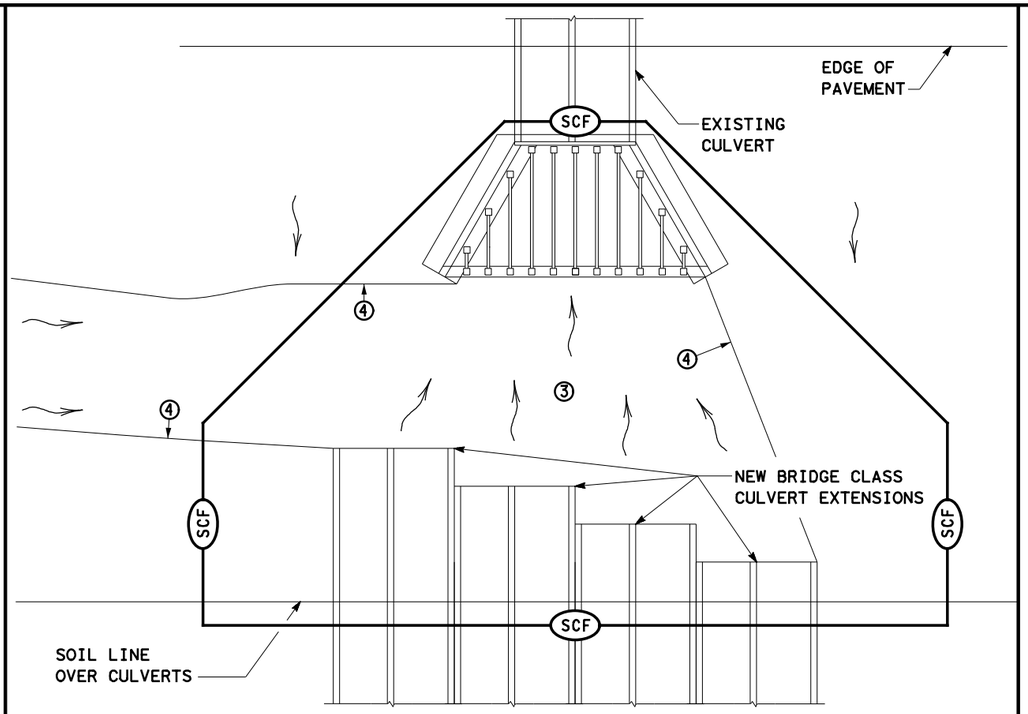


BEST MANAGEMENT PRACTICE (BMP) #9

STOCKPILE SEDIMENT CONTROL



BEST MANAGEMENT PRACTICE (BMP) #10

FOR 404 OR NON-404 STREAMS ONLY ~
SEDIMENT CONTROL AT PHASED CONSTRUCTION OF BRIDGE CLASS CULVERTS

SCF	SEDIMENT CONTROL FENCE
RFD2	ROCK FILTER DAM (TY 2)
RFD3	ROCK FILTER DAM (TY 3)
	DIRECTION OF FLOW

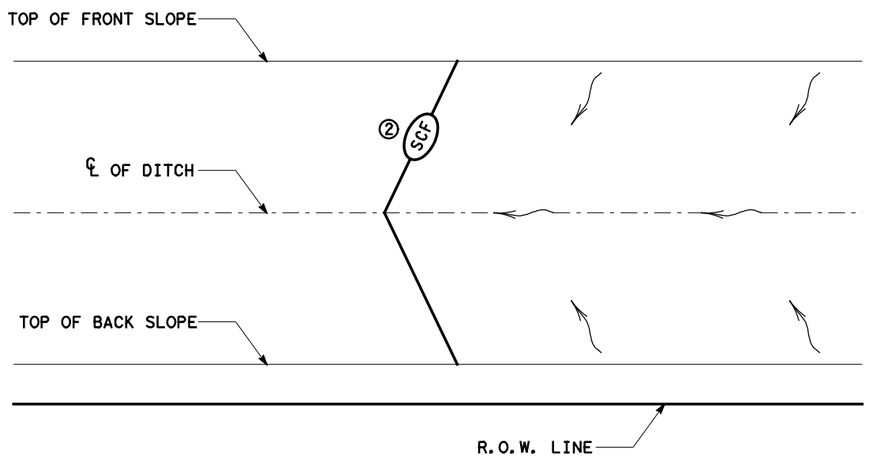
NOTES:

① START SEDIMENT CONTROL AT LOCATION SO ALL STORM WATER WITH SEDIMENT IS COLLECTED

② ROCK FILTER DAMS OR EARTH/GRASSED EMBANKMENTS CAN BE SUBSTITUTED AS DIRECTED.

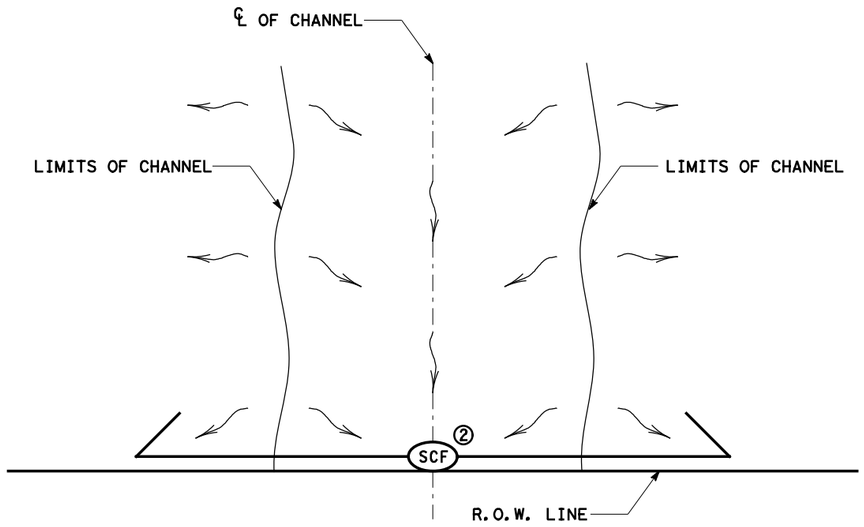
③ PROVIDE A SMOOTH TRANSITION FROM THE INVERT ELEVATIONS BETWEEN CULVERTS. REMOVE LOOSE SOIL FROM EXCAVATED AREA BETWEEN CULVERTS.

④ PROVIDE AND INSTALL PNEUMATICALLY PLACED CONCRETE ON THE DITCH BOTTOM AND SIDE SLOPES BETWEEN TEMPORARY TERMINATIONS BETWEEN OLD AND NEW CULVERTS. PNEUMATICALLY PLACED CONCRETE WILL BE PLACED TO THE HEIGHT OF THE LARGEST CULVERT ON THE DITCH SIDE SLOPES; AND TO A LIMIT 10 FEET OUTSIDE THE LOCATION OF BMPS ALONG THE DITCH BOTTOM. CEMENT STABILIZED SAND MAY BE SUBSTITUTED FOR PNEUMATICALLY PLACED CONCRETE, IN AREAS WHERE INSTALLATION WORKS AND AT THE OPTION OF TXDOT.



BEST MANAGEMENT PRACTICE (BMP) #11

BOUNDRY SEDIMENT CONTROL ~ BOTH ENDS OF CONTROL TERMINATED UP SLOPE



BEST MANAGEMENT PRACTICE (BMP) #12

BOUNDRY SEDIMENT CONTROL ~ BOTH ENDS OF CONTROL TERMINATED DOWN SLOPE

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TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

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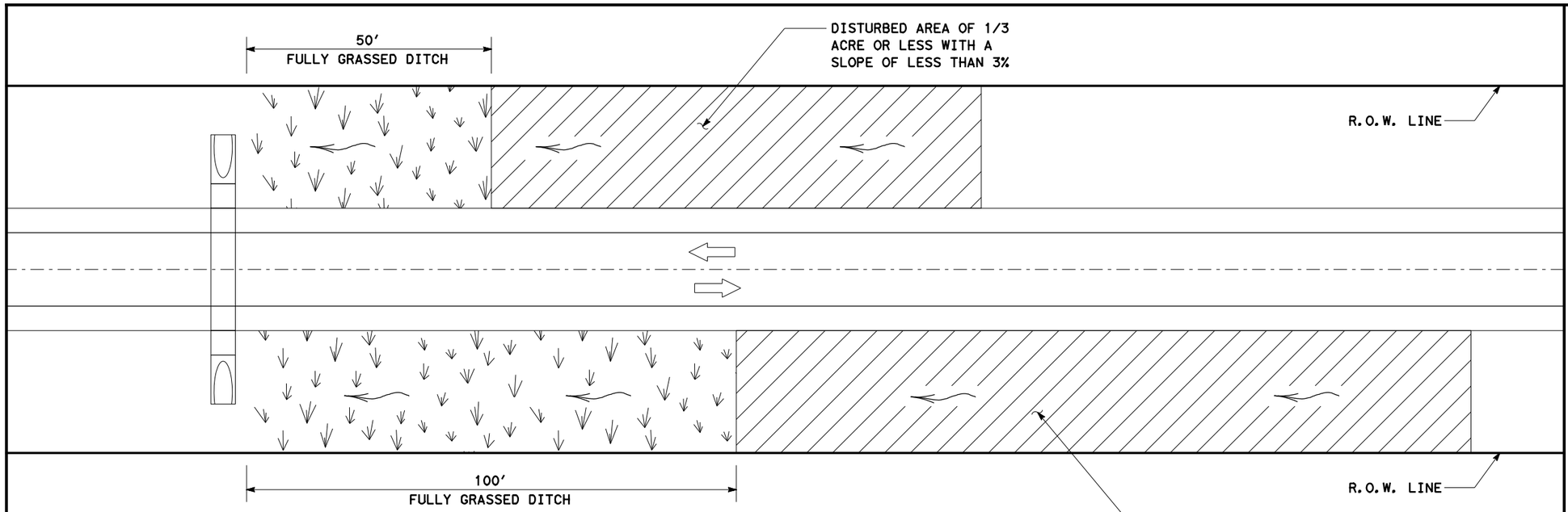
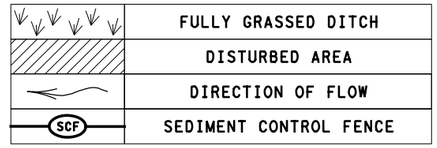
FEB 2015		WACO		CORYELL			147



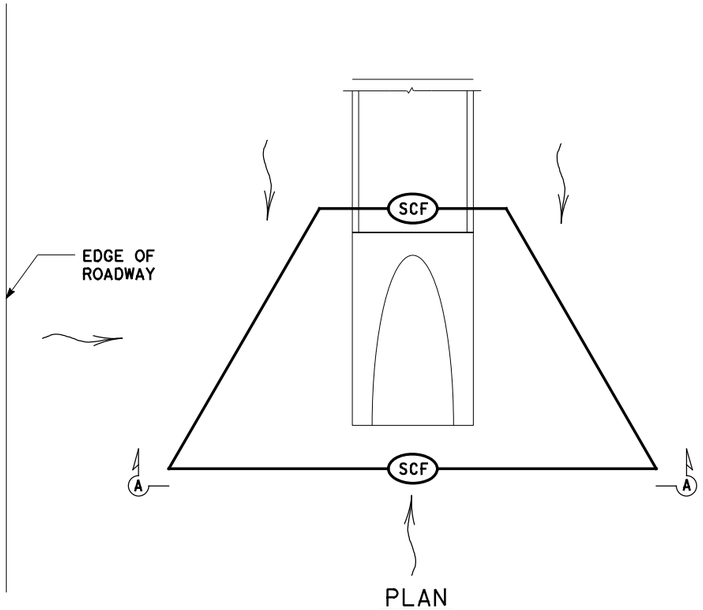
BEST MANAGEMENT PRACTICE (BMP) #13

USE OF VEGETATIVE BUFFERS IN PLACE OF TEMPORARY SEDIMENT CONTROLS SUCH AS SILT FENCE AND ROCK FILTER DAMS

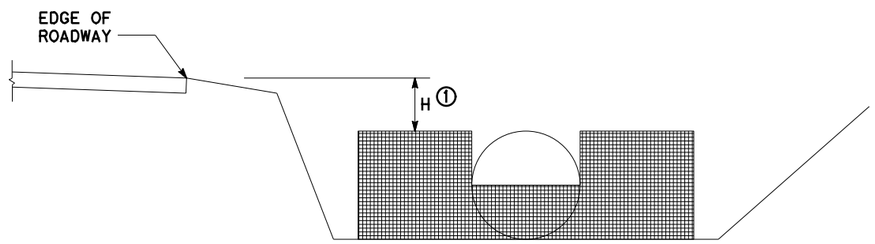


① FOR H DIMENSIONS LESS THAN 1.5' SILT FENCE MAY NEED TO BE NOTCHED AS SHOWN IN VIEW A-A. ADD EXTRA POSTS AT NOTCH.

② BMP #14 MAY BE USED AT CROSS DRAINAGE STRUCTURES AS DIRECTED.



PLAN



VIEW A-A

BEST MANAGEMENT PRACTICE (BMP) #14

NON-404 STREAMS AND DITCHES ONLY ~ SEDIMENT CONTROL AT PARALLEL DRAINAGE STRUCTURE ENTRANCE ②

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TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

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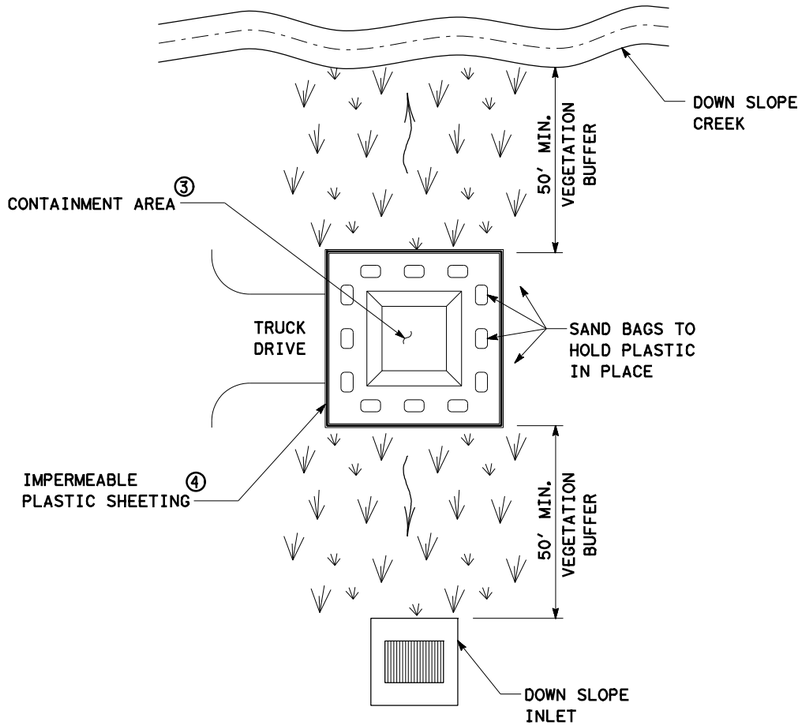
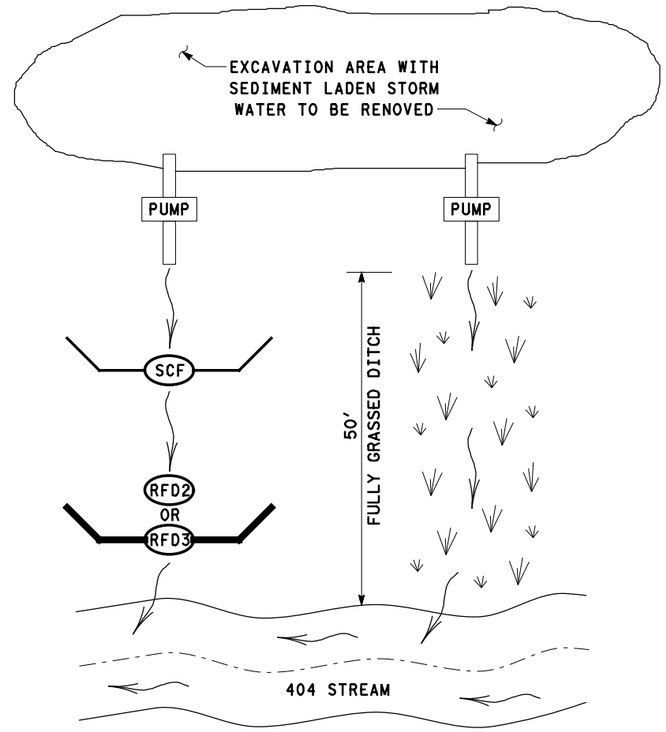


BEST MANAGEMENT PRACTICE (BMP) #15

CONCRETE TRUCK WASHOUT AREA



BEST MANAGEMENT PRACTICE (BMP) #16

PUMPED STORM WATER SEDIMENT CONTROLS ①

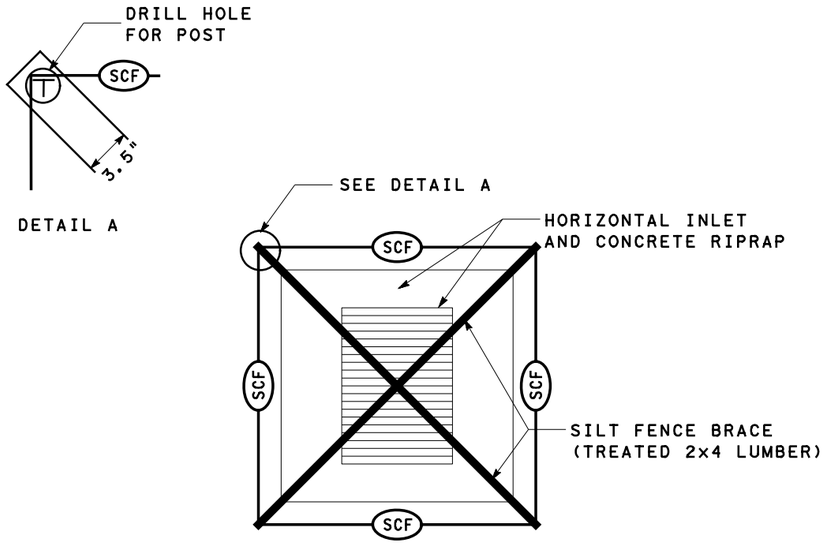
	FULLY GRASSED DITCH
	DIRECTION OF FLOW
SCF	SEDIMENT CONTROL FENCE
RFD2	ROCK FILTER DAM (TY 2)
RFD3	ROCK FILTER DAM (TY 3)

① PUMPED STORM WATER FROM AN EXCAVATION AREA SHOULD BE DISCHARGED IN A 50' VEGETATIVE BARRIER OR THROUGH TWO TEMPORARY SEDIMENT CONTROLS BEFORE ENTERING A 404 STREAM.

② FOR LANDOWNER STOCKPONDS WITHIN 50' OF THE RIGHT OF WAY LINE, PROVIDE REDUNDANT SEDIMENT CONTROLS AT THE CONVEYANCE OF THE POND. MINIMUM OF TWO SEDIMENT CONTROLS.

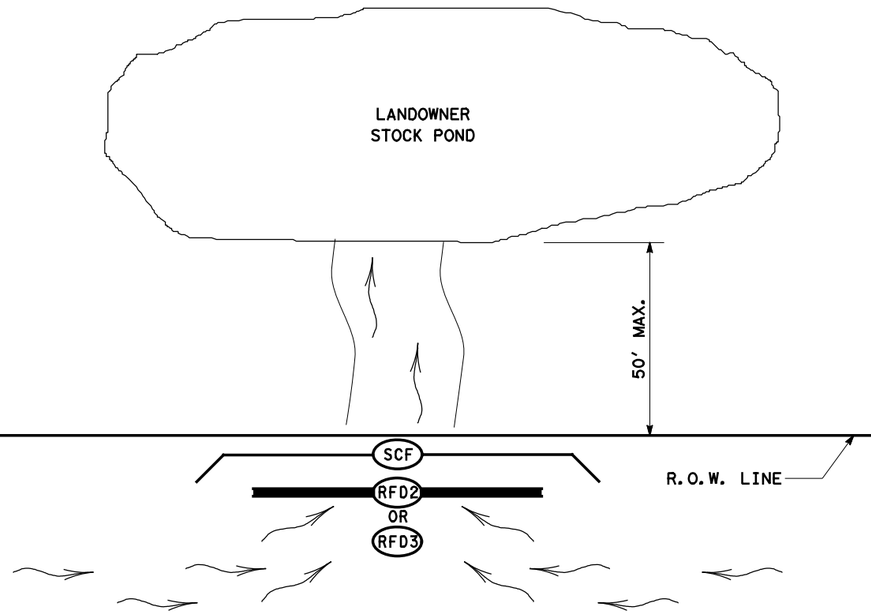
③ WHEN CONTAINMENT AREA REACHES 1' FREEBOARD, DISCONTINUE WASHOUT PLACEMENT AND REMOVE MATERIAL UPON SOLIDIFICATION.

④ EACH TIME SOLIDIFIED MATERIAL IS REMOVED REPLACE PLASTIC SHEETING.



BEST MANAGEMENT PRACTICE (BMP) #17

HORIZONTAL INLET SEDIMENT CONTROL



BEST MANAGEMENT PRACTICE (BMP) #18

LANDOWNER STOCKPOND SEDIMENT CONTROL ②

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TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

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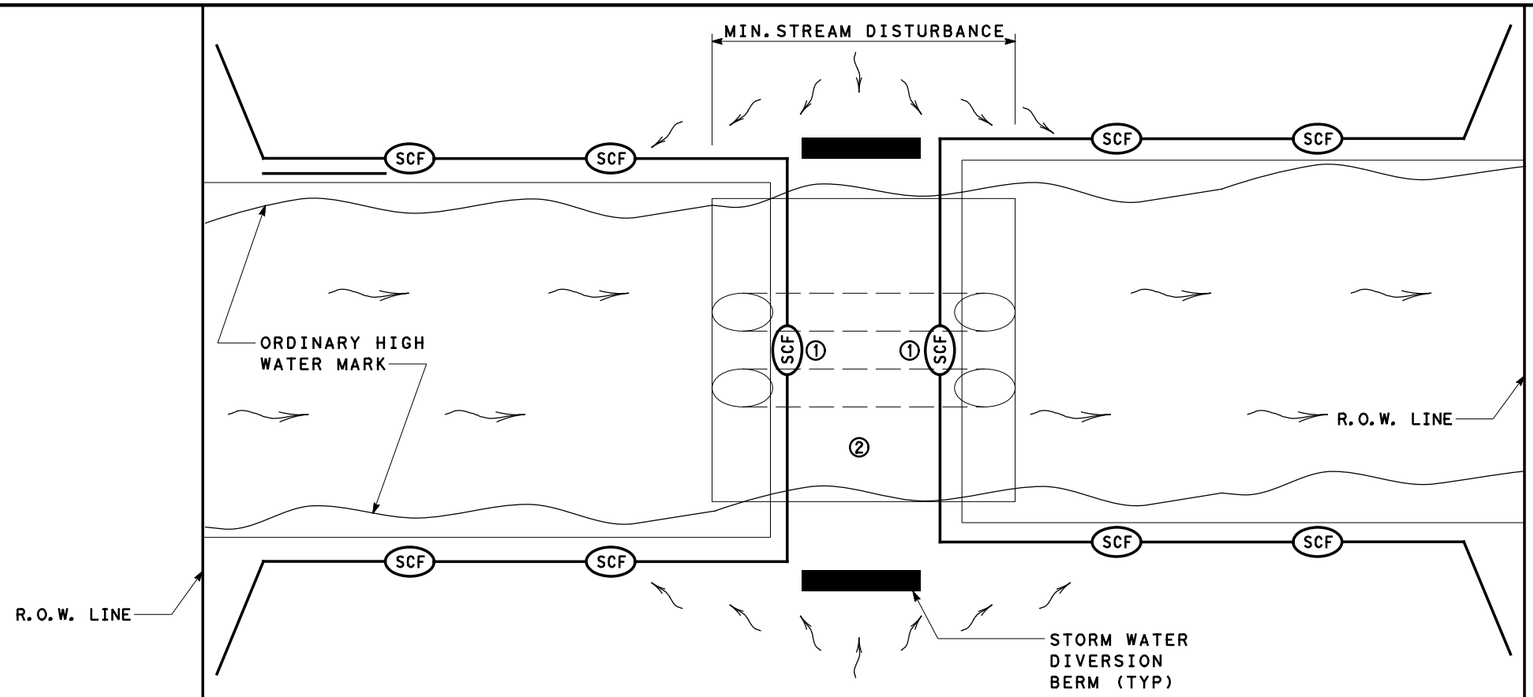


BEST MANAGEMENT PRACTICE (BMP) #19

TYPICAL 404 STREAM CROSSING (SEDIMENT CONTROL AT CROSSING)

	DIRECTION OF FLOW
SCF	SEDIMENT CONTROL FENCE
RFD	ROCK FILTER DAM
	SECURITY FENCING

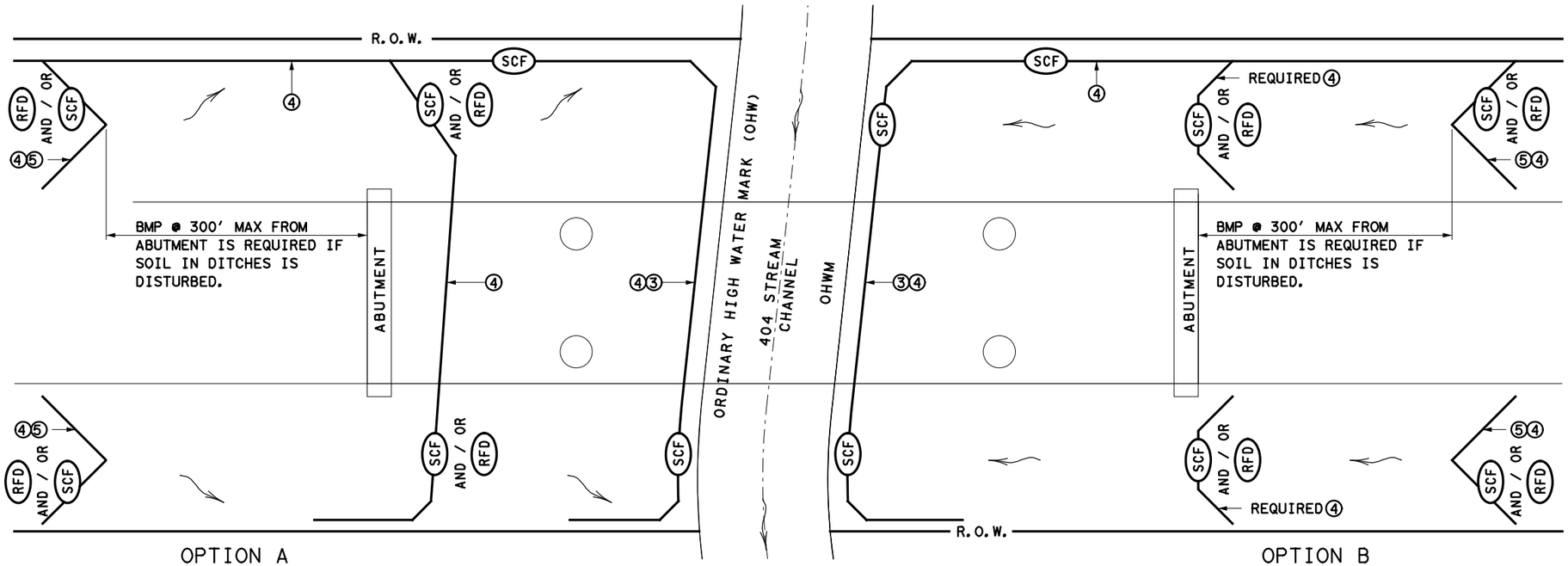
① HAY BALES MAY BE SUBSTITUTED FOR SILT FENCE OVER THE STREAM CROSSING.

② CROSSING WILL BE AS PER REQUIREMENTS OF THE WATERS OF THE US GENERAL NOTES.

③ INSTALL SILT FENCE SLIGHTLY UP FROM OHW MARK FROM R.O.W. TO R.O.W.

④ USE SILT FENCE L-HOOKS ON LEVEL OR DOWN SLOPING ENDS TO BLOCK STORM WATER SEDIMENT

⑤ INSTALL LARGE V OR U SHAPED BMP'S FROM ABUTMENT AS SHOWN. IF THERE IS STEEP DITCH CONDITIONS DECREASE SPACING AND CONSIDER RFD'S. ADD ADDITIONAL BMP'S IF GRADE IS STEEP OR IF FLOW IS HIGH.



BEST MANAGEMENT PRACTICE (BMP) #20

FOR 404 STREAMS ~ BMP'S AT BRIDGES

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TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

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