FED.RD. DIV.NO.	PROJECT NO.			SHEET NO.
6	C 1133-2-30			1
STATE	STATE DIST.	COUNTY		
TEXAS	YKM	GONZALES		
CONT.	SECT.	JOB	HIGHWAY NO.	
1133	02	030	FM 794	

SEE SHEET 2 FOR "INDEX OF SHEETS"

CONTRACTOR:______________________________
DATE OF LETTING:__________________________
DATE WORK BEGAN:_________________________
DATE WORK COMPLETED:_____________________
DATE WORK ACCEPTED: ______________________
FINAL CONTRACT COST: $____________________

LIST OF APPROVED FIELD CHANGES:

STATE OF TEXAS
TEXAS DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

FOR THE CONSTRUCTION OF REHABILITATION OF EXISTING ROADWAY
CONSISTING OF REHABILITATE ROADWAY

HWY FUNCTIONAL CLASS: RURAL MAJOR COLLECTOR
DESIGN SPEED: 40 MPH
ADT: 1,141 VPD (2022)
1,597 VPD (2042)

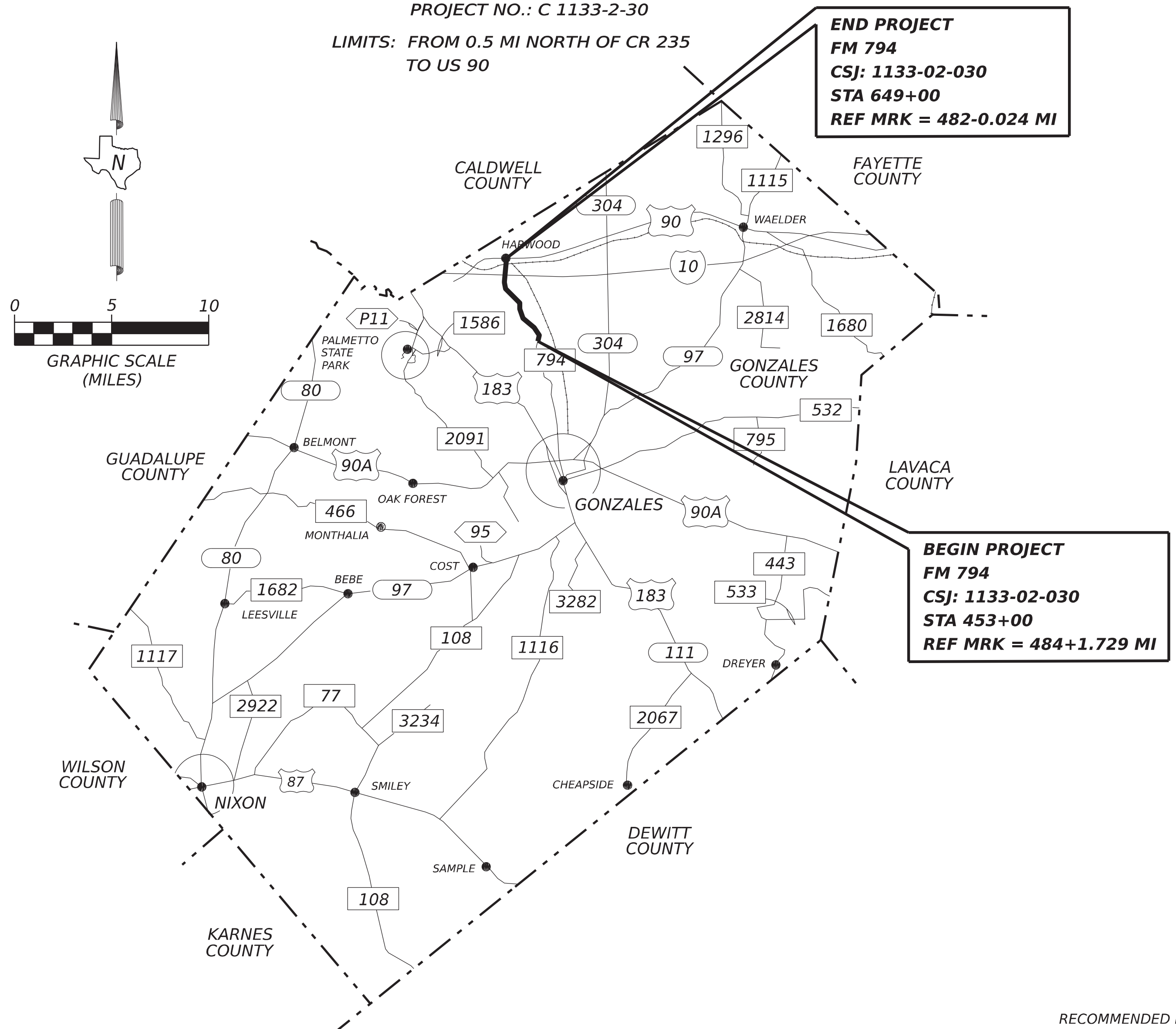
PROJECT LENGTH

ROADWAY	=	19,510.84 FT	=	3.695 MI
BRIDGES	=	80.16 FT	=	0.015 MI
TOTAL	=	19,591.00 FT	=	3.710 MI

FM 794
GONZALES COUNTY

CSJ: 1133-02-030
PROJECT NO.: C 1133-2-30

LIMITS: FROM 0.5 MI NORTH OF CR 235
TO US 90



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

GONZALES COUNTY
YOAKUM DISTRICT

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, OCTOBER 2023).

EXCEPTIONS: STA 648+08.50 TO STA 648+17.50 (RAILROAD CROSSING)(-9.00 FT)

EQUATIONS: NONE

RAILROAD CROSSINGS: STA 648+08.50 TO STA 648+17.50
(UNION PACIFIC RAILROAD AT GRADE RETAINED)

STATE OF TEXAS
AMANDA ANDERLE FLING
105989
LICENSED
PROFESSIONAL ENGINEER

SUBMITTED FOR LETTING 01/25/2024
Amanda Anderle Fling, P.E.
DISTRICT DESIGN ENGINEER

RECOMMENDED FOR LETTING 1/25/2024
DocuSigned by:
Jeffery Vinklarek, P.E.
DIRECTOR OF TRANSPORTATION PLANNING AND DEVELOPMENT

APPROVED FOR LETTING 1/25/2024
DocuSigned by:
Martin C. Horst, PE
DISTRICT ENGINEER

TEXAS DEPARTMENT OF TRANSPORTATION

SHEET NO.	DESCRIPTION
	GENERAL
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3-4	TYPICAL SECTIONS
5-10	GENERAL NOTES
11-14	ESTIMATE & QUANTITY SHEETS
15-16	ROADWAY SUMMARIES
17-18	EARTHWORK SUMMARY
19-20	MBGF LAYOUT & SUMMARY
21	RIPRAP LAYOUT & SUMMARY
22-24	DRIVEWAY SUMMARY & DETAILS
25-26	STRUCTURE SUMMARY
27-28	MISCELLANEOUS SUMMARIES & DETAILS
29	MAILBOX TURNOUT SUMMARY & DETAILS
30	CTB LAYOUT & SUMMARY
31-32	SUMMARY OF SMALL SIGNS
33	CRASH CUSHION SUMMARY SHEET
	TRAFFIC CONTROL
	STANDARD SHEETS
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46	TCP(2-1)-18
47	TCP(2-2)-18
48	TCP(3-1)-13
49	TCP(3-3)-14
50	TCP(6-2)-12
51	TCP(6-4)-12
52	TCP(7-1)-13
53-60	TCP(SC-1-8)-22
61	TCP - UNSURFACED ROADWAY(YKM DISTRICT)
62	WZ(STPM)-23
63	WZ(UL)-13
64	WZ(RS)-22
	ROADWAY
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67	HORIZONTAL AND VERTICAL CONTROL
68-69	HORIZONTAL ALIGNMENT DATA
70-86	PLAN AND PROFILE
	STANDARD SHEETS
87	GF(31)-19
88-89	GF(31)TR TL3-20
90	GF(31)MS-19
91	SGT(12S)31-18
92	SGT(15)31-20
93-96	T80PP-RF
97-98	CSB(1)-10
99	ABSORB(M)-19
100	SLED-19
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SHEET NO.	DESCRIPTION
	DRAINAGE
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107-108	STA 526+30.00 TO STA 526+70.08 HYDRAULIC DATA
109-110	STA 571+35.00 TO STA 571+75.08 HYDRAULIC DATA
111	CULVERT COMPUTATIONS
112-126	CULVERT LAYOUT
	STANDARD SHEETS
127	BCS
128	SCC-MD
129-130	SCC-5 & 6
131	SCP-MD
132	SCP-4
133	MC-MD
134-135	MC-5-20
136-137	MC-6-16
138	PW
139-140	SETB-CD
141-143	SETB-FW-0
144-145	SETP-CD
146	SETP-PD
147-148	SRR
149	ECD
	TRAFFIC
150-151	SIGN DETAILS
	STANDARD SHEETS
152	D & OM(1)-20
153	D & OM(2)-20
154	D & OM(3)-20
155	D & OM(4)-20
156	D & OM(5)-20
157	D & OM(VIA)-20
158	PM(1)-22
159	PM(2)-22
160	SMD(GEN)-08
161	SMD(SLIP-1)-08
162	SMD(SLIP-2)-08
163	SMD(SLIP-3)-08
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165	TSR(3)-13
166	TSR(4)-13
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SHEET NO.	DESCRIPTION
	ENVIRONMENTAL
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	RAILROAD
	STANDARD SHEETS
183	RAILROAD SCOPE OF WORK
184-185	RAILROAD REQUIREMENTS FOR NON-BRIDGE CONSTRUCTION PROJECTS

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

STATE OF TEXAS
AMANDA ANDERLE FLING
105989
LICENSED
PROFESSIONAL ENGINEER

Amanda Anderle Fling, P.E.

01/27/2024

INDEX OF SHEETS

Texas Department of Transportation

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TEXAS	YKM	GONZALES	2

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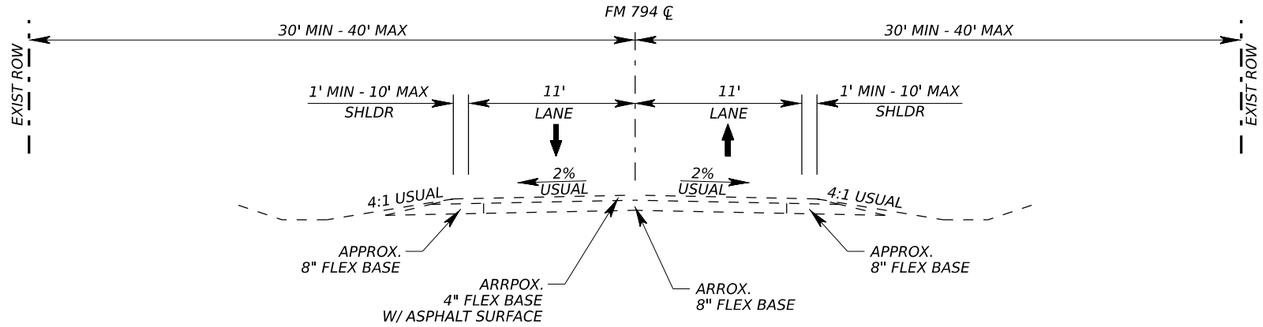

EXISTING TYPICAL SECTION

STA 453+00 TO STA 649+00 (1)

(1) EXCEPTION: STA 648+08.50 TO STA 648+17.50 (RAILROAD CROSSING).

STATE OF TEXAS
AMANDA ANDERLE FLING
105989
LICENSED
PROFESSIONAL ENGINEER

Amanda Anderle Fling, P.E.

01/27/2024

TYPICAL SECTIONS

SCALE: 1" = 10'

Texas Department of Transportation

SHEET 1 OF 2

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STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	3

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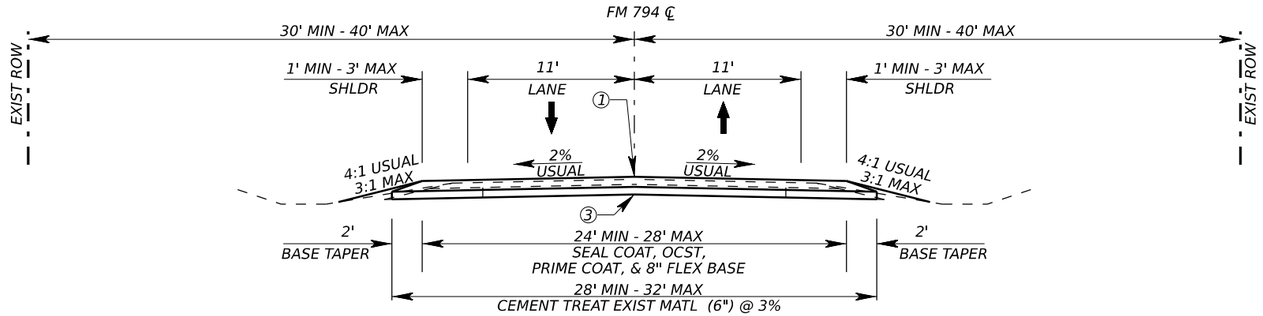
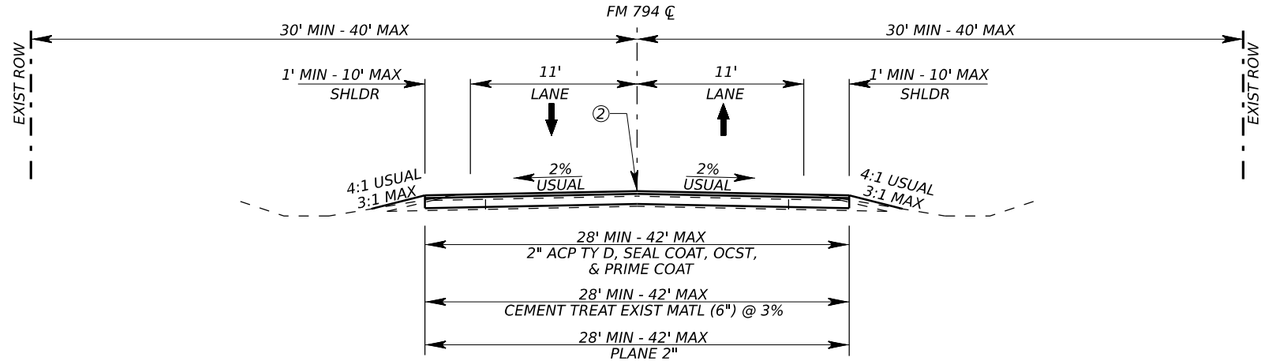
DATE: 1/26/2024



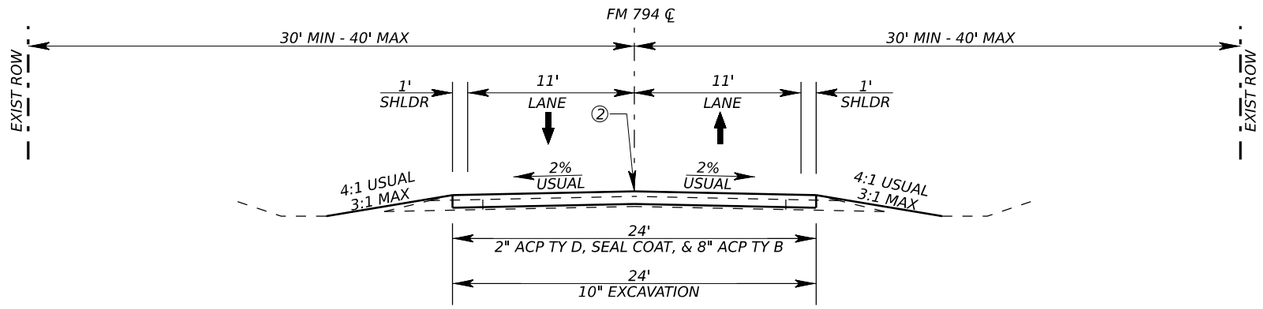
PROPOSED TYPICAL SECTION

STA 453+00 TO STA 586+90 ⑤
STA 595+25 TO STA 646+30



PROPOSED TYPICAL SECTION

STA 586+90 TO STA 595+25 ⑤



PROPOSED TYPICAL SECTION

STA 646+30 TO STA 649+00 ④

NOTES:

① PROPOSED PGL APPROXIMATELY 2" HIGHER THAN EXISTING PGL.
② PROPOSED PGL MATCHES EXISTING PGL.
③ BOTTOM OF PROPOSED BOTTOM BASE MATCHES BOTTOM OF EXISTING BASE MATERIAL.
④ EXCEPTION: STA 648+08.50 TO STA 648+17.50 (RAILROAD CROSSING).
⑤ SEE "PLAN AND PROFILE" SHEETS AND "MBGF LAYOUT & SUMMARY" SHEETS FOR MBGF LIMITS.

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FILE: PROPOSEDTYPICALSECTIONS.dgn
DATE: 1/26/2024

STATE OF TEXAS
AMANDA ANDERLE FLING
105989
LICENSED
PROFESSIONAL ENGINEER

Amanda Anderle Fling, P.E.

01/27/2024

TYPICAL SECTIONS

SCALE: 1" = 10'

Texas Department of Transportation

FED.RD. DIV.NO.		PROJECT NO.	
6			
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	4

GENERAL:

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

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

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

I. UNION PACIFIC RAILROAD COMPANY

PROTECTION OF FIBER OPTIC CABLE SYSTEMS

Fiber optic cable systems may be buried on the railroad's property. Protection of the fiber optic cable systems is of extreme importance since any break could disrupt service to users resulting in business interruption and loss of revenue and profits. The state and/or its contractor shall telephone the railroad during normal business hours (7:00 a.m. to 9:00 p.m., central time, Monday through Friday, except holidays) at 1-800-336-9193 (also a 24-hour, seven-day number for emergency calls) to determine if fiber optic cable is buried on the railroad's premises to be used by the state. If it is, the state and/or its contractor will telephone the telecommunications company(ies) involved, arrange for a cable locator and make arrangements for relocation or other protection of the fiber optic cable prior to beginning any work on the railroad's premises.

The Contractor’s attention is directed to the fact that several companies have existing underground gas/oil facilities located within or near the project limits. Excavation and/or construction is prohibited without prior notification to these companies.

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.

In the removal of the surface and base material on the existing pavement, exercise extreme care in providing a smooth and uniform edge adjacent to the existing travelway pavement which is to remain in place.

Individual structures will be extended on one side at a time through completion before construction work is begun on the opposite side unless otherwise directed.

Install guard fence and/or railing on one side of the roadway at each location at one time through completion before work is begun on the other side of the roadway, unless directed otherwise.

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

Project Number: **Sheet: 5**

County: GONZALES **Control: 1133-02-030**

Highway: FM 794

Leave all traffic lanes open to traffic at night, weekends and holidays unless otherwise approved.

In the event of adverse conditions whereby the roadway will not allow for the safe and efficient passage of two-way traffic, provide for one way traffic as shown on the traffic control plan for one lane roadway. This traffic control plan will remain in effect 24 hours a day until the roadway is considered safe and suitable for two-way traffic. Provide lights to illuminate flaggers and work area during night time operations. Class 3 garments shall be required for all workers and flaggers during nighttime work.

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 sodding/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.

At those locations where centerline structures are to be replaced, remove existing structures and install new structures in half widths. Work and materials required for temporary bulkheads will be considered subsidiary. One-way traffic will be allowed during daylight hours only.

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.

Notify the District Operations section once final surface has been placed to ball-bank-reconstructed curves to determine the advisory speed of each curve. Advisory signs for curves should not be ordered until this evaluation is complete, no additional compensation will be made should this require a separate order or additional mobilization.

ITEM 6: CONTROL OF MATERIALS

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

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

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

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

ITEM 7: LEGAL RELATIONS AND RESPONSIBILITIES

The 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.

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.

ITEM 8: PROSECUTION AND PROGRESS

The delayed start special provision is for allowing the contractor additional time for mobilizing crews and equipment to start this project.

Provide progress schedule as a Bar Chart.

Project Number: **Sheet: 6**

County: GONZALES **Control: 1133-02-030**

Highway: FM 794

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. 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.

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.

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.

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

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.

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.

Correct 0.1-mi.sections for each wheel path having an average international roughness index (IRI) value greater than 115.0 in. per mile to an IRI value of 115.0 in. per mile or less, unless otherwise shown in plans.

Method of correcting 0.1 mile section(s) for ride quality shall be approved prior to performing corrective work.

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.

Uniformly spread and blanket roll all flex base hauled with a pneumatic roller before the end of the day.

All manipulation of roadway delivered material prior to cement or lime treatment, including spreading, rolling and maintaining an acceptable riding surface, will be subsidiary to this item.

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 bottom base layer. 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.

Use two paper widths covering a minimum of five feet at the beginning of each shot to construct a straight transverse joint and to prevent overlapping of the asphalt.

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 351: FLEXIBLE PAVEMENT STRUCTURE REPAIR

The Engineer will select the locations. The repairs will consist of the removal of existing subgrade, base and surfacing and replacement with asphaltic concrete pavement conforming to Item 3076, Dense Graded Hot-Mix Asphalt (Exempt), Type B, PG 64-22. All work and materials required to bring the repaired pavement section to its desired depth will be considered subsidiary to the item “Flexible Pavement Structure Repair”.

Project Number: **Sheet: 7**

County: GONZALES **Control: 1133-02-030**

Highway: FM 794

ITEM 354: PLANING AND TEXTURING PAVEMENT

Use caution when planing adjacent to existing manhole, water valves, water meters, etc. Remove pavement that is not removed by the planing machine by other methods as approved. Damage due to the removal method will be repaired by the contractor at his entire expense using an approved method.

Prior to planning operations, the contractor shall coordinate the adequate planning depths near overpasses with the Engineer. After surfacing operations and prior to project completion, the Engineer will field verify the clearance signage by measuring the vertical distances at overpasses. This measurement information will be provided to the TxDOT Bridge Engineer for database tracking. It is also expected that this necessary coordination will be discussed during pre-construction and pre-paving meetings.

ITEM 400: EXCAVATION AND BACKFILL FOR STRUCTURES

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

ITEM 432: RIPRAP

Place 1/2 inch expansion joint material between the two concrete areas or structures where riprap is placed against other concrete such as concrete pavement and structures unless otherwise shown on the plans or as directed. This work will not be paid for directly but will be subsidiary to the pertinent items.

Unless otherwise shown on the plans or directed, riprap will be 5" deep and reinforced; reinforced toewalls 6" wide and 12" deep will be placed around the perimeter of each location.

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 460: CORRUGATED METAL PIPE

Corrugations shall be 2 2/3 by 1/2 inch and minimum 16 gauge.

ITEM 462: CONCRETE BOX CULVERTS AND DRAINS

Use precast concrete boxes at the following location(s): STA 600+35

When using precast boxes, cast-in-place 1'-8" of the precast box at the connection to the existing structure, as directed.

When extending box culverts, if footings and interior walls are not broken back to expose reinforcement, embed steel dowels into the concrete to splice with the "F" bars of the proposed footing and wall extensions. Embed dowels a minimum of 12" into the new construction to meet the minimum splice requirements of Item 440. Match the number, size and grade of dowel bars to the proposed "F" bars. Epoxy for dowel bar embedment will be as approved. This work will not be paid for directly but will be subsidiary to pertinent items.

Rings and covers placed directly in the top of box culverts will not be paid for directly but will be subsidiary Item 462.

Removing and disposing of portions of existing structures including wingwalls, headwalls, safety end treatments, etc. is subsidiary to the proposed culvert extension, proposed end treatment, or remove structure (small)(large)(box culvert)(pipe) items.

For payment purposes, the culvert extension quantities are measured from the outside edge of the existing culvert headwall and do not include any necessary breakback into the existing culvert. Alternatives to the breakback including doweling may be allowed or directed dependent on related standard sheets (skew/fill depth) and other applicable general notes. All work related to breakback and alternative construction methods is subsidiary to pertinent items.

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 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.

Do not provide riprap aprons on temporary structures with safety end treatments.
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

Remove existing structures and install new structures in half widths. Work and materials required for temporary bulkheads will be subsidiary.

Material removed under this item will not be deemed salvageable.

Carefully dismantle all metal railing deemed salvageable for reuse and deliver to the local TXDOT Maintenance office.

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

Use the following sequence of work for the Proposed Typical Section located from STA 453+00 to STA 586+90 and STA 595+25 to STA 646+30 unless otherwise approved:

1. Construct subgrade on one side of the roadway before moving to the opposite side of the roadway. Subgrade shall be completed on both sides within the same day. Scarify and spread existing material full width, as shown in the proposed typical section, and place 42” cones within the limits of the constructed subgrade each day.
2. Cement treat existing material.
3. Place proposed flex base full width, as shown in the proposed typical section, by the end of each day.
4. Place prime coat, one course surface treatment, and seeding.

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County: GONZALES **Control: 1133-02-030**

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5. Place work zone pavement markings.

Use the following sequence of work for the Proposed Typical Section located from STA 586+90 to STA 595+25 unless otherwise approved:

1. Plane 2” of existing pavement.
2. Scarify and cement treat existing material full width, as shown in the proposed typical section, and place 42” cones within the limits of the constructed material each day.
3. Place prime coat, one course surface treatment, and seeding.
4. Place work zone pavement markings.
5. Place seal coat with work zone pavement markings.
6. Place final ACP surface thru completion with proposed rail with work zone pavement markings.

Use the following sequence of work for the Proposed Typical Section located from STA 646+30 to STA 649+00 unless otherwise approved:

1. In half widths, excavate 10” of existing material and construct proposed pavement thru TY B ACP full depth before moving to the opposite side of the roadway. Construct pavement full width by the end of each day.
2. Upon completion of TY B ACP, place seal coat.
3. Place work zone pavement markings.
4. Place final ACP surface with work zone pavement markings.

Complete construction activities through OCST or final ACP surface within one work section before advancing to the next work section, unless otherwise approved. Work section station limits are defined as follows:

Section 1: STA 453+00 to STA 520+40 (1.28 Mi.)
Section 2: STA 520+40 to STA 595+25 (1.42 Mi.)
Section 3: STA 595+25 to STA 649+00 (1.02 Mi.)

Upon completion of the construction activities outlined above, place remaining final surface and complete through final pavement markings for the entire limits of the project.

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.

Law enforcement assistance for this project will be required, as approved, for major traffic control changes and lane closures. Coordinate with local law enforcement and arrange for law enforcement in a marked vehicle as approved by the Engineer. Complete the daily tracking form provided by the department, including all signatures, and submit invoices that agree with the tracking form for payment at the end of each month approved services were provided.

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

Use TCP(2-2b) for one-lane, two-way traffic control.

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).

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.

Leave 42” cones in place until the pavement edge has been backfilled and a white edge line has been striped after the one course surface treatment.

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

Maintain a minimum distance of two (2) miles between work areas.

Limit lane closure lengths for seal coat operations to two (2) miles on two lane, two-way highways and three (3) miles on four lane highways. The lane closure length will be determined during construction in urban areas.

Provide a 3:1 slope or flatter from the pavement edge with 42” cones in all work areas during non-working hours. If adequate width is not available to set the 42” cones, the 3:1 edge build up shall be widened to accommodate 42” cone 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.

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.

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Provide lights to illuminate the flaggers and work area during night time operations. Class 3 garments shall be required for all workers and flaggers during night time work.

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 540: METAL BEAM GUARD FENCE

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

No additional payment will be allowed for the low fill culvert post mounting option if required over a structure. 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.

Areas damaged due to the installation or removal of the crash cushion attenuators shall be restored to the proposed pavement section. This includes the removal of foundation pads if required. This work shall be considered subsidiary to Item 545.

Crash cushion attenuators are not to be salvaged, but are to remain the property of the contractor.

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.

Replace the signs with reference markers to the exact station from which they were removed.

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

Place non-removable work zone pavement markings on all milled areas by the end of each day unless otherwise approved. Traffic paint and beads or tape as approved will be allowed on milled areas for non-removable work zone pavement markings.

Remove the exposed portions of the temporary flexible reflective roadway marker tabs after raised pavement markers are installed. If the tabs are not in line with the markings, remove the tabs immediately after the centerline markings are installed.

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 668: PREFABRICATED PAVEMENT MARKINGS

Pavement marking material may be placed on roadways at any time during the year, subject to temperature and moisture limitations specified.

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ITEM 3076: DENSE-GRADED HOT-MIX ASPHALT

Quantities shown for asphaltic concrete level-up are based on the average amount of material needed to bring depressed areas up to a desired grade and are shown on an average square yard basis. Place the level-up courses as directed.

Tie HMACP tapers to a vertical transition joint created by the milling operation at the beginning and ending transitions and at all exceptions, or as directed. Provide a temporary HMACP taper at vertical joints until overlay operations begin. Milling and HMACP work will not be paid for directly but will be considered subsidiary to this item.

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.

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.

Limit uneven pavement to two days production with the requirement that all longitudinal joints adjacent to a travelway are constructed with a joint maker providing a maximum one inch vertical edge (1/2” desirable) with an adjacent 6:1 taper.

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.

The TMA/TA used for installation/removal of traffic control for a work area will be subsidiary to the TMA/TA used to perform the work.

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 1133-02-030 **DISTRICT** Yoakum **COUNTY** Gonzales
HIGHWAY FM 794

						TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB		**1133-02-030**			
		PROJECT ID		**A00124552**			
		COUNTY		**Gonzales**			
		HIGHWAY		**FM 794**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	100-6002	PREPARING ROW	STA	67.000		67.000	
	104-6009	REMOVING CONC (RIPRAP)	SY	1,056.000		1,056.000	
	104-6017	REMOVING CONC (DRIVEWAYS)	SY	17.500		17.500	
	110-6001	EXCAVATION (ROADWAY)	CY	3,918.000		3,918.000	
	132-6005	EMBANKMENT (FINAL)(ORD COMP)(TY C)	CY	2,458.000		2,458.000	
	150-6002	BLADING	HR	20.000		20.000	
	164-6001	BROADCAST SEED (PERM) (RURAL) (SANDY)	SY	4,667.000		4,667.000	
	164-6009	BROADCAST SEED (TEMP) (WARM)	SY	1,167.000		1,167.000	
	164-6011	BROADCAST SEED (TEMP) (COOL)	SY	1,167.000		1,167.000	
	164-6033	DRILL SEEDING (PERM) (RURAL) (SANDY)	SY	65,333.000		65,333.000	
	164-6041	DRILL SEEDING (TEMP) (WARM)	SY	16,333.000		16,333.000	
	164-6043	DRILL SEEDING (TEMP) (COOL)	SY	16,333.000		16,333.000	
	168-6001	VEGETATIVE WATERING	MG	589.210		589.210	
	247-6057	FL BS (CMP IN PLC)(TYE GR1-2)(FNAL POS)	CY	13,894.000		13,894.000	
	275-6001	CEMENT	TON	639.000		639.000	
	275-6002	CEMENT TREAT (EXIST MATL) (6")	SY	70,151.000		70,151.000	
	316-6029	ASPH (RC-250)	GAL	12,386.000		12,386.000	
	316-6202	AGGR(TY-E GR-5 SAC-B)	CY	442.000		442.000	
	316-6246	AGGR(TY-PE GR-3 SAC-B)	CY	729.000		729.000	
	316-6249	AGGR(TY-PE GR-4 SAC-B)	CY	599.000		599.000	
	316-6542	ASPH (AC 20-5TR OR AC-20XP OR CRS-2P)	GAL	51,227.000		51,227.000	
	351-6004	FLEXIBLE PAVEMENT STRUCTURE REPAIR(8")	SY	200.000		200.000	
	354-6036	PLANE CONC PAV(0" TO 1-1/2")	SY	8,280.000		8,280.000	
	354-6045	PLANE ASPH CONC PAV (2")	SY	3,518.000		3,518.000	
	400-6005	CEM STABIL BKFL	CY	135.000		135.000	
	400-6006	CUT & RESTORING PAV	SY	66.000		66.000	
	400-6012	CUT AND RESTORE PAV (FLEX BASE)	SY	112.000		112.000	
	402-6001	TRENCH EXCAVATION PROTECTION	LF	202.000		202.000	
	403-6001	TEMPORARY SPL SHORING	SF	1,132.000		1,132.000	
	420-6066	CL C CONC (RAIL FOUNDATION)	CY	56.000		56.000	
	432-6002	RIPRAP (CONC)(5 IN)	CY	81.200		81.200	
	432-6033	RIPRAP (STONE PROTECTION)(18 IN)	CY	134.000		134.000	
	432-6046	RIPRAP (MOW STRIP)(5 IN)	CY	51.500		51.500	
	450-6122	RAIL (TY T80PP)	LF	350.000		350.000	
	460-6002	CMP (GAL STL 18 IN)	LF	28.000		28.000	
	460-6023	CMP (GAL STL 15 IN)	LF	36.000		36.000	
	462-6003	CONC BOX CULV (4 FT X 2 FT)	LF	42.000		42.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 1133-02-030 **DISTRICT** Yoakum **COUNTY** Gonzales
HIGHWAY FM 794

			CONTROL SECTION JOB		**1133-02-030**	TOTAL EST.	TOTAL FINAL
			PROJECT ID		**A00124552**		
			COUNTY		**Gonzales**		
			HIGHWAY		**FM 794**		
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	462-6006	CONC BOX CULV (5 FT X 2 FT)	LF	18.000		18.000	
	462-6007	CONC BOX CULV (5 FT X 3 FT)	LF	12.000		12.000	
	462-6010	CONC BOX CULV (6 FT X 3 FT)	LF	15.000		15.000	
	462-6011	CONC BOX CULV (6 FT X 4 FT)	LF	174.000		174.000	
	464-6002	RC PIPE (CL III)(15 IN)	LF	336.000		336.000	
	464-6003	RC PIPE (CL III)(18 IN)	LF	428.000		428.000	
	464-6005	RC PIPE (CL III)(24 IN)	LF	94.000		94.000	
	464-6007	RC PIPE (CL III)(30 IN)	LF	88.000		88.000	
	464-6009	RC PIPE (CL III)(42 IN)	LF	48.000		48.000	
	466-6181	WINGWALL (PW - 1) (HW=6 FT)	EA	4.000		4.000	
	467-6131	SET (TY I)(S= 4 FT)(HW= 2 FT)(3:1) (C)	EA	1.000		1.000	
	467-6139	SET (TY I)(S= 4 FT)(HW= 3 FT)(4:1) (C)	EA	1.000		1.000	
	467-6171	SET (TY I)(S= 5 FT)(HW= 3 FT)(3:1) (C)	EA	6.000		6.000	
	467-6175	SET (TY I)(S= 5 FT)(HW= 4 FT)(3:1) (C)	EA	4.000		4.000	
	467-6211	SET (TY I)(S= 6 FT)(HW= 4 FT)(3:1) (C)	EA	6.000		6.000	
	467-6333	SET (TY II) (15 IN) (CMP) (6: 1) (P)	EA	6.000		6.000	
	467-6341	SET (TY II) (15 IN) (RCP) (6: 1) (P)	EA	20.000		20.000	
	467-6348	SET (TY II) (18 IN) (CMP) (6: 1) (P)	EA	4.000		4.000	
	467-6358	SET (TY II) (18 IN) (RCP) (4: 1) (C)	EA	2.000		2.000	
	467-6363	SET (TY II) (18 IN) (RCP) (6: 1) (P)	EA	28.000		28.000	
	467-6390	SET (TY II) (24 IN) (RCP) (4: 1) (C)	EA	2.000		2.000	
	467-6395	SET (TY II) (24 IN) (RCP) (6: 1) (P)	EA	2.000		2.000	
	467-6417	SET (TY II) (30 IN) (RCP) (3: 1) (C)	EA	1.000		1.000	
	467-6419	SET (TY II) (30 IN) (RCP) (4: 1) (C)	EA	3.000		3.000	
	467-6461	SET (TY II) (42 IN) (RCP) (3: 1) (C)	EA	1.000		1.000	
	467-6463	SET (TY II) (42 IN) (RCP) (4: 1) (C)	EA	1.000		1.000	
	480-6001	CLEAN EXIST CULVERTS	EA	1.000		1.000	
	496-6042	REMOV STR (SMALL)	EA	29.000		29.000	
	500-6001	MOBILIZATION	LS	1.000		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	8.000		8.000	
	506-6001	ROCK FILTER DAMS (INSTALL) (TY 1)	LF	100.000		100.000	
	506-6011	ROCK FILTER DAMS (REMOVE)	LF	100.000		100.000	
	506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	800.000		800.000	
	506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	800.000		800.000	
	512-6005	PORT CTB (FUR & INST)(F-SHAPE)(TY 1)	LF	330.000		330.000	
	512-6029	PORT CTB (MOVE)(F-SHAPE)(TY 1)	LF	270.000		270.000	
	512-6053	PORT CTB (REMOVE)(F-SHAPE)(TY 1)	LF	330.000		330.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 1133-02-030 **DISTRICT** Yoakum **COUNTY** Gonzales
HIGHWAY FM 794

			CONTROL SECTION JOB		**1133-02-030**	TOTAL EST.	TOTAL FINAL
			PROJECT ID		**A00124552**		
			COUNTY		**Gonzales**		
			HIGHWAY		**FM 794**		
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	530-6004	DRIVEWAYS (CONC)	SY	24.400		24.400	
	530-6006	DRIVEWAYS (SURF TREAT)	SY	1,573.000		1,573.000	
	530-6009	TURNOUTS (SURF TREAT)	SY	305.000		305.000	
	540-6001	MTL W-BEAM GD FEN (TIM POST)	LF	1,239.680		1,239.680	
	540-6006	MTL BEAM GD FEN TRANS (THRIE-BEAM)	EA	4.000		4.000	
	540-6020	MTL W - BEAM GD FEN (LOW FILL CULVERT)	LF	160.320		160.320	
	542-6001	REMOVE METAL BEAM GUARD FENCE	LF	2,225.000		2,225.000	
	542-6002	REMOVE TERMINAL ANCHOR SECTION	EA	11.000		11.000	
	544-6001	GUARDRAIL END TREATMENT (INSTALL)	EA	12.000		12.000	
	544-6003	GUARDRAIL END TREATMENT (REMOVE)	EA	3.000		3.000	
	545-6003	CRASH CUSH ATTEN (MOVE & RESET)	EA	2.000		2.000	
	545-6005	CRASH CUSH ATTEN (REMOVE)	EA	2.000		2.000	
	545-6019	CRASH CUSH ATTEN (INSTL)(S)(N)(TL3)	EA	2.000		2.000	
	560-6003	MAILBOX INSTALL-M (TWG-POST) TY 1	EA	1.000		1.000	
	560-6007	MAILBOX INSTALL-S (WC-POST) TY 3	EA	8.000		8.000	
	560-6008	MAILBOX INSTALL-D (WC-POST) TY 3	EA	6.000		6.000	
	644-6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	2.000		2.000	
	644-6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA	2.000		2.000	
	644-6005	IN SM RD SN SUP&AM TY10BWG(1)SA(T-2EXT)	EA	1.000		1.000	
	644-6030	IN SM RD SN SUP&AM TYS80(1)SA(T)	EA	9.000		9.000	
	644-6034	IN SM RD SN SUP&AM TYS80(1)SA(U-1EXT)	EA	2.000		2.000	
	644-6035	IN SM RD SN SUP&AM TYS80(1)SA(U-2EXT)	EA	1.000		1.000	
	644-6060	IN SM RD SN SUP&AM TYTWT(1)WS(P)	EA	36.000		36.000	
	644-6061	IN SM RD SN SUP&AM TYTWT(1)WS(T)	EA	2.000		2.000	
	644-6064	IN BRIDGE MNT CLEARANCE SGN ASSM(TY N)	EA	2.000		2.000	
	644-6076	REMOVE SM RD SN SUP&AM	EA	57.000		57.000	
	658-6014	INSTL DEL ASSM (D-SW)SZ (BRF)CTB (BI)	EA	29.000		29.000	
	658-6062	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2(BI)	EA	44.000		44.000	
	658-6073	INSTL OM ASSM (OM-2Y)(WC)GND(BI)	EA	22.000		22.000	
	662-6035	WK ZN PAV MRK NON-REMOV (Y)6"(BRK)	LF	10,086.000		10,086.000	
	662-6037	WK ZN PAV MRK NON-REMOV (Y)6"(SLD)	LF	74,803.000		74,803.000	
	662-6111	WK ZN PAV MRK SHT TERM (TAB)TY Y-2	EA	6,769.000		6,769.000	
	666-6343	REF PROF PAV MRK TY I(W)6"(SLD)(100MIL)	LF	44,916.000		44,916.000	
	666-6346	REF PROF PAV MRK TY I(Y)6"(BRK)(100MIL)	LF	3,362.000		3,362.000	
	666-6347	REF PROF PAV MRK TY I(Y)6"(SLD)(100MIL)	LF	29,551.000		29,551.000	
	668-6031	PREFAB PAV MRK TY B (W)(RR XING)	EA	2.000		2.000	
	668-6076	PREFAB PAV MRK TY C (W) (24") (SLD)	LF	66.000		66.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 1133-02-030 **DISTRICT** Yoakum **COUNTY** Gonzales
HIGHWAY FM 794

			CONTROL SECTION JOB		**1133-02-030**	TOTAL EST.	TOTAL FINAL
			PROJECT ID		**A00124552**		
			COUNTY		**Gonzales**		
			HIGHWAY		**FM 794**		
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	672-6009	REFL PAV MRKR TY II-A-A	EA	503.000		503.000	
	3076-6007	D-GR HMA TY-B SAC-B PG70-22	TON	313.000		313.000	
	3076-6042	D-GR HMA TY-D SAC-B PG70-22	TON	1,816.000		1,816.000	
	6001-6002	PORTABLE CHANGEABLE MESSAGE SIGN	EA	4.000		4.000	
	6185-6002	TMA (STATIONARY)	DAY	10.000		10.000	
	6185-6005	TMA (MOBILE OPERATION)	DAY	20.000		20.000	
	18	LAW ENFORCEMENT: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000		1.000	
		SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000		1.000	
		EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS	1.000		1.000	
		RAILROAD FLAGGING: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000		1.000	

FM 794 ROADWAY TOTALS

ROADWAY SURFACE WIDTH		LOCATION			ITEM 110	FLEX BASE WIDTH		ITEM 247	CEMENT TREAT WIDTH		ITEM 275		PRIME, OCST, SEAL, PLANE, & ACP WIDTH		ITEM 316 PRIME		ITEM 316 OCST		ITEM 316 SEAL		ITEM 354	ITEM 3076	
BEGIN WIDTH FT	END WIDTH FT	STA	STA	LENGTH FT	EXCAVATION ROADWAY (10") CY	BEGIN WIDTH FT	END WIDTH FT	FL BS (CMP IN PLC) (TY E GR1-2) (FINAL POS) 8" CY	BEGIN WIDTH FT	END WIDTH FT	CEMENT 135#/CF 3% TON	CEMENT TREAT (EXIST MTL) (6") SY	BEGIN WIDTH FT	END WIDTH FT	ASPH (RC-250) 0.20 GAL/SY GAL	AGGR (TY - E GR - 5 SAC-B) 1 CY/140 SY CY	ASPH (AC-20-5TR OR AC-20XP OR CRS-2P) 0.40 GAL/SY GAL	AGGR (TY - PE GR - 3 SAC-B) 1 CY/85 SY CY	ASPH (AC-20-5TR OR AC-20XP OR CRS-2P) 0.34 GAL/SY GAL	AGGR (TY - PE GR - 4 SAC-B) 1 CY/130 SY CY	PLANE ASPH CONC PAV (2") SY	D-GR HMA TY-B SAC-B PG64-22 8" TON	D-GR HMA TY-D SAC-B PG70-22 2" TON
28	28	453+00	523+21	7021.00		30	30	5200.7	32	32	227.5	24963.6	28	28	4368.6	156.0	8737.2	257.0	7426.7	168.0			
28	33.8	523+21	523+71	50.00		30	35.8	40.6	32	37.8	1.8	193.9	28	33.8	34.3	1.2	68.7	2.0	58.4	1.3			
33.8	33.8	523+71	523+76	5.00		35.8	35.8	4.4	37.8	37.8	0.2	21.0	33.8	33.8	3.8	0.1	7.5	0.2	6.4	0.1			
33.8	31.7	523+76	524+20	44.00		35.8	33.7	37.8	37.8	35.7	1.6	179.7	33.8	31.7	32.0	1.1	64.0	1.9	54.4	1.2			
31.7	32	524+20	524+26	6.00		33.7	34	5.0	35.7	36	0.2	23.9	31.7	32	4.2	0.2	8.5	0.2	7.2	0.2			
32	37.3	524+26	524+70	44.00		34	39.3	39.8	36	41.3	1.7	189.0	32	37.3	33.9	1.2	67.8	2.0	57.6	1.3			
37.3	37.3	524+70	524+75	5.00		39.3	39.3	4.9	41.3	41.3	0.2	22.9	37.3	37.3	4.1	0.1	8.3	0.2	7.0	0.2			
37.3	35	524+75	525+25	50.00		39.3	37	47.1	41.3	39	2.0	223.1	37.3	35	40.2	1.4	80.3	2.4	68.3	1.5			
35	35	525+25	527+76	251.00		37	37	229.3	39	39	9.9	1087.7	35	35	195.2	7.0	390.4	11.5	331.9	7.5			
35	37.3	527+76	528+26	50.00		37	39.3	47.1	39	41.3	2.0	223.1	35	37.3	40.2	1.4	80.3	2.4	68.3	1.5			
37.3	37.3	528+26	528+31	5.00		39.3	39.3	4.9	41.3	41.3	0.2	22.9	37.3	37.3	4.1	0.1	8.3	0.2	7.0	0.2			
37.3	32	528+31	528+75	44.00		39.3	34	39.8	41.3	36	1.7	189.0	37.3	32	33.9	1.2	67.8	2.0	57.6	1.3			
32	31.7	528+75	528+81	6.00		34	33.7	5.0	36	35.7	0.2	23.9	32	31.7	4.2	0.2	8.5	0.2	7.2	0.2			
31.7	33.8	528+81	529+25	44.00		33.7	35.8	37.8	35.7	37.8	1.6	179.7	31.7	33.8	32.0	1.1	64.0	1.9	54.4	1.2			
33.8	33.8	529+25	529+30	5.00		35.8	35.8	4.4	37.8	37.8	0.2	21.0	33.8	33.8	3.8	0.1	7.5	0.2	6.4	0.1			
33.8	28	529+30	529+80	50.00		35.8	30	40.6	37.8	32	1.8	193.9	33.8	28	34.3	1.2	68.7	2.0	58.4	1.3			
28	28	529+80	568+28	3848.00		30	30	2850.4	32	32	124.7	13681.8	28	28	2394.3	85.5	4788.6	140.8	4070.3	92.1			
28	33.8	568+28	568+78	50.00		30	35.8	40.6	32	37.8	1.8	193.9	28	33.8	34.3	1.2	68.7	2.0	58.4	1.3			
33.8	33.8	568+78	568+83	5.00		35.8	35.8	4.4	37.8	37.8	0.2	21.0	33.8	33.8	3.8	0.1	7.5	0.2	6.4	0.1			
33.8	31.7	568+83	569+29	46.00		35.8	33.7	39.5	37.8	35.7	1.7	187.8	33.8	31.7	33.5	1.2	67.0	2.0	56.9	1.3			
31.7	32	569+29	569+33	4.00		33.7	34	3.3	35.7	36	0.1	15.9	31.7	32	2.8	0.1	5.7	0.2	4.8	0.1			
32	37.3	569+33	569+79	46.00		34	39.3	41.6	36	41.3	1.8	197.5	32	37.3	35.4	1.3	70.8	2.1	60.2	1.4			
37.3	37.3	569+79	569+84	5.00		39.3	39.3	4.9	41.3	41.3	0.2	22.9	37.3	37.3	4.1	0.1	8.3	0.2	7.0	0.2			
37.3	35	569+84	570+34	50.00		39.3	37	47.1	41.3	39	2.0	223.1	37.3	35	40.2	1.4	80.3	2.4	68.3	1.5			
35	35	570+34	572+83	249.00		37	37	227.5	39	39	9.8	1079.0	35	35	193.7	6.9	387.3	11.4	329.2	7.4			
35	37.3	572+83	573+33	50.00		37	39.3	47.1	39	41.3	2.0	223.1	35	37.3	40.2	1.4	80.3	2.4	68.3	1.5			
37.3	37.3	573+33	573+38	5.00		39.3	39.3	4.9	41.3	41.3	0.2	22.9	37.3	37.3	4.1	0.1	8.3	0.2	7.0	0.2			
37.3	32	573+38	573+84	46.00		39.3	34	41.6	41.3	36	1.8	197.5	37.3	32	35.4	1.3	70.8	2.1	60.2	1.4			
32	31.7	573+84	573+88	4.00		34	33.7	3.3	36	35.7	0.1	15.9	32	31.7	2.8	0.1	5.7	0.2	4.8	0.1			
31.7	33.8	573+88	574+34	46.00		33.7	35.8	39.5	35.7	37.8	1.7	187.8	31.7	33.8	33.5	1.2	67.0	2.0	56.9	1.3			
33.8	33.8	574+34	574+39	5.00		35.8	35.8	4.4	37.8	37.8	0.2	21.0	33.8	33.8	3.8	0.1	7.5	0.2	6.4	0.1			
33.8	28	574+39	574+89	50.00		35.8	30	40.6	37.8	32	1.8	193.9	33.8	28	34.3	1.2	68.7	2.0	58.4	1.3			
28	28	574+89	586+20	1131.00		30	30	837.8	32	32	36.6	4021.3	28	28	703.7	25.1	1407.5	41.4	1196.3	27.1			
28	30.4	586+20	586+90	70.00		30	32.4	53.9	32	34.4	2.4	258.2	28	30.4	45.4	1.6	90.8	2.7	77.2	1.7			
30.4	36.5	586+90	588+70	180.00					30.4	36.5	6.1	669.0	30.4	36.5	133.8	4.8	267.6	7.9	227.5	5.1	669.0		73.6
36.5	42	588+70	589+35	65.00					36.5	42	2.6	283.5	36.5	42	56.7	2.0	113.4	3.3	96.4	2.2	283.5		31.2
42	42	589+35	593+00	365.00					42	42	15.5	1703.3	42	42	340.7	12.2	681.3	20.0	579.1	13.1	1703.3		187.4
42	37.2	593+00	593+60	60.00					42	37.2	2.4	264.0	42	37.2	52.8	1.9	105.6	3.1	89.8	2.0	264.0		29.0
37.2	28	593+60	595+25	165.00					37.2	28	5.4	597.7	37.2	28	119.5	4.3	239.1	7.0	203.2	4.6	597.7		65.7
28	28	595+25	644+50	4925.00		30	30	3648.1	32	32	159.6	17511.1	28	28	3064.4	109.4	6128.9	180.3	5209.6	117.9			
28	24	644+50	646+30	180.00		30	26	124.4	32	28	5.5	600.0	28	24	104.0	3.7	208.0	6.1	176.8	4.0			
24	24	646+30	648+08.50①	178.50	132.2								24	24					161.8	3.7		209.4	52.4
24	24	①648+17.50	648+80	62.50	46.3								24	38					56.7	1.3		73.3	18.3
24	38	648+80	649+00	20.00	19.1								24	38					23.4	0.5		30.3	7.6
LEVEL-UP AS DIRECTED BY ENGINEER IN THE FIELD. (EST)																							100.0
PROJECT TOTALS					**198**			**13894**			**639**	**70151**			**12386**	**442**	**24773**	**729**	**21299**	**482**	**3518**	**313**	**565**

① EXCEPTION: STA 648+08.50 TO STA 648+17.50 (RAILROAD CROSSING).

ROADWAY SUMMARIES

Texas Department of Transportation

FED.RD. DIV.NO.		PROJECT NO.	
6			
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	15

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FILE: ROADWAY SUMMARY.dgn
DATE: 1/28/2024

FRONTAGE ROAD TOTALS

ROADWAY SURFACE WIDTH		LOCATION			PLANE & ACP		ITEM 316		ITEM 354	ITEM 3076
BEGIN WIDTH FT	END WIDTH FT	STA	STA	LENGTH FT	BEGIN WIDTH FT	END WIDTH FT	ASPH (AC-20-5TR OR AC-20XP OR CRS-2P) 0.34 GAL/SY GAL	AGGR (TY - PE GR - 4 SAC-B) 1 CY/130 SY CY	PLANE ASPH CONC PAV (0"-1.5") SY	D-GR HMA TY-D SAC-B PG70-22 1.5" TON
EASTBOUND FRONTAGE ROAD										
25	36	229+05	231+05	200.00	25	36	230.4	5.2	677.8	55.9
36	40	231+05	232+55	150.00	36	40	215.3	4.9		52.3
40	40	232+55	233+77	122.00	40	40	184.4	4.2		44.7
40	40	233+77	235+40	163.00	40	40	246.3	5.6	724.4	59.8
40	85	235+40	235+77	37.00	40	85	87.4	2.0	256.9	21.2
26	26	236+20	238+20	200.00	26	26	196.4	4.4	577.8	47.7
26	26	238+20	244+55	635.00	26	26	623.7	14.1		151.3
26	26	244+55	246+55	200.00	26	26	196.4	4.4	577.8	47.7
CONNECTOR							54.4	1.2	160.0	13.2
WESTBOUND FRONTAGE ROAD										
25	25	219+15	221+15	200.00	25	25	188.9	4.3	555.6	45.8
25	25	221+15	223+45	230.00	25	25	217.2	4.9		52.7
25	40	223+45	227+15	370.00	25	40	454.3	10.3	1336.1	110.2
40	40	227+15	229+15	200.00	40	40	302.2	6.8	888.9	73.3
40	40	229+15	234+70	555.00	40	40	838.7	19.0		203.5
40	40	234+70	236+00	130.00	40	40	196.4	4.4	577.8	47.7
40	75	236+00	236+70	70.00	40	75	152.1	3.4	447.2	36.9
77	26	237+10	237+50	40.00	77	26	77.8	1.8	228.9	18.9
26	26	237+50	239+10	160.00	26	26	157.2	3.6	462.2	38.1
26	26	239+10	241+75	265.00	26	26	260.3	5.9		63.2
26	26	241+75	243+75	200.00	26	26	196.4	4.4	577.8	47.7
CONNECTOR							78.5	1.8	231.0	19.1
PROJECT TOTALS							**5155**	**117**	**8280**	**1251**

PAVEMENT REPAIR SUMMARY

LOCATION	ITEM 351 FLEXIBLE PAVEMENT STRUCTURE REPAIR (8") SY	REMARKS
STA 453+00 TO STA 649+00	200	LOCATIONS TO BE DETERMINED BY ENGINEER IN THE FIELD.
PROJECT TOTALS	**200**	

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FILE: ROADWAY SUMMARY.dgn
DATE: 1/28/2024

ROADWAY SUMMARIES

Texas Department of Transportation

FED.RD. DIV.NO.		PROJECT NO.	
6			
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	16

FM 794
EARTHWORK SUMMARY

End Area Volume Report

BASELINE STATION	ITEM 110 EXCAVATION AREA (SF)	VOLUME (CY)	CUMULATIVE VOLUME (CY)	ITEM 132 EMBANKMENT AREA (SF)	VOLUME (CY)	CUMULATIVE VOLUME (CY)
454+50.00 R1	15.8	0.0	0.0	1.8	0.0	0.0
455+00.00 R1	16.1	29.6	29.6	0.8	2.4	2.4
456+00.00 R1	14.4	56.5	86.0	3.9	8.6	11.0
457+00.00 R1	3.7	33.5	119.6	8.7	23.2	34.2
458+00.00 R1	3.9	14.2	133.7	4.8	25.0	59.2
459+00.00 R1	4.1	14.8	148.5	11.4	30.0	89.2
460+00.00 R1	4.2	15.2	163.8	15.8	50.4	139.7
461+00.00 R1	21.5	47.4	211.2	5.5	39.5	179.2
462+00.00 R1	6.2	51.1	262.3	0.6	11.2	190.3
463+00.00 R1	6.4	23.3	285.6	4.2	8.8	199.1
464+00.00 R1	5.4	21.9	307.5	2.7	12.7	211.8
465+00.00 R1	4.6	18.5	326.0	2.9	10.3	222.1
466+00.00 R1	3.5	15.0	340.9	3.2	11.3	233.4
467+00.00 R1	4.4	14.7	355.6	3.2	11.9	245.3
468+00.00 R1	7.4	21.9	377.5	0.0	5.9	251.2
469+00.00 R1	4.2	21.5	399.0	1.7	3.2	254.3
470+00.00 R1	3.0	13.3	412.3	4.7	11.8	266.1
471+00.00 R1	4.1	13.0	425.3	0.8	10.1	276.2
472+00.00 R1	4.2	15.3	440.6	3.0	7.1	283.3
473+00.00 R1	5.5	18.0	458.6	2.1	9.4	292.7
474+00.00 R1	6.3	21.8	480.4	0.8	5.4	298.1
475+00.00 R1	4.3	19.5	499.9	5.1	11.1	309.1
476+00.00 R1	2.0	11.7	511.5	5.6	19.9	329.1
477+00.00 R1	2.1	7.6	519.2	4.3	18.3	347.4
478+00.00 R1	4.8	12.7	531.8	1.5	10.6	357.9
479+00.00 R1	5.3	18.6	550.4	0.6	3.7	361.7
480+00.00 R1	5.6	20.1	570.5	1.2	3.4	365.0
481+00.00 R1	4.8	19.2	589.7	2.4	6.8	371.8
482+00.00 R1	5.1	18.4	608.1	3.1	10.1	381.9
483+00.00 R1	4.6	17.9	626.1	1.2	7.9	389.8
484+00.00 R1	2.1	12.2	638.3	3.8	9.3	399.0
485+00.00 R1	0.8	5.3	643.6	6.6	19.2	418.2
486+00.00 R1	3.3	7.6	651.2	4.0	19.6	437.8
487+00.00 R1	28.7	59.2	710.5	3.8	14.3	452.1
488+00.00 R1	33.8	115.7	826.1	7.9	21.5	473.6
489+00.00 R1	2.8	67.7	893.8	8.1	29.6	503.2
490+00.00 R1	2.4	9.5	903.4	5.5	25.3	528.5
491+00.00 R1	2.4	8.7	912.1	4.1	17.9	546.3
492+00.00 R1	4.4	12.6	924.7	3.2	13.5	559.8
493+00.00 R1	4.6	16.8	941.4	3.3	12.0	571.8
494+00.00 R1	5.2	18.1	959.5	2.8	11.3	583.1
495+00.00 R1	5.7	20.2	979.7	2.5	9.8	592.9
496+00.00 R1	4.4	18.7	998.4	2.3	8.9	601.8
497+00.00 R1	4.9	17.3	1015.7	0.9	5.9	607.7
498+00.00 R1	6.8	21.7	1037.4	0.0	1.7	609.4
499+00.00 R1	5.7	23.0	1060.4	1.0	1.8	611.2
500+00.00 R1	5.9	21.3	1081.7	0.6	2.8	613.9
501+00.00 R1	6.0	22.0	1103.7	0.1	1.3	615.2
502+00.00 R1	6.1	22.5	1126.2	0.0	0.2	615.4
503+00.00 R1	5.9	22.2	1148.4	0.3	0.6	616.0
504+00.00 R1	5.5	21.0	1169.4	1.3	2.9	618.9
505+00.00 R1	4.5	18.5	1187.8	3.4	8.6	627.5
506+00.00 R1	4.4	16.5	1204.3	10.3	25.3	652.8
507+00.00 R1	4.4	16.3	1220.6	7.5	33.0	685.7
508+00.00 R1	5.1	17.7	1238.3	2.2	18.0	703.8
509+00.00 R1	5.2	19.2	1257.5	1.4	6.6	710.4
510+00.00 R1	3.8	16.8	1274.2	3.6	9.2	719.6
511+00.00 R1	4.0	14.5	1288.8	6.9	19.5	739.1
512+00.00 R1	6.0	18.5	1307.3	1.1	14.9	754.0
513+00.00 R1	6.2	22.4	1329.7	0.8	3.5	757.4
514+00.00 R1	5.3	21.1	1350.9	1.6	4.3	761.7
515+00.00 R1	4.5	18.0	1368.8	2.9	8.2	770.0
516+00.00 R1	6.2	19.6	1388.5	1.1	7.4	777.4
517+00.00 R1	6.2	22.9	1411.3	0.5	2.9	780.3
518+00.00 R1	5.8	22.3	1433.6	0.4	1.6	781.9
519+00.00 R1	5.0	20.0	1453.6	0.9	2.3	784.2
520+00.00 R1	5.3	19.1	1472.7	0.6	2.7	786.9
521+00.00 R1	6.0	21.0	1493.7	0.2	1.4	788.3
522+00.00 R1	6.1	22.4	1516.1	0.1	0.5	788.8
523+00.00 R1	3.9	18.4	1534.5	1.1	2.2	791.1
524+00.00 R1	3.2	13.1	1547.6	5.8	12.7	803.7
525+00.00 R1	4.9	15.0	1562.6	10.7	30.5	834.2
526+00.00 R1	3.4	15.4	1578.0	15.1	47.8	882.0
527+00.00 R1	6.8	19.0	1596.9	3.3	34.0	916.0
528+00.00 R1	6.2	24.1	1621.0	2.1	10.0	926.1
529+00.00 R1	5.3	21.2	1642.2	1.2	6.1	932.2
530+00.00 R1	5.4	19.6	1661.9	0.1	2.3	934.5
531+00.00 R1	5.0	19.1	1681.0	0.2	0.4	934.9
532+00.00 R1	2.6	13.9	1694.9	2.5	4.9	939.8
533+00.00 R1	3.9	11.9	1706.7	1.5	7.4	947.1
534+00.00 R1	3.4	13.4	1720.1	1.9	6.2	953.4
535+00.00 R1	4.0	13.7	1733.9	1.8	6.8	960.2
536+00.00 R1	6.8	20.1	1754.0	0.0	3.4	963.6
537+00.00 R1	4.2	20.5	1774.5	1.8	3.4	967.0
538+00.00 R1	5.7	18.4	1792.9	0.1	3.6	970.6
539+00.00 R1	6.2	22.1	1815.0	0.3	0.8	971.4
540+00.00 R1	17.1	43.3	1858.3	0.7	1.8	973.2
541+00.00 R1	5.4	41.7	1900.0	0.9	2.9	976.1

FM 794
EARTHWORK SUMMARY(CONT)

End Area Volume Report

BASELINE STATION	ITEM 110 EXCAVATION AREA (SF)	VOLUME (CY)	CUMULATIVE VOLUME (CY)	ITEM 132 EMBANKMENT AREA (SF)	VOLUME (CY)	CUMULATIVE VOLUME (CY)
542+00.00 R1	4.3	17.9	1918.0	0.4	2.4	978.4
543+00.00 R1	3.6	14.6	1932.6	1.8	4.1	982.6
544+00.00 R1	3.5	13.2	1945.7	1.9	7.0	989.5
545+00.00 R1	3.5	12.9	1958.6	1.6	6.5	996.0
546+00.00 R1	1.2	8.6	1967.2	4.1	10.5	1006.5
547+00.00 R1	0.3	2.7	1969.9	19.0	42.7	1049.2
548+00.00 R1	0.2	0.9	1970.8	24.6	80.7	1129.9
549+00.00 R1	2.1	4.2	1975.1	2.8	50.7	1180.6
550+00.00 R1	3.7	10.8	1985.8	2.6	10.0	1190.6
551+00.00 R1	4.3	14.9	2000.8	4.0	12.2	1202.8
552+00.00 R1	2.8	13.2	2014.0	2.3	11.6	1214.4
553+00.00 R1	2.6	10.1	2024.1	2.1	8.0	1222.4
554+00.00 R1	3.2	10.8	2034.9	3.3	10.0	1232.4
555+00.00 R1	2.3	10.2	2045.0	8.9	22.6	1254.9
556+00.00 R1	1.6	7.2	2052.2	6.1	27.7	1282.7
557+00.00 R1	1.6	5.9	2058.1	3.6	18.0	1300.7
558+00.00 R1	2.4	7.5	2065.6	3.0	12.2	1312.9
559+00.00 R1	4.6	13.0	2078.6	0.6	6.6	1319.5
560+00.00 R1	3.7	15.2	2093.8	1.7	4.2	1323.6
561+00.00 R1	4.2	14.5	2108.3	1.9	6.5	1330.2
562+00.00 R1	1.7	10.8	2119.1	5.8	14.3	1344.5
563+00.00 R1	0.5	4.0	2123.1	12.4	33.8	1378.2
564+00.00 R1	1.4	3.4	2126.5	6.4	34.8	1413.0
565+00.00 R1	2.6	7.3	2133.8	2.2	15.9	1428.9
566+00.00 R1	2.3	9.0	2142.8	3.7	10.9	1439.8
567+00.00 R1	1.1	6.3	2149.1	5.6	17.1	1457.0
568+00.00 R1	1.5	4.8	2153.8	3.3	16.3	1473.3
569+00.00 R1	3.2	8.6	2162.5	2.8	11.2	1484.5
570+00.00 R1	8.4	21.5	2184.0	4.9	14.2	1498.7
571+00.00 R1	4.7	24.3	2208.3	3.7	15.8	1514.5
572+00.00 R1	2.4	13.2	2221.5	18.1	40.3	1554.8
573+00.00 R1	3.4	10.7	2232.1	8.1	48.5	1603.3
574+00.00 R1	6.3	17.9	2250.0	2.0	18.8	1622.1
575+00.00 R1	3.4	18.0	2267.9	2.0	7.4	1629.5
576+00.00 R1	4.0	13.7	2281.7	3.1	9.5	1638.9
577+00.00 R1	6.3	19.1	2300.7	0.0	5.8	1644.7
578+00.00 R1	5.2	21.3	2322.1	0.7	1.2	1645.9
579+00.00 R1	4.5	18.1	2340.2	2.0	4.9	1650.8
580+00.00 R1	5.1	17.8	2358.0	0.5	4.6	1655.4
581+00.00 R1	4.3	17.3	2375.3	2.2	5.0	1660.5
582+00.00 R1	5.1	17.4	2392.7	0.2	4.5	1664.9
583+00.00 R1	5.4	19.4	2412.1	0.5	1.2	1666.2
584+00.00 R1	4.1	17.6	2429.7	1.1	2.9	1669.1
585+00.00 R1	3.6	14.2	2443.9	1.5	4.8	1673.9
586+00.00 R1	3.3	12.8	2456.7	1.2	4.9	1678.8
587+00.00 R1	0.0	6.2	2462.8	9.5	19.7	1698.5
588+00.00 R1	1.5	2.8	2465.6	2.8	22.8	1721.3
589+00.00 R1	7.7	17.0	2482.6	0.0	5.3	1726.6
590+00.00 R1	4.2	22.0	2504.6	4.5	8.3	1734.9
591+00.00 R1	2.1	11.6	2516.2	5.7	18.8	1753.7
592+00.00 R1	4.0	11.2	2527.4	3.9	17.7	1771.4
593+00.00 R1	9.3	24.6	2552.0	0.7	8.5	1779.9
594+00.00 R1	8.1	32.1	2584.2	0.0	1.4	1781.2
595+00.00 R1	2.8	20.1	2604.3	0.4	0.8	1782.0
596+00.00 R1	4.5	13.4	2617.7	3.0	6.3	1788.3
597+00.00 R1	3.7	15.1	2632.8	1.6	8.5	1796.8
598+00.00 R1	3.4	13.2	2646.0	3.1	8.7	1805.5
599+00.00 R1	3.6	13.0	2659.0	1.9	9.2	1814.8
600+00.00 R1	3.7	13.4	2672.4	1.5	6.2	1821.0
601+00.00 R1	3.2	12.6	2685.0	5.3	12.6	1833.5
602+00.00 R1	3.5	12.4	2697.4	7.4	23.5	1857.1
603+00.00 R1	2.9	11.8	2709.2	4.2	21.5	1878.5
604+00.00 R1	4.6	13.9	2723.1	1.8	11.0	1889.6
605+00.00 R1	5.9	19.4	2742.5	0.3	3.9	1893.5
606+00.00 R1	4.1	18.5	2761.0	1.2	2.7	1896.2
607+00.00 R1	3.4	13.9	2774.8	1.7	5.2	1901.4
608+00.00 R1	3.8	13.3	2788.2	4.1	10.7	1912.1
609+00.00 R1	2.9	12.4	2800.6	17.5	40.1	1952.2
610+00.00 R1	4.3	13.2	2813.8	3.1	38.2	1990.4
611+00.00 R1	4.6	16.3	2830.1	2.4	10.1	2000.5
612+00.00 R1	3.9	15.8	2845.9	1.9	7.9	2008.3
613+00.00 R1	4.5	15.7	2861.5	2.1	7.3	2015.6
614+00.00 R1	4.2	16.1	2877.6	4.9	12.8	2028.4
615+00.00 R1	3.2	13.8	2891.4	12.1	31.4	2059.8
616+00.00 R1	3.5	12.4	2903.8	7.1	35.5	2095.3
617+00.00 R1	3.1	12.1	2915.9	7.8	27.6	2122.9
618+00.00 R1	3.6	12.3	2928.2	7.3	28.0	2150.8
619+00.00 R1	5.5	16.9	2945.1	1.0	15.4	2166.2
620+00.00 R1	4.9	19.4	2964.4	2.4	6.3	2172.5
621+00.00 R1	4.4	17.3	2981.8	2.8	9.6	2182.1
622+00.00 R1	4.2	16.1	2997.8	1.1	7.2	2189.3
623+00.00 R1	3.5	14.4	3012.2	2.4	6.4	2195.7
624+00.00 R1	3.3	12.7	3024.9	3.0	9.9	2205.6
625+00.00 R1	3.2	12.1	3037.0	6.1	16.8	2222.4
626+00.00 R1	3.1	11.6	3048.5	3.5	17.7	2240.1
627+00.00 R1	2.5	10.3	3058.9	4.0	13.8	2253.9
628+00.00 R1	3.9	11.9	3070.8	1.8	10.7	2264.6
629+00.00 R1	3.1	13.0	3083.8	10.9	23.6	2288.1

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DATE: 1/27/2024

EARTHWORK SUMMARY

Texas Department of Transportation

FED.RD. DIV.NO.		PROJECT NO.	
6			
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	17

FM 794

EARTHWORK SUMMARY(CONT)

End Area Volume Report						
	ITEM 110 EXCAVATION			ITEM 132 EMBANKMENT		
BASELINE STATION	AREA (SF)	VOLUME (CY)	CUMULATIVE VOLUME (CY)	AREA (SF)	VOLUME (CY)	CUMULATIVE VOLUME (CY)
630+00.00 R1	3.7	12.5	3096.3	9.4	37.6	2325.8
631+00.00 R1	3.8	13.9	3110.1	5.4	27.4	2353.2
632+00.00 R1	3.8	14.0	3124.2	3.0	15.7	2368.9
633+00.00 R1	2.9	12.3	3136.5	4.4	13.8	2382.7
634+00.00 R1	4.0	12.7	3149.1	1.8	11.5	2394.3
635+00.00 R1	4.6	15.9	3165.0	2.4	7.7	2402.0
636+00.00 R1	4.9	17.6	3182.6	1.4	6.9	2408.9
637+00.00 R1	4.3	17.0	3199.6	2.6	7.3	2416.2
638+00.00 R1	3.3	14.1	3213.8	3.1	10.4	2426.6
639+00.00 R1	6.6	18.2	3232.0	0.0	5.7	2432.3
640+00.00 R1	8.8	28.5	3260.5	0.0	0.0	2432.3
641+00.00 R1	5.4	26.3	3286.7	1.4	2.5	2434.8
642+00.00 R1	4.6	18.4	3305.2	1.6	5.5	2440.3
643+00.00 R1	5.2	18.1	3323.3	1.0	4.9	2445.2
644+00.00 R1	4.1	17.2	3340.5	2.1	5.8	2451.0
645+00.00 R1	7.6	21.6	3362.0	0.0	4.0	2455.0
646+00.00 R1	16.7	45.0	3407.0	0.0	0.0	2455.0
647+00.00 R1	13.5	55.9	3463.0	0.9	1.7	2456.7
648+00.00 R1	62.6	140.9	3603.9	0.0	1.7	2458.4
649+00.00 R1	0.0	116.0	3719.9	0.0	0.0	2458.4
PROJECT TOTALS		3720			2458	

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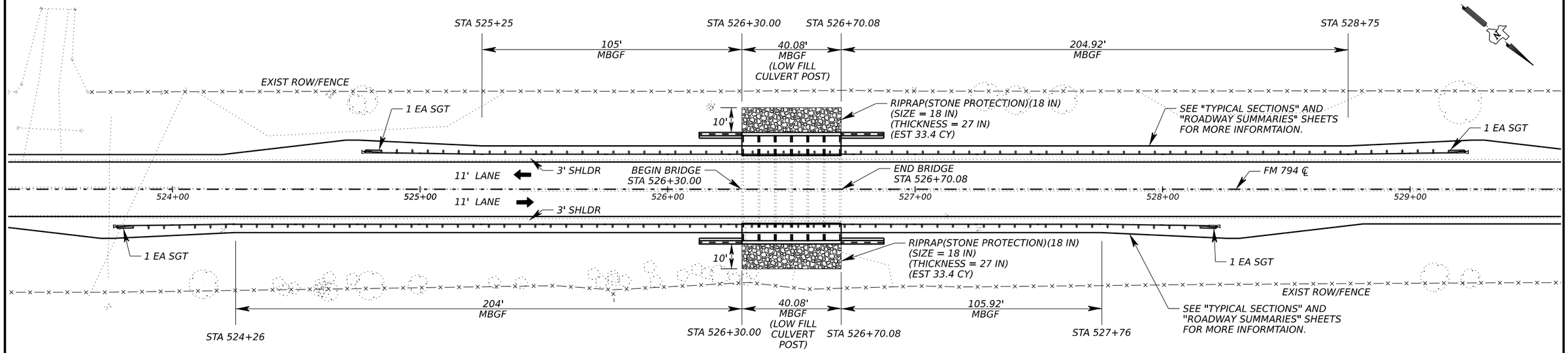
DATE: 1/27/2024

EARTHWORK SUMMARY

Texas Department of Transportation

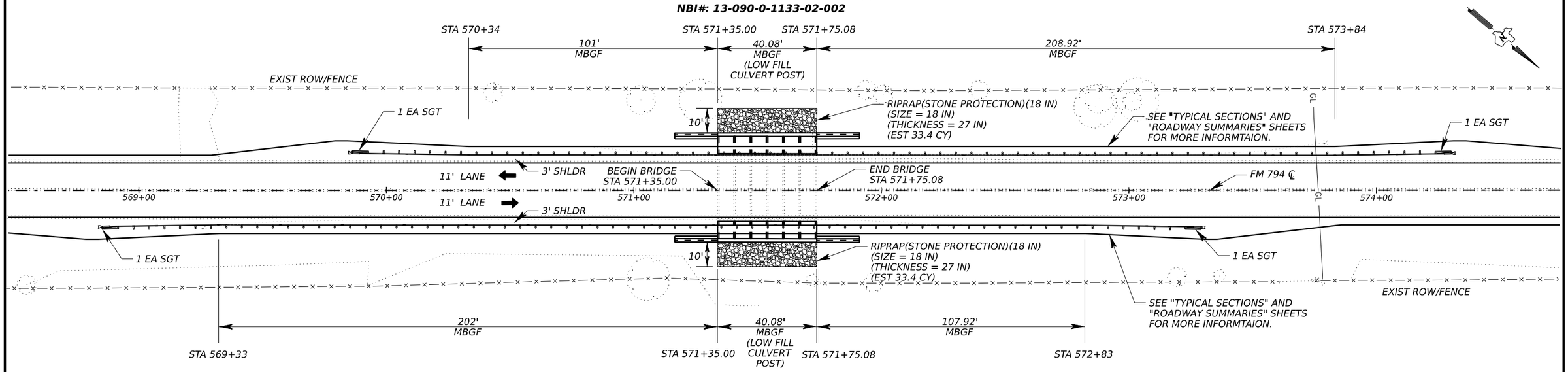
FED.RD. DIV.NO.		PROJECT NO.	
6			
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	18



DRAW BRIDGE BRIDGE CLASS CULVERT

STA 526+30.00 TO STA 526+70.08

NBI#: 13-090-0-1133-02-002



ARTESIA CREEK BRIDGE CLASS CULVERT

STA 571+35.00 TO STA 571+75.08

NBI#: 13-090-0-1133-02-001

NOTE: SEE "PLAN AND PROFILE" SHEETS FOR MORE INFORMATION.

STATE OF TEXAS
AMANDA ANDERLE FLING
105989
LICENSED
PROFESSIONAL ENGINEER

Amanda Anderle Fling, P.E.

01/27/2024

MBGF LAYOUT & SUMMARY

NOT TO SCALE

Texas Department of Transportation

SHEET 1 OF 2

FED.RD. DIV.NO.		PROJECT NO.	
6			
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	19

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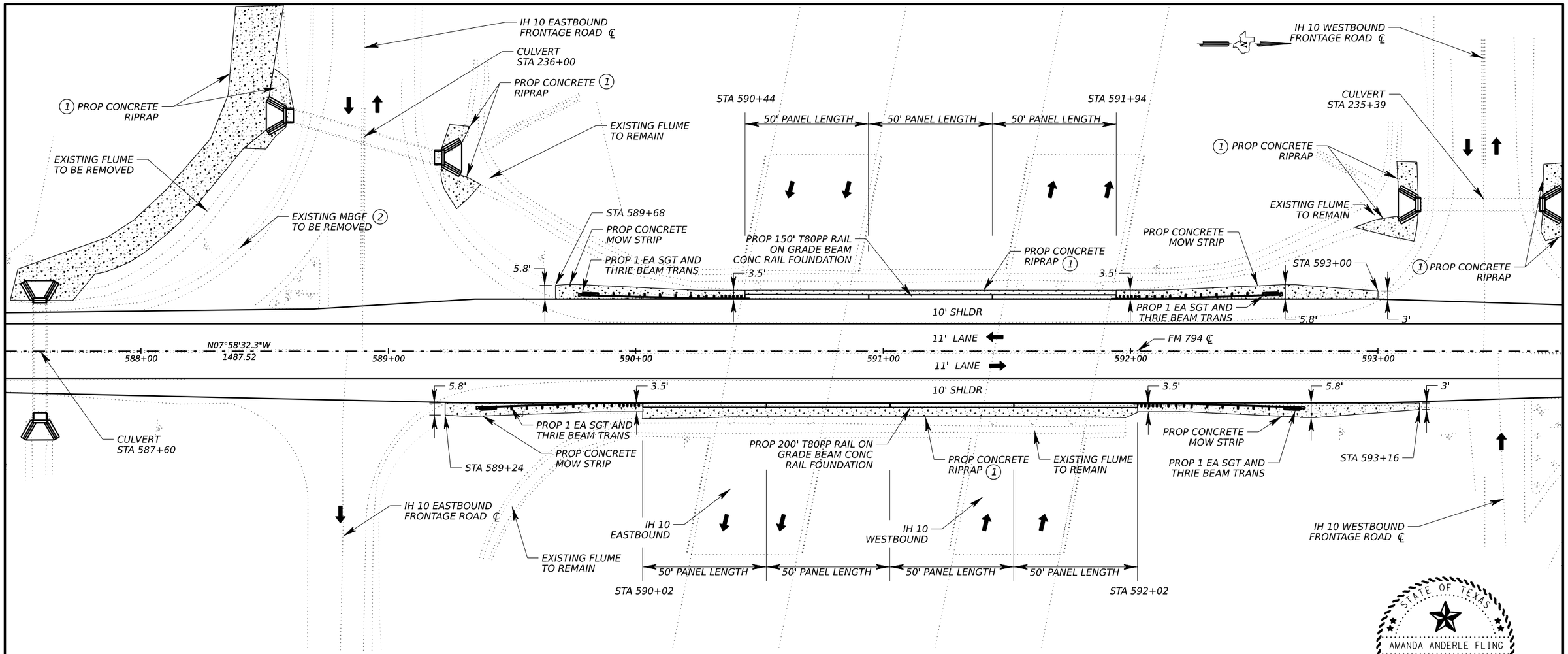

RAIL, MBGF, AND MOW STRIP SUMMARY

LOCATION	ITEM 420	ITEM 432	ITEM 450	ITEM 540			ITEM 542		ITEM 544		ITEM 658		REMARKS
	CL C CONC (RAIL FOUNDATION)	RIPRAP (MOW STRIP) (5 IN)	RAIL (TY T80PP)	MTL W-BEAM GD FEN (LOW FILL CULVERT)	MTL W-BEAM GD FEN (TIM POST)	MTL BEAM GD FEN TRANS (THRIE-BEAM)	REMOVE METAL BEAM GD FEN	REMOVE TERMINAL ANCHOR SECTION	GUARDRAIL END TREATMENT (INSTALL)	GUARDRAIL END TREATMENT (REMOVE)	INSTL DEL ASSM (D-SW)SZ BRF CTB(BI)	INSTL DEL ASSM (D-SW)SZ 1 (BRF) GF2(BI)	
	CY	CY	LF	LF	LF	EA	LF	EA	EA	EA	EA	EA	
STA 523+76 TO STA 528+26 (RT)				40.08	309.92		250	2	2			9	DRAW BRIDGE (STA 526+30.00 TO STA 526+70.08) NBI# 13-090-0-1133-02-002
STA 524+75 TO STA 529+25 (LT)				40.08	309.92		250		2	2		9	
STA 568+82 TO STA 573+33 (RT)				40.08	309.92		250	2	2			9	ARTESIA CREEK BRIDGE (STA 571+35.00 TO STA 571+75.08) NBI# 13-090-0-1133-02-001
STA 569+84 TO STA 574+33 (LT)				40.08	309.92		250	2	2			9	
STA 587+16 TO STA 588+69 (LT)							250	2					FM 794 @ IH 10 EASTBOUND 2 FRONTAGE ROAD
STA 589+35 TO STA 593+16 (RT)	32.0	24.9	200			2	400	1	2	1	5	4	GRADE BEAM FOUNDATION
STA 589+68 TO STA 593+00 (LT)	24.0	26.6	150			2	575	2	2		4	4	GRADE BEAM FOUNDATION
TOTALS	**56.0**	**51.5**	**350**	**160.32**	**1239.68**	**4**	**2225**	**11**	**12**	**3**	**9**	**44**	

NOTE: SEE APPLICABLE STANDARDS FOR MORE INFORMATION.

1 SEE "RIPRAP LAYOUT & SUMMARY" SHEET FOR QUANTITY.

STATE OF TEXAS
AMANDA ANDERLE FLING
105989
LICENSED
PROFESSIONAL ENGINEER

Amanda Anderle Fling, P.E.

01/27/2024

MBGF LAYOUT & SUMMARY

NOT TO SCALE

Texas Department of Transportation

SHEET 2 OF 2

FED.RD. DIV.NO.		PROJECT NO.	
6			
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	20

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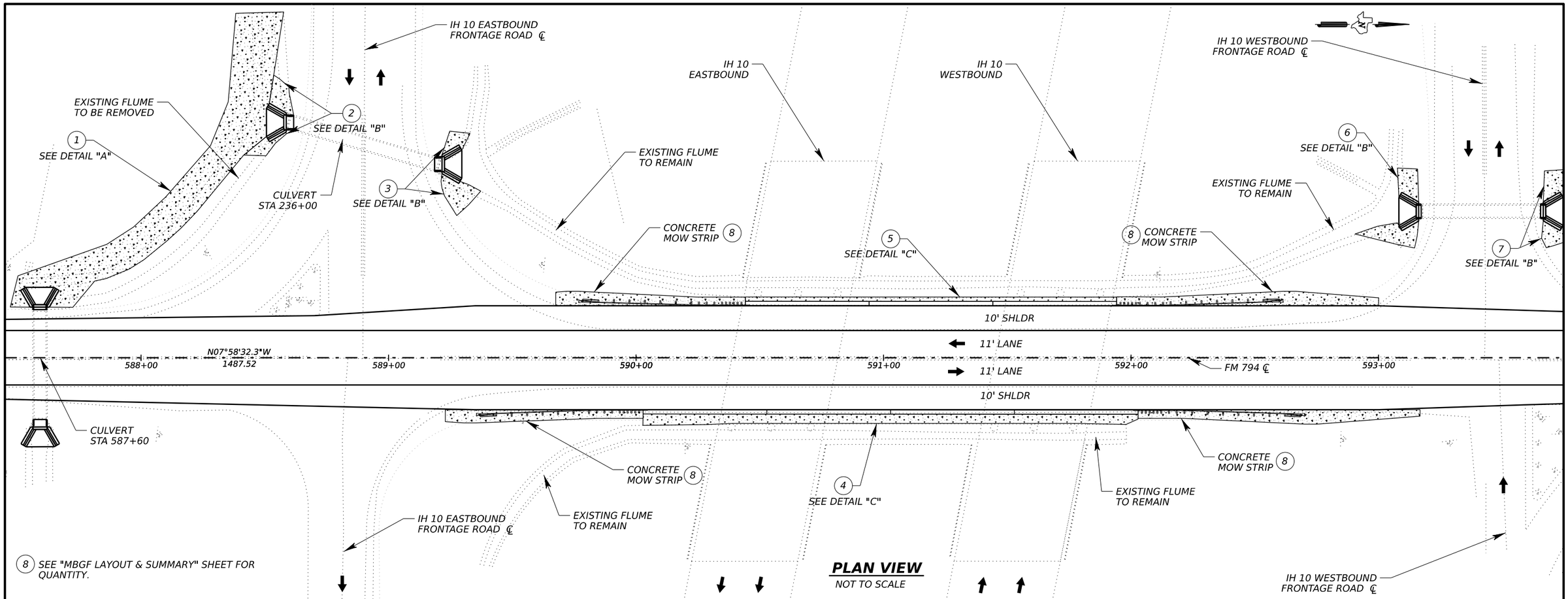
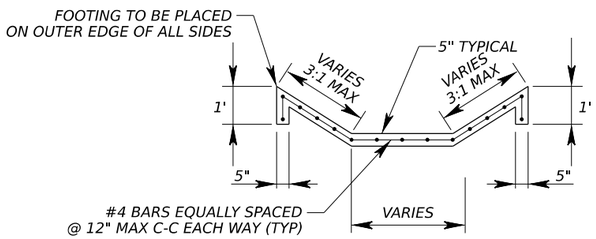


8 SEE "MBGF LAYOUT & SUMMARY" SHEET FOR QUANTITY.

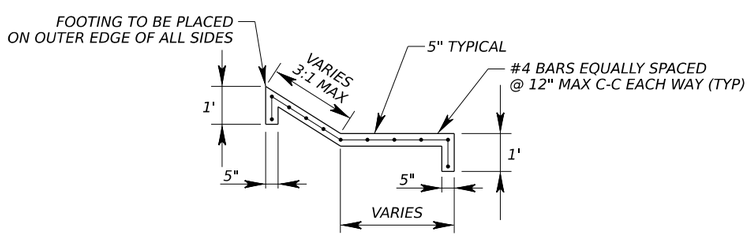
PLAN VIEW
NOT TO SCALE

RIPRAP SUMMARY

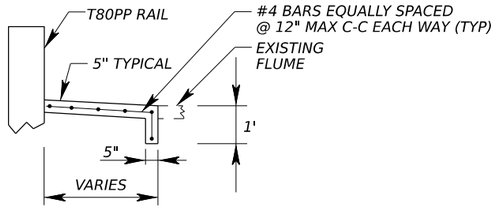
LOCATION	ITEM 104 REMOVING CONC (RIPRAP) (EST) SY	ITEM 432 CONC RIPRAP (5 IN) (EST) CY	REMARKS
1 STA 587+47 TO STA 588+57 (LT)	222.9	36.9	
2 STA 588+46 TO STA 588+60 (LT)	34.2	3.3	EASTBOUND FRONTAGE ROAD
3 STA 589+21 TO STA 589+35 (LT)	16.9	3.2	EASTBOUND FRONTAGE ROAD
4 STA 590+02 TO STA 592+02 (RT)		11.9	
5 STA 590+44 TO STA 591+94 (LT)		4.1	
6 STA 593+09 TO STA 593+16 (LT)	19.8	3.7	WESTBOUND FRONTAGE ROAD
7 STA 593+66 TO STA 593+74 (LT)	13.2	2.6	WESTBOUND FRONTAGE ROAD
TOTALS	**307**	**65.7**	



RIPRAP DETAIL "A"
NOT TO SCALE



RIPRAP DETAIL "B"
NOT TO SCALE



RIPRAP DETAIL "C"
NOT TO SCALE

Amanda Anderle Fling, P.E.

01/27/2024

RIPRAP LAYOUT & SUMMARY

NOT TO SCALE

Texas Department of Transportation

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		
6			
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	21

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FILE: FM794_RIPRAPSUMMARY_LAYOUT.dgn
DATE: 1/27/2024

DRIVEWAY SUMMARY

DRIVEWAY STATION	LT/RT	EXISTING STRUCTURE	PROPOSED WORK	DWY LENGTH "L" FT	DWY WIDTH "W" FT	DWY AREA SY	ITEM 104 REMOVING CONC (DRIVEWAYS) SY	ITEM 247 * FLEX BASE (CMP IN PLC) (TY E GR1-2) (FNAL POS) 6" CY	ITEM 316 PRIME * ASPH (RC-250) 0.20 GAL/SY GAL	ITEM 316 PRIME * AGGR (TY-E GR-5 SAC-B) 1 CY/140 SY CY	ITEM 316 OCST * ASPH (AC-20-5TR OR AC-20XP OR CRS-2P) 0.40 GAL/SY GAL	ITEM 316 OCST * AGGR (TY-PE GR-3 SAC-B) 1 CY/85 SY CY	ITEM 400 CUT AND RESTORE PAV (FLEX BASE) SY	ITEM 460 CMP GAL STL 15" LF	ITEM 460 CMP GAL STL 18" LF	ITEM 464 RC PIPE (CLIII) 15" LF	ITEM 464 RC PIPE (CLIII) 18" LF	ITEM 464 RC PIPE (CLIII) 24" LF	ITEM 467 SET (TY II) 15" CMP (6:1) (P) EA	ITEM 467 SET (TY II) 15" RCP (6:1) (P) EA	ITEM 467 SET (TY II) 18" CMP (6:1) (P) EA	ITEM 467 SET (TY II) 18" RCP (6:1) (P) EA	ITEM 467 SET (TY II) 24" RCP (6:1) (P) EA	ITEM 496 REMOVE STR (SMALL) EA	ITEM 530 DRIVEWAYS (CONC) SY	ITEM 530 DRIVEWAYS (SURF TREAT) SY	REMARKS
468+10	LT	1 - 24" X 40' RCP	REMOVE EXIST STRUCTURE. PROP 1 - 24"X 48' RCP W/ SET LT & RT.	17	25	58.3		9.7	11.7	0.4	23.3	0.7	13.7					48					2	1		58.3	
485+35	LT	NO STRUCTURE	NO PROPOSED WORK	10	16	28.9		4.8	5.8	0.2	11.6	0.3														28.9	
487+55	RT	NO STRUCTURE	NO PROPOSED WORK	10	24	37.8		6.3	7.6	0.3	15.1	0.4														37.8	
500+80	LT	NO STRUCTURE	NO PROPOSED WORK	25	31	97.2		16.2	19.4	0.7	38.9	1.1														97.2	CR 234
501+25	RT	NO STRUCTURE	NO PROPOSED WORK	10	13	25.6		4.3	5.1	0.2	10.2	0.3														25.6	
502+00	LT	1 - 15" X 46' CMP W/ SLOPED ENDS LT & RT	REMOVE EXIST STRUCTURE. PROP 1 - 15" X 48' RCP W/ SET LT & RT.	16	18	43.1		7.2	8.6	0.3	17.2	0.5	3.3			48				2			1			43.1	28.25' FROM CL
502+50	RT	NO STRUCTURE	NO PROPOSED WORK	10	21	34.4		5.7	6.9	0.2	13.8	0.4														34.4	
511+35	RT	1-15" X 22' CMP	REMOVE 2' LT & RT. ADD 6' LT & RT W/ SET LT & RT.	10	12	24.4		4.1	4.9	0.2	9.8	0.3		12					2							24.4	
513+70	RT	1 - 18" X 28' RCP	REMOVE 4' LT & RT. ADD 12' LT & RT W/ SET LT & RT.	10	27	41.1		6.9	8.2	0.3	16.4	0.5					24					2				41.1	
515+15	LT	NO STRUCTURE	NO PROPOSED WORK	10	17	30.0		5.0	6.0	0.2	12.0	0.4														30.0	
523+50	LT	1 - 18" X 26' CMP	REMOVE EXIST STRUCTURE. PROP 1 - 18" X 30' RCP W/ SET LT & RT.	10	12	24.4		4.1	4.9	0.2	9.8	0.3	4.7				30					2			24.4	25.5' FROM CL
537+60	RT	1 - 18" X 20' RCP	REMOVE 4' LT & RT. ADD 10' LT & RT W/ SET LT & RT.	10	12	24.4		4.1	4.9	0.2	9.8	0.3					20					2				24.4	
547+10	RT	1 - 12" X 20' RCP	REMOVE EXIST STRUCTURE. PROP 1 - 15" X 34' RCP W/ SET LT & RT.	16	17	41.3		6.9	8.3	0.3	16.5	0.5	2.9			34				2			1			41.3	28.0' FROM CL
548+85	RT	1 - 12" X 42' RCP	REMOVE EXIST STRUCTURE. PROP 1 - 15" X 42' RCP W/ SET LT & RT.	16	17	41.3		6.9	8.3	0.3	16.5	0.5	2.0			42				2			1			41.3	28.0' FROM CL
549+20	LT	NO STRUCTURE	NO PROPOSED WORK	10	11	23.3		3.9	4.7	0.2	9.3	0.3														23.3	
551+15	RT	NO STRUCTURE	NO PROPOSED WORK	10	9	21.1		3.5	4.2	0.2	8.4	0.2														21.1	
553+95	RT	1 - 6" X 22' PCLV PIPE	REMOVE EXIST STRUCTURE. PROP 1 - 18" X 24' RCP W/ SET LT & RT.	14	10	26.7		4.5	5.3	0.2	10.7	0.3	4.0				24					2		1		26.7	25.5' FROM CL BACK TO BACK SET RT W/ DRIVEWAY STA 554+30
554+30	RT	1 - 18" X 16' RCP	REMOVE EXIST STRUCTURE. PROP 1 - 18" X 24' RCP W/ SET LT & RT.	14	8	23.6		3.9	4.7	0.2	9.4	0.3	3.2				24					2		1		23.6	25.5' FROM CL BACK TO BACK SET LT W/ DRIVEWAY STA 553+95
555+30	RT	1 - 18" X 14' RCP	REMOVE EXIST STRUCTURE. PROP 1 - 18" X 30' RCP W/ SET LT & RT.	14	10	26.7		4.5	5.3	0.2	10.7	0.3	4.1				30					2		1		26.7	25.5' FROM CL
560+85	RT	1 - 18" X 38' CMP W/ SLOPED ENDS LT & RT	REMOVE SLOPED ENDS LT & RT. ADD 6' LT & RT W/ SET LT & RT.	10	34	48.9		8.2	9.8	0.3	19.6	0.6			12					2						48.9	
566+95	LT	1 - 18" X 24' RCP	REMOVE 4' LT & RT. ADD 12' LT & RT W/ SET LT & RT.	25	22	72.2		12.0	14.4	0.5	28.9	0.8					24					2				72.2	CR 233
577+00	LT	1 - 15" X 26' CMP W/ SLOPED ENDS LT & RT	REMOVE SLOPED ENDS LT & RT. ADD 6' LT & RT W/ SET LT & RT.	10	20	33.3		5.6	6.7	0.2	13.3	0.4		12					2							33.3	
579+55	LT	1 - 18" X 18' CMP	REMOVE EXIST STRUCTURE. PROP 1 - 18"X 28' RCP W/ SET LT & RT.	17	11	31.9		5.3	6.4	0.2	12.8	0.4	3.9				28					2		1		31.9	29' FROM CL
			SHEET TOTALS				**0**	143.6	172.1	6.2	344.0	10.1	**41.8**	**24**	**12**	**124**	**204**	**48**	**4**	**6**	**2**	**16**	**2**	**9**	**0**	**859.9**	

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STANDARD(S) USED: SETP-PD.

NOTES:

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3. REMOVE EXISTING DRIVEWAY MATERIAL. GRADE AND RESHAPE DITCH TO MATCH ADJACENT ROADWAY DITCH. THIS WORK WILL NOT BE PAID FOR DIRECTLY, BUT CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS.
4. PROPOSED DRIVEWAY STRUCTURE TO BE LOCATED AT THE PROPOSED GRADED DITCH FLOWLINES VERTICALLY AND HORIZONTALLY ENSURING POSITIVE DRAINAGE.

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FILE: DRIVEWAY_SUMMARY&DETAILS.dgn
DATE: 1/28/2024

DRIVEWAY SUMMARY & DETAILS

Texas Department of Transportation

FED.RD. DIV.NO.		PROJECT NO.	
6			
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	22

DRIVEWAY SUMMARY CONT.

DRIVEWAY STATION	LT/RT	EXISTING STRUCTURE	PROPOSED WORK	DWY LENGTH "L" FT	DWY WIDTH "W" FT	DWY AREA SY	ITEM 104 REMOVING CONC (DRIVEWAYS) SY	ITEM 247 * FLEX BASE (CMP IN PLC) (TY E GR1-2) (FNAL POS) 6" CY	ITEM 316 PRIME * ASPH (RC-250) 0.20 GAL/SY GAL	ITEM 316 PRIME * AGGR (TY-E GR-5 SAC-B) 1 CY/140 SY CY	ITEM 316 OCST * ASPH (AC-20-5TR OR AC-20XP OR CRS-2P) 0.40 GAL/SY GAL	ITEM 316 OCST * AGGR (TY-PE GR-3 SAC-B) 1 CY/85 SY CY	ITEM 400 CUT AND RESTORE PAV (FLEX BASE) SY	ITEM 460 CMP GAL STL 15" LF	ITEM 460 CMP GAL STL 18" LF	ITEM 464 RC PIPE (CLIII) 15" LF	ITEM 464 RC PIPE (CLIII) 18" LF	ITEM 464 RC PIPE (CLIII) 24" LF	ITEM 467 SET (TY II) 15" CMP (6:1) (P) EA	ITEM 467 SET (TY II) 15" RCP (6:1) (P) EA	ITEM 467 SET (TY II) 18" CMP (6:1) (P) EA	ITEM 467 SET (TY II) 18" RCP (6:1) (P) EA	ITEM 467 SET (TY II) 24" RCP (6:1) (P) EA	ITEM 496 REMOVE STR (SMALL) EA	ITEM 530 DRIVEWAYS (CONC) SY	ITEM 530 DRIVEWAYS (SURF TREAT) SY	REMARKS
597+20	LT	NO STRUCTURE	NO PROPOSED WORK	10	10	22.2		3.7	4.4	0.2	8.9	0.3																
597+80	RT	NO STRUCTURE	NO PROPOSED WORK	10	30	44.4		7.4	8.9	0.3	17.8	0.5																
617+70	RT	1 - 15" X 30' CMP	REMOVE 2' LT & RT. ADD 6' LT & RT W/ SET LT & RT.	10	25	38.9		6.5	7.8	0.3	15.6	0.5		12					2								38.9	
620+20	LT	1 - 18" X 12' RCP	REMOVE EXIST STRUCTURE. PROP 1 - 18" X 28' RCP W/ SET LT & RT.	13	10	25.6		4.3	5.1	0.2	10.2	0.3	4.8				28						2		1		25.6	25.5' FROM CL
625+95	LT	1 - 18" X 22' RCP	REMOVE EXIST STRUCTURE. PROP 1 - 18" X 28' RCP W/ SET LT & RT.	13	12	28.4		4.7	5.7	0.2	11.4	0.3	5.6				28						2		1		28.4	25.5' FROM CL
629+75	LT	1 - 18" X 20' CMP	REMOVE 2' LT & RT. ADD 8' LT & RT W/ SET LT & RT.	10	13	25.6		4.3	5.1	0.2	10.2	0.3			16						2					25.6	
630+35	LT	1 - 18" X 22' CMP	REMOVE EXIST STRUCTURE. PROP 1 - 18" X 28' RCP W/ SET LT & RT.	15	8	24.4	17.5						3.8				28						2		1	24.4		27' FROM CL
630+65	RT	1 - 15" X 30' CMP	REMOVE EXIST STRUCTURE. PROP 1 - 15" X 34' RCP W/ SET LT & RT.	11	18	33.1		5.5	6.6	0.2	13.2	0.4	7.3			34				2					1		33.1	23.5' FROM CL
631+50	LT	1 - 15" X 48' CMP W/ SET LT & RT	NO PROPOSED WORK	10	19	32.2		5.4	6.4	0.2	12.9	0.4															32.2	
632+25	RT	1 - 12" X 24' CMP	REMOVE EXIST STRUCTURE. PROP 1 - 15" X 28' RCP W/ SET LT & RT.	15	15	36.1		6.0	7.2	0.3	14.4	0.4	5.8			28				2					1		36.1	27.5' FROM CL BACK TO BACK SET RT W/ DRIVEWAY STA 632+65
632+65	RT	1 - 12" X 30' CMP	REMOVE EXIST STRUCTURE. PROP 1 - 15" X 30' RCP W/ SET LT & RT.	15	15	36.1		6.0	7.2	0.3	14.4	0.4	5.8			30				2					1		36.1	27.5' FROM CL BACK TO BACK SET LT W/ DRIVEWAY STA 632+25
633+50	RT	1 - 15" X 16' CMP	REMOVE EXIST STRUCTURE. PROP 1 - 15" X 28' RCP W/ SET LT & RT.	15	10	27.8		4.6	5.6	0.2	11.1	0.3	3.7			28				2					1		27.8	27.5' FROM CL
635+65	LT	1 - 18" X24' CMP W/ SET LT & RT	REMOVE EXIST STRUCTURE. PROP 1 - 18" X 32' RCP W/ SET LT & RT.	10	12	24.4		4.1	4.9	0.2	9.8	0.3	5.6				32						2		1		24.4	22.5' FROM CL
636+85	LT	1 - 12" X 24' CMP	REMOVE EXIST STRUCTURE. PROP 1 - 15" X 32' RCP W/ SET LT & RT.	10	15	27.8		4.6	5.6	0.2	11.1	0.3	6.8			32				2					1		27.8	22.5' FROM CL
637+10	RT	1 - 15" X 26' CMP W/ SLOPED ENDS	REMOVE EXIST STRUCTURE. PROP 1 - 15" X 32' RCP W/ SET LT & RT.	10	15	27.8		4.6	5.6	0.2	11.1	0.3	7.7			32				2					1		27.8	22.5' FROM CL
639+30	LT	NO STRUCTURE	NO PROPOSED WORK	21	17	50.8		8.5	10.2	0.4	20.3	0.6															50.8	CR 230 W
639+30	RT	NO STRUCTURE	NO PROPOSED WORK	21	24	67.1		11.2	13.4	0.5	26.8	0.8															67.1	S 2ND ST
642+95	RT	1 - 18" X 16' RCP	REMOVE EXIST STRUCTURE. PROP 1 - 18" X 32' RCP W/ SET LT & RT.	15	13	32.8		5.5	6.6	0.2	13.1	0.4	5.6				32						2		1		32.8	S 1ST ST, 25.5' FROM CL
644+50	LT	1 - 18" X 16' CMP	REMOVE EXIST STRUCTURE. PROP 1 - 18" X 28' RCP W/ SET LT & RT.	11	10	23.3		3.9	4.7	0.2	9.3	0.3	4.0				28						2		1		23.3	23' FROM CL
644+80	RT	1 - 12" X 26' RCP	REMOVE EXIST STRUCTURE.																						1			EXISTING DRIVEWAY TO BE REMOVED AND REGRADED.
645+20	LT	1 - 12" X 14' RCP	REMOVE EXIST STRUCTURE. PROP 1 - 15" X 28' RCP W/ SET LT & RT.	11	10	23.3		3.9	4.7	0.2	9.3	0.3	3.6			28				2					1		23.3	
646+75	RT	NO STRUCTURE	NO PROPOSED WORK	24	28	85.8		14.3	17.2	0.6	34.3	1.0															85.8	JOBE AND LUM ST
			SHEET TOTALS				**17.5**	119.0	142.9	5.3	285.2	8.4	**70.1**	**12**	**16**	**212**	**176**	**0**	**2**	**14**	**2**	**12**	**0**	**14**	**24.4**	**713.5**	
			PROJECT TOTALS				**17.5**	262.6	315.0	11.5	629.2	18.5	**112**	**36**	**28**	**336**	**380**	**48**	**6**	**20**	**4**	**28**	**2**	**23**	**24.4**	**1573**	

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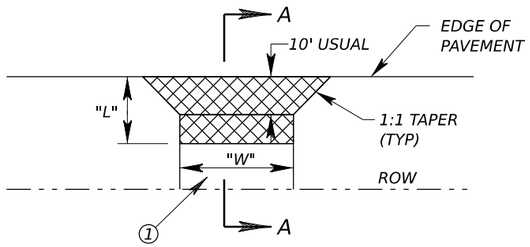
FILE: DRIVEWAY_SUMMARY&DETAILS.dgn
DATE: 1/28/2024

DRIVEWAY SUMMARY & DETAILS

Texas Department of Transportation

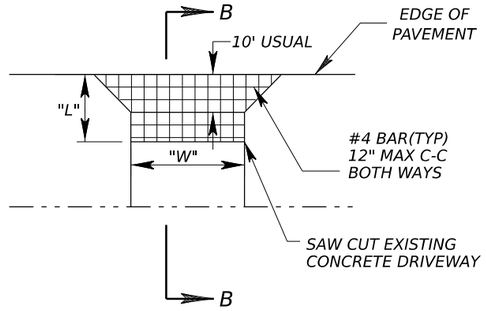
FED.RD. DIV.NO.	PROJECT NO.		
6			
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	23



DRIVEWAYS (SURF TRT)

PLAN VIEW

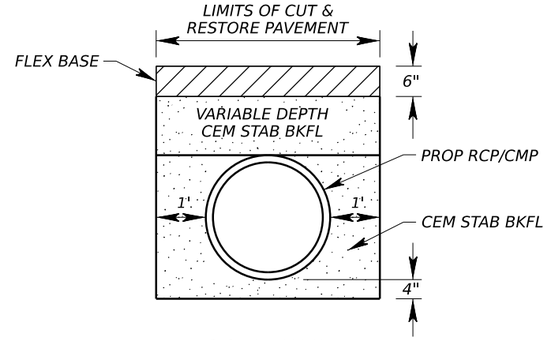
NOT TO SCALE



DRIVEWAYS (CONC)

PLAN VIEW

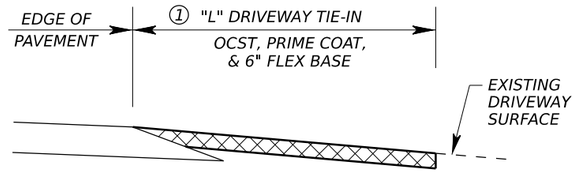
NOT TO SCALE



DRIVEWAY CUT & RESTORE PAVEMENT DETAIL

SECTION VIEW

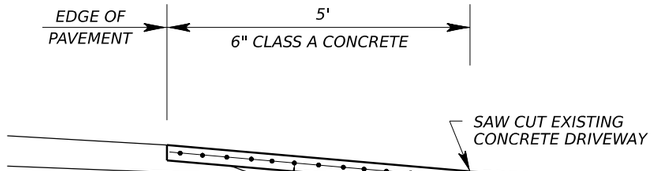
NOT TO SCALE



DRIVEWAYS (SURF TRT)

SECTION A-A

NOT TO SCALE



DRIVEWAYS (CONC)

SECTION B-B

NOT TO SCALE

DRIVEWAY TIE-IN AREA

1 *PLACE FLEX BASE, PRIME COAT, AND OCST TO THE ROW LINE ON COUNTY ROADS. SY AREA FOR PAYMENT INCLUDES THIS ADDITIONAL AREA.*

GRADE AND FINISH EXISTING COUNTY ROAD BEYOND LIMITS OF TIE-IN TO A CONDITION THAT IS SATISFACTORY TO THE ENGINEER PRIOR TO PRIME COAT. THIS WORK IS SUBSIDIARY TO ITEM 530.

CUT & RESTORE PAVEMENT NOTES:

1. *FLEX BASE IS SUBSIDIARY TO ITEM 400 CUT AND RESTORE PAVEMENT.*
2. *PROVIDE A SMOOTH AND UNIFORM DRIVING SURFACE AS APPROVED BY THE ENGINEER.*

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Amanda Anderle Fling, P.E.

01/27/2024

DRIVEWAY SUMMARY & DETAILS

NOT TO SCALE

Texas Department of Transportation

FED.RD. DIV.NO.		PROJECT NO.	
6			
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	24

PATH: T:\YKMANNEXIPS&E\113302030_FM794\Plan_Sheets\
FILE: DRIVEWAY_SUMMARY&DETAILS.dgn
DATE: 1/27/2024

STRUCTURE SUMMARY

CULVERT LOCATION (STA)	DESCRIPTION	ITEM 104 REMOVING CONC (RIPRAP) (EST) SY	ITEM 400 CEM STAB BKFL CY	ITEM 400 ∗ STRUCT EXCAV CY	ITEM 400 CUT RESTORE PAV SY	ITEM 402 TRENCH EXCAV PROTECT LF	ITEM 403 TEMPORARY SPL SHORING SF	ITEM 432 ① RIPRAP (CONC) (5 IN) CY	ITEM 432 RIPRAP (STONE PROTEC) (18 IN) CY	ITEM 462 CONC BOX CULV 4'X2' LF	5'X2' LF	5'X3' LF	6'X3' LF	6'X4' LF	ITEM 464 RC PIPE (CL III) 18 IN LF	24 IN LF	30 IN LF	42 IN LF	ITEM 466 WINGWALL (PW-1) (HW=6) EA	ITEM 467 SET (TY I) (S=4) (HW=2) (3:1) (C) EA	(S=4) (HW=3) (4:1) (C) EA	(S=5) (HW=3) (3:1) (C) EA	(S=5) (HW=4) (3:1) (C) EA	(S=6) (HW=4) (3:1) (C) EA	SET (TY II) (18 IN) (RCP) (4:1) (C) EA	(24 IN) (RCP) (4:1) (C) EA	(30 IN) (RCP) (3:1) (C) EA	(30 IN) (RCP) (4:1) (C) EA	(42 IN) (RCP) (3:1) (C) EA	(42 IN) (RCP) (4:1) (C) EA	ITEM 480 CLEAN EXIST CULVERT EA	ITEM 496 REMOV STR (SMALL) EA	REMARKS
NON-BRIDGE CLASS CULVERTS																																
474+72	EXIST 3 - 6' x 3' x 34.83' MBC W/ SETS LT & RT. REMOVE HEADWALLS & SETS LT & RT. EXTEND 3' LT & 2' RT. ADD SET(TY I)(S=6)(HW=4)(3:1)(C) LT & RT USING BCS, MC-MD, MC-6-16, & SETB-FW-0.		4.1					6.6					15										6								1	
495+16	EXIST 1 - 24" x 46.00' CMP W/ SETS LT & RT. REMOVE EXIST STRUCTURE. PROP 1 - 24" x 46.00' RCP W/ SET(TY II)(24 IN)(RCP)(4:1)(C) LT & RT USING SETP-CD.		13.3	12.0	12.0	40.0										46								2						1	
514+33	EXIST 1 - DES 4 x 42.00' CMP W/ SETS LT & RT. REMOVE EXIST STRUCTURE. PROP 1 - 30" x 42.00' RCP W/ SET(TY II)(30 IN)(RCP)(4:1)(C) LT & RT USING SETP-CD.		15.4	12.5	13.5	28.0											42									2				1	
539+40	EXIST 2 - 5' x 3' x 35.33' MBC W/ SETS LT & RT. REMOVE HEADWALLS & SETS LT & RT. EXTEND 3' LT & 3' RT. ADD SET(TY I)(S=5)(HW=4)(3:1)(C) LT & RT USING BCS, MC-MD, MC-5-20, & SETB-FW-0.		4.1					4.0				12											4								1	
587+60	EXIST 1 - 5' x 2' x 44.33' CBC W/ FLARED WINGS LT & RT. REMOVE HEADWALL AND FLARED WINGS LT & RT. EXTEND 2' LT & 4' RT. ADD SET(TY I)(S=5)(HW=3)(3:1)(C) LT & RT USING BCS, SCC-MD, SCC-5 & 6, & SETB-FW-0.	199.4	2.1	9.5				② 1.2			6											2									
600+35	EXIST 1 - DES 5 x 38.00' CMP. REMOVE EXIST STRUCTURE. PROP 1 - 4' x 2' x 42.00' CBC W/ SET(TY I)(S=4)(HW=2)(3:1)(C) LT & SET(TY I)(S=4)(HW=3)(4:1)(C) RT USING BCS, SCP-MD, SCP-4, & SETB-FW-0.		14.1	18.7		32.0		1.3		42										1	1									1	
609+10	EXIST 1 - 42" x 48.00' CMP. REMOVE EXIST STRUCTURE. PROP 1 - 42" x 48.00' RCP W/ SET(TY II)(42 IN)(RCP)(3:1)(C) LT & SET(TY II)(42 IN)(RCP)(4:1)(C) RT USING SETP-CD.		25.6	13.6	16.7	48.0											48												1	1	1	
625+23	EXIST 1 - 30" x 40.00' CMP. REMOVE EXIST STRUCTURE. PROP 1 - 30" x 46.00' RCP W/ SET(TY II)(30 IN)(RCP)(4:1)(C) LT & SET(TY II)(30 IN)(RCP)(3:1)(C) RT USING SETP-CD.		16.8	12.9	13.5	40.0											46										1	1			1	
648+42	EXIST 1 - 18" x 40.00' CMP. REMOVE EXIST STRUCTURE. PROP 1 - 18" x 48.00' RCP W/ SET(TY II)(18 IN)(RCP)(4:1)(C) LT & RT USING SETP-CD.		9.6	5.2	10.5										48									2						1	
236+00 IH 10 EASTBOUND FRONTAGE ROAD	EXIST 1 - 5' x 2' x 61.17' NORMAL CBC (63.33' ALONG 15° SKEW) W/ FLARED WINGS LT & RT. REMOVE HEADWALLS AND FLARED WINGS LT & RT. REMOVE 2' LT NORMAL (2.07' ALONG 15° SKEW) & 1.75' RT NORMAL (1.81' ALONG 15° SKEW). EXTEND 4' LT & 4' RT. ADD SET(TY I)(S=5)(HW=3)(3:1)(C) LT & RT USING BCS, SCC-MD, SCC-5 & 6, & SETB-FW-0.	211.0	2.1	17.8				1.2			8											2									
235+39 IH 10 WESTBOUND FRONTAGE ROAD	EXIST 1 - 5' x 2' x 48.33' CBC W/ FLARED WINGS LT & RT. REMOVE HEADWALLS AND FLARED WINGS LT & RT. EXTEND 2' LT & 2' RT. ADD SET(TY I)(S=5)(HW=3)(3:1)(C) LT & RT USING BCS, SCC-MD, SCC-5 & 6, & SETB-FW-0.	338.6	1.3	11.6				② 1.2			4											2									
NON-BRIDGE CLASS TOTALS		**749.0**	**108.5**	113.8	**66.2**	**188.0**	**0**	**15.5**	**0**	**42**	**18**	**12**	**15**	**0**	**48**	**46**	**88**	**48**	**0**	**1**	**1**	**6**	**4**	**6**	**2**	**2**	**1**	**3**	**1**	**1**	**0**	**6**	

∗ FOR CONTRACTOR'S INFORMATION ONLY.

① 5" CONCRETE RIPRAP QUANTITY IS FOR CONCRETE APRON AS SHOWN ON THE SETB-FW-O STANDARD.

② SEE "RIPRAP LAYOUT & SUMMARY" SHEET FOR MORE INFORMATION.

NOTES:

1. CEMENT STABILIZED BACKFILL FOR ENTIRE LENGTH OF EXTENSION.
2. THE PLACEMENT AND LOCATION OF STONE RIPRAP, WHERE CALLED FOR, SHALL BE PLACED AS DIRECTED BY THE ENGINEER.
3. SEE "MBGF LAYOUT & SUMMARY" SHEETS FOR MBGF AND END TREATMENT QUANTITIES.

PATH: T:\YKMANNEX\PS&E\113302030_FM794\Plan_Sheets\
FILE: STRUCTURE SUMMARY.dgn
DATE: 1/28/2024

STRUCTURE SUMMARY

Texas Department of Transportation

FED.RD. DIV.NO.	PROJECT NO.		
6			
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	25

STRUCTURE SUMMARY

CULVERT LOCATION (STA)	DESCRIPTION	ITEM 104 REMOVING CONC (RIPRAP) (EST) SY	ITEM 400 CEM STAB BKFL CY	ITEM 400 ∗ STRUCT EXCAV CY	ITEM 400 CUT RESTORE PAV SY	ITEM 402 TRENCH EXCAV PROTECT LF	ITEM 403 TEMPORARY SPL SHORING SF	ITEM 432 ① RIPRAP (CONC) (5 IN) CY	ITEM 432 RIPRAP (STONE PROTEC) (18 IN) CY	ITEM 462 CONC BOX CULV 4'X2' LF	5'X2' LF	5'X3' LF	6'X3' LF	6'X4' LF	ITEM 464 RC PIPE (CL III) 18 IN LF	24 IN LF	30 IN LF	42 IN LF	ITEM 466 WINGWALL (PW-1) (HW=6) EA	ITEM 467 SET (TY I) (S=4) (HW=2) (3:1) (C) EA	(S=4) (HW=3) (4:1) (C) EA	SET (TY I) (S=5) (HW=3) (3:1) (C) EA	(S=5) (HW=4) (3:1) (C) EA	SET (TY II) (S=6) (HW=4) (3:1) (C) EA	(18 IN) (RCP) (4:1) (C) EA	(24 IN) (RCP) (4:1) (C) EA	(30 IN) (RCP) (3:1) (C) EA	(30 IN) (RCP) (4:1) (C) EA	(42 IN) (RCP) (3:1) (C) EA	(42 IN) (RCP) (4:1) (C) EA	ITEM 480 CLEAN EXST CULVERT EA	ITEM 496 REMOV STR (SMALL) EA	REMARKS
BRIDGE CLASS CULVERTS																															
470+16.75 TO 470+43.25	EXIST 4 - 6' x 3' x 37.33' MBC W/ SETS LT & RT. NO PROPOSED WORK.																														NBI#13-090-0-1133-02-003
526+30.00 TO 526+70.08	EXIST 6 - 6' x 4' x 27.33' MBC W/ STRAIGHT WINGS LT & RT. REMOVE HEADWALLS & STRAIGHT WINGS LT & RT. EXTEND 8' LT & 7' RT W/ PARALLEL WINGS LT & RT USING BCS, MC-MD, MC-6-16, ECD, & PW.		13.7	69.7		7.0	565.8		66.8					90				2											1		NBI#13-090-0-1133-02-002
571+35.00 TO 571+75.08	EXIST 6 - 6' x 4' x 27.33' MBC W/ STRAIGHT WINGS LT & RT. REMOVE HEADWALLS & STRAIGHT WINGS LT & RT. EXTEND 7' LT & 7' RT W/ PARALLEL WINGS LT & RT USING BCS, MC-MD, MC-6-16, ECD, & PW.		12.7	27.1		7.0	565.8		66.8					84				2													NBI#13-090-0-1133-02-001
	BRIDGE CLASS TOTALS	**0**	**26.4**	96.8	**0**	**14.0**	**1131.6**	**0**	**133.6**	**0**	**0**	**0**	**0**	**174**	**0**	**0**	**0**	**0**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	
	PROJECT TOTALS	**749**	**135**	211	**66**	**202**	**1132**	**15.5**	**134**	**42**	**18**	**12**	**15**	**174**	**48**	**46**	**88**	**48**	**4**	**1**	**1**	**6**	**4**	**6**	**2**	**2**	**1**	**3**	**1**	**1**	**1**	**6**	

∗ FOR CONTRACTOR'S INFORMATION ONLY.

① 5" CONCRETE RIPRAP QUANTITY IS FOR CONCRETE APRON AS SHOWN ON THE SETB-FW-O STANDARD.

② SEE "RIPRAP LAYOUT & SUMMARY" SHEET FOR MORE INFORMATION.

NOTES:

1. CEMENT STABILIZED BACKFILL FOR ENTIRE LENGTH OF EXTENSION.
2. THE PLACEMENT AND LOCATION OF STONE RIPRAP, WHERE CALLED FOR, SHALL BE PLACED AS DIRECTED BY THE ENGINEER.
3. SEE "MBGF LAYOUT & SUMMARY" SHEETS FOR MBGF AND END TREATMENT QUANTITIES.

PATH: T:\YKM\ANNEX\PS&E\113302030_FM794\Plan_Sheets\
FILE: STRUCTURE SUMMARY.dgn
DATE: 1/28/2024

STRUCTURE SUMMARY

Texas Department of Transportation

FED.RD. DIV.NO.		PROJECT NO.	
6			
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	26

TRAFFIC CONTROL SUMMARY

DESCRIPTION	LENGTH FT	ITEM 662 WK ZN PAV MRK NON-REMOV (Y)6" (BRK) LF	ITEM 662 WK ZN PAV MRK NON-REMOV (Y)6" (SLD) LF	ITEM 662 WK ZN PAV MRK SHT TERM (TAB) TY Y-2 EA	ITEM 6001 PORTABLE CHANGEABLE MESSAGE SIGN EA	ITEM 6185 TMA (STATIONARY) DAY	ITEM 6185 TMA (MOBILE OPERATION) DAY	REMARKS
STA 453+00 TO STA 649+00								
AS DIRECTED BY ENGINEER					4	10	20	
AFTER SURFACE 1								
PASSING	1730	433		130				(Y)6"(BRK) = 10 LF/40 LF - (TAB)TY Y-2 = 3 EA/40 LF
SINGLE NO PASS	11715	2929	11715	1465				(Y)6"(BRK) = 10 LF/40 LF - (TAB)TY Y-2 = 5 EA/40 LF
DOUBLE NO PASS	6155		12310	616				(TAB)TY Y-2 = 2 EA/20 LF
AFTER SURFACE 2								
PASSING	1730	433		130				(Y)6"(BRK) = 10 LF/40 LF - (TAB)TY Y-2 = 3 EA/40 LF
SINGLE NO PASS	11715	2929	11715	1465				(Y)6"(BRK) = 10 LF/40 LF - (TAB)TY Y-2 = 5 EA/40 LF
DOUBLE NO PASS	6155		12310	616				(TAB)TY Y-2 = 2 EA/20 LF
AFTER SURFACE 3								
PASSING	1730	433		130				(Y)6"(BRK) = 10 LF/40 LF - (TAB)TY Y-2 = 3 EA/40 LF
SINGLE NO PASS	11715	2929	11715	1465				(Y)6"(BRK) = 10 LF/40 LF - (TAB)TY Y-2 = 5 EA/40 LF
DOUBLE NO PASS	6155		12310	616				(TAB)TY Y-2 = 2 EA/20 LF
FRONTAGE ROADS								
DOUBLE NO PASS	1364		2728	136				(TAB)TY Y-2 = 2 EA/20 LF
PROJECT TOTALS		**10086**	**74803**	**6769**	**4**	**10**	**20**	

SURFACE 1: PRIME COAT FROM STA 453+00 TO STA 646+30. 8" ACP TY B FROM STA 646+30 TO STA 649+00.
SURFACE 2: OCST FROM STA 453+00 TO STA 646+30. SEAL COAT FROM STA 646+30 TO STA 649+00.
SURFACE 3: SEAL COAT FROM STA 453+00 TO STA 586+90 AND FROM STA 595+25 TO STA 646+30.
2" ACP TY D FROM STA 586+90 TO STA 595+25 AND FROM STA 646+30 TO STA 649+00.

DELINEATOR AND OBJECT MARKER SUMMARY

LOCATION	ITEM 658 INSTL OM ASSM (OM-2Y) (WC)GND (BI) EA	REMARKS
CENTERLINE STRUCTURES	22	SEE D & OM(4)-20 DETAIL 2
PROJECT TOTAL	**22**	

BLADING SUMMARY

LOCATION	ITEM 150 BLADING (EST) HR	REMARKS
STA 453+00 TO STA 649+00	20	AS APPROVED OR DIRECTED BY THE ENGINEER.
PROJECT TOTAL	**20**	

PAVEMENT MARKINGS SUMMARY

DESCRIPTION	LENGTH FT	ITEM 666 REF PROF PAV MRK TY I (W)6"(SLD) (100MIL) LF	ITEM 666 REF PROF PAV MRK TY I (Y)6"(BRK) (100MIL) LF	ITEM 666 REF PROF PAV MRK TY I (Y)6"(SLD) (100MIL) LF	ITEM 668 PREFAB PAV MRK TY C (W)(24") (SLD) LF	ITEM 668 PREFAB PAV MRK TY B (W) (RR XING) EA	ITEM 672 REFL PAV MRKR TY II-A-A EA	REMARKS
EDGELINES	19600	39200						
PASSING	1730		433				22	(Y)6"(BRK) = 10 LF/40 LF - REFL PAV MRKR TY II-A-A = 1 EA/80 LF
SINGLE NO PASS	11715		2929	11715			293	(Y)6"(BRK) = 10 LF/40 LF - REFL PAV MRKR TY II-A-A = 1 EA/40 LF
DOUBLE NO PASS	6155			12310			154	REFL PAV MRKR TY II-A-A = 1 EA/40 LF
RAILROAD CROSSING						2		
STOP BAR					66			
FRONTAGE ROAD	1364	5716		5526			34	REFL PAV MRKR TY II-A-A = 1 EA/40 LF
PROJECT TOTALS		**44916**	**3362**	**29551**	**66**	**2**	**503**	

PREPARING ROW SUMMARY

LOCATION	ITEM 100 PREP ROW (EST) STA	REMARKS
STA 516+10 TO STA 523+10 RT	7.00	
STA 523+10 TO STA 537+10 LT & RT	14.00	
STA 555+60 TO STA 587+60 RT	32.00	
STA 632+80 TO STA 646+80 LT & RT	14.00	
PROJECT TOTALS	**67.00**	

SEEDING SUMMARY

SEEDING WIDTH BEGIN WIDTH FT	SEEDING WIDTH END WIDTH FT	LOCATION BEGIN STA	LOCATION END STA	LENGTH FT	ITEM 164 BROADCAST SEEDING (PERM) (RURAL) (SANDY) SY	ITEM 164 BROADCAST SEEDING (TEMP) (WARM) SY	ITEM 164 BROADCAST SEEDING (TEMP) (COOL) SY	ITEM 164 DRILL SEEDING (PERM) (RURAL) (SANDY) SY	ITEM 164 DRILL SEEDING (TEMP) (WARM) SY	ITEM 164 DRILL SEEDING (TEMP) (COOL) SY	ITEM 166 * FERTILIZER 500 LBS/AC TON	ITEM 168 VEGETATIVE WATERING (13.58 MG/AC X 3 CYCLES) MG	REMARKS
30	30	453+00	649+00	19600				65333	16333	16333	3.37	549.93	WIDTH IS 15' AVG/SIDE
30	30	VARIES	VARIES	VARIES	4667	1167	1167				0.24	39.28	WIDTH IS 15' AVG/SIDE AT CULVERTS LOCATIONS AS DIRECTED BY THE ENGINEER.
PROJECT TOTALS					**4667**	**1167**	**1167**	**65333**	**16333**	**16333**	3.61	**589.21**	

* FOR CONTRACTOR'S INFORMATION ONLY.

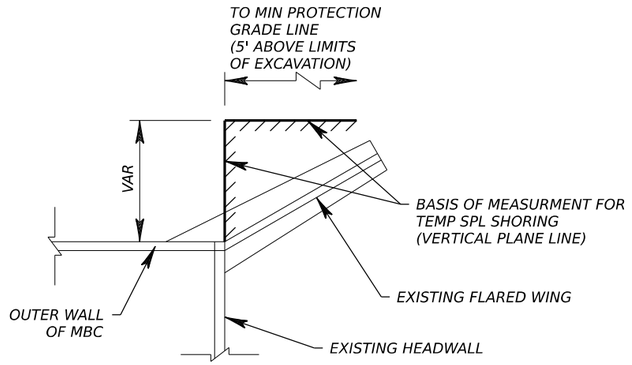
MISCELLANEOUS SUMMARIES & DETAILS

Texas Department of Transportation

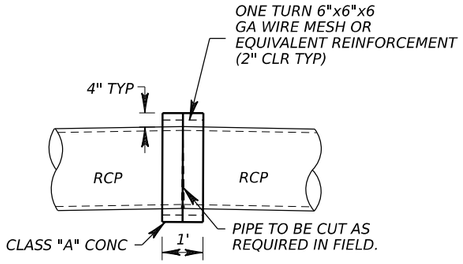
SHEET 1 OF 2

FED.RD. DIV.NO.	PROJECT NO.		
6			
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	27

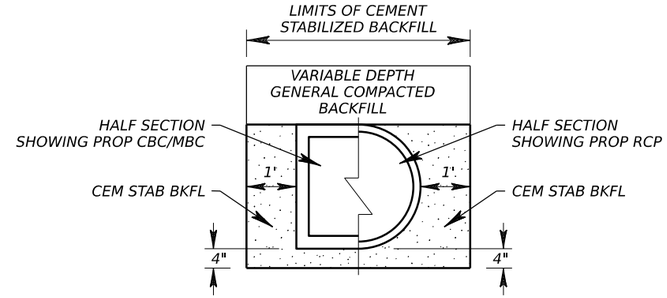
PATH: T:\YKMANNEXPS&E\113302030_FM794\Plan_Sheets\
FILE: MISCELLANEOUS SUMMARIES.dgn
DATE: 1/27/2024



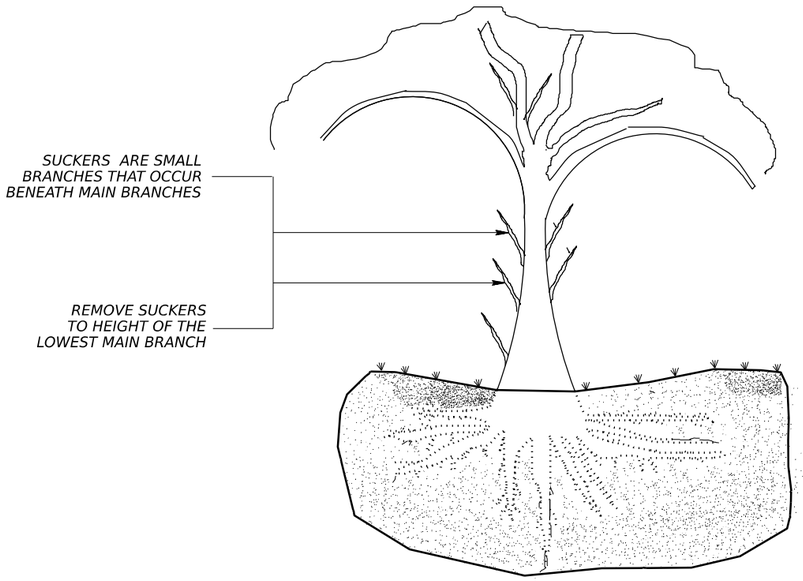
TEMP SPL SHORING DETAIL
PLAN VIEW
(NOT TO SCALE)



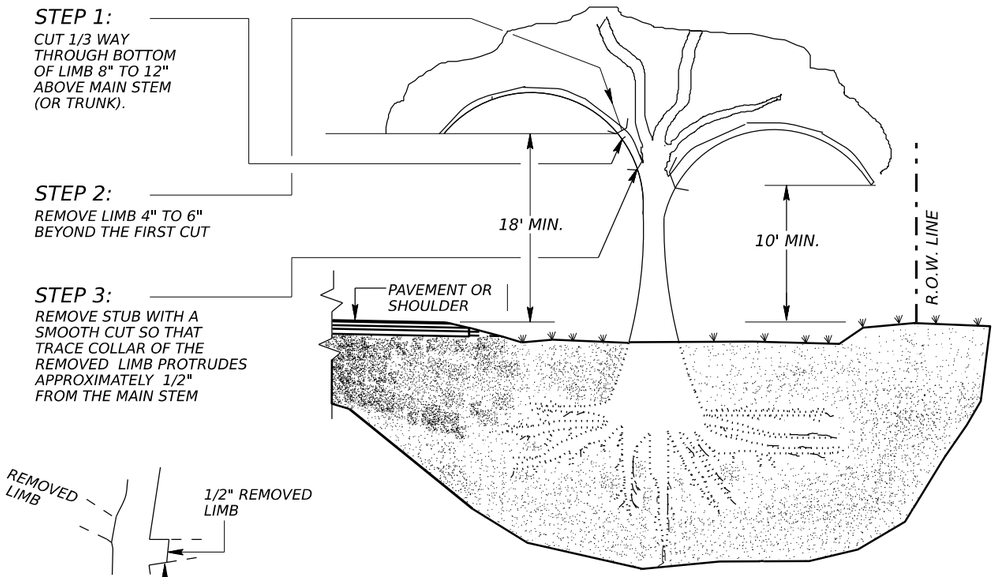
PIPE COLLAR DETAIL
(NOT TO SCALE)



EXCAVATION & BACKFILL FOR STRUCTURES DETAIL
SECTION VIEW
(NOT TO SCALE)



STEPS 1, 2, AND 3 APPLY WHEN REMOVING LIMBS 2" IN DIAMETER OR LARGER.



TREE TRIMMING NOTES:

1. *TRIM AND REMOVE ALL TREE LIMBS ON THE PAVEMENT SIDE OF THE TRUNK 18' ABOVE THE PAVEMENT OR BRIDGE DECK ELEVATION, UNLESS OTHERWISE SHOWN ON THE PLANS.*

2. *TRIM AND REMOVE ALL TREE LIMBS BETWEEN THE TRUNK AND R.O.W. LINE 10' ABOVE NATURAL GROUND, TERRAIN OR OTHER STRUCTURE ELEVATION, UNLESS OTHERWISE SHOWN ON THE PLANS.*

TREE TRIMMING DETAILS
(NOT TO SCALE)

STATE OF TEXAS
AMANDA ANDERLE FLING
105989
LICENSED
PROFESSIONAL ENGINEER

Amanda Anderle Fling, P.E.

01/27/2024

MISCELLANEOUS SUMMARIES & DETAILS

Texas Department of Transportation

FED.RD. DIV.NO.		PROJECT NO.	
6			
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	28

PATH: T:\YKMANNEX\PS&E\113302030_FM794\Plan_Sheets\
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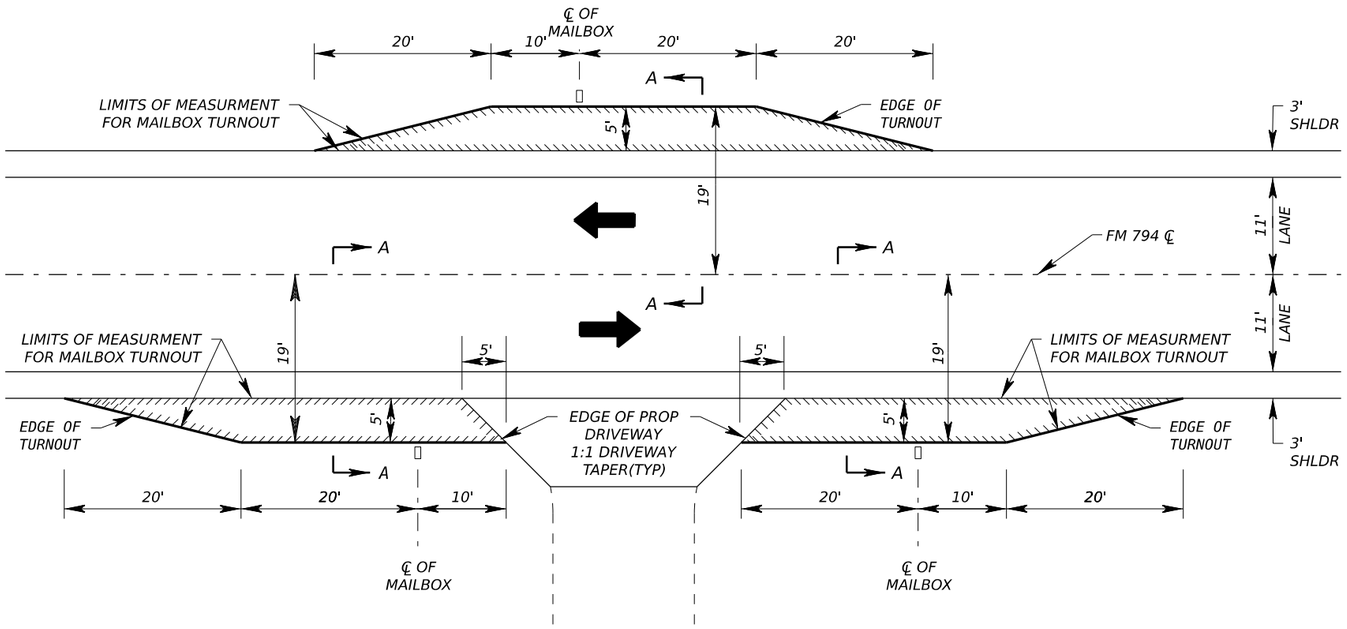
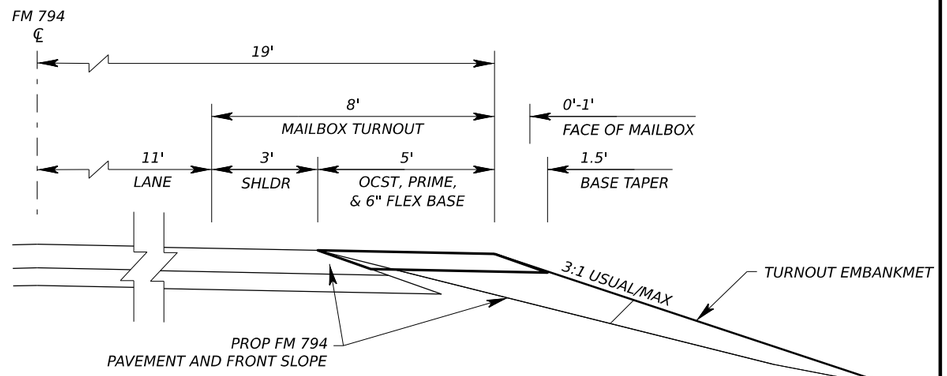
DATE: 1/27/2024

SHOWING MAILBOX TURNOUT WITH NO DRIVEWAY



SHOWING MAILBOX TURNOUT UPSTREAM OF DRIVEWAY

SHOWING MAILBOX TURNOUT DOWNSTREAM OF DRIVEWAY



TYPICAL MAILBOX TURNOUT SECTION

SECTION A-A
(NOT TO SCALE)

MAILBOX TURNOUT DETAILS

PLAN VIEW
(NOT TO SCALE)

MAILBOX TURNOUT SUMMARY

LOCATION STATION		ITEM 132 ∗ EMBANKMENT (FINAL) (ORD COMP) (TY C) EST CY	ITEM 247 ∗ FLEX BASE 6" CY	ITEM 316 PRIME ∗ ASPH 0.2 GAL/SY GAL	ITEM 316 PRIME ∗ AGGR(GR5) 1 CY/140 SY CY	ITEM 316 OCST ∗ ASPH 0.4 GAL/SY GAL	ITEM 316 OCST ∗ AGGR(GR3) 1 CY/85 SY CY	ITEM 530 TURNOUTS (SURF TREAT) SY	ITEM 560 MAILBOX INSTALL - M (TWG-POST) TY 1 EA	ITEM 560 MAILBOX INSTALL - S (WC-POST) TY 3 EA	ITEM 560 MAILBOX INSTALL - D (WC-POST) TY 3 EA	REMARKS
467+80	LT	11	4.0	4.2	0.1	8.3	0.2	20.8		1		UPSTREAM OF DRIVEWAY
500+45	LT	11	4.0	4.2	0.1	8.3	0.2	20.8			1	UPSTREAM OF DRIVEWAY
502+55	LT	11	4.0	4.2	0.1	8.3	0.2	20.8		1		DOWNSTREAM OF DRIVEWAY
511+40	LT	14	5.3	5.6	0.2	11.1	0.3	27.8		1		NO DRIVEWAY
548+90	LT	11	4.0	4.2	0.1	8.3	0.2	20.8		1		UPSTREAM OF DRIVEWAY
554+35	LT	14	5.3	5.6	0.2	11.1	0.3	27.8		1		NO DRIVEWAY
579+80	LT	11	4.0	4.2	0.1	8.3	0.2	20.8		1		DOWNSTREAM OF DRIVEWAY
586+90	LT	14	5.3	5.6	0.2	11.1	0.3	27.8		1		NO DRIVEWAY
597+45	LT	11	4.0	4.2	0.1	8.3	0.2	20.8			2	DOWNSTREAM OF DRIVEWAY
630+20	LT	11	4.0	4.2	0.1	8.3	0.2	20.8			1	UPSTREAM OF DRIVEWAY
632+50	LT	14	5.3	5.6	0.2	11.1	0.3	27.8			1	NO DRIVEWAY
633+90	LT	14	5.3	5.6	0.2	11.1	0.3	27.8		1		NO DRIVEWAY
638+90	LT	11	4.0	4.2	0.1	8.3	0.2	20.8	1		1	UPSTREAM OF DRIVEWAY
PROJECT TOTALS		158	58.5	61.6	1.8	121.9	3.1	**305**	**1**	**8**	**6**	

∗ FOR CONTRACTOR'S INFORMATION ONLY.

NOTES:

1. ADJUST EXISTING MAILBOX LOCATIONS AT DRIVEWAYS TO CONFORM TO MAILBOX LOCATION SHOWN ON DETAIL.
2. THE TYPES OF MATERIALS FOR TURNOUTS SHALL CONFORM TO THE ROADWAY ITEMS.
3. SEE "DRIVEWAY SUMMARY & DETAILS" SHEETS FOR DRIVEWAY DETAILS AND DIMENSIONS.

STATE OF TEXAS
AMANDA ANDERLE FLING
105989
LICENSED
PROFESSIONAL ENGINEER

Amanda Anderle Fling, P.E.

01/27/2024

MAILBOX TURNOUT SUMMARY & DETAILS

Texas Department of Transportation

SHEET 1 OF 1

FED.RD. DIV.NO.		PROJECT NO.	
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CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	29

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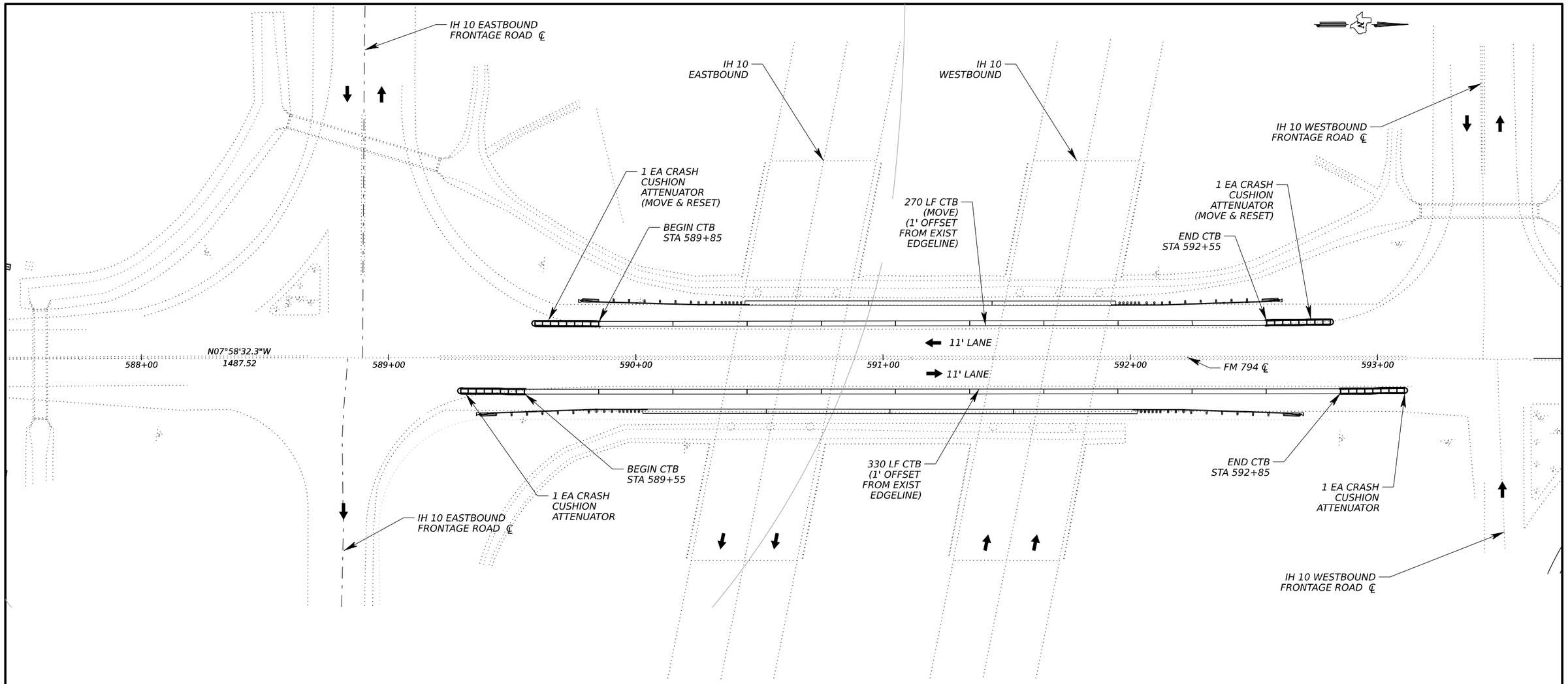
DATE: 1/27/2024



CTB SUMMARY

CTB LOCATION	ITEM 512			ITEM 545			ITEM 658	REMARKS
	PORT CTB (FUR & INST) (F SHAPE) TY 1	PORT CTB (MOVE) (F SHAPE) TY 1	PORT CTB (REMOVE) (F SHAPE) TY 1	CRASH CUSH ATTEN (INSTALL) (S)(N) (TL3)	CRASH CUSH ATTEN (MOVE & RESET)	CRASH CUSH ATTEN (REMOVE)	INSTL DEL ASSM (D-SW) SZ (BRF) CTB (BI)	
	LF	LF	LF	EA	EA	EA	EA	
STA 589+55 TO STA 592+85 (RT)	330			2			11	NORTHBOUND
STA 589+85 TO STA 592+55 (LT)		270	330		2	2	9	SOUTHBOUND
TOTALS	**330**	**270**	**330**	**2**	**2**	**2**	**20**	

NOTES:

1. THE "CTB SUMMARY" FOR "FURNISH & INSTALL", "MOVE", AND "REMOVE" QUANTITY OF PORTABLE CONCRETE TRAFFIC BARRIER IS BASED ON INSTALLING GUARD FENCE AND/OR RAILING ON ONE SIDE OF THE ROADWAY AT THE LOCATION THROUGH COMPLETION BEFORE WORK IS BEGUN ON THE OTHER SIDE OF THE ROADWAY.
2. PLACE THE PORTABLE CONCRETE TRAFFIC BARRIER ON THE SHOULDER, 1' OFFSET FROM THE EDGELINE UNLESS OTHERWISE DIRECTED.
3. IF THE CONTRACTOR ELECTS TO DEVIATE FROM THE ABOVE SEQUENCE, IT WILL BE AT THE EXPENSE OF THE CONTRACTOR.

STATE OF TEXAS
AMANDA ANDERLE FLING
105989
LICENSED
PROFESSIONAL ENGINEER

Amanda Anderle Fling, P.E.

01/27/2024

CTB LAYOUT & SUMMARY

NOT TO SCALE

Texas Department of Transportation

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		
6			
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	30

PATH: T:\YKMANNEX\PS&E\113302030_FM794\Plan_Sheets\
FILE: FM794_BARRIER_LAYOUT.dgn
DATE: 1/28/2024

SUMMARY OF SMALL SIGNS

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

- Post Type: FRP = Fiberglass; TWT = Thin-Wall; 10BWG = 10 BWG; S80 = Sch 80
- Posts: (1 or 2)
- Anchor Type: UA = Univer-Conc; UB = Univer-Bolt; WS = Wedge-Steel; SA = Slip-Conc; SB = Slip-Bolt
- Mounting Designation: P = Prefab. "Plain"; T = Prefab. "T"; U = Prefab. "U"
- 1EXT or 2EXT = # of Ext.; BM = Extruded Wind Beam; WC = 1.12 #/ft Wing Chan.; EXAL = Extruded Alum. signs

SIGN NO.	LOCATION STATION	SIGN NOMENCLATURE	TEXT SIGN	SIGN DIMEN. W x H	Post Type	Posts	Anchor Type	Mounting Designation		ITEM 644 IN BRIDGE MNT CLR SGN ASSM(TY N) EA	ITEM 644 IN SM RD SGN ASSM: 10BWG (1)SA (P) EA	10BWG (1)SA (T) EA	10BWG (1)SA (T-2EXT) EA	S80 (1)SA (T) EA	S80 (1)SA (U-1 EXT) EA	S80 (1)SA (U-2 EXT) EA	TWT (1)WS (P) EA	TWT (1)WS (T) EA	ITEM 644 REMOVE SM RD SN SUP&AM EA	REMARKS
1	497+20 RT	W1-2L	LEFT CURVE WARNING(SYMBOL)	36 x 36	TWT	1	WS	P									1		1	
2	498+40 RT	D20-1TL	CR 234 ⬅	24 x 24	TWT	1	WS	P									1		1	
3	500+65 LT	R1-1	STOP	36 x 36	TWT	1	WS	P									1		1	
4	503+95 LT	D20-1TR	CR 234 ➡	24 x 24	TWT	1	WS	P									1		1	
5	543+90 RT	M1-6F	FM 794	24 x 24	TWT	1	WS	P									1		1	
		D10-7aT	RM 484	3 x 10																
6	556+75 RT	W3-5	SPEED LIMIT WARNING 55MPH	36 x 36	TWT	1	WS	P									1		1	
7	562+15 LT	R2-1	SPEED LIMIT 60	30 x 36	TWT	1	WS	P									1		1	
8	562+15 RT	R2-1	SPEED LIMIT 55	30 x 36	TWT	1	WS	P									1		1	
9	563+15 RT	D20-1TL	CO RD 233 ⬅	24 x 24	TWT	1	WS	P									1		1	
10	563+15 RT	R1-1	STOP	36 x 36	TWT	1	WS	P									1		1	
11	567+75 RT	W1-2R	RIGHT CURVE WARNING(SYMBOL)	36 x 36	10BWG	1	SA	P			1								1	
		W13-1P	50 MPH	18 x 18																
12	572+25 LT	D20-1TR	CR 233 ➡	24 x 24	TWT	1	WS	P									1		1	
13	578+30 RT	M2-1B	JCT	21 x 15	TWT	1	WS	P									1		1	
		M1-1	IH 10	24 x 24																
14	581+50 RT	W12-2	HEIGHT LIMIT XX'-X"	36 x 36	TWT	1	WS	P									1		1	
15	581+75 LT	D2-1	GONZALES 10	84 x 18	10BWG	1	SA	T				1							1	
16	584+75 RT	D1-2	⬆ SAN ANTONIO HOUSTON ➡	96 x 30	S80	1	SA	T						1					1	
17	585+15 LT	W1-2L	LEFT CURVE WARNING(SYMBOL)	36 x 36	10BWG	1	SA	P			1								1	
		W13-1P	50 MPH	18 x 18																
18	586+55 LT	M3-3	SOUTH	24 x 12	TWT	1	WS	P									1		1	
		M1-6F	FM 794	24 x 24																
19	588+05 RT	M3-4B	WEST	24 x 12	S80	1	SA	U	1 EXT						1				1	
		M1-1	IH 10	24 x 24																
		M6-3B	⬆	21 x 15																
		M3-1	NORTH	24 x 12																
		M1-6F	FM 794	24 x 24																
		M6-3	⬆	21 x 15																
		M3-2B	EAST	24 x 12																
		M1-1	IH 10	24 x 24																
		M6-1B	➡	21 x 15																
20	588+25 LT	R1-2	YIELD	48 x 48	S80	1	SA	T						1					1	BACK TO BACK
		R5-1	DO NOT ENTER	48 x 48																
21	588+60 LT	R5-1	DO NOT ENTER	48 x 48	S80	1	SA	T						1					1	
22	588+65 LT	M1-6F	FM 794	24 x 24	TWT	1	WS	P									1		1	
		M6-4	⬅➡	21 x 15																
23	588+70 LT	R1-1	STOP	48 x 48	S80	1	SA	T						1					1	
24	589+60 LT	M3-2B	EAST	24 x 12	TWT	1	WS	P									1		1	
		M1-1	IH 10	24 x 24																
		M6-1B	⬅	21 x 15																
25	590+20 RT	D1-1	⬅ SAN ANTONIO	102 x 18	10BWG	1	SA	T	2 EXT				1						1	
26	590+40	W12-2a	XX FT X IN	84 x 24						1									1	
27	591+90	W12-2a	XX FT X IN	84 x 24						1									1	
									SHEET TOTAL	2	2	1	1	4	1	0	16	0	27	

NOTES:

REPLACE SIGNS WITH REFERENCE MARKERS TO THE EXACT LOCATION FROM WHERE THEY WERE REMOVED.

CLEARANCES TO BE VERIFIED AND APPROVED BY THE ENGINEER IN THE FIELD. (SEE TMUTCD, SECTION 2C.27.)

SUMMARY OF SMALL SIGNS

Texas Department of Transportation

FED.RD. DIV.NO.	PROJECT NO.		
6			
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	31

PATH: T:\YKM\ANNEX\PS&E\113302030_FM794\Plan_Sheets\
FILE: SUMMARY OF SMALL SIGNS.dgn
DATE: 1/28/2024

SUMMARY OF SMALL SIGNS

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

- XXXXX: Post Type — FRP = Fiberglass; TWT = Thin-Wall 10BWG = 10 BWG; S80 = Sch 80
- (X): Posts (1 or 2)
- XX: Anchor Type — UA = Univer-Conc; UB = Univer-Bolt; WS = Wedge-Steel; SA = Slip-Conc; SB = Slip-Bolt
- (X-XXXX): Mounting Designation — P = Prefab. "Plain"; T = Prefab. "T"; U = Prefab. "U"; 1EXT or 2EXT = # of Ext.; BM = Extruded Wind Beam; WC = 1.12 #/ft Wing Chan.; EXAL = Extruded Alum. signs

SIGN NO.	LOCATION STATION	SIGN NOMENCLATURE	TEXT SIGN	SIGN DIMEN. W x H	Post Type	Posts	Anchor Type	Mounting Designation		ITEM 644 IN BRIDGE MNT CLR SGN ASSM(TY N) EA	ITEM 644 IN SM RD SGN ASSM: 10BWG (1)SA (P) EA	10BWG (1)SA (T) EA	10BWG (1)SA (T-2EXT) EA	S80 (1)SA (T) EA	S80 (1)SA (U-1 EXT) EA	S80 (1)SA (U-2 EXT) EA	TWT (1)WS (P) EA	TWT (1)WS (T) EA	ITEM 644 REMOVE SM RD SN SUP&AM EA	REMARKS
28	592+10 LT	D1-1	⬅ HOUSTON	78 x 18	TWT	1	WS	T										1	1	
29	592+85 RT	M3-4B	WEST	24 x 12	TWT	1	WS	P									1		1	
		M1-1	IH 10	24 x 24																
		M6-1B	⬅	21 x 15																
30	593+05 LT	R1-1	STOP	36 x 36	TWT	1	WS	P									1		1	
31	593+25 RT	R5-1	DO NOT ENTER	48 x 48	S80	1	SA	T						1					1	
32	593+65 RT	R1-1	STOP	48 x 48	S80	1	SA	T						1					1	BACK TO BACK
		R5-1	DO NOT ENTER	48 x 48																
33	593+75 RT	M1-6F	FM 794	24 x 24	TWT	1	WS	P									1		1	
		M6-4	⬅➡	21 x 15																
34	593+90 RT	R5-1	DO NOT ENTER	48 x 48	S80	1	SA	T						1					1	
35	594+25 RT	R1-2	YIELD	48 x 48	S80	1	SA	T						1					1	
36	594+30 LT	M3-2B	EAST	24 x 12	S80	1	SA	U	1 EXT						1				1	
		M1-1	IH 10	24 x 24																
		M6-3B	⬆	21 x 15																
		M3-3	SOUTH	24 x 12																
		M1-6F	FM 794	24 x 24																
		M6-3	⬆	21 x 15																
		M3-4B	WEST	24 x 12																
		M1-1	IH 10	24 x 24																
		M6-1B	➡	21 x 15																
37	597+95 LT	D1-2	⬆ HOUSTON SAN ANTONIO ➡	102 x 30	S80	1	SA	T	2 EXT							1			1	
38	598+50 RT	R2-1	SPEED LIMIT 55	30 x 36	TWT	1	WS	P									1		1	
39	601+40 LT	W12-2	HEIGHT LIMIT XX'-X"	36 x 36	TWT	1	WS	P									1		1	
40	601+85 RT	D2-1	HARWOOD 1	72 x 18	TWT	1	WS	T										1	1	
41	616+90 LT	R2-1	SPEED LIMIT 55	30 x 36	TWT	1	WS	P									1		1	
42	616+90 RT	R2-1	SPEED LIMIT 45	30 x 36	TWT	1	WS	P									1		1	
43	631+00 LT	R2-1	SPEED LIMIT 45	30 x 36	TWT	1	WS	P									1		1	
44	631+00 RT	R2-1	SPEED LIMIT 35	30 x 36	TWT	1	WS	P									1		1	
45	633+00 RT	D20-1TL	CO RD 230 ⬅	24 x 24	TWT	1	WS	P									1		1	
46	638+15 RT	W10-1	RAILROAD CROSSING	36 DIA	TWT	1	WS	P									1		1	
47	639+10 LT	R1-1	STOP	36 x 36	TWT	1	WS	P									1		1	
48	640+10 LT	D2-1	GONZALES 12	84 x 18	10BWG	1	SA	T				1							1	
49	640+75 RT	W3-1	STOP AHEAD (SYMBOL)	36 x 36	TWT	1	WS	P									1		1	
50	643+05 RT	R1-1	STOP	36 x 36	TWT	1	WS	P									1		1	
51	643+45 RT	D1-2	⬅ LULING WAELDER ➡	78 x 30	S80	1	SA	T						1					1	
52	643+45 LT	D20-1TR	CO RD 230 ➡	24 x 24	TWT	1	WS	P									1		1	
53	645+35 LT	R2-1	SPEED LIMIT 35	30 x 36	TWT	1	WS	P									1		1	
54	647+65 RT	M3-3	SOUTH	24 x 12	TWT	1	WS	P									1		1	
		M1-6F	FM 794	24 x 24																
		D10-7aT	RM 482	3 x 10																
55	647+65 RT	R12-1T	WEIGHT LIMIT	24 x 36	TWT	1	WS	P									1		1	
56	648+85 LT	W10-1	RAILROAD CROSSING	36 DIA	TWT	1	WS	P									1		1	
57	648+90 RT	R1-1	STOP	36 x 36	TWT	1	WS	P									1		1	
									SHEET TOTAL	0	0	1	0	5	1	1	20	2	30	
									PROJECT TOTAL	2	2	2	1	9	2	1	36	2	57	

NOTES:

REPLACE SIGNS WITH REFERENCE MARKERS TO THE EXACT LOCATION FROM WHERE THEY WERE REMOVED.

CLEARANCES TO BE VERIFIED AND APPROVED BY THE ENGINEER IN THE FIELD. (SEE TMUTCD, SECTION 2C.27.)

PATH: T:\YKMANNEX\PS&E\113302030_FM794\Plan_Sheets\
FILE: SUMMARY OF SMALL SIGNS.dgn
DATE: 1/28/2024

SUMMARY OF SMALL SIGNS

Texas Department of Transportation

SHEET 2 OF 2

FED.RD. DIV.NO.		PROJECT NO.	
6			
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	32

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	SEE "CTB LAYOUT & SUMMARY" SHEET	30	FM 794 @ IH 10	STA 589+55 RT	TL-3	BI	SEE STANDARD	SEE STANDARD	PORT CSB	24"	32"	30'	1								X	
2	SEE "CTB LAYOUT & SUMMARY" SHEET	30	FM 794 @ IH 10	STA 592+85 RT	TL-3	BI	SEE STANDARD	SEE STANDARD	PORT CSB	24"	32"	30'	1								X	
3	SEE "CTB LAYOUT & SUMMARY" SHEET	30	FM 794 @ IH 10	STA 589+85 LT	TL-3	BI	SEE STANDARD	SEE STANDARD	PORT CSB	24"	32"	30'		1	1	1					X	
4	SEE "CTB LAYOUT & SUMMARY" SHEET	30	FM 794 @ IH 10	STA 592+55 LT	TL-3	BI	SEE STANDARD	SEE STANDARD	PORT CSB	24"	32"	30'		1	1	2					X	
												PROJECT TOTAL	*2*	*2*	*2*							

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	1133	02	030	FM 794
	DIST	COUNTY		
	YKM	GONZALES		
	FEDERAL AID PROJECT			SHEET NO.
				33

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

DATE: 1/26/2024 $TIME$
FILE: $FILE$

Texas Department of Transportation

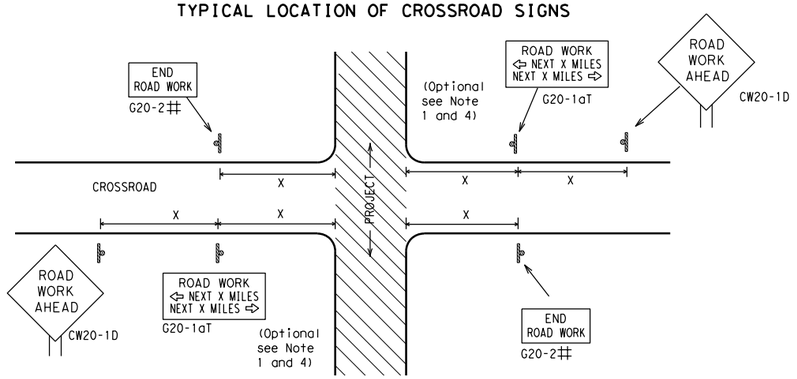
Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-03 7-13	1133	02	030	FM 794
9-07 8-14	DIST	COUNTY		SHEET NO.
5-10 5-21	YKM	GONZALES		34

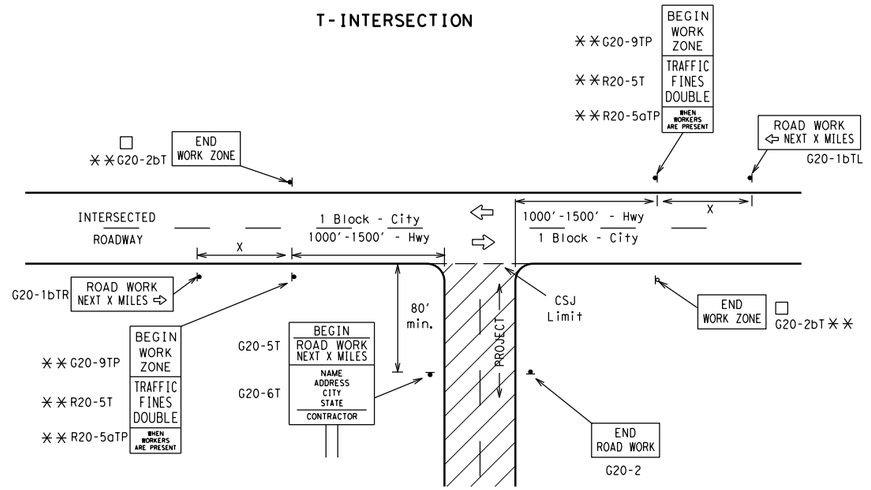
TYPICAL LOCATION OF CROSSROAD SIGNS



May be mounted on back of "ROAD WORK AHEAD"(CW20-1D) sign with approval of Engineer. (See note 2 below)

1. The typical minimum signing on a crossroad approach should be a "ROAD WORK AHEAD" (CW20-1D)sign and a (G20-2) "END ROAD WORK" sign, unless noted otherwise in plans.
2. The Engineer may use the reduced size 36" x 36" ROAD WORK AHEAD (CW20-1D) sign mounted back to back with the reduced size 36" x 18" "END ROAD WORK"(G20-2) sign on low volume crossroads (see Note 4 under "Typical Construction Warning Sign Size and Spacing"). See the "Standard Highway Sign Designs for Texas" manual for sign details. The Engineer may omit the advance warning signs on low volume crossroads. The Engineer will determine whether a road is low volume as per TMUTCD Part 5. This information shall be shown in the plans.
3. Based on existing field conditions, the Engineer/Inspector may require additional signs such as FLAGGER AHEAD, LOOSE GRAVEL, or other appropriate signs. When additional signs are required, these signs will be considered part of the minimum requirements. The Engineer/Inspector will determine the proper location and spacing of any sign not shown on the BC sheets, Traffic Control Plan sheets or the Work Zone Standard Sheets.
4. The "ROAD WORK NEXT X MILES"(G20-1aT)sign shall be required at high volume crossroads to advise motorists of the length of construction in either direction from the intersection. The Engineer will determine whether a roadway is considered high volume.
5. Additional traffic control devices may be shown elsewhere in the plans for higher volume crossroads.
6. When work occurs in the intersection area, appropriate traffic control devices, as shown elsewhere in the plans or as determined by the Engineer/Inspector, shall be in place.

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

1. The Engineer will determine the types and location of any additional traffic control devices, such as a flagger and accompanying signs, or other signs, that should be used when work is being performed at or near an intersection.
2. If construction closes the road at a T-intersection, the Contractor shall place the "CONTRACTOR NAME"(G20-6T) sign behind the Type 3 Barricades for the road closure (see BC(10) also). The "ROAD WORK NEXT X MILES" left arrow(G20-1bTL) and "ROAD WORK NEXT X MILES" right arrow (G20-1bTR)" signs shall be replaced by the detour signing called for in the plans.

TYPICAL CONSTRUCTION WARNING SIGN SIZE AND SPACING[1,5,6]

SIZE

Sign Number or Series	Conventional Road	Expressway/ Freeway
CW20[4] CW21 CW22 CW23 CW25	48" x 48"	48" x 48"
CW1, CW2, CW7, CW8, CW9, CW11, CW14	36" x 36"	48" x 48"
CW3, CW4, CW5, CW6, CW8-3, CW10, CW12	48" x 48"	48" x 48"

SPACING

Posted Speed	Sign △ Spacing "X"
MPH	Feet (Apprx.)
30	120
35	160
40	240
45	320
50	400
55	500[2]
60	600[2]
65	700[2]
70	800[2]
75	900[2]
80	1000[2]
✳	✳[3]

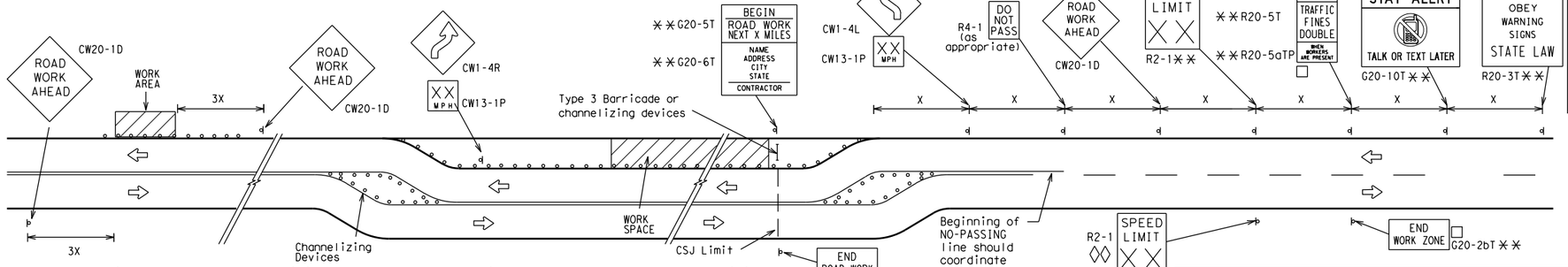
✳ For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. 36" x 36" "ROAD WORK AHEAD" (CW20-1D)signs may be used on low volume crossroads at the discretion of the Engineer as per TMUTCD Part 5. See Note 2 under "Typical Location of Crossroad Signs".
5. Only diamond shaped warning sign sizes are indicated.
6. See sign size listing in "TMUTCD", Sign Appendix or the "Standard Highway Sign Designs for Texas" manual for complete list of available sign design sizes.

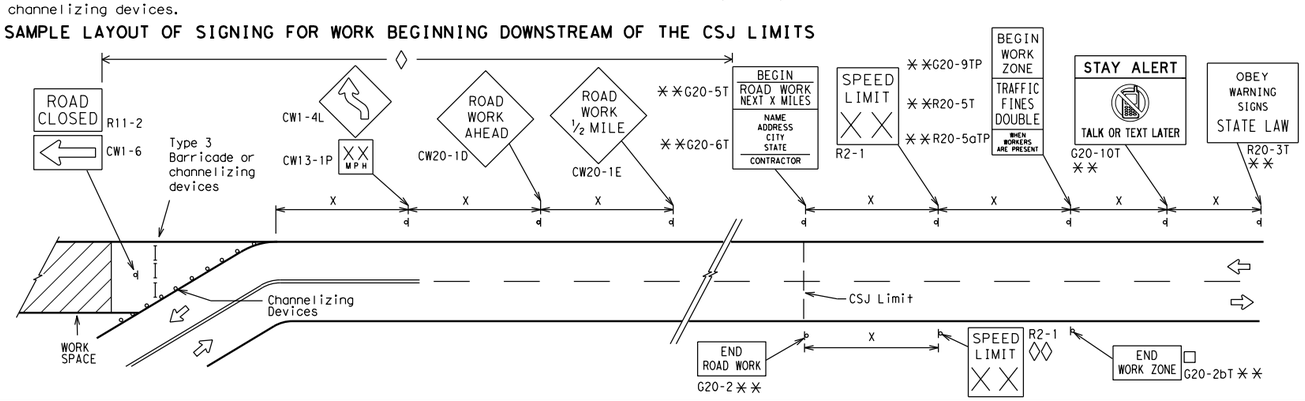
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



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

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS

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



NOTES

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

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

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

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

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

LEGEND

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

SHEET 2 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	030	FM 794
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	YKM	GONZALES		35

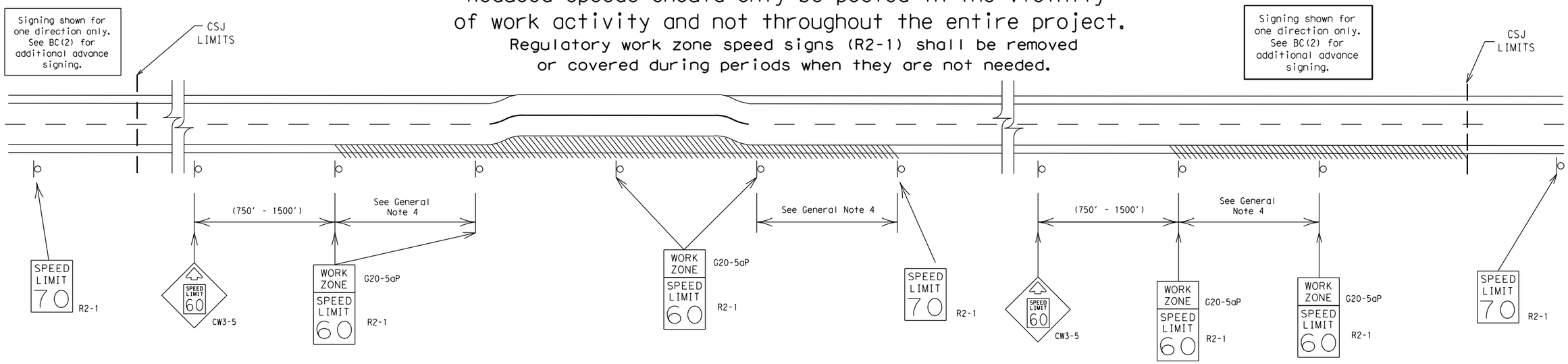
DATE: 1/26/2024 $TIME$
FILE: $FILE$

TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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

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



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Safety Division Standard

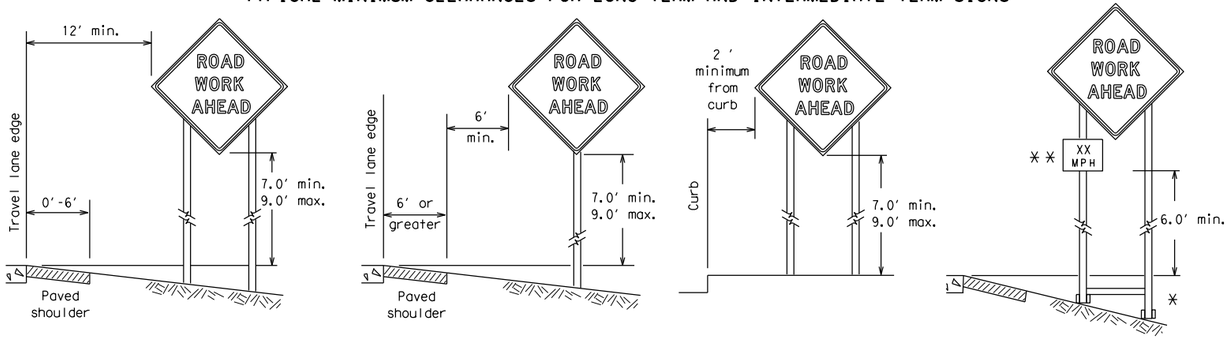
BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 9-07 8-14 7-13 5-21	1133	02	030	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		36

DATE: 1/26/2024 $TIME$
FILE: $FILE$

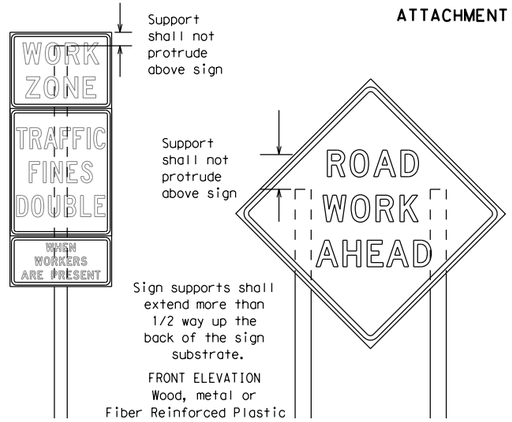
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

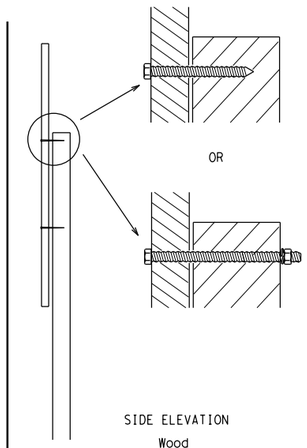


⁎ When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

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

ATTACHMENT FOR SIGN SUPPORTS





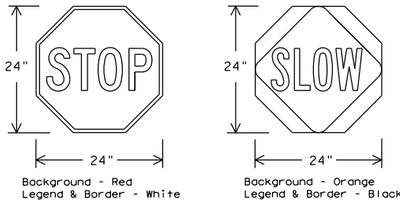
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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

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

STOP/SLOW PADDLES

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



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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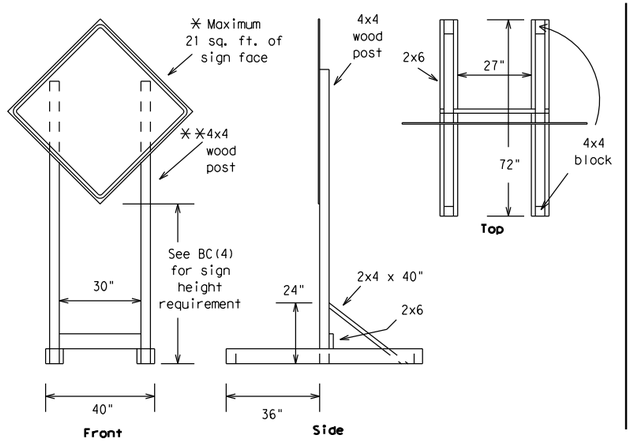
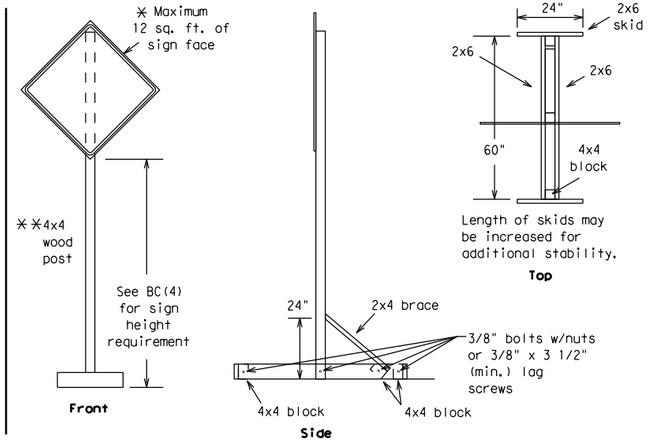
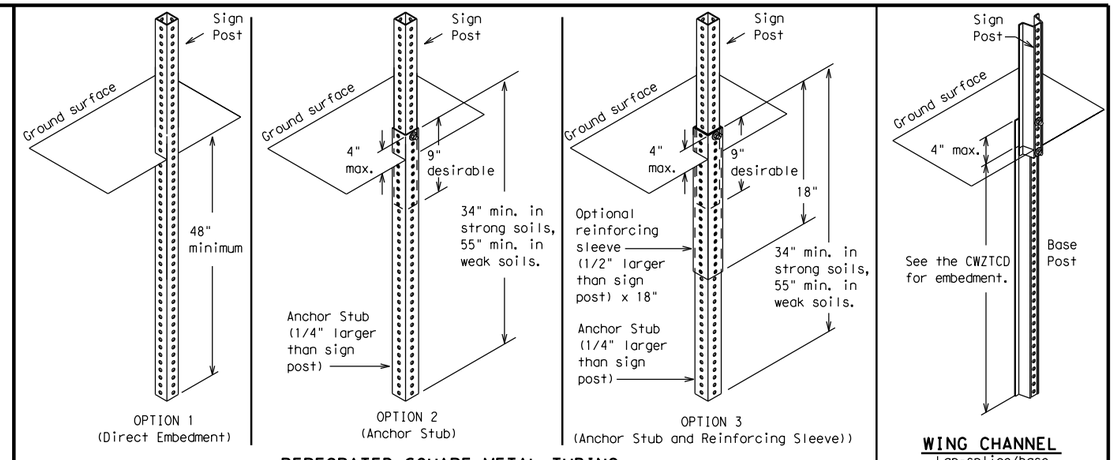




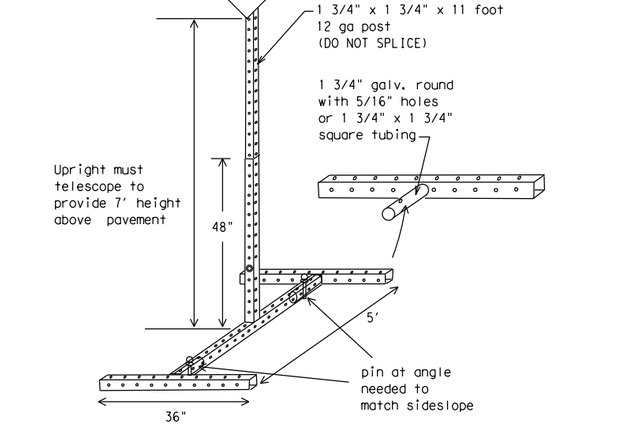
SKID MOUNTED WOOD SIGN SUPPORTS

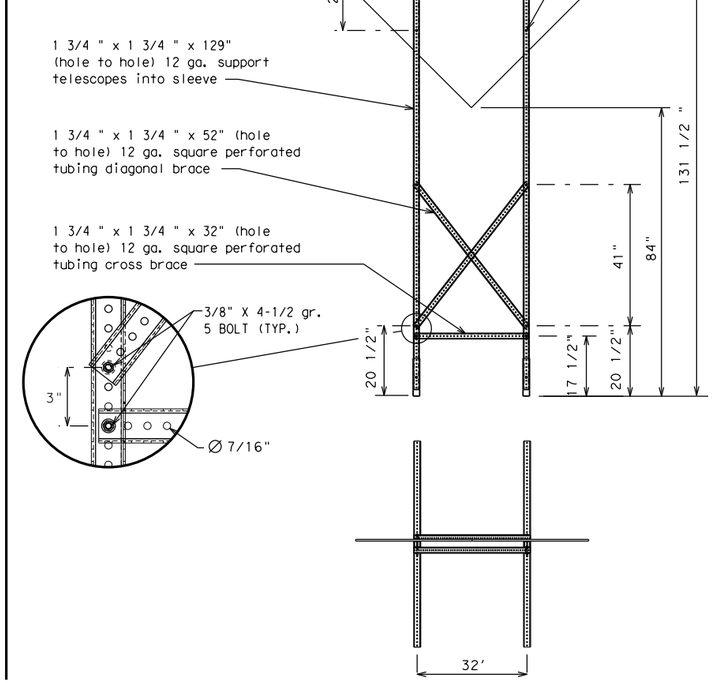
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

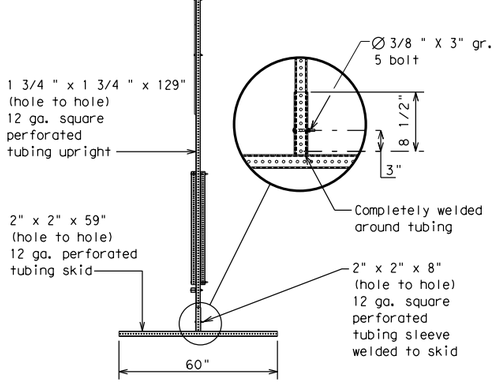


GROUND MOUNTED SIGN SUPPORTS

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







SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

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

PORTABLE CHANGEABLE MESSAGE SIGNS

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

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

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

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

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

Other Condition List

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

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

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

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

Location List

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

Warning List

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

** Advance Notice List

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

* 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

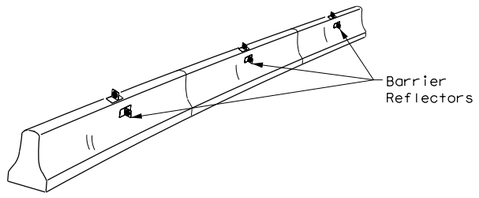
BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	030	FM 794
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	YKM	GONZALES		39

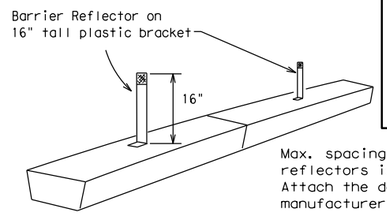
100

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.



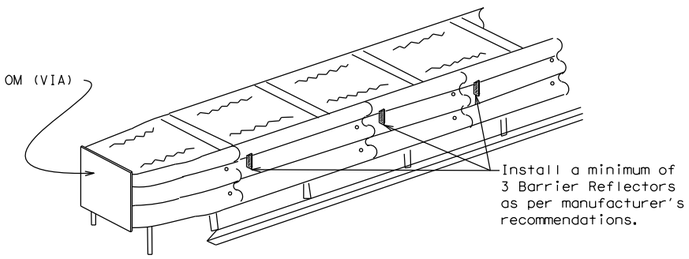
CONCRETE TRAFFIC BARRIER (CTB)

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

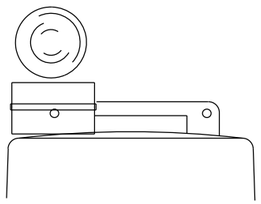
LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

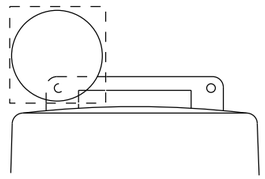
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

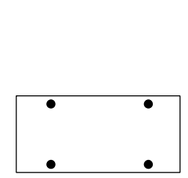
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing 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.

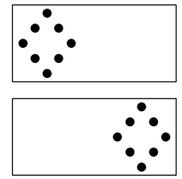
Arrow Boards may be located behind channelizing devices in place for a shoulder taper or merging taper, otherwise they shall be delineated with four (4) channelizing devices placed perpendicular to traffic on the upstream side of traffic.

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:

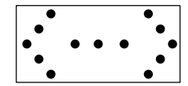


4 CORNER CAUTION

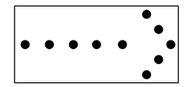
OR



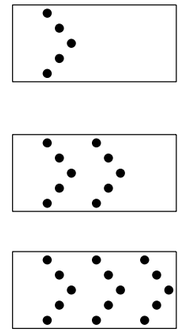
ALTERNATING DIAMOND CAUTION



DOUBLE ARROW



RIGHT/LEFT ARROW
(right arrow shown; left is similar)



RIGHT/LEFT SEQUENTIAL CHEVRON
(right chevron shown; left is similar)

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	1133	02	030	FM 794
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	YKM	GONZALES		40

DATE: 1/26/2024 $TIME$
FILE: $FILE$

GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

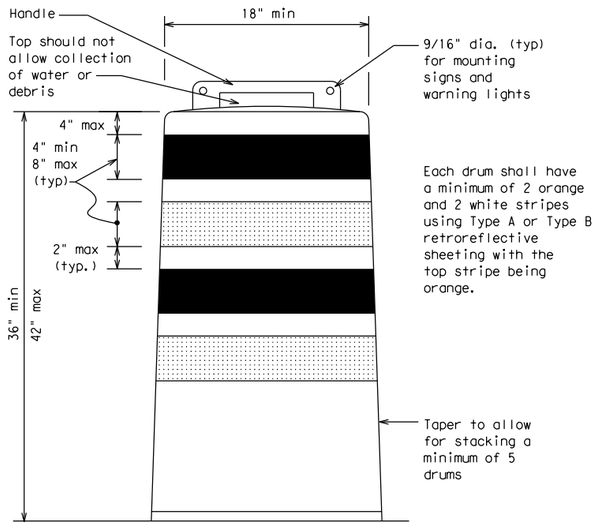
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

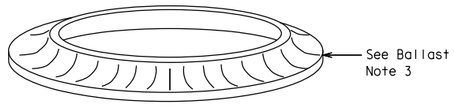
RETROREFLECTIVE SHEETING

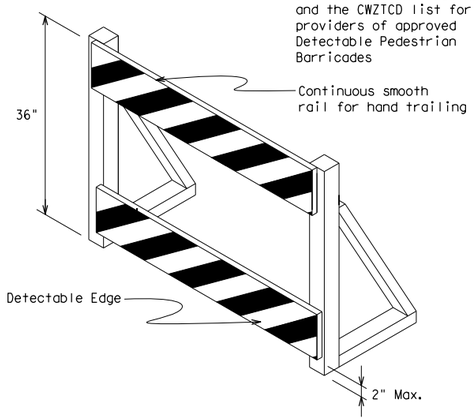
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

BALLAST

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

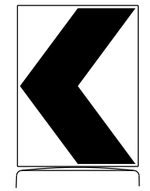




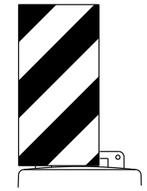


DETECTABLE PEDESTRIAN BARRICADES

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



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



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

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

Texas Department of Transportation

Traffic Safety Division Standard

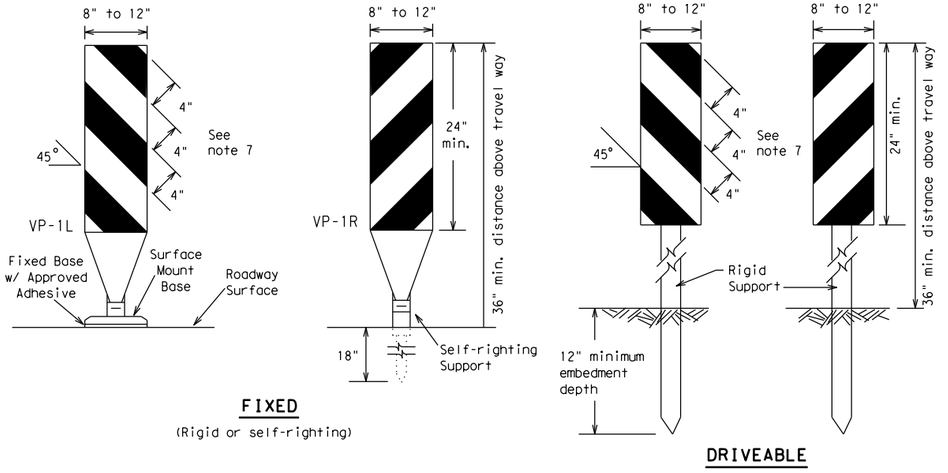
BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	030	FM 794
4-03 8-14	DIST	COUNTY		SHEET NO.
9-07 5-21	YKM	GONZALES		41
7-13				

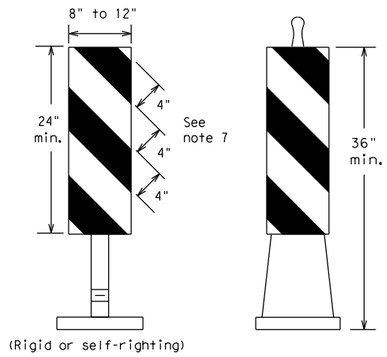
102

DATE: 1/26/2024 $TIME$
FILE: $FILE$



FIXED
(Rigid or self-righting)

DRIVEABLE

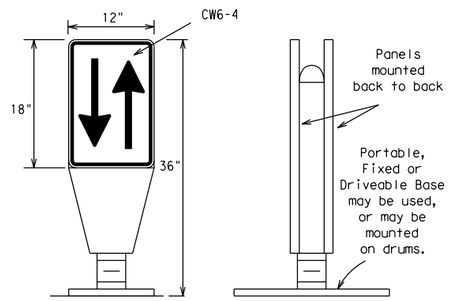


(Rigid or self-righting)

PORTABLE

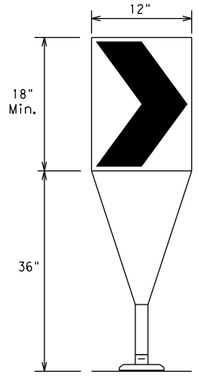
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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

VERTICAL PANELS (VPs)



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

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



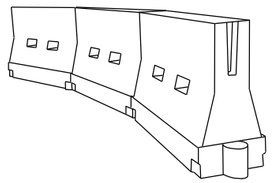
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

CHEVRONS

GENERAL NOTES

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



LONGITUDINAL CHANNELIZING DEVICES (LCD)

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

WATER BALLASTED SYSTEMS USED AS BARRIERS

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

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

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

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

SHEET 9 OF 12

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	1133	02	030	FM 794
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7-13 5-21	YKM	GONZALES		42

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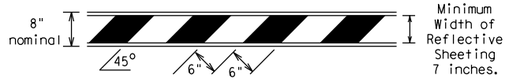
DATE: 1/26/2024 $TIME$
FILE: $FILE$

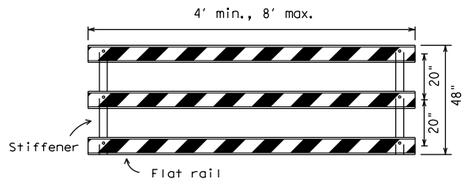
TYPE 3 BARRICADES

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.



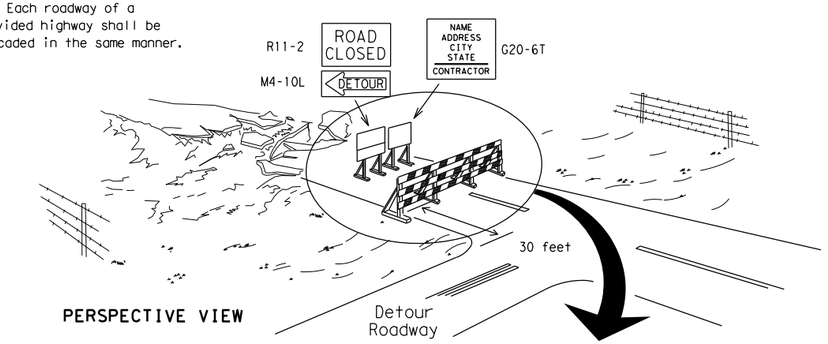
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

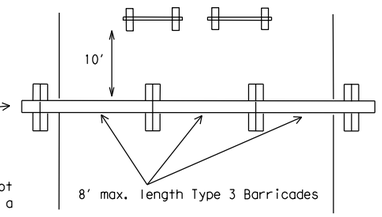
Each roadway of a divided highway shall be barricaded in the same manner.



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.

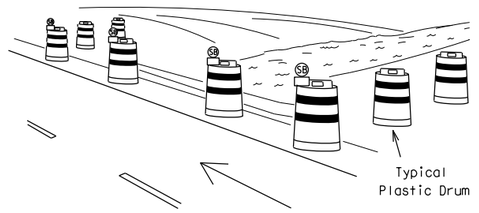
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

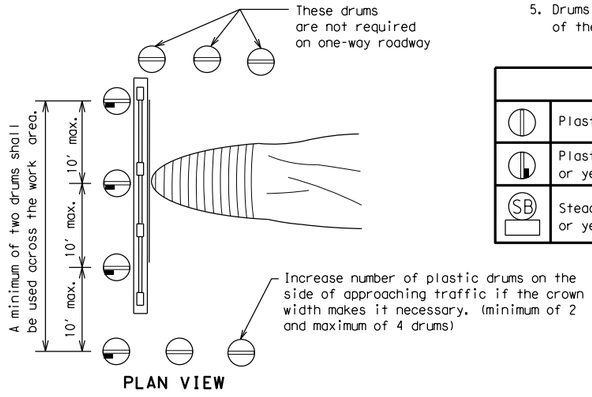
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

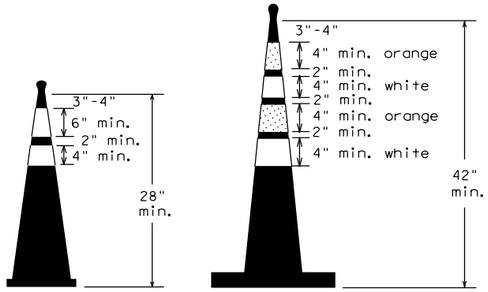
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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

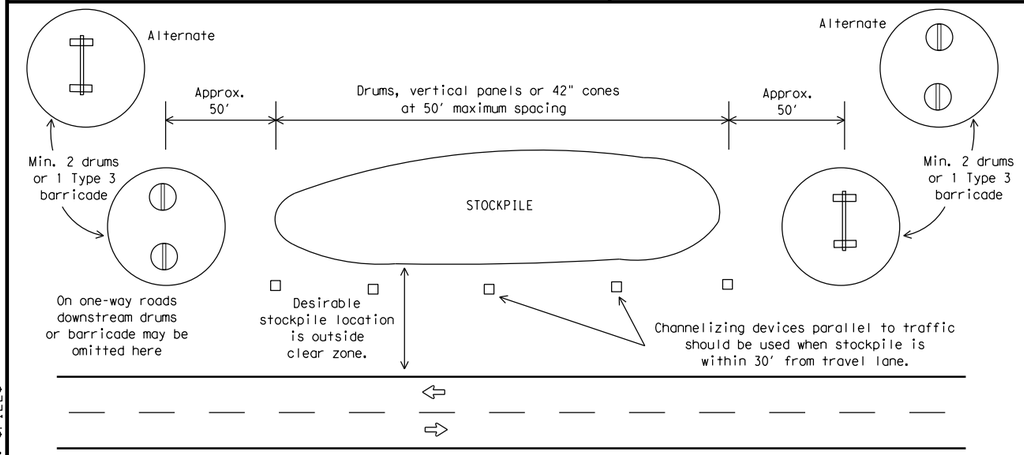
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



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

Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
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9-07 8-14	DIST	COUNTY		SHEET NO.
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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.

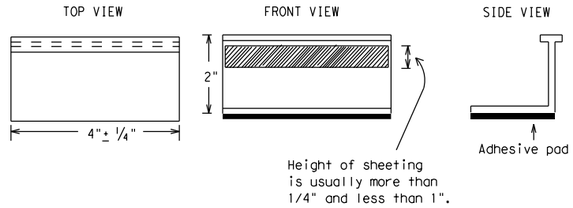
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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
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REVISIONS	1133	02	030	FM 794
2-98 9-07 5-21	DIST	COUNTY		SHEET NO.
1-02 7-13	YKM	GONZALES		44
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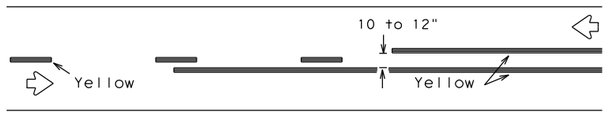
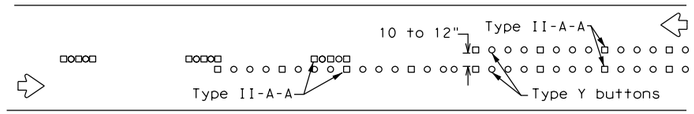
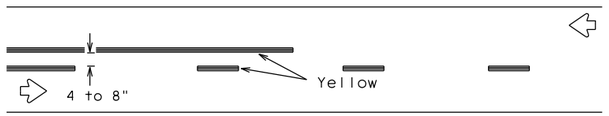
PAVEMENT MARKING PATTERNS



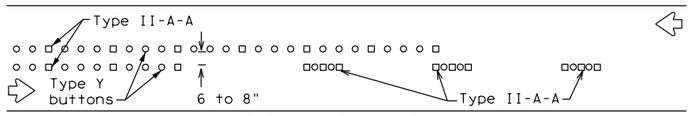
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



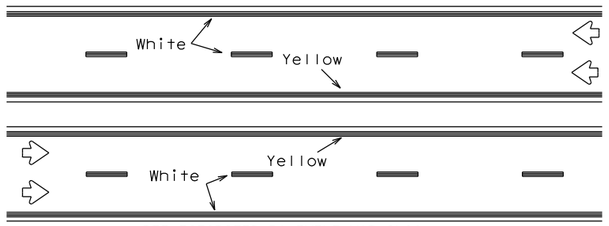
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



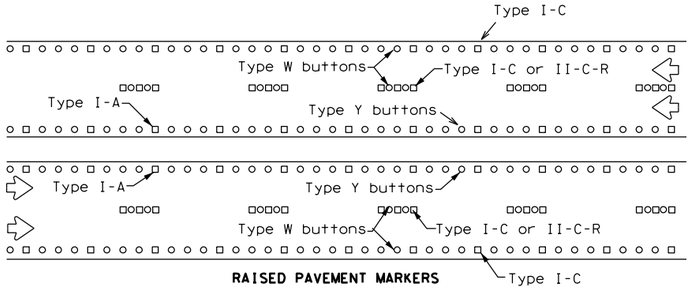
RAISED PAVEMENT MARKERS - PATTERN B

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

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



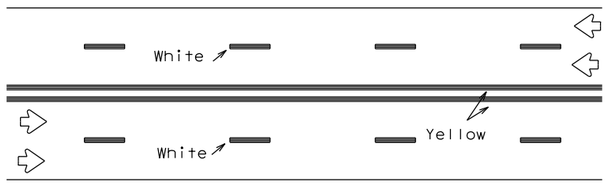
REFLECTORIZED PAVEMENT MARKINGS



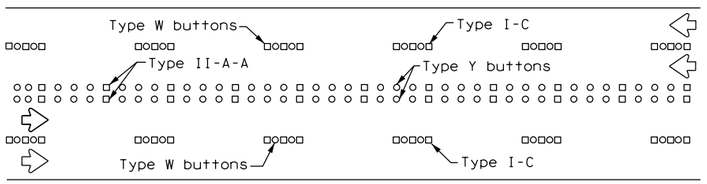
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



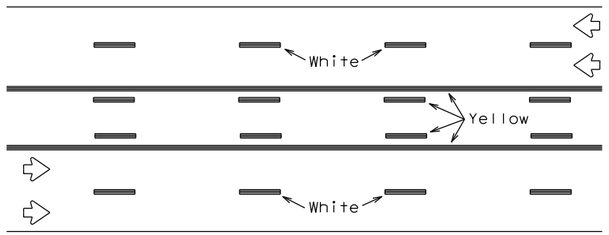
REFLECTORIZED PAVEMENT MARKINGS



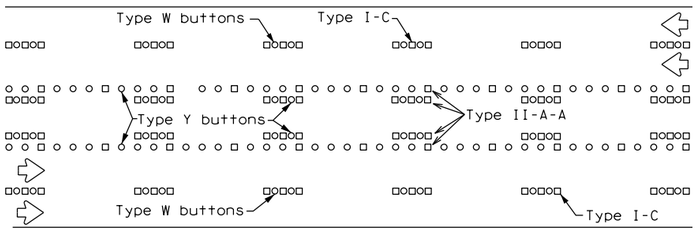
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

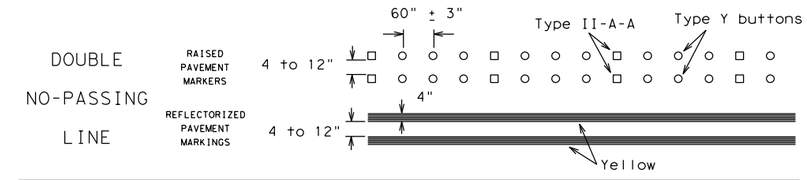
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

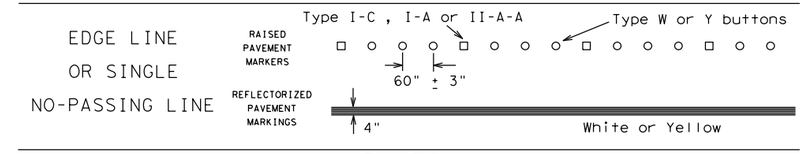
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

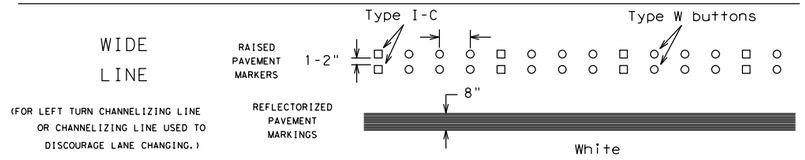


EDGE LINE OR SINGLE NO-PASSING LINE



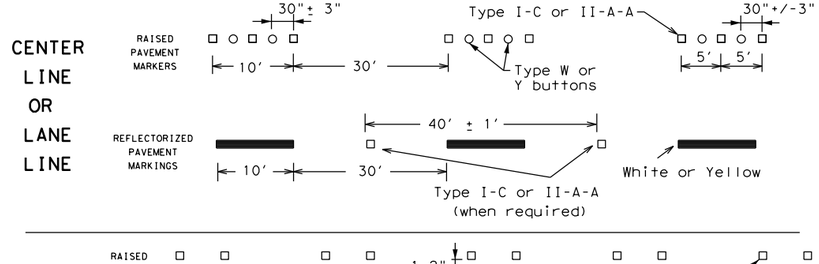
WIDE LINE

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

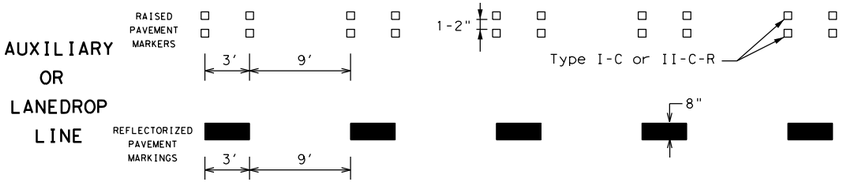


BROKEN LINES

CENTER LINE OR LANE LINE

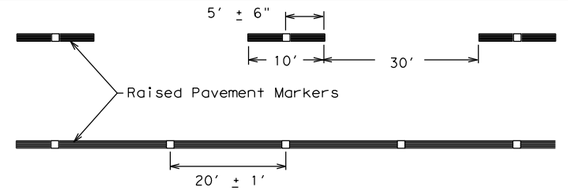


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



Centerline only - not to be used on edge lines

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

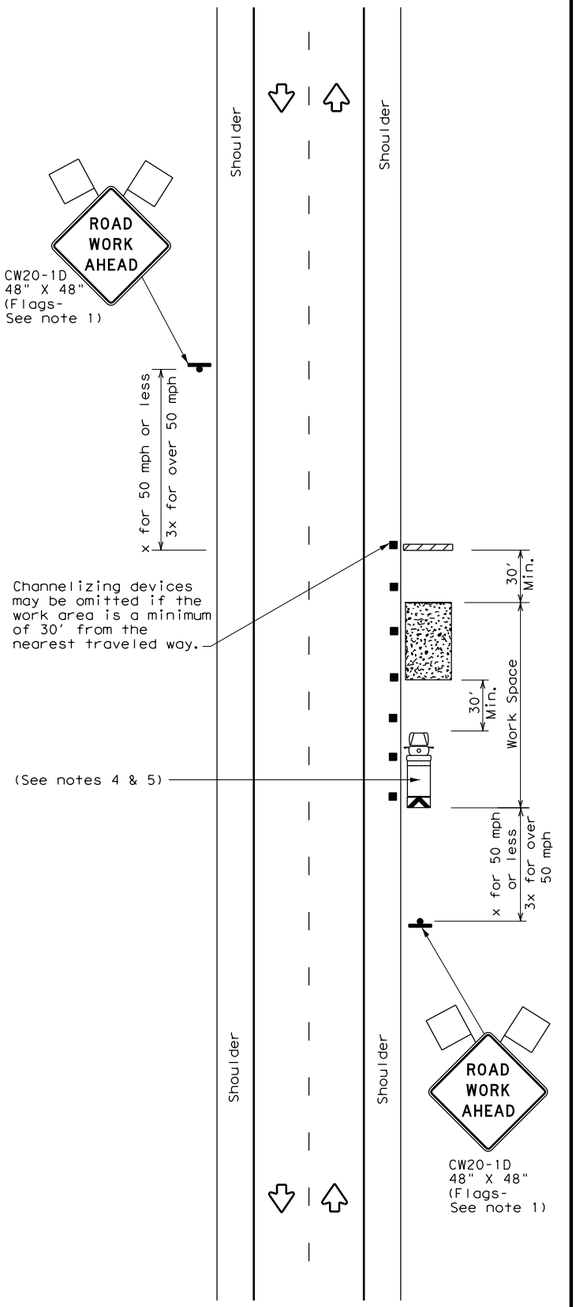
BC(12)-21

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	1133	02	030	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		45

106

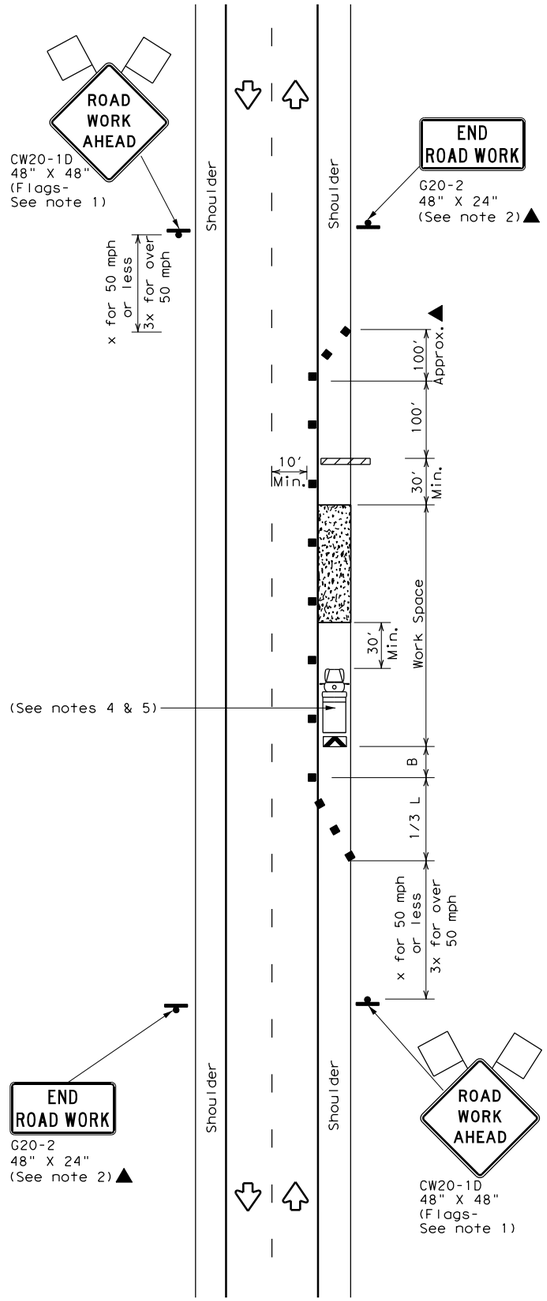
DATE: 1/26/2024 $TIME$
FILE: $FILE$

DATE: 1/26/2024 $TIME$
FILE: $FILE$



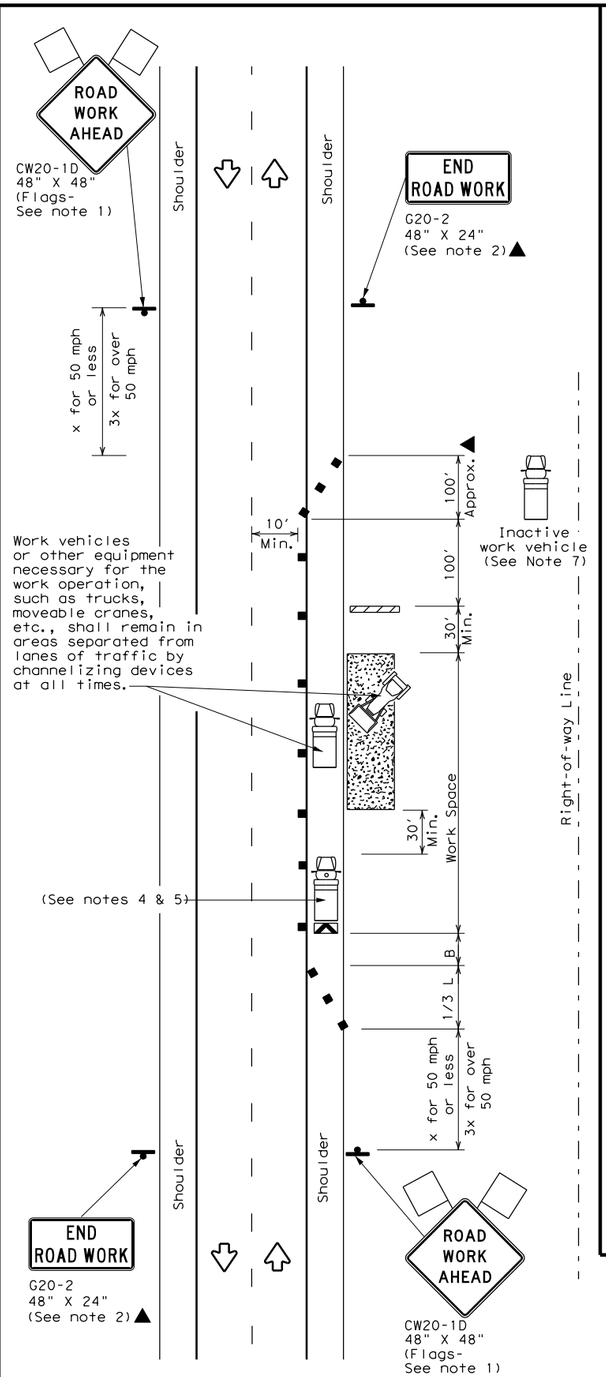
TCP (2-1a)

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.

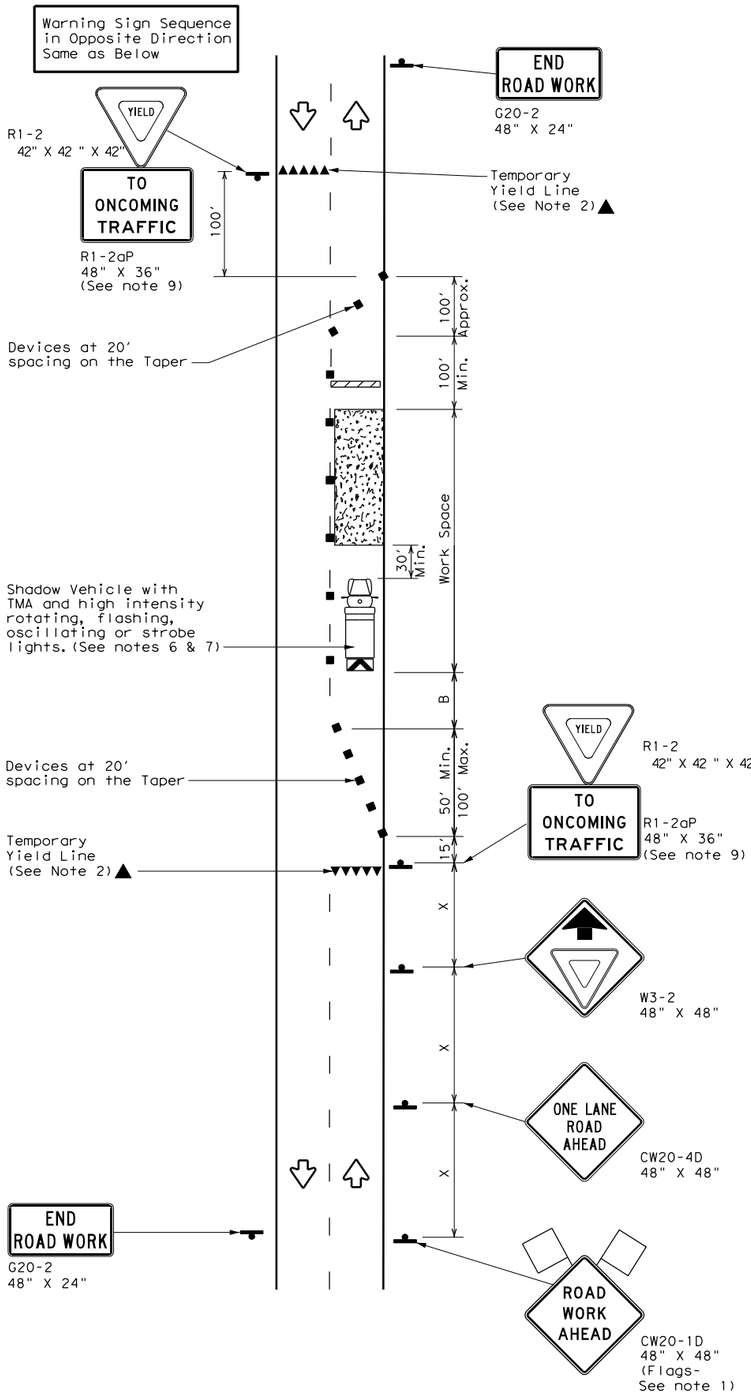
Texas Department of Transportation

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	1133	02	030	FM 794
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	YKM	GONZALES		46
1-97 2-18				



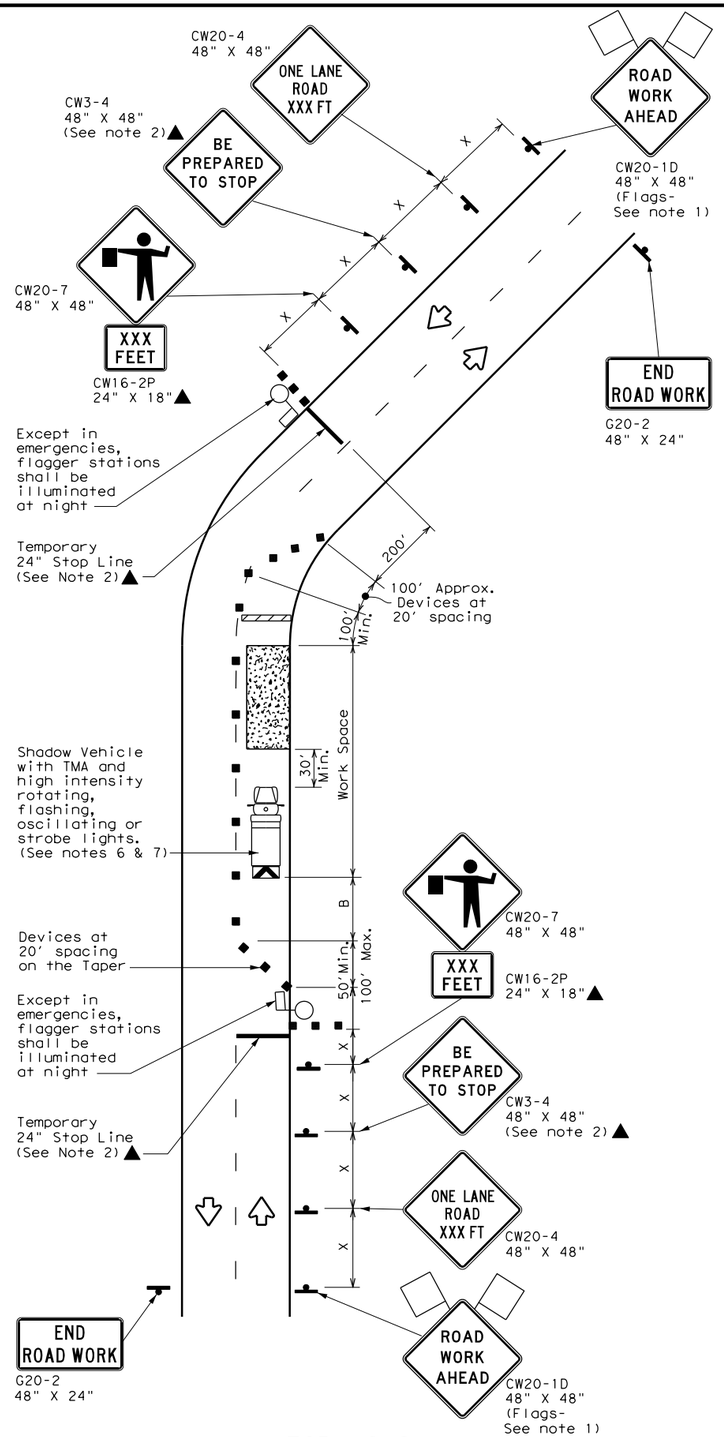
TCP (2-2a)

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 1-97 2-12 4-98 2-18	1133	02	030	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		47

DATE: 1/26/2024 $TIME$
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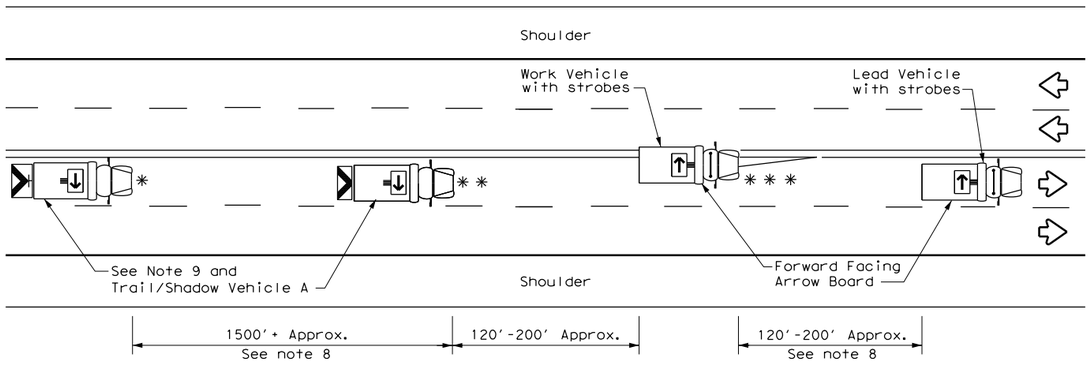
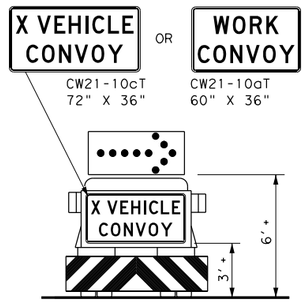


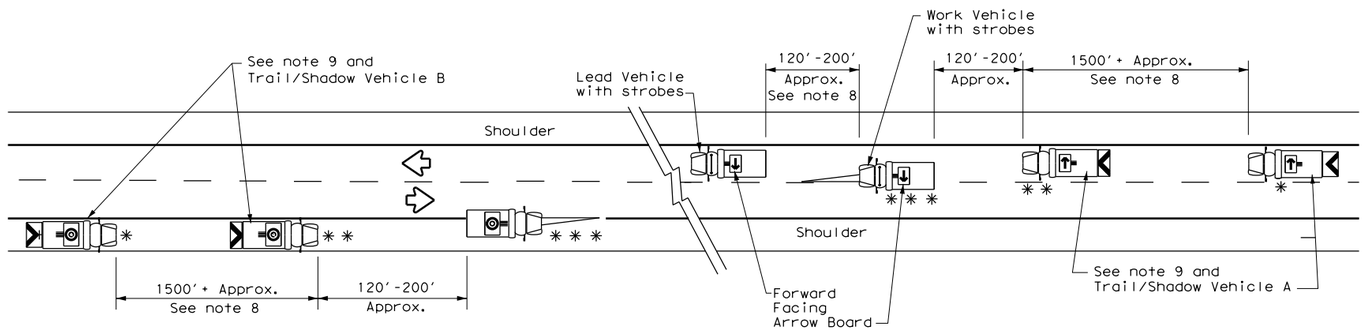
TCP (3-1a)

UNDIVIDED MULTILANE ROADWAY



TRAIL/SHADOW VEHICLE A

with RIGHT Directional display Flashing Arrow Board

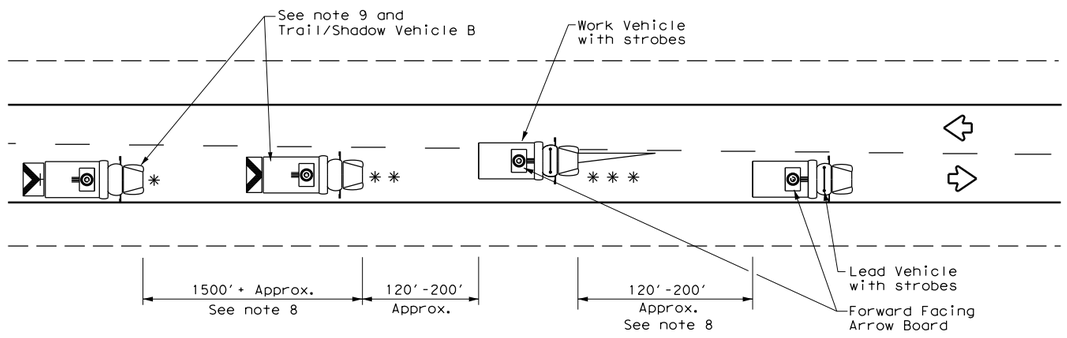


WORK ON SHOULDER

WORK ON TRAVEL LANE

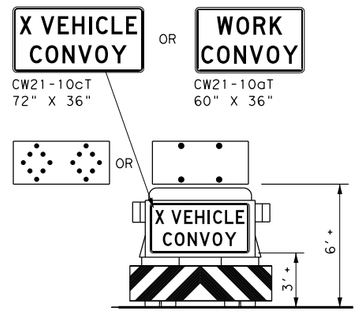
TCP (3-1b)

TWO-WAY ROADWAY WITH PAVED SHOULDERS



TCP (3-1c)

TWO-WAY ROADWAY WITHOUT PAVED SHOULDERS



TRAIL/SHADOW VEHICLE B

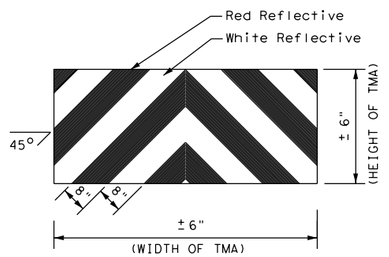
with Flashing Arrow Board in CAUTION display

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	1133	02	030	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		48

DATE: 1/26/2024 $TIME$
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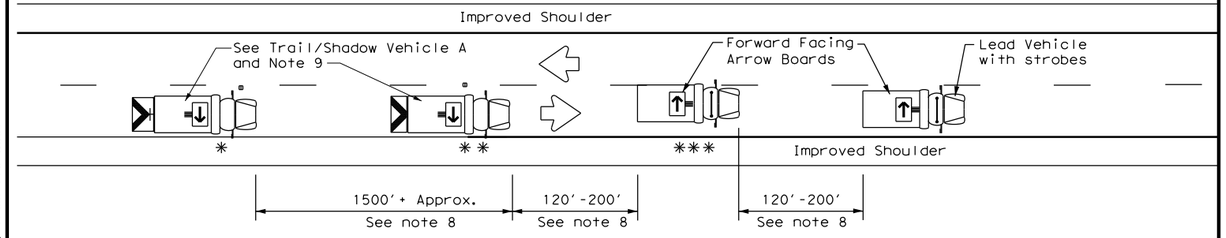
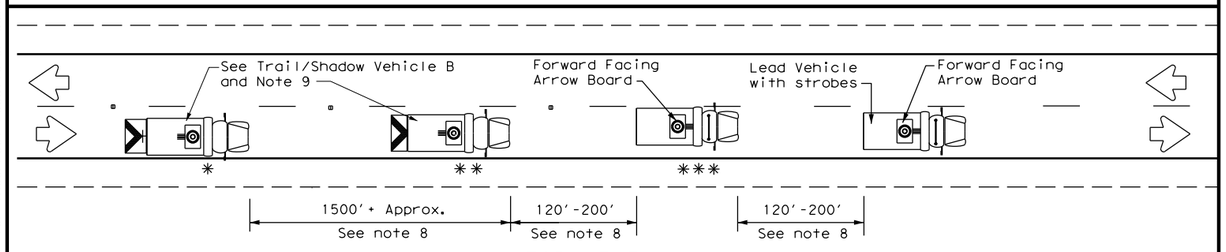


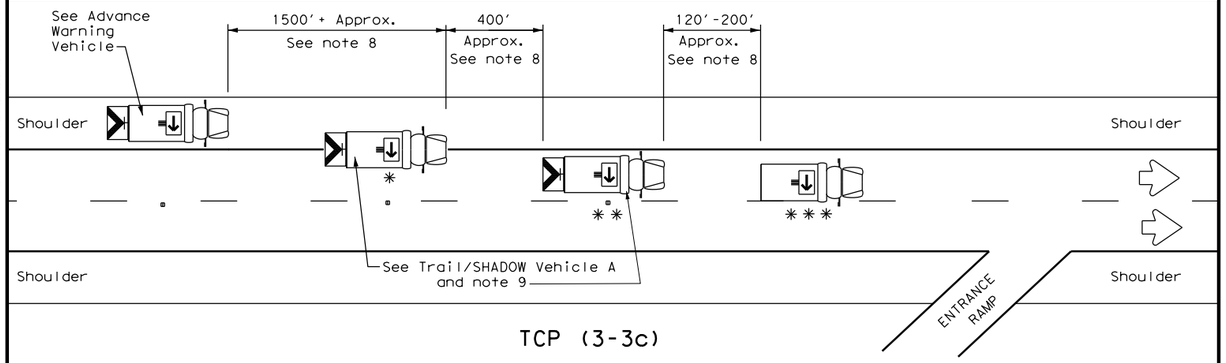
TCP (3-3a)

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



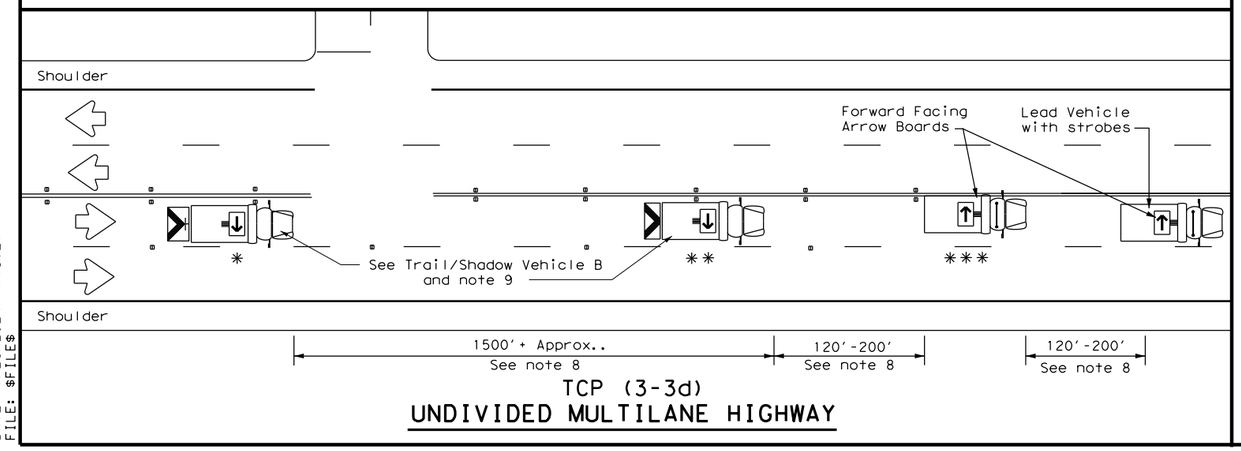
TCP (3-3b)

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



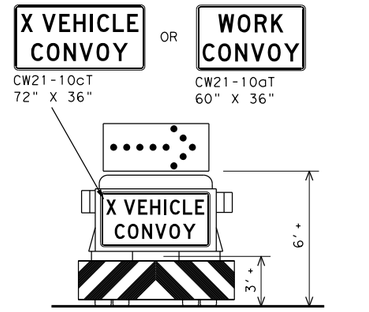
TCP (3-3c)

DIVIDED MULTILANE HIGHWAY



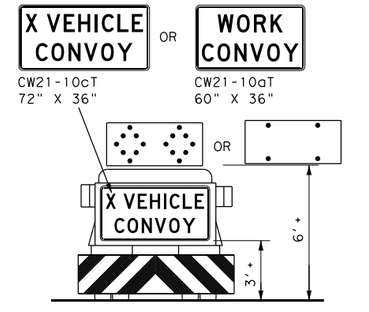
TCP (3-3d)

UNDIVIDED MULTILANE HIGHWAY



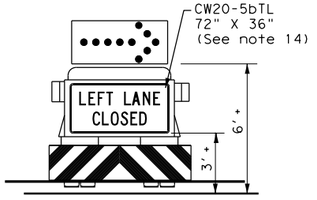
TRAIL/SHADOW VEHICLE A

with RIGHT Directional display
Flashing Arrow Board

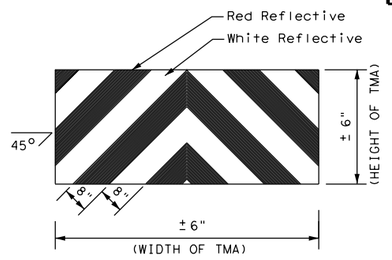


TRAIL/SHADOW VEHICLE B

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

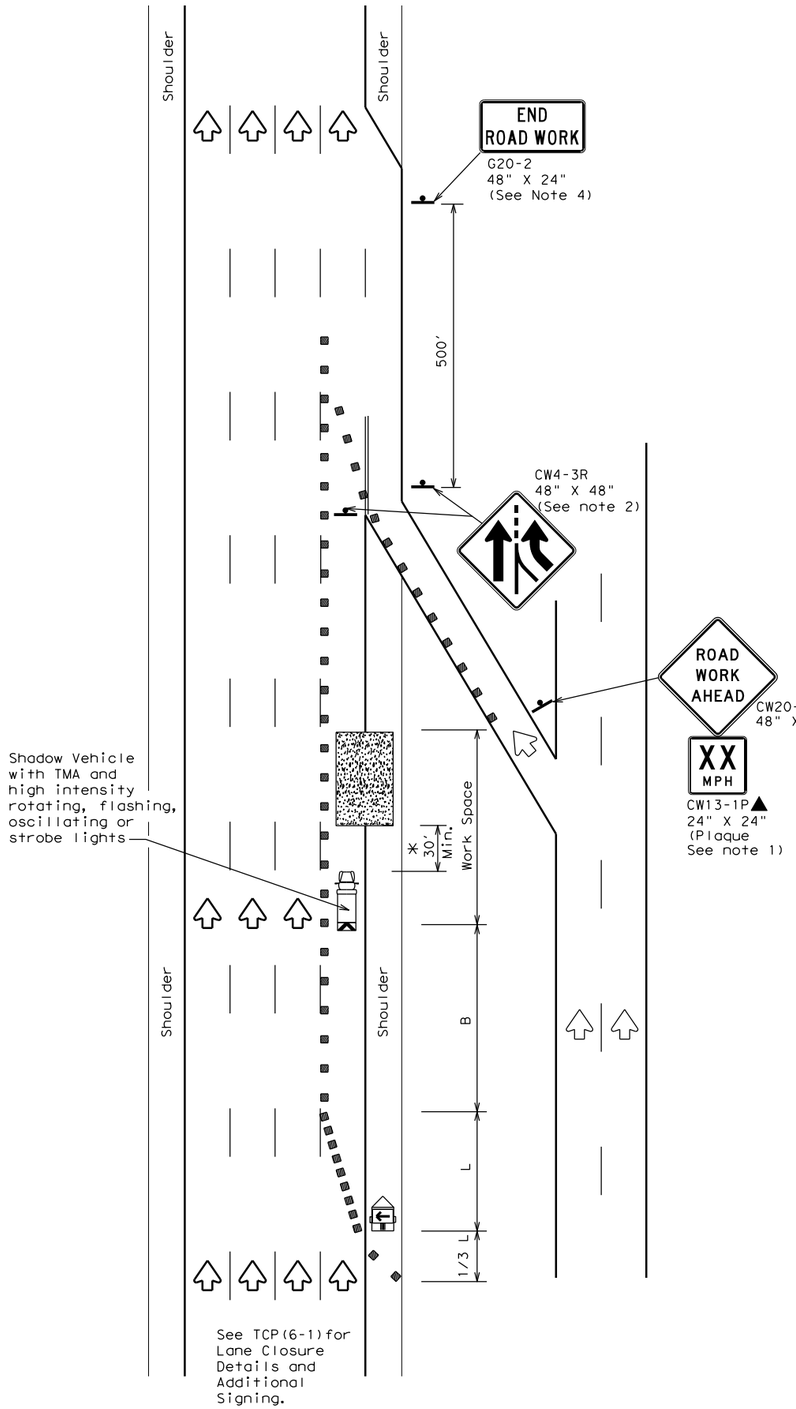
TRAFFIC CONTROL PLAN MOBILE OPERATIONS RAISED PAVEMENT MARKER INSTALLATION/ REMOVAL

TCP(3-3)-14

FILE: tcp3-3.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT September 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	030	FM 794
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 7-13	YKM	GONZALES		49
1-97 7-14				

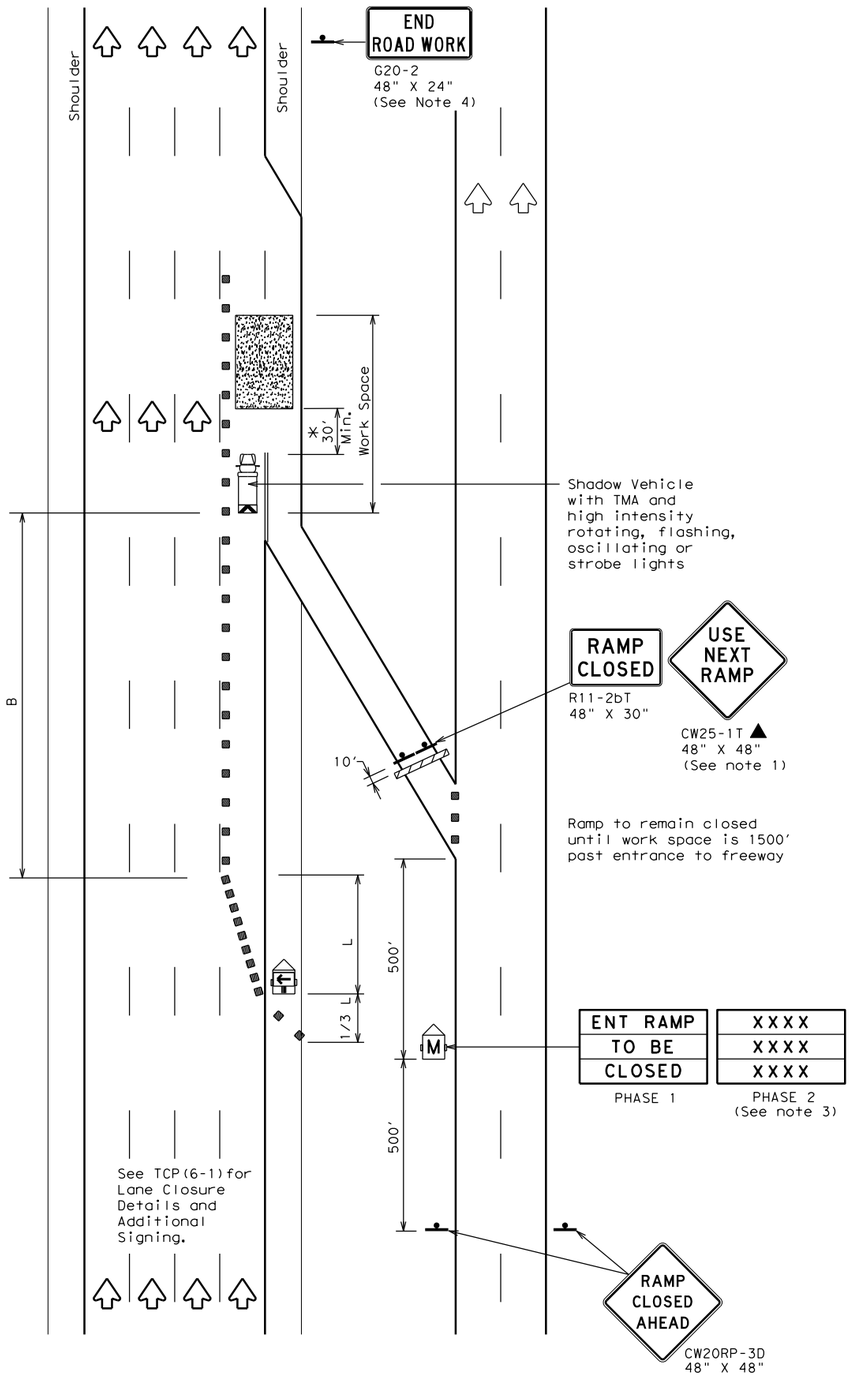
177

DATE: 1/26/2024 $TIME$
FILE: $FILE$



TCP (6-2a)

ENTRANCE RAMP OPEN
WORK WITHIN 500' OF RAMP



TCP (6-2b)

ENTRANCE RAMP CLOSED

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

Posted Speed	Formula	Minimum Desirable Taper Lengths "L" **			Suggested Maximum Spacing of Channelizing Devices		Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent	
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'

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

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

GENERAL NOTES

1. All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
2. ADDED LANE Symbol (CW4-3) sign may be omitted when sign between ramp and mainlane can be seen from both roadways.
3. See "Advance Notice List" on BC(6) for recommended date and time formatting options for PCMS Phase 2 message.
4. The END ROAD WORK (G20-2) sign may be omitted when it conflicts with G20-2 signs already in place on the project.

* A shadow vehicle equipped with a Truck Mounted Attenuator is typically required. A shadow vehicle equipped with a TMA shall be used if it can be positioned 30' to 100' in advance of the area of crew exposure without adversely affecting the work performance.

Additional requirements for lane closures and advance signing shall be as shown on TCP (6-1) or as directed by the Engineer.

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
WORK AREA NEAR RAMP

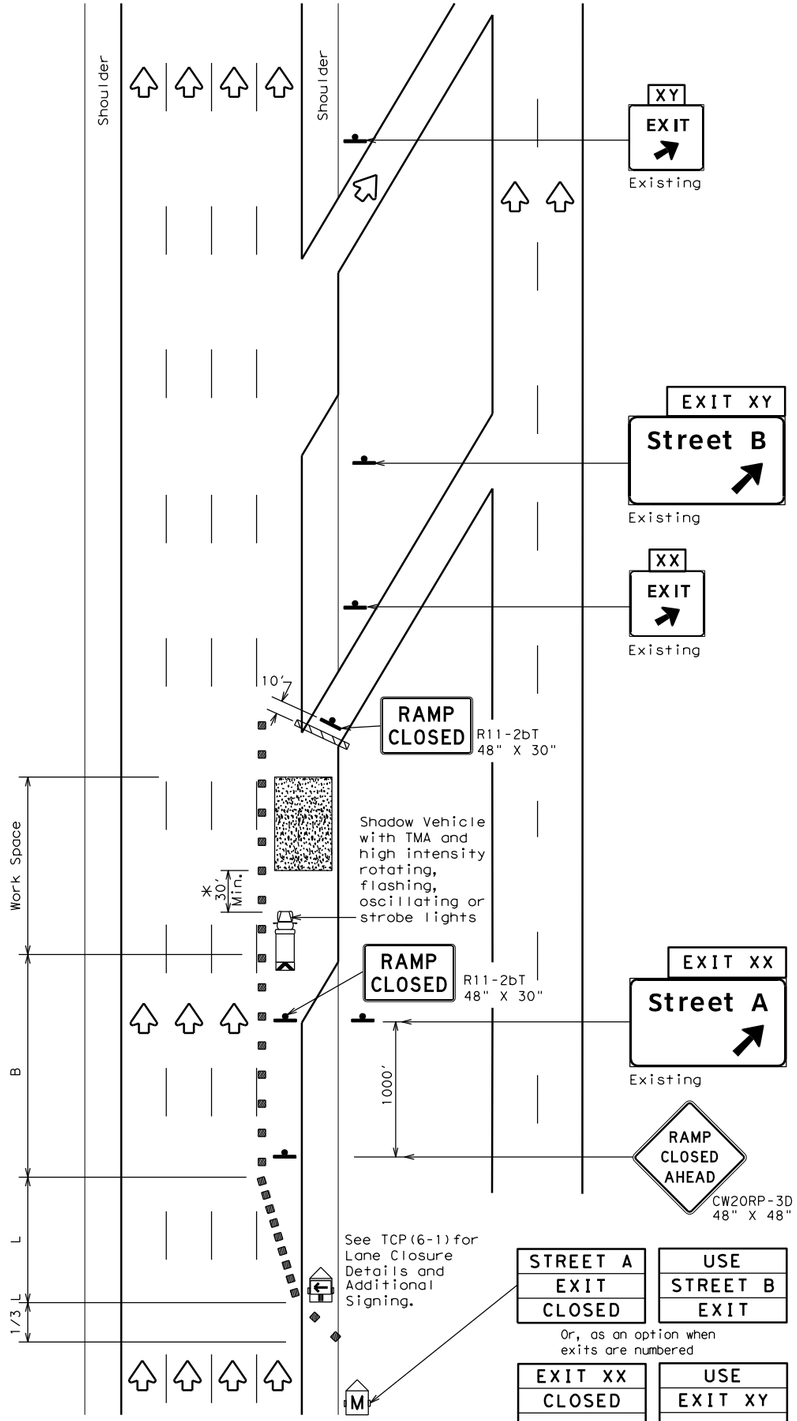
TCP(6-2)-12

FILE: tcp6-2.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1994	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	030	FM 794
1-97 8-98	DIST	COUNTY		SHEET NO.
4-98 8-12	YKM	GONZALES		50

202

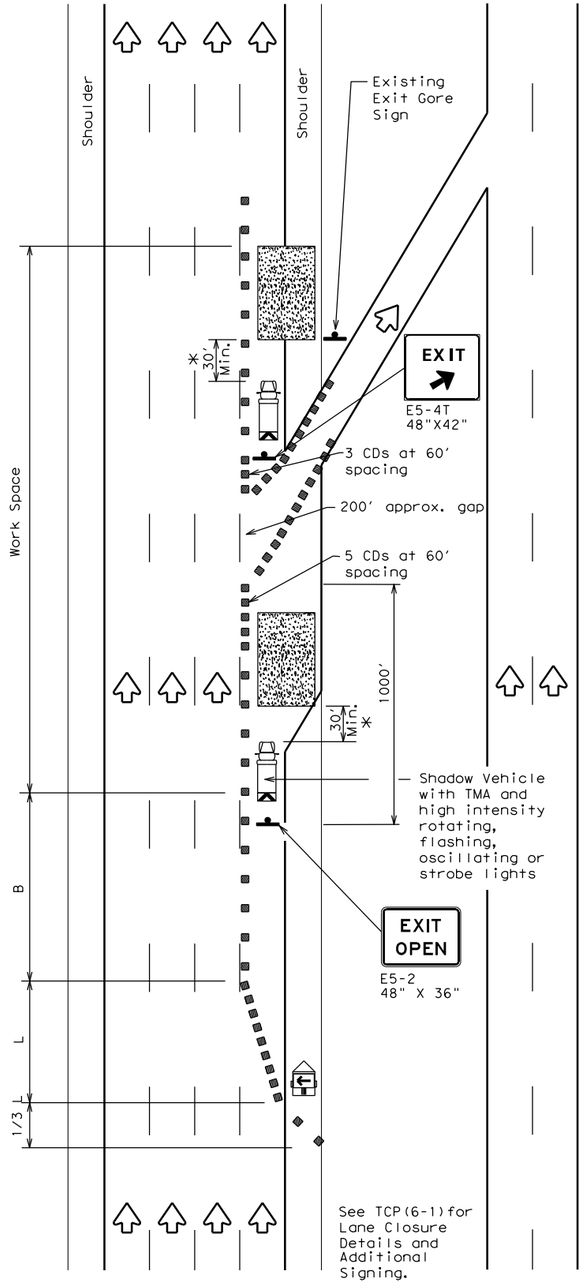
DATE: 1/26/2024 $TIME$
FILE: $FILE$

DATE: 1/26/2024 $TIME$
FILE: $FILE$



TCP (6-4a)

EXIT RAMP CLOSED
TRAFFIC EXITS PAST CLOSED RAMP



TCP (6-4b)

EXIT RAMP OPEN

LEGEND			
	Type 3 Barricade		Channelizing Devices (CDs)
	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 "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'

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

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

GENERAL NOTES

1. All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
2. See BC Standards for sign details.

*A shadow vehicle equipped with a Truck Mounted Attenuator is typically required. A shadow vehicle equipped with a TMA shall be used if it can be positioned 30' to 100' in advance of the area of crew exposure without adversely affecting the work performance.

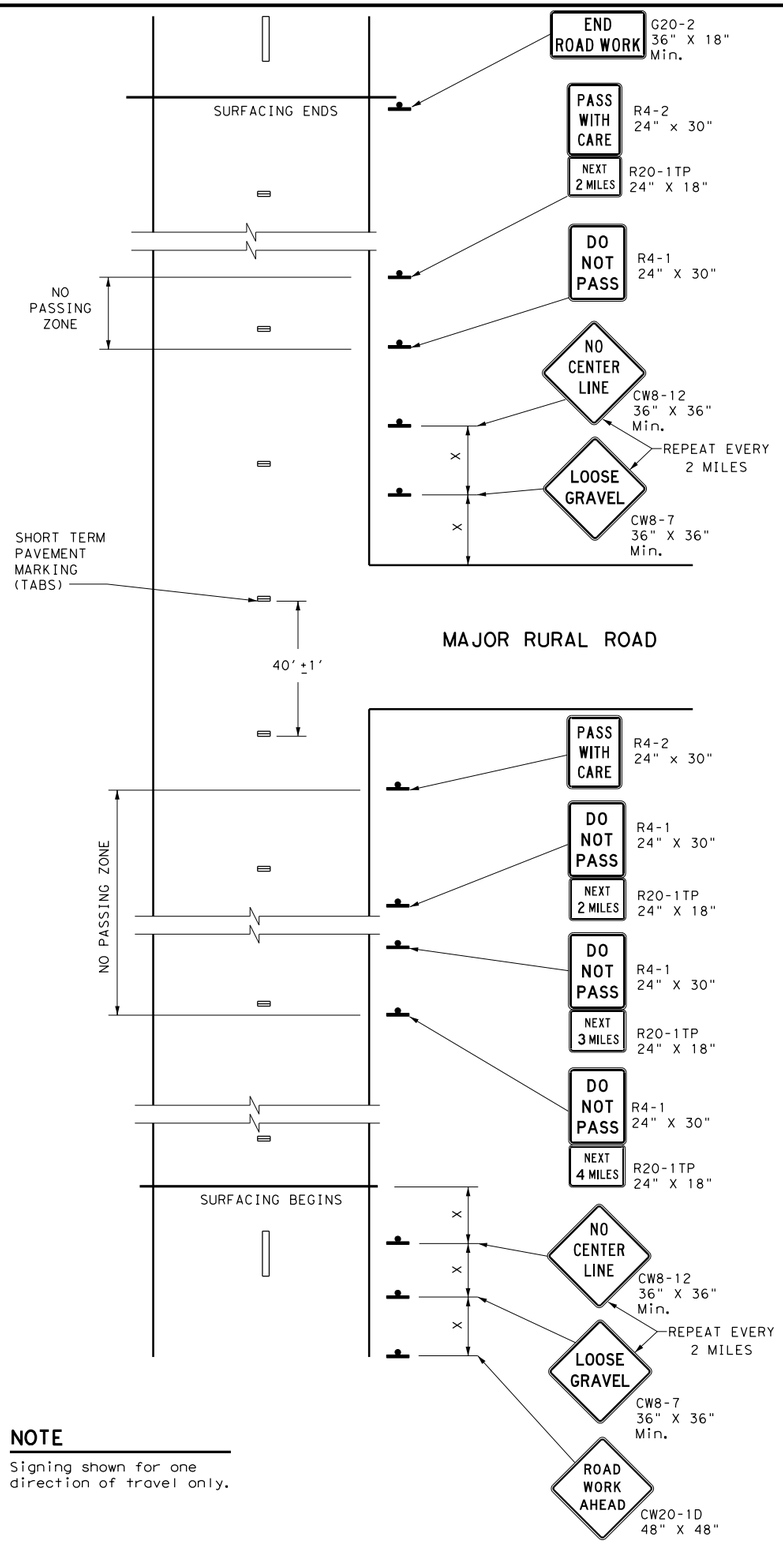
Additional requirements for lane closures and advance signing shall be as shown on TCP (6-1) or as directed by the Engineer.

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
WORK AREA AT EXIT RAMP

TCP(6-4)-12

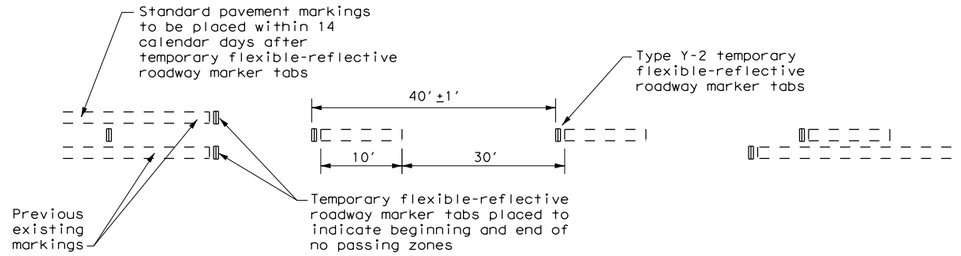
FILE: tcp6-4.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT Feburary 1994	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	030	FM 794
1-97 8-98	DIST	COUNTY		SHEET NO.
4-98 8-12	YKM	GONZALES		51



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
REVISIONS	1133	02	030	FM 794
4-92 4-98	DIST	COUNTY		SHEET NO.
1-97 7-13	YKM	GONZALES		52

210

DATE: 1/26/2024 $TIME$
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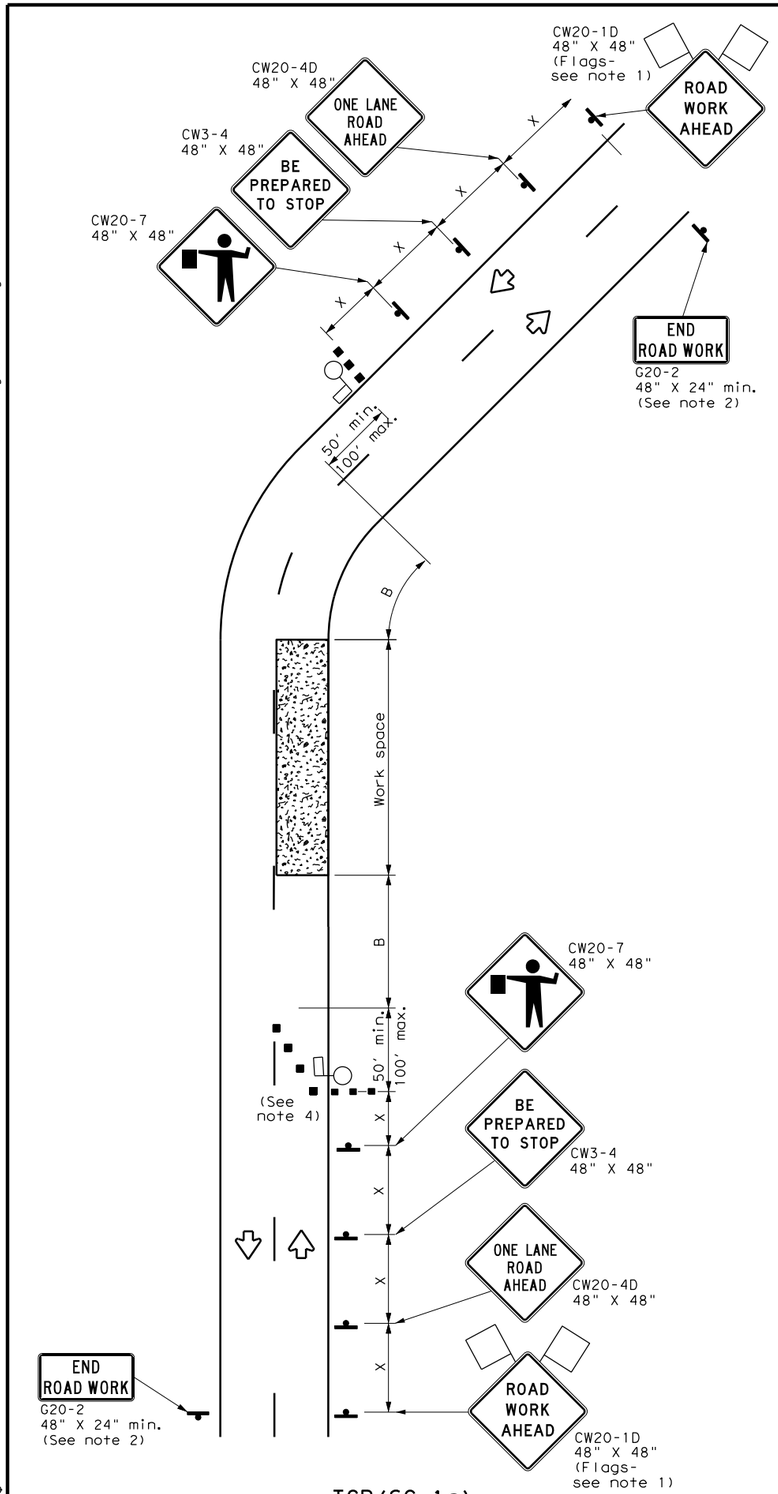
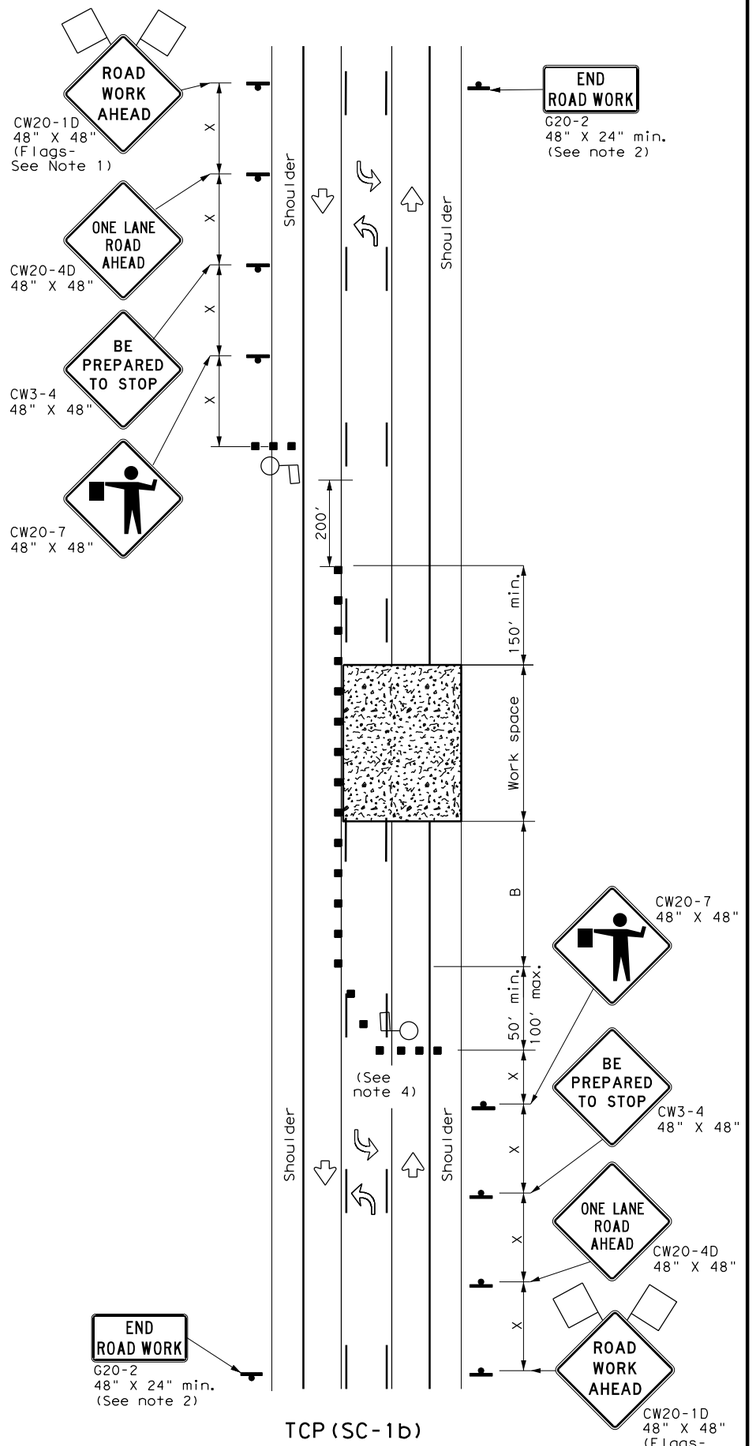


TCP(SC-1a)

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	1133	02	030	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		53

217

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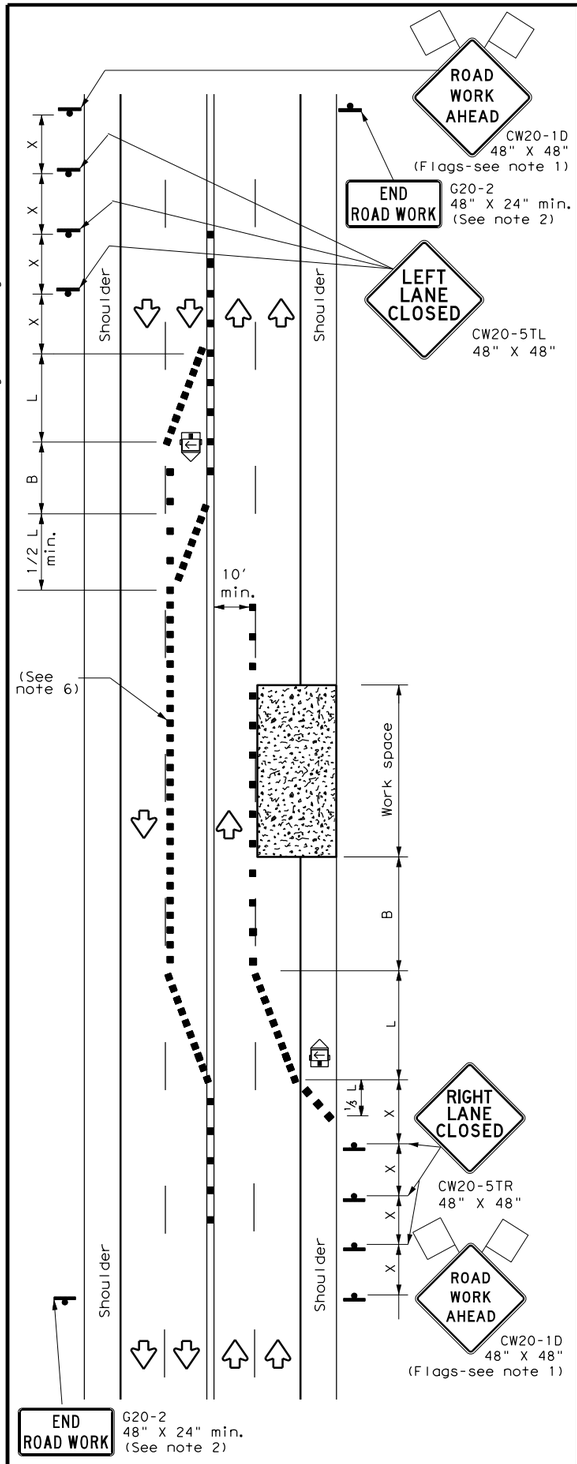
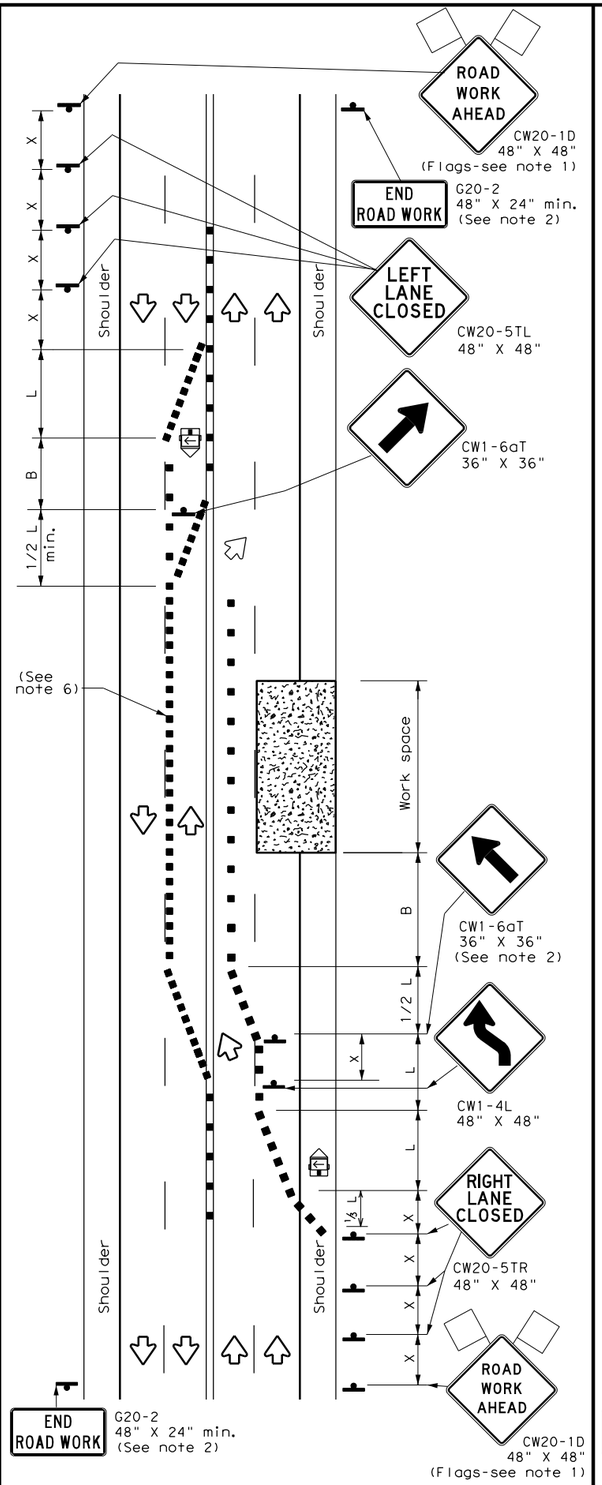


TCP (SC-2a)

ONE LANE CLOSED EACH DIRECTION

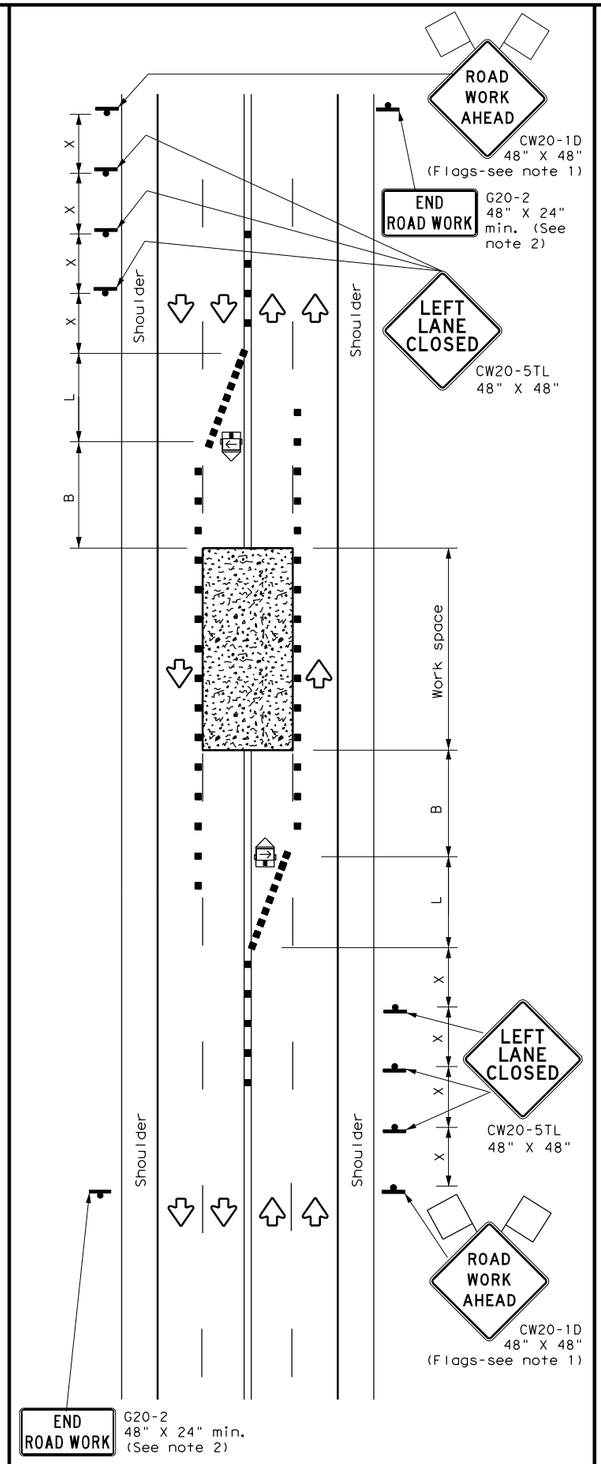
CONTROL W/ CHANNELIZING DEVICES



TCP (SC-2b)

ONE LANE CLOSED EACH DIRECTION

CONTROL W/ CHANNELIZING DEVICES



TCP (SC-2c)

CENTER LANES CLOSED

CONTROL W/ CHANNELIZING DEVICES

DATE: 1/26/2024 $TIME$
FILE: $FILE$

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 4-21 10-22	1133	02	030	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		54

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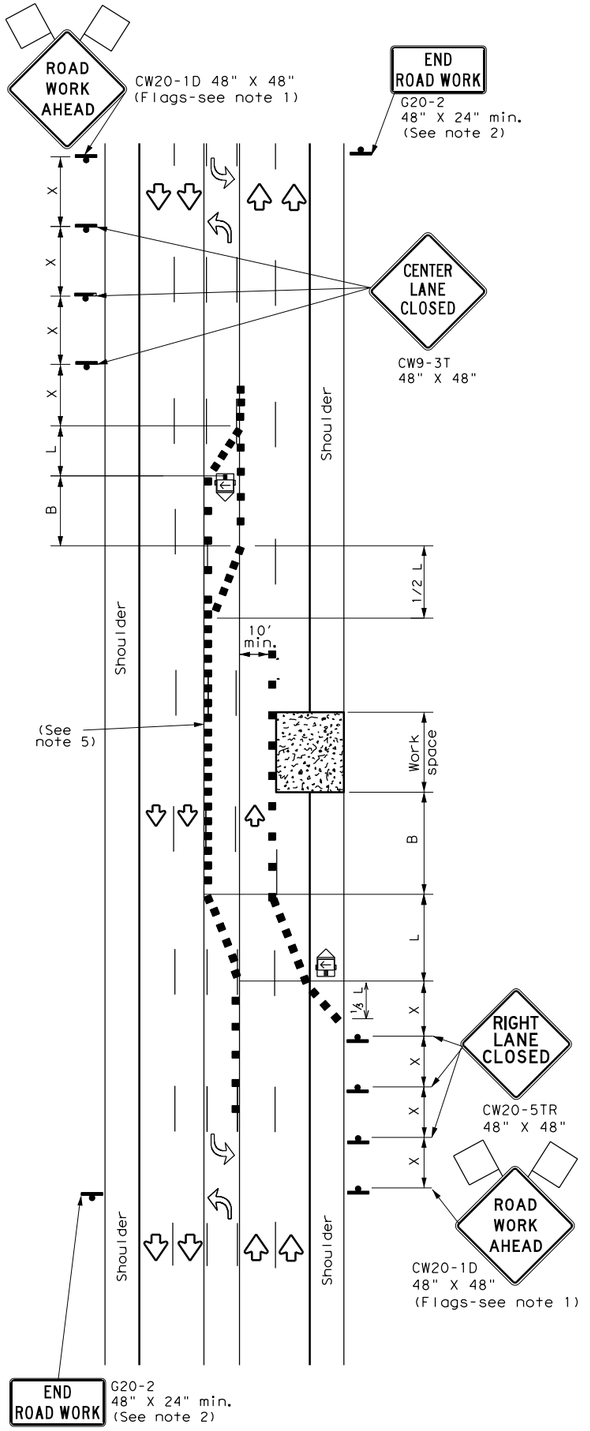
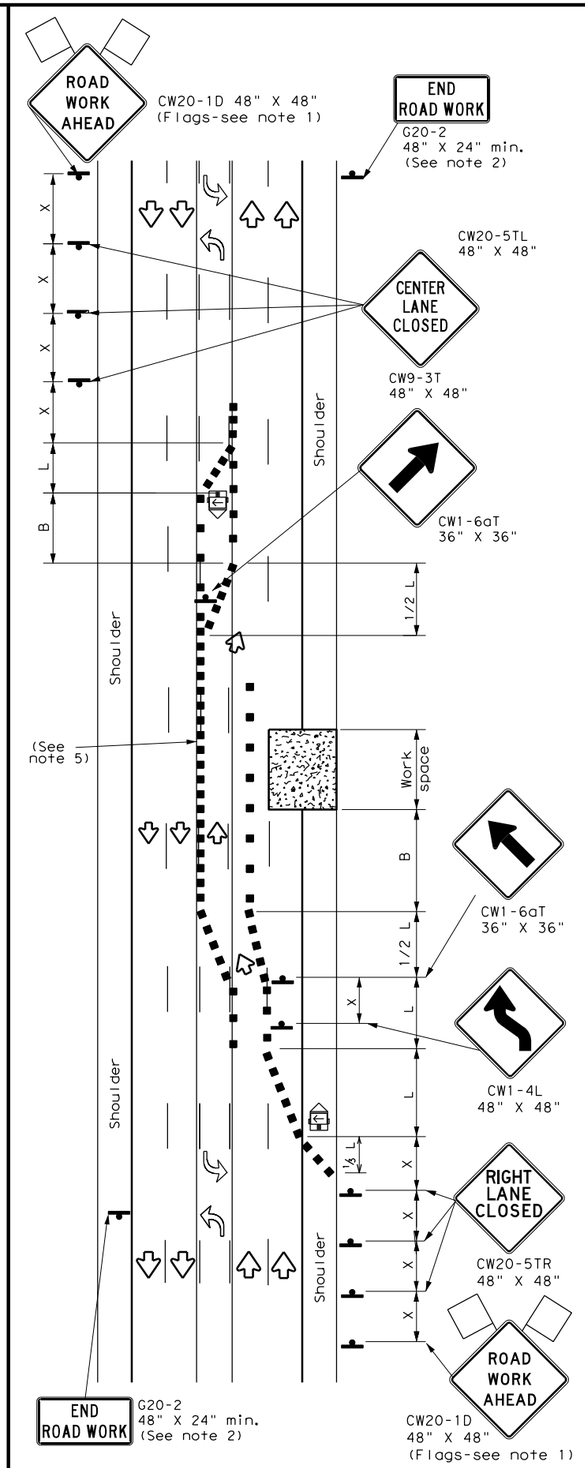
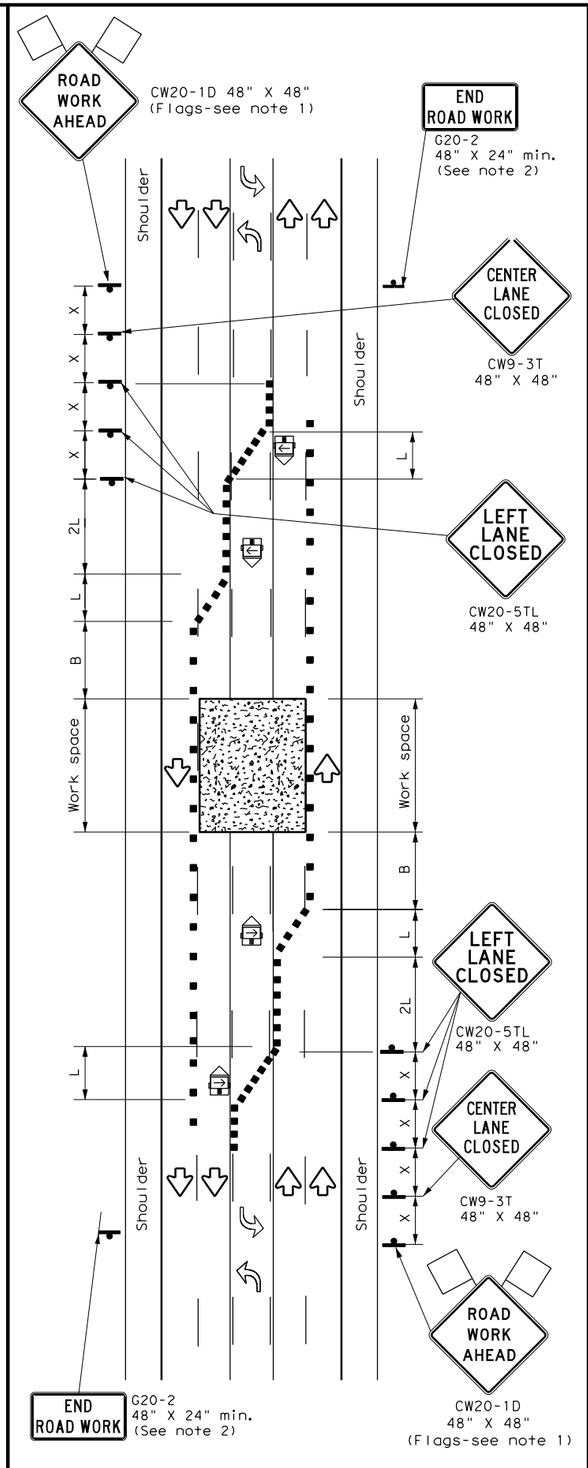
DATE: 1/26/2024 $TIME$
FILE: $FILE$



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)

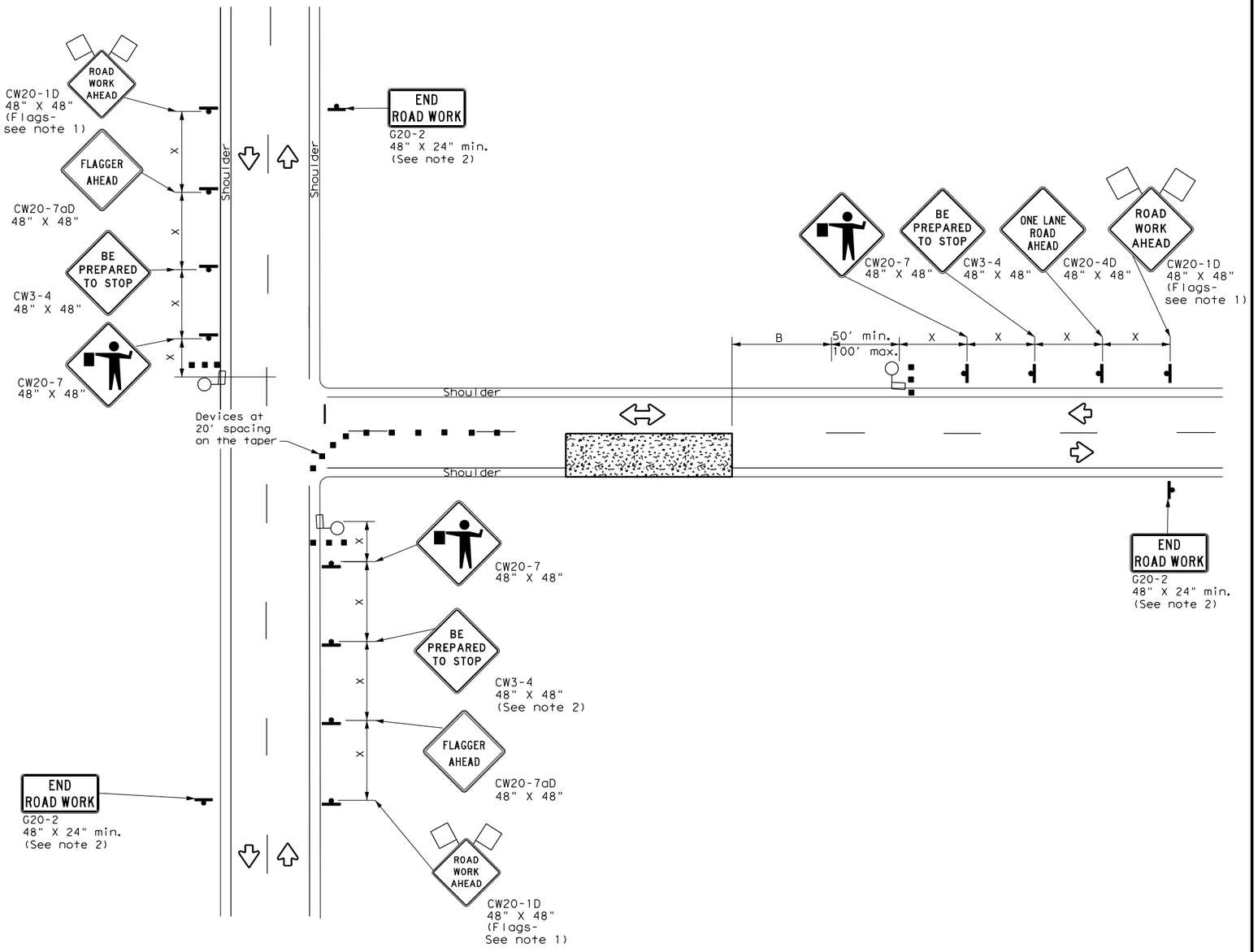
5. Channelizing devices which separate two-way traffic shall be spaced on tapers at:
   a.) 20 feet;
   b.) 15 feet when posted speeds are 35 mph or slower; or
   c.) at 1/2(S) for tangent sections.
   This tighter device spacing is intended for the areas of conflicting markings, not the entire work 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	1133	02	030	FM 794
4-21	DIST	COUNTY		SHEET NO.
10-22	YKM	GONZALES		55



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

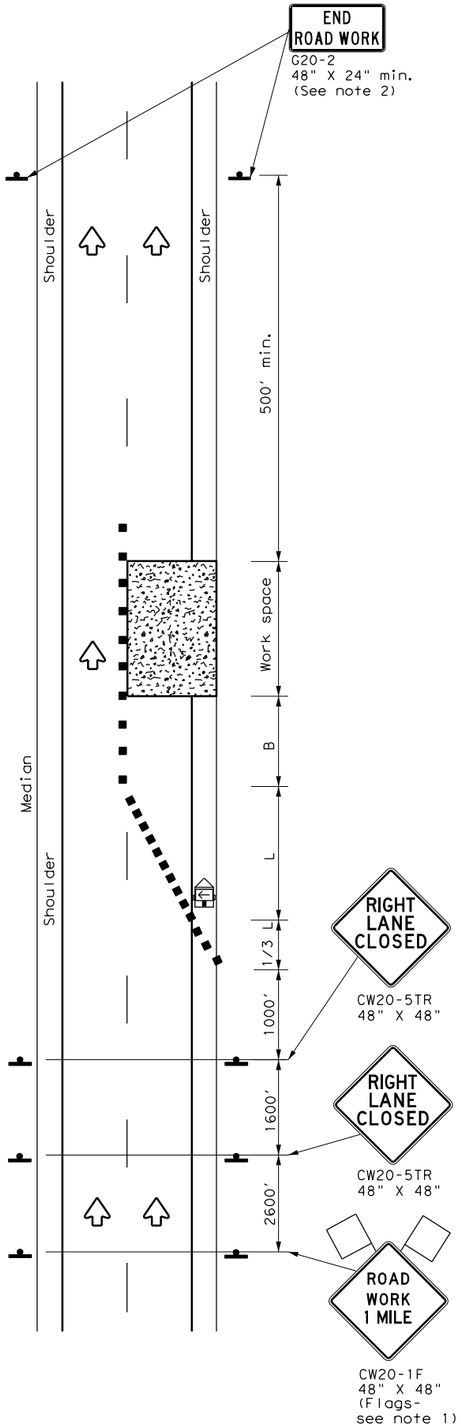
TRAFFIC CONTROL PLAN SEAL COAT OPERATIONS NEAR INTERSECTION

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	1133	02	030	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		56

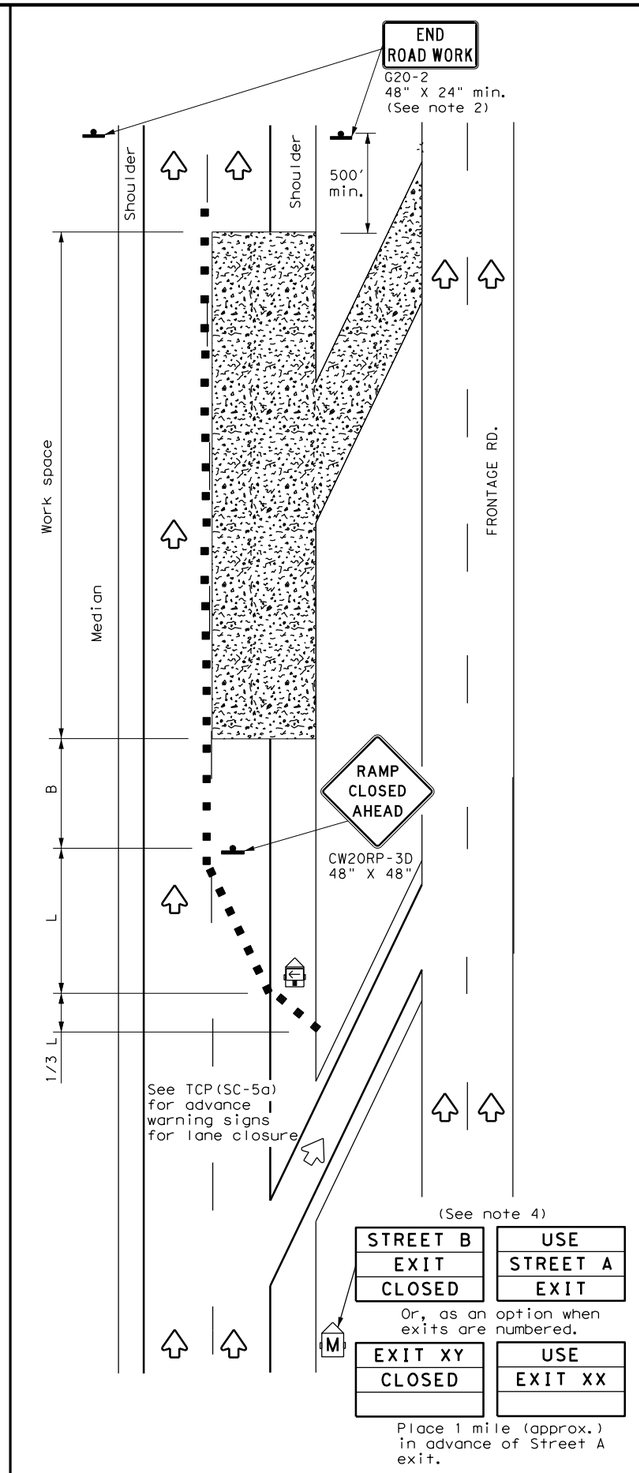
220

DATE: 1/26/2024 $TIME$
FILE: $FILE$



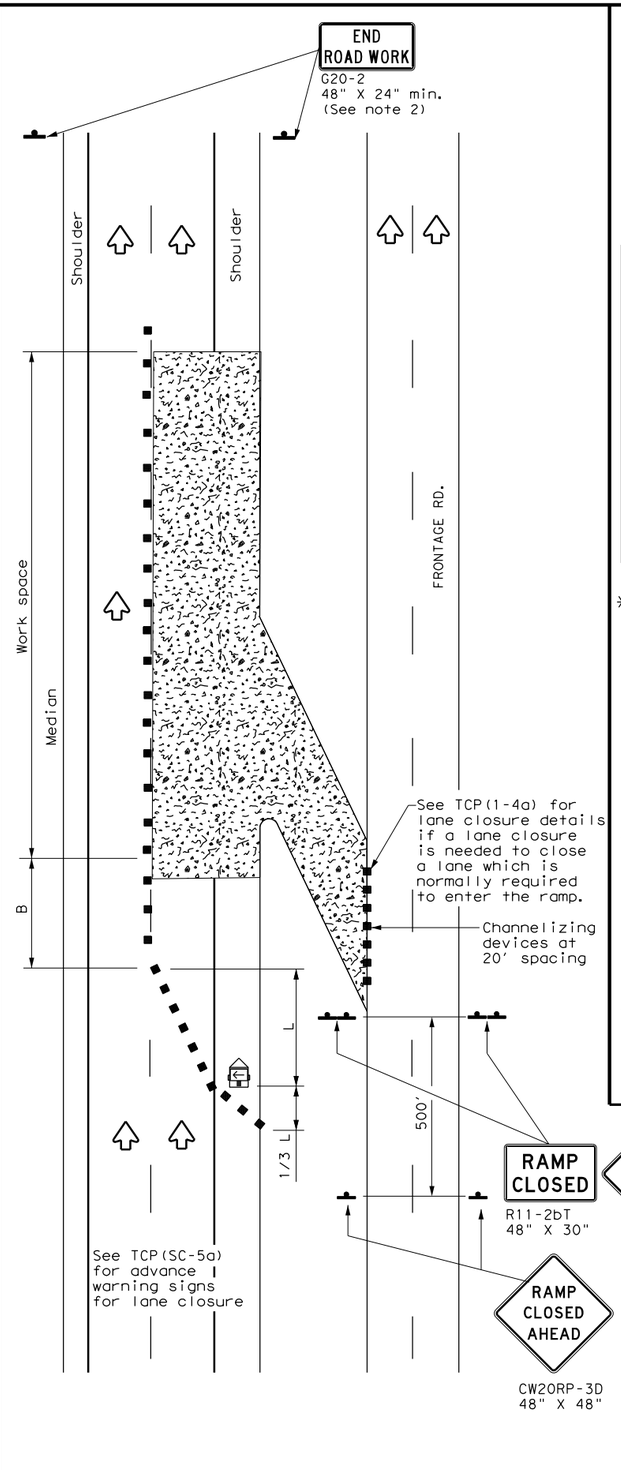
TCP (SC-5a)

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

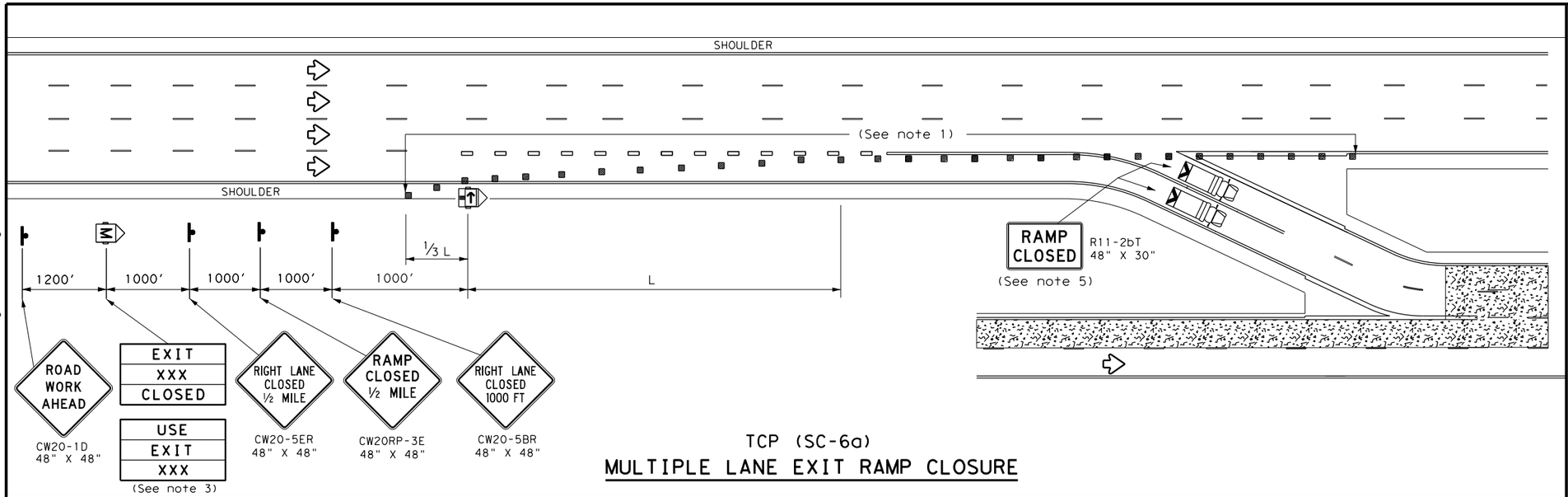
TRAFFIC CONTROL PLAN SEAL COAT OPERATIONS DIVIDED HIGHWAYS

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	1133	02	030	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		57

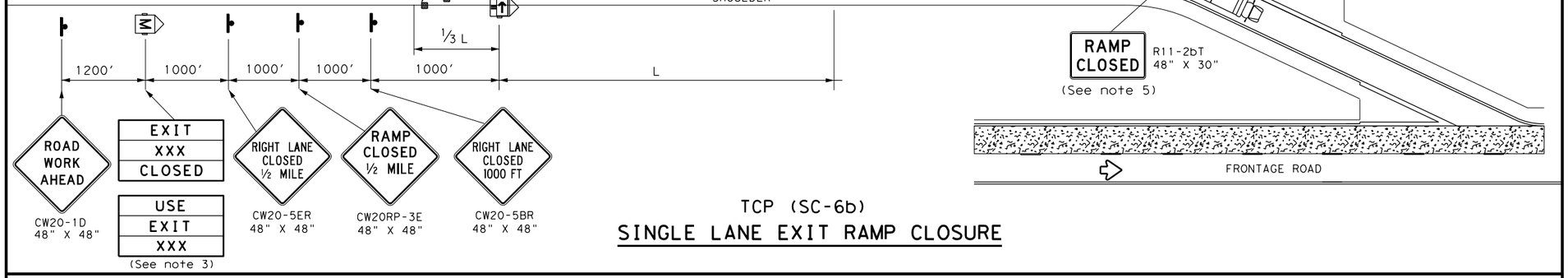
221

DATE: 1/26/2024 $TIME$
FILE: $FILE$



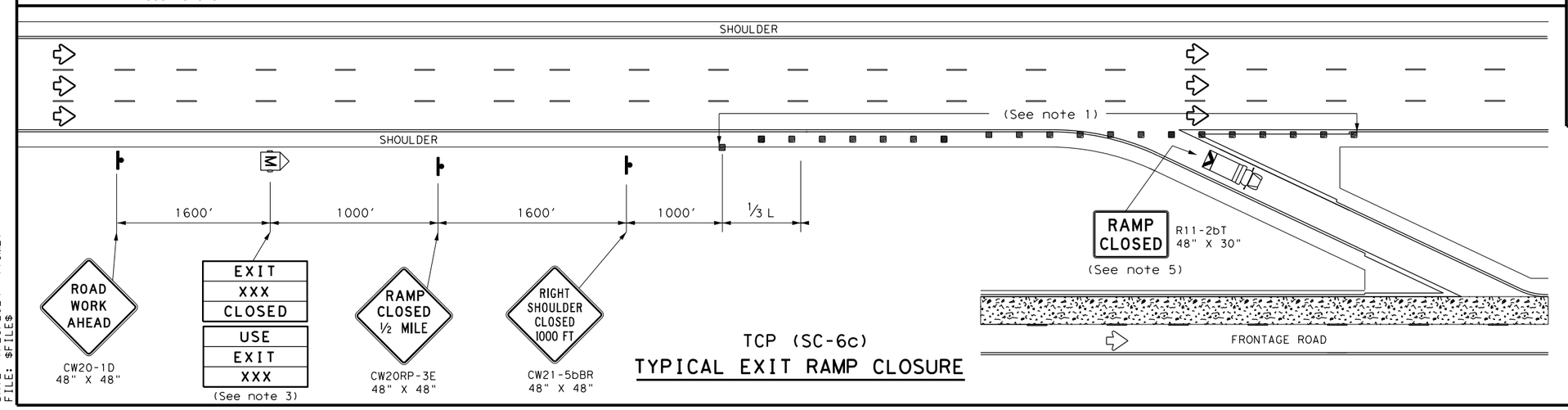
TCP (SC-6a)

MULTIPLE LANE EXIT RAMP CLOSURE



TCP (SC-6b)

SINGLE LANE EXIT RAMP CLOSURE



TCP (SC-6c)

TYPICAL EXIT RAMP CLOSURE

DATE: 1/26/2024 $TIME$
FILE: $FILE$

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" ✻✻			Suggested Maximum Spacing of Channelizing Devices		Suggested Longitudinal Buffer Space "B"
		10′ Offset	11′ Offset	12′ Offset	On a Taper	On a Tangent	
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

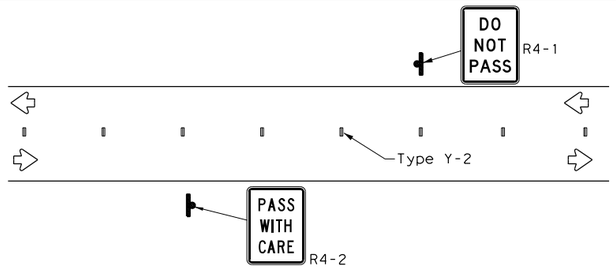
TRAFFIC CONTROL PLAN SEAL COAT OPERATIONS DIVIDED HIGHWAYS

TCP(SC-6)-22

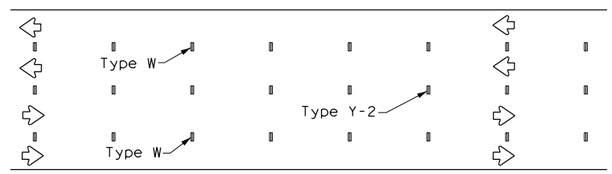
FILE: tcpsc-6-22.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 10-22	1133	02	030	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		58

DATE: 1/26/2024
FILE: $FILE$

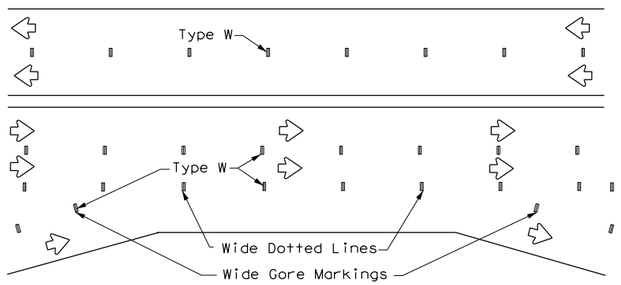
WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS (TABS)



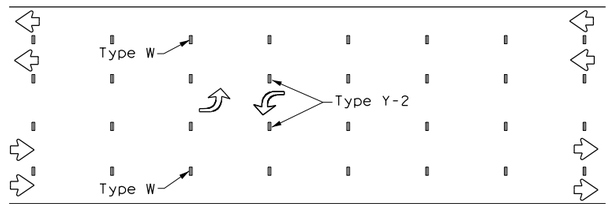
CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO LANE TWO-WAY HIGHWAYS



LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS

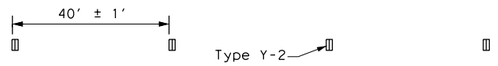
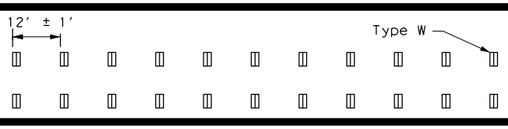
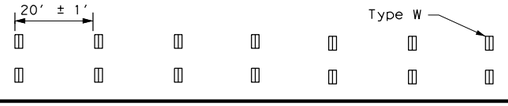


LANE LINES FOR DIVIDED HIGHWAY

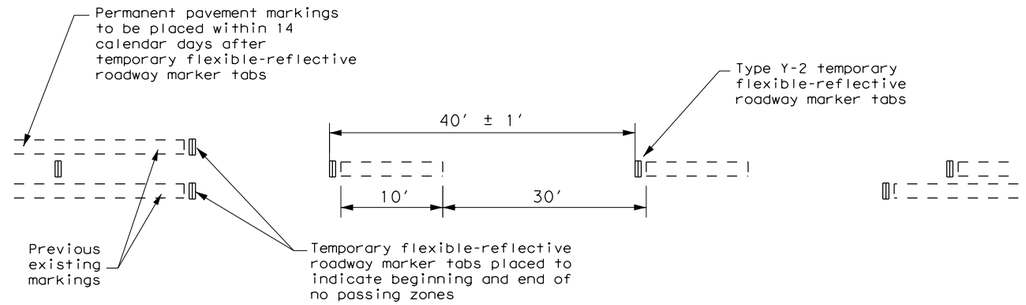


TWO-WAY LEFT TURN LANE

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.

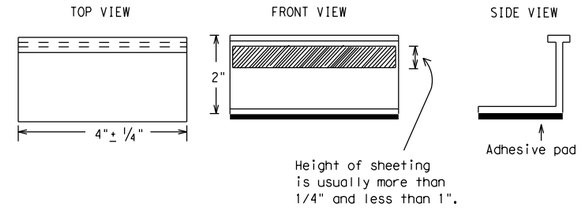
NOTES:

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 ¼ 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

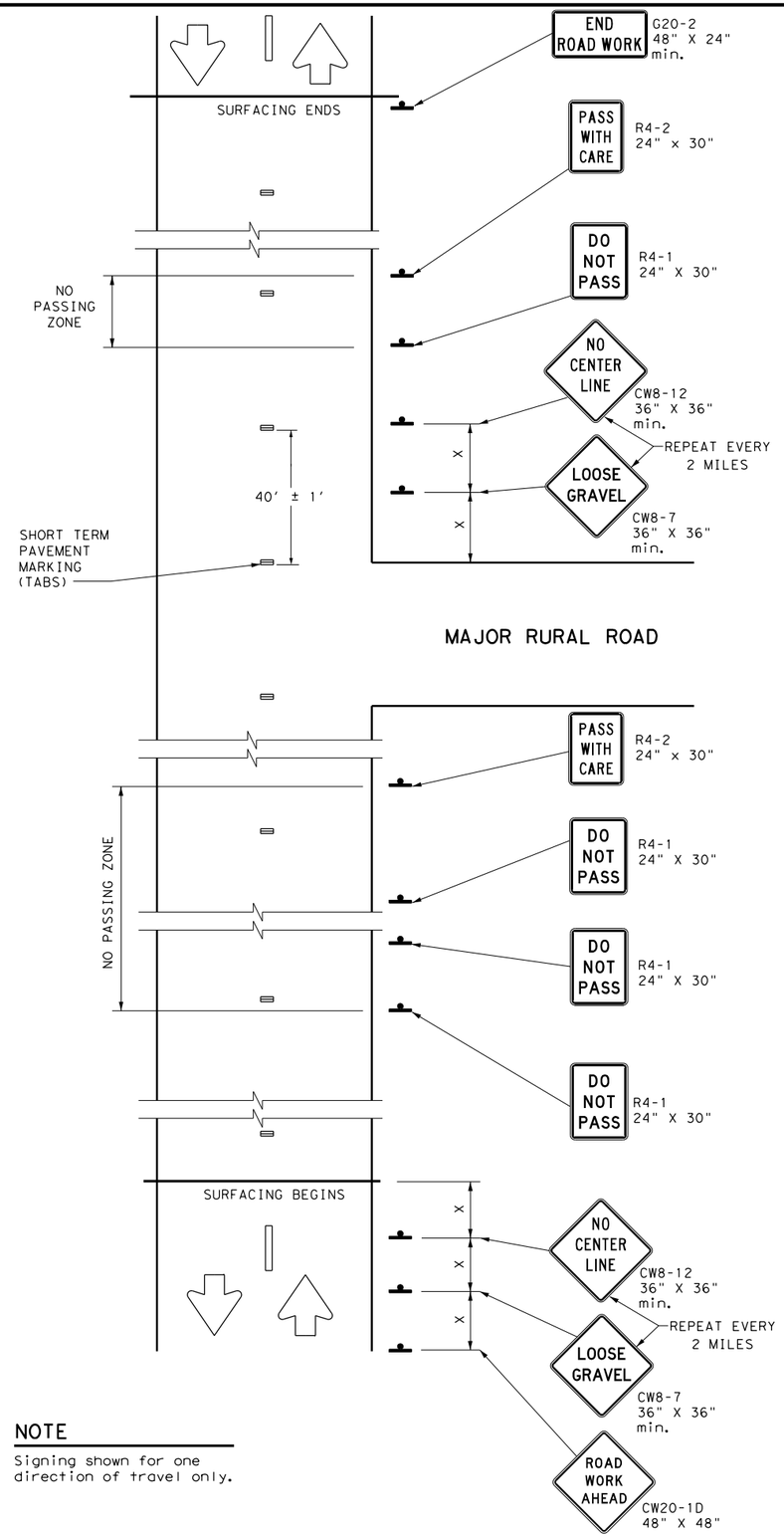
TEMPORARY PAVEMENT MARKINGS FOR SEAL COAT OPERATIONS

TCP(SC-7)-22

FILE:	tcpsc-7-22.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT	October 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS		1133	02	030	FM 794
4-21		DIST	COUNTY		SHEET NO.
10-22		YKM	GONZALES		59

223

DATE: 1/26/2024 $TIME$
FILE: $FILE$



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.

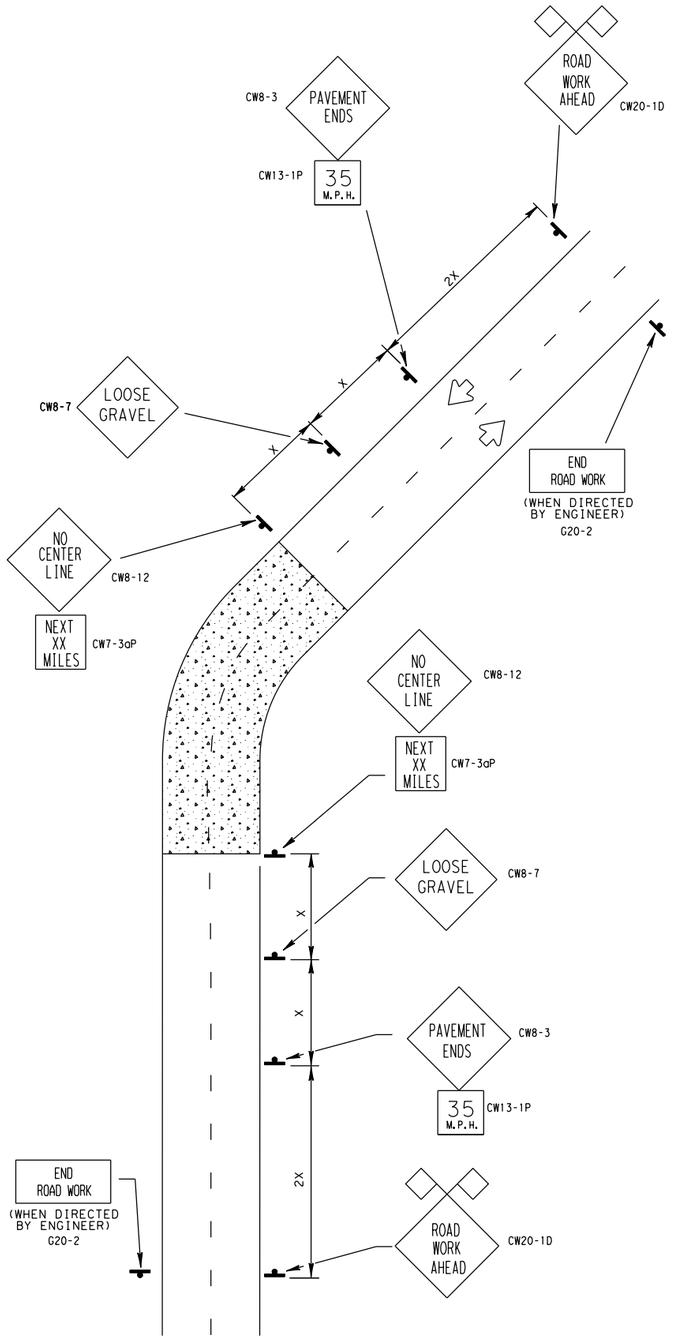
Texas Department of Transportation

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
©TxDOT October 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	030	FM 794
4-21	DIST	COUNTY		SHEET NO.
10-22	YKM	GONZALES		60



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)

SIGN SPACING AND SIZES SHALL BE IN ACCORDANCE WITH THE CURRENT BC STANDARDS.

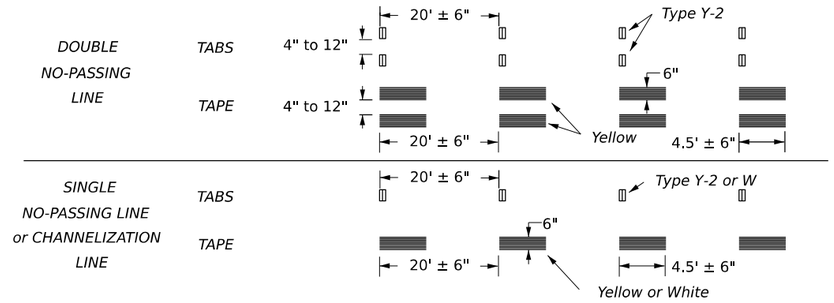
STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL PLAN

(YKM. DISTRICT)
TCP - UNSURFACED ROADWAY

ORIG DRAW DATE: December 1985	DN:	CK:	DW:	CK:
REVISIONS	CONT	SECT	JOB	HIGHWAY
3-22-99	1133	02	030	FM 794
4-24-12	DIST	COUNTY		SHEET NO.
5-14-13	YKM	GONZALES		61
10-13-15				

WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS



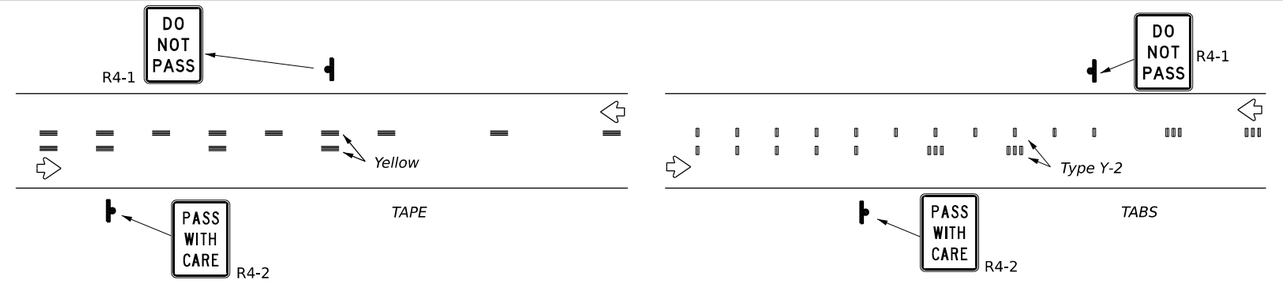
NOTES:

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

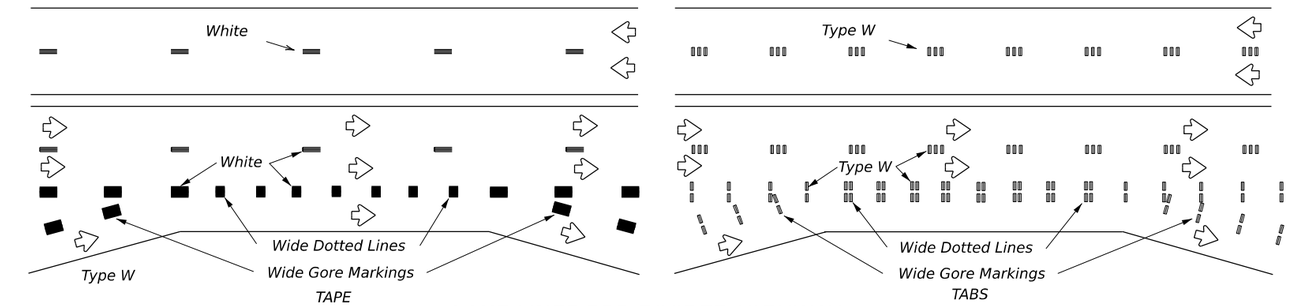
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS (TABS)

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

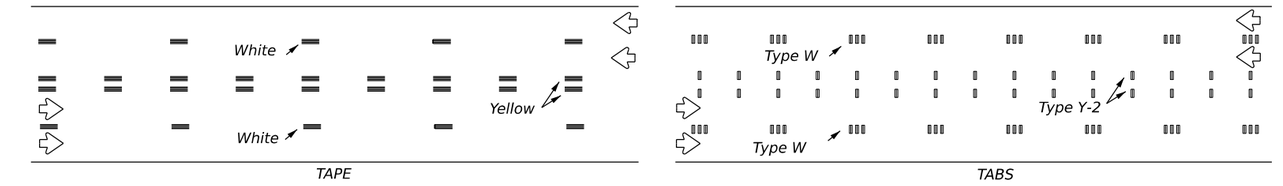
WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS



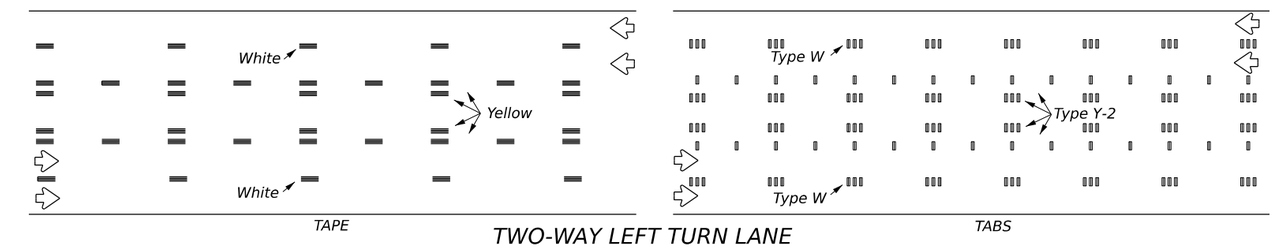
CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO LANE TWO-WAY HIGHWAYS



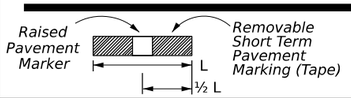
LANE LINES FOR DIVIDED HIGHWAY



LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



TWO-WAY LEFT TURN LANE



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

PREFABRICATED PAVEMENT MARKINGS

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

RAISED PAVEMENT MARKERS

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

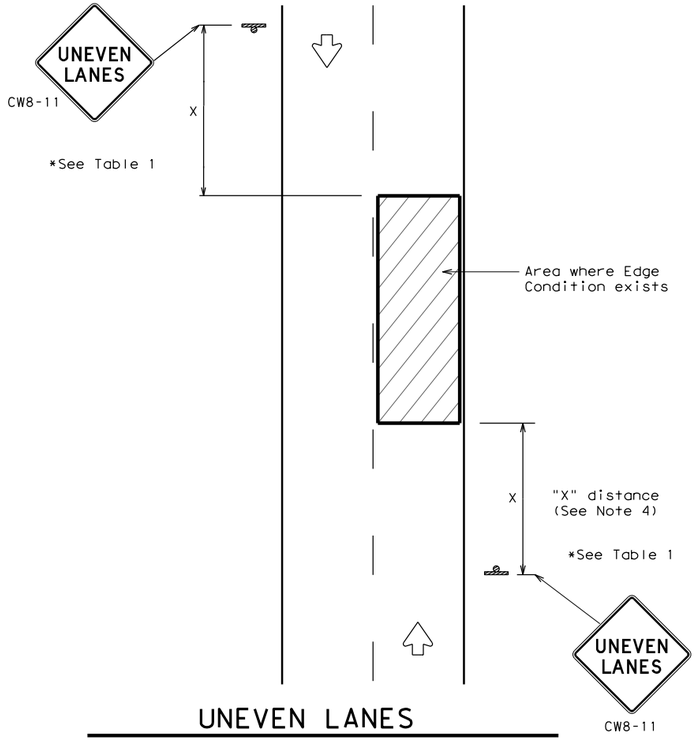
WORK ZONE SHORT TERM PAVEMENT MARKINGS

WZ(STPM)-23

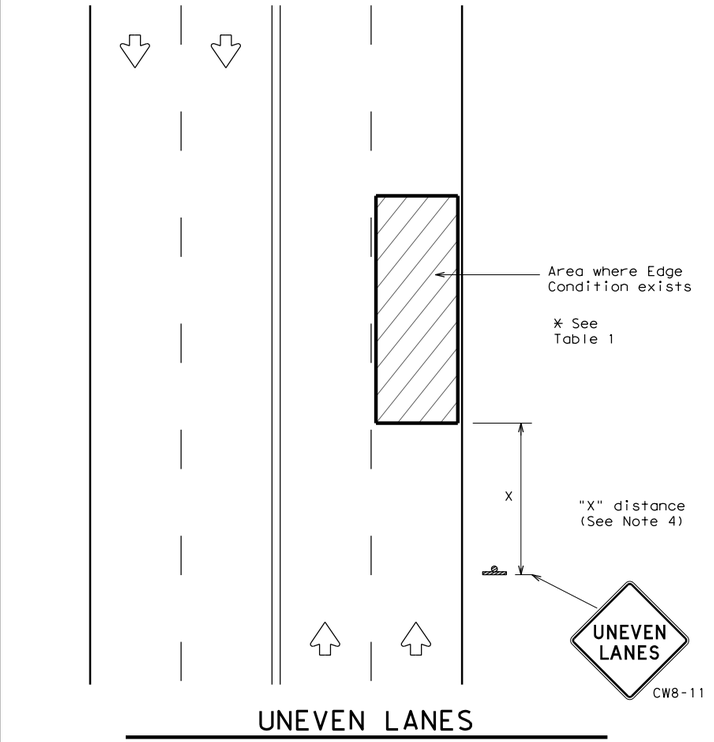
FILE: wzstpm-23.dgn	DN:	CK:	DW:	CK:
©TxDOT February 2023	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	030	FM 794
4-92 7-13	DIST	COUNTY		SHEET NO.
1-97 2-23	YKM	GONZALES		62
3-03				

DATE: 1/26/2024 $TIME$
FILE: $FILE$

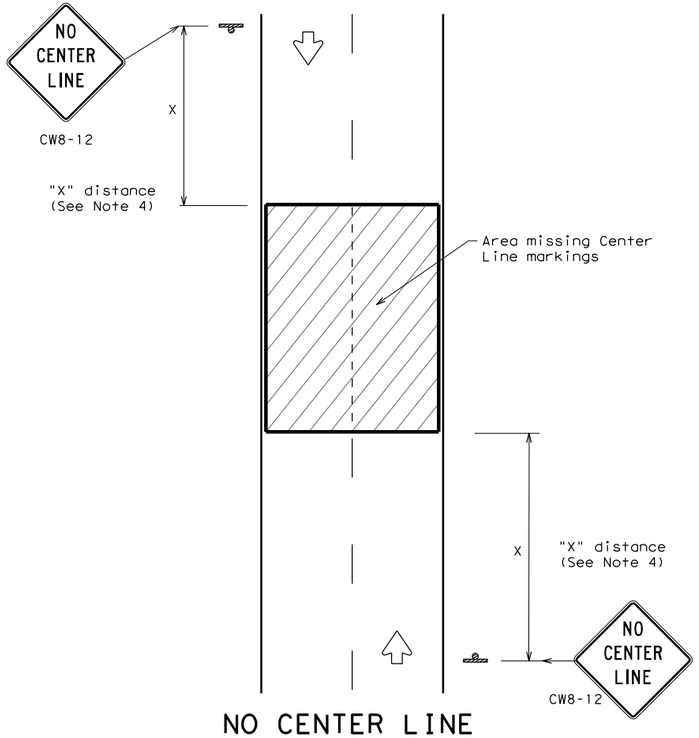
DATE: 1/26/2024 $TIME$
FILE: $FILE$



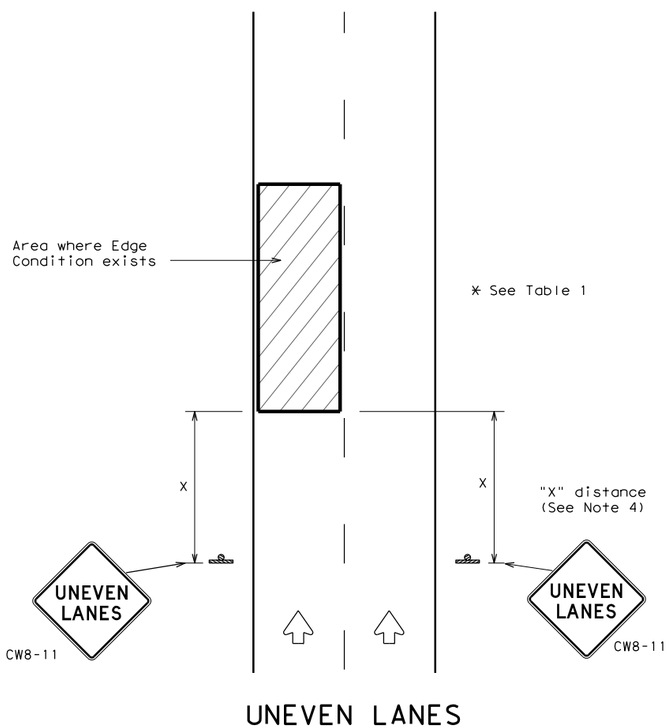
UNEVEN LANES
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
FOUR LANE CONVENTIONAL ROAD



NO CENTER LINE
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
DIVIDED ROADWAY

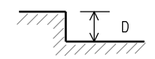
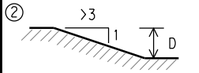
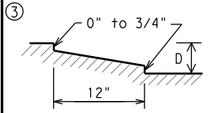
DEPARTMENTAL MATERIAL SPECIFICATIONS	
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240
TEMPORARY (REMOVABLE) PREFABRICATED PAVEMENT MARKINGS	DMS-8241
SIGN FACE MATERIALS	DMS-8300

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

GENERAL NOTES

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

TABLE 1

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

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

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

Texas Department of Transportation

Traffic Operations Division Standard

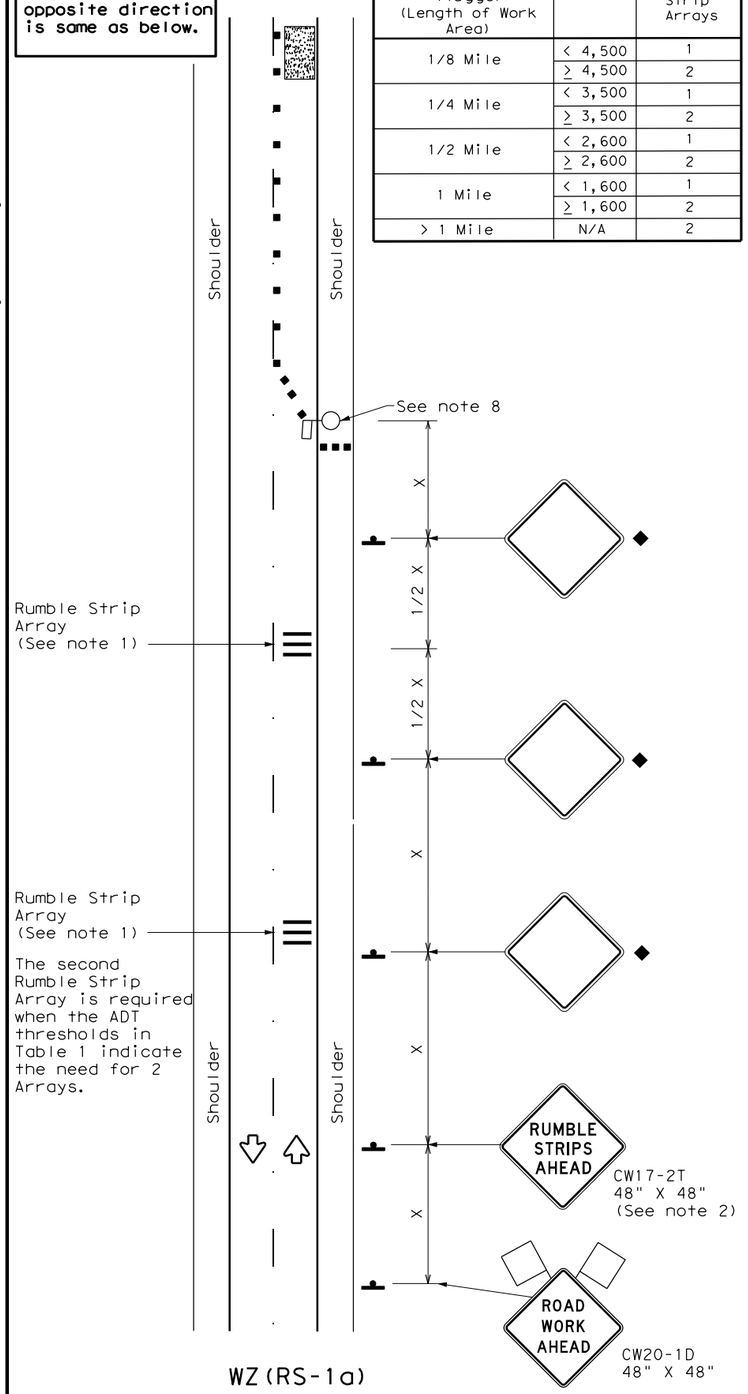
SIGNING FOR UNEVEN LANES

WZ(UL)-13

FILE: wzul-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 1992	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	030	FM 794
8-95 2-98 7-13	DIST	COUNTY		SHEET NO.
1-97 3-03	YKM	GONZALES		63

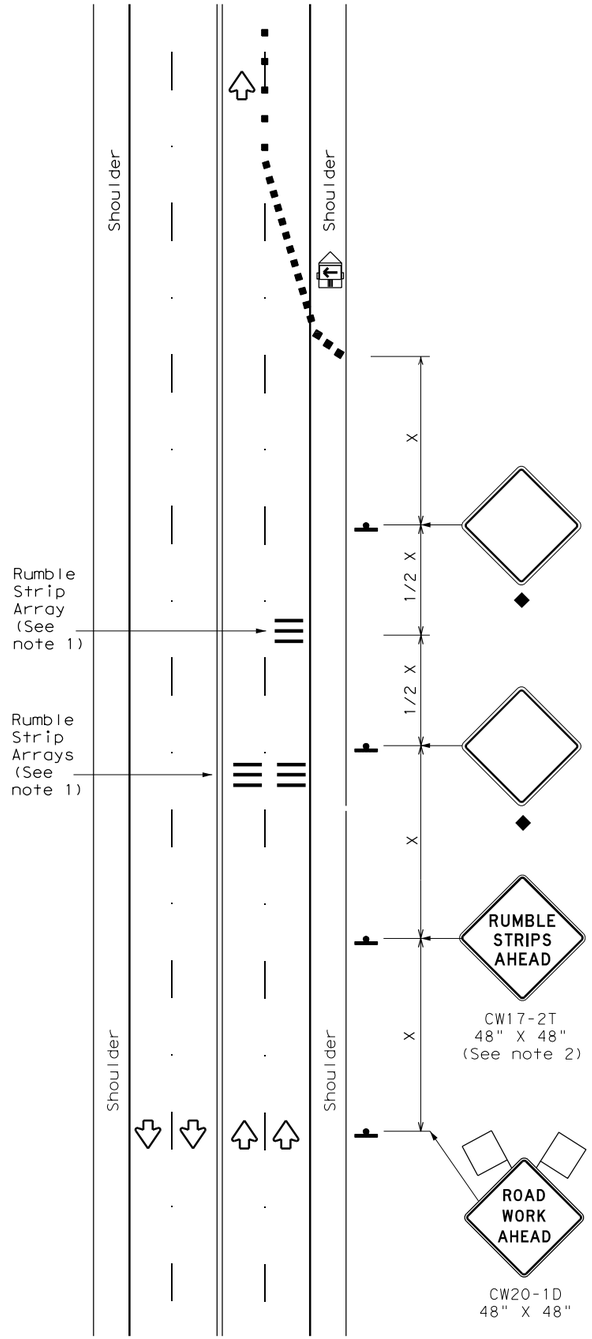
Warning sign and rumble strip sequence in opposite direction is same as below.

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



WZ(RS-1a)

RUMBLE STRIPS ON ONE-LANE TWO-WAY APPLICATION



WZ(RS-1b)

RUMBLE STRIPS FOR LANE CLOSURE ON CONVENTIONAL ROADWAY

GENERAL NOTES

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

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

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

* Conventional Roads Only

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

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

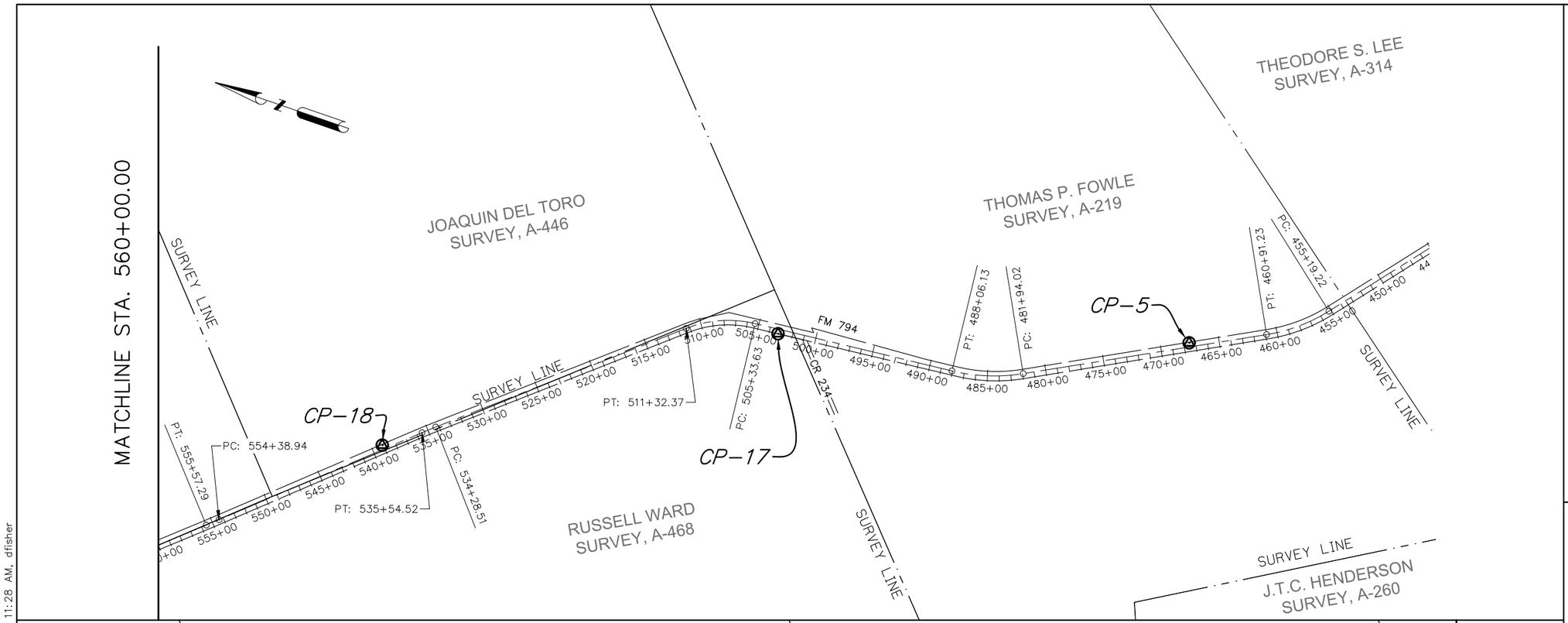
TEMPORARY RUMBLE STRIPS

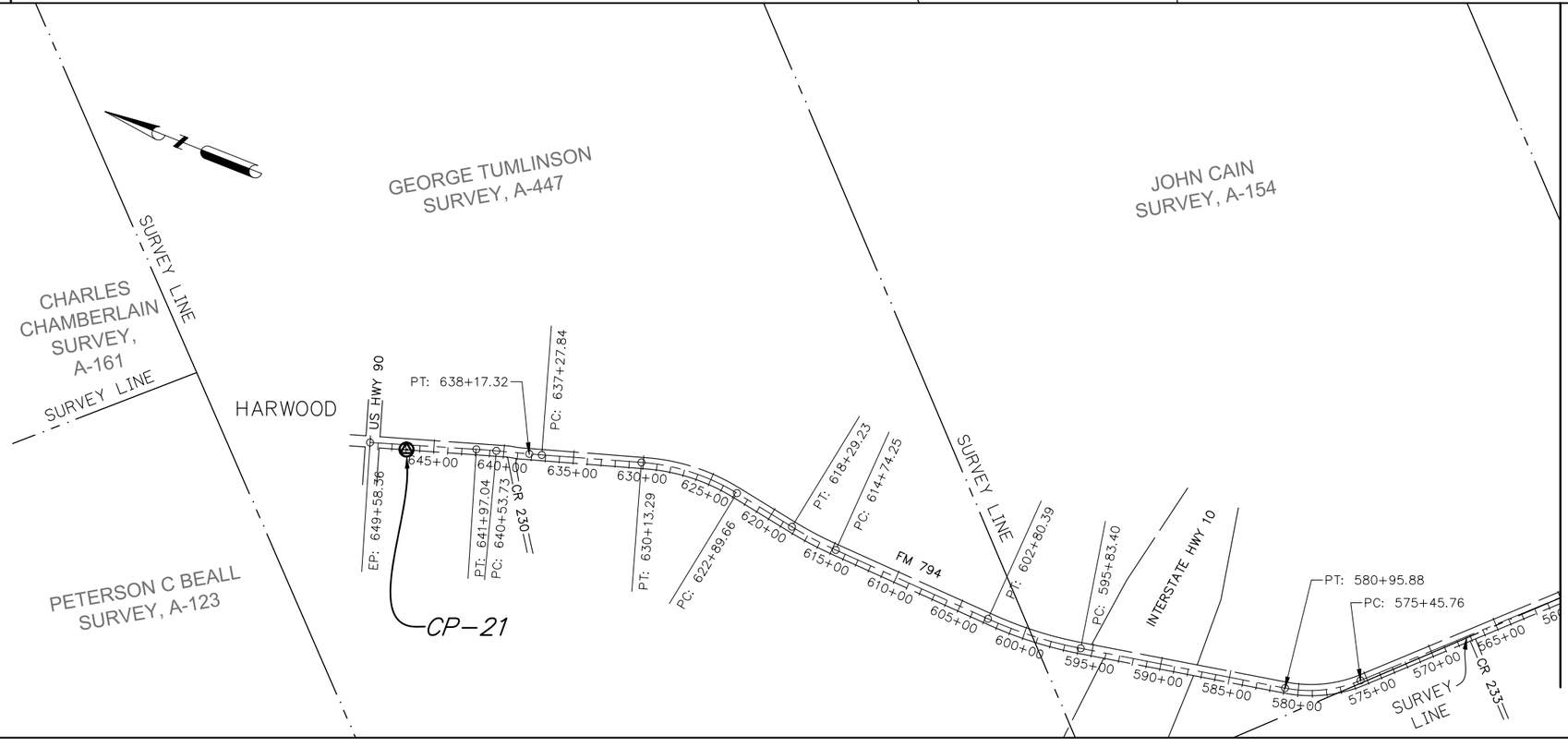
WZ(RS)-22

FILE: wzrs22.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-14 1-22 4-16	1133	02	030	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		64

117

DATE: 1/26/2024 $TIME$
FILE: $FILE$





GENERAL NOTES

1. ALL BEARINGS AND COORDINATES ARE REFERENCED TO THE TEXAS STATE PLANE COORDINATE SYSTEM OF 1983, TEXAS SOUTH CENTRAL ZONE 4204, NAD 83 (2011 ADJ.; EPOCK 2010.00) GEOID 12B, AND NAVD 88. ALL DISTANCES AND COORDINATES ARE SURFACE VALUES AND MAY BE CONVERTED TO GRID BY DIVIDING BY THE TXDOT COUNTYWIDE SURFACE ADJUSTMENT FACTOR OF 1.00013 (GONZALES COUNTY).
2. ALL PROJECT CONTROL ELEVATIONS ARE NAVD88 BASED ON GPS OBSERVATIONS USING THE TXDOT VRS SYSTEM. DIGITAL LEVEL LOOPS WERE RUN BETWEEN ALL CONTROL POINTS TO HOLD AN ELEVATION OF 389.56 ON CONTROL POINT 5.
3. ALL MEASUREMENTS ARE IN U.S. SURVEY FEET.
4. LAT/LONG GENERATED FROM GRID COORDINATES.
5. THE SURVEY CONTROL INFORMATION HAS BEEN ACCEPTED AND INCORPORATED INTO THIS PS&E.

STATE OF TEXAS
REGISTERED
JONATHAN O. NOBLES
5777
PROFESSIONAL
LAND SURVEYOR

REVISED
8/12/2022

JONATHAN O. NOBLES RPLS NO. 5777
BGE, INC.
101 WEST LOUIS HENNA BLVD., SUITE 400
AUSTIN, TEXAS 78728
TELEPHONE: (512) 879-0400

Texas Department of Transportation

BGE, Inc.
1701 Directors Blvd., Suite 1000, Austin, TX 78744
Tel: 512-879-0400 • www.bgeinc.com
TBPE Registration No. F-1046

FM 794

SURVEY CONTROL INDEX

SHEET 1 OF 2

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			65
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794

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CONTROL BEARING TABLE			
FROM	TO	BEARING	DISTANCE
CP–5	CP–17	N 17°42'56" W	3,507.91'
CP–17	CP–18	N 34°42'02" W	3,507.77'
CP–18	CP–21	N 17°49'08" W	10,158.33'

POINT TABLE						
POINT NO.	NORTHING	EASTING	ELEVATION	STATION	OFFSET	DESCRIPTION
5	13,778,409.765	2,449,685.745	389.56'	467+54.78	35.08' RT	1/2" IRON ROD W/ "BGE TRAV" CAP IN CONCRETE
17	13,781,751.330	2,448,618.316	414.37'	503+22.97	38.49' LT	1/2" IRON ROD W/ "BGE TRAV" CAP IN CONCRETE
18	13,784,635.202	2,446,621.393	395.52'	539+08.77	35.91' RT	1/2" IRON ROD W/ "BGE TRAV" CAP IN CONCRETE
21	13,794,306.227	2,443,512.871	459.30'	646+95.08	33.81' LT	1/2" IRON ROD W/ "BGE TRAV" CAP IN CONCRETE

POINT TABLE (GRID/GEODETIC)				
POINT NO.	NORTHING	EASTING	LATITUDE	LONGITUDE
5	13,776,618.805	2,449,367.327	N29°37'17.29"	W97°29'11.10"
17	13,779,959.935	2,448,300.037	N29°37'50.50"	W97°29'22.71"
18	13,782,843.432	2,446,303.374	N29°38'19.30"	W97°29'44.91"
21	13,792,513.200	2,443,195.256	N29°39'55.42"	W97°30'18.73"

GENERAL NOTES

1. ALL BEARINGS AND COORDINATES ARE REFERENCED TO THE TEXAS STATE PLANE COORDINATE SYSTEM OF 1983, TEXAS SOUTH CENTRAL ZONE 4204, NAD 83 (2011 ADJ.; EPOCK 2010.00) GEOID 12B, AND NAVD 88. ALL DISTANCES AND COORDINATES ARE SURFACE VALUES AND MAY BE CONVERTED TO GRID BY DIVIDING BY THE TXDOT COUNTYWIDE SURFACE ADJUSTMENT FACTOR OF 1.00013 (GONZALES COUNTY).
2. ALL PROJECT CONTROL ELEVATIONS ARE NAVD88 BASED ON GPS OBSERVATIONS USING THE TXDOT VRS SYSTEM. DIGITAL LEVEL LOOPS WERE RUN BETWEEN ALL CONTROL POINTS TO HOLD AN ELEVATION OF 389.56 ON CONTROL POINT 5.
3. ALL MEASUREMENTS ARE IN U.S. SURVEY FEET.
4. LAT/LONG GENERATED FROM GRID COORDINATES.
5. THE SURVEY CONTROL INFORMATION HAS BEEN ACCEPTED AND INCORPORATED INTO THIS PS&E.

STATE OF TEXAS
REGISTERED
JONATHAN O. NOBLES
5777
PROFESSIONAL
LAND SURVEYOR

REVISED
8/12/2022

JONATHAN O. NOBLES RPLS NO. 5777
BGE, INC.
101 WEST LOUIS HENNA BLVD., SUITE 400
AUSTIN, TEXAS 78728
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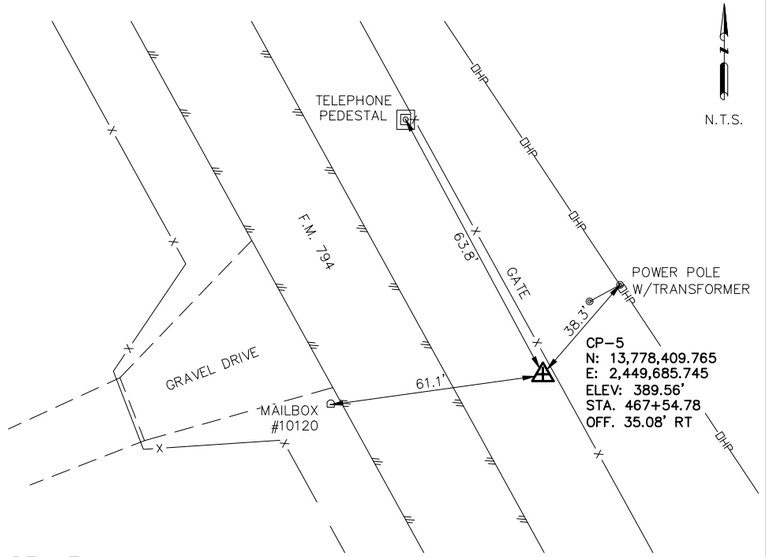
1701 Directors Blvd., Suite 1000, Austin, TX 78744
Tel: 512-879-0400 • www.bgeinc.com
TBPE Registration No. F-1046

FM 794

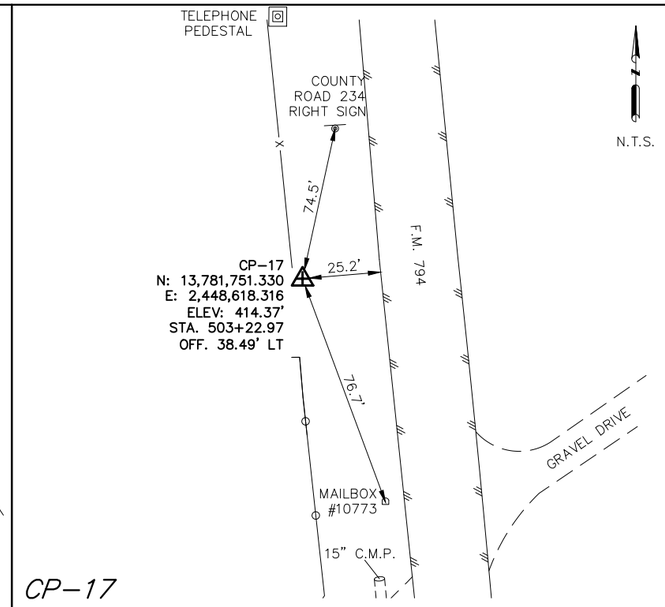
SURVEY CONTROL INDEX

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			66
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794



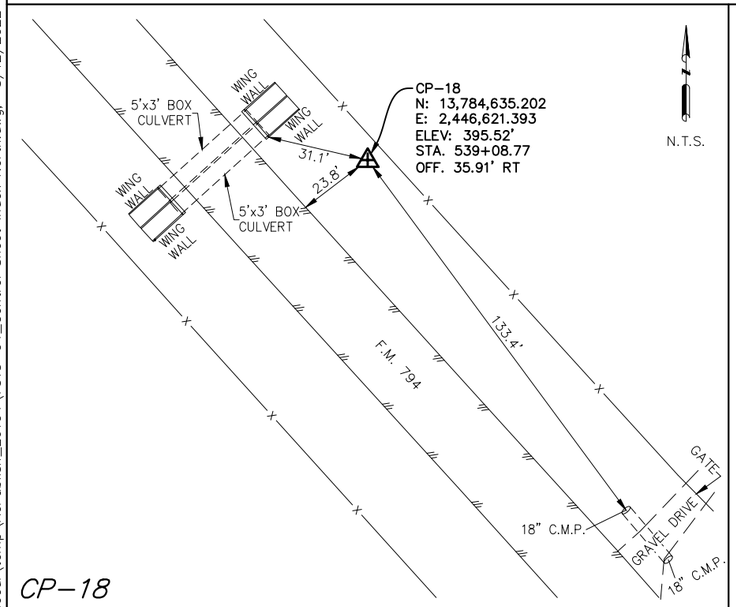
CP-5

SET 1/2-INCH IRON ROD WITH PLASTIC CAP STAMPED "BGE TRAV" IN CONCRETE ON THE NORTHEAST SIDE OF F.M. 794, APPROXIMATELY 3,310 FEET SOUTH OF THE INTERSECTION WITH COUNTY ROAD 234, BEING 61.1 FEET EAST OF MAILBOX #10120, 38.3 FEET SOUTHWEST OF A POWER POLE WITH TRANSFORMER, AND 63.8 FEET SOUTHEAST OF A TELEPHONE PEDESTAL.
(ESTABLISHED 06/01/2020)



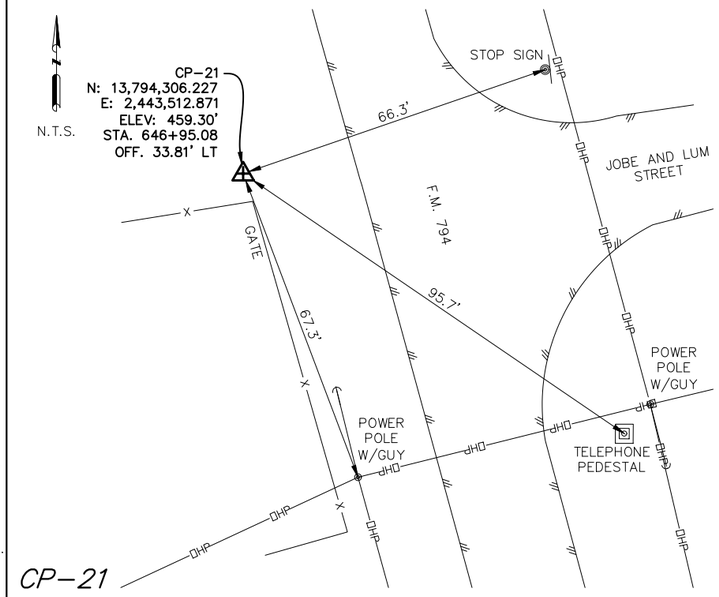
CP-17

SET 1/2-INCH IRON ROD WITH PLASTIC CAP STAMPED "BGE TRAV" IN CONCRETE ON THE WEST SIDE OF F.M. 794, APPROXIMATELY 243 FEET NORTH OF THE INTERSECTION WITH COUNTY ROAD 234, BEING 76.7 FEET NORTHWEST OF MAILBOX #10773, 74.5 FEET SOUTHWEST OF A COUNTY ROAD 234 RIGHT SIGN, AND 25.2 FEET WEST OF THE EDGE OF ASPHALT OF F.M. 794.
(ESTABLISHED 07/21/2020)



CP-18

SET 1/2-INCH IRON ROD WITH PLASTIC CAP STAMPED "BGE TRAV" IN CONCRETE ON THE NORTHEAST SIDE OF F.M. 794, APPROXIMATELY 2,790 FEET SOUTHEAST OF THE INTERSECTION WITH COUNTY ROAD 233, BEING 133.4 FEET NORTHWEST OF AN 18-INCH C.M.P., 23.8 FEET NORTHEAST OF THE EDGE OF ASPHALT OF F.M. 794, AND 31.1 FEET SOUTHEAST OF A CONCRETE HEADWALL.
(ESTABLISHED 07/21/2020)



CP-21

SET 1/2-INCH IRON ROD WITH PLASTIC CAP STAMPED "BGE TRAV" IN CONCRETE ON THE WEST SIDE OF F.M. 794, APPROXIMATELY 243 FEET SOUTH OF THE INTERSECTION WITH U.S. HIGHWAY 90, BEING 66.3 FEET WEST OF A STOP SIGN, 95.7 FEET NORTHWEST OF A TELEPHONE PEDESTAL, AND 67.3 FEET NORTH OF A POWER POLE WITH GUY ANCHOR.
(ESTABLISHED 07/22/2020)

LEGEND

C.M.P.	CORRUGATED METAL PIPE
N.T.S.	NOT TO SCALE
⚠	CONTROL POINT
▫	MAILBOX
⊡	TELEPHONE PEDESTAL
	SIGN
	POWER POLE
	GUY ANCHOR
	EDGE OF ASPHALT
DHP	OVERHEAD POWER
X	BARBED WIRE FENCE

GENERAL NOTES

1. ALL BEARINGS AND COORDINATES ARE REFERENCED TO THE TEXAS STATE PLANE COORDINATE SYSTEM OF 1983, TEXAS SOUTH CENTRAL ZONE 4204, NAD 83 (2011 ADJ.; EPOCK 2010.00) GEOID 12B, AND NAVD 88. ALL DISTANCES AND COORDINATES ARE SURFACE VALUES AND MAY BE CONVERTED TO GRID BY DIVIDING BY THE TXDOT COUNTYWIDE SURFACE ADJUSTMENT FACTOR OF 1.00013 (GONZALES COUNTY).
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3. ALL MEASUREMENTS ARE IN U.S. SURVEY FEET.
4. LAT/LONG GENERATED FROM GRID COORDINATES.
5. THE SURVEY CONTROL INFORMATION HAS BEEN ACCEPTED AND INCORPORATED INTO THIS PS&E.

STATE OF TEXAS
REGISTERED
JONATHAN O. NOBLES
5777
PROFESSIONAL
LAND SURVEYOR

REVISED
8/12/2022

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Texas Department of Transportation

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TBPE Registration No. F-1046

FM 794

HORIZONTAL AND VERTICAL CONTROL

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			67
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794

Horizontal Alignment Review Report

Project: FM 794

Note: All units in this report are in feet unless specified otherwise.

Alignment Name: FM794CL
Alignment Description:
Alignment Style: Alignment\Baseline

		Station	Northing	Easting
Element: Linear				
POT	( )	436+88.400 R1	13776218.11	2451752.38
PC	( )	455+19.216 R1	13777369.83	2450329.202
	Tangential Direction:	N51°01'05.606"W		
	Tangential Length:	1830.816		
Element: Circular				
PC	( )	455+19.216 R1	13777369.83	2450329.202
PI	( )	458+09.101 R1	13777552.19	2450103.861
CC	( )		13778481.44	2451228.776
PT	( )	460+91.235 R1	13777807.91	2449967.325
	Radius:	1430		
	Delta:	22°55'08.613" Right		
	Degree of Curvature (Arc):	04°00'24.112"		
	Length:	572.019		
	Tangent:	289.885		
	Chord:	568.213		
	Middle Ordinate:	28.507		
	External:	29.086		
	Back Tangent Direction:	N51°01'05.606"W		
	Back Radial Direction:	N38°58'54.394"E		
	Chord Direction:	N39°33'31.299"W		
	Ahead Radial Direction:	N61°54'03.008"E		
	Ahead Tangent Direction:	N28°05'56.992"W		
Element: Linear				
PT	( )	460+91.235 R1	13777807.91	2449967.325
PC	( )	481+94.020 R1	13779662.85	2448976.915
	Tangential Direction:	N28°05'56.992"W		
	Tangential Length:	2102.785		
Element: Circular				
PC	( )	481+94.020 R1	13779662.85	2448976.915
PI	( )	485+04.115 R1	13779936.39	2448830.861
CC	( )		13780392.89	2450344.222
PT	( )	488+06.129 R1	13780245.07	2448801.287
	Radius:	1550		
	Delta:	22°37'35.849" Right		
	Degree of Curvature (Arc):	03°41'47.407"		
	Length:	612.109		
	Tangent:	310.095		
	Chord:	608.139		
	Middle Ordinate:	30.118		
	External:	30.715		
	Back Tangent Direction:	N28°05'56.992"W		
	Back Radial Direction:	N61°54'03.008"E		
	Chord Direction:	N16°47'09.068"W		
	Ahead Radial Direction:	N84°31'38.857"E		
	Ahead Tangent Direction:	N05°28'21.143"W		
Element: Linear				
PT	( )	488+06.129 R1	13780245.07	2448801.287
PC	( )	505+33.626 R1	13781964.7	2448636.538
	Tangential Direction:	N05°28'21.143"W		
	Tangential Length:	1727.497		
Element: Circular				
PC	( )	505+33.626 R1	13781964.7	2448636.538
PI	( )	508+42.671 R1	13782272.33	2448607.065
CC	( )		13781871.23	2447661.005
PT	( )	511+32.368 R1	13782507.41	2448406.447
	Radius:	980		
	Delta:	35°00'19.845" Left		
	Degree of Curvature (Arc):	05°50'47.429"		
	Length:	598.742		
	Tangent:	309.045		
	Chord:	589.473		
	Middle Ordinate:	45.372		
	External:	47.574		
	Back Tangent Direction:	N05°28'21.143"W		
	Back Radial Direction:	N84°31'38.857"E		
	Chord Direction:	N22°58'31.066"W		
	Ahead Radial Direction:	N49°31'19.012"E		
	Ahead Tangent Direction:	N40°28'40.988"W		
Element: Linear				
PT	( )	511+32.368 R1	13782507.41	2448406.447
PC	( )	534+28.509 R1	13784253.98	2446915.892
	Tangential Direction:	N40°28'40.988"W		
	Tangential Length:	2296.141		
Element: Circular				
PC	( )	534+28.509 R1	13784253.98	2446915.892
PI	( )	534+91.519 R1	13784301.91	2446874.988
CC	( )		13781508.05	2443698.322
PT	( )	535+54.520 R1	13784348.6	2446832.675
	Radius:	4230		
	Delta:	01°42'24.601" Left		
	Degree of Curvature (Arc):	01°21'16.237"		
	Length:	126.011		
	Tangent:	63.01		
	Chord:	126.006		
	Middle Ordinate:	0.469		
	External:	0.469		
	Back Tangent Direction:	N40°28'40.988"W		
	Back Radial Direction:	N49°31'19.012"E		
	Chord Direction:	N41°19'53.289"W		
	Ahead Radial Direction:	N47°48'54.411"E		
	Ahead Tangent Direction:	N42°11'05.589"W		

Horizontal Alignment Review Report

Project: FM 794

Note: All units in this report are in feet unless specified otherwise.

Alignment Name: FM794CL
Alignment Description:
Alignment Style: Alignment\Baseline

		Station	Northing	Easting
Element: Linear				
PT	( )	535+54.520 R1	13784348.6	2446832.675
PC	( )	554+38.937 R1	13785744.92	2445567.242
	Tangential Direction:	N42°11'05.589"W		
	Tangential Length:	1884.417		
Element: Circular				
PC	( )	554+38.937 R1	13785744.92	2445567.242
PI	( )	554+98.115 R1	13785788.77	2445527.502
CC	( )		13792460.17	2452977.06
PT	( )	555+57.293 R1	13785833.08	2445488.284
	Radius:	10000		
	Delta:	00°40'41.268" Right		
	Degree of Curvature (Arc):	00°34'22.648"		
	Length:	118.356		
	Tangent:	59.179		
	Chord:	118.355		
	Middle Ordinate:	0.175		
	External:	0.175		
	Back Tangent Direction:	N42°11'05.589"W		
	Back Radial Direction:	N47°48'54.411"E		
	Chord Direction:	N41°50'44.955"W		
	Ahead Radial Direction:	N48°29'35.678"E		
	Ahead Tangent Direction:	N41°30'24.322"W		
Element: Linear				
PT	( )	555+57.293 R1	13785833.08	2445488.284
PC	( )	575+45.761 R1	13787322.2	2444170.509
	Tangential Direction:	N41°30'24.322"W		
	Tangential Length:	1988.468		
Element: Circular				
PC	( )	575+45.761 R1	13787322.2	2444170.509
PI	( )	578+28.947 R1	13787534.27	2443982.839
CC	( )		13787945.15	2444874.454
PT	( )	580+95.876 R1	13787814.72	2443943.547
	Radius:	940		
	Delta:	33°31'52.069" Right		
	Degree of Curvature (Arc):	06°05'43.064"		
	Length:	550.115		
	Tangent:	283.186		
	Chord:	542.298		
	Middle Ordinate:	39.957		
	External:	41.73		
	Back Tangent Direction:	N41°30'24.322"W		
	Back Radial Direction:	N48°29'35.678"E		
	Chord Direction:	N24°44'28.287"W		
	Ahead Radial Direction:	N82°01'27.748"E		
	Ahead Tangent Direction:	N07°58'32.252"W		
Element: Linear				
PT	( )	580+95.876 R1	13787814.72	2443943.547
PC	( )	595+83.397 R1	13789287.85	2443737.15
	Tangential Direction:	N07°58'32.252"W		
	Tangential Length:	1487.522		
Element: Circular				
PC	( )	595+83.397 R1	13789287.85	2443737.15
PI	( )	599+33.472 R1	13789634.54	2443688.577
CC	( )		13789704.11	2446708.132
PT	( )	602+80.394 R1	13789983.1	2443721.133
	Radius:	3000		
	Delta:	13°18'41.946" Right		
	Degree of Curvature (Arc):	01°54'35.494"		
	Length:	696.996		
	Tangent:	350.074		
	Chord:	695.43		
	Middle Ordinate:	20.219		
	External:	20.356		
	Back Tangent Direction:	N07°58'32.252"W		
	Back Radial Direction:	N82°01'27.748"E		
	Chord Direction:	N01°19'11.279"W		
	Ahead Radial Direction:	S84°39'50.306"E		
	Ahead Tangent Direction:	N05°20'09.694"E		

STATE OF TEXAS
AMANDA ANDERLE FLING
105989
LICENSED
PROFESSIONAL ENGINEER

Amanda Anderle Fling, P.E.

01/27/2024

HORIZONTAL ALIGNMENT DATA

Texas Department of Transportation

FED.RD. DIV.NO.		PROJECT NO.	
6			
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	68

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DATE: 1/27/2024

Horizontal Alignment Review Report

Project: FM 794

Note: All units in this report are in feet unless specified otherwise.

Alignment Name: FM794CL
Alignment Description:
Alignment Style: Alignment\Baseline

		Station	Northing	Easting
Element: Linear				
PT	( )	602+80.394 R1	13789983.1	2443721.133
PC	( )	614+74.251 R1	13791171.78	2443832.157
	Tangential Direction:	N05°20'09.694"E		
	Tangential Length:	1193.857		
Element: Circular				
PC	( )	614+74.251 R1	13791171.78	2443832.157
PI	( )	616+51.972 R1	13791348.73	2443848.685
CC	( )		13790906.74	2446669.807
PT	( )	618+29.233 R1	13791522.26	2443887.068
	Radius:	2850		
	Delta:	07°08'11.389" Right		
	Degree of Curvature (Arc):	02°00'37.362"		
	Length:	354.983		
	Tangent:	177.721		
	Chord:	354.753		
	Middle Ordinate:	5.525		
	External:	5.536		
	Back Tangent Direction:	N05°20'09.694"E		
	Back Radial Direction:	S84°39'50.306"E		
	Chord Direction:	N08°54'15.388"E		
	Ahead Radial Direction:	S77°31'38.917"E		
	Ahead Tangent Direction:	N12°28'21.083"E		
Element: Linear				
PT	( )	618+29.233 R1	13791522.26	2443887.068
PC	( )	622+89.663 R1	13791971.82	2443986.507
	Tangential Direction:	N12°28'21.083"E		
	Tangential Length:	460.43		
Element: Circular				
PC	( )	622+89.663 R1	13791971.82	2443986.507
PI	( )	626+58.421 R1	13792331.88	2444066.148
CC	( )		13792301.18	2442497.498
PT	( )	630+13.288 R1	13792688.54	2443972.481
	Radius:	1525		
	Delta:	27°11'14.353" Left		
	Degree of Curvature (Arc):	03°45'25.561"		
	Length:	723.625		
	Tangent:	368.758		
	Chord:	716.855		
	Middle Ordinate:	42.72		
	External:	43.951		
	Back Tangent Direction:	N12°28'21.083"E		
	Back Radial Direction:	S77°31'38.917"E		
	Chord Direction:	N01°07'16.094"W		
	Ahead Radial Direction:	N75°17'06.729"E		
	Ahead Tangent Direction:	N14°42'53.271"W		
Element: Linear				
PT	( )	630+13.288 R1	13792688.54	2443972.481
PC	( )	637+27.836 R1	13793379.66	2443790.98
	Tangential Direction:	N14°42'53.271"W		
	Tangential Length:	714.548		
Element: Circular				
PC	( )	637+27.836 R1	13793379.66	2443790.98
PI	( )	637+72.581 R1	13793422.93	2443779.615
CC	( )		13794708.12	2448849.448
PT	( )	638+17.324 R1	13793466.4	2443768.991
	Radius:	5230		
	Delta:	00°58'49.293" Right		
	Degree of Curvature (Arc):	01°05'43.878"		
	Length:	89.488		
	Tangent:	44.745		
	Chord:	89.487		
	Middle Ordinate:	0.191		
	External:	0.191		
	Back Tangent Direction:	N14°42'53.271"W		
	Back Radial Direction:	N75°17'06.729"E		
	Chord Direction:	N14°13'28.624"W		
	Ahead Radial Direction:	N76°15'56.022"E		
	Ahead Tangent Direction:	N13°44'03.978"W		

Horizontal Alignment Review Report

Project: FM 794

Note: All units in this report are in feet unless specified otherwise.

Alignment Name: FM794CL
Alignment Description:
Alignment Style: Alignment\Baseline

		Station	Northing	Easting
Element: Linear				
PT	( )	638+17.324 R1	13793466.4	2443768.991
PC	( )	640+53.734 R1	13793696.05	2443712.862
	Tangential Direction:	N13°44'03.978"W		
	Tangential Length:	236.41		
Element: Circular				
PC	( )	640+53.734 R1	13793696.05	2443712.862
PI	( )	641+25.392 R1	13793765.66	2443695.849
CC	( )		13792454.33	2438632.406
PT	( )	641+97.041 R1	13793834.77	2443676.935
	Radius:	5230		
	Delta:	01°34'11.838" Left		
	Degree of Curvature (Arc):	01°05'43.878"		
	Length:	143.307		
	Tangent:	71.658		
	Chord:	143.302		
	Middle Ordinate:	0.491		
	External:	0.491		
	Back Tangent Direction:	N13°44'03.978"W		
	Back Radial Direction:	N76°15'56.022"E		
	Chord Direction:	N14°31'09.897"W		
	Ahead Radial Direction:	N74°41'44.184"E		
	Ahead Tangent Direction:	N15°18'15.816"W		
Element: Linear				
PT	( )	641+97.041 R1	13793834.77	2443676.935
POT	( )	649+58.355 R1	13794569.09	2443475.988
	Tangential Direction:	N15°18'15.816"W		
	Tangential Length:	761.315		

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FILE: HORIZONTAL ALIGNMENT DATA.dgn
DATE: 1/27/2024

STATE OF TEXAS
AMANDA ANDERLE FLING
105989
LICENSED
PROFESSIONAL ENGINEER

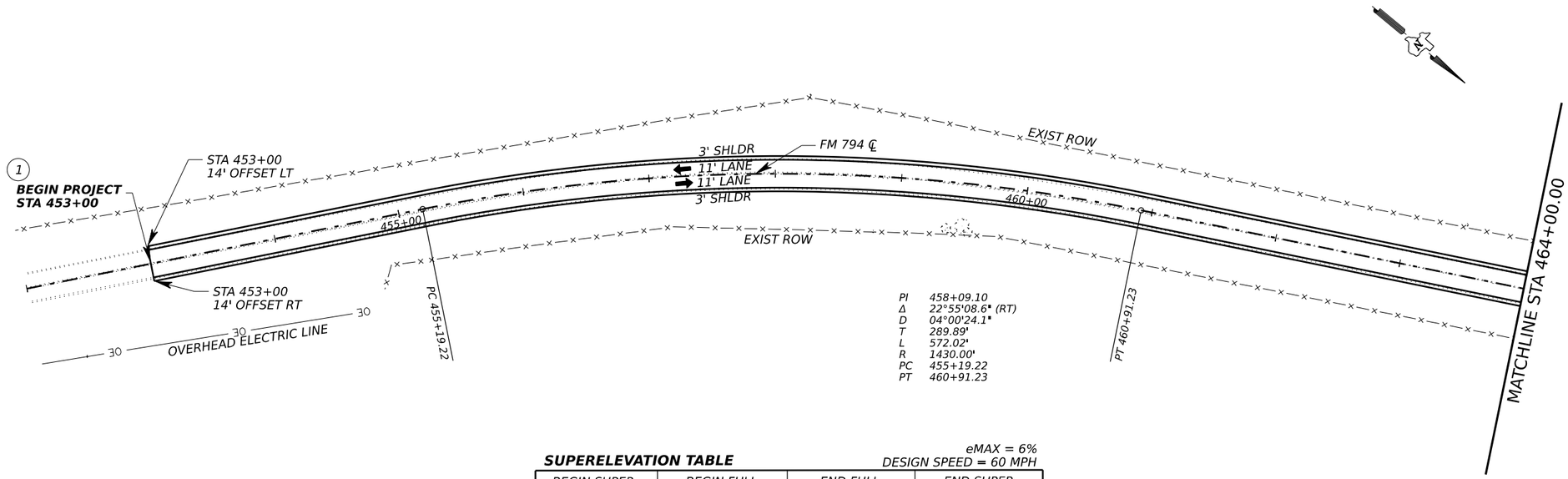
Amanda Anderle Fling, P.E.

01/27/2024

HORIZONTAL ALIGNMENT DATA

Texas Department of Transportation

FED.RD. DIV.NO.		PROJECT NO.	
6			
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	69



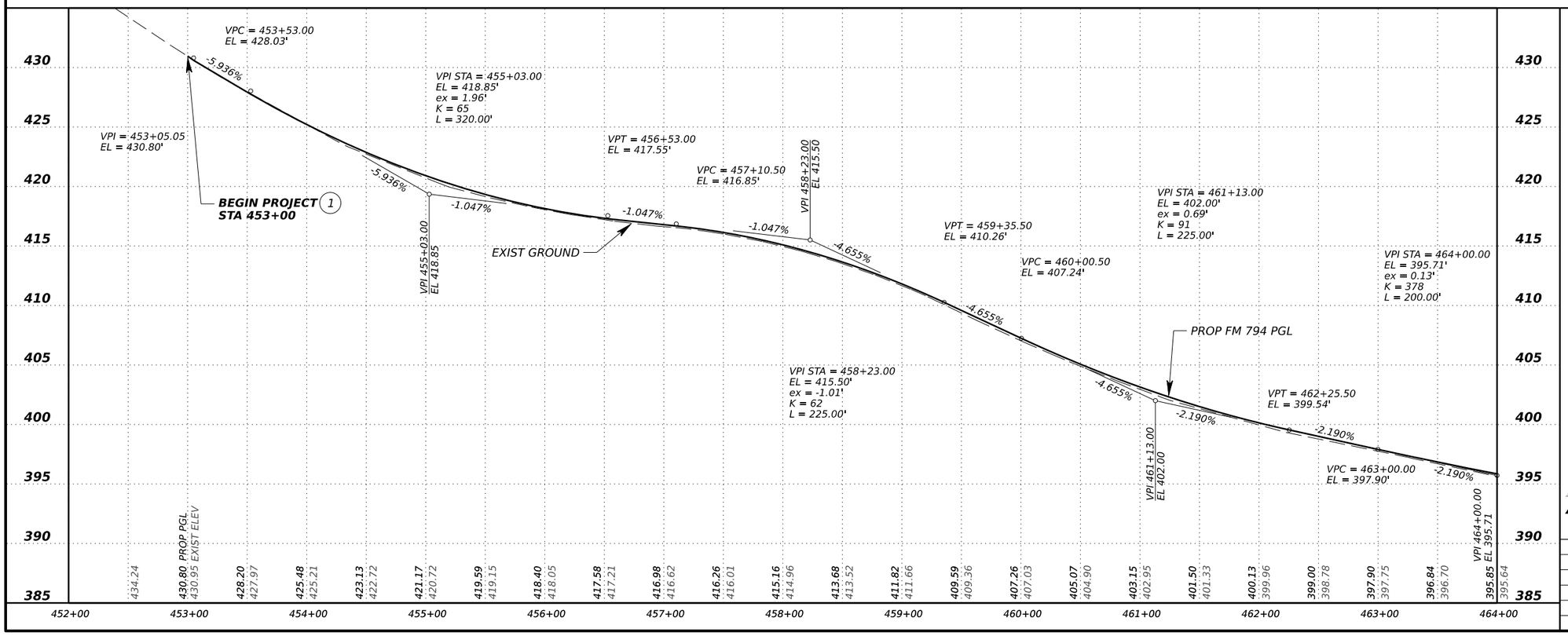
PI	458+09.10
Δ	22°55'08.6" (RT)
D	04°00'24.1"
T	289.89'
L	572.02'
R	1430.00'
PC	455+19.22
PT	460+91.23

1 MATCH EXISTING PAVEMENT CROSS SLOPE AND ELEVATION.

SUPERELEVATION TABLE

eMAX = 6%
DESIGN SPEED = 60 MPH

BEGIN SUPER TRANSITION	BEGIN FULL SUPER	END FULL SUPER	END SUPER TRANSITION
STA 453+85.00 LT LANE -2.0% RT LANE -2.0%	STA 455+75.00 LT LANE +5.9% RT LANE -5.9%	STA 460+35.00 LT LANE +5.9% RT LANE -5.9%	STA 462+25.00 LT LANE -2.0% RT LANE -2.0%



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DATE: 1/27/2024

STATE OF TEXAS
AMANDA ANDERLE FLING
105989
LICENSED PROFESSIONAL ENGINEER

Amanda Anderle Fling, P.E.

01/27/2024

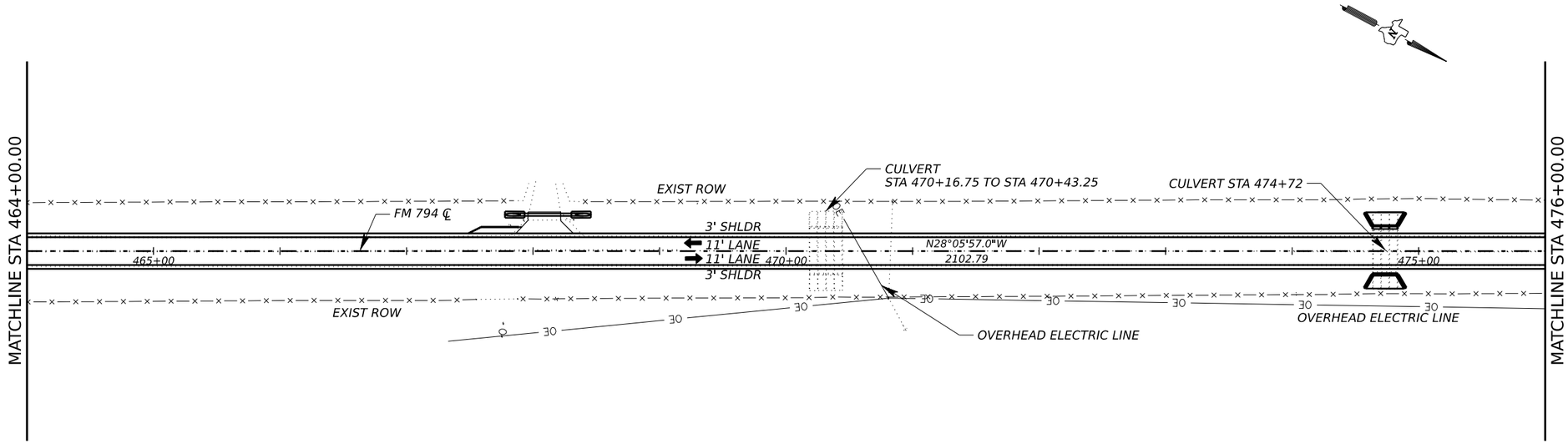
PLAN AND PROFILE

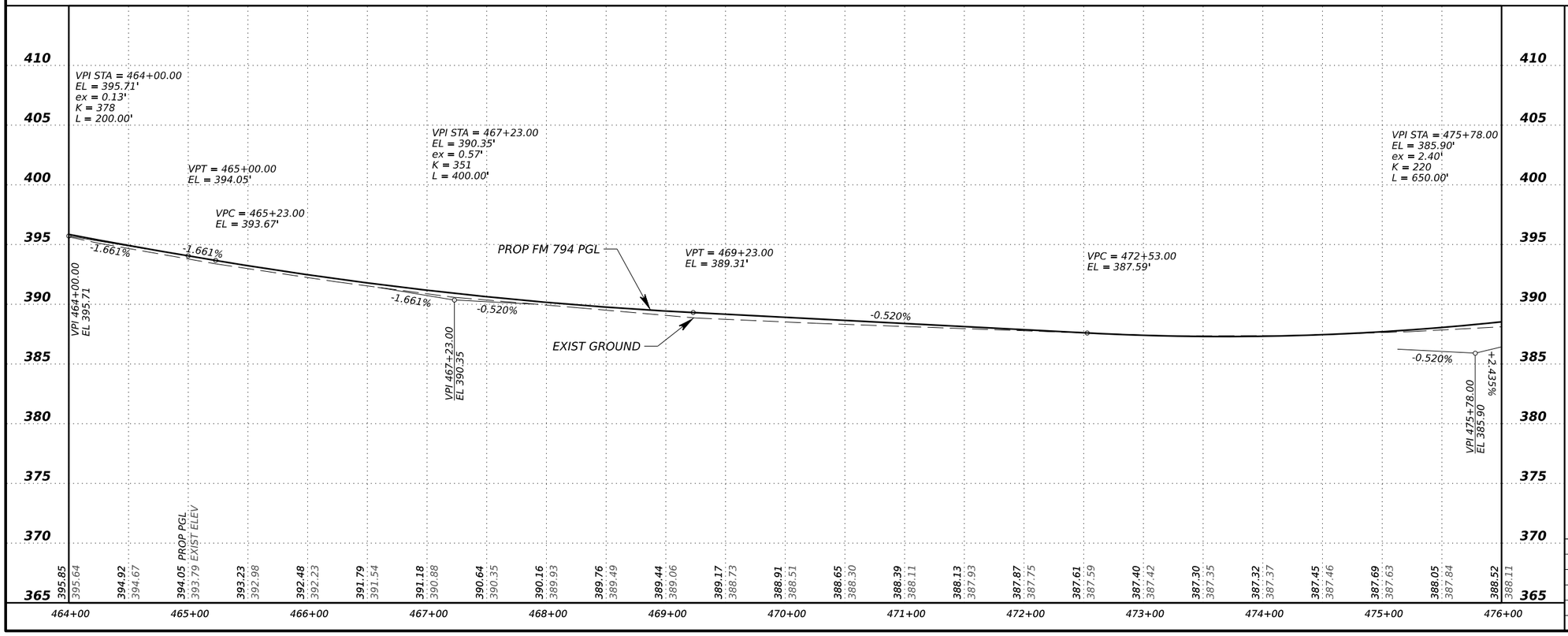
SCALE: HOR 1" = 100'
VER 1" = 10'

Texas Department of Transportation

SHEET 1 OF 17

FED.RD. DIV.NO.		PROJECT NO.	
6			
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	70





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FILE: FM794_PP_SHEET_2.dgn
DATE: 1/26/2024

STATE OF TEXAS
AMANDA ANDERLE FLING
105989
LICENSED
PROFESSIONAL ENGINEER

Amanda Anderle Fling, P.E.

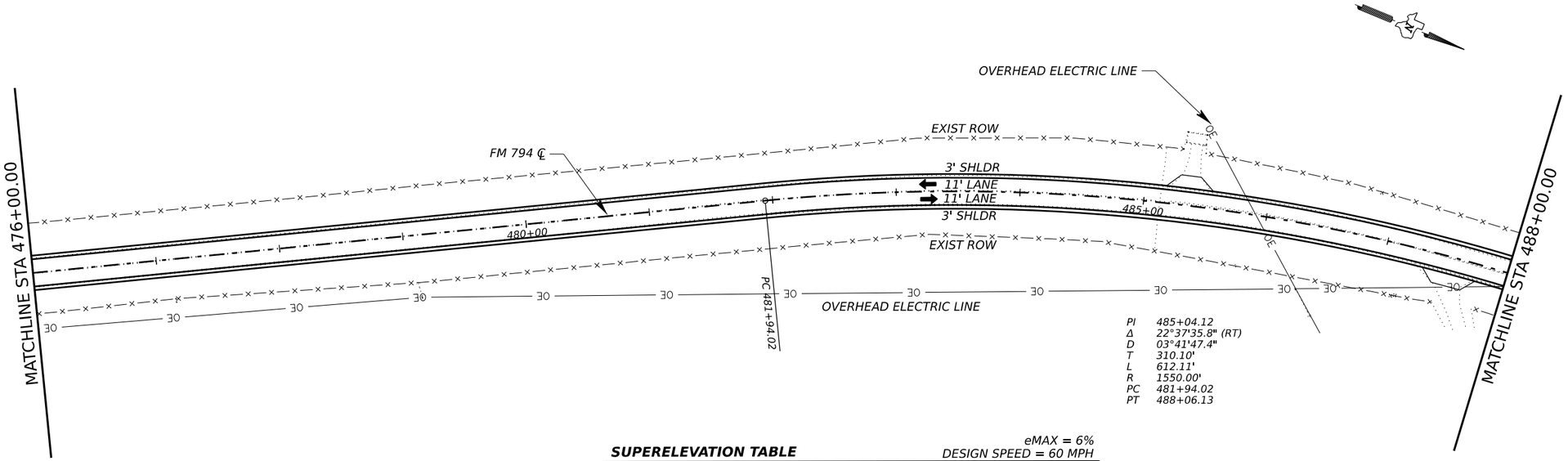
01/27/2024

PLAN AND PROFILE

SCALE: HOR 1" = 100'
VER 1" = 10'

Texas Department of Transportation

FED.RD. DIV.NO.		PROJECT NO.	
6			
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	71

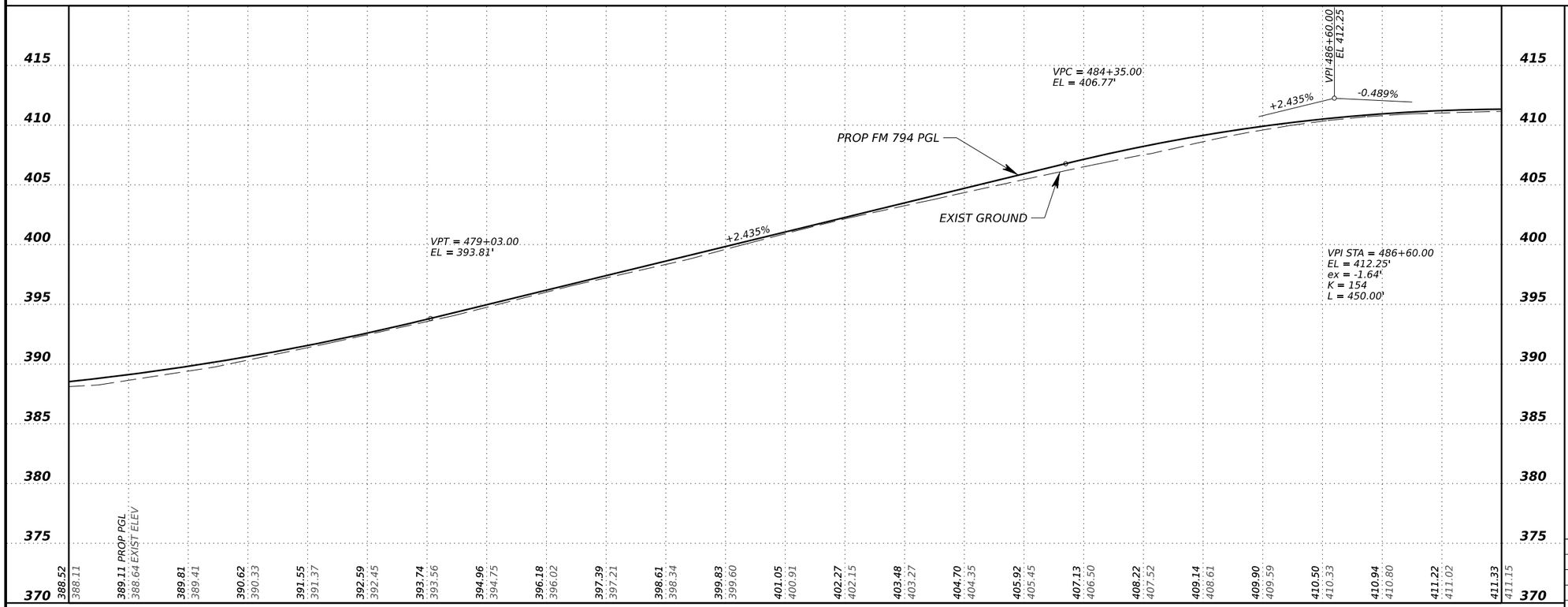


PI	485+04.12
Δ	22°37'35.8" (RT)
D	03°41'47.4"
T	310.10'
L	612.11'
R	1550.00'
PC	481+94.02
PT	488+06.13

SUPERELEVATION TABLE

eMAX = 6%
DESIGN SPEED = 60 MPH

BEGIN SUPER TRANSITION	BEGIN FULL SUPER	END FULL SUPER	END SUPER TRANSITION
STA 480+60.00 LT LANE -2.0% RT LANE -2.0%	STA 482+50.00 LT LANE +5.9% RT LANE -5.9%	STA 487+55.00 LT LANE +5.9% RT LANE -5.9%	STA 489+45.00 LT LANE -2.0% RT LANE -2.0%



STATE OF TEXAS
AMANDA ANDERLE FLING
105989
LICENSED
PROFESSIONAL ENGINEER
Amanda Anderle Fling, P.E.

01/27/2024

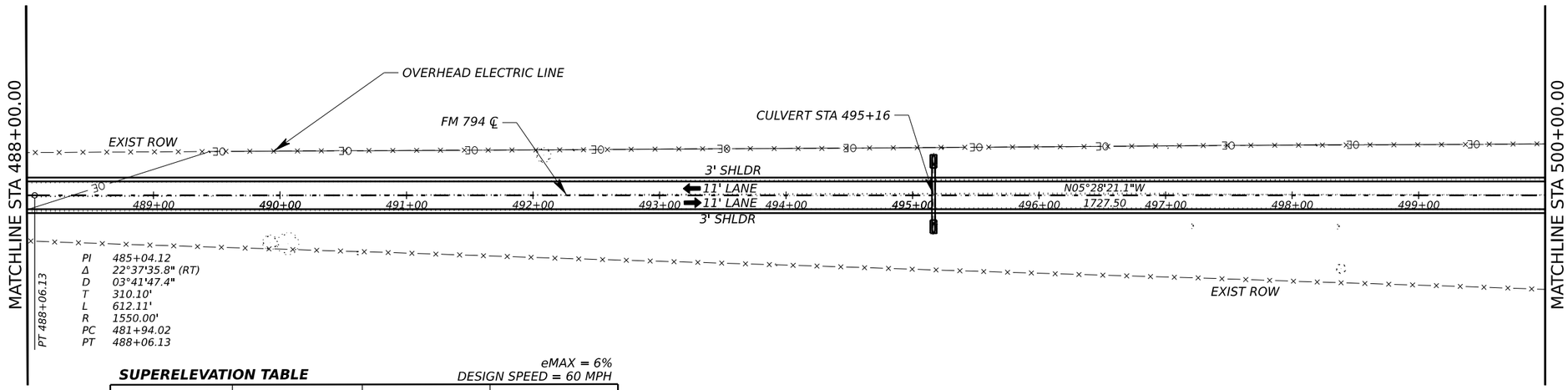
PLAN AND PROFILE

SCALE: HOR 1" = 100'
VER 1" = 10'

Texas Department of Transportation

FED.RD. DIV.NO.		PROJECT NO.	
6			
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	72

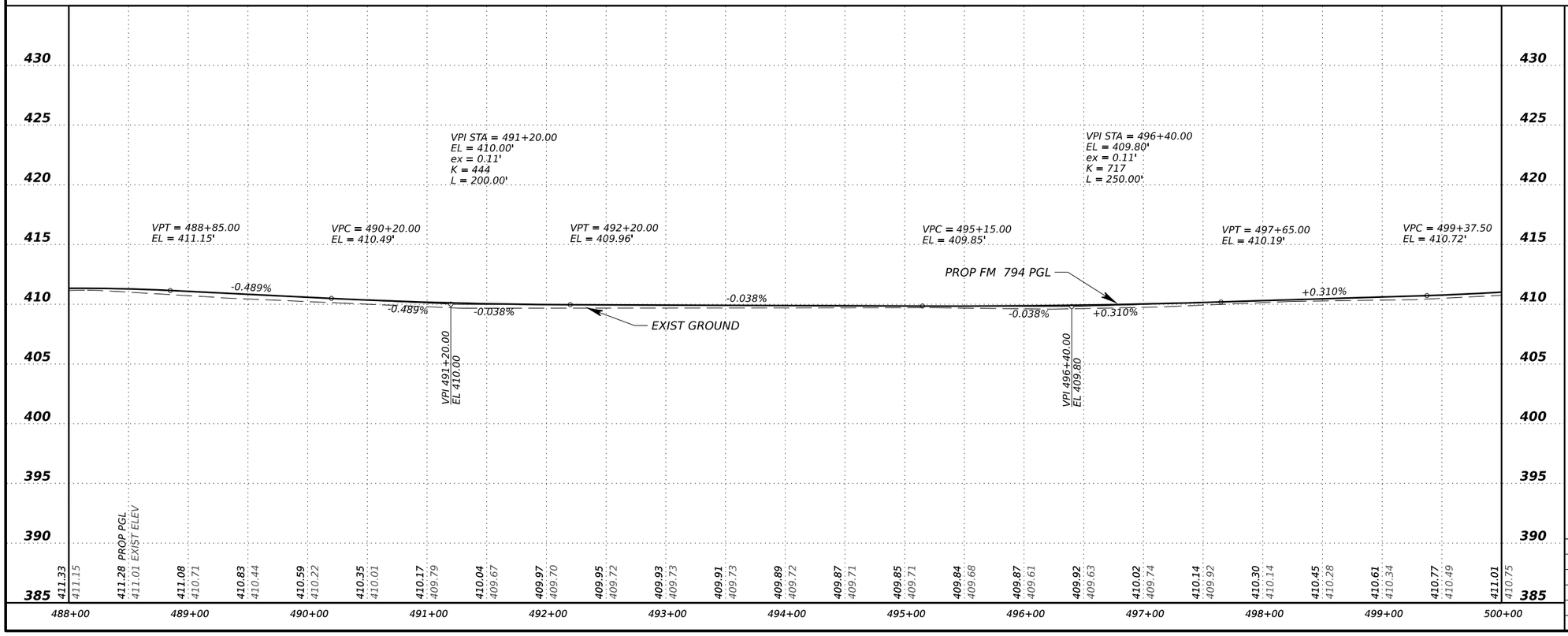
PATH: T:\YKMANNEX\PS&E\113302030_FM794\Plan_Profiles\
FILE: FM794_PP_SHEET_3.dgn
DATE: 1/26/2024



SUPERELEVATION TABLE

eMAX = 6%
DESIGN SPEED = 60 MPH

BEGIN SUPER TRANSITION	BEGIN FULL SUPER	END FULL SUPER	END SUPER TRANSITION
STA 480+60.00 LT LANE -2.0% RT LANE -2.0%	STA 482+50.00 LT LANE +5.9% RT LANE -5.9%	STA 487+55.00 LT LANE +5.9% RT LANE -5.9%	STA 489+45.00 LT LANE -2.0% RT LANE -2.0%



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FILE: FM794_PP_SHEET_4.dgn
DATE: 1/26/2024

STATE OF TEXAS
AMANDA ANDERLE FLING
105989
LICENSED
PROFESSIONAL ENGINEER

Amanda Anderle Fling, P.E.

01/27/2024

PLAN AND PROFILE

SCALE: HOR 1" = 100'
VER 1" = 10'

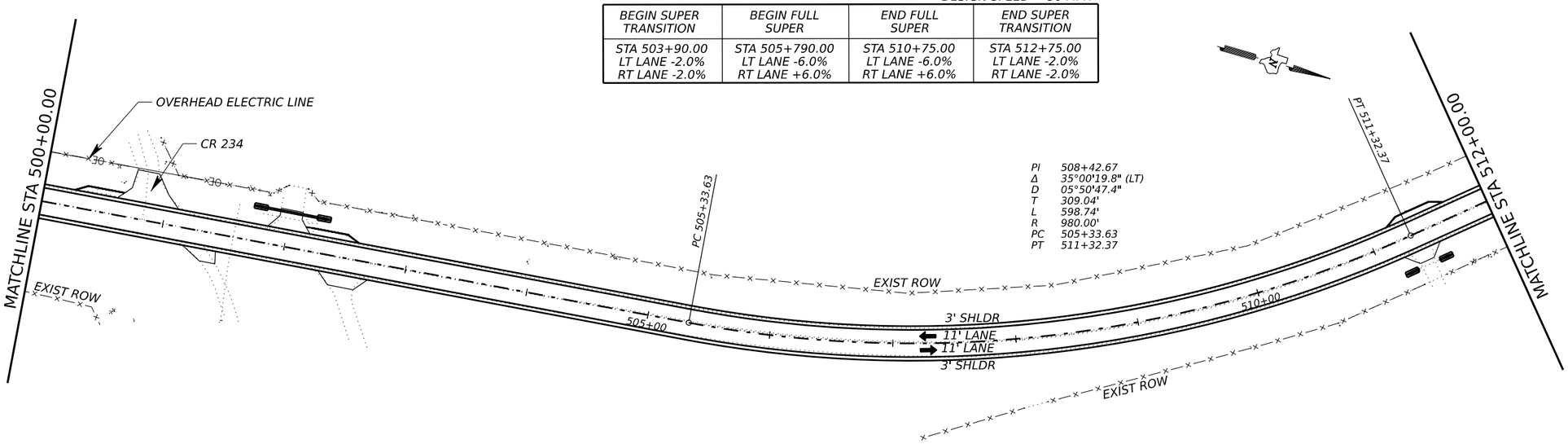
Texas Department of Transportation

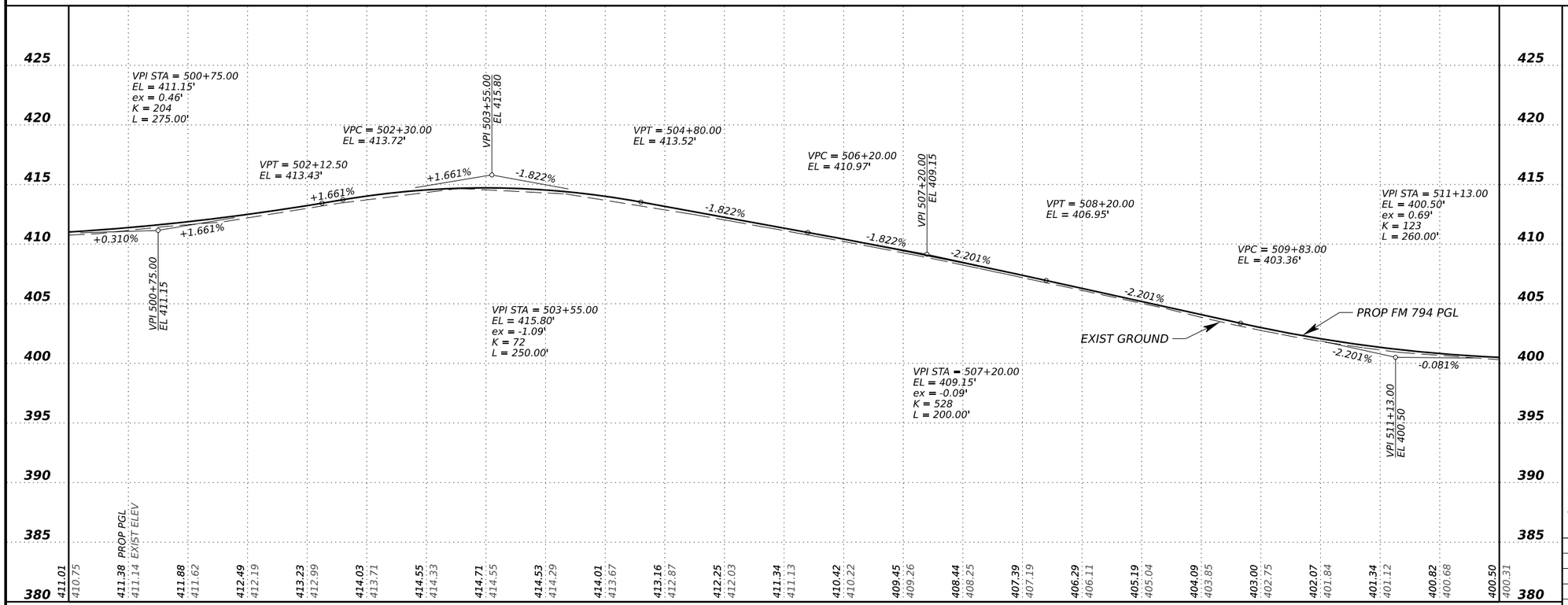
FED.RD. DIV.NO.		PROJECT NO.	
6			
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	73

SUPERELEVATION TABLE

eMAX = 6%
DESIGN SPEED = 50 MPH

BEGIN SUPER TRANSITION	BEGIN FULL SUPER	END FULL SUPER	END SUPER TRANSITION
STA 503+90.00 LT LANE -2.0% RT LANE -2.0%	STA 505+790.00 LT LANE -6.0% RT LANE +6.0%	STA 510+75.00 LT LANE -6.0% RT LANE +6.0%	STA 512+75.00 LT LANE -2.0% RT LANE -2.0%





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FILE: FM794_PP_SHEET_5.dgn
DATE: 1/27/2024

STATE OF TEXAS
AMANDA ANDERLE FLING
105989
LICENSED PROFESSIONAL ENGINEER

Amanda Anderle Fling, P.E.

01/27/2024

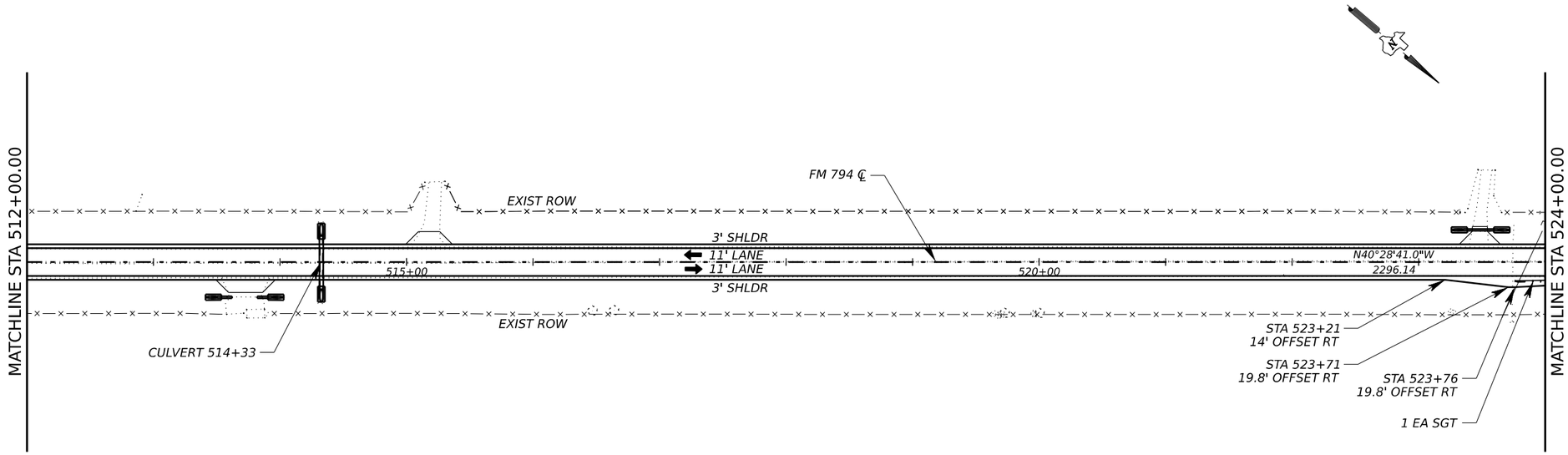
PLAN AND PROFILE

SCALE: HOR 1" = 100'
VER 1" = 10'

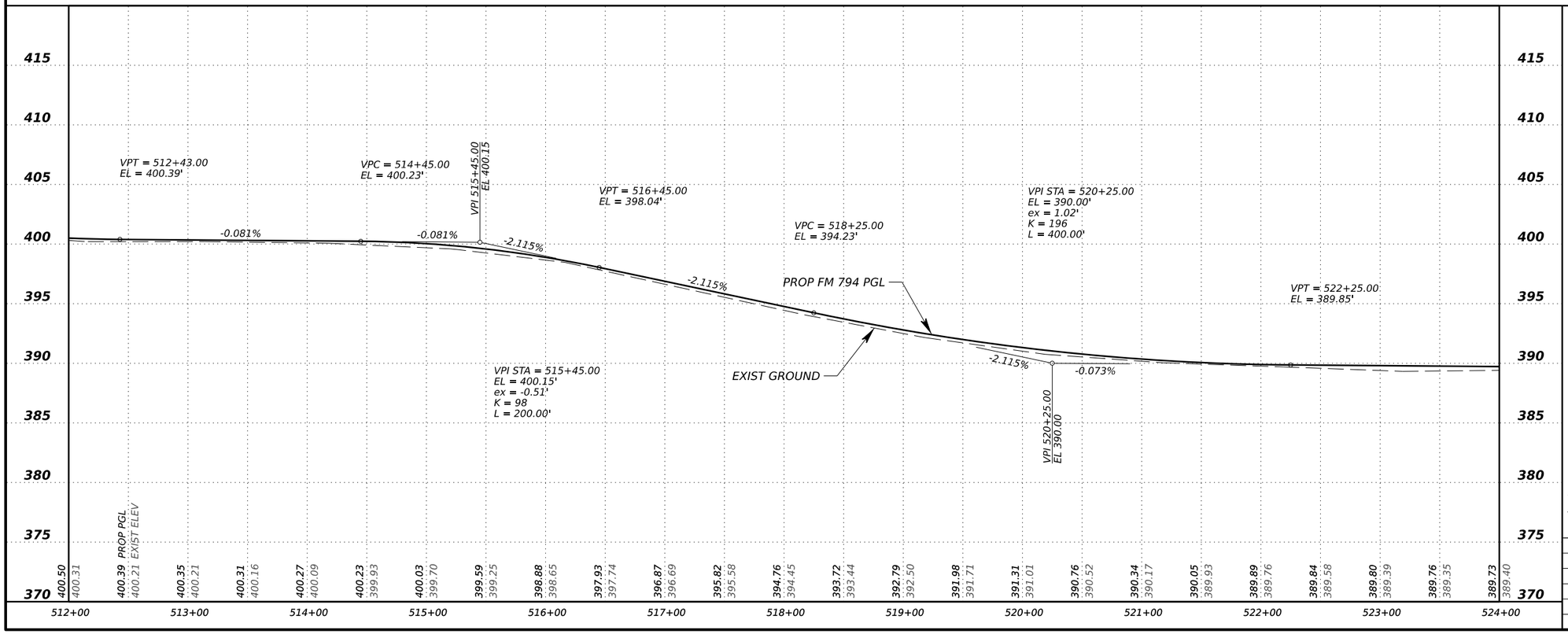
Texas Department of Transportation

SHEET 5 OF 17

FED.RD. DIV.NO.		PROJECT NO.	
6			
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	74



NOTE: SEE "MBGF LAYOUT & SUMMARY" SHEETS FOR MORE INFORMATION.



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FILE: FM794_PP_SHEET_6.dgn
DATE: 1/27/2024

STATE OF TEXAS
AMANDA ANDERLE FLING
105989
LICENSED
PROFESSIONAL ENGINEER

Amanda Anderle Fling, P.E.

01/27/2024

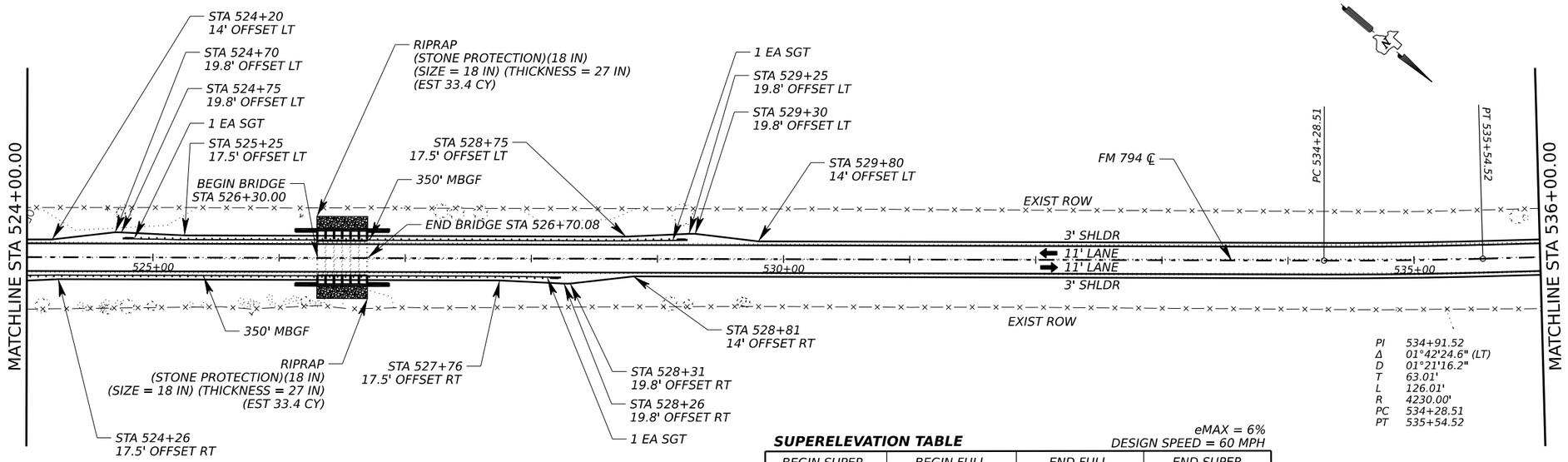
PLAN AND PROFILE

SCALE: HOR 1" = 100'
VER 1" = 10'

Texas Department of Transportation

SHEET 6 OF 17

FED.RD. DIV.NO.		PROJECT NO.	
6			
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	75

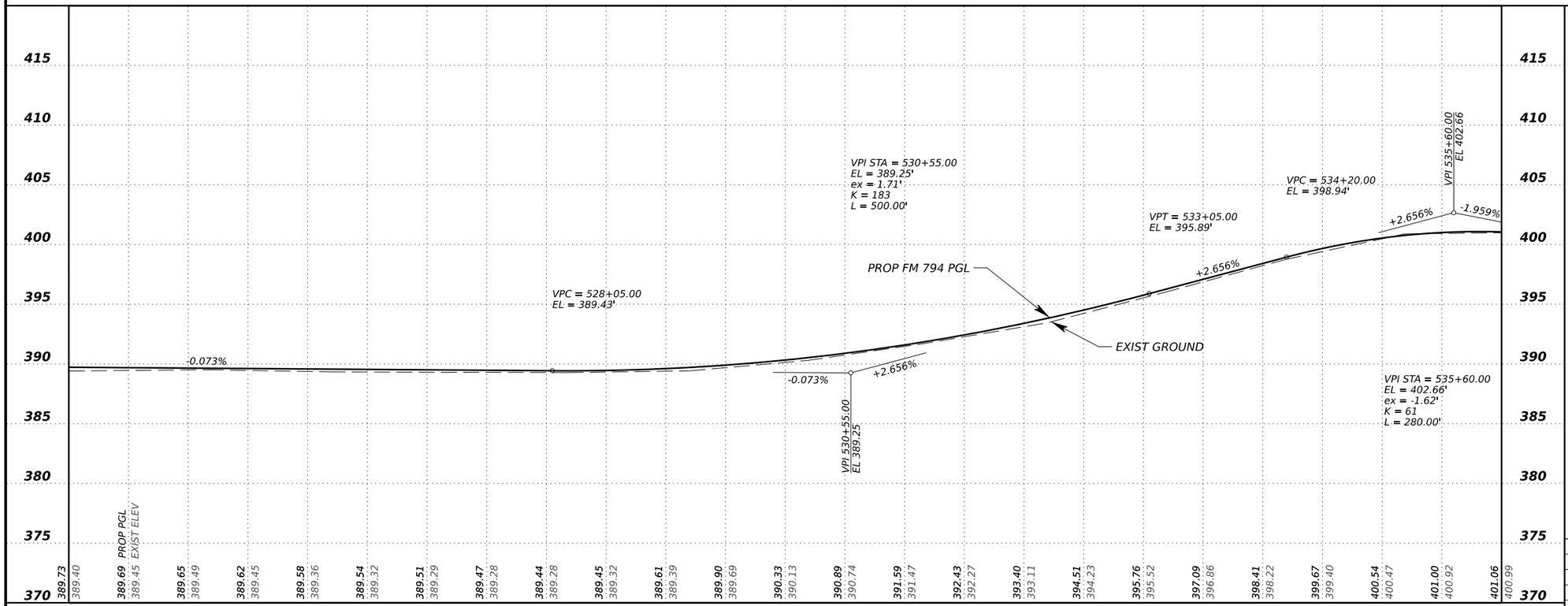


SUPERELEVATION TABLE

eMAX = 6%
DESIGN SPEED = 60 MPH

BEGIN SUPER TRANSITION	BEGIN FULL SUPER	END FULL SUPER	END SUPER TRANSITION
STA 533+35.00 LT LANE -2.0% RT LANE -2.0%	STA 534+65.00 LT LANE -3.4% RT LANE +3.4%	STA 535+20.00 LT LANE -3.4% RT LANE +3.4%	STA 536+50.00 LT LANE -2.0% RT LANE -2.0%

NOTE: SEE "MBGF LAYOUT & SUMMARY" SHEETS FOR MORE INFORMATION.



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DATE: 1/27/2024

STATE OF TEXAS
AMANDA ANDERLE FLING
105989
LICENSED
PROFESSIONAL ENGINEER

Amanda Anderle Fling, P.E.

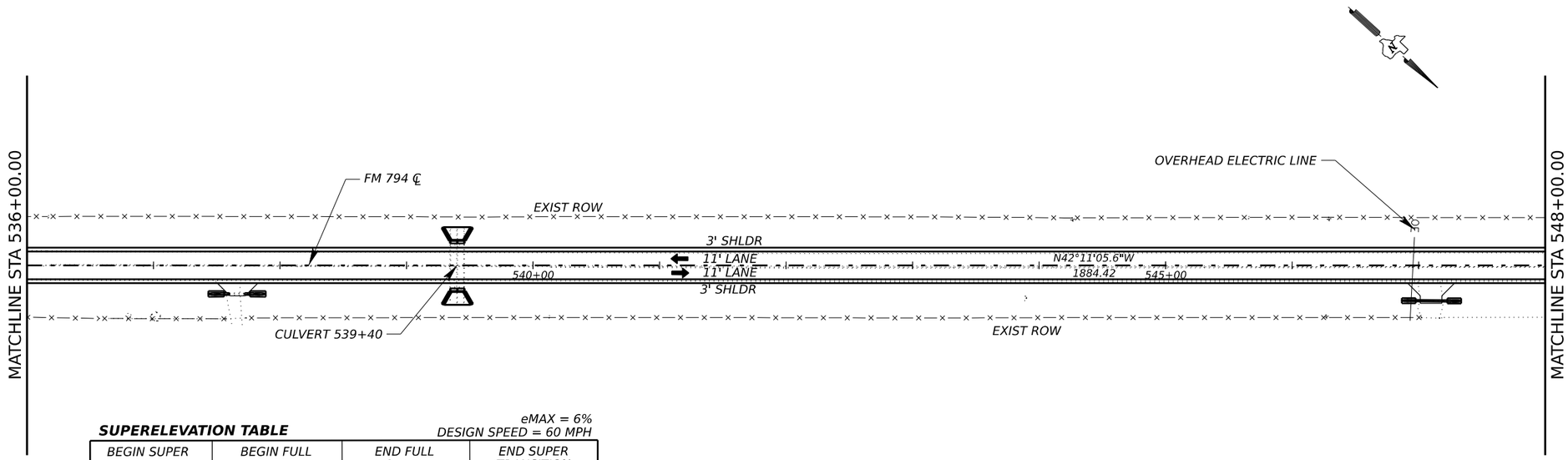
01/27/2024

PLAN AND PROFILE

SCALE: HOR 1" = 100'
VER 1" = 10'

Texas Department of Transportation

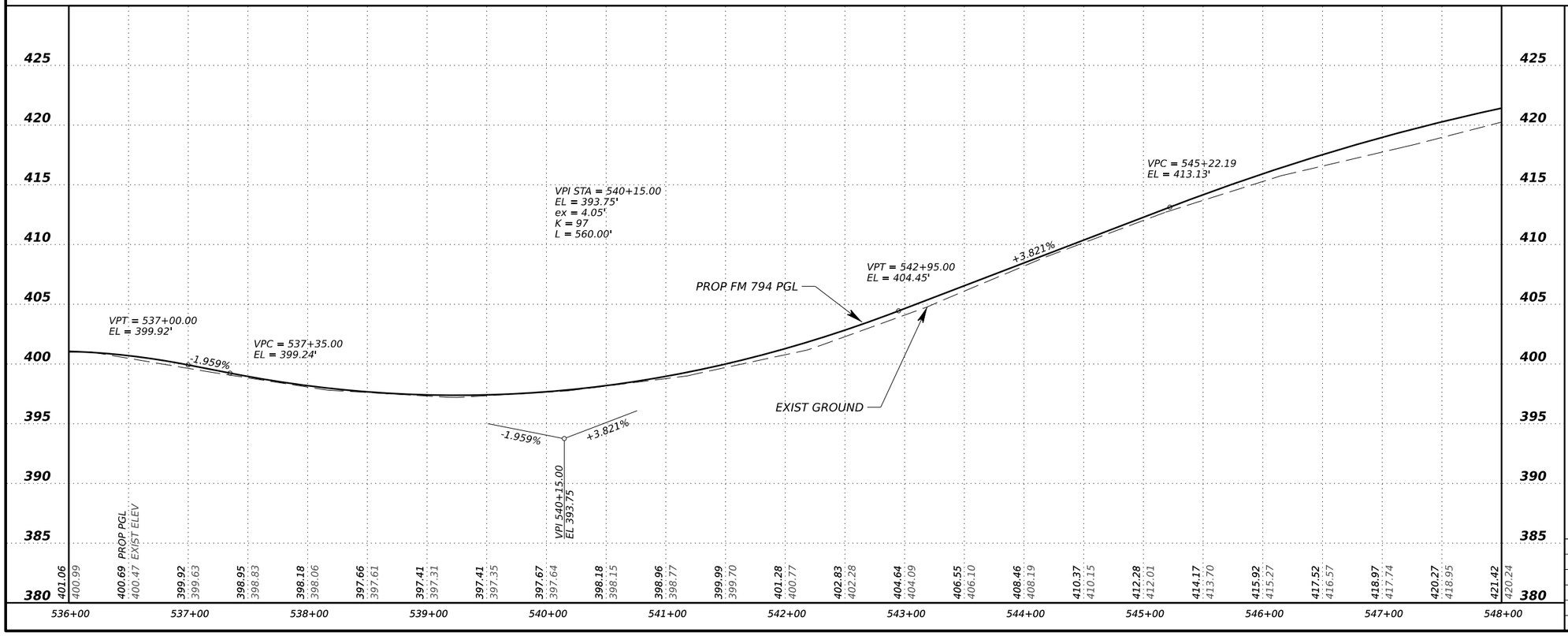
FED.RD. DIV.NO.		PROJECT NO.	
6			
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	76



SUPERELEVATION TABLE

eMAX = 6%
DESIGN SPEED = 60 MPH

BEGIN SUPER TRANSITION	BEGIN FULL SUPER	END FULL SUPER	END SUPER TRANSITION
STA 533+35.00 LT LANE -2.0% RT LANE -2.0%	STA 534+65.00 LT LANE -3.4% RT LANE +3.4%	STA 535+20.00 LT LANE -3.4% RT LANE +3.4%	STA 536+50.00 LT LANE -2.0% RT LANE -2.0%



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FILE: FM794_PP_SHEET_8.dgn
DATE: 1/27/2024

STATE OF TEXAS
AMANDA ANDERLE FLING
105989
LICENSED PROFESSIONAL ENGINEER

Amanda Anderle Fling, P.E.

01/27/2024

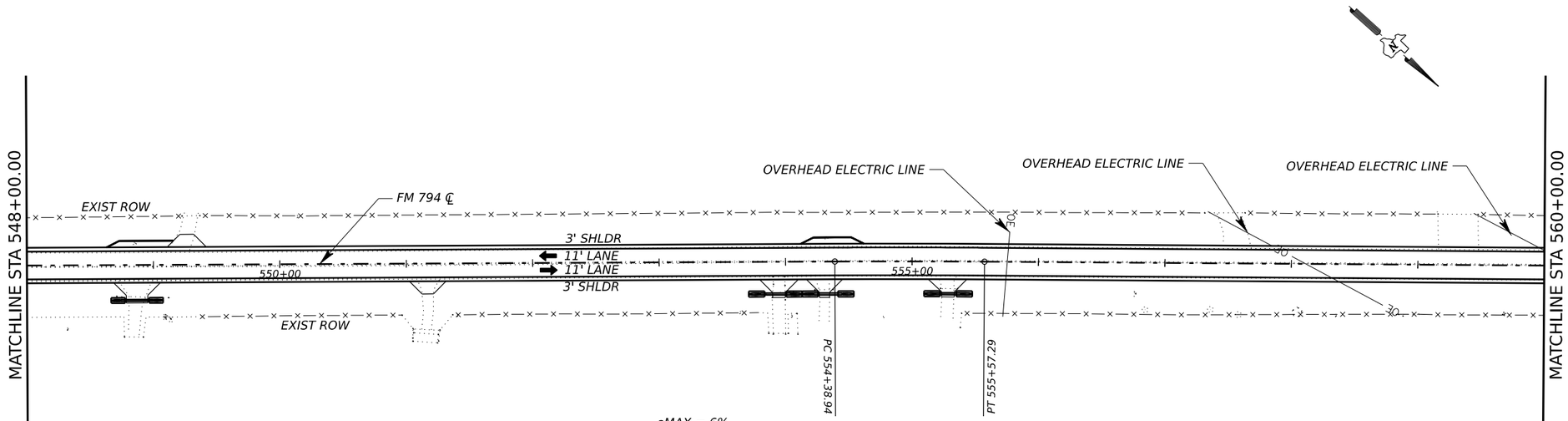
PLAN AND PROFILE

SCALE: HOR 1" = 100'
VER 1" = 10'

Texas Department of Transportation

SHEET 8 OF 17

FED.RD. DIV.NO.		PROJECT NO.	
6			
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	77

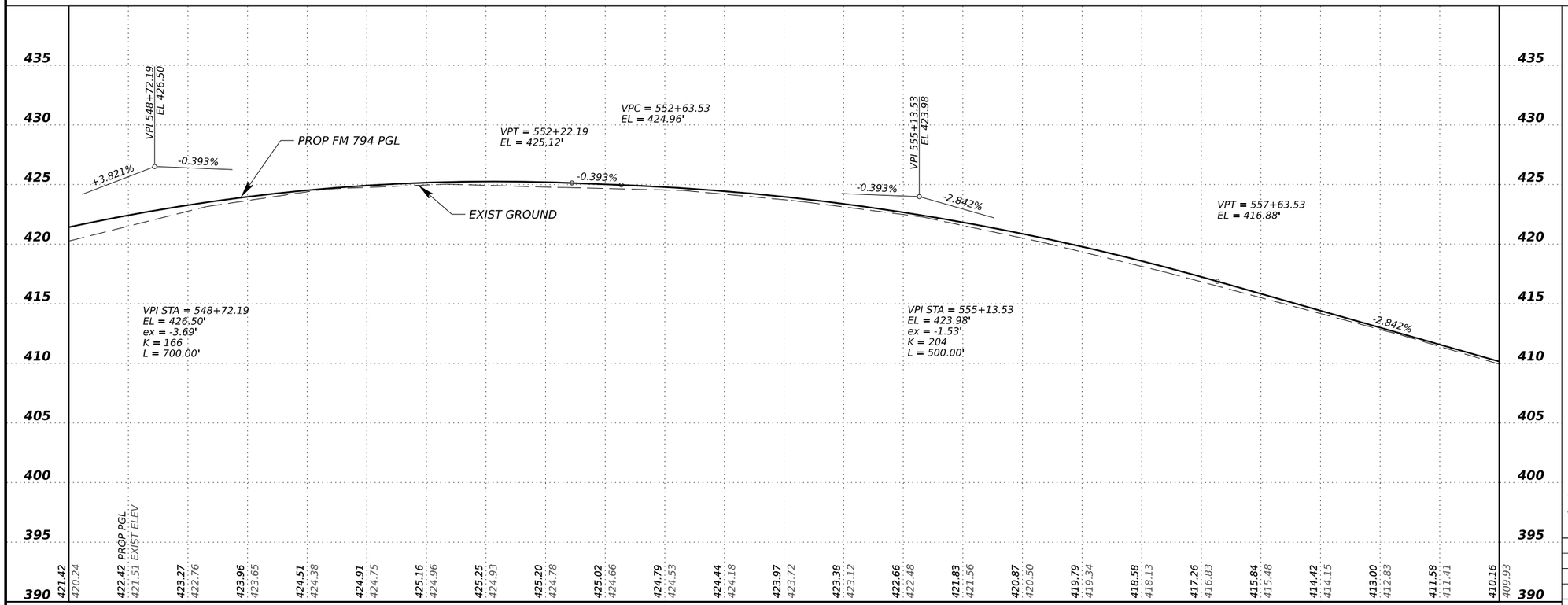


SUPERELEVATION TABLE

eMAX = 6%
DESIGN SPEED = 60 MPH

BEGIN SUPER TRANSITION	BEGIN FULL SUPER	END FULL SUPER	END SUPER TRANSITION
STA 553+65.00 LT LANE -2.0% RT LANE -2.0%	STA 554+65.00 LT LANE +2.0% RT LANE -2.0%	STA 555+30.00 LT LANE +2.0% RT LANE -2.0%	STA 556+30.00 LT LANE -2.0% RT LANE -2.0%

PI	554+98.12
Δ	00°40'41.3" (RT)
D	00°34'22.6"
T	59.18'
L	118.36'
R	10000.00'
PC	554+38.94
PT	555+57.29



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FILE: FM794_PP_SHEET_9.dgn
DATE: 1/27/2024

STATE OF TEXAS
AMANDA ANDERLE FLING
105989
LICENSED
PROFESSIONAL ENGINEER

Amanda Anderle Fling, P.E.

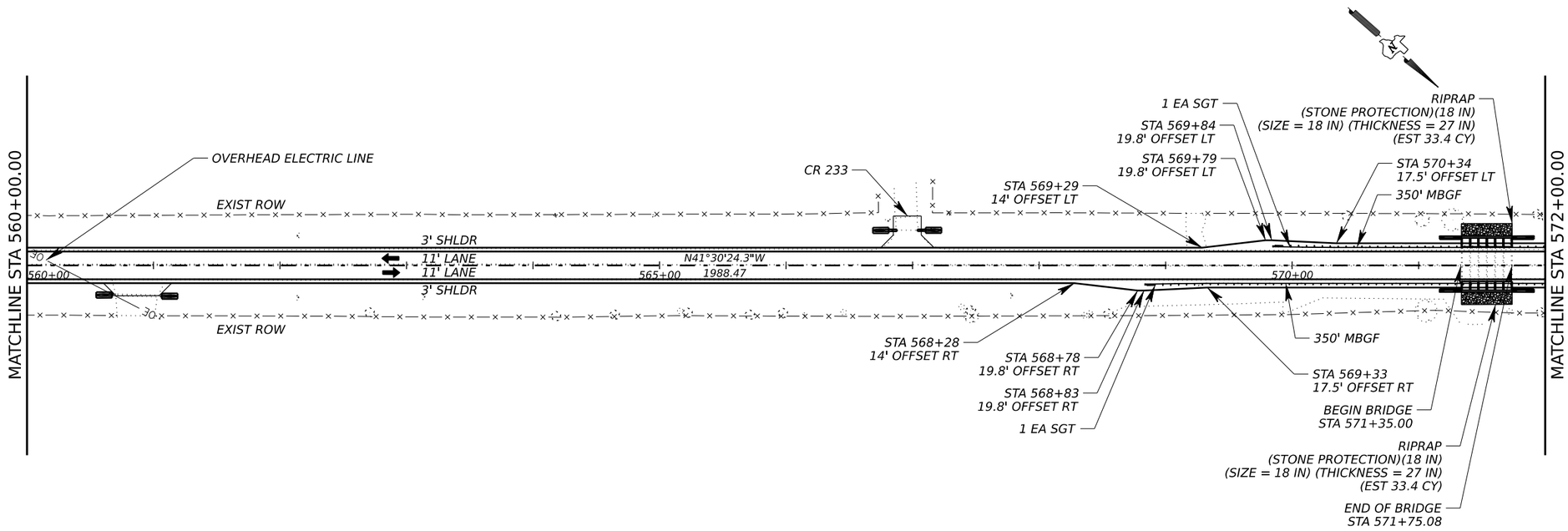
01/27/2024

PLAN AND PROFILE

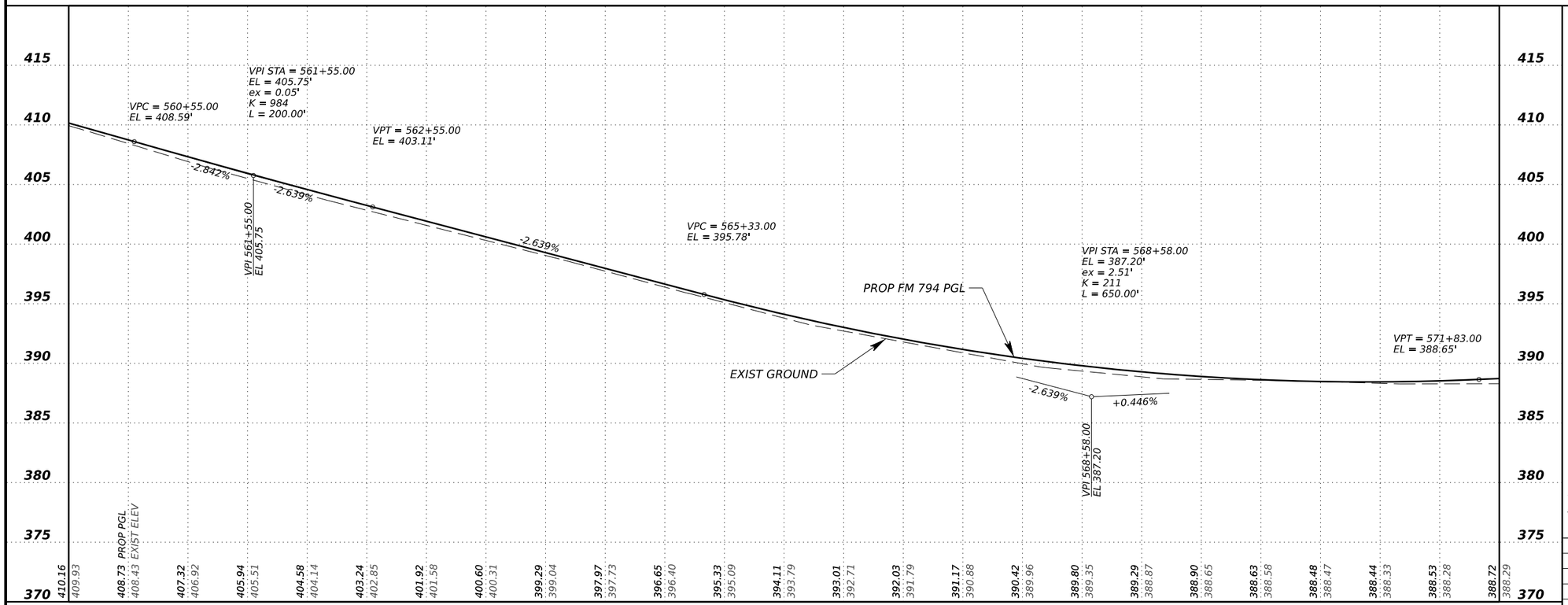
SCALE: HOR 1" = 100'
VER 1" = 10'

Texas Department of Transportation

FED.RD. DIV.NO.		PROJECT NO.	
6			
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	78



NOTE: SEE "MBGF LAYOUT & SUMMARY" SHEETS FOR MORE INFORMATION.



STATE OF TEXAS
AMANDA ANDERLE FLING
105989
LICENSED PROFESSIONAL ENGINEER

Amanda Anderle Fling, P.E.

01/27/2024

PLAN AND PROFILE

SCALE: HOR 1" = 100'
VER 1" = 10'

Texas Department of Transportation

SHEET 10 OF 17

FED.RD. DIV.NO.		PROJECT NO.	
6			
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	79

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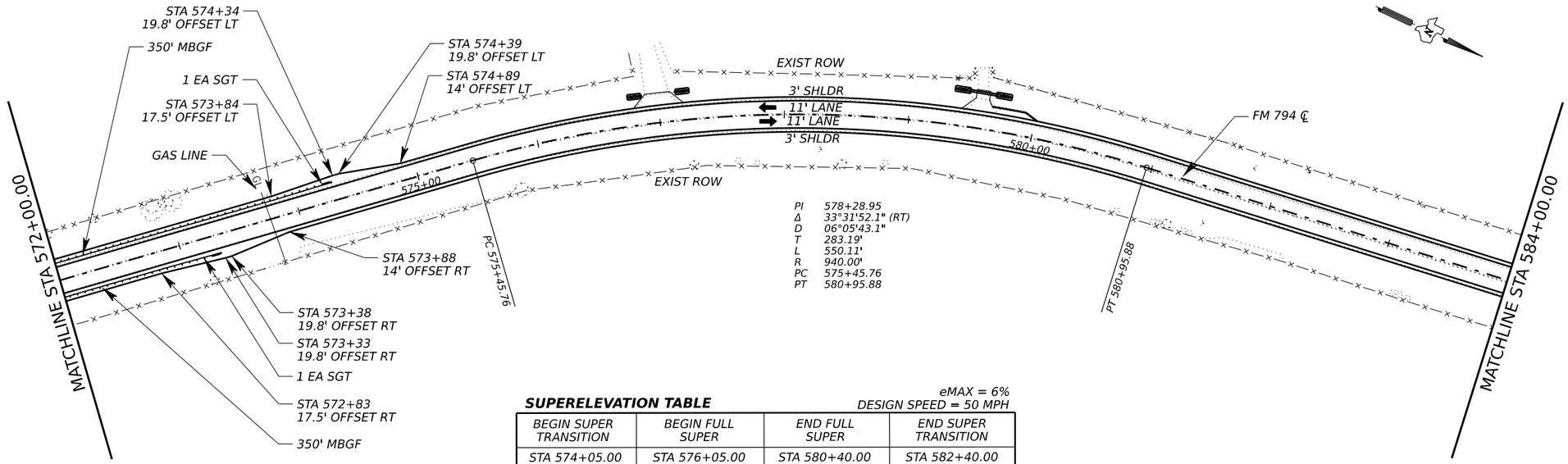
DATE: 1/27/2024

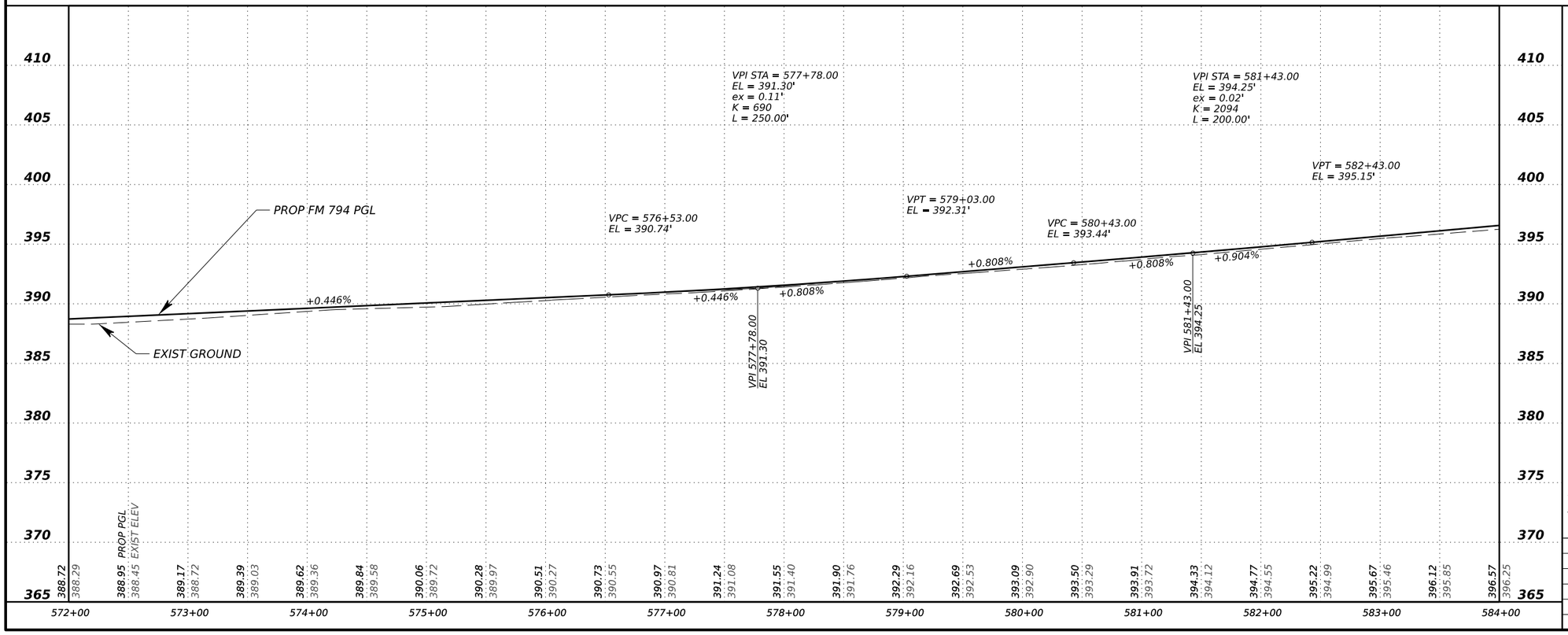


SUPERELEVATION TABLE

eMAX = 6%
DESIGN SPEED = 50 MPH

BEGIN SUPER TRANSITION	BEGIN FULL SUPER	END FULL SUPER	END SUPER TRANSITION
STA 574+05.00 LT LANE -2.0% RT LANE -2.0%	STA 576+05.00 LT LANE +6.0% RT LANE -6.0%	STA 580+40.00 LT LANE +6.0% RT LANE -6.0%	STA 582+40.00 LT LANE -2.0% RT LANE -2.0%

NOTE: SEE "MBGF LAYOUT & SUMMARY" SHEETS FOR MORE INFORMATION.



STATE OF TEXAS
AMANDA ANDERLE FLING
105989
LICENSED
PROFESSIONAL ENGINEER

Amanda Anderle Fling, P.E.

01/27/2024

PLAN AND PROFILE

SCALE: HOR 1" = 100'
VER 1" = 10'

Texas Department of Transportation

FED.RD. DIV.NO.		PROJECT NO.	
6			
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	80

PATH: T:\YKMANNEX\PS&E\113302030_FM794\Plan_Profiles\
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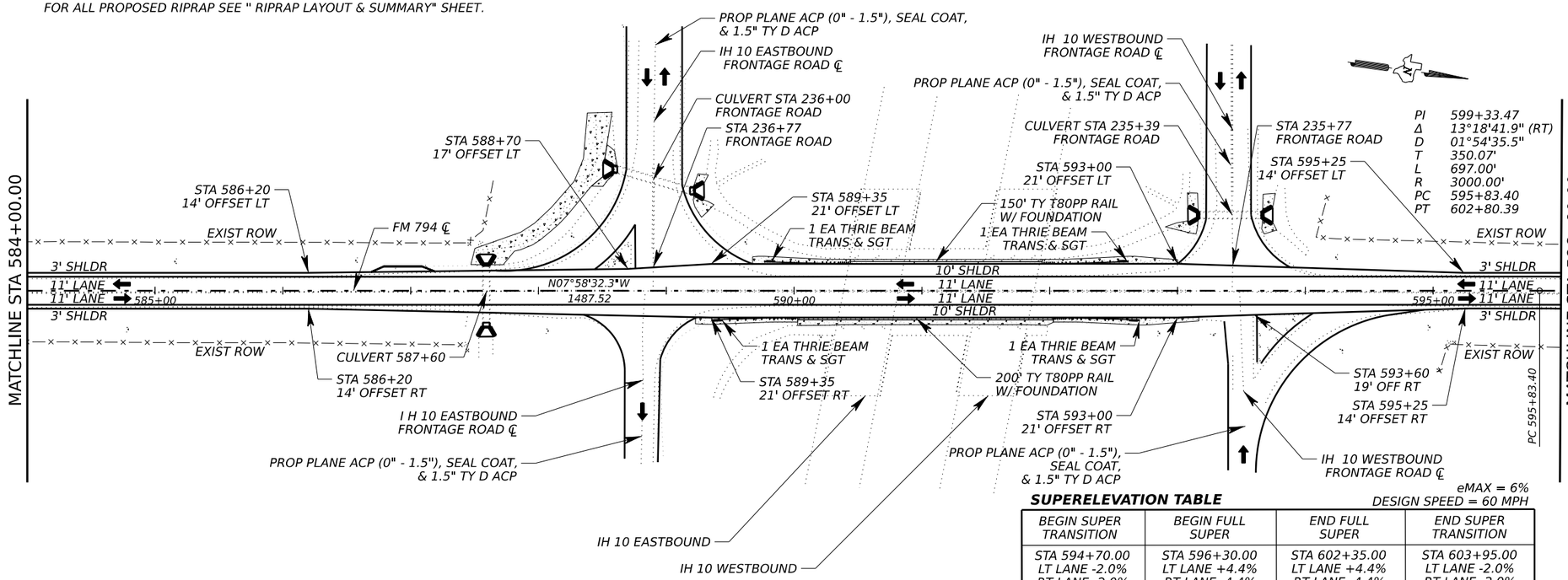
DATE: 1/27/2024

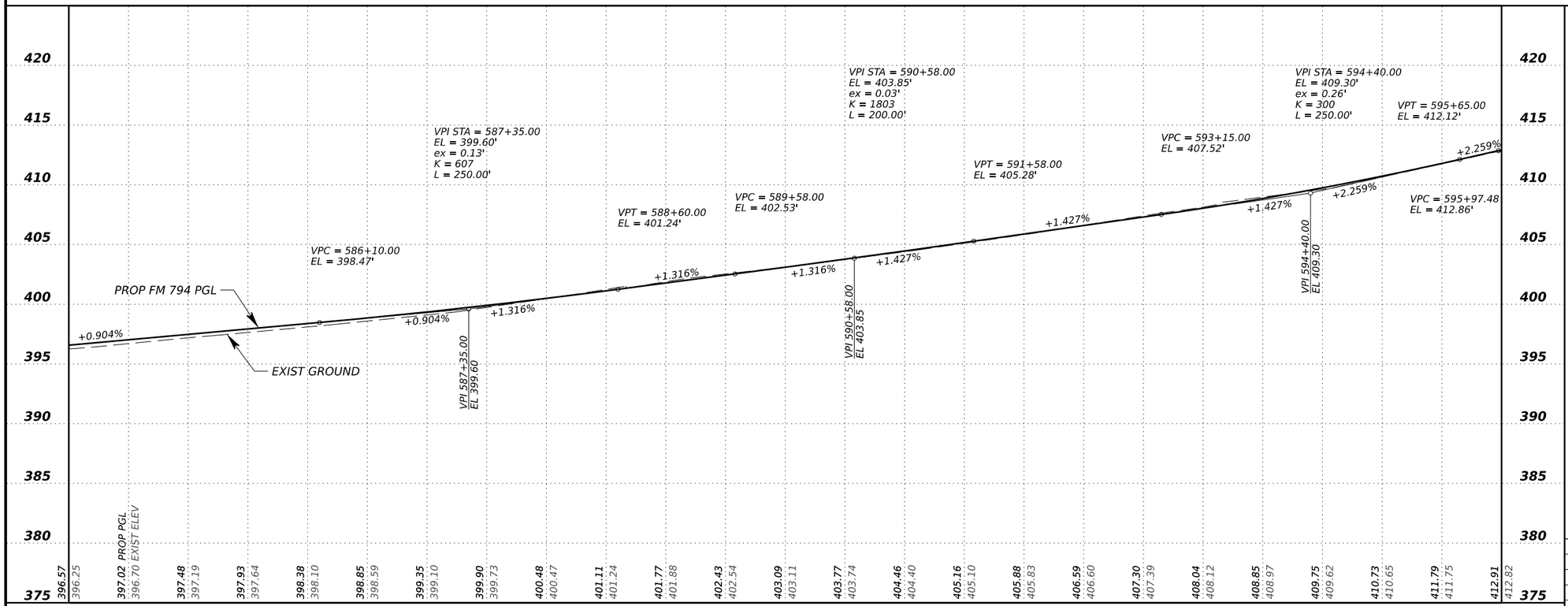
FOR ALL PROPOSED RIPRAP SEE " RIPRAP LAYOUT & SUMMARY" SHEET.



SUPERELEVATION TABLE

eMAX = 6%
DESIGN SPEED = 60 MPH

BEGIN SUPER TRANSITION	BEGIN FULL SUPER	END FULL SUPER	END SUPER TRANSITION
STA 594+70.00 LT LANE -2.0% RT LANE -2.0%	STA 596+30.00 LT LANE +4.4% RT LANE -4.4%	STA 602+35.00 LT LANE +4.4% RT LANE -4.4%	STA 603+95.00 LT LANE -2.0% RT LANE -2.0%



STATE OF TEXAS
AMANDA ANDERLE FLING
105989
LICENSED PROFESSIONAL ENGINEER

Amanda Anderle Fling, P.E.

01/27/2024

PLAN AND PROFILE

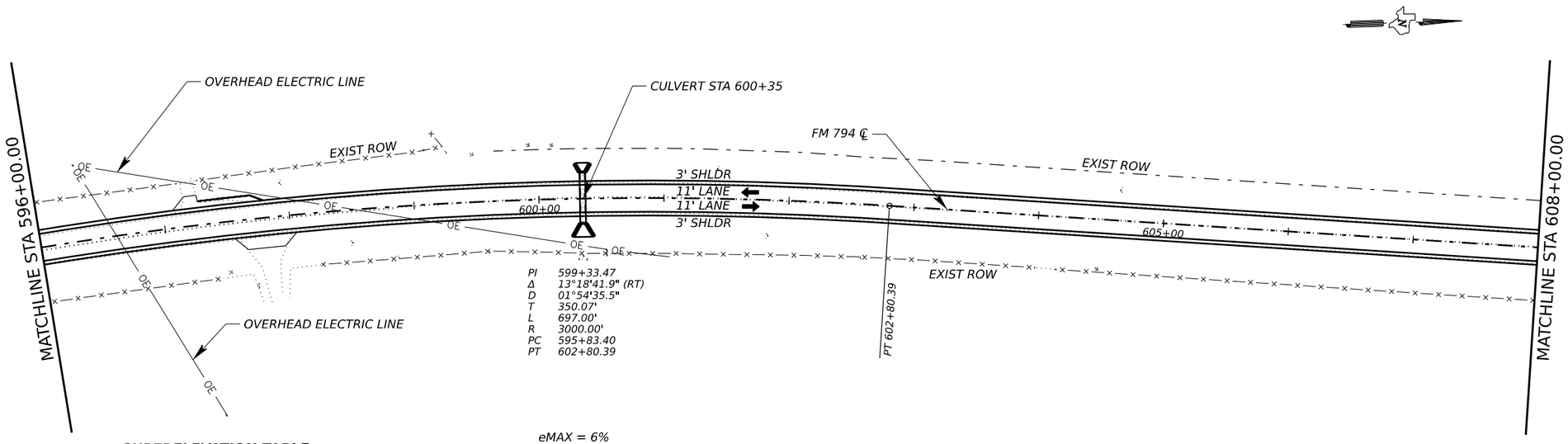
SCALE: HOR 1" = 100'
VER 1" = 10'

Texas Department of Transportation

SHEET 12 OF 17

FED.RD. DIV.NO.		PROJECT NO.	
6			
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	81

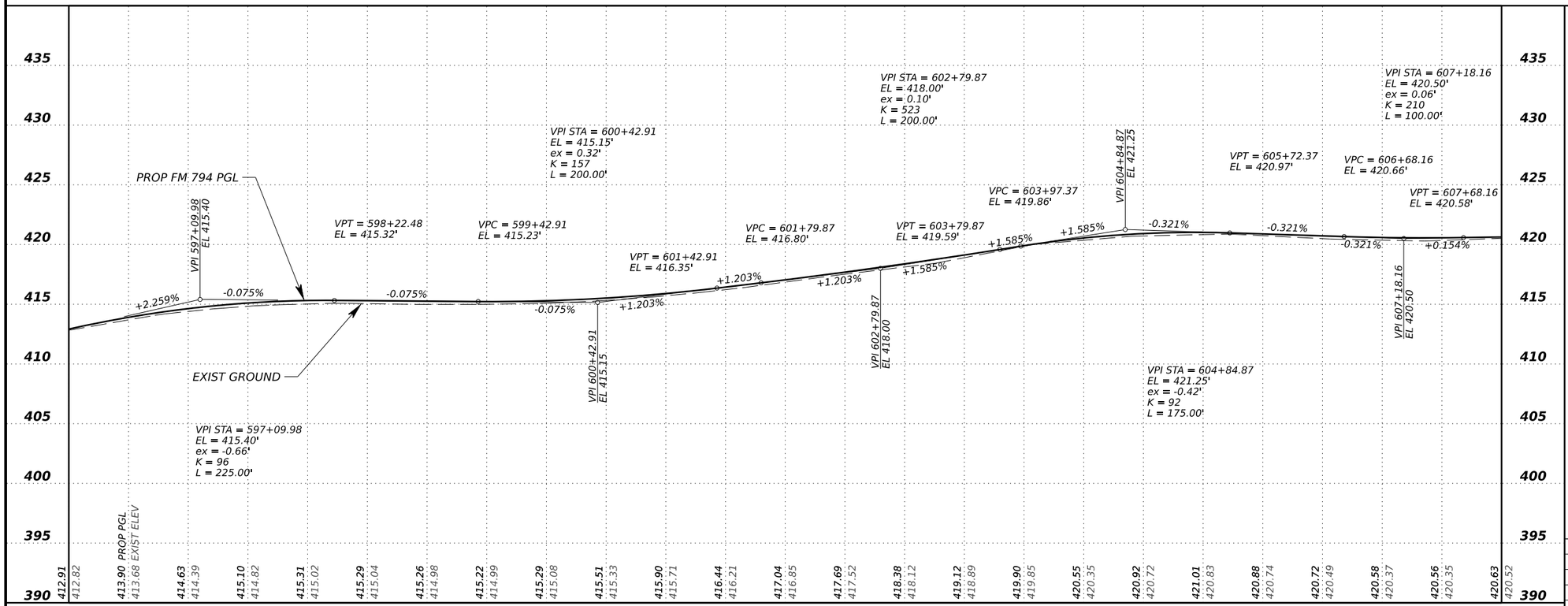
PATH: T:\YKMANNEX\PS&E\113302030_FM794\Plan_Profiles\
FILE: FM794_PP_SHEET_12.dgn
DATE: 1/28/2024



SUPERELEVATION TABLE

eMAX = 6%
DESIGN SPEED = 60 MPH

BEGIN SUPER TRANSITION	BEGIN FULL SUPER	END FULL SUPER	END SUPER TRANSITION
STA 594+70.00 LT LANE -2.0% RT LANE -2.0%	STA 596+30.00 LT LANE +4.4% RT LANE -4.4%	STA 602+35.00 LT LANE +4.4% RT LANE -4.4%	STA 603+95.00 LT LANE -2.0% RT LANE -2.0%



STATE OF TEXAS
AMANDA ANDERLE FLING
105989
LICENSED PROFESSIONAL ENGINEER

Amanda Anderle Fling, P.E.

01/27/2024

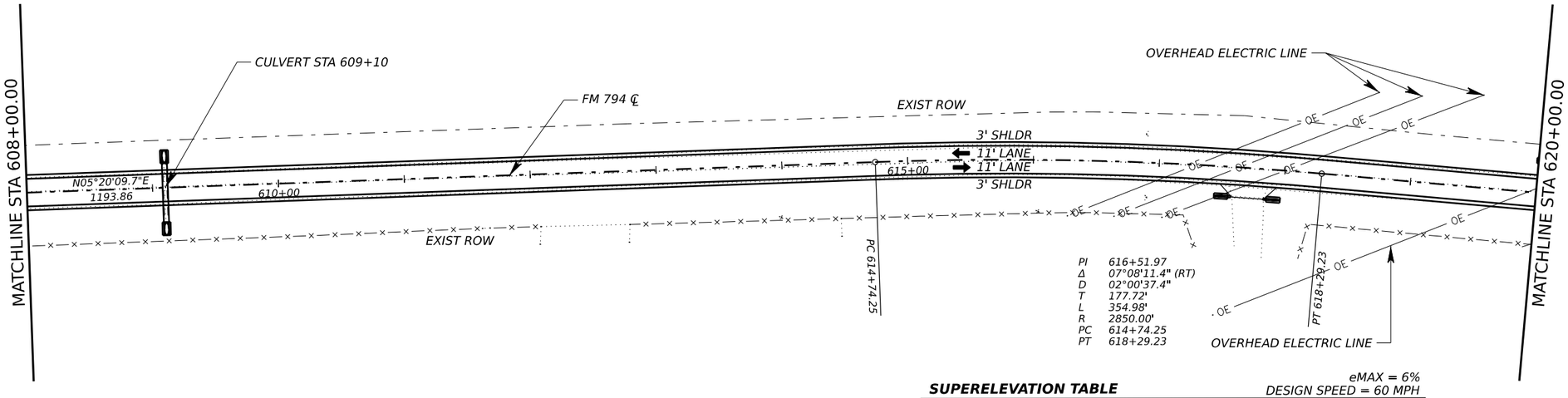
PLAN AND PROFILE

SCALE: HOR 1" = 100'
VER 1" = 10'

Texas Department of Transportation

FED.RD. DIV.NO.		PROJECT NO.	
6			
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	82

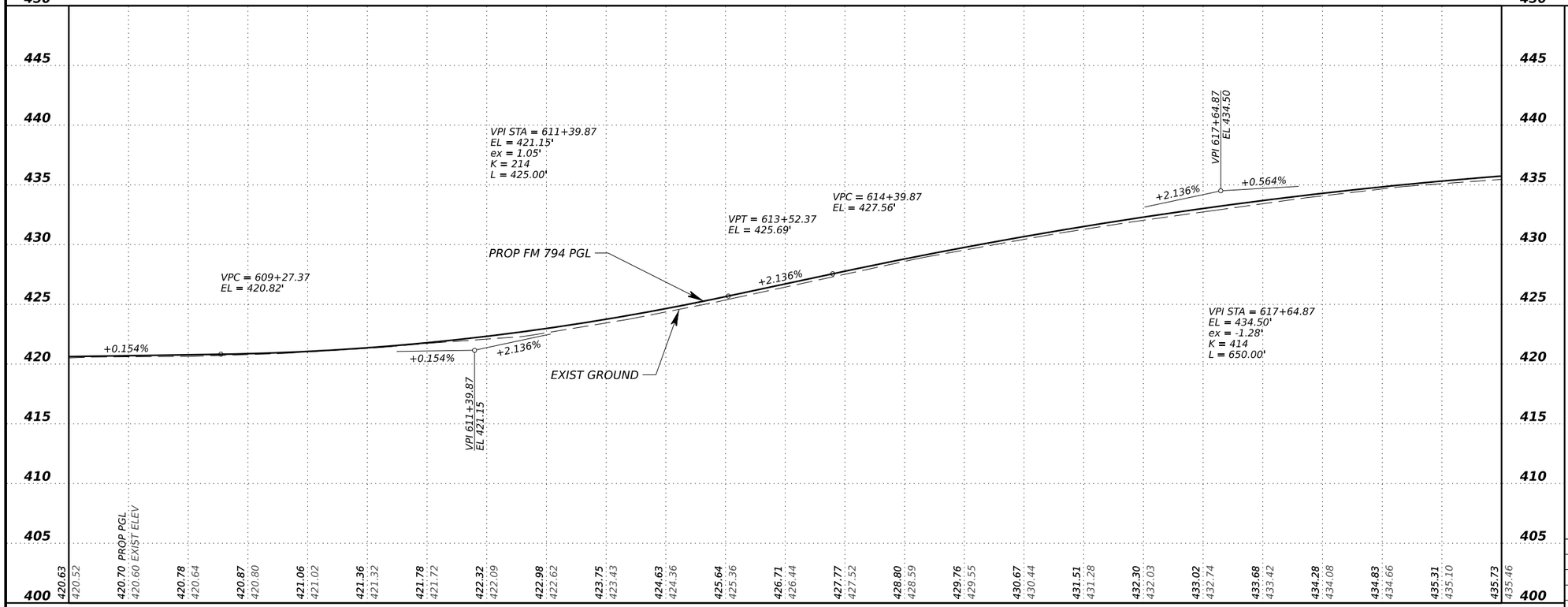
PATH: T:\YKMANNEX\PS&E\113302030_FM794\Plan_Profiles\
FILE: FM794_PP_SHEET_13.dgn
DATE: 1/26/2024



SUPERELEVATION TABLE

eMAX = 6%
DESIGN SPEED = 60 MPH

BEGIN SUPER TRANSITION	BEGIN FULL SUPER	END FULL SUPER	END SUPER TRANSITION
STA 613+60.00 LT LANE -2.0% RT LANE -2.0%	STA 615+20.00 LT LANE +4.5% RT LANE -4.5%	STA 617+85.00 LT LANE +4.5% RT LANE -4.5%	STA 619+45.00 LT LANE -2.0% RT LANE -2.0%



STATE OF TEXAS
AMANDA ANDERLE FLING
105989
LICENSED PROFESSIONAL ENGINEER

Amanda Anderle Fling, P.E.

01/27/2024

PLAN AND PROFILE

SCALE: HOR 1" = 100'
VER 1" = 10'

Texas Department of Transportation

FED.RD. DIV.NO.		PROJECT NO.	
6			
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	83

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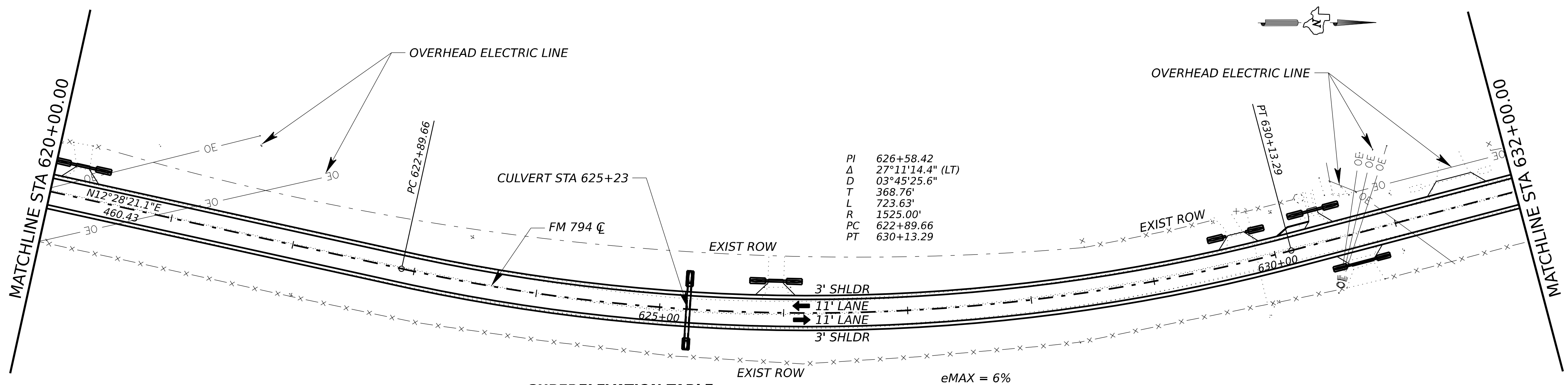
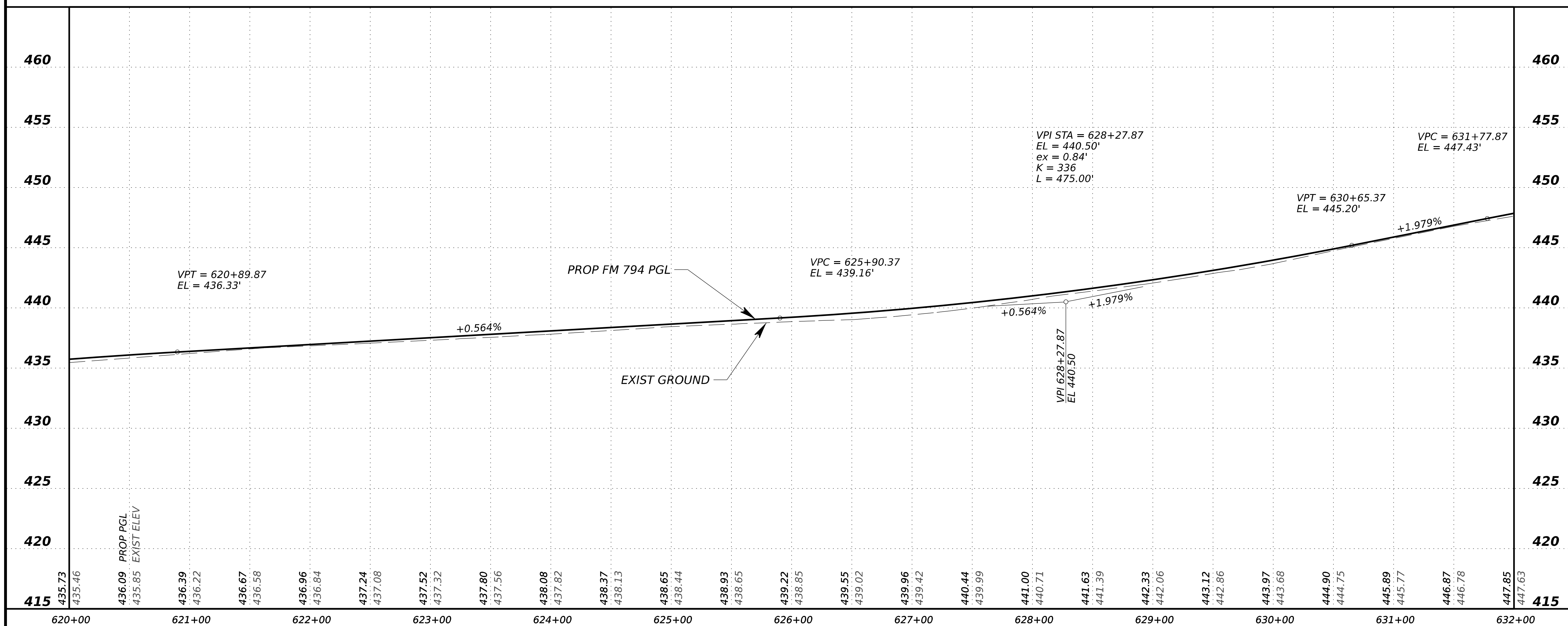


SUPERELEVATION TABLE

eMAX = 6%
DESIGN SPEED = 60 MPH

BEGIN SUPER TRANSITION	BEGIN FULL SUPER	END FULL SUPER	END SUPER TRANSITION
STA 621+55.00 LT LANE -2.0% RT LANE -2.0%	STA 623+45.00 LT LANE -5.9% RT LANE +5.9%	STA 629+60.00 LT LANE -5.9% RT LANE +5.9%	STA 631+50.00 LT LANE -2.0% RT LANE -2.0%



STATE OF TEXAS
AMANDA ANDERLE FLING
105989
LICENSED
PROFESSIONAL ENGINEER

Amanda Anderle Fling, P.E.

01/27/2024

PLAN AND PROFILE

SCALE: HOR 1" = 100'
VER 1" = 10'

Texas Department of Transportation

SHEET 15 OF 17

FED.RD. DIV.NO.	PROJECT NO.		
6			
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	84

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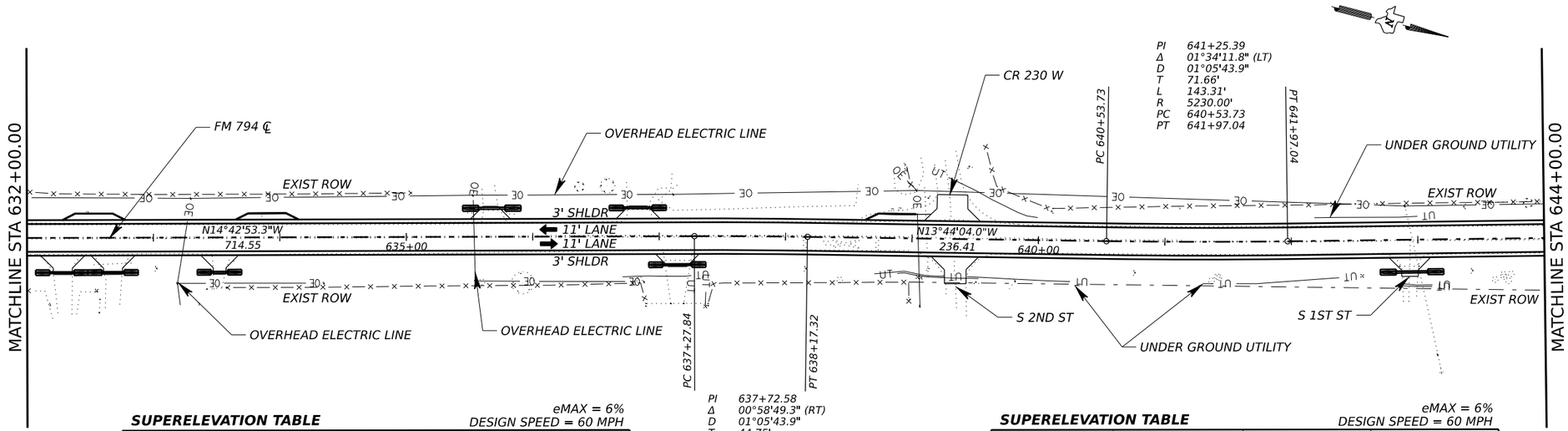


PI 641+25.39
Δ 01°34'11.8" (LT)
D 01°05'43.9"
T 71.66'
L 143.31'
R 5230.00'
PC 640+53.73
PT 641+97.04

PI 637+72.58
Δ 00°58'49.3" (RT)
D 01°05'43.9"
T 44.75'
L 89.49'
R 5230.00'
PC 637+27.84
PT 638+17.32

SUPERELEVATION TABLE

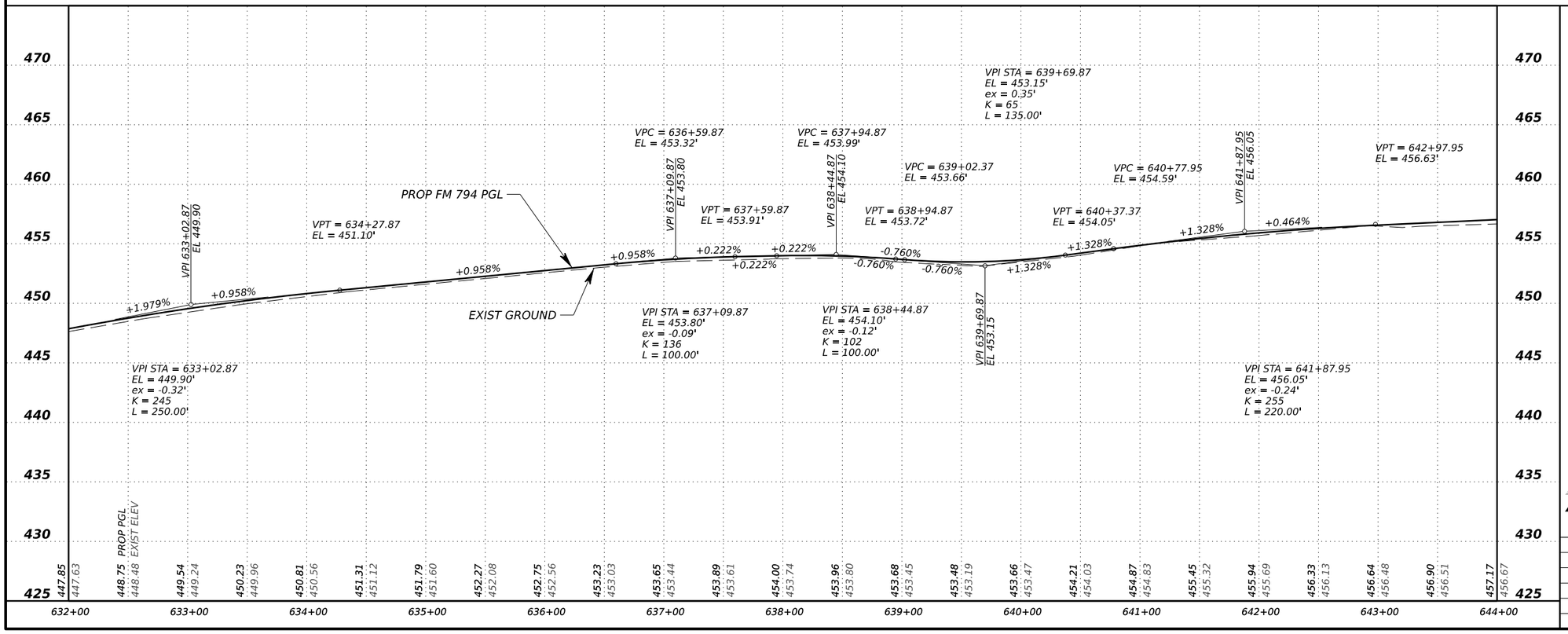
eMAX = 6%
DESIGN SPEED = 60 MPH

BEGIN SUPER TRANSITION	BEGIN FULL SUPER	END FULL SUPER	END SUPER TRANSITION
STA 636+40.00 LT LANE -2.0% RT LANE -2.0%	STA 637+60.00 LT LANE +2.9% RT LANE -2.9%	STA 637+85.00 LT LANE +2.9% RT LANE -2.9%	STA 639+05.00 LT LANE -2.0% RT LANE -2.0%

SUPERELEVATION TABLE

eMAX = 6%
DESIGN SPEED = 60 MPH

BEGIN SUPER TRANSITION	BEGIN FULL SUPER	END FULL SUPER	END SUPER TRANSITION
STA 639+65.00 LT LANE -2.0% RT LANE -2.0%	STA 640+85.00 LT LANE -2.9% RT LANE +2.9%	STA 641+65.00 LT LANE -2.9% RT LANE +2.9%	STA 642+85.00 LT LANE -2.0% RT LANE -2.0%



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STATE OF TEXAS
AMANDA ANDERLE FLING
105989
LICENSED PROFESSIONAL ENGINEER

Amanda Anderle Fling, P.E.

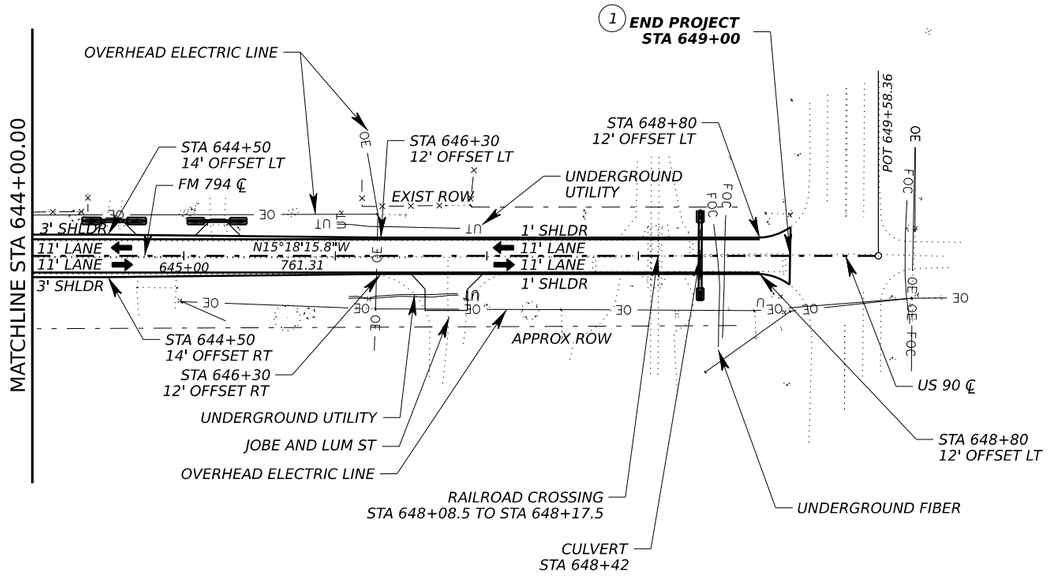
01/27/2024

PLAN AND PROFILE

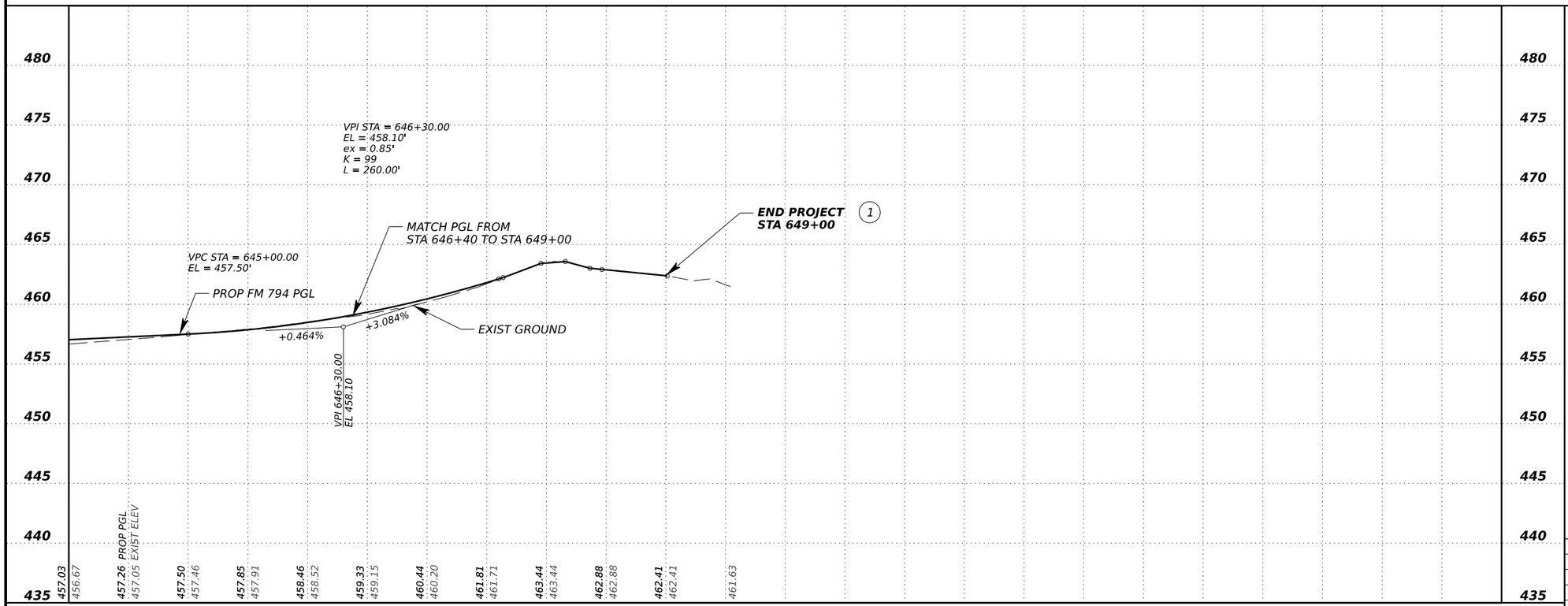
SCALE: HOR 1" = 100'
VER 1" = 10'

Texas Department of Transportation

FED.RD. DIV.NO.		PROJECT NO.	
6			
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	85



1 MATCH EXISTING PAVEMENT CROSS SLOPE AND ELEVATION.



STATE OF TEXAS
AMANDA ANDERLE FLING
105989
LICENSED
PROFESSIONAL ENGINEER

Amanda Anderle Fling, P.E.

01/27/2024

PLAN AND PROFILE

SCALE: HOR 1" = 100'
VER 1" = 10'

Texas Department of Transportation

SHEET 17 OF 17

FED.RD. DIV.NO.		PROJECT NO.	
6			
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	86

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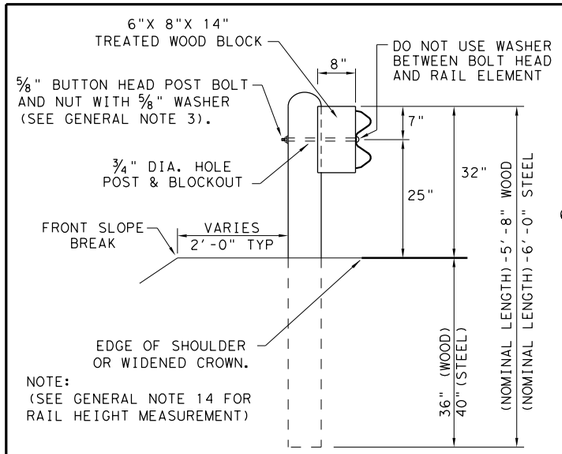
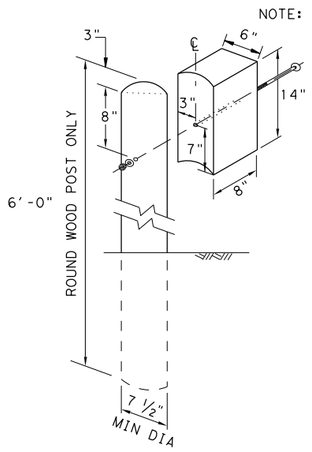
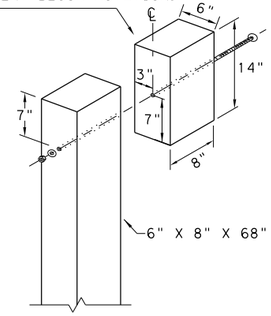


TYPICAL POST PLACEMENT

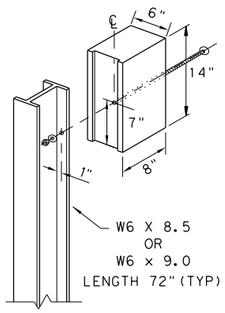


WOOD BLOCK TO ROUND WOOD POST

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

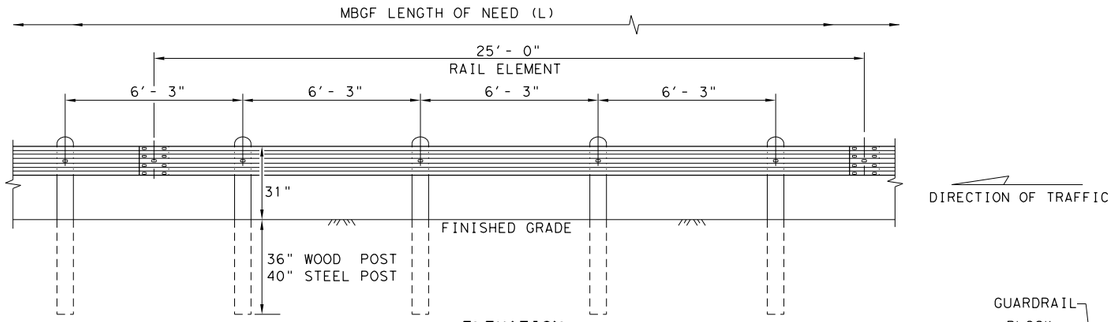


WOOD BLOCK TO RECTANGULAR WOOD POST



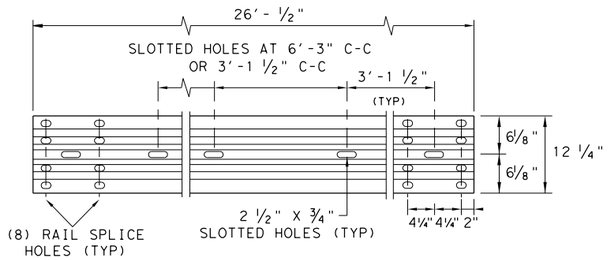
ROUTED WOOD BLOCK TO I-BEAM STEEL POST

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



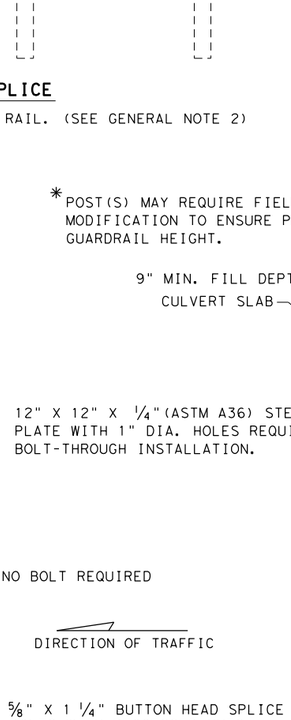
ELEVATION
MID-SPAN RAIL SPLICE

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

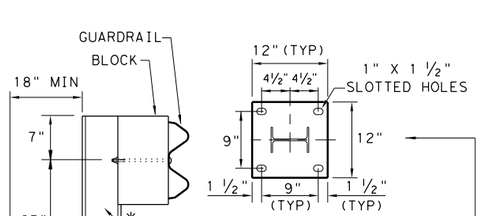


ELEVATION 25'- 0" (NOM.) W-BEAM SECTION

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



LOW FILL CULVERT POST



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

NOTE: TWO INSTALLATION OPTIONS.

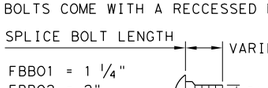
1. BOLT-THROUGH OPTION: REQUIRES A 6" MIN. SLAB THICKNESS. ⅞" DIA (ASTM A449) HEAVY HEX BOLTS WITH TWO HARDENED WASHER EACH AND HEAVY HEX NUTS.
   NOTE: BOLT LENGTH = SLAB PLUS 2 ¼" MIN.

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.

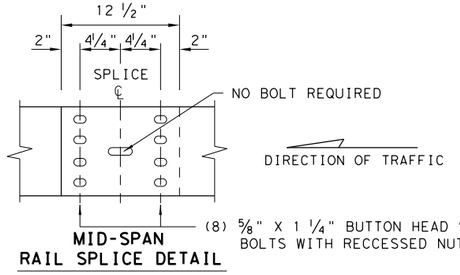
NOTE: TRANSISTIONS TO BRIDGE RAILS OR TRAFFIC BARRIERS.
SEE GF(31)TL3 TR STANDARD FOR HIGH-SPEED TL-3 TRANSITIONS.
SEE GF(31)TL2 TR STANDARD FOR LOW-SPEED TL-2 TRANSITIONS.

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



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	1133	02	030	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		87

DATE: 1/26/2024
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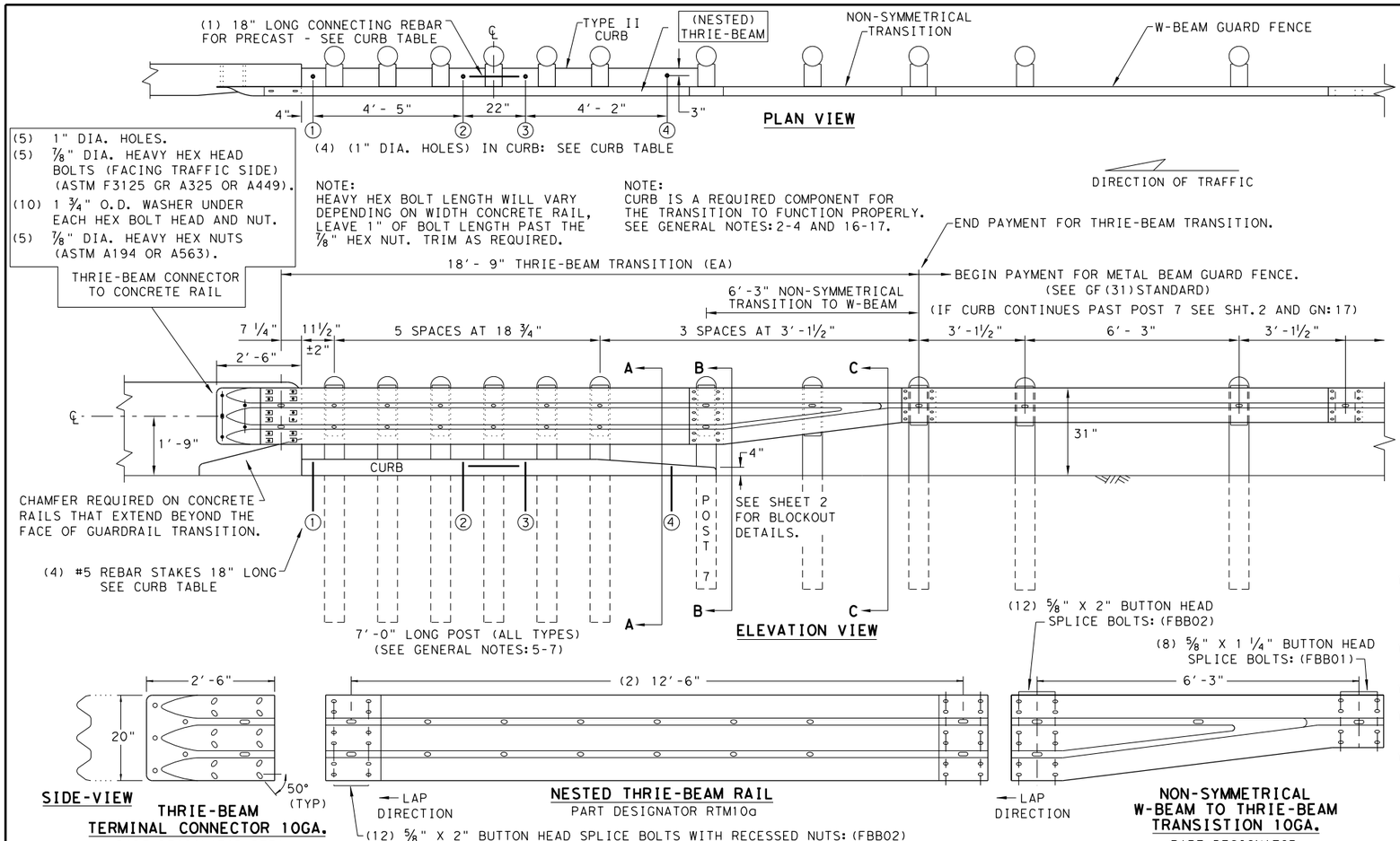


GENERAL NOTES

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

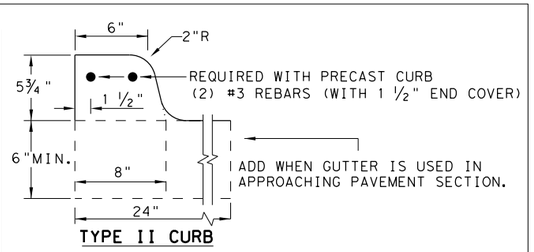
PRECAST CURB FULL LENGTH EQUALS 12'- 2"
THE PRECAST CURB MAY BE FORMED INTO TWO SECTIONS.

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.

* 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

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

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: gf31trt1320.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	030	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		88

DATE: 1/26/2024
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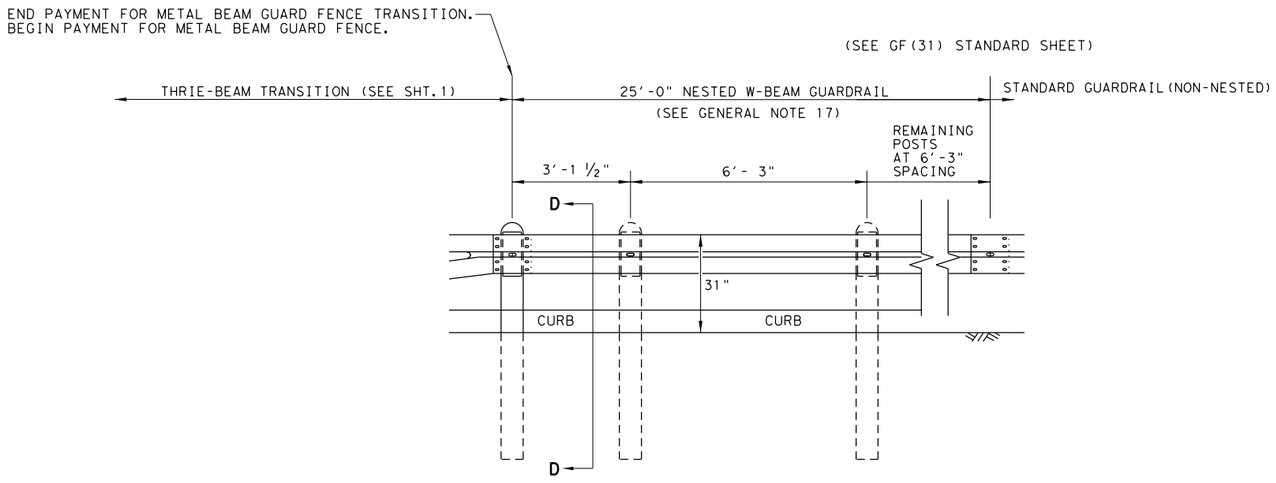
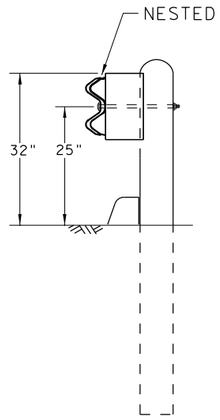
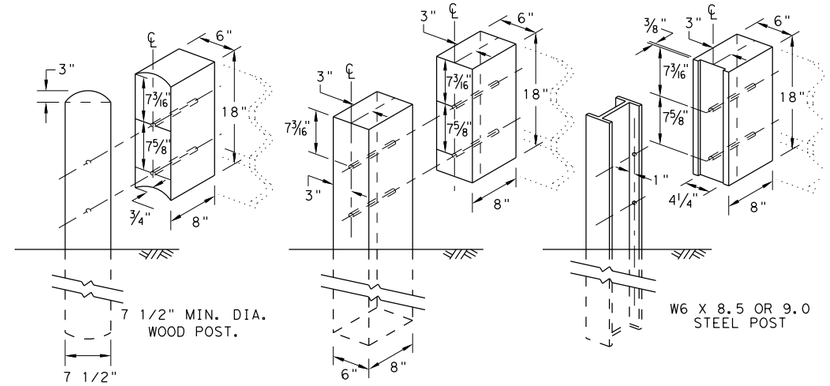
REQUIRED ALTERNATIVE FOR CONTINUOUS CURB EXTENDING PAST POST 7 (SEE SHT. 1 GENERAL NOTE 17)



ELEVATION VIEW



SECTION D-D



THRIE BEAM TRANSITION BLOCKOUT DETAILS

HIGH-SPEED TRANSITION

SHEET 2 OF 2

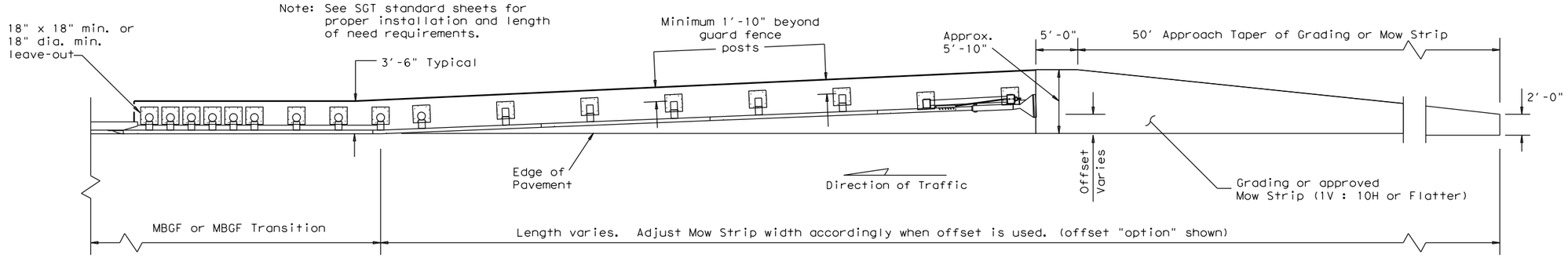
Texas Department of Transportation | Design Division Standard

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

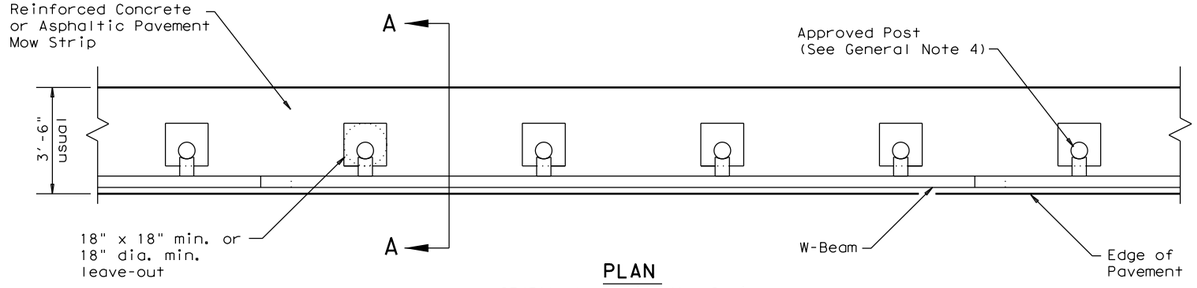
GF(31)TR TL3-20

FILE: gf31tr1320.dgn	DN: TxDOT	CK: KM	DW: KM	CK: CGL/AG	
©TxDOT: NOVEMBER 2020	CONT	SECT	JOB	HIGHWAY	
REVISIONS	1133	02	030	FM 794	
	DIST	COUNTY		SHEET NO.	
	YKM	GONZALES		89	

DATE: 1/26/2024
FILE: $FILE$

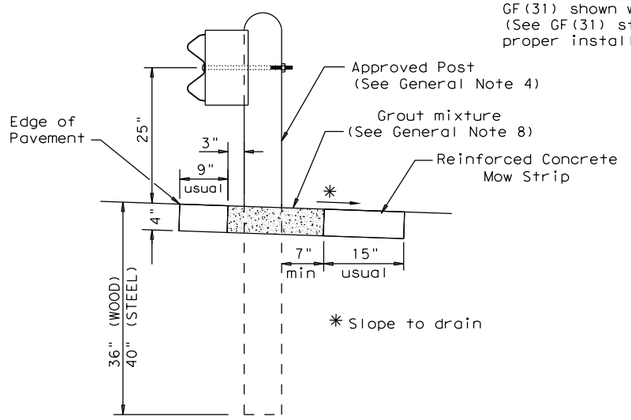


GRADING AND MOW STRIP AT GUARDRAIL END TREATMENTS



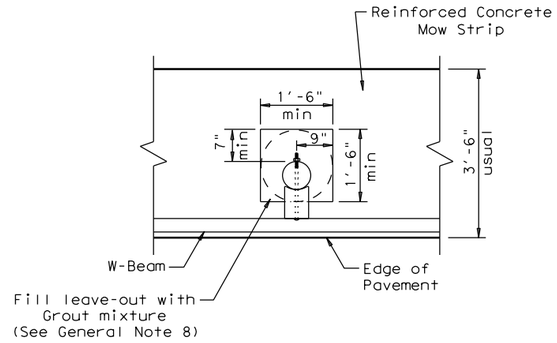
PLAN

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



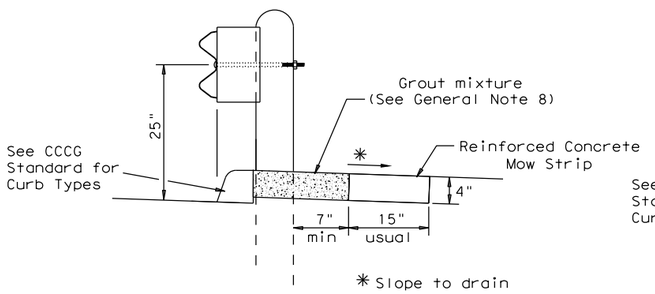
SECTION A-A

Typical



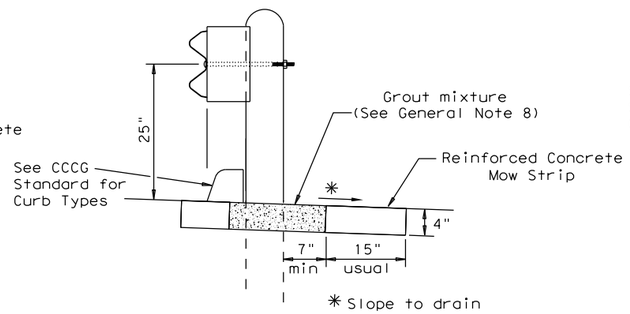
MOW STRIP DETAIL

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



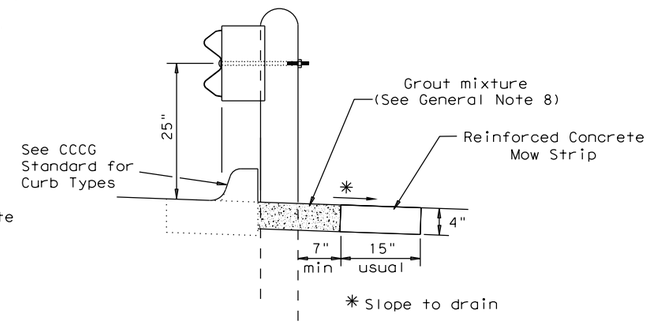
CURB OPTION (1)

This option will increase the post embedment throughout the system.



CURB OPTION (2)

Curb shown on top of mow strip



CURB OPTION (3)

Note: Site Condition(s)

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

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

GENERAL NOTES

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

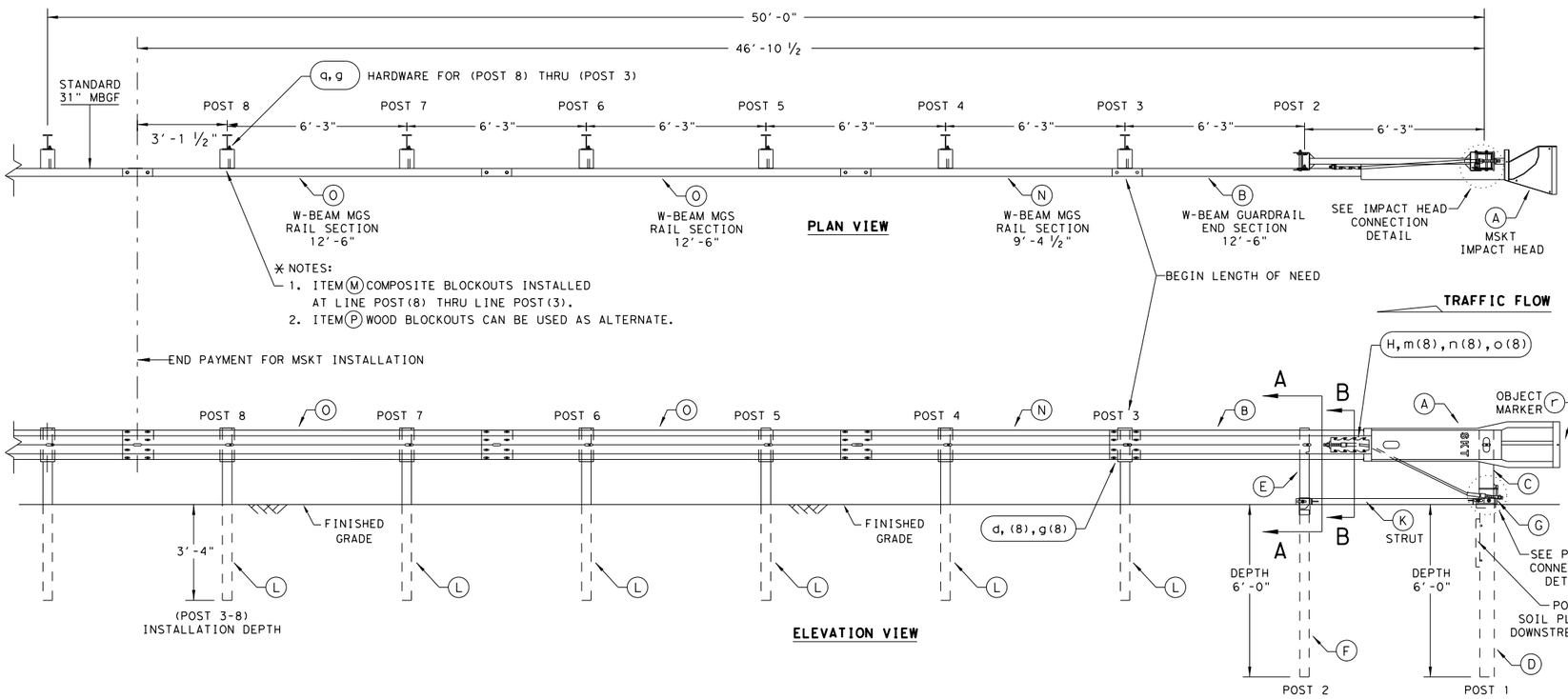
Texas Department of Transportation

Design Division Standard

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

GF(31)MS-19

FILE: gf31ms19.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	030	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		90



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

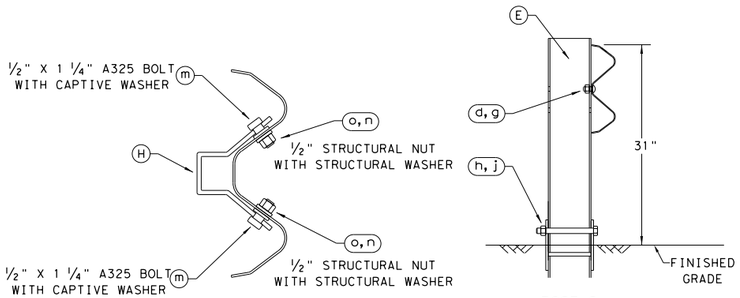
GENERAL NOTES

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

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

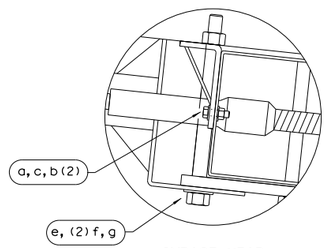
SEE NOTES: ✳

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

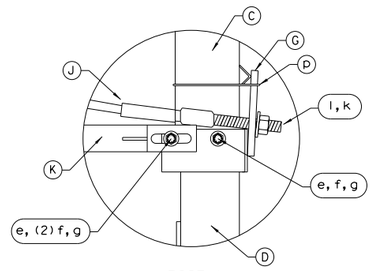


SECTION B-B
ANCHOR BRACKET

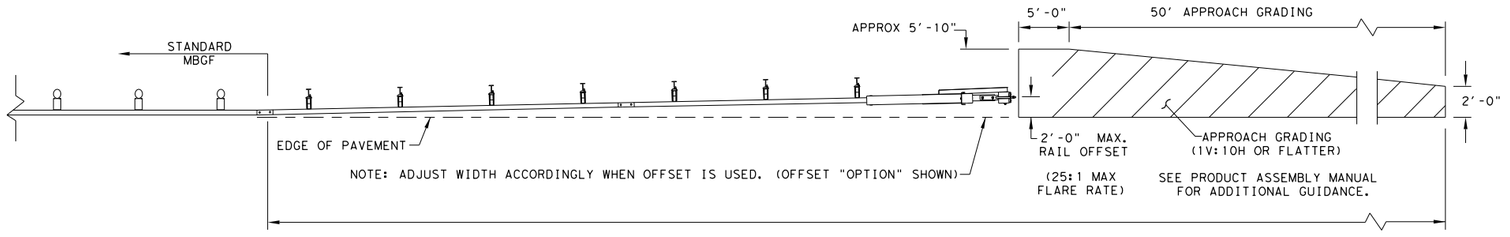
POST 2
SECTION A-A



IMPACT HEAD
CONNECTION DETAIL



POST 1
CONNECTION DETAIL



APPROACH GRADING AT GUARDRAIL END TREATMENTS

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

TRAFFIC FLOW

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

Texas Department of Transportation

Design Division Standard

SINGLE GUARDRAIL TERMINAL

MSKT-MASH-TL-3

SGT(12S)31-18

FILE: sgt12s3118.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CL	
© TxDOT: APRIL 2018	CONT	SECT	JOB	HIGHWAY	
REVISIONS	1133	02	030	FM 794	
	DIST	COUNTY		SHEET NO.	
	YKM	GONZALES		91	

DATE: 1/26/2024
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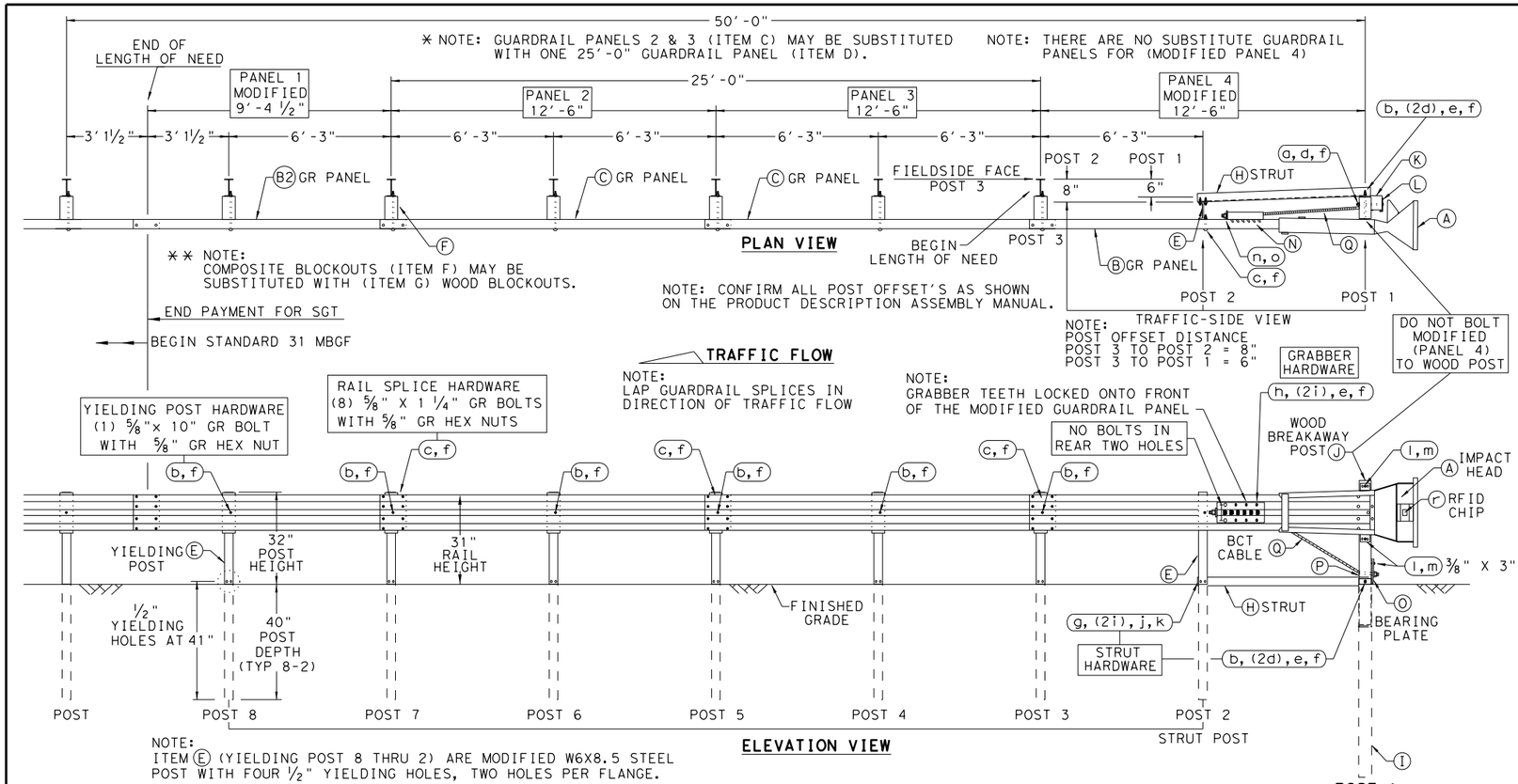
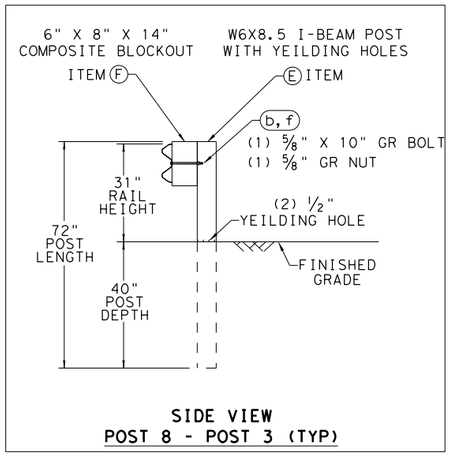


GENERAL NOTES

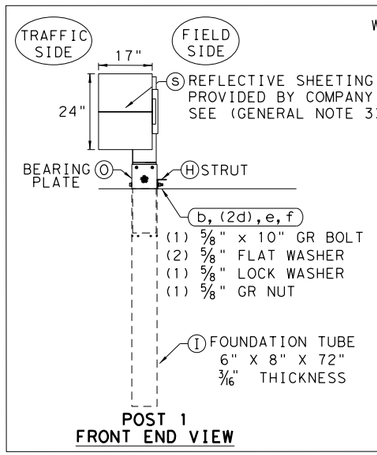
1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: SPIG INDUSTRY, INC. AT 1(267) 644-9510. 14675 INDUSTRIAL PARK RD; BRISTOL, VA 24202
2. FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO THE MANUFACTURER'S; SGET END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY 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

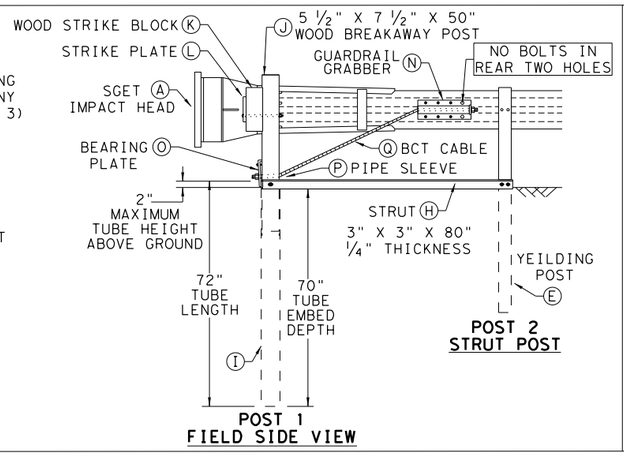
ALTERNATIVE ITEMS * D E
NOTE: ** G
SEE PLAN VIEW



SIDE VIEW
POST 8 - POST 3 (TYP)

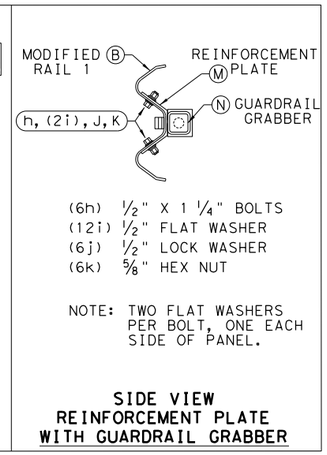


POST 1
FRONT END VIEW

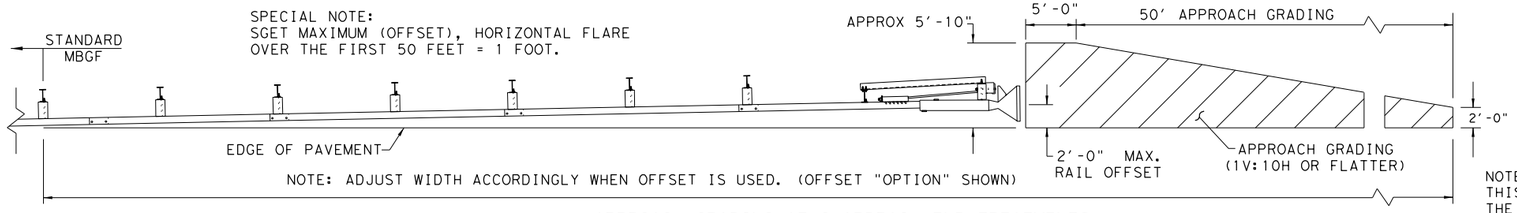


POST 1
FIELD SIDE VIEW

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		
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	DIST	COUNTY		SHEET NO.		
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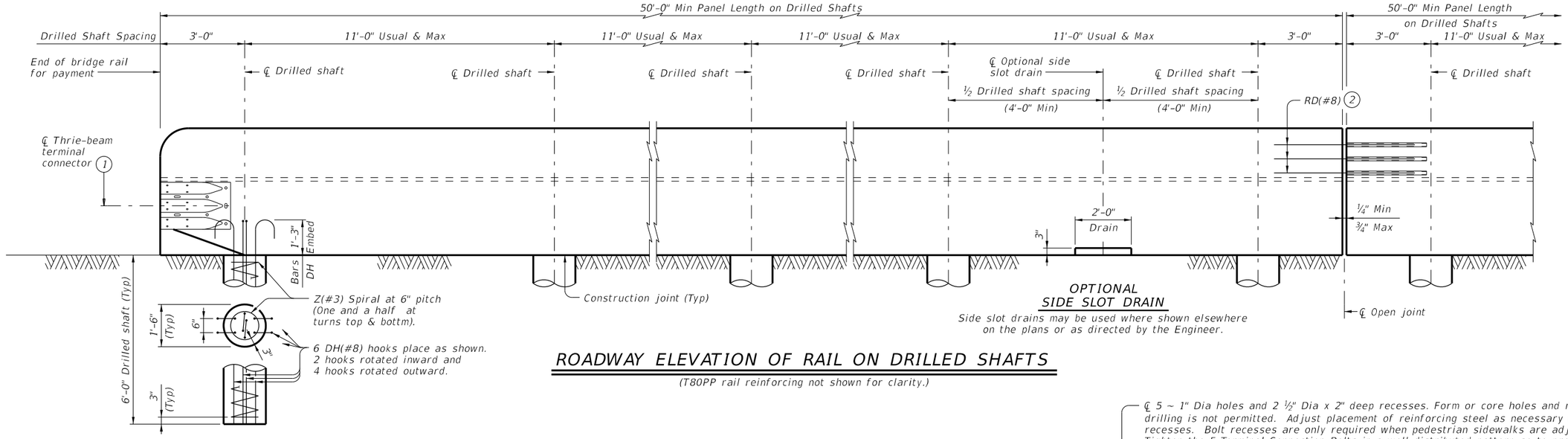


OPTIONAL SIDE SLOT DRAIN

Side slot drains may be used where shown elsewhere on the plans or as directed by the Engineer.

ROADWAY ELEVATION OF RAIL ON DRILLED SHAFTS

(T80PP rail reinforcing not shown for clarity.)

(1) Terminal Connectors and associated hardware are to be paid for under the Item "Metal Beam Guard fence". Attach Metal Beam Guard Fence Transitions to the bridge rail and extend along the embankment unless otherwise shown in the plans.

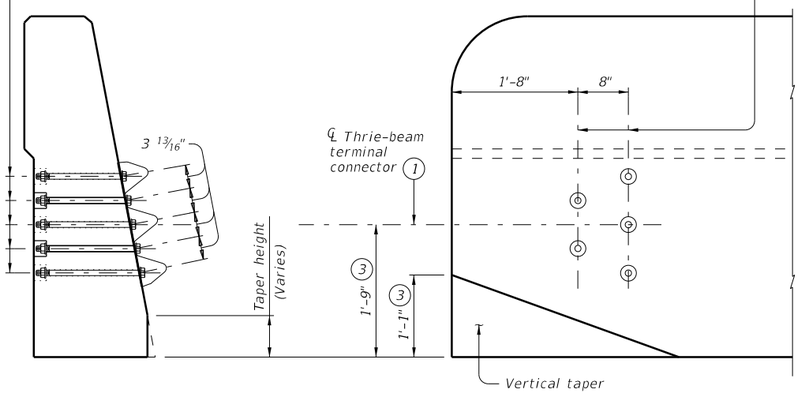
(2) Located at rail joints. For placement and assembly of Bar RD(#8), see "Section Thru Rail On Drilled Shafts" and "Bar RD(#8) Assembly Detail".

(3) Increase 2" for structures with overlay.

(4) Adjust bottom bars R(#6) as required to maintain 1 ½" cover over slots.

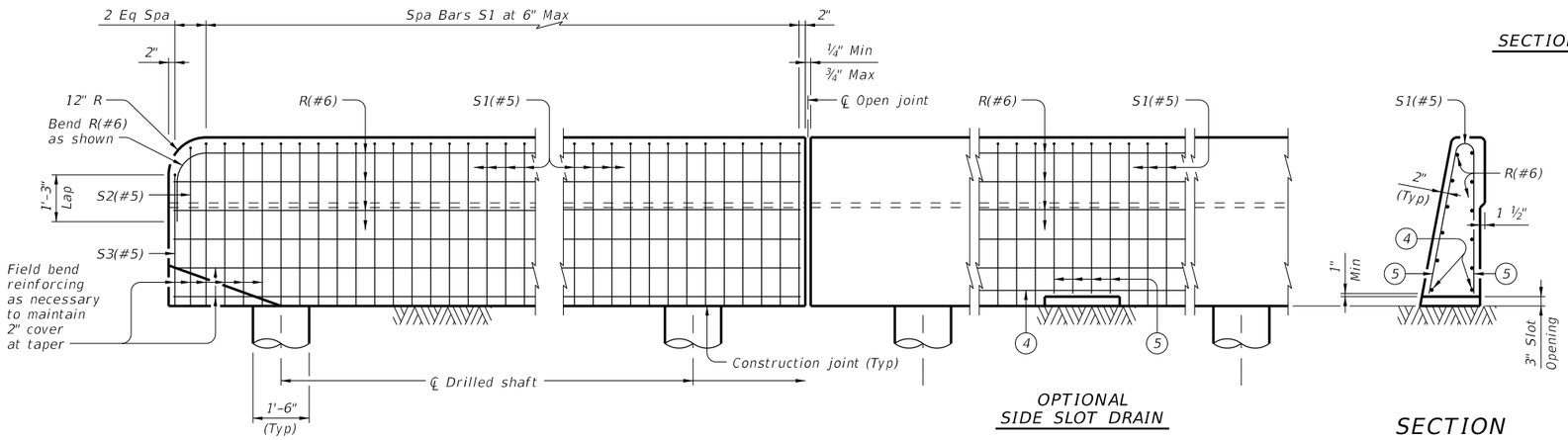
(5) Cut Bars S1(#5) as required to maintain 1" end cover over drain slot.

℄ 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 o after installation so as to extend no more than ¾" beyond nut. Paint ends of cut-o bolts with zinc-rich paint.



SECTION ELEVATION

TERMINAL CONNECTION DETAILS



OPTIONAL SIDE SLOT DRAIN

ELEVATION SHOWING RAIL REINFORCING ON DRILLED SHAFT FOUNDATIONS

(Drilled shaft reinforcing and RD(#8) bars not shown for clarity.)

SECTION THRU OPTIONAL SIDE SLOT DRAIN

SHEET 1 OF 4

Texas Department of Transportation

Bridge Division Standard

T80PP TRAFFIC RAIL AND TRAFFIC RAIL FOUNDATION FOR MASH TL-5 PIER PROTECTION

T80PP-RF

FILE:	rlstd046-20.dgn	DN: TxDOT	CK: TAR	DW: JTR	CK: TAR
©TxDOT	July 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS		1133	02	030	FM 794
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DATE: 1/26/2024 $TIME$
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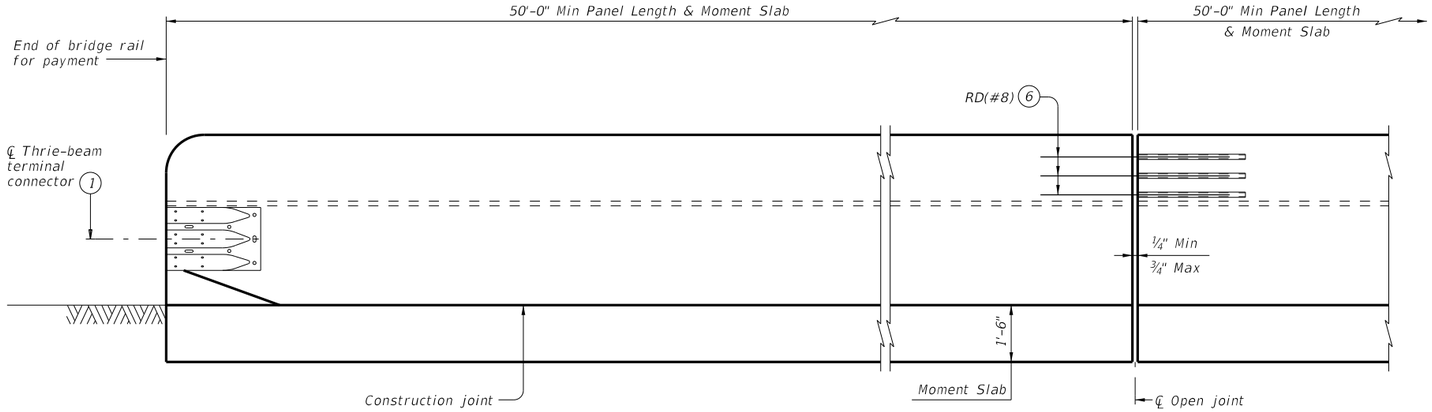
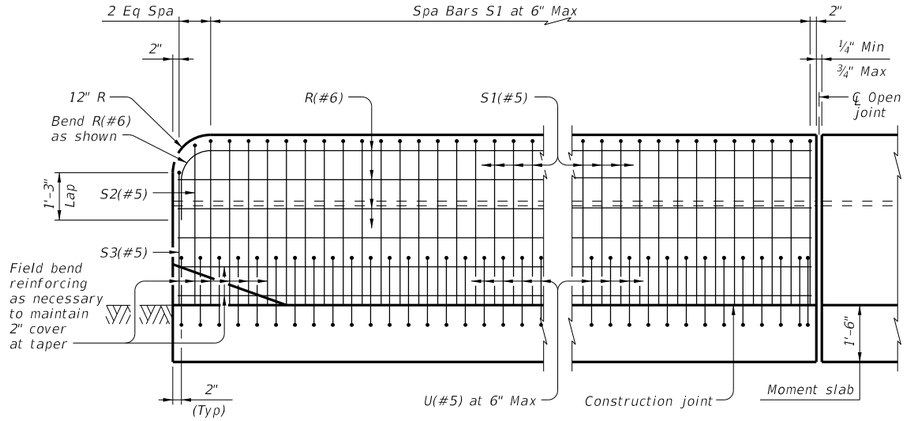
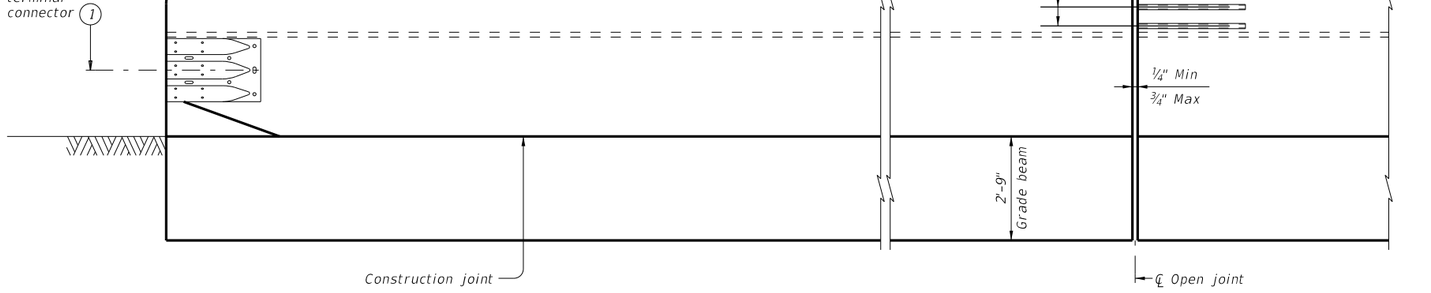


ROADWAY ELEVATION OF RAIL ON MOMENT SLAB

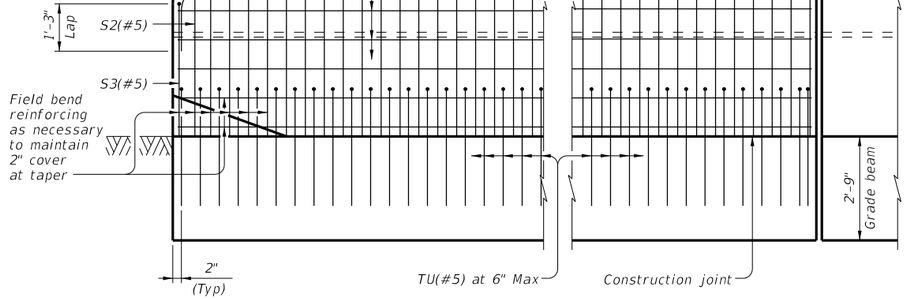


ELEVATION SHOWING RAIL REINFORCING ON MOMENT SLAB

(Moment slab reinforcing and Bars RD(#8) not shown for clarity.)

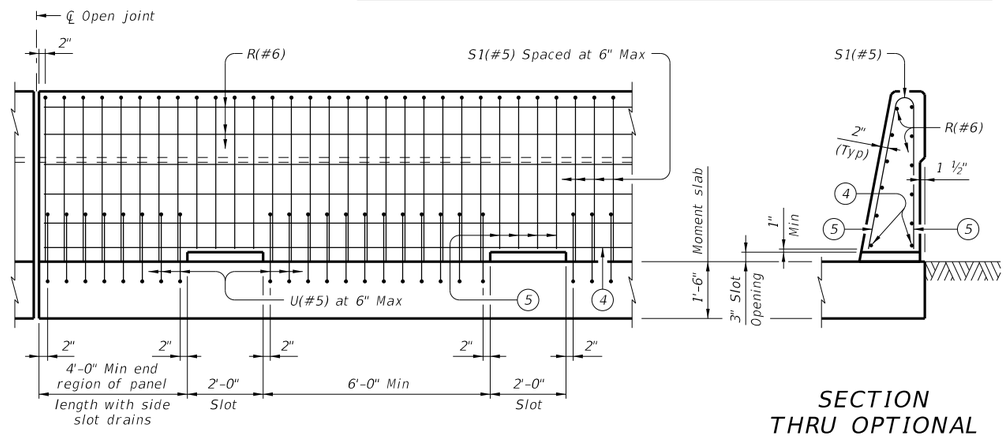


ROADWAY ELEVATION OF RAIL ON GRADE BEAM



ELEVATION SHOWING RAIL REINFORCING ON GRADE BEAM

(Grade beam reinforcing and Bars RD(#8) not shown for clarity.)



OPTIONAL SIDE SLOT DRAIN DETAIL

Side slot drains may be used where shown elsewhere on the plans or as directed by the Engineer. (Showing T80PP rail on moment slab, rail on grade beam is similar. Moment slab reinforcing and RD(#8) bars are not shown for clarity.)

SECTION THRU OPTIONAL SIDE SLOT DRAIN

(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.*

(4) *Adjust bottom bars R(#6) as required to maintain 1 ½" cover over slots.*

(5) *Cut Bars S1(#5) as required to maintain 1" end cover over drain slot.*

(6) *Located at rail joints. For placement and assembly of RD(#8) bar, see "Section Thru Rail On Moment Slab" and "Bar RD(#8) Assembly Detail".*

(7) *Located at rail joints. For placement and assembly of RD(#8) bar, see "Section Thru Rail On Grade Beam" and "Bar RD(#8) Assembly Detail".*

Texas Department of Transportation

Bridge Division Standard

T80PP TRAFFIC RAIL AND TRAFFIC RAIL FOUNDATION

FOR MASH TL-5 PIER PROTECTION

T80PP-RF

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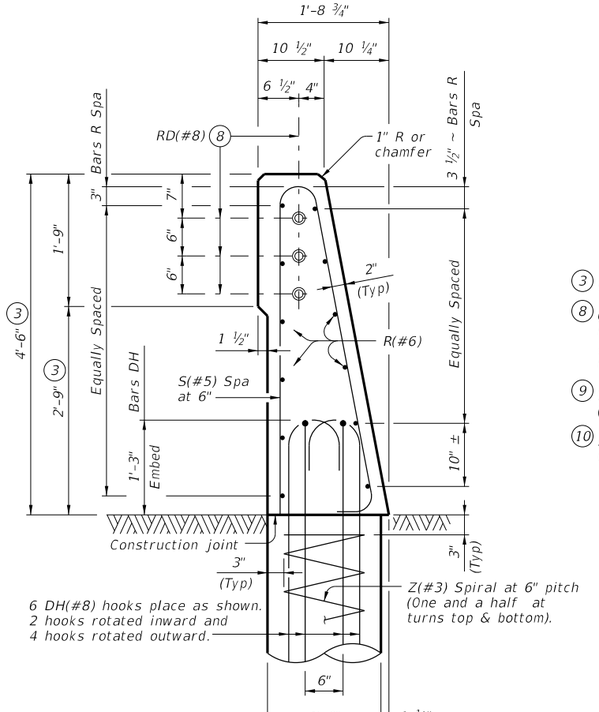


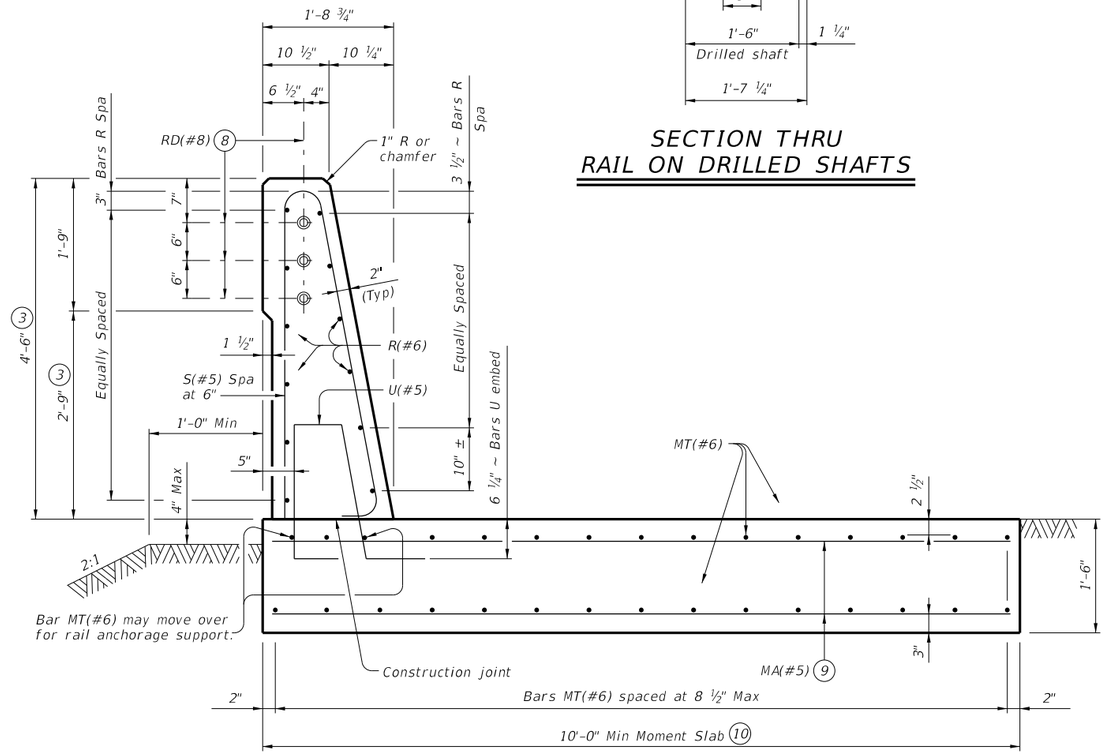
SECTION THRU RAIL ON DRILLED SHAFTS

(3) Increase 2" for structures with overlay.

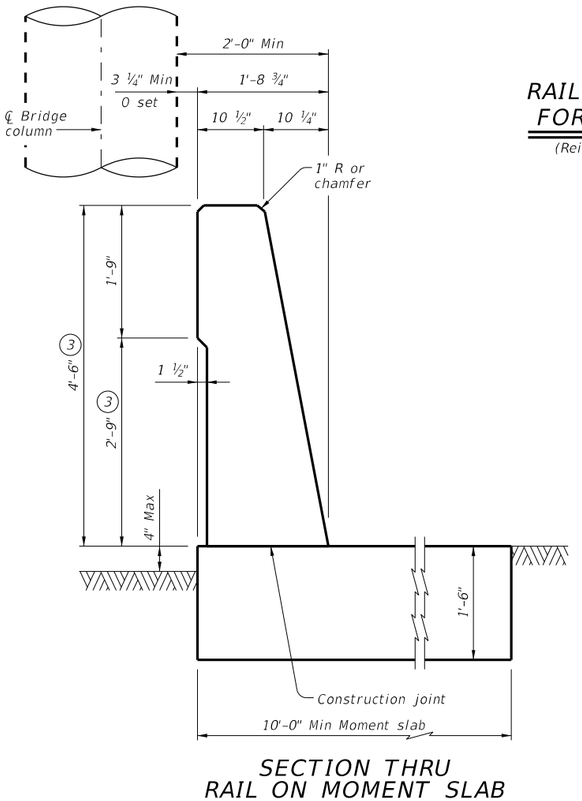
(8) ℄ 3 Bars RD(#8) placed as shown at each joint. Center Bar RD(#8) at joint locations with 1 ¼" PVC pipe Sch 80 sleeve on one side of joint. See "Bar RD(#8) Assembly Detail".

(9) MA(#5) space longitudinally along moment slab at 12" Max (Spaced 2" longitudinally from outside edge of moment slab).

(10) Approximate moment slab concrete = 0.56 CY/LF and reinforcement = 65.4 LB/LF.

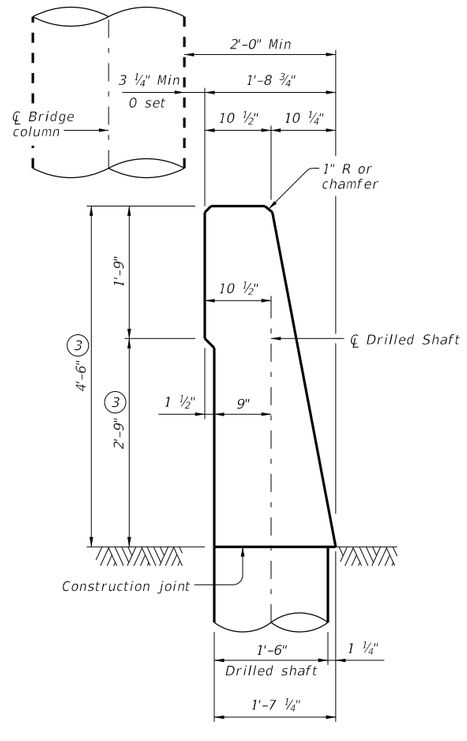


SECTION THRU RAIL ON MOMENT SLAB



SECTION THRU RAIL ON MOMENT SLAB FOR PIER PROTECTION

(Reinforcing not shown for clarity.)



SECTION THRU RAIL ON DRILLED SHAFT FOR PIER PROTECTION

(Reinforcing not shown for clarity.)

SHEET 3 OF 4

Texas Department of Transportation

Bridge Division Standard

T80PP TRAFFIC RAIL AND TRAFFIC RAIL FOUNDATION

FOR MASH TL-5 PIER PROTECTION

T80PP-RF

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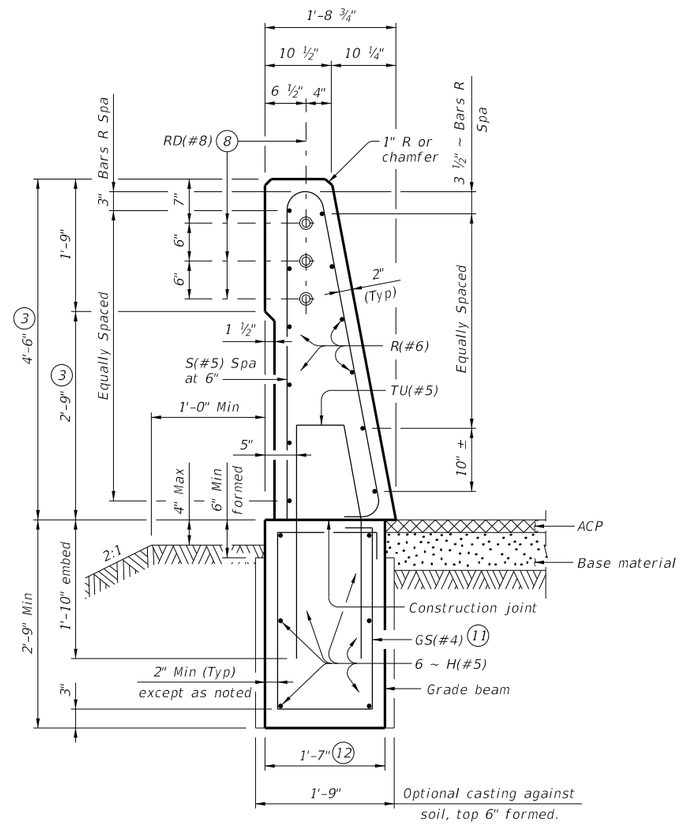
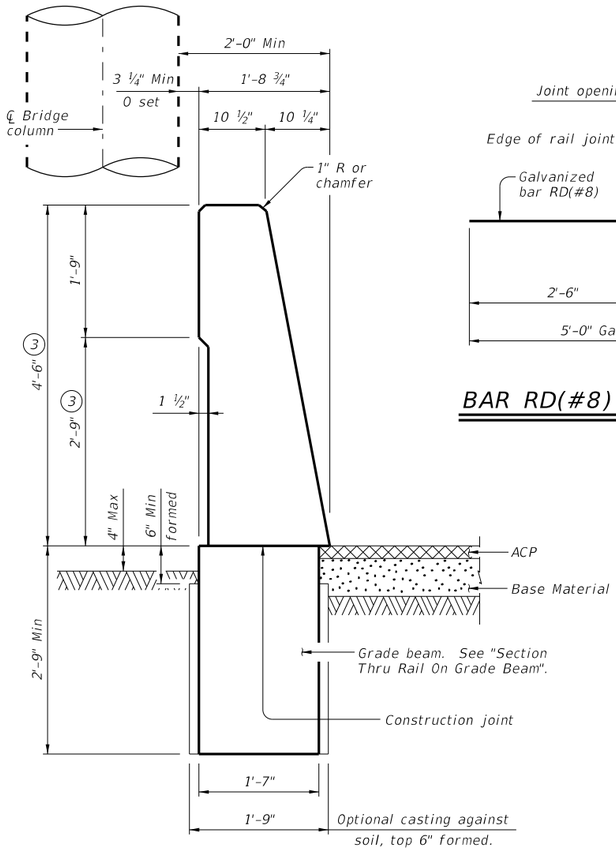
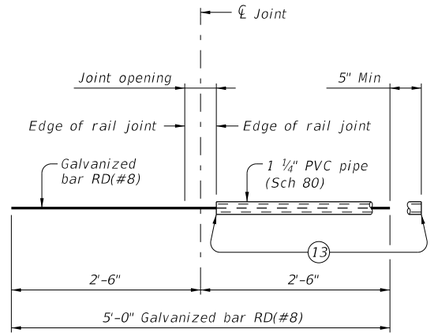


SECTION THRU RAIL ON GRADE BEAM



SECTION THRU RAIL ON GRADE BEAM FOR PIER PROTECTION

(Reinforcing not shown for clarity.)



BAR RD(#8) ASSEMBLY DETAIL

(3) Increase 2" for structures with overlay.

(8) ℄ 3 Bars RD(#8) placed as shown at each joint. Center RD(#8) bar at joint locations with 1 1/4" PVC pipe Sch 80 sleeve on one side of joint. See "Bar RD(#8) Assembly Detail".

(11) GS(#4) space longitudinally along grade beam at 8" Max. (Spaced 2 1/2" longitudinally from outside edge of grade beam).

(12) Approximate grade beam concrete = 0.16 CY/LF and reinforcement = 14.2 LB/LF.

(13) Tape ends of 1 1/4" PVC Sch 80 to prevent concrete or mortar from seeping in.

CONSTRUCTION NOTES:

Align moment slab or grade beam open joints with rail open joints maintaining no less than the minimum rail length. Provide moment slab or grade beam with open joints at no greater than 105' spacing unless shown on the plans or approved by the Engineer.

The back of railing must be vertical unless otherwise shown on the plans or approved by the Engineer.

MATERIAL NOTES:

Galvanize RD(#8) bar as shown.

Provide Class "C" concrete. Provide Class "C" (HPC) if required elsewhere.

Provide Grade 60 reinforcing steel.

Epoxy coat or galvanize all reinforcing steel if required elsewhere.

Deformed Welded Wire Reinforcement (WWR) (ASTM A1064) of equal size and spacing may be substituted for Bars GS(#4), H(#5), U(#5) and TU(#5) unless noted otherwise. Provide the same laps as required for reinforcing bars.

Provide bar laps, where required, as follows:

Uncoated or galvanized ~ #5 = 2'-4"
Epoxy coated ~ #5 = 3'-6"
Uncoated or galvanized ~ #6 = 2'-5"
Epoxy coated ~ #6 = 3'-7"

GENERAL NOTES:

This rail has been successfully evaluated by full-scale crash test to meet MASH TL-5 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.

The foundation design resistance is based on the current AASHTO bridge railing requirements with the assumption of fair to good soil support conditions. Poor soil conditions will require suitably deeper and/or wider foundations.

This detail is intended for use as a guide to unusual railing anchorage situations but may be included in the plans, modified as necessary to apply to specific installations required on the project.

Payment for drilled shafts, moment slab and grade beam will be by Class "C" concrete or Class "C" (HPC) concrete for rail foundation.

Payment for railing will be as per Item 450, "Railing" (Ty T80PP).

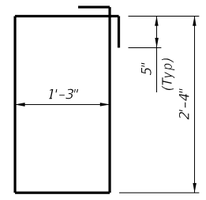
Excavation will be subsidiary to other Items.

See elsewhere in the plans for foundation type.

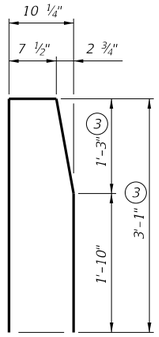
Shop drawings are not required for this rail.

Average weight of railing without rail foundation and no overlay is 828 plf.

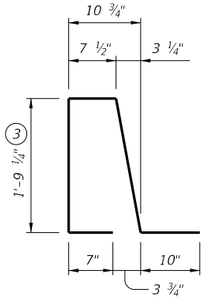
Cover dimensions are clear dimensions, unless noted otherwise. Reinforcing bar dimensions shown are out-to-out of bar.



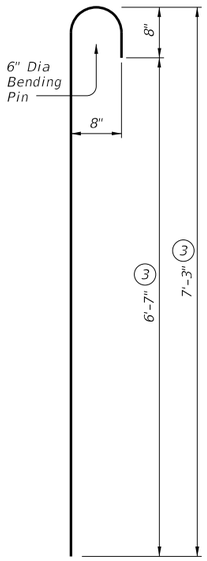
BARS GS(#4)



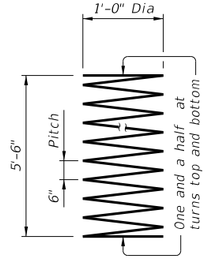
BARS TU(#5)



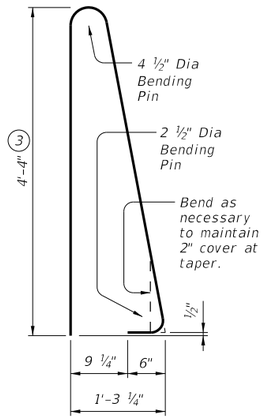
BARS U(#5)



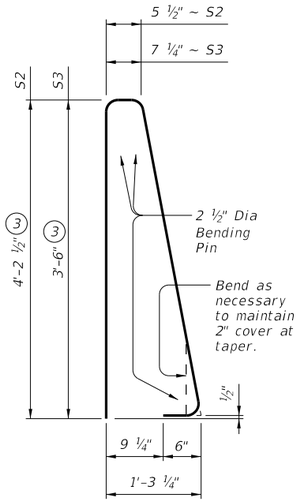
BARS DH(#8)



BARS Z(#3)



BARS S1(#5)



BARS S2-3(#5)

Texas Department of Transportation — Bridge Division Standard

T80PP TRAFFIC RAIL AND TRAFFIC RAIL FOUNDATION FOR MASH TL-5 PIER PROTECTION

T80PP-RF

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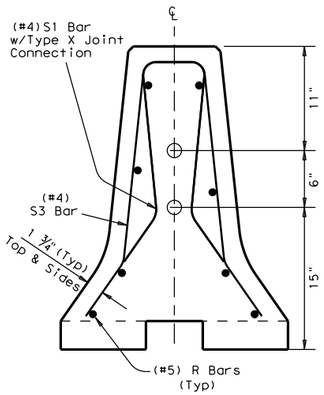
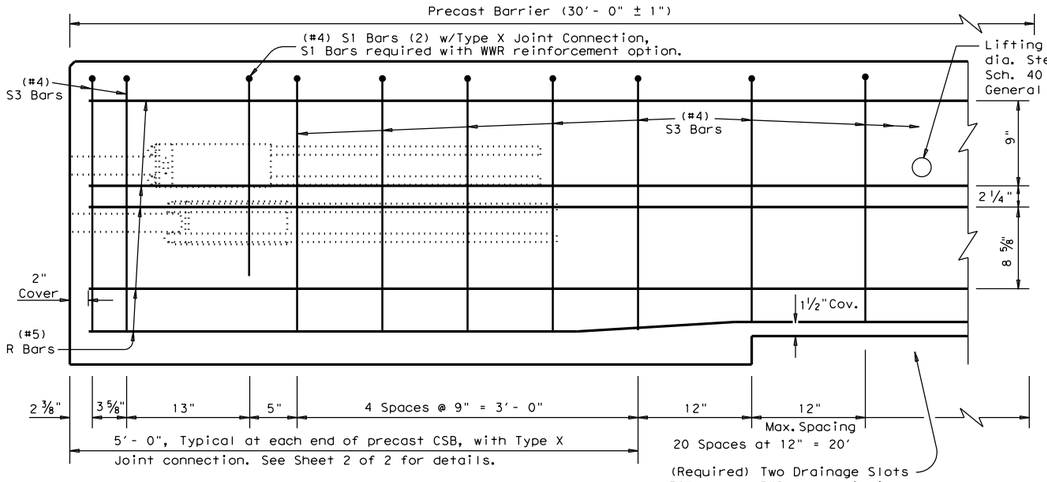


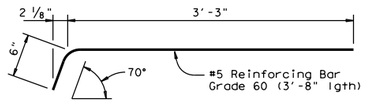
End View Precast Barrier

See sheet 2 of 3 for Joint connection Type X



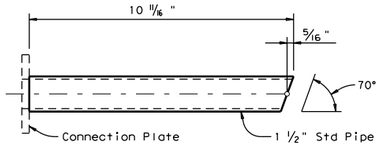
Reinforcement for Precast (CSB) Concrete Safety Barrier (Type 1)

Showing reinforcement for Joint Type X



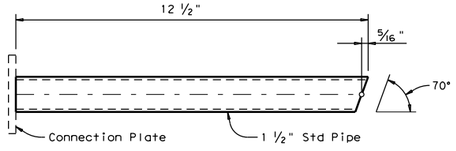
DEFORMED BAR ANCHOR DETAILS

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



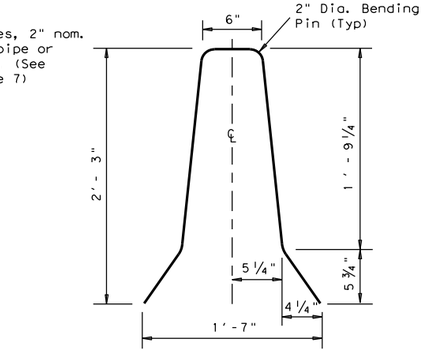
UPPER CONNECTION PIPE DETAILS

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



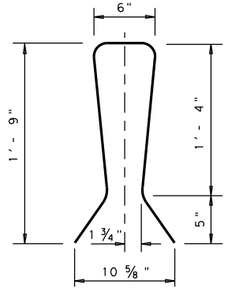
LOWER CONNECTION PIPE DETAILS

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



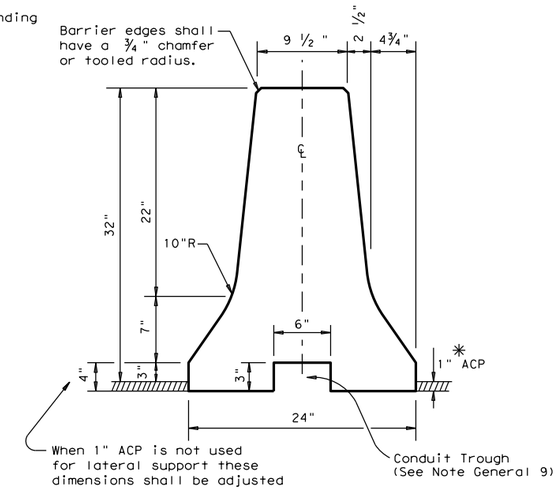
S3 Bar

#4 Bar



S1 Bar

#4 Bar (2)
(Joint Type X)

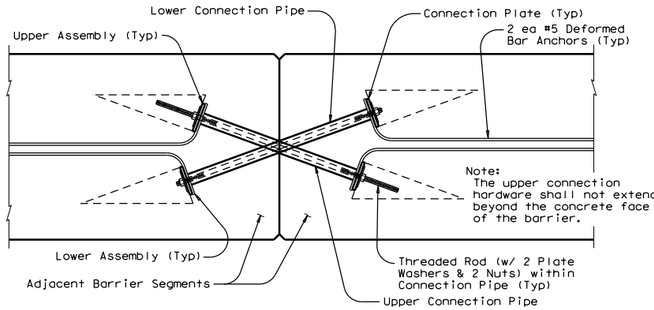


Concrete Safety Barrier

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

GENERAL NOTES

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



TYPE X JOINT INSTALLATION DETAIL

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

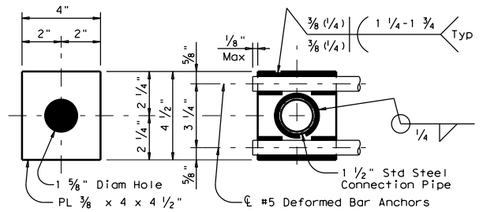
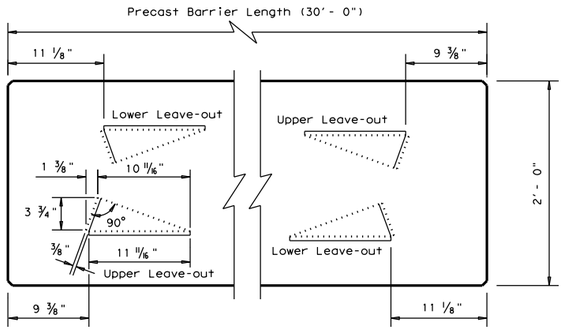


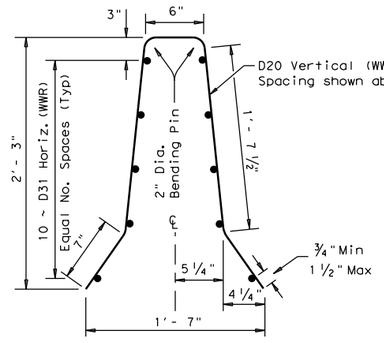
PLATE DIMENSIONS WELDING DETAILS

CONNECTION PLATE DETAILS

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



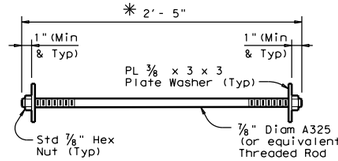
BARRIER PLAN AT END JOINTS



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

(WWR) General Notes

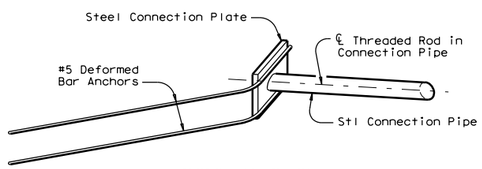
1. Deformed Welded Wire Reinforcement (WWR) shall conform to ASTM A497.
2. Welded wire cage may be cut or bent to accommodate the Type X joint connection and drainage slots, as directed by the Engineer.
3. All reinforcement shall comply with Item 440, "Reinforcing Steel."
4. Combinations of reinforcing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



CONNECTION BOLT OR THREADED ROD DETAIL

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

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



ISOMETRIC OF TYPICAL WELDED ASSEMBLY

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

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

SHEET 1 OF 2

Texas Department of Transportation

Design Division Standard

CONCRETE SAFETY BARRIER (F-SHAPE)

PRECAST BARRIER (TYPE 1)

CSB(1)-10

FILE: csb110.dgn	DN: TxDOT	CK: AM	DW: BD	CK: VP
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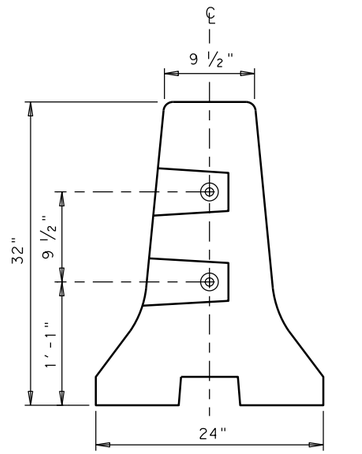
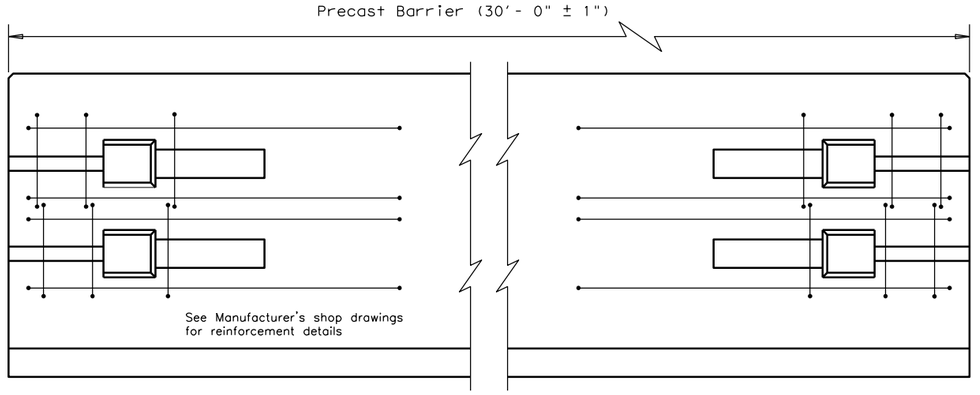


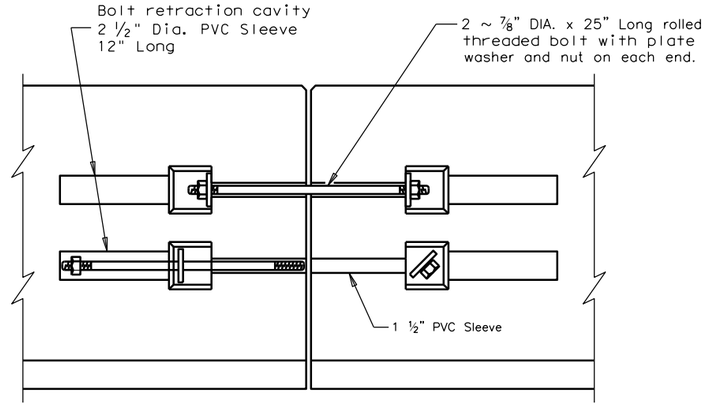
END VIEW (CSB) QUICK-BOLT

QUICK-BOLT POCKET LOCATIONS



ELEVATION (CSB) QUICK-BOLT

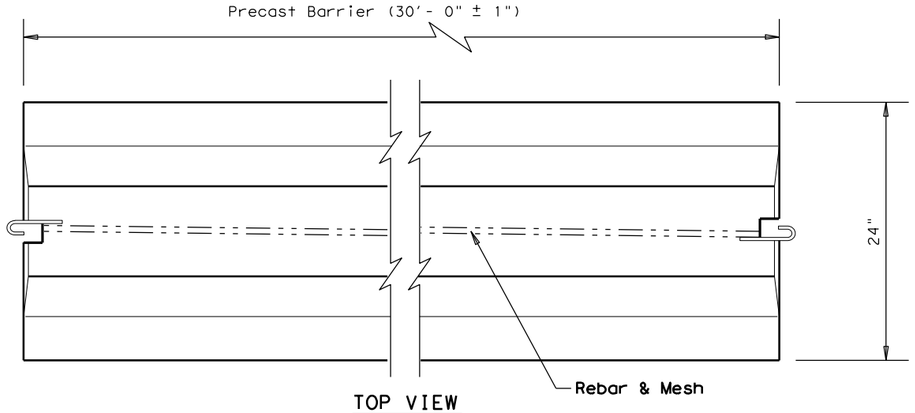
See Manufacturer's shop drawing for additional details



ELEVATION VIEW SHOWING JOINT CONNECTION

"QUICK-BOLT"

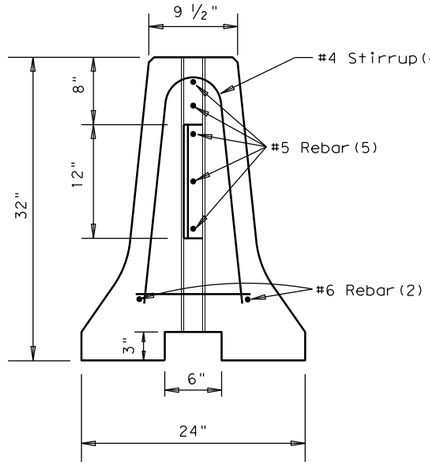
Joint Connection (Type Q)



TOP VIEW

PRECAST (CSB) WITH J-J HOOKS

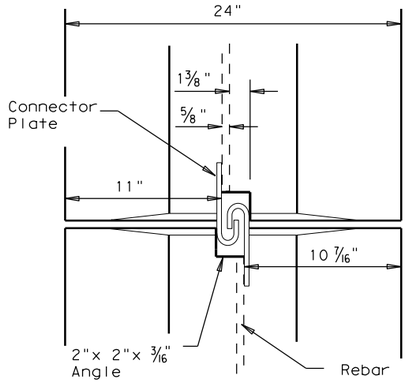
See Manufacturer's shop drawing for additional details



END VIEW

J-J HOOK CONNECTION

Joint Connection (Type J)



VIEW FROM ABOVE

J-J HOOK CONNECTION

Proprietary Joint Connections (CSB)

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

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

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

Texas Department of Transportation

Design Division Standard

CONCRETE SAFETY BARRIER (F-SHAPE)

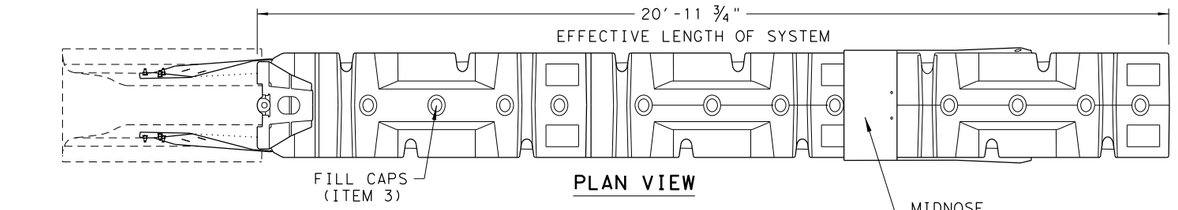
PRECAST BARRIER
(TYPE 1)

CSB(1)-10

FILE: csb110.dgn	DN: TxDOT	CK: AM	DW: BD	CK: VP
©TxDOT December 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	030	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		98

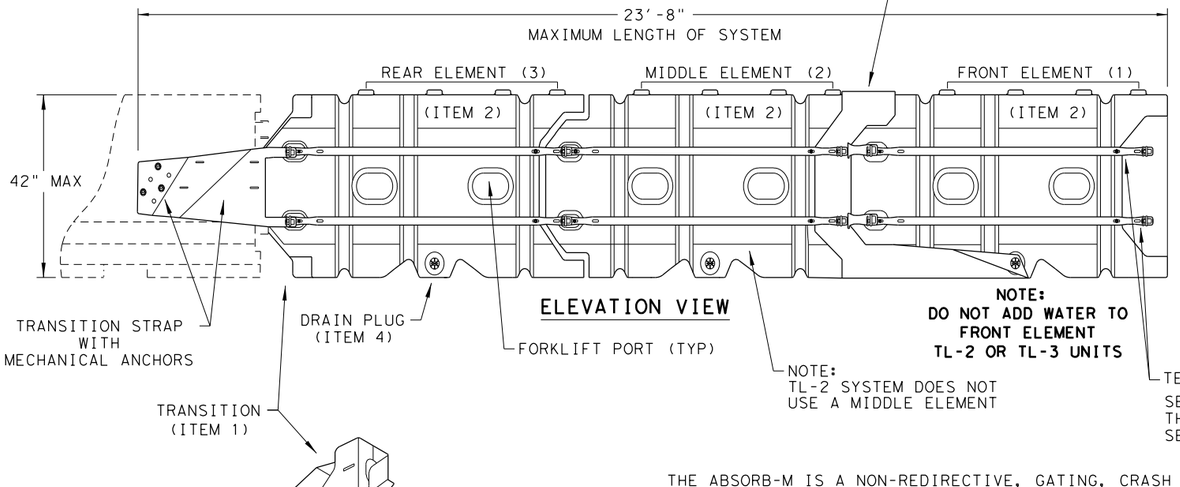
DATE: 1/26/2024 $TIME$
FILE: $FILE$

SYSTEM SHOWN - ABSORB-M TL-3



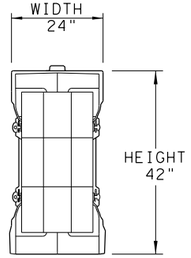
PLAN VIEW

TRAFFIC FLOW

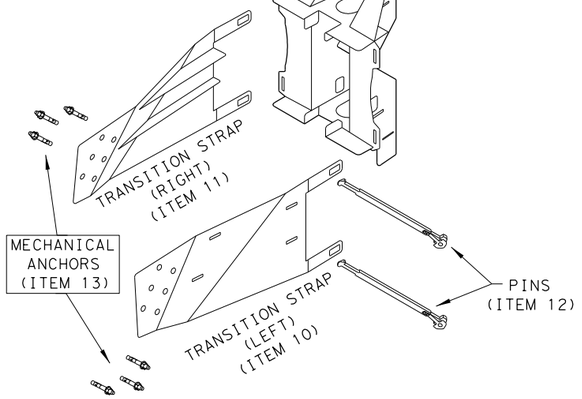


ELEVATION VIEW

TRAFFIC FLOW



SECTION A-A



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

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

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

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

GENERAL NOTES

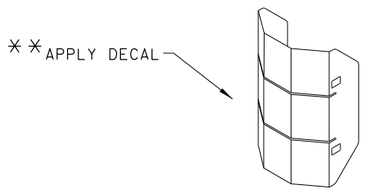
1. FOR SPECIFIC INFORMATION REGARDING THE INSTALLATION AND TECHNICAL GUIDANCE, CONTACT: LINDSAY TRANSPORTATION SOLUTIONS (LTS) - BARRIER SYSTEMS, INC. AT (707) 374-6800. 180 RIVER ROAD, RIO VISTA, CA 94571
2. THE ABSORB-M SYSTEM IS ONLY APPROVED FOR USE IN (TEMPORARY WORK ZONE) LOCATIONS.
3. THE ABSORB-M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

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

*COMPONENTS PRE-ASSEMBLED WITH ELEMENT ASSEMBLY

DELINEATION DECAL PLACEMENT GUIDE

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



NOSE PLATE

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

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

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

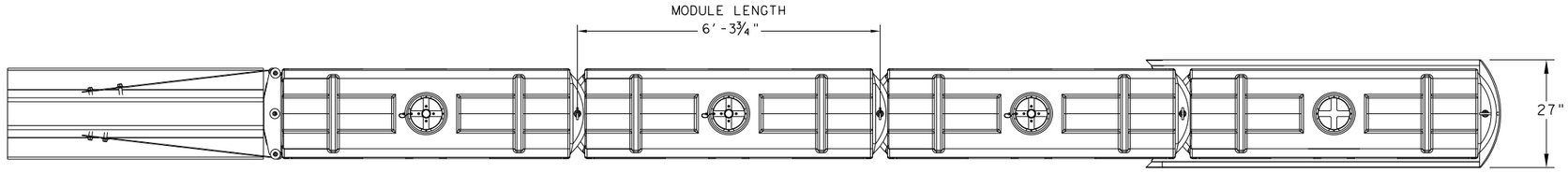
SACRIFICIAL

Texas Department of Transportation — Design Division Standard

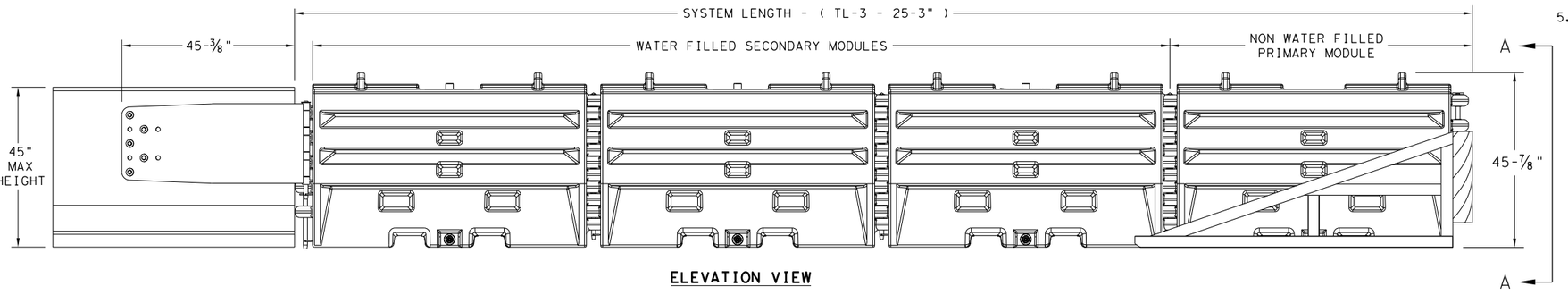
LINDSAY TRANSPORTATION SOLUTIONS
CRASH CUSHION
(MASH TL-3 & TL-2)
TEMPORARY - WORK ZONE
ABSORB(M)-19

FILE: absorbm19	DN: TxDOT	CK: KM	DW: VP	CK:
© TxDOT: JULY 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	030	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		99

DATE: 1/26/2024
FILE: $FILE$



PLAN VIEW



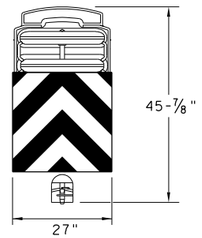
ELEVATION VIEW

GENERAL NOTES

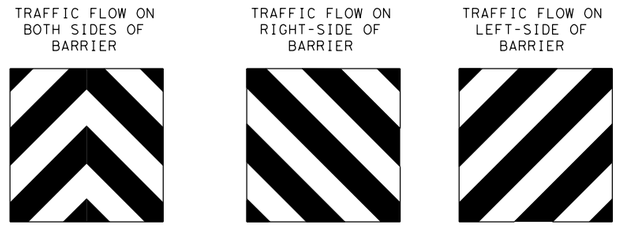
1. REFER TO THE INSTALLATION MANUAL FOR SPECIFIC SYSTEM ASSEMBLY AND MODULE ORIENTATION. FOR ADDITIONAL INFORMATION, CONTACT TRAFFIX, INC. AT (949) 361-5663.
2. THE SLED SYSTEM IS A MASH APPROVED TEST LEVEL 3 (TL-3) CRASH CUSHION APPROVED FOR USE IN TEMPORARY WORK ZONES. THE SLED SYSTEM IS A NON-REDIRECTIVE,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

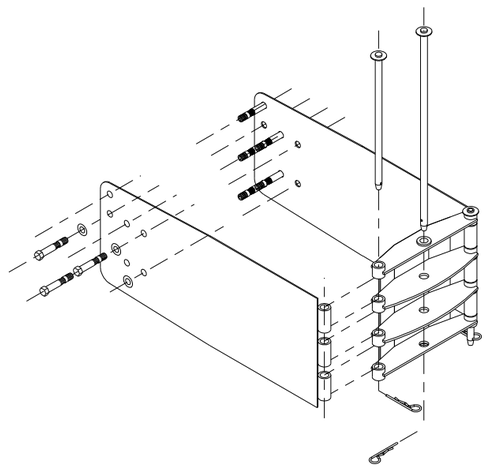


SECTION A-A



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

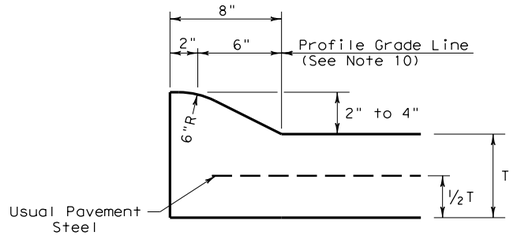
Texas Department of Transportation

Design Division Standard

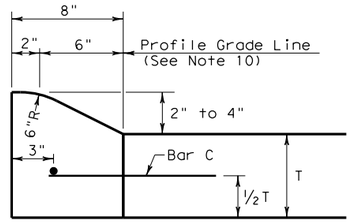
SLED
CRASH CUSHION
TL-3 MASH COMPLIANT
(TEMPORARY, WORK ZONE)
SLED-19

FILE: sled19.dgn	DN: TxDOT	CK: KM	DW: VP	CK:
© TxDOT: DECEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	030	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		100

DATE: 1/26/2024
FILE: $FILE$



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



TYPE I CURB
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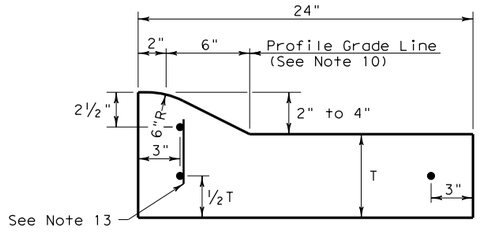
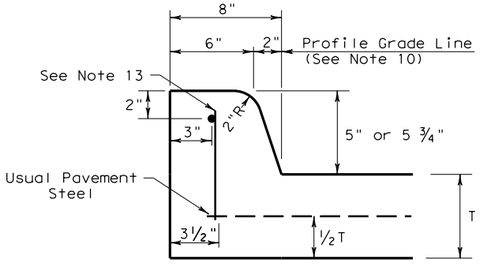
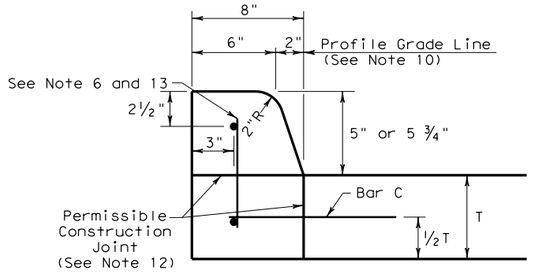


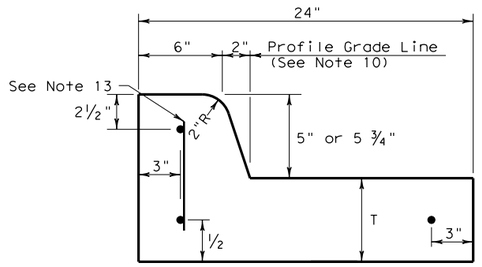
TYPE I CURB AND GUTTER
2" - 4" HEIGHT



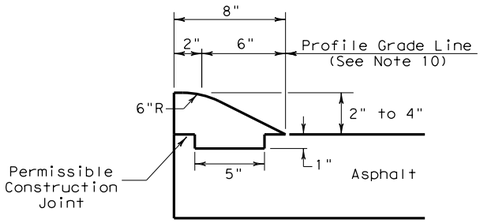
TYPE II CURB (MONOLITHIC)
5" - 5 ¾" HEIGHT



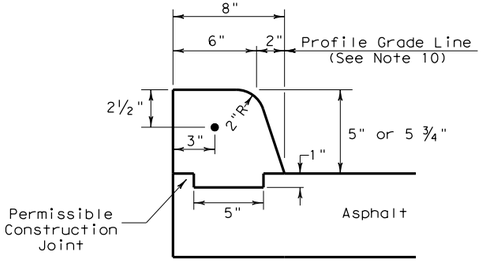
TYPE II CURB
5" - 5 ¾" HEIGHT



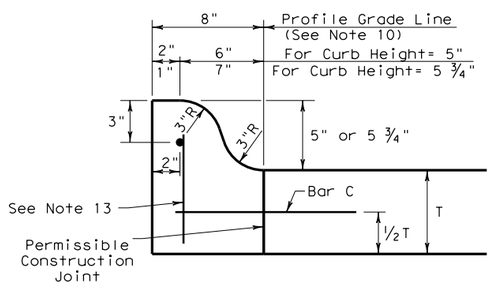
TYPE II CURB AND GUTTER
5" - 5 ¾" HEIGHT



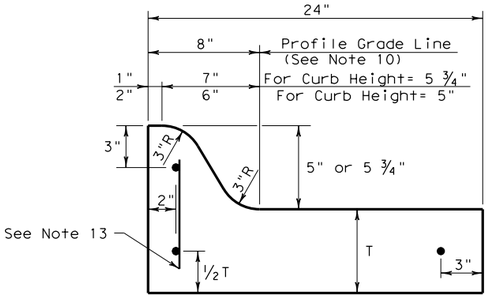
TYPE III CURB (KEYED)
2" - 4" HEIGHT



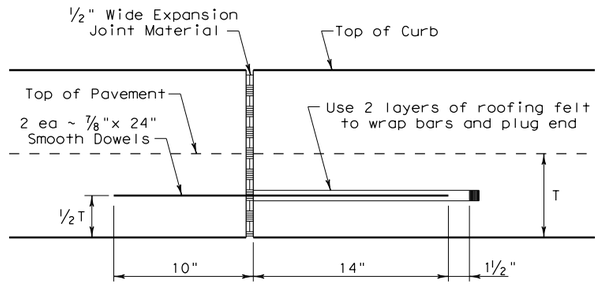
TYPE IV CURB (KEYED)
5" - 5 ¾" HEIGHT



TYPE IIa CURB
5" - 5 ¾" HEIGHT

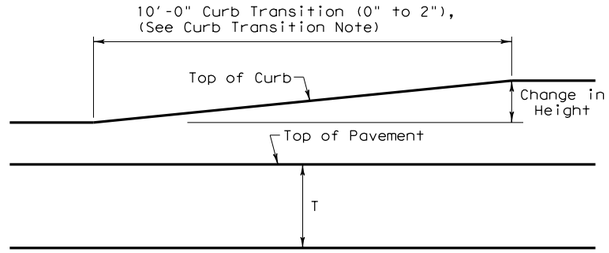


TYPE IIa CURB AND GUTTER
5" - 5 ¾" HEIGHT



EXPANSION JOINT DETAIL

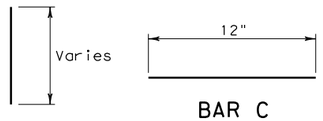
CURB TRANSITION NOTE:
Field conditions may require a longer or shorter transition, and shall be shown elsewhere in the plans, or as directed by the Engineer.



CURB TRANSITION
Note: To be paid for as Highest Curb

GENERAL NOTES

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



BAR B

BAR C

Texas Department of Transportation

Design Division Standard

CONCRETE CURB AND CURB AND GUTTER

CCCG-22

FILE: cccg21.dgn	DN: TXDOT		CK: AN		DW: CS		CK: KM
©TxDOT: JUNE 2022	CONT	SECT	JOB		HIGHWAY		
REVISIONS	1133	02	030		FM 794		
	DIST	COUNTY			SHEET NO.		
	YKM	GONZALES			101		

DATE: 1/26/2024
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DATE: 1/26/2024 $TIME$
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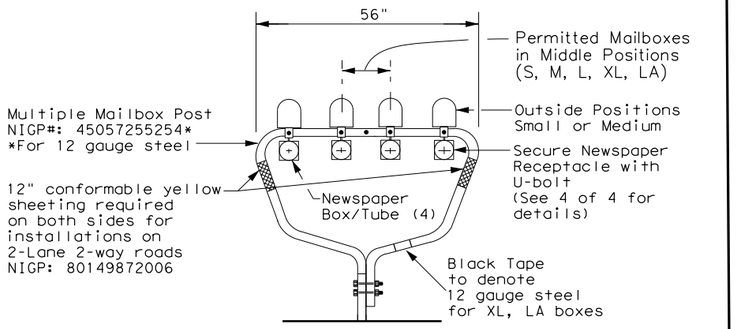
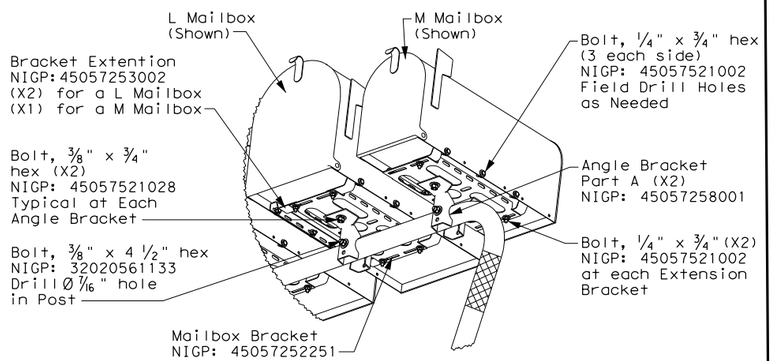
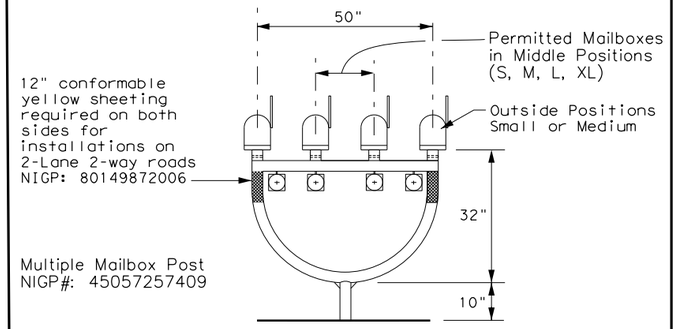
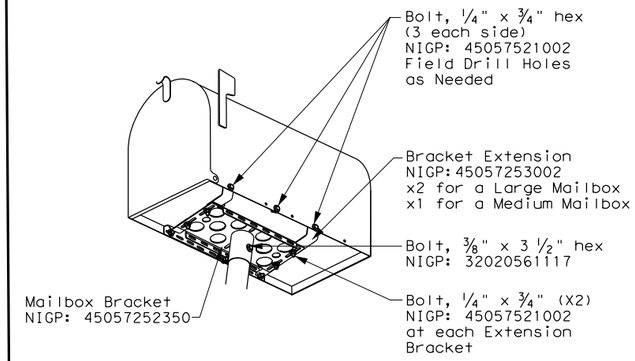
TYPE 1 - MULTIPLE





TYPE 4 - MULTIPLE





MAILBOX SIZES

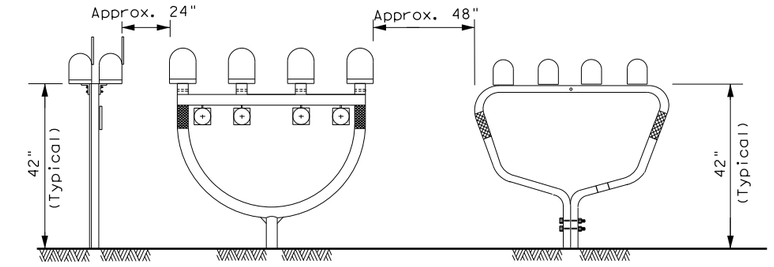
MAILBOX SIZE	TYPICAL DIMENSIONS			MAX **
	LENGTH	WIDTH	HEIGHT	WEIGHT
SMALL	19 1/2"	6"	7"	6 LBS
MEDIUM	22 1/2" *	8" *	11 1/2" *	8 LBS
LARGE	23 1/2"	11 1/2"	13 1/2"	11 LBS
EXTRA LARGE	18"	14"	12"	13 LBS
LOCKABLE	18"	11 1/2"	15"	23 LBS

* See Note 1.
** Excluding Molded Plastic on 4 X 4 Post

GENERAL NOTES:

1. Dimensions shown (length, width, and height) are typical, not maximums. However, anytime a medium size mailbox is mounted on a single/double mount or on the outside position on a multi mount, the dimensions shown are maximums.
2. Mailboxes shall be made of light weight sheet metal or light weight plastic. Heavy steel, cast iron or decorative mailboxes shall not be used on the state highway system.

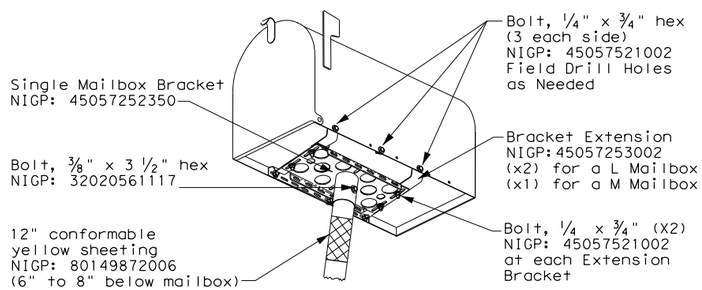
TYPICAL INSTALLATION MEASUREMENTS

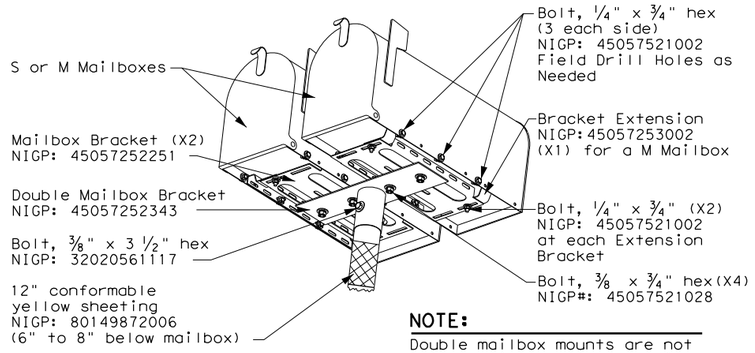


NOTE:

Mailbox installations in sidewalk areas shall be in accordance with the latest TxDOT Design Standard sheets PED-Pedestrian Facilities Curb Ramps.

TYPE 2 and 4 - SINGLE/DOUBLE

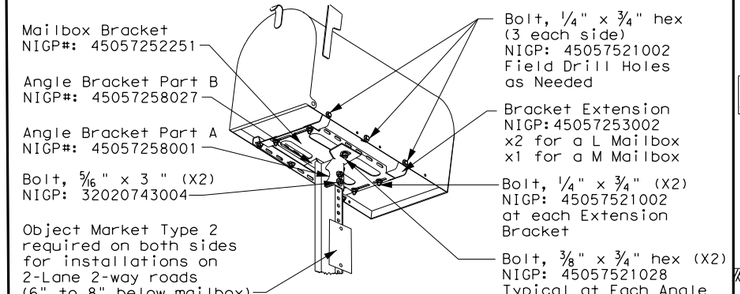


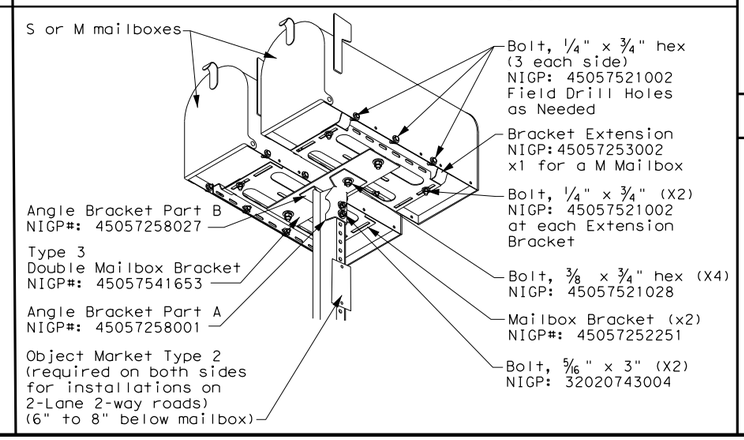


NOTE:

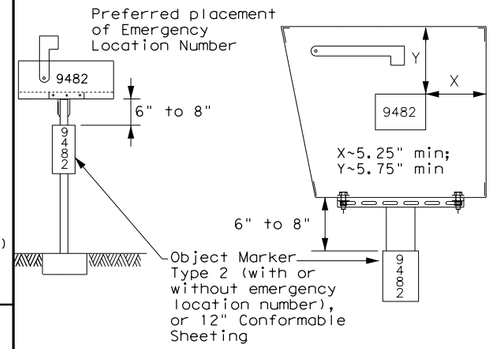
Double mailbox mounts are not allowed with a type 4 multiple mailbox installation

TYPE 3 - SINGLE/DOUBLE





PLACEMENT OF EMERGENCY LOCATION NUMBER

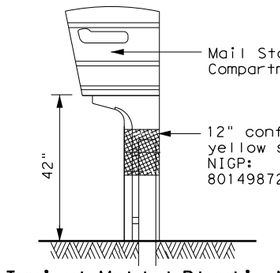


NOTES:

1. Location numbers are provided by homeowner. Minimum size 1" height.
2. Location number is typically placed on the mailbox in a contrasting color.
3. Black numbers may be placed on the Type 2 object marker if the numbers cannot be placed on the mailbox.
4. Alternatively, a green or blue plate with white numbers attached may be mounted below the object marker. Other contrasting color configuration, as approved, may be used.
5. See 3 of 4 for Foundation details.
6. See 4 of 4 for Hardware details.

SHEET 1 OF 4

TYPE 5



Typical Molded Plastic Mailbox

Texas Department of Transportation
Maintenance Division Standard

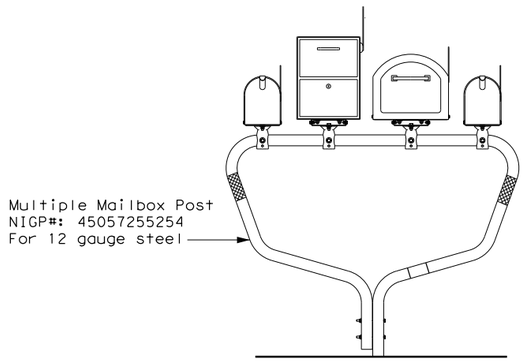
MAILBOX MOUNTING AND ASSEMBLY

MB(1)-21

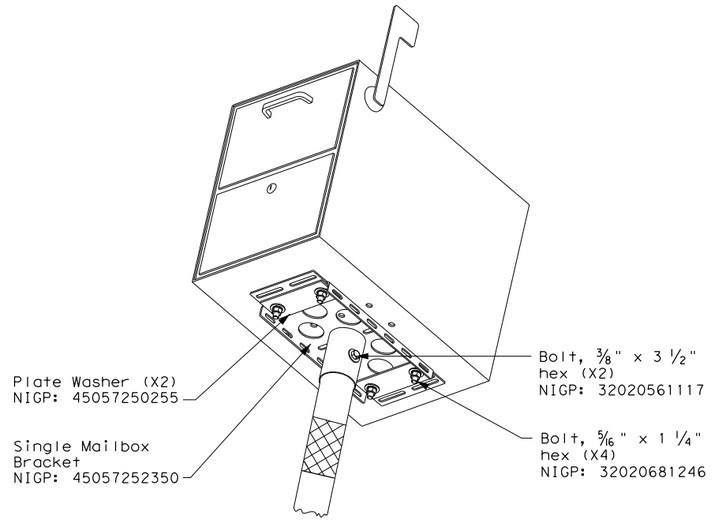
FILE: MB-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT March 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS 2/2005 11/2009 4/2015 6/2005 1/2011 11/2006 7/2014	1133	02	030	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		102

DATE: 1/26/2024 $TIME$
FILE: $FILE$

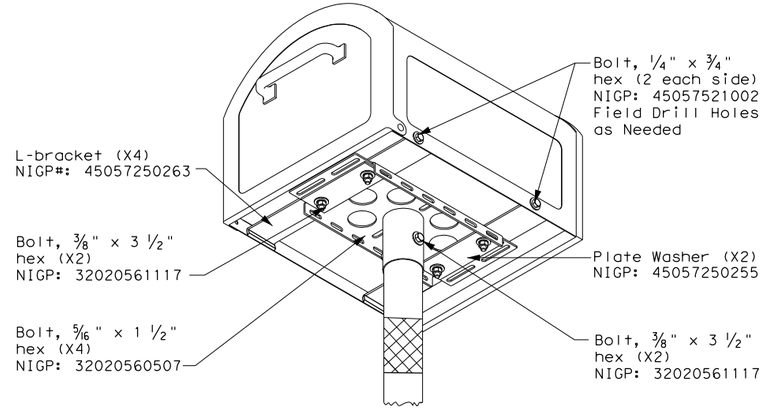
TYPE 1- MULTI LOCKABLE AND XL MAILBOX



TYPE 2/4 - SINGLE LOCKABLE MAILBOX

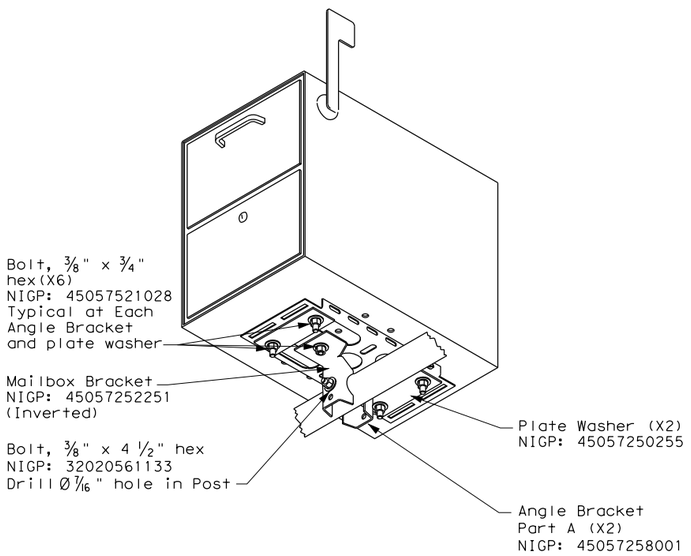


TYPE 2/4 - SINGLE XL MAILBOX

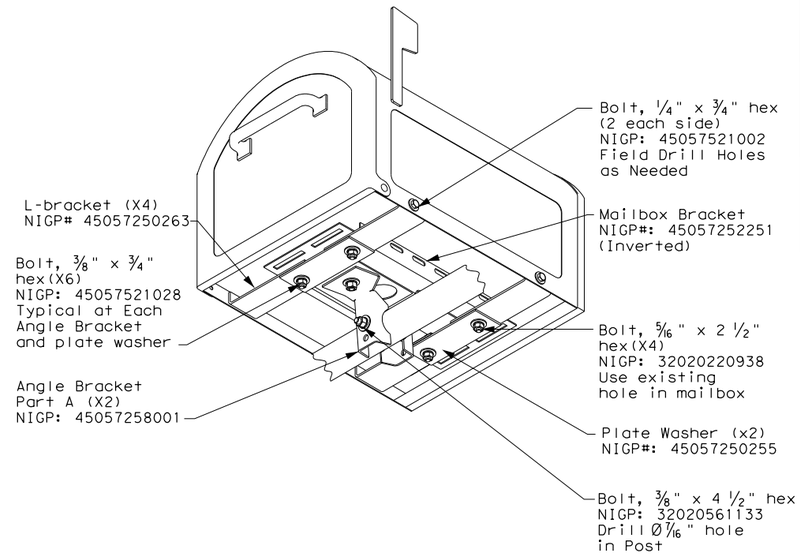


NOTE:
Follow same configuration when mounting an XL mailbox on a Type 4 multi post.

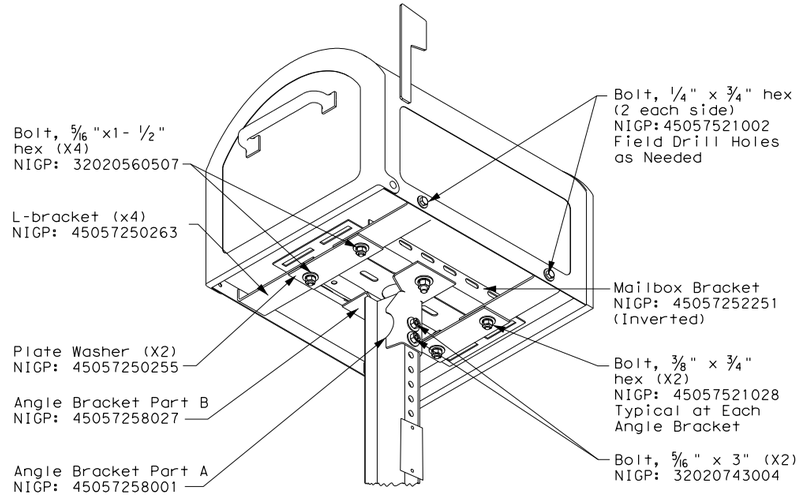
TYPE 1 MULTI – LOCKABLE ARCHITECTURAL (LA)



TYPE 1 MULTI – XL MAILBOX



TYPE 3 - XL MAILBOX MOUNTING



Texas Department of Transportation

Maintenance Division Standard

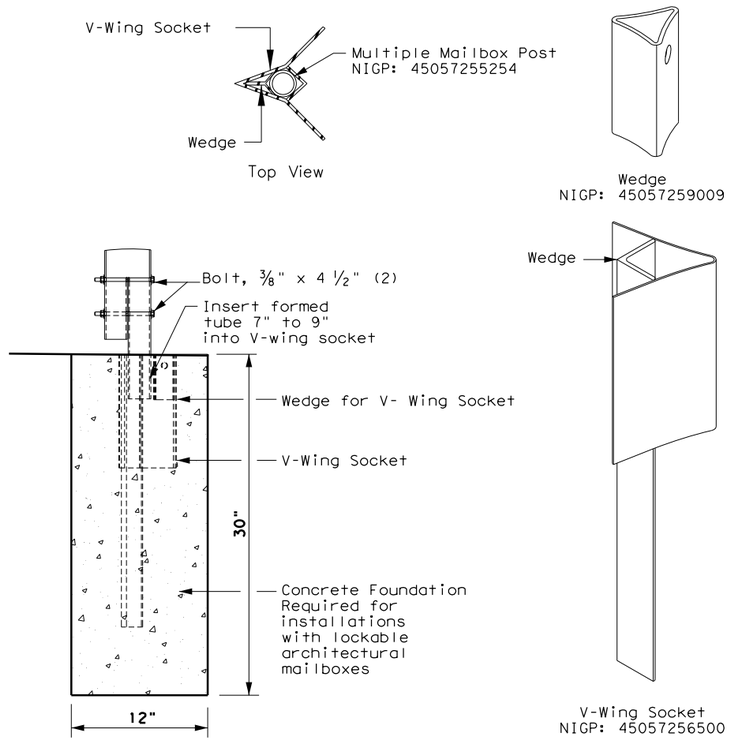
XL AND LOCKABLE ARCHITECTURAL MAILBOX ASSEMBLY

MB(2)-21

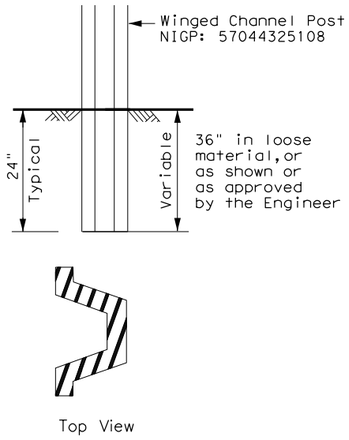
FILE: MB-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT March 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS 2/2005 11/2009 4/2015 6/2005 1/2011 11/2006 7/2014	1133	02	030	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		103

DATE: 1/26/2010244 $TIME$
FILE: $FILE$

TYPE 1 - SUPPORT/FOUNDATION
Thin Wall Tube w/ V-LOC Anchorage

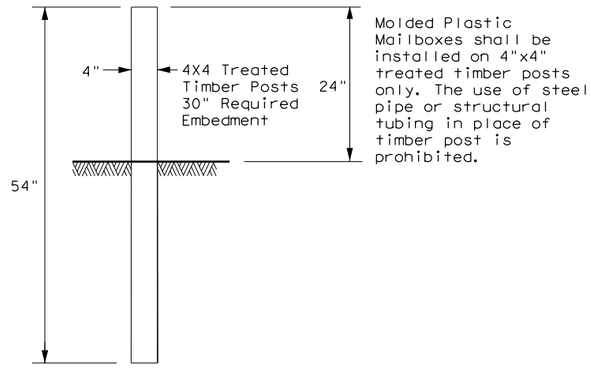


TYPE 3 - SUPPORT/FOUNDATION

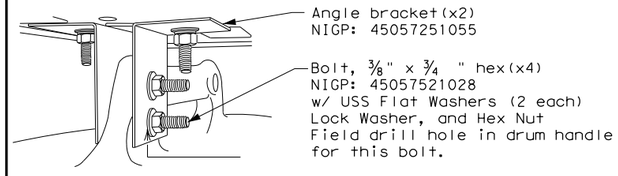


NOTES:
1. Attach Object Marker(OM) facing direction of traffic.
2. OM will also be required on opposite side if installed on a 2-Lane, 2-Way roadway.

TYPE 5 - SUPPORT/FOUNDATION



TYPE 6 - TEMPORARY MAILBOX SUPPORT

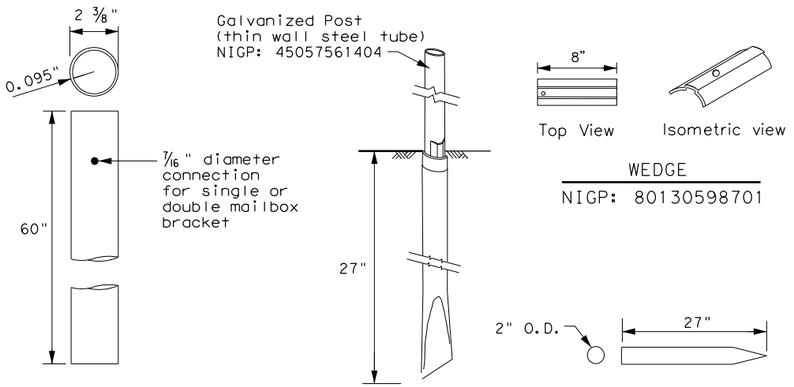


Plastic Drum NIGP: 55093383655
Rubber Collar NIGP: 55093387102

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

GENERAL NOTES:
1. Erect post plumb or vertical.
2. When galvanized part is required galvanize in accordance with Item 445.
3. Use a concrete footing as shown or when directed. Concrete footing will be required when soils do not hold the support/foundations in a stable condition, only on Type 1, Type 2, and Type 4

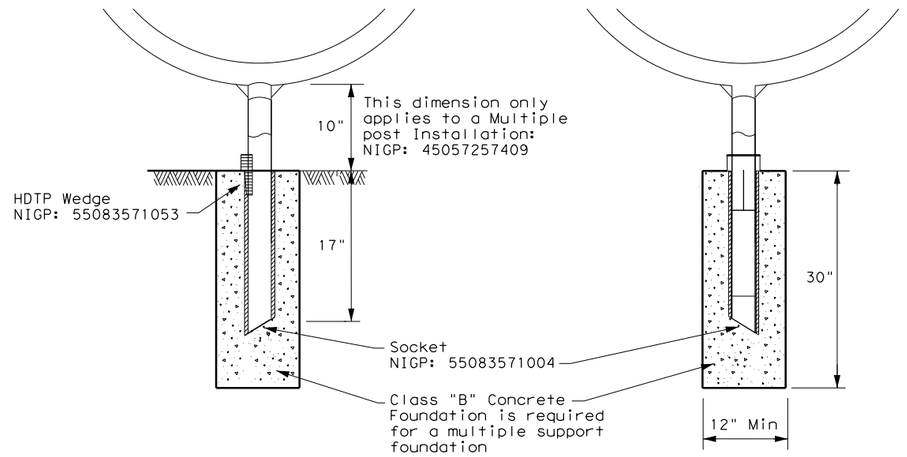
TYPE 2 - SUPPORT/FOUNDATION
Thin Wall Steel Tube w/Wedge Anchor System



MAILBOX POST

WEDGE ANCHOR
NIGP: 80130238407

TYPE 4 - SUPPORT/FOUNDATION
Whitecoated steel post NIGP: 45057561107
Multiple post NIGP: 45057257409
Recycled Rubber post (RR) NIGP: 45057561057



SHEET 3 OF 4

Texas Department of Transportation

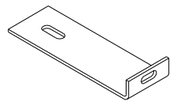
Maintenance Division Standard

MAILBOX SUPPORT AND FOUNDATION

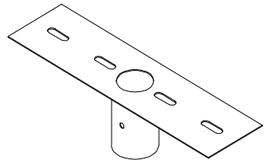
MB(3)-21

FILE: MB-21.dgn	DN:	CK:	DW:	CK:
© TxDOT March 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS 2/2005 11/2009 4/2015 6/2005 1/2011 11/2006 7/2014	1133	02	030	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		104

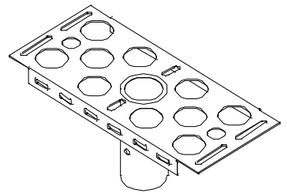
TYPE	TYPE 1	TYPE 2	TYPE 3	TYPE 4			TYPE 5	TYPE 6
Configuration	Multiple	Single or Double	Single or Double	Single	Double	Multiple	Single	Single
Mailbox Size NIGP #	Outside Position: S or M Inside Position: S, M, L, XL, or LA	Single: S, M, L, XL, or LA Double: SS, SM, MM	Single: S, M, L, or XL Double: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



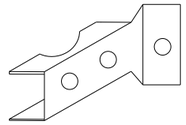
NIGP: 45057250263
L-Bracket x4 for
XL sized mailboxes



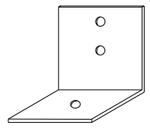
NIGP: 45057252343
Double Mailbox Bracket
For Type 2 and Type 4
double mount



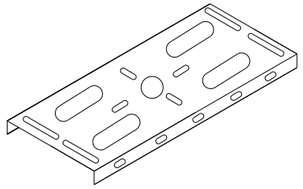
NIGP: 45057252350
Single Mailbox Bracket
For Type 2 single and for
Type 4 single and multi mount



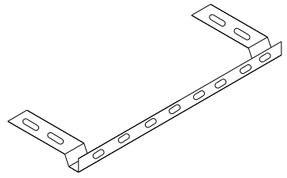
NIGP: 45057258001
Part "A" Angle Bracket
For Type 1 multi (2 per mailbox)
and Type 3 single and double



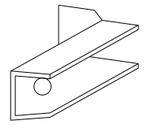
NIGP: 45057251055
Type 6 Angle Bracket
(2 per mailbox)



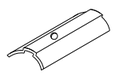
NIGP: 45057252251
Mailbox Bracket
For Type 1 multi and
any double mount (use 2)



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

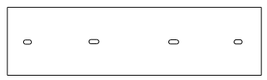


NIGP: 45057258027
Part "B" Angle Bracket
For Type 3 single
and double

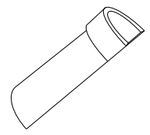


NIGP: 80130598701
Wedge for Type 2

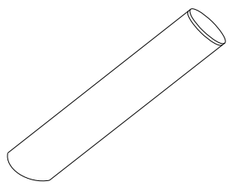
NIGP: 45057250255
Plate Washer for Architecural
and XL Mailboxes



NIGP: 45057541653
Type 3 double mailbox bracket

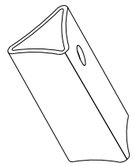


NIGP: 55083571053
Type 4 Mailbox Wedge

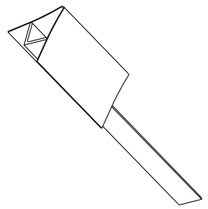


NIGP: 55083571004
Type 4 Mailbox Socket

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

DATE: 1/26/2024 $TIME$
FILE: $FILE$

SHEET 4 OF 4

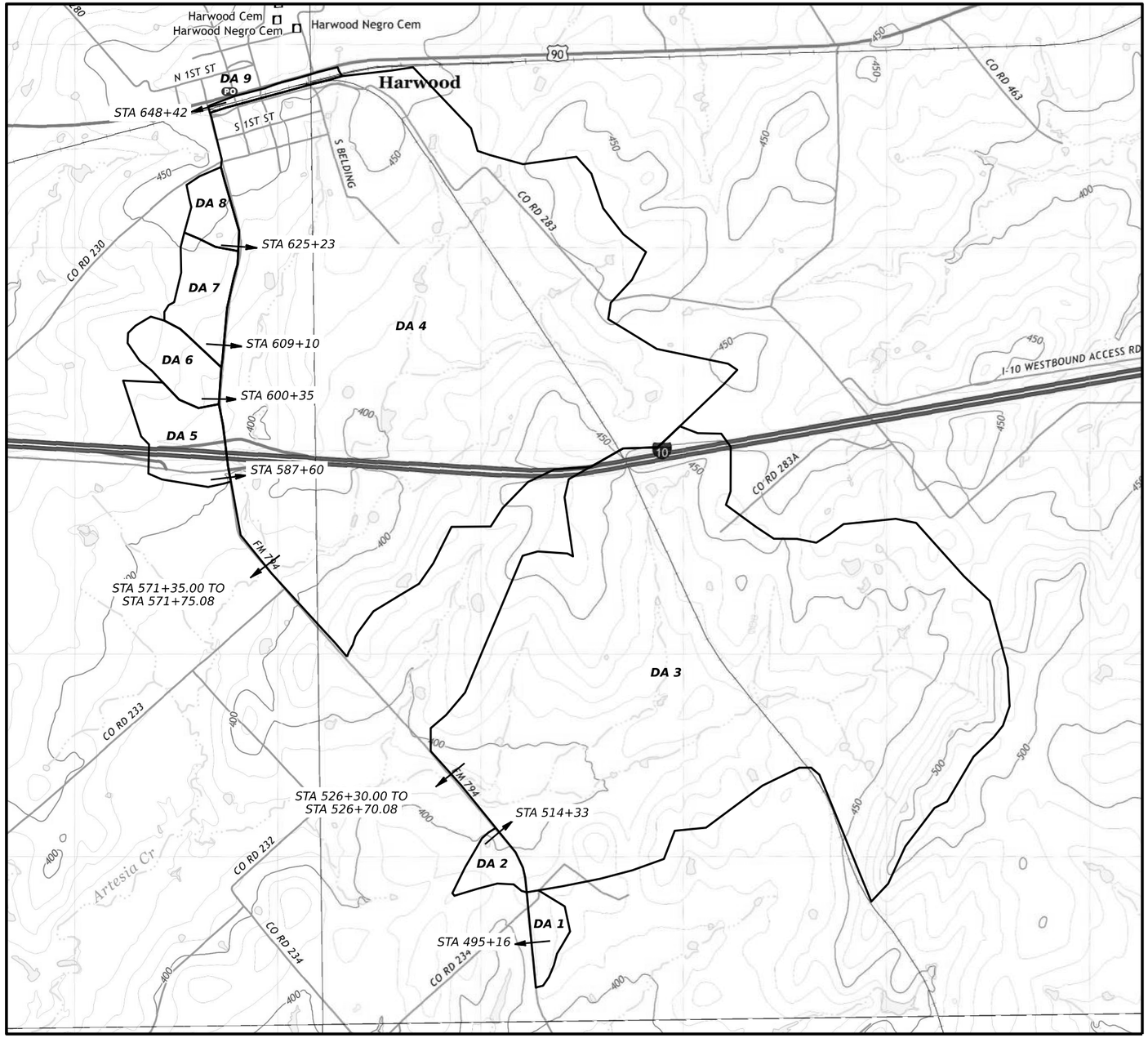
Texas Department of Transportation

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	1133	02	030	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		105



DRAINAGE AREA MAP

STRUCTURE STATION	DRAINAGE AREA NUMBER	DRAINAGE AREA SIZE
STA 495+16	1	16 AC
STA 514+33	2	16 AC
STA 526+30.00 TO STA 526+70.08	3	1019 AC
STA 571+35.00 TO STA 571+75.08	4	1109 AC
STA 600+35	6	30 AC
STA 609+10	7	38 AC
STA 625+23	8	15 AC
STA 648+42	9	6 AC

NOTE:
PEAK DISCHARGE DETERMINED BY USDA NRCS TR-55 METHOD
(JUNE 1986) USING WinTR-55 VERSION 1.00.10 DATED 04/01/2011.

STATE OF TEXAS
AMANDA ANDERLE FLING
105989
LICENSED
PROFESSIONAL ENGINEER

Amanda Anderle Fling, P.E.

01/27/2024

DRAINAGE AREA MAP

SCALE: 1" = 2000'

Texas Department of Transportation

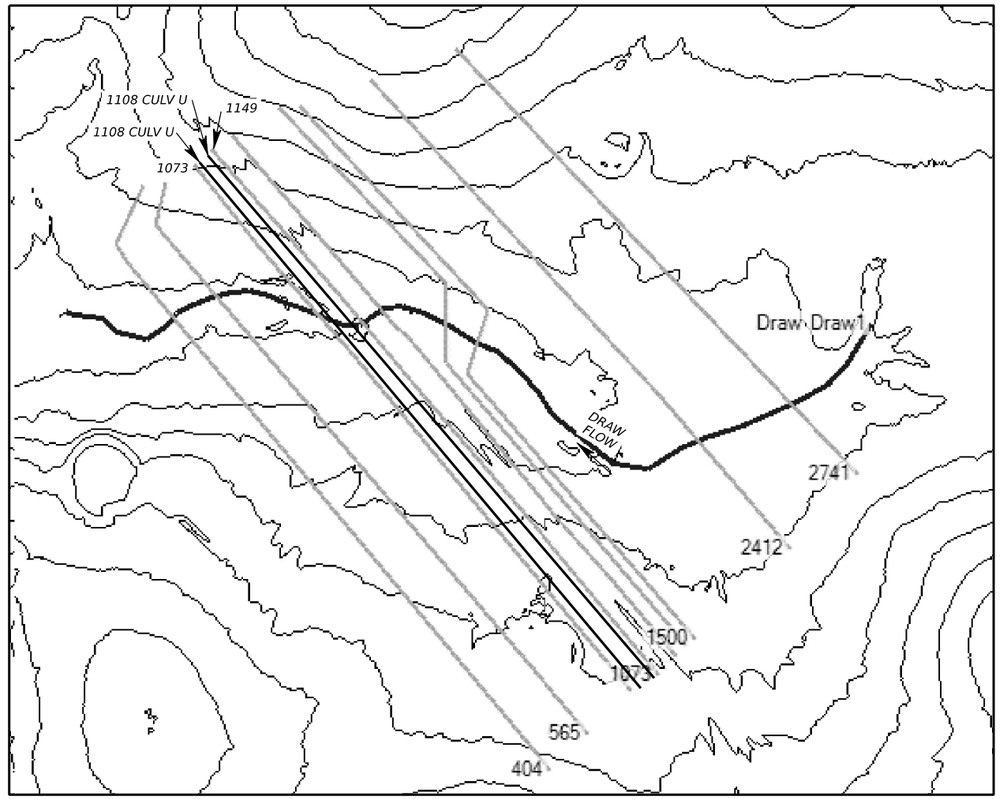
SHEET 1 OF 1

FED.RD. DIV.NO.		PROJECT NO.	
6			
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	106

PATH: T:\YKMANNEX\PS&E\1133302030_FM794\Plan_Sheets\
FILE: DRAINAGE MAP.dgn
DATE: 1/28/2024

HYDRAULIC DATA

Reach	River Sta	Profile	Plan	E.G. Elev (ft)	W.S. Elev (ft)	Crit W.S. Frctn (ft)	Loss (ft)	C & E Loss (ft)	Top Width (ft)	Q Left (cfs)	Q Channel (cfs)	Q Right (cfs)	Vel Chnl (ft/s)
Draw1	2741	5 YR	EX	394.22	394.17		1.88	0.02	575.18	14.5	254.49	549.02	1.77
Draw1	2741	5 YR	Pro	394.22	394.17		1.89	0.02	575.08	14.48	254.5	549.02	1.77
Draw1	2741	10 YR	EX	394.46	394.41		1.96	0.02	639.3	42.35	352.32	783.33	2.04
Draw1	2741	10 YR	Pro	394.46	394.41		1.95	0.02	639.61	42.43	352.28	783.3	2.04
Draw1	2741	100 YR	EX	395.25	395.15	394.21	2.12	0.03	859.13	277.81	763.05	1889.13	2.87
Draw1	2741	100 YR	Pro	395.25	395.15	394.21	2.12	0.03	859.13	277.81	763.05	1889.13	2.87
Draw1	2412	5 YR	EX	392.32	392.11	392.11	1.42	0.04	507.2	0.76	66.76	750.48	3.88
Draw1	2412	5 YR	Pro	392.32	392.11	392.11	1.43	0.04	507.2	0.76	66.76	750.48	3.88
Draw1	2412	10 YR	EX	392.49	392.24	392.24	1.2	0.06	598.75	4.66	71.65	1101.69	3.1
Draw1	2412	10 YR	Pro	392.49	392.24	392.24	1.17	0.06	598.75	4.66	71.65	1101.69	3.1
Draw1	2412	100 YR	EX	393.08	392.65	392.65	0.59	0.11	681.38	75.8	239.66	2614.53	4.15
Draw1	2412	100 YR	Pro	393.08	392.65	392.65	0.51	0.11	681.38	75.8	239.66	2614.53	4.15
Draw1	1500	5 YR	EX	388.75	388.68		0.37	0	468.83	475.69	335.86	6.45	2.42
Draw1	1500	5 YR	Pro	388.75	388.68		0.38	0	468.58	475.54	336.02	6.44	2.42
Draw1	1500	10 YR	EX	389.1	389.03		0.29	0	533.51	726.68	439.05	12.27	2.5
Draw1	1500	10 YR	Pro	389.11	389.04		0.28	0	534.48	728.06	437.56	12.38	2.47
Draw1	1500	100 YR	EX	390.54	390.48		0.11	0	705.44	2038.67	807.43	83.9	2.46
Draw1	1500	100 YR	Pro	390.66	390.6		0.09	0	736.1	2044.04	792.12	93.84	2.32
Draw1	1375	5 YR	EX	388.38	388.29		0.93	0.01	358.56	148.99	593.3	75.71	2.63
Draw1	1375	5 YR	Pro	388.37	388.28		0.91	0.01	358.06	148.06	594.55	75.39	2.65
Draw1	1375	10 YR	EX	388.81	388.72		0.37	0.01	427.26	289.77	759.45	128.78	2.71
Draw1	1375	10 YR	Pro	388.83	388.75		0.34	0.01	429.41	294.39	753.92	129.69	2.66
Draw1	1375	100 YR	EX	390.43	390.37		0.15	0.01	774.32	1346.35	1225.21	358.44	2.49
Draw1	1375	100 YR	Pro	390.57	390.51		0.13	0.01	786.71	1380.02	1186.79	363.19	2.33
Draw1	1149	5 YR	EX	387.43	387.22	386.95			235.24	328.6	440.88	48.52	4.51
Draw1	1149	5 YR	Pro	387.45	387.26	386.95			237.71	335.44	432.93	49.63	4.35
Draw1	1149	10 YR	EX	388.43	388.36	387.19			458.42	609.81	402.58	165.61	2.67
Draw1	1149	10 YR	Pro	388.48	388.42	387.19			478.48	611.51	394.41	172.07	2.57
Draw1	1149	100 YR	EX	390.27	390.23	388.05			932.33	1604.23	566.24	759.53	2.38
Draw1	1149	100 YR	Pro	390.44	390.4	388.05			974.66	1614.27	541.44	774.3	2.2
Draw1	1108			Culvert									
Draw1	1073	5 YR	EX	387.02	386.79	386.65	0.62	0.09	360.75	69.11	624.19	124.7	4.24
Draw1	1073	5 YR	Pro	387.02	386.79	386.65	0.62	0.09	360.75	69.11	624.19	124.7	4.24
Draw1	1073	10 YR	EX	387.31	387.09		0.55	0.08	379.67	149.66	768.28	260.06	4.34
Draw1	1073	10 YR	Pro	387.31	387.09		0.55	0.08	379.67	149.66	768.28	260.06	4.34
Draw1	1073	100 YR	EX	388.4	388.17		0.45	0.06	472.96	651.67	1313.43	964.89	4.6
Draw1	1073	100 YR	Pro	388.4	388.17		0.45	0.06	472.96	651.67	1313.43	964.89	4.6
Draw1	918	5 YR	EX	386.31	386.27		0.81	0.01	396.58	202.55	615.01	0.43	1.87
Draw1	918	5 YR	Pro	386.31	386.27		0.81	0.01	396.58	202.55	615.01	0.43	1.87
Draw1	918	10 YR	EX	386.68	386.62		0.73	0.01	424.95	320.15	854.64	3.21	2.08
Draw1	918	10 YR	Pro	386.68	386.62		0.73	0.01	424.95	320.15	854.64	3.21	2.08
Draw1	918	100 YR	EX	387.89	387.78		0.69	0.01	493.27	952.73	1932.01	45.26	2.81
Draw1	918	100 YR	Pro	387.89	387.78		0.69	0.01	493.27	952.73	1932.01	45.26	2.81
Draw1	565	5 YR	EX	385.51	385.41		0.47	0	284.82	251.22	530.84	35.93	2.95
Draw1	565	5 YR	Pro	385.51	385.41		0.47	0	284.82	251.22	530.84	35.93	2.95
Draw1	565	10 YR	EX	385.94	385.82		0.45	0	316	436.33	676.87	64.79	3.18
Draw1	565	10 YR	Pro	385.94	385.82		0.45	0	316	436.33	676.87	64.79	3.18
Draw1	565	100 YR	EX	387.19	387.02		0.45	0	493.04	1366.67	1258.07	305.26	4.07
Draw1	565	100 YR	Pro	387.19	387.02		0.45	0	493.02	1366.67	1258.08	305.25	4.07
Draw1	404	5 YR	EX	385.04	384.92	383.93			214.25	16.3	796.17	5.53	2.84
Draw1	404	5 YR	Pro	385.04	384.92	383.93			214.25	16.3	796.17	5.53	2.84
Draw1	404	10 YR	EX	385.49	385.33	384.23			307.79	48.77	1092.96	36.27	3.22
Draw1	404	10 YR	Pro	385.49	385.33	384.23			307.79	48.77	1092.96	36.27	3.22
Draw1	404	100 YR	EX	386.73	386.51	385.48			514.3	373.83	2134.74	421.43	4.21
Draw1	404	100 YR	Pro	386.73	386.51	385.48			514.3	373.83	2134.74	421.43	4.21



CROSS SECTION LOCATIONS

NOT TO SCALE

NOTES:

1. HYDRAULIC ANALYSIS PERFORMED USING THE U.S. ARMY CORPS OF ENGINEERS HEC-RAS RIVER ANALYSIS SYSTEM SOFTWARE VERSION 5.0.6 (NOVEMBER 2018).
2. RIVER STATIONS ARE IN FEET.
3. TAILWATER ELEVATIONS WERE DETERMINED BY A NORMAL DEPTH COMPUTATION USING A DOWNSTREAM CHANNEL BED SLOPE OF 0.0030 FT/FT.
4. THE PROJECT SITE IS NOT LOCATED IN A MAPPED FLOODPLAIN.

STATE OF TEXAS
AMANDA ANDERLE FLING
105989
LICENSED
PROFESSIONAL ENGINEER

Amanda Anderle Fling, P.E.

01/27/2024

STA 526+30.00 TO STA 526+70.08 HYDRAULIC DATA

Texas Department of Transportation

FED.RD. DIV.NO.		PROJECT NO.	
6			
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	107

PATH: T:\YKMANNEX\PS&E\113302030_FM794\Plan_Sheets\
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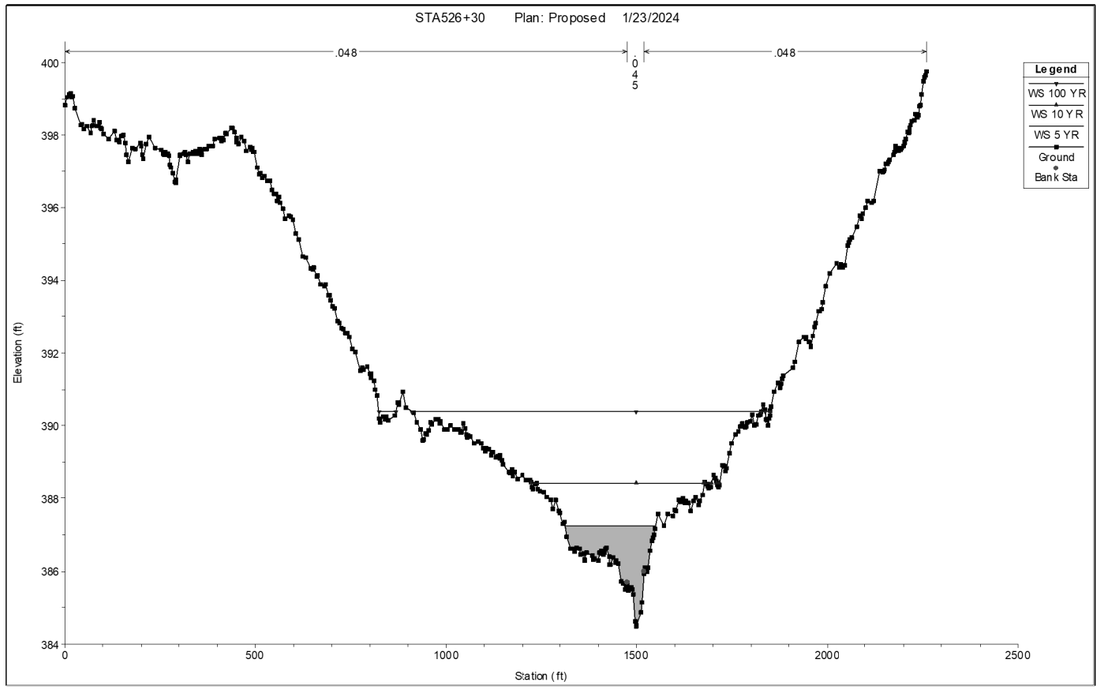
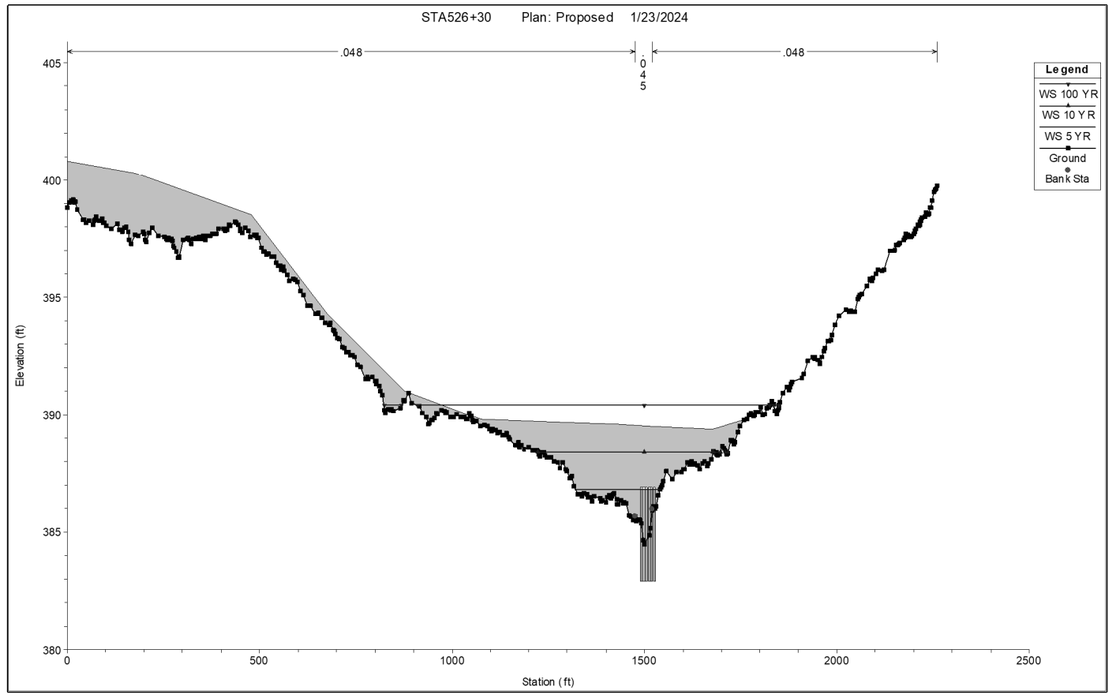
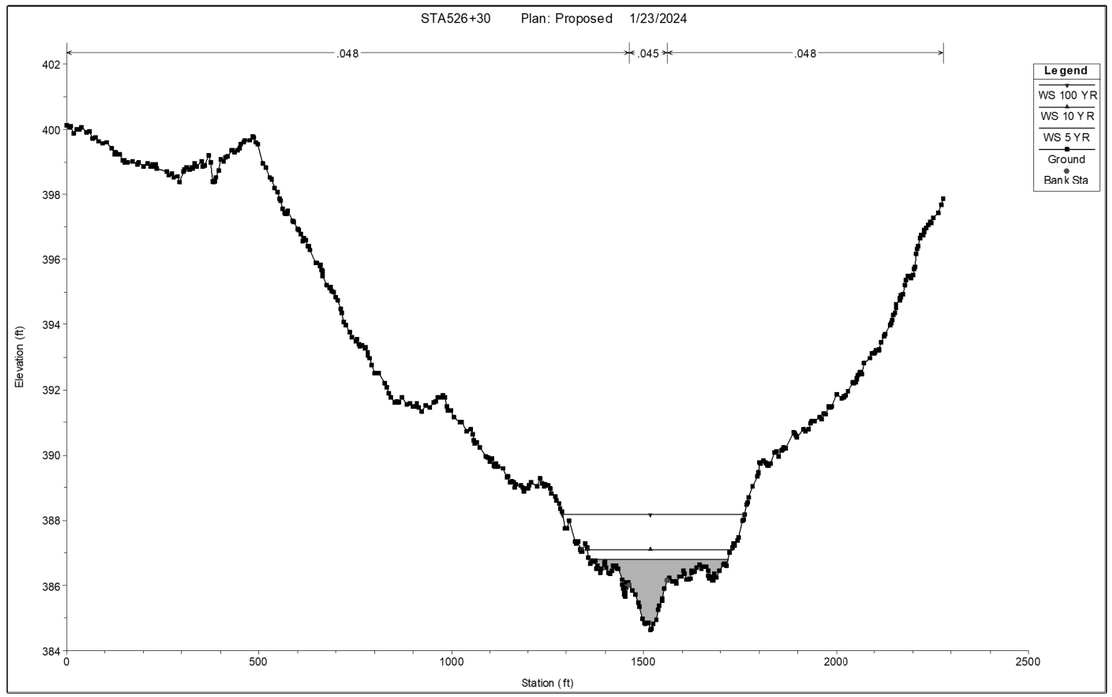
DATE: 1/29/2024



RIVER STATION 1149
(UPSTREAM)
NOT TO SCALE



RIVER STATION 1108
(UPSTREAM FACE OF PROPOSED BRIDGE)
NOT TO SCALE



RIVER STATION 1073
(DOWNSTREAM)

NOTE:

1. *HEC-RAS MODEL (VERSION 5.0.6, NOVEMBER 2018) WAS USED FOR HYDRAULIC ANALYSIS OF EXISTING CONDITIONS AND DESIGN OF PROPOSED STRUCTURE.*

STATE OF TEXAS
AMANDA ANDERLE FLING
105989
LICENSED
PROFESSIONAL ENGINEER

Amanda Anderle Fling, P.E.

01/27/2024

STA 526+30.00 TO STA 526+70.08 HYDRAULIC DATA

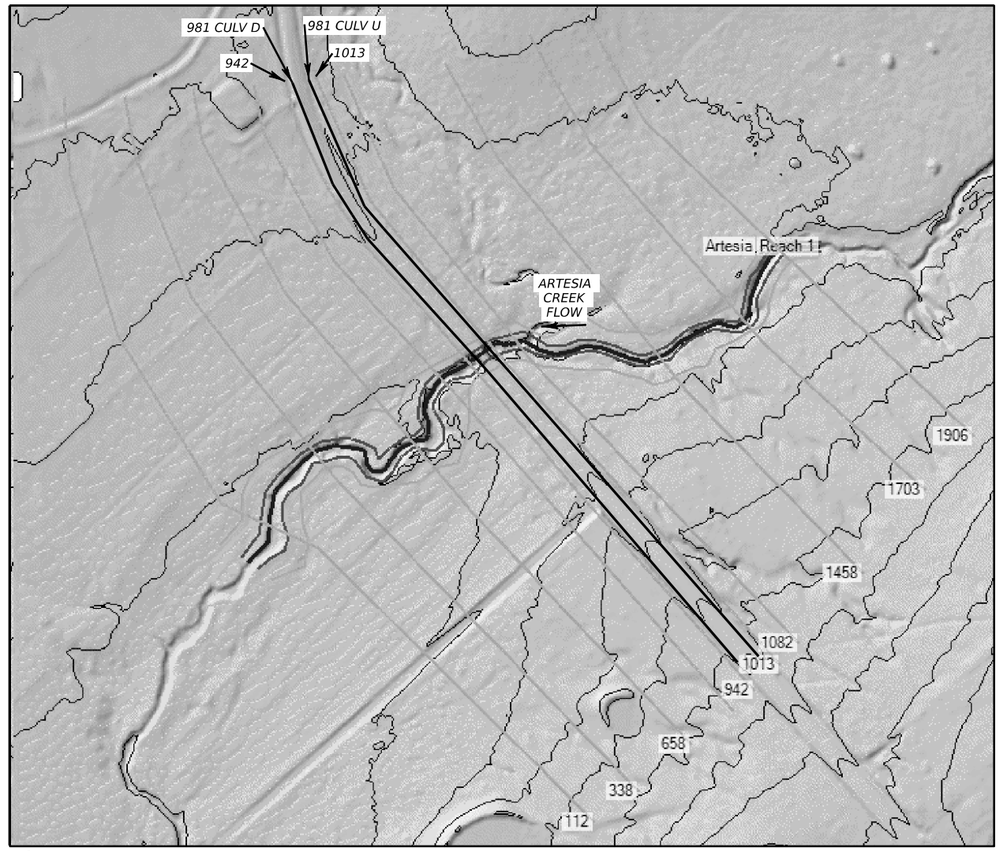
Texas Department of Transportation

FED.RD. DIV.NO.		PROJECT NO.	
6			
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	108

PATH: T:\YKMANNEX\PS&E\113302030_FM794\Plan_Sheets\
FILE: HYD DATA1.dgn
DATE: 1/29/2024

HYDRAULIC DATA

Reach	River Sta	Profile	Plan	E.G. Elev (ft)	W.S. Elev (ft)	Crit W.S. Frctn (ft)	Loss (ft)	C & E Loss (ft)	Top Width (ft)	Q Left (cfs)	Q Channel (cfs)	Q Right (cfs)	Vel Chnl (ft/s)
Reach 1	1906	5 yr	EX	389.81	389.72	389.36	0.95	0.02	601.85	207.61	313.25	308.14	3.22
Reach 1	1906	5 yr	PRO	389.81	389.72	389.36	0.95	0.02	601.85	207.61	313.25	308.14	3.22
Reach 1	1906	10 yr	EX	390	389.9	389.54	0.93	0.01	636.38	285.56	380.77	522.67	3.69
Reach 1	1906	10 yr	PRO	390	389.89	389.54	0.93	0.01	635.75	285.75	381.77	521.48	3.7
Reach 1	1906	100 yr	EX	390.73	390.59		0.52	0.01	732.36	603.96	554.37	1711.68	4.38
Reach 1	1906	100 yr	PRO	390.77	390.64		0.44	0.02	735.4	599.91	538.05	1732.04	4.19
Reach 1	1703	5 yr	EX	388.84	388.55	388.55	0.65	0.07	435.01	1.06	384.28	443.66	5.81
Reach 1	1703	5 yr	PRO	388.84	388.55	388.55	0.65	0.07	435.01	1.06	384.28	443.66	5.81
Reach 1	1703	10 yr	EX	389.06	388.86		0.44	0.05	540.77	5.32	386.11	797.57	5.23
Reach 1	1703	10 yr	PRO	389.06	388.86		0.43	0.05	545.7	5.48	383.1	800.42	5.17
Reach 1	1703	100 yr	EX	390.19	390.1		0.24	0.02	710.68	61.96	371.66	2436.39	3.53
Reach 1	1703	100 yr	PRO	390.32	390.24		0.19	0.01	717.05	65.25	348.36	2456.4	3.2
Reach 1	1458	5 yr	EX	388.05	388.01		0.73	0.01	539.11	15.15	202.9	610.96	2.31
Reach 1	1458	5 yr	PRO	388.05	388.01		0.72	0.01	538.78	15.12	203.17	610.71	2.32
Reach 1	1458	10 yr	EX	388.56	388.53		0.4	0	639.73	30.73	213.61	944.67	2.1
Reach 1	1458	10 yr	PRO	388.58	388.55		0.37	0	640.63	31.05	211.35	946.6	2.07
Reach 1	1458	100 yr	EX	389.94	389.9		0.25	0	771.42	118.68	302.27	2449.05	2.19
Reach 1	1458	100 yr	PRO	390.12	390.08		0.19	0	787.43	125.22	287.02	2457.77	2
Reach 1	1082	5 yr	EX	387.31	387.13		0.21	0	203.34	243.13	383.34	202.53	4.2
Reach 1	1082	5 yr	PRO	387.33	387.15		0.2	0	206.23	245.08	379.99	203.93	4.14
Reach 1	1082	10 yr	EX	388.16	388.08		0.1	0	456.44	441.45	362	385.56	3.08
Reach 1	1082	10 yr	PRO	388.2	388.13		0.1	0	465.6	443.67	353.92	391.41	2.98
Reach 1	1082	100 yr	EX	389.69	389.63		0.06	0	932.33	1031.06	437.5	1401.45	2.74
Reach 1	1082	100 yr	PRO	389.93	389.89		0.04	0	992.82	1006.58	396.33	1467.1	2.37
Reach 1	1013	5 yr	EX	387.1	386.92	385.56			135.66	251	455.2	122.8	3.89
Reach 1	1013	5 yr	PRO	387.12	386.95	385.56			136.65	251.85	452.28	124.88	3.84
Reach 1	1013	10 yr	EX	388.05	387.93	386.06			313.1	391.8	509	288.2	3.51
Reach 1	1013	10 yr	PRO	388.1	387.99	386.06			334.44	393.16	500.18	295.66	3.41
Reach 1	1013	100 yr	EX	389.62	389.54	387.76			742.5	1026.94	663.75	1179.31	3.5
Reach 1	1013	100 yr	PRO	389.89	389.82	387.76			863.76	1032.41	596.04	1241.55	3.02
Reach 1	981			Culvert									
Reach 1	942	5 yr	EX	386.83	386.44	385.56	0.49	0.07	173.73	30.96	796.49	1.54	5.14
Reach 1	942	5 yr	PRO	386.83	386.44	385.56	0.49	0.07	173.73	30.96	796.49	1.54	5.14
Reach 1	942	10 yr	EX	387.24	386.69	386.59	0.57	0.11	232.47	116.53	1066.53	5.94	6.25
Reach 1	942	10 yr	PRO	387.24	386.69	386.59	0.57	0.11	232.47	116.53	1066.53	5.94	6.25
Reach 1	942	100 yr	EX	388.29	387.65	387.65	0.64	0.11	430.35	955.9	1751.22	162.88	7.66
Reach 1	942	100 yr	PRO	388.29	387.65	387.65	0.64	0.11	430.35	955.9	1751.22	162.88	7.66
Reach 1	863	5 yr	EX	386.27	386.11		0.69	0.03	337.04	309.4	502.09	17.52	3.82
Reach 1	863	5 yr	PRO	386.27	386.11		0.69	0.03	337.04	309.4	502.09	17.52	3.82
Reach 1	863	10 yr	EX	386.56	386.38		0.72	0.03	356.69	528.01	608.05	52.94	4.18
Reach 1	863	10 yr	PRO	386.56	386.38		0.72	0.03	356.69	528.01	608.05	52.94	4.18
Reach 1	863	100 yr	EX	387.51	387.24		0.78	0.04	405.56	1564.11	996.31	309.59	5.27
Reach 1	863	100 yr	PRO	387.51	387.24		0.78	0.04	405.56	1564.1	996.32	309.58	5.27
Reach 1	658	5 yr	EX	385.55	385.48		0.93	0	468.23	409.34	217.53	202.14	2.78
Reach 1	658	5 yr	PRO	385.55	385.48		0.93	0	468.23	409.34	217.53	202.14	2.78
Reach 1	658	10 yr	EX	385.81	385.73		0.93	0	482.16	608.44	263.78	316.78	3.03
Reach 1	658	10 yr	PRO	385.81	385.73		0.93	0	482.16	608.44	263.78	316.78	3.03
Reach 1	658	100 yr	EX	386.69	386.55		0.97	0	588.96	1565.96	440.73	863.31	3.82
Reach 1	658	100 yr	PRO	386.69	386.55		0.97	0	588.96	1565.96	440.73	863.31	3.82
Reach 1	338	5 yr	EX	384.62	384.55	384.16	0.71	0	486.04	609.13	218.19	1.68	3.09
Reach 1	338	5 yr	PRO	384.62	384.55	384.16	0.71	0	486.04	609.13	218.19	1.68	3.09
Reach 1	338	10 yr	EX	384.89	384.8		0.7	0	545.03	925.88	255.59	7.53	3.26
Reach 1	338	10 yr	PRO	384.89	384.8		0.7	0	545.03	925.88	255.59	7.53	3.26
Reach 1	338	100 yr	EX	385.72	385.59		0.71	0	641.5	2407.63	400.21	62.16	3.92
Reach 1	338	100 yr	PRO	385.72	385.59		0.71	0	641.51	2407.64	400.18	62.17	3.92
Reach 1	112	5 yr	EX	383.91	383.84	383.41			502.62	523.87	300.45	4.68	2.88
Reach 1	112	5 yr	PRO	383.91	383.84	383.41			502.62	523.87	300.45	4.68	2.88
Reach 1	112	10 yr	EX	384.18	384.11	383.59			581.19	833.59	333.43	21.98	2.82
Reach 1	112	10 yr	PRO	384.18	384.11	383.59			581.19	833.59	333.43	21.98	2.82
Reach 1	112	100 yr	EX	385.01	384.89	384.08			676.35	2133.78	555.91	180.31	3.46
Reach 1	112	100 yr	PRO	385.01	384.89	384.08			676.35	2133.78	555.91	180.31	3.46



CROSS SECTION LOCATIONS

NOT TO SCALE

NOTES:

1. HYDRAULIC ANALYSIS PERFORMED USING THE U.S. ARMY CORPS OF ENGINEERS HEC-RAS RIVER ANALYSIS SYSTEM SOFTWARE VERSION 5.0.6 (NOVEMBER 2018).
2. RIVER STATIONS ARE IN FEET.
3. TAILWATER ELEVATIONS WERE DETERMINED BY A NORMAL DEPTH COMPUTATION USING A DOWNSTREAM CHANNEL BED SLOPE OF 0.0030 FT/FT.
4. THE PROJECT SITE IS NOT LOCATED IN A MAPPED FLOODPLAIN.

STATE OF TEXAS
AMANDA ANDERLE FLING
105989
LICENSED PROFESSIONAL ENGINEER

Amanda Anderle Fling, P.E.

01/27/2024

STA 571+35.00 TO STA 571+75.08 HYDRAULIC DATA

Texas Department of Transportation

FED.RD. DIV.NO.		PROJECT NO.	
6			
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	109

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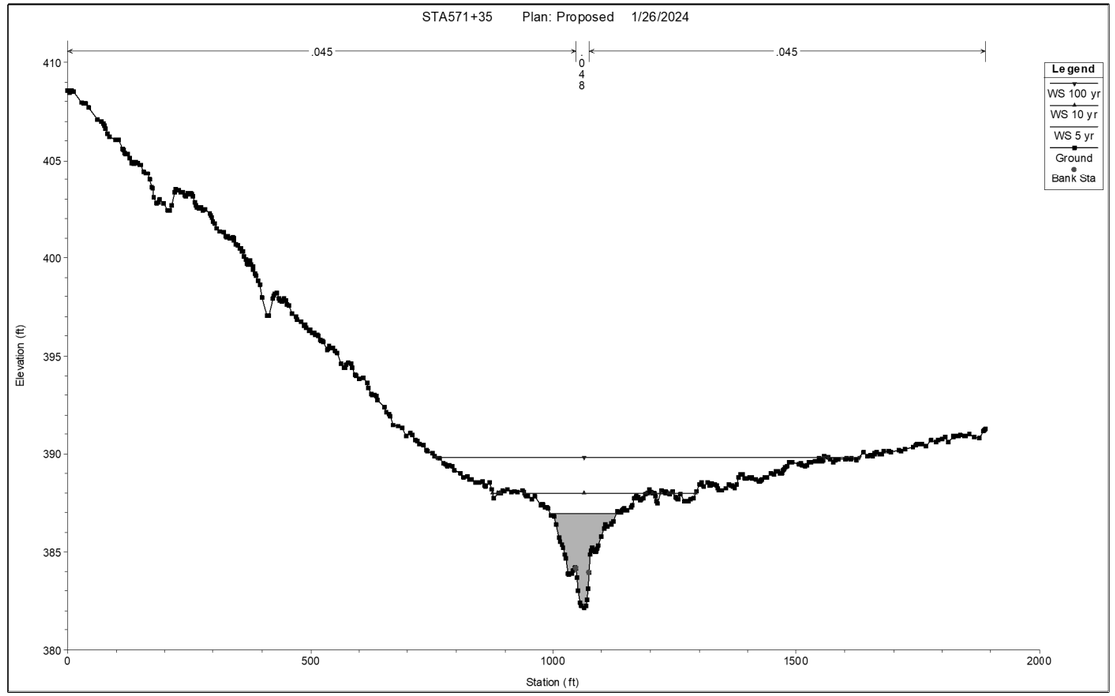
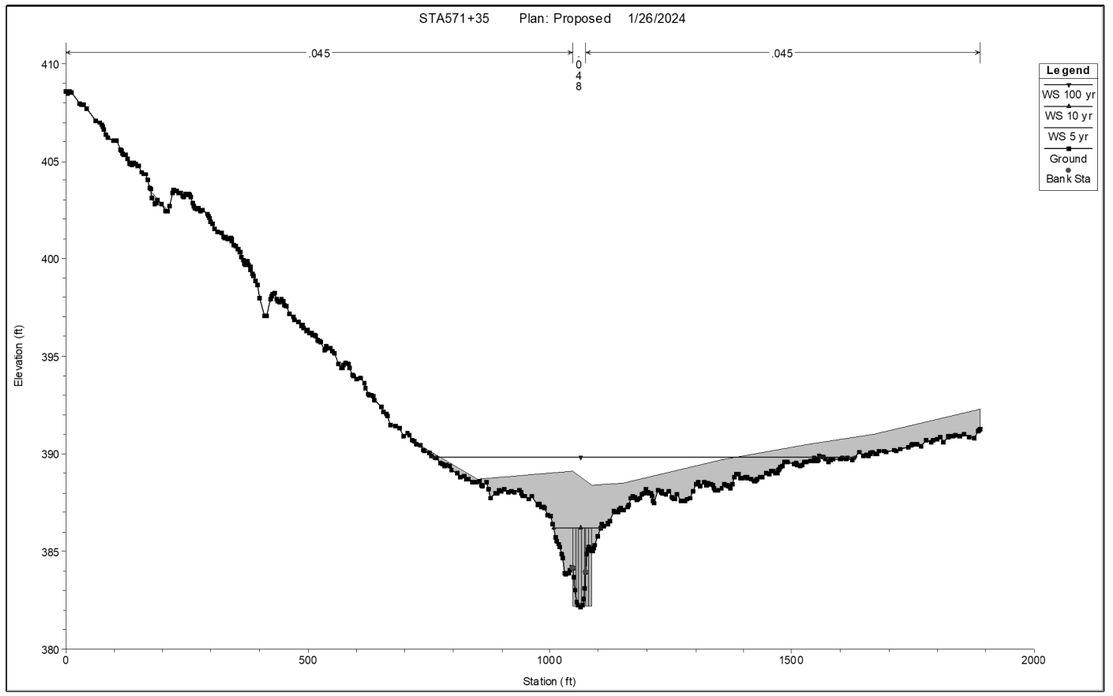
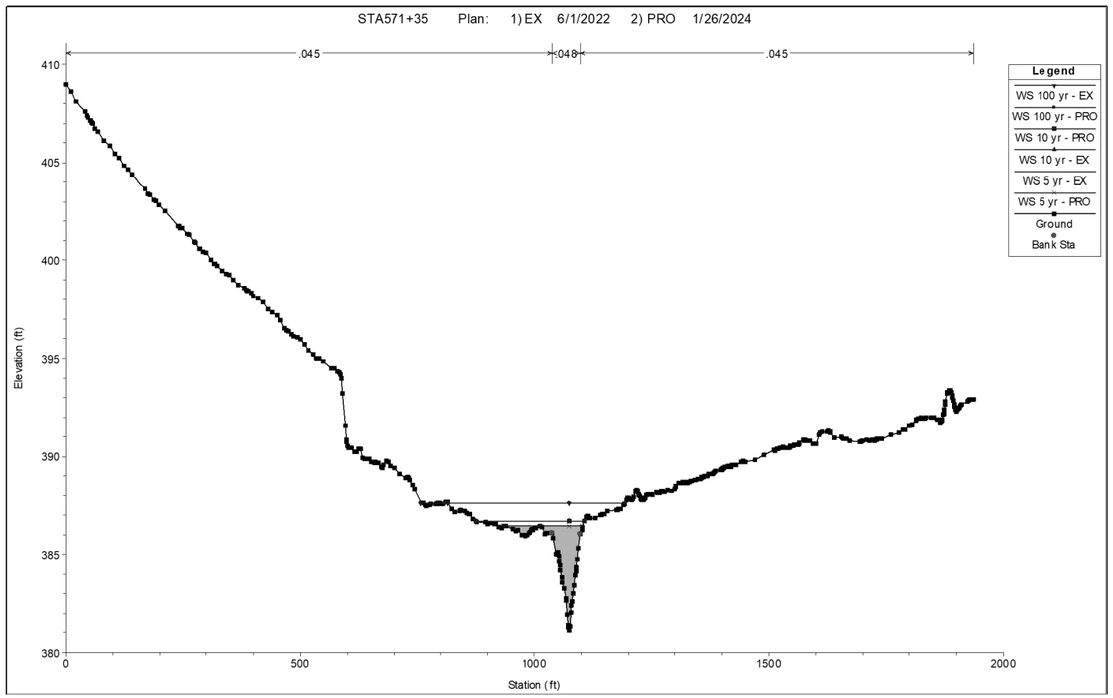
DATE: 1/29/2024



RIVER STATION 1013
(UPSTREAM)
NOT TO SCALE



RIVER STATION 981
(UPSTREAM FACE OF PROPOSED BRIDGE)
NOT TO SCALE



RIVER STATION 942
(DOWNSTREAM)

NOTE:

1. *HEC-RAS MODEL (VERSION 5.0.6, NOVEMBER 2018) WAS USED FOR HYDRAULIC ANALYSIS OF EXISTING CONDITIONS AND DESIGN OF PROPOSED STRUCTURE.*

STATE OF TEXAS
AMANDA ANDERLE FLING
105989
LICENSED
PROFESSIONAL ENGINEER

Amanda Anderle Fling, P.E.

01/27/2024

STA 571+35.00 TO STA 571+75.08 HYDRAULIC DATA

Texas Department of Transportation

FED.RD. DIV.NO.		PROJECT NO.	
6			
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	110

PATH: T:\YKMANNEX\PS&E\113302030_FM794\Plan_Sheets\
FILE: HYD DATA2.dgn
DATE: 1/29/2024

DRAINAGE AREA NO.	CULVERT STATION	EXISTING STRUCTURE (TRUE LENGTHS-ALONG ANY SKEWS)	PROPOSED STRUCTURE (TRUE LENGTHS-ALONG ANY SKEWS)	FREQ (YR)	TOTAL AREA (ACRES)	WATER COURSE LENGTH (FT)	WATER COURSE LENGTH (FT/SEC)	TIME * (min or hrs) (10 min minimum)	RATIONAL C	RATIONAL I ($^{in}/_{hr}$)	RATIONAL Q (CFS)	NRCS CN	NRCS Q (CFS)	CULVERT MAX ALLOW DES FREQ HW EL	CULVERT CALC HW ELEV	CULVERT V_{out} (FT/S)	CULVERT CULV S (FT/FT)	CULVERT n	OUTFALL (SEE NOTES 3 & 4) S (FT/FT)	OUTFALL n	OUTFALL TW ELEV	OUTFALL TW VEL (FT/S)	REMARKS
1	495+16	1 - 24" x 46.00' CMP		10	16			28.1 MIN	0.25	4.6	19			409.73	408.57	6.80	0.0080	0.012	0.0362	0.035	404.78	2.89	NO KNOWN OVERTOPPING.
				100						7	28			---	409.69	7.74					404.83	3.38	
			1 - 24" x 46.00' RCP W/ SET LT & RT.	10										409.85	408.26	7.39	0.0080	0.012					NO EXISTING EROSION, NO ARMORING PROPOSED.
				100										---	409.87	8.41							
2	514+33	1 - DES 4 x 42.00' CMP		10	16			23.1 MIN	0.25	5.1	20			400.08	397.02	1.85	0.0010	0.012	0.0147	0.035	397.02	3.06	NO KNOWN OVERTOPPING.
				100						7.7	31			---	397.14	2.07					397.13	3.35	
			1 - 30" x 42.00' RCP W/ SET LT & RT.	10										400.24	397.02	2.06	0.0010	0.012					NO EXISTING EROSION, NO ARMORING PROPOSED.
				100										---	397.14	2.22							
3	526+30.00 TO 526+70.08	6 - 6' x 4' x 27.33' MBC W/ STRAIGHT WINGS LT & RT.		10	1019			2.015 HR				71	1178	HEC-RAS USED FOR CULVERT COMPUTATIONS. SEE "STA 526+30.00 TO STA 526+70.08 HYDRAULIC DATA" SHEETS FOR ADDITIONAL INFORMATION.									BRIDGE CLASS CULVERT NBI # 13-090-0-1133-02-002 NO EXISTING EROSION, ARMORING PROPOSED.
				100									2930										
			6 - 6' x 4' x 42.33' MBC W/ PARALLEL WINGS LT & RT.	10																			
				100																			
4	571+35.00 TO 571+75.08	6 - 6' x 4' x 27.33' MBC W/ STRAIGHT WINGS LT & RT.		10	1109			2.442 HR				73	1189	HEC-RAS USED FOR CULVERT COMPUTATIONS. SEE "STA 571+35.00 TO STA 571+75.08 HYDRAULIC DATA" SHEETS FOR ADDITIONAL INFORMATION.									BRIDGE CLASS CULVERT NBI # 13-090-0-1133-02-001 NO EXISTING EROSION, ARMORING PROPOSED.
				100									2870										
			6 - 6' x 4' x 41.33' MBC W/ PARALLEL WINGS LT & RT.	10																			
				100																			
6	600+35	1 - DES 5 x 38.00' CMP		10	30	2296	0.013	15.8 MIN	0.25	6.2	47			415.53	415.27	8.27	0.0105	0.012	0.0201	0.035	412.53	2.77	NO KNOWN OVERTOPPING
				100						9.2	69			---	415.68	8.74					412.63	3.03	
			1 - 4' x 2' x 42.00' CBC W/ SET LT & RT.	10										415.99	413.78	9.06	0.0095	0.012					NO EXISTING EROSION, NO ARMORING PROPOSED.
				100										---	415.26	10.05							
7	609+10	1 - 42" x 48.00' CMP		10	38	2231	0.015	15.4 MIN	0.25	6.2	59			420.60	419.31	13.13	0.0625	0.012	0.0082	0.035	414.27	3.91	NO KNOWN OVERTOPPING
				100						9.3	88			---	420.53	13.86					414.62	4.30	
			1 - 42" x 48.00' RCP W/ SET LT & RT.	10										420.80	419.27	16.56	0.0625	0.012					NO EXISTING EROSION, NO ARMORING PROPOSED.
				100										---	420.67	17.43							
8	625+23	1 - 30" x 40.00' CMP		10	15	1892	0.009	18.6 MIN	0.25	5.7	21			439.05	437.00	6.86	0.0200	0.012	0.0104	0.035	434.53	1.40	NO KNOWN OVERTOPPING
				100						8.5	32			---	437.68	7.22					434.60	1.43	
			1 - 30" x 46.00' RCP W/ SET LT & RT.	10										439.21	436.78	9.60	0.0174	0.012					NO EXISTING EROSION, NO ARMORING PROPOSED.
				100										---	437.68	10.60							
9	648+42	1 - 18" x 40.00' CMP		10	6	2196	0.014	55.1 MIN	0.25	3.1	5			463.00	461.40	3.54	0.0025	0.012	0.0021	0.035	460.82	0.78	NO KNOWN OVERTOPPING
				100						4.8	7			---	462.03	4.64					460.89	0.81	
			1 - 18" x 48.00' RCP W/ SET LT & RT.	10										463.0	461.22	3.54	0.0021	0.012					NO EXISTING EROSION, NO ARMORING PROPOSED.
				100										---	461.54	4.64							

* MINUTES FOR RATIONAL METHOD, HOURS FOR NRCS METHOD.

NOTES:

1. HEC-RAS VERSION 5.0.6 DATED NOVEMBER, 2018 WAS USED FOR BRIDGE CLASS CULVERT COMPUTATIONS.
2. HY-8 VERSION 8.7.3 DATED SEPTEMBER, 2014 WAS USED FOR CULVERT COMPUTATIONS.
3. RUNOFF Q & TAILWATER ELEVATIONS & VELOCITIES ARE THE SAME FOR EXISTING & PROPOSED UNLESS OTHERWISE NOTED.
4. ALL OUTFALL CHANNELS ARE IRREGULAR UNLESS OTHERWISE NOTED.

STATE OF TEXAS
AMANDA ANDERLE FLING
105989
LICENSED
PROFESSIONAL ENGINEER

Amanda Anderle Fling, P.E.

01/27/2024

CULVERT COMPUTATIONS

Texas Department of Transportation

FED.RD. DIV.NO.		PROJECT NO.	
6			
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	111

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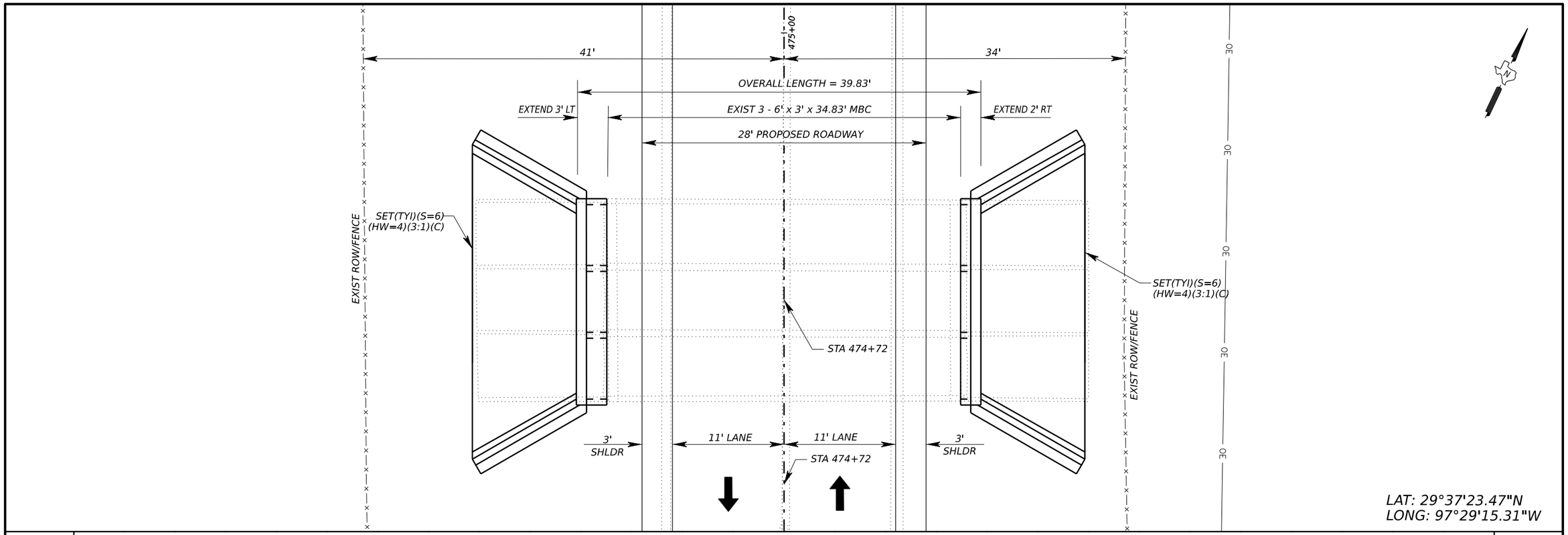
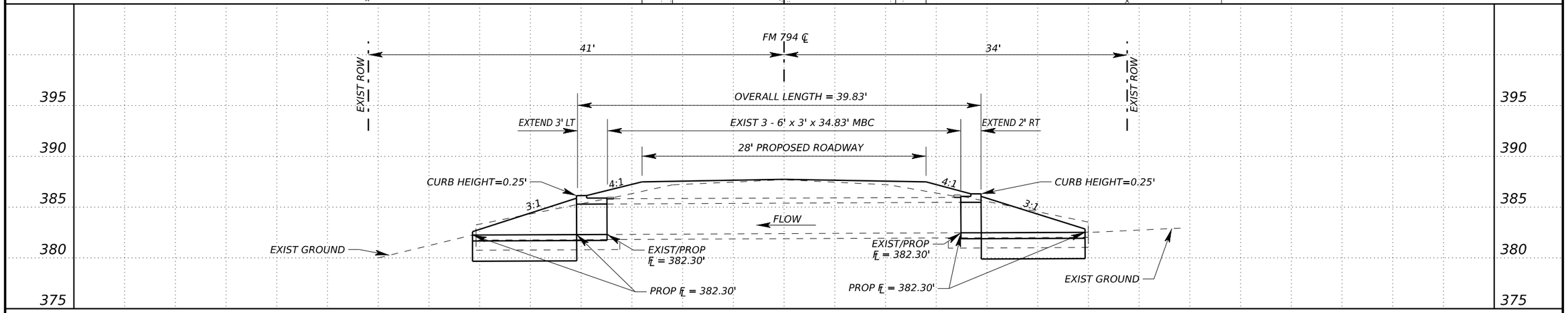
DATE: 1/29/2024





NOTES:

1. CONTRACTOR SHALL VERIFY ALL DIMENSIONS & ELEVATIONS IN THE FIELD.
2. CONTRACTOR SHALL LOCATE ALL UTILITIES & INFORM ENGINEER IN WRITING OF ANY CONFLICTS PRIOR TO BEGINNING CONSTRUCTION.
3. SET PIPE RUNNERS NOT SHOWN FOR CLARITY. SEE APPLICABLE STANDARDS FOR MORE INFORMATION.

CULVERT STA 474+72

EXIST 3 - 6' x 3' x 34.83' MBC W/ SETS LT & RT.
REMOVE HEADWALLS & SETS LT & RT.
EXTEND 3' LT & 2' RT. ADD SET(TY I)(S=6)(HW=4)(3:1)(C) LT & RT
USING BCS, MC-MD, MC-6-16, & SETB-FW-0.

STATE OF TEXAS
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105989
LICENSED
PROFESSIONAL ENGINEER

Amanda Anderle Fling, P.E.

01/27/2024

CULVERT LAYOUT

SCALE: 1" = 10'

Texas Department of Transportation

SHEET 1 OF 15

FED.RD. DIV.NO.		PROJECT NO.	
6			
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	112

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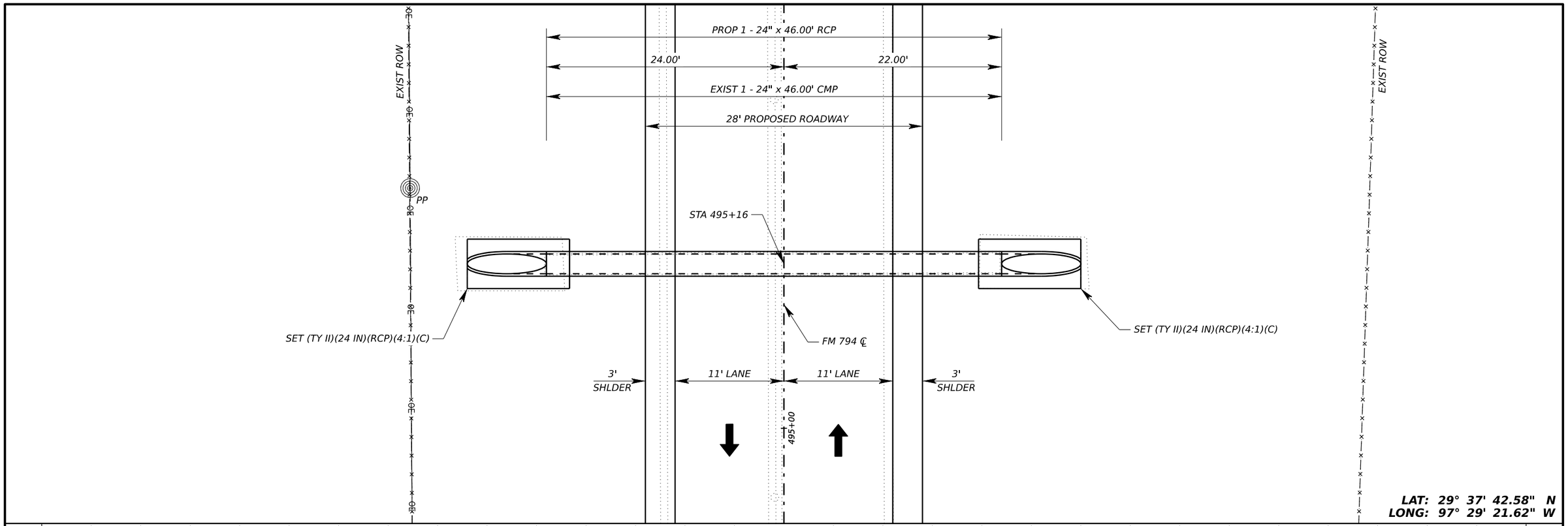
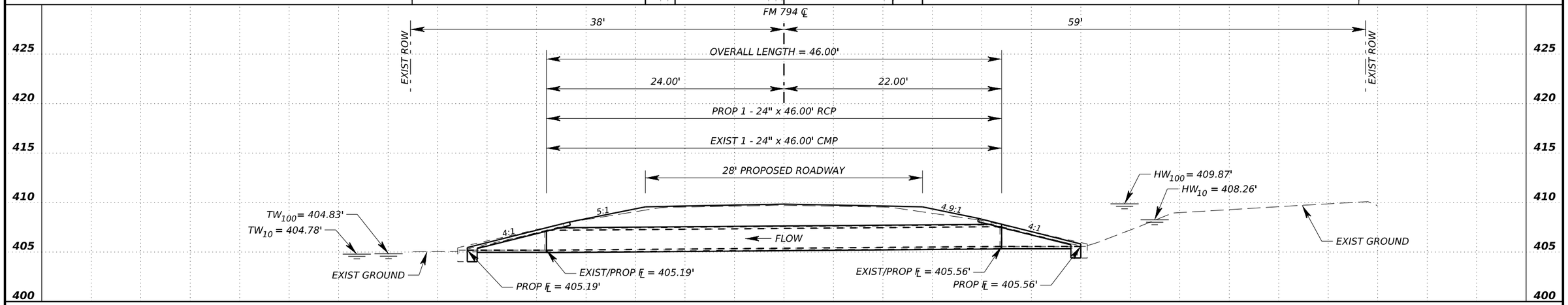
FILE: CULVERTS.dgn
DATE: 1/28/2024





NOTES:

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2. CONTRACTOR SHALL LOCATE ALL UTILITIES & INFORM ENGINEER IN WRITING OF ANY CONFLICTS PRIOR TO BEGINNING CONSTRUCTION.
3. SET PIPE RUNNERS NOT SHOWN FOR CLARITY. SEE APPLICABLE STANDARDS FOR MORE INFORMATION.

CULVERT STA 495+16

EXIST 1 - 24" x 46.00' CMP W/ SETS LT & RT.
REMOVE EXIST STRUCTURE.
PROP 1 - 24" x 46.00' RCP W/
SET(TY II)(24 IN)(RCP)(4:1)(C) LT & RT
USING SETP-CD.

STATE OF TEXAS
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Amanda Anderle Fling, P.E.

01/27/2024

CULVERT LAYOUT

SCALE: 1" = 10'

Texas Department of Transportation

FED.RD. DIV.NO.		PROJECT NO.	
6			
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	113

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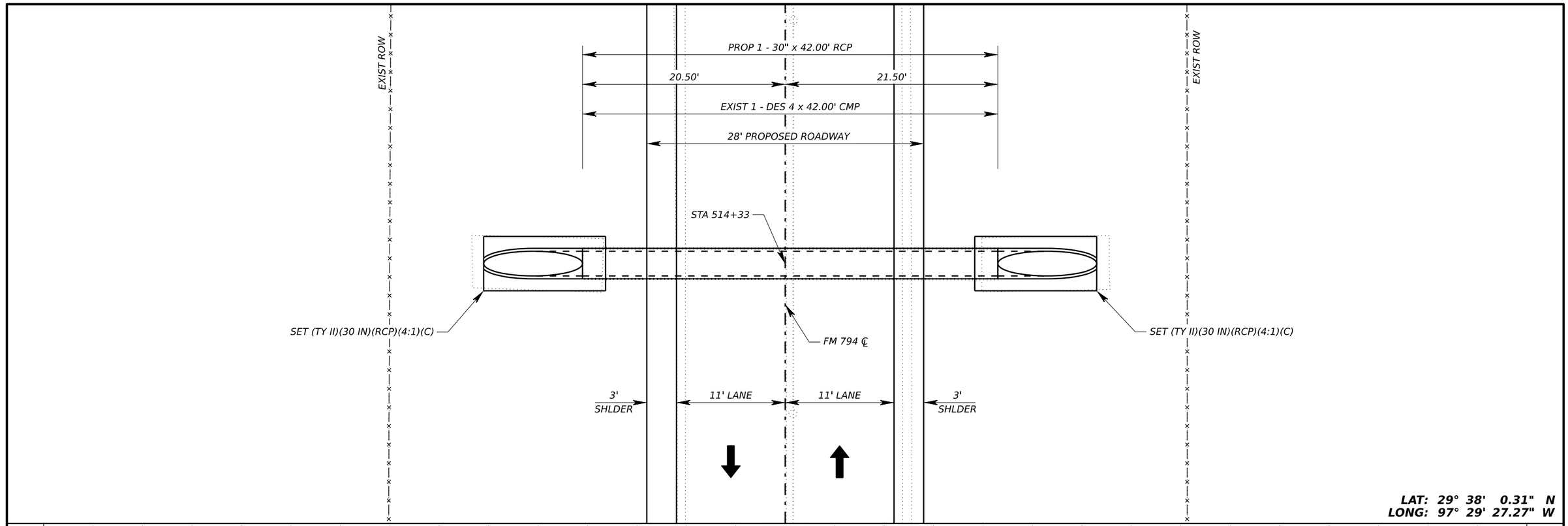
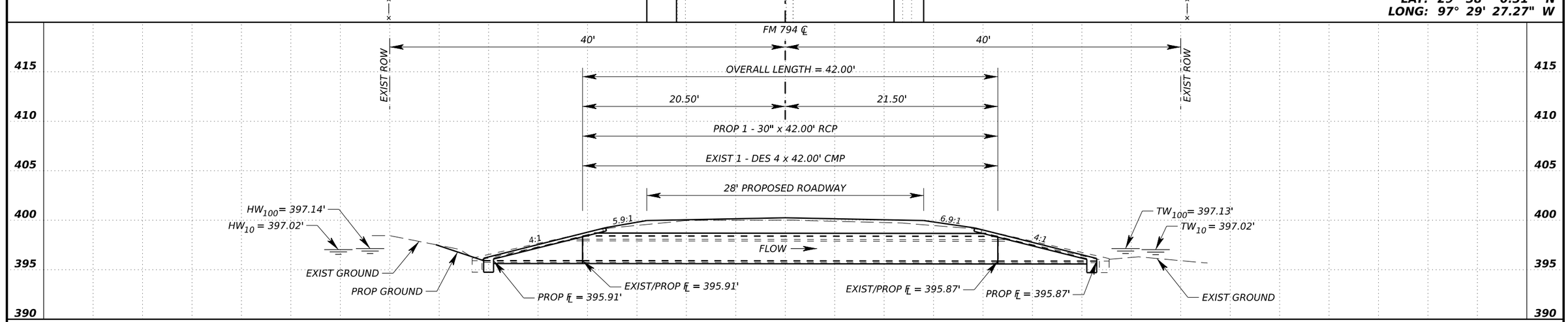
DATE: 1/28/2024





NOTES:

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2. CONTRACTOR SHALL LOCATE ALL UTILITIES & INFORM ENGINEER IN WRITING OF ANY CONFLICTS PRIOR TO BEGINNING CONSTRUCTION.
3. SET PIPE RUNNERS NOT SHOWN FOR CLARITY. SEE APPLICABLE STANDARDS FOR MORE INFORMATION.

CULVERT STA 514+33

EXIST 1 - DES 4 x 42.00' CMP W/ SETS LT & RT.
REMOVE EXIST STRUCTURE.
PROP 1 - 30" x 42.00' RCP W/ SET(TY II)(30 IN)(RCP)(4:1)(C) LT & RT USING SETP-CD.

STATE OF TEXAS
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Amanda Anderle Fling, P.E.

01/27/2024

CULVERT LAYOUT

SCALE: 1" = 10'

Texas Department of Transportation

FED.RD. DIV.NO.		PROJECT NO.	
6			
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	114

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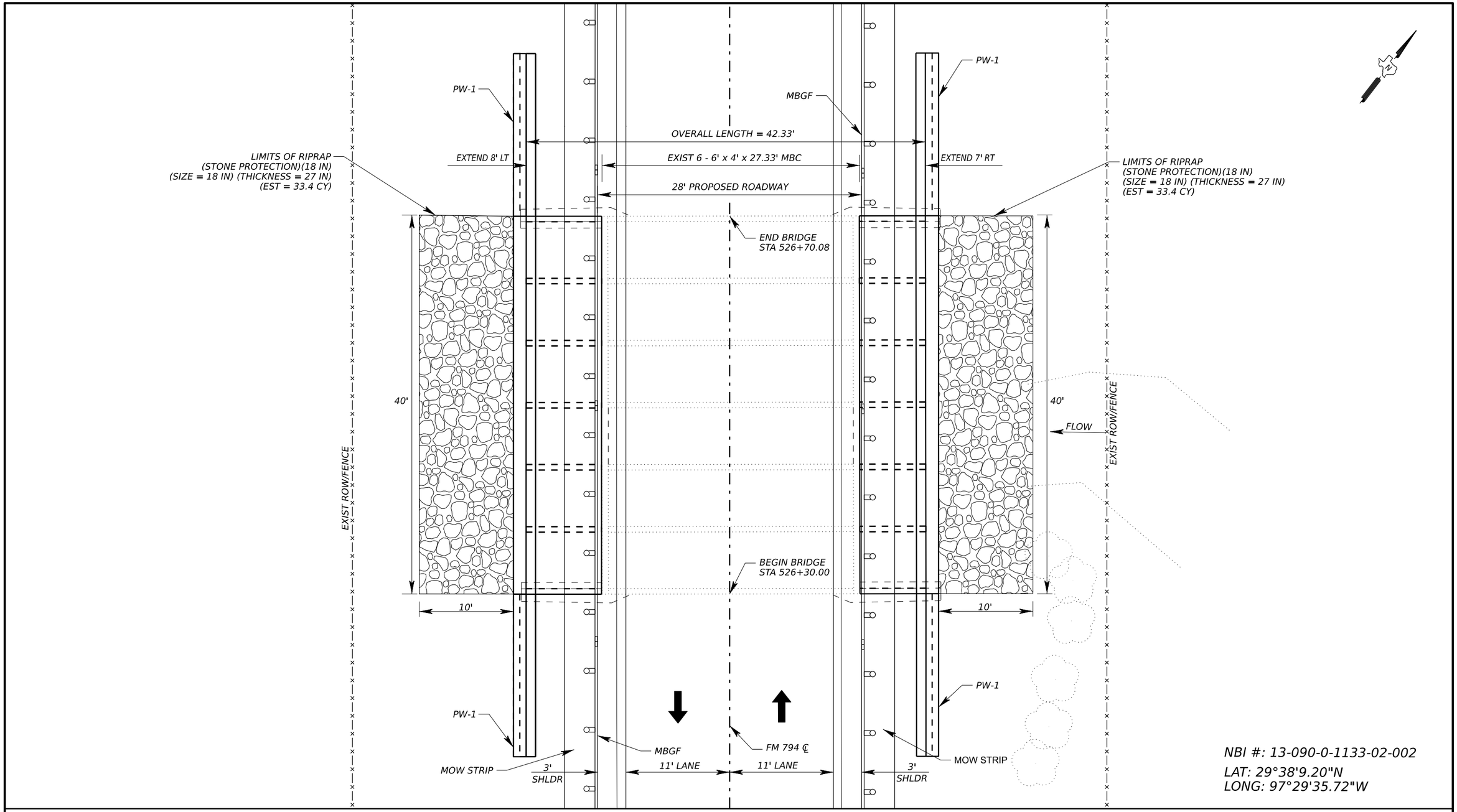
DATE: 1/28/2024



NBI #: 13-090-0-1133-02-002
LAT: 29°38'9.20"N
LONG: 97°29'35.72"W

NOTES:

1. CONTRACTOR SHALL VERIFY ALL DIMENSIONS & ELEVATIONS IN THE FIELD.
2. CONTRACTOR SHALL LOCATE ALL UTILITIES & INFORM ENGINEER IN WRITING OF ANY CONFLICTS PRIOR TO BEGINNING CONSTRUCTION.
3. SET PIPE RUNNERS NOT SHOWN FOR CLARITY. SEE APPLICABLE STANDARDS FOR MORE INFORMATION.

CULVERT STA 526+30.00 TO STA 526+70.08

EXIST 6 - 6' x 4' x 27.33' MBC W/ STRAIGHT WINGS LT & RT.
REMOVE HEADWALLS & STRAIGHT WINGS LT & RT.
EXTEND 8' LT & 7' RT W/ PARALLEL WINGS LT & RT
USING BCS, MC-MD, MC-6-16, ECD, & PW.

STATE OF TEXAS
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01/27/2024

CULVERT LAYOUT

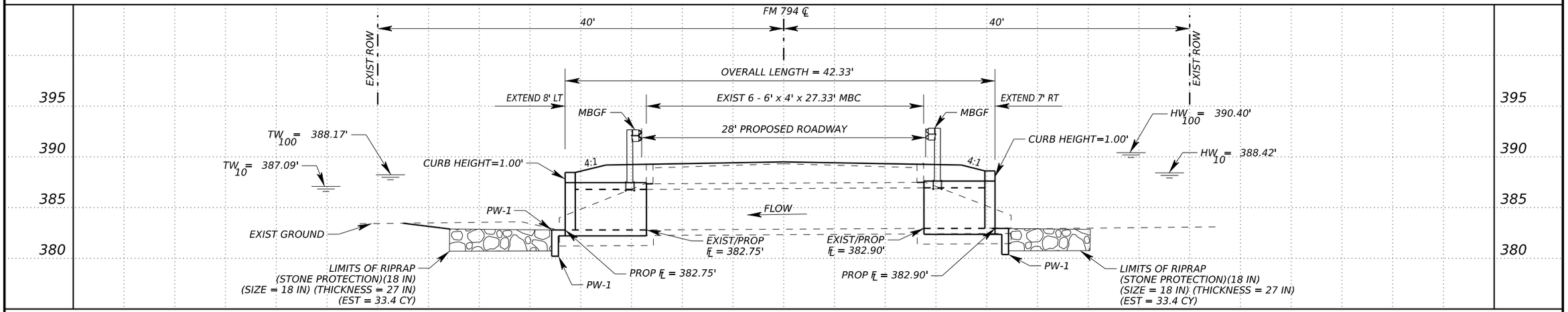
SCALE: 1" = 10'

Texas Department of Transportation

FED.RD. DIV.NO.		PROJECT NO.	
6			
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	115

PATH: T:\YKMANNEX\PS&E\1133020030_FM794\Plan_Sheets\
FILE: CULVERTS.dgn
DATE: 1/28/2024

NBI #: 13-090-0-1133-02-002
LAT: 29°38'9.20"N
LONG: 97°29'35.72"W



NOTES:

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3. SET PIPE RUNNERS NOT SHOWN FOR CLARITY. SEE APPLICABLE STANDARDS FOR MORE INFORMATION.

CULVERT STA 526+30.00 TO STA 526+70.08

EXIST 6 - 6' x 4' x 27.33' MBC W/ STRAIGHT WINGS LT & RT.
REMOVE HEADWALLS & STRAIGHT WINGS LT & RT.
EXTEND 8' LT & 7' RT W/ PARALLEL WINGS LT & RT
USING BCS, MC-MD, MC-6-16, ECD, & PW.

STATE OF TEXAS
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105989
LICENSED PROFESSIONAL ENGINEER

Amanda Anderle Fling, P.E.

01/27/2024

CULVERT LAYOUT

SCALE: 1" = 10'

Texas Department of Transportation

FED.RD. DIV.NO.		PROJECT NO.	
6			
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	116

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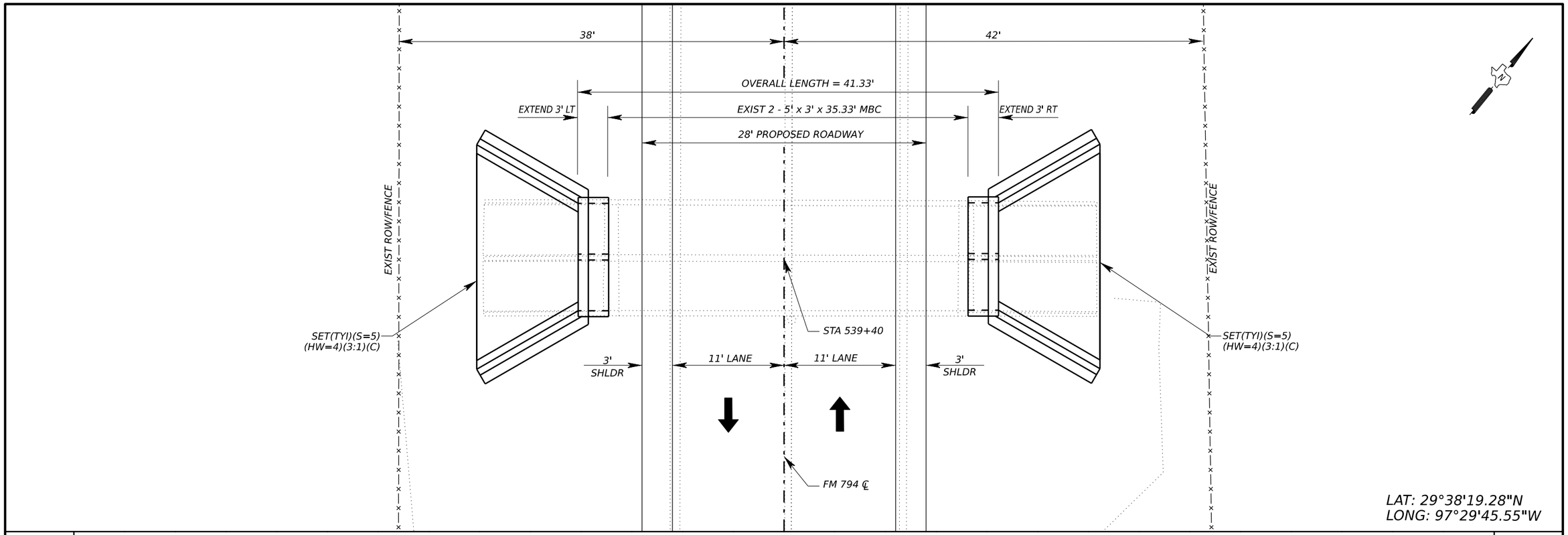
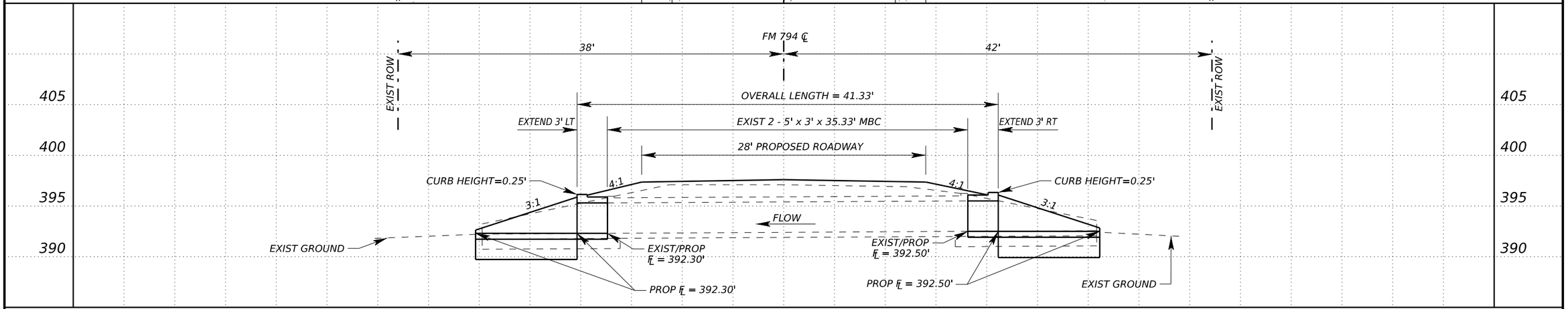
DATE: 1/28/2024





NOTES:

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2. CONTRACTOR SHALL LOCATE ALL UTILITIES & INFORM ENGINEER IN WRITING OF ANY CONFLICTS PRIOR TO BEGINNING CONSTRUCTION.
3. SET PIPE RUNNERS NOT SHOWN FOR CLARITY. SEE APPLICABLE STANDARDS FOR MORE INFORMATION.

CULVERT STA 539+40

EXIST 2 - 5' x 3' x 35.33' MBC W/ SETS LT & RT.
REMOVE HEADWALLS & SETS LT & RT.
EXTEND 3' LT & 3' RT. ADD SET(TY I)(S=5)(HW=4)(3:1)(C) LT & RT
USING BCS, MC-MD, MC-5-20, & SETB-FW-0.

STATE OF TEXAS
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105989
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Amanda Anderle Fling, P.E.

01/27/2024

CULVERT LAYOUT

SCALE: 1" = 10'

Texas Department of Transportation

SHEET 6 OF 15

FED.RD. DIV.NO.		PROJECT NO.	
6			
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	117

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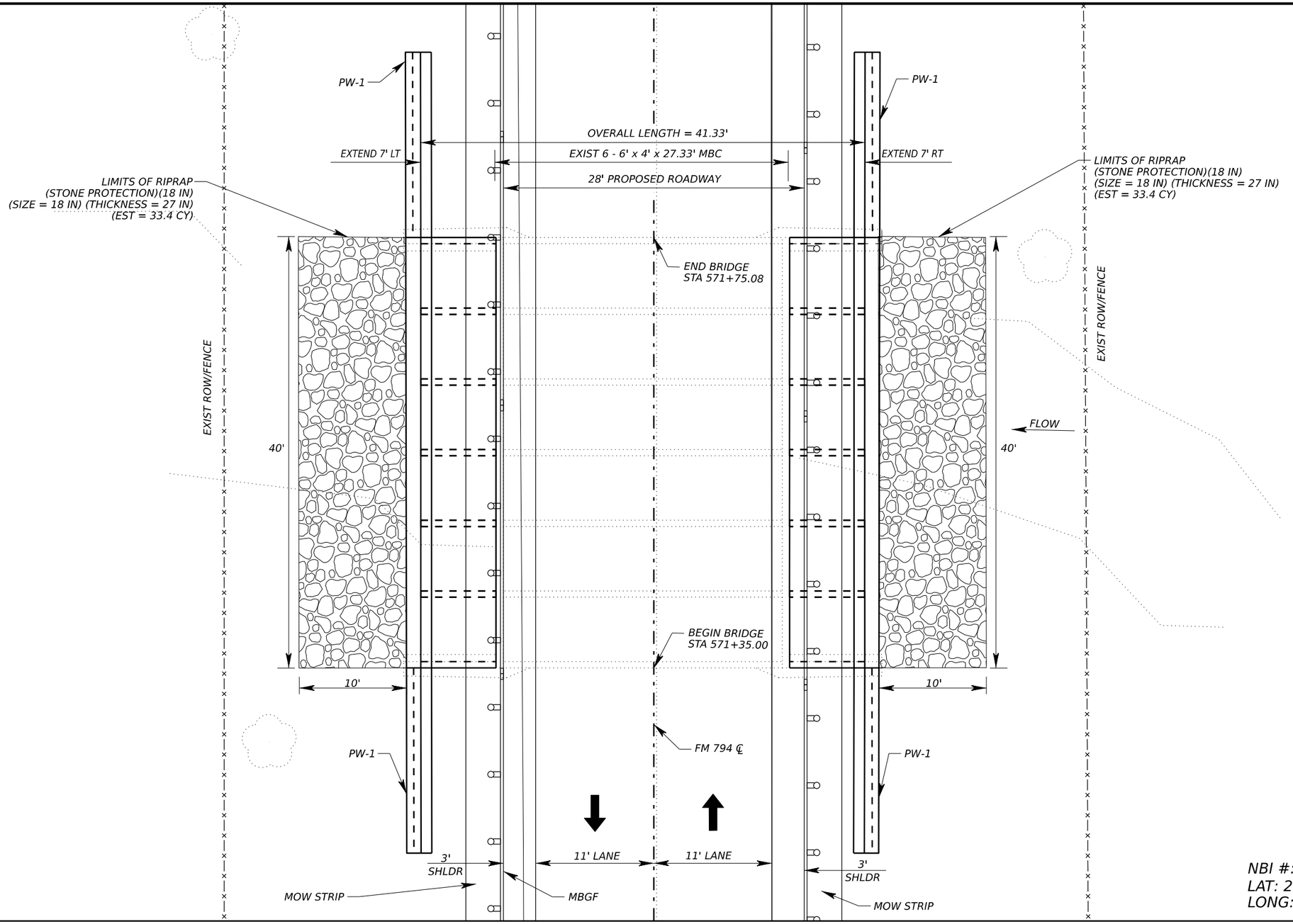
DATE: 1/28/2024



NBI #: 13-090-0-1133-02-001
LAT: 29°38'43.36"N
LONG: 97°30'9.53"W

NOTES:

1. CONTRACTOR SHALL VERIFY ALL DIMENSIONS & ELEVATIONS IN THE FIELD.
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3. SET PIPE RUNNERS NOT SHOWN FOR CLARITY. SEE APPLICABLE STANDARDS FOR MORE INFORMATION.

CULVERT STA 571+35.00 TO STA 571+75.08

EXIST 6 - 6' x 4' x 27.33' MBC W/ STRAIGHT WINGS LT & RT.
REMOVE HEADWALLS & STRAIGHT WINGS LT & RT.
EXTEND 7' LT & 7' RT W/ PARALLEL WINGS LT & RT
USING BCS, MC-MD, MC-6-16, ECD, & PW.

STATE OF TEXAS
AMANDA ANDERLE FLING
105989
LICENSED
PROFESSIONAL ENGINEER

Amanda Anderle Fling, P.E.

01/27/2024

CULVERT LAYOUT

SCALE: 1" = 10'

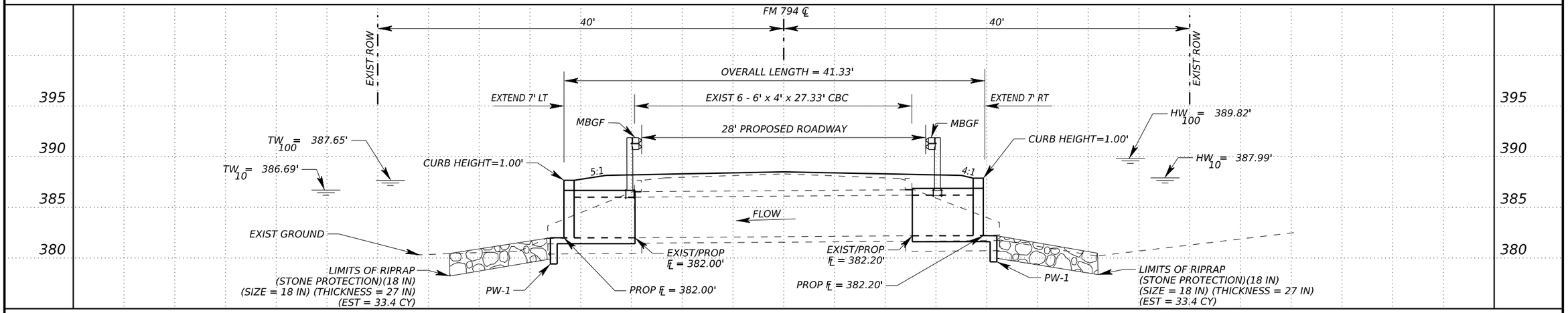
Texas Department of Transportation

SHEET 7 OF 15

FED.RD. DIV.NO.		PROJECT NO.	
6			
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	118

PATH: T:\YKMANNEX\PS&E\113302030_FM794\Plan_Sheets\
FILE: CULVERTS.dgn
DATE: 1/28/2024

NBI #: 13-090-0-1133-02-001
LAT: 29°38'43.36"N
LONG: 97°30'9.53"W



NOTES:

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2. CONTRACTOR SHALL LOCATE ALL UTILITIES & INFORM ENGINEER IN WRITING OF ANY CONFLICTS PRIOR TO BEGINNING CONSTRUCTION.
3. SET PIPE RUNNERS NOT SHOWN FOR CLARITY. SEE APPLICABLE STANDARDS FOR MORE INFORMATION.

CULVERT STA 571+35.00 TO STA 571+75.08

EXIST 6 - 6' x 4' x 27.33' MBC W/ STRAIGHT WINGS LT & RT.
REMOVE HEADWALLS & STRAIGHT WINGS LT & RT.
EXTEND 7' LT & 7' RT W/ PARALLEL WINGS LT & RT
USING BCS, MC-MD, MC-6-16, ECD, & PW.

STATE OF TEXAS
AMANDA ANDERLE FLING
105989
LICENSED PROFESSIONAL ENGINEER

Amanda Anderle Fling, P.E.

01/27/2024

CULVERT LAYOUT

SCALE: 1" = 10'

Texas Department of Transportation

SHEET 8 OF 15

FED.RD. DIV.NO.		PROJECT NO.	
6			
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	119

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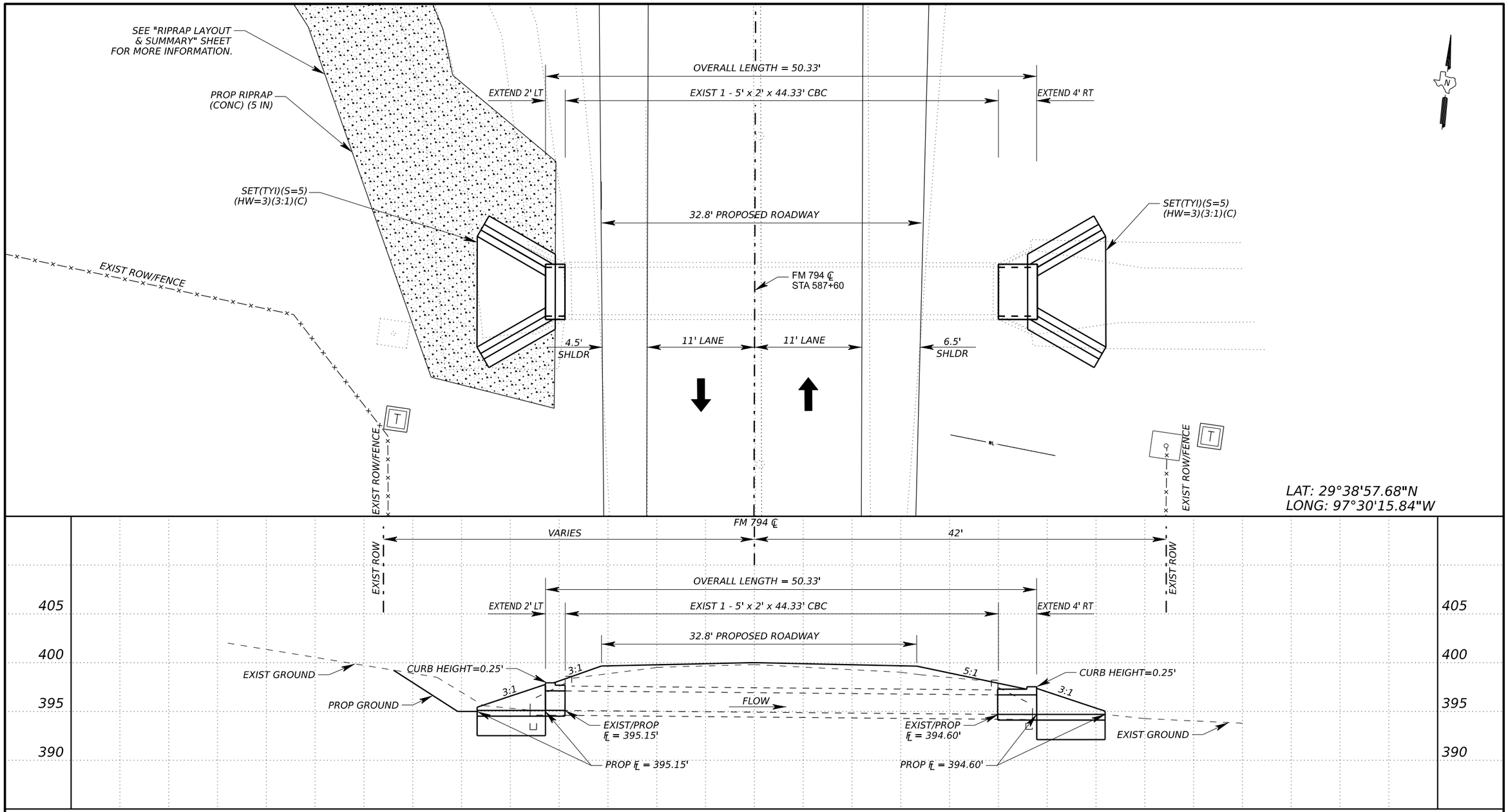
DATE: 1/29/2024



NOTES:

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2. CONTRACTOR SHALL LOCATE ALL UTILITIES & INFORM ENGINEER IN WRITING OF ANY CONFLICTS PRIOR TO BEGINNING CONSTRUCTION.
3. SET PIPE RUNNERS NOT SHOWN FOR CLARITY. SEE APPLICABLE STANDARDS FOR MORE INFORMATION.

CULVERT STA 587+60

EXIST 1 - 5' x 2' x 44.33' CBC W/ FLARED WINGS LT & RT.
REMOVE HEADWALL AND FLARED WINGS LT & RT.
EXTEND 2' LT & 4' RT. ADD SET(TY I)(S=5)(HW=3)(3:1)(C) LT & RT
USING BCS, SCC-MD, SCC-5 & 6, & SETB-FW-0.

STATE OF TEXAS
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105989
LICENSED
PROFESSIONAL ENGINEER

Amanda Anderle Fling, P.E.

01/27/2024

CULVERT LAYOUT

SCALE: 1" = 10'

Texas Department of Transportation

FED.RD. DIV.NO.		PROJECT NO.	
6			
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	120

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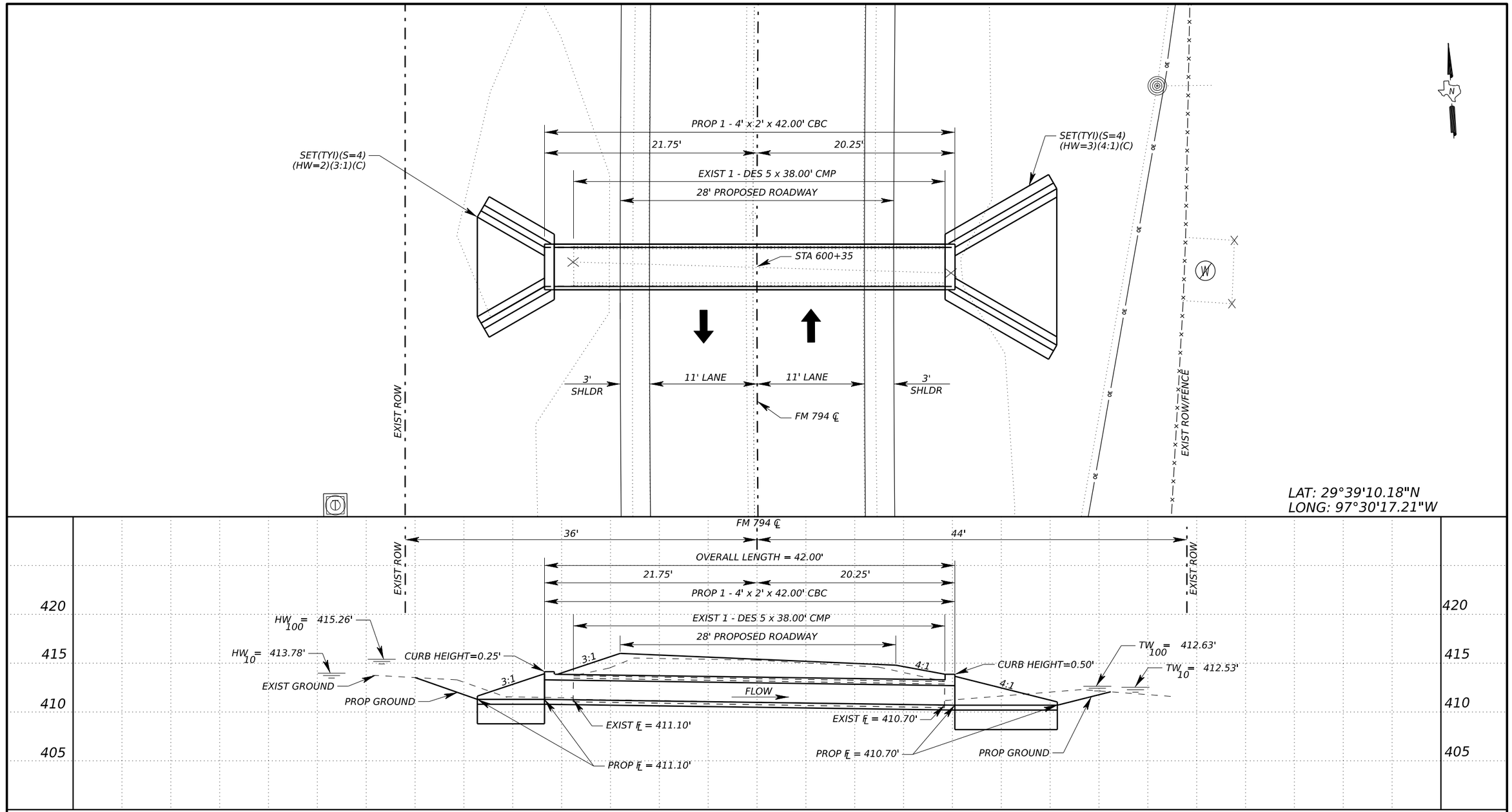

NOTES:

1. CONTRACTOR SHALL VERIFY ALL DIMENSIONS & ELEVATIONS IN THE FIELD.
2. CONTRACTOR SHALL LOCATE ALL UTILITIES & INFORM ENGINEER IN WRITING OF ANY CONFLICTS PRIOR TO BEGINNING CONSTRUCTION.
3. SET PIPE RUNNERS NOT SHOWN FOR CLARITY. SEE APPLICABLE STANDARDS FOR MORE INFORMATION.

CULVERT STA 600+35

EXIST 1 - DES 5 x 38.00' CMP. REMOVE EXIST STRUCTURE.
PROP 1 - 4' x 2' x 42.00' CBC W/ SET(TY I)(S=4)(HW=2)(3:1)(C) LT
& SET(TY I)(S=4)(HW=3)(4:1)(C) RT
USING BCS, SCP-MD, SCP-4, & SETB-FW-0.

STATE OF TEXAS
AMANDA ANDERLE FLING
105989
LICENSED
PROFESSIONAL ENGINEER

Amanda Anderle Fling, P.E.

01/27/2024

CULVERT LAYOUT

SCALE: 1" = 10'

Texas Department of Transportation

SHEET 10 OF 15

FED.RD. DIV.NO.		PROJECT NO.	
6			
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	121

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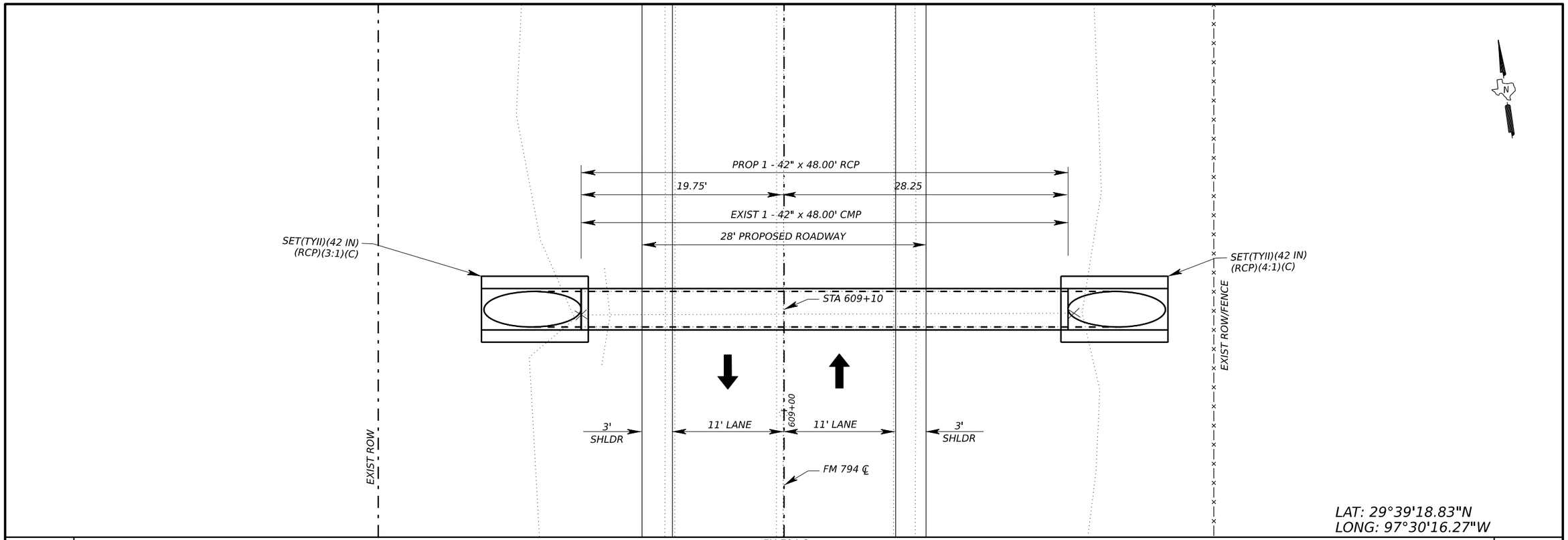
FILE: CULVERTS.dgn
DATE: 1/28/2024



NOTES:

1. CONTRACTOR SHALL VERIFY ALL DIMENSIONS & ELEVATIONS IN THE FIELD.
2. CONTRACTOR SHALL LOCATE ALL UTILITIES & INFORM ENGINEER IN WRITING OF ANY CONFLICTS PRIOR TO BEGINNING CONSTRUCTION.
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CULVERT STA 609+10

EXIST 1 - 42" x 48.00' CMP. REMOVE EXIST STRUCTURE.
PROP 1 - 42" x 48.00' RCP W/ SET(TY II)(42 IN)(RCP)(3:1)(C) LT &
SET(TY II)(42 IN)(RCP)(4:1)(C) RT USING SETP-CD.

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Amanda Anderle Fling, P.E.

01/27/2024

CULVERT LAYOUT

SCALE: 1" = 10'

Texas Department of Transportation

SHEET 11 OF 15

FED.RD. DIV.NO.		PROJECT NO.	
6			
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	122

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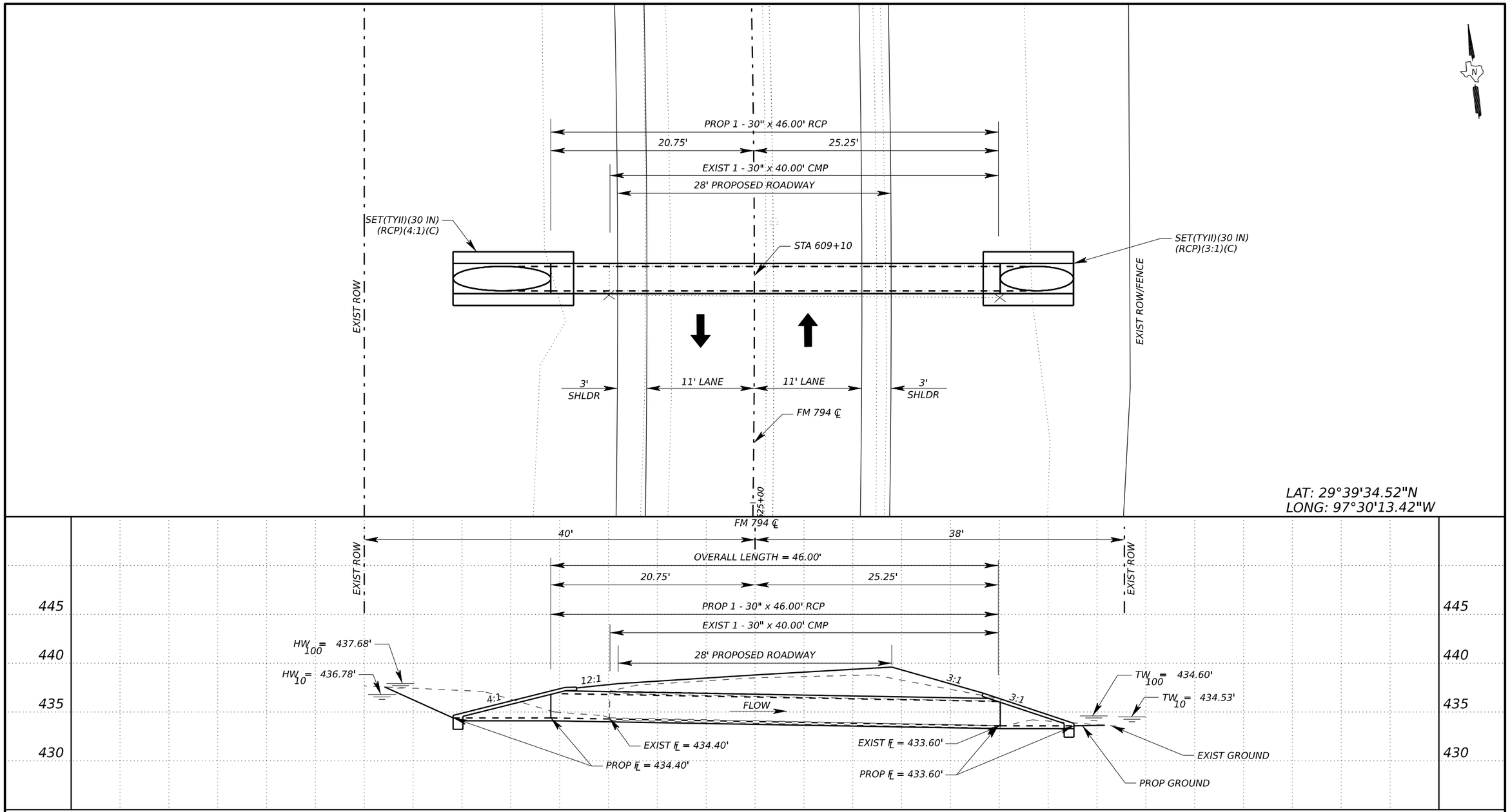
DATE: 1/28/2024



LAT: 29°39'34.52"N
LONG: 97°30'13.42"W

NOTES:

1. CONTRACTOR SHALL VERIFY ALL DIMENSIONS & ELEVATIONS IN THE FIELD.
2. CONTRACTOR SHALL LOCATE ALL UTILITIES & INFORM ENGINEER IN WRITING OF ANY CONFLICTS PRIOR TO BEGINNING CONSTRUCTION.
3. SET PIPE RUNNERS NOT SHOWN FOR CLARITY. SEE APPLICABLE STANDARDS FOR MORE INFORMATION.

CULVERT STA 625+23

EXIST 1 - 30" x 40.00' CMP. REMOVE EXIST STRUCTURE.
PROP 1 - 30" x 46.00' RCP W/ SET(TY II)(30 IN)(RCP)(4:1)(C) LT &
SET(TY II)(30 IN)(RCP)(3:1)(C) RT USING SETP-CD.

STATE OF TEXAS
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Amanda Anderle Fling, P.E.

01/27/2024

CULVERT LAYOUT

SCALE: 1" = 10'

Texas Department of Transportation

SHEET 12 OF 15

FED.RD. DIV.NO.		PROJECT NO.	
6			
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	123

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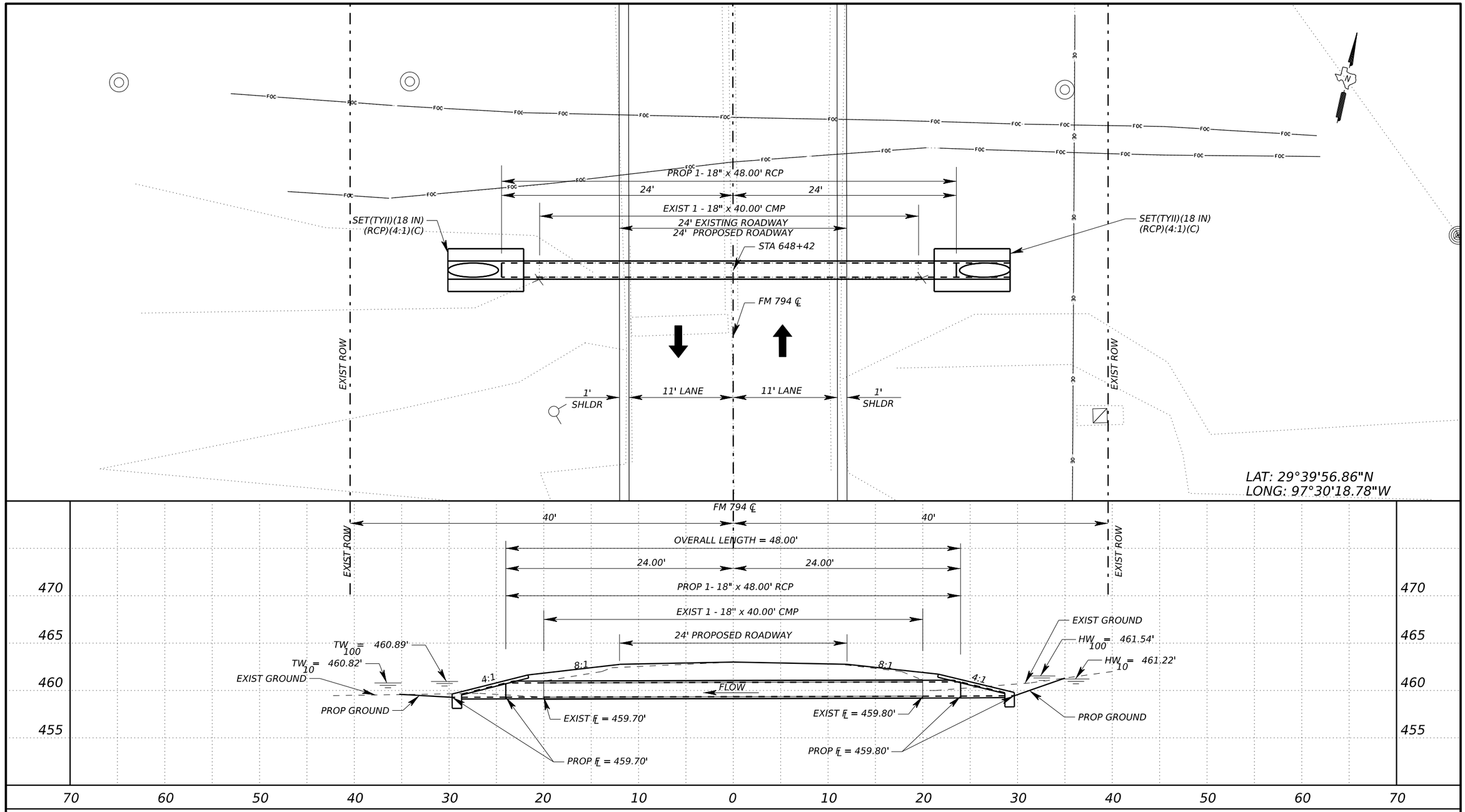
FILE: CULVERTS.dgn
DATE: 1/28/2024



NOTES:

1. CONTRACTOR SHALL VERIFY ALL DIMENSIONS & ELEVATIONS IN THE FIELD.
2. CONTRACTOR SHALL LOCATE ALL UTILITIES & INFORM ENGINEER IN WRITING OF ANY CONFLICTS PRIOR TO BEGINNING CONSTRUCTION.
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CULVERT STA 648+42

EXIST 1 - 18" x 40.00' CMP. REMOVE EXIST STRUCTURE.
PROP 1 - 18" x 48.00' RCP W/ SET(TY II)(18 IN)(RCP)(4:1)(C) LT & RT
USING SETP-CD.

STATE OF TEXAS
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Amanda Anderle Fling, P.E.

01/27/2024

CULVERT LAYOUT

SCALE: 1" = 10'

Texas Department of Transportation

SHEET 13 OF 15

FED.RD. DIV.NO.		PROJECT NO.	
6			
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	124

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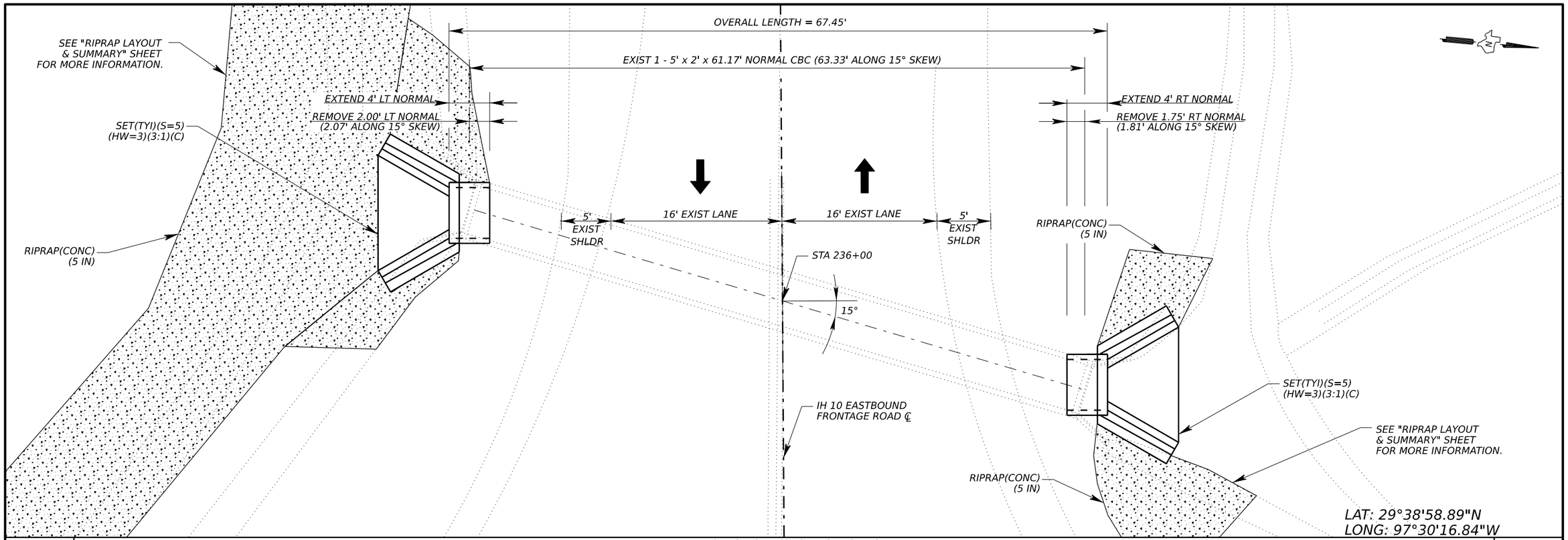
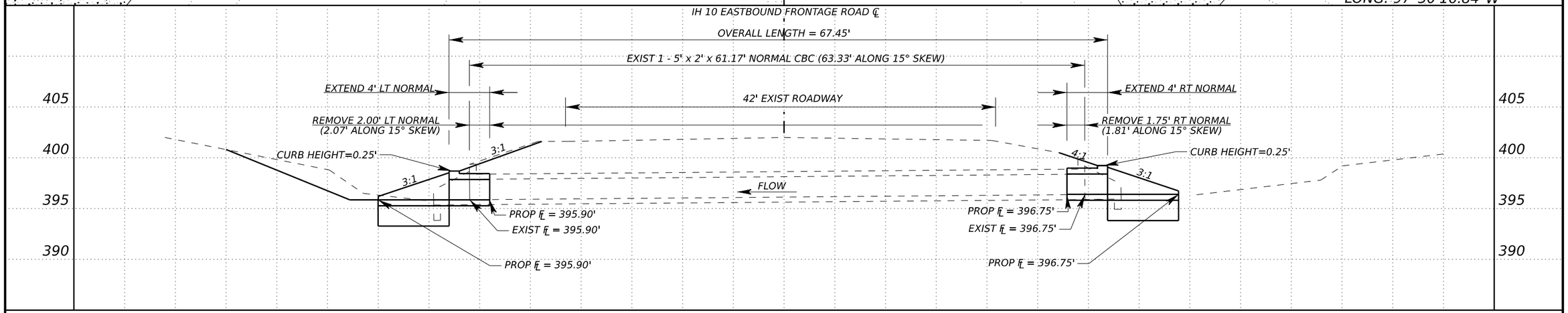
FILE: CULVERTS.dgn
DATE: 1/28/2024





NOTES:

1. CONTRACTOR SHALL VERIFY ALL DIMENSIONS & ELEVATIONS IN THE FIELD.
2. CONTRACTOR SHALL LOCATE ALL UTILITIES & INFORM ENGINEER IN WRITING OF ANY CONFLICTS PRIOR TO BEGINNING CONSTRUCTION.
3. SET PIPE RUNNERS NOT SHOWN FOR CLARITY. SEE APPLICABLE STANDARDS FOR MORE INFORMATION.

CULVERT STA 236+00 (IH 10 EASTBOUND FRONTAGE ROAD)

EXIST 1 - 5' x 2' x 61.17' NORMAL CBC (63.33' ALONG 15° SKEW) W/ FLARED WINGS LT & RT. REMOVE HEADWALLS AND FLARED WINGS LT & RT. REMOVE 2' LT NORMAL (2.07' ALONG 15° SKEW) & 1.75' RT NORMAL (1.81' ALONG 15° SKEW). EXTEND 4' LT & 4' RT. ADD SET(TY I)(S=5)(HW=3)(3:1)(C) LT & RT USING BCS, SCC-MD, SCC-5 & 6, & SETB-FW-0.

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Amanda Anderle Fling, P.E.

01/27/2024

CULVERT LAYOUT

SCALE: 1" = 10'

Texas Department of Transportation

SHEET 14 OF 15

FED.RD. DIV.NO.		PROJECT NO.	
6			
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	125

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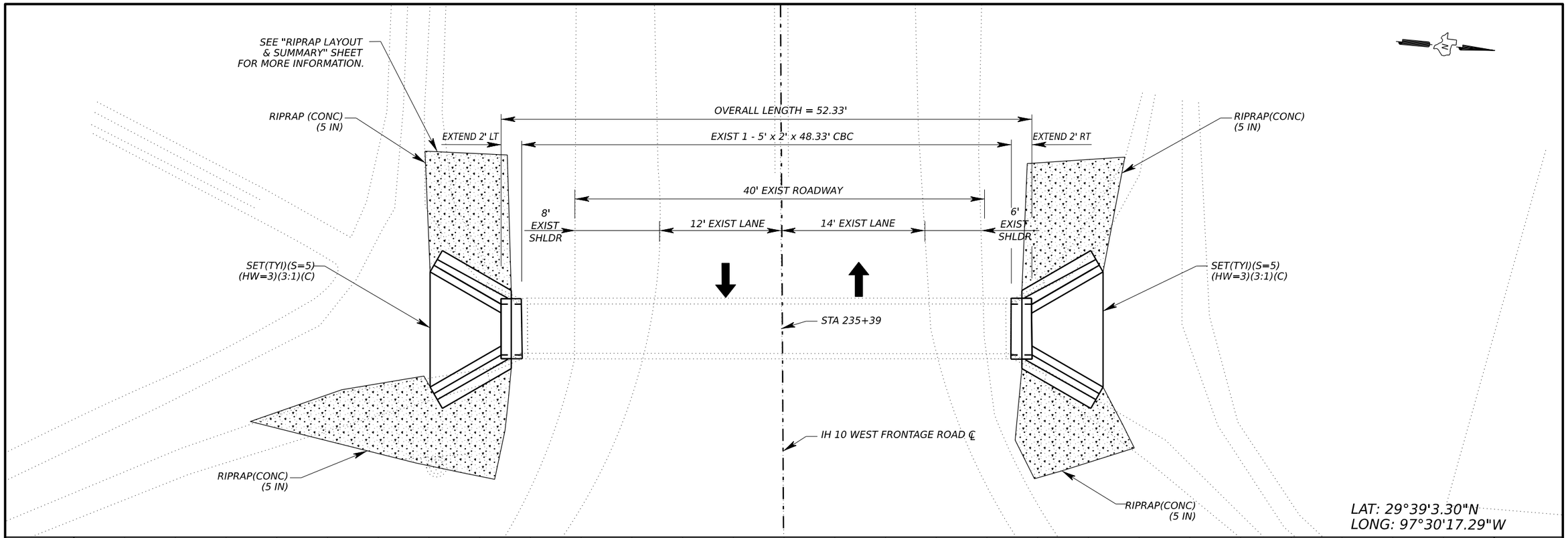
FILE: CULVERTS.dgn
DATE: 1/29/2024



NOTES:

1. CONTRACTOR SHALL VERIFY ALL DIMENSIONS & ELEVATIONS IN THE FIELD.
2. CONTRACTOR SHALL LOCATE ALL UTILITIES & INFORM ENGINEER IN WRITING OF ANY CONFLICTS PRIOR TO BEGINNING CONSTRUCTION.
3. SET PIPE RUNNERS NOT SHOWN FOR CLARITY. SEE APPLICABLE STANDARDS FOR MORE INFORMATION.

CULVERT STA 235+39 (IH 10 WESTBOUND FRONTAGE ROAD)

EXIST 1 - 5' x 2' x 48.33' CBC W/ FLARED WINGS LT & RT.
REMOVE HEADWALLS AND FLARED WINGS LT & RT.
EXTEND 2' LT & 2' RT. ADD SET(TY I)(S=5)(HW=3)(3:1)(C) LT & RT
USING BCS, SCC-MD, SCC-5 & 6, & SETB-FW-0.

STATE OF TEXAS
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105989
LICENSED PROFESSIONAL ENGINEER

Amanda Anderle Fling, P.E.

01/27/2024

CULVERT LAYOUT

SCALE: 1" = 10'

Texas Department of Transportation

SHEET 15 OF 15

FED.RD. DIV.NO.		PROJECT NO.	
6			
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	126

PATH: T:\YKMANNEX\PS&E\113302030_FM794\Plan_Sheets\
FILE: CULVERTS.dgn
DATE: 1/28/2024

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 0 set of End of Wingwall (Ft)	Lw Length of Longest Wingwall (Ft)	Ltw Culvert Toewall Length (Ft)	Atw Anchor Toewall Length (Ft)	Riprap Apron (CY)	Class "C" Conc (Curb) (2) (CY)	Class "C" Conc (Wingwall) (3) (CY)	Total Wingwall Area (SF)
STA 474+72 (Both)	3 ~ 6'x 3'	1.8'	MC-6-16	SETB-FW-0	0°	3:1	9"	7"	0.250'	3.750'	10.250'	5.918'	11.836'	N/A	31.002'	6.6	0.4	11.0	N/A
STA 526+30 TO STA 526+70.08 (Both)	6 ~ 6'x 4'	2'	MC-6-16	PW-1	0°	3:1	9"	7"	1.000'	5.750'	N/A	N/A	17.250'	40.083'	N/A	0.0	3.0	31.4	396
STA 539+40 (Both)	2 ~ 5'x 3'	1.7'	MC-5-20	SETB-FW-0	0°	3:1	8"	7"	0.250'	3.667'	10.000'	5.774'	11.547'	N/A	22.130'	4.0	0.2	9.6	N/A
STA 571+35 TO STA 571+75.08 (Both)	6 ~ 6'x 4'	1.85'	MC-6-16	PW-1	0°	3:1	9"	7"	1.000'	5.750'	N/A	N/A	17.250'	40.083'	N/A	0.0	3.0	31.4	396
STA 587+60 (Both)	1 ~ 5'x 2'	2.5'	SCC-5&6	SETB-FW-0	0°	3:1	8"	7"	0.250'	2.667'	7.000'	4.041'	8.083'	N/A	13.083'	1.2	0.2	5.8	N/A
STA 600+35 (Lt)	1 ~ 4'x 2'	2.35'	SCP-4	SETB-FW-0	0°	3:1	5"	5"	0.250'	2.417'	6.250'	3.608'	7.217'	N/A	11.217'	0.4	0.0	2.5	N/A
STA 600+35 (Rt)	1 ~ 4'x 2'	2.35'	SCP-4	SETB-FW-0	0°	4:1	5"	5"	0.500'	2.667'	9.333'	5.389'	10.777'	N/A	14.777'	0.9	0.1	3.8	N/A
STA 236+00 (FRONTAGE ROAD) (Both)	1 ~ 5'x 2'	3.3'	SCC-5&6	SETB-FW-0	0°	3:1	8"	7"	0.250'	2.667'	7.000'	4.041'	8.083'	N/A	13.083'	1.2	0.2	5.8	N/A
STA 235+39 (FRONTAGE ROAD) (Both)	1 ~ 5'x 2'	1.4'	SCC-5&6	SETB-FW-0	0°	3:1	8"	7"	0.250'	2.667'	7.000'	4.041'	8.083'	N/A	13.083'	1.2	0.2	5.8	N/A

DATE: 1/29/2024 $TIME$
FILE: $FILE$

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 ared or straight wingwalls.
- Channel slope for parallel wingwalls.
- Slope must be 3:1 or atter 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 = 0 set 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 di erent type than those shown on this sheet, it is the Contractor's responsibility to make the necessary adjustments to the dimensions and quantities shown.

SPECIAL NOTE:

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

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

STATE OF TEXAS
AMANDA ANDERLE FLING
105989
LICENSED
PROFESSIONAL ENGINEER

Amanda Anderle Fling, P.E.

01/27/2024

Texas Department of Transportation

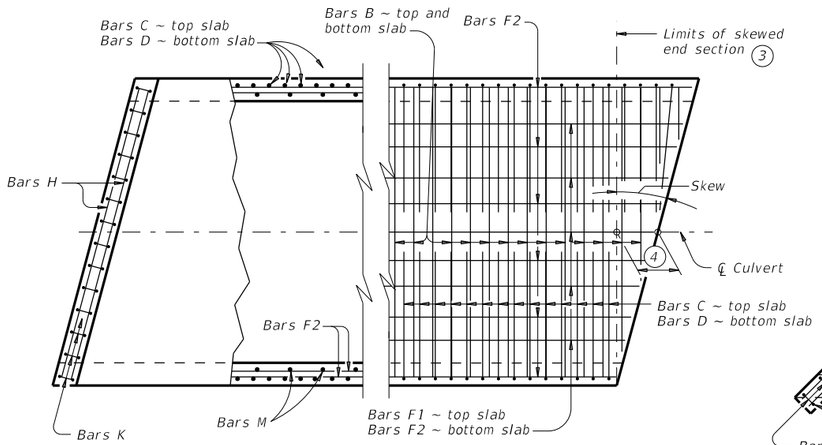
Bridge Division Standard

BOX CULVERT SUPPLEMENT
WINGS AND END TREATMENTS

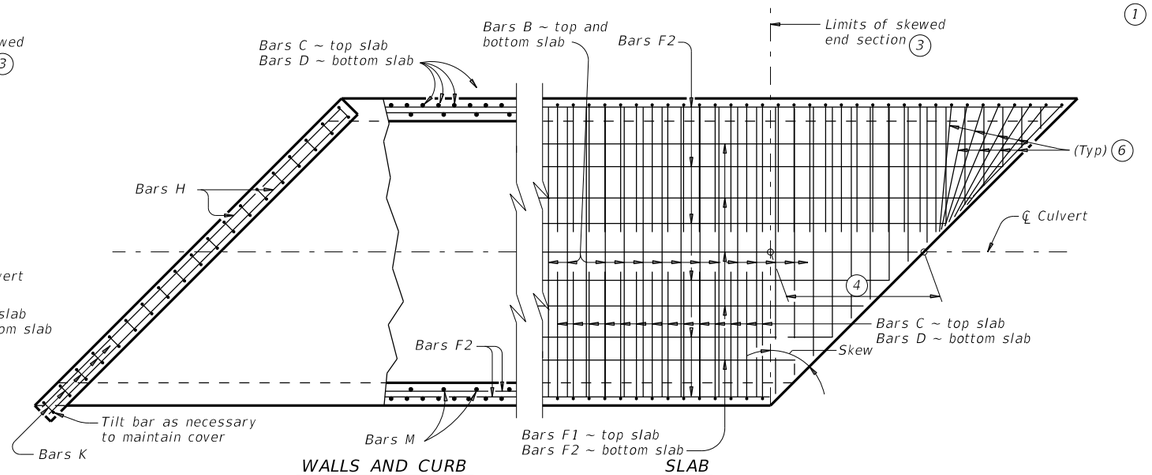
BCS

FILE: bcsstde1-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	030	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		127

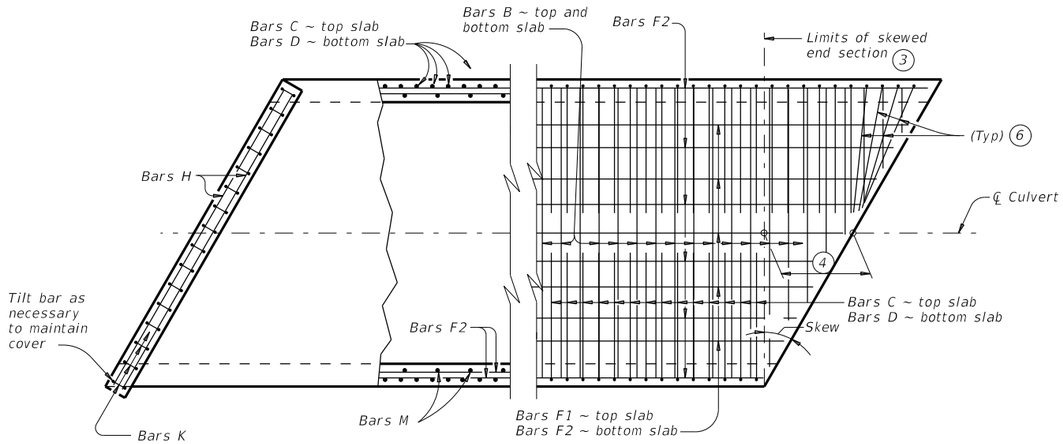
DATE: 1/28/2024 $TIME$
FILE: $FILE$



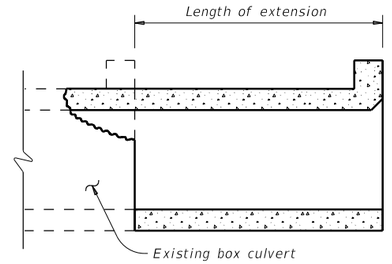
PLAN OF SKEWED ENDS ~ FROM 0° TO 15° (7)



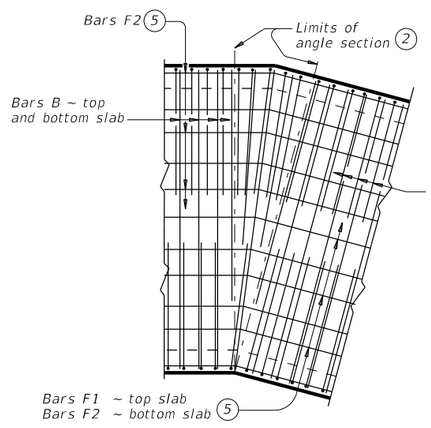
PLAN OF SKEWED ENDS ~ OVER 30° TO 45°



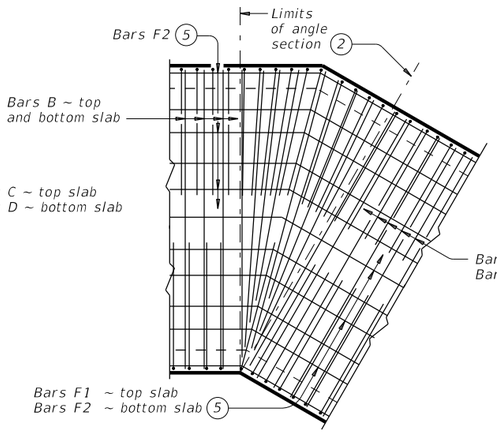
PLAN OF SKEWED ENDS ~ OVER 15° TO 30°



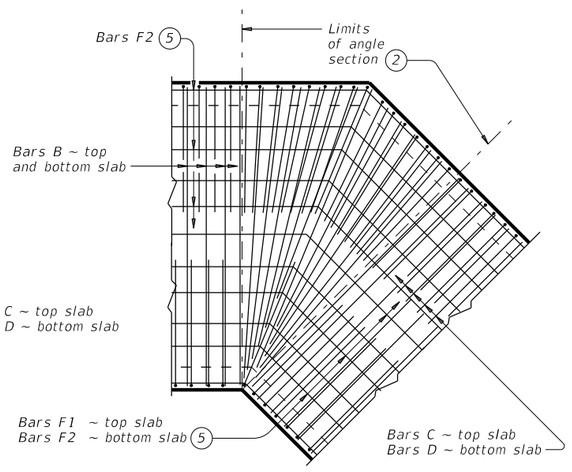
LENGTHENING DETAIL (1)



PLAN OF ANGLE SECTION ~ FROM 0° TO 15°



PLAN OF ANGLE SECTION ~ OVER 15° TO 30°



PLAN OF ANGLE SECTION ~ OVER 30° TO 45°

(1) For skewed box culverts with less than 2'-0" of ll, break back the top slab to provide a 1'-10" minimum lap of the existing longitudinal bars with the longitudinal bars in the extension.

For non-skewed box culverts with less than 2'-0" of ll and for skewed or non-skewed culverts with a ll depth of 2'-0" or greater, break back the top slab to provide a 1'-10" minimum lap of the existing longitudinal bars with the longitudinal bars in the extension. Alternatively, if the box is non-skewed, embed #6 anchor bars with a Type III, C, D , E, or F anchor adhesive into the existing walls, top and bottom slab at 1'-6" center-to-center spacing. Minimum embedment depth is 8". Anchor adhesive chosen must be able to achieve a basic bond strength in tension, Nba, of 26.4 kips. Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing." Test adhesive anchors in accordance with Item 450.3.3, "Tests." Test 3 anchors per 100 anchors installed.

Break back wings and apron as necessary to install the extension. Clean and extend the exposed wingwall and apron reinforcing into the extension. When lengthening existing box culverts with dimensions di erent than current standard dimensions, form horizontal and vertical transitions as directed by the Engineer. Match bottom slabs to maintain an uninterrupted ow line. Field bend existing and new reinforcing into transitions and maintain speci ed cover requirements. For top slabs of culverts with overlay, with 1-to-2 course surface treatment, or with the top slab as the nal riding surface, adjust the "H" dimension to provide a smooth riding surface.

(2) When the spacing between Bars B becomes less than half of the normal spacing, cut bars to avoid con ict.

(3) The length of Bars B vary in the skewed end sections.

(4) [One half of overall width] x [tangent of the skew angle]

(5) Place Bars F1 and F2 continuously through the angle section. Bend Bars F1 and F2 to remain parallel to the walls of the box culvert.

(6) When necessary to avoid con ict in acute corners, shorten the slab extension leg of Bars C and Bars D to a minimum of 1'-6" for skews of 30° thru 45°.

(7) At the Contractor's option, for skews of 15° or less, place Bars B, C, and D parallel to the skewed end while maintaining spacing along centerline of box. Increase lengths of Bars B shown on the Single Box Culverts Cast-In-Place (SCC) standards sheets to accommodate the skew.

CONSTRUCTION NOTES:

Do not use permanent forms.
When required, lap Bars H 1'-8" for uncoated or galvanized bars.
Provide a minimum of 1 ½" clear cover.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel, if required elsewhere in the plans.
Provide Class C concrete (f'c = 3,600 psi) with these exceptions:
provide Class S concrete (f'c = 4,000 psi) for top slabs of culverts with overlay, with 1-to-2 course surface treatment, or with the top slab as the nal riding surface.

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Speci cations.

Refer to Single Box Culverts Cast-in-Place (SCC) standard sheets for details of straight sections of culvert.

For skewed sections and angle sections, refer to Single Box Culverts Cast-in-Place (SCC) standard sheets for slab and wall dimensions, bar sizes, maximum bar spacing, and any other details not shown.

For skewed ends with curbs, adjust length of Bars H, number of Bars K, curb concrete volume, and reinforcing steel weight by dividing the values shown on the culvert Single Box Culverts Cast-In-Place (SCC) standard sheets by the cosine of the skew angle.

Cover dimensions are clear dimensions, unless noted otherwise.

HL93 LOADING

Texas Department of Transportation

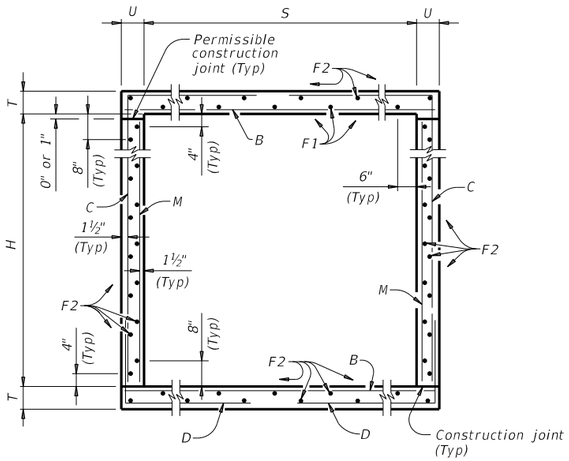
Bridge Division Standard

SINGLE BOX CULVERTS CAST-IN-PLACE MISCELLANEOUS DETAILS

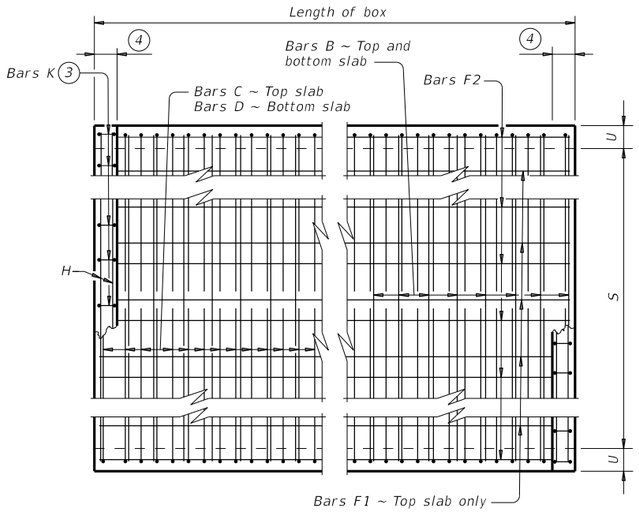
SCC-MD

FILE: sccmdste-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	030	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		128

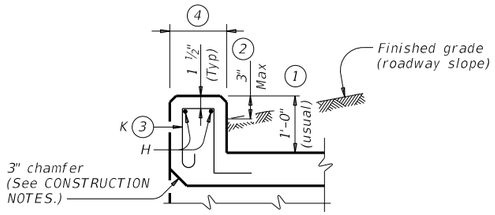
DATE: 1/28/2024 $TIME$
FILE: $FILE$



TYPICAL SECTION



PLAN OF REINF STEEL



SECTION THRU CURB

(1) 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 Rail Anchorage Curb (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.

(2) For vehicle safety, the following requirements must be met:
- For structures without bridge rail, construct curbs no more than 3" above nished grade.
- For structures with bridge rail, construct curbs ush with nished 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.

(3) 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.

(4) 1'-0" typical. 2'-3" when the Rail Anchorage Curb (RAC) standard sheet is referred to elsewhere in the plans.

The Contractor may replace Bars B, C, D, E, F1, F2, M, Y, and/or Z with deformed welded wire reinforcement (WWR) meeting the requirements of ASTM A1064. The area of required reinforcement may be reduced by the ratio of 60 ksi / 70 ksi. Spacing of WWR is limited to 4" Min and 18" Max. When required, provide lap splices in the WWR of the same length required for the equivalent bar size, rounded up for wire sizes between conventional bar sizes. The lap length required for WWR is never less than the lap length required for uncoated #4 bars.

Example conversion: Replacing No. 6 Gr 60 at 6" Spacing with WWR.
Required WWR = (0.44 sq. in. per 0.5 ft.) x (60 ksi / 70 ksi) = 0.755 sq. in. per ft.
If D30.6 wire is used to meet the 0.755 sq. in. per ft. requirement in this example, the required spacing = (0.306 sq. in.) / (0.755 sq. in. per ft.) x (12 in. per ft.) = 4.86" Max spacing. Required lap length for the provided D30.6 wire is 2'-1" (the same minimum lap length required for uncoated #5 bars, as listed under MATERIAL NOTES).

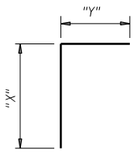
CONSTRUCTION NOTES:
Do not use permanent forms.
Chamfer the bottom edge of the top slab 3" at the entrance.
Optionally, raise construction joints shown at the ow line by a maximum of 6". If this option is taken, Bars M may be cut o or raised, Bars C and D may be reversed.

MATERIAL NOTES:
Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.
Provide Class C concrete (f'_c = 3,600 psi) for culvert barrel and curb, with the following exceptions: provide Class S concrete (f'_c = 4,000 psi) for top slabs of:
- culverts with overlay,
- culverts with 1-to-2 course surface treatment, or
- culverts with the top slab as the nal riding surface.

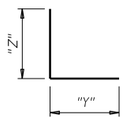
Provide bar laps, where required, as follows:
- Uncoated or galvanized ~ #4 = 1'-8" Min
- Uncoated or galvanized ~ #5 = 2'-1" Min
- Uncoated or galvanized ~ #6 = 2'-6" Min

GENERAL NOTES:
Designed according to AASHTO LRFD Bridge Design Speci cations for the range of ll heights shown.
See the Single Box Culverts Cast-In-Place Miscellaneous Detail (SCC-MD) standard sheet for details pertaining to skewed ends, angle sections, and lengthening.

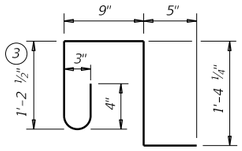
Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.



BARS C



BARS D



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

HL93 LOADING SHEET 1 OF 2

Texas Department of Transportation | Bridge Division Standard

SINGLE BOX CULVERTS CAST-IN-PLACE
0' TO 30' FILL

SCC-5 & 6

FILE: scc56ste-21.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	030	FM 794
04/2021 Updated X values.	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		129

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DATE: 1/28/2024 $TIME$
FILE: $FILE$

SECTION DIMENSIONS				FILL HEIGHT (5)	BILLS OF REINFORCING STEEL (For Box Length = 40 feet)																										QUANTITIES					
					Bars B					Bars C							Bars D							Bars M ~ #4				Bars F1 ~ #4 at 18" Spa			Bars F2 ~ #4 at 18" Spa			Bars H 4 ~ #4		Bars K		Per Foot of Barrel		Curb		Total	
S	H	T	U		No.	Size	Spa	Length	Weight	No.	Size	Spa	Length	Weight	" X "	" Y "	No.	Size	Spa	Length	Weight	" Y "	" Z "	No.	Spa	Length	Weight	No.	Length	Wt	No.	Length	Weight	Length	Wt	No.	Wt	Conc (CY)	Reinf (Lb)	Conc (CY)	Reinf (Lb)	Conc (CY)	Reinf (Lb)
5' – 0"	2' – 0"	8"	7"	26'	108	#6	9"	5' – 11"	960	108	#5	9"	6' – 3"	704	2' – 6"	3' – 9"	108	#5	9"	6' – 5"	723	3' – 9"	2' – 8"	108	9"	2' – 0"	144	4	39' – 9"	106	22	39' – 9"	584	5' – 11"	16	14	39	0.391	80.5	0.5	55	16.1	3,276
5' – 0"	2' – 0"	9"	7"	30'	108	#6	9"	5' – 11"	960	108	#5	9"	6' – 4"	713	2' – 7"	3' – 9"	108	#5	9"	6' – 6"	732	3' – 9"	2' – 9"	108	9"	2' – 0"	144	4	39' – 9"	106	22	39' – 9"	584	5' – 11"	16	14	39	0.429	81.0	0.5	55	17.6	3,294
5' – 0"	3' – 0"	8"	7"	26'	108	#6	9"	5' – 11"	960	108	#5	9"	7' – 3"	817	3' – 6"	3' – 9"	108	#5	9"	6' – 5"	723	3' – 9"	2' – 8"	108	9"	3' – 0"	216	4	39' – 9"	106	26	39' – 9"	690	5' – 11"	16	14	39	0.434	87.8	0.5	55	17.8	3,567
5' – 0"	3' – 0"	9"	7"	30'	108	#6	9"	5' – 11"	960	108	#5	9"	7' – 4"	826	3' – 7"	3' – 9"	108	#5	9"	6' – 6"	732	3' – 9"	2' – 9"	108	9"	3' – 0"	216	4	39' – 9"	106	26	39' – 9"	690	5' – 11"	16	14	39	0.472	88.3	0.5	55	19.3	3,585
5' – 0"	4' – 0"	8"	7"	26'	108	#6	9"	5' – 11"	960	108	#5	9"	8' – 3"	929	4' – 6"	3' – 9"	108	#5	9"	6' – 5"	723	3' – 9"	2' – 8"	108	9"	4' – 0"	289	4	39' – 9"	106	26	39' – 9"	690	5' – 11"	16	14	39	0.477	92.4	0.5	55	19.5	3,752
5' – 0"	4' – 0"	9"	7"	30'	108	#6	9"	5' – 11"	960	108	#5	9"	8' – 4"	939	4' – 7"	3' – 9"	108	#5	9"	6' – 6"	732	3' – 9"	2' – 9"	108	9"	4' – 0"	289	4	39' – 9"	106	26	39' – 9"	690	5' – 11"	16	14	39	0.515	92.9	0.5	55	21.1	3,771
5' – 0"	5' – 0"	8"	7"	26'	108	#6	9"	5' – 11"	960	108	#5	9"	9' – 3"	1,042	5' – 6"	3' – 9"	108	#5	9"	6' – 5"	723	3' – 9"	2' – 8"	108	9"	5' – 0"	361	4	39' – 9"	106	30	39' – 9"	797	5' – 11"	16	14	39	0.521	99.7	0.5	55	21.3	4,044
5' – 0"	5' – 0"	9"	7"	30'	108	#6	9"	5' – 11"	960	108	#5	9"	9' – 4"	1,051	5' – 7"	3' – 9"	108	#5	9"	6' – 6"	732	3' – 9"	2' – 9"	108	9"	5' – 0"	361	4	39' – 9"	106	30	39' – 9"	797	5' – 11"	16	14	39	0.559	100.2	0.5	55	22.8	4,062
6' – 0"	2' – 0"	8"	7"	20'	108	#6	9"	6' – 11"	1,122	108	#5	9"	6' – 7"	742	2' – 6"	4' – 1"	108	#5	9"	6' – 9"	760	4' – 1"	2' – 8"	108	9"	2' – 0"	144	5	39' – 9"	133	25	39' – 9"	664	6' – 11"	18	16	45	0.440	89.1	0.5	63	18.1	3,628
6' – 0"	2' – 0"	9"	7"	26'	108	#6	9"	6' – 11"	1,122	162	#5	6"	6' – 8"	1,126	2' – 7"	4' – 1"	162	#5	6"	6' – 10"	1,155	4' – 1"	2' – 9"	108	9"	2' – 0"	144	5	39' – 9"	133	25	39' – 9"	664	6' – 11"	18	16	45	0.485	108.6	0.5	63	19.9	4,407
6' – 0"	2' – 0"	10"	8"	30'	108	#6	9"	7' – 1"	1,149	162	#5	6"	6' – 10"	1,155	2' – 8"	4' – 2"	162	#5	6"	7' – 0"	1,183	4' – 2"	2' – 10"	82	12"	2' – 0"	110	5	39' – 9"	133	25	39' – 9"	664	7' – 1"	19	18	50	0.551	109.9	0.5	69	22.6	4,463
6' – 0"	3' – 0"	8"	7"	20'	108	#6	9"	6' – 11"	1,122	108	#5	9"	7' – 7"	854	3' – 6"	4' – 1"	108	#5	9"	6' – 9"	760	4' – 1"	2' – 8"	108	9"	3' – 0"	216	5	39' – 9"	133	29	39' – 9"	770	6' – 11"	18	16	45	0.484	96.4	0.5	63	19.9	3,918
6' – 0"	3' – 0"	9"	7"	26'	108	#6	9"	6' – 11"	1,122	162	#5	6"	7' – 8"	1,295	3' – 7"	4' – 1"	162	#5	6"	6' – 10"	1,155	4' – 1"	2' – 9"	108	9"	3' – 0"	216	5	39' – 9"	133	29	39' – 9"	770	6' – 11"	18	16	45	0.528	117.3	0.5	63	21.6	4,754
6' – 0"	3' – 0"	10"	8"	30'	108	#6	9"	7' – 1"	1,149	162	#5	6"	7' – 10"	1,324	3' – 8"	4' – 2"	162	#5	6"	7' – 0"	1,183	4' – 2"	2' – 10"	82	12"	3' – 0"	164	5	39' – 9"	133	29	39' – 9"	770	7' – 1"	19	18	50	0.601	118.1	0.5	69	24.6	4,792
6' – 0"	4' – 0"	8"	7"	20'	108	#6	9"	6' – 11"	1,122	108	#5	9"	8' – 7"	967	4' – 6"	4' – 1"	108	#5	9"	6' – 9"	760	4' – 1"	2' – 8"	108	9"	4' – 0"	289	5	39' – 9"	133	29	39' – 9"	770	6' – 11"	18	16	45	0.527	101.0	0.5	63	21.6	4,104
6' – 0"	4' – 0"	9"	7"	26'	108	#6	9"	6' – 11"	1,122	162	#5	6"	8' – 8"	1,464	4' – 7"	4' – 1"	162	#5	6"	6' – 10"	1,155	4' – 1"	2' – 9"	108	9"	4' – 0"	289	5	39' – 9"	133	29	39' – 9"	770	6' – 11"	18	16	45	0.571	123.3	0.5	63	23.4	4,996
6' – 0"	4' – 0"	10"	8"	30'	108	#6	9"	7' – 1"	1,149	162	#5	6"	8' – 10"	1,493	4' – 8"	4' – 2"	162	#5	6"	7' – 0"	1,183	4' – 2"	2' – 10"	82	12"	4' – 0"	219	5	39' – 9"	133	29	39' – 9"	770	7' – 1"	19	18	50	0.650	123.7	0.5	69	26.5	5,016
6' – 0"	5' – 0"	8"	7"	20'	108	#6	9"	6' – 11"	1,122	108	#5	9"	9' – 7"	1,080	5' – 6"	4' – 1"	108	#5	9"	6' – 9"	760	4' – 1"	2' – 8"	108	9"	5' – 0"	361	5	39' – 9"	133	33	39' – 9"	876	6' – 11"	18	16	45	0.570	108.3	0.5	63	23.3	4,395
6' – 0"	5' – 0"	9"	7"	26'	108	#6	9"	6' – 11"	1,122	162	#5	6"	9' – 8"	1,633	5' – 7"	4' – 1"	162	#5	6"	6' – 10"	1,155	4' – 1"	2' – 9"	108	9"	5' – 0"	361	5	39' – 9"	133	33	39' – 9"	876	6' – 11"	18	16	45	0.614	132.0	0.5	63	25.1	5,343
6' – 0"	5' – 0"	10"	8"	30'	108	#6	9"	7' – 1"	1,149	162	#5	6"	9' – 10"	1,661	5' – 8"	4' – 2"	162	#5	6"	7' – 0"	1,183	4' – 2"	2' – 10"	82	12"	5' – 0"	274	5	39' – 9"	133	33	39' – 9"	876	7' – 1"	19	18	50	0.700	131.9	0.5	69	28.5	5,345
6' – 0"	6' – 0"	8"	7"	20'	108	#6	9"	6' – 11"	1,122	108	#5	9"	10' – 7"	1,192	6' – 6"	4' – 1"	108	#5	9"	6' – 9"	760	4' – 1"	2' – 8"	108	9"	6' – 0"	433	5	39' – 9"	133	37	39' – 9"	982	6' – 11"	18	16	45	0.613	115.6	0.5	63	25.0	4,685
6' – 0"	6' – 0"	9"	7"	26'	108	#6	9"	6' – 11"	1,122	162	#5	6"	10' – 8"	1,802	6' – 7"	4' – 1"	162	#5	6"	6' – 10"	1,155	4' – 1"	2' – 9"	108	9"	6' – 0"	433	5	39' – 9"	133	37	39' – 9"	982	6' – 11"	18	16	45	0.657	140.7	0.5	63	26.8	5,690
6' – 0"	6' – 0"	10"	8"	30'	108	#6	9"	7' – 1"	1,149	162	#5	6"	10' – 10"	1,830	6' – 8"	4' – 2"	162	#5	6"	7' – 0"	1,183	4' – 2"	2' – 10"	82	12"	6' – 0"	329	5	39' – 9"	133	37	39' – 9"	982	7' – 1"	19	18	50	0.749	140.2	0.5	69	30.5	5,675

(5) For direct tra c culverts (ll height ≤ 2 ft.), identify the required box size and select the option with the minimum ll height.

HL93 LOADING SHEET 2 OF 2

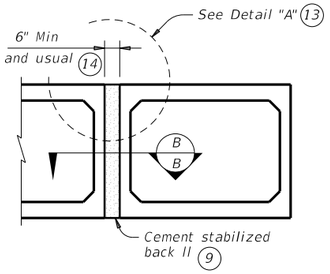
Texas Department of Transportation

Bridge Division Standard

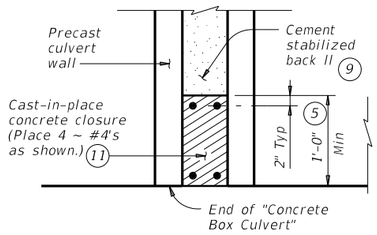
SINGLE BOX CULVERTS CAST-IN-PLACE
0' TO 30' FILL

SCC-5 & 6

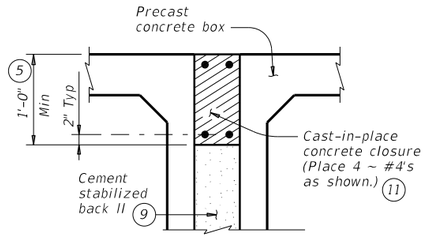
FILE: scc56ste-21.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	030	FM 794
04/2021 Updated X values.	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		130



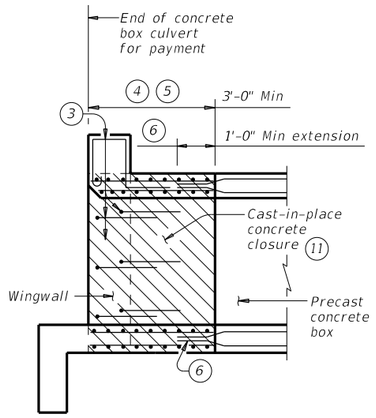
MULTIPLE UNIT PLACEMENT



SECTION B-B

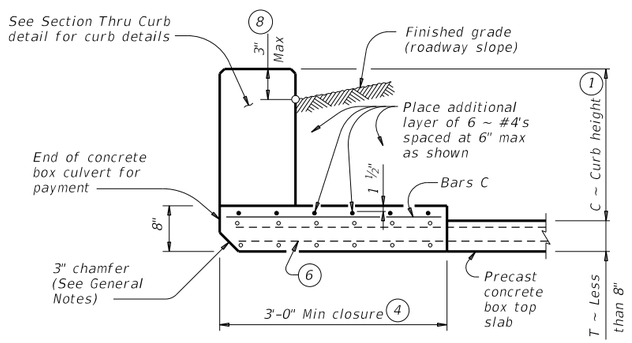


DETAIL "A" (13)

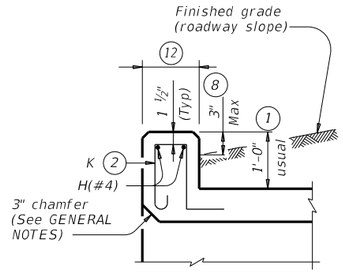


WINGWALL CONNECTION

(Also applies to safety end treatment.)

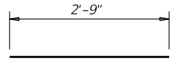


SECTION THRU TOP SLABS LESS THAN 8"



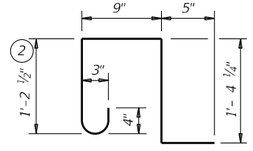
SECTION THRU CURB

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



BARS C (#4)

(Spa = 1'–0" Max)

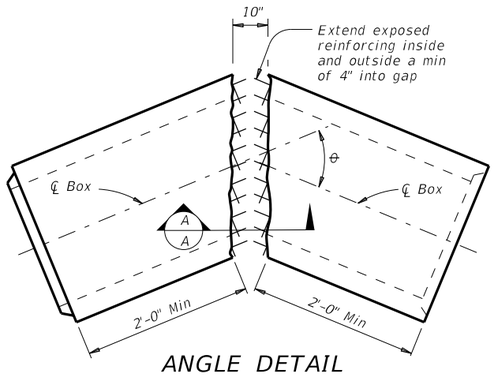


BARS K (#4)

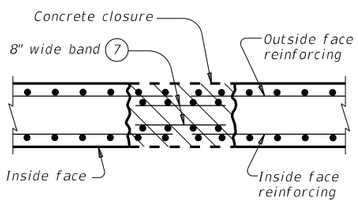
(Spa = 1'–0" Max)
(Length = 4'–2")

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 t into closure area.
4. Provide a 3'–0" Min cast–in–place concrete closure. Break back boxes in the eld 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 ush 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 nished grade.
   - For structures with bridge rail, construct curbs ush with nished grade.

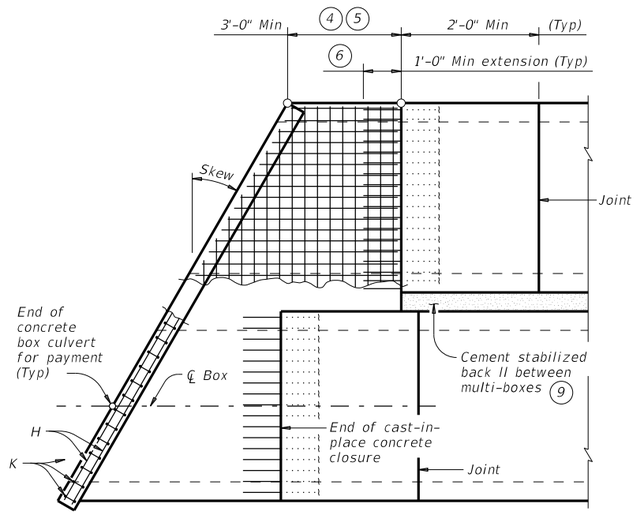
   Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.
9. Cement stabilized back II between boxes is considered part of the box culvert for payment.
10. All curb concrete and reinforcing is 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 nal 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.



ANGLE DETAIL



SECTION A-A



PLAN OF SKEWED ENDS

(Showing multi–box placement.)

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 back II meeting the requirements of Item 400, "Excavation and Back II 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 Speci cations.
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.

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Texas Department of Transportation

Bridge Division Standard

BOX CULVERTS PRECAST MISCELLANEOUS DETAILS

SCP-MD

FILE: CD-SCP-MD-20.dgn	DN: GAF	CK: LMW	DW: BWH/TxDOT	CK: GAF
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REVISIONS	1133	02	030	FM 794
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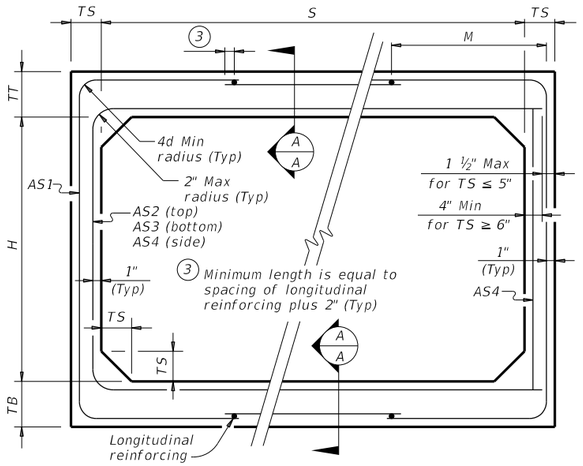
BOX DATA

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)
4	2	7.5	6	5	< 2	–	0.18	0.27	0.15	0.12	0.18	0.18	0.14	4.5
4	2	5	5	5	2 < 3	38	0.18	0.19	0.17	0.12	–	–	–	3.6
4	2	5	5	5	3 – 5	38	0.13	0.13	0.13	0.12	–	–	–	3.6
4	2	5	5	5	10	38	0.12	0.12	0.12	0.12	–	–	–	3.6
4	2	5	5	5	15	38	0.14	0.16	0.16	0.12	–	–	–	3.6
4	2	5	5	5	20	38	0.18	0.20	0.21	0.12	–	–	–	3.6
4	2	5	5	5	25	38	0.23	0.25	0.25	0.12	–	–	–	3.6
4	2	5	5	5	30	38	0.28	0.30	0.30	0.12	–	–	–	3.6
4	3	7.5	6	5	< 2	–	0.18	0.31	0.18	0.12	0.18	0.18	0.14	5.0
4	3	5	5	5	2 < 3	38	0.15	0.23	0.20	0.12	–	–	–	4.1
4	3	5	5	5	3 – 5	38	0.12	0.16	0.16	0.12	–	–	–	4.1
4	3	5	5	5	10	38	0.12	0.14	0.14	0.12	–	–	–	4.1
4	3	5	5	5	15	38	0.12	0.18	0.18	0.12	–	–	–	4.1
4	3	5	5	5	20	38	0.14	0.23	0.24	0.12	–	–	–	4.1
4	3	5	5	5	25	38	0.17	0.29	0.29	0.12	–	–	–	4.1
4	3	5	5	5	30	38	0.21	0.35	0.35	0.12	–	–	–	4.1
4	4	7.5	6	5	< 2	–	0.18	0.33	0.20	0.12	0.18	0.18	0.14	5.5
4	4	5	5	5	2 < 3	38	0.12	0.26	0.23	0.12	–	–	–	4.6
4	4	5	5	5	3 – 5	38	0.12	0.18	0.18	0.12	–	–	–	4.6
4	4	5	5	5	10	38	0.12	0.15	0.15	0.12	–	–	–	4.6
4	4	5	5	5	15	38	0.12	0.19	0.20	0.12	–	–	–	4.6
4	4	5	5	5	20	38	0.12	0.25	0.25	0.12	–	–	–	4.6
4	4	5	5	5	25	38	0.14	0.31	0.31	0.12	–	–	–	4.6
4	4	5	5	5	30	38	0.17	0.37	0.37	0.12	–	–	–	4.6

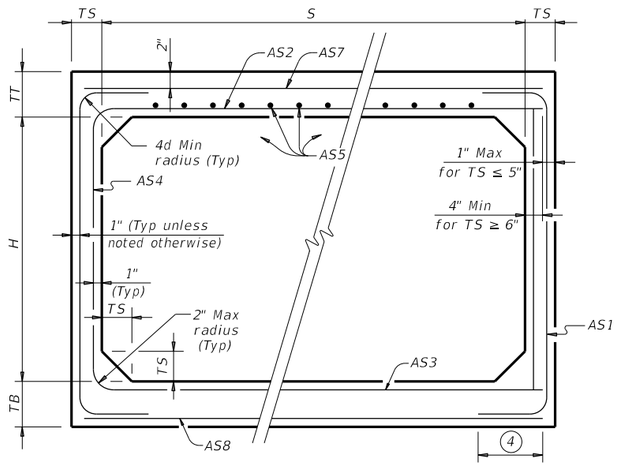
(1) For box length = 8'-0"

(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"

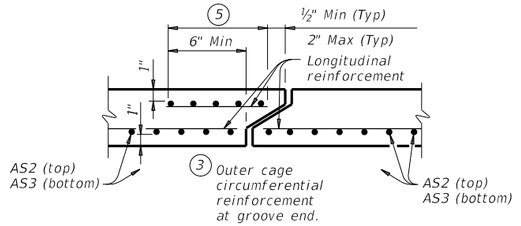
FILL HEIGHT 2 FT AND GREATER



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 ll height in the table. Submit shop plans for alternate designs in accordance with Item "Precast Concrete Structural Members (Fabrication)."

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SINGLE BOX CULVERTS PRECAST

4'-0" SPAN

SCP-4

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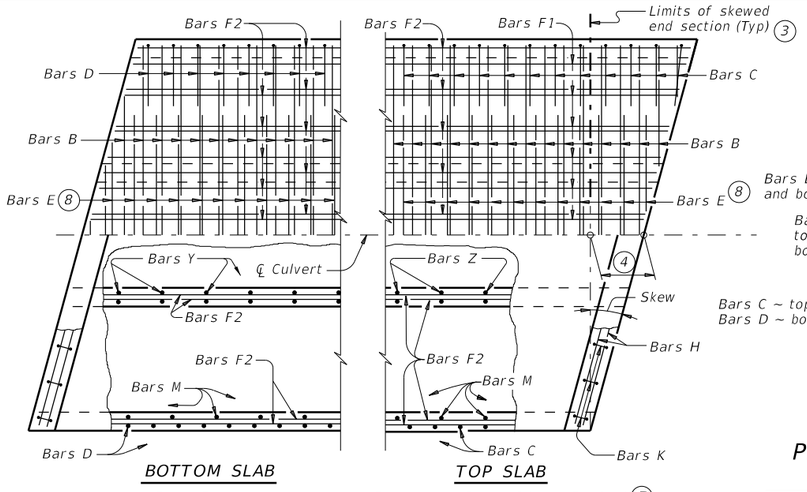
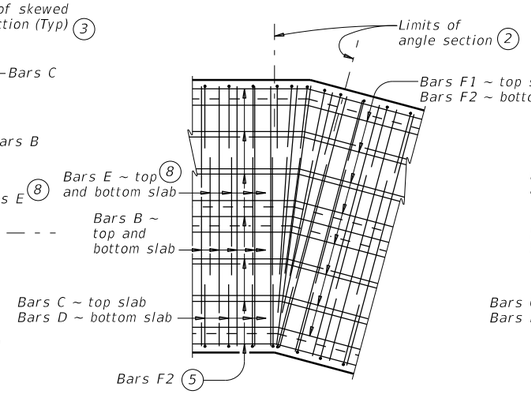
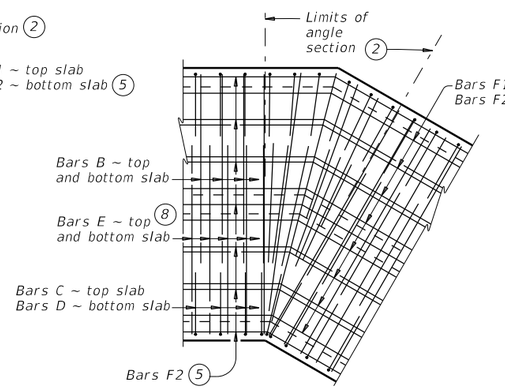
	YKM	GONZALES		132



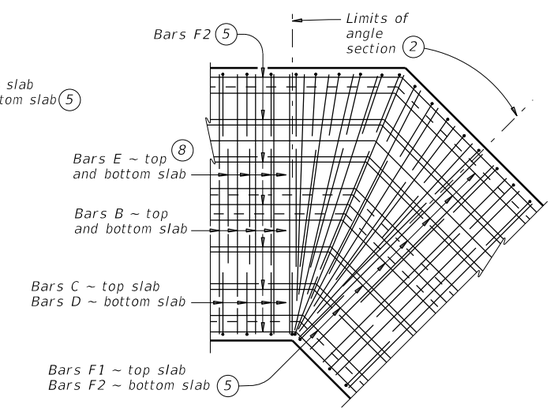
PLAN OF SKEWED ENDS ~ FROM 0° TO 15° 7



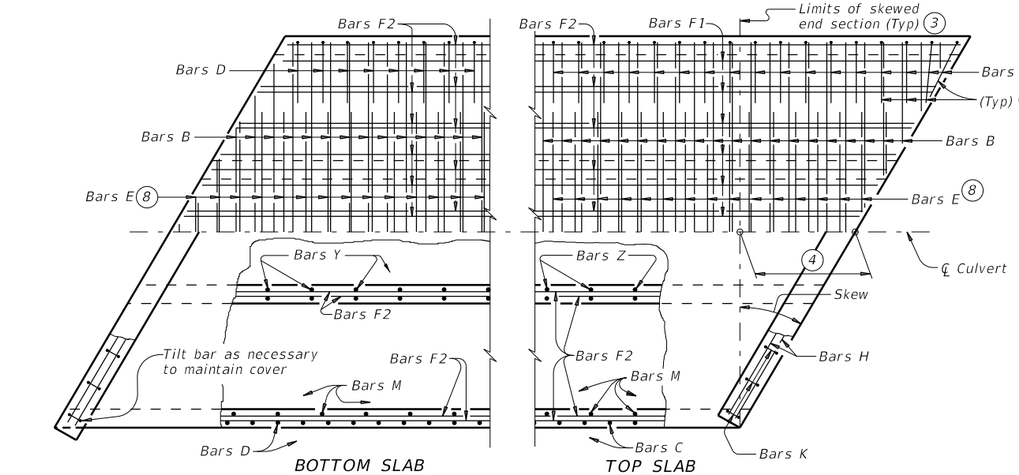
PLAN OF ANGLE SECTION ~ FROM 0° TO 15°



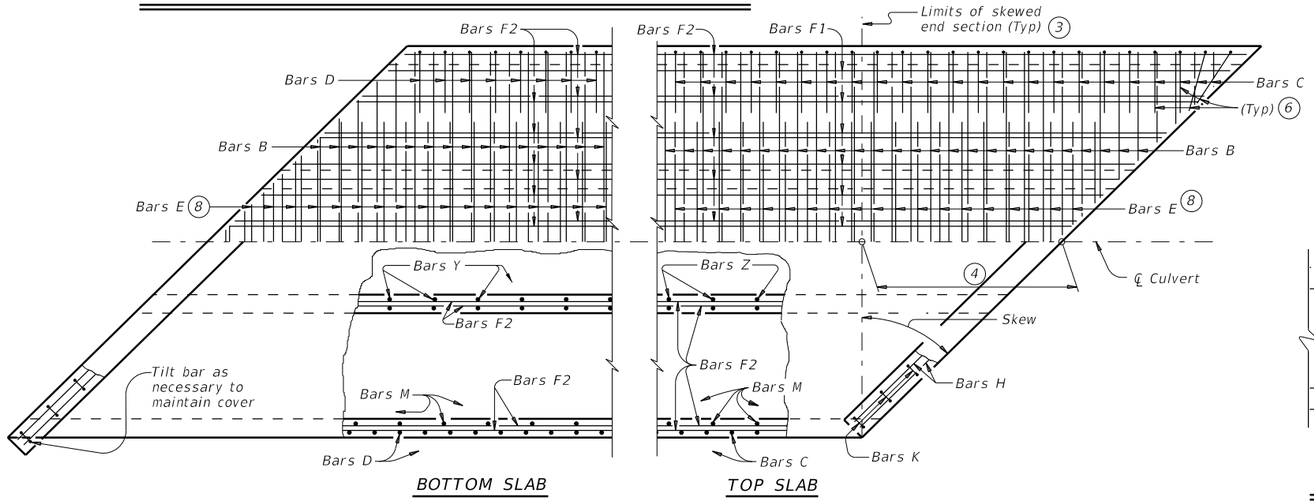
PLAN OF ANGLE SECTION ~ OVER 15° TO 30°



PLAN OF ANGLE SECTION ~ OVER 30° TO 45°



PLAN OF SKEWED ENDS ~ OVER 15° TO 30°



PLAN OF SKEWED ENDS ~ OVER 30° TO 45°

1 For skewed box culverts with less than 2'-0" of fill, break back the top slab to provide a 1'-10" minimum lap of the existing longitudinal bars with the longitudinal bars in the extension.

For non-skewed box culverts with less than 2'-0" of fill and for skewed or non-skewed culverts with a fill depth of 2'-0" or greater, break back the top slab to provide a 1'-10" minimum lap of the existing longitudinal bars with the longitudinal bars in the extension. Alternatively, if the box is non-skewed, embed #6 anchor bars with a Type III, Class C, D, E, or F anchor adhesive into the existing walls, top and bottom slab at 1'-6" center-to-center spacing. Minimum embedment depth is 8". Anchor adhesive chosen must be able to achieve a basic bond strength in tension, Nba, of 26.4 kips. Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing." Test adhesive anchors in accordance with Item 450.3.3, "Tests." Test 3 anchors per 100 anchors installed.

Break back wings and apron as necessary to install the extension. Clean and extend the exposed wingwall and apron reinforcing into the extension. When lengthening existing box culverts with dimensions different than current standard dimensions, form horizontal and vertical transitions as directed by the Engineer. Match bottom slabs to maintain an uninterrupted flow line. Field bend existing and new reinforcing into transitions and maintain specified cover requirements. For top slabs of culverts with overlay, with 1-to-2 course surface treatment, or with the top slab as the final riding surface, adjust the "H" dimension to provide a smooth riding surface.

2 When the spacing between Bars B or Bars E becomes less than half of the normal spacing, cut bars to avoid conflict.

3 The length of Bars B and Bars E will vary in the skewed end sections.

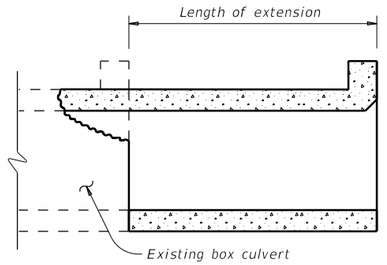
4 [One half of overall width] x [tangent of the skew angle]

5 Place Bars F1 and F2 continuously through the angle section. Bend Bars F1 and F2 to remain parallel to the walls of the box culvert.

6 When necessary to avoid conflict in acute corners, shorten the slab extension leg of Bars C and Bars D to a minimum of 1'-6" for skews of 30° thru 45°.

7 At the Contractor's option, for skews of 15° or less, place Bars B, C, D, and E parallel to the skewed end while maintaining spacing along centerline of box. Increase lengths of Bars B and Bars E shown on the Multiple Box Culverts Cast-In-Place (MC) standard sheets to accommodate the skew.

8 Extend Bars E as shown on the MC standard sheet for direct traffic culverts.



LENGTHENING DETAIL 1

CONSTRUCTION NOTES:

Do not use permanent forms.
When required, lap Bars H 1'-8" for uncoated or galvanized bars.
Provide a minimum of 1 ½" clear cover.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel, if required elsewhere in the plans.
Provide Class C concrete (f'c = 3,600 psi) with these exceptions: provide Class S concrete (f'c = 4,000 psi) for top slabs of culverts with overlay, with 1-to-2 course surface treatment, or with the top slab as the final riding surface.

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.
Refer to Multiple Box Culverts Cast-in-Place (MC) standard sheets for details of straight sections of culvert.
For skewed sections and angle sections, refer to Multiple Box Culverts Cast-in-Place (MC) standard sheets for slab and wall dimensions, bar sizes, maximum bar spacing, and any other details not shown.
For skewed ends with curbs, adjust length of Bars H, number of Bars K, curb concrete volume, and reinforcing steel weight by dividing the values shown on the Multiple Box Culverts Cast-In-Place (MC) standard sheets by the cosine of the skew angle.

Cover dimensions are clear dimensions, unless noted otherwise.

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Texas Department of Transportation

Bridge Division Standard

MULTIPLE BOX CULVERTS CAST-IN-PLACE MISCELLANEOUS DETAILS

MC-MD

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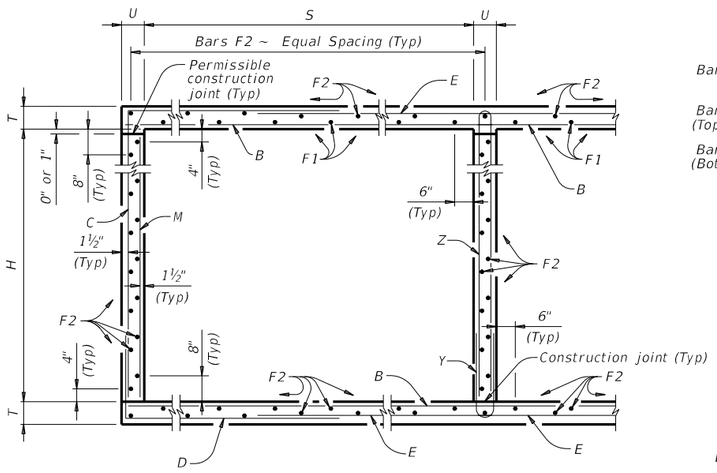
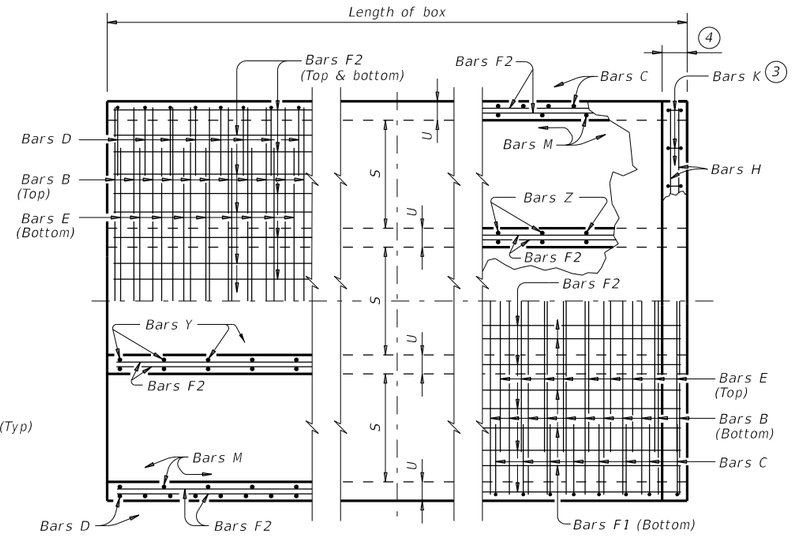


TYPICAL SECTION



BOTTOM SLAB TOP SLAB

PART PLANS

1. 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 Rail Anchorage Curb (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.

2. For vehicle safety, the following requirements must be met:
   - For structures without bridge rail, construct curbs no more than 3" above nished grade.
   - For structures with bridge rail, construct curbs ush with nished 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.

3. 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.

4. 1'-0" typical. 2'-3" when the Rail Anchorage Curb (RAC) standard sheet is referred to elsewhere in the plans.

The Contractor may replace Bars B, C, D, E, F1, F2, M, Y, and/or Z with deformed welded wire reinforcement (WWR) meeting the requirements of ASTM A1064. The area of required reinforcement may be reduced by the ratio of 60 ksi / 70 ksi. Spacing of WWR is limited to 4" Min and 18" Max. When required, provide lap splices in the WWR of the same length required for the equivalent bar size, rounded up for wire sizes between conventional bar sizes. The lap length required for WWR is never less than the lap length required for uncoated #4 bars.

Example conversion: Replacing No. 6 Gr 60 at 6" Spacing with WWR
Required WWR = (0.44 sq. in. per 0.5 ft.) x (60 ksi / 70 ksi) = 0.755 sq. in. per ft.
If D30.6 wire is used to meet the 0.755 sq. in. per ft. requirement in this example, the required spacing = (0.306 sq. in.) / (0.755 sq. in. per ft.) x (12 in. per ft.) = 4.86" Max spacing. Required lap length for the provided D30.6 wire is 2'-1" (the same minimum lap length required for uncoated #5 bars, as listed under MATERIAL NOTES).

CONSTRUCTION NOTES:

Do not use permanent forms.
Chamfer the bottom edge of the top slab 3" at the entrance.
Optionally, raise construction joints shown at the ow line by a maximum of 6". If this option is taken, Bars M may be cut o or raised, Bars C and D may be reversed, and Bars Y and Z may be reversed.

MATERIAL NOTES:

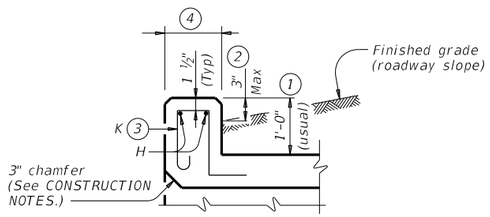
Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.
Provide Class C concrete (f'c = 3,600 psi) for culvert barrel and curb, with the following exceptions: provide Class S concrete (f'c = 4,000 psi) for top slabs of:
- culverts with overlay,
- culverts with 1-to-2 course surface treatment, or
- culverts with the top slab as the nal riding surface.

Provide bar laps, where required, as follows:
- Uncoated or galvanized ~ #4 = 1'-8" Min
- Uncoated or galvanized ~ #5 = 2'-1" Min
- Uncoated or galvanized ~ #6 = 2'-6" Min

GENERAL NOTES:

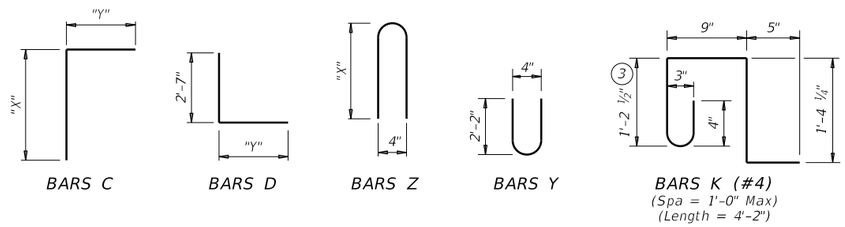
Designed according to AASHTO LRFD Bridge Design Speci cations for the range of ll heights shown.
See the Multiple Box Culverts Cast-In-Place Miscellaneous Detail (MC-MD) standard sheet for details pertaining to skewed ends, angle sections, and lengthening.

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



SECTION THRU CURB

TABLE OF BAR DIMENSIONS		
H	"X"	"Y"
2'-0"	2'-6 ½"	3'-8 ½"
3'-0"	3'-6 ½"	3'-8 ½"
4'-0"	4'-6 ½"	3'-8 ½"
5'-0"	5'-6 ½"	3'-8 ½"



HL93 LOADING SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

MULTIPLE BOX CULVERTS CAST-IN-PLACE
5'-0" SPAN
0' TO 20' FILL

MC-5-20

FILE: mc520ste-20.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
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NUMBER OF SPANS	SECTION DIMENSIONS				BILLS OF REINFORCING STEEL (For Box Length = 40 feet)																														QUANTITIES					
					Bars B					Bars C & D							Bars E					Bars F1 ~ #4				Bars F2 ~ #4				Bars M ~ #4				Bars Y & Z ~ #4						Bars H 4 ~ #4		Bars K		Per Foot of Barrel		Curb		Total	
	S	H	T	U	No.	Size	Spa	Length	Wt	No.	Size	Spa	Bars C Length	Bars C Wt	Bars D Length	Bars D Wt	No.	Size	Spa	Length	Wt	No.	Spa	Length	Wt	No.	Spa	Length	Wt	No.	Spa	Length	Wt	No.	Spa	Bars Y Length	Bars Y Wt	Bars Z Length	Bars Z Wt	Length	Wt	No.	Wt	Conc (CY)	Renf (Lb)	Conc (CY)	Renf (Lb)	Conc (CY)	Renf (Lb)
2	5' – 0"	2' – 0"	8"	7"	108	#5	9"	11' – 6"	1,295	108	#5	9"	6' – 3"	704	6' – 4"	713	108	#5	9"	8' – 8"	976	8	18"	39' – 9"	212	38	18"	39' – 9"	1,009	108	9"	2' – 0"	144	54	9"	4' – 7"	165	5' – 3"	189	11' – 6"	31	26	72	0.710	135.2	0.9	103	29.3	5,510
3	5' – 0"	2' – 0"	8"	7"	108	#5	9"	17' – 1"	1,924	108	#5	9"	6' – 3"	704	6' – 4"	713	108	#5	9"	14' – 3"	1,605	12	18"	39' – 9"	319	54	18"	39' – 9"	1,434	108	9"	2' – 0"	144	108	9"	4' – 7"	331	5' – 3"	379	17' – 1"	46	38	106	1.029	188.8	1.3	152	42.4	7,705
4	5' – 0"	2' – 0"	8"	7"	108	#5	9"	22' – 8"	2,553	108	#5	9"	6' – 3"	704	6' – 4"	713	108	#5	9"	19' – 10"	2,234	16	18"	39' – 9"	425	70	18"	39' – 9"	1,859	108	9"	2' – 0"	144	162	9"	4' – 7"	496	5' – 3"	568	22' – 8"	61	48	134	1.348	242.4	1.7	195	55.6	9,891
5	5' – 0"	2' – 0"	8"	7"	108	#5	9"	28' – 3"	3,182	108	#5	9"	6' – 3"	704	6' – 4"	713	108	#5	9"	25' – 5"	2,863	20	18"	39' – 9"	531	86	18"	39' – 9"	2,284	108	9"	2' – 0"	144	216	9"	4' – 7"	661	5' – 3"	758	28' – 3"	75	60	167	1.667	296.0	2.1	242	68.8	12,082
6	5' – 0"	2' – 0"	8"	7"	108	#5	9"	33' – 10"	3,811	108	#5	9"	6' – 3"	704	6' – 4"	713	108	#5	9"	31' – 0"	3,492	24	18"	39' – 9"	637	102	18"	39' – 9"	2,708	108	9"	2' – 0"	144	270	9"	4' – 7"	827	5' – 3"	947	33' – 10"	90	70	195	1.986	349.6	2.5	285	82.0	14,268
2	5' – 0"	3' – 0"	8"	7"	108	#6	9"	11' – 6"	1,865	108	#5	9"	7' – 3"	817	6' – 4"	713	108	#5	9"	8' – 8"	976	8	18"	39' – 9"	212	44	18"	39' – 9"	1,168	108	9"	3' – 0"	216	54	9"	4' – 7"	165	7' – 3"	262	11' – 6"	31	26	72	0.775	159.9	0.9	103	31.9	6,497
3	5' – 0"	3' – 0"	8"	7"	108	#6	9"	17' – 1"	2,771	108	#5	9"	7' – 3"	817	6' – 4"	713	108	#5	9"	14' – 3"	1,605	12	18"	39' – 9"	319	62	18"	39' – 9"	1,646	108	9"	3' – 0"	216	108	9"	4' – 7"	331	7' – 3"	523	17' – 1"	46	38	106	1.115	223.5	1.3	152	45.9	9,093
4	5' – 0"	3' – 0"	8"	7"	108	#6	9"	22' – 8"	3,677	108	#5	9"	7' – 3"	817	6' – 4"	713	108	#5	9"	19' – 10"	2,234	16	18"	39' – 9"	425	80	18"	39' – 9"	2,124	108	9"	3' – 0"	216	162	9"	4' – 7"	496	7' – 3"	785	22' – 8"	61	48	134	1.456	287.2	1.7	195	59.9	11,682
5	5' – 0"	3' – 0"	8"	7"	108	#6	9"	28' – 3"	4,583	108	#5	9"	7' – 3"	817	6' – 4"	713	108	#5	9"	25' – 5"	2,863	20	18"	39' – 9"	531	98	18"	39' – 9"	2,602	108	9"	3' – 0"	216	216	9"	4' – 7"	661	7' – 3"	1,046	28' – 3"	75	60	167	1.796	350.8	2.1	242	73.9	14,274
6	5' – 0"	3' – 0"	8"	7"	108	#6	9"	33' – 10"	5,488	108	#5	9"	7' – 3"	817	6' – 4"	713	108	#5	9"	31' – 0"	3,492	24	18"	39' – 9"	637	116	18"	39' – 9"	3,080	108	9"	3' – 0"	216	270	9"	4' – 7"	827	7' – 3"	1,308	33' – 10"	90	70	195	2.137	414.5	2.5	285	88.0	16,863
2	5' – 0"	4' – 0"	8"	7"	108	#6	9"	11' – 6"	1,865	108	#5	9"	8' – 3"	929	6' – 4"	713	108	#5	9"	8' – 8"	976	8	18"	39' – 9"	212	44	18"	39' – 9"	1,168	108	9"	4' – 0"	289	54	9"	4' – 7"	165	9' – 3"	334	11' – 6"	31	26	72	0.840	166.3	0.9	103	34.5	6,754
3	5' – 0"	4' – 0"	8"	7"	108	#6	9"	17' – 1"	2,771	108	#5	9"	8' – 3"	929	6' – 4"	713	108	#5	9"	14' – 3"	1,605	12	18"	39' – 9"	319	62	18"	39' – 9"	1,646	108	9"	4' – 0"	289	108	9"	4' – 7"	331	9' – 3"	667	17' – 1"	46	38	106	1.202	231.8	1.3	152	49.4	9,422
4	5' – 0"	4' – 0"	8"	7"	108	#6	9"	22' – 8"	3,677	108	#5	9"	8' – 3"	929	6' – 4"	713	108	#5	9"	19' – 10"	2,234	16	18"	39' – 9"	425	80	18"	39' – 9"	2,124	108	9"	4' – 0"	289	162	9"	4' – 7"	496	9' – 3"	1,001	22' – 8"	61	48	134	1.564	297.2	1.7	195	64.3	12,083
5	5' – 0"	4' – 0"	8"	7"	108	#6	9"	28' – 3"	4,583	108	#5	9"	8' – 3"	929	6' – 4"	713	108	#5	9"	25' – 5"	2,863	20	18"	39' – 9"	531	98	18"	39' – 9"	2,602	108	9"	4' – 0"	289	216	9"	4' – 7"	661	9' – 3"	1,335	28' – 3"	75	60	167	1.926	362.7	2.1	242	79.1	14,748
6	5' – 0"	4' – 0"	8"	7"	108	#6	9"	33' – 10"	5,488	108	#5	9"	8' – 3"	929	6' – 4"	713	108	#5	9"	31' – 0"	3,492	24	18"	39' – 9"	637	116	18"	39' – 9"	3,080	108	9"	4' – 0"	289	270	9"	4' – 7"	827	9' – 3"	1,668	33' – 10"	90	70	195	2.288	428.1	2.5	285	94.0	17,408
2	5' – 0"	5' – 0"	8"	7"	108	#6	9"	11' – 6"	1,865	108	#5	9"	9' – 3"	1,042	6' – 4"	713	108	#5	9"	8' – 8"	976	8	18"	39' – 9"	212	50	18"	39' – 9"	1,328	108	9"	5' – 0"	361	54	9"	4' – 7"	165	11' – 3"	406	11' – 6"	31	26	72	0.904	176.7	0.9	103	37.0	7,171
3	5' – 0"	5' – 0"	8"	7"	108	#6	9"	17' – 1"	2,771	108	#5	9"	9' – 3"	1,042	6' – 4"	713	108	#5	9"	14' – 3"	1,605	12	18"	39' – 9"	319	70	18"	39' – 9"	1,859	108	9"	5' – 0"	361	108	9"	4' – 7"	331	11' – 3"	812	17' – 1"	46	38	106	1.288	245.3	1.3	152	52.8	9,965
4	5' – 0"	5' – 0"	8"	7"	108	#6	9"	22' – 8"	3,677	108	#5	9"	9' – 3"	1,042	6' – 4"	713	108	#5	9"	19' – 10"	2,234	16	18"	39' – 9"	425	90	18"	39' – 9"	2,390	108	9"	5' – 0"	361	162	9"	4' – 7"	496	11' – 3"	1,217	22' – 8"	61	48	134	1.672	313.9	1.7	195	68.6	12,750
5	5' – 0"	5' – 0"	8"	7"	108	#6	9"	28' – 3"	4,583	108	#5	9"	9' – 3"	1,042	6' – 4"	713	108	#5	9"	25' – 5"	2,863	20	18"	39' – 9"	531	110	18"	39' – 9"	2,921	108	9"	5' – 0"	361	216	9"	4' – 7"	661	11' – 3"	1,623	28' – 3"	75	60	167	2.056	382.5	2.1	242	84.3	15,540
6	5' – 0"	5' – 0"	8"	7"	108	#6	9"	33' – 10"	5,488	108	#5	9"	9' – 3"	1,042	6' – 4"	713	108	#5	9"	31' – 0"	3,492	24	18"	39' – 9"	637	130	18"	39' – 9"	3,452	108	9"	5' – 0"	361	270	9"	4' – 7"	827	11' – 3"	2,029	33' – 10"	90	70	195	2.439	451.0	2.5	285	100.1	18,326

HL93 LOADING SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

MULTIPLE BOX CULVERTS CAST-IN-PLACE

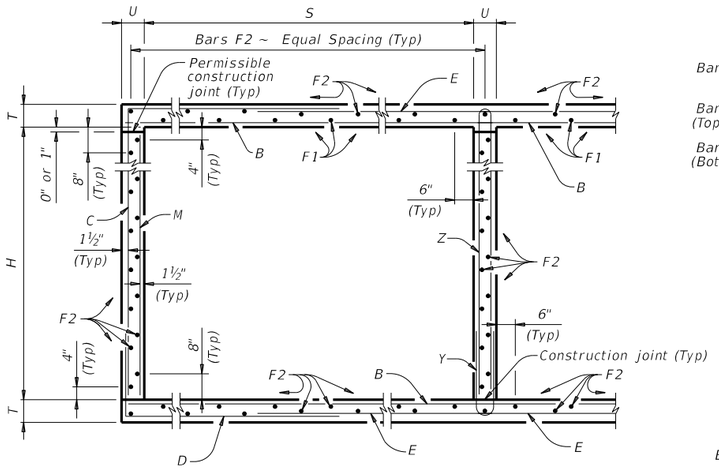
5'-0" SPAN

0' TO 20' FILL

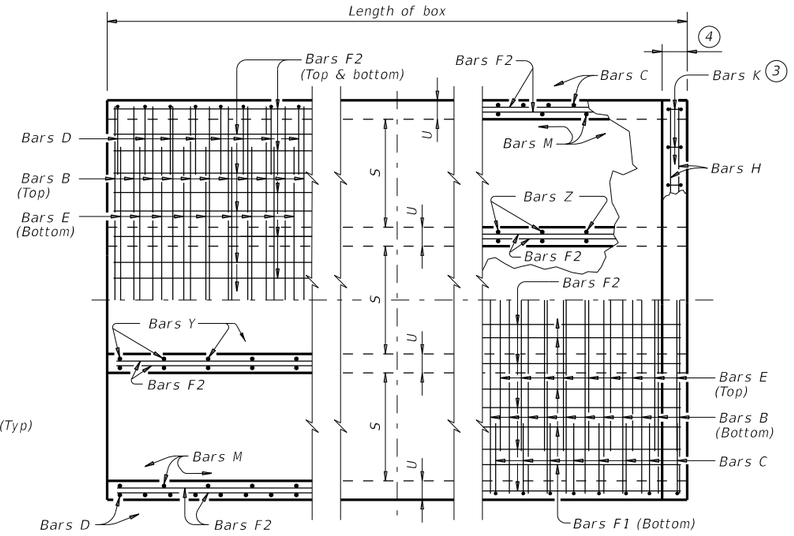
MC-5-20

FILE: mc520ste-20.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	030	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		135

DATE: 1/28/2024 $TIME$
FILE: $FILE$

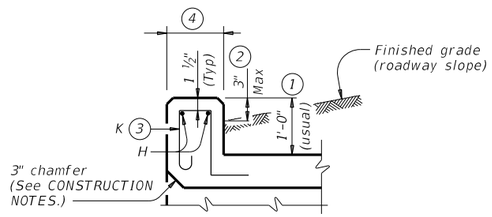


TYPICAL SECTION



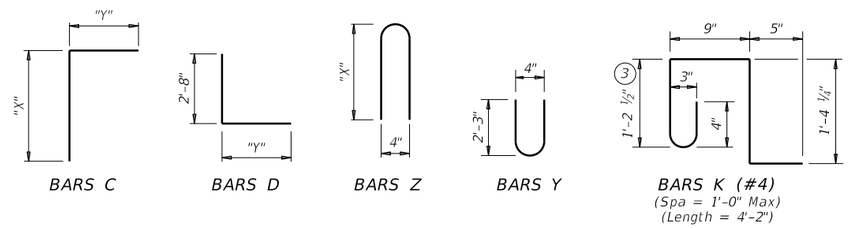
BOTTOM SLAB TOP SLAB

PART PLANS



SECTION THRU CURB

TABLE OF BAR DIMENSIONS		
H	"X"	"Y"
2'-0"	2'-7 ½"	4'-1"
3'-0"	3'-7 ½"	4'-1"
4'-0"	4'-7 ½"	4'-1"
5'-0"	5'-7 ½"	4'-1"
6'-0"	6'-7 ½"	4'-1"



BARS C BARS D BARS Z BARS Y BARS K (#4)
(Spa = 1'-0" Max)
(Length = 4'-2")

1. 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 Rail Anchorage Curb (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.

2. For vehicle safety, the following requirements must be met:
   - For structures without bridge rail, construct curbs no more than 3" above nished grade.
   - For structures with bridge rail, construct curbs ush with nished 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.

3. 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.

4. 1'-0" typical. 2'-3" when the Rail Anchorage Curb (RAC) standard sheet is referred to elsewhere in the plans.

The Contractor may replace Bars B, C, D, E, F1, F2, M, Y, and/or Z with deformed welded wire reinforcement (WWR) meeting the requirements of ASTM A1064. The area of required reinforcement may be reduced by the ratio of 60 ksi / 70 ksi. Spacing of WWR is limited to 4" Min and 18" Max. When required, provide lap splices in the WWR of the same length required for the equivalent bar size, rounded up for wire sizes between conventional bar sizes. The lap length required for WWR is never less than the lap length required for uncoated #4 bars.

Example conversion: Replacing No. 6 Gr 60 at 6" Spacing with WWR
Required WWR = (0.44 sq. in. per 0.5 ft.) x (60 ksi / 70 ksi) = 0.755 sq. in. per ft.
If D30.6 wire is used to meet the 0.755 sq. in. per ft. requirement in this example, the required spacing = (0.306 sq. in.) / (0.755 sq. in. per ft.) x (12 in. per ft.) = 4.86" Max spacing. Required lap length for the provided D30.6 wire is 2'-1" (the same minimum lap length required for uncoated #5 bars, as listed under MATERIAL NOTES).

CONSTRUCTION NOTES:

Do not use permanent forms.
Chamfer the bottom edge of the top slab 3" at the entrance.
Optionally, raise construction joints shown at the ow line by a maximum of 6". If this option is taken, Bars M may be cut o or raised, Bars C and D may be reversed, and Bars Y and Z may be reversed.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.
Provide Class C concrete (f'c = 3,600 psi) for culvert barrel and curb, with the following exceptions: provide Class S concrete (f'c = 4,000 psi) for top slabs of:
- culverts with overlay,
- culverts with 1-to-2 course surface treatment, or
- culverts with the top slab as the nal riding surface.

Provide bar laps, where required, as follows:
- Uncoated or galvanized ~ #4 = 1'-8" Min
- Uncoated or galvanized ~ #5 = 2'-1" Min
- Uncoated or galvanized ~ #6 = 2'-6" Min

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Speci cations for the range of ll heights shown.
See the Multiple Box Culverts Cast-In-Place Miscellaneous Detail (MC-MD) standard sheet for details pertaining to skewed ends, angle sections, and lengthening.

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

HL93 LOADING SHEET 1 OF 2

Texas Department of Transportation — Bridge Division Standard

MULTIPLE BOX CULVERTS CAST-IN-PLACE 6'-0" SPAN 0' TO 16' FILL

MC-6-16

FILE: mc616ste-20.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	030	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		136

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DATE: 1/28/2024 $TIME$
FILE: $FILE$

NUMBER OF SPANS	SECTION DIMENSIONS				BILLS OF REINFORCING STEEL (For Box Length = 40 feet)																														QUANTITIES					
					Bars B					Bars C & D							Bars E					Bars F1 ~ #4				Bars F2 ~ #4				Bars M ~ #4				Bars Y & Z ~ #4						Bars H 4 ~ #4		Bars K		Per Foot of Barrel		Curb		Total	
	S	H	T	U	No.	Size	Spa	Length	Wt	No.	Size	Spa	Bars C Length	Bars C Wt	Bars D Length	Bars D Wt	No.	Size	Spa	Length	Wt	No.	Spa	Length	Wt	No.	Spa	Length	Wt	No.	Spa	Length	Wt	No.	Spa	Bars Y Length	Bars Y Wt	Bars Z Length	Bars Z Wt	Length	Wt	No.	Wt	Conc (CY)	Renf (Lb)	Conc (CY)	Renf (Lb)	Conc (CY)	Renf (Lb)
2	6' – 0"	2' – 0"	9"	7"	108	#6	9"	13' – 6"	2,190	108	#5	9"	6' – 8"	751	6' – 9"	760	108	#6	9"	10' – 2"	1,649	10	18"	39' – 9"	266	44	18"	39' – 9"	1,168	108	9"	2' – 0"	144	54	9"	4' – 9"	171	5' – 5"	195	13' – 6"	36	30	84	0.894	182.4	1.0	120	36.8	7,414
3	6' – 0"	2' – 0"	9"	7"	108	#6	9"	20' – 1"	3,258	108	#5	9"	6' – 8"	751	6' – 9"	760	108	#6	9"	16' – 9"	2,717	15	18"	39' – 9"	398	63	18"	39' – 9"	1,673	108	9"	2' – 0"	144	108	9"	4' – 9"	343	5' – 5"	391	20' – 1"	54	44	122	1.302	260.9	1.5	176	53.6	10,611
4	6' – 0"	2' – 0"	9"	7"	108	#6	9"	26' – 8"	4,326	108	#5	9"	6' – 8"	751	6' – 9"	760	108	#6	9"	23' – 4"	3,785	20	18"	39' – 9"	531	82	18"	39' – 9"	2,177	108	9"	2' – 0"	144	162	9"	4' – 9"	514	5' – 5"	586	26' – 8"	71	56	156	1.711	339.4	2.0	227	70.4	13,801
5	6' – 0"	2' – 0"	9"	7"	108	#6	9"	33' – 3"	5,394	108	#5	9"	6' – 8"	751	6' – 9"	760	108	#6	9"	29' – 11"	4,853	25	18"	39' – 9"	664	101	18"	39' – 9"	2,682	108	9"	2' – 0"	144	216	9"	4' – 9"	685	5' – 5"	782	33' – 3"	89	70	195	2.120	417.9	2.5	284	87.3	16,999
6	6' – 0"	2' – 0"	9"	7"	108	#6	9"	39' – 10"	6,462	108	#5	9"	6' – 8"	751	6' – 9"	760	108	#6	9"	36' – 6"	5,921	30	18"	39' – 9"	797	120	18"	39' – 9"	3,186	108	9"	2' – 0"	144	270	9"	4' – 9"	857	5' – 5"	977	39' – 10"	106	82	228	2.529	496.4	3.0	334	104.1	20,189
2	6' – 0"	3' – 0"	9"	7"	108	#6	9"	13' – 6"	2,190	108	#5	9"	7' – 8"	864	6' – 9"	760	108	#6	9"	10' – 2"	1,649	10	18"	39' – 9"	266	50	18"	39' – 9"	1,328	108	9"	3' – 0"	216	54	9"	4' – 9"	171	7' – 5"	268	13' – 6"	36	30	84	0.958	192.8	1.0	120	39.3	7,832
3	6' – 0"	3' – 0"	9"	7"	108	#6	9"	20' – 1"	3,258	108	#5	9"	7' – 8"	864	6' – 9"	760	108	#6	9"	16' – 9"	2,717	15	18"	39' – 9"	398	71	18"	39' – 9"	1,885	108	9"	3' – 0"	216	108	9"	4' – 9"	343	7' – 5"	535	20' – 1"	54	44	122	1.389	274.4	1.5	176	57.1	11,152
4	6' – 0"	3' – 0"	9"	7"	108	#6	9"	26' – 8"	4,326	108	#5	9"	7' – 8"	864	6' – 9"	760	108	#6	9"	23' – 4"	3,785	20	18"	39' – 9"	531	92	18"	39' – 9"	2,443	108	9"	3' – 0"	216	162	9"	4' – 9"	514	7' – 5"	803	26' – 8"	71	56	156	1.819	356.1	2.0	227	74.7	14,469
5	6' – 0"	3' – 0"	9"	7"	108	#6	9"	33' – 3"	5,394	108	#5	9"	7' – 8"	864	6' – 9"	760	108	#6	9"	29' – 11"	4,853	25	18"	39' – 9"	664	113	18"	39' – 9"	3,000	108	9"	3' – 0"	216	216	9"	4' – 9"	685	7' – 5"	1,070	33' – 3"	89	70	195	2.250	437.7	2.5	284	92.5	17,790
6	6' – 0"	3' – 0"	9"	7"	108	#6	9"	39' – 10"	6,462	108	#5	9"	7' – 8"	864	6' – 9"	760	108	#6	9"	36' – 6"	5,921	30	18"	39' – 9"	797	134	18"	39' – 9"	3,558	108	9"	3' – 0"	216	270	9"	4' – 9"	857	7' – 5"	1,338	39' – 10"	106	82	228	2.681	519.3	3.0	334	110.2	21,107
2	6' – 0"	4' – 0"	9"	7"	108	#6	9"	13' – 6"	2,190	108	#5	9"	8' – 8"	976	6' – 9"	760	108	#6	9"	10' – 2"	1,649	10	18"	39' – 9"	266	50	18"	39' – 9"	1,328	108	9"	4' – 0"	289	54	9"	4' – 9"	171	9' – 5"	340	13' – 6"	36	30	84	1.023	199.2	1.0	120	41.9	8,089
3	6' – 0"	4' – 0"	9"	7"	108	#6	9"	20' – 1"	3,258	108	#5	9"	8' – 8"	976	6' – 9"	760	108	#6	9"	16' – 9"	2,717	15	18"	39' – 9"	398	71	18"	39' – 9"	1,885	108	9"	4' – 0"	289	108	9"	4' – 9"	343	9' – 5"	679	20' – 1"	54	44	122	1.475	282.6	1.5	176	60.5	11,481
4	6' – 0"	4' – 0"	9"	7"	108	#6	9"	26' – 8"	4,326	108	#5	9"	8' – 8"	976	6' – 9"	760	108	#6	9"	23' – 4"	3,785	20	18"	39' – 9"	531	92	18"	39' – 9"	2,443	108	9"	4' – 0"	289	162	9"	4' – 9"	514	9' – 5"	1,019	26' – 8"	71	56	156	1.927	366.1	2.0	227	79.1	14,870
5	6' – 0"	4' – 0"	9"	7"	108	#6	9"	33' – 3"	5,394	108	#5	9"	8' – 8"	976	6' – 9"	760	108	#6	9"	29' – 11"	4,853	25	18"	39' – 9"	664	113	18"	39' – 9"	3,000	108	9"	4' – 0"	289	216	9"	4' – 9"	685	9' – 5"	1,359	33' – 3"	89	70	195	2.380	449.5	2.5	284	97.7	18,264
6	6' – 0"	4' – 0"	9"	7"	108	#6	9"	39' – 10"	6,462	108	#5	9"	8' – 8"	976	6' – 9"	760	108	#6	9"	36' – 6"	5,921	30	18"	39' – 9"	797	134	18"	39' – 9"	3,558	108	9"	4' – 0"	289	270	9"	4' – 9"	857	9' – 5"	1,698	39' – 10"	106	82	228	2.832	533.0	3.0	334	116.2	21,652
2	6' – 0"	5' – 0"	9"	7"	108	#6	9"	13' – 6"	2,190	108	#5	9"	9' – 8"	1,089	6' – 9"	760	108	#6	9"	10' – 2"	1,649	10	18"	39' – 9"	266	56	18"	39' – 9"	1,487	108	9"	5' – 0"	361	54	9"	4' – 9"	171	11' – 5"	412	13' – 6"	36	30	84	1.088	209.6	1.0	120	44.5	8,505
3	6' – 0"	5' – 0"	9"	7"	108	#6	9"	20' – 1"	3,258	108	#5	9"	9' – 8"	1,089	6' – 9"	760	108	#6	9"	16' – 9"	2,717	15	18"	39' – 9"	398	79	18"	39' – 9"	2,098	108	9"	5' – 0"	361	108	9"	4' – 9"	343	11' – 5"	824	20' – 1"	54	44	122	1.562	296.2	1.5	176	64.0	12,024
4	6' – 0"	5' – 0"	9"	7"	108	#6	9"	26' – 8"	4,326	108	#5	9"	9' – 8"	1,089	6' – 9"	760	108	#6	9"	23' – 4"	3,785	20	18"	39' – 9"	531	102	18"	39' – 9"	2,708	108	9"	5' – 0"	361	162	9"	4' – 9"	514	11' – 5"	1,235	26' – 8"	71	56	156	2.035	382.7	2.0	227	83.4	15,536
5	6' – 0"	5' – 0"	9"	7"	108	#6	9"	33' – 3"	5,394	108	#5	9"	9' – 8"	1,089	6' – 9"	760	108	#6	9"	29' – 11"	4,853	25	18"	39' – 9"	664	125	18"	39' – 9"	3,319	108	9"	5' – 0"	361	216	9"	4' – 9"	685	11' – 5"	1,647	33' – 3"	89	70	195	2.509	469.3	2.5	284	102.8	19,056
6	6' – 0"	5' – 0"	9"	7"	108	#6	9"	39' – 10"	6,462	108	#5	9"	9' – 8"	1,089	6' – 9"	760	108	#6	9"	36' – 6"	5,921	30	18"	39' – 9"	797	148	18"	39' – 9"	3,930	108	9"	5' – 0"	361	270	9"	4' – 9"	857	11' – 5"	2,059	39' – 10"	106	82	228	2.983	555.9	3.0	334	122.3	22,570
2	6' – 0"	6' – 0"	9"	7"	108	#6	9"	13' – 6"	2,190	108	#5	9"	10' – 8"	1,202	6' – 9"	760	108	#6	9"	10' – 2"	1,649	10	18"	39' – 9"	266	62	18"	39' – 9"	1,646	108	9"	6' – 0"	433	54	9"	4' – 9"	171	13' – 5"	484	13' – 6"	36	30	84	1.153	220.0	1.0	120	47.1	8,921
3	6' – 0"	6' – 0"	9"	7"	108	#6	9"	20' – 1"	3,258	108	#5	9"	10' – 8"	1,202	6' – 9"	760	108	#6	9"	16' – 9"	2,717	15	18"	39' – 9"	398	87	18"	39' – 9"	2,310	108	9"	6' – 0"	433	108	9"	4' – 9"	343	13' – 5"	968	20' – 1"	54	44	122	1.648	309.7	1.5	176	67.4	12,565
4	6' – 0"	6' – 0"	9"	7"	108	#6	9"	26' – 8"	4,326	108	#5	9"	10' – 8"	1,202	6' – 9"	760	108	#6	9"	23' – 4"	3,785	20	18"	39' – 9"	531	112	18"	39' – 9"	2,974	108	9"	6' – 0"	433	162	9"	4' – 9"	514	13' – 5"	1,452	26' – 8"	71	56	156	2.144	399.4	2.0	227	87.7	16,204
5	6' – 0"	6' – 0"	9"	7"	108	#6	9"	33' – 3"	5,394	108	#5	9"	10' – 8"	1,202	6' – 9"	760	108	#6	9"	29' – 11"	4,853	25	18"	39' – 9"	664	137	18"	39' – 9"	3,638	108	9"	6' – 0"	433	216	9"	4' – 9"	685	13' – 5"	1,936	33' – 3"	89	70	195	2.639	489.1	2.5	284	108.0	19,849
6	6' – 0"	6' – 0"	9"	7"	108	#6	9"	39' – 10"	6,462	108	#5	9"	10' – 8"	1,202	6' – 9"	760	108	#6	9"	36' – 6"	5,921	30	18"	39' – 9"	797	162	18"	39' – 9"	4,302	108	9"	6' – 0"	433	270	9"	4' – 9"	857	13' – 5"	2,420	39' – 10"	106	82	228	3.134	578.9	3.0	334	128.3	23,488

HL93 LOADING SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

MULTIPLE BOX CULVERTS CAST-IN-PLACE

6'-0" SPAN

0' TO 16' FILL

MC-6-16

FILE: mc616ste-20.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	030	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		137

DATE: 1/26/2024 $TIME$
FILE: $FILE$

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

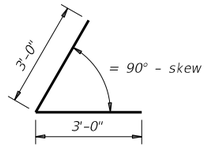
Dimensions					Variable Reinforcing				Estimated Quantities per ft of wing (2~wings) (4)		Estimated Quantities per ft of Toewall (1~toewall)	
Maximum Wingwall Height Hw	W	X	Y	Z	Bars J1		Bars J2					
					Size	Spa	Size	Spa	Reinf (Lb/Ft)	Conc (CY/Ft)	Reinf (Lb/Ft)	Conc (CY/Ft)
2'-6"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	48.64	0.406	6.85	0.071
2'-9"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	49.31	0.424	6.85	0.071
3'-0"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	49.98	0.444	6.85	0.071
3'-3"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	53.32	0.462	6.85	0.071
3'-6"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	53.98	0.480	6.85	0.071
4'-0"	3'-2"	1'-2"	1'-0"	7"	#4	1'-0"	#4	1'-0"	55.77	0.532	6.85	0.071
4'-6"	3'-2"	1'-2"	1'-0"	7"	#4	1'-0"	#4	1'-0"	59.77	0.568	6.85	0.071
5'-0"	3'-9"	1'-7"	1'-2"	7"	#4	1'-0"	#4	1'-0"	63.45	0.632	6.96	0.075
5'-6"	3'-9"	1'-7"	1'-2"	7"	#4	1'-0"	#4	1'-0"	67.46	0.668	6.96	0.075
6'-0"	4'-4"	2'-0"	1'-4"	7"	#5	1'-0"	#5	1'-0"	80.67	0.730	7.07	0.078
6'-6"	4'-4"	2'-0"	1'-4"	7"	#5	1'-0"	#5	1'-0"	85.05	0.768	7.07	0.078
7'-0"	5'-0"	2'-3"	1'-9"	8"	#5	1'-0"	#5	1'-0"	92.15	0.864	8.07	0.093
7'-6"	5'-0"	2'-3"	1'-9"	8"	#5	1'-0"	#5	1'-0"	96.54	0.902	8.07	0.093
8'-0"	5'-6"	2'-8"	1'-10"	8"	#5	6"	#5	6"	139.04	0.962	8.13	0.095
8'-6"	5'-6"	2'-8"	1'-10"	8"	#5	6"	#5	6"	144.47	1.000	8.13	0.095
9'-6"	6'-0"	2'-10"	2'-2"	9"	#5	6"	#5	6"	156.93	1.136	8.41	0.110
10'-6"	6'-5"	3'-0"	2'-5"	9"	#6	6"	#5	6"	196.27	1.234	8.57	0.117
11'-6"	7'-2"	3'-6"	2'-8"	11"	#6	6"	#6	6"	230.13	1.438	9.52	0.140
12'-6"	7'-8"	3'-9"	2'-11"	1'-0"	#7	6"	#6	6"	283.41	1.592	9.74	0.157
13'-6"	8'-2"	4'-0"	3'-2"	1'-2"	#8	6"	#6	6"	348.72	1.804	10.02	0.186
14'-6"	8'-10"	4'-5"	3'-5"	1'-4"	#9	6"	#6	6"	432.94	2.046	10.30	0.218
15'-6"	9'-6"	4'-10"	3'-8"	1'-6"	#9	6"	#7	6"	489.52	2.302	11.24	0.253
16'-0"	9'-11"	5'-0"	3'-11"	1'-7"	#9	6"	#7	6"	505.72	2.448	11.47	0.279

TABLE OF WINGWALL REINFORCING
(2~wings)

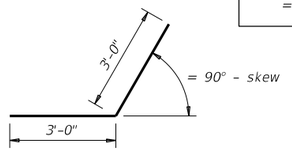
Bar	Size	No.	Spa
D1	#6	~	1'-0"
D2	#6	~	1'-0"
E1	#4	~	1'-0"
F	#4	~	1'-0"
G	#6	~	8"
M1	#4	4	~
P	#4	~	1'-0"
V	#4	~	1'-0"

TABLE OF TOEWALL REINFORCING

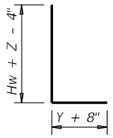
Bar	Size	No.	Spa
J3	#4	~	1'-0"
M2	#4	2	~
E2	#4	~	1'-0"



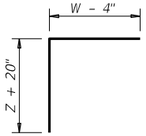
BARS D1



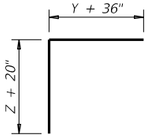
BARS D2



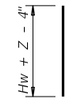
BARS J1



BARS J2



BARS J3



BARS V

WING DIMENSION FORMULAS:
(All values are in feet.)

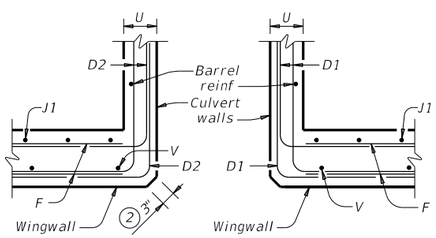
Hw = H + T + C
Lw = (Hw) (SL) ÷ cosine (θ) for Type PW-1
= (Hw - 1') (SL) ÷ cosine (θ) for Type PW-2 and Hw ≥ 4'
= (Hw - 0.5') (SL) ÷ cosine (θ) for Type PW-2 and Hw < 4'

For cast-in-place culverts:
Ltw = [(N) (S) + (N + 1) (U)] ÷ cosine (θ)

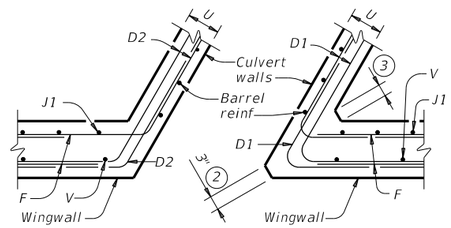
For precast culverts:
Ltw = [(N) (2 U + S) + (N - 1) (0.5')] ÷ cosine (θ)
Total Wingwall Area (two wings ~ SF)
= (2)(Hw)(Lw) for Type PW-1
= (2)(Hw)(Lw) - 6 SF for Type PW-2 and Hw ≥ 4'
= (2)(Hw)(Lw) - 1.5 SF for Type PW-2 and Hw < 4'

Hw = Height of wingwall
Lw = Length of wingwall
Ltw = Culvert toewall length
N = Number of culvert spans
SL:1 = Channel slope ratio. (horizontal: 1 vertical, usual value is 2:1)
θ = Culvert skew

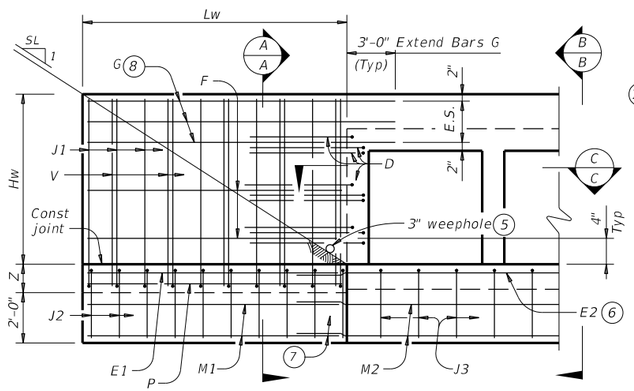
See applicable box culvert standard sheet for S, H, T, and U values.



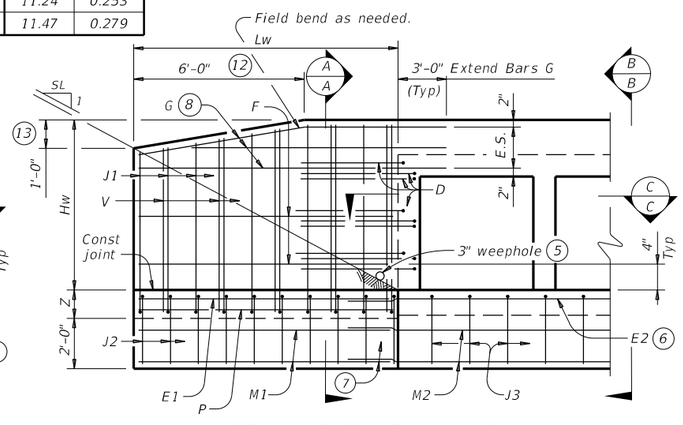
SECTION C-C - PW-1



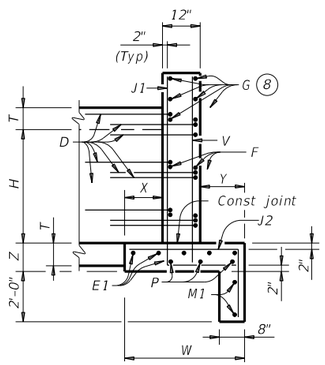
SECTION C-C - PW-2



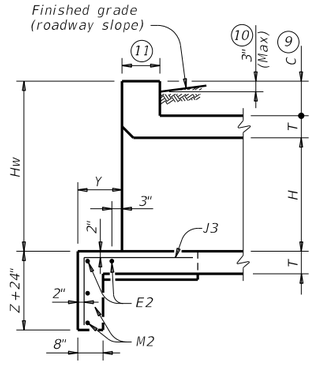
PARTIAL ELEVATION - PW-1



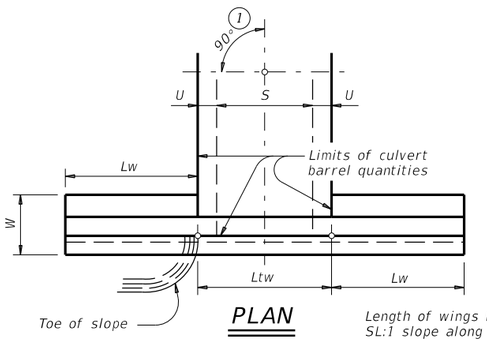
PARTIAL ELEVATION - PW-2



SECTION A-A
(Showing wing reinforcement.)

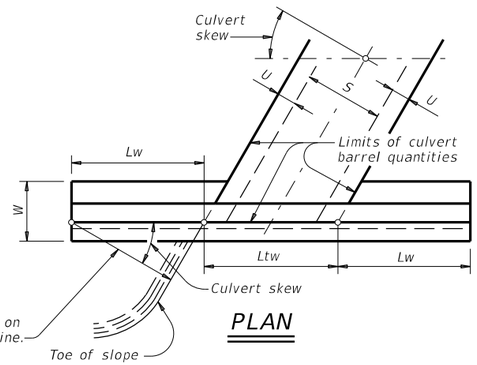


SECTION B-B
(Showing wing reinforcement.)



PLAN

DETAILS FOR NON-SKEWED BOX CULVERTS



PLAN

DETAILS FOR SKEWED BOX CULVERTS
(Showing 30° skew.)

1. Skew = 0°
2. At discharge end, chamfer may be ¾" minimum.
3. For 15° skew ~ 1"
   For 30° skew ~ 2"
   For 45° skew ~ 3"
4. Quantities shown are for two Type PW-1 wings. Adjust concrete volume for Type PW-2 wings. To determine estimated quantities for two wings, multiply the tabulated values by Lw. Quantities shown do not include weight of Bars D.
5. Provide weepholes for Hw = 5'-0" and greater. Fill around weepholes with coarse gravel.
6. Extend Bars E2 1'-6" minimum into the wingwall footing.
7. Lap Bars M1 1'-6" minimum with Bars M2.
8. Place Bars G as shown, equally spaced at 8" maximum. Provide at least two pairs of Bars G per wing.
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 nished grade.
    - For structures with bridge rail, construct curbs ush with nished 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.
11. 1'-0" typical. 2'-3" when the Box Culvert Rail Mounting Details (RAC) standard sheet is referred to elswhere in the plans.
12. 3'-0" for Hw < 4'.
13. 6" for Hw < 4'.

DESIGNER NOTES:
Type PW-1 can be used for all applications and must be used if railing is to be mounted to the wingwall.
Type PW-2 can only be used for applications without a railing mounted to the wingwall.

MATERIAL NOTES:
Provide Class C concrete (f'c=3,600 psi).
Provide Grade 60 reinforcing steel.
Provide galvanized reinforing steel if required elsewhere in the plans.

GENERAL NOTES:
Designed in accordance with AASHTO LRFD Bridge Design Speci cations.
Depth of toewalls for wingwalls and culverts may be reduced or eliminated when founded on solid rock, when directed by the Engineer.
See Box Culvert Supplement (BCS) standard sheet for wingwall type and additional dimensions and information.
Quantities for concrete and reinforcing steel resulting from the formulas given on this sheet are for the Contractor's information only.

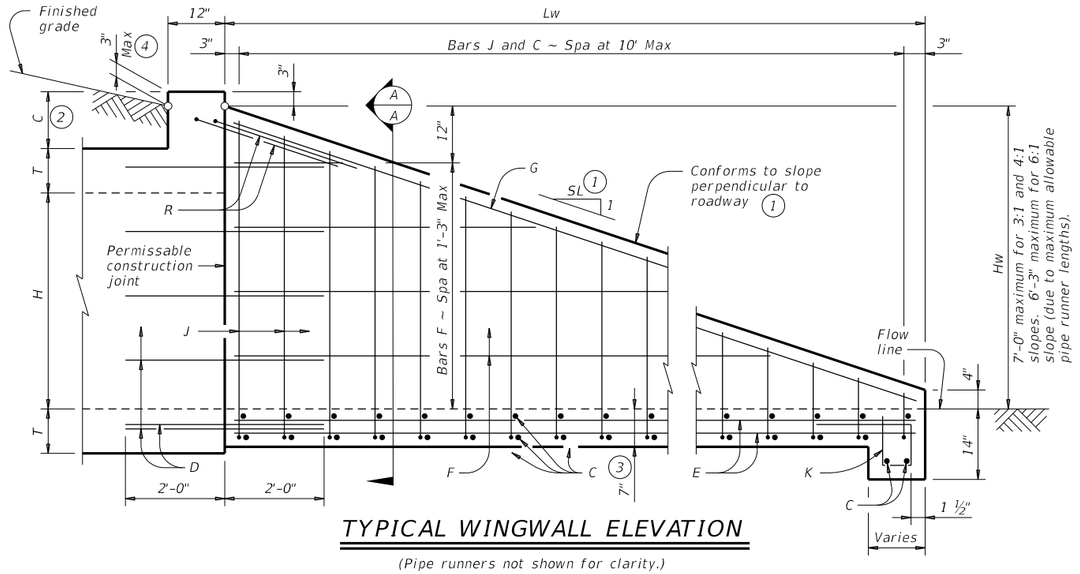
Cover dimensions are clear dimensions, unless noted otherwise. Reinforcing dimensions are out-to-out of bars.

Texas Department of Transportation
Bridge Division Standard

CONCRETE WINGWALLS
WITH PARALLEL WINGS FOR BOX CULVERTS
TYPES PW-1 AND PW-2

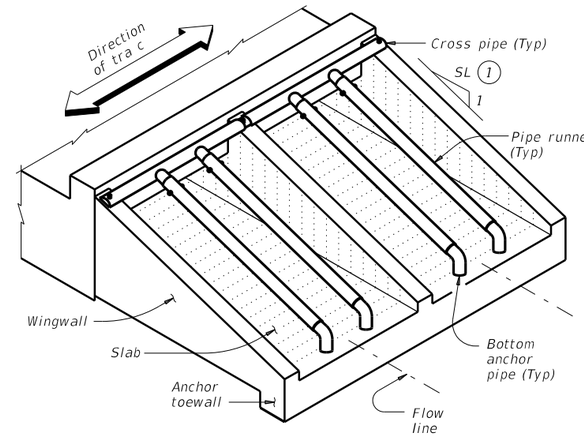
PW

FILE: pwstde01-20.dgn	DN: GAF	CK: CAT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	030	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		138



TYPICAL WINGWALL ELEVATION

(Pipe runners not shown for clarity.)



ISOMETRIC VIEW OF TYPICAL INSTALLATION

WING DIMENSION CALCULATIONS:

$Hw = H + T + C - 0.250'$

$Lw = (Hw - 0.333') (SL)$

For cast-in-place culverts:

$Atw = (N) (S) + (N + 1) (U)$

For precast culverts:

$Atw = (N) (2U + S) + (N - 1) (0.500')$

Total Wingwall Area (SF)
$= (0.5) (Hw + 0.333') (Lw) (N + 1)$

Total Concrete Volume (CY)
$= [(\text{Wingwall Area}) (0.583') +$
$(Lw) (Atw) (0.583') +$
$(Atw) (1.167') (1.167' - 0.583')] \div (27)$

PIPE RUNNER DIMENSION CALCULATIONS:

Pipe Runner Length
$= (Lw) (K1) - (1.917')$

Total Reinforcing (Lb)
$= (1.55) (Lw) (Atw) +$
$(4.43) (Atw) +$
$(K2) (Hw) (N + 1) (\sqrt{Lw})$

C = Height of curb above top of top slab (feet)
Hw = Height of wingwall (feet)
K = Constant value for use in formulas

Slope SL:1	K1	K2
3:1	~ 1.054 ~	7.45
4:1	~ 1.031 ~	8.49
6:1	~ 1.014 ~	10.30

Atw = Anchor toewall length (feet)
Lw = Length of wingwall (feet)
N = Number of culvert barrels
SL:1 = Side slope ratio (horizontal : 1 vertical)

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

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.

Provide galvanized reinforcing steel if required elsewhere in the plans.

Adjust reinforcing as necessary to provide a minimum clear cover of 1 ½".

Provide Class "C" concrete (f`c = 3,600 psi).

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

Provide ASTM A307 bolts.

Galvanize all steel components, except the concrete reinforcing, unless required elsewhere in the plans, after fabrication.

Repair galvanizing damaged during transport or construction in accordance with the Item 445, "Galvanizing".

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Speci cations.

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

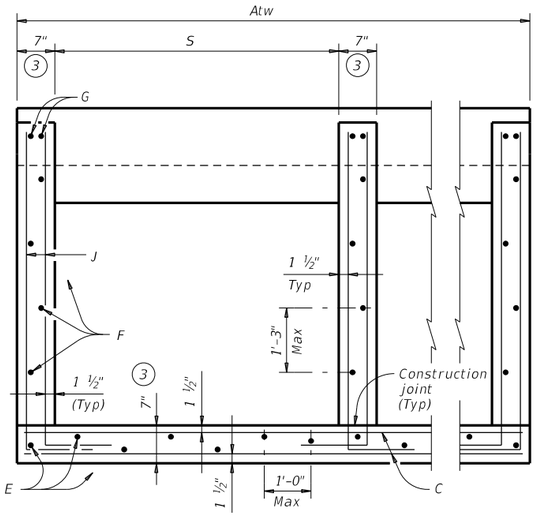
Pipe runners are designed for a traversing load of 1,800 pounds at yield as recommended by Research Report 280-1, "Safety Treatment of Roadside Cross-Drainage Structures", Texas Transportation Institute, March 1981.

The quantities for pipe runners, reinforcing steel, and concrete resulting from the formulas given herein are for Contractor's information only.

See the Box Culvert Supplement (BCS) standard sheet for additional dimensions and information.

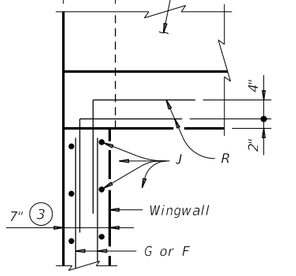
Alternate design drawings bearing the seal of a professional engineer will be acceptable for precast construction of the safety end treatments.

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



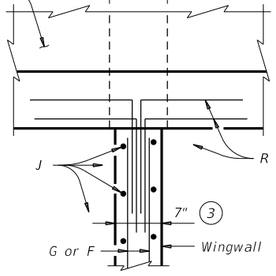
SECTION A-A

(Showing typical wingwall and wing slab reinforcing. Pipe runners not shown for clarity.)



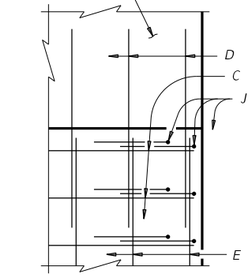
AT TOP OF EXTERIOR WINGWALL

(Cast-in-place culvert)



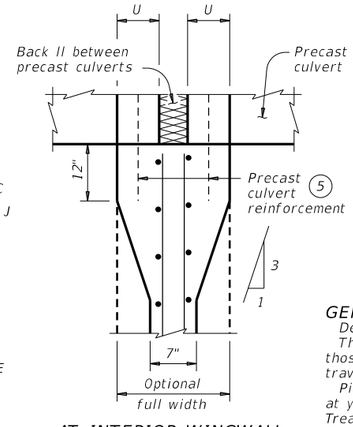
AT TOP OF INTERIOR WINGWALL

(Cast-in-place culvert)



AT OUTSIDE OF BOTTOM SLAB

(Cast-in-place culvert)



AT INTERIOR WINGWALL

(Precast culvert)

PLAN VIEWS OF CORNER DETAILS

(1) Recommended values of slope are: 3:1, 4:1, and 6:1. Provide 3:1 or atter slope.

(2) 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures without railing and curbs taller than 1'-0", refer to the Extended Curb Details (ECD) standard sheet.

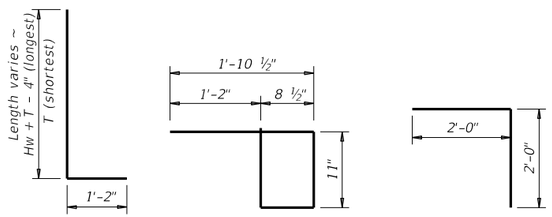
(3) Wingwall and slab thicknesses may be the same as the adjacent culvert wall and slab thicknesses (7" minimum). If thicknesses greater than the minimum (7") are used, no changes will be made in quantities and no additional compensation will be allowed.

(4) For vehicle safety, reduce curb height, if necessary, to provide a maximum 3" projection. No changes will be made in quantities and no additional compensation will be allowed for this work.

(5) For culverts with C = 0", the precast culvert reinforcing may extend 1'-0" minimum into wingwall. Wingwall Bars D and R may be omitted. Otherwise, refer to the Wingwall Connection detail on the Box Culvert Precast Miscellaneous Details (SCP-MD) standard sheet.

TABLE OF REINFORCING BAR SIZES AND SPACING

Bar	Size	Spacing
C	#4	10" Max
D	#4	Match F and E
E	#4	1'-0" Max
F	#4	1'-3" Max
G	#6	As shown
J	#4	10" Max
K	#4	1'-0" Max
R	#4	As shown



SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

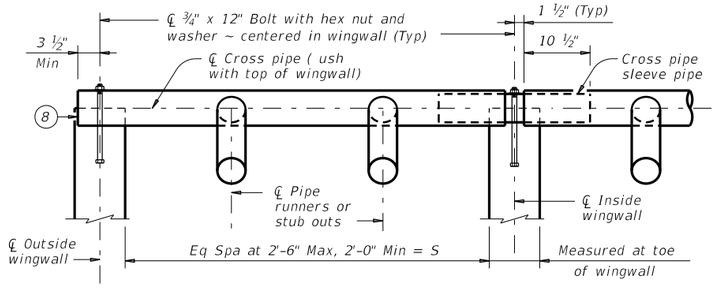
SAFETY END TREATMENT

FOR 0° SKEW BOX CULVERTS
(MAXIMUM Hw = 7'-0")
TYPE I ~ CROSS DRAINAGE

SETB-CD

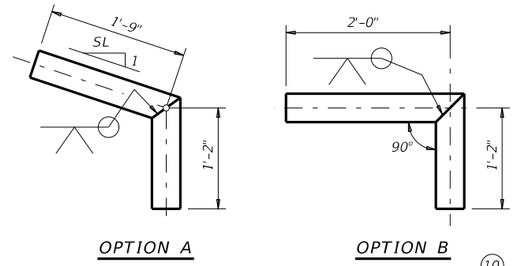
FILE: setbcdse-20.dgn	DN: GAF	CK: CAT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	030	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		139

DATE: 1/26/2024 $TIME$
FILE: $FILE$



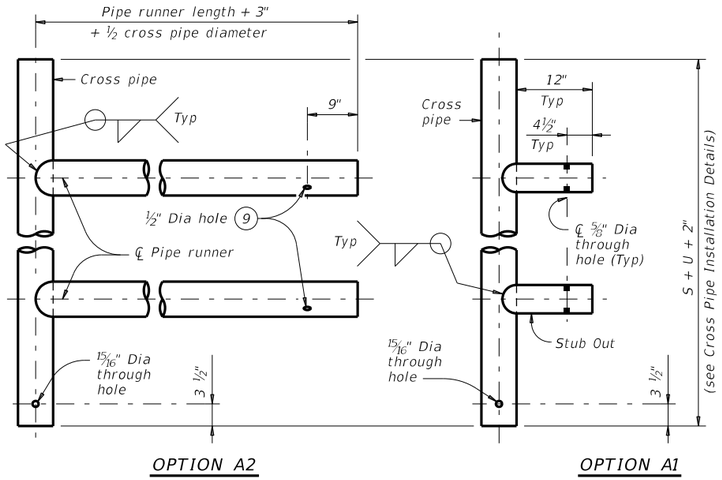
NOTE: At Contractor's option, make the cross pipe continuous across the inside wingwalls. If option is selected, omit the sleeve pipe and make a $^{15}/_{16}$" diameter through hole in the cross pipe to accept the anchor bolt at the centerline of each inside wingwall.

CROSS PIPE INSTALLATION DETAILS



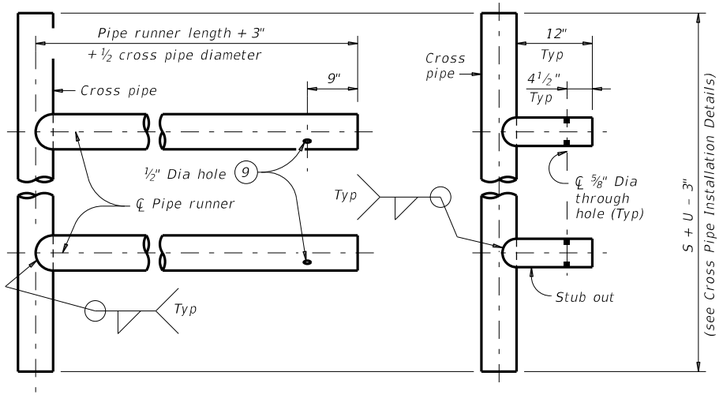
OPTION A OPTION B

BOTTOM ANCHOR PIPE DETAILS (10)



OPTION A2 OPTION A1

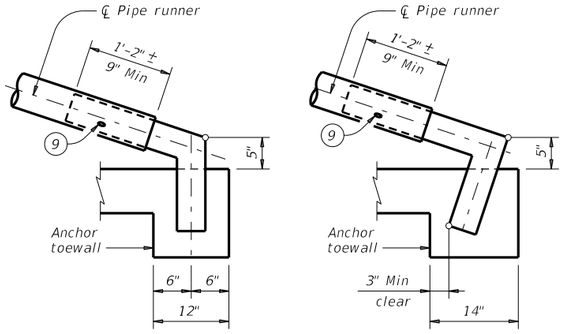
FOR USE IN OUTSIDE CULVERT BAY



OPTION A2 OPTION A1

FOR USE IN INSIDE CULVERT BAY

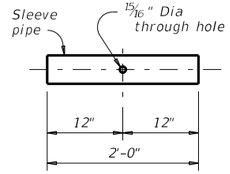
CROSS PIPE AND CONNECTIONS DETAILS



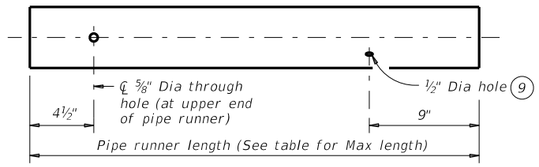
OPTION B1 OPTION B2

BOTTOM ANCHOR TOEWALL DETAILS

(Wingwall not shown for clarity.)

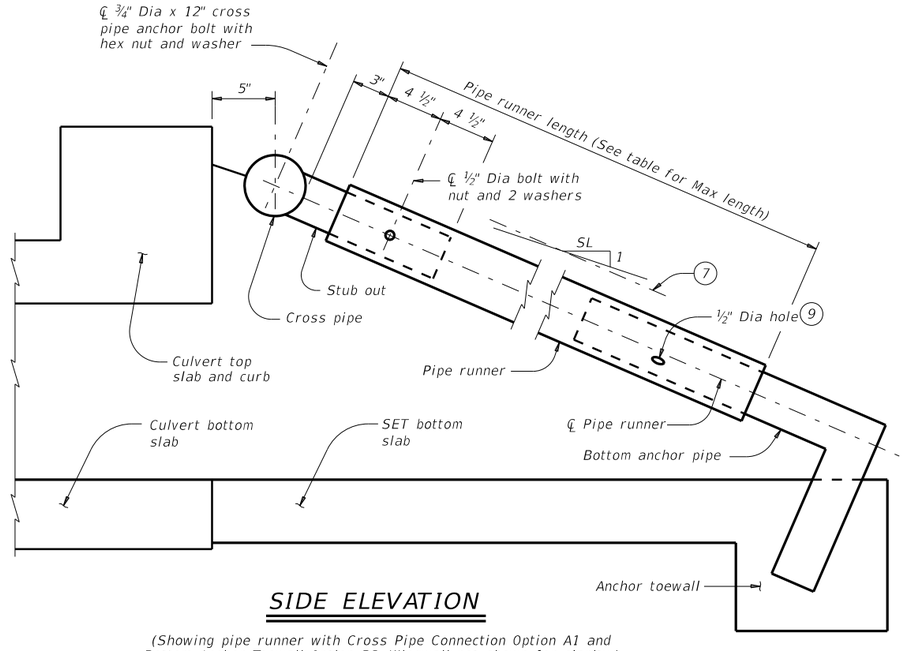


CROSS PIPE SLEEVE PIPE DETAILS



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

PIPE RUNNER DETAILS



SIDE ELEVATION

(Showing pipe runner with Cross Pipe Connection Option A1 and Bottom Anchor Toewall Option B2. Wingwall not shown for clarity.)

(6) Cross pipe is the same size as the pipe runner. Cross pipe stub out is the same size as the anchor pipe.

(7) Note that actual slope of safety pipe runner may vary slightly from side slope.

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

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

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

MAXIMUM PIPE RUNNER LENGTHS AND (6) REQUIRED PIPE RUNNER AND ANCHOR PIPE SIZES

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

DATE: 1/26/2024 $TIME$
FILE: $FILE$

SHEET 2 OF 2

Texas Department of Transportation — Bridge Division Standard

SAFETY END TREATMENT

FOR 0° SKEW BOX CULVERTS
(MAXIMUM Hw = 7'-0")
TYPE I ~ CROSS DRAINAGE

SETB-CD

FILE: setbcdse-20.dgn	DN: GAF	CK: CAT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020 REVISIONS	CONT	SECT	JOB	HIGHWAY
	1133	02	030	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		140

DATE: 1/26/2024 $TIME$
FILE: $FILE$

TABLE OF DIMENSIONS AND REINFORCING STEEL
(Wings for One Structure End)

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

TABLE OF WING WALL REINFORCING
(Two~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

TABLE OF ESTIMATED ANCHOR TOEWALL QUANTITIES

Bar	Size	No.	Spa
K	#4	~	1'-0"
N	#5	6	~
OL	#4	6	~
Reinf (Lb/Ft)			9.82
Conc (CY/Ft)			0.074

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

(2) Adjust to t as necessary to maintain 1 1#2" clear cover and 4" Min 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 slope are: 3:1, 4:1, and 6:1. Provide 3:1 or atter slope.

(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, extend construction joints or grooved joints, oriented in the direction of ow, 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 is not required.

(6) At Contractor's option, end the culvert toewall ush with wingwall toewall. Adjust reinforcing as needed.

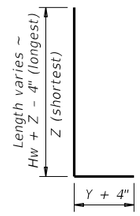
(7) 3" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures without railing and curbs taller than 1'-0", refer to the Extend Curb Details (ECD) standard sheet.

(8) For vehicle safety, reduce curb heights, if necessary, to provide a maximum 3" projection above nished grade. No changes will be made in quantities and no additional compensation will be allowed for this work.

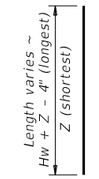
(9) See Table of Maximum Wing Heights for various slopes. Height is limited based on a 33'-6" maximum safety pipe runner length.

TABLE OF MAXIMUM WING HEIGHTS (9)

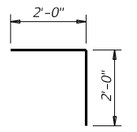
Side Slope	Hw Max
3:1	11'- 5"
4:1	8'-10"
6:1	6'- 1"



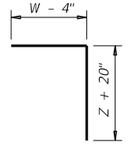
BARS J1



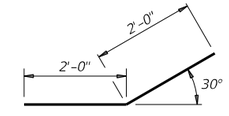
BARS V



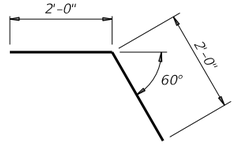
BARS L



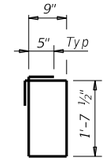
BARS J2



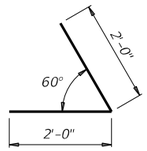
BARS D



BARS R



BARS K
(Length = 5'-5")



BARS OL

WING DIMENSION CALCULATIONS:

Hw = H + T + C - 0.250' (9)
A = (Hw - 0.333') (SL)
B = (A) (tan (30°))
Lw = (A) ÷ cos (30°))

For cast-in-place culverts:
Ltw = (N) (S) + (N + 1) (U)
For precast culverts:
Ltw = (N) (2U + S) + (N - 1) (0.500')

Lc = (Ltw) - (2U)
Atw = (Lc) + (2B)
Total Wingwall Area (two wings ~ SF) = (Hw + 0.333') (Lw)

Hw = Height of wingwall (feet)
Atw = Anchor toewall length (feet)
Lw = Length of wingwall (feet)
N = Number of culvert barrels
SL:1 = Side slope ratio (horizontal : 1 vertical)
Ltw = Culvert toewall length (feet)
Lc = Culvert curb between wings (feet)

See applicable box culvert standard for H, S, T, and U values.
See Table of Maximum Wall Heights for limits on Hw.

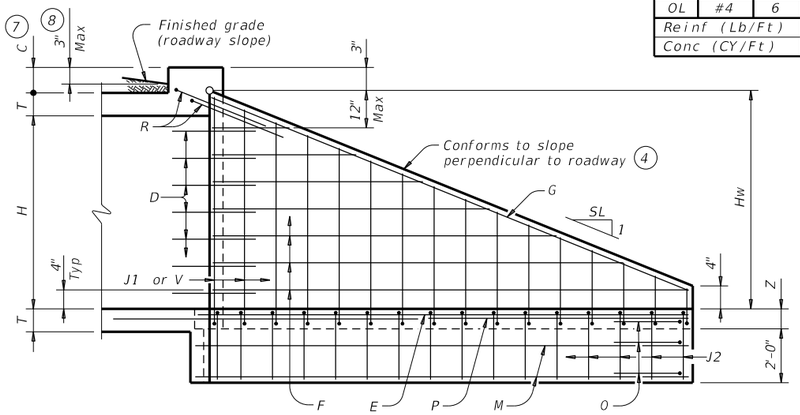
MATERIAL NOTES:

Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.
Synthetic bers 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 Class "C" concrete (f`c = 3,600 psi).
Adjust reinforcing as necessary to provide a minimum clear cover of 1 ½".
Provide pipe runners and anchor pipes meeting the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 Gr B, or API 5LX52.
Provide ASTM A307 bolts and nuts.
Provide ASTM A36 steel plates.
Galvanize all steel components, except reinforcing unless required elsewhere in the plans, after fabrication.
Repair galvanizing damaged during transport or construction in accordance with the Item 445, "Galvanizing".
For optional adhesive anchors, install adhesive anchorages in accordance with the manufacturer's instructions including hole size, drilling equipment and method, hole cleaning equipment and method, mixing and dispensing adhesive, and anchor insertion. Do not alter the manufacturer's mixing nozzle or dispenser. Provide anchorage rods that are clean and free of grease, oil, or any other foreign material. Demonstrate hole cleaning method to the Engineer for approval and continue the approved process for all anchorage locations. Test adhesive anchors in accordance with Item 450.3.3, "Tests." Test 3 anchors per 100 anchors installed.

GENERAL NOTES:

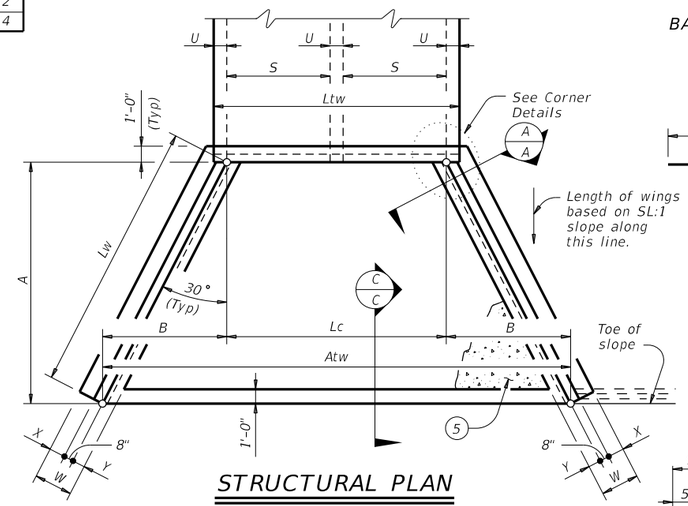
Designed according to AASHTO LRFD Bridge Design Speci cations.
The safety end treatments shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the pipe runners.
Pipe runners are designed for a traversing load of 1,800 pounds at yield as recommended by Research Report 280-1, "Safety Treatment of Roadside Cross-Drainage Structures", Texas Transportation Institute, March 1981.
When structure is founded on solid rock, depth of toewalls for culverts and wingwalls may be reduced or eliminated as directed by the Engineer.
All bolts, nuts, washers, brackets, angles, and pipe runners are considered parts of the safety end treatment for payment.
The quantities for pipe runners, reinforcing steel, and concrete, resulting from the formulas given herein are for Contractor's information only.
See the Box Culvert Supplement (BCS) standard sheet for additional dimensions and information.

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



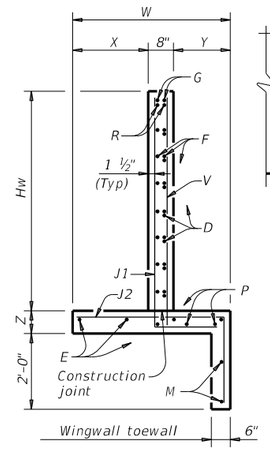
INSIDE ELEVATION OF WINGWALL

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

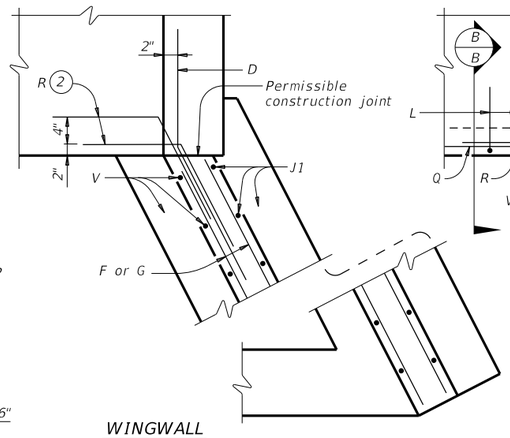


STRUCTURAL PLAN

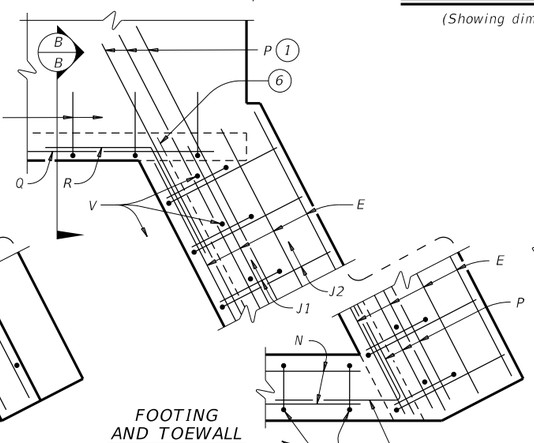
(Showing dimensions.)



SECTION A-A



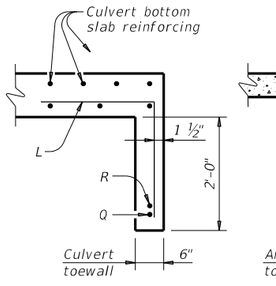
WINGWALL



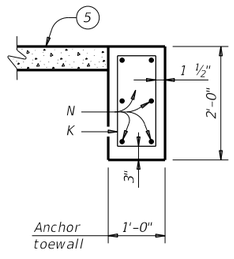
FOOTING AND TOEWALL

CORNER DETAILS

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



SECTION B-B (5)



SECTION C-C

SHEET 1 OF 3

Texas Department of Transportation

Bridge Division Standard

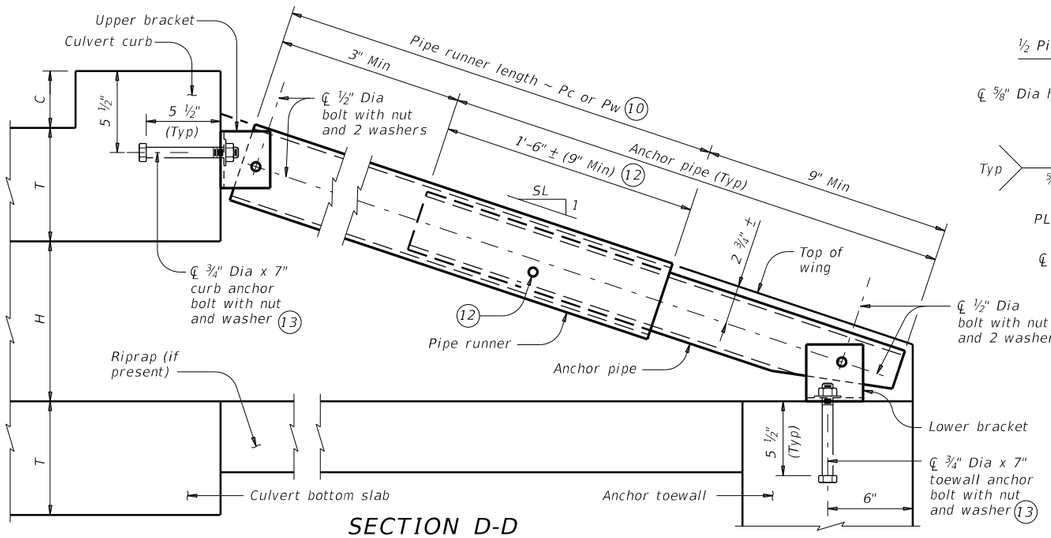
SAFETY END TREATMENT WITH FLARED WINGS

FOR 0° SKEW BOX CULVERTS
TYPE I ~ CROSS DRAINAGE

SETB-FW-0

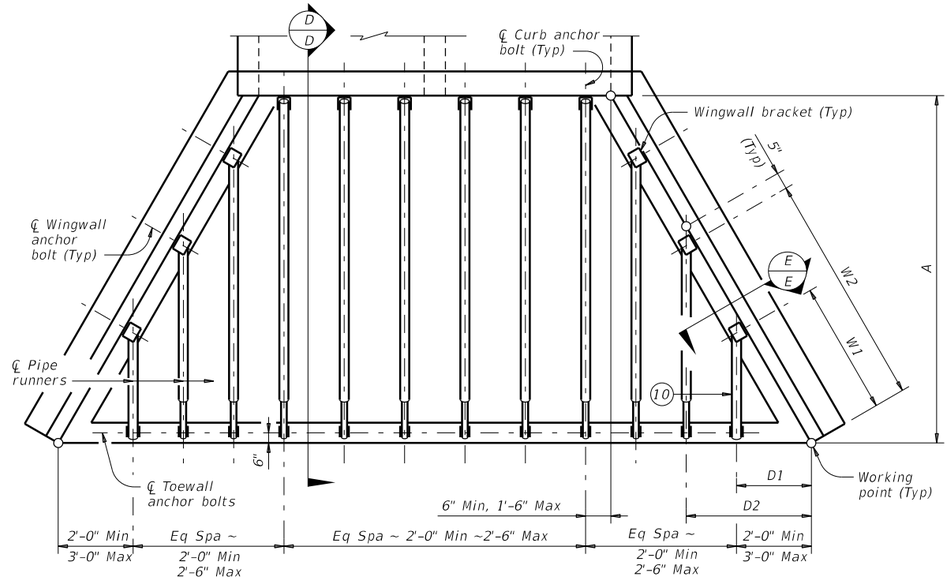
FILE: setbf0se-20.dgn	DN: GAF	CK: CAT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	030	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		141

DATE: 1/26/2024 $TIME$
FILE: $FILE$

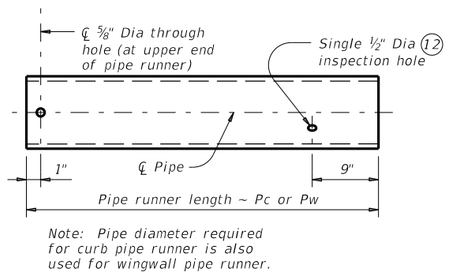


SECTION D-D

(Showing curb pipe runner. Except for upper bracket, wingwall pipe runners are similar.)

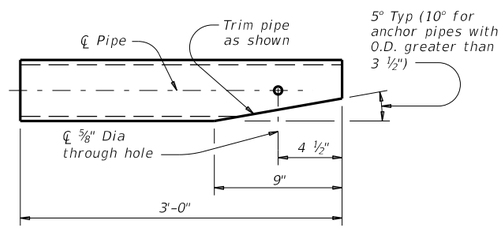


PIPE RUNNER PLAN

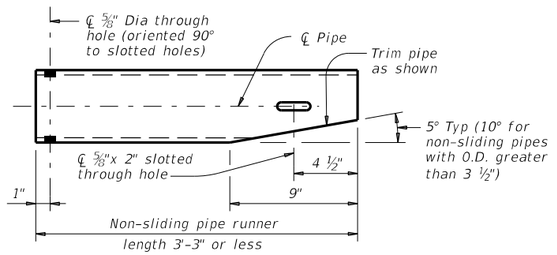


Note: Pipe diameter required for curb pipe runner is also used for wingwall pipe runner.

PIPE RUNNER DETAILS

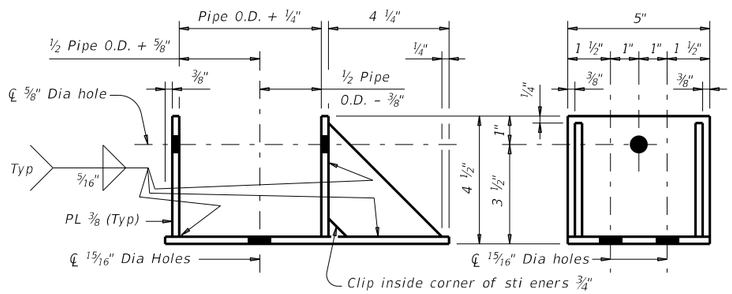


ANCHOR PIPE DETAILS

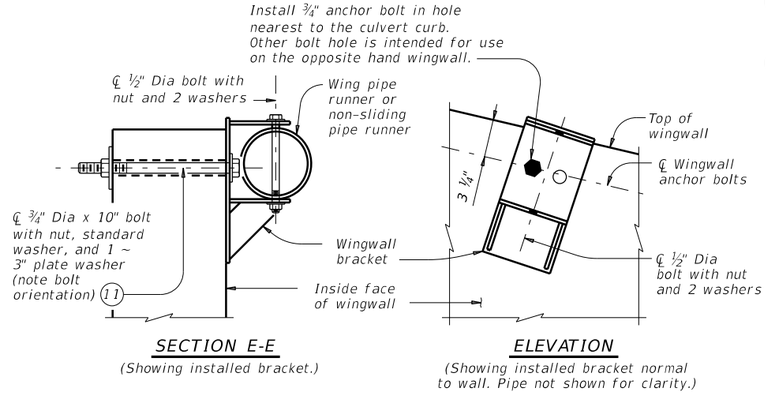


Note: Pipe size is the same as required for curb pipe runner. Adjust the corresponding lower bracket accordingly.

NON-SLIDING PIPE RUNNER DETAILS



ELEVATION SIDE VIEW

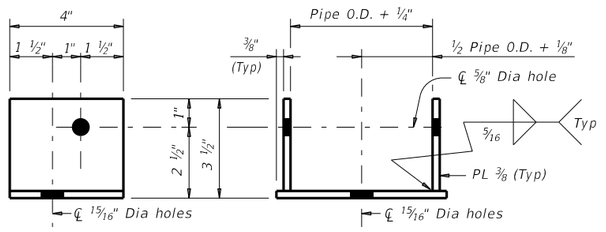


SECTION E-E (Showing installed bracket.)

ELEVATION (Showing installed bracket normal to wall. Pipe not shown for clarity.)

Note: Match wingwall bracket to the upper curb bracket size.

WINGWALL BRACKET DETAILS



SIDE VIEW ELEVATION

Note: Match upper and lower brackets, except for the brackets used with non-sliding pipe runners, to the required pipe diameters as shown in the table.

UPPER AND LOWER BRACKET DETAILS

MAXIMUM PIPE RUNNER LENGTHS AND REQUIRED PIPE RUNNER SIZES

Maximum Pipe Runner Length (Pc or Pw)	Required Pipe Runner Size			Required Anchor Pipe Size		
	Pipe Size	Pipe O.D.	Pipe I.D.	Pipe Size	Pipe O.D.	Pipe I.D.
9'-4"	3" STD	3.500"	3.068"	2" STD	2.375"	2.067"
19'-0"	4" STD	4.500"	4.026"	3" STD	3.500"	3.068"
33'-6"	5" STD	5.563"	5.047"	4" STD	4.500"	4.026"

(10) If pipe runner length (Pw) is 1'-9" or less replace the normal pipe runner and anchor pipe with a single non-sliding pipe runner. See Non-Sliding Pipe Runner Details for additional information.

(11) At Contractor's option, ⅞" diameter hole may be formed or cored drilled. Percussion drilling is not permitted. Adjust placement of reinforcing steel as necessary to avoid bolt holes.

(12) After installation of pipe runner, use the ½" inspection hole to ensure that the lap of the anchor pipe with the pipe runner is adequate.

(13) At Contractor's option, an adhesive anchor may be used. Provide ¾" Dia adhesive anchors that meet the requirements of ASTM A307 Gr A fully threaded rods. Embed threaded rods into curb, wingwalls, and toewall using a Type III, Class C, D, E, or F anchor adhesive. Minimum embedment depth is 5 ½". Provide anchor adhesive able to achieve a basic bond strength in tension, Nba, of 20 kips. Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use.

PIPE RUNNER DIMENSION CALCULATIONS:

Wn = (2.000) (Dn) - (0.416')
Pwn = (Dn) (K2) - (2.063')
Pw1 Non-Sliding Pipe Runner (If required) = (D1) (K2) - (0.563')
Pc = (A) (K1) - (1.688')

Wn = Distance from working point to centerline anchor bolt measured along bottom inside face of wing (feet)
Dn = Distance from working point to centerline pipe runner measured along outside face of anchor toewall (feet)
Pw = Wingwall pipe runner length (feet)
Pc = Curb pipe runner length (feet)
K = Constant values for use in formulas

Slope SL:1	K1		K2
3:1	~ 1.054	~	1.826
4:1	~ 1.031	~	1.785
6:1	~ 1.014	~	1.756

n = Wing pipe runner number

Texas Department of Transportation — Bridge Division Standard

SAFETY END TREATMENT WITH FLARED WINGS

FOR 0° SKEW BOX CULVERTS
TYPE I ~ CROSS DRAINAGE

SETB-FW-0

FILE: setbf0se-20.dgn	DN: GAF	CK: CAT	DW: TxDOT	CK: TxDOT
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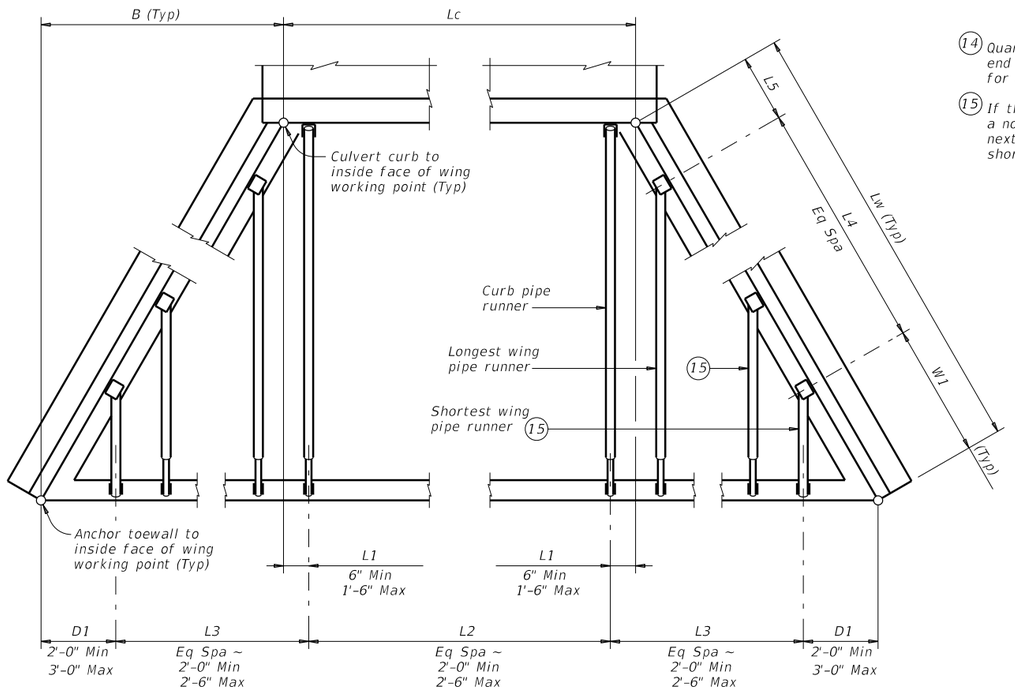
REVISIONS	1133	02	030	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		142

Culvert Station and/or Creek name followed by applicable end (Lt, Rt or Both) (14)	Lc	L1	L2			D1	L3			W1	L4			L5	Curb Pipe Runner (Pc)		Longest Wing Pipe Runner (Pw)	Shortest Wing Pipe Runner (Pw)	Non-Sliding Wing Pipe Runner (if applicable)	Curb, Wing, and/or Non-Sliding Pipe Runners		3'-0" Anchor Pipe	
			No. Spa	Spa at	Overall Length		No. Spa	Spa at	Overall Length		No. Spa	Spa at	Overall Length		No.	Length				Size (3",4" or 5")	Total Length (14)	Size (2",3" or 4")	Total Length (14)
	(Ft)	(Ft)		(Ft)	(Ft)	(Ft)		(Ft)	(Ft)	(Ft)		(Ft)	(Ft)	(Ft)		(Ft)	(Ft)	(Ft)	(Ft)				
STA 474+72 (Both)	19.167'	0.500'	8	2.271'	18.167'	2.250'	2	2.084'	4.168'	4.083'	1	4.168'	4.168'	3.585'	9	9.125'	5.854'	2.042'	N/A	3"	195.833'	2"	78.000'
STA 539+40 (Both)	10.583'	0.500'	4	2.396'	9.583'	2.250'	2	2.012'	4.024'	4.083'	1	4.024'	4.024'	3.440'	5	8.854'	5.729'	2.042'	N/A	3"	119.625'	2"	54.000'
STA 587+60 (Both)	5.000'	0.500'	2	2.000'	4.000'	2.250'	1	2.291'	2.291'	4.083'	0	4.583'	0.000'	4.000'	3	5.688'	2.042'	N/A	N/A	3"	42.292'	2"	30.000'
STA 600+35 (Lt)	4.000'	1.000'	1	2.000'	2.000'	2.250'	1	2.358'	2.358'	4.083'	0	4.717'	0.000'	3.134'	2	4.896'	2.042'	N/A	N/A	3"	13.875'	2"	12.000'
STA 600+35 (Rt)	4.000'	0.750'	1	2.500'	2.500'	2.000'	2	2.069'	4.139'	3.583'	1	4.139'	4.139'	3.055'	2	7.938'	5.208'	N/A	3.000'	3"	32.292'	2"	12.000'
STA 236+00 (FRONTAGE ROAD) (Both)	5.176'	0.500'	2	2.338'	4.676'	2.250'	1	2.291'	2.291'	4.083'	0	4.583'	0.000'	4.000'	3	5.688'	2.042'	N/A	N/A	3"	38.208'	2"	24.000'
STA 235+39 (FRONTAGE ROAD) (Both)	5.000'	0.500'	2	2.000'	4.000'	2.250'	1	2.291'	2.291'	4.083'	0	4.583'	0.000'	4.000'	3	5.688'	2.042'	N/A	N/A	3"	42.292'	2"	30.000'



PIPE RUNNER LAYOUT

(14) Quantities shown are for one structure end if Lt or Rt. Quantities shown are for two structure ends if Both.

(15) If the outermost wing pipe runner is a non-sliding pipe runner, consider the next outermost wing pipe runner as the shortest.

SPECIAL NOTE:

This tabular sheet is to be filled out by the culvert specifier and provides information for the construction details and quantities of pipe runners.

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

Note that the tabular quantities are given for estimating purposes only. It is likely that these quantities will change due to field conditions. Therefore, all dimensions must be verified by the Contractor in the field prior to fabrication of the safety end treatment components.

STATE OF TEXAS
AMANDA ANDERLE FLING
105989
LICENSED PROFESSIONAL ENGINEER

Amanda Anderle Fling, P.E.

01/27/2024

DATE: 1/29/2024 $TIME$
FILE: $FILE$

SHEET 3 OF 3

Texas Department of Transportation

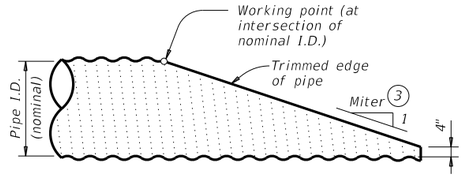
Bridge Division Standard

SAFETY END TREATMENT WITH FLARED WINGS

FOR 0° SKEW BOX CULVERTS TYPE I ~ CROSS DRAINAGE

SETB-FW-0

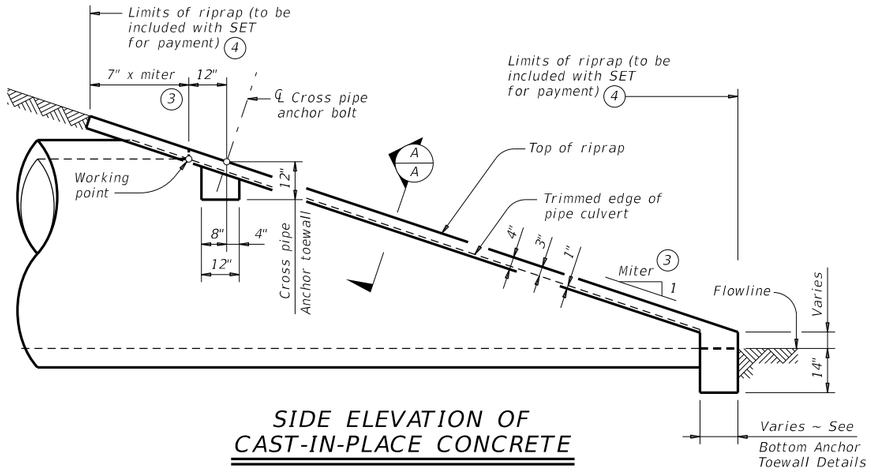
FILE: setbf0se-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	030	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		143



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

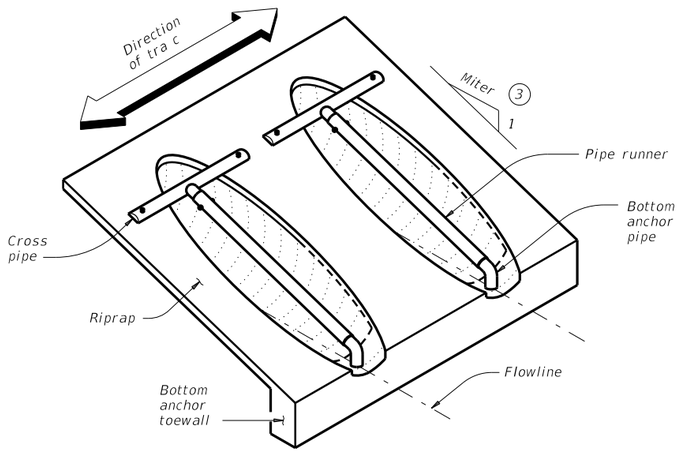
SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER

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



SIDE ELEVATION OF CAST-IN-PLACE CONCRETE

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



ISOMETRIC VIEW OF TYPICAL INSTALLATION

(Showing installation with no skew.)

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

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

TYPICAL PIPE CULVERT MITERS (3)

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

CONDITIONS WHERE PIPE RUNNERS ARE NOT REQUIRED (2)

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

STANDARD PIPE SIZES AND MAX PIPE RUNNER LENGTHS (1)

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

ESTIMATED CONCRETE RIPRAP QUANTITIES (CY) (5)

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

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

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

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

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

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

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

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

DATE: 1/26/2024 $TIME$
FILE: $FILE$

SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

SAFETY END TREATMENT

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

SETP-CD

FILE: setpcdse-20.dgn	DN: GAF	CK: CAT	DW: JRP	CK: GAF
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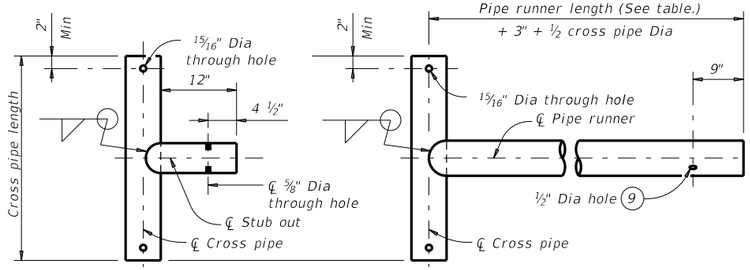
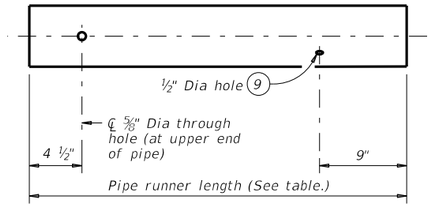
REVISIONS	1133	02	030	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		144

DATE: 1/26/2024 $TIME$
FILE: $FILE$



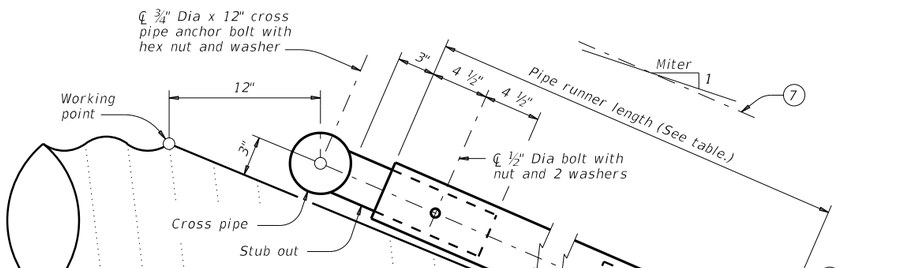
OPTION A1 OPTION A2

CROSS PIPE AND CONNECTIONS DETAILS



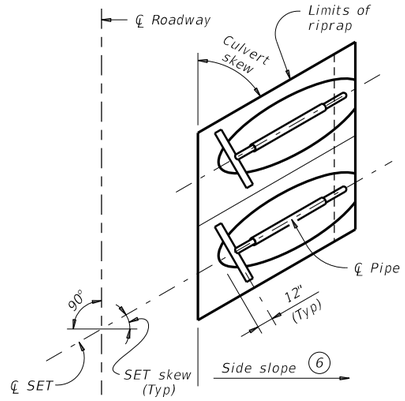
NOTE: The separate pipe runner shown is required when Cross Pipe Connection Option A1 is used.

PIPE RUNNER DETAILS

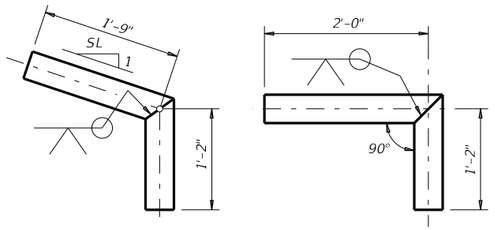


SIDE ELEVATION OF SAFETY END TREATMENT INSTALLATION

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

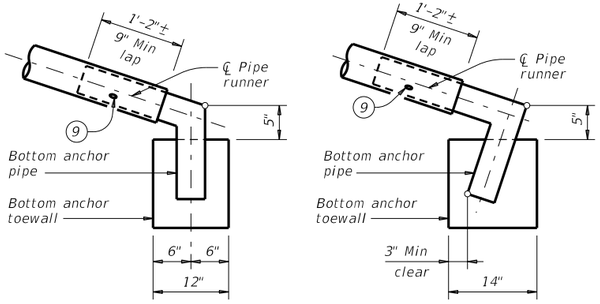


PLAN OF SKEWED INSTALLATION



OPTION B1 OPTION B2

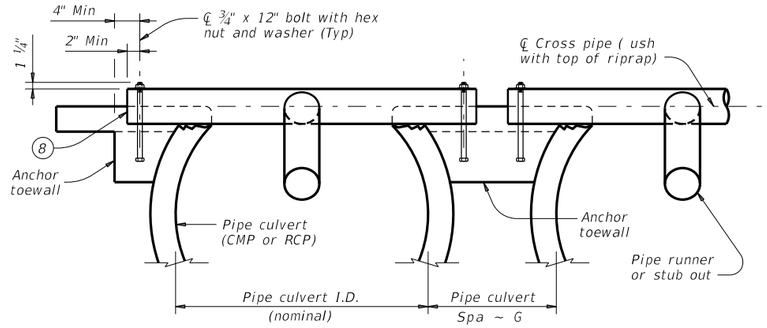
BOTTOM ANCHOR PIPE DETAILS (10)



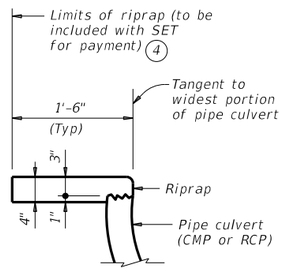
OPTION B1 OPTION B2

BOTTOM ANCHOR TOEWALL DETAILS

(Culvert and riprap not shown for clarity.)



SHOWING CROSS PIPE AND ANCHOR TOEWALL



SHOWING TYPICAL PIPE CULVERT AND RIPRAP

SECTION A-A

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

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

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

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

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

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

MATERIAL NOTES:

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

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

Provide ASTM A307 bolts and nuts.

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

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

GENERAL NOTES:

Pipe runners are designed for a traversing load of 1,800 pounds at yield as recommended by Research Report 280-1, "Safety Treatment of Roadside Cross-Drainage Structures", Texas Transportation Institute, March 1981.

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

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

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

SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

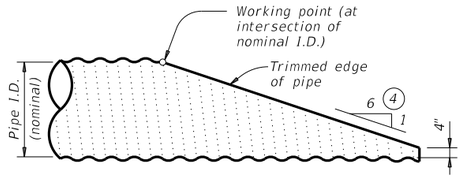
SAFETY END TREATMENT

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

SETP-CD

FILE: setpcdse-20.dgn	DN: GAF	CK: CAT	DW: JRP	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	030	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		145

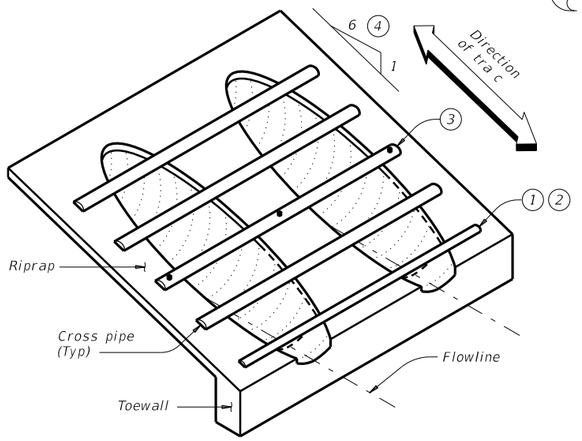
DATE: 1/26/2024 $TIME$
FILE: $FILE$



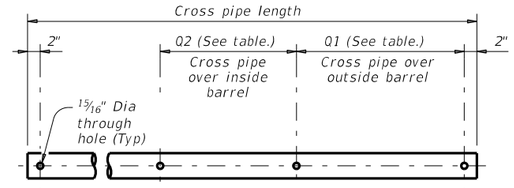
NOTE: All cross pipes, calculations, and dimensions are based on the pipe culverts mitered as shown in this detail. Alternate styles of mitered ends will require that appropriate adjustments be made to the values presented on this standard.

SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER

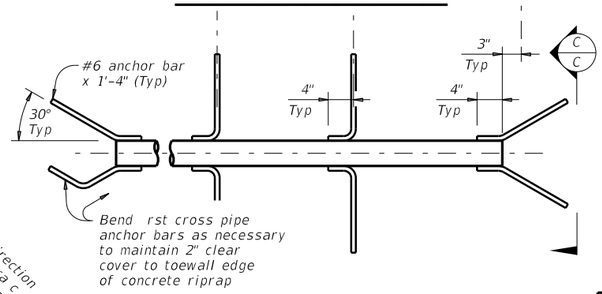
(Showing corrugated metal pipe (CMP) culvert Details at reinforced concrete pipe (RCP) culvert are similar.)



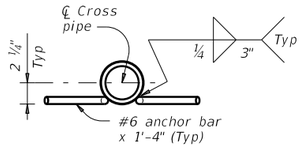
ISOMETRIC VIEW OF TYPICAL INSTALLATION



PIPE WITH BOLTED ANCHOR

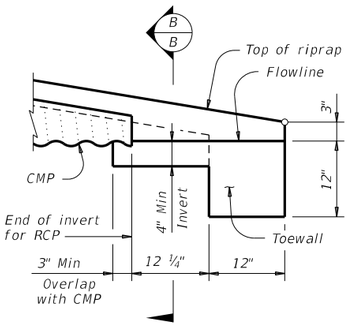


PIPE WITH ANCHOR BARS



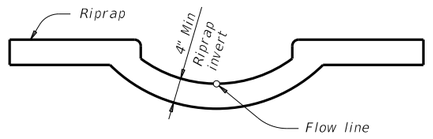
SECTION C-C

CROSS PIPE DETAILS



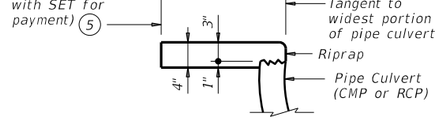
DETAIL "A"

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

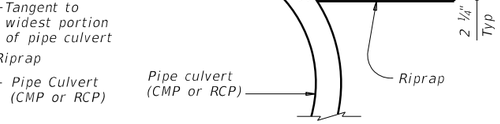


SECTION B-B

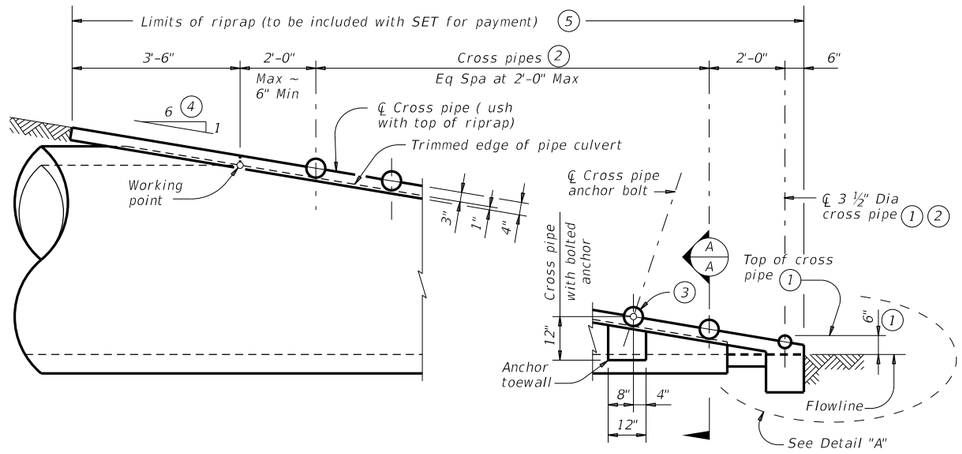
(Cross pipes not shown for clarity.)



SHOWING TYPICAL PIPE CULVERT AND RIPRAP

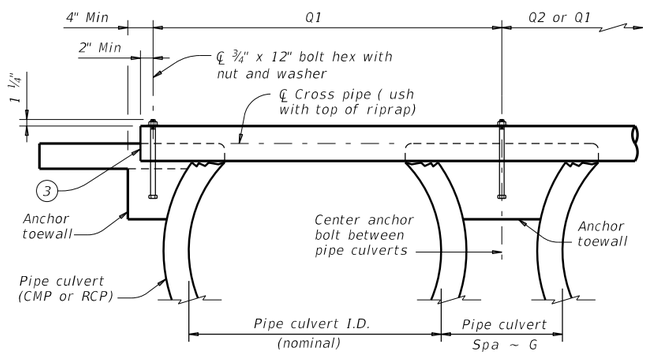


SHOWING CROSS PIPE WITH ANCHOR BAR



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 1/2" Std (4.000" O.D.)
30"	1.1	1' - 10"	N/A	4' - 2"	4' - 4"	2 or more pipe culverts	
33"	1.2	1' - 11"	4' - 2"	4' - 5"	4' - 8"	All pipe culverts	
36"	1.3	2' - 1"	4' - 5"	4' - 9"	5' - 1"	All pipe culverts	4" Std (4.500" O.D.)
42"	1.5	2' - 4"	4' - 11"	5' - 5"	5' - 10"		
48"	1.7	2' - 7"	5' - 5"	6' - 0"	6' - 7"	All pipe culverts	5" Std (5.563" O.D.)
54"	2.0	3' - 0"	5' - 11"	6' - 9"	7' - 6"		
60"	2.2	3' - 3"	6' - 5"	7' - 4"	8' - 3"		
66"	2.4	3' - 3"	6' - 11"	7' - 10"	8' - 9"		
72"	2.7	3' - 4"	7' - 5"	8' - 5"	9' - 4"		

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

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

(3) Install the third cross pipe from the bottom of the culvert using a bolted connection. Ensure that riprap concrete does not ow 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 atter 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 bers 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 speci cations.

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	1133	02	030	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		146

DATE: 1/26/2024 $TIME$
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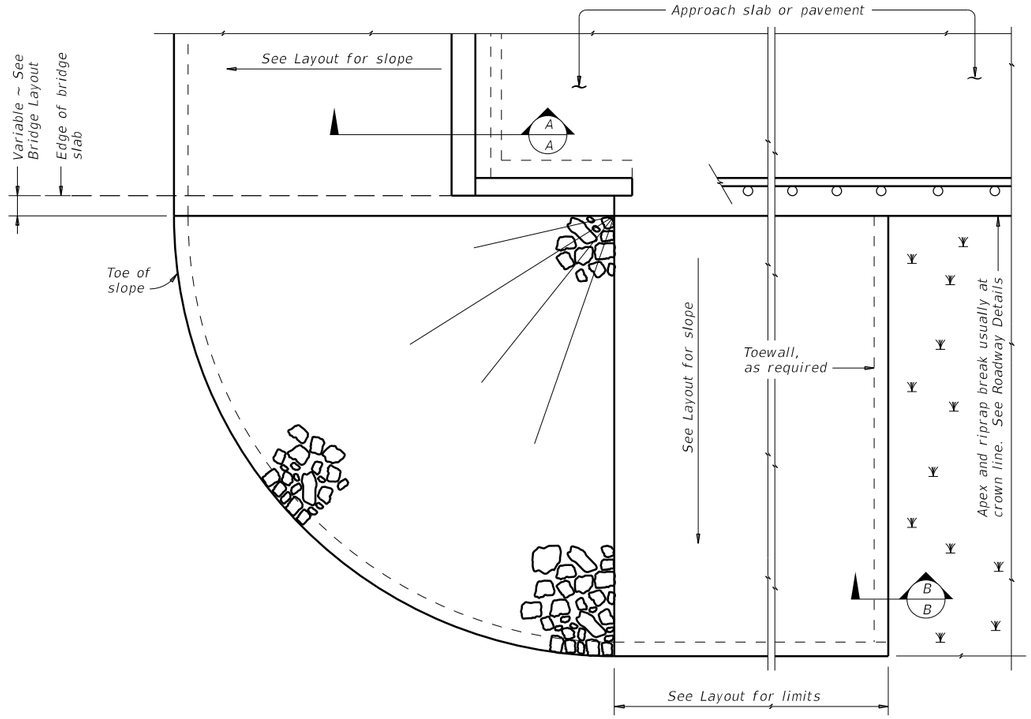
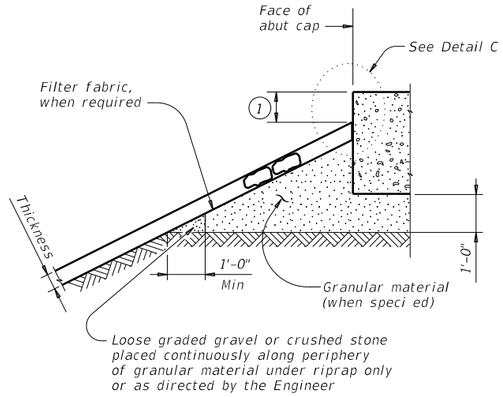
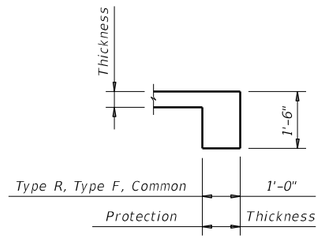


PLAN

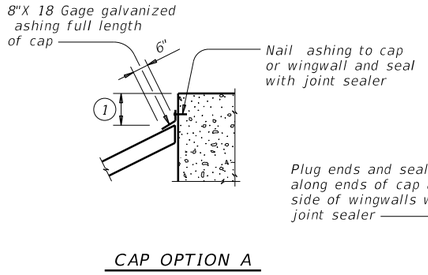


SECTION A-A AT CAP

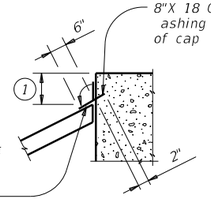


SECTION B-B

Provide toewall when shoulder drain is located adjacent to limits of stone riprap. Omit toewall when thickness of protection riprap is greater than 18".

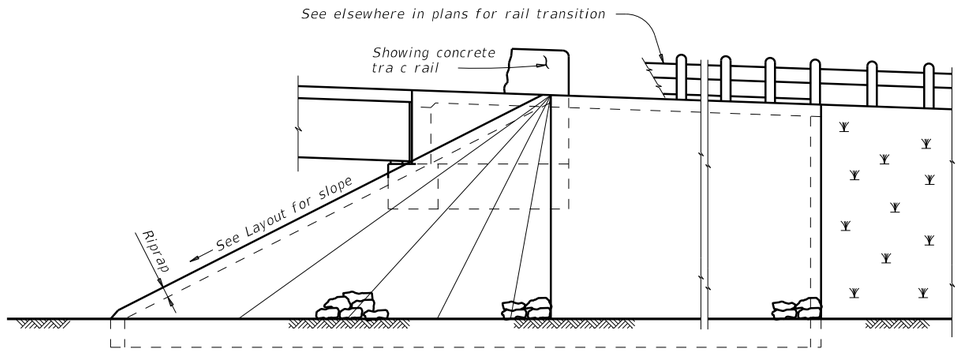


CAP OPTION A



CAP OPTION B

DETAIL C



ELEVATION

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

GENERAL NOTES:
Refer to Item 432, "Riprap" for stone size and gradation, and construction details. See Layout for limits and thickness of riprap speci ed.
See elsewhere in plans for locations and details of shoulder drains.

SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

STONE RIPRAP

SRR

FILE: MS-SRR-19.dgn	DN: AES	CK: JGD	DW: BWH	CK: AES
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	030	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		147

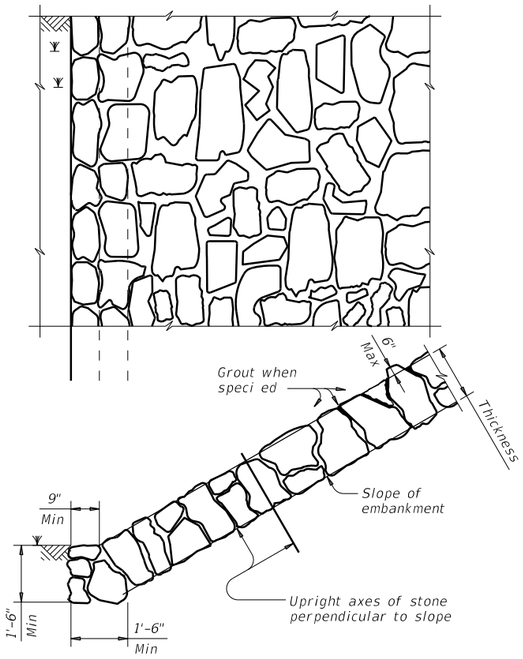


FIGURE 1 ~ TYPE R STONE RIPRAP

dry or grouted

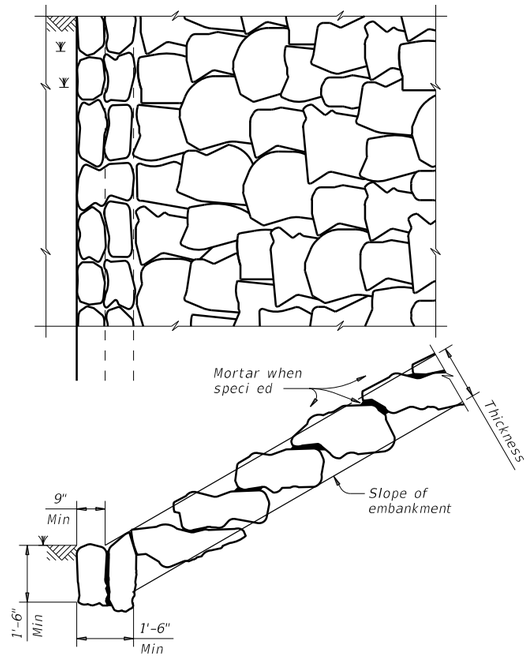


FIGURE 2 ~ TYPE F STONE RIPRAP

dry or mortared

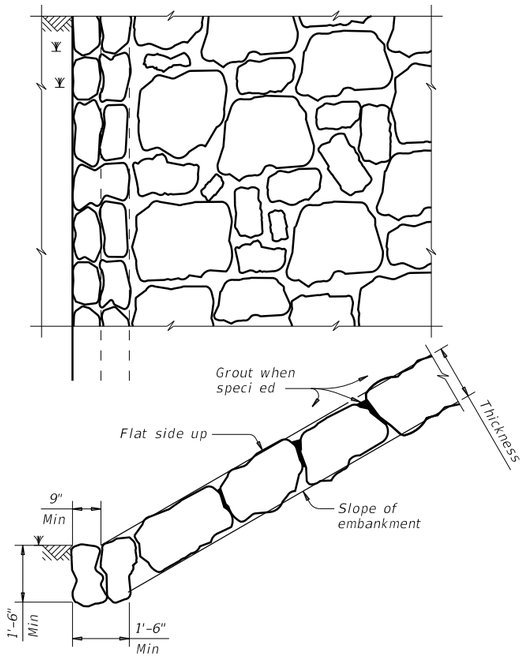


FIGURE 3 ~ TYPE F STONE RIPRAP

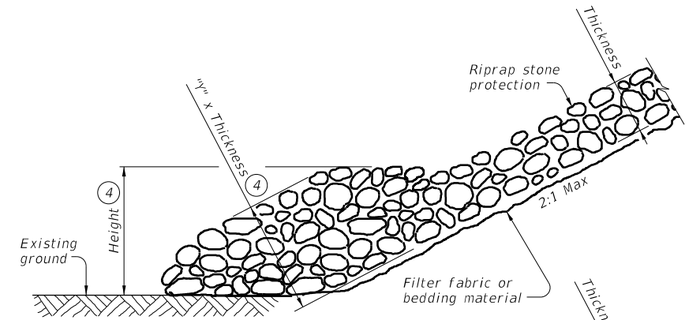
grouted

(2) Provide bedding material instead of lter fabric if shown elsewhere in plans. See Layout for thickness of bedding material.

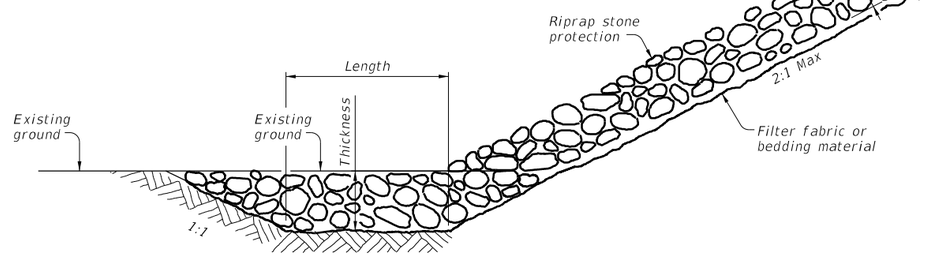
(3) Minimum toe depth is the larger of the maximum scour depth or 2 times the riprap thickness.

(4) "Y" and Height need to be de ned. 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)

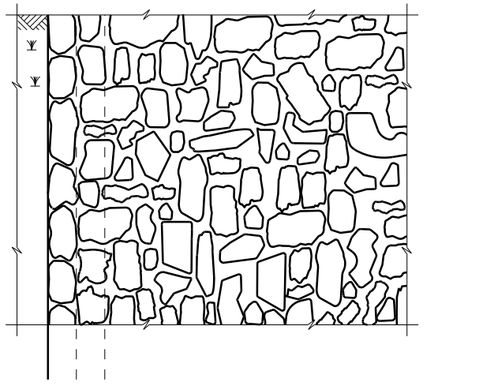


FIGURE 4 ~ COMMON STONE RIPRAP

dry or grouted

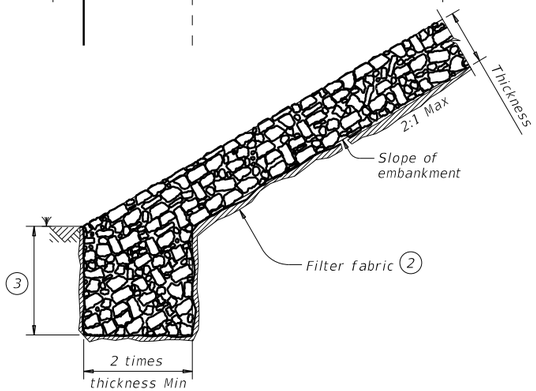


FIGURE 5 ~ PROTECTION STONE RIPRAP (5)

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SHEET 2 OF 2

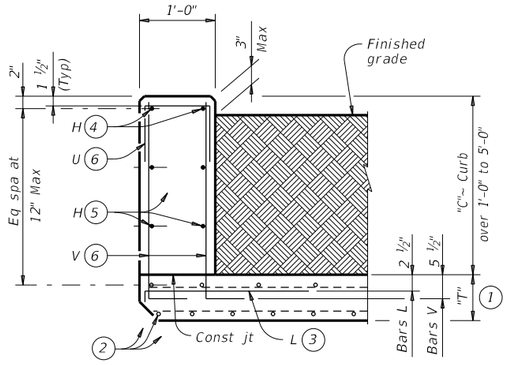
Texas Department of Transportation

Bridge Division Standard

STONE RIPRAP

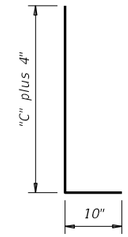
SRR

FILE: MS-SRR-19.dgn	DN: AES	CK: JGD	DW: BWH	CK: AES
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	030	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		148

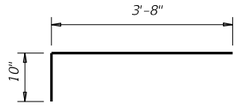


TYPICAL SECTION

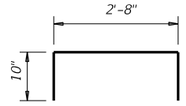
Used for curbs over 1'-0" to 5'-0"



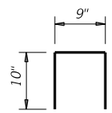
BARS V (#5) (6)
Spaced at 12" Max



BARS L (#5) (3)
Spaced at 12" Max



OPTIONAL BARS L (#5) (3) (7)
Spaced at 12" Max



BARS U (#4) (6)
Spaced at 12" Max

(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) Adjust normal culvert slab bars as necessary to clear obstructions.

(3) Place bars L as shown. Tilt hook as necessary to maintain cover.

(4) Place normal culvert curb bars H(#4) as shown. Adjust as necessary to clear obstructions.

(5) Additional bars H(#4) as required to maintain 12" Max spacing.

(6) Replace normal culvert curb bars K with one bar U and two bars V as shown spaced at 12" Max. Adjust length of bars V as necessary to maintain clear cover.

(7) Optional bars L are to be used only for precast box culverts with 3'-0" closure pour.

(8) Quantities shown are for Contractor's information only. Quantities are per linear foot of curb length. The value in table can be interpolated for intermediate values of curb height, "C". Quantity includes bars K (when applicable).

TABLE OF ESTIMATED CURB QUANTITIES (8)

Curb Height "C"	Conc (CY/LF)	Reinf Steel (Lb/LF)
1'-0"	0.037	10.4
1'-6"	0.056	14.5
2'-0"	0.074	15.6
2'-6"	0.093	18.0
3'-0"	0.111	19.0
3'-6"	0.130	21.3
4'-0"	0.148	22.4
4'-6"	0.167	24.8
5'-0"	0.185	25.9

CONSTRUCTION NOTES:

Adjust reinforcing steel as necessary to provide 1 ¼" cover. For vehicle safety, top of the curb must not project more than 3" above the nished grade.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.
Provide Class "C" concrete (f'_c = 3,600 psi) minimum for curbs.
Provide bar laps, where required, as follows:
- Uncoated or galvanized ~ #4 = 1'-8" Min

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Speci cations.
These extended curb details have su cient strength to allow for future retro t of Type T631 or T631LS railing. These details are suitable for use with PR11, PR22 and PR3 type rails. These details are not suitable for the mounting of other rail types. For new construction using T631 or T631LS railing, use the T631-CM standard.
This Curb is considered as part of the Box Culvert for payment.

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

Texas Department of Transportation

Bridge Division Standard

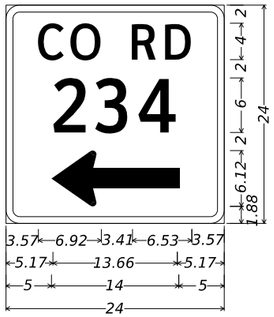
EXTENDED CURB DETAILS FOR BOX CULVERTS WITH CURBS OVER 1'-0" TO 5'-0" TALL

ECD

FILE: CD-ECD-20.dgn	DN: GAF	CK: TxDOT	DW: TxDOT	CK: GAF			
©TxDOT February 2020	CONT	SECT	JOB		HIGHWAY		
REVISIONS	1133	02	030		FM 794		
	DIST	COUNTY			SHEET NO.		
	YKM	GONZALES			149		

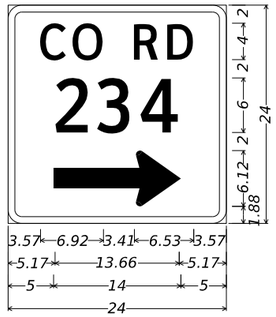
DATE: 1/26/2024 $TIME$
FILE: $FILE$

SIGN #2



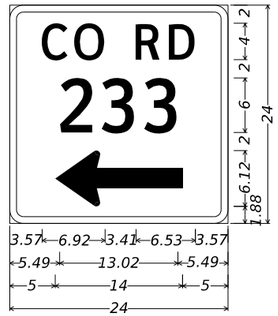
D20-1TL;
1.50" Radius, 0.75" Border, White on Green;
"CO RD", ClearviewHwy-3-W;
"234", ClearviewHwy-3-W;
Standard Arrow Custom 14.00" X 6.13" 180□;

SIGN #4



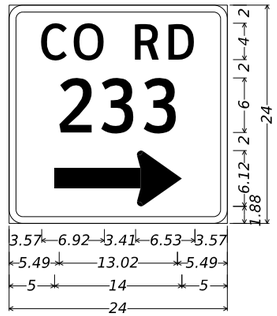
D20-1TL;
1.50" Radius, 0.75" Border, White on Green;
"CO RD", ClearviewHwy-3-W;
"234", ClearviewHwy-3-W;
Standard Arrow Custom 14.00" X 6.13" 0□;

SIGN #9



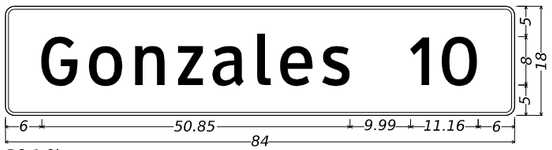
D20-1TL;
1.50" Radius, 0.75" Border, White on Green;
"CO RD", ClearviewHwy-3-W;
"233", ClearviewHwy-3-W;
Standard Arrow Custom 14.00" X 6.13" 180□;

SIGN #12



D20-1TL;
1.50" Radius, 0.75" Border, White on Green;
"CO RD", ClearviewHwy-3-W;
"233", ClearviewHwy-3-W;
Standard Arrow Custom 14.00" X 6.13" 0□;

SIGN #15

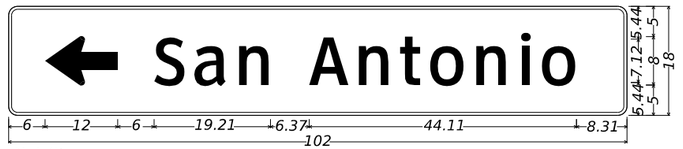


D2-1 8in;
1.50" Radius, 0.50" Border, White on Green;
"Gonzales", ClearviewHwy-3-W; "10", ClearviewHwy-3-W;

SIGN #16

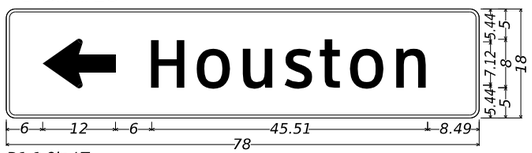
D1-2 8in UP-RT;
1.88" Radius, 0.75" Border, White on Green;
Standard Arrow Custom 10.00" X 7.13" 90□; "San Antonio", ClearviewHwy-3-W;
1.88" Radius, 0.75" Border, White on Green;
"Houston", ClearviewHwy-3-W; Standard Arrow Custom 12.00" X 7.13" 0□;

SIGN #25



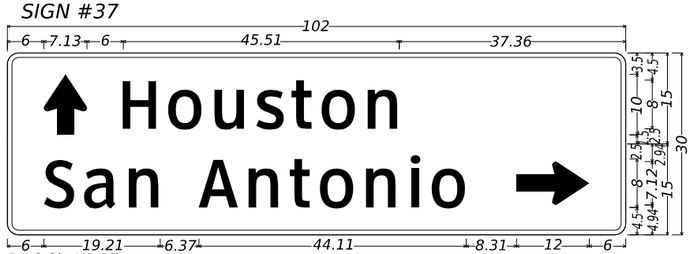
D1-1 8in LT;
1.50" Radius, 0.50" Border, White on Green;
Standard Arrow Custom 12.00" X 7.13" 180□; "San Antonio", ClearviewHwy-3-W;

SIGN #28



D1-1 8in LT;
1.50" Radius, 0.50" Border, White on Green;
Standard Arrow Custom 12.00" X 7.13" 180□; "Houston", ClearviewHwy-3-W;

SIGN #37



D1-2 8in UP-RT;
1.88" Radius, 0.75" Border, White on Green;
Standard Arrow Custom 10.00" X 7.13" 90□; "Houston", ClearviewHwy-3-W;
1.88" Radius, 0.75" Border, White on Green;
"San Antonio", ClearviewHwy-3-W; Standard Arrow Custom 12.00" X 7.13" 0□;

STATE OF TEXAS
AMANDA ANDERLE FLING
105989
LICENSED
PROFESSIONAL ENGINEER

Amanda Anderle Fling, P.E.

01/27/2024

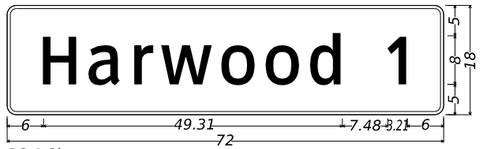
SIGN DETAILS

Texas Department of Transportation

FED.RD. DIV.NO.		PROJECT NO.	
6			
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	150

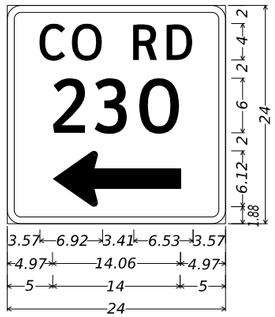
PATH: T:\YKMANNEX\PS&E\113302030_FM794\Plan_Sheets\
FILE: SIGN DETAILS.dgn
DATE: 1/26/2024

SIGN #40



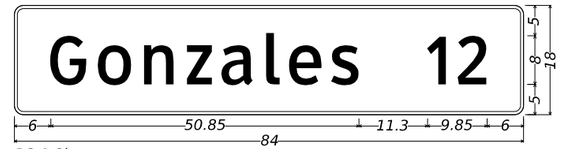
D2-1 8in;
1.50" Radius, 0.50" Border, White on Green;
"Harwood", ClearviewHwy-3-W; "1", ClearviewHwy-3-W;

SIGN #45



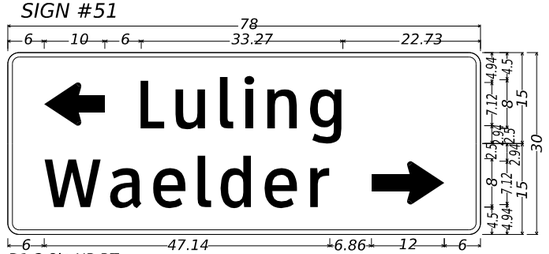
D20-1TL;
1.50" Radius, 0.75" Border, White on Green;
"CO RD", ClearviewHwy-3-W;
"230", ClearviewHwy-3-W;
Standard Arrow Custom 14.00" X 6.13" 180°;

SIGN #48



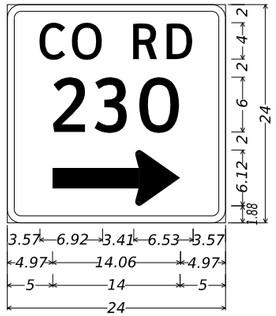
D2-1 8in;
1.50" Radius, 0.50" Border, White on Green;
"Gonzales", ClearviewHwy-3-W; "12", ClearviewHwy-3-W;

SIGN #51



D1-2 8in UP-RT;
1.88" Radius, 0.75" Border, White on Green;
Standard Arrow Custom 10.00" X 7.13" 180°; "Luling", ClearviewHwy-3-W;
1.88" Radius, 0.75" Border, White on Green;
"Waelder", ClearviewHwy-3-W; Standard Arrow Custom 12.00" X 7.13" 0°;

SIGN #52



D20-1TL;
1.50" Radius, 0.75" Border, White on Green;
"CO RD", ClearviewHwy-3-W;
"230", ClearviewHwy-3-W;
Standard Arrow Custom 14.00" X 6.13" 0°;

STATE OF TEXAS
AMANDA ANDERLE FLING
105989
LICENSED
PROFESSIONAL ENGINEER

Amanda Anderle Fling, P.E.

01/27/2024

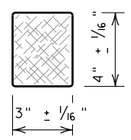
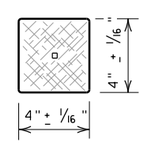
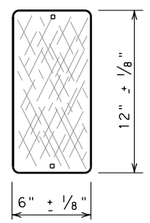
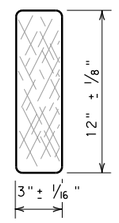
SIGN DETAILS

Texas Department of Transportation

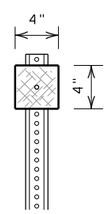
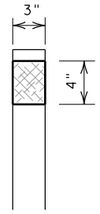
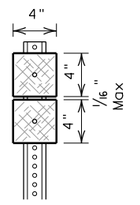
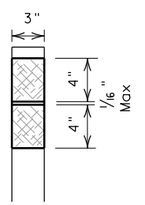
FED.RD. DIV.NO.		PROJECT NO.	
6			
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	151

PATH: T:\YKMANNEX\PS&E\113302030_FM794\Plan_Sheets\
FILE: SIGN DETAILS.dgn
DATE: 1/26/2024

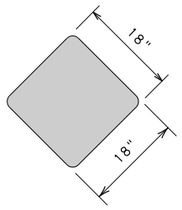
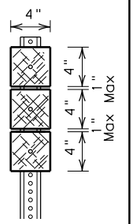
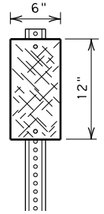
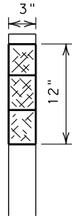
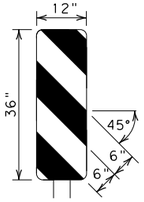
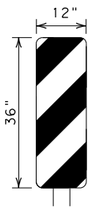
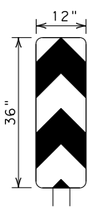
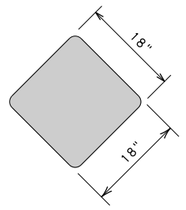
REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS

	SIZE 1	SIZE 2	SIZE 3	SIZE 4
DEVICE				
SHEETING	Yellow, White or Red Type B or C reflective sheeting			
NOTE	1. Size 1 and 4 - Direct applied reflective sheeting for use on flexible post (flx). 2. Size 2 and 3 - For use on wing channel (wc) post only. Use approved metal, plastic or fiberglass backplate with 17/64" mounting holes.			

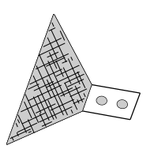
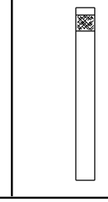
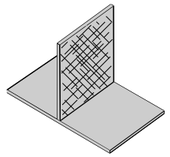
DELINEATORS

	SINGLE		DOUBLE	
DEVICE				
	1-Size 2 reflector unit	1-Size 1 reflector unit	2-Size 2 reflector units	2-Size 1 reflector units
SHEETING	Yellow, White or Red Type B or C Reflective Sheeting			
POST TYPE	WC	YFLX, WFLX	WC	YFLX, WFLX
MOUNT TYPE	GND	GND, SRF	GND	GND, SRF

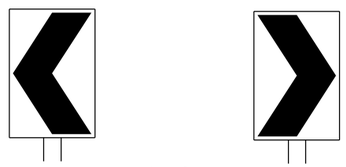
OBJECT MARKERS

	Type 1 (OM-1)	Type 2 (OM-2)			Type 3 (OM-3)			Type 4 (OM-4)
	OM-1	OM-2X	OM-2Y	OM-2Z	OM-3L	OM-3R	OM-3C	OM-4
DEVICE								
		3-Size 2 reflector units	1-Size 3 reflector unit	3-Size 1 reflector units or 1-Size 4 reflector unit				
SHEETING	Yellow-Type B_{FL} or C_{FL} Sheeting	Yellow - Type B or C Sheeting			Alternating acrylic black and retroflective yellow - Type B_{FL} or C_{FL} Sheeting			Red -Type B_{FL} or C_{FL} Sheeting
POST TYPE	TWT	WC	WC	WFLX	TWT			TWT
MOUNT TYPE	WAS, WAP	GND	GND	GND, SRF	WAS, WAP			WAS, WAP

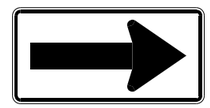
BARRIER REFLECTORS (BRF)

	GF1	GF2	CTB
DEVICE			
	1. Barrier reflectors shall meet the requirements of DMS 8600. 2. Approved Barrier Reflectors are listed on the "Barrier Reflectors" Material Producer List at: www.txdot.gov.		
SHEETING	Yellow, White, Red		
NOTE	1. Reflective sheeting shall have a minimum dimension of 3 inches and minimum surface area of 9 square inches.		

CHEVRONS

DEVICE	 W1-8			
SIZE (W x L)	18"x 24" (Conventional)	24"x 30" (Conventional Oversize)	30"x 36" (Expressway)	36" x 48" (Freeway)
MOUNTING HEIGHT	4'-0" or 7'-0"		7'-0" Only	
NOTE	1. CHEVRON (W1-8) signs and ONE DIRECTION LARGE ARROW (W1-6) Signs shall be installed per Sign Mounting Details (SMD) Standard Sheets and paid under Item 644 (Small Roadside Sign Assemblies). 2. When there is a need to increase conspicuity, the Texas version of the ONE DIRECTION LARGE ARROW sign (W1-9T) may be used instead of the ONE DIRECTION LARGE ARROW (W1-6).			

ONE DIRECTION LARGE ARROW

DEVICE	 W1-6	
SIZE (W x L)	48" x 24" (Conventional)	60" x 30" (Expressway & Freeway)
MOUNTING HEIGHT	7'-0"	

D & OM DESCRIPTIVE CODES

INSTL DEL ASSM (D-XX)SZ X (XXXX)XXX(XX)

NUMBER OF REFLECTORS
S = Single
D = Double

COLOR OF REFLECTORS
W = White
Y = Yellow
R = Red

REFLECTOR UNIT SIZE
1 or 2

TYPE OF POST OR DELINEATOR
WC = Wing Channel Post
YFLX = Yellow Flexible Post
WFLX = White Flexible Post
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

DEPARTMENTAL MATERIAL SPECIFICATIONS	
FLEXIBLE DELINEATOR & OBJECT MARKER POSTS (EMBEDDED & SURFACE MOUNT TYPES)	DMS-4400
SIGN FACE MATERIALS	DMS-8300
DELINEATORS, OBJECT MARKERS AND BARRIER REFLECTORS	DMS-8600

NOTE:

Delineator and object marker substrates and sign substrates shall be 0.080" Aluminum sign blank to conform to ASTM B-209 Alloy 6061-T6 or approved alternative.

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER MATERIAL DESCRIPTION

D & OM(1)-20

FILE: dom1-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	030	FM 794
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	YKM	GONZALES		152

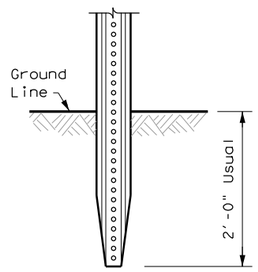
20A

DATE: 1/26/2024 $TIME$
FILE: $FILE$

POST TYPE AND SUPPORT FOUNDATION DETAILS

WING CHANNEL (WC)

GND

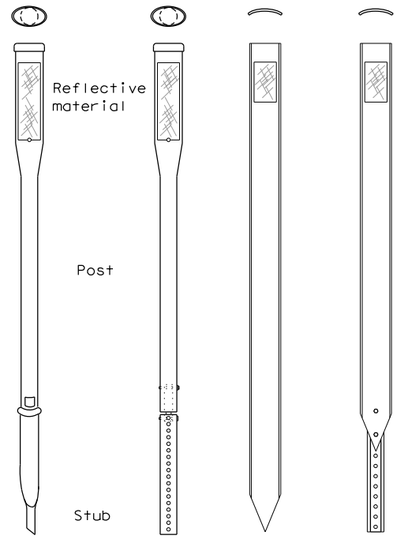


NOTES

1. Embedded Wing Channel (WC) post option may be used for Type 2 Object Markers and Delineators only.
2. 1.12 lbs/ft steel per ASTM A 1011 SS Gr. 50, or ASTM A499.

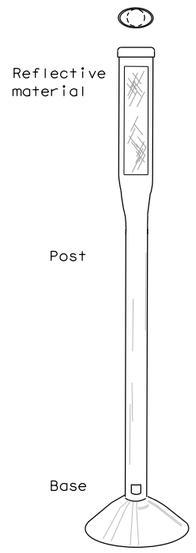
FLEXIBLE POSTS (YFLX, WFLX)

GND



EMBEDDED

SRF



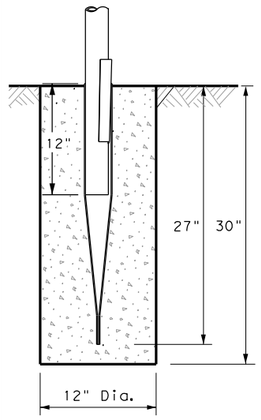
SURFACE MOUNT

NOTES

1. See "Flexible Delineator and Object Marker Posts" Material Producer List for approved devices.
2. Install per manufacturer's recommendations.
3. Post length may vary to meet field conditions.
4. When using yellow delineators with flexible posts to separate opposing direction of travel, such as centerline or median use, the flexible posts shall be yellow.

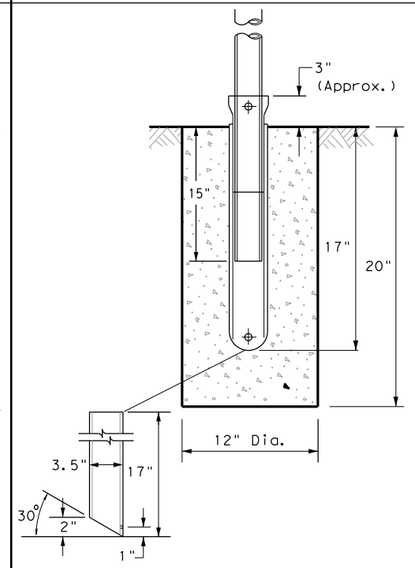
WEDGE ANCHOR SYSTEMS

WAS



STEEL

WAP



PLASTIC

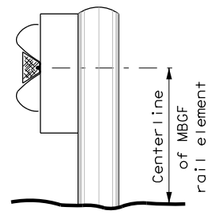
NOTE

1. Install per manufacturer's recommendations.

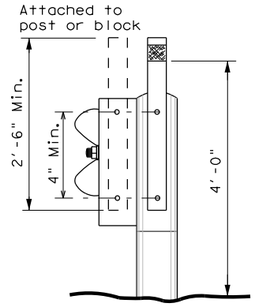
TYPE OF BARRIER MOUNTS

GUARD FENCE ATTACHMENT

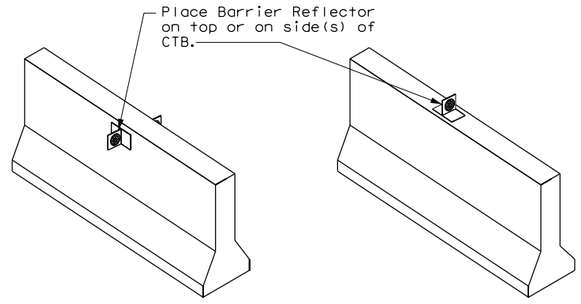
GF1



GF2



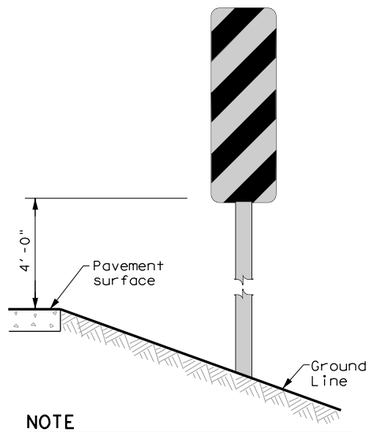
CONCRETE TRAFFIC BARRIER (CTB)



GENERAL NOTES

1. Place delineators on a section of roadway at a consistent distance from the edge of pavement.
2. Where a restriction prevents consistent placement from the pavement edge, place the affected object markers in line with the innermost edge of the obstruction.
3. When Type 2 object markers and delineators are more than 8'-0" from the edge of the pavement, it may not be possible to maintain a height of approximately 4'-0". If this is the case, place the object marker or delineator as close to the desired height as possible.
4. Install all delineators, object markers and barrier reflectors in accordance with the manufacturer's recommendation.
5. Barrier reflectors should be installed a minimum of 18 inches above the edge of the pavement surface.
6. Diagonal stripes on Type 3 object markers shall slope down toward the intended travel lane.

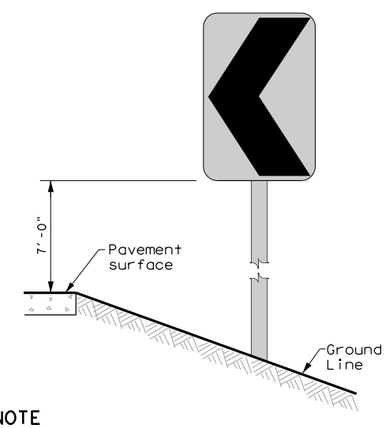
TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS



NOTE

Mounting at 4 feet to the bottom of the chevron is permitted for chevrons that will not exceed a height of 6'-6" to the top of the chevron (sizes 24" x 30" and smaller)

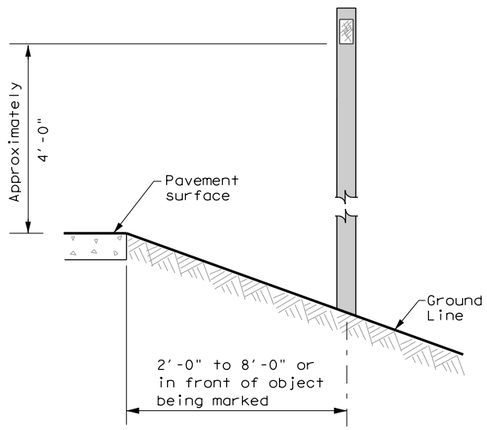
CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN



NOTE

Chevrons 30" x 36" and larger shall be mounted at a height of 7' to the bottom of the chevron. Chevron sign and ONE DIRECTION LARGE ARROW sign (W1-9T) shall be installed per SMD standard sheets and paid under item 644.

DELINEATORS AND TYPE 2 OBJECT MARKERS



See general notes 1, 2 and 3.

Texas Department of Transportation — Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER INSTALLATION

D & OM(2)-20

FILE: dom2-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	030	FM 794
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	YKM	GONZALES		153

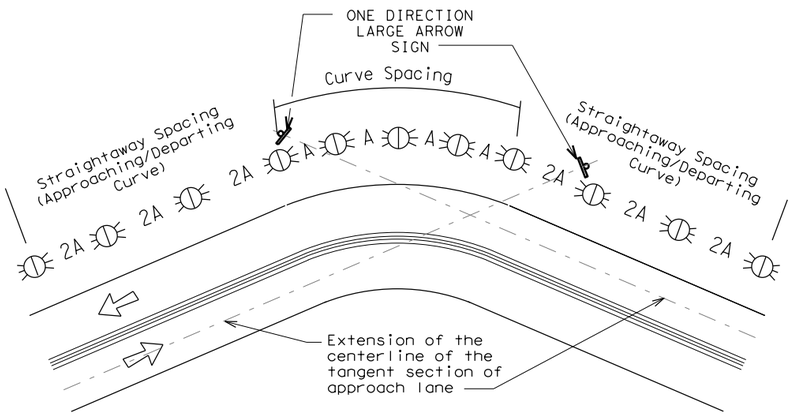
20B

DATE: 1/26/2024 $TIME$
FILE: $FILE$

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

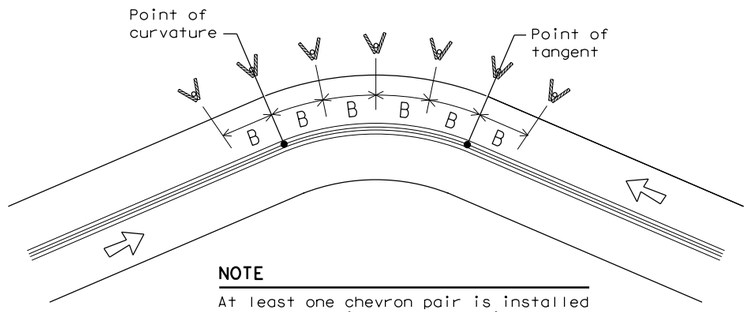
SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES



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

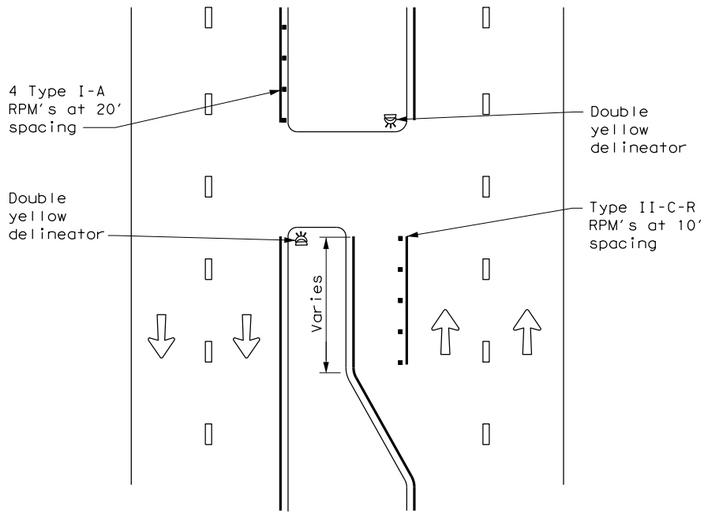
D & OM(3)-20

FILE: dom3-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	030	FM 794
3-15 8-15	DIST	COUNTY		SHEET NO.
8-15 7-20	YKM	GONZALES		154

20C

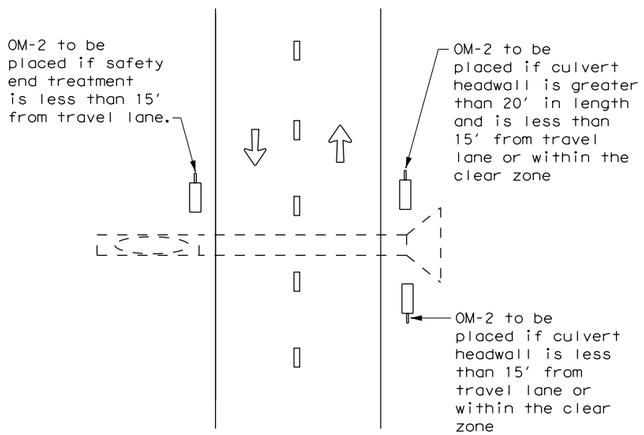
DATE: 1/26/2024 $TIME$
FILE: $FILE$

CROSSOVERS



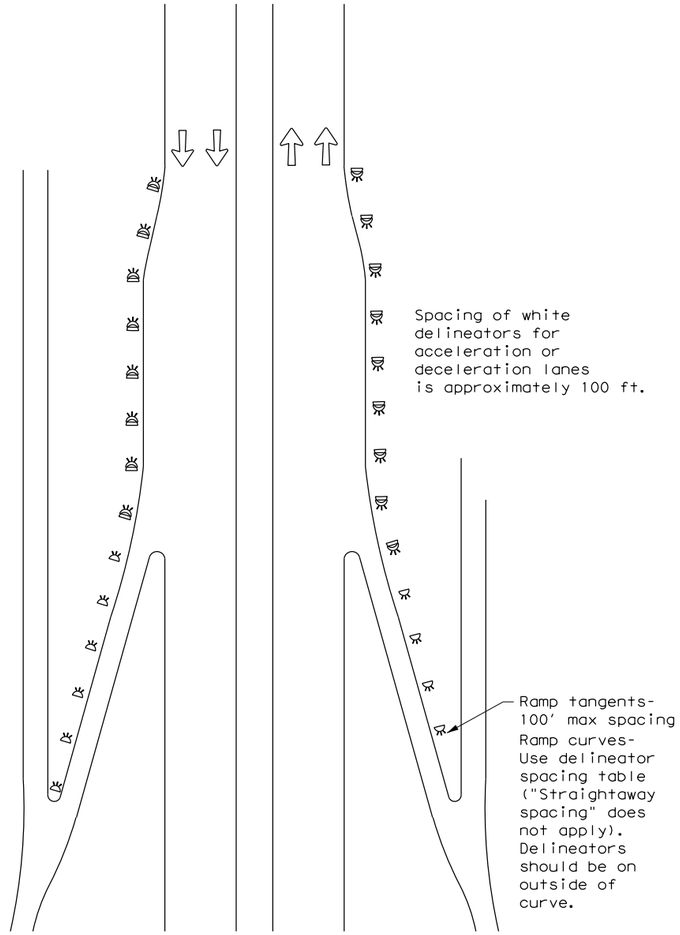
DETAIL 1

FOR CULVERTS WITHOUT MBGF



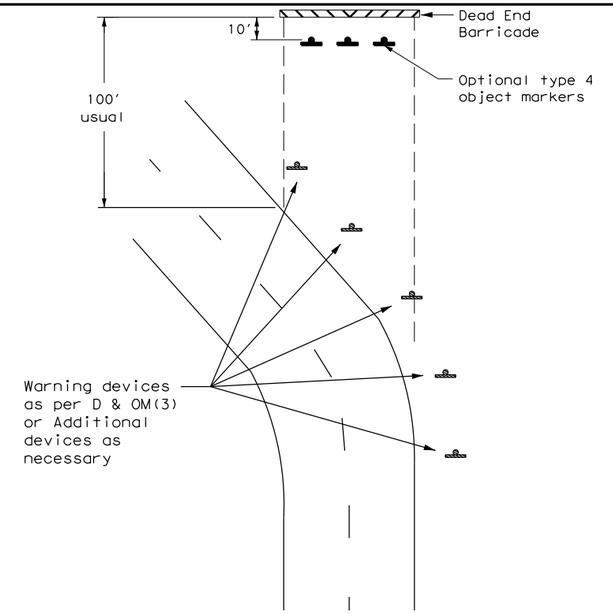
DETAIL 2

FREEWAY DELINEATION FOR RAMPS AND ACCELERATION/DECELERATION LANES



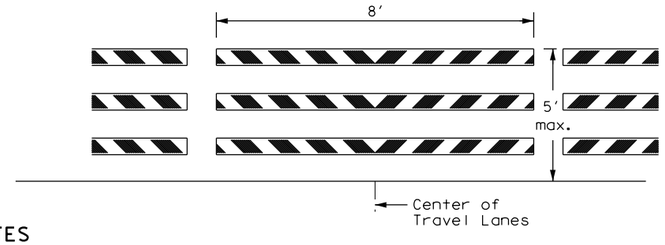
DETAIL 3

TYPICAL APPLICATION OF DEAD END BARRICADE



DETAIL 4

TYPICAL DEAD END BARRICADE INSTALLATION



NOTES

1. Barricade striping shall be red and white reflective sheeting for all permanent road closures.
2. Barricade striping is red and white sloping toward the center of the roadway.
3. Type 3 Barricade Supports should be anchored to soil or pavement as described in compliant Work Zone Traffic Control Devices List, section D.2.f and D.2.g.

DETAIL 5

LEGEND	
	Bidirectional Delineator
	Delineator
	OM-3
	Barricade
	Sign
	OM-2
	Double Delineator

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(4)-20

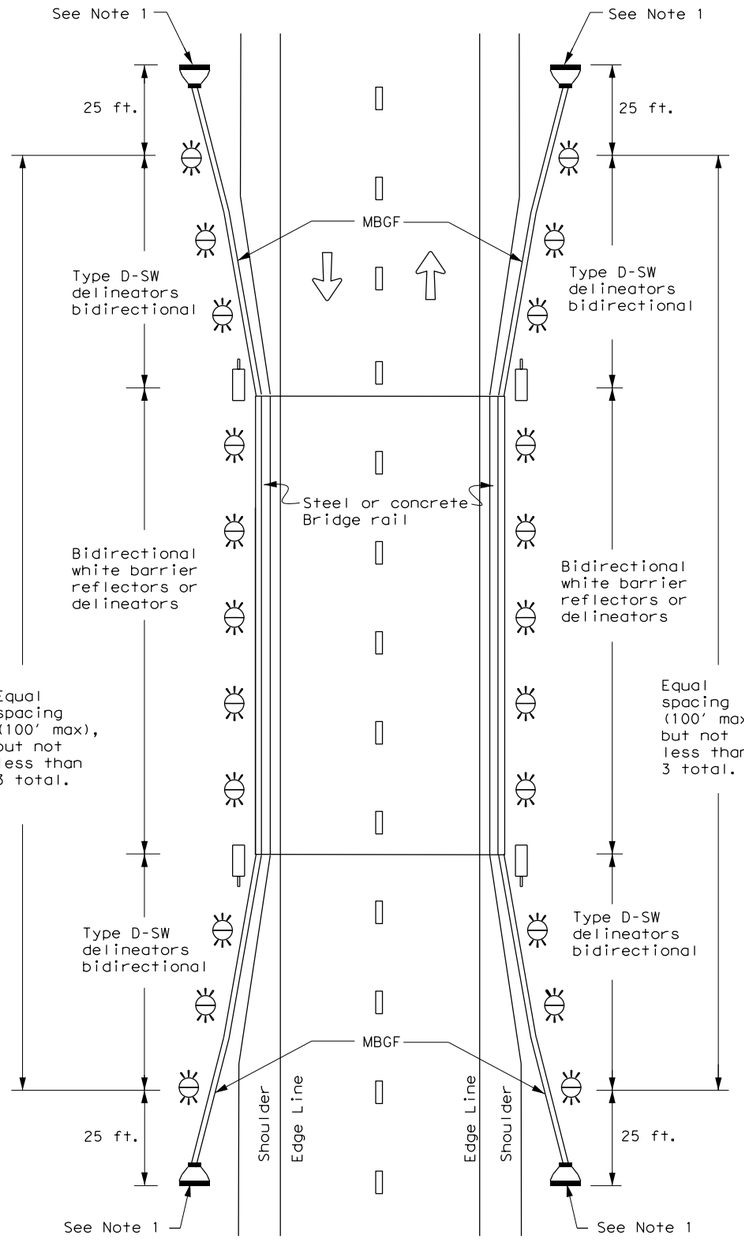
FILE: dom4-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	030	FM 794
3-15	DIST	COUNTY		SHEET NO.
7-20	YKM	GONZALES		155

20D

DATE: 1/26/2024 $TIME$
FILE: $FILE$

DATE: 1/26/2024 $TIME$
FILE: $FILE$

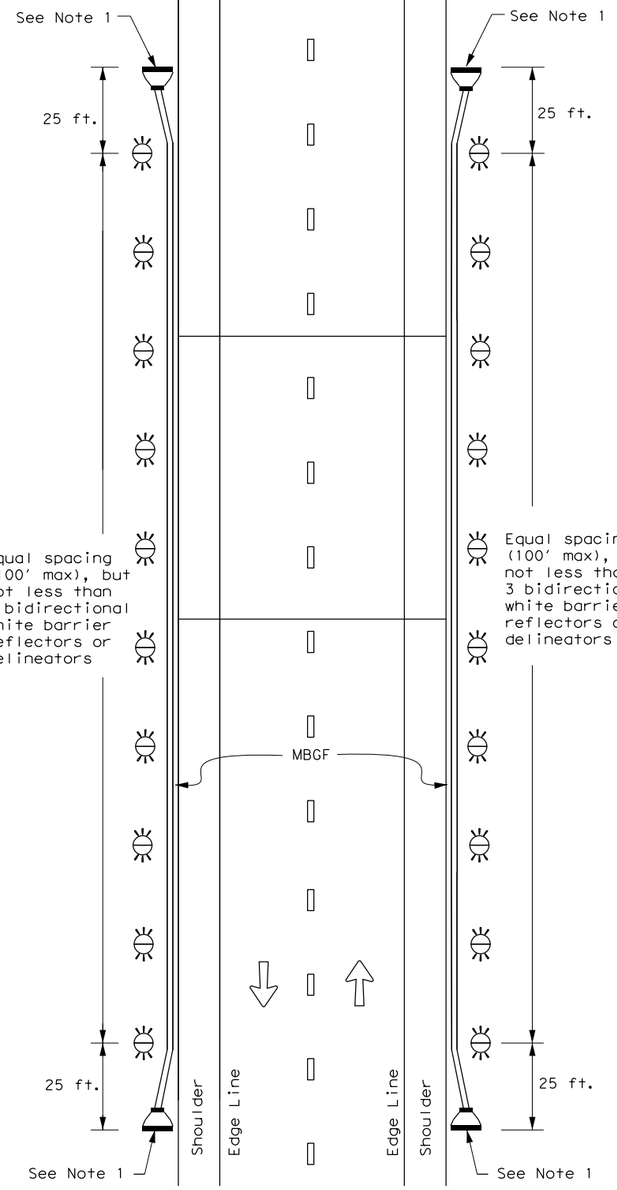
TWO-WAY, TWO LANE ROADWAY WITH REDUCED WIDTH APPROACH RAIL



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.

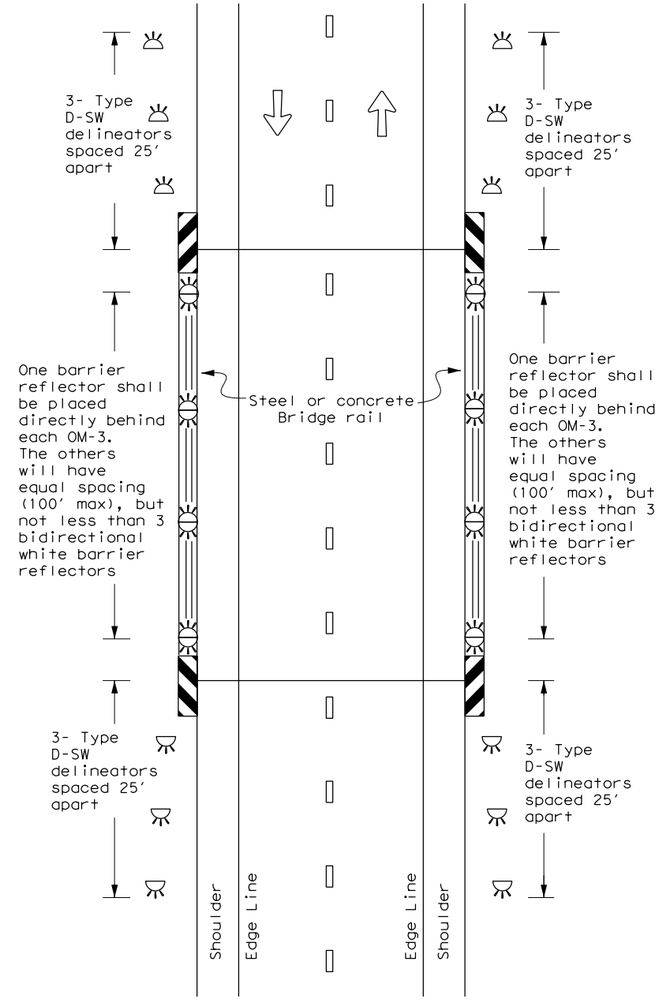
TWO-WAY, TWO LANE ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



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

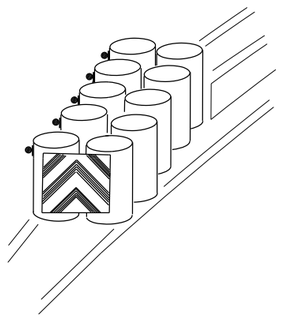
Traffic Safety Division Standard

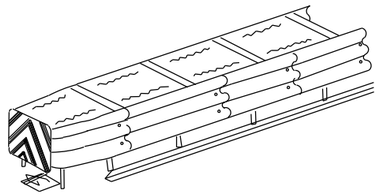
DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

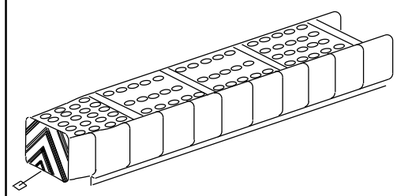
D & OM(5)-20

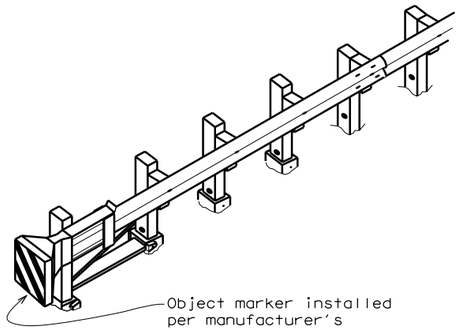
FILE: dom5-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	030	FM 794
7-20	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		156

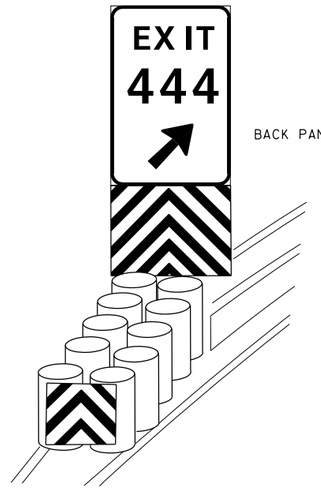
20E

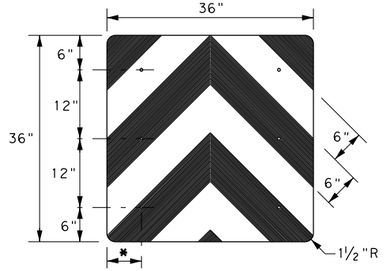


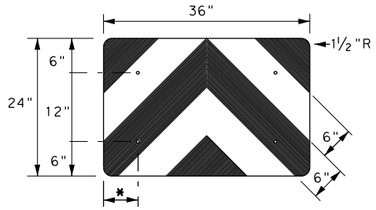




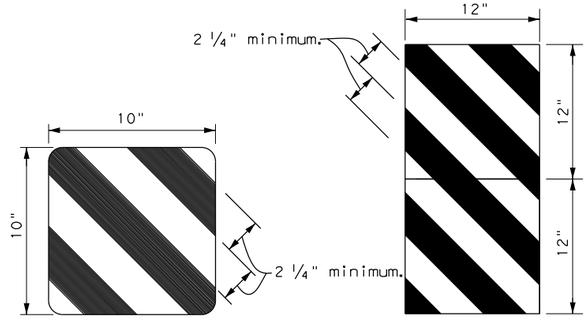




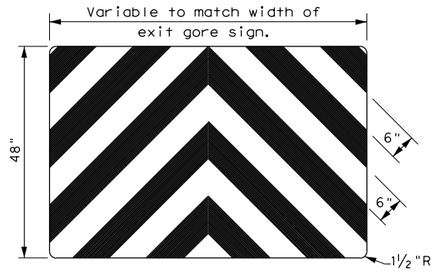


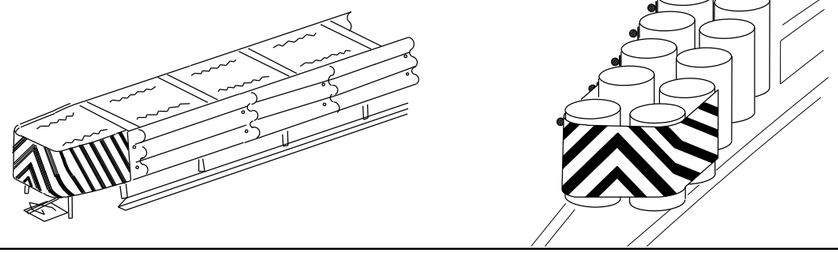


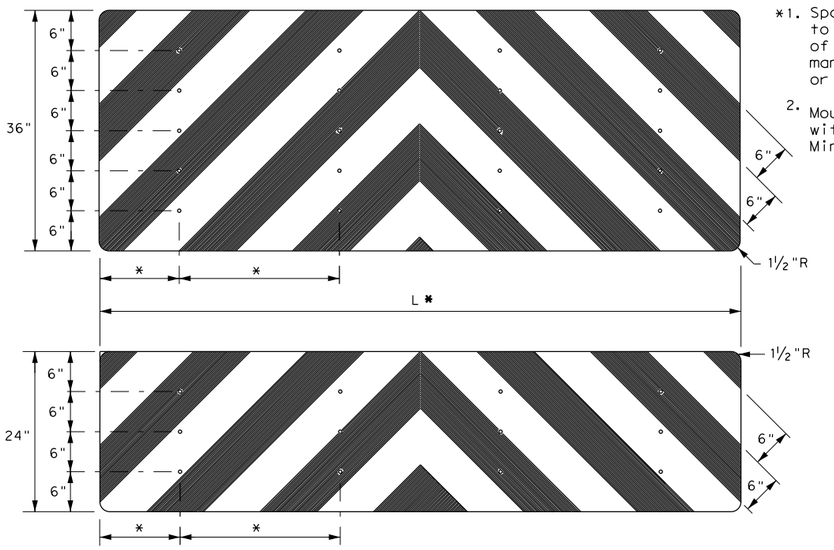
* Adjust to fit attenuator per manufacturer's recommendation, or as directed by the Engineer



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

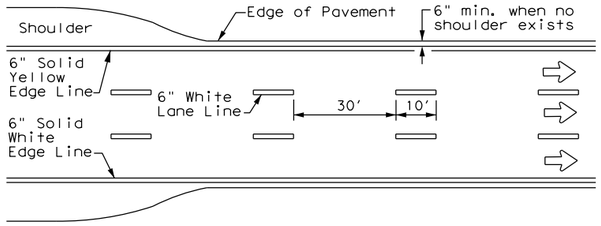
DELINEATOR & OBJECT MARKER FOR VEHICLE IMPACT ATTENUATORS

D & OM(VIA)-20

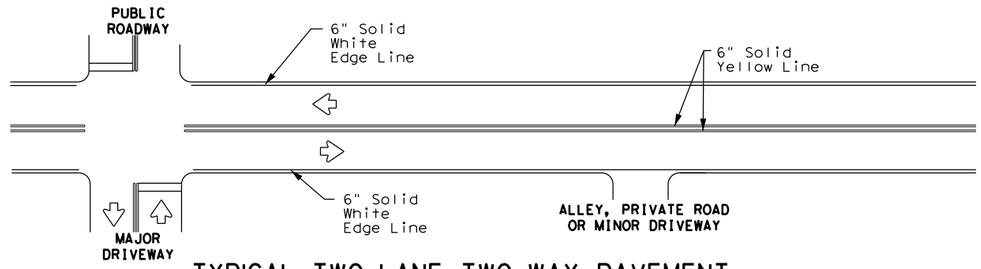
FILE: domvia20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT December 1989	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	030	FM 794
4-92 8-04	DIST	COUNTY		SHEET NO.
8-95 3-15	YKM	GONZALES		157
4-98 7-20				

20G

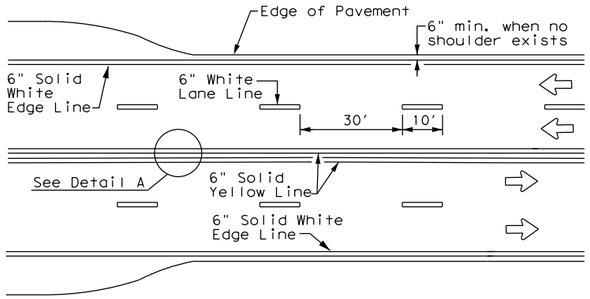
DATE: 1/26/2024 $TIME$
FILE: $FILE$

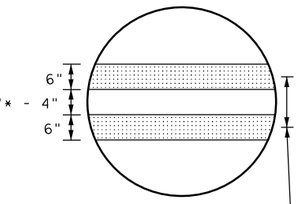


EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS



TYPICAL TWO-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS





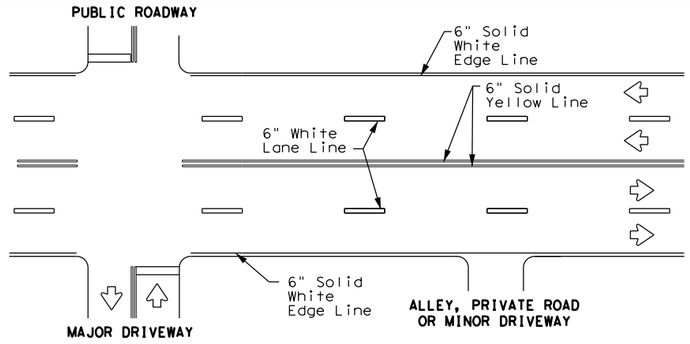
DETAIL "A"

9"** min. - 10" typ.
(18" max. for traveled way greater than 48' only)

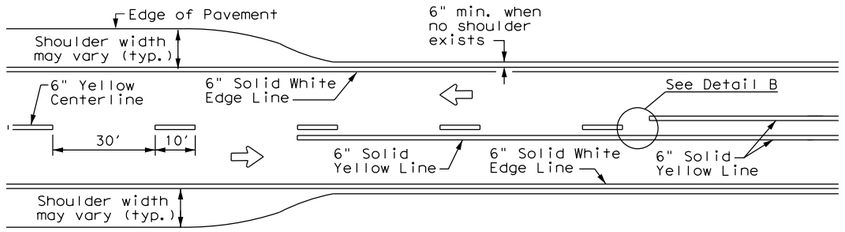
CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS

* 2" minimum for restripe projects when approved by the Engineer.

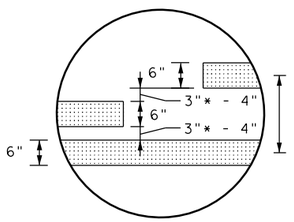
** 8" minimum for restripe projects when approved by the Engineer.



TYPICAL MULTI-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS

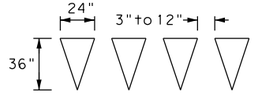


TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



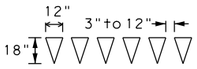
DETAIL "B"

* 2" minimum for restripe projects when approved by the Engineer.

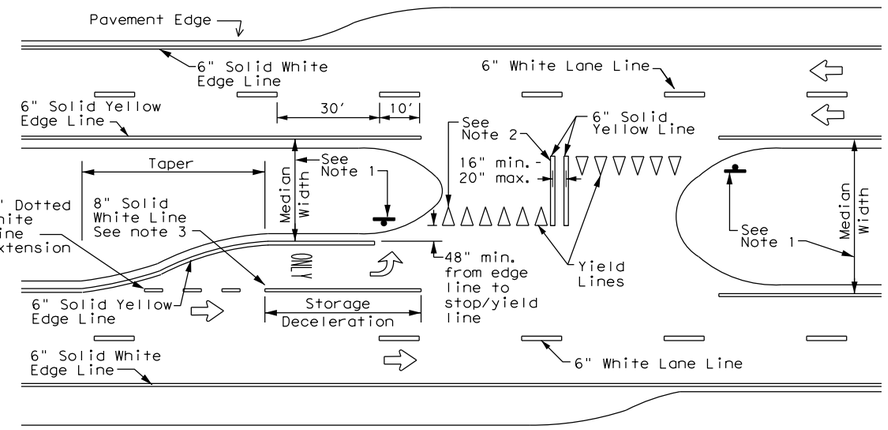


For posted speed on road being marked equal to or greater than 45 MPH.

YIELD LINES



For posted speed on road being marked equal to or less than 40 MPH.



FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

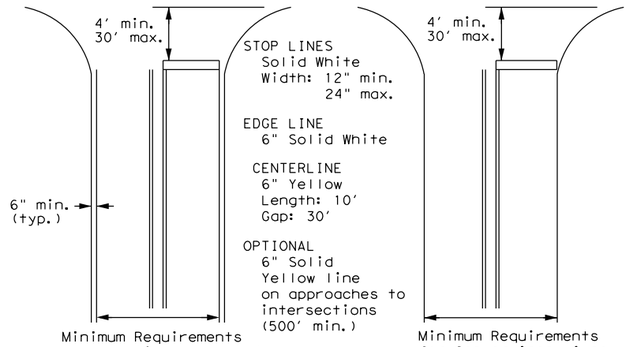
1. Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections.
   Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling width to determine if signs are required. Yield signs are the typical intersection control. Stop signs and stop bars are optional as determined by the Engineer.
2. Install median striping (double yellow centerlines and stop lines/yield lines) when a 50' or greater median centerline can be placed. Stop lines shall only be used with stop signs. Yield lines shall only be used with yield signs.
3. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

GENERAL NOTES

1. Edge line striping shall be as shown in the plans or as directed by the Engineer. The edge line should not be placed less than 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edge lines are not required in curb and gutter sections of roadways.
2. The traveled way includes only that portion of the roadway used for vehicular travel. It does not include the parking lanes, sidewalks, berms and shoulders. The traveled ways shall be measured from the center of edge line to the center of edge line of a two lane roadway.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



NOTE: Traveled way is exclusive of shoulder widths. Refer to General Note 2 for additional details.

GUIDE FOR PLACEMENT OF STOP LINES, EDGE LINE & CENTERLINE

Based on Traveled Way and Pavement Widths for Undivided Roadways

Texas Department of Transportation

Traffic Safety Division Standard

TYPICAL STANDARD PAVEMENT MARKINGS

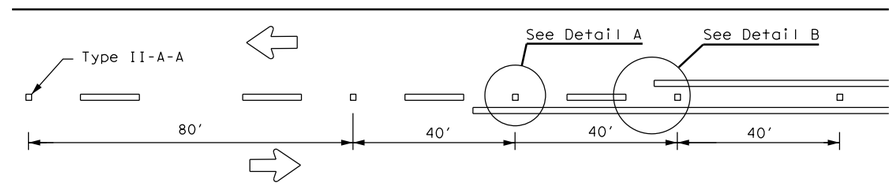
PM(1)-22

FILE: pm1-22.dgn	DN:	CK:	DW:	CK:
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	030	FM 794
11-78 8-00 6-20	DIST	COUNTY		SHEET NO.
8-95 3-03 12-22	YKM	GONZALES		158
5-00 2-12				

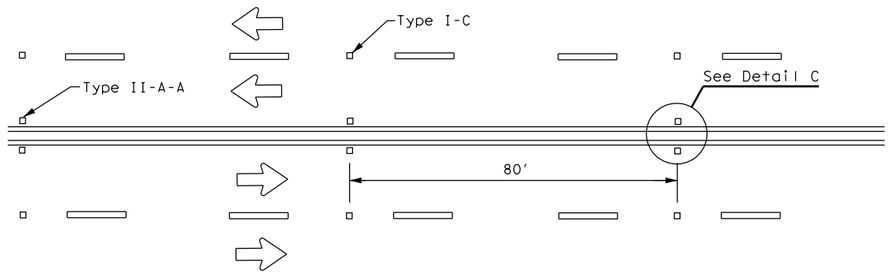
22A

DATE: 1/26/2024 $TIME$
FILE: $FILE$

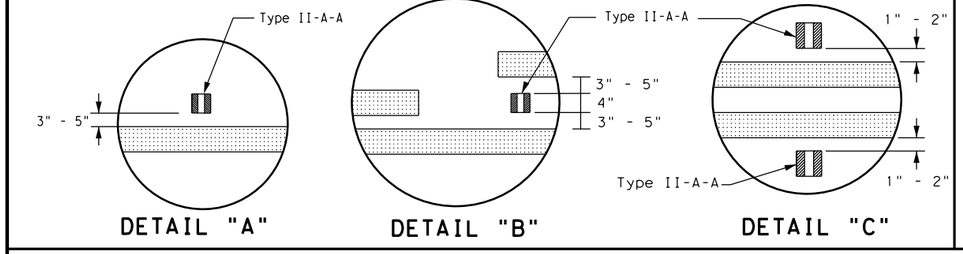
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE

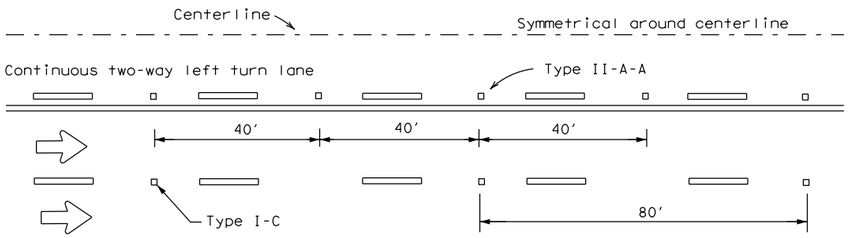


CENTERLINE FOR ALL TWO LANE TWO-WAY ROADWAYS

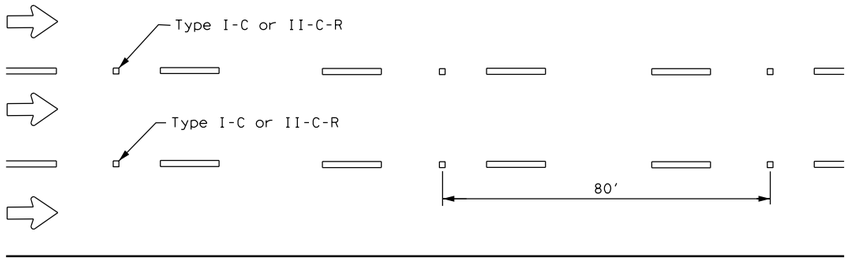


CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY ROADWAYS





CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



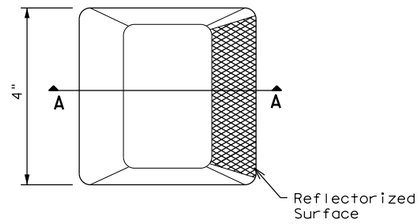
LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.

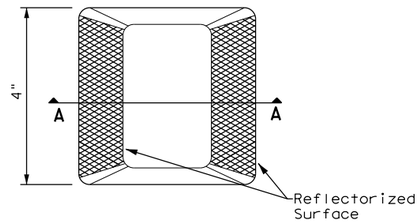
See Note 3.

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

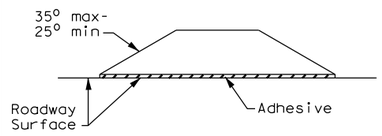
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)

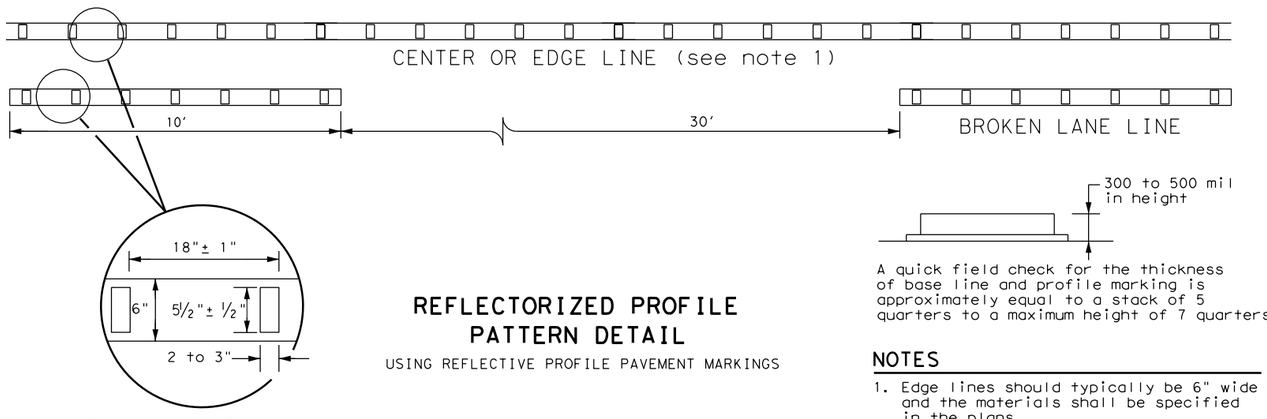


Type II (Top View)



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	1133	02	030	FM 794
4-77 8-00 6-20	DIST	COUNTY		SHEET NO.
4-92 2-10 12-22	YKM	GONZALES		159
5-00 2-12				

22B

DATE: 1/26/2024 $TIME$
FILE: $FILE$

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)

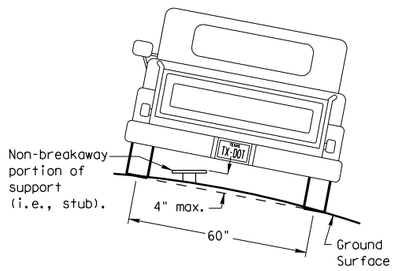
Anchor Type

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))

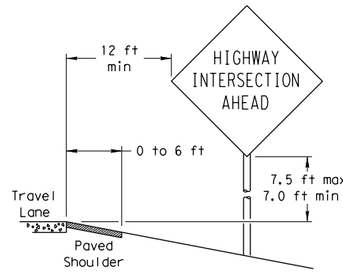
REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



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).

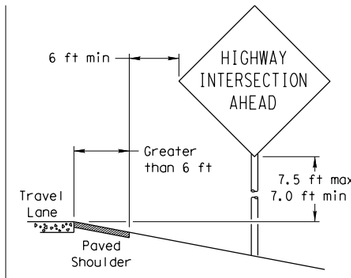
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

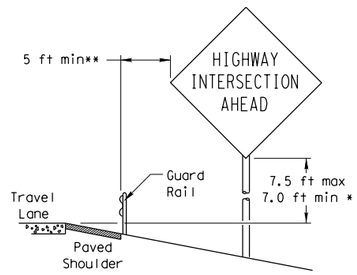
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



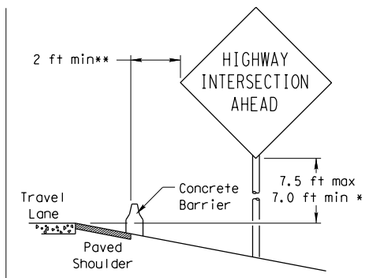
GREATER THAN 6 FT. WIDE

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.

BEHIND BARRIER



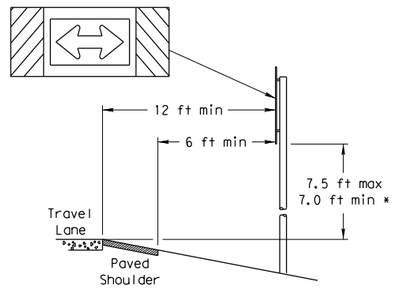
BEHIND GUARDRAIL



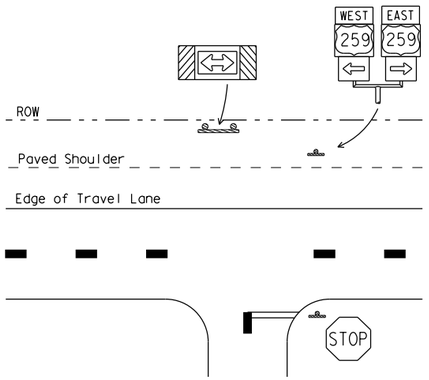
BEHIND CONCRETE BARRIER

**Sign clearance based on distance required for proper guard rail or concrete barrier performance.

T-INTERSECTION



When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.



* Signs shall be mounted using the following condition that results in the greatest sign elevation:

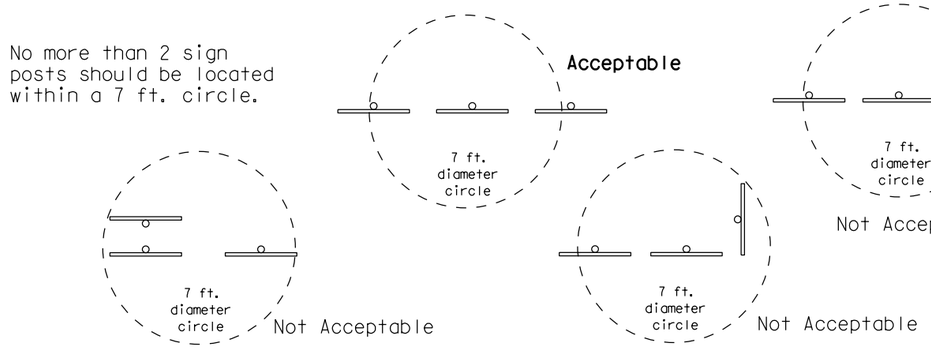
(1) a minimum of 7 to a maximum of 7.5 feet above the edge of the travel lane or

(2) a minimum of 7 to a maximum of 7.5 feet above the grade at the base of the support when sign is installed on the backslope.

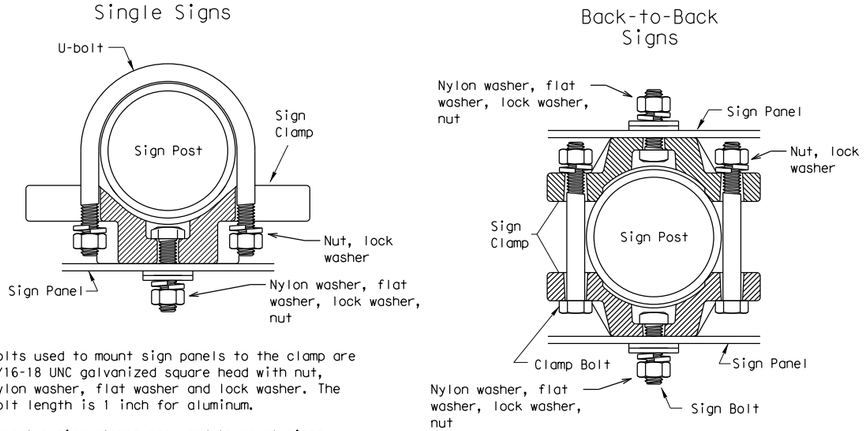
The maximum values may be increased when directed by the Engineer.

See the Traffic Operations Division website for detailed drawings of sign clamps, Triangular Slipbase System components and Wedge Anchor System components.

The website address is:
http://www.txdot.gov/publications/traffic.htm



TYPICAL SIGN ATTACHMENT DETAIL



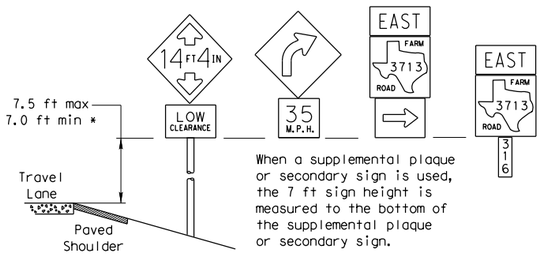
Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

When two sign clamps are used to mount signs back-to-back, use a 5/16-18 UNC galvanized hex head per ASTM A307 with nut and helical-spring lock washer. The approximate bolt lengths for various post sizes and sign clamp types are given in the table at right. The bolt length may need to be adjusted depending upon field conditions.

Sign clamps may be either the specific size clamp or the universal clamp.

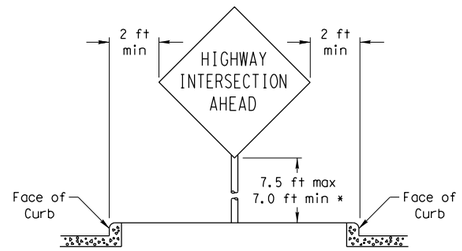
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



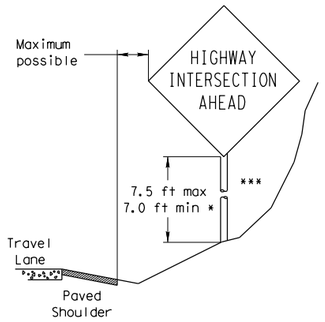
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

CURB & GUTTER OR RAISED ISLAND



RESTRICTED RIGHT-OF-WAY

(When 6 ft min. is not possible.)



Right-of-way restrictions may be created by rocks, water, vegetation, forest, buildings, a narrow island, or other factors.

In situations where a lateral restriction prevents the minimum horizontal clearance from the edge of the travel lane, signs should be placed as far from the travel lane as practical.

*** Post may be shorter if protected by guardrail or if Engineer determines the post could not be hit due to extreme slope.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

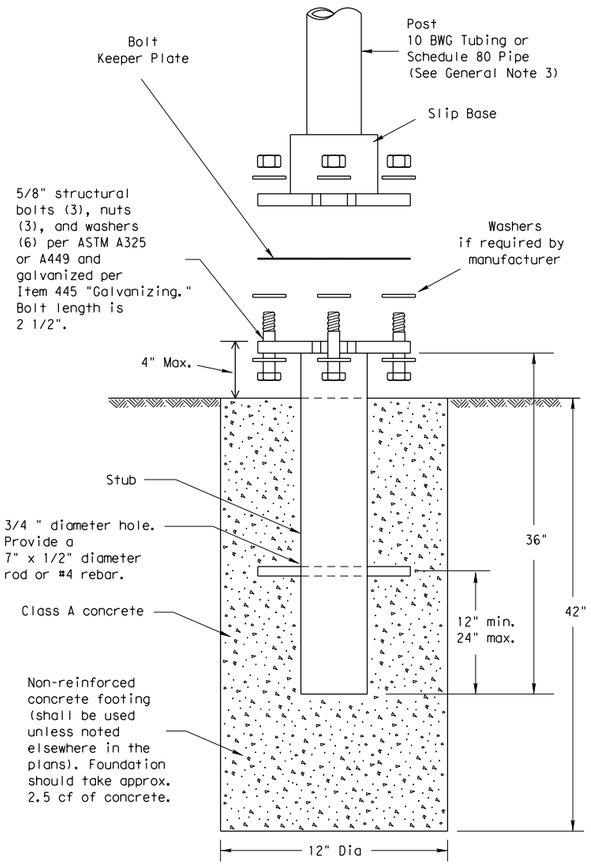
SMD(GEN)-08

REVISIONS
9-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
CONT	SECT	JOB	HIGHWAY
1133	02	030	FM 794
DIST	COUNTY		SHEET NO.
YKM	GONZALES		160

DATE: 1/26/2024 $TIME$
FILE: $FILE$

TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS



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

NOTE

There are various devices approved for the Triangular Slipbase System. Please reference the Material Producer List for approved slip base systems. http://www.txdot.gov/business/producer_list.htm The devices shall be installed per manufacturers' recommendations. Installation procedures shall be provided to the Engineer by Contractor.

GENERAL NOTES:

1. Slip base shall be permanently marked to indicate manufacturer. Method, design, and location of marking are subject to approval of the TxDOT Traffic Standards Engineer.
2. Material used as post with this system shall conform to the following specifications:
   10 BWG Tubing (2.875" outside diameter)
   - 0.134" nominal wall thickness
   - Seamless or electric-resistance welded steel tubing or pipe
   - Steel shall be HSLAS Gr 55 per ASTM A1011 or ASTM A1008
   - Other steels may be used if they meet the following:
     - 55,000 PSI minimum yield strength
     - 70,000 PSI minimum tensile strength
     - 20% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of 0.122" to 0.138"
   - Outside diameter (uncoated) shall be within the range of 2.867" to 2.883"
   - Galvanization per ASTM A123 or ASTM A653 G210. For precoated steel tubing (ASTM A653), recoat tube outside diameter weld seam by metallizing with zinc wire per ASTM B833.

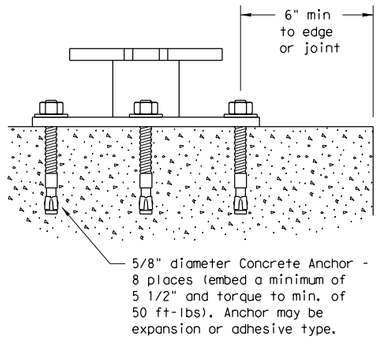
   Schedule 80 Pipe (2.875" outside diameter)
   - 0.276" nominal wall thickness
   - Steel tubing per ASTM A500 Gr C
   - Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the following:
     - 46,000 PSI minimum yield strength
     - 62,000 PSI minimum tensile strength
     - 21% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of 0.248" to 0.304"
   - Outside diameter (uncoated) shall be within the range of 2.855" to 2.895"
   - Galvanization per ASTM A123
3. See the Traffic Operations Division website for detailed drawings of sign clamps and Texas Universal Triangular Slipbase System components. The website address is: http://www.txdot.gov/publications/traffic.htm
4. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.

ASSEMBLY PROCEDURE

Foundation
1. Prepare 12-inch diameter by 42-inch deep hole. If solid rock is encountered, the depth of the foundation may be reduced such that it is embedded a minimum of 18 inches into the solid rock.
2. The Engineer may permit batches of concrete less than 2 cubic yards to be mixed with a portable, motor-driven concrete mixer. For small placements less than 0.5 cubic yards, hand mixing in a suitable container may be allowed by Engineer. Concrete shall be Class A.
3. Push the pipe end of the slip base stub into the center of the concrete. Rotate the stub back and forth while pushing it down into the concrete to assure good contact between the concrete and stub. Continue to work the stub into the concrete until it is between 2 to 4 inches above the ground.
4. Plumb the stub. Allow a minimum of 4 days to set, unless otherwise directed by the Engineer.
5. The triangular slipbase system is multidirectional and is designed to release when struck from any direction.

Support
1. Cut support so that the bottom of the sign will be 7 to 7.5 feet above the edge of the travelway (i.e., edge of the closest lane) when slip plate is below the edge of pavement or 7 to 7.5 feet above slip plate when the slip plate is above the edge of the travelway. The cut shall be plumb and straight.
2. Attach sign to support using connections shown. When multiple signs are installed on the same support, ensure the minimum clearance between each sign is maintained. See SMD(SLIP-2) for clearances based on sign types.

CONCRETE ANCHOR



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

Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. Heavy hex nut per ASTM A563, and hardened washer per ASTM F436. The stud bolt shall have a minimum yield and ultimate tensile strength of 50 and 75 KSI, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Adhesive type anchors shall have stud bolts installed with Type III epoxy per DMS-6100, "Epoxies and Adhesives." Adhesive anchors may be loaded after adequate epoxy cure time per the manufacturer's recommendations. Top of bolt shall extend at least flush with top of the nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 5 1/2" minimum embedment, shall have a minimum allowable tension and shear of 3900 and 3100 psi, respectively.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

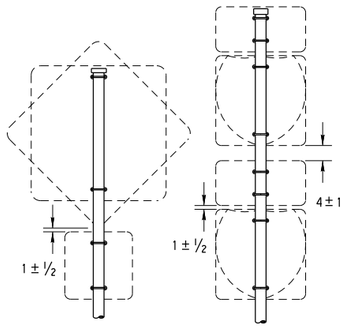
SMD(SLIP-1)-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
REVISIONS 9-08			

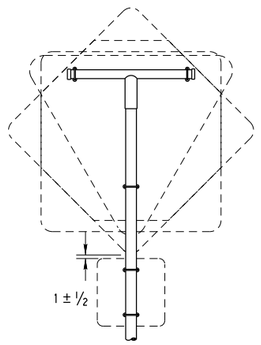
CONT	SECT	JOB	HIGHWAY
1133	02	030	FM 794

DIST	COUNTY	SHEET NO.
YKM	GONZALES	161

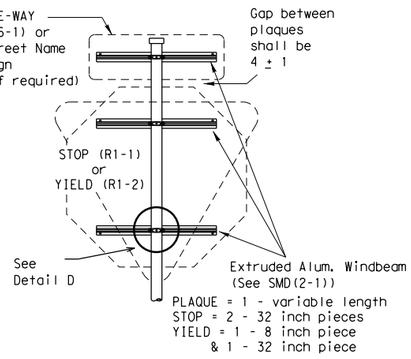
DATE: 1/26/2024 $TIME$
FILE: $FILE$



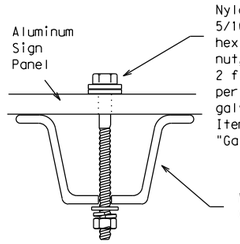
SM RD SGN ASSM TY XXXXX(1)XX(P)



SM RD SGN ASSM TY XXXXX(1)XX(T)

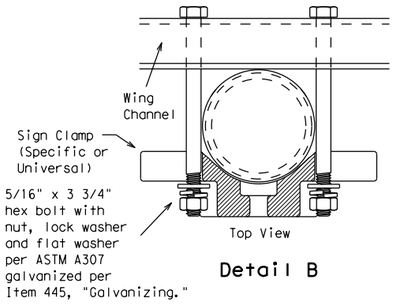


SM RD SGN ASSM TY XXXXX(1)XX(P-BM)



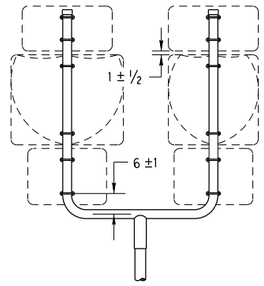
Top View

Detail A

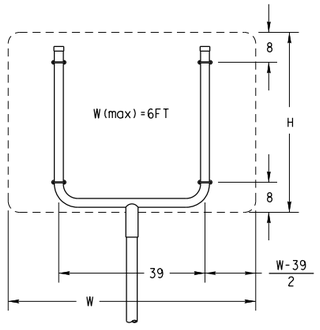


Top View

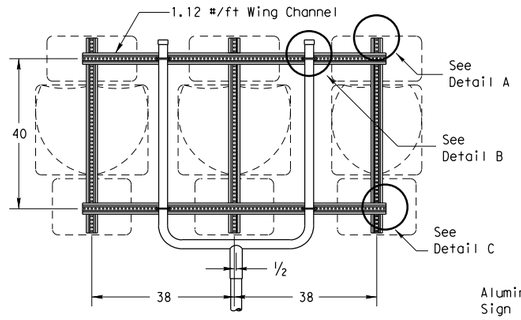
Detail B



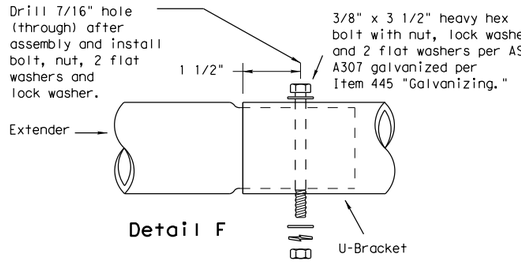
SM RD SGN ASSM TY XXXXX(1)XX(U)



SM RD SGN ASSM TY XXXXX(1)XX(U)

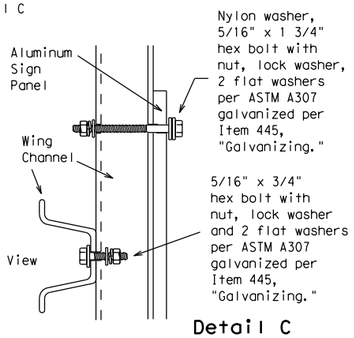


SM RD SGN ASSM TY XXXXX(1)XX(U-WC)
(See Note 11)

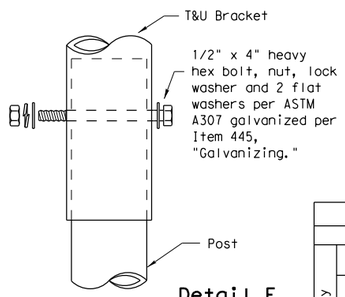


Detail F

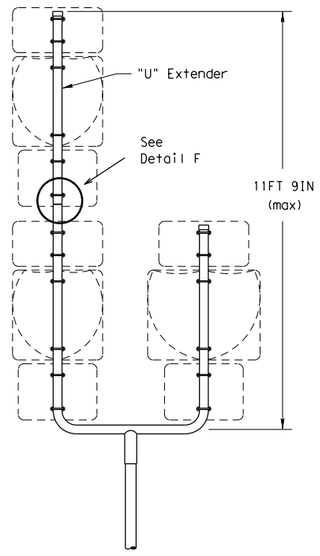
Splices shall only be allowed behind the sign substrate.



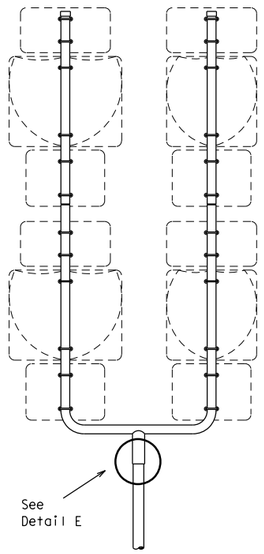
Detail C



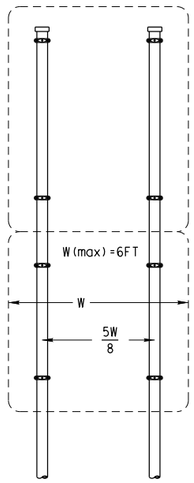
Detail E



SM RD SGN ASSM TY S80(1)XX(U-1EXT)

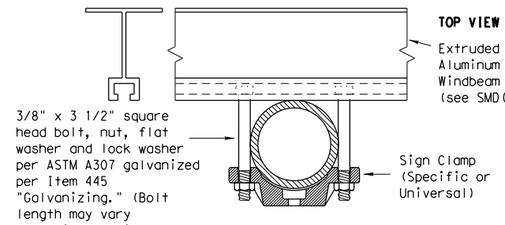


SM RD SGN ASSM TY S80(1)XX(U-2EXT)

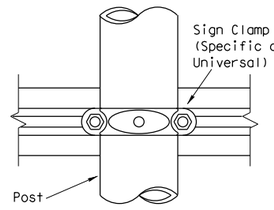


SM RD SGN ASSYM TY XXXXX(2)XX(P)

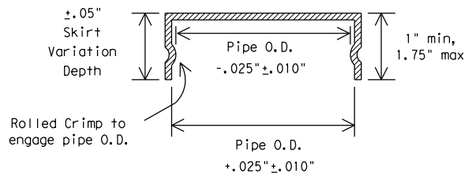
SIDE VIEW



Detail D



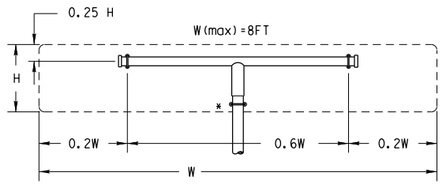
FRICTION CAP DETAIL



Friction caps may be manufactured from hot rolled or cold rolled steel sheets. The minimum sheet metal thickness shall be 24 gauge for all cap sizes.

The rim edges shall be reasonably straight and smooth. Caps shall be sized and formed in such a manner as to produce a drive-on friction fit and have no tendency to rock when seated on the pipe. The depth shall be sufficient to give positive protection against entrance of rainwater. They shall be free of sharp creases or indentations and show no evidence of metal fracture.

Caps shall have an electrodeposited coating of zinc in accordance with the requirements of ASTM B633 Class FE/ZN 8.



SM RD SGN ASSM TY XXXXX(1)XX(T)
(* - See Note 12)

All dimensions are in english unless detailed otherwise.

GENERAL NOTES:

1.

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Additional route markers may be added vertically, provided the total sign area does not exceed the maximum allowable amount per Note 1.
11. Additional sign clamp required on the "T-bracket" post for 24 inch height signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.
13. Sign blanks shall be the sizes and shapes shown on the plans.

REQUIRED SUPPORT

	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-2)-08

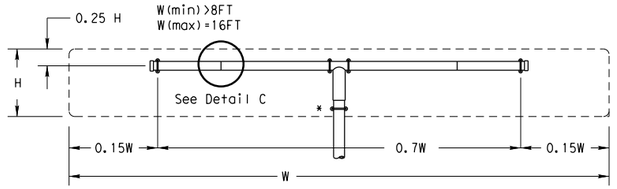
DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS	CONT	SECT	JOB	HIGHWAY
9-08	1133	02	030	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		162

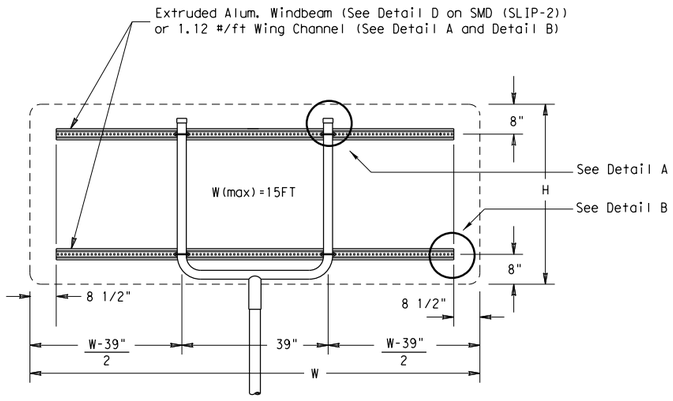
26C

DATE: 1/26/2024 $TIME$
FILE: $FILE$

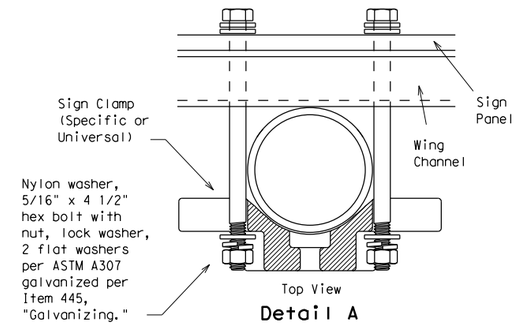
DATE:
FILE:



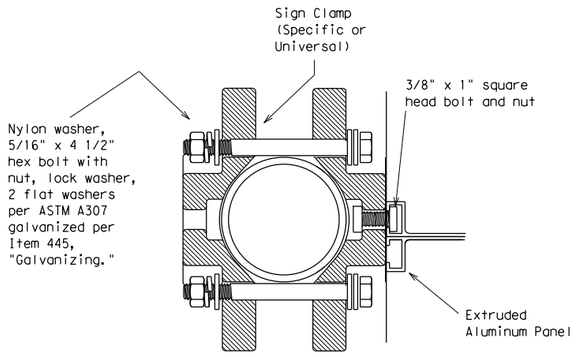
SM RD SGN ASSM TY XXXXX(1)XX(T-2EXT)
(* - See Note 12)



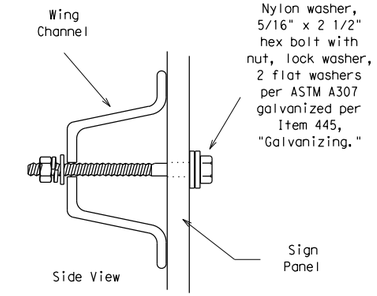
SM RD SGN ASSM TY XXXXX(1)XX(U-XX)



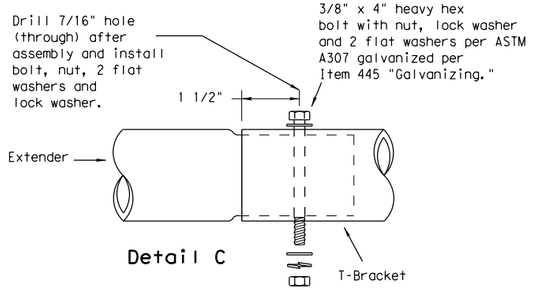
Detail A



Detail D
EXTRUDED ALUMINUM SIGN WITH T BRACKET

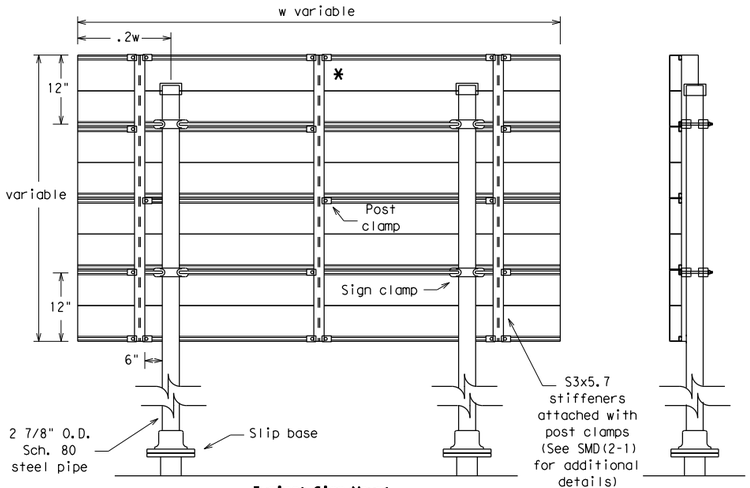


Detail B



Detail C

Splices shall only be allowed behind the sign substrate.

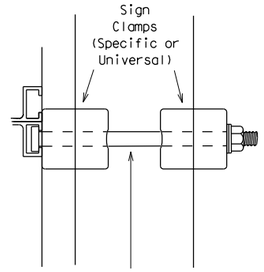


Typical Sign Mount

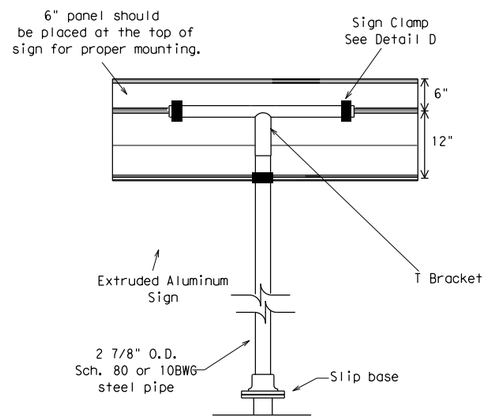
SM RD SGN ASSM TY S80(2)XX(P-EXAL)

* Additional stiffener placed at approximate center of signs when sign width is greater than 10'.

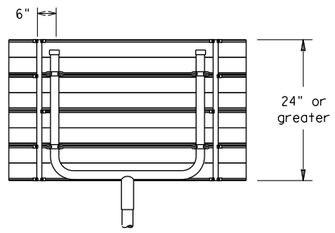
See Detail E
for clamp installation



Detail E



Extruded Aluminum Sign
With T Bracket



Use Extruded Alum. Windbeam as stiffeners
See SMD (2-1) for additional details

See Detail E
for clamp installation

GENERAL NOTES:

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Sign blanks shall be the sizes and shapes shown on the plans.
11. Additional sign clamp required on the "T-bracket" post for 24 inch high signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.

REQUIRED SUPPORT

	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-3)-08

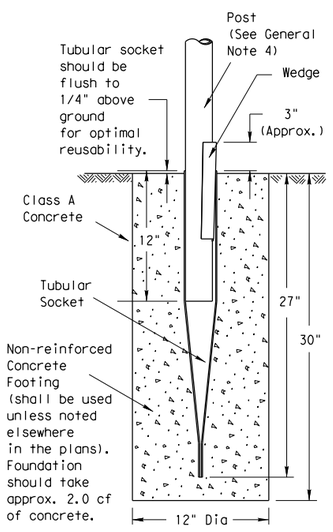
REVISIONS
9-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

CONT	SECT	JOB	HIGHWAY
1133	02	030	FM 794

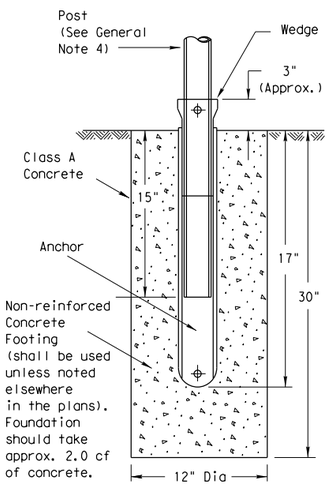
DIST	COUNTY	SHEET NO.
YKM	GONZALES	163

Wedge Anchor Steel System



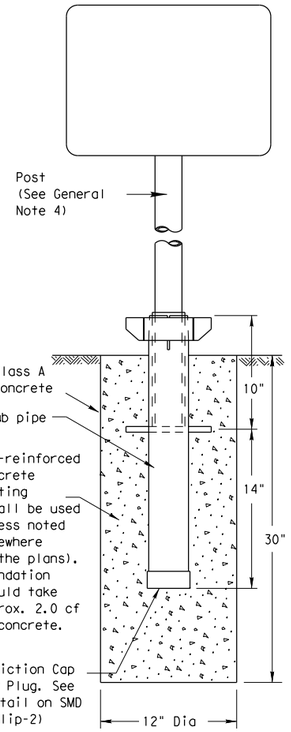
SM RD SGN ASSM TY TWT(X)WS(X)

Wedge Anchor High Density Polyethylene (HDPE) System

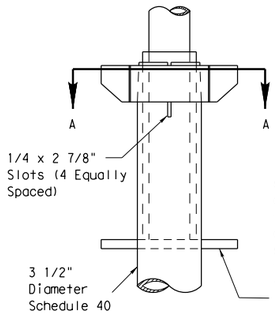


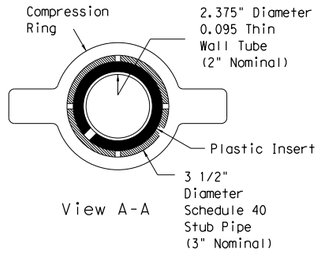
SMD RD SGN ASSM TY TWT(X)WP(X)

Universal Anchor System with Thin-Walled Tubing Post



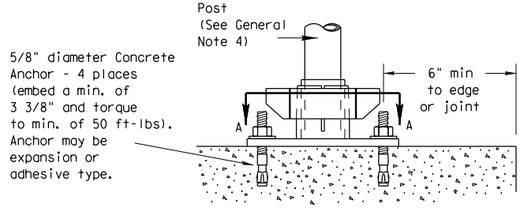
SM RD SGN ASSM TY TWT(X)UA(P)



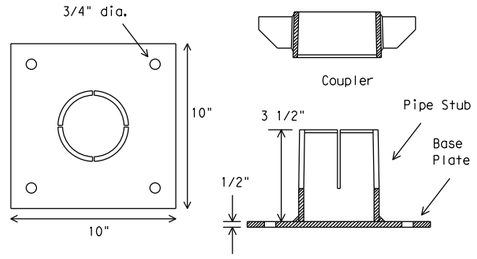


View A-A

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.

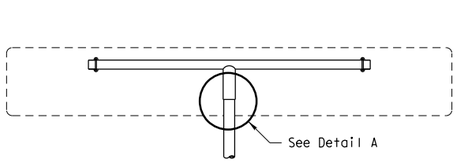


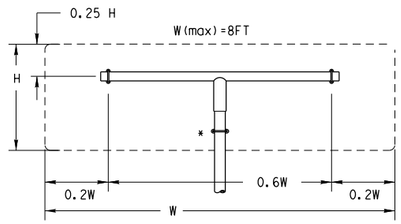
Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. A heavy hex nut per ASTM A563 and hardened washer per ASTM F436. The stud bolt shall have minimum yield and ultimate tensile strengths of 50 and 75 ksi, respectively. Nuts, bolts and washers shall be galvanized 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)

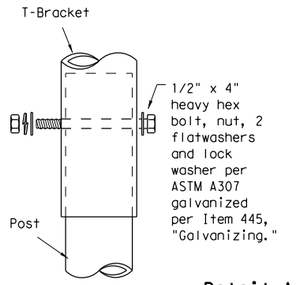
Sign Installation Using a Prefabricated T-Bracket for Thin-Wall Tubing Post





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

REVISIONS	CONT	SECT	JOB	HIGHWAY
9-08	1133	02	030	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		164

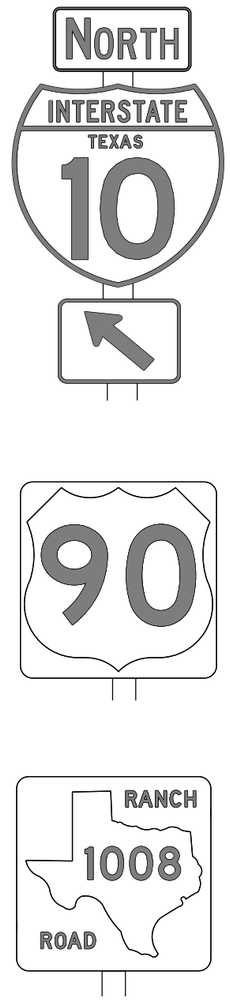
26E

DATE: 1/26/2024 $TIME$
FILE: $FILE$

DATE: 1/26/2024 $TIME$
FILE: $FILE$

REQUIREMENTS FOR INDEPENDENT MOUNTED ROUTE SIGNS

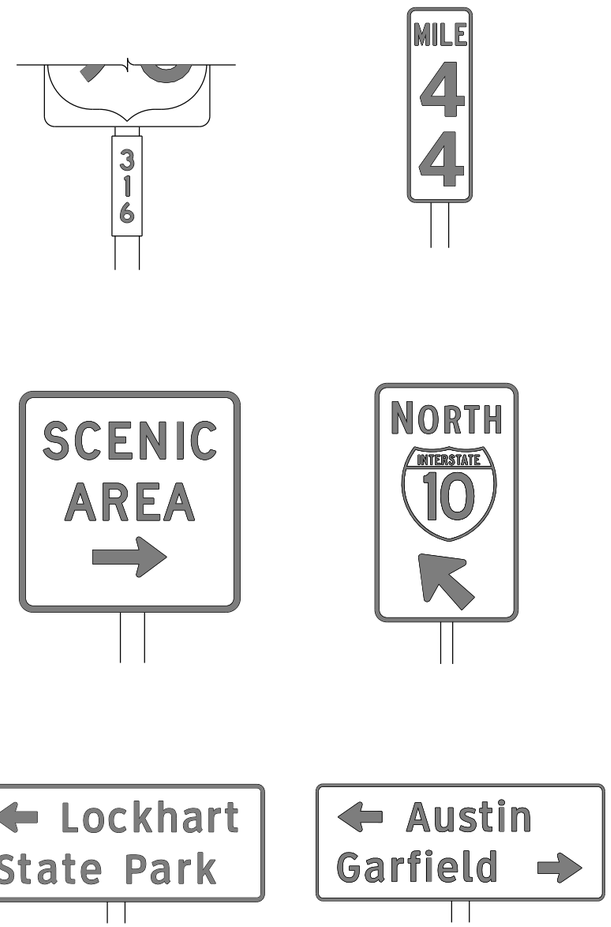
SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE A SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & BORDERS	ALL OTHERS	TYPE B or C SHEETING



TYPICAL EXAMPLES

REQUIREMENTS FOR BLUE, BROWN & GREEN D AND I SERIES GUIDE SIGNS

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	ALL	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE D SHEETING
LEGEND, SYMBOLS & BORDERS	ALL OTHERS	TYPE B OR C SHEETING



TYPICAL EXAMPLES

GENERAL NOTES

1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).

2. White legend shall use the Clearview Alphabet. The following Clearview fonts shall be used to replace the existing white Federal Highway Administration (FHWA) Standard Highway Alphabets, when not specified in the SHSD, or in the plans.

B	CV-1W
C	CV-2W
D	CV-3W
E	CV-4W
Emod	CV-5WR
F	CV-6W

3. Route sign legend (ie. IH, US, SH and FM shields) shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets B, C, D, E, Emod or F).

4. Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.

5. Independent mounted route sign with white or colored legend and borders shall be applied by screening process with transparent color ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof. White legend, symbols and borders on all other signs shall be cut-out white sheeting applied to colored background sheeting.

6. Information regarding borders and radii for signs is found in the "Standard Highway Sign Designs for Texas". Dimensions shown and described for borders and corner radii on parent sign are nominal. Borders may vary in width as much as 1/2 inch. Corner radii above 3 inches may vary in width as much as 1 inch. Borders and corner radii within a parent sign must be of matching widths. The sign area outside the corner radius should be trimmed or rounded.

7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.

8. Mounting details of roadside signs are shown in the "SMD series" Standard Plan Sheets.

DEPARTMENTAL MATERIAL SPECIFICATIONS	
ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300

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

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

http://www.txdot.gov/

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

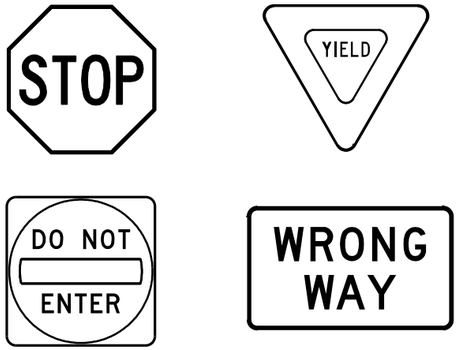
TSR(3)-13

FILE: tsr3-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	030	FM 794
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	YKM	GONZALES		165

DATE: 1/26/2024 $TIME$
FILE: $FILE$

REQUIREMENTS FOR RED BACKGROUND REGULATORY SIGNS

(STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)



REQUIREMENTS FOR FOUR SPECIFIC SIGNS ONLY

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	WHITE	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE B OR C SHEETING
LEGEND	RED	TYPE B OR C SHEETING

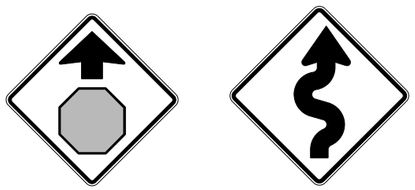
REQUIREMENTS FOR WHITE BACKGROUND REGULATORY SIGNS

(EXCLUDING STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)

TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND, BORDERS AND SYMBOLS	ALL OTHER	TYPE B OR C SHEETING

REQUIREMENTS FOR WARNING SIGNS



TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	FLOURESCENT YELLOW	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & SYMBOLS	ALL OTHER	TYPE B OR C SHEETING

REQUIREMENTS FOR SCHOOL SIGNS

TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	FLOURESCENT YELLOW GREEN	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
SYMBOLS	RED	TYPE B OR C SHEETING

GENERAL NOTES

1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).
2. Sign legend shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets (B, C, D, E, Emod or F).
3. Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.
4. Black legend and borders shall be applied by screening process or cut-out acrylic non-reflective black film to background sheeting, or combination thereof.
5. White legend and borders shall be applied by screening process with transparent colored ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof.
6. Colored legend shall be applied by screening process with transparent colored ink, transparent colored overlay film or colored sheeting to background sheeting, or combination thereof.
7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.
8. Mounting details for roadside mounted signs are shown in the "SMD series" Standard Plan Sheets.

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

DEPARTMENTAL MATERIAL SPECIFICATIONS	
ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300

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

http://www.txdot.gov/

Texas Department of Transportation

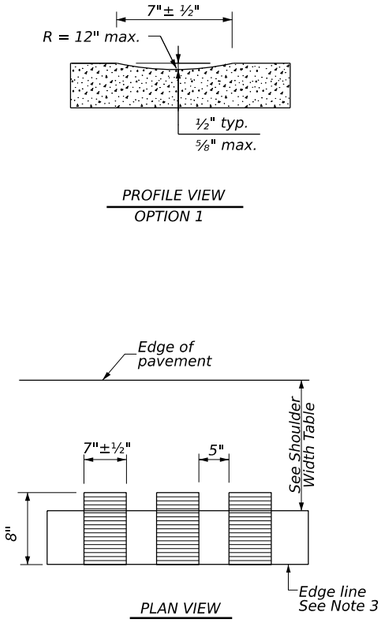
Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

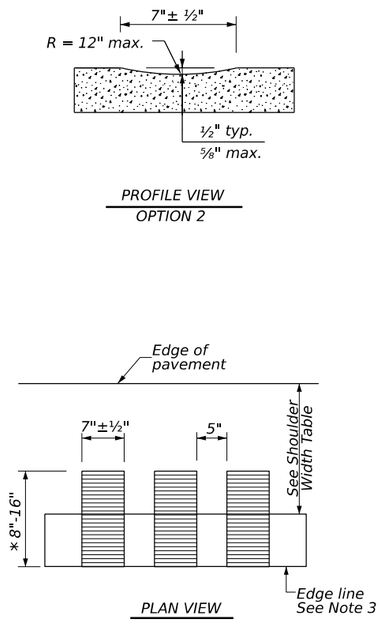
TSR(4)-13

FILE: tsr4-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	030	FM 794
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	YKM	GONZALES		166

DATE: 1/26/2024 $TIME$
FILE: $FILE$

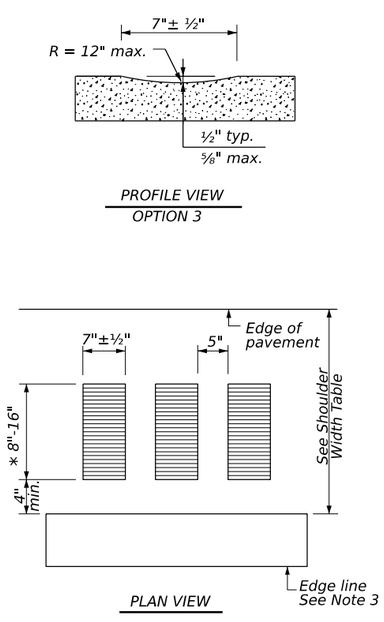


CONTINUOUS MILLED DEPRESSIONS (Rumble Strips)



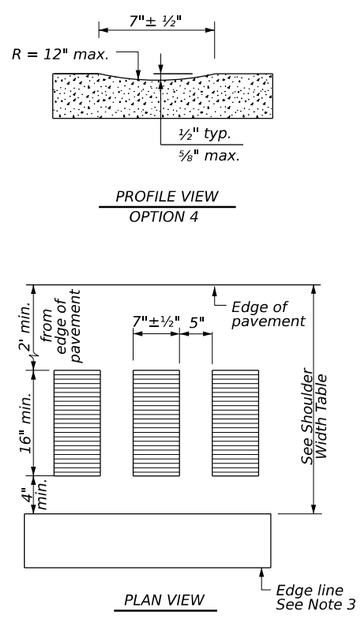
∗ This distance may vary based on width of shoulder

CONTINUOUS MILLED DEPRESSIONS (Rumble Strips)

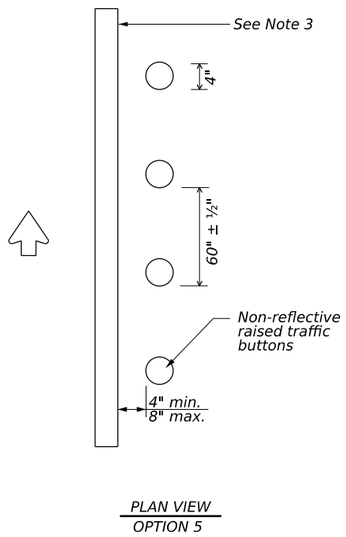


∗ This distance may vary based on width of shoulder

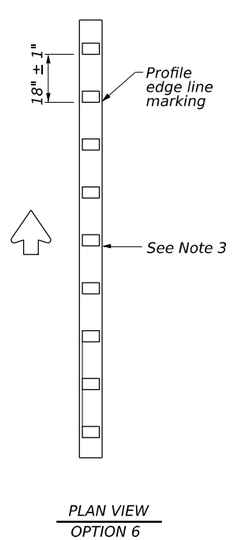
CONTINUOUS MILLED DEPRESSIONS (Rumble Strips)



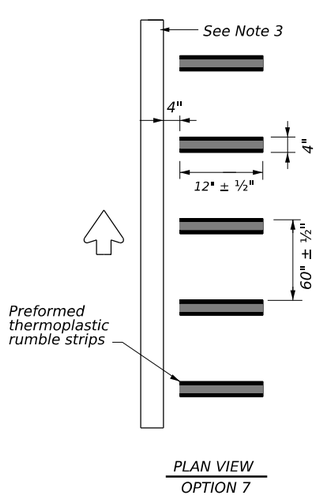
CONTINUOUS MILLED DEPRESSIONS (Rumble Strips)



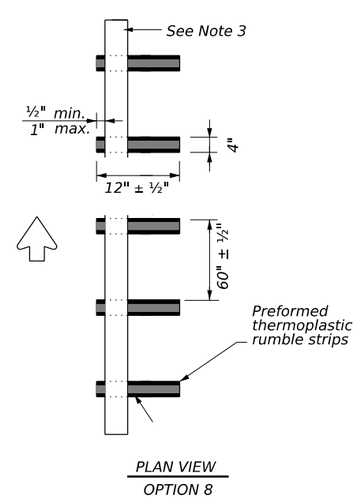
RAISED EDGE LINE (Rumble Strips)



PROFILE EDGE LINE MARKINGS (Rumble Strips)



PREFORMED THERMOPLASTIC EDGE LINE (Rumble Strips)



PREFORMED THERMOPLASTIC EDGE LINE (Rumble Strips)

SHOULDER WIDTH TABLE		
EQUAL TO OR LESS THAN 2 FEET	GREATER THAN 2 FEET LESS THAN 4 FEET	EQUAL TO OR GREATER THAN 4 FEET
Option 1, 5, 6 or 8	Option 1, 2, 3 5, 6 or 7	Option 2, 4, 5 6 or 7

GENERAL NOTES

1. Rumble strips and profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.
2. Milled rumble strips are preferred when adequate pavement depth is available. If pavement thickness is less than 2 inches, milled rumble strips shall not be used. Rumble strips shall not be milled or depressed into bridge decks.
3. Use Standard Sheet PM(2) and FPM(1) for positioning, dimensioning, and spacing of all reflective raised pavement markers, pavement markings, and profile markings.
4. See the Shoulder Width Table below for determining what options may be used for edge line rumble strips.
5. Breaks in edge line rumble strips shall occur at least 50 feet and no more than 150 feet in advance of bridges, railroad crossings, intersections, or driveways with high usage of large trucks when installed on conventional highways.
6. Rumble strips shall not be placed across exit or entrance ramps, acceleration or deceleration lanes, crossovers, gore areas, or intersections with other roadways.
7. Consideration should be given to noise levels when edgeline rumble strips are to be installed near residential areas, schools, churches, etc. A 3/8 inch deep (minimum) milled rumble strip may be considered in these areas.
8. Consideration shall be given to bicyclists. See RS(6).

WHEN INSTALLING MILLED DEPRESSION EDGE LINE RUMBLE STRIPS:

9. See dimensions for milled rumble strips. Other shapes and dimensions may be used if approved by the Traffic Safety Division.
10. Pavement markings can be applied over milled shoulder rumble strips to create an edge line rumble strip.

WHEN INSTALLING RAISED OR PROFILE EDGE LINE RUMBLE STRIPS:

11. Raised rumble strips consisting of non-reflective raised traffic buttons may be used. Non-reflective raised traffic buttons can be affixed to asphalt or concrete with bitumen or adhesives, as per the manufacturer's recommendations.
12. Non-reflective traffic buttons shall be placed adjacent to the pavement marking delineating the edge line when used as a rumble strip. The color of the button should match the color of the adjacent edge line marking (white or yellow). The buttons will be paid for under Item 672, "Raised Pavement Markers." Non-reflective traffic buttons must meet the requirements of DMS-4300.
13. Non-reflective traffic buttons shall not be placed across exit or entrance ramps, acceleration and deceleration lanes, crossovers, gore areas or intersections with other roadways.
14. The minimum distance between the edge line and the buttons should be used if the shoulder is less than 8 feet in width.
15. Raised profile thermoplastic markings used as edge lines may substitute for buttons.

Texas Department of Transportation

Traffic Safety Division Standard

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

FILE: rs(2)-23.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2023	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	030	FM 794
10-13 1-23	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		167

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DATE: 1/26/2024 $TIME$
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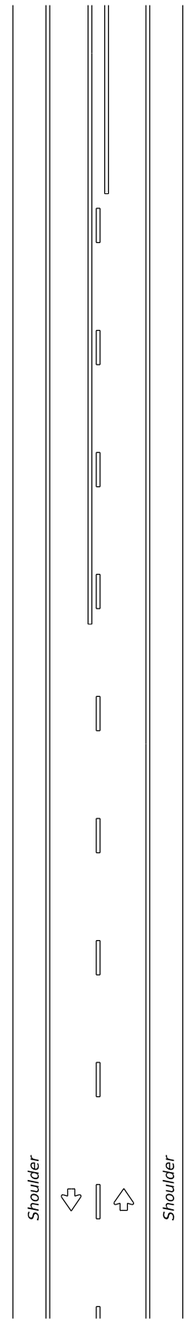
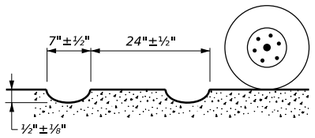
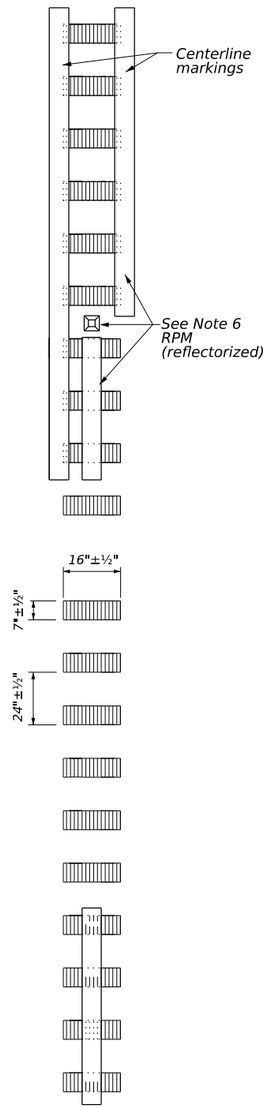
CENTERLINE RUMBLE STRIPS



TWO LANE TWO-WAY HIGHWAYS

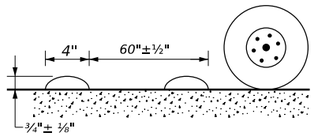


PROFILE VIEW

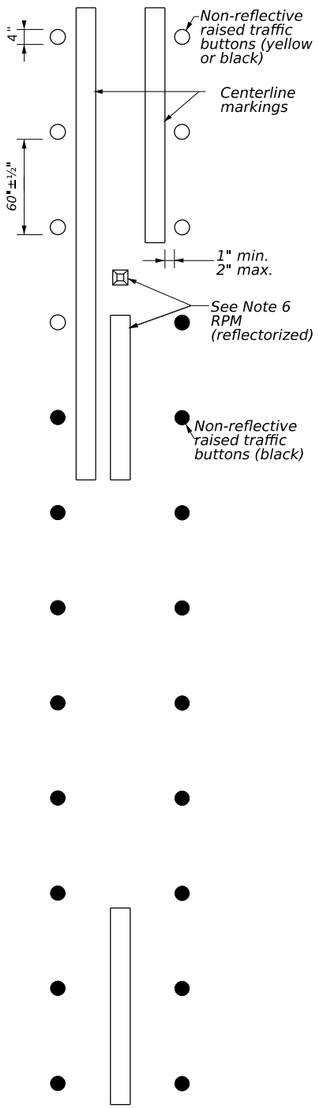


PLAN VIEW
OPTION 1

MILLED CENTERLINE RUMBLE STRIPS

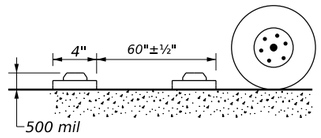


PROFILE VIEW

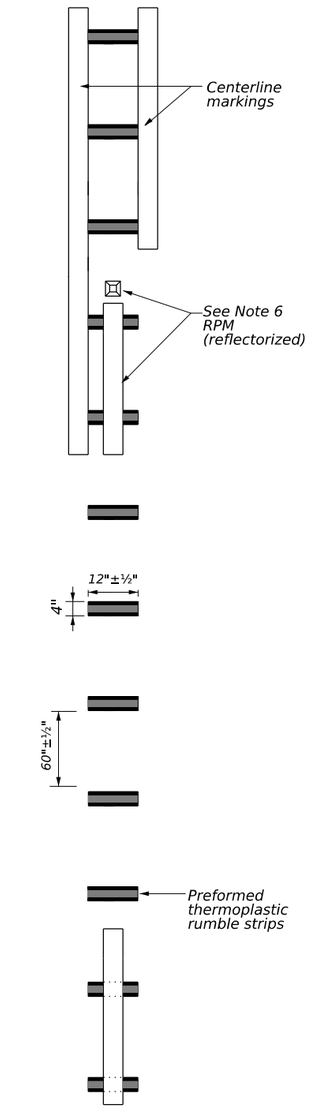


PLAN VIEW
OPTION 2

RAISED CENTERLINE RUMBLE STRIPS

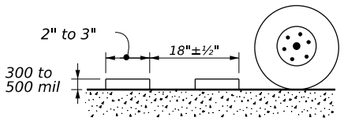


PROFILE VIEW

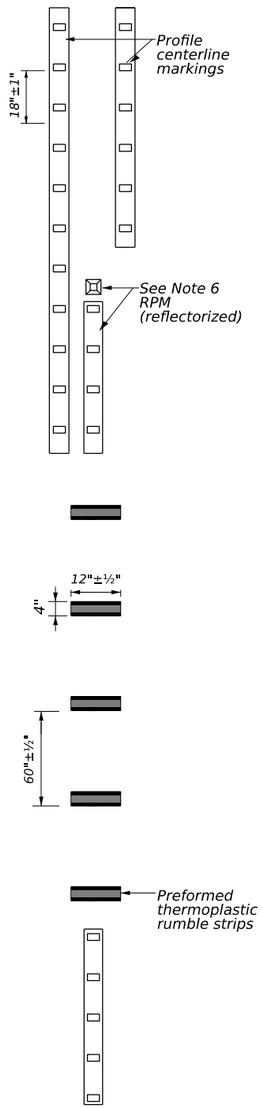


PLAN VIEW
OPTION 3

PREFORMED THERMOPLASTIC RUMBLE STRIPS



PROFILE VIEW



PLAN VIEW
OPTION 4

PROFILE CENTERLINE MARKINGS AND PREFORMED THERMOPLASTIC RUMBLE STRIPS

GENERAL NOTES

1. This standard sheet provides guidelines for installing centerline rumble strips on two-lane highways with or without shoulders.
2. Centerline and edge line rumble strips or profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.
3. Milled rumble strips are preferred when adequate pavement depth is available. If pavement thickness is less than 2 inches, milled rumble strips shall not be used. Rumble strips shall not be milled or depressed into bridge decks.
4. See dimensions for milled rumble strips. Other shapes and dimensions may be used if approved by the Traffic Safety Division.
5. Breaks in milled centerline rumble strips shall occur at least 50 feet and no more than 150 feet in advance of bridges, railroad crossings, intersections or driveways with high usage of large trucks.
6. Use standard sheet PM(2) for positioning, dimensioning, and spacing of all reflective raised pavement markers, pavement markings and profile markings.
7. Consideration should be given to noise levels when centerline rumble strips are to be installed near residential areas, schools, churches, etc. A 3/8 inch deep (minimum) milled rumble strip may be considered in these areas.
8. Pavement markings must be applied over milled centerline rumble strips.

WHEN INSTALLING CENTERLINE RUMBLE STRIPS:

9. Raised rumble strips consisting of non-reflective raised traffic buttons may be used. Non-reflective raised traffic buttons can be affixed to asphalt or concrete with bitumen or adhesives, as per manufacturer's recommendations.
10. When using non-reflective raised traffic buttons as a centerline rumble strip, the button shall be placed adjacent to the pavement marking delineating the centerline. The buttons will be paid for under Item 672, "Raised Pavement Markers." Non-reflective traffic buttons must meet the requirements of DMS-4300.
11. The color of the button should be yellow for a continuous no passing roadway. Black buttons should be used in areas where passing is allowed.
12. Consideration shall be given to bicyclists. See RS(6).

WHEN INSTALLING EDGE LINE RUMBLE STRIPS WITH OR WITHOUT CENTERLINE RUMBLE STRIPS ON UNDIVIDED HIGHWAYS:

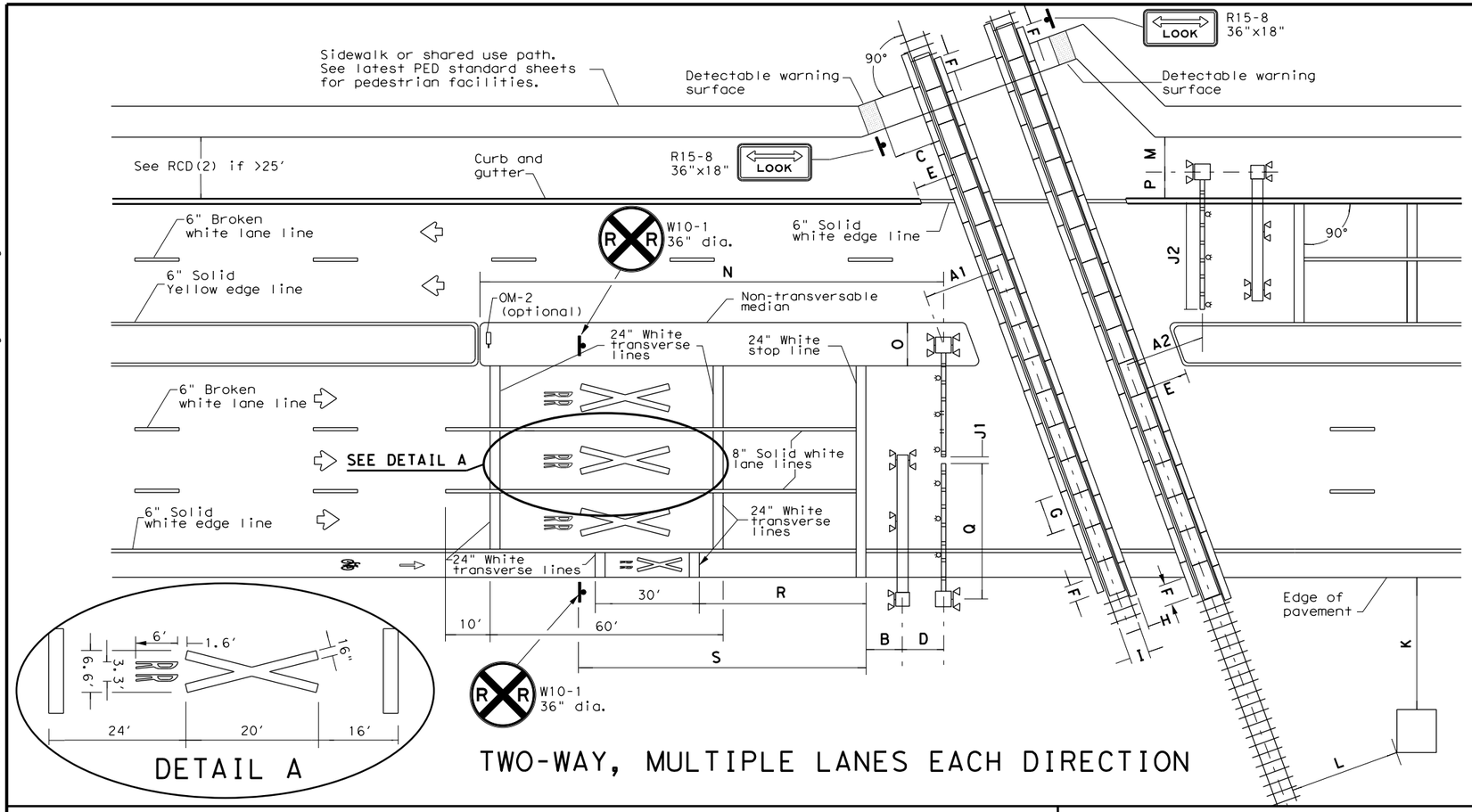
13. See standard sheet RS(2).

Texas Department of Transportation

Traffic Safety Division Standard

CENTERLINE RUMBLE STRIPS ON TWO LANE TWO-WAY HIGHWAYS RS(4)-23

FILE: rs(4)-23.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2023	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	030	FM 794
10-13 1-23	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		168



NOTES

A1: Center of RR mast to center of rail: 12′ minimum, 15′ typical.

A2: Tip of gate to center of rail: 12′ minimum, 15′ typical.

B: Center of mast (cantilever, gate, or mast flasher) of nearest active traffic control device to stop line: 8′ (NOTE: Stop line may be moved as needed, but should be at least 8′ back from gates, if present).

C: Near edge of detectable warning surface to nearest rail: 12′ minimum.

D: Center of gate mast to center of cantilever mast: 6′ typical.
NOTE: Cantilever may be located in front or behind gates.

E: Edge of median or curb to nearest rail: 10′ typical.
NOTE: Design median edge to be parallel with rail.

F: Edge of planking panel from edge of pavement or sidewalk: 3′ minimum.
NOTE: Field panels need not be in line with gauge panels.

G: Length of panels along rail: 8′ typical.

H: Width of field panel: 2′ typical (check with railroad company).

I: Distance between rails: 4′- 8′1/2".

J1: Tip of gate to tip of gate: 2′ maximum.

J2: 90% of traveled roadway to be covered by gate.

K: Nearest edge of RR cabinet from edge of pavement: 30′ typical.
NOTE: Cabinet not required to be parallel to edge of pavement.

L: Nearest edge of RR cabinet from nearest rail: 25′ typical.

M: Center of RR mast to edge of sidewalk: 6′ minimum.

N: Center of gate mast to leading edge of non-traversable median: 100′ minimum to qualify as a Quiet Zone SSM. NOTE: 60′will suffice if there is a street intersection within the 100′ and all street intersections within 60′ are closed.

O: Width of median for RR gate assembly: 8′-6" minimum, 10′ typical when using median gates. NOTE: Center of gate mast minimum 4′-3" from face of curb.

P: Center of RR mast to face of curb: 5′-3" minimum.
Center of RR mast to edge of pavement (with shoulder): 7′ minimum.
Center of RR mast to edge of pavement (no shoulder): 9′-3" minimum.
NOTE: Final location determined by the railroad company.

Q: Gate length: 28′ or less typical, but railroad company may allow up to 32′ under special circumstances.

R: Stop line to first RR Crossing transverse line (bike lane): 50′ typical.

S: Stop line to GRADE CROSSING ADVANCE WARNING (W10-1) sign and adjacent RR Crossing pavement markings. See Table 1. See RCD(2) for other signs.

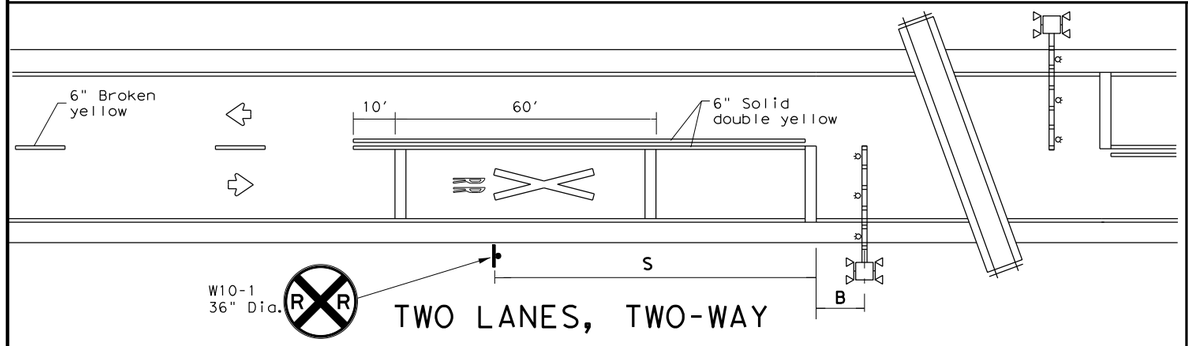
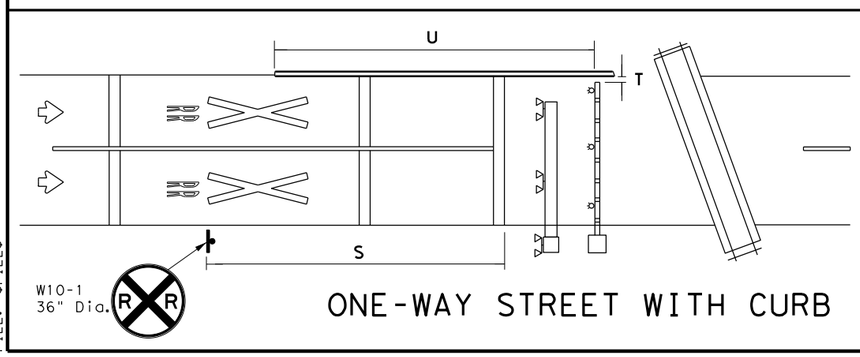


TABLE 1	
Approach Speed (mph)	Desirable Placement (feet)
20	100
25	100
30	100
35	100
40	125
45	175
50	250
55	325
60	400
65	475
70	550
75	650

LEGEND	
	Sign
	Object Marker
	Traffic Flow
	Cantilever
	Gate Assembly
	Mast Flasher Pair

GENERAL NOTES

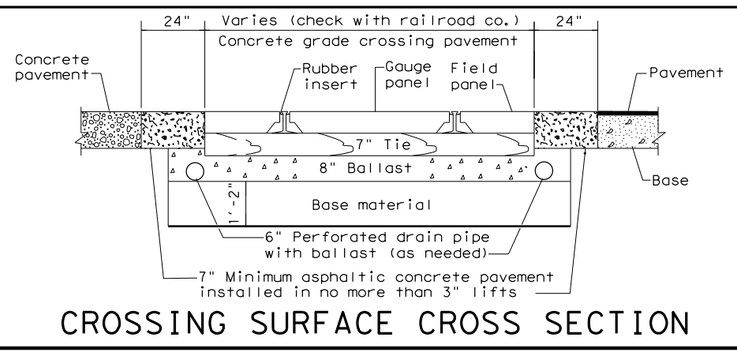
1. Medians and curbs must be non-traversable to qualify as a Quiet Zone Supplementary Safety Measure (SSM). Non-traversable curbs in Quiet Zones are 6" tall minimum and used on roadways where speed does not exceed 40 mph.
2. Raised pavement markers may be used to supplement striping. See PM(2) and PM(3) standard sheets.
3. Medians preferred whenever possible to prevent vehicles from driving around gates.
4. Longitudinal edge striping may be continued thru crossing as needed. Illumination may also be considered for nighttime visibility.
5. See SMD standard sheets for sign mounting details.
6. See the Standard Highway Sign Design for Texas (SHSD) manual for sign and pavement marking details.



NOTES

T: Tip of gate to edge of curb: 1′ maximum for Quiet Zone SSM, 90% of traveled way covered by gates for all other locations.

U: Non-traversable curb length from gate: 100′ minimum for a Quiet Zone SSM, 10′ minimum for all other locations.



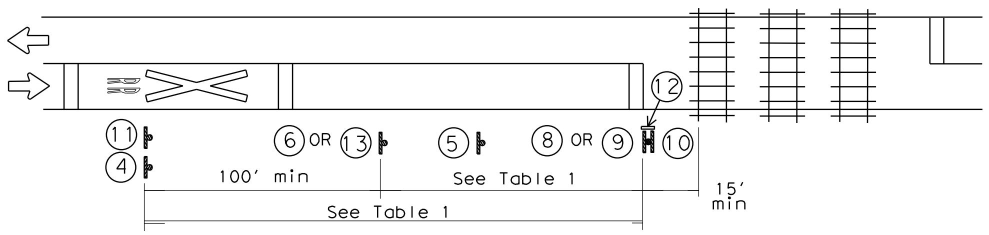
Texas Department of Transportation

Traffic Safety Division Standard

RAILROAD CROSSING DETAILS SIGNING, STRIPING, AND DEVICE PLACEMENT RCD(1)-22

FILE: rcd1-22.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	030	FM 794
2-16	DIST	COUNTY		SHEET NO.
11-22	YKM	GONZALES		169

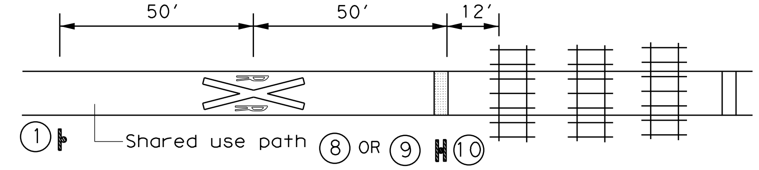
DATE: 1/26/2024 $TIME$
FILE: $FILE$



NOTES

1. STOP or YIELD sign may also be installed to the left of the crossbuck sign, rather than below it.
2. A 2" white retroreflective strip shall be installed on front and back of crossbuck sign post.
3. See the Crossbuck Assemblies with YIELD or STOP Signs at Passive Grade Crossings section of the TMUTCD for further details about sign mounting arrangements.

PASSIVE CROSSING



NOTES

1. A shared use path is considered a separate pathway crossing when more than 25′ from traveled way of adjacent roadway.
2. Detectable warning used at stop bar.
3. Smaller signs preferred. See the Design of Bicycle Signs section within the TMUTCD for sizing details.

PATHWAY CROSSING

TABLE 1

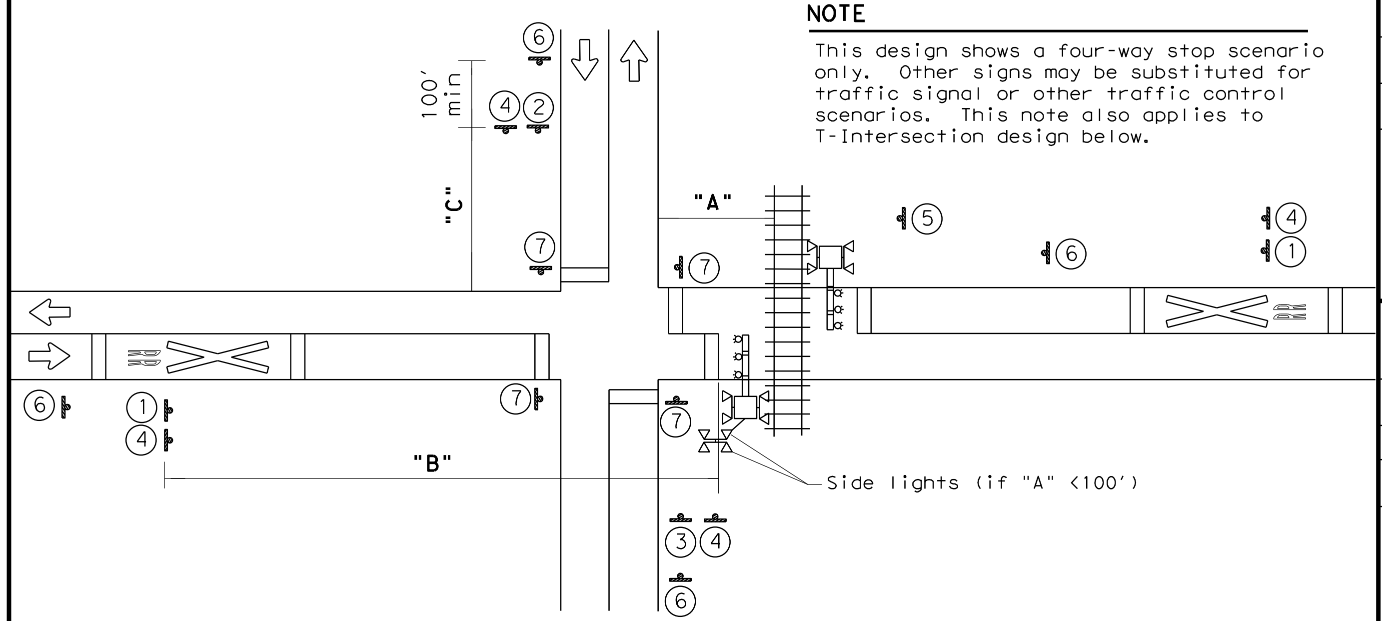
Approach Speed (mph)	Desirable Placement (feet)
20	100
25	100
30	100
35	100
40	125
45	175
50	250
55	325
60	400
65	475
70	550
75	650

GENERAL NOTES

1. Railroad company to provide active traffic control devices, CROSSBUCK (R15-1), NUMBER OF TRACKS (R15-2P) plaque (if more than 1 track), and EMERGENCY NOTIFICATION (I-13) signs.
2. LOW GROUND CLEARANCE (W10-5) signs may be relocated further upstream of crossing to provide advance warning of alternate route.
3. GRADE CROSSING AND INTERSECTION ADVANCE WARNING (W10-2) signs may be modified as needed to fit roadway geometry.
4. Table 1 placement distances may vary per the Placement of Warning Signs section of the TMUTCD.
5. See Table 1 to determine placement of STOP AHEAD (W3-1) and YIELD AHEAD (W3-2) signs unless shown otherwise.
6. DO NOT STOP ON TRACKS (R8-8) signs installed when potential for vehicles stopping on tracks is significant as determined by sealing engineer. Install so sign does not block view of RR mast.
7. See the Standard Highway Sign Design for Texas (SHSD) manual for sign and pavement marking details.

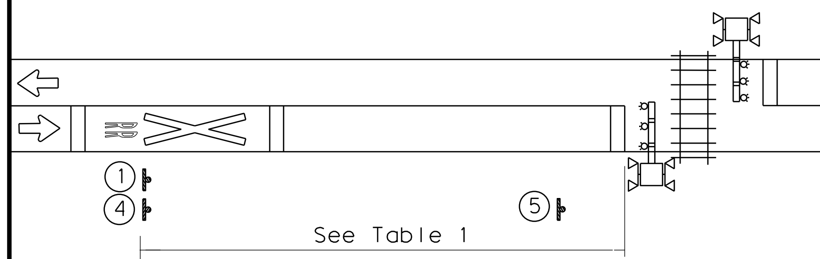
NOTE

This design shows a four-way stop scenario only. Other signs may be substituted for traffic signal or other traffic control scenarios. This note also applies to T-Intersection design below.

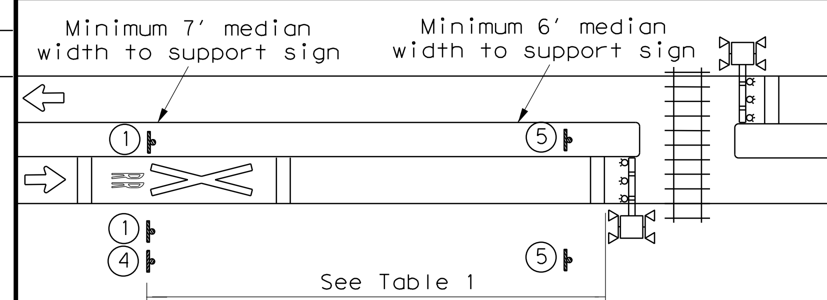


	"A" <100′	"A" ≥100′
"B"	See Table 1. Place pavement markings and signs on opposite side of intersection from rail if spacing from Table 1 would put markings within intersection.	See Table 1. Place pavement markings and signs between rail and intersection if spacing from Table 1 would put markings within intersection.
"C"	See Table 1.	GRADE CROSSING AND INTERSECTION ADVANCE WARNING (W10-2, W10-3, W10-4) signs should only be installed if W10-1 sign is not between intersection and railroad crossing. If needed, see Table 1.

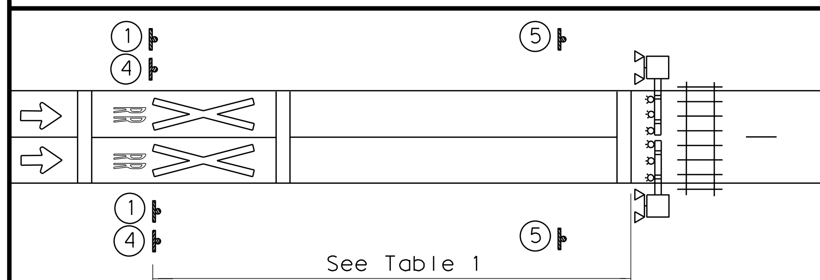
GRADE CROSSING NEAR A PARALLEL STREET



TWO-WAY

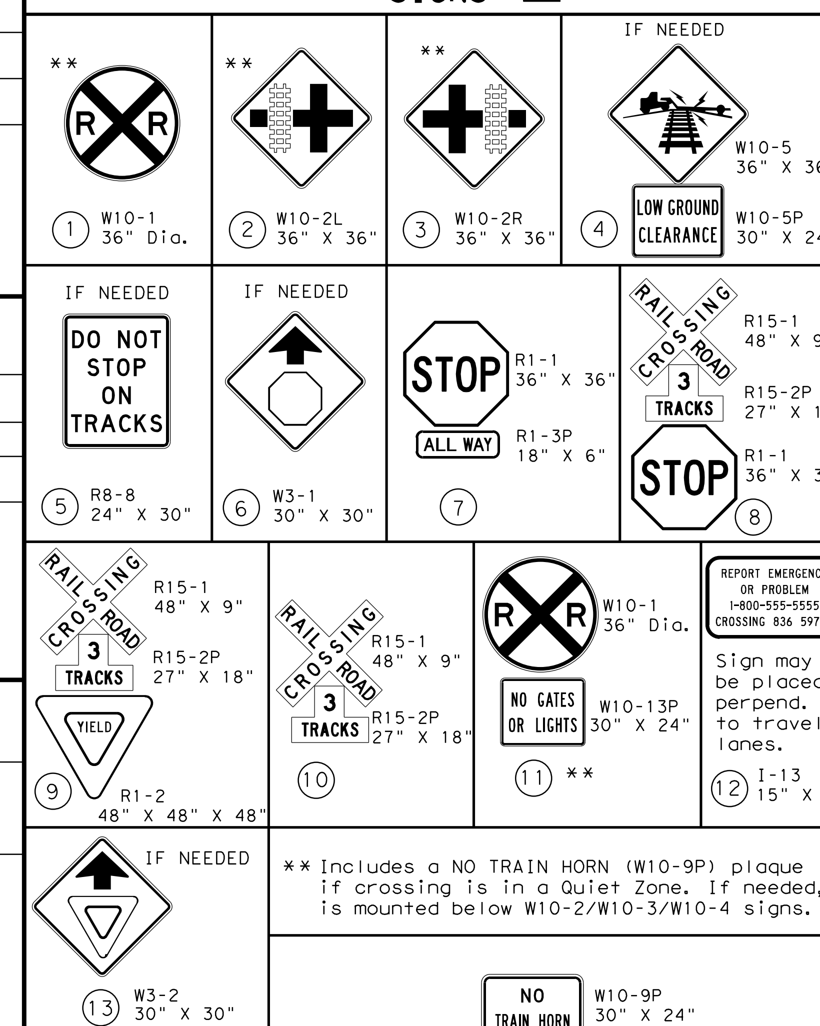


TWO-WAY WITH MEDIAN



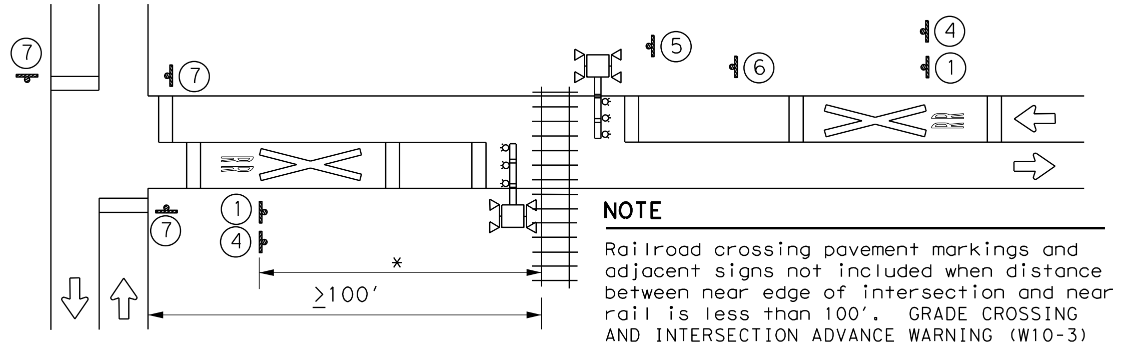
ONE-WAY

SIGNS



** Includes a NO TRAIN HORN (W10-9P) plaque if crossing is in a Quiet Zone. If needed, is mounted below W10-2/W10-3/W10-4 signs.

NO TRAIN HORN W10-9P 30" X 24"

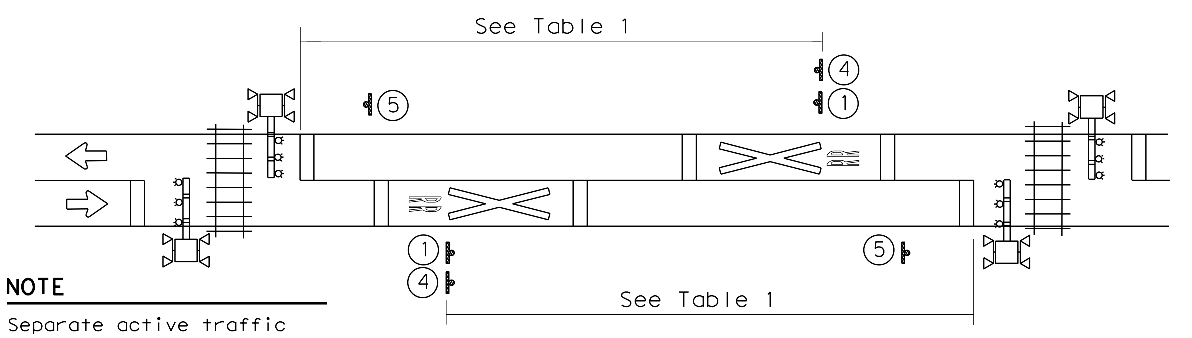


*Use Table 1 if sufficient space exists.

NOTE

Railroad crossing pavement markings and adjacent signs not included when distance between near edge of intersection and near rail is less than 100′. GRADE CROSSING AND INTERSECTION ADVANCE WARNING (W10-3) signs installed on roadway parallel with rail in this case.

T-INTERSECTION



NOTE

Separate active traffic control devices, railroad crossing pavement markings, and adjacent signs required when tracks are more than 100′ apart.

TWO ADJACENT CROSSINGS

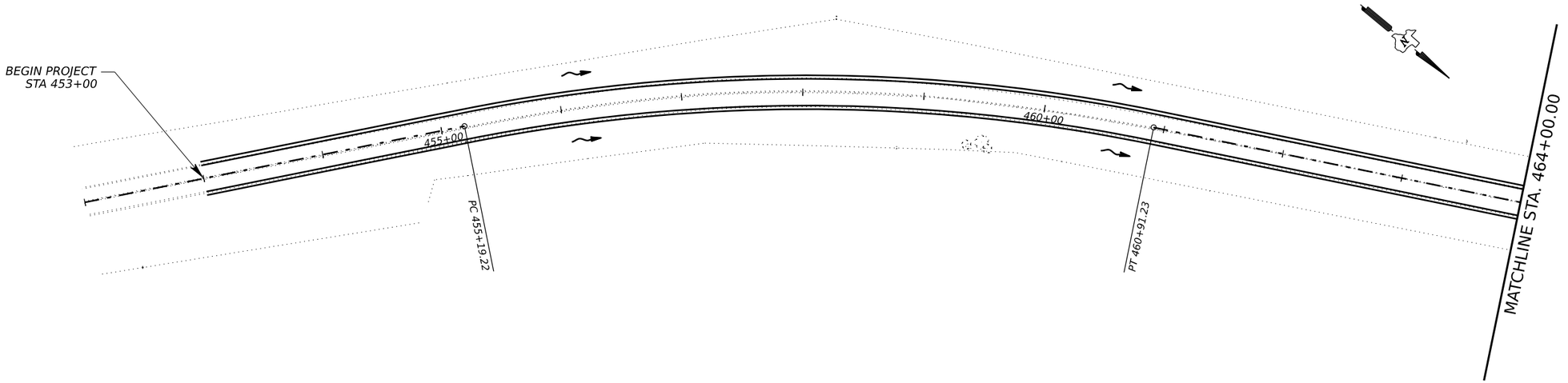
Texas Department of Transportation | Traffic Safety Division Standard

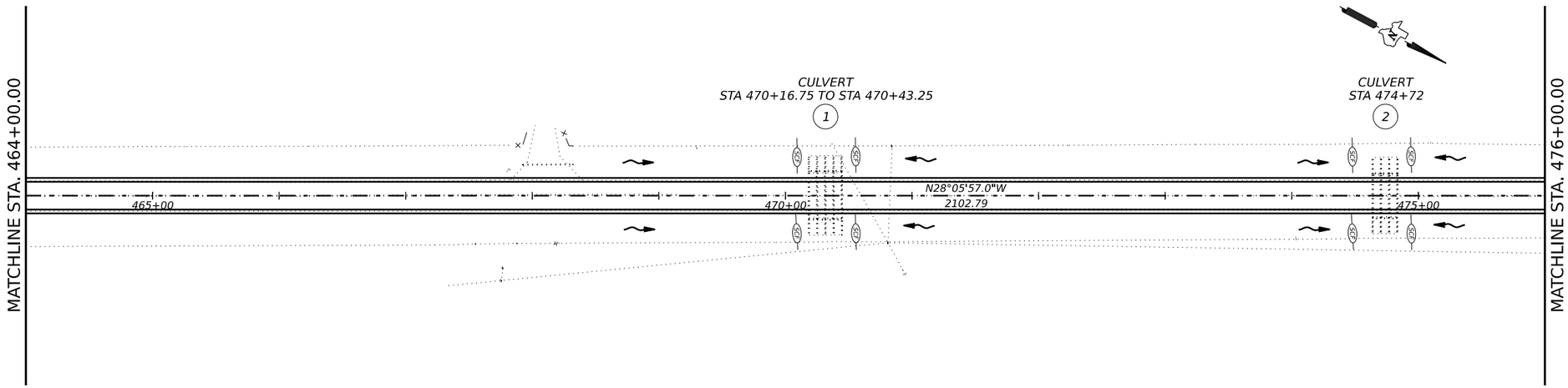
RAILROAD CROSSING DETAILS SIGNING & STRIPING

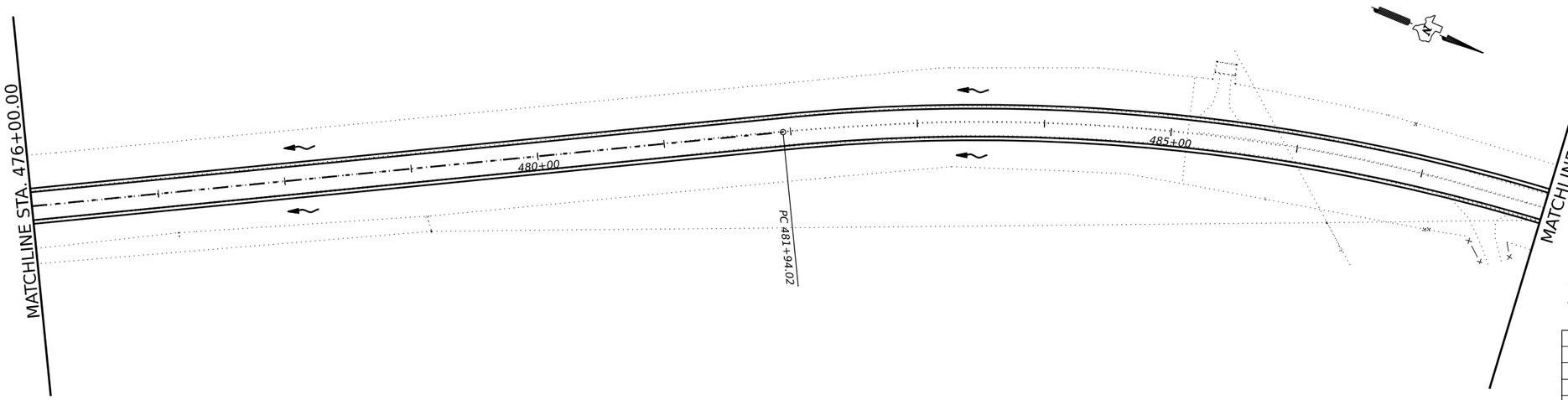
RCD(2)-22

FILE: rcd2-22.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2022	CONT 1133	SECT 02	JOB 030	HIGHWAY FM 794
REVISIONS 2-16 11-22	DIST YKM		COUNTY GONZALES	SHEET NO. 170

DATE: 1/26/2024 $TIME$
FILE: $FILE$







LEGEND

SCF	SILT FENCE
XX	ID NUMBER
	DIRECTION OF FLOW
	ROCK FILTER DAM

NOTES:

1. INSTALL BMP'S TO CORRESPOND WITH SEQUENCE OF CONSTRUCTION. ADDITIONAL BMP'S MAY BE ADDED TO CORRESPOND WITH CONSTRUCTION ACTIVITIES AS APPROVED OR DIRECTED BY THE ENGINEER.
2. ACTUAL BMP LOCATIONS AND LENGTHS MAY VARY TO MEET FIELD CONDITIONS, AS APPROVED OR DIRECTED BY THE ENGINEER.

STATE OF TEXAS
AMANDA ANDERLE FLING
105989
LICENSED
PROFESSIONAL ENGINEER

Amanda Anderle Fling, P.E.

01/27/2024

SW3P LAYOUT & SUMMARY

NOT TO SCALE

Texas Department of Transportation

FED.RD. DIV.NO.		PROJECT NO.	
6			
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	171

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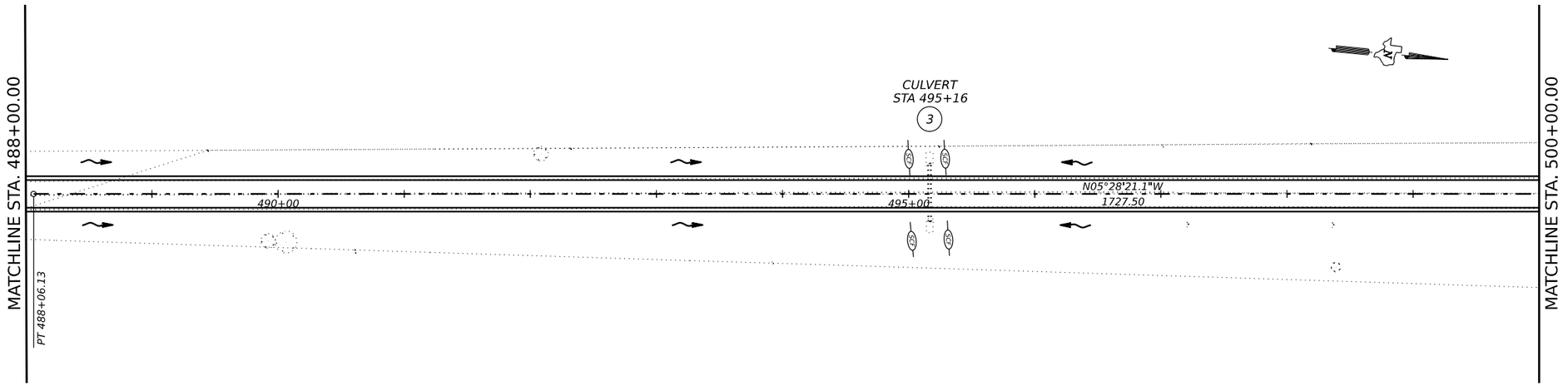
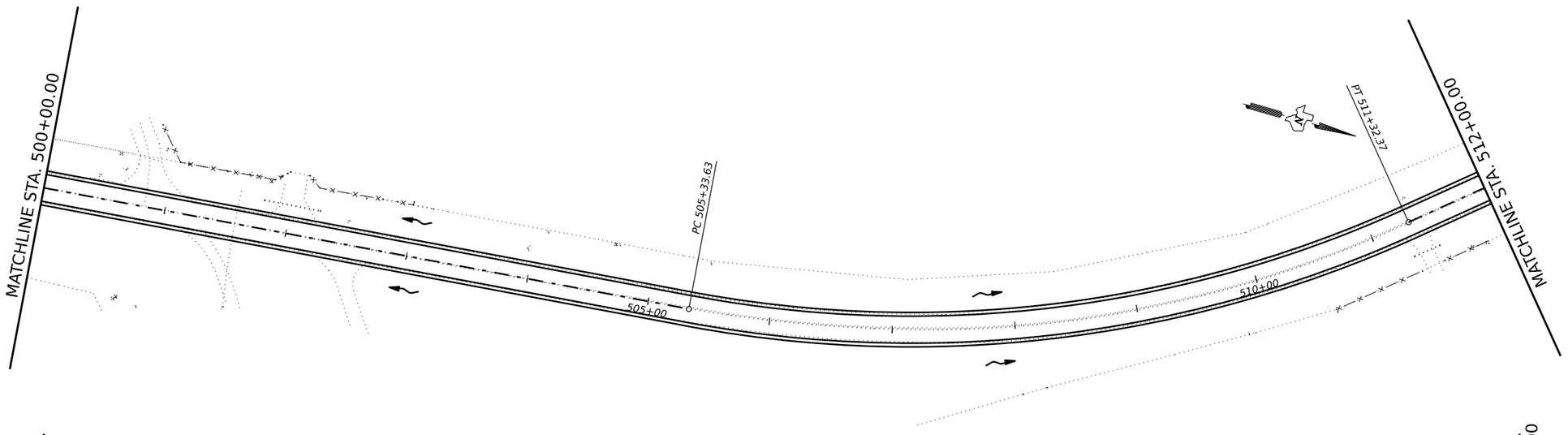
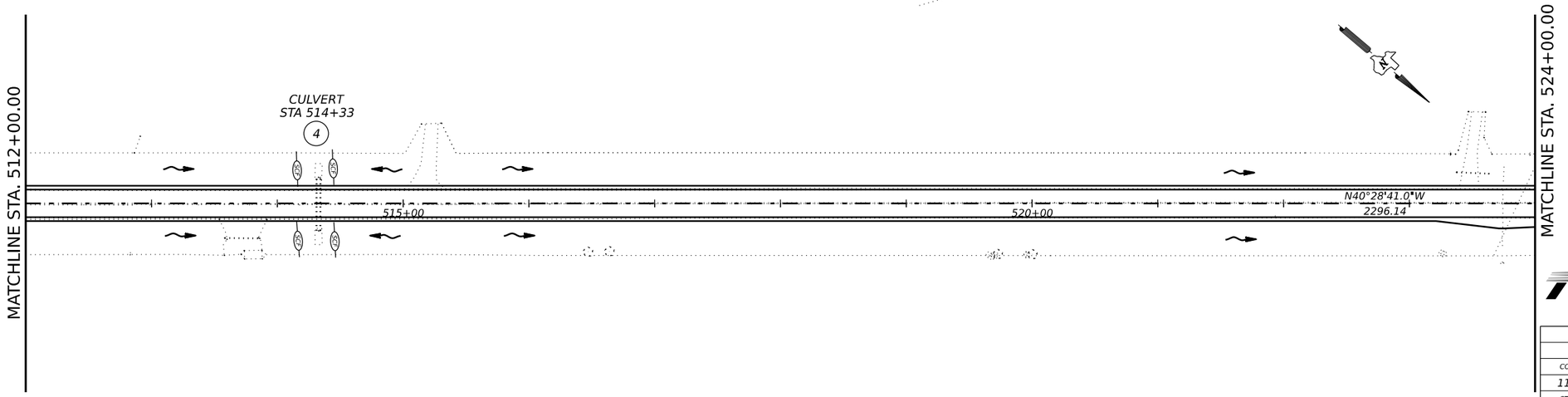
DATE: 1/29/2024







LEGEND

SCF	SILT FENCE
XX	ID NUMBER
	DIRECTION OF FLOW
	ROCK FILTER DAM

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1. INSTALL BMP'S TO CORRESPOND WITH SEQUENCE OF CONSTRUCTION. ADDITIONAL BMP'S MAY BE ADDED TO CORRESPOND WITH CONSTRUCTION ACTIVITIES AS APPROVED OR DIRECTED BY THE ENGINEER.
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STATE OF TEXAS
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SW3P LAYOUT & SUMMARY

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Texas Department of Transportation

FED.RD. DIV.NO.		PROJECT NO.	
6			
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	172

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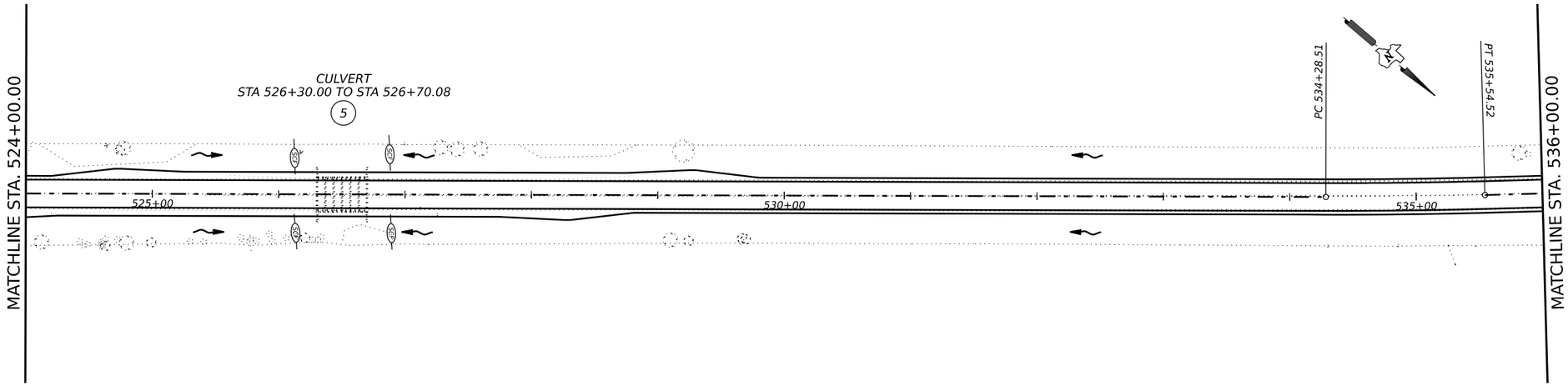

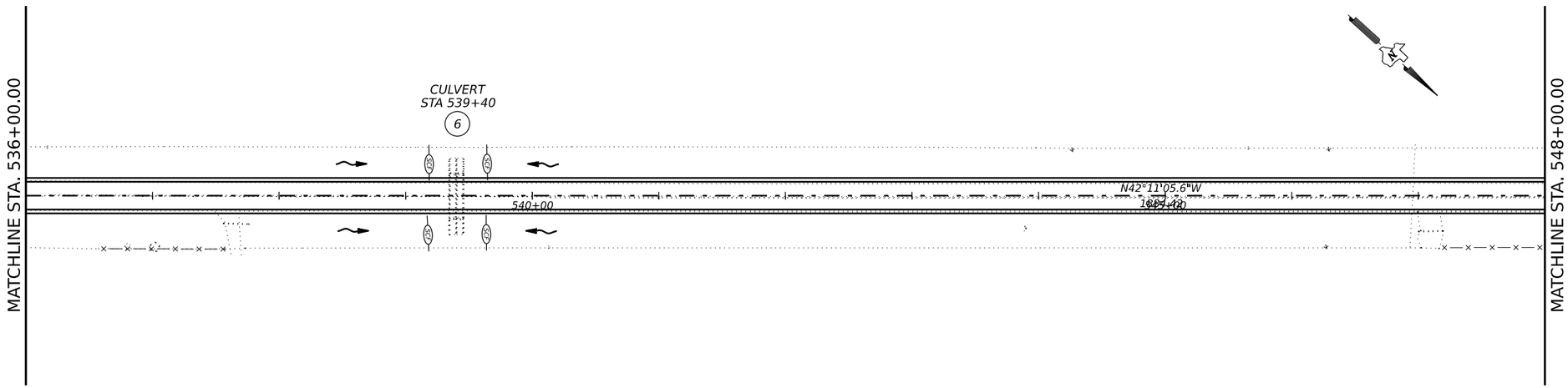

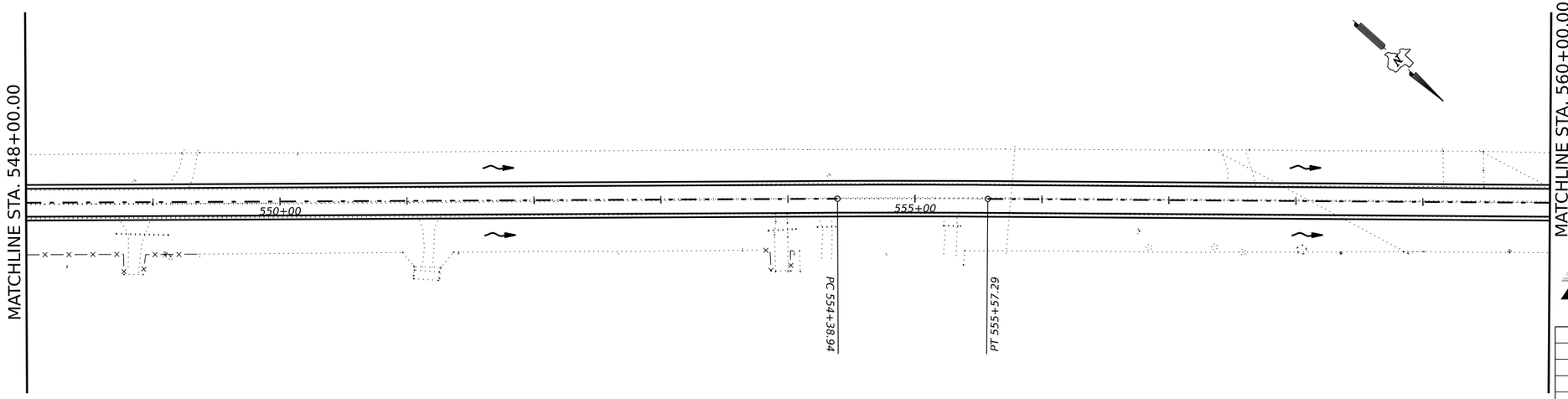

LEGEND

SCF	SILT FENCE
XX	ID NUMBER
	DIRECTION OF FLOW
	ROCK FILTER DAM

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SW3P LAYOUT & SUMMARY

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Texas Department of Transportation

SHEET 3 OF 6

FED.RD. DIV.NO.		PROJECT NO.	
6			
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	173

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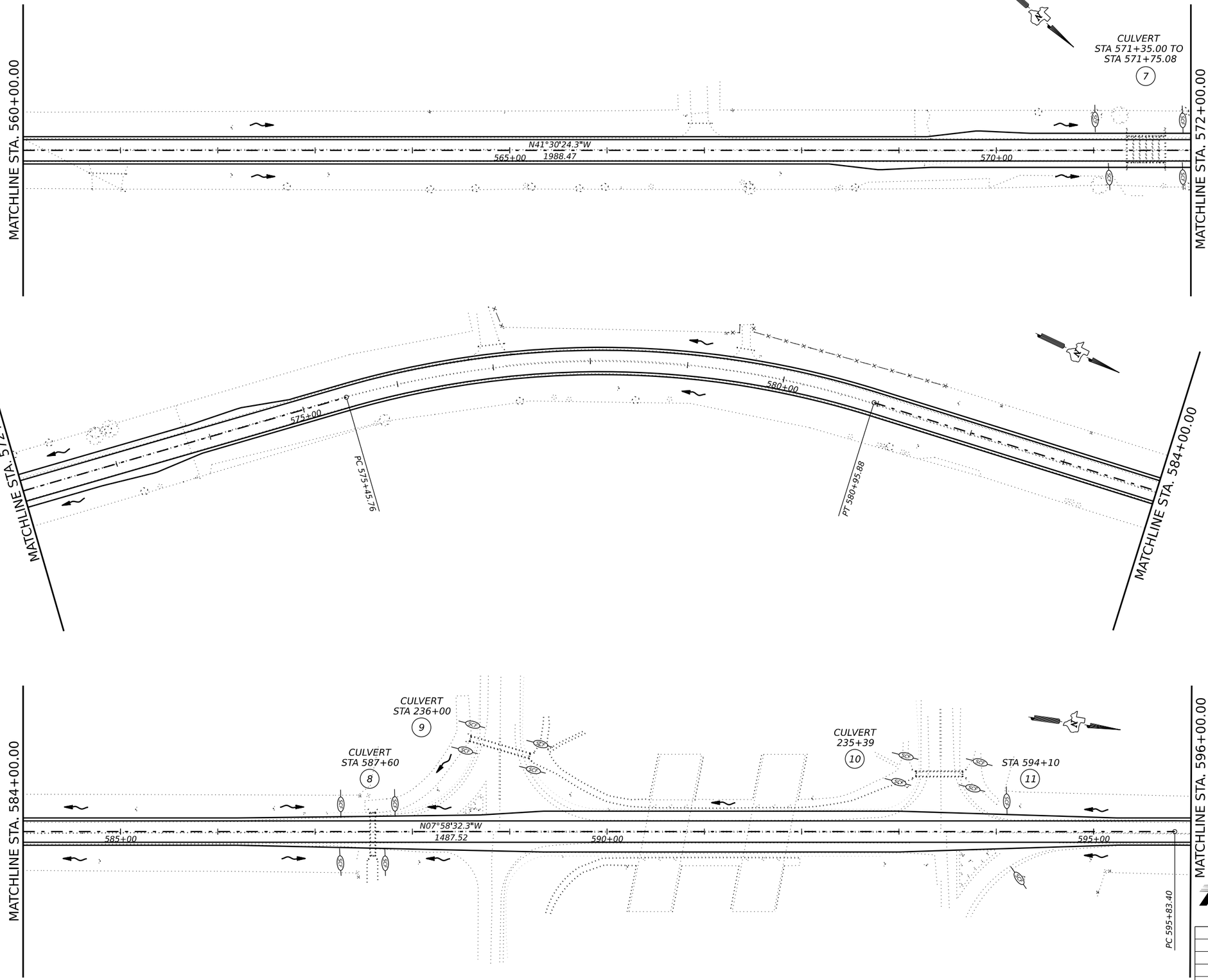
DATE: 1/29/2024



LEGEND

- SCF — SILT FENCE
- XX — ID NUMBER
- DIRECTION OF FLOW
- ROCK FILTER DAM

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01/27/2024

SW3P LAYOUT & SUMMARY

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Texas Department of Transportation

FED.RD. DIV.NO.		PROJECT NO.	
6			
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	174

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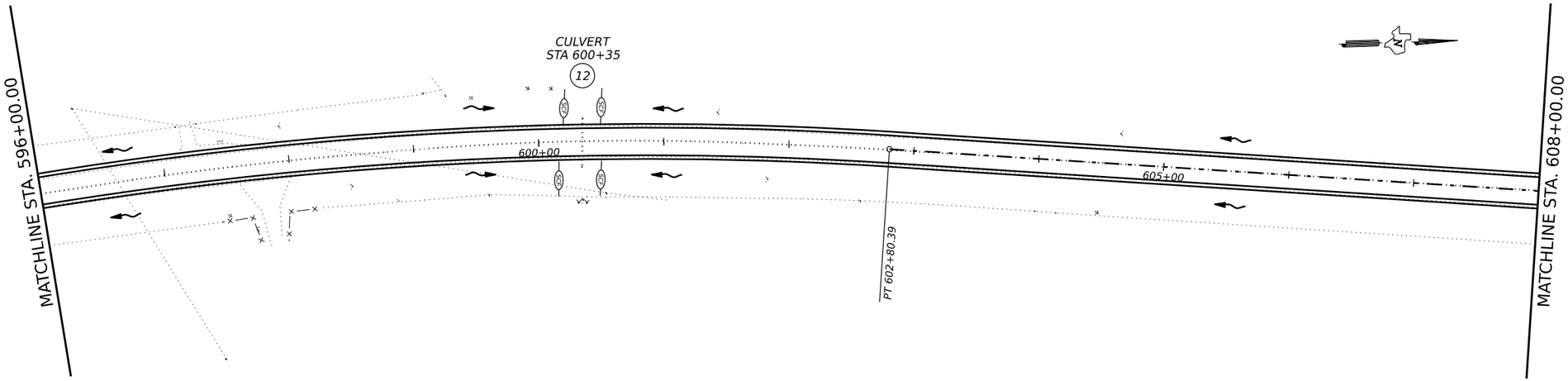

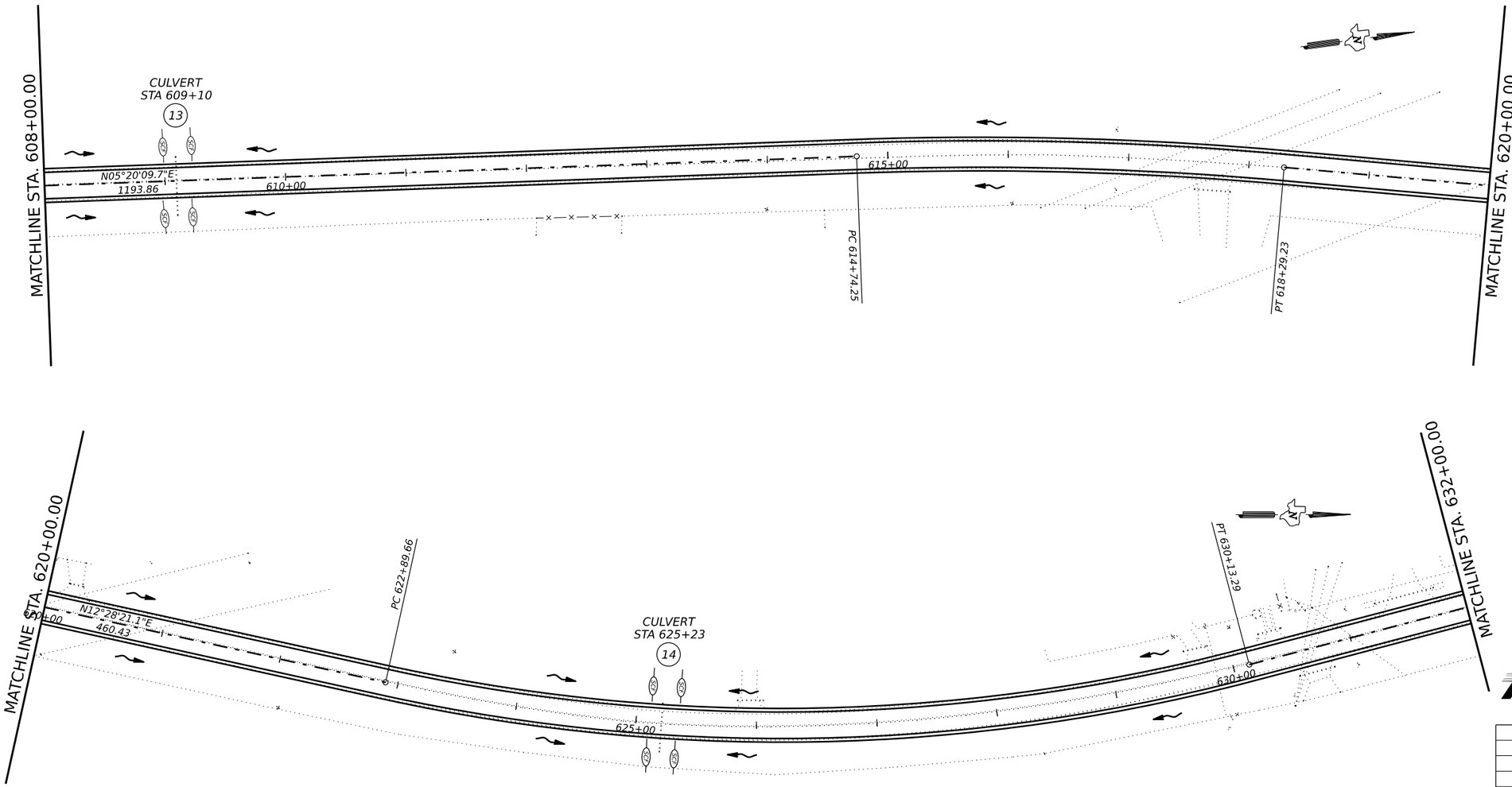

LEGEND

SCF	SILT FENCE
XX	ID NUMBER
	DIRECTION OF FLOW
	ROCK FILTER DAM

NOTES:

1. INSTALL BMP'S TO CORRESPOND WITH SEQUENCE OF CONSTRUCTION. ADDITIONAL BMP'S MAY BE ADDED TO CORRESPOND WITH CONSTRUCTION ACTIVITIES AS APPROVED OR DIRECTED BY THE ENGINEER.
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01/27/2024

SW3P LAYOUT & SUMMARY

NOT TO SCALE

Texas Department of Transportation

SHEET 5 OF 6

FED.RD. DIV.NO.		PROJECT NO.	
6			
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	175

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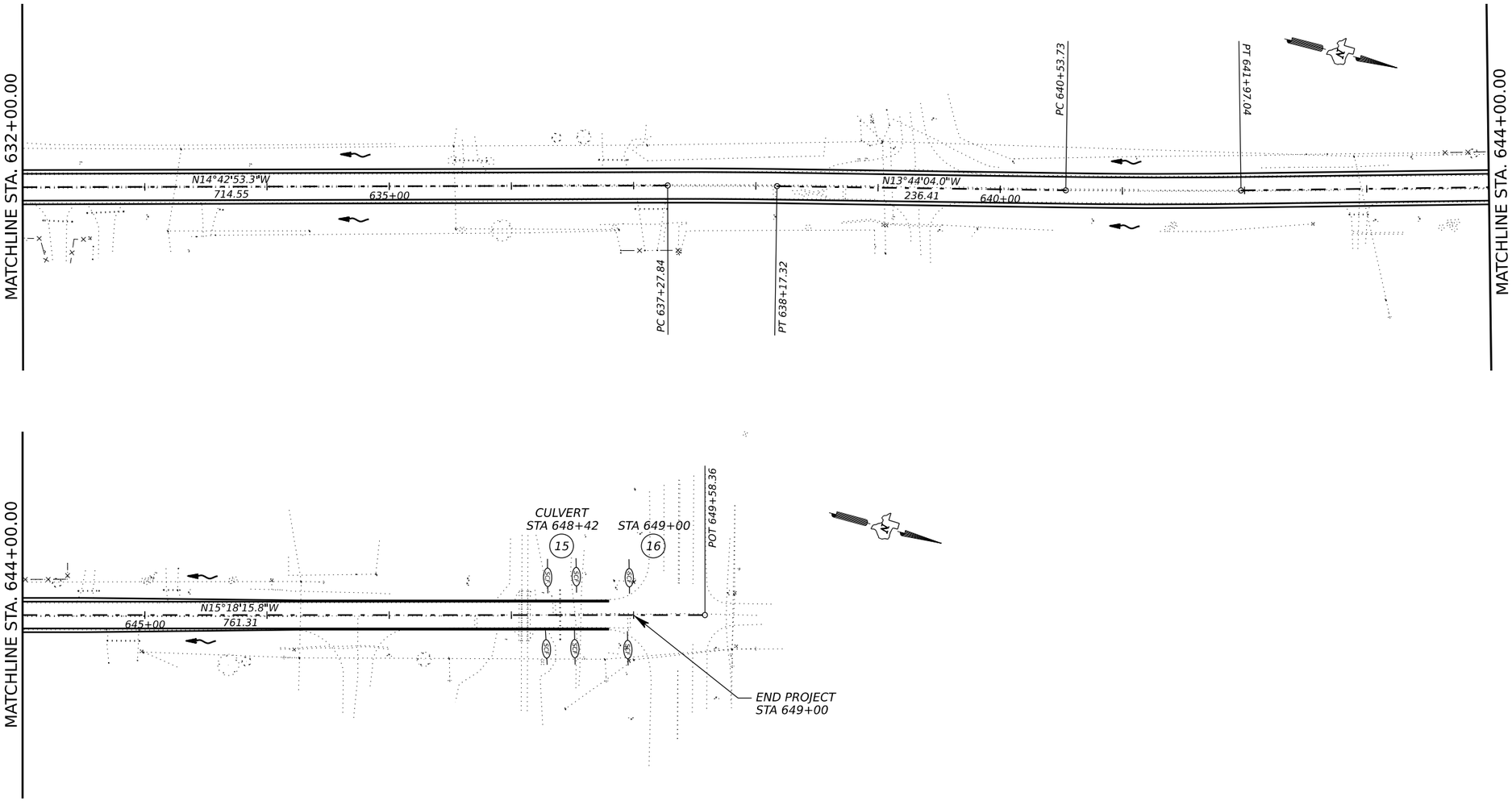

LEGEND

SCF	SILT FENCE
XX	ID NUMBER
	DIRECTION OF FLOW
	ROCK FILTER DAM

NOTES:

1. INSTALL BMP'S TO CORRESPOND WITH SEQUENCE OF CONSTRUCTION. ADDITIONAL BMP'S MAY BE ADDED TO CORRESPOND WITH CONSTRUCTION ACTIVITIES AS APPROVED OR DIRECTED BY THE ENGINEER.
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SW3P SUMMARY

ID #	LOCATION	ITEM 506			
		TEMP SEDIMENT CONTROL FENCE (INSTALL) LF	TEMP SEDIMENT CONTROL FENCE (REMOVE) LF	ROCK FILTER DAMS(INSTALL) (TY 1) LF	ROCK FILTER DAMS (REMOVE) LF
1	CULVERT STA 470+16.75 TO STA 470+43.25 LT & RT	60	60		
2	CULVERT STA 474+72 LT & RT	60	60		
3	CULVERT STA 495+16 LT & RT	40	40		
4	CULVERT STA 514+33 LT & RT	40	40		
5	CULVERT STA 526+30.00 TO STA 526+70.08 LT & RT	60	60		
6	CULVERT STA 539+40 LT & RT	40	40		
7	CULVERT STA 571+35.00 TO STA 571+75.08 LT & RT	60	60		
8	CULVERT STA 587+60 LT & RT	40	40		
9	CULVERT STA 236+00 LT & RT	40	40		
10	CULVERT STA 235+39 LT & RT	40	40		
11	STA 594+10 LT & RT	30	30		
12	CULVERT STA 600+35 LT & RT	40	40		
13	CULVERT STA 609+10 LT & RT	40	40		
14	CULVERT STA 625+23 LT & RT	40	40		
15	CULVERT STA 648+42 LT & RT	40	40		
16	STA 649+00 LT & RT	30	30		
	AS APPROVED OR DIRECTED	100	100	100	100
	PROJECT TOTALS	**800**	**800**	**100**	**100**

STATE OF TEXAS
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01/27/2024

SW3P LAYOUT & SUMMARY

NOT TO SCALE

Texas Department of Transportation

SHEET 6 OF 6

FED.RD. DIV.NO.		PROJECT NO.	
6			
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	GONZALES	176

PATH: T:\YKMANNEX\PS&E\113302030_FM794\Plan_Sheets\
FILE: FM794_SW3P_NAMEDBOUNDARIES.dgn
DATE: 1/29/2024

STORMWATER POLLUTION PREVENTION PLAN (SWP3):

This SWP3 has been developed in accordance with the TPDES Construction General Permit TXR150000 (CGP). The Texas Department of Transportation (TxDOT) ensures that project specifications include adequate best management practices (BMPs) for this project.

For all projects with soil disturbing activity and for projects that have Environmental, Permits, Issues, and Commitments (EPICs) dependent on stormwater controls and water quality measures TxDOT will maintain a SWP3 with all pertinent records, correspondence, environmental documents, etc. at the project field office, Area Office, or electronically.

This SWP3 is consistent with requirements specified in applicable stormwater plans and the projects environmental permits, issues, and commitments (EPICs). A copy of the CGP

1.0 SITE/PROJECT DESCRIPTION

1.1 PROJECT CONTROL SECTION JOB (CSJ):

1133-02-030

1.2 PROJECT LIMITS:

From: 0.5 Mi North of CR 235

To: US 90

1.3 PROJECT COORDINATES:

BEGIN: (Lat) 29°37'6.50" N ,(Long) 97°29'3.47" W

END: (Lat) 29°37'57.57" N ,(Long) 97°30'18.97" W

1.4 TOTAL PROJECT AREA (Acres): 35.7 Acres

1.5 TOTAL AREA TO BE DISTURBED (Acres): 13.4 Acres

1.6 NATURE OF CONSTRUCTION ACTIVITY:

Rehabilitation of existing roadway.

1.7 MAJOR SOIL TYPES:

Soil Type	Description
Rosanky fine sandy loam, 1 to 3 percent slopes	Slow infiltration rate when wet, soil has slow water transmission.
Dimebox clay, 1 to 3 percent slopes	Slow infiltration rate when wet, soil has slow water transmission.

1.8 PROJECT SPECIFIC LOCATIONS (PSLs):

PSLs must be depicted on the Environmental Layout Sheets in Attachment 1.2 of this SWP3. PSLs may be identified during preconstruction meetings or during the construction process. Please choose from the options below:

☒ PSLs determined during preconstruction meeting
☐ PSLs determined during construction
☐ No PSLs planned for construction

Type	Sheet #s

All off-ROW PSLs required by the Contractor are the Contractor's responsibility. The Contractor shall secure all permits required by local, state, federal laws for off-ROW PSLs. The contractor shall provide diagrams, areas of disturbance, acreage, and BMPs for all off-ROW PSLs within one mile of the project.

1.9 CONSTRUCTION ACTIVITIES:

(Use the following list as a starting point when developing the Construction Activity Schedule and Ceasing Record in Attachment 2.5.)

☒ Mobilization
☒ Install sediment and erosion controls
☒ Blade existing topsoil into windrows, prep ROW, clear and grub
☒ Remove existing pavement
☒ Grading operations, excavation, and embankment
☒ Excavate and prepare subgrade for proposed pavement widening
☒ Remove existing culverts, safety end treatments (SETs)
☒ Remove existing metal beam guard fence (MBGF), bridge rail
☒ Install proposed pavement per plans
☒ Install culverts, culvert extensions, SETs
☒ Install mow strip, MBGF, bridge rail
☒ Place flex base
☒ Rework slopes, grade ditches
☒ Blade windrowed material back across slopes
☒ Revegetation of unpaved areas
☒ Achieve site stabilization and remove sediment and erosion control measures
☐ Other: _____
☐ Other: _____
☐ Other: _____

1.10 POTENTIAL POLLUTANTS AND SOURCES:

☒ Sediment laden stormwater from stormwater conveyance over disturbed area
☒ Fuels, oils, and lubricants from construction vehicles, equipment, and storage
☒ Solvents, paints, adhesives, etc. from various construction activities
☒ Transported soils from offsite vehicle tracking
☒ Construction debris and waste from various construction activities
☒ Contaminated water from excavation or dewatering pump-out water
☒ Sanitary waste from onsite restroom facilities
☒ Trash from various construction activities/receptacles
☒ Long-term stockpiles of material and waste
☐
☐ Other: _____
☐ Other: _____
☐ Other: _____

1.11 RECEIVING WATERS:

Receiving waters must be depicted on the Environmental Layout Sheets in Attachment 1.2 of this SWP3. Include Segment # for receiving waters.

Tributaries	Classified Waterbody
Artesia Creek	San Marcos River Stream Segment No. 1808
Canoe Creek	San Marcos River Stream Segment No. 1808

* Add (*) for impaired waterbodies with pollutant in ().

1.12 ROLES AND RESPONSIBILITIES: TxDOT

☒ Development of plans and specifications
☒ Submit Notice of Intent (NOI) to TCEQ (≥5 acres)
☒ Post Construction Site Notice
☐ Submit NOI/CSN to local MS4
☒ Perform SWP3 inspections
☒ Maintain SWP3 records and update to reflect daily operations
☒ Complete and submit Notice of Termination to TCEQ
☒ Maintain SWP3 records for 3 years
☐ Other: _____
☐ Other: _____
☐ Other: _____

1.13 ROLES AND RESPONSIBILITIES: CONTRACTOR

☒ Day To Day Operational Control
☒ Submit Notice of Intent (NOI) to TCEQ (≥5 acres)
☒ Post Construction Site Notice
☐ Submit NOI/CSN to local MS4
☒ Maintain schedule of major construction activities
☒ Install, maintain and modify BMPs
☒ Complete and submit Notice of Termination to TCEQ
☒ Maintain SWP3 records for 3 years
☐ Other: _____
☐ Other: _____
☐ Other: _____

1.14 LOCAL MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) OPERATOR COORDINATION:

MS4 Entity

STATE OF TEXAS
AMANDA ANDERLE FLING
105989
LICENSED PROFESSIONAL ENGINEER

Amanda Anderle Fling, P.E.

01/27/2024

STORMWATER POLLUTION PREVENTION PLAN (SWP3)

July 2023 Sheet 1 of 2

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
			177
STATE	STATE DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794

STORMWATER POLLUTION PREVENTION PLAN (SWP3):

2.0 BEST MANAGEMENT PRACTICES (BMPs) AND CONTROLS, INSPECTION, AND MAINTENANCE

The Contractor shall be the responsible party for implementing the BMPs described herein and for complying with the SWP3 for control of erosion and sedimentation during day-to-day operations. The Contractor shall implement changes to this SWP3 approved by TxDOT within the times specified in this SWP3 or the CGP.

2.1 EROSION CONTROL AND SOIL STABILIZATION BMPs:

T / P

- ☐ ☐ Protection of Existing Vegetation
- ☐ ☐ Vegetated Buffer Zones
- ☐ ☐ Soil Retention Blankets
- ☐ ☐ Geotextiles
- ☐ ☐ Mulching/ Hydromulching
- ☐ ☐ Soil Surface Treatments
- ☒ ☐ Temporary Seeding
- ☐ ☒ Permanent Planting, Sodding or Seeding
- ☐ ☐ Biodegradable Erosion Control Logs
- ☒ ☐ Rock Filter Dams/ Rock Check Dams
- ☐ ☐ Vertical Tracking
- ☐ ☐ Interceptor Swale
- ☐ ☒ Riprap
- ☐ ☐ Diversion Dike
- ☐ ☐ Temporary Pipe Slope Drain
- ☐ ☒ Embankment for Erosion Control
- ☐ ☐ Paved Flumes
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____

2.2 SEDIMENT CONTROL BMPs:

T / P

- ☐ ☐ Biodegradable Erosion Control Logs
- ☐ ☐ Dewatering Controls
- ☐ ☐ Inlet Protection
- ☒ ☐ Rock Filter Dams/ Rock Check Dams
- ☐ ☐ Sandbag Berms
- ☒ ☐ Sediment Control Fence
- ☐ ☐ Stabilized Construction Exit
- ☐ ☐ Floating Turbidity Barrier
- ☐ ☐ Vegetated Buffer Zones
- ☐ ☐ Vegetated Filter Strips
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

Sediment control BMPs requiring design capacity calculations (See SWP3 Attachment 1.3.):

T / P

- ☐ ☐ Sediment Trap
  - ☐ Calculated volume runoff from 2-year, 24-hour storm for each acre of disturbed area
  - ☐ 3,600 cubic feet of storage per acre drained
- ☒ ☐ Sedimentation Basin
  - ☐ Not required (<10 acres disturbed)
  - ☐ Required (>10 acres) and implemented.
    - ☐ Calculated volume runoff from 2-year, 24-hour storm for each acre of disturbed area
    - ☐ 3,600 cubic feet of storage per acre drained
  - ☒ Required (>10 acres), but not feasible due to:
    - ☒ Available area/Site geometry
    - ☒ Site slope/Drainage patterns
    - ☐ Site soils/Geotechnical factors
    - ☐ Public safety
    - ☐ Other: _____

2.3 PERMANENT CONTROLS:

(Coordinate post-construction BMPs with appropriate TxDOT maintenance sections.)

BMPs To Be Left In Place Post Construction:

Type	Stationing	
	From	To

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.4 OFFSITE VEHICLE TRACKING CONTROLS:

- ☒ Excess dirt/mud on road removed daily
- ☒ Haul roads dampened for dust control
- ☒ Loaded haul trucks to be covered with tarpaulin
- ☐ Stabilized construction exit
- ☐ Daily street sweeping
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

2.5 POLLUTION PREVENTION MEASURES:

- ☒ Chemical Management
- ☒ Concrete and Materials Waste Management
- ☒ Debris and Trash Management
- ☒ Dust Control
- ☒ Sanitary Facilities
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

2.6 VEGETATED BUFFER ZONES:

Natural vegetated buffers shall be maintained as feasible to protect adjacent surface waters. If vegetated natural buffer zones are not feasible due to site geometry, the appropriate additional sediment control measures have been incorporated into this SWP3.

Type	Stationing	
	From	To

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.7 ALLOWABLE NON-STORMWATER DISCHARGES:

- ☒ Fire hydrant flushings
- ☒ Irrigation drainage
- ☒ Pavement washwater (where spills or leaks have not occurred, and detergents are not used)
- ☒ Potable water sources
- ☒ Springs
- ☒ Uncontaminated groundwater
- ☒ Water used to wash vehicles or control dust
- ☒ Other allowable non-stormwater discharges as allowed by TPDES GP TXR150000.

2.8 DEWATERING:

Dewatering discharges of accumulated stormwater, groundwater, and surface water including discharges from dewatering of trenches, excavations, foundations, vaults, and other points of accumulation are prohibited unless managed by appropriate controls to prevent and minimize the offsite discharge of sediment and other pollutants.

2.9 INSPECTIONS:

All disturbed areas and erosion and sediment control devices shall be inspected at least once every seven (7) days. Inspections shall be performed by TxDOT as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.5 of this SWP3.

When dewatering activities are present, a daily inspection will be conducted once per day during those activities and documented in accordance with CGP and TxDOT requirements.

2.10 MAINTENANCE:

Control measures shall be properly installed according to specifications. If it is determined that a BMP or control measure is not operating effectively, maintenance must be accomplished as soon as possible and before the next anticipated rain event, but in no case later than 7 calendar days after being able to access the site. Maintenance shall be performed by the Contractor as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.5 of this SWP3.

STATE OF TEXAS
AMANDA ANDERLE FLING
105989
LICENSED PROFESSIONAL ENGINEER

Amanda Anderle Fling, P.E.

01/27/2024

STORMWATER POLLUTION PREVENTION PLAN (SWP3)

July 2023 Sheet 2 of 2

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
			178
STATE	STATE DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	030	FM 794

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

Bird BMPs:

White-tailed hawk (Buteo albicaudatus) -
- Avoid vegetation clearing activities during the general bird nesting season, March through August, to minimize adverse impacts to birds.
- Prior to construction, perform daytime surveys for nests including under bridges and in culverts to determine if they are active before removal. Nests that are active should not be disturbed. If active nests are observed during surveys, TPWD recommends a 150-foot buffer of vegetation remain around the nests until the young have fledged or the nest is abandoned.
- Do not disturb, destroy, or remove active nests, including ground nesting birds, during the nesting season.

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 ☒

No further action required.

TxDOT is still required to notify DSHS 14 working days prior to any 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.

No Additional Comments

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 any 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	1133	02	030	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		179

DATE:
FILE:

VIII. OTHER ENVIRONMENTAL ISSUES	VIII. OTHER ENVIRONMENTAL ISSUES	VIII. OTHER ENVIRONMENTAL ISSUES
Section V continued: Bird BMPs: - If unoccupied, inactive nests will be removed, ensure that nests are not protected under the Endangered Species Act (ESA), MBTA, or BGEPA. - Prevent the establishment of active nests during the nesting season on TxDOT owned and operated facilities and structures proposed for replacement or repair. - Do not collect, capture, relocate, or transport birds, eggs, young, or active nests without a permit. - Minimize extended human presence near nesting birds during construction and maintenance activities. Protect sensitive habitat areas with temporary barriers or fencing to limit human foot traffic and off-road vehicle use to alert and discourage contractors from causing any unintentional impacts. - Minimize construction noise above ambient levels during general bird nesting season to minimize adverse impacts on birds. - Minimize construction lighting during the general bird nesting season by scheduling work activities between dawn and dusk.		

DATE:
FILE:

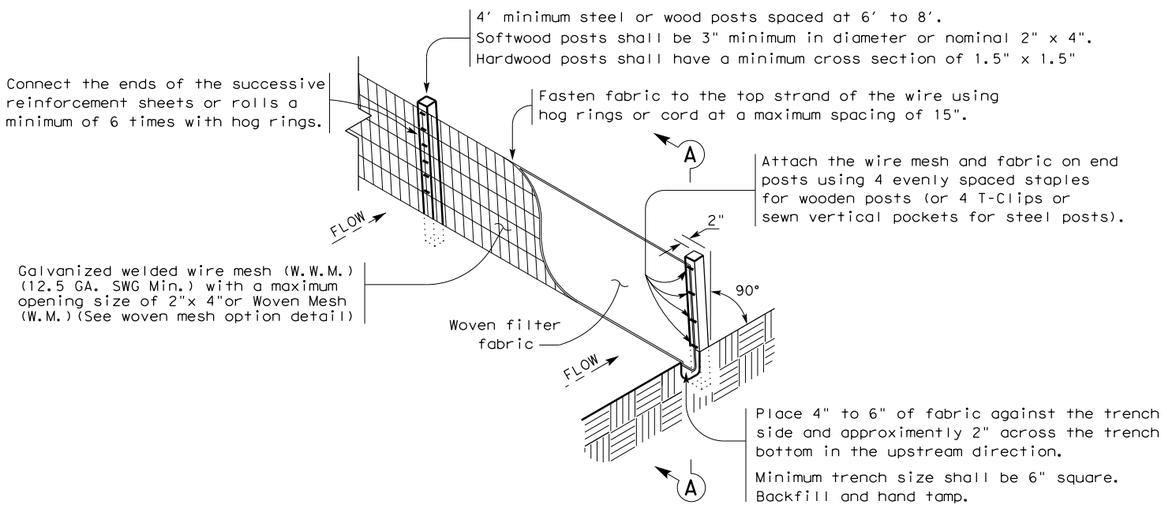
Texas Department of Transportation

TxDOT
Yoakum
District

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

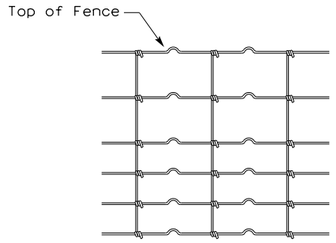
EPIC

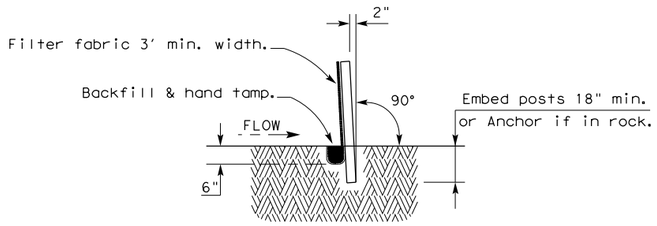
FILE: EPIC Sheet.dgn	DN:		CK:	DW:	CK:
© TxDOT: March 2017	CONT	SECT	JOB		HIGHWAY
REVISIONS	1133	02	030		FM 794
	DIST	COUNTY			SHEET NO.
	YKM	GONZALES			180



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.

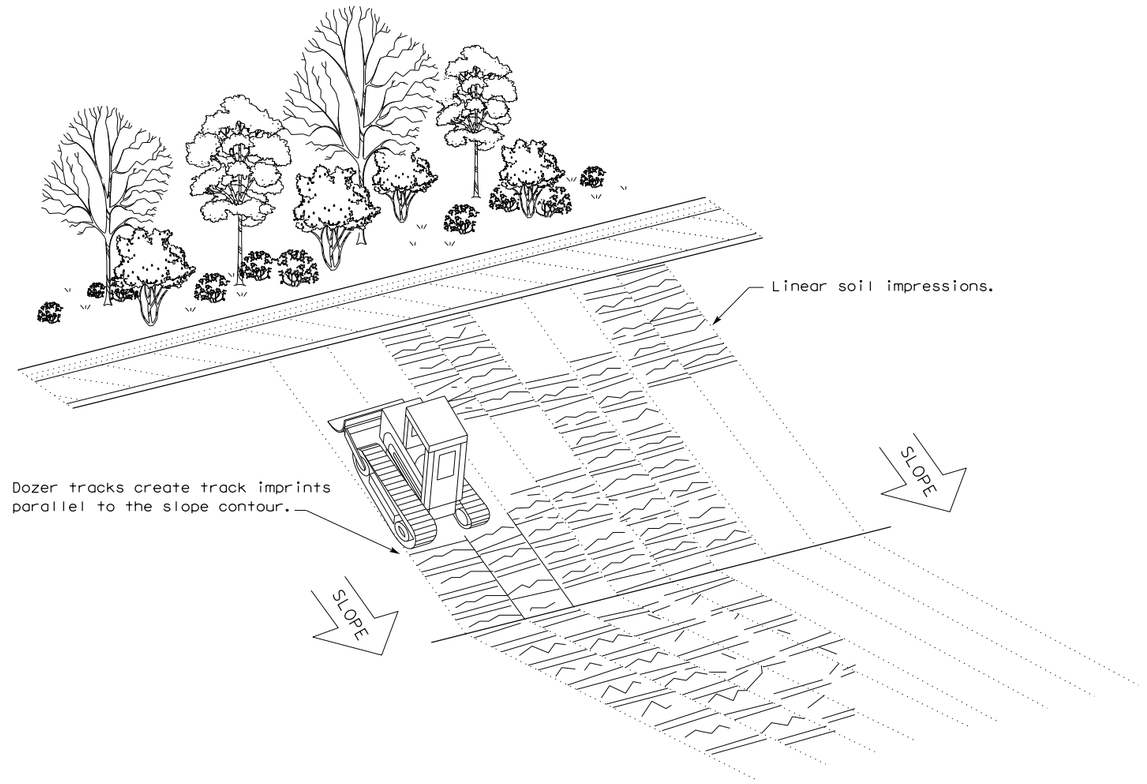
LEGEND

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	1133	02	030		FM 794		
	DIST	COUNTY					SHEET NO.
	YKM	GONZALES					181

10/17/2024
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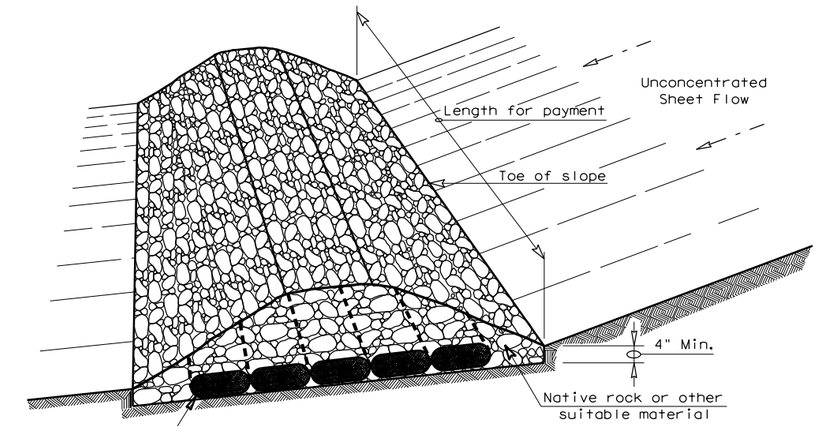
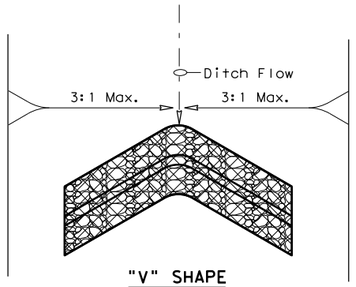
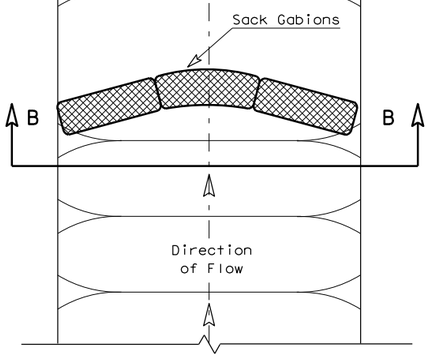


FILTER DAM AT TOE OF SLOPE

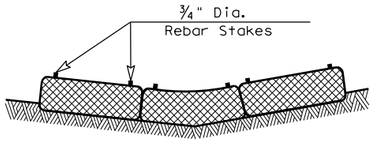
RFD1



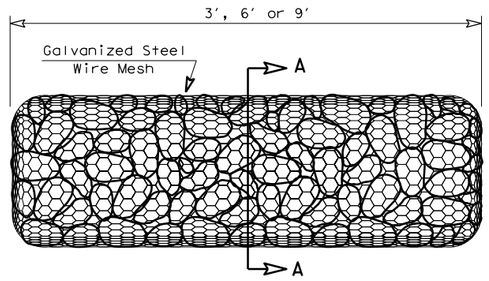
"V" SHAPE PLAN VIEW



PLAN VIEW

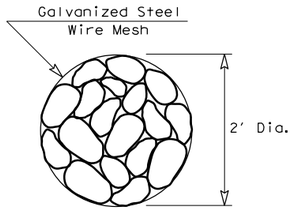


SECTION B-B

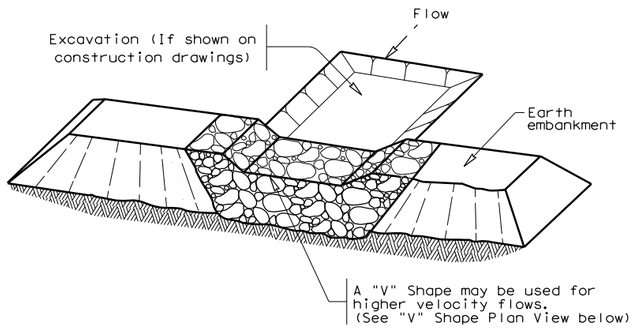


TYPE 4 (SACK GABIONS)

RFD4

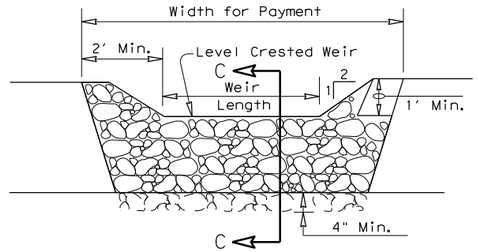


SECTION A-A

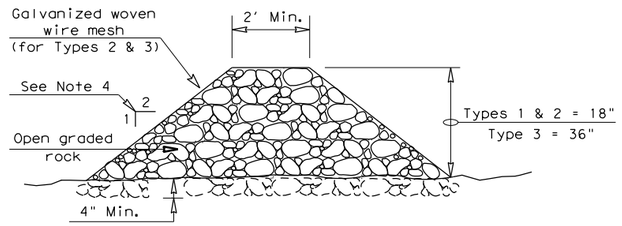


FILTER DAM AT SEDIMENT TRAP

RFD1 OR RFD2



PROFILE



SECTION C-C

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.

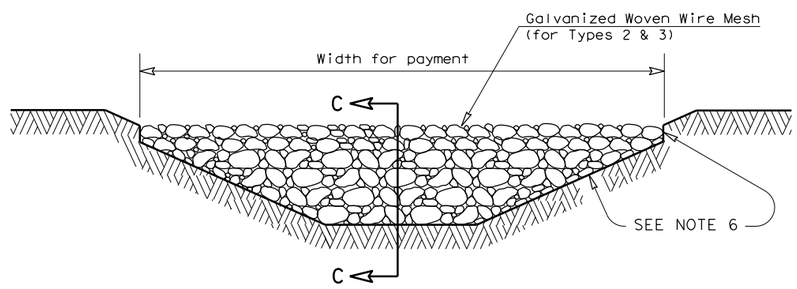
Type 1 (18" high with no wire mesh) (3" to 6" aggregate): Type 1 may be used at the toe of slopes, around inlets, in small ditches, and at dike or swale outlets. This type of dam is recommended to control erosion from a drainage area of 5 acres or less. Type 1 may not be used in concentrated high velocity 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.



FILTER DAM AT CHANNEL SECTIONS

RFD1 OR RFD2 OR RFD3

GENERAL NOTES

1. If shown on the plans or directed by the Engineer, filter dams should be placed near the toe of slopes where erosion is anticipated, upstream and/or downstream at drainage structures, and in roadway ditches and channels to collect sediment.
2. Materials (aggregate, wire mesh, sandbags, etc.) shall be as indicated by the specification for "Rock Filter Dams for Erosion and Sedimentation Control".
3. The rock filter dam dimensions shall be as indicated on the SW3P plans.
4. Side slopes should be 2:1 or flatter. Dams within the safety zone shall have sideslopes of 6:1 or flatter.
5. Maintain a minimum of 1' between top of rock filter dam weir and top of embankment for filter dams at sediment traps.
6. Filter dams should be embedded a minimum of 4" into existing ground.
7. The sediment trap for ponding of sediment laden runoff shall be of the dimensions shown on the plans.
8. Rock filter dam types 2 & 3 shall be secured with 20 gauge galvanized woven wire mesh with 1" diameter hexagonal openings. The aggregate shall be placed on the mesh to the height & slopes specified. The mesh shall be folded at the upstream side over the aggregate and tightly secured to itself on the downstream side using wire ties or hog rings. For in stream use, the mesh should be secured or staked to the stream bed prior to aggregate placement.
9. Sack Gabions should be staked down with ¾" dia. rebar stakes, and have a double-twisted hexagonal weave with a nominal mesh opening of 2 ½" x 3 ¼"
10. Flow outlet should be onto a stabilized area (vegetation, rock, etc.).
11. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

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	1133	02	030	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		182

DATE: 1/27/2024
FILE: $FILE$

I. WORK AT CROSSING LOCATIONS (AT GRADE, HIGHWAY OVERPASS, HIGHWAY UNDERPASS, PEDESTRIAN, OR CLOSED/ABANDONED)

☐ This project is adjacent or parallel work, not within RR ROW:

DOT No.: 742684Y
Crossing Type: AT GRADE
RR Company Operating Track at Crossing: UNION PACIFIC RAILROAD
RR Company Owning Track at Crossing: UNION PACIFIC RAILROAD
RR MP: 144.310
RR Subdivision: GLIDDEN
City: HARWOOD
County: GONZALES
CSJ at this Crossing: 1133-02-030
Latitude: 29.6657238
Longitude: -97.5052111

Scope of Work, including any TCP, to be performed by State Contractor:

AN ASPHALTIC CONCRETE PAVEMENT OVERLAY WILL BE COMPLETED ON FM 794 THROUGH RAILROAD RIGHT OF WAY. THE OVERLAY WILL INCLUDE THE REMOVAL (MILLING) AND REPLACEMENT (OVERLAY) OF THE EXISTING SURFACE. CULVERT WORK WILL BE PERFORMED WITHIN RAILROAD RIGHT OF WAY AS WELL. DURING THE ONE LANE TWO-WAY TRAFFIC CONTROL OPERATIONS A RAILROAD FLAGGER AND CONSTRUCTION FLAGGER MUST BE PRESENT FOR THE DURATION OF THE WORK THROUGH UPRR RIGHT OF WAY.

Scope of Work to be performed by Railroad Company:

NONE

II. FLAGGING & INSPECTION

No. of Days of Railroad Flagging Expected: 10

On this project, night or weekend flagging is:

☐ Expected
☑ Not Expected

Flagging services will be provided by:

☐ Railroad Company: 1) Txdot will pay flagging invoices. Flagging Agreement with railroad will be needed or, 2) Permitted crossing. Railroad company to provide flagging.
☑ Outside Party: Contractor will pay flagging invoices to be reimbursed by TxDOT

Contractor must incorporate flaggers into anticipated construction schedule. The Railroad requires a 30-day notice if their flaggers are to be utilized. If Contractor falls behind schedule due to their own negligence and is not ready for scheduled flaggers, any flagging charges will be paid by Contractor.

Contact Information for Flagging:

☑ **UPRR** UP.info@railpros.com
Call Center 877-315-0513, Select #1 for flagging
UP.request@nrssinc.net
Call Center 877-984-6777

☐ **BNSF** BNSFinfo@railprosfs.com
Call Center 877-315-0513, Select #1 for flagging

☐ **CPKCR** KCS.info@railpros.com
Call Center 877-315-0513, Select #1 for flagging
Bottom Line On-Track Safety Services
bottomline076@aol.com, 903-767-7630

☐ OTHERS:

Contractor must incorporate railroad construction inspection into anticipated construction schedule.

☑ Not Required
☐ Required. Contact Information for Construction Inspection:

III. CONSTRUCTION WORK TO BE PERFORMED BY THE RAILROAD

☐ Required.
☑ Not Required

Railroad Point of Contact: _____

Coordinate with TxDOT for any work to be performed by the Railroad Company. TxDOT must issue a work order for any work done by the Railroad Company prior to the work being performed.

IV. RAILROAD INSURANCE REQUIREMENTS

The Contractor shall confirm the insurance requirements with the Railroad as the insurance limits are subject to change without notice.

Insurance policies and corresponding certificates of insurance must be issued by the contractor on behalf of the Railroad. Separate insurance policies and certificates are required when more than one Railroad Company is operating on the same right of way, or when several Railroad Companies are involved and operate on their own separate right of ways.

No direct compensation will be made to the Contractor for providing the insurance coverages shown below or any deductibles. These costs are incidental to the various bid items.

Escalated Limits

Type of Insurance	Amount of Coverage (Minimum)
Workers Compensation	$500,000 / $500,000 / $500,000
Commercial General Liability	$2,000,000 / $4,000,000
Business Automobile	$2,000,000

Railroad Protective Liability Limits

☐ Not Required	
☑ Non - Bridge/Typical Maintenance Projects. Includes repairs to overpass/underpass and culvert structures	$2,000,000 / $6,000,000
☐ Bridge Structure Projects. Includes new construction or replacement of overpass/ underpass structures	$5,000,000 / $10,000,000
☐ Other: _____	

V. CONTRACTOR'S RIGHT OF ENTRY (CROE)

☐ Not Required
☑ Required: UPRR Maintenance Consent Letter. TxDOT to assist
☐ Required: TxDOT to assist in obtaining the UPRR CROE
☐ Required: Contractor to obtain
- ☐ BNSF: _____
  https://bnsf.railpermitting.com
- ☐ CPKCR
  https://jllrpg.360works.com/fmi/webd/rpo_web_kcs.fmp12
- ☐ Other Railroads: _____

To view previously approved CROE templates agreed upon between the State and Railroad, see: https://www.txdot.gov/business/resources/railroad-highway-crossing/sample-right-of-entry-agreements.html

Approved CROE templates are not to be modified by the Contractor.

Contractor shall not operate within Railroad Right of Way without an executed Construction & Maintenance Agreement between the State and the Railroad and an executed CROE between the Contractor and the Railroad if required on project.

VI. RAILROAD COORDINATION MEETING

A Railroad Coordination Meeting is required. See item 5, Article 8.1, of the Standard Specifications for Construction and Maintenance of Highways, Streets and Bridges Manual for more details.

VII. RAILROAD SAFETY ORIENTATION

A. Complete the Railroad's course "Orientation for Contractor's Safety," and maintain registration prior to working on the Railroad's property. This course is required to be completed annually by Contractor and Subcontractor personnel working on site.

UPRR, BNSF, CPKCR will not accept on-track safety training certificates from other Railroads. Refer to each Railroad's specific contractor right of entry for training information.

Know and follow the Contractor's Right of Entry Agreement EXHIBIT D, MINIMUM SAFETY REQUIREMENTS regarding clothing, personal protective equipment, and general safety requirements.

VIII. SUBCONTRACTORS

Contractor shall not subcontract work without written consent of TxDOT. Subcontractors are subject to the same insurance requirements as the Prime Contractor.

IX. EMERGENCY NOTIFICATION

In Case of Railroad Emergency
Call: UNION PACIFIC RAILROAD
Railroad Emergency Line at: 888-877-7267
Location: DOT 742684Y
RR Milepost: 144.310
Subdivision: GLIDDEN

RRD Review Only
Initials: _____
Date: 09/08/2023

Texas Department of Transportation — Rail Division

RAILROAD SCOPE OF WORK
PROJECT SPECIFIC DETAILS

FILE: rr-scope-of-work.pdf		DN: TxDOT	CK:	DW:		CK:	
© TxDOT June 2014		CONT	SECT	JOB		HIGHWAY	
REVISIONS		1133	02	030		FM 794	
6/2023		DIST	COUNTY			SHEET NO.	
		YKM	GONZALES			183	

PART 1 - GENERAL

1.01 DESCRIPTION

This project includes construction work within the right of way and/or properties of the Railroad and adjacent to its tracks, wire lines and other facilities. These sheets describe the minimum special requirements for coordination with the Railroad when working upon, over or under Railroad Right of Way or when impacting current or future Railroad operations. Coordinate with the Railroad while performing the work outlined herein, and afford the same cooperation with the Railroad as with TxDOT. Complete all submittals and work in accordance with TxDOT Standard Specifications, Railroad Guidelines and AREMA recommendations as modified by these minimum special requirements or as directed in writing by the Railroad Designated Representative.

For purposes of this project, the Railroad Designated Representative is the person or persons designated by the Railroad Manager of Industry and Public Projects to handle specific tasks related to the project.

1.02 REQUEST FOR INFORMATION / CLARIFICATION

Submit Requests for Information ("RFI") involving work within any Railroad Right of Way to the TxDOT Engineer. The TxDOT Engineer will submit the RFI to the Railroad Designated Representative for review and approval for RFI's corresponding to work within Railroad Right of Way. Allow six (6) weeks total time for review and approval, which includes four (4) weeks for review and approval by the Railroad.

1.03 PLANS / SPECIFICATIONS

TxDOT has received written Railroad approval of the plans and specifications for this project. Any revisions or changes in the plans after award of the Contract must have the approval of TxDOT and the Railroad.

PART 2 - UTILITIES AND FIBER OPTIC

Construct all utility installations in accordance with current AREMA recommendations, Railroad, TxDOT and owning utility specifications and requirements. Railroad general guidelines can be found on the Railroad website or by contacting the Railroad Designated Representative.

PART 3 - CONSTRUCTION

3.01 GENERAL

A. Perform all work in compliance with all applicable Railroad, Federal Railroad Administration (FRA), and TxDOT rules and regulations. Arrange and conduct work in a manner that does not endanger or interfere with the safe operation of the tracks and property of the Railroad and the traffic moving on such tracks, or the wires, signals and other property of the Railroad, its tenants or licensees, at or in the vicinity of the Work. The safe operation of railroad train movements takes precedence over any work to be performed by the Contractor. The Contractor is responsible for train delay cost and lost revenue claims due to any delays or interruption of train operations resulting from Contractor's construction or other activities.

B. Construction activities within 15 feet of the operational tracks will only be allowed if absolutely necessary and the Railroad's Designated Representative grants approval. Construction activities within 15 feet of the operational track(s) preferably allow the tracks to stay operational. In such cases, coordination and approval by the Railroad Track Manager is required with regard to schedule, flagging, and slow orders. See Sections 3.07 and 3.08 for additional information.

C. Provide track protection for all work equipment (including rubber tired equipment) operating within 25 feet from nearest rail. When not in use, keep Contractor machinery and materials at least 50 feet from the Railroad's nearest track.

D. Vehicular crossings of railroad track are allowed only at existing crossings, or haul road crossings developed with Railroad approval.

E. The Contractor is also advised that new railroad facilities within the project may be built by the Railroad. If applicable, these facilities are delineated in the plans. Be aware of the limits of responsibilities and coordinate efforts with the Railroad and TxDOT.

F. Railroad requirements do not allow work within 50 feet of track centers when a train passes the work site and all personnel must clear the area within 50 feet of the track centerline and secure all equipment. Additional allowances may be pursued as outlined in 3.02 and 3.03.

G. All permanent clearances shall be verified before project closing.

3.02 RAILROAD OPERATIONS

A. Trains and/or equipment are expected on any track, at any time, in either direction. Become familiar with the train schedules in this location and structure bid assuming intermittent track windows in this period, as defined in Paragraph B that follows.

B. All railroad tracks within and adjacent to the contract site are active, and rail traffic over these facilities shall be maintained throughout the Project. Activities may include both through moves and switching moves to local customers. railroad traffic and operations will occur continuously throughout the day and night on these tracks and shall be maintained at all times as defined herein. Coordinate and schedule the work so that construction activities do not interfere with railroad operations.

C. Coordinate work windows with TxDOT and the Railroad's Designated Representative. Types of work windows include Conditional Work Windows and Absolute Work Windows, as defined below:

1. Conditional Work Window: A Conditional Work Window is a period of time that railroad operations have priority over construction activities. When construction activities may occur on and/or adjacent to the railroad tracks within 25 feet of the nearest track, a railroad flag person will be required. At the direction of the railroad flag person, upon approach of a train, and when trains are present on the tracks, the tracks must be cleared (i.e., no construction equipment, materials or personnel within 25 feet, or as directed by the Railroad Designated Representative, from the tracks). Conditional Work Windows are available for the Project.

2. Absolute Work Window: An Absolute Work Window is a period of time that construction activities are given priority over railroad operations. During this time frame, the designated railroad track(s) will be inactive for train movements and may be fouled by the Contractor. At the end of an Absolute Work Window, the railroad tracks and/or signals must be completely operational for train operations and all Railroad, Public Utilities Commission (PUC) and FRA requirements, codes and regulations for operational tracks must be satisfied. In the situation where the operating tracks and/or signals have been affected, the Railroad will perform inspections of the work prior to placing that track back into service. Railroad flag persons will be required for construction activities requiring an Absolute Work Window. Absolute Work Windows will not generally be granted. Any request will require a detailed explanation for Railroad review.

3.03 RIGHT OF ENTRY, ADVANCE NOTICE AND WORK STOPPAGES

A. Do not perform any work within Railroad Right of Way without a valid executed Right of Entry Agreement if required on this project.

B. Give advance notice to the Railroad as required in the "Contractor's Right of Entry Agreement" before commencing work in connection with construction upon or over Railroad Right of Way and observe the Railroad's rules and regulations with respect thereto.

C. Perform all work upon Railroad Right of Way in a manner to avoid interference with or endanger the operations of the Railroad. Whenever work may affect the operations or safety of trains, submit the work method to the Railroad Designated Representative for approval. Approval does not relieve the Contractor from liability. Do not commence any work which requires flagging service or inspection service until the flagging protection required by the Railroad is available at the job site. See Section 3.15 for railroad flagging requirements.

D. Make requests in writing for both Absolute and Conditional Work Windows, at least 30 days in advance of any work. Include in the written request:
1. Exactly what the work entails.
2. The days and hours that work will be performed.
3. The exact location of work, and proximity to the tracks.
4. The type of window requested and the amount of time requested.
5. The designated contact person.

Provide a written confirmation notice to the Railroad at least 48 hours before commencing work in connection with approved work windows when work is within 25 feet of nearest rail. Perform all work in accordance with previously approved work plans.

E. Make provisions to protect operations and property of the Railroad should a condition arising from, or in connection with the work, require immediate and unusual action. If in the judgment of the Railroad Designated Representative such provisions are insufficient, the Railroad Designated Representative may require or provide such provisions as deemed necessary. In any event, such provisions shall be at the Contractor's expense and without cost to the Railroad or TxDOT. The Railroad or TxDOT shall have the right to order the Contractor to temporarily cease operations in the event of an emergency or, if in the opinion of the Railroad Designated Representative, the Contractor's operations could endanger railroad operations. In the event of such an order, immediately notify TxDOT of the order.

3.04 INSURANCE

Do not begin work upon or over Railroad Right of Way until furnishing the Railroad with the insurance policies, binders, certificates and endorsements required by the "Contractor's Right of Entry Agreement", and until the Railroad Designated Representative has advised TxDOT that such insurance is in accordance with the Agreement.

3.05 RAILROAD SAFETY ORIENTATION

A. Complete the railroad course "Orientation for Contractor's Safety", and maintain current registration prior to working on railroad property. This course is required to be completed annually by Contractor and Subcontractor personnel working on site.

"UPRR, BNSF, KCS/TEXMEX will not accept on-track safety training certificates from other railroads. Refer to Railroad specific contractor right of entry for training information."

B. Know and follow the "Contractor's Right of Entry Agreement" EXHIBIT D, MINIMUM SAFETY REQUIREMENTS regarding clothing, personal protective equipment, and general safety requirements.

3.06 COOPERATION

The Railroad will cooperate with Contractor so that work may be conducted in an efficient manner, and will cooperate with Contractor in enabling use of Railroad Right of Way in performing the work.

3.07 MINIMUM CONSTRUCTION CLEARANCES FOR FALSEWORK AND OTHER TEMPORARY STRUCTURES

Abide by the following minimum temporary clearances during the course of construction:
A. 15' - 0" (BNSF)(UPRR)and 14'-0" (KCS) horizontal from centerline of track
B. 22' (KCS) and 21' - 6" (UPRR & BNSF) vertically above top of rail.

For construction clearance less than listed above, obtain local Railroad Operating Unit review and approval.

3.08 APPROVAL OF REDUCED CLEARANCES

A. Maintain minimum track clearances during construction as specified in Section 3.07.

B. Submit any proposed infringement on the specified minimum clearances to the Railroad Designated Representative through TxDOT at least 30 days in advance of the work. Do not proceed with such infringement without written approval by the Railroad Designated Representative.

C. Do not commence work involving an approved infringement without receiving written assurance from the Railroad Designated Representative that arrangements have been made for any necessary flagging service.

Texas Department of Transportation | Rail Division

RAILROAD REQUIREMENTS FOR NON-BRIDGE CONSTRUCTION PROJECTS

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT October 2018	CONT	SECT	JOB	HIGHWAY
REVISIONS March 2020	1133	02	030	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		184

DATE: 1/27/2024 $TIME$
FILE: $FILE$

3.09 MAINTENANCE OF RAILROAD FACILITIES

A. Maintain all ditches and drainage structures free of silt or other obstructions resulting from Contractor's operations. Repair eroded areas and any other damage within Railroad Right of Way and repair any other damage to the property of the Railroad, or its tenants.

B. Perform all such maintenance and repair of damages due to the Contractors's operations at Contractor's expense.

C. Submit a proposed method of erosion control for review by the Railroad prior to beginning any grading on the project site. Comply with all applicable local, state and federal regulations when developing and implementing such erosion control.

3.10 SITE INSPECTIONS BY RAILROAD's DESIGNATED REPRESENTATIVE

A. In addition to the office reviews of construction submittals, site inspections may be performed by the Railroad Designated Representative at significant points during construction, including the following if applicable:
   1. Pre-construction meetings.
   2. Pile driving/drilling of caissons or drilled shafts.
   3. Reinforcement and concrete placement for railroad bridge substructure and/or superstructure.
   4. Erection of precast concrete or steel bridge superstructure.
   5. Placement of waterproofing (prior to placing ballast on bridge deck).
   6. Completion of the bridge structure.

B. Site inspection is not limited to the milestone events listed above. Site visits to check progress of the work may be performed at any time throughout the construction as deemed necessary by the Railroad.

C. Provide a detailed construction schedule, including the proposed temporary horizontal and vertical clearances and construction sequence for all work to TxDOT for submittal to the Railroad Designated Representative for review prior to commencement of work. Include the anticipated dates when the above listed events will occur. Update this schedule for the above listed events as necessary and each month at a minimum to allow the Railroad to schedule site inspections.

3.11 RAILROAD REPRESENTATIVES

Railroad representatives, conductors, flag person or watch person will be provided by the Railroad at expense of TxDOT to protect Railroad facilities, property and movements of its trains or engines. In general, the Railroad will furnish such personnel or other protective services as follows:

A. When any part of any equipment is standing or being operated within 25 feet, measured horizontally, from nearest rail of any track on which trains may operate, or when any object is off the ground and any dimension thereof could extend inside the 25 foot limit, or when any erection or construction activities are in progress within such limits, regardless of elevation above or below track.

B. For any excavation below elevation of track subgrade if, in the opinion of the Railroad Designated Representative, track or other railroad facilities may be subject to settlement or movement.

C. During any clearing, grubbing, excavation or grading in proximity to railroad facilities, which, in the opinion of the Railroad Designated Representative, may endanger railroad facilities or operations.

D. During any Contractor's operations when, in the opinion of the Railroad Designated Representative, railroad facilities, including, but not limited to, tracks, buildings, signals, wire lines, or pipe lines, may be endangered.

E. Arrange with the Railroad Designated Representative to provide the adequate number of flag persons to accomplish the work.

3.12 COMMUNICATIONS AND SIGNAL LINES

If required, the Railroad will rearrange its communications and signal lines, its grade crossing warning devices, train signals and tracks, and facilities that are in use and maintained by the Railroad's forces in connection with its operation at expense of TxDOT. This work by the Railroad will be done by its own forces and it is not a part of the Work under this Contract.

3.13 TRAFFIC CONTROL

Coordinate any operations that control traffic across or around railroad facilities with the Railroad Designated Representative.

3.14 CONSTRUCTION EXCAVATIONS AND BORING ACTIVITIES UNDER TRACK

A. Take special precaution and care in connection with excavating and shoring. Excavations for construction of footings, piers, columns, walls or other facilities that require shoring shall comply with requirements of TxDOT, OSHA, AREMA and Railroad "Guidelines for Temporary Shoring".

B. The project plans indicate whether there are fiber optic lines or other such telecommunications systems that require consideration. Regardless, contact the necessary call center to determine if such cable systems are present:

   UPRR 1-800-336-9193
   7:00 AM to 9:00 PM CST Monday-Friday except holidays,
   staffed 24 hrs/day for emergencies
   48 hrs notice required

   BNSF 1-800-533-2891
   24 hour number
   5 working days notice required

   KCS 1-800-344-8377
   Texas One Call, a 24 hour number
   48 hrs notice required, excluding weekends and holidays

   If a telecommunications system is buried anywhere on or near railroad property, coordinate with TxDOT, the Railroad and the Telecommunication Company(ies) to arrange for relocation or protective measures prior to beginning work on or near railroad property. Refer to the project General Notes for additional information.

C. Projects involving a boring or jack and bore operation under track such as drainage pipes or culverts and utilities require an installation plan reviewed and approved by the Railroad and TxDOT prior to proceeding with such construction. A railroad inspector and contractor assisted monitoring of ground and track movement is required to maintain safe passage of rail traffic. Stop installation and do not allow passage of trains if movements in excess of 1/4 inch vertical or horizontal is detected in the tracks. Immediately repair the damage to the satisfaction of TxDOT and the Railroad before proceeding.

3.15 RAILROAD FLAGGING

Per the Right of Entry Agreement for flagging, notify the Railroad Representative at least 10 working days in advance of Contractor's work and at least 30 working days in advance of any Contractor's work in which any person or equipment will be within 25 feet of nearest rail or as specified in the Contractor Right of Entry (CROE).

3.16 CLEANING OF RIGHT-OF-WAY

When work is complete, remove all tools, implements, and other materials brought into Railroad Right of Way and leave the right of Way in a clean and presentable condition to the satisfaction of TxDOT and the Railroad.

Texas Department of Transportation | Rail Division

RAILROAD REQUIREMENTS FOR NON-BRIDGE CONSTRUCTION PROJECTS

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS March 2020	1133	02	030	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		185

DATE: 1/27/2024 $TIME$
FILE: $FILE$