FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	BR 2023(980)		1
STATE	STATE DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONTROL	SECTION	JOB	HIGHWAY NO.
0715	01	025, ETC	FM 108, ETC

INDEX OF SHEETS

SEE SHEET 2

STATE OF TEXAS
TEXAS DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

FEDERAL PROJECT NO. BR 2023(980)

FM 108 AT DRAW & BRUSHY CREEK
FM 108 AT FIVE MILE CREEK & DRAW
SH 97 AT RED BRANCH

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

FM 108 AT DRAW AND BRUSHY CREEK	- 2470.00 LF = 0.468 MI
FM 108 AT DRAW AND FIVE MILE CREEK	- 1065.00 LF = 0.201 MI
SH 97 AT RED BRANCH	- 530.00 LF = 0.100 MI
PROJECT TOTAL	- 4065.00 LF = 0.769 MI

CONTRACTOR: _____
DATE OF LETTING: _____
DATE WORK BEGAN: _____
DATE WORK COMPLETED: _____
DATE WORK ACCEPTED: _____
FINAL CONTRACT COST: $ _____

LIST OF APPROVED FIELD CHANGES:

THIS IS TO CERTIFY THAT THE CONSTRUCTION WORK WAS PERFORMED IN ACCORDANCE WITH THE PLANS, CONTRACT, AND LISTED FIELD CHANGES.

_____ P.E.
AREA ENGINEER DATE

(1) COUNTY: GONZALES
CSJ: 0715-01-025
HIGHWAY: FM 108
LIMITS: FM 108 AT DRAW AND BRUSHY CREEK
FUNCTIONAL CLASS: RURAL MAJOR COLLECTOR
DESIGN SPEED: 60 MPH
ADT: 1104 VPD (2021); 2031 VPD (2041)

ROADWAY = 2314.00 LF = 0.438 MI
BRIDGE = 156 LF = 0.030 MI
TOTAL = 2470.00 LF = 0.468 MI

(2) COUNTY: GONZALES
CSJ: 0715-01-025
HIGHWAY: FM 108
LIMITS: FM 108 AT FIVE MILE CREEK & DRAW
FUNCTIONAL CLASS: RURAL MAJOR COLLECTOR
DESIGN SPEED: 60 MPH
ADT: 1104 VPD (2021); 2031 VPD (2041)

ROADWAY = 947.84 LF = 0.180 MI
BRIDGE = 117.16 LF = 0.021 MI
TOTAL = 1065.00 LF = 0.201 MI

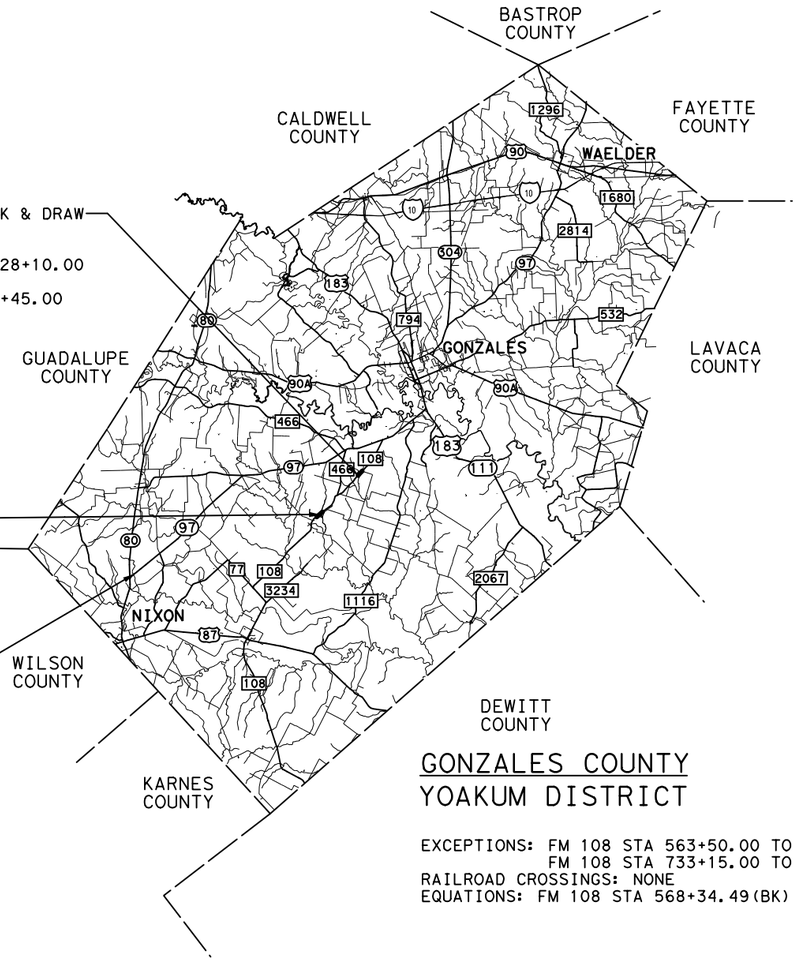
(3) COUNTY: GONZALES
CSJ: 0347-02-033
HIGHWAY: SH 97
LIMITS: SH 97 AT RED BRANCH CREEK
FUNCTIONAL CLASS: RURAL MAJOR COLLECTOR
DESIGN SPEED: 65 MPH
ADT: 2616 VPD (2021); 3662 VPD (2041)

ROADWAY = 506.16 LF = 0.095 MI
BRIDGE = 23.84 LF = 0.005 MI
TOTAL = 530.00 LF = 0.100 MI

(2) FM 108 AT FIVE MILE CREEK & DRAW
PROJECT NO. BR 2023(980)
CSJ 0715-01-025
BEGIN CONSTRUCTION STA 728+10.00
REF MRK = 498+0.853
END CONSTRUCTION STA 743+45.00
REF MRK = 498+0.567

(1) FM 108 AT DRAW
& BRUSHY CREEK
PROJECT NO. BR 2023(980)
CSJ 0715-01-025
BEGIN CONSTRUCTION STA 538+80.00
REF MRK = 502+0.415
END CONSTRUCTION STA 563+50.00
REF MRK = 502-0.047

(3) SH 97 AT RED BRANCH
PROJECT NO. BR 2023(980)
CSJ 0347-02-033
BEGIN CONSTRUCTION STA 1127+10.00
REF MRK = 580+0.277
END CONSTRUCTION STA 1132+40.00
REF MRK = 580+0.186



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CP&Y an STV Company
TEXAS REGISTERED ENGINEERING FIRM F-1741

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

GONZALES COUNTY
YOAKUM DISTRICT

EXCEPTIONS: FM 108 STA 563+50.00 TO STA 728+10.00
FM 108 STA 733+15.00 TO STA 737+85.00
RAILROAD CROSSINGS: NONE
EQUATIONS: FM 108 STA 568+34.49(BK) = STA 568+34.30(AH) = 0.19'

STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED
PROFESSIONAL ENGINEER

SUBMITTED FOR LETTING 3/31/2023

PROJECT MANAGER
CP&Y, INC.

RECOMMENDED FOR LETTING 4/19/2023
DocuSigned by: Jeffery Vinklarek, P.E.
DIRECTOR OF TRANSPORTATION PLANNING & DEVELOPMENT

APPROVED FOR LETTING 4/20/2023
DocuSigned by: Martin C. Horsley PE
DISTRICT ENGINEER

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SHEET NO.		DESCRIPTION
		GENERAL
1		TITLE SHEET
2		INDEX OF SHEETS
3 – 7		TYPICAL SECTIONS
8, 8A–8I		GENERAL NOTES
9, 9A–9B		ESTIMATE & QUANTITY SHEET
10 – 13		SUMMARY OF QUANTITIES (FM 108 AT DRAW AND BRUSHY CREEK)
14 – 16		SUMMARY OF QUANTITIES (FM 108 AT FIVE MILE CREEK AND DRAW)
17 – 18		SUMMARY OF QUANTITIES (SH 97 AT RED BRANCH)
19 – 20		CRASH CUSHION SUMMARY SHEET
		TRAFFIC CONTROL PLAN
21		TRAFFIC CONTROL PLAN SEQUENCE OF WORK
22		OMITTED
23		TRAFFIC CONTROL PLAN PHASE 1 (FM 108 AT DRAW NEAR BRUSHY CREEK)
24		TRAFFIC CONTROL PLAN PHASE 1 (FM 108 AT DRAW AND FIVE MILE CREEK)
25		TRAFFIC CONTROL PLAN PHASE 2
26		TRAFFIC CONTROL PLAN PHASE 3
27		TRAFFIC CONTROL PLAN PHASE 4
28 – 29		TRAFFIC CONTROL PLAN TYPICAL SECTIONS (FM 108 AT BRUSHY CREEK AND DRAW)
30 – 32		TRAFFIC CONTROL PLAN PHASE 3A (FM 108 AT DRAW AND BRUSHY CREEK)
33		TRAFFIC CONTROL PLAN PHASE 4 (FM 108 AT DRAW AND BRUSHY CREEK)
34		TRAFFIC CONTROL PLAN (SH 97 DETOUR LAYOUT)
		STANDARD SHEETS
35 – 46	*	BC(1)–21 TO BC(12)–21
47	*	TCP(2–1)–18
48	*	TCP(2–2)–18
49	*	TCP(2–8)–18
50	*	TCP(3–1)–13
51	*	TCP(3–3)–14
52	*	TCP(7–1)–13
53 – 60	*	TCP(SC–1)–22 TO TCP(SC–8)–22
61	*	WZ(STPM)–13
62	*	WZ(UL)–13
63	*	WZ(RS)–22
64 – 65	*	SSCB(2)–10
66	*	ABSORB(M)–19
67	*	SLED–19
		ROADWAY DETAILS
68 – 69		HORIZONTAL/VERTICAL CONTROL INDEX SHEET (FM 108 AT DRAW AND BRUSHY CREEK)
70 – 71		HORIZONTAL/VERTICAL CONTROL INDEX SHEET (FM 108 AT FIVE MILE CREEK AND DRAW)
72		HORIZONTAL/VERTICAL CONTROL INDEX SHEET (SH 97 AT RED BRANCH)
73 – 74		HORIZONTAL/VERTICAL CONTROL (FM 108 AT DRAW AND BRUSHY CREEK)
75 – 76		HORIZONTAL/VERTICAL CONTROL (FM 108 AT FIVE MILE CREEK AND DRAW)
77		HORIZONTAL/VERTICAL CONTROL (SH 97 AT RED BRANCH)
78		HORIZONTAL ALIGNMENT DATA (FM 108 AT DRAW AND BRUSHY CREEK)
79		HORIZONTAL ALIGNMENT DATA (FM 108 AT FIVE MILE CREEK AND DRAW)
80 – 84		PLAN AND PROFILE (FM 108 AT DRAW AND BRUSHY CREEK)
85 – 86		PLAN AND PROFILE (FM 108 AT FIVE MILE CREEK AND DRAW)
87		PLAN AND PROFILE (SH 97 AT RED BRANCH)
88 – 89		DRIVEWAY LAYOUT (FM 108 AT DRAW AND BRUSHY CREEK)
90		DRIVEWAY LAYOUT (FM 108 AT FIVE MILE CREEK AND DRAW)
91		CR137 LAYOUT (FM 108 AT FIVE MILE CREEK AND DRAW)
92		WIRE FENCE DETAIL
		STANDARD SHEETS
93	*	GF(31)–19
94 – 95	*	GF(31)TR TL3–20
96	*	BED–14
97	*	SGT(12S)31–18
98	*	SGT(15)31–20
99 – 102	*	MB(1 THRU 4)–21
103	*	WF(2)–10
104	*	SMTC(N)–16
105	*	QGUARD(M10)(N)–20
		DRAINAGE
106		DRAINAGE AREA MAP (FM 108 AT DRAW AND BRUSHY CREEK)
107		DRAINAGE AREA MAP (FM 108 AT FIVE MILE AND DRAW)
108		DRAINAGE AREA MAP (SH 97 AT RED BRANCH)
109		HYDRAULIC DATA SHEET (FM 108 AT DRAW)
110		HYDRAULIC DATA SHEET (FM 108 AT BRUSHY CREEK)
111		HYDRAULIC DATA SHEET (FM 108 AT FIVE MILE CREEK)
112		HYDRAULIC DATA SHEET (FM 108 AT DRAW)
113		HYDRAULIC DATA SHEET (SH 97 AT RED BRANCH)
113A		SCOUR DATA SHEET (FM 108 AT BRUSHY CREEK)
114		BRIDGE CLASS CULVERT LAYOUT (FM 108 AT DRAW)
115		BRIDGE CLASS CULVERT LAYOUT (FM 108 AT FIVE MILE CREEK)
116		BRIDGE CLASS CULVERT LAYOUT (FM 108 AT DRAW)
117		BRIDGE CLASS CULVERT LAYOUT (SH 97 AT RED BRANCH)
118 – 121		STEPPED CULVERT DETAILS
122		BCS

SHEET NO.		DESCRIPTION
		STANDARD SHEETS
123	*	SETP–PD
124	*	CRR
125	*	FW–0
126	#	FW–0 (MOD)
127	#	FW–S (MOD)
128 – 129	#	RAC (MOD)
130	*	SCP–8
131	*	SCP–9
132	*	SCP–10
133	*	SCP–MD
		BRIDGES
134		BRIDGE LAYOUT BRUSHY CREEK BRIDGE
135		BORING LOGS BRUSHY CREEK BRIDGE
136		CONSTRUCTION SEQUENCE AND TYPICAL SECTION BRUSHY CREEK BRIDGE
137		ESTIMATED QUANTITIES AND CAP ELEVATIONS BRUSHY CREEK BRIDGE
138		ABUTMENT NO. 1 (PHASE 1)
139		ABUTMENT NO. 1 (PHASE 2)
140		ABUTMENT NO. 4 (PHASE 1)
141		ABUTMENT NO. 4 (PHASE 2)
142		MISCELLANEOUS ABUTMENT DETAILS
143		INTERIOR BENT NO. 2 AND 3 (PHASE 1)
144		INTERIOR BENT NO. 2 AND 3 (PHASE 2)
145		BEAM LAYOUT (PHASE 1 AND PHASE 2)
146		100.00' PRESTR CONC SLAB BEAM UNIT (PHASE 1)
147		100.00' PRESTR CONC SLAB BEAM UNIT (PHASE 2)
		STANDARD SHEETS
148	#	AJ
149 – 150	#	CSAB
151	#	BAS–A
152 – 153	#	FD
154	#	NBIS
155	#	PSB–4SB15
156	#	PSB–5SB15
157	#	PSBEB
158	#	PSBRA
159	#	PSBND
160 – 161	#	SRR
162 – 163	#	SSTR
		TRAFFIC ITEMS
		STANDARD SHEETS
164 – 168	*	D & OM(1–5)–20
169	*	D & OM(VIA)–20
170	*	PM(1)–22
171	*	PM(2)–22
172	*	SMD(GEN)–08
173	*	SMD(TW)–08
		ENVIRONMENTAL ISSUES
174 – 175		TXDOT STORM WATER POLLUTION PREVENTION PLAN (FM 108 SWP3)
176 – 177		TXDOT STORM WATER POLLUTION PREVENTION PLAN (SH 97 SWP3)
178 – 180		SWP3 LAYOUT (FM 108 AT DRAW AND BRUSHY CREEK)
181		SWP3 LAYOUT (FM 108 AT FIVE MILE CREEK)
182		SWP3 LAYOUT (FM 108 AT DRAW)
183		SWP3 LAYOUT (SH 97 AT RED BRANCH)
184 – 184A		EPIC
		STANDARD SHEETS
185	*	EC(1)–16
186	*	EC(2)–16

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

03/31/2023

BRIAN A. JONES, P.E.

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

03/31/2023

KELLY HO, P.E.

NO.	REVISION	BY	DATE

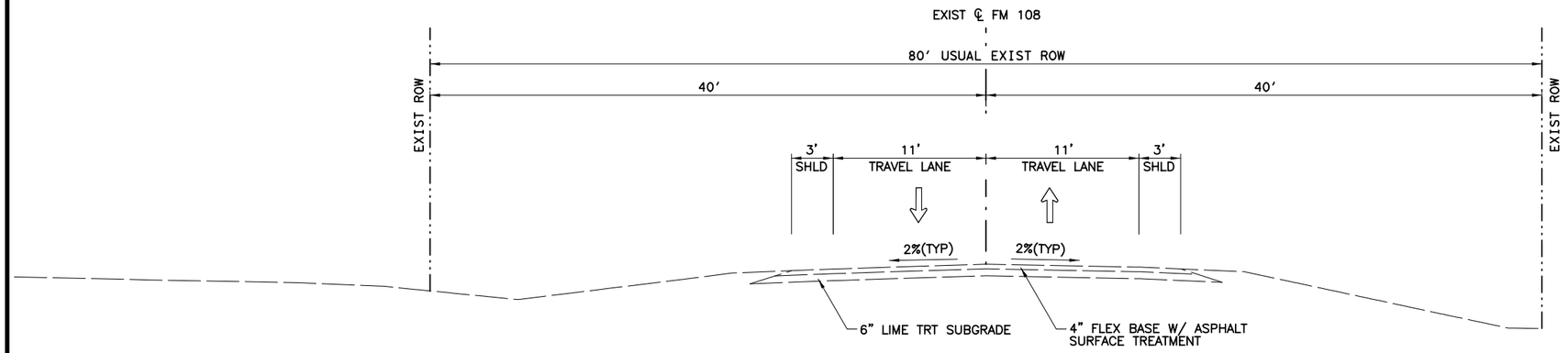
CP&Y an STV Company

TEXAS REGISTERED ENGINEERING FIRM F-1741

INDEX OF SHEETS

CSJ 0715–01–025

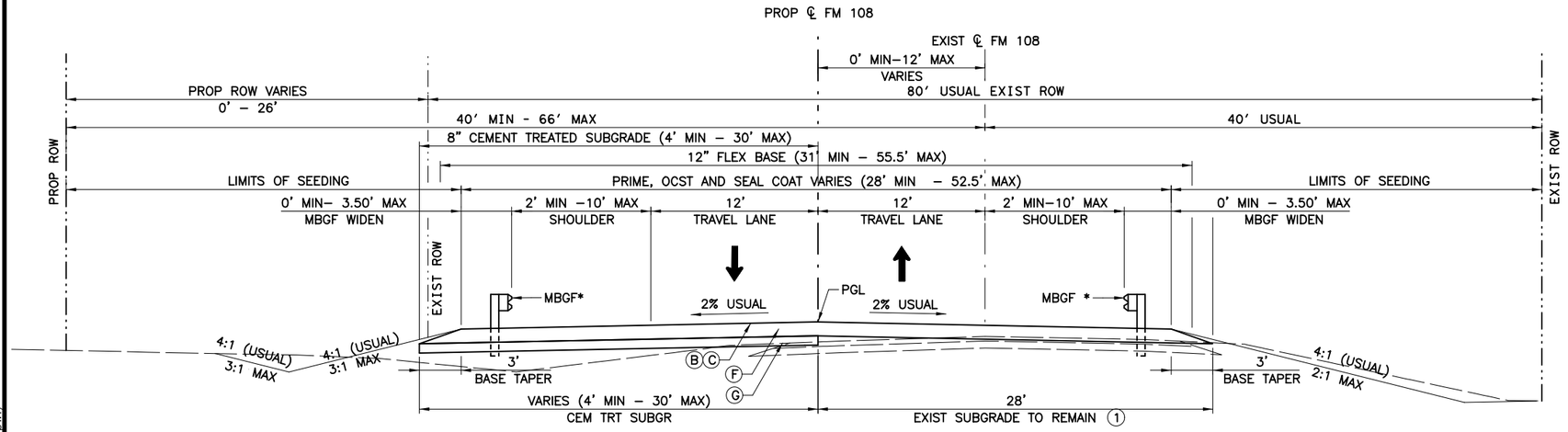
Designed:	CPY	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	CPY	6	TEXAS					FM 108,ETC
Drawn:	CPY	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	CPY	YKM	GONZALES	0715	01	025,ETC		2



FM 108 EXISTING ROADWAY TYPICAL SECTION

NOT TO SCALE

STA 539+12.00 TO STA 541+43.00
STA 542+00.00 TO STA 549+44.00
STA 550+44.00 TO STA 563+50.00



FM 108 PROPOSED ROADWAY TYPICAL SECTION

NOT TO SCALE

STA 538+80.00 TO STA 540+31.00 LT (SHLDR VARIES 2′–8′)
STA 540+31.00 TO STA 543+84.00 LT (8′)
STA 543+84.00 TO STA 548+21.00 LT (SHLDR VARIES 8′–10′)
STA 548+21.00 TO STA 552+55.00 LT (10′)
STA 552+55.00 TO STA 553+05.00 LT (SHLDR VARIES 10′–2′)

STA 538+80.00 TO STA 539+31.00 RT (SHLDR VARIES 2′–8′)
STA 539+31.00 TO STA 543+09.00 RT (8′)
STA 543+09.00 TO STA 547+32.00 RT (SHLDR VARIES 8′–10′)
STA 547+32.00 TO STA 551+68.00 RT (10′)
STA 551+68.00 TO STA 552+18.00 RT (SHLDR VARIES 10′–2′)

① FULL WIDTH CEMENT TREATMENT FROM STA 538+80.00 TO STA 541+40.00

LEGEND

- Ⓐ 2" HMA (TYPE D)
- Ⓑ PRIME COAT (RC–250) WITH GR 5 AGGR
- Ⓒ OCST WITH GR 3 AGGR
- Ⓓ 10" HMA (TYPE B)
- Ⓔ SEAL COAT WITH GR 4 AGGR
- Ⓕ 12" FLEX BASE
- Ⓖ 8" CEMENT TREATED SUBGRADE

STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED
PROFESSIONAL ENGINEER
3/31/2023

NO.	REVISION	BY	DATE

CP&Y an STV Company
TEXAS REGISTERED ENGINEERING FIRM F-1741

 Texas Department of Transportation

FM 108 AT BRUSHY CREEK & DRAW

TYPICAL SECTIONS

CSJ 0715–01–025 SHEET 1 OF 5

Designed:	YP	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	BAJ	6	TEXAS				FM 108,ETC
Drawn:	YP	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	BAJ	YKM	GONZALES	0715	01	025,ETC	3

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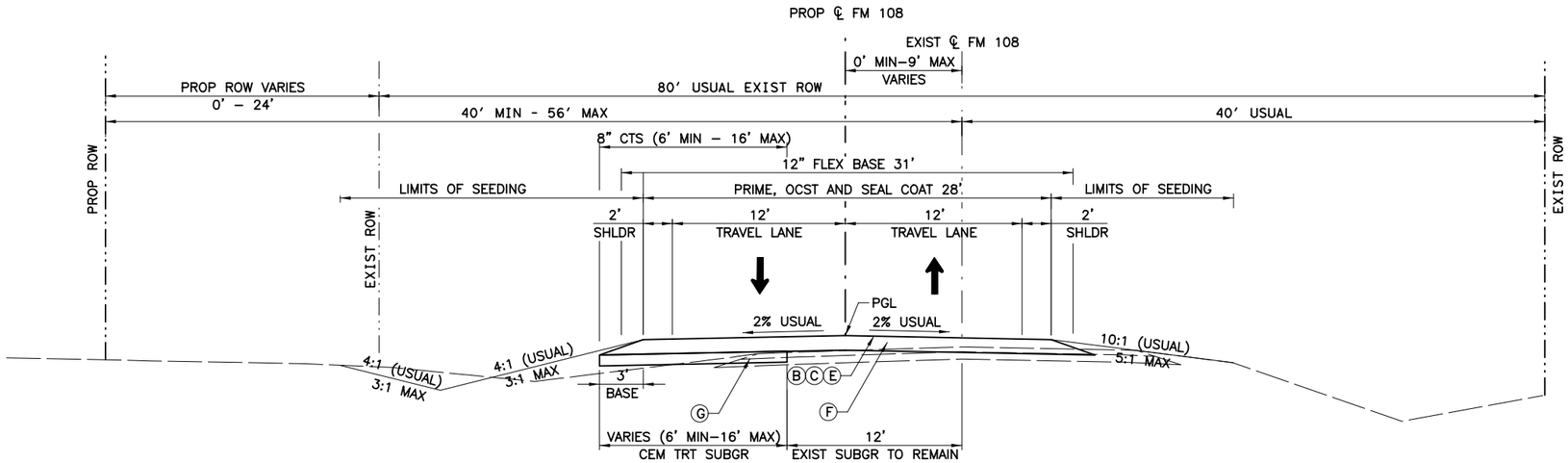


FM 108 PROPOSED ROADWAY TYPICAL SECTION

NOT TO SCALE

STA 553+05.00 TO STA 563+50.00 LT

STA 552+18.00 TO STA 563+50.00 RT

EXISTING PAVEMENT TO BE SCARIFIED AND SHAPED TO CONFORM TO THE NEW SUBGRADE PAID FOR UNDER CEMENT TREATED BASE OPERATION.

LEGEND

- (A) 2" HMA (TYPE D)
- (B) PRIME COAT (RC–250) WITH GR 5 AGGR
- (C) OCST WITH GR 3 AGGR
- (D) 10" HMA (TYPE B)
- (E) SEAL COAT WITH GR 4 AGGR
- (F) 12" FLEX BASE
- (G) 8" CEMENT TREATED SUBGRADE

STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED PROFESSIONAL ENGINEER

3/31/2023

NO.	REVISION	BY	DATE

CP&Y an STV Company

TEXAS REGISTERED ENGINEERING FIRM F-1741

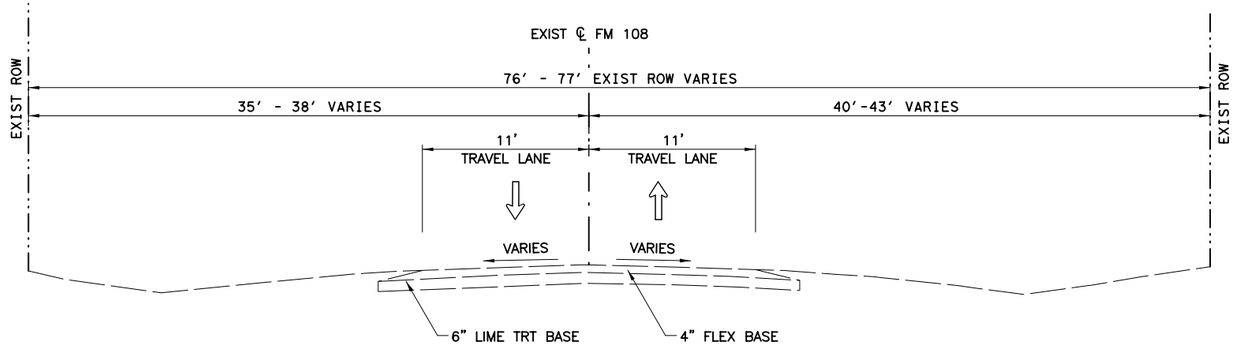
 Texas Department of Transportation

FM 108 AT BRUSHY CREEK & DRAW

TYPICAL SECTIONS

CSJ 0715–01–025 SHEET 2 OF 5

Designed:	YP	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	BAJ	6	TEXAS					FM 108,ETC
Drawn:	YP	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	BAJ	YKM	GONZALES	0715	01	025,ETC		4



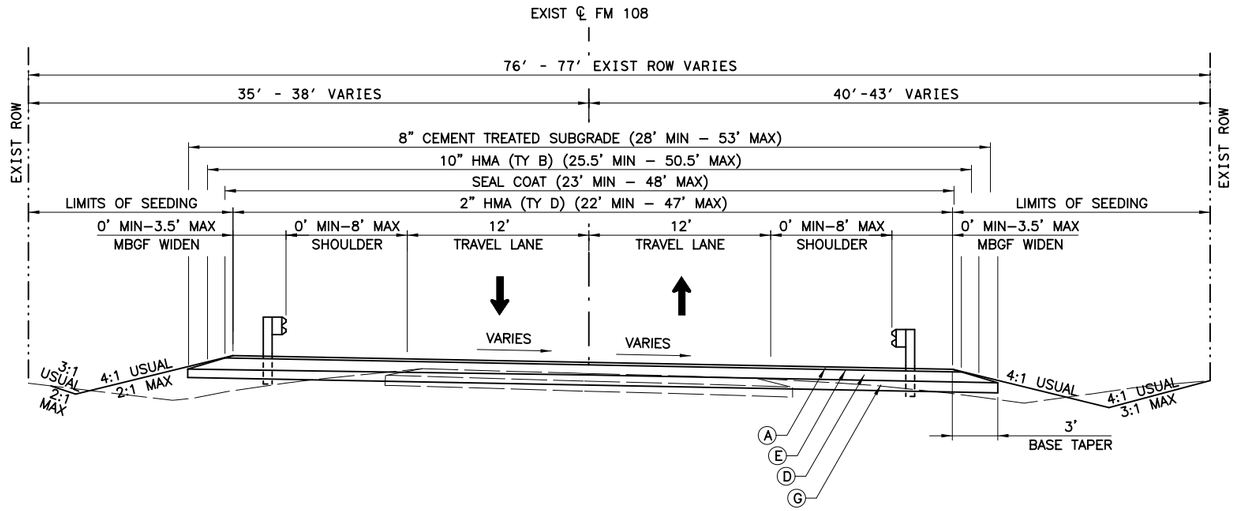
FM 108 EXISTING ROADWAY TYPICAL SECTION

NOT TO SCALE

STA 728+10.00 TO STA 732+80.00

LEGEND

- Ⓐ 2" HMA (TYPE D)
- Ⓑ PRIME COAT (RC–250) WITH GR 5 AGGR
- Ⓒ OCST WITH GR 3 AGGR
- Ⓓ 10" HMA (TYPE B)
- Ⓔ SEAL COAT WITH GR 4 AGGR
- Ⓕ 12" FLEX BASE
- Ⓖ 8" CEMENT TREATED SUBGRADE



FM 108 PROPOSED ROADWAY TYPICAL SECTION

NOT TO SCALE

STA 728+10.00 TO STA 732+80.00

STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED
PROFESSIONAL ENGINEER

3/31/2023

NO.	REVISION	BY	DATE

CP&Y an STV Company

TEXAS REGISTERED ENGINEERING FIRM F-1741

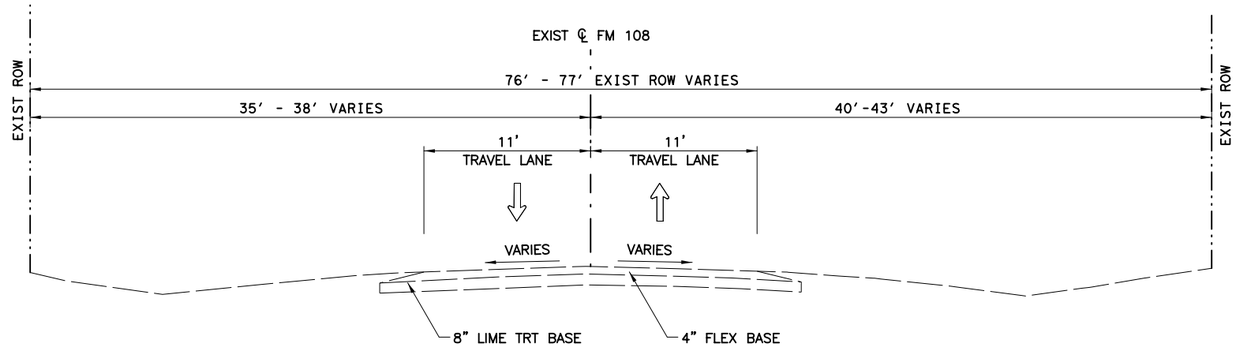
 Texas Department of Transportation

FM 108 AT FIVE MILE CREEK & DRAW

TYPICAL SECTIONS

CSJ 0715–01–025 SHEET 3 OF 5

Designed:	FV	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	BAJ	6	TEXAS				FM 108,ETC
Drawn:	FV	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	BAJ	YKM	GONZALES	0715	01	025,ETC	5



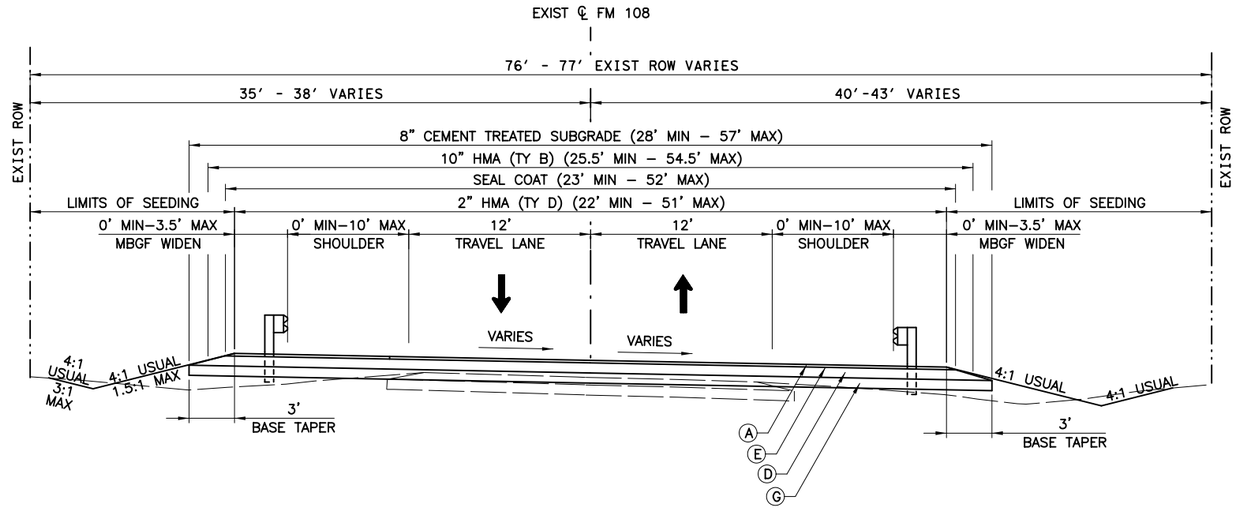
FM 108 EXISTING ROADWAY TYPICAL SECTION

NOT TO SCALE

STA 737+90.00 TO STA 743+20.00

LEGEND

- (A) 2" HMA (TYPE D)
- (B) PRIME COAT (RC-250) W/ GR 5 AGGR
- (C) OCST WITH GR 3 AGGR
- (D) 10" HMA (TYPE B)
- (E) SEAL COAT WITH GR 4 AGGR
- (F) 12" FLEX BASE
- (G) 8" CEMENT TREATED SUBGRADE



FM 108 PROPOSED ROADWAY TYPICAL SECTION

NOT TO SCALE

STA 737+90.00 TO STA 743+20.00

BRIAN A. JONES
95732
LICENSED
PROFESSIONAL ENGINEER
STATE OF TEXAS
3/31/2023

NO.	REVISION	BY	DATE

CP&Y an STV Company

TEXAS REGISTERED ENGINEERING FIRM F-1741

 Texas Department of Transportation

FM 108 AT FIVE MILE CREEK & DRAW

TYPICAL SECTIONS

CSJ 0715-01-025 SHEET 4 OF 5

Designed:	FV	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	BAJ	6	TEXAS				FM 108,ETC
Drawn:	FV	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	BAJ	YKM	GONZALES	0715	01	025,ETC	6

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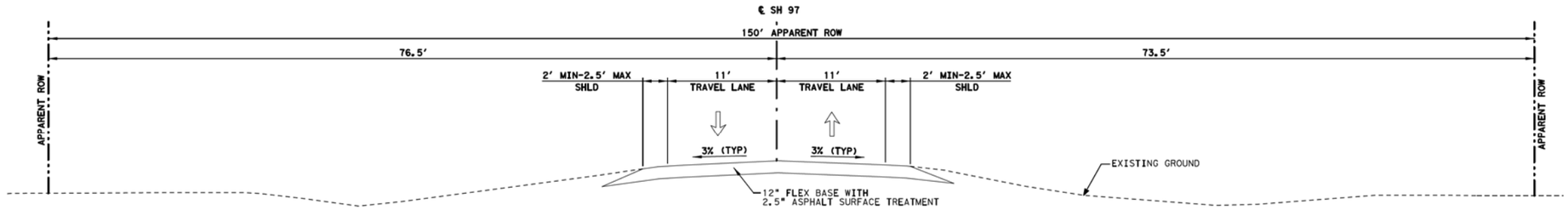
LEGEND

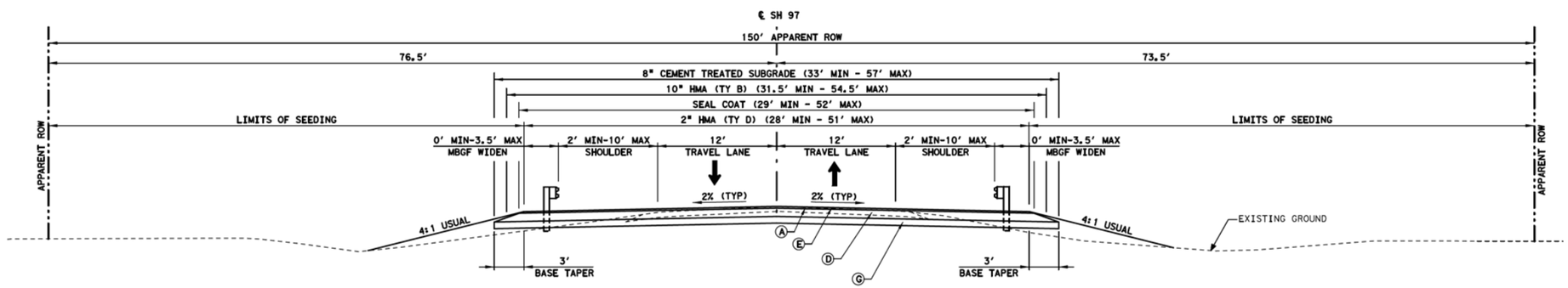
- (A) 2" HMA (TYPE D)
- (B) PRIME COAT (RC-250) WITH GR 5 AGGR
- (C) OCST WITH GR 3 AGGR
- (D) 10" HMA (TY B)
- (E) SEAL COAT WITH GR 4 AGGR
- (F) 12" FLEX BASE
- (G) 8" CEMENT TREATED SUBGRADE



SH97 EXISTING ROADWAY TYPICAL SECTION

NTS

STA 1127+10.00 TO STA 1132+40.00



SH 97 PROPOSED ROADWAY TYPICAL SECTION

NTS

STA 1127+10.00 TO STA 1132+40.00

*SEE PLAN AND PROFILE FOR LIMITS OF MBGF AND PAVEMENT TRANSITIONS
**SEE BRIDGE CLASS CULVERT LAYOUT FOR CUT & RESTORE PAVEMENT DETAIL

STATE OF TEXAS
AMANDA H. ARAJ
123725
LICENSED
PROFESSIONAL ENGINEER
3/31/2023

NO.	REVISION	BY	DATE

WSP USA Inc.
16200 Park Row, Sute 200
Houston, TX 77084
TBPE # F-2263

SH 97 AT RED BRANCH

TYPICAL SECTIONS

CSJ 0347-02-033 SHEET 1 OF 1

Designed: MAK	FWD. RT. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked: AHA	6	TEXAS					FM 108,ETC
Drawn: MAK	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked: AHA	YKM	GONZALES	0715	01	025,ETC		7

3/31/2023

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GENERAL NOTES:

GENERAL:

The Contractor is to take note that this project has Milestones for substantial completion. See Item 8 below for details.

The contractor shall work continuously as much as possible including night time operations during Bridge Class Culvert Phase 1 construction (precast barrel installation) to reduce impact to traffic. During the implementation to temporary traffic signals, the contractor is also expected to perform work on Saturdays to limit traffic impacts.

Contractor questions on this project are to be addressed to the following individual(s):
Covey Morrow IV Covey.Morrow@txdot.gov
Chase Hermes Chase.Hermes@txdot.gov

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

Questions may 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

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.

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

Provide a minimum two week advance notice to TxDOT prior to any roadway closures. TxDOT will notify local officials at least one week in advance.

CSJ 0347-02-033: Notify Mr. Mark Cornelius, at (956) 236-2144, minimum 7 days prior to beginning work at SH 97 at Red Branch, to arrange movement of cattle and contractor's temporary fence installation.

Remove and dispose of existing raised pavement markers as directed. All work involved in the removal and disposal of these markers will not be paid for directly but shall be considered subsidiary to the various bid items involved.

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County: GONZALES **Control: 0715-01-025, ETC.**

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Remove and replace right-of-way fences at particular work sites, where necessary, at contractor's entire expense except as shown on plans. Replace fences in a condition comparable to that at removal.

Do not work on the roadway before sunrise or after sunset unless otherwise approved.

The following standard detail sheets have been modified:
FW-0 (MOD)
FW-S (MOD)
RAC (MOD)

Furnish a certified copy of the legal gross weight of each vehicle hauling materials by weight and certified measurements for all trucks hauling material by volume.

Leave all intersecting roadways, side streets, and entrances open during construction unless otherwise approved. Should there be a request to restrict access for such reasons as parallel culvert replacement, reconstruction, etc., approval will be required 48 hours in advance and the contractor will be required to coordinate satisfactorily with any affected property owners.

Place the seeding after completion of flex base and prior to beginning next phase unless otherwise directed.

Unless otherwise approved, maintain a minimum safety clearance from the edge of the travelway for material stockpiled in proximity of traffic lanes based on the current average traffic count of the particular highway as follows:

0 - 1500 = 16 feet
Over 1500 = 30 feet

In the event the above requirements cannot be met, make arrangements to stockpile material off the right of way.

Provide temporary pipe drains or culverts and take such other measures as directed to provide for continued drainage from all abutting property, the right of way and the roadway during construction operations. Labor and materials involved in this work will not be paid for directly, but will be considered subsidiary to the various bid items of the contract.
The Department will provide the cylinder testing machine for this project. Deliver the test specimens to the engineer's curing facilities as directed.

Do not clean out concrete trucks within the right of way.

The contractor shall field verify all existing pipe, box culvert, and safety end treatments sizes prior to fabrication of related items. All work involved with field verifying will not be measured or paid for directly but will be subsidiary to pertinent items.

ITEM 5: CONTROL OF THE WORK

Where a precast or cast-in-place concrete bridge 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 denial or use of alternates.

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.

SPECIAL PROVISION TO ITEM 6:

Structure 13-090-0715-01-006:
As reported by Burcham Environmental Services, L.L.C. in the NESHAP Asbestos/Lead Inspection Report dated December 15, 2021, the gray paint on the steel H piling has a lead content ranging from 45% to 57%.

Structure 13-090-0715-01-007:
As reported by Burcham Environmental Services, L.L.C. in the NESHAP Asbestos/Lead Inspection Report dated December 28, 2021, the gray paint on the steel H piling has a lead content ranging from 35% to 38%.

Structure 13-090-0715-01-010:
As reported by Burcham Environmental Services, L.L.C. in the NESHAP Asbestos/Lead Inspection Report dated December 15, 2021, the gray paint on the steel H piling has a lead content ranging from 35% to 41%.

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County: GONZALES **Control: 0715-01-025, ETC.**

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Structure 13-090-0715-01-011:
As reported by Burcham Environmental Services, L.L.C. in the NESHAP Asbestos/Lead Inspection Report dated December 15, 2021, the gray paint on the steel H piling has a lead content ranging from 32% to 42%.

Provide for the safety and health of employees and abide by all OSHA standards and regulations when removing or disposing of painted steel. Remove painted elements in complete units. Do not saw or flame cut through painted areas. Obtain the Engineer's approval of the proposed removal process prior to removing steel elements.

If the Contractor determines that saw or flame cutting of the steel pile is necessary to facilitate their removal, the Contractor shall excavate the material surrounding the steel pile down to the pile cut off depth. The excavation shall be adequate to allow the Engineer to verify the presence of paint. The Contractor may have to de-water the excavated area. The material used for de-watering shall be a non-erodible material. If the stream is flowing, near normal flow shall be maintained.

If paint is present, the Contractor shall give the Department seven days written notice in advance of the date of cutting and removing the pile. A Specialty Contractor, paid for by either Force Account Work or hired by the Department, will remove a 4-inch wide strip of paint from each pile. The stripped area will be marked with a heat-activated crayon. Paint removal requested beyond one 4-inch wide strip per pile will be at the Contractor's expense. The Contractor shall then cut off the pile within the stripped area, remove, and properly dispose of the pile.

If no paint is present at the pile cut off depth, the Contractor may cut off, remove, and properly dispose of the pile without disturbing the lead paint.

Labor, equipment and materials needed to provide excavation or dewatering for the paint investigation or removal process will not be paid for directly, but will be considered subsidiary to Item 496 "Removing Structures".

Structure 13-090-0715-01-006:
As reported by Burcham Environmental Services, L.L.C. in the NESHAP Asbestos/Lead Inspection Report dated December 15, 2021, the asphalt board material located in the deck joints has an asbestos content of 3% Chrysotile Asbestos. Submit a notification form to the Engineer at least 30 days prior to the scheduled bridge demolition to assist with the development of an abatement procedure and to perform management activities as necessary. Coordinate asbestos abatement activities between the Engineer and the asbestos consultant.

Structure 13-090-0715-01-007:
As reported by Burcham Environmental Services, L.L.C. in the NESHAP Asbestos/Lead Inspection Report dated December 28, 2021, the asphalt board material located in the deck joints has an asbestos content of 5% Chrysotile Asbestos. Submit a notification form to the Engineer at least 30 days prior to the scheduled bridge demolition to assist with the development of an abatement procedure and to perform management activities as necessary. Coordinate asbestos abatement activities between the Engineer and the asbestos consultant.

Structure 13-090-0715-01-010:
As reported by Burcham Environmental Services, L.L.C. in the NESHAP Asbestos/Lead Inspection Report dated December 15, 2021, the asphalt board material located in the deck joints has an asbestos content of 3% Chrysotile Asbestos. Submit a notification form to the Engineer at least 30 days prior to the scheduled bridge demolition to assist with the development of an abatement procedure and to perform management activities as necessary. Coordinate asbestos abatement activities between the Engineer and the asbestos consultant.

Structure 13-090-0715-01-011:
As reported by Burcham Environmental Services, L.L.C. in the NESHAP Asbestos/Lead Inspection Report dated December 15, 2021, the asphalt board material located in the deck joints has an asbestos content of 5% Chrysotile Asbestos. Submit a notification form to the Engineer at least 30 days prior to the scheduled bridge demolition to assist with the development of an abatement procedure and to perform management activities as necessary. Coordinate asbestos abatement activities between the Engineer and the asbestos consultant.

ITEM 7: LEGAL RELATIONS AND RESPONSIBILITIES

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

The Department will obtain the appropriate permit(s), Nationwide or Individual, when necessary as dictated by the proposed actions for the project and its potential to affect USACE jurisdictional areas. The Contractor may review the permitted plans at the office of the Area Engineer in charge of construction. The Department will hold the Contractor responsible for following all conditions of the approved permit. If the Contractor cannot work within the limits of this permit(s), then it becomes the Contractor's entire responsibility to consult with the USACE pertaining to the need for changes or amendments to the conditions of the existing permit(s) as originally obtained by the Department.

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Particular importance is stressed on the fact that any impacts to USACE jurisdictional waters of the U.S., including jurisdictional wetlands, be the minimum necessary to complete the proposed work. The Contractor shall maintain near normal flow of any jurisdictional waters of the U.S. at all times during construction. If the Contractor needs further explanation of the conditions of the permit, including means of compliance, they may contact the TXDOT Yoakum District Environmental Coordinator.

If the Contractor elects to work on a structure when the stream is flowing, near normal flow shall be maintained by a method approved by the Engineer. Labor and materials involved in this work will not be paid for directly, but will be considered subsidiary to the various bid items of the contract.

No significant traffic generator events identified.

If the contractor proposes work beyond the TxDOT obtained permit limitations, the contractor is responsible for additional costs, delays, and obtaining new or revised permits prior to construction.

All temporary construction access work and materials will not be measured or paid for directly but will be subsidiary to pertinent items. Prior to the scheduling of a Pre-Construction Meeting, submit a Temporary Construction Access Plan to the Area Engineer and to District Environmental Staff for their approval. The Construction Plan should contain a description of the equipment, such as barges, structures, etc., which may occupy waters of the US including jurisdictional wetlands, and a detailed work schedule. No work of any kind will be allowed until the pre-construction meeting has been held.

Temporary construction waterway crossings have been environmental cleared/permitted within Right of Way. Restrict construction operations in any water body to the necessary areas as shown on the plans or applicable permit, or as directed. Use temporary bridges, timber mats, or other structurally sound and non-eroding material for stream crossings. All temporary construction access materials shall be completely removed as soon as possible once temporary access is no longer required and affected areas shall be returned to preconstruction elevations and contours and revegetated in accordance with the SWP3. All work must comply with the General Conditions of the appropriate USACE permit.

ITEM 8: PROSECUTION AND PROGRESS

This project has the following FULL CLOSURE Milestones:

Milestone 1A

Time charges for Milestone 1A begin when FM 108 at Draw near Brushy Creek (NBI# 13-090-0-0715-01-030) is closed to traffic. The time charges for Milestone 1A shall end when traffic is following the lane arrangement as shown on the plans for the constructed and/or existing roadway as specified in the TCP (Phase 2) and/or the final lane configuration. All pavement construction, traffic control devices, and safety devices shall be in their final position (or as called for in the plans for the specified phase of work) at this time.

The contractor shall have 5 calendar days to complete Milestone 1A.

The daily road user cost for Milestone 1A completion shall be $4,064.

Milestone 3A

Time charges for Milestone 3A begin when SH 97 at Red Branch (NBI# 13-090-0-0347-02-017) is closed to traffic. The time charges for Milestone 3A shall end when traffic is following the lane arrangement as shown on the plans for the constructed and/or existing roadway as specified in the TCP (Phase 2) and/or the final lane configuration. All pavement construction, traffic control devices, and safety devices shall be in their final position (or as called for in the plans for the specified phase of work) at this time.

The contractor shall have 8 calendar days to complete Milestone 3A.

The daily road user cost for Milestone 3A completion shall be $11,027.

Milestone 4A

Time charges for Milestone 4A begin when FM 108 at Five Mile Creek (NBI# 13-090-0-0715-01-032) is closed to traffic. The time charges for Milestone 4A shall end when traffic is following the lane arrangement as shown on the plans for the constructed and/or existing roadway as specified in the TCP (Phase 2) and/or the final lane configuration. All pavement construction, traffic control devices, and safety devices shall be in their final position (or as called for in the plans for the specified phase of work) at this time.

The contractor shall have 8 calendar days to complete Milestone 4A.

The daily road user cost for Milestone 4A completion shall be $2,172.

Milestone 5A

Time charges for Milestone 5A begin when FM 108 at Draw near Five Mile Creek (NBI# 13-090-0-0715-01-033) is closed to traffic. The time charges for Milestone 5A shall end when traffic is following the lane arrangement as shown on the plans for the constructed and/or existing roadway as specified in the TCP (Phase 2) and/or the final lane configuration. All

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pavement construction, traffic control devices, and safety devices shall be in their final position (or as called for in the plans for the specified phase of work) at this time.

The contractor shall have 8 calendar days to complete Milestone 5A.

The daily road user cost for Milestone 5A completion shall be $2,172.

Time charges for the purpose of the FULL CLOSURE Milestone credits/penalties will be computed and charged in accordance with Article 8.3.1.5 Calendar Day.

This project has the following LANE CLOSURE Milestones:

Milestone 1B

Time charges for Milestone 1B begin when FM 108 at Draw near Brushy Creek (NBI# 13-090-0-0715-01-030) is reduced to one lane (Phase 3). The time charges for Milestone 1B shall end when traffic is restored to two-lane operation (Phase 4). All pavement construction, traffic control devices, and safety devices shall be in their final position (or as called for in the plans for the specified phase of work) at this time.

The contractor shall have 26 working days to complete Milestone 1B.

The daily road user cost for Milestone 1B completion shall be $1,403.

Milestone 2

Time charges for Milestone 2 begin when FM 108 at Brushy Creek (NBI# 13-090-0-0715-01-031) is reduced to one lane (Phase 4). The time charges for Milestone 2 shall end when traffic is is restored to two-lane operation and/or the final lane configuration. All pavement construction, traffic control devices, and safety devices shall be in their final position (or as called for in the plans for the specified phase of work) at this time.

The contractor shall have 74 working days to complete Milestone 2.

The daily road user cost for Milestone 2 completion shall be $1,403.

Milestone 3B

Time charges for Milestone 3B begin when SH 97 at Red Branch (NBI# 13-090-0-0347-02-017) is reduced to one lane (Phase 3). The time charges for Milestone 3B shall end when traffic is restored to two-lane operation (Phase 4). All pavement construction, traffic control devices, and safety devices shall be in their final position (or as called for in the plans for the specified phase of work) at this time.

The contractor shall have 15 working days to complete Milestone 3B.

The daily road user cost for Milestone 3B completion shall be $3,208.

Milestone 4B

Time charges for Milestone 4B begin when FM 108 at Five Mile Creek (NBI# 13-090-0-0715-01-032) is reduced to one lane (Phase 3). The time charges for Milestone 4B shall end when traffic is restored to two-lane operation (Phase 4). All pavement construction, traffic control devices, and safety devices shall be in their final position (or as called for in the plans for the specified phase of work) at this time.

The contractor shall have 17 working days to complete Milestone 4B.

The daily road user cost for Milestone 4B completion shall be $2,173.

Milestone 5B

Time charges for Milestone 5B begin when FM 108 at Draw near Five Mile Creek (NBI# 13-090-0-0715-01-033) is reduced to one lane (Phase 3). The time charges for Milestone 5B shall end when traffic is restored to two-lane operation (Phase 4). All pavement construction, traffic control devices, and safety devices shall be in their final position (or as called for in the plans for the specified phase of work) at this time.

The contractor shall have 18 working days to complete Milestone 5B.

The daily road user cost for Milestone 5B completion shall be $2,173.

Time charges for the purpose of the LANE CLOSURE Milestone credits/penalties will be computed and charged in accordance with the following. Milestone days will be charged Monday through Saturday, excluding national or state holidays, if weather or other conditions permit the performance of the principal unit of work underway, as determined by the Engineer, for a continuous period of at least 7 hr. between 7:00 A.M. and 6:00 P.M. The Contractor has the option of working on state holidays. Provide sufficient advance notice to the Engineer when scheduling work on state holidays. Work on Sundays and national holidays will not be permitted without written permission of the Engineer. If work requiring an Inspector to be present is performed on a Sunday or holiday, and weather or other conditions permit the performance of work for 7 hr. between 7:00 A.M. and 6:00 P.M., a working day will be charged.

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Should a Milestone be completed beyond the established number of working/calendar days, the contractor will be assessed/penalized the road user cost as noted above for each day beyond the established number of working/calendar days.

Should the Milestone be completed under the established number of working/calendar days, the contractor will be credited the road user cost per day as noted above. For each milestone, the maximum number of days for computing the incentive credit is 3 days. This project has nine (9) separate milestones totaling a maximum incentive of $89,385.

TxDOT will supply bidders, upon written request, one electronic copy of the time determination schedule. The time determination schedule provided is for informational use only and is not intended for bidding or construction purposes.

TxDOT will not adjust the number of days for the project or milestones, if any, due to differences in opinion regarding any assumptions made in the preparation of the schedule or for errors, omissions, or discrepancies found in the time determination schedule.

Provide progress schedule as a Bar Chart.

Do not close the road at more than one location at a time unless otherwise approved by the Engineer.

ITEM 100: PREPARING RIGHT-OF-WAY

Dispose of trees from the right-of-way within 24 hours of removal.

Treat cuts on trees designated for preservation in accordance with Item 100, “Preparing Right of Way”.

ITEM 110: EXCAVATION

Remove existing vegetation, including roots and topsoil, within the grading limits to a depth of approximately 2 inches immediately before grading operations begin within any section. Place the material in a windrow on each side of the roadbed, and replace as directed on the completed slopes as soon as practicable. Measurement and payment will be in accordance with Item "Excavation" for cut sections. All topsoil excavation and the work involved in replacing the topsoil will not be paid for directly but will be subsidiary to the pertinent items for fill sections.

ITEMS 110 & 132: EXCAVATION AND EMBANKMENT

Grading quantities required to construct side road intersections and entrances will not be measured or paid for directly, but will be subsidiary to pertinent items.

Removal/Reworking of existing pavement is included in the excavation and embankment items.

ITEM 132: EMBANKMENT

Furnish Type C embankment consisting of suitable earth material such as loam, clay or other such material that will form a stable embankment and has a plasticity index of at least 15 but not more than 40. Requirements may vary for material excavated under Item 110, "Excavation" as directed.

ITEM 150: BLADING

Sprinkling and rolling which may be required during the operation of Item 150 will not be measured or paid for directly, but will be considered subsidiary to this item.

Remove existing vegetation, including roots and topsoil, within the grading limits to a depth of approximately 2 inches immediately before grading operations begin within any section. Place the material in a windrow on each side of the roadbed, and replace as directed on the completed slopes as soon as practicable. Measurement and payment will be in accordance with Item "Blading" for cut sections.

ITEM 247: FLEXIBLE BASE

Unless otherwise approved, the delivered material's moisture content at most will be two percent above optimum moisture content, determined by TEX-113-E.

Limit the depth of any course to 6 inches unless otherwise approved. Compact each course to the required density before subsequent courses are placed.

For Type E material, furnish crushed limestone produced and graded from oversize quarried aggregate that originates from a single, naturally occurring source. Do not use caliche, iron ore, gravel, or multiple sources.

Density requirements for base in side road entrances, intersections, or detours may be waived provided the material is satisfactorily sprinkled and compacted.

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Compact the Type E flex base to at least 98.0% of the maximum density determined by TEX-113-E.

ITEM 275: CEMENT TREATMENT (ROAD MIXED)

Pulverize the existing bituminous surface so that 100% of the material passes a 2 inch sieve and incorporate it into the treated area. Provide equipment capable of thoroughly mixing the materials full depth in a single pass. This work will not be paid for directly but will be subsidiary to this item.

ITEM 302: AGGREGATES FOR SURFACE TREATMENTS

Furnish Type PE and Type E aggregate consisting of crushed slag, crushed stone or natural limestone rock asphalt.

Furnish precoated aggregate that has a residual bitumen coating target value of 1.0% by weight.

ITEM 316: SEAL COAT

Use an Emulsion instead of an Asphalt Cement as approved when the surface treatment is placed between September 15 and May 1.

The asphalt application rate shown in the plans is an average between an Asphalt Cement and an Emulsion. The type of asphalt and application rate to be used will be as directed. The approximate application rate for Asphalt Cement with a Grade 3 aggregate is 0.32 Gal/SY and with a Grade 4 aggregate is 0.27 Gal/SY. The approximate application rate for an Emulsion with a Grade 3 aggregate is 0.48 Gal/SY and with a Grade 4 aggregate is 0.40 Gal/SY.

Cure any seal coat or one course surface treatment a minimum of three days before the succeeding course is placed unless otherwise directed.

Cure the RC-250 a minimum of seven (7) days prior to placement of the one course surface treatment. Place one course surface treatment no later than fourteen (14) days after placement of the RC-250, unless otherwise directed.

ITEM 320: EQUIPMENT FOR ASPHALT CONCRETE PAVEMENT

Provide a material transfer device capable of transferring mix from the haul trucks to the paver. Monitor its loading such that no damage is done to the existing pavement structures if a material transfer vehicle is used.

Securely attach a waterproof tarpaulin to the top of all trucks hauling ACP, to prevent air flow across the mix, for the duration of all ACP operations.

ITEM 400: EXCAVATION AND BACKFILL FOR STRUCTURES

Flexible base (Ty D) may be used for cement stabilized backfill aggregate, as approved.

STRUCTURAL EXCAVATION NOTES

Place hot mix in the area of cut and restore pavement within three calendar days from the time the existing pavement is removed at each structure. Install “LOOSE GRAVEL” signs at these locations as directed.

ITEM 420: CONCRETE SUBSTRUCTURES

Concrete for pier and bent structure elements, when paid for by the cubic yard, will be measured for plans quantity payment in accordance with Article 420.5.2 of Item 420, “Concrete Substructures".

ITEM 425: PRECAST PRESTRESSED CONCRETE STRUCTURAL MEMBERS

No traffic is allowed on the bridge (including construction traffic) until the grout has attained the required strength.

ITEM 427: SURFACE FINISHES FOR CONCRETE

Provide Surface Area II, railing, and culvert headwalls and wingwalls with a Slurry Coat Finish per 427.4.3.2 for cast-in-place concrete surfaces.

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ITEM 432: RIPRAP

The dimension as shown in the stone protection bid item description is the stone size as described in the specification. The required thickness will be as shown elsewhere in the plans.

ITEM 462: CONCRETE BOX CULVERTS AND DRAINS

Use precast concrete boxes on this project.

ITEMS 464 & 467: REINFORCED CONCRETE PIPE & SAFETY END TREATMENT

If required, concrete collars, as approved, will be used at pipe joints. Collars will be reinforced as directed. No direct compensation will be made for concrete collars and they will be subsidiary to the pertinent items.

ITEM 466: HEADWALLS AND WINGWALLS

In the structures designated as stockpasses, furnish and install tie rings consisting of 5/8" diameter by 9" long galvanized eye bolts, as directed and approved. Work and material required in installing these rings will not be paid for directly but will be subsidiary to the pertinent items.

ITEM 467: SAFETY END TREATMENT

Precast safety end treatment sections will not be allowed.

Provide reinforced concrete riprap for all pipe safety end treatments. Round corners on safety end treatment riprap to a minimum 12 inch radius as directed. The riprap will not be paid for directly but will be subsidiary to Item 467.

Provide and use a form along the cut end of the pipe when placing the adjacent reinforced concrete riprap for pipe safety end treatment sections.

Riprap cross slope above the working point may need to be flatter than 6:1 slope to improve driveway tie-in as directed by the engineer.

ITEM 496: REMOVING STRUCTURES

Material removed under this item will not be deemed salvageable.

The removal of the existing concrete riprap or stone riprap protecting the existing bridge, is subsidiary to Item 496 Removing Structures, except as shown in the plans.

The removal of multiple culvert barrels at one drainage location will be paid as a single structure by the each.

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.

Work zone speed limit signing will be utilized. The work zone speed limit sign locations will be as directed. The work zone speed limit signs may need to be reinstalled/relocated/removed multiple times. This work will not be paid for directly but considered subsidiary to this item.

Use WZ(RS)-22 in conjunction with TCP(2-2) and TCP(2-8).

Use TCP(2-2b) for one-lane, two-way traffic control, unless otherwise stated in the plans.

When using TCP(2-2b), a pilot car is required to lead traffic through the work space with or without channelizing devices on the center line unless otherwise approved.

When using TCP(2-2b), channelizing devices may be omitted during base, subgrade and seal coat operations unless otherwise directed. Flaggers will be required at public intersections when channelizing devices are omitted.

When using TCP(2-2b), arrow boards, displaying the caution mode, may be used to enhance the flagger stations. If used, place the arrow board in advance of the flagger station a distance of ½X, the sign spacing distance shown on BC(2). Use arrow boards as shown on BC(7).

When using TCP(2-2b), the temporary 24" stop line and the CW16-2P plaques may be omitted.

When using TCP(2-2b), an additional "Road Work Ahead" and "Be Prepared To Stop" signs will be required on each end of the lane closure unless otherwise approved.

Provide trail and lead vehicles when using TCP(3-1) or TCP(3-3).

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County: GONZALES **Control: 0715-01-025, ETC.**

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Utilize TCP(3-3) for sweeping operations or for installing and removing tabs or raised pavement markers.

Provide suitable warning lights mounted high enough to be visible from all directions on all construction equipment, including pilot vehicles, and operate warning lights when the equipment is within the right of way. Equip other equipment such as trucks, trailers, autos, etc., with emergency flashers and use emergency flashers while within the work area.

All culvert work must be completed prior to performing excavation and embankment within the work area. The contractor will only be allowed to perform culvert work on one side of the roadway at a time, through completion, before starting on the opposite side unless otherwise approved.

The utilization of TCP (2-2b) while work is being performed at cross culvert locations shall be considered subsidiary to Item 502, "Barricades, Signs, and Traffic Handling". Any additional measures desired by the contractor and as approved by the engineer, will be at the contractor's entire expense.

No additional payment will be made for relocating existing sign assemblies to temporary mounts.

Provide a 3:1 slope or flatter from the pavement edge with drums in all work areas during non-working hours. If adequate width is not available to set the drums, the 3:1 edge build up shall be widened to accommodate drum placement. Labor and materials involved in this work will not be paid for directly, but shall be considered subsidiary to the various bid items of the contract. After placement of the prime, the 3:1 slope will not be required, but drums will still be required.

Signs warning of temporary conditions, such as "NO CENTER LINE," "LOOSE GRAVEL," etc., shall only be displayed when conditions are present. Remove or completely cover signs that do not apply to the roadway conditions. These signs may be installed prior to beginning work but shall remain completely covered until the signs are applicable.

In accordance with Article 502.4.2, no payment will be made for the month if the contractor fails to provide or properly maintain signs in compliance with the contract requirements. Temporary warning signs that are visible when conditions do not apply will be considered improper maintenance of signs.

ITEM 504: FIELD OFFICE AND LABORATORY

Provide a Type D structure for the asphalt mix control laboratory for the engineer's exclusive use. Equip the structure with a 240 volt electrical entrance service. The service will consist of a minimum of four 120 volt circuits with 20 amp breakers and at most two grounded convenience outlets per circuit and provisions for a minimum of two 220 volt ovens. Space heaters for heating the structure are unacceptable. Portable structures will be support blocked for stability and will be tied down.

ITEM 506: TEMPORARY EROSION, SEDIMENTATION, AND ENVIRONMENTAL CONTROLS

1. See SWP3 plan sheet for total disturbed acreage.

2. The disturbed area in this project, all project locations in the contract, and contractor project specific locations (PSLs), within one (1) mile of the project limits, for the contract will further establish the authorization requirements for storm water discharges.

3. The department will obtain an authorization to discharge storm water from the Texas Commission on Environmental Quality (TCEQ) for the construction activities shown on the plans.

4. Obtain any required authorization from the TCEQ for any contractor PSLs for construction activities on or off right-of-way (ROW).

5. When the total disturbed area for all projects in the contract and PSLs within one (1) mile of the project limits exceeds five (5) acres, provide a copy of the contractor NOI.

6. Provide a signed sketch detailing the location of any contractor's PSLs on ROW or within one (1) mile of the project.

ITEM 510: ONE-WAY TRAFFIC CONTROL

Use the portable traffic signal method for one-way traffic control as shown on the plans.

Program the traffic signal to "rest" in red for all approaches (including driveway devices) and to give a green indication to the first approach that is actuated.

Submit the proposed signal timings to TxDOT for approval at least two weeks prior to implementing operation of the temporary traffic signal.

Project Number: **Sheet: 8H**

County: GONZALES **Control: 0715-01-025, ETC.**

Highway: FM 108, ETC.

Contractor to furnish and install driveway assistance devices at each driveway or as directed by the Engineer. Devices shall include a solid red lamp and two flashing arrow lamps that activate concurrently during actuation. Devices shall have separate/independent actuation and shall be integrated into main signal actuation. Driveway assistance devices will not be paid for separately and are considered subsidiary to Item 510.

ITEM 540: METAL BEAM GUARD FENCE

Furnish and install only one type of timber post at each location.

Furnish Type II rail elements at all locations.

ITEMS 540 & 544: METAL BEAM GUARD FENCE AND GUARDRAIL END TREATMENTS

No exposed bridge rail ends or guard fence ends will be allowed after normal working hours. Complete all work at each location during the normal working day.

ITEM 545: CRASH CUSHION ATTENUATORS

Use either the ABSORB-19 or SLED-19 crash cushion attenuators.

Use either the SMTC or QUADGUARD mash compliant crash cushion attenuators to protect the ends of the permanent concrete traffic barrier. The test level for this attenuator is TL-3.

Crash cushion attenuator foundations shall be reinforced concrete as shown on applicable standards. This will be considered subsidiary to Item 545.

ITEM 552: WIRE FENCE

The fencing twisted stays as shown on the applicable Wire Fence standards (WF) shall be replaced with standard line posts. The required fencing material shall be attached to these additional line posts as described for a typical line post. This work and materials are subsidiary to the pertinent bid items.

ITEM 560: MAILBOX ASSEMBLIES

Furnish and place two OM-2Y Object Markers on mailbox supports, one in each direction. These will not be paid for directly but are subsidiary to this item.

Provide 12 inches of clearance from the pavement edge to the mailbox.

ITEM 644: SMALL ROADSIDE SIGN SUPPORTS AND ASSEMBLIES

Use Class B concrete for all small roadside sign assembly concrete footings.

The exact location of the foundations to be placed will be determined in the field by the Engineer.

Drill the holes in the signs carefully as to not damage the reflective sheeting of the signs.

Install the wedge anchor system in a concrete footing 42" in depth and 12" in diameter. Foundation should take approximately 2.7 cubic feet of concrete.

ITEM 662: WORK ZONE PAVEMENT MARKINGS

Use raised pavement markers for removable work zone pavement markings.

ITEM 666: REFLECTORIZED PAVEMENT MARKINGS

Use a mobile retroreflectometer to measure retroreflectivity unless otherwise directed. A DVD video of the retroreflectometer data will not be required.

Provide Type I pavement markings in accordance with this item. The requirements of this item are supplemented with the following provision: Place Type I pavement markings with a ribbon-gun application. All other provisions remain in effect.

Retroreflectivity testing is required for all profile striping.

ITEM 3076: DENSE-GRADED HOT-MIX ASPHALT

Mixture designs, using the PG binder originally specified and without additives, failing to meet the requirements of Table 10 will require the addition of a minimum 1.0% of Type A hydrated lime based on dry weight of the total aggregate.

Project Number: **Sheet: 8I**

County: GONZALES **Control: 0715-01-025, ETC.**

Highway: FM 108, ETC.

Use of RAS in the HMACP surface course is not permitted.

Do not add additional quantity of RAP to stockpiles tested and approved. If additional RAP is added to a stockpile, a new design and trial batch will be required prior to placement on the roadway.

The extracted aggregate from contractor-owned RAP shall have a minimum of 85% two crushed faces when tested in accordance with TEX-460-A, Part I.

ITEM 6001: PORTABLE CHANGEABLE MESSAGE SIGN

Provide Portable Changeable Message Signs (PCMS) for the duration of the project. Locations and messages or other miscellaneous uses of PCMS, shall be as approved or directed by the Engineer.

ITEM 6185: TRUCK MOUNTED ATTENUATOR (TMA) AND TRAILER ATTENUATOR (TA)

Shadow vehicle(s) with TMA are set up for stationary and/or mobile operations. The contractor will be responsible for determining if operations will be ongoing at the same time to determine the total number of TMAs needed for the project.

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0715-01-025 **DISTRICT** Yoakum **COUNTY** Gonzales
HIGHWAY FM 108, SH 97

			CONTROL SECTION JOB		**0347-02-033**		**0715-01-025**		TOTAL EST.	TOTAL FINAL
			PROJECT ID		**A00128600**		**A00128602**			
			COUNTY		**Gonzales**		**Gonzales**			
			HIGHWAY		**SH 97**		**FM 108**			
ALT	**BID CODE**	**DESCRIPTION**		**UNIT**	EST.	FINAL	EST.	FINAL		
	100-6002	PREPARING ROW		STA	2.000		26.700		28.700	
	110-6001	EXCAVATION (ROADWAY)		CY	855.000		2,080.000		2,935.000	
	110-6002	EXCAVATION (CHANNEL)		CY			5,088.000		5,088.000	
	132-6005	EMBANKMENT (FINAL)(ORD COMP)(TY C)		CY	761.000				761.000	
	132-6006	EMBANKMENT (FINAL)(DENS CONT)(TY C)		CY			5,124.000		5,124.000	
	150-6002	BLADING		HR	30.000		32.000		62.000	
	164-6003	BROADCAST SEED (PERM) (RURAL) (CLAY)		SY	5,259.000		12,311.000		17,570.000	
	164-6009	BROADCAST SEED (TEMP) (WARM)		SY	1,315.000		3,078.000		4,393.000	
	164-6011	BROADCAST SEED (TEMP) (COOL)		SY	1,315.000		3,078.000		4,393.000	
	168-6001	VEGETATIVE WATERING		MG	59.100		313.000		372.100	
	247-6057	FL BS (CMP IN PLC)(TYE GR1-2)(FNAL POS)		CY			2,855.000		2,855.000	
	275-6001	CEMENT		TON	48.000		189.000		237.000	
	275-6010	CEMENT TREAT (SUBGRADE) (8")		SY	3,038.000		11,743.000		14,781.000	
	316-6029	ASPH (RC-250)		GAL			1,936.000		1,936.000	
	316-6202	AGGR(TY-E GR-5 SAC-B)		CY			71.000		71.000	
	316-6246	AGGR(TY-PE GR-3 SAC-B)		CY			115.000		115.000	
	316-6249	AGGR(TY-PE GR-4 SAC-B)		CY	22.000		119.000		141.000	
	316-6400	ASPH (AC-15P OR AC-10-2TR OR CRS-2P)		GAL	978.000		9,016.000		9,994.000	
	400-6005	CEM STABIL BKFL		CY	176.000		242.000		418.000	
	400-6006	CUT & RESTORING PAV		SY	136.000		459.000		595.000	
	402-6001	TRENCH EXCAVATION PROTECTION		LF	92.000				92.000	
	403-6001	TEMPORARY SPL SHORING		SF	2,209.000		2,033.000		4,242.000	
	416-6002	DRILL SHAFT (24 IN)		LF			690.000		690.000	
	420-6013	CL C CONC (ABUT)		CY			31.200		31.200	
	420-6029	CL C CONC (CAP)		CY			24.600		24.600	
	420-6037	CL C CONC (COLUMN)		CY			16.400		16.400	
	420-6074	CL C CONC (MISC)		CY			3.600		3.600	
	422-6007	REINF CONC SLAB (SLAB BEAM)		SF			4,658.000		4,658.000	
	422-6015	APPROACH SLAB		CY			98.100		98.100	
	425-6011	PRESTR CONC SLAB BEAM (4SB15)		LF			886.320		886.320	
	425-6012	PRESTR CONC SLAB BEAM (5SB15)		LF			196.960		196.960	
	432-6002	RIPRAP (CONC)(5 IN)		CY	40.000		89.000		129.000	
	432-6033	RIPRAP (STONE PROTECTION)(18 IN)		CY	86.000		1,177.000		1,263.000	
	450-6054	RAIL (TY SSTR) (W/DRAIN SLOTS)		LF	48.000		570.400		618.400	
	454-6004	ARMOR JOINT (SEALED)		LF			90.000		90.000	
	462-6019	CONC BOX CULV (8 FT X 4 FT)		LF			263.200		263.200	
	462-6026	CONC BOX CULV (9 FT X 7 FT)		LF			310.800		310.800	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0715-01-025 **DISTRICT** Yoakum **COUNTY** Gonzales
HIGHWAY FM 108, SH 97

				CONTROL SECTION JOB	0347-02-033		0715-01-025		TOTAL EST.	TOTAL FINAL
				PROJECT ID	A00128600		A00128602			
				COUNTY	Gonzales		Gonzales			
				HIGHWAY	SH 97		FM 108			
ALT	BID CODE	DESCRIPTION	UNIT		EST.	FINAL	EST.	FINAL		
	462-6031	CONC BOX CULV (10 FT X 7 FT)	LF				126.000		126.000	
	462-6034	CONC BOX CULV (10 FT X 10 FT)	LF		92.000				92.000	
	464-6003	RC PIPE (CL III)(18 IN)	LF				56.000		56.000	
	466-6144	WINGWALL (FW - 0) (HW=12 FT)	EA		2.000				2.000	
	466-6218	WINGWALL (FW-0) (HW=6 FT) (MOD)	EA				2.000		2.000	
	466-6248	WINGWALL (FW-0)(HW=5FT)(MOD)	EA				2.000		2.000	
	466-6265	WINGWALL(FW-S)(HW=5FT)(MOD)	EA				1.000		1.000	
	466-6266	WINGWALL(FW-S)(HW=6FT)(MOD)	EA				1.000		1.000	
	467-6341	SET (TY II) (15 IN) (RCP) (6: 1) (P)	EA				2.000		2.000	
	467-6363	SET (TY II) (18 IN) (RCP) (6: 1) (P)	EA				6.000		6.000	
	496-6001	REMOV STR (BOX CULVERT)	EA		2.000				2.000	
	496-6009	REMOV STR (BRIDGE 0 - 99 FT LENGTH)	EA				4.000		4.000	
	496-6016	REMOV STR (PIPE)	EA				1.000		1.000	
	496-6043	REMOV STR (SMALL FENCE)	LF		234.000				234.000	
	500-6001	MOBILIZATION	LS				1.000		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO		4.000		7.000		11.000	
	506-6001	ROCK FILTER DAMS (INSTALL) (TY 1)	LF				240.000		240.000	
	506-6011	ROCK FILTER DAMS (REMOVE)	LF				240.000		240.000	
	506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF		82.000		1,270.000		1,352.000	
	506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF		82.000		1,270.000		1,352.000	
	508-6001	CONSTRUCTING DETOURS	SY		203.000				203.000	
	510-6003	ONE-WAY TRAF CONT (PORT TRAF SIG)	MO		1.000		6.000		7.000	
	512-6001	PORT CTB (FUR & INST)(SGL SLOPE)(TY 1)	LF		780.000		2,340.000		3,120.000	
	512-6025	PORT CTB (MOVE)(SGL SLP)(TY 1)	LF		780.000		3,390.000		4,170.000	
	512-6049	PORT CTB (REMOVE)(SGL SLP)(TY 1)	LF		780.000		2,340.000		3,120.000	
	530-6005	DRIVEWAYS (ACP)	SY				104.000		104.000	
	530-6006	DRIVEWAYS (SURF TREAT)	SY				166.000		166.000	
	540-6001	MTL W-BEAM GD FEN (TIM POST)	LF		300.000		1,225.000		1,525.000	
	540-6006	MTL BEAM GD FEN TRANS (THRIE-BEAM)	EA		4.000		15.000		19.000	
	542-6001	REMOVE METAL BEAM GUARD FENCE	LF		669.000		1,485.000		2,154.000	
	544-6001	GUARDRAIL END TREATMENT (INSTALL)	EA		4.000		15.000		19.000	
	544-6003	GUARDRAIL END TREATMENT (REMOVE)	EA		4.000		8.000		12.000	
	545-6003	CRASH CUSH ATTEN (MOVE & RESET)	EA		4.000		18.000		22.000	
	545-6005	CRASH CUSH ATTEN (REMOVE)	EA		4.000		14.000		18.000	
	545-6007	CRASH CUSH ATTEN (INSTL)(L)(N)(TL3)	EA				1.000		1.000	
	545-6019	CRASH CUSH ATTEN (INSTL)(S)(N)(TL3)	EA		4.000		14.000		18.000	
	552-6001	WIRE FENCE (TY A)	LF		148.000				148.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0715-01-025 **DISTRICT** Yoakum **COUNTY** Gonzales
HIGHWAY FM 108, SH 97

				CONTROL SECTION JOB	0347-02-033		0715-01-025		TOTAL EST.	TOTAL FINAL
				PROJECT ID	A00128600		A00128602			
				COUNTY	Gonzales		Gonzales			
				HIGHWAY	SH 97		FM 108			
ALT	BID CODE	DESCRIPTION	UNIT		EST.	FINAL	EST.	FINAL		
	552-6003	WIRE FENCE (TY C)	LF		234.000				234.000	
	560-6007	MAILBOX INSTALL-S (WC-POST) TY 3	EA				3.000		3.000	
	560-6008	MAILBOX INSTALL-D (WC-POST) TY 3	EA				2.000		2.000	
	644-6060	IN SM RD SN SUP&AM TYTWT(1)WS(P)	EA		1.000				1.000	
	644-6076	REMOVE SM RD SN SUP&AM	EA		1.000				1.000	
	658-6014	INSTL DEL ASSM (D-SW)SZ (BRF)CTB (BI)	EA				22.000		22.000	
	658-6062	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2(BI)	EA		8.000		47.000		55.000	
	662-6063	WK ZN PAV MRK REMOV (W)4"(SLD)	LF		2,720.000		13,680.000		16,400.000	
	662-6075	WK ZN PAV MRK REMOV (W)24"(SLD)	LF		48.000		96.000		144.000	
	662-6095	WK ZN PAV MRK REMOV (Y)4"(SLD)	LF		8,800.000		12,190.000		20,990.000	
	666-6343	REF PROF PAV MRK TY I(W)6"(SLD)(100MIL)	LF		1,060.000		7,002.000		8,062.000	
	666-6346	REF PROF PAV MRK TY I(Y)6"(BRK)(100MIL)	LF		1,043.000		2,000.000		3,043.000	
	666-6347	REF PROF PAV MRK TY I(Y)6"(SLD)(100MIL)	LF		6,280.000		8,390.000		14,670.000	
	672-6009	REFL PAV MRKR TY II-A-A	EA		158.000		219.000		377.000	
	677-6001	ELIM EXT PAV MRK & MRKS (4")	LF		9,400.000		7,290.000		16,690.000	
	3076-6001	D-GR HMA TY-B PG64-22	TON		1,578.000		3,067.000		4,645.000	
	3076-6041	D-GR HMA TY-D SAC-A PG70-22	TON		310.000		598.000		908.000	
	3076-6066	TACK COAT	GAL		287.000		579.000		866.000	
	6001-6002	PORTABLE CHANGEABLE MESSAGE SIGN	EA		2.000		4.000		6.000	
	6185-6002	TMA (STATIONARY)	DAY				24.000		24.000	
	6185-6005	TMA (MOBILE OPERATION)	DAY				36.000		36.000	

FM 108 AT DRAW & BRUSHY CREEK

SUMMARY OF ROADWAY QUANTITIES

LOCATION	SURFACE		LENGTH	FLEX BASE			CEMENT TREATED SUBGRADE			0100	0150	0247	0275	0275	0316		0316		0316		0432
	BEGIN WIDTH	END WIDTH		BEGIN WIDTH	END WIDTH	① DEPTH	BEGIN WIDTH	END WIDTH	DEPTH	PREPARING ROW	BLADING	① FL BS (CMP IN PLC) (TYE GR1-2) (FNAL POS)	CEMENT	CEMENT TREAT (SUBGRADE) (8")	ASPH (RC-250)	AGGR (TY-E GR-5 SAC-B)	ASPH (AC-15P OR AC-10-2TR OR CRS-2P)	AGGR (TY-PE GR-3 SAC-B)	ASPH (AC-15P OR AC-10-2TR OR CRS-2P)	AGGR (TY-PE GR-4 SAC-B)	RIPRAP (STONE PROTECTION) (18 IN)
													106 PCF		PRIME		OCST		SEAL COAT		
													@ 5%		0.20 GAL/SY	1 CY/140 SY	0.40 GAL/SY	1 CY/85 SY	0.34 GAL/SY	1 CY/130 SY	
	FT	FT	FT	FT	FT	IN	FT	FT	IN	STA	HR	CY	TON	SY	GAL	CY	GAL	CY	GAL	CY	CY
CSJ: 0715-01-025																					
STA 538+80.00 TO STA 540+31.00 LT	14.0	25.8	151	15.5	27.3	12	16.0	28.8	8	1.51		102	6.0	376	67	2.4	134	4.0	114.0	2.6	
STA 540+31.00 TO STA 540+36.00 LT	25.8	25.8	5	27.3	27.3	12	28.8	28.8	8	0.05		5	0.3	16	3	0.2	6	0.2	5.0	0.2	
STA 540+36.00 TO STA 540+86.00 LT	25.8	23.5	50	27.3	25.0	12	28.8	26.5	8	0.50		47	2.4	154	28	1.0	55	1.7	47.0	1.1	
STA 540+86.00 TO STA 541+42.00 LT	23.5	23.5	56	25.0	25.0	12	26.5	26.5	8	0.56		36	2.6	165	30	1.1	59	1.8	50.0	1.2	
BRIDGE AT DRAW	21.0	21.0	56	22.5	22.5	12	8.0	8.0	8	0.56		47	0.8	50	27	1.0	53	1.6	45.0	1.1	29
STA 541+98.00 TO STA 543+29.00 LT	23.5	23.5	131	25.0	25.0	12	14.5	15.1	8	1.31		111	3.4	215	69	2.5	137	4.1	117.0	2.7	
STA 543+29.00 TO STA 543+79.00 LT	23.5	25.8	50	25.0	27.3	12	15.1	18.2	8	0.50		47	1.5	93	28	1.0	55	1.7	47.0	1.1	
STA 543+79.00 TO STA 543+84.00 LT	25.8	25.8	5	27.3	27.3	12	18.2	18.2	8	0.05		5	0.2	10	3	0.2	6	0.2	5.0	0.2	
STA 543+84.00 TO STA 544+38.00 LT	25.8	20.0	54	27.3	21.5	12	18.2	13.4	8	0.54		45	1.5	95	28	1.0	55	1.7	47.0	1.1	
STA 544+38.00 TO STA 547+71.00 LT	20.0	20.0	333	21.5	21.5	12	13.4	21.8	8	3.33		226	10.4	651	148	5.3	296	8.8	252.0	5.7	
STA 547+71.00 TO STA 548+21.00 LT	20.0	27.8	50	21.5	29.3	12	21.8	30.3	8	0.50		47	2.3	145	27	1.0	54	1.6	46.0	1.1	
STA 548+21.00 TO STA 548+26.00 LT	27.8	27.8	5	29.3	29.3	12	30.3	30.3	8	0.05		5	0.3	17	4	0.2	7	0.2	6.0	0.2	
STA 548+26.00 TO STA 548+76.00 LT	27.8	25.5	50	29.3	27.0	12	30.3	28.5	8	0.50		52	2.6	163	30	1.1	60	1.8	51.0	1.2	
STA 548+76.00 TO STA 549+18.00 LT	25.5	25.5	42	27.0	27.0	12	28.5	28.5	8	0.42		42	2.1	133	24	0.9	48	1.4	41.0	1.0	
BRIDGE AT BRUSHY CREEK										1.52		0						0.0	0.0	0.0	
STA 550+70.00 TO STA 552+00.00 LT	25.5	25.5	130	27.0	27.0	12	28.5	27.8	8	1.30		130	6.5	407	74	2.7	148	4.4	126.0	2.9	
STA 552+00.00 TO STA 552+50.00 LT	25.5	27.8	50	27.0	29.3	12	27.8	29.7	8	0.50		52	2.5	160	30	1.1	60	1.8	51.0	1.2	
STA 552+50.00 TO STA 552+55.00 LT	27.8	27.8	5	29.3	29.3	12	29.7	29.7	8	0.05		5	0.3	17	4	0.2	7	0.2	6.0	0.2	
STA 552+55.00 TO STA 553+05.00 LT	27.8	14.0	50	29.3	15.5	12	29.7	16.0	8	0.50		42	2.0	127	24	0.9	47	1.4	40.0	0.9	
STA 553+05.00 TO STA 563+50.00 LT	14.0	14.0	1045	15.5	15.5	12	16.0	7.0	8	10.45		362	21.2	1335	326	11.7	651	19.2	553.0	12.6	
												0									
STA 538+80.00 TO STA 539+31.00 RT	14.0	25.8	51	15.5	27.3	12	16.0	28.8	8			31	2.0	127	23	0.9	46	1.4	39.0	0.9	
STA 539+31.00 TO STA 539+36.00 RT	25.8	25.8	5	27.3	27.3	12	28.8	28.8	8			4	0.3	16	3	0.2	6	0.2	5.0	0.2	
STA 539+36.00 TO STA 539+86.00 RT	25.8	23.5	50	27.3	25.0	12	28.8	26.5	8			42	2.4	154	28	1.0	55	1.7	47.0	1.1	
STA 539+86.00 TO STA 541+42.00 RT	23.5	23.5	156	25	25	12	26.5	26.5	8			136	7.3	459	82	3.0	163	4.8	139.0	3.2	
BRIDGE AT DRAW	21.0	21.0	56	22.5	22.5	12	8.0	8.0	8			47	0.8	50	27	1.0	53	1.6	45.0	1.1	
STA 541+98.00 TO STA 542+54.00 RT	23.5	23.5	56	25.0	25.0	12	14.5	14.5	8			43	1.4	90	30	1.1	59	1.8	50.0	1.2	
STA 542+54.00 TO STA 543+04.00 RT	23.5	25.8	50	25.0	27.3	12	14.5	16.5	8			44	1.4	86	28	1.0	55	1.7	47.0	1.1	
STA 543+04.00 TO STA 543+09.00 RT	25.8	25.8	5	27.3	27.3	12	16.5	16.5	8			5	0.1	9	3	0.2	6	0.2	5.0	0.2	
STA 543+09.00 TO STA 543+59.00 RT	24.5	20.0	50	26.0	21.5	12	16.5	10.0	8			41	1.2	74	25	0.9	50	1.5	43.0	1.0	
STA 543+59.00 TO STA 546+82.00 RT	20.0	20.0	323	21.5	21.5	12	10.0	4.0	8			201	4.0	251	144	5.2	288	8.5	245.0	5.6	
STA 546+82.00 TO STA 547+32.00 RT	20.0	27.8	50	21.5	29.3	12	0.0	0.0	9			34	0.0	0	27	1.0	54	1.6	46.0	1.1	
STA 547+32.00 TO STA 547+37.00 RT	27.8	25.5	5	29.3	27.0	12	0.0	0.0	8			4	0.0	0	3	0.2	6	0.2	6.0	0.2	
STA 547+37.00 TO STA 547+88.00 RT	25.5	25.5	51	27.0	27.0	12	0.0	0.0	8			40	0.0	0	29	1.1	58	1.7	50.0	1.2	
STA 547+88.00 TO STA 549+18.00 RT	25.5	25.5	130	27.0	27.0	12	0.0	0.0	8			112	0.0	0	74	2.7	148	4.4	126.0	2.9	
BRIDGE AT BRUSHY CREEK												0									
STA 550+70.00 TO STA 551+13.00 RT	25.5	25.5	43	27.0	27.0	12	0.0	0.0	8			41	0.0	0	25	0.9	49	1.5	42.0	1.0	
STA 551+13.00 TO STA 551+63.00 RT	25.5	27.8	50	27.0	29.3	12	0.0	0.0	8			49	0.0	0	30	1.1	60	1.8	51.0	1.2	
STA 551+63.00 TO STA 551+68.00 RT	27.8	27.8	5	29.3	29.3	12	0.0	0.0	8			5	0.0	0	4	0.2	7	0.2	6.0	0.2	
STA 551+68.00 TO STA 552+18.00 RT	27.8	14.0	50	29.3	15.5	12	0.0	0.0	8			40	0.0	0	24	0.9	47	1.4	40.0	0.9	
STA 552+18.00 TO STA 563+50.00 RT	14.0	14.0	1132	15.5	15.5	12	0.0	0.0	8			528	0.0	0	353	12.6	705	20.8	599.0	13.6	
TOTAL										**24.70**	**16**	**2855**	**90**	**5645**	**1936**	**71**	**3853**	**115**	**3280**	**77**	**29**

① TOTAL FLEX BASE SECTION DEPTH IS SHOWN. ITEM 247 CALCULATED QUANTITY ACCOUNTS FOR INCORPORATION OF EXISTING MATERIAL.

NO.	REVISION	BY	DATE

CP&Y an STV Company — TEXAS REGISTERED ENGINEERING FIRM F-1741

FM 108 AT DRAW & BRUSHY CREEK

SUMMARY OF QUANTITIES

CSJ 0715-01-025 SHEET 1 OF 4

Designed:	YP	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	BAJ	6	TEXAS				FM 108,ETC
Drawn:	YP	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	BAJ	YKM	GONZALES	0715	01	025,ETC	10

FM 108 AT DRAW & BRUSHY CREEK

SUMMARY OF DRIVEWAYS													
LOCATION	*0247	*0316		*0316		*0316		0464	0467	0467	0530	0560	0560
	FL BS (CMP IN PLC) (TYE GR1-2) (FNAL POS)	ASPH (RC-250)	AGGR (TY-E GR-5 SAC-B)	ASPH (AC-15P OR AC-10-2TR OR CRS-2P)	AGGR (TY-PE GR-3 SAC-B)	ASPH (AC-15P OR AC-10-2TR OR CRS-2P)	AGGR (TY-PE GR-4 SAC-B)	RC PIPE (CL III) (18 IN)	SET (TY II) (15 IN) (RCP) (6: 1) (P)	SET (TY II) (18 IN) (RCP) (6: 1) (P)	DRIVEWAYS (SURF TREAT)	MAILBOX INSTALL-S (WC-POST) TY 3	MAILBOX INSTALL-D (WC-POST) TY 3
		PRIME		OCST		SEAL COAT							
		0.20 GAL/SY	1 CY/140 SY	0.40 GAL/SY	1 CY/85 SY	0.34 GAL/SY	1 CY/130 SY						
	CY	GAL			CY	GAL	CY	LF	EA	EA	SY	EA	EA
CSJ: 0715-01-025													
FM 108 AT DRAW AND BRUSHY CREEK													
DW-01	7	8	1	16	1	14	1	28		2	39		
DW-02	12	14	1	28	1	24	1				68		1
DW-03									2				
DW-04	10	12	1	24	1	21	1	4		2	59	1	
TOTAL	**29**	**34**	**3**	**68**	**3**	**59**	**3**	**32**	**2**	**4**	**166**	**1**	**1**

* FOR CONTRACTOR INFO ONLY

SUMMARY OF PAVEMENT MARKINGS AND MARKERS				
LOCATION	0666	0666	0666	0672
	REF PROF PAV MRK TY I(W) 6"(SLD)(100MIL)	REF PROF PAV MRK TY I(Y) 6"(BRK)(100MIL)	REF PROF PAV MRK TY I(Y) 6"(SLD)(100MIL)	REFL PAV MRKR TY II-A-A
	LF	LF	LF	EA
CSJ: 0715-01-025				
FM 108 AT DRAW AND BRUSHY CREEK				
(2)		260	1600	46
STA 538+80.00 TO STA 542+75.00	790		790	10
STA 542+75.00 TO STA 548+00.00	1050		1050	14
STA 548+00.00 TO STA 553+25.00	1050	60	1050	14
STA 553+25.00 TO STA 558+50.00	1050	130	1050	14
STA 558+50.00 TO STA 563+50.00	1000	130	275	10
(2)		200	790	20
TOTAL	**4940**	**780**	**6605**	**128**

(2) QUANTITIES EXTEND BEYOND PROJECT LIMITS AFTER TCP

SUMMARY OF REMOVAL QUANTITIES				
DESCRIPTION	0496	0496	0542	0544
	REMOV STR (BRIDGE 0 - 99 FT LENGTH)	REMOV STR (PIPE)	REMOVE METAL BEAM GUARD FENCE	GUARDRAIL END TREATMENT (REMOVE)
	EA	EA	LF	EA
CSJ: 0715-01-025				
FM 108 AT DRAW AND BRUSHY CREEK				
STA 538+80.00 TO STA 542+75.00	1		608	3
STA 542+75.00 TO STA 548+00.00		1		2
STA 548+00.00 TO STA 553+25.00	1		877	3
STA 553+25.00 TO STA 558+50.00				
STA 558+50.00 TO STA END				
TOTAL	**2**	**1**	**1485**	**8**

SUMMARY OF BRIDGE CLASS CULVERT QUANTITIES									
DESCRIPTION	NBI #	0400	0420	0432	0432	0450	0462	0462	0466
		CEM STABIL BKFL	CL C CONC (MISC)	RIPRAP (CONC)(5 IN)	RIPRAP (STONE PROTECTION) (18 IN)	RAIL (TY SSTR) (W/DRAIN SLOTS)	CONC BOX CULV (8 FT X 4 FT)	CONC BOX CULV (10 FT X 7 FT)	WINGWALL (FW-0) (HW=6 FT)(MOD)
		CY	CY	CY	CY	LF	LF	LF	EA
CSJ: 0715-01-025									
FM 108 AT DRAW	13-090-0-0715-01-030	80	1.2	30	50	112	84	126	2
TOTAL		**80**	**1.2**	**30**	**50**	**112**	**84**	**126**	**2**

NOTE: SEE SEPARATE ESTIMATED QUANTITY SHEET FOR FM 108 AT BRUSHY CREEK

NO.	REVISION	BY	DATE

CP&Y an STV Company

TEXAS REGISTERED ENGINEERING FIRM F-1741

FM 108 AT DRAW & BRUSHY CREEK

SUMMARY OF QUANTITIES

CSJ 0715-01-025 SHEET 2 OF 4

Designed:	YP	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	BAJ	6	TEXAS				FM 108,ETC
Drawn:	YP	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	BAJ	YKM	GONZALES	0715	01	025,ETC	11

FM 108 AT DRAW & BRUSHY CREEK

SUMMARY OF TRAFFIC CONTROL QUANTITIES

DESCRIPTION	0400 CUT & RESTORING PAV (SY)	0403 TEMPORARY SPL SHORING (SF)	0510 ONE-WAY TRAF CONT (PORT TRAF SIG) (MO)	0512 PORT CTB (FUR & INST) (SGL SLOPE)(TY 1) (LF)	0512 PORT CTB (MOVE) (SGL SLP)(TY 1) (LF)	0512 PORT CTB (REMOVE) (SGL SLP)(TY 1) (LF)	0545 CRASH CUSH ATTEN (MOVE & RESET) (EA)	0545 CRASH CUSH ATTEN (REMOVE) (EA)	0545 CRASH CUSH ATTEN (INSTL)(S)(N)(TL3) (EA)	0662 WK ZN PAV MRK REMOV (W)4"(SLD) (LF)	0662 WK ZN PAV MRK REMOV (W)24"(SLD) (EA)	0662 WK ZN PAV MRK REMOV (Y)4"(SLD) (LF)	0677 ELIM EXT PAV MRK & MRKS (4") (LF)	6001 PORTABLE CHANGEABLE MESSAGE SIGN (EA)	6185 TMA (STATIONARY) (DAY)	6185 TMA (MOBILE OPERATION) (DAY)
CSJ: 0715-01-025																
FM 108 AT DRAW AND BRUSHY CREEK																
PHASE 1	156	953												4	2	
CSJ: 0715-01-025																
FM 108 AT DRAW AND BRUSHY CREEK																
PHASE 2				690					4						2	
CSJ: 0715-01-025																
FM 108 AT DRAW AND BRUSHY CREEK																
PHASE 3		250	0.5		780	300	4	2		1740	24	3600	3410		2	
CSJ: 0715-01-025																
FM 108 AT DRAW AND BRUSHY CREEK																
PHASE 4			3.5	180	390	570	2	4	2	5540	24	2910	1050		2	16
TOTAL	**156**	**1203**	**4**	**870**	**1170**	**870**	**6**	**6**	**6**	**7280**	**48**	**6510**	**4460**	**4**	**8**	**16**

SUMMARY OF GUARDRAIL QUANTITIES

DESCRIPTION	0540 MTL W-BEAM GD FEN (TIM POST) (LF)	0540 MTL BEAM GD FEN TRANS (THRIE-BEAM) (EA)	0544 GUARDRAIL END TREATMENT (INSTALL) (EA)
CSJ: 0715-01-025			
FM 108 AT DRAW AND BRUSHY CREEK			
BEGIN TO STA 542+75.00	271	4	3
STA 542+75.00 TO STA 548+00.00	67		2
STA 548+00.00 TO STA 553+25.00	338	4	3
STA 553+25.00 TO STA 558+50.00			
STA 558+50.00 TO STA END			
TOTAL	**675**	**8**	**8**

SUMMARY OF DELINEATOR QUANTITIES

LOCATION	0658 INSTL DEL ASSM (D-SW)SZ (BRF)CTB (BI) (EA)	0658 INSTL DEL ASSM (D-SW)SZ 1 (BRF)GF2(BI) (EA)
CSJ: 0715-01-025		
BRIDGE AT DRAW	4	12
CSJ: 0715-01-025		
BRIDGE AT BRUSHY CREEK	6	14
TOTAL	**10**	**26**

NO.	REVISION	BY	DATE

CP&Y an STV Company — TEXAS REGISTERED ENGINEERING FIRM F-1741

FM 108 AT DRAW & BRUSHY CREEK

SUMMARY OF QUANTITIES

CSJ 0715-01-025 SHEET 3 OF 4

Designed:	YP	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	BAJ	6	TEXAS					FM 108,ETC
Drawn:	YP	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	BAJ	YKM	GONZALES	0715	01	025,ETC		12

FM 108 AT DRAW & BRUSHY CREEK

SUMMARY OF SWP3 QUANTITIES									
LOCATION	0164 BROADCAST SEED (PERM) (RURAL) (CLAY)	0164 BROADCAST SEED (TEMP) (WARM)	0164 BROADCAST SEED (TEMP) (COOL)	*0166 FERTILIZER 500 LBS/AC	0168 VEGETATIVE WATERING 13.6 MG/AC/MO	0506 ROCK FILTER DAMS (INSTALL) (TY 1)	0506 ROCK FILTER DAMS (REMOVE)	0506 TEMP SEDMT CONT FENCE (INSTALL)	0506 TEMP SEDMT CONT FENCE (REMOVE)
	SY	SY	SY	TON	MG	LF	LF	LF	LF
FM 108 AT DRAW AND BRUSHY CREEK									
STA 538+80.00 TO STA 563+50.00	9386	2347	2347	0.49	238				
BMP #1								125	125
BMP #2						20	20		
BMP #3						20	20		
BMP #4								125	125
BMP #5								125	125
BMP #6						20	20		
BMP #7						20	20		
BMP #8								125	125
BMP #9								120	120
BMP #10								170	170
BMP #11								220	220
BMP #12								180	180
BMP #13								20	20
BMP #14								20	20
BMP #15								20	20
BMP #16								20	20
TOTAL	**9386**	**2347**	**2347**	**0.49**	**238**	**80**	**80**	**1270**	**1270**

*** FOR CONTRACTOR INFO ONLY**

SUMMARY OF EARTHWORK QUANTITIES				
STATION	0110 EXCAVATION (ROADWAY)	0110 EXCAVATION (CHANNEL)	0132 EMBANKMENT (FINAL)(DENS CONT)(TY C)	* 400 STRUCT EXCAV
	CY	CY	CY	CY
CSJ: 0715-01-025				
STA 539+00.00	3		110	
STA 540+00.00	7		272	
STA 541+00.00	22		447	
BRIDGE CLASS CULVERT AT DRAW				1302
STA 543+00.00	46		115	
STA 544+00.00	24		58	
STA 545+00.00	11		88	
STA 546+00.00	8		103	
STA 547+00.00	2		153	
STA 548+00.00	35		136	
STA 549+00.00	188		260	
BRIDGE AT BRUSHY CREEK		5088		1302
STA 551+00.00	155		1615	
STA 552+00.00	257		25	
STA 553+00.00	136		71	
STA 554+00.00	86		111	
STA 555+00.00	54		115	
STA 556+00.00	43		98	
STA 557+00.00	36		79	
STA 558+00.00	29		72	
STA 559+00.00	22		74	
STA 560+00.00	12		80	
STA 561+00.00	5		78	
STA 562+00.00	3		83	
STA 563+00.00	1		105	
STA 564+00.00	0		59	
STA 00+00.00				
TOTAL	**1184**	**5088**	**4418**	**1302**

* FOR CONTRACTORS INFO ONLY

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NO.	REVISION	BY	DATE

CP&Y an STV Company — TEXAS REGISTERED ENGINEERING FIRM F-1741

 Texas Department of Transportation

FM 108 AT DRAW & BRUSHY CREEK

SUMMARY OF QUANTITIES

CSJ 0715-01-025 SHEET 4 OF 4

Designed:	YP	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	BAJ	6	TEXAS				FM 108,ETC
Drawn:	YP	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	BAJ	YKM	GONZALES	0715	01	025,ETC	13

FM 108 AT FIVE MILE CREEK & DRAW

SUMMARY OF ROADWAY QUANTITIES

LOCATION	SURFACE		LENGTH	HMA TYPE D			HMA TYPE B			CEMENT TREATED SUBGRADE			0100	0150	0275	0275	0316		0432	3076		
	BEGIN WIDTH	END WIDTH		BEGIN WIDTH	END WIDTH	DEPTH	BEGIN WIDTH	END WIDTH	DEPTH	BEGIN WIDTH	END WIDTH	DEPTH	PREPARING ROW	BLADING	CEMENT	CEMENT TREAT (SUBGRADE) (8")	ASPH (AC-15P OR AC-10-2TR OR CRS-2P)	AGGR (TY-PE GR-4 SAC-B)	RIPRAP (STONE PROTECTION) (18 IN)	D-GR HMA TY-B PG64-22	D-GR HMA TY-D SAC-A PG70-22	TACK COAT
															106 PCF @ 5%		SEAL COAT			10"	2"	
																	0.34 GAL/SY	1 CY/140 SY		110 LB/SY-IN	110 LB/SY-IN	0.1 GAL/SY
	FT	FT	FT	FT	FT	IN	FT	FT	IN	FT	FT	IN	STA	HR	TON	SY	GAL	CY	CY	TON	TON	GAL
CSJ: 0715-01-025																						
FM 108 AT FIVE MILE CREEK																						
STA 728+10.00 TO STA 728+84.00 LT	11.6	23.5	74.0	11.9	23.8	2	13.4	25.3	10	14.6	26.5	8			3.0	169	51	1.1		88	17	16
STA 728+84.00 TO STA 729+92.00 LT	23.5	23.5	108.0	23.8	23.8	2	25.3	25.3	10	26.5	26.5	8			6.0	318	98	2.1		167	32	31
STA 729+92.00 TO STA 729+93.50 LT	23.5	20.0	1.5	23.5	20.0	2	23.5	20.0	10	23.5	20.0	8			1.0	4	2	0.1	76	2	1	1
BRIDGE CLASS CULVERT AT FIVE MILE CREEK LT	20.0	20.0	62.9	20.0	20.0	2	20.0	20.0	8	20.0	20.0	0	1.00		0.0	140	49	1.1		62	16	14
STA 730+56.43 TO STA 730+58.00 LT	20.0	23.5	1.6	20.0	23.5	2	20.0	23.5	10	20.0	23.5	8			1.0	4	2	0.1	45	3	1	1
STA 730+58.00 TO STA 732+65.00 LT	23.5	23.5	207.0	23.8	23.8	2	25.3	25.3	10	26.5	26.5	8			10.0	610	188	4.0		320	61	59
STA 732+65.00 TO STA 733+15.00 LT	23.5	11.0	50.0	23.8	11.3	2	25.3	12.8	10	26.5	14.0	8			2.0	113	34	0.8		59	11	11
STA 728+10.00 TO STA 728+60.00 RT	10.9	14.6	50.0	11.2	14.9	2	12.7	16.4	10	13.9	17.6	8			2.0	88	26	0.6		45	8	9
STA 728+60.00 TO STA 729+91.75 RT	23.5	23.5	131.8	23.8	23.8	2	25.3	25.3	10	26.5	26.5	8			7.0	388	120	2.6		204	39	37
STA 729+91.75 TO STA 729+93.34 RT	23.5	20.0	1.6	23.5	20.0	2	23.5	20.0	10	23.5	20.0	8			1.0	4	2	0.1	21	3	1	1
BRIDGE CLASS CULVERT AT FIVE MILE CREEK RT	20.0	20.0	63.4	20.0	20.0	2	20.0	20.0	4	20.0	20.0	0			0.0	141	50	1.1		31	16	15
STA 730+56.73 TO STA 730+58.39 RT	20.0	23.5	1.7	20.0	23.5	2	20.0	23.5	10	20.0	23.5	8			1.0	4	2	0.1	65	3	1	1
STA 730+58.39 TO STA 731+69.00 RT	23.5	23.5	110.6	23.8	23.8	2	25.3	25.3	10	26.5	26.5	8			6.0	326	101	2.2		171	33	32
STA 731+69.00 TO STA 732+65.00 RT	23.5	20.0	96.0	23.8	20.3	2	25.3	21.8	10	26.5	23.0	8			5.0	264	81	1.7		138	26	26
STA 732+65.00 TO STA 733+15.00 RT	20.0	10.6	50.0	20.3	10.9	2	21.8	12.4	10	23.0	13.6	8			2.0	102	29	0.7		53	10	10
FM 108 AT DRAW																						
STA 737+85.00 TO STA 738+35.00 LT	10.2	22.0	50.0	10.5	22.3	2	12.0	23.8	10	13.2	25.0	8			2.0	106	31	0.7		55	10	10
STA 738+40.00 TO STA 739+47.71 LT	22.0	22.0	107.7	22.3	22.3	2	23.8	23.8	10	25.0	25.0	8			5.0	299	90	2.0		157	30	29
STA 739+47.71 TO STA 740+07.00 LT	22.0	25.5	59.3	22.3	25.8	2	23.8	27.3	10	25.0	28.5	8			3.0	176	54	1.2		93	18	17
STA 740+07.00 TO STA 740+44.19 LT	25.5	25.5	37.2	25.8	25.8	2	27.3	27.3	10	28.5	28.5	8			2.0	118	36	0.8		62	12	12
BRIDGE CLASS CULVERT AT DRAW LT	22.0	22.0	54.0	22.0	22.0	2	22.0	22.0	9	22.0	22.0	1	1.00		1.0	132	45	1.0		66	15	14
STA 740+97.90 TO STA 740+99.69 LT	22.0	25.5	1.8	22.0	25.5	2	22.0	25.5	10	25.0	28.5	8			1.0	5	2	0.1		3	1	1
STA 740+99.69 TO STA 742+95.00 LT	25.5	25.5	195.3	25.8	25.8	2	27.3	27.3	10	28.5	28.5	8			10.0	618	189	4.1		326	62	60
STA 742+95.00 TO STA 743+45.00 LT	25.5	11.4	50.0	25.8	11.7	2	27.3	13.2	10	28.5	14.4	8			2.0	119	35	0.8		62	12	12
STA 737+85.00 TO STA 738+35.00 RT	12.0	25.5	50.0	12.3	25.8	2	13.8	27.3	10	15.0	28.5	8			2.0	121	36	0.8		63	12	12
STA 738+35.00 TO STA 740+30.30 RT	25.5	25.5	195.3	25.8	25.8	2	27.3	27.3	10	28.5	28.5	8			10.0	618	189	4.1		326	62	60
STA 740+30.30 TO STA 740+32.10 RT	25.5	22.0	1.8	25.5	22.0	2	25.5	22.0	10	25.5	22.0	8			1.0	5	2	0.1		3	1	1
BRIDGE CLASS CULVERT AT DRAW RT	22.0	22.0	53.7	22.0	22.0	2	22.0	22.0	5	22.0	22.0	0			0.0	131	45	1.0		37	15	14
STA 740+85.81 TO STA 741+83.00 RT	25.5	25.5	97.2	25.8	25.8	2	27.3	27.3	10	28.5	28.5	8			5.0	308	94	2.1		162	31	30
STA 741+83.00 TO STA 742+95.00 RT	25.5	22.0	112.0	25.8	22.3	2	27.3	23.8	10	28.5	25.0	8			6.0	333	101	2.2		175	33	32
STA 742+95.00 TO STA 743+45.00 RT	22.0	11.2	50.0	22.3	11.5	2	23.8	13.0	10	25.0	14.2	8		16	2.0	109	32	0.7		57	11	11
CR 137	18.3	59.6	45.0	18.8	60.1		21.8	63.1	6	24.3	65.6					225	67	1.6		71		
TOTAL													**2.00**	**16**	**99**	**6098**	**1883**	**42**	**207**	**3067**	**598**	**579**

SUMMARY OF GUARDRAIL QUANTITIES

DESCRIPTION	0540 MTL W-BEAM GD FEN (TIM POST)	0540 MTL BEAM GD FEN TRANS (THRIE-BEAM)	0544 GUARDRAIL END TREATMENT (INSTALL)	0545 CRASH CUSH ATTEN (INSTL)(L)(N)(TL3)
	LF	EA	EA	EA
CSJ: 0715-01-025				
FM 108 AT FIVE MILE CREEK				
STA 728+10.00 TO STA 733+15.00	275	4	4	
CSJ: 0715-01-025				
FM 108 AT DRAW				
STA 737+85.00 TO STA 743+45.00	275	3	3	1
TOTAL	**550**	**7**	**7**	**1**

NO.	REVISION	BY	DATE

TEXAS REGISTERED ENGINEERING FIRM F-1741

CP&Y an STV Company

FM 108 AT FIVE MILE CREEK & DRAW

SUMMARY OF QUANTITIES

CSJ 0715-01-025 SHEET 1 OF 3

Designed:	FV	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	BAJ	6	TEXAS				FM 108,ETC
Drawn:	FV	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	BAJ	YKM	GONZALES	0715	01	025,ETC	14

FM 108 AT FIVE MILE CREEK & DRAW

SUMMARY OF BRIDGE CLASS CULVERT QUANTITIES

DESCRIPTION	NBI #	0400 CEM STABIL BKFL (CY)	0420 CL C CONC (MISC) (CY)	0432 RIPRAP (CONC)(5 IN) (CY)	0432 RIPRAP (STONE PROTECTION) (18 IN) (CY)	0450 RAIL (TY SSTR) (W/DRAIN SLOTS) (LF)	0462 CONC BOX CULV (8 FT X 4 FT) (LF)	0462 CONC BOX CULV (9 FT X 7 FT) (LF)	0466 WINGWALL (FW-0) (HW=5FT)(MOD) (EA)	0466 WINGWALL(FW-S) (HW=5FT)(MOD) (EA)	0466 WINGWALL(FW-S) (HW=6FT)(MOD) (EA)
CSJ: 0715-01-025											
FM 108 AT FIVE MILE CREEK	**13-090-0-0715-01-032**	66	**1.2**	**33**	**82**	126.4	84	168	2		
CSJ: 0715-01-025											
FM 108 AT DRAW CREEK	**13-090-0-0715-01-033**	80	**1.2**	**26**	**66**	108	95.2	142.8		1	1
TOTAL		**146**	**2.4**	**59**	**148**	**234.4**	**179.2**	**310.8**	**2**	**1**	**1**

SUMMARY OF SWP3 QUANTITIES

LOCATION	0164 BROADCAST SEED (PERM) (RURAL) (CLAY) (SY)	0164 BROADCAST SEED (TEMP) (WARM) (SY)	0164 BROADCAST SEED (TEMP) (COOL) (SY)	*0166 FERTILIZER 500 LBS/AC (TON)	0168 VEGETATIVE WATERING 13.6 MG/AC/MO (MG)	0506 ROCK FILTER DAMS (INSTALL) (TY 1) (LF)	0506 ROCK FILTER DAMS (REMOVE) (LF)
CSJ: 0715-01-025							
FM 108 AT FIVE MILE CREEK							
STA 728+10.00 TO STA 733+15.00	1298	325	325	0.07	33		
BMP #1						20	20
BMP #2						20	20
BMP #3						20	20
BMP #4						20	20
CSJ: 0715-01-025							
FM 108 AT DRAW							
STA 737+85.00 TO STA 743+45.00	1627	407	407	0.09	42		
BMP #1						20	20
BMP #2						20	20
BMP #3						20	20
BMP #4						20	20
TOTAL	**2925**	**731**	**731**	**0.16**	**75**	**160**	**160**

SUMMARY OF DRIVEWAYS

LOCATION	*0316 ASPH (AC-15P OR AC-10-2TR OR CRS-2P) (GAL)	*0316 AGGR (TY-PE GR-4 SAC-B) (CY)	0464 RC PIPE (CL III) (18 IN) (LF)	0467 SET (TY II) (18 IN) (RCP) (6: 1) (P) (EA)	0530 DRIVEWAYS (ACP) (SY)	0560 MAILBOX INSTALL-S (WC-POST) TY 3 (EA)	0560 MAILBOX INSTALL-D (WC-POST) TY 3 (EA)	*3076 D-GR HMA TY-B PG64-22 (TON)
	SEAL COAT							6"
	0.34 GAL/SY	1 CY/130 SY						660 LB/SY
CSJ: 0715-01-025								
FM 108 AT FIVE MILE CREEK								
DW-05	13	1	24	2	36	1		12
CSJ: 0715-01-025								
FM 108 AT DRAW								
DW-06	24	1			68	1	1	23
TOTAL	**37**	**2**	**24**	**2**	**104**	**2**	**1**	**35**

* FOR CONTRACTOR INFO ONLY

SUMMARY OF DELINEATOR QUANTITIES

LOCATION	0658 INSTL DEL ASSM (D-SW)SZ (BRF)CTB (BI) (EA)	0658 INSTL DEL ASSM (D-SW)SZ 1 (BRF)GF2(BI) (EA)
CSJ: 0715-01-025		
FM 108 AT FIVE MILE CREEK		
STA 728+10.00 TO STA 733+15.00	6	12
CSJ: 0715-01-025		
FM 108 AT DRAW		
STA 737+85.00 TO STA 743+45.00	6	9
TOTAL	**12**	**21**

NO.	REVISION	BY	DATE

CP&Y an STV Company — TEXAS REGISTERED ENGINEERING FIRM F-1741

FM 108 AT FIVE MILE CREEK & DRAW

SUMMARY OF QUANTITIES

CSJ 0715-01-025 SHEET 2 OF 3

Designed: FV	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked: BAJ	6	TEXAS					FM 108,ETC
Drawn: FV	DIST.	COUNTY		CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked: BAJ	YKM	GONZALES		0715	01	025,ETC	15

FM 108 AT FIVE MILE CREEK & DRAW

SUMMARY OF TRAFFIC CONTROL QUANTITIES

DESCRIPTION	0400 CUT & RESTORING PAV	0403 TEMPORARY SPL SHORING	0510 ONE-WAY TRAF CONT (PORT TRAF SIG)	0512 PORT CTB (FUR & INST) (SGL SLOPE)(TY 1)	0512 PORT CTB (MOVE) (SGL SLP)(TY 1)	0512 PORT CTB (REMOVE) (SGL SLP)(TY 1)	0545 CRASH CUSH ATTEN (MOVE & RESET)	0545 CRASH CUSH ATTEN (REMOVE)	0545 CRASH CUSH ATTEN (INSTL)(S)(N)(TL3)	0662 WK ZN PAV MRK REMOV (W)4"(SLD)	0662 WK ZN PAV MRK REMOV (W)24"(SLD)	0662 WK ZN PAV MRK REMOV (Y)4"(SLD)	0677 ELIM EXT PAV MRK & MRKS (4")	6185 TMA (STATIONARY)	6185 TMA (MOBILE OPERATION)
	SY	SF	MO	LF	LF	LF	EA	EA	EA	LF	LF	LF	LF	DAY	DAY
CSJ: 0715-01-025															
FM 108 AT FIVE MILE CREEK															
PHASE 1	162	370												2	
CSJ: 0715-01-025															
FM 108 AT FIVE MILE CREEK															
PHASE 2				690					4					2	
CSJ: 0715-01-025															
FM 108 AT FIVE MILE CREEK															
PHASE 3			0.5		690	360	4	2		1540	24	3600	2420	2	
CSJ: 0715-01-025															
FM 108 AT FIVE MILE CREEK															
PHASE 4			0.5		330	330	2	2		1540				2	10
CSJ: 0715-01-025															
FM 108 AT DRAW															
PHASE 1	141	460												2	
CSJ: 0715-01-025															
FM 108 AT DRAW															
PHASE 2				780					4					2	
CSJ: 0715-01-025															
FM 108 AT DRAW															
PHASE 3			0.5		780	360	4	2		1660	24	2080	410	2	
CSJ: 0715-01-025															
FM 108 AT DRAW															
PHASE 4			0.5		420	420	2	2		1660				2	10
TOTAL	**303**	**830**	**2**	**1470**	**2220**	**1470**	**12**	**8**	**8**	**6400**	**48**	**5680**	**2830**	**16**	**20**

SUMMARY OF REMOVAL QUANTITIES

DESCRIPTION	0496 REMOV STR (BRIDGE 0 - 99 FT LENGTH)
	EA
CSJ: 0715-01-025	
FM 108 AT FIVE MILE CREEK	
STA 728+10.00 TO STA 733+15.00	1
CSJ: 0715-01-025	
FM 108 AT DRAW	
STA 737+85.00 TO STA 743+45.00	1
TOTAL	**2**

SUMMARY OF EARTHWORK QUANTITIES

STATION	0110 EXCAVATION (ROADWAY)	0132 EMBANKMENT (FINAL)(DENS CONT)(TY C)	*0400 STRUCT EXCAV
	CY	CY	CY
CSJ: 0715-01-025			
STA 728+00.00	8		
STA 729+00.00	77	35	
STA 729+93.42	79	105	
BRIDGE CLASS CULVERT AT FIVE MILE CREEK			271
STA 731+00.00	15	109	
STA 732+00.00	105	39	
STA 733+00.00	135	14	
STA 734+00.00	51	12	
STA 738+00.00	29	6	
STA 739+00.00	104	36	
STA 740+00.00	58	98	
STA 740+38.00	10	48	
BRIDGE CLASS CULVERT AT DRAW			285
STA 741+00.00	1	16	
STA 742+00.00	45	139	
STA 743+00.00	111	31	
STA 744+00.00	68	8	
TOTAL	**896**	**706**	**556**

* FOR CONTRACTOR INFO ONLY

SUMMARY OF PAVEMENT MARKINGS AND MARKERS

LOCATION	0666 REF PROF PAV MRK TY I(W) 6"(SLD)(100MIL)	0666 REF PROF PAV MRK TY I(Y) 6"(BRK)(100MIL)	0666 REF PROF PAV MRK TY I(Y) 6"(SLD)(100MIL)	0672 REFL PAV MRKR TY II-A-A
	LF	LF	LF	EA
CSJ: 0715-01-025				
FM 108 AT FIVE MILE CREEK				
(2)		480	1525	46
STA 728+10.00 TO STA 733+15.00	1010	130		7
(2)			120	6
CSJ: 0715-01-025				
FM 108 AT DRAW				
STA 737+85.00 TO STA 743+45.00	1052	140		7
(2)		470	140	25
TOTAL	**2062**	**1220**	**1785**	**91**

(2) QUANTITIES EXTEND BEYOND PROJECT LIMITS AFTER TCP

NO.	REVISION	BY	DATE

CP&Y an STV Company — TEXAS REGISTERED ENGINEERING FIRM F-1741

FM 108 AT FIVE MILE CREEK & DRAW

SUMMARY OF QUANTITIES

CSJ 0715-01-025 SHEET 3 OF 3

Designed:	FV	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	BAJ	6	TEXAS				FM 108,ETC
Drawn:	FV	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	BAJ	YKM	GONZALES	0715	01	025,ETC	16

SH 97 AT RED BRANCH

SUMMARY OF ROADWAY QUANTITIES

ITEM DESCRIPTION	PAVEMENT SECTION						0100	0150	0275	0275	0316	0316	0496	0552	0552	3076	3076	3076
	LENGTH	BEGIN WIDTH	END WIDTH	HMA TYPE D DEPTH	HMA TYPE B DEPTH	CEMENT TREATED SUBGRADE DEPTH	PREPARING ROW	BLADING **	CEMENT	CEMENT TREAT (SUBGRADE) (8")	AGGR(TY-PE GR-4 SAC-B)	ASPH (AC-15P OR AC-10-2TR OR CRS-2P)	REMOV STR (SMALL FENCE)	WIRE FENCE (TY A)	WIRE FENCE (TY C)	D-GR HMA TY-B PG64-22	D-GR HMA TY-D SAC-A PG70-22	TACK COAT
											SEAL COAT		***					
	FT	FT	FT	IN	IN	IN	STA	HR	TON	SY	CY	GAL	LF	LF	LF	TON	TON	GAL
									106 PCF @5%		1 CY/130 SY	0.34 GAL/SY				110 LBS/SY-IN	110 LBS/SY-IN	0.1 GAL/SY
CSJ: 0347-02-033 - SH 97 AT RED BRANCH								30										
STA 1127+10.00 TO 1127+60.00	50	26	46.2	2	10	8			4	234	2	70				119	22	22
STA 1127+60.00 TO 1128+60.00	100	46.2	53.3	2	10	8			10	619	4	192				322	61	59
STA 1128+60.00 TO 1129+63.08	103.08	53.3	51	2	10	8			11	666	5	207	117	74	117	347	66	63
STA 1129+63.08 TO 1129+86.92 (BRIDGE CLASS CULVERT)	23.84	44	44	2			2				1	41					13	
STA 1129+86.92 TO 1130+90.00	103.08	51	53.3	2	10	8			11	666	5	207	117	74	117	347	66	63
STA 1130+90.00 TO 1131+90.00	100	53.3	46	2	10	8			10	618	4	191				322	61	59
STA 1131+90.00 TO 1132+40.00	50	46	26.5	2	10	8			4	235	2	70				120	22	22
PROJECT TOTAL							2	30	48	3038	22	978	234	148	234	1578	310	287

* TREE REMOVAL SUBSIDIARY TO ITEM 100 PREP ROW
** ESTIMATED QUANTITY
*** EXISTING FENCE REMOVAL IS SUBSIDIARY TO ITEM 100 PREP ROW. TEMPORARY FENCE REMOVAL SHALL BE PAID UNDER ITEM 496 REMOVE STR (SMALL FENCE)

SUMMARY OF BRIDGE CLASS CULVERT QUANTITIES

ITEM DESCRIPTION	NBI #	0400	0402	0432	0432	0450	0462	0466	0496
		CEM STABIL BKFL	TRENCH EXCAVATION PROTECTION	RIPRAP (CONC)(5 IN)	RIPRAP (STONE PROTECTION)(18 IN)	RAIL (TY SSTR) (W/DRAIN SLOTS)	CONC BOX CULV (10 FT X 10 FT)	WINGWALL (FW - 0) (HW=12 FT)	REMOV STR (BOX CULVERT)
		CY	LF	CY	CY	LF	LF	EA	EA
CSJ: 0347-02-033 - SH 97 AT RED BRANCH									
STA 1127+10.00 TO 1132+40.00	13-090-0-0347-02-017	176	92	40	86	48	92	2	2
PROJECT TOTAL		176	92	40	86	48	92	2	2

SUMMARY OF GUARDRAIL QUANTITIES

ITEM DESCRIPTION	0540	0540	0542	0544	0544
	MTL W-BEAM GD FEN (TIM POST)	MTL BEAM GD FEN TRANS (THRIE-BEAM)	REMOVE METAL BEAM GUARD FENCE	GUARDRAIL END TREATMENT (INSTALL)	GUARDRAIL END TREATMENT (REMOVE)
	LF	EA	LF	EA	EA
CSJ: 0347-02-033 - SH 97 AT RED BRANCH					
STA 1127+10.00 TO 1132+40.00					
LEFT	150	2	338	2	2
RIGHT	150	2	331	2	2
PROJECT TOTAL	300	4	669	4	4

SUMMARY OF SW3P QUANTITIES

ITEM DESCRIPTION	0164	0164	0164	0166	0168	0506	0506
	BROADCAST SEED (PERM) (RURAL) (CLAY)	BROADCAST SEED (TEMP) (WARM)	BROADCAST SEED (TEMP) (COOL)	FERTILIZER *	VEGETATIVE WATERING	TEMP SEDMT CONT FENCE (INSTALL)	TEMP SEDMT CONT FENCE (REMOVE)
	SY	SY	SY	TON	MG	LF	LF
				500 LBS/AC	13.6 MG/AC/MO		
CSJ: 0347-02-033 - SH 97 AT RED BRANCH							
STA 1127+10.00 TO 1132+40.00	5259	1315	1315	0.27	59.1		
BMP #1						22	22
BMP #2						22	22
BMP #3						19	19
BMP #4						19	19
PROJECT TOTAL	5259	1315	1315	0.27	59.1	82	82

* PROVIDED FOR CONTRACTOR'S INFORMATION ONLY

SUMMARY OF SIGNING, DELINEATOR AND OBJECT MARKER QUANTITIES

ITEM DESCRIPTION	0644	0644	0658	0666	0666	0666	0672
	IN SM RD SN SUP&AM TYTWT(1)WS(P)	REMOVE SM RD SN SUP&AM *	INSTL DEL ASSM (D-SW)SZ 1 (BRF)GF2(BI)	REF PROF PAV MRK TY I(Y)6"(SLD)(100MIL	REF PROF PAV MRK TY I(Y)6"(BRK)(100MIL	REF PROF PAV MRK TY I(W)6"(SLD)(100MIL	REFL PAV MRKR TY II-A-A
	EA	EA	EA	LF	LF	LF	EA
CSJ: 0347-02-033 - SH 97 AT RED BRANCH							
②				3400	325		85
STA 1127+10.00 TO 1132+40.00	1	1	8	530	130	1060	14
②				2350	588		59
PROJECT TOTAL	1	1	8	6280	1043	1060	158

*SIGN REMOVAL SUBSIDIARY TO ITEM 100 PREP ROW
② QUANTITIES EXTEND BEYOUND PROJECT LIMITS AFTER TCP

NO.	REVISION	BY	DATE

WSP USA Inc.
16200 Park Row, Suite 200
Houston, TX 77084
TBPE # F-2263

SH 97 AT RED BRANCH

SUMMARY OF QUANTITIES

CSJ 0347-02-033 SHEET 1 OF 2

Designed:	MAK	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	AHA	6	TEXAS				FM 108, ETC
Drawn:	GTD	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	AHA	YKM	GONZALES	0715	01	025,ETC	17

SH 97 AT RED BRANCH

SUMMARY OF TRAFFIC CONTROL QUANTITIES

ITEM DESCRIPTION	0400 CUT & RESTORING PAV	0403 TEMPORARY SPL SHORING	0510 ONE-WAY TRAF CONT (PORT TRAF SIG)	0512 PORT CTB (FUR & INST)(SGL SLOPE)(TY 1)	0512 PORT CTB (MOVE)(SGL SLP)(TY 1)	0512 PORT CTB (REMOVE)(SGL SLP)(TY 1)	0545 CRASH CUSH ATTEN (MOVE & RESET)	0545 CRASH CUSH ATTEN (REMOVE)	0545 CRASH CUSH ATTEN (INSTL)(S)(N)(TL3)	0662 WK ZN PAV MRK REMOV (W)24"(SLD)	0662 WK ZN PAV MRK REMOV (W)4"(SLD)	0662 WK ZN PAV MRK REMOV (Y)4"(SLD)	0677 ELIM EXT PAV MRK & MRKS (4")	6001 PORTABLE CHANGEABLE MESSAGE SIGN
	SY	SF	MO	LF	LF	LF	EA	EA	EA	LF	LF	LF	LF	EA
CSJ: 0347-02-033 - SH 97 AT RED BRANCH														
PHASE 1	136	2209												2
CSJ: 0347-02-033 - SH 97 AT RED BRANCH														
PHASE 2				780					4					
CSJ: 0347-02-033 - SH 97 AT RED BRANCH														
PHASE 3					390		2			24	1360	8400	9200	
CSJ: 0347-02-033 - SH 97 AT RED BRANCH														
PHASE 4					390	780	2	4		24	1360	400	200	
PROJECT TOTAL	136	2209	1	780	780	780	4	4	4	48	2720	8800	9400	2

SUMMARY OF EARTHWORK QUANTITIES

ITEM DESCRIPTION	0110 EXCAVATION (ROADWAY)	0132 EMBANKMENT (FINAL)(ORD COMP)(TY C)
	CY	CY
CSJ: 0347-02-033 - SH 97 AT RED BRANCH		
1127+10 TO 1127+50	80	3
1127+50 TO 1128+00	91	13
1128+00 TO 1128+50	74	44
1128+50 TO 1129+00	65	80
1129+00 TO 1129+50	60	242
1129+50 TO 1129+63	9	58
BRIDGE CLASS CULVERT	0	0
1129+87 TO 1130+00	11	51
1130+00 TO 1130+50	78	201
1130+50 TO 1131+00	94	40
1131+00 TO 1131+50	106	14
1131+50 TO 1132+00	106	11
1132+00 TO 1132+40	81	4
PROJECT TOTAL	855	761

cpybw ANSIB.tbl
cyppdf_ANSIB.pltcfg
pw:/
4/4/2023 3:22:17 PM USMK676488
pw:/

NO.	REVISION	BY	DATE

WSP USA Inc.
16200 Park Row, Suite 200
Houston, TX 77084
TBPE # F-2263

SH 97 AT RED BRANCH

SUMMARY OF QUANTITIES

CSJ 0347-02-033 SHEET 2 OF 2

Designed:	MAK	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	AHA	6	TEXAS					FM 108, ETC.
Drawn:	GTD	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	AHA	YKM	GONZALES	0715	01	025,ETC		18

LOC NO.	TCP PHASE	PLAN SHEET NUMBER	LOCATION	STA	TEST LEVEL	DIRECTION OF TRAFFIC (UNI/BI)	FOUNDATION PAD		BACKUP SUPPORT			AVAILABLE SITE LENGTH	CRASH CUSHION									
															MOVE / RESET		L	L	R	R	S	S
							PROPOSED MATERIAL	PROPOSED THICKNESS	DESCRIPTION	WIDTH	HEIGHT		INSTALL	REMOVE	MOVE/ RESET	FROM LOC.#	N	W	N	W	N	W
1	PHASE 2	24	BEGIN LT DRAW NEAR BRUSHY	540+30.00	TL-3	BI	N/A	N/A	SSCB	24"	42"	30′	1								1	
2	PHASE 2	24	BEGIN RT DRAW NEAR BRUSHY	539+35.00	TL-3	BI	N/A	N/A	SSCB	24"	42"	30′	1								1	
3	PHASE 2	24	END LT DRAW NEAR BRUSHY	543+30.00	TL-3	BI	N/A	N/A	SSCB	24"	42"	30′	1								1	
4	PHASE 2	24	END RT DRAW NEAR BRUSHY	543+25.00	TL-3	BI	N/A	N/A	SSCB	24"	42"	30′	1								1	
5	PHASE 3	25	BEGIN LT DRAW NEAR BRUSHY	540+30.00	TL-3	BI	N/A	N/A	SSCB	24"	42"	30′		1	1	1					1	
6	PHASE 3	25	BEGIN RT DRAW NEAR BRUSHY	539+35.00	TL-3	BI	N/A	N/A	SSCB	24"	42"	30′			1	2					1	
7	PHASE 3	25	END LT DRAW NEAR BRUSHY	543+30.00	TL-3	BI	N/A	N/A	SSCB	24"	42"	30′		1	1	3					1	
8	PHASE 3	25	END RT DRAW NEAR BRUSHY	543+25.00	TL-3	BI	N/A	N/A	SSCB	24"	42"	30′			1	4					1	
9	PHASE 4	26	BEGIN RT DRAW NEAR BRUSHY	539+35.00	TL-3	BI	N/A	N/A	SSCB	24"	42"	30′		1	1	6					1	
10	PHASE 4	26	END RT DRAW NEAR BRUSHY	543+25.00	TL-3	BI	N/A	N/A	SSCB	24"	42"	30′		1	1	8					1	
11	PHASE 2	24	BEGIN LT SH 97 AT RED BRANCH	1128+00.00	TL-3	BI	N/A	N/A	SSCB	24"	42"	30′	1								1	
12	PHASE 2	24	BEGIN RT SH 97 AT RED BRANCH	1127+60.00	TL-3	BI	N/A	N/A	SSCB	24"	42"	30′	1								1	
13	PHASE 2	24	END LT SH 97 AT RED BRANCH	1131+90.00	TL-3	BI	N/A	N/A	SSCB	24"	42"	30′	1								1	
14	PHASE 2	24	END RT SH 97 AT RED BRANCH	1131+50.00	TL-3	BI	N/A	N/A	SSCB	24"	42"	30′	1								1	
15	PHASE 4	32	NORTH OF EXIST BRUSHY CREEK BRIDGE	549+05.00	TL-3	BI	N/A	N/A	SSCB	24"	42"	30′	1	1							1	
16	PHASE 4	32	SOUTH OF EXIST BRUSHY CREEK BRIDGE	550+85.00	TL-3	BI	N/A	N/A	SSCB	24"	42"	30′	1	1							1	
17	PHASE 3	25	BEGIN LT SH 97 AT RED BRANCH	1128+00.00	TL-3	BI	N/A	N/A	SSCB	24"	42"	30′		1	1	11					1	
18	PHASE 3	25	BEGIN RT SH 97 AT RED BRANCH	1127+60.00	TL-3	BI	N/A	N/A	SSCB	24"	42"	30′			1	12					1	
19	PHASE 3	25	END LT SH 97 AT RED BRANCH	1131+90.00	TL-3	BI	N/A	N/A	SSCB	24"	42"	30′		1	1	13					1	
20	PHASE 3	25	END RT SH 97 AT RED BRANCH	1131+50.00	TL-3	BI	N/A	N/A	SSCB	24"	42"	30′			1	14					1	
21	PHASE 4	26	BEGIN RT SH 97 AT RED BRANCH	1127+60.00	TL-3	BI	N/A	N/A	SSCB	24"	42"	30′		1	1	18					1	
22	PHASE 4	26	END RT SH 97 AT RED BRANCH	1131+50.00	TL-3	BI	N/A	N/A	SSCB	24"	42"	30′		1	1	20					1	
23	PHASE 2	24	BEGIN LT FIVE MILE CREEK	728+85.00	TL-3	BI	N/A	N/A	SSCB	24"	42"	30′	1								1	
24	PHASE 2	24	BEGIN RT FIVE MILE CREEK	728+85.00	TL-3	BI	N/A	N/A	SSCB	24"	42"	30′	1								1	
25	PHASE 2	24	END LT FIVE MILE CREEK	732+45.00	TL-3	BI	N/A	N/A	SSCB	24"	42"	30′	1								1	
26	PHASE 2	24	END RT FIVE MILE CREEK	732+15.00	TL-3	BI	N/A	N/A	SSCB	24"	42"	30′	1								1	
27	PHASE 3	25	BEGIN LT FIVE MILE CREEK	728+85.00	TL-3	BI	N/A	N/A	SSCB	24"	42"	30′		1	1	23					1	
28	PHASE 3	25	BEGIN RT FIVE MILE CREEK	728+85.00	TL-3	BI	N/A	N/A	SSCB	24"	42"	30′			1	24					1	
29	PHASE 3	25	END LT FIVE MILE CREEK	732+45.00	TL-3	BI	N/A	N/A	SSCB	24"	42"	30′		1	1	25					1	
											SHEET TOTALS		14	12	15							

LEGEND:

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

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

CRASH CUSHION SUMMARY SHEET

FILE: ccss.dgn	DN: TxDOT	CK:		CK:
© TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS	0715	01	025,ETC	FM 108,ETC
	DIST	COUNTY		
	YKM	GONZALEZ		
	FEDERAL AID PROJECT			SHEET NO.
				19

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TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

LOC NO.	TCP PHASE	PLAN SHEET NUMBER	LOCATION	STA	TEST LEVEL	DIRECTION OF TRAFFIC (UNI/BI)	FOUNDATION PAD: PROPOSED MATERIAL	FOUNDATION PAD: PROPOSED THICKNESS	BACKUP SUPPORT: DESCRIPTION	BACKUP SUPPORT: WIDTH	BACKUP SUPPORT: HEIGHT	AVAILABLE SITE LENGTH	CRASH CUSHION: INSTALL	CRASH CUSHION: REMOVE	CRASH CUSHION: MOVE / RESET: MOVE/ RESET	CRASH CUSHION: MOVE / RESET: FROM LOC. #	L N	L W	R N	R W	S N	S W
30	PHASE 3	25	END RT FIVE MILE CREEK	732+15.00	TL-3	BI	N/A	N/A	SSCB	24"	42"	30'			1	26					1	
31	PHASE 4	26	BEGIN RT FIVE MILE CREEK	728+85.00	TL-3	BI	N/A	N/A	SSCB	24"	42"	30'		1	1	28					1	
32	PHASE 4	26	END RT FIVE MILE CREEK	732+15.00	TL-3	BI	N/A	N/A	SSCB	24"	42"	30'		1	1	30					1	
33	PHASE 2	24	BEGIN LT DRAW NEAR FIVE MILE CREEK	740+40.00	TL-3	BI	N/A	N/A	SSCB	24"	42"	30'	1								1	
34	PHASE 2	24	BEGIN RT DRAW NEAR FIVE MILE CREEK	738+50.00	TL-3	BI	N/A	N/A	SSCB	24"	42"	30'	1								1	
35	PHASE 2	24	END LT DRAW NEAR FIVE MILE CREEK	742+80.00	TL-3	BI	N/A	N/A	SSCB	24"	42"	30'	1								1	
36	PHASE 2	24	END RT DRAW NEAR FIVE MILE CREEK	742+70.00	TL-3	BI	N/A	N/A	SSCB	24"	42"	30'	1								1	
39	PHASE 3	25	BEGIN LT DRAW NEAR FIVE MILE CREEK	740+40.00	TL-3	BI	N/A	N/A	SSCB	24"	42"	30'		1	1	33					1	
40	PHASE 3	25	BEGIN RT DRAW NEAR FIVE MILE CREEK	738+50.00	TL-3	BI	N/A	N/A	SSCB	24"	42"	30'			1	34					1	
41	PHASE 3	25	END LT DRAW NEAR FIVE MILE CREEK	742+80.00	TL-3	BI	N/A	N/A	SSCB	24"	42"	30'		1	1	35					1	
42	PHASE 3	25	END RT DRAW NEAR FIVE MILE CREEK	742+70.00	TL-3	BI	N/A	N/A	SSCB	24"	42"	30'			1	36					1	
43	PHASE 4	26	BEGIN RT DRAW NEAR FIVE MILE CREEK	738+50.00	TL-3	BI	N/A	N/A	SSCB	24"	42"	30'		1	1	40					1	
44	PHASE 4	26	END RT DRAW NEAR FIVE MILE CREEK	742+70.00	TL-3	BI	N/A	N/A	SSCB	24"	42"	30'		1	1	42					1	
45	PERMANENT	86	FM 108 AT DRAW	740+20.00 LT	TL-3	BI	N/A	N/A	SSTR	24"	32"	30'	1				1					
												SHEET TOTALS	5	6	9							
												GRAND TOTAL	19	18	24							

LEGEND:

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

FOR DEFINITIONS SEE THE "CRASH CUSHION CATEGORIZATION CHART.PDF" AT THE DESIGN DIVISION (ROADWAY STANDARDS) WEBSITE. USE QUICK LINKS TO ACCESS ATTENUATORS / CRASH CUSHIONS SECTION.

http://www.dot.state.tx.us/insdtdot/orgchart/cmd/cserve/standard/rdwylse.htm

CRASH CUSHION SUMMARY SHEET

FILE: ccss.dgn	DN: TxDOT	CK:	CK:
© TxDOT	CONT / SECT / JOB		HIGHWAY
REVISIONS	0715 / 01 / 025,ETC		FM 108,ETC
	DIST	COUNTY	
	YKM	GONZALEZ	
	FEDERAL AID PROJECT		SHEET NO.
			20

TRAFFIC CONTROL PLAN NARRATIVE

THIS NARRATIVE IS SUPPLEMENTAL TO THE TRAFFIC CONTROL PLAN (TCP) SHEETS IN THE CONTRACT. THE TCP SHEETS DETAIL A GENERAL PLAN FOR CONSTRUCTION PHASING AND TRAFFIC MANAGEMENT.

CONTRACTOR SHALL PROVIDE ALL ADVANCE WARNING SIGNS PER TXDOT BC STANDARDS, TXDOT TCP STANDARDS AND AS SHOWN IN TRAFFIC CONTROL PLANS FOR THE PROJECT LIMITS. EXISTING CONFLICTING SIGNS SHALL BE COVERED OR REMOVED, STORED AND REPLACED AS PER THE CONTRACT PLANS.

CONTRACTOR SHALL FIELD VERIFY EXISTING UTILITIES AND NOTIFY THE ENGINEER OF ANY CONFLICTS DISCOVERED.

THE CONTRACTOR SHALL MAINTAIN THE TRAFFIC CONTROL MEASURES AND ALL DEVICES USED SHALL BE CLEARLY VISIBLE.

THE CONTRACTOR SHALL PROVIDE SAFE ALL WEATHER ACCESS AT ALL TIMES TO ALL ADJACENT PROPERTIES.

THE CONTRACTOR SHALL PLACE VERTICAL TRANSITIONS AS NECESSARY TO PREVENT DROP OFFS AND ASSURE SMOOTH TRANSITION OF TRAFFIC BETWEEN COMPLETED WORK AREAS.

THE CONTRACTOR SHALL NOT CLOSE FM 108 IN MULTIPLE LOCATIONS AT THE SAME TIME.

TRAFFIC CONTROL SEQUENCE OF WORK:

TRAFFIC CONTROL SHALL FOLLOW THIS SEQUENCE UNLESS OTHERWISE APPROVED BY THE ENGINEER.

1. DRAW NEAR BRUSHY CREEK CULVERT
2. BRUSHY CREEK BRIDGE
3. SH 97 CULVERT
4. FIVE MILE CREEK CULVERT
5. DRAW NEAR FIVE MILE CREEK CULVERT

FM 108 AT DRAW & BRUSHY CREEK BRIDGE:

COMBINES BRIDGE CLASS CULVERT WORK FOR DRAW NEAR BRUSHY CREEK WITH BRIDGE WORK AT BRUSHY CREEK.

BRIDGE CLASS CULVERT PHASE 1

TRAFFIC: CLOSE FM 108 TO THROUGH TRAFFIC UNTIL THE PRECAST BOX CULVERTS ARE PLACED AND PHASE 1 WORK IS COMPLETE. BRUSHY CREEK BRIDGE WIDENING PHASE 1 CONSTRUCTION SHALL COMMENCE CONCURRENTLY WITH PHASE 1 CULVERT WORK.

CONSTRUCTION:
1. PLACE ADVANCE WARNING SIGNS AND BARRICADES AS SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER.
2. PLACE ALL SIGNING PER TXDOT BC STANDARDS FOR THE PHASE 1 DETOUR.
3. CLOSE ROAD TO TRAFFIC (BEGIN MILESTONE 1A).
4. DEMOLISH EXISTING DRAW BRIDGE AND INSTALL PRECAST CULVERTS.
5. RESTORE PAVEMENT AND INSTALL PRECAST CONCRETE BARRIER AS SHOWN ON TCP. ADJUST ADVANCE WARNING SIGNS AS NECESSARY AND OPEN ROAD TO TWO-LANE TWO-WAY TRAFFIC. (END MILESTONE 1A)
6. BRIDGE: BEGIN CONSTRUCTION OF PHASE 1 OF THE BRUSHY CREEK BRIDGE PER PHASE 1 OF BRIDGE PLANS. MAINTAIN TWO-WAY TWO-LANE TRAFFIC ON EXISTING BRIDGE DURING CONSTRUCTION.

BRIDGE CLASS CULVERT PHASE 2

TRAFFIC: MAINTAIN TWO-WAY TWO-LANE TRAFFIC WHILE THE HEADWALLS, WINGWALLS, AND BRIDGE RAIL ARE COMPLETED. CONTINUE BRUSHY CREEK BRIDGE PHASE 1 WORK.

CONSTRUCTION:
1. THE CONTRACTOR SHALL MAINTAIN TWO-WAY TRAFFIC PER THE PHASE 2 BRIDGE CLASS CULVERT TCP PLANS UNLESS APPROVED OTHERWISE BY THE ENGINEER.
2. COMPLETE CULVERT WINGWALL AND BRIDGE RAIL CONSTRUCTION.
3. BRIDGE: THE CONTRACTOR SHALL CONTINUE PHASE 1 CONSTRUCTION OF BRUSHY CREEK BRIDGE.

BRIDGE CLASS CULVERT PHASE 3

TRAFFIC: MAINTAIN ALTERNATING ONE-LANE TRAFFIC CONTROL USING TEMP TRAFFIC SIGNAL PER TCP (2-8)-18. CONTINUE BRUSHY CREEK BRIDGE WIDENING PHASE 1 WORK.

CONSTRUCTION:
1. THE CONTRACTOR SHALL NOT BEGIN PHASE 3 OF THE BRIDGE CLASS CULVERT CONSTRUCTION UNTIL PHASE 2 IS COMPLETE AND ACCEPTED BY THE ENGINEER.
2. ADJUST ADVANCE WARNING SIGNS IN ACCORDANCE CONTRACT PLANS AND TXDOT STANDARDS OR AS DIRECTED BY ENGINEER.
3. ESTABLISH ALTERNATING ONE-LANE TRAFFIC CONTROL WITH TRAFFIC SIGNAL IN ACCORDANCE WITH CONTRACT PLANS AND TXDOT STANDARDS. THE CONTRACTOR SHALL NOT CHANGE THE TCP UNLESS APPROVED BY THE ENGINEER PRIOR TO IMPLEMENTATION (BEGIN MILESTONE 1B).
4. CONSTRUCT LEFT SIDE OF FM 108 IN ACCORDANCE WITH THE CONTRACT PLANS AND TCP, THRU PRIME COAT TO STA 544+50 INCLUDING PLACEMENT OF APPROACH RAIL.
5. **BRIDGE:** THE CONTRACTOR SHALL CONTINUE PHASE 1 CONSTRUCTION OF THE FM 108 BRUSHY CREEK BRIDGE.

BRIDGE CLASS CULVERT PHASE 4

TRAFFIC: MAINTAIN ALTERNATING ONE-LANE TRAFFIC CONTROL USING TEMP TRAFFIC SIGNAL PER TCP (2-8)-18. CONTINUE BRUSHY CREEK BRIDGE PHASE 1 WORK.

CONSTRUCTION:
1. THE CONTRACTOR SHALL NOT BEGIN PHASE 4 OF THE BRIDGE CLASS CONSTRUCTION UNTIL PREVIOUS PHASE IS COMPLETE AND ACCEPTED BY THE ENGINEER.
2. ADJUST ADVANCE WARNING SIGNS IN ACCORDANCE CONTRACT PLANS AND TXDOT STANDARDS OR AS DIRECTED BY ENGINEER.
3. ESTABLISH ALTERNATING ONE-LANE TRAFFIC CONTROL WITH TRAFFIC SIGNAL IN ACCORDANCE WITH CONTRACT PLANS AND TXDOT STANDARDS. THE CONTRACTOR SHALL NOT CHANGE THE TCP UNLESS APPROVED BY THE ENGINEER PRIOR TO IMPLEMENTATION.
4. CONSTRUCT RIGHT SIDE OF FM 108, THRU PRIME COAT TO STA 544+50 INCLUDING PLACEMENT OF APPROACH RAIL.
5. OPEN BRIDGE TO TWO-LANE TWO-WAY TRAFFIC (END MILESTONE 1B).
6. BRIDGE: THE CONTRACTOR SHALL CONTINUE PHASES 1 CONSTRUCTION OF THE FM 108 BRUSHY CREEK BRIDGE.

FM 108 AT DRAW & BRUSHY CREEK BRIDGE

THE CONTRACTOR SHALL NOT BEGIN PHASE 2 OF THE FM 108 BRUSHY CREEK BRIDGE UNTIL BRIDGE CLASS CULVERT PHASES 1 THRU 4 ARE COMPLETE AND ACCEPTED BY THE ENGINEER.

BRIDGE PHASE 1

TRAFFIC: MAINTAIN TWO-WAY TRAFFIC ON EXISTING BRUSHY CREEK BRIDGE.

CONSTRUCTION:
1. CONSTRUCT PHASE 1 OF THE BRIDGE PER THE BRIDGE CONSTRUCTION SEQUENCE AND BRIDGE PLANS.

BRIDGE PHASE 2

TRAFFIC: MAINTAIN TWO-WAY TWO-LANE TRAFFIC ON FM 108 ACROSS THE EXISTING BRIDGE AND CONSTRUCT SUBGRADE AS SHOWN BY THE PHASE 2 TCP PLANS AND TYPICAL SECTIONS.

CONSTRUCTION:
1. ADJUST ADVANCE WARNING SIGNS AS NECESSARY PER THE TCP PLANS AND TXDOT BC STANDARDS, OR AS DIRECTED BY THE ENGINEER.
2. THE CONTRACTOR SHALL MAINTAIN TRAFFIC PER THE TCP PLANS UNLESS APPROVED OTHERWISE BY THE ENGINEER. DAYTIME LANE CLOSURES WILL BE PERMITTED USING APPROPRIATE TXDOT TCP STANDARDS.
3. THE CONTRACTOR SHALL PLACE EMBANKMENT AND CEMENT TREATED SUBGRADE AS SHOWN IN THE TCP PLANS.
4. COMPLETE PHASE 1 CONSTRUCTION OF THE BRUSHY CREEK BRIDGE DURING THIS PHASE OF CONSTRUCTION.

BRIDGE PHASE 3

TRAFFIC: MAINTAIN TWO-WAY TWO-LANE TRAFFIC ON FM 108 ACROSS THE EXISTING BRIDGE AND PERFORM REHAB/FLEX BASE WORK AS SHOWN BY THE PHASE 3 TCP TYPICAL SECTIONS.

CONSTRUCTION:
1. ADJUST ADVANCE WARNING SIGNS AS NECESSARY PER THE TCP PLANS AND TXDOT BC STANDARDS, OR AS DIRECTED BY THE ENGINEER.
2. THE CONTRACTOR SHALL MAINTAIN TRAFFIC PER THE TCP PLANS UNLESS APPROVED OTHERWISE BY THE ENGINEER.
3. SCARIFY EXISTING PAVEMENT SURFACE, PLACE NEW FLEX BASE. DURING WORKING HOURS, THE CONTRACTOR SHALL USE ALTERNATING ONE-LANE TRAFFIC CONTROL AS NECESSARY TO PERFORM DAILY FULL WIDTH CONSTRUCTION OF FM 108. TAPERS SHALL BE PLACED AS NEEDED TO MAINTAIN TWO-WAY TWO-LANE TRAFFIC DURING NON-WORKING HOURS.
4. THE CONTRACTOR SHALL PLACE THE FLEX BASE THRU STATION 546+80 AND BEYOND STATION 552+60 PER CONTRACT PLANS THRU PRIME COAT.

BRIDGE PHASE 4

TRAFFIC: MAINTAIN ALTERNATING ONE-LANE TRAFFIC CONTROL USING TEMP TRAFFIC SIGNAL ACROSS THE COMPLETED PHASE 1 PORTION OF THE BRUSHY CREEK BRIDGE.

CONSTRUCTION:
1. ADJUST ADVANCE WARNING SIGNS AS NECESSARY PER THE TCP PLANS AND TXDOT BC STANDARDS, OR AS DIRECTED BY THE ENGINEER.
2. ESTABLISH ALTERNATING ONE-LANE TRAFFIC CONTROL WITH TRAFFIC SIGNAL ACROSS THE PORTION OF THE PROPOSED BRIDGE BUILT DURING PHASE 1 OF THE BRIDGE CONSTRUCTION SEQUENCE (BEGIN MILESTONE 2).
3. DEMO EXISTING BRIDGE.
4. CONSTRUCT THE REMAINDER OF THE PROPOSED BRUSHY CREEK BRIDGE.
5. SCARIFY EXISTING PAVEMENT SURFACE AND PLACE NEW FLEX BASE FROM STA 546+80 TO STA 552+60 THRU THE PRIME COAT.
6. UPON COMPLETION OF BRIDGE AND APPROACHES INCLUDING APPROACH RAIL, OPEN BRIDGE TO TWO-WAY TWO-LANE TRAFFIC (END MILESTONE 2).
7. USE MOBILE TRAFFIC CONTROL OPERATIONS TO PLACE ONE COAT SURFACE TREATMENT, SEAL COAT AND FINAL STRIPING ON ENTIRE PROJECT.

BRIDGE CLASS CULVERTS AT FM 108 AT FIVE MILE CREEK, DRAW AND SH 97 AT RED BRANCH:

BRIDGE CLASS CULVERT PHASE 1

TRAFFIC: CLOSE ROADWAY TO THROUGH TRAFFIC UNTIL THE PRECAST BOX CULVERTS ARE PLACED AND PHASE 1 WORK IS COMPLETE.

CONSTRUCTION:
1. PLACE ADVANCE WARNING SIGNS AND BARRICADES AS SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER.
2. PLACE ALL SIGNING PER TXDOT BC STANDARDS FOR THE PHASE 1 DETOUR.
3. CLOSE ROAD TO TRAFFIC (BEGIN MILESTONE 3A/4A/5A).
4. DEMOLISH EXISTING DRAW BRIDGE AND INSTALL PRECAST CULVERTS.
5. RESTORE PAVEMENT AND INSTALL PRECAST CONCRETE BARRIER AS SHOWN ON TCP. ADJUST ADVANCE WARNING SIGNS AS NECESSARY AND OPEN ROAD TO TWO-LANE TWO-WAY TRAFFIC (END MILESTONE 3A/4A/5A).

BRIDGE CLASS CULVERT PHASE 2

TRAFFIC: MAINTAIN TWO-WAY TWO-LANE TRAFFIC WHILE THE HEADWALLS, WINGWALLS AND BRIDGE RAIL ARE COMPLETED PER THE CONTRACT PLANS.

CONSTRUCTION:
1. THE CONTRACTOR SHALL MAINTAIN TWO-WAY TRAFFIC PER THE PHASE 2 BRIDGE CLASS CULVERT TCP PLANS UNLESS APPROVED OTHERWISE BY THE ENGINEER.
2. COMPLETE CULVERT WINGWALL AND BRIDGE RAIL CONSTRUCTION.

BRIDGE CLASS CULVERT PHASE 3

TRAFFIC: MAINTAIN ALTERNATING ONE-LANE TRAFFIC CONTROL USING TEMP TRAFFIC SIGNAL PER TCP (2-8)-18.

CONSTRUCTION:
1. THE CONTRACTOR SHALL NOT BEGIN PHASE 3 OF THE BRIDGE CLASS CULVERT CONSTRUCTION UNTIL PHASE 2 IS COMPLETE AND ACCEPTED BY THE ENGINEER.
2. ADJUST ADVANCE WARNING SIGNS IN ACCORDANCE CONTRACT PLANS AND TXDOT STANDARDS OR AS DIRECTED BY ENGINEER.
3. ESTABLISH ALTERNATING ONE-LANE TRAFFIC CONTROL WITH TRAFFIC SIGNAL IN ACCORDANCE WITH CONTRACT PLANS AND TXDOT STANDARDS. THE CONTRACTOR SHALL NOT CHANGE THE TCP UNLESS APPROVED BY THE ENGINEER. (BEGIN MILESTONE 3B/4B/5B).
4. CONSTRUCT LEFT SIDE OF ROADWAY THRU TY B HMA. INSTALL APPROACH RAIL.

BRIDGE CLASS CULVERT PHASE 4

TRAFFIC: MAINTAIN ALTERNATING ONE-LANE ONE-WAY TRAFFIC CONTROL USING TEMP TRAFFIC SIGNAL AND PREVIOUSLY CONSTRUCTED LEFT SIDE PER TCP (2-8)-18.

CONSTRUCTION:
1. THE CONTRACTOR SHALL NOT BEGIN PHASE 4 OF THE BRIDGE CLASS CONSTRUCTION UNTIL PREVIOUS PHASE IS COMPLETE AND ACCEPTED BY THE ENGINEER.
2. ADJUST ADVANCE WARNING SIGNS IN ACCORDANCE CONTRACT PLANS AND TXDOT STANDARDS OR AS DIRECTED BY ENGINEER.
3. ESTABLISH ALTERNATING ONE-LANE TRAFFIC CONTROL WITH TRAFFIC SIGNAL IN ACCORDANCE WITH CONTRACT PLANS AND TXDOT STANDARDS. THE CONTRACTOR SHALL NOT CHANGE THE TCP UNLESS APPROVED BY THE ENGINEER PRIOR TO IMPLEMENTATION.
4. CONSTRUCT RIGHT SIDE OF ROADWAY THRU TY B HMA. INSTALL APPROACH RAIL.
5. OPEN BRIDGE TO TWO-LANE TWO-WAY TRAFFIC (END MILESTONE 3B/4B/5B).
6. UPON COMPLETION OF BRIDGE CLASS CULVERT ENDS AND APPROACHES INCLUDING APPROACH RAIL, USE MOBILE TRAFFIC CONTROL OPERATIONS TO PLACE SEAL COAT AND TY D HMA SURFACE AND FINAL STRIPING ON ENTIRE PROJECT.

STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED
PROFESSIONAL ENGINEER
3/31/2023

NO.	REVISION	BY	DATE

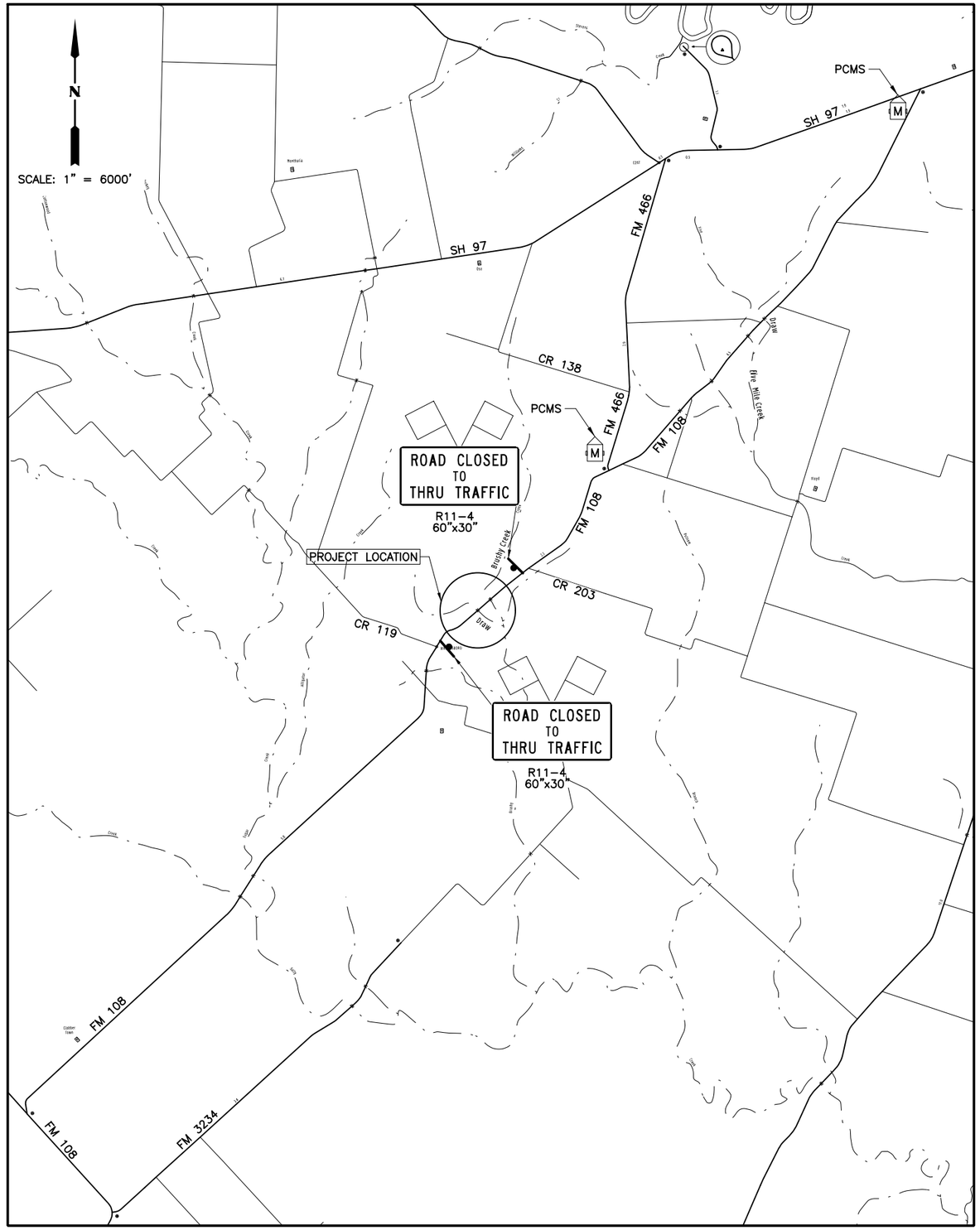
CP&Y an STV Company
TEXAS REGISTERED ENGINEERING FIRM F-1741

 Texas Department of Transportation

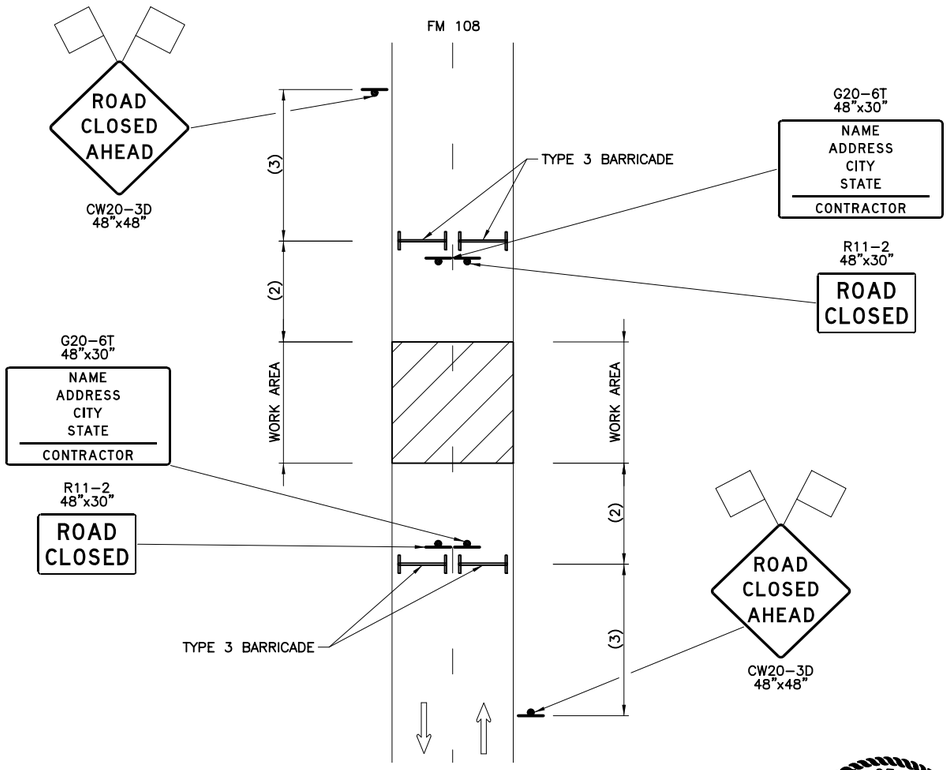
TRAFFIC CONTROL PLAN SEQUENCE OF WORK

CSJ 0715-01-025 SHEET 1 OF 2

Designed:	YP	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	BAJ	6	TEXAS					FM 108,ETC
Drawn:	YP	DIST.	COUNTY		CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	BAJ	YKM	GONZALES		0715	01	025,ETC	21



LOCATION MAP



CONSTRUCTION SIGNING AT PROJECT LOCATION

N.T.S.

NOTES:

(1.) FM 108 WILL BE CLOSED DURING PLACEMENT OF PRECAST BOX CULVERTS. OPEN TO TRAFFIC PER TCP LAYOUT DURING CONSTRUCTION OF WINGWALLS.

(2.) TYPE 3 BARRICADES TO BE PLACED IN A LOCATION THAT IS SATISFACTORY TO THE ENGINEER TO ALLOW EGRESS AND INGRESS FOR LOCAL PROPERTY OWNERS.

(3.) SEE BC SHEETS FOR SIGN SPACING.

(4.) INSTALL PORTABLE CHANGEABLE MESSAGE SIGN AT FM 108 AND SH 97, AT FM 108 AND FM 466, AND FM 108 AND US HIGHWAY 87 E (NOT SHOWN) , 7 DAYS PRIOR TO BRIDGE CLOSURE. MESSAGE SHALL BE APPROVED BY THE ENGINEER AND SHALL INCLUDE DATE OF PENDING CLOSURE. ENGINEER WILL DIRECT RELOCATION OF PCMS TO NEW LOCATIONS AFTER BRIDGE CLOSURE.

STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED
PROFESSIONAL ENGINEER

3/31/2023

NO.	REVISION	BY	DATE

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TEXAS REGISTERED ENGINEERING FIRM F-1741

 Texas Department of Transportation

FM 108 AT DRAW NEAR BRUSHY CREEK

TRAFFIC CONTROL PLAN
PHASE 1
CSJ 0715-01-025 SHEET 1 OF 1

		FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Designed:	YP	6	TEXAS				FM 108,ETC
Checked:	BAJ						
Drawn:	YP	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	BAJ	YKM	GONZALES	0715	01	025,ETC	23

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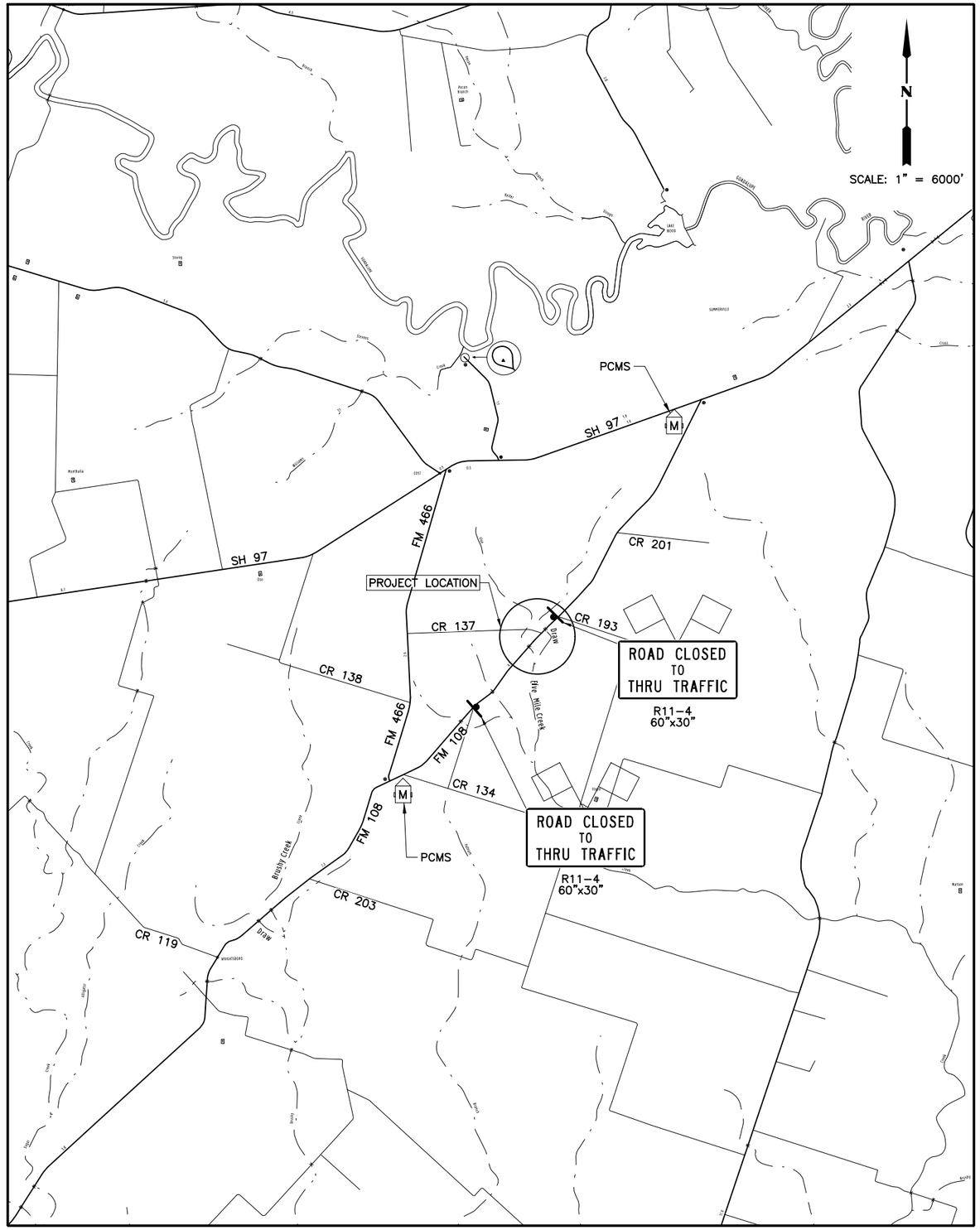
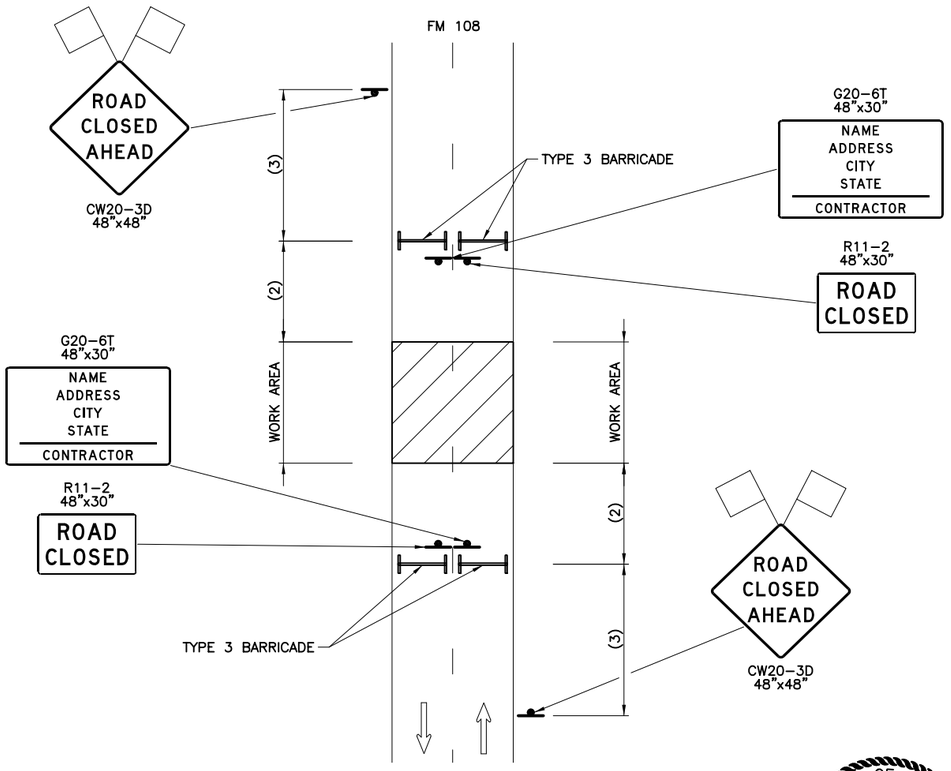


LOCATION MAP



CONSTRUCTION SIGNING AT PROJECT LOCATION

N.T.S.

NOTES:

(1.) FM 108 WILL BE CLOSED DURING PLACEMENT OF PRECAST BOX CULVERTS. OPEN TO TRAFFIC PER TCP LAYOUT DURING CONSTRUCTION OF WINGWALLS.

(2.) TYPE 3 BARRICADES TO BE PLACED IN A LOCATION THAT IS SATISFACTORY TO THE ENGINEER TO ALLOW EGRESS AND INGRESS FOR LOCAL PROPERTY OWNERS.

(3.) SEE BC SHEETS FOR SIGN SPACING.

(4.) INSTALL PORTABLE CHANGEABLE MESSAGE SIGN AT FM 108 AND SH 97, AT FM 108 AND FM 466, AND FM 108 AND US HIGHWAY 87 E (NOT SHOWN) , 7 DAYS PRIOR TO BRIDGE CLOSURE. MESSAGE SHALL BE APPROVED BY THE ENGINEER AND SHALL INCLUDE DATE OF PENDING CLOSURE. ENGINEER WILL DIRECT RELOCATION OF PCMS TO NEW LOCATIONS AFTER BRIDGE CLOSURE.

STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED
PROFESSIONAL ENGINEER

3/31/2023

NO.	REVISION	BY	DATE

CP&Y an STV Company

TEXAS REGISTERED ENGINEERING FIRM F-1741

 Texas Department of Transportation

FM 108 AT DRAW & FIVE MILE CREEK

TRAFFIC CONTROL PLAN PHASE 1

CSJ 0715-01-025 SHEET 1 OF 1

Designed:	YP	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	BAJ	6	TEXAS					FM 108,ETC
Drawn:	YP	DIST.	COUNTY		CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	BAJ	YKM	GONZALES		0715	01	025,ETC	24

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3/30/2023 7:16:41 PM fveragra
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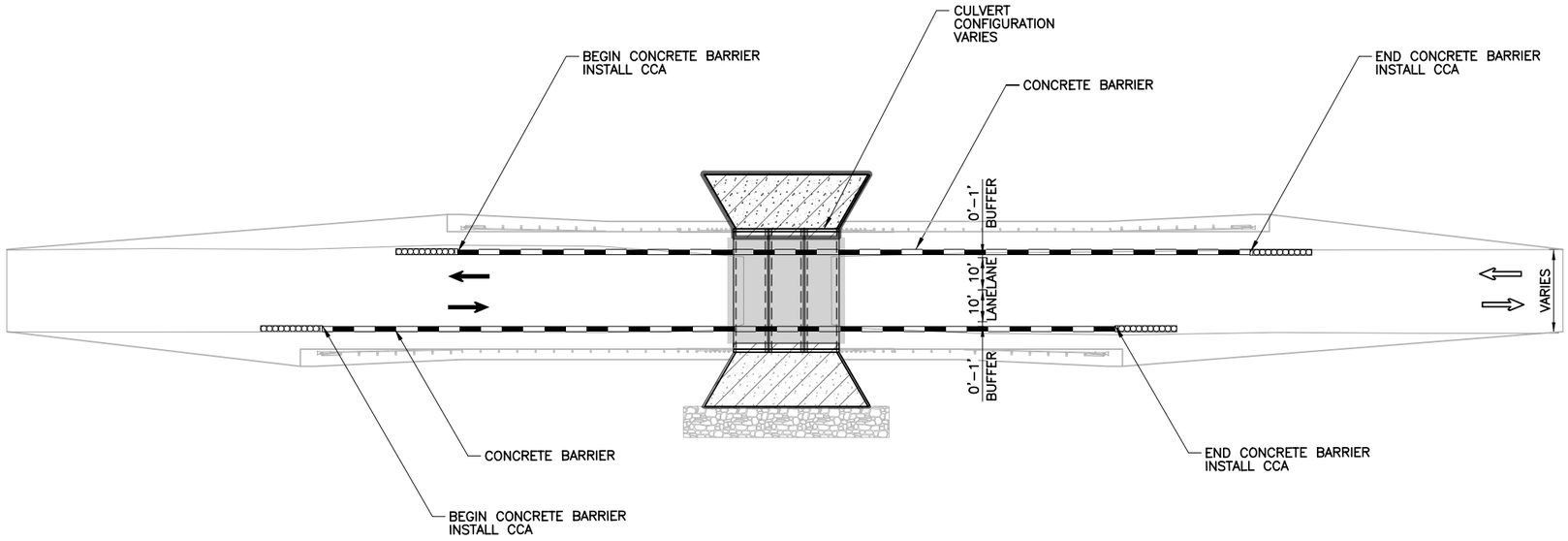
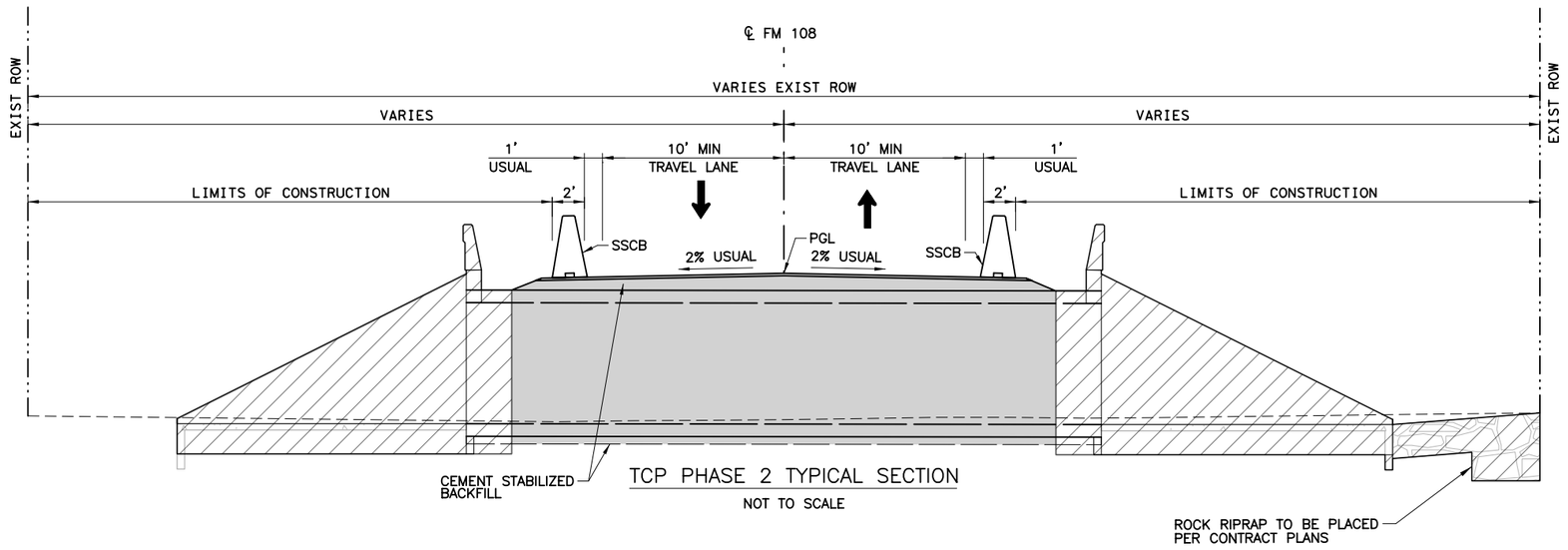
CONCRETE BARRIER LIMITS					
LOCATION	CENTERLINE	BEGIN STA		END STA	
		LT	RT	LT	RT
DRAW (NEAR BRUSHY CREEK)	FM 108	540+30.00	539+35.00	543+30.00	543+25.00
FIVE MILE CREEK	FM 108	728+85.00	728+85.00	732+45.00	732+15.00
DRAW (NEAR FIVE MILE)	FM 108	740+40.00	738+50.00	742+80.00	742+70.00
SH 97 AT RED BRANCH	SH 97	1128+00.00	1127+60.00	1131+90.00	1131+50.00





TCP PHASE 2 TYPICAL SECTION

NOT TO SCALE

NOT TO SCALE

LEGEND

- PROPOSED CONSTRUCTION THIS PHASE
- CONSTRUCTION PREVIOUS PHASE
- CTB BARRIER
- EXISTING TRAFFIC
- PROPOSED TRAFFIC

NOTES:

1. CULVERT AND ROADWAY LAYOUT SHOWN HERE ARE GENERIC AS THIS DETAIL APPLIES TO ALL BRIDGE CLASS CULVERT LOCATIONS. PLEASE SEE TABLE IN THIS SHEET FOR CONCRETE BARRIER LIMITS.
2. SEE CUT & RESTORE PAVEMENT DETAIL/ CEMENT STABILIZED DETAIL SHOWN IN CULVERT LAYOUTS FOR MORE INFO.
3. IF 2' OF SLIDE ROOM CANNOT BE ACHIEVED BEHIND THE SSCB, THEN THE BARRIER SHALL BE PINNED ACROSS THE CULVERT.

STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED
PROFESSIONAL ENGINEER

3/31/2023

NO.	REVISION	BY	DATE

CP&Y an STV Company

TEXAS REGISTERED ENGINEERING FIRM F-1741

 Texas Department of Transportation

BRIDGE CLASS CULVERT TRAFFIC CONTROL PLAN PHASE 2

CSJ 0715-01-025 SHEET 1 OF 1

Designed:	YP	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	BAJ	6	TEXAS				FM 108,ETC
Drawn:	YP	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	BAJ	YKM	GONZALES	0715	01	025,ETC	25

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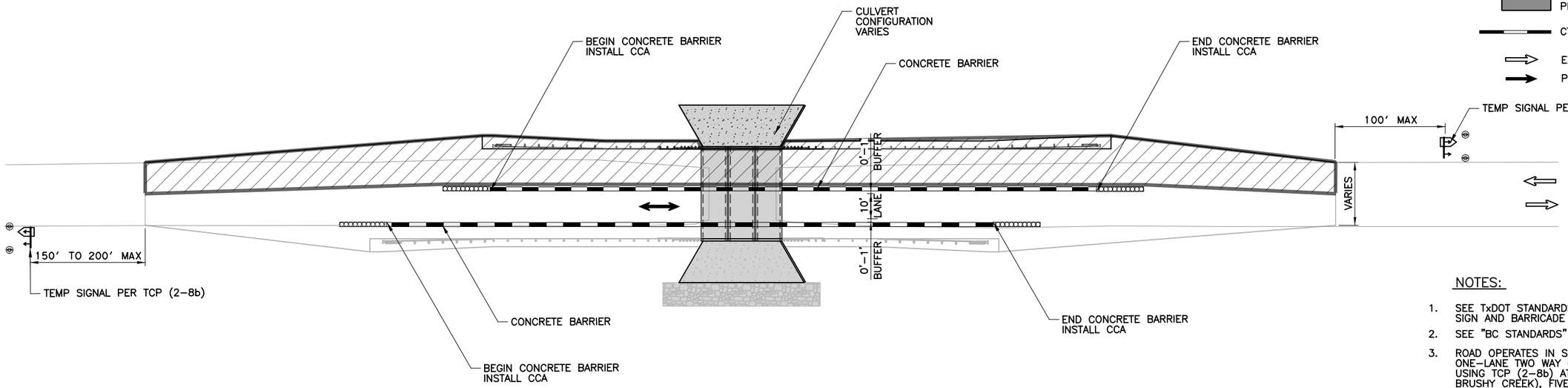
CONCRETE BARRIER LIMITS					
LOCATION	CENTERLINE	BEGIN STA		END STA	
		LT	RT	LT	RT
DRAW (NEAR BRUSHY CREEK)	FM 108	540+30.00	539+35.00	543+30.00	543+25.00
FIVE MILE CREEK	FM 108	728+85.00	728+85.00	732+45.00	732+15.00
DRAW (NEAR FIVE MILE)	FM 108	740+40.00	738+50.00	742+80.00	742+70.00
SH 97 AT RED BRANCH	SH 97	1128+00.00	1127+60.00	1131+90.00	1131+50.00

NOT TO SCALE

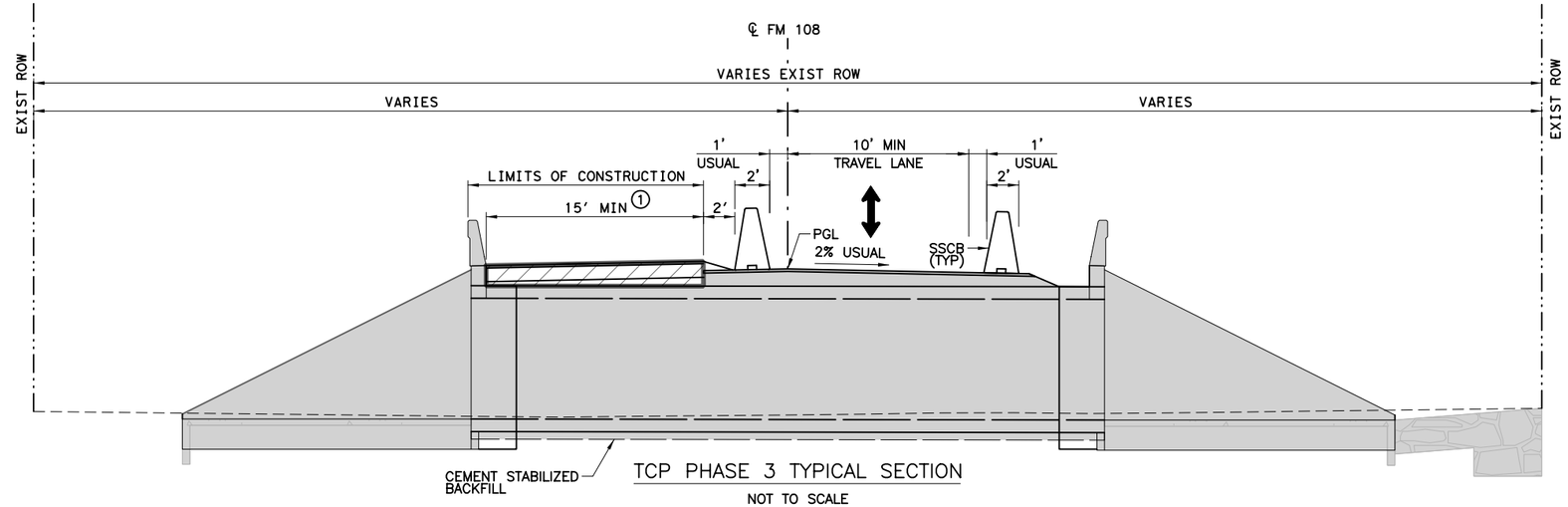


LEGEND

- PROPOSED CONSTRUCTION THIS PHASE
- CONSTRUCTION PREVIOUS PHASE
- CTB BARRIER
- EXISTING TRAFFIC
- PROPOSED TRAFFIC

NOTES:

1. SEE TxDOT STANDARDS FOR ADDITIONAL SIGN AND BARRICADE INFORMATION.
2. SEE "BC STANDARDS" FOR SIGN SPACING (X).
3. ROAD OPERATES IN SIGNAL-CONTROLLED ONE-LANE TWO WAY CONFIGURATION USING TCP (2-8b) AT DRAW (NEAR BRUSHY CREEK), FIVE MILE CREEK, DRAW (NEAR FIVE MILE CREEK), AND SH 97 AT RED BRANCH. SEE STANDARD DRAWING FOR APPROACH SIGNAGE, PAVEMENT MARKINGS AND OTHER DEVICES.



TCP PHASE 3 TYPICAL SECTION

NOT TO SCALE

① 15' FOR DRAW (NEAR BRUSHY CREEK)
15' FOR FIVE MILE CREEK
17' FOR DRAW (NEAR FIVE MILE CREEK)
17' FOR SH 97 AT BRUSHY BRANCH

STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED PROFESSIONAL ENGINEER

3/31/2023

NO.	REVISION	BY	DATE

CP&Y an STV Company
TEXAS REGISTERED ENGINEERING FIRM F-1741

 Texas Department of Transportation

BRIDGE CLASS CULVERT TRAFFIC CONTROL PLAN PHASE 3

CSJ 0715-01-025 SHEET 1 OF 1

Designed:	FV	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	BAJ	6	TEXAS				FM 108,ETC
Drawn:	FV	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	BAJ	YKM	GONZALES	0715	01	025,ETC	26

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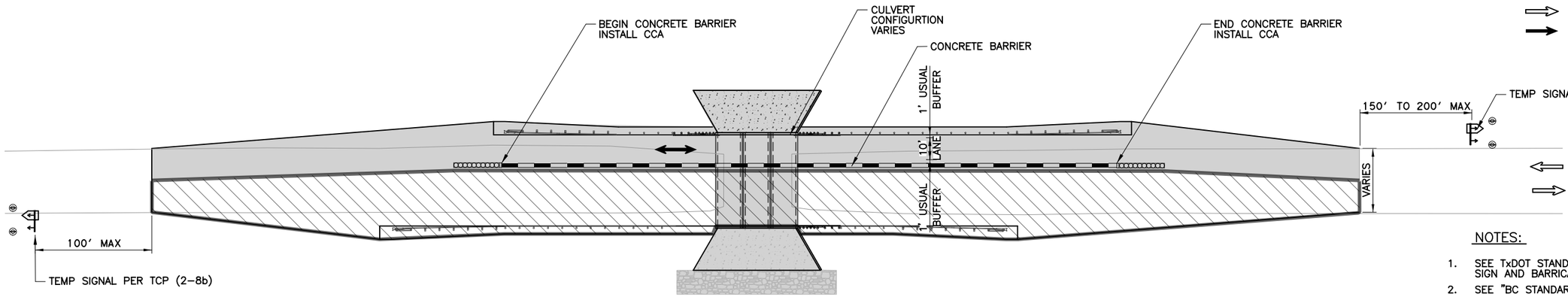
CONCRETE BARRIER LIMITS					
LOCATION	CENTERLINE	BEGIN STA		END STA	
		LT	RT	LT	RT
DRAW (NEAR BRUSHY CREEK)	FM 108	N/A	539+35.00	N/A	543+25.00
FIVE MILE CREEK	FM 108	N/A	728+85.00	N/A	732+15.00
DRAW (NEAR FIVE MILE)	FM 108	N/A	738+50.00	N/A	742+70.00
SH 97 AT RED BRANCH	SH 97	N/A	1127+60.00	N/A	1131+50.00

NOT TO SCALE

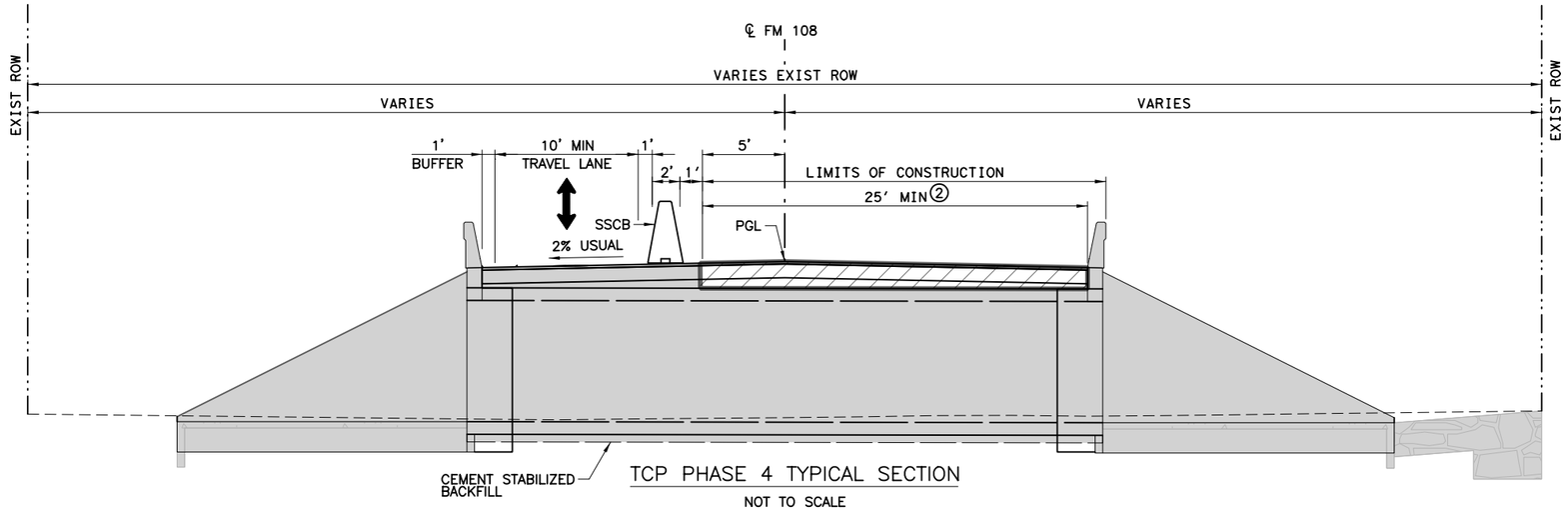


LEGEND

- PROPOSED CONSTRUCTION THIS PHASE
- CONSTRUCTION PREVIOUS PHASE
- CTB BARRIER
- EXISTING TRAFFIC
- PROPOSED TRAFFIC

NOTES:

1. SEE TxDOT STANDARDS FOR ADDITIONAL SIGN AND BARRICADE INFORMATION.
2. SEE "BC STANDARDS" FOR SIGN SPACING (X).
3. ROAD OPERATES IN SIGNAL-CONTROLLED ONE-LANE TWO WAY CONFIGURATION USING TCP (2-8b) AT DRAW (NEAR BRUSHY CREEK), FIVE MILE CREEK, DRAW (NEAR FIVE MILE CREEK), AND SH 97 AT RED BRANCH. SEE STANDARD DRAWING FOR APPROACH SIGNAGE, PAVEMENT MARKINGS AND OTHER DEVICES.



TCP PHASE 4 TYPICAL SECTION

NOT TO SCALE

②25' FOR DRAW (NEAR BRUSHY CREEK)
25' FOR FIVE MILE CREEK
27' FOR DRAW (NEAR FIVE MILE CREEK)
27' FOR SH 97 AT BRUSHY BRANCH

STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED
PROFESSIONAL ENGINEER

3/31/2023

NO.	REVISION	BY	DATE

CP&Y an STV Company
TEXAS REGISTERED ENGINEERING FIRM F-1741

 Texas Department of Transportation

BRIDGE CLASS CULVERT TRAFFIC CONTROL PLAN PHASE 4

CSJ 0715-01-025 SHEET 1 OF 1

Designed:	FV	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	BAJ	6	TEXAS				FM 108,ETC
Drawn:	FV	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	BAJ	YKM	GONZALES	0715	01	025,ETC	27

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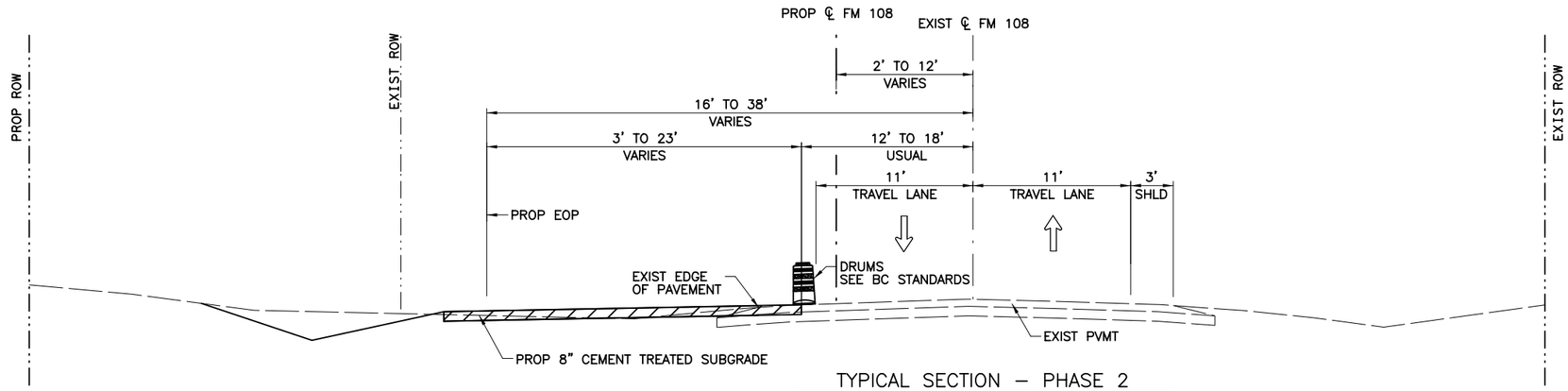
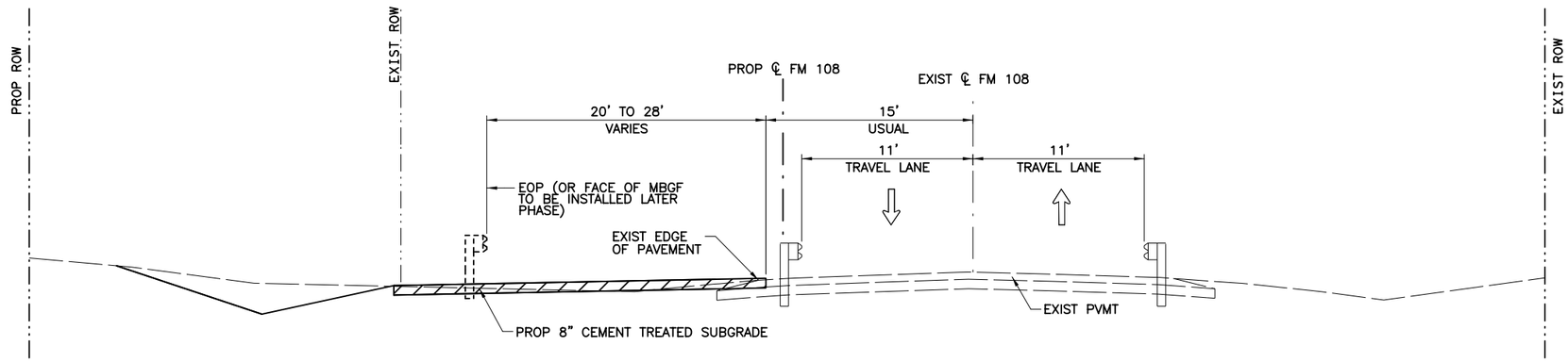


TYPICAL SECTION – PHASE 2

NOT TO SCALE

STA 544+50.00 TO STA 546+80.00
STA 552+60.00 TO STA 563+50.00



TYPICAL SECTION – PHASE 2

NOT TO SCALE

STA 546+80.00 TO STA 552+60.00

LEGEND

PROPOSED CONSTRUCTION THIS PHASE

CONSTRUCTION PREVIOUS PHASE

NOTES:

1. SEE TxDOT STANDARDS FOR ADDITIONAL SIGN AND BARRICADE INFORMATION.
2. SEE "BC STANDARDS" FOR SIGN SPACING (X).
3. UNLESS OTHERWISE NOTED, STATION AND OFFSETS SHOWN ON THIS SHEET ARE BASED ON THE PROPOSED FM 108 CENTERLINE ALIGNMENT.
4. SEE TCP TYPICAL SECTIONS AND NARRATIVE FOR MORE INFO.

STATE OF TEXAS
BRIAN A. JONES
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LICENSED
PROFESSIONAL ENGINEER

3/31/2023

NO.	REVISION	BY	DATE

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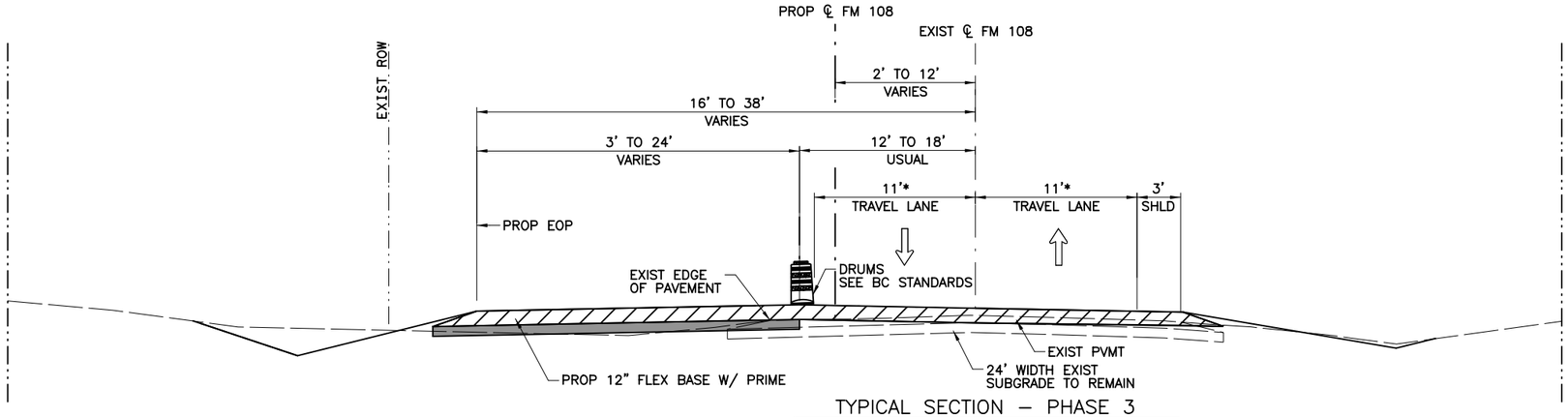
 Texas Department of Transportation

FM 108 AT DRAW & BRUSHY CREEK

TRAFFIC CONTROL PLAN
TYPICAL SECTIONS
CSJ 0715-01-025 SHEET 1 OF 2

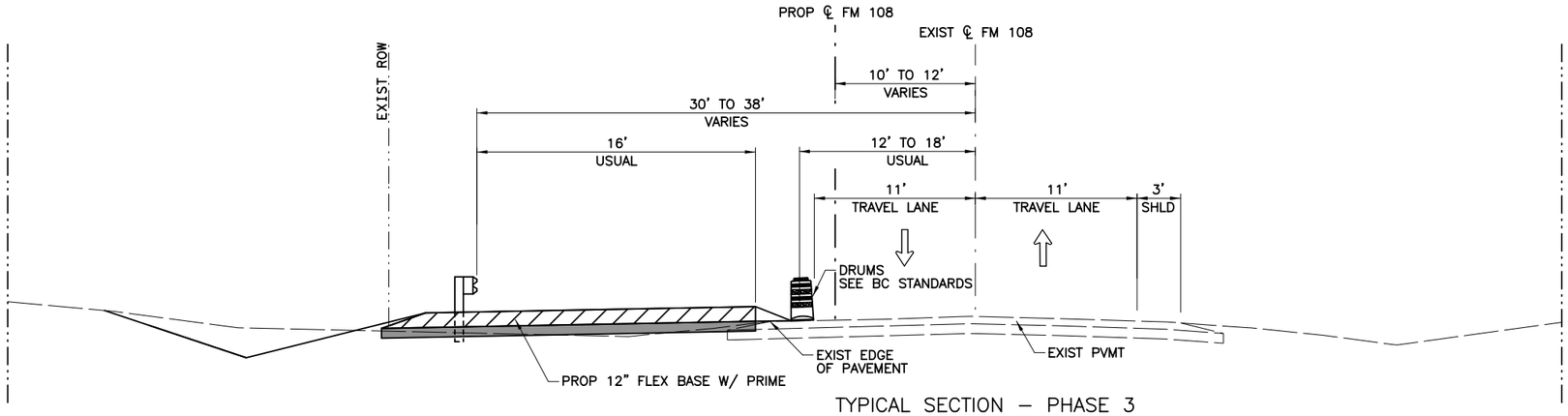
Designed:	FV	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	BAJ	6	TEXAS					FM 108,ETC
Drawn:	FV	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	BAJ	YKM	GONZALES	0715	01	025,ETC		28



TYPICAL SECTION – PHASE 3

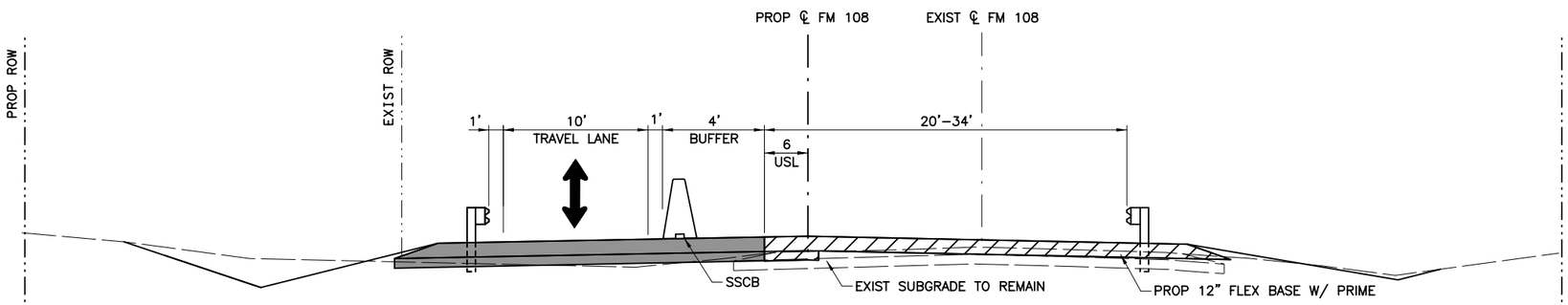
NOT TO SCALE
STA 544+50.00 TO STA 546+80.00
STA 552+60.00 TO STA 563+50.00

* DAILY ONE–LANE TWO–WAY OPERATION PER TCP(2–2b)
OPEN TO TWO–LANE OPERATION AT END OF DAILY WORK



TYPICAL SECTION – PHASE 3

NOT TO SCALE
STA 546+80.00 TO STA 552+60.00



TYPICAL SECTION – PHASE 4

NOT TO SCALE
STA 546+80.00 TO STA 552+60.00

LEGEND

PROPOSED CONSTRUCTION THIS PHASE

CONSTRUCTION PREVIOUS PHASE

NOTES:

1. SEE TxDOT STANDARDS FOR ADDITIONAL SIGN AND BARRICADE INFORMATION.
2. SEE "BC STANDARDS" FOR SIGN SPACING (X).
3. UNLESS OTHERWISE NOTED, STATION AND OFFSETS SHOWN ON THIS SHEET ARE BASED ON THE PROPOSED FM 108 CENTERLINE ALIGNMENT.
4. SEE TCP TYPICAL SECTIONS AND NARRATIVE FOR MORE INFO.

STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED
PROFESSIONAL ENGINEER

3/31/2023

NO.	REVISION	BY	DATE

CP&Y an STV Company
TEXAS REGISTERED ENGINEERING FIRM F-1741

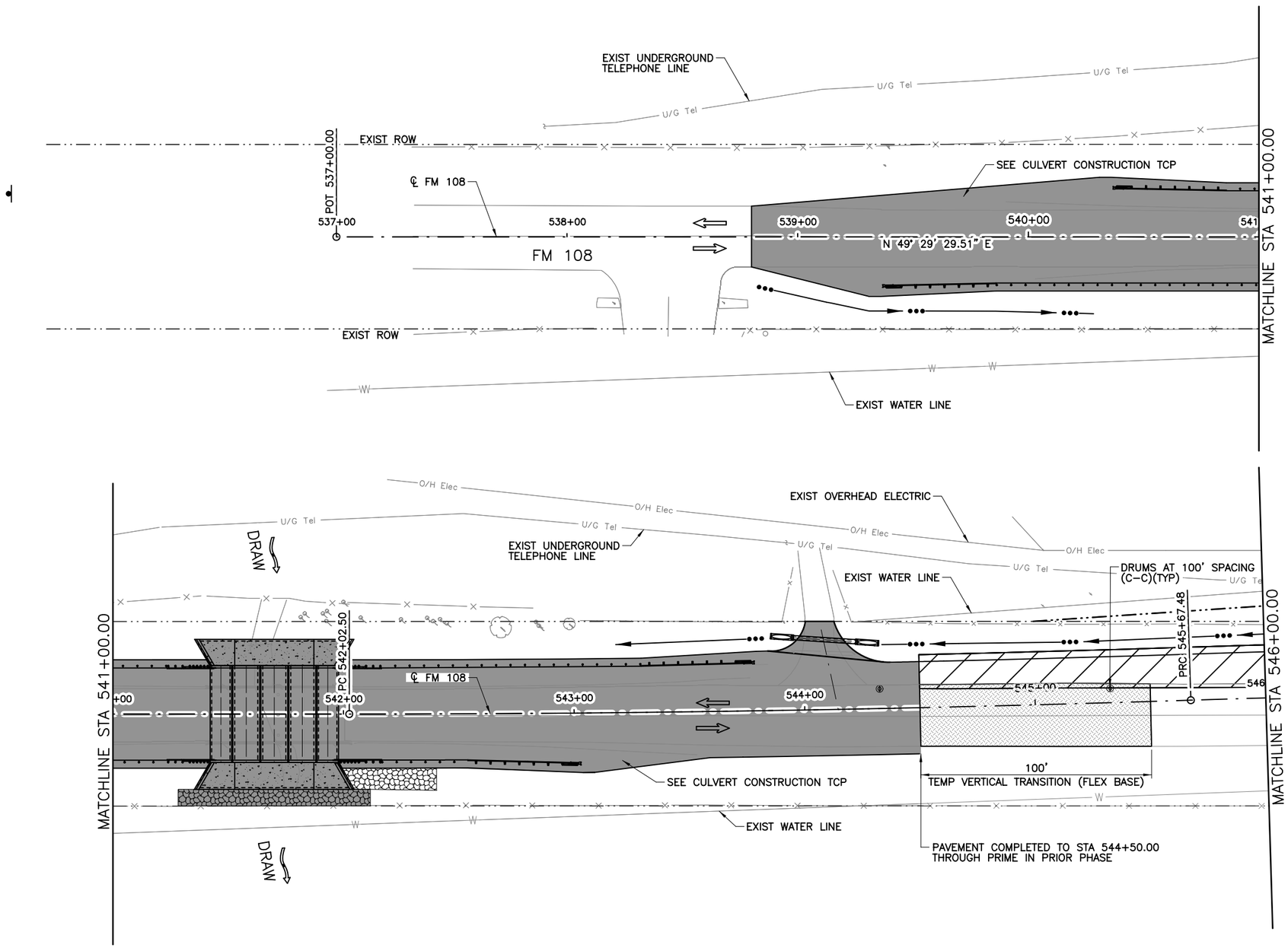
 Texas Department of Transportation

FM 108 AT DRAW & BRUSHY CREEK

TRAFFIC CONTROL PLAN TYPICAL SECTIONS

CSJ 0715–01–025 SHEET 1 OF 2

Designed:	FV	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	BAJ	6	TEXAS				FM 108,ETC
Drawn:	FV	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	BAJ	YKM	GONZALES	0715	01	025,ETC	29



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LEGEND

- PROPOSED CONSTRUCTION THIS PHASE
- CONSTRUCTION PREVIOUS PHASE
- TEMP VERTICAL TRANSITION
- CTB BARRIER
- CRASH CUSHION ATTENUATOR
- DRUMS
- EXISTING TRAFFIC
- PROPOSED TRAFFIC
- TEMPORARY SIGNAL
- TY 3 BARRICADE
- CONSTRUCTION SIGN

NOTES:

1. SEE TxDOT STANDARDS FOR ADDITIONAL SIGN AND BARRICADE INFORMATION.
2. SEE "BC STANDARDS" FOR SIGN SPACING (X).
3. UNLESS OTHERWISE NOTED, STATION AND OFFSETS SHOWN ON THIS SHEET ARE BASED ON THE PROPOSED FM 108 CENTERLINE ALIGNMENT.
4. SEE TCP TYPICAL SECTIONS AND NARRATIVE FOR MORE INFO.

STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED PROFESSIONAL ENGINEER
3/31/2023

NO.	REVISION	BY	DATE

CP&Y an STV Company
TEXAS REGISTERED ENGINEERING FIRM F-1741

 Texas Department of Transportation

FM 108 AT DRAW & BRUSHY CREEK

TRAFFIC CONTROL PLAN PHASE 2

CSJ 0715–01–025 SHEET 1 OF 3

Designed:	YP	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	BAJ	6	TEXAS				FM 108,ETC
Drawn:	YP	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	BAJ	YKM	GONZALES	0715	01	025,ETC	30

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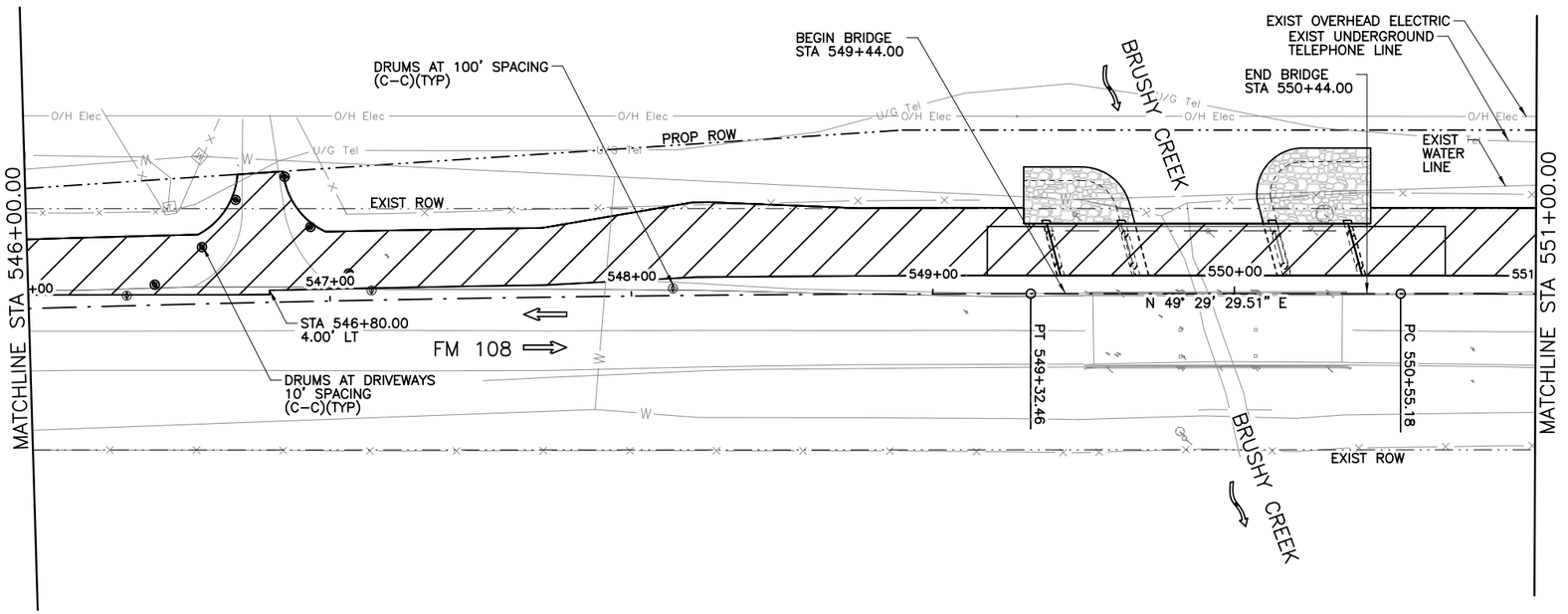

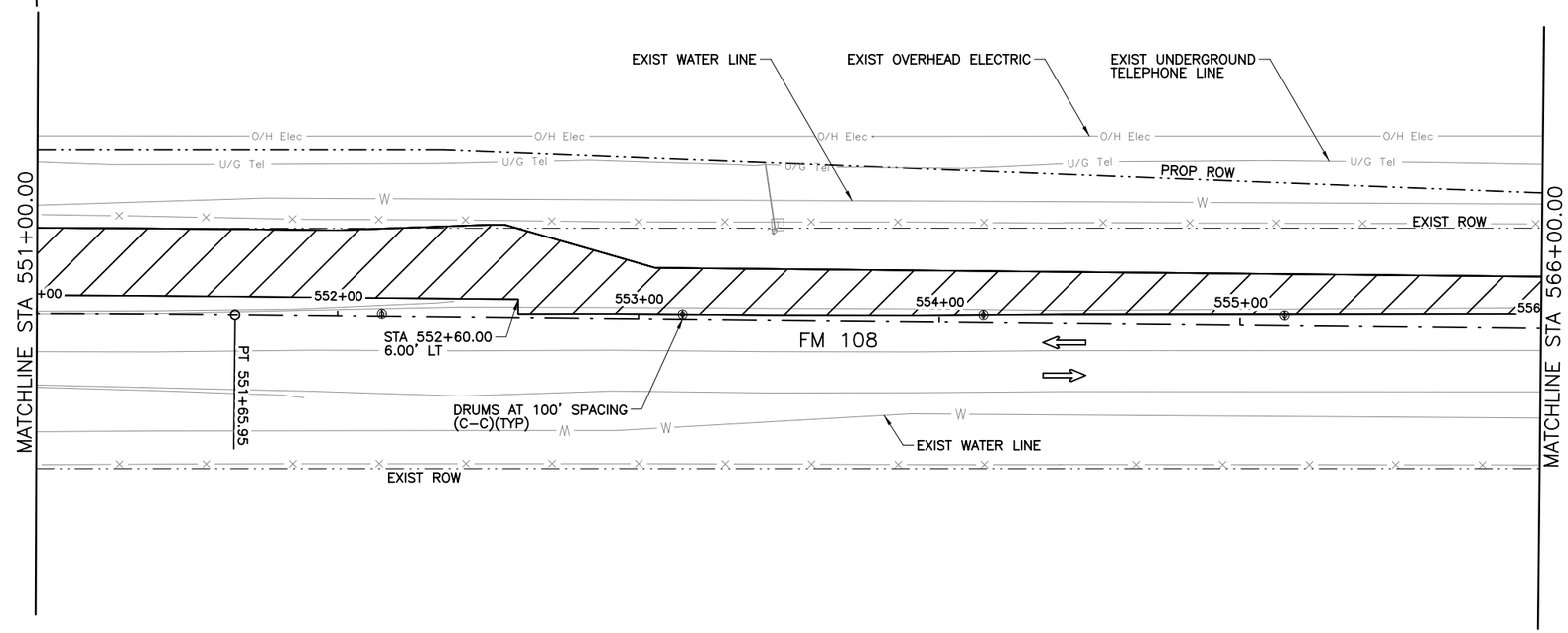

25 12.5 0 25 50
SCALE FEET
HORZ.

LEGEND

- PROPOSED CONSTRUCTION THIS PHASE
- CONSTRUCTION PREVIOUS PHASE
- TEMP VERTICAL TRANSITION
- CTB BARRIER
- CRASH CUSHION ATTENUATOR
- DRUMS
- EXISTING TRAFFIC
- PROPOSED TRAFFIC
- TEMPORARY SIGNAL
- TY 3 BARRICADE
- CONSTRUCTION SIGN

NOTES:

1. SEE TxDOT STANDARDS FOR ADDITIONAL SIGN AND BARRICADE INFORMATION.
2. SEE "BC STANDARDS" FOR SIGN SPACING (X).
3. UNLESS OTHERWISE NOTED, STATION AND OFFSETS SHOWN ON THIS SHEET ARE BASED ON THE PROPOSED FM 108 CENTERLINE ALIGNMENT.
4. SEE TCP TYPICAL SECTIONS AND NARRATIVE FOR MORE INFO.

STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED
PROFESSIONAL ENGINEER
3/31/2023

NO.	REVISION	BY	DATE

CP&Y an STV Company
TEXAS REGISTERED ENGINEERING FIRM F-1741

 Texas Department of Transportation

FM 108 AT DRAW & BRUSHY CREEK

TRAFFIC CONTROL PLAN PHASE 2

CSJ 0715-01-025 SHEET 2 OF 3

		FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Designed:	YP	6	TEXAS				FM 108,ETC
Checked:	BAJ	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Drawn:	YP	YKM	GONZALES	0715	01	025,ETC	31
Checked:	BAJ						

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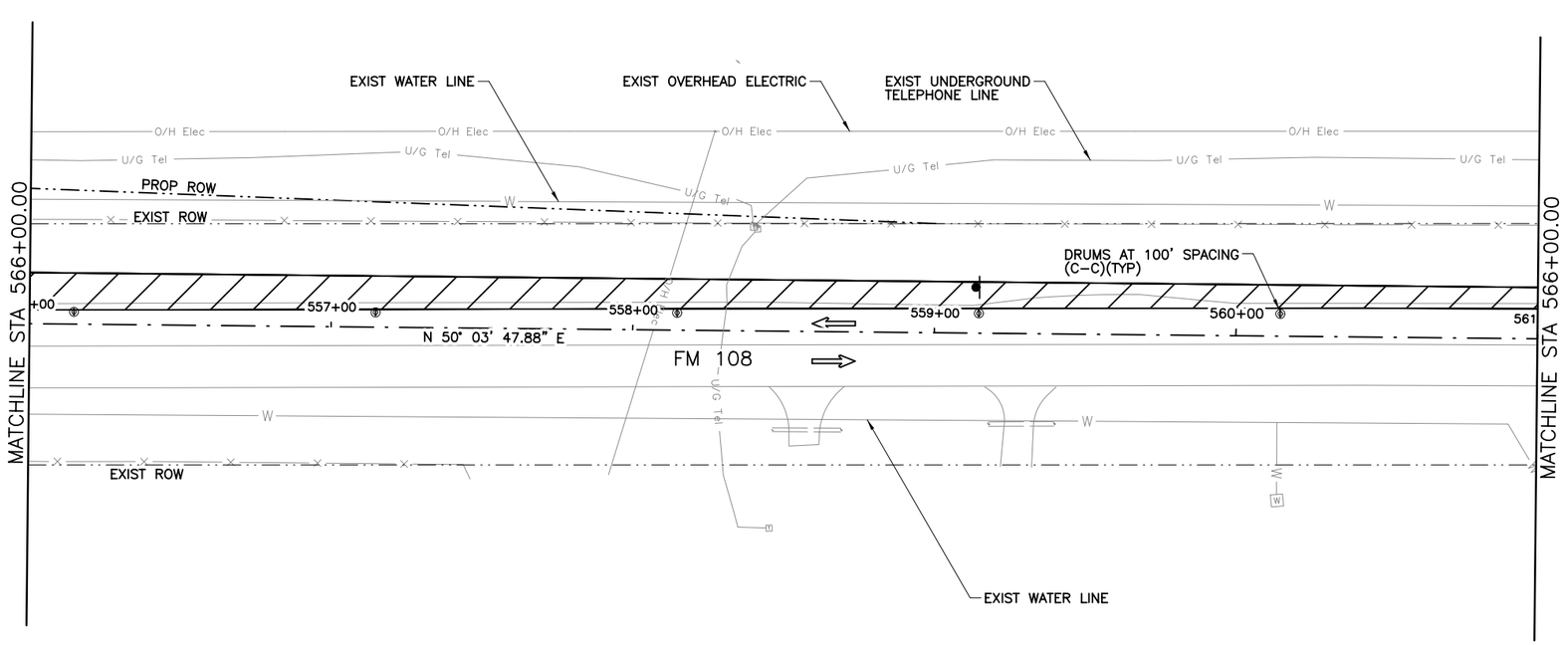

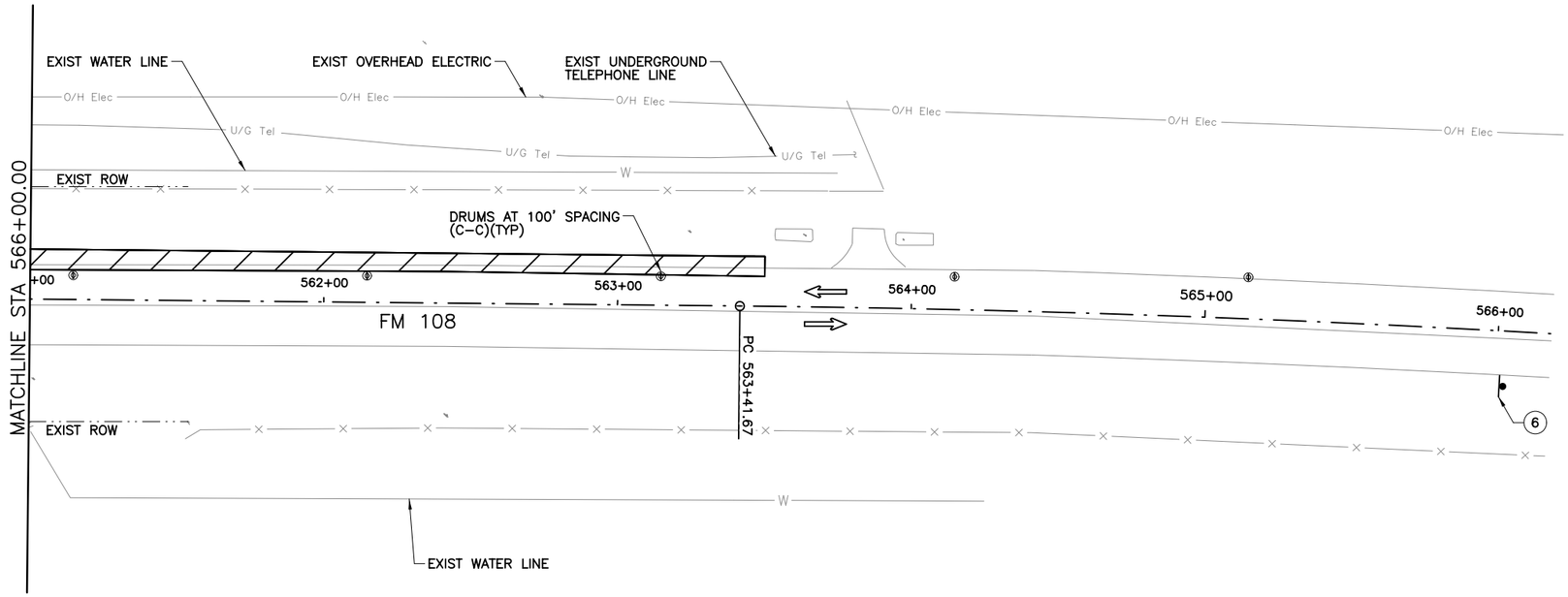

25 12.5 0 25 50
SCALE FEET
HORZ.

N

LEGEND

- PROPOSED CONSTRUCTION THIS PHASE
- CONSTRUCTION PREVIOUS PHASE
- TEMP VERTICAL TRANSITION
- CTB BARRIER
- CRASH CUSHION ATTENUATOR
- DRUMS
- EXISTING TRAFFIC
- PROPOSED TRAFFIC
- TEMPORARY SIGNAL
- TY 3 BARRICADE
- CONSTRUCTION SIGN

NOTES:

1. SEE TxDOT STANDARDS FOR ADDITIONAL SIGN AND BARRICADE INFORMATION.
2. SEE "BC STANDARDS" FOR SIGN SPACING (X).
3. UNLESS OTHERWISE NOTED, STATION AND OFFSETS SHOWN ON THIS SHEET ARE BASED ON THE PROPOSED FM 108 CENTERLINE ALIGNMENT.
4. SEE TCP TYPICAL SECTIONS AND NARRATIVE FOR MORE INFO.

STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED
PROFESSIONAL ENGINEER

3/31/2023

NO.	REVISION	BY	DATE

CP&Y an STV Company
TEXAS REGISTERED ENGINEERING FIRM F-1741

 Texas Department of Transportation

FM 108 AT DRAW & BRUSHY CREEK

TRAFFIC CONTROL PLAN PHASE 2

CSJ 0715-01-025 SHEET 3 OF 3

Designed:	YP	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.	
Checked:	BAJ	6	TEXAS				FM 108,ETC	
Drawn:	YP	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.	
Checked:	BAJ	YKM	GONZALES	0715	01	025,ETC	32	

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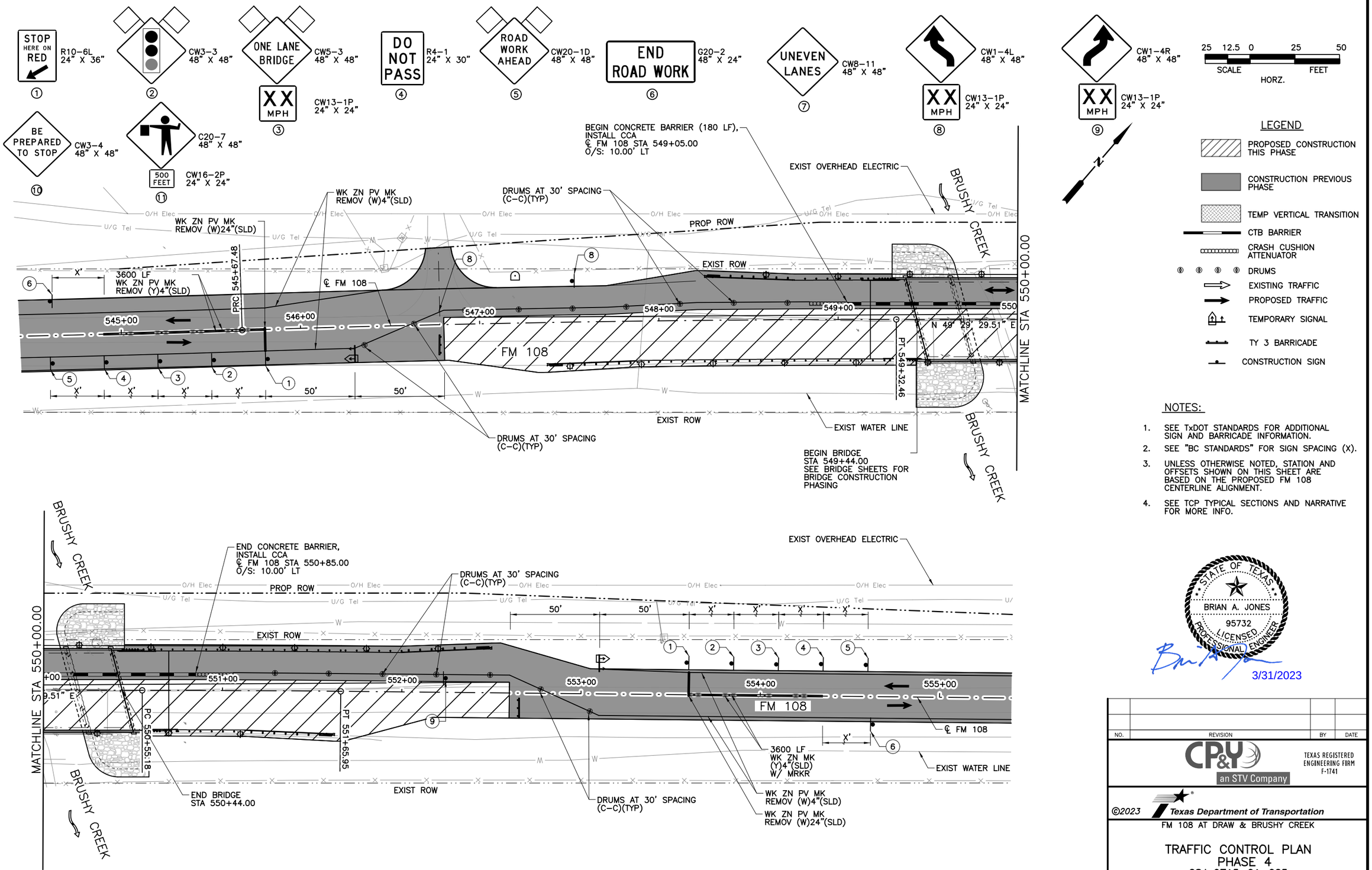

NOTES:

1. SEE TxDOT STANDARDS FOR ADDITIONAL SIGN AND BARRICADE INFORMATION.
2. SEE "BC STANDARDS" FOR SIGN SPACING (X).
3. UNLESS OTHERWISE NOTED, STATION AND OFFSETS SHOWN ON THIS SHEET ARE BASED ON THE PROPOSED FM 108 CENTERLINE ALIGNMENT.
4. SEE TCP TYPICAL SECTIONS AND NARRATIVE FOR MORE INFO.

STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED
PROFESSIONAL ENGINEER

3/31/2023

NO.	REVISION	BY	DATE

CP&Y an STV Company
TEXAS REGISTERED ENGINEERING FIRM F-1741

 Texas Department of Transportation

FM 108 AT DRAW & BRUSHY CREEK

TRAFFIC CONTROL PLAN PHASE 4

CSJ 0715-01-025 SHEET 1 OF 1

Designed:	YP	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	BAJ	6	TEXAS					FM 108,ETC
Drawn:	YP	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	BAJ	YKM	GONZALES	0715	01	025,ETC		33

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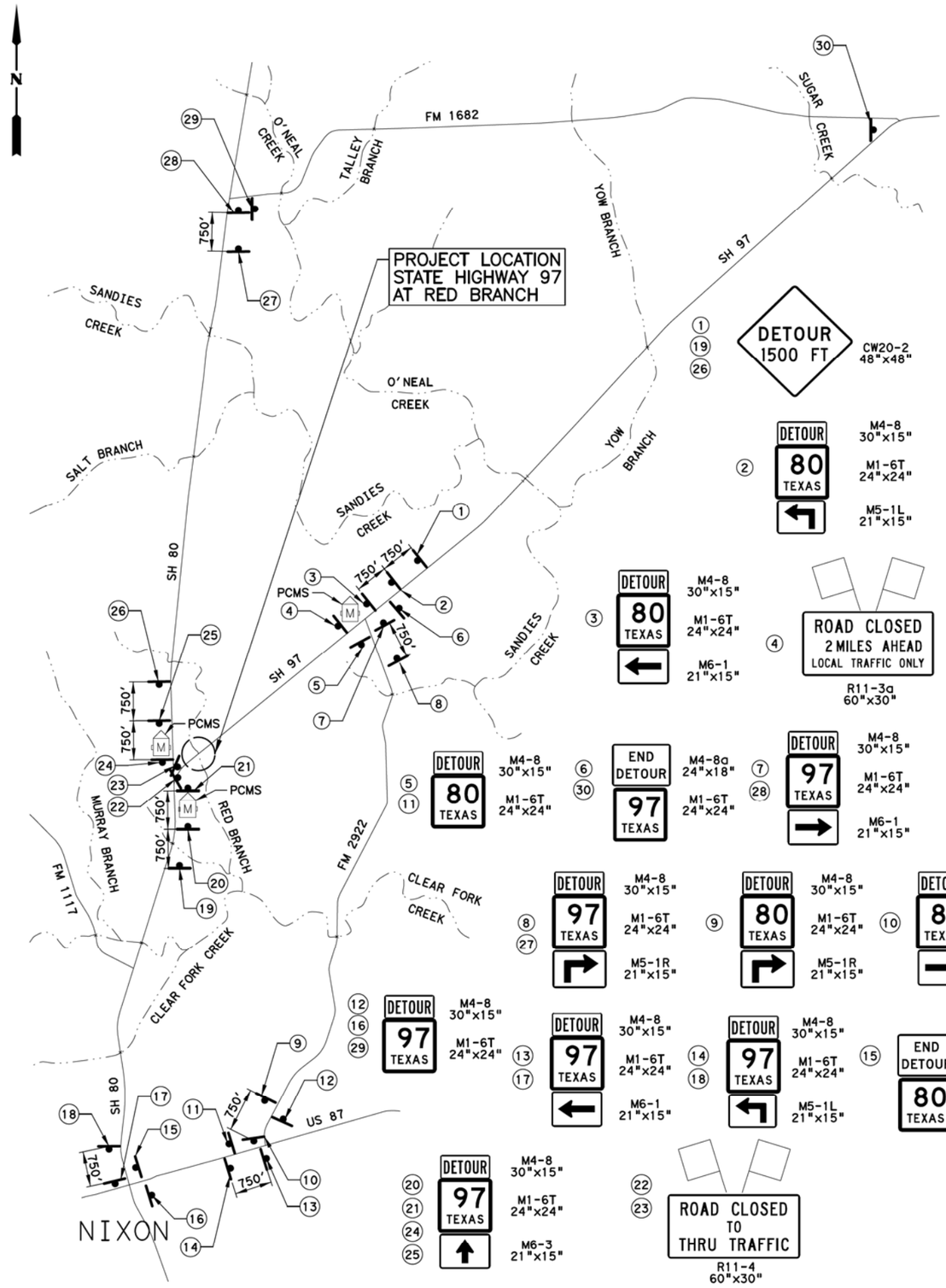

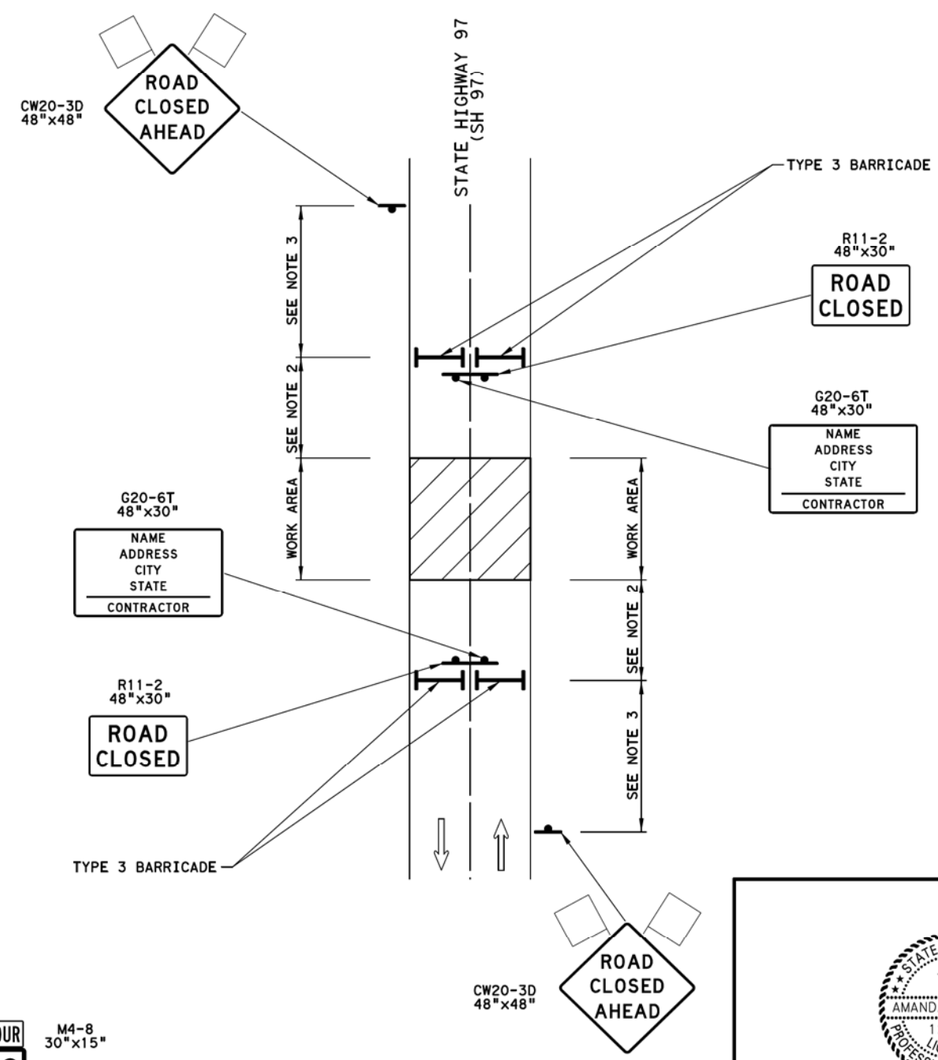

CONSTRUCTION SIGNING AT PROJECT LOCATION

NTS

NOTES:

(1.) STATE HIGHWAY 97 (SH 97) WILL BE CLOSED TO THROUGH TRAFFIC DURING PLACEMENT OF PRECAST BOX CULVERTS AND OPEN TO TRAFFIC PER TCP LAYOUT DURING CONSTRUCTION OF WINGWALLS.

(2.) TYPE 3 BARRICADES TO BE PLACED IN A LOCATION THAT IS SATISFACTORY TO THE ENGINEER TO ALLOW EGRESS AND INGRESS FOR LOCAL PROPERTY OWNERS.

(3.) SEE BC SHEETS FOR SIGN SPACING.

(4.) SEE ITEM 8 GENERAL NOTES REGARDING CLOSURE.

STATE OF TEXAS
AMANDA H. ARAJ
123725
LICENSED
PROFESSIONAL ENGINEER
3/31/2023

NO.	REVISION	BY	DATE

WSP USA Inc.
16200 Park Row, Sute 200
Houston, TX 77084
TBPE # F-2263

 Texas Department of Transportation

SH 97 AT RED BRANCH

TRAFFIC CONTROL PLAN

CSJ 0347-02-033 SHEET 1 OF 1

Designed:	MAK	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	AHA	6	TEXAS				SH 97
Drawn:	MAK	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	AHA	YKM	GONZALES	0715	01	025,ETC	34

3/31/2023

pw:/

DATE:
FILE:

BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

WORKER SAFETY NOTES:

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

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

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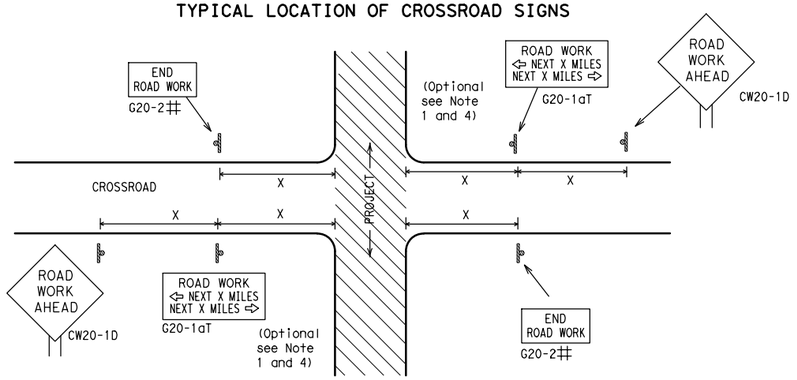
REVISIONS 4-03 7-13 9-07 8-14 5-10 5-21	0715	01	025,ETC	FM108,ETC
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		35

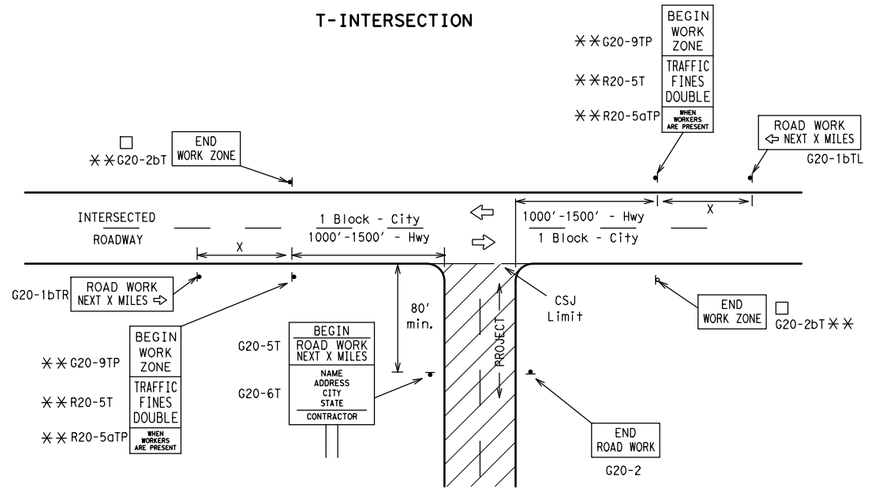
TYPICAL LOCATION OF CROSSROAD SIGNS



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.

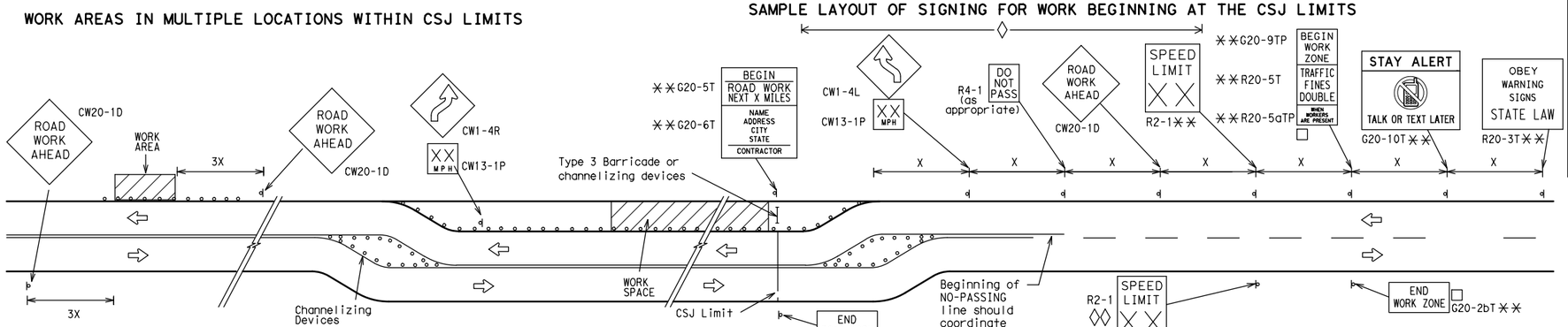
△ Minimum distance from work area to first Advance Warning sign nearest the work area and/or distance between each additional sign.

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.

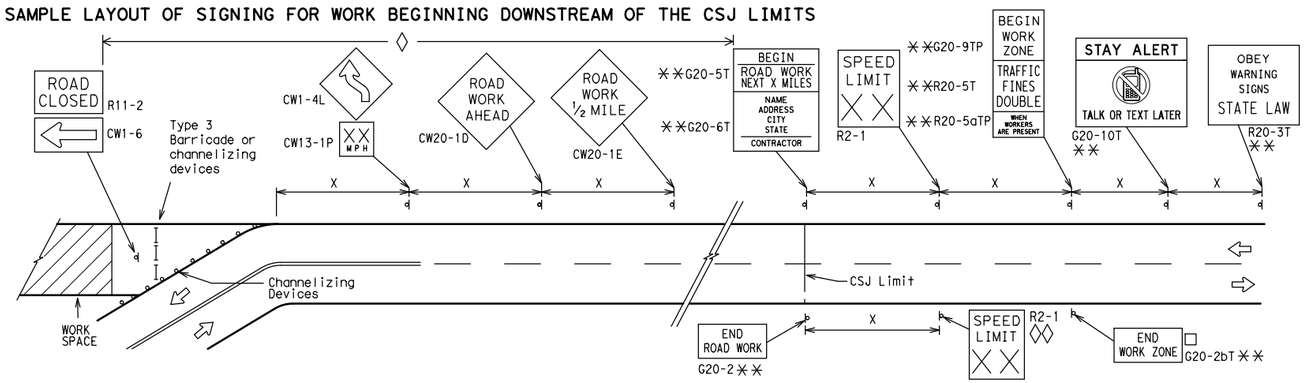
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS

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

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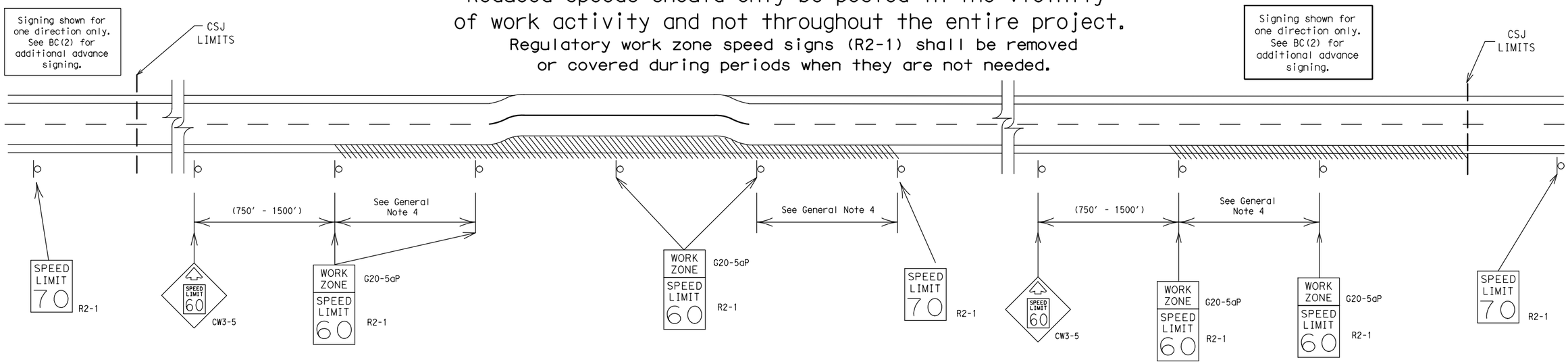
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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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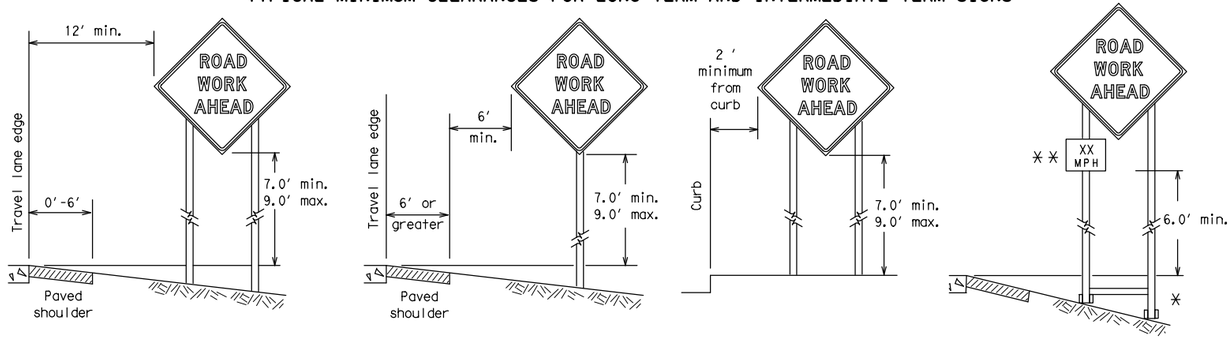
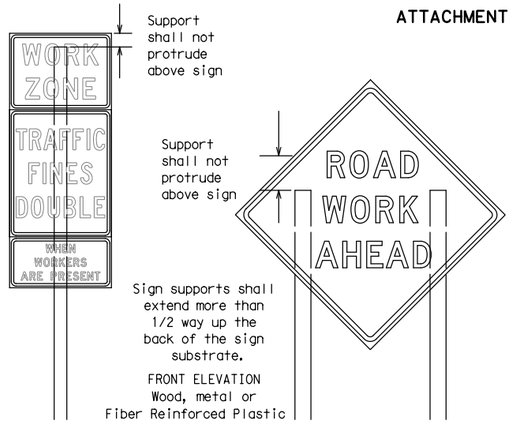
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS



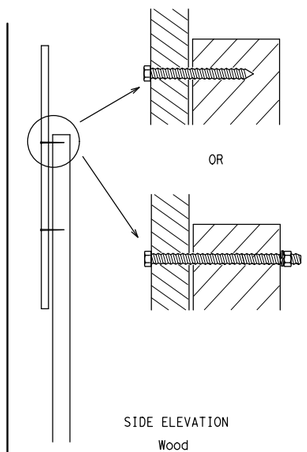
⚹ When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

⚹⚹ 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



FRONT ELEVATION
Wood, metal or
Fiber Reinforced Plastic



SIDE ELEVATION
Wood

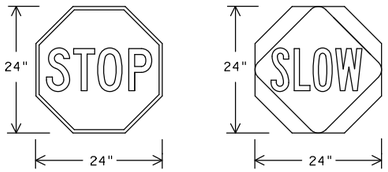
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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

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

STOP/SLOW PADDLES

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



Background - Red
Legend & Border - White

Background - Orange
Legend & Border - Black

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

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

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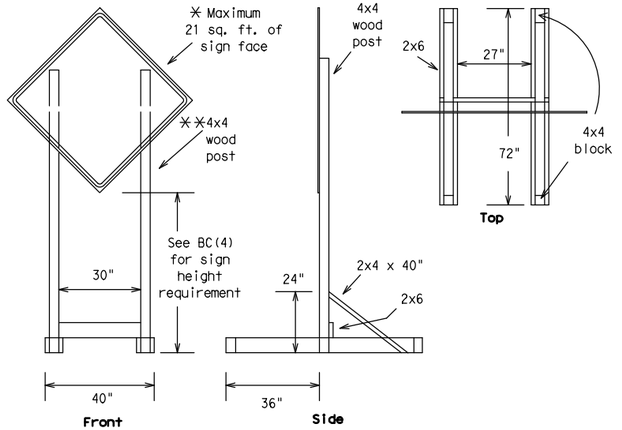
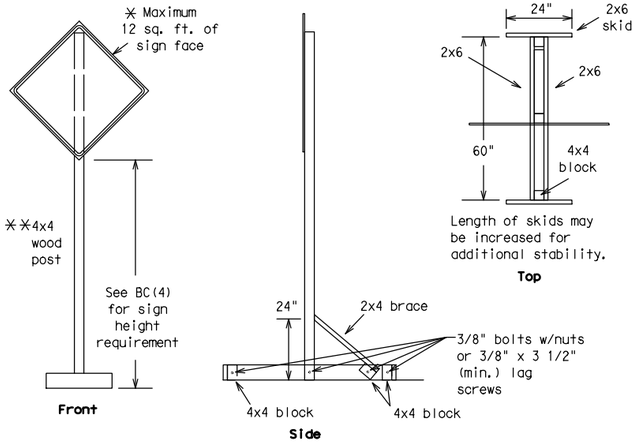
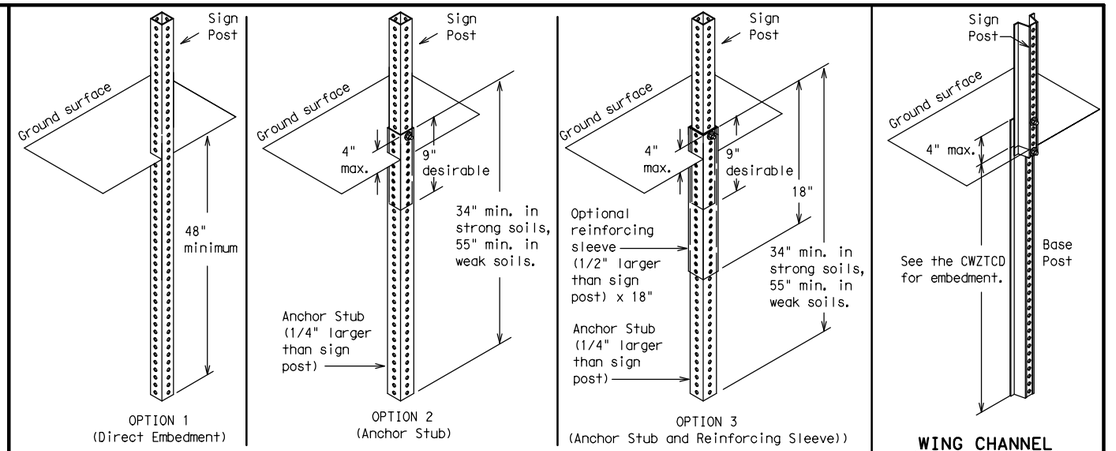
REVISIONS	0715	01	025,ETC	FM108,ETC
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	YKM	GONZALES		38





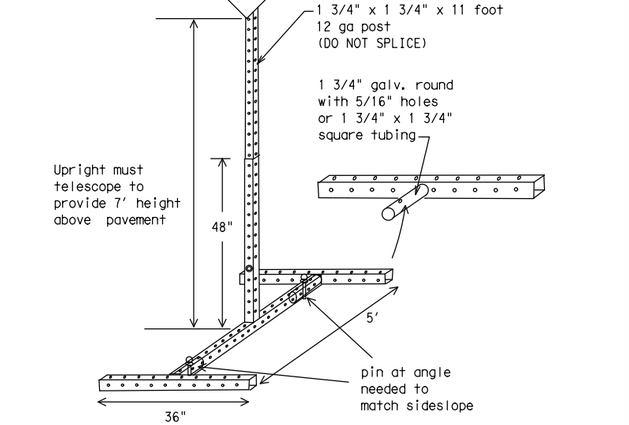
SKID MOUNTED WOOD SIGN SUPPORTS

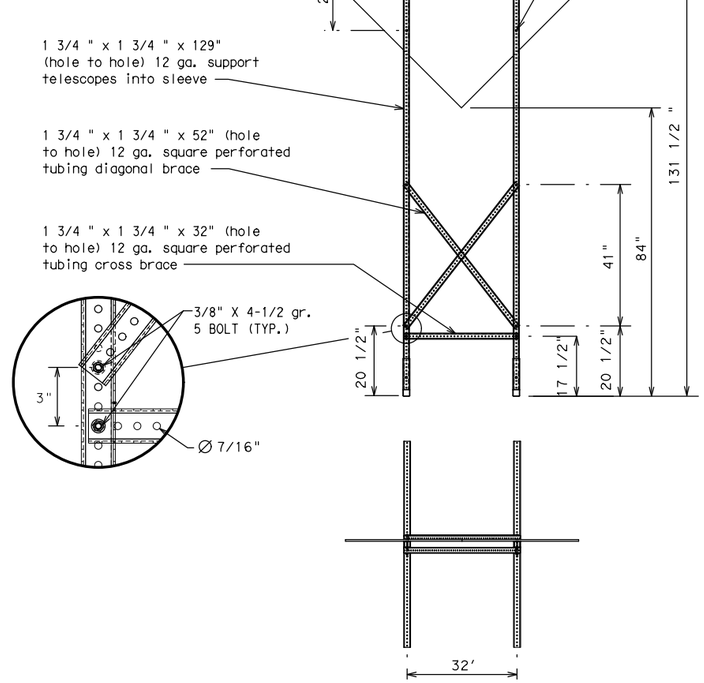
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

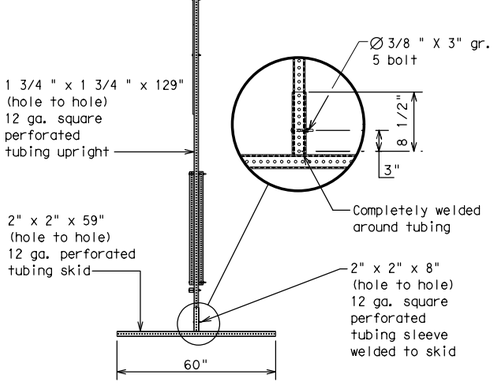


GROUND MOUNTED SIGN SUPPORTS

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







SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0715	01	025,ETC	FM108,ETC
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	YKM	GONZALES		39

DATE:
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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		Other Condition List	
FREEWAY CLOSED X MILE	FRONTAGE ROAD CLOSED	ROADWORK XXX FT	ROAD REPAIRS XXXX FT
ROAD CLOSED AT SH XXX	SHOULDER CLOSED XXX FT	FLAGGER XXXX FT	LANE NARROWS XXXX FT
ROAD CLSD AT FM XXXX	RIGHT LN CLOSED XXX FT	RIGHT LN NARROWS XXXX FT	TWO-WAY TRAFFIC XX MILE
RIGHT X LANES CLOSED	RIGHT X LANES OPEN	MERGING TRAFFIC XXXX FT	CONST TRAFFIC XXX FT
CENTER LANE CLOSED	DAYTIME LANE CLOSURES	LOOSE GRAVEL XXXX FT	UNEVEN LANES XXXX FT
NIGHT LANE CLOSURES	I-XX SOUTH EXIT CLOSED	DETOUR X MILE	ROUGH ROAD XXXX FT
VARIOUS LANES CLOSED	EXIT XXX CLOSED X MILE	ROADWORK PAST SH XXXX	ROADWORK NEXT FRI-SUN
EXIT CLOSED	RIGHT LN TO BE CLOSED	BUMP XXXX FT	US XXX EXIT X MILES
MALL DRIVEWAY CLOSED	X LANES CLOSED TUE - FRI	TRAFFIC SIGNAL XXXX FT	LANES SHIFT *
XXXXXXXX BLVD CLOSED			

Phase 2: Possible Component Lists

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

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

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

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

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

FULL MATRIX PCMS SIGNS

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

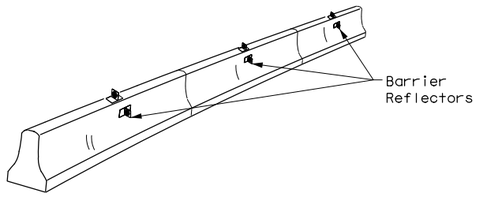
BC(6)-21

FILE:	bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT	November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS		0715	01	025,ETC	FM108,ETC
9-07 8-14		DIST	COUNTY		SHEET NO.
7-13 5-21		YKM	GONZALES		40

100

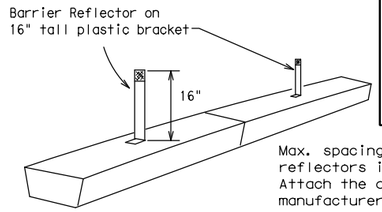
DATE:
FILE:

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



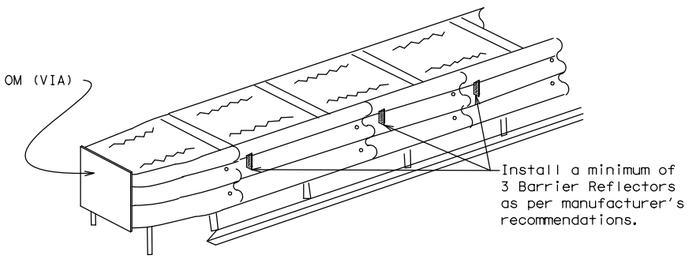
CONCRETE TRAFFIC BARRIER (CTB)

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



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

LOW PROFILE CONCRETE BARRIER (LPCB)



DELINEATION OF END TREATMENTS

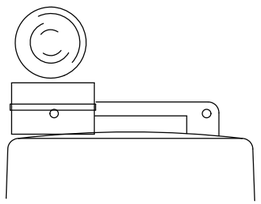
LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

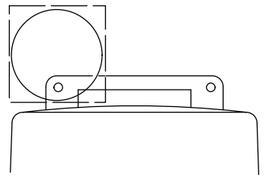
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



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



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

WARNING LIGHTS

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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

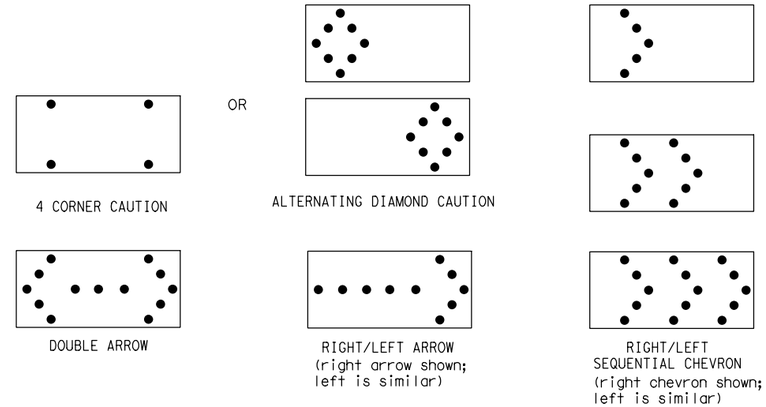
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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

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

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

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

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



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

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

ATTENTION

Flashing Arrow Boards shall be equipped with automatic dimming devices.

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

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

Texas Department of Transportation

Traffic Safety Division Standard

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

BC(7)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0715	01	025,ETC	FM108,ETC
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	YKM	GONZALES		41

101

DATE:
FILE:

GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

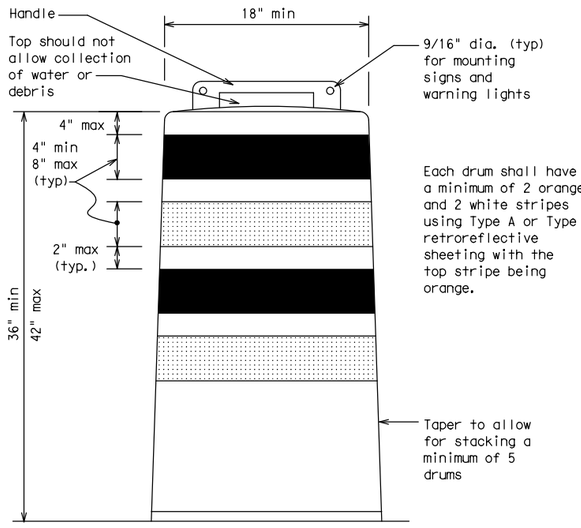
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

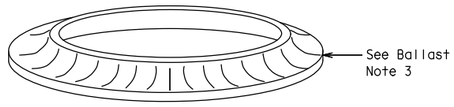
RETROREFLECTIVE SHEETING

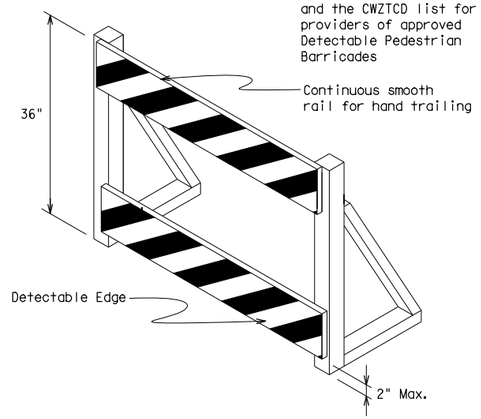
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

BALLAST

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

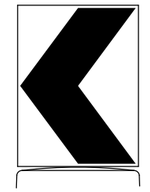




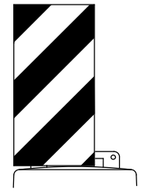


DETECTABLE PEDESTRIAN BARRICADES

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



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



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

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

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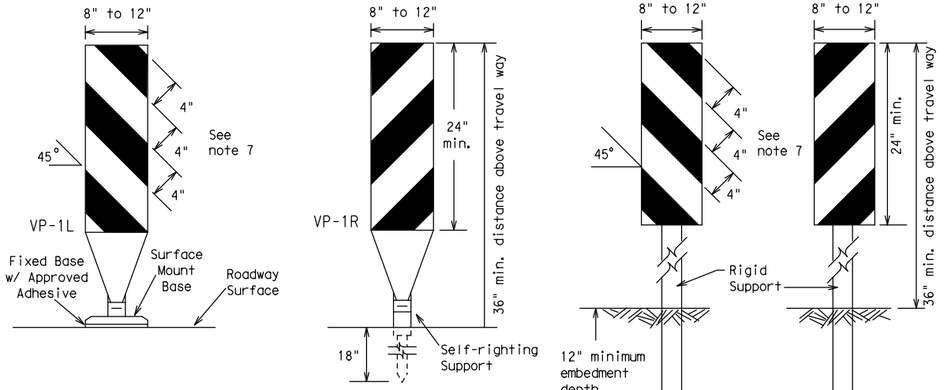
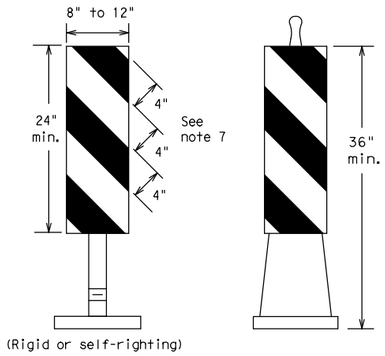


FIXED
(Rigid or self-righting)

DRIVEABLE

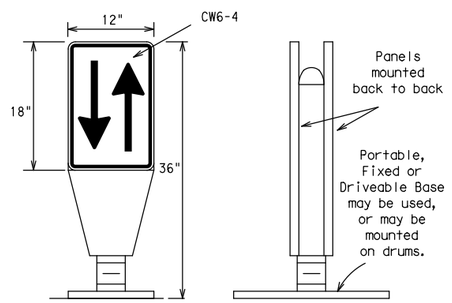


(Rigid or self-righting)

PORTABLE

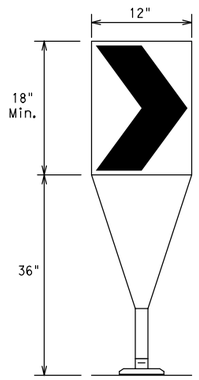
VERTICAL PANELS (VPs)

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



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

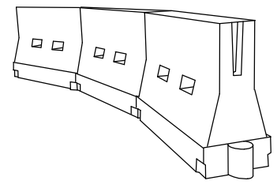
OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



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

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

CHEVRONS



LONGITUDINAL CHANNELIZING DEVICES (LCD)

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

WATER BALLASTED SYSTEMS USED AS BARRIERS

1. Water ballasted systems used as barriers shall not be used solely to channelize road users, but also to protect the work space per the appropriate Manual for Assessing Safety Hardware (MASH) crashworthiness requirements based on roadway speed and barrier application.
2. Water ballasted systems used to channelize vehicular traffic shall be supplemented with retroreflective delineation or channelizing devices to improve daytime/nighttime visibility. They may also be supplemented with pavement markings.
3. Water ballasted systems used as barriers shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
4. Water ballasted systems used as barriers should not be used for a merging taper except in low speed (less than 45 MPH) urban areas. When used on a taper in a low speed urban area, the taper shall be delineated and the taper length should be designed to optimize road user operations considering the available geometric conditions.
5. When water ballasted systems used as barriers have blunt ends exposed to traffic, they should be attenuated as per manufacturer recommendations or flared to a point outside the clear zone.

If used to channelize pedestrians, longitudinal channelizing devices or water ballasted systems must have a continuous detectable bottom for users of long canes and the top of the unit shall not be less than 32 inches in height.

HOLLOW OR WATER BALLASTED SYSTEMS USED AS LONGITUDINAL CHANNELIZING DEVICES OR BARRIERS

GENERAL NOTES

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

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

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BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

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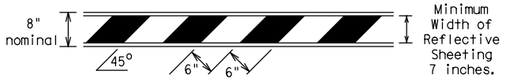
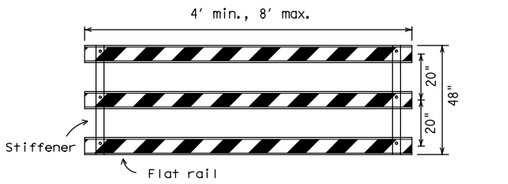
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



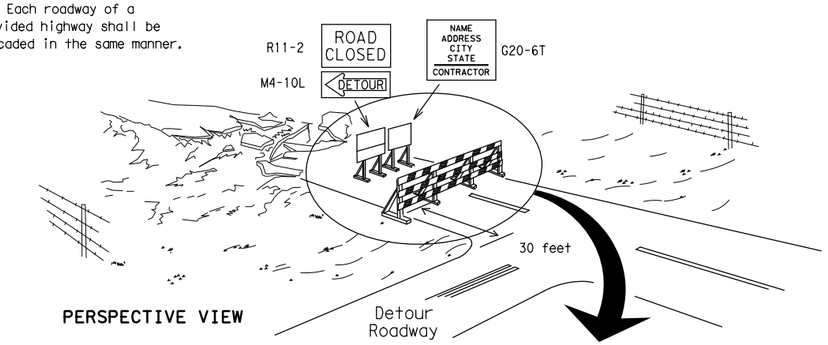
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

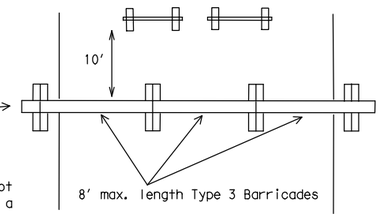
Each roadway of a divided highway shall be barricaded in the same manner.



PERSPECTIVE VIEW

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

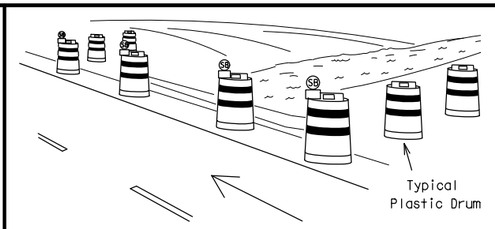
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

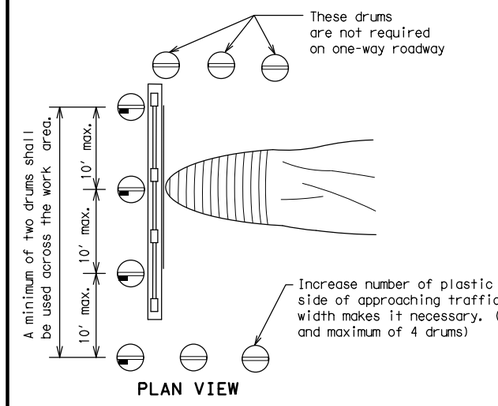
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

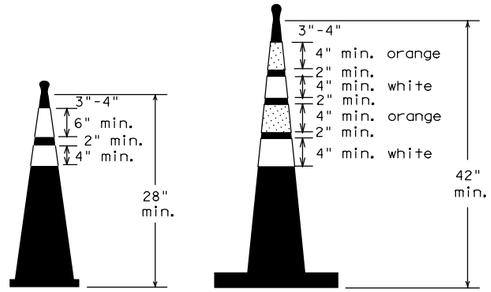
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



PLAN VIEW

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

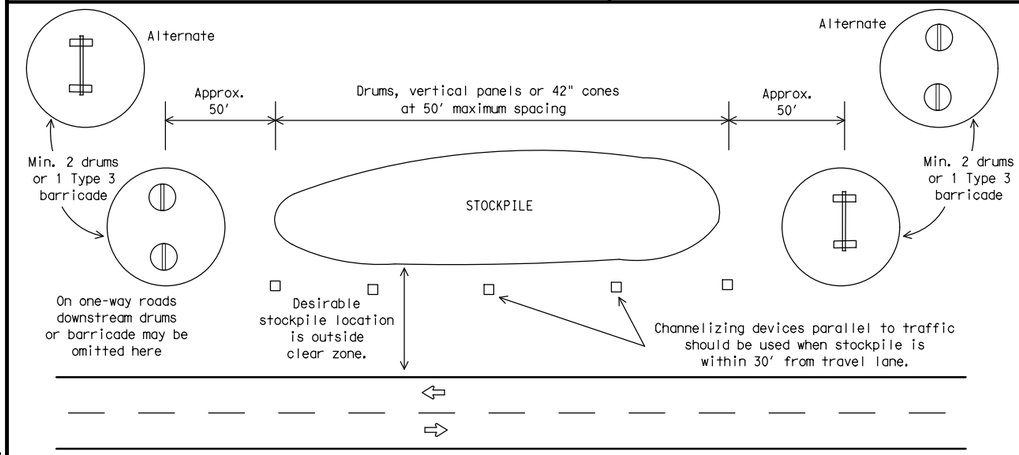
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



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

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

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

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BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

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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.

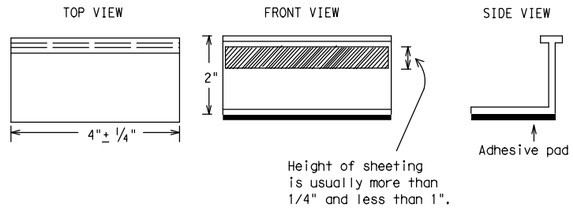
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

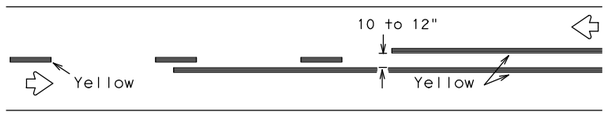
Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

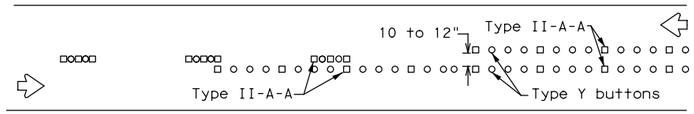
BC(11)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0715	01	025,ETC	FM108,ETC
2-98 9-07 5-21	DIST	COUNTY		SHEET NO.
1-02 7-13	YKM	GONZALES		45
11-02 8-14				

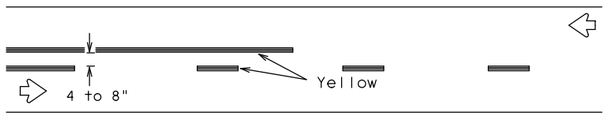
PAVEMENT MARKING PATTERNS



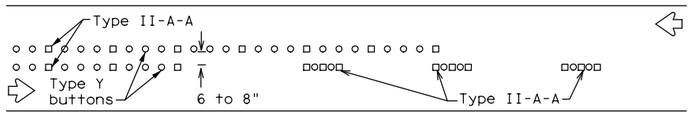
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



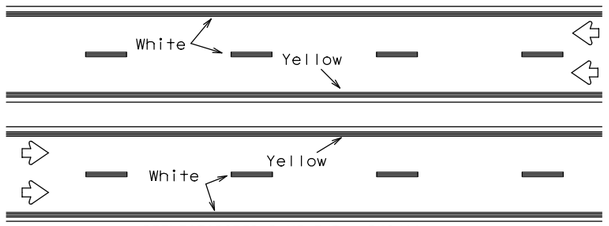
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



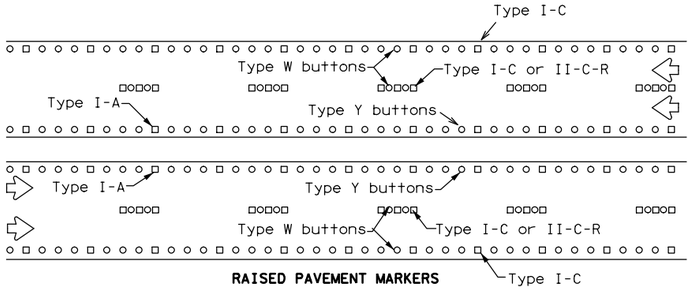
RAISED PAVEMENT MARKERS - PATTERN B

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



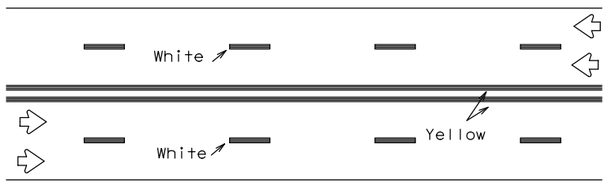
REFLECTORIZED PAVEMENT MARKINGS



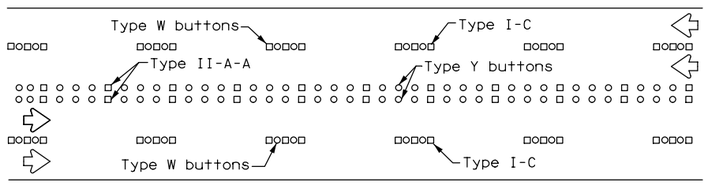
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



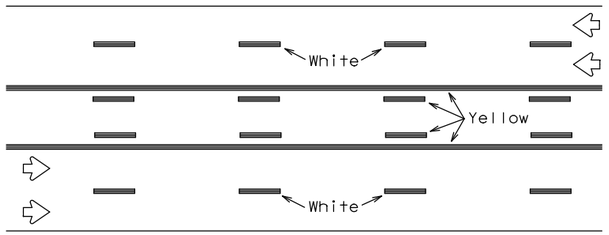
REFLECTORIZED PAVEMENT MARKINGS



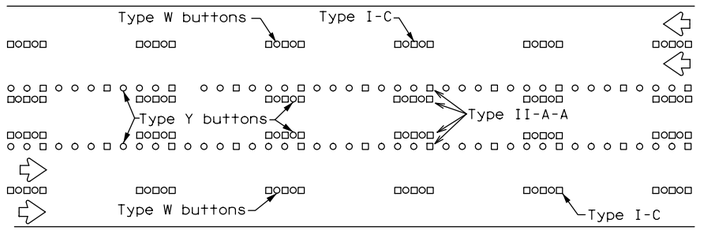
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

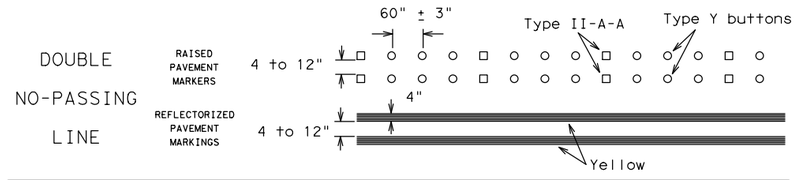
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

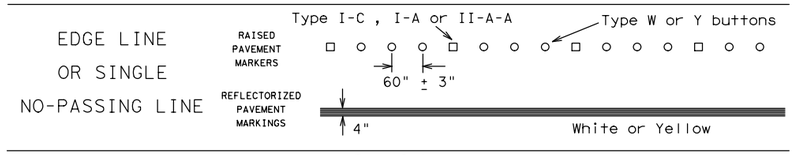
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

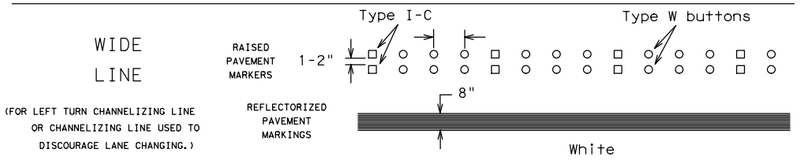


EDGE LINE OR SINGLE NO-PASSING LINE



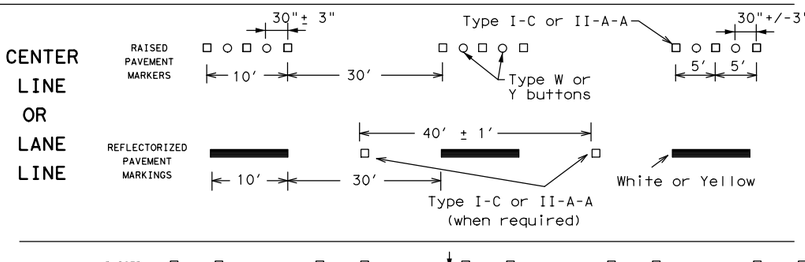
WIDE LINE

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

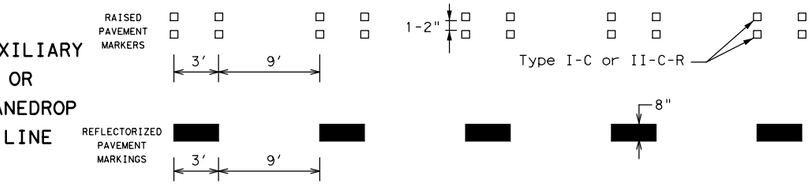


BROKEN LINES

CENTER LINE OR LANE LINE

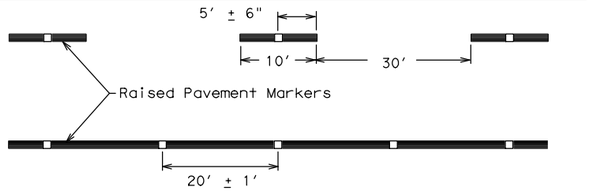


AUXILIARY OR LANEDROP LINE



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."

Texas Department of Transportation

Traffic Safety Division Standard

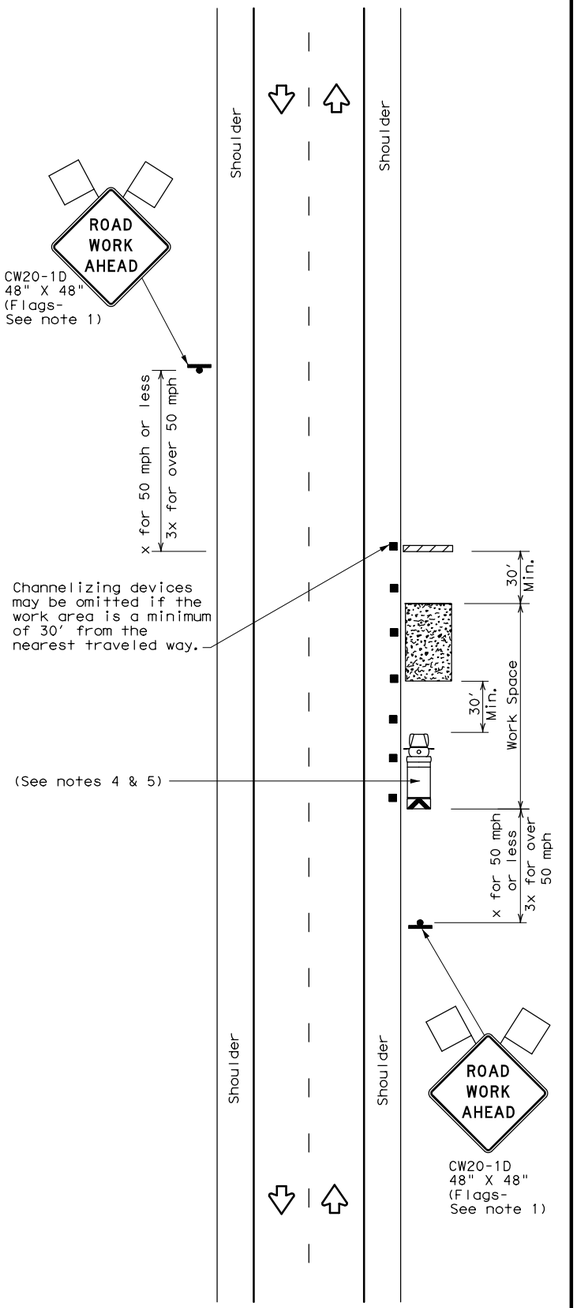
BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

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	0715	01	025,ETC	FM108,ETC
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		46

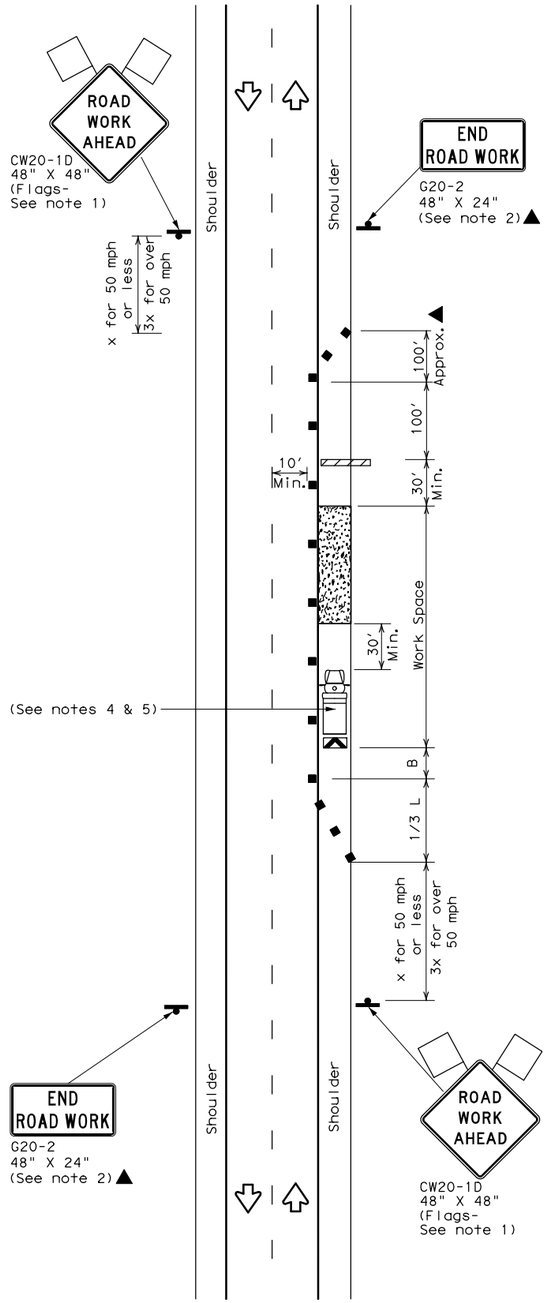
DATE:
FILE:

DATE:
FILE:



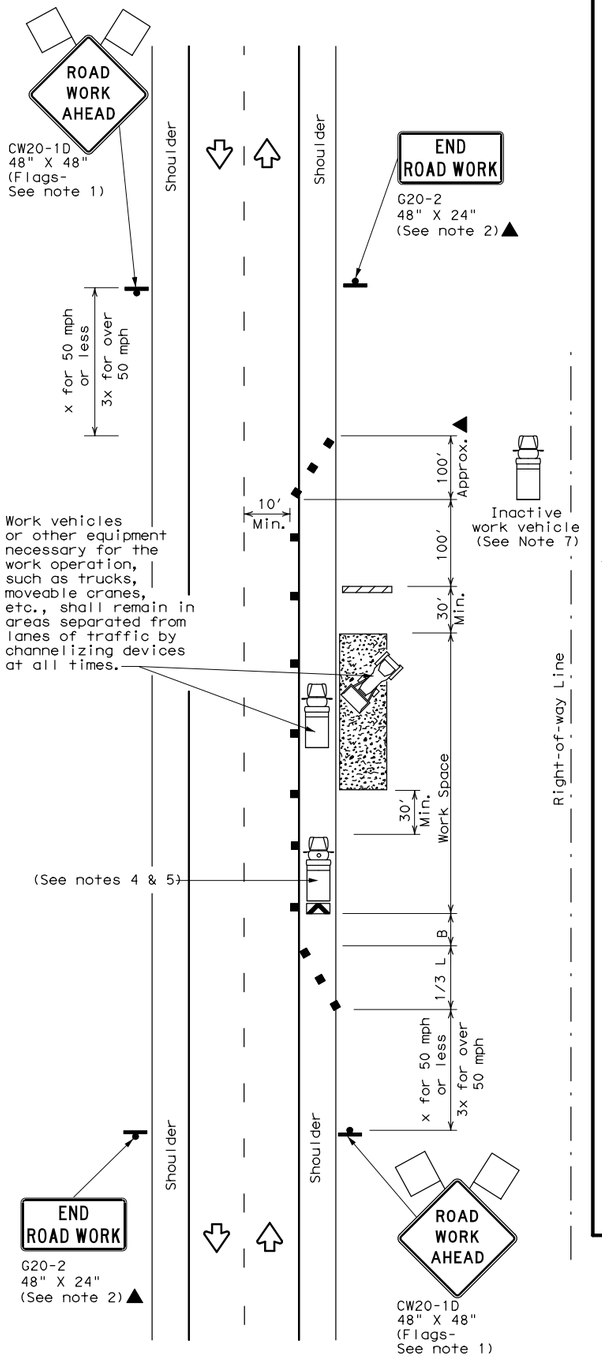
TCP (2-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (2-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (2-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

Texas Department of Transportation

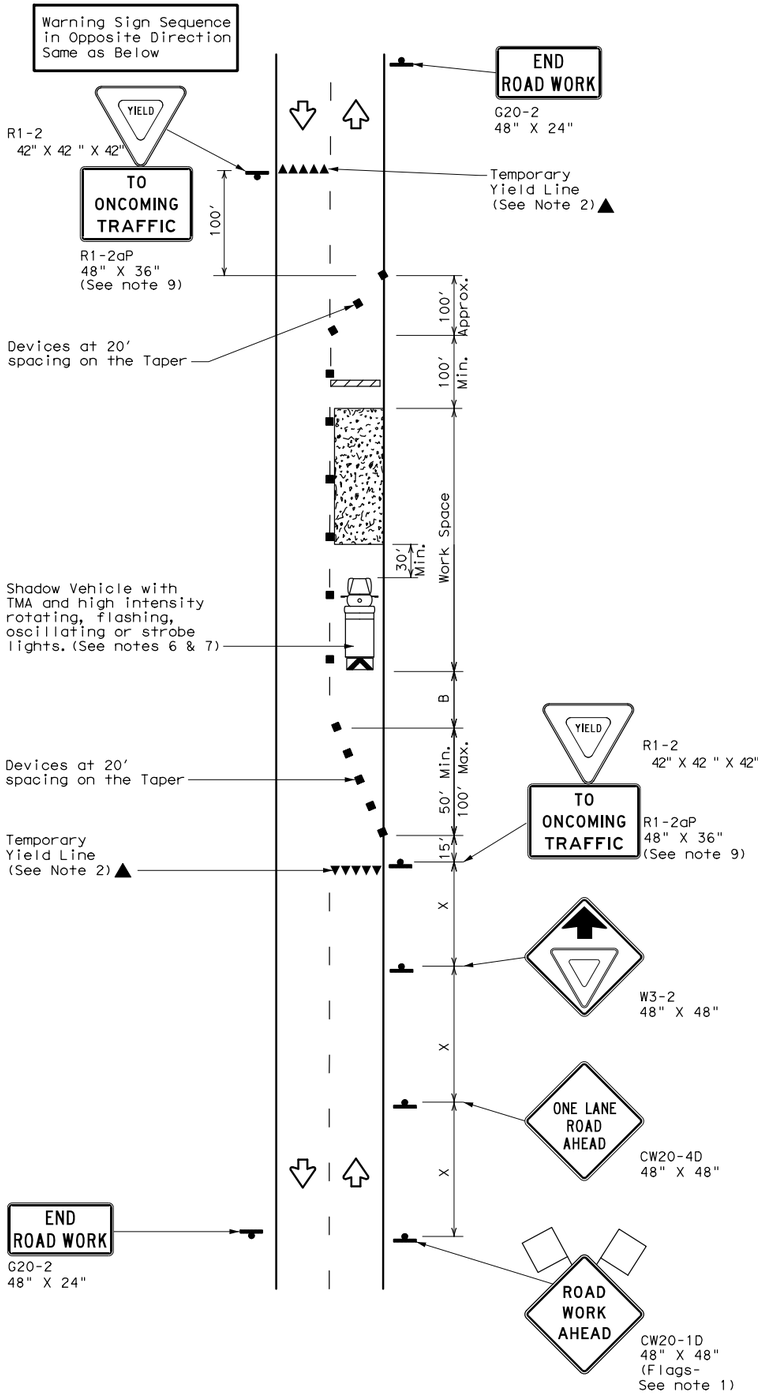
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

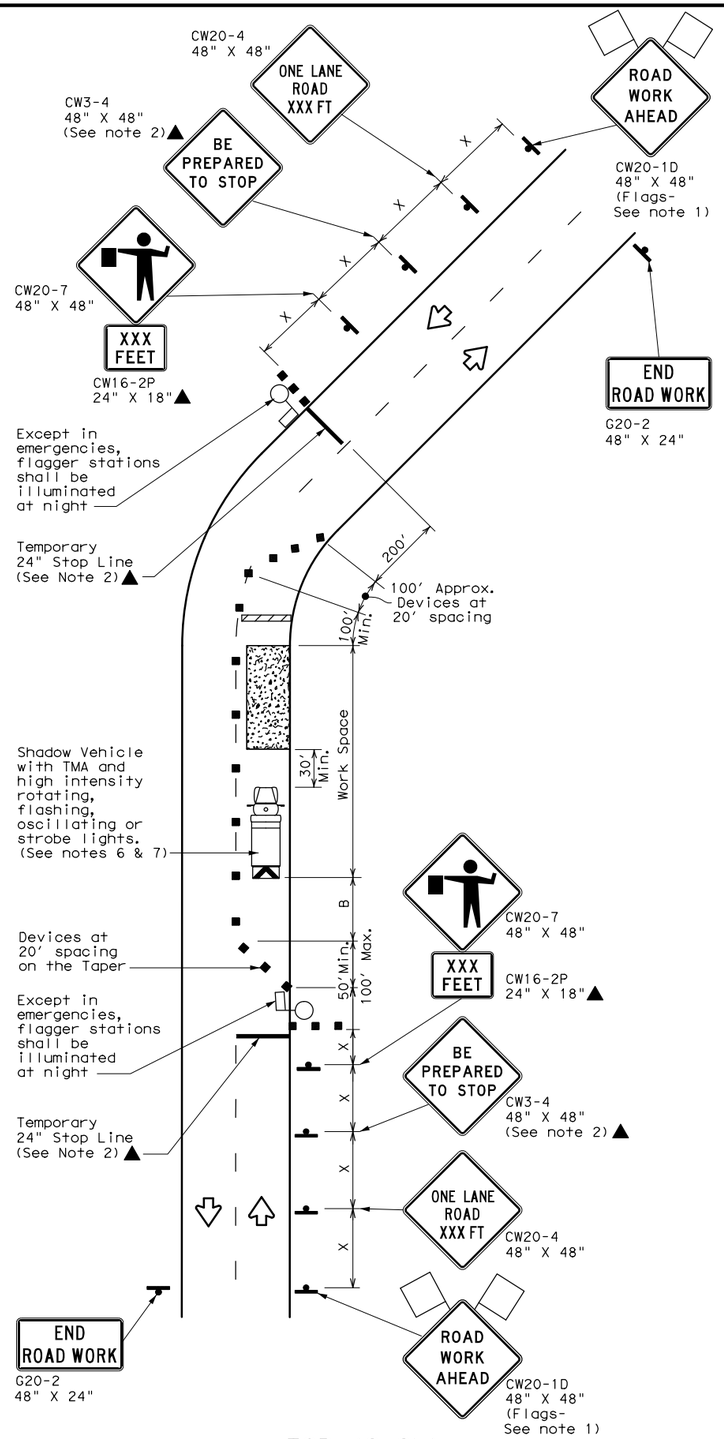
TCP(2-1)-18

FILE: tcp2-1-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0715	01	025,ETC	FM108,ETC
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	YKM	GONZALES		47
1-97 2-18				

DATE:
FILE:



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



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

LEGEND

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

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'	200'
35		205'	225'	245'	35'	70'	160'	120'	250'
40		265'	295'	320'	40'	80'	240'	155'	305'
45	L=WS	450'	495'	540'	45'	90'	320'	195'	360'
50		500'	550'	600'	50'	100'	400'	240'	425'
55		550'	605'	660'	55'	110'	500'	295'	495'
60		600'	660'	720'	60'	120'	600'	350'	570'
65		650'	715'	780'	65'	130'	700'	410'	645'
70		700'	770'	840'	70'	140'	800'	475'	730'
75		750'	825'	900'	75'	150'	900'	540'	820'

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

TYPICAL USAGE

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

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. The CW3-4 "BE PREPARED TO STOP" sign may be installed after the CW20-4 "ONE LANE ROAD XXX FT" sign, but proper sign spacing shall be maintained.
4. Flaggers should use two-way radios or other methods of communication to control traffic.
5. Length of work space should be based on the ability of flaggers to communicate.
6. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
7. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.

TCP (2-2a)

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

TCP (2-2b)

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

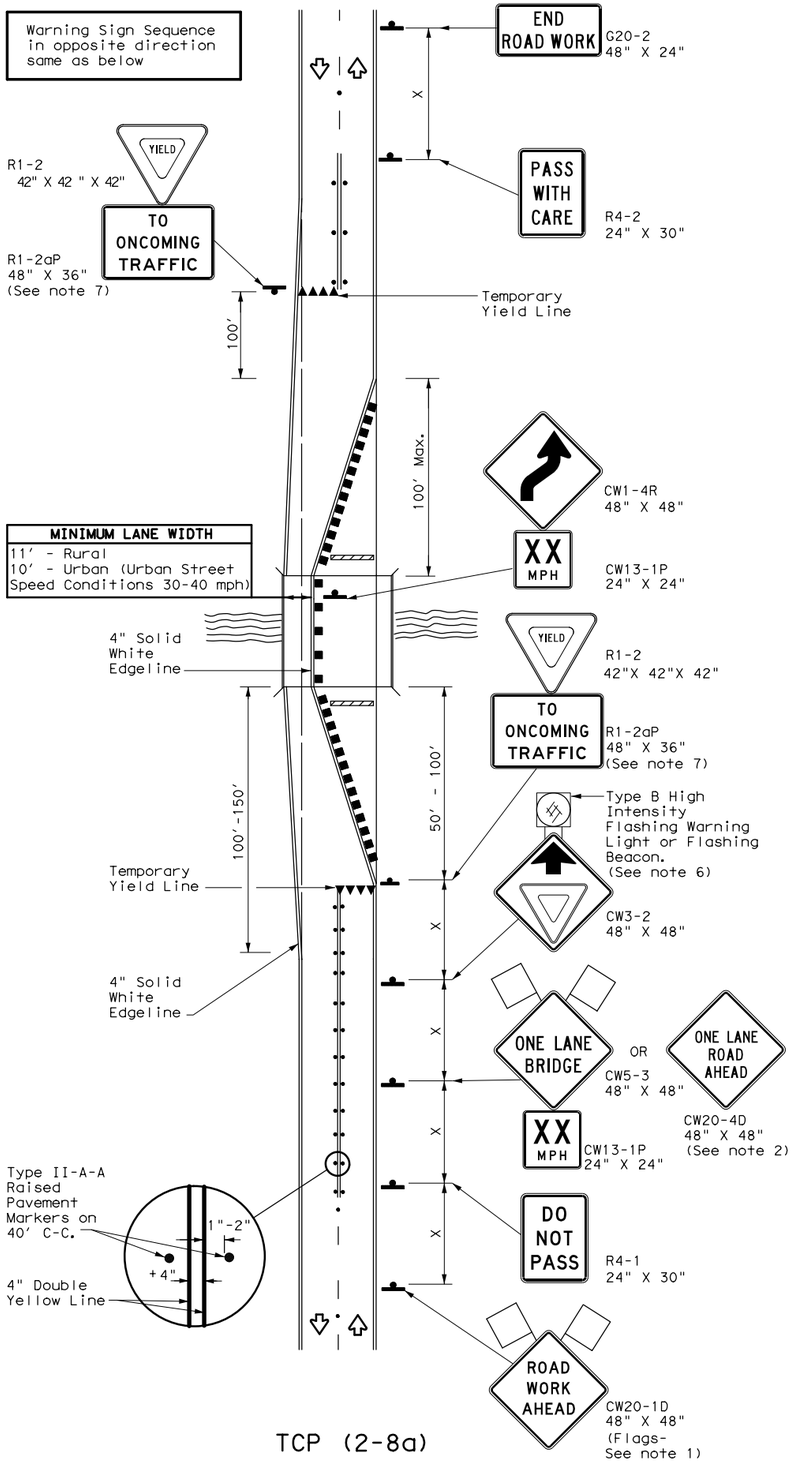
Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
ONE-LANE TWO-WAY TRAFFIC CONTROL

TCP(2-2)-18

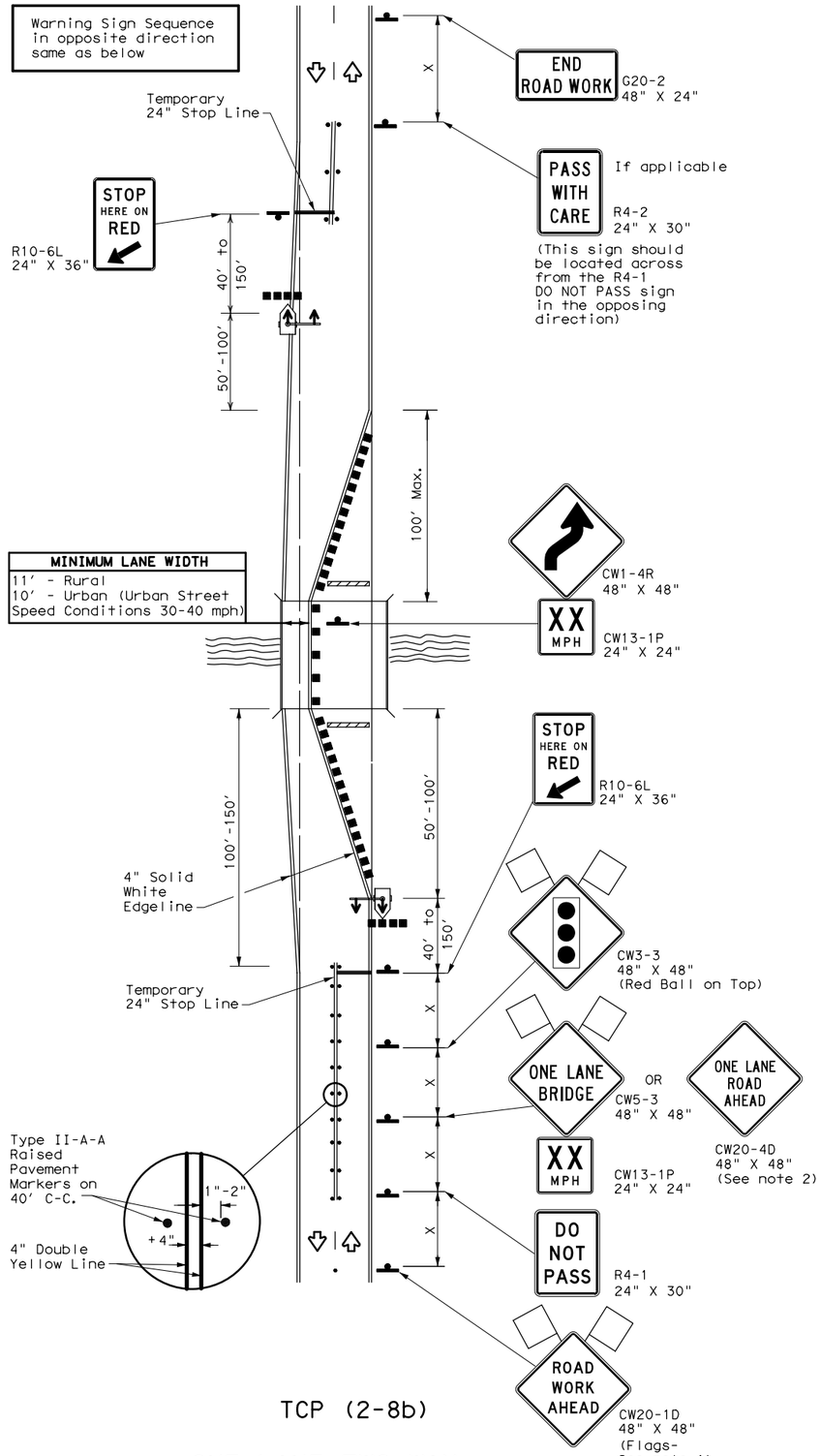
FILE: tcp2-2-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03	0715	01	025,ETC	FM108,ETC
1-97 2-12	DIST	COUNTY		SHEET NO.
4-98 2-18	YKM	GONZALES		48

DATE:
FILE:



TCP (2-8a)

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



TCP (2-8b)

ONE LANE TWO-WAY
TRAFFIC CONTROL WITH TRAFFIC SIGNAL

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

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'	200'
35		205'	225'	245'	35'	70'	160'	120'	250'
40		265'	295'	320'	40'	80'	240'	155'	305'
45	L=WS	450'	495'	540'	45'	90'	320'	195'	360'
50		500'	550'	600'	50'	100'	400'	240'	425'
55		550'	605'	660'	55'	110'	500'	295'	495'
60		600'	660'	720'	60'	120'	600'	350'	570'
65		650'	715'	780'	65'	130'	700'	410'	645'
70		700'	770'	840'	70'	140'	800'	475'	730'
75		750'	825'	900'	75'	150'	900'	540'	820'

* Conventional Roads Only

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

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

GENERAL NOTES

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

TCP (2-8a)

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

TCP (2-8b)

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

Texas Department of Transportation

Traffic Operations Division Standard

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

TCP(2-8)-18

FILE: tcp2-8-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
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1-97 2-12	YKM	GONZALES		49
4-98 2-18				

DATE:
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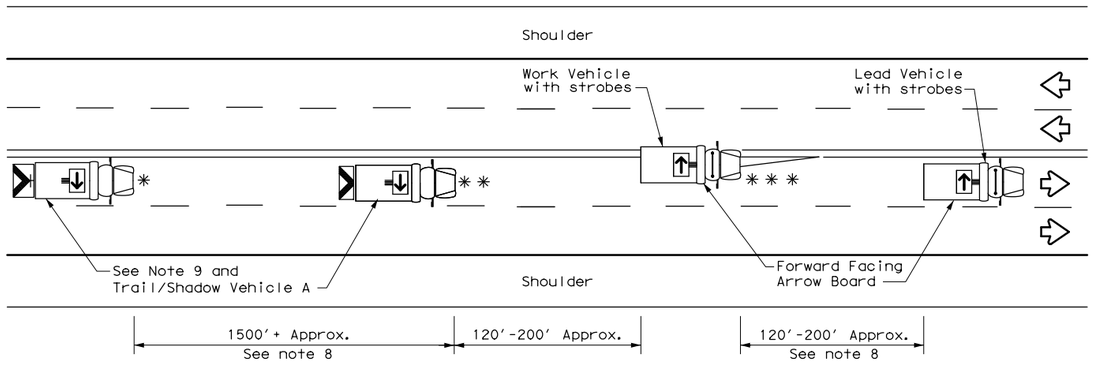
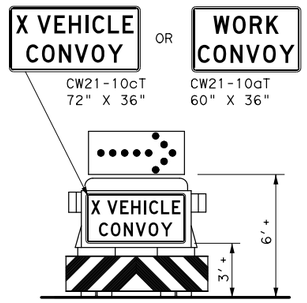


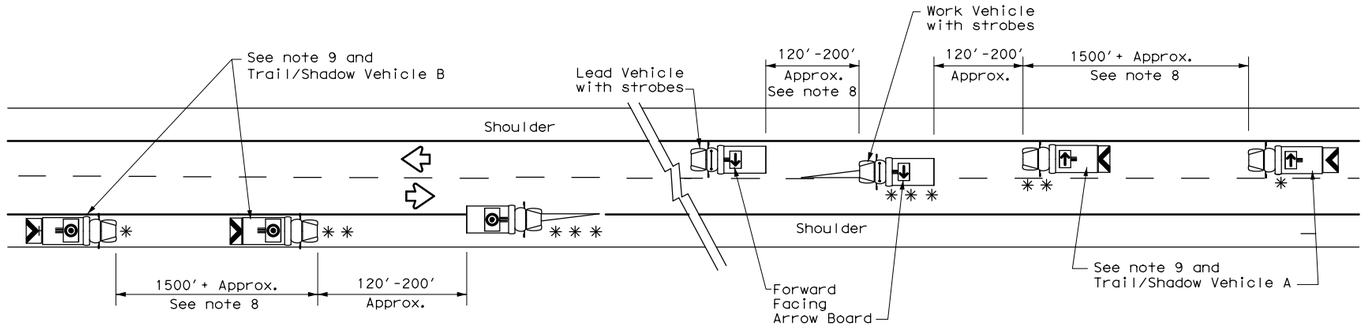
TCP (3-1a)

UNDIVIDED MULTILANE ROADWAY



TRAIL/SHADOW VEHICLE A

with RIGHT Directional display Flashing Arrow Board

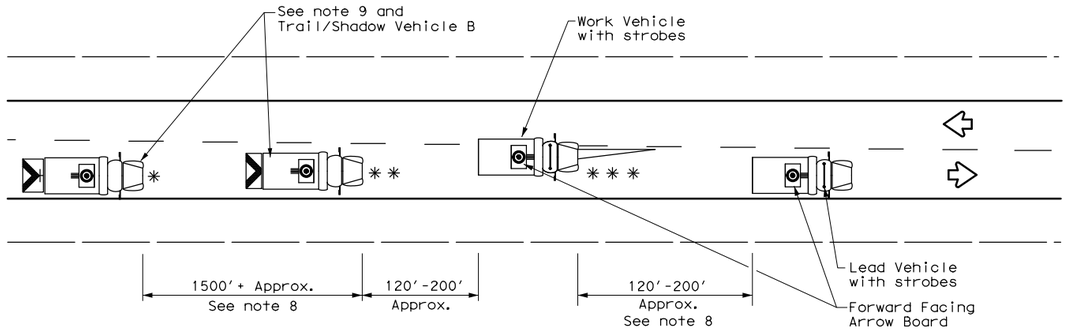


WORK ON SHOULDER

WORK ON TRAVEL LANE

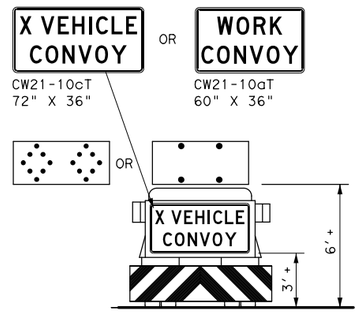
TCP (3-1b)

TWO-WAY ROADWAY WITH PAVED SHOULDERS



TCP (3-1c)

TWO-WAY ROADWAY WITHOUT PAVED SHOULDERS



TRAIL/SHADOW VEHICLE B

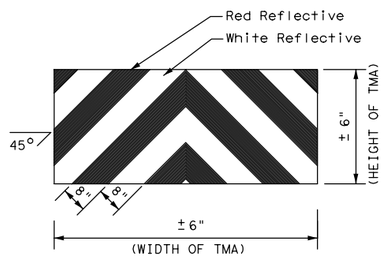
with Flashing Arrow Board in CAUTION display

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

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

GENERAL NOTES

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



STRIPING FOR TMA

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS UNDIVIDED HIGHWAYS

TCP(3-1)-13

FILE: tcp3-1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98 8-95 7-13 1-97	0715	01	025,ETC	FM108,ETC
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DATE:
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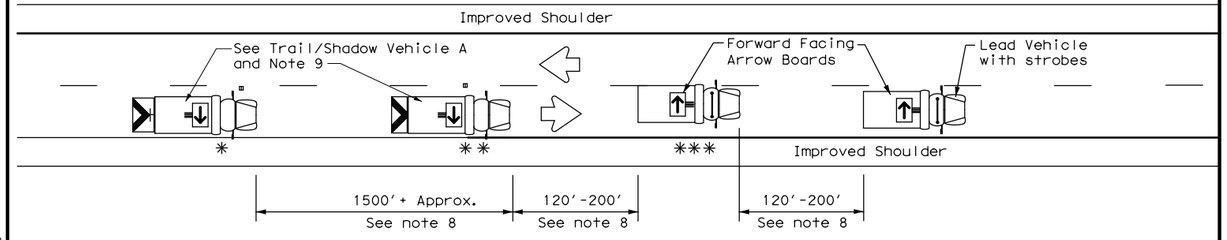
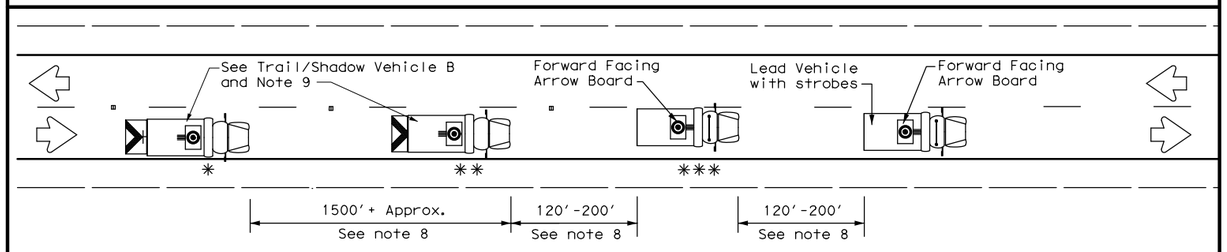


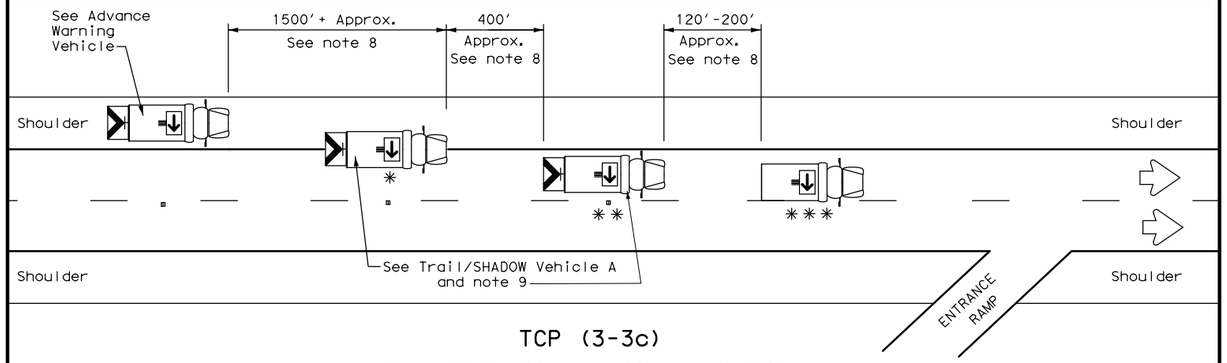
TCP (3-3a)

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



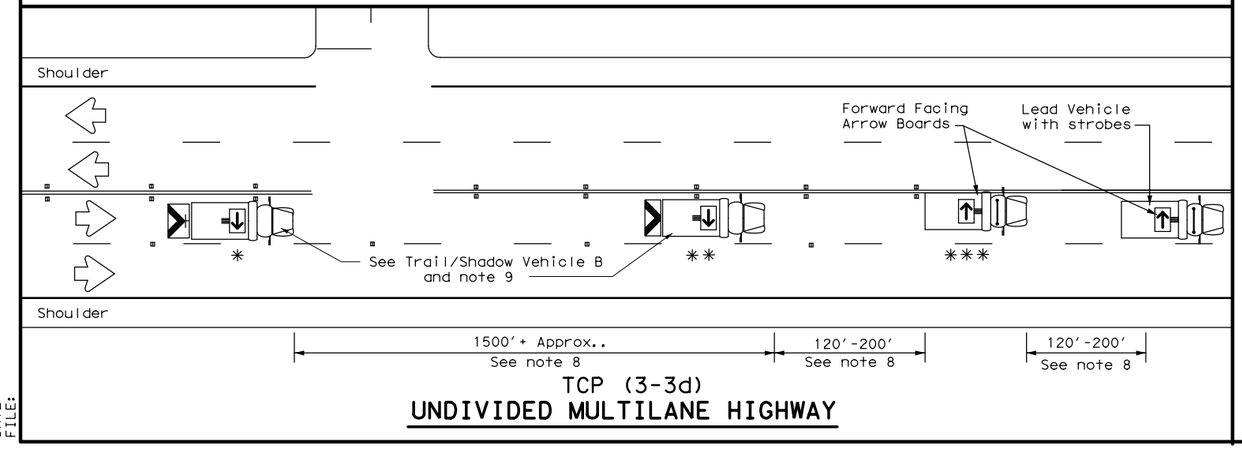
TCP (3-3b)

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



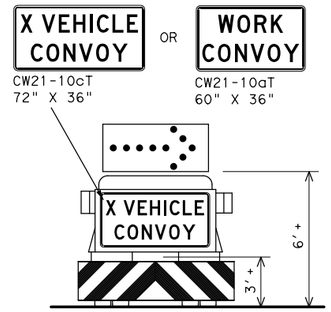
TCP (3-3c)

DIVIDED MULTILANE HIGHWAY



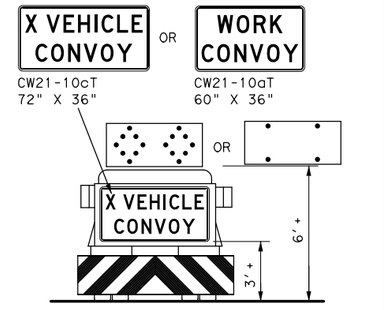
TCP (3-3d)

UNDIVIDED MULTILANE HIGHWAY



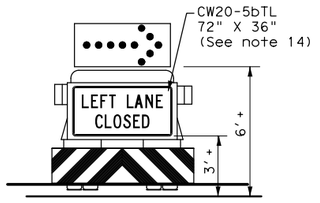
TRAIL/SHADOW VEHICLE A

with RIGHT Directional display
Flashing Arrow Board

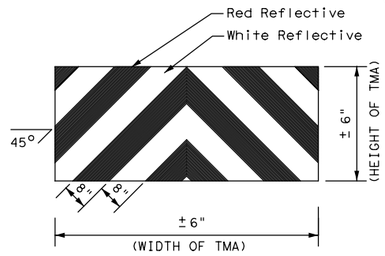


TRAIL/SHADOW VEHICLE B

with Flashing Arrow Board
in Caution Mode



ADVANCE WARNING VEHICLE



STRIPING FOR TMA

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS RAISED PAVEMENT MARKER INSTALLATION/ REMOVAL

TCP(3-3)-14

FILE: tcp3-3.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT September 1987	CONT	SECT	JOB	HIGHWAY
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8-95 7-13	YKM	GONZALES		51
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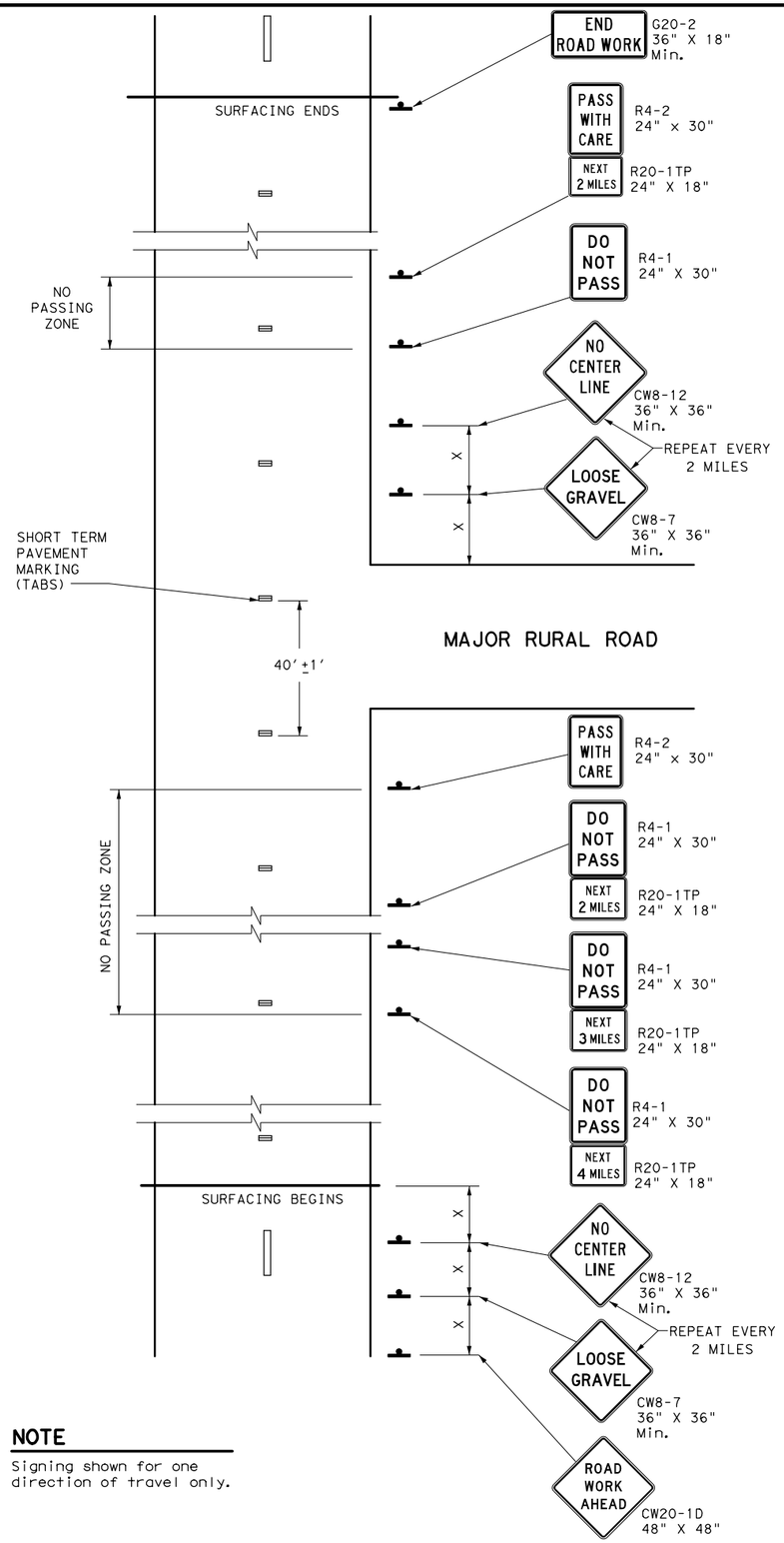
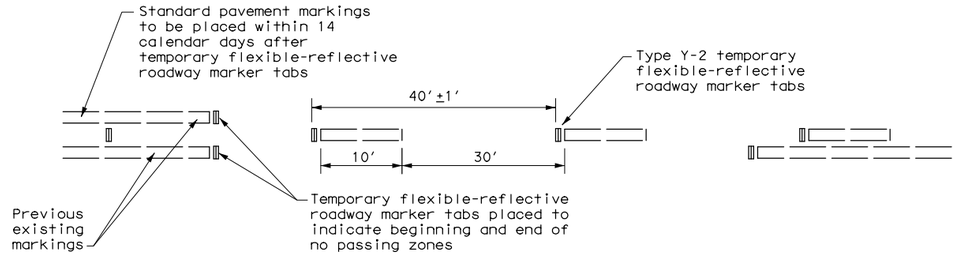


NOTE

Signing shown for one direction of travel only.

NO PASSING ZONES ON TWO-LANE TWO-WAY ROADS



TABS ON CENTERLINES OF TWO-LANE TWO-WAY ROADS

For seal coat, micro-surface or similar operations

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

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

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

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

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

"NO CENTER LINE" SIGN (CW8-12)

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

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

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

"LOOSE GRAVEL" SIGN (CW8-7)

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

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

PAVEMENT MARKINGS

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

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

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

COORDINATION OF SIGN LOCATIONS

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

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

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

*** Conventional Roads Only**

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL DETAILS FOR SURFACING OPERATIONS

TCP(7-1)-13

FILE: tcp7-1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT March 1991	CONT	SECT	JOB	HIGHWAY
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210

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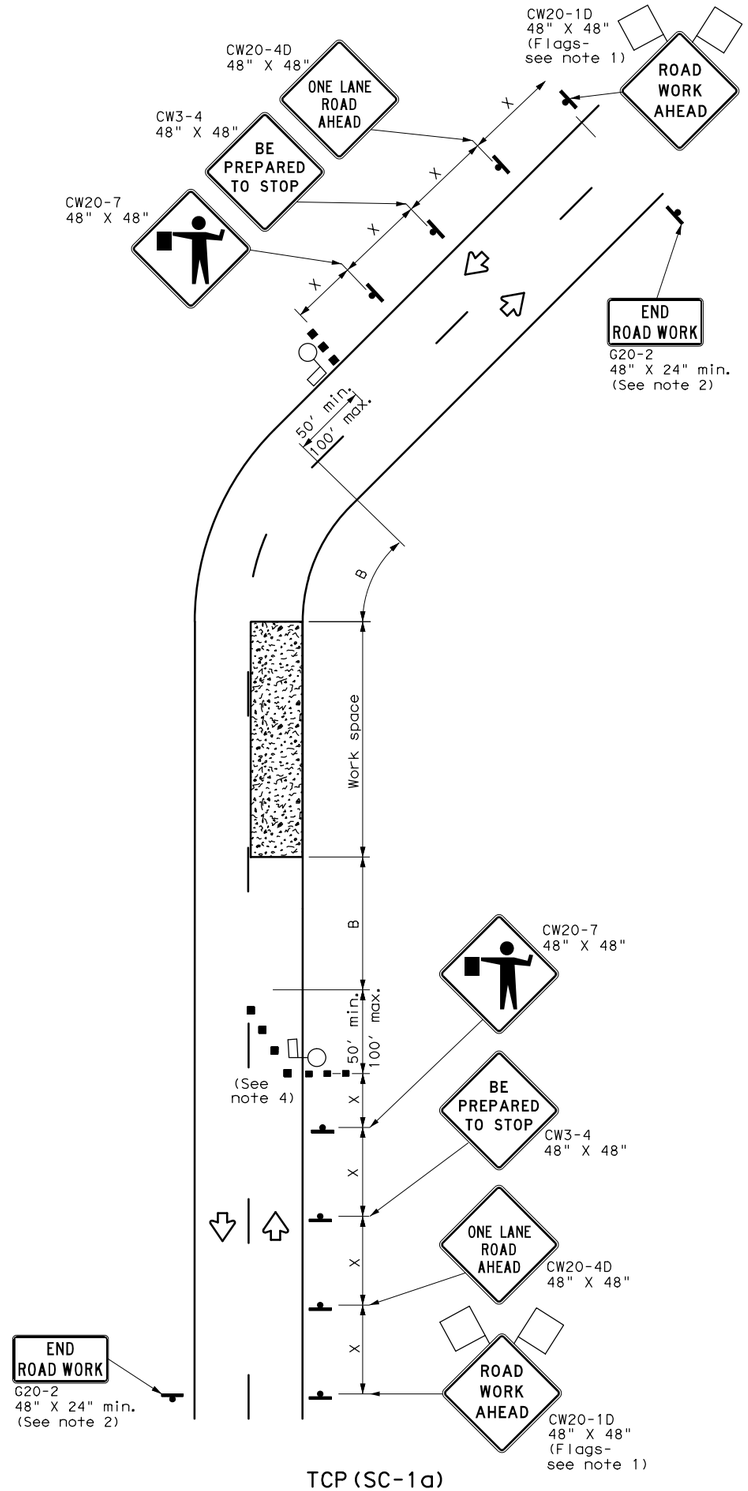
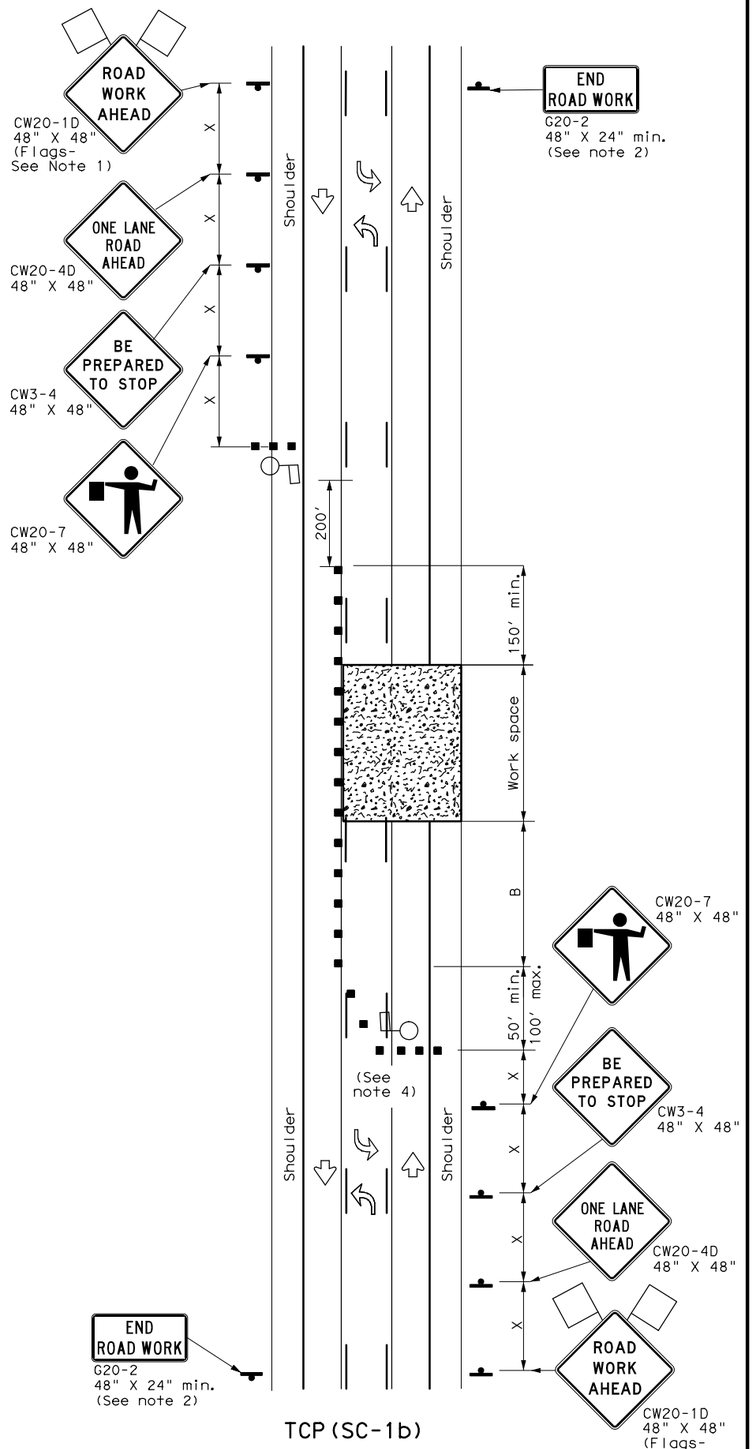


TCP(SC-1a)

ONE LANE TWO-WAY (TWO LANES) CONTROL WITH PILOT VEHICLE



TCP(SC-1b)

ONE LANE TWO-WAY (THREE LANES) CONTROL WITH PILOT VEHICLE AND CHANNELIZING DEVICES

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

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent	Minimum Sign Spacing Distance "X"	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'	200'
35		205'	225'	245'	35'	70'	160'	120'	250'
40		265'	295'	320'	40'	80'	240'	155'	305'
45	L=WS	450'	495'	540'	45'	90'	320'	195'	360'
50		500'	550'	600'	50'	100'	400'	240'	425'
55		550'	605'	660'	55'	110'	500'	295'	495'
60		600'	660'	720'	60'	120'	600'	350'	570'
65		650'	715'	780'	65'	130'	700'	410'	645'
70		700'	770'	840'	70'	140'	800'	475'	730'
75		750'	825'	900'	75'	150'	900'	540'	820'

* Conventional Roads Only

** Taper lengths have been rounded off.

L = Length of Taper (FT) W = Width of Offset (FT) S = Posted Speed (MPH)

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

GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except: if project signing is present, END ROAD WORK (G20-2) sign is optional with approval by the Engineer.
3. Sign spacing may be increased or an additional ROAD WORK AHEAD (CW20-1D) sign may be used if advance warning ahead of the flagger sign is less than 1500 feet.
4. Flaggers should use two-way radios or other methods of communication at all times for traffic control coordination.
5. Flaggers should use 24" STOP (CW20-8) / SLOW (CW20-8aT) paddles to control traffic. Flags should be limited to emergency situations.
6. If the work space is located near a horizontal or vertical curve, the buffer distances should be increased in order to maintain adequate stopping sight distance to the flagger and a queue of stopped vehicles (see table above).
7. If the seal coat operation crosses intersections, traffic in these areas must be controlled. Care must be taken to prevent vehicles from crossing the asphalt before the aggregate is placed. This may require positioning additional traffic control personnel (flaggers) at the intersection.
8. Temporary rumble strips are not required on seal coat operations.
9. The pilot car is used to guide vehicles through traffic control zone. The pilot car shall have an identification name displayed and PILOT CAR, FOLLOW ME (G20-4) sign or message board mounted in a conspicuous position on rear.

TCP (SC-1a)

1. Channelizing devices on the centerline are not required when a pilot car is leading traffic, unless directed by the Engineer.

Texas Department of Transportation — Traffic Safety Division Standard

TRAFFIC CONTROL PLAN SEAL COAT OPERATIONS ONE-LANE TWO-WAY

TCP(SC-1)-22

FILE: tcpsc-1-22.dgn	DN:	CK:	DW:	CK:
© TxDOT October 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-21 10-22	0715	01	025,ETC	FM108,ETC
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		53

217

DATE:
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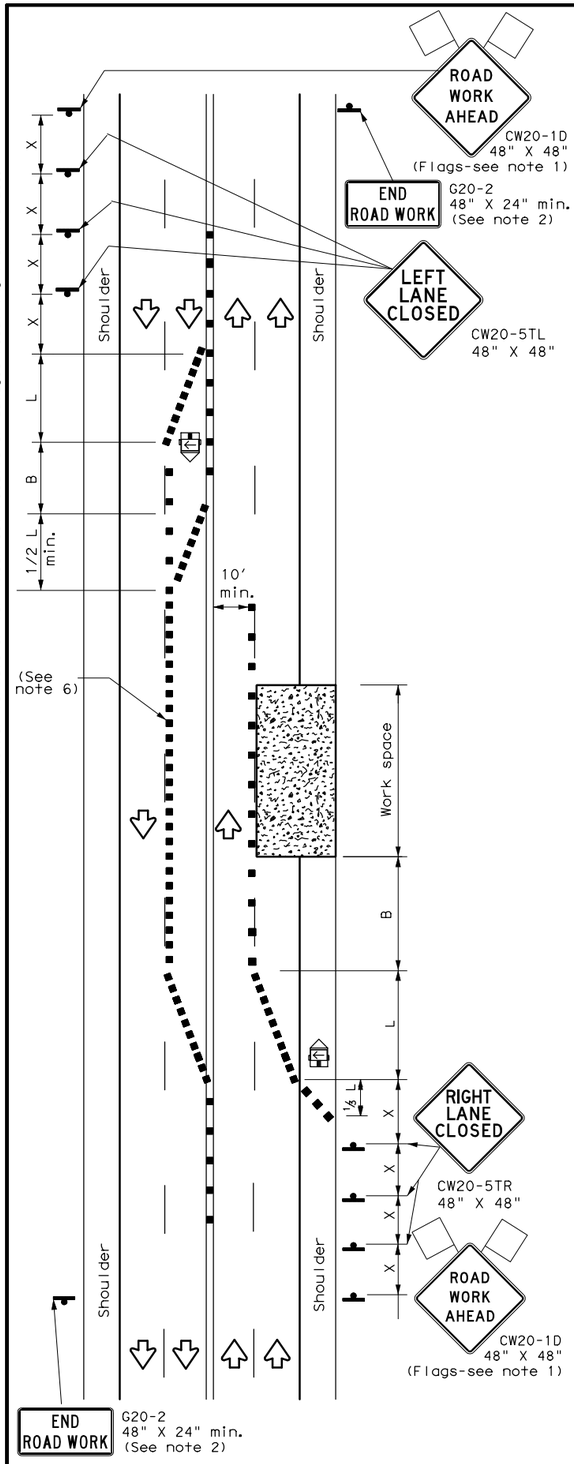
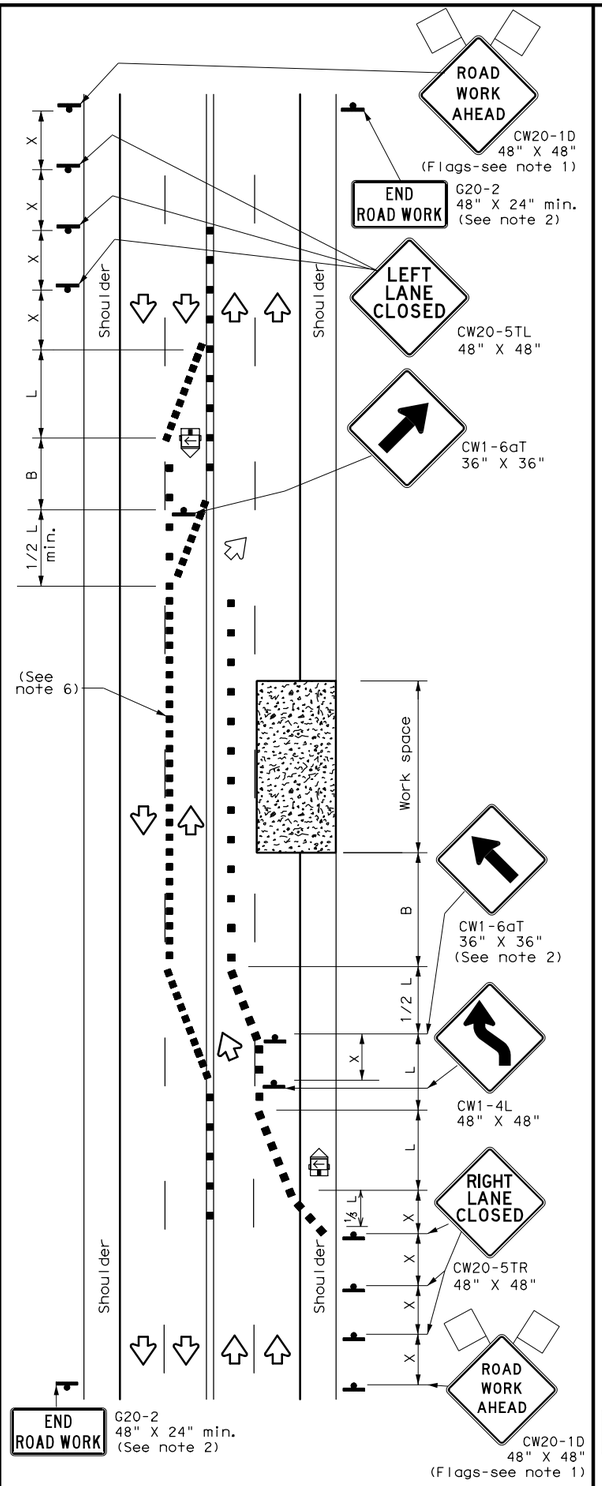


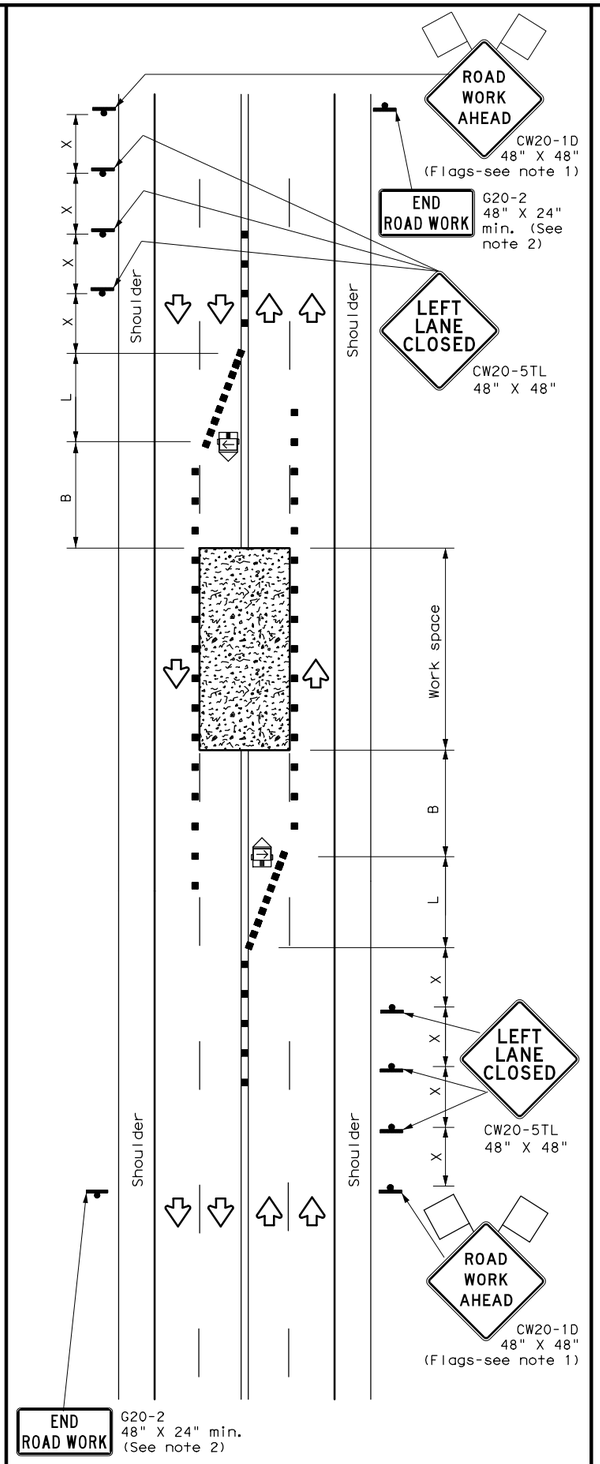
TCP (SC-2a)

ONE LANE CLOSED EACH DIRECTION
CONTROL W/ CHANNELIZING DEVICES



TCP (SC-2b)

ONE LANE CLOSED EACH DIRECTION
CONTROL W/ CHANNELIZING DEVICES



TCP (SC-2c)

CENTER LANES CLOSED
CONTROL W/ CHANNELIZING DEVICES

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

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

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

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

GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.

2. All traffic control devices illustrated are REQUIRED, except: if project signing is present, END ROAD WORK (G20-2) sign is optional with approval by the Engineer.

3. The ROAD WORK AHEAD (CW20-1D) sign may be repeated if the visibility of the work zone is less than 1500 feet.

4. If the seal coat operation crosses intersections, traffic in these areas must be controlled. Care must be taken to prevent vehicles from crossing the asphalt before the aggregate is placed. This may require positioning additional traffic control personnel (flaggers) at the intersection.

5. Temporary rumble strips are not required on seal coat operations.

TCP (SC-2a) and (SC-2b)

6. Channelizing devices which separate two-way traffic shall be spaced on tapers at:
   a.) 20 feet;
   b.) 15 feet when posted speeds are 35 mph or slower; or
   c.) at 1/2(S) for tangent sections.
   This tighter device spacing is intended for the areas of conflicting markings, not the entire work zone.

Texas Department of Transportation — Traffic Safety Division Standard

TRAFFIC CONTROL PLAN SEALCOAT OPERATIONS MULTILANE ROADS (UNDIVIDED)

TCP(SC-2)-22

FILE:	tcpsc-2-22.dgn	DN:	CK:	DW:	CK:
©TxDOT	October 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS		0715	01	025,ETC	FM108,ETC
4-21		DIST	COUNTY		SHEET NO.
10-22		YKM	GONZALES		54

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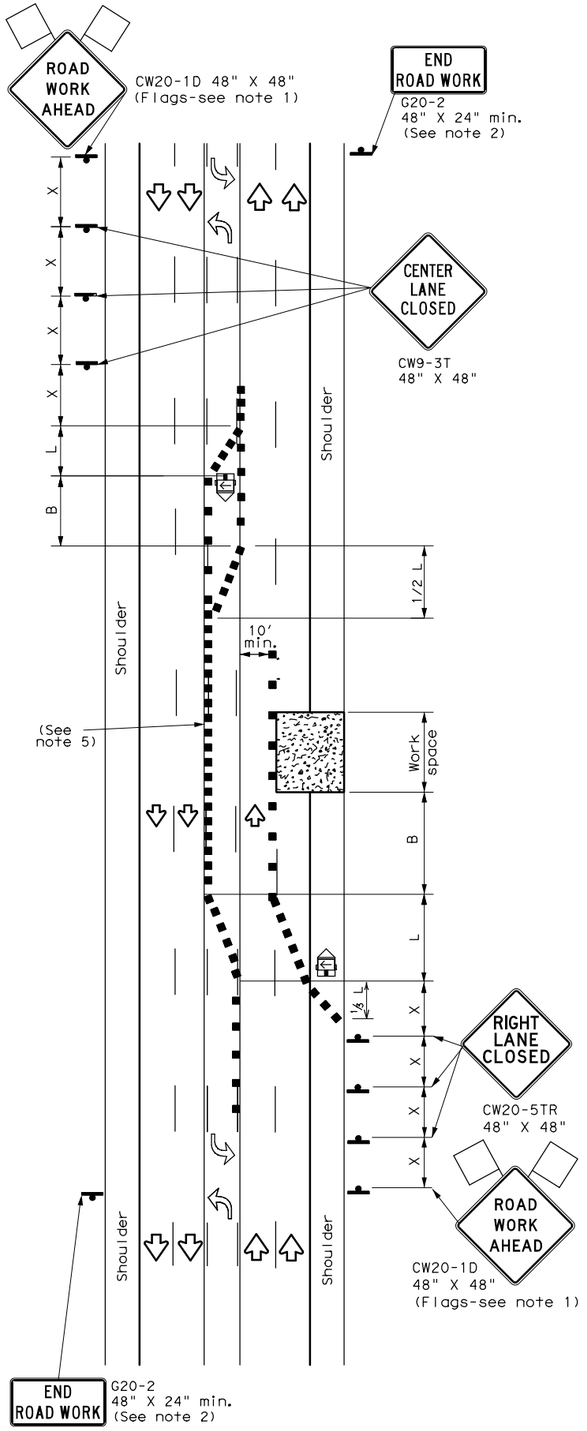
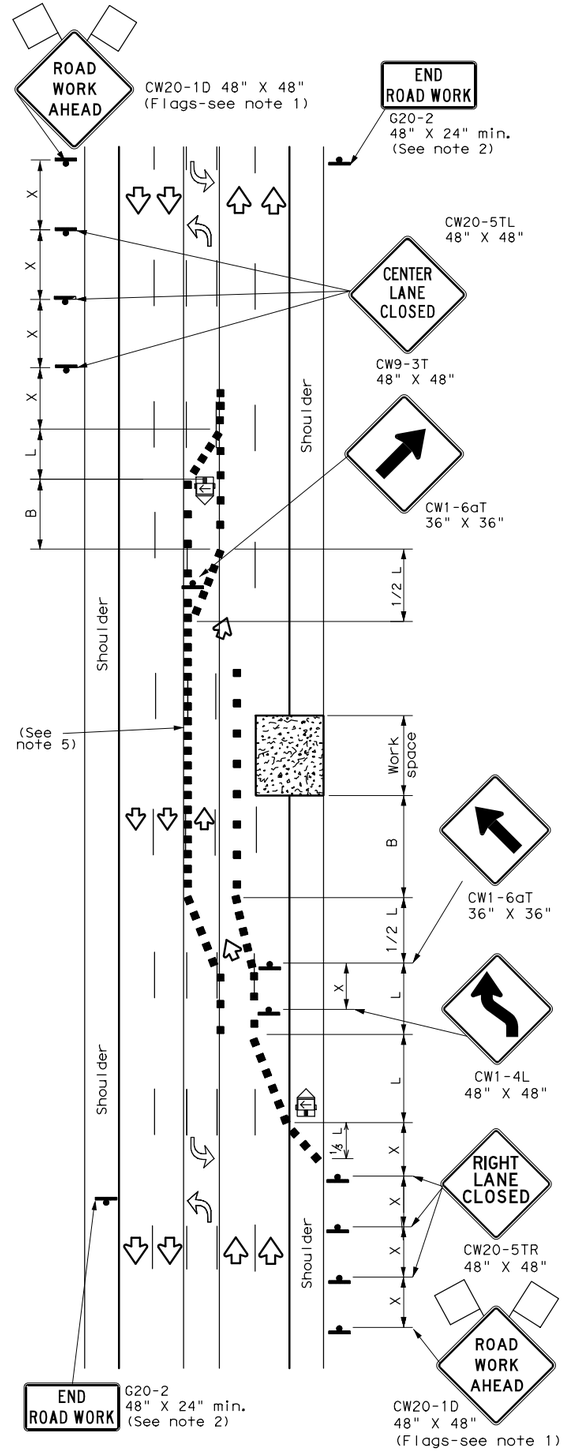
DATE:
FILE:



TCP(SC-3a)

ONE LANE CLOSED

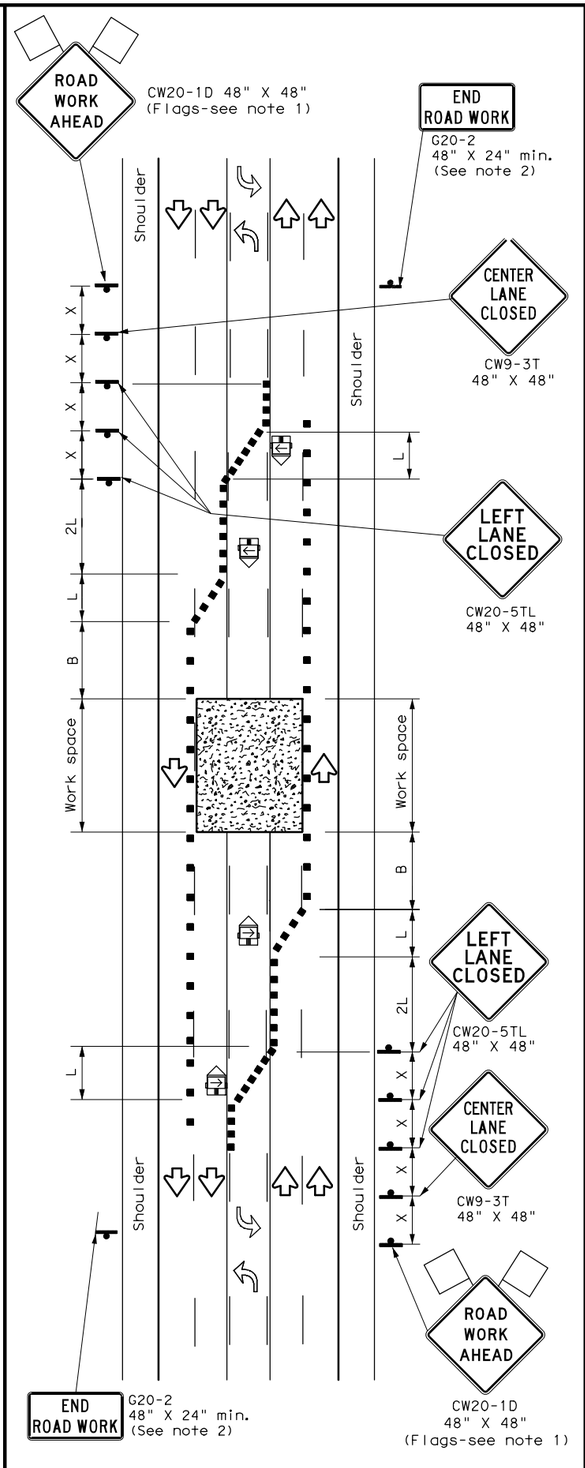
CONTROL W/ CHANNELIZING DEVICES



TCP(SC-3b)

TWO LANES CLOSED

CONTROL W/ CHANNELIZING DEVICES



TCP(SC-3c)

CENTER LANES CLOSED

CONTROL W/ CHANNELIZING DEVICES

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

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

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

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

GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except: if project signing is present, END ROAD WORK (G20-2) sign is optional with approval by the Engineer.
3. If the seal coat operation crosses intersections, traffic in these areas must be controlled. Care must be taken to prevent vehicles from crossing the asphalt before the aggregate is placed. This may require positioning additional traffic control personal (flaggers) at the intersection.
4. Temporary rumble strips are not required on seal coat operations.

TCP (SC-3a) and (SC-3b)

5. Channelizing devices which separate two-way traffic shall be spaced on tapers at:
   a.) 20 feet;
   b.) 15 feet when posted speeds are 35 mph or slower; or
   c.) at 1/2(S) for tangent sections.
   This tighter device spacing is intended for the areas of conflicting markings, not the entire work zone.

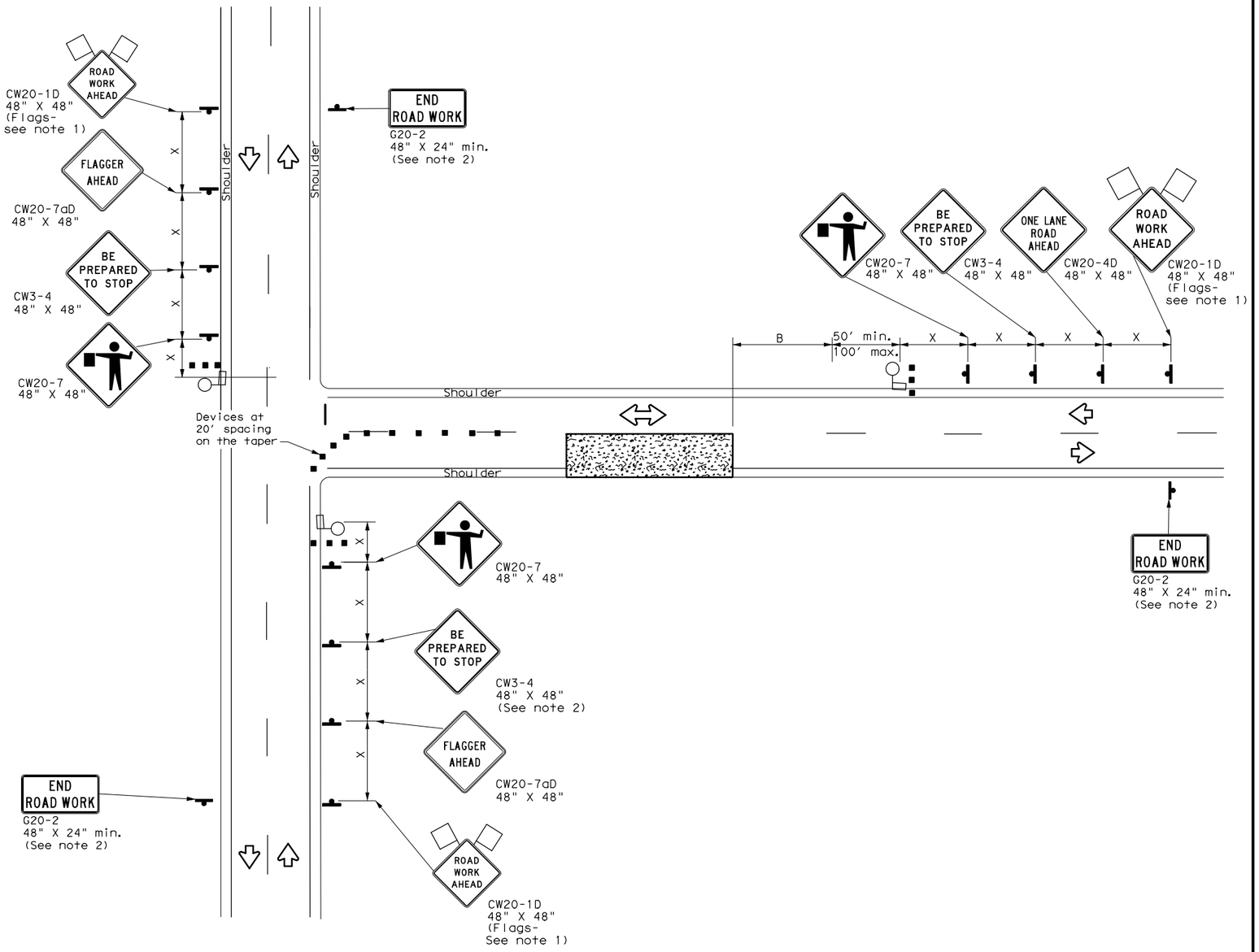
Texas Department of Transportation — Traffic Safety Division Standard

TRAFFIC CONTROL PLAN SEAL COAT OPERATIONS MULTILANE ROADS (W/ CENTER LEFT TURN LANE)

TCP(SC-3)-22

FILE: tcpsc-3-22.dgn	DN:	CK:	DW:	CK:
© TxDOT October 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0715	01	025,ETC	FM108,ETC
4-21	DIST	COUNTY		SHEET NO.
10-22	YKM	GONZALES		55

DATE:
FILE:



ONE LANE TWO-WAY (T-INTERSECTION) CONTROL WITH PILOT VEHICLE

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

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent	Minimum Sign Spacing Distance "X"	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'	200'
35		205'	225'	245'	35'	70'	160'	120'	250'
40		265'	295'	320'	40'	80'	240'	155'	305'
45	L=WS	450'	495'	540'	45'	90'	320'	195'	360'
50		500'	550'	600'	50'	100'	400'	240'	425'
55		550'	605'	660'	55'	110'	500'	295'	495'
60		600'	660'	720'	60'	120'	600'	350'	570'
65		650'	715'	780'	65'	130'	700'	410'	645'
70		700'	770'	840'	70'	140'	800'	475'	730'
75		750'	825'	900'	75'	150'	900'	540'	820'

* Conventional Roads Only

** Taper lengths have been rounded off.

L = Length of Taper (FT) W = Width of Offset (FT) S = Posted Speed (MPH)

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

GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except: if project signing is present, END ROAD WORK (G20-2) sign is optional with approval by the Engineer.
3. Flaggers should use two-way radios or other methods of communication at all times for traffic control coordination.
4. Flaggers should use 24" STOP (CW20-8) / SLOW (CW20-8aT) paddles to control traffic. Flags should be limited to emergency situations.
5. If the work space is located near a horizontal or vertical curve, the buffer distances should be increased in order to maintain adequate stopping sight distance to the flagger and a queue of stopped vehicles (see table above).
6. Temporary rumble strips are not required on seal coat operations.
7. The pilot car is used to guide vehicles through traffic control zone. The pilot car shall have an identification name displayed and PILOT CAR, FOLLOW ME (G20-4) sign or message board mounted in a conspicuous position on rear.

Texas Department of Transportation

Traffic Safety Division Standard

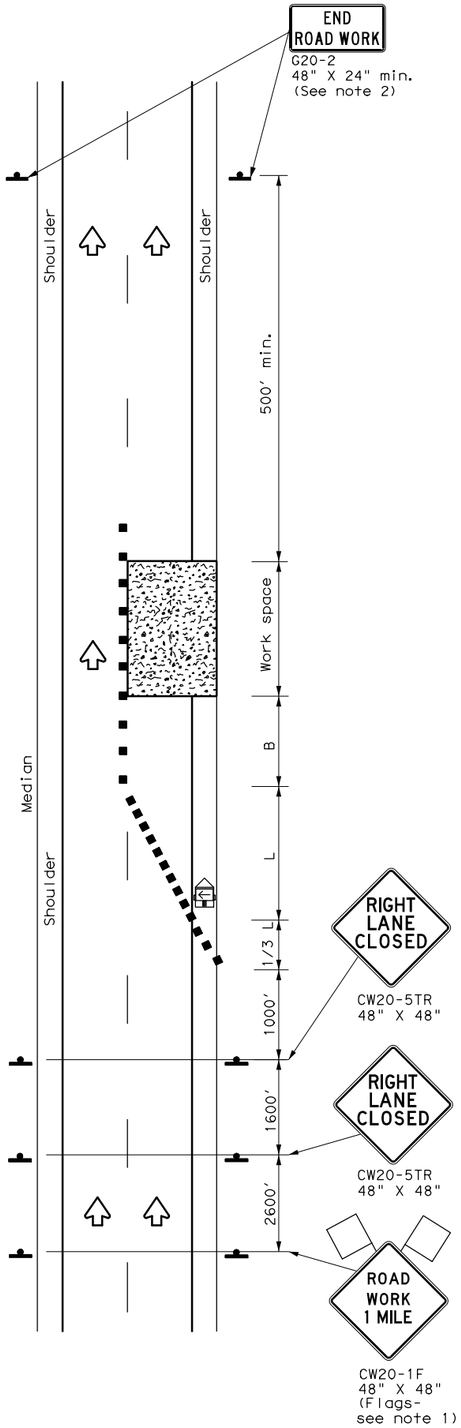
TRAFFIC CONTROL PLAN SEAL COAT OPERATIONS NEAR INTERSECTION

TCP(SC-4)-22

FILE: tcpsc-4-22.dgn	DN:	CK:	DW:	CK:
©TxDOT October 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-21 10-22	0715	01	025,ETC	FM108,ETC
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		56

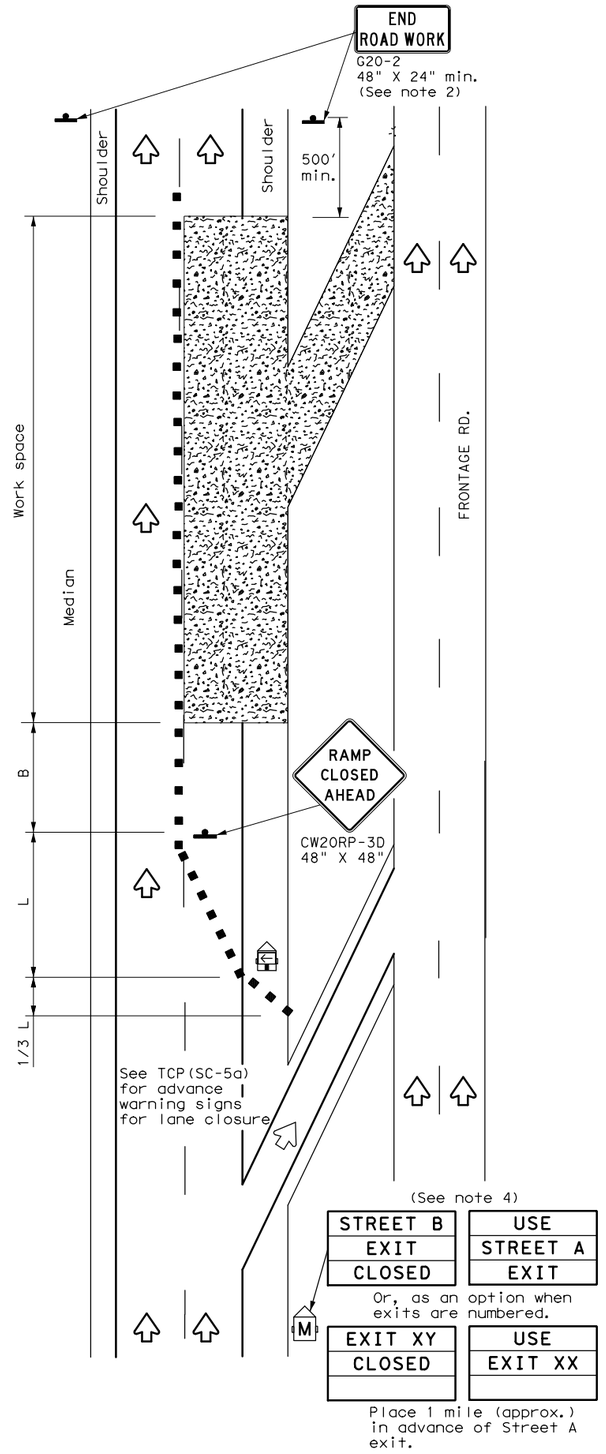
220

DATE:
FILE:



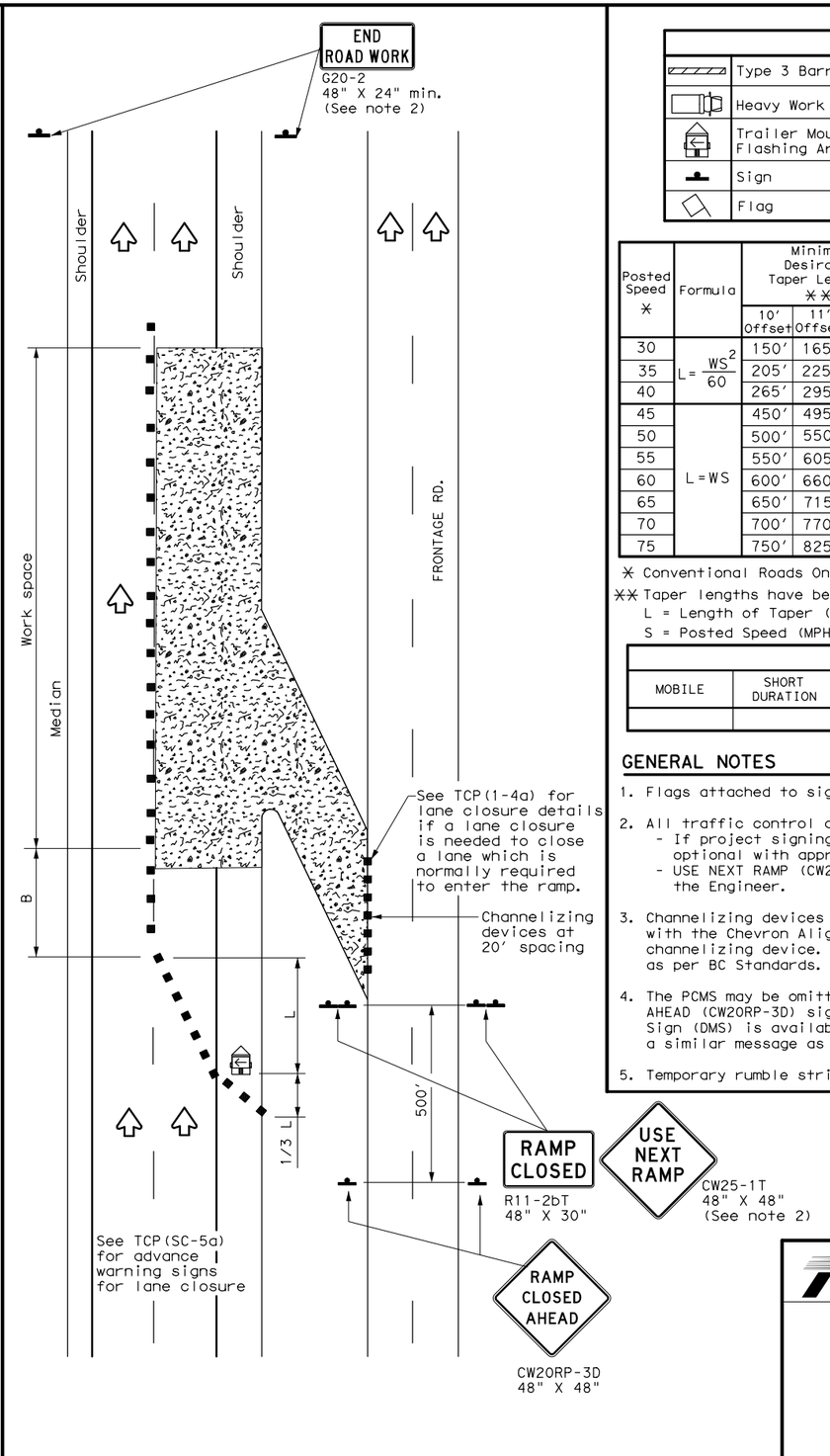
TCP (SC-5a)

ONE LANE CLOSURE



TCP (SC-5b)

LANE AND RAMP CLOSURE AT EXIT RAMPS



TCP (SC-5c)

LANE AND RAMP CLOSURE AT ENTRANCE RAMPS

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except:
   - If project signing is present, END ROAD WORK (G20-2) sign is optional with approval by the Engineer.
   - USE NEXT RAMP (CW25-1T) sign is optional with approval by the Engineer.
3. Channelizing devices used to close lanes may be supplemented with the Chevron Alignment Sign placed on every other channelizing device. Chevrons may be attached to plastic drums as per BC Standards.
4. The PCMS may be omitted if: it is replaced with a RAMP CLOSED AHEAD (CW20RP-3D) sign or when a permanent Dynamic Message Sign (DMS) is available in the appropriate location to display a similar message as called for on the PCMS.
5. Temporary rumble strips are not required on seal coat operations.

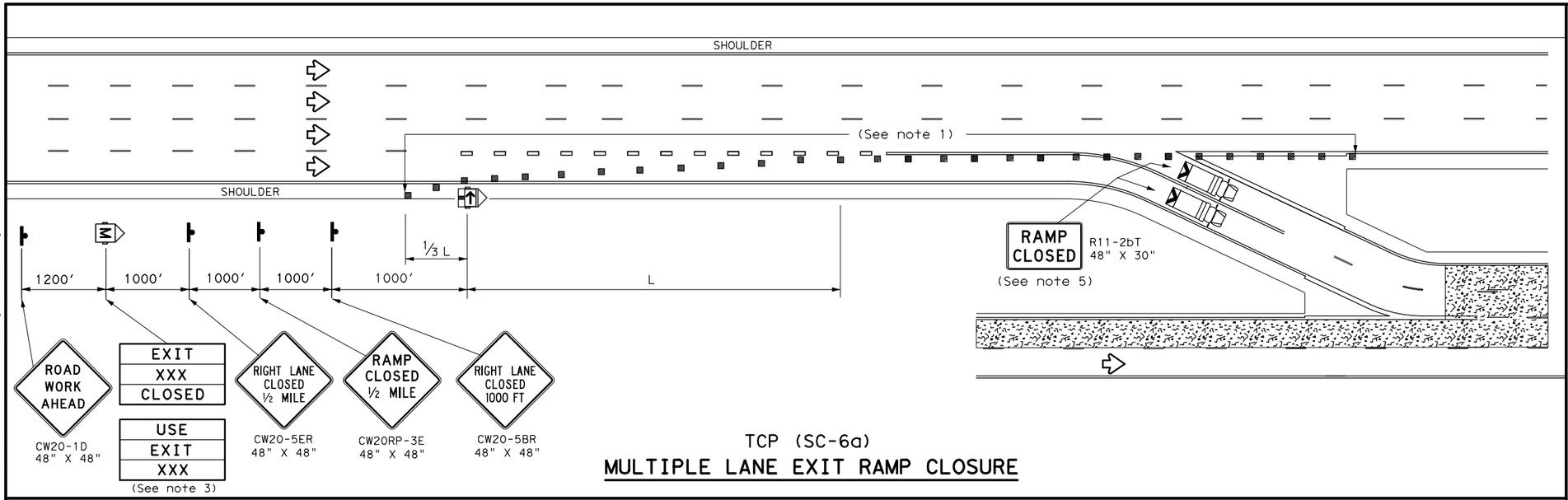
Texas Department of Transportation

Traffic Safety Division Standard

TRAFFIC CONTROL PLAN SEAL COAT OPERATIONS DIVIDED HIGHWAYS

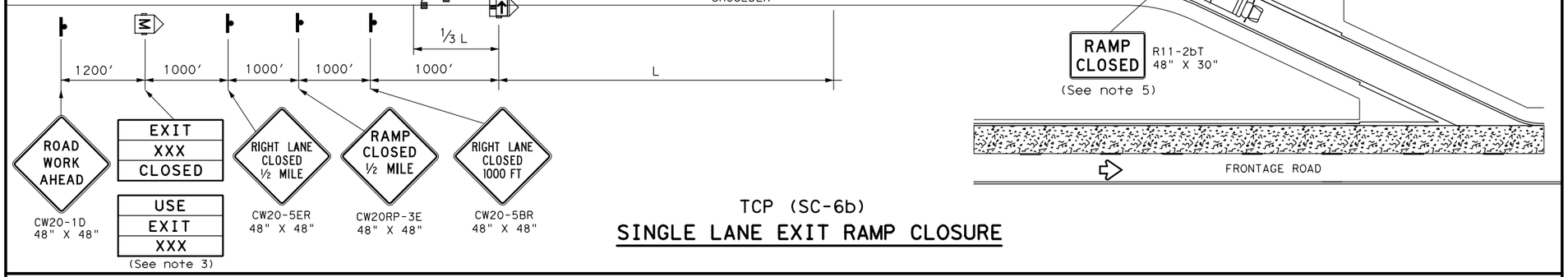
TCP(SC-5)-22

FILE: tcpsc-5-22.dgn	DN:	CK:	DW:	CK:
©TxDOT October 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-21 10-22	0715	01	025,ETC	FM108,ETC
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		57



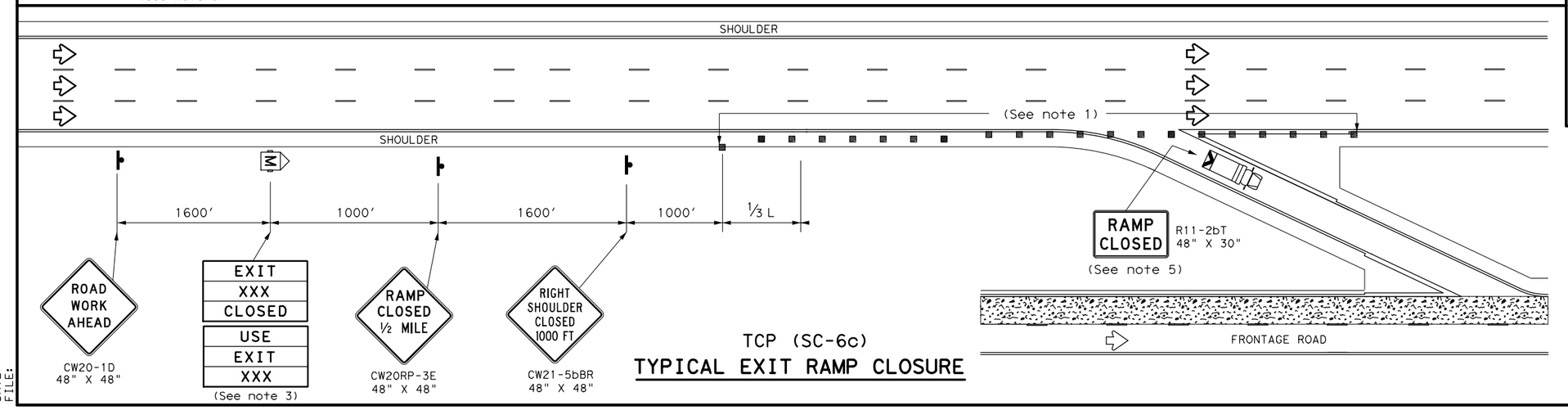
TCP (SC-6a)

MULTIPLE LANE EXIT RAMP CLOSURE



TCP (SC-6b)

SINGLE LANE EXIT RAMP CLOSURE



TCP (SC-6c)

TYPICAL EXIT RAMP CLOSURE

DATE:
FILE:

LEGEND

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

Posted Speed	Formula	Minimum Desirable Taper Lengths "L" ✻✻ 10′ Offset	11′ Offset	12′ Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent	Suggested Longitudinal Buffer Space "B"
45	L=WS	450′	495′	540′	45′	90′	195′
50		500′	550′	600′	50′	100′	240′
55		550′	605′	660′	55′	110′	295′
60		600′	660′	720′	60′	120′	350′
65		650′	715′	780′	65′	130′	410′
70		700′	770′	840′	70′	140′	475′
75		750′	825′	900′	75′	150′	540′
80		800′	880′	960′	80′	160′	615′
85		850′	935′	1020′	85′	170′	695′

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

TYPICAL USAGE

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

GENERAL NOTES

1. Place channelizing devices at 20′ spacings. Tighter spacing allowed as necessary to address field conditions or observed driver behavior.
2. See the Standard Highway Sign Design for Texas (SHSD) for sign details.
3. The PCMS may be omitted if replaced with a RAMP CLOSED AHEAD (CW20RP-3D) sign or when a permanent Dynamic Message Sign (DMS) is available in an appropriate location to display a similar message as called for on the PCMS.
4. When it is determined that a through lane should be closed in addition to the exit ramp, refer to TCP(6-4) for traffic control details.
5. A Truck Mounted Attenuator (TMA), where shown, is REQUIRED and shall have a RAMP CLOSED (R11-2bT) sign mounted on the rear of the truck.

Texas Department of Transportation

Traffic Safety Division Standard

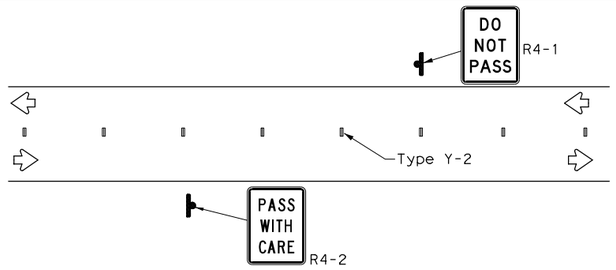
TRAFFIC CONTROL PLAN SEAL COAT OPERATIONS DIVIDED HIGHWAYS

TCP(SC-6)-22

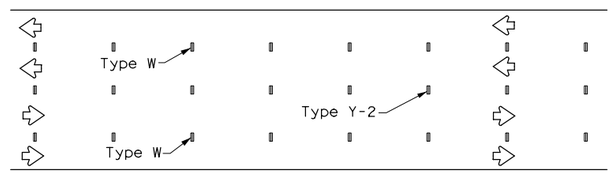
FILE: tcpsc-6-22.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 10-22	0715	01	025,ETC	FM108,ETC
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		58

DATE:
FILE:

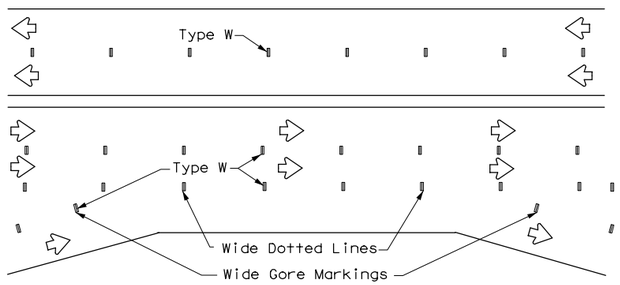
WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS (TABS)



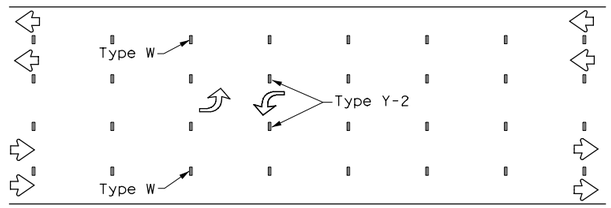
CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO LANE TWO-WAY HIGHWAYS



LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS

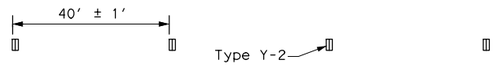
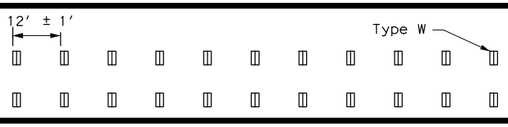


LANE LINES FOR DIVIDED HIGHWAY

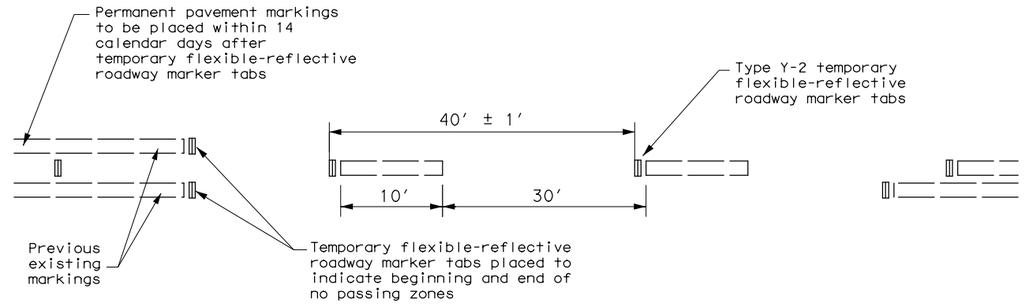


TWO-WAY LEFT TURN LANE

WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS (TABS)

SOLID LINES	DOUBLE NO-PASSING LINE	
	SINGLE NO-PASSING LINE or CHANNELIZATION LINE	
	8" WIDE SOLID LINE	
BROKEN LINES (FOR CENTER LINE OR LANE LINE)		
WIDE DOTTED LINES (FOR LANE DROP LINES)		
WIDE GORE MARKINGS		

TABS ON CENTERLINES OF TWO-LANE TWO-WAY ROADS



TEMPORARY FLEXIBLE-REFLECTIVE ROADWAY MARKER TABS

1. Temporary markings for surfacing projects shall be Temporary Flexible-Reflective Roadway Marker Tabs with protective cover unless otherwise approved by the Engineer. Tabs are to be installed to provide true alignment for striping crews or as directed by the Engineer. Tabs will be placed at the spacing indicated. Tabs should be applied to the pavement no more than two days before the surfacing is applied. After the surfacing is rolled and swept, the protective cover over the reflective strip shall be removed.
2. Temporary Flexible-Reflective Roadway Marker Tabs detailed on this sheet will be designated Type Y-2 (two amber reflective surfaces with a yellow body); Type Y (one amber reflective surface with yellow body); and Type W (one white or silver reflective surface with white body). Additional details may be found on BC(11).
3. Temporary Flexible-Reflective Roadway Marker Tabs will require normal maintenance replacement when used on roadways with an Average Daily Traffic (ADT) per lane of up to 7500 vehicles with no more than 10% truck mix. When roadway volumes exceed these values, additional maintenance replacement of these devices should be planned for.
4. When dry, tabs shall be visible for a minimum distance of 200 feet during normal daylight hours and when illuminated by automobile low- beam head light at night, unless sight distance is restricted by roadway geometrics.
5. No two consecutive tabs nor four tabs per 1000 feet of line shall be missing or fail to meet the visual performance requirements of Note 4.
6. Tabs shall meet requirements of Departmental Material Specification DMS-8242.
7. Tabs shall NOT be used to simulate edge lines.

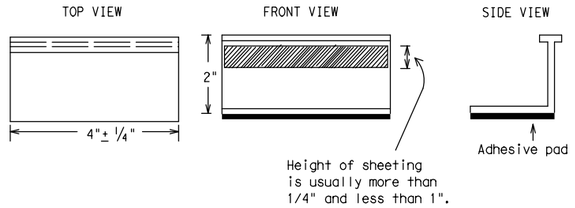
NOTES:

1. The Contractor will be responsible for maintaining short term pavement markings until permanent pavement markings are in place. When the Contractor is responsible for placement of permanent pavement markings, no segment of roadway shall remain without permanent pavement markings for a period greater than 14 calendar days unless weather conditions prohibit placement. Permanent pavement markings shall be placed as soon as weather permits.
2. For exit gores where a lane is being dropped, place wide gore markings or retroreflective channelizing devices to guide motorist through the exit. If channelizing devices are to be used it should be noted elsewhere in the plans. One piece cones are NOT acceptable.
3. Dimensions indicated on this sheet are typical and approximate. Variations in size and height may occur between markers or devices made by manufacturers, by as much as 1/4 inch, unless otherwise noted.

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

1. DMSs referenced above may be found along with embedded links to their respective MPLs at the following website: http://www.txdot.gov

TEMPORARY FLEXIBLE-REFLECTIVE ROADWAY MARKER TABS



Texas Department of Transportation

Traffic Safety Division Standard

TEMPORARY PAVEMENT MARKINGS FOR SEAL COAT OPERATIONS

TCP(SC-7)-22

FILE:	tcpsc-7-22.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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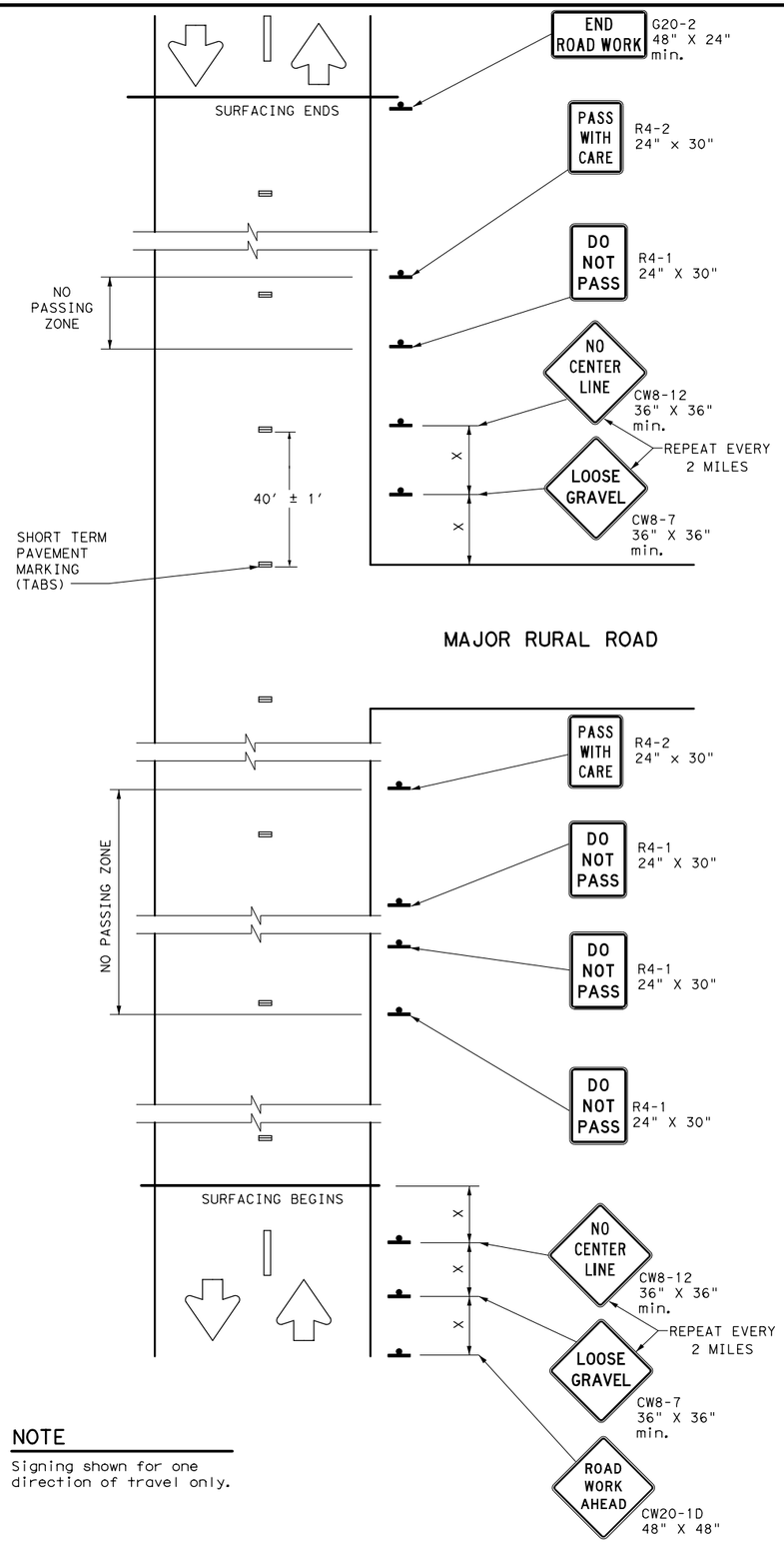
DATE:
FILE:



NOTE

Signing shown for one direction of travel only.

NO PASSING ZONES ON TWO-LANE TWO-WAY ROADS

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

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

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

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

D. DO NOT PASS and PASS WITH CARE signs are to remain in place until permanent pavement markings are installed.

NO CENTER LINE (CW8-12) SIGN

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

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

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

LOOSE GRAVEL (CW8-7) SIGN

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

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

COORDINATION OF SIGN LOCATIONS

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

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

LOOSE GRAVEL and NO CENTER LINE sign placements will then be repeated as described above.

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

* Conventional Roads Only

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

GENERAL NOTES

1. Surfacing operations that cover or obliterate existing pavement markings must first have the passing zones clearly marked with tabs as well as having any of the traffic control devices detailed on this sheet furnished and erected as directed by the Engineer.
2. The devices shown on this sheet are to be used to supplement those required by the BC Standards or others required elsewhere in the plans.
3. Signs shall be erected as detailed on the BC Standards or the Compliant Work Zone Traffic Control Devices List (CWZTCD) on supports approved for Short Duration / Short Term Stationary Work Zone Sign Supports.
4. When surfacing operations take place on divided highways, freeways or expressways, the size of diamond shaped construction warning signs shall be 48" x 48".
5. Signs on divided highways, freeways and expressways should be placed on both right and left sides of the roadway based on roadway conditions as directed by the Engineer.

Texas Department of Transportation

Traffic Safety Division Standard

TRAFFIC CONTROL DETAILS FOR SEAL COAT OPERATIONS

TCP(SC-8)-22

FILE: tcpsc-8-22.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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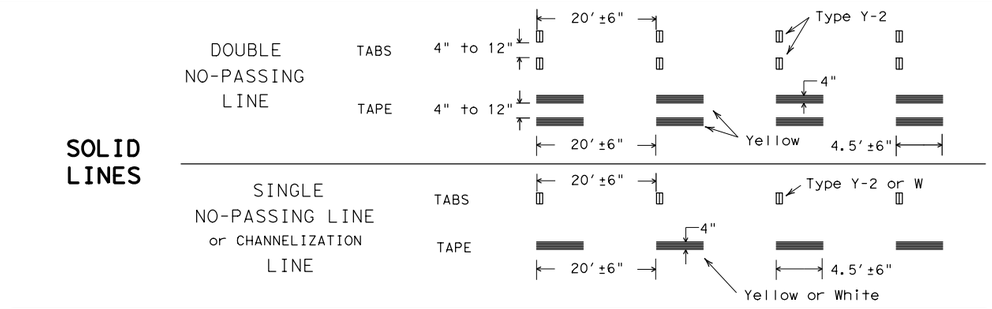
WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS



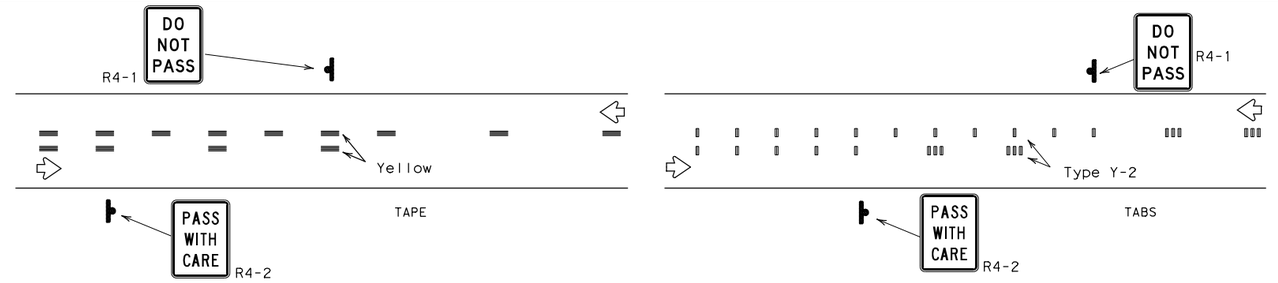
NOTES:

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

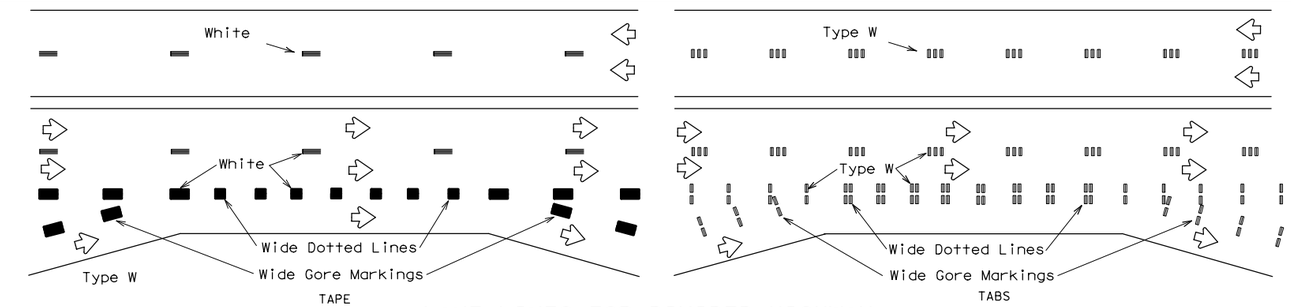
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS (TABS)

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

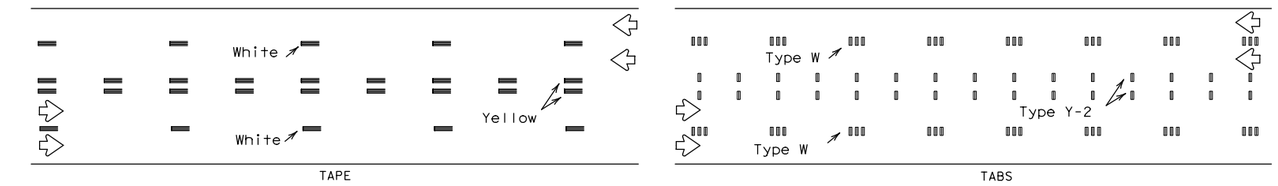
WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS



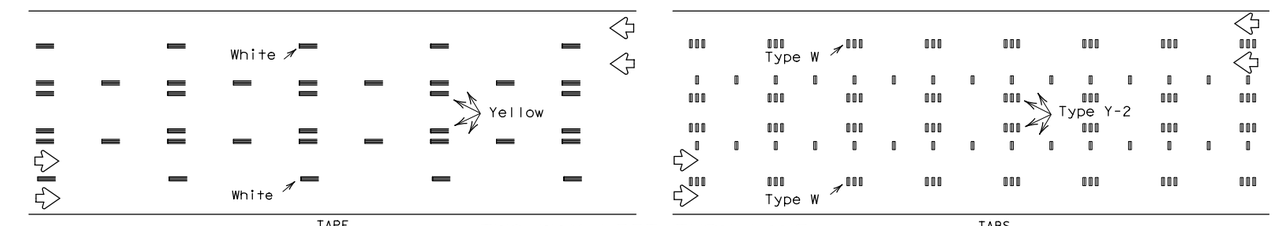
CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO LANE TWO-WAY HIGHWAYS



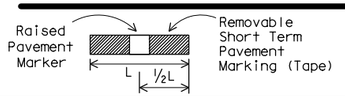
LANE LINES FOR DIVIDED HIGHWAY



LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



TWO-WAY LEFT TURN LANE



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

PREFABRICATED PAVEMENT MARKINGS

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

RAISED PAVEMENT MARKERS

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

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

1. DMSs referenced above can be found along with embedded links to their respective MPLs at the following website:
   http://www.txdot.gov/business/contractors_consultants/material_specifications/default.htm

Texas Department of Transportation

Traffic Operations Division Standard

WORK ZONE SHORT TERM PAVEMENT MARKINGS

WZ(STPM)-13

FILE:	wzstpm-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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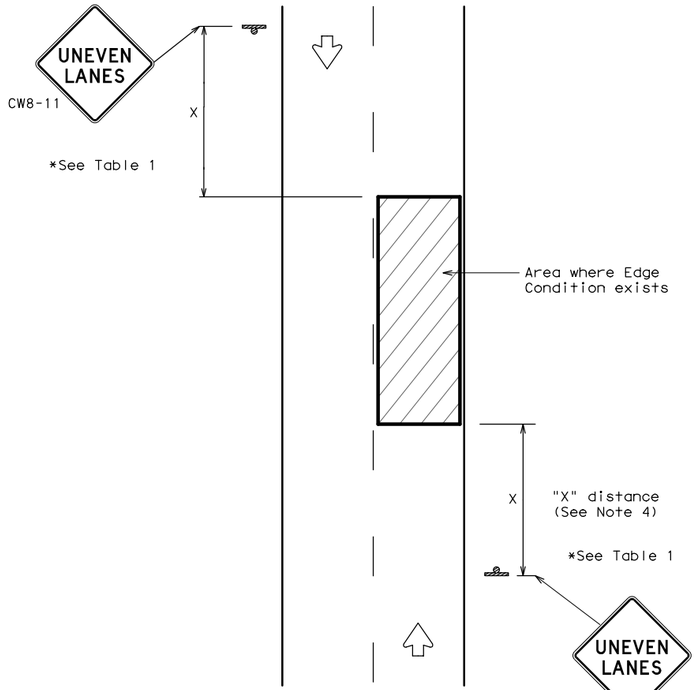
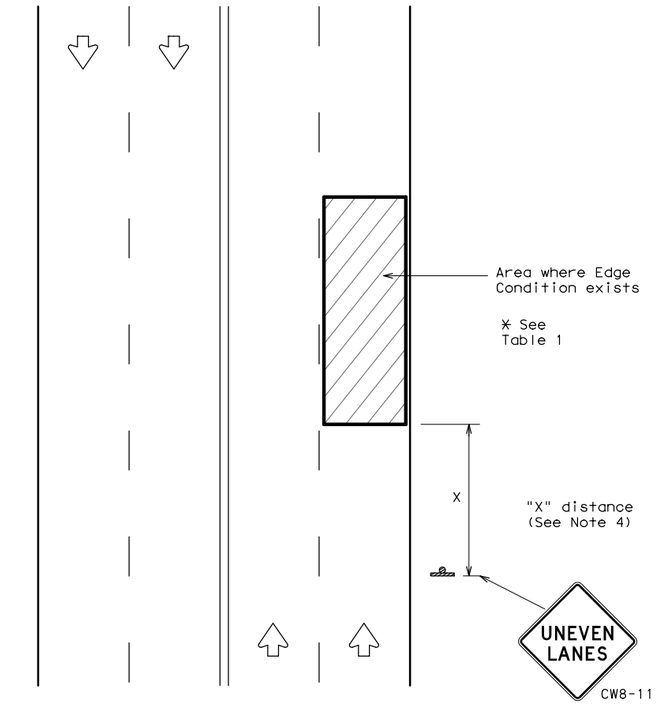
7-13					

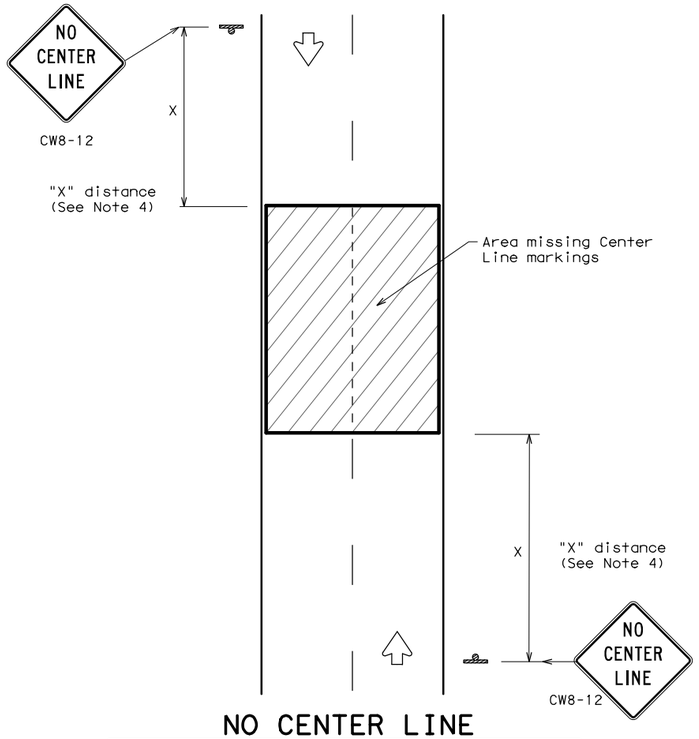
111



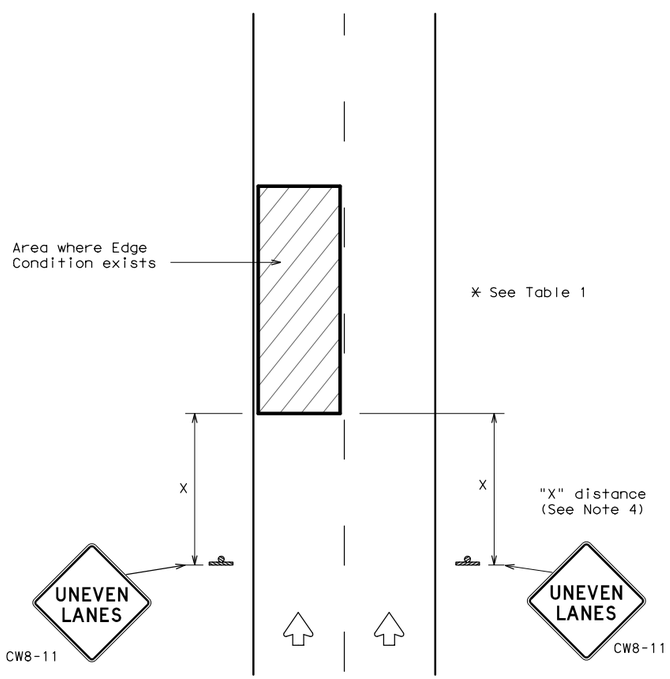
UNEVEN LANES
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
FOUR LANE CONVENTIONAL ROAD



NO CENTER LINE
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
DIVIDED ROADWAY

DATE:
FILE:

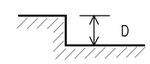
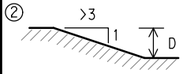
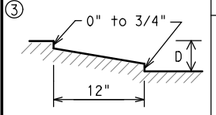
DEPARTMENTAL MATERIAL SPECIFICATIONS	
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240
TEMPORARY (REMOVABLE) PREFABRICATED PAVEMENT MARKINGS	DMS-8241
SIGN FACE MATERIALS	DMS-8300

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

GENERAL NOTES

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

TABLE 1

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

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

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

Texas Department of Transportation

Traffic Operations Division Standard

SIGNING FOR UNEVEN LANES

WZ(UL)-13

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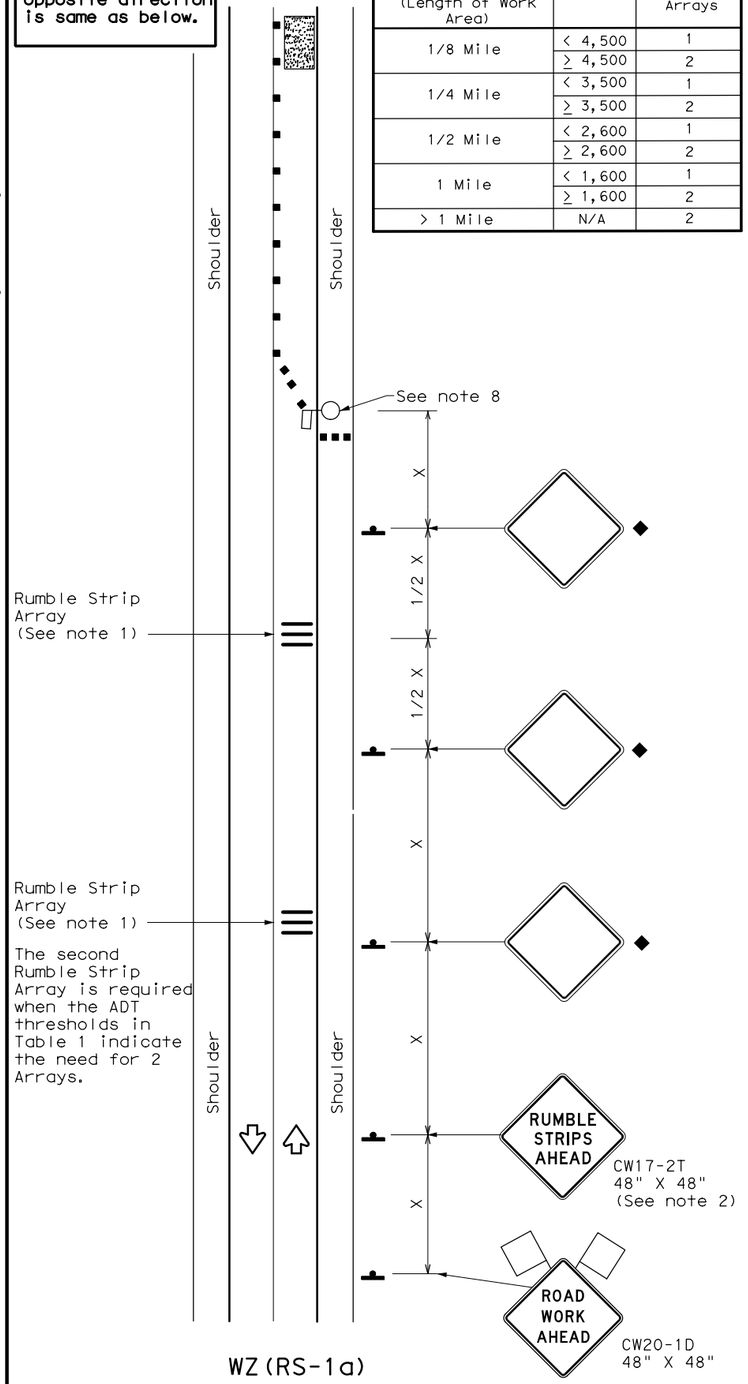
1-97 3-03	YKM	GONZALES		62

DATE:
FILE:

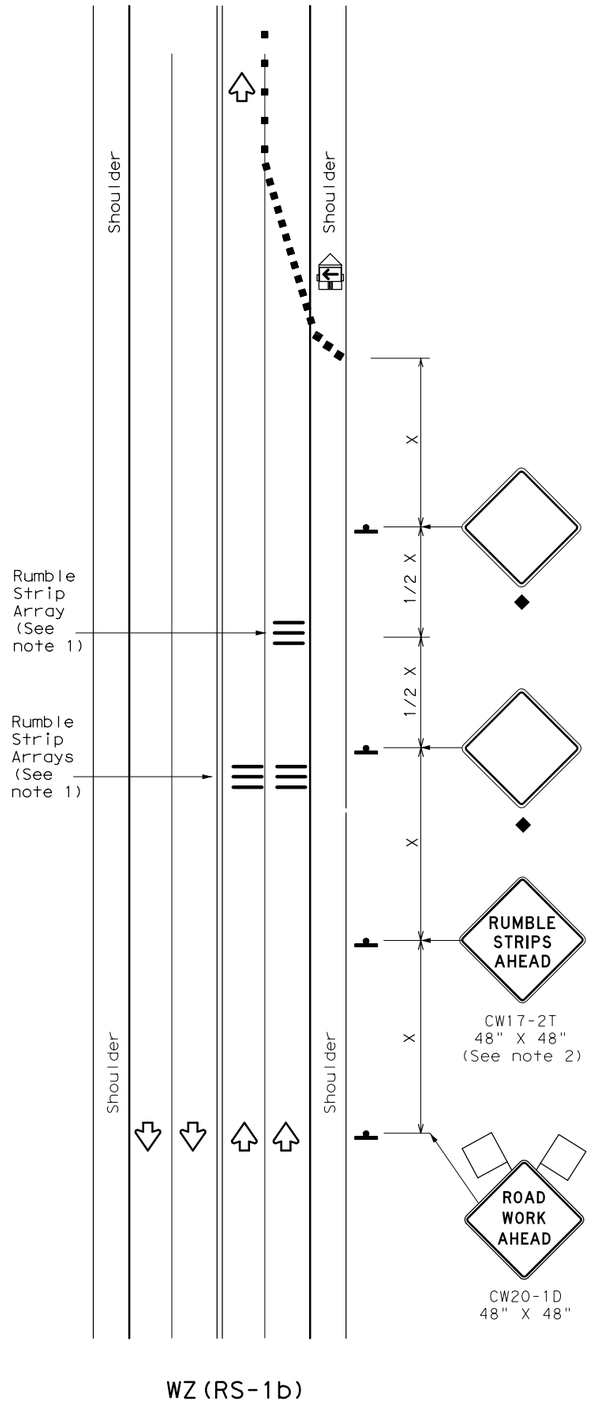
Warning sign and rumble strip sequence in opposite direction is same as below.

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



WZ(RS-1a)

RUMBLE STRIPS ON ONE-LANE TWO-WAY APPLICATION



WZ(RS-1b)

RUMBLE STRIPS FOR LANE CLOSURE ON CONVENTIONAL ROADWAY

GENERAL NOTES

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

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

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

* Conventional Roads Only

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

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

TEMPORARY RUMBLE STRIPS

WZ(RS)-22

FILE: wzrs22.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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	YKM	GONZALES		63

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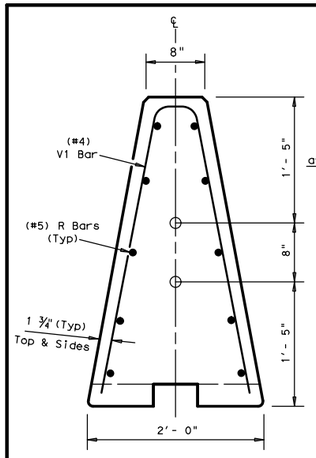
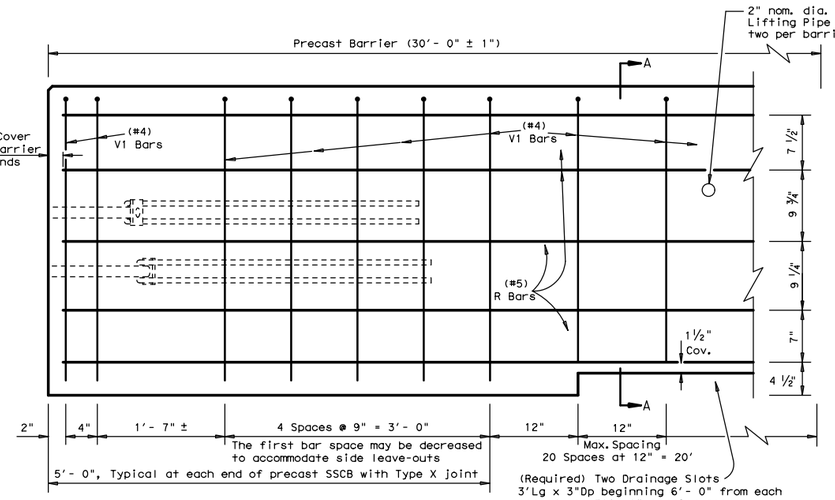


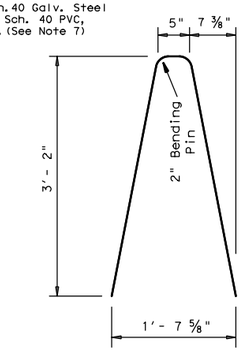
End View Precast Barrier

Pipe locations for Joint Type X connection



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

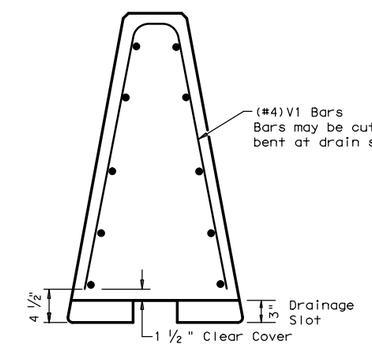
Showing reinforcement for Joint Connection (Type X)



V1 Bar

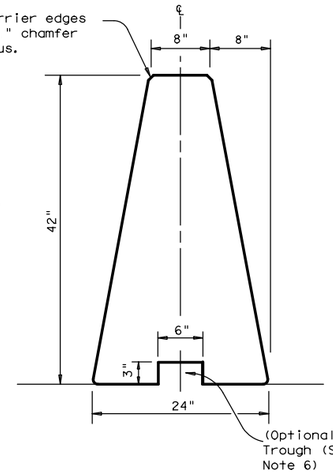
#4 Rebar

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



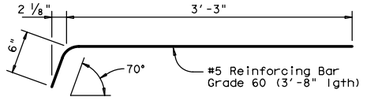
Section A-A

Steel Placement at (Required) Drainage Slots



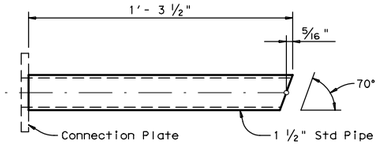
Single Slope Concrete Traffic Barrier

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



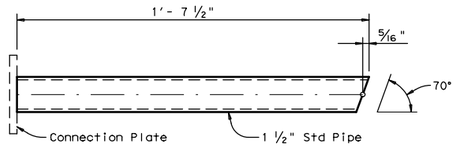
DEFORMED BAR ANCHOR DETAILS

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



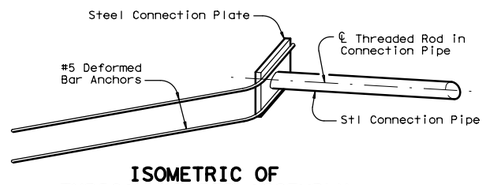
UPPER CONNECTION PIPE DETAILS

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



LOWER CONNECTION PIPE DETAILS

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

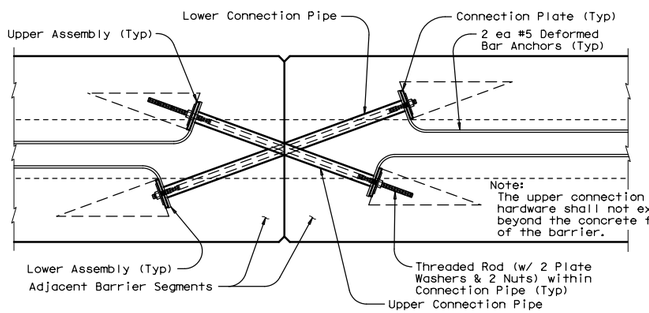


ISOMETRIC OF TYPICAL WELDED ASSEMBLY

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

General Notes

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



TYPE X JOINT INSTALLATION DETAIL

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

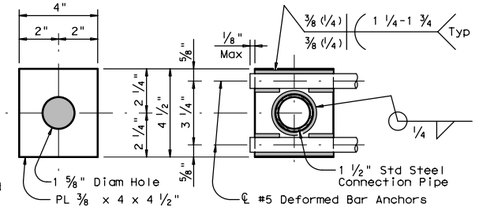
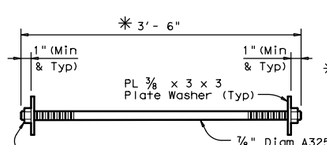


PLATE DIMENSIONS | WELDING DETAILS

CONNECTION PLATE DETAILS

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

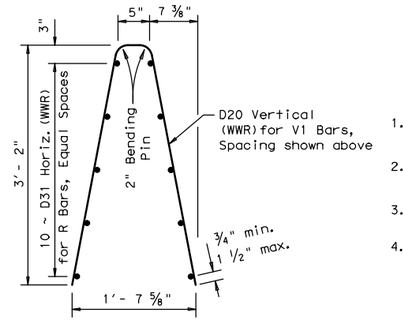


✳ The connection hardware shall not extend beyond the concrete face of the barrier. Hex head bolts may be provided. The proper length of all hardware should be verified.

CONNECTION BOLT OR THREADED ROD DETAIL

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

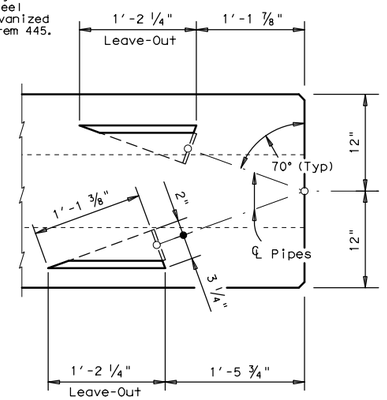
Weight of one precast 30 ft. (SSCB) segment = Approx. 10.5 Tons or 717 lbs per ft.



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

(WWR) General Notes

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



BARRIER PLAN AT JOINT

SHEET 1 OF 2

Texas Department of Transportation | Design Division Standard

SINGLE SLOPE CONCRETE BARRIER

PRECAST BARRIER (TYPE 1)

SSCB(2)-10

FILE: sscb210.dgn	DN: TxDOT	CK: AM	DW: BD	CK:
©TxDOT December 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS	0715	01	025,ETC	FM108,ETC
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		64

DATE:
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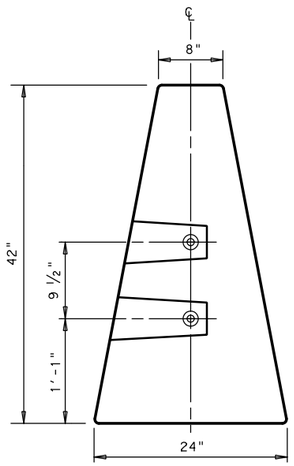
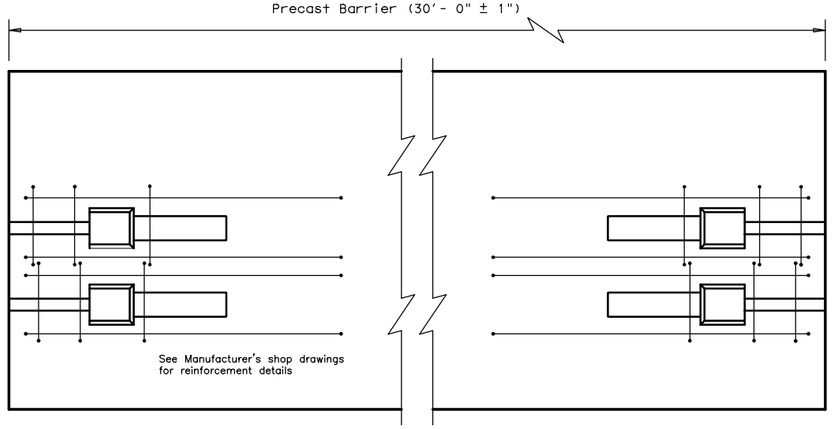
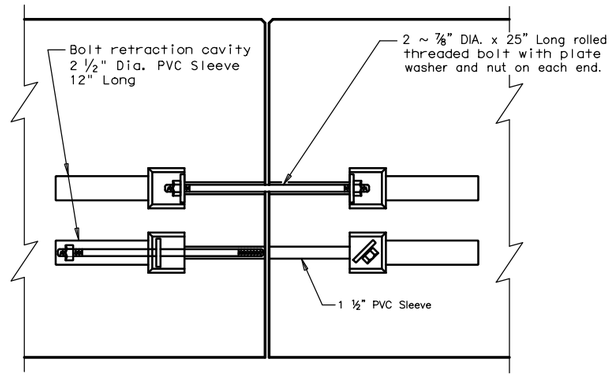


END VIEW
"QUICK-BOLT" POCKET LOCATIONS

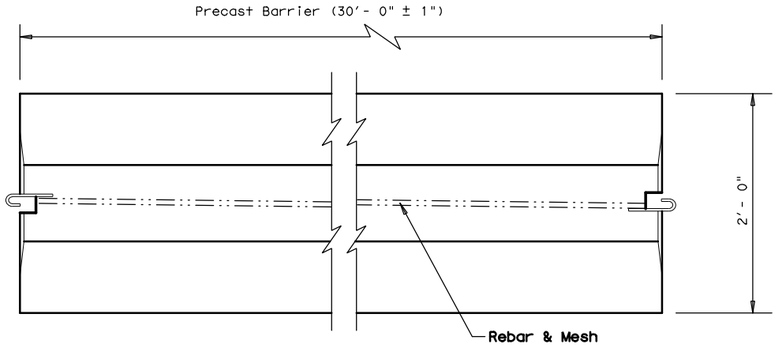


ELEVATION VIEW
"QUICK-BOLT" (SSCB)
See Manufacturer's shop drawing for additional details

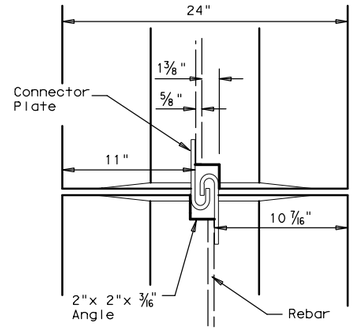


ELEVATION VIEW SHOWING JOINT CONNECTION
"QUICK-BOLT"

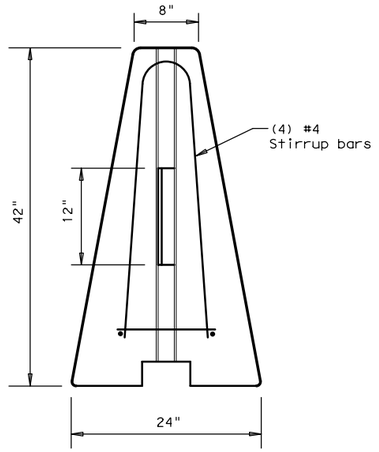
Joint Connection (Type Q)



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



VIEW FROM ABOVE
J-J HOOK CONNECTION



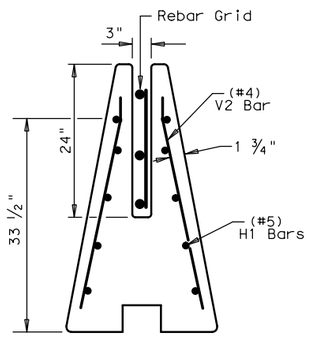
END VIEW

Proprietary Joint Connections (SSCB)

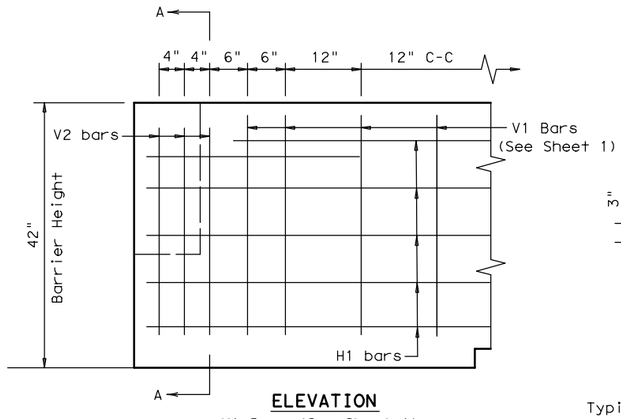
Two proprietary joint connections are acceptable as alternates to the (Type X) connection shown, here on. These joint connections types are:

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

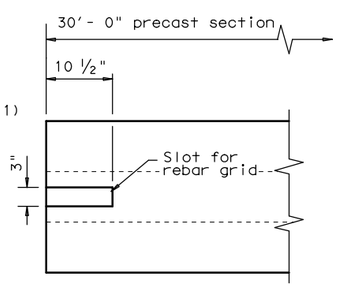
If one of these connection systems are exclusively specified in the plans, prior approval for sole source use must be obtained. Details of the connection components and barrier reinforcement for these systems, will be shown on the manufacturer's shop drawing(s) furnished to the Engineer.



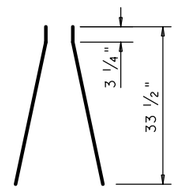
SECTION A-A
Showing (Type R) Rebar Grid



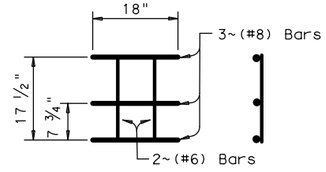
ELEVATION
V1 Bars (See Sheet 1)



TOP VIEW
JOINT CONNECTION
Typical at both ends of barrier segment



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



WELDED REBAR GRID

Joint Connection (Type R)

SHEET 2 OF 2

Texas Department of Transportation — Design Division Standard

SINGLE SLOPE CONCRETE BARRIER

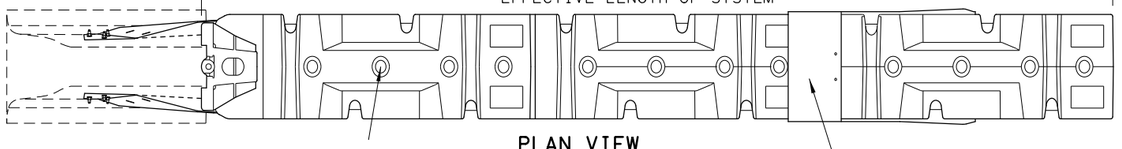
PRECAST BARRIER
(TYPE 1)

SSCB(2)-10

FILE: sscb210.dgn	DN: TxDOT	CK: AM	DW: VP	CK:
©TxDOT December 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS	0715	01	025,ETC	FM108,ETC
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		65

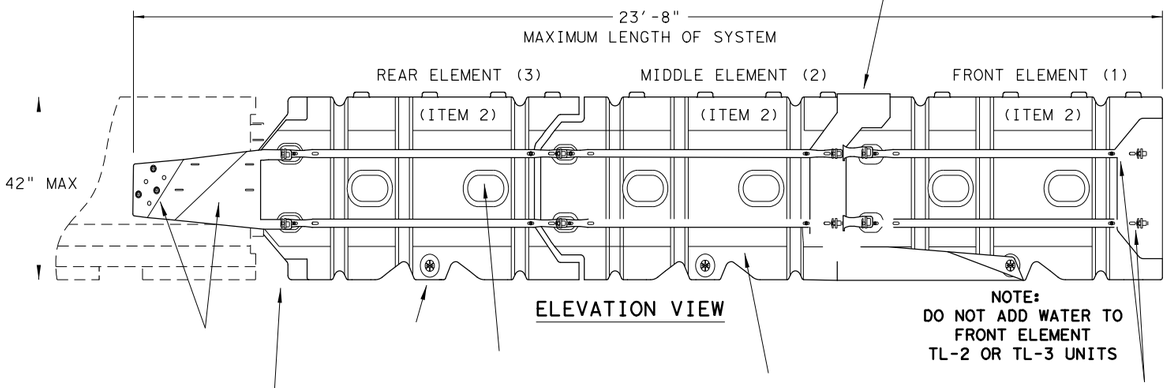
DATE:
FILE:

SYSTEM SHOWN - ABSORB-M TL-3



PLAN VIEW

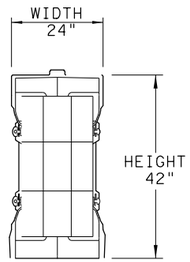
TRAFFIC FLOW



ELEVATION VIEW

NOTE:
DO NOT ADD WATER TO FRONT ELEMENT TL-2 OR TL-3 UNITS

TRAFFIC FLOW



SECTION A-A

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

GENERAL NOTES

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

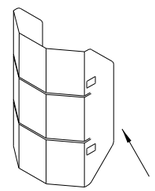
BILL OF MATERIALS (BOM) ABSORB-M TL-3 & TL-2 SYSTEMS			QTY	QTY
ITEM #	PART NUMBER	PART DESCRIPTION	TL-2 SYSTEM	TL-3 SYSTEM
1	BSI-1809036-00	TRANSITION-(GALV)	1	1
* 2	BSI-1808002-00	PRE-ASSEMBLED ABSORBING (ELEMENTS)	2	3
* 3	BSI-4004598	FILL CAPS	8	12
* 4	BSI-4004599	DRAIN PLUGS	2	3
* 5	BSI-1809053-00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

*COMPONENTS PRE-ASSEMBLED WITH ELEMENT ASSEMBLY

DELINEATION DECAL PLACEMENT GUIDE

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

**APPLY DECAL



NOSE PLATE

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

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

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

SACRIFICIAL

Texas Department of Transportation — Design Division Standard

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

FILE: absorbm19	DN: TxDOT	CK: KM	DW: VP	CK:
REVISIONS	CONT	SECT	JOB	HIGHWAY
	0715	01	025,ETC	FM108,ETC
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	YKM	GONZALES		66

DATE:
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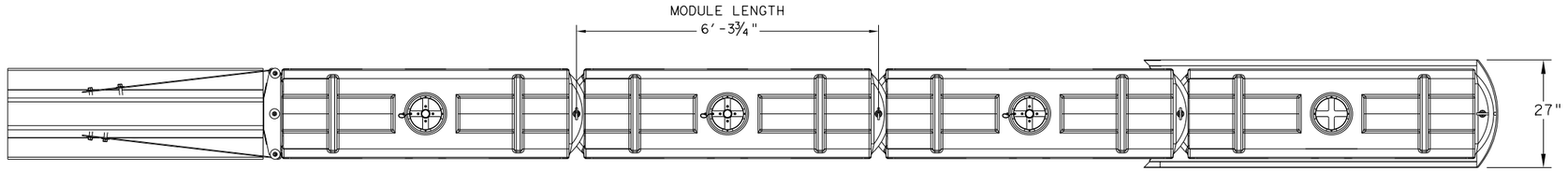
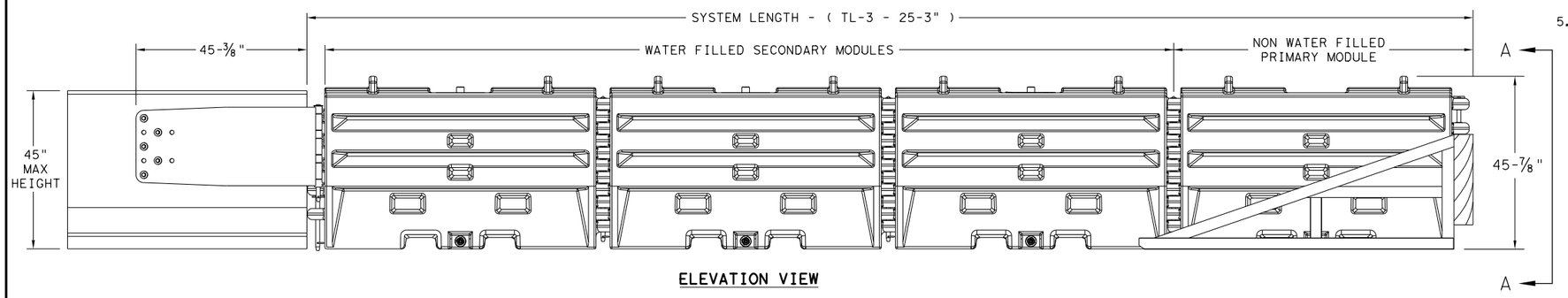


PLAN VIEW



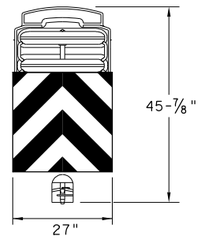
ELEVATION VIEW

GENERAL NOTES

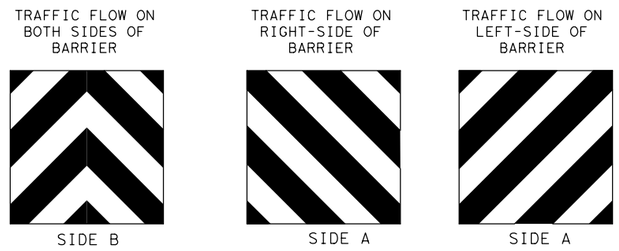
1. REFER TO THE INSTALLATION MANUAL FOR SPECIFIC SYSTEM ASSEMBLY AND MODULE ORIENTATION. FOR ADDITIONAL INFORMATION, CONTACT TRAFFIX, INC. AT (949) 361-5663.
2. THE SLED SYSTEM IS A MASH APPROVED TEST LEVEL 3 (TL-3) CRASH CUSHION APPROVED FOR USE IN TEMPORARY WORK ZONES. THE SLED SYSTEM IS A NON-REDIRECTIVE,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

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

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

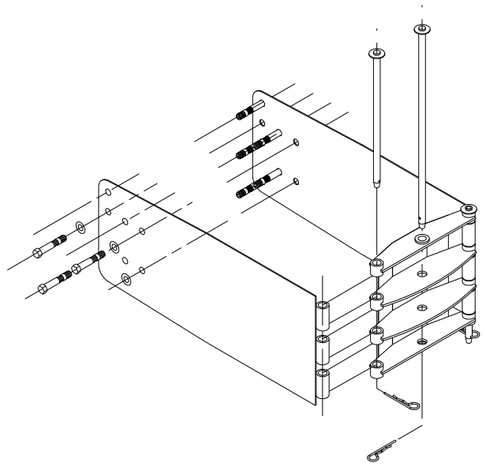


SECTION A-A



NOSE SHEETING PANEL DELINEATION

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



SLED TRANSITION COMPONENTS FOR ATTACHMENT TO CMB

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

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

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

SACRIFICIAL

BILL OF MATERIAL

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

Texas Department of Transportation

Design Division Standard

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

FILE: sled19.dgn	DN: TxDOT	CK: KM	DW: VP	CK:
©TxDOT: DECEMBER 2019	CONT	SECT	JOB	HIGHWAY
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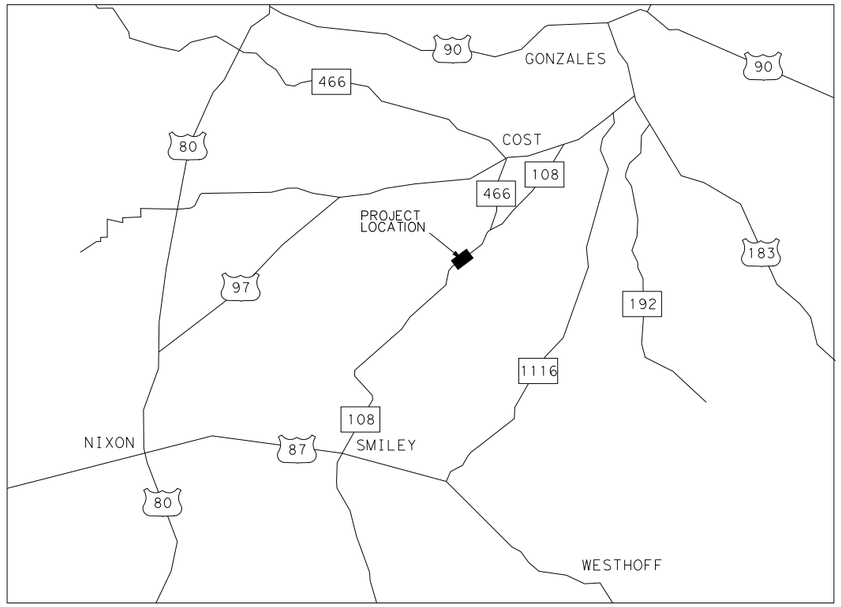
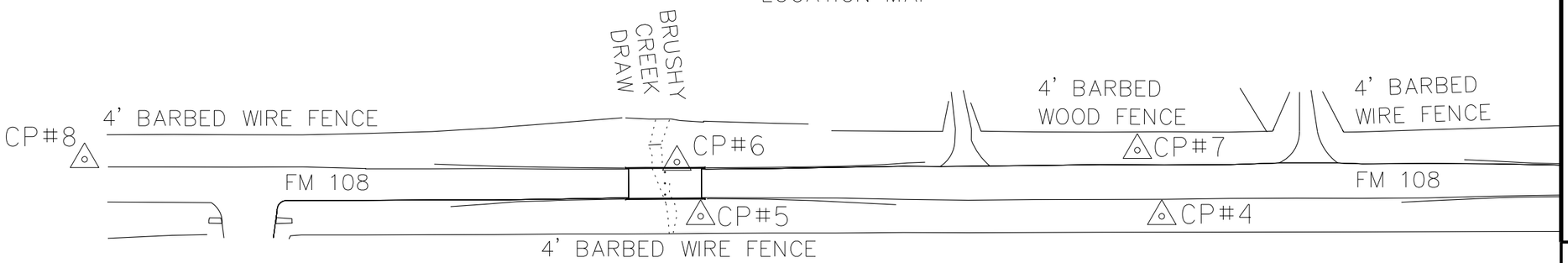
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		67

N

N.T.S.



LOCATION MAP



CONTROL POINT	SURFACE COORDINATES		NAVD 88 ELEVATION	GRID COORDINATES		DESCRIPTION
	NORTHING	EASTING		NORTHING	EASTING	
CP#1	13,690,610.300	2,428,847.775	278.81	13,688,830.750	2,428,532.066	5/8-IR W/ RED CAP STAMPED "CP&Y TRAV. POINT"
CP#2	13,690,322.340	2,428,498.845	274.84	13,688,542.830	2,428,183.181	5/8-IR W/ RED CAP STAMPED "CP&Y TRAV. POINT"
CP#3	13,690,352.240	2,428,477.138	277.75	13,688,572.730	2,428,161.477	5/8-IR W/ RED CAP STAMPED "CP&Y TRAV. POINT"
CP#4	13,690,019.640	2,428,155.455	280.37	13,688,240.170	2,427,839.836	5/8-IR W/ RED CAP STAMPED "CP&Y TRAV. POINT"
CP#5	13,689,784.890	2,427,879.088	278.39	13,688,005.450	2,427,563.505	5/8-IR W/ RED CAP STAMPED "CP&Y TRAV. POINT"
CP#6	13,689,805.340	2,427,837.264	276.66	13,688,025.900	2,427,521.686	5/8-IR W/ RED CAP STAMPED "CP&Y TRAV. POINT"
CP#7	13,690,046.790	2,428,107.181	280.94	13,688,267.320	2,427,791.568	5/8-IR W/ RED CAP STAMPED "CP&Y TRAV. POINT"
CP#8	13,689,505.360	2,427,480.950	283.86	13,687,725.960	2,427,165.418	5/8-IR W/ RED CAP STAMPED "CP&Y TRAV. POINT"

NOTES:
HORIZONTAL COORDINATES SHOWN ARE IN U.S. SURVEY FEET, AND ARE BASED UPON THE TEXAS COORDINATE SYSTEM OF NAD '83 (HARN '93) TEXAS SOUTH CENTRAL ZONE 4204, WITH A SURFACE ADJUSTMENT FACTOR OF 1.00013. VALUES WERE DERIVED UTILIZING THE TXDOT STATE VIRTUAL REFERENCE STATION NETWORK IN AUGUST, 2021.

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ELEVATIONS ARE BASED UPON NAVD '88 DATUM (GEOID 2012B) DERIVED FROM UTILIZING THE TXDOT STATE VIRTUAL REFERENCE STATION NETWORK IN AUGUST 2021.

LEGEND

- 5/8" IRON ROD W/ RED PLASTIC CAP SET "CP&Y TRAV. POINT"
- SIGN
- UTILITY POLE
- GUY WIRE
- TREE

STATE OF TEXAS
REGISTERED
BRIAN K. KIDD
6496
PROFESSIONAL
LAND SURVEYOR

1/4/2023

NO.	REVISION	BY	DATE

CP&Y

TEXAS REGISTERED SURVEYING FIRM 10194305
TEXAS REGISTERED ENGINEERING FIRM F-1741

 Texas Department of Transportation

FM 108 AT DRAW & BRUSHY CREEK

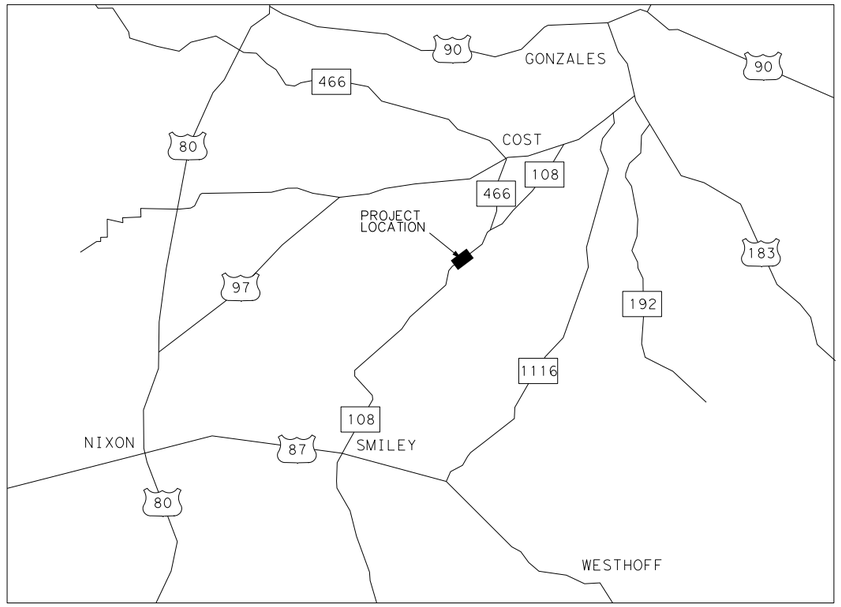
HORIZONTAL/VERTICAL CONTROL INDEX SHEET

CSJ: 0715-01-025 SHEET 1 OF 2

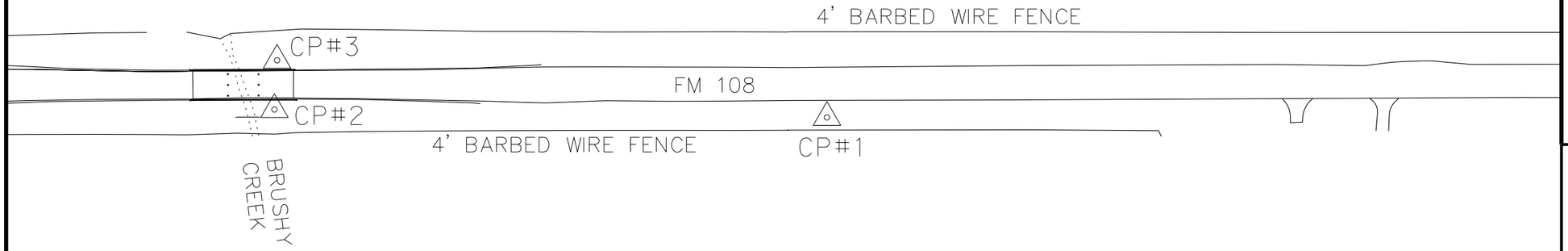
Designed:	--	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	--	6	TEXAS					FM 108,ETC
Drawn:	JF	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	BKK	YKM	GONZALES	0715	01	025,ETC		68

N

N.T.S.



LOCATION MAP



CONTROL POINT	SURFACE COORDINATES		NAVD 88 ELEVATION	GRID COORDINATES		DESCRIPTION
	NORTHING	EASTING		NORTHING	EASTING	
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CP#8	13,689,505.360	2,427,480.950	283.86	13,687,725.960	2,427,165.418	5/8-IR W/ RED CAP STAMPED "CP&Y TRAV. POINT"

NOTES:
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LEGEND

- 5/8" IRON ROD W/ RED PLASTIC CAP SET "CP&Y TRAV. POINT"
- SIGN
- UTILITY POLE
- GUY WIRE
- TREE

STATE OF TEXAS
REGISTERED
BRIAN K. KIDD
6496
PROFESSIONAL
LAND SURVEYOR

1/4/2023

NO.	REVISION	BY	DATE

CP&Y
TEXAS REGISTERED SURVEYING FIRM 10194305
TEXAS REGISTERED ENGINEERING FIRM F-1741

 Texas Department of Transportation

FM 108 AT DRAW & BRUSHY CREEK

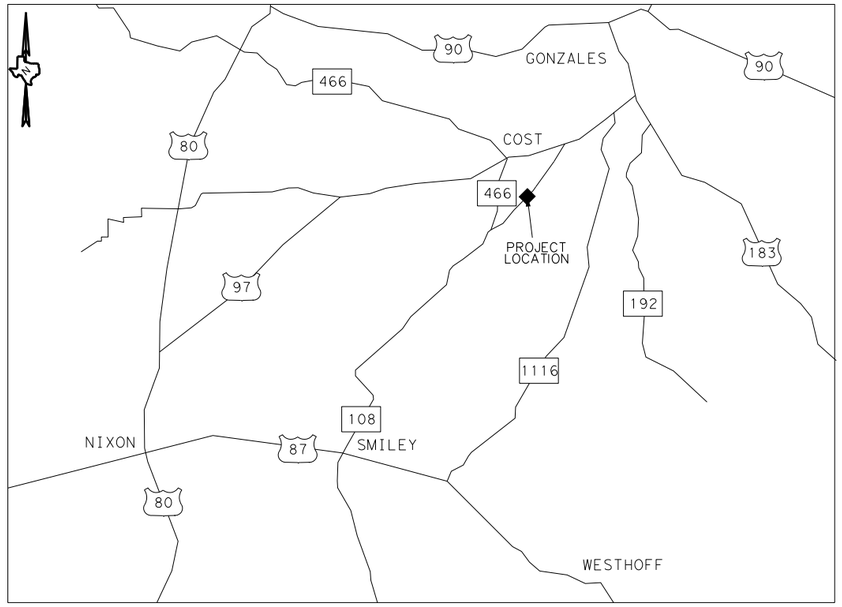
HORIZONTAL/VERTICAL CONTROL INDEX SHEET

CSJ: 0715-01-025 **SHEET 2 OF 2**

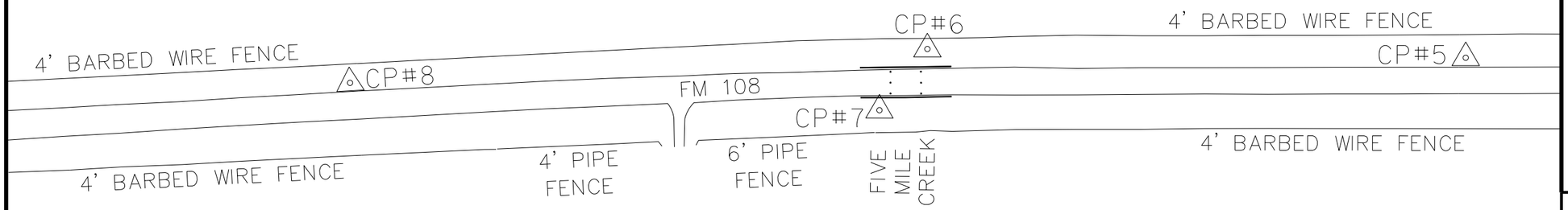
Designed:	--	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.	
Checked:	--	6	TEXAS				FM 108,ETC	
Drawn:	JF	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.	
Checked:	BKK	YKM	GONZALES	0715	01	025,ETC	69	

N

N.T.S.



LOCATION MAP



CONTROL POINT	SURFACE COORDINATES		NAVD 88 ELEVATION	GRID COORDINATES		DESCRIPTION
	NORTHING	EASTING		NORTHING	EASTING	
CP#1	13,703,856.407	2,441,877.145	297.78	13,702,075.138	2,441,559.742	5/8-IR W/ RED CAP STAMPED "CP&Y TRAV. POINT"
CP#2	13,703,567.515	2,441,562.189	293.87	13,701,786.283	2,441,244.827	5/8-IR W/ RED CAP STAMPED "CP&Y TRAV. POINT"
CP#3	13,703,525.028	2,441,585.630	292.61	13,701,743.801	2,441,268.265	5/8-IR W/ RED CAP STAMPED "CP&Y TRAV. POINT"
CP#4	13,703,244.739	2,441,252.415	296.84	13,701,463.549	2,440,935.093	5/8-IR W/ RED CAP STAMPED "CP&Y TRAV. POINT"
CP#5	13,703,143.457	2,441,157.884	296.66	13,701,362.280	2,440,840.574	5/8-IR W/ RED CAP STAMPED "CP&Y TRAV. POINT"
CP#6	13,702,831.197	2,440,846.709	292.51	13,701,050.060	2,440,529.440	5/8-IR W/ RED CAP STAMPED "CP&Y TRAV. POINT"
CP#7	13,702,768.119	2,440,855.598	292.47	13,700,986.991	2,440,538.328	5/8-IR W/ RED CAP STAMPED "CP&Y TRAV. POINT"
CP#8	13,702,471.731	2,440,538.543	296.21	13,700,690.641	2,440,221.314	5/8-IR W/ RED CAP STAMPED "CP&Y TRAV. POINT"

NOTES:
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LEGEND

- 5/8" IRON ROD W/ RED PLASTIC CAP SET "CP&Y TRAV. POINT"
- SIGN
- UTILITY POLE
- GUY WIRE
- TREE

STATE OF TEXAS
REGISTERED
BRIAN K. KIDD
6496
PROFESSIONAL
LAND SURVEYOR

1/4/2023

NO.	REVISION	BY	DATE

CP&Y
TEXAS REGISTERED SURVEYING FIRM 10194305
TEXAS REGISTERED ENGINEERING FIRM F-1741

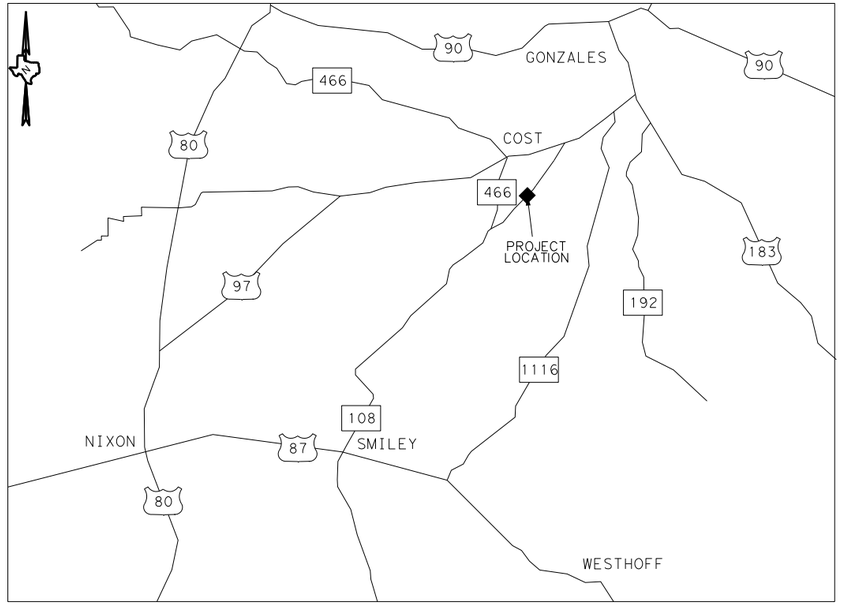
 Texas Department of Transportation

FM 108 AT FIVE MILE CREEK & DRAW

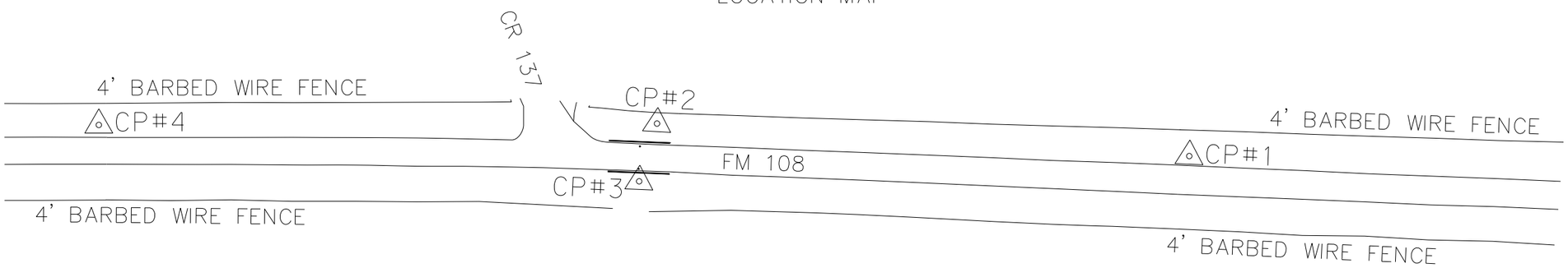
HORIZONTAL/VERTICAL CONTROL INDEX SHEET

CSJ: 0715-01-025 **SHEET 1 OF 2**

		FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Designed:	--	6	TEXAS				FM 108,ETC
Checked:	--	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Drawn:	JDS						
Checked:	BKK	YKM	GONZALES	0715	01	025,ETC	70



LOCATION MAP



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LEGEND

- 5/8" IRON ROD W/ RED PLASTIC CAP SET "CP&Y TRAV. POINT"
- SIGN
- UTILITY POLE
- GUY WIRE
- TREE

STATE OF TEXAS
REGISTERED
BRIAN K. KIDD
6496
PROFESSIONAL
LAND SURVEYOR

1/4/2023

NO.	REVISION	BY	DATE

CP&Y
TEXAS REGISTERED SURVEYING FIRM 10194305
TEXAS REGISTERED ENGINEERING FIRM F-1741

 Texas Department of Transportation

FM 108 AT FIVE MILE CREEK & DRAW

HORIZONTAL/VERTICAL CONTROL INDEX SHEET

CSJ: 0715-01-025 SHEET 2 OF 2

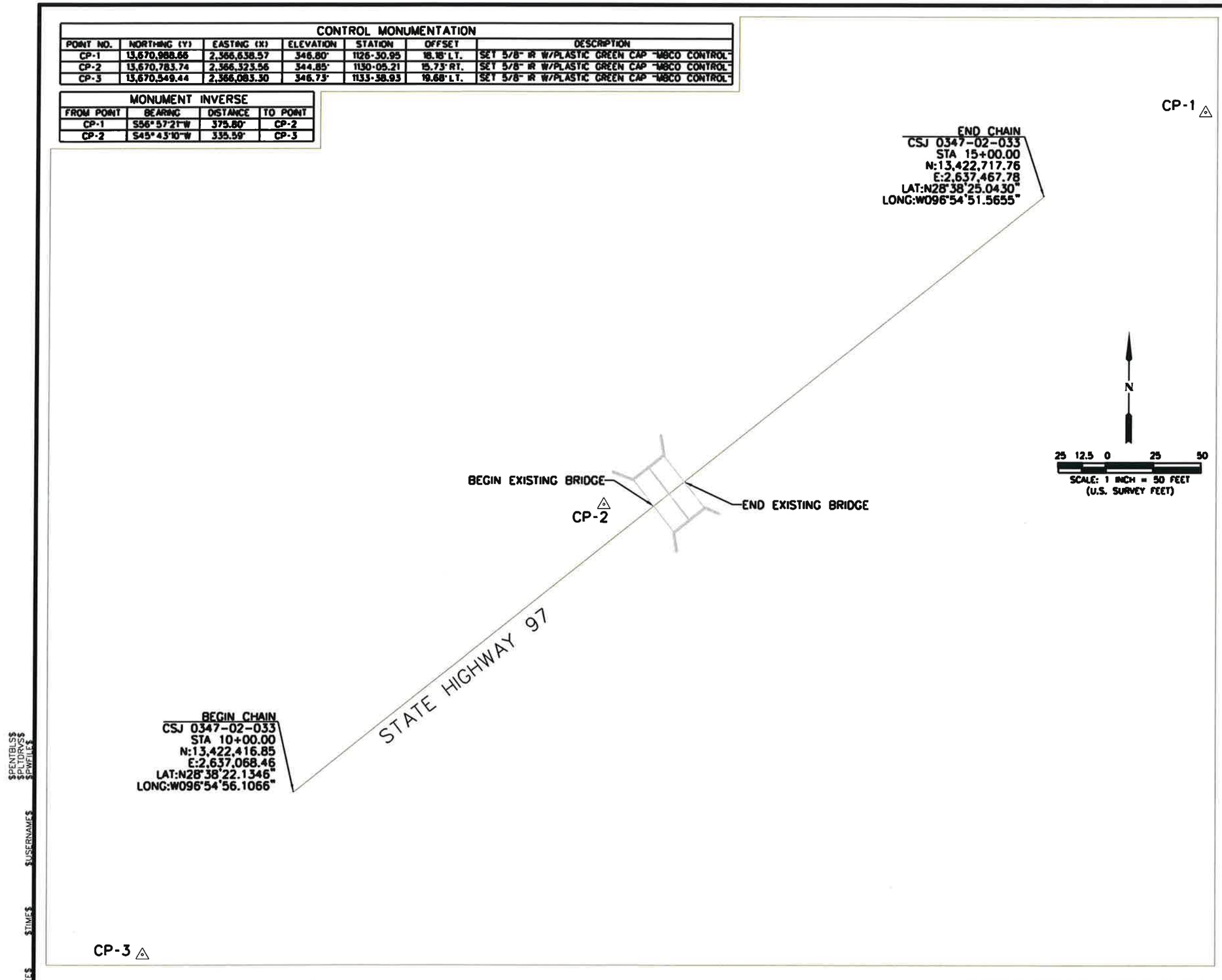
Designed:	--	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	--	6	TEXAS				FM 108,ETC
Drawn:	JDS	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	BKK	YKM	GONZALES	0715	01	025,ETC	71

CONTROL MONUMENTATION

POINT NO.	NORTHING (Y)	EASTING (X)	ELEVATION	STATION	OFFSET	DESCRIPTION
CP-1	13,670,988.66	2,366,638.57	346.80'	1126+30.95	18.18' LT.	SET 5/8" IR W/PLASTIC GREEN CAP "MBCO CONTROL"
CP-2	13,670,783.74	2,366,323.56	344.85'	1130+05.21	15.73' RT.	SET 5/8" IR W/PLASTIC GREEN CAP "MBCO CONTROL"
CP-3	13,670,549.44	2,366,083.30	346.73'	1133+38.93	19.68' LT.	SET 5/8" IR W/PLASTIC GREEN CAP "MBCO CONTROL"

MONUMENT INVERSE

FROM POINT	BEARING	DISTANCE	TO POINT
CP-1	S56°57'21"W	375.80'	CP-2
CP-2	S45°43'10"W	335.59'	CP-3



NOTES

1. ALL BEARINGS AND DISTANCES SHOWN HEREON ARE BASED ON THE TEXAS COORDINATE SYSTEM OF 1983, SOUTH CENTRAL ZONE NO. 4204, NAD83 (2011), EPOCH 2010.00, AND MEASURED IN US SURVEY FEET.
2. ALL COORDINATES REFERENCED HEREON ARE SURFACE VALUES AND MAY BE CONVERTED TO GRID VALUES BY DIVIDING BY A COMBINED SCALE FACTOR OF 1.00013.
3. ALL ELEVATIONS SHOWN HEREON ARE BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88), GEOID 12B.
4. THE HORIZONTAL AND VERTICAL POSITIONS OF MONUMENTS IN THE CONTROL NETWORK HAVE BEEN IDENTIFIED THROUGH STATIC GPS OBSERVATIONS AND 3-WIRE DIFFERENTIAL LEVELING.

LEGEND

PROPERTY LINE — APPARENT ROW
PROPOSED BASELINE — CONTROL POINT

This survey control information has been accepted and incorporated into this PS&E.

DATED:.....BY/DATE:.....

The control points shown herein were determined by a survey made on the ground under my supervision.

STATE OF TEXAS REGISTERED MARION R. CLARK 1881 PROFESSIONAL LAND SURVEYOR

DATED:.....BY/DATE:.....

SURVEY DATE: JUNE 2021

MBCO ENGINEERING & SURVEYING
1505 Highway 6 South
Suite 180
Houston, Texas 77077
TBPELS Reg. No. F16850
Phone: 281-760-1656
www.mbcoengineering.com

CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

Texas Department of Transportation

SH 97 AT RED BRANCH

CONTROL INDEX SHEET

CSJ 0347-02-033 SHEET 1 OF 1

		FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Designed:	SBS	6	TEXAS				FM 108,ETC
Checked:	JDH						
Drawn:	SBS	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	JDH	YKM	GONZALES	0715	01	025,ETC	72

MEASUREMENTS SHOWN IN U.S. SURVEY FEET

SURVEY CONTROL INDEX SHEET

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$USERNAME$
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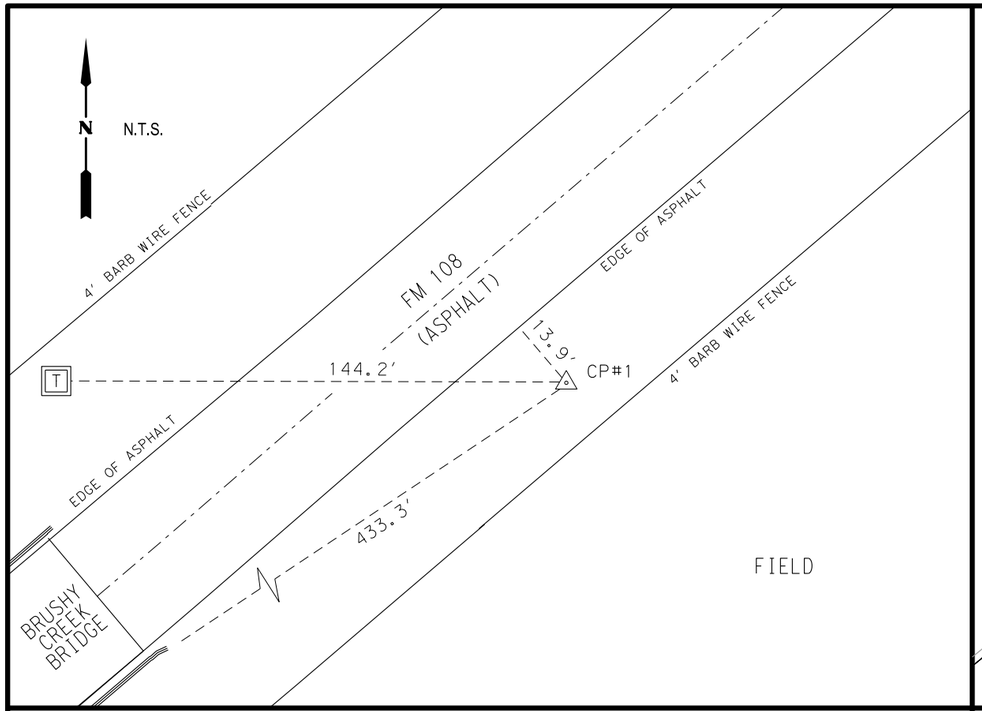
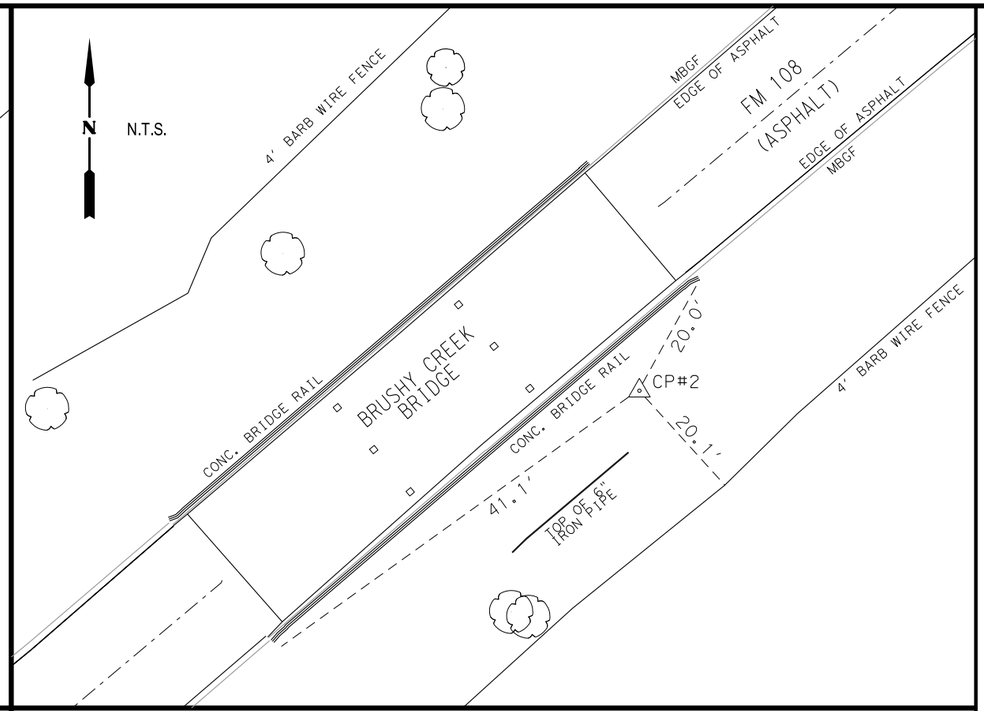


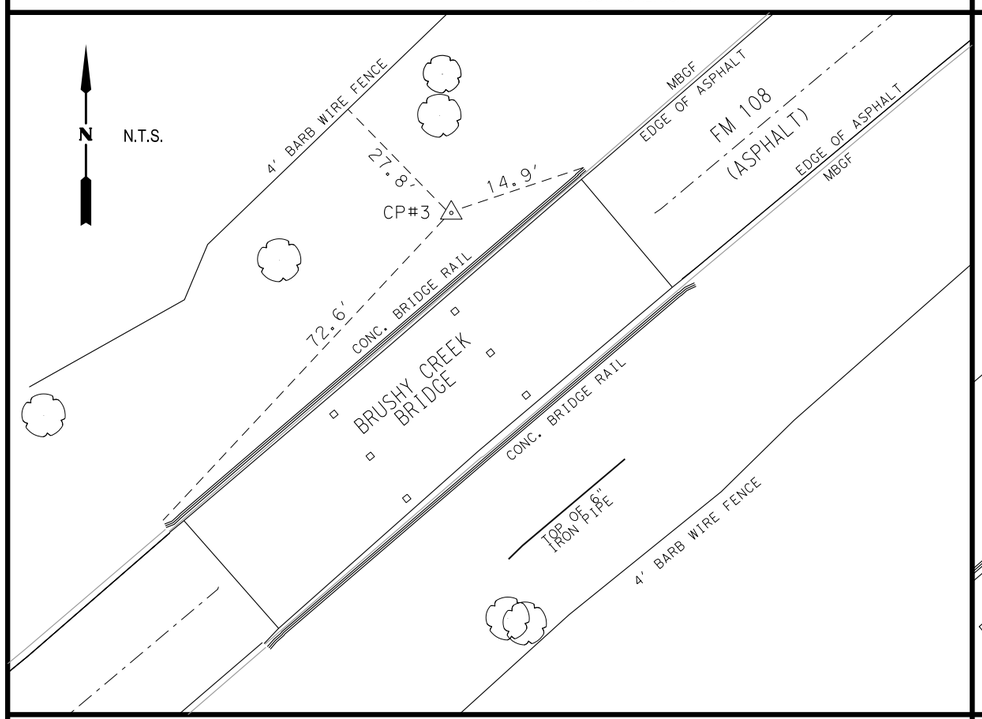
CP#1 IS A 5/8-INCH IRON ROD WITH RED PLASTIC CAP STAMPED "CP&Y TRAV. POINT" LOCATED IN GONZALES COUNTY, TX., ON THE SOUTHEAST SIDE OF FM 108, +/- 433.3' NORTHEAST OF THE EAST CORNER OF FM 108 BRIDGE AT BRUSHY CREEK, +/- 144.2 EAST OF A TELEPHONE PEDESTAL, AND +/- 13.9' SOUTHEAST OF THE SOUTHEAST EDGE OF ASPHALT OF FM 108.

US SURVEY FEET
DATA SET: AUGUST 2021
MONUMENT: 5/8"-IR W/ RED PLASTIC CAP STAMPED "CP&Y TRAV. POINT"
SURFACE ADJUSTMENT FACTOR 1.00013
ELEVATIONS ARE NAVD 88 BASED UPON GEOID 2012B
TXDOT VRS NETWORK



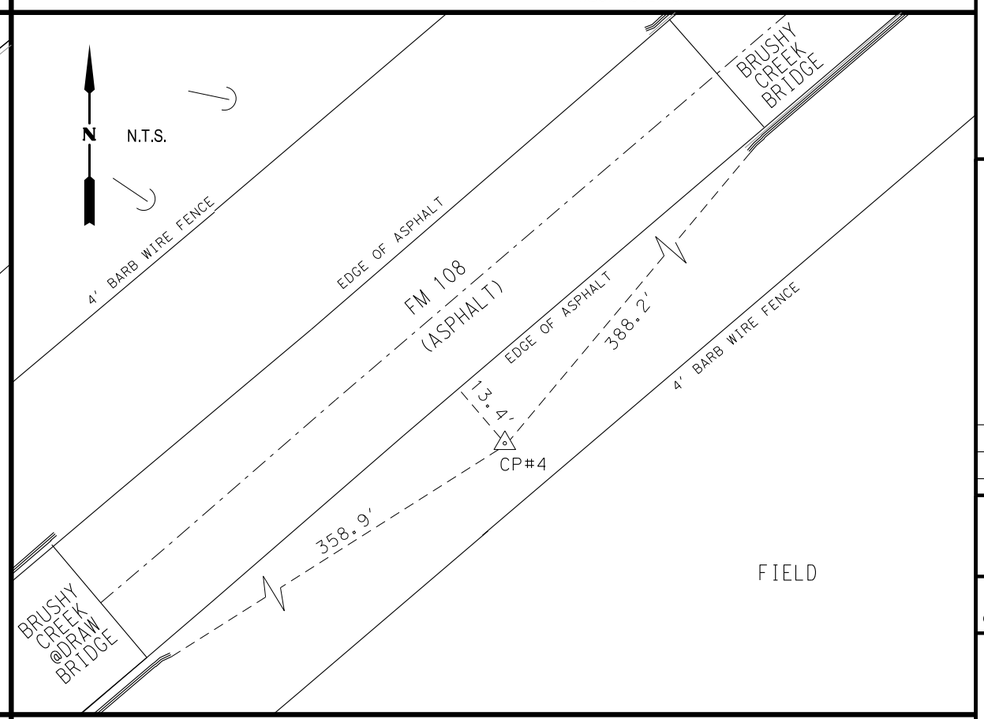
CP#2 IS A 5/8-INCH IRON ROD WITH RED PLASTIC CAP STAMPED "CP&Y TRAV. POINT" LOCATED IN GONZALES COUNTY, TX., ON THE SOUTHEAST SIDE OF FM 108, +/- 20.0' SOUTHWEST OF THE EAST CORNER OF FM 108 BRIDGE AT BRUSHY CREEK, +/- 70.1' NORTHEAST OF THE SOUTH CORNER OF FM 108 BRIDGE AT BRUSHY CREEK, AND +/- 20.1' NORTHWEST OF A 4' BARB WIRE FENCE.

US SURVEY FEET
DATA SET: AUGUST 2021
MONUMENT: 5/8"-IR W/ RED PLASTIC CAP STAMPED "CP&Y TRAV. POINT"
SURFACE ADJUSTMENT FACTOR 1.00013
ELEVATIONS ARE NAVD 88 BASED UPON GEOID 2012B
TXDOT VRS NETWORK



CP#3 IS A 5/8-INCH IRON ROD WITH RED PLASTIC CAP STAMPED "CP&Y TRAV. POINT" LOCATED IN GONZALES COUNTY, TX., ON THE NORTHWEST SIDE OF FM 108, +/- 14.9' SOUTHWEST OF THE NORTH CORNER OF FM 108 BRIDGE AT BRUSHY CREEK, +/- 72.6' NORTHEAST OF THE WEST CORNER OF FM 108 BRIDGE AT BRUSHY CREEK, AND +/- 27.8' SOUTHEAST OF A 4' BARB WIRE FENCE.

US SURVEY FEET
DATA SET: AUGUST 2021
MONUMENT: 5/8"-IR W/ RED PLASTIC CAP STAMPED "CP&Y TRAV. POINT"
SURFACE ADJUSTMENT FACTOR 1.00013
ELEVATIONS ARE NAVD 88 BASED UPON GEOID 2012B
TXDOT VRS NETWORK



CP#4 IS A 5/8-INCH IRON ROD WITH RED PLASTIC CAP STAMPED "CP&Y TRAV. POINT" LOCATED IN GONZALES COUNTY, TX., ON THE SOUTHEAST SIDE OF FM 108, +/- 388.2' SOUTHWEST OF THE SOUTH CORNER OF FM 108 BRIDGE AT BRUSHY CREEK, +/- 358.9' NORTHEAST OF THE EAST CORNER OF FM 108 BRIDGE AT BRUSHY CREEK AT DRAW, AND +/- 13.4' SOUTHEAST OF THE SOUTHEAST EDGE OF ASPHALT OF FM 108.

US SURVEY FEET
DATA SET: AUGUST 2021
MONUMENT: 5/8"-IR W/ RED PLASTIC CAP STAMPED "CP&Y TRAV. POINT"
SURFACE ADJUSTMENT FACTOR 1.00013
ELEVATIONS ARE NAVD 88 BASED UPON GEOID 2012B
TXDOT VRS NETWORK

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ELEVATIONS ARE BASED UPON NAVD '88 DATUM (GEOID 2012B) DERIVED FROM UTILIZING THE TXDOT STATE VIRTUAL REFERENCE STATION NETWORK IN AUGUST 2021.

LEGEND

- 5/8" IRON ROD W/ RED PLASTIC CAP SET "CP&Y TRAV. POINT"
- SIGN
- UTILITY POLE
- GUY WIRE
- TREE
- TELEPHONE PEDESTAL

STATE OF TEXAS
REGISTERED
BRIAN K. KIDD
6496
PROFESSIONAL
LAND SURVEYOR

1/4/2023

NO.	REVISION	BY	DATE

CP&Y
TEXAS REGISTERED SURVEYING FIRM 10194305
TEXAS REGISTERED ENGINEERING FIRM F-1741

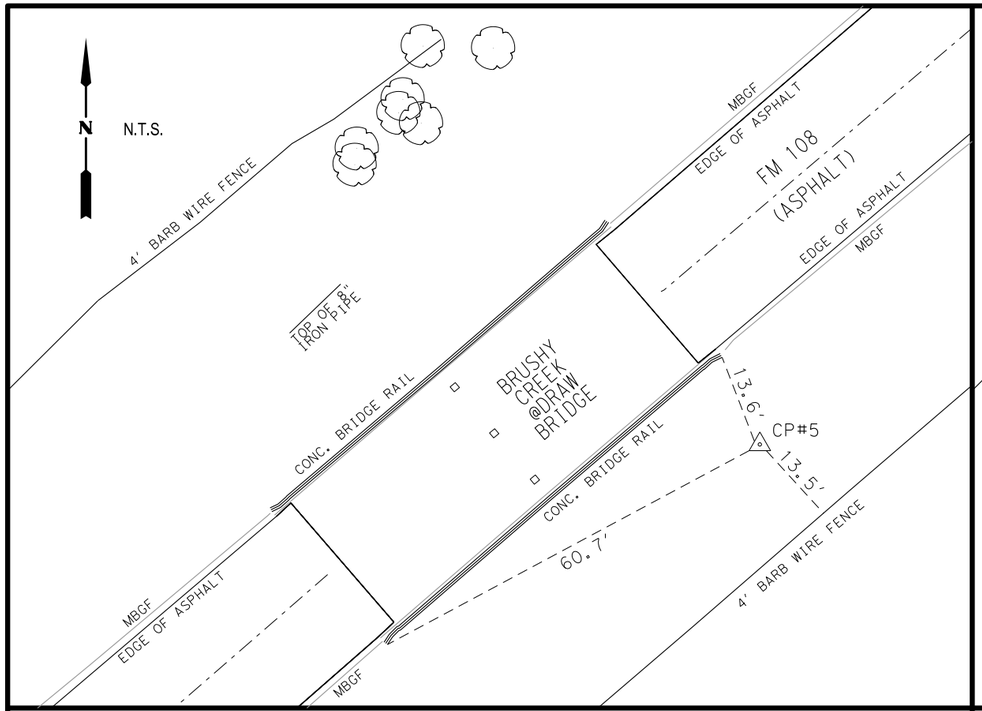
 Texas Department of Transportation

FM 108 AT DRAW & BRUSHY CREEK

HORIZONTAL/VERTICAL CONTROL

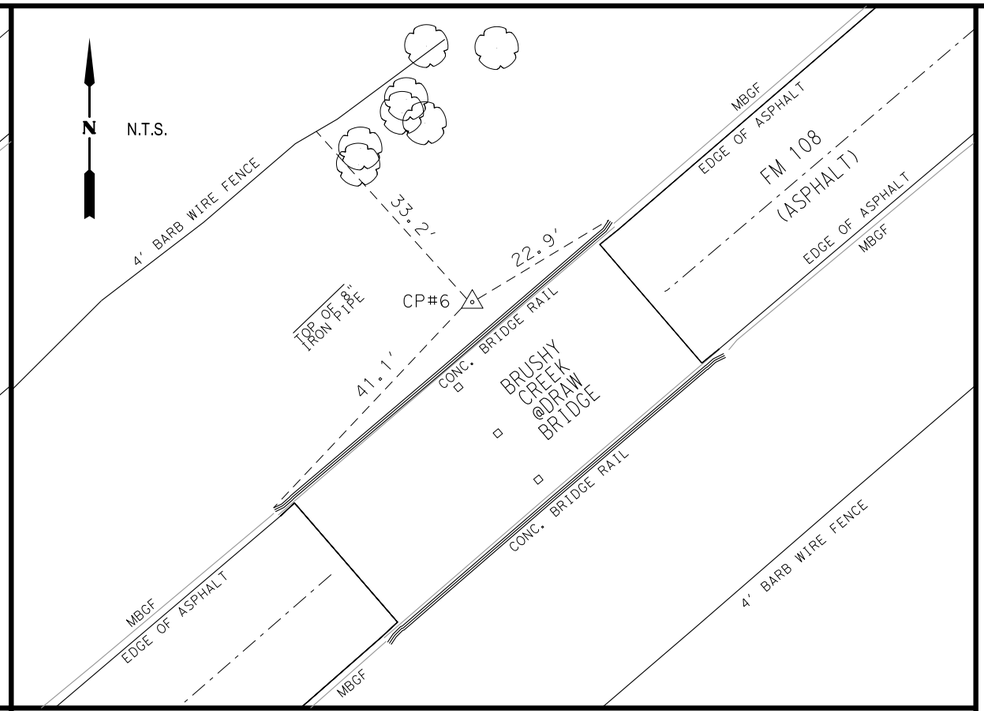
CSJ: 0715-01-025 SHEET 1 OF 2

Designed:	--	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	--	6	TEXAS				FM 108,ETC
Drawn:	JF	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	BKK	YKM	GONZALES	0715	01	025,ETC	73



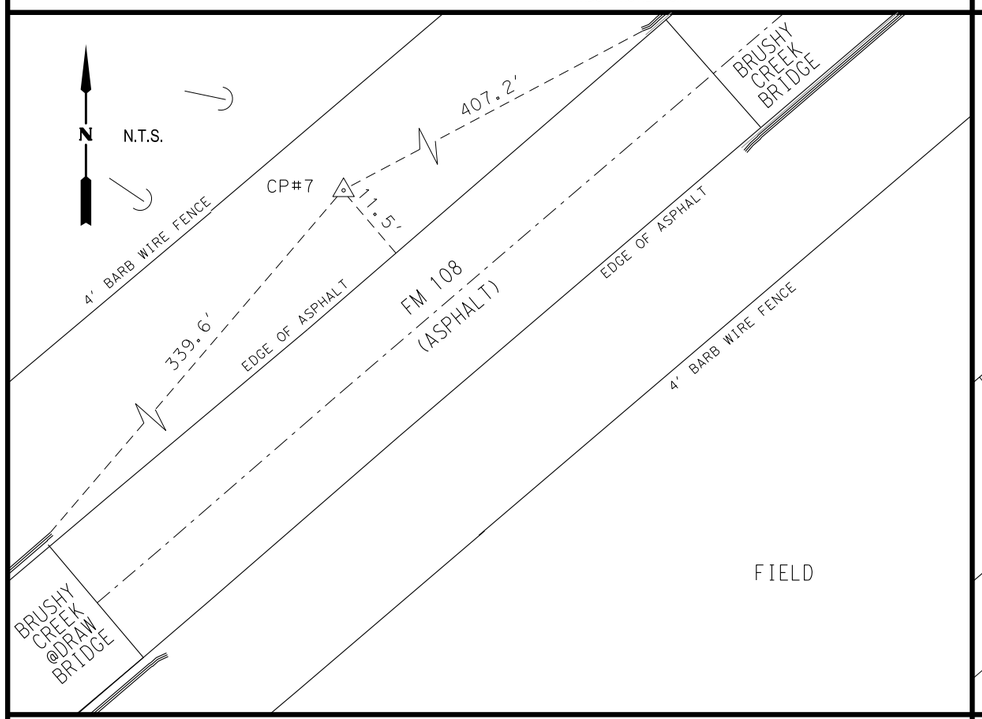
CP#7 IS A 5/8-INCH IRON ROD WITH RED PLASTIC CAP STAMPED "CP&Y TRAV. POINT" LOCATED IN GONZALES COUNTY, TX., ON THE SOUTHEAST SIDE OF FM 108, +/- 13.6' SOUTHWEST OF THE EAST CORNER OF FM 108 BRIDGE AT BRUSHY CREEK AT DRAW, +/- 60.7' NORTHEAST OF THE SOUTH CORNER OF FM 108 BRIDGE AT BRUSHY CREEK AT DRAW, AND +/- 13.5' NORTHWEST OF A 4' BARB WIRE FENCE.

US SURVEY FEET
DATA SET: AUGUST 2021
MONUMENT: 5/8"-IR W/ RED PLASTIC CAP STAMPED "CP&Y TRAV. POINT"
SURFACE ADJUSTMENT FACTOR 1.00013
ELEVATIONS ARE NAVD 88 BASED UPON GEOID 2012B
TXDOT VRS NETWORK



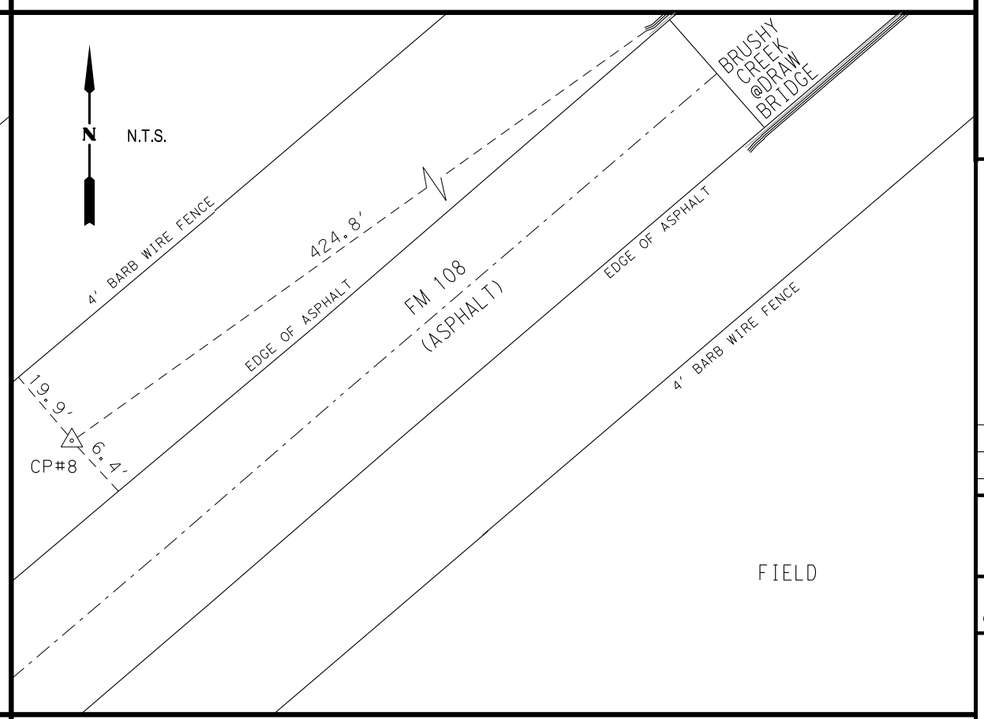
CP#6 IS A 5/8-INCH IRON ROD WITH RED PLASTIC CAP STAMPED "CP&Y TRAV. POINT" LOCATED IN GONZALES COUNTY, TX., ON THE NORTHWEST SIDE OF FM 108, +/- 22.9 SOUTHWEST OF THE NORTH CORNER OF FM 108 BRIDGE AT BRUSHY CREEK AT DRAW, +/- 41.1' NORTHEAST OF THE WEST CORNER OF FM 108 BRIDGE AT BRUSHY CREEK, AND +/- 33.2' SOUTHEAST OF A 4' BARB WIRE FENCE.

US SURVEY FEET
DATA SET: AUGUST 2021
MONUMENT: 5/8"-IR W/ RED PLASTIC CAP STAMPED "CP&Y TRAV. POINT"
SURFACE ADJUSTMENT FACTOR 1.00013
ELEVATIONS ARE NAVD 88 BASED UPON GEOID 2012B
TXDOT VRS NETWORK



CP#7 IS A 5/8-INCH IRON ROD WITH RED PLASTIC CAP STAMPED "CP&Y TRAV. POINT" LOCATED IN GONZALES COUNTY, TX., ON THE NORTHWEST SIDE OF FM 108, +/- 407.2' SOUTHWEST OF THE WEST CORNER OF FM 108 BRIDGE AT BRUSHY CREEK, +/- 339.6' NORTHEAST OF THE NORTH CORNER OF FM 108 BRIDGE AT BRUSHY CREEK AT DRAW, AND +/- 11.5' NORTHWEST OF THE NORTHWEST EDGE OF ASPHALT OF FM 108.

US SURVEY FEET
DATA SET: AUGUST 2021
MONUMENT: 5/8"-IR W/ RED PLASTIC CAP STAMPED "CP&Y TRAV. POINT"
SURFACE ADJUSTMENT FACTOR 1.00013
ELEVATIONS ARE NAVD 88 BASED UPON GEOID 2012B
TXDOT VRS NETWORK



CP#8 IS A 5/8-INCH IRON ROD WITH RED PLASTIC CAP STAMPED "CP&Y TRAV. POINT" LOCATED IN GONZALES COUNTY, TX., ON THE NORTHWEST SIDE OF FM 108, +/- 424.8 SOUTHWEST OF THE WEST CORNER OF FM 108 BRIDGE AT BRUSHY CREEK ATDRAW, +/- 19.9 SOUTHEAST OF A 4' BARB WIRE FENCE, AND +/- 6.4" NORTHWEST OF THE NORTHWEST EDGE OF ASPHALT OF FM 108.

US SURVEY FEET
DATA SET: AUGUST 2021
MONUMENT: 5/8"-IR W/ RED PLASTIC CAP STAMPED "CP&Y TRAV. POINT"
SURFACE ADJUSTMENT FACTOR 1.00013
ELEVATIONS ARE NAVD 88 BASED UPON GEOID 2012B
TXDOT VRS NETWORK

NOTES:
HORIZONTAL COORDINATES SHOWN ARE IN U.S. SURVEY FEET, AND ARE BASED UPON THE TEXAS COORDINATE SYSTEM OF NAD '83 (HARN '93) TEXAS SOUTH CENTRAL ZONE 4204, WITH A SURFACE ADJUSTMENT FACTOR OF 1.00013. VALUES WERE DERIVED UTILIZING THE TXDOT STATE VIRTUAL REFERENCE STATION NETWORK IN AUGUST, 2021.

GEOGRAPHIC COORDINATES SHOWN ARE BASED UPON THE TEXAS COORDINATE SYSTEM OF NAD '83 (HARN '93) TEXAS SOUTH CENTRAL ZONE 4204. VALUES WERE CONVERTED FROM GRID STATE PLANE COORDINATES.

ELEVATIONS ARE BASED UPON NAVD '88 DATUM (GEOID 2012B) DERIVED FROM UTILIZING THE TXDOT STATE VIRTUAL REFERENCE STATION NETWORK IN AUGUST 2021.

LEGEND

- 5/8" IRON ROD W/ RED PLASTIC CAP SET "CP&Y TRAV. POINT"
- SIGN
- UTILITY POLE
- GUY WIRE
- TREE
- TELEPHONE PEDESTAL

STATE OF TEXAS
REGISTERED
BRIAN K. KIDD
6496
PROFESSIONAL
LAND SURVEYOR

1/4/2023

NO.	REVISION	BY	DATE

CP&Y
TEXAS REGISTERED SURVEYING FIRM 10194305
TEXAS REGISTERED ENGINEERING FIRM F-1741

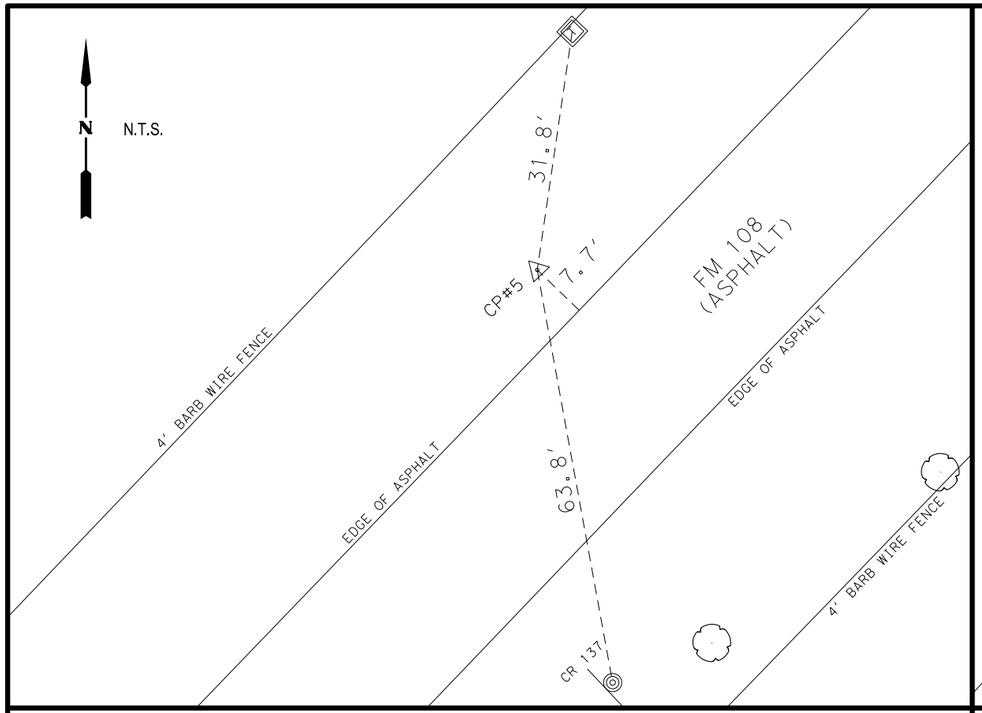
 Texas Department of Transportation

FM 108 AT DRAW & BRUSHY CREEK

HORIZONTAL/VERTICAL CONTROL

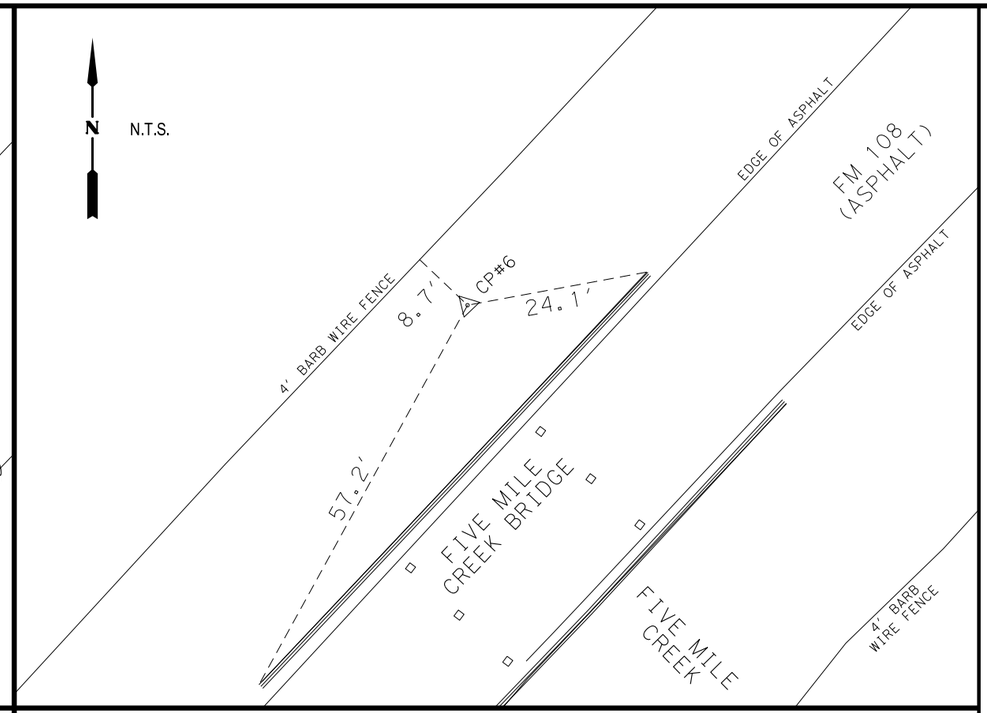
CSJ: 0715-01-025 SHEET 2 OF 2

Designed:	--	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	--	6	TEXAS				FM 108,ETC
Drawn:	JF	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	BKK	YKM	GONZALES	0715	01	025,ETC	74



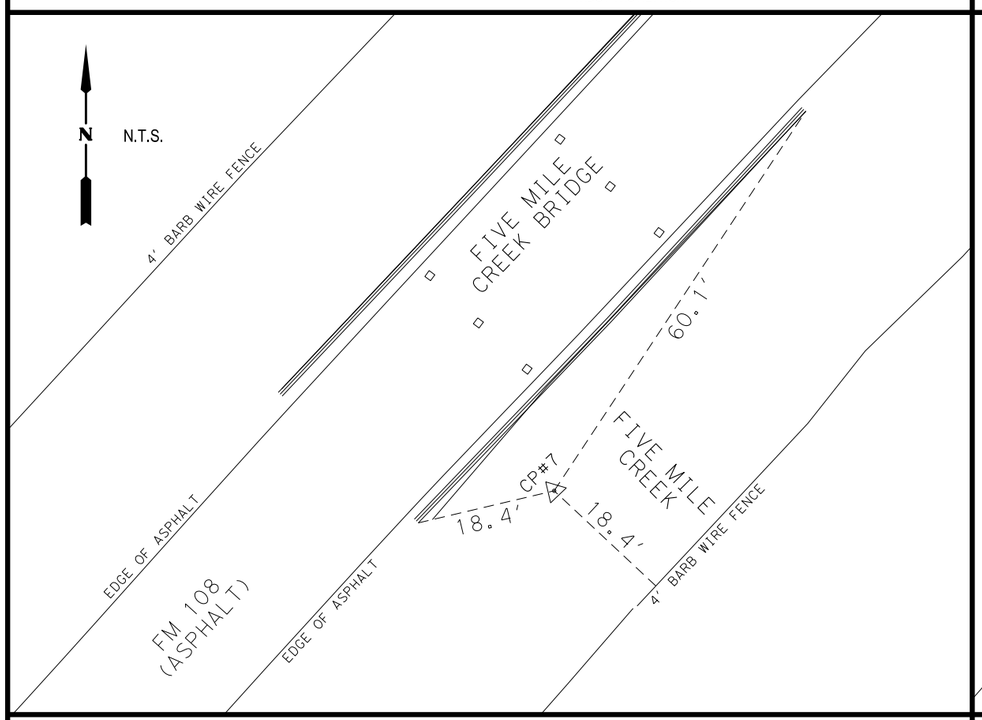
CP#5 IS A 5/8-INCH IRON ROD WITH RED PLASTIC CAP STAMPED "CP&Y TRAV. POINT" LOCATED IN GONZALES COUNTY, TX., ON THE NORTHWEST SIDE OF FM 108, +/- 510' SOUTHWEST OF THE INTERSECTION OF FM 108 AND CR 137, +/- 63.8' NORTH OF A CR 137 SIGN, +/- 31.8' SOUTHWEST OF A TELEPHONE PEDESTAL AND +/- 7.7' NORTHWEST OF THE NORTHWEST EDGE OF ASPHALT OF FM 108.

US SURVEY FEET
DATA SET: AUGUST 2021
MONUMENT: 5/8"-IR W/ RED PLASTIC CAP STAMPED "CP&Y TRAV. POINT"
SURFACE ADJUSTMENT FACTOR 1.00013
ELEVATIONS ARE NAVD 88 BASED UPON GEOID 2012B
TXDOT VRS NETWORK



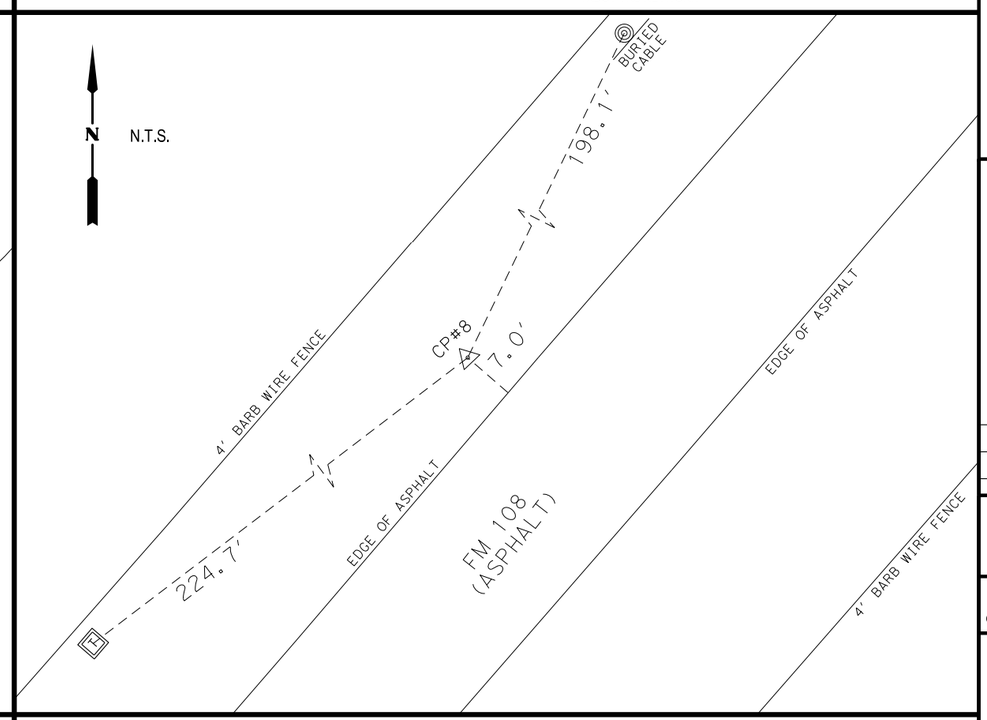
CP#6 IS A 5/8-INCH IRON ROD WITH RED PLASTIC CAP STAMPED "CP&Y TRAV. POINT" LOCATED IN GONZALES COUNTY, TX., ON THE NORTHWEST SIDE OF FM 108, +/- 950' SOUTHWEST OF THE INTERSECTION OF FM 108 AND CR 137, +/- 57.2' NORTHEAST OF THE WEST CORNER OF THE BRIDGE AT FM 108 AT FIVE MILE CREEK, +/- 24.1' WEST OF THE NORTH CORNER OF THE BRIDGE AT FIVE MILE CREEK AND +/- 8.7' SOUTHEAST OF A 4' BARBED WIRE FENCE.

US SURVEY FEET
DATA SET: AUGUST 2021
MONUMENT: 5/8"-IR W/ RED PLASTIC CAP STAMPED "CP&Y TRAV. POINT"
SURFACE ADJUSTMENT FACTOR 1.00013
ELEVATIONS ARE NAVD 88 BASED UPON GEOID 2012B
TXDOT VRS NETWORK



CP#7 IS A 5/8-INCH IRON ROD WITH RED PLASTIC CAP STAMPED "CP&Y TRAV. POINT" LOCATED IN GONZALES COUNTY, TX., ON THE SOUTHEAST SIDE OF FM 108, +/- 990' SOUTHWEST OF THE INTERSECTION OF FM 108 AND CR 137, +/- 60.1' SOUTHWEST OF THE EAST CORNER OF THE BRIDGE AT FM 108 AND FIVE MILE CREEK, +/- 18.4' EAST OF THE SOUTH CORNER OF THE BRIDGE AT FM 108 AND FIVE MILE CREEK AND +/1 18.4' NORTHWEST OF A 4' BARBED WIRE FENCE.

US SURVEY FEET
DATA SET: AUGUST 2021
MONUMENT: 5/8"-IR W/ RED PLASTIC CAP STAMPED "CP&Y TRAV. POINT"
SURFACE ADJUSTMENT FACTOR 1.00013
ELEVATIONS ARE NAVD 88 BASED UPON GEOID 2012B
TXDOT VRS NETWORK



CP#8 IS A 5/8-INCH IRON ROD WITH RED PLASTIC CAP STAMPED "CP&Y TRAV. POINT" LOCATED IN GONZALES COUNTY, TX., ON THE NORTHWEST SIDE OF FM 108, +/- 1420' SOUTHWEST OF THE INTERSECTION OF FM 108 AND CR 137, +/- 224.7' NORTHEAST OF A TELEPHONE PEDESTAL, +/- 198.1' SOUTHWEST OF A BURIED CABLE SIGN AND +/- 7.0' NORTHWEST OF THE NORTHWEST EDGE OF ASPHALT OF FM 108.

US SURVEY FEET
DATA SET: AUGUST 2021
MONUMENT: 5/8"-IR W/ RED PLASTIC CAP STAMPED "CP&Y TRAV. POINT"
SURFACE ADJUSTMENT FACTOR 1.00013
ELEVATIONS ARE NAVD 88 BASED UPON GEOID 2012B
TXDOT VRS NETWORK

NOTES:
HORIZONTAL COORDINATES SHOWN ARE IN U.S. SURVEY FEET, AND ARE BASED UPON THE TEXAS COORDINATE SYSTEM OF NAD '83 (HARN '93) TEXAS SOUTH CENTRAL ZONE 4204, WITH A SURFACE ADJUSTMENT FACTOR OF 1.00013. VALUES WERE DERIVED UTILIZING THE TXDOT STATE VIRTUAL REFERENCE STATION NETWORK IN AUGUST, 2021.

GEOGRAPHIC COORDINATES SHOWN ARE BASED UPON THE TEXAS COORDINATE SYSTEM OF NAD '83 (HARN '93) TEXAS SOUTH CENTRAL ZONE 4204. VALUES WERE CONVERTED FROM GRID STATE PLANE COORDINATES.

ELEVATIONS ARE BASED UPON NAVD '88 DATUM (GEOID 2012B) DERIVED FROM UTILIZING THE TXDOT STATE VIRTUAL REFERENCE STATION NETWORK IN AUGUST 2021.

LEGEND

- 5/8" IRON ROD W/ RED PLASTIC CAP SET "CP&Y TRAV. POINT"
- SIGN
- UTILITY POLE
- GUY WIRE
- TREE
- TELEPHONE PEDESTAL

STATE OF TEXAS
REGISTERED
BRIAN K. KIDD
6496
PROFESSIONAL
LAND SURVEYOR

1/4/2023

NO.	REVISION	BY	DATE

CP&Y
TEXAS REGISTERED SURVEYING FIRM 10194305
TEXAS REGISTERED ENGINEERING FIRM F-1741

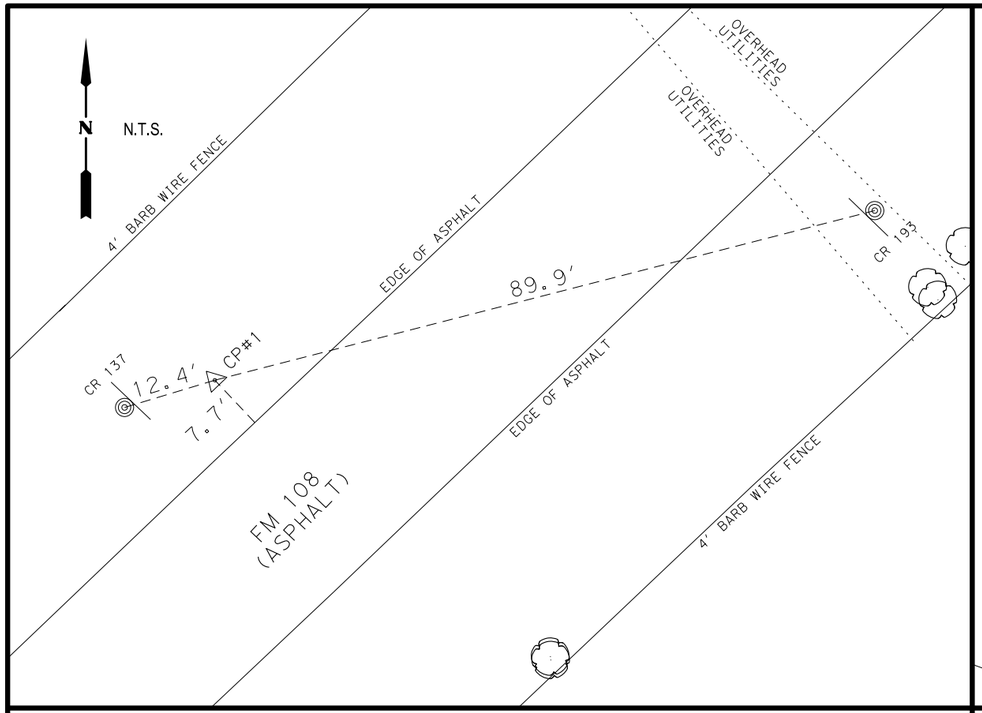
 Texas Department of Transportation

FM 108 AT FIVE MILE CREEK & DRAW

HORIZONTAL/VERTICAL CONTROL

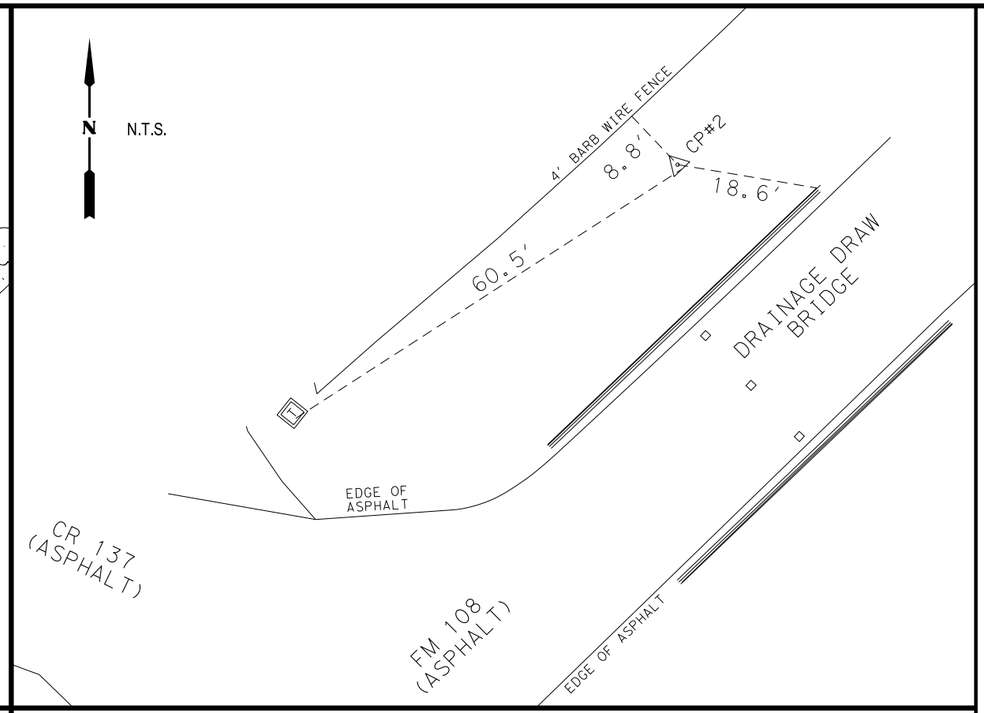
CSJ: 0715-01-025 SHEET 1 OF 2

Designed:	--	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	--	6	TEXAS				FM 108,ETC
Drawn:	JDS	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	BKK	YKM	GONZALES	0715	01	025,ETC	75



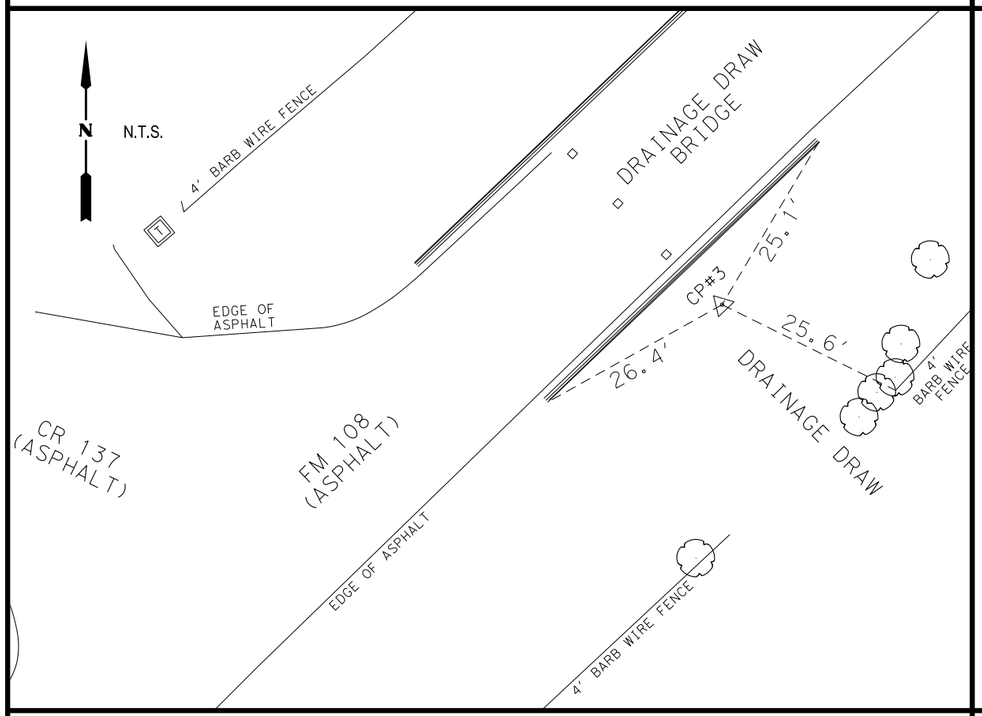
CP#1 IS A 5/8-INCH IRON ROD WITH RED PLASTIC CAP STAMPED "CP&Y TRAV. POINT" LOCATED IN GONZALES COUNTY, TX., ON THE NORTHWEST SIDE OF FM 108, +/- 510' NORTHEAST OF THE INTERSECTION OF FM 108 AND CR 137, +/- 89.9' SOUTWEST OF A CR 193 SIGN, 12.4' NORTHEAST OF A CR 137 SIGN AND +/- 7.7' NORTHWEST OF THE NORTHWEST EDGE OF ASPHALT OF FM 108.

US SURVEY FEET
DATA SET: AUGUST 2021
MONUMENT: 5/8"-IR W/ RED PLASTIC CAP STAMPED "CP&Y TRAV. POINT"
SURFACE ADJUSTMENT FACTOR 1.00013
ELEVATIONS ARE NAVD 88 BASED UPON GEOID 2012B
TXDOT VRS NETWORK



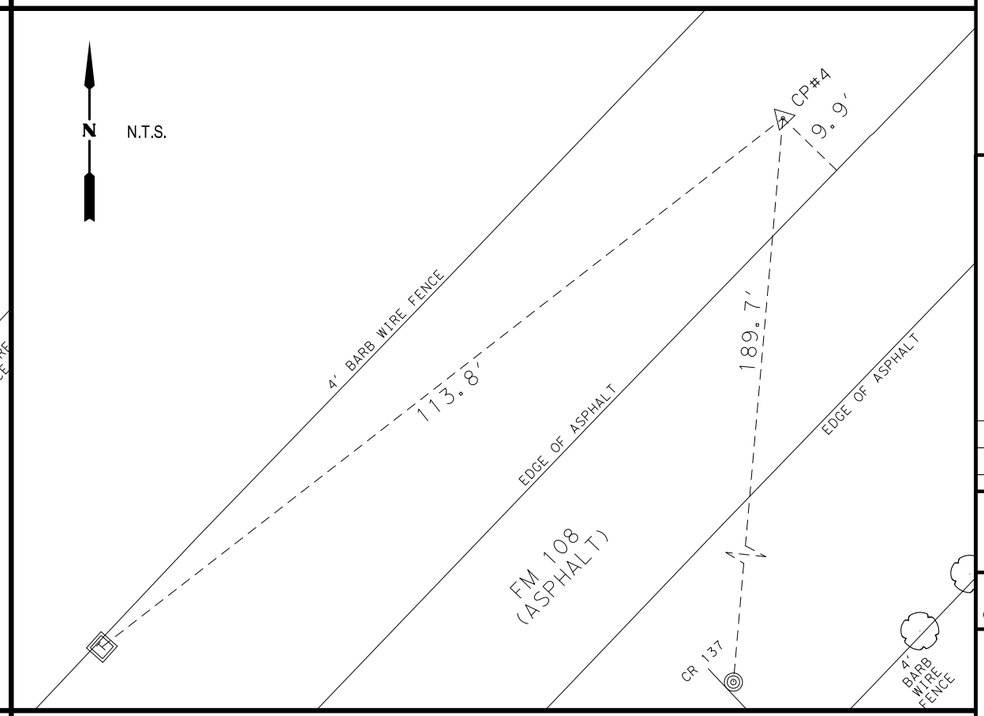
CP#2 IS A 5/8-INCH IRON ROD WITH RED PLASTIC CAP STAMPED "CP&Y TRAV. POINT" LOCATED IN GONZALES COUNTY, TX., ON THE NORTHWEST SIDE OF FM 108, +/- 82' NORTHEAST OF THE INTERSECTION OF FM 108 AND CR 137, +/- 60.5' NORTHEAST OF A TELEPHONE PEDISTAL, +/- 8.8' SOUTHEAST OF A 4' BARBED WIRE FENCE AND +/- 18.6' NORTHWEST OF THE NORTH CORNER OF AN FM 108 BRIDGE AT A DRAINAGE DRAW JUST NORTH OF CR 137.

US SURVEY FEET
DATA SET: AUGUST 2021
MONUMENT: 5/8"-IR W/ RED PLASTIC CAP STAMPED "CP&Y TRAV. POINT"
SURFACE ADJUSTMENT FACTOR 1.00013
ELEVATIONS ARE NAVD 88 BASED UPON GEOID 2012B
TXDOT VRS NETWORK



CP#3 IS A 5/8-INCH IRON ROD WITH RED PLASTIC CAP STAMPED "CP&Y TRAV. POINT" LOCATED IN GONZALES COUNTY, TX., ON THE SOUTHEAST SIDE OF FM 108, +/- 65' NORTHEAST OF THE INTERSECTION OF FM 108 AND CR 137, +/- 25.6' NORTHWEST OF THE END OF A 4' BARBED WIRE FENCE, +/- 25.1' SOUTHWEST OF THE EAST CORNER OF AN FM 108 BRIDGE AT A DRAINAGE DRAW JUST NORTH OF CR 137 AND +/- 264' NORTHEAST OF THE SOUTH CORNER OF AN FM 108 BRIDGE AT A DRAINAGE DRAW JUST NORTH OF CR 137.

US SURVEY FEET
DATA SET: AUGUST 2021
MONUMENT: 5/8"-IR W/ RED PLASTIC CAP STAMPED "CP&Y TRAV. POINT"
SURFACE ADJUSTMENT FACTOR 1.00013
ELEVATIONS ARE NAVD 88 BASED UPON GEOID 2012B
TXDOT VRS NETWORK



CP#4 IS A 5/8-INCH IRON ROD WITH RED PLASTIC CAP STAMPED "CP&Y TRAV. POINT" LOCATED IN GONZALES COUNTY, TX., ON THE NORTHWEST SIDE OF FM 108, +/- 370' SOUTHWEST OF THE INTERSECTION OF FM 108 AND CR 137, +/- 113.8' NORTHEAST OF A TELEPHONE PEDESTAL, +/- 189.7' NORTH OF A CR 137 SIGN AND +/- 9.9' NORTHWEST OF THE NORTHWEST EDGE OF ASPHALT OF FM 108.

US SURVEY FEET
DATA SET: AUGUST 2021
MONUMENT: 5/8"-IR W/ RED PLASTIC CAP STAMPED "CP&Y TRAV. POINT"
SURFACE ADJUSTMENT FACTOR 1.00013
ELEVATIONS ARE NAVD 88 BASED UPON GEOID 2012B
TXDOT VRS NETWORK

NOTES:
HORIZONTAL COORDINATES SHOWN ARE IN U.S. SURVEY FEET, AND ARE BASED UPON THE TEXAS COORDINATE SYSTEM OF NAD '83 (HARN '93) TEXAS SOUTH CENTRAL ZONE 4204, WITH A SURFACE ADJUSTMENT FACTOR OF 1.00013. VALUES WERE DERIVED UTILIZING THE TXDOT STATE VIRTUAL REFERENCE STATION NETWORK IN AUGUST, 2021.

GEOGRAPHIC COORDINATES SHOWN ARE BASED UPON THE TEXAS COORDINATE SYSTEM OF NAD '83 (HARN '93) TEXAS SOUTH CENTRAL ZONE 4204. VALUES WERE CONVERTED FROM GRID STATE PLANE COORDINATES.

ELEVATIONS ARE BASED UPON NAVD '88 DATUM (GEOID 2012B) DERIVED FROM UTILIZING THE TXDOT STATE VIRTUAL REFERENCE STATION NETWORK IN AUGUST 2021.

LEGEND

- 5/8" IRON ROD W/ RED PLASTIC CAP SET "CP&Y TRAV. POINT"
- SIGN
- UTILITY POLE
- GUY WIRE
- TREE
- TELEPHONE PEDESTAL

STATE OF TEXAS
REGISTERED
BRIAN K. KIDD
6496
PROFESSIONAL
LAND SURVEYOR

1/4/2023

NO.	REVISION	BY	DATE

CP&Y
TEXAS REGISTERED SURVEYING FIRM 10194305
TEXAS REGISTERED ENGINEERING FIRM F-1741

 Texas Department of Transportation

FM 108 AT FIVE MILE CREEK & DRAW

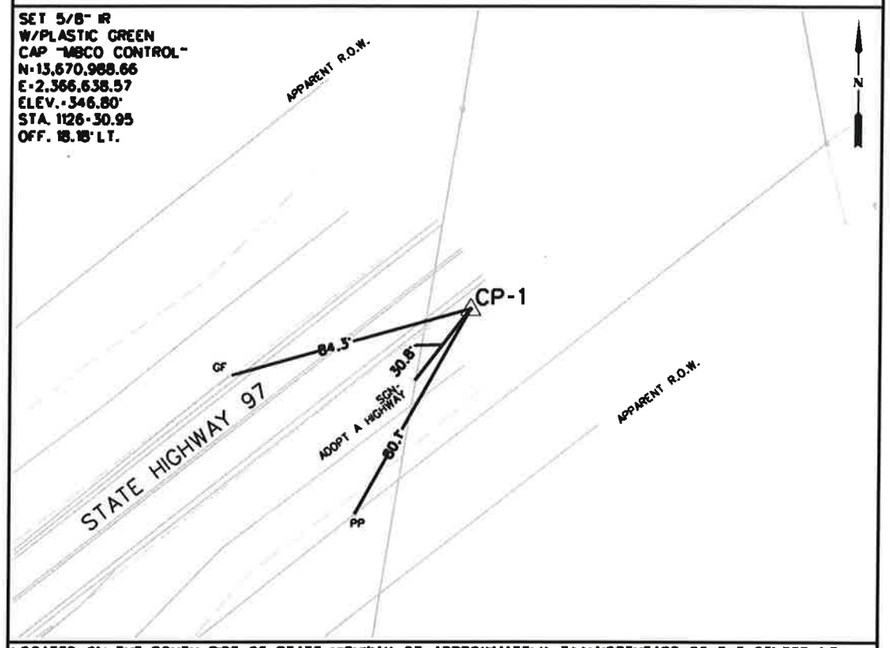
HORIZONTAL/VERTICAL CONTROL

CSJ: 0715-01-025 SHEET 2 OF 2

Designed:	--	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	--	6	TEXAS					FM 108,ETC
Drawn:	JDS	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	BKK	YKM	GONZALES	0715	01	025,ETC		76

CP-1

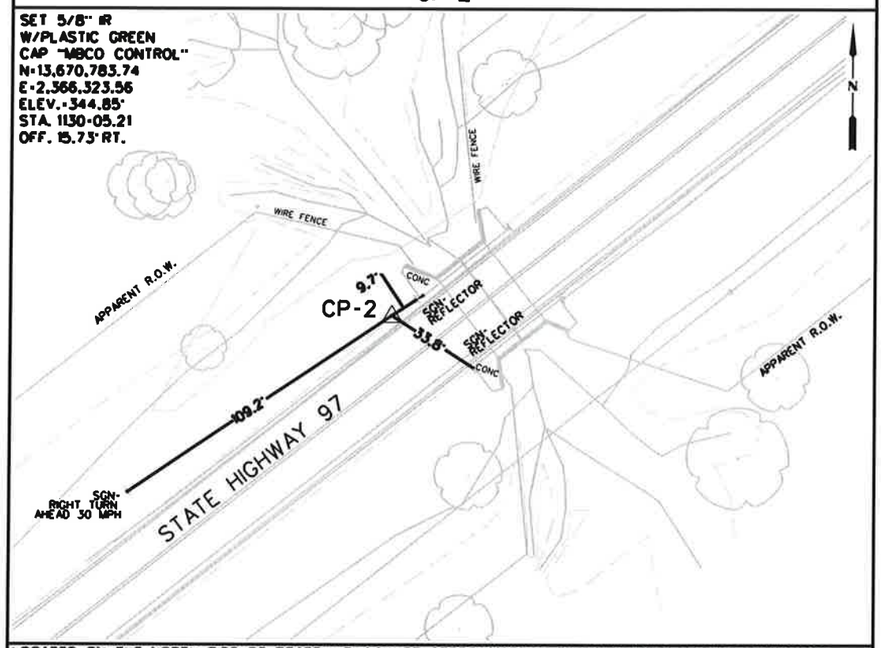
SET 5/8" IR
W/PLASTIC GREEN
CAP "MBCO CONTROL"
N=13,670,988.66
E=2,366,638.57
ELEV.=346.80'
STA. 1126+30.95
OFF. 18.18' LT.



LOCATED ON THE SOUTH SIDE OF STATE HIGHWAY 97, APPROXIMATELY 344' NORTHEAST OF THE CENTERLINE OF THE STATE HIGHWAY 97 BRIDGE, AT BASELINE STATION XX+XX.XX, X.XX' LEFT.

CP-2

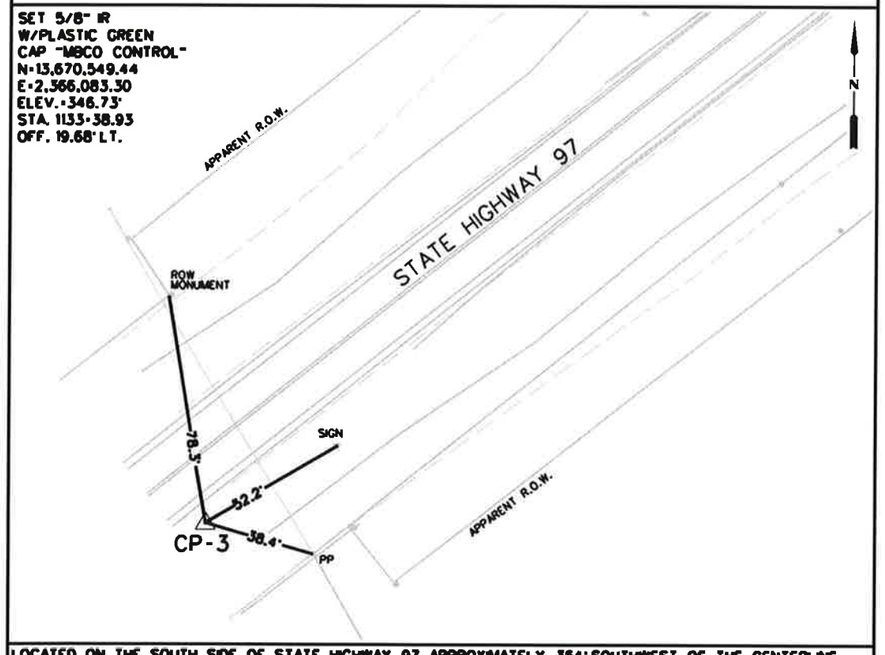
SET 5/8" IR
W/PLASTIC GREEN
CAP "MBCO CONTROL"
N=13,670,783.74
E=2,366,323.56
ELEV.=344.85'
STA. 1130+05.21
OFF. 15.73' RT.



LOCATED ON THE NORTH SIDE OF STATE HIGHWAY 97, APPROXIMATELY 30' SOUTHWEST OF THE CENTERLINE OF THE STATE HIGHWAY 97 BRIDGE, AT BASELINE STATION XX+XX.XX, X.XX' RIGHT.

CP-3

SET 5/8" IR
W/PLASTIC GREEN
CAP "MBCO CONTROL"
N=13,670,549.44
E=2,366,083.30
ELEV.=346.73'
STA. 1133+38.93
OFF. 19.68' LT.



LOCATED ON THE SOUTH SIDE OF STATE HIGHWAY 97, APPROXIMATELY 364' SOUTHWEST OF THE CENTERLINE OF THE STATE HIGHWAY 97 BRIDGE, AT BASELINE STATION XX+XX.XX, X.XX' LEFT.

NOTES

1. ALL BEARINGS AND DISTANCES SHOWN HEREON ARE BASED ON THE TEXAS COORDINATE SYSTEM OF 1983, SOUTH CENTRAL ZONE NO. 4204, NAD83 (2011), EPOCH 2010.00, AND MEASURED IN US SURVEY FEET.
2. ALL COORDINATES REFERENCED HEREON ARE SURFACE VALUES AND MAY BE CONVERTED TO GRID VALUES BY DIVIDING BY A COMBINED SCALE FACTOR OF 1.00013.
3. ALL ELEVATIONS SHOWN HEREON ARE BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88), GEOID 12B.
4. THE HORIZONTAL AND VERTICAL POSITIONS OF MONUMENTS IN THE CONTROL NETWORK HAVE BEEN IDENTIFIED THROUGH STATIC GPS OBSERVATIONS AND 3-WIRE DIFFERENTIAL LEVELING.

LEGEND

△ CONTROL POINT

0 25 50
SCALE: 1 INCH = 50 FEET
(U.S. SURVEY FEET)

This survey control information has been accepted and incorporated into this PS&E.

DATED:.....DDATE$.....

The control points shown herein were determined by a survey made on the ground under my supervision.

STATE OF TEXAS
REGISTERED
MARION R. CLARK
1881
PROFESSIONAL
LAND SURVEYOR

DATED:.....DDATE$.....

SURVEY DATE:
JUNE 2021

MBCO ENGINEERING & SURVEYING
1505 Highway 6 South
Suite 180
Houston, Texas 77077
TBPELS Reg. No. F16850
Phone: 281-760-1656
www.mbcoengineering.com

CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

Texas Department of Transportation

SH 97 AT RED BRANCH

HORIZONTAL & VERTICAL CONTROL SHEET

CSJ 0347-02-033 SHEET 1 OF 1

Designed: SBS	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked: DPB	6	TEXAS				FM 108,ETC
Drawn: SBS	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked: DPB	YKM	GONZALES	0715	01	025,ETC	77

$PENTBLS$
$PLTDRVS$
$PWFILE$
$USERNAME$
$TIME$
$DATE$
$PWFILE$

FM 108 AT DRAW & BRUSHY CREEK

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================================================================================
POINT 7               N  13,689,480.3778 E   2,427,482.1501 STA     537+00.00

COURSE FROM 7 TO PC FM  108  3 N 49° 29′ 29.51" E DIST 502.4955

                                  CURVE DATA
                                 *----------*
CURVE FM  108  3
P.I.  STATION            543+85.00  N      13,689,925.3286  E      2,428,002.9648
DELTA         =       1° 53′ 02.25" (LT)
DEGREE        =       0° 30′ 58.24"
TANGENT       =            182.5075
LENGTH        =            364.9822
RADIUS        =         11,100.0000
EXTERNAL      =              1.5003
LONG CHORD    =            364.9658
MID. ORD.     =              1.5001
P.C.  STATION            542+02.50  N      13,689,806.7790  E      2,427,864.2025
P.T.  STATION            545+67.48  N      13,690,048.3761  E      2,428,137.7547
C.C.                                N      13,698,246.2195  E      2,420,654.0816
BACK         = N  49° 29′ 29.51" E
AHEAD        = N  47° 36′ 27.26" E
CHORD BEAR   = N  48° 32′ 58.39" E

                                  CURVE DATA
                                 *----------*
CURVE FM  108  4
P.I.  STATION            547+49.99  N      13,690,171.4236  E      2,428,272.5446
DELTA         =       1° 53′ 02.25" (RT)
DEGREE        =       0° 30′ 58.24"
TANGENT       =            182.5075
LENGTH        =            364.9822
RADIUS        =         11,099.9985
EXTERNAL      =              1.5003
LONG CHORD    =            364.9658
MID. ORD.     =              1.5001
P.C.  STATION            545+67.48  N      13,690,048.3761  E      2,428,137.7547
P.T.  STATION            549+32.46  N      13,690,289.9732  E      2,428,411.3069
C.C.                                N      13,681,850.5338  E      2,435,621.4269
BACK         = N  47° 36′ 27.26" E
AHEAD        = N  49° 29′ 29.51" E
CHORD BEAR   = N  48° 32′ 58.39" E

COURSE FROM PT FM  108  4 TO PC FM  108  7 N 49° 29′ 29.51" E DIST 122.7204

                                  CURVE DATA
                                 *----------*
CURVE FM  108  7
P.I.  STATION            551+10.57  N      13,690,405.6637  E      2,428,546.7226
DELTA         =       0° 34′ 18.37" (RT)
DEGREE        =       0° 30′ 58.24"
TANGENT       =             55.3854
LENGTH        =            110.7699
RADIUS        =         11,100.0140
EXTERNAL      =              0.1382
LONG CHORD    =            110.7694
MID. ORD.     =              0.1382
P.C.  STATION            550+55.18  N      13,690,369.6876  E      2,428,504.6125
P.T.  STATION            551+65.95  N      13,690,441.2179  E      2,428,589.1895
C.C.                                N      13,681,930.2364  E      2,435,714.7424
BACK         = N  49° 29′ 29.51" E
AHEAD        = N  50° 03′ 47.88" E
CHORD BEAR   = N  49° 46′ 38.70" E

COURSE FROM PT FM  108  7 TO PC FM  108  10 N 50° 03′ 47.88" E DIST 1,175.7177

                                  CURVE DATA
                                 *----------*
CURVE FM  108  10
P.I.  STATION            565+88.23  N      13,691,354.2384  E      2,429,679.7296
DELTA         =       4° 55′ 41.62" (RT)
DEGREE        =       1° 00′ 00.00"
TANGENT       =            246.5636
LENGTH        =            492.8231
RADIUS        =          5,729.5800
EXTERNAL      =              5.3028
LONG CHORD    =            492.6712
MID. ORD.     =              5.2979
P.C.  STATION            563+41.67  N      13,691,195.9591  E      2,429,490.6759
P.T.  STATION            568+34.49  N      13,691,495.6913  E      2,429,881.6817
C.C.                                N      13,686,802.7801  E      2,433,168.7277
BACK         = N  50° 03′ 47.88" E
AHEAD        = N  54° 59′ 29.50" E
CHORD BEAR   = N  52° 31′ 38.69" E

                                                              END   REGION 1
EQUATION: STA 568+34.49 (BK) = STA 568+34.30 (AH)             ---------------
                                                              BEGIN REGION 2

POINT STAEQU1         N  13,691,495.6913 E   2,429,881.6817 STA     568+34.30

COURSE FROM STAEQU1 TO 8 N 54° 59′ 29.52" E DIST 300.0000

POINT 8               N  13,691,667.8005 E   2,430,127.4019 STA     571+34.30

================================================================================
ENDING CHAIN FM  108 DESCRIPTION
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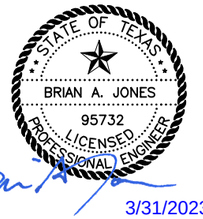

NO.	REVISION	BY	DATE

TEXAS REGISTERED ENGINEERING FIRM F-1741

CP&Y an STV Company

FM 108 AT DRAW & BRUSHY CREEK

HORIZONTAL ALIGNMENT DATA

CSJ 0715-01-025 SHEET 1 OF 1

Designed:	YP	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	BAJ	6	TEXAS				FM 108,ETC
Drawn:	YP	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	BAJ	YKM	GONZALES	0715	01	025,ETC	78

FM 108 AT FIVE MILE CREEK & DRAW

BEGINNING CHAIN FM108_FIVE DESCRIPTION
FEATURE: RD_MAIN_PGL

POINT 23 N 13,702,213.9320 E 2,440,342.2531 STA 722+50.00

COURSE FROM 23 TO PC FM108_FIVE_3 N 40° 49′ 30.55" E DIST 548.6000

		CURVE DATA				
CURVE FM108_FIVE_3						
P.I. STATION		729+48.63	N	13,702,742.5942	E	2,440,798.9873
DELTA	= 3° 00′ 00.00"	(RT)				
DEGREE	= 1° 00′ 00.00"					
TANGENT	= 150.0343					
LENGTH	= 300.0000					
RADIUS	= 5,729.5780					
EXTERNAL	= 1.9641					
LONG CHORD	= 299.9657					
MID. ORD.	= 1.9634					
P.C. STATION		727+98.60	N	13,702,629.0621	E	2,440,700.9019
P.T. STATION		730+98.60	N	13,702,850.8374	E	2,440,902.8800
C.C.			N	13,698,883.3342	E	2,445,036.5203
BACK	= N 40° 49′ 30.55" E					
AHEAD	= N 43° 49′ 30.55" E					
CHORD BEAR	= N 42° 19′ 30.55" E					

COURSE FROM PT FM108_FIVE_3 TO PC FM108_FIVE_6 N 43° 49′ 30.55" E DIST 684.1000

		CURVE DATA				
CURVE FM108_FIVE_6						
P.I. STATION		739+07.72	N	13,703,434.5820	E	2,441,463.1631
DELTA	= 2° 30′ 00.00"	(RT)				
DEGREE	= 1° 00′ 00.00"					
TANGENT	= 125.0198					
LENGTH	= 250.0000					
RADIUS	= 5,729.5780					
EXTERNAL	= 1.3638					
LONG CHORD	= 249.9802					
MID. ORD.	= 1.3635					
P.C. STATION		737+82.70	N	13,703,344.3857	E	2,441,376.5919
P.T. STATION		740+32.70	N	13,703,520.9164	E	2,441,553.5862
C.C.			N	13,699,376.8825	E	2,445,510.2321
BACK	= N 43° 49′ 30.55" E					
AHEAD	= N 46° 19′ 30.55" E					
CHORD BEAR	= N 45° 04′ 30.55" E					

COURSE FROM PT FM108_FIVE_6 TO 24 N 46° 19′ 30.55" E DIST 767.3000

POINT 24 N 13,704,050.7869 E 2,442,108.5516 STA 748+00.00

ENDING CHAIN FM108_FIVE DESCRIPTION

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STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED
PROFESSIONAL ENGINEER

3/31/2023

NO.	REVISION	BY	DATE

CP&Y an STV Company

TEXAS REGISTERED ENGINEERING FIRM F-1741

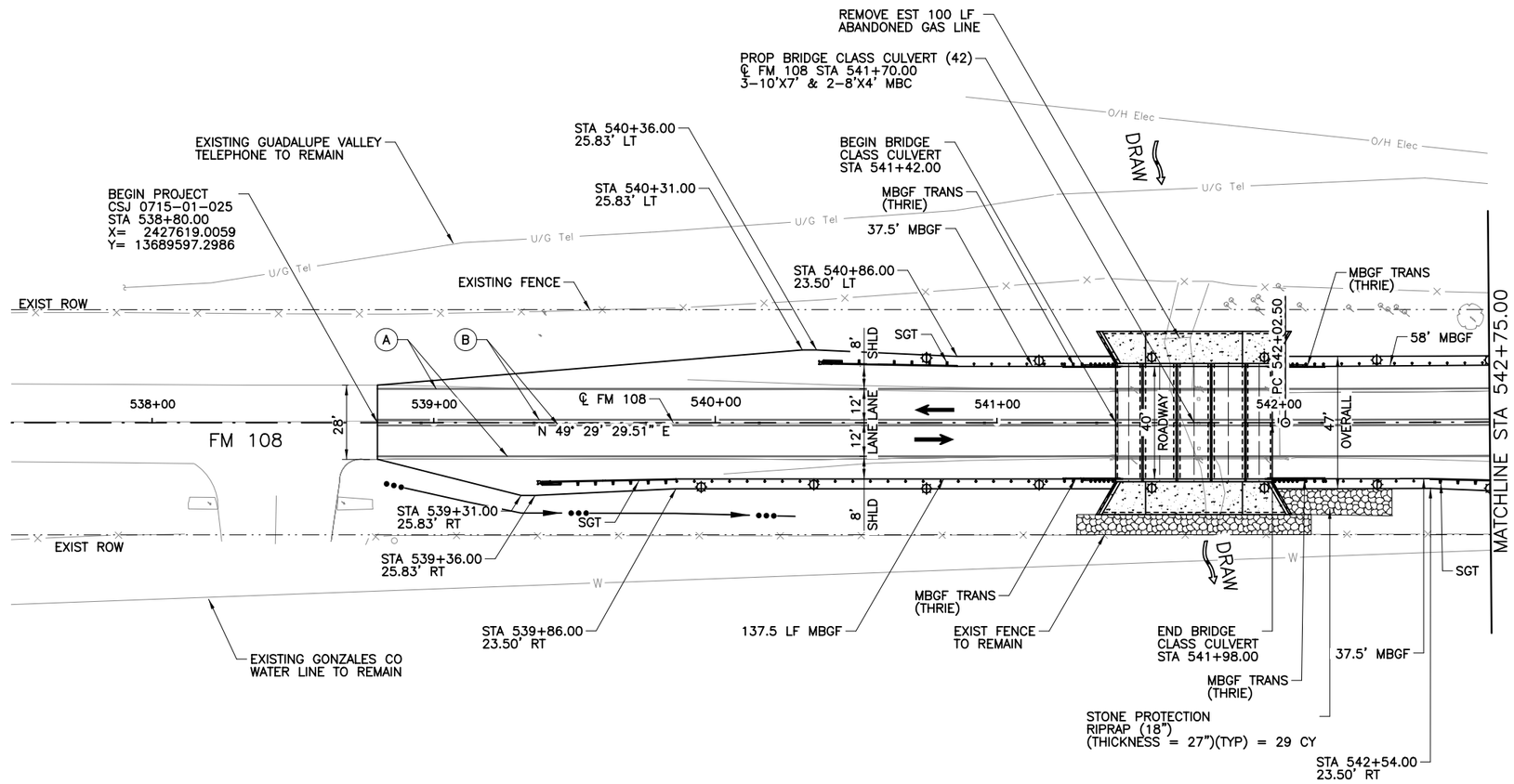
 Texas Department of Transportation

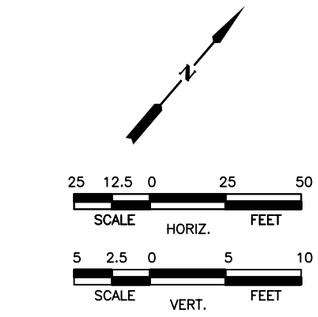
FM 108 AT DRAW & FIVE MILE CREEK

HORIZONTAL ALIGNMENT DATA

CSJ 0715-01-025 SHEET 1 OF 1

Designed:	FV	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	BAJ	6	TEXAS					FM 108,ETC
Drawn:	FV	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	BAJ	YKM	GONZALES	0715	01	025,ETC		79



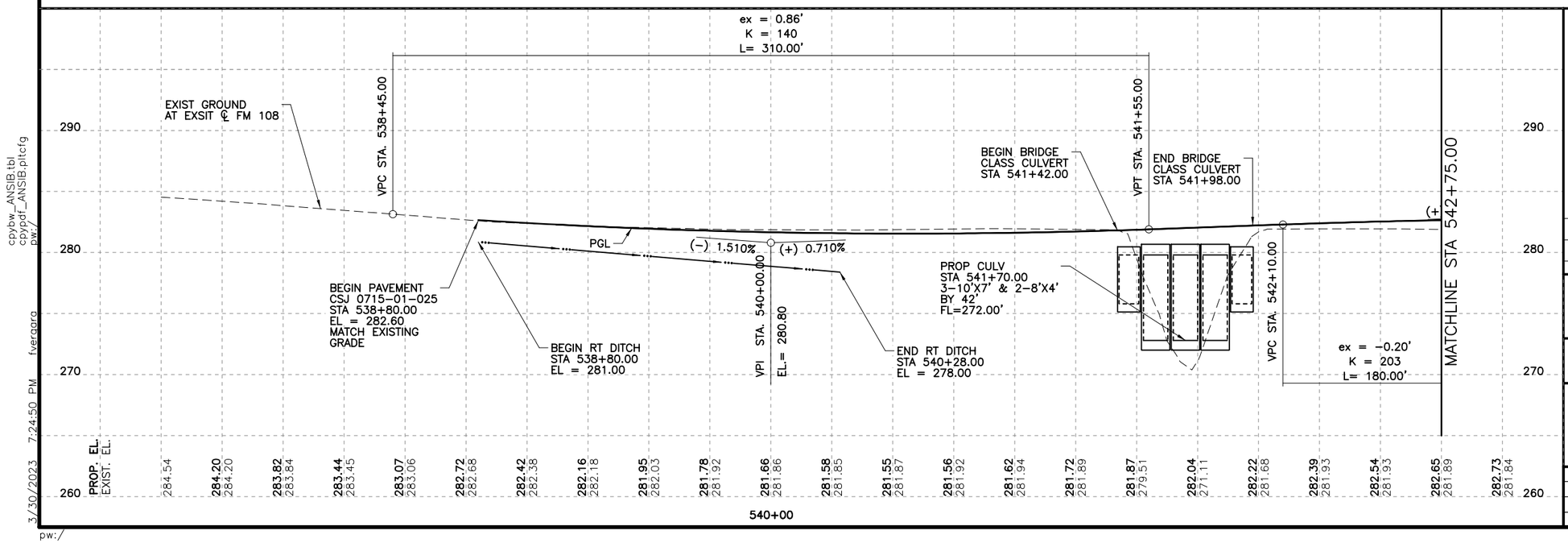


LEGEND

O/H Elec	OVERHEAD ELECTRIC
U/G Tel	UNDERGROUND TELEPHONE
X	EXISTING FENCE
W	WATER LINE
	EXIST ROW
	DIRECTION OF TRAFFIC
	MAILBOX
	BI–DIRECTIONAL DELINEATORS
	RIPRAP (CONC)(5")
	RIPRAP (STONE PROTECTION) (18") 27" THICKNESS
DW-XX	DRIVEWAY ID
(A)	RE PROF PAV MRK TY I (W)6"(SLD)
(B)	RE PROF PAV MRK TY I (Y)6"(SLD) WITH REFL PAV MRKR TY II–A–A
(C)	RE PROF PAV MRK TY I (Y)6"(BRK) WITH REFL PAV MRKR TY II–A–A

NOTES:

1. SEE CULVERT LAYOUT AND OTHER DRAINAGE SHEETS FOR MORE DETAILS



STATE OF TEXAS
BRIAN A. JONES
95732
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3/31/2023

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TEXAS REGISTERED ENGINEERING FIRM F-1741

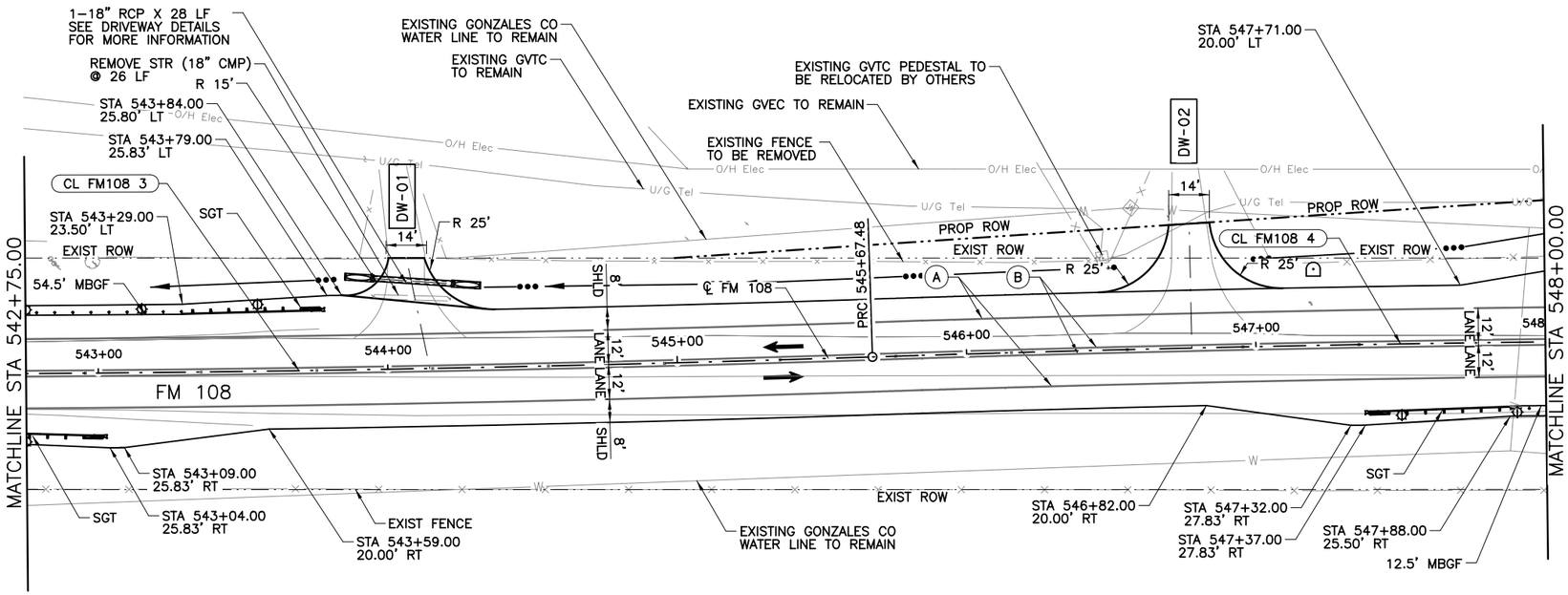
 Texas Department of Transportation

FM 108 AT DRAW & BRUSHY CREEK

PLAN & PROFILE

CSJ 0715–01–025 SHEET 1 OF 5

Designed:	YP	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	BAJ	6	TEXAS				FM 108,ETC
Drawn:	YP	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	BAJ	YKM	GONZALES	0715	01	025,ETC	80



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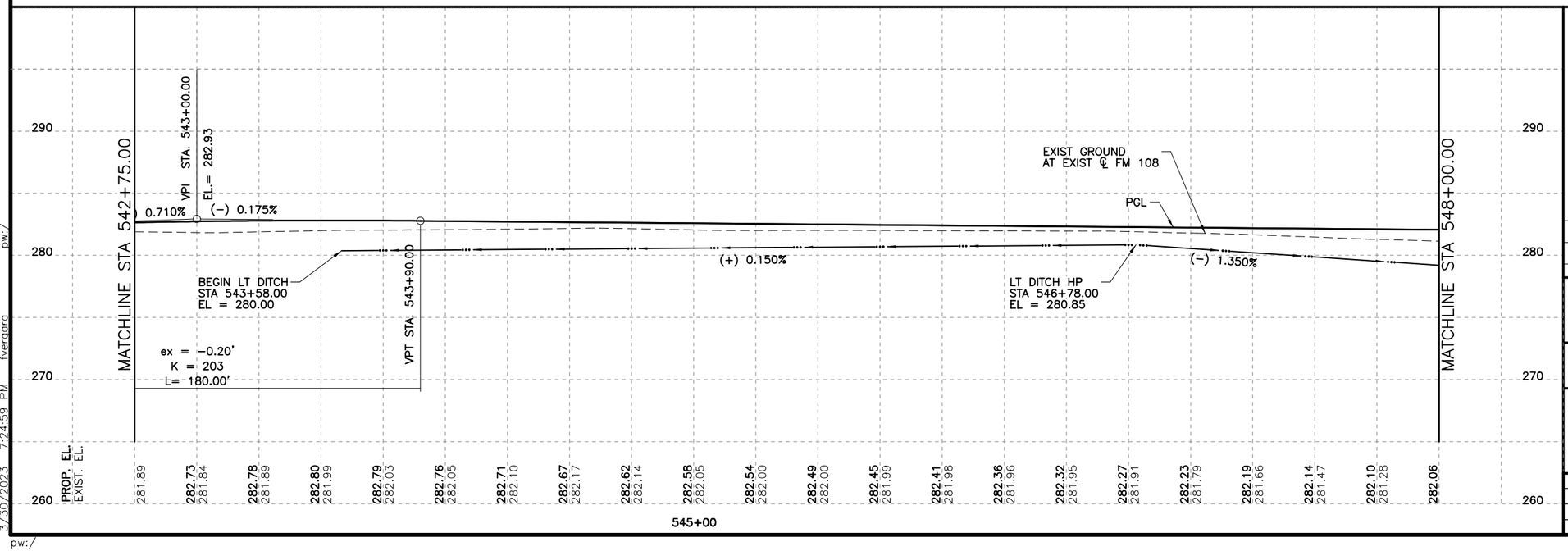
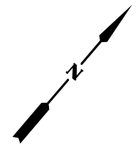
PI STATION = 543+85.00
NORTHING = 13,689,925.3286
EASTING = 2,428,002.9648
DELTA = 1° 53' 02" (LT)
RADIUS = 11,100.00'
D = 0° 30' 58"
TANGENT = 182.51'
LENGTH = 364.98'

CL FM108 4
PI STATION = 547+49.99
NORTHING = 13,690,171.4236
EASTING = 2,428,272.5446
DELTA = 1° 53' 02" (RT)
RADIUS = 11,100.00'
D = 0° 30' 58"
TANGENT = 182.51'
LENGTH = 364.98'





25 12.5 0 25 50
SCALE HORIZ. FEET

5 2.5 0 5 10
SCALE VERT. FEET

LEGEND

- O/H Elec — OVERHEAD ELECTRIC
- U/G Tel — UNDERGROUND TELEPHONE
- X — EXISTING FENCE
- W — WATER LINE
- EXIST ROW
- DIRECTION OF TRAFFIC
- MAILBOX
- BI–DIRECTIONAL DELINEATORS
- RIPRAP (CONC)(5")
- RIPRAP (STONE PROTECTION) (18") 27" THICKNESS
- DW-XX — DRIVEWAY ID
- (A) RE PROF PAV MRK TY I (W)6"(SLD)
- (B) RE PROF PAV MRK TY I (Y)6"(SLD) WITH REFL PAV MRKR TY II–A–A
- (C) RE PROF PAV MRK TY I (Y)6"(BRK) WITH REFL PAV MRKR TY II–A–A

NOTES:

1. SEE CULVERT LAYOUT AND OTHER DRAINAGE SHEETS FOR MORE DETAILS

STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED
PROFESSIONAL ENGINEER
3/31/2023

NO.	REVISION	BY	DATE

CP&Y an STV Company
TEXAS REGISTERED ENGINEERING FIRM F-1741

 Texas Department of Transportation

FM 108 AT DRAW & BRUSHY CREEK

PLAN & PROFILE

CSJ 0715–01–025 SHEET 2 OF 5

Designed:	YP	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	BAJ	6	TEXAS					FM 108,ETC
Drawn:	YP	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	BAJ	YKM	GONZALES	0715	01	025,ETC		81

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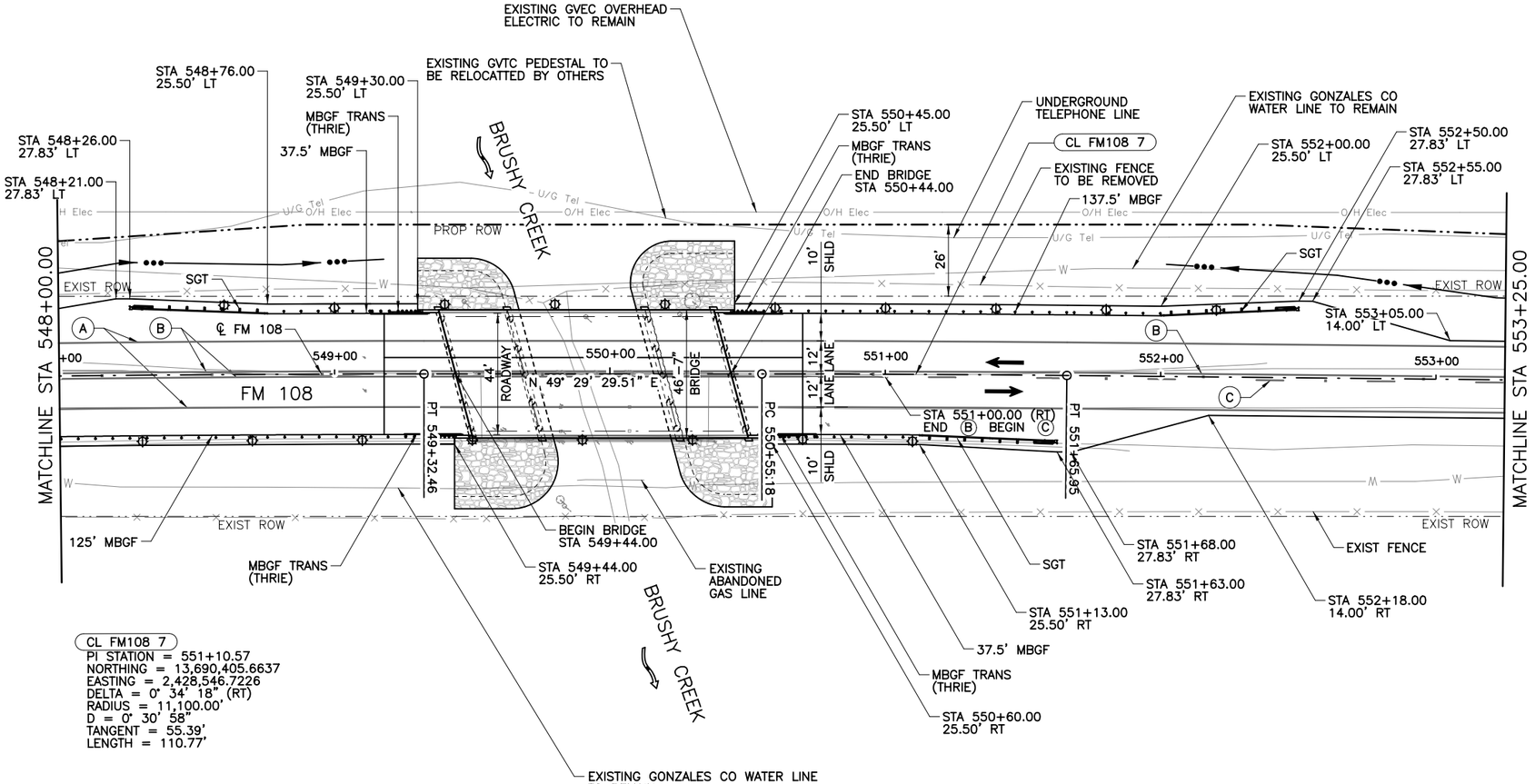


CL FM108 7
PI STATION = 551+10.57
NORTHING = 13,690,405.6637
EASTING = 2,428,546.7226
DELTA = 0° 34' 18" (RT)
RADIUS = 11,100.00'
D = 0° 30' 58"
TANGENT = 55.39'
LENGTH = 110.77'

25 12.5 0 25 50
SCALE HORIZ. FEET

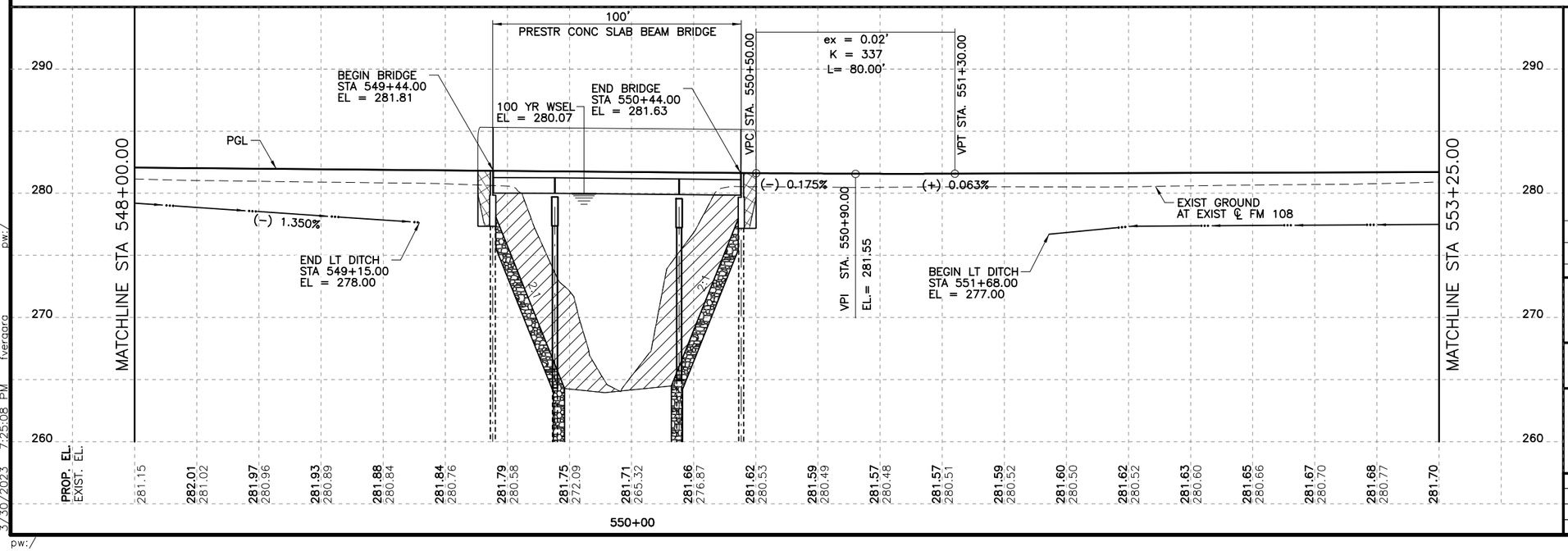
5 2.5 0 5 10
SCALE VERT. FEET

LEGEND

- O/H Elec — OVERHEAD ELECTRIC
- U/G Tel — UNDERGROUND TELEPHONE
- X — EXISTING FENCE
- W — WATER LINE
- EXIST ROW
- DIRECTION OF TRAFFIC
- MAILBOX
- BI-DIRECTIONAL DELINEATORS
- RIPRAP (CONC)(5")
- RIPRAP (STONE PROTECTION) (18") 27" THICKNESS
- DW-XX — DRIVEWAY ID
- (A) RE PROF PAV MRK TY I (W)6"(SLD)
- (B) RE PROF PAV MRK TY I (Y)6"(SLD) WITH REFL PAV MRKR TY II-A-A
- (C) RE PROF PAV MRK TY I (Y)6"(BRK) WITH REFL PAV MRKR TY II-A-A

NOTES:

1. SEE CULVERT LAYOUT AND OTHER DRAINAGE SHEETS FOR MORE DETAILS



STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED PROFESSIONAL ENGINEER
3/31/2023

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TEXAS REGISTERED ENGINEERING FIRM F-1741

FM 108 AT DRAW & BRUSHY CREEK

PLAN & PROFILE

CSJ 0715-01-025 SHEET 3 OF 5

Designed:	YP	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	BAJ	6	TEXAS					FM 108,ETC
Drawn:	YP	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	BAJ	YKM	GONZALES	0715	01	025,ETC		82

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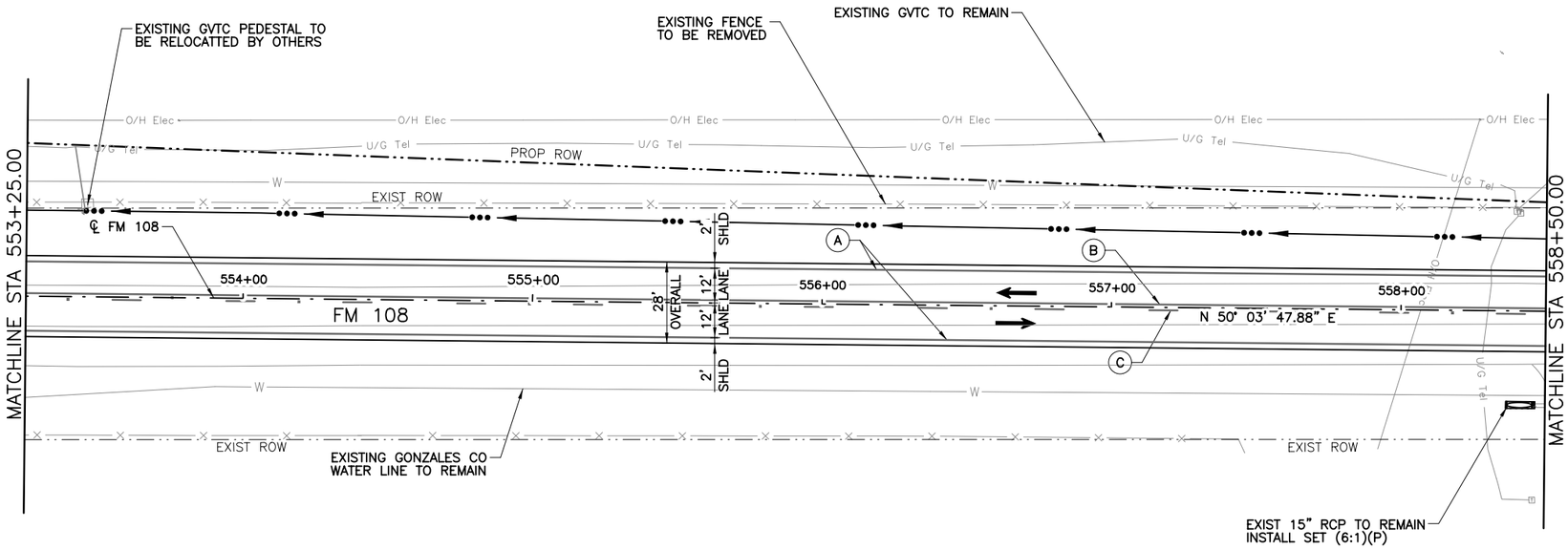
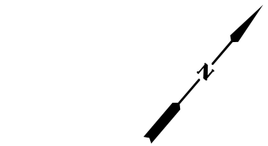


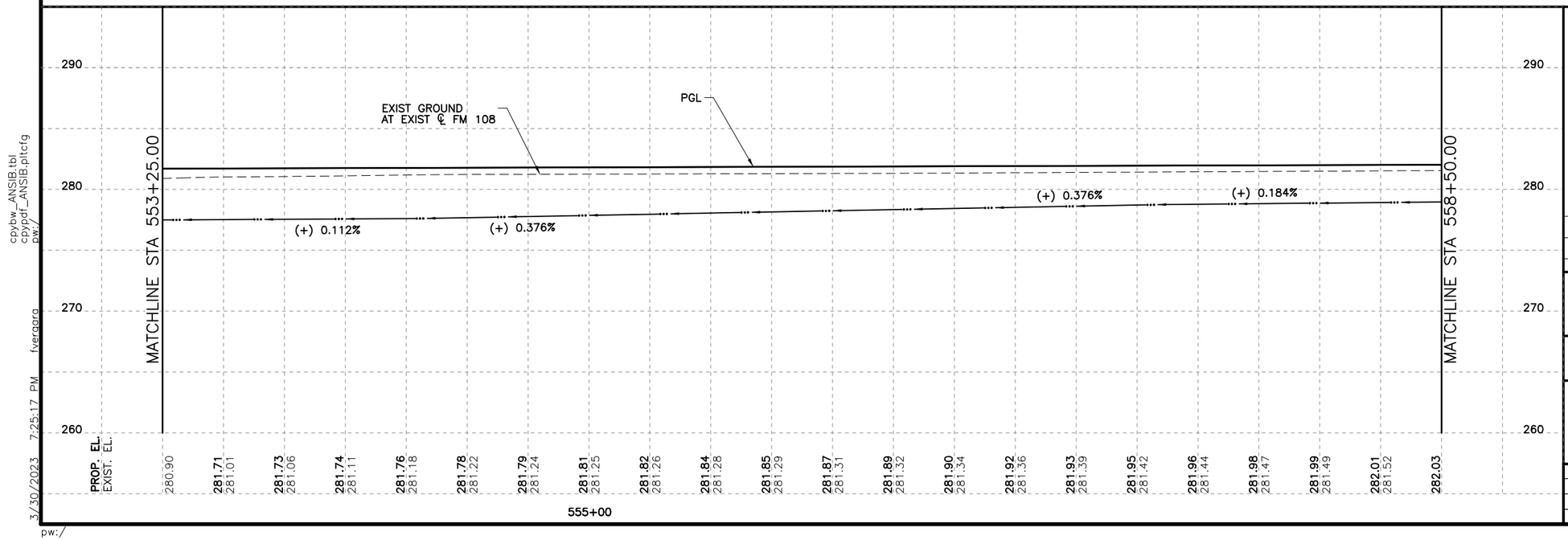


LEGEND

- O/H Elec — OVERHEAD ELECTRIC
- U/G Tel — UNDERGROUND TELEPHONE
- X — EXISTING FENCE
- W — WATER LINE
- EXIST ROW
- DIRECTION OF TRAFFIC
- MAILBOX
- BI–DIRECTIONAL DELINEATORS
- RIPRAP (CONC)(5")
- RIPRAP (STONE PROTECTION) (18") 27" THICKNESS
- DW-XX — DRIVEWAY ID
- (A) RE PROF PAV MRK TY I (W)6"(SLD)
- (B) RE PROF PAV MRK TY I (Y)6"(SLD) WITH REFL PAV MRKR TY II–A–A
- (C) RE PROF PAV MRK TY I (Y)6"(BRK) WITH REFL PAV MRKR TY II–A–A

NOTES:

1. SEE CULVERT LAYOUT AND OTHER DRAINAGE SHEETS FOR MORE DETAILS



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STATE OF TEXAS
BRIAN A. JONES
95732
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3/31/2023

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TEXAS REGISTERED ENGINEERING FIRM F-1741

 Texas Department of Transportation

FM 108 AT DRAW & BRUSHY CREEK

PLAN & PROFILE

CSJ 0715–01–025 SHEET 4 OF 5

Designed:	YP	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.	
Checked:	BAJ	6	TEXAS				FM 108,ETC	
Drawn:	YP	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.	
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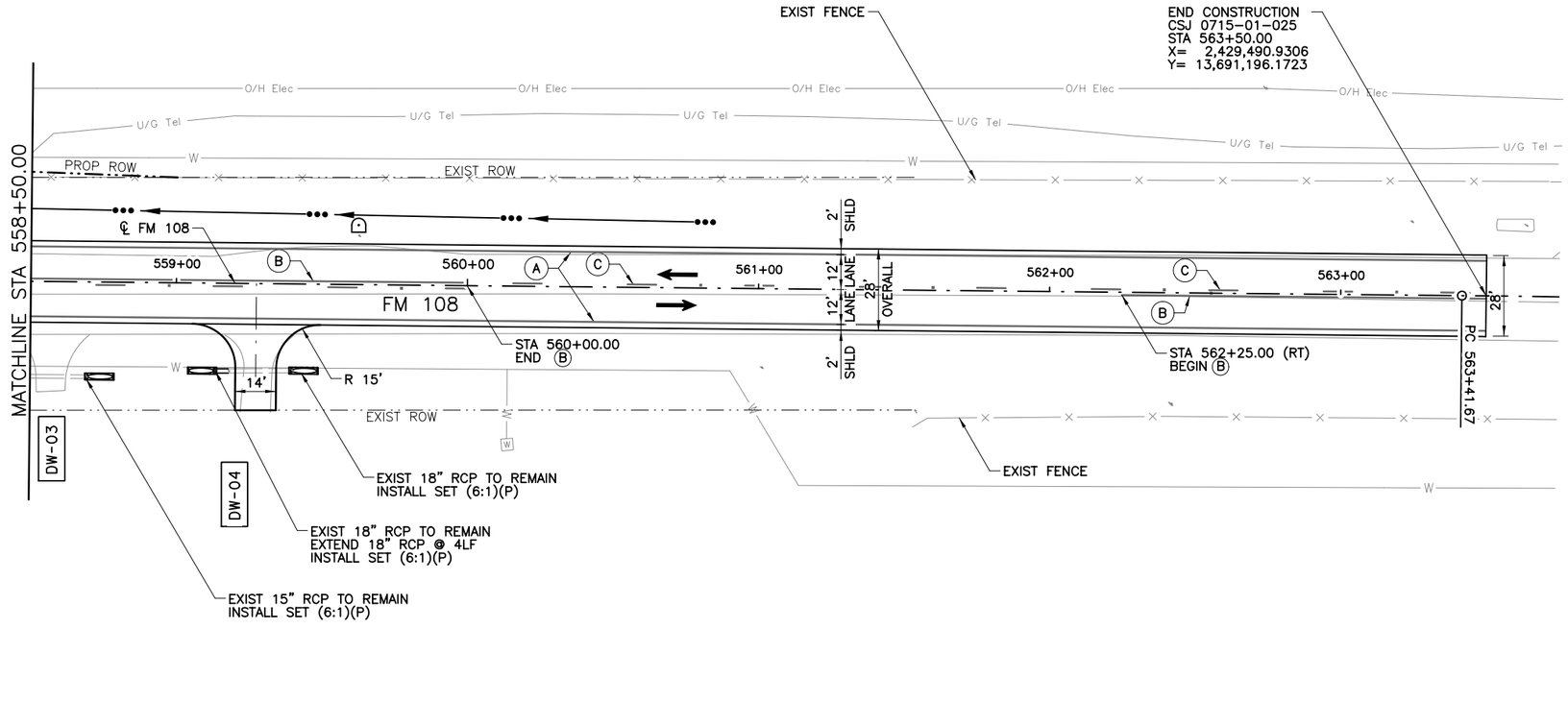

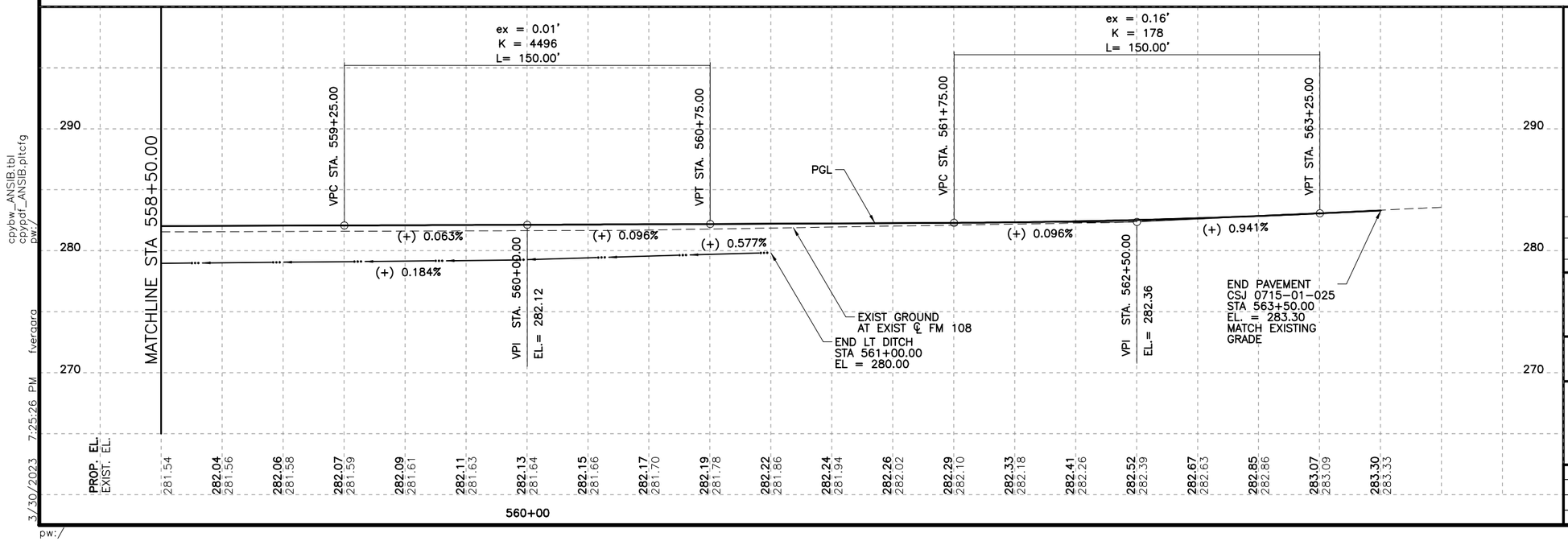

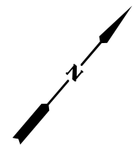

25 12.5 0 25 50
SCALE HORIZ. FEET

5 2.5 0 5 10
SCALE VERT. FEET

LEGEND

- O/H Elec — OVERHEAD ELECTRIC
- U/G Tel — UNDERGROUND TELEPHONE
- X — EXISTING FENCE
- W — WATER LINE
- EXIST ROW
- DIRECTION OF TRAFFIC
- MAILBOX
- BI-DIRECTIONAL DELINEATORS
- RIPRAP (CONC)(5")
- RIPRAP (STONE PROTECTION) (18") 27" THICKNESS
- DW-XX — DRIVEWAY ID
- (A) RE PROF PAV MRK TY I (W)6"(SLD)
- (B) RE PROF PAV MRK TY I (Y)6"(SLD) WITH REFL PAV MRKR TY II-A-A
- (C) RE PROF PAV MRK TY I (Y)6"(BRK) WITH REFL PAV MRKR TY II-A-A

NOTES:

1. SEE CULVERT LAYOUT AND OTHER DRAINAGE SHEETS FOR MORE DETAILS

STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED
PROFESSIONAL ENGINEER
3/31/2023

NO.	REVISION	BY	DATE

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TEXAS REGISTERED ENGINEERING FIRM F-1741

 Texas Department of Transportation

FM 108 AT DRAW & BRUSHY CREEK

PLAN & PROFILE

CSJ 0715-01-025 SHEET 5 OF 5

Designed:	YP	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	BAJ	6	TEXAS				FM 108,ETC
Drawn:	YP	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	BAJ	YKM	GONZALES	0715	01	025,ETC	84

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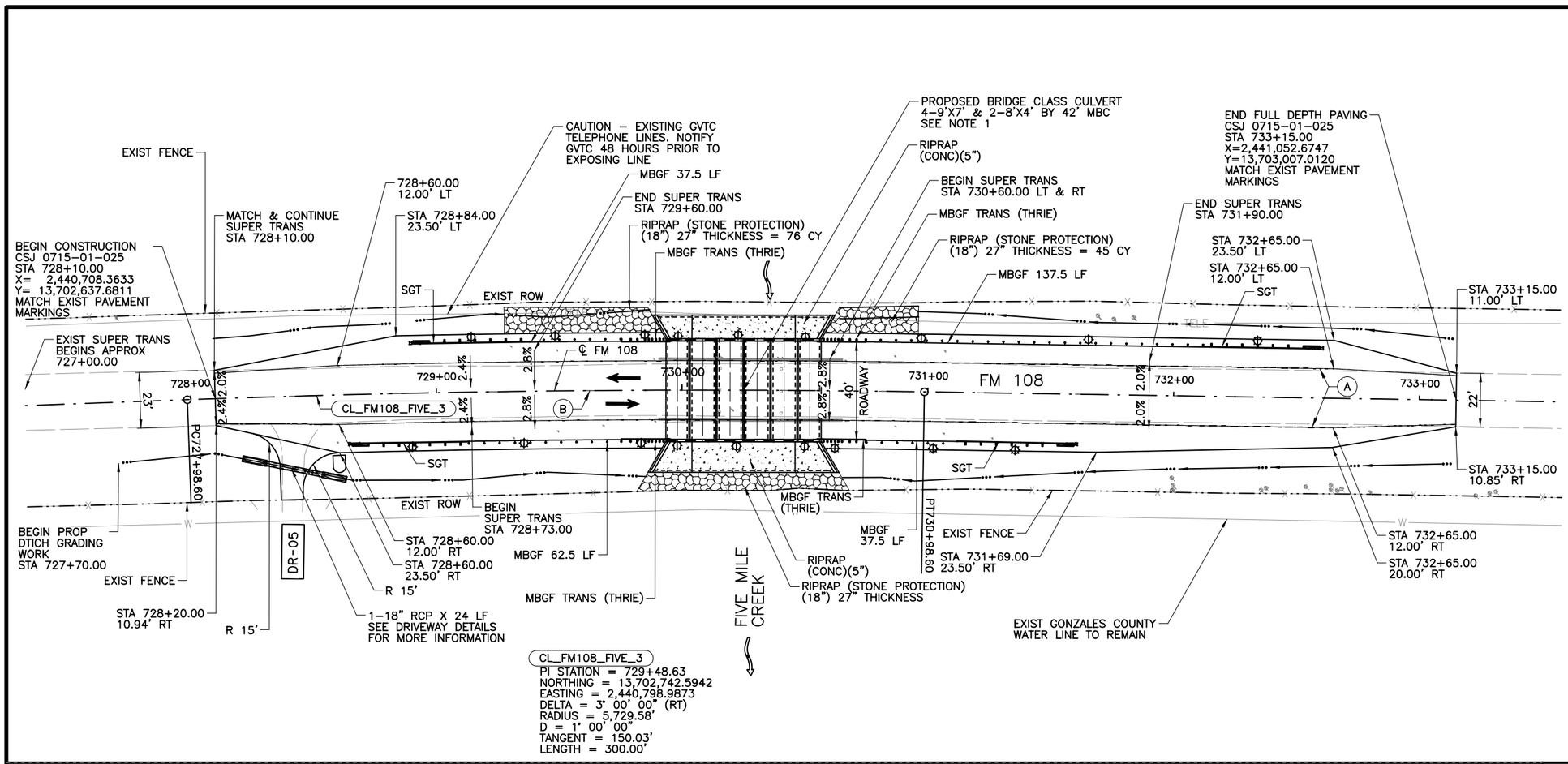
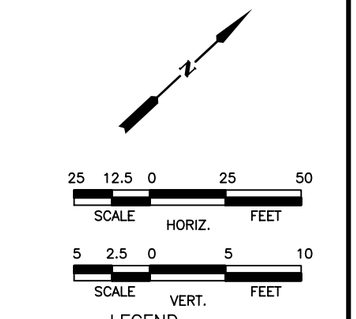
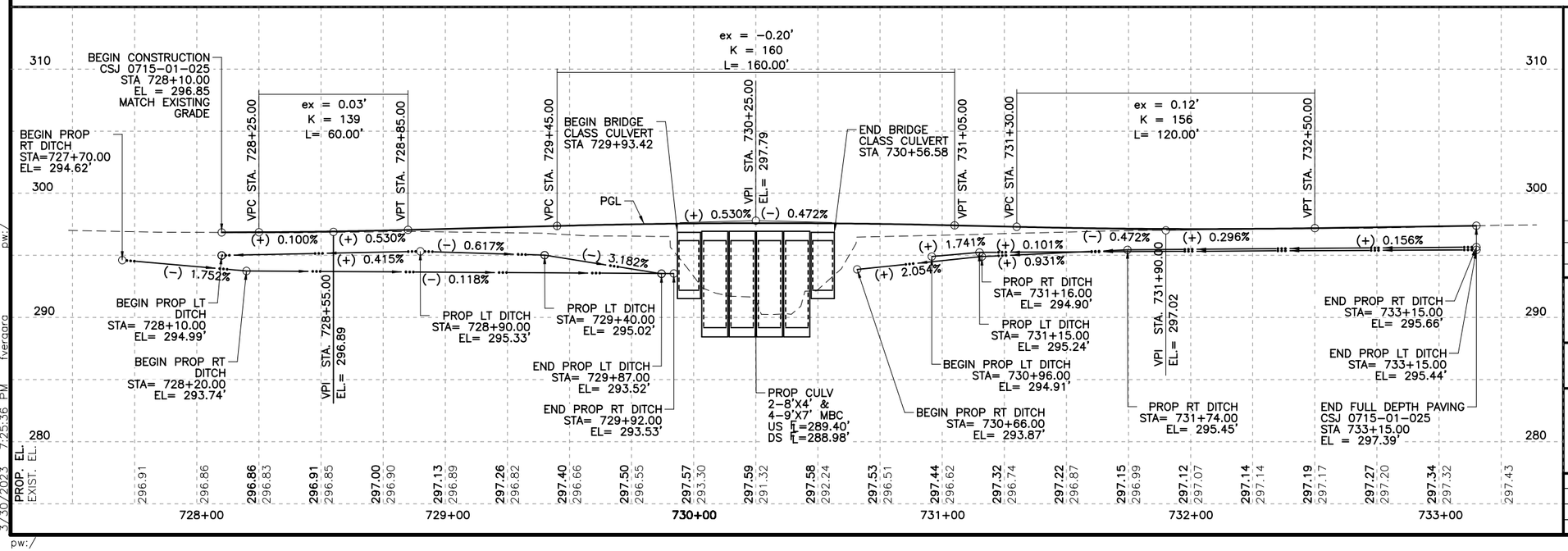




NOTES:

1. SEE CULVERT LAYOUT AND OTHER DRAINAGE SHEETS FOR MORE DETAILS



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STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED PROFESSIONAL ENGINEER
3/31/2023

NO.	REVISION	BY	DATE

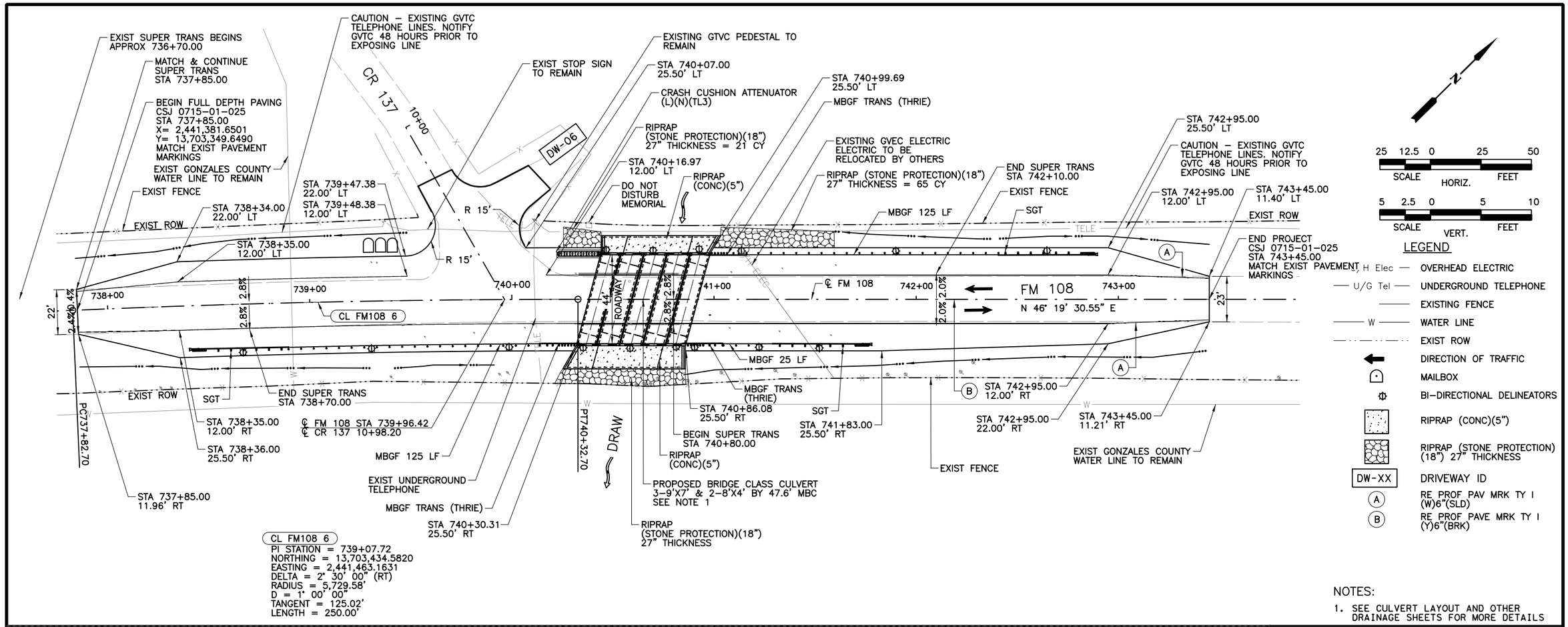
CP&Y an STV Company
TEXAS REGISTERED ENGINEERING FIRM F-1741

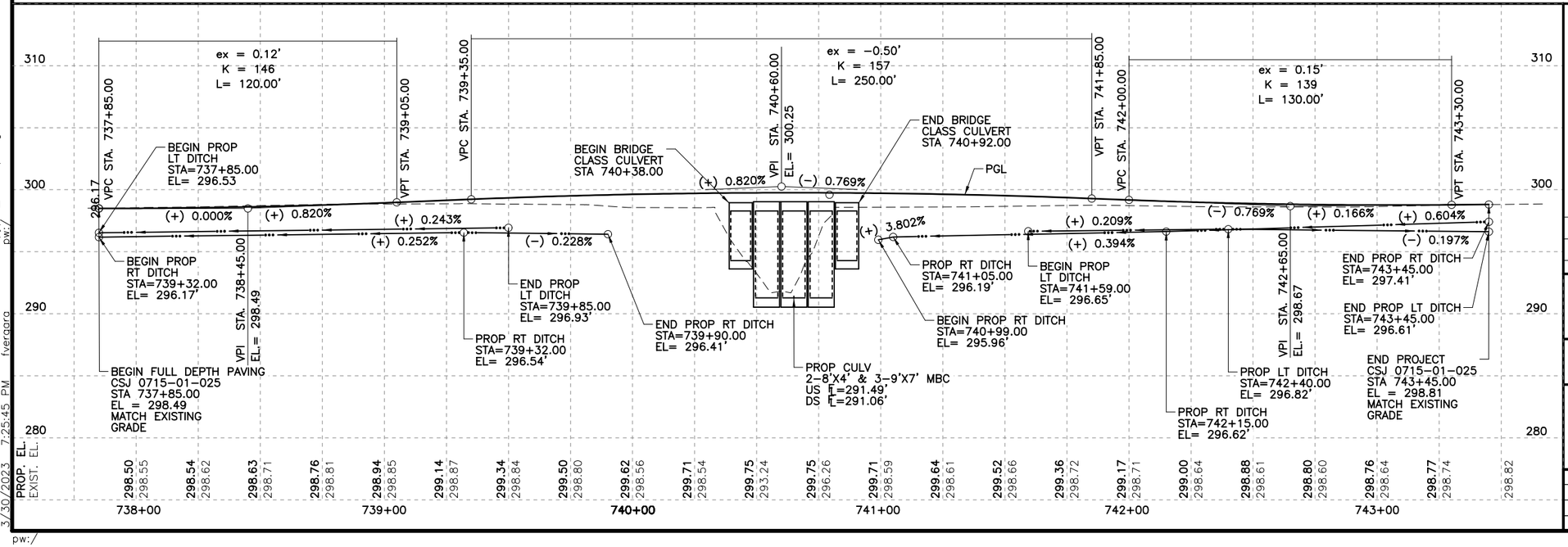
FM 108 AT FIVE MILE CREEK & DRAW

PLAN & PROFILE

CSJ 0715-01-025 SHEET 1 OF 1

Designed:	FV	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	BAJ	6	TEXAS				FM 108,ETC
Drawn:	FV	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	BAJ	YKM	GONZALES	0715	01	025,ETC	85





NOTES:

1. SEE CULVERT LAYOUT AND OTHER DRAINAGE SHEETS FOR MORE DETAILS

STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED PROFESSIONAL ENGINEER
3/31/2023

NO.	REVISION	BY	DATE

CP&Y an STV Company
TEXAS REGISTERED ENGINEERING FIRM F-1741

 Texas Department of Transportation

FM 108 AT FIVE MILE CREEK & DRAW

PLAN & PROFILE

CSJ 0715-01-025 SHEET 1 OF 1

Designed:	FV	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.	
Checked:	BAJ	6	TEXAS					FM 108,ETC	
Drawn:	FV	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.	
Checked:	BAJ	YKM	GONZALES	0715	01	025,ETC		86	

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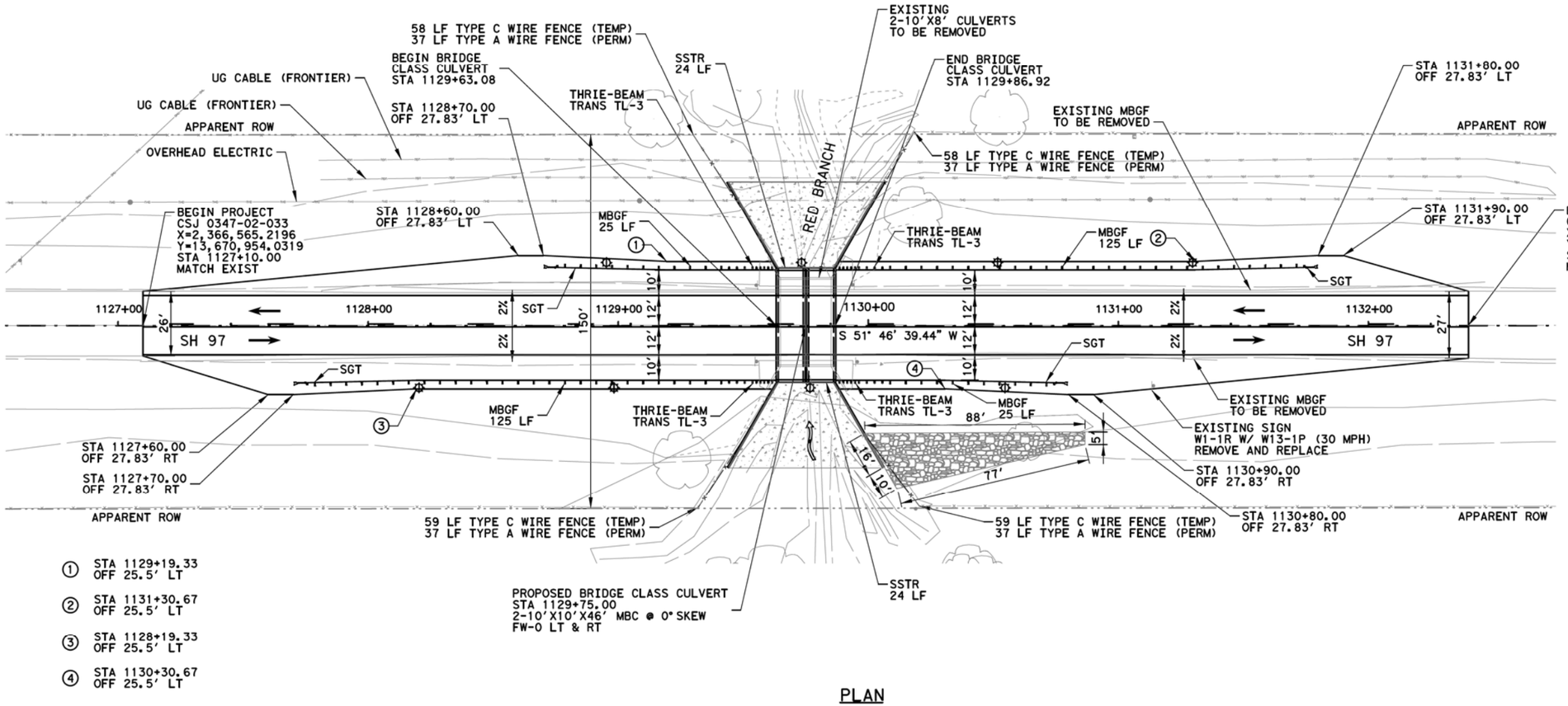


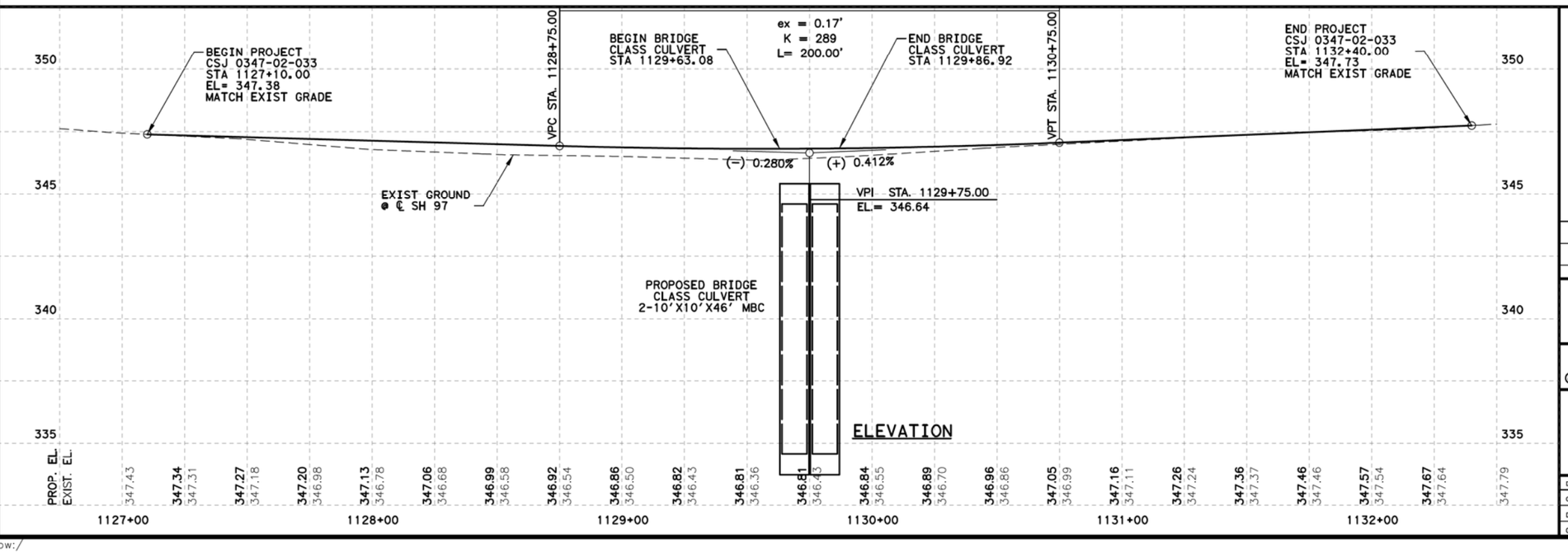
① STA 1129+19.33 OFF 25.5' LT

② STA 1131+30.67 OFF 25.5' LT

③ STA 1128+19.33 OFF 25.5' LT

④ STA 1130+30.67 OFF 25.5' LT

PLAN



STATE OF TEXAS
AMANDA H. ARAJ
123725
LICENSED PROFESSIONAL ENGINEER
3/31/2023

NO.	REVISION	BY	DATE

WSP USA Inc.
16200 Park Row, Suite 200
Houston, TX 77084
TBPE # F-2263

SH 97 AT RED BRANCH

PLAN & PROFILE

CSJ 0347-02-033 SHEET 1 OF 1

Designed:	MAK	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	AHA	6	TEXAS				FM 108, ETC
Drawn:	MAK	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
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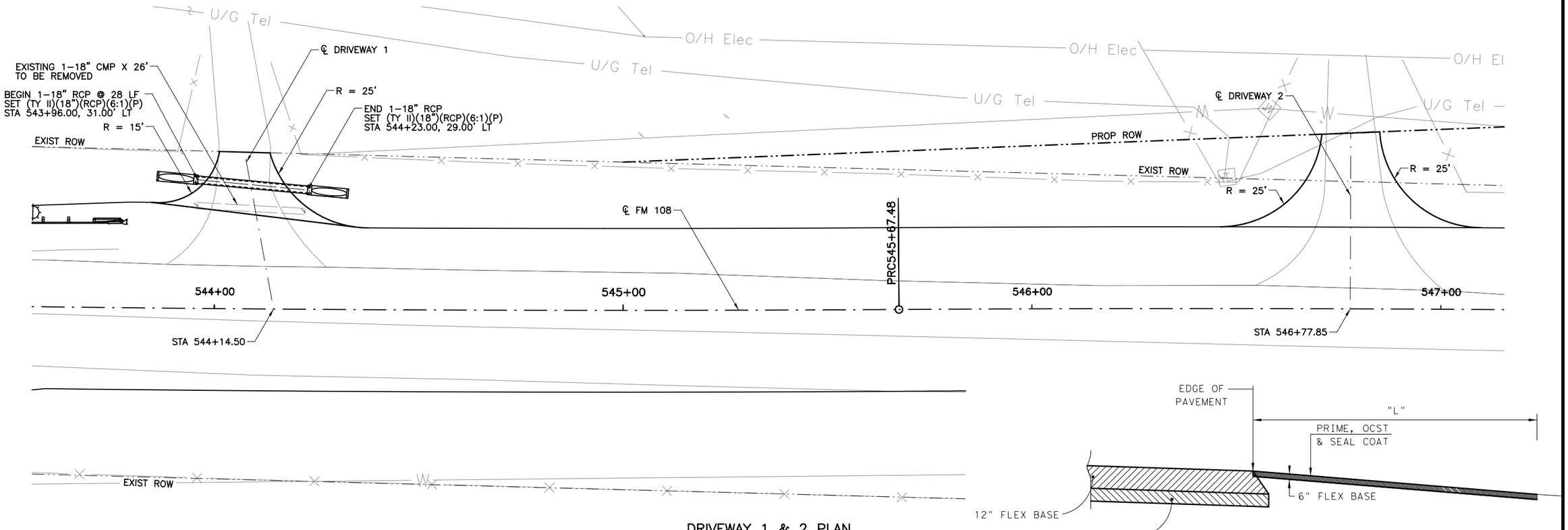
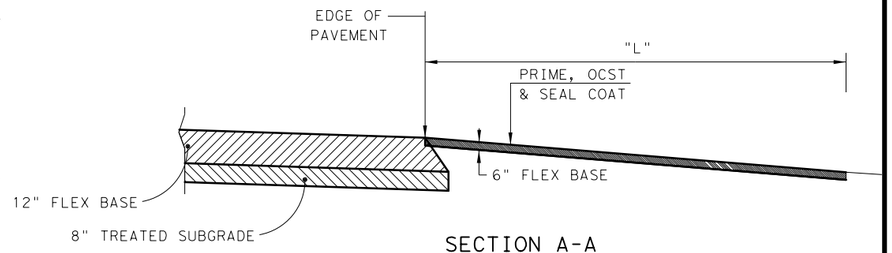
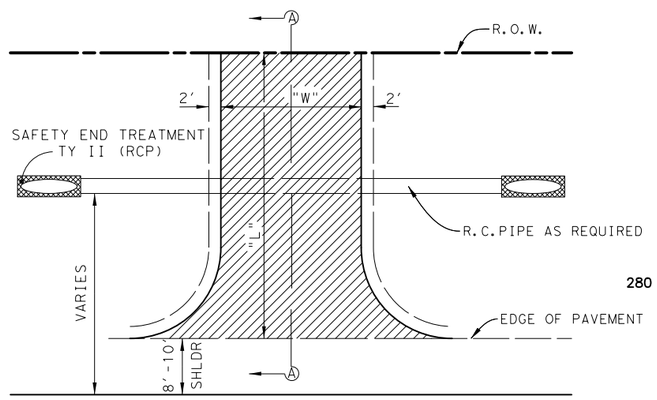


DRIVEWAY 1 & 2 PLAN

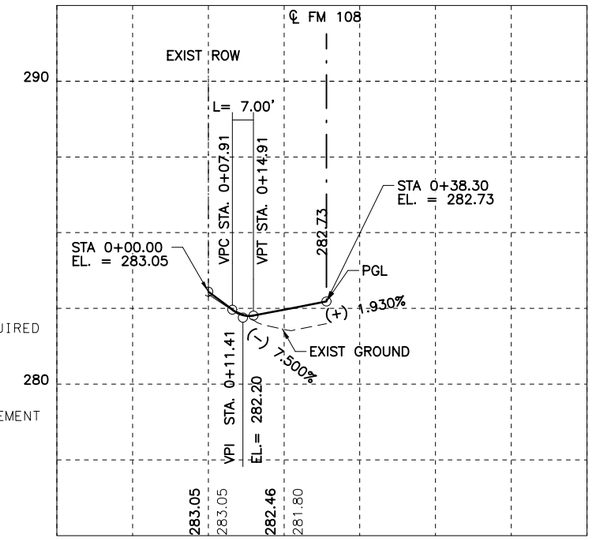
N.T.S



SECTION A-A

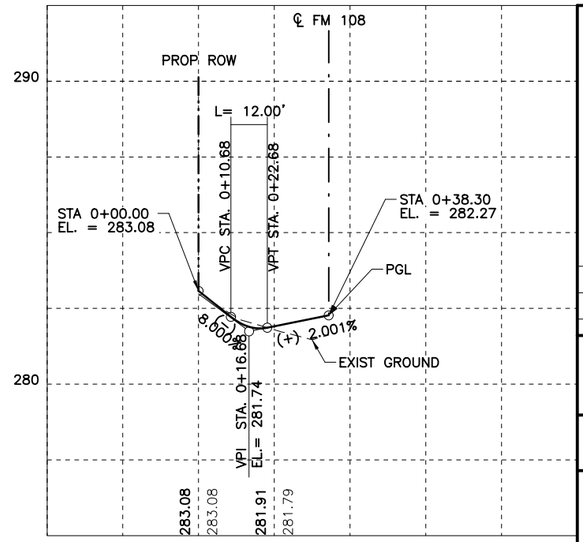


TYPICAL DRIVEWAY DETAIL



DRIVEWAY 1 PROFILE

HORIZ. SCALE = 50'
VERT. SCALE = 5'



DRIVEWAY 2 PROFILE

HORIZ. SCALE = 50'
VERT. SCALE = 5'

STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED
PROFESSIONAL ENGINEER
3/31/2023

NO.	REVISION	BY	DATE

CP&Y an STV Company

TEXAS REGISTERED ENGINEERING FIRM F-1741

 Texas Department of Transportation

FM 108 AT DRAW & BRUSHY CREEK

DRIVEWAY LAYOUT

CSJ 0715-01-025 SHEET 1 OF 3

Designed:	YP	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	BAJ	6	TEXAS					FM 108,ETC
Drawn:	YP	DIST.	COUNTY		CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
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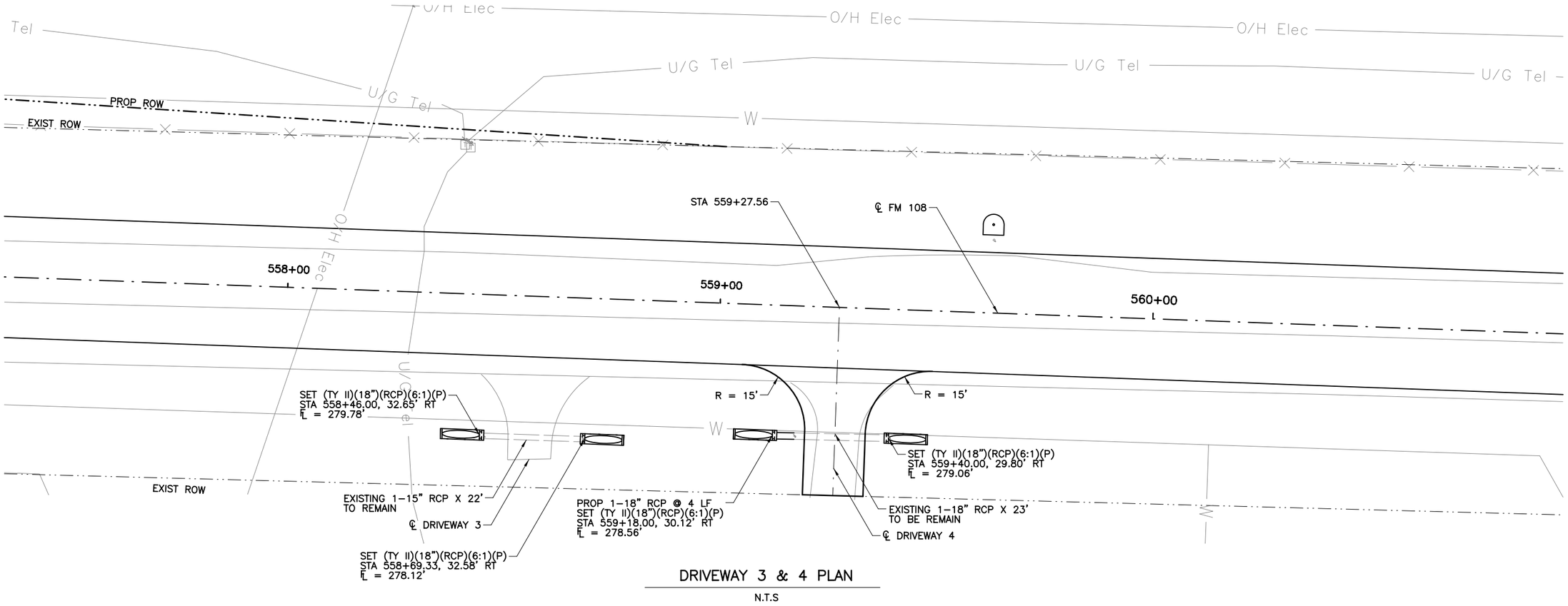
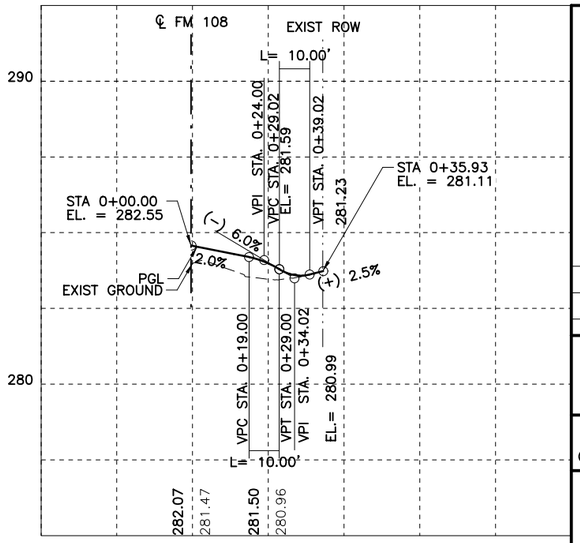


DRIVEWAY 3 & 4 PLAN

N.T.S



DRIVEWAY 4 PROFILE

HORIZ. SCALE = 50'
VERT. SCALE = 5'

STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED
PROFESSIONAL ENGINEER
3/31/2023

NO.	REVISION	BY	DATE

CP&Y an STV Company
TEXAS REGISTERED ENGINEERING FIRM F-1741

 Texas Department of Transportation

FM 108 AT DRAW & BRUSHY CREEK

DRIVEWAY LAYOUT

CSJ 0715-01-025 SHEET 2 OF 3

Designed:	YP	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	BAJ	6	TEXAS				FM 108,ETC
Drawn:	YP	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
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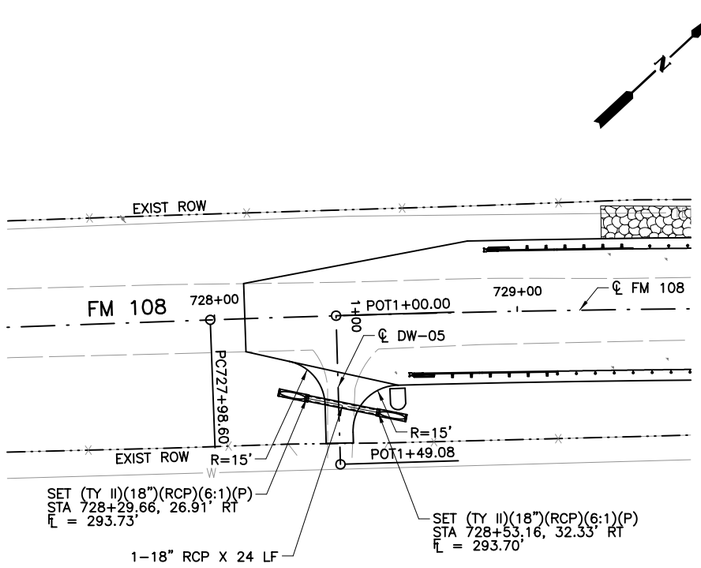
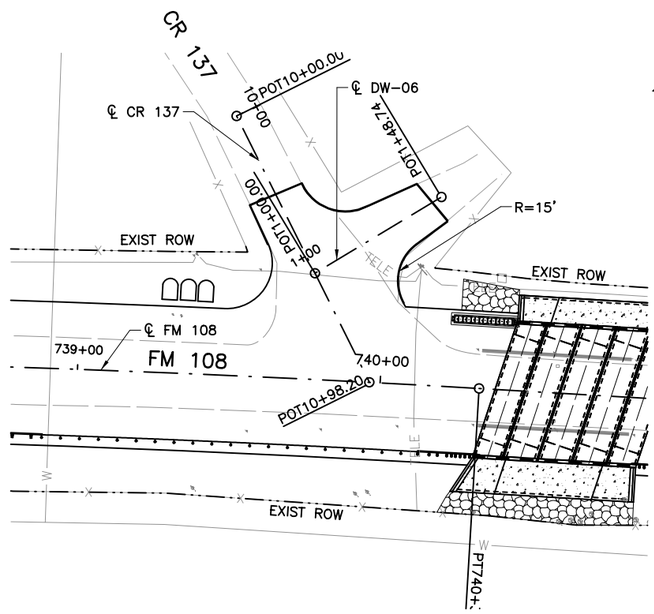
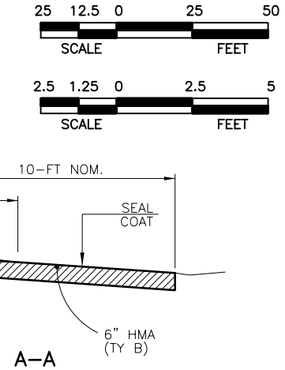


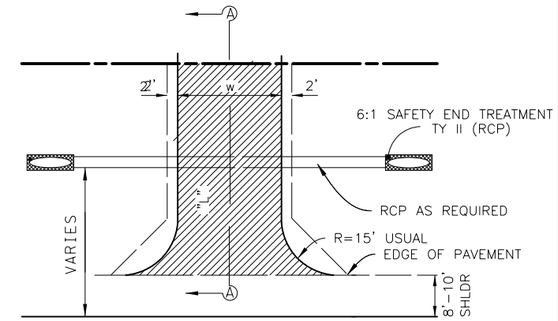
DRIVEWAY 5 PLAN



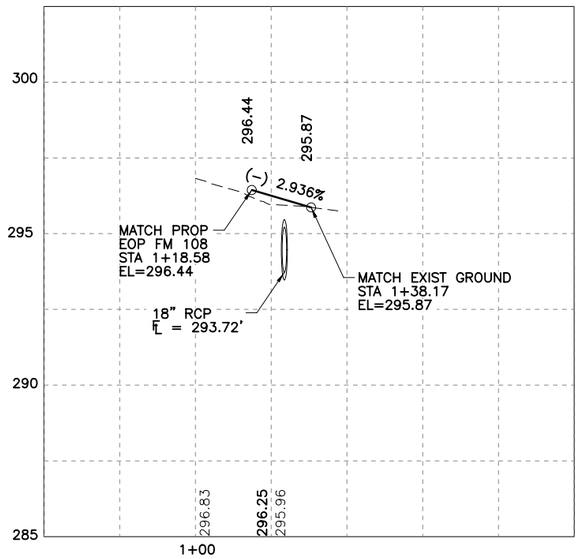
DRIVEWAY 6 PLAN



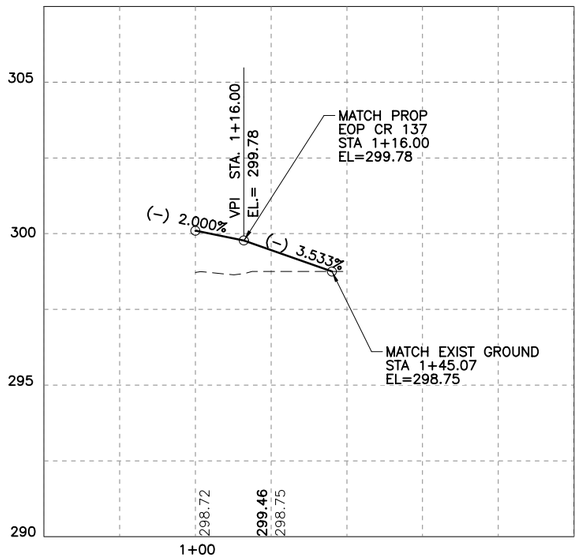
SECTION A-A



TYPICAL DRIVEWAY DETAIL



DRIVEWAY 5 PROFILE



DRIVEWAY 6 PROFILE

25 12.5 0 25 50
SCALE FEET

2.5 1.25 0 2.5 5
SCALE FEET

STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED PROFESSIONAL ENGINEER

3/31/2023

NO.	REVISION	BY	DATE

CP&Y an STV Company
TEXAS REGISTERED ENGINEERING FIRM F-1741

 Texas Department of Transportation

FM 108 AT FIVE MILE CREEK & DRAW

DRIVEWAY LAYOUT

CSJ 0715-01-025 SHEET 3 OF 3

Designed:	FV	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	BAJ	6	TEXAS					FM 108,ETC
Drawn:	FV	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	BAJ	YKM	GONZALES	0715	01	025,ETC		90

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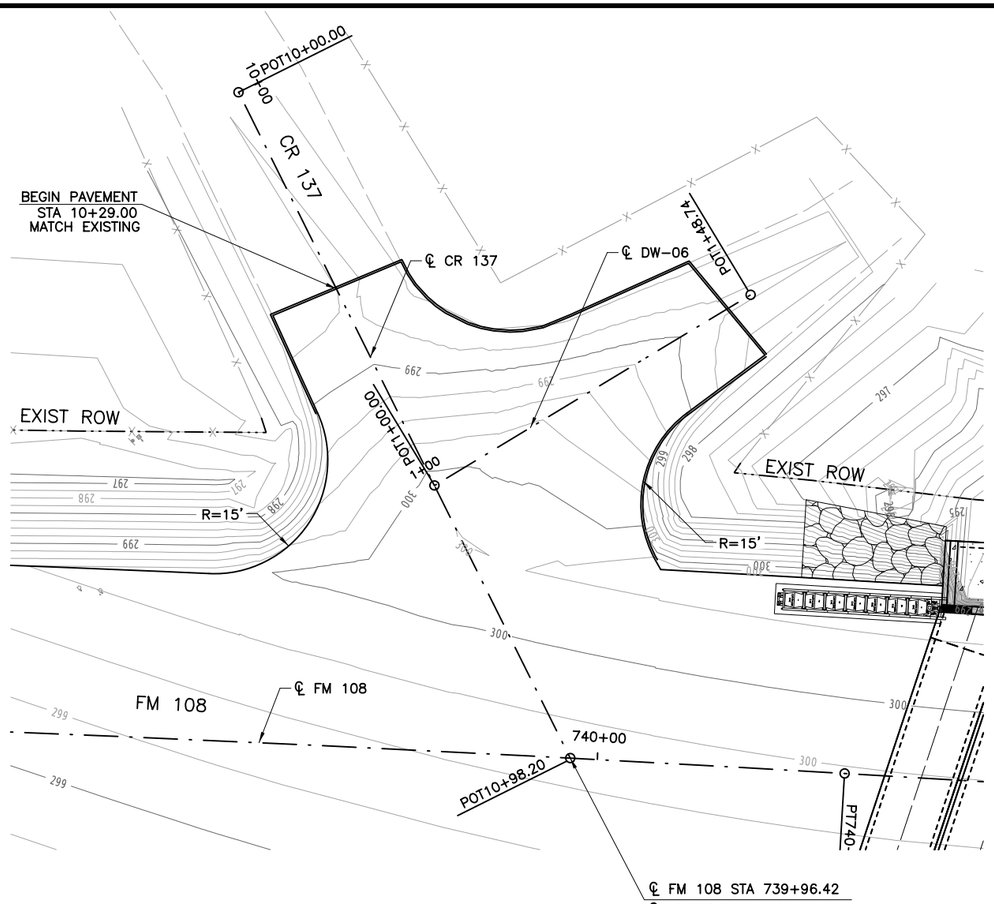
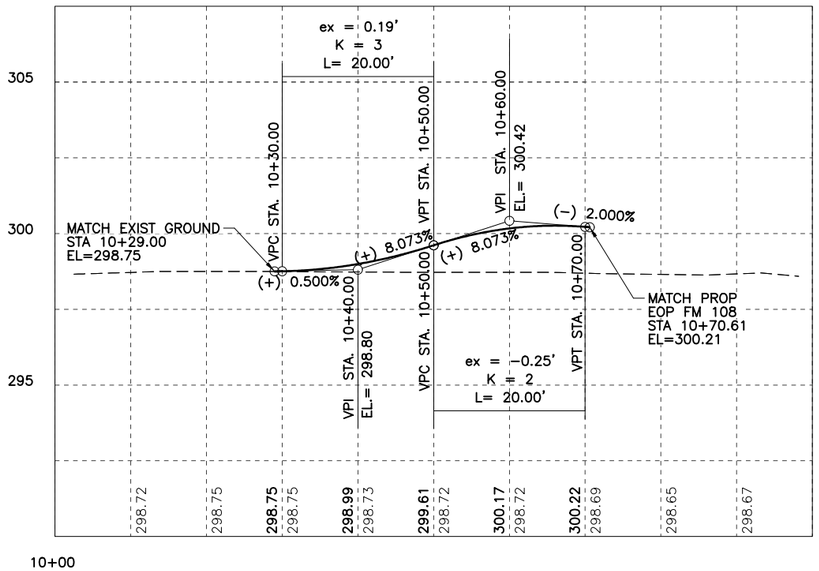
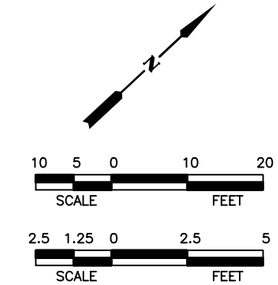




CR137 PROFILE



NO.	REVISION	BY	DATE

TEXAS REGISTERED ENGINEERING FIRM F-1741

CP&Y an STV Company

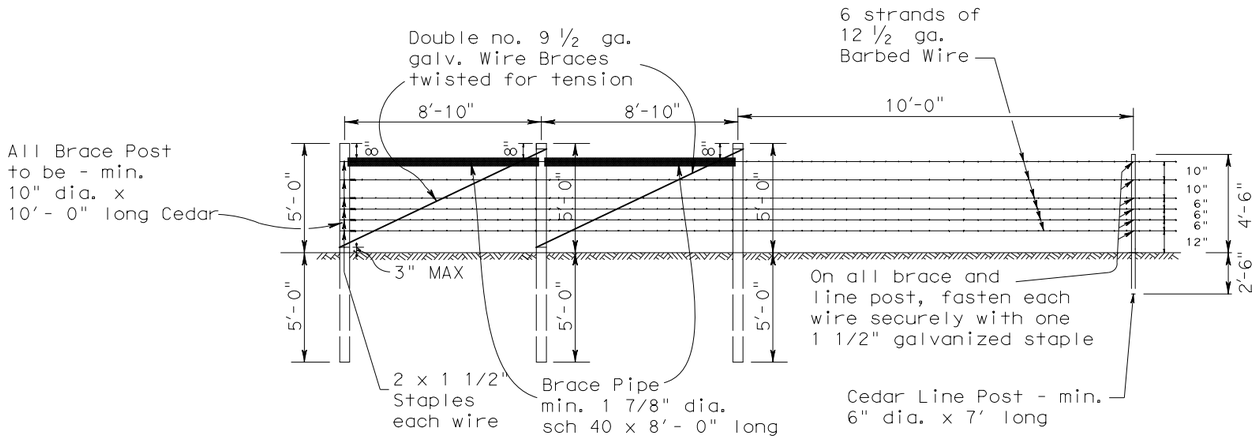
 Texas Department of Transportation

FM 108 AT FIVE MILE CREEK & DRAW

CR 137 LAYOUT

CSJ 0715-01-025 SHEET 1 OF 1

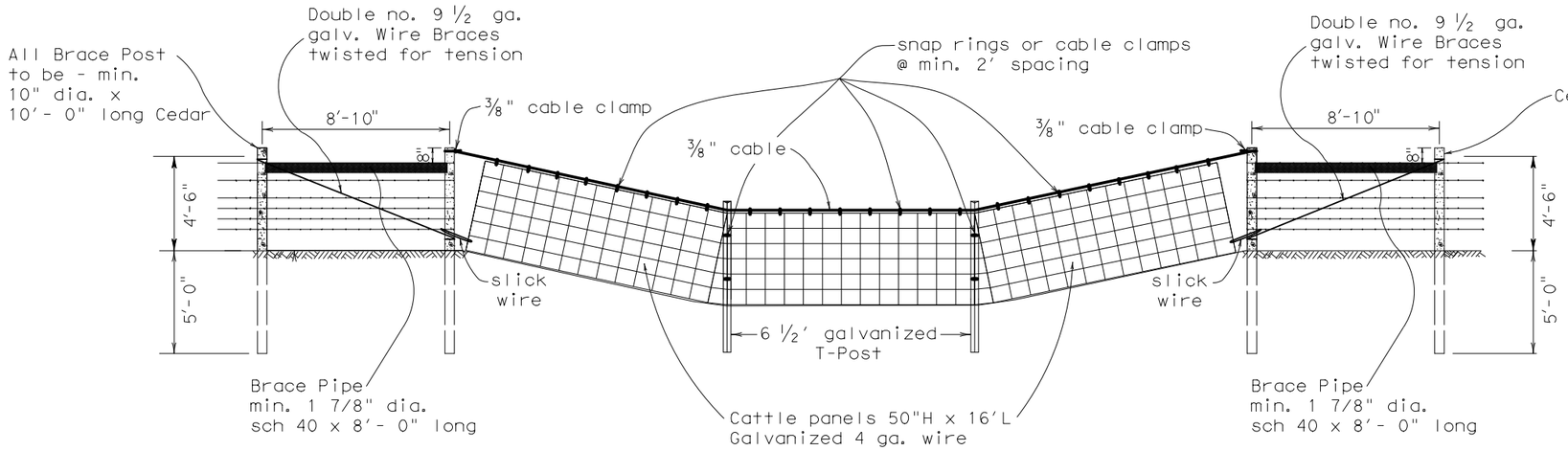
Designed:	FV	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	BAJ	6	TEXAS				FM 108,ETC
Drawn:	FV	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	BAJ	YKM	GONZALES	0715	01	025,ETC	91



TYPE "A" FENCE

NOTES:

1. Twisted brace wire to be double wrapped around the bottom and top of each brace post.
2. Drive 3 - 16 penny dipped galv nails half way into each brace post on a 1 1/4" dia. to hold the 1 7/8" brace pipe in place.
3. Barbed Wire shall be mechanically stretched.
4. Braced Post and Line Post to be backfilled and tamped in 6" lifts.
5. Excess dirt to be piled up around base of each post after tamping.
6. Second brace is needed when the length of fence between PIs is greater tha or equal to 200'.
7. The Type "A" Fence & Wire Gap will be paid for, under Item 552 Wire Fence (Ty A).
8. Barbed Wire shall be in accordance with ASTM A 121(Class 1) Design designation 12-2-4-1 or 12-2-5-1 4R, or as approved by the Engineer.



DETAIL OF WIRE GAP

STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED
PROFESSIONAL ENGINEER

4/26/2023

CP&Y, Inc.
Firm # F-1741

WIRE FENCE DETAIL

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

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Texas Department of Transportation

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			92
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
0715	01	025,ETC	FM 108,ETC

DATE:
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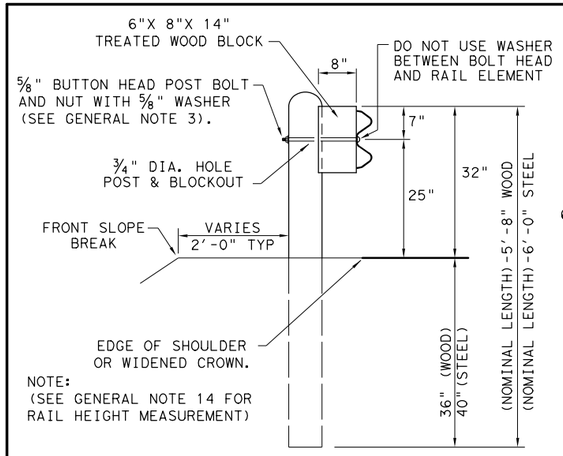
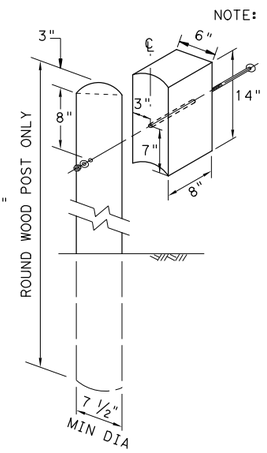
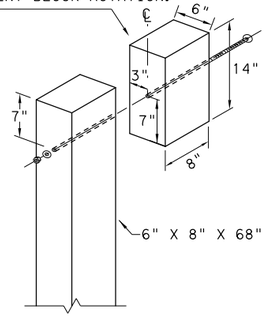


TYPICAL POST PLACEMENT

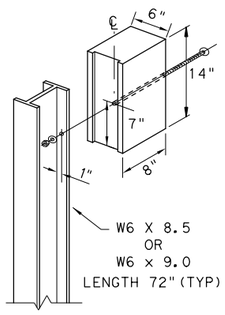


WOOD BLOCK TO ROUND WOOD POST

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

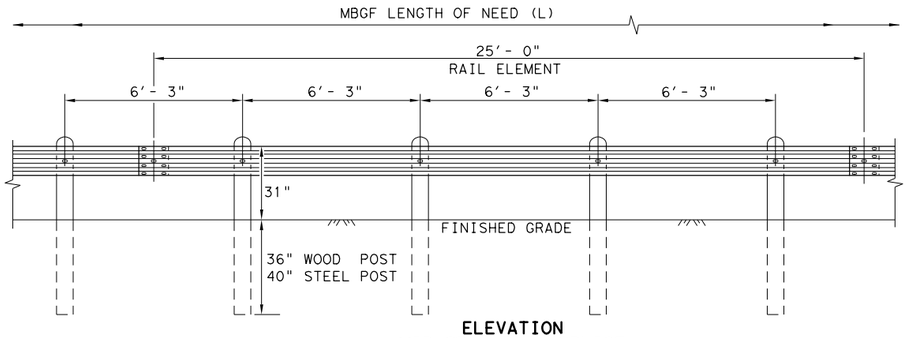


WOOD BLOCK TO RECTANGULAR WOOD POST



ROUTED WOOD BLOCK TO I-BEAM STEEL POST

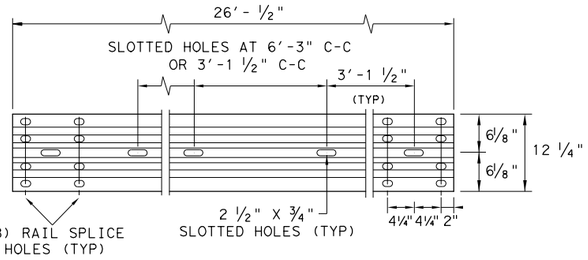
NOTE: ✳✳ "WOOD" INDICATES DIMENSIONS FOR BOTH ROUND AND RECTANGULAR WOOD POST SYSTEMS.



ELEVATION MID-SPAN RAIL SPLICE

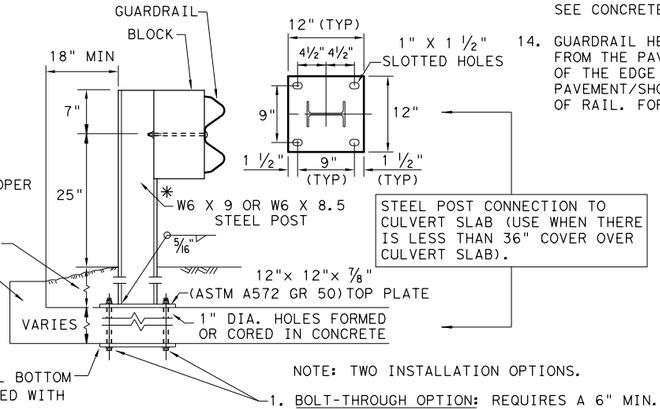
SHOWING A 25'- 0" SECTION OF W-BEAM RAIL. (SEE GENERAL NOTE 2)

DIRECTION OF TRAFFIC



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

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



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

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

LOW FILL CULVERT POST

NOTE: TWO INSTALLATION OPTIONS.

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

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

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

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

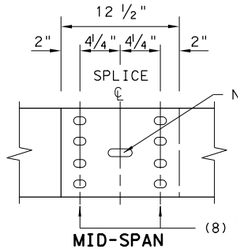
NOTE:
FOUR TYPES OF BUTTON-HEAD GUARD RAIL BOLTS COME WITH A RECCESSED NUT.

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

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

BUTTON HEAD BOLT

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



MID-SPAN RAIL SPLICE DETAIL

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

GENERAL NOTES

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

Texas Department of Transportation — Design Division Standard

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

FILE: gf3119.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0715	01	025,ETC	FM108,ETC
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		93

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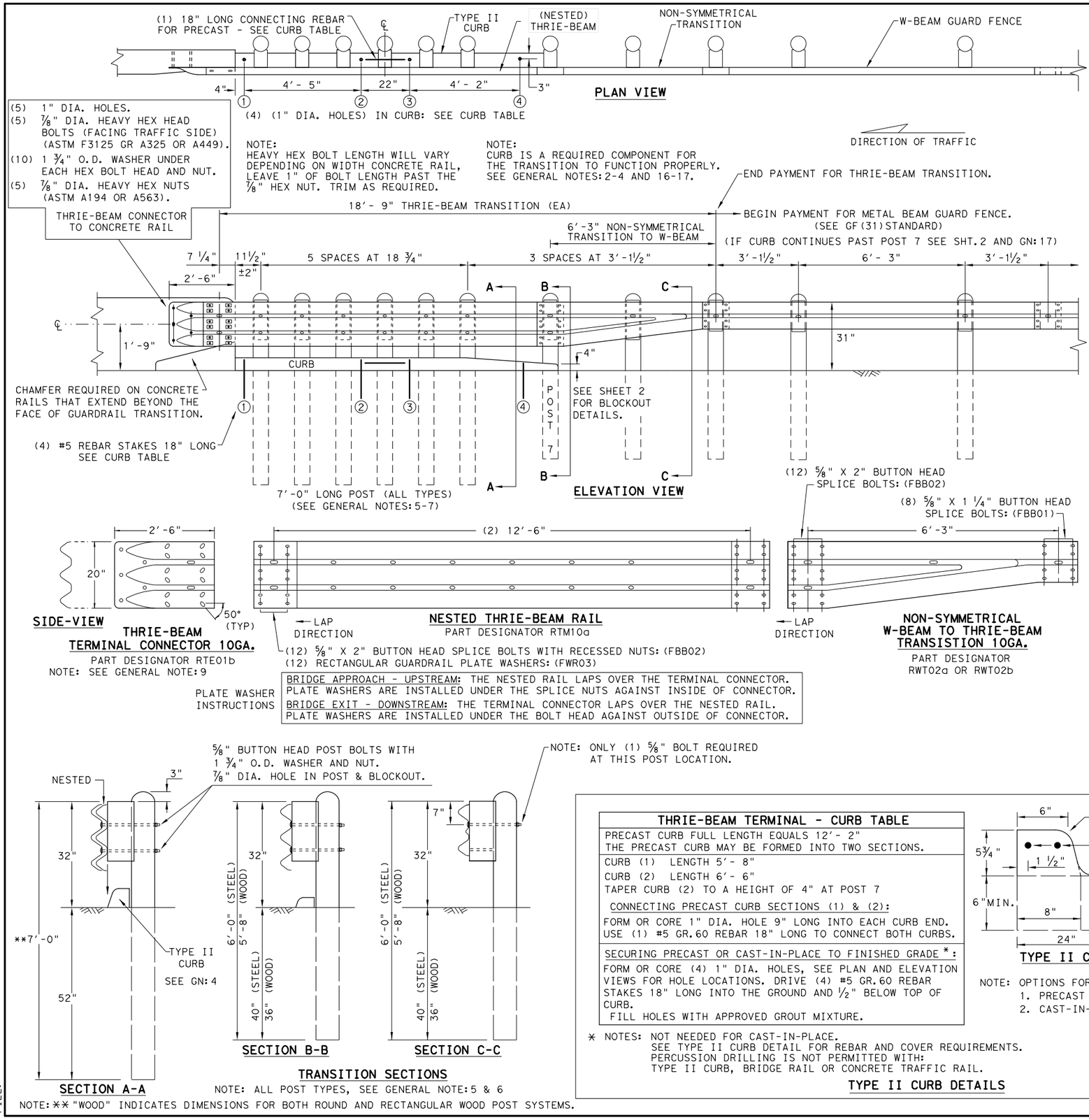


GENERAL NOTES

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- 3/4" 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 1/2" 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 5/8" 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 5/8" 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.

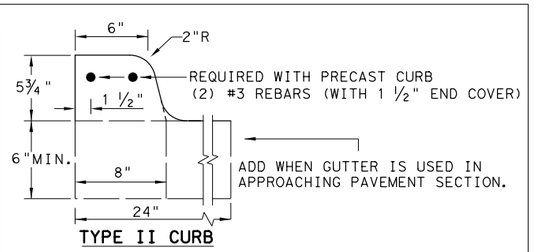
THRIE-BEAM TERMINAL - CURB TABLE

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 1/2" BELOW TOP OF CURB.
FILL HOLES WITH APPROVED GROUT MIXTURE.



TYPE II CURB

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

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: gf31tr1320.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
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REVISIONS	0715	01	025,ETC	FM108,ETC
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		94

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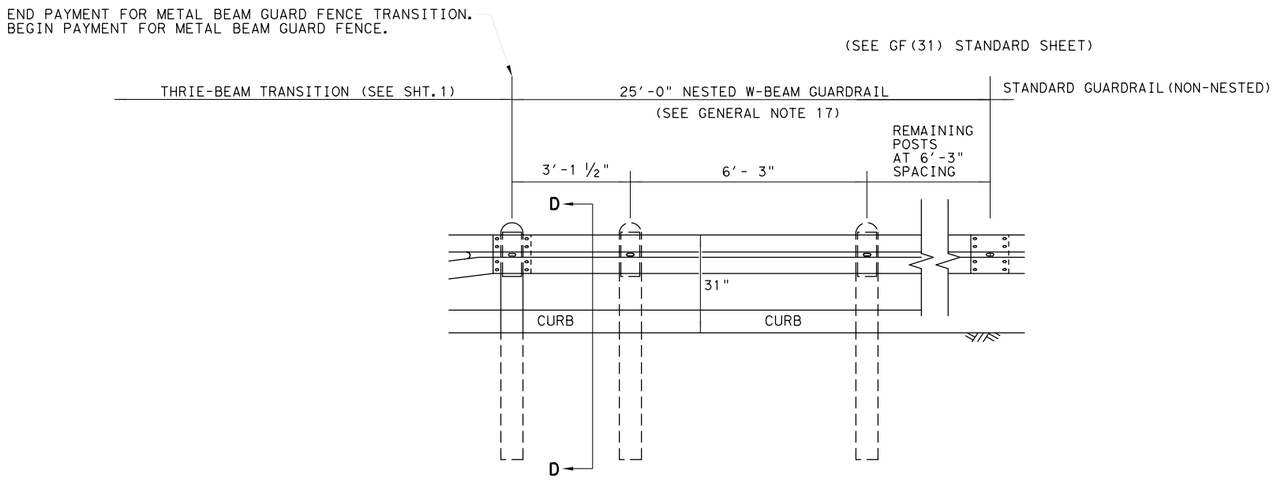
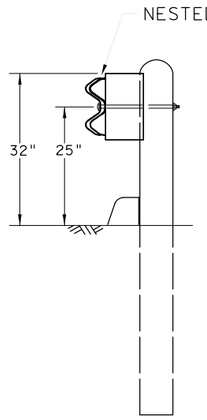
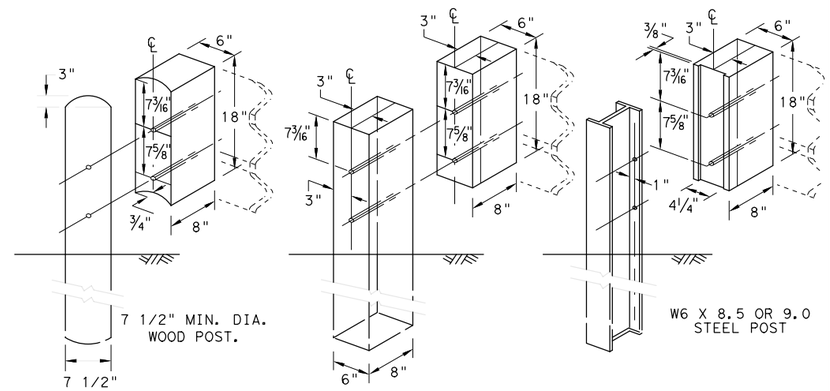
REQUIRED ALTERNATIVE FOR CONTINUOUS CURB EXTENDING PAST POST 7 (SEE SHT. 1 GENERAL NOTE 17)



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

FILE: gf31tr1320.dgn	DN: TxDOT	CK: KM	DW: KM	CK: CGL/AG	
©TxDOT: NOVEMBER 2020	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0715	01	025,ETC	FM108,ETC	
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	YKM	GONZALES		95	

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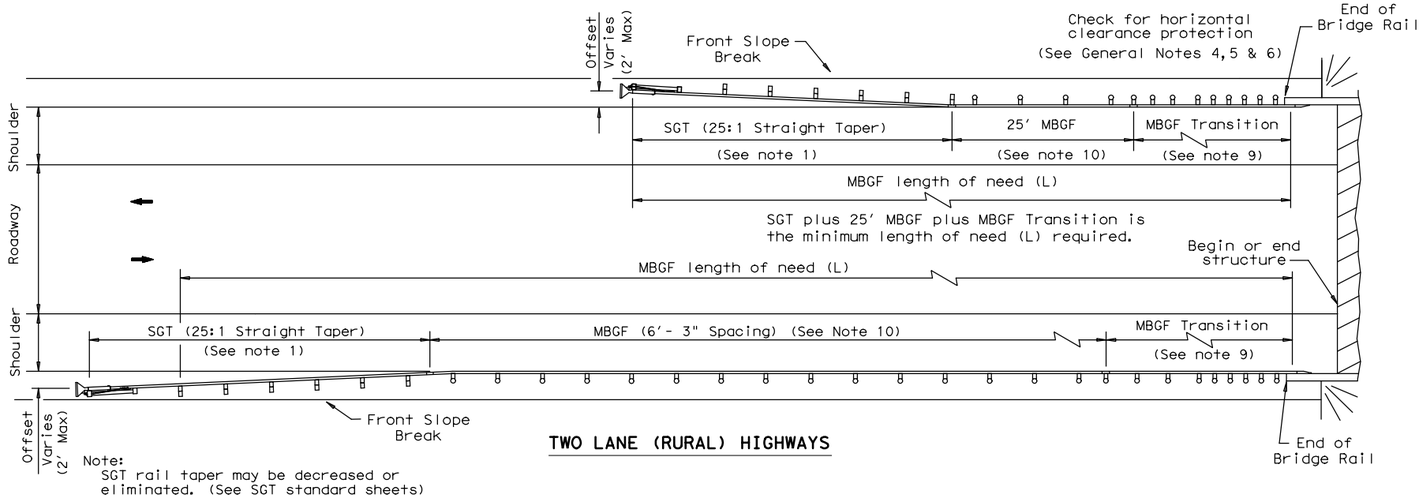
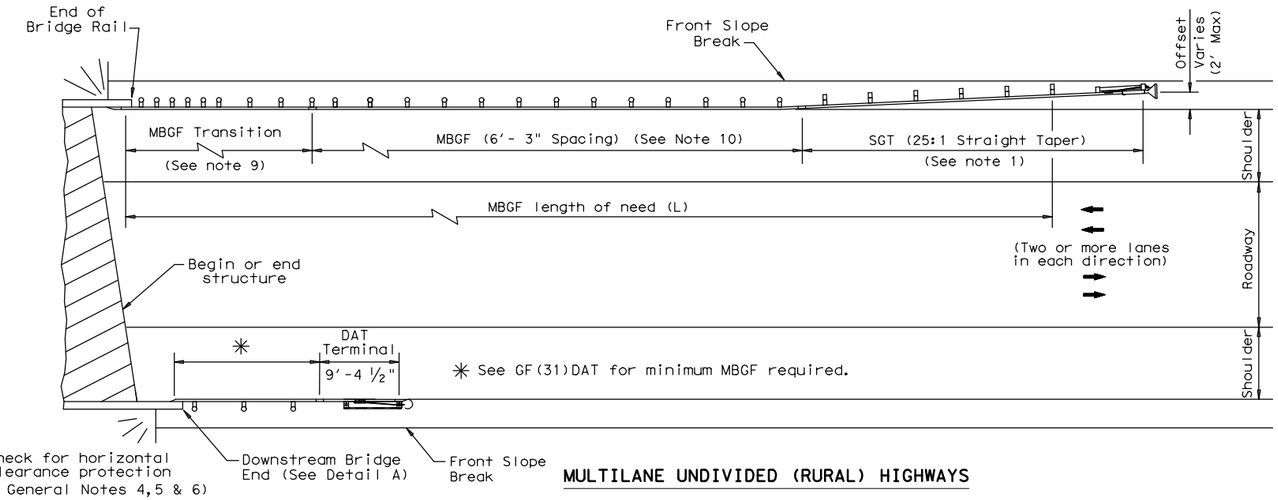
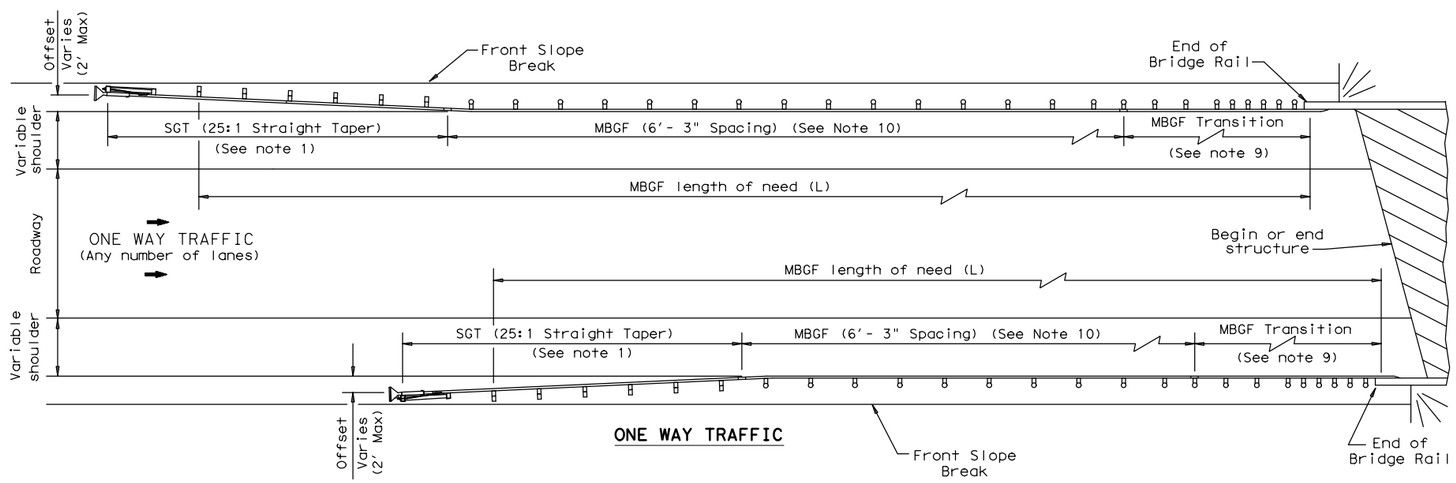


TWO LANE (RURAL) HIGHWAYS

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



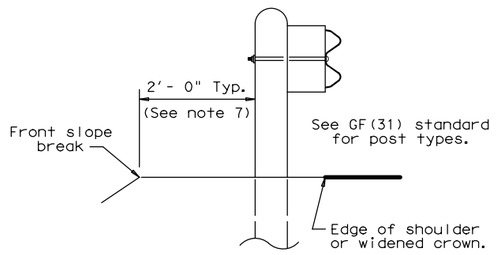
MULTILANE UNDIVIDED (RURAL) HIGHWAYS



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
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REVISED APRIL 2014 SEE (MEMO 0414)	DIST	COUNTY		SHEET NO.
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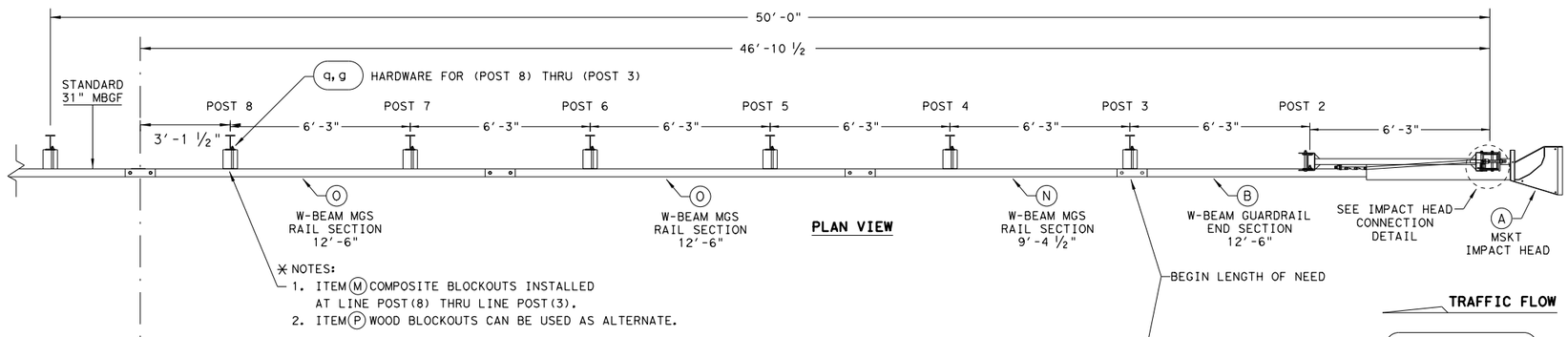
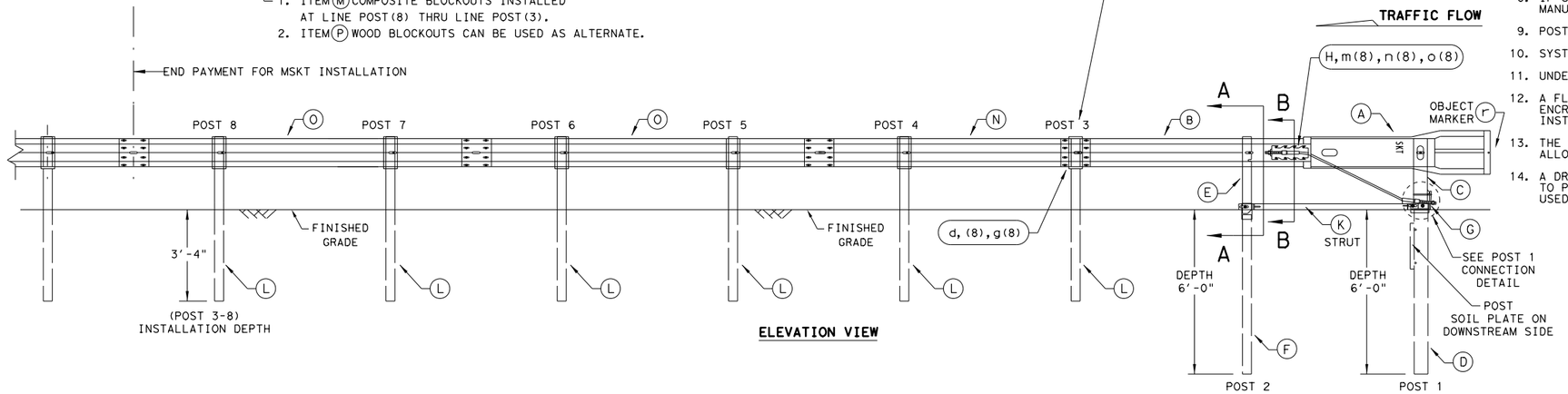




NOTE: SEE (GENERAL NOTE 14) FOR DRIVING CAP INFORMATION.

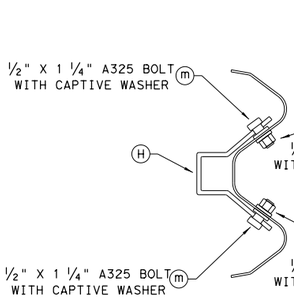
GENERAL NOTES

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.

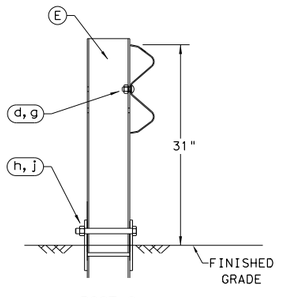
ITEM	QTY	MAIN SYSTEM COMPONENTS	ITEM NUMBERS
A	1	MSKT IMPACT HEAD	MS3000
B	1	W-BEAM GUARDRAIL END SECTION, 12 Ga.	SF1303
C	1	POST 1 - TOP (6" X 6" X ⅛" TUBE)	MTPHP1A
D	1	POST 1 - BOTTOM (6′ W6X15)	MTPHP1B
E	1	POST 2 - ASSEMBLY TOP	UHP2A
F	1	POST 2 - ASSEMBLY BOTTOM (6′ W6X9)	HP2B
G	1	BEARING PLATE	E750
H	1	CABLE ANCHOR BOX	S760
J	1	BCT CABLE ANCHOR ASSEMBLY	E770
K	1	GROUND STRUT	MS785
L	6	W6x9 OR W6x8.5 STEEL POST	P621
M	6	COMPOSITE BLOCKOUTS	CBSP-14
N	1	W-BEAM MGS RAIL SECTION (9′-4 ½")	G12025
O	2	W-BEAM MGS RAIL SECTION (12′-6")	G1203A
P	6	WOOD BLOCKOUT 6" X 8" X 14"	P675
Q	1	W-BEAM MGS RAIL SECTION (25′-0")	G1209
		SMALL HARDWARE	
a	2	⅝" x 1" HEX BOLT (GRD 5)	B5160104A
b	4	⅝" WASHER	W0516
c	2	⅝" HEX NUT	N0516
d	25	⅝" Dia. x 1 ¼" SPLICE BOLT (POST 2)	B580122
e	2	⅝" Dia. x 9" HEX BOLT (GRD A449)	B580904A
f	3	⅝" WASHER	W050
g	33	⅝" Dia. H.G.R NUT	N050
h	1	¾" Dia. x 8 ½" HEX BOLT (GRD A449)	B340854A
j	1	¾" Dia. HEX NUT	N030
k	2	1 ANCHOR CABLE HEX NUT	N100
l	2	1 ANCHOR CABLE WASHER	W100
m	8	½" x 1 ¼" A325 BOLT WITH CAPTIVE WASHER	SB12A
n	8	½" STRUCTURAL NUTS	N012A
o	8	1 1/16" O.D. x 9/16" I.D. STRUCTURAL WASHERS	W012A
p	1	BEARING PLATE RETAINER TIE	CT-100ST
q	6	⅝" x 10" H.G.R. BOLT	B581002
r	1	OBJECT MARKER 18" X 18"	E3151

SEE NOTES: ✳

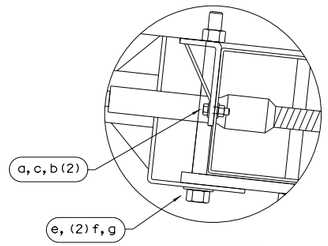
ALTERNATIVE ITEMS NOT SHOWN. ✳✳
✳ ITEM(P) 8" WOOD-BLOCKOUT
✳✳ ITEM(Q) 25′GUARD FENCE PANEL



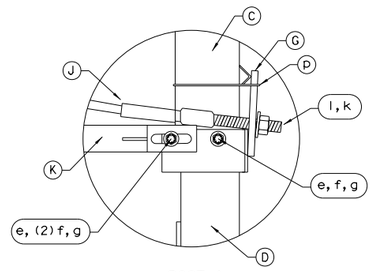
SECTION B-B
ANCHOR BRACKET



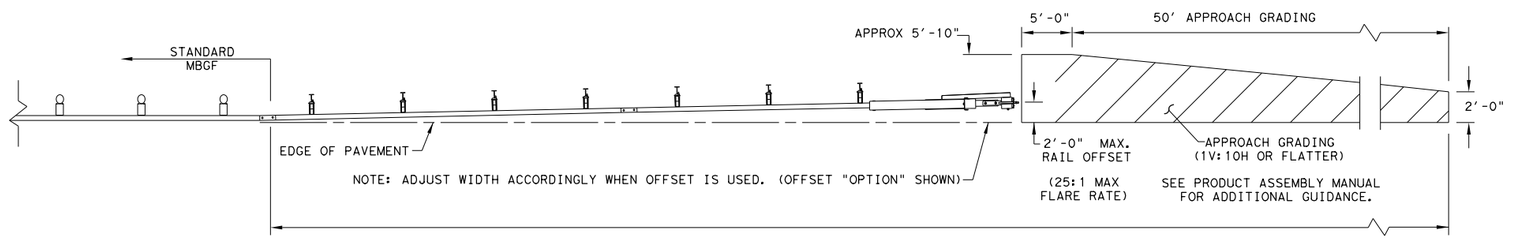
POST 2
SECTION A-A



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	
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	DIST	COUNTY		SHEET NO.	
	YKM	GONZALES		97	

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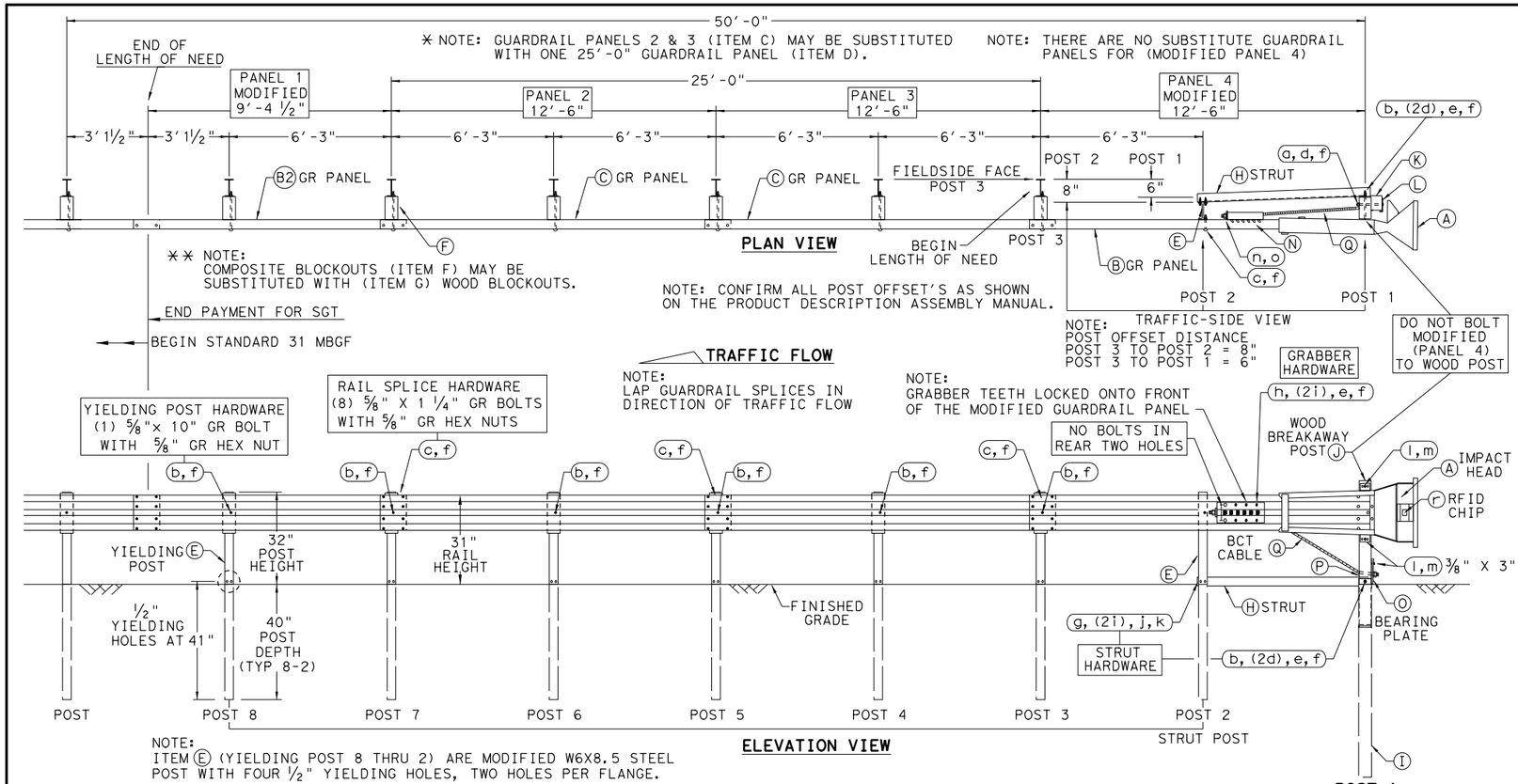
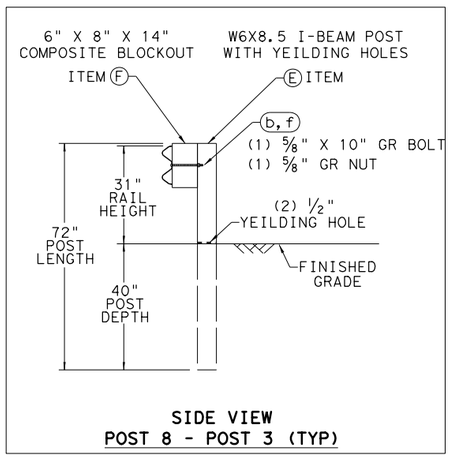


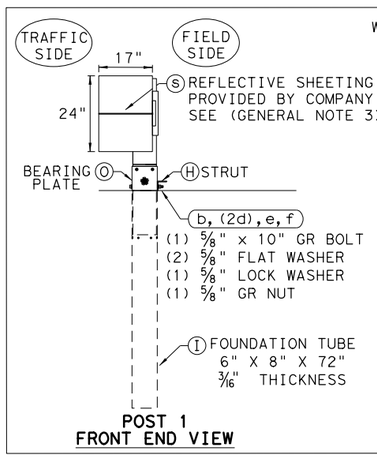
GENERAL NOTES

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.

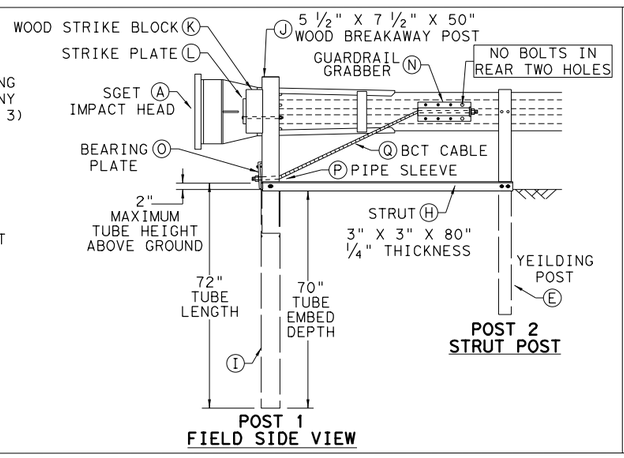
ITEM	QTY	MAIN SYSTEM COMPONENTS	ITEM #
A	1	SGET IMPACT HEAD	SIH1A
B	1	MODIFIED GUARDRAIL PANEL 12'-6" 12GA	126SPZGP
B2	1	MODIFIED GUARDRAIL PANEL 9'-4 1/2" 12GA	GP94
C	2	STANDARD GUARDRAIL PANEL 12'-6" 12GA	GP126
D	1	STANDARD GUARDRAIL PANEL 25'-0" 12GA	GP25
E	7	MODIFIED YIELDING I-BEAM POST W6x8.5	YP6MOD
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



SIDE VIEW
POST 8 - POST 3 (TYP)

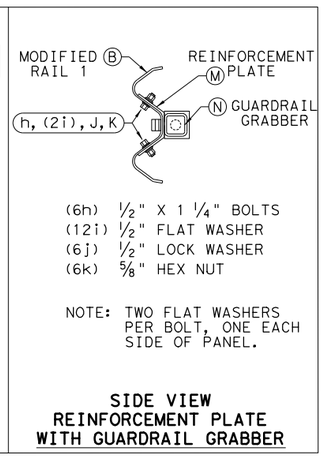


POST 1
FRONT END VIEW

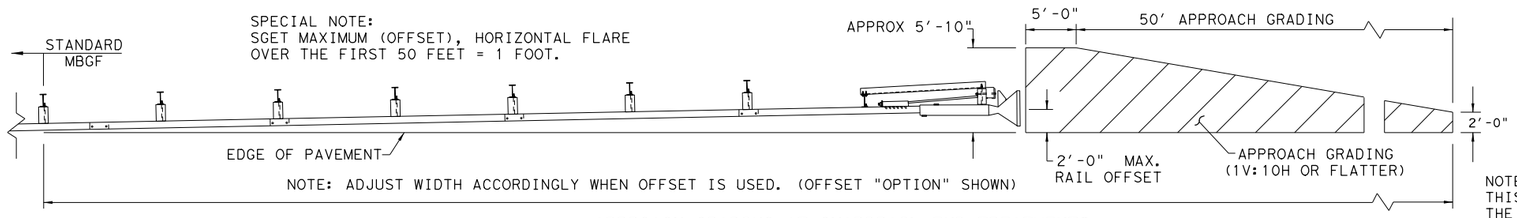


POST 1
FIELD SIDE VIEW

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

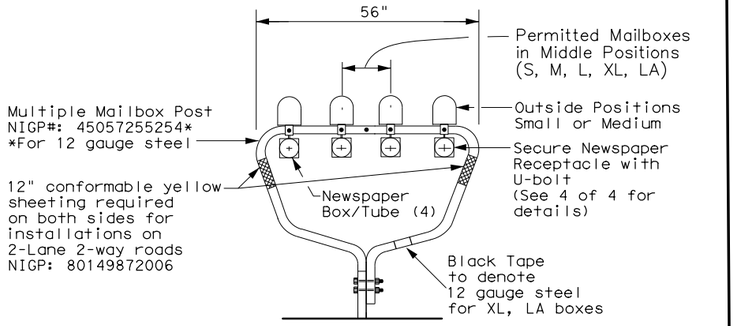
Design Division Standard

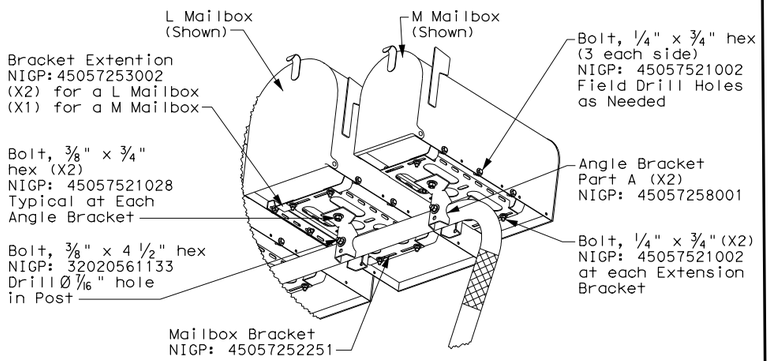
SPIG INDUSTRY, LLC
SINGLE GUARDRAIL TERMINAL
SGET - TL-3 - MASH
SGT(15)31-20

FILE: sgt153120.dgn	DN: TxDOT		CK: KM	DW: VP		CK: VP
© TxDOT: APRIL 2020	CONT	SECT	JOB		HIGHWAY	
REVISIONS	0715	01	025,ETC		FM108,ETC	
	DIST	COUNTY			SHEET NO.	
	YKM	GONZALES			98	

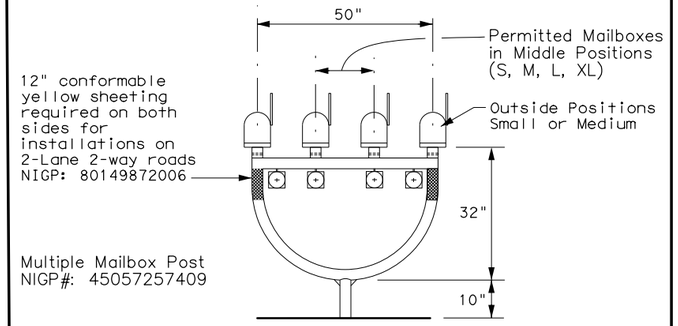
DATE:
FILE:

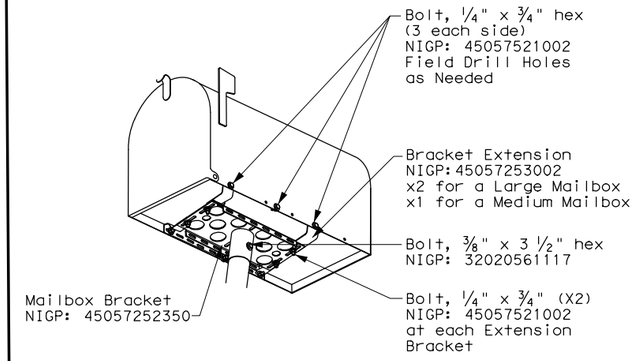
TYPE 1 - MULTIPLE





TYPE 4 - MULTIPLE





MAILBOX SIZES

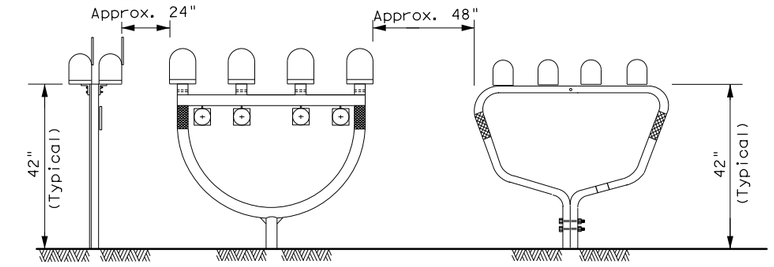
MAILBOX SIZE	TYPICAL DIMENSIONS			MAX ** WEIGHT
	LENGTH	WIDTH	HEIGHT	
SMALL	19 1/2"	6"	7"	6 LBS
MEDIUM	22 1/2" *	8" *	11 1/2" *	8 LBS
LARGE	23 1/2"	11 1/2"	13 1/2"	11 LBS
EXTRA LARGE	18"	14"	12"	13 LBS
LOCKABLE	18"	11 1/2"	15"	23 LBS

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

GENERAL NOTES:

1. Dimensions shown (length, width, and height) are typical, not maximums. However, anytime a medium size mailbox is mounted on a single/double mount or on the outside position on a multi mount, the dimensions shown are maximums.
2. Mailboxes shall be made of light weight sheet metal or light weight plastic. Heavy steel, cast iron or decorative mailboxes shall not be used on the state highway system.

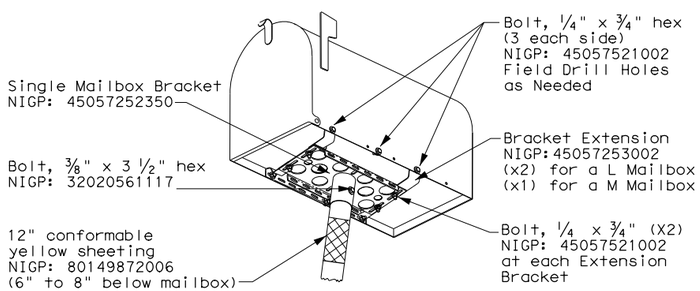
TYPICAL INSTALLATION MEASUREMENTS

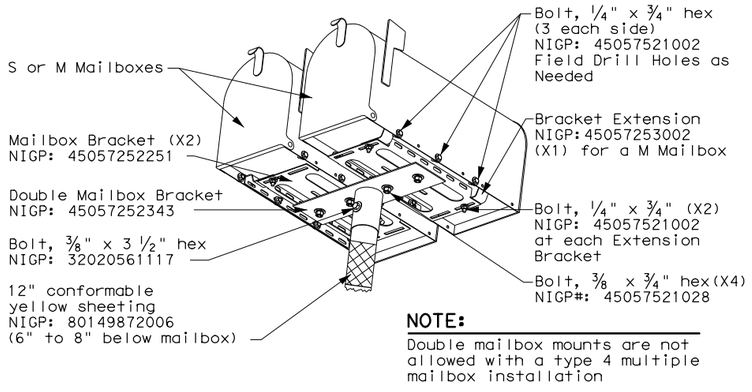


NOTE:

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

TYPE 2 and 4 - SINGLE/DOUBLE

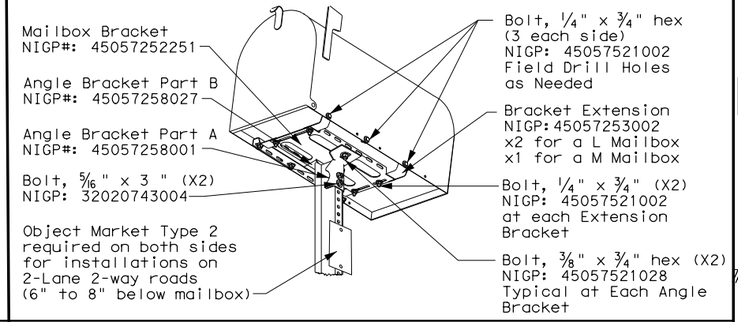


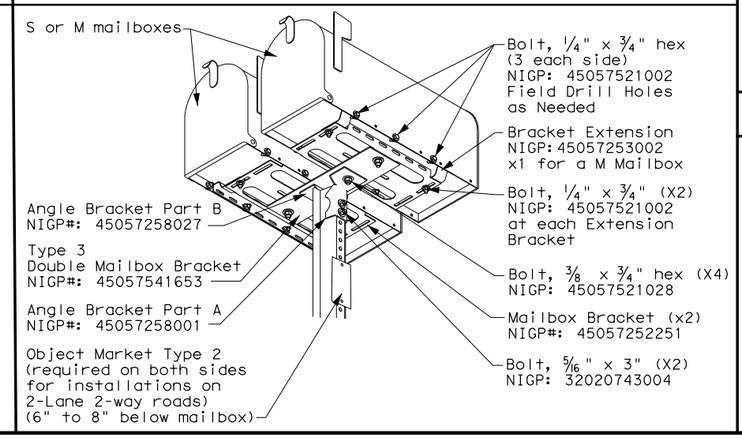


NOTE:

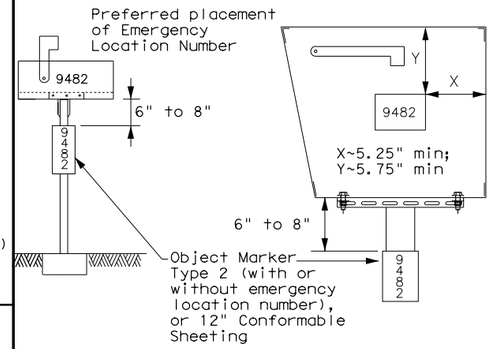
Double mailbox mounts are not allowed with a type 4 multiple mailbox installation

TYPE 3 - SINGLE/DOUBLE





PLACEMENT OF EMERGENCY LOCATION NUMBER

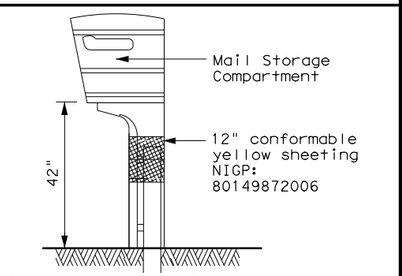


NOTES:

1. Location numbers are provided by homeowner. Minimum size 1" height.
2. Location number is typically placed on the mailbox in a contrasting color.
3. Black numbers may be placed on the Type 2 object marker if the numbers cannot be placed on the mailbox.
4. Alternatively, a green or blue plate with white numbers attached may be mounted below the object marker. Other contrasting color configuration, as approved, may be used.
5. See 3 of 4 for Foundation details.
6. See 4 of 4 for Hardware details.

SHEET 1 OF 4

TYPE 5



Typical Molded Plastic Mailbox

Texas Department of Transportation

Maintenance Division Standard

MAILBOX MOUNTING AND ASSEMBLY

MB(1)-21

FILE: MB-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT March 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS 2/2005 11/2009 4/2015 6/2005 1/2011 11/2006 7/2014	0715	01	025,ETC	FM108,ETC
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	YKM	GONZALES		99

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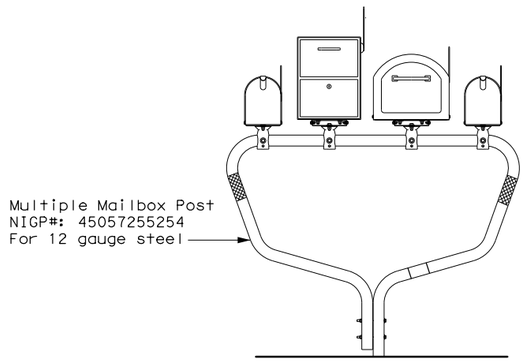
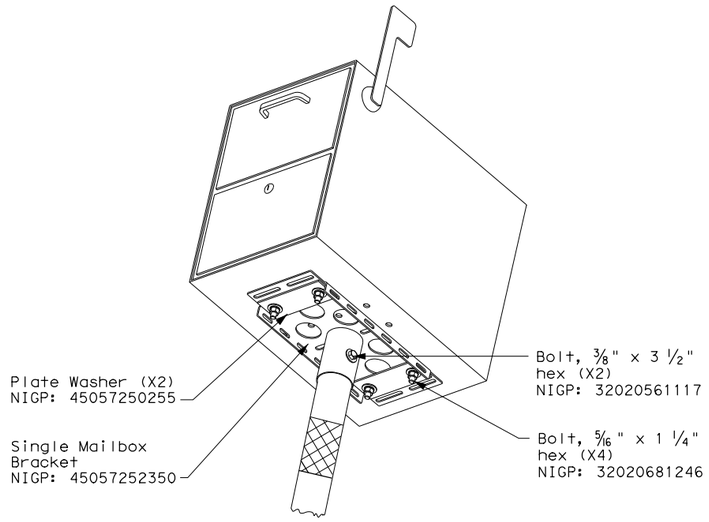
DATE:
FILE:

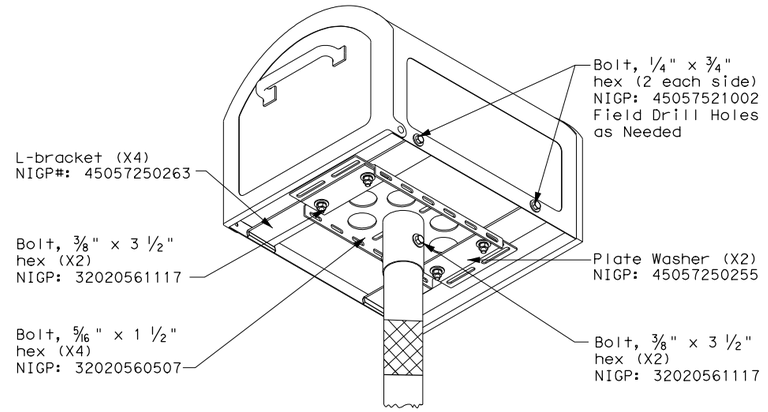
TYPE 1 - MULTI LOCKABLE AND XL MAILBOX



TYPE 2/4 - SINGLE LOCKABLE MAILBOX

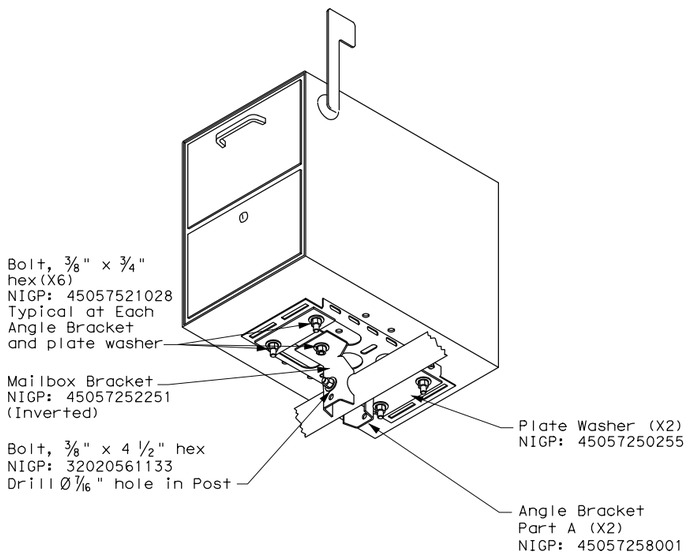


TYPE 2/4 - SINGLE XL MAILBOX

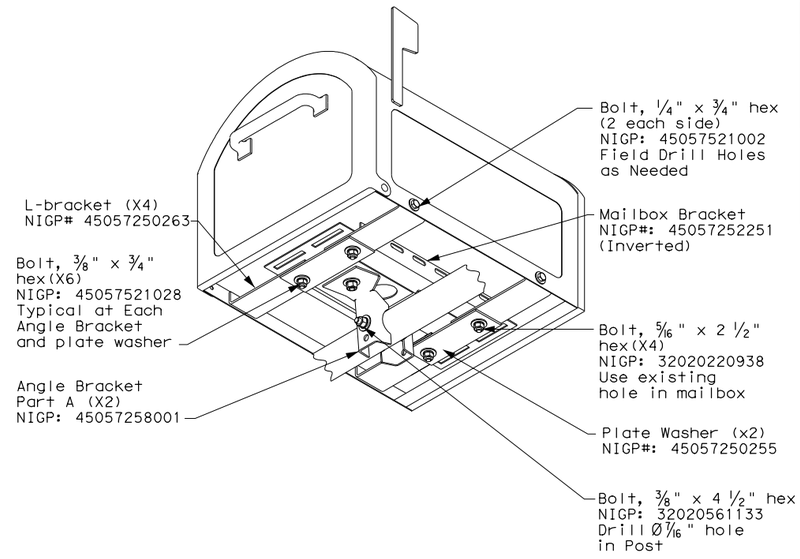


NOTE:
Follow same configuration when mounting an XL mailbox on a Type 4 multi post.

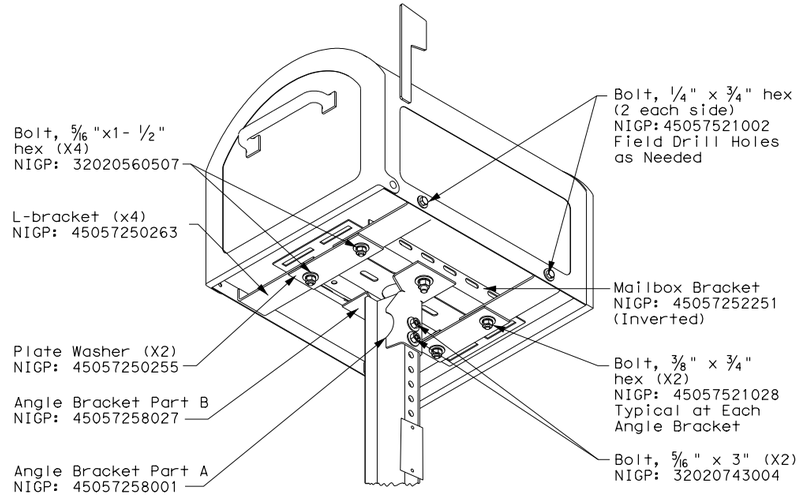
TYPE 1 MULTI – LOCKABLE ARCHITECTURAL (LA)



TYPE 1 MULTI – XL MAILBOX



TYPE 3 - XL MAILBOX MOUNTING



Texas Department of Transportation

Maintenance Division Standard

XL AND LOCKABLE ARCHITECTURAL MAILBOX ASSEMBLY

MB(2)-21

FILE: MB-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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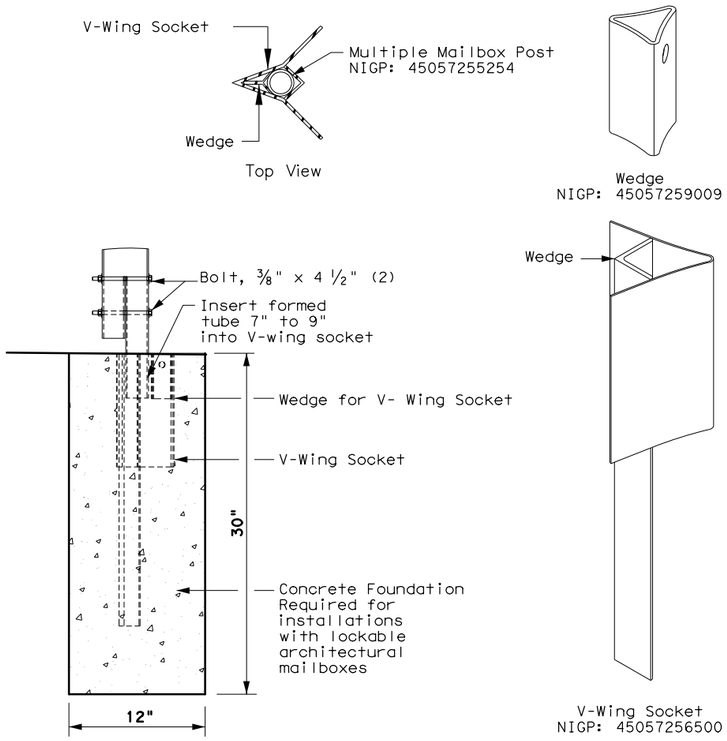
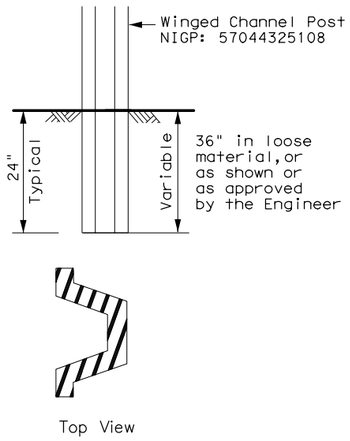
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		100

TYPE 1 - SUPPORT/FOUNDATION

Thin Wall Tube w/ V-LOC Anchorage



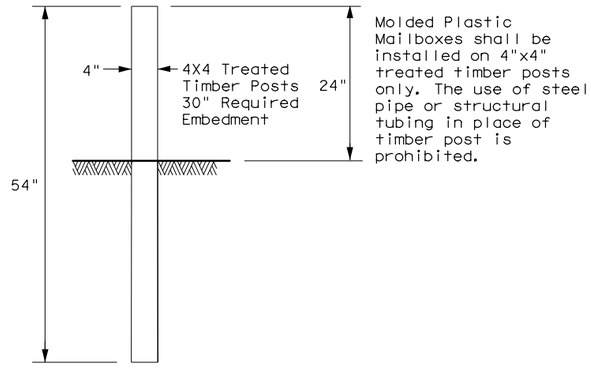
TYPE 3 - SUPPORT/FOUNDATION



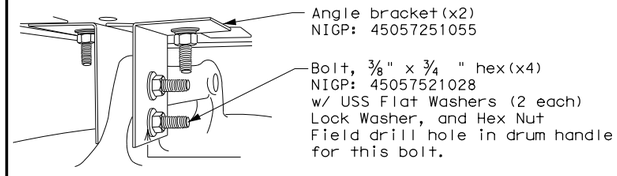
NOTES:

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

TYPE 5 - SUPPORT/FOUNDATION



TYPE 6 - TEMPORARY MAILBOX SUPPORT



Plastic Drum NIGP: 55093383655
Rubber Collar NIGP: 55093387102

NOTES:

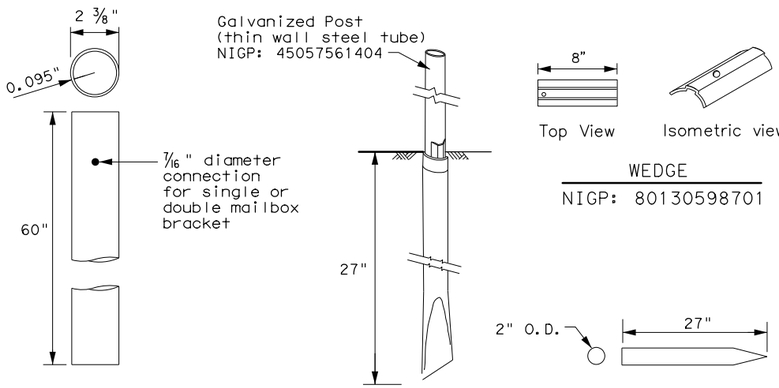
1. Place on approved plastic drum as shown in the Compliant Work Zone Traffic Control Devices (CWZTCD).
2. Existing attachment hardware shall be used unless damaged. Damaged hardware shall be replaced.

GENERAL NOTES:

1. Erect post plumb or vertical.
2. When galvanized part is required galvanize in accordance with Item 445.
3. Use a concrete footing as shown or when directed. Concrete footing will be required when soils do not hold the support/foundations in a stable condition, only on Type 1, Type 2, and Type 4

TYPE 2 - SUPPORT/FOUNDATION

Thin Wall Steel Tube w/Wedge Anchor System

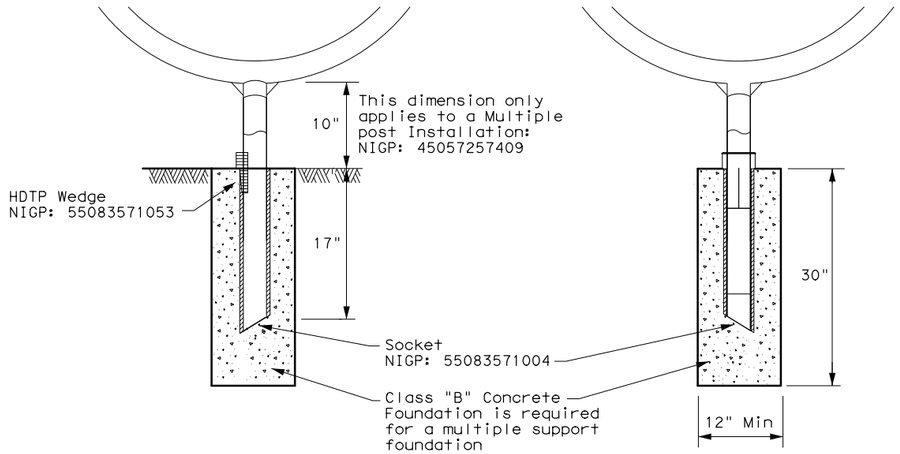


MAILBOX POST

WEDGE ANCHOR
NIGP: 80130238407

TYPE 4 - SUPPORT/FOUNDATION

Whitecoated steel post NIGP: 45057561107
Multiple post NIGP: 45057257409
Recycled Rubber post (RR) NIGP: 45057561057



SHEET 3 OF 4

Texas Department of Transportation

Maintenance Division Standard

MAILBOX SUPPORT AND FOUNDATION

MB(3)-21

FILE: MB-21.dgn	DN:	CK:	DW:	CK:
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REVISIONS 2/2005 11/2009 4/2015 6/2005 1/2011 11/2006 7/2014	0715	01	025,ETC	FM108,ETC
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		101

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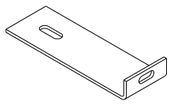
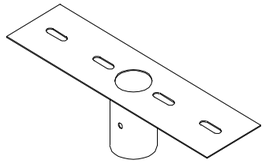
DATE:
FILE:

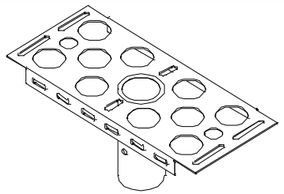
TYPE	TYPE 1	TYPE 2	TYPE 3	TYPE 4			TYPE 5	TYPE 6
Configuration	Multiple	Single or Double	Single or Double	Single	Double	Multiple	Single	Single
Mailbox Size NIGP #	Outside Position: S or M Inside Position: S, M, L, XL, or LA	Single: S, M, L, XL, or LA Double: SS, SM, MM	Single: S, M, L, or XL Double: SS, SM, MM	S, M, L, XL, or LA	SS, SM, or MM	Outside Position: S or M Inside Position: S, M, L, or XL	Molded Plastic	S, or M
Mailbox Post NIGP #	45057255254 (Galvanized Multiple)	45057561404 (Thin Walled Gavanize)	57044325108 (Wing Channel Post)	45057561107 (Thin walled white powder coated) 45057561057 (Recycled Rubber Post: S or M only)	45057561107 (Thin Walled White Powder Coated)	45057257409 (White Powder Coated Multiple)	4x4 Timber	Construction Barrel
Post and Mailbox Hardware NIGP #	45057259009 (Wedge) 45057256500 (V-Wing Socket) 45057253002 (Bracket Extension) 45057252251 (Mailbox Bracket) 45057258001 (Part A Angle Bracket x2) 45057250255 (Plate Washer for XL/LA x2) 45057250263 (L-Bracket for XL x4)	80130598701 (Wedge) 80130238407 (Wedge Anchor) 45057253002 (Bracket Extension) 45057252343 (Double MB Bracket) 45057252350 (S. Mailbox Bracket) 45057252251 (Mailbox Bracket) 45057250255 (Plate Washer for XL/LA x2) 45057250263 (L-Bracket forXL x4)	45057541653 (Type 3 Double Mailbox Bracket) 45057252251 (Mailbox Bracket) 45057253002 (Bracket Extension) 45057258001 (Part A Angle Bracket) 45057258027 (Part B Angle Bracket) 45057250255 (Plate Washer for XL x2) 45057250263 (L-Bracket for XL x4)	55083571053 (Wedge) 55083571004 (Socket) 45057252350 (Single Mailbox Bracket) 45057253002 (Bracket Extension) 45057250255 (Plate Washer for XL/LA x2) 45057250263 (L-Bracket for XL x4)	55083571053 (Wedge) 55083571004 (Socket) 45057253002 (Bracket Extension) 45057252343 (Double Mount Bracket) 45057252251 (Mailbox Bracket x2)	55083571053 (Wedge) 55083571004 (Socket) 45057253002 (Bracket Extension) 45057252350 (Single Mount Bracket) 45057250255 (Plate Washer for XL x2) 45057250263 (L-Bracket for XL x4)	None	45057251055 Angle Bracket (x2)
Foundation Used	Class B Concrete (Required for LA Mailboxes)	Class B Concrete (Required for LA Mailboxes)	None	Class B Concrete (not used with recycled rubber post, required for LA Mailboxes)	Class B Concrete (not required)	Class B Concrete	None	None



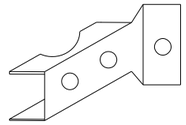
NIGP: 45057250263
L-Bracket x4 for
XL sized mailboxes



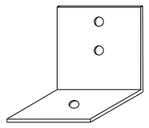
NIGP: 45057252343
Double Mailbox Bracket
For Type 2 and Type 4
double mount



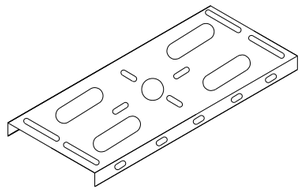
NIGP: 45057252350
Single Mailbox Bracket
For Type 2 single and for
Type 4 single and multi mount



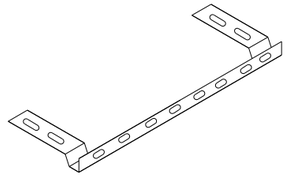
NIGP: 45057258001
Part "A" Angle Bracket
For Type 1 multi (2 per mailbox)
and Type 3 single and double



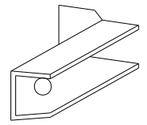
NIGP: 45057251055
Type 6 Angle Bracket
(2 per mailbox)



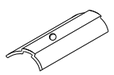
NIGP: 45057252251
Mailbox Bracket
For Type 1 multi and
any double mount (use 2)



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



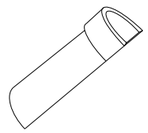
NIGP: 45057258027
Part "B" Angle Bracket
For Type 3 single
and double



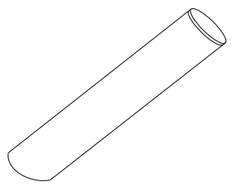
NIGP: 80130598701
Wedge for Type 2

NIGP: 45057250255
Plate Washer for Architecural
and XL Mailboxes

NIGP: 45057541653
Type 3 double mailbox bracket

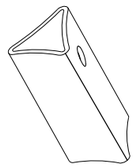


NIGP: 55083571053
Type 4 Mailbox Wedge

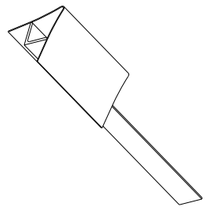


NIGP: 55083571004
Type 4 Mailbox Socket

NIGP: 80130238407
Type 2 Wedge Anchor



NIGP: 45057259009
Wedge for Type 1 V-wing Socket



NIGP: 45057256500
V-wing Socket for
Type 1 Foundation

NIGP #	OBJECT MARKERS AND CONFORMABLE SHEETING
55008311759	Type 2 OM 4"x4" (3 Needed) for Type 3 Wing Channel Post
55008312906	Type 2 OM 6"x12" (1 needed) for Type 3 Wing Channel Post
80149872006	12" Conformable Reflective Yellow Sheeting for Flexible Posts

NOTES:

1. Type 2 object marker in accordance with Traffic Engineering Standard Delineators & Object Markers.
2. A light weight receptacle for newspaper delivery can be attached to mailbox posts if the receptacle does not touch the mailbox, present a hazard to traffic or delivery of the mail, extend beyond the front of the mailbox, or display advertising, except the publication title.

BID CODES FOR CONTRACTS

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

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

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

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

Texas Department of Transportation

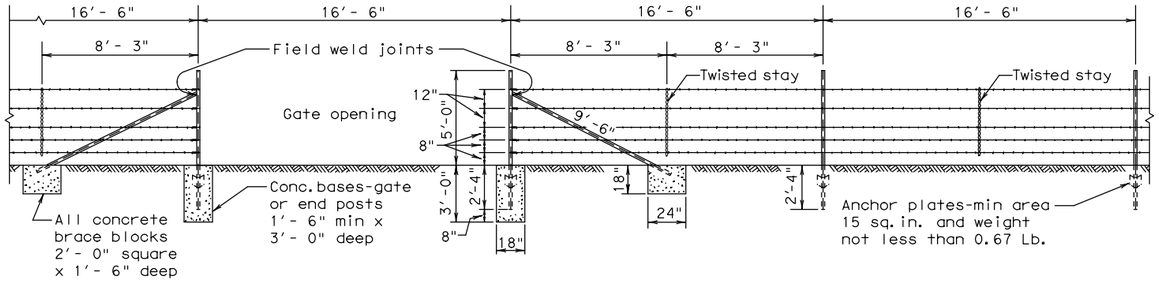
Maintenance Division Standard

NIGP PARTS LIST AND COMPATIBILITY

MB(4)-21

FILE: MB-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT March 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS 2/2005 11/2009 4/2015 6/2005 1/2011 11/2006 7/2014	0715	01	025,ETC	FM108,ETC
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		102

DATE:
FILE:



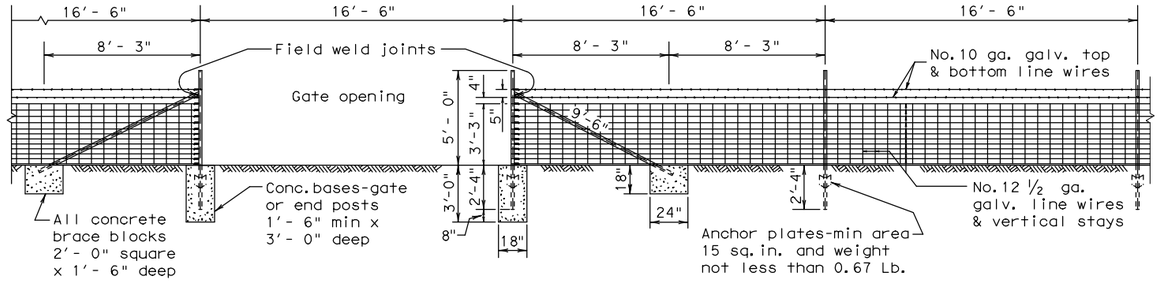
SECTION GALVANIZED BARBED WIRE FENCE WITH METAL POSTS

BRACING DETAIL USED AT ENDS AND GATES

TYPE "C" FENCE

(See General Note 8)

Note:
For Steel pipe and T-Post requirements. (See General Notes 6 & 7)

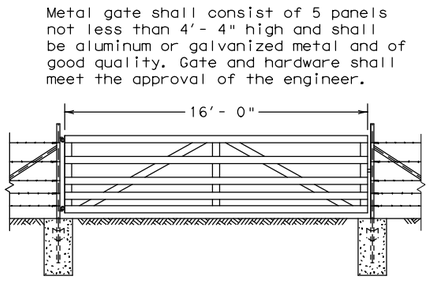


SECTION GALVANIZED WOVEN WIRE FENCE WITH METAL POSTS

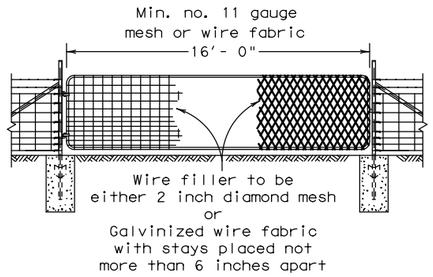
BRACING DETAIL USED AT ENDS AND GATES

TYPE "D" FENCE

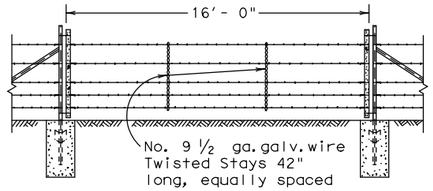
(See General Note 8)



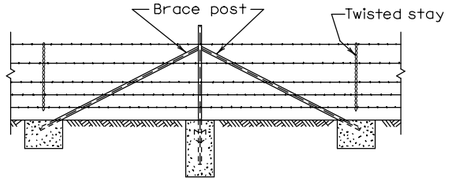
DETAIL TYPE 1 GATE



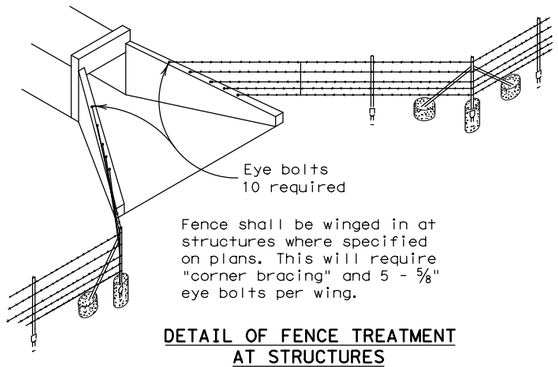
DETAIL TYPE 2 GATE



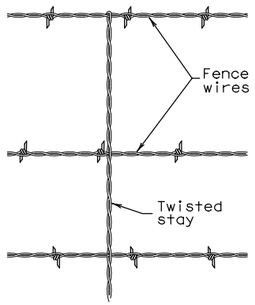
DETAIL TYPE 3 GATE



CORNER OR PULL POST ASSEMBLY

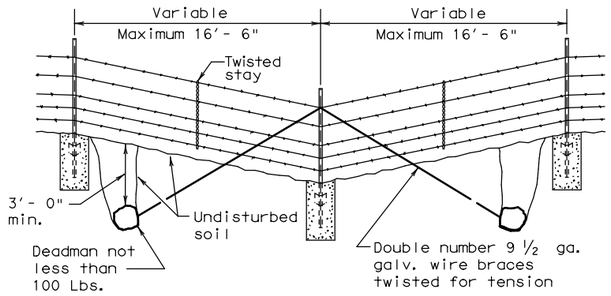


DETAIL OF FENCE TREATMENT AT STRUCTURES

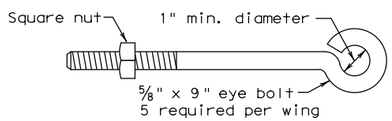


DETAIL OF STAY

(Barbed Wire Fence)



DETAIL OF FENCE SAG



DETAIL OF EYE BOLT

GENERAL NOTES

1. Any high point which interferes with the placing of wire mesh shall be excavated to provide a 2 inch clearance.
2. Latches for Type 1 and Type 2 gates shall be good commercial quality and design latch of the spring, fork or chain type. All latches shall be suitable to the gate and shall be approved by the Engineer.
3. Hinges for Type 2 gates shall be a commercial design approved by the Engineer suitable for post and gate.
4. Concrete shall be of the design and consistency approved by the Engineer and shall contain not less than 4 sacks of cement per cubic yard. Concrete footings are to be crowned at the top to shed water.
5. Steel anchor plates shall be of a design and thickness sufficient to prevent turning of the post in firm soil.
6. Steel pipe end posts, corner and pull posts shall be a minimum of 2" Std. pipe (2.375" O.D., 0.154" wall thickness) with a 1¼" Std. pipe brace (1.660" O.D., 0.140" wall thickness), with a 2"x2"x1/4" angle, or other as approved by the Engineer. Fasteners for securing barbed wire or woven wire fence to metal posts shall be a minimum of 11 gauge galvanized steel wire. Tubular posts shall be fitted with water malleable iron caps.
7. If Steel pipe is used for posts and braces, use standard pipe in accordance with ASTM A 53, Class B or A 501. For T-Posts use steel that meets ASTM A 702. Metal line posts shall be not less than 6′-6" in length and shall weigh not less than (1.33 lbs./lin.ft.). These Items shall be in accordance with Item 552, "Wire Fence."
8. Barbed Wire shall be in accordance with ASTM A 121, Class 1 Design designation 12-2-4-1 4R or 12-2-5-1 4R, or as approved by the Engineer.

   Woven Wire Fence (Type D) shall be in accordance with ASTM A 116, Class 1 No. 12-1/2 Grade 60 (See Table 1 ASTM A 116) to the height and design shown on the plans, or as approved by the Engineer.
9. The location of gates and corner posts will be as indicated elsewhere in these plans.

Texas Department of Transportation

Design Division Standard

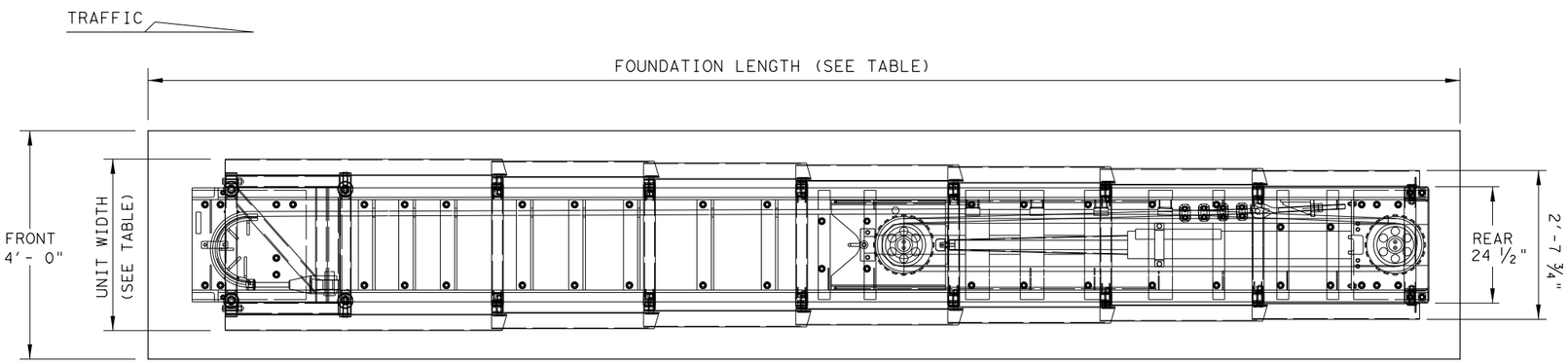
BARBED WIRE AND WOVEN WIRE FENCE

(STEEL POSTS)

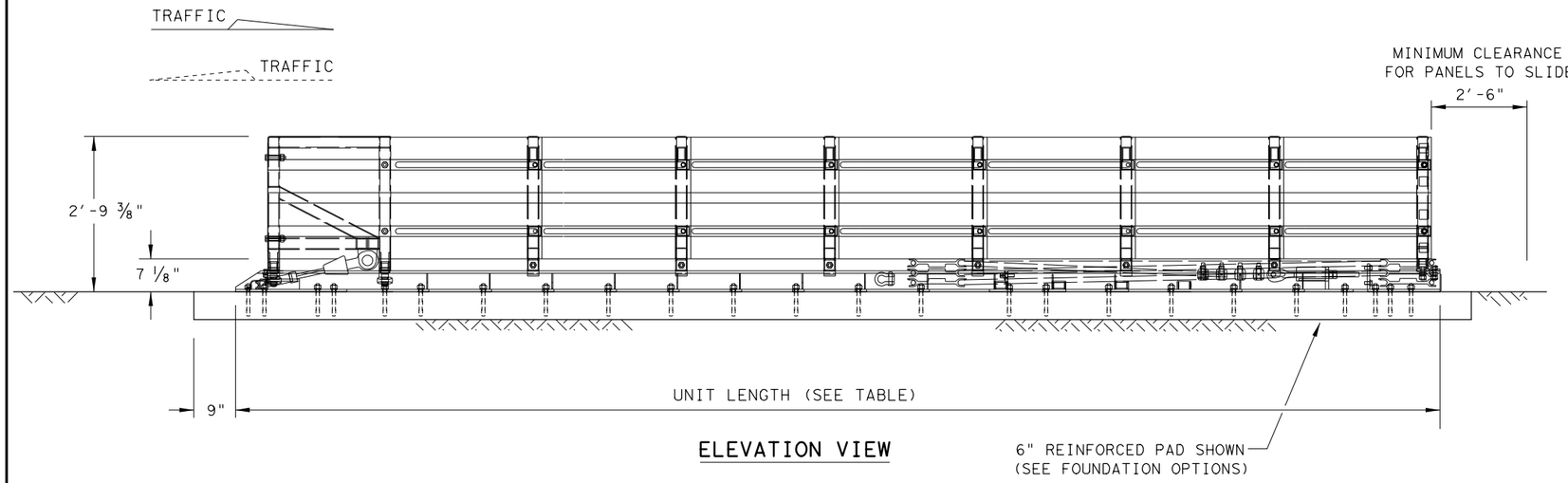
WF(2)-10

FILE: wf210.dgn	DN: TxDOT	CK: AM	DW: VP	CK:
© TxDOT 1996	CONT	SECT	JOB	HIGHWAY
REVISIONS	0715	01	025,ETC	FM108,ETC
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		103

DATE:
FILE:



PLAN VIEW



ELEVATION VIEW

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

SYSTEM AND PAD LENGTHS VARY DEPENDING ON BACKUP TYPE.

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

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

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

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

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

GENERAL NOTES

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

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

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

Texas Department of Transportation

Design Division Standard

WORK AREA PROTECTION CORP (SMART-NARROW)

SMTC(N)-16

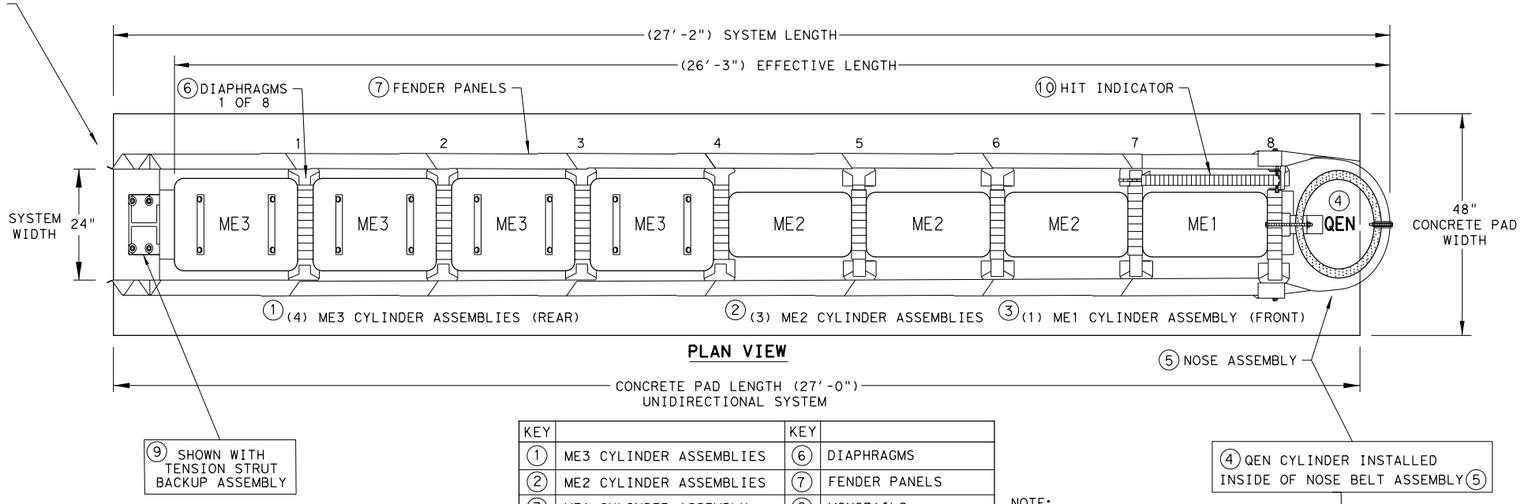
FILE: smtcn16.dgn	DN: TxDOT	CK: KM	DW: VP	CK: VP
©TxDOT: February 2006	CONT	SECT	JOB	HIGHWAY
REVISIONS	0715	01	025,ETC	FM108,ETC
REVISED 06, 2013 (VP)	DIST	COUNTY		SHEET NO.
REVISED 03, 2016 (VP)	YKM	GONZALES		104

LOW MAINTENANCE

DATE:
FILE:

NOTE:
A TRANSITION MAY BE REQUIRED TO INSTALL THE QUADGUARD ELITE M10 TO THE OBJECT BEING SHIELDED.

QUADGUARD EITE M10 24" WIDE (8 BAY) SYSTEM



PLAN VIEW

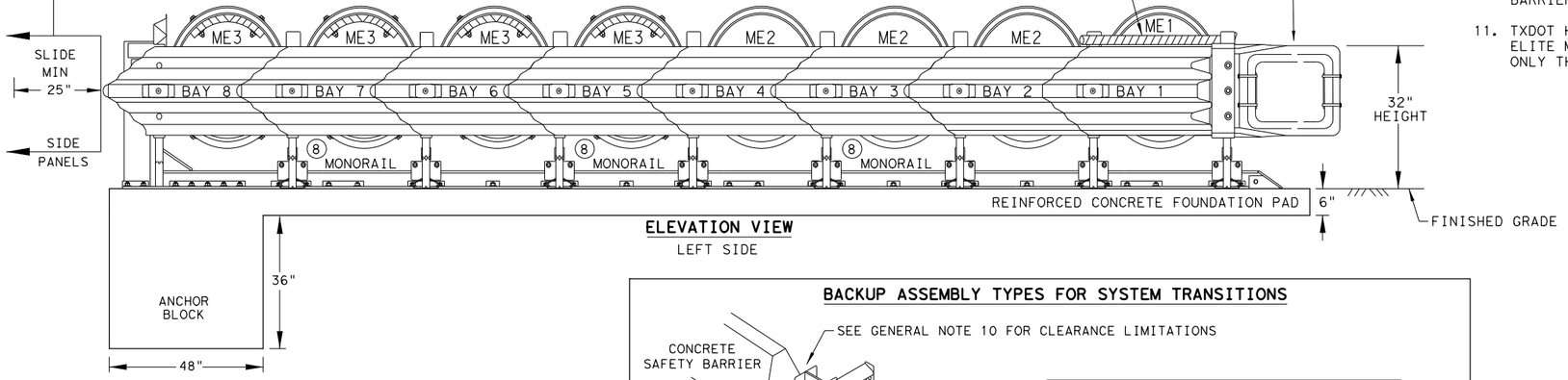
⑨ SHOWN WITH TENSION STRUT BACKUP ASSEMBLY

④ QEN CYLINDER INSTALLED INSIDE OF NOSE BELT ASSEMBLY ⑤

KEY		KEY	
①	ME3 CYLINDER ASSEMBLIES	⑥	DIAPHRAGMS
②	ME2 CYLINDER ASSEMBLIES	⑦	FENDER PANELS
③	ME1 CYLINDER ASSEMBLY	⑧	MONORAILS
④	QEN CYLINDER	⑨	TYPE OF BACKUP
⑤	NOSE BELT ASSEMBLY	⑩	HIT INDICATOR

NOTE:
PROVISION SHALL BE MADE FOR REAR FENDER SIDE PANELS TO SLIDE REARWARD UPON IMPACT, 25" MIN.

NOTE:
HIT INDICATOR WILL RAISE UPON IMPACT.



ELEVATION VIEW
LEFT SIDE

NOTES:
CONTACT THE MANUFACTURER WITH SITE SPECIFIC DATA (SSD) FOR CONCRETE PAD AND ANCHOR BLOCK INSTALLATION REQUIREMENTS.

A MANUFACTURER'S DRAWING PACKAGE UNIQUE AND SPECIFIC FOR THE QUADGUARD ELITE M10 FIELD INSTALATION AND INFORMATION REGARDING THE TYPE OF BACKUP ASSEMBLY REQUIRED FOR THE TRANSITION WILL BE PROVIDED BY THE MANUFACTURER TO THE ENGINEER AND INSTALLER.

6" REINFORCED CONCRETE PAD REQUIRES THE INSTALLATION OF AN ANCHOR BLOCK AS SHOWN ON THE MANUFACTURER'S DRAWING PACKAGE.

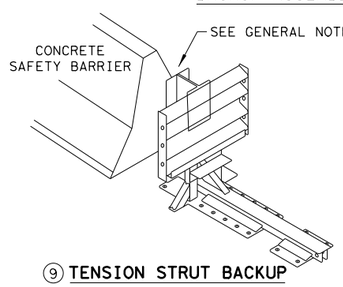
8" NON-REINFORCED CONCRETE PAD MAY NOT REQUIRE AN ANCHOR BLOCK, IF THE PAD IS INSTALLED AGAINST AN IMMOVABLE CONCRETE BACKUP.

CONCRETE PAD AND ANCHOR BLOCK COMBINATIONS SHALL BE CONFIRMED WITH THE MANUFACTURER BASED UPON SITE SPECIFIC DATA (SSD).

NOTE:
THE QUADGUARD ELITE M10 8-BAY, 24" WIDE - NARROW SYSTEM TESTED TO MASH TEST LEVEL 3.

TL-3 MODEL #	QM10024E	CYLINDER TYPES IN BAYS			
BAYS	8	TYPE-ME3	TYPE-ME2	TYPE-ME1	TYPE-QEN
DIAPHRAGMS	8	4	3	1	1
WIDTH	24"	REAR	FRONT		NOSE

BACKUP ASSEMBLY TYPES FOR SYSTEM TRANSITIONS

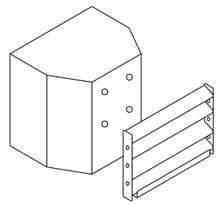


⑨ TENSION STRUT BACKUP

SYSTEM TRANSITIONS TYPES	
1	QUAD-BEAM TO CONCRETE SAFETY BARRIER
2	QUAD-BEAM TO CONCRETE BRIDGE RAIL
3	QUAD-BEAM TO CONCRETE END SHOE
4	QUAD-BEAM TO THRIE-BEAM RAIL
5	QUAD-BEAM TO W-BEAM RAIL

NOTE:
TRANSITION ASSEMBLIES FOR THE QUADGUARD ELITE M10 TO THRIE-BEAM OR W-BEAM FENCE REQUIRES I-BEAM POSTS:

ALL POSTS W6X8.5/9 I-BEAMS (78" LONG).



⑨ CONCRETE BACKUP

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

NOTE:
THIS STANDARD IS A BASIC REPRESENTATION OF THE QUADGUARD ELITE M10 SYSTEM AND 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: TRINITY HIGHWAY - ENERGY ABSORPTION INC. AT 1(888)323-6374.
2. SEE THE RECENT QUADGUARD ELITE M10 PRODUCT DESCRIPTION ASSEMBLY MANUAL FOR IMPACT PERFORMANCE CHARACTERISTICS AND DESIGN LIMITATIONS AND THE DRAWING PACKAGE FOR THE NARROW 24" SYSTEM BEFORE INSTALLING THE QUADGUARD ELITE M10 AT ANY GIVEN LOCATION.
3. FOR BI-DIRECTIONAL TRAFFIC: THE LOCATION AND OR WIDTH OF THE QUADGUARD ELITE M10 IS RESTRICTED. AS BI-DIRECTIONAL TRAFFIC APPROACHES THE REAR OF THE QUADGUARD ELITE M10, THE QUADGUARD ELITE M10 SHOULD NOT EXTEND FURTHER INTO THE TRAFFIC-SIDE OF THE BARRIER THAN THE OBSTACLE. ANY TRANSITION INSTALLED MUST EITHER BE TANGENT TO BOTH QUADGUARD ELITE M10 AND OBSTACLE OR MUST ANGLE TOWARD FIELD SIDE OF THE BARRIER.
4. SYSTEM TRANSITION: APPROPRIATE TRANSITION PANELS OR SIDE PANELS WILL BE REQUIRED FOR PROPER IMPACT PERFORMANCE. THE CORRECT PANEL(S) TO USE WILL DEPEND ON THE DIRECTION OF TRAFFIC FLOW AND WHAT TYPE OF BARRIER OR ROAD FEATURE THE QUADGUARD ELITE M10 SYSTEM IS SHIELDING. SEE THE QUADGUARD ELITE M10 PRODUCT DESCRIPTION & ASSEMBLY MANUAL FOR FURTHER DETAILS.
5. COMPONENTS FOR THE QUADGUARD ELITE (M10) BACKUP AND REINFORCING DETAILS ARE SHOWN ON THE QUADGUARD ELITE M10 PRODUCT DESCRIPTION & ASSEMBLY MANUAL.
6. CONCRETE PAD SHALL BE 6" MIN. REINFORCED 28MPa @4,000 PSI (P.C.) OR 8" MIN. NON-REINFORCED 28MPa @4,000 PSI CONCRETE ROADWAY MEASURING AT LEAST 12'-0" WIDE BY 50'-0" LONG. ANCHOR BLOCK IS NOT REQUIRED WHEN USING 8" CONCRETE PAD INSTALLED AGAINST AN IMMOVABLE STRUCTURE, E.G. CONCRETE WALL.
7. IF THE CROSS-SLOPE VARIES MORE THAN 2% OVER THE LENGTH OF THE SYSTEM, THE CONCRETE PAD WILL REQUIRE LEVELING. MAXIMUM PERMISSIBLE CROSS-SLOPE IS 8%.
8. THE INSTALLATION AREA SHOULD BE FREE OF CURBS, ELEVATED OBJECTS, OR DEPRESSIONS.
9. THE QUADGUARD ELITE M10 SYSTEM SHOULD BE INSTALLED APPROXIMATELY PARALLEL WITH THE BARRIER.
10. FOR THE TENSION STRUT BACKUP THE DISTANCE BETWEEN THE BACK OF BACKUP AND THE BARRIER WALL SHOULD NOT EXCEED 7" IN ANY CASE.
11. TXDOT HAS ONLY APPROVED THE 24" WIDE QUADGUARD ELITE M10 SYSTEM. THE QUADGUARD ELITE M10 PRODUCT DESCRIPTION AND ASSEMBLY MANUAL INCLUDES SYSTEM WIDTH OF 24". ONLY THE 24" SYSTEM IS ALLOWED TO BE INSTALLED ON TEXAS ROADWAYS.

FOUNDATION & ANCHORING REQUIREMENTS FOUNDATION TYPES: A, B, C, & D	
FOUNDATION TYPE: A	REINFORCED CONCRETE PAD OR ROADWAY
FOUNDATION:	6" MINIMUM DEPTH (P.C.C.)
ANCHORAGE:	7" STUDS EMBEDDED 5 ½" - APPROVED ADHESIVE
FOUNDATION TYPE: B	ASPHALT OVER P.C.C.
FOUNDATION:	3" MIN. (A.C.) OVER 3" MIN. (P.C.C.)
ANCHORAGE:	18" THREADED ROD EMBEDDED 16 ½" - APPROVED ADHESIVE
FOUNDATION TYPE: C	ASPHALT OVER SUBBASE
FOUNDATION:	6" MIN. (A.C.) OVER 6" MIN. (C.S.)
ANCHORAGE:	18" THREADED ROD EMBEDDED 16 ½" - APPROVED ADHESIVE
FOUNDATION TYPE: D	ASPHALT ONLY
FOUNDATION:	8" MIN. (A.C.)
ANCHORAGE:	18" THREADED ROD EMBEDDED 16 ½" - APPROVED ADHESIVE

KEY:
ASPHALT CONCRETE (A.C.)
COMPACTED SUBBASE (C.S.)
PORTLAND CEMENT CONCRETE (P.C.C.)

NOTE: SEE TRINITY'S PRODUCT DESCRIPTION ASSEMBLY MANUAL FOR THE APPROVED ADHESIVE.

IF THE UNIT IS ANCHORED TO ASPHALTIC CONCRETE, IT SHOULD BE RELOCATED TO FRESH, UNDISTURBED ASPHALT AND RE-ANCHORED AFTER EACH IMPACT TO ENSURE ADEQUATE FUTURE PERFORMANCE.

TENSION STRUT BACKUP MAY BE USED IN CONSTRUCTION ZONES ON ASPHALT CONCRETE (A.C.) FOR TEMPORARY USE ONLY.

LOW MAINTENANCE

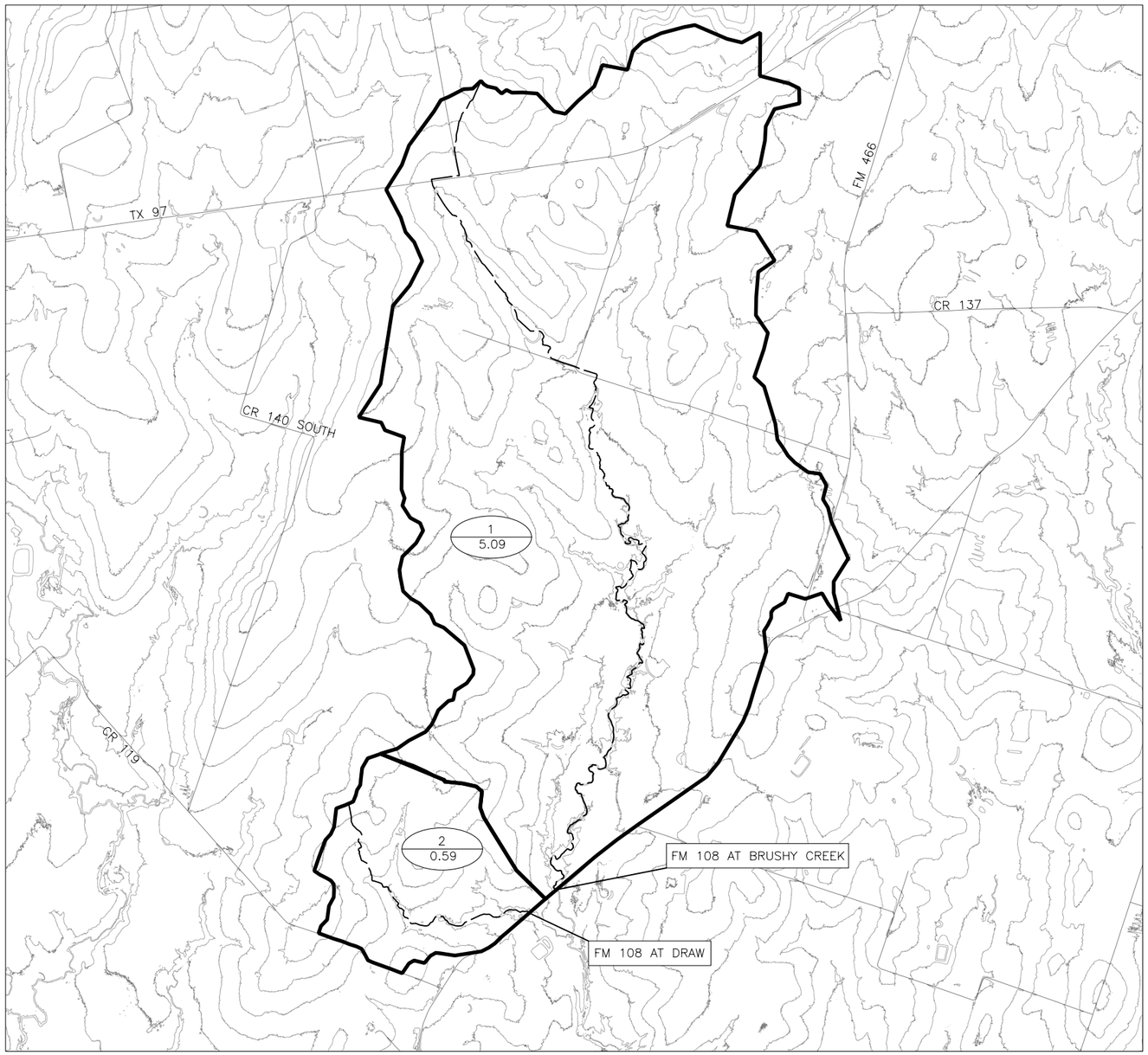
Texas Department of Transportation

Design Division Standard

TRINITY HIGHWAY ENERGY ABSORPTION QUADGUARD ELITE M10 (MASH TL-3)

QGELITE(M10)(N)-20

FILE: qgelitem10n20.dgn	DN: TxDOT	CK: KM	DW: VP	CK: AG
©TxDOT: NOVEMBER 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0715	01	025,ETC	FM108,ETC
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		105



Basin Name	Parameters		Q (cfs)					
			50% AEP	20% AEP	10% AEP	4% AEP	2% AEP	1% AEP
Draw	Area (sq. mi)	5.09	322	546	744	959	1,171	1,355
	TC	57						
	CN	69						
Brushy Creek	Area (sq. mi)	0.59	767	1,353	1,927	2,524	3,154	3,675
	TC (mins)	282						
	CN	68						

N

1,500 0 1,500 3,000

SCALE FEET

LEGEND

- DRAINAGE AREA BOUNDARY
- NHD FLOWLINE
- FLOW DIRECTION
- X / XX — AREA I.D. / AREA IN SQ. MI.

NOTES:

1. DRAINAGE AREA WAS DELINEATED USING 2017 LiDAR SOURCED FROM TEXAS NATURAL RESOURCES INFORMATION SYSTEM (TNRIS). CONTOUR INTERVAL = 5-FT

2. PEAK FLOWS WERE CALCULATED IN HEC-HMS (V.4.8) USING THE NRCS CN METHOD PER TXDOT'S HYDRAULIC DESIGN MANUAL (SEPTEMBER 2019).

3. THE PROJECT LOCATION IS IN A ZONE A SPECIAL FLOOD HAZARD AREA PER FEMA FIRM 48177C0375D, EFFECTIVE DATE: JANUARY 22, 2020.

4. RAINFALL DATA WAS SOURCED FROM NOAA ATLAS 14.

STATE OF TEXAS
AARON R. ROBERTS
110497
LICENSED
PROFESSIONAL ENGINEER

3/30/2023

NO.	REVISION	BY	DATE

CP&Y an STV Company

TEXAS REGISTERED ENGINEERING FIRM F-1741

 Texas Department of Transportation

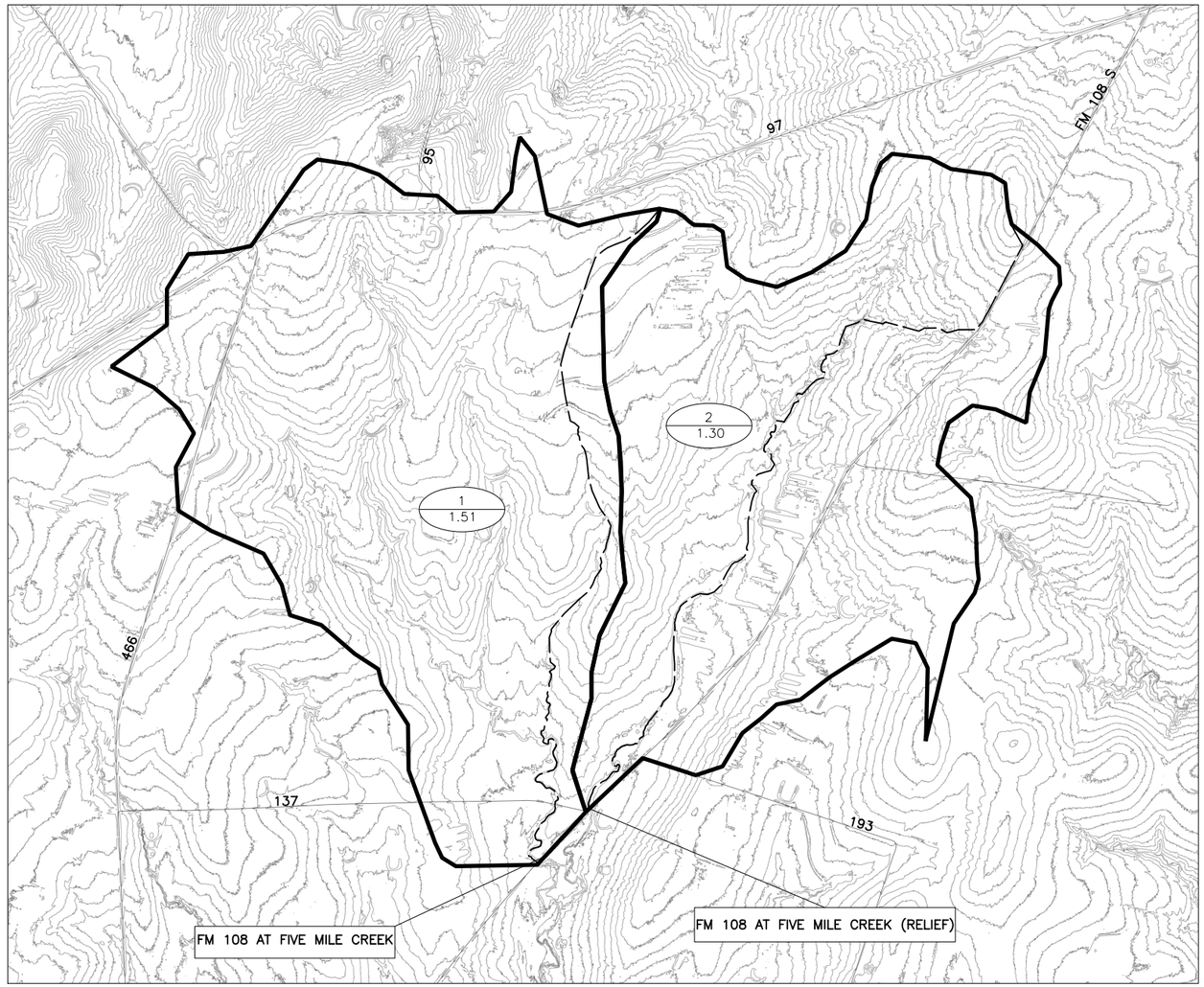
FM 108 AT BRUSHY CREEK & DRAW

DRAINAGE AREA MAP

CSJ 0715-01-025 SHEET 1 OF 1

Designed:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	6	TEXAS				FM 108,ETC
Drawn:	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	YKM	GONZALES	0715	01	025,ETC	106

TEXAS REGISTERED ENGINEERING FIRM F-1741



Basin Name	Parameters		Q (CFS)					
			50% AEP	20% AEP	10% AEP	4% AEP	2% AEP	1% AEP
5–Mile Creek	Area (sq. mi.)	1.51	370	647	925	1,351	1,709	2,095
	TC (mins)	126.48						
	CN	66.16						
Draw	Area (sq. mi.)	1.30	487	805	1,112	1,564	1,934	2,324
	TC (mins)	88.08						
	CN	68.00						

N

1000 500 0 1000 2000

SCALE FEET

LEGEND

DRAINAGE AREA BOUNDARY

NHD FLOWLINE

FLOW DIRECTION

X AREA I.D.
XX AREA IN SQ. MI.

NOTES:

1. DRAINAGE AREA WAS DELINEATED USING 2019 USGS TOPOGRAPHIC DATA. CONTOUR INTERVAL = 3–FT
2. PEAK FLOWS WERE CALCULATED IN HEC–HMS (V.4.8) USING THE NRCS CN METHOD PER TXDOT'S HYDRAULIC DESIGN MANUAL (SEPTEMBER 2019).
3. THE PROJECT LOCATION IS IN A ZONE A SPECIAL FLOOD HAZARD AREA PER FEMA FIRM 48177C0375D, EFFECTIVE DATE: JANUARY 22, 2020.
4. RAINFALL DATA WAS SOURCED FROM NOAA ATLAS 14.

STATE OF TEXAS
AARON R. ROBERTS
110497
LICENSED
PROFESSIONAL ENGINEER

3/30/2023

NO.	REVISION	BY	DATE

CP&Y an STV Company

TEXAS REGISTERED ENGINEERING FIRM F-1741

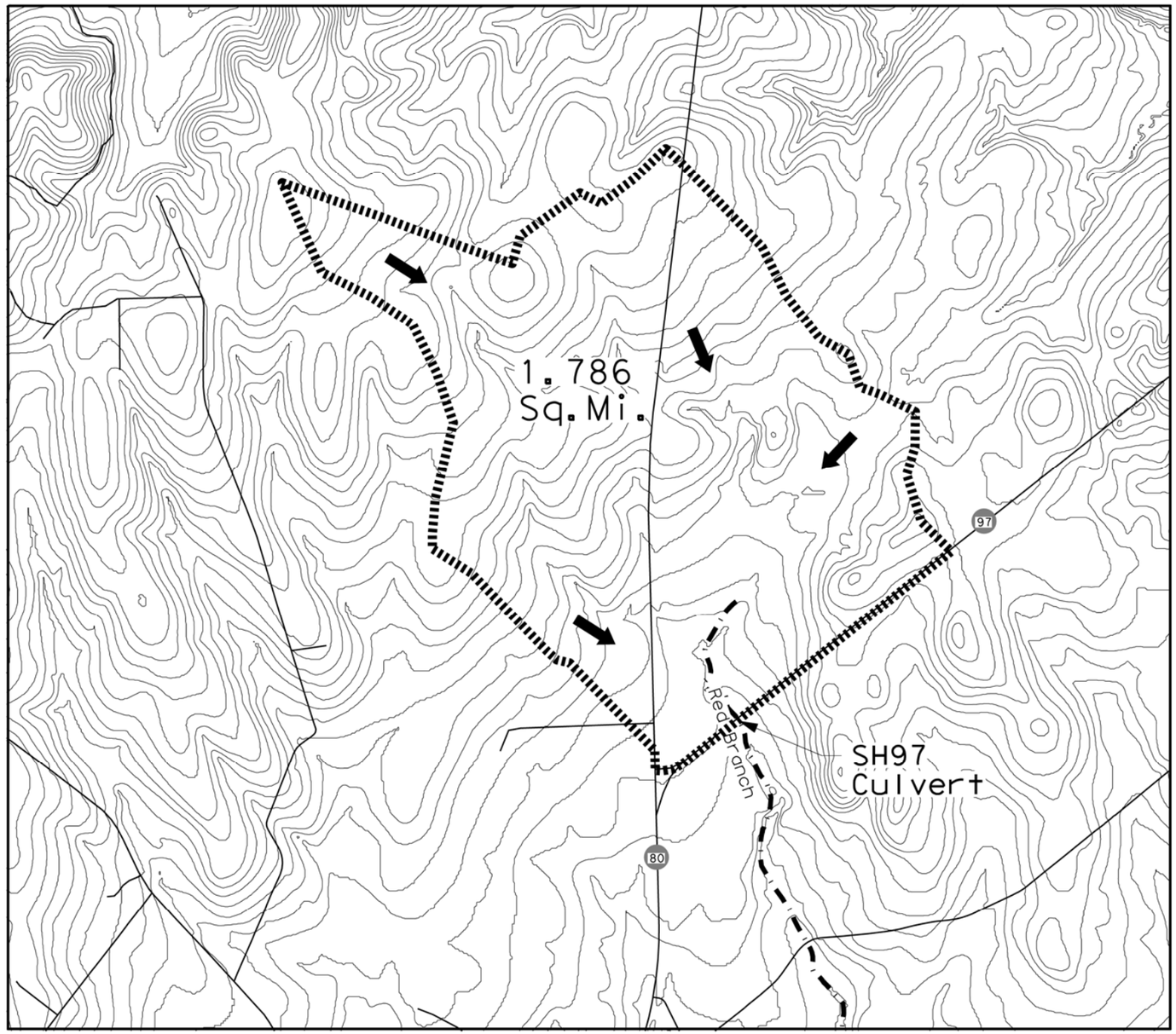
 Texas Department of Transportation

FM 108 AT FIVE MILE CREEK & DRAW

DRAINAGE AREA MAP

CSJ 0715–01–025 SHEET 1 OF 1

Designed:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	6	TEXAS				FM 108,ETC
Drawn:	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	YKM	GONZALES	0715	01	025,ETC	107



LEGEND

- DRAINAGE AREA BOUNDARY
- STREAMS
- CONTOUR LINE
- DIRECTION OF FLOW

NOTES:

1. DRAINAGE AREA DELINEATION BASED ON USGS TOPOGRAPHIC LIDAR DATA PUBLICATION DATED 02/20/2019.
2. NRCS METHOD USED PER CHAPER 4, SECTION 13 OF TXDOT HYDRAULIC DESIGN MANUAL, SEPTEMBER 2019. FOR NRCS METHOD USING HEC-HMS (V.4.8), THE FREQUENCY STORM INPUT REQUIREMENT WERE POPULATED WITH ANNUAL-MAXMUM DEPTH INFORMATION FROM THE LATEST NOAA ALTAS-14 DATA.
3. THE PROJECT LOCATED AT FEMA ZONE A, MAP NO 48177C0475C, EFFECTIVE DATE DECEMBER3, 2010.

Drainage Area (sqmi)	CN	Percent Impervious	Lag Tc (min)	Peak Discharge (From HEC-HMS 4.8)				
				5-Year (cfs)	10-Year (cfs)	25-Year (cfs)	50-Year (cfs)	100-Year (cfs)
1.786	74	6%	55	1,201	1,600	2,178	2,631	3,122

NO.	DESCRIPTION	DATE

STATE OF TEXAS
LIQUN ZHANG
93660
LICENSED
PROFESSIONAL ENGINEER

3/30/2023

WSP USA Inc
16200 Park Row, Suite 200
Houston, TX 77084
TEL: 281.589.5900
TBPE F-2263

SH 97 AT RED BRANCH

DRAINAGE AREA MAP

CSJ 0347-02-033 SHEET 1 OF 1

DSN:	LZ	DIST. NO. DIV. NO.	STATE	PROJECT NO.				HIGHWAY NO.
CK:	SP	6	TEXAS					FM 108,ETC
DRN:	LZ	STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
APPVD:	SP	YKM	GONZALES	0715	01	025,ETC		108

3/30/2023 2:50:47 PM ZhangL

...\DGN\Red Branch_HYD_01.dgn

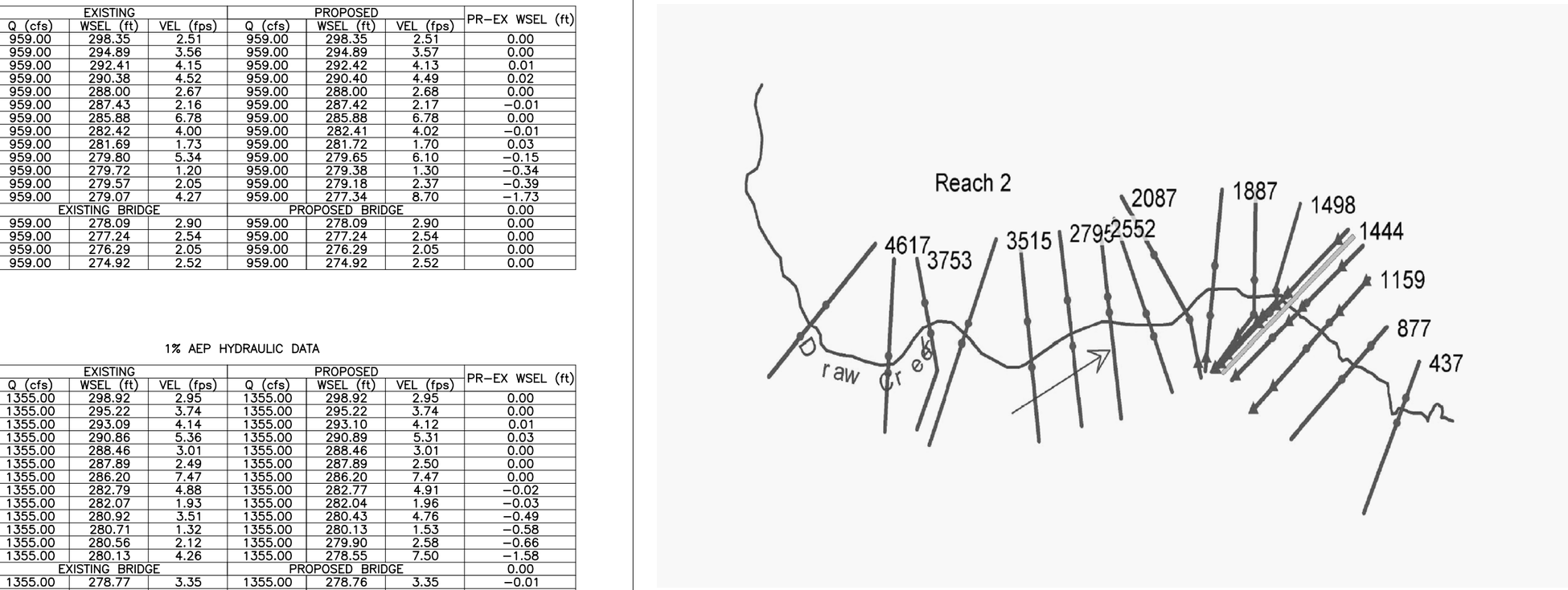
C:\2020\AAA\30900325 YKM Off Bridge Red Branch\DGN\Red Branch_HYD_01.dgn

4% AEP HYDRAULIC DATA

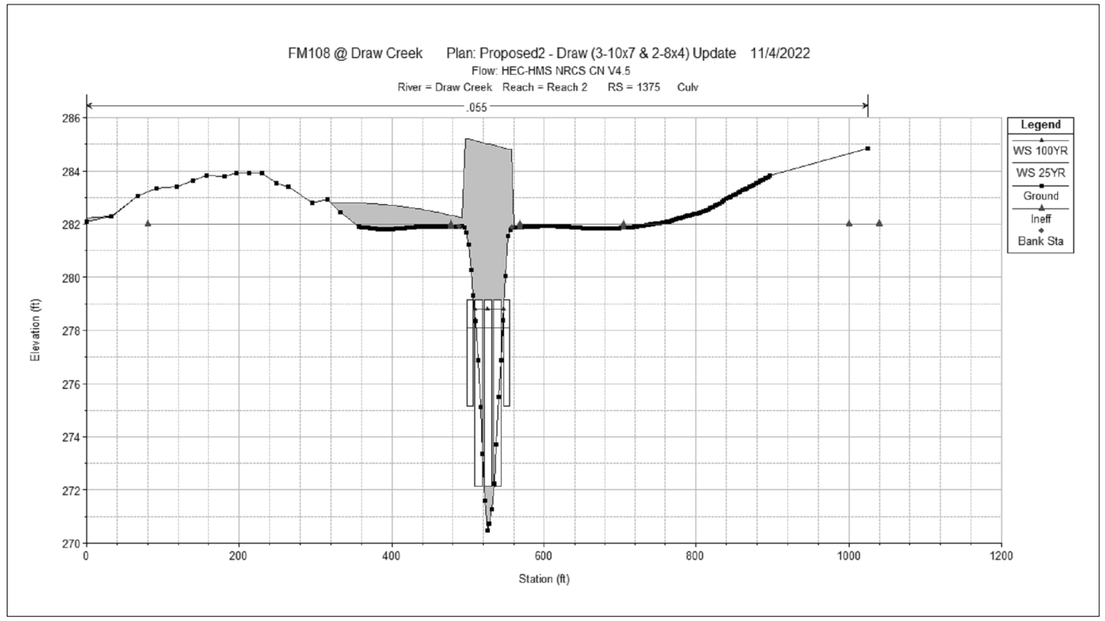
RIVER STATION	EXISTING			PROPOSED			PR-EX WSEL (ft)
	Q (cfs)	WSEL (ft)	VEL (fps)	Q (cfs)	WSEL (ft)	VEL (fps)	
4617	959.00	298.35	2.51	959.00	298.35	2.51	0.00
4069	959.00	294.89	3.56	959.00	294.89	3.57	0.00
3753	959.00	292.41	4.15	959.00	292.42	4.13	0.01
3515	959.00	290.38	4.52	959.00	290.40	4.49	0.02
3065	959.00	288.00	2.67	959.00	288.00	2.68	0.00
2795	959.00	287.43	2.16	959.00	287.42	2.17	-0.01
2552	959.00	285.88	6.78	959.00	285.88	6.78	0.00
2318	959.00	282.42	4.00	959.00	282.41	4.02	-0.01
2087	959.00	281.69	1.73	959.00	281.72	1.70	0.03
1887	959.00	279.80	5.34	959.00	279.65	6.10	-0.15
1630	959.00	279.72	1.20	959.00	279.38	1.30	-0.34
1498	959.00	279.57	2.05	959.00	279.18	2.37	-0.39
1444	959.00	279.07	4.27	959.00	277.34	8.70	-1.73
1375	EXISTING BRIDGE			PROPOSED BRIDGE			0.00
1333	959.00	278.09	2.90	959.00	278.09	2.90	0.00
1159	959.00	277.24	2.54	959.00	277.24	2.54	0.00
877	959.00	276.29	2.05	959.00	276.29	2.05	0.00
437	959.00	274.92	2.52	959.00	274.92	2.52	0.00

1% AEP HYDRAULIC DATA

RIVER STATION	EXISTING			PROPOSED			PR-EX WSEL (ft)
	Q (cfs)	WSEL (ft)	VEL (fps)	Q (cfs)	WSEL (ft)	VEL (fps)	
4617	1355.00	298.92	2.95	1355.00	298.92	2.95	0.00
4069	1355.00	295.22	3.74	1355.00	295.22	3.74	0.00
3753	1355.00	293.09	4.14	1355.00	293.10	4.12	0.01
3515	1355.00	290.86	5.36	1355.00	290.89	5.31	0.03
3065	1355.00	288.46	3.01	1355.00	288.46	3.01	0.00
2795	1355.00	287.89	2.49	1355.00	287.89	2.50	0.00
2552	1355.00	286.20	7.47	1355.00	286.20	7.47	0.00
2318	1355.00	282.79	4.88	1355.00	282.77	4.91	-0.02
2087	1355.00	282.07	1.93	1355.00	282.04	1.96	-0.03
1887	1355.00	280.92	3.51	1355.00	280.43	4.76	-0.49
1630	1355.00	280.71	1.32	1355.00	280.13	1.53	-0.58
1498	1355.00	280.56	2.12	1355.00	279.90	2.58	-0.66
1444	1355.00	280.13	4.26	1355.00	278.55	7.50	-1.58
1375	EXISTING BRIDGE			PROPOSED BRIDGE			0.00
1333	1355.00	278.77	3.35	1355.00	278.76	3.35	-0.01
1159	1355.00	277.93	2.81	1355.00	277.93	2.81	0.00
877	1355.00	276.98	2.31	1355.00	276.98	2.31	0.00
437	1355.00	275.56	2.88	1355.00	275.56	2.88	0.00



CROSS SECTION LOCATION MAP



STREAM CROSS SECTION AT ROAD PROFILE

NOTES:

1. HEC-RAS 6.1 WAS USED FOR THE BRIDGE AND CULVERT ANALYSES. NORMAL DEPTH WITH SLOPE S = 0.00354 FT/FT WAS USED FOR EXISTING AND PROPOSED CONDITIONS.
2. COORDINATION WITH THE GONZALES COUNTY FLOODPLAIN ADMINISTRATOR OCCURED ON MARCH 30, 2023.
3. DISCHARGES WERE DETERMINED USING THE NRCS CN METHOD PER TXDOT'S HYDRAULIC DESIGN MANUAL (SEPTEMBER 2019).
4. THE EXISTING AND PROPOSED STRUCTURES CONFIGURATIONS HAVE A 1% AEP LEVEL OF SERVICE.

STATE OF TEXAS
AARON R. ROBERTS
110497
LICENSED
PROFESSIONAL ENGINEER
3/30/2023

NO.	REVISION	BY	DATE

CP&Y an STV Company
TEXAS REGISTERED ENGINEERING FIRM F-1741

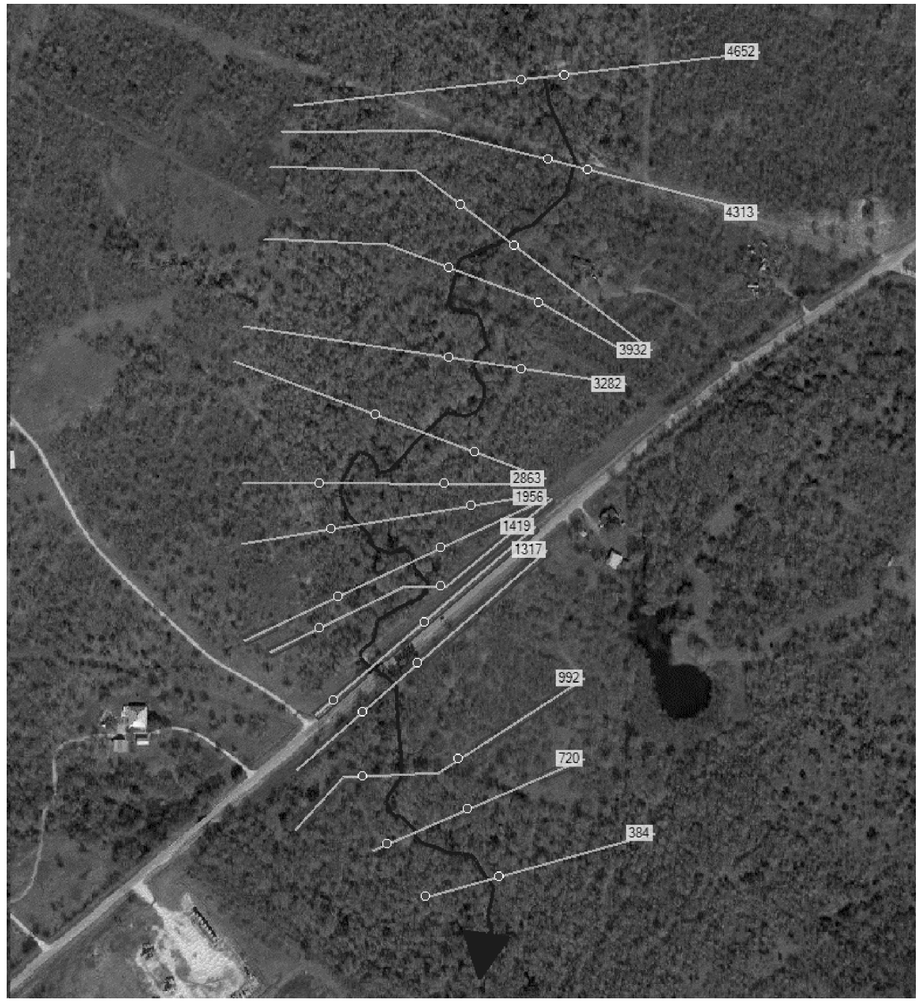
 Texas Department of Transportation

FM 108 AT BRUSHY CREEK & DRAW (DRAW)

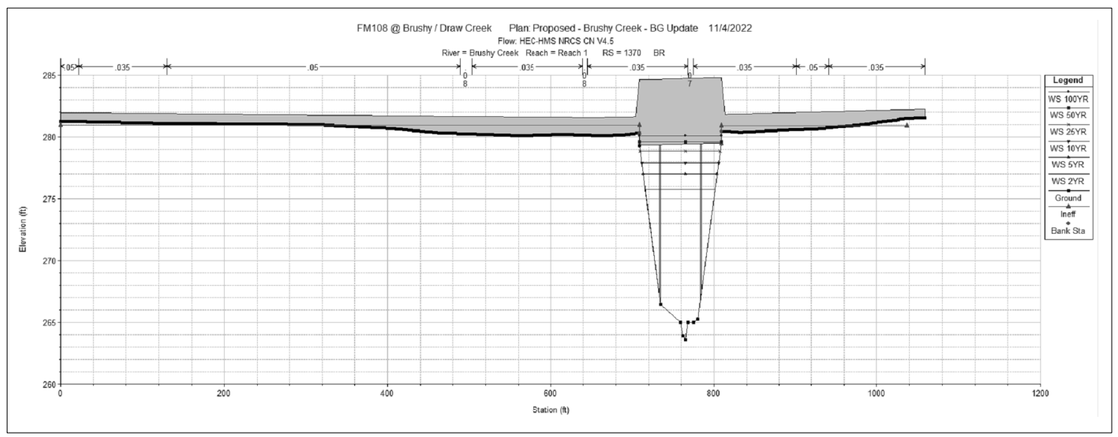
HYDRAULIC DATA SHEET

CSJ 0715-01-025 SHEET 1 OF 2

Designed:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	6	TEXAS				FM 108,ETC
Drawn:	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	YKM	GONZALES	0715	01	025,ETC	109



CROSS SECTION LOCATION MAP



STREAM CROSS SECTION AT ROAD PROFILE

4% AEP HYDRAULIC DATA

RIVER STATION	EXISTING			PROPOSED			PR–EX WSEL (ft)
	Q (cfs)	WSEL (ft)	VEL (fps)	Q (cfs)	WSEL (ft)	VEL (fps)	
4652	2524.00	282.78	1.81	2524.00	282.79	1.84	0.01
4313	2524.00	282.27	2.57	2524.00	282.22	2.65	–0.05
3932	2524.00	281.57	1.93	2524.00	281.37	2.07	–0.20
3712	2524.00	281.29	1.04	2524.00	281.02	1.10	–0.27
3282	2524.00	280.92	1.39	2524.00	280.51	1.56	–0.41
2863	2524.00	280.73	0.84	2524.00	280.23	0.95	–0.50
2400	2524.00	280.48	1.61	2524.00	279.86	1.88	–0.62
2232	2524.00	280.35	1.50	2524.00	279.64	1.85	–0.71
1956	2524.00	280.18	1.38	2524.00	279.32	1.71	–0.86
1847	2524.00	280.14	1.13	2524.00	279.24	1.38	–0.90
1419	2524.00	279.74	3.56	2524.00	278.81	3.35	–0.93
1370	EXISTING BRIDGE			PROPOSED BRIDGE			0.00
1317	2524.00	278.66	4.76	2524.00	278.60	4.03	–0.06
992	2524.00	277.46	2.99	2524.00	277.46	2.98	0.00
720	2524.00	277.01	1.96	2524.00	277.01	1.96	0.00
384	2524.00	276.61	1.83	2524.00	276.61	1.83	0.00

1% AEP HYDRAULIC DATA

RIVER STATION	EXISTING			PROPOSED			PR–EX WSEL (ft)
	Q (cfs)	WSEL (ft)	VEL (fps)	Q (cfs)	WSEL (ft)	VEL (fps)	
4652	3675.00	283.75	1.98	3675.00	283.75	2.01	0.00
4313	3675.00	283.22	2.85	3675.00	283.20	2.94	–0.02
3932	3675.00	282.57	2.08	3675.00	282.39	2.19	–0.18
3712	3675.00	282.33	1.22	3675.00	282.11	1.27	–0.22
3282	3675.00	281.99	1.55	3675.00	281.70	1.66	–0.29
2863	3675.00	281.80	0.95	3675.00	281.45	1.01	–0.35
2400	3675.00	281.54	1.81	3675.00	281.11	2.01	–0.43
2232	3675.00	281.42	1.66	3675.00	280.94	1.86	–0.48
1956	3675.00	281.25	1.60	3675.00	280.70	1.79	–0.55
1847	3675.00	281.20	1.33	3675.00	280.63	1.50	–0.57
1419	3675.00	280.83	2.72	3675.00	280.07	4.18	–0.76
1370	EXISTING BRIDGE			PROPOSED BRIDGE			0.00
1317	3675.00	279.99	4.37	3675.00	279.72	4.95	–0.27
992	3675.00	278.49	3.31	3675.00	278.49	3.37	0.00
720	3675.00	278.01	2.31	3675.00	278.01	2.31	0.00
384	3675.00	277.58	1.95	3675.00	277.58	1.95	0.00

NOTES:

1. HEC–RAS VERSION 6.1 WAS USED FOR THE BRIDGE ANALYSIS. NORMAL DEPTH WITH SLOPE S = 0.00129 FT/FT WAS USED FOR EXISTING AND PROPOSED CONDITIONS.
2. COORDINATION WITH THE GONZALES COUNTY FLOODPLAIN ADMINISTRATOR OCCURED ON MARCH 30, 2023.
3. DISCHARGES WERE DETERMINED USING THE NRCS CN METHOD PER TXDOT'S HYDRAULIC DESIGN MANUAL (SEPTEMBER 2019).
4. THE EXISTING AND PROPOSED BRIDGE CONFIGURATIONS HAVE A 4% AEP LEVEL OF SERVICE.

STATE OF TEXAS
AARON R. ROBERTS
110497
LICENSED
PROFESSIONAL ENGINEER

3/30/2023

NO.	REVISION	BY	DATE

CP&Y an STV Company

TEXAS REGISTERED ENGINEERING FIRM F-1741

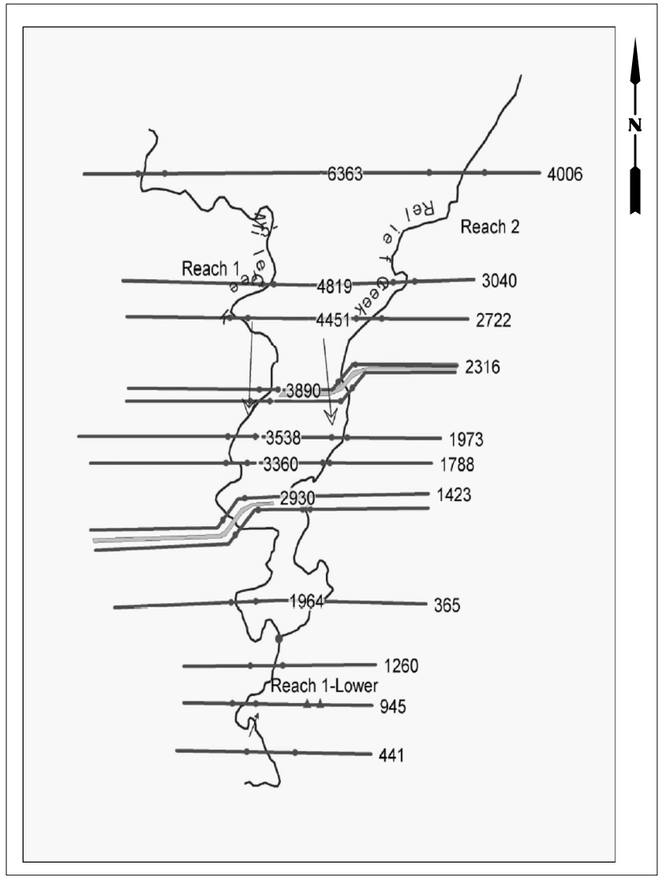
 Texas Department of Transportation

FM 108 AT BRUSHY CREEK & DRAW
(BRUSHY CREEK)

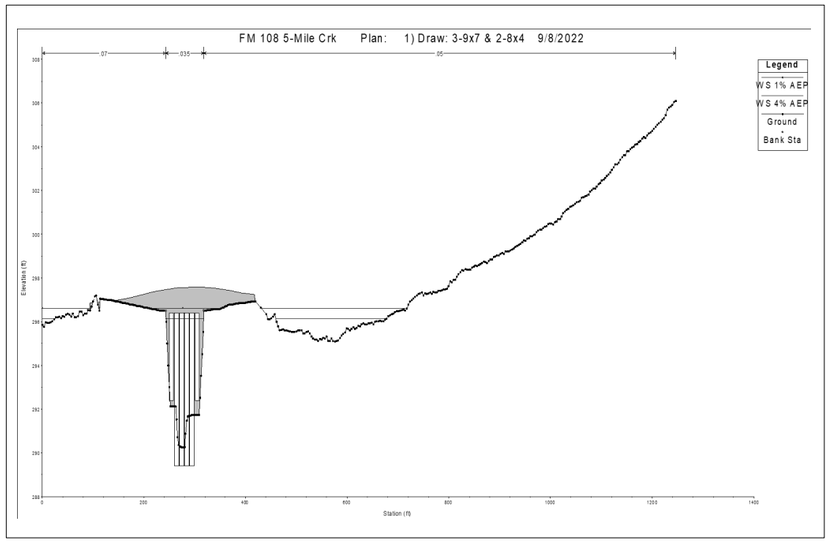
HYDRAULIC DATA SHEET

CSJ 0715–01–025 SHEET 2 OF 2

Designed:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	6	TEXAS				FM 108,ETC
Drawn:	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	YKM	GONZALES	0715	01	025,ETC	110



CROSS SECTION LOCATION MAP



STREAM CROSS SECTION AT ROAD PROFILE

4% AEP HYDRAULIC DATA

RIVER STATION	EXISTING			PROPOSED			PR-EX WSEL (ft)
	Q (cfs)	WSEL (ft)	VEL (fps)	Q (cfs)	WSEL (ft)	VEL (fps)	
6363	1015.00	303.03	1.00	1015.00	303.03	1.00	0.00
4819	1015.00	300.26	3.78	1015.00	300.26	3.78	0.00
4451	1015.00	299.43	2.59	1015.00	299.43	2.59	0.00
3890	1015.00	298.29	2.69	1015.00	298.29	2.69	0.00
3786	1015.00	298.01	2.49	1015.00	298.02	2.46	0.01
3538	1015.00	297.31	2.67	1015.00	297.32	2.68	0.01
3360	1015.00	296.99	2.30	1015.00	296.85	2.71	−0.14
2930	1015.00	296.74	1.54	1015.00	296.16	2.37	−0.58
2850	EXISTING BRIDGE			PROPOSED CULVERT			0.00
2809	1015.00	296.12	1.91	1015.00	296.12	1.91	0.00
1964	1015.00	295.27	1.86	1015.00	295.27	1.86	0.00

1% AEP HYDRAULIC DATA

RIVER STATION	EXISTING			PROPOSED			PR-EX WSEL (ft)
	Q (cfs)	WSEL (ft)	VEL (fps)	Q (cfs)	WSEL (ft)	VEL (fps)	
6363	1512.00	303.26	1.21	1512.00	303.26	1.21	0.00
4819	1512.00	300.69	3.45	1512.00	300.69	3.46	0.00
4451	1512.00	299.80	3.22	1512.00	299.81	3.19	0.01
3890	1512.00	298.59	2.52	1512.00	298.56	2.62	−0.03
3786	1512.00	298.37	2.43	1512.00	298.31	2.60	−0.06
3538	1512.00	298.00	2.03	1512.00	297.71	2.70	−0.29
3360	1512.00	297.84	1.99	1512.00	297.24	3.08	−0.60
2930	1512.00	297.72	1.35	1512.00	296.62	2.49	−1.10
2850	EXISTING BRIDGE			PROPOSED CULVERT			0.00
2809	1512.00	296.57	2.00	1512.00	296.57	2.00	0.00
1964	1512.00	295.79	1.94	1512.00	295.79	1.94	0.00

NOTES:

1. HEC-RAS VERSION 6.1 WAS USED FOR THE BRIDGE ANALYSIS. NORMAL DEPTH WITH SLOPE S = 0.00414 FT/FT WAS USED FOR EXISTING AND PROPOSED CONDITIONS.
2. COORDINATION WITH THE GONZALES COUNTY FLOODPLAIN ADMINISTRATOR OCCURED ON MARCH 30, 2023.
3. DISCHARGES WERE DETERMINED USING THE NRCS CN METHOD PER TXDOT'S HYDRAULIC DESIGN MANUAL (SEPTEMBER 2019).
4. THE EXISTING AND PROPOSED BRIDGE CONFIGURATIONS HAVE A 4% AEP LEVEL OF SERVICE.

STATE OF TEXAS
AARON R. ROBERTS
110497
LICENSED
PROFESSIONAL ENGINEER

3/30/2023

NO.	REVISION	BY	DATE

CP&Y an STV Company

TEXAS REGISTERED ENGINEERING FIRM F-1741

 Texas Department of Transportation

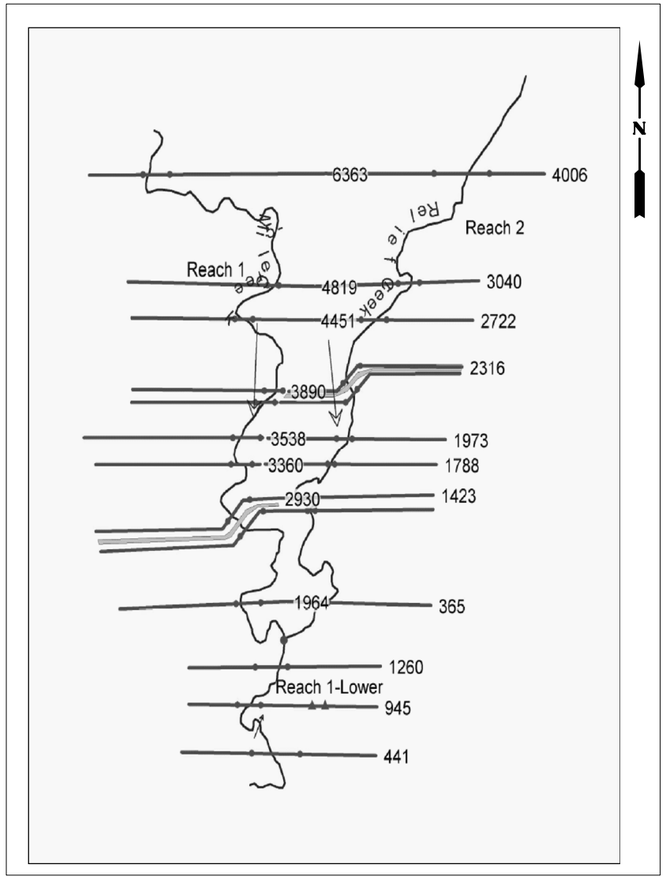
FM 108 AT FIVE MILE CREEK & DRAW
(FIVE MILE CREEK)

HYDRAULIC DATA SHEET

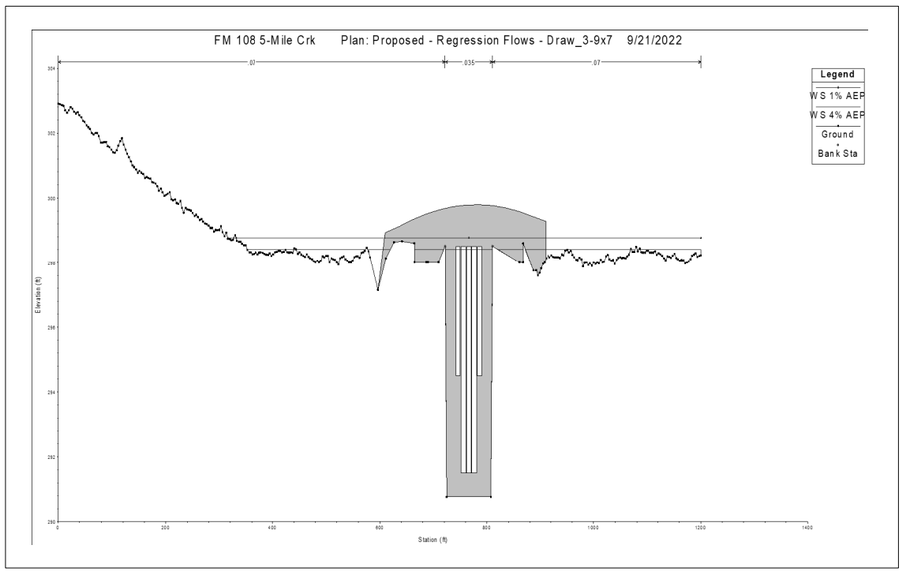
CSJ 0715-01-025 SHEET 1 OF 2

Designed:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	6	TEXAS				FM 108,ETC
Drawn:	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	YKM	GONZALES	0715	01	025,ETC	111

TEXAS REGISTERED ENGINEERING FIRM F-1741



CROSS SECTION LOCATION MAP



STREAM CROSS SECTION AT ROAD PROFILE

TEXAS REGISTERED ENGINEERING FIRM F-1741

4% AEP HYDRAULIC DATA

RIVER STATION	EXISTING			PROPOSED			PR-EX WSEL (ft)
	Q (cfs)	WSEL (ft)	VEL (fps)	Q (cfs)	WSEL (ft)	VEL (fps)	
4006	870.00	301.09	1.53	870.00	301.09	1.49	0.00
3040	870.00	299.59	2.00	870.00	299.41	2.21	−0.18
2722	870.00	299.32	1.70	870.00	298.98	2.04	−0.34
2316	870.00	299.15	0.90	870.00	298.41	1.71	−0.74
2270	EXISTING BRIDGE			PROPOSED CULVERT			0.00
2227	870.00	298.30	1.77	870.00	298.30	1.75	0.00
1973	870.00	297.96	1.02	870.00	297.96	1.02	0.00
1788	870.00	297.71	1.08	870.00	297.71	1.08	0.00
1423	870.00	297.23	1.29	870.00	297.23	1.29	0.00
1218	870.00	296.93	1.53	870.00	296.93	1.53	0.00
365	870.00	295.26	1.96	870.00	295.26	1.96	0.00

1% AEP HYDRAULIC DATA

RIVER STATION	EXISTING			PROPOSED			PR-EX WSEL (ft)
	Q (cfs)	WSEL (ft)	VEL (fps)	Q (cfs)	WSEL (ft)	VEL (fps)	
4006	1279.00	301.49	1.59	1279.00	301.49	1.56	0.00
3040	1279.00	299.98	2.31	1279.00	299.86	2.49	−0.12
2722	1279.00	299.64	2.10	1279.00	299.38	2.41	−0.26
2316	1279.00	299.42	1.05	1279.00	298.77	1.92	−0.65
2270	EXISTING BRIDGE			PROPOSED CULVERT			0.00
2227	1279.00	298.70	1.67	1279.00	298.70	1.66	0.00
1973	1279.00	298.41	1.07	1279.00	298.41	1.07	0.00
1788	1279.00	298.20	1.03	1279.00	298.20	1.03	0.00
1423	1279.00	297.78	1.41	1279.00	297.78	1.41	0.00
1218	1279.00	297.48	1.66	1279.00	297.48	1.66	0.00
365	1279.00	295.78	2.12	1279.00	295.78	2.12	0.00

NOTES:

1. HEC−RAS VERSION 6.1 WAS USED FOR THE BRIDGE ANALYSIS. NORMAL DEPTH WITH SLOPE S = 0.00414 FT/FT WAS USED FOR EXISTING AND PROPOSED CONDITIONS.
2. COORDINATION WITH THE GONZALES COUNTY FLOODPLAIN ADMINISTRATOR OCCURED ON MARCH 30, 2023.
3. DISCHARGES WERE DETERMINED USING THE NRCS CN METHOD PER TXDOT'S HYDRAULIC DESIGN MANUAL (SEPTEMBER 2019).
4. THE EXISTING AND PROPOSED BRIDGE CONFIGURATIONS HAVE A 4% AEP LEVEL OF SERVICE.

STATE OF TEXAS
AARON R. ROBERTS
110497
LICENSED
PROFESSIONAL ENGINEER

3/30/2023

NO.	REVISION	BY	DATE

CP&Y an STV Company

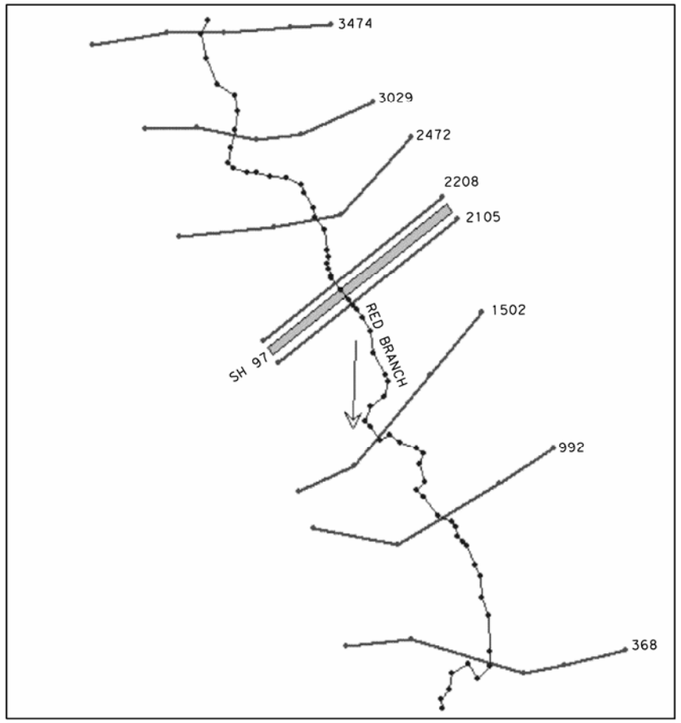
TEXAS REGISTERED ENGINEERING FIRM F-1741

FM 108 AT FIVE MILE CREEK & DRAW
(DRAW)

HYDRAULIC DATA SHEET

CSJ 0715−01−025 SHEET 2 OF 2

Designed:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	6	TEXAS				FM 108,ETC
Drawn:	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	YKM	GONZALES	0715	01	025,ETC	112

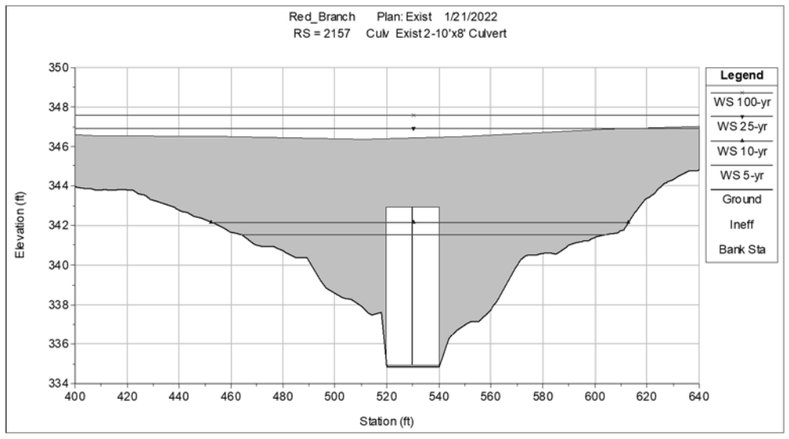


HEC-RAS LAYOUT

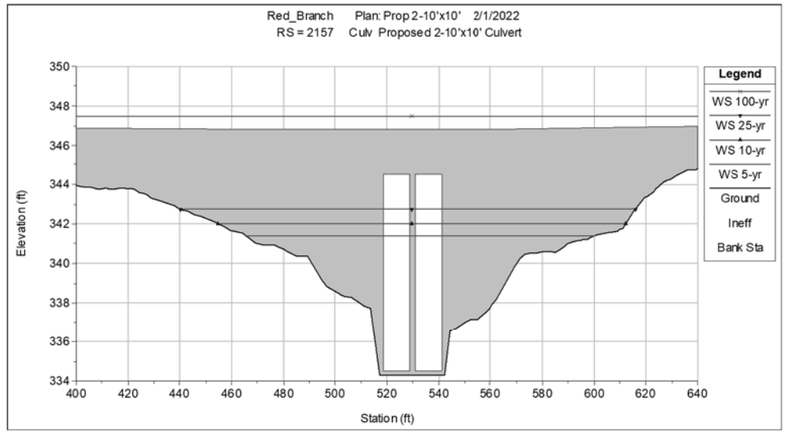
N. T. S.

HEC-RAS ANALYSIS DATA

HEC-RAS STATION	DESIGN FREQUENCY	FLOWS (CFS)	COMPUTED WATER SURFACE ELEVATIONS			VELOCITIES (FT/S)	
			EXISTING	PROPOSED	Δ (PR - EX)	EXISTING	PROPOSED
3474	5-yr	1201	347.80	347.80	0.00	4.84	4.83
	10-yr	1600	347.94	348.03	0.09	6.12	5.94
	25-yr	2178	348.28	348.26	-0.02	7.39	7.43
	100-yr	3122	349.10	349.09	-0.01	8.17	8.19
3029	5-yr	1201	344.74	344.73	-0.01	5.51	5.53
	10-yr	1600	345.71	345.53	-0.18	4.52	4.88
	25-yr	2178	347.39	347.24	-0.15	3.52	3.67
	100-yr	3122	348.19	348.15	-0.04	4.14	4.17
2472	5-yr	1201	343.55	343.26	-0.29	2.65	2.86
	10-yr	1600	345.06	344.71	-0.35	2.53	2.71
	25-yr	2178	347.03	346.84	-0.19	2.44	2.53
	100-yr	3122	347.70	347.65	-0.05	3.12	3.15
2208	5-yr	1201	343.40	343.11	-0.29	2.30	2.26
	10-yr	1600	344.94	344.59	-0.35	2.44	2.41
	25-yr	2178	346.94	346.74	-0.20	2.51	2.59
	100-yr	3122	347.57	347.49	-0.08	3.16	3.28
2157	CULVERT						
2105	5-yr	1201	341.49	341.39	-0.10	3.92	3.72
	10-yr	1600	342.04	341.95	-0.09	4.55	4.31
	25-yr	2178	342.85	342.64	-0.21	5.12	5.05
	100-yr	3122	343.74	343.61	-0.13	5.85	6.04
1502	5-yr	1201	339.29	339.29	0.00	4.42	4.42
	10-yr	1600	339.78	339.78	0.00	4.83	5.33
	25-yr	2178	340.40	340.40	0.00	5.33	5.33
	100-yr	3122	341.28	341.28	0.00	6.04	6.04
992	5-yr	1201	337.49	337.49	0.00	3.33	3.33
	10-yr	1600	338.02	338.02	0.00	3.73	3.73
	25-yr	2178	338.69	338.69	0.00	4.20	4.19
	100-yr	3122	339.64	339.64	0.00	4.78	4.78
368	5-yr	1201	335.71	335.71	0.00	3.73	3.73
	10-yr	1600	336.25	336.25	0.00	4.11	4.11
	25-yr	2178	336.94	336.94	0.00	4.54	4.54
	100-yr	3122	337.91	337.91	0.00	5.13	5.13



HEC-RAS EXISTING CULVERT UPSTREAM SECTION



HEC-RAS PROPOSED CULVERT UPSTREAM SECTION

NOTES:

1. RED BRANCH IS NOT A FEMA STUDIED STREAM. INFORMAL COORDINATION WAS COMPLETED ON 03/30/2023 WITH JIMMY HARLESS, GONZALES COUNTY.
2. HEC-RAS VERSION 6.0 USED FOR HYDRAULIC ANALYSIS OF EXISTING CONDITION AND DESIGN OF PROPOSED STRUCTURE. TAILWATER ELEVATIONS WERE DETERIMINED BY NORMAL DEPTH COMPUTATIONS USING A 0.0031 FT/FT CHANNEL BED SLOPE.
3. PROPOSED CULVERT IS 46 FT 2-10'X10'MBC.
4. ELEVATION DATUM IS REFERENCED TO NAVD 1988.

NO.	DESCRIPTION	DATE

STATE OF TEXAS
LIQUN ZHANG
93660
LICENSED
PROFESSIONAL ENGINEER
3/30/2023

WSP USA Inc
16200 Park Row, Suite 200
Houston, TX 77084
TEL: 281.589.5900
TBPE F-2263

SH 97 AT RED BRANCH

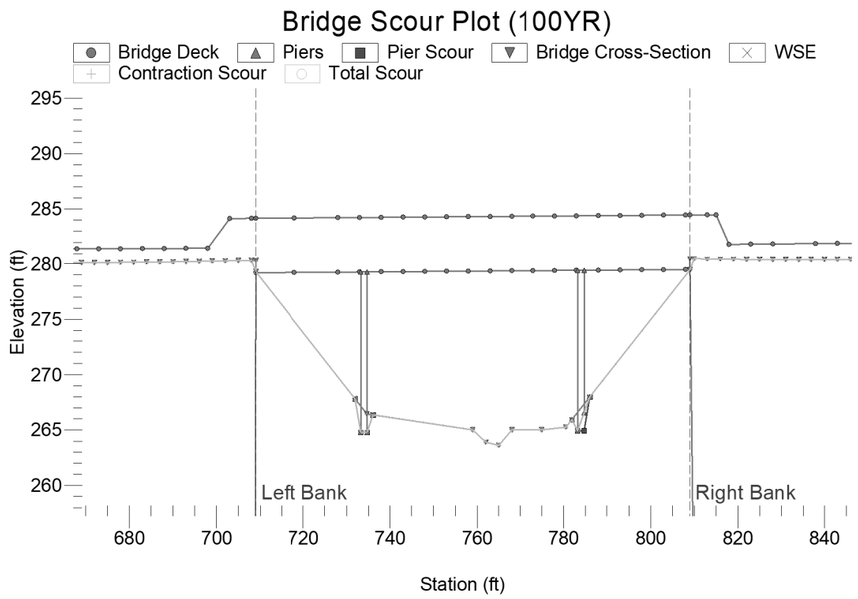
HYDRAULIC DATA SHEET

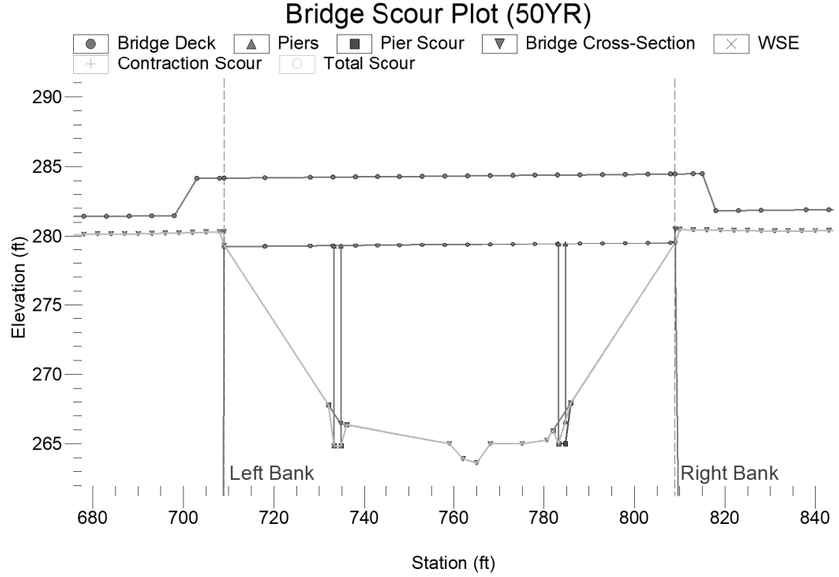
CSJ 0347-02-033

SHEET 1 OF 1

DSN:	LZ	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CK:	SP	6	TEXAS				FM 108,ETC
DRN:	LZ	STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
APPVD:	SP	YKM	GONZALES	0715	01	025,ETC	113

FHWA HYDRAULIC TOOLBOX 5.0				
Scenario	2% AEP	1% AEP	Units	Method
Contraction Scour				
Clear Water Contraction Scour Depth	−2.67	−2.80	ft	Clear−Water and Live−Bed Scour
Live Bed Contraction Scour Depth	−2.97	−3.21	ft	Clear−Water and Live−Bed Scour
Applied Contraction Scour Elevation with LTD	263.62	263.62	ft−msl	Clear−Water and Live−Bed Scour
Piers				
Pier Name	Pier 1	Pier 1		
Pier Scour Depth	1.96	2.02	ft	Computation Method: Pier 1−50YR: HEC−18 100YR: HEC−18
Total Scour at Pier	1.96	2.02	ft	
Total Scour Elevation at Pier	264.84	264.78	ft−msl	
Pier Name	Pier 2	Pier 2	ft	
Pier Scour Depth	1.96	2.02	ft	Computation Method: Pier 2−50YR: HEC−18 100YR: HEC−18
Total Scour at Pier	1.96	2.02	ft−msl	





STATE OF TEXAS
AARON R. ROBERTS
110497
LICENSED
PROFESSIONAL ENGINEER

3/30/2023

NO.	REVISION	BY	DATE

CP&Y an STV Company
TEXAS REGISTERED ENGINEERING FIRM F-1741

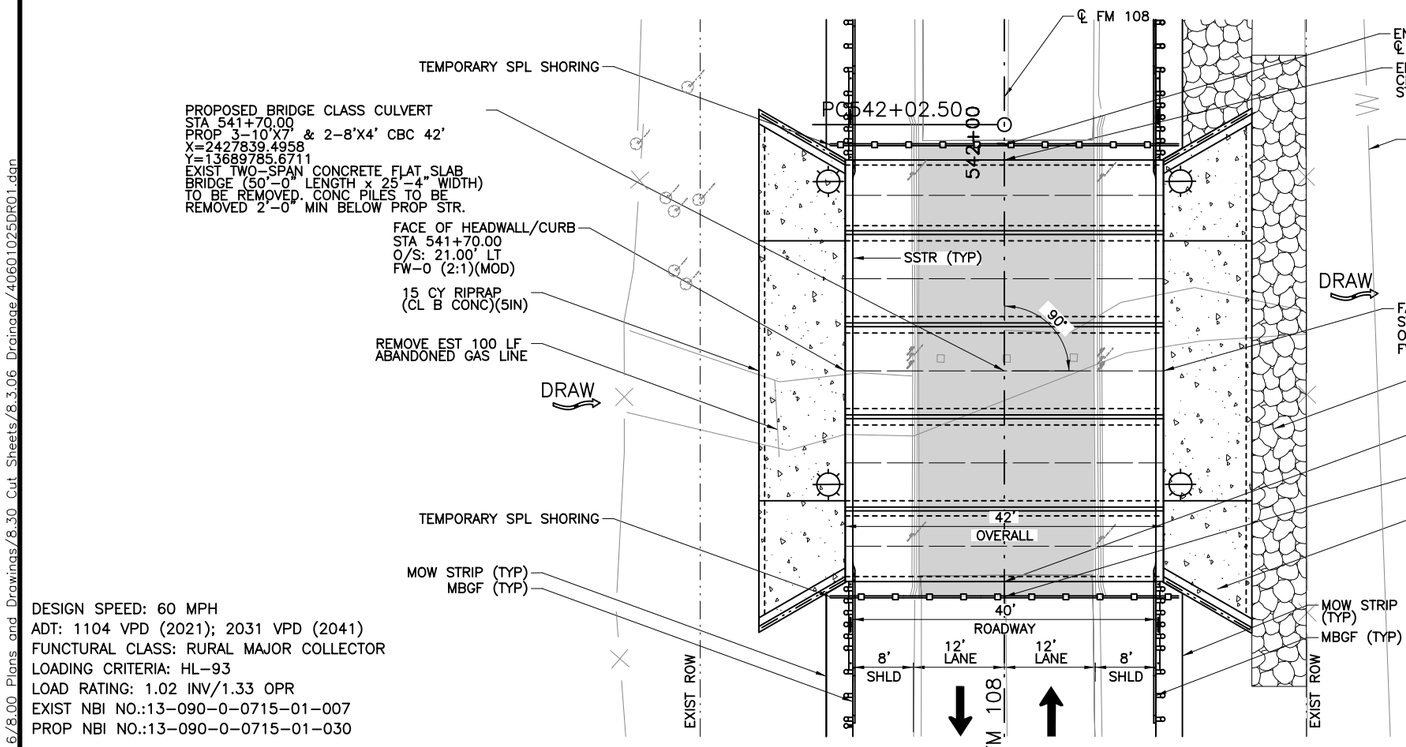
 Texas Department of Transportation

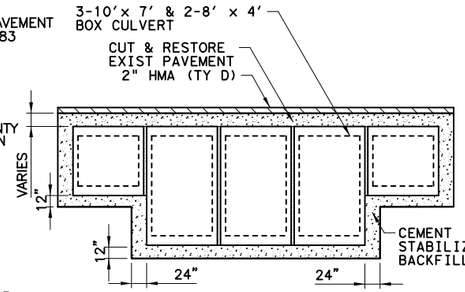
FM 108 AT BRUSHY CREEK

SCOUR DATA SHEET

SHEET 1 OF 1

		FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Designed:	–	6	TEXAS				FM108,ETC
Checked:	–	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Drawn:	–	YKM	GONZALES	0715	01	025,ETC	113A
Checked:	–						





CUT & RESTORE PAVEMENT DETAIL

N. T. S.

10 5 0 10 20
SCALE HORIZ. FEET

5 2.5 0 5 10
SCALE VERT. FEET

DESIGN SPEED: 60 MPH
ADT: 1104 VPD (2021); 2031 VPD (2041)
FUNCTURAL CLASS: RURAL MAJOR COLLECTOR
LOADING CRITERIA: HL-93
LOAD RATING: 1.02 INV/1.33 OPR
EXIST NBI NO.:13-090-0-0715-01-007
PROP NBI NO.:13-090-0-0715-01-030

HYDRAULIC DATA TABLE

EXISTING		
HW 25YR	279.07	ft
TW 25YR	278.09	ft
Q 25YR	959	cfs
V 25YR	2.90	fps

PROPOSED		
HW 25YR	279.18	ft
TW 25YR	278.09	ft
Q 25YR	959	cfs
V 25YR	2.90	fps

EXISTING		
HW 100YR	280.13	ft
TW 100YR	278.77	ft
Q 100YR	1355	cfs
V 100YR	3.35	fps

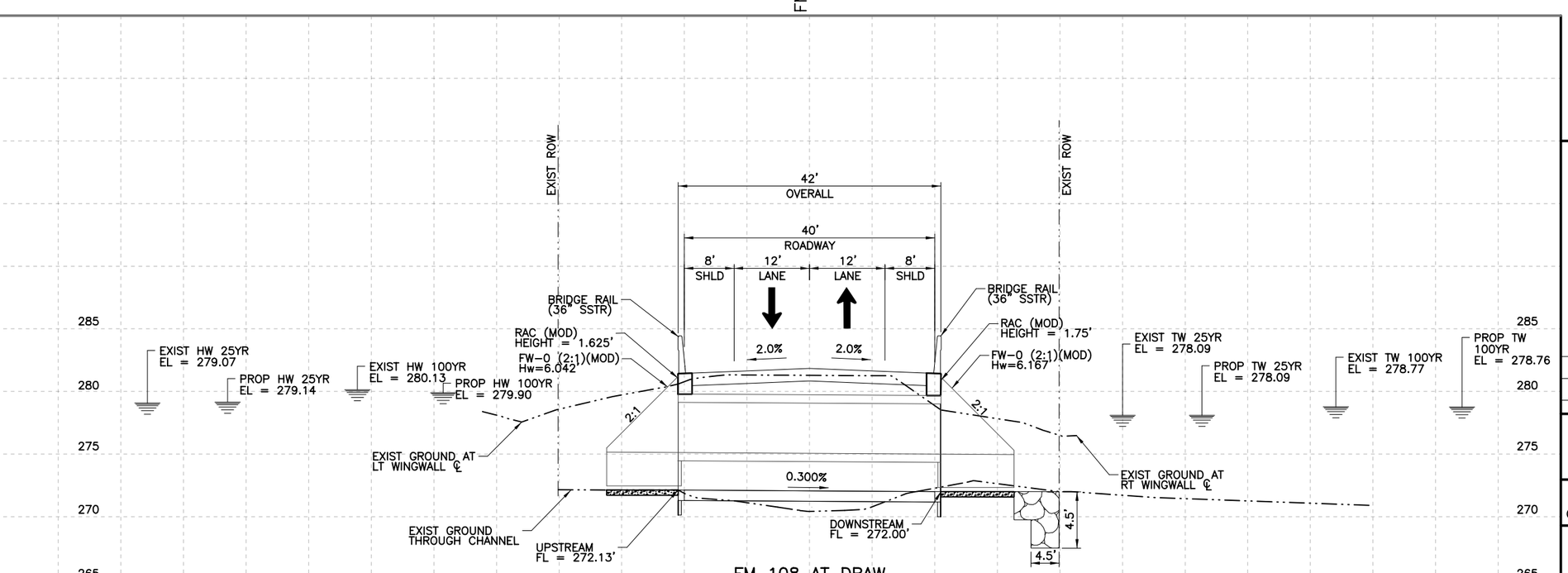
PROPOSED		
HW 100YR	279.90	ft
TW 100YR	278.76	ft
Q 100YR	1355	cfs
V 100YR	3.35	fps

LEGEND

- RIPRAP (CONC)(5")
- RIPRAP (STONE PROTECTION) (18") 27" THICKNESS
- DIRECTION OF TRAFFIC
- EXISTING ROW
- LIMITS OF CUT & RESTORE
- TEMPORARY SPL SHORING

NOTES:

1. SEE STEPPED CULVERT DETAILS FOR MORE INFORMATION.



FM 108 AT DRAW
℄ STA 541+42.17 TO STA 541+97.83
REMOVE EXISTING STRUCTURE
PROP 3-10'X7'X42' & 2-8'X4'X42' MBC,
USING SCP-10, SCP-8, SCP-MD, RAC(MOD), BCS W/WINGWALLS FW-0(MOD)

STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED PROFESSIONAL ENGINEER
4/4/2023

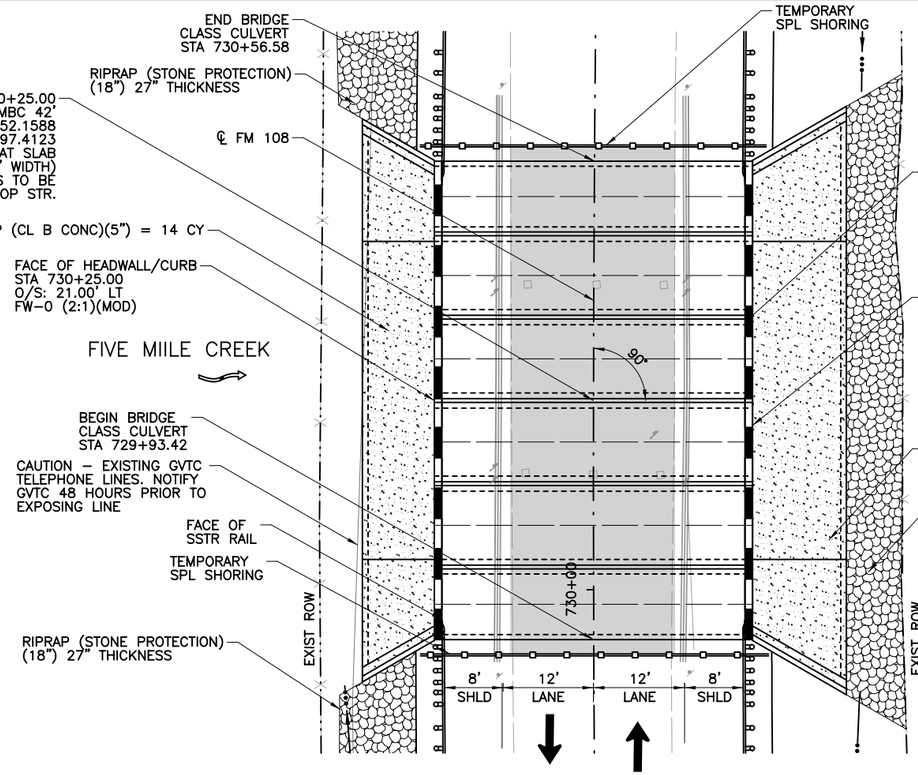
NO.	REVISION	BY	DATE

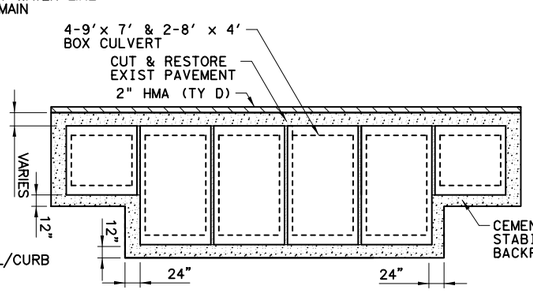
CP&Y an STV Company
TEXAS REGISTERED ENGINEERING FIRM F-1741

 Texas Department of Transportation

FM 108 AT DRAW & BRUSHY CREEK
BRIDGE CLASS CULVERT LAYOUT
(FM 108 AT DRAW STA 541+70.00)
CSJ 0715-01-025 SHEET 1 OF 1

Designed:	YP	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	BAJ	6	TEXAS				FM 108,ETC
Drawn:	YP	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	BAJ	YKM	GONZALES	0715	01	025,ETC	114





CUT & RESTORE PAVEMENT DETAIL

N. T. S.

10 5 0 10 20
SCALE HORIZ. FEET

5 2.5 0 5 10
SCALE VERT. FEET

DESIGN SPEED: 60 MPH
ADT: 1104 VPD (2021); 2031 VPD (2041)
FUNTIONAL CLASS: RURAL MAJOR COLLECTOR
LOADING CRITERIA: HL–93
LOAD RATING: 1.02 INV/1.33 OPR
EXIST NBI.:13–090–0–0715–01–010
PROP NBI.:13–090–0715–01–032

HYDRAULIC DATA

EXISTING		
HW 25–YR	296.74	ft
TW 25–YR	296.12	ft
Q 25–YR	1015	cfs
V 25–YR	1.91	fps

PROPOSED		
HW 25–YR	296.16	ft
TW 25–YR	296.12	ft
Q 25–YR	1015	cfs
V 25–YR	1.91	fps

EXISTING		
HW 100–YR	297.72	ft
TW 100–YR	296.57	ft
Q 100–YR	1512	cfs
V 100–YR	2	fps

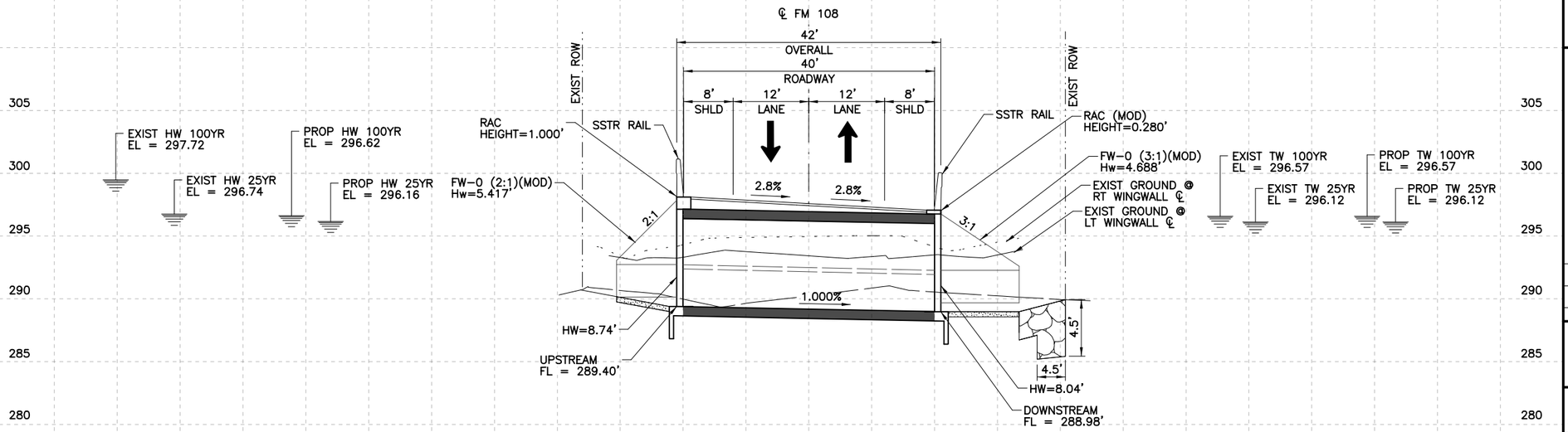
PROPOSED		
HW 100–YR	296.62	ft
TW 100–YR	296.57	ft
Q 100–YR	1512	cfs
V 100–YR	2	fps

LEGEND

- RIPRAP (CONC)(5")
- RIPRAP (STONE PROTECTION) (18") 27" THICKNESS
- DIRECTION OF TRAFFIC
- EXISTING ROW
- LIMITS OF CUT & RESTORE
- TEMPORARY SPL SHORING

NOTES:

1. SEE STEPPED CULVERT DETAILS FOR MORE INFORMATION.
2. CUT & RESTORE PAVEMENT SECTION TO BE REPLACED BY PERMANENT PVMT PER TYPICAL SECTIONS.



FM 108 AT FIVE MILE CREEK
℄ STA 729+93.42 TO STA 730+56.58
REMOVE EXISTING BRIDGE STRUCTURE
PROP 4–9'X7' & 2 8'X4'X42' MBC,
USING SCP–9, SCP–8, SCP–MD, RAC(MOD), BCS W/ WINGWALLS FW–0(MOD)

STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED
PROFESSIONAL ENGINEER
4/4/2023

NO.	REVISION	BY	DATE

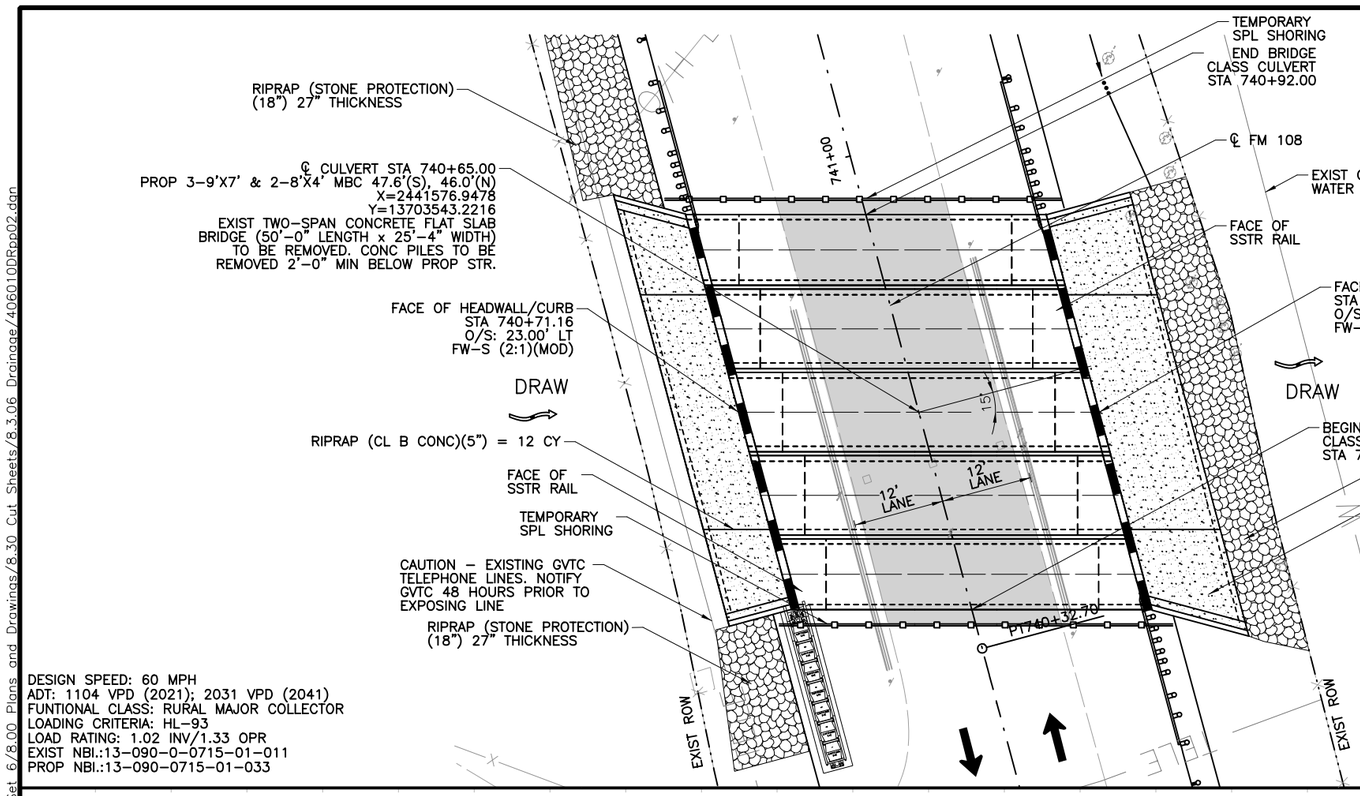
CP&Y an STV Company
TEXAS REGISTERED ENGINEERING FIRM F-1741

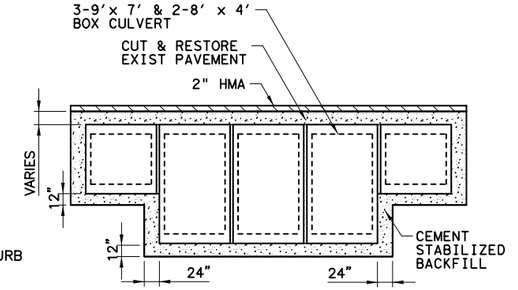
 Texas Department of Transportation

FM 108 AT FIVE MILE CREEK & DRAW

BRIDGE CLASS
CULVERT LAYOUT
(FM 108 AT FIVE MILE CREEK)
CSJ 0715–01–025 SHEET 1 OF 1

		FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Designed:	FV	6	TEXAS				FM 108,ETC
Checked:	BAJ						
Drawn:	FV	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	BAJ	YKM	GONZALES	0715	01	025,ETC	115





CUT & RESTORE PAVEMENT DETAIL

N. T. S.

SCALE HORIZ. 10 5 0 10 20 FEET

SCALE VERT. 5 2.5 0 5 10 FEET

DESIGN SPEED: 60 MPH
ADT: 1104 VPD (2021); 2031 VPD (2041)
FUNTIONAL CLASS: RURAL MAJOR COLLECTOR
LOADING CRITERIA: HL-93
LOAD RATING: 1.02 INV/1.33 OPR
EXIST NBI.:13-090-0-0715-01-011
PROP NBI.:13-090-0715-01-033

HYDRAULIC DATA TABLE

EXISTING		
HW 25-YR	299.15	ft
TW 25-YR	298.3	ft
Q 25-YR	870	cfs
V 25-YR	1.77	fps

PROPOSED		
HW 25-YR	298.41	ft
TW 25-YR	298.3	ft
Q 25-YR	870	cfs
V 25-YR	1.75	fps

EXISTING		
HW 100-YR	299.42	ft
TW 100-YR	298.7	ft
Q 100-YR	1279	cfs
V 100-YR	1.67	fps

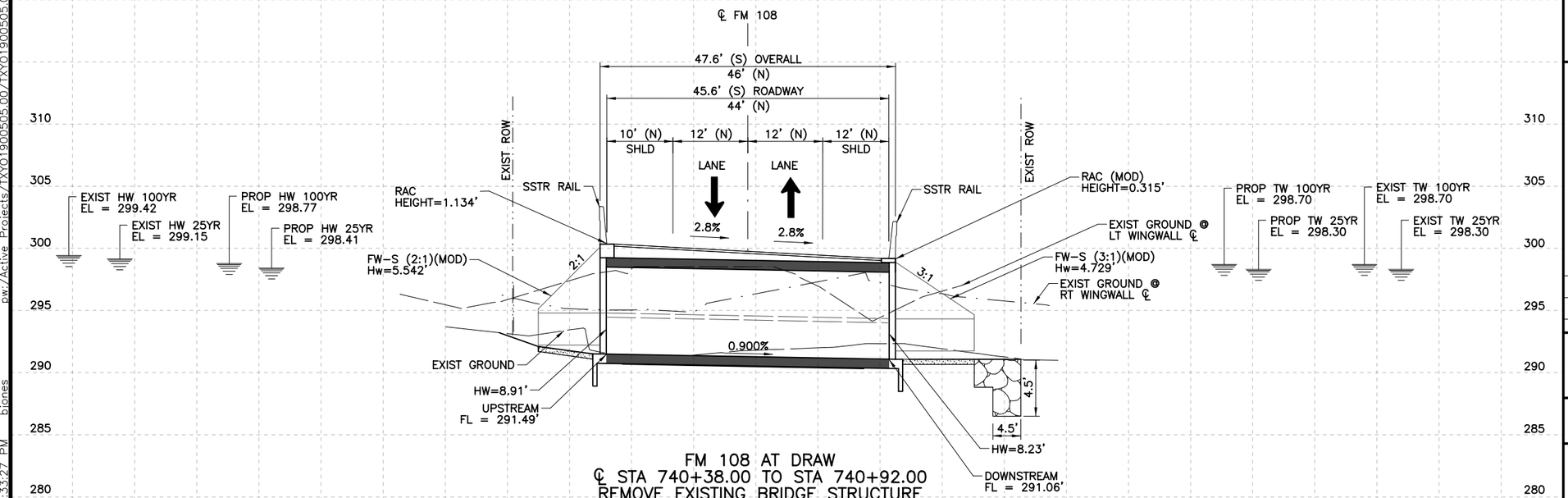
PROPOSED		
HW 100-YR	298.77	ft
TW 100-YR	298.7	ft
Q 100-YR	1279	cfs
V 100-YR	1.66	fps

LEGEND

- RIPRAP (CONC)(5")
- RIPRAP (STONE PROTECTION) (18") 27" THICKNESS
- DIRECTION OF TRAFFIC
- EXISTING ROW
- LIMITS OF CUT & RESTORE
- TEMPORARY SPL SHORING

NOTES:

1. SEE STEPPED CULVERT DETAILS FOR MORE INFORMATION.
2. CUT & RESTORE PAVEMENT SECTION TO BE REPLACED BY PERMANENT PVMT PER TYPICAL SECTIONS.



FM 108 AT DRAW
℄ STA 740+38.00 TO STA 740+92.00
REMOVE EXISTING BRIDGE STRUCTURE
PROP 6-9'X7' & 2 8'X4'X47.6'(S), 46'(N) MBC
USING SCP-9, SCP-8, SCP-MD, RAC(MOD), BCS W/ WINGWALLS FW-S(MOD)
15 DEG LT FORWARD SKEW

STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED PROFESSIONAL ENGINEER
4/4/2023

NO.	REVISION	BY	DATE

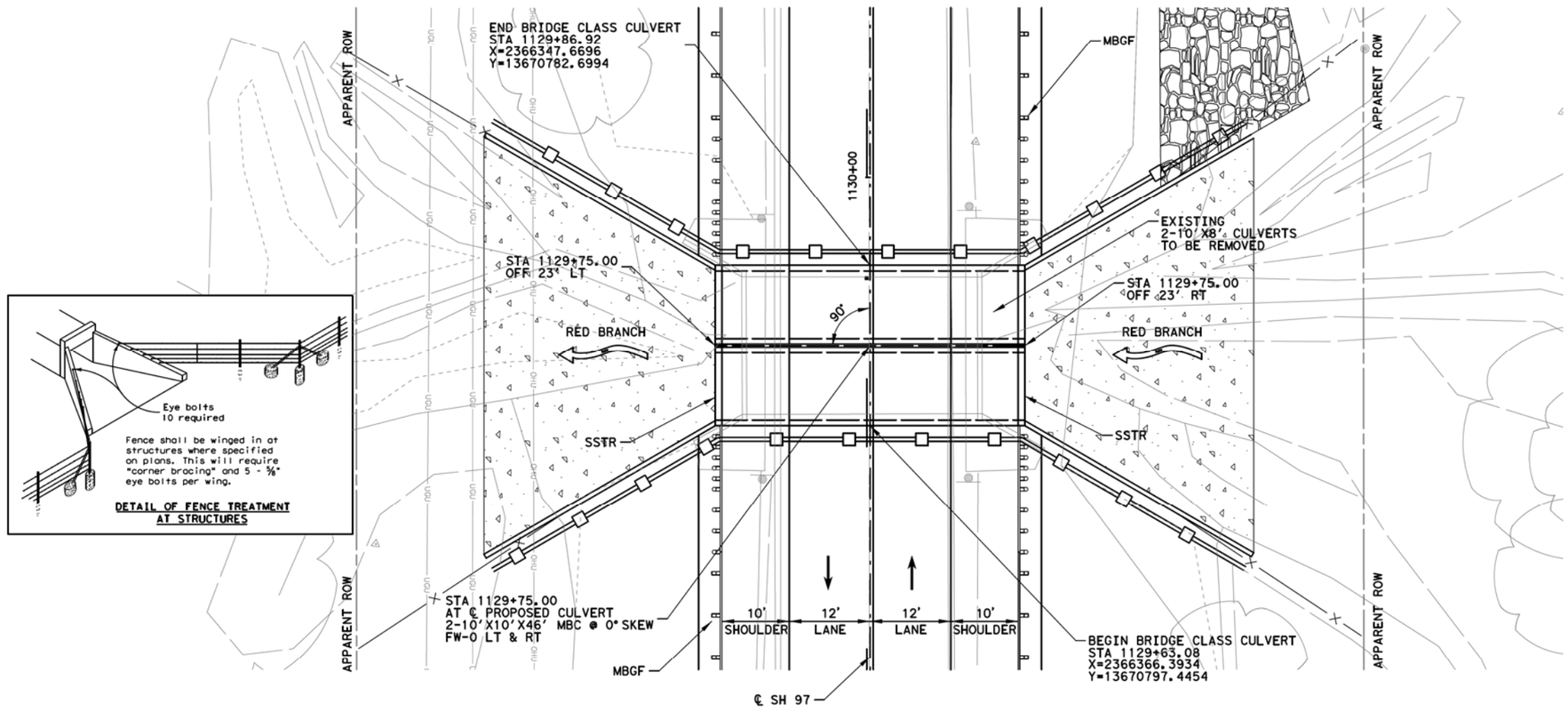
CP&Y an STV Company
TEXAS REGISTERED ENGINEERING FIRM F-1741

FM 108 AT FIVE MILE CREEK & DRAW

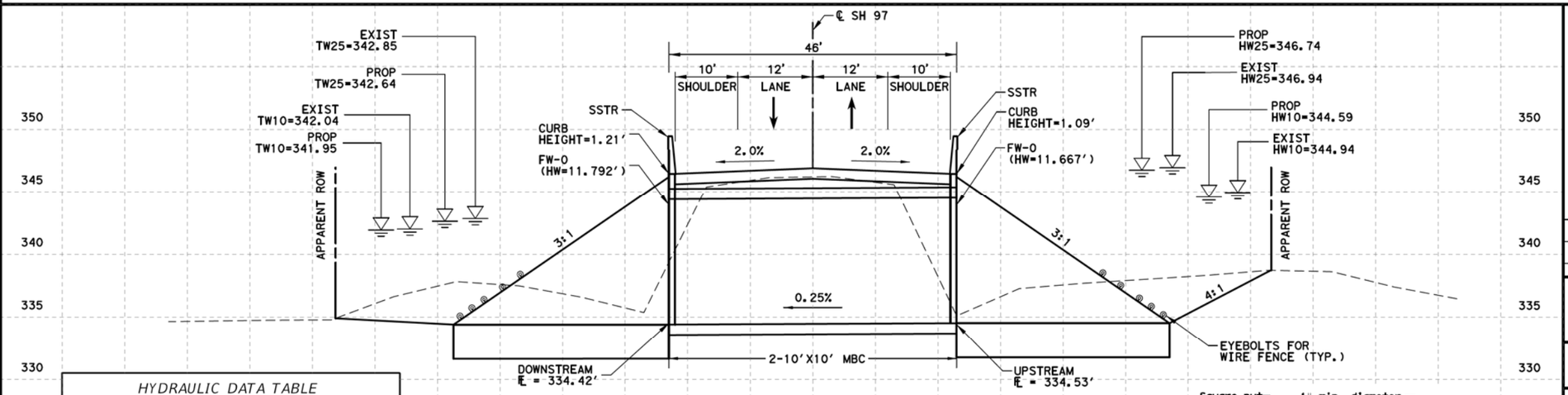
BRIDGE CLASS CULVERT LAYOUT
(FM 108 AT DRAW STA 740+65.00)
CSJ 0715-01-025 SHEET 1 OF 1

Designed:	FV	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	BAJ	6	TEXAS				FM 108,ETC
Drawn:	FV	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	BAJ	YKM	GONZALES	0715	01	025,ETC	116

DETAIL OF FENCE TREATMENT AT STRUCTURES



PLAN

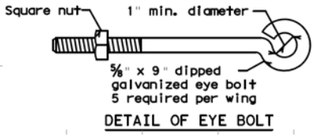


SH 97 STA 1129+63.08 TO STA 1129+86.92
REMOVE EXISTING 2-10'X8' CULVERTS
PROPOSED 2-10'X10'X46' MBC
USING RAC, SCP-10, SCP-MD, & BCS
W/ WINGWALLS FW-0 LT & RT

SECTION

HYDRAULIC DATA TABLE

EXIST HW25 = 346.94 ft	*PROP HW25 = 346.74 ft*
EXIST Q25 = 2,178 cfs	*PROP Q25 = 2,178 cfs*
EXIST V25 = 2.51 ft/s	*PROP V25 = 2.59 ft/s*
EXIST HW100 = 347.57 ft	*PROP HW100 = 347.49 ft*
EXIST Q100 = 3,122 cfs	*PROP Q100 = 3,122 cfs*
EXIST V100 = 3.16 ft/s	*PROP V100 = 3.28 ft/s*



DETAIL OF EYE BOLT

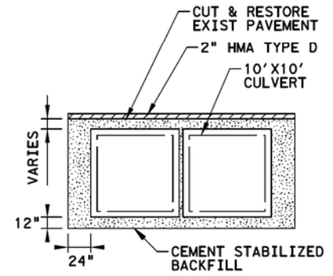
LEGEND

TEMPORARY SPECIAL SHORING

10 5 0 10 20
SCALE FEET
HORIZ.

5 2.5 0 5 10
SCALE FEET
VERT.

DESIGN SPEED: 65 MPH
ADT: 2,616 (2021); 3,662 (2041)
FUNCTIONAL CLASS: MAJOR COLLECTOR (RURAL)
LOADING CRITERIA: HL93
LOAD RATING: 1.68 INV/2.18 OPR
EXIST NBI NO.: 13-090-0-0347-02-009
PROP NBI NO.: 13-090-0-0347-02-017



CUT & RESTORE PAVEMENT DETAIL
N.T.S.

STATE OF TEXAS
AMANDA H. ARAJ
123725
LICENSED
PROFESSIONAL ENGINEER
3/31/2023

NO.	REVISION	BY	DATE

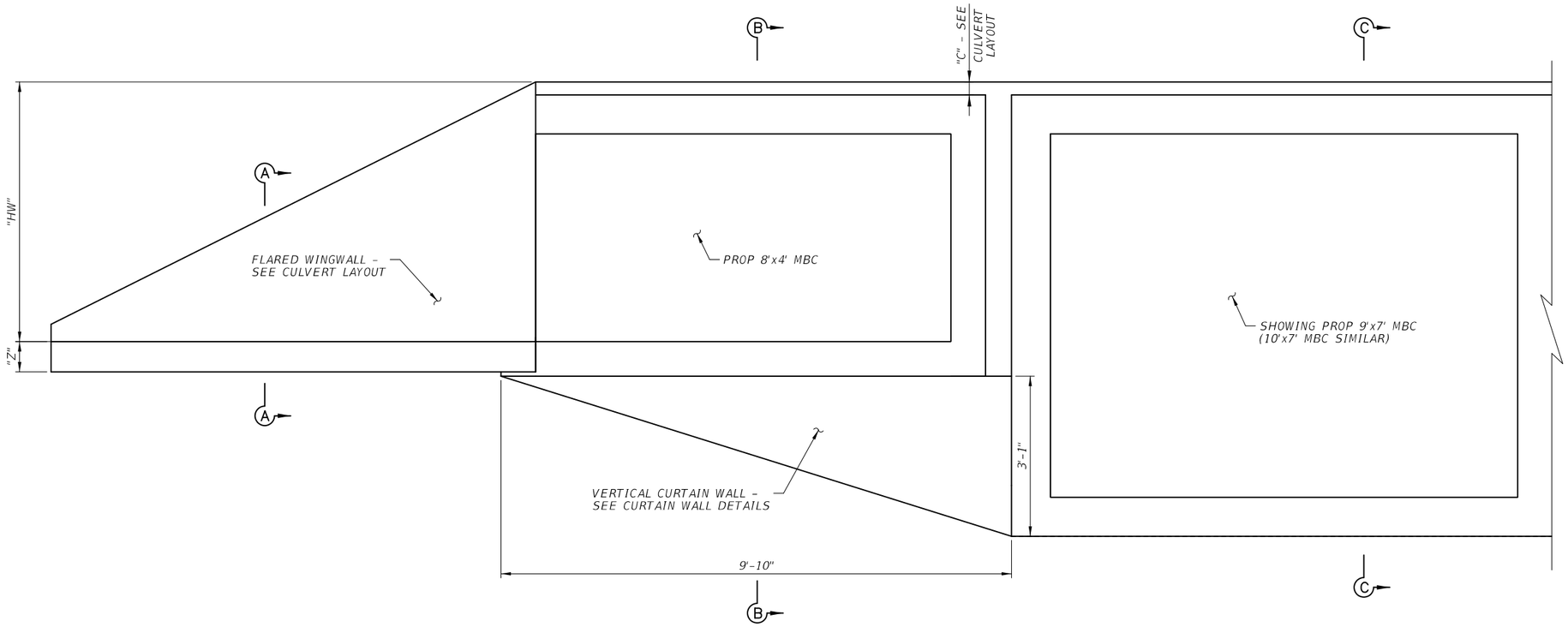
WSP USA Inc.
16200 Park Row, Suite 200
Houston, TX 77084
TBPE # F-2263

SH 97 AT RED BRANCH

BRIDGE CLASS CULVERT LAYOUT

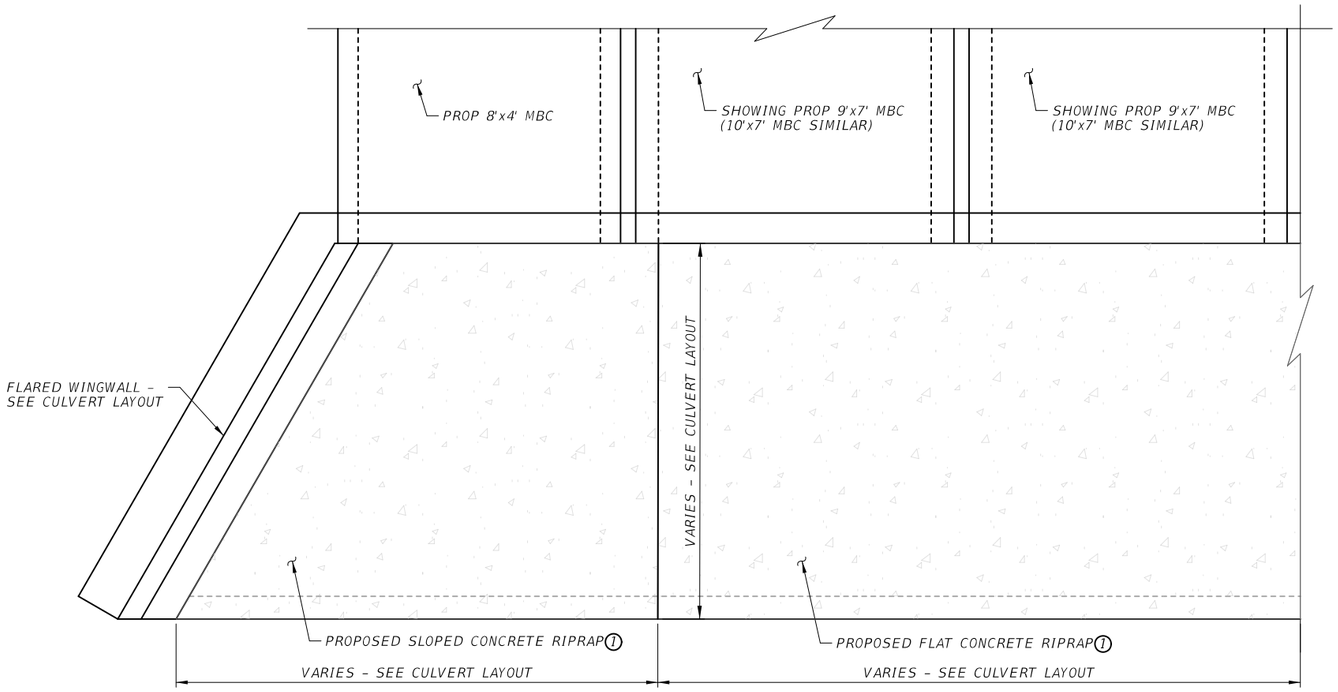
CSJ 0347-02-033 SHEET 1 OF 1

Designed:	MAK	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	AHA	6	TEXAS					FM 108, ETC
Drawn:	MAK	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	AHA	YKM	GONZALES	0715	01	025,ETC		117



ELEVATION VIEW

(NOT SHOWING CONCRETE RIPRAP FOR CLARITY - SEE PLAN VIEW FOR RIPRAP LIMITS)



PLAN VIEW

GENERAL NOTES:

1. DESIGNED ACCORDING TO 2017 AASHTO LRFD SPECIFICATIONS, 8TH EDITION (HL93 LOADING).
2. COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE. REINFORCING BAR DIMENSIONS ARE OUT-TO-OUT OF BAR.
3. SEE FW-0 (MOD) AND FW-S (MOD) FOR ADDITIONAL REINFORCING DETAILS AND INFORMATION.
4. SEE CULVERT LAYOUT FOR ADDITIONAL INFORMATION AND LIMITS OF CONCRETE RIPRAP.
5. SEE T631-CM STANDARD FOR RAIL ANCHORAGE ON CULVERT HEADWALLS.

MATERIAL NOTES:

1. PROVIDE CLASS C (HPC) CONCRETE (f'c = 3,600 psi).
2. PROVIDE GRADE 60 REINFORCING STEEL.

(1) SEE CRR FOR ADDITIONAL REINFORCING DETAILS AND INFORMATION.

STATE OF TEXAS
KELLY HO
112947
LICENSED
PROFESSIONAL ENGINEER
04/03/2023

NO.	REVISION	BY	DATE

CP&Y an STV Company
TEXAS REGISTERED ENGINEERING FIRM F-1741

 Texas Department of Transportation

FM 108 AT DRAW

STEPPED CULVERT DETAILS

CSJ: 0715-01-025 SHEET 1 OF 4

Designed:	KAD	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	KH	6	TEXAS					FM108,ETC
Drawn:	KAD	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	KH	YKM	GONZALES	0715	01	025,ETC		118

cpybw_ANSIB.tbl
cpydf_ANSIB.pltcfg
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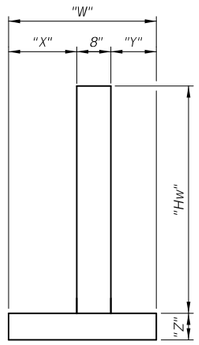
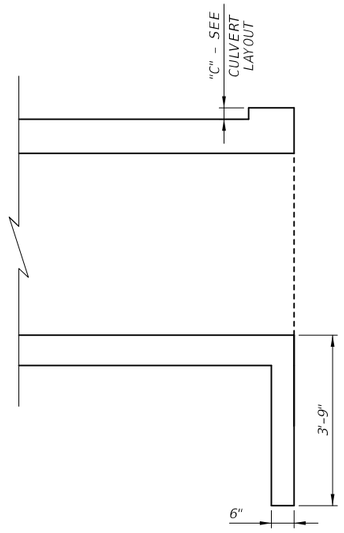
CURTAIN WALL QUANTITIES ②

BAR	NO.	SIZE	LENGTH	WEIGHT
L	6	#4	VARIES (2'-7" TO 5'-7")	16
Q	4	#4	9'-7"	26
REINFORCING STEEL			LB	42
CLASS "C" CONC (MISC)			CY	0.3

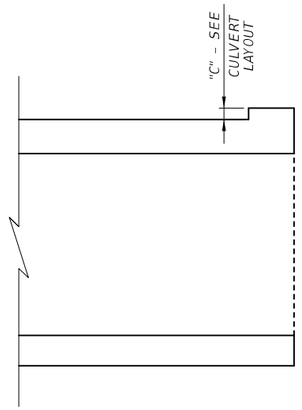
② QUANTITIES SHOWN ARE FOR ONE CURTAIN WALL ONLY.



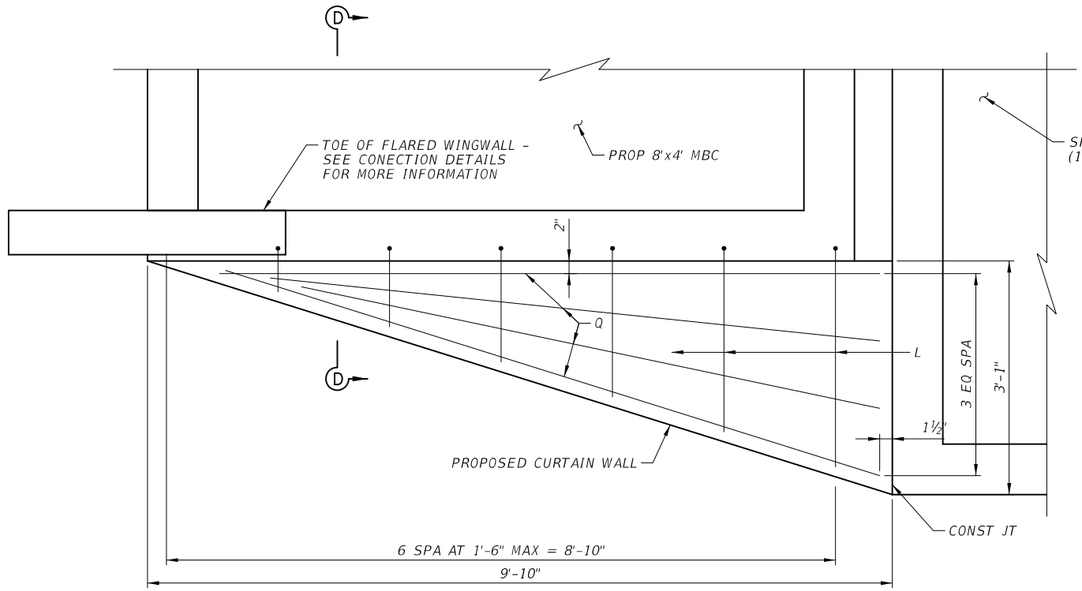
SECTION A-A



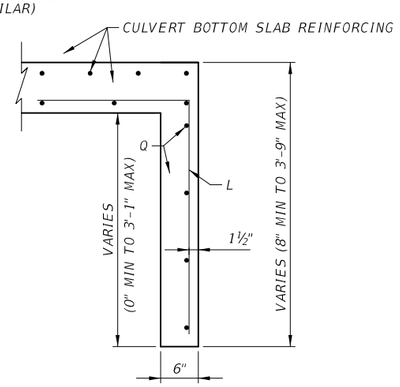
SECTION B-B



SECTION C-C



ELEVATION



SECTION D-D

CURTAIN WALL DETAILS

STATE OF TEXAS
KELLY HO
112947
LICENSED
PROFESSIONAL ENGINEER
04/03/2023

NO.	REVISION	BY	DATE

CP&Y an STV Company
TEXAS REGISTERED ENGINEERING FIRM F-1741

 Texas Department of Transportation

FM 108 AT DRAW

STEPPED CULVERT DETAILS

CSJ: 0715-01-025 SHEET 2 OF 4

		FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Designed:	KAD	6	TEXAS				FM108,ETC
Drawn:	KAD	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	KH	YKM	GONZALES	0715	01	025,ETC	119
Checked:	KH						

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cpydf_ANSIB.pltcfg
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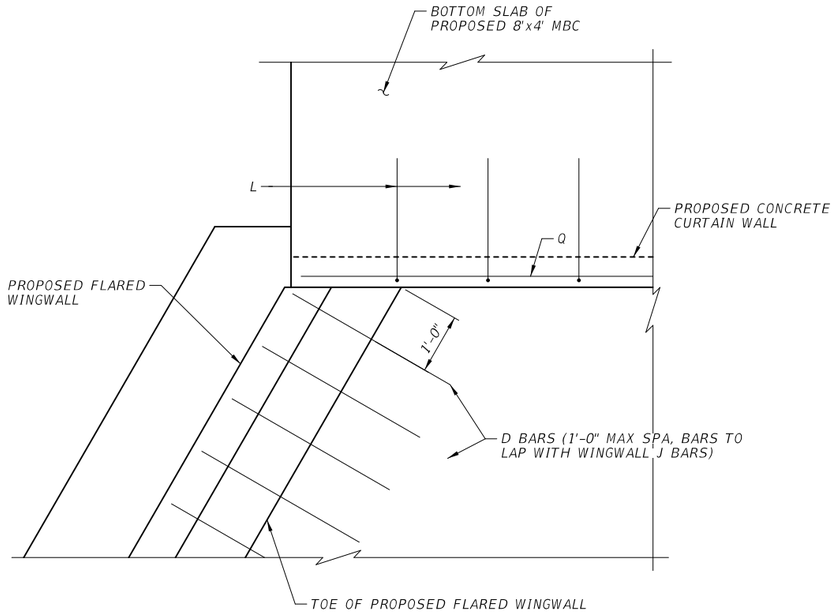
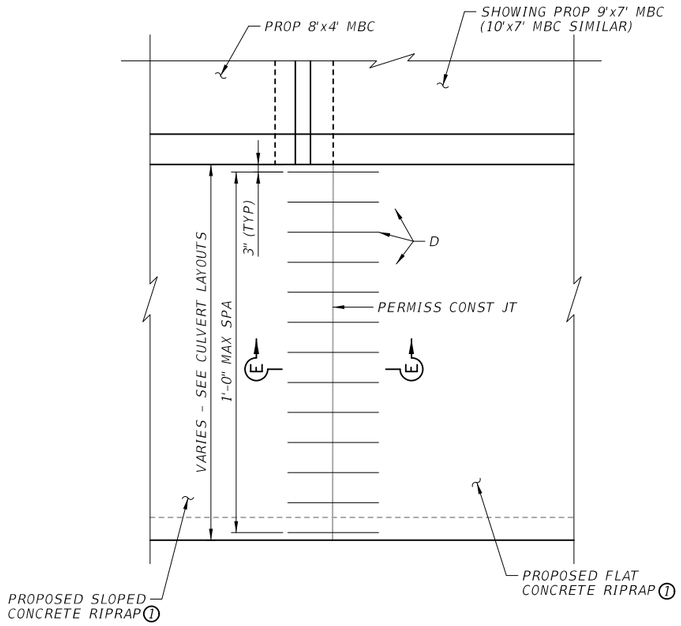
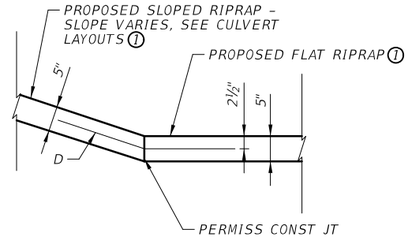


FLARED WINGWALL TO SLOPED RIPRAP CONNECTION



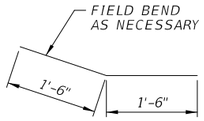
SLOPED RIPRAP TO FLAT RIPRAP CONNECTION



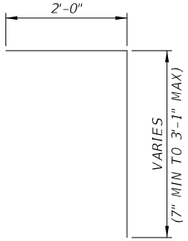
SECTION E-E

CONNECTION DETAILS

(1) SEE CRR FOR ADDITIONAL REINFORCING DETAILS AND INFORMATION.



D BARS (#4)



L BARS (#4)

STATE OF TEXAS
KELLY HO
112947
LICENSED PROFESSIONAL ENGINEER

04/03/2023

NO.	REVISION	BY	DATE

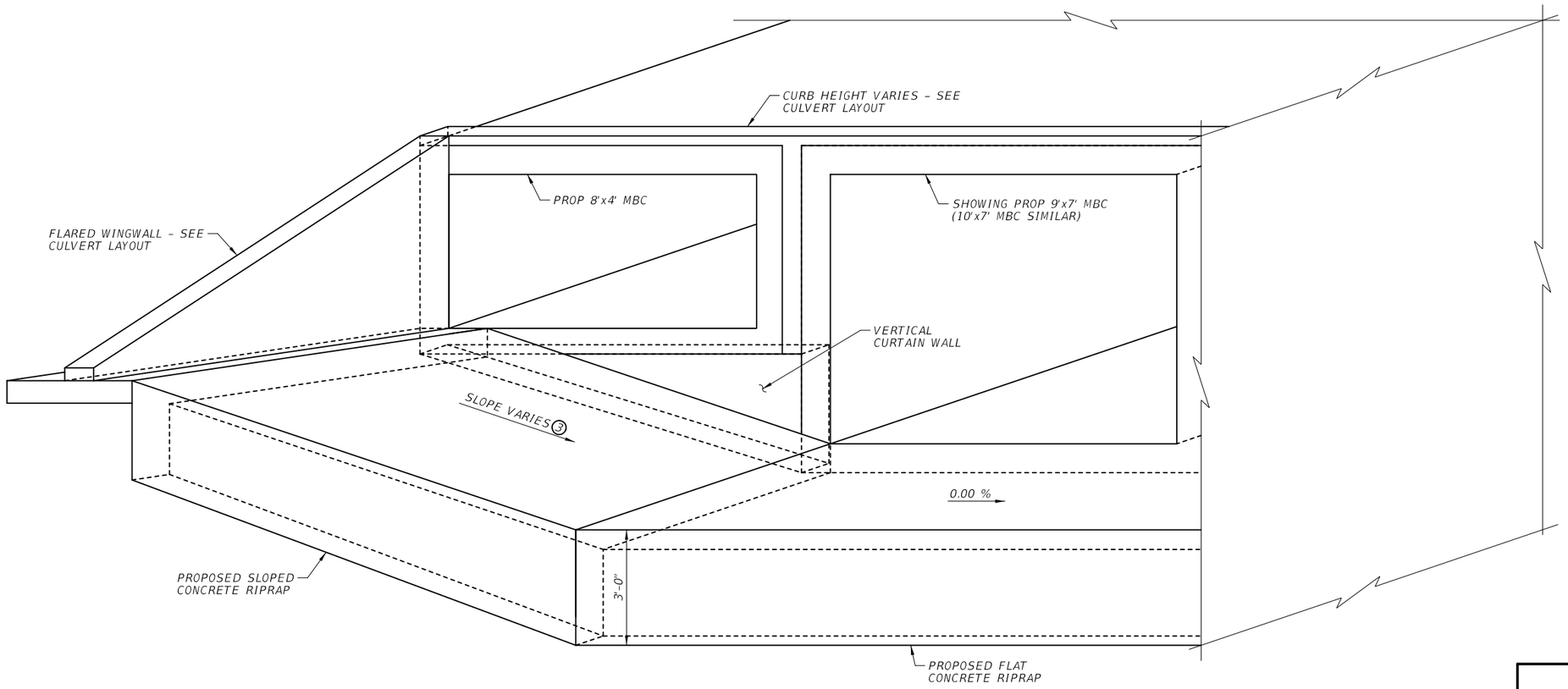
CP&Y an STV Company
TEXAS REGISTERED ENGINEERING FIRM F-1741

FM 108 AT DRAW

STEPPED CULVERT DETAILS

CSJ: 0715-01-025 SHEET 3 OF 4

Designed:	KAD	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	KH	6	TEXAS					FM108,ETC
Drawn:	KAD	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	KH	YKM	GONZALES	0715	01	025,ETC		120



ISOMETRIC VIEW

(3) SLOPE VARIES ~ 2.9:1 MAX TO 5.3:1 MIN

STATE OF TEXAS
KELLY HO
112947
LICENSED
PROFESSIONAL ENGINEER

04/03/2023

NO.	REVISION	BY	DATE

CP&Y an STV Company

TEXAS REGISTERED ENGINEERING FIRM F-1741

 Texas Department of Transportation

FM 108 AT DRAW

STEPPED CULVERT DETAILS

CSJ: 0715-01-025 SHEET 4 OF 4

		FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Designed:	KAD						
Checked:	KH	6	TEXAS				FM108,ETC
Drawn:	KAD	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	KH	YKM	GONZALES	0715	01	025,ETC	121

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Culvert Station and/or Creek Name followed by applicable end (Lt, Rt or Both)	Description of Box Culvert No. Spans ~ Span X Height	Max Fill Height (Ft)	Applicable Box Culvert Standard (4)	Applicable Wingwall or End Treatment Standard	Skew Angle (0°,15°, 30° or 45°)	Side Slope or Channel Slope Ratio (SL:1)	T Culvert Top Slab Thickness (In)	U Culvert Wall Thickness (In)	C Estimated Curb Height (Ft)	Hw (1) Height of Wingwall (Ft)	A Curb to End of Wingwall (Ft)	B Offset of End of Wingwall (Ft)	Lw Length of Longest Wingwall (Ft)	Ltw Culvert Toewall Length (Ft)	Atw Anchor Toewall Length (Ft)	Riprap Apron (CY)	Class "C" (2) Conc (Curb) (CY)	Class "C" (3) Conc (Wingwall) (CY)	Total Wingwall Area (SF)
FM 108 AT DRAW STA 541+70.00 (LT)	2 ~ 8'x 4'	2.27'	SCP-8	FW-0	0°	2:1	8"	8"	1.625'	6.042'	11.417'	6.591'	13.183'	(5)	(5)	15.0	7.5	5.5	84
	3 ~ 10'x 7'	2.27'	SCP-10																
FM 108 AT DRAW STA 541+70.00 (RT)	2 ~ 8'x 4'	2.27'	SCP-8	FW-0	0°	2:1	8"	8"	1.750'	6.167'	11.667'	6.736'	13.472'	(5)	(5)	15.0	8.1	5.6	88
	3 ~ 10'x 7'	2.27'	SCP-10																
FM 108 AT FIVE MILE CREEK (LT)	2 ~ 8'x 4'	1'	SCP-8	FW-0	0°	2:1	8"	8"	1.000'	5.417'	10.167'	5.870'	11.739'	(5)	(5)	14.0	5.3	4.2	68
STA 730+25.00	4 ~ 9'x 7'	1'	SCP-9																
FM 108 AT FIVE MILE CREEK (RT)	2 ~ 8'x 4'	1'	SCP-8	FW-0	0°	3:1	8"	8"	0.280'	4.688'	13.063'	7.542'	15.083'	(5)	(5)	18.0	1.5	5.2	76
STA 730+25.00	4 ~ 9'x 7'	1'	SCP-9																
FM 108 AT DRAW STA 740+65.00 (LT)	2 ~ 8'x 4'	1.13'	SCP-8	FW-S	15°	2:1	8"	8"	1.130'	5.542'	10.417'	6.014'	12.028'	(5)	(5)	11.0	5.1	4.1	66
	6 ~ 9'x 7'	1.13'	SCP-9																
FM 108 AT DRAW STA 740+65.00 (RT)	2 ~ 8'x 4'	1.13'	SCP-8	FW-S	15°	3:1	8"	8"	0.315'	4.729'	13.188'	7.614'	15.228'	(5)	(5)	13.0	1.4	4.9	72
	6 ~ 9'x 7'	1.13'	SCP-9																
SH 97 AT RED BRANCH STA 1129+75.00 (LT)	2 ~10'x 10	2'	SCP-10	FW-0	0°	3:1	10"	10"	1.090'	11.667'	34.000'	19.630'	39.260'	23.833'	N/A	20.0	1.0	28.3	471
SH 97 AT RED BRANCH STA 1129+75.00 (RT)	2 ~10'x 10	2'	SCP-10	FW-0	0°	3:1	10"	10"	1.210'	11.792'	34.375'	19.846'	39.693'	23.833'	N/A	20.3	1.1	28.6	481

DATE:
FILE:

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

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

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

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

C = Curb height

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

Hw = Height of wingwall

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

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

Lw = Length of longest wingwall.

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

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

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

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

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

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

(5) See Stepped Culvert Details for addtional details and information.

3/31/2023
CP&Y, Inc.
Firm # F-1741

Texas Department of Transportation

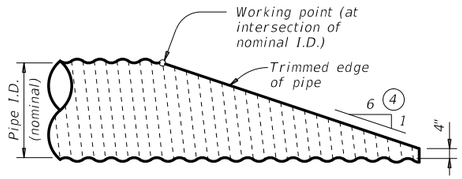
Bridge Division Standard

BOX CULVERT SUPPLEMENT
WINGS AND END TREATMENTS

BCS

FILE: bcsstde1-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0715	01	025,ETC	FM 108,ETC
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		122

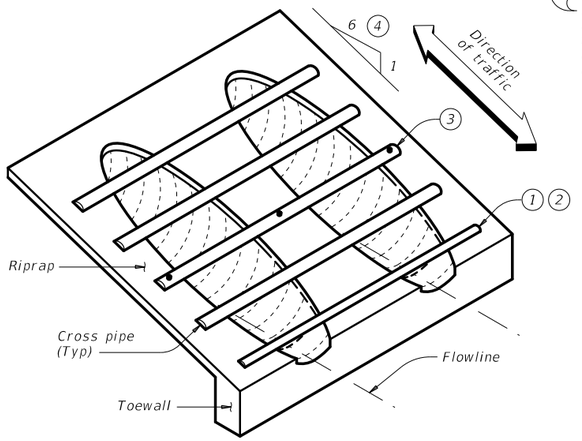
DATE:
FILE:



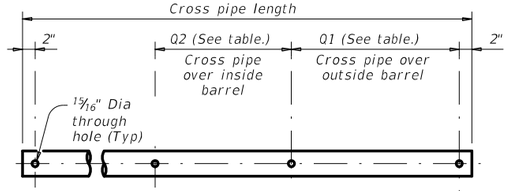
NOTE: All cross pipes, calculations, and dimensions are based on the pipe culverts mitered as shown in this detail. Alternate styles of mitered ends will require that appropriate adjustments be made to the values presented on this standard.

SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER

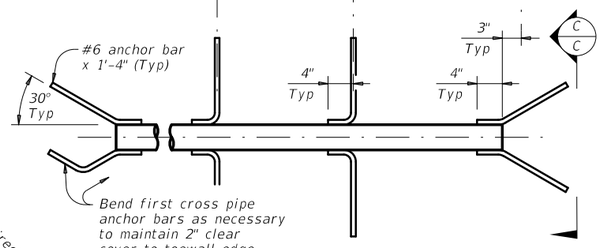
(Showing corrugated metal pipe (CMP) culvert Details at reinforced concrete pipe (RCP) culvert are similar.)



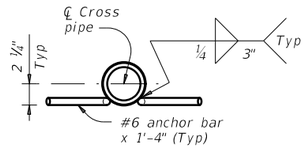
ISOMETRIC VIEW OF TYPICAL INSTALLATION



PIPE WITH BOLTED ANCHOR

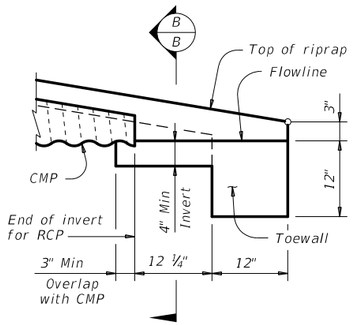


PIPE WITH ANCHOR BARS



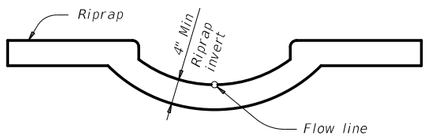
SECTION C-C

CROSS PIPE DETAILS



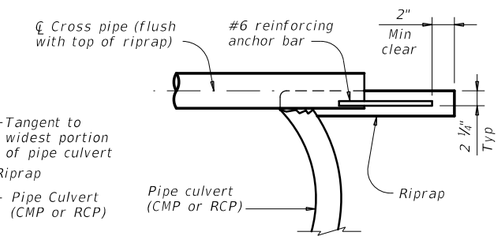
DETAIL "A"

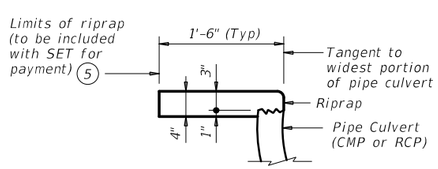
(Showing invert with corrugated metal pipe (CMP) culvert. Reinforced concrete pipe (RCP) culvert details are similar. Cross pipes not shown for clarity.)



SECTION B-B

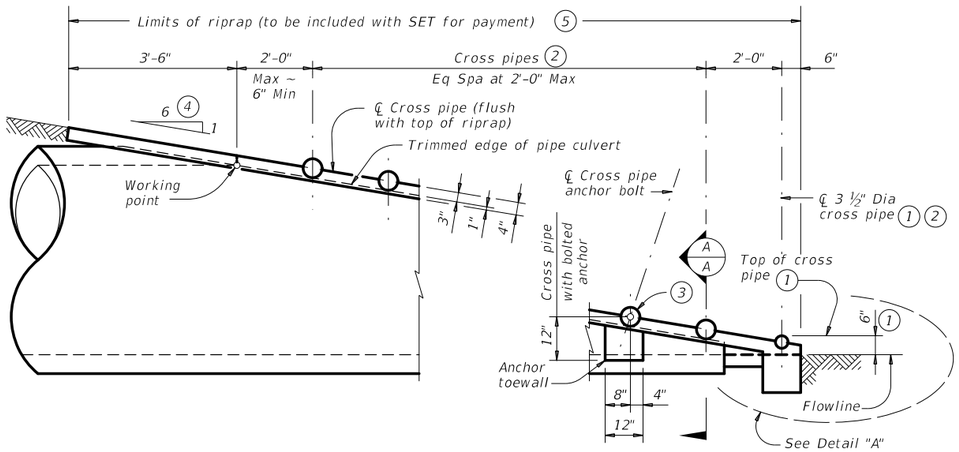
(Cross pipes not shown for clarity.)





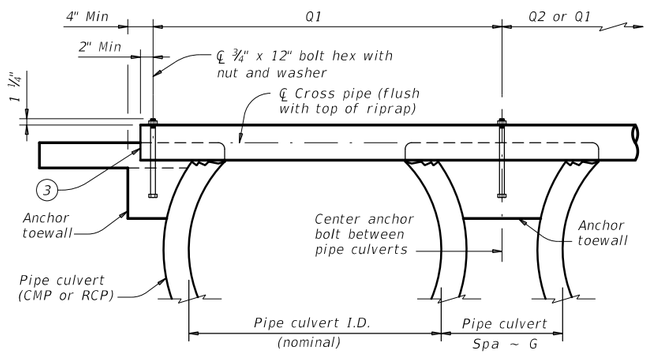
SHOWING TYPICAL PIPE CULVERT AND RIPRAP

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 ½" Std (4.000" O.D.)
30"	1.1	1' – 10"	N/A	4' – 2"	4' – 4"	2 or more pipe culverts	
33"	1.2	1' – 11"	4' – 2"	4' – 5"	4' – 8"	All pipe culverts	
36"	1.3	2' – 1"	4' – 5"	4' – 9"	5' – 1"	All pipe culverts	4" Std (4.500" O.D.)
42"	1.5	2' – 4"	4' – 11"	5' – 5"	5' – 10"		
48"	1.7	2' – 7"	5' – 5"	6' – 0"	6' – 7"	All pipe culverts	5" Std (5.563" O.D.)
54"	2.0	3' – 0"	5' – 11"	6' – 9"	7' – 6"		
60"	2.2	3' – 3"	6' – 5"	7' – 4"	8' – 3"		
66"	2.4	3' – 3"	6' – 11"	7' – 10"	8' – 9"		
72"	2.7	3' – 4"	7' – 5"	8' – 5"	9' – 4"		

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

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

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

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

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

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

MATERIAL NOTES:

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

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

Provide ASTM A307 bolts and nuts.

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

GENERAL NOTES:

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

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

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

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

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	0715	01	025,ETC	FM108,ETC
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		123

DATE:
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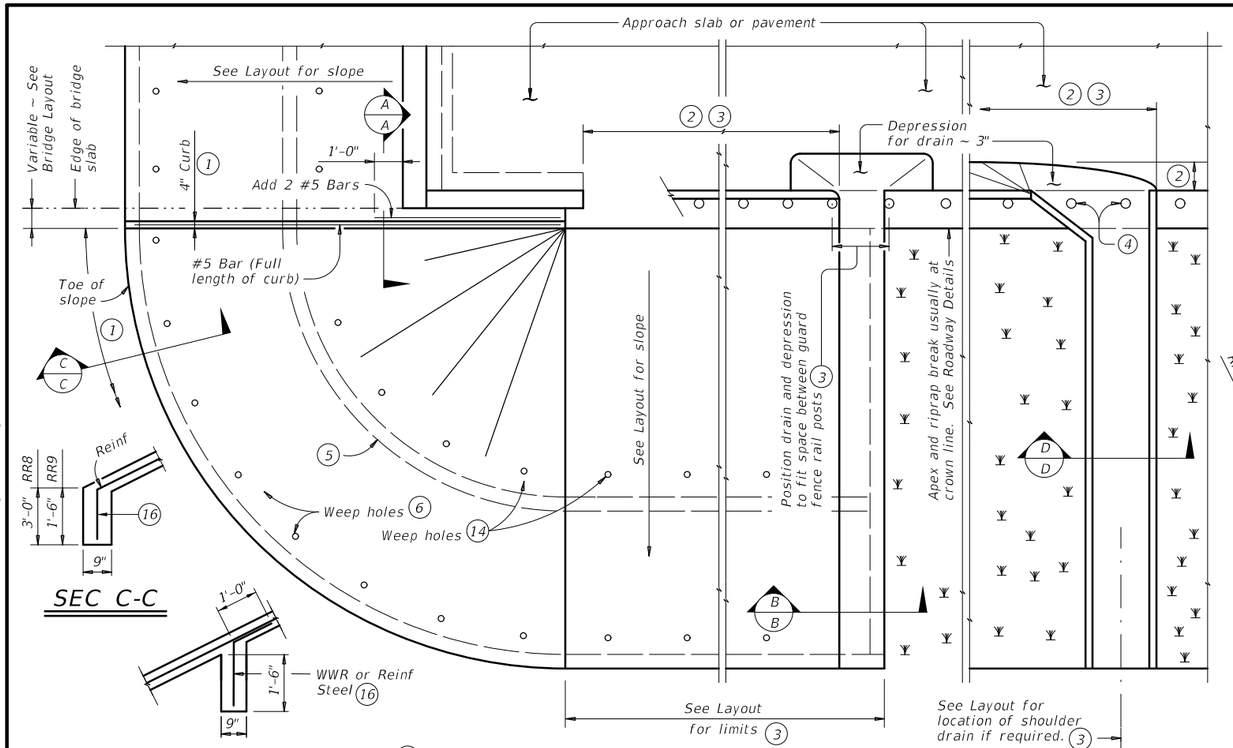
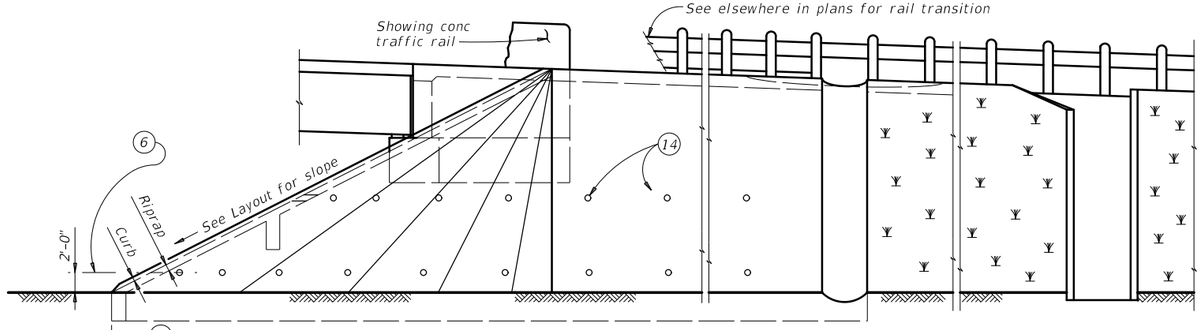


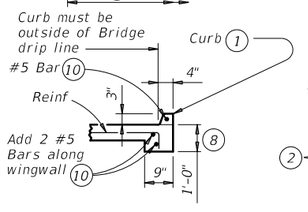
PLAN

SEC C-C

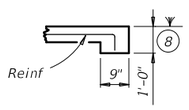
INTERMEDIATE TOEWALL (5)



ELEVATION

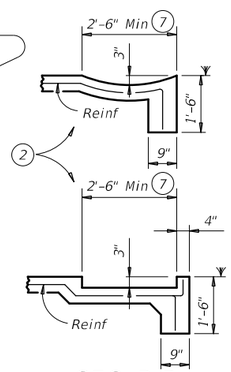


SEC A-A



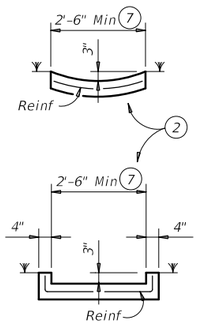
SEC B-B

(No drain)



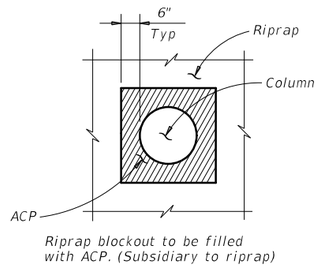
SEC B-B

(Shoulder drain integral with riprap)



SEC D-D

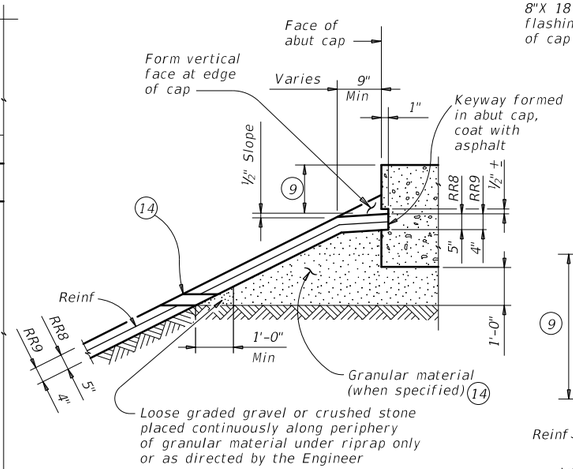
(Shoulder drain)



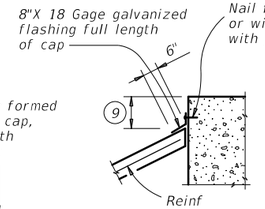
Riprap blockout to be filled with ACP. (Subsidiary to riprap)

RIPRAP DETAIL AT COLUMNS

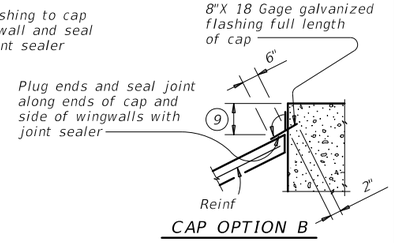
(As directed by the Engineer)



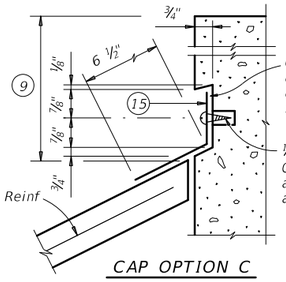
SHOWING KEYWAY OPTION



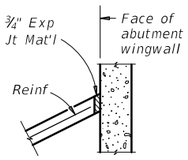
CAP OPTION A



CAP OPTION B

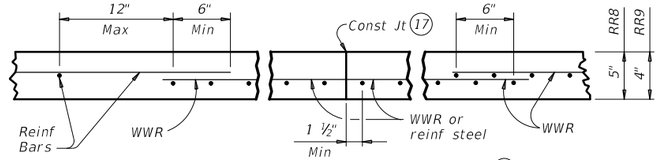


CAP OPTION C



SECT THRU RIPRAP AT WINGWALL (12)

SECTIONS THRU RIPRAP AT CAP (11)



REINFORCEMENT DETAILS (13)

See General Notes for optional synthetic fiber reinforcement.

1. When riprap is shown extended around header on layout, extend slab and toewall as shown and eliminate 4" curb.
2. Limits and configuration of drains and depressions are as shown elsewhere in plans or as directed by the Engineer.
3. Location of shoulder drain must consider limitations imposed by rail transition. Do not locate shoulder drains at expansion joints between approach slab and concrete pavement.
4. See details elsewhere in plans for installation of guard fence posts through concrete riprap.
5. Provide intermediate toewall only when designated elsewhere in the plans or included in the specifications.
6. Provide lower level of 2" Dia weep holes at 10' c-c backed by 1 CF packet of gravel and galvanized hardware cloth at all locations unless directed by the Engineer to eliminate.
7. Use wider or other drain configurations if shown elsewhere in plans or if directed by the Engineer.
8. Wall extension may be reduced or modified if approved by the Engineer. Increase wall extension to 1'-6" whenever the optional intermediate toewall is called for in the plans.
9. Top of cap to top of riprap dimension varies as directed by the Engineer. Should be 9" Min for beam/slab type bridges and 1'-6" for slab span, box beam, or slab beam bridges.
10. #5 bars shown are required even when synthetic fiber reinforcing option is selected.
11. Provide sealing option for joint between the face of cap and riprap as designated by the Engineer or as shown elsewhere on plans.
12. Flashing (shown in Cap Option A) may be used at wingwall in addition to Exp Jt Mat'l if shown on plans or directed by the Engineer.
13. Provide #3 reinforcing bars at 18" Spa c-c. Provide Welded Wire Reinforcement (WWR) as 6x6-D2.9xD2.9 or D3xD3. Combinations of WWR and reinforcing bars may be used if both are permitted. Use lap splices of a minimum 6 inches, measured from the transverse wire of WWR, and the ends of reinforcing bars.
14. If granular material is specified, provide upper level of 2" Dia weep holes at 10' c-c backed by galvanized hardware cloth.
15. 8" x 18 Gage Galv Sheet Metal
16. Provide WWR or #3 bars, with 1'-0" extension into slope.
17. WWR or reinforcing steel is continuous through riprap construction joints. Provide WWR or reinforcing steel that extends 1'-1" minimum into adjacent riprap on each side of construction joint even if synthetic reinforcing fiber is utilized.

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

GENERAL NOTES:

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

Provide Grade 60 reinforcing steel.

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

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

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

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

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

See Layout for limits of riprap.

RR8 is to be used on stream crossings.

RR9 is to be used on other embankments.

Texas Department of Transportation

Bridge Division Standard

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

CRR

FILE: crrstde1-19.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0715	01	025,ETC	FM108,ETC
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		124

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

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

TABLE OF WINGWALL REINFORCING
(2~wings)

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

TABLE OF ESTIMATED CULVERT TOEWALL QUANTITIES

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

WING DIMENSION FORMULAS:
(All values are in feet.)

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

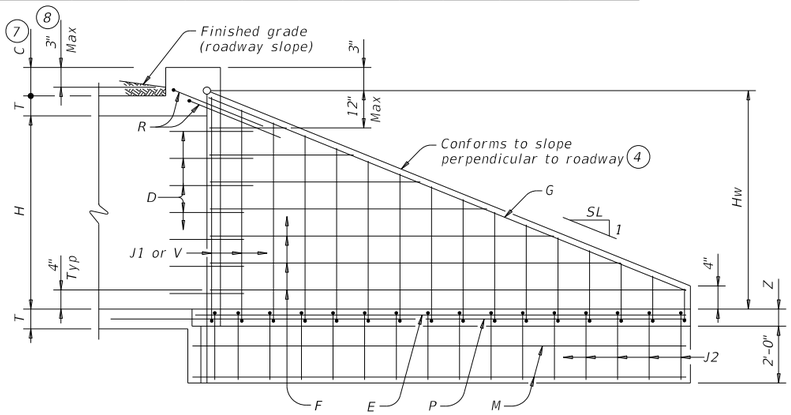
For cast-in-place culverts:
Ltw = (N) (S) + (N + 1) (U)

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

Total wingwall area (two wings ~ SF) = (Hw + 0.333') (Lw)

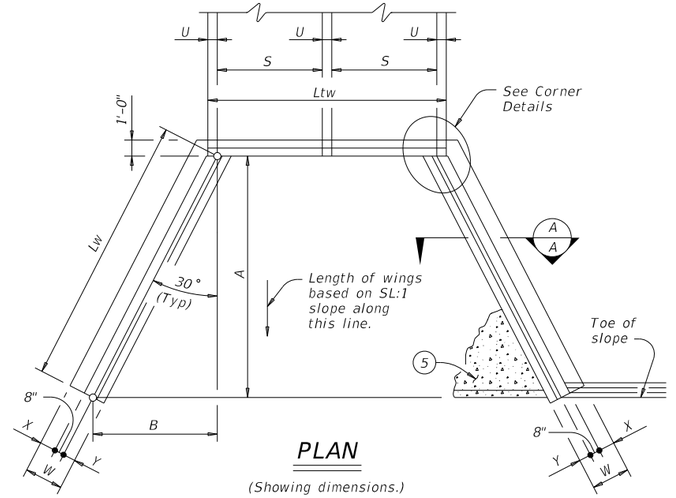
Hw = Height of wingwall
SL:1 = Side slope ratio (horizontal:1 vertical)
Lw = Length of wingwall
Ltw = Culvert toewall length
N = Number of culvert spans

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



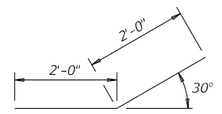
INSIDE ELEVATION

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

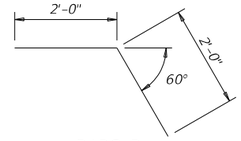


PLAN

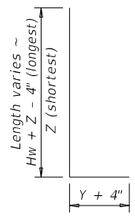
(Showing dimensions.)



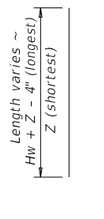
BARS D



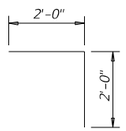
BARS R



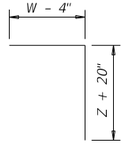
BARS J1



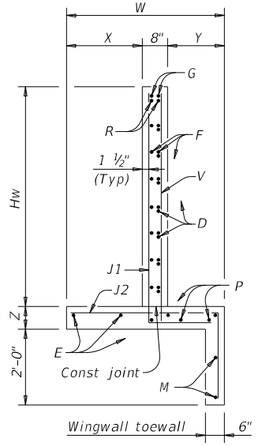
BARS V



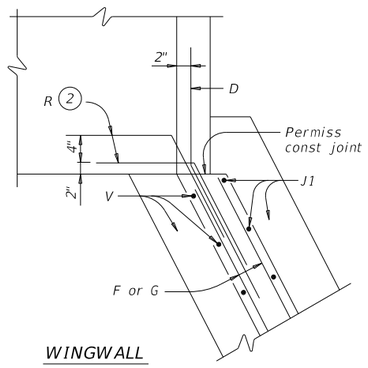
BARS L



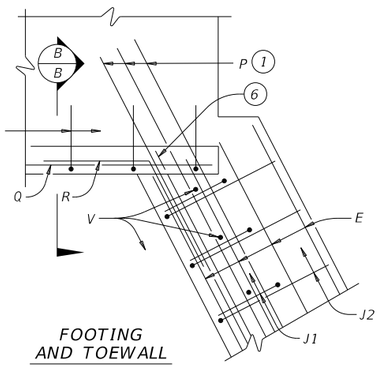
BARS J2



SECTION A-A



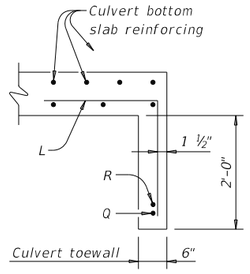
WINGWALL



FOOTING AND TOEWALL

CORNER DETAILS

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



SECTION B-B (5)

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

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

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

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

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

(6) At Contractor's option, culvert toewall may be ended flush with wingwall toewall. Adjust reinforcing as needed.

(7) 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'-0, refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Box Culvert Rail Mounting Details (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.

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

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

MATERIAL NOTES:
Provide Class C concrete (f'c=3,600 psi).
Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.
In riprap concrete synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing unless noted otherwise.

GENERAL NOTES:
Designed according to AASHTO LRFD Bridge Design Specifications.
When structure is founded on solid rock, depth of toewalls for culverts and wingwalls may be reduced or eliminated as directed by the Engineer.
See Box Culvert Supplement (BCS) standard sheet for additional dimensions and information.
The quantities for concrete and reinforcing steel resulting from the formulas given on this sheet are for Contractor's information only.

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

Texas Department of Transportation

Bridge Division Standard

CONCRETE WINGWALLS WITH FLARED WINGS FOR 0° SKEW BOX CULVERTS

FW-0

FILE: fw-0stde-20.dgn	DN: GAF	CK: CAT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0715	01	025,ETC	FM108,ETC
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		125

DATE:
FILE:

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

Dimensions					Variable Reinforcing				Estimated Quantities per ft of wing length (2~wings) (3)	
					Bars J1		Bars J2			
Maximum Wingwall Height Hw	W	X	Y	Z	Size	Spa	Size	Spa	Reinf (Lb/Ft)	Conc (CY/Ft)
2'-6"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	33.73	0.248
3'-0"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	37.07	0.261
3'-6"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	37.74	0.273
4'-0"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	38.41	0.285
4'-6"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	38.91	0.293
5'-0"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	42.25	0.306
5'-6"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	42.91	0.318
6'-0"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	43.58	0.330
7'-0"	3'-8"	1'-9"	1'-3"	7"	#4	1'-0"	#4	1'-0"	52.77	0.414
8'-0"	4'-2"	2'-0"	1'-6"	8"	#5	1'-0"	#4	1'-0"	60.19	0.486
9'-0"	4'-8"	2'-3"	1'-9"	8"	#4	6"	#4	6"	81.49	0.535
10'-0"	5'-2"	2'-6"	2'-0"	8"	#5	6"	#4	6"	97.25	0.584
11'-0"	5'-8"	2'-9"	2'-3"	8"	#6	6"	#5	6"	133.65	0.634
12'-0"	6'-2"	3'-0"	2'-6"	9"	#7	6"	#5	6"	162.29	0.721
13'-0"	6'-8"	3'-3"	2'-9"	11"	#7	6"	#5	6"	178.80	0.856
14'-0"	7'-2"	3'-6"	3'-0"	1'-0"	#8	6"	#5	6"	216.78	0.959
15'-0"	7'-8"	4'-0"	3'-0"	1'-1"	#9	6"	#6	6"	283.06	1.068
16'-0"	8'-2"	4'-6"	3'-0"	1'-3"	#9	6"	#6	6"	297.02	1.234

TABLE OF WINGWALL REINFORCING
(2~wings)

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

TABLE OF ESTIMATED CULVERT TOEWALL QUANTITIES

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

WING DIMENSION FORMULAS:
(All values are in feet.)

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

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

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

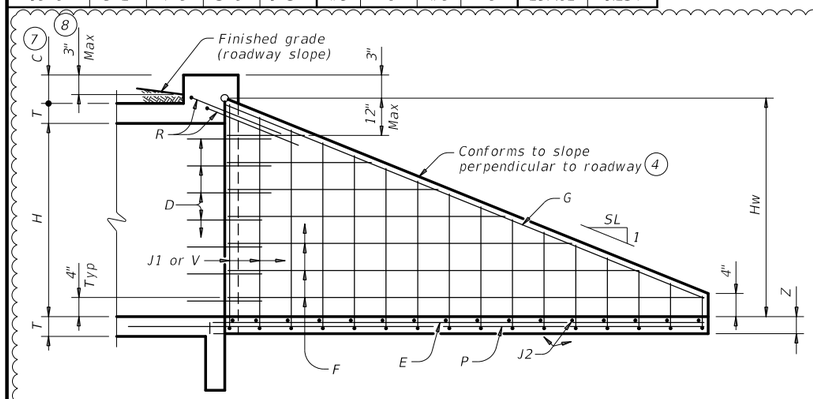
Total wingwall area (two wings ~ SF) = (Hw + 0.333') (Lw)

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

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

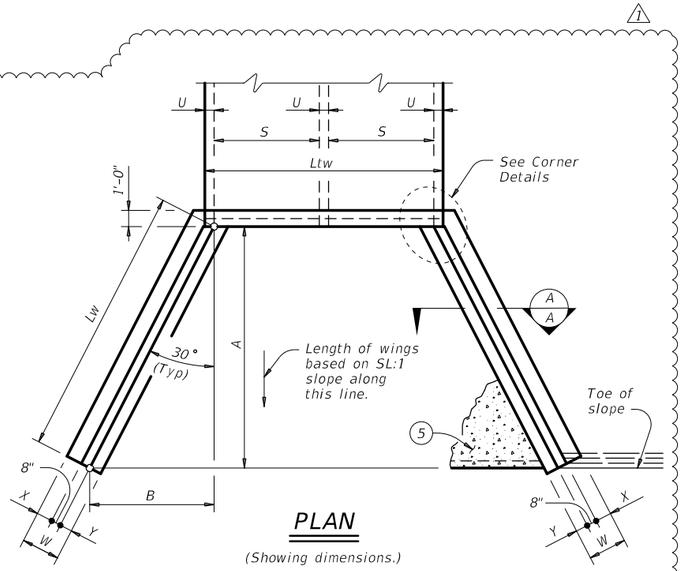
1. Extend Bars P 3'-0" minimum into bottom slab of box culvert.
2. Adjust as necessary to maintain 1 1#2" clear cover and 4" minimum between bars.
3. Quantities shown are based on an average wing height for two wings (one structure end). To determine total quantities for two wings, multiply the tabulated values by Lw.
4. Recommended values of side slope are: 2:1, 3:1, 4:1, and 6:1.
1 5. See Stepped CUlvert Details for sloped concrete riprap details.
6. At Contractor's option, culvert toewall may be ended flush with wingwall toewall. Adjust reinforcing as needed.
7. 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'-0, refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Box Culvert Rail Mounting Details (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.
8. For vehicle safety, the following requirements must be met:
   - For structures without bridge rail, construct curbs no more than 3" above finished grade.
   - For structures with bridge rail, construct curbs flush with finished grade.

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



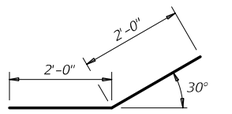
INSIDE ELEVATION

(See Stepped Culvert Details for sloped concrete riprap details.)

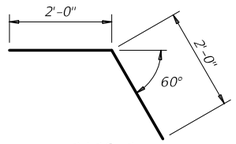


PLAN

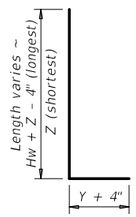
(Showing dimensions.)



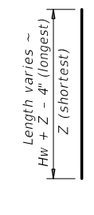
BARS D



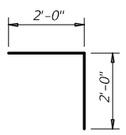
BARS R



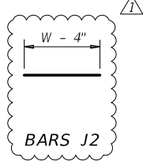
BARS J1



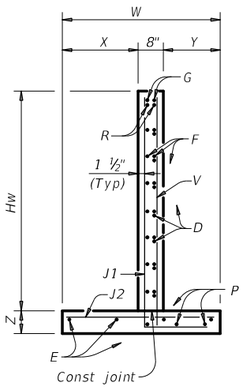
BARS V



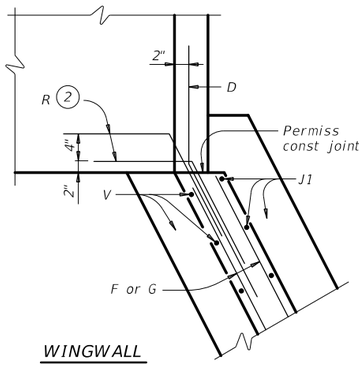
BARS L



BARS J2

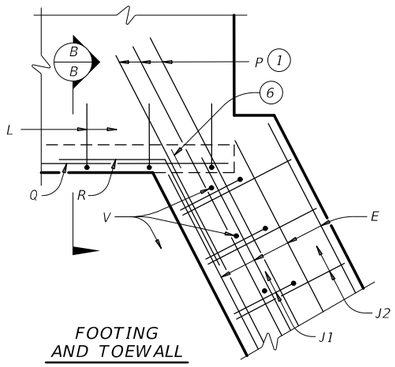


SECTION A-A



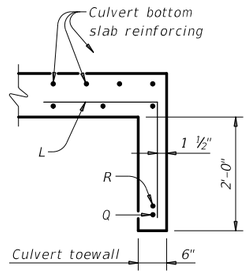
WINGWALL

CORNER DETAILS



FOOTING AND TOEWALL

(See Stepped Culvert Details for sloped concrete riprap details.)



SECTION B-B 5

1 MODIFIED TOE OF WINGWALL FOR FM 108 AT DRAW STA 541+70.00 AND FM 108 AT FIVE MILE CREEK ONLY. -KH 03/2023

STATE OF TEXAS
KELLY HO
112947
LICENSED
PROFESSIONAL ENGINEER
03/30/2023

MATERIAL NOTES:
Provide Class C concrete (f'c=3,600 psi).
Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.
In riprap concrete synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing unless noted otherwise.

GENERAL NOTES:
Designed according to AASHTO LRFD Bridge Design Specifications.
When structure is founded on solid rock, depth of toewalls for culverts and wingwalls may be reduced or eliminated as directed by the Engineer.
See Box Culvert Supplement (BCS) standard sheet for additional dimensions and information.
The quantities for concrete and reinforcing steel resulting from the formulas given on this sheet are for Contractor's information only.

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

Texas Department of Transportation

Bridge Division Standard

CONCRETE WINGWALLS WITH FLARED WINGS FOR 0° SKEW BOX CULVERTS

FW-0 (MOD)

FILE: fw-0stde-20.dgn	DN: GAF	CK: CAT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020 REVISIONS	CONT	SECT	JOB	HIGHWAY
	0715	01	025,ETC	FM108,ETC
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		126

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

Dimensions					Variable Reinforcing				Estimated Quantities per ft of wing length (2~wings) (3)	
					Bars J1		Bars J2			
Maximum Wingwall Height Hw	W	X	Y	Z	Size	Spa	Size	Spa	Reinf (Lb/Ft)	Conc (CY/Ft)
2'-6"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	33.73	0.248
3'-0"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	37.07	0.261
3'-6"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	37.74	0.273
4'-0"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	38.41	0.285
4'-6"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	41.75	0.330
5'-0"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	42.25	0.306
5'-6"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	42.91	0.318
6'-0"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	43.58	0.330
7'-0"	3'-8"	1'-9"	1'-3"	7"	#4	1'-0"	#4	1'-0"	52.77	0.414
8'-0"	4'-2"	2'-0"	1'-6"	8"	#5	1'-0"	#4	1'-0"	60.19	0.486
9'-0"	4'-8"	2'-3"	1'-9"	8"	#4	6"	#4	6"	81.49	0.535
10'-0"	5'-2"	2'-6"	2'-0"	8"	#5	6"	#4	6"	97.25	0.584
11'-0"	5'-8"	2'-9"	2'-3"	8"	#6	6"	#5	6"	133.65	0.634
12'-0"	6'-2"	3'-0"	2'-6"	9"	#7	6"	#5	6"	162.29	0.721
13'-0"	6'-8"	3'-3"	2'-9"	11"	#7	6"	#5	6"	178.80	0.856
14'-0"	7'-2"	3'-6"	3'-0"	1'-0"	#8	6"	#5	6"	216.78	0.959
15'-0"	7'-8"	4'-0"	3'-0"	1'-1"	#9	6"	#6	6"	283.06	1.068
16'-0"	8'-2"	4'-6"	3'-0"	1'-3"	#9	6"	#6	6"	297.02	1.234

TABLE OF WINGWALL REINFORCING
(2~wings)

Bar	Size	No.	Spa
DL	#5	~	1'-0"
DS	#5	~	1'-0"
E	#4	~	1'-0"
F	#4	~	1'-0"
G	#6	4	~
M	#4	4	~
P	#4	~	1'-0"
RS	#5	3	~
RL	#5	3	~
V	#4	~	1'-0"

TABLE OF ESTIMATED CULVERT TOEWALL QUANTITIES

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

WING DIMENSION FORMULAS:
(All values are in feet.)

Hw = H + T + C – 0.250'
A = (Hw – 0.333')(SL)
B = (A) [tanget (θ + 15°)]
Lw = (A) ÷ [cosine (θ + 15°)]

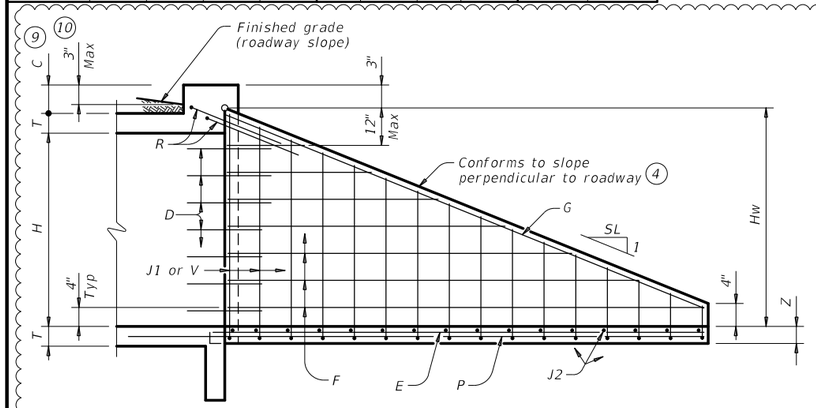
For cast–in–place culverts:
Ltw = [(N) (S) + (N + 1) (U)] ÷ cosine θ

For precast culverts:
Ltw = [(N) (2U + S) + (N – 1) (0.5')] ÷ cosine θ

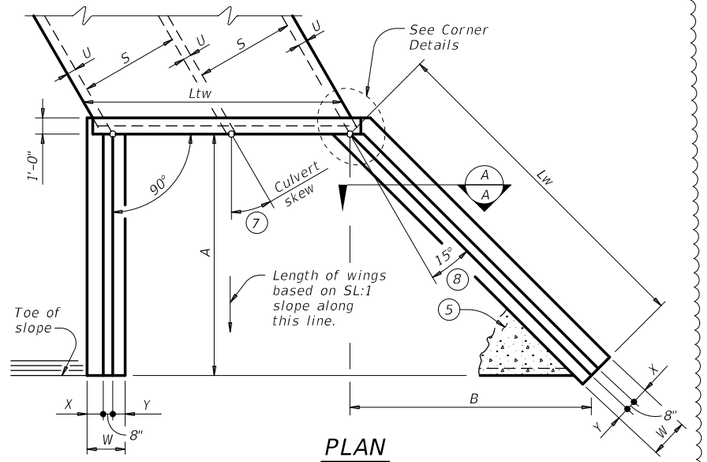
Total wingwall area (two wings ~ SF) = 0.5 (Hw + 0.333') (Lw + A)

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

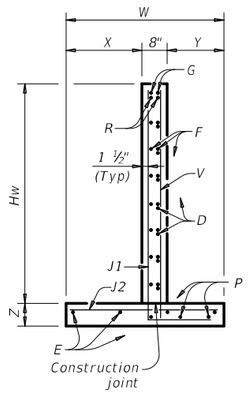
See applicable box culvert standard sheet for H, S, T, and U values.



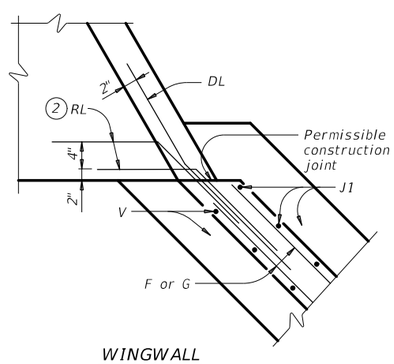
INSIDE ELEVATION
(See Stepped Culvert Details for sloped concrete riprap details.)



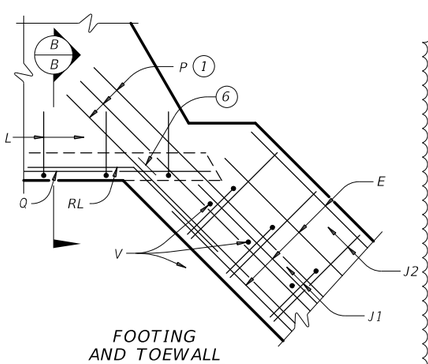
PLAN
(Showing dimensions and 30° skew.)



SECTION A-A

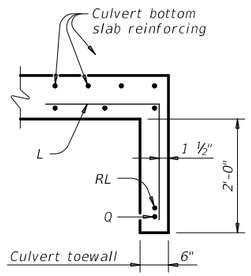


WINGWALL

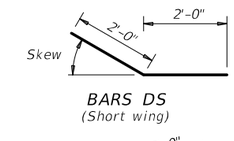


FOOTING AND TOEWALL

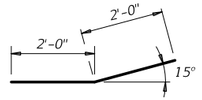
CORNER DETAILS
(See Stepped Culvert Details for sloped concrete riprap details.)



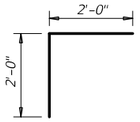
SECTION B-B (5)



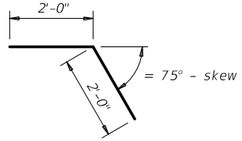
BARS DS
(Short wing)



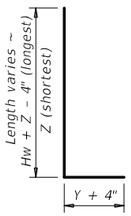
BARS DL
(Long wing)



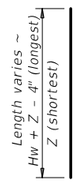
BARS RS
(Short wing)



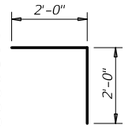
BARS RL
(Long wing)



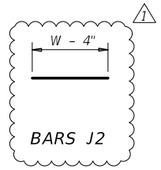
BARS J1



BARS V



BARS L



BARS J2

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

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

(3) Quantities shown are based on an average wing height for two wings (one structure end). To determine total quantities for two wings, multiply the tabulated values by 0.5 x (A + Lw).

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

(1) (5) See Stepped Culvert Details for sloped concrete riprap details.

(6) At Contractor's option, culvert toewall may be ended flush with wingwall toewall. Adjust reinforcing as needed.

(7) Applicable values of skew are: 15°, 30°, and 45°.

(8) Typical wingwall angle for all skews.

(9) 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'-0, refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Box Culvert Rail Mounting Details (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.

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

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

MATERIAL NOTES:
Provide Class C concrete (f'c=3,600 psi).
Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.
In riprap concrete, synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise.

GENERAL NOTES:
Designed according to AASHTO LRFD Bridge Design Specifications.
When structure is founded on solid rock, depth of toewalls for culverts and wingwalls may be reduced or eliminated as directed by the Engineer.
See Box Culvert Supplement (BCS) standard sheet for additional dimensions and information.
The quantities for concrete and reinforcing steel resulting from the formulas given on this sheet are for Contractor's information only.

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

(1) MODIFIED TOE OF WINGWALL FOR FM 108 AT DRAW STA 740+65.00 ONLY. – KH 03/2023

STATE OF TEXAS
KELLY HO
112947
LICENSED
PROFESSIONAL ENGINEER
03/30/2023

Texas Department of Transportation

Bridge Division Standard

CONCRETE WINGWALLS WITH FLARED WINGS FOR SKEWED BOX CULVERTS

FW-S (MOD)

FILE:	fw-sstde-20.dgn	DN: GAF	CK: CAT	DW: TxDOT	CK: TxDOT
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REVISIONS		0715	01	025,ETC	FM108,ETC
		DIST	COUNTY		SHEET NO.
		YKM	GONZALES		127

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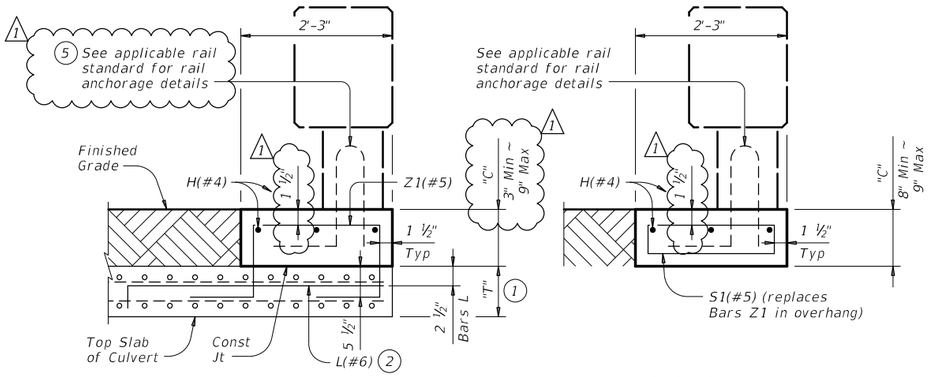
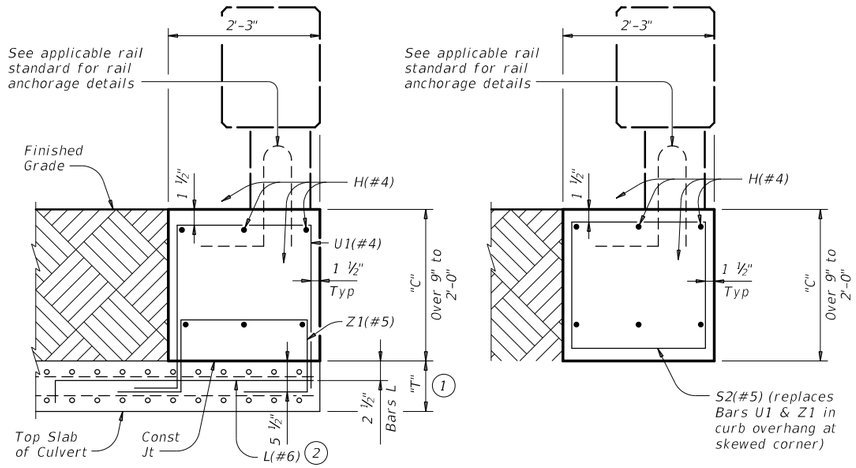


TYPE 1 CURB - MODIFIED FOR "C" HEIGHT OF 3" MIN

Used for curbs from 3" to 9" (Showing "C" = 9"). Showing T223 Rail, other rails similar. (Bars L(#5) on T223 and C223 Rails are not used for this structure). Bars RH(#5) required on standards T80HT, T80SS and T224 are not required when used with the RAC standard.



TYPE 2 CURB

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

TYPE 3 CURB

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

TYPICAL CURB PLAN

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

TABLE OF REINFORCING SPACING

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

TABLE OF ESTIMATED QUANTITIES (4)

(1) Curb Height "C"	Section Type	Reinf Steel (LB/LF)	Class "C" Concrete (CY/LF)
3"	1	20.6	0.021
9"	1	21.5	0.063
1'-0"	2	29.7	0.083
1'-6"	2	30.6	0.125
2'-0"	2	31.5	0.167
3'-0"	3	44.6	0.250
4'-0"	3	56.8	0.333
5'-0"	3	60.0	0.417

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

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

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

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

CONSTRUCTION NOTES:

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

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

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.

Galvanize all reinforcing steel if required elsewhere.

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

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

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

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

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

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

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

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

STATE OF TEXAS
KELLY HO
112947
LICENSED
PROFESSIONAL ENGINEER
03/30/2023

(1) Revised RAC for SSTR and 3" min curb height for culverts at FM 108 at Five Mile Creek (Sta 730+25.00) and FM 108 at Draw (Sta 740+65.00).

-KH 01/2023

SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

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

RAC (MOD)

FILE: racste01-20.dgn	DN: GAF	CK: TxDOT	DW: TxDOT	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0715	01	025,ETC	FM108,ETC
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		128

DATE:
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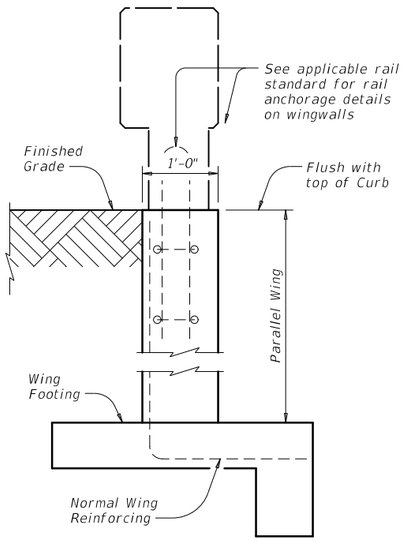
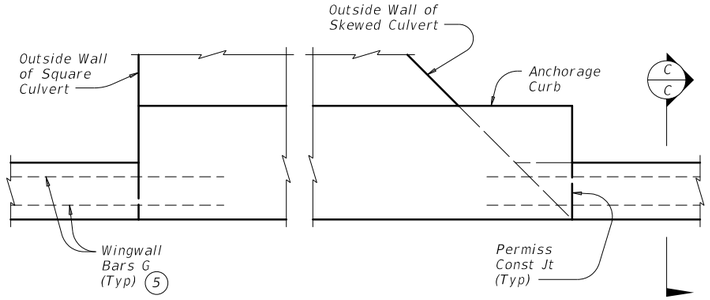


SECTION C-C



TYPICAL CURB PLAN

Curb reinforcing and footings not shown for clarity

INSTALLATION AT PARALLEL CULVERT WINGWALLS

See culvert wingwall standard for bars and details not shown.

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

STATE OF TEXAS
KELLY HO
112947
LICENSED
PROFESSIONAL ENGINEER

03/30/2023

1 Revised RAC for SSTR and 3" min curb height for culverts at FM 108 at Five Mile Creek (Sta 730+25.00) and FM 108 at Draw (Sta 740+65.00).

-KH 01/2023

SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

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

RAC

FILE: racste01-20.dgn	DN: GAF	CK: TxDOT	DW: TxDOT	CK: GAF
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REVISIONS	0715	01	025,ETC	FM108,ETC
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		129

DATE:
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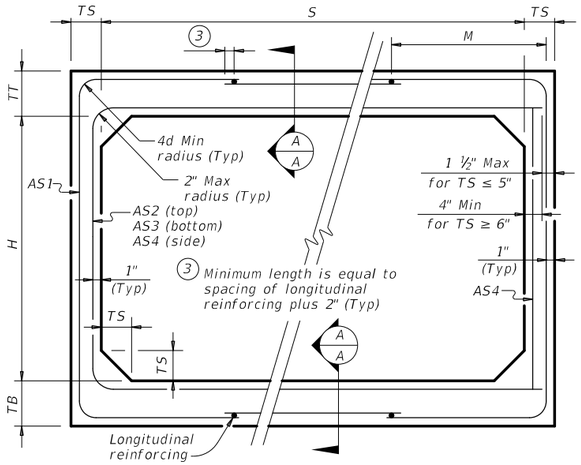
BOX DATA

SECTION DIMENSIONS					Fill Height	M (Min)	REINFORCING (sq. in. / ft.) (2)							(1) Lift Weight
S (ft.)	H (ft.)	TT (in.)	TB (in.)	TS (in.)	(ft.)	(in.)	AS1	AS2	AS3	AS4	AS5	AS7	AS8	(tons)
8	3	8	8	8	< 2	–	0.31	0.35	0.25	0.19	0.19	0.19	0.19	10.4
8	3	8	8	8	2 < 3	55	0.35	0.29	0.28	0.19	–	–	–	10.4
8	3	8	8	8	3 – 5	50	0.28	0.23	0.24	0.19	–	–	–	10.4
8	3	8	8	8	10	45	0.29	0.25	0.26	0.19	–	–	–	10.4
8	3	8	8	8	15	45	0.39	0.33	0.34	0.19	–	–	–	10.4
8	3	8	8	8	20	45	0.51	0.43	0.44	0.19	–	–	–	10.4
8	3	8	8	8	25	45	0.63	0.53	0.54	0.19	–	–	–	10.4
8	4	8	8	8	< 2	–	0.27	0.38	0.29	0.19	0.19	0.19	0.19	11.2
8	4	8	8	8	2 < 3	50	0.31	0.34	0.32	0.19	–	–	–	11.2
8	4	8	8	8	3 – 5	50	0.25	0.27	0.27	0.19	–	–	–	11.2
8	4	8	8	8	10	45	0.26	0.28	0.29	0.19	–	–	–	11.2
8	4	8	8	8	15	41	0.34	0.37	0.38	0.19	–	–	–	11.2
8	4	8	8	8	20	41	0.44	0.48	0.49	0.19	–	–	–	11.2
8	5	8	8	8	< 2	–	0.24	0.40	0.32	0.19	0.19	0.19	0.19	12.0
8	5	8	8	8	2 < 3	50	0.28	0.37	0.35	0.19	–	–	–	12.0
8	5	8	8	8	3 – 5	45	0.23	0.29	0.30	0.19	–	–	–	12.0
8	5	8	8	8	10	45	0.23	0.31	0.32	0.19	–	–	–	12.0
8	5	8	8	8	15	41	0.30	0.41	0.42	0.19	–	–	–	12.0
8	5	8	8	8	20	41	0.39	0.52	0.54	0.19	–	–	–	12.0
8	6	8	8	8	< 2	–	0.22	0.42	0.35	0.19	0.19	0.19	0.19	12.8
8	6	8	8	8	2 < 3	50	0.25	0.40	0.38	0.19	–	–	–	12.8
8	6	8	8	8	3 – 5	50	0.21	0.32	0.33	0.19	–	–	–	12.8
8	6	8	8	8	10	45	0.22	0.33	0.34	0.19	–	–	–	12.8
8	6	8	8	8	15	41	0.28	0.43	0.45	0.19	–	–	–	12.8
8	6	8	8	8	20	41	0.36	0.55	0.57	0.19	–	–	–	12.8
8	7	8	8	8	< 2	–	0.20	0.44	0.37	0.19	0.19	0.19	0.19	13.6
8	7	8	8	8	2 < 3	55	0.23	0.43	0.41	0.19	–	–	–	13.6
8	7	8	8	8	3 – 5	55	0.19	0.34	0.35	0.19	–	–	–	13.6
8	7	8	8	8	10	50	0.20	0.34	0.36	0.19	–	–	–	13.6
8	7	8	8	8	15	41	0.26	0.45	0.47	0.19	–	–	–	13.6
8	7	8	8	8	20	41	0.33	0.57	0.60	0.19	–	–	–	13.6
8	8	8	8	8	< 2	–	0.20	0.45	0.40	0.19	0.19	0.19	0.19	14.4
8	8	8	8	8	2 < 3	65	0.21	0.45	0.44	0.19	–	–	–	14.4
8	8	8	8	8	3 – 5	65	0.19	0.36	0.38	0.19	–	–	–	14.4
8	8	8	8	8	10	55	0.19	0.35	0.38	0.19	–	–	–	14.4
8	8	8	8	8	15	45	0.24	0.46	0.49	0.19	–	–	–	14.4
8	8	8	8	8	20	45	0.31	0.59	0.62	0.19	–	–	–	14.4

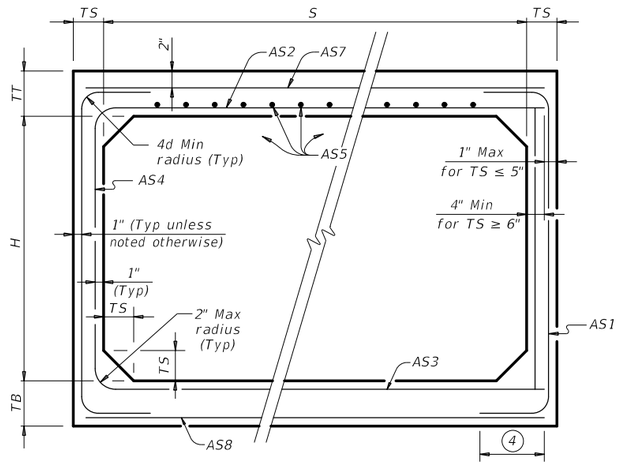
(1) For box length = 8'-0"

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



CORNER OPTION "A" CORNER OPTION "B"

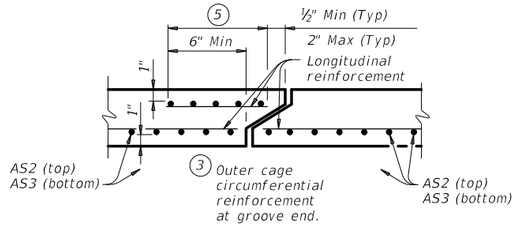
FILL HEIGHT 2 FT AND GREATER



CORNER OPTION "A" CORNER OPTION "B"

FILL HEIGHT LESS THAN 2 FT

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



SECTION A-A

(Showing top and bottom slab joint reinforcement.)

MATERIAL NOTES:

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

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

GENERAL NOTES:

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

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

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

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

SINGLE BOX CULVERTS PRECAST

8'-0" SPAN

SCP-8

FILE: scp08sts-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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	YKM	GONZALES		130

DATE:
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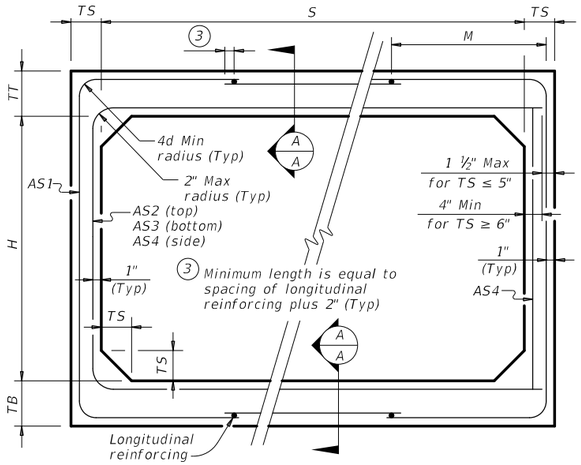
BOX DATA

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

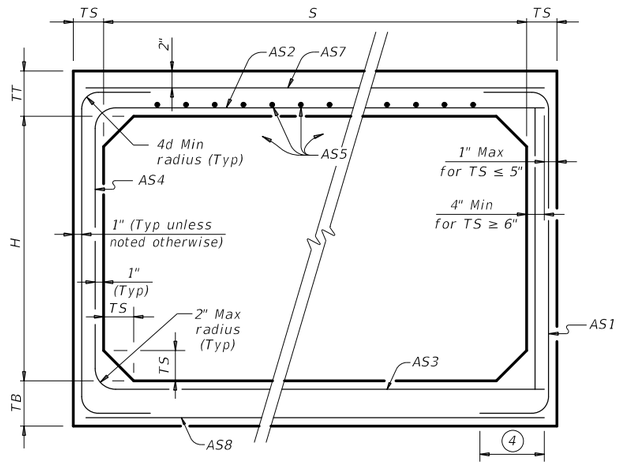
(1) For box length = 8'-0"

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



CORNER OPTION "A" CORNER OPTION "B"

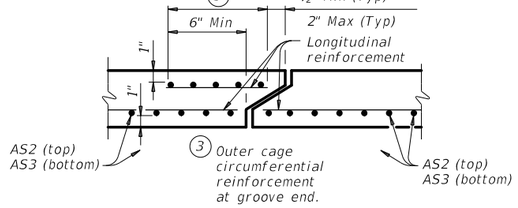
FILL HEIGHT 2 FT AND GREATER



CORNER OPTION "A" CORNER OPTION "B"

FILL HEIGHT LESS THAN 2 FT

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



SECTION A-A

(Showing top and bottom slab joint reinforcement.)

MATERIAL NOTES:

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

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

GENERAL NOTES:

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

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

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

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

SINGLE BOX CULVERTS PRECAST

9'-0" SPAN

SCP-9

FILE: scp09sts-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0715	01	025,ETC	FM108,ETC
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		131

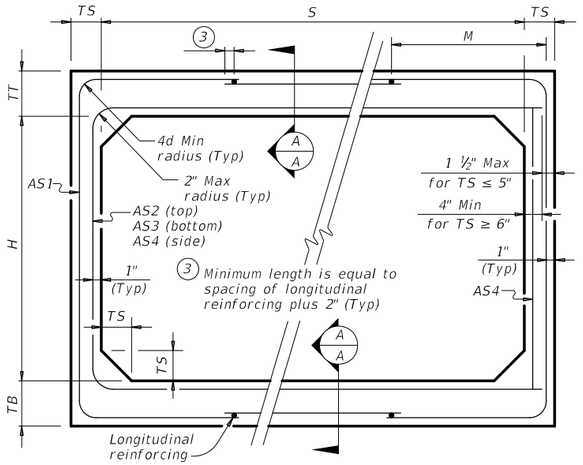
DATE:
FILE:

BOX DATA

SECTION DIMENSIONS					Fill Height	M (Min)	REINFORCING (sq. in. / ft.) (2)							(1) Lift Weight
S (ft.)	H (ft.)	TT (in.)	TB (in.)	TS (in.)	(ft.)	(in.)	AS1	AS2	AS3	AS4	AS5	AS7	AS8	(tons)
10	4	10	10	10	< 2	–	0.33	0.34	0.27	0.24	0.24	0.24	0.24	16.5
10	4	10	10	10	2 < 3	58	0.38	0.35	0.30	0.24	–	–	–	16.5
10	4	10	10	10	3 – 5	53	0.31	0.28	0.27	0.24	–	–	–	16.5
10	4	10	10	10	10	52	0.36	0.32	0.33	0.24	–	–	–	16.5
10	4	10	10	10	15	52	0.47	0.42	0.43	0.24	–	–	–	16.5
10	4	10	10	10	20	52	0.61	0.54	0.55	0.24	–	–	–	16.5
10	4	10	10	10	25	52	0.75	0.67	0.68	0.24	–	–	–	16.5
10	5	10	10	10	< 2	–	0.30	0.36	0.30	0.24	0.24	0.24	0.24	17.5
10	5	10	10	10	2 < 3	58	0.35	0.39	0.34	0.24	–	–	–	17.5
10	5	10	10	10	3 – 5	52	0.28	0.31	0.30	0.24	–	–	–	17.5
10	5	10	10	10	10	52	0.33	0.35	0.36	0.24	–	–	–	17.5
10	5	10	10	10	15	47	0.42	0.46	0.47	0.24	–	–	–	17.5
10	5	10	10	10	20	47	0.55	0.59	0.61	0.24	–	–	–	17.5
10	5	10	10	10	25	47	0.68	0.73	0.75	0.24	–	–	–	17.5
10	6	10	10	10	< 2	–	0.28	0.38	0.33	0.24	0.24	0.24	0.24	18.5
10	6	10	10	10	2 < 3	58	0.32	0.42	0.37	0.24	–	–	–	18.5
10	6	10	10	10	3 – 5	53	0.26	0.34	0.33	0.24	–	–	–	18.5
10	6	10	10	10	10	52	0.30	0.38	0.39	0.24	–	–	–	18.5
10	6	10	10	10	15	47	0.39	0.49	0.51	0.24	–	–	–	18.5
10	6	10	10	10	20	47	0.50	0.63	0.65	0.24	–	–	–	18.5
10	6	10	10	10	25	47	0.61	0.78	0.80	0.24	–	–	–	18.5
10	7	10	10	10	< 2	–	0.25	0.40	0.36	0.24	0.24	0.24	0.24	19.5
10	7	10	10	10	2 < 3	58	0.30	0.45	0.40	0.24	–	–	–	19.5
10	7	10	10	10	3 – 5	58	0.24	0.36	0.35	0.24	–	–	–	19.5
10	7	10	10	10	10	52	0.28	0.40	0.42	0.24	–	–	–	19.5
10	7	10	10	10	15	47	0.36	0.52	0.54	0.24	–	–	–	19.5
10	7	10	10	10	20	47	0.46	0.67	0.69	0.24	–	–	–	19.5
10	7	10	10	10	25	47	0.56	0.82	0.85	0.24	–	–	–	19.5
10	8	10	10	10	< 2	–	0.24	0.41	0.38	0.24	0.24	0.24	0.24	20.5
10	8	10	10	10	2 < 3	64	0.27	0.47	0.43	0.24	–	–	–	20.5
10	8	10	10	10	3 – 5	58	0.24	0.38	0.38	0.24	–	–	–	20.5
10	8	10	10	10	10	52	0.26	0.42	0.44	0.24	–	–	–	20.5
10	8	10	10	10	15	47	0.34	0.54	0.57	0.24	–	–	–	20.5
10	8	10	10	10	20	47	0.43	0.69	0.72	0.24	–	–	–	20.5
10	9	10	10	10	< 2	–	0.24	0.42	0.41	0.24	0.24	0.24	0.24	21.5
10	9	10	10	10	2 < 3	70	0.26	0.50	0.46	0.24	–	–	–	21.5
10	9	10	10	10	3 – 5	64	0.24	0.40	0.40	0.24	–	–	–	21.5
10	9	10	10	10	10	58	0.25	0.43	0.46	0.24	–	–	–	21.5
10	9	10	10	10	15	52	0.32	0.56	0.59	0.24	–	–	–	21.5
10	9	10	10	10	20	47	0.40	0.71	0.75	0.24	–	–	–	21.5
10	10	10	10	10	< 2	–	0.24	0.44	0.44	0.24	0.24	0.24	0.24	22.5
10	10	10	10	10	2 < 3	79	0.25	0.52	0.48	0.24	–	–	–	22.5
10	10	10	10	10	3 – 5	70	0.24	0.42	0.43	0.24	–	–	–	22.5
10	10	10	10	10	10	64	0.24	0.44	0.48	0.24	–	–	–	22.5
10	10	10	10	10	15	52	0.30	0.57	0.61	0.24	–	–	–	22.5
10	10	10	10	10	20	52	0.38	0.73	0.77	0.24	–	–	–	22.5

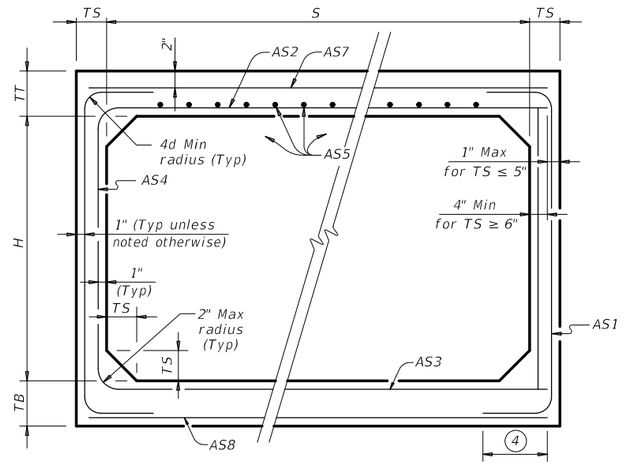
(1) For box length = 8'-0"

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



CORNER OPTION "A" CORNER OPTION "B"

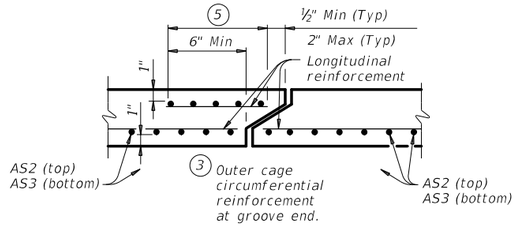
FILL HEIGHT 2 FT AND GREATER



CORNER OPTION "A" CORNER OPTION "B"

FILL HEIGHT LESS THAN 2 FT

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



SECTION A-A

(Showing top and bottom slab joint reinforcement.)

MATERIAL NOTES:

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

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

GENERAL NOTES:

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

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

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

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

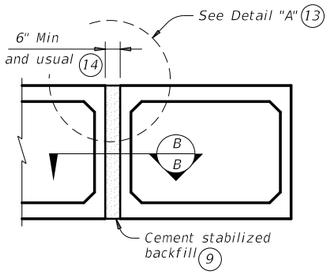
SINGLE BOX CULVERTS PRECAST

10'-0" SPAN

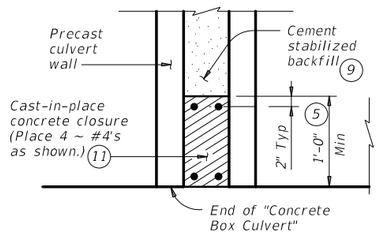
SCP-10

FILE: scp10sts-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0715	01	025,ETC	FM108,ETC
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		132

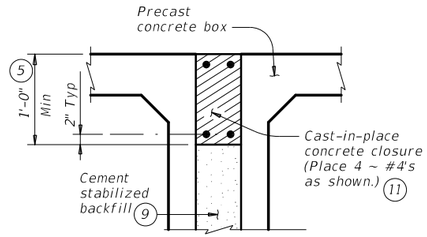
DATE:
FILE:



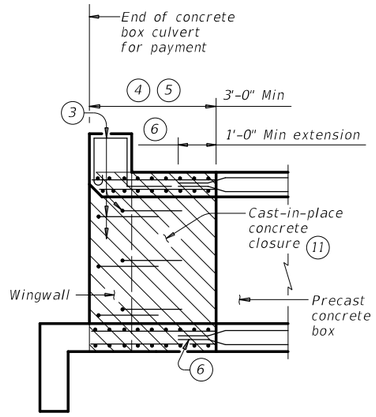
MULTIPLE UNIT PLACEMENT



SECTION B-B

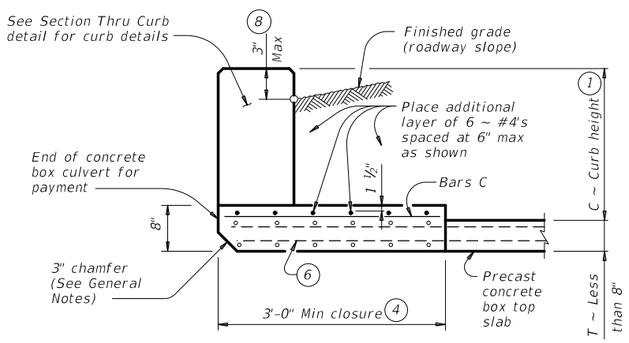


DETAIL "A" (13)

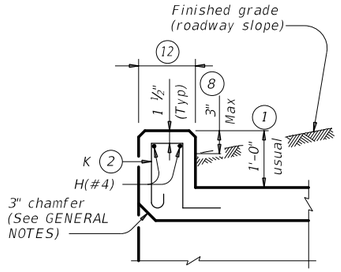


WINGWALL CONNECTION

(Also applies to safety end treatment.)

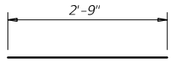


SECTION THRU TOP SLABS LESS THAN 8"

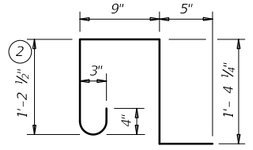


SECTION THRU CURB

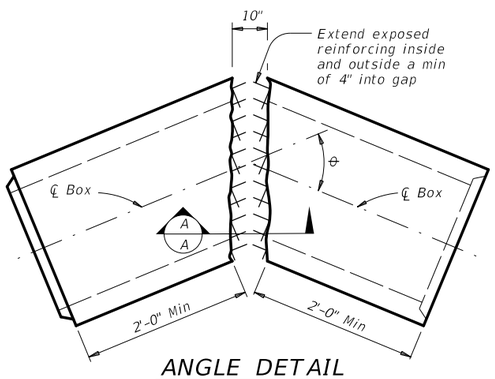
QUANTITIES PER FOOT OF CURB (10)	
Reinforcing Steel	4.12 Lb
Concrete	0.037 CY



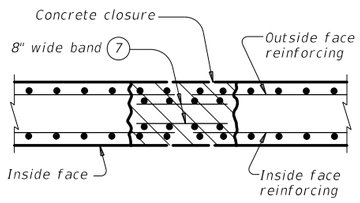
BARS C (#4)
(Spa = 1'-0" Max)



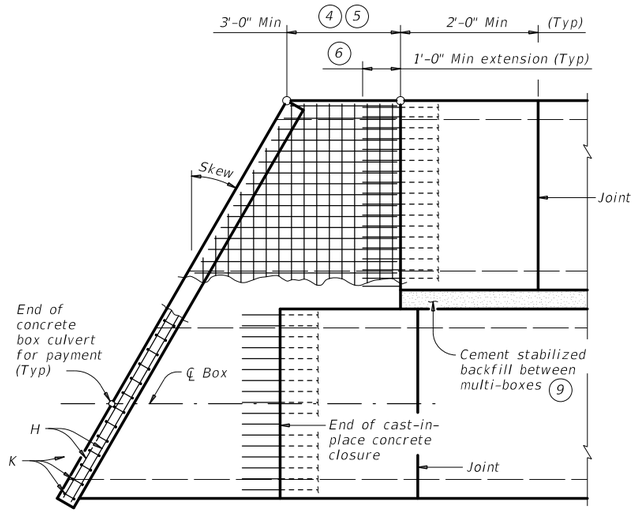
BARS K (#4)
(Spa = 1'-0" Max)
(Length = 4'-2")



ANGLE DETAIL



SECTION A-A



PLAN OF SKEWED ENDS

(Showing multi-box placement.)

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

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

HL93 LOADING

MATERIAL NOTES:

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

GENERAL NOTES:

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

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

HL93 LOADING

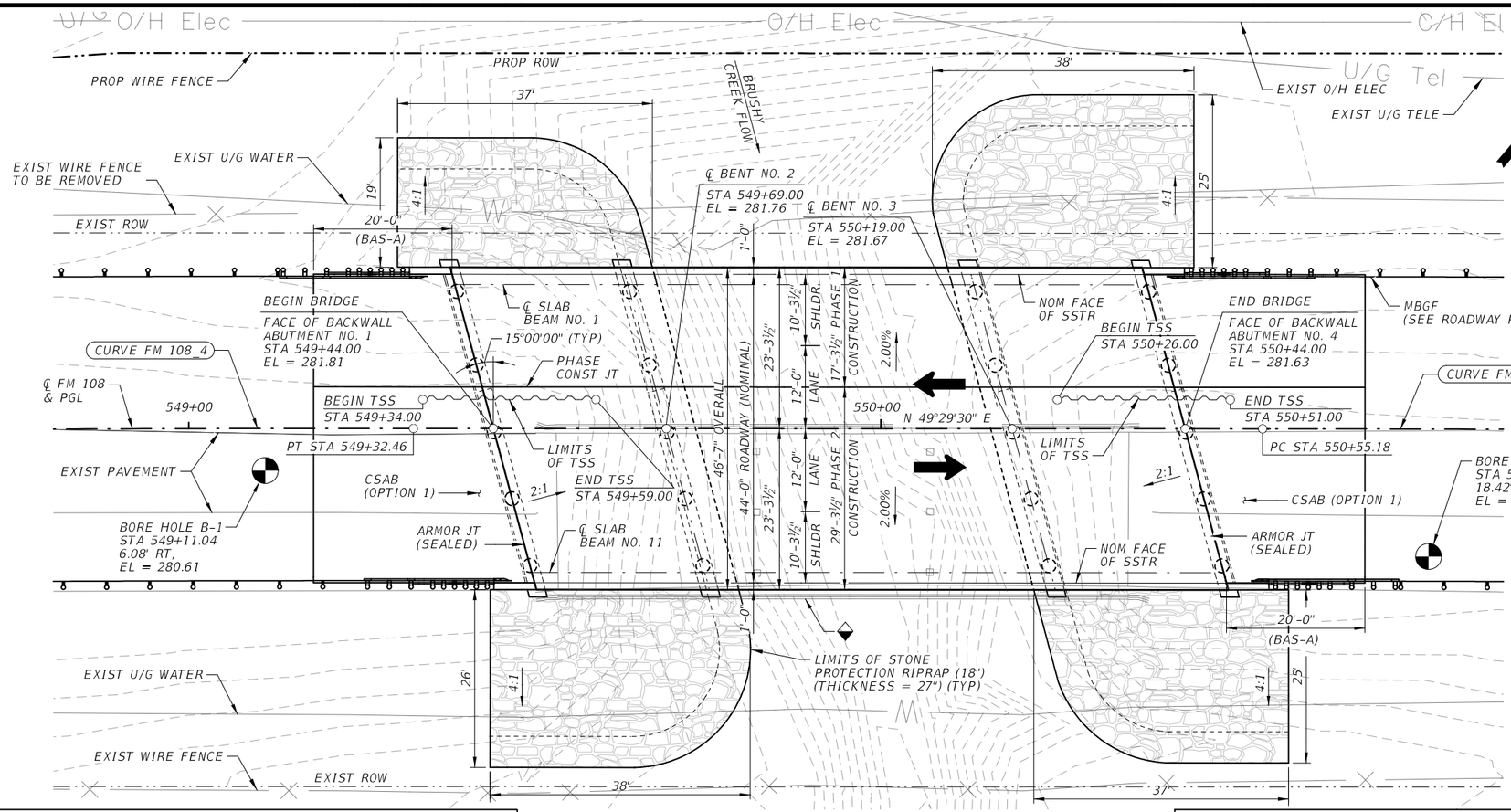
Texas Department of Transportation

Bridge Division Standard

BOX CULVERTS PRECAST MISCELLANEOUS DETAILS

SCP-MD

FILE: scpmdsts-20.dgn	DN: GAF	CK: LMW	DW: BWH/TxDOT	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0715	01	025,ETC	FM108,ETC
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		133



10 5 0 10 20
SCALE FEET

GENERAL NOTES:

1. DESIGNED ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION (2020) AND TXDOT BRIDGE DESIGN MANUAL (NOV 2021).
2. USE OPTION 1 FOR CONFIGURATION OF CEMENT STABILIZED BACKFILL BEHIND ABUTMENTS. SEE CSAB STANDARD FOR DETAILS.
3. SEE BRIDGE BORING LOG SHEET FOR GEOTECHNICAL INFORMATION.
4. THE "H" VALUES SHOWN ARE ESTIMATED COLUMN HEIGHTS. CONTRACTOR IS RESPONSIBLE FOR CALCULATING ACTUAL COLUMN HEIGHTS BASED ON FIELD CONDITIONS.

◆ EXISTING THREE-SPAN CONCRETE FLAT SLAB BRIDGE (75'-0" LENGTH x 25'-3" WIDTH) CONSISTING OF CONCRETE DECK, ABUTMENTS AND INTERIOR BENT CAPS TO BE REMOVED. CONCRETE PILES TO BE REMOVED 2'-0" MINIMUM BELOW FINISHED GROUND.

EXIST NBI NUMBER: 13-090-0-0715-01-006
PROP NBI NUMBER: 13-090-0-0715-01-031
FUNCTIONAL CLASSIFICATION: RURAL MAJOR COLLECTOR
DESIGN SPEED: 60 MPH
ADT: 1,104 VPD (2021), 2,031 VPD (2041)

HORIZONTAL CURVE DATA

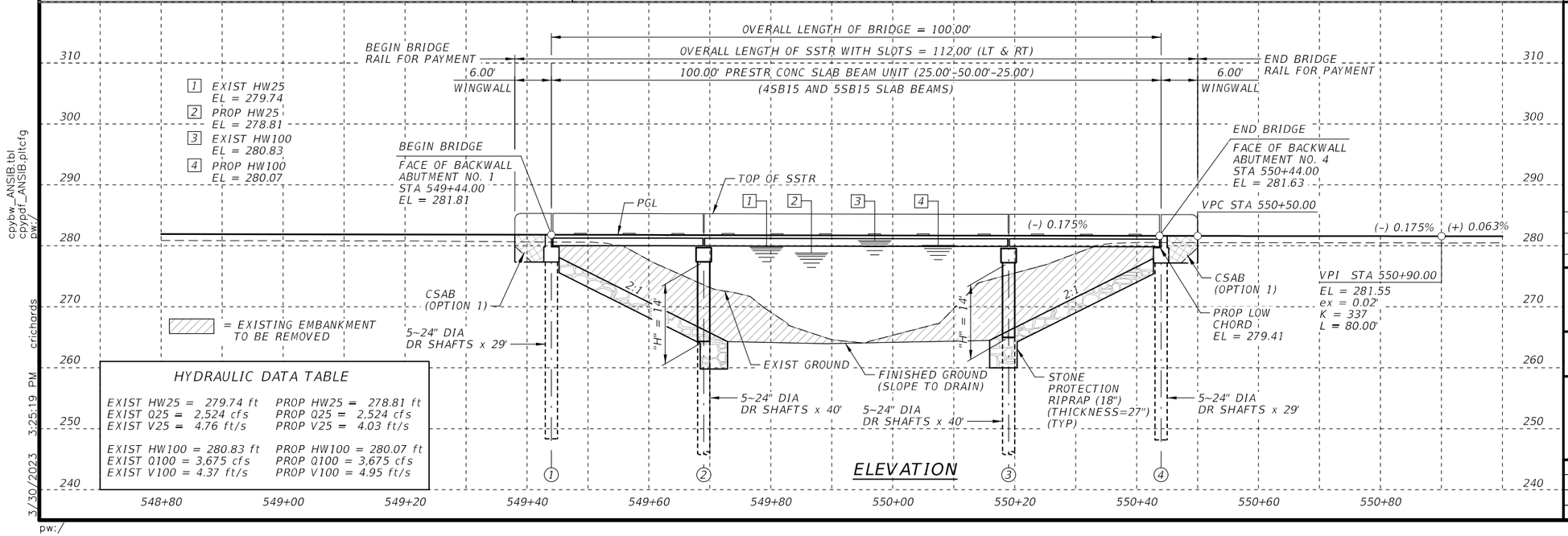
CURVE FM 108_4		CURVE FM 108_7	
P.I. STATION	= 547+49.99	P.I. STATION	= 551+10.57
DELTA	= 01°53'02" (RT)	DELTA	= 00°34'18" (RT)
DEGREE	= 00°30'58"	DEGREE	= 00°30'58"
TANGENT	= 182.51'	TANGENT	= 55.39'
LENGTH	= 364.98'	LENGTH	= 110.77'
RADIUS	= 11,100.00'	RADIUS	= 11,100.00'
P.C. STATION	= 545+67.48	P.C. STATION	= 550+55.18
P.T. STATION	= 549+32.46	P.T. STATION	= 551+65.95
BACK BEARING	= N 47°36'27" E	BACK BEARING	= N 49°29'30" E
FWD BEARING	= N 49°29'30" E	FWD BEARING	= N 50°03'48" E

ALL ABUTMENTS AND INTERIOR BENT CAPS ON BEARING N 55°30'30" W

PLAN

SUPERSTRUCTURE INV/OPR RATINGS: 1.04/1.60

HL93 LOADING



HYDRAULIC DATA TABLE

EXIST HW25 = 279.74 ft	PROP HW25 = 278.81 ft
EXIST Q25 = 2,524 cfs	PROP Q25 = 2,524 cfs
EXIST V25 = 4.76 ft/s	PROP V25 = 4.03 ft/s
EXIST HW100 = 280.83 ft	PROP HW100 = 280.07 ft
EXIST Q100 = 3,675 cfs	PROP Q100 = 3,675 cfs
EXIST V100 = 4.37 ft/s	PROP V100 = 4.95 ft/s

ELEVATION

KELLY HO
112947
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS
03/30/2023

NO.	REVISION	BY	DATE

CP&Y an STV Company
TEXAS REGISTERED ENGINEERING FIRM F-1741

 Texas Department of Transportation

FM 108 AT BRUSHY CREEK

BRIDGE LAYOUT
BRUSHY CREEK BRIDGE

CSJ 0715-01-025 SHEET 1 OF 1

		FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Designed:	KH	6	TEXAS				FM108,ETC
Checked:	KAD	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Drawn:	BT	YKM	GONZALES	0715	01	025,ETC	134
Checked:	KH						

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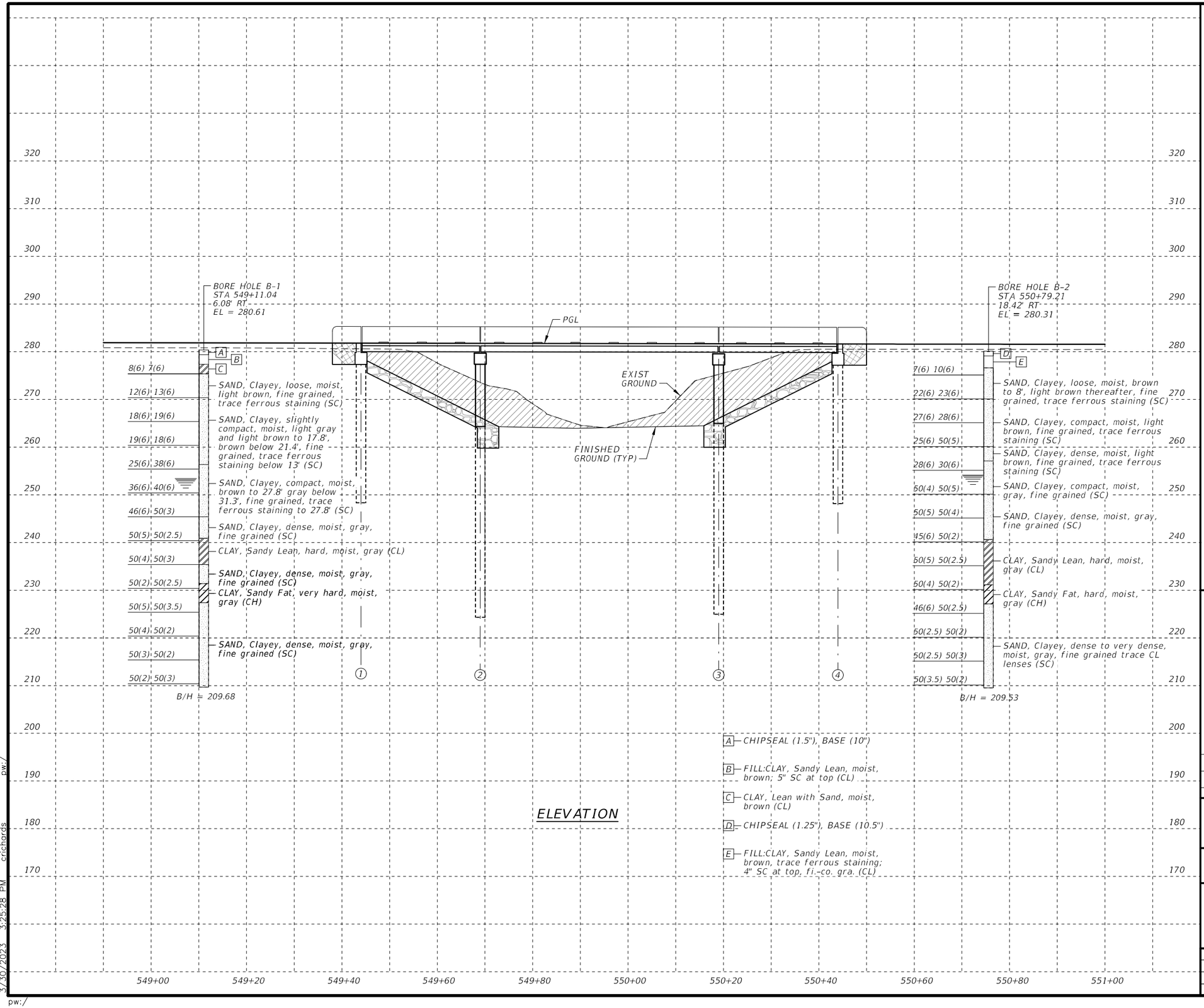

ELEVATION

10 5 0 10 20
SCALE FEET

GENERAL NOTES:

1. BORING LOGS REPLICATED FROM CORSAIR CONSULTING, LLC. BORINGS TAKEN FROM JUNE 22 – JUNE 23, 2021.
2. GROUNDWATER ENCOUNTERED AT DEPTH OF 27.00 FEET FOR B-1 AND 26.00 FEET FOR B-2.

   ANY GROUNDWATER ELEVATION INFORMATION IS REPRESENTATIVE OF CONDITIONS EXISTING ON THE DAY AND FOR THE SPECIFIC LOCATION WHERE THIS INFORMATION WAS COLLECTED.

   ACTUAL GROUNDWATER ELEVATION MAY FLUCTUATE DUE TO TIME, CLIMATE CONDITIONS, AND/OR CONSTRUCTION ACTIVITY.
3. CONTRACTOR'S ATTENTION IS BROUGHT TO WATER BEARING SANDY SOILS SHOWN IN BORING LOGS. THE USE OF TEMPORARY CASING AND/OR DRILLING SLURRY MAY BE NECESSARY TO INSTALL DRILLED SHAFT TO REQUIRED LENGTH AS SHOWN.

= GROUNDWATER

HL93 LOADING

STATE OF TEXAS
KELLY HO
112947
LICENSED
PROFESSIONAL ENGINEER
03/30/2023

NO.	REVISION	BY	DATE

CP&Y an STV Company
TEXAS REGISTERED ENGINEERING FIRM F-1741

 Texas Department of Transportation

FM 108 AT BRUSHY CREEK

BORING LOGS
BRUSHY CREEK BRIDGE

CSJ 0715-01-025 SHEET 1 OF 1

Designed:	KH	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	KAD	6	TEXAS					FM108,ETC
Drawn:	CDR	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	KH	YKM	GONZALES	0715	01	025,ETC		135

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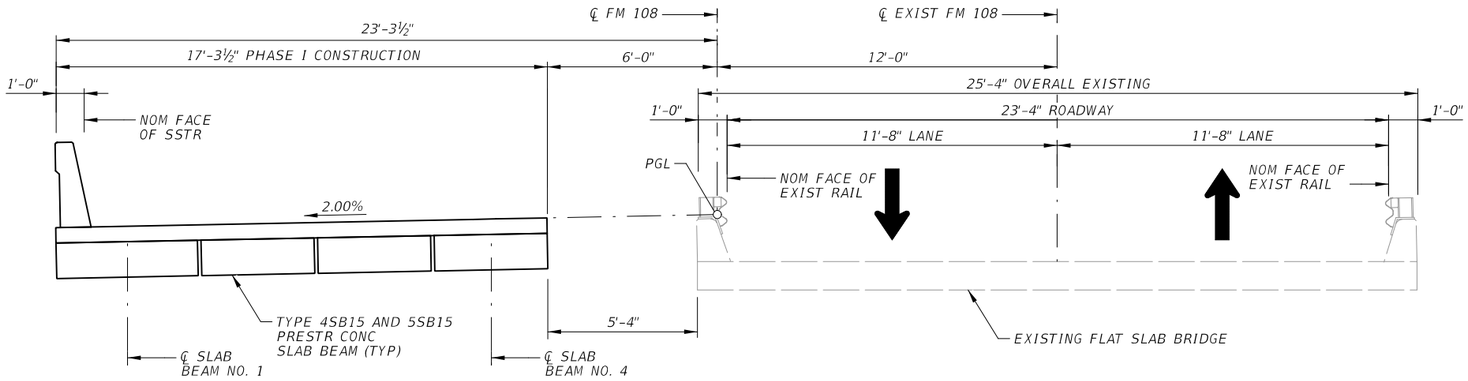
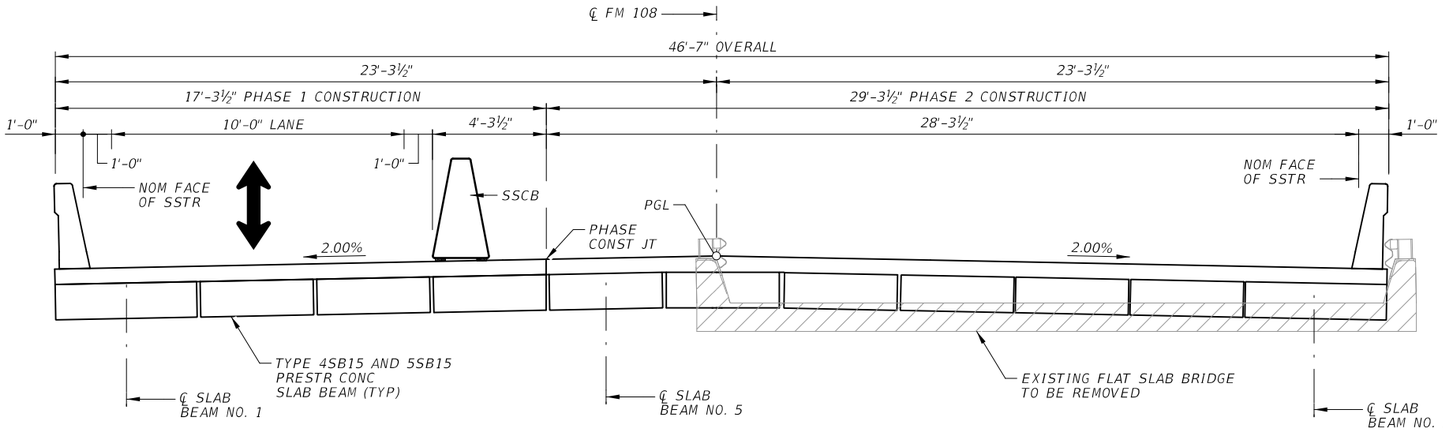
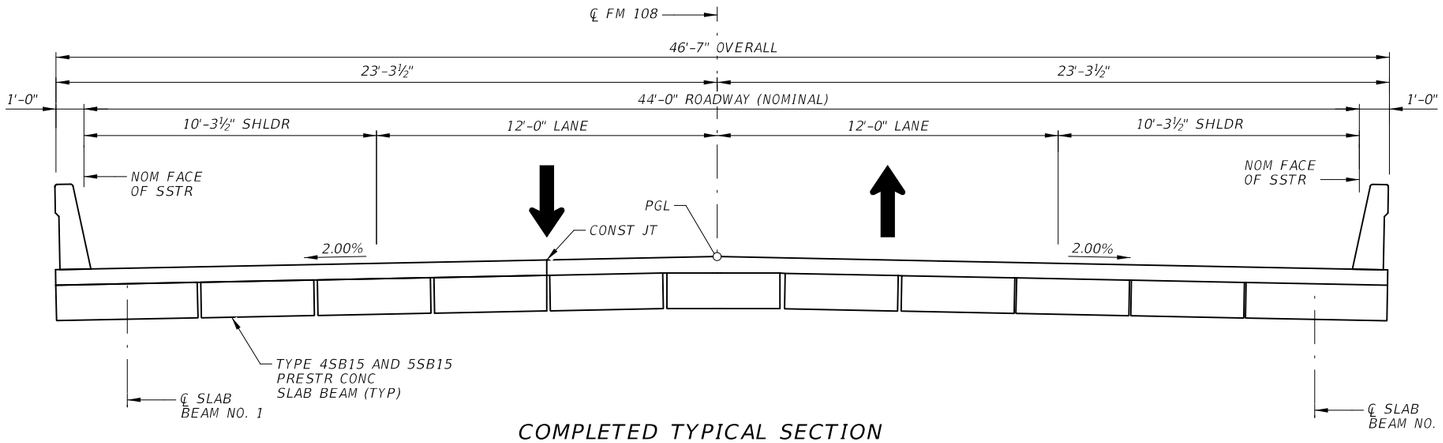


PHASE 1 CONSTRUCTION



PHASE 2 CONSTRUCTION



COMPLETED TYPICAL SECTION

HL93 LOADING

STATE OF TEXAS
KELLY HO
112947
LICENSED
PROFESSIONAL ENGINEER
03/30/2023

NO.	REVISION	BY	DATE

CP&Y an STV Company
TEXAS REGISTERED ENGINEERING FIRM F-1741

FM 108 AT BRUSHY CREEK

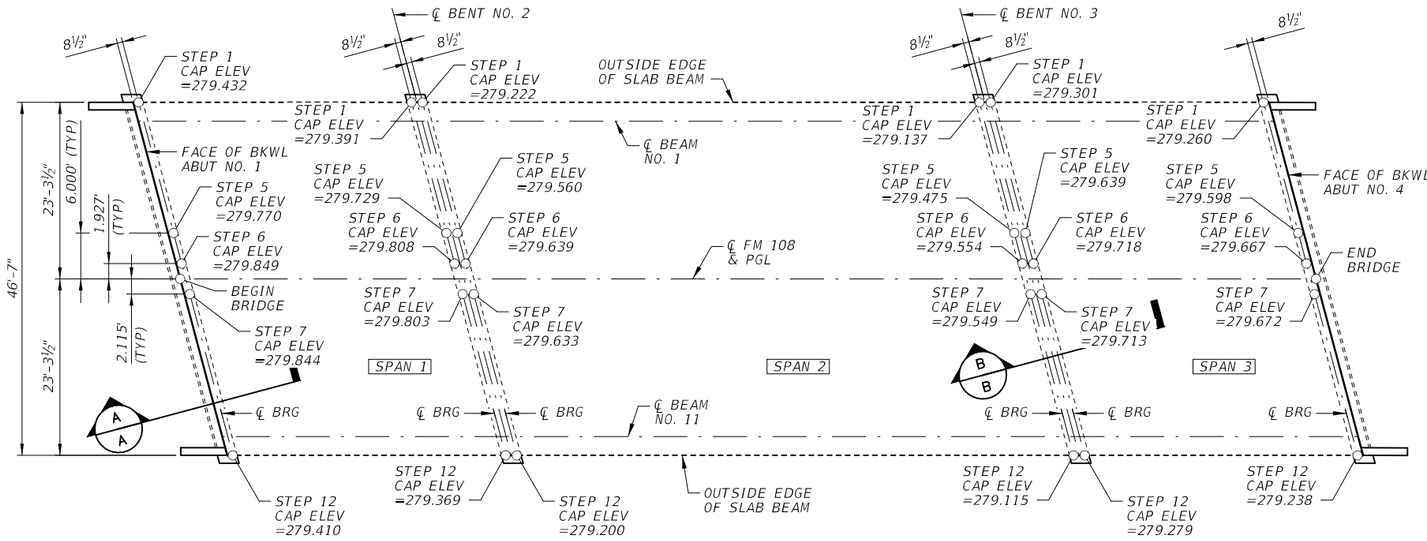
CONSTRUCTION SEQUENCE AND TYPICAL SECTION BRUSHY CREEK BRIDGE

CSJ 0715-01-025 SHEET 1 OF 1

Designed:	KH	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	KAD	6	TEXAS				FM108,ETC
Drawn:	BT	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	KH	YKM	GONZALES	0715	01	025,ETC	136

SUMMARY OF ESTIMATED QUANTITIES – FM 108 AT BRUSHY CREEK

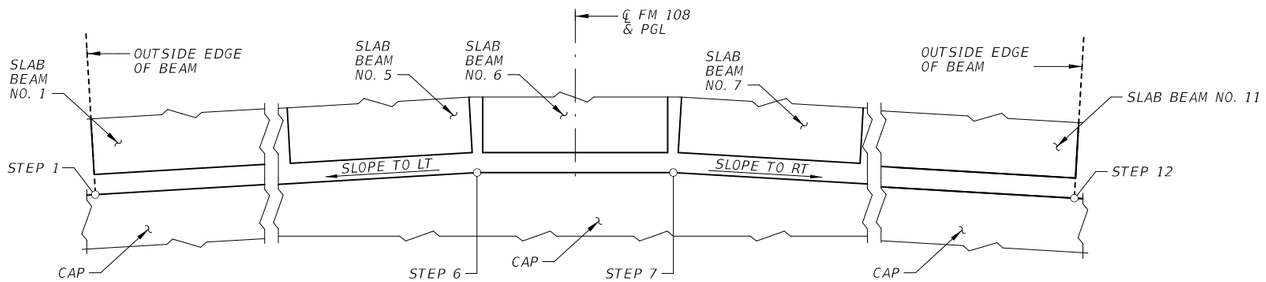
	BID ITEM	400 6005	416 6002	420 6013	420 6029	420 6037	422 6007	422 6015	425 6011	425 6012	432 6033	450 6023	454 6004
	BID ITEM DESCRIPTION	CEM STABIL BKFL	DRILL SHAFT (24 IN)	CL C CONC (ABUT)	CL C CONC (CAP)	CL C CONC (COLUMN)	REINF CONC SLAB (SLAB BEAM)	APPROACH SLAB	PRESTR CONC SLAB BEAM (4SB15)	PRESTR CONC SLAB BEAM (5SB15)	RIPRAP (STONE PROTECTION) (18 IN)	RAIL (TY SSTR)	ARMOR JOINT (SEALED)
	BRIDGE ELEMENT	CY	LF	CY	CY	CY	SF	CY	LF	LF	CY	LF	LF
PHASE 1	2 - ABUTMENTS	6	116	12.6				36.4			332	12.0	32
PHASE 1	2 - INTERIOR BENTS		160		9.6	6.6							
PHASE 1	1 - 100.00' PRESTRESSED CONCRETE SLAB BEAM UNIT						1,729		295.44	98.48		100.0	
PHASE 1	PHASE TOTAL	6	276	12.6	9.6	6.6	1,729	36.4	295.44	98.48	332	112.0	32
PHASE 2	2 - ABUTMENTS	10	174	18.6				61.7			411	12.0	58
PHASE 2	2 - INTERIOR BENTS		240		15.0	9.8							
PHASE 2	1 - 100.00' PRESTRESSED CONCRETE SLAB BEAM UNIT						2,929		590.88	98.48		100.0	
PHASE 2	PHASE TOTAL	10	414	18.6	15.0	9.8	2,929	61.7	590.88	98.48	411	112.0	58
	TOTAL	16	690	31.2	24.6	16.4	4,658	98.1	886.32	196.96	743	224.0	90



PLAN OF STEP LOCATIONS

SECTION A-A

SECTION B-B



COMMON TRANSVERSE SECTIONS AT STEP LOCATIONS

HL93 LOADING

STATE OF TEXAS
KELLY HO
112947
LICENSED PROFESSIONAL ENGINEER
03/30/2023

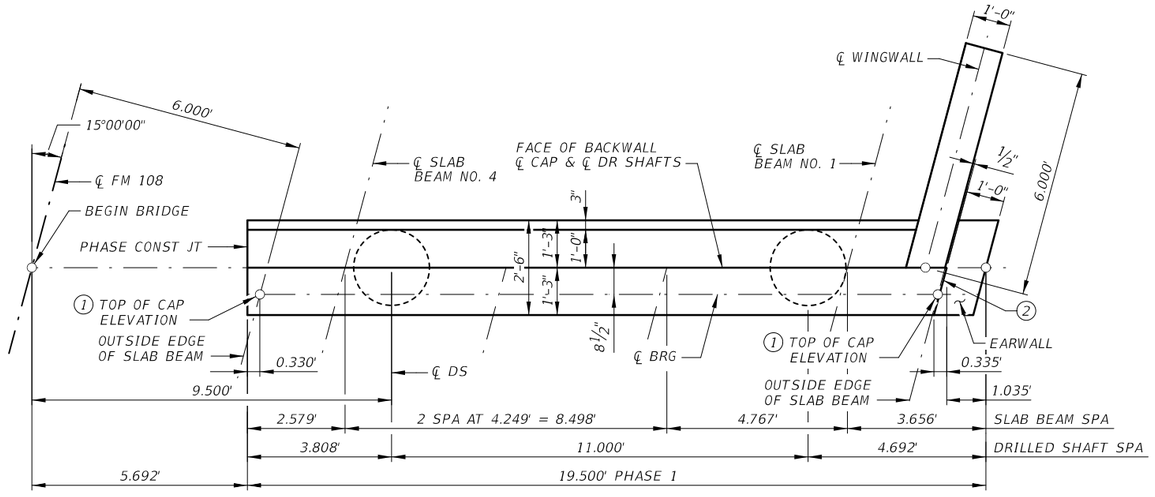
NO.	REVISION	BY	DATE

CP&Y an STV Company

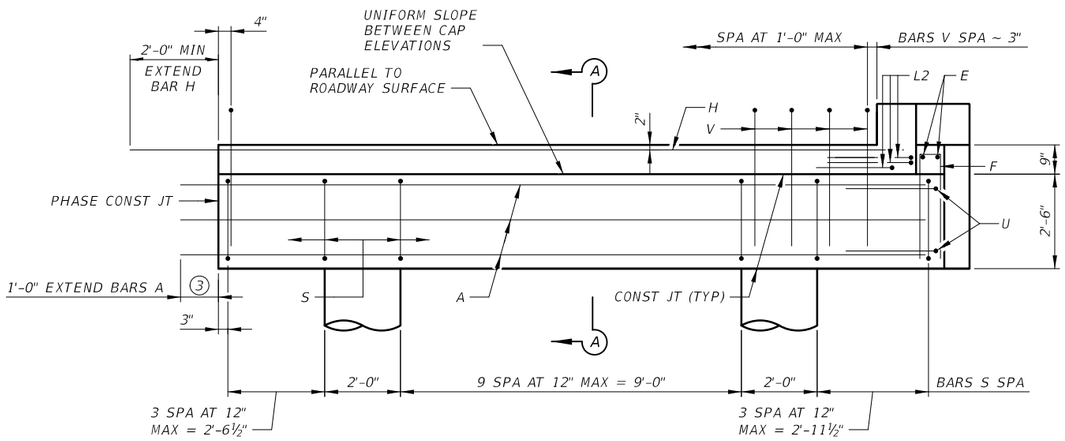
TEXAS REGISTERED ENGINEERING FIRM F-1741

FM 108 AT BRUSHY CREEK
ESTIMATED QUANTITIES AND CAP ELEVATIONS
BRUSHY CREEK BRIDGE
CSJ 0715-01-025 SHEET 1 OF 1

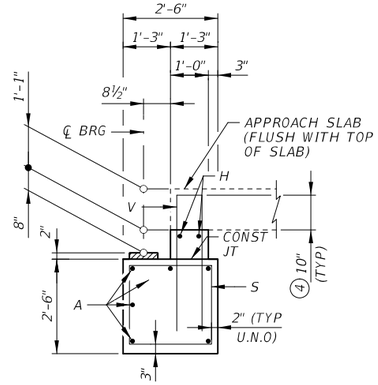
Designed:	KAD	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	KH	6	TEXAS				FM108,ETC
Drawn:	KAD	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	KH	YKM	GONZALES	0715	01	025,ETC	137



PLAN



ELEVATION



SECTION A-A

1. SEE ESTIMATED QUANTITIES AND CAP ELEVATIONS SHEET FOR TOP OF CAP ELEVATIONS.
2. ½" PREFORMED BITUMINOUS FIBER MATERIAL BETWEEN SLAB BEAM AND EARWALL. BOND TO EARWALL WITH AN APPROVED ADHESIVE. INSIDE FACE OF EARWALL TO BE CAST PERPENDICULAR TO CAP. DO NOT CAST EARWALLS UNTIL BEAMS ARE ERECTED IN THEIR FINAL POSITION IN PHASE 1.
3. CONTRACTOR TO SPLICE BARS A BY WELDING IN ACCORDANCE WITH ITEM 448, "STRUCTURAL FIELD WELDING" OR BY USE OF MECHANICAL COUPLERS IN ACCORDANCE WITH ITEM 440.2.8 "MECHANICAL COUPLERS."
4. INCREASE AS REQUIRED TO MAINTAIN 3" FROM FINISHED GROUND.

TABLE OF ESTIMATED QUANTITIES – PHASE 1

BAR	NO.	SIZE	LENGTH	WEIGHT
A	6	#11	20'- 0"	638
E	2	#4	2'- 3"	3
F	5	#4	6'- 4"	21
H	2	#5	20'- 4"	42
L	3	#6	4'- 0"	18
S	19	#4	9'- 4"	118
U	2	#6	7'- 1"	21
V	17	#5	7'- 7"	134
wH1	4	#6	5'- 8"	34
wH2	4	#6	6'-11"	42
wU	6	#4	1'- 8"	7
wV	14	#5	4'- 2"	61
REINFORCING STEEL			LB	1,139
CLASS "C" CONC (ABUT)			CY	6.3

GENERAL NOTES:

1. DESIGNED ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION (2020) AND TXDOT BRIDGE DESIGN MANUAL (NOV 2021).
2. SEE BRIDGE LAYOUTS FOR FOUNDATION, SIZE AND LENGTH.
3. SEE FD STANDARD SHEET FOR ALL FOUNDATION DETAILS AND NOTES.
4. COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE. REINFORCING BAR DIMENSIONS ARE OUT-TO-OUT OF BAR.
5. CALCULATED FOUNDATION LOADS:
   36 TONS/DR SHAFT.

MATERIAL NOTES:

1. PROVIDE CLASS C CONCRETE (f'c = 3,600 psi).
2. PROVIDE GRADE 60 REINFORCING STEEL.

HL93 LOADING

STATE OF TEXAS
KELLY HO
112947
LICENSED PROFESSIONAL ENGINEER
03/30/2023

NO.	REVISION	BY	DATE

CP&Y an STV Company
TEXAS REGISTERED ENGINEERING FIRM F-1741

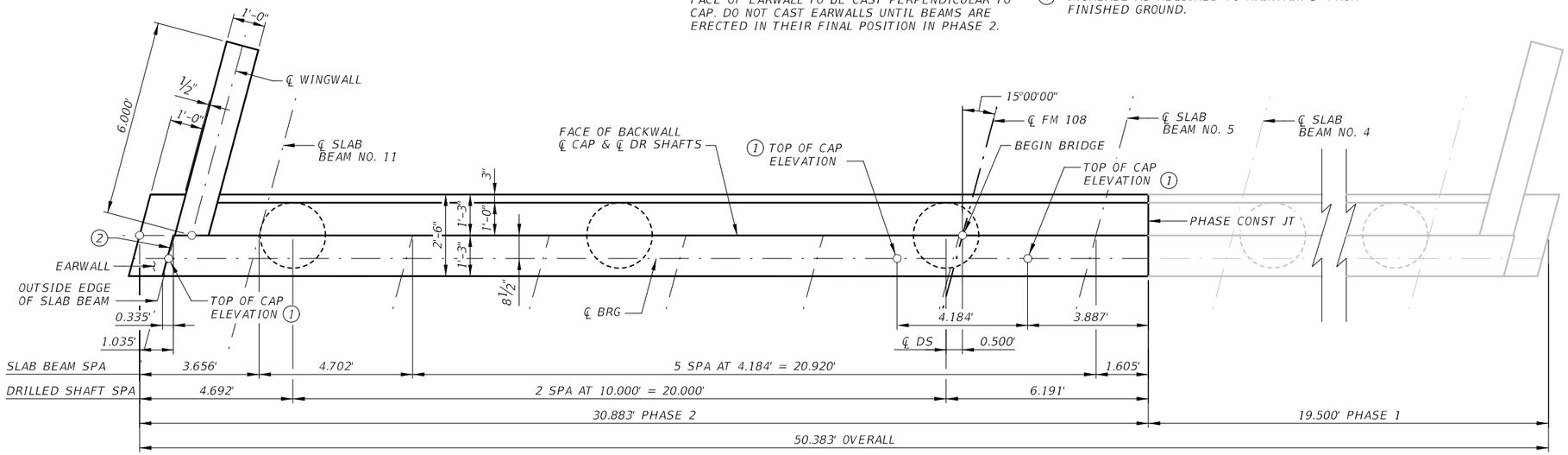
FM 108 AT BRUSHY CREEK

ABUTMENT NO. 1 (PHASE 1)

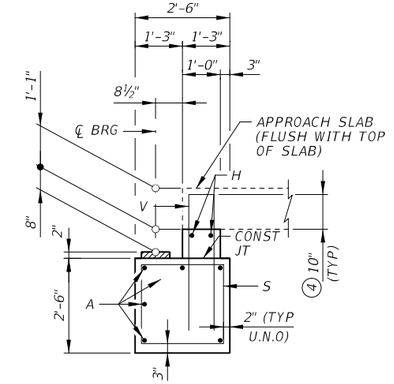
CSJ 0715-01-025 SHEET 1 OF 1

Designed:	SJR	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	KH	6	TEXAS				FM108,ETC
Drawn:	CBR	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	KH	YKM	GONZALES	0715	01	025,ETC	138

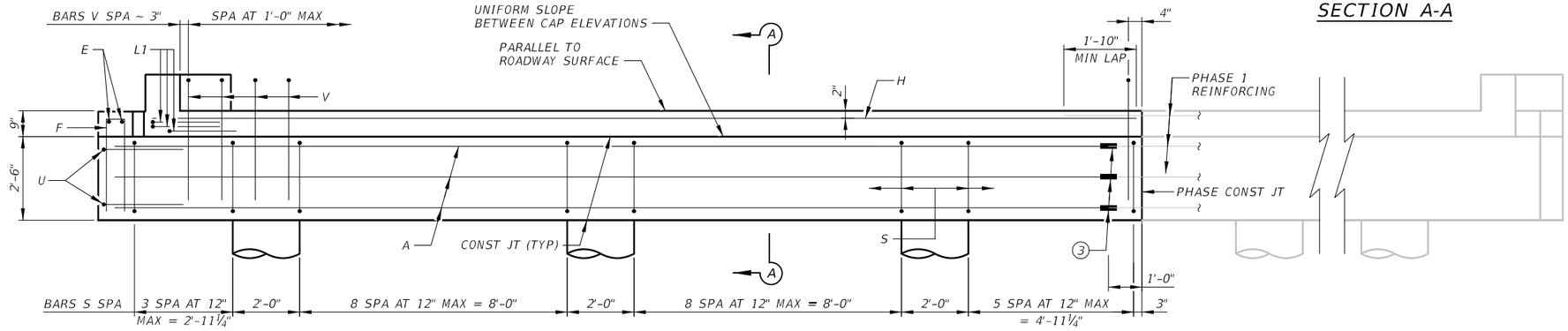
1. SEE ESTIMATED QUANTITIES AND CAP ELEVATIONS SHEET FOR TOP OF CAP ELEVATIONS.
2. ½" PREFORMED BITUMINOUS FIBER MATERIAL BETWEEN SLAB BEAM AND EARWALL. BOND TO EARWALL WITH AN APPROVED ADHESIVE. INSIDE FACE OF EARWALL TO BE CAST PERPENDICULAR TO CAP. DO NOT CAST EARWALLS UNTIL BEAMS ARE ERECTED IN THEIR FINAL POSITION IN PHASE 2.
3. CONTRACTOR TO SPLICE BARS A BY WELDING IN ACCORDANCE WITH ITEM 448, "STRUCTURAL FIELD WELDING" OR BY USE OF MECHANICAL COUPLERS IN ACCORDANCE WITH ITEM 440.2.8 "MECHANICAL COUPLERS."
4. INCREASE AS REQUIRED TO MAINTAIN 3" FROM FINISHED GROUND.



PLAN



SECTION A-A



ELEVATION

TABLE OF ESTIMATED QUANTITIES – PHASE 2

BAR	NO.	SIZE	LENGTH	WEIGHT
A	6	#11	29'– 3"	932
E	2	#4	2'– 3"	3
F	5	#4	6'– 4"	21
H	2	#5	29'– 6"	62
L	3	#6	4'– 0"	18
S	31	#4	9'– 4"	193
U	2	#6	7'– 1"	21
V	29	#5	7'– 8"	232
wH1	4	#6	5'– 8"	34
wH2	4	#6	6'–11"	42
wU	6	#4	1'– 8"	7
wV	14	#5	4'– 2"	61
REINFORCING STEEL			LB	1,626
CLASS "C" CONC (ABUT)			CY	9.3

GENERAL NOTES:

1. DESIGNED ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION (2020) AND TXDOT BRIDGE DESIGN MANUAL (NOV 2021).
2. SEE BRIDGE LAYOUTS FOR FOUNDATION, SIZE AND LENGTH.
3. SEE FD STANDARD SHEET FOR ALL FOUNDATION DETAILS AND NOTES.
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5. CALCULATED FOUNDATION LOADS:
   36 TONS/DR SHAFT.

MATERIAL NOTES:

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HL93 LOADING

STATE OF TEXAS
KELLY HO
112947
LICENSED PROFESSIONAL ENGINEER
03/30/2023

NO.	REVISION	BY	DATE

CP&Y an STV Company
TEXAS REGISTERED ENGINEERING FIRM F-1741

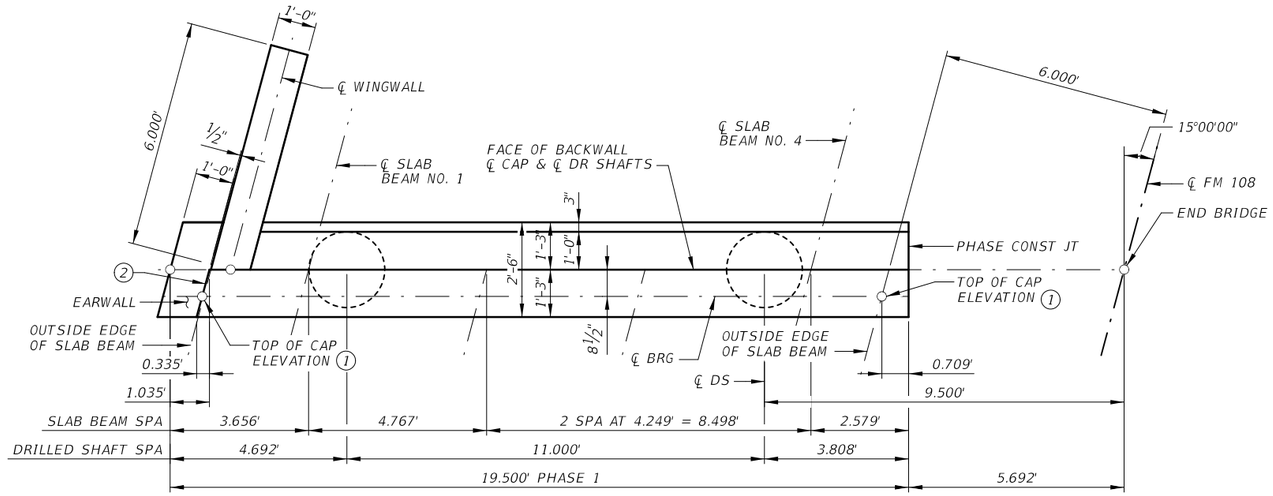
 Texas Department of Transportation

FM 108 AT BRUSHY CREEK

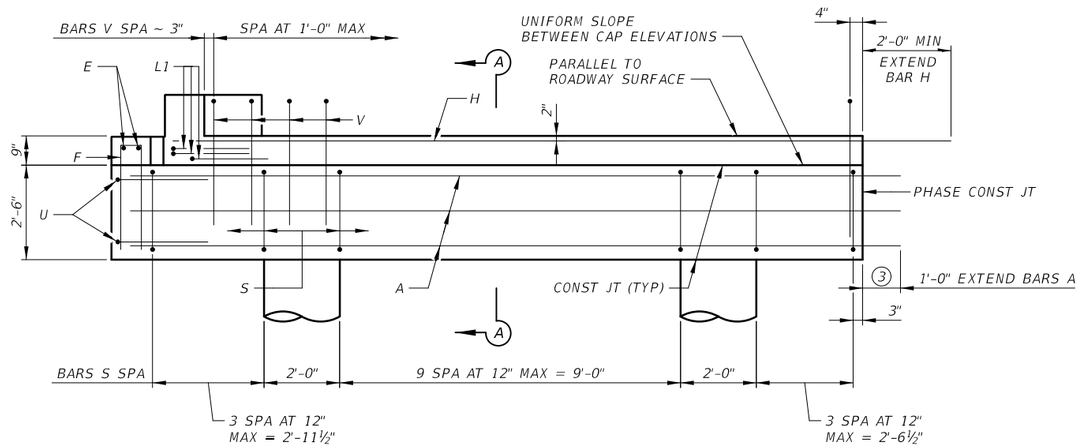
ABUTMENT NO. 1 (PHASE 2)

CSJ 0715–01–025 SHEET 1 OF 1

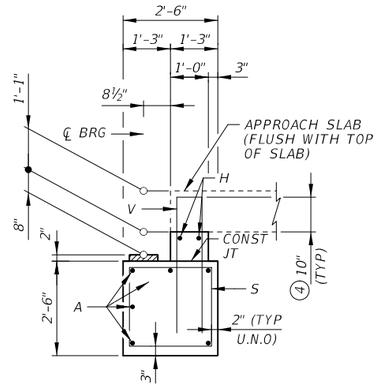
Designed:	SJR	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	KH	6	TEXAS					FM108,ETC
Drawn:	CBR	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	KH	YKM	GONZALES	0715	01	025,ETC		139



PLAN



ELEVATION



SECTION A-A

1. SEE ESTIMATED QUANTITIES AND CAP ELEVATIONS SHEET FOR TOP OF CAP ELEVATIONS.
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3. CONTRACTOR TO SPLICE BARS A BY WELDING IN ACCORDANCE WITH ITEM 448, "STRUCTURAL FIELD WELDING" OR BY USE OF MECHANICAL COUPLERS IN ACCORDANCE WITH ITEM 440.2.8 "MECHANICAL COUPLERS."
4. INCREASE AS REQUIRED TO MAINTAIN 3" FROM FINISHED GROUND.

TABLE OF ESTIMATED QUANTITIES – PHASE 1

BAR	NO.	SIZE	LENGTH	WEIGHT
A	6	#11	20'– 0"	638
E	2	#4	2'– 3"	3
F	5	#4	6'– 4"	21
H	2	#5	20'– 4"	42
L	3	#6	4'– 0"	18
S	19	#4	9'– 4"	118
U	2	#6	7'– 1"	21
V	17	#5	7'– 7"	134
wH1	4	#6	5'– 8"	34
wH2	4	#6	6'–11"	42
wU	6	#4	1'– 8"	7
wV	14	#5	4'– 2"	61
REINFORCING STEEL			LB	1,139
CLASS "C" CONC (ABUT)			CY	6.3

GENERAL NOTES:

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5. CALCULATED FOUNDATION LOADS: 36 TONS/DR SHAFT.

MATERIAL NOTES:

1. PROVIDE CLASS C CONCRETE (f'c = 3,600 psi).
2. PROVIDE GRADE 60 REINFORCING STEEL.

HL93 LOADING

STATE OF TEXAS
KELLY HO
112947
LICENSED
PROFESSIONAL ENGINEER
03/30/2023

NO.	REVISION	BY	DATE

CP&Y an STV Company
TEXAS REGISTERED ENGINEERING FIRM F-1741

 Texas Department of Transportation

FM 108 AT BRUSHY CREEK

ABUTMENT NO. 4 (PHASE 1)

CSJ 0715-01-025 SHEET 1 OF 1

Designed:	SJR	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	KH	6	TEXAS					FM108,ETC
Drawn:	CBR	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	KH	YKM	GONZALES	0715	01	025,ETC		140

1. SEE ESTIMATED QUANTITIES AND CAP ELEVATIONS SHEET FOR TOP OF CAP ELEVATIONS.
2. ½" PREFORMED BITUMINOUS FIBER MATERIAL BETWEEN SLAB BEAM AND EARWALL. BOND TO EARWALL WITH AN APPROVED ADHESIVE. INSIDE FACE OF EARWALL TO BE CAST PERPENDICULAR TO CAP. DO NOT CAST EARWALLS UNTIL BEAMS ARE ERECTED IN THEIR FINAL POSITION IN PHASE 2.
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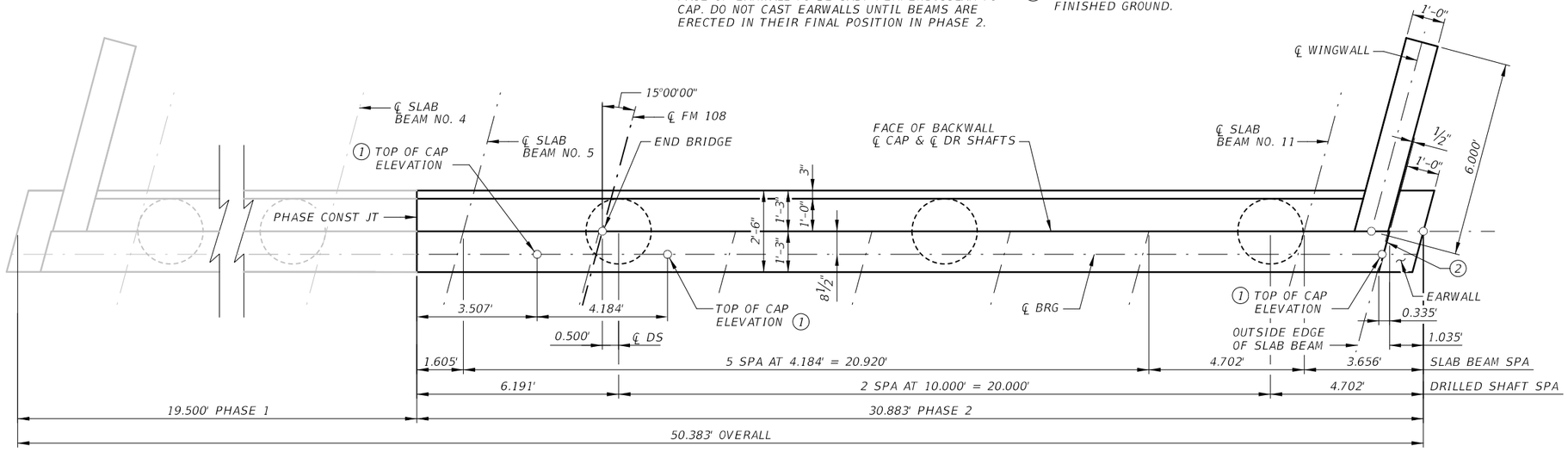
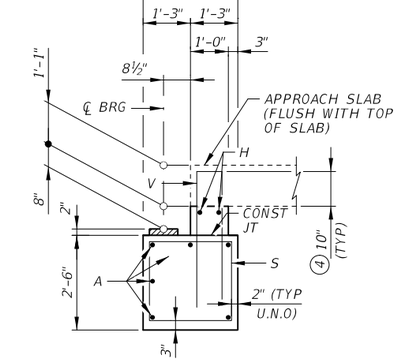
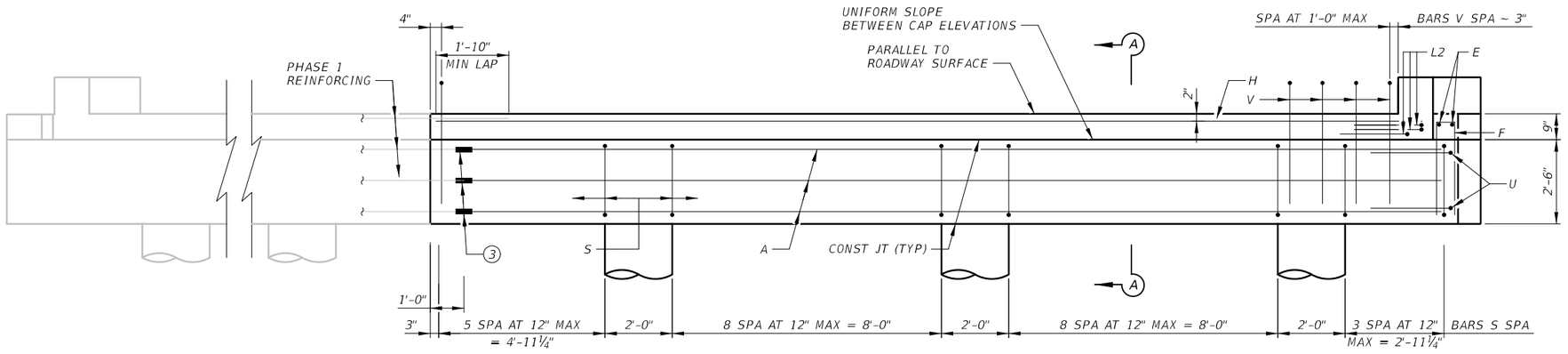
4. INCREASE AS REQUIRED TO MAINTAIN 3" FROM FINISHED GROUND.



PLAN



SECTION A-A



ELEVATION

TABLE OF ESTIMATED QUANTITIES – PHASE 2

BAR	NO.	SIZE	LENGTH	WEIGHT
A	6	#11	29'– 3"	932
E	2	#4	2'– 3"	3
F	5	#4	6'– 4"	21
H	2	#5	29'– 6"	62
L	3	#6	4'– 0"	18
S	31	#4	9'– 4"	193
U	2	#6	7'– 1"	21
V	29	#5	7'– 8"	232
wH1	4	#6	5'– 8"	34
wH2	4	#6	6'–11"	42
wU	6	#4	1'– 8"	7
wV	14	#5	4'– 2"	61
REINFORCING STEEL			LB	1,626
CLASS "C" CONC (ABUT)			CY	9.3

GENERAL NOTES:

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5. CALCULATED FOUNDATION LOADS: 36 TONS/DR SHAFT.

MATERIAL NOTES:

1. PROVIDE CLASS C CONCRETE (f'c = 3,600 psi).
2. PROVIDE GRADE 60 REINFORCING STEEL.

HL93 LOADING

STATE OF TEXAS
KELLY HO
112947
LICENSED PROFESSIONAL ENGINEER
03/30/2023

NO.	REVISION	BY	DATE

CP&Y an STV Company
TEXAS REGISTERED ENGINEERING FIRM F-1741

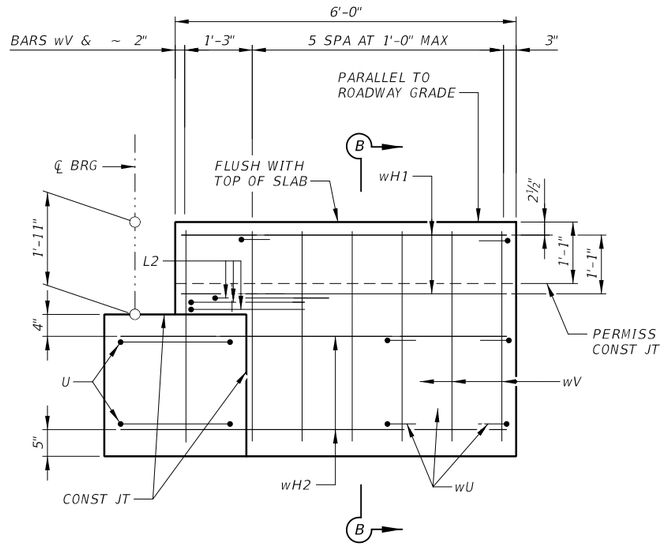
 Texas Department of Transportation

FM 108 AT BRUSHY CREEK

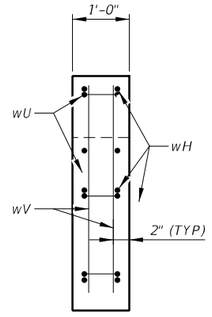
ABUTMENT NO. 4 (PHASE 2)

CSJ 0715–01–025 SHEET 1 OF 1

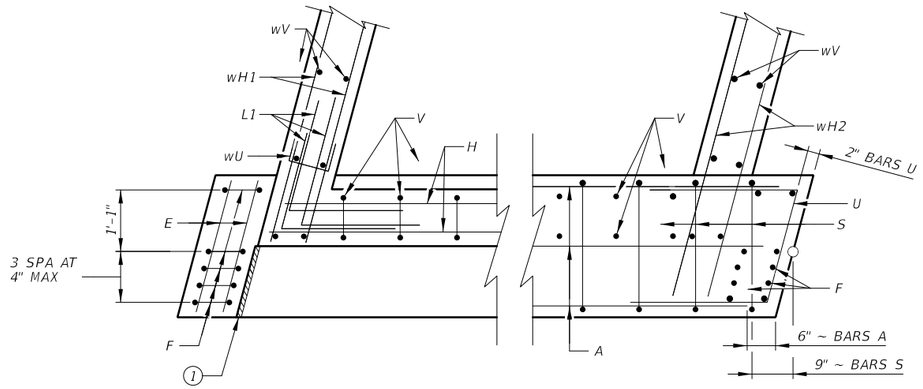
Designed:	SJR	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	KH	6	TEXAS					FM108,ETC
Drawn:	CBR	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	KH	YKM	GONZALES	0715	01	025,ETC		141



WINGWALL ELEVATION

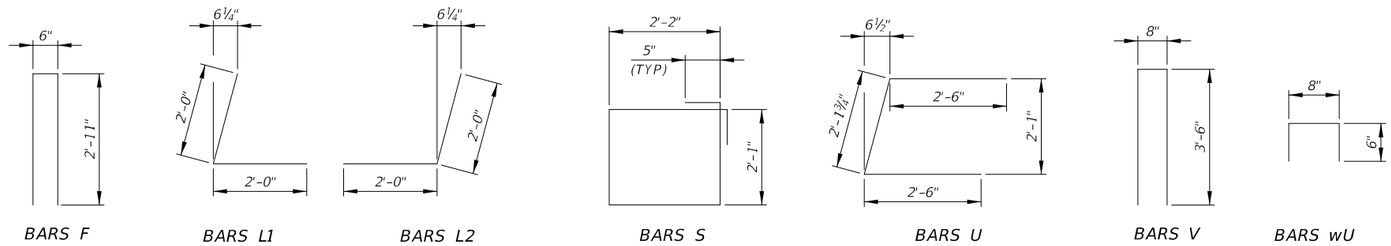


SECTION B-B



BACKWALL CAP

CORNER DETAILS



BARS F BARS L1 BARS L2 BARS S BARS U BARS V BARS wU

① ½" PREFORMED BITUMINOUS FIBER MATERIAL BETWEEN SLAB BEAM AND EARWALL. BOND TO EARWALL WITH AN APPROVED ADHESIVE. INSIDE FACE OF EARWALL TO BE CAST PERPENDICULAR TO CAP. DO NOT CAST EARWALLS UNTIL BEAMS ARE ERECTED IN THEIR FINAL POSITION.

HL93 LOADING

NO.	REVISION	BY	DATE

CP&Y an STV Company

TEXAS REGISTERED ENGINEERING FIRM F-1741

FM 108 AT BRUSHY CREEK

MISCELLANEOUS ABUTMENT DETAILS

CSJ 0715-01-025 SHEET 1 OF 1

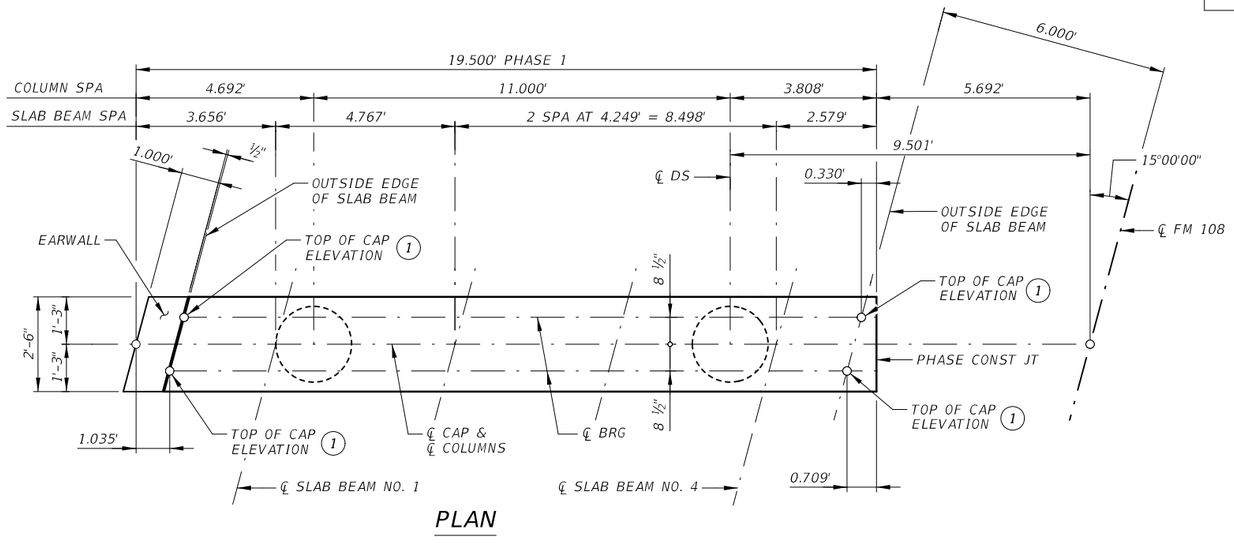
Designed:	SJR	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	KH	6	TEXAS				FM108,ETC
Drawn:	CBR	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	KH	YKM	GONZALES	0715	01	025,ETC	142

TABLE OF COLUMN QUANTITIES - PHASE 1 (4)

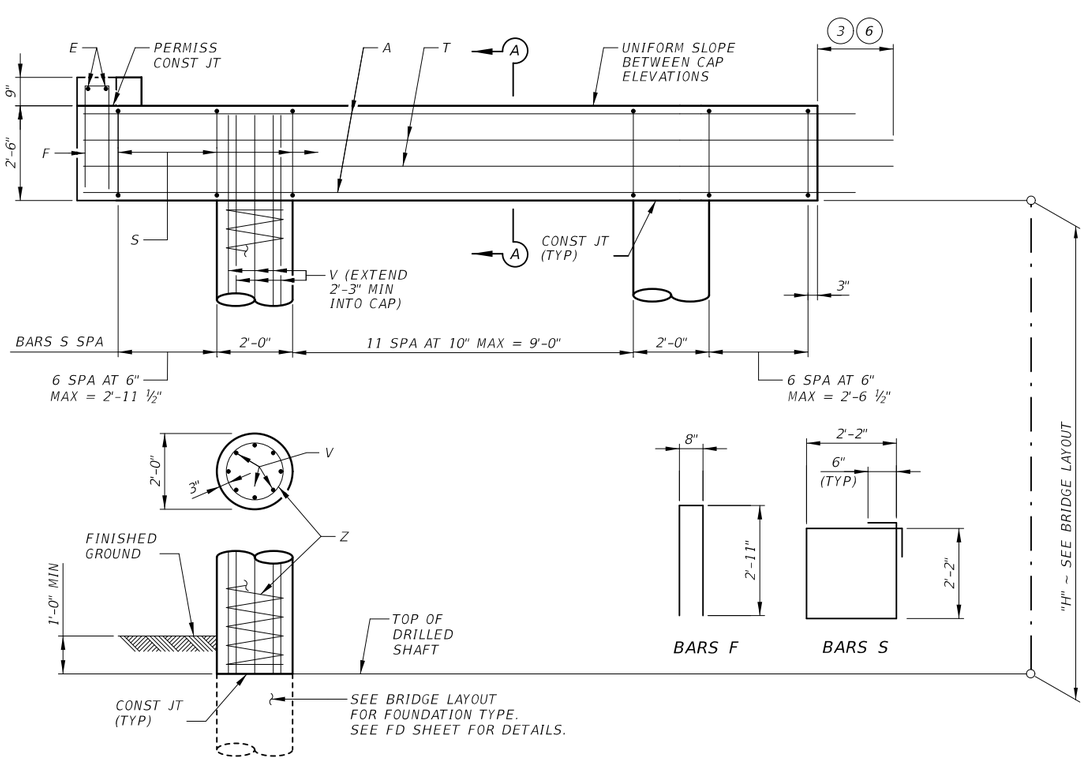
BENT	"H"	BARS V 16 ~ #7		BARS Z 2 ~ #3 SPIRALS		CLASS "C" CONC (COL)	REINF STEEL
NO.	HEIGHT	LENGTH	WEIGHT	LENGTH	WEIGHT	CY	LB
2	14'	17'- 0"	556	147'- 2"	111	3.3	667
3	14'	17'- 0"	556	147'- 2"	111	3.3	667

TABLE OF CAP QUANTITIES - PHASE 1 (5)

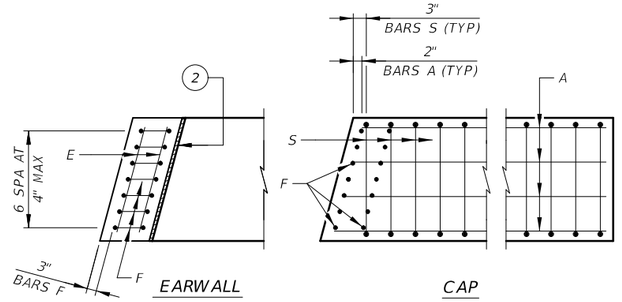
BAR	NO.	SIZE	LENGTH	WEIGHT
A	4	#11	20'- 4"	432
B	4	#11	20'- 4"	432
S	18	#5	9'- 8"	181
T	4	#5	21'- 4"	89
E	2	#4	2'- 2"	3
F	7	#4	6'- 6"	30
REINFORCING STEEL			LB	1,167
CLASS "C" CONC (CAP)			CY	4.8



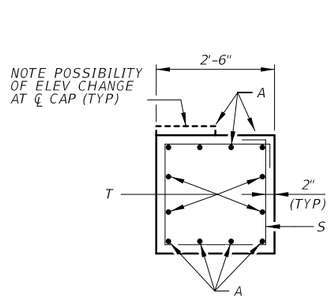
PLAN



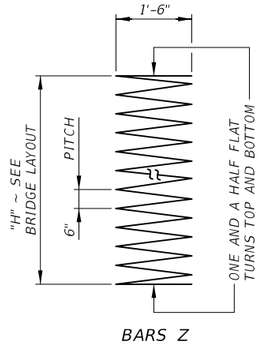
ELEVATION



CAP END DETAIL



SECTION A-A



BARS Z

GENERAL NOTES:

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2. COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTES OTHERWISE. REINFORCING BAR DIMENSIONS ARE OUT-TO-OUT OF BAR.
3. SEE IGEB STANDARD FOR BEARING PAD DETAILS.
4. SEE BRIDGE LAYOUT FOR FOUNDATION SIZE AND LENGTH.
5. SEE FD STANDARD SHEET FOR ALL FOUNDATION DETAILS AND NOTES.
6. CALCULATED FOUNDATION LOAD:

   BENT NO. 2 AND 3 = 82 TON/DR SHAFT

MATERIAL NOTES:

1. PROVIDE CLASS C CONCRETE (f'c = 3,600 psi).
2. PROVIDE GRADE 60 REINFORCING STEEL.

HL93 LOADING

(1) SEE ESTIMATED QUANTITIES AND CAP ELEVATIONS SHEET FOR TOP OF CAP ELEVATIONS.

(2) ½" PREFORMED BITUMINOUS FIBER MATERIAL BETWEEN SLAB BEAM AND EARWALL. BOND TO EARWALL WITH AN APPROVED ADHESIVE. INSIDE FACE OF EARWALL TO BE CAST PERPENDICULAR TO CAP. DO NOT CAST EARWALLS UNTIL BEAMS ARE ERECTED IN THEIR FINAL POSITION IN PHASE 1.

(3) CONTRACTOR TO SPLICE BARS A BY WELDING IN ACCORDANCE WITH ITEM 448 "STRUCTURAL FIELD WELDING" OR BY USING MECHANICAL COUPLERS IN ACCORDANCE WITH ITEM 440.2.8 "MECHANICAL COUPLERS".

(4) FOR EACH LINEAR FOOT VARIATION IN "H" VALUE, MAKE THE FOLLOWING ADJUSTMENTS:
BARS V LENGTH: 1'-0"
BARS Z LENGTH: 9'-6"
REINFORCING STEEL: 40 LB
CLASS "C" CONCRETE (COL): 0.24 CY

(5) QUANTITIES SHOWN ARE FOR ONE BENT CAP IN PHASE 1.

(6) MINIMUM EXTENSION INTO PHASE 2:
BARS A: 1'-0"
BARS T: 2'-0"

KELLY HO
112947
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS
03/30/2023

NO.	REVISION	BY	DATE

CP&Y an STV Company

 Texas Department of Transportation

FM 108 AT BRUSHY CREEK

INTERIOR BENT NO. 2 AND 3 (PHASE 1)

CSJ 0715-01-025 SHEET 1 OF 1

Designed:	SJR	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	KH	6	TEXAS				FM108,ETC
Drawn:	NB	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	KH	YKM	GONZALES	0715	01	025,ETC	143

(1) SEE ESTIMATED QUANITIES AND CAP ELEVATIONS SHEET FOR TOP OF CAP ELEVATIONS.

(2) ½" PREFORMED BITUMINOUS FIBER MATERIAL BETWEEN SLAB BEAM AND EARWALL. BOND TO EARWALL WITH AN APPROVED ADHESIVE. INSIDE FACE OF EARWALL TO BE CAST PERPENDICULAR TO CAP. DO NOT CAST EARWALLS UNTIL BEAMS ARE ERECTED IN THEIR FINAL POSITION IN PHASE 2.

(3) CONTRACTOR TO SPLICE BARS A BY WELDING IN ACCORDANCE WITH ITEM 448 "STRUCTURAL FIELD WELDING" OR BY USING MECHANICAL COUPLERS IN ACCORDANCE WITH ITEM 440.2.8 "MECHANICAL COUPLERS".

(4) 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" CONCRETE (COL): 0.35 CY

(5) QUANTITIES SHOWN ARE FOR ONE BENT CAP IN PHASE 2.

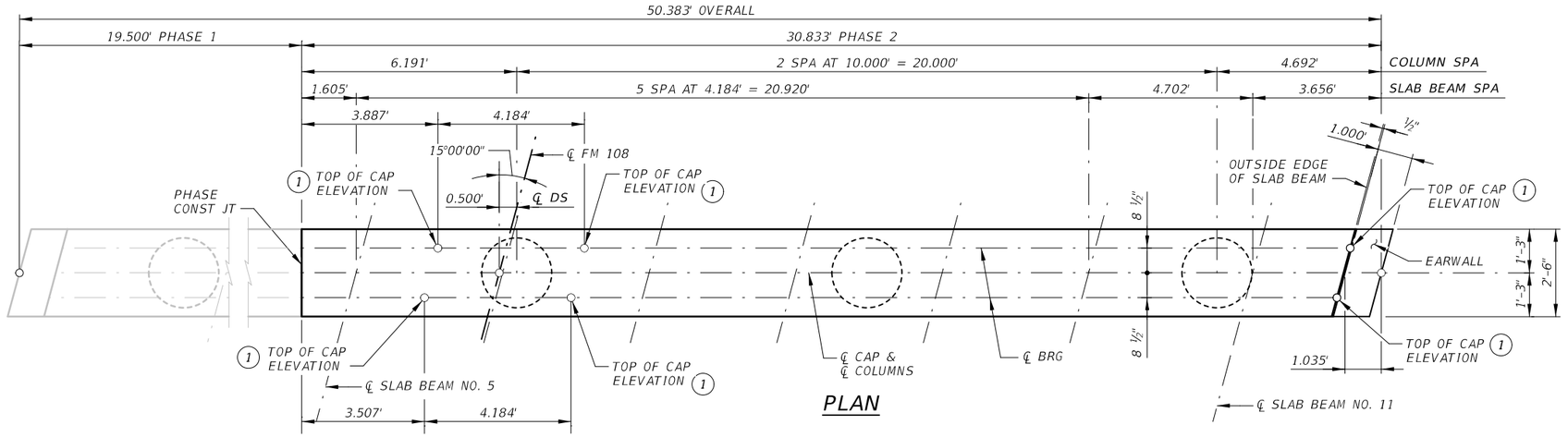
(6) MINIMUM EXTENSION INTO PHASE 2:
BARS A: 1'-0"
BARS T: 2'-0"

TABLE OF COLUMN QUANTITIES - PHASE 2 (4)

BENT	"H"	BARS V 24 ~ #7		BARS Z 3 ~ #3 SPIRALS		CLASS "C" CONC (COL)	REINF STEEL
NO.	HEIGHT	LENGTH	WEIGHT	LENGTH	WEIGHT	CY	LB
2	14'	17'- 0"	834	147'- 2"	166	4.9	1,000
3	14'	17'- 0"	834	147'- 2"	166	4.9	1,000

TABLE OF CAP QUANTITIES - PHASE 2 (5)

BAR	NO.	SIZE	LENGTH	WEIGHT
A	4	#11	29'- 9"	632
B	4	#11	29'- 9"	632
S	30	#5	9'- 8"	302
T	4	#5	30'- 6"	127
E	2	#4	2'- 2"	3
F	7	#4	6'- 6"	30
REINFORCING STEEL			LB	1,693
CLASS "C" CONC (CAP)			CY	7.5



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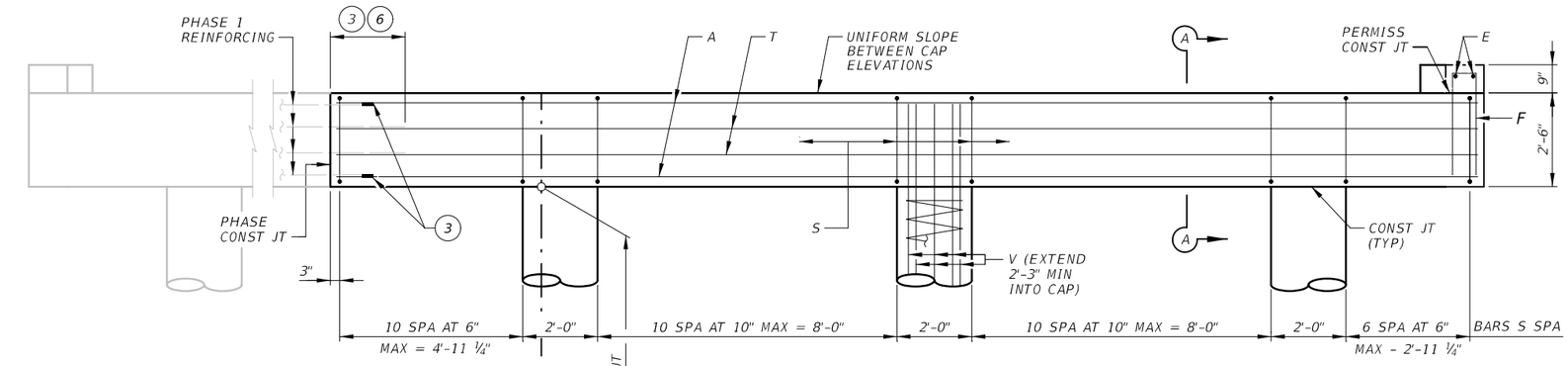
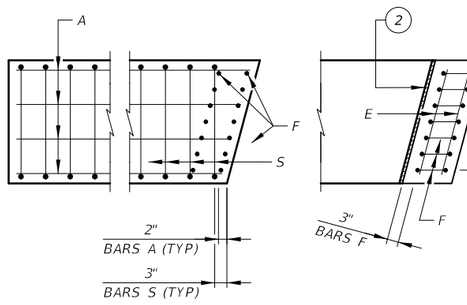
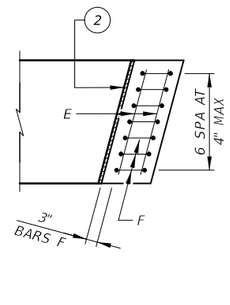
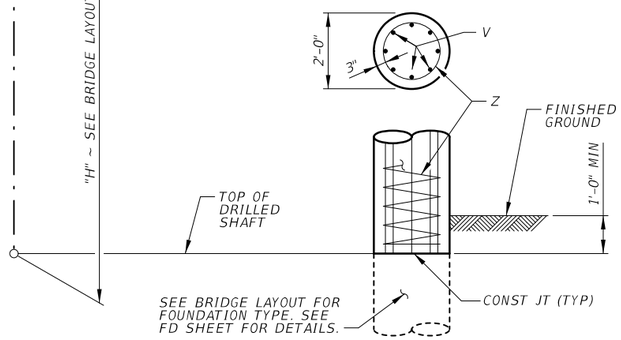


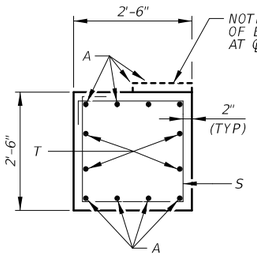




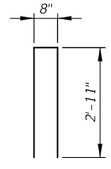
CAP END DETAIL



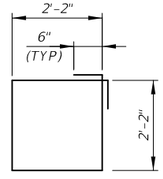
ELEVATION



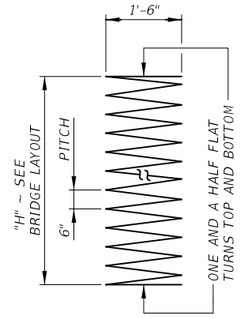
SECTION A-A



BARS F



BARS S



BARS Z

GENERAL NOTES:

1. DESIGNED ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION (2020) AND TXDOT BRIDGE DESIGN MANUAL (NOV 2021).
2. COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTES OTHERWISE. REINFORCING BAR DIMENSIONS ARE OUT-TO-OUT OF BAR.
3. SEE IGEB STANDARD FOR BEARING PAD DETAILS.
4. SEE BRIDGE LAYOUT FOR FOUNDATION SIZE AND LENGTH.
5. SEE FD STANDARD SHEET FOR ALL FOUNDATION DETAILS AND NOTES.
6. CALCULATED FOUNDATION LOAD:

   BENT NO. 2 AND 3 = 82 TON/DR SHAFT

MATERIAL NOTES:

1. PROVIDE CLASS C CONCRETE (f'c = 3,600 psi).
2. PROVIDE GRADE 60 REINFORCING STEEL.

HL93 LOADING

STATE OF TEXAS
KELLY HO
112947
LICENSED
PROFESSIONAL ENGINEER
03/30/2023

NO.	REVISION	BY	DATE

CP&Y an STV Company

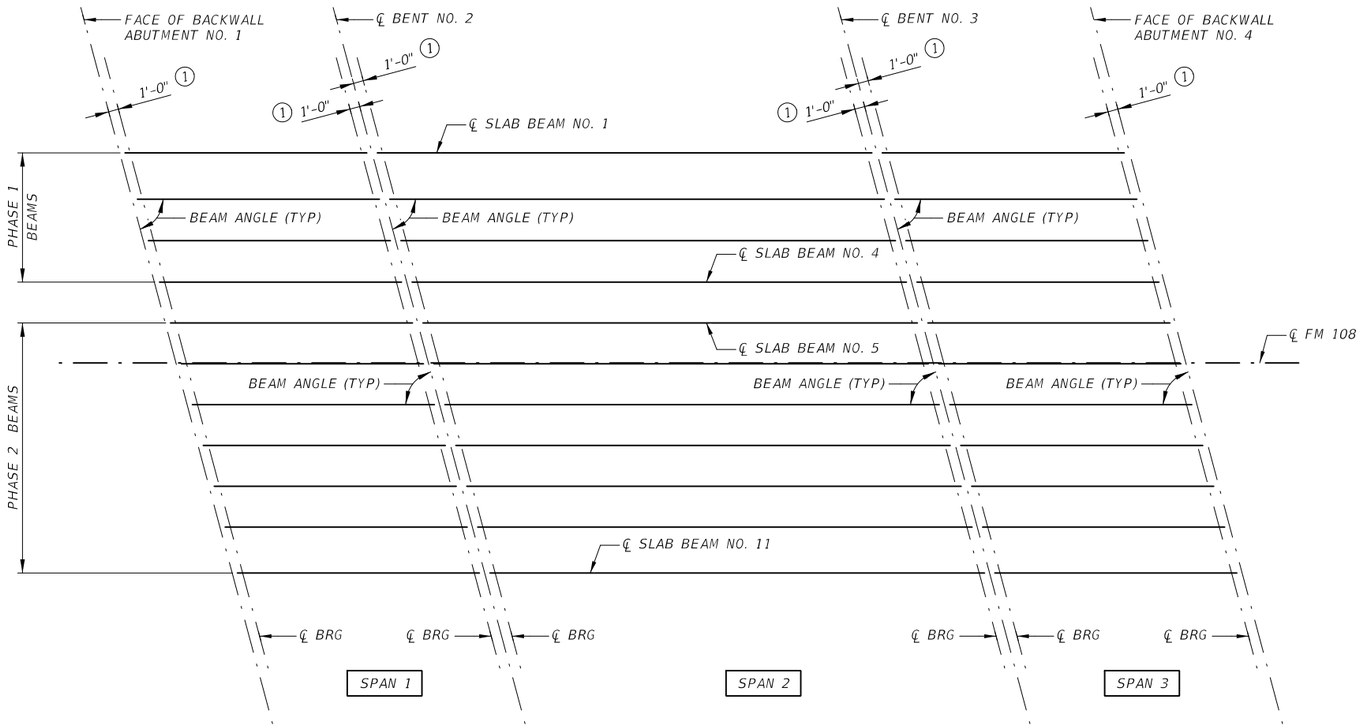
 Texas Department of Transportation

FM 108 AT BRUSHY CREEK

INTERIOR BENT NO. 2 AND 3 (PHASE 2)

CSJ 0715-01-025 SHEET 1 OF 1

Designed:	SJR	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	KH	6	TEXAS				FM108,ETC
Drawn:	NB	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	KH	YKM	GONZALES	0715	01	025,ETC	144



PLAN

BENT REPORT

ABUT NO. 1 (S 55 30 30.43 E)
DISTANCE BETWEEN STATION LINE AND BEAM 1: 21.536 L

			GIRDER SPAC. (C.L. BENT)	GIRDER ANGLE D	M	S
SPAN 1	BEAM	1	0.000	75	0	0
	BEAM	2	4.767	75	0	0
	BEAM	3	4.249	75	0	0
	BEAM	4	4.249	75	0	0
	BEAM	5	4.184	75	0	0
	BEAM	6	4.184	75	0	0
	BEAM	7	4.184	75	0	0
	BEAM	8	4.184	75	0	0
	BEAM	9	4.184	75	0	0
	BEAM	10	4.184	75	0	0
	BEAM	11	4.701	75	0	0
	TOTAL		43.070			

BENT NO. 2 (S 55 30 30.43 E)
DISTANCE BETWEEN STATION LINE AND BEAM 1: 21.536 L

			GIRDER SPAC. (C.L. BENT)	GIRDER ANGLE D	M	S
SPAN 1	BEAM	1	0.000	75	0	0
	BEAM	2	4.767	75	0	0
	BEAM	3	4.249	75	0	0
	BEAM	4	4.249	75	0	0
	BEAM	5	4.184	75	0	0
	BEAM	6	4.184	75	0	0
	BEAM	7	4.184	75	0	0
	BEAM	8	4.184	75	0	0
	BEAM	9	4.184	75	0	0
	BEAM	10	4.184	75	0	0
	BEAM	11	4.701	75	0	0
	TOTAL		43.070			
SPAN 2	BEAM	1	0.000	75	0	0
	BEAM	2	4.767	75	0	0
	BEAM	3	4.249	75	0	0
	BEAM	4	4.249	75	0	0
	BEAM	5	4.184	75	0	0
	BEAM	6	4.184	75	0	0
	BEAM	7	4.184	75	0	0
	BEAM	8	4.184	75	0	0
	BEAM	9	4.184	75	0	0
	BEAM	10	4.184	75	0	0
	BEAM	11	4.701	75	0	0
	TOTAL		43.070			

BENT NO. 3 (S 57 18 11.22 E)
DISTANCE BETWEEN STATION LINE AND BEAM 1: 5.951 R

			GIRDER SPAC. (C.L. BENT)	GIRDER ANGLE D	M	S
SPAN 2	BEAM	1	0.000	75	0	0
	BEAM	2	4.767	75	0	0
	BEAM	3	4.249	75	0	0
	BEAM	4	4.249	75	0	0
	BEAM	5	4.184	75	0	0
	BEAM	6	4.184	75	0	0
	BEAM	7	4.184	75	0	0
	BEAM	8	4.184	75	0	0
	BEAM	9	4.184	75	0	0
	BEAM	10	4.184	75	0	0
	BEAM	11	4.701	75	0	0
	TOTAL		43.070			
SPAN 3	BEAM	1	0.000	75	0	0
	BEAM	2	4.767	75	0	0
	BEAM	3	4.249	75	0	0
	BEAM	4	4.249	75	0	0
	BEAM	5	4.184	75	0	0
	BEAM	6	4.184	75	0	0
	BEAM	7	4.184	75	0	0
	BEAM	8	4.184	75	0	0
	BEAM	9	4.184	75	0	0
	BEAM	10	4.184	75	0	0
	BEAM	11	4.701	75	0	0
	TOTAL		43.070			

ABUT NO. 4 (S 55 30 30.43 E)
DISTANCE BETWEEN STATION LINE AND BEAM 1: 21.536 L

			GIRDER SPAC. (C.L. BENT)	GIRDER ANGLE D	M	S
SPAN 3	BEAM	1	0.000	75	0	0
	BEAM	2	4.767	75	0	0
	BEAM	3	4.249	75	0	0
	BEAM	4	4.249	75	0	0
	BEAM	5	4.184	75	0	0
	BEAM	6	4.184	75	0	0
	BEAM	7	4.184	75	0	0
	BEAM	8	4.184	75	0	0
	BEAM	9	4.184	75	0	0
	BEAM	10	4.184	75	0	0
	BEAM	11	4.701	75	0	0
	TOTAL		43.070			

BEAM REPORT

BEAM REPORT, SPAN 1

		HORIZONTAL DISTANCE C-C BENT	C-C BRG.	TRUE DISTANCE BOT.BM.FLG. (2)	BEAM SLOPE
BEAM	1	25.000	23.533	24.49	-0.0017
BEAM	2	25.000	23.533	24.49	-0.0017
BEAM	3	25.000	23.533	24.49	-0.0017
BEAM	4	25.000	23.533	24.49	-0.0017
BEAM	5	25.000	23.533	24.49	-0.0017
BEAM	6	25.000	23.533	24.49	-0.0017
BEAM	7	25.000	23.533	24.49	-0.0017
BEAM	8	25.000	23.533	24.49	-0.0017
BEAM	9	25.000	23.533	24.49	-0.0017
BEAM	10	25.000	23.533	24.49	-0.0017
BEAM	11	25.000	23.533	24.49	-0.0017

BEAM REPORT, SPAN 2

		HORIZONTAL DISTANCE C-C BENT	C-C BRG.	TRUE DISTANCE BOT.BM.FLG. (2)	BEAM SLOPE
BEAM	1	50.000	48.533	49.50	-0.0017
BEAM	2	50.000	48.533	49.50	-0.0017
BEAM	3	50.000	48.533	49.50	-0.0017
BEAM	4	50.000	48.533	49.50	-0.0017
BEAM	5	50.000	48.533	49.50	-0.0017
BEAM	6	50.000	48.533	49.50	-0.0017
BEAM	7	50.000	48.533	49.50	-0.0017
BEAM	8	50.000	48.533	49.50	-0.0017
BEAM	9	50.000	48.533	49.50	-0.0017
BEAM	10	50.000	48.533	49.50	-0.0017
BEAM	11	50.000	48.533	49.50	-0.0017

BEAM REPORT, SPAN 3

		HORIZONTAL DISTANCE C-C BENT	C-C BRG.	TRUE DISTANCE BOT.BM.FLG. (2)	BEAM SLOPE
BEAM	1	25.000	23.533	24.49	-0.0017
BEAM	2	25.000	23.533	24.49	-0.0017
BEAM	3	25.000	23.533	24.49	-0.0017
BEAM	4	25.000	23.533	24.49	-0.0017
BEAM	5	25.000	23.533	24.49	-0.0017
BEAM	6	25.000	23.533	24.49	-0.0017
BEAM	7	25.000	23.533	24.49	-0.0017
BEAM	8	25.000	23.533	24.49	-0.0017
BEAM	9	25.000	23.533	24.49	-0.0017
BEAM	10	25.000	23.533	24.49	-0.0017
BEAM	11	25.000	23.533	24.49	-0.0017

(1) SEE IGEB STANDARD FOR ORIENTATION OF DIMENSION.

(2) BEAM LENGTHS SHOWN ARE BOTTOM BEAM LENGTHS WITH ADJUSTMENTS MADE FOR BEAM SLOPE.

HL93 LOADING

STATE OF TEXAS
KELLY HO
112947
LICENSED
PROFESSIONAL ENGINEER
03/30/2023

NO.	REVISION	BY	DATE

CP&Y an STV Company
TEXAS REGISTERED ENGINEERING FIRM F-1741

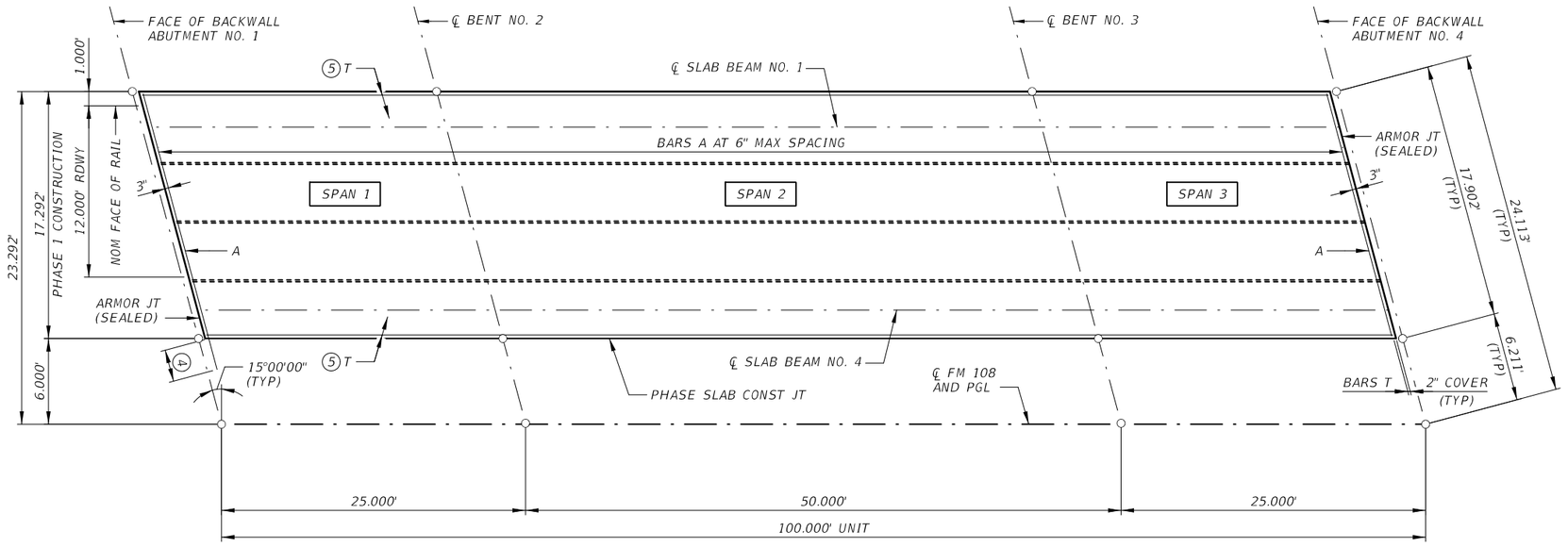
 Texas Department of Transportation

FM 108 AT BRUSHY CREEK

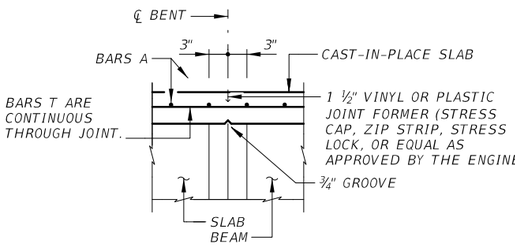
BEAM LAYOUT (PHASE 1 AND PHASE 2)

CSJ 0715-01-025 SHEET 1 OF 1

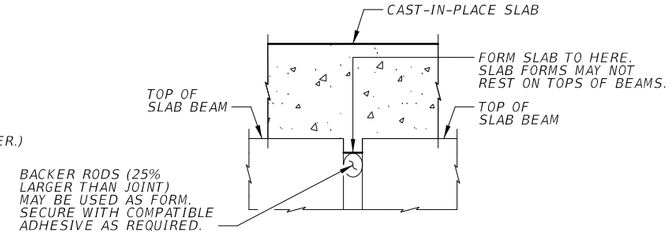
Designed:	SJR	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	KH	6	TEXAS				FM108,ETC
Drawn:	BT	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	KH	YKM	GONZALES	0715	01	025,ETC	145



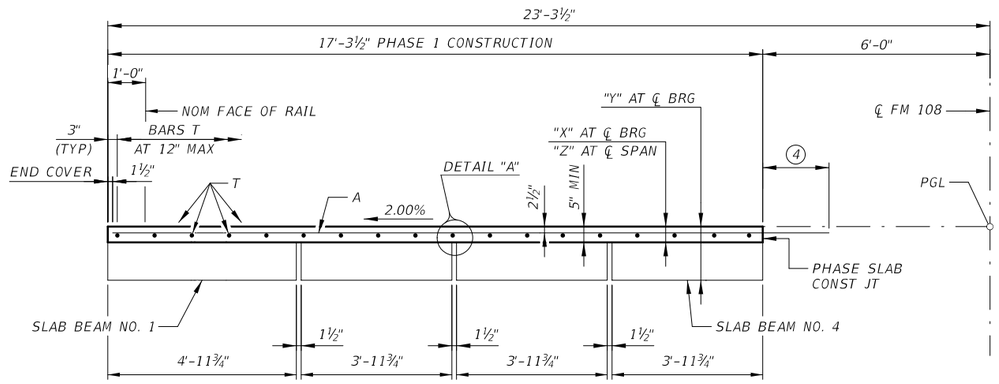
PLAN



CONTINUOUS SLAB DETAIL



DETAIL "A"



TYPICAL TRANSVERSE SECTION

TABLE OF ESTIMATED QUANTITIES

SPAN	REINF CONC SLAB (SLAB BEAM)	PRESTR CONC SLAB BEAM (4SB15) (2)	PRESTR CONC SLAB BEAM (5SB15) (2)	REINF STEEL (1)
NO.	SF	LF	LF	LB
1	432	73.47	24.49	1,210
2	865	148.50	49.50	2,422
3	432	73.47	24.49	1,210
TOTAL	1,729	295.44	98.48	4,842

(1) REINFORCING STEEL WEIGHT IS CALCULATED USING AN APPROXIMATE FACTOR OF 2.8 LBS/SF.

(2) QUANTITIES SHOWN ARE BOTTOM BEAM LENGTHS WITH ADJUSTMENTS MADE FOR BEAM SLOPE. SEE BEAM LAYOUT FOR BEAM LENGTHS.

(3) THEORETICAL DIMENSION

(4) EXTEND BARS A 2'-2" MINIMUM PAST PHASE SLAB CONSTRUCTION JOINT.

(5) WHERE SLAB IS CONTINUOUS OVER INTERIOR BENTS, BARS T ARE CONTINUOUS THROUGH JOINT. SEE "CONTINUOUS SLAB DETAIL".

GENERAL NOTES:

1. DESIGNED ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION (2020) AND TXDOT BRIDGE DESIGN MANUAL (NOV 2021).
2. SEE SLAB BEAM RAIL ANCHORAGE DETAILS (PSBRA) STANDARD FOR RAIL ANCHORAGE DETAILS.
3. COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE.

MATERIAL NOTES:

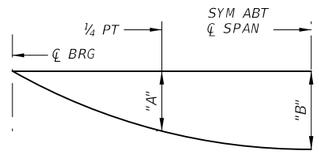
1. PROVIDE CLASS S CONCRETE (f'c = 4,000 psi).
2. PROVIDE GRADE 60 REINFORCING STEEL.
3. PROVIDE BAR LAPS, WHERE REQUIRED, AS FOLLOWS:
   UNCOATED ~ #4 = 1'-7"
   ~ #5 = 2'-0"

TABLE OF SECTION DEPTHS

SPAN NO.	BEAM NO.	"X" AT ℄ BRG	"Y" AT ℄ BRG	"Z" AT ℄ SPAN (3)
1,3	1-4	6"	1'-9"	5¾"
2	1-4	8"	1'-11"	5⅞"

TABLE OF DEAD LOAD DEFLECTIONS

SPAN	BEAM	"A"	"B"
		Ft	Ft
1,3	1-4	0.002	0.002
2	1-4	0.027	0.039



DEAD LOAD DEFLECTION DIAGRAM

NOTE: DEFLECTIONS SHOWN ARE DUE TO CONCRETE SLAB ONLY (Ec = 5,000 ksi). CALCULATED DEFLECTIONS SHOWN ARE THEORETICAL AND ACTUAL DIMENSIONS MAY VARY. ADJUST BASED ON FIELD VERIFICATION.

BAR TABLE

BAR	SIZE
A	#5
T	#4

HL93 LOADING

STATE OF TEXAS
KELLY HO
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LICENSED
PROFESSIONAL ENGINEER

03/30/2023

NO.	REVISION	BY	DATE

CP&Y an STV Company

TEXAS REGISTERED ENGINEERING FIRM F-1741

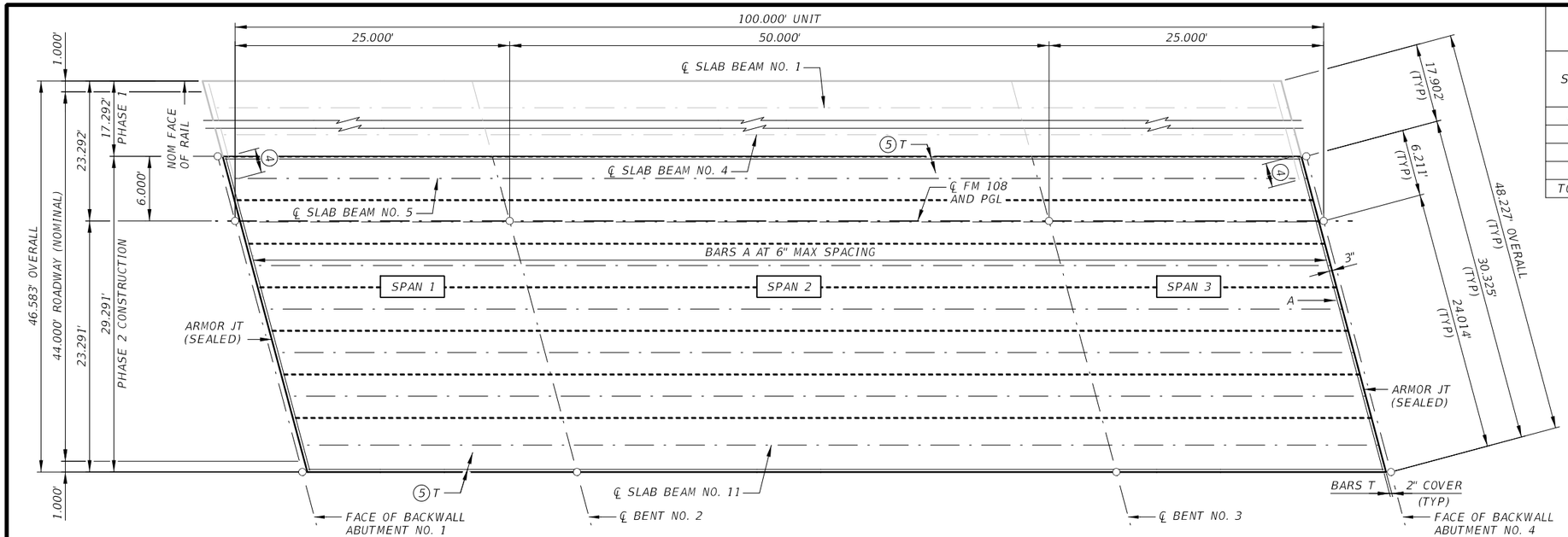
 Texas Department of Transportation

FM 108 AT BRUSHY CREEK

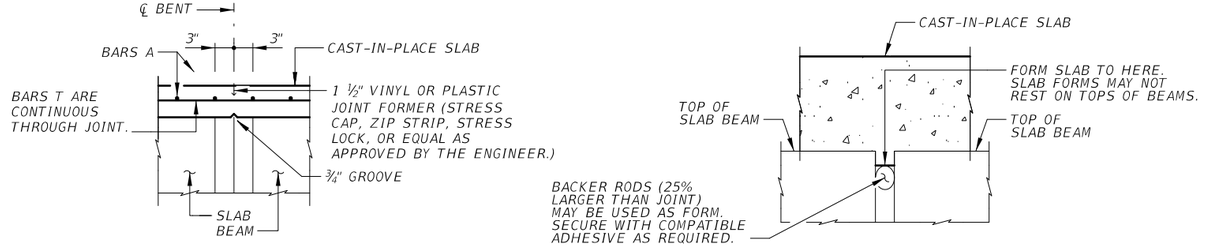
100.00' PRESTR CONC SLAB BEAM UNIT (PHASE 1)

CSJ 0715-01-025 SHEET 1 OF 1

Designed:	SJR	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	KH	6	TEXAS					FM108,ETC
Drawn:	BT	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	KH	YKM	GONZALES	0715	01	025,ETC		146

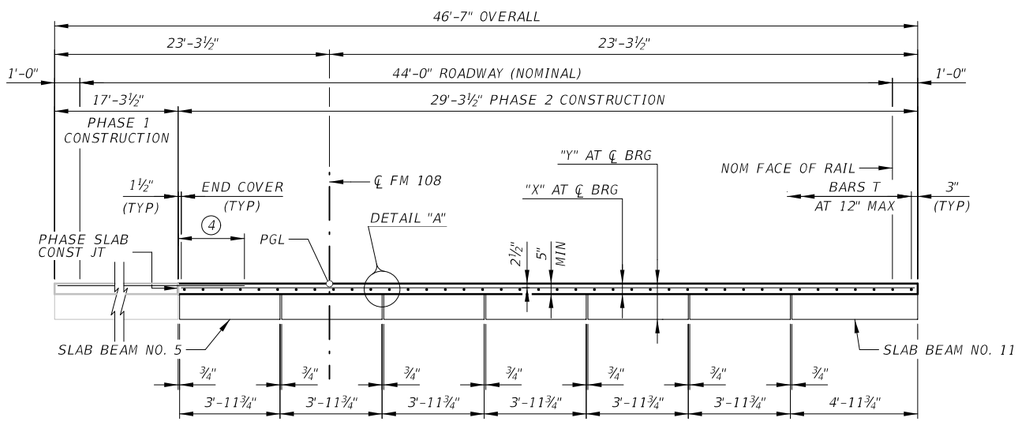


PLAN



CONTINUOUS SLAB DETAIL

DETAIL "A"



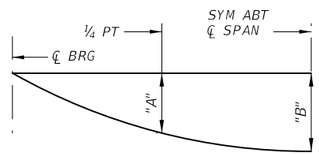
TYPICAL TRANSVERSE SECTION

TABLE OF SECTION DEPTHS

SPAN NO.	BEAM NO.	"X" AT ℄ BRG	"Y" AT ℄ BRG	"Z" AT ℄ SPAN (3)
1,3	5-11	6"	1'-9"	5¾"
2	5-11	8"	1'-11"	5⅝"

TABLE OF DEAD LOAD DEFLECTIONS

SPAN	BEAM	"A"	"B"
		Ft	Ft
1,3	5-11	0.002	0.002
2	5-11	0.027	0.039



DEAD LOAD DEFLECTION DIAGRAM

NOTE: DEFLECTIONS SHOWN ARE DUE TO CONCRETE SLAB ONLY (Ec = 5,000 ksi). CALCULATED DEFLECTIONS SHOWN ARE THEORETICAL AND ACTUAL DIMENSIONS MAY VARY. ADJUST BASED ON FIELD VERIFICATION.

BAR TABLE

BAR	SIZE
A	#5
T	#4

TABLE OF ESTIMATED QUANTITIES

SPAN	REINF CONC SLAB (SLAB BEAM)	PRESTR CONC SLAB BEAM (4SB15) (2)	PRESTR CONC SLAB BEAM (5SB15) (2)	REINF STEEL (1)
NO.	SF	LF	LF	LB
1	732	146.94	24.49	2,050
2	1,465	297.00	49.50	4,102
3	732	146.94	24.49	2,050
TOTAL	2,929	590.88	98.48	8,202

(1) REINFORCING STEEL WEIGHT IS CALCULATED USING AN APPROXIMATE FACTOR OF 2.8 LBS/SF.

(2) QUANTITIES SHOWN ARE BOTTOM BEAM LENGTHS WITH ADJUSTMENTS MADE FOR BEAM SLOPE. SEE BEAM LAYOUT FOR BEAM LENGTHS.

(3) THEORETICAL DIMENSION

(4) LAP BARS A 2'-0" MINIMUM WITH PHASE 1 REINFORCING STEEL.

(5) WHERE SLAB IS CONTINUOUS OVER INTERIOR BENTS, BARS T ARE CONTINUOUS THROUGH JOINT. SEE "CONTINUOUS SLAB DETAIL".

GENERAL NOTES:

1. DESIGNED ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION (2020) AND TXDOT BRIDGE DESIGN MANUAL (NOV 2021).
2. SEE SLAB BEAM RAIL ANCHORAGE DETAILS (PSBRA) STANDARD FOR RAIL ANCHORAGE DETAILS.
3. COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE.

MATERIAL NOTES:

1. PROVIDE CLASS S CONCRETE (f'c = 4,000 psi).
2. PROVIDE GRADE 60 REINFORCING STEEL.
3. PROVIDE BAR LAPS, WHERE REQUIRED, AS FOLLOWS:
   UNCOATED ~ #4 = 1'-7"
   ~ #5 = 2'-0"

HL93 LOADING

STATE OF TEXAS
KELLY HO
112947
LICENSED
PROFESSIONAL ENGINEER
03/30/2023

NO.	REVISION	BY	DATE

CP&Y an STV Company
TEXAS REGISTERED ENGINEERING FIRM F-1741

 Texas Department of Transportation

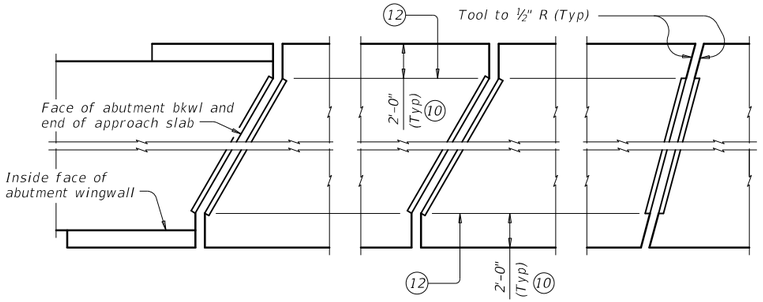
FM 108 AT BRUSHY CREEK

100.00' PRESTR CONC SLAB BEAM UNIT (PHASE 2)

CSJ 0715-01-025 SHEET 1 OF 1

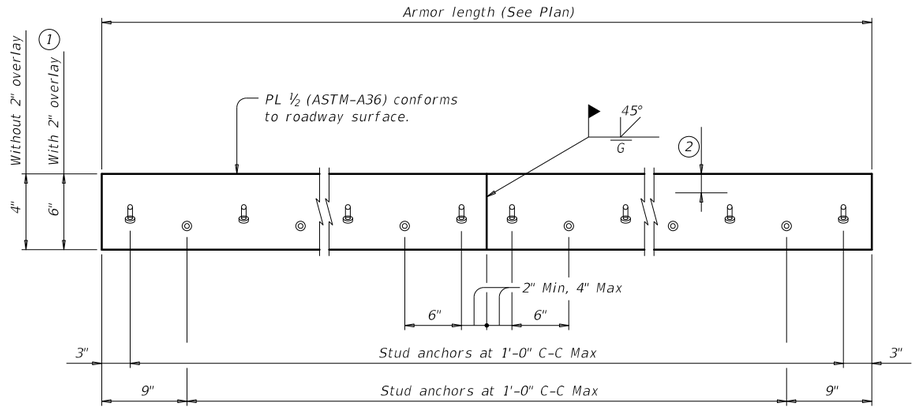
Designed:	SJR	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	KH	6	TEXAS					FM108,ETC
Drawn:	BT	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	KH	YKM	GONZALES	0715	01	025,ETC		147

DATE:
FILE:



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.

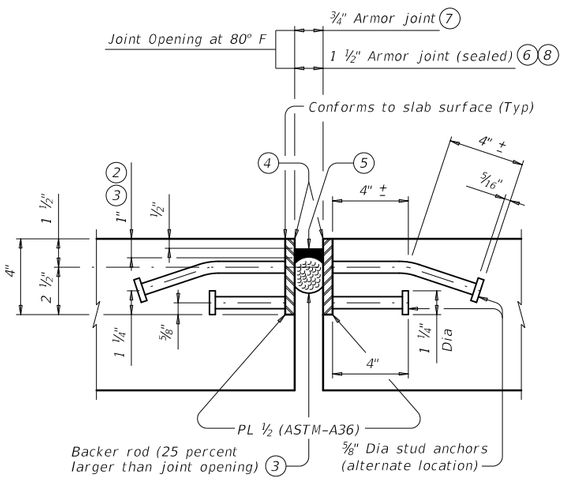
(9) Form vertical leg of seal as per the Manufacturer's recommendations. Use Class 4 joint sealant if Class 7 cannot be installed correctly. Install according to Manufacturer's recommendations.

(10) Unless shown otherwise, terminate armor plate at slab break point if break is more than 2'-0" from slab edge.

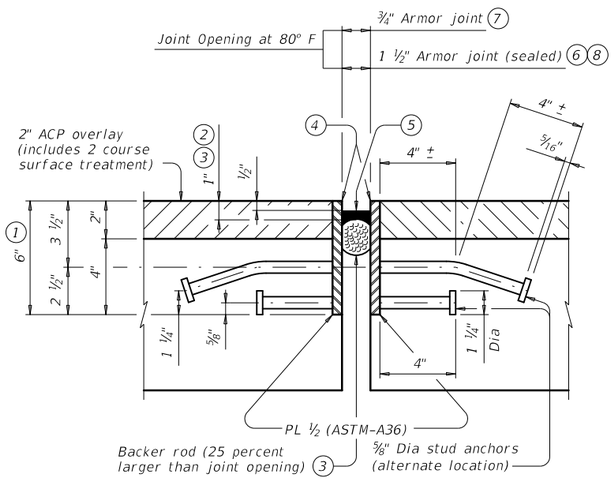
(11) See "Plans of Armor Plates".

(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.

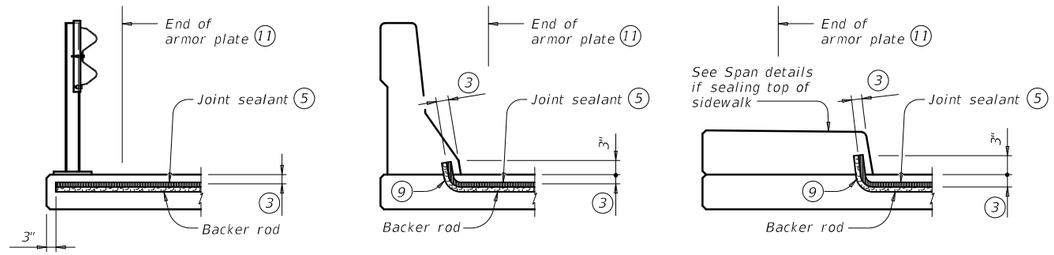
Remove shipping angle immediately after each joint half is secured in place. Grind smooth, and touch up with organic zinc-rich paint.

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).

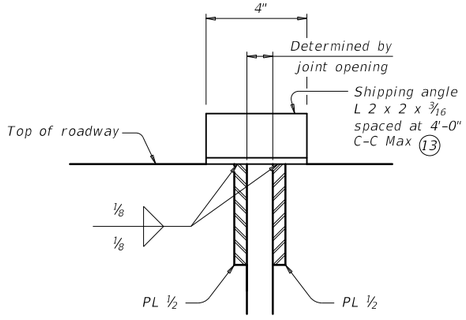
Payment for armor joint, with or without seal, is based on length of armor plate.



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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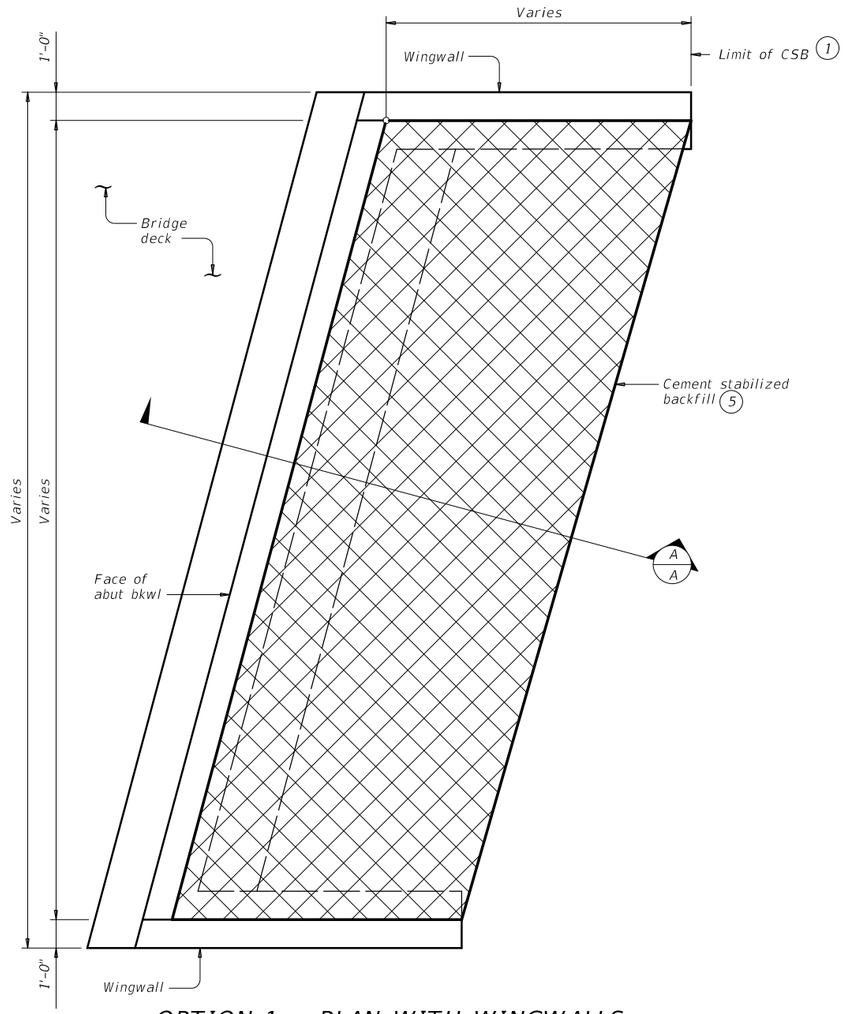
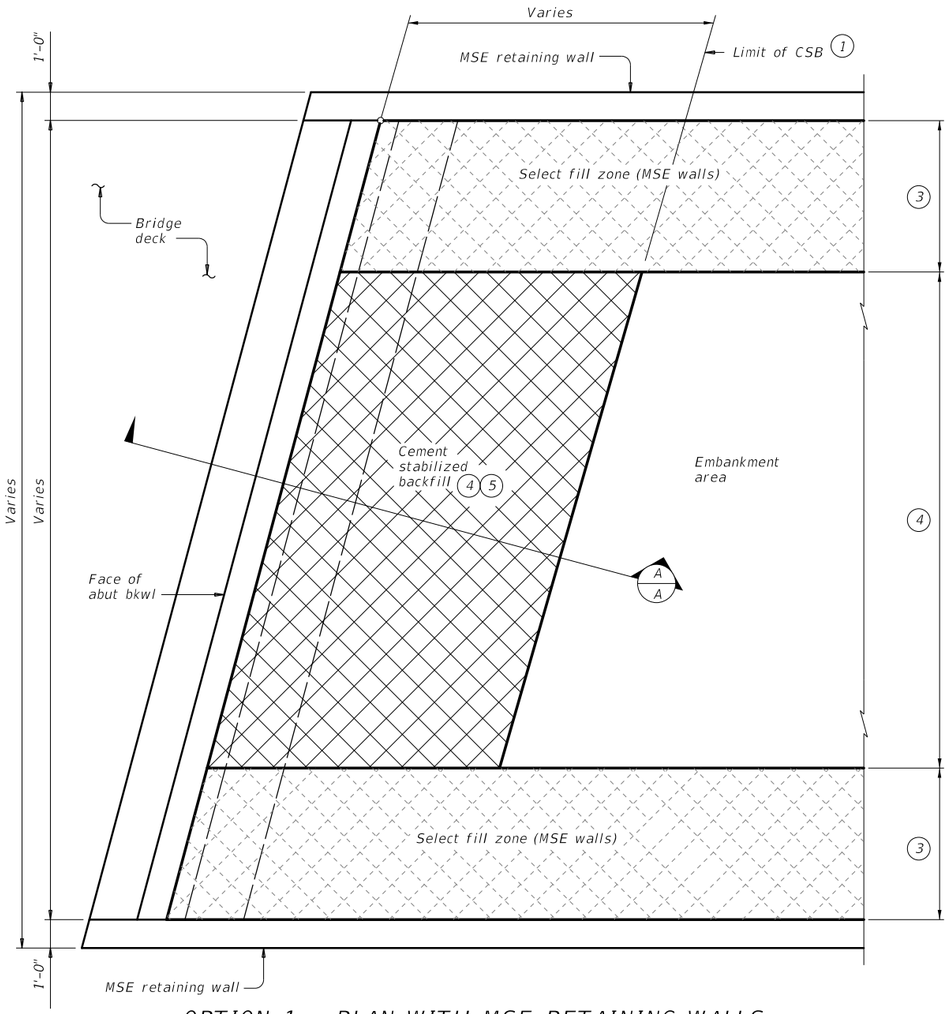
	0715	01	025,ETC	FM108,ETC
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		148

DATE:
FILE:

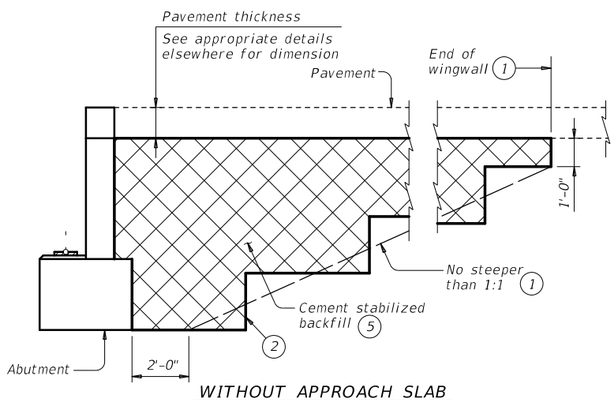


OPTION 1 ~ PLAN WITH WINGWALLS

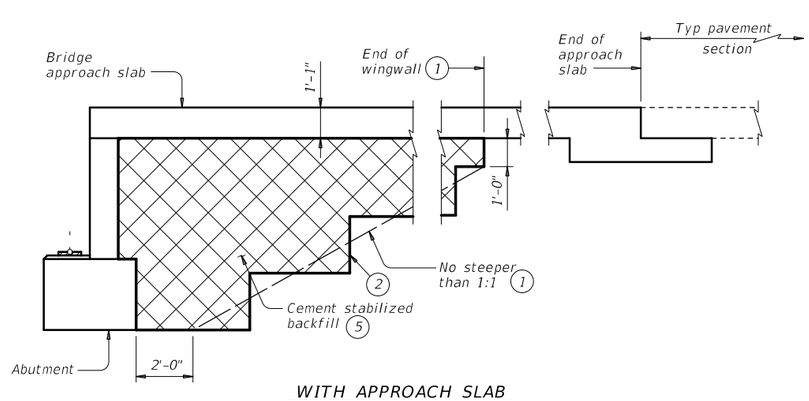
Cast-in-place retaining walls similar.



OPTION 1 ~ PLAN WITH MSE RETAINING WALLS



WITHOUT APPROACH SLAB



WITH APPROACH SLAB

(Showing BAS-C, BAS-A similar.)

SECTION A-A

(1) Usual limit of Cement Stabilized Backfill is at end of wingwall. Extend CSB limits as required to maintain a slope no steeper than 1:1 at bottom of backfill.

(2) Bench backfill as shown with 12" (approximate) bench depths.

(3) Where MSE retaining walls are present, adjust CSB limits to accommodate the select fill zone. See retaining wall details for additional information.

(4) When distance between select fill zones is less than 5'-0", MSE select fill may be substituted for cement stabilized backfill with approval from the Engineer.

(5) If shown in the plans, flowable backfill can be used as a substitute for cement stabilized backfill with the following constraints:
a). If flowable backfill is to be placed over MSE backfill, then a filter fabric will be placed over the MSE backfill prior to placement of the flowable fill; and
b). Place flowable fill in lifts not exceeding 2 feet in height. Place each successive lift when the previous lift has stiffened/hardened (i.e. has lost its flowability).

GENERAL NOTES:

See the Bridge Layout for selected Option. Option 1 is intended for construction only requiring plasticity index (PI) controlled embankment fill or excavation in competent soils/rocks in order to construct the abutment. Option 2 is intended for new construction requiring high plasticity embankment fill with a PI greater than 30 or pavement built in poor native soil. Poor soils are defined as high plasticity clays or expansive clays.

Construct abutment backfill in accordance with Item 400, "Excavation and Backfill for Structures".

Provide Cement Stabilized Backfill (CSB) meeting the requirements of Item 400, "Excavation and Backfill for Structures", to the limits shown at bridge abutments.

If required elsewhere in the plans, provide Flowable Backfill meeting the requirements of Item 401, "Flowable Backfill", to the limits shown at bridge abutments.

Details are drawn showing left forward skew. See Bridge Layout for actual skew direction.

These details do not apply when Concrete Block retaining walls are used in lieu of wingwalls.

Texas Department of Transportation

Bridge Division Standard

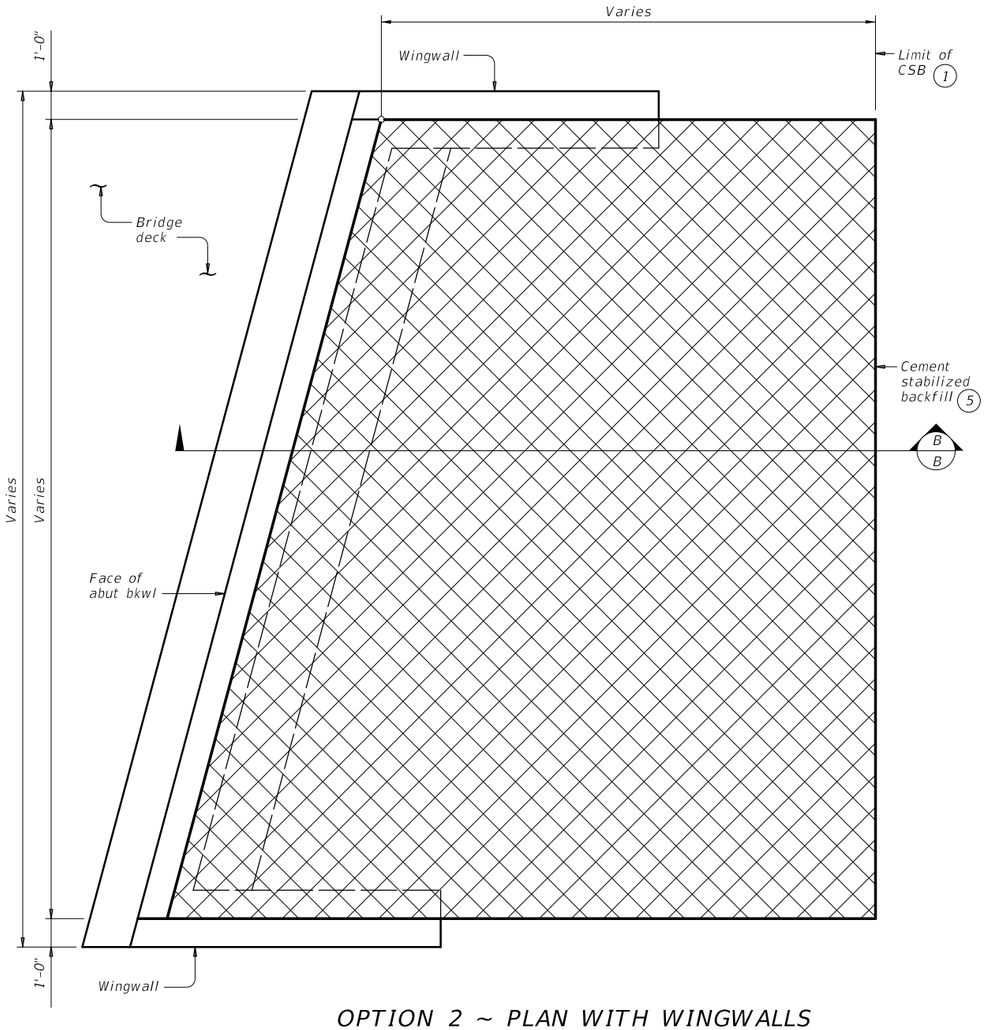
CEMENT STABILIZED ABUTMENT BACKFILL

BRIDGE ABUTMENT

CSAB

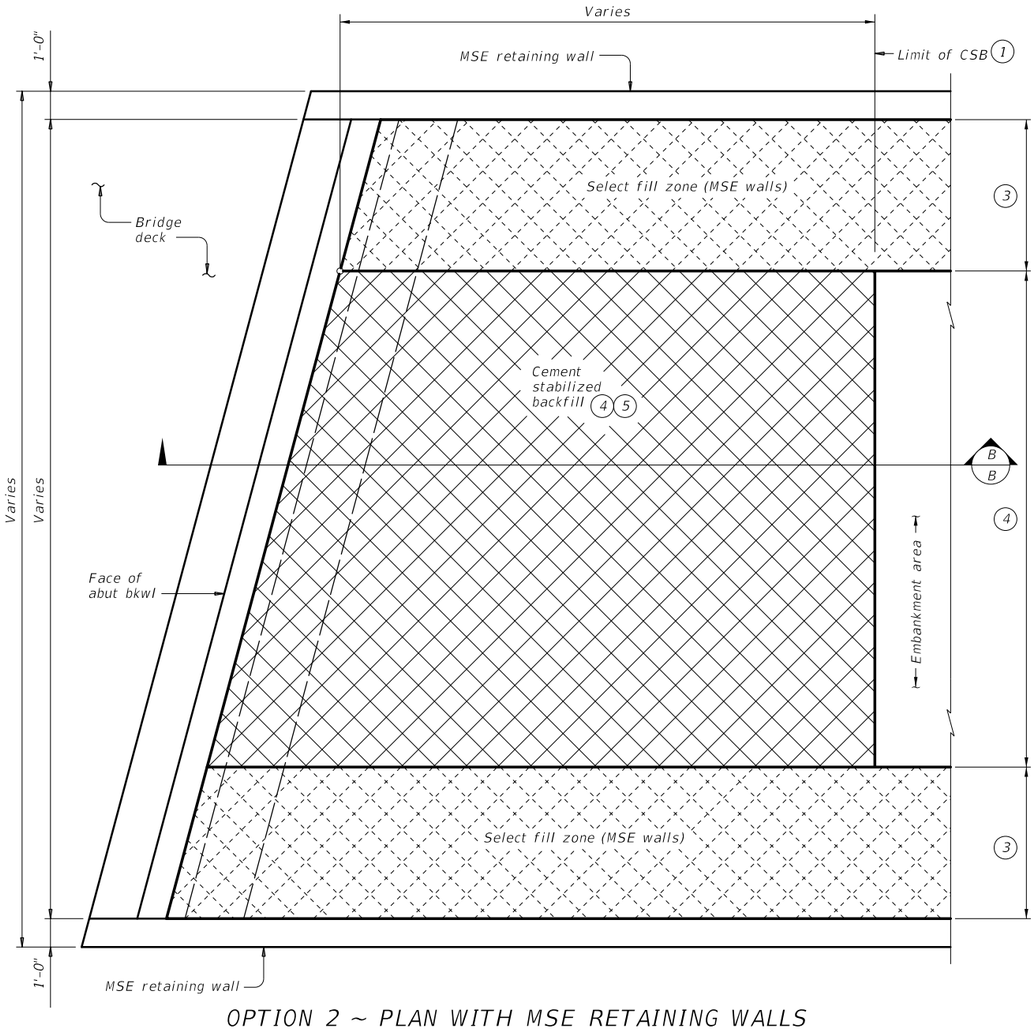
FILE: MS-CSAB-23.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0715	01	025,ETC	FM108,ETC
02-20: Added Option 2. 03-23: Updated General Notes.	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		149

DATE:
FILE:



OPTION 2 ~ PLAN WITH WINGWALLS

Cast-in-place retaining walls similar.



OPTION 2 ~ PLAN WITH MSE RETAINING WALLS

(1) Usual limit of Cement Stabilized Backfill is at end of wingwall. Extend CSB limits as required to maintain a slope no steeper than 1:1 at bottom of backfill.

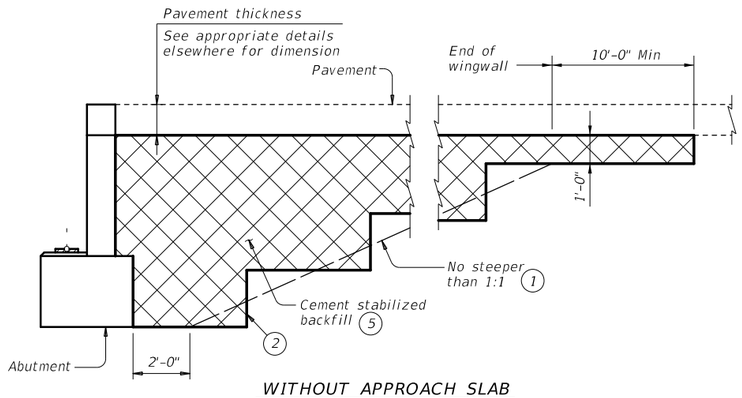
(2) Bench backfill as shown with 12" (approximate) bench depths.

(3) Where MSE retaining walls are present, adjust CSB limits to accommodate the select fill zone. See retaining wall details for additional information.

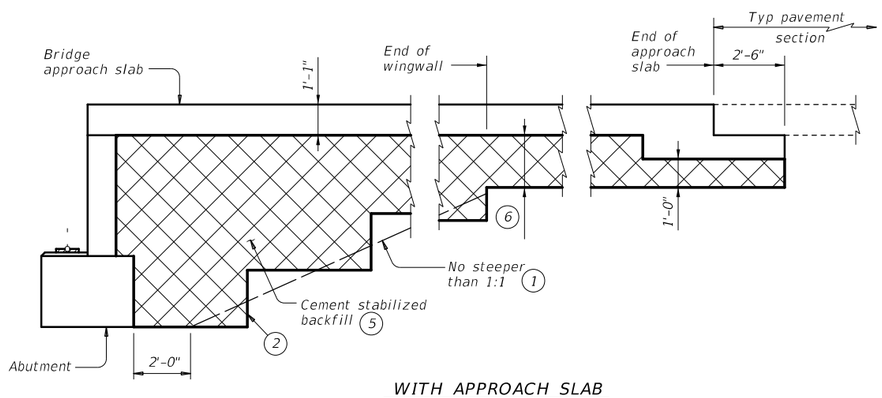
(4) When distance between select fill zones is less than 5'-0", MSE select fill may be substituted for cement stabilized backfill with approval from the Engineer.

(5) If shown in the plans, flowable backfill can be used as a substitute for cement stabilized backfill with the following constraints:
a). If flowable backfill is to be placed over MSE backfill, then a filter fabric will be placed over the MSE backfill prior to placement of the flowable fill; and
b). Place flowable fill in lifts not exceeding 2 feet in height. Place each successive lift when the previous lift has stiffened/hardened (i.e. has lost its flowability).

(6) 1'-0" for BAS-A
1'-10" for BAS-C



WITHOUT APPROACH SLAB



WITH APPROACH SLAB
(Showing BAS-C, BAS-A similar.)

SECTION B-B

SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

CEMENT STABILIZED ABUTMENT BACKFILL

BRIDGE ABUTMENT

CSAB

FILE: MS-CSAB-23.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0715	01	025,ETC	FM108,ETC
02-20: Added Option 2. 03-23: Updated General Notes.	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		150

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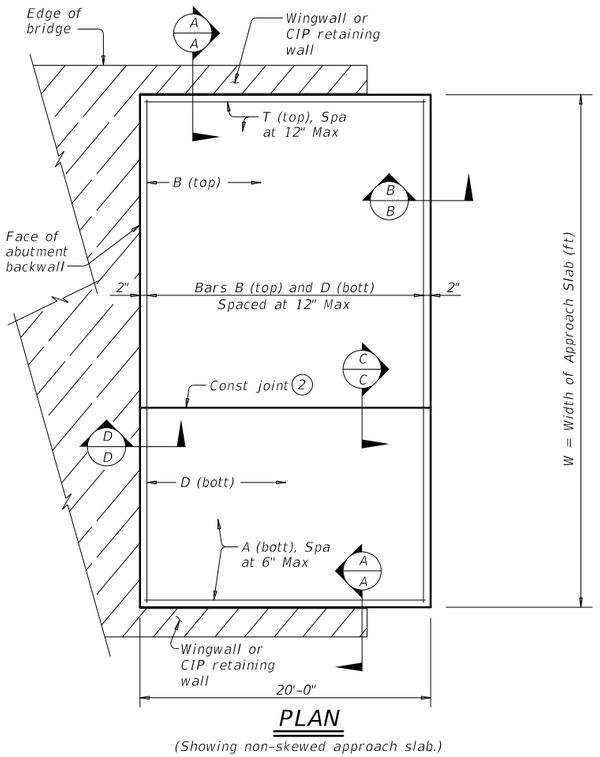
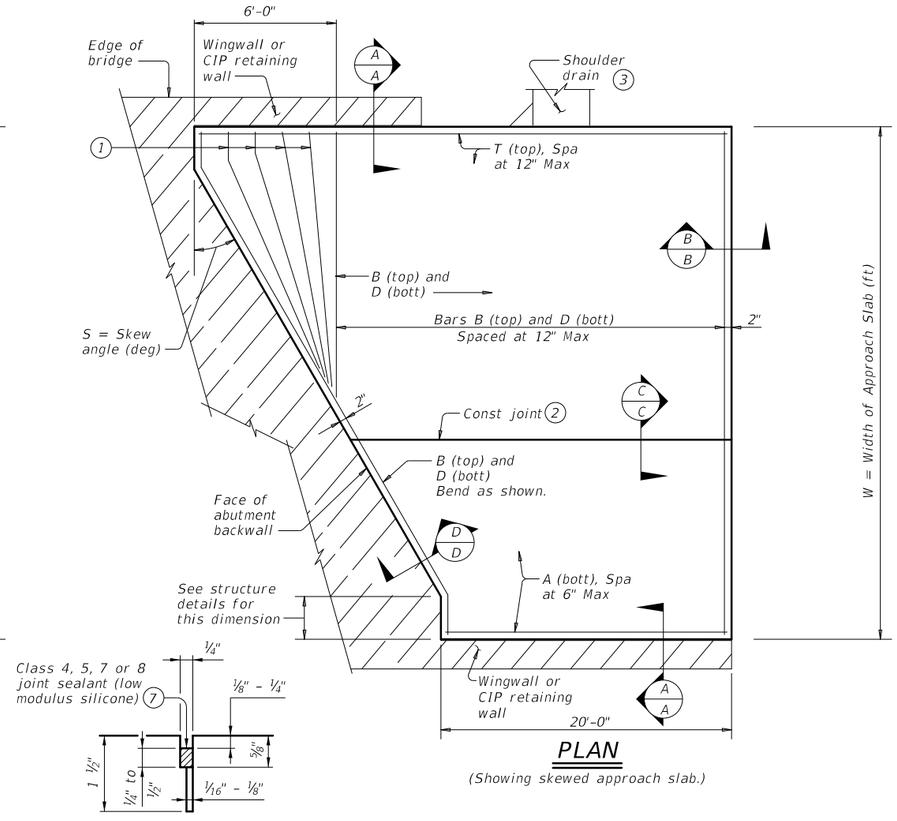


PLAN

(Showing non-skewed approach slab.)



PLAN

(Showing skewed approach slab.)

LONGITUDINAL SAW CUT JOINT DETAIL

BAR TABLE	
BAR	SIZE
A	#8
B	#5
D	#5
T	#5

APPROXIMATE QUANTITIES (4)

Reinf steel weight = 8.5 Lbs/SF of Approach Slab

Volume of Appr Slab Conc (CY) = 0.802W + 0.02W² Tan S

W = Width of Approach Slab (ft)

S = Skew Angle (deg)

(1) Flare Bars B and D in this region (1'-6" Max Spa, 3" Min Spa). Minimum flared bar length = 2'-6". Bend bars as necessary.

(2) Provide longitudinal construction joints that align with longitudinal construction joints in the bridge slab with bridges built in stages. Other longitudinal construction joints must receive approval of the Engineer.

(3) See details elsewhere in plans for shoulder drain location and details.

(4) For Contractor's information only. Quantities shown are for one approach slab.

(5) Multiple piece tie bars are acceptable at longitudinal construction joints provided minimum laps shown are achieved.

(6) See details elsewhere in plans for required cross-slope.

(7) Place in accordance with Item 438.

(8) Provide backer rod that is 25% larger than joint opening and compatible with the sealant.

(9) If bridge rail is present at the wingwall or CIP retaining wall, place ½" rebonded recycled tire rubber between concrete railing and top of approach slab as shown when concrete railing projects over the approach slab.

GENERAL NOTES:

Construct approach slab in accordance with Item 422.

Provide Class "S" concrete with a minimum compressive strength of 4,000 psi.

Provide Grade 60 reinforcing steel.

Provide longitudinal joints as shown on the Longitudinal Saw Cut Joint Detail at lane lines and shoulders when width between longitudinal construction joints or edges of approach slab exceeds 16 feet. Saw cut joints within 24 hours of concrete placement to a depth of 1 ½" and seal in accordance with Item 438. Alternately, provide a controlled joint consisting of 1 ½" vinyl or plastic joint former (Stress Cap, Zip Strip, Stress Lock, or equal as approved by the Engineer.)

Provide rebonded recycled tire rubber joint filler that meets the requirements of DMS-6310, "Joint Sealants and Fillers."

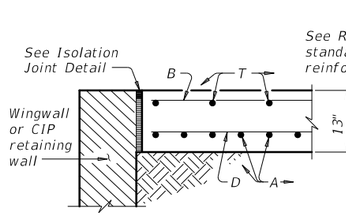
Construct the subgrade or subbase away from the bridge for a minimum distance of 100 feet prior to the approach slab, unless otherwise indicated on the plans.

Compact and finish the subgrade or foundation for the approach slab to the typical cross-section and to the lines and grades shown on the plans.

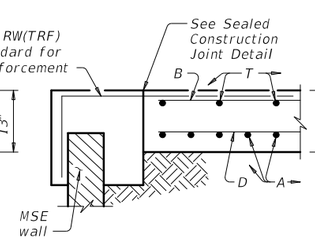
Cure for 4 days using water or membrane curing per Item 422.

All details shown herein are subsidiary to bridge approach slab.

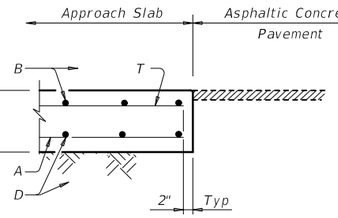
Cover dimensions are clear dimensions, unless noted otherwise.

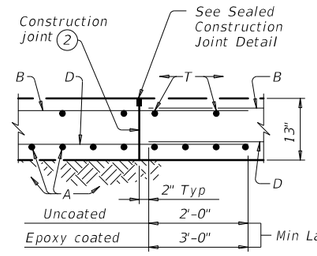


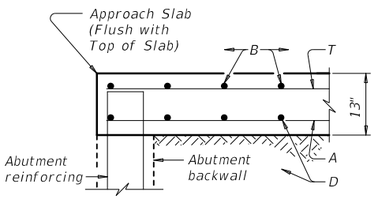
SHOWING WINGWALL OR CIP RETAINING WALL



SHOWING MSE WALL





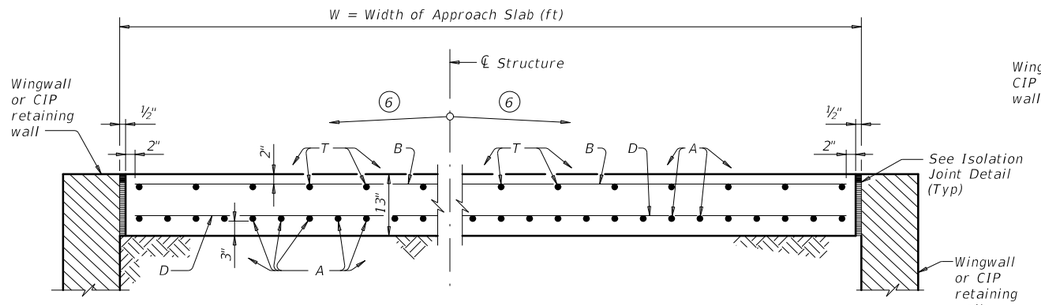


SECTION A-A

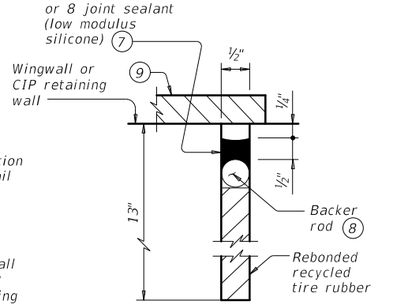
SECTION B-B

SECTION C-C (5)

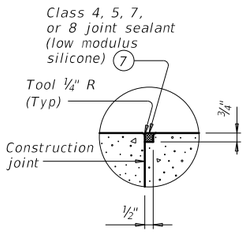
SECTION D-D



TYPICAL TRANSVERSE SECTION



ISOLATION JOINT DETAIL



SEALED CONSTRUCTION JOINT DETAIL

Texas Department of Transportation

Bridge Division Standard

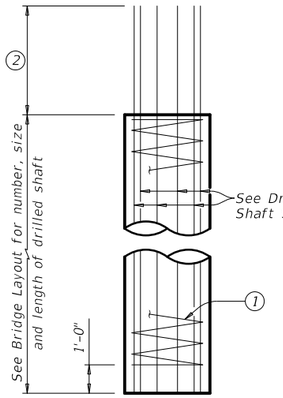
BRIDGE APPROACH SLAB

ASPHALTIC CONCRETE PAVEMENT

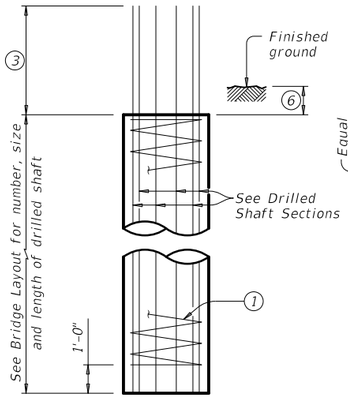
BAS-A

FILE: basaste1-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0715	01	025,ETC	FM108,ETC
02-20: Removed stress relieving pad.	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		151

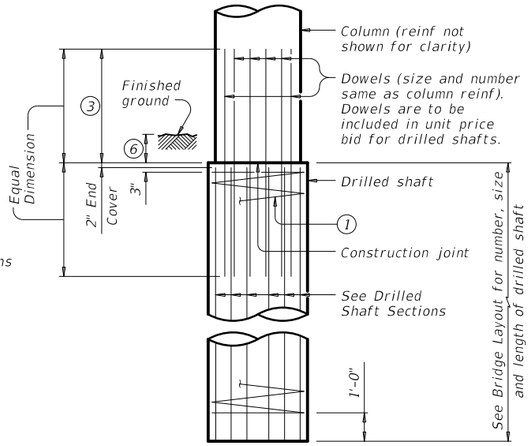
DATE:
FILE:



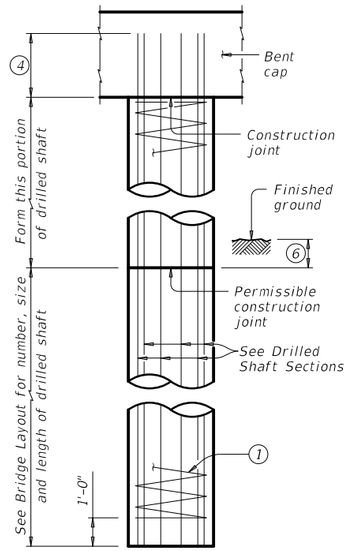
ABUTMENTS, WINGWALLS AND MULTI-DRILLED SHAFT FOOTINGS



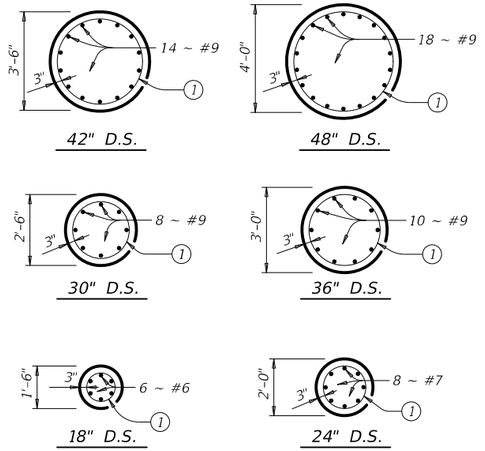
INTERIOR BENTS DRILLED SHAFT DIA EQUAL TO COLUMN DIA



INTERIOR BENTS DRILLED SHAFT DIA GREATER THAN COLUMN DIA



OPTIONAL INTERIOR BENT DRILLED SHAFT DETAIL (5)

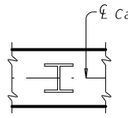


DRILLED SHAFT SECTIONS

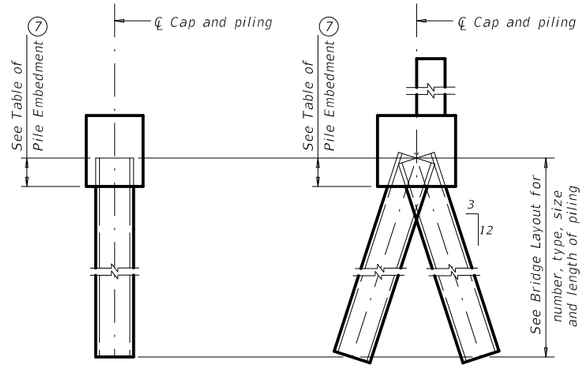
DRILLED SHAFT DETAILS

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.

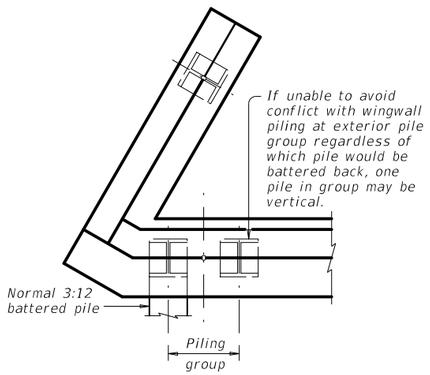


ORIENTATION OF STEEL H-PILING



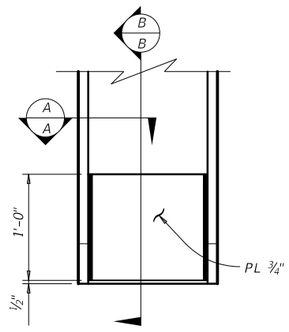
PILING DETAILS

(Concrete or steel H)

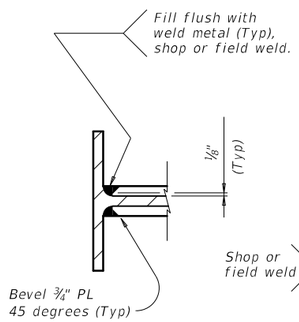


DETAIL "A"

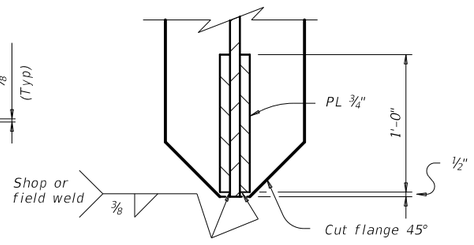
(Showing plan view of a 30° skewed abutment)



ELEVATION



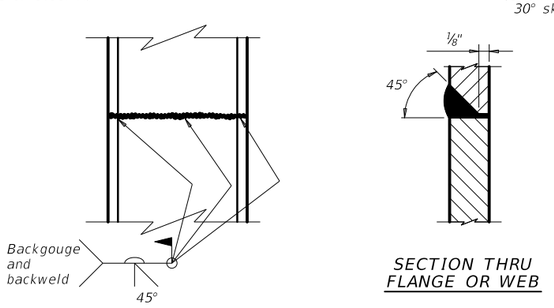
SECTION A-A



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.



STEEL H-PILE SPLICE DETAIL

Use when required.

SECTION THRU FLANGE OR WEB

(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

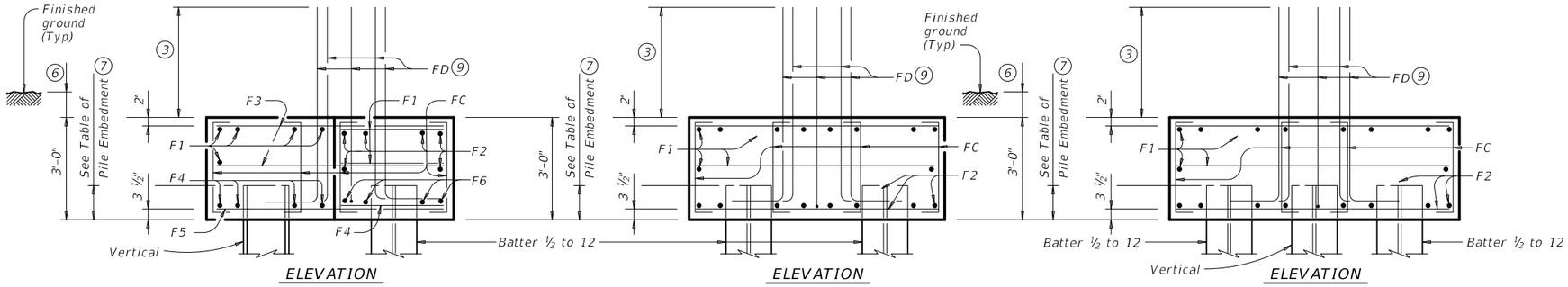
Bridge Division Standard

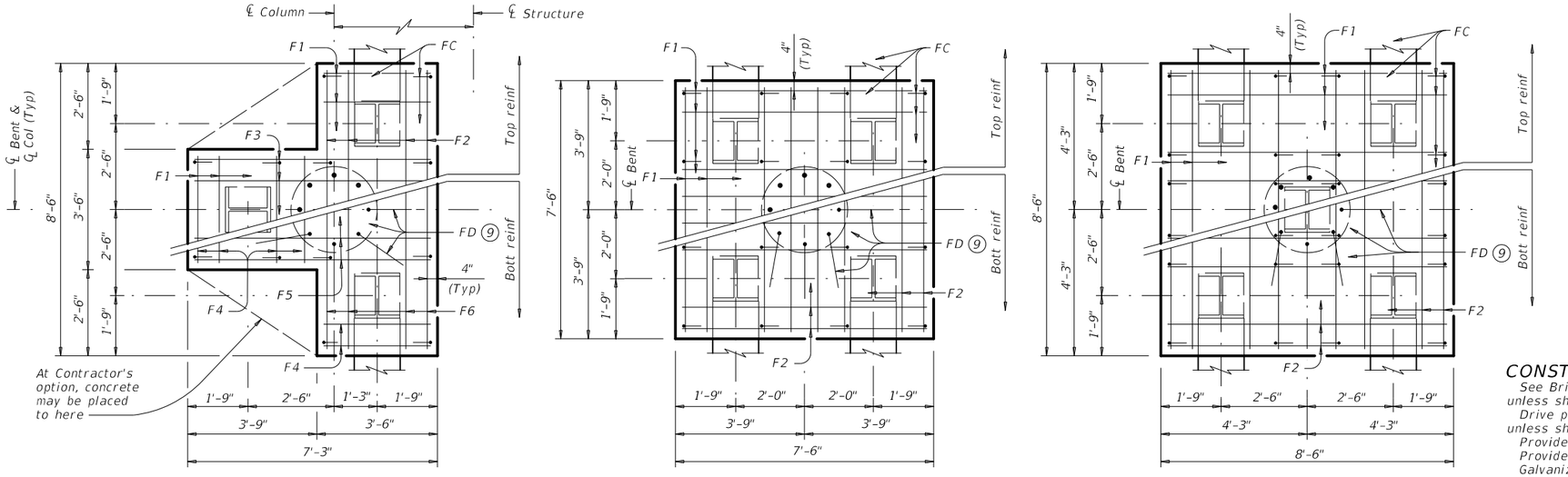
COMMON FOUNDATION DETAILS

FD

FILE: fdstde01-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0715	01	025,ETC	FM108,ETC
01-20: Added #11 bars to the FD bars.	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		152

DATE:
FILE:





THREE PILE FOOTING (8)

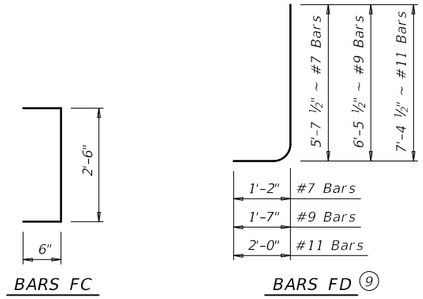
For 36" Dia and smaller columns.

FOUR PILE FOOTING (8)

For 42" Dia and smaller columns.

FIVE PILE FOOTING (8)

For 42" Dia and smaller columns.



(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

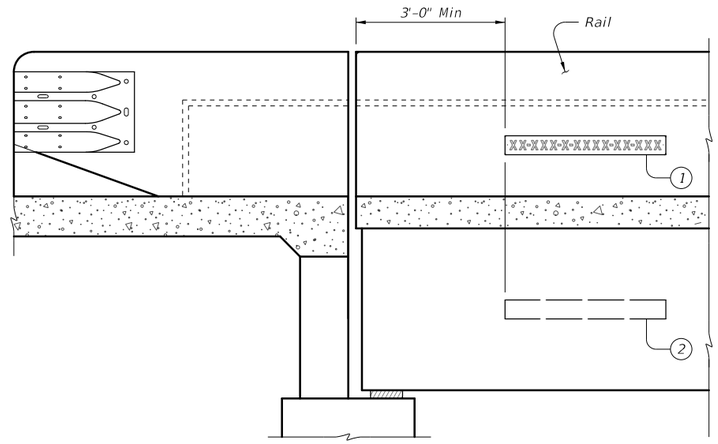
Bridge Division Standard

COMMON FOUNDATION DETAILS

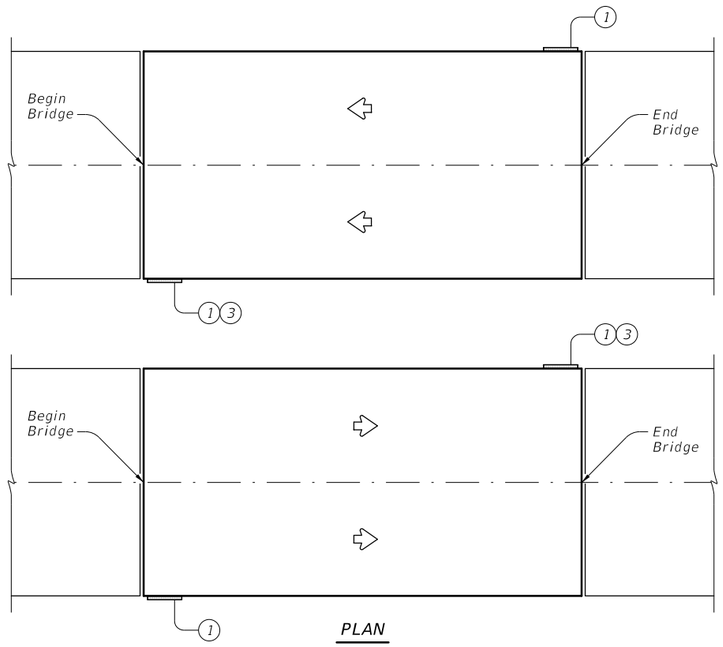
FD

FILE: fdstde01-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0715	01	025,ETC	FM108,ETC
01-20: Added #11 bars to the FD bars.	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		153

DATE:
FILE:

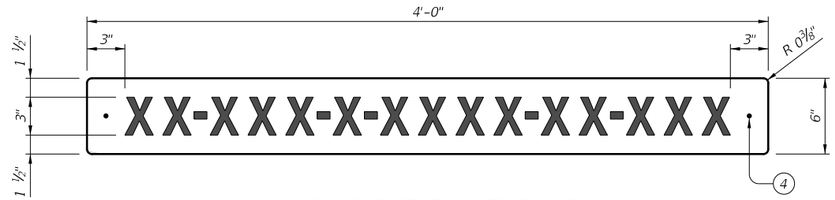


ELEVATION

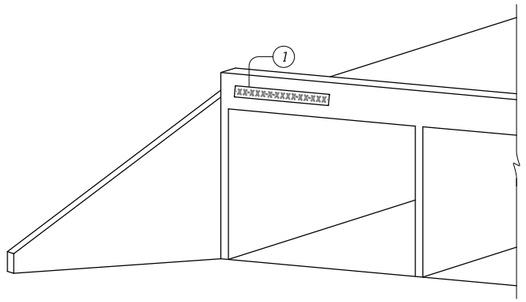


PLAN

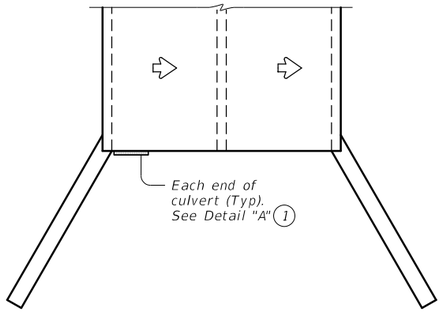
BRIDGE SIGN LOCATIONS



BRIDGE IDENTIFICATION SIGN

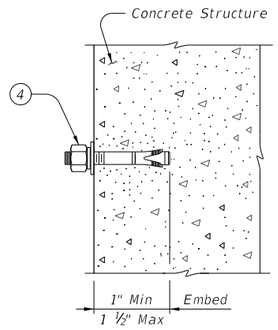


DETAIL "A"



PLAN

BRIDGE CLASS CULVERT SIGN PLACEMENT



ANCHOR DETAIL

SHEETING REQUIREMENTS

Usage	Color	Sign Face Material
Background	White	Type B or C Sheeting
Letters and Symbols	Black	Type B or C Sheeting

(1) Bridge identification sign location

(2) Alternate sign placement location for exterior concrete beams.

(3) If adjacent bridges are less than 2 feet apart, these signs may be omitted.

(4) ¼" Diameter stainless steel expansion anchor with hex nut, washer, and spring-lock washer.

SIGN NOTES:

Standard sign designs can be found in the Standard Highway Sign Designs for Texas (SHSD).

Use the Clearview Alphabet CV-2W for the letters and symbols.

MATERIAL NOTES:

Provide lateral spacing between letters and numerals conforming with the SHSD, and any approved changes thereto. Provide a balanced appearance when spacing is not shown.

Provide aluminum sign blanks with a minimum thickness of 0.080" that meet the requirements of DMS-7110.

Provide sign face materials that meet the requirements of DMS-8300 and the sheeting requirements shown in the table.

Provide ¼" diameter stainless steel expansion anchors with one hex head nut, one flat washer, and one helical spring-lock washer each.

Use torque controlled mechanical expansion anchors that are approved for use in cracked concrete by the International Code Council, Evaluation Service (ICC-ES). Provide anchor products that have a designated ICC-ES Evaluation Report number. The approval status must be maintained on the ICC-ES website under Division 031600 for Concrete Anchors.

Unless otherwise approved by the Engineer: do not use adhesive anchors; do not use expansion anchors that are not included in the ICC-ES approval list; and do not use expansion anchors that are only approved for use in uncracked concrete.

Use anchors manufactured with stainless steel expansion wedges. Anchors manufactured with carbon steel expansion wedges are not allowed. Anchor bodies can be either zinc-plated carbon steel or stainless steel. For application in marine environments, provide both stainless steel anchor bodies and expansion wedges.

GENERAL NOTES:

Prior to hole drilling, locate rebar to ensure clearing of existing reinforcement and/or strands.

Prior to installation, obtain approval of sign locations from the Engineer. Avoid placement of sign over travel lanes and pedestrian walkways. Submit proposed installation method to Engineer prior to beginning work. Install anchors as shown on plans and in accordance with the anchor manufacturer's published installation instructions.

Do not install anchors sections of members under tension.

For new construction, the signs and anchors are subsidiary to the bridge. For installations on existing structures, the signs and anchors are paid under Item 442, "Metal for Structures." Each sign weighs 28 lbs.

Texas Department of Transportation

Bridge Division Standard

NBI BRIDGE IDENTIFICATION SIGN STANDARD

NBIS

FILE: MS-NBIS-23.dgn	DN: TAR	CK: TxDOT	DW: JER	CK: TAR
©TxDOT March 2023	CONT	SECT	JOB	HIGHWAY
REVISIONS	0715	01	025,ETC	FM108,ETC
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		154

DATE:
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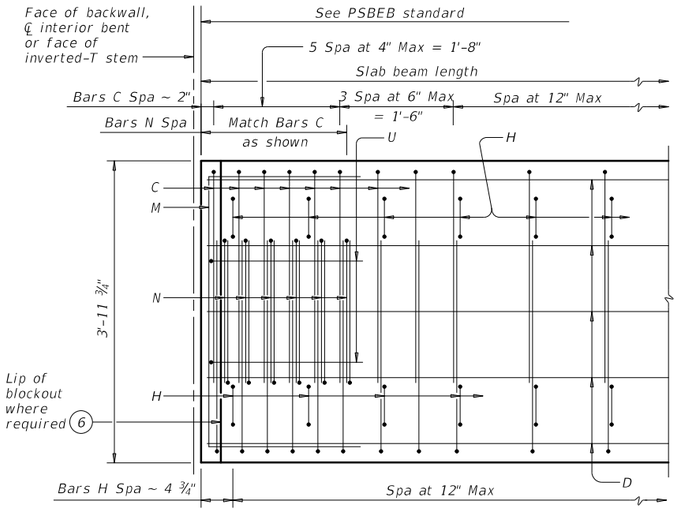
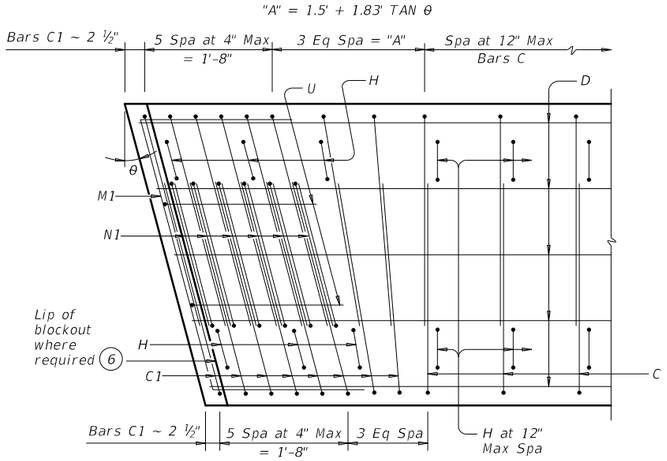
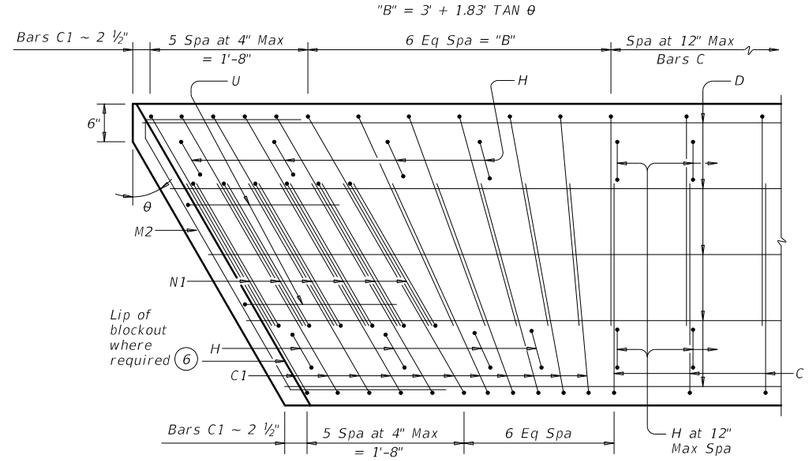


PART PLAN



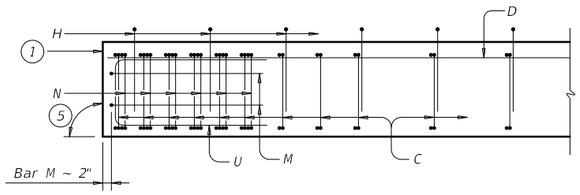
PART SKEW PLAN

(Showing θ over 0° to 15° Skew)

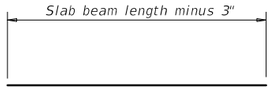


PART SKEW PLAN

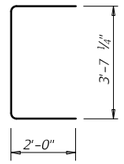
(Showing θ over 15° to 30° Skew)



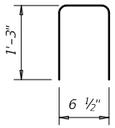
ELEVATION



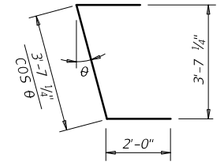
BARS D(#6)



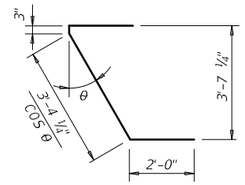
BARS M(#4)



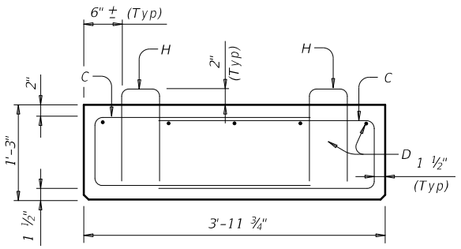
BARS H(#4)



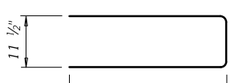
BARS M1(#4)



BARS M2(#4)



SECTION



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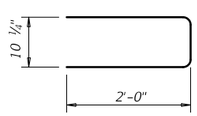
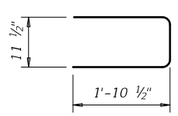


BARS U(#5)



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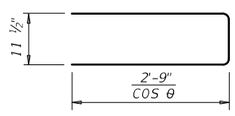

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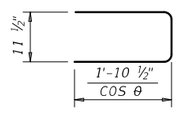

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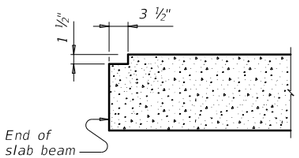
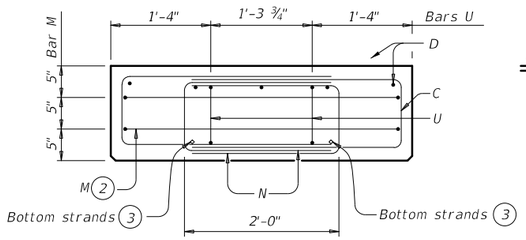


ELEVATION OF BLOCKOUT (6)



END MAT REINFORCING

Bars H not shown for clarity.

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 3/4" or round to a 3/4" 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

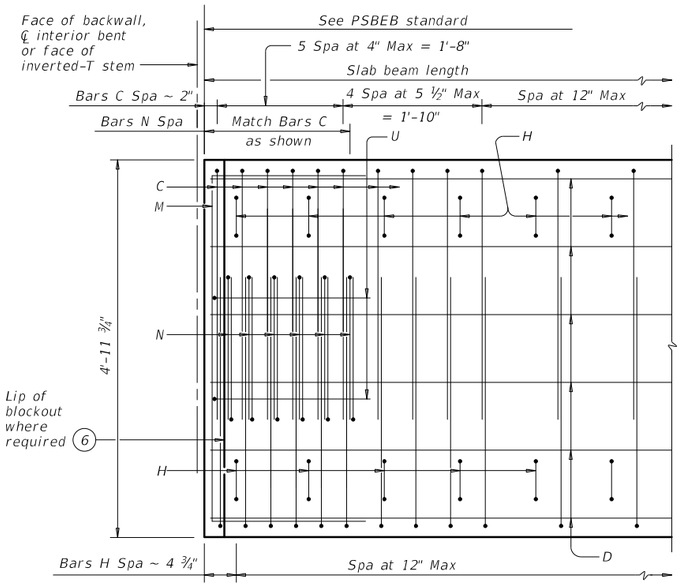
PRESTRESSED CONCRETE SLAB BEAM DETAILS

(TYPE 4SB15)

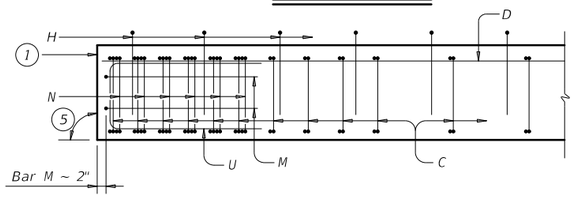
PSB-4SB15

FILE: psbsts02-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0715	01	025,ETC	FM108,ETC
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		155

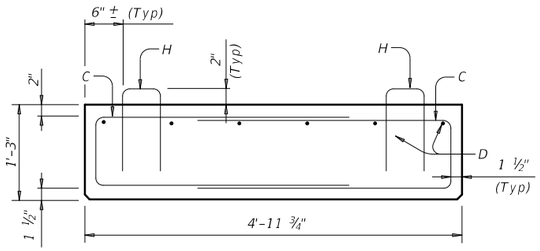
DATE:
FILE:



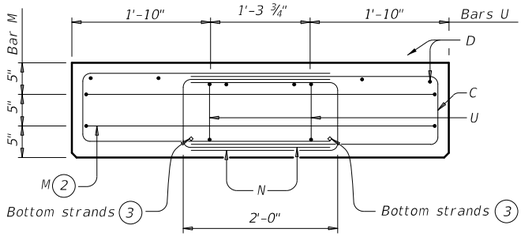
PART PLAN



ELEVATION



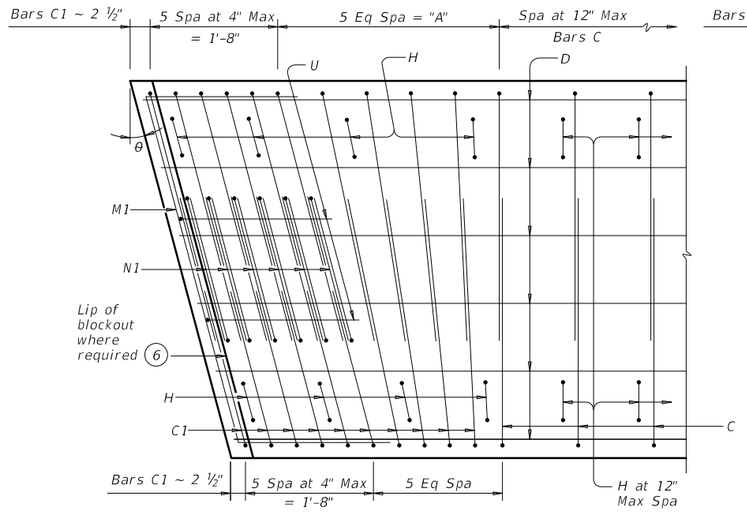
SECTION



END MAT REINFORCING

Bars H not shown for clarity.

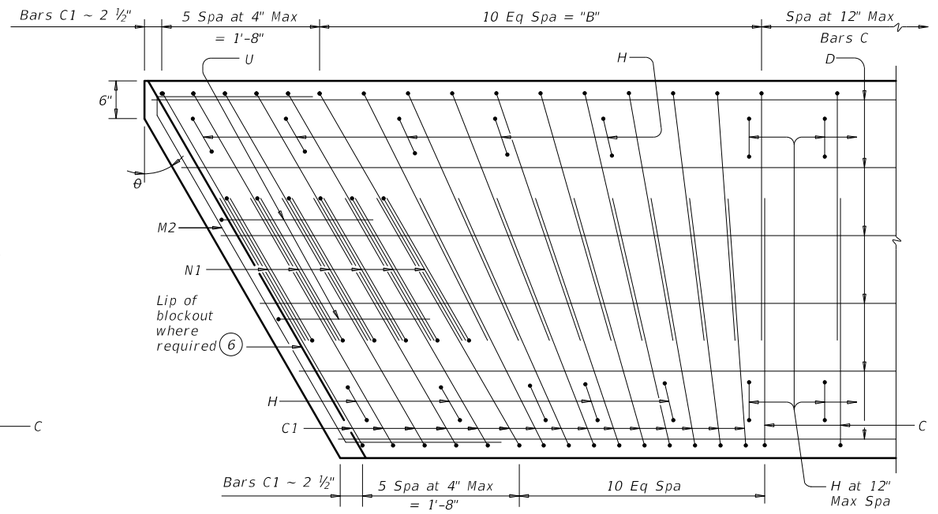
"A" = 2.29' + 2.33' TAN θ



PART SKEW PLAN

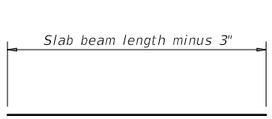
(Showing θ over 0° to 15° skew)

"B" = 4.58' + 2.33' TAN θ

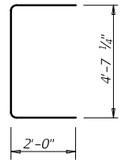


PART SKEW PLAN

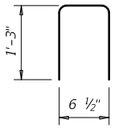
(Showing θ over 15° to 30° skew)



BARS D(#6)



BARS M(#4)



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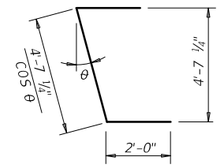
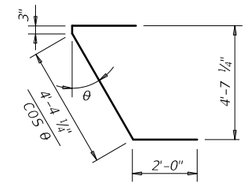
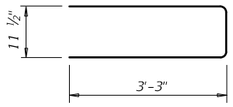


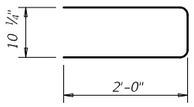
BARS M1(#4)



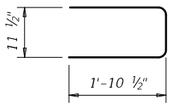
BARS M2(#4)



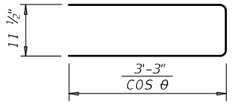
BARS C(#4)



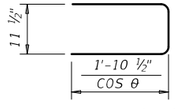
BARS U(#5)



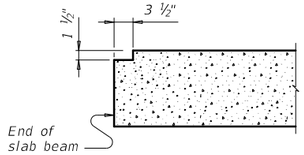
BARS N(#4)



BARS C1(#4)



BARS N1(#4)



ELEVATION OF BLOCKOUT (6)

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

Provide Class H concrete. Provide Class H (HPC) if shown elsewhere in the plans.

Provide Grade 60 reinforcing steel.

An equal area of welded wire reinforcement (WWR) (ASTM 1064) may be substituted for bars C and D if approved by the Engineer.

These details can be used for any skew angle up to a maximum of 30 degrees.

Chamfer all exposed corners ¾" or round to a ¾" radius.

Details are drawn showing right forward skew. See Bridge Layout for actual direction.

Cover dimensions are clear dimensions, unless noted otherwise.

Reinforcing bar dimensions shown are out-to-out of bar.

BEAM PROPERTIES		
Area	in^2	896.2
Y top	in	7.50
Y bott	in	7.50
I	in^4	16,805
Weight (4)	lb/ft	934

(1) See End Mat Reinforcing detail.

(2) Adjust bars M vertically to avoid strands.

(3) See sheet PSBND or PSBSD for strand locations.

(4) Assumes 150 pcf weight density of concrete.

(5) 90° at conventional interior bents. End of beam must be vertical at abutment backwall and inverted-T stem.

(6) Blockout required at armor joint (AJ) and sealed expansion joint (SEJ) locations to accommodate joint anchorage.

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

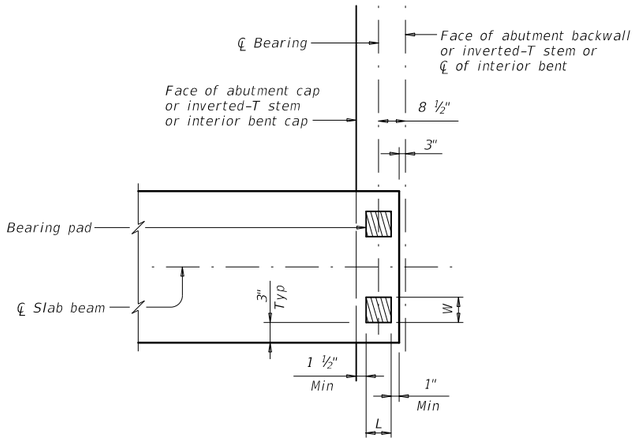
PRESTRESSED CONCRETE SLAB BEAM DETAILS

(TYPE 5SB15)

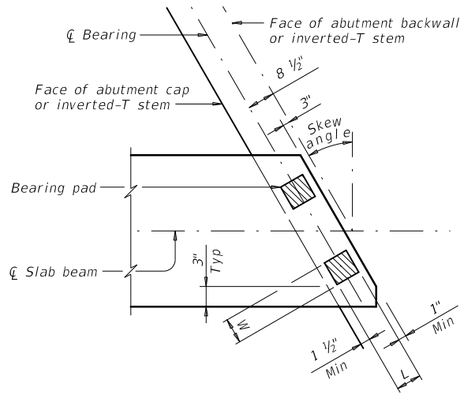
PSB-5SB15

FILE: psbsts04-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0715	01	025,ETC	FM108,ETC
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		156

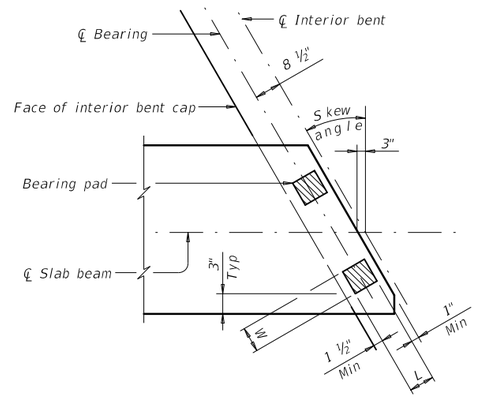
DATE:
FILE:



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)



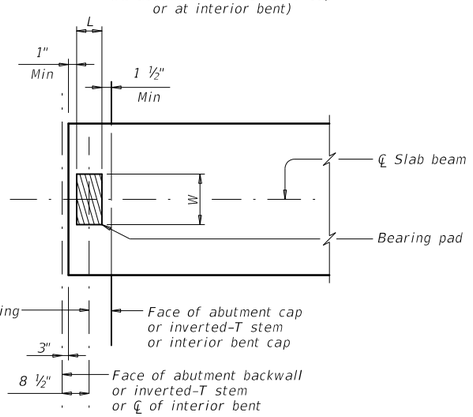
TWO-PAD DETAIL SKEW PLAN
(At interior bent)

TABLE OF BEARING PAD DIMENSIONS (ALL PRESTR CONC SLAB BM TYPES)

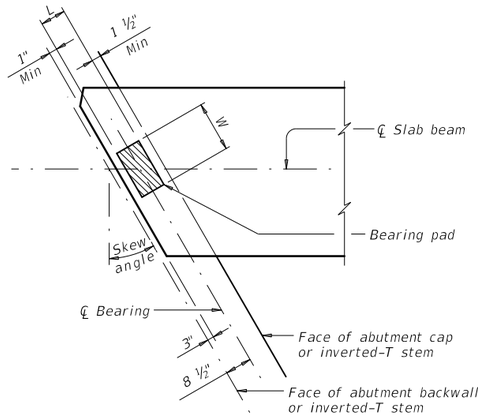
One-Pad (Ty SB1-"N") (2)			Two-Pad (Ty SB2-"N") (2)		
W	L	T	W	L	T
14"	7"	2"	7"	7"	2"

Pad sizes shown are applicable for the following conditions:

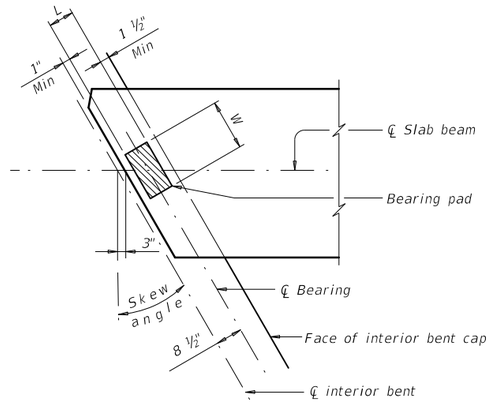
(1) All one, two and three span units where the minimum span length is not less than 25' and the maximum span is not more than 50'.
(2) Skews less than or equal to 30°.



ONE-PAD DETAIL PLAN
(At abutment or inverted-T cap or at interior bent)



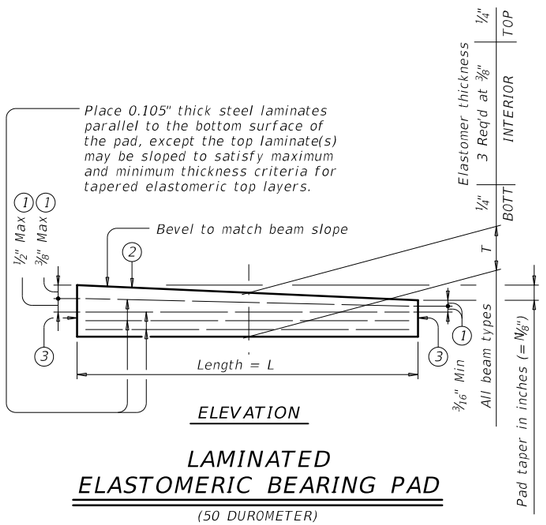
ONE-PAD DETAIL SKEW PLAN
(At abutment or inverted-T cap)



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

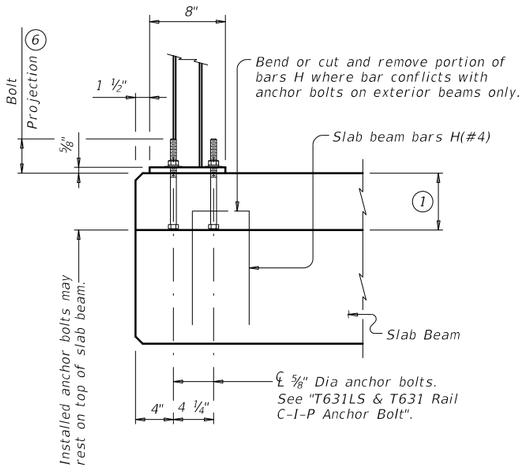
ELASTOMERIC BEARING AND BEAM END DETAILS

PRESTR CONCRETE SLAB BEAM

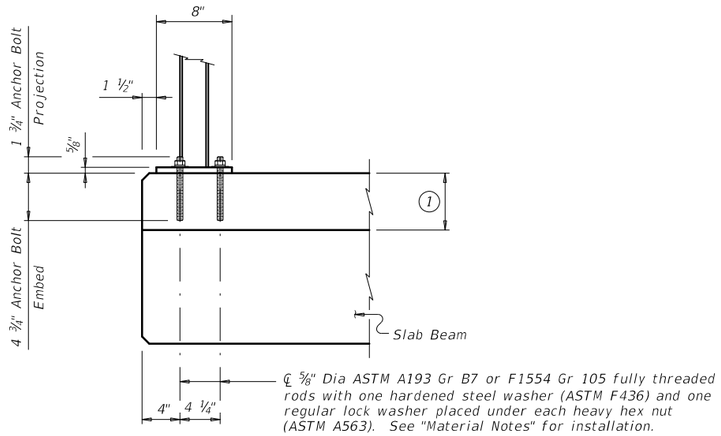
PSBEB

FILE: psbsle06-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0715	01	025,ETC	FM108,ETC
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		157

DATE:
FILE:



CAST-IN-PLACE ANCHORAGE OPTION



ADHESIVE ANCHORAGE OPTION

T631LS & T631 RAIL ANCHORAGE PLACEMENT (2)(7)

PART SPAN ELEVATION

SECTION

TYPICAL CONCRETE RAIL ANCHORAGE

(Showing typical concrete rail anchorage)

T631LS & T631 RAIL C-I-P ANCHOR BOLT

PLAN OF CONCRETE RAILS AT EXPANSION JOINTS

(1) Cast-in-place slab thickness varies due to beam camber (5" minimum).

(2) Replace cast-in-place anchor bolts shown on T631LS and T631 Rail standard with an adhesive anchor system or cast-in-place anchor bolts shown on this sheet.

(3) Bar length shown on rail standard, minus 1 ¼". Adjust bar length for a raised sidewalk.

(4) See rail standard for projection from finished grade or top of sidewalk.

(5) Place additional (#5) longitudinal bar.

(6) Excess bolt length has been provided to accommodate a variable slab thickness due to beam camber. If slab thickness on span details exceed 7", bolt length must be increased accordingly. After posts have been set and bolts tightened, bolt projection above nuts of more than ½" must be cut off and painted with two coats of zinc-rich paint conforming to the Item 445 "Galvanizing".

(7) Distance from end of top outside edge of slab to center of first bolt group can not be less than 9", except: 15° Skew: 1'-0" (acute corner only)
30° Skew: 1'-3" (acute corner only)

(8) Location of rail expansion joint must be at the intersection of ℄ slab expansion joint, ℄ rail footprint and perpendicular to slab outside edge.

(9) Cross-hatched area must have ½" preformed bituminous fiber material under concrete rail, as shown.

CONSTRUCTION NOTES:

Rail anchorage bars may be field bent as required to clear rail reinforcing or provide minimum cover shown on standard rail detail sheets.

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

MATERIAL NOTES:

Galvanize all steel components of steel rail system.

Provide Grade 60 reinforcing steel.

Cast-in-place anchorage system for T631LS and T631 Rail must be ⅝" Dia heavy hex head anchor bolts (ASTM F3125 Gr 325 or A449) with one hardened steel washer (ASTM F436) and one regular lock washer placed under heavy hex nut. Nuts must conform to ASTM A563 requirements. Embed anchor bolts 4 ½" minimum.

Adhesive anchors for T631LS and T631 Rail must be ⅝" Dia ASTM A193 Gr B7 or F1554 Gr 105 fully threaded rods with one hardened steel washer (ASTM F436) and one regular lock washer placed under each heavy hex nut. Nuts must conform to ASTM A563 requirements. Embed fully threaded rod into slab and/or abutment wingwall using a Type III, Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment depth is 4 ¾". Anchor adhesive chosen must be able to achieve a nominal bond strength in tension of a single anchor, Na, of 8 kips (edge distance must be accounted for). Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing."

Epoxy coat or galvanize reinforcing steel shown on this standard if rail reinforcement is epoxy coated or galvanized.

GENERAL NOTES:

Designed in accordance with AASHTO LRFD Bridge Design Specifications.

This standard is for use with structures with a 5" minimum cast-in-place concrete slab.

This standard may require modification for interior rails. This standard does not apply to median barriers.

This standard does not provide details for Type T221P, T224, T80HT, T80SS, C412, PR11, PR22 and PR3 rails on slab beam bridges.

See rail standards for approved speed restrictions, notes and details not shown.

Cover dimensions are clear dimensions, unless noted otherwise.

Texas Department of Transportation

Bridge Division Standard

RAIL ANCHORAGE DETAILS

PRESTR CONCRETE SLAB BEAMS

PSBRA

FILE: psbste07-18.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT January 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0715	01	025,ETC	FM108,ETC
03-18: Updated adhesive anchor notes.	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		158

DATE:
FILE:

DESIGNED BEAMS (STRAIGHT STRANDS)

STRUCTURE	SPAN NO.	BEAM NO.	BEAM TYPE	PRESTRESSING STRANDS						DEBONDED STRANDS PER ROW								CONCRETE	
				NON-STD STRAND PATTERN	TOTAL NO.	SIZE (in)	STRGTH fpu (ksi)	"e" ℄ (in)	"e" END (in)	TOT NO. DEB	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	RELEASE STRGTH ① f'ci (ksi)	MINIMUM 28 DAY COMP STRGTH f'c (ksi)
Brushy Creek Bridge	1, 3	1, 11	5SB15		10	0.6	270	5.00	5.00	0	0.00	0	0	0	0	0	0	0	4.500	5.500
	1, 3	2 – 10	4SB15		8	0.6	270	5.00	5.00	0	0.00	0	0	0	0	0	0	0	4.500	5.500
	2	1, 11	5SB15		22	0.6	270	5.00	5.00	4	2.50	22	4	2	2	0	0	0	4.500	5.500
	2	2 – 10	4SB15		22	0.6	270	5.00	5.00	8	2.50	22	8	4	2	2	0	0	4.500	5.500

OPTIONAL DESIGN

STRUCTURE	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
Brushy Creek Bridge	0.704	-0.846	493	0.385	0.385
	0.746	-0.916	446	0.365	0.365
	2.641	-3.037	1173	0.384	0.384
	2.842	-3.316	1059	0.363	0.363

LOAD RATING FACTORS

STRUCTURE	STRENGTH I Inv	STRENGTH I Opr	SERVICE III Inv
Brushy Creek Bridge	2.57	3.33	3.49
	2.16	2.80	2.93
	1.40	1.81	1.04
	1.23	1.60	1.24

NON-STANDARD STRAND PATTERNS

PATTERN	STRAND ARRANGEMENT AT ℄ OF BEAM

① Based on the following allowable stresses (ksi):

Compression = 0.65 f'ci

Tension = $0.24\sqrt{f'ci}$

Optional designs must likewise conform.

② Portion of full HL93.

DESIGN NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

Load rated using Load and Resistance Factor Rating according to AASHTO Manual for Bridge Evaluation.

Prestress losses for the designed beams have been calculated for a relative humidity of 60 percent. Optional designs must likewise conform.

FABRICATION NOTES:

Provide Class H concrete.

Provide Grade 60 reinforcing steel.

Use low relaxation strands, each pretensioned to 75 percent of fpu.

Full-length debonded strands are not permitted in positions "A" and "B".

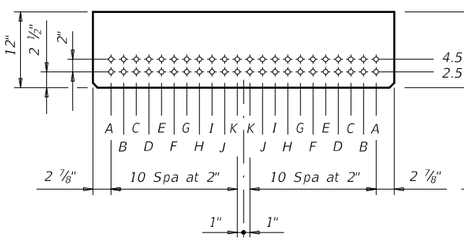
Strand debonding must comply with Item 424.4.2.2.2.4.

When shown on this sheet, the Fabricator has the option of furnishing either the designed beam or an approved optional beam design. All optional design submittals and shop drawings must be signed, sealed and dated by a Professional Engineer registered in the State of Texas.

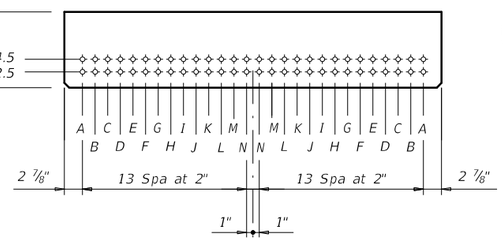
Locate strands for the designed beam as low as possible on the 2" grid system unless a non-standard strand pattern is indicated. Fill row "2.5", then row "4.5". Place strands within a row as follows:

1) Locate a strand in each "A" position.
2) Place strand symmetrically about vertical centerline of beam.
3) Space strands as equally as possible across the entire width.

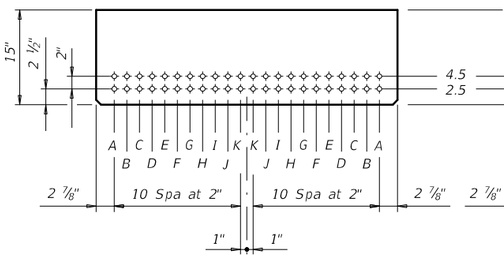
Do not debond strands in position "A". Distribute debonded strands symmetrically about the vertical centerline. Increase debonded lengths working outward, with debonding staggered in each row.



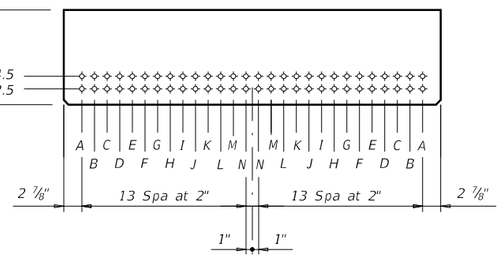
TxDOT 4SB12 SLAB BEAM



TxDOT 5SB12 SLAB BEAM



TxDOT 4SB15 SLAB BEAM



TxDOT 5SB15 SLAB BEAM

03/30/2023

HL93 LOADING

Texas Department of Transportation

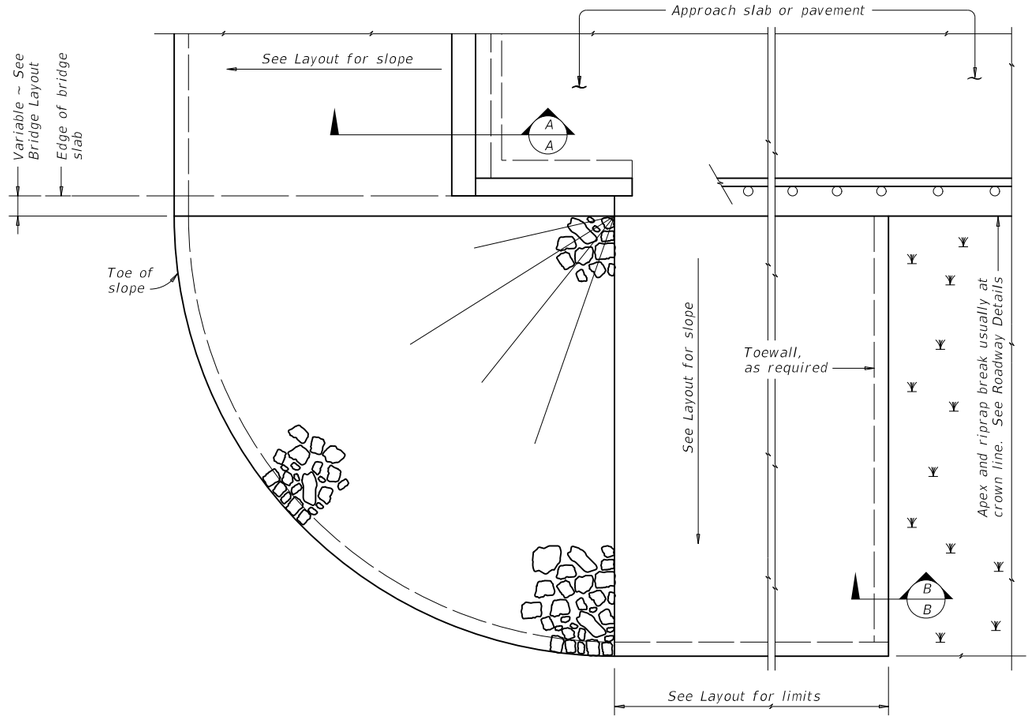
Bridge Division Standard

PRESTRESSED CONCRETE SLAB BEAM DESIGNS (NON-STANDARD SPANS)

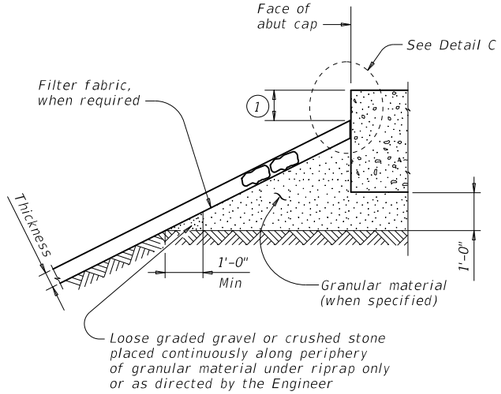
PSBND

FILE: psbsts05-22.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS 3-22: Added Load Rating.	0715	01	025,ETC	FM108,ETC
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		159

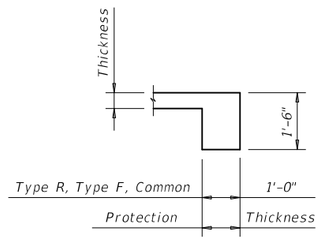
DATE:
FILE:



PLAN

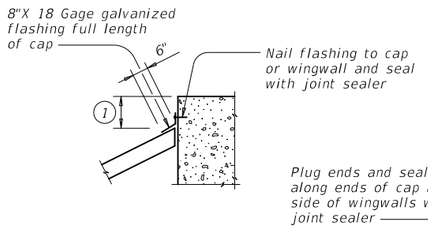


SECTION A-A AT CAP

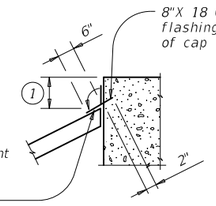


SECTION B-B

Provide toewall when shoulder drain is located adjacent to limits of stone riprap. Omit toewall when thickness of protection riprap is greater than 18".

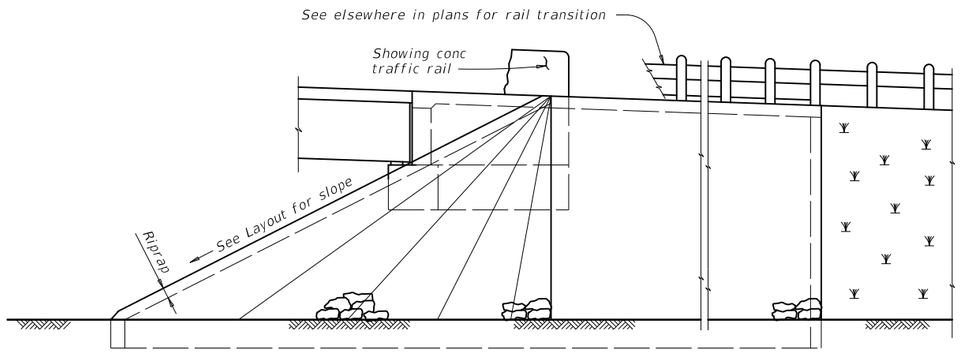


CAP OPTION A



CAP OPTION B

DETAIL C



ELEVATION

(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	0715	01	025,ETC	FM108,ETC
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		160

DATE:
FILE:

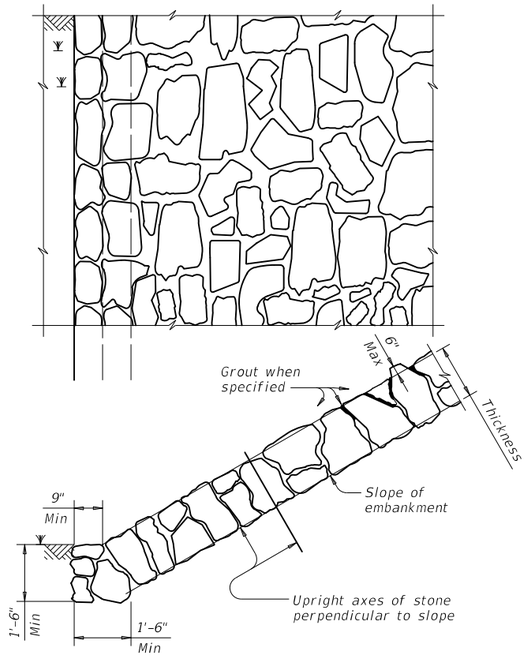


FIGURE 1 ~ TYPE R STONE RIPRAP

dry or grouted

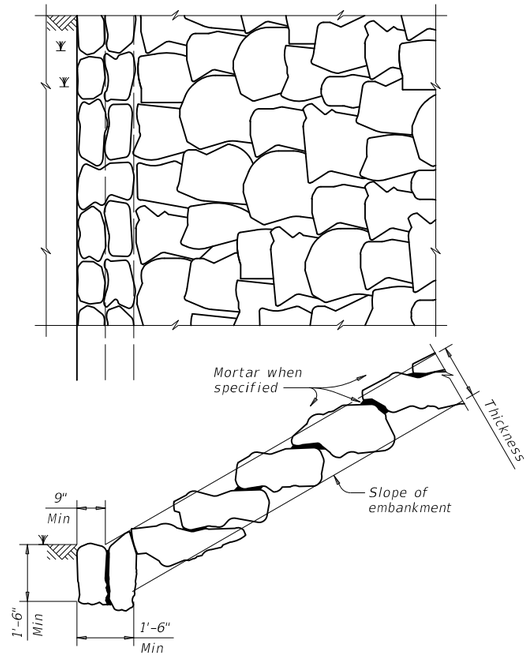


FIGURE 2 ~ TYPE F STONE RIPRAP

dry or mortared

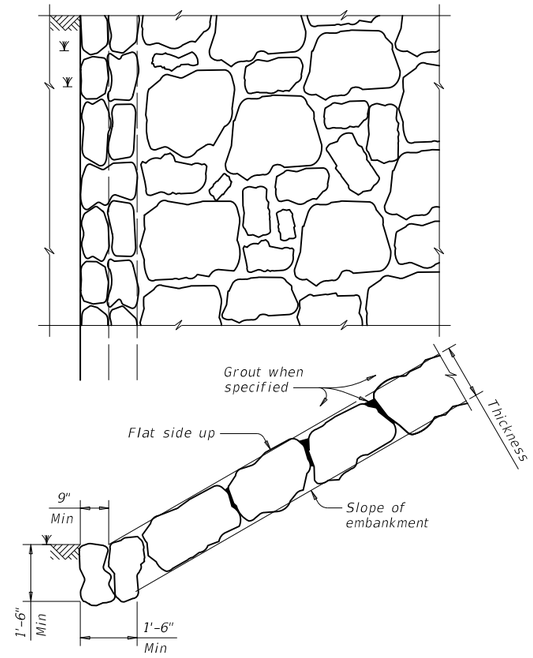


FIGURE 3 ~ TYPE F STONE RIPRAP

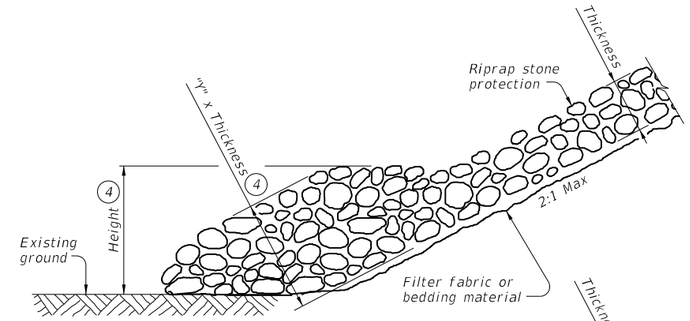
grouted

(2) Provide bedding material instead of filter fabric if shown elsewhere in plans. See Layout for thickness of bedding material.

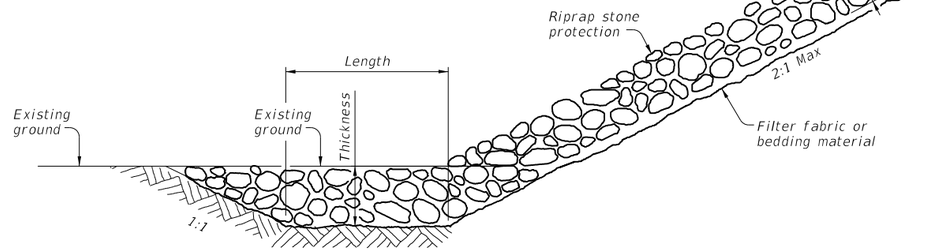
(3) Minimum toe depth is the larger of the maximum scour depth or 2 times the riprap thickness.

(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)

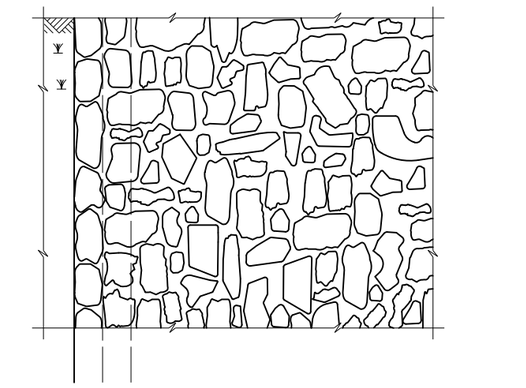


FIGURE 4 ~ COMMON STONE RIPRAP

dry or grouted

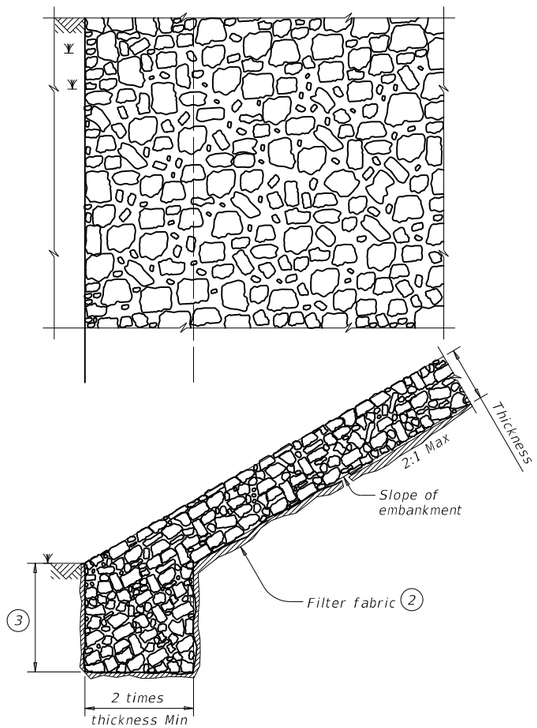


FIGURE 5 ~ PROTECTION STONE RIPRAP (5)

SHEET 2 OF 2

Texas Department of Transportation

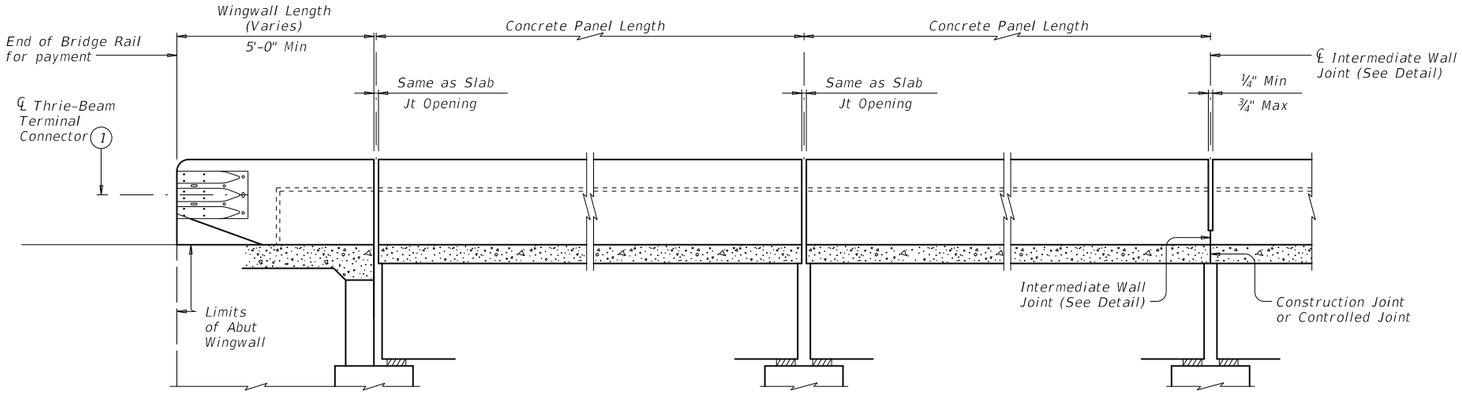
Bridge Division Standard

STONE RIPRAP

SRR

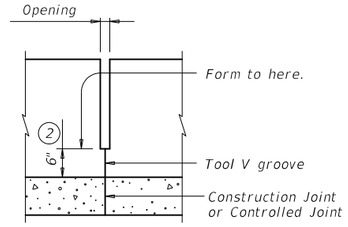
FILE: srrstde1-19.dgn	DN: AES	CK: JGD	DW: BWH	CK: AES
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0715	01	025,ETC	FM108,ETC
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		161

DATE:
FILE:



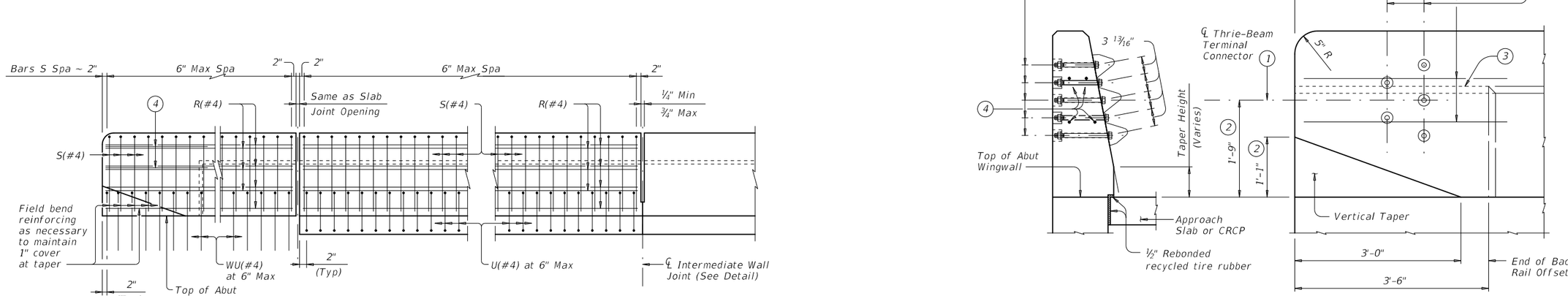
AT ABUTMENTS | AT BENTS WITH SLAB EXP JOINTS | AT BENTS WITHOUT SLAB EXP JOINTS

ROADWAY ELEVATION OF RAIL

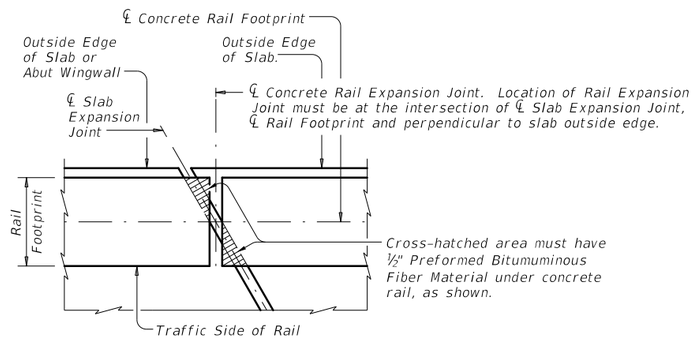


INTERMEDIATE WALL JOINT DETAIL

Provide at all interior bents without slab expansion joints.



ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT



PLAN OF RAIL AT EXPANSION JOINTS

Example showing Slab Expansion Joints without breakbacks.

℄ 5 ~ 1" Dia holes and 2 ½" Dia x 2" deep recesses. Form or core holes and recesses. Percussion drilling is not permitted. Adjust placement of reinforcing steel as necessary to avoid bolt holes and recesses. Bolt recesses are only required when pedestrian sidewalks are adjacent to back of rail. Tighten the 5 Terminal Connection Bolts in a well distributed pattern so to prevent damage or distortion of the Thrie-Beam Connection and the MBGF Transition. Cut bolts off after installation so as to extend no more than ¾" beyond nut. Paint ends of cut-off bolts with Zinc-rich paint.

SECTION | ELEVATION

TERMINAL CONNECTION DETAILS

1. Terminal Connectors and associated hardware are to be paid for under the Item "Metal Beam Guard Fence". Attach Metal Beam Guard Fence Transitions to the bridge rail and extend along the embankment unless otherwise shown in the plans.
2. Increase 2" for structures with Overlay.
3. Back of rail offset may, with Engineer's approval, be continued to the end of the railing.
4. Place 4 additional Bars R(#4) 3'-8" in length inside Bars S(#4) and centered 2'-0" from end of rail when Terminal Connections are required.

Texas Department of Transportation

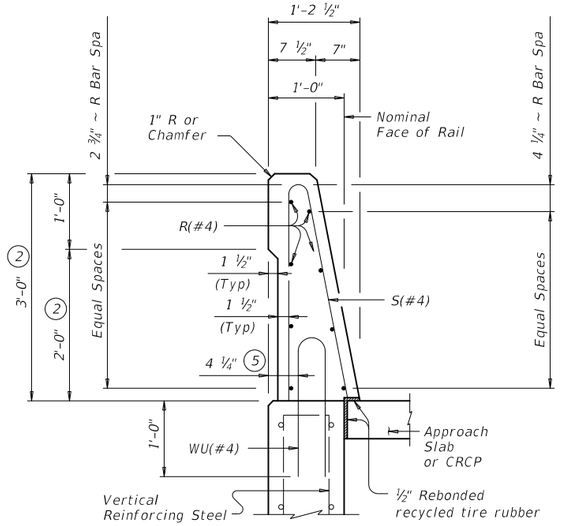
Bridge Division Standard

TRAFFIC RAIL SINGLE SLOPE

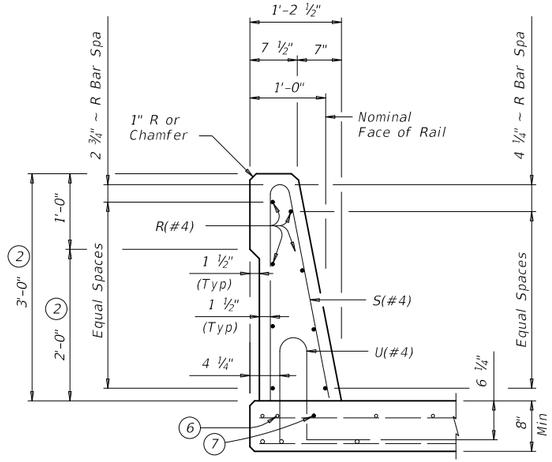
TYPE SSTR

FILE: rlstd014-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0715	01	025,ETC	FM108,ETC
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		162

DATE:
FILE:



ON ABUTMENT WINGWALLS OR CIP RETAINING WALLS



ON BRIDGE SLAB

SECTIONS THRU RAIL

(2) Increase 2" for structures with Overlay.

(5) 5 ¼" when vertical reinforcing has closer clear cover over horizontal reinforcing in abutment wingwalls or retaining walls on traffic side of wall.

(6) As an aid in supporting reinforcement, additional longitudinal bars may be used in the slab with the approval of the Engineer. Such bars must be furnished at the Contractor's expense.

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

(8) No longitudinal wires may be within upper bend.

(9) Bend or cut as required to clear drain slots.

(10) Space U(#4) bars at 4" Max when end region of panel length is less than 6'-0" to side slot drain. Space U(#4) bars at 6" Max when end region of panel length is 6'-0" and greator to side slot drain.

CONSTRUCTION NOTES:

This railing may be constructed by the slipform process when approved by the Engineer, with equipment approved by the Engineer. Provide sensor control for both line and grade. Tack welding to provide bracing for slipform operations is acceptable. Welding may be performed at a minimum spacing of 3 ft between the cage and the anchorage. It is permissible to weld to bars U, WU and S at any location on the cage. If increased bracing is needed, provide additional anchorage devices and weld in the upper two thirds of the cage. Paint welded areas on epoxy coated and/or galvanized reinforcing with an organic zinc rich paint in accordance with Item 445 "Galvanizing".

If rail is slipformed, apply an heavy epoxy bead 1" behind toe of traffic side of rail to concrete deck just prior to slip forming. Provide a ⅜" width x ¼" tall heavy epoxy bead with Type III, Class C or a Type V epoxy.

The back of railing must be vertical unless otherwise shown in the plans or approved by the Engineer.

MATERIAL NOTES:

Provide Class "C" concrete. Provide Class "C" (HPC) if required elsewhere.

Provide Grade 60 reinforcing steel.

Epoxy coat or galvanize all reinforcing steel if slab bars are epoxy coated or galvanized.

Deformed Welded Wire Reinforcement (WWR) (ASTM A1064) of equal size and spacing may be substituted for Bars U and WU unless noted otherwise. Deformed WWR (ASTM A1064) may be substituted for Bars R and S, as shown. Combinations of reinforcing steel and WWR or configurations of WWR other than shown are permitted if conditions in the table are satisfied. Provide the same laps as required for reinforcing bars.

Provide bar laps, where required, as follows:

Uncoated or galvanized ~ #4 = 1'-7"

Epoxy coated ~ #4 = 2'-5"

GENERAL NOTES:

This rail has been successfully evaluated by full-scale crash test to meet MASH TL-4 criteria. This rail can be used for speeds of 50 mph and greater when a TL-3 rated guard fence transition is used. When a TL-2 rated guard fence transition is used, this rail can only be used for speeds of 45 mph and less.

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

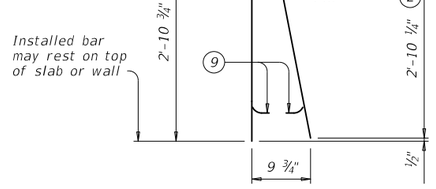
Rail anchorage details shown on this standard may require modification for select structure types. See appropriate details elsewhere in plans for these modifications.

Shop drawings will not be required for this rail.

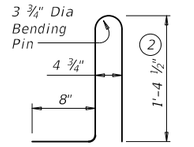
Average weight of railing with no overlay is 376 plf.

Cover dimensions are clear dimensions, unless noted otherwise.

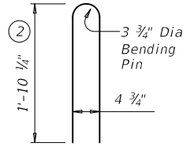
Reinforcing bar dimensions shown are out-to-out of bar.



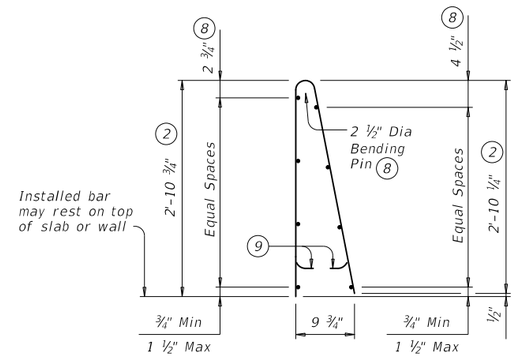
BARS S (#4)



BARS U (#4)

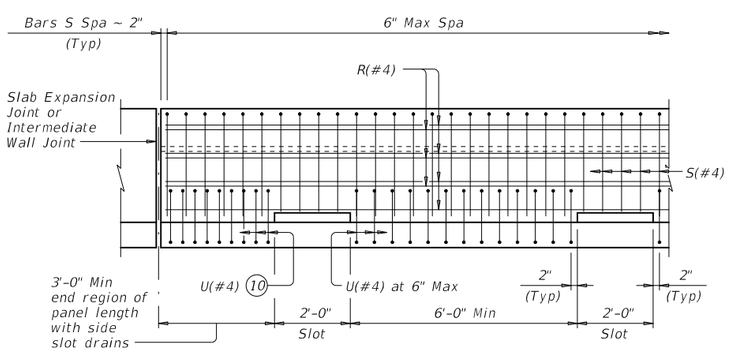


BARS WU (#4)



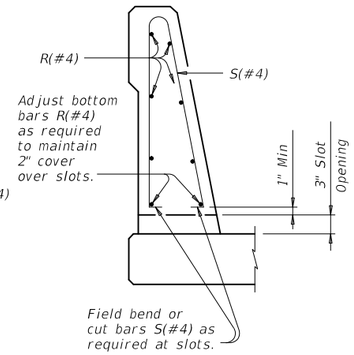
OPTIONAL WELDED WIRE REINFORCEMENT (WWR)

DESCRIPTION	LONGITUDINAL WIRES	VERTICAL WIRES
Minimum (Cumulative Total) Wire Area	1.067 Sq In.	0.267 Sq In. per Ft
	No. of Wires	Spacing
Minimum	8	4"
Maximum	10	8"
Maximum Wire Size Differential	The smaller wire must have an area of 40% or more of the larger wire.	



OPTIONAL SIDE SLOT DRAIN DETAIL

Note: Side Slot Drains may be used where shown elsewhere on the plans or as directed by the Engineer. Drains should not be placed over railroad tracks, lower roadways, or sidewalks. When this rail is used as a separator between a roadway surface and a sidewalk surface, side drain slots will not be permitted.



SECTION THRU OPTIONAL SIDE SLOT DRAIN

SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

TRAFFIC RAIL SINGLE SLOPE

TYPE SSTR

FILE: rlstd014-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0715	01	025,ETC	FM108,ETC
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		163

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DATE:
FILE:

REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS

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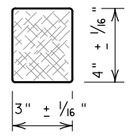
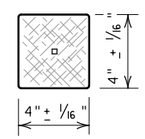
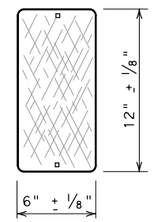
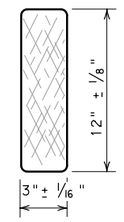
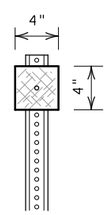
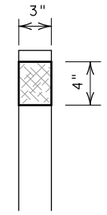
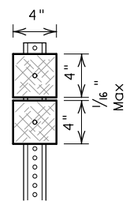
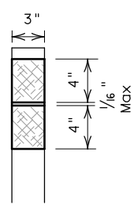
DEVICE				
SHEETING	Yellow, White or Red Type B or C reflective sheeting			
NOTE	1. Size 1 and 4 - Direct applied reflective sheeting for use on flexible post (flx). 2. Size 2 and 3 - For use on wing channel (wc) post only. Use approved metal, plastic or fiberglass backplate with 17/64" mounting holes.			

DELINEATORS

	SINGLE		DOUBLE	
DEVICE				
	1-Size 2 reflector unit	1-Size 1 reflector unit	2-Size 2 reflector units	2-Size 1 reflector units
SHEETING	Yellow, White or Red Type B or C Reflective Sheeting			
POST TYPE	WC	YFLX, WFLX	WC	YFLX, WFLX
MOUNT TYPE	GND	GND, SRF	GND	GND, SRF

D & OM DESCRIPTIVE CODES

INSTL DEL ASSM (D-XX)SZ X (XXXX)XXX(XX)

NUMBER OF REFLECTORS
S = Single
D = Double

COLOR OF REFLECTORS
W = White
Y = Yellow
R = Red

REFLECTOR UNIT SIZE
1 or 2

TYPE OF POST OR DELINEATOR
WC = Wing Channel Post
YFLX = Yellow Flexible Post
WFLX = White Flexible Post
BRF = Barrier Reflector

TYPE OF MOUNT
GND = Embedded (drivable or set in concrete)
CTB = Concrete Barrier Mount
GF1 or GF2 = Guard Fence Attachment
SRF = Surface Mount

DIRECTION
If Required
BI = Bi-Directional
BR = Bi-Directional with red on back

INSTL OM ASSM (OM-XX) (XXXX)XXX(XX)

TYPE OF OBJECT MARKER
1, 2, 3, or 4

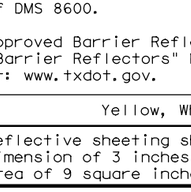
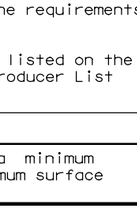
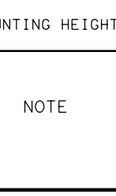
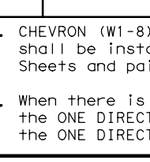
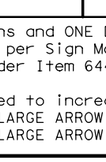
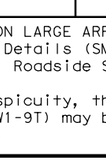
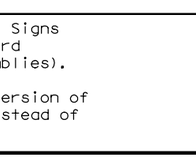
NUMBER OF REFLECTORS OR DIRECTION
X = 3-Size 2 reflector units (Type 2 only)
Y = 1-Size 3 reflector unit (Type 2 only)
Z = 3-Size 1 or 1-Size 4 reflector unit(s)(Type 2 only)
L = Left Side (Type 3 Object Marker only)
R = Right Side (Type 3 Object Marker only)
C = Center (Type 3 Object Marker only)

TYPE OF POST
WC = Wing Channel Post
WFLX = White Flexible Post
TWT = Thin Walled Tubing

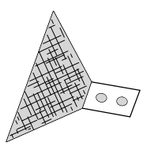
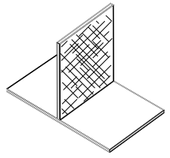
TYPE OF MOUNT
GND = Embedded (drivable)
SRF = Surface Mount
WAS = Wedge Anchor Steel
WAP = Wedge Anchor Plastic

DIRECTION
If Required
BI = Bi-Directional

OBJECT MARKERS

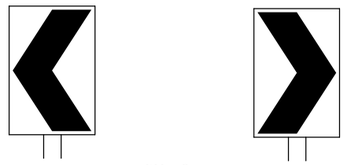
	Type 1 (OM-1)	Type 2 (OM-2)			Type 3 (OM-3)			Type 4 (OM-4)
	OM-1	OM-2X	OM-2Y	OM-2Z	OM-3L	OM-3R	OM-3C	OM-4
DEVICE								
		3-Size 2 reflector units	1-Size 3 reflector unit	3-Size 1 reflector units or 1-Size 4 reflector unit				
SHEETING	Yellow-Type B_{FL} or C_{FL} Sheeting	Yellow - Type B or C Sheeting			Alternating acrylic black and retroflective yellow - Type B_{FL} or C_{FL} Sheeting			Red -Type B_{FL} or C_{FL} Sheeting
POST TYPE	TWT	WC	WC	WFLX	TWT			TWT
MOUNT TYPE	WAS, WAP	GND	GND	GND, SRF	WAS, WAP			WAS, WAP

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"	

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.

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DELINEATOR & OBJECT MARKER MATERIAL DESCRIPTION

D & OM(1)-20

FILE: dom1-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
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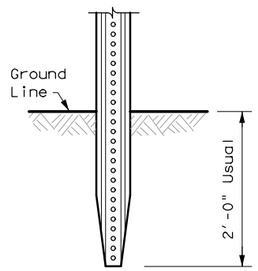
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	YKM	GONZALES		164

20A

POST TYPE AND SUPPORT FOUNDATION DETAILS

WING CHANNEL (WC)

GND

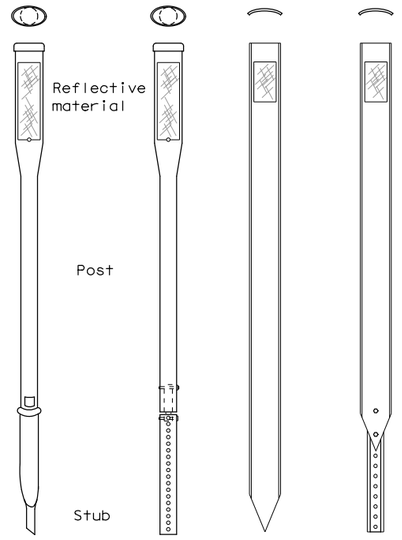


NOTES

1. Embedded Wing Channel (WC) post option may be used for Type 2 Object Markers and Delineators only.
2. 1.12 lbs/ft steel per ASTM A 1011 SS Gr. 50, or ASTM A499.

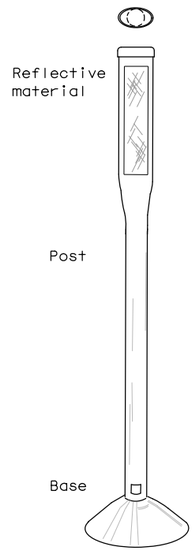
FLEXIBLE POSTS (YFLX, WFLX)

GND



EMBEDDED

SRF



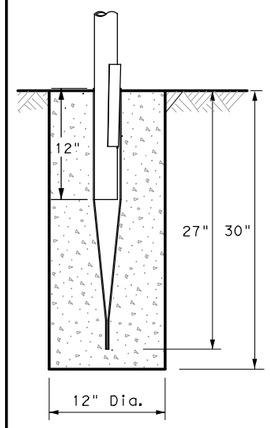
SURFACE MOUNT

NOTES

1. See "Flexible Delineator and Object Marker Posts" Material Producer List for approved devices.
2. Install per manufacturer's recommendations.
3. Post length may vary to meet field conditions.
4. When using yellow delineators with flexible posts to separate opposing direction of travel, such as centerline or median use, the flexible posts shall be yellow.

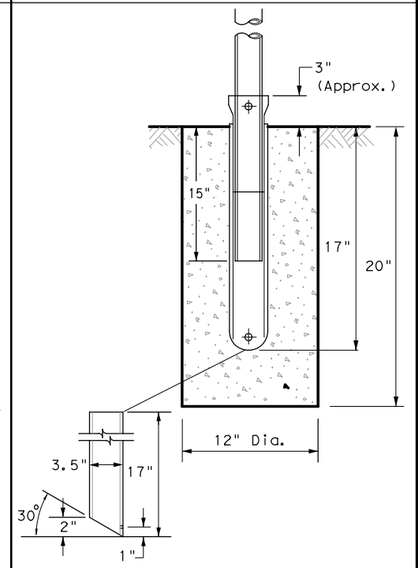
WEDGE ANCHOR SYSTEMS

WAS



STEEL

WAP



PLASTIC

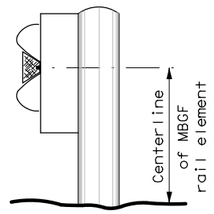
NOTE

1. Install per manufacturer's recommendations.

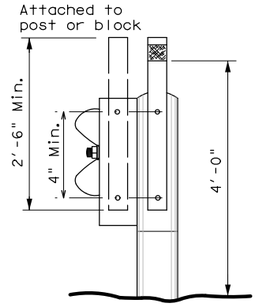
TYPE OF BARRIER MOUNTS

GUARD FENCE ATTACHMENT

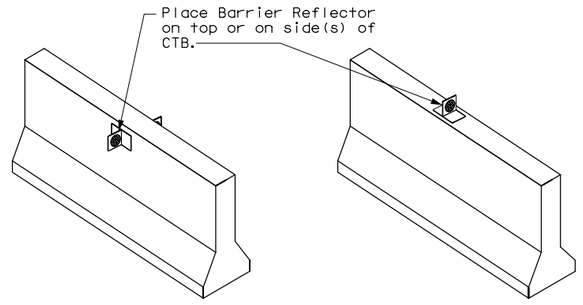
GF1



GF2



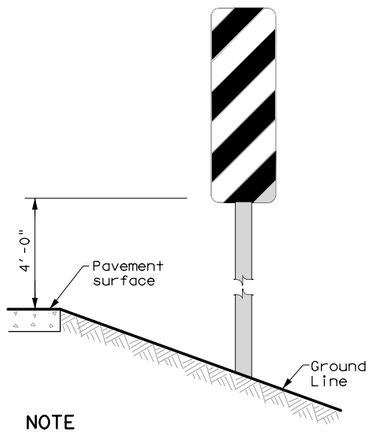
CONCRETE TRAFFIC BARRIER (CTB)



GENERAL NOTES

1. Place delineators on a section of roadway at a consistent distance from the edge of pavement.
2. Where a restriction prevents consistent placement from the pavement edge, place the affected object markers in line with the innermost edge of the obstruction.
3. When Type 2 object markers and delineators are more than 8'-0" from the edge of the pavement, it may not be possible to maintain a height of approximately 4'-0". If this is the case, place the object marker or delineator as close to the desired height as possible.
4. Install all delineators, object markers and barrier reflectors in accordance with the manufacturer's recommendation.
5. Barrier reflectors should be installed a minimum of 18 inches above the edge of the pavement surface.
6. Diagonal stripes on Type 3 object markers shall slope down toward the intended travel lane.

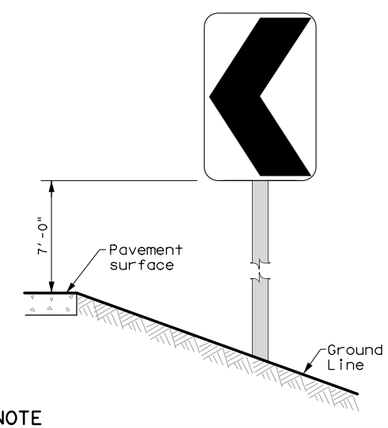
TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS



NOTE

Mounting at 4 feet to the bottom of the chevron is permitted for chevrons that will not exceed a height of 6'-6" to the top of the chevron (sizes 24" x 30" and smaller)

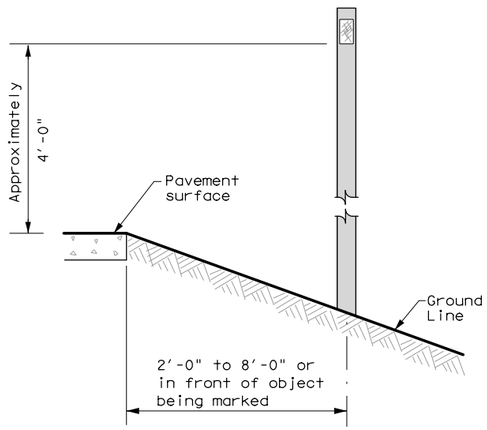
CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN



NOTE

Chevrons 30" x 36" and larger shall be mounted at a height of 7' to the bottom of the chevron. Chevron sign and ONE DIRECTION LARGE ARROW sign (W1-9T) shall be installed per SMD standard sheets and paid under item 644.

DELINEATORS AND TYPE 2 OBJECT MARKERS



See general notes 1, 2 and 3.

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DELINEATOR & OBJECT MARKER INSTALLATION

D & OM(2)-20

FILE: dom2-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
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20B

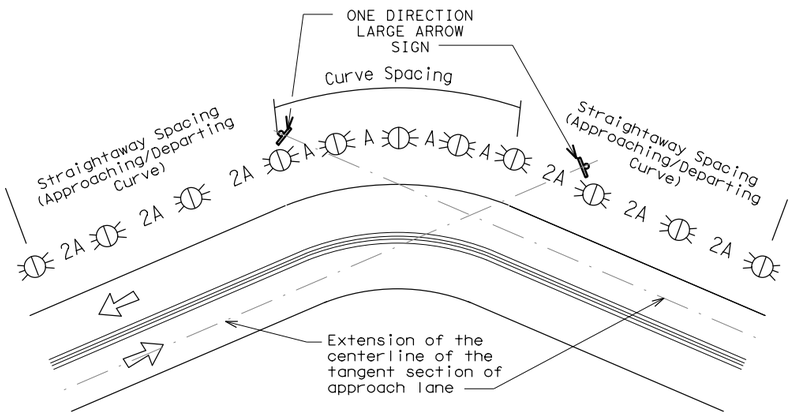
DATE:
FILE:

DATE:
FILE:

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

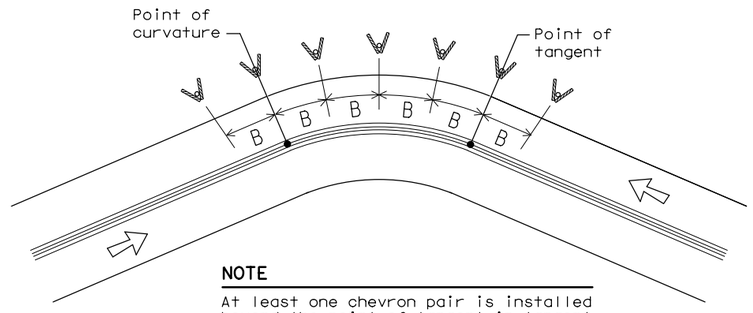
SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES



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

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20C

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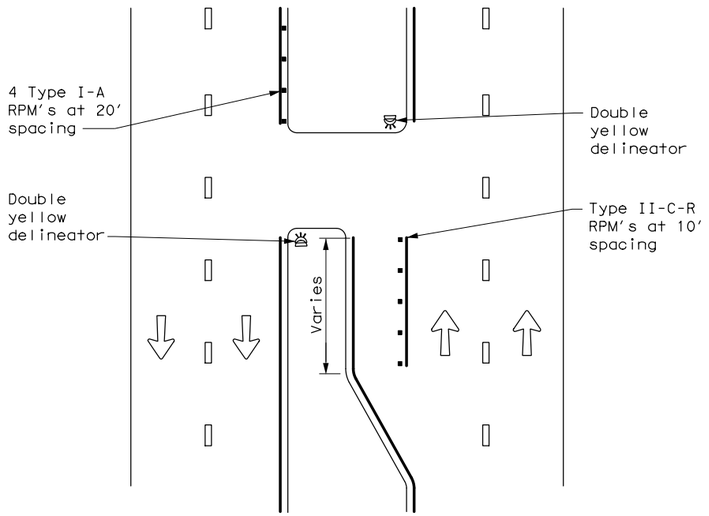
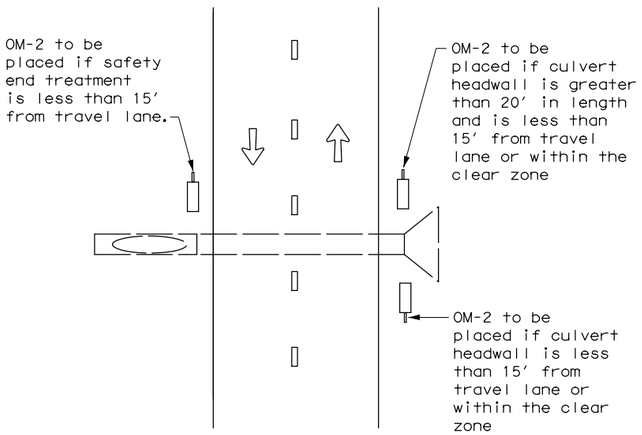
CROSSOVERS



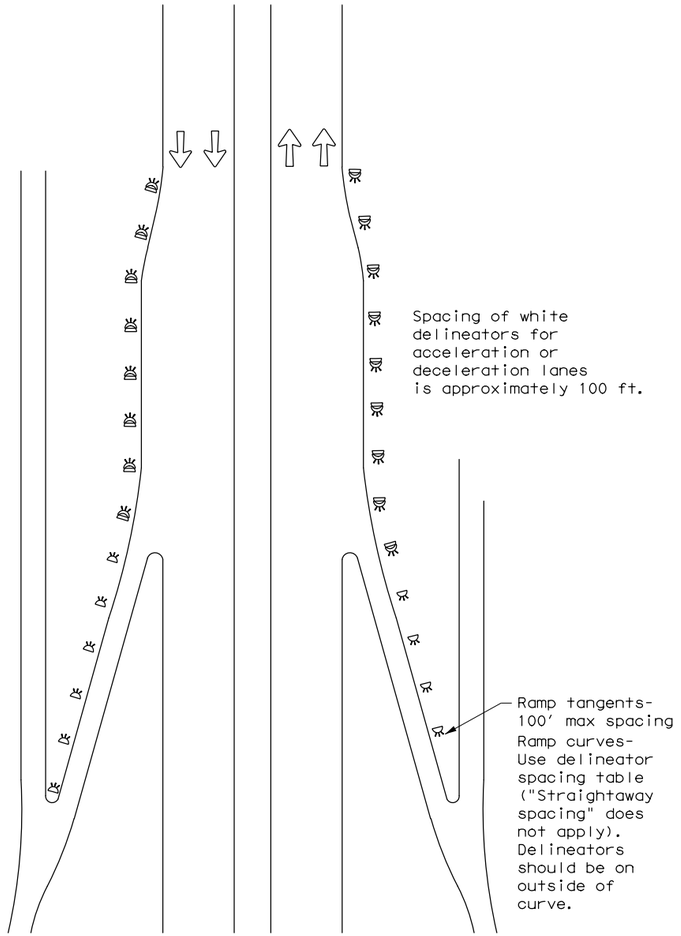
DETAIL 1

FOR CULVERTS WITHOUT MBGF



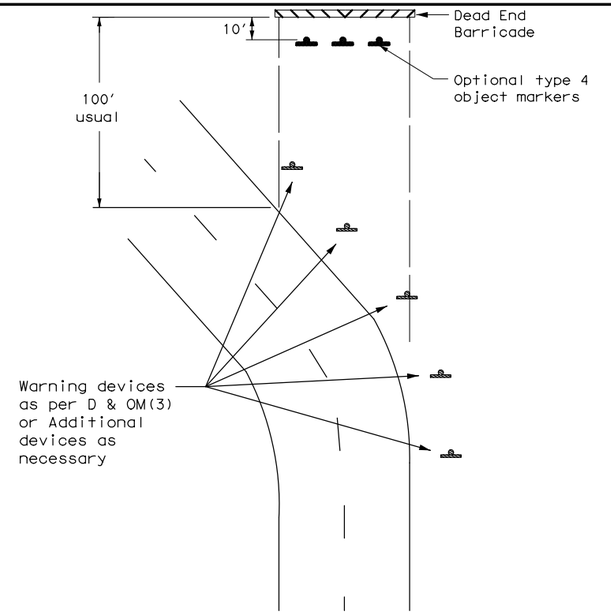
DETAIL 2

FREEWAY DELINEATION FOR RAMPS AND ACCELERATION/DECELERATION LANES



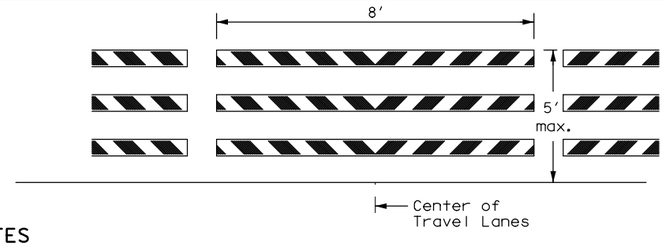
DETAIL 3

TYPICAL APPLICATION OF DEAD END BARRICADE



DETAIL 4

TYPICAL DEAD END BARRICADE INSTALLATION



NOTES

1. Barricade striping shall be red and white reflective sheeting for all permanent road closures.
2. Barricade striping is red and white sloping toward the center of the roadway.
3. Type 3 Barricade Supports should be anchored to soil or pavement as described in compliant Work Zone Traffic Control Devices List, section D.2.f and D.2.g.

DETAIL 5

LEGEND	
	Bidirectional Delineator
	Delineator
	OM-3
	Barricade
	Sign
	OM-2
	Double Delineator

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DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(4)-20

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7-20	YKM	GONZALES		167

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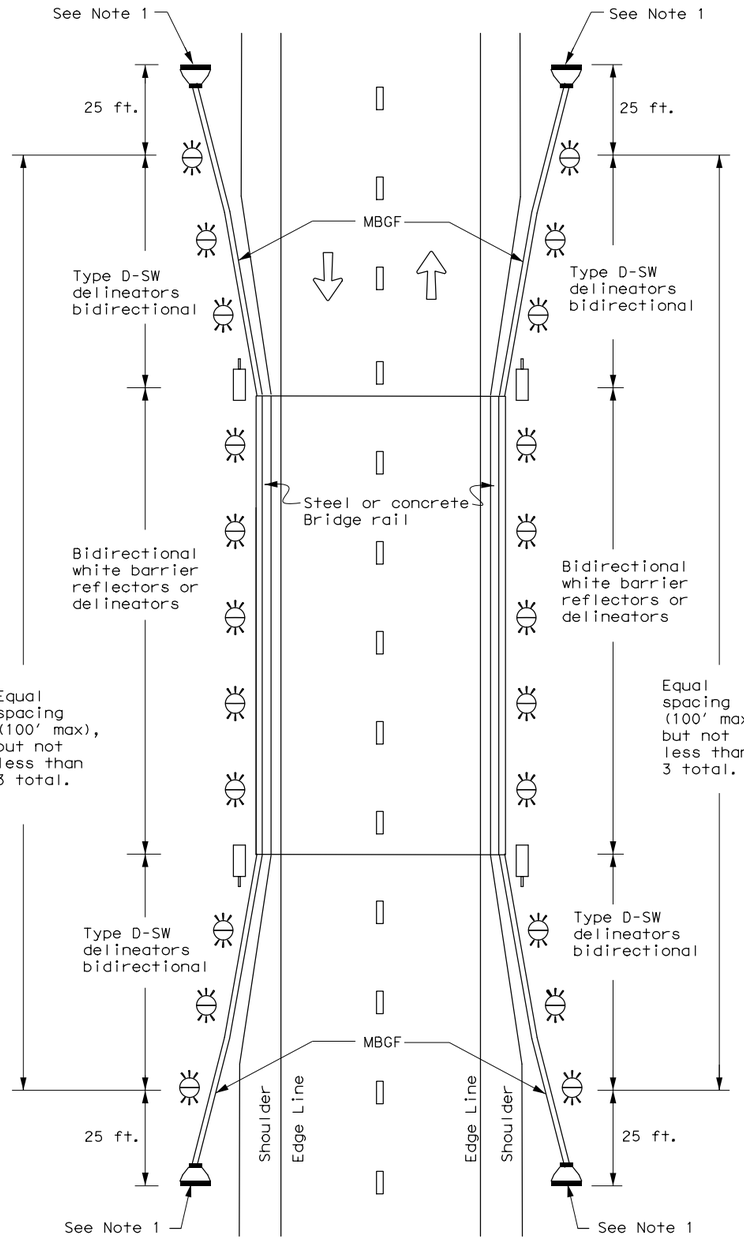
FILE:

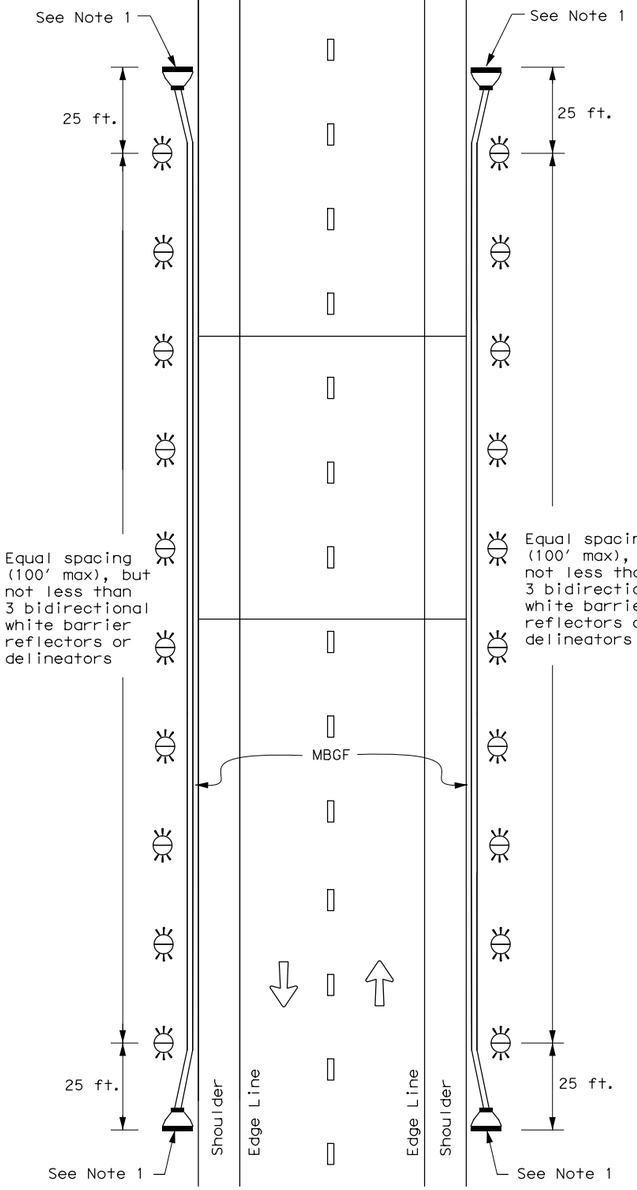
TWO-WAY, TWO LANE ROADWAY WITH REDUCED WIDTH APPROACH RAIL



NOTE:

1. Terminal ends require reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end.

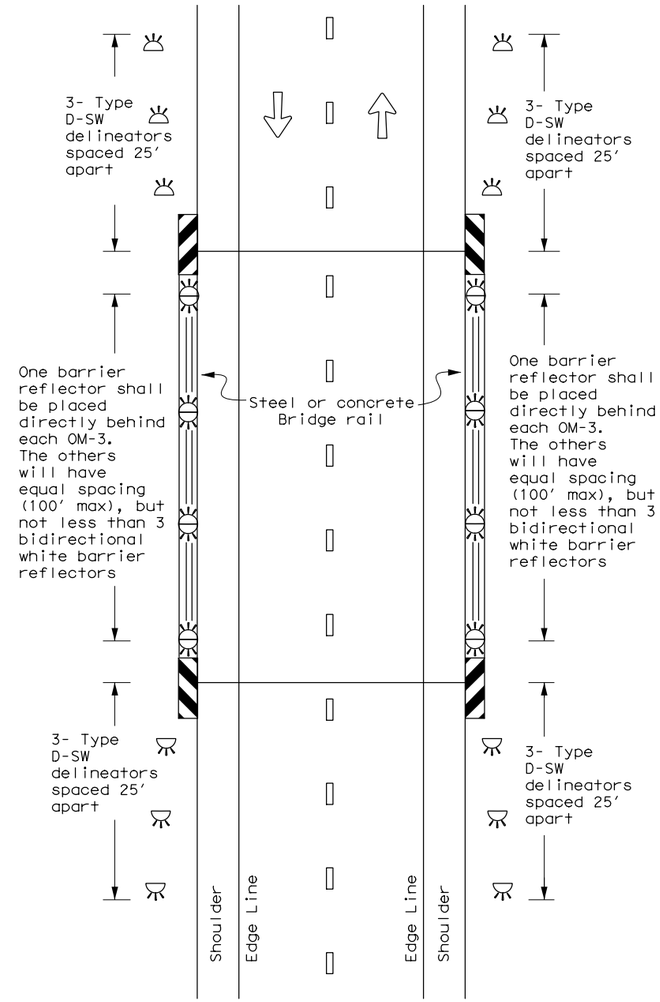
TWO-WAY, TWO LANE ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



NOTE:

1. Terminal ends require reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end.

TWO-WAY, TWO LANE ROADWAY BRIDGE WITH NO APPROACH RAIL



LEGEND

	Bidirectional Delineator
	Delineator
	OM-3
	OM-2
	Terminal End
	Traffic Flow

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(5)-20

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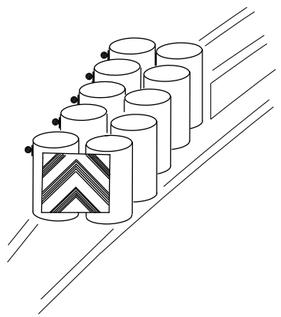
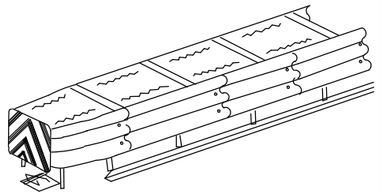
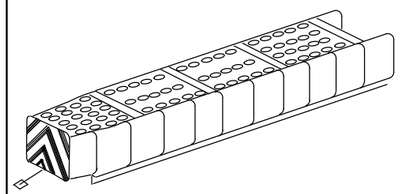
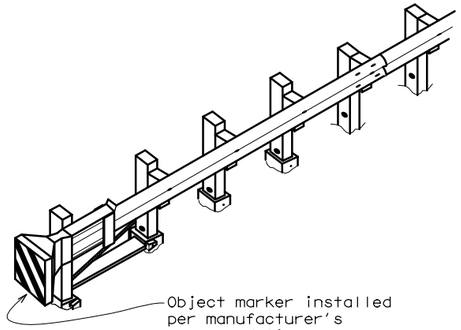
7-20	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		168

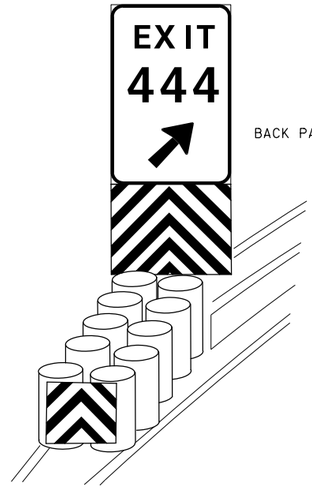
20E

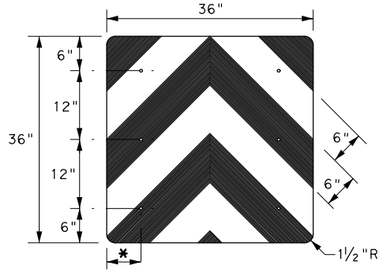


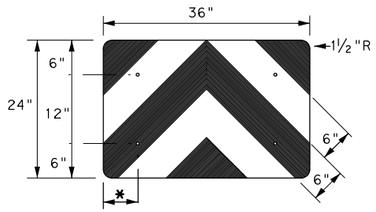




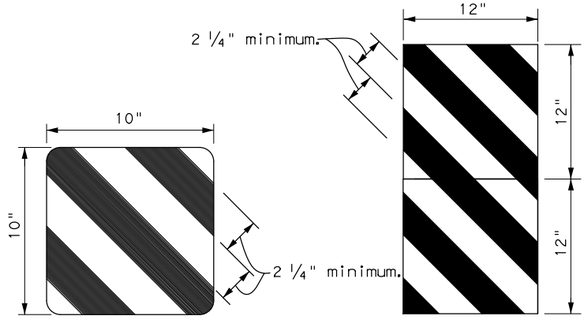




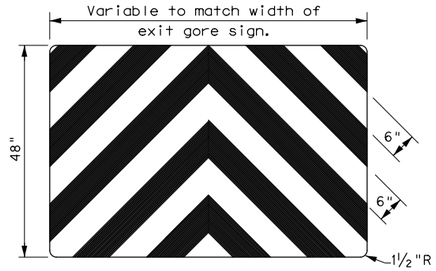


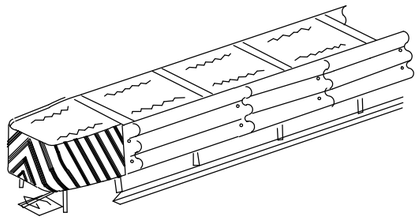


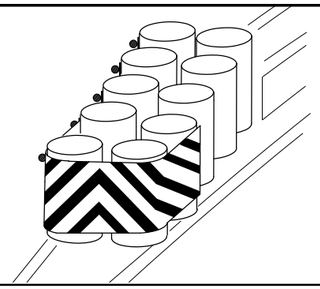
* Adjust to fit attenuator per manufacturer's recommendation, or as directed by the Engineer

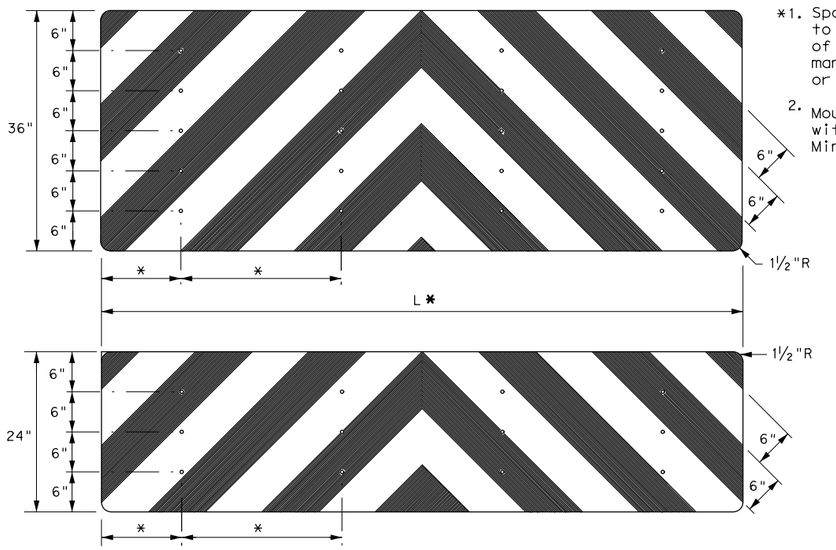


OBJECT MARKERS SMALLER THAN 3 FT^2









NOTES

*1. Spacing should be adjusted to attach through centerline of drum, per attenuator manufacturers recommendation, or as directed by the Engineer.

2. Mounting should be flush with top of attenuator. Minimum size 96" x 24".

NOTES

1. Object Markers shall conform to the Texas MUTCD and meet the color and reflectivity requirement of Department Material Specification DMS 8300. Background shall be yellow reflective sheeting (Type B or C) and Chevron shall be black.

2. Object Markers may be fabricated from adhesive backed reflective sheeting applied directly to guardrail end treatment, or applied directly to an "end cap" as per the manufacturer's recommendation. Direct applied sheeting shall provide a smooth surface and have no wrinkles, air bubbles, cuts or tears. A radius at the corners is not required for direct applied sheeting.

3. Object Marker size may be reduced to fit smaller devices. Width of alternating black and yellow stripes are typically 6". Object Markers smaller than 3ft may have reduced width stripes of a minimum of 2 ¼".

4. Pop rivets, screws, or nuts and bolts may be used to attach object markers and reflectors. Holes, slots or other openings may be cut or drilled through object markers to allow cable or other attachments.

5. Object Marker at nose of attenuator is subsidiary to the attenuator.

6. See D & OM (1-4) for required barrier reflectors.

Texas Department of Transportation

Traffic Safety Division Standard

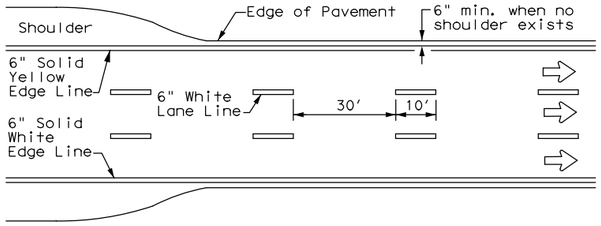
DELINEATOR & OBJECT MARKER FOR VEHICLE IMPACT ATTENUATORS

D & OM(VIA)-20

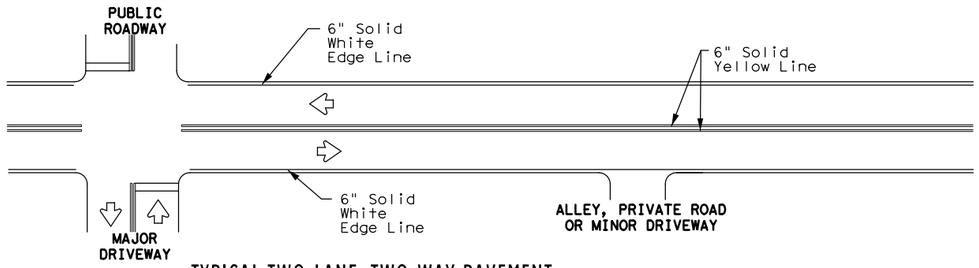
FILE: domvia20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT December 1989	CONT	SECT	JOB	HIGHWAY
REVISIONS	0715	01	025,ETC	FM108,ETC
4-92 8-04	DIST	COUNTY		SHEET NO.
8-95 3-15	YKM	GONZALES		169
4-98 7-20				

20G

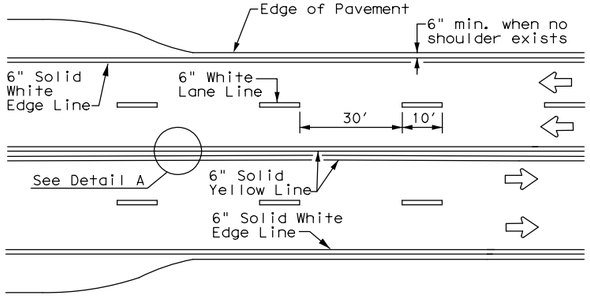
DATE:
FILE:



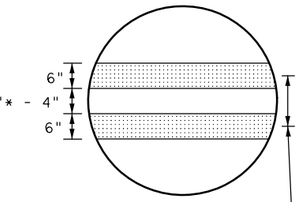
EDGE LINE AND LANE LINES
ONE-WAY ROADWAY
WITH OR WITHOUT SHOULDERS



TYPICAL TWO-LANE, TWO-WAY PAVEMENT
MARKINGS THROUGH INTERSECTIONS



CENTERLINE AND LANE LINES
FOUR LANE TWO-WAY ROADWAY
WITH OR WITHOUT SHOULDERS

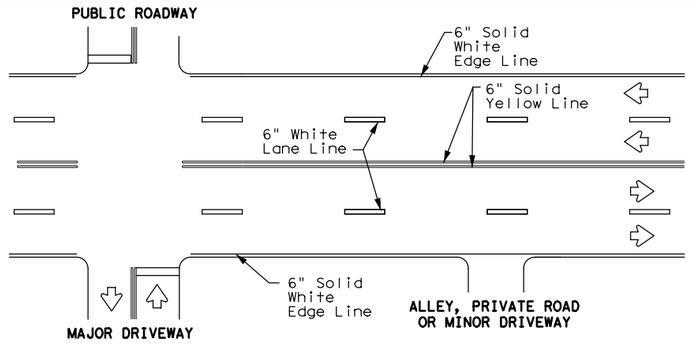


DETAIL "A"

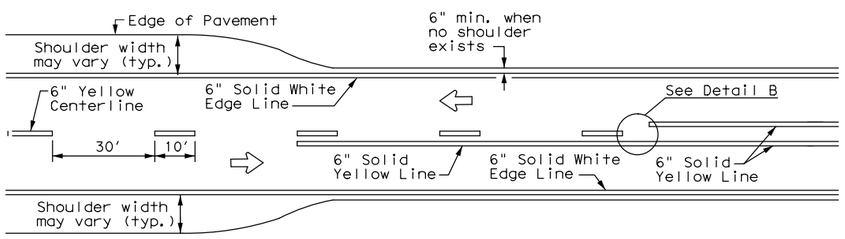
9"** min. - 10" typ.
(18" max. for traveled way greater than 48' only)

* 2" minimum for restripe projects when approved by the Engineer.

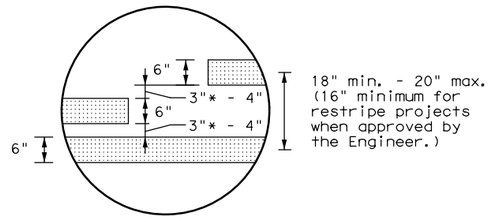
** 8" minimum for restripe projects when approved by the Engineer.



TYPICAL MULTI-LANE, TWO-WAY PAVEMENT
MARKINGS THROUGH INTERSECTIONS

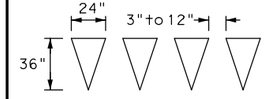


TWO LANE TWO-WAY ROADWAY
WITH OR WITHOUT SHOULDERS



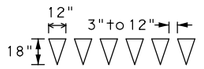
DETAIL "B"

* 2" minimum for restripe projects when approved by the Engineer.

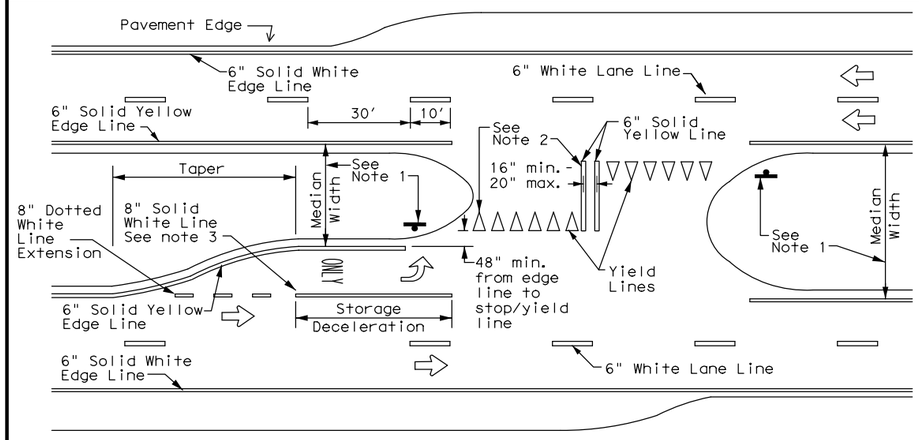


For posted speed on road being marked equal to or greater than 45 MPH.

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.

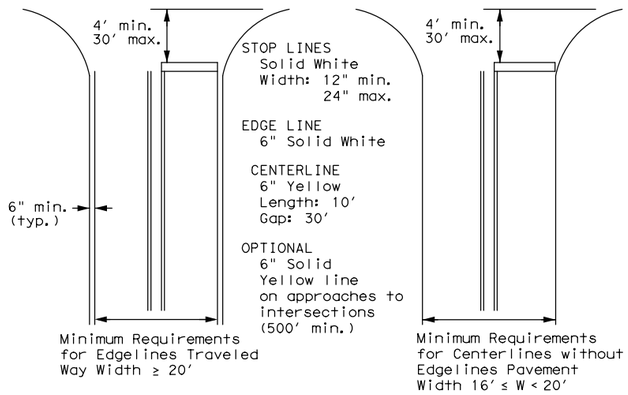
GENERAL NOTES

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

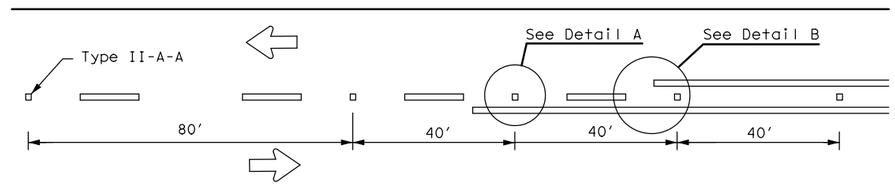
PM(1)-22

FILE: pm1-22.dgn	DN:	CK:	DW:	CK:
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0715	01	025,ETC	FM108,ETC
11-78 8-00 6-20	DIST	COUNTY		SHEET NO.
8-95 3-03 12-22	YKM	GONZALES		170
5-00 2-12				

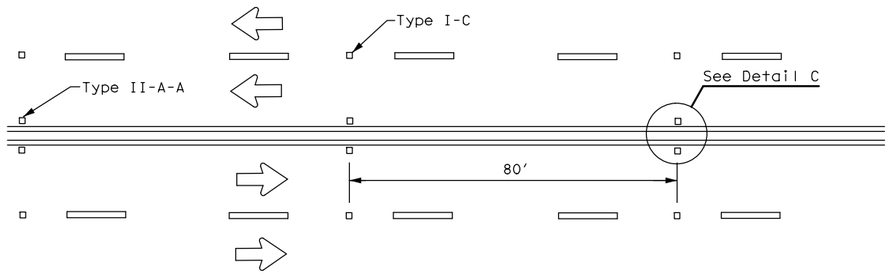
22A

DATE:
FILE:

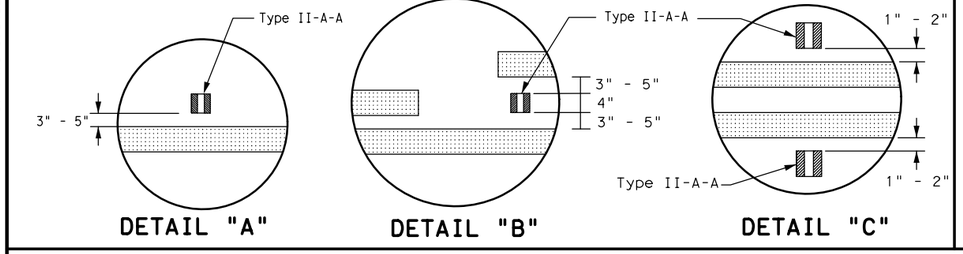
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE



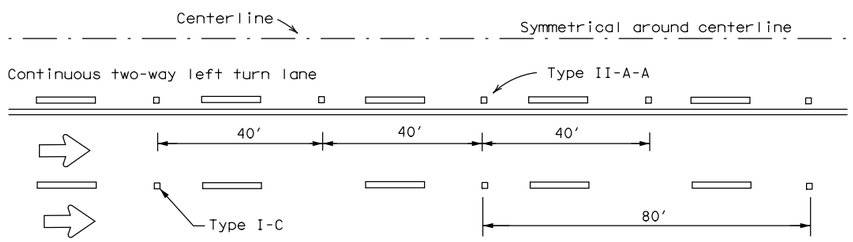
CENTERLINE FOR ALL TWO LANE TWO-WAY ROADWAYS



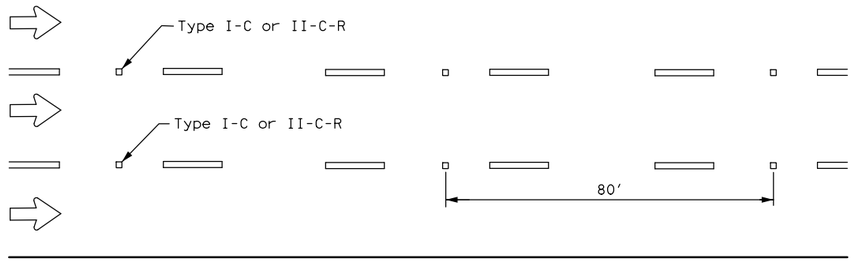
CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY ROADWAYS



DETAIL "A" **DETAIL "B"** **DETAIL "C"**



CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



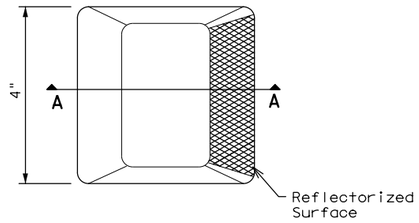
LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.

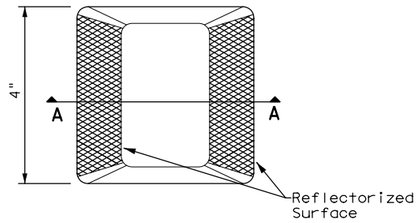
See Note 3.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

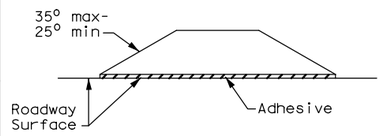
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)

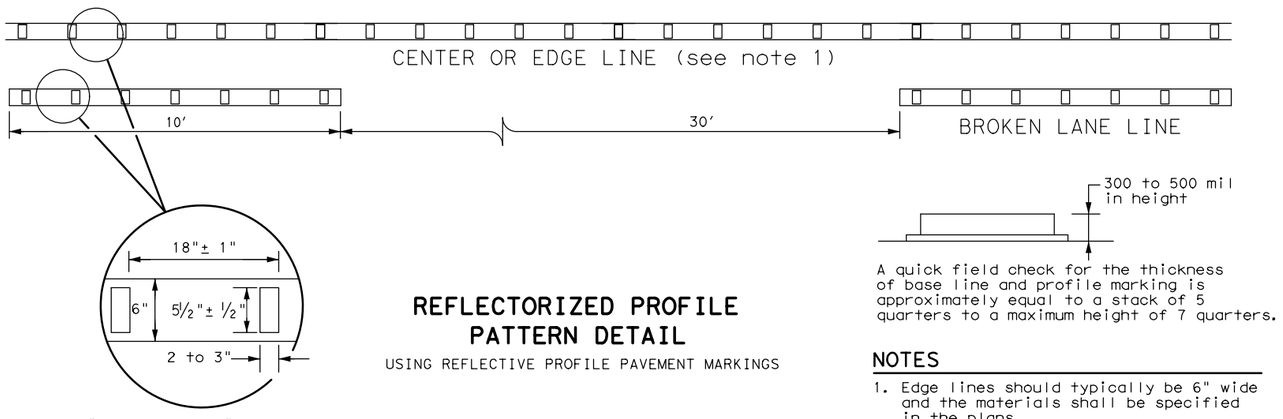


Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS



6" EDGE LINE, 6" CENTERLINE OR 6" LANE LINE

REFLECTORIZED PROFILE PATTERN DETAIL

USING REFLECTIVE PROFILE PAVEMENT MARKINGS

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	0715	01	025,ETC	FM108,ETC
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		171

22B

DATE:
FILE:

SIGN SUPPORT DESCRIPTIVE CODES

(Descriptive Codes correspond to project estimate and quantities sheets)

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

Post Type

FRP = Fiberglass Reinforced Plastic Pipe (see SMD(FRP))
TWT = Thin-Walled Tubing (see SMD(TWT))
10BWG = 10 BWG Tubing (see SMD(SLIP-1) to (SLIP-3))
S80 = Schedule 80 Pipe (see SMD(SLIP-1) to (SLIP-3))

Number of Posts (1 or 2)

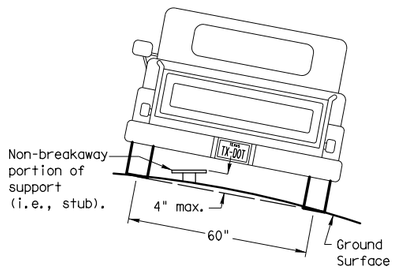
Anchor Type

UA = Universal Anchor - Concreted (see SMD(FRP) and (TWT))
UB = Universal Anchor - Bolted down (see SMD(FRP) and (TWT))
WS = Wedge Anchor Steel - (see SMD(TWT))
WP = Wedge Anchor Plastic (see SMD(TWT))
SA = Slipbase - Concreted (see SMD(SLIP-1) to (SLIP-3))
SB = Slipbase - Bolted Down (see SMD(SLIP-1) to (SLIP-3))

Sign Mounting Designation

P = Prefab. "Plain" (see SMD(SLIP-1) to (SLIP-3), (TWT), (FRP))
T = Prefab. "T" (see SMD(SLIP-1) to (SLIP-3), (TWT))
U = Prefab. "U" (see SMD(SLIP-1) to (SLIP-3))
IF REQUIRED
1EXT or 2EXT = Number of Extensions (see SMD(SLIP-1) to (SLIP-3), (TWT))
BM = Extruded Wind Beam (see SMD(SLIP-1) to (SLIP-3))
WC = 1.12 #/ft Wing Channel (see SMD(SLIP-1) to (SLIP-3))
EXAL = Extruded Aluminum Sign Panels (see SMD(SLIP-1))

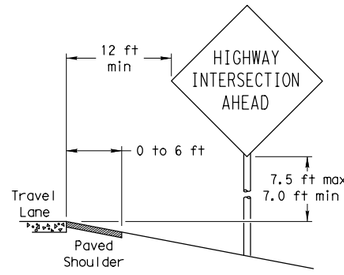
REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



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

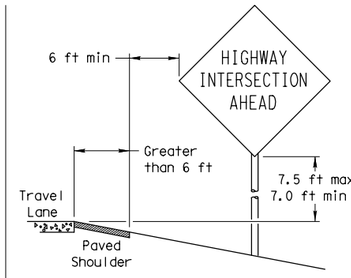
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

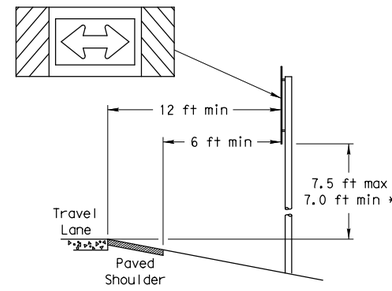
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



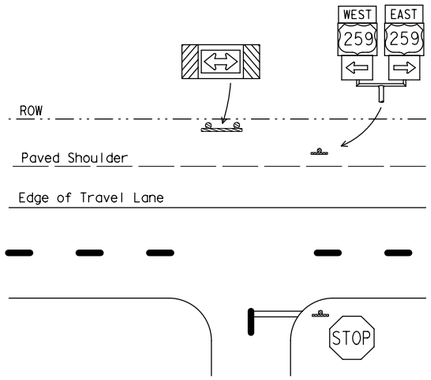
GREATER THAN 6 FT. WIDE

When the shoulder is greater than 6 ft in width, the sign must be placed at least 6 ft. from the edge of the shoulder.

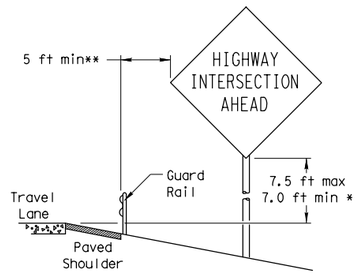
T-INTERSECTION



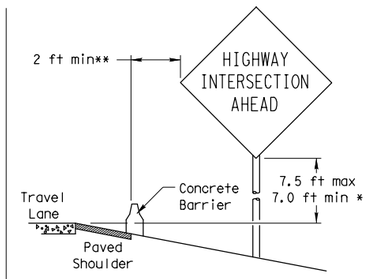
When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.



BEHIND BARRIER



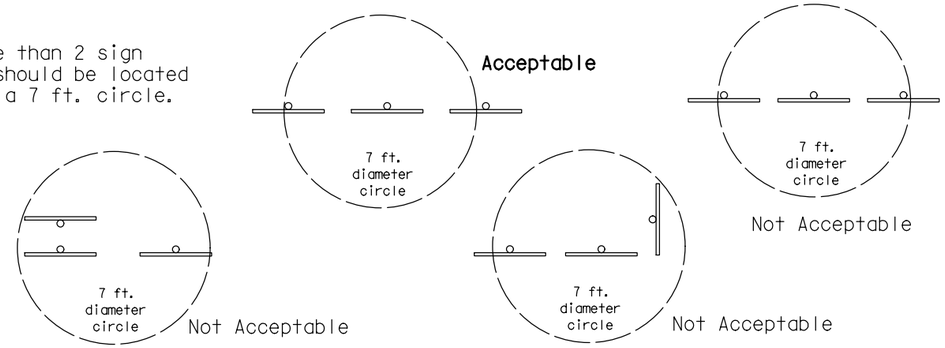
BEHIND GUARDRAIL



BEHIND CONCRETE BARRIER

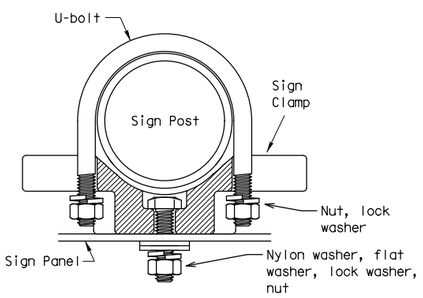
**Sign clearance based on distance required for proper guard rail or concrete barrier performance.

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



TYPICAL SIGN ATTACHMENT DETAIL

Single Signs

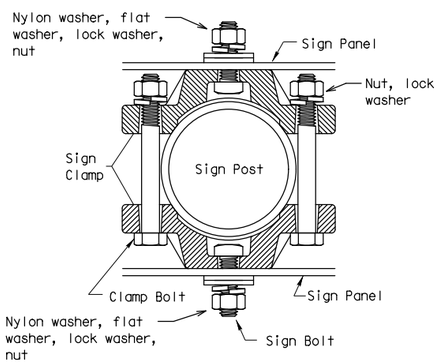


Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

When two sign clamps are used to mount signs back-to-back, use a 5/16-18 UNC galvanized hex head per ASTM A307 with nut and helical-spring lock washer. The approximate bolt lengths for various post sizes and sign clamp types are given in the table at right. The bolt length may need to be adjusted depending upon field conditions.

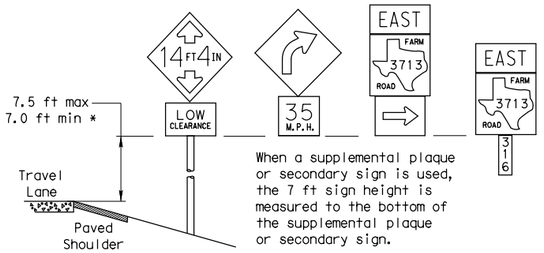
Sign clamps may be either the specific size clamp or the universal clamp.

Back-to-Back Signs



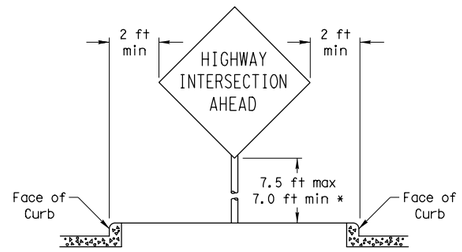
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



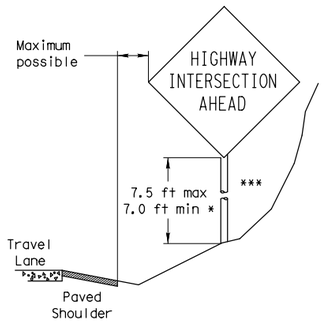
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

CURB & GUTTER OR RAISED ISLAND



RESTRICTED RIGHT-OF-WAY

(When 6 ft min. is not possible.)



Right-of-way restrictions may be created by rocks, water, vegetation, forest, buildings, a narrow island, or other factors.

In situations where a lateral restriction prevents the minimum horizontal clearance from the edge of the travel lane, signs should be placed as far from the travel lane as practical.

*** Post may be shorter if protected by guardrail or if Engineer determines the post could not be hit due to extreme slope.

* Signs shall be mounted using the following condition that results in the greatest sign elevation:

(1) a minimum of 7 to a maximum of 7.5 feet above the edge of the travel lane or

(2) a minimum of 7 to a maximum of 7.5 feet above the grade at the base of the support when sign is installed on the backslope.

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

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

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

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

SMD(GEN)-08

REVISIONS
9-08

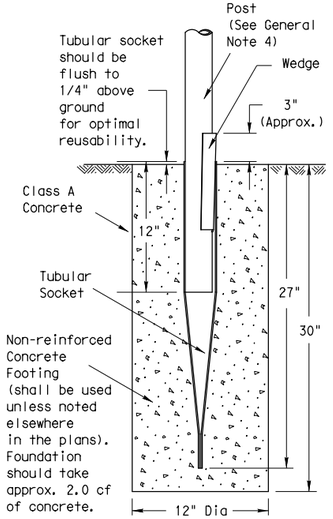
DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

CONT	SECT	JOB	HIGHWAY
0715	01	025,ETC	FM108,ETC

DIST	COUNTY	SHEET NO.
YKM	GONZALES	172

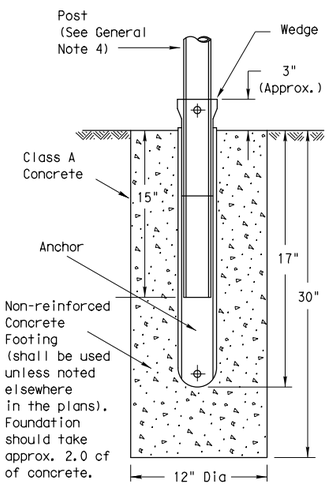
DATE:
FILE:

Wedge Anchor Steel System



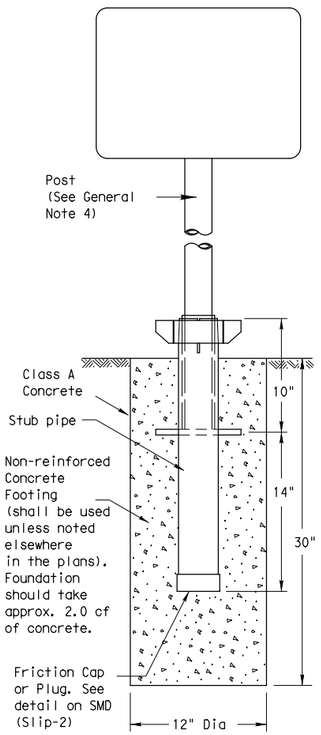
SM RD SGN ASSM TY TWT(X)WS(X)

Wedge Anchor High Density Polyethylene (HDPE) System

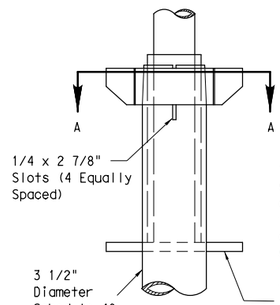


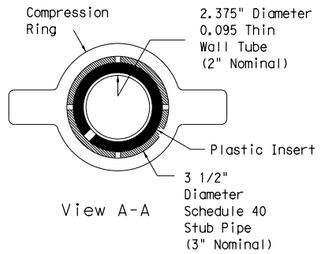
SMD RD SGN ASSM TY TWT(X)WP(X)

Universal Anchor System with Thin-Walled Tubing Post



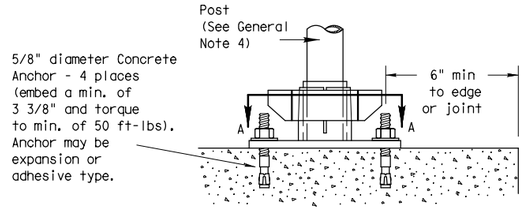
SM RD SGN ASSM TY TWT(X)UA(P)



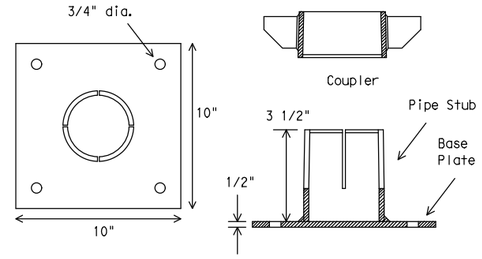


View A-A

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.

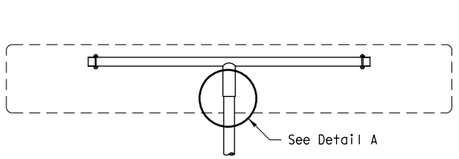


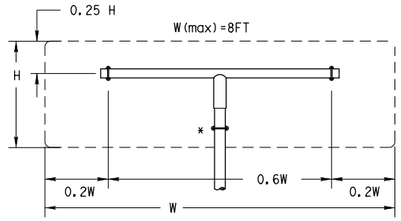
Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. A heavy hex nut per ASTM A563 and hardened washer per ASTM F436. The stud bolt shall have minimum yield and ultimate tensile strengths of 50 and 75 ksi, respectively. Nuts, bolts and washers shall be galvanized 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.



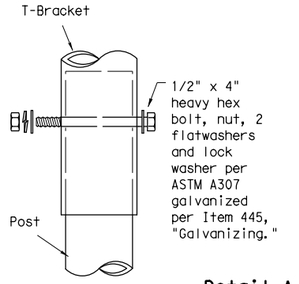
SM RD SGN ASSM TY TWT(X)UB(P)

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

CONT	SECT	JOB	HIGHWAY
0715	01	025,ETC	FM108,ETC

DIST	COUNTY	SHEET NO.
YKM	GONZALES	173

9-08 REVISIONS

DATE:
FILE:

26E

STORMWATER POLLUTION PREVENTION PLAN (SWP3):

This SWP3 has been developed in accordance with the TPDES Construction General Permit TXR150000 (CGP). The Texas Department of Transportation (TxDOT) ensures that project specifications include adequate best management practices (BMPs) for this project.

For all projects with any soil disturbing activities, TxDOT will maintain a SWP3 with all pertinent records, correspondence, environmental documents, etc. at the project field office. If no field office is available, then this SWP3 shall be kept in the appropriate TxDOT Area Office.

This SWP3 is consistent with requirements specified in applicable stormwater plans and the projects environmental permits, issues, and commitments (EPICs). A copy of the CGP is included in Attachment 2.12 of the SWP3 binder.

1.0 SITE/PROJECT DESCRIPTION

1.1 PROJECT CONTROL SECTION JOB (CSJ):
0715-01-025

1.2 PROJECT LIMITS:
From: FM 108 AT BRUSHY & DRAW,FIVE MILE & DRAW

To: STR#0715-01-006,-007,-010 & -011

1.3 PROJECT COORDINATES:
BEGIN: (Lat) 29.4175°(N) ,(Long) 97.5130°(W)

END: (Lat) 29.3757°(N) ,(Long) 97.5633°(W)

1.4 TOTAL PROJECT AREA (Acres): 7.10

1.5 TOTAL AREA TO BE DISTURBED (Acres): 5.38

1.6 NATURE OF CONSTRUCTION ACTIVITY:
CONSTRUCTION OF BRIDGE REPLACEMENT CONSISTING OF REPLACE BRIDGE AND APPROACHES

1.7 MAJOR SOIL TYPES:

Soil Type	Description
Laewest clay, 0 to 1% slopes	**90% clay, moderately well drained, high rate of runoff, and slight erosion potential.**
Dacosta sandy clay loam, 0 to 1% slopes	**90% sandy clay loam, moderately well drained, medium rate of runoff, and low erosion potential.**
Dacosta-Contee complex, 0 to 1% slopes	**60% clay/40% loam, moderately well drained, high rate of runoff, and low erosion potential.**

1.8 PROJECT SPECIFIC LOCATIONS (PSLs):
PSLs must be depicted on the Environmental Layout Sheets in Attachment 1.2 of this SWP3. PSLs may be identified during preconstruction meetings or during the construction process. Please choose from the options below:

- X PSLs determined during preconstruction meeting
- ☐ PSLs determined during construction
- ☐ No PSLs planned for construction

Type	Sheet #s

All off-ROW PSLs required by the Contractor are the Contractor's responsibility. The Contractor shall secure all permits required by local, state, federal laws for off-ROW PSLs. The contractor shall provide diagrams, areas of disturbance, acreage, and BMPs for all off-ROW PSLs within one mile of the project.

1.9 CONSTRUCTION ACTIVITIES:
(Use the following list as a starting point when developing the Construction Activity Schedule and Ceasing Record in Attachment 2.5.)

- X Mobilization
- X Install sediment and erosion controls
- X Blade existing topsoil into windrows, prep ROW, clear and grub
- X Remove existing pavement
- X Grading operations, excavation, and embankment
- X Excavate and prepare subgrade for proposed pavement widening
- X Remove existing culverts, safety end treatments (SETs)
- X Remove existing metal beam guard fence (MBGF), bridge rail
- X Install proposed pavement per plans
- ☐ Install culverts, culvert extensions, SETs
- X Install mow strip, MBGF, bridge rail
- X Place flex base
- X Rework slopes, grade ditches
- X Blade windrowed material back across slopes
- X Revegetation of unpaved areas
- X Achieve site stabilization and remove sediment and erosion control measures
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

1.10 POTENTIAL POLLUTANTS AND SOURCES:

- X Sediment laden stormwater from stormwater conveyance over disturbed area
- X Fuels, oils, and lubricants from construction vehicles, equipment, and storage
- X Solvents, paints, adhesives, etc. from various construction activities
- X Transported soils from offsite vehicle tracking
- X Construction debris and waste from various construction activities
- X Contaminated water from excavation or dewatering pump-out water
- X Sanitary waste from onsite restroom facilities
- X Trash from various construction activities/receptacles
- ☐ 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
Placedo Creek	***Lavaca/Chocolate Bay (2453); Impaired for bacteria in oyster waters**
NO TMDLs or I-PLANS WERE IDENTIFIED	

* Add (*) for impaired waterbodies with pollutant in ().

1.12 ROLES AND RESPONSIBILITIES: TxDOT

- X Development of plans and specifications
- ☐ Submit Notice of Intent (NOI) to TCEQ (≥5 acres)
- X Post Construction Site Notice
- ☐ Submit NOI/CSN to local MS4
- X Perform SWP3 inspections
- X Maintain SWP3 records and update to reflect daily operations
- X Complete and submit Notice of Termination to TCEQ
- X Maintain SWP3 records for 3 years
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

1.13 ROLES AND RESPONSIBILITIES: CONTRACTOR

- X Day To Day Operational Control
- ☐ Submit Notice of Intent (NOI) to TCEQ (≥5 acres)
- X Post Construction Site Notice
- ☐ Submit NOI/CSN to local MS4
- X Maintain schedule of major construction activities
- X Install, maintain and modify BMPs
- X Complete and submit Notice of Termination to TCEQ
- X Maintain SWP3 records for 3 years
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

1.14 LOCAL MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) OPERATOR COORDINATION:

MS4 Entity
No MS4s receive stormwater discharge from the site.

STORMWATER POLLUTION PREVENTION PLAN (SWP3)

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
			174
STATE	STATE DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
0715	01	025, ETC	FM 108,ETC

STORMWATER POLLUTION PREVENTION PLAN (SWP3):

2.0 BEST MANAGEMENT PRACTICES (BMPs) AND CONTROLS, INSPECTION, AND MAINTENANCE

The Contractor shall be the responsible party for implementing the BMPs described herein and for complying with the SWP3 for control of erosion and sedimentation during day-to-day operations. The Contractor shall implement changes to this SWP3 approved by TxDOT within the times specified in this SWP3 or the CGP.

2.1 EROSION CONTROL AND SOIL STABILIZATION BMPs:

T / P

- X X Protection of Existing Vegetation
- ☐ ☐ Vegetated Buffer Zones
- ☐ ☐ Soil Retention Blankets
- ☐ ☐ Geotextiles
- ☐ ☐ Mulching/ Hydromulching
- ☐ ☐ Soil Surface Treatments
- X ☐ Temporary Seeding
- ☐ X Permanent Planting, Sodding or Seeding
- ☐ ☐ Biodegradable Erosion Control Logs
- ☐ ☐ Rock Filter Dams/ Rock Check Dams
- ☐ ☐ Vertical Tracking
- ☐ ☐ Interceptor Swale
- ☐ X 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

Sediment control BMPs requiring design capacity calculations (See SWP3 Attachment 1.3.):

T / P

- ☐ ☐ Sediment Trap
  - ☐ Calculated volume runoff from 2-year, 24-hour storm for each acre of disturbed area
  - ☐ 3,600 cubic feet of storage per acre drained
- ☐ ☐ Sedimentation Basin
  - X Not required (<10 acres disturbed)
  - ☐ Required (>10 acres) and implemented.
    - ☐ Calculated volume runoff from 2-year, 24-hour storm for each acre of disturbed area
    - ☐ 3,600 cubic feet of storage per acre drained
  - ☐ Required (>10 acres), but not feasible due to:
    - ☐ Available area/Site geometry
    - ☐ Site slope/Drainage patterns
    - ☐ Site soils/Geotechnical factors
    - ☐ Public safety
    - ☐ Other: _____

2.3 PERMANENT CONTROLS:

(Coordinate post-construction BMPs with appropriate TxDOT maintenance sections.)

BMPs To Be Left In Place Post Construction:

Type	Stationing	
	From	To

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.4 OFFSITE VEHICLE TRACKING CONTROLS:

- X Excess dirt/mud on road removed daily
- X 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:

- X Chemical Management
- X Concrete and Materials Waste Management
- X Debris and Trash Management
- X Dust Control
- X Sanitary Facilities
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

2.6 VEGETATED BUFFER ZONES:

Natural vegetated buffers shall be maintained as feasible to protect adjacent surface waters. If vegetated natural buffer zones are not feasible due to site geometry, the appropriate additional sediment control measures have been incorporated into this SWP3.

Type	Stationing	
	From	To
No surface waters present, vegetated buffer zones are not planned.		

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.7 ALLOWABLE NON-STORMWATER DISCHARGES:

- ☐ Fire hydrant flushings
- X Irrigation drainage
- X Pavement washwater (where spills or leaks have not occurred, and detergents are not used)
- X Potable water sources
- X Springs
- X Uncontaminated groundwater
- X Water used to wash vehicles or control dust
- X Other allowable non-stormwater discharges as allowed by TPDES GP TXR150000.

2.8 INSPECTIONS:

All disturbed areas and erosion and sediment control devices shall be inspected at least once every seven (7) days. Inspections shall be performed by TxDOT as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.5 of this SWP3 .

2.9 MAINTENANCE:

Control measures shall be properly installed according to specifications. If it is determined that a BMP or control measure is not operating effectively, maintenance must be accomplished as soon as possible and before the next anticipated rain event, but in no case later than 7 calendar days after being able to access the site. Maintenance shall be performed by the Contractor as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.5 of this SWP3.

STORMWATER POLLUTION PREVENTION PLAN (SWP3)

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
			175
STATE	STATE DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
0715	01	025, ETC	FM 108,ETC

STORMWATER POLLUTION PREVENTION PLAN (SWP3):

This SWP3 has been developed in accordance with the TPDES Construction General Permit TXR150000 (CGP). The Texas Department of Transportation (TxDOT) ensures that project specifications include adequate best management practices (BMPs) for this project.

For all projects with any soil disturbing activities, TxDOT will maintain a SWP3 with all pertinent records, correspondence, environmental documents, etc. at the project field office. If no field office is available, then this SWP3 shall be kept in the appropriate TxDOT Area Office.

This SWP3 is consistent with requirements specified in applicable stormwater plans and the projects environmental permits, issues, and commitments (EPICs). A copy of the CGP is included in Attachment 2.12 of the SWP3 binder.

1.0 SITE/PROJECT DESCRIPTION

1.1 PROJECT CONTROL SECTION JOB (CSJ):
0347-02-033

1.2 PROJECT LIMITS: SH 97 at Red Branch

From: Station 1127+10.00

To: Station 1132+40.00

1.3 PROJECT COORDINATES:

BEGIN: (Lat) 29° 20' 00.89" ,(Long) -97° 45' 02.08"

END: (Lat) 29° 19' 57.69" ,(Long) -97° 45' 06.82"

1.4 TOTAL PROJECT AREA (Acres): 1.82

1.5 TOTAL AREA TO BE DISTURBED (Acres): 1.13

1.6 NATURE OF CONSTRUCTION ACTIVITY:
Construction of the replacement of existing bridge class culvert.

1.7 MAJOR SOIL TYPES:

Soil Type	Description
Fine Sandy Loam	The existing soils are sandy loams, clays, and clay loams that frequently flood.
Clay	The existing soils are sandy loams, clays, and clay loams that frequently flood.
Clay Loam	The existing soils are sandy loams, clays, and clay loams that frequently flood.

1.8 PROJECT SPECIFIC LOCATIONS (PSLs):
PSLs must be depicted on the Environmental Layout Sheets in Attachment 1.2 of this SWP3. PSLs may be identified during preconstruction meetings or during the construction process. Please choose from the options below:

X PSLs determined during preconstruction meeting
☐ PSLs determined during construction
☐ No PSLs planned for construction

Type	Sheet #s

All off-ROW PSLs required by the Contractor are the Contractor's responsibility. The Contractor shall secure all permits required by local, state, federal laws for off-ROW PSLs. The contractor shall provide diagrams, areas of disturbance, acreage, and BMPs for all off-ROW PSLs within one mile of the project.

1.9 CONSTRUCTION ACTIVITIES:
(Use the following list as a starting point when developing the Construction Activity Schedule and Ceasing Record in Attachment 2.5.)

X Mobilization
X Install sediment and erosion controls
X Blade existing topsoil into windrows, prep ROW, clear and grub
X Remove existing pavement
X Grading operations, excavation, and embankment
X Excavate and prepare subgrade for proposed pavement widening
X Remove existing culverts, safety end treatments (SETs)
X Remove existing metal beam guard fence (MBGF), bridge rail
X Install proposed pavement per plans
X Install culverts, culvert extensions, SETs
X Install mow strip, MBGF, bridge rail
X Place flex base
X Rework slopes, grade ditches
X Blade windrowed material back across slopes
X Revegetation of unpaved areas
X Achieve site stabilization and remove sediment and erosion control measures
☐ Other: _____
☐ Other: _____
☐ Other: _____

1.10 POTENTIAL POLLUTANTS AND SOURCES:

X Sediment laden stormwater from stormwater conveyance over disturbed area
X Fuels, oils, and lubricants from construction vehicles, equipment, and storage
X Solvents, paints, adhesives, etc. from various construction activities
X Transported soils from offsite vehicle tracking
X Construction debris and waste from various construction activities
X Contaminated water from excavation or dewatering pump-out water
X Sanitary waste from onsite restroom facilities
X Trash from various construction activities/receptacles
X Long-term stockpiles of material and waste
☐ 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
From Red Branch into Clear Fork Creek, then into Sandies Creek (1803B)	Guadalupe River Below San Marcos River (1803)

* Add (*) for impaired waterbodies with pollutant in ().

1.12 ROLES AND RESPONSIBILITIES: TxDOT

X Development of plans and specifications
X Submit Notice of Intent (NOI) to TCEQ (≥5 acres)
X Post Construction Site Notice
☐ Submit NOI/CSN to local MS4
X Perform SWP3 inspections
X Maintain SWP3 records and update to reflect daily operations
X Complete and submit Notice of Termination to TCEQ
X Maintain SWP3 records for 3 years
☐ Other: _____
☐ Other: _____
☐ Other: _____

1.13 ROLES AND RESPONSIBILITIES: CONTRACTOR

X Day To Day Operational Control
☐ Submit Notice of Intent (NOI) to TCEQ (≥5 acres)
X Post Construction Site Notice
☐ Submit NOI/CSN to local MS4
X Maintain schedule of major construction activities
X Install, maintain and modify BMPs
X Complete and submit Notice of Termination to TCEQ
X Maintain SWP3 records for 3 years
☐ Other: _____
☐ Other: _____
☐ Other: _____

1.14 LOCAL MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) OPERATOR COORDINATION:

MS4 Entity

STORMWATER POLLUTION PREVENTION PLAN (SWP3)

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			176
STATE	STATE DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
0715	01	025, ETC.	FM 108, ETC.

STORMWATER POLLUTION PREVENTION PLAN (SWP3):

2.0 BEST MANAGEMENT PRACTICES (BMPs) AND CONTROLS, INSPECTION, AND MAINTENANCE

The Contractor shall be the responsible party for implementing the BMPs described herein and for complying with the SWP3 for control of erosion and sedimentation during day-to-day operations. The Contractor shall implement changes to this SWP3 approved by TxDOT within the times specified in this SWP3 or the CGP.

2.1 EROSION CONTROL AND SOIL STABILIZATION BMPs:

T / P

- [X] [ ] Protection of Existing Vegetation
- [ ] [ ] Vegetated Buffer Zones
- [ ] [ ] Soil Retention Blankets
- [ ] [ ] Geotextiles
- [ ] [X] Mulching/ Hydromulching
- [ ] [ ] Soil Surface Treatments
- [X] [ ] Temporary Seeding
- [ ] [X] Permanent Planting, Sodding or Seeding
- [ ] [ ] Biodegradable Erosion Control Logs
- [ ] [ ] Rock Filter Dams/ Rock Check Dams
- [ ] [ ] Vertical Tracking
- [ ] [ ] Interceptor Swale
- [ ] [X] Riprap
- [ ] [ ] Diversion Dike
- [ ] [ ] Temporary Pipe Slope Drain
- [ ] [ ] Embankment for Erosion Control
- [ ] [ ] Paved Flumes
- [ ] [ ] Other: _____
- [ ] [ ] Other: _____
- [ ] [ ] Other: _____
- [ ] [ ] Other: _____

2.2 SEDIMENT CONTROL BMPs:

T / P

- [ ] [ ] Biodegradable Erosion Control Logs
- [ ] [ ] Dewatering Controls
- [ ] [ ] Inlet Protection
- [ ] [ ] Rock Filter Dams/ Rock Check Dams
- [ ] [ ] Sandbag Berms
- [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

Sediment control BMPs requiring design capacity calculations (See SWP3 Attachment 1.3.):

T / P

- [ ] [ ] Sediment Trap
  - [ ] Calculated volume runoff from 2-year, 24-hour storm for each acre of disturbed area
  - [ ] 3,600 cubic feet of storage per acre drained
- [ ] [ ] Sedimentation Basin
  - [X] Not required (<10 acres disturbed)
  - [ ] Required (>10 acres) and implemented.
    - [ ] Calculated volume runoff from 2-year, 24-hour storm for each acre of disturbed area
    - [ ] 3,600 cubic feet of storage per acre drained
  - [ ] Required (>10 acres), but not feasible due to:
    - [ ] Available area/Site geometry
    - [ ] Site slope/Drainage patterns
    - [ ] Site soils/Geotechnical factors
    - [ ] Public safety
    - [ ] Other: _____

2.3 PERMANENT CONTROLS:

(Coordinate post-construction BMPs with appropriate TxDOT maintenance sections.)

BMPs To Be Left In Place Post Construction:

Type	Stationing	
	From	To
Broadcast Seed	1127+10.00	1132+40.00
Riprap	1129+98.50	1130+87.00

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
- [X] 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:

- [X] Chemical Management
- [X] Concrete and Materials Waste Management
- [X] Debris and Trash Management
- [X] Dust Control
- [X] Sanitary Facilities
- [ ] Other: _____
- [ ] Other: _____
- [ ] Other: _____
- [ ] Other: _____
- [ ] Other: _____

2.6 VEGETATED BUFFER ZONES:

Natural vegetated buffers shall be maintained as feasible to protect adjacent surface waters. If vegetated natural buffer zones are not feasible due to site geometry, the appropriate additional sediment control measures have been incorporated into this SWP3.

Type	Stationing	
	From	To

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.7 ALLOWABLE NON-STORMWATER DISCHARGES:

- [X] Fire hydrant flushings
- [X] Irrigation drainage
- [X] Pavement washwater (where spills or leaks have not occurred, and detergents are not used)
- [X] Potable water sources
- [X] Springs
- [X] Uncontaminated groundwater
- [X] Water used to wash vehicles or control dust
- [X] Other allowable non-stormwater discharges as allowed by TPDES GP TXR150000.

2.8 INSPECTIONS:

All disturbed areas and erosion and sediment control devices shall be inspected at least once every seven (7) days. Inspections shall be performed by TxDOT as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.5 of this SWP3 .

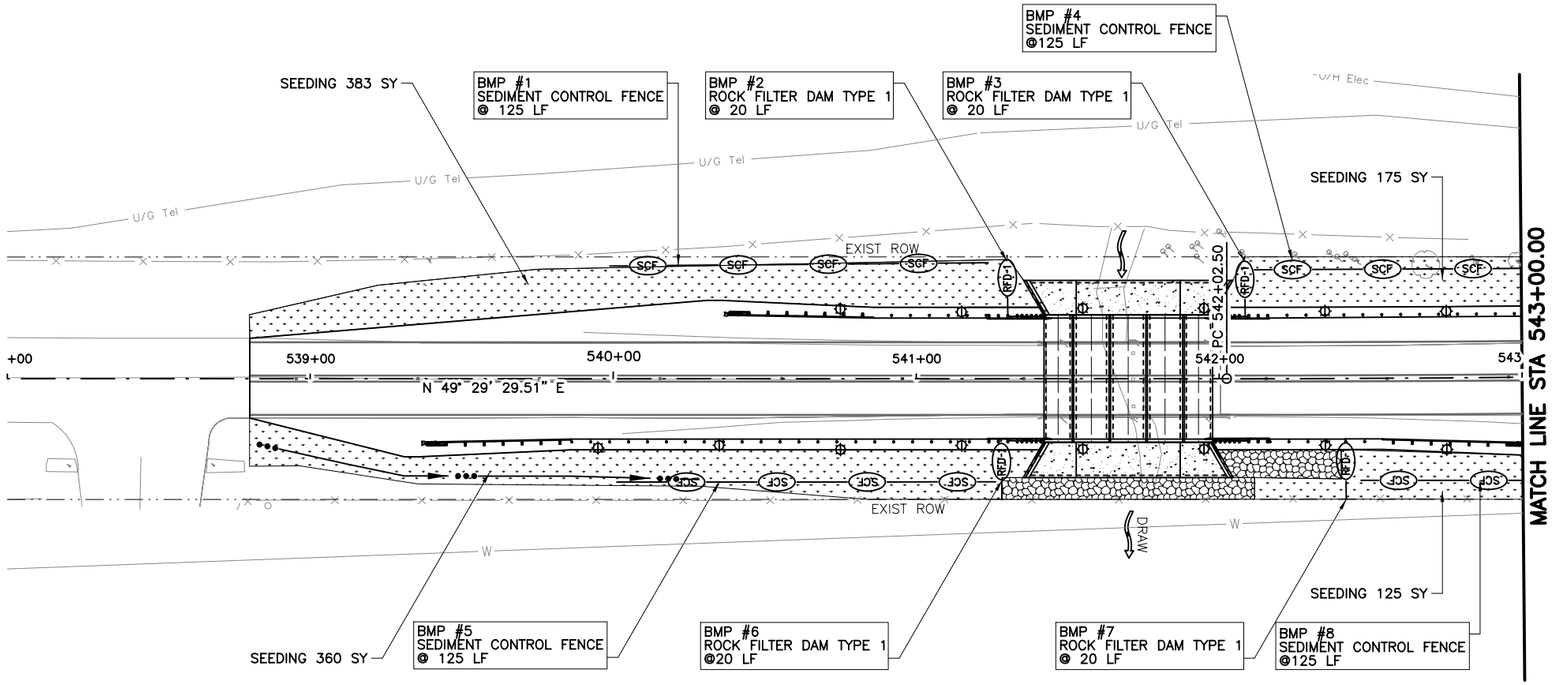
2.9 MAINTENANCE:

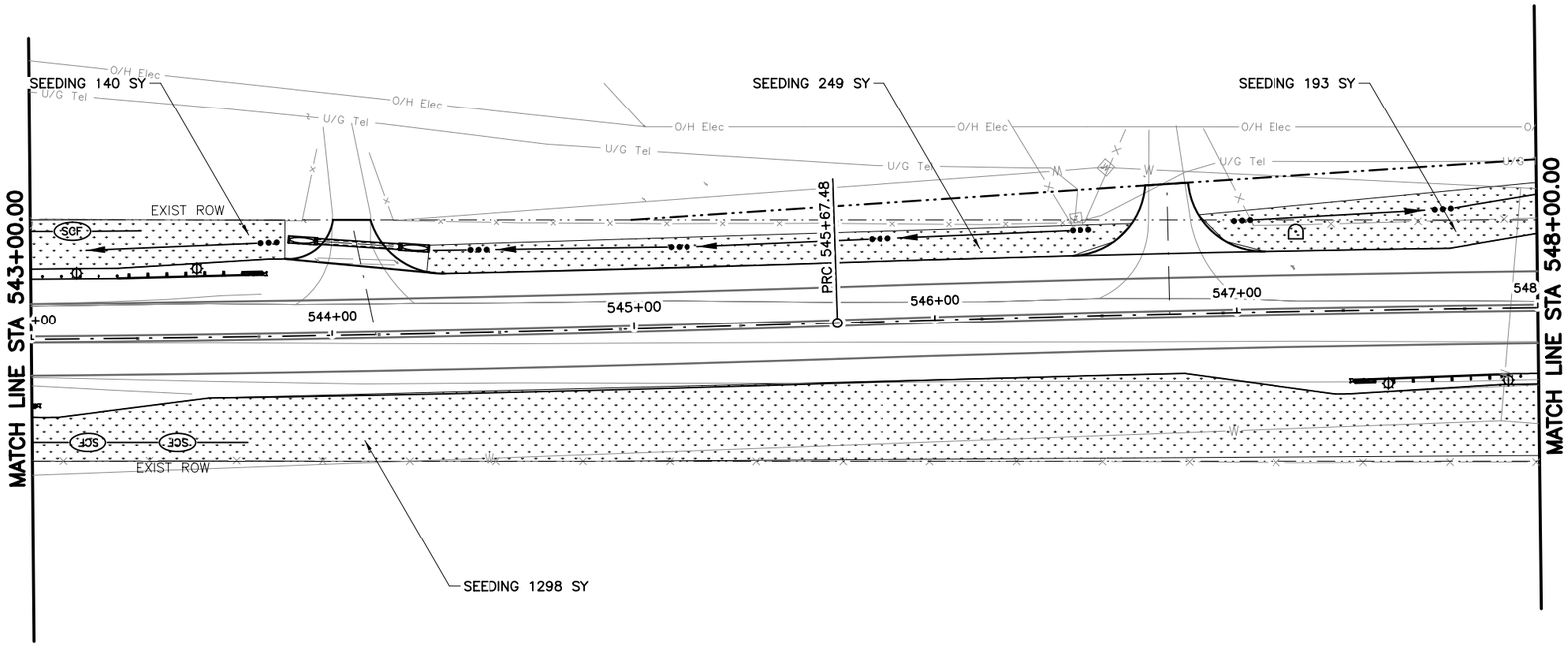
Control measures shall be properly installed according to specifications. If it is determined that a BMP or control measure is not operating effectively, maintenance must be accomplished as soon as possible and before the next anticipated rain event, but in no case later than 7 calendar days after being able to access the site. Maintenance shall be performed by the Contractor as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.5 of this SWP3.

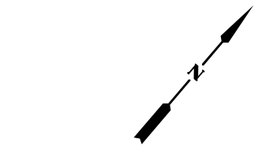
STORMWATER POLLUTION PREVENTION PLAN (SWP3)

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			177
STATE	STATE DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
0715	01	025, ETC.	FM 108, ETC.







LEGEND

- SCF — SEDIMENT CONTROL FENCE
- RFD-1 — ROCK FILTER DAM (TY 1)
- SEEDING AREA

NOTES:

1. ACTUAL BMP LOCATIONS AND LENGTHS MAY VARY TO MEET FIELD CONDITIONS, AS APPROVED OR AS DIRECTED BY THE ENGINEER.

STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED
PROFESSIONAL ENGINEER
3/31/2023

NO.	REVISION	BY	DATE

CP&Y an STV Company
TEXAS REGISTERED ENGINEERING FIRM F-1741

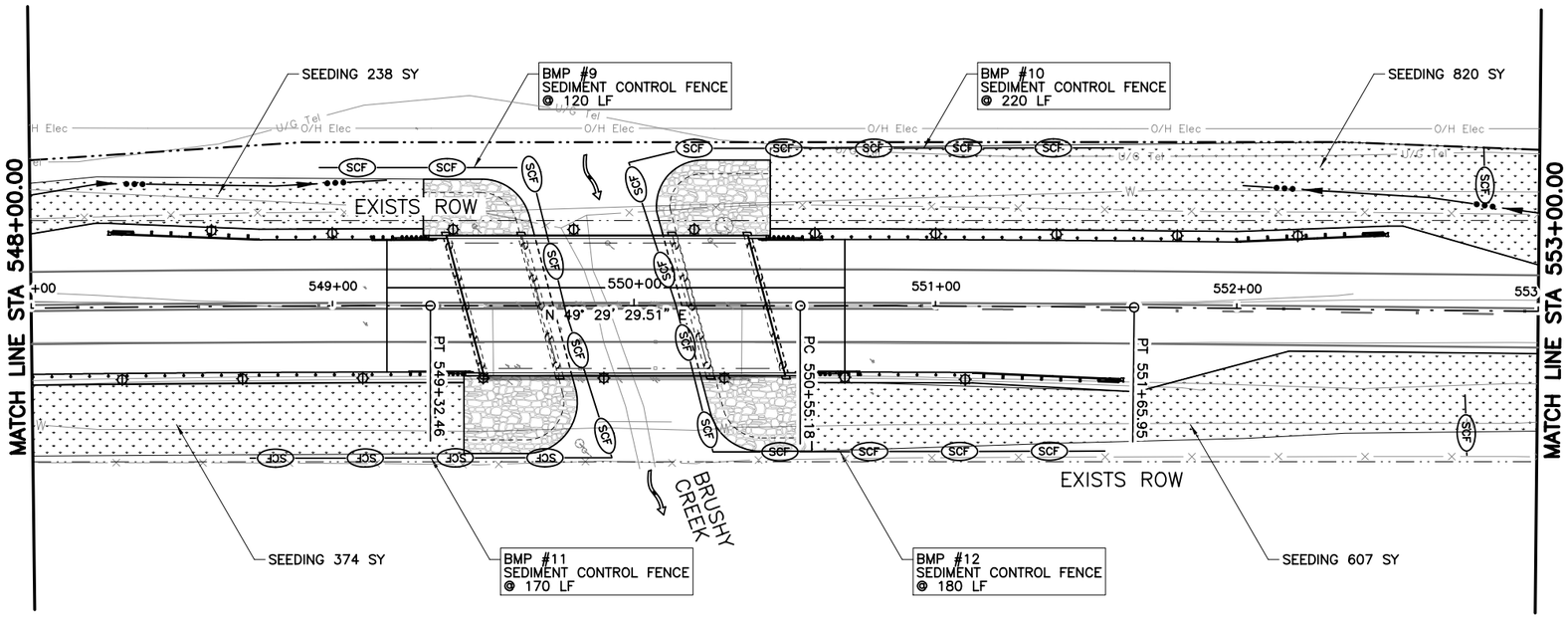
 Texas Department of Transportation

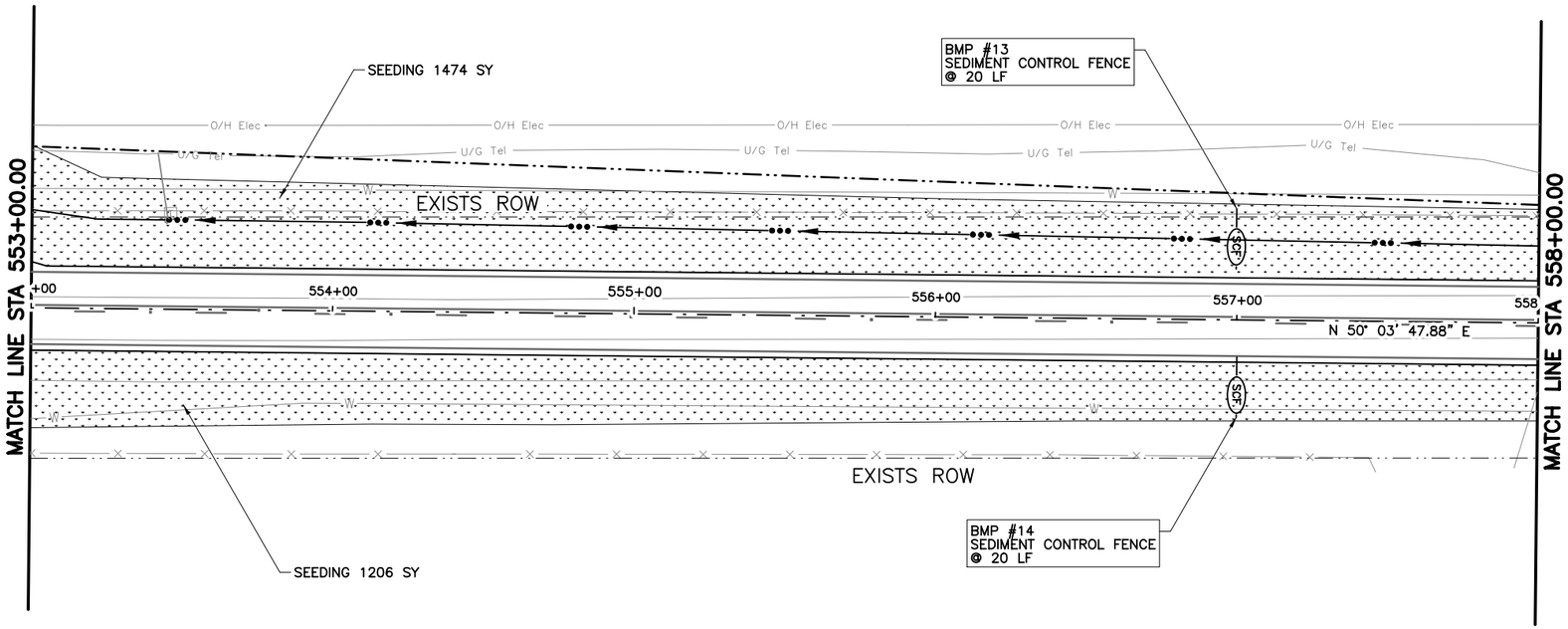
FM 108 AT DRAW & BRUSHY CREEK

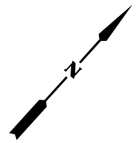
SWP3 LAYOUT

CSJ 0715-01-025 SHEET 1 OF 3

Designed:	YP	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	BAJ	6	TEXAS					FM 108,ETC
Drawn:	YP	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	BAJ	YKM	GONZALES	0715	01	025,ETC		178







25 12.5 0 25 50
SCALE HORIZ. FEET

5 2.5 0 5 10
SCALE VERT. FEET

LEGEND
- SCF — SEDIMENT CONTROL FENCE
- RFD-1 — ROCK FILTER DAM (TY 1)
- SEEDING AREA

NOTES:

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STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED
PROFESSIONAL ENGINEER
3/31/2023

NO.	REVISION	BY	DATE

CP&Y an STV Company
TEXAS REGISTERED ENGINEERING FIRM F-1741

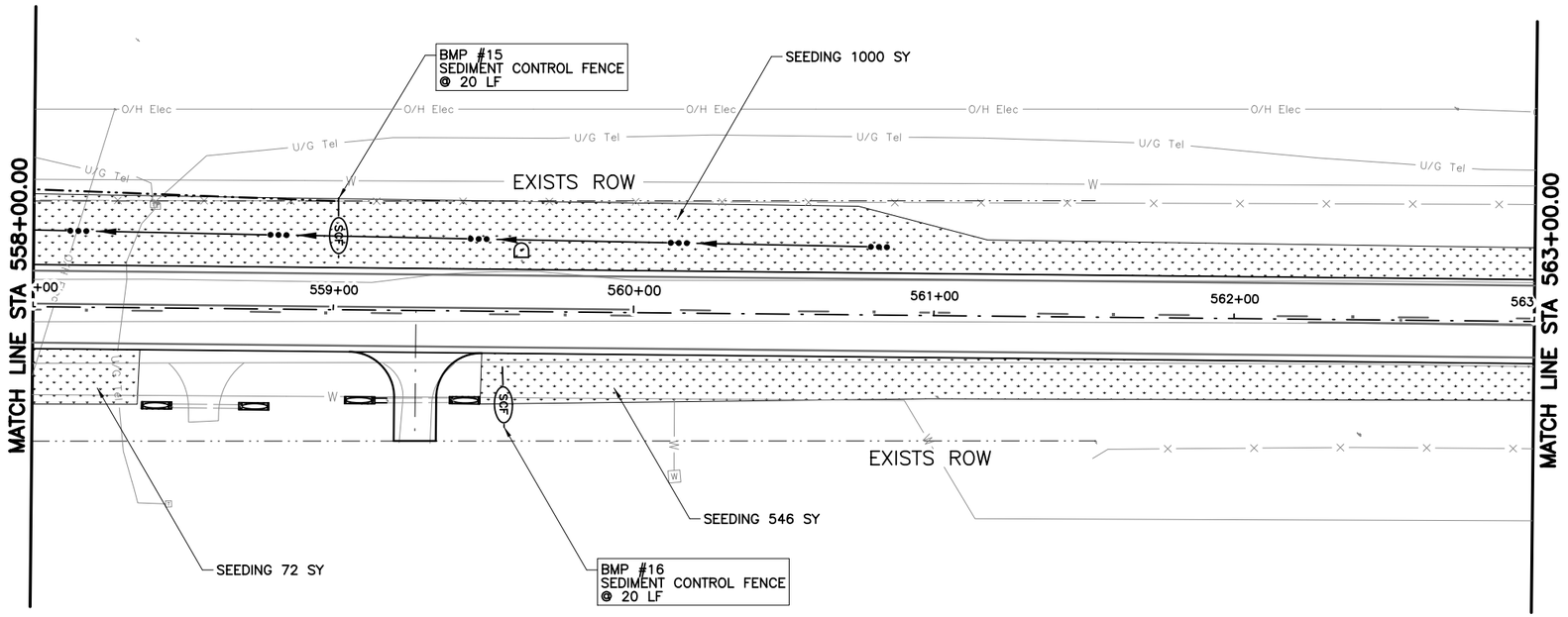
 Texas Department of Transportation

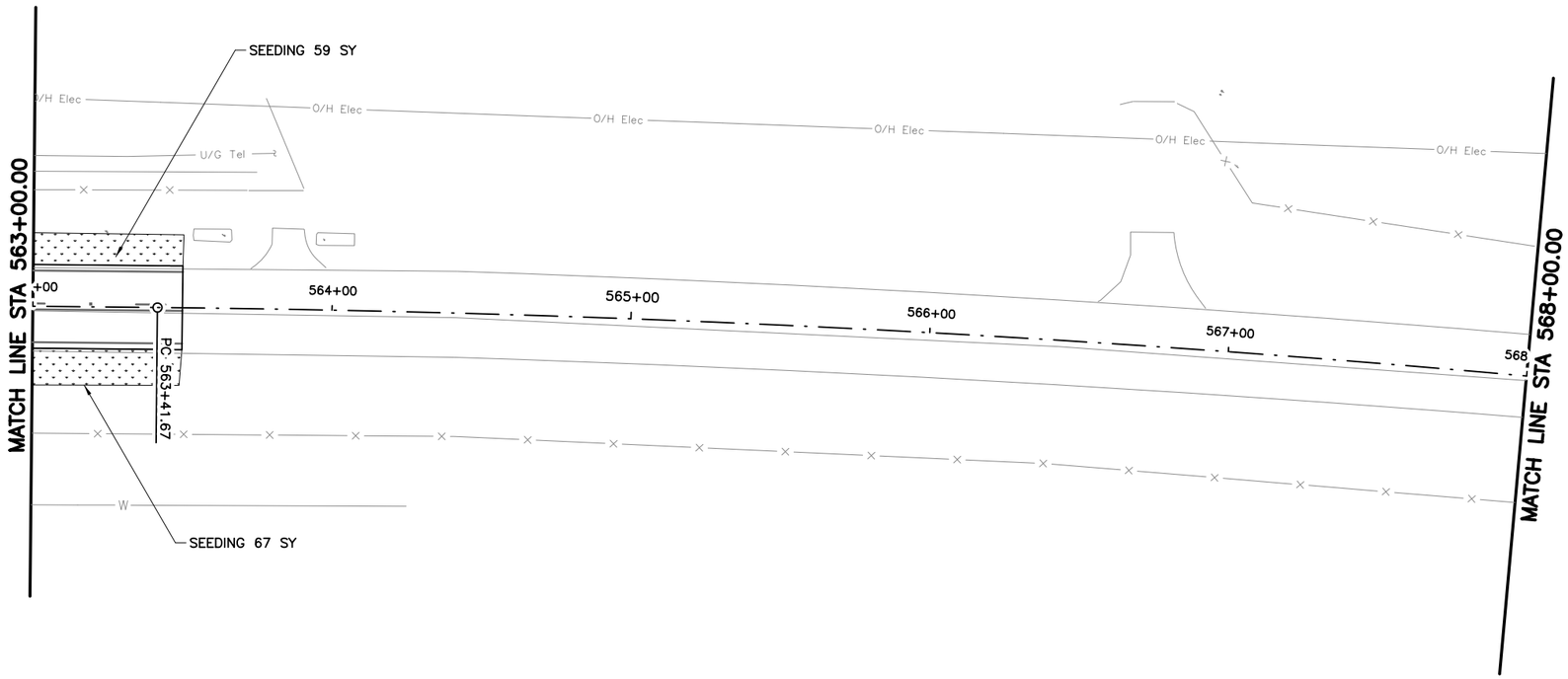
FM 108 AT DRAW & BRUSHY CREEK

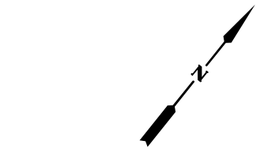
SWP3 LAYOUT

CSJ 0715-01-025 SHEET 2 OF 3

Designed:	YP	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	BAJ	6	TEXAS					FM 108,ETC
Drawn:	YP	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	BAJ	YKM	GONZALES	0715	01	025,ETC		179







LEGEND

- SCF — SEDIMENT CONTROL FENCE
- RFD-1 — ROCK FILTER DAM (TY 1)
- SEEDING AREA

NOTES:

1. ACTUAL BMP LOCATIONS AND LENGTHS MAY VARY TO MEET FIELD CONDITIONS, AS APPROVED OR AS DIRECTED BY THE ENGINEER.

STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED
PROFESSIONAL ENGINEER
3/31/2023

NO.	REVISION	BY	DATE

CP&Y an STV Company
TEXAS REGISTERED ENGINEERING FIRM F-1741

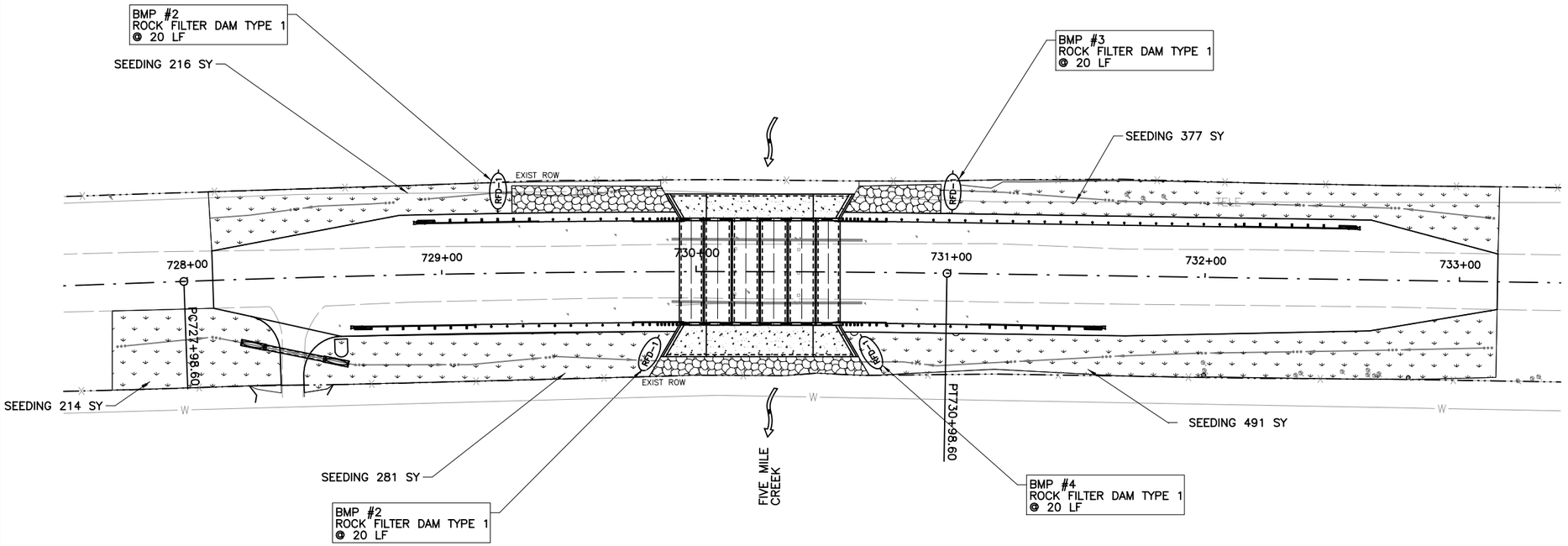
 Texas Department of Transportation

FM 108 AT DRAW & BRUSHY CREEK

SWP3 LAYOUT

CSJ 0715-01-025 SHEET 3 OF 3

Designed:	YP	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	BAJ	6	TEXAS					FM 108,ETC
Drawn:	YP	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	BAJ	YKM	GONZALES	0715	01	025,ETC		180



N

25 12.5 0 25 50
SCALE HORIZ. FEET

5 2.5 0 5 10
SCALE VERT. FEET

LEGEND

- SCF — SEDIMENT CONTROL FENCE
- RFD-1 — ROCK FILTER DAM (TY 1)
- SEEDING AREA

NOTES:

1. ACTUAL BMP LOCATIONS AND LENGTHS MAY VARY TO MEET FIELD CONDITIONS, AS APPROVED OR AS DIRECTED BY THE ENGINEER.

STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED PROFESSIONAL ENGINEER
3/31/2023

NO.	REVISION	BY	DATE

CP&Y an STV Company
TEXAS REGISTERED ENGINEERING FIRM F-1741

FM 108 AT FIVE MILE CREEK & DRAW

SWP3 LAYOUT

CSJ 0715-01-025 SHEET 1 OF 1

Designed:	KP	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	BAJ	6	TEXAS				FM 108,ETC
Drawn:	KP	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	FV	YKM	GONZALES	0715	01	025,ETC	181

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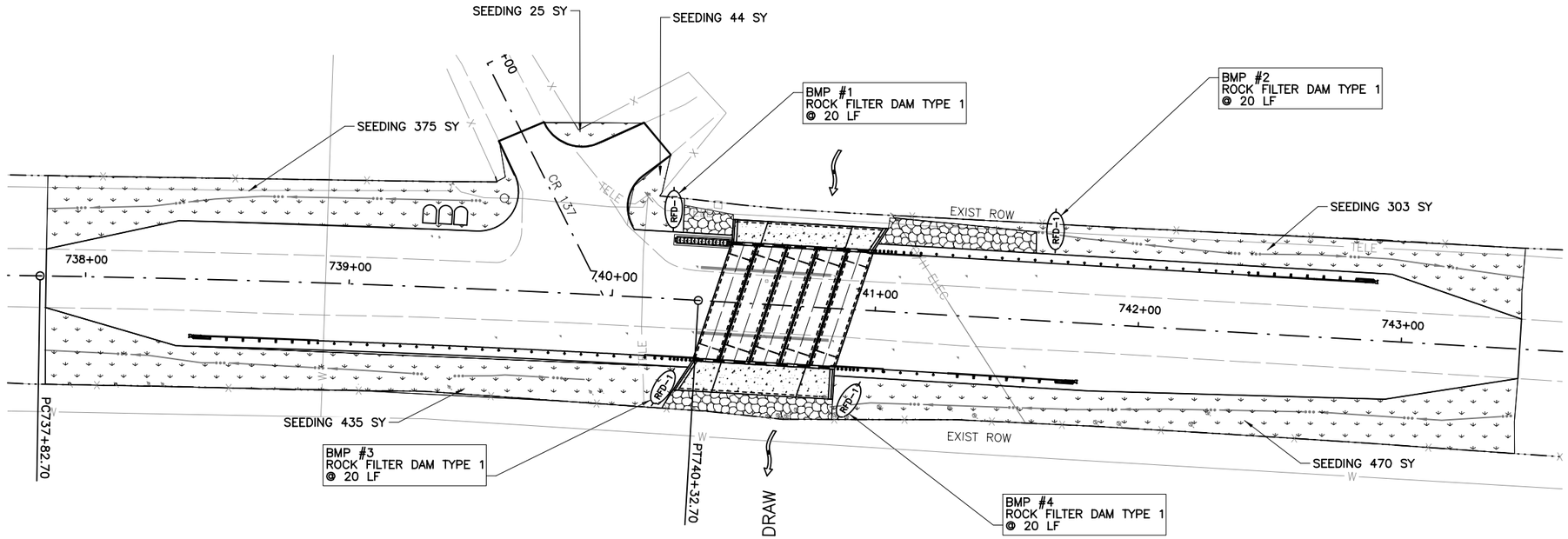


N

25 12.5 0 25 50
SCALE FEET
HORIZ.

5 2.5 0 5 10
SCALE FEET
VERT.

LEGEND

- SCF — SEDIMENT CONTROL FENCE
- RFD-1 — ROCK FILTER DAM (TY 1)
- SEEDING AREA

NOTES:

1. ACTUAL BMP LOCATIONS AND LENGTHS MAY VARY TO MEET FIELD CONDITIONS, AS APPROVED OR AS DIRECTED BY THE ENGINEER.

STATE OF TEXAS
BRIAN A. JONES
95732
LICENSED
PROFESSIONAL ENGINEER
3/31/2023

NO.	REVISION	BY	DATE

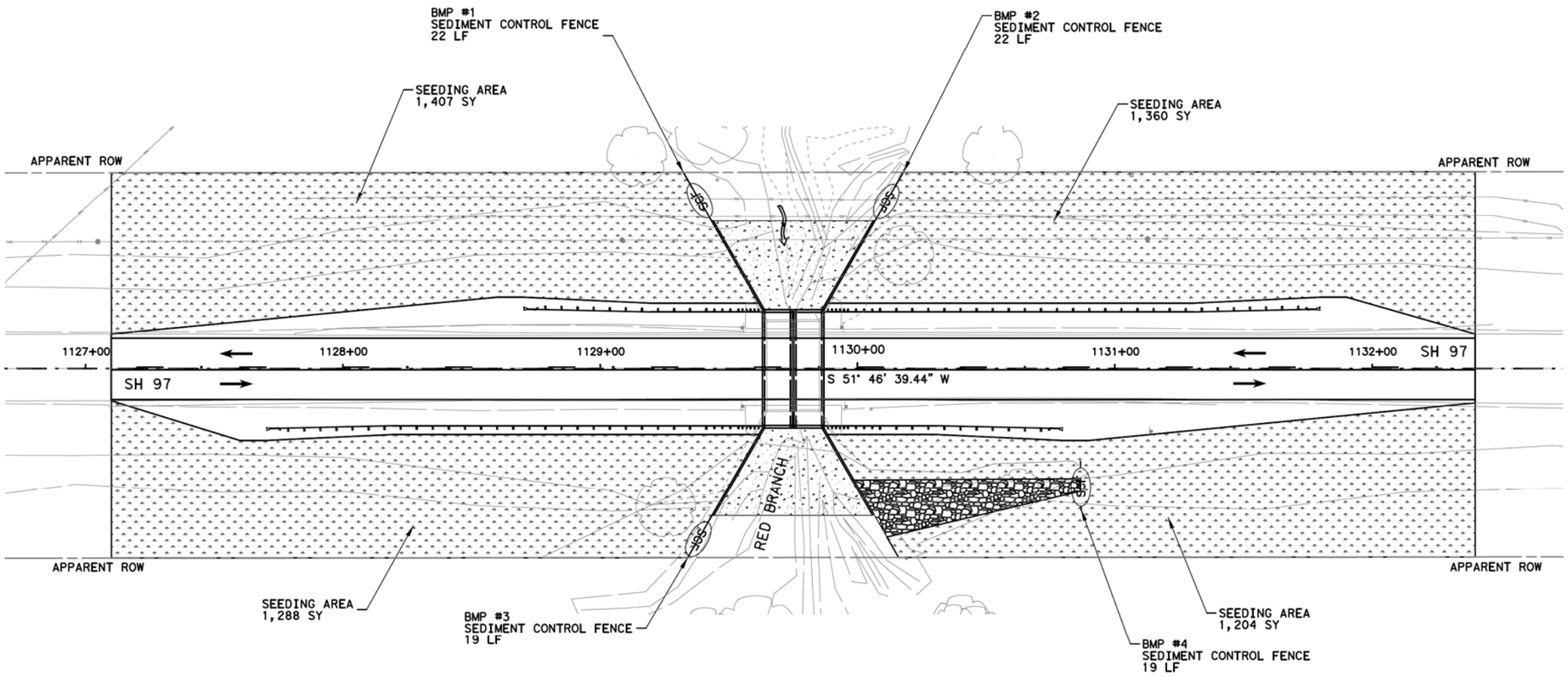
CP&Y an STV Company
TEXAS REGISTERED ENGINEERING FIRM F-1741

FM 108 AT FIVE MILE CREEK & DRAW

SWP3 LAYOUT

CSJ 0715-01-025 SHEET 1 OF 1

Designed:	KP	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	BAJ	6	TEXAS					FM 108,ETC
Drawn:	KP	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	FV	YKM	GONZALES	0715	01	025,ETC		182



N

25 12.5 0 25 50
SCALE HORIZ. FEET

LEGEND

SCF — SEDIMENT CONTROL FENCE

DIRECTION OF FLOW

SEEDING AREA

NOTES:

1. INSTALL BMPS TO CORRESPOND WITH SEQUENCE OF CONSTRUCTION. ADDITIONAL BMPS MAY BE ADDED TO CORRESPOND WITH CONSTRUCTION ACTIVITIES AS APPROVED OR AS DIRECTED BY THE ENGINEER.

2. BMP QUANTITIES AND LOCATIONS SHOWN ARE ESTIMATES. ACTUAL BMP LOCATIONS AND LENGTHS MAY VARY TO MEET FIELD CONDITIONS, AS APPROVED OR AS DIRECTED BY THE ENGINEER.

STATE OF TEXAS
AMANDA H. ARAJ
123725
LICENSED
PROFESSIONAL ENGINEER
3/31/2023

NO.	REVISION	BY	DATE

WSP USA Inc.
16200 Park Row, Suite 200
Houston, TX 77084
TBPE # F-2263

SH 97 AT RED BRANCH

SWP3 LAYOUT

CSJ 0347-02-033 SHEET 1 OF 1

Designed:	MAK	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.	
Checked:	AHA	6	TEXAS				FM 108, ETC	
Drawn:	MAK	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.	
Checked:	AHA	YKM	GONZALES	0715	01	025,ETC	183	

I. STORMWATER POLLUTION PREVENTION

Texas Pollutant Discharge Elimination System (TPDES) TXR 150000: Stormwater Discharge Permit or Construction General Permit is 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. If applicable list MS4 operator that may receive discharges from this project. MS4 operator should be notified prior to construction activities.

- ☒ Prevent stormwater pollution erosion and sedimentation in accordance with TPDES Permit TXR 150000.
- ☒ Comply with the SW3P and revise when necessary to control pollution or as required by the Engineer.
- ☒ Post Construction Site Notice (CSN) with SW3P information on or near the site, accessible to the public and TCEQ, EPA, or other inspectors.
- ☒ When Contractor project specific locations (PSL) increase disturbed soil area to 5 acres or more, sumbit Notice of Intent (NOI) to TCEQ and Engineer.
- ☐ MS4 Operator(s):

No Additional Comments

II. WORK IN OR NEAR STREAMS, WATERBODIES AND WETLANDS

United States Army Corps of Engineers (USACE) Permit is required for filling, dredging, excavating or other work in water bodies, rivers, creeks, streams, wetlands or wet areas. The Contractor must adhere to all of the terms and general conditions associated with the following permit(s). If additional work not represented in the plans is required, contact the Engineer immediately.

- ☐ No USACE Permit Required
- ☒ Work is authorized by the USACE under a Nationwide Permit **14** without a Pre-Construction Notification (PCN). Project specific permit was not issued by USACE, therefore is not in the plan set.
- ☐ Work is authorized by the USACE under a Nationwide Permit _____ with a Pre-Construction Notification (PCN). The project specific permit issued by the USACE is included in the plan set.
- ☐ Work is authorized by the USACE under a Individual Permit (IP). The project specific permit issued by the USACE is included in the plan set.
- ☐ Work would be authorized by the USACE. The project specific permit issued by the USACE or Nationwide Permit will be provided to the contractor.

United States Coast Guard (USCG) Permit is required for projects that involve the construction or modification (including changes to lighting) of a bridge or causeway across a water body determined to be navigable by the United States Coast Guard (USCG) under Section 9 of the Rivers and Harbors Act. If additional work not represented in the plans is required, contact the Engineer immediately.

- ☒ No United States Coast Guard (USCG) Coordination Required
- ☐ United States Coast Guard (USCG) Permit
- ☐ United States Coast Guard (USCG) Exemption

Best Management Practices

Erosion	Sedimentation	Post Construction TSS
☒ Temporary Vegetation	☒ Silt Fence	☒ Vegetative Filter Strips
☐ Vegetation Lined Ditches	☐ Rock Filter Dam	☐ Vegetation Lined Ditches
☐ Sodding	☐ Sand Bag Berm	☐ Grassy Swales

No Additional Comments

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 area and contact the Engineer immediately.

No Additional Comments

IV. VEGETATION RESOURCES

Preserve native vegetation to the extent practical. Refer to TxDOT Standard Specifications 162, 164, 192, 193, 506, 730, 751, and 752 in order to comply with requirements for invasive species, beneficial landscaping and tree/brush removal.

No Additional Comments

V. FEDERAL LISTED, PROPOSED THREATENED, ENDANGERED SPECIES, CRITICAL HABITAT, STATE LISTED SPECIES, CANDIDATE SPECIES AND MIGRATORY BIRDS

If any of the listed species below are observed, cease work in the area, do not disturb species or habitat and contact the Engineer immediately.

The work may not remove active nests (from bridges, structures, or vegetation adjacent to the roadway, etc.) during nesting season (February 15 to October 1). If removal of structures or vegetation is necessary during the nesting season, the Contractor shall conduct a bird survey no more than 3 days in advance of the clearing/demolish start date. All bird surveys shall be conducted by a Field Biologist and adhere to the guidance document “Avoiding Migratory Birds and Handling Potential Violations” found in the TxDOT Environmental Compliance Toolkits at the time of the survey. (See below for Field Biologist and Ornithologist qualifications)

Additional Comments

Eastern Spotted Skunk (Spilogale putorius):
- The Eastern Spotted Skunk has the potential to occur within the project area. The contractor shall not harm the species, it's dens or young.

Eastern Box Turtle (Terrapene carolina):
• For open trenches and excavated pits, install escape ramps at an angle of less than 45 degrees (1:1) in areas left uncovered. Visually inspect excavation areas for trapped wildlife prior to backfilling
• Avoid or minimize disturbing or removing cover objects, such as downed trees, rotting stumps, brush piles, and leaf litter. If avoidance or minimization is not practicable, consider removing cover objects prior to the start of the project and replace them at project completion.

(con't)

Field Biologist, Ornithologist – a field biologist is defined as an individual qualified to perform field investigations, presence/absence surveys and habitat surveys for protected avian species or species of concern. A mandatory bachelor’s degree in biology or a related science is required. At a minimum, the Field Biologist, Ornithologist, shall have completed and reported a minimum of three presence/absence and habitat surveys for protected avian species in the past five years. A minimum of three projects must have been conducted in Texas. Surveys shall have been performed for documentation of species in accordance with a protocol approved by USFWS or TPWD, or following generally accepted methodologies.

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

Refer to TxDOT Standard Specifications in the event potentially contaminated materials are observed, such as dead or distressed vegetation, trash disposal areas, drums, canisters, barrels, leaching or seepage of substances, unusual smells or odors, or stained soil, cease work in the area and contact the Engineer immediately.

Does the project involve any bridge class structure rehabilitation or replacements (bridge class structutres not including box culverts)? Yes ☒ No ☐

Are results of the asbestos inspection positive (is asbestos present)? Yes ☒ No ☐

TxDOT must retain a DSHS licensed asbestos consultant to assist with the notification, development abatement/mitigation procedures, and perform management activities as necessary. The notification form to DSHS must be postmarked at least 14 working days prior to scheduled demolition.

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.

Additional Comments

Lead Based Paint has been identified on all bridges.

VII. GENERAL NOTES

The contractor's attention is directed to the fact that discharges of permanent or temporary fill material into the waters of the United States, including jurisdictional wetlands, as necessary for construction, will require specific approval of the USACE under Section 404 of the Clean Water Act.

TxDOT will obtain the appropriate permit(s), Nationwide or Individual, when necessary as dictated by the proposed actions for the project and it's potential to affect USACE jurisdictional areas. The contractor may review the permitted plans at the office of the Area Engineer in charge of construction. TxDOT will hold the contractor responsible for following all conditions of the approved permit. If the contractor cannot work within the limits of the permit(s), then it becomes the contractor's entire responsibility to consult with the USACE pertaining to the need for changes or amendments to the conditions of the exiting permit(s) as origianlly obtained by the department.

Particular importance is stressed on the fact that nay impacts to USACE jurisdictional waters of the United States, including jurisdictional wetlands, be the minimum necessary to complete the proposed work. The contractor shall maintain near normal flow of any jurisdictional waters of the United States at all times during construction. If the contractor needs further explanation of the conditions of the permit, including means of compliance, they may contact the Yoakum District Environmental Coordinator.

Version 13.1

Texas Department of Transportation — TxDOT Yoakum District

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

EPIC

FILE: EPIC Sheet.dgn	DN:	CK:	DW:	CK:
© TxDOT: March 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0715	01	025	FM 108
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		184

DATE:
FILE:

VIII. OTHER ENVIRONMENTAL ISSUES	VIII. OTHER ENVIRONMENTAL ISSUES	VIII. OTHER ENVIRONMENTAL ISSUES
Eastern Box Turtle (con't): • Examine heavy equipment stored on site before use, particularly after rain events when reptile and amphibian movements occur more often, to ensure use will not harm individuals that might be seeking temporary refuge. • Due to increased activity (mating) of reptiles and amphibian during the spring, construction activities like clearing or grading should attempt to be scheduled outside of the spring (March-May) season. Also, timing ground disturbing activities before October when reptiles and amphibians become less active and may be using burrows in the project area is also encouraged. • If Texas tortoises (Gopherus berlandieri) or box turtles (Terrepene spp.) are present in a project area, they should be removed from the area and relocated between 100 and 200 meters from the project area. After removal of the individuals, the area that will be disturbed during active construction and project specific locations should be fenced off to exclude reentry by turtles, tortoises, and other reptiles. The exclusion fence should be constructed and maintained as follows: o The exclusion fence should be constructed with metal flashing or drift fence material. o Rolled erosion control mesh material should not be used. o The exclusion fence should be buried at least 6 inches deep and be at least 24 inches high. o The exclusion fence should be maintained for the life of the project and only removed after the construction is completed and the disturbed site has been revegetated. • After project is complete, revegetate disturbed areas with an appropriate locally sourced native seed mix. If erosion control blankets or mats will be used, the product should not contain netting, but should only contain loosely woven natural fiber netting in which the mesh design allows the threads to move, therefore allowing expansion of the mesh openings. Plastic netting should be avoided. • Minimize the amount of vegetation cleared. Removal of native vegetation, particularly mature native trees and shrubs should be avoided. • To minimize adverse effects, activities should be planned to preserve mature trees, particularly acorn, nut or berry producing varieties. These types of vegetation have high value to wildlife as food and cover. • The use of any non-native vegetation in landscaping and revegetation is discouraged. Locally adapted native species should be used. • The use of seed mix that contains seeds from only regional ecotype native species is recommended.		

DATE:
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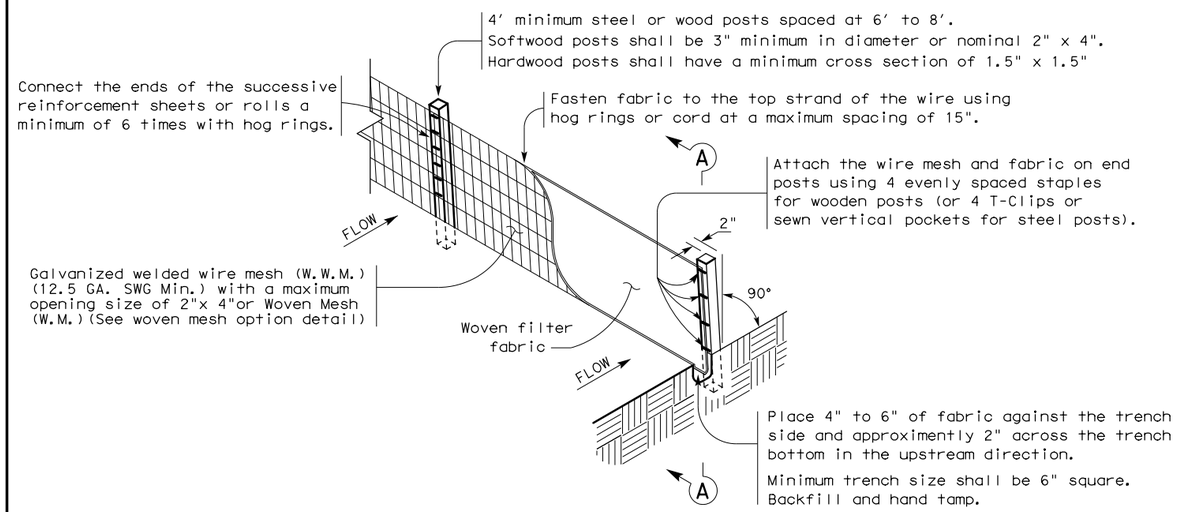
Texas Department of Transportation

TxDOT
Yoakum
District

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

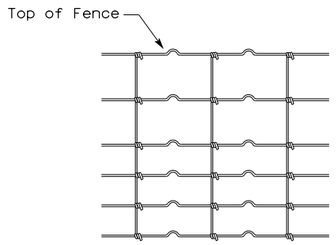
EPIC

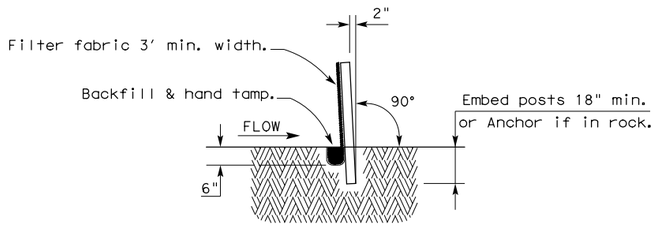
FILE: EPIC Sheet.dgn	DN:	CK:	DW:	CK:
© TxDOT: March 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0715	01	025	FM 108
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		184A



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.

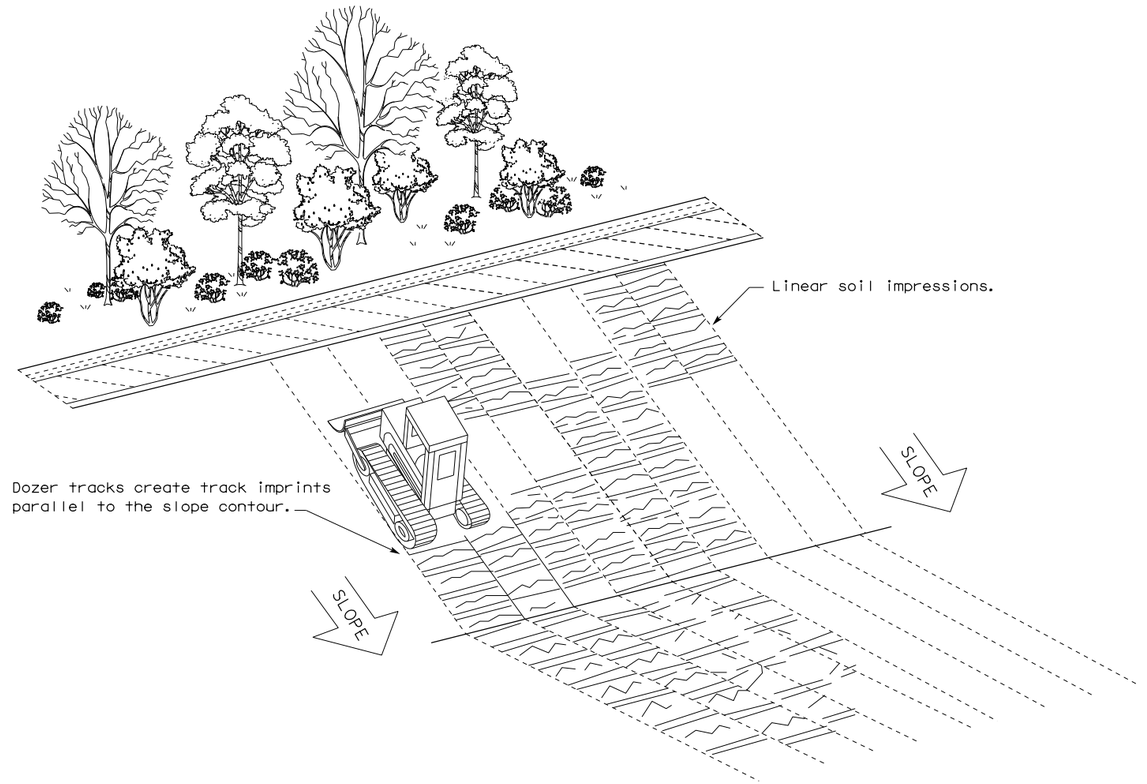
LEGEND

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	0715	01	025,ETC		FM108,ETC	
	DIST	COUNTY			SHEET NO.	
	YKM	GONZALES			185	

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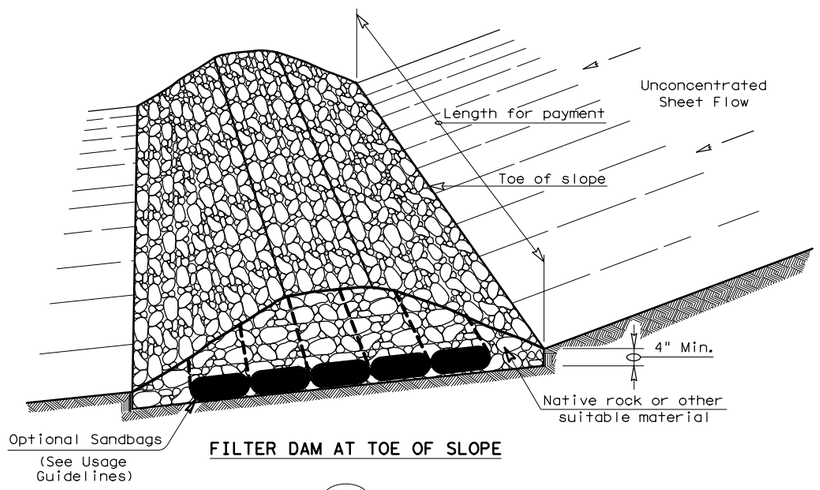
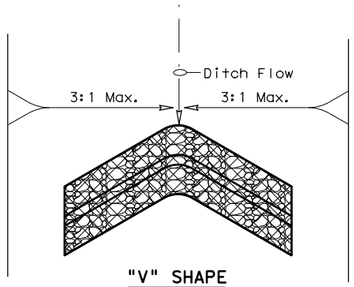
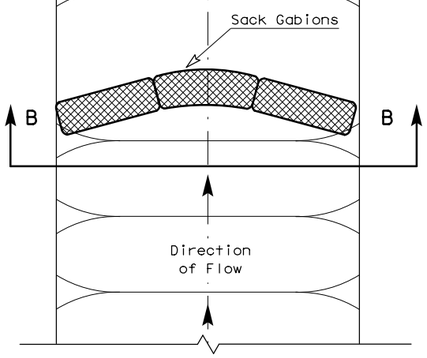


FILTER DAM AT TOE OF SLOPE

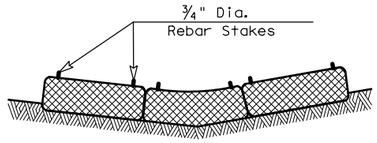
RFD1



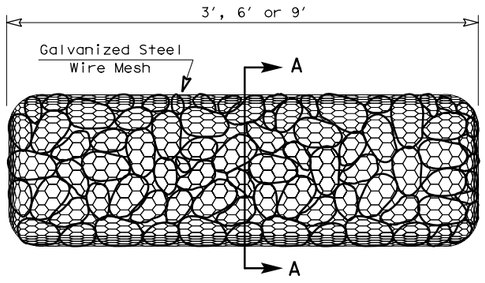
"V" SHAPE PLAN VIEW



PLAN VIEW

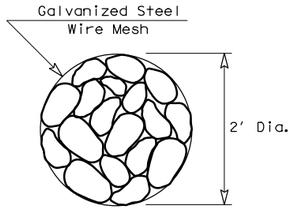


SECTION B-B

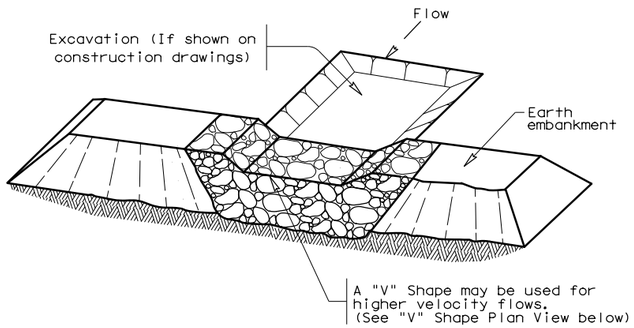


TYPE 4 (SACK GABIONS)

RFD4

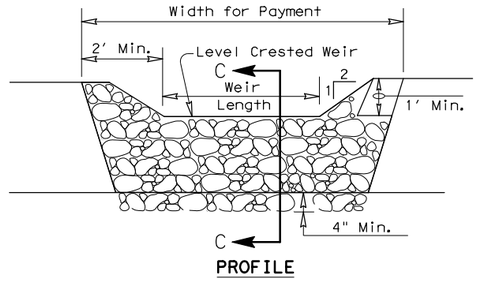


SECTION A-A

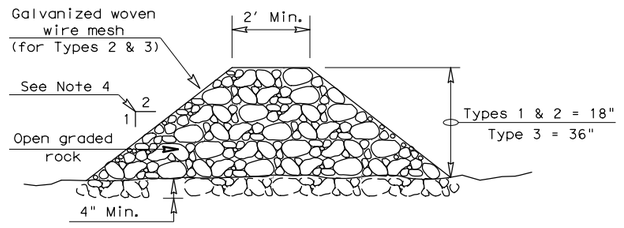


FILTER DAM AT SEDIMENT TRAP

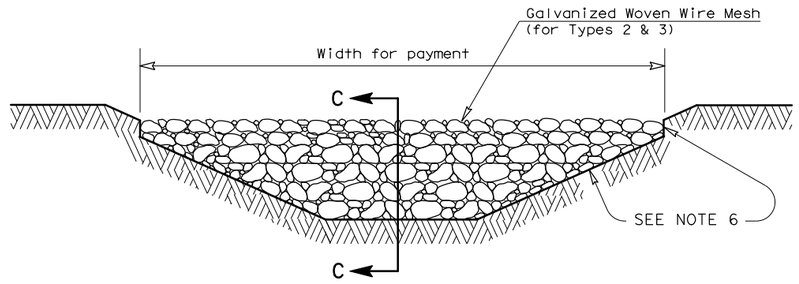
RFD1 — OR — RFD2



PROFILE



SECTION C-C



FILTER DAM AT CHANNEL SECTIONS

RFD1 — OR — RFD2 — OR — RFD3

ROCK FILTER DAM USAGE GUIDELINES

Rock Filter Dams should be constructed downstream from disturbed areas to intercept sediment from overland runoff and/or concentrated flow. The dams should be sized to filter a maximum flow through rate of 60 GPM/FT^2 of cross sectional area. A 2 year storm frequency may be used to calculate the flow rate.

Type 1 (18" high with no wire mesh) (3" to 6" aggregate): Type 1 may be used at the toe of slopes, around inlets, in small ditches, and at dike or swale outlets. This type of dam is recommended to control erosion from a drainage area of 5 acres or less. Type 1 may not be used in concentrated high velocity flows (approximently 8 Ft/Sec or more) in which aggregate wash out may occur. Sandbags may be used at the embedded foundation (4" deep min.) for better filtering efficiency of low flows if called for on the plans or directed by the Engineer.

Type 2 (18" high with wire mesh) (3" to 6" aggregate): Type 2 may be used in ditches and at dike or swale outlets.

Type 3 (36" high with wire mesh) (4" to 8" aggregate): Type 3 may be used in stream flow and should be secured to the stream bed.

Type 4 (Sack gabions) (3" to 6" aggregate): Type 4 May be used in ditches and smaller channels to form an erosion control dam.

Type 5: Provide rock filter dams as shown on plans.

GENERAL NOTES

1. If shown on the plans or directed by the Engineer, filter dams should be placed near the toe of slopes where erosion is anticipated, upstream and/or downstream at drainage structures, and in roadway ditches and channels to collect sediment.
2. Materials (aggregate, wire mesh, sandbags, etc.) shall be as indicated by the specification for "Rock Filter Dams for Erosion and Sedimentation Control".
3. The rock filter dam dimensions shall be as indicated on the SW3P plans.
4. Side slopes should be 2:1 or flatter. Dams within the safety zone shall have sideslopes of 6:1 or flatter.
5. Maintain a minimum of 1' between top of rock filter dam weir and top of embankment for filter dams at sediment traps.
6. Filter dams should be embedded a minimum of 4" into existing ground.
7. The sediment trap for ponding of sediment laden runoff shall be of the dimensions shown on the plans.
8. Rock filter dam types 2 & 3 shall be secured with 20 gauge galvanized woven wire mesh with 1" diameter hexagonal openings. The aggregate shall be placed on the mesh to the height & slopes specified. The mesh shall be folded at the upstream side over the aggregate and tightly secured to itself on the downstream side using wire ties or hog rings. For in stream use, the mesh should be secured or staked to the stream bed prior to aggregate placement.
9. Sack Gabions should be staked down with ¾" dia. rebar stakes, and have a double-twisted hexagonal weave with a nominal mesh opening of 2 ½" x 3 ¼"
10. Flow outlet should be onto a stabilized area (vegetation, rock, etc.).
11. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

PLAN SHEET LEGEND

Type 1 Rock Filter Dam	RFD1
Type 2 Rock Filter Dam	RFD2
Type 3 Rock Filter Dam	RFD3
Type 4 Rock Filter Dam	RFD4

Texas Department of Transportation — Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

ROCK FILTER DAMS

EC(2)-16

FILE: ec216	DN: TxDOT	CK: KM	DW: VP		DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY
REVISIONS	0715	01	025,ETC		FM108,ETC
	DIST	COUNTY			SHEET NO.
	YKM	GONZALES			186