100% SUBMITTAL

INDEX OF SHEETS

SEE SHEET 2 FOR INDEX OF SHEETS

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

PROJECT NO. F 2B23(052)

CSJ: 0579-02-014

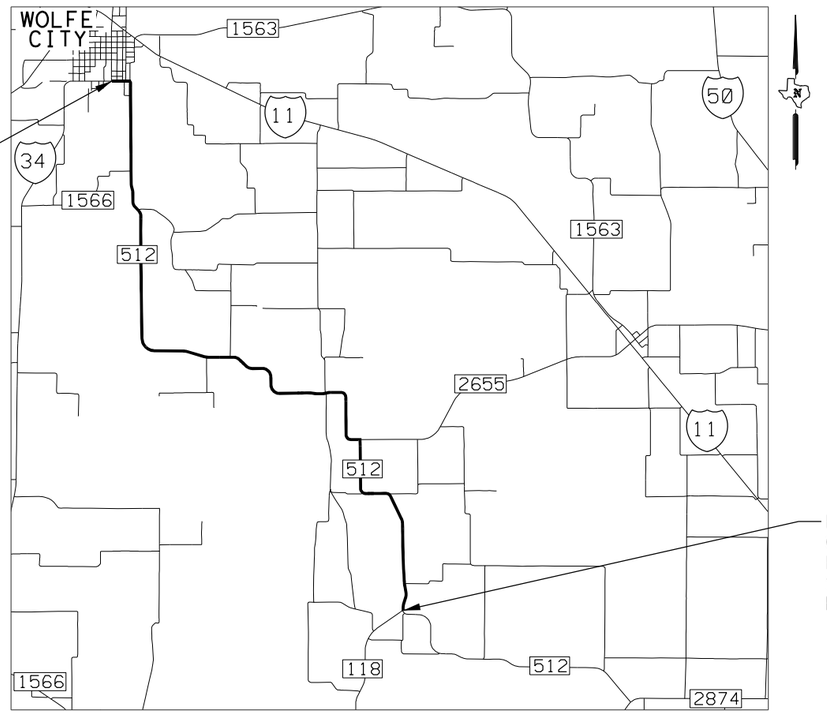
NET LENGTH OF ROADWAY = 50,561.22 FT = 9.576 MI.
NET LENGTH OF BRIDGE = 242.11 FT = 0.046 MI.
NET LENGTH OF PROJECT = 50,803.33 FT = 9.622 MI.

FM 512
HUNT COUNTY

LIMITS: FROM SH 34 TO FM 118

FOR THE CONSTRUCTION OF: REHBILITIATION OF EXISTING ROAD
CONSISTING OF REWORKING BASE, GEOGRID, FLEXBASE, CEMENT TREATING, 2CST

BEGIN PROJECT
CSJ: 0579-02-014
FM 512
STA: 0+50.00
REF MRK: 220+1.896



END PROJECT
CSJ: 0579-02-014
FM 512
STA: 508+53.33
REF MRK: 232+1.620

EXCEPTIONS: N/A
EQUATIONS: N/A
RAILROAD CROSSINGS: N/A

FHWA TEXAS DIVISION			SHEET NO. 1
STATE	DISTRICT	COUNTY	
TEXAS	PARIS	HUNT	
CONTROL	SECTION	JOB	HIGHWAY NO.
0579	02	014	FM 512

FUNCTIONAL CLASS = MAJOR COLLECTOR
DESIGN SPEED = 30 MPH
A.D.T. (2023) = 1000
A.D.T. (2043) = 1300

FINAL PLANS

LETTING DATE:

DATE CONTRACTOR BEGAN WORK:

DATE WORK WAS COMPLETED:

DATE WORK WAS ACCEPTED:

ORIGINAL CONTRACT WORKING DAYS:

USED OF WORKING DAYS

NO. OF CHANGE ORDERS:

FINAL CONTRACT COST:

PERCENT OVER/UNDER RUN:

CONTRACTOR:

I CERTIFY THAT THIS PROJECT WAS BUILT IN ACCORDANCE WITH PLANS AND SPECIFICATIONS.

AREA ENGINEER DATE

REQUIRED SIGNS SHALL BE IN ACCORDANCE WITH BC (1)- 21 THRU BC (12)- 21 AND THE "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES".

100% SUBMITTAL

STATE OF TEXAS
CHARLES M. SHINE
62999
LICENSED
PROFESSIONAL ENGINEER

5/24/2023

Charles M. Shine P.E.

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, NOVEMBER 1, 2014 AND SPECIFICATION ITEMS LISTED AND DATED AS FOLLOWS, SHALL GOVERN ON THIS PROJECT: REQUIRED CONTRACT PROVISIONS FOR ALL FEDERAL-AID CONSTRUCTION CONTRACTS (FORM FHWA 1273, JULY 5, 2022)

RECOMMENDED FOR LETTING: 5/26/2023
DocuSigned by:
18841028B1974EC... P.E.
TP&D DIRECTOR

RECOMMENDED FOR LETTING: 5/26/2023
DocuSigned by:
James Atkins M
A2C81980FB8844... AREA ENGINEER

APPROVED FOR LETTING: 5/30/2023
DocuSigned by:
Kod Paramanantham
AF7AF41AFE6049... DISTRICT ENGINEER

FILE: Z:\Transportation\TxDOT\PS&E\STATEWIDE 36-9IDP5101\WA2-TxDOT Paris\Project Data\FM 512 (0579-02-014)\CADD\DGN\01*GENERAL\FM512*GNNTS.dgn
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100% SUBMITTAL

INDEX OF SHEETS

STATE OF TEXAS
PAUL A. WARDEN
101319
LICENSED
PROFESSIONAL ENGINEER

Paul A. Warden, P.E. 5/24/2023

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

_____ ,P.E.
SIGNATURE OF REGISTRANT DATE

STATE OF TEXAS
JUAN E. TREVINO-GUERRA
141908
LICENSED
PROFESSIONAL ENGINEER

5/24/2023

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

_____ ,P.E.
SIGNATURE OF REGISTRANT DATE

IDCUS PLANNERS ENGINEERS MANAGERS
8632 Fredericksburg Rd.
Suite 200
San Antonio, Tx. 78240
(210) 448-1800
FIRM # F-6825

Texas Department of Transportation

FM 512

INDEX OF SHEETS

SHEET 1 OF 1

		HIGHWAY NO
		FM 512

STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	2
CONTROL	SECTION	JOB	
0579	02	014	

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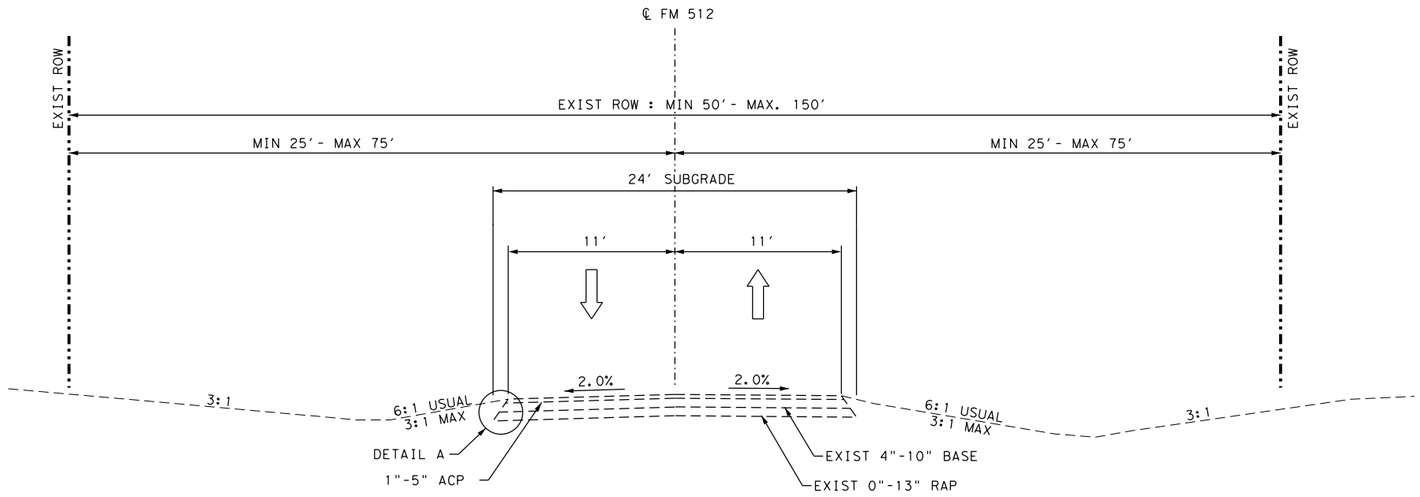
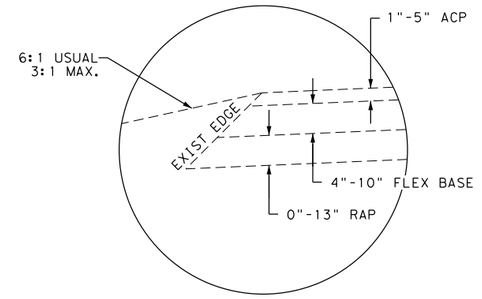
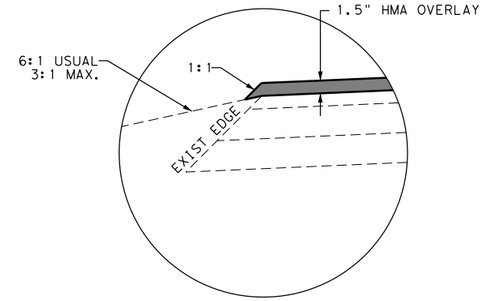


FM 512 EXISTING TYPICAL SECTION

STA 0+50.00 TO STA 452+54.00
STA 453+54.00 TO STA 508+53.33



DETAIL A



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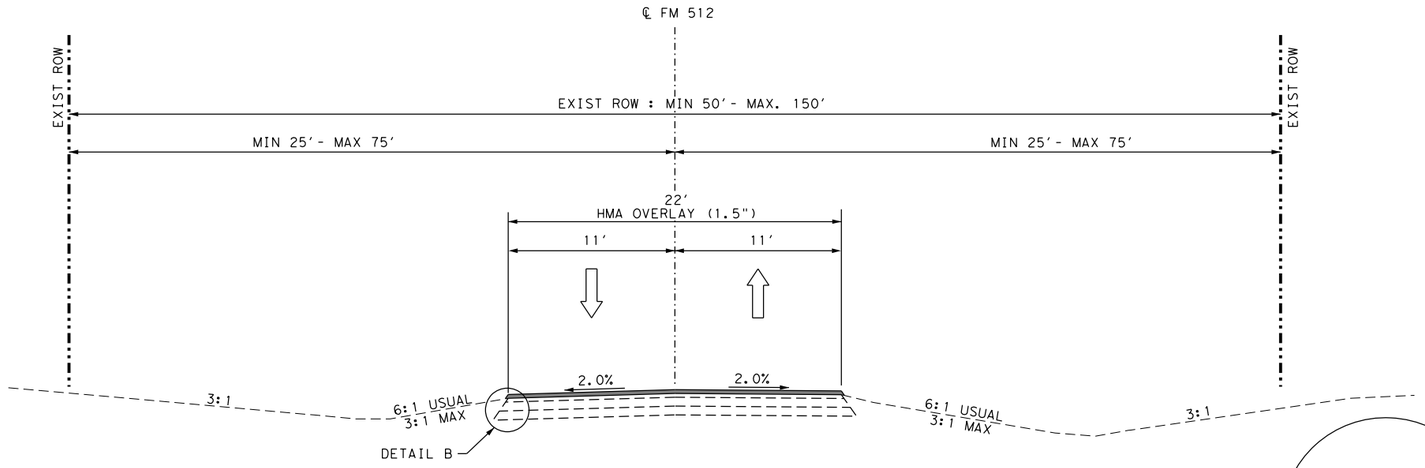
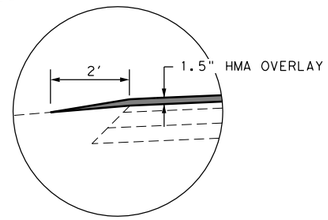


FM 512 PROPOSED TYPICAL SECTION
HMA OVERLAY

STA 0+50.00 TO STA 13+50.00



DETAIL AT DRIVEWAY LOCATIONS
STA 0+50.00 TO STA 13+50.00

SCALE: NTS

STATE OF TEXAS
PAUL A. WARDEN
101319
LICENSED
PROFESSIONAL ENGINEER

Paul A. Warden, P.E. 5/24/2023

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PLANNERS ENGINEERS MANAGERS
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(210) 448-1800
FIRM # F-6825

Texas Department of Transportation

FM 512

TYPICAL SECTIONS

SHEET 1 OF 4

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	3
CONTROL	SECTION	JOB	
0579	02	014	

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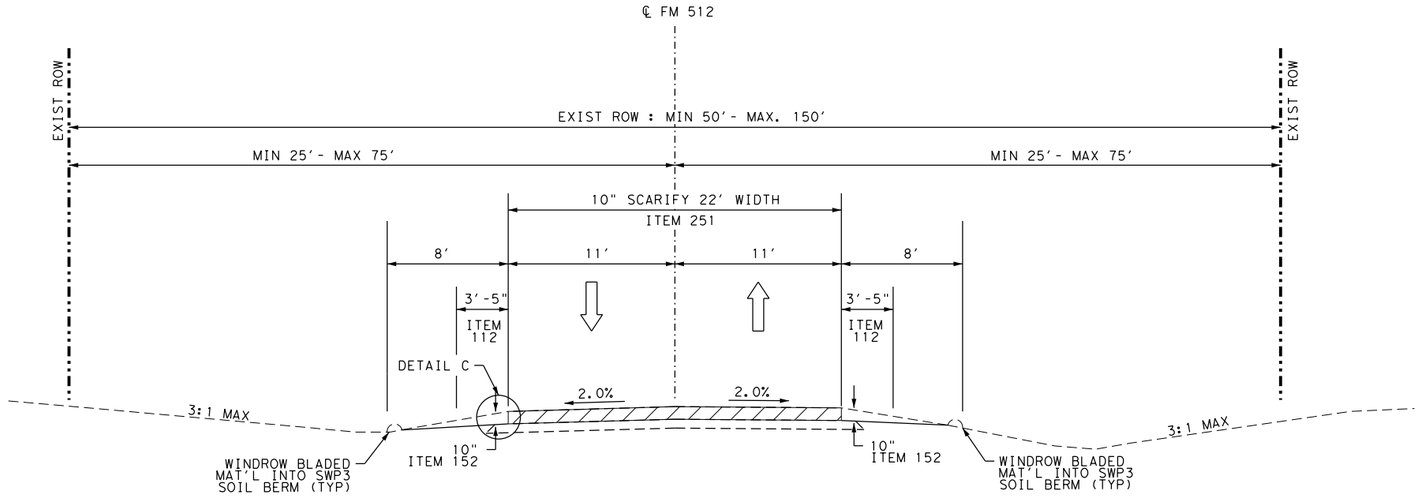
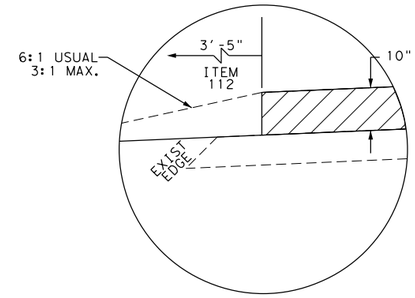


PROPOSED TYPICAL SECTION
EXISTING ACP AND BASE SCARIFICATION & SUBGRADE WIDENING

STA 13+50.00 TO STA 452+54.00
STA 453+54.00 TO STA 508+53.33



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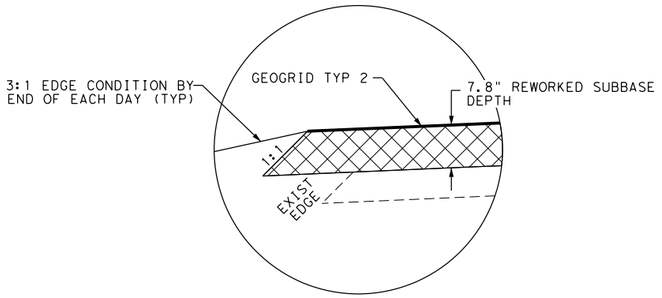

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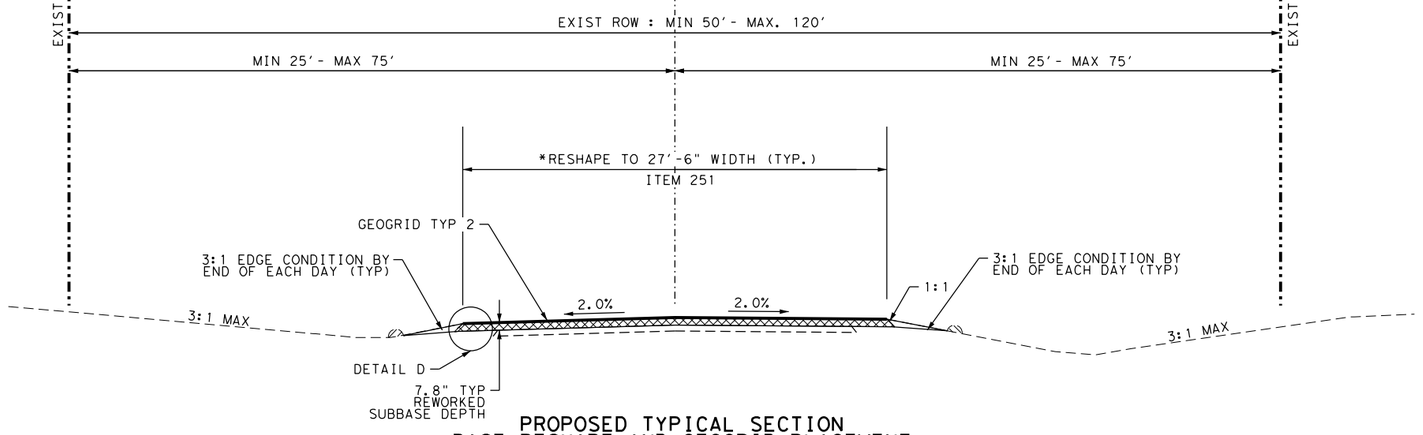

PROPOSED TYPICAL SECTION
BASE RESHAPE AND GEOGRID PLACEMENT

STA 13+50.00 TO STA 452+54.00
STA 453+54.00 TO STA 508+53.33

*WIDTH VARIES AT BRIDGE TRANSITIONS
23-3" TO 27'-6" STA 13+50.00 TO STA 14+50.00
27'-6" TO 23-3" STA 452+04.00 TO STA 452+54.00
23-3" TO 27-6" STA 453+54.00 TO STA 454+04.00

SCALE: NTS

STATE OF TEXAS
PAUL A. WARDEN
101319
LICENSED
PROFESSIONAL ENGINEER
Paul A. Warden, P.E. 5/24/2023

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PLANNERS ENGINEERS MANAGERS
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(210) 448-1800
FIRM # F-6825

Texas Department of Transportation

FM 512

TYPICAL SECTIONS

SHEET 2 OF 4

			HIGHWAY NO.
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	PARIS	HUNT	4
CONTROL	SECTION	JOB	
0579	02	014	

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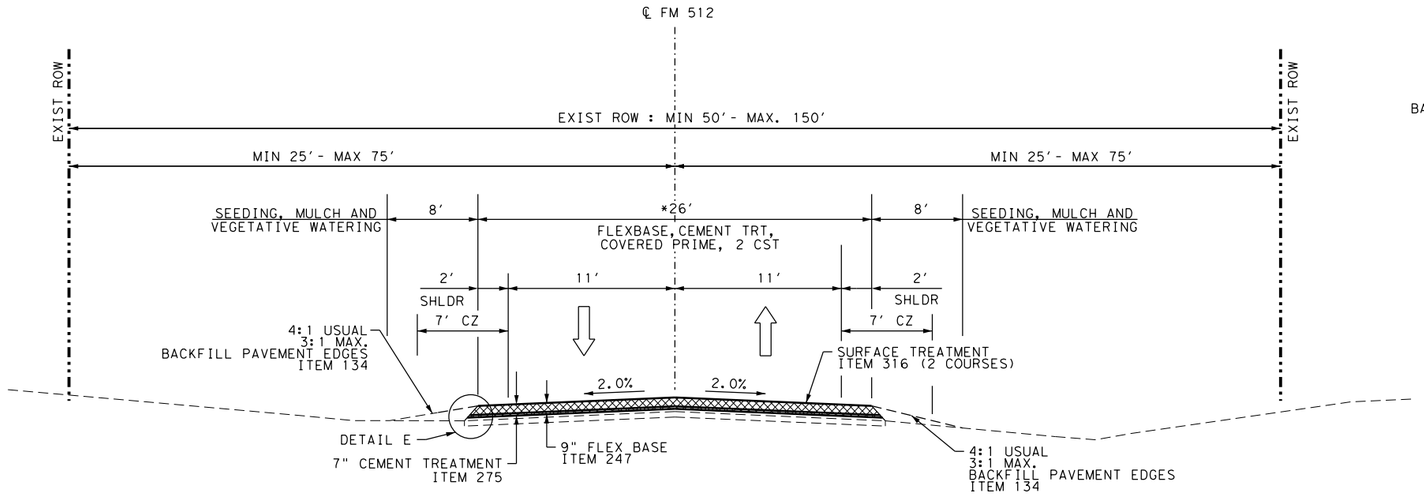
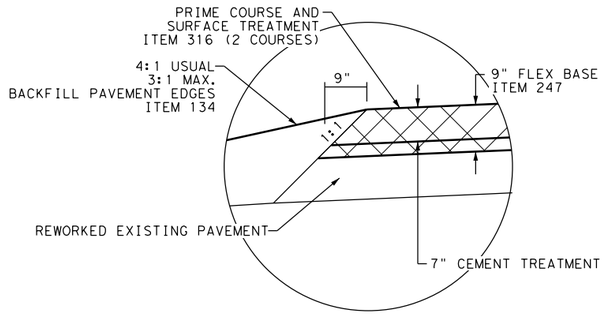


PROPOSED TYPICAL SECTION

STA 13+50.00 TO STA 452+54.00
STA 453+54.00 TO STA 508+53.33

*WIDTH VARIES AT BRIDGE TRANSITIONS
22' TO 26' STA 13+50.00 TO STA 14+50.00
26' TO 24' STA 452+04.00 TO STA 452+54.00
24' TO 26' STA 453+54.00 TO STA 454+04.00



DETAIL E

SCALE: NTS

STATE OF TEXAS
PAUL A. WARDEN
101319
LICENSED
PROFESSIONAL ENGINEER
Paul A. Warden, P.E. 5/24/2023

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FIRM # F-6825

Texas Department of Transportation

FM 512

TYPICAL SECTIONS

SHEET 3 OF 4

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	5
CONTROL	SECTION	JOB	
0579	02	014	

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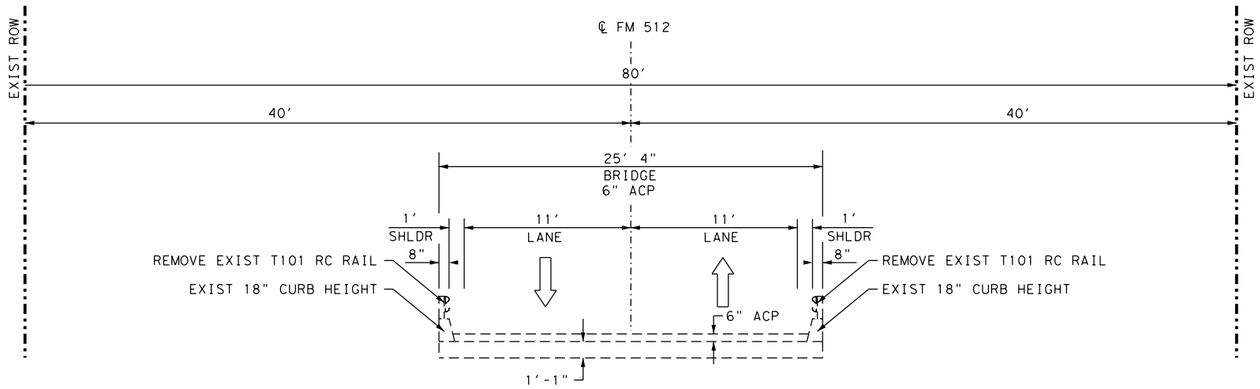
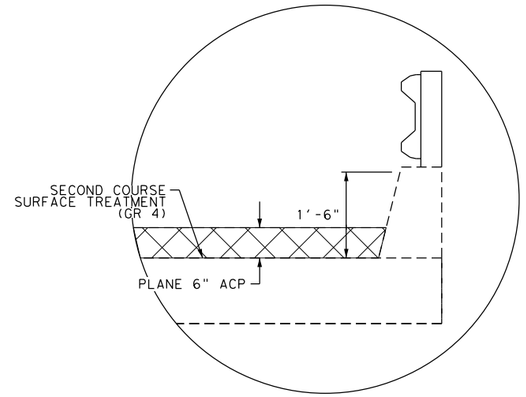
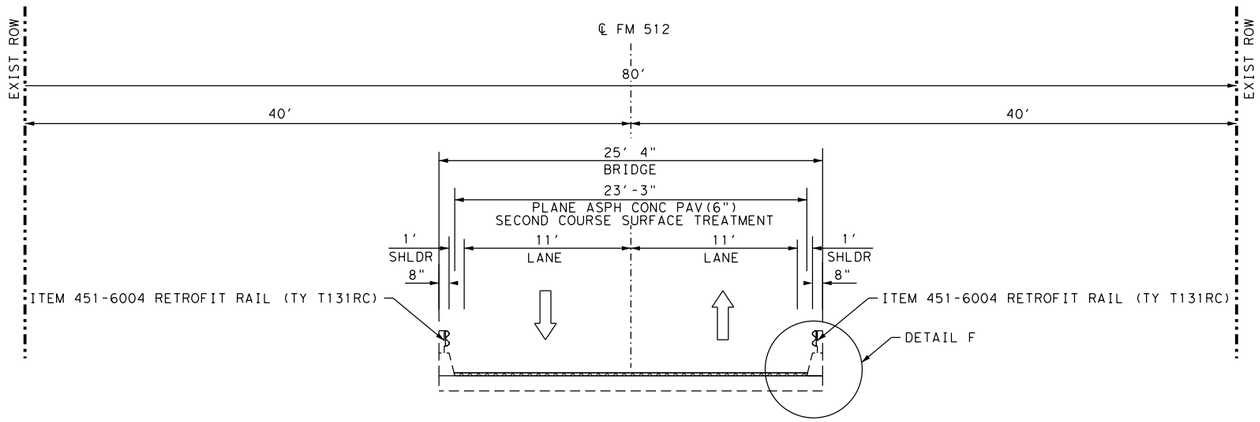


EXISTING BRIDGE TYPICAL SECTION
STA 452+54.00 TO STA 453+54.00



DETAIL F



PROPOSED BRIDGE TYPICAL SECTION
STA 452+54.00 TO STA 453+54.00

SCALE: NTS

STATE OF TEXAS
PAUL A. WARDEN
101319
LICENSED
PROFESSIONAL ENGINEER

Paul A. Warden, P.E. 5/24/2023

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FIRM # F-6825

Texas Department of Transportation

FM 512

TYPICAL SECTIONS

SHEET 4 OF 4

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	6
CONTROL	SECTION	JOB	
0579	02	014	

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GENERAL NOTES

General:

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

Greenville Area Office
James Atkins II, P.E. – James.Atkins@txdot.gov
Willie Bolden II, P.E. - Willie.Bolden@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.

On Contractor request, earthwork cross sections and construction timelines will be posted to TxDOT's Public FTP at the following Address:
https://ftp.dot.state.tx.us/pub/txdot-info/Pre-Letting%20Responses/
The site is organized by District, Project Type (Construction or Maintenance), Letting Date, CCSJ/Project Name

Locate equipment a minimum of 30 feet from roadway when possible. Place signs and barricades as approved.

Stockpile sites for construction materials must be approved. Give at least 48 hours notification prior to stockpiling material.

Item 5 Control of the Work:

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

Working days will be computed and charged in accordance with Article 8.3.1.4 Standard Work Week.

Right and left are determined based upon the forward direction of stationing in the specific control section.

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

Item 6 Control of Materials:

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

Refer to the BUY America 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

Item 7 Legal Relations and Responsibilities:

No significant traffic generator events identified.

Item 8 Prosecution and Progress:

Before beginning work on this project submit in writing, for approval, a plan of construction operations outlining in detail a sequence of work to be followed.

Provide a Bar Chart progress schedule for this project.

This project includes SP 008-003 which allows up to a 90-day delay to begin work on the project to allow for Contractor Mobilization.

SP 008-003 is required to allow for TxDOT to properly staff this project either with in-house or contract forces. This SP also allows the contractor ample time to obtain and schedule resources, material and manpower to ensure continuous prosecution of the work.

Roadway widening operations shall only be allowed on one side of the roadway at a time.

Item 9 Measurement and Payment:

Items of work for the Monthly Estimate will be cut off on the 25th of each month. Items of work performed after the 25th will be processed and paid on the following month's estimate. Material On Hand (MOH) will cut off on the 20th of each month. Special circumstances will be considered on a case-by-case basis.

Item 100 Preparing Right of Way:

Remove all trees on both sides of roadway to ROW. At cross structures, remove trees to ROW line and within 100' of the structure, parallel to the roadway. Remove underbrush and neatly trim trees and overhanging branches to produce a 60' vertical clear area within the limits of Prep ROW. Remove any trees or underbrush that interferes with any construction operation, including relocation of ditches or other drainage elements. Receive approval of equipment used to trim limbs. A boom axe will not be allowed. Remove all trimmed debris from the ROW or mulch all debris and incorporate into the topsoil on State ROW to the satisfaction of the Engineer.

Item 110 Excavation:

Material below finished subgrade elevation suspected of containing sulfates will be tested in accordance with Tex-145-E by the Department. Treat subgrade material to the required depth and width in accordance with the Soil Sulfates Mitigation General Notes.

Before excavation operations the existing topsoil shall be salvaged in a manner to preserve the vigor of the existing Bermuda grass sod per Item 160.

Item 112 Subgrade Widening:

Limit daily subgrade widening operations to the amount of base widening (proposed depth) that can be completed daily.

All pavement edge drop-offs, at end of day, shall be backfilled in accordance with Edge Treatment Condition I on the "Treatment for Various Edge Conditions" sheet. Backfill material shall be approved by the Engineer.

Item 132 Embankment:

Test potential embankment sources using Tex-145-E to determine the presence and concentration of sulfates. Do not bring soil with greater than 3000 ppm sulfates into project.

Embankment sources containing sulfates that meet specification requirements may be used as fill material provided it is placed with at least one foot of separation from materials to be treated with lime, cement, or other calcium-based stabilizers. When soils are to be placed with less than one foot

of separation from material to be treated with lime, cement, or other calcium-based stabilizers, process and treat such soils according to the Soil Sulfates Mitigation General Notes.

Excavation pits for project embankment made within 250 feet of State Right of Way must be approved.

Before embankment operations the existing topsoil shall be salvaged in a manner to preserve the vigor of the existing Bermuda grass sod per Item 160.

Item 134 Backfilling Pavement Edges:

The backfill material source shall be approved.

Dirt driveway shaping/construction will be subsidiary to Item 134.

Item 152 Road Grader Work:

Use road grader work to windrow sod (6" depth), construct slopes, construct/repair dirt driveways, prepare driveways for surfacing, grade ditches as necessary to establish drainage and redistribute sod on finished slopes.

Cut ditches to proposed grade in the immediate vicinity of cross drain structures prior to placing Storm Water BMP devices at the early stages of the project.

If excess material is generated under this item, it may be utilized to construct slopes, or wasted as approved.

Item 164 Seeding for Erosion Control, 166 Fertilizer:

Apply fertilizer with a ratio of 3-1-2 (N-P-K) over the areas to be seeded. This work will not be paid for directly, but will be considered subsidiary.

Item 168 Vegetative Watering:

Use water trucks equipped with a sprinkler system adequate to permit coverage of the entire seeded area from the roadbed. This equipment must be available to perform watering throughout the duration of vegetative establishment.

Water all seeded areas the day seed is applied. Thereafter, maintain the seeded areas in a well-watered condition throughout the duration of vegetative establishment.

Item 247 Flexible Base:

Grading requirements
Tests to be in accordance with TxDOT Standard Test Methods

Soil Constants

Item Desc.	Linear Shrinkage	LL	Wet Ball	WBMV (incr. passing #40 sieve)
Item 247 Flex Base	6.0 max.	40 max.	40 max.	20% max.

PERCENT RETAINED ON SIEVE:

1-3/4"	7/8"	3/8"	No. 4	No. 40
0	10-35	30-50	45-65	70-85

Flexible Base will not contain more than 1% by weight of clay balls.

Place blue top hubs for alignment and elevations of new base at centerline and edge of pavement.

Measure roadway profile smoothness prior to the cover prime or prime course application.

Provide all profile measurements to the Engineer in electronic data files prior to the placement of the prime/cover prime coat using the format specified in Tex-1001-S. The Engineer will use Department software to evaluate longitudinal profiles to determine areas requiring corrective action. Correct 0.1-mi. sections having an average international roughness index (IRI) value greater than 100.0 in. per mile to an IRI value of 100.0 in. per mile or less. The average IRI for the left and right wheel paths will be used to determine acceptance for each 0.1-mi. section. However, the Engineer reserves the right to have the contractor correct isolated imperfections even if the 0.1-mi. section has a passing IRI. This work will be performed at the contractor's expense. Once all corrections have been made, the prime/cover prime coat may be applied.

Re-profile and correct sections that fail to maintain ride quality until placement of the first seal coat, as directed. Correct re-profiled sections until specification requirements are met, as approved. In the spirit of partnering, the department will participate in 50% of an agreed upon cost of repair for any section that has to be subjected to traffic throughout the winter with only a cover prime coat.

Item 251 Reworking Base Courses:

Full depth HMAC patching and stabilized areas of various depths are to be expected and are to be reworked into existing base. Stabilized areas may include but are not limited to cement, fly ash, or asphalt treated base.

Areas with deep asphaltic patching or widening will require processing and relocation operations to incorporate additional flex base to reduce the asphaltic material ration to a 50% maximum by volume. This work will be subsidiary to this Item.

The finished roadway must match existing grades at project limits, highway intersections and

bridges. In these areas, salvage existing base and remove sufficient subgrade material to construct the full-depth proposed pavement section, according to the transition details shown in the plans. This removal will not be paid for directly, but will be considered subsidiary to the various bid items. Excess subgrade material generated by these transitions may be utilized to construct slopes or wasted as approved by the Engineer.

Item 275 Cement Treatment (Road Mixed):

Microcracking is required where flexible base widths accept full roller width. When temperatures during curing period average below 60 degrees F, perform microcracking operations between 48 and 72 hours.

Subgrade, embankment or backfill suspected of containing sulfates will be tested in accordance with Tex-145-E by the Department. Subgrade, embankment or backfill material within one foot of any area to be treated using cement is subject to the following restriction:

Greater than 7,000 ppm sulfates – Do not treat with any cement or other calcium-based stabilizers. Material within one foot of any area to be treated with cement or other calcium-based stabilizers must be removed or processed as directed.

Item 302 Aggregates for Surface Treatments:

Use unmodified AC or PG for pre-coating aggregate. Emulsion pre-coating will not be allowed.

Use liquid antistrip or other approved antistrip agent complying with the requirements of Item 301 Asphalt Antistripping Agents. The aggregate will be evaluated for moisture susceptibility using test method TEX-530-C.

Item 316 Surface Treatments:

Unless otherwise permitted by the Engineer in writing, the open season for asphalt placement will be:

May 15- August 31 for AC

Permission to place asphalt outside of the open season may require the contractor to place a fog seal at the contractor's expense.

***Rates For Construction Projects**

First Course

ITEM	APPLICATION	
	Cover Prime	1st Course
*Asphalt Type	RC-250	AC-20XP
*Asph. Rate (Gal/SY)	0.28	0.46
Aggregate Type	B	B
Aggregate Grade	5	3
Aggr. Rate (CY/SY)	1:140	1:105
Min. Cure Time	14 days **	

Second Course

ITEM	APPLICATION
	2nd Course
*Asphalt Type	AC-20XP
*Asph. Rate (Gal/SY)	0.36
Aggregate Type	PB
Aggregate Grade	4
Aggr. Rate (CY/SY)	1:120

* The information above is intended to provide general guidance and as a basis of estimate. Based on the season and weather conditions at the time, the engineer will determine the asphalt type and rates to be used at the time of application.
** Or as approved by the Engineer

Item 354 Planing and Texturing Pavement:

Plane full width by end of work day.

RAP that is not to be used on this project will become the property of TXDOT. Transfer these millings directly into trucks, and transport directly to the stockpile site located at 1600 Joe Ramsey Blvd, Greenville Tx, or as approved. At the end of the project, shape each stockpile for measurement as directed.
Provide a RAP accountability plan that is acceptable to the Area Engineer.

All bridges will be planed down to the existing concrete bridge deck. After planing the existing asphalt off the bridge decks, the bridge decks must be inspected by Justin Ferguson, Bridge Inspector at Paris District Headquarters, to evaluate the current condition of the bridge deck. The inspection must be done before the seal coat/tack coat operation on the bridge decks.

Justin Ferguson
Justin.Ferguson@txdot.gov
(903)-583-9523

Item 400 Excavation and Backfill for Structures:

Excavation and backfill for bridge, culvert and Safety End Treatment construction/installation will be subsidiary to Item 462, 464, 466, and 467.

Pavement markings and RPM replacement will be subsidiary to "Cut and Restore Pavement".

Cut and Restore Pavement: Backfill to top of pipe using HES flowable fill. Use an accelerator that produces a minimum strength of 250 psi in 4 hours. Provide rheofill or equivalent to ensure flowability. Anchor pipes to ensure no movement or displacement by the flowable fill. Furnish paper type cylinder test molds. Place flowable fill from the top of the pipe to within 10" of the existing pavement surface. Place Type B or C HMAC from the top of the flowable fill to the existing roadway surface. These items will be subsidiary to this item and will not be paid for directly.

Item 402 Trench Excavation Protection:

Submit a Trench Excavation Protection Plan to the Engineer a minimum of three weeks prior to use. The excavation support plan shall address excavation/protection methods, work sequencing, traffic control, backfill operations, etc.

Item 403 Temporary Special Shoring:

Submit a Temporary Special Shoring Plan to the Engineer a minimum of three weeks prior to use. The excavation support plan shall address excavation/protection methods, work sequencing, traffic control, backfill operations, etc.

Item 432 Riprap:

The Engineer may adjust placement of riprap in the field.

Filter fabric is required for stone riprap.

Removed headwall, wingwall and concrete riprap concrete may be used for stone rip rap. Cut protruding rebar within 2" of concrete surface. Maximum waste concrete cobble size shall match proposed stone rip rap Dmax size.

Item 451 Railing:

Deliver and Stockpile salvaged bridge rail at TXDOT Area Office located at 3001 IH 30 East, Greenville TX.

Item 462 Concrete Box Culverts and Drains:

Required excavation and backfill will be subsidiary to this Item.

Item 464 Reinforced Concrete Pipe:

Required excavation and backfill will be subsidiary to this Item.

Item 465 Manholes and Inlets:

Required excavation and backfill will be subsidiary to this item.

Item 466 Headwalls and Wingwalls:

Unless shown in plans to obtain from offsite source, obtain headwall and wingwall backfill from ROW and perform grading to shape ditch to headwall/wingwall, per Engineers directions. This work will be subsidiary to this Item.

Required excavation, backfill and pipe saw cutting will be subsidiary to this Item.

Removed headwalls and wingwalls may be broken into riprap size pieces (12” average diameter) for use as stone riprap on the project. Cut protruding steel reinforcement flush with concrete pieces. Broken concrete and riprap must be stored according to the requirements for material stockpiles indicated on the BC standards.

Item 467 Safety End Treatment:

Parallel pipe culverts ~ 30" diameter and smaller require precast SET unless directed by the Engineer to use cast-in-place SETs when precast SETs would project over 3" above surrounding ground surface or when otherwise indicated in the plans. Additional work to install cast in place SETs will be subsidiary to this Item.

Cross pipe culverts ~ 30" diameter and smaller require precast SET unless indicated otherwise in the plans.

Repair damage culvert ends prior to SET installation. Straighten CMP ends by straightening or cutting off damaged ends. Paint cut off ends with zinc paint. Repair minor damaged RCP ends with epoxy mortar. This work will be subsidiary to this Item.

When necessary to close connection gaps, grout precast SETs to culvert ends. Materials, labor and equipment will be subsidiary to this item.

On existing CMP parallel culverts with mitered metal ends, construct concrete cast in place SETs or remove the mitered ends and install precast or cast-in-place SETs. Replace/remove existing mitered metal ends that are not 6:1 or flatter.

Required excavation, backfill and pipe saw cutting will be subsidiary to this Item.

Unless shown in the plans to obtain backfill from offsite source, obtain SET backfill from the Right-of-Way. This work will be subsidiary to this Item.
Placement of concrete Riprap between multiple SETs on multiple barrel culverts will be subsidiary to this Item.
During SET installation, unless indicated otherwise in the plans, match SET flow line grade with the culvert flow line grade.

Removal and disposal of existing headwalls for parallel culverts will be subsidiary to this Item. Removed concrete headwalls and wingwalls may be broken into riprap size pieces (12” average diameter) for use as stone riprap. Cut protruding steel reinforcement. Broken concrete and riprap must be stored according to the requirements for material stockpiles indicated on BC(10)-21.

Item 496 Removing Structure:

The Contractor shall coordinate with the county commissioner for transferring salvageable materials such as beams, piling, and concrete riprap. The Contractor shall dispose of remaining materials.

Item 502 Barricades, Signs and Traffic Handling:

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

The following items will be required for flagger on this project:

1. Flaggers are required to wear a white hard hat while performing flagging operations.
2. Flaggers will be required at the intersection of all State maintained roadways.
3. Flaggers may be required at other high traffic generating intersections as deemed necessary by the Area Engineer.

Item 502 Barricades, Signs and Traffic Handling (Cont.):

The traffic control plan for this contract consists of the installation and maintenance of warning signs and other traffic control devices shown in the plans, specification data which may be included in the general notes, applicable provisions of the Texas Manual on Uniform Traffic Control Devices (TMUTCD), traffic control plan sheets included in the plans, standard BC sheets and Item 502 of the Standard Specifications.

Do not begin Item 502, Barricades, Signs, and Traffic Handling, on the roadway until both of the following conditions are met:

1. The work schedule is approved.
2. No more than 5 workdays will pass between the beginning of Item 502 and the actual commencement of roadway work bid items.

The final estimate will be withheld until all disturbed areas are covered with at least 70% perennial vegetative cover.

Correct all deficiencies within the time frame noted on the Traffic Control Device Inspection Form 599. Failure to make corrections within time frame specified may result in no payment for this Item for the month of the noted deficiency.

Provide shadow vehicles equipped with Truck Mounted Attenuators (TMA) as shown on Traffic Control Plan (TCP) standards.

Ensure that all travel lanes are open at night.

Provide pilot car during one lane/two-way traffic operations.

Provide Pavement Ends CW8-3 (36x36), Loose Gravel CW8-7 (36x36) and No Center line CW 8-12 (36x36) prior to reworking base material per TMUCTD.
Road closures must be approved by the Engineer. Provide a two-week advance notice to the Engineer prior to desired roadway closure period. Begin display of closure information on PCMBs ten days prior to roadway closure.

The total months of barricades includes the number of working days plus the winterization period.

Portable traffic signals for TCP (2-8)-20 PAR, TCP (2-8)-18 will be subsidiary to this Item.

Item 506 Temporary Erosion, Sedimentation & Environmental Controls:

The Temporary Erosion Control measures for this project will consist of using the following items, as directed:

1. Temporary Silt Fence
2. Rock Filter Dams: All rock filter dams shall be installed with 6:1 slopes regardless of their location on the project. Failure to do so will result in no payment for the dam.
3. Erosion control logs.
4. Construction exits.

Silt fences will remain the property of the Contractor upon completion of the project. The final estimate will not be released until all silt fences have been properly removed, or as directed and 70% establishment of vegetative cover is obtained.

Acquire approval for any change to the location of temporary sediment fence, as shown in the plans, prior to installation. Placement of erosion protection devices may be altered, as directed, to satisfy the requirements of the SW3P.

The pay item to remove rock filter dams will require only a partial removal after 70 percent perennial vegetation has been established and approved. When removing the rock filter dams, leave the lower layer of rock adjacent to the ground in place so as not to disturb the soil.
Refer to the SW3P sheet for the total disturbed area for the project.

The disturbed area in this project, all project locations in the Contract, and Contractor project specific locations (PSLs) within one mile of the project limits will further establish the authorization requirements for storm water discharges. The Department will obtain an authorization to discharge storm water from the Texas Commission on Environmental Quality (TCEQ) for the construction activities shown on the plans. Obtain any required authorization from the TCEQ for any Contractor PSLs for construction support activities on or off ROW. When the total area disturbed for all projects in the Contract and PSLs within one mile of the project limits exceeds five acres, provide a copy of the Contractors NOI for PSLs on the ROW (to the appropriate MS4 operator when on an off-system route).

Item 512 Portable Traffic Barrier:

PTB stockpiled at 1100 Hillcrest Drive Sulphur Springs, TX 75482 shall be used in this project. At project completion all Portable Traffic Barriers shall be stockpiled at 1100 Hillcrest Drive Sulphur Springs, TX 75482. All stockpiled Portable Traffic Barriers shall be cleaned to the extent that all loose and foreign material is removed. Any damaged PTB, as determined by the Engineer, and shall become the property of the Contractor.

Inspect PTB before bidding and provide necessary connection hardware as required.

Reflectors shall be placed on all PTB as shown on standard BC(7)-21, throughout stage construction. Expense for this work will be subsidiary to this Item.

Item 540 Metal Beam Guard Fence:

Reinstall removed MBGF and SGT's on the same day.

MBGF delineation shall be installed within ten (10) working days of the completion of each MBGF section. Concrete mow strip is not considered to be a part of this work.

Item 542 Removing Metal Beam Guard Fence:

Removed re-usable MBGF rail shall be stockpiled at the TXDOT Area Office located at 3001 IH 30 East, Greenville TX.

Item 560 Mailbox Assemblies:

Install new mailboxes unless the property owner chooses to have an existing, compliant mailbox reinstalled. Return all custom non-compliant mailboxes to the property owner.

All new mailboxes furnished and installed by the contractor will display the address number using one inch (1") adhesive back numbering. The color, type, and style of numbering shall be consistent throughout the project.

Install Type 2 Mailbox foundations. Set the mailbox foundations in 12" diameter by 30" deep concrete (Class B) foundations.

Item 644 Small Roadside Sign Support and Assemblies:

Upon removal of sign assemblies, deliver sign faces to TxDOT office at 3001 IH 30 East, Greenville TX. Dispose of foundations, posts, and hardware.

Use the Southern Plains style triangular slip base for all post types.

Once the cover prime is completed, the Paris District Traffic Operations office will field verify the need and spacing of chevrons. If this verification results in fewer materials, the Paris District will purchase the excess signs at invoice price.

Remove the existing city street and county road topper from city and county signs and install on the new city street and county road stop sign assemblies. This work will be subsidiary to Item 644.

Stake proposed sign locations and obtain Engineer's approval of locations prior to placing foundations.

Contact the Engineer to obtain updated curve travel speeds before manufacture of curve speed warning signs.

Item 662 Work Zone Pavement Markings:

Non-removable markings may be paint and beads.

Place flexible reflective roadway tabs in accordance with the current WZ (STPM) prior to seal coat operations. Place tabs to indicate the beginning and ending of no passing zones.

Cut, remove and properly dispose of the upright portions of all work zone tabs prior to acceptance of any roadway. Remove entire tab when located on HMAC or concrete surfaces.

Item 666 Reflectorized Pavement Markings:

No stripe will be placed unless the inspector is present and at least 24 hours advance notice has been given by the Contractor.

Lay out pilot lines for approval 24 hours prior to all final pavement marking applications.

Use equipment with footage counters capable of measuring the linear footage placed. Calibrate counters prior to the beginning of striping operations.

Due to problems in traffic handling, do not place a dash center stripe and edge line at the same time.

Item 3076 Dense-Graded Hot-Mix Asphalt:

All surface mixes are to be SAC A.

RAS is not allowed in surface mixes.

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

Specify Hot Mix Asphalt Concrete (HMAC) or Warm Mix Asphalt (WMA) at the time of design submittal. After design submittal, continue producing the chosen design unless otherwise approved.

RAP from contractor owned sources may be used if the RAP is fractionated. The course fraction of contractor owned RAP will not be allowed if it consists primarily of siliceous aggregates.

Item 3076 Dense-Graded Hot-Mix Asphalt (Cont.):

A tack coat is required for all overlay areas and for all longitudinal joints unless otherwise directed.

Evaluation of the mixture for moisture susceptibility will be performed by using test method TEX 530-C (boil test) and there shall be no evidence of stripping during design verification or at any time during production.

The maximum nighttime paved surface vertical differential will be limited to two inches. Prevent ponding of water on any travel ways that are exposed to traffic.

Perform all sampling for aggregate quality testing on stockpiles at the HMAC plant. Mixture sampling for QC/QA testing will typically be taken from the truck at the plant; however, the Engineer may direct that a sample be taken at any point or location of mixture during production, delivery, or placement.

Preparation and construction of permanent / temporary transitions, terminations of mix courses and transitions to driveways and intersecting roadways is subsidiary to Item 340. This includes all labor, machinery, materials, and incidentals to complete the work including planing, removal, hauling and stockpiling of materials and necessary clean-up.

Item 3096 Asphalts, Oils, and Emulsions:

Provide 1L (1qt.) clean and dry screw top or friction-lid sampling cans as directed.

Furnish at least one sample of each type of asphalt used on the project for QA/QC purposes.

Item 5001 Geogrid Base Reinforcement:

Install Geogrid with at least a 1 ft. overlap along the longest joint when construction sequencing allows as determined by the Engineer.
Install Geogrid per manufacturer's specifications as well with the following exceptions / inclusions:

1. Cascade Base onto Geogrid using a bulldozer to a depth of at least six inches so that no equipment has direct contact with Geogrid. Raise dozer blade gradually as each lift is pushed out over the Geogrid.
2. Do not operate rubber-tired equipment directly on Geogrid unless allowed by the Engineer. Should operating rubber-tired equipment directly on Geogrid be allowed, operate at no more than 5 mph, do not turn tires on the Geogrid or make sudden stops and starts which causes excessive deformation waves. Keep Geogrid taut and flat. Adjustments to Geogrid installation or construction methods may be directed by the Engineer to minimize deformation waves.

3. Sufficiently compact unbound buffer layer directly above Geogrid to achieve the required density in all subsequently constructed pavement layers.

Item 6001 Portable Changeable Message Board:

Three (3) portable changeable message boards are required for advance warning.

Item 6185 Truck Mounted Attenuators:

Shadow vehicles with truck mounted attenuator (TMA) are required on the traffic control plan and TCP standards for this project. The contractor will be responsible for determining if one or more of these traffic control operations will be ongoing at the same time to determine the total number of TMAs needed for the project.

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0579-02-014 **DISTRICT** Paris **COUNTY** Hunt
HIGHWAY FM 512

ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL
	100-6002	PREPARING ROW	STA	508.000	
	104-6017	REMOVING CONC (DRIVEWAYS)	SY	102.000	
	104-6028	REMOVING CONC (MISC)	SY	49.300	
	110-6003	EXCAVATION (SPECIAL)	CY	106.600	
	112-6001	SUBGRADE WIDENING (ORD COMP)	STA	494.000	
	132-6019	EMBANKMENT (VEHICLE)(ORD COMP)(TY B)	CY	3,560.000	
	134-6001	BACKFILL (TY A)	STA	507.000	
	152-6001	ROAD GRADER WORK (ORD COMP)	STA	507.000	
	164-6009	BROADCAST SEED (TEMP) (WARM)	SY	45,159.000	
	164-6011	BROADCAST SEED (TEMP) (COOL)	SY	45,159.000	
	164-6015	STRAW/HAY MLCH SEED(PERM)(RURAL)(CLAY)	SY	90,317.000	
	168-6001	VEGETATIVE WATERING	MG	1,084.000	
	216-6001	PROOF ROLLING	HR	30.110	
	247-6124	FL BS (RDWY DEL) (TY A GR 4)	TON	2,049.600	
	247-6242	FL BS (CMP IN PLACE)(TY A GR 4)(9")	SY	143,281.600	
	251-6073	REWRKING BS MATL (TY C)(10")(ORD COMP)	SY	121,239.000	
	275-6001	CEMENT	TON	1,014.980	
	275-6079	CEMENT TREAT (NEW BASE)(7")	SY	143,208.000	
	316-6016	ASPH (AC-20XP)	GAL	118,126.200	
	316-6029	ASPH (RC-250)	GAL	40,098.100	
	316-6126	AGGR(TY-PB GR-4 SAC-A)	CY	1,209.600	
	316-6173	AGGR(TY-B GR-3 SAC-B)	CY	1,363.900	
	316-6177	AGGR(TY-B GR-5 SAC-B)	CY	1,022.900	
	354-6016	PLAN & TEXT CONC PAV(0" TO 1-1/2")	SY	49.000	
	354-6049	PLANE ASPH CONC PAV (6")	SY	2,400.000	
	400-6006	CUT & RESTORING PAV	SY	53.000	
	401-6001	FLOWABLE BACKFILL	CY	87.600	
	402-6001	TRENCH EXCAVATION PROTECTION	LF	54.000	
	403-6001	TEMPORARY SPL SHORING	SF	1,849.000	
	420-6071	CL C CONC (COLLAR)	EA	7.000	
	420-6158	CL C CONC(PILE ENCASEMENT)	LF	45.000	
	429-6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	SF	92.000	
	432-6002	RIPRAP (CONC)(5 IN)	CY	92.000	
	432-6031	RIPRAP (STONE PROTECTION)(12 IN)	CY	185.000	
	432-6045	RIPRAP (MOW STRIP)(4 IN)	CY	254.300	
	438-6004	CLEANING AND SEALING EXIST JOINTS(CL7)	LF	99.000	
	451-6004	RETROFIT RAIL (TY T131RC)	LF	200.000	
	462-6051	CONC BOX CULV (5 FT X 3 FT)(EXTEND)	LF	8.000	
	462-6052	CONC BOX CULV (5 FT X 4 FT)(EXTEND)	LF	2.000	
	462-6055	CONC BOX CULV (6 FT X 4 FT)(EXTEND)	LF	6.000	
	462-6059	CONC BOX CULV (7 FT X 4 FT)(EXTEND)	LF	5.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0579-02-014 **DISTRICT** Paris **COUNTY** Hunt
HIGHWAY FM 512

ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL
	462-6063	CONC BOX CULV (8 FT X 4 FT)(EXTEND)	LF	10.000	
	462-6066	CONC BOX CULV (8 FT X 7 FT)(EXTEND)	LF	6.000	
	462-6067	CONC BOX CULV (8 FT X 8 FT)(EXTEND)	LF	6.000	
	462-6091	CONC BOX CULV (5FT X 2.5FT)	LF	10.000	
	462-6100	CONC BOX CULV (9 FT X 4 FT)(EXTEND)	LF	5.000	
	464-6001	RC PIPE (CL III)(12 IN)	LF	164.000	
	464-6008	RC PIPE (CL III)(36 IN)	LF	134.000	
	465-6126	INLET (COMPL)(PSL)(FG)(3FTX3FT-3FTX3FT)	EA	1.000	
	466-6099	HEADWALL (CH - PW - 0) (DIA= 30 IN)	EA	2.000	
	466-6101	HEADWALL (CH - PW - 0) (DIA= 36 IN)	EA	2.000	
	466-6150	WINGWALL (FW - 0) (HW=3 FT)	EA	2.000	
	466-6151	WINGWALL (FW - 0) (HW=4 FT)	EA	2.000	
	466-6152	WINGWALL (FW - 0) (HW=5 FT)	EA	4.000	
	466-6155	WINGWALL (FW - 0) (HW=8 FT)	EA	2.000	
	466-6156	WINGWALL (FW - 0) (HW=9 FT)	EA	2.000	
	466-6166	WINGWALL (FW - S) (HW=5 FT)	EA	2.000	
	466-6194	WINGWALL (PW - 2) (HW=5 FT)	EA	4.000	
	467-6326	SET (TY II) (12 IN) (RCP) (6: 1) (P)	EA	59.000	
	467-6341	SET (TY II) (15 IN) (RCP) (6: 1) (P)	EA	4.000	
	467-6363	SET (TY II) (18 IN) (RCP) (6: 1) (P)	EA	116.000	
	467-6395	SET (TY II) (24 IN) (RCP) (6: 1) (P)	EA	20.000	
	467-6417	SET (TY II) (30 IN) (RCP) (3: 1) (C)	EA	2.000	
	467-6423	SET (TY II) (30 IN) (RCP) (6: 1) (P)	EA	18.000	
	467-6448	SET (TY II) (36 IN) (RCP) (3: 1) (C)	EA	2.000	
	467-6454	SET (TY II) (36 IN) (RCP) (6: 1) (P)	EA	2.000	
	480-6001	CLEAN EXIST CULVERTS	EA	103.000	
	496-6004	REMOV STR (SET)	EA	2.000	
	496-6005	REMOV STR (WINGWALL)	EA	18.000	
	496-6007	REMOV STR (PIPE)	LF	743.000	
	500-6001	MOBILIZATION	LS	1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	27.000	
	506-6002	ROCK FILTER DAMS (INSTALL) (TY 2)	LF	1,020.000	
	506-6011	ROCK FILTER DAMS (REMOVE)	LF	1,020.000	
	506-6021	CONSTRUCTION EXITS (INSTALL) (TY 2)	SY	444.000	
	506-6024	CONSTRUCTION EXITS (REMOVE)	SY	444.000	
	506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	8,343.000	
	506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	8,343.000	
	506-6041	BIODEG EROSN CONT LOGS (INSTL) (12")	LF	20.000	
	510-6003	ONE-WAY TRAF CONT (PORT TRAF SIG)	MO	4.000	
	512-6017	PORT CTB (DES SOURCE)(F-SHAPE)(TY 1)	LF	540.000	
	512-6029	PORT CTB (MOVE)(F-SHAPE)(TY 1)	LF	540.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0579-02-014 **DISTRICT** Paris **COUNTY** Hunt
HIGHWAY FM 512

ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL
	512-6041	PORT CTB (STKPL)(F-SHAPE)(TY 1)	LF	540.000	
	530-6003	INTERSECTIONS (SURF TREAT)	SY	1,889.930	
	530-6004	DRIVEWAYS (CONC)	SY	85.000	
	530-6005	DRIVEWAYS (ACP)	SY	1,151.000	
	530-6008	TURNOUTS (ACP)	SY	1,668.000	
	530-6016	DRIVEWAYS (BASE)	SY	1,055.000	
	540-6002	MTL W-BEAM GD FEN (STEEL POST)	LF	2,900.000	
	540-6006	MTL BEAM GD FEN TRANS (THRIE-BEAM)	EA	8.000	
	542-6001	REMOVE METAL BEAM GUARD FENCE	LF	1,050.000	
	542-6005	RM MTL BM GD FEN TRANS (T101)	EA	4.000	
	544-6001	GUARDRAIL END TREATMENT (INSTALL)	EA	20.000	
	544-6003	GUARDRAIL END TREATMENT (REMOVE)	EA	12.000	
	545-6003	CRASH CUSH ATTEN (MOVE & RESET)	EA	2.000	
	545-6005	CRASH CUSH ATTEN (REMOVE)	EA	2.000	
	545-6019	CRASH CUSH ATTEN (INSTL)(S)(N)(TL3)	EA	2.000	
	560-6004	MAILBOX INSTALL-S (TWG-POST) TY 2	EA	58.000	
	560-6005	MAILBOX INSTALL-D (TWG-POST) TY 2	EA	6.000	
	560-6006	MAILBOX INSTALL-M (TWG-POST) TY 2	EA	2.000	
	644-6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	239.000	
	644-6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA	4.000	
	644-6007	IN SM RD SN SUP&AM TY10BWG(1)SA(U)	EA	1.000	
	644-6033	IN SM RD SN SUP&AM TYS80(1)SA(U)	EA	4.000	
	644-6037	IN SM RD SN SUP&AM TYS80(1)SA(U-WC)	EA	7.000	
	644-6076	REMOVE SM RD SN SUP&AM	EA	256.000	
	658-6060	REMOVE DELIN & OBJECT MARKER ASSMS	EA	45.000	
	658-6062	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2(BI)	EA	31.000	
	658-6073	INSTL OM ASSM (OM-2Y)(WC)GND(BI)	EA	50.000	
	662-6008	WK ZN PAV MRK NON-REMOV (W)6"(SLD)	LF	101,607.000	
	662-6035	WK ZN PAV MRK NON-REMOV (Y)6"(BRK)	LF	8,104.000	
	662-6037	WK ZN PAV MRK NON-REMOV (Y)6"(SLD)	LF	55,991.000	
	662-6050	WK ZN PAV MRK REMOV (REFL) TY II-A-A	EA	1,847.000	
	662-6067	WK ZN PAV MRK REMOV (W)6"(SLD)	LF	3,176.000	
	662-6075	WK ZN PAV MRK REMOV (W)24"(SLD)	LF	22.000	
	662-6098	WK ZN PAV MRK REMOV (Y)6"(SLD)	LF	18,000.000	
	662-6111	WK ZN PAV MRK SHT TERM (TAB)TY Y-2	EA	15,540.000	
	666-6042	REFL PAV MRK TY I (W)12"(SLD)(100MIL)	LF	140.000	
	666-6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF	42.000	
	666-6099	REF PAV MRK TY I(W)18"(YLD TRI)(100MIL)	EA	4.000	
	666-6343	REF PROF PAV MRK TY I(W)6"(SLD)(100MIL)	LF	101,607.000	
	666-6346	REF PROF PAV MRK TY I(Y)6"(BRK)(100MIL)	LF	8,104.000	
	666-6347	REF PROF PAV MRK TY I(Y)6"(SLD)(100MIL)	LF	55,991.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0579-02-014 **DISTRICT** Paris **COUNTY** Hunt
HIGHWAY FM 512

ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL
	672-6009	REFL PAV MRKR TY II-A-A	EA	865.000	
	677-6002	ELIM EXT PAV MRK & MRKS (6")	LF	13,600.000	
	3076-6066	TACK COAT	GAL	269.000	
	3076-6068	D-GR HMA TY-D SAC-A PG64-22(EXEMPT)	TON	350.000	
	5001-6002	GEOGRID BASE REINFORCEMENT (TY II)	SY	151,444.000	
	6001-6002	PORTABLE CHANGEABLE MESSAGE SIGN	EA	3.000	
	6185-6002	TMA (STATIONARY)	DAY	518.000	
	6185-6003	TMA (MOBILE OPERATION)	HR	96.000	
	18	SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000	
		EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS	1.000	
1	464-6003	RC PIPE (CL III)(18 IN)	LF	579.000	
1A	464-6003	RC PIPE (CL III)(18 IN)	LF	235.000	
	4122-6023	THERMO PIPE(18")(PP)(TY S)(TY II)	LF	344.000	
2	464-6005	RC PIPE (CL III)(24 IN)	LF	124.000	
3	464-6007	RC PIPE (CL III)(30 IN)	LF	114.000	
3A	464-6007	RC PIPE (CL III)(30 IN)	LF	60.000	
	4122-6025	THERMO PIPE(30")(PP)(TY S)(TY II)	LF	54.000	
2A	4122-6024	THERMO PIPE(24")(PP)(TY S)(TY II)	LF	124.000	

100%
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SUMMARY OF ROADWAY ITEMS

DESCRIPTION						100-6002	112-6001	132-6019	134-6001	152-6001	216-6001	247-6124	247-6242	251-6073	275-6001	275-6079
STA	TO	STA	LENGTH	EXISTING WIDTH	PROPOSED SURFACE AVERAGE WIDTH	PREPARING ROW	SUBGRADE WIDENING (ORD COMP)	* EMBANKMENT (VEHICLE) (ORD COMP) (TY B)	BACKFILL (TY A)	ROAD GRADER WORK (ORD COMP)	PROOF ROLLING	FL BS (RDWY DEL) (TY A GR 4)	FL BS (CMP IN PLACE) (TY A GR 4) (9")	REWRKING BS MATL (TY C) (10") (ORD COMP)	CEMENT	CEMENT TREAT (NEW BASE) (7")
						STA	STA	CY	STA	STA	HR	TON	SY	SY	TON	SY
CSJ: 0579-02-014			LF	LF	LF											
0+50.00	TO	13+50.00	1300.00	22	22	13.0			13.0	13.0						
13+50.00	TO	14+50.00	100.00	22	24	1.0	1.0		1.0	1.0	0.06		267	245	1.89	267
14+50.00	TO	452+04.00	43754.00	22	26	437.5	437.5	2,961.0	437.5	437.5	26.8		126,921	107,427	899.55	126,921
452+04.00	TO	452+54.00	50.00	22	25	0.5	0.5	250.0	0.5	0.5	0.03		139	123	0.98	139
452+54.00	TO	453+54.00	100.00	22	24	1.0										
453+54.00	TO	454+04.00	50.00	22	25	0.5	0.5	213.0	0.5	0.5	0.03		139	123	0.98	139
454+04.00	TO	508+53.33	5449.33	22	26	54.5	54.5		54.5	54.5	3.15		15,743	13,321	111.58	15,743
SUPERELEVATION												2,049.60				
MAILBOX TURNOUTS																
PROJECT TOTAL:						508.0	494.0	3,424.0	507.0	507.0	30.11	2,049.60	143,208	121,239	1,014.98	143,208

* QUANTITY TO BE USED ON PROPOSED MOW STRIP LOCATIONS, REFER TO MISCELLANEOUS DETAILS SHEET.

DESCRIPTION						316-6029	316-6177	316-6016	316-6173	316-6016	316-6126	3076-6066	3076-6068	5001-6002
STA	TO	STA	LENGTH	EXISTING WIDTH	PROPOSED SURFACE AVERAGE WIDTH	ASPH (RC-250)	AGGR (TY-B GR-5 SAC-B)	ASPH (AC-20XP)	AGGR (TY-B GR-3 SAC-B)	ASPH (AC-20XP)	AGGR (TY-PB GR-4 SAC-A)	TACK COAT	D-GR HMA TY-D SAC-A PG64-22 (EXEM PT)	GEOGRID BASE REINFORCEMENT (TY II)
						GAL	CY	GAL	CY	GAL	CY	GAL	TON	SY
CSJ: 0579-02-014			LF	LF	LF									
0+50.00	TO	13+50.00	1300.00	22	22							269.0	284.0	
13+50.00	TO	14+50.00	100.00	22	24	74.7	1.9	122.7	2.5	96.0	2.2			283
14+50.00	TO	452+04.00	43754.00	22	26	35,537.8	906.6	58,383.5	1,208.8	45,691.4	1,057.7			134,216
452+04.00	TO	452+54.00	50.00	22	25	38.9	1.0	63.9	1.3	50.0	1.2			147
452+54.00	TO	453+54.00	100.00	22	24					96.0	2.2			
453+54.00	TO	454+04.00	50.00	22	25	38.9	1.0	63.9	1.3	50.0	1.2			147
454+04.00	TO	508+53.33	5449.33	22	26	4,407.9	112.4	7,241.6	149.9	5,667.3	131.2			16,651
SUPERELEVATION													66.0	
MAILBOX TURNOUTS										600.0	14.0			
PROJECT TOTAL:						40,098.1	1,022.9	65,875.5	1,363.9	52,250.7	1,209.6	269.0	350.0	151,444

PRIME COURSE
RC/250 @ 0.28 GAL/SY
GR 5 B @ 1CY / 140SY

FIRST COURSE
AC-20XP @ 0.46 GAL/SY
GR 3 B @ 1CY / 105SY

SECOND COURSE
AC-20XP @ 0.36 GAL/SY
GR 4 PB @ 1CY / 120SY

CEMENT TREATMENT
BASED ON AN ASSUMED DRY COMPACTED UNIT WEIGHT OF 135 LBS/CF @ 2% BY WEIGHT
PROOF ROLLING BASED UPON 5000 SY/HR

FLEX BASE
FL BS (RDWY DEL) (TY A GR 4)
ESTIMATE @ WEIGHT OF 135 LBS/CF

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Texas Department of Transportation

FM 512

QUANTITIY SUMMARIES

SHEET 1 OF 11

		HIGHWAY NO
		FM 512
STATE	DISTRICT / COUNTY	SHEET NO
TEXAS	PARIS / HUNT	9
CONTROL	SECTION / JOB	
0579	02 / 014	

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SUMMARY OF TRAFFIC CONTROL ITEMS																
DESCRIPTION				510-6003 ONE-WAY TRAF CONT (PORT TRAF SIG)	512-6017 PORT CTB (DES SOURCE)(F-SHAPE)(TY 1)	512-6029 PORT CTB (MOVE)(F-SHAPE)(TY 1)	512-6041 PORT CTB (STKPL)(F-SHAPE)(TY 1)	545-6003 CRASH CUSH ATTEN (MOVE & RESET)	545-6005 CRASH CUSH ATTEN (REMOVE)	545-6019 CRASH CUSH ATTEN (INSTL)(S)(N)(TL3)	662-6008 WK ZN PAV MRK NON-REMOV (W)6"(SLD)	662-6035 WK ZN PAV MRK NON-REMOV (Y)6"(BRK)	662-6037 WK ZN PAV MRK NON-REMOV (Y)6"(SLD)	662-6050 WK ZN PAV MRK REMOV (REFL) TY II-A-A	662-6067 WK ZN PAV MRK REMOV (W)6"(SLD)	662-6075 WK ZN PAV MRK REMOV (W)24"(SLD)	662-6098 WK ZN PAV MRK REMOV (Y)6"(SLD)	662-6111 * WK ZN PAV MRK SHT TERM (TAB)TY Y-2
STA	TO	STA	LENGTH (LF)	MO	LF	LF	LF	EA	EA	EA	LF	LF	LF	EA	LF	LF	LF	EA
CSJ: 0579-02-014																		
0+50	TO	508+53	50,803								101,607	8,104	55,991	1,091				15,540
CULVERT 3				1										300	800		6,000	
CULVERT 7				1										300	800		6,000	
RAYS CREEK NBI: 01-117-0-1097-02-001																		
452+54	TO	453+54	100.00	2	540	540	540	2	2	2				156	1,576	22	6,000	
PROJECT TOTAL				4	540	540	540	2	2	2	101,607	8,104	55,991	1,847	3,176	22	18,000	15,540

* BASED ON THREE APPLICATIONS

SUMMARY OF TRAFFIC CONTROL ITEMS							
DESCRIPTION				677-6002 ELIM EXT PAV MRK & MRKS (6")	6001-6002 PORTABLE CHANGEABLE MESSAGE SIGN	6185-6002 TMA (STATIONARY)	6185-6003 TMA (MOBILE OPERATION)
STA	TO	STA	LENGTH (LF)	LF	EA	DAY	HR
CSJ: 0579-02-014							
0+50	TO	508+53	50,803		3	518	96
CULVERT 3				6,800			
CULVERT 7				6,800			
RAYS CREEK NBI: 01-117-0-1097-02-001							
452+54	TO	453+54	100.00				
PROJECT TOTAL				13,600	3	518	96

SUMMARY OF BRIDGE ITEMS													
DESCRIPTION				110-6003 EXCAVATION (SPECIAL)	247-6242 FL BS (CMP IN PLACE)(TY A GR 4)(9")	429-6007 CONC STR REPAIR (VERTICAL & OVERHEAD)	401-6001 FLOWABLE BACKFILL	420-6158 CL C CONC(PILE ENCASEMENT)	432-6045 RIPRAP (MOW STRIP)(4 IN)	438-6004 CLEANING AND SEALING EXIST JOINTS(CL7)	540-6002 MTL W-BEAM GD FEN (STEEL POST)	540-6006 MTL BEAM GD FEN TRANS (THRIE-BEAM)	544-6001 GUARDRAIL END TREATMENT (INSTALL)	451-6004 RETROFIT RAIL (TY T131RC)
STA	TO	STA	LENGTH	CY	SY	SF	CY	LF	CY	LF	LF	EA	EA	LF
CSJ: 0579-02-014														
CULVERT 06 NBI: 01-117-0-0579-02-008														
189+28	TO	189+81	52.90						55.1		750		4	
CULVERT 09 NBI: 01-117-0-0579-02-009														
255+72	TO	255+95	22.46						55.6		550		4	
CULVERT 12 NBI: 01-117-0-0579-02-010														
306+79	TO	307+23	44.82						46.4		550		4	
CULVERT 16 NBI: 01-117-0-0579-02-004														
415+81	TO	416+03	21.93						56.2		700	4	4	
RAYS CREEK NBI: 01-117-0-0579-02-001														
452+54	TO	453+54	100.00	106.6	73.6	12	82.6	45.0	41.0	99	350	4	4	200
PROJECT TOTAL				106.6	73.6	12	82.6	45.0	254.3	99	2,900	8	20	200

SUMMARY OF REMOVAL ITEMS								
DESCRIPTION				354-6016 PLAN & TEXT CONC PAV(0" TO 1-1/2")	354-6049 PLANE ASPH CONC PAV (6")	542-6001 REMOVE METAL BEAM GUARD FENCE	542-6005 RM MTL BM GD FEN TRANS (T101)	544-6003 GUARDRAIL END TREATMENT (REMOVE)
STA	TO	STA	LENGTH	SY	SY	LF	EA	EA
CSJ: 0579-02-014			LF					
0+50	TO	452+54	45204.00	49		700		8
452+54	TO	453+54	100.00		2400	350	4	4
453+54	TO	508+53	5499.33					
PROJECT TOTAL:				49	2,400	1,050	4	12

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FM 512

QUANTITIY SUMMARIES

SHEET 2 OF 11

		HIGHWAY NO.
		FM 512
STATE	DISTRICT / COUNTY	SHEET NO.
TEXAS	PARIS / HUNT	10
CONTROL	SECTION / JOB	
0579	02 / 014	

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SUMMARY OF DRIVEWAY ITEMS

DRIVEWAY NO.	CL STATION	LT/RT	SURFACE	L (LENGTH)	W (WIDTH)	R1 (RADIUS)	R2 (RADIUS)	AREA	104-6017 REMOVING CONC (DRIVEWAYS)	530-6003 INTERSECTIONS (SURF TREAT)	530-6004 DRIVEWAYS (CONC)	530-6005 DRIVEWAYS (ACP)	530-6016 DRIVEWAYS (BASE)
				LT	LF	LF	LF	SF	SY	SY	SY	SY	SY
CSJ: 0579-02-014													
1	0+66.34	RT	GRAVEL	8.00	15.00	8.00	8.00	47.40					
2	1+27.91	RT	GRAVEL	8.00	15.00	8.00	8.00	47.40					
3	1+67.29	LT	GRAVEL	8.00	24.00	15.00	15.00	87.70					
4	1+70.61	RT	CONCRETE	8.00	18.00	8.00	8.00	53.40					
5	2+26.72	RT	CONCRETE	8.00	20.00	8.00	8.00	57.30					
6	2+58.03	RT	DIRT/GRAVEL	8.00	18.00	8.00	8.00	53.30					
S PRESTON ST	3+72.31	LT	HMA	264.00	20.00	40.00	40.00	164.80					
7	5+44.17	RT	CONCRETE	8.00	21.00	10.00	10.00	65.60					
8	5+79.17	LT	DIRT	8.00	12.00	8.00	1.00	34.40					
9	5+94.45	LT	CONCRETE	8.00	48.00	15.00	15.00	124.70					
10	7+03.81	LT	CONCRETE	8.00	20.00	8.00	8.00	56.90					
S MILL ST	7+47.56	LT	HMA	258.90	20.00	20.00	20.00	96.40					
CHERRY ST	8+60.11	RT	HMA	248.90	15.00	20.00	12.00	73.20					
11	9+04.08	RT	ASPHALT	8.00	15.00	8.00	8.00	47.40					
S GREENVILLE ST	9+55.94	LT	HMA	271.90	15.00	12.00	12.00	60.00					
12	11+12.27	LT	HMA	8.00	18.00	8.00	8.00	53.30					
13	11+91.45	LT	HMA	8.00	12.00	15.00	8.00	57.00					
COMMERCE ST	12+14.44	LT	HMA	169.70	20.00	30.00	120.00	1649.73					
14	13+85.46	LT	DIRT	8.00	15.00	8.00	8.00	155.90					17.32
15	14+66.98	LT	FLEX BASE	8.00	18.00	6.00	6.00	159.40				17.71	
16	16+75.91	RT	BASE	8.00	12.00	8.00	8.00	128.40					14.27
17	17+97.04	LT	BASE	8.00	12.00	8.00	8.00	123.40					13.71
S CHERRY ST	21+50.62	RT	HMA	8.00	15.00	12.00	12.00	466.80		51.87			
18	23+53.35	RT	HMA	8.00	12.00	8.00	8.00	123.40				13.71	
19	23+55.09	LT	BASE	8.00	12.00	8.00	8.00	123.90					13.77
20	25+58.81	LT	GRAVEL	8.00	12.00	8.00	8.00	123.40					13.71
21	33+47.18	RT	DIRT	8.00	18.00	8.00	8.00	171.40					19.04
22	35+32.55	RT	GRAVEL	8.00	12.00	8.00	15.00	154.00					17.11
23	39+06.13	LT	ASPHALT	8.00	12.00	12.00	12.00	157.90				17.54	
24	40+51.29	LT	ASPHALT	8.00	12.00	8.00	8.00	123.40				13.71	
25	41+27.11	LT	ASPHALT	8.00	12.00	8.00	8.00	123.40				13.71	
26	48+00.87	LT	ASPHALT	8.00	18.00	8.00	8.00	171.90				19.10	
27	49+25.81	RT	BASE	8.00	24.00	8.00	8.00	219.40					24.38
28	53+35.98	RT	CONCRETE	8.00	14.00	10.00	10.00	154.60	20.29		17.18		
29	55+24.65	RT	BASE	8.00	12.00	8.00	8.00	123.40					13.71
30	56+94.76	RT	CONCRETE	8.00	11.00	8.00	8.00	101.70	13.74		11.30		
31	57+06.26	RT	DIRT	8.00	12.00	8.00	8.00	109.70					12.19
32	57+52.97	LT	DIRT	8.00	14.00	8.00	8.00	139.40					15.49
33	58+31.16	LT	ASPHALT	8.00	12.00	8.00	8.00	123.40				13.71	
34	58+87.71	RT	DIRT	8.00	12.00	8.00	8.00	123.40					13.71
35	60+09.81	RT	ASPHALT	8.00	12.00	8.00	8.00	123.40				13.71	
36	61+20.09	RT	FLEX BASE	8.00	12.00	8.00	8.00	123.40					13.71
37	66+11.9	LT	FLEX BASE	8.00	18.00	12.00	12.00	203.90					22.66
38	69+14.78	RT	ASPHALT	8.00	15.00	8.00	8.00	147.80				16.42	
CR 4817	71+21.20	RT	ASPHALT	30.00	20.00	30.00	30.00	986.28		109.56			
39	72+67.20	LT	FLEX BASE	8.00	12.00	8.00	8.00	123.40				13.71	
40	73+77.04	RT	CONCRETE	8.00	10.00	5.00	5.00	90.70	12.30		10.08		
41	77+86.89	LT	FLEX BASE	8.00	12.00	15.00	15.00	184.60				20.51	
42	80+34.63	LT	HMA	8.00	12.00	8.00	8.00	125.20				13.91	
43	80+81.19	RT	FLEX BASE	8.00	10.00	8.00	8.00	105.80				11.76	
44	82+08.17	RT	HMA	8.00	15.00	8.00	8.00	147.10				16.34	
45	82+14.28	LT	BASE	8.00	15.00	8.00	8.00	147.60					16.40
46	82+54.75	LT	HMA	8.00	12.00	8.00	8.00	125.90				13.99	
47	88+94.17	RT	HMA	8.00	18.00	10.00	10.00	186.60				20.73	
48	90+18.38	RT	DIRT	8.00	8.00	10.00	10.00	106.60					11.84
49	91+06.40	LT	FLEX BASE	8.00	15.00	15.00	15.00	209.10				23.23	
50	95+98.46	RT	FLEX BASE	8.00	15.00	15.00	15.00	208.60				23.18	
CR 4719	98+63.88	LT	FLEX BASE	35.00	22.00	30.00	30.00	1335.51		148.39			
51	107+60.36	LT	FLEX BASE	8.00	10.00	8.00	8.00	107.40				11.93	
52	110+33.36	LT	HMA	8.00	15.00	10.00	10.00	162.60				18.07	
53	114+55.16	LT	HMA	8.00	15.00	10.00	10.00	162.60				18.07	
54	120+08.16	LT	BASE	8.00	15.00	8.00	8.00	147.70					16.41
55	127+89.61	LT	FLEX BASE	8.00	12.00	10.00	10.00	138.60				15.40	
56	131+90.53	RT	HMA	8.00	12.00	8.00	8.00	123.40				13.71	
57	132+82.53	RT	DIRT	8.00	10.00	8.00	8.00	107.40					11.93
58	138+33.23	LT	FLEX BASE	8.00	15.00	18.00	18.00	239.50				26.61	
59	150+19.4	LT	CONCRETE	8.00	26.50	7.00	7.00	233.00	31.78		25.89		
CR 4816	150+71.11	RT	BASE	30.00	18.00	15.00	15.00	583.47		64.83			
60	150+83.56	LT	BASE	8.00	15.00	8.00	8.00	147.40					16.38
61	152+16.75	RT	BASE	8.00	12.00	8.00	8.00	123.40					13.71
62	155+18.7	RT	BASE	8.00	12.00	8.00	8.00	123.40					13.71
63	159+93.02	LT	CONCRETE	8.00	17.33	N/A	15.00	183.00	24.19		20.33		
64	167+72.19	LT	BASE	8.00	24.00	12.00	10.00	234.30					26.03
65	168+69.23	LT	HMA	8.00	15.00	N/A	10.00	141.30				15.70	

CONT. NEXT SHEET

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Texas Department of Transportation

FM 512

QUANTITIY SUMMARIES

SHEET 3 OF 11

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	11
CONTROL	SECTION	JOB	
0579	02	014	

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SUMMARY OF DRIVEWAY ITEMS

DRIVEWAY NO.	CL STATION	LT/RT	SURFACE	L (LENGTH)	W (WIDTH)	R1 (RADIUS)	R2 (RADIUS)	AREA	104-6017 REMOVING CONC (DRIVEWAYS)	530-6003 INTERSECTIONS (SURF TREAT)	530-6004 DRIVEWAYS (CONC)	530-6005 DRIVEWAYS (ACP)	530-6016 DRIVEWAYS (BASE)
				LT	LF	LF	LF	SF	SY	SY	SY	SY	SY
CSJ: 0579-02-014													
67	179+05.69	RT	BASE	8.00	12.00	10.00	10.00	138.60					15.40
68	183+65.33	RT	HMA	8.00	10.00	10.00	10.00	121.70				13.52	
69	192+81.28	RT	HMA	8.00	12.00	10.00	10.00	137.20				15.24	
70	195+28.33	LT	HMA	8.00	15.00	8.00	8.00	137.20				15.24	
71	204+22.22	LT	HMA	8.00	18.00	10.00	10.00	186.60				20.73	
72	205+94.22	LT	BASE	8.00	12.00	8.00	8.00	123.40					13.71
73	207+26.05	RT	BASE	8.00	12.00	8.00	8.00	123.40					13.71
74	207+41.67	LT	GRAVEL	8.00	8.00	8.00	8.00	91.40					10.16
75	208+73.69	LT	HMA	8.00	12.00	6.00	6.00	111.40				12.38	
76	210+78.8	RT	BASE	8.00	12.00	6.00	6.00	111.40					12.38
77	224+35.32	LT	HMA	8.00	12.00	8.00	8.00	127.00				14.11	
78	227+52.61	RT	DIRT	8.00	22.00	10.00	10.00	218.40					24.27
79	231+43.99	LT	BASE	8.00	15.00	10.00	10.00	165.90					18.43
CR 4727	231+53.76	RT	HMA	40.00	22.00	25.00	25.00	1132.48		125.83			
80	234+64.91	RT	BASE	8.00	12.00	15.00	15.00	184.60					20.51
81	237+43.83	LT	HMA	8.00	13.00	8.00	8.00	131.70				14.63	
82	239+56.20	RT	BASE	8.00	12.00	15.00	15.00	184.60					20.51
83	245+59.61	LT	BASE	8.00	12.00	10.00	10.00	138.60					15.40
CR 4722	247+18.35	LT	BASE	30.00	12.00	25.00	25.00	629.68		69.96			
84	247+85.80	RT	BASE	8.00	12.00	8.00	8.00	123.40					13.71
85	249+90.65	LT	BASE	8.00	12.00	8.00	8.00	122.20					13.58
86	250+79.91	RT	BASE	8.00	12.00	8.00	8.00	124.80					13.87
87	251+73.22	RT	BASE	8.00	20.00	10.00	10.00	205.60					22.84
88	261+53.67	RT	BASE	8.00	12.00	8.00	8.00	126.60					14.07
89	265+99.03	LT	BASE	8.00	12.00	8.00	8.00	123.80					13.76
90	266+16.03	RT	HMA	8.00	12.00	8.00	8.00	122.80				13.64	
91	269+76.23	RT	BASE	8.00	12.00	8.00	8.00	123.40					13.71
92	270+22.23	RT	HMA	8.00	12.00	8.00	8.00	123.40				13.71	
93	275+39.46	LT	BASE	8.00	12.00	10.00	10.00	140.50					15.61
94	279+18.85	RT	HMA	8.00	12.00	8.00	8.00	124.80				13.87	
95	282+16.99	RT	BASE	8.00	12.00	8.00	8.00	123.40					13.71
96	284+22.66	RT	BASE	8.00	10.00	5.00	5.00	101.10					11.23
97	285+28.86	LT	HMA	8.00	12.00	10.00	10.00	141.60				15.73	
98	285+33.86	RT	BASE	8.00	10.00	8.00	8.00	106.30					11.81
99	286+51.75	LT	HMA	8.00	18.00	8.00	8.00	173.90				19.32	
100	287+27.42	RT	BASE	8.00	12.00	8.00	8.00	146.20					16.24
101	288+80.62	RT	HMA	8.00	18.00	20.00	20.00	276.70				30.74	
102	292+82.80	RT	HMA	8.00	12.00	8.00	8.00	126.20				14.02	
103	296+83.12	RT	DIRT	8.00	12.00	10.00	10.00	138.60					15.40
104	300+45.57	LT	HMA	8.00	18.00	5.00	5.00	154.70				17.19	
105	301+45.73	RT	BASE	8.00	12.00	8.00	8.00	123.40					13.71
106	311+50.10	RT	HMA	78.00	15.00	25.00	25.00	330.00				36.67	
107	315+17.54	LT	HMA	8.00	33.00	8.00	8.00	291.40				32.38	
108	316+17.77	RT	BASE	8.00	12.00	8.00	8.00	123.00					13.67
109	316+67.47	LT	HMA	8.00	15.00	10.00	10.00	164.60				18.29	
110	317+81.07	LT	HMA	8.00	12.00	5.00	5.00	107.10				11.90	
111	320+19.67	LT	GRAVEL	8.00	12.00	15.00	15.00	184.60					20.51
112	321+59.20	RT	HMA	8.00	15.00	8.00	8.00	147.40				16.38	
CR 4617	324+43.77	LT	HMA	50.00	22.00	50.00	50.00	2267.36		251.93			
CR 4502	324+50.40	RT	HMA	36.00	18.00	15.00	36.00	1025.57		113.95			
113	325+68.51	LT	DIRT	8.00	8.00	8.00	8.00	90.40					10.04
114	331+76.64	LT	HMA	8.00	12.00	8.00	8.00	123.40				13.71	
115	332+74.21	LT	BASE	8.00	12.00	8.00	8.00	123.40					13.71
116	333+16.66	LT	HMA	8.00	12.00	8.00	8.00	123.40				13.71	
117	336+93.75	LT	HMA	14.60	20.00	30.00	5.00	331.90				36.88	
118	338+11.57	LT	HMA	10.70	26.00	5.00	30.00	260.00				28.89	
119	339+63.21	LT	HMA	8.00	20.00	18.00	18.00	279.50				31.06	
120	340+80.72	LT	HMA	8.00	12.00	8.00	8.00	123.40				13.71	
121	373+93.46	RT	BASE	8.00	14.00	8.00	8.00	139.40					15.49
122	375+73.28	RT	BASE	8.00	18.00	15.00	15.00	256.70					28.52
CR 4600	410+76.52	RT	HMA	30.00	24.00	25.00	25.00	1008.27		112.03			
123	419+95.42	LT	HMA	8.00	12.00	8.00	8.00	123.40				13.71	
124	421+30.66	LT	FLEX BASE	8.00	10.00	8.00	8.00	107.40				11.93	
125	423.41.15	RT	FLEX BASE	8.00	12.00	8.00	8.00	123.40				13.71	
126	424+14.20	RT	BASE	8.00	12.00	8.00	8.00	123.40					13.71
127	424+88.20	RT	BASE	8.00	10.00	8.00	8.00	107.40					11.93
CR 4601	428+10.13	LT	HMA	30.00	20.00	100.00	20.00	886.40		98.49			
128	433+36.37	RT	BASE	8.00	12.00	8.00	8.00	123.40					13.71
129	435+65.19	LT	BASE	8.00	15.00	8.00	8.00	147.40					16.38
130	443+31.40	RT	BASE	8.00	12.00	8.00	8.00	123.40					13.71
131	445+05.69	LT	HMA	8.00	12.00	8.00	8.00	123.40				13.71	
132	447+78.40	RT	HMA	8.00	12.00	8.00	8.00	124.90				13.88	
133	450+23.57	RT	BASE	8.00	12.00	8.00	8.00	123.40					13.71

CONT. NEXT SHEET

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Texas Department of Transportation

FM 512

QUANTITIY SUMMARIES

SHEET 4 OF 11

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	12
CONTROL	SECTION	JOB	
0579	02	014	

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100%
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SUMMARY OF DRIVEWAY ITEMS

DRIVEWAY NO.	CL STATION	LT/RT	SURFACE	L (LENGTH)	W (WIDTH)	R1 (RADIUS)	R2 (RADIUS)	AREA	104-6017 REMOVING CONC (DRIVEWAYS)	530-6003 INTERSECTIONS (SURF TREAT)	530-6004 DRIVEWAYS (CONC)	530-6005 DRIVEWAYS (ACP)	530-6016 DRIVEWAYS (BASE)
				LT	LF	LF	LF	SF	SY	SY	SY	SY	SY
CSJ: 0579-02-014													
134	461+65.48	LT	HMA	8.00	12.00	8.00	8.00	123.40				13.71	
135	474+72.54	LT	BASE	8.00	12.00	8.00	8.00	123.40					13.71
136	479+98.42	RT	DIRT	8.00	12.00	8.00	8.00	123.40					13.71
137	486+38.42	RT	BASE	8.00	12.00	8.00	8.00	123.40					13.71
138	486+75.42	LT	HMA	8.00	10.00	8.00	8.00	107.40				11.93	
139	487+81.42	LT	HMA	8.00	12.00	8.00	8.00	123.70				13.74	
MUD RD	489+14.52	LT	HMA	20.00	15.00	18.00	18.00	396.20		44.02			
140	490+93.99	LT	HMA	8.00	12.00	8.00	8.00	123.70				13.74	
141	491+15.13	RT	HMA	8.00	12.00	8.00	8.00	123.80				13.76	
142	492+46.02	LT	BASE	8.00	10.00	8.00	8.00	107.40					11.93
143	493+24.59	RT	BASE	8.00	12.00	8.00	8.00	123.40					13.71
144	493+65.59	RT	BASE	8.00	12.00	8.00	8.00	123.40					13.71
145	494+11.47	LT	HMA	8.00	12.00	8.00	8.00	123.40				13.71	
146	494+98.88	LT	HMA	8.00	12.00	8.00	8.00	122.60				13.62	
147	496+01.13	RT	HMA	10.00	18.00	8.00	8.00	172.60				19.18	
148	496+13.84	LT	DIRT/GRAVEL	8.00	16.00	8.00	8.00	154.40					17.16
149	496+55.51	LT	HMA	8.00	15.00	8.00	8.00	146.50				16.28	
150	498+32.25	RT	HMA	8.00	10.00	8.00	8.00	116.30				12.92	
151	499+47.29	LT	FLEX BASE	8.00	28.00	8.00	8.00	251.40				27.93	
152	500+05.29	RT	BASE	8.00	12.00	8.00	8.00	130.80					14.53
153	502+44.97	LT	DIRT	8.00	12.00	8.00	8.00	123.40					13.71
154	504+32.26	RT	BASE	8.00	10.00	8.00	8.00	106.80					11.87
FM 118	507+70.7	RT	HMA	120.00	24.00	100.00	100.00	6291.60		699.07			
							PROJECT TOTAL		102	1,889.93	85	1,151	1,055

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Texas Department of Transportation

FM 512

QUANTITIY SUMMARIES

SHEET 5 OF 11

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	13
CONTROL	SECTION	JOB	
0579	02	014	

5/24/2023 6:20:00 PM
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SUMMARY OF PARALLEL DRAINAGE ITEMS																				ALT BID		
					104-6028	420-6071	464-6001	464-6003	464-6005	464-6007	465-6126	467-6326	467-6341	467-6363	467-6395	467-6423	480-6001	496-6007	4122-6023	4122-6024	4122-6025
DRIVEWAY NO.	CL STATION	LT/RT	EXIST PIPE TYPE	EXIST PIPE DIAMETER	REMOVING CONC (MISC)	CL C CONC (COLLAR)	RC PIPE (CL III)(12 IN)	RC PIPE (CL III)(18 IN)	RC PIPE (CL III)(24 IN)	RC PIPE (CL III)(30 IN)	INLET (COMPL)(PSL)(FG)(3FTX3FT-3FTX3FT)	SET (TY II) (12 IN) (RCP) (6: 1) (P)	SET (TY II) (15 IN) (RCP) (6: 1) (P)	SET (TY II) (18 IN) (RCP) (6: 1) (P)	SET (TY II) (24 IN) (RCP) (6: 1) (P)	SET (TY II) (30 IN) (RCP) (6: 1) (P)	CLEAN EXIST CULVERTS	REMOV STR (PIPE)	THERMO PIPE(18") (PP)(TY S)(TY II)	THERMO PIPE(24") (PP)(TY S)(TY II)	THERMO PIPE(30") (PP)(TY S)(TY II)
				IN	SY	EA	LF	LF	LF	LF	EA	EA	EA	EA	EA	EA	EA	LF	LF	(SEE NOTE 1)	
CSJ: 0579-02-014																					
S PRESTON ST	3+72.31	LT	RCP	18				3						2			1				
7	5+44.17	RT	RCP	12								2					1				
S GREENVILLE ST	9+55.94	LT	RCP	18										2			1				
12	11+12.27	LT	CMP	12				24						2				24	24		
* 13	11+91.45	LT	CMP	12		2	7				1	1					1				
* COMMERCE ST	12+14.44	LT	RCP	18				6						1			1				
14	13+85.46	LT	CMP	12		1	24					2					1				
15	14+66.98	LT	RCP	18				8						2			1	3			
16	16+75.91	RT	RCP	18				8						1			1	3			
17	17+97.04	LT	CMP	18										2			1				
S CHERRY ST	21+50.62	RT	RCP	18				12						2			1	3			
18	23+53.35	RT	RCP	12								2					1				
19	23+55.09	LT	RCP	12								2					1				
20	25+58.81	LT	CMP	12				24						2				24	24		
23	39+06.13	LT	CMP	18		1		24						2			1	4			
24	40+51.29	LT	RCP	18				16						2			1	6			
25	41+27.11	LT	RCP	18				36						2				6			
26	48+00.87	LT	CMP	18				24						1			1				
27	49+25.81	RT	CMP	18																	
28	53+35.98	RT	RCP	12				28						2				24	28		
29	55+24.65	RT	RCP	12			4					2					1	3			
30	56+94.76	RT	RCP	12			11					2					1	8			
31	57+06.26	RT	CMP	12								2					1				
32	57+52.97	LT	RCP	12			4					2					1	3			
33	58+31.16	LT	CMP	18				26						2			1	2			
34	58+87.71	RT	RCP	18										2			1				
35	60+09.81	RT	RCP	12								2					1				
36	61+20.09	RT	CMP	18										2			1				
37	66+11.9	LT	CMP	12		1	24					2					1				
38	69+14.78	RT	CMP	18										2			1				
CR 4817	71+21.20	RT	CMP	18		1		6						2				3			
39	72+67.20	LT	RCP	12			18					2						16	18		
40	73+77.04	RT	CMP	18										2			1				
41	77+86.89	LT	CMP	18										2			1				
42	80+34.63	LT	CMP	12								2					1				
43	80+81.19	RT	RCP	18				4						2			1	3			
44	82+08.17	RT	RCP	12								2					1				
45	82+14.28	LT	CMP	12								2					1				
46	82+54.75	LT	CMP	12								2					1				
47	88+94.17	RT	CMP	18																	
49	91+06.40	LT	CMP	24																	
50	95+98.46	RT	CMP	18																	
51	107+60.36	LT	RCP	18				4						2			1	3			
52	110+33.36	LT	CMP	18				24.00						2			1				
53	114+55.16	LT	CMP	18																	
54	120+08.16	LT	CMP	18										2			1				
55	127+89.61	LT	CMP	18										2			1				
56	131+90.53	RT	CMP	18										2			1				
57	132+82.53	RT	RCP	18				4						2			1	3			
58	138+33.23	LT	CMP	18										2			1				
59	150+19.4	LT	CMP	18										2			1				
CR 4816	150+71.11	RT	CMP	18										2			1				
60	150+83.56	LT	CMP	18										2			1				
61	152+16.75	RT	CMP	18										2			1				
62	155+18.7	RT	CMP	18				4						2			1	3			
66	171+80.23	LT	CMP	18										2			1				
67	179+05.69	RT	CMP	18										2			1				
68	183+65.33	RT	RCP	12			4					2					1	3			
69	192+81.28	RT	RCP	12								2					1				
70	195+28.33	LT	CMP	18																	
71	204+22.22	LT	CMP	15									2				1				
72	205+94.22	LT	CMP	12								2					1				
75	208+73.69	LT	CMP	12								2					1				
76	210+78.8	RT	RCP	12				24						2			1	16	24		
77	224+35.32	LT	RCP	18				4						2			1	3			
81	237+43.83	LT	CMP	24											2		1				
82	239+56.20	RT	CMP	18																	
83	245+59.61	LT	CMP	12		1	4					2					1	3			
84	247+85.80	RT	CMP	12				24						2				20	24		
85	249+90.65	LT	CMP	12				24						2				22	24		
86	250+79.91	RT	RCP	12								2					1	2			
87	251+73.22	RT	CMP	18										2			1				
88	261+53.67	RT	CMP	12			24					2						24	24		
89	265+99.03	LT	CMP	18				24						2				24			
90	266+16.03	RT	CMP	18				24						2				20	24		

* REFER TO DETAIL A

CONT. NEXT SHEET

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FIRM # F-6825

Texas Department of Transportation

FM 512

QUANTITIY SUMMARIES

SHEET 6 OF 11

			HIGHWAY NO.
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	PARIS	HUNT	14
CONTROL	SECTION	JOB	
0579	02	014	

5/24/2023 6:20:00 PM
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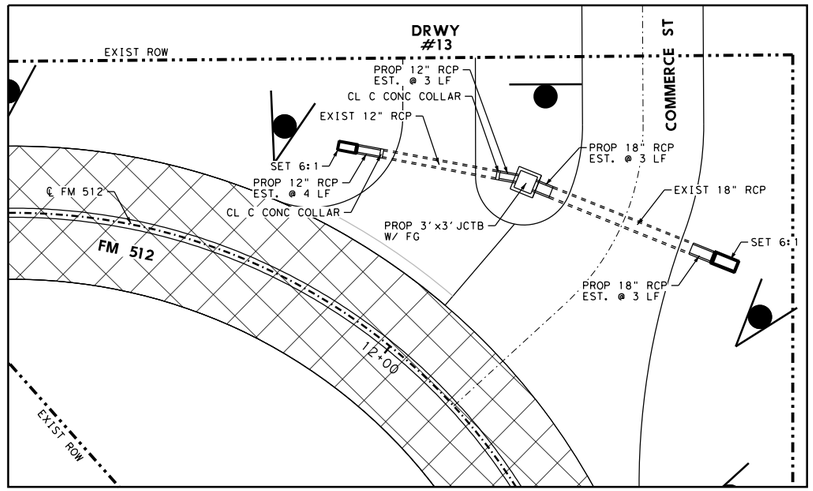
SUMMARY OF PARALLEL DRAINAGE ITEMS

DRIVEWAY NO.	CL STATION	LT/RT	EXIST PIPE TYPE	EXIST PIPE DIAMETER	104-6028 REMOVING CONC (MISC)	420-6071 CL C CONC (COLLAR)	464-6001 RC PIPE (CL III)(12 IN)	464-6003 RC PIPE (CL III)(18 IN)	464-6005 RC PIPE (CL III)(24 IN)	464-6007 RC PIPE (CL III)(30 IN)	465-6126 INLET (COMPL)(PSL)(FG)(3FTX3FT-3FTX3FT)	467-6326 SET (TY II) (12 IN)(RCP)(6: 1)(P)	467-6341 SET (TY II) (15 IN)(RCP)(6: 1)(P)	467-6363 SET (TY II) (18 IN)(RCP)(6: 1)(P)	467-6395 SET (TY II) (24 IN)(RCP)(6: 1)(P)	467-6423 SET (TY II) (30 IN)(RCP)(6: 1)(P)	480-6001 CLEAN EXIST CULVERTS	496-6007 REMOV STR (PIPE)	ALT BID 4122-6023 THERMO PIPE(18")(PP)(TY S)(TY II)	ALT BID 4122-6024 THERMO PIPE(24")(PP)(TY S)(TY II)	ALT BID 4122-6025 THERMO PIPE(30")(PP)(TY S)(TY II)
				IN	SY	EA	LF	LF	LF	LF	EA	EA	EA	EA	EA	EA	EA	LF	LF	LF	LF
93	275+39.46	LT	CMP	18										2			1				
95	282+16.99	RT	CMP	12								2					1				
96	284+22.66	RT	CMP	12				20						2				15	20		
98	285+33.86	RT	RCP	12			4					2					1	3			
99	286+51.75	LT	CMP	18																	
100	287+27.42	RT	CMP	12																	
102	292+82.80	RT	CMP	18										2			1				
105	301+45.73	RT	CMP	12								2					1				
107	315+17.54	LT	CMP	24											2		1				
108	316+17.77	RT	CMP	2-30												4	2				
109	316+67.47	LT	RCP	24											2		1				
110	317+81.07	LT	CMP	18										2			1				
112	321+59.20	RT	RCP	30	9.3											2	1				
CR 4502	324+50.40	RT	RCP	30						10						2	1	6			
114	331+76.64	LT	CMP	12								2					1				
121	373+93.46	RT	RCP	30												2	1				
CR 4600	410+76.52	RT	RCP	24																	
123	419+95.42	LT	CMP	12								2					1				
124	421+30.66	LT	CMP	12								2					1				
125	423.41.15	RT	CMP	18										2			1				
126	424+14.20	RT	CMP	18																	
127	424+88.20	RT	CMP	18										2			1				
128	433+36.37	RT	CMP	15									2				1				
129	435+65.19	LT	CMP	18																	
130	443+31.40	RT	CMP	24					20						2			20		20	
131	445+05.69	LT	RCP	18				48						2				22	48		
132	447+78.40	RT	CMP	18										2			1				
133	450+23.57	RT	CMP	18										2			1				
134	461+65.48	LT	RCP	30						8						2	1				
135	474+72.54	LT	CMP	18				44						2				20	44		
137	486+38.42	RT	CMP	18										2			1				
138	486+75.42	LT	RCP	18										2			1				
139	487+81.42	LT	CMP	24											2		1				
140	490+93.99	LT	RCP	12			36					2					1	3			
142	492+46.02	LT	RCP	24											2		1				
143	493+24.59	RT	RCP	18				12						2			1	6			
144	493+65.59	RT	RCP	18				12						2			1	6			
145	494+11.47	LT	RCP	24					26						2			20		26	
146	494+98.88	LT	RCP	18				8						2			1	6			
147	496+01.13	RT	RCP	18				8						1			1	6			
148	496+13.84	LT	RCP	30												2	1				
149	496+55.51	LT	CMP	30						30						2		30			30
150	498+32.25	RT	CMP	24						24						2		10			24
151	499+47.29	LT	CMP	18																	
152	500+05.29	RT	CMP	18					30						2			18		30	
153	502+44.97	LT	RCP	2-24					48						4			44		48	
154	504+32.26	RT	RCP	18				18						2				18	18		
PROJECT TOTAL					9.3	7	164	579	124	72	1	59	4	116	20	18	89	534	344	124	54



CULVERT DETAIL A
AT FM 512 AND COMMERCE ST

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FM 512

QUANTITIY SUMMARIES

SHEET 7 OF 11

			HIGHWAY NO.
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	PARIS	HUNT	15
CONTROL	SECTION	JOB	
0579	02	014	

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SUMMARY OF MAILBOXES							(SEE NOTE 1)	
			560-6004	560-6005	560-6006	530-6008	316-6404	316-6405
LOCATION	LT/RT	NUMBER OF BOXES	MAILBOX INSTALL-S (TWG-POST) TY 2	MAILBOX INSTALL-D (TWG-POST) TY 2	MAILBOX INSTALL-M (TWG-POST) TY 2	TURNOUTS (ACP)	AGGR (TY-PB GR-4 OR TY-PL GR-4 SAC-A)	ASPH (AC-20-5TR OR AC-20XP)
STA			EA	EA	EA	SY	CY	GAL
CSJ: 0579-02-014								
6+57	LT	1	1			29.3	0.2	10.5
13+98	LT	1	1			21.3	0.2	7.7
23+38	LT	1	1			21.3	0.2	7.7
35+42	LT	1	1			29.3	0.2	10.6
38+87	LT	1	1			21.3	0.2	7.7
41+40	LT	1	1			21.3	0.2	7.7
48+15	LT	1	1			21.3	0.2	7.7
53+49	LT	1	1			29.3	0.2	10.6
56+72	LT	1	1			29.3	0.2	10.6
58+11	LT	1	1			21.3	0.2	7.7
60+34	LT	1	1			29.3	0.2	10.6
61+34	LT	1	1			29.3	0.2	10.6
65+88	LT	1	1			21.3	0.2	7.7
69+41	LT	1	1			29.3	0.2	10.6
77+65	LT	1	1			21.3	0.2	7.7
80+15	LT	1	1			21.2	0.2	7.6
82+40	LT	2		1		21.3	0.2	7.7
90+83	LT	1	1			21.3	0.2	7.7
95+69	LT	1	1			28.8	0.2	10.4
110+48	LT	1	1			21.3	0.2	7.7
114+70	LT	1	1			21.3	0.2	7.7
128+02	LT	1	1			21.3	0.2	7.7
152+10	LT	1	1			29.3	0.2	10.6
154+86	LT	1	1			29.3	0.2	10.6
159+70	LT	1	1			21.3	0.2	7.7
168+82	LT	1	1			21.3	0.2	7.7
195+11	LT	2		1		21.2	0.2	7.6
208+52	LT	1	1			21.3	0.2	7.7
234+68	LT	1	1			29.4	0.2	10.6
237+59	LT	1	1			21.3	0.2	7.7
239+56	LT	1	1			29.4	0.2	10.6
245+38	LT	1	1			21.3	0.2	7.7
247+86	LT	1	1			29.3	0.2	10.6
252+30	LT	1	1			30.0	0.2	10.8
261+18	LT	1	1			28.8	0.2	10.4
266+17	LT	2		1		21.3	0.2	7.7
269+68	LT	1	1			29.3	0.2	10.6
278+87	LT	1	1			30.0	0.2	10.8
281+59	LT	1	1			29.3	0.2	10.6
285+44	LT	1	1			21.2	0.2	7.6
287+47	LT	1	1			28.8	0.2	10.4
288+95	LT	4			1	28.8	0.2	10.4
292+81	LT	1	1			28.8	0.2	10.4
300+22	LT	1	1			21.3	0.2	7.7
301+62	LT	1	1			29.3	0.2	10.6
311+45	LT	3			1	29.3	0.2	10.6
316+37	LT	2		1		21.2	0.2	7.6
317+93	LT	1	1			21.2	0.2	7.6
319+98	LT	1	1			21.3	0.2	7.7
321+82	LT	1	1			28.2	0.2	10.2
331+92	LT	1	1			21.3	0.2	7.7
340+98	LT	1	1			21.3	0.2	7.7
420+08	LT	1	1			21.3	0.2	7.7
423+70	LT	1	1			29.3	0.2	10.6
424+96	LT	1	1			29.3	0.2	10.6
427+66	LT	1	1			21.9	0.2	7.9
433+39	LT	1	1			29.3	0.2	10.6
444+86	LT	1	1			21.3	0.2	7.7
450+17	LT	1	1			29.3	0.2	10.6
474+83	LT	1	1			21.3	0.2	7.7
487+94	LT	1	1			21.3	0.2	7.7
490+73	LT	2		1		21.3	0.2	7.7
493+91	LT	1	1			21.3	0.2	7.7
494+78	LT	1	1			21.3	0.2	7.7
495+94	LT	2		1		29.8	0.2	10.7
496+68	LT	1	1			21.5	0.2	7.7
498+29						29.8	0.2	10.7
PROJECT TOTAL			58	6	2	1,668	14	600

NOTE:

1. APPLY SECOND COURSE SURFACE TREATMENT TO MAILBOX TURNOUTS.

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QUANTITIY SUMMARIES

SHEET 8 OF 11

		HIGHWAY NO
		FM 512
STATE	DISTRICT / COUNTY	SHEET NO
TEXAS	PARIS / HUNT	16
CONTROL	SECTION / JOB	
0579	02 / 014	

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SUMMARY OF DRAINAGE ITEMS																				
DESCRIPTION		104-6028 REMOVING CONC (MISC)	132-6019 EMBANKMENT (VEHICLE)(ORD COMP)(TY B)	400-6006 CUT & RESTORING PAV	401-6001 FLOWABLE BACKFILL	402-6001 TRENCH EXCAVATION PROTECTION	403-6001 TEMPORARY SPL SHORING	429-6007 CONC STR REPAIR (VERTICAL & OVERHEAD)	432-6002 RIPRAP (CONC)(5 IN)	432-6031 RIPRAP (STONE PROTECTION)(12 IN)	462-6051 CONC BOX CULV (5 FT X 3 FT)(EXTEND)	462-6052 CONC BOX CULV (5 FT X 4 FT)(EXTEND)	462-6055 CONC BOX CULV (6 FT X 4 FT)(EXTEND)	462-6059 CONC BOX CULV (7 FT X 4 FT)(EXTEND)	462-6063 CONC BOX CULV (8 FT X 4 FT)(EXTEND)	462-6066 CONC BOX CULV (8 FT X 7 FT)(EXTEND)	462-6067 CONC BOX CULV (8 FT X 8 FT)(EXTEND)	462-6091 CONC BOX CULV (5FT X 2.5FT)	462-6100 CONC BOX CULV (9 FT X 4 FT)(EXTEND)	464-6007 RC PIPE (CL III)(30 IN)	464-6008 RC PIPE (CL III)(36 IN)
CULVERT NO.	STA	SY	CY	SY	CY	LF	SF	SF	CY	CY	LF	LF	LF	LF	LF	LF	LF	LF	LF	LF	LF
CSJ: 0579-02-014																					
CULVERT 1	30+70.25		4	12.2		22				18										42	
CULVERT 2	44+89.85		5				50		6		8										
CULVERT 3	76+57.36		4				99		9	13.5			6								
CULVERT 4	94+41.83		4	15		10															42
CULVERT 5	162+95.74		7				80		4.6	17								10			
CULVERT 7	228+99.24		6				160		27	44							6				
CULVERT 8	231+94.15		3				70		8.4	13		2									
CULVERT 9	255+83.82																				
CULVERT 10	257+32.72		30				130		22.2							6					
CULVERT 11	295+16.99		14							18											
CULVERT 12	307+00.86																				
CULVERT 13	312+88.60		10				100		15.2						10						
CULVERT 14	370+06.67		27	26		22				48											80
CULVERT 15	375+20.36		10																		12
CULVERT 16	415+92.00	40	7		5			80		13											
CULVERT 17	456+79.07		2				568							5							
CULVERT 18	484+24.53		3				592												5		
PROJECT TOTAL		40	136	53	5	54	1,849	80	92	185	8	2	6	5	10	6	6	10	5	42	134

SUMMARY OF DRAINAGE ITEMS																		
DESCRIPTION		466-6099 HEADWALL (CH - PW - 0) (DIA= 30 IN)	466-6101 HEADWALL (CH - PW - 0) (DIA= 36 IN)	466-6150 WINGWALL (FW - 0) (HW=3 FT)	466-6151 WINGWALL (FW - 0) (HW=4 FT)	466-6152 WINGWALL (FW - 0) (HW=5 FT)	466-6155 WINGWALL (FW - 0) (HW=8 FT)	466-6156 WINGWALL (FW - 0) (HW=9 FT)	466-6166 WINGWALL (FW - S) (HW=5 FT)	466-6194 WINGWALL (PW - 2) (HW=5 FT)	467-6417 SET (TY II) (30 IN) (RCP) (3: 1) (C)	467-6448 SET (TY II) (36 IN) (RCP) (3: 1) (C)	467-6454 SET (TY II) (36 IN) (RCP) (6: 1) (P)	480-6001 CLEAN EXIST CULVERTS	496-6004 REMOV STR (SET)	496-6005 REMOV STR (WINGWALL)	496-6007 REMOV STR (PIPE)
CULVERT NO.	STA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	LF
CSJ: 0579-02-014																	
CULVERT 1	30+70.25										2						43
CULVERT 2	44+89.85				2									1		2	
CULVERT 3	76+57.36					2								1		2	
CULVERT 4	94+41.83											2					50
CULVERT 5	162+95.74			2										1		2	
CULVERT 7	228+99.24							2						1		2	
CULVERT 8	231+94.15					2								1		2	
CULVERT 9	255+83.82													1			
CULVERT 10	257+32.72						2							1		2	
CULVERT 11	295+16.99	2												1			16
CULVERT 12	307+00.86													1			
CULVERT 13	312+88.60								2					1		2	
CULVERT 14	370+06.67		2														100
CULVERT 15	375+20.36												2	1	2		
CULVERT 16	415+92.00													1			
CULVERT 17	456+79.07									2				1		2	
CULVERT 18	484+24.53									2				1		2	
PROJECT TOTAL		2	2	2	2	4	2	2	2	4	2	2	2	14	2	18	209

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FM 512

QUANTITIY SUMMARIES

SHEET 9 OF 11

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	17
CONTROL	SECTION	JOB	
0579	02	014	

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SUMMARY OF PAVEMENT MARKINGS

DESCRIPTION				666-6042	666-6048	666-6099	666-6343	666-6346	666-6347	672-6009
				REFL PAV MRK TY I (W)12"(SLD) (100MIL)	REFL PAV MRK TY I (W)24"(SLD) (100MIL)	REF PAV MRK TY I (W)18" (YLD TRI) (100MIL)	REF PROF PAV MRK TY I (W)6"(SLD) (100MIL)	REF PROF PAV MRK TY I (Y)6"(BRK) (100MIL)	REF PROF PAV MRK TY I (Y)6"(SLD) (100MIL)	REFL PAV MRKR TY II-A-A
STA	TO	STA	LENGTH	LF	LF	EA	LF	LF	LF	EA
CSJ: 0579-02-014										
0+50	TO	15+00	1450				2,900		2,900	36
15+00	TO	23+39	839				1,677	210	839	10
23+39	TO	35+29	1190				2,381	298		15
35+29	TO	44+00	871				1,742	218	871	11
44+00	TO	45+50	150				300	38		2
45+50	TO	66+26	2076				4,153	519	2,076	26
66+26	TO	72+00	574				1,147	143		7
72+00	TO	80+79	879				1,758	220	879	11
80+79	TO	102+96	2217				4,435		4,435	55
102+96	TO	111+49	853				1,705	213	853	11
111+49	TO	172+50	6101				12,203	1,525		76
172+50	TO	181+31	881				1,762	220	881	11
181+31	TO	195+00	1369				2,738		2,738	34
195+00	TO	204+25	925				1,849	231	925	12
204+25	TO	208+63	438				877	110		5
208+63	TO	217+44	881				1,762	220	881	11
217+44	TO	232+14	1470				2,941		2,941	37
232+14	TO	238+34	620				1,239	155	620	8
238+34	TO	240+22	188				377	47		2
240+22	TO	249+20	898				1,797	225	898	11
249+20	TO	295+14	4594				9,187		9,187	115
295+14	TO	304+00	886				1,772	222	886	11
304+00	TO	306+66	266				532	67		3
306+66	TO	313+26	660				1,319	165	660	8
313+26	TO	315+18	192				384	48		2
315+18	TO	338+12	2294				4,588		4,588	57
338+12	TO	347+13	901				1,803	225	901	11
347+13	TO	360+63	1350				2,700	338		17
360+63	TO	363+76	313				626	78	313	4
363+76	TO	386+33	2257	140	12	4	4,513		4,513	56
386+33	TO	395+17	884				1,769	221	884	11
395+17	TO	402+67	750				1,500	188		9
402+67	TO	407+42	475				949	119	475	6
407+42	TO	411+72	430				860		860	11
411+72	TO	426+38	1466				2,932	367	1,466	18
426+38	TO	429+96	358				716		716	9
429+96	TO	435+65	569				1,138	142	569	7
435+65	TO	439+15	350				700	88		4
439+15	TO	446+60	745				1,490	186	745	9
446+60	TO	448+50	190				380		380	5
448+50	TO	456+67	817				1,634	204	817	10
456+67	TO	458+17	150				300	38		2
458+17	TO	467+50	933				1,866	233	933	12
467+50	TO	482+51	1500				3,000	375		19
482+51	TO	490+94	843				1,687	211	843	11
490+94	TO	508+53	1759		30		3,519		3,519	44
PROJECT TOTAL				140	42	4	101,607	8,104	55,991	865

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FM 512

QUANTITIY SUMMARIES

SHEET 10 OF 11

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	18
CONTROL	SECTION	JOB	
0579	02	014	

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SUMMARY OF SIGNING ITEMS

DESCRIPTION				644-6001 IN SM RD SN SUP&AM TY10BWG(1)SA(P)	644-6004 IN SM RD SN SUP&AM TY10BWG(1)SA(T)	644-6007 IN SM RD SN SUP&AM TY10BWG(1)SA(U)	644-6037 IN SM RD SN SUP&AM TYS80(1)SA(U-WC)	644-6033 IN SM RD SN SUP&AM TYS80(1)SA(U)	644-6076 REMOVE SM RD SN SUP&AM	658-6060 REMOVE DELIN & OBJECT MARKER ASSMS	658-6073 INSTL OM ASSM (OM-2Y)(WC)GND(BI)	658-6062 INSTL DEL ASSM (D-SW)SZ1(BRF)GF2(BI)
STA	TO	STA	LENGTH	EA	EA	EA	EA	EA	EA	EA	EA	EA
CSJ: 0579-02-014			LF									
0+50	TO	508+53	50,803	239	4	1	7	4	256	45	50	31
PROJECT TOTAL				239	4	1	7	4	256	45	50	31

SUMMARY OF SWPPP ITEMS

DESCRIPTION				164-6009 BROADCAST SEED (TEMP) (WARM)	164-6011 BROADCAST SEED (TEMP) (COOL)	164-6015 STRAW/HAY MLCH SEED(PERM)(RURAL)(CLAY)	168-6001 ** VEGETATIVE WATERING	506-6002 ROCK FILTER DAMS (INSTALL) (TY 2)	506-6011 ROCK FILTER DAMS (REMOVE)	506-6021 CONSTRUCTION EXITS (INSTALL) (TY 2)	506-6024 CONSTRUCTION EXITS (REMOVE)	506-6038 TEMP SEDMT CONT FENCE (INSTALL)	506-6039 TEMP SEDMT CONT FENCE (REMOVE)	506-6041 BIODEG EROSN CONT LOGS (INSTL) (12")	FERTILIZER 3-1-2 *
STA	TO	STA	LENGTH	SY	SY	SY	MG	LF	LF	SY	SY	LF	LF	LF	LBS
CSJ: 0579-02-014			LF												
0+50	TO	508+53	50,803	45,159	45,159	90,317	1,084	1,020	1,020	444	444	8,343	8,343	20	8,887.2
PROJECT TOTAL				45,159	45,159	90,317	1,084	1,020	1,020	444	444	8,343	8,343	20	8,887.2

* FOR CONTRACTOR INFORMATION ONLY: 2 CYCLES AT 50 LBS. NITROGEN PER ACRE AT 21-7-14 (NPK) ANALYSIS = 0.0492 LBS/SY/CYCLE

** VEGETATIVE WATERING BASED ON 2 APPLICATIONS AT A RATE OF 0.003 MG/SY/CYCLE

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FM 512

QUANTITIY SUMMARIES

SHEET 11 OF 11

		HIGHWAY NO
		FM 512
STATE	DISTRICT / COUNTY	SHEET NO
TEXAS	PARIS / HUNT	19
CONTROL	SECTION / JOB	
0579	02 / 014	

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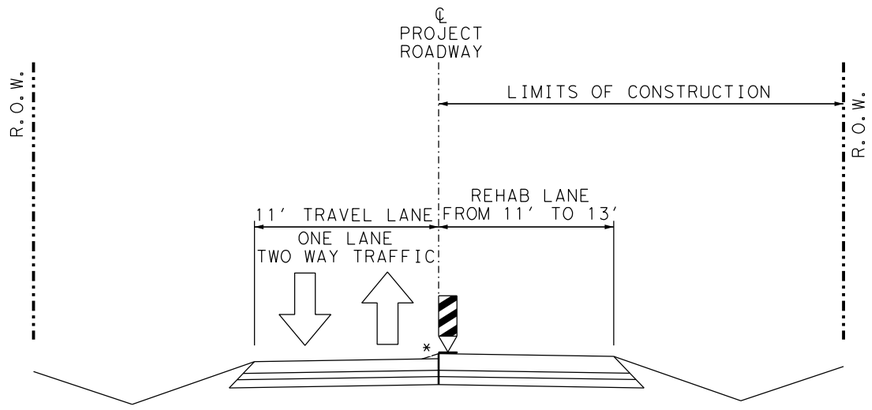
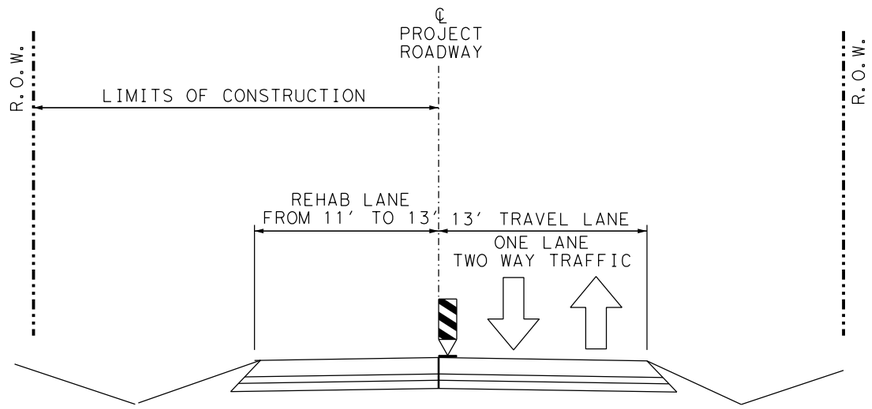
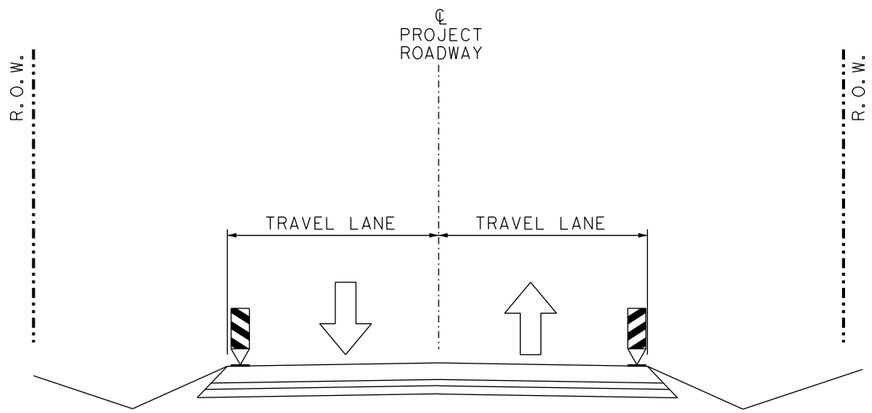


PHASE IV ~ A
DAYTIME OPERATIONS

* REFER TO "TREATMENT FOR VARIOUS EDGE CONDITIONS" STANDARD



PHASE IV ~ B
DAYTIME OPERATIONS



NIGHT TIME TRAFFIC FLOW

PHASE I ~ INITIAL TRAFFIC CONTROL

INSTALL PROJECT LIMIT TRAFFIC CONTROL DEVICES (TCD) PER THE BC STANDARD SHEETS. UTILIZE THE APPLICABLE TCP(2-1)-18 OR TCP(2-2b)-18 LAYOUT FOR RCD INSTALATION.

PROVIDE PAVEMENT ENDS CW8-3 (36X36), LOOSE GRAVEL CW8-7 (36X36) AND NO CENTER LINE CW 8-12 (36X36), SHOULDER DROP OFF W8-9AT (36X36) SIGNS AS DIRECTED BY THE ENGINEER.

PHASE II ~ EROSION CONTROL

INSTALL EROSION CONTROL DEVICES UTILIZING THE APPLICABLE TCP(2-1)-18 LAYOUT OR TCP(2-2b)-18.

PHASE III ~ CULVERT WORK (CROSS AND PARALLEL CULVERTS)

PERFORM OFF-PAVEMENT CULVERT OPERATIONS UTILIZING THE APPLICABLE TCP(2-1)-18.

PERFORM ON-PAVEMENT CULVERT OPERATIONS UTILIZING TCP(2-2b)-18.

PERFORM OFF-PAVEMENT BOX CULVERT EXTENSIONS UTILIZING TCP(2-2b)-18.

PERFORM BOX CULVERT #3 AND #7 EXTENSIONS WORK UTILIZING TCP(2-8b)-23.

REFER TO BC(10)-21 FOR ADDITIONAL DETAILS WHEN WORK IS NOT IN PROGRESS.

CULVERT WORK MAY PROCEED CONCURRENTLY WITH ROADWAY REHABILITATION WHEN APPROVED BY THE ENGINEER. ADHERE TO THE WORKSHEET FOR EDGE CONDITION TREATMENT TYPES.

PHASE IV ~ ROADWAY REHABILITATION

REFER TO THE TRAFFIC CONTROL PLAN (TCP) TYPICAL SECTIONS FOR CONSTRUCTION WORK AREA AND TRAFFIC FLOW.

PERFORM OPERATIONS TO FULL WIDTH BY END OF EACH WORK DAY.

PERFORM PAVEMENT REHABILITATION OPERATIONS UP TO COVERED PRIME UTILIZING TCP(2-2b)-18 AND PLACE WORK ZONE PAVEMENT MARKING UTILIZING TCP (3-1)-13

INSTALL BRIDGE RAIL RETRO-FIT, AND MBGF PRIOR TO WIDENING UTILIZING "TCP RETRO-FIT RAIL LAYOUT" SHEET.

LIMIT ROADWAY REHABILITATION OPERATIONS TO ONE MILE SECTIONS. PRIOR TO ADVANCEMENT TO THE NEXT SECTION, ALL BACKFILLING AND TEMPORARY SEEDING MUST BE COMPLETED AND THE SECTION BE APPROVED BY THE ENGINEER. ADHERE TO THE WORKSHEET FOR EDGE CONDITION TREATMENT TYPES.

PHASE V ~ FINAL PAVEMENT MARKINGS

PLACE TWO COURSE SURFACE TREATMENT UTILIZING TCP(2-2b)-18 AND FINAL PAVEMENT MARKINGS/MARKERS UTILIZING TCP (3-1)-13 AND TCP (3-3)-14 RESPECTIVELY.

PHASE VI ~ SIGN AND SEEDING OPERATIONS

PERFORM SIGN INSTALATION AND SEEDING UTILIZING TCP(2-1)-18.

PHASE VII ~ PROJECT CLEAN UP

REMOVE EROSION CONTROL DEVICES, CONSTRUCTION DEBRIS AND WASTE MATERIAL UTILIZING TCP(2-1)-18.

NOTES:

PRIOR TO A SPECIFIC CONSTRUCTION OPERATION, THE TRAFFIC CONTROL STANDARD SPECIFIED FOR THE CONSTRUCTION PHASE IN THIS NARRATIVE MUST BE EVALUATED THOROUGHLY FOR APPROPRIATENESS.

ALL TRAFFIC CONTROL OPERATIONS MUST ADHERE TO THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD) AND THE APPLICABLE TRAFFIC CONTROL STANDARDS. CONSTRUCTION PHASE ORDER MAY BE VARIED WHEN APPROVED BY THE ENGINEER. SUBMIT A WORK AND TRAFFIC CONTROL SEQUENCE PLAN TO THE ENGINEER FOR APPROVAL. ENSURE THAT BOTH TRAVEL LANES ARE OPEN AT NIGHT. PROVIDE ACCESS TO PRIVATE PROPERTY AND PUBLIC ROADS AT ALL TIMES. PROVIDE PILOT CAR DURING ONE LANE/TWO WAY TRAFFIC OPERATIONS. ROAD CLOSURES MUST BE APPROVED BY THE ENGINEER.

Paul A. Warden, P.E. 5/24/2023

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8632 Fredericksburg Rd.
Suite 200
San Antonio, Tx. 78240
(210) 448-1800
FIRM # F-6825

Texas Department of Transportation

FM 512

CONSTRUCTION SEQUENCE NARRATIVE

SHEET 1 OF 1

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	
CONTROL	SECTION	JOB	20
0579	02	014	

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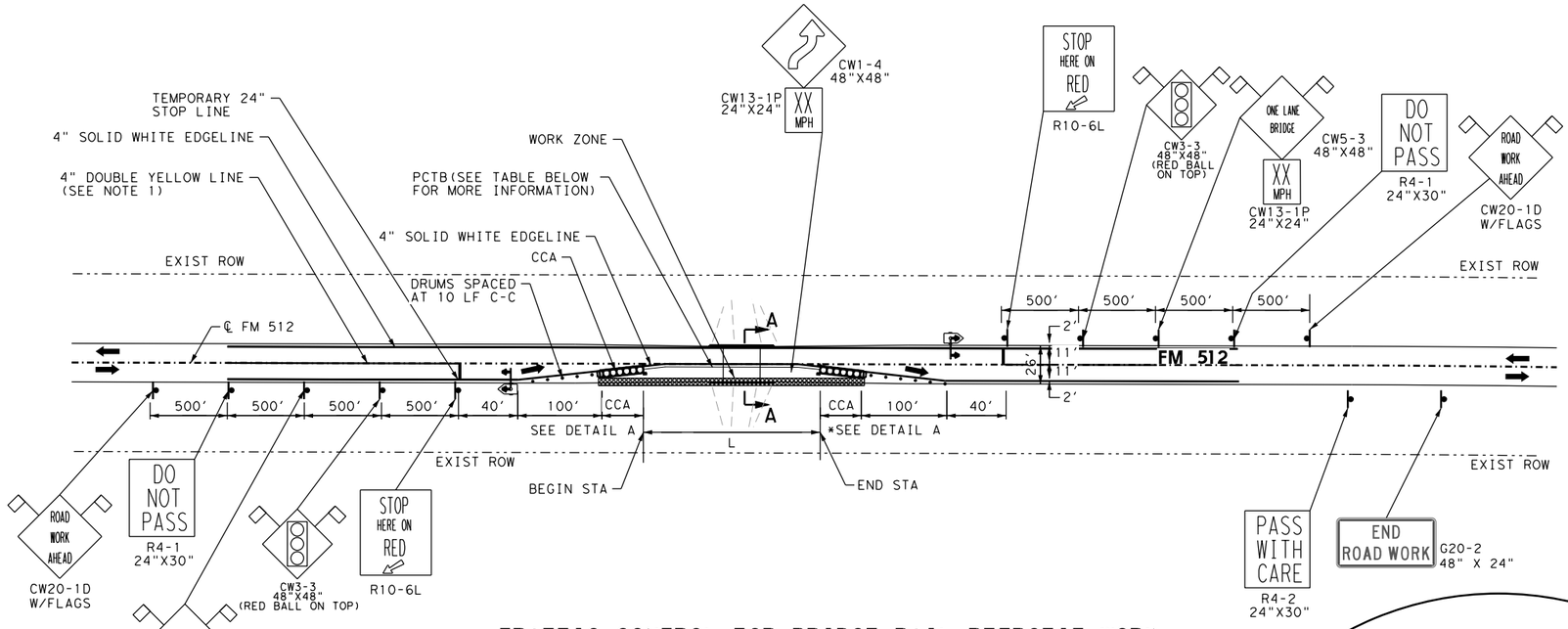
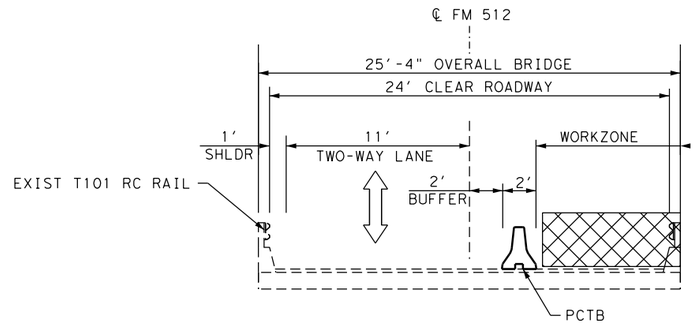


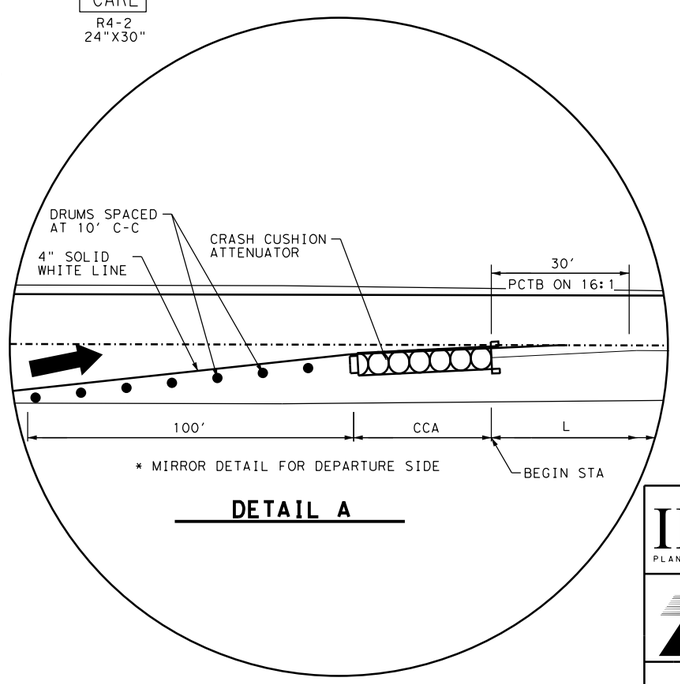
TRAFFIC CONTROL FOR BRIDGE RAIL RETROFIT WORK



SECTION A-A

STA 452+54.00 TO STA 453+54.00

(MIRROR IMAGE FOR OPPOSITE SIDE OF BRIDGE WORK)
(N.T.S.)



DETAIL A

NOT TO SCALE

SUMMARY OF PORTABLE CONCRETE TRAFIC BARRIER LOCATION							
LOCATIONS				L			CCA
STA	TO	STA	LENGTH	BEG STA	END STA	LENGTH (FT)	EA
RAYS CREEK	NBI: 01-117-0-1097-02-001						
452+54	TO	453+54	100.00	450+34	455+74	540	2

Paul A. Warden P.E. 5/30/2023

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TRAFFIC CONTROL RAIL RETROFIT LAYOUT

SHEET 1 OF 1

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	21
CONTROL	SECTION	JOB	
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BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

WORKER SAFETY NOTES:

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

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

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

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

SHEET 1 OF 12

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

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©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0579	02	014	FM 512
4-03 7-13	DIST	COUNTY		SHEET NO.
9-07 8-14	PARIS	HUNT		22
5-10 5-21				

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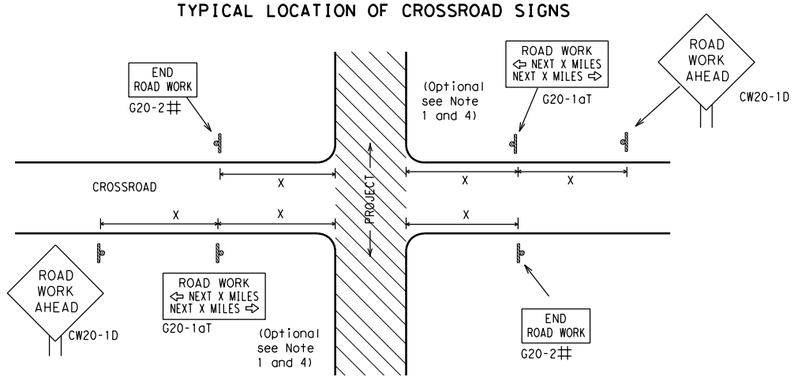
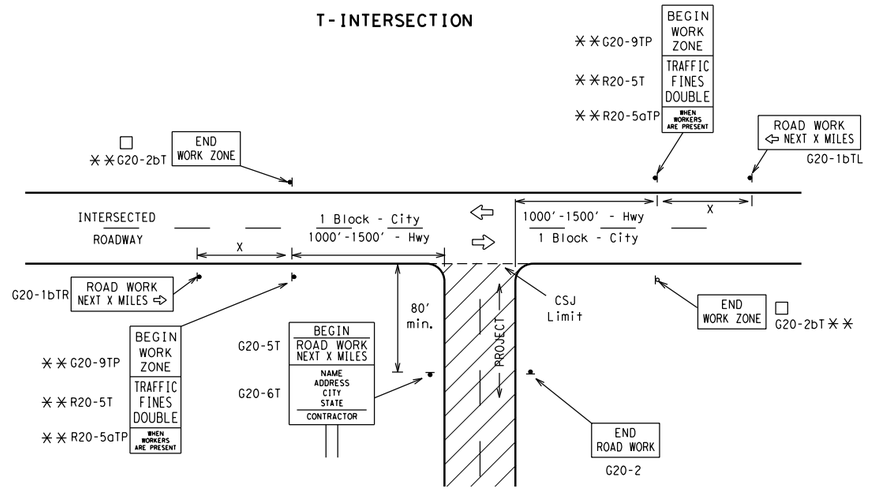
TYPICAL LOCATION OF CROSSROAD SIGNS



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

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

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

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

SIZE

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

SPACING

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

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

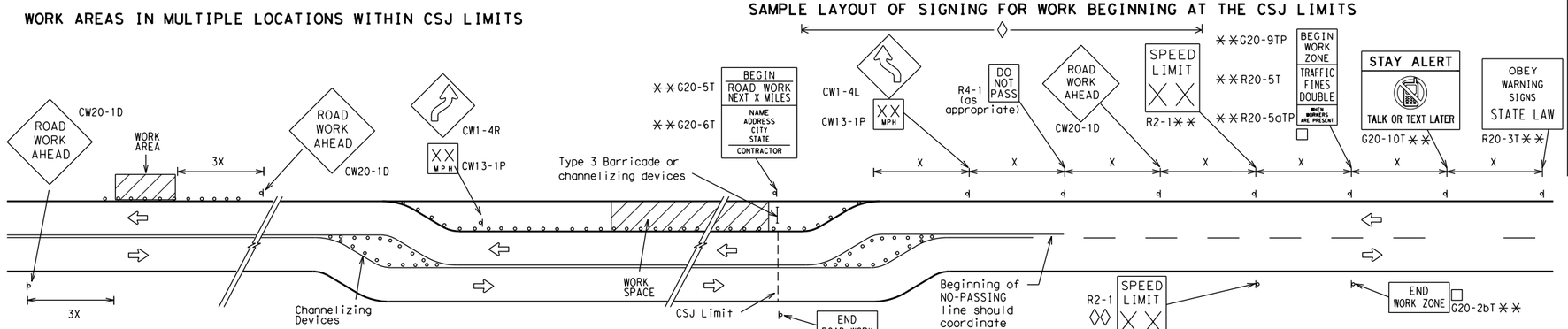
△ Minimum distance from work area to first Advance Warning sign nearest the work area and/or distance between each additional sign.

GENERAL NOTES

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

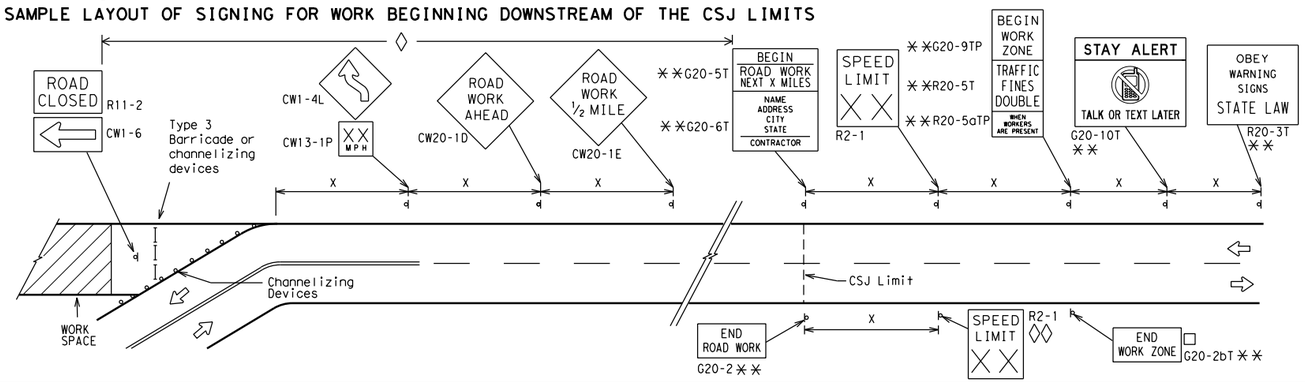
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS



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

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



NOTES

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

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

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

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

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

LEGEND

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

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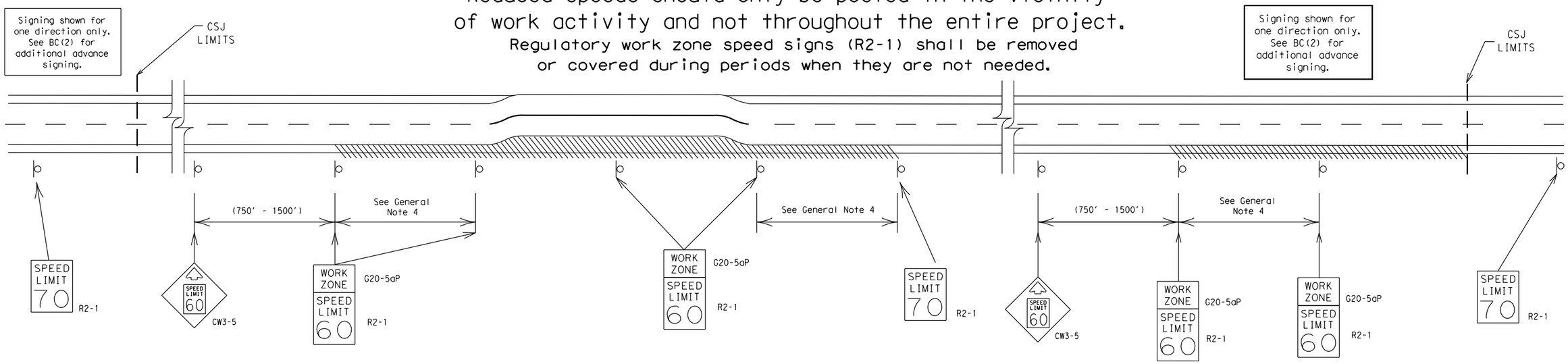
REVISIONS	0579	02	014	FM 512
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	PARI$	HUNT		23

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.

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SHEET 3 OF 12

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

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9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	PARI$	HUNT		24

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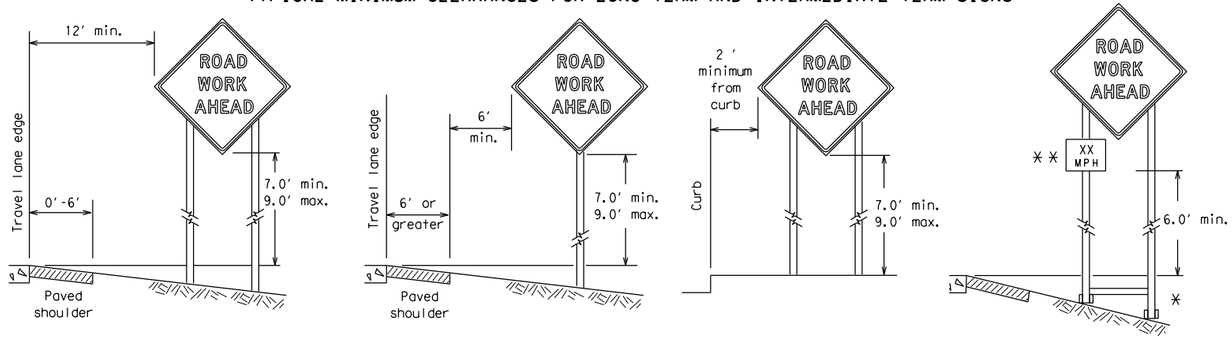
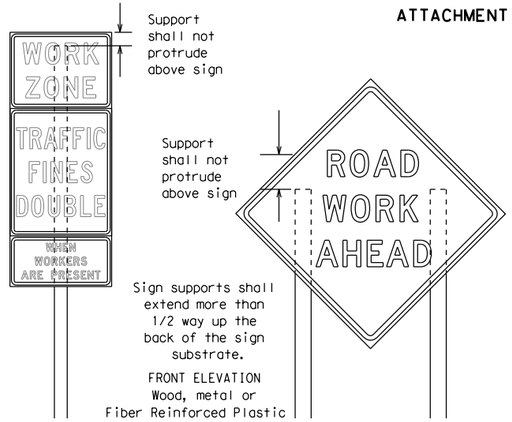
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS



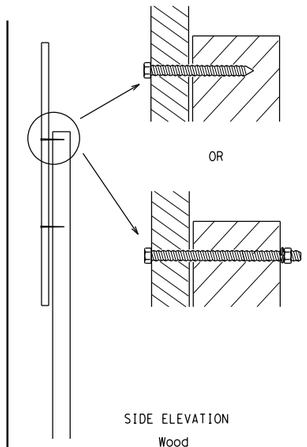
⁎ When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

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

ATTACHMENT FOR SIGN SUPPORTS



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.

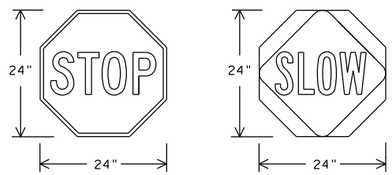


Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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.

STOP/SLOW PADDLES

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



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

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
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9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	PARIS	HUNT		25

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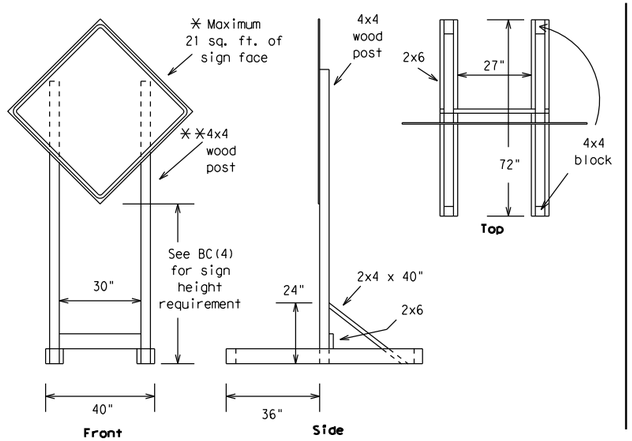
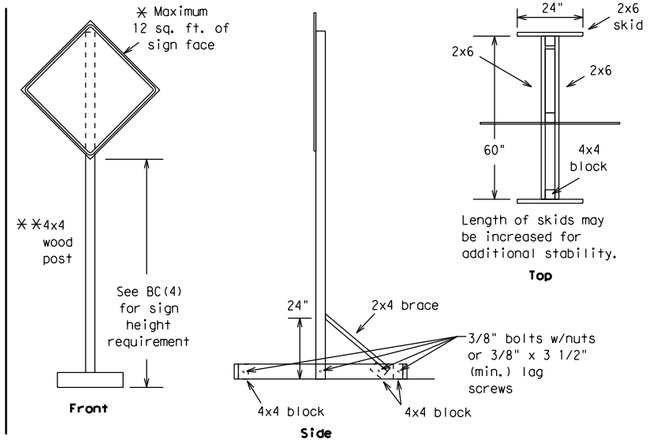
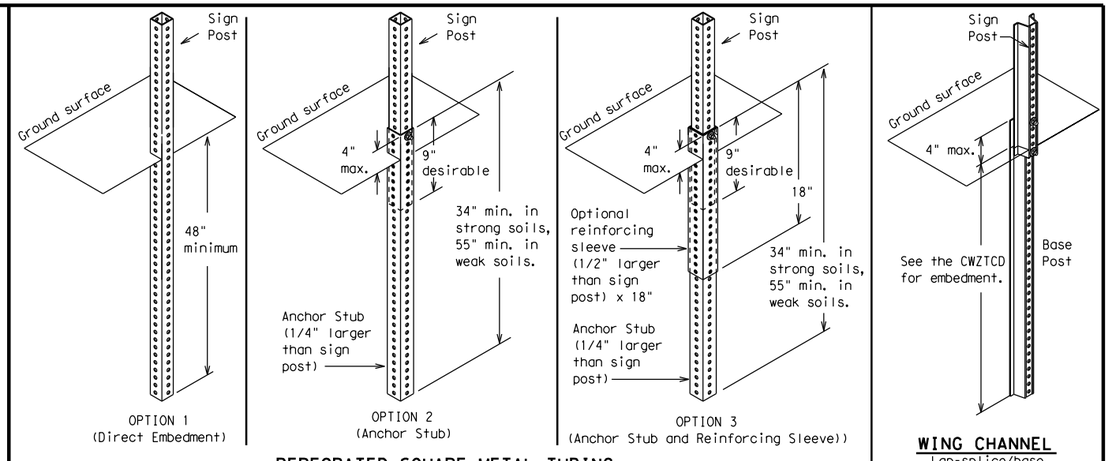




SKID MOUNTED WOOD SIGN SUPPORTS

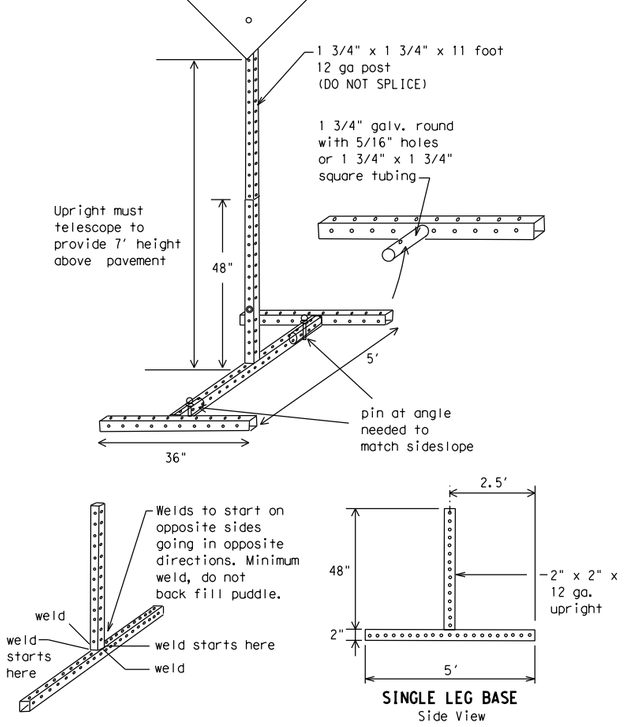
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

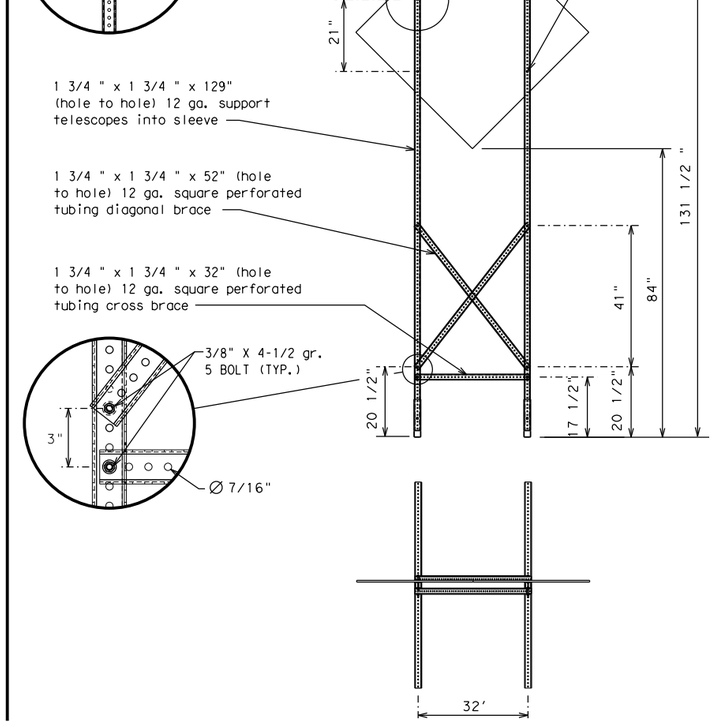


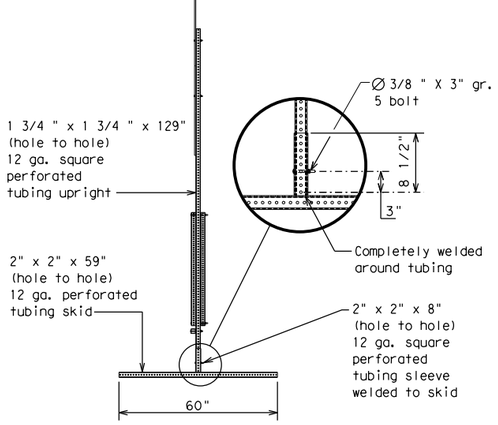
PERFORATED SQUARE METAL TUBING

GROUND MOUNTED SIGN SUPPORTS

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







SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

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

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

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

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
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9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	PARIS	HUNT		26

DATE: 5/24/2023 6:20:04 PM
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WHEN NOT IN USE, REMOVE THE PCMS FROM THE RIGHT-OF-WAY OR PLACE THE PCMS BEHIND BARRIER OR GUARDRAIL WITH SIGN PANEL TURNED PARALLEL TO TRAFFIC

PORTABLE CHANGEABLE MESSAGE SIGNS

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

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

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

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

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

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

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

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

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

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

FULL MATRIX PCMS SIGNS

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

Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-21

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©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
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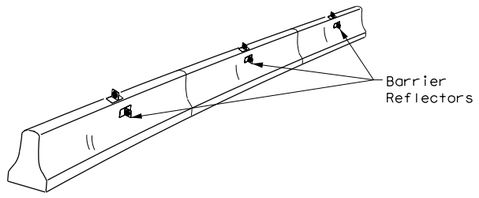
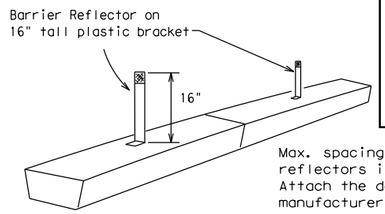
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost of the reflectors shall be considered subsidiary to Item 512.



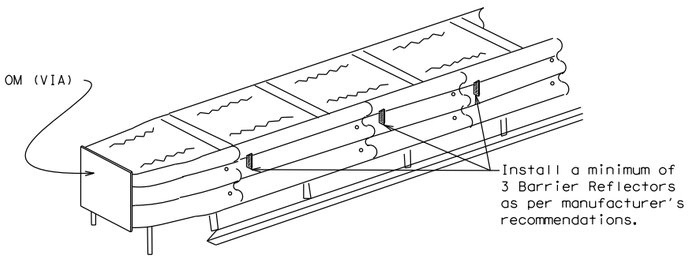
CONCRETE TRAFFIC BARRIER (CTB)

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



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

LOW PROFILE CONCRETE BARRIER (LPCB)



DELINEATION OF END TREATMENTS

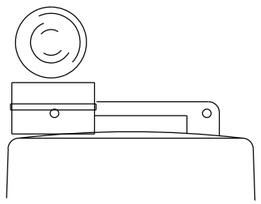
LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

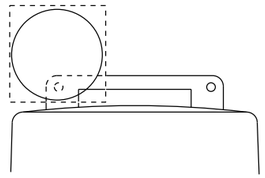
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



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

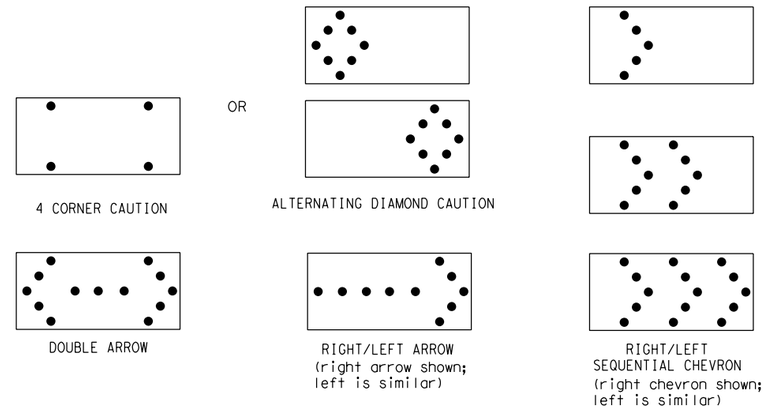
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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

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	0579	02	014	FM 512
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	PARIS	HUNT		28

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GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

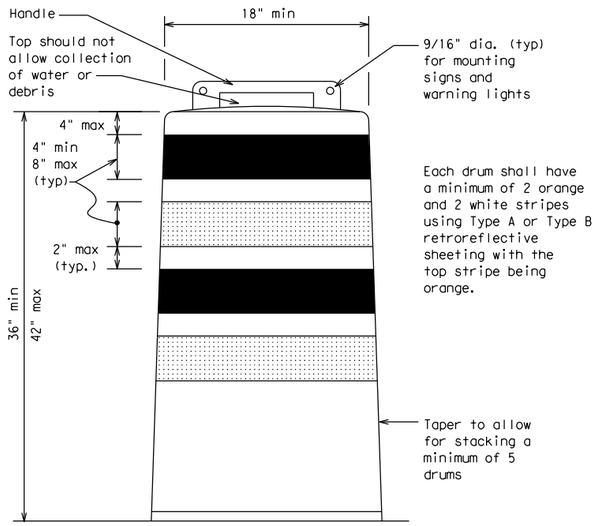
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

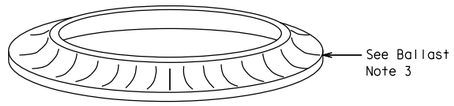
RETROREFLECTIVE SHEETING

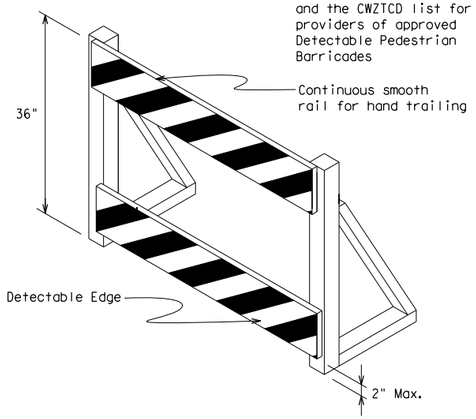
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

BALLAST

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

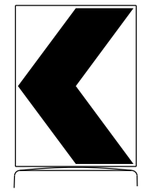




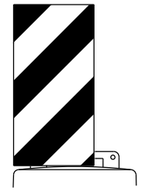


DETECTABLE PEDESTRIAN BARRICADES

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



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



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

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0579	02	014	FM 512
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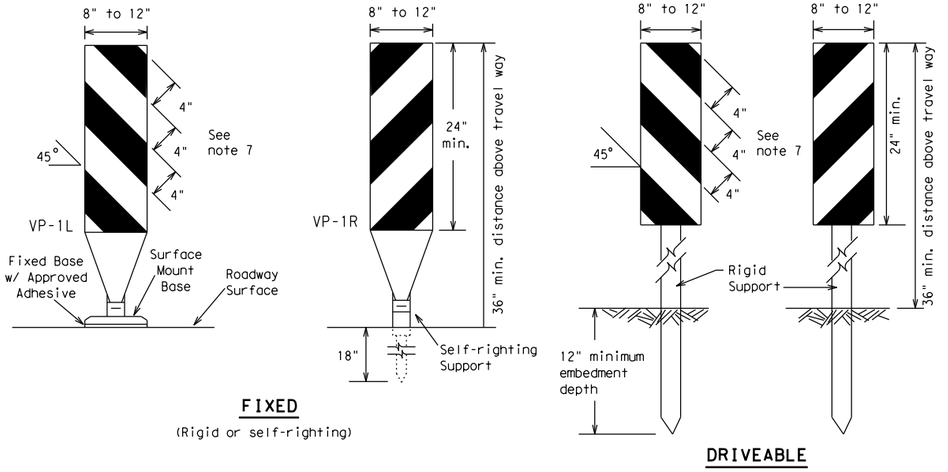


FIXED
(Rigid or self-righting)

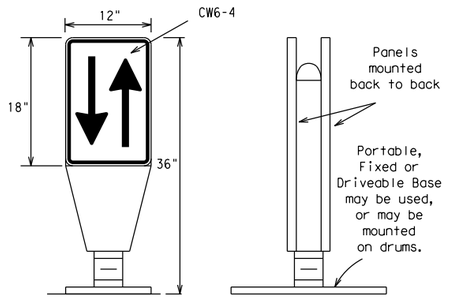
DRIVEABLE

(Rigid or self-righting)

PORTABLE

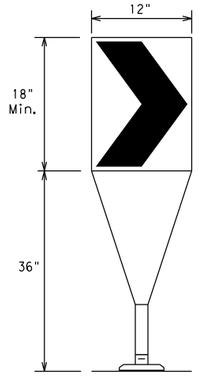
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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

VERTICAL PANELS (VPs)



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

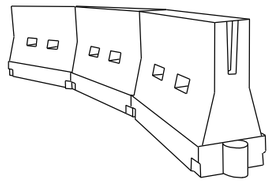
OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



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

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

CHEVRONS



LONGITUDINAL CHANNELIZING DEVICES (LCD)

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

WATER BALLASTED SYSTEMS USED AS BARRIERS

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

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

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

GENERAL NOTES

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

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

SHEET 9 OF 12

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

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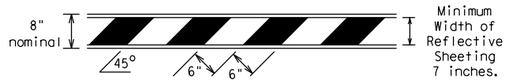
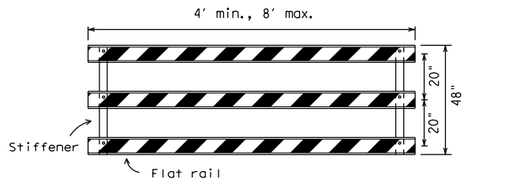
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



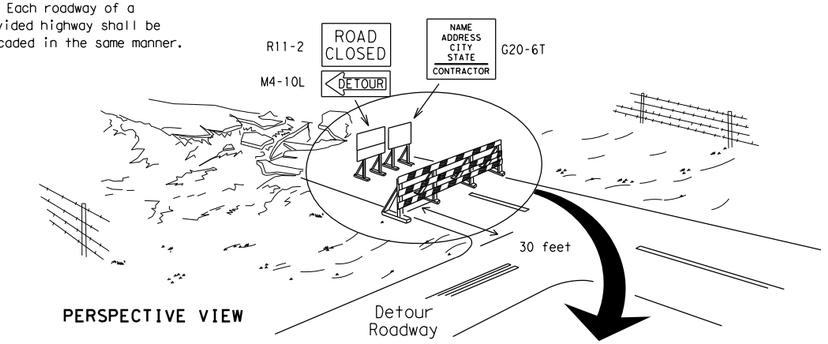
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

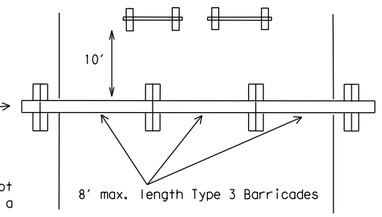
Each roadway of a divided highway shall be barricaded in the same manner.



PERSPECTIVE VIEW

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

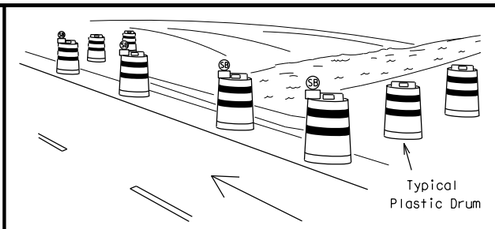
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

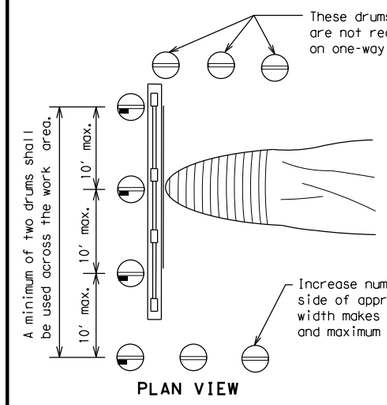
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

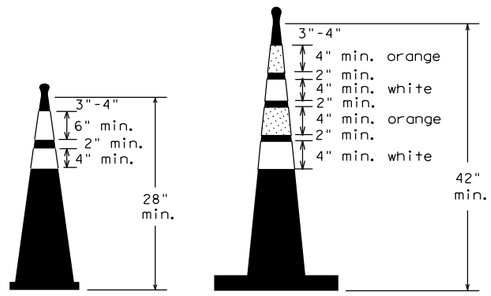
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



PLAN VIEW

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

CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS

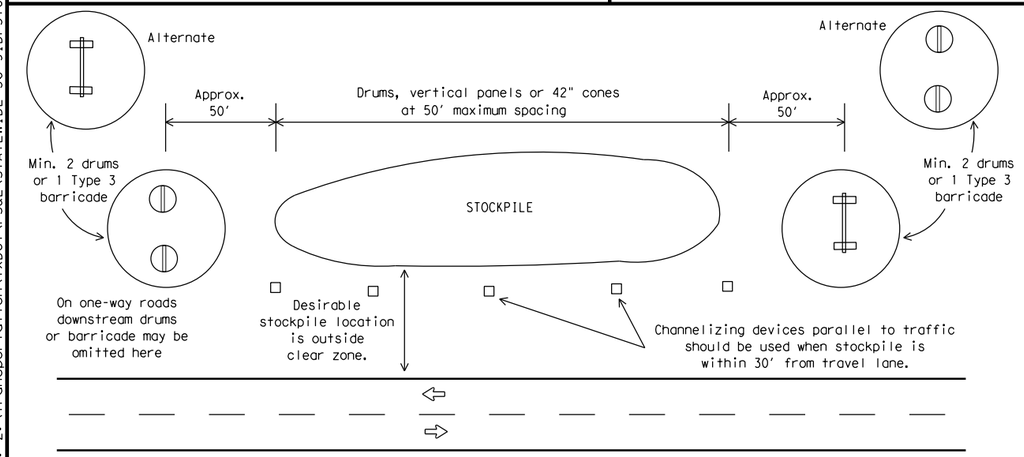


Two-Piece cones | One-Piece cones | Tubular Marker

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

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

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

SHEET 10 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

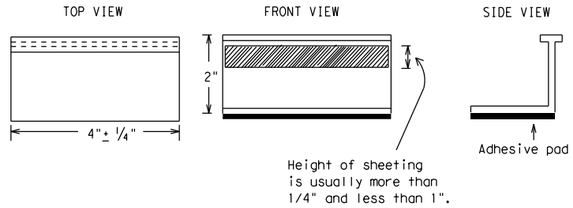
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

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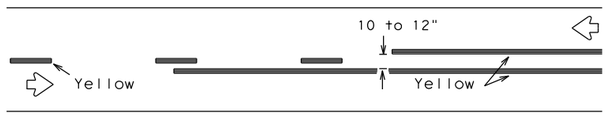
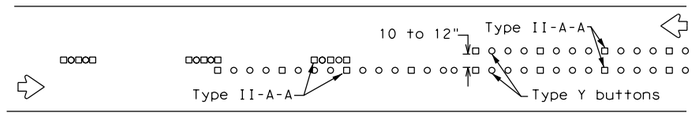
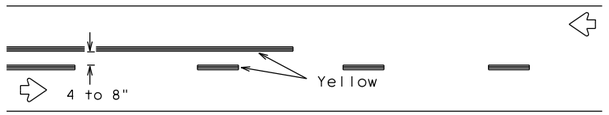
PAVEMENT MARKING PATTERNS



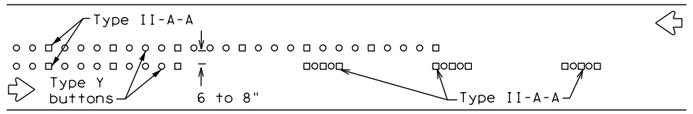
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



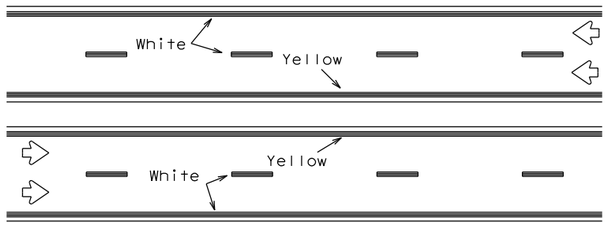
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



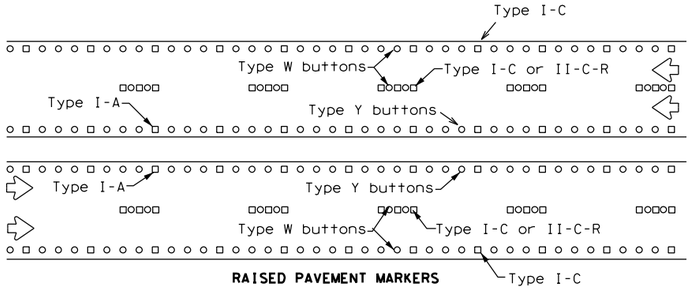
RAISED PAVEMENT MARKERS - PATTERN B

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

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



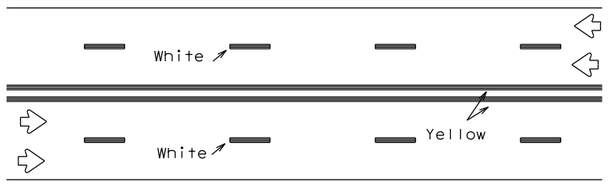
REFLECTORIZED PAVEMENT MARKINGS



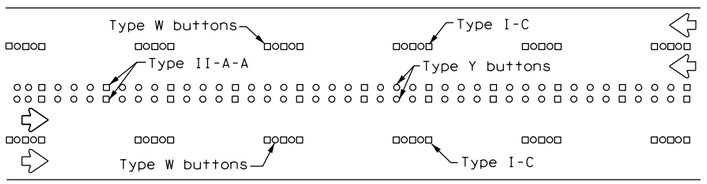
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



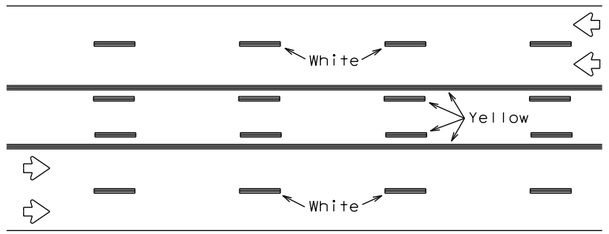
REFLECTORIZED PAVEMENT MARKINGS



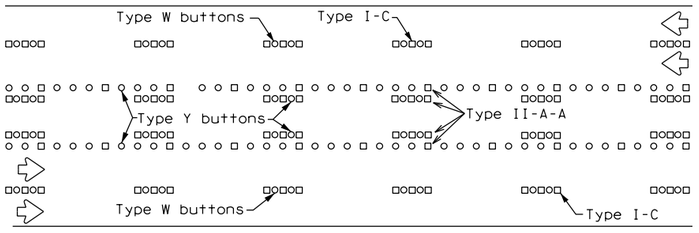
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

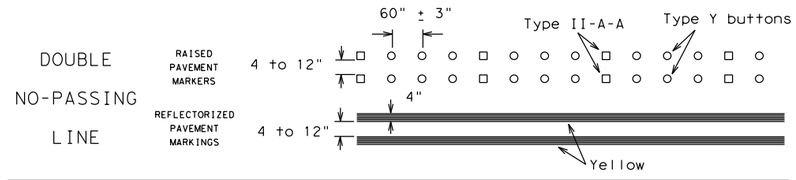
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

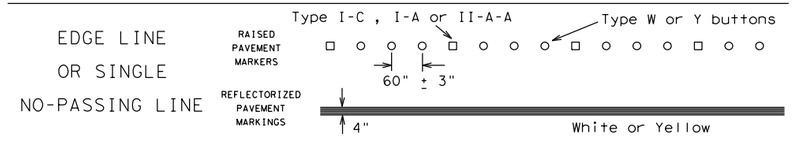
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

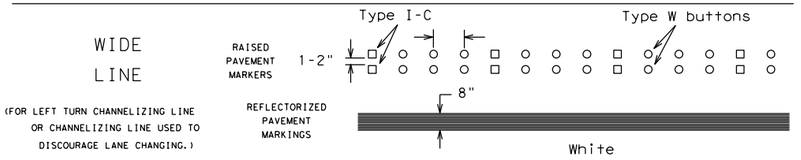


EDGE LINE OR SINGLE NO-PASSING LINE



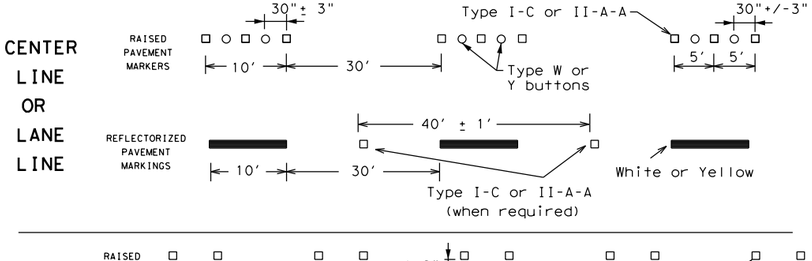
WIDE LINE

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

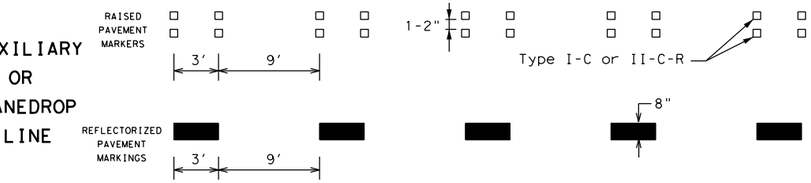


BROKEN LINES

CENTER LINE OR LANE LINE

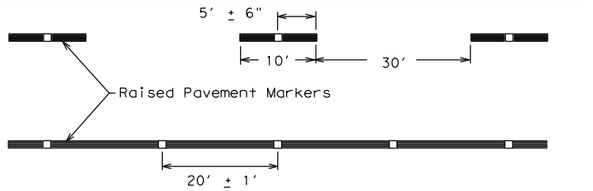


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



Centerline only - not to be used on edge lines

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

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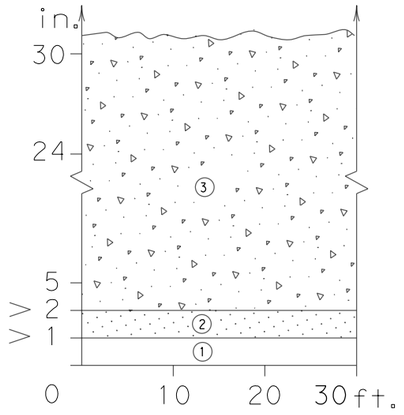
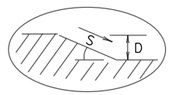
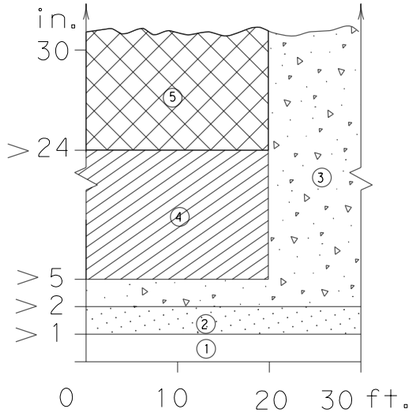
DEFINITION OF TREATMENT ZONES FOR VARIOUS EDGE CONDITIONS

Edge Height (D) in Inches versus Lateral Clearance (Y) in Feet

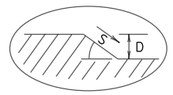


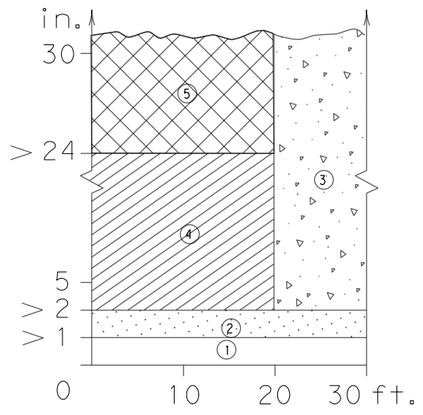
Edge Condition I
S = (3:1) (or flatter)



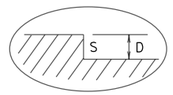


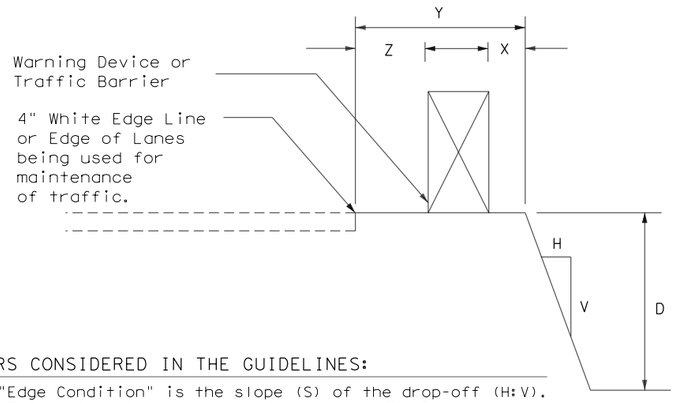
Edge Condition II
S = ((2.99):1) to (1:1)





Edge Condition III
S is steeper than (1:1)





FACTORS CONSIDERED IN THE GUIDELINES:

1. The "Edge Condition" is the slope (S) of the drop-off (H:V). The "Edge Height is the depth of the drop-off "D".

2. Distance "X" is to be the maximum practical under job conditions. Two feet minimum for high speed conditions. Distance "Y" is the lateral clearance from edge of travel lane to edge of dropoff. Distance "Z" does not have a minimum.

3. In addition to the factors considered in the guidelines, each construction zone drop-off situation should be analyzed individually, taking into account other variables, such as: traffic mix, posted speed in the construction zone, horizontal curvature, and the practicality of the treatment options.

4. The conditions for indicating the use of positive or protective barriers are given by Zone-5 and Figure-1. Traffic barriers are primarily applicable for high speed conditions. Urban areas with speeds of 30 mph or less may have a lesser need for signing, delineation, and barriers. Right-angled edges, however, with "D" greater than 2 inches and located within a lateral offset of 6 feet, may indicate a higher level of treatment.

5. If the distance "Y" must be less than 3 feet, the use of a positive barrier may not be feasible. In such a case, consider either: 1) narrowing the lanes to a desired 11 to 12 feet or 10 foot minimum (see CW20-8 sign), or 2) provide an edge slope such as Edge Condition I.

Zone	Treatment Types Guidelines:
①	No treatment
②	CW 8-11 "Uneven Lanes" signs.
③	CW 8-9a Shoulder Drop-Off" or CW 8-11 signs plus vertical panels.
④	CW8-9a or CW 8-11, signs plus drums. Where restricted space precludes the use of drums, use vertical panels. An edge slope to that of the profered Edge Condition I.
⑤	Check indications (Figure-1) for possitive barrier. Where positive barrier is not indicated, the treatment shown above for Zone-4 may be used after consideration of other applicable factors.

Edge Condition Notes:

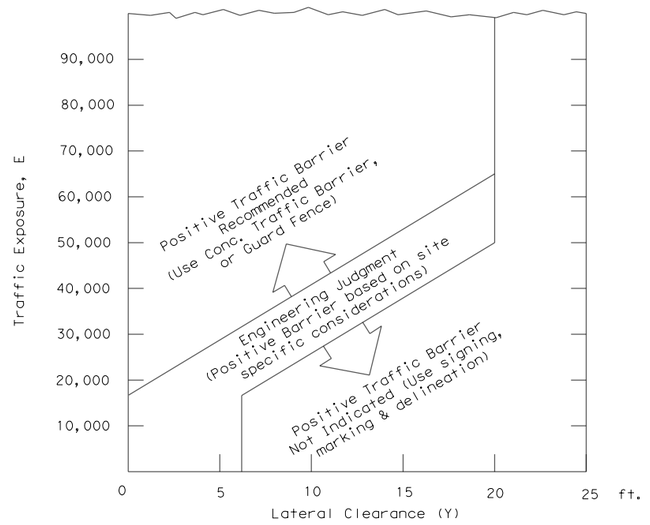
1. Edge Condition I: Most vehicles are able to traverse an edge condition with a slope rate of (3 to 1) or flatter. The slope must be constructed with a compacted material capable of supporting vehicles.

2. Edge Condition II: Most vehicles are able to traverse an edge condition with a slope between (2.99 to 1) and (1 to 1) so long as "D" does not exceed 5 inches. Under-carriage drag on most automobiles will occur when "D" exceeds 6 inches. As "D" exeeds 24 inches, the possibility for rollover is greater in most vehicles.

3. Edge Condition III: When slopes are greater than (1 to 1) and where "D" is greater than 2 inches, a more difficult control factor may exist for some vehicles, if not properly treated. For example, where "D" is greater than 2 inches and up to 24 inches different types of vehicles may experience different steering control at different edge heights. Automobiles might experience more steering control differential when "D" is greater than 2 inches and up to 5 inches. Trucks, particularly those with high loads, have more steering control differential when "D" is greater than 5 inches and up to 24 inches. When "D" exceeds 24 inches, the possibility of rollover is greater for most vehicles.

4. Milling or overlay operations that result in Edge Condition III should not be in place without appropriate warning treatments, and these conditions should not be left in place for extended periods of time.

FIGURE-1: CONDITIONS INDICATING USE OF POSITIVE BARRIER FOR ZONE 5 (▨)



1. E = ADT x T
Where ADT is that portion of the average daily traffic volume traveling within 20 feet (generally two adjacent lanes) of the edge dropoff condition; and, T is the duration time in years of the dropoff condition.

2. Figure-1 provides a practical approach to the use of positive barriers for the protection of vehicles from pavement drop-offs. Other factors, such as the presence of heavy machinery, construction workers, or the mix and volume of traffic may make the use of positive barriers appropriate, even when the edge condition alone may not justify the use of a barrier.

3. An approved end treatment should be provided for any positive barrier end located within the clear zone.

These guidelines apply to temporary traffic control areas or work zones where continuous pavement edges or drop-offs exists parallel and adjacent to a lane used by traffic. The edge conditions may be present between shoulders and travel lanes, between adjacent or opposing travel lanes, or at intermediate points across the width of the paved surface. Due to the variability in construction operations, tolerances in the variables may be allowed by the engineer. These guidelines do not apply to short term operations. These guidelines do not constitute a rigid standard or policy; rather, they are guidance to be used in conjunction with engineering judgement. These guidelines may be updated on the Design Division's on-line manuals.

Engineer's Seal

STATE OF TEXAS
PAUL A. WARDEN
101319
LICENSED
PROFESSIONAL ENGINEER

Paul A. Warden, P.E. 5/24/2023

Date 5/24/2023

Texas Department of Transportation

Traffic Safety Division Standard

TREATMENT FOR VARIOUS EDGE CONDITIONS

FILE: edgecon.dgn	DN:	CK:	DW:	CK:
©TxDOT August 2000	CONT	SECT	JOB	HIGHWAY
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03-01 08-01 9-21	DIST	COUNTY		SHEET NO.
	PARIS	HUNT		34

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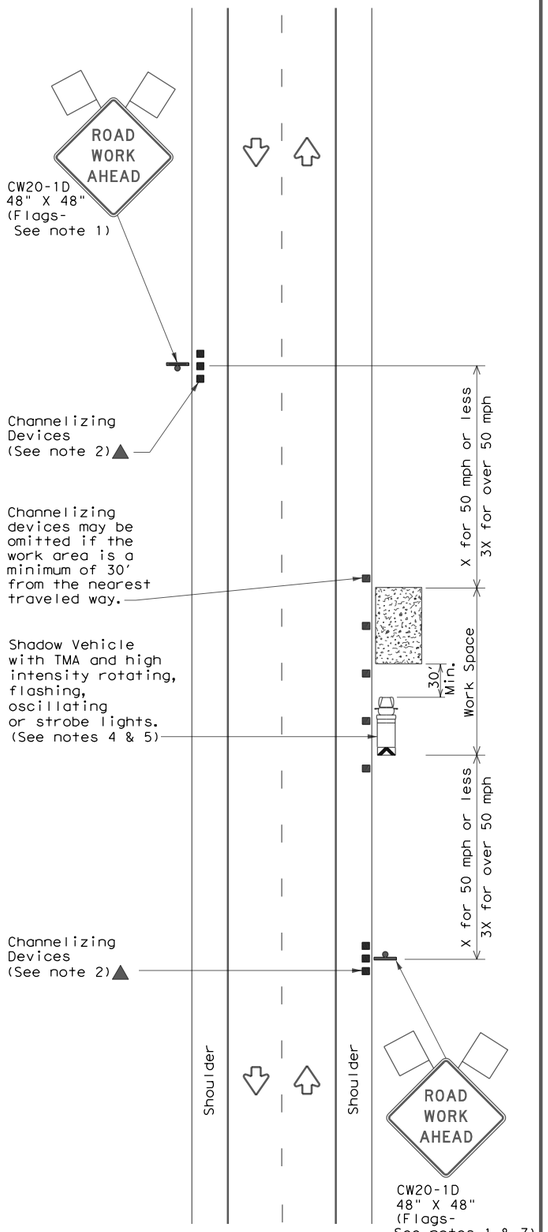
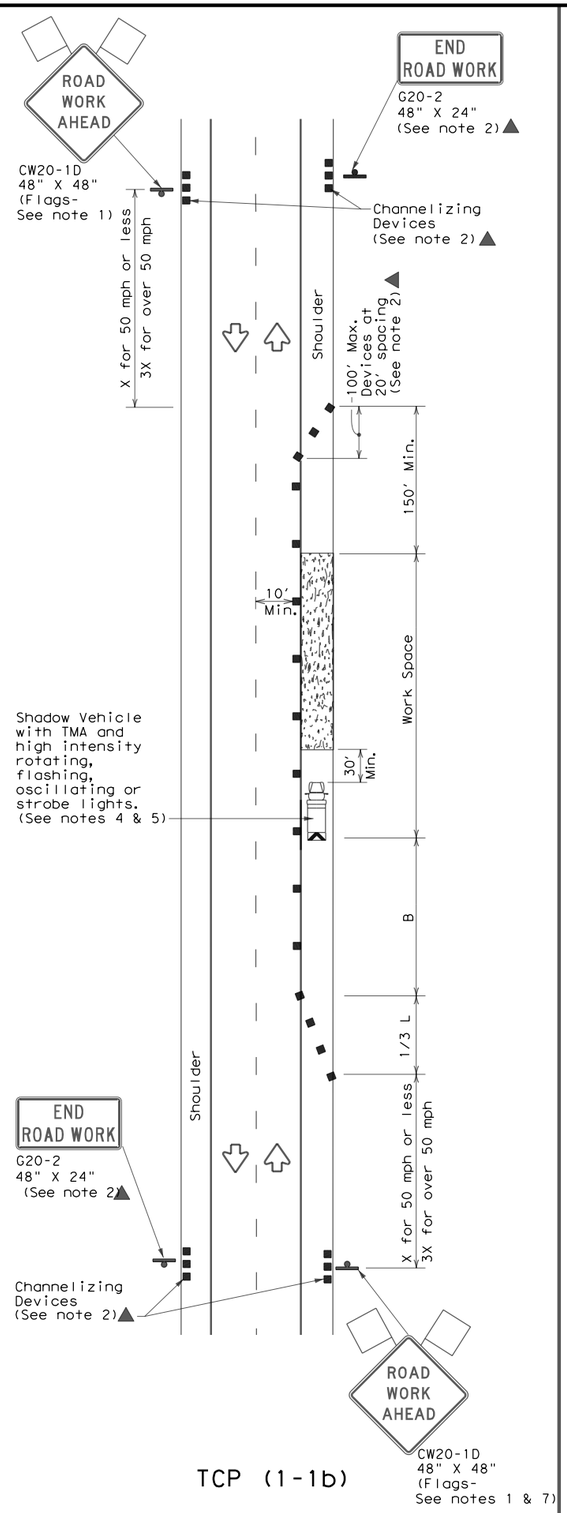


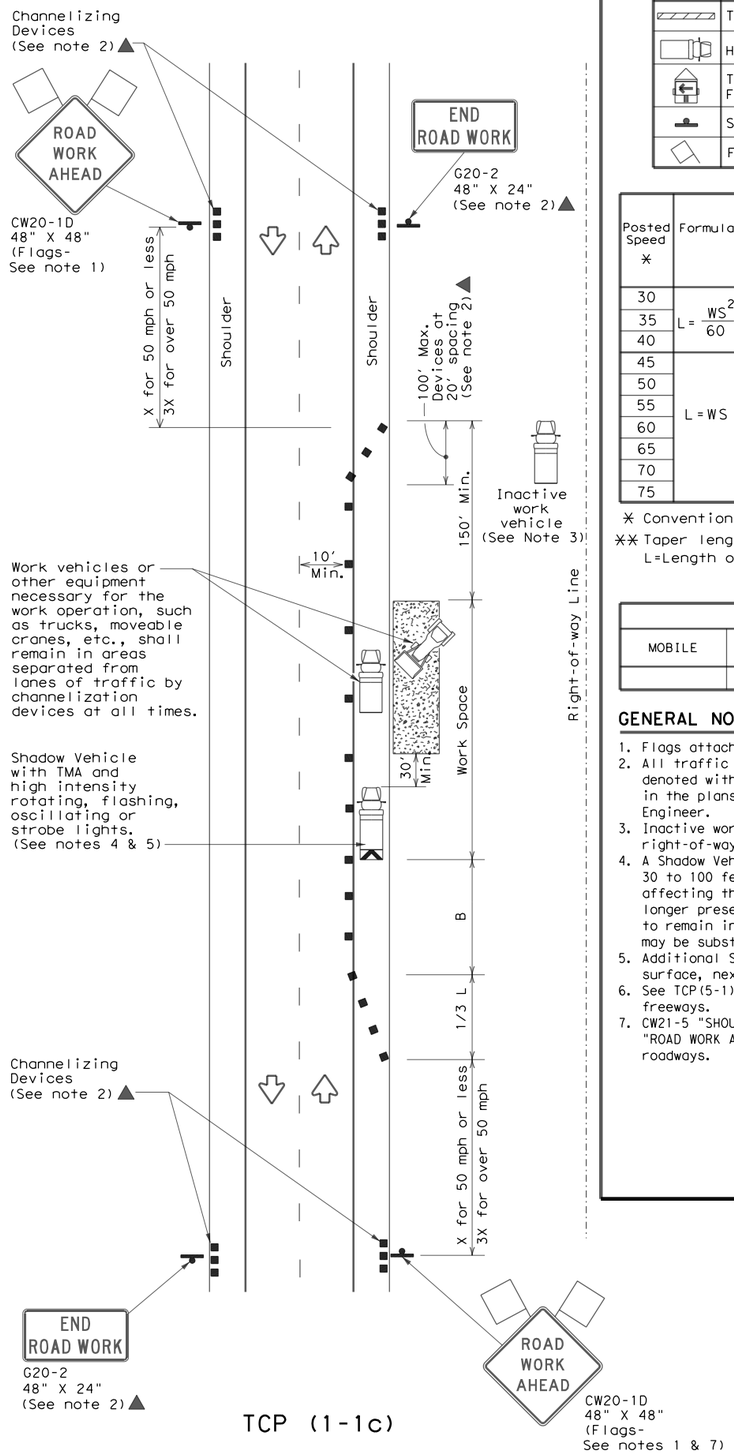
TCP (1-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (1-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (1-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(1-1)-18

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© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
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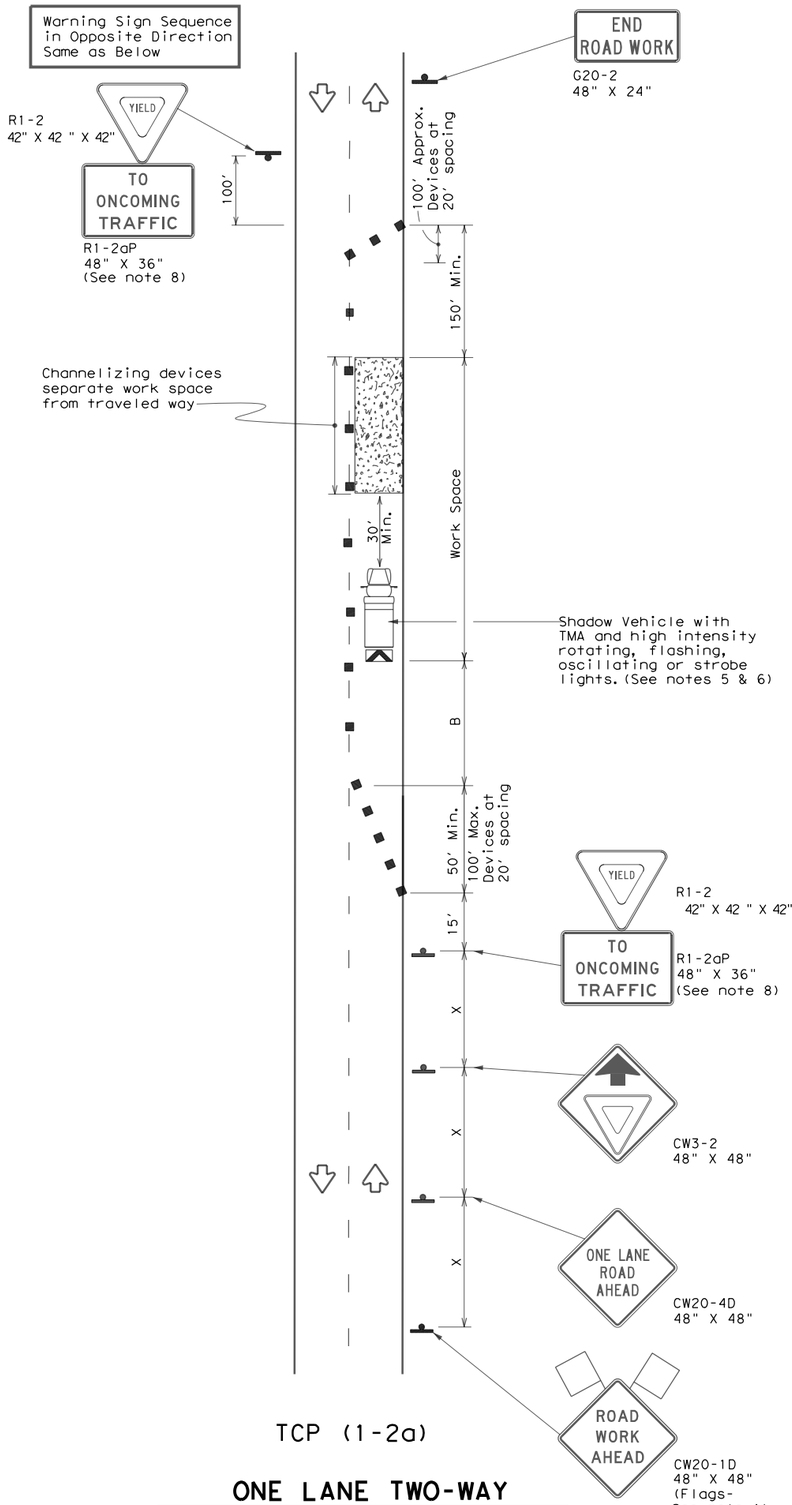
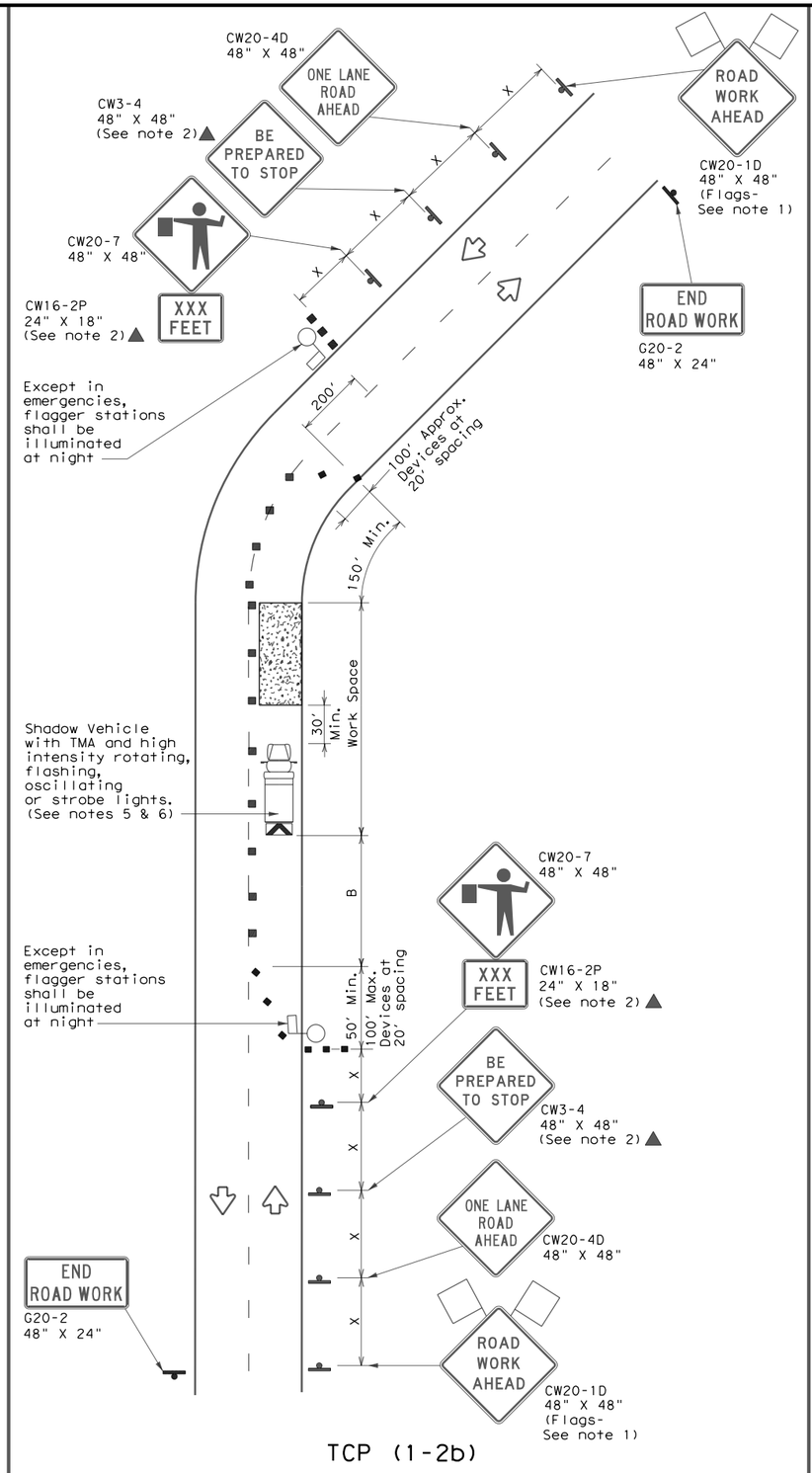


TCP (1-2a)

ONE LANE TWO-WAY CONTROL WITH YIELD SIGNS

(Less than 2000 ADT - See note 7)



TCP (1-2b)

ONE LANE TWO-WAY CONTROL WITH FLAGGERS

LEGEND

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

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

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

TYPICAL USAGE

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

GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. The CW3-4 "BE PREPARED TO STOP" sign may be installed after the CW20-4D "ONE LANE ROAD AHEAD" sign, but proper sign spacing shall be maintained.
4. Sign spacing may be increased or an additional CW20-1D "ROAD WORK AHEAD" sign may be used if advance warning ahead of the flagger or R1-2 "YIELD" sign is less than 1500 feet.
5. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
6. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.

TCP (1-2a)

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

TCP (1-2b)

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN ONE-LANE TWO-WAY TRAFFIC CONTROL

TCP(1-2)-18

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©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
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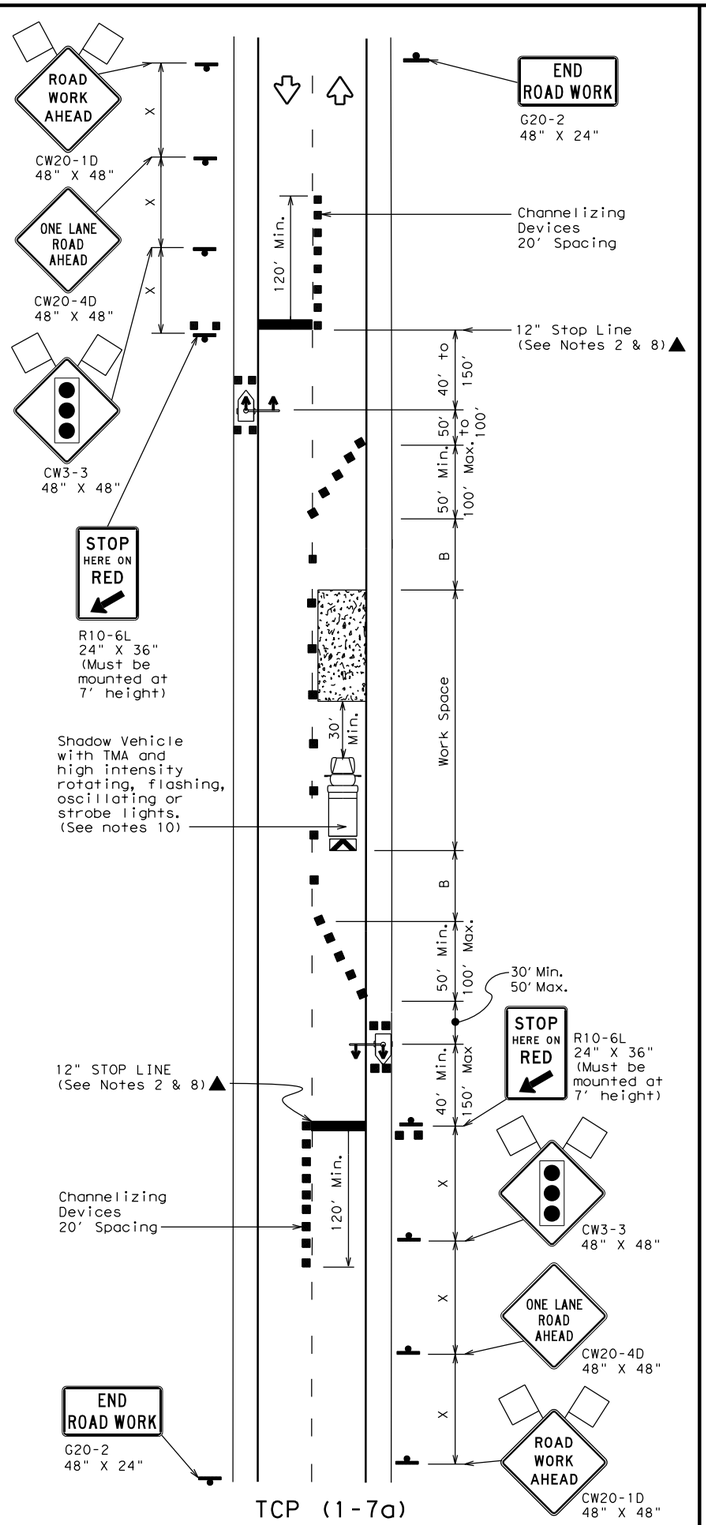
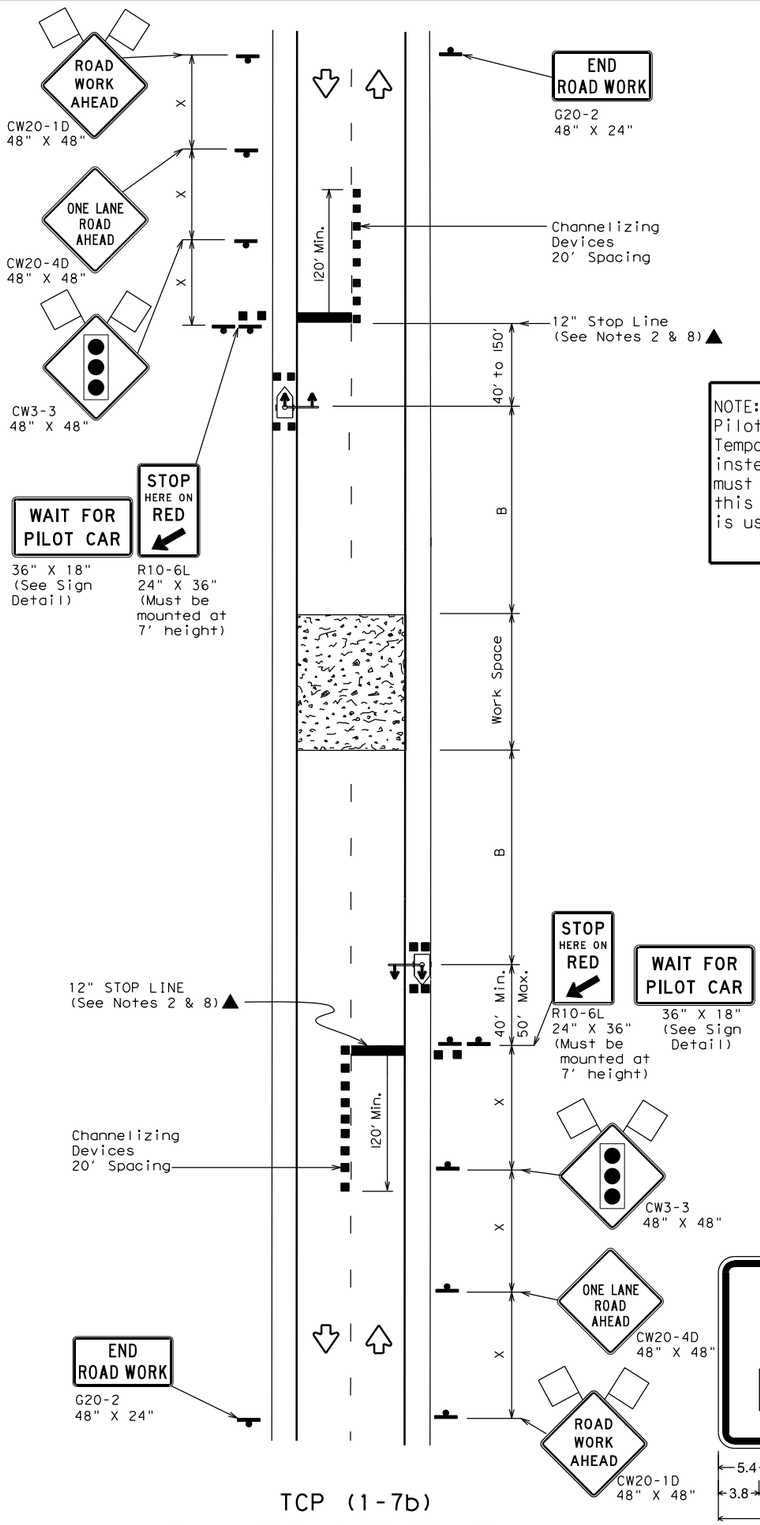


TCP (1-7a)

ONE LANE TWO-WAY TRAFFIC CONTROL WITH TRAFFIC SIGNALS



TCP (1-7b)

FULL WIDTH CLOSURE WITH TRAFFIC SIGNALS AND PILOT CAR

NOTE: FORM 6(09)-19(E) - Pilot Vehicles using Temporary Traffic Signals instead of Flaggers - TxDOT, must be filled out each day this preliminary standard is used.

LEGEND			
	Sign		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Temporary or Portable Traffic Signal	M	Portable Changeable Message Sign (PCMS)
	Flag		Traffic Flow

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'

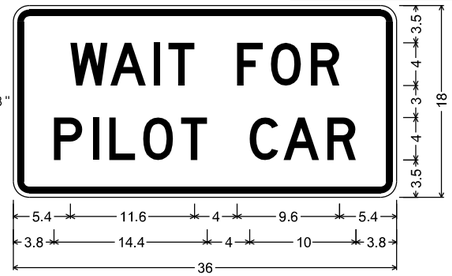
* Conventional Roads Only

** 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. Unless otherwise stated in the plans, flags attached to signs 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 BE PREPARED TO STOP sign may be installed after the ONE LANE ROAD AHEAD sign, but proper sign spacing shall be maintained.
4. ROAD WORK AHEAD sign may be repeated if the visibility of the work zone is less than 1500'.
5. If pilot car is used to guide vehicles through traffic control zone, vehicle shall have an identification name displayed and "PILOT CAR, FOLLOW ME" (G20-4) sign or message board mounted in a conspicuous position on rear.
6. Channelizing devices are recommended for all applications. Devices may be offset as needed for Maintenance operations.
7. See "Recommended Work Zone Settings" chart in the control box for preset programming.
8. A temporary STOP line may be used in conjunction with "Stop here on Red" (R10-6).
9. Proper alignment of overhead signal with on-coming lane should be ensured.
10. A Shadow Vehicle with TMA should be used anytime it can be positioned approximately 30 to 100' in advance of workers exposed to traffic 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 remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.



1.5" Radius, 0.625" Border, 0.375" Indent, Black on White;
[WAIT FOR] D; [PILOT CAR] D;
(Must be mounted at 7' height)

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN SHORT TERM TEMPORARY SIGNALS PRELIMINARY STANDARD

TCP(1-7)-11

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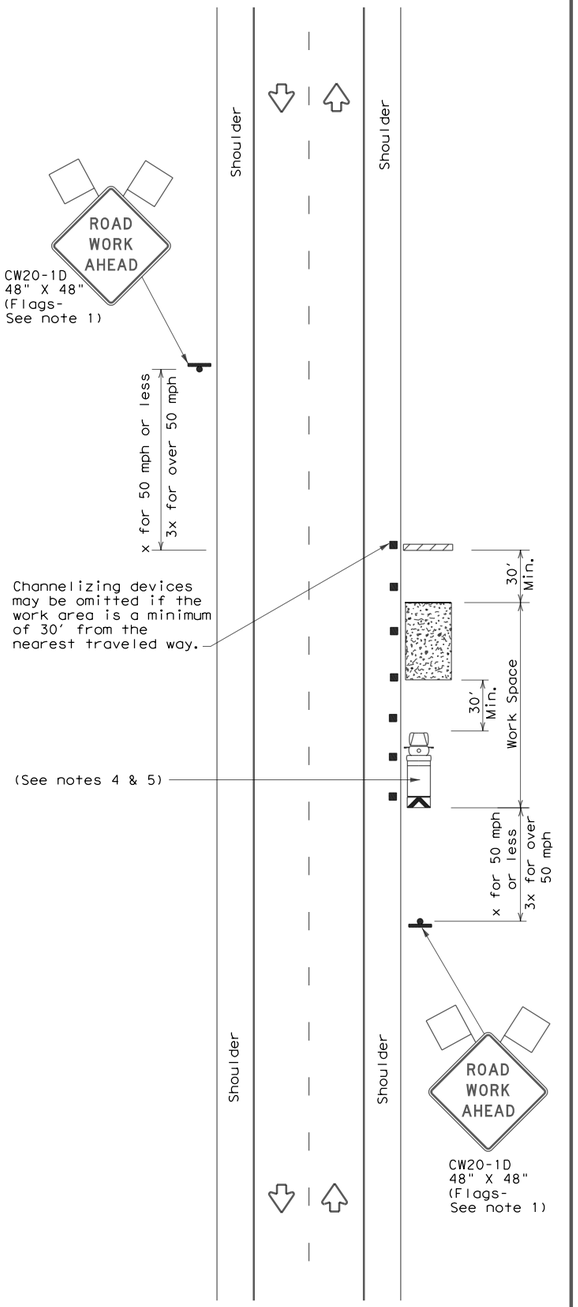
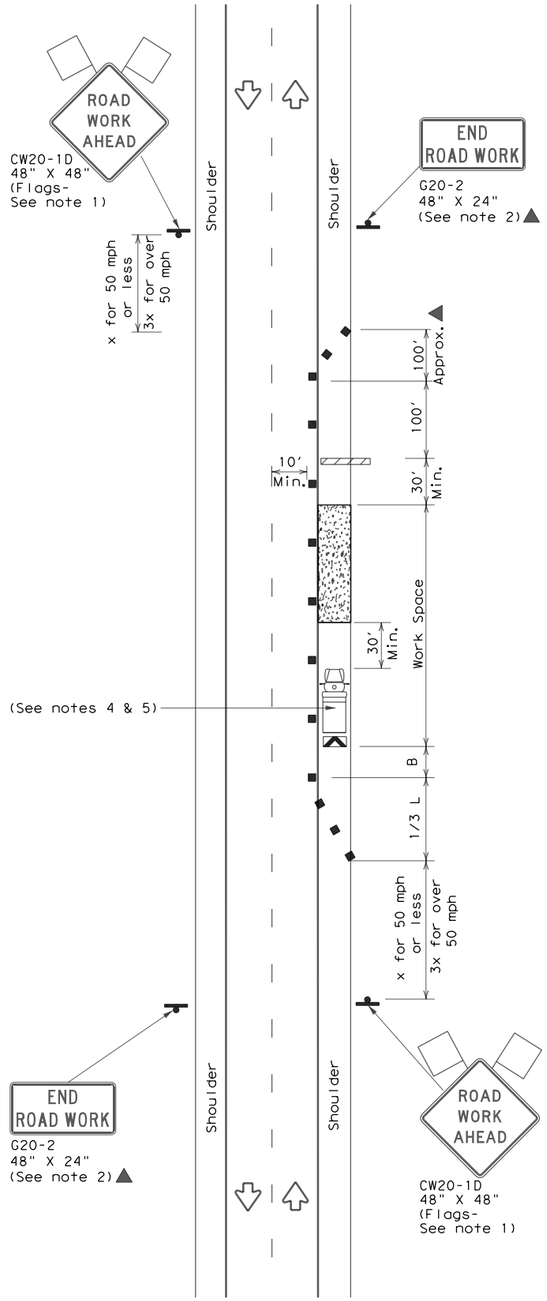


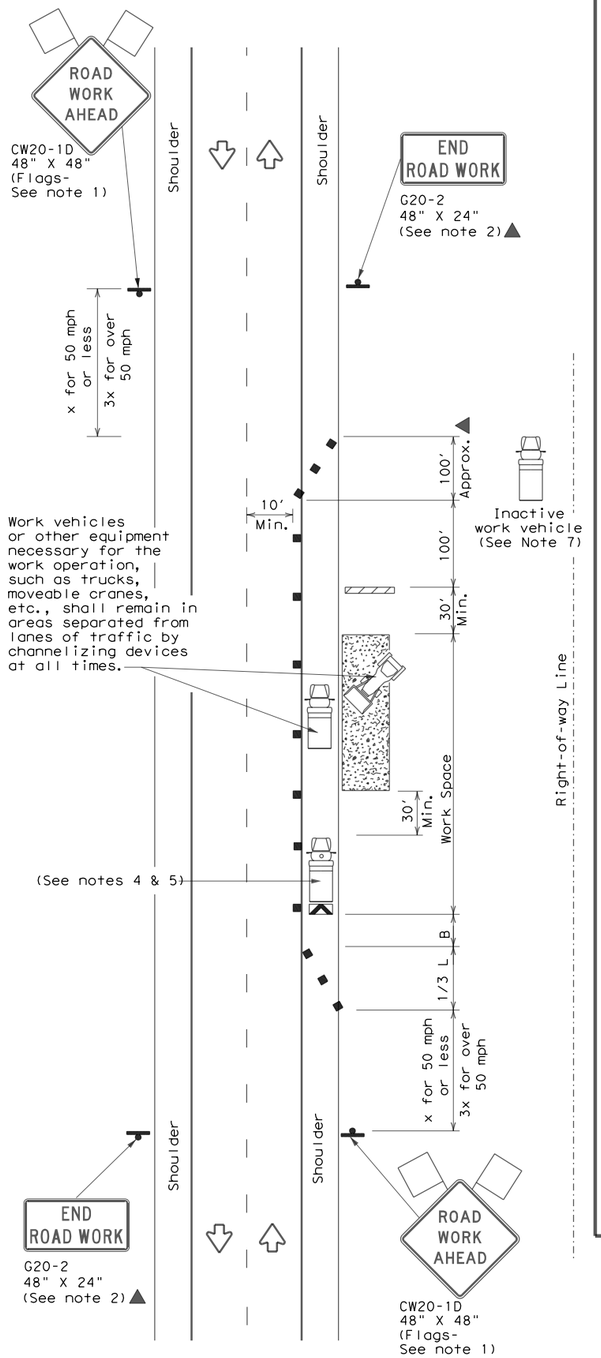
TCP (2-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (2-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (2-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(2-1)-18

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© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0579	02	014	FM 512
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	PARIS	HUNT		38
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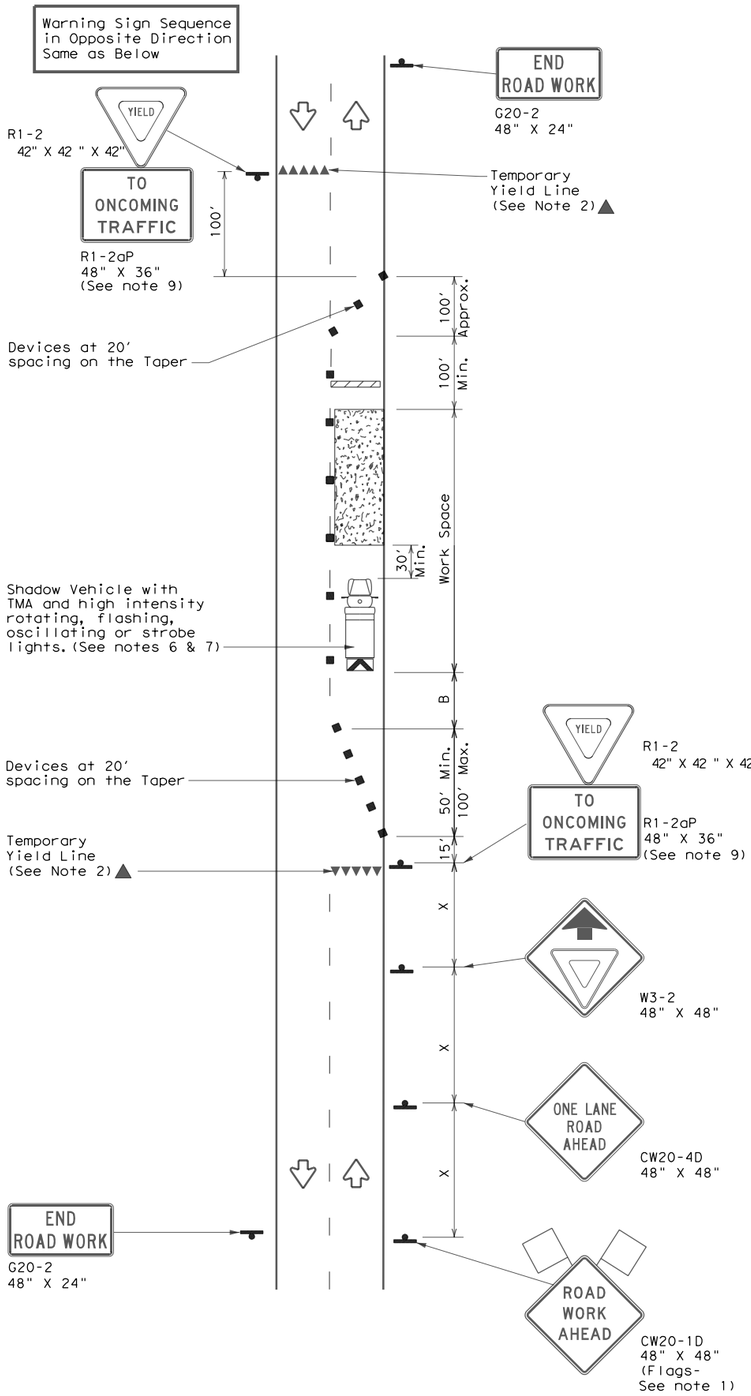
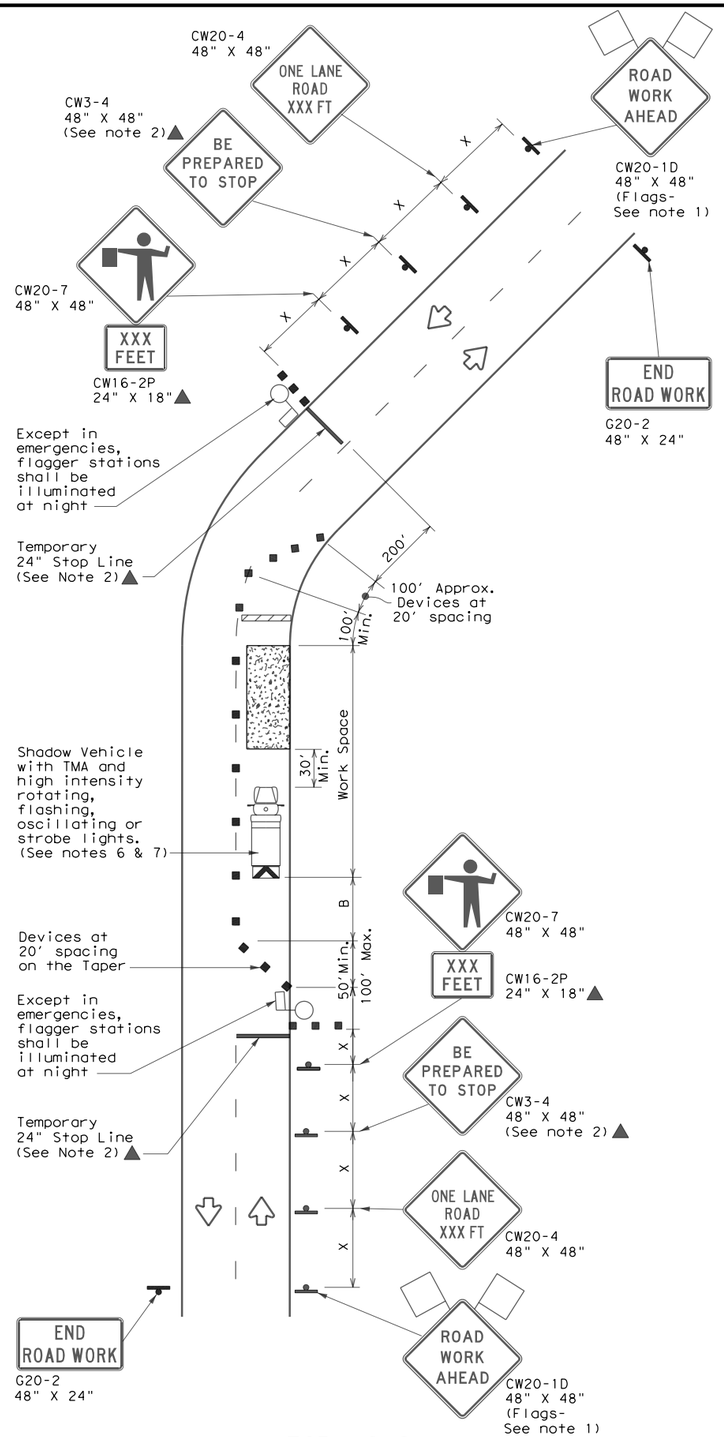


TCP (2-2a)
2-LANE ROADWAY WITHOUT PAVED SHOULDERS
ONE LANE TWO-WAY
CONTROL WITH YIELD SIGNS
(Less than 2000 ADT - See Note 9)



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

LEGEND

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

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

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

TYPICAL USAGE

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

GENERAL NOTES

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

TCP (2-2a)

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

TCP (2-2b)

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

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
ONE-LANE TWO-WAY TRAFFIC CONTROL

TCP(2-2)-18

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©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03 1-97 2-12 4-98 2-18	0579	02	014	FM 512
	DIST	COUNTY		SHEET NO.
	PARIS	HUNT		39

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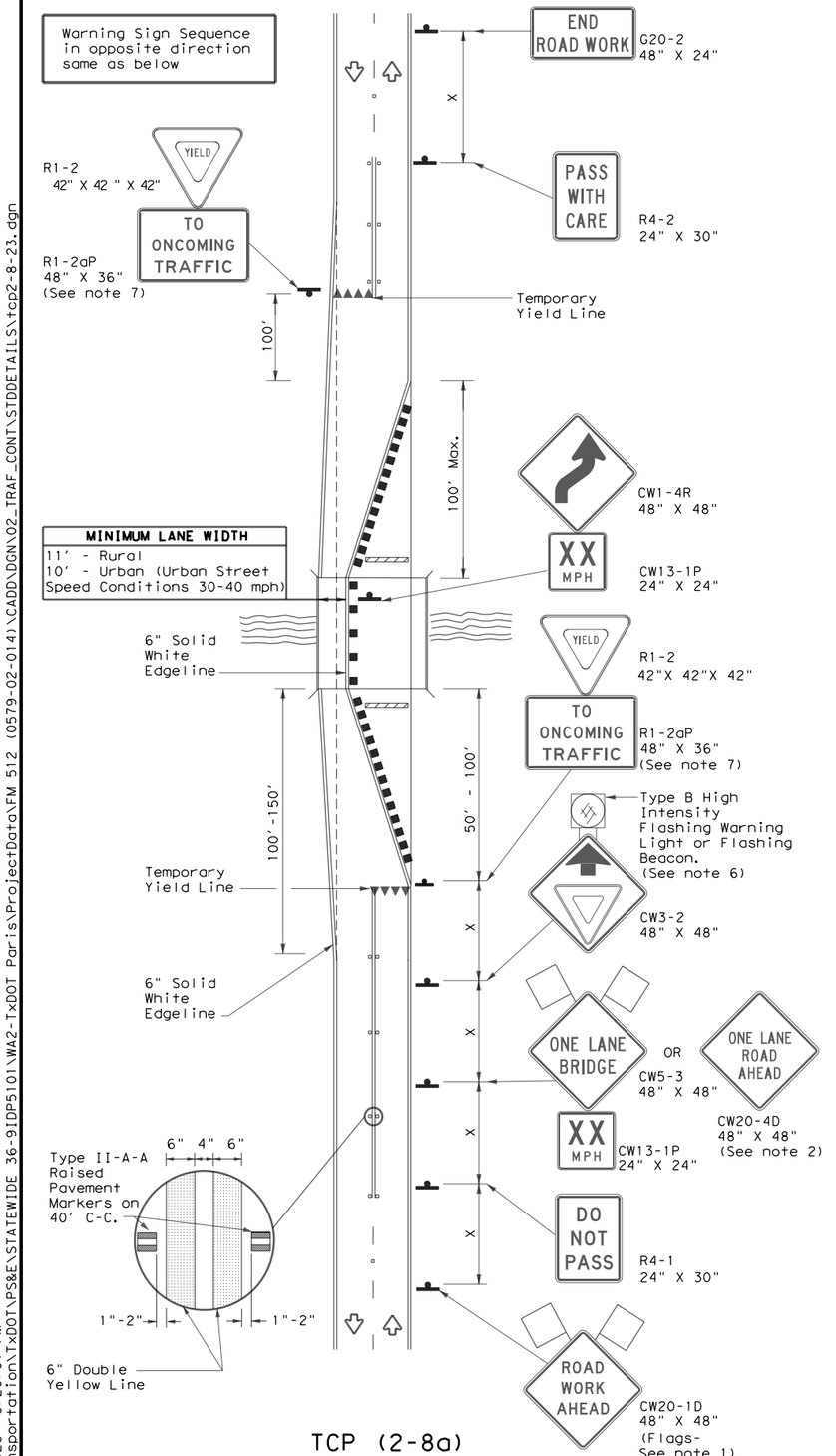
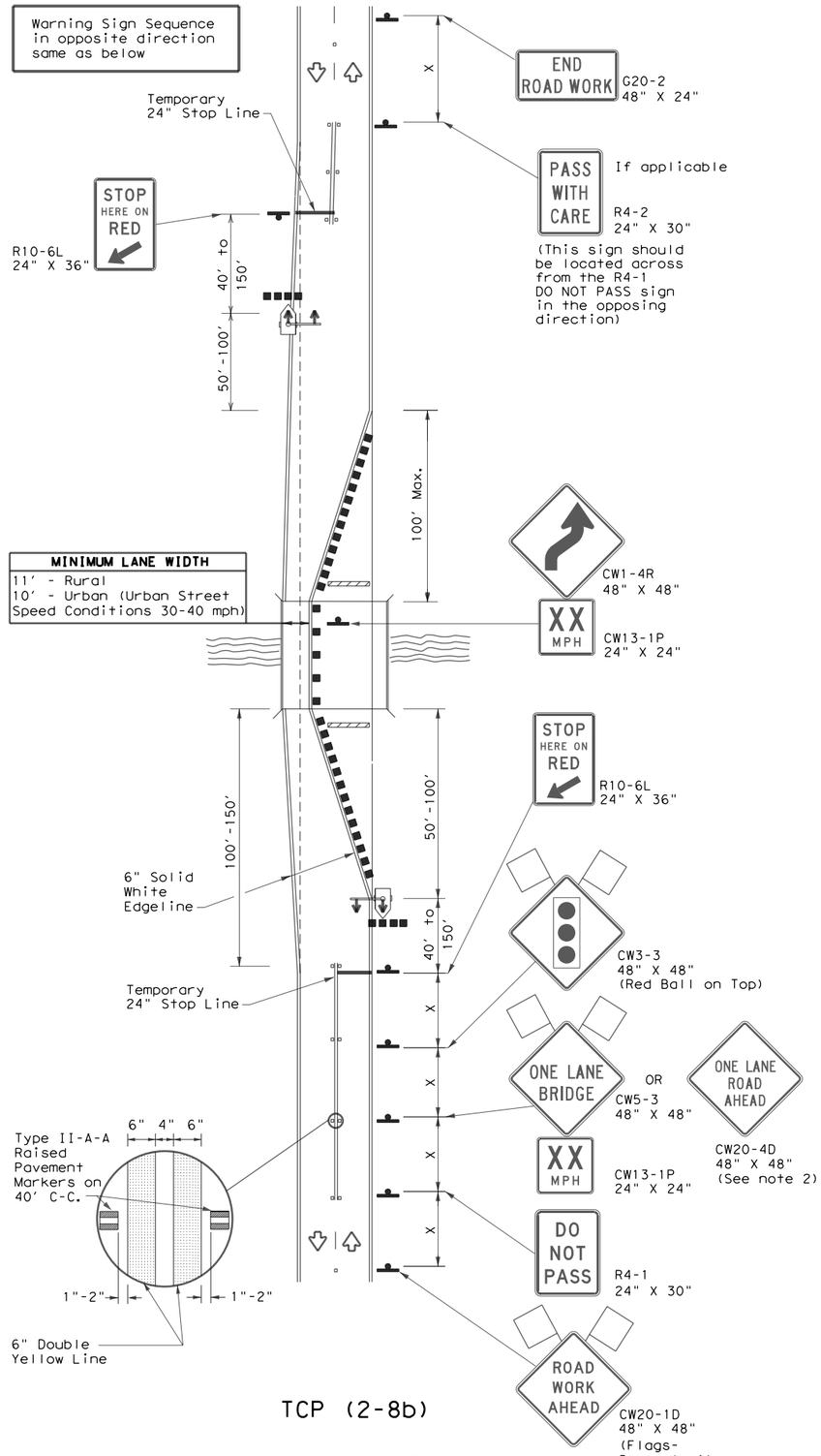


TCP (2-8a)

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



TCP (2-8b)

ONE LANE TWO-WAY
TRAFFIC CONTROL WITH TRAFFIC SIGNAL

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

TCP (2-8a)

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

TCP (2-8b)

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

Texas Department of Transportation

Traffic Safety Division Standard

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

TCP(2-8)-23

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8-95 3-03 4-23	PARIS	HUNT		40
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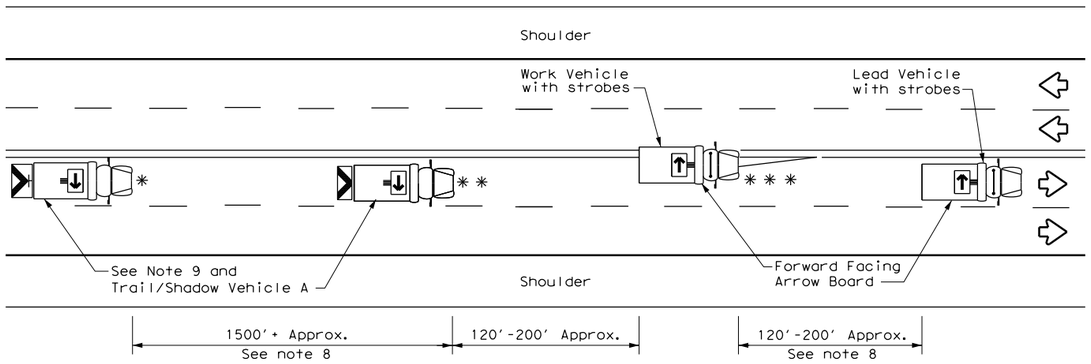
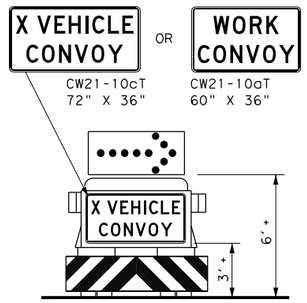


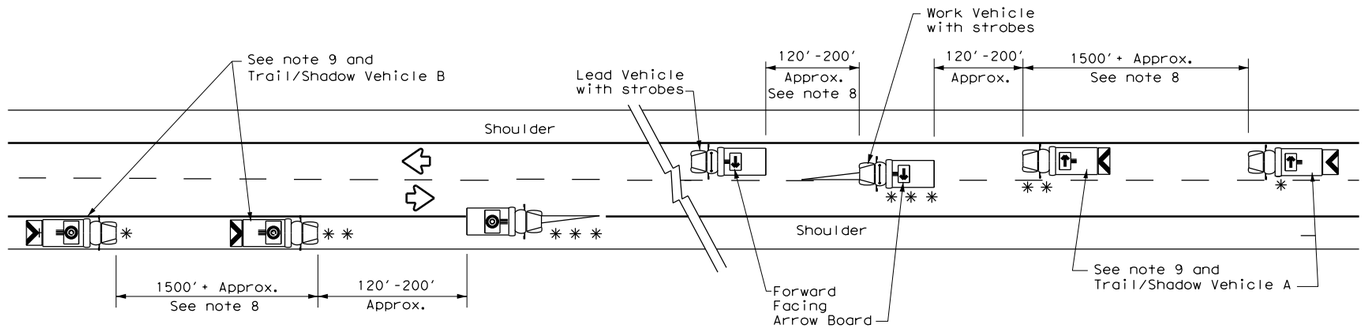
TCP (3-1a)

UNDIVIDED MULTILANE ROADWAY



TRAIL/SHADOW VEHICLE A

with RIGHT Directional display Flashing Arrow Board

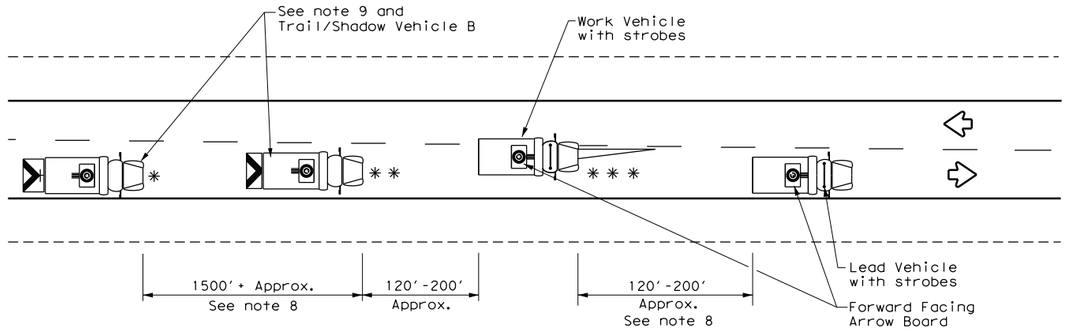


WORK ON SHOULDER

WORK ON TRAVEL LANE

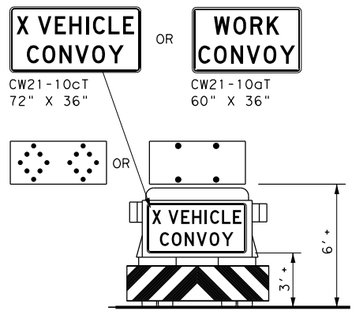
TCP (3-1b)

TWO-WAY ROADWAY WITH PAVED SHOULDERS



TCP (3-1c)

TWO-WAY ROADWAY WITHOUT PAVED SHOULDERS



TRAIL/SHADOW VEHICLE B

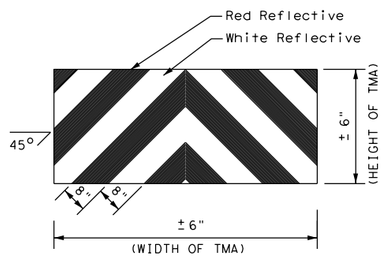
with Flashing Arrow Board in CAUTION display

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

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

GENERAL NOTES

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



STRIPING FOR TMA

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS UNDIVIDED HIGHWAYS

TCP(3-1)-13

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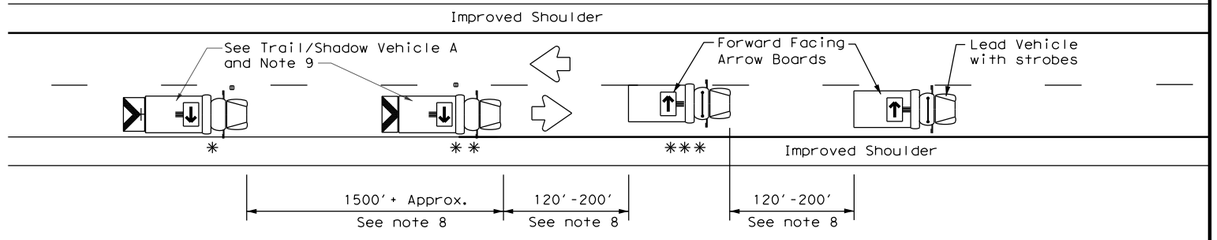
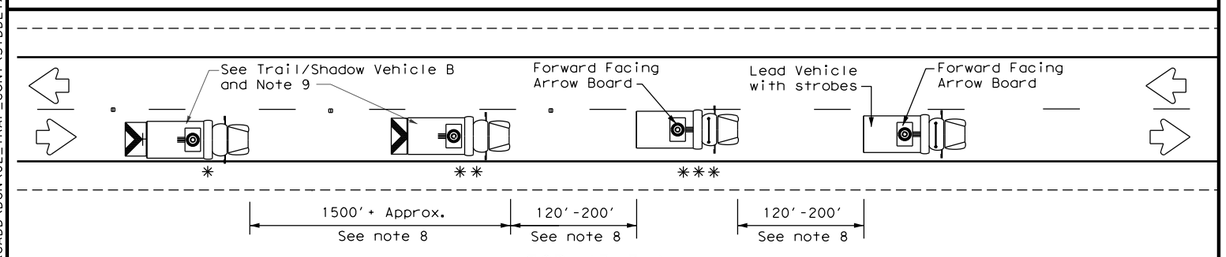


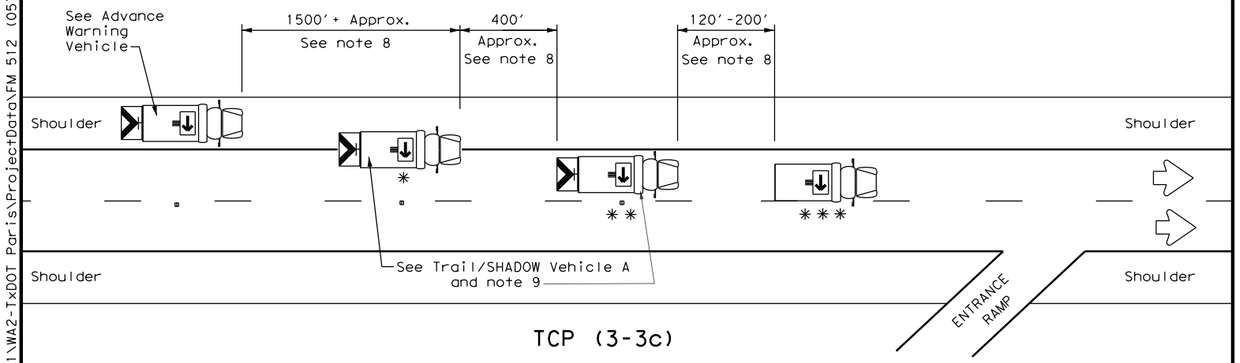
TCP (3-3a)

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



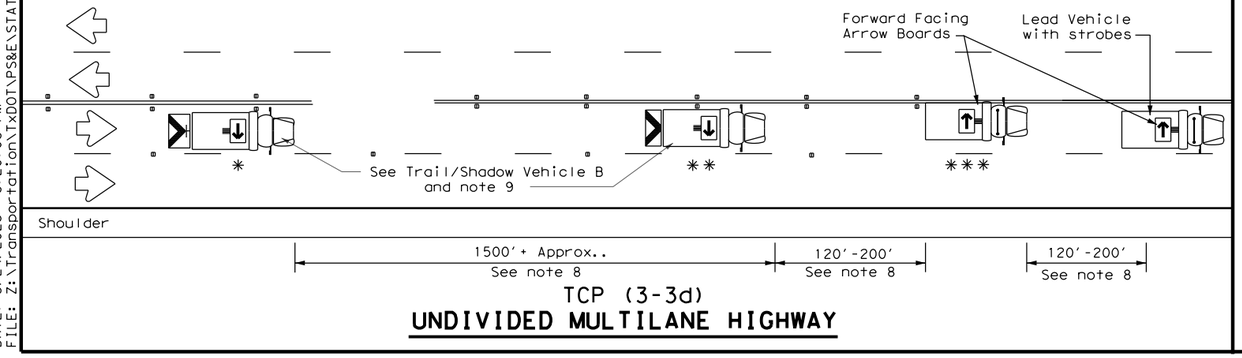
TCP (3-3b)

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



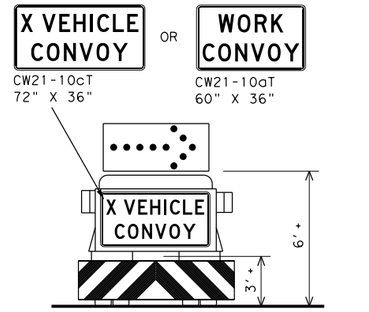
TCP (3-3c)

DIVIDED MULTILANE HIGHWAY



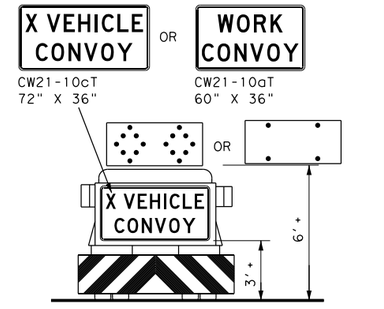
TCP (3-3d)

UNDIVIDED MULTILANE HIGHWAY



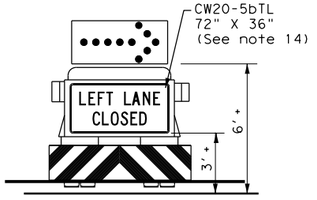
TRAIL/SHADOW VEHICLE A

with RIGHT Directional display
Flashing Arrow Board

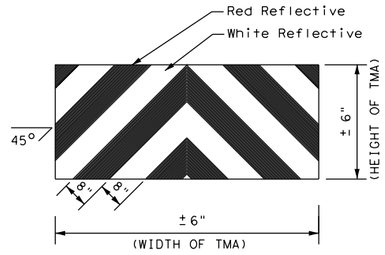


TRAIL/SHADOW VEHICLE B

with Flashing Arrow Board
in Caution Mode



ADVANCE WARNING VEHICLE



STRIPING FOR TMA

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS RAISED PAVEMENT MARKER INSTALLATION/ REMOVAL

TCP(3-3)-14

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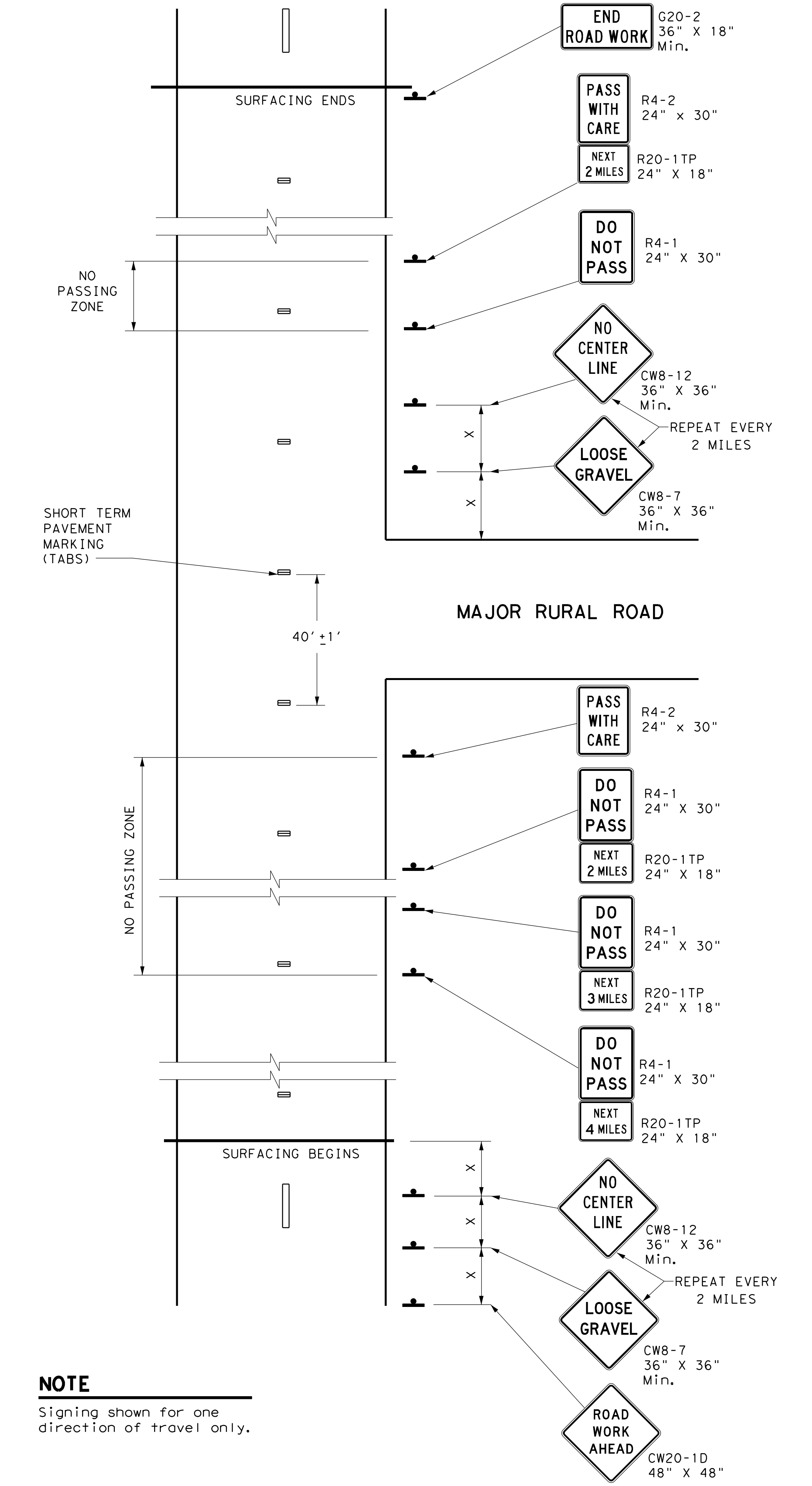
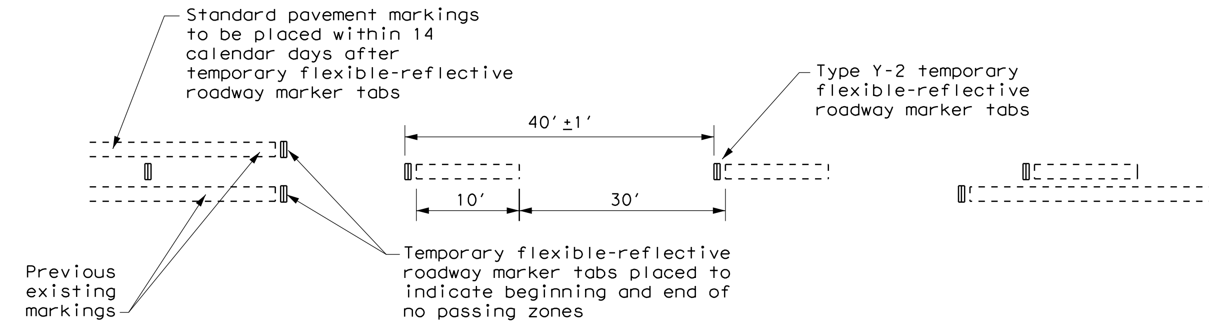


NOTE

Signing shown for one direction of travel only.

NO PASSING ZONES ON TWO-LANE TWO-WAY ROADS



TABS ON CENTERLINES OF TWO-LANE TWO-WAY ROADS

For seal coat, micro-surface or similar operations

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
			✓	✓

"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.

GENERAL NOTES

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

Texas Department of Transportation — Traffic Operations Division Standard

TRAFFIC CONTROL DETAILS FOR SURFACING OPERATIONS

TCP(7-1)-13

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© TxDOT March 1991	CONT	SECT	JOB	HIGHWAY
REVISIONS	0579	02	014	FM 512
4-92 4-98	DIST		COUNTY	SHEET NO.
1-97 7-13	PARIS		HUNT	43

210

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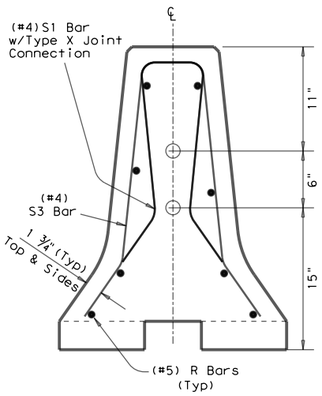
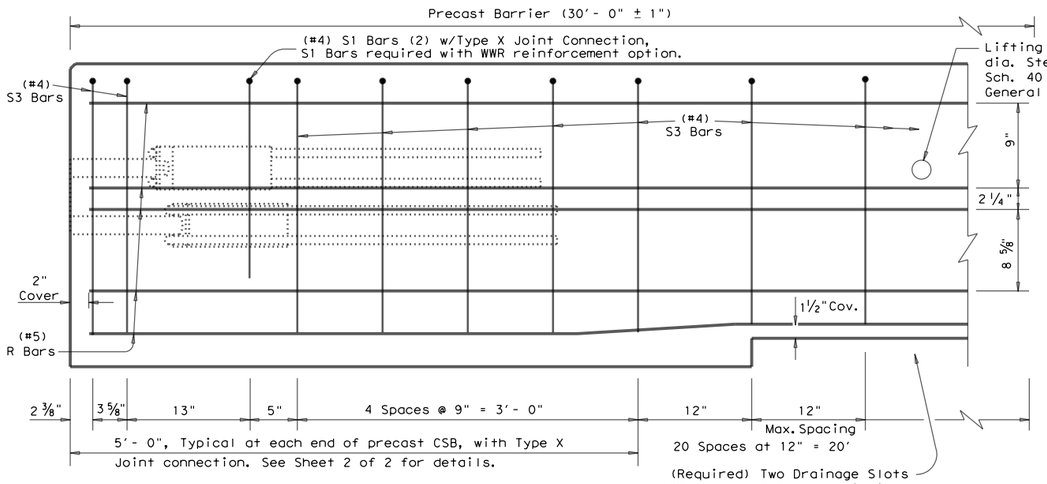


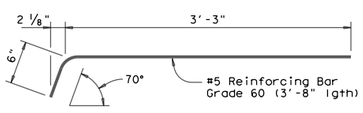
End View Precast Barrier

See sheet 2 of 3 for Joint connection Type X



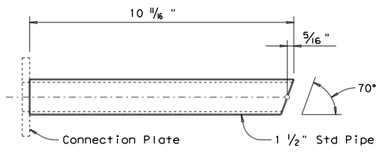
Reinforcement for Precast (CSB) Concrete Safety Barrier (Type 1)

Showing reinforcement for Joint Type X



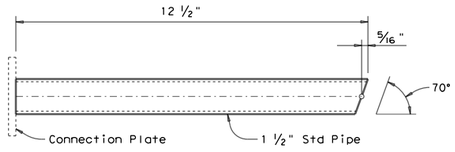
DEFORMED BAR ANCHOR DETAILS

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



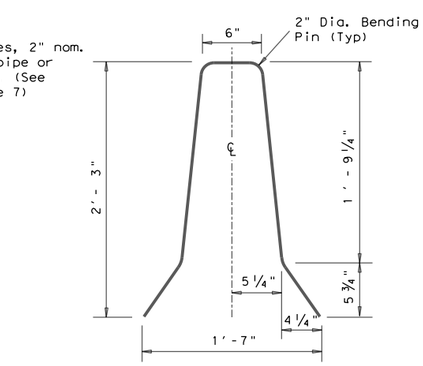
UPPER CONNECTION PIPE DETAILS

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



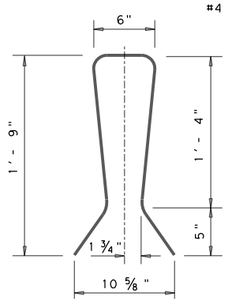
LOWER CONNECTION PIPE DETAILS

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



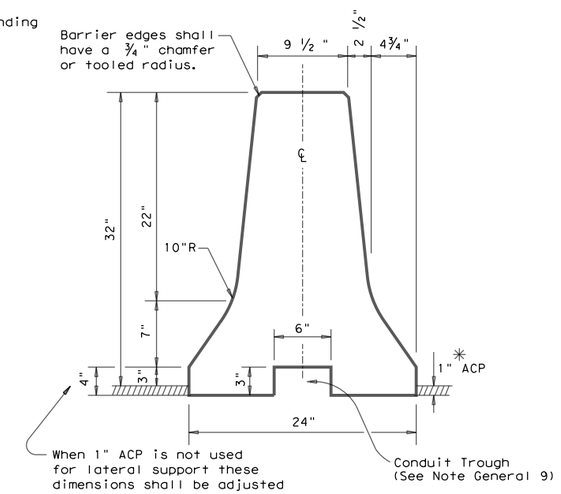
S3 Bar

#4 Bar



S1 Bar

#4 Bar (2)
(Joint Type X)

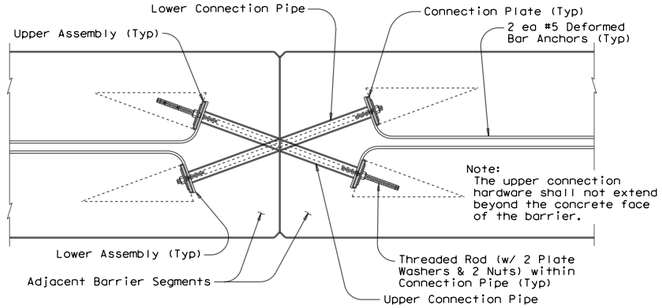


Concrete Safety Barrier

✳ 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.

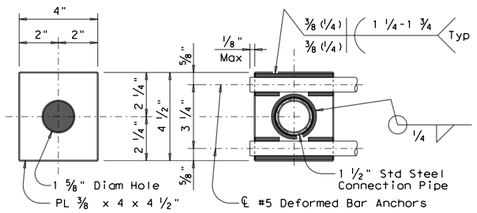
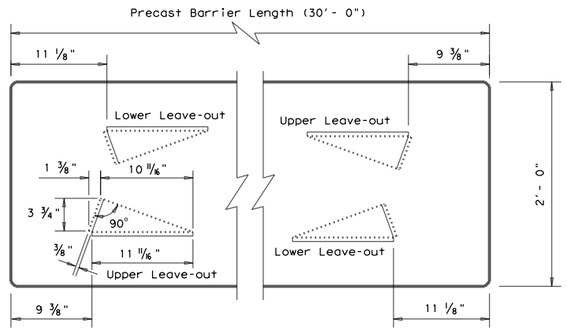


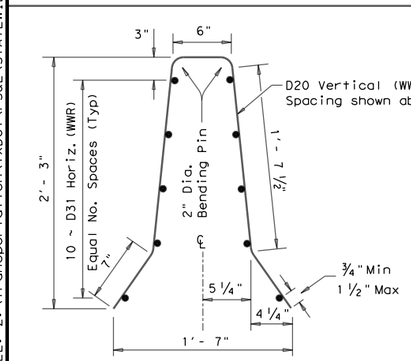
PLATE DIMENSIONS WELDING DETAILS

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.



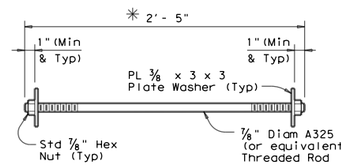
BARRIER PLAN AT END JOINTS



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

(WWR) General Notes

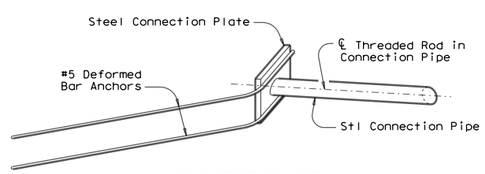
1. Deformed Welded Wire Reinforcement (WWR) shall conform to ASTM A497.
2. Welded wire cage may be cut or bent to accommodate the Type X joint connection and drainage slots, as directed by the Engineer.
3. All reinforcement shall comply with Item 440, "Reinforcing Steel."
4. Combinations of reinforcing 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

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©TxDOT December 2010	CONT	SECT	JOB	HIGHWAY
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	PARIS	HUNT		44

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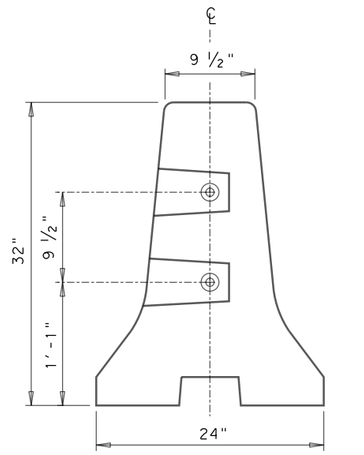
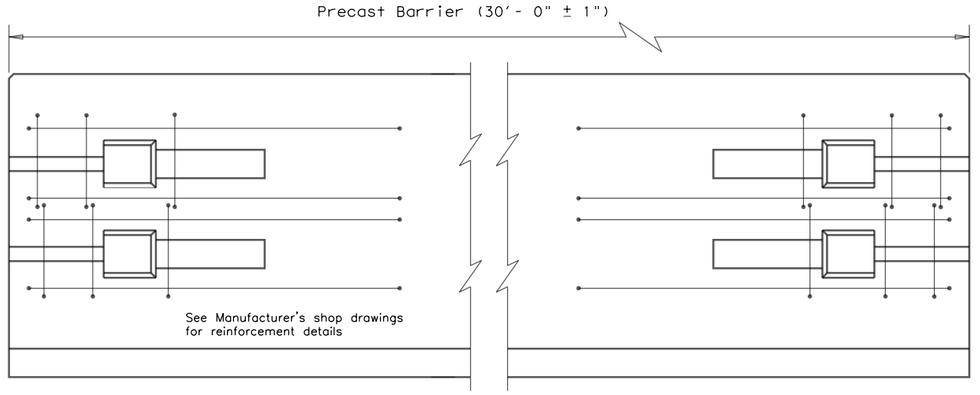
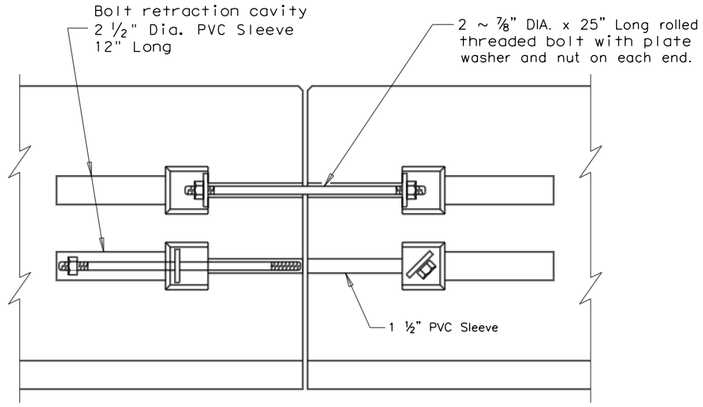


END VIEW (CSB) QUICK-BOLT
QUICK-BOLT POCKET LOCATIONS

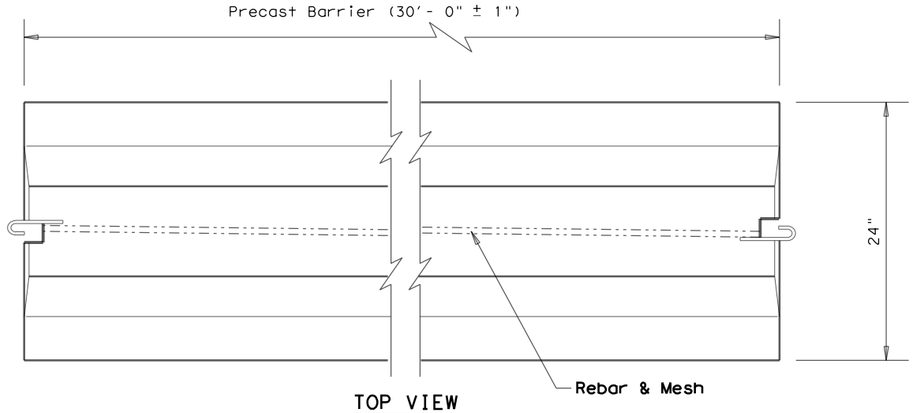


ELEVATION (CSB) QUICK-BOLT
See Manufacturer's shop drawing for additional details

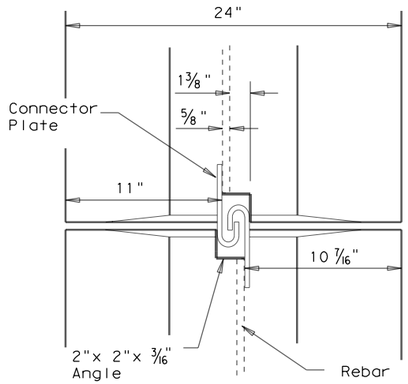


ELEVATION VIEW SHOWING JOINT CONNECTION
"QUICK-BOLT"

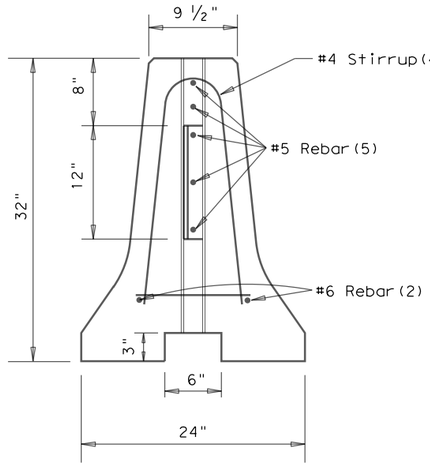
Joint Connection (Type Q)



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



VIEW FROM ABOVE
J-J HOOK CONNECTION



END VIEW
J-J HOOK CONNECTION

Joint Connection (Type J)

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

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©TxDOT December 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS	0579	02	014	FM 512
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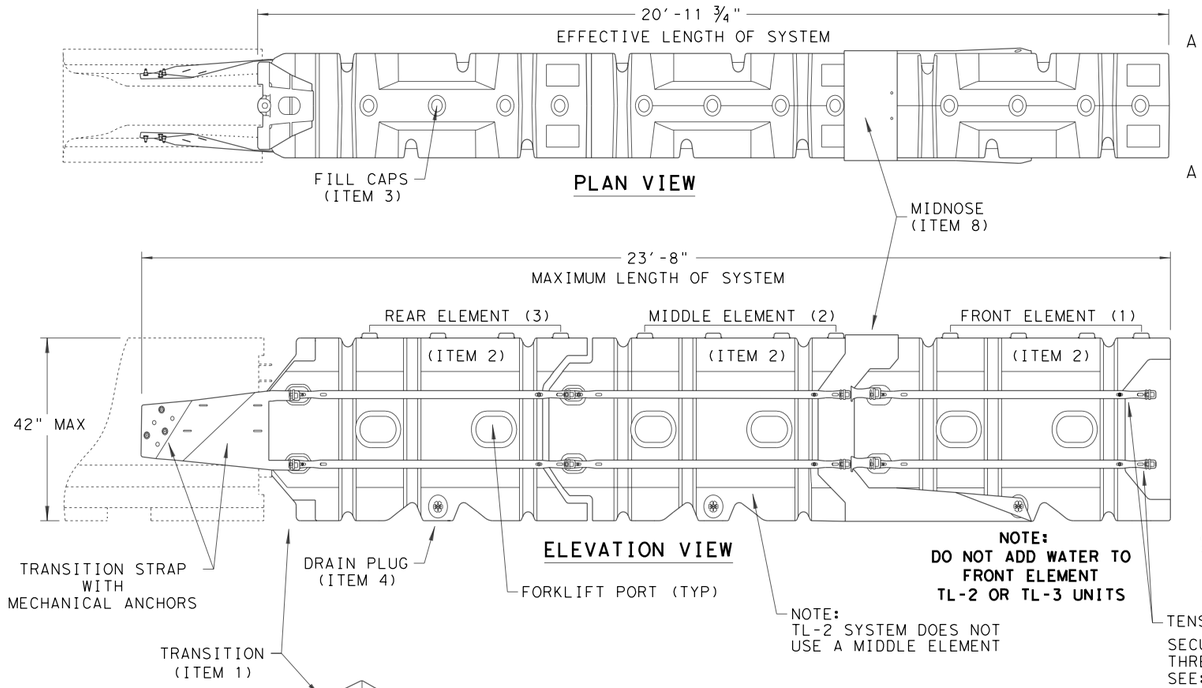
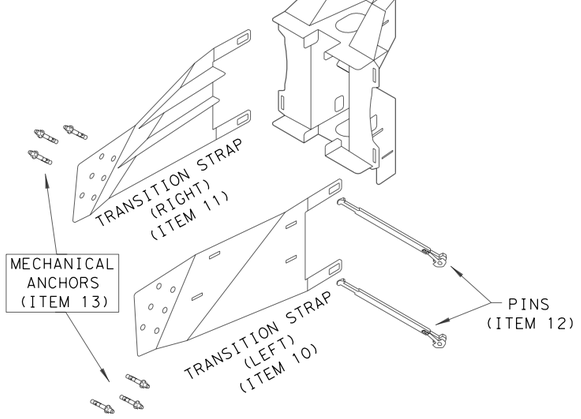
SYSTEM SHOWN - ABSORB-M TL-3





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

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

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

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

GENERAL NOTES

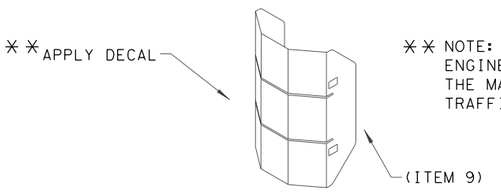
1. FOR SPECIFIC INFORMATION REGARDING THE INSTALLATION AND TECHNICAL GUIDANCE, CONTACT: LINDSAY TRANSPORTATION SOLUTIONS (LTS) - BARRIER SYSTEMS, INC. AT (707) 374-6800. 180 RIVER ROAD, RIO VISTA, CA 94571
2. THE ABSORB-M SYSTEM IS ONLY APPROVED FOR USE IN (TEMPORARY WORK ZONE) LOCATIONS.
3. THE ABSORB-M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

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

*COMPONENTS PRE-ASSEMBLED WITH ELEMENT ASSEMBLY

DELINEATION DECAL PLACEMENT GUIDE

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 REVISIONS	CONT	SECT	JOB	HIGHWAY
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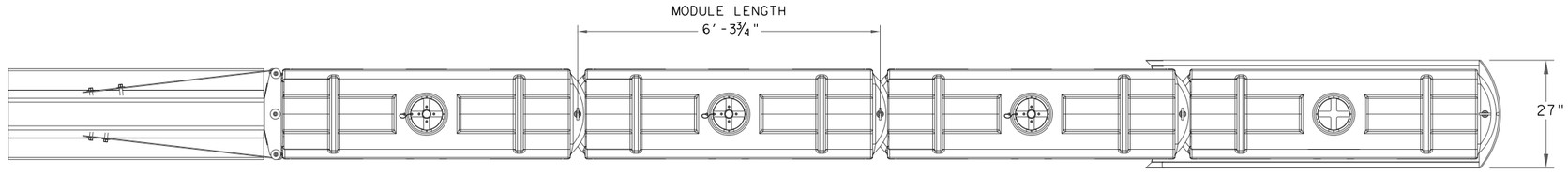
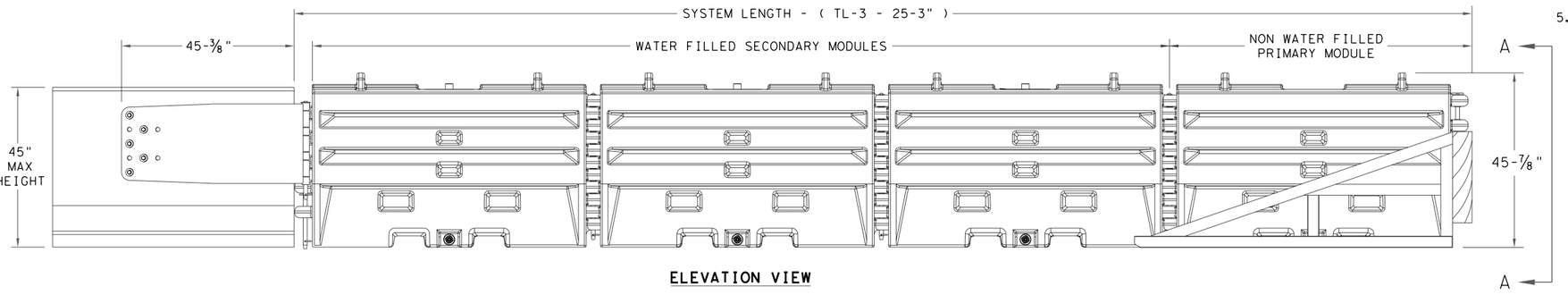


PLAN VIEW

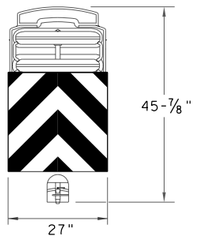


ELEVATION VIEW

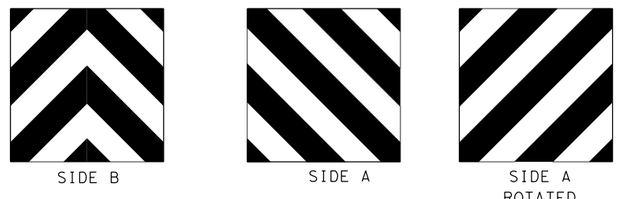
GENERAL NOTES

1. REFER TO THE INSTALLATION MANUAL FOR SPECIFIC SYSTEM ASSEMBLY AND MODULE ORIENTATION. FOR ADDITIONAL INFORMATION, CONTACT TRAFFIX, INC. AT (949) 361-5663.
2. THE SLED SYSTEM IS A MASH APPROVED TEST LEVEL 3 (TL-3) CRASH CUSHION APPROVED FOR USE IN TEMPORARY WORK ZONES. THE SLED SYSTEM IS A NON-REDIRECTIVE, GATING CRASH CUSHION THAT DOES NOT NEED TO BE ATTACHED TO THE GROUND AND CAN BE INSTALLED ON CONCRETE, ASPHALT, GRAVEL OR COMPACTED SOIL.
3. MAXIMUM PERMISSIBLE CROSS SLOPE IS 8° (DEGREES) (14%).
4. THE INSTALLATION AREA SHOULD BE FREE FROM CURBS, ELEVATED OBJECTS, OR DEPRESSIONS.
5. THE SLED SYSTEM CAN BE ATTACHED TO:
   - CONCRETE BARRIER, TEMPORARY OR PERMANENT, 45" MAXIMUM HEIGHT
   - STEEL BARRIER
   - PLASTIC BARRIER
   - CONCRETE BRIDGE ABUTMENTS
   - W-BEAM GUARD RAIL
   - THRIE BEAM GUARD RAIL

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



SECTION A-A

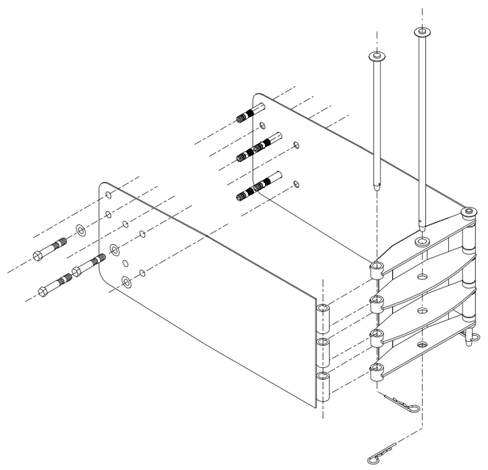


NOSE SHEETING PANEL DELINEATION

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

BILL OF MATERIAL

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



SLED TRANSITION COMPONENTS FOR ATTACHMENT TO CMB

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

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

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

SACRIFICIAL

Texas Department of Transportation

Design Division Standard

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

FILE: sled19.dgn	DN: TxDOT	CK: KM	DW: VP	CK:
© TxDOT: DECEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0579	02	014	FM 512
	DIST	COUNTY		SHEET NO.
	PARIS	HUNT		47

DATE: 5/24/2023 6:20:10 PM
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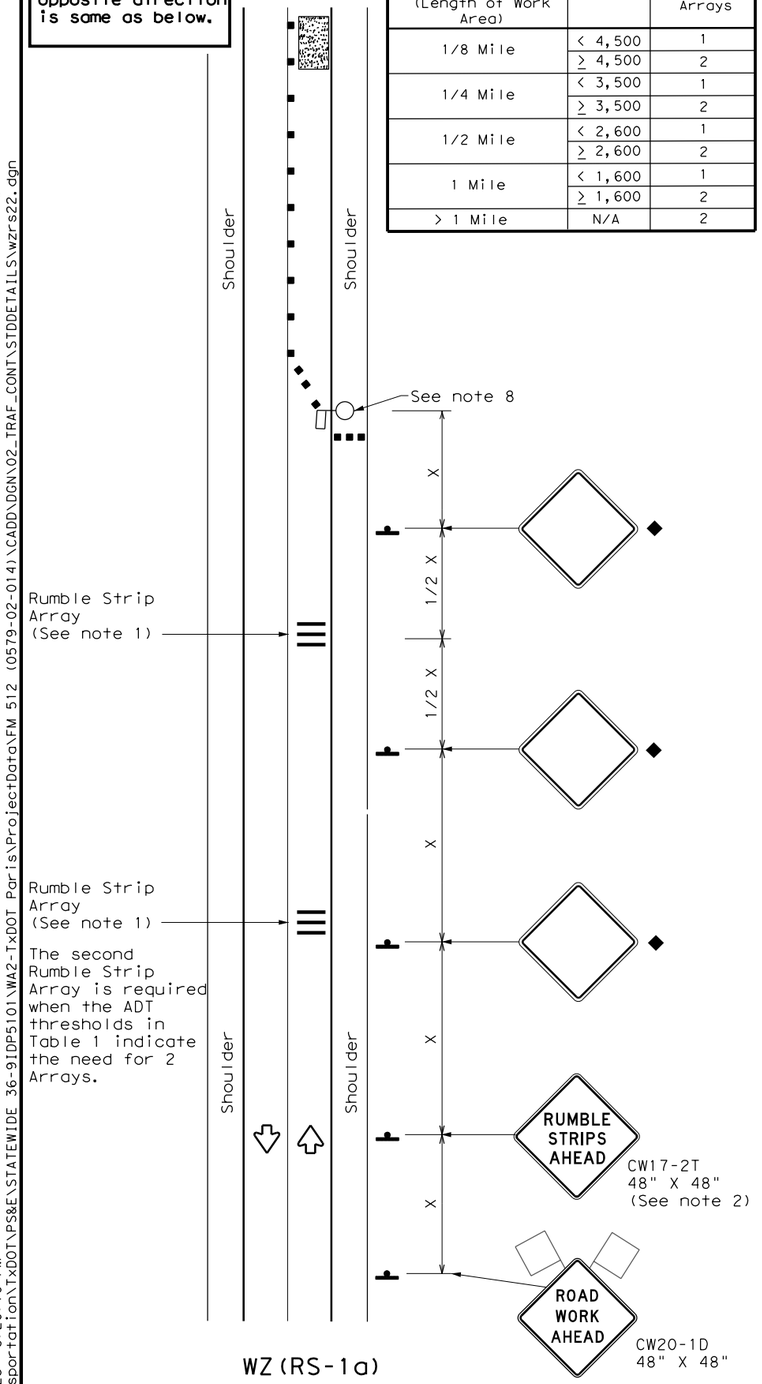
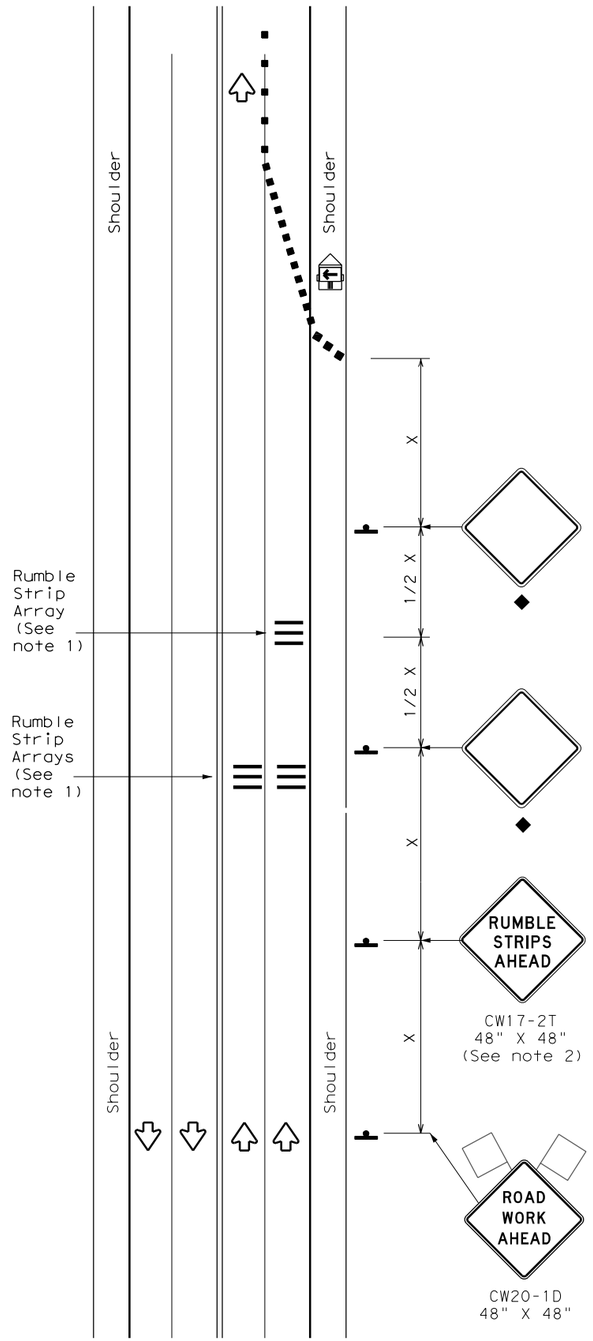
Warning sign and rumble strip sequence in opposite direction is same as below.

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	0579	02	014	FM 512
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	PARIS	HUNT		48

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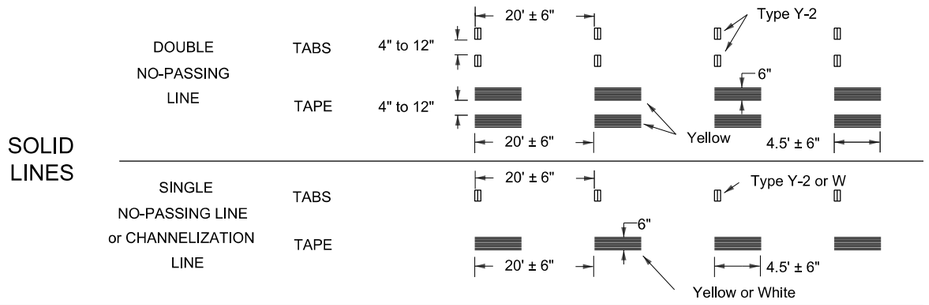
WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS



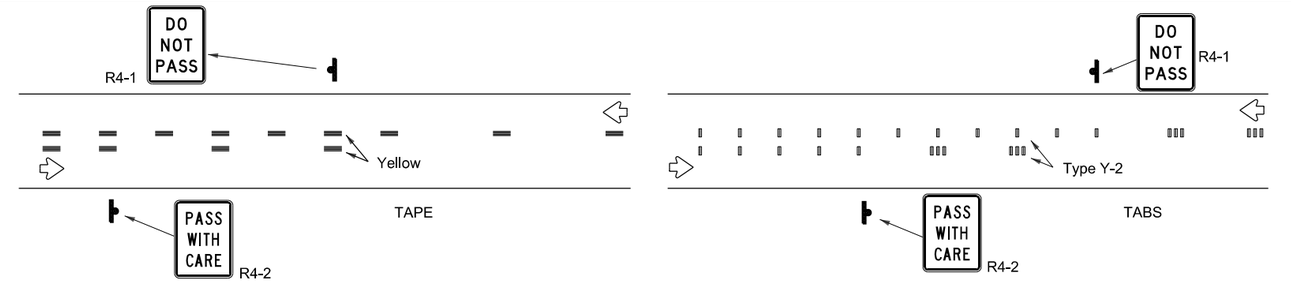
NOTES:

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

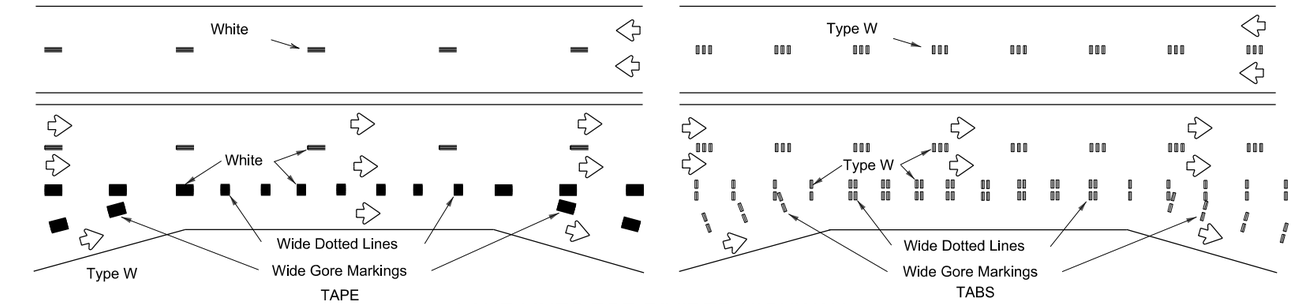
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS (TABS)

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

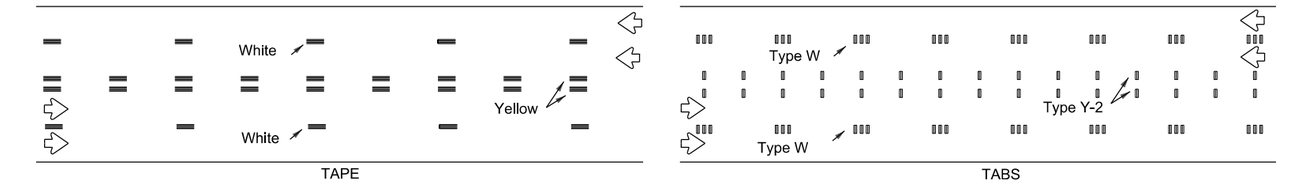
WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS



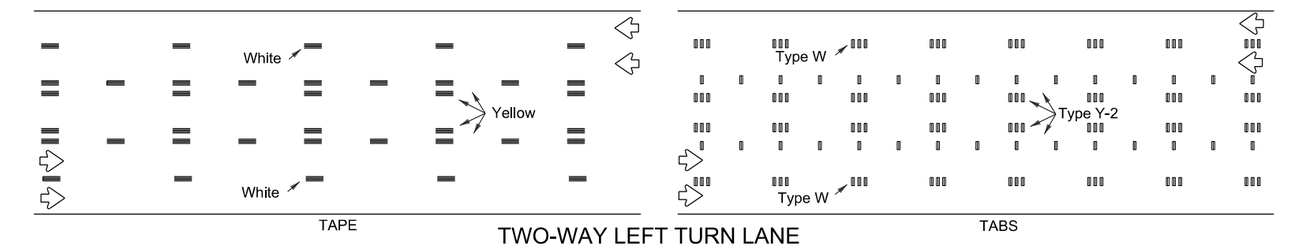
CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO LANE TWO-WAY HIGHWAYS



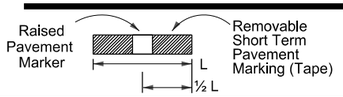
LANE LINES FOR DIVIDED HIGHWAY



LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



TWO-WAY LEFT TURN LANE



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

PREFABRICATED PAVEMENT MARKINGS

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

RAISED PAVEMENT MARKERS

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

WORK ZONE SHORT TERM PAVEMENT MARKINGS

WZ(STPM)-23

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© TxDOT February 2023	CONT	SECT	JOB	HIGHWAY
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4-92 7-13 1-97 2-23 3-03	DIST	COUNTY		SHEET NO.
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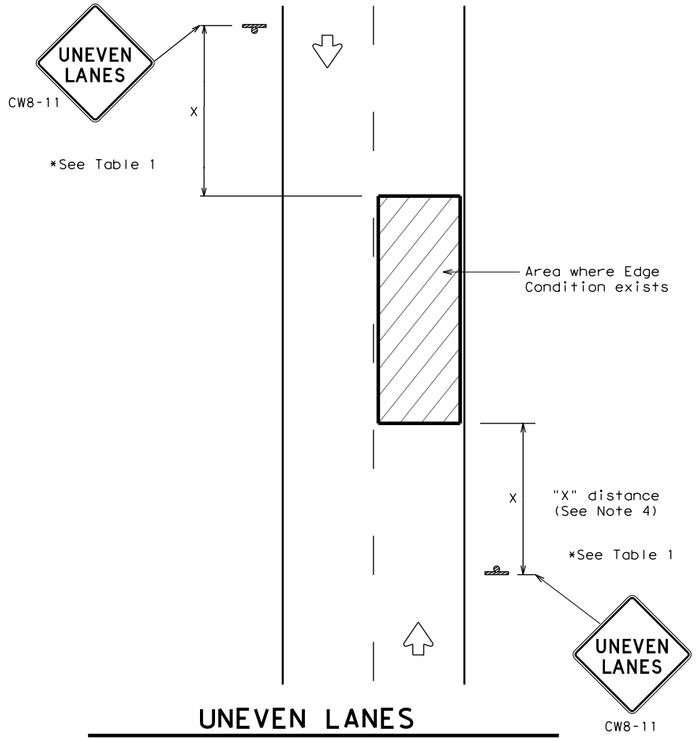
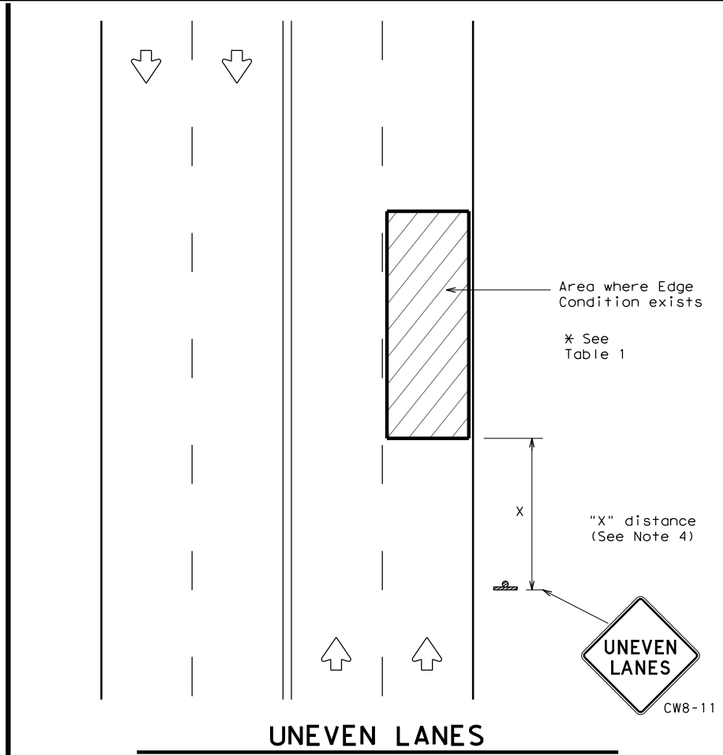
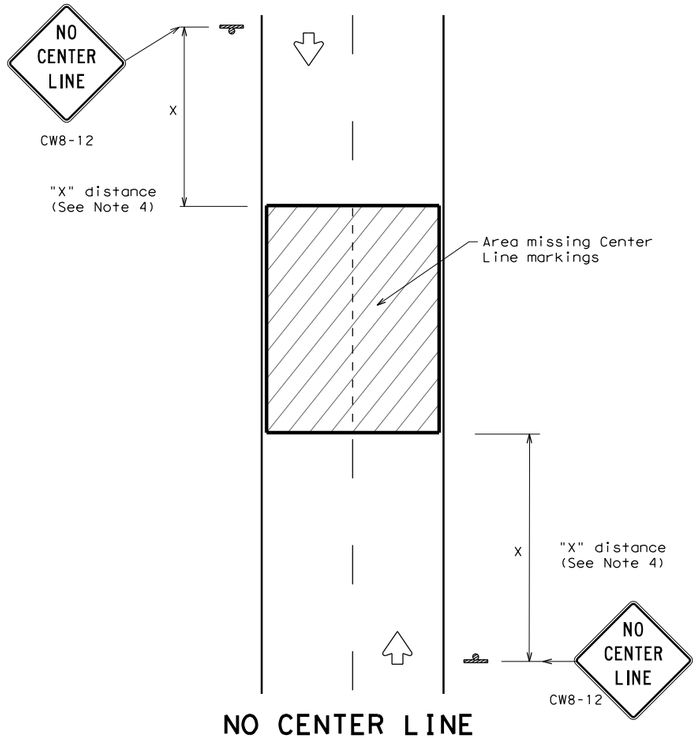


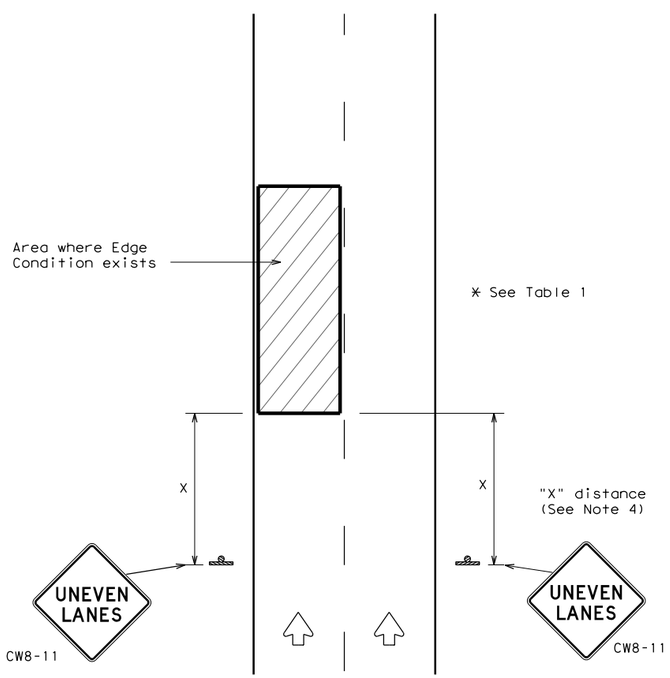
UNEVEN LANES
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
FOUR LANE CONVENTIONAL ROAD



NO CENTER LINE
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
DIVIDED ROADWAY

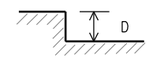
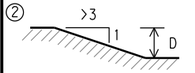
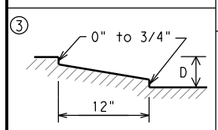
DEPARTMENTAL MATERIAL SPECIFICATIONS	
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240
TEMPORARY (REMOVABLE) PREFABRICATED PAVEMENT MARKINGS	DMS-8241
SIGN FACE MATERIALS	DMS-8300

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
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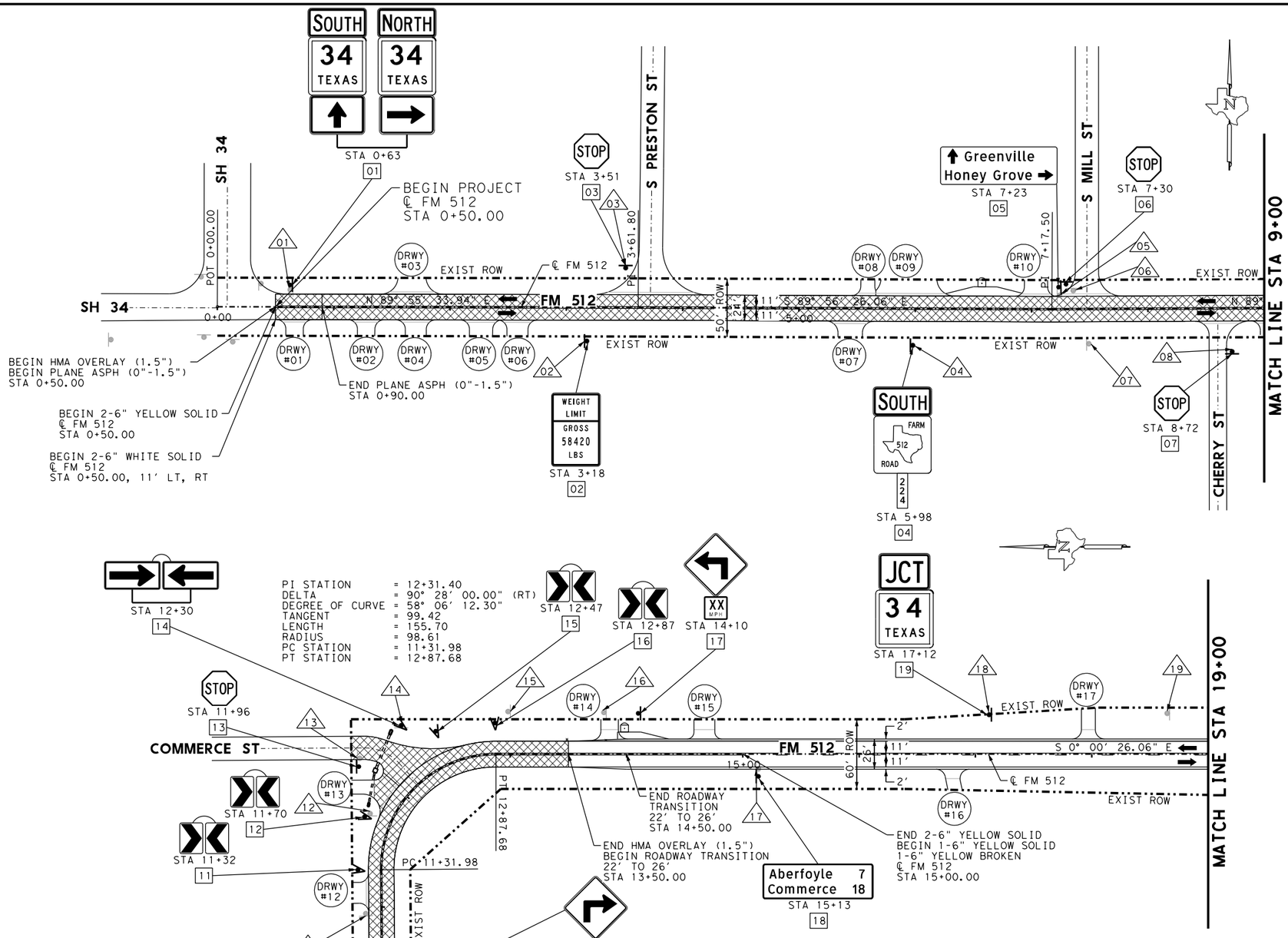
1-97 3-03	PARIS	HUNT		50

100%
SUBMITTAL



LEGEND

- XX — PROPOSED SMALL SIGN ASSEM & NUMBER
- XX — EXIST SMALL SIGN ASSEM TO BE REMOVED
- DIRECTION OF TRAFFIC FLOW
- DRWY #XX — DRIVEWAY NUMBER
- MAIL BOX
- PLANE ASPH (0"-1.5")

NOTES:

1. HORIZONTAL ALIGNMENT DATA IS FOR INFORMATION ONLY. MATCH EXISTING ROADWAY.
2. FOR DRIVEWAY DETAIL REFER TO DRIVEWAY SUMMARY SHEET.

0 25 50 100
SCALE: 1"=100'

STATE OF TEXAS
PAUL A. WARDEN
101319
LICENSED
PROFESSIONAL ENGINEER
Paul A. Warden P.E. 5/24/2023

IDCUS PLANNERS ENGINEERS MANAGERS
8632 Fredericksburg Rd.
Suite 200
San Antonio, Tx. 78240
(210) 448-1800
FIRM # F-6825

Texas Department of Transportation

FM 512

ROADWAY PLAN LAYOUT

SHEET 1 OF 27

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	51
CONTROL	SECTION	JOB	
0579	02	014	

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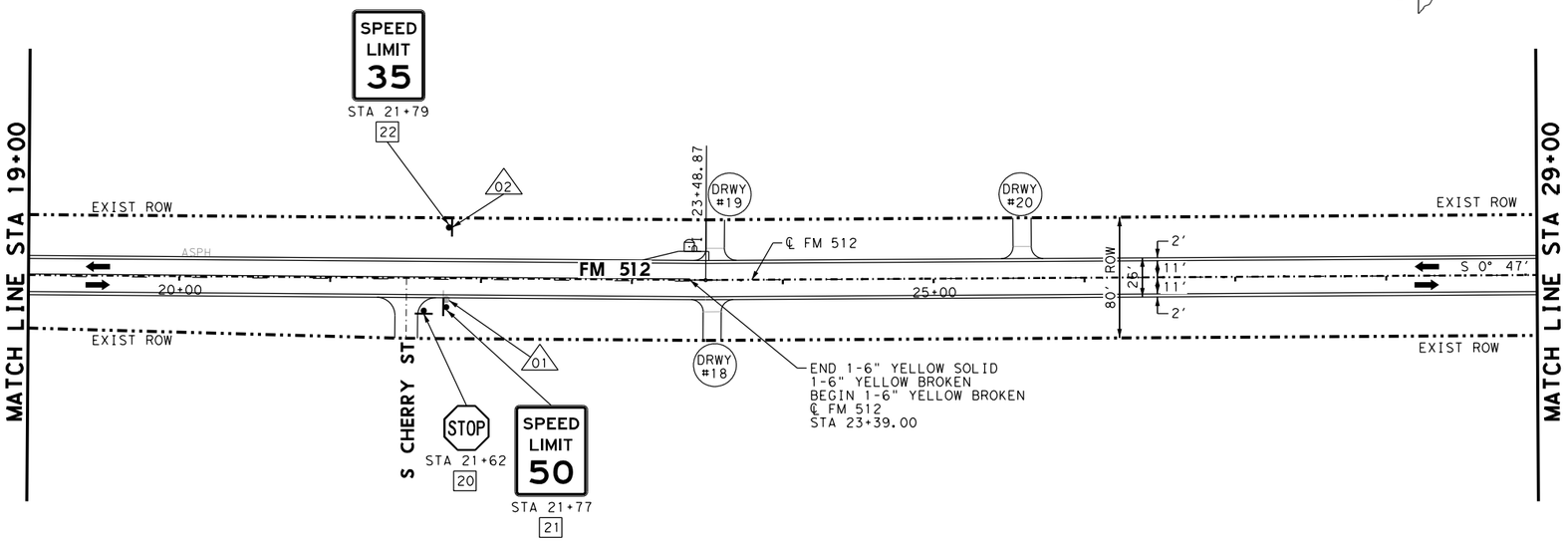
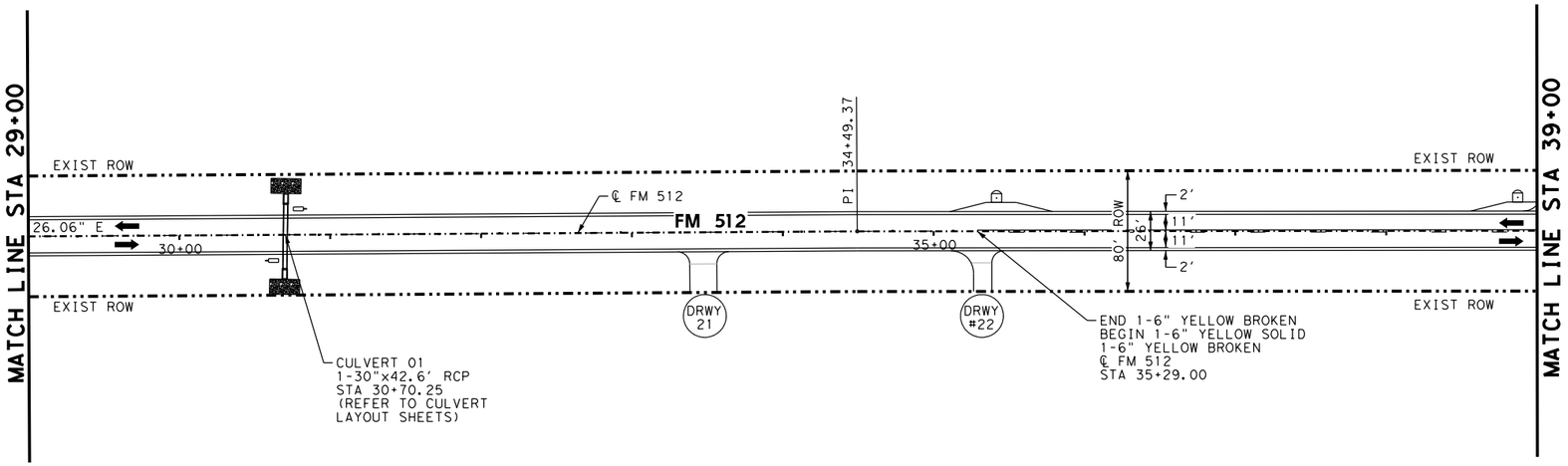
100%
SUBMITTAL





LEGEND

- XX — PROPOSED SMALL SIGN ASSEM & NUMBER
- XX — EXIST SMALL SIGN ASSEM TO BE REMOVED
- DIRECTION OF TRAFFIC FLOW
- DRWY #XX — DRIVEWAY NUMBER
- MAIL BOX
- PLANE ASPH (0"-1.5")

NOTES:

1. HORIZONTAL ALIGNMENT DATA IS FOR INFORMATION ONLY. MATCH EXISTING ROADWAY.
2. FOR DRIVEWAY DETAIL REFER TO DRIVEWAY SUMMARY SHEET.

0 25 50 100
SCALE: 1"=100'

STATE OF TEXAS
PAUL A. WARDEN
101319
LICENSED
PROFESSIONAL ENGINEER

Paul A. Warden, P.E. 5/24/2023

IDCUS PLANNERS ENGINEERS MANAGERS
8632 Fredericksburg Rd.
Suite 200
San Antonio, Tx. 78240
(210) 448-1800
FIRM # F-6825

Texas Department of Transportation

FM 512

ROADWAY PLAN LAYOUT

SHEET 2 OF 27

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	52
CONTROL	SECTION	JOB	
0579	02	014	

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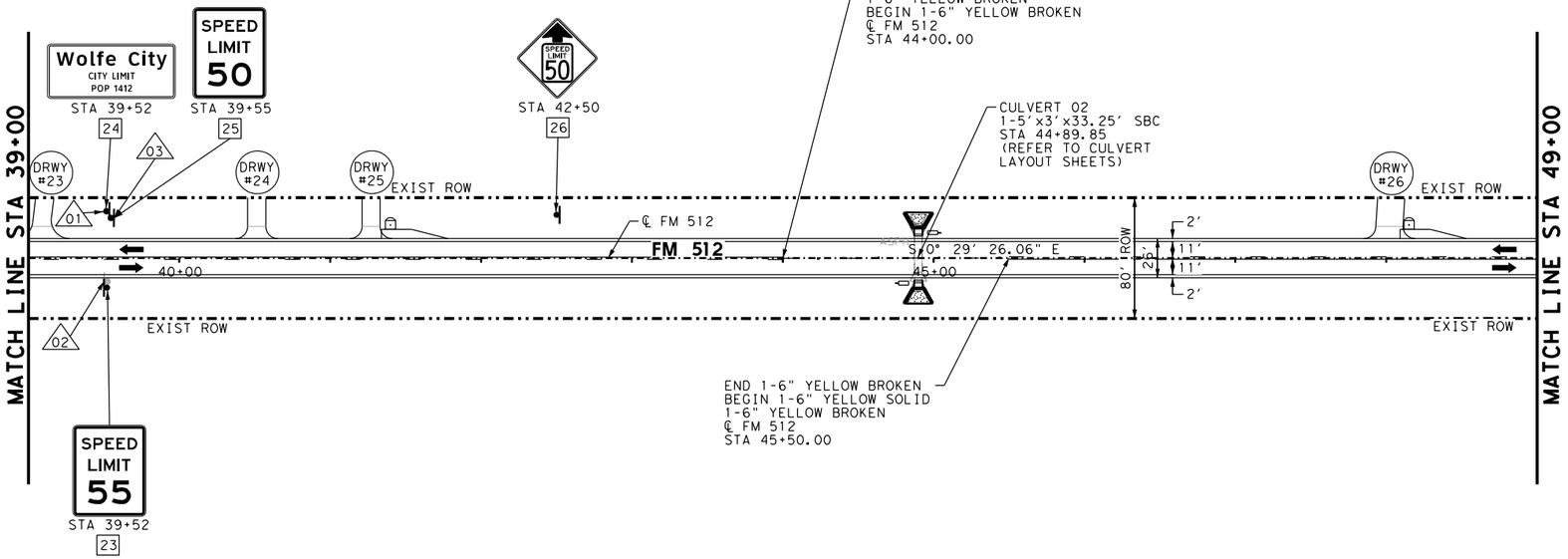

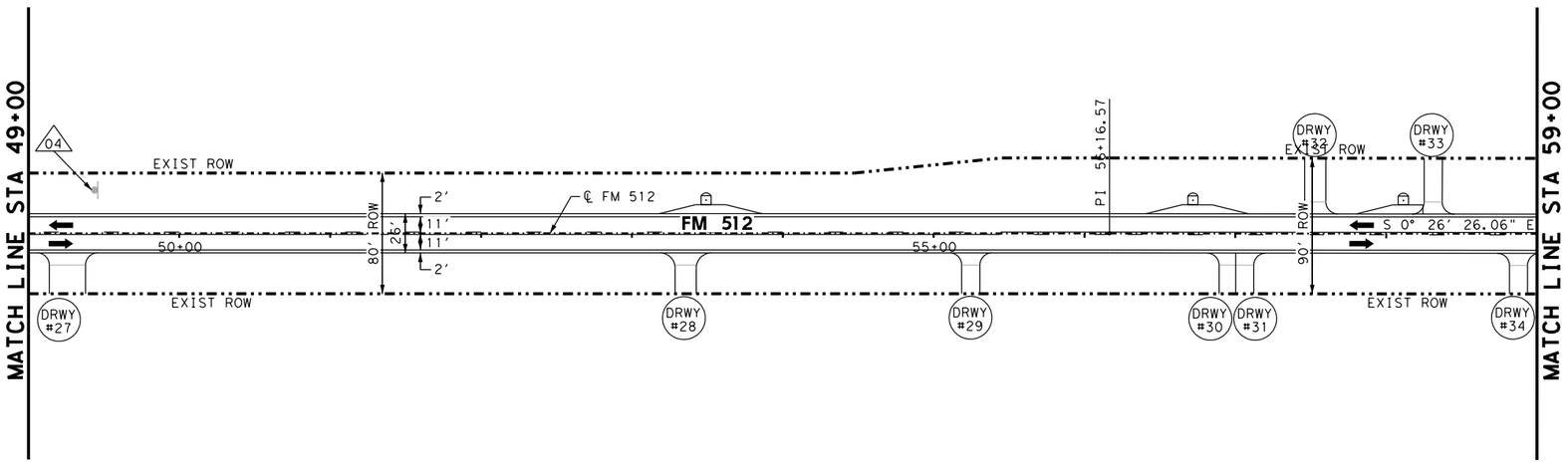

LEGEND

- XX — PROPOSED SMALL SIGN ASSEM & NUMBER
- XX — EXIST SMALL SIGN ASSEM TO BE REMOVED
- DIRECTION OF TRAFFIC FLOW
- DRWY #XX — DRIVEWAY NUMBER
- MAIL BOX
- PLANE ASPH (0"-1.5")

NOTES:

1. HORIZONTAL ALIGNMENT DATA IS FOR INFORMATION ONLY. MATCH EXISTING ROADWAY.
2. FOR DRIVEWAY DETAIL REFER TO DRIVEWAY SUMMARY SHEET.

0 25 50 100
SCALE: 1"=100'

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FM 512

ROADWAY PLAN LAYOUT

SHEET 3 OF 27

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	53
CONTROL	SECTION	JOB	
0579	02	014	

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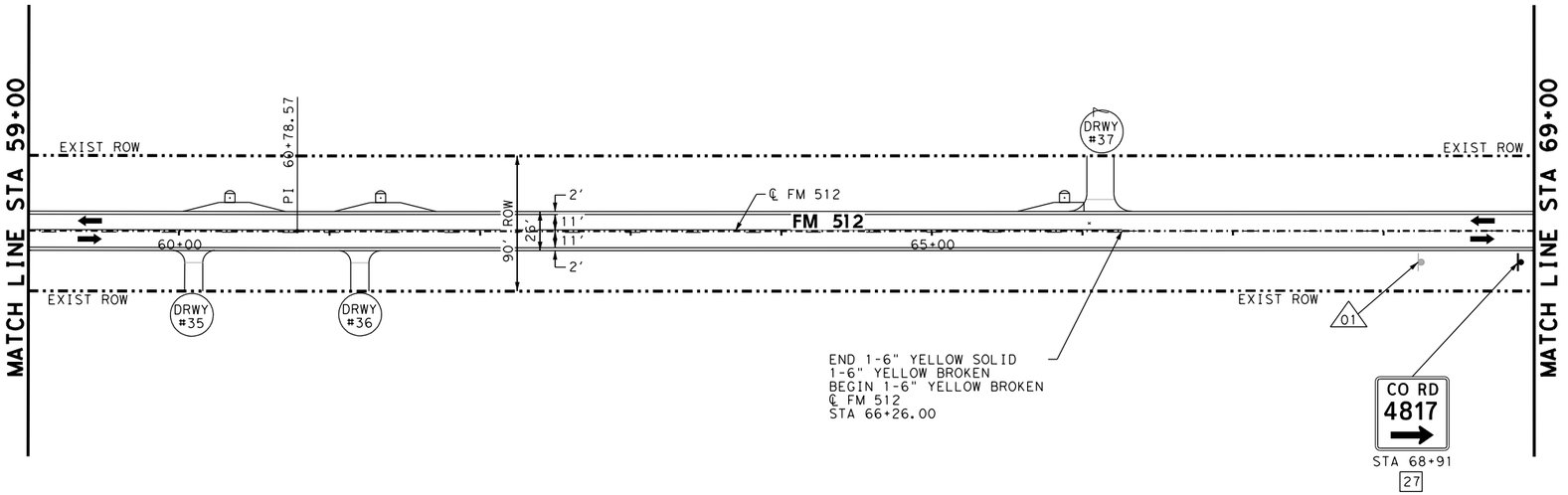

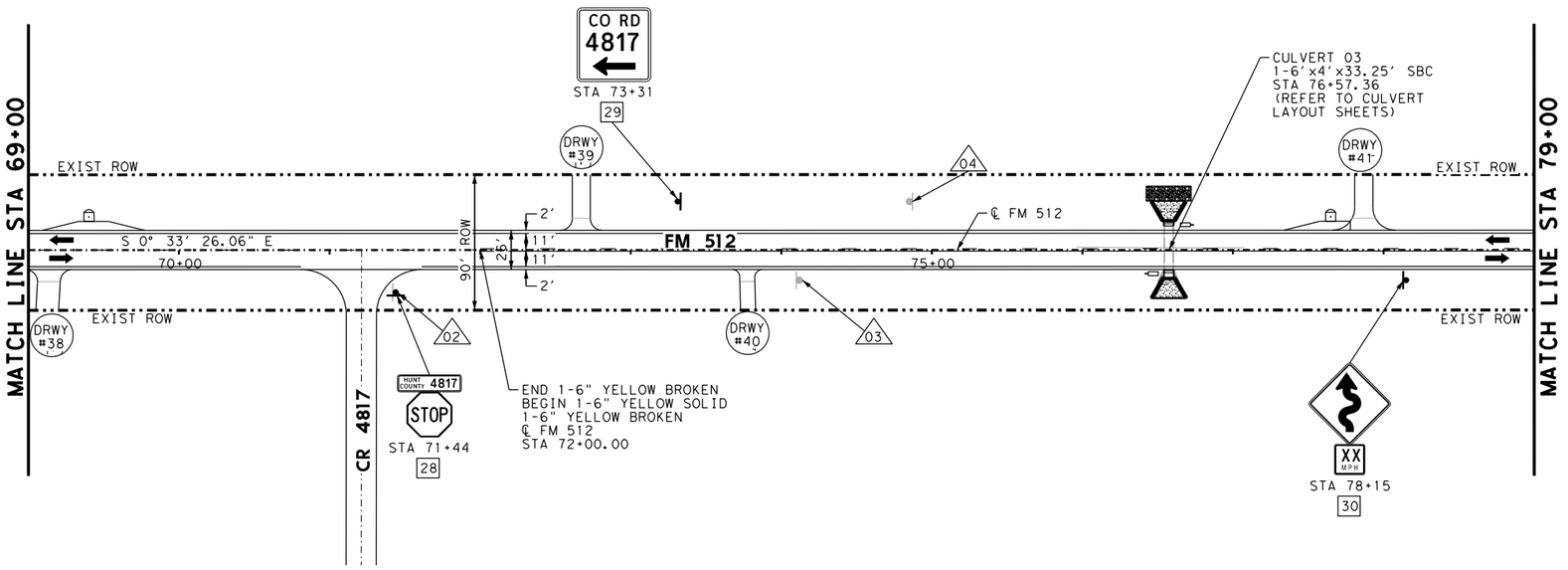

LEGEND

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- XX — EXIST SMALL SIGN ASSEM TO BE REMOVED
- DIRECTION OF TRAFFIC FLOW
- DRWY #XX — DRIVEWAY NUMBER
- MAIL BOX
- PLANE ASPH (0"-1.5")

NOTES:

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0 25 50 100
SCALE: 1"=100'

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Texas Department of Transportation

FM 512

ROADWAY PLAN LAYOUT

SHEET 4 OF 27

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	54
CONTROL	SECTION	JOB	
0579	02	014	

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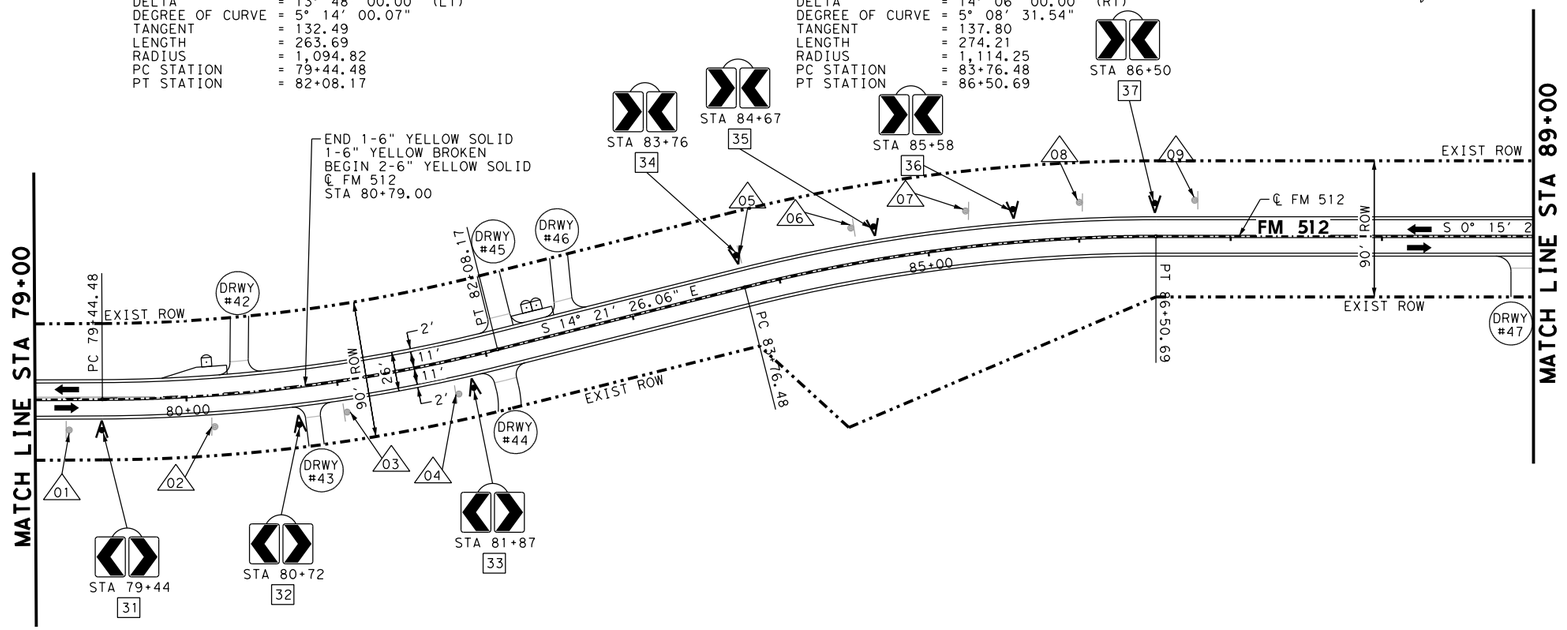

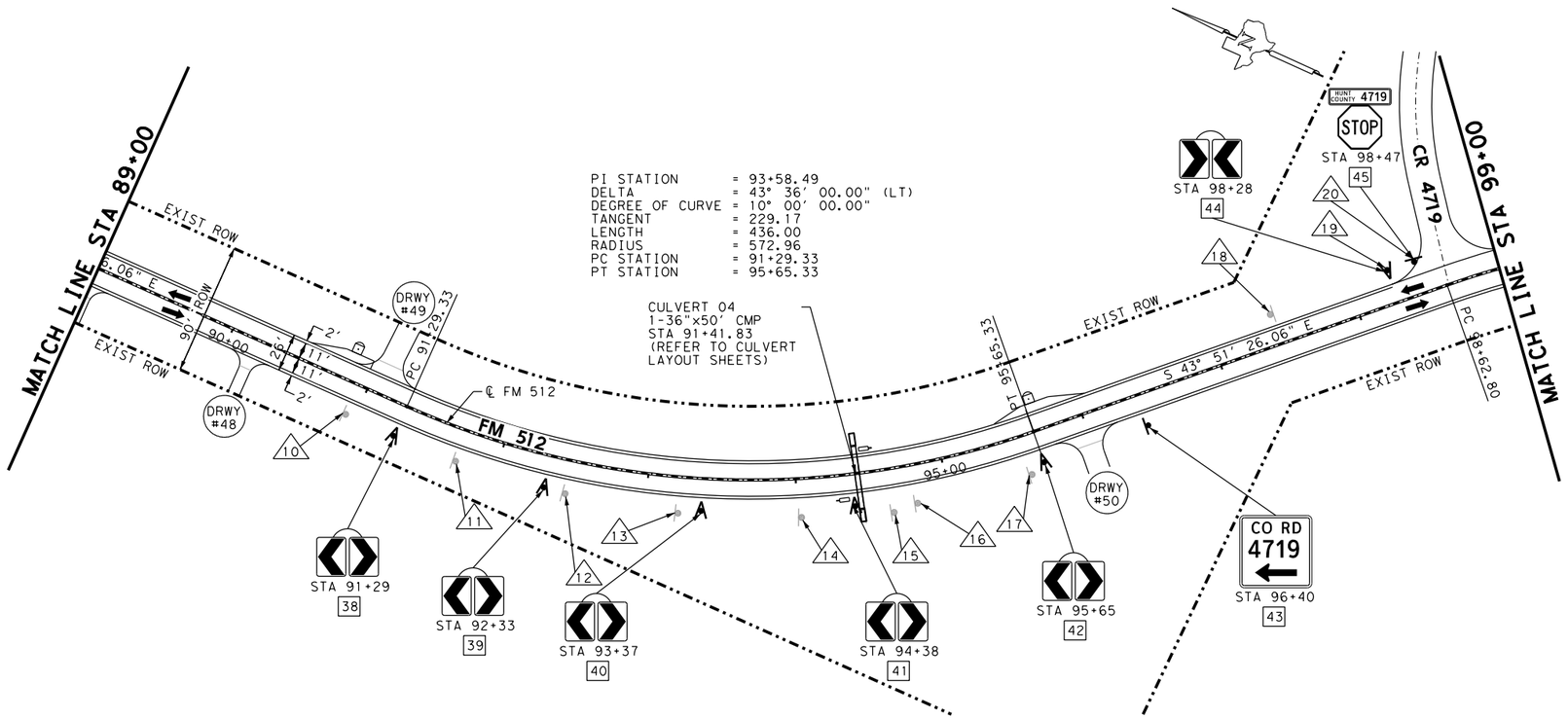

LEGEND

- XX — PROPOSED SMALL SIGN ASSEM & NUMBER
- XX — EXIST SMALL SIGN ASSEM TO BE REMOVED
- DIRECTION OF TRAFFIC FLOW
- DRWY #XX — DRIVEWAY NUMBER
- MAIL BOX
- PLANE ASPH (0"-1.5")

NOTES:

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FM 512

ROADWAY PLAN LAYOUT

SHEET 5 OF 27

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	55
CONTROL	SECTION	JOB	
0579	02	014	

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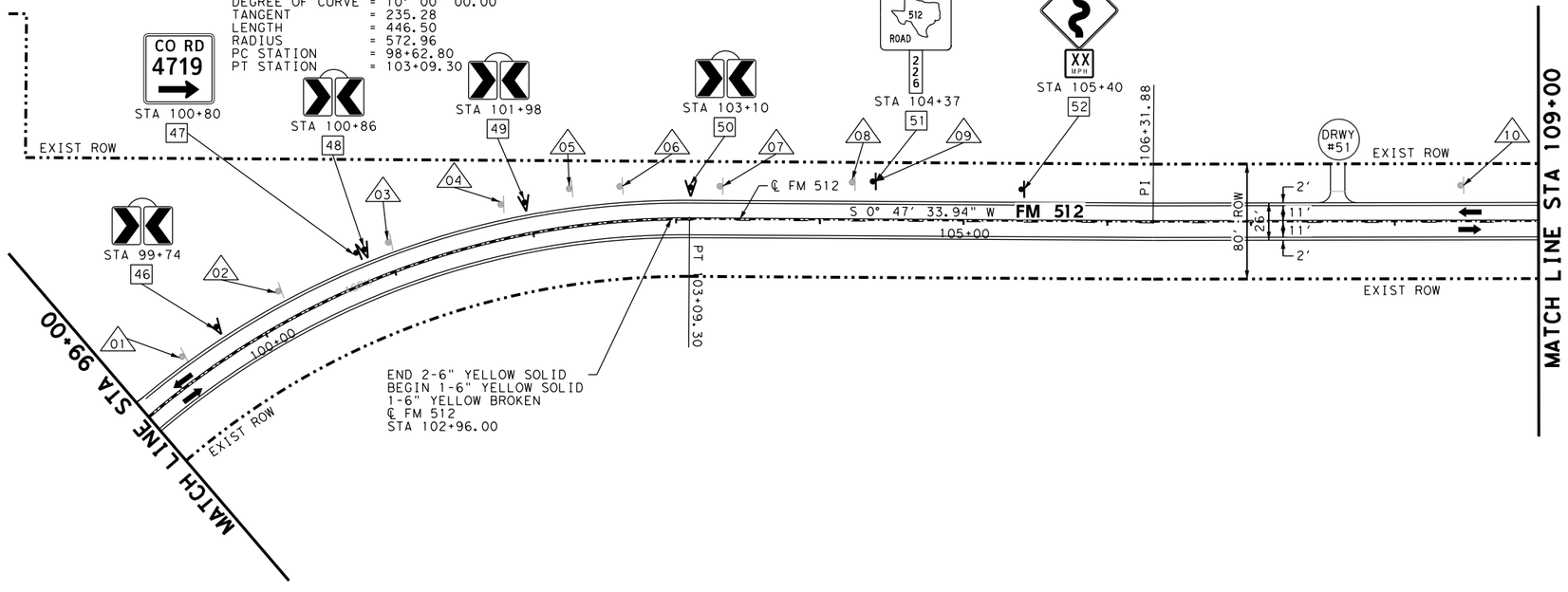

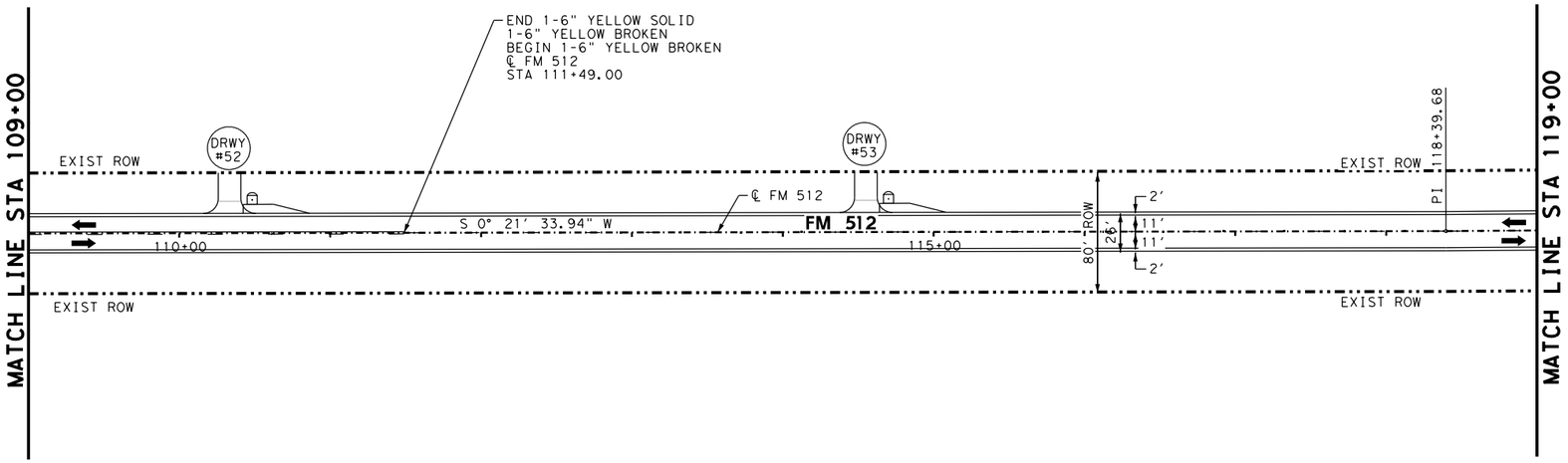

LEGEND

- XX — PROPOSED SMALL SIGN ASSEM & NUMBER
- XX — EXIST SMALL SIGN ASSEM TO BE REMOVED
- DIRECTION OF TRAFFIC FLOW
- DRWY #XX — DRIVEWAY NUMBER
- MAIL BOX
- PLANE ASPH (0"-1.5")

NOTES:

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0 25 50 100
SCALE: 1"=100'

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FM 512

ROADWAY PLAN LAYOUT

SHEET 6 OF 27

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	56
CONTROL	SECTION	JOB	
0579	02	014	

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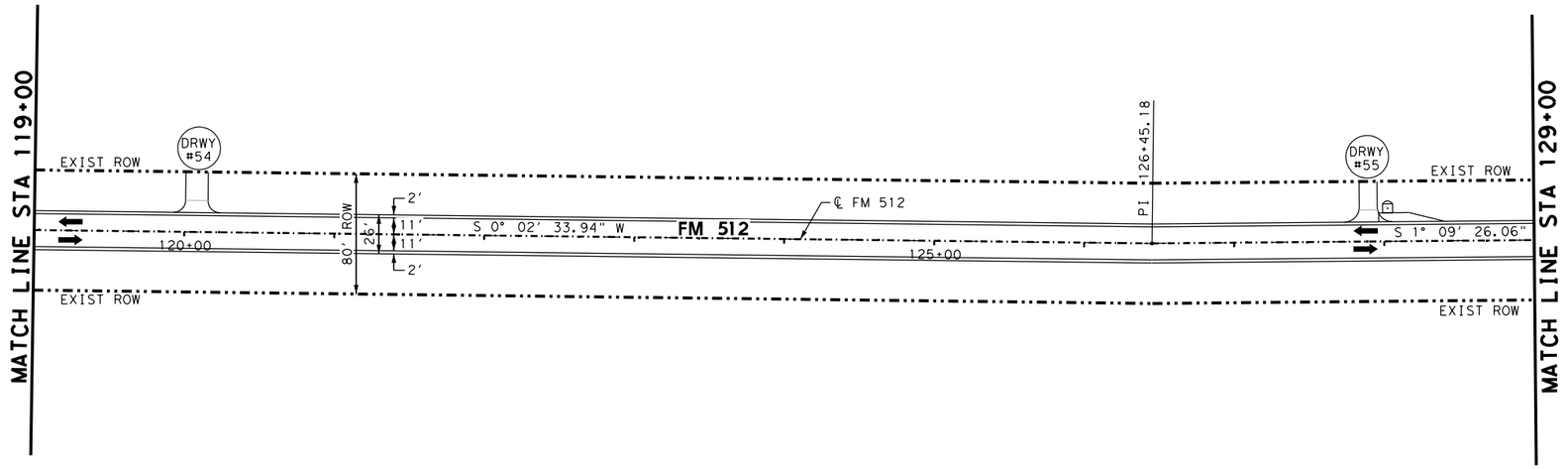

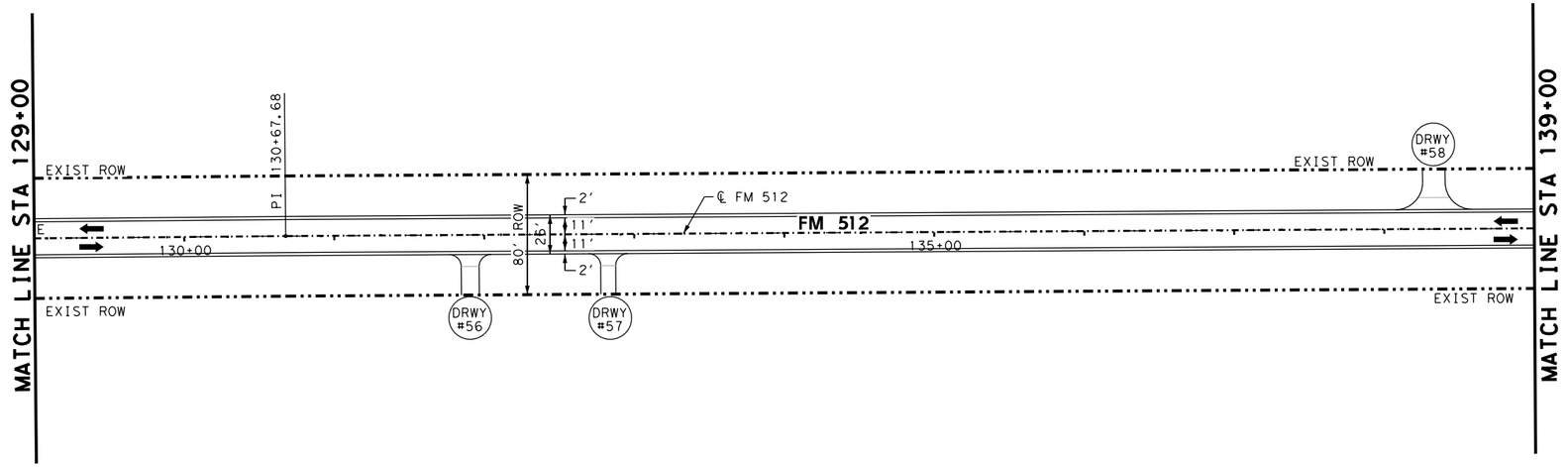

LEGEND

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- XX — EXIST SMALL SIGN ASSEM TO BE REMOVED
- DIRECTION OF TRAFFIC FLOW
- DRWY #XX — DRIVEWAY NUMBER
- MAIL BOX
- PLANE ASPH (0"-1.5")

NOTES:

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0 25 50 100
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ROADWAY PLAN LAYOUT

SHEET 7 OF 27

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	57
CONTROL	SECTION	JOB	
0579	02	014	

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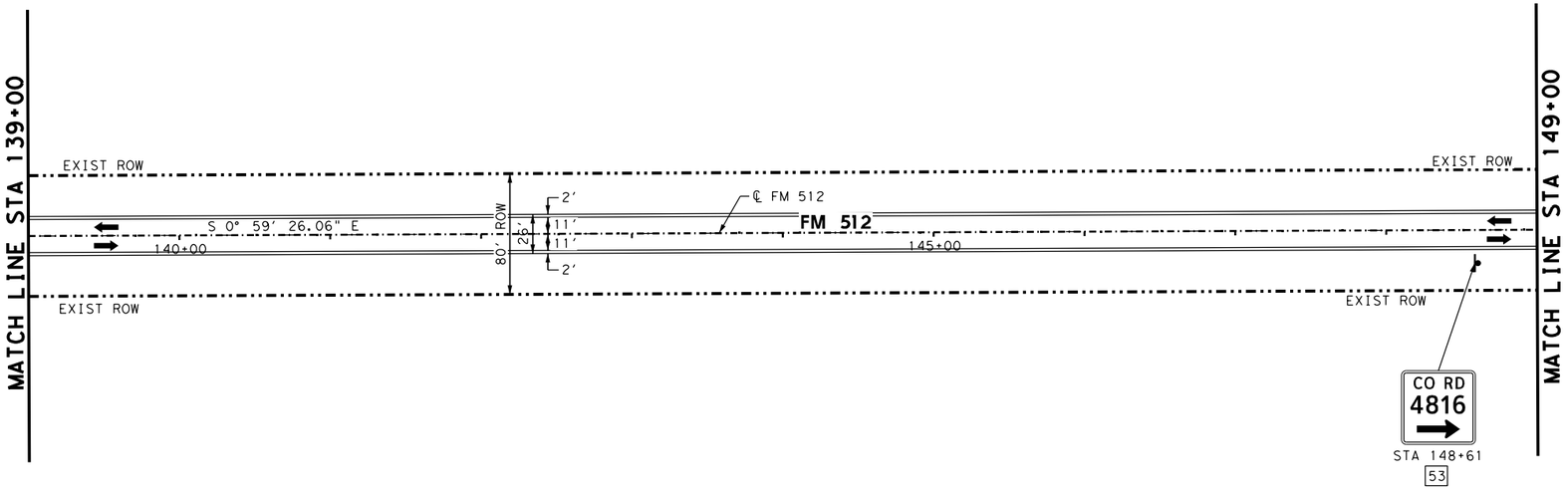

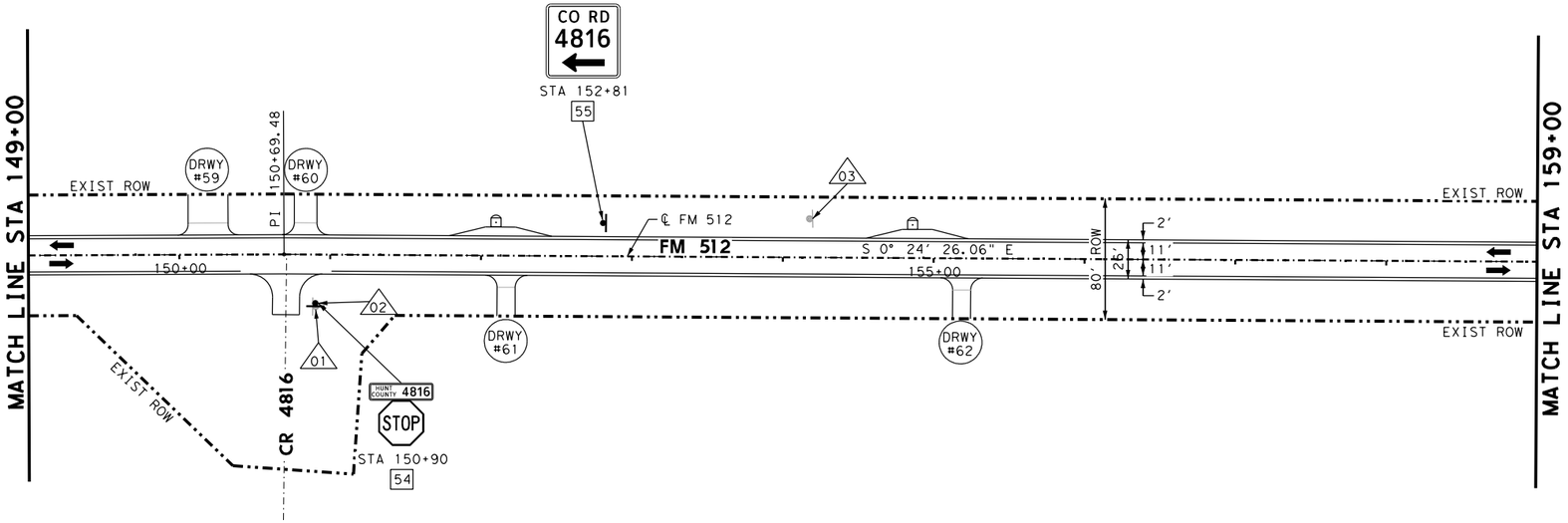

LEGEND

- XX — PROPOSED SMALL SIGN ASSEM & NUMBER
- XX — EXIST SMALL SIGN ASSEM TO BE REMOVED
- DIRECTION OF TRAFFIC FLOW
- DRWY #XX — DRIVEWAY NUMBER
- MAIL BOX
- PLANE ASPH (0"-1.5")

NOTES:

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0 25 50 100
SCALE: 1"=100'

STATE OF TEXAS
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FM 512

ROADWAY PLAN LAYOUT

SHEET 8 OF 27

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	58
CONTROL	SECTION	JOB	
0579	02	014	

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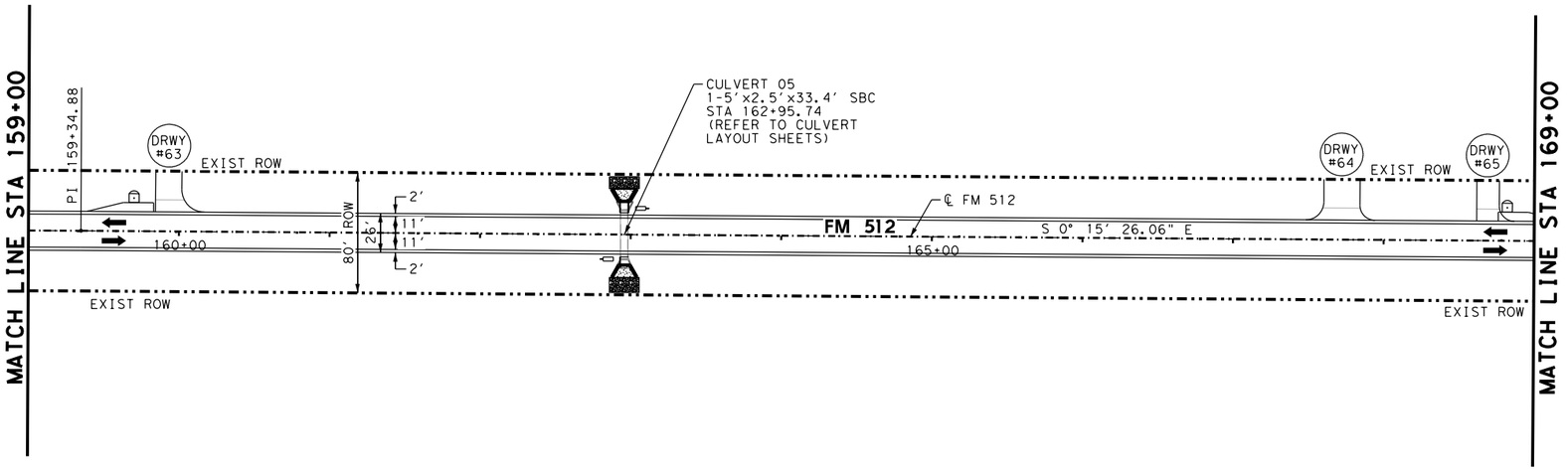

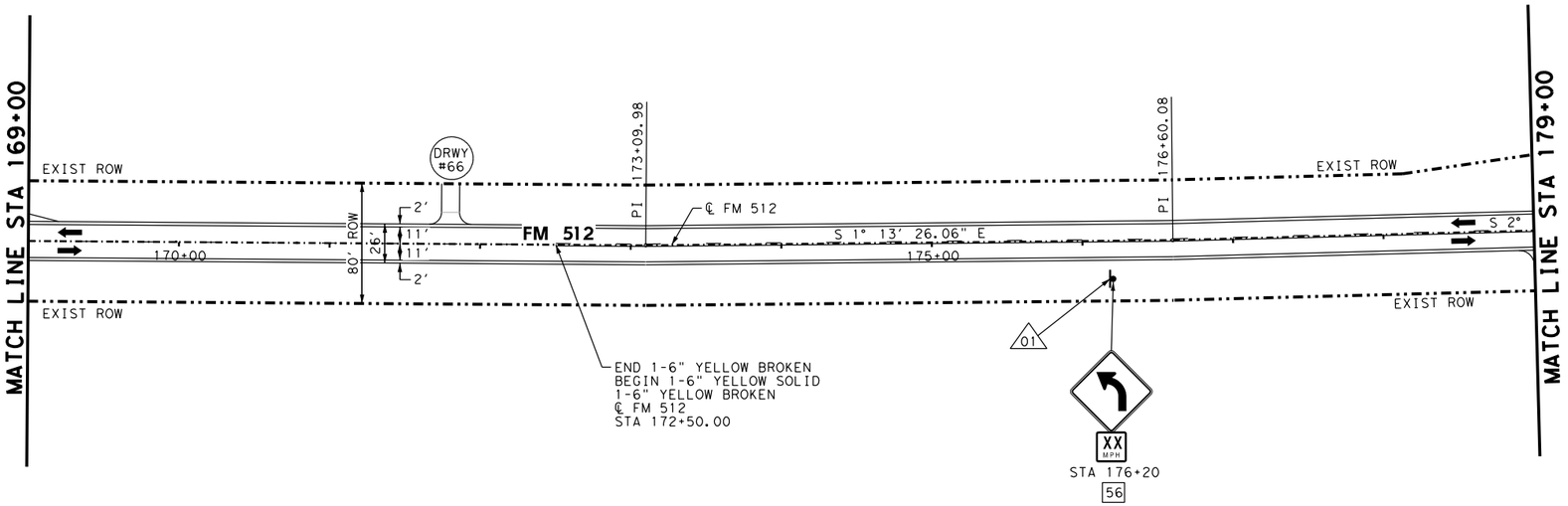

LEGEND

- XX — PROPOSED SMALL SIGN ASSEM & NUMBER
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- DIRECTION OF TRAFFIC FLOW
- DRWY #XX — DRIVEWAY NUMBER
- MAIL BOX
- PLANE ASPH (0"-1.5")

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0 25 50 100
SCALE: 1"=100'

STATE OF TEXAS
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Texas Department of Transportation

FM 512

ROADWAY PLAN LAYOUT

SHEET 9 OF 27

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	59
CONTROL	SECTION	JOB	
0579	02	014	

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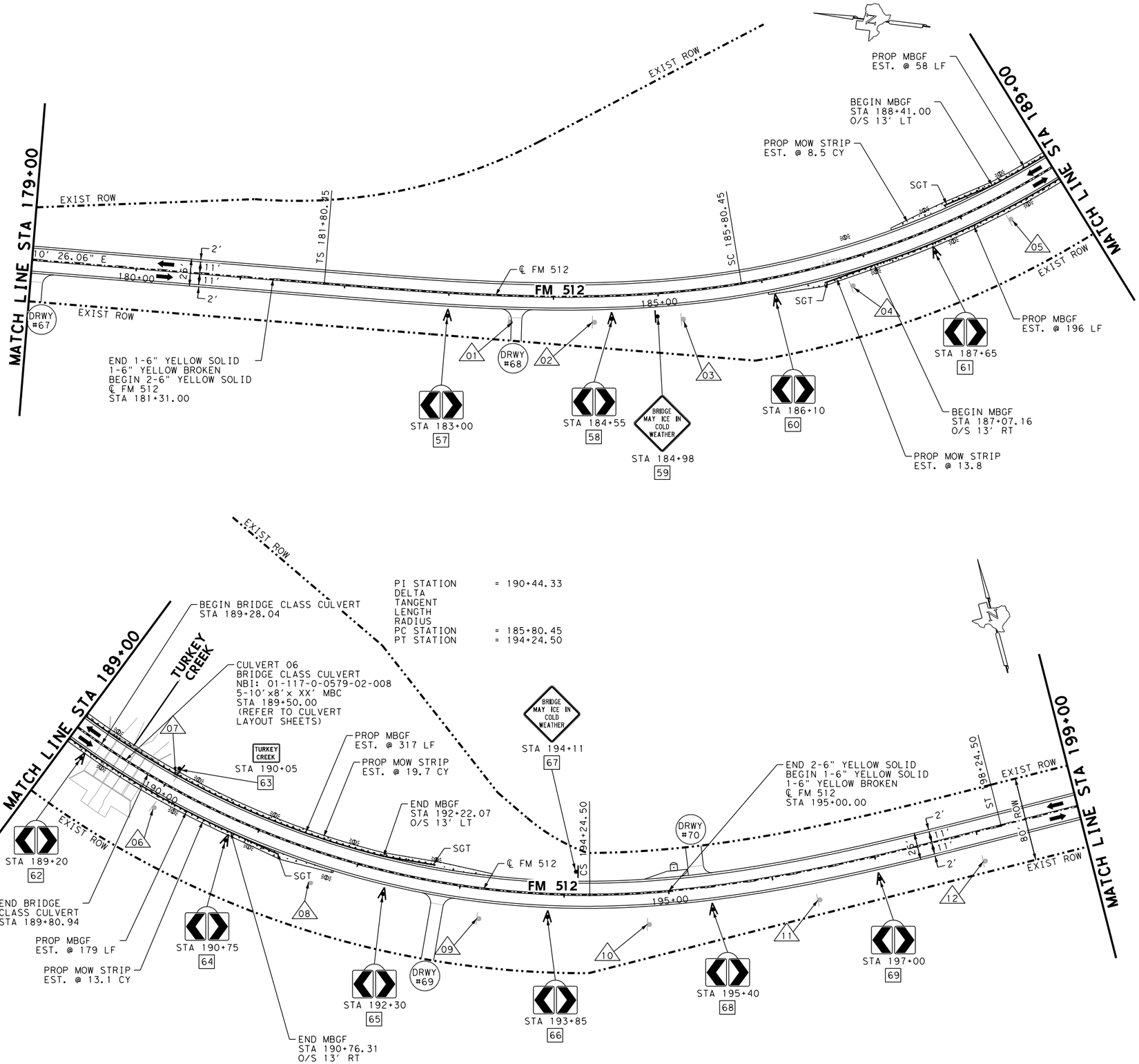

LEGEND

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- DRWY #XX — DRIVEWAY NUMBER
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- PLANE ASPH (0"-1.5")

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SCALE: 1"=100'

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FM 512

ROADWAY PLAN LAYOUT

SHEET 10 OF 27

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	60
CONTROL	SECTION	JOB	
0579	02	014	

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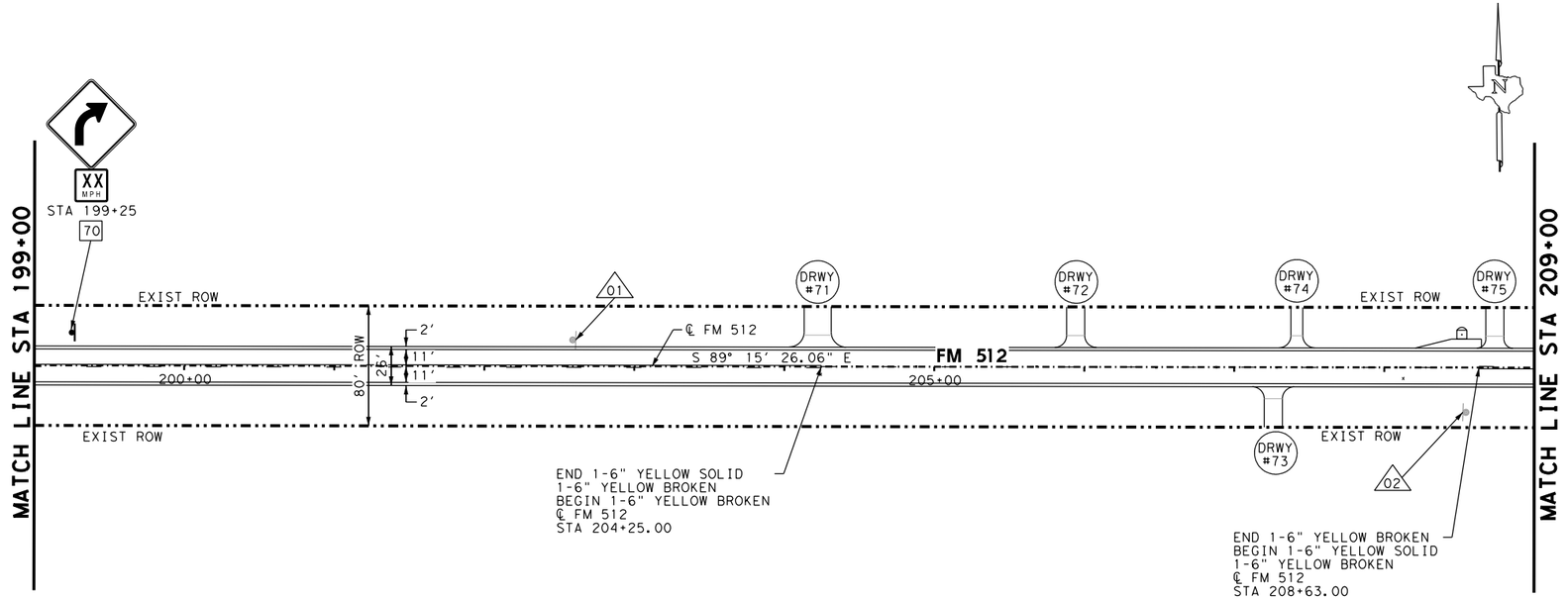

LEGEND

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- XX — EXIST SMALL SIGN ASSEM TO BE REMOVED
- DIRECTION OF TRAFFIC FLOW
- DRWY #XX — DRIVEWAY NUMBER
- MAIL BOX
- PLANE ASPH (0"-1.5")

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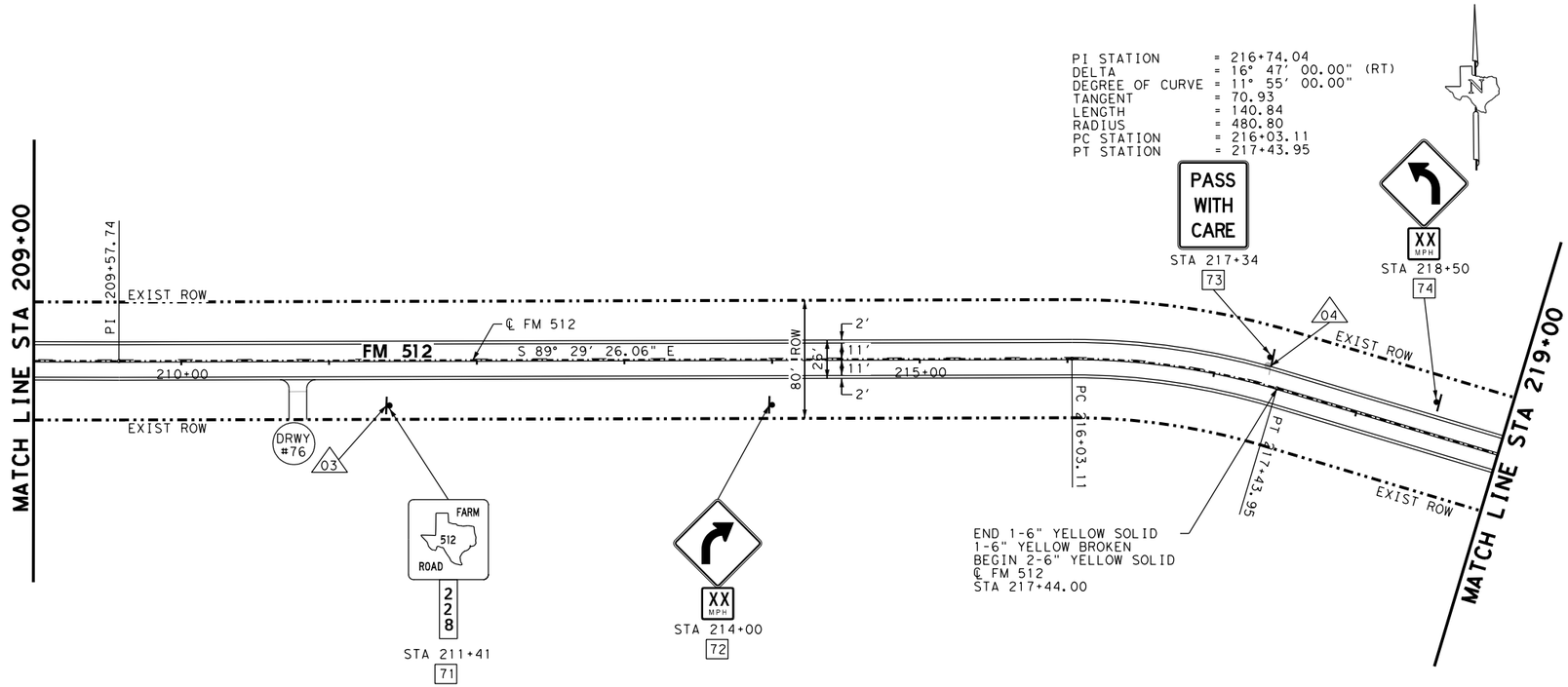

0 25 50 100
SCALE: 1"=100'

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FM 512

ROADWAY PLAN LAYOUT

SHEET 11 OF 27

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	61
CONTROL	SECTION	JOB	
0579	02	014	

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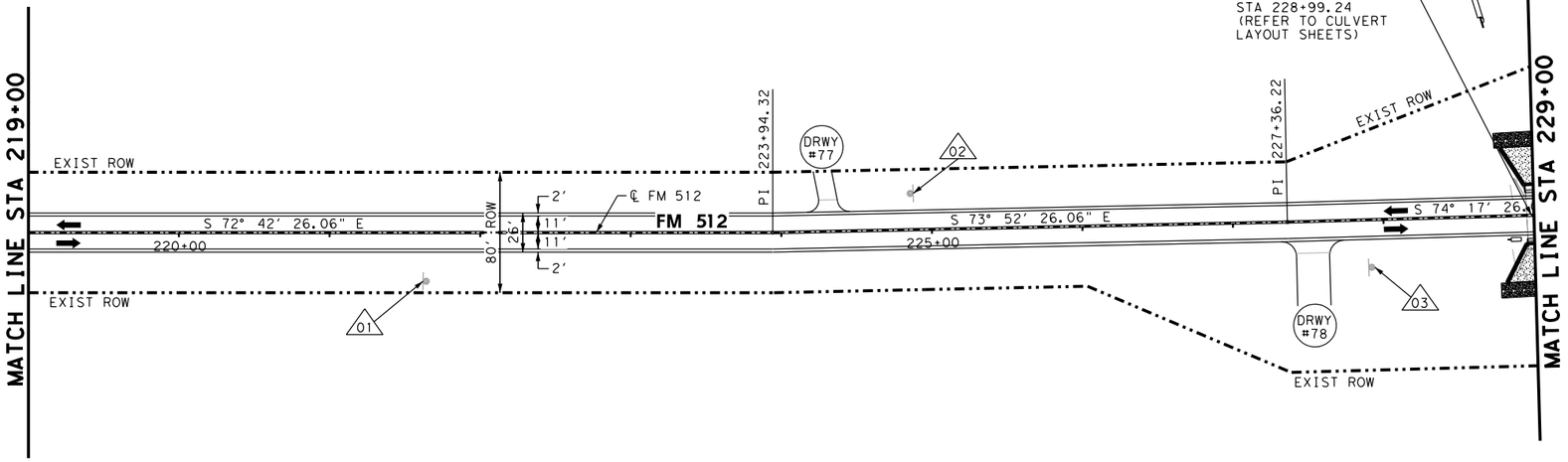

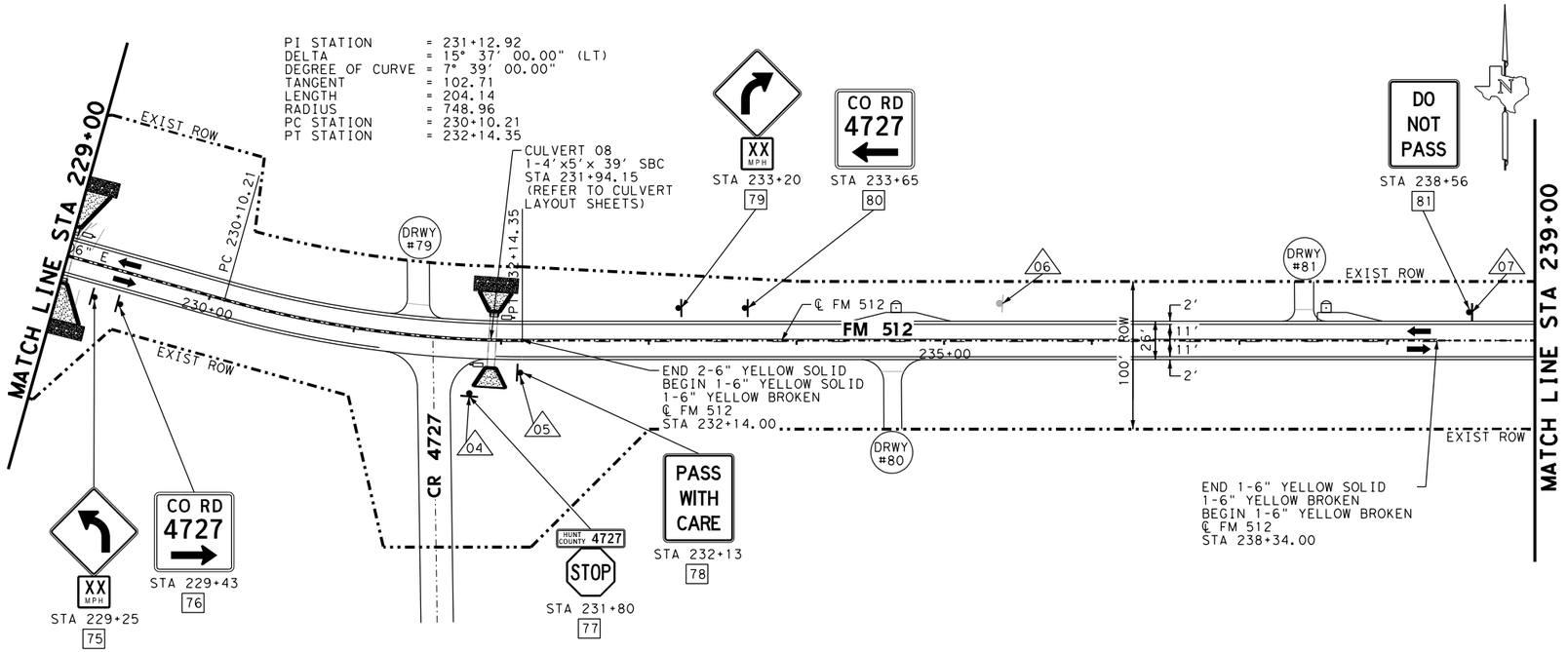

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SCALE: 1"=100'

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FM 512

ROADWAY PLAN LAYOUT

SHEET 12 OF 27

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	62
CONTROL	SECTION	JOB	
0579	02	014	

FM512_RD_PPM_12.dgn

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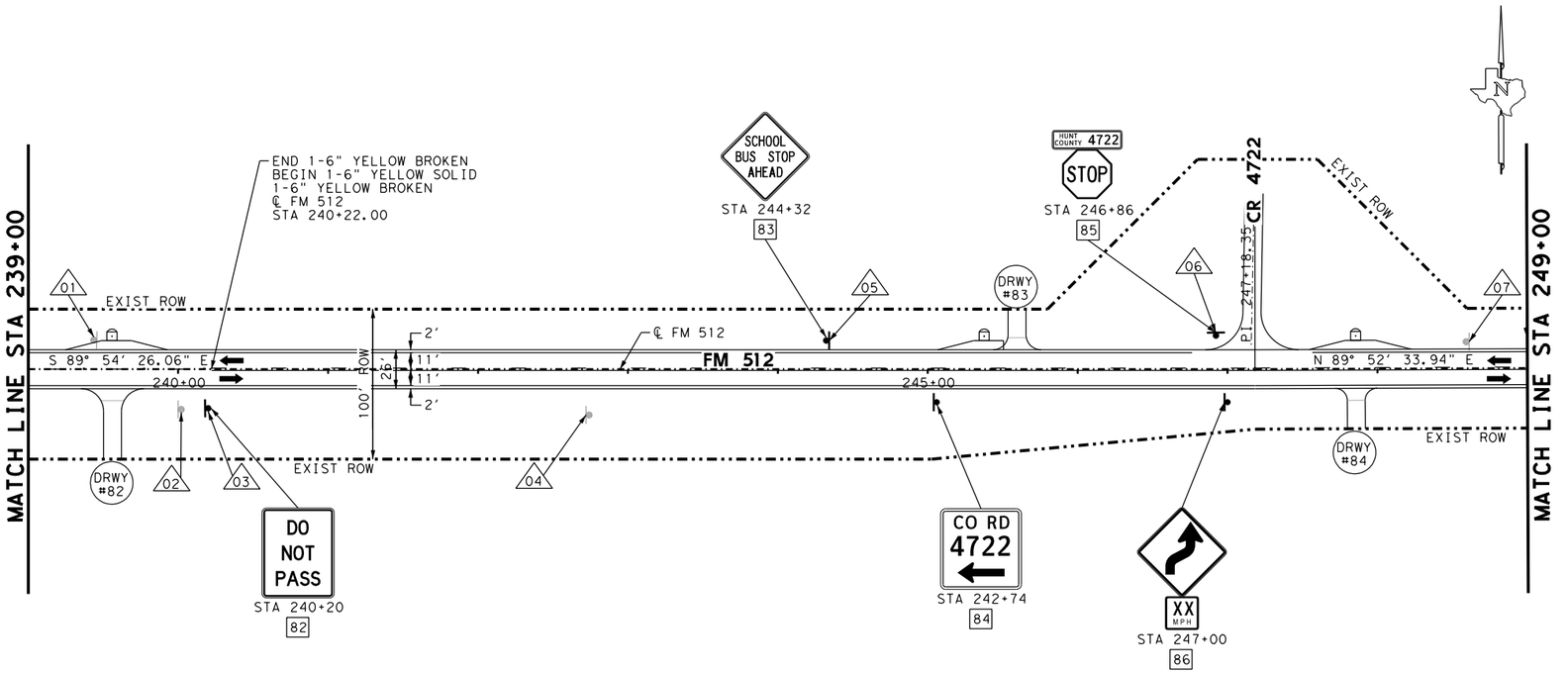

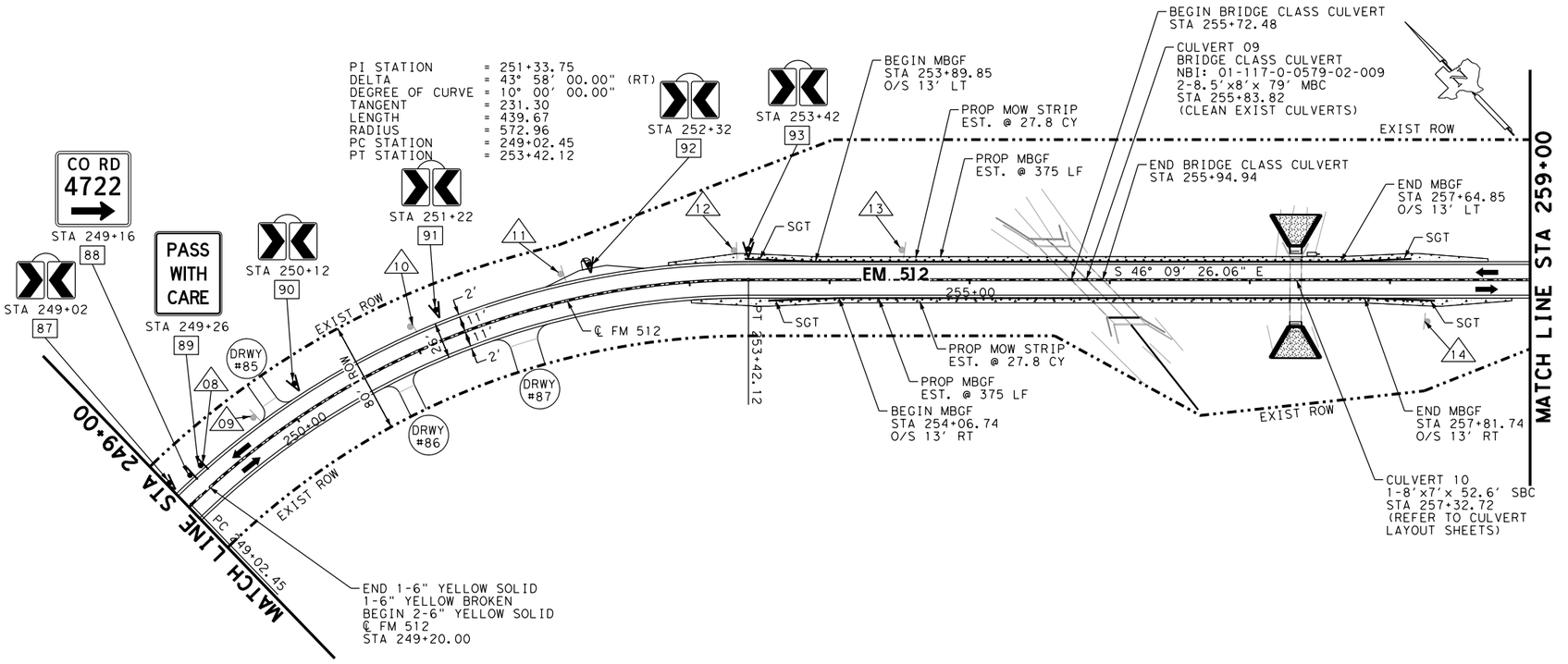

LEGEND

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- XX — EXIST SMALL SIGN ASSEM TO BE REMOVED
- DIRECTION OF TRAFFIC FLOW
- DRWY #XX — DRIVEWAY NUMBER
- MAIL BOX
- PLANE ASPH (0"-1.5")

NOTES:

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0 25 50 100
SCALE: 1"=100'

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FM 512

ROADWAY PLAN LAYOUT

SHEET 13 OF 27

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	63
CONTROL	SECTION	JOB	
0579	02	014	

FM512_RD_PPM_13.dgn

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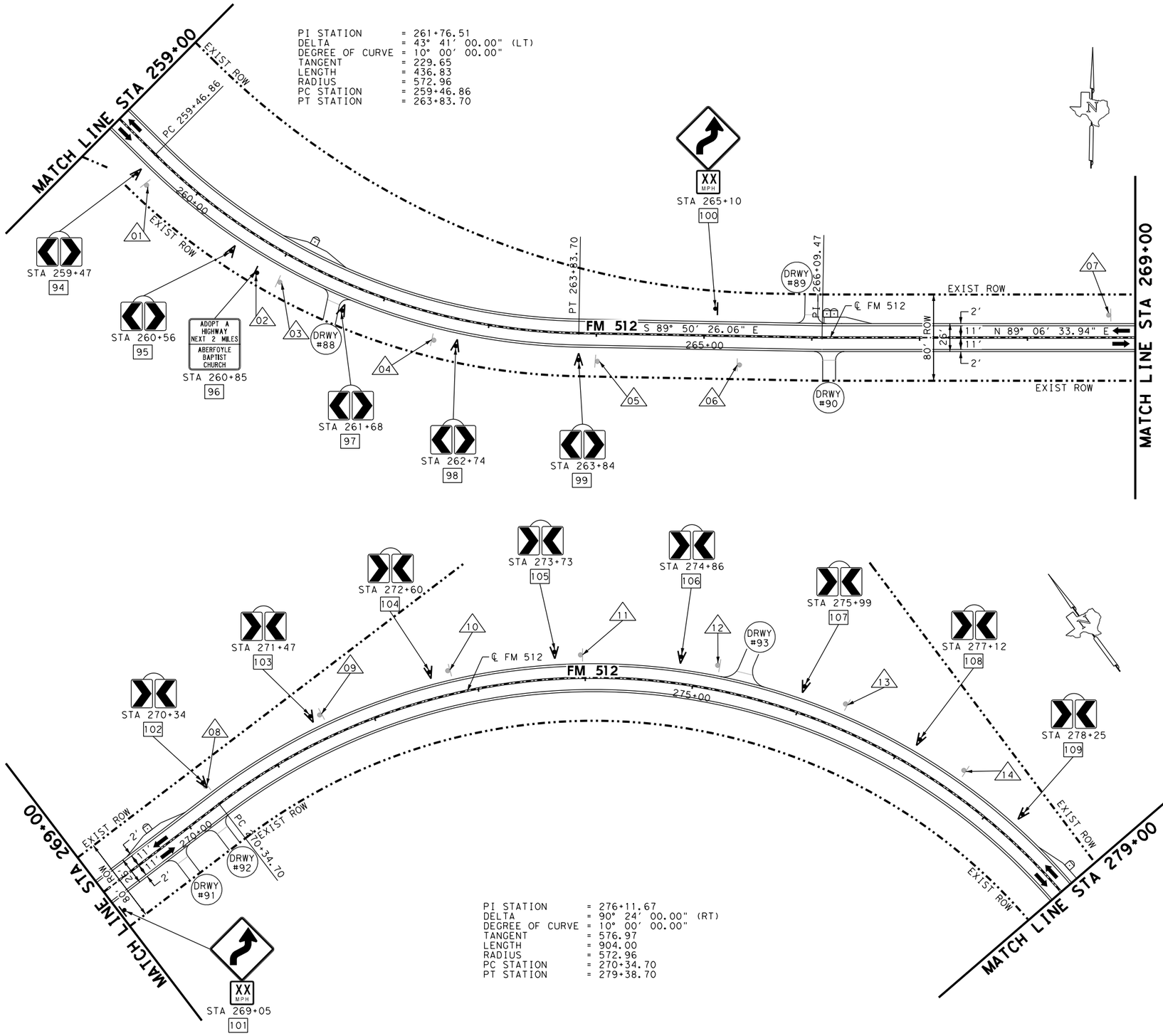

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- DIRECTION OF TRAFFIC FLOW
- DRWY #XX — DRIVEWAY NUMBER
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SCALE: 1"=100'

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PAUL A. WARDEN
101319
LICENSED
PROFESSIONAL ENGINEER

Paul A. Warden, P.E. 5/24/2023

IDCUS PLANNERS ENGINEERS MANAGERS
8632 Fredericksburg Rd.
Suite 200
San Antonio, Tx. 78240
(210) 448-1800
FIRM # F-6825

Texas Department of Transportation

FM 512

ROADWAY PLAN LAYOUT

SHEET 14 OF 27

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	64
CONTROL	SECTION	JOB	
0579	02	014	

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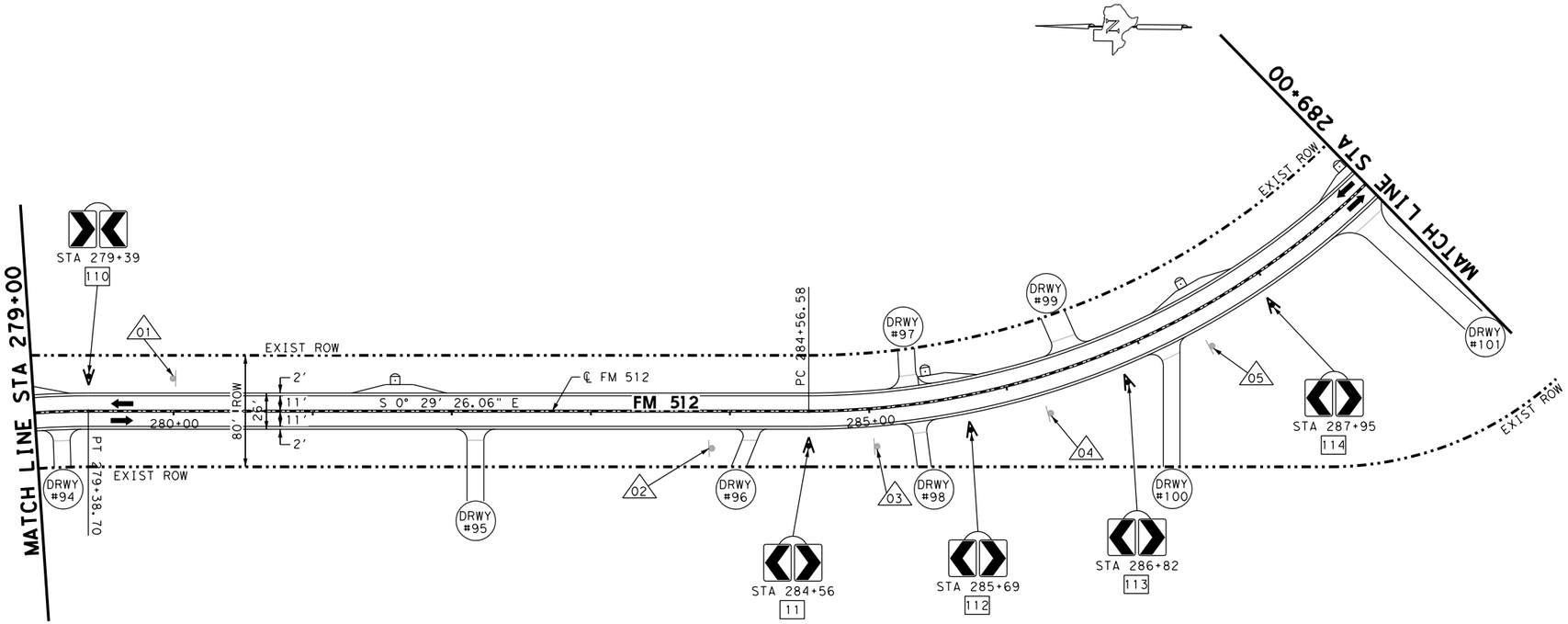

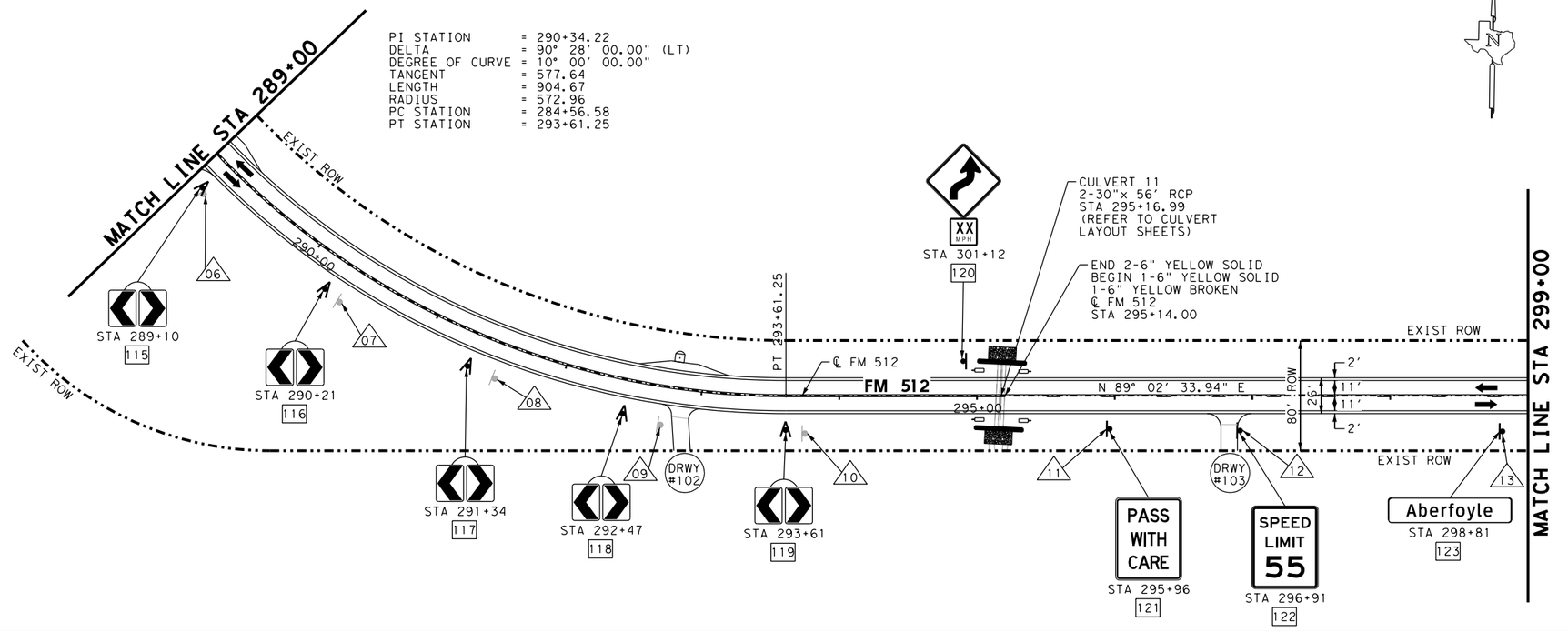

LEGEND

- XX — PROPOSED SMALL SIGN ASSEM & NUMBER
- XX — EXIST SMALL SIGN ASSEM TO BE REMOVED
- DIRECTION OF TRAFFIC FLOW
- DRWY #XX — DRIVEWAY NUMBER
- MAIL BOX
- PLANE ASPH (0"-1.5")

NOTES:

1. HORIZONTAL ALIGNMENT DATA IS FOR INFORMATION ONLY. MATCH EXISTING ROADWAY.
2. FOR DRIVEWAY DETAIL REFER TO DRIVEWAY SUMMARY SHEET.

0 25 50 100
SCALE: 1"=100'

STATE OF TEXAS
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FM 512

ROADWAY PLAN LAYOUT

SHEET 15 OF 27

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	65
CONTROL	SECTION	JOB	
0579	02	014	

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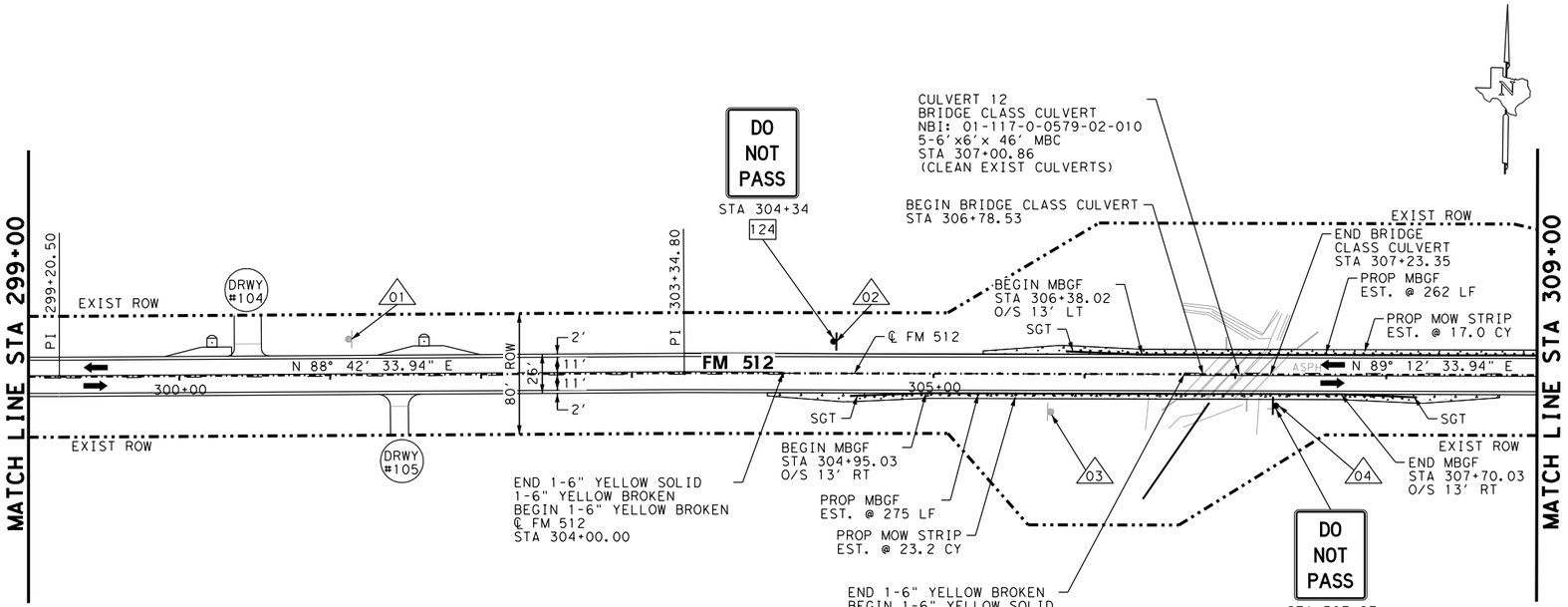

LEGEND

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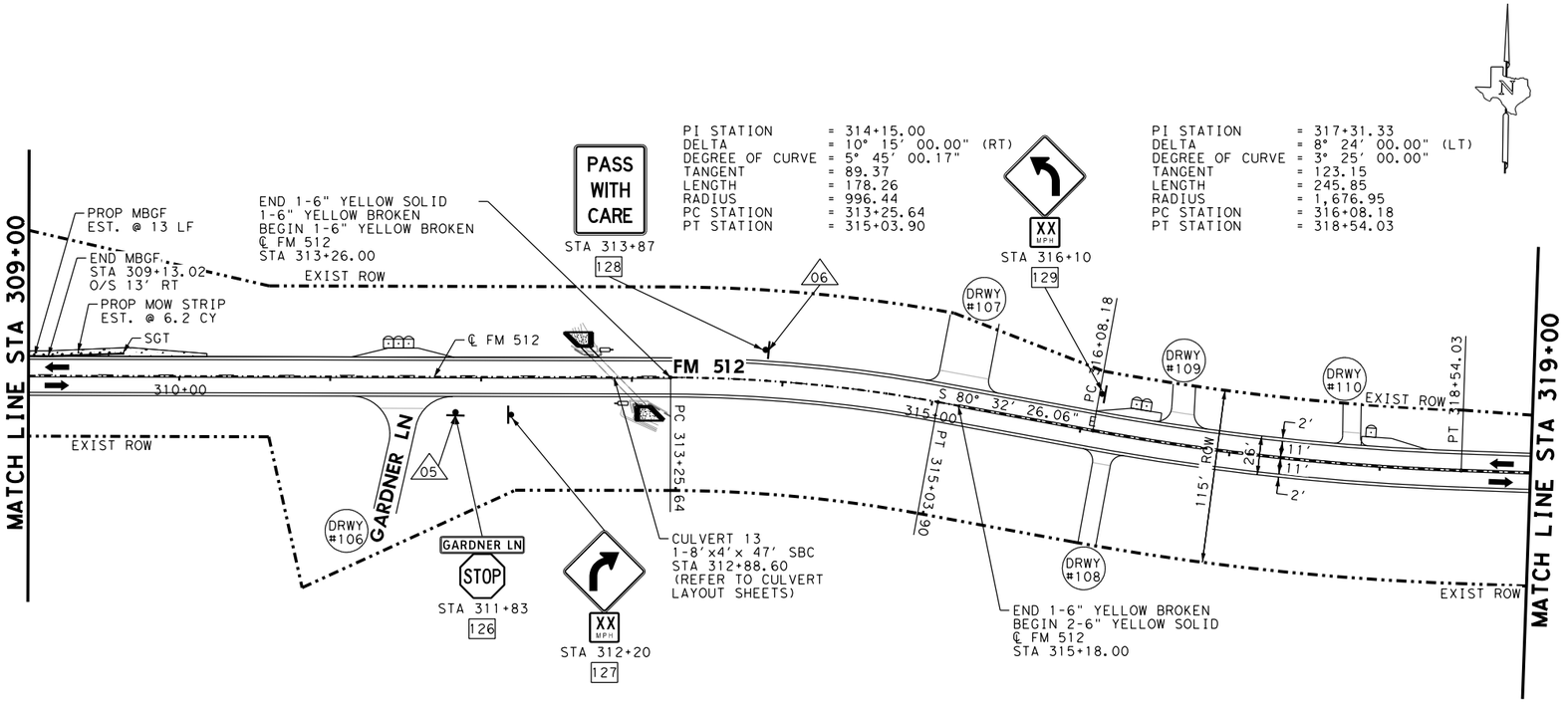

0 25 50 100
SCALE: 1"=100'

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FM 512

ROADWAY PLAN LAYOUT

SHEET 16 OF 27

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	66
CONTROL	SECTION	JOB	
0579	02	014	

FM512_RD_PPM_16.dgn

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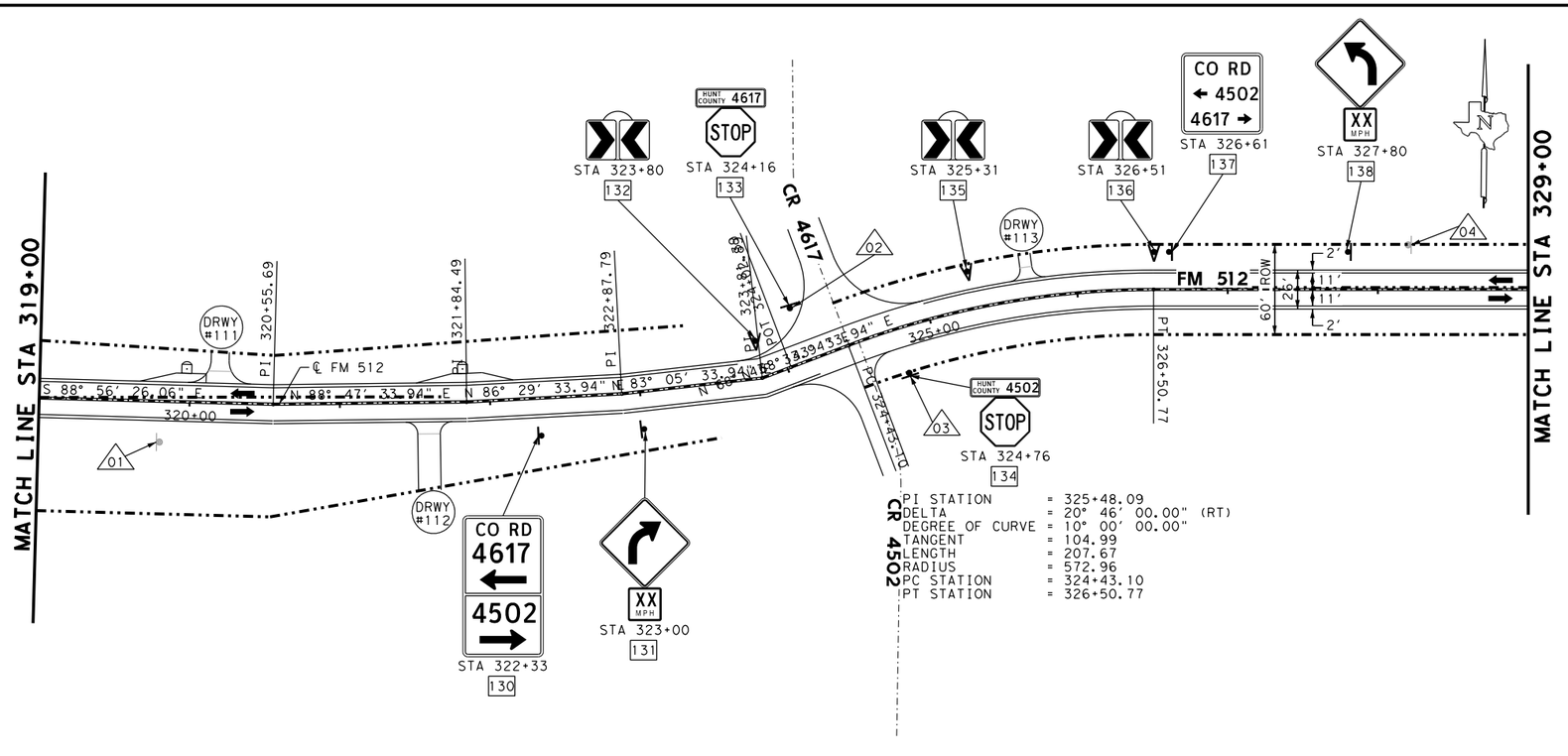
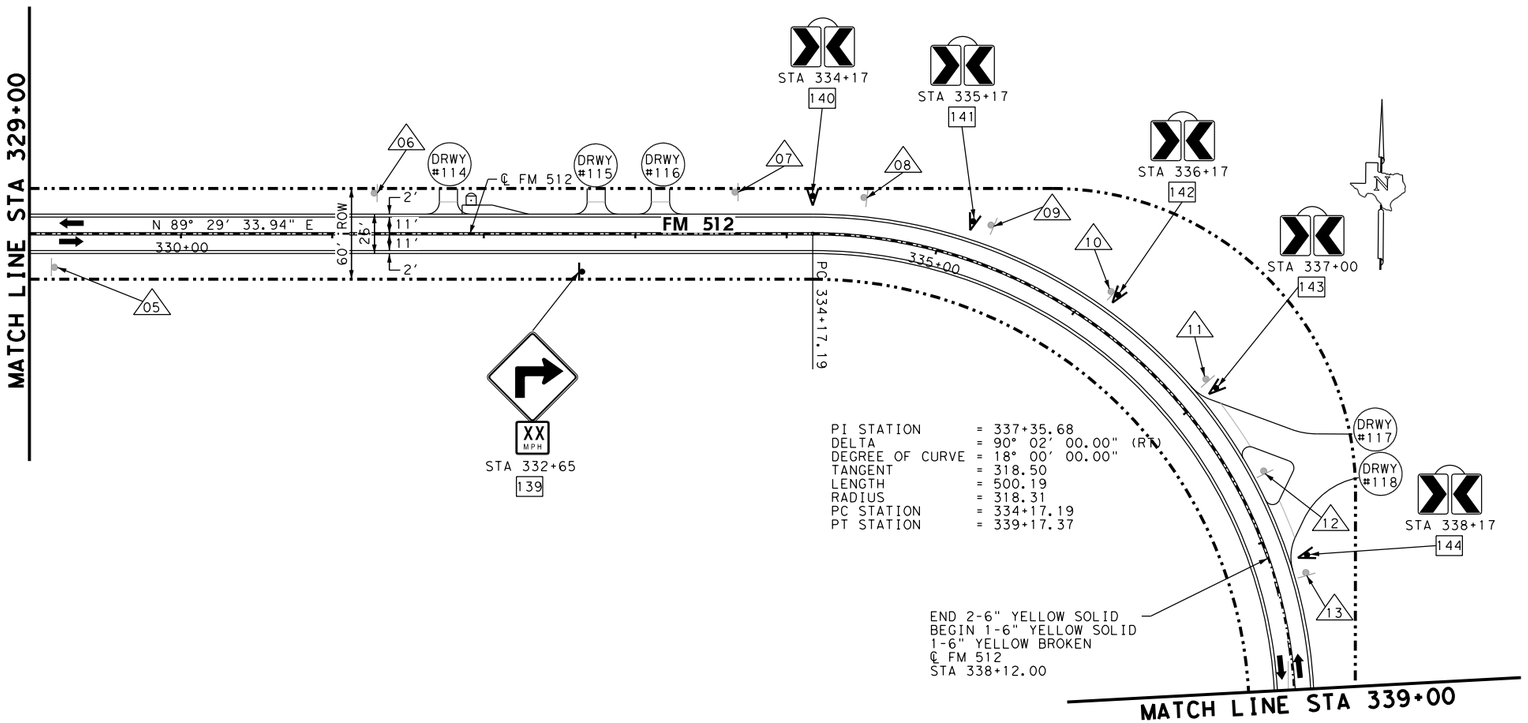
SUBMITTAL





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FM 512

ROADWAY PLAN LAYOUT

SHEET 17 OF 27

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	67
CONTROL	SECTION	JOB	
0579	02	014	

5/24/2023 6:20:17 PM
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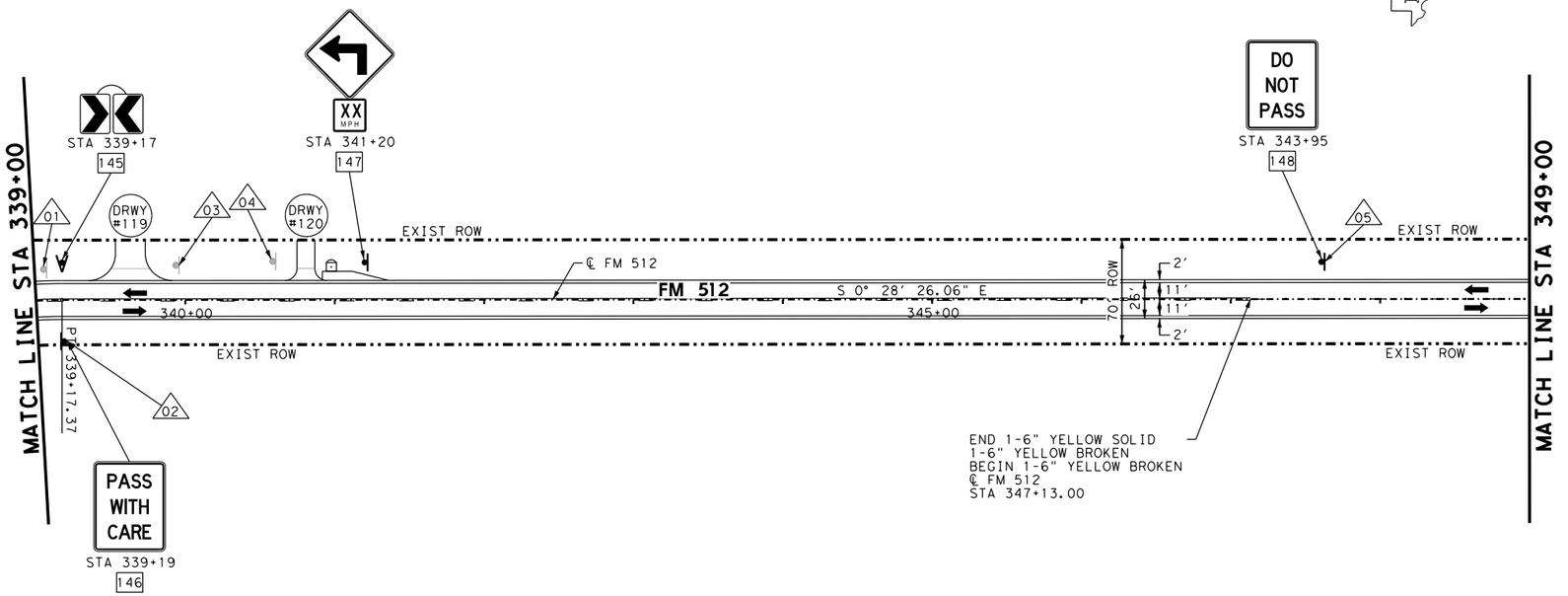

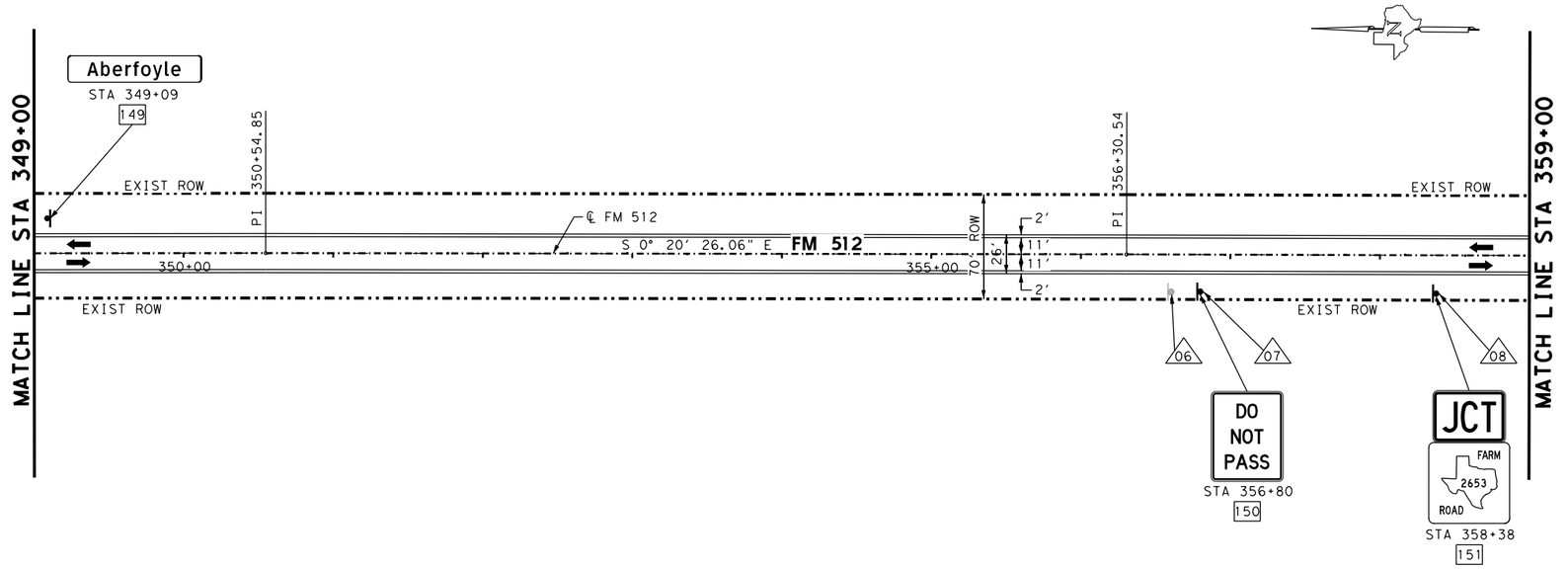

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SCALE: 1"=100'

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ROADWAY PLAN LAYOUT

SHEET 18 OF 27

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	68
CONTROL	SECTION	JOB	
0579	02	014	

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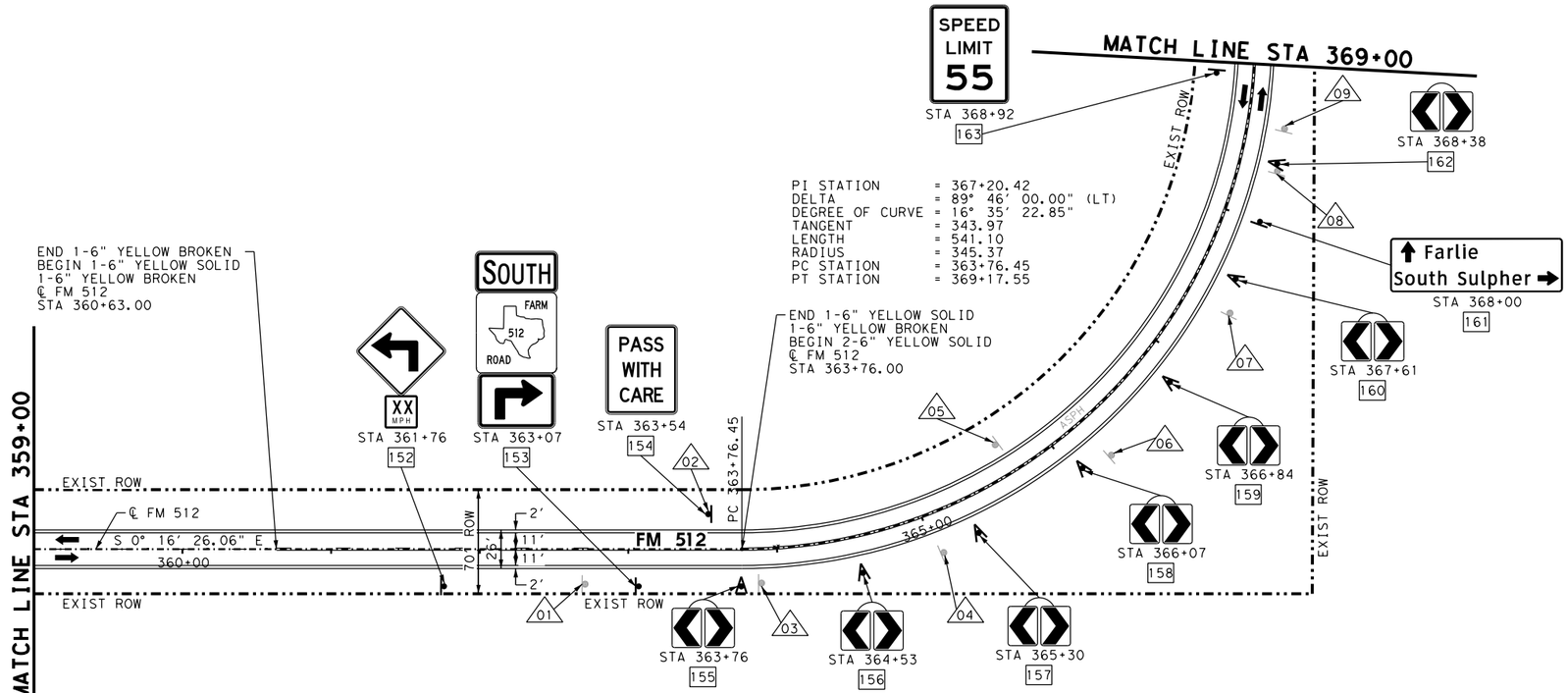
LEGEND

- XX — PROPOSED SMALL SIGN ASSEM & NUMBER
- XX — EXIST SMALL SIGN ASSEM TO BE REMOVED
- DIRECTION OF TRAFFIC FLOW
- DRWY #XX — DRIVEWAY NUMBER
- MAIL BOX
- PLANE ASPH (0"-1.5")



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ROADWAY PLAN LAYOUT

SHEET 19 OF 27

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	69
CONTROL	SECTION	JOB	
0579	02	014	

FM512_RD_PPM_19.dgn

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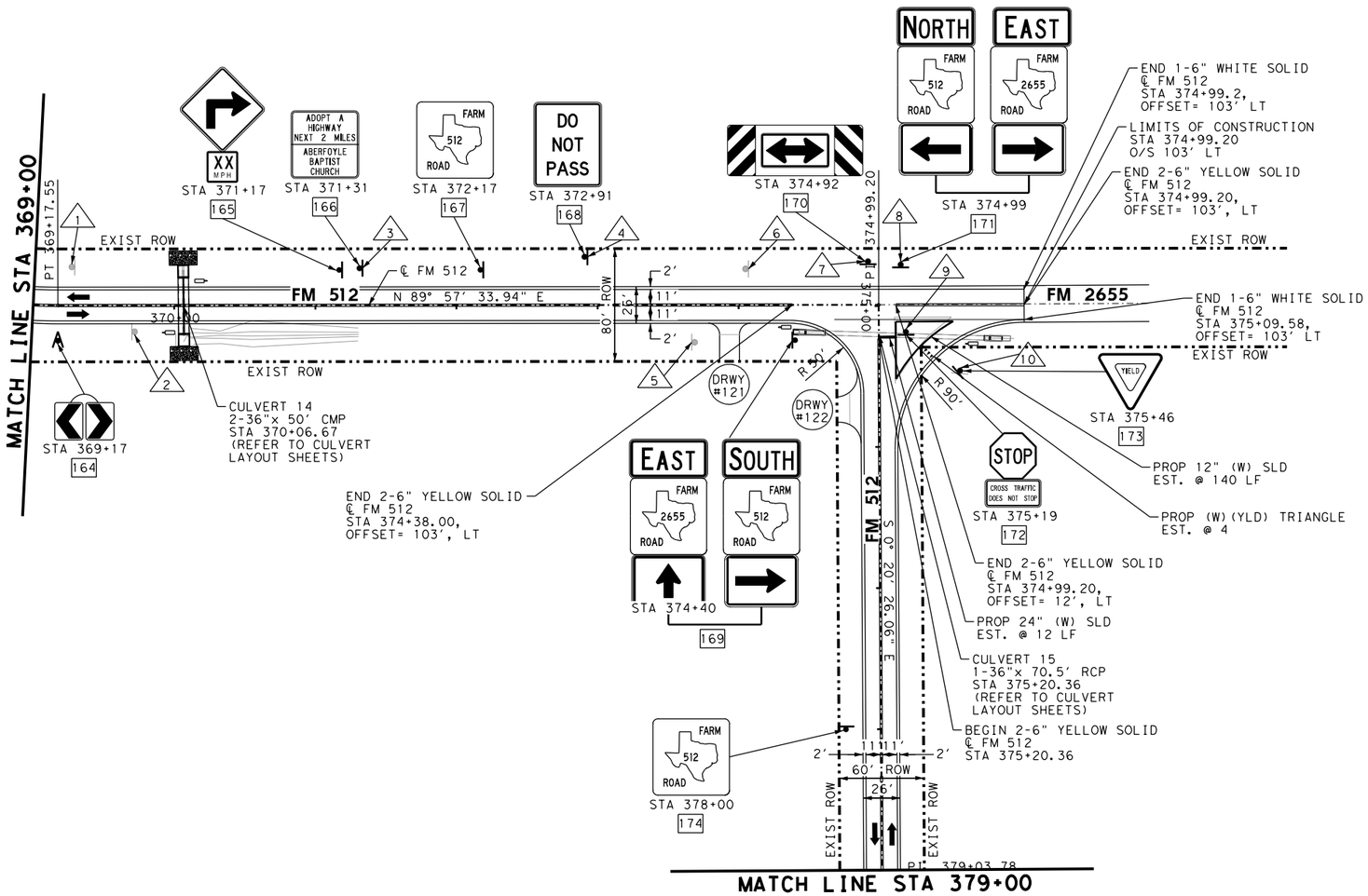

LEGEND

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- DIRECTION OF TRAFFIC FLOW
- DRWY #XX — DRIVEWAY NUMBER
- MAIL BOX
- PLANE ASPH (0"-1.5")

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ROADWAY PLAN LAYOUT

SHEET 20 OF 27

			HIGHWAY NO.
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	PARIS	HUNT	70
CONTROL	SECTION	JOB	
0579	02	014	

5/24/2023 6:20:18 PM
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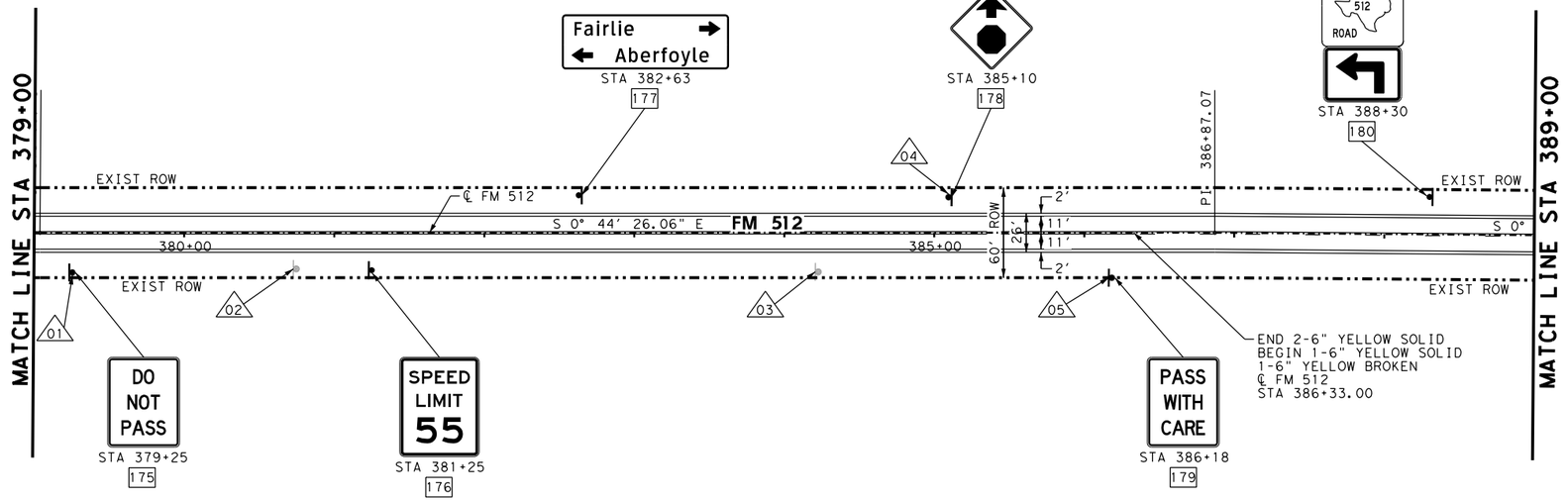

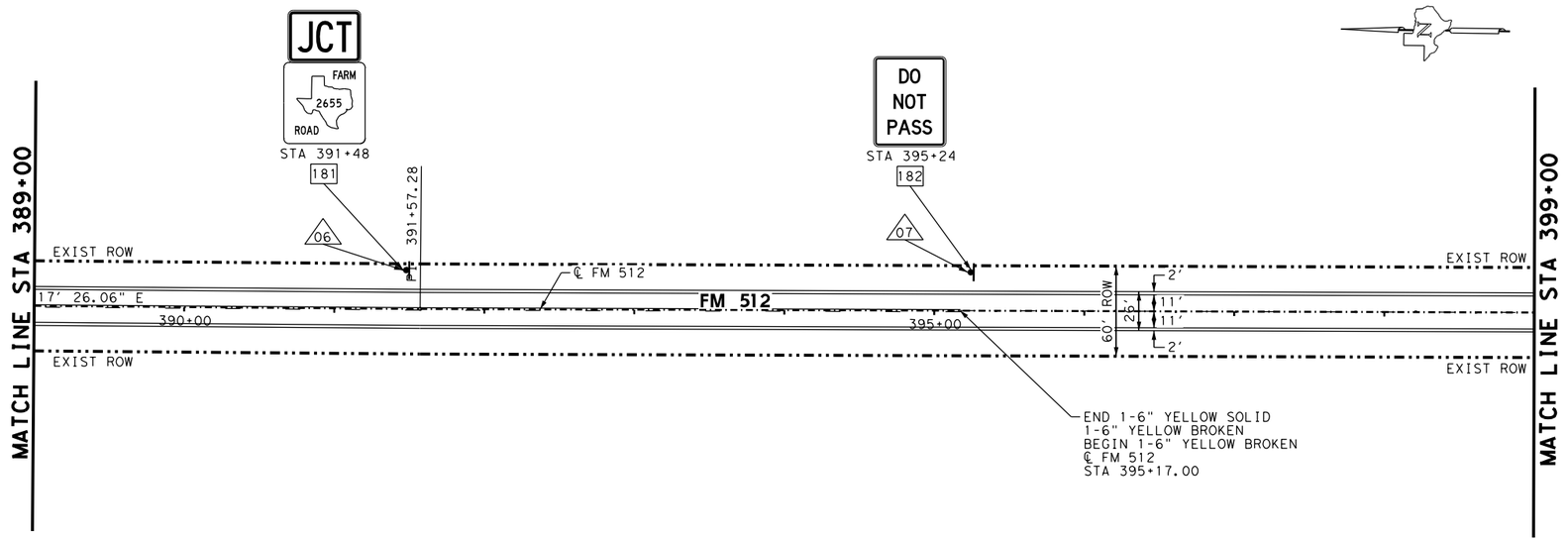

LEGEND

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- DIRECTION OF TRAFFIC FLOW
- DRWY #XX — DRIVEWAY NUMBER
- MAIL BOX
- PLANE ASPH (0"-1.5")

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0 25 50 100
SCALE: 1"=100'

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FM 512

ROADWAY PLAN LAYOUT

SHEET 21 OF 27

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	71
CONTROL	SECTION	JOB	
0579	02	014	

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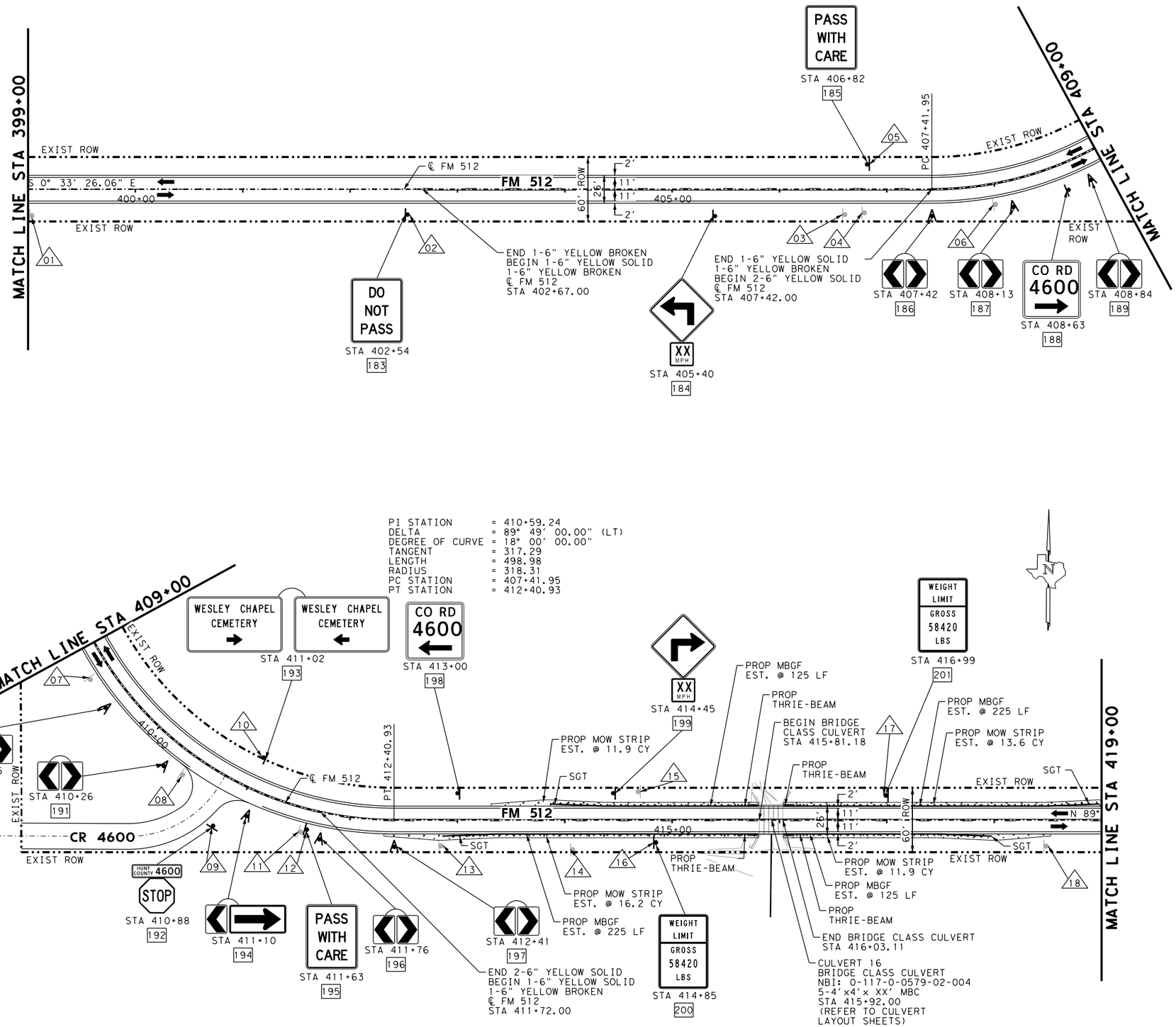

PI STATION = 410+59.24
DELTA = 89° 49' 00.00" (LT)
DEGREE OF CURVE = 18° 00' 00.00"
TANGENT = 317.29
LENGTH = 498.98
RADIUS = 318.31
PC STATION = 407+41.95
PT STATION = 412+40.93

LEGEND

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- XX — EXIST SMALL SIGN ASSEM TO BE REMOVED
- DIRECTION OF TRAFFIC FLOW
- DRWY #XX — DRIVEWAY NUMBER
- MAIL BOX
- PLANE ASPH (0"-1.5")

NOTES:

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0 25 50 100
SCALE: 1"=100'

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FM 512

ROADWAY PLAN LAYOUT

SHEET 22 OF 27

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	72
CONTROL	SECTION	JOB	
0579	02	014	

5/24/2023 6:20:19 PM
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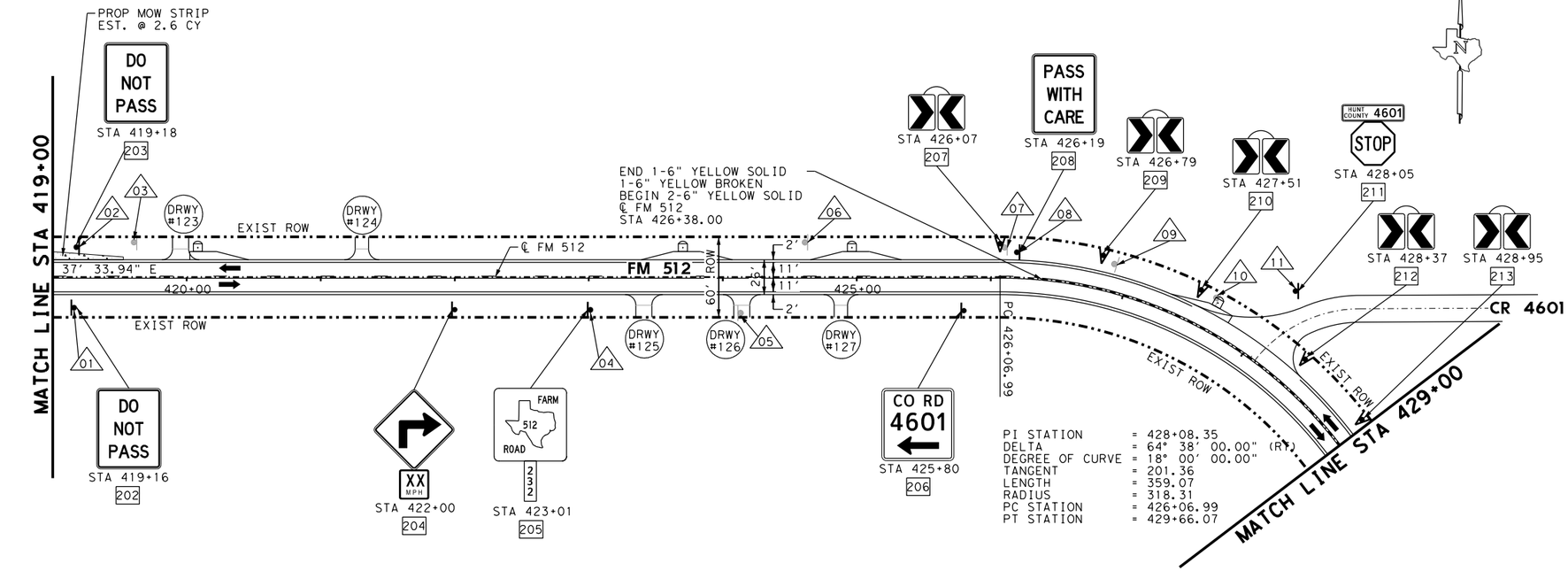

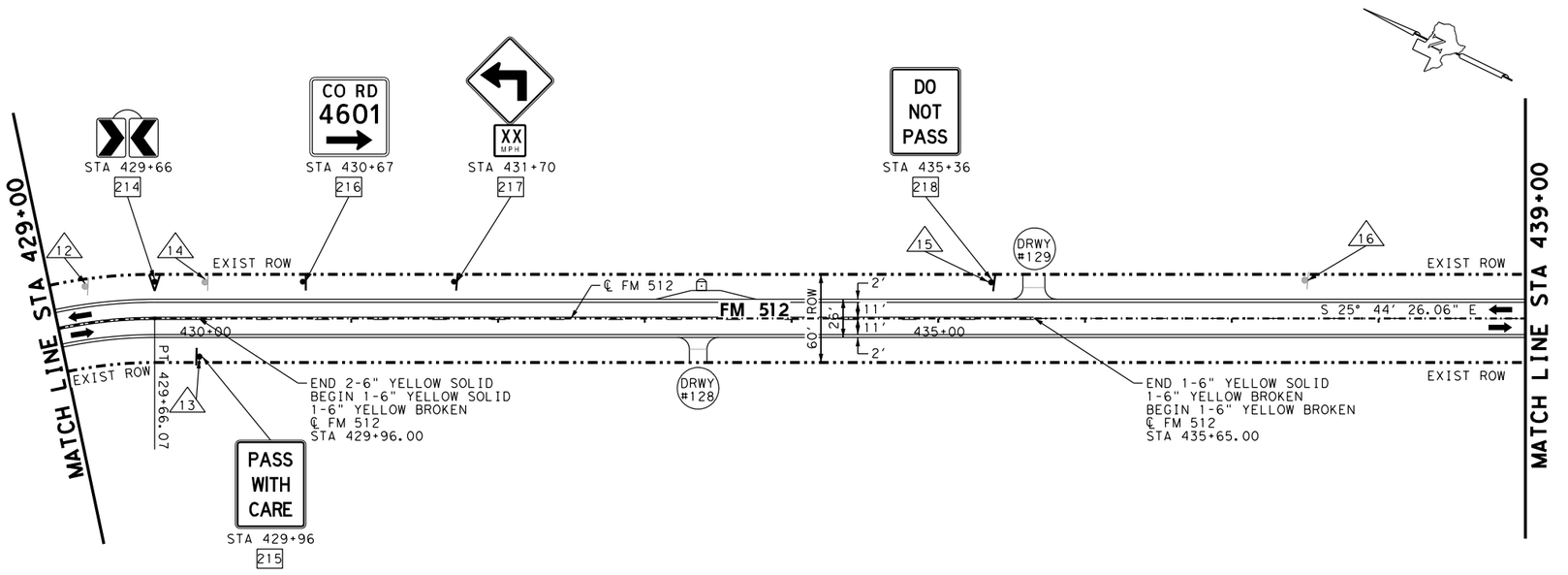

0 25 50 100
SCALE: 1"=100'

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Texas Department of Transportation

FM 512

ROADWAY PLAN LAYOUT

SHEET 23 OF 27

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	73
CONTROL	SECTION	JOB	
0579	02	014	

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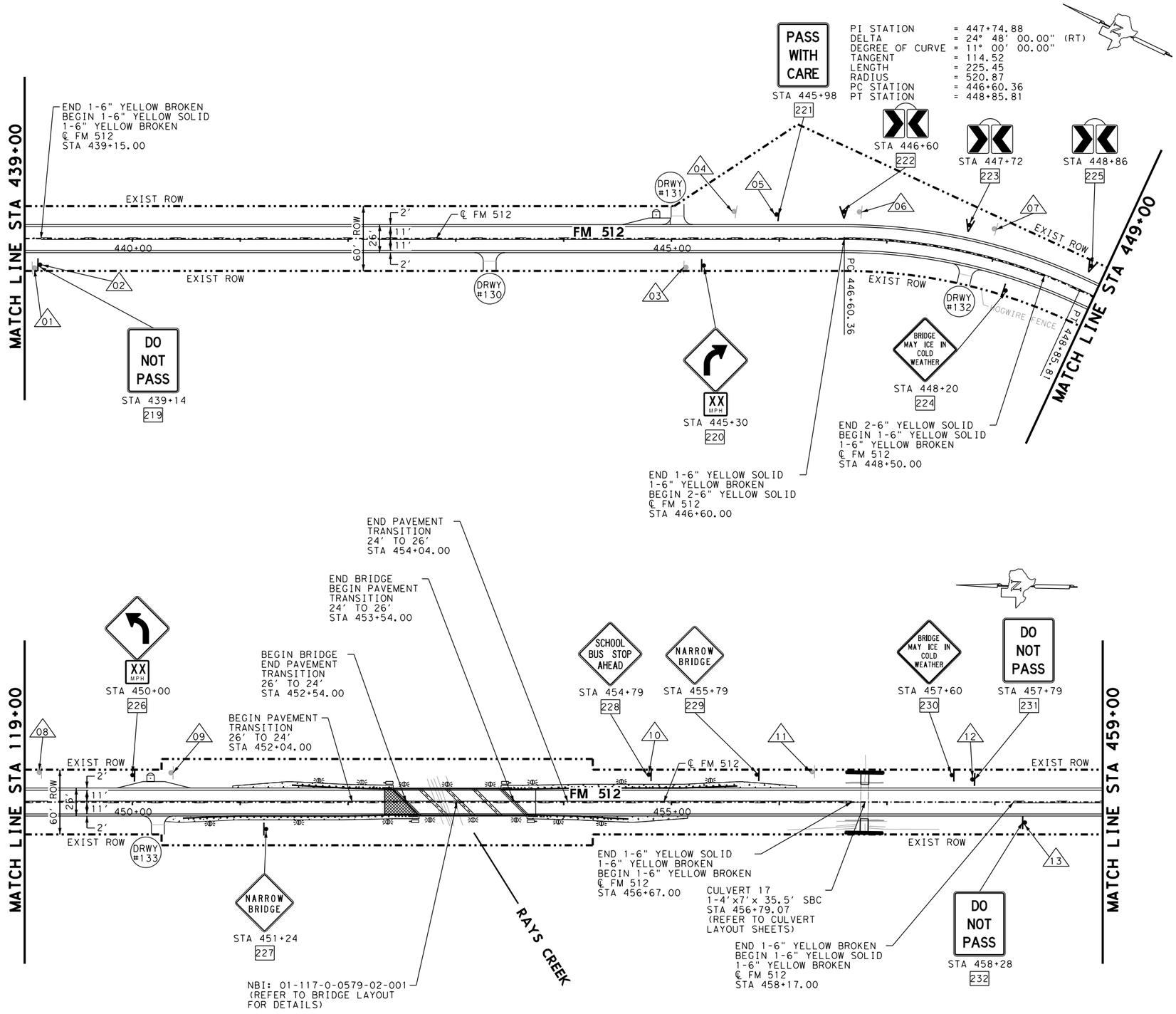

LEGEND

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FM 512

ROADWAY PLAN LAYOUT

SHEET 24 OF 27

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	74
CONTROL	SECTION	JOB	
0579	02	014	

5/24/2023 6:20:20 PM
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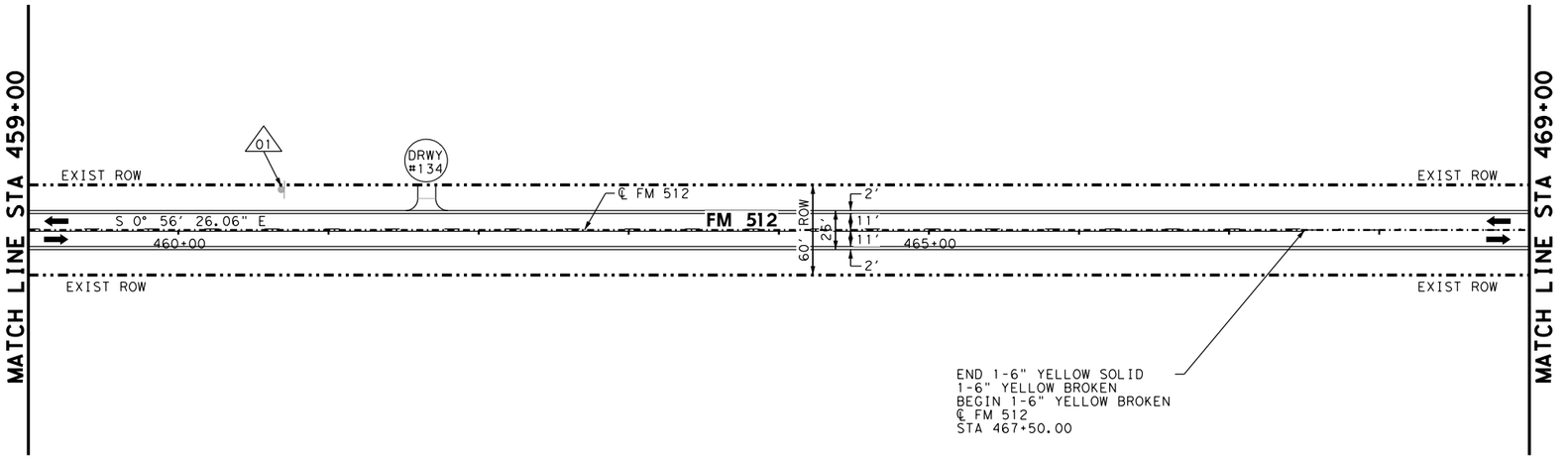

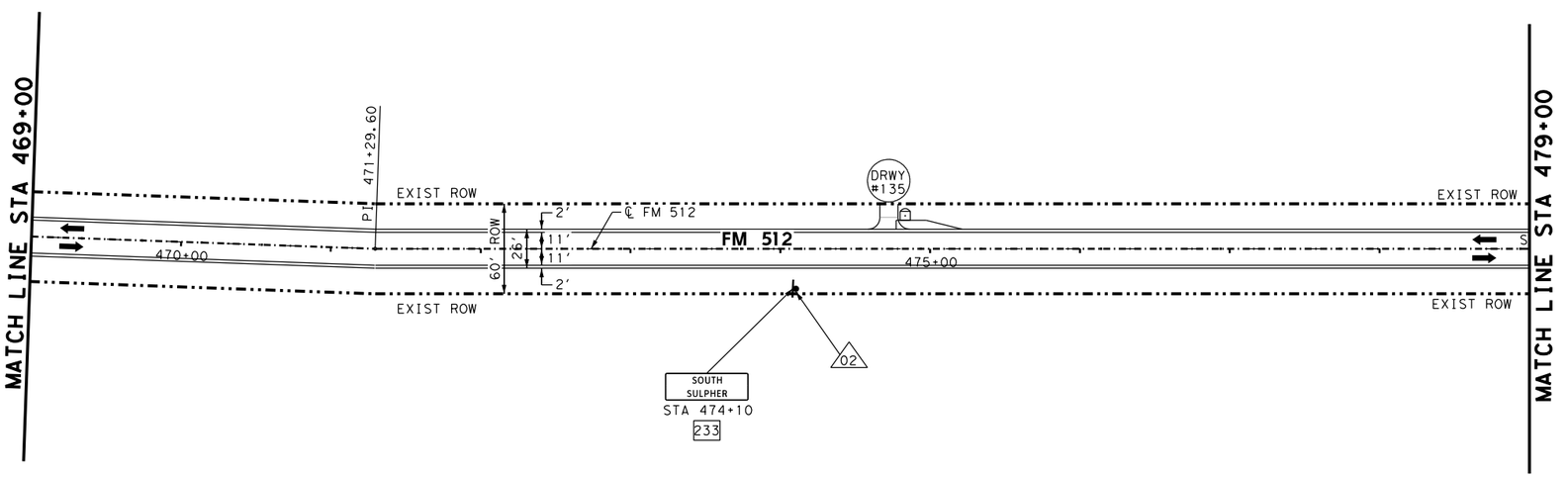

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FM 512

ROADWAY PLAN LAYOUT

SHEET 25 OF 27

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	75
CONTROL	SECTION	JOB	
0579	02	014	

5/24/2023 6:20:20 PM
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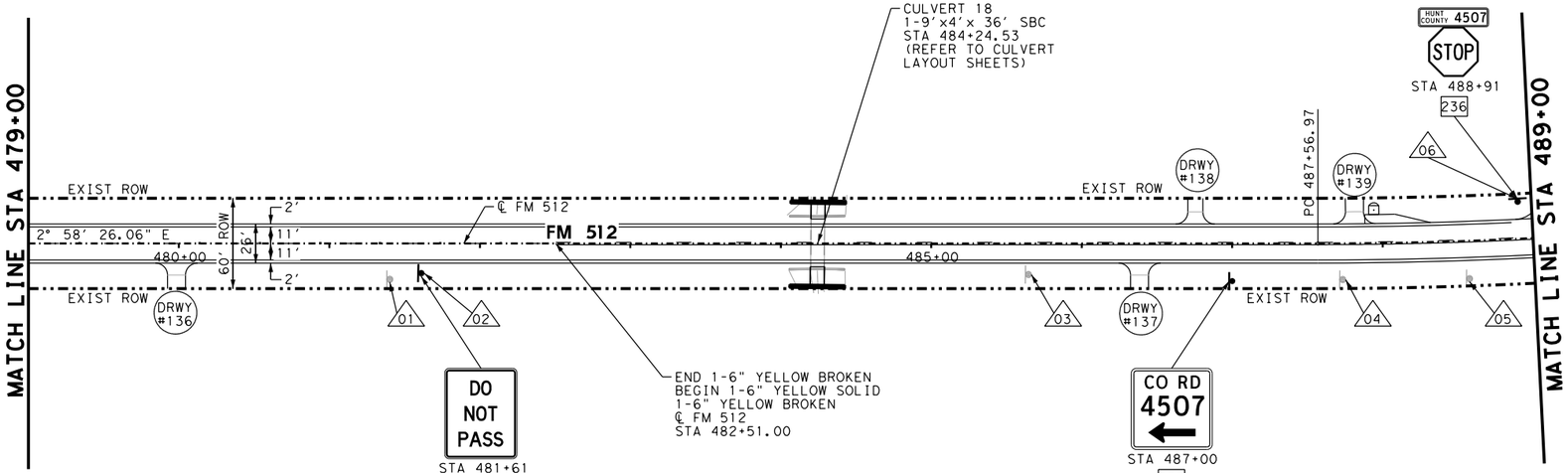

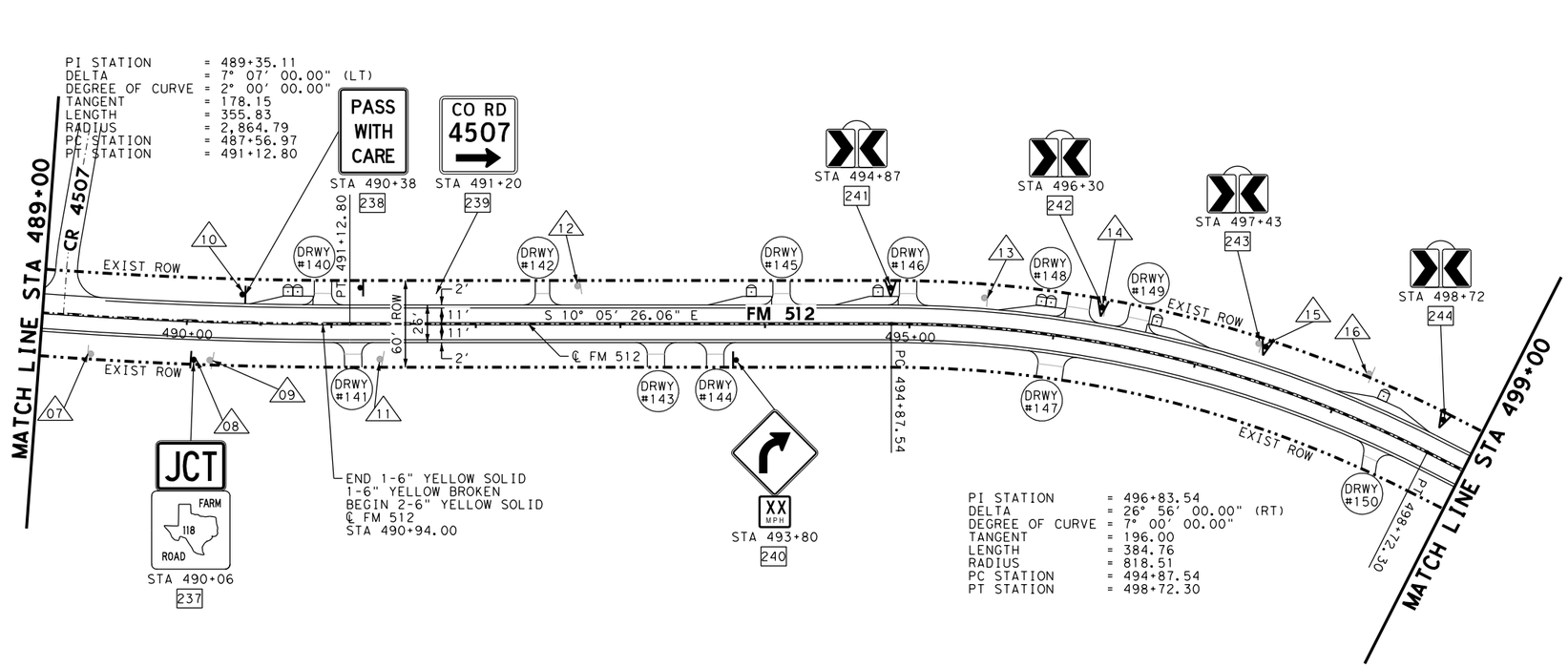

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FM 512

ROADWAY PLAN LAYOUT

SHEET 26 OF 27

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	76
CONTROL	SECTION	JOB	
0579	02	014	

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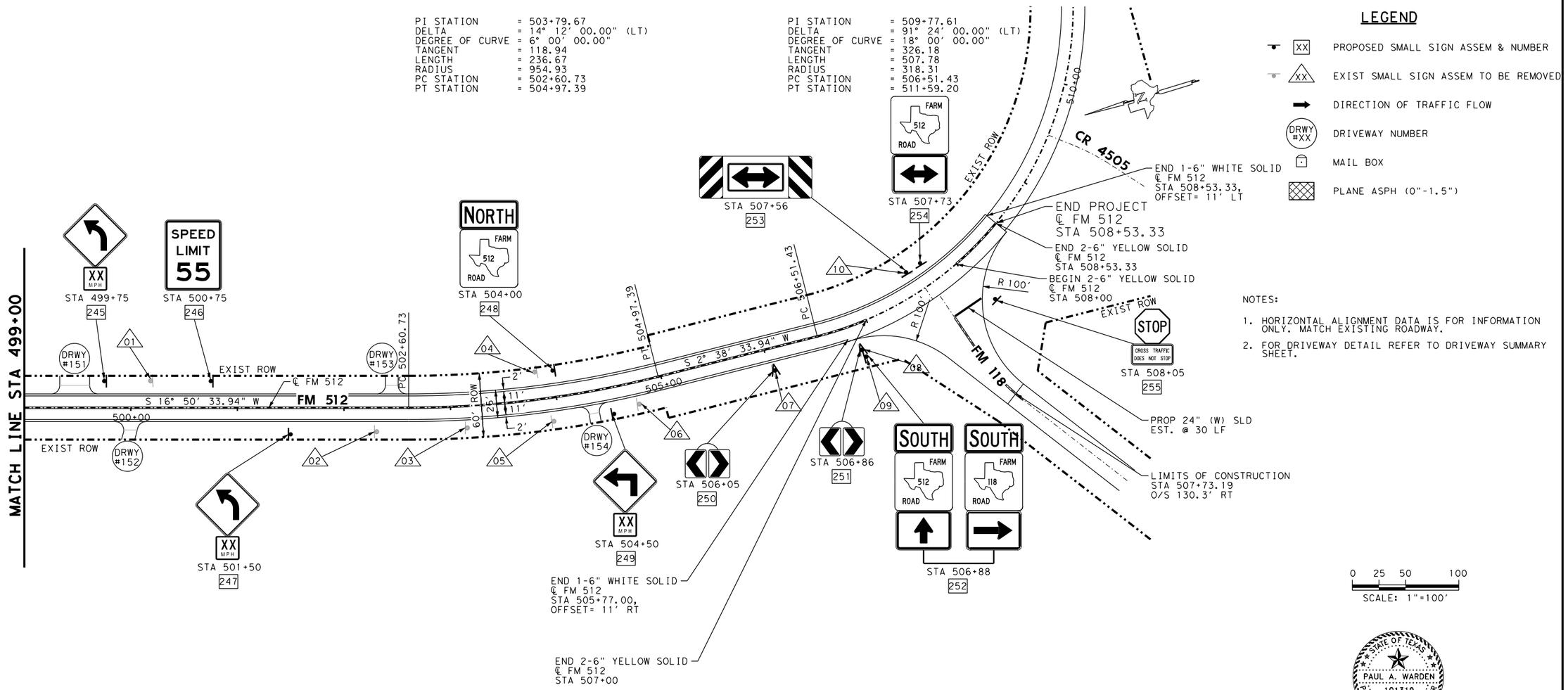
100%
SUBMITTAL

PI STATION = 503+79.67
DELTA = 14° 12' 00.00" (LT)
DEGREE OF CURVE = 6° 00' 00.00"
TANGENT = 118.94
LENGTH = 236.67
RADIUS = 954.93
PC STATION = 502+60.73
PT STATION = 504+97.39

PI STATION = 509+77.61
DELTA = 91° 24' 00.00" (LT)
DEGREE OF CURVE = 18° 00' 00.00"
TANGENT = 326.18
LENGTH = 507.78
RADIUS = 318.31
PC STATION = 506+51.43
PT STATION = 511+59.20



LEGEND

- XX — PROPOSED SMALL SIGN ASSEM & NUMBER
- XX — EXIST SMALL SIGN ASSEM TO BE REMOVED
- DIRECTION OF TRAFFIC FLOW
- DRWY #XX — DRIVEWAY NUMBER
- MAIL BOX
- PLANE ASPH (0"-1.5")

NOTES:

1. HORIZONTAL ALIGNMENT DATA IS FOR INFORMATION ONLY. MATCH EXISTING ROADWAY.
2. FOR DRIVEWAY DETAIL REFER TO DRIVEWAY SUMMARY SHEET.

0 25 50 100
SCALE: 1"=100'

STATE OF TEXAS
PAUL A. WARDEN
101319
LICENSED
PROFESSIONAL ENGINEER

Paul A. Warden P.E. 5/24/2023

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FIRM # F-6825

Texas Department of Transportation

FM 512

ROADWAY PLAN LAYOUT

SHEET 27 OF 27

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	77
CONTROL	SECTION	JOB	
0579	02	014	

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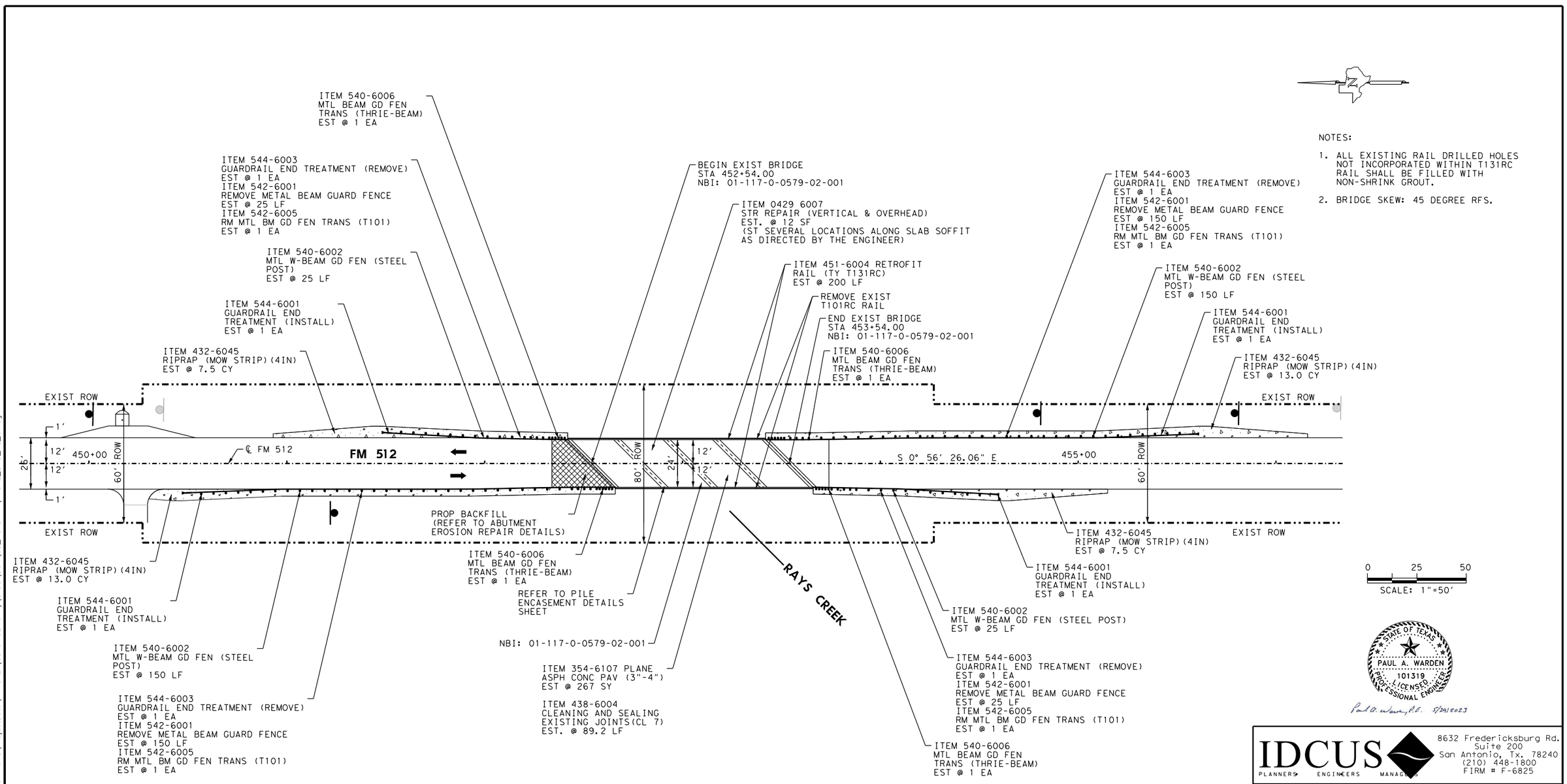
100%
SUBMITTAL



NOTES:

1. ALL EXISTING RAIL DRILLED HOLES NOT INCORPORATED WITHIN T131RC RAIL SHALL BE FILLED WITH NON-SHRINK GROUT.
2. BRIDGE SKEW: 45 DEGREE RFS.

0 25 50
SCALE: 1"=50'

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Texas Department of Transportation

FM 512

BRIDGE PLAN LAYOUT AT RAYS CREEK

NBI: 01-117-0-0579-02-001

SHEET 1 OF 1

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	78
CONTROL	SECTION	JOB	
0579	02	014	

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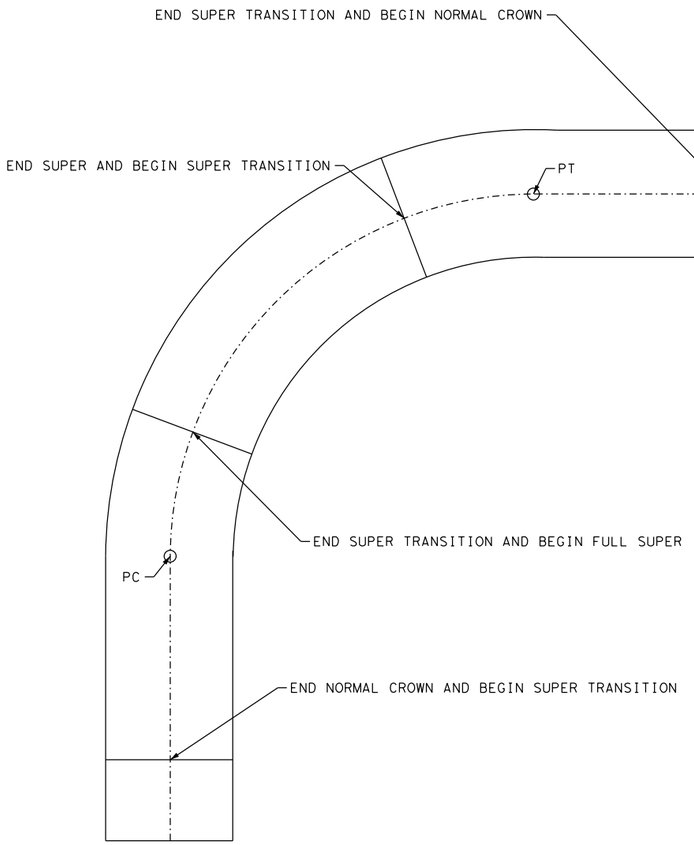
100% SUBMITTAL

NOTES: CONTRACTOR IS TO CONFIRM EXISTING SUPERELEVATION SLOPE AND NOTIFY AREA ENGINEER BEFORE ROADWAY REHABILITATION STARTS.

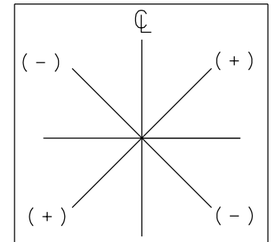
EXCESS MATERIAL GENERATED IS PROPERTY OF CONTRACTOR.



PROPOSED SUPERELEVATION TABLE

STATION	SHOULDER CROSS SLOPE LEFT (%)	TRAVEL LANE CROSS SLOPE LEFT (%)	TRAVEL LANE CROSS SLOPE RIGHT (%)	SHOULDER CROSS SLOPE RIGHT (%)	ITEM 247-6124 FL BS (RDWY DEL) (TY A GR4) TON	ITEM 3076-6068 D-GR HMA TY-D SAC-A PG64-22 (EXEMPT)
BEGIN PROJECT						
10+45.00 END NC	2.00	2.00	-2.00	-2.00		
SUPERELEVATION TRANSITION						
11+54.00 BEGIN FS						
12+66.00 END FS	-5.90	-5.90	-5.90	-5.90		66.0
SUPERELEVATION TRANSITION						
13+75.00 BEGIN NC						
78+21.00 END NC	2.00	2.00	-2.00	-2.00		
SUPERELEVATION TRANSITION						
79+97.00 BEGIN FS						
81+16.00 END FS	6.00	6.00	6.00	6.00	46.8	
SUPERELEVATION TRANSITION						
82+92.00 BEGIN NC						
82+92.00 END NC	2.00	2.00	-2.00	-2.00		
SUPERELEVATION TRANSITION						
84+68.00 BEGIN FS						
85+98.00 END FS	-6.00	-6.00	-6.00	-6.00	58.1	
SUPERELEVATION TRANSITION						
87+74.00 BEGIN NC						
90+07.00 END NC	2.00	2.00	-2.00	-2.00		
SUPERELEVATION TRANSITION						
91+60.00 BEGIN FS						
95+35.00 END FS	5.90	5.90	5.90	5.90	80.3	
SUPERELEVATION TRANSITION						
96+88.00 BEGIN NC						
97+40.00 END NC	2.00	2.00	-2.00	-2.00		
SUPERELEVATION TRANSITION						
98+93.00 BEGIN FS						
102+79.00 END FS	-5.90	-5.90	-5.90	-5.90	0.0	
SUPERELEVATION TRANSITION						
104+32.00 BEGIN NC						
182+97.00 END NC	2.00	2.00	-2.00	-2.00		
SUPERELEVATION TRANSITION						
184+58.61 BEGIN FS						
193+02.66 END FS	5.80	5.80	5.80	5.80	261.0	
SUPERELEVATION TRANSITION						
194+65.00 BEGIN NC						
214+92.00 END NC	2.00	2.00	-2.00	-2.00		
SUPERELEVATION TRANSITION						
216+31.00 BEGIN FS						
217+16.00 END FS	-5.80	-5.80	-5.80	-5.80	50.3	
SUPERELEVATION TRANSITION						
218+55.00 BEGIN NC						
227+41.00 END NC	2.00	2.00	-2.00	-2.00		
SUPERELEVATION TRANSITION						
228+98.00 BEGIN FS						
233+24.00 END FS	5.10	5.10	5.10	5.10	144.2	
SUPERELEVATION TRANSITION						
234+81.00 BEGIN NC						
247+80.00 END NC	2.00	2.00	-2.00	-2.00		
SUPERELEVATION TRANSITION						
249+33.00 BEGIN FS						
253+12.00 END FS	-5.90	-5.90	-5.90	-5.90	73.4	
SUPERELEVATION TRANSITION						
254+65.00 BEGIN NC						
258+24.00 END NC	2.00	2.00	-2.00	-2.00		
SUPERELEVATION TRANSITION						
259+77.00 BEGIN FS						
263+53.00 END FS	5.90	5.90	5.90	5.90	53.6	
SUPERELEVATION TRANSITION						
265+06.00 BEGIN NC						
CONT. NEXT SHEET	2.00	2.00	-2.00	-2.00		

NC = NORMAL CROWN
FS = FULL SUPERELEVATION
RC = REVERSE CROWN



CROSS SLOPE SIGN CONVENTION

STATE OF TEXAS
PAUL A. WARDEN
101319
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FIRM # F-6825

Texas Department of Transportation

FM 512

SUPERELEVATION TABLE

SHEET 1 OF 3

		HIGHWAY NO.
		FM 512
STATE	DISTRICT / COUNTY	SHEET NO.
TEXAS	PARIS / HUNT	79
CONTROL	SECTION / JOB	
0579	02 / 014	

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100% SUBMITTAL

NOTES: CONTRACTOR IS TO CONFIRM EXISTING SUPERELEVATION SLOPE AND NOTIFY AREA ENGINEER BEFORE ROADWAY REHABILITATION STARTS.

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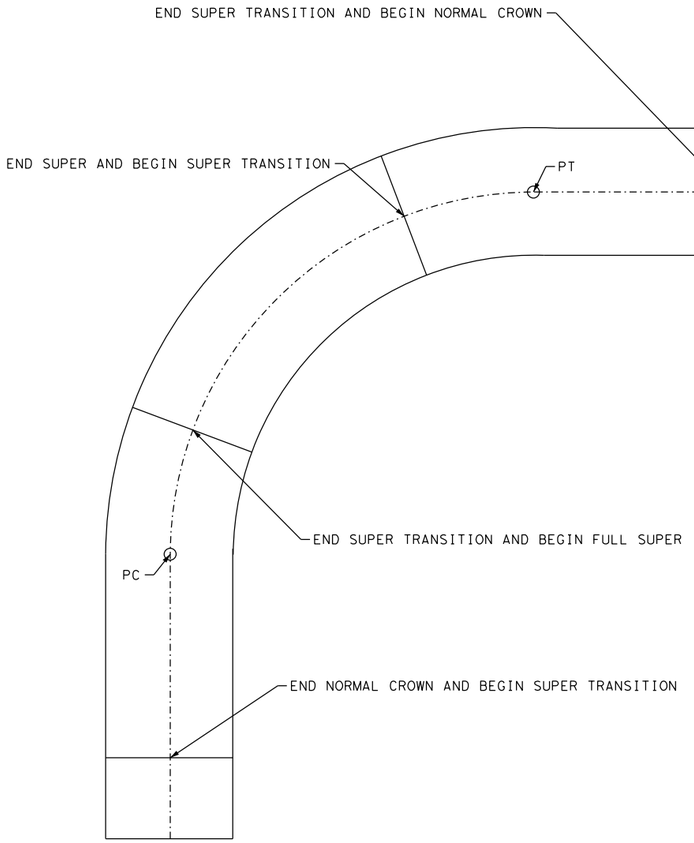
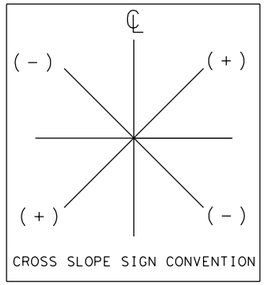


PROPOSED SUPERELEVATION TABLE

STATION	SHOULDER CROSS SLOPE LEFT (%)	TRAVEL LANE CROSS SLOPE LEFT (%)	TRAVEL LANE CROSS SLOPE RIGHT (%)	SHOULDER CROSS SLOPE RIGHT (%)	ITEM 247-6124 FL BS (RDWY DEL) (TY A GR4) TON	ITEM 3076-6068 D-GR HMA TY-D SAC-A PG64-22 (EXEMPT)
CONT. 269+12.00 END NC	2.00	2.00	-2.00	-2.00		
SUPERELEVATION TRANSITION						
270+65.00 BEGIN FS > 279+08.00 END FS	-5.90	-5.90	-5.90	-5.90	127.6	
SUPERELEVATION TRANSITION						
280+61.00 BEGIN NC > 283+34.00 END NC	2.00	2.00	-2.00	-2.00		
SUPERELEVATION TRANSITION						
284+87.00 BEGIN FS > 293+31.00 END FS	5.90	5.90	5.90	5.90	126.5	
SUPERELEVATION TRANSITION						
294+84.00 BEGIN NC > 312+04.00 END NC	2.00	2.00	-2.00	-2.00		
SUPERELEVATION TRANSITION						
313+78.00 BEGIN FS > 313+82.00 END FS	-5.90	-5.90	-5.90	-5.90	71.9	
SUPERELEVATION TRANSITION						
315+56.00 BEGIN NC > 315+56.00 END NC	2.00	2.00	-2.00	-2.00		
SUPERELEVATION TRANSITION						
317+19.00 BEGIN FS > 318+05.00 END FS	5.40	5.40	5.40	5.40	0.0	
SUPERELEVATION TRANSITION						
319+68.00 BEGIN NC > 323+21.00 END NC	2.00	2.00	-2.00	-2.00		
SUPERELEVATION TRANSITION						
324+74.00 BEGIN FS > 326+20.00 END FS	-5.90	-5.90	-5.90	-5.90	87.0	
SUPERELEVATION TRANSITION						
327+73.00 BEGIN NC > 333+16.00 END NC	2.00	2.00	-2.00	-2.00		
SUPERELEVATION TRANSITION						
334+43.00 BEGIN FS > 338+92.00 END FS	-5.70	-5.70	-5.70	-5.70	201.8	
SUPERELEVATION TRANSITION						
340+19.00 BEGIN NC > 363+02.00 END NC	2.00	2.00	-2.00	-2.00		
SUPERELEVATION TRANSITION						
364+29.00 BEGIN FS > 368+77.00 END FS	5.70	5.70	5.70	5.70	101.3	
SUPERELEVATION TRANSITION						
370+04.00 BEGIN NC > 406+40.00 END NC	2.00	2.00	-2.00	-2.00		
SUPERELEVATION TRANSITION						
407+67.00 BEGIN FS > 412+16.00 END FS	5.70	5.70	5.70	5.70	106.5	
SUPERELEVATION TRANSITION						
413+43.00 BEGIN NC > 425+05.00 END NC	2.00	2.00	-2.00	-2.00		
SUPERELEVATION TRANSITION						
426+32.00 BEGIN FS > 429+41.00 END FS	-5.70	-5.70	-5.70	-5.70	72.0	
SUPERELEVATION TRANSITION						
430+68.00 BEGIN NC > 445+36.00 END NC	2.00	2.00	-2.00	-2.00		
SUPERELEVATION TRANSITION						
446+91.00 BEGIN FS > 448+55.00 END FS	-6.00	-6.00	-6.00	-6.00	53.4	
SUPERELEVATION TRANSITION						
450+10.00 BEGIN NC > CONT. NEXT SHEET	2.00	2.00	-2.00	-2.00		

NC = NORMAL CROWN
FS = FULL SUPERELEVATION
RC = REVERSE CROWN



CROSS SLOPE SIGN CONVENTION

Paul A. Warden, P.E. 5/24/2023

IDCUS PLANNERS ENGINEERS MANAGERS
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FIRM # F-6825

Texas Department of Transportation

FM 512

SUPERELEVATION TABLE

SHEET 2 OF 3

			HIGHWAY NO.
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	PARIS	HUNT	80
CONTROL	SECTION	JOB	
0579	02	014	

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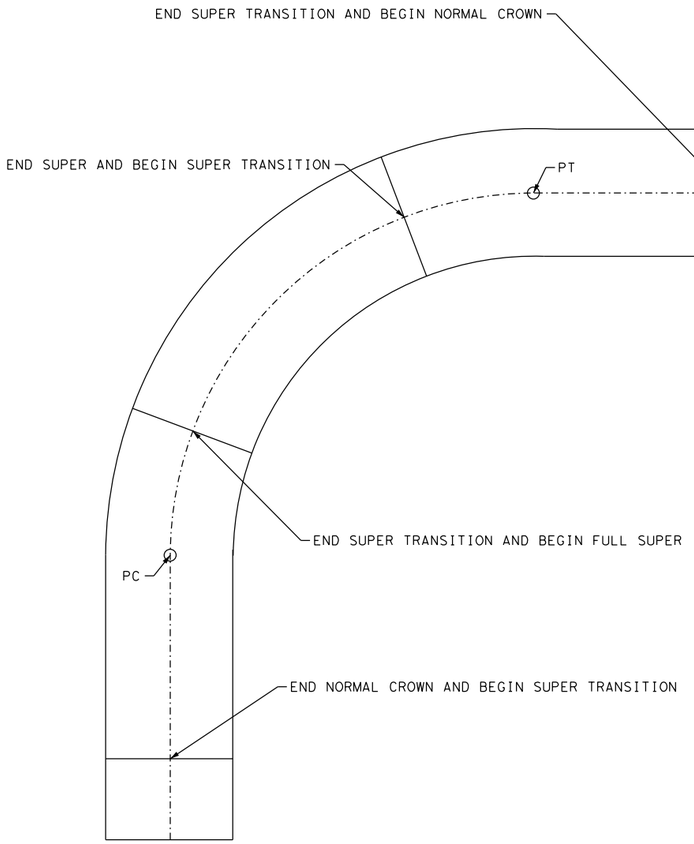
NOTES: CONTRACTOR IS TO CONFIRM EXISTING SUPERELEVATION SLOPE AND NOTIFY AREA ENGINEER BEFORE ROADWAY REHABILITATION STARTS.

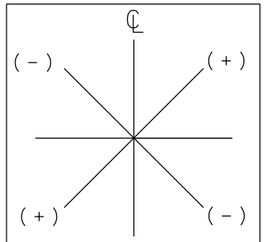
EXCESS MATERIAL GENERATED IS PROPERTY OF CONTRACTOR.



PROPOSED SUPERELEVATION TABLE

STATION	SHOULDER CROSS SLOPE LEFT (%)	TRAVEL LANE CROSS SLOPE LEFT (%)	TRAVEL LANE CROSS SLOPE RIGHT (%)	SHOULDER CROSS SLOPE RIGHT (%)	ITEM 247-6124 FL BS (RDWY DEL) (TY A GR4) TON	ITEM 3076-6068 D-GR HMA TY-D SAC-A PG64-22 (EXEMPT)
CONT. 486+95.00 END NC						
SUPERELEVATION TRANSITION						
487+83.00 BEGIN FS > 490+86.00 END FS	4.00	4.00	4.00	4.00	63.1	
SUPERELEVATION TRANSITION						
491+74.00 BEGIN NC > 493+58.00 END NC	2.00	2.00	-2.00	-2.00		
SUPERELEVATION TRANSITION						
495+20.00 BEGIN FS > 498+40.00 END FS	-5.80	-5.80	-5.80	-5.80	214.8	
SUPERELEVATION TRANSITION						
500+02.00 BEGIN NC > 501+39.00 END NC	2.00	2.00	-2.00	-2.00		
SUPERELEVATION TRANSITION						
503+13.00 BEGIN FS > 504+00.00 END FS	5.90	5.90	5.90	5.90	56.0	
SUPERELEVATION TRANSITION						
505+74.00 BEGIN NC > 505+74.00 END NC	2.00	2.00	-2.00	-2.00		
SUPERELEVATION TRANSITION						
507+01.00 BEGIN FS > 511+34.00 END FS	5.70	5.70	5.70	5.70	0.0	
SUPERELEVATION TRANSITION						
512+61.00 BEGIN NC > END PROJECT	2.00	2.00	-2.00	-2.00		
				TOTAL	2,049.6	66.0

NC = NORMAL CROWN
FS = FULL SUPERELEVATION
RC = REVERSE CROWN



CROSS SLOPE SIGN CONVENTION

STATE OF TEXAS
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Texas Department of Transportation

FM 512

SUPERELEVATION TABLE

SHEET 3 OF 3

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	81
CONTROL	SECTION	JOB	
0579	02	014	

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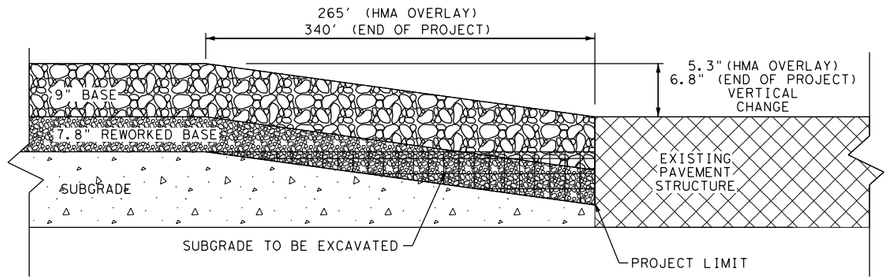
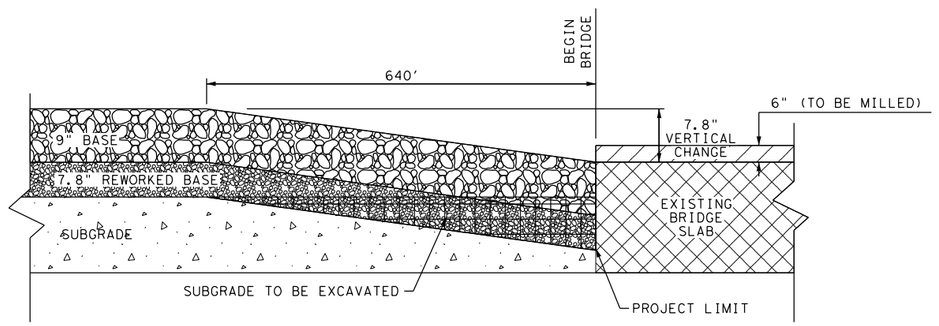
SUBMITTAL



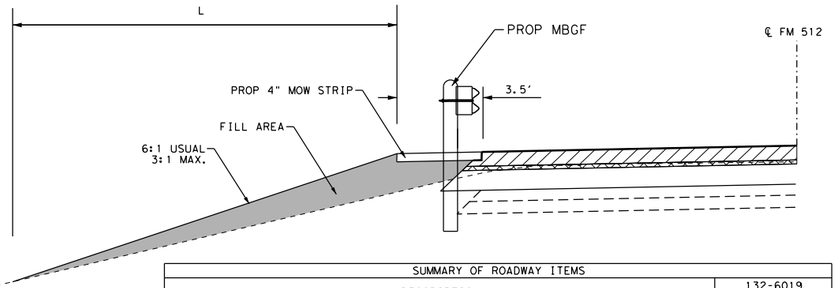
TRANSITION TO PROJECT LIMITS/HMA OVERLAY

TRANSITION RATIO IS 1":50'



TRANSITION AT BRIDGE

TRANSITION RATIO IS 1":50'

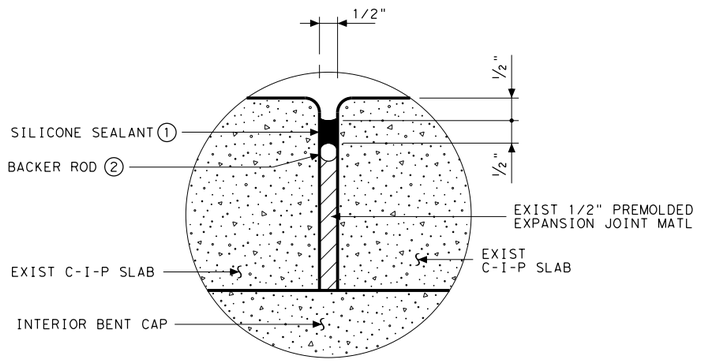


SUMMARY OF ROADWAY ITEMS

DESCRIPTION							132-6019
BEGIN MOW STRIP STA	TO	END MOW STRIP STA	LT/RT	LENGTH	AREA	"L"	EMBANKMENT (VEHICLE) (ORD COMP) (TY B)
	FM 512			LF	SF	LF	CY
187+33.69	TO	189+27.14	LT	193	6.0	8.0	42
186+04.00	TO	189+28.30	RT	324	14.9	11.9	179
189+81.99	TO	193+29.40	LT	347	31.4	19.4	404
189+80.65	TO	191+79.59	RT	199	10.6	12.8	78
252+86.24	TO	258+70.11	LT	584	6.5	6.8	140
253+00.25	TO	258+86.99	RT	587	13.4	9.8	290
305+32.77	TO	306+93.83	LT	161	13.8	10.4	82
303+89.78	TO	306+60.66	RT	271	17.4	16.6	174
307+40.90	TO	310+18.28	LT	277	46.6	24.2	478
307+07.82	TO	308+75.29	RT	167	17.2	13.5	106
413+31.41	TO	415+80.41	LT	249	12.8	11.1	117
412+31.71	TO	415+80.27	RT	349	36.4	17.9	469
416+03.74	TO	419+52.75	LT	349	17.2	13.0	222
416+03.70	TO	418+52.70	RT	249	19.6	12.0	180
450+93.06	TO	452+42.00	LT	149	15.3	10.0	84
450+30.18	TO	452+66.00	RT	236	19.1	11.4	166
453+42.00	TO	456+16.00	LT	274	16.8	12.0	170
453+66.00	TO	455+14.94	RT	149	7.9	13.7	43
						FM 512 TOTAL	3,424

① USE CLASS 7 JOINT SEALANT IN ACCORDANCE WITH DMS-6310, "JOINT SEALANTS AND FILTERS." PREPARE JOINT AND SEAL IN ACCORDANCE WITH ITEM 438 "CLEANING AND SEALING JOINTS."

② PROVIDE BACKER ROD 25% LARGER THAN JOINT OPENING AND COMPATIBLE WITH THE SEALANT. USE OF MULTIPLE PIECES TO CREATE A BACKER ROD CROSS SECTION IS NOT PERMITTED. TOP OF BACKER ROD MUST BE CONVEX AS SHOWN.



JOINT DETAIL

CONTRACTOR SHALL FIELD VERIFY EXISTING DIMENSION PRIOR TO ORDERING MATERIALS

GENERAL NOTES:

CLEANING EXISTING JOINT OPENING (FULL DEPTH) OF ALL DEBRIS, PROVIDING AND REPLACING BACKER ROD, SAW-CUTTING ASPHALT OVERLAY, AND SEALING JOINT IS PAID FOR BY ITEM 438, "CLEANING AND SEALING JOINTS" AND MEASURED BY THE LINEAR FOOT.

OBTAIN APPROVAL FOR ALL TOOLS, EQUIPMENT, MATERIALS AND TECHNIQUES PROPOSED TO CLEAN AND SEAL THE JOINT.

PROVIDE CLASS 7 JOINT SEALANT IN ACCORDANCE WITH DMS-6310, "JOINT SEALANTS AND FILTERS" FOR JOINTS IN ASPHALT OVERLAY.

EXTEND SEALANT UP INTO RAIL OR CURB 3 INCHES ON LOW SIDE OR SIDES OF DECK. IF THE CLASS 7 JOINT SEALANT CANNOT BE OFFECTIVELY PLACED IN THE VERTICAL POSITION, A CLASS 4 JOINT SEALANT COMPATIBLE WITH THE CLASS 7 JOINT SEALANT IS ALLOWED FOR THE EXTENSION OF THE SEAL INTO THE CURB OR RAIL. PREPARE SURFACES WHERE SEALANT IS TO BE PLACED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.

PROCEDURE FOR CLEANING AND SEALING EXISTING CONCRETE GIRDER JOINT WITH SILICONE SEAL:

1) CLEAN JOINT OPENING OF ALL EXISTING EXPANSION MATERIALS/DEVICES, DIRT, AND ALL OTHER DELETERIOUS MATERIALS IN ACCORDANCE WITH ITEM 438, "CLEANING AND SEALING JOINTS." CLEAN JOINT OUT FULL DEPTH OF THE JOINT.

2) OBTAIN APPROVAL OF CLEANED JOINT PRIOR TO PROCEEDING WITH JOINT SEALING OPERATION.

3) FILL VOID WITH EXTRUDED POLYSTYRENE FOAM.

4) PLACE BACKER ROD INTO JOINT OPENING 1" BELOW THE TOP OF CONCRETE.

5) SEAL THE JOINT OPENING WITH A CLASS 7 JOINT SEALANT. RECESS SEAL 1/2" BELOW TOP OF CONCRETE IN TRAVEL LANES AND 1/4" BELOW TOP OF CONCRETE IN SHOULDERS.

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San Antonio, Tx. 78240
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FIRM # F-6825

Texas Department of Transportation

FM 512

MISCELLANEOUS DETAILS

SHEET 1 OF 1

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	82
CONTROL	SECTION	JOB	
0579	02	014	

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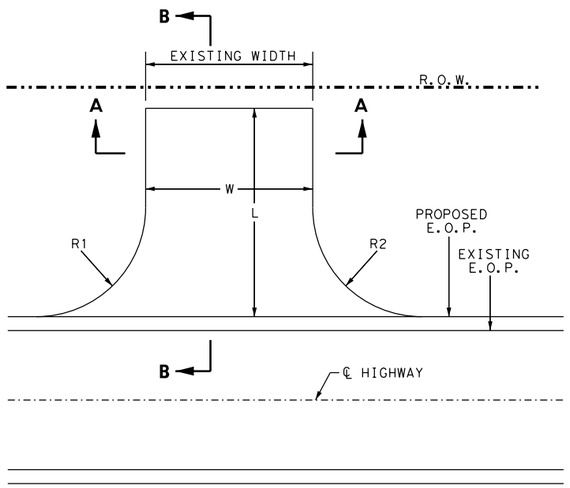
SUBMITTAL

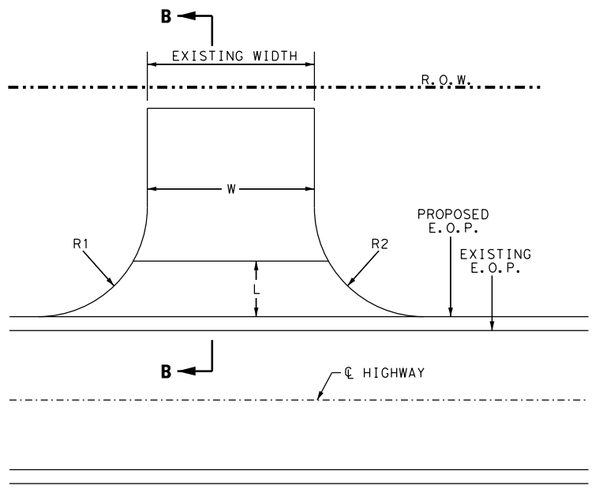
DRIVEWAY BASE SURFACE

N.T.S.



DRIVEWAY ACP SURFACE

N.T.S.



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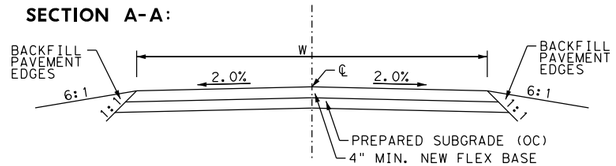

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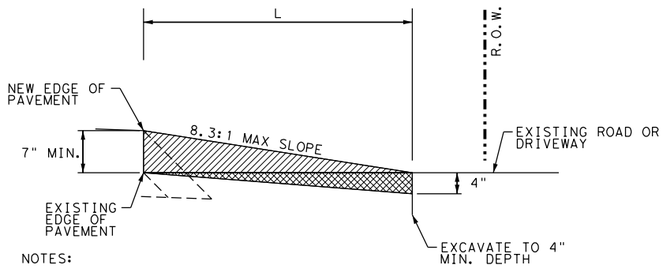
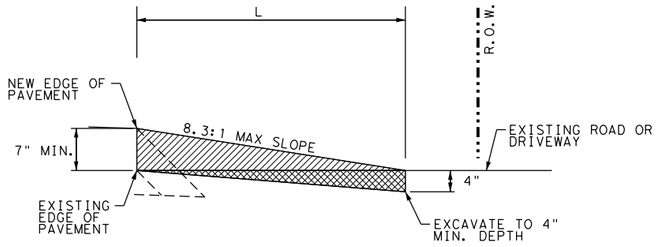


NOTES:

1. THIS WORK WILL BE MEASURED AND PAID FOR AS: "DRIVEWAYS (BASE)".
2. DIMENSIONS W, L, R1 AND R2 ARE PROVIDED IN QUANTITY SUMMARY FOR DRIVEWAYS.

SECTION B-B:



HOT MIX WEDGE

N.T.S.

NOTES:

1. THIS WORK WILL BE MEASURED AND PAID FOR AS: "DRIVEWAYS (ACP)".
2. DIMENSIONS W, L, R1 AND R2 ARE PROVIDED IN QUANTITY SUMMARY FOR DRIVEWAYS.
3. DIMENSION W DOES NOT REPRESENT THE AVERAGE WIDTH OF WEDGE AREA TO BE PAID.
4. HMA WILL BE TY C UNLESS OTHERWISE APPROVED BY THE ENGINEER.

STATE OF TEXAS
PAUL A. WARDEN
101319
LICENSED
PROFESSIONAL ENGINEER

Paul A. Warden, P.E. 5/24/2023

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Texas Department of Transportation

FM 512

DRIVEWAY DETAILS

SHEET 1 OF 2

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	83
CONTROL	SECTION	JOB	
0579	02	014	

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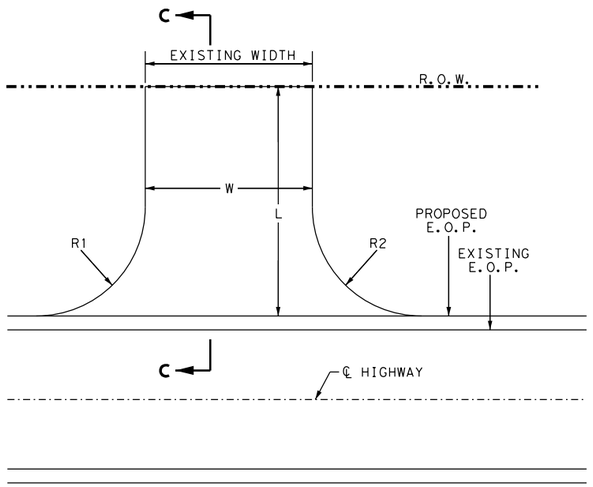
SUBMITTAL

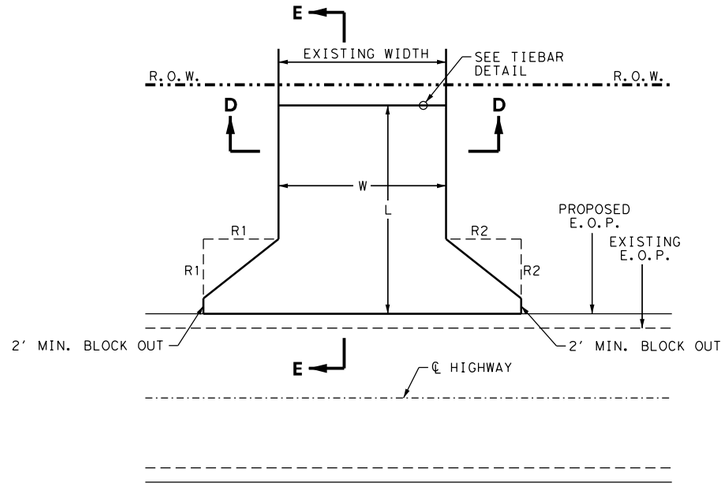
INTERSECTION (SURF TEAT)

N.T.S.

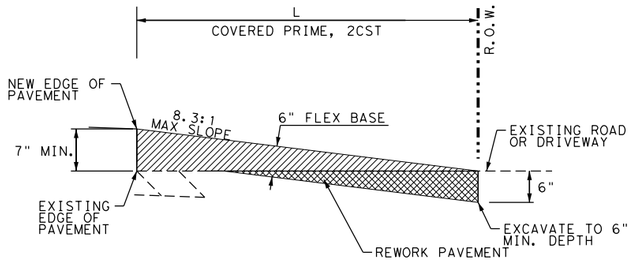


CONCRETE DRIVEWAY

N.T.S.



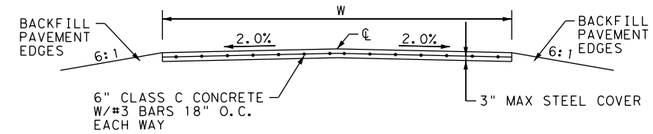
SECTION C-C:



NOTES:

1. THIS WORK WILL BE MEASURED AND PAID FOR AS: "INTERSECTION (SURF TREAT)".
2. DIMENSIONS W, L, R1 AND R2 ARE PROVIDED IN QUANTITY SUMMARY FOR DRIVEWAYS.
3. DIMENSION W DOES NOT REPRESENT THE AVERAGE WIDTH OF WEDGE AREA TO BE PAID.

SECTION D-D:



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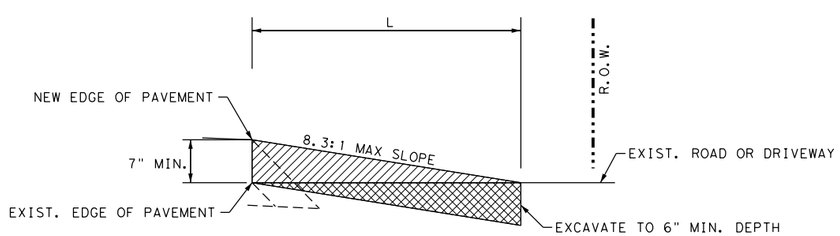

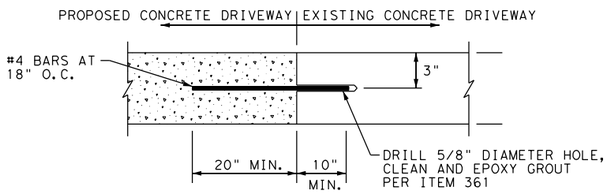

TIE-BAR DETAIL

N.T.S.

NOTES:

1. THIS WORK WILL BE MEASURED AND PAID FOR AS: DRIVEWAYS (CONC).
2. DIMENSIONS W, L, R1 AND R2 ARE PROVIDED IN QUANITY SUMMARY FOR DRIVEWAYS.

STATE OF TEXAS
PAUL A. WARDEN
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Texas Department of Transportation

FM 512

DRIVEWAY DETAILS

SHEET 2 OF 2

			HIGHWAY NO.
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	PARIS	HUNT	84
CONTROL	SECTION	JOB	
0579	02	014	

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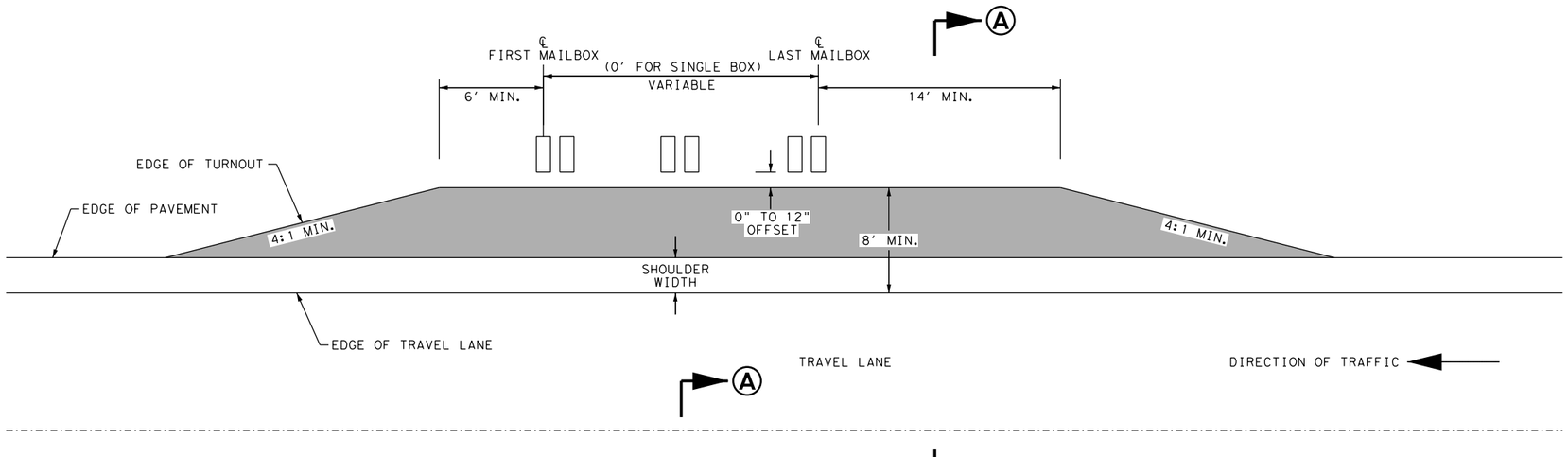

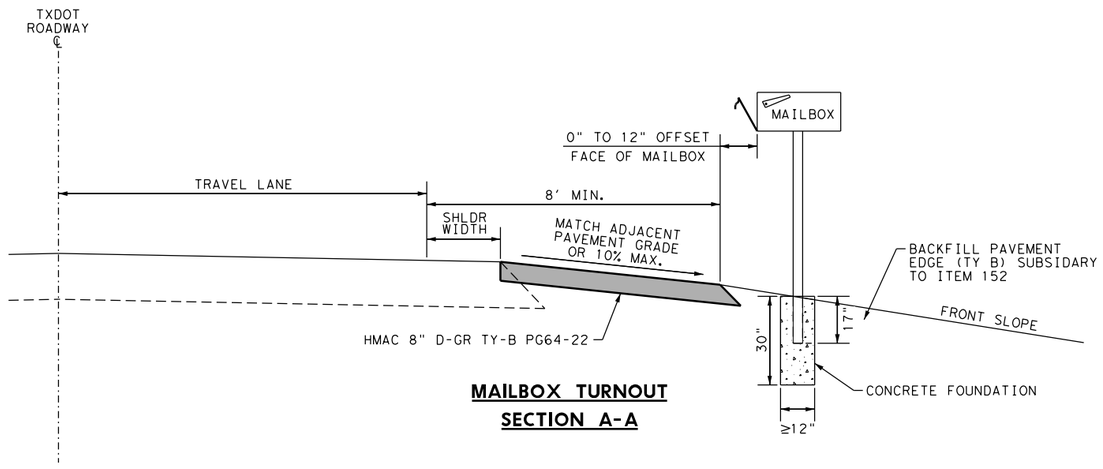

MAILBOX TURNOUT
SECTION A-A

STATE OF TEXAS
PAUL A. WARDEN
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FM 512

MAILBOX TURNOUT DETAILS

SHEET 1 OF 1

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	85
CONTROL	SECTION	JOB	
0579	02	014	

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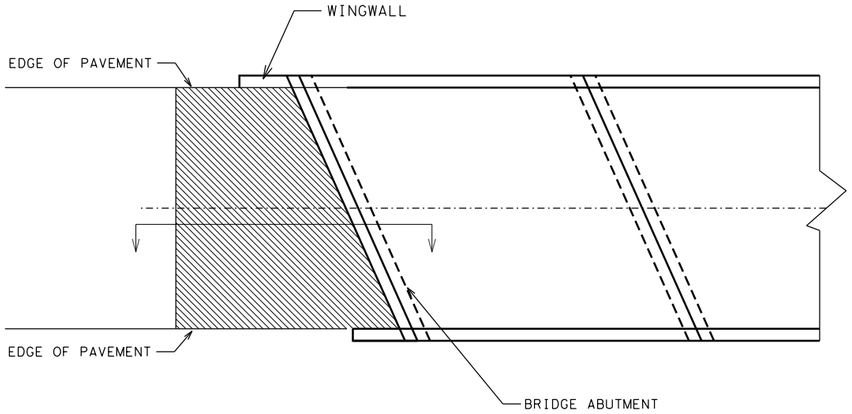
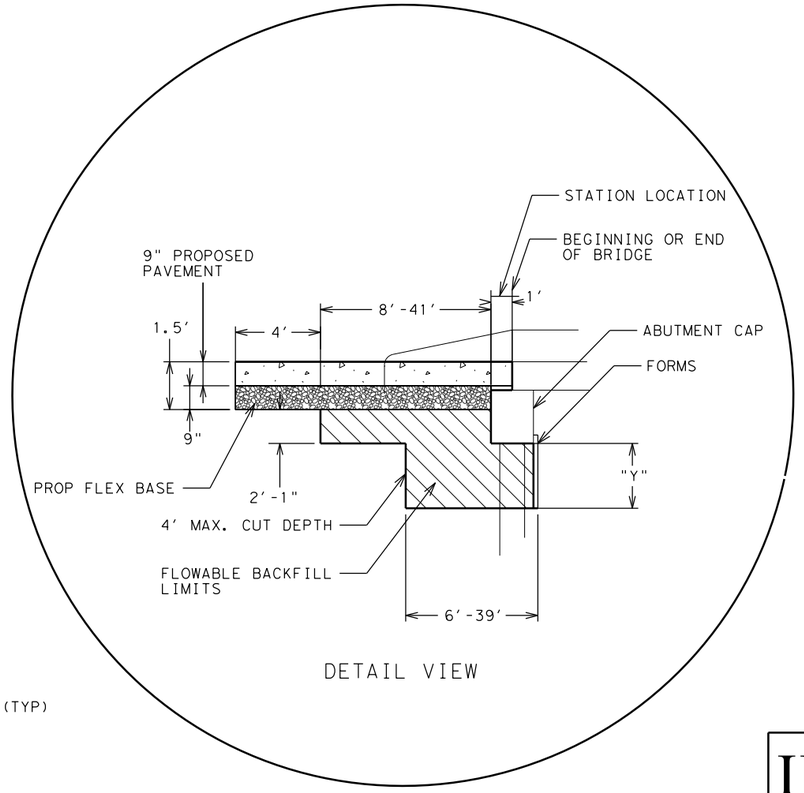
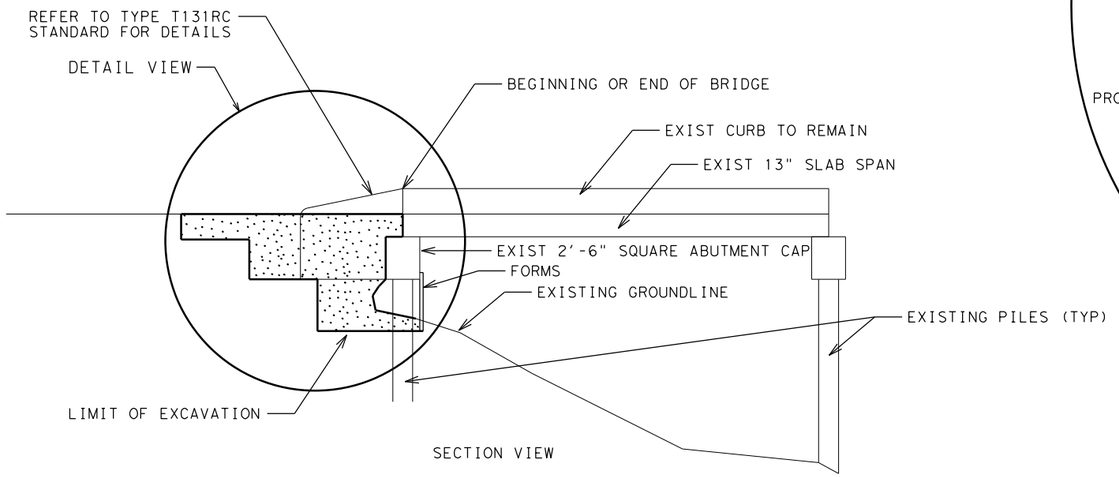


ABUTMENT QUANTITIES					
			110-6003	247-6242	401-6001
LOCATION	STA	"Y"	EXCAVATION (SPECIAL)	FL BS (CMP IN PLACE)(TY A GR 4)(9")	FLOWABLE BACKFILL
		FT	CY	SY	CY
RAYS CREEK	452+54.00	2	106.6	73.6	82.6
		TOTAL	106.6	73.6	82.6



DETAIL VIEW



SECTION VIEW

NOTES:

1. IT IS THE CONTRACTOR'S RESPONSABILITY TO VERIFY ALL DIMENSIONS AND ELEVATION PRIOR TO COMMENCING ANY CONSTRUCTION.

Paul A. Warden, P.E. 5/24/2023

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Texas Department of Transportation

FM 512

ABUTMENT EROSION REPAIR DETAILS

SHEET 1 OF 1

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	86
CONTROL	SECTION	JOB	
0579	02	014	

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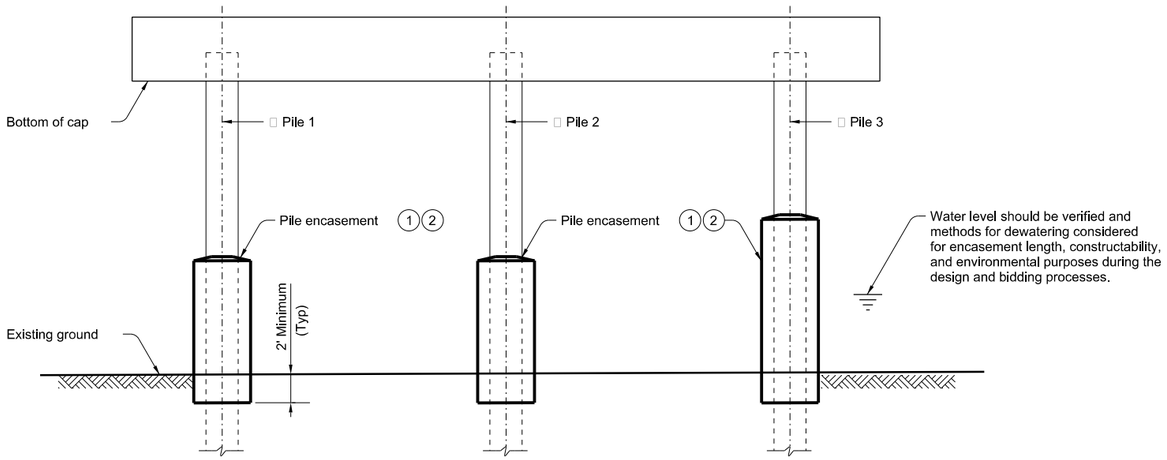
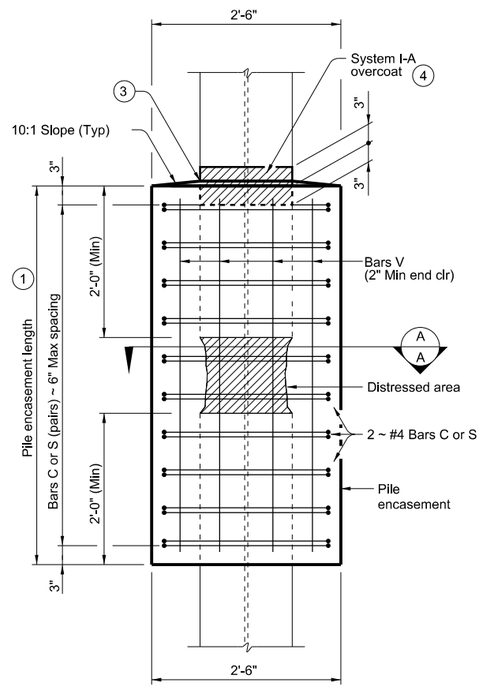


TYPICAL BENT ELEVATION

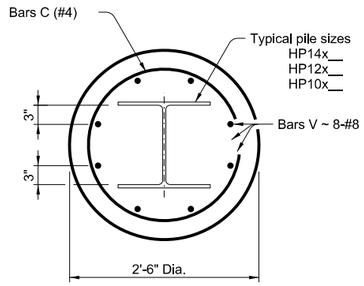
(Looking upstation)

TABLE OF PILE ENCASEMENT LENGTHS			
Bent	Pile	Length of Pile Encasement (ft)	Bent Total (ft)
2	1	5	15
	2	5	
	3	5	
3	1	5	15
	2	5	
	3	5	
4	1	5	15
	2	5	
	3	5	
		Total	45

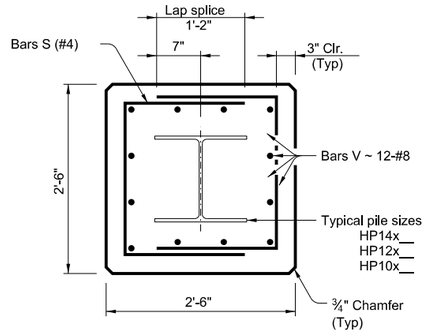


ELEVATION OF PILE ENCASEMENT

1. See Table of Pile Encasement Lengths.
2. Field adjust encasement length based on actual conditions.
3. Seal gap with Class 4 or Class 7joint sealant (DMS-6310).
4. Apply System I-A overcoat (or alternate coating system, as specified) per Item 446, "Field Cleaning and Painting Steel" to an area covering 3" above and 3" below the top of concrete encasement as shown. Refer to Painting Notes for more information. Payment for this work is subsidiary to Item 420, "Concrete Substructures."

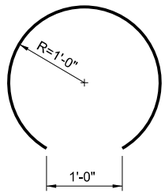


ROUND ENCASEMENT

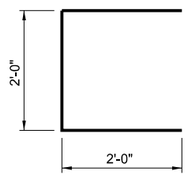


SQUARE ENCASEMENT

SECTION A-A



BAR C (#4)



BAR S (#4)

Arrange Bar C pairs to provide 1'-0" opening on opposite faces:

PILE ENCASEMENT PROCEDURE:

1) Verify channel line elevations and report to the Engineer for possible adjustments.
2) Submit a concrete mix design and procedures for casting the encasements for approval.
3) Clean mud, grease, loose rust, and paint off the section of H-piling to be encased with hand tools and high pressure water.
4) Place and secure the steel reinforcement and install formwork.
5) Place the concrete in the encasement per approved procedures and in accordance with Item 420, "Concrete Substructures."
6) Leave forms in-place for at least 48 hours.

PAINTING NOTES:

1) Clean the area to be painted with hand tools and high pressure water blasting.
2) Apply a minimum of 4.0 mils DFT coating conforming to DMS-8105 as shown.
3) Allow coating to cure a minimum of 24 hours prior to placing concrete.

GENERAL NOTES:

Verify dimensions for steel H-piling encasements and ground elevations. Pile Encasement Length may be adjusted by the Engineer based on actual channel and ground line elevations.

Existing conditions may be under water. Contractor is responsible for dewatering. Payment for dewatering is subsidiary to Item 420, "Concrete Substructures." The Contractor may submit a plan that adequately demonstrates the ability to perform the repairs without dewatering to the Engineer for approval. If approved, dewatering may be waived.

Obtain approval for the mix design and the construction procedures before beginning work.

If underwater placement is approved, concrete mix should be designed for underwater placement and may require the use of anti-washout admixtures.

Provide concrete for the H-piling encasement capable of attaining an average concrete compressive strength of 3,000 psi within 24 hours and consisting of coarse aggregate grades not greater than No. 5 (¾"). Provide a concrete mix with 2 gallons of corrosion inhibitor per CY.

Pile encasement will be paid for per the unit bid price for each linear foot of encasement, per Item 420, "Concrete Substructures." Payment for collars is subsidiary to Item 420, "Concrete Substructures."

Provide Grade 60 reinforcing steel.

Texas Department of Transportation | Bridge Division

PILE ENCASEMENT DETAILS

NBI: 01-117-0-0579-02-001

FILE: WD-PED-22.dgn	DN:	CK:	DW:	CK:
©TxDOT August 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0579	02	014	FM 512
	DIST	COUNTY		SHEET NO.
	PARIS	HUNT		87

DATE: 5/24/2023
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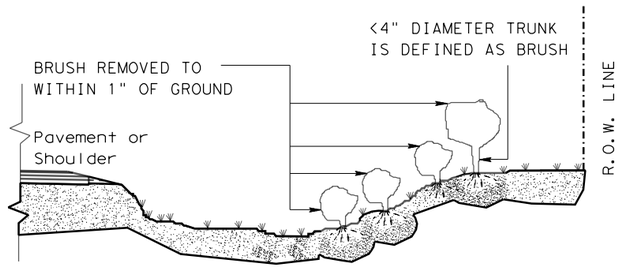
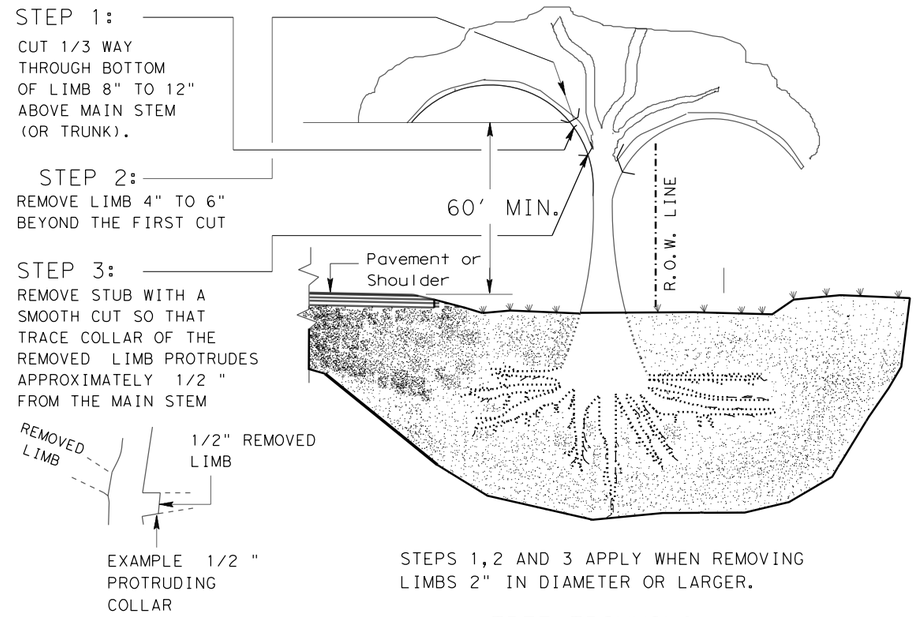
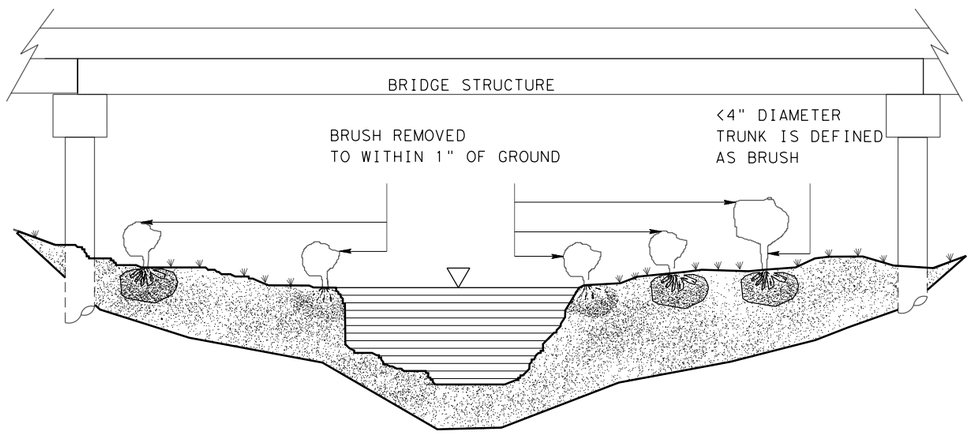


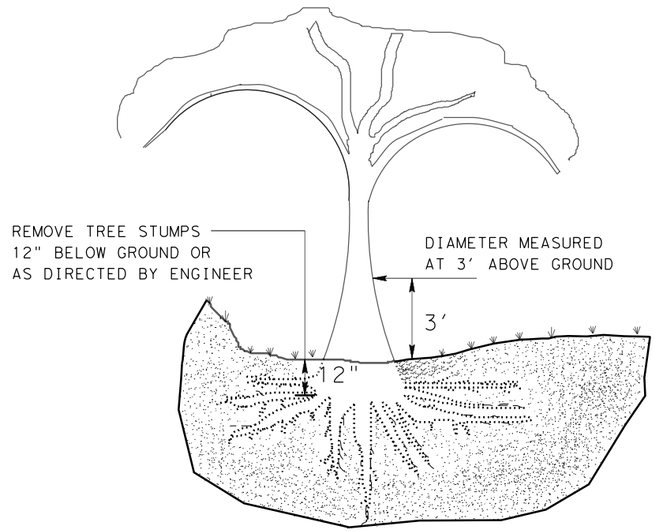
BRUSH REMOVAL



TREE TRIMMING



BRUSH REMOVAL UNDER BRIDGE AND IN CHANNEL



TREE REMOVAL

SPECIFIC LOCATION SPECIFIED IN PLANS

STATE OF TEXAS
PAUL A. WARDEN
101319
LICENSED
PROFESSIONAL ENGINEER

Paul A. Warden, P.E. 5/24/2023

FM 512
TREE TRIMMING & BRUSH REMOVAL

SHEET 1 OF 1

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0579	02	014	FM 512
DIST	COUNTY		SHEET NO.
PARIS	HUNT		88

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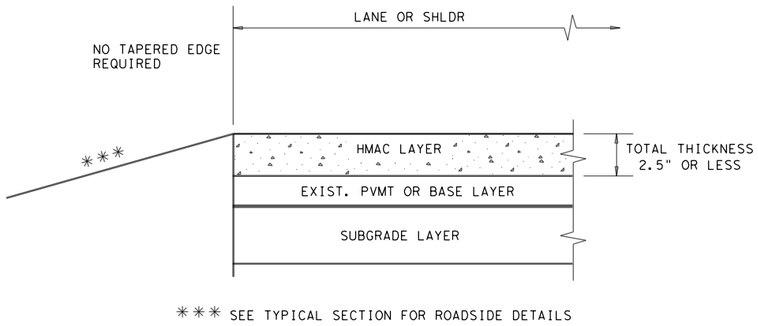
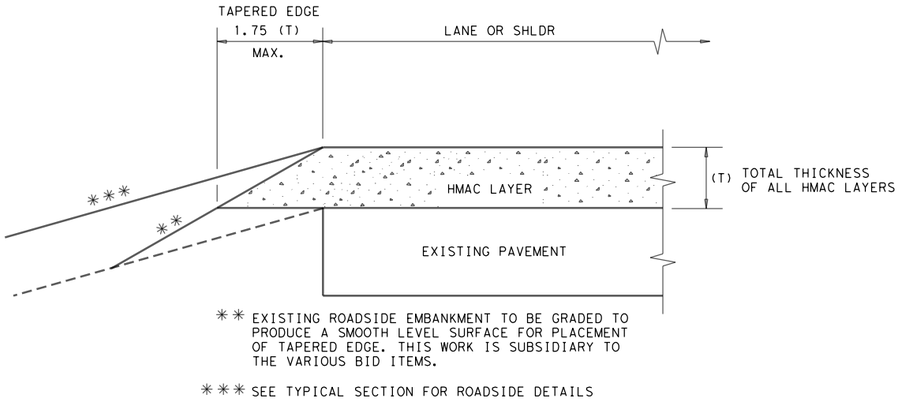
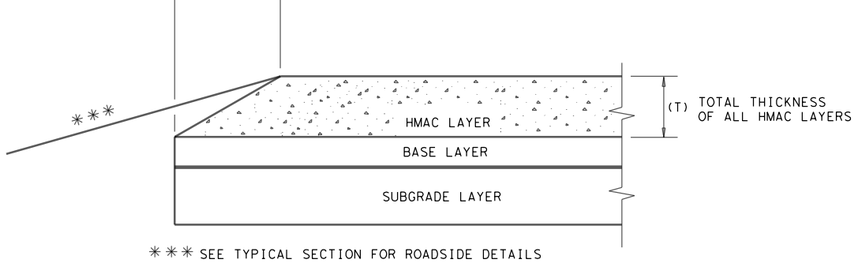


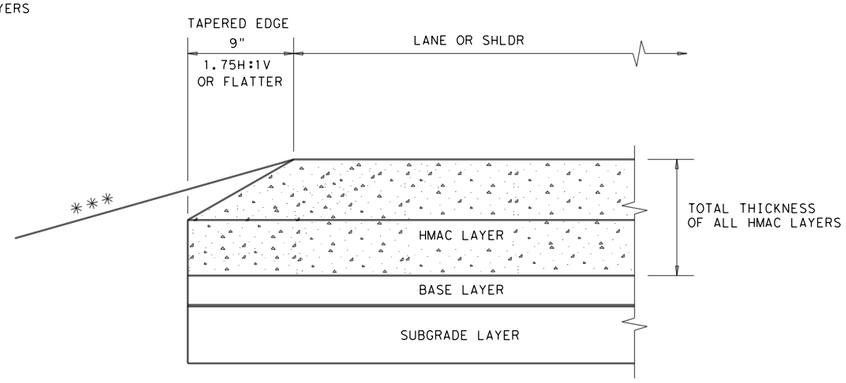
CONDITION - 1
THIN HMAC SURFACES OR HMAC OVERLAY
WITH THICKNESS OF 2.5" OR LESS



CONDITION - 2
OVERLAY OF EXISTING PAVEMENT
HMAC THICKNESS 2.5" TO 5"



CONDITION - 3
NEW OR RECONSTRUCTED PAVEMENT
HMAC THICKNESS 2.5" TO 5"



CONDITION - 4
NEW OR RECONSTRUCTED PAVEMENT
HMAC THICKNESS 5" OR GREATER

GENERAL NOTES

1. UNLESS OTHERWISE SHOWN IN THE PLANS, A VERTICAL EDGE IS PERMISSIBLE FOR HMAC PLACED GREATER THAN 5" BELOW THE EDGE OF PAVEMENT AND FOR THICKNESS OF HMAC LESS THAN 2.5".
2. FOR FURTHER INFORMATION REGARDING THE ROADSIDE AND PAVEMENT DETAILS, SEE TYPICAL SECTIONS.
3. PAYMENT FOR TAPERED EDGE WILL BE IN ACCORDANCE WITH APPLICABLE ITEMS IN THE CONTRACT.
4. THE SLOPE OF THE TAPERED EDGE SHALL BE 1.75H:1V OR FLATTER.
5. THE TAPERED EDGE SHALL BE PRODUCED BY USE OF A SCREED ATTACHMENT CAPABLE OF PRODUCING A SMOOTH COMPACTED SURFACE. ADDITIONAL COMPACTING EFFORT BEHIND THE SCREED IS NOT REQUIRED.

(NOT TO SCALE)

Texas Department of Transportation | Design Division Standard

TAPERED EDGE DETAILS
HMAC PAVEMENT

TE(HMAC)-11

FILE: tehmac11.dgn	DN: TxDOT		CK: RL	DW: KB		CK:	
©TxDOT January 2011	CONT	SECT	JOB		HIGHWAY		
REVISIONS	0579	02	014		FM 512		
	DIST	COUNTY				SHEET NO.	
	PARIS	HUNT				89	

DATE: 5/24/2023 6:20:25 PM
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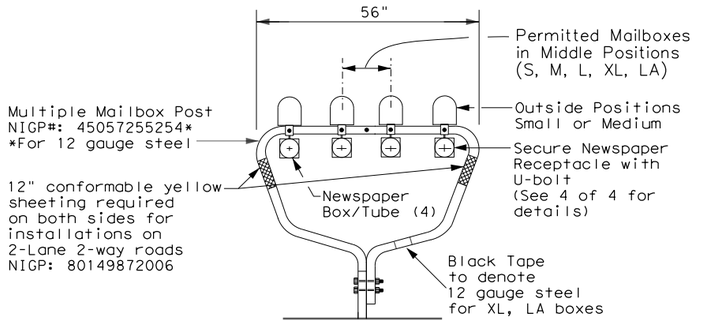
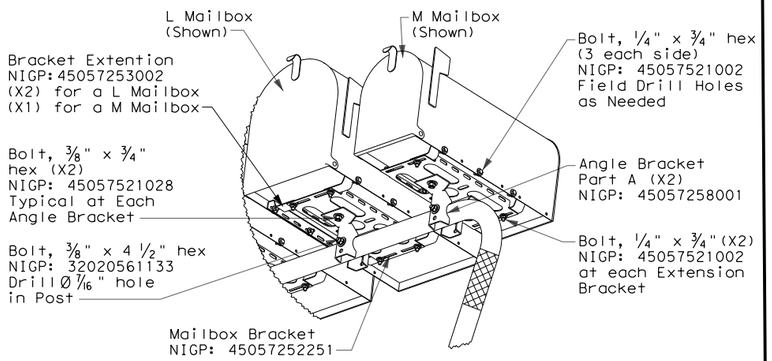
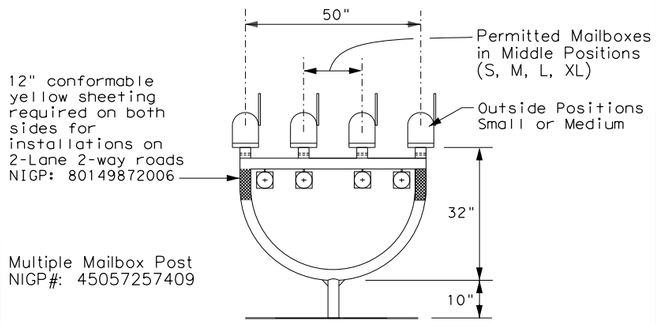
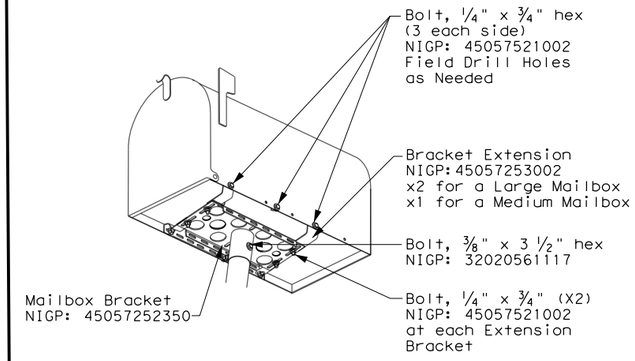
TYPE 1 - MULTIPLE





TYPE 4 - MULTIPLE





MAILBOX SIZES

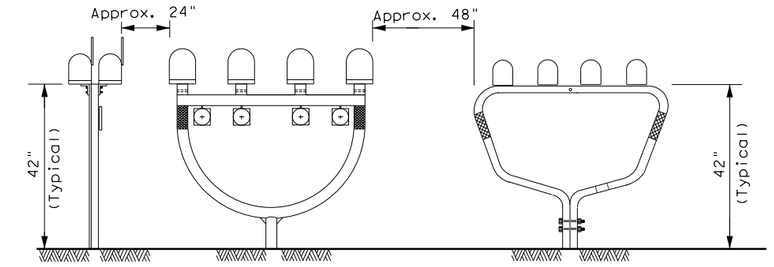
MAILBOX SIZE	TYPICAL DIMENSIONS			MAX **
	LENGTH	WIDTH	HEIGHT	WEIGHT
SMALL	19 1/2"	6"	7"	6 LBS
MEDIUM	22 1/2" *	8" *	11 1/2" *	8 LBS
LARGE	23 1/2"	11 1/2"	13 1/2"	11 LBS
EXTRA LARGE	18"	14"	12"	13 LBS
LOCKABLE	18"	11 1/2"	15"	23 LBS

* 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.

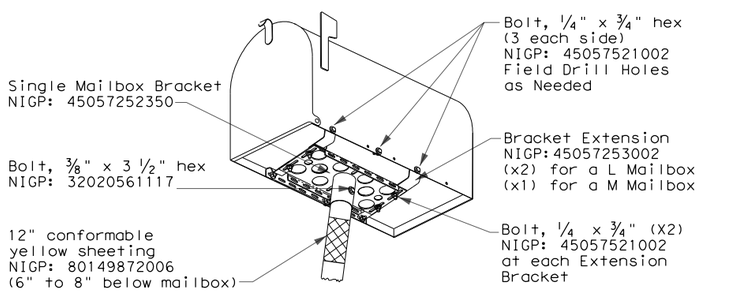
TYPICAL INSTALLATION MEASUREMENTS

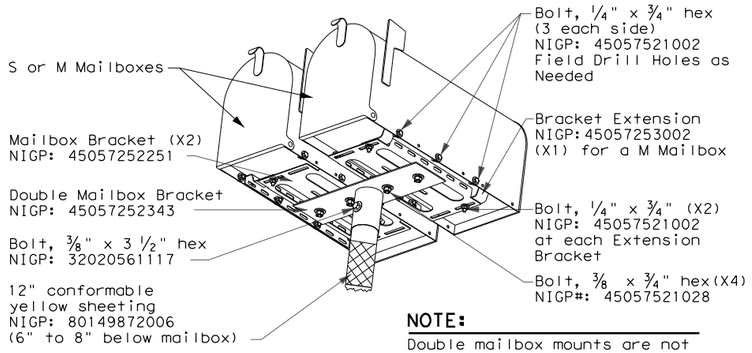


NOTE:

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

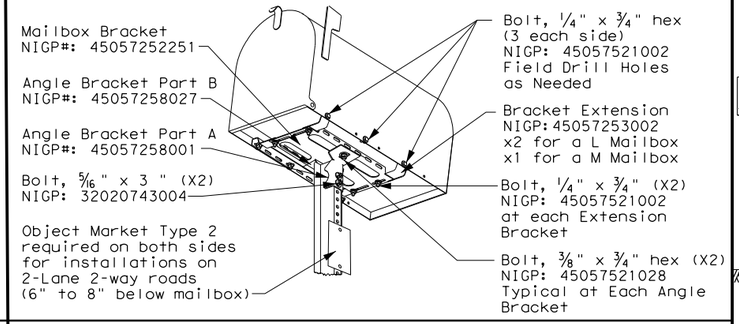


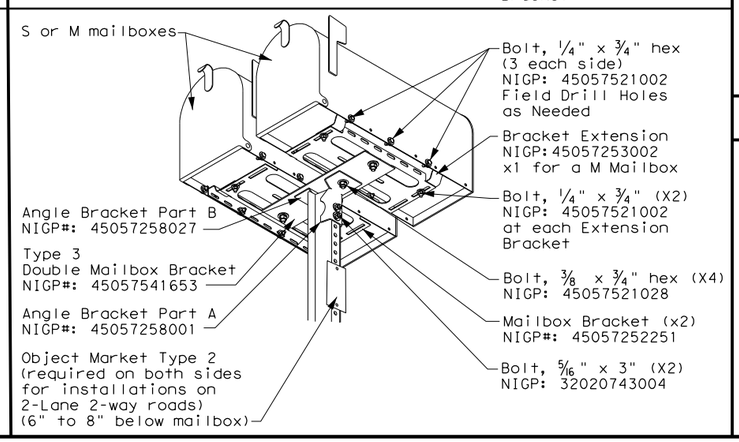


NOTE:

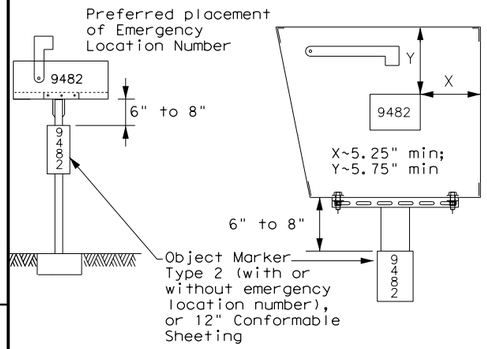
Double mailbox mounts are not allowed with a type 4 multiple mailbox installation

TYPE 3 - SINGLE/DOUBLE





PLACEMENT OF EMERGENCY LOCATION NUMBER

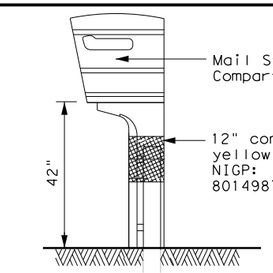


NOTES:

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	0579	02	014	FM 512
	DIST	COUNTY		SHEET NO.
	PARIS	HUNT		90

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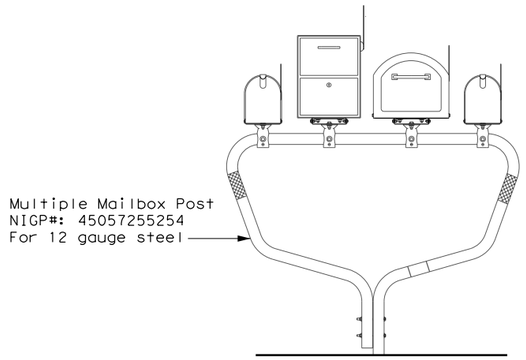
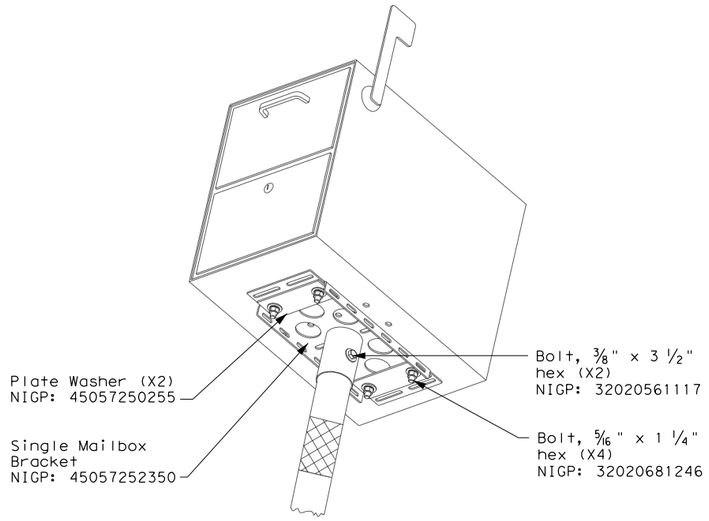
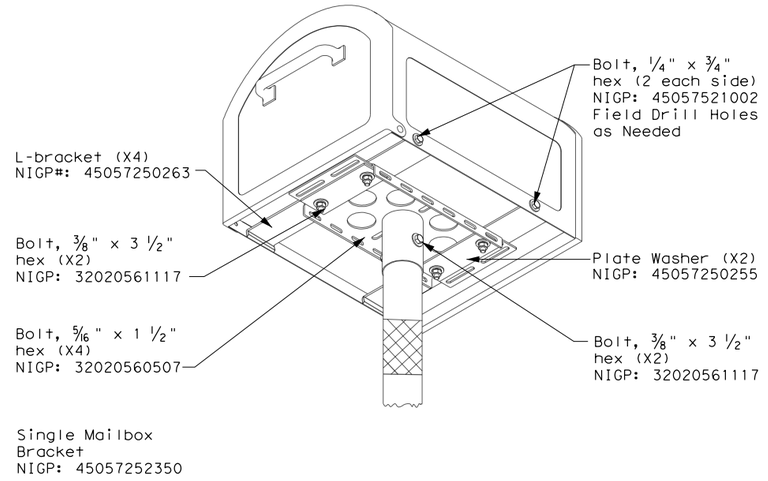
TYPE 1- MULTI LOCKABLE AND XL MAILBOX



TYPE 2/4 - SINGLE LOCKABLE MAILBOX

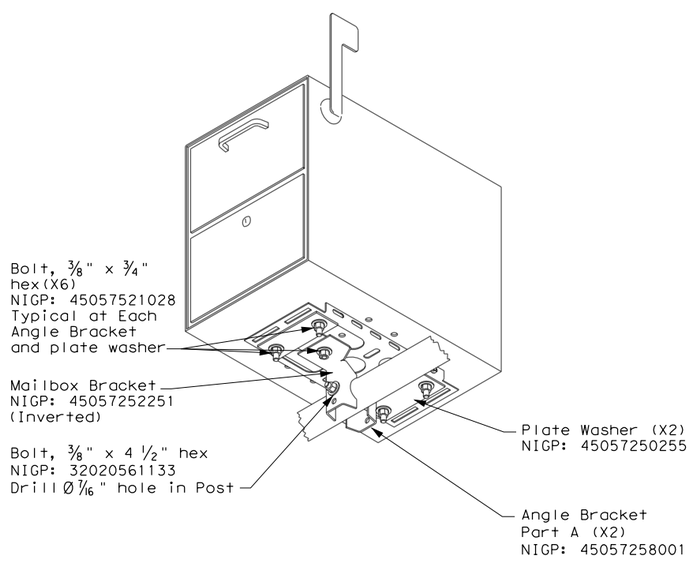


TYPE 2/4 - SINGLE XL MAILBOX

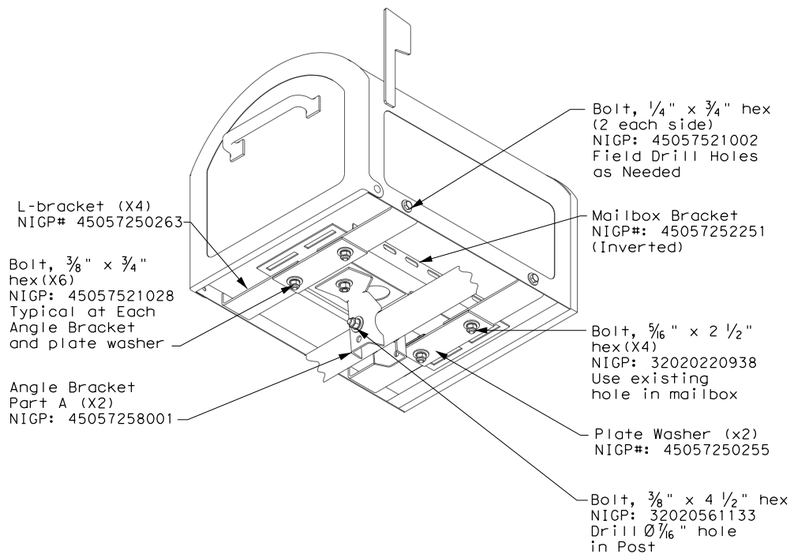


NOTE:
Follow same configuration when mounting an XL mailbox on a Type 4 multi post.

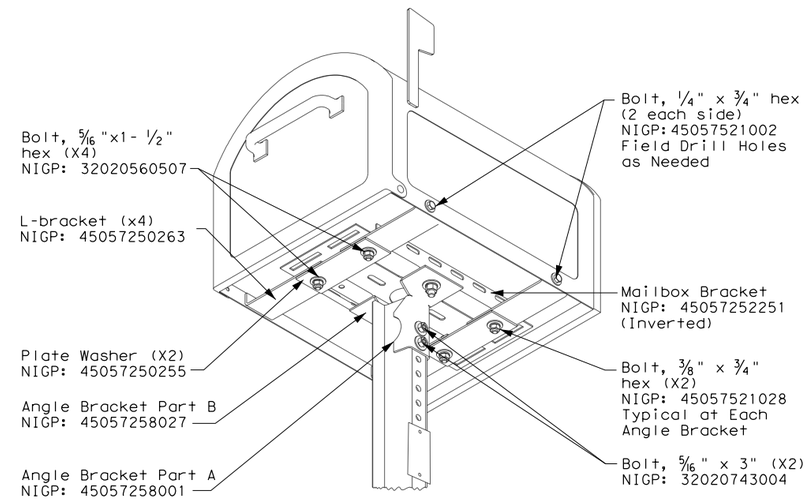
TYPE 1 MULTI – LOCKABLE ARCHITECTURAL (LA)



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	0579	02	014	FM 512
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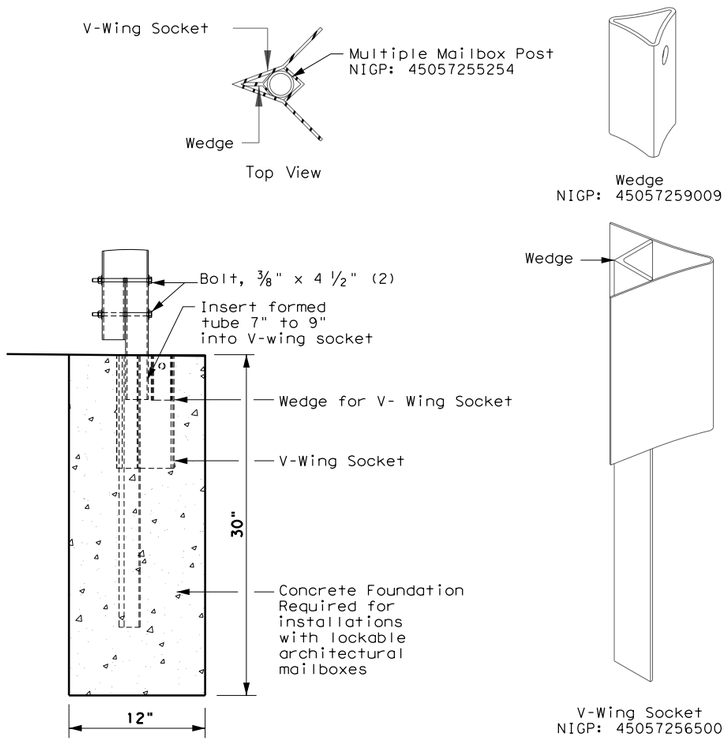
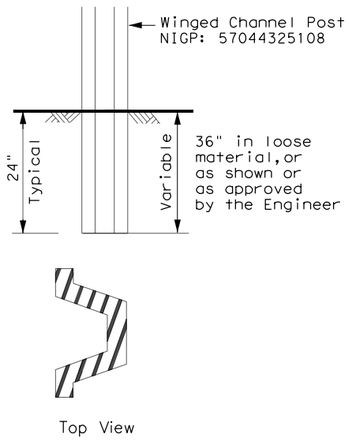
TYPE 1 - SUPPORT/FOUNDATION

Thin Wall Tube w/ V-LOC Anchorage



TYPE 3 - SUPPORT/FOUNDATION

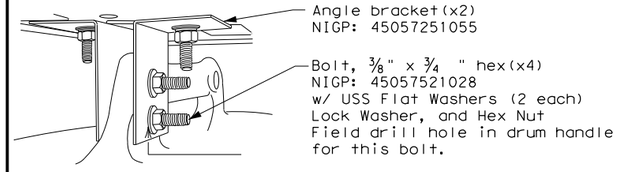


NOTES:

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:

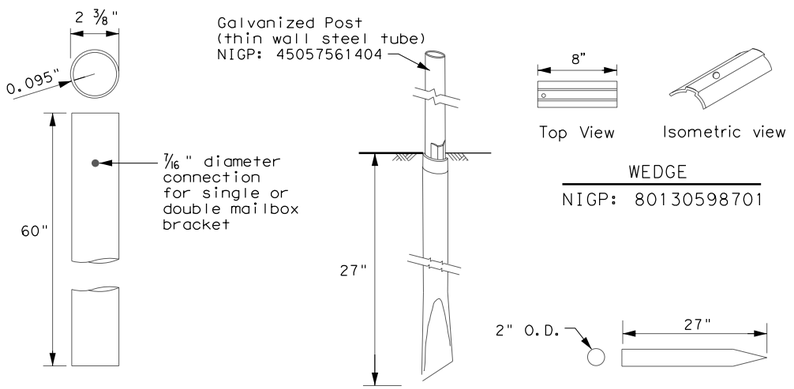
1. Place on approved plastic drum as shown in the Compliant Work Zone Traffic Control Devices (CWZTCD).
2. Existing attachment hardware shall be used unless damaged. Damaged hardware shall be replaced.

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

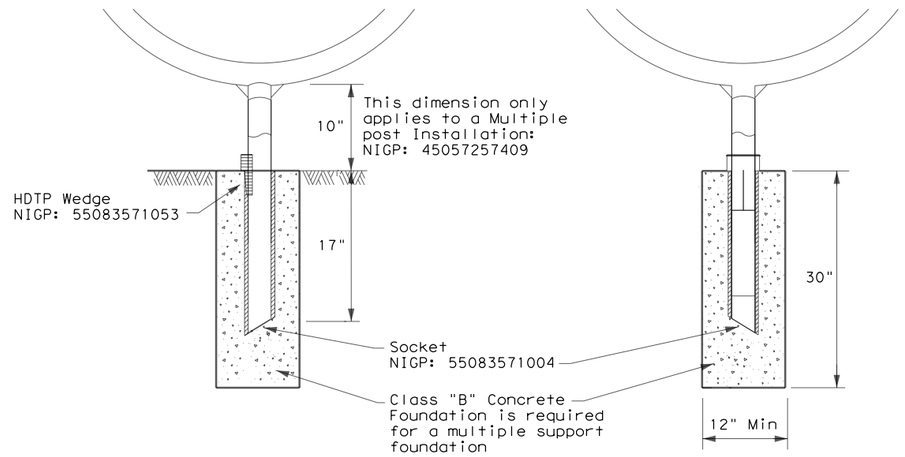


MAILBOX POST

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

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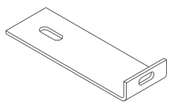
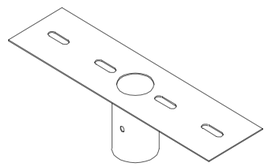
©TxDOT March 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS 2/2005 11/2009 4/2015 6/2005 1/2011 11/2006 7/2014	0579	02	014	FM 512
	DIST	COUNTY		SHEET NO.
	PARIS	HUNT		92

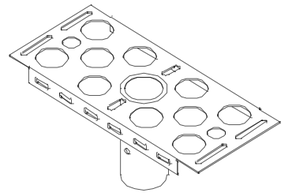
TYPE	TYPE 1	TYPE 2	TYPE 3	TYPE 4			TYPE 5	TYPE 6
Configuration	Multiple	Single or Double	Single or Double	Single	Double	Multiple	Single	Single
Mailbox Size NIGP #	Outside Position: S or M Inside Position: S, M, L, XL, or LA	Single: S, M, L, XL, or LA Double: SS, SM, MM	Single: S, M, L, or XL Double: SS, SM, MM	S, M, L, XL, or LA	SS, SM, or MM	Outside Position: S or M Inside Position: S, M, L, or XL	Molded Plastic	S, or M
Mailbox Post NIGP #	45057255254 (Galvanized Multiple)	45057561404 (Thin Walled Gavanize)	57044325108 (Wing Channel Post)	45057561107 (Thin walled white powder coated) 45057561057 (Recycled Rubber Post: S or M only)	45057561107 (Thin Walled White Powder Coated)	45057257409 (White Powder Coated Multiple)	4x4 Timber	Construction Barrel
Post and Mailbox Hardware NIGP #	45057259009 (Wedge) 45057256500 (V-Wing Socket) 45057253002 (Bracket Extension) 45057252251 (Mailbox Bracket) 45057258001 (Part A Angle Bracket x2) 45057250255 (Plate Washer for XL/LA x2) 45057250263 (L-Bracket for XL x4)	80130598701 (Wedge) 80130238407 (Wedge Anchor) 45057253002 (Bracket Extension) 45057252343 (Double MB Bracket) 45057252350 (S. Mailbox Bracket) 45057252251 (Mailbox Bracket) 45057250255 (Plate Washer for XL/LA x2) 45057250263 (L-Bracket forXL x4)	45057541653 (Type 3 Double Mailbox Bracket) 45057252251 (Mailbox Bracket) 45057253002 (Bracket Extension) 45057258001 (Part A Angle Bracket) 45057258027 (Part B Angle Bracket) 45057250255 (Plate Washer for XL x2) 45057250263 (L-Bracket for XL x4)	55083571053 (Wedge) 55083571004 (Socket) 45057252350 (Single Mailbox Bracket) 45057253002 (Bracket Extension) 45057250255 (Plate Washer for XL/LA x2) 45057250263 (L-Bracket for XL x4)	55083571053 (Wedge) 55083571004 (Socket) 45057253002 (Bracket Extension) 45057252343 (Double Mount Bracket) 45057252251 (Mailbox Bracket x2)	55083571053 (Wedge) 55083571004 (Socket) 45057253002 (Bracket Extension) 45057252350 (Single Mount Bracket) 45057250255 (Plate Washer for XL x2) 45057250263 (L-Bracket for XL x4)	None	45057251055 Angle Bracket (x2)
Foundation Used	Class B Concrete (Required for LA Mailboxes)	Class B Concrete (Required for LA Mailboxes)	None	Class B Concrete (not used with recycled rubber post, required for LA Mailboxes)	Class B Concrete (not required)	Class B Concrete	None	None



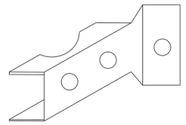
NIGP: 45057250263
L-Bracket x4 for
XL sized mailboxes



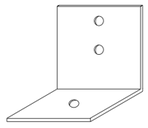
NIGP: 45057252343
Double Mailbox Bracket
For Type 2 and Type 4
double mount



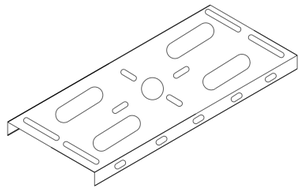
NIGP: 45057252350
Single Mailbox Bracket
For Type 2 single and for
Type 4 single and multi mount



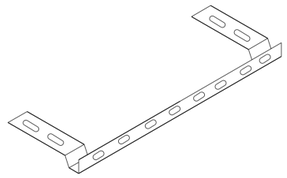
NIGP: 45057258001
Part "A" Angle Bracket
For Type 1 multi (2 per mailbox)
and Type 3 single and double



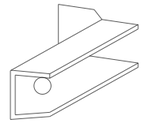
NIGP: 45057251055
Type 6 Angle Bracket
(2 per mailbox)



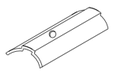
NIGP: 45057252251
Mailbox Bracket
For Type 1 multi and
any double mount (use 2)



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



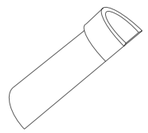
NIGP: 45057258027
Part "B" Angle Bracket
For Type 3 single
and double



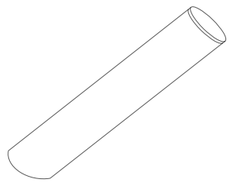
NIGP: 80130598701
Wedge for Type 2

NIGP: 45057250255
Plate Washer for Architecural
and XL Mailboxes

NIGP: 45057541653
Type 3 double mailbox bracket

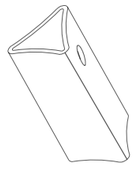


NIGP: 55083571053
Type 4 Mailbox Wedge

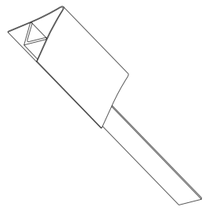


NIGP: 55083571004
Type 4 Mailbox Socket

NIGP: 80130238407
Type 2 Wedge Anchor



NIGP: 45057259009
Wedge for Type 1 V-wing Socket



NIGP: 45057256500
V-wing Socket for
Type 1 Foundation

NIGP #	OBJECT MARKERS AND CONFORMABLE SHEETING
55008311759	Type 2 OM 4"x4" (3 Needed) for Type 3 Wing Channel Post
55008312906	Type 2 OM 6"x12" (1 needed) for Type 3 Wing Channel Post
80149872006	12" Conformable Reflective Yellow Sheeting for Flexible Posts

NOTES:

1. Type 2 object marker in accordance with Traffic Engineering Standard Delineators & Object Markers.
2. A light weight receptacle for newspaper delivery can be attached to mailbox posts if the receptacle does not touch the mailbox, present a hazard to traffic or delivery of the mail, extend beyond the front of the mailbox, or display advertising, except the publication title.

BID CODES FOR CONTRACTS

MB-(X) ASSM TY (XXX) (X)

Type of Mailbox
- S = Single
- D = Double
- M = Multiple
- MP = Molded Plastic

Type of Post
- WC = Winged Channel Post
- RR = Recycled Rubber
- TWW = Thin Walled White Tubing
- TWG = Thin Walled Galvanized Tubing
- TIM = Timber

Type of Foundation
- Ty 1 = V-Loc
- Ty 2 = Wedge Anchor Steel System
- Ty 3 = Winged Channel post
- Ty 4 = Wedge Anchor Plastic System
- Ty 5 = 4 X 4 Post

Texas Department of Transportation — Maintenance Division Standard

NIGP PARTS LIST AND COMPATIBILITY

MB(4)-21

FILE: MB-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT March 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS 2/2005 11/2009 4/2015 6/2005 1/2011 11/2006 7/2014	0579	02	014	FM 512
	DIST	COUNTY		SHEET NO.
	PARIS	HUNT		93

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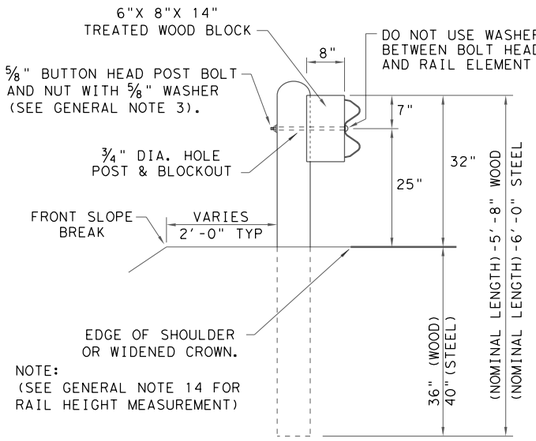
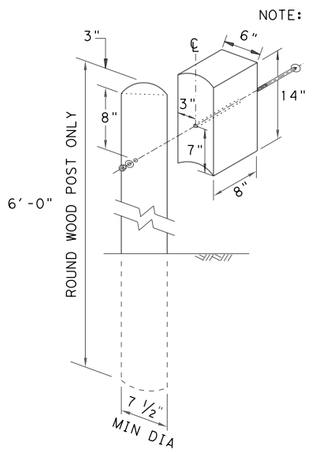
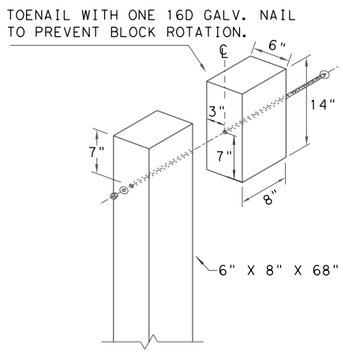


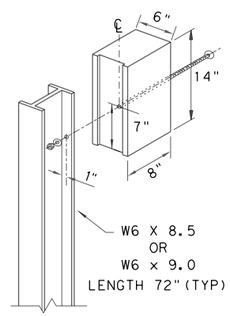
TYPICAL POST PLACEMENT



WOOD BLOCK TO ROUND WOOD POST

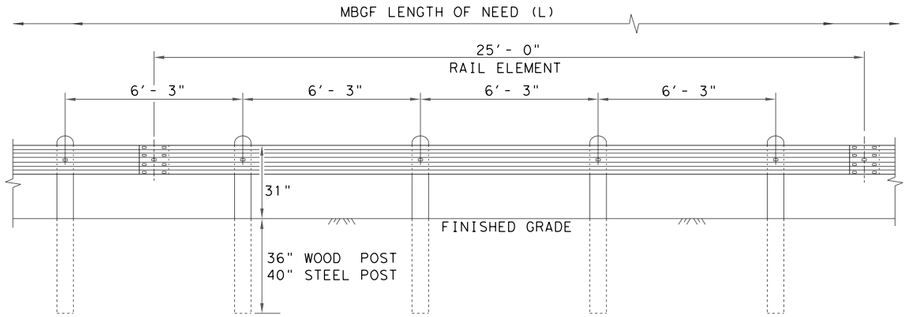


WOOD BLOCK TO RECTANGULAR WOOD POST



ROUTED WOOD BLOCK TO I-BEAM STEEL POST

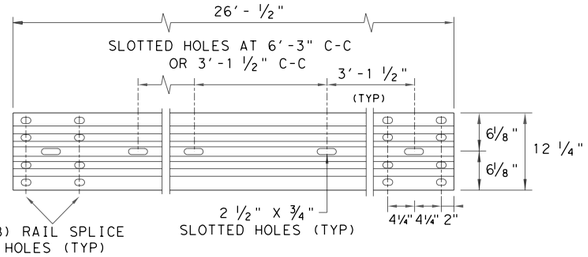
NOTE: ** "WOOD" INDICATES DIMENSIONS FOR BOTH ROUND AND RECTANGULAR WOOD POST SYSTEMS.



DIRECTION OF TRAFFIC

ELEVATION MID-SPAN RAIL SPLICE

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



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

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

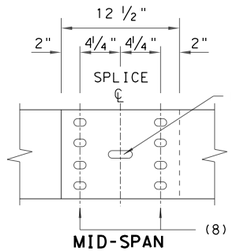
NOTE:
FOUR TYPES OF BUTTON-HEAD GUARD RAIL
BOLTS COME WITH A RECCESSED NUT.

SPLICE BOLT LENGTH
FBBO1 = 1 ¼"
FBBO2 = 2"
VARIES
⅝"

POST & BLOCK LENGTH
FBBO3 = 10"
FBBO4 = 18"

BUTTON HEAD BOLT

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

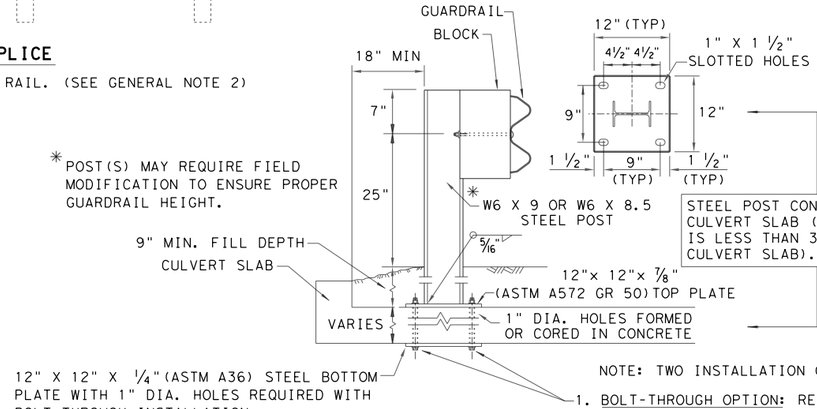


DIRECTION OF TRAFFIC

(8) ⅝" X 1 ¼" BUTTON HEAD SPLICE BOLTS WITH RECCESSED NUTS.

MID-SPAN RAIL SPLICE DETAIL

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



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

LOW FILL CULVERT POST

NOTE: TWO INSTALLATION OPTIONS.

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

2. EPOXY ANCHOR OPTION: THIS OPTION MAY ONLY BE USED IF THE CULVERT SLAB IS 9" MIN. THICK. THREADED ANCHOR RODS MUST BE ⅞" DIA. ASTM A449 OR A193 GRADE B7 WITH HEAVY HEX NUT, AND ONE HARDENED WASHER EACH. EMBED ANCHOR RODS 6" WITH HILTI HIT RE 500 EPOXY ADHESIVE. OTHER TYPE III CLASS C EPOXY ADHESIVES MEETING THE REQUIREMENTS OF DMS-6100, "EPOXIES AND ADHESIVES", MAY BE USED IF IT CAN BE DEMONSTRATED THAT THEY MEET OR EXCEED THE STRENGTH OF HILTI HIT RE 500 WITH THE SAME EMBEDMENT DEPTH AND THREADED ROD DIA. FOLLOW THE MANUFACTURER'S REQUIREMENTS FOR INSTALLING EPOXIED THREADED RODS. EXTEND RODS ¼" MIN. BEYOND NUT.

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

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

GENERAL NOTES

1. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST, OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. THE EXACT POSITION OF MBGF SHALL BE SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. STEEL POSTS TO BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING."
2. RAIL ELEMENTS SHALL MEET THE REQUIREMENTS OF ITEM 540,"METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED IN THE PLANS. THE CONTRACTOR MAY FURNISH RAIL ELEMENTS OF 25'- 0", OR 12'- 6" (NOM.) LENGTHS. RAIL ELEMENTS MAY HAVE SLOTTED HOLES AT 3'-1 ½" C-C OR 6'-3" C-C. A SPECIAL LENGTH OF RAIL MAY BE MANUFACTURED TO ACCOMMODATE THE DOWNSTREAM ANCHOR TERMINAL (DAT) AND THE TRANSITION SECTIONS OF GUARDRAIL.
3. BUTTON HEAD "POST BOLTS & NUTS" SHALL MEET THE REQUIREMENTS OF (ASTM A307), AND SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND ⅝" WASHER (FWC16a) AND NOT MORE THAN 1" BEYOND IT. TRIM REMAINING BOLT LENGTH TO MEET REQUIRED LENGTH.
4. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445,"GALVANIZING." FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
5. CROWN SHALL BE WIDENED TO ACCOMMODATE THE METAL BEAM GUARD FENCE.
6. THE LATERAL APPROACH TO THE GUARD FENCE, SHALL HAVE A MAXIMUM SLOPE OF 1V:10H.
7. IF SHOWN ELSEWHERE IN THE PLANS OR AS DIRECTED BY THE ENGINEER, THE GUARD FENCE MAY BE FLARED AT A RATE OF 25:1 OR FLATTER.
8. UNLESS OTHERWISE SHOWN IN THE PLANS, GUARD FENCE PLACED IN THE VICINITY OF CURBS SHALL BE POSITIONED SO THAT THE FACE OF CURB IS LOCATED DIRECTLY BELOW OR BEHIND THE FACE OF THE RAIL. RAIL PLACED OVER CURBS SHALL BE INSTALLED SO THAT THE POST BOLT IS LOCATED APPROXIMATELY 25 INCHES ABOVE THE GUTTER PAN OR EDGE OF SHOULDER.
9. APPLICATIONS IN SOLID ROCK ARE ONLY ALLOWED WITH STEEL POSTS. IF SOLID ROCK IS ENCOUNTERED WITHIN 0 TO 18" OF THE FINISHED GRADE, DRILL A 24" DIA. HOLE, 24" INTO THE ROCK. IF SOLID ROCK IS ENCOUNTERED BELOW 18", DRILL A 12" DIA. HOLE, 12" INTO THE ROCK OR TO THE STANDARD EMBEDMENT DEPTH, WHICHEVER MAYBE LESS. ANY EXCESS POST LENGTH, AFTER MEETING THESE DEPTHS, MAY BE FIELD CUT TO ENSURE PROPER GUARDRAIL MOUNTING HEIGHT. BACKFILL WITH COARSE AGGREGATE MATERIAL.
10. POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
11. SPECIAL FABRICATION WILL BE REQUIRED AT INSTALLATION LOCATIONS HAVING A CURVATURE OF LESS THAN 150 FT. RADIUS.
12. UNLESS OTHERWISE SHOWN IN THE PLANS, A COMPOSITE MATERIAL BLOCK THAT MEETS THE REQUIREMENTS OF DMS-7210,"COMPOSITE MATERIAL POSTS AND BLOCKS FOR METAL BEAM GUARD FENCE" MAY BE SUBSTITUTED FOR BLOCKS OF SIMILAR DIMENSIONS. THE CONSTRUCTION DIVISION, TXDOT MAINTAINS A MATERIAL PRODUCER LIST (MPL) FOR PRODUCERS OF MATERIALS CONFORMING TO DMS-7210 ONLY PRODUCERS ON THE MPL MAY FURNISH COMPOSITE MATERIAL BLOCKS.
13. FOR THE LOW FILL CULVERT OPTION, POSTS LOCATED PARTIALLY OR WHOLLY BETWEEN PRECAST BOX CULVERT UNITS, THE USE OF A CAST-IN-PLACE CONCRETE CLOSURE BETWEEN BOXES IS REQUIRED. THE LENGTH OF THE CAST-IN-PLACE CONCRETE CLOSURE SHALL ACCOMMODATE THE PLACEMENT OF THE LOW FILL CULVERT OPTION. SEE CONCRETE CLOSURE DETAILS ON BRIDGE STANDARD SCP-MD.
14. GUARDRAIL HEIGHT MEASUREMENT: WHEN THE GUARDRAIL IS LOCATED ABOVE PAVEMENT, MEASURE THE HEIGHT FROM THE PAVEMENT TO THE TOP OF THE W-BEAM RAIL. WHEN THE GUARDRAIL IS LOCATED UP TO 2 FT. OFF OF THE EDGE OF PAVEMENT OR FOR A PAVEMENT OVERLAY, USE A 10-FOOT STRAIGHTEDGE TO EXTEND THE PAVEMENT/SHOULDER SLOPE TO THE BACK OF RAIL, MEASURE FROM THE BOTTOM OF STRAIGHTEDGE TO THE TOP OF RAIL. FOR GUARDRAIL LOCATED DOWN A 10:1 SLOPE, MEASURE FROM THE NOMINAL TERRAIN.

Texas Department of Transportation

Design Division Standard

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

FILE: gf3119.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
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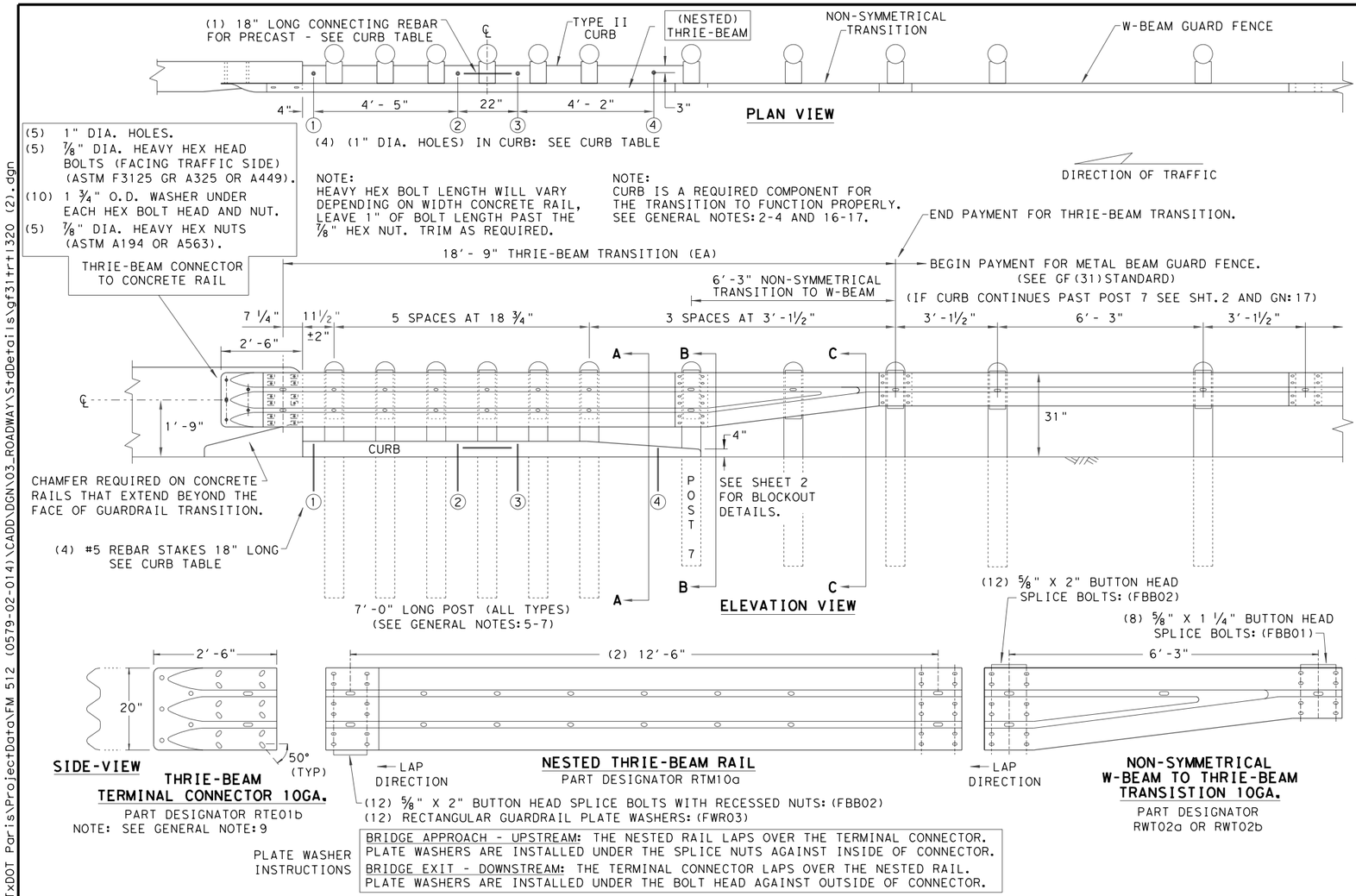


GENERAL NOTES

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.

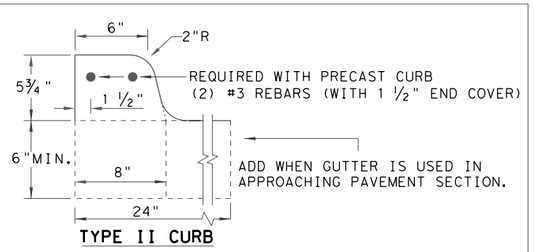
CURB (1) LENGTH 5'- 8"
CURB (2) LENGTH 6'- 6"
TAPER CURB (2) TO A HEIGHT OF 4" AT POST 7

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 DETAILS



TYPE II CURB

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

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	0579	02	014	FM 512
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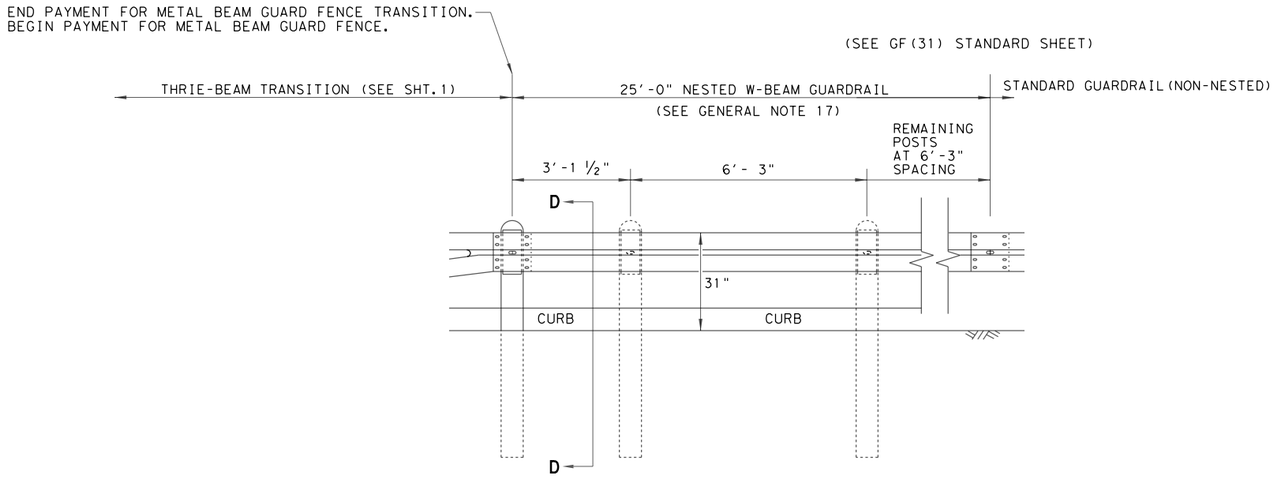
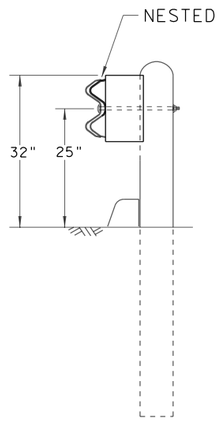
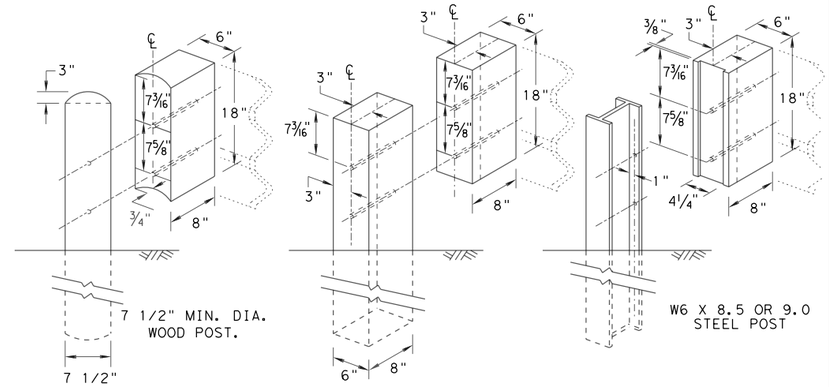
REQUIRED ALTERNATIVE FOR CONTINUOUS CURB EXTENDING PAST POST 7 (SEE SHT. 1 GENERAL NOTE 17)



ELEVATION VIEW



SECTION D-D



THRIE BEAM TRANSITION BLOCKOUT DETAILS

HIGH-SPEED TRANSITION

SHEET 2 OF 2

Texas Department of Transportation | Design Division Standard

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

GF(31)TR TL3-20

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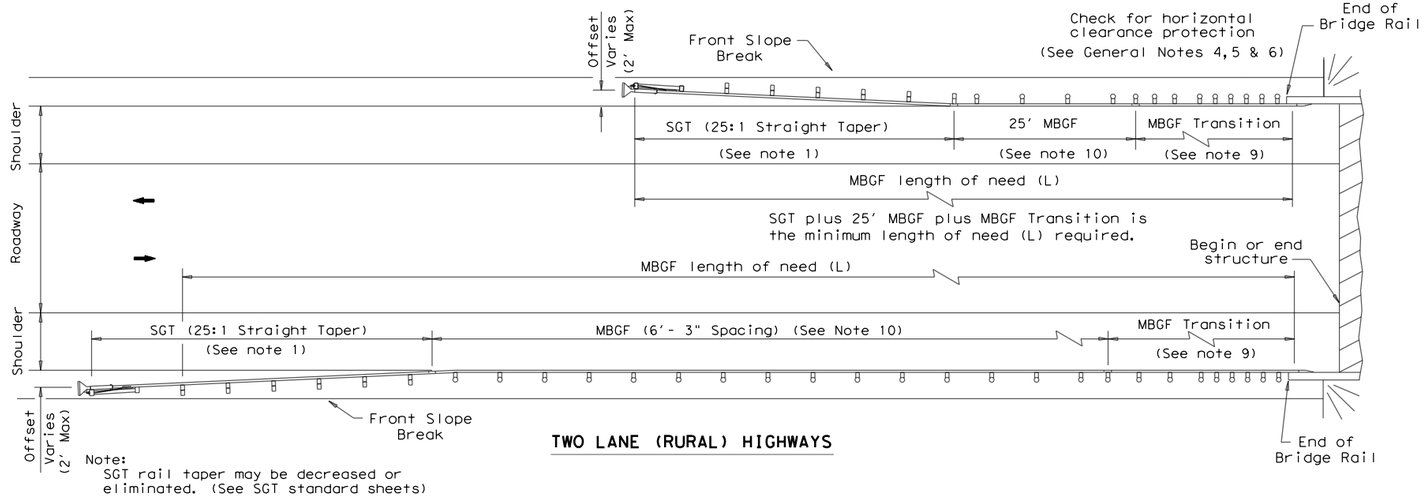
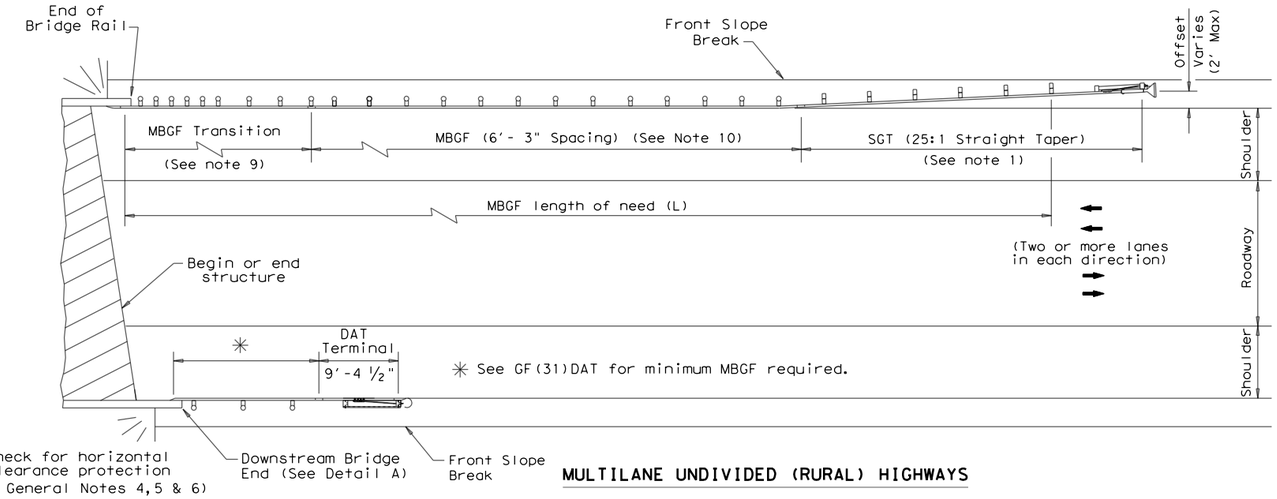
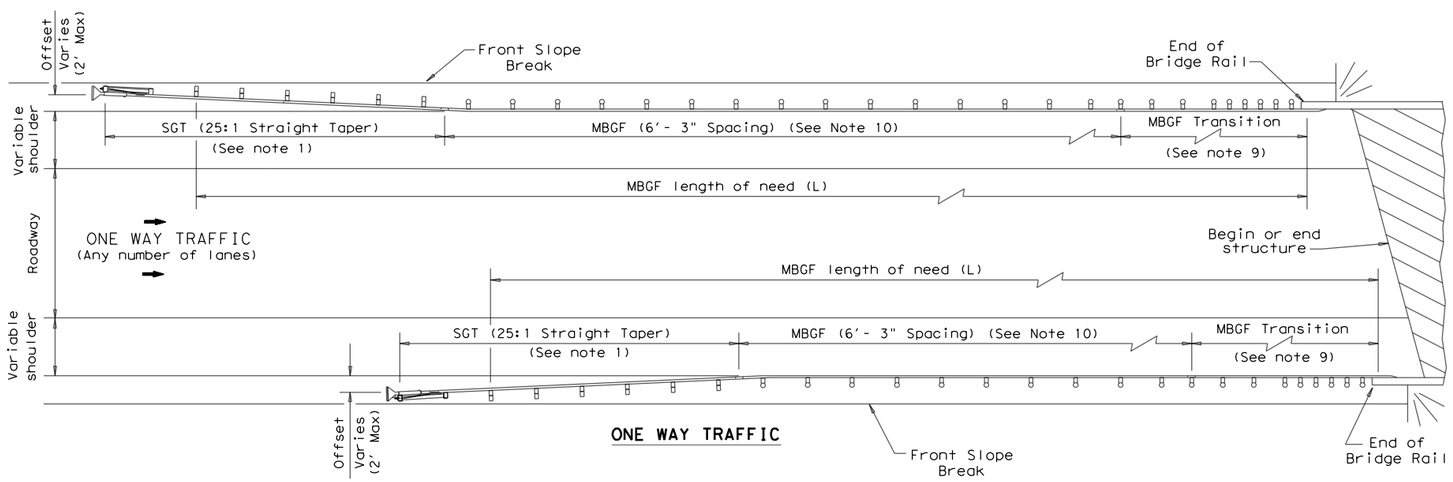


TWO LANE (RURAL) HIGHWAYS

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



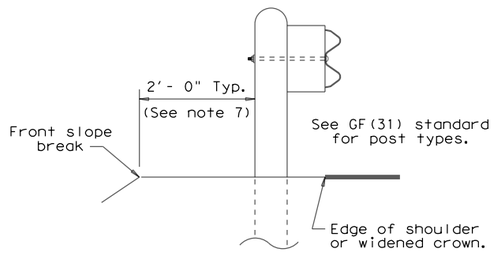
MULTILANE UNDIVIDED (RURAL) HIGHWAYS



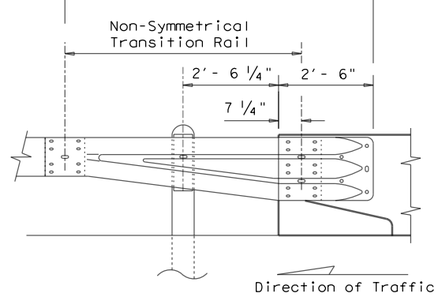
ONE WAY TRAFFIC

GENERAL NOTES

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



TYPICAL CROSS SECTION AT MBGF



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

DETAIL A

Showing Downstream Rail Attachment

Texas Department of Transportation

Design Division Standard

BRIDGE END DETAILS

(METAL BEAM GUARD FENCE APPLICATIONS TO RIGID RAILS)

BED-14

FILE: bed14.dgn	DN: TxDOT	CK: AM	DW: BD/VP	CK: CGL
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REVISED APRIL 2014 SEE (MEMO 0414)	DIST	COUNTY		SHEET NO.
	PARIS	HUNT		97

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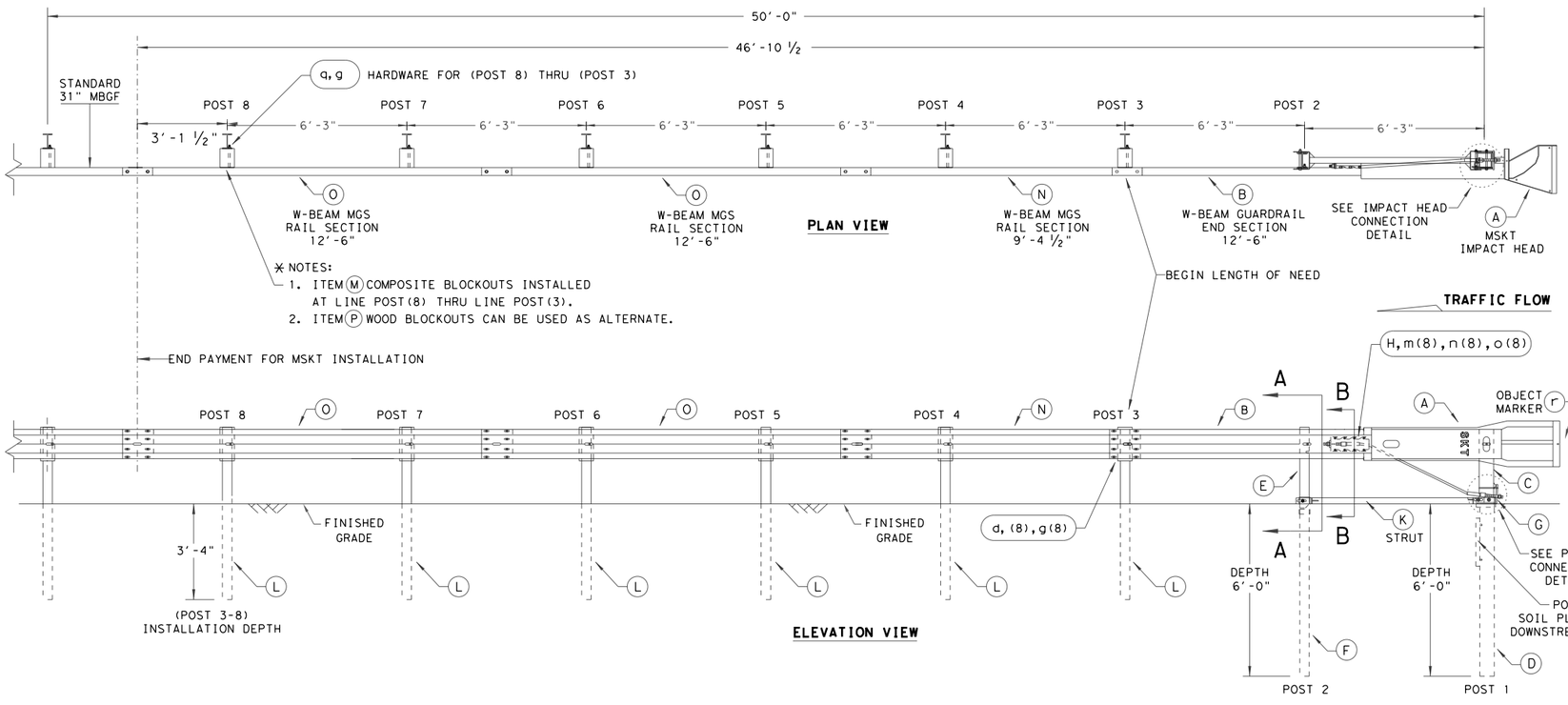
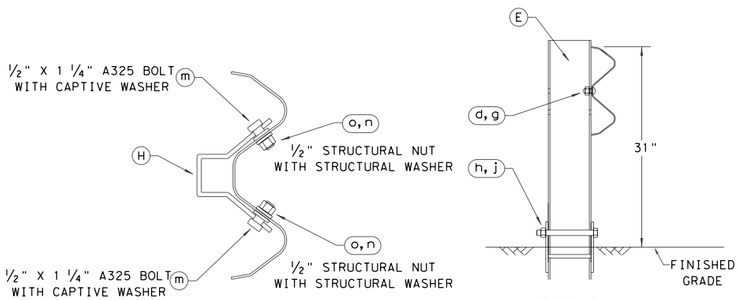
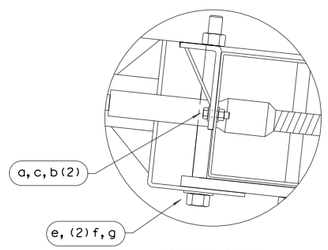
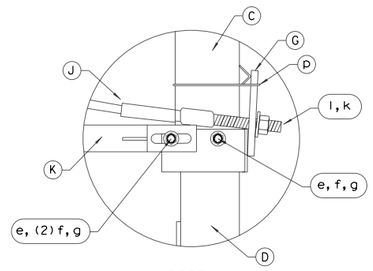


NOTE: SEE (GENERAL NOTE 14) FOR DRIVING CAP INFORMATION.







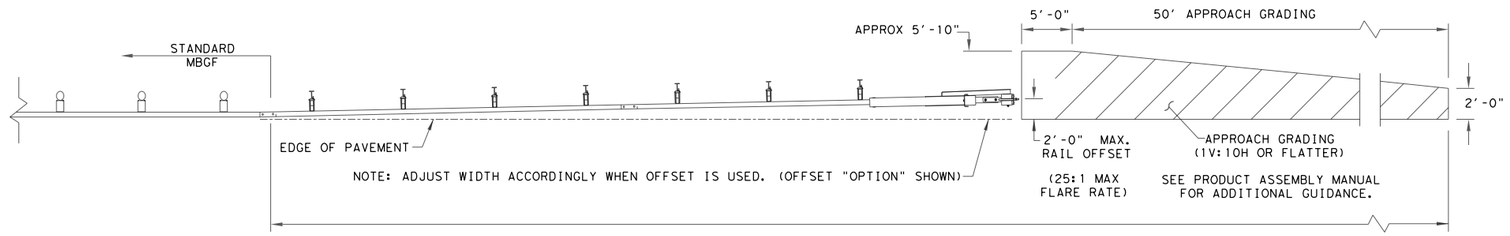
GENERAL NOTES

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

SEE NOTES: ✳

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

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 9/16" I.D. STRUCTURAL WASHERS	W012A
p	1	BEARING PLATE RETAINER TIE	CT-100ST
q	6	5/8" x 10" H.G.R. BOLT	B581002
r	1	OBJECT MARKER 18" X 18"	E3151



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

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

Texas Department of Transportation

Design Division Standard

SINGLE GUARDRAIL TERMINAL

MSKT-MASH-TL-3

SGT(12S)31-18

FILE: sgt12s3118.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CL	
© TxDOT: APRIL 2018	CONT	SECT	JOB	HIGHWAY	
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	DIST	COUNTY		SHEET NO.	
	PARIS	HUNT		98	

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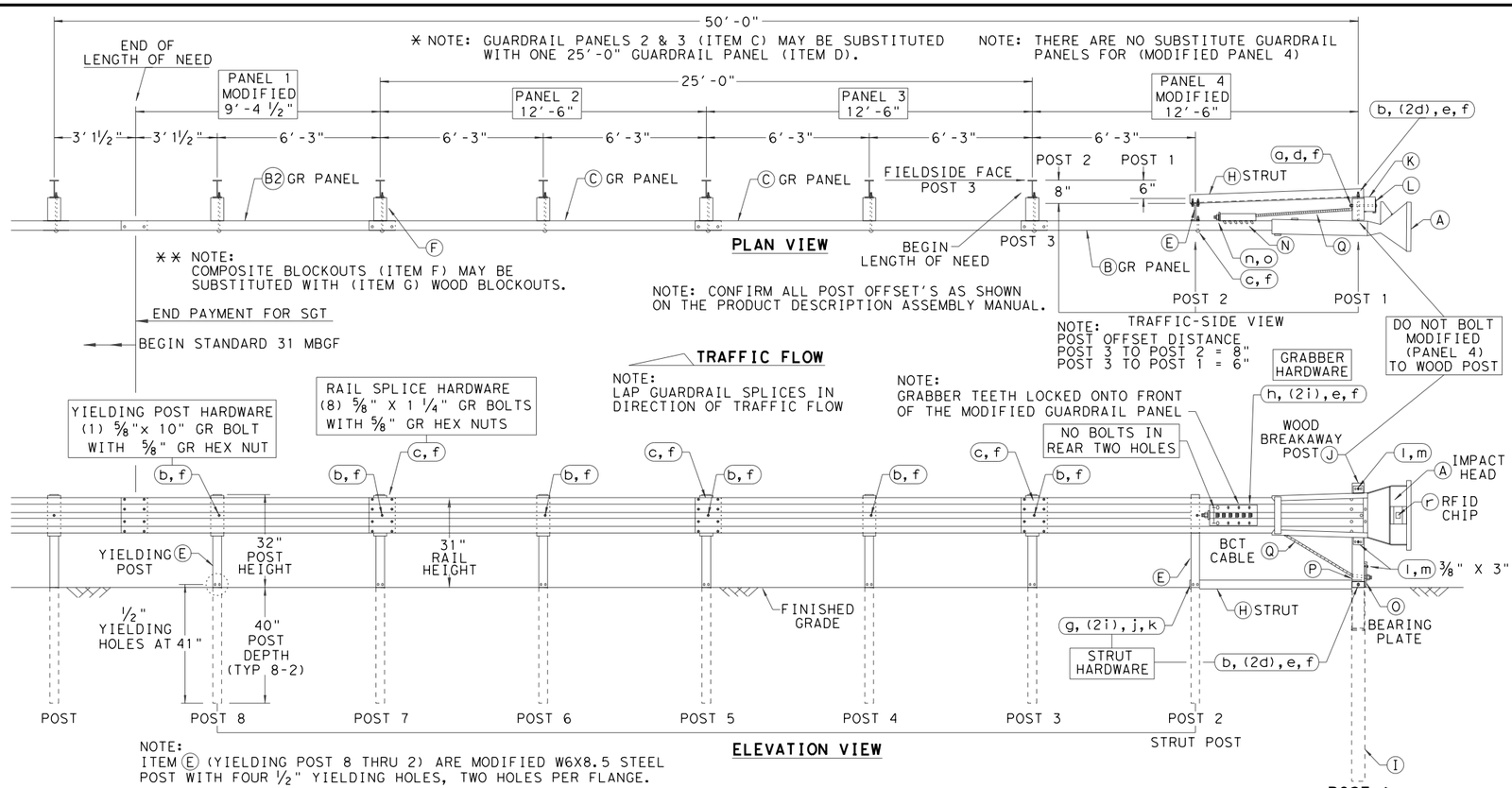
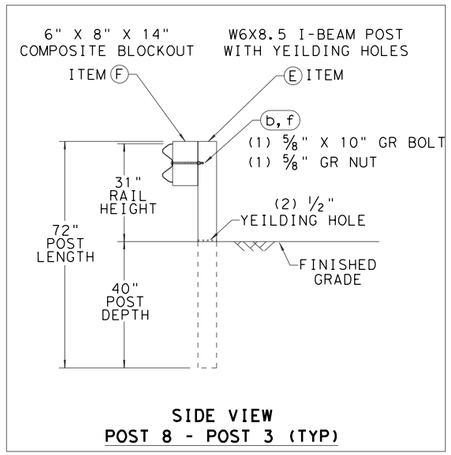


GENERAL NOTES

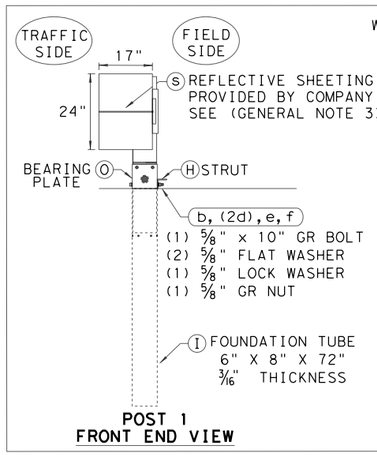
1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: SPIG INDUSTRY, INC. AT 1(267) 644-9510. 14675 INDUSTRIAL PARK RD; BRISTOL, VA 24202
2. FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO THE MANUFACTURER'S; SGET END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY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

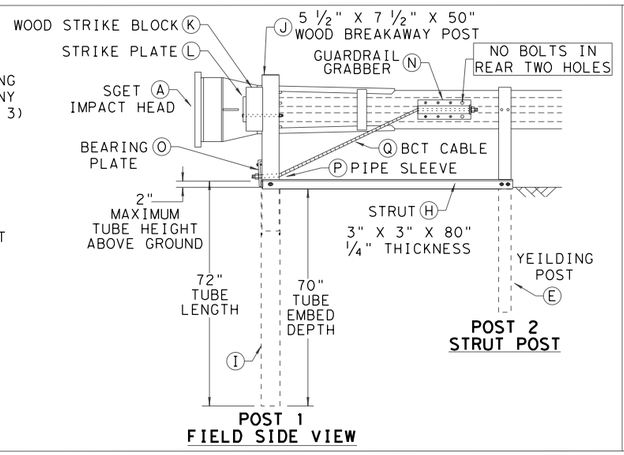
* ALTERNATIVE ITEMS
** NOTE: SEE PLAN VIEW



SIDE VIEW
POST 8 - POST 3 (TYP)

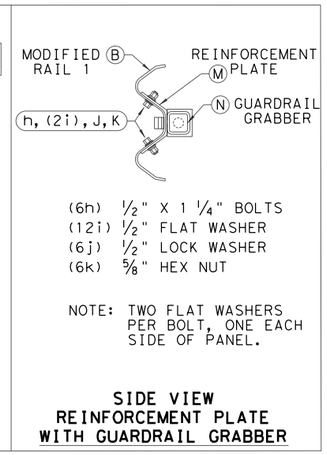


POST 1
FRONT END VIEW



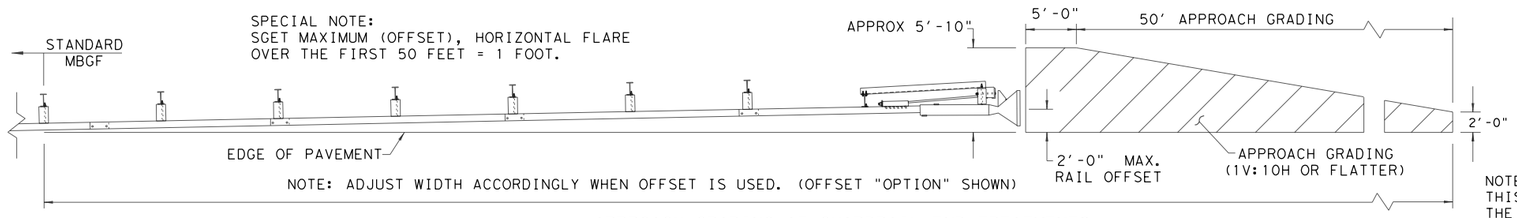
POST 1
FIELD SIDE VIEW

POST 2
STRUT POST



NOTE: TWO FLAT WASHERS PER BOLT, ONE EACH SIDE OF PANEL.

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.	
	PARIS	HUNT			99	

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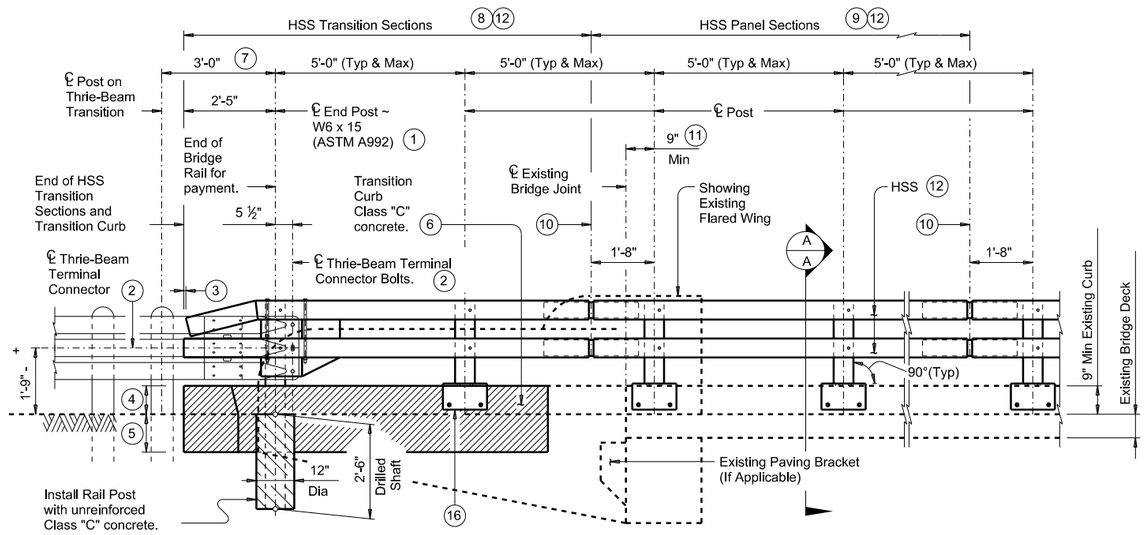
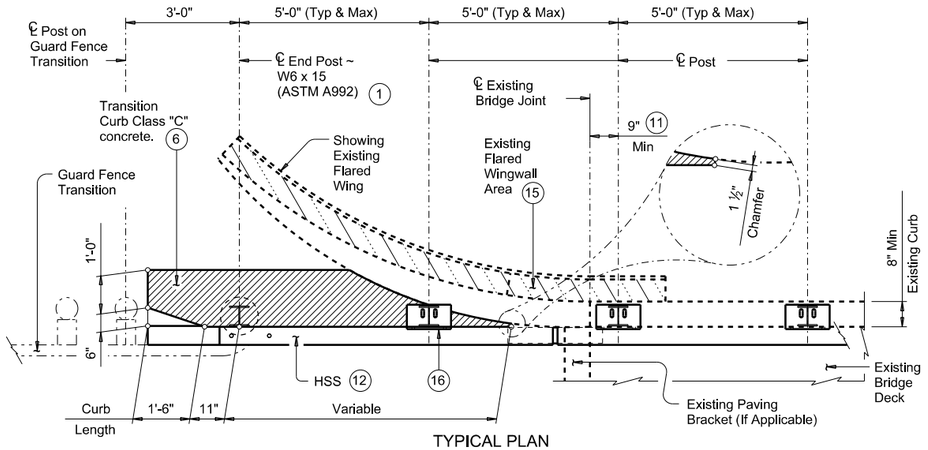


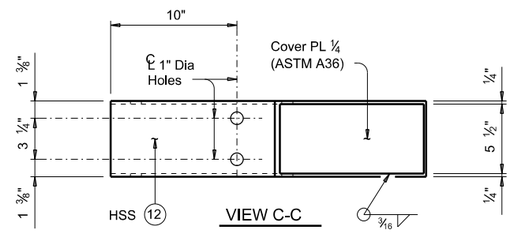
TYPICAL ROADWAY ELEVATION

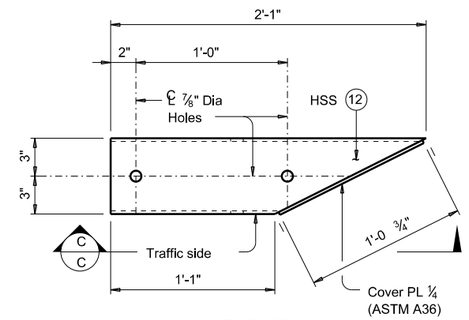


TYPICAL PLAN

RETROFIT WITH FLARED WING

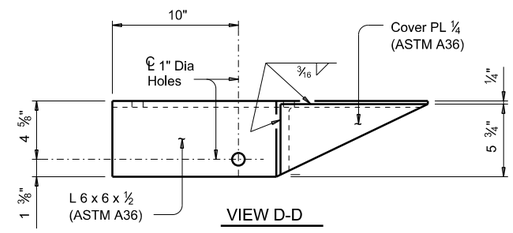
(Showing 9" high and 8" wide curbs, higher and wider curbs similar)

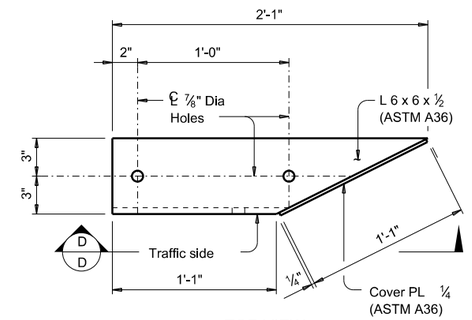




TOP VIEW

HSS SHOE DETAILS





TOP VIEW

ANGLE SHOE DETAILS

Angle Shoe shown is detailed for one side only, other side similar. For other side shoe must be built for opposite hand.

1. Post length = Top of rail elevation minus bottom of drilled shaft elevation.
2. Terminal Connectors and associated hardware are to be paid for under the Item "Metal Beam Guard Fence". The appropriate Metal Beam Guard Fence Transitions or Downstream Anchor Terminal must be attached to the bridge rail and extended along the embankment.
3. Top HSS can be shorter than bottom HSS ⅝" plus or minus.
4. Match existing bridge curb height.
5. Cast transition curb 1'-0" into soil or top of concrete approach slab. Remove any asphaltic concrete or mow strip if present.
6. Match existing bridge curb face on traffic side of transition curb. Transition curb 6" x 1'-6" taper will remain vertical.
7. Showing first post for a TL-3 rated guard fence transition. First post for a TL-2 rated guard fence transition or a guard fence downstream anchor terminal is 4'-4 ¾".
8. HSS Transition Sections must have one soil mounted end post embedded in an unreinforced, Class "C" concrete drilled shaft as shown, and a minimum of one curb mounted post per transition section.
9. HSS Panel Sections must have a minimum of three posts and a maximum of eight posts per panel section.
10. ℄ HSS Expansion Joint or L HSS Splice Joint as required.
11. Use 9" minimum for both expansion joints and construction/controlled joints.
12. HSS 6 x 6 x ¼ (ASTM A1085 or A500 Gr C).
15. Remove all existing structure area from top of existing curb. Cut and grind flush all existing reinforcing extending from top of existing curb and paint ends with two coats of zinc-rich paint conforming to the Item "Galvanizing".
16. When post is mounted to the transition curb on flared wings as shown, transition curb must be supported laterally by the existing wingwall/curb.

STATE OF TEXAS
JEROME A. QUINTERO
49648
LICENSED PROFESSIONAL ENGINEER
5/24/2023

Texas Department of Transportation

Bridge Division Standard

RETROFIT GUIDE FOR T131RC RAIL ON CURBS

TYPE T131RC

FILE: rlstd034-19.dgn	DN: TxDOT	CK: JMH	DW: JTR	CK: MAS
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0579	02	014	FM 512
	DIST	COUNTY		SHEET NO.
	PARIS	HUNT		100

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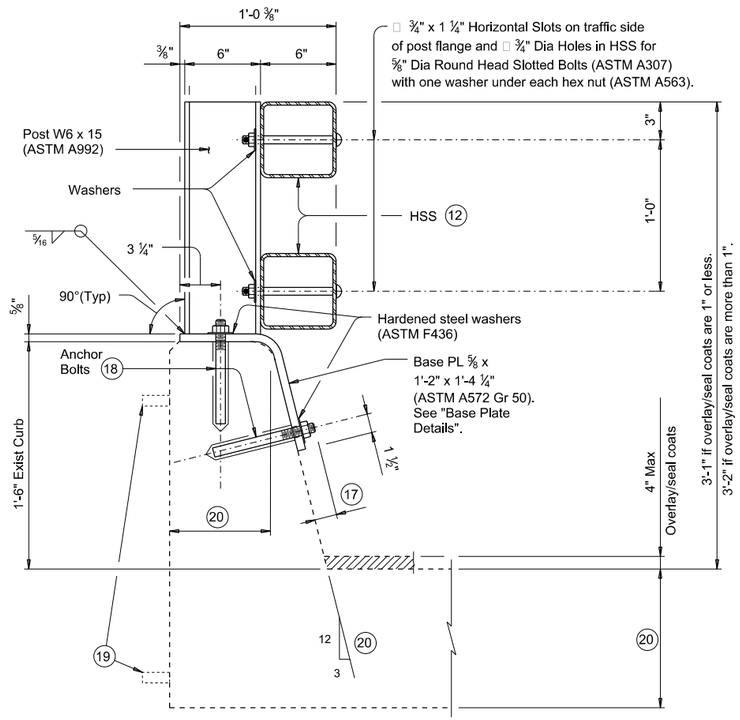
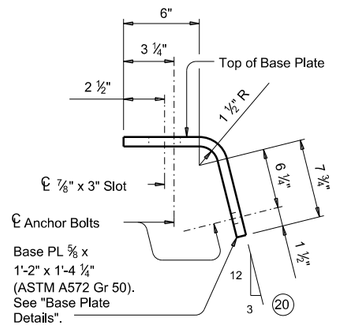


SECTION A-A OF 18" HIGH CURBS

(Showing example of 8" Min width curb, wider curbs similar)



18" HIGH CURB BASE PLATE DETAIL

(12) HSS 6 x 6 x ¼ (ASTM A1085 or A500 Gr C).

(17) 1 ¾" Bolt Projection (Typ).

(18) See "Material Notes" for anchor Bolt information.

(19) Remove existing railing (including posts), cut and grind anchor bolts flush and paint ends with two coats of zinc-rich paint conforming to the Item "Galvanizing".

(20) See elsewhere in plans for dimensions (curb width and height, slab and overlay thickness). Slope of curb may differ from what is shown. Adjust base plate as necessary to conform to curb face geometry.

STATE OF TEXAS
JEROME A. QUINTERO
49648
LICENSED
PROFESSIONAL ENGINEER
5/24/2023

Texas Department of Transportation

Bridge Division Standard

RETROFIT GUIDE FOR T131RC RAIL ON CURBS

TYPE T131RC

FILE: rlstd034-19.dgn	DN: TxDOT	CK: JMH	DW: JTR	CK: MAS
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
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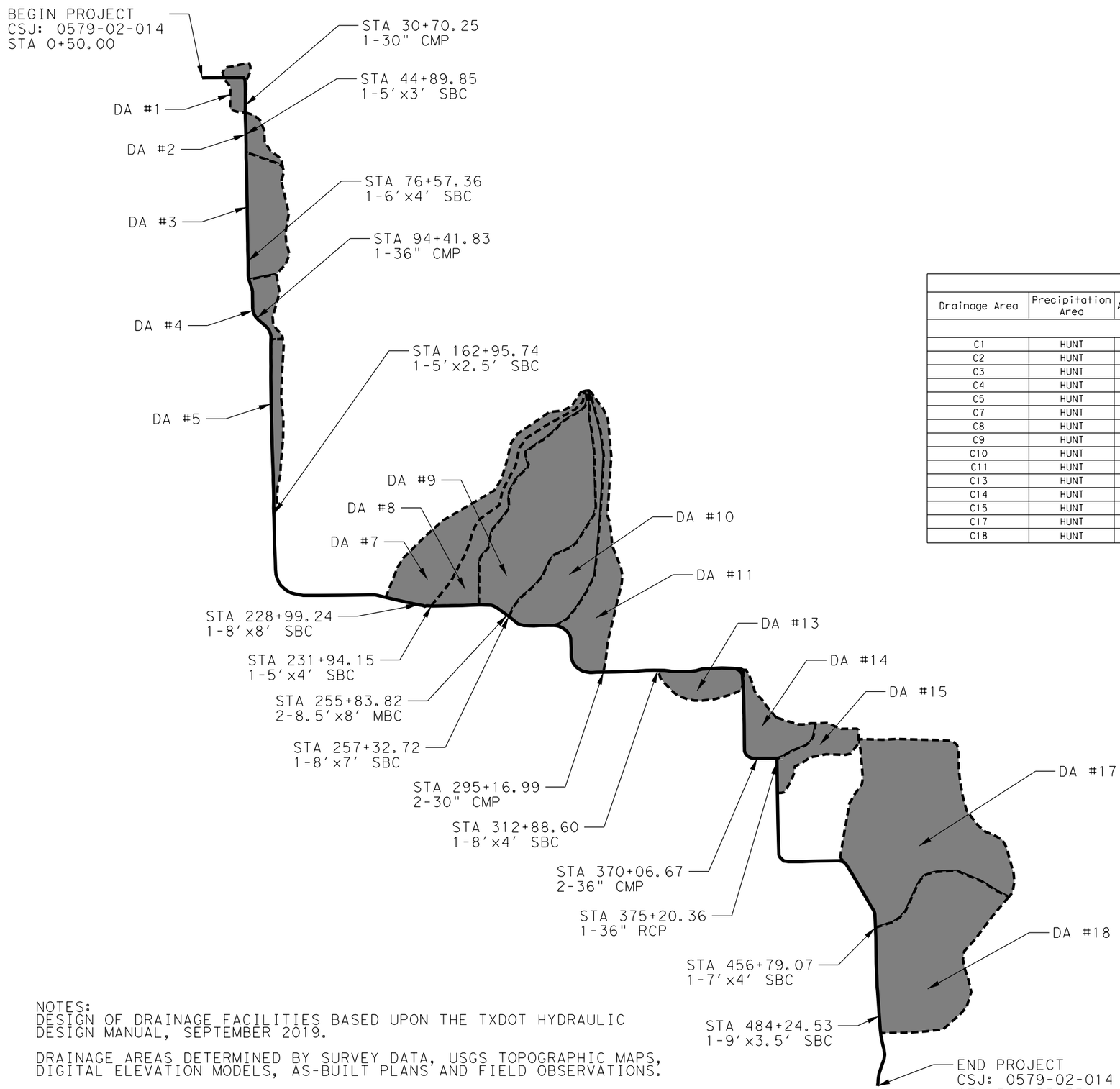
	PARIS	HUNT		101

100%
SUBMITTAL



0 875 1750 3500
SCALE: 1"=3500'

Rational Q Values									
Drainage Area	Precipitation Area	AREA (AC)	Tc (min)	C	I - 10YR	I - 100YR	Q - 10YR	Q - 25YR	Q - 100YR
Existing Conditions									
C1	HUNT	20.77	24.3	0.40	4.40	6.37	36.55	43.20	52.92
C2	HUNT	20.75	30.0	0.35	3.93	5.70	28.54	33.70	41.39
C3	HUNT	105.25	41.8	0.35	3.24	4.73	119.36	141.46	174.24
C4	HUNT	29.57	24.8	0.35	4.37	6.31	45.23	53.30	65.30
C5	HUNT	37.82	73.2	0.36	2.27	3.33	30.91	36.62	45.34
C7	HUNT	147.49	122.0	0.35	1.59	2.37	82.08	98.08	122.34
C8	HUNT	82.72	116.3	0.35	1.65	2.45	47.77	57.03	70.93
C9	HUNT	311.38	102.9	0.35	NRCS Method		255.90	356.70	518.80
C10	HUNT	129.30	107.8	0.35	1.74	2.58	78.75	93.68	116.76
C11	HUNT	130.43	132.2	0.35	1.51	2.24	68.93	82.17	102.26
C13	HUNT	50.38	41.3	0.37	3.26	4.76	60.77	71.96	88.73
C14	HUNT	72.46	40.8	0.37	3.29	4.79	88.21	104.30	128.43
C15	HUNT	49.87	45.8	0.37	3.06	4.48	56.47	66.98	82.67
C17	HUNT	462.85	100.0	0.37	NRCS Method		153.80	320.90	641.50
C18	HUNT	327.20	95.4	0.37	NRCS Method		115.30	244.30	492.60

NOTES:
DESIGN OF DRAINAGE FACILITIES BASED UPON THE TXDOT HYDRAULIC DESIGN MANUAL, SEPTEMBER 2019.

DRAINAGE AREAS DETERMINED BY SURVEY DATA, USGS TOPOGRAPHIC MAPS, DIGITAL ELEVATION MODELS, AS-BUILT PLANS AND FIELD OBSERVATIONS.

5/24/2023

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FM 512

OVERALL DRAINAGE AREA MAP

SHEET 1 OF 1

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	TEXAS	HUNT	102
CONTROL	SECTION	JOB	
0579	02	014	

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STRUCTURE INLET STA	DRAINAGE AREA IDENTIFIER	AREA (AC)	HYDAULIC CONDITION	STRUCTURE DESCRIPTION	STRUCTURE MANNINGS "n"	STRUCTURE SLOPE (FT/FT)	ENTRANCE / EXIT TYPE		FLOOD FREQUENCY	FLOW (Q) (CFS)	HEADWATER ELEV (FT)	TAILWATER ELEV (FT)	TAILWATER VELOCITY (FT/S)	FLOW OVER ROADWAY (CFS)	ROADWAY ELEV OVERTOP (FT)
30+70.25	DA 1	20.77	EXISTING	1-30" x 43' CMP	0.022	0.0277	LEFT	PROJ	10 YEAR	36.55	670.22	666.20	4.50	0.00	670.26
							RIGHT	PROJ	100 YEAR	52.92	670.5	666.39	4.98	14.05	
			PROPOSED	1-30" x 42' RCP	0.012	0.015	LEFT	PSET-SC	10 YEAR	36.55	669.71	666.17	4.50	0.00	670.93
							RIGHT	PSET-SC	100 YEAR	52.92	671.07	666.36	4.95	6.26	
44+89.85	DA 2	20.75	EXISTING	1-5'x3' x 33' SBC	0.012	0.0179	LEFT	FW-O	10 YEAR	28.54	654.61	653.05	4.02	0.00	657.47
							RIGHT	FW-O	100 YEAR	41.39	655.08	653.21	4.49	0.00	
			PROPOSED	1-5'x3' x 41' SBC	0.012	0.0178	LEFT	FW-O	10 YEAR	28.54	654.51	652.98	4.02	0.00	658.14
							RIGHT	FW-O	100 YEAR	41.39	654.95	653.14	4.49	0.00	
76+57.36	DA 3	105.25	EXISTING	1-6'x4' x 33' SBC	0.012	0.0066	RIGHT	FW-O	10 YEAR	119.36	634.98	632.30	6.00	0.00	636.53
							LEFT	FW-O	100 YEAR	174.24	636.29	632.61	6.66	0.00	
			PROPOSED	1-6'x4' x 39' SBC	0.012	0.0187	RIGHT	FW-O	10 YEAR	119.36	634.66	632.27	6.00	0.00	637.20
							LEFT	FW-O	100 YEAR	174.24	635.84	632.58	6.66	0.00	
94+41.83	DA 4	29.57	EXISTING	1-36" x 50' CMP	0.022	0.0034	RIGHT	PROJ	10 YEAR	45.23	630.26	627.47	4.74	0.00	631.06
							LEFT	PROJ	100 YEAR	65.30	631.22	627.68	5.24	7.30	
			PROPOSED	1-36" x 42' RCP	0.012	0.0049	RIGHT	PSET-SC	10 YEAR	45.23	630.28	627.43	4.74	0.00	631.73
							LEFT	PSET-SC	100 YEAR	65.30	631.80	627.64	5.24	2.03	
162+95.74	DA 5	37.82	EXISTING	1-5'x2.5' x 33' SBC	0.012	0.0176	LEFT	FW-O	10 YEAR	30.91	578.47	576.86	4.12	0.00	657.47
							RIGHT	FW-O	100 YEAR	45.34	578.98	577.03	4.61	0.00	
			PROPOSED	1-5'x2.5' x 43' SBC	0.012	0.0177	LEFT	FW-O	10 YEAR	30.91	578.37	576.75	4.12	0.00	658.14
							RIGHT	FW-O	100 YEAR	45.34	578.85	576.92	4.61	0.00	
228+99.24	DA 7	147.49	EXISTING	1-8'x8' x 34.5' SBC	0.012	0.0032	LEFT	FW-O	10 YEAR	82.08	573.89	572.24	5.13	0.00	581.10
							RIGHT	FW-O	100 YEAR	122.34	574.67	572.48	5.80	0.00	
			PROPOSED	1-8'x8' x 40.5' SBC	0.012	0.0032	LEFT	FW-O	10 YEAR	82.08	573.63	572.23	5.13	0.00	581.77
							RIGHT	FW-O	100 YEAR	122.34	574.33	572.47	5.80	0.00	
231+94.15	DA 8	82.72	EXISTING	1-5'x4' x 39' SBC	0.012	0.00692	LEFT	FW-O	10 YEAR	47.77	578.59	576.85	4.68	0.00	581.17
							RIGHT	FW-O	100 YEAR	70.93	579.3	577.06	5.24	0.00	
			PROPOSED	1-5'x4' x 39' SBC	0.012	0.00692	LEFT	FW-O	10 YEAR	47.77	578.35	576.86	4.68	0.00	581.84
							RIGHT	FW-O	100 YEAR	70.93	579.01	577.07	5.24	0.00	
255+83.82	DA 9	311.38	EXISTING	2-8.5'x8' x 79' MBC	0.012	0.0027	LEFT	FW-S	10 YEAR	255.90	577.2	575.58	7.27	0.00	586.56
							RIGHT	FW-S	100 YEAR	518.80	579.18	576.39	8.81	0.00	
			PROPOSED	2-8.5'x8' x 79' MBC	0.012	0.0027	LEFT	N/A	10 YEAR	255.90	577.2	575.58	7.27	0.00	587.23
							RIGHT	N/A	100 YEAR	518.80	579.18	576.39	8.81	0.00	
257+32.72	DA 10	129.30	EXISTING	1-8'x7' x 52.6' SBC	0.012	0.038	RIGHT	FW-O	10 YEAR	78.75	578.45	575.12	5.20	0.00	586.48
							LEFT	FW-O	100 YEAR	116.76	579.16	575.37	5.84	0.00	
			PROPOSED	1-8'x7' x 58.6' SBC	0.012	0.038	RIGHT	FW-O	10 YEAR	78.75	578.35	575.02	5.20	0.00	587.15
							LEFT	FW-O	100 YEAR	116.76	578.99	575.27	5.84	0.00	
295+16.99	DA 11	130.43	EXISTING	2-30" x 56' RCP	0.012	0.0034	RIGHT	PROJ	10 YEAR	68.93	581.11	578.44	5.20	0.00	583.51
							LEFT	PROJ	100 YEAR	102.26	583.46	578.70	5.80	0.00	
			PROPOSED	2-30" x 48' RCP	0.012	0.0034	RIGHT	CH-PW-O	10 YEAR	68.93	581.09	578.44	5.20	0.00	584.18
							LEFT	CH-PW-O	100 YEAR	102.26	583.44	578.70	5.80	0.00	
312+88.60	DA 13	50.38	EXISTING	1-8'x4' x 47 SBC	0.012	0.0239	LEFT	FW-S	10 YEAR	60.77	580.28	578.04	4.81	0.00	584.06
							RIGHT	FW-S	100 YEAR	88.73	580.85	578.25	5.39	0.00	
			PROPOSED	1-8'x4' x 57' SBC	0.012	0.0239	LEFT	FW-S	10 YEAR	60.77	579.98	577.99	4.81	0.00	584.73
							RIGHT	FW-S	100 YEAR	88.73	580.53	578.20	5.39	0.00	
370+06.67	DA 14	72.46	EXISTING	2-36" x 50' CMP	0.022	0.0076	LEFT	PROJ	10 YEAR	88.21	584.77	582.13	5.57	0.00	585.56
							RIGHT	PROJ	100 YEAR	128.43	585.8	582.40	6.18	13.90	
			PROPOSED	2-36" x 40' RCP	0.012	0.015	LEFT	CH-PW-O	10 YEAR	88.21	584.62	581.77	5.57	0.00	586.23
							RIGHT	CH-PW-O	100 YEAR	128.43	586.27	582.04	6.18	0.80	
375+20.36	DA 15	49.87	EXISTING	1-36" x 116.5' RCP	0.012	0.0075	LEFT	PSET-SC	10 YEAR	56.47	594.84	590.60	5.04	0.00	594.85
							RIGHT	PSET-SC	100 YEAR	82.67	595.18	590.84	5.58	22.46	
			PROPOSED	1-36" x 128.5' RCP	0.012	0.0075	LEFT	PSET-SC	10 YEAR	56.47	594.85	590.51	5.04	0.00	595.52
							RIGHT	PSET-SC	100 YEAR	82.67	595.79	590.75	5.58	16.35	
456+79.07	DA 17	462.85	EXISTING	1-7'x4' x 35.5' SBC	0.012	0.0078	RIGHT	PW-2	10 YEAR	153.80	564.11	561.23	6.38	0.00	568.09
							LEFT	PW-2	100 YEAR	641.50	569.83	562.81	9.38	278.42	
			PROPOSED	1-7'x4' x 40.5' SBC	0.012	0.0078	RIGHT	PW-2	10 YEAR	153.80	564.17	561.25	6.38	0.00	568.76
							LEFT	PW-2	100 YEAR	641.50	569.31	562.83	9.38	294.00	
484+24.53	DA 18	327.20	EXISTING	1-9'x3.5' x 36' SBC	0.012	0.0084	RIGHT	PW-2	10 YEAR	115.30	558.66	556.69	5.65	0.00	563.65
							LEFT	PW-2	100 YEAR	492.60	564.56	558.04	8.47	105.99	
			PROPOSED	1-9'x3.5' x 41' SBC	0.012	0.0084	RIGHT	PW-2	10 YEAR	115.30	558.73	556.61	5.65	0.00	564.32
							LEFT	PW-2	100 YEAR	492.60	564.60	557.96	8.47	106.76	

STATE OF TEXAS
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Texas Department of Transportation

FM 512

HYDRAULIC DATA COMPUTATIONS

SHEET 1 OF 1

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	
CONTROL	SECTION	JOB	103
0579	02	014	

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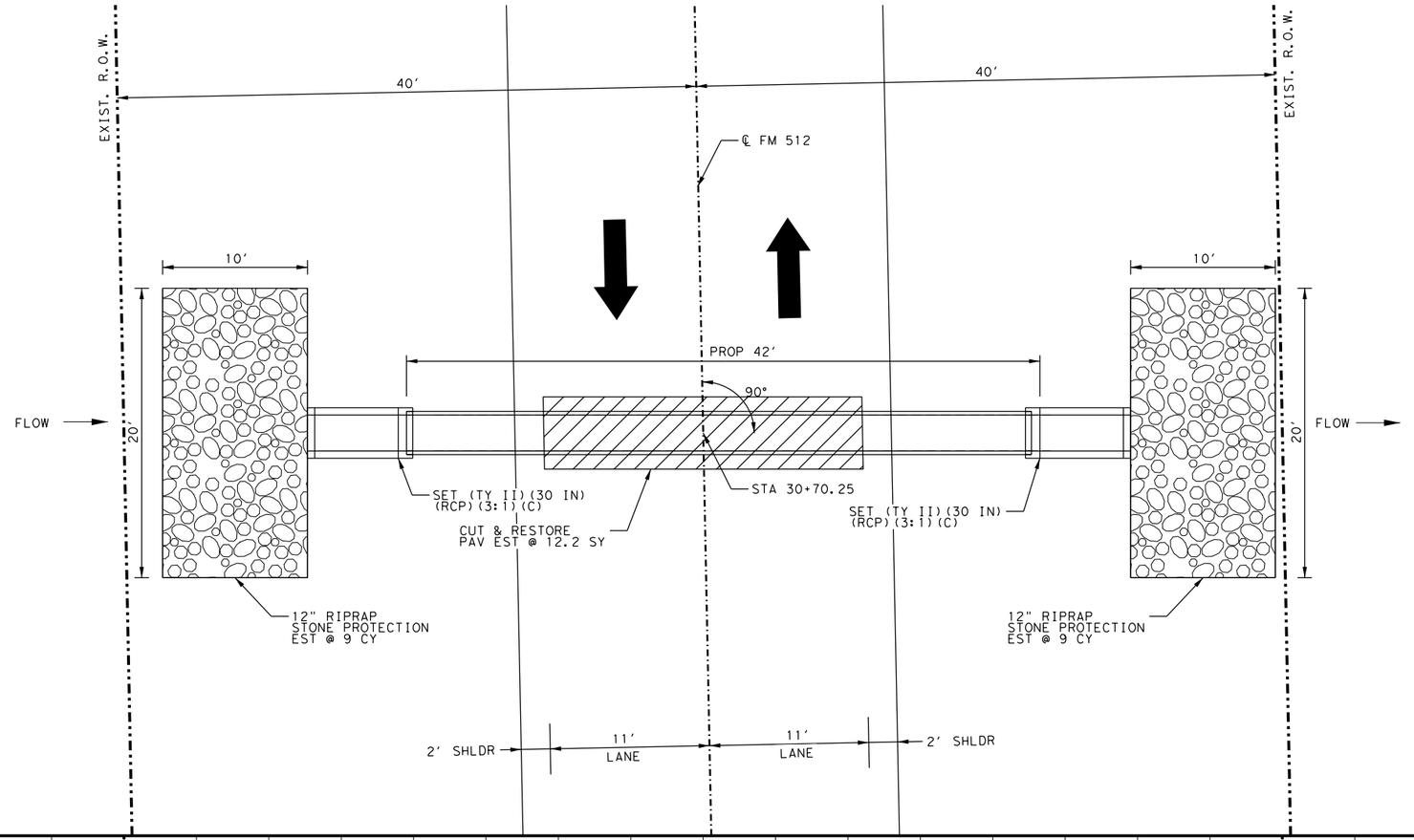

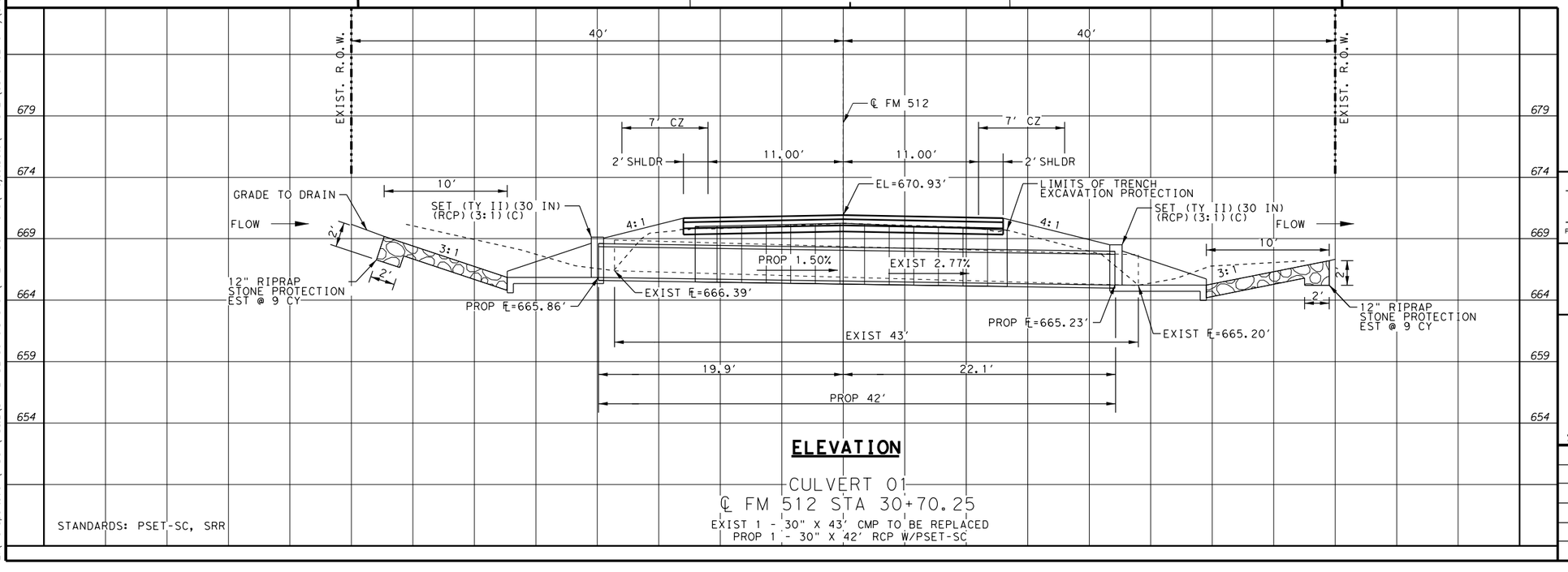

ELEVATION

CULVERT 01
℄ FM 512 STA 30+70.25
EXIST 1 - 30" X 43' CMP TO BE REPLACED
PROP 1 - 30" X 42' RCP W/PSET-SC

STANDARDS: PSET-SC, SRR

0 5 10
SCALE: 1"=10'

NOTES:

1. HORIZONTAL ALIGNMENT DATA IS FOR INFORMATION ONLY. MATCH EXISTING ROADWAY.
2. CONTRACTOR TO FIELD VERIFY ELEVATIONS AND CONSTRUCT PROPOSED STRUCTURES TO ALLOW PROPER DRAINAGE FLOW.

ESTIMATED QUANTITIES			
ITEM	DESCRIPTION	UNIT	QTY
132 6019	EMBANKMENT (VEHICLE)(ORD COMP)(TY B)	CY	4
402 6001	TRENCH EXCAVATION PROTECTION	LF	22
432 6031	RIPRAP (STONE PROTECTION) (12IN)	CY	18
464 6007	RC PIPE (CL III)(30 IN)	LF	42
467 6417	SET (TY II) (30 IN) (RCP) (3:1) (C)	EA	2
496 6007	REMOV STR (PIPE)	LF	43
400 6006	CUT & RESTORING PAV	SY	12.2

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CULVERT LAYOUT 01
STA 30+70.25

SHEET 1 OF 1

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	104
CONTROL	SECTION	JOB	
0579	02	014	

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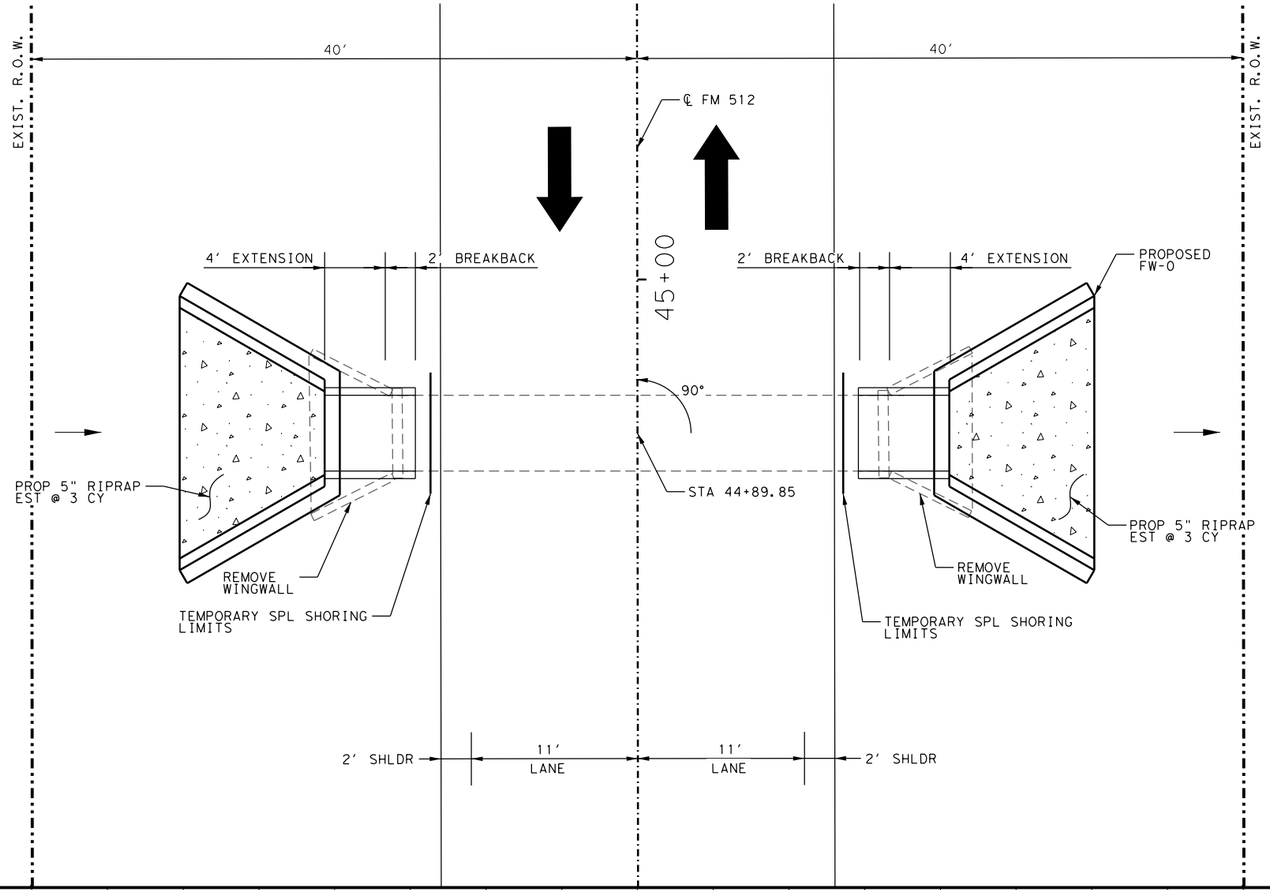

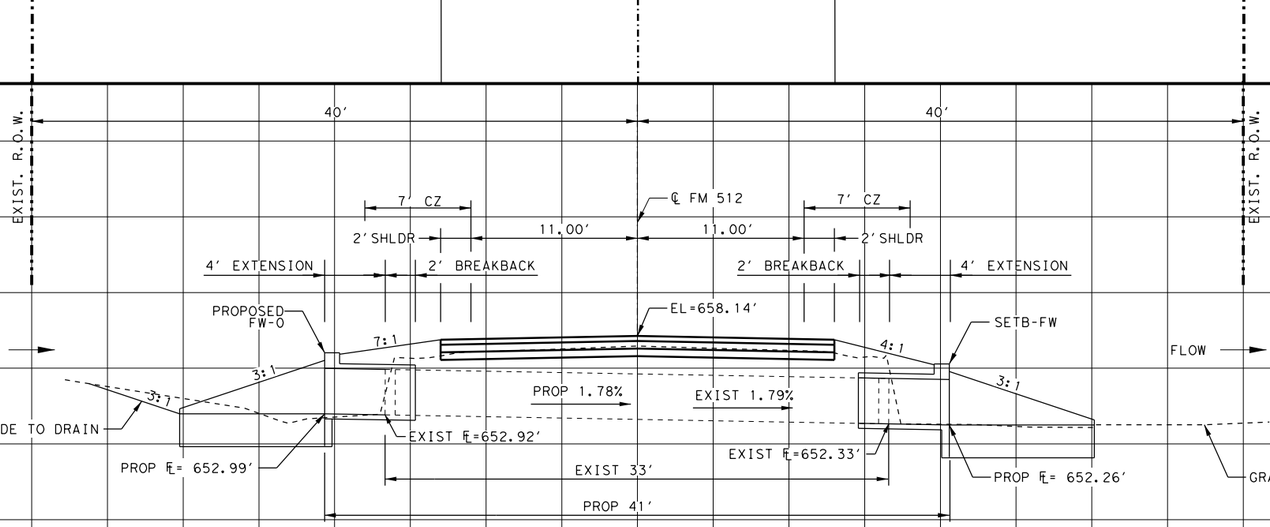

ELEVATION

CULVERT 02
℄ FM 512 STA 44+89.85
EXIST 1 - 5' X 3' X 33' SBC TO BE EXTENDED
PROP RIGHT EXTEND 4' W/FW-O
PROP LEFT EXTEND 4' W/FW-O

STANDARDS: FW-O, SCC-3 & 4, SCC-MD

0 5 10
SCALE: 1"=10'

NOTES:

1. HORIZONTAL ALIGNMENT DATA IS FOR INFORMATION ONLY. MATCH EXISTING ROADWAY.
2. CONTRACTOR TO FIELD VERIFY ELEVATIONS AND CONSTRUCT PROPOSED STRUCTURES TO ALLOW PROPER DRAINAGE FLOW.

ESTIMATED QUANTITIES			
ITEM	DESCRIPTION	UNIT	QTY
132 6019	EMBANKMENT (VEHICLE)(ORD COMP)(TY B)	CY	5
403 6001	TEMPORARY SPL SHORING	SF	50
432 6002	RIPRAP (CONC) (5 IN)	CY	6
462 6051	CONC BOX CULV (5 FT X 3 FT)(EXTEND)	LF	8
466 6151	WINGWALL (FW - 0) (HW=4 FT)	EA	2
480 6001	CLEAN EXIST CULVERTS	EA	1
496 6005	REMOV STR (WINGWALL)	EA	2

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FM 512

CULVERT LAYOUT 02
STA 44+89.85

SHEET 1 OF 1

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	105
CONTROL	SECTION	JOB	
0579	02	014	

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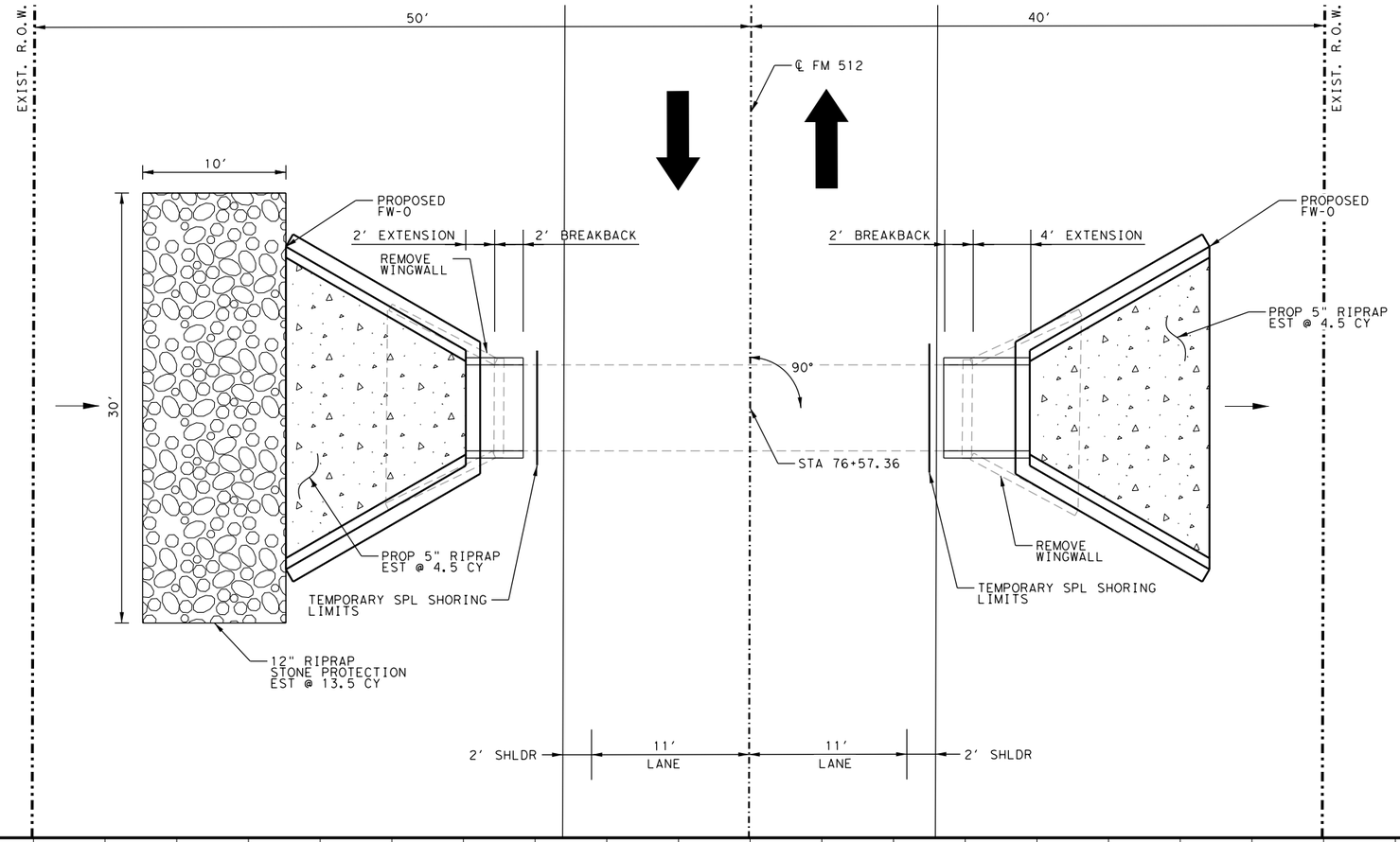

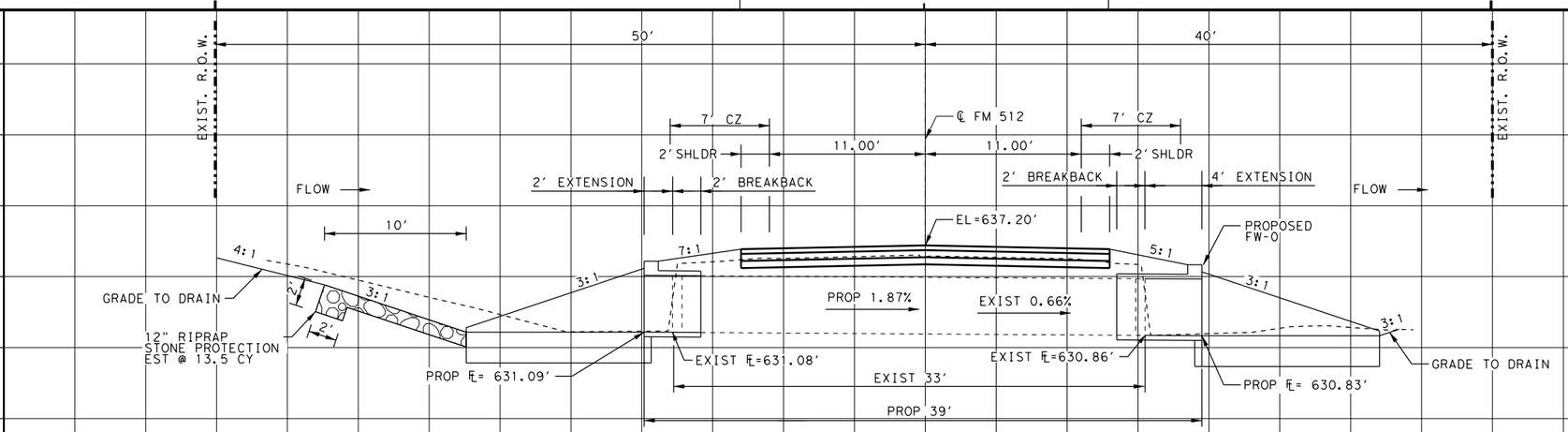

ELEVATION

CULVERT 03
℄ FM 512 STA 76+57.36

EXIST 1 - 6' X 4' X 33' SBC TO BE EXTENDED
PROP RIGHT EXTEND 4' W/FW-O
PROP LEFT EXTEND 2' W/FW-O

STANDARDS: FW-O, SCC-3 & 4, SCC-MD, SRR

0 5 10
SCALE: 1"=10'

NOTES:

1. HORIZONTAL ALIGNMENT DATA IS FOR INFORMATION ONLY. MATCH EXISTING ROADWAY.
2. CONTRACTOR TO FIELD VERIFY ELEVATIONS AND CONSTRUCT PROPOSED STRUCTURES TO ALLOW PROPER DRAINAGE FLOW.

ESTIMATED QUANTITIES			
ITEM	DESCRIPTION	UNIT	QTY
132 6019	EMBANKMENT (VEHICLE)(ORD COMP)(TY B)	CY	4
403 6001	TEMPORARY SPL SHORING	SF	99
432 6002	RIPRAP (CONC) (5 IN)	CY	9
432 6031	RIPRAP (STONE PROTECTION) (12 IN)	CY	13.5
462 6055	CONC BOX CULV (6 FT X 4 FT)(EXTEND)	LF	6
466 6152	WINGWALL (FW - O) (HW=5 FT)	EA	2
480 6001	CLEAN EXIST CULVERTS	EA	1
496 6005	REMOV STR (WINGWALL)	EA	2

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FM 512

CULVERT LAYOUT 03
STA 76+57.36

SHEET 1 OF 1

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	106
CONTROL	SECTION	JOB	
0579	02	014	

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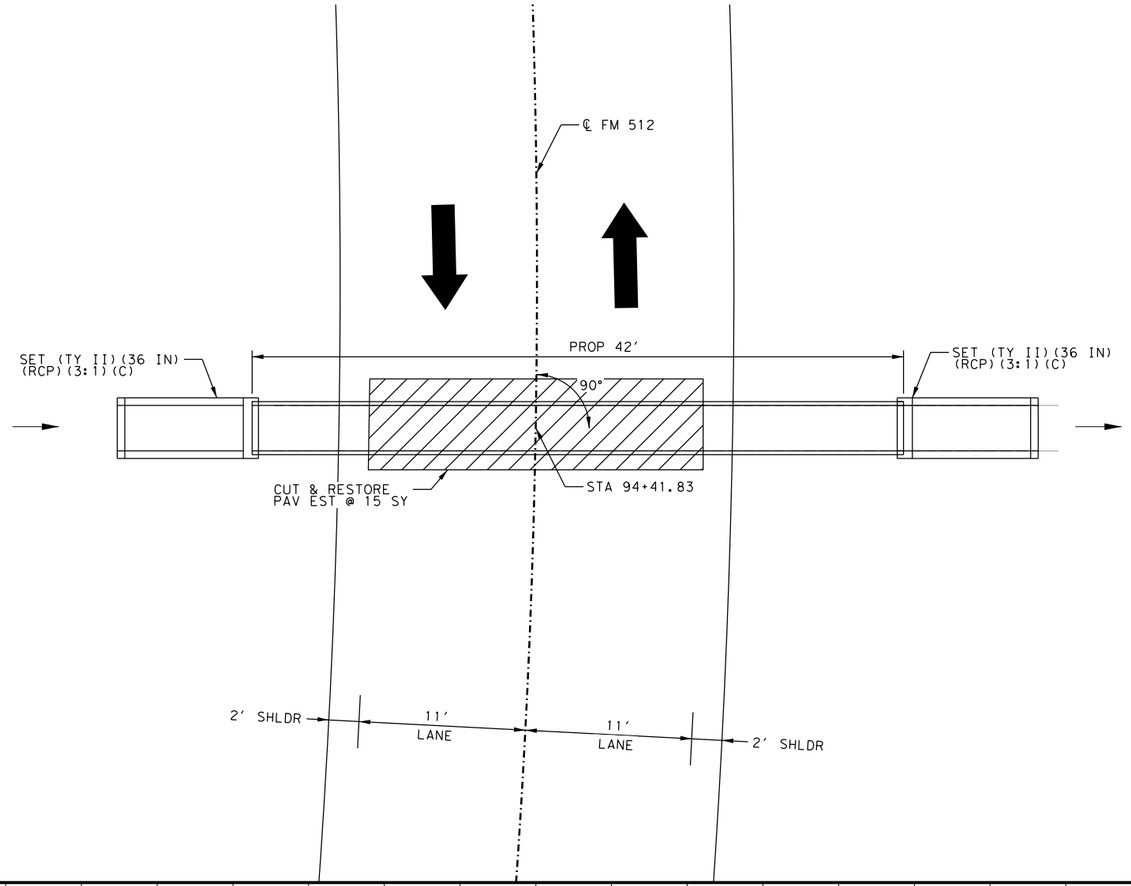

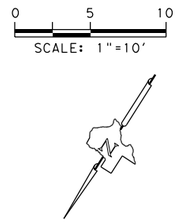

NOTES:

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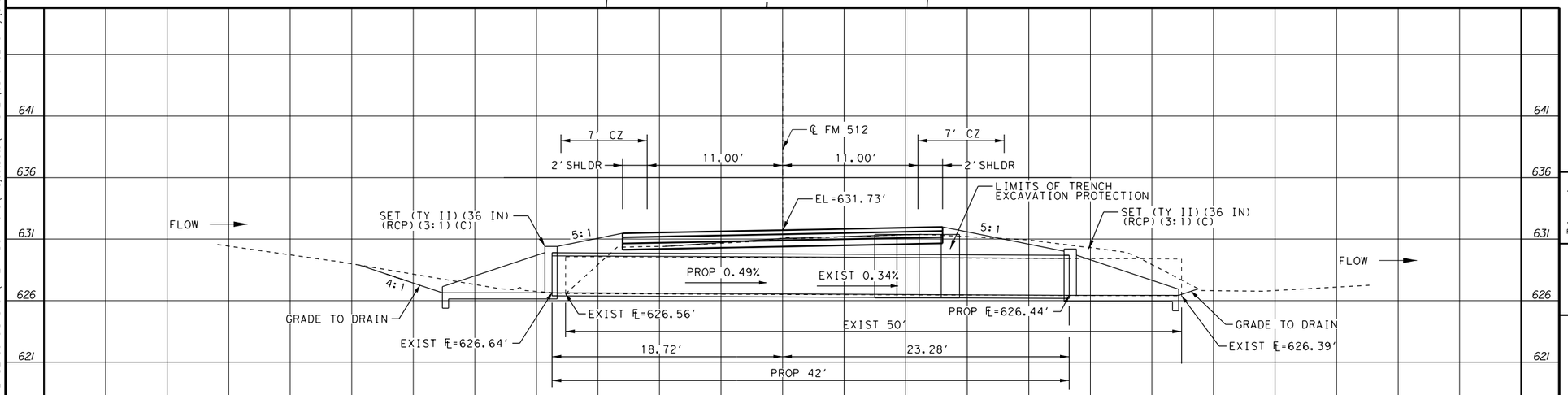
2. CONTRACTOR TO FIELD VERIFY ELEVATIONS AND CONSTRUCT PROPOSED STRUCTURES TO ALLOW PROPER DRAINAGE FLOW.

ESTIMATED QUANTITIES			
ITEM	DESCRIPTION	UNIT	QTY
132 6019	EMBANKMENT (VEHICLE)(ORD COMP)(TY B)	CY	4
402 6001	TRENCH EXCAVATION PROTECTION	LF	10
464 6008	RC PIPE (CL III) (36 IN)	LF	42
467 6448	SET (TY II) (36 IN) (RCP) (3: 1) (C)	EA	2
496 6007	REMOV STR (PIPE)	LF	50
400 6006	CUT & RESTORE PAV	SY	15



ELEVATION

CULVERT 04
℄ FM 512 STA 94+41.83
EXIST 1 - 36" X 50' CMP TO BE REPLACED
PROP 1 - 36" X 42' RCP W/PSET-SC

STANDARDS: PSET-SC

5/24/2023

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FM 512

CULVERT LAYOUT 04
STA 94+41.83

SHEET 1 OF 1

			HIGHWAY NO.
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	PARIS	HUNT	107
CONTROL	SECTION	JOB	
0579	02	014	

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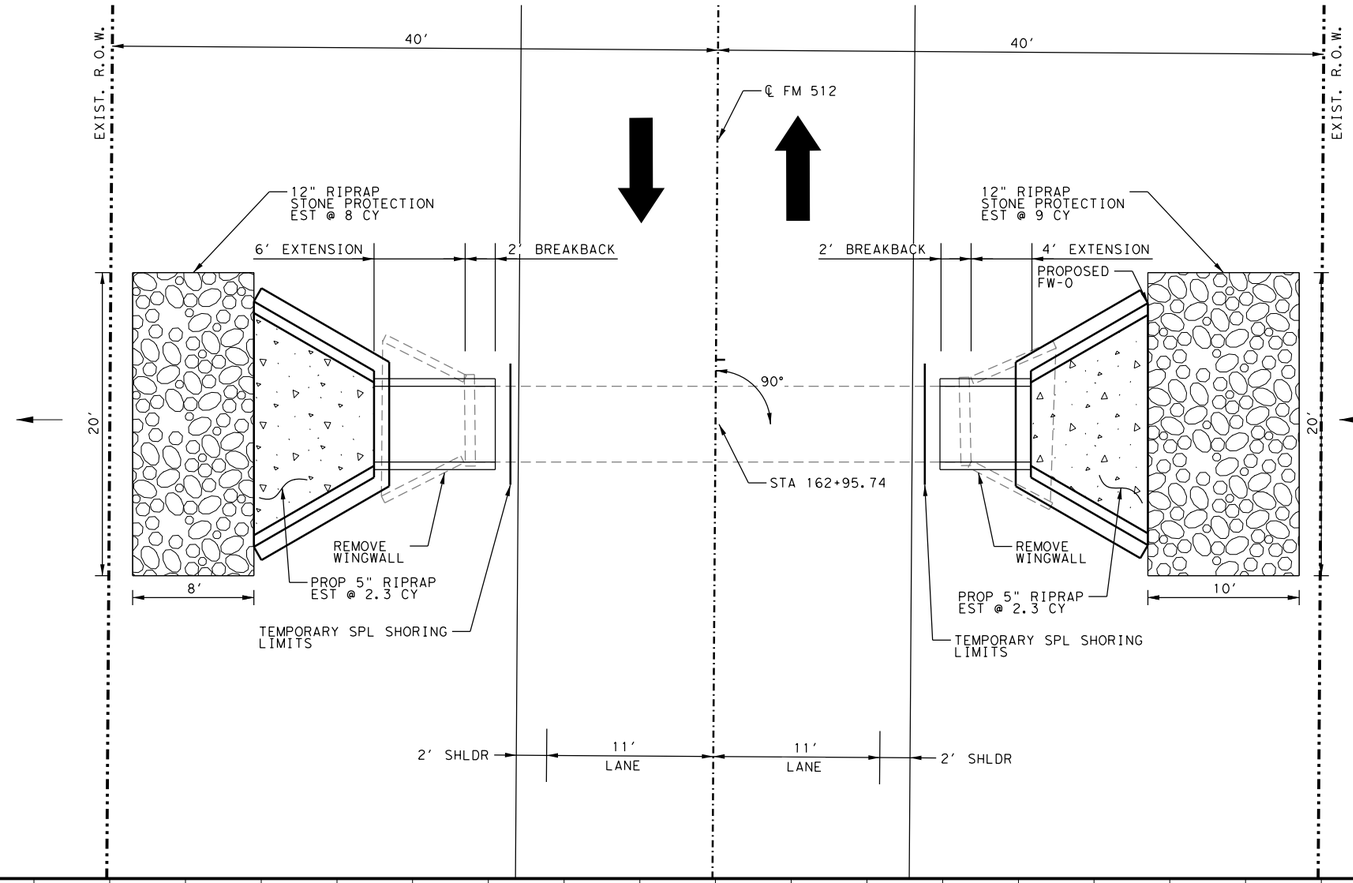

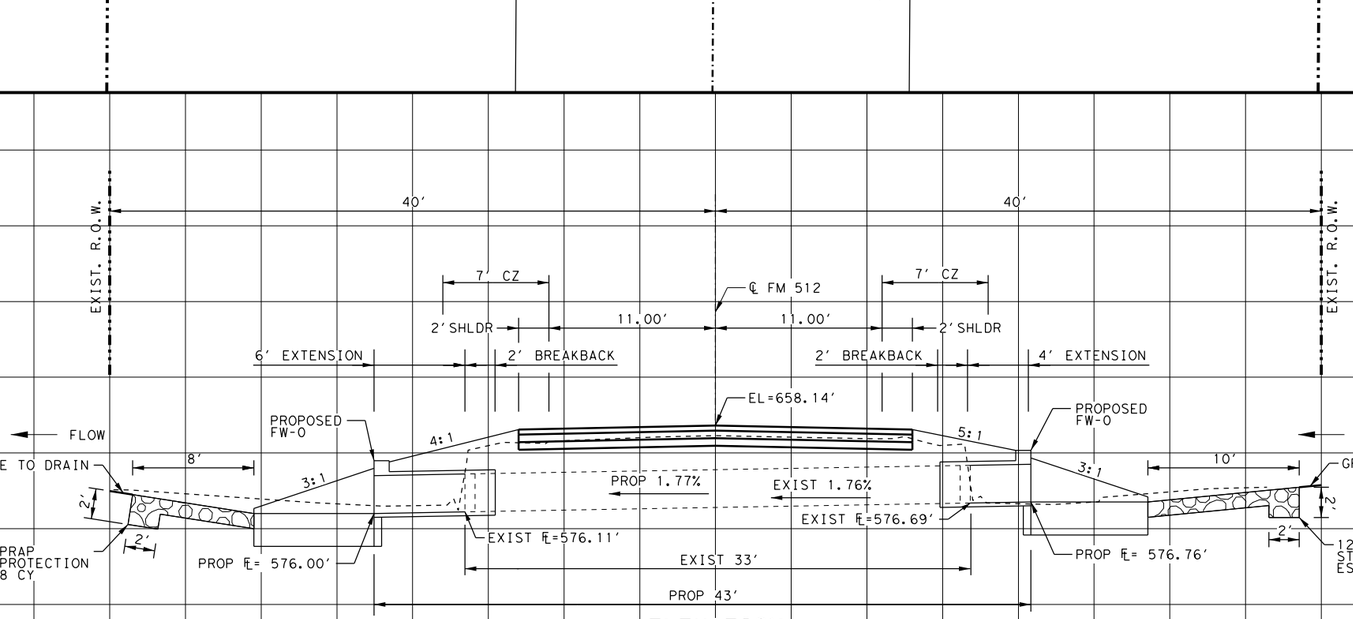

ELEVATION

CULVERT 05

℄ FM 512 STA 162+95.74

EXIST 1 - 5' X 2.5' X 33' SBC TO BE EXTENDED
PROP RIGHT EXTEND 4' W/FW-O
PROP LEFT EXTEND 6' W/FW-O

STANDARDS: FW-O, SCC-5 & 6, SCC-MD, SRR

0 5 10
SCALE: 1"=10'

NOTES:

1. HORIZONTAL ALIGNMENT DATA IS FOR INFORMATION ONLY. MATCH EXISTING ROADWAY.
2. CONTRACTOR TO FIELD VERIFY ELEVATIONS AND CONSTRUCT PROPOSED STRUCTURES TO ALLOW PROPER DRAINAGE FLOW.

ESTIMATED QUANTITIES			
ITEM	DESCRIPTION	UNIT	QTY
132 6019	EMBANKMENT (VEHICLE)(ORD COMP)(TY B)	CY	7
403 6001	TEMPORARY SPL SHORING	SF	80
432 6002	RIPRAP (CONC) (5 IN)	CY	4.6
432 6031	RIPRAP (STONE PROTECTION) (12 IN)	CY	17
462 6091	CONC BOX CULV (5FT X 2.5FT)(EXTEND)	LF	10
466 6150	WINGWALL (FW - O) (HW=3 FT)	EA	2
480 6001	CLEAN EXIST CULVERTS	EA	1
496 6005	REMOV STR (WINGWALL)	EA	2

STATE OF TEXAS
JUAN E. TREVINO-GUERRA
141908
LICENSED
PROFESSIONAL ENGINEER
5/24/2023

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FM 512

CULVERT LAYOUT 05
STA 162+95.74

SHEET 1 OF 1

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	108
CONTROL	SECTION	JOB	
0579	02	014	

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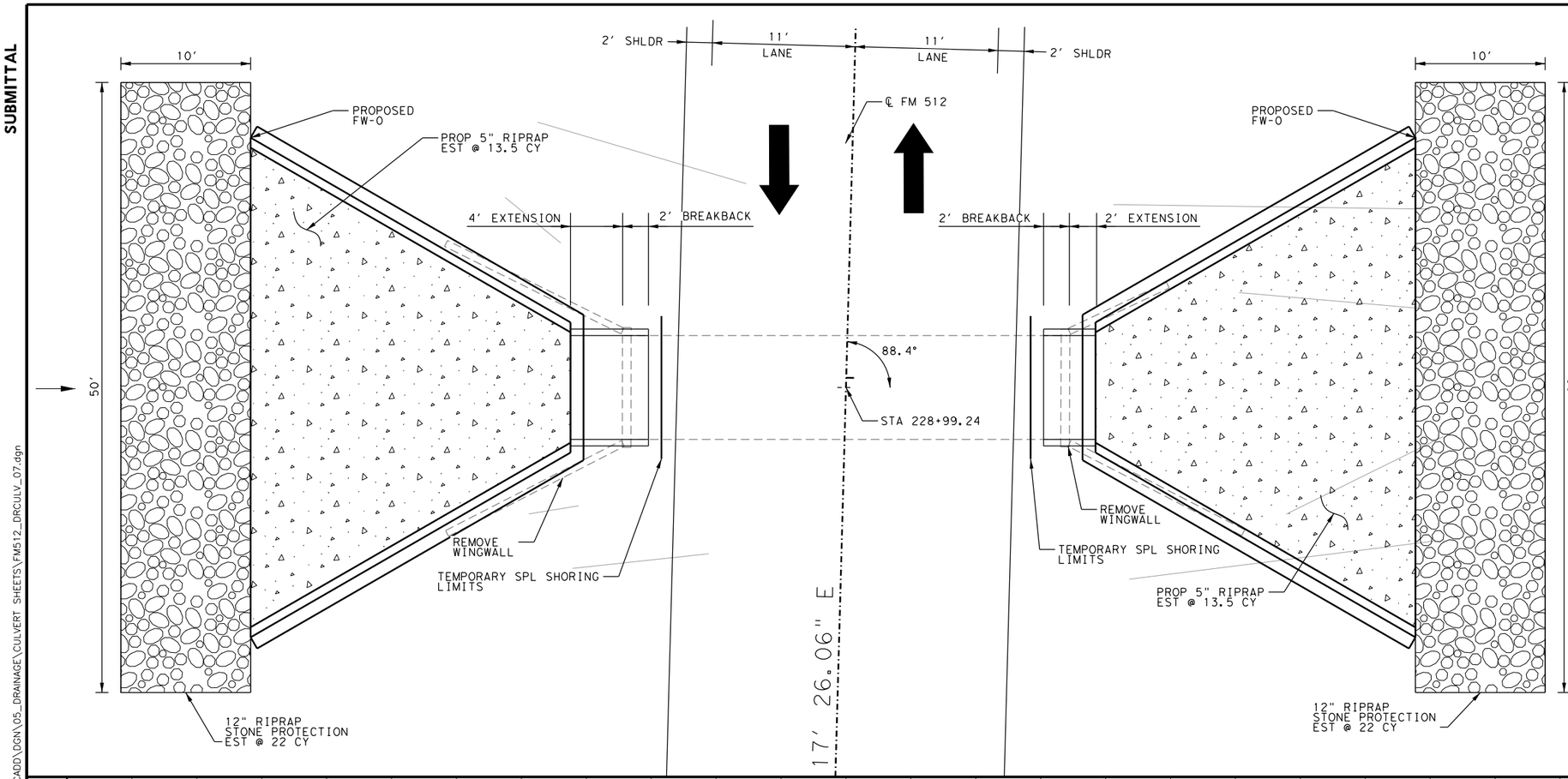

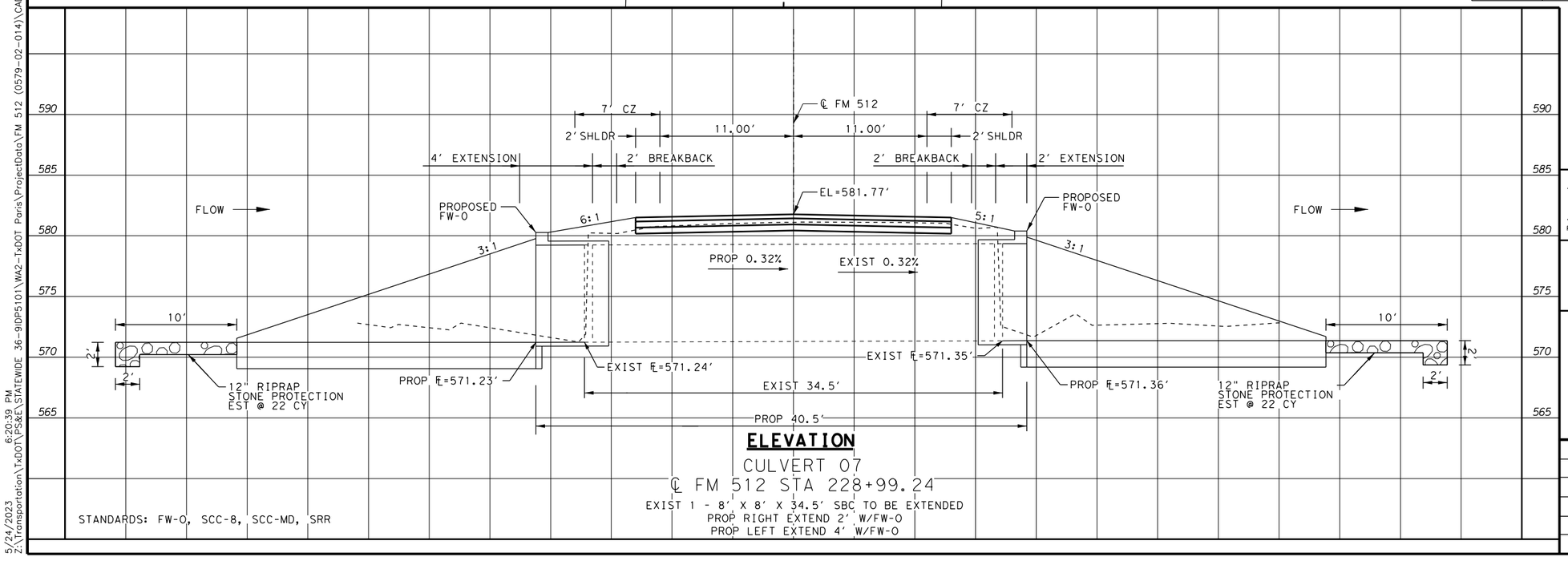

ELEVATION

CULVERT 07

℄ FM 512 STA 228+99.24

EXIST 1 - 8' X 8' X 34.5' SBC TO BE EXTENDED
PROP RIGHT EXTEND 2' W/FW-O
PROP LEFT EXTEND 4' W/FW-O

STANDARDS: FW-O, SCC-8, SCC-MD, SRR

0 5 10
SCALE: 1"=10'

NOTES:

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ESTIMATED QUANTITIES			
ITEM	DESCRIPTION	UNIT	QTY
132 6019	EMBANKMENT (VEHICLE)(ORD COMP)(TY B)	CY	6
403 6001	TEMPORARY SPL SHORING	SF	160
432 6002	RIPRAP (CONC) (5 IN)	CY	27
432 6031	RIPRAP (STONE PROTECTION) (12 IN)	CY	44
462 6067	CONC BOX CULV (8 FT X 8 FT)(EXTEND)	LF	6
466 6156	WINGWALL (FW - O) (HW=9 FT)	EA	2
480 6001	CLEAN EXIST CULVERTS	EA	1
496 6005	REMOV STR (WINGWALL)	EA	2

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FM 512

CULVERT LAYOUT 07
STA 228+99.24

SHEET 1 OF 1

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	109
CONTROL	SECTION	JOB	
0579	02	014	

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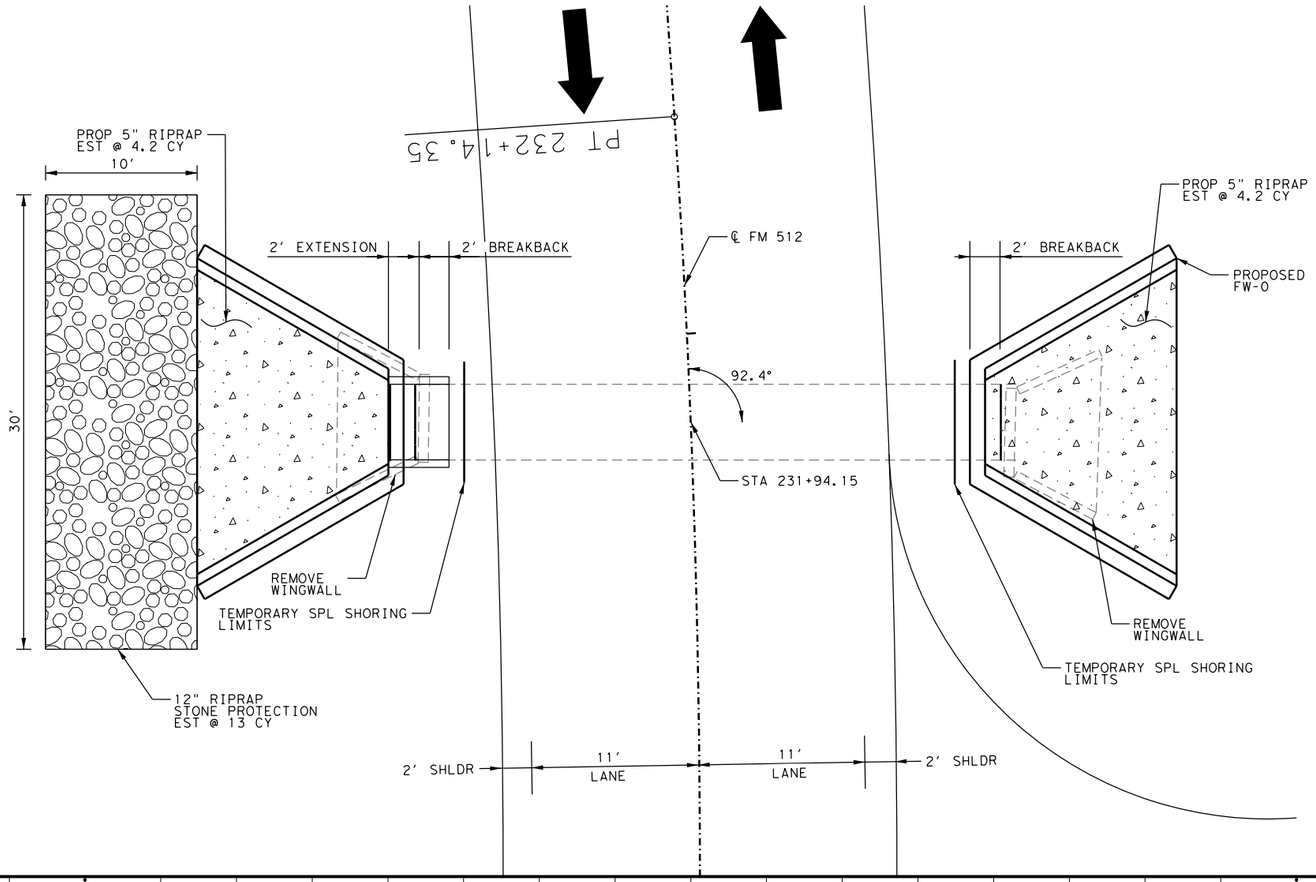

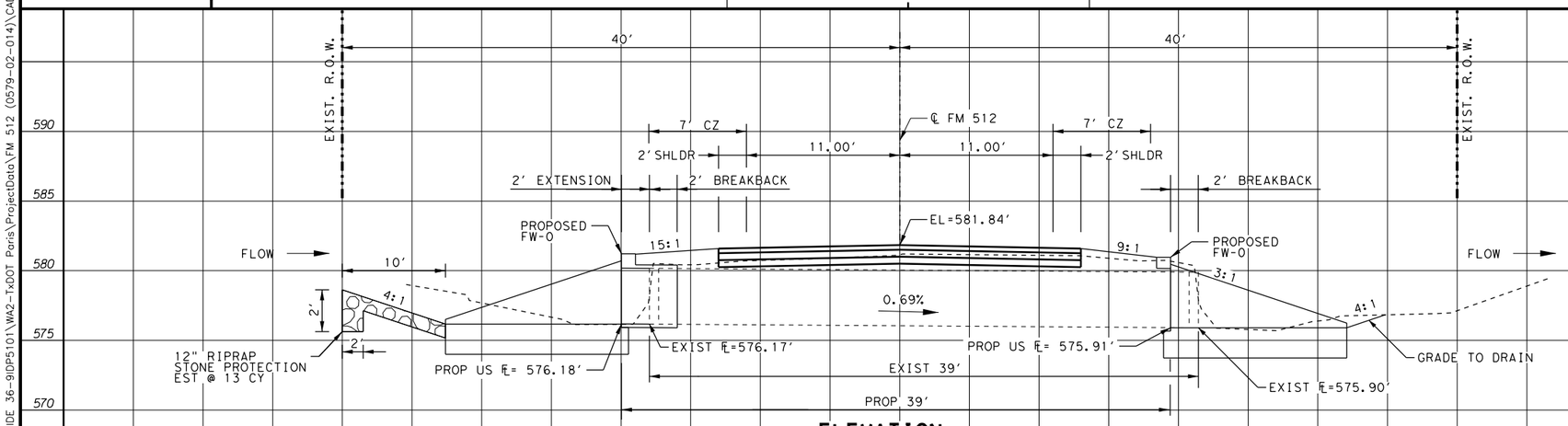

ELEVATION

CULVERT 08
℄ FM 512 STA 231+94.15
EXIST 1 - 5' X 4' X 39' SBC TO BE EXTENDED
PROP RIGHT BREAKBACK 2', ADD W/FW-O
PROP LEFT EXTEND 2' W/FW-O

STANDARDS: FW-O, SCC-5 & 6, SCC-MD, SRR

0 5 10
SCALE: 1"=10'

NOTES:

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ESTIMATED QUANTITIES			
ITEM	DESCRIPTION	UNIT	QTY
132 6019	EMBANKMENT (VEHICLE)(ORD COMP)(TY B)	CY	3
403 6001	TEMPORARY SPL SHORING	SF	70
432 6002	RIPRAP (CONC)(5 IN)	CY	8.4
432 6031	RIPRAP (STONE PROTECTION)(12 IN)	CY	13
462 6052	CONC BOX CULV (5 FT X 4 FT)(EXTEND)	LF	2
466 6152	WINGWALL (FW - 0) (HW=5 FT)	EA	2
480 6001	CLEAN EXIST CULVERTS	EA	1
496 6005	REMOV STR (WINGWALL)	EA	2

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FM 512

CULVERT LAYOUT 08
STA 231+94.15

SHEET 1 OF 1

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	110
CONTROL	SECTION	JOB	
0579	02	014	

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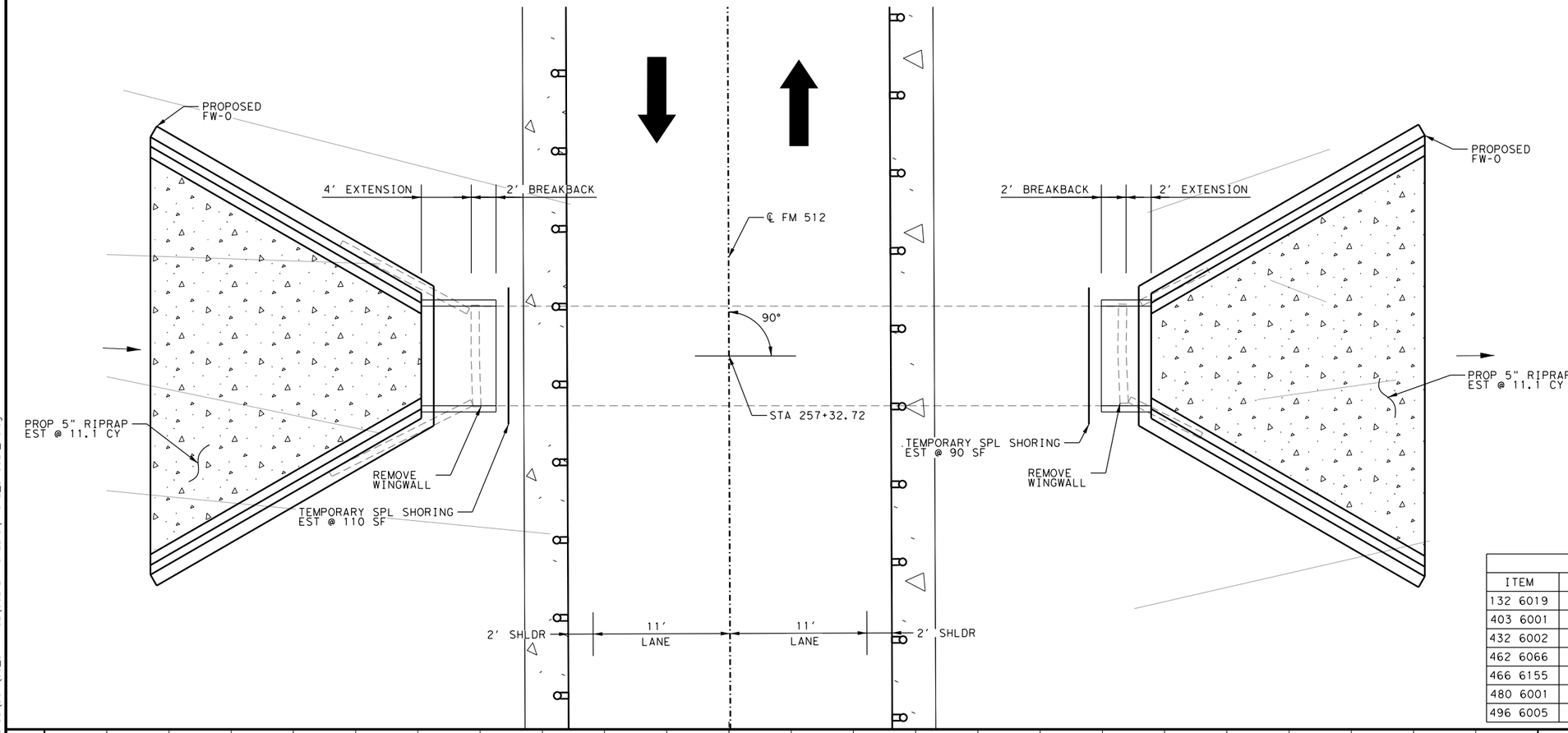

0 5 10
SCALE: 1"=10'

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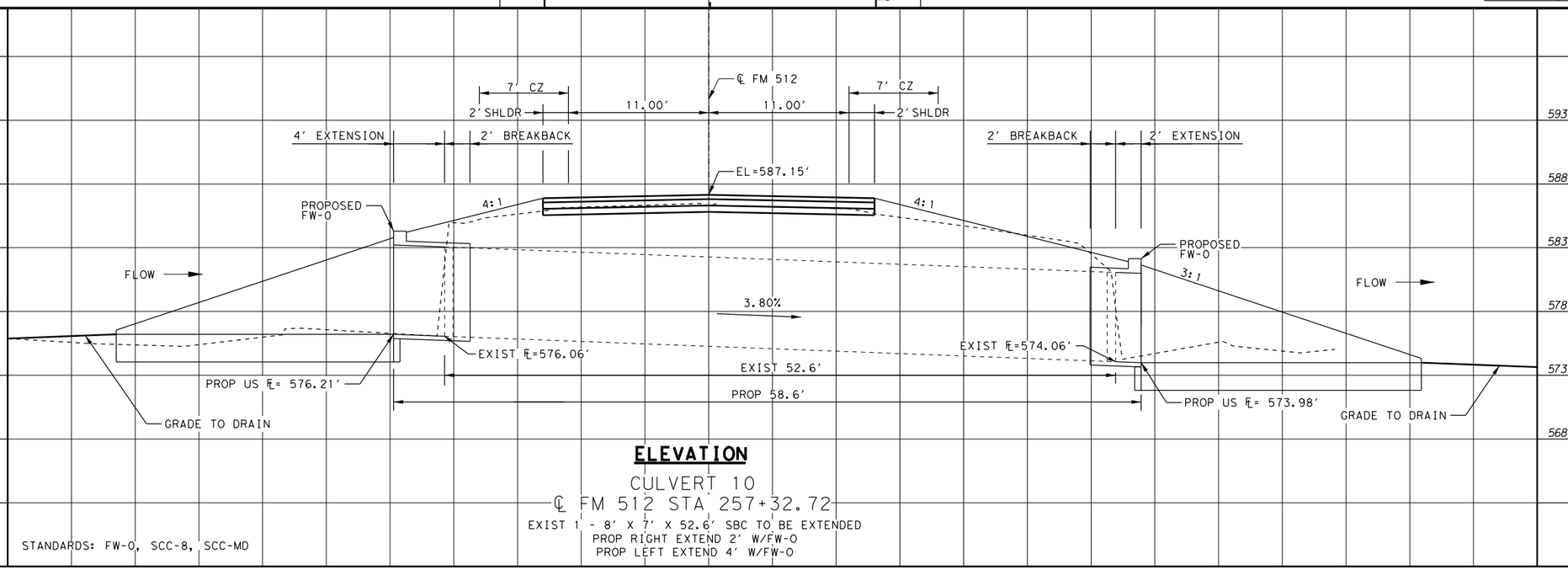
ESTIMATED QUANTITIES			
ITEM	DESCRIPTION	UNIT	QTY
132 6019	EMBANKMENT (VEHICLE)(ORD COMP)(TY B)	CY	30
403 6001	TEMPORARY SPL SHORING	SF	130
432 6002	RIPRAP (CONC)(5 IN)	CY	22.2
462 6066	CONC BOX CULV (8 FT X 7 FT)(EXTEND)	LF	6
466 6155	WINGWALL (FW - 0) (HW=8 FT)	EA	2
480 6001	CLEAN EXIST CULVERTS	EA	1
496 6005	REMOV STR (WINGWALL)	EA	2



ELEVATION

CULVERT 10

℄ FM 512 STA 257+32.72

EXIST 1 - 8' X 7' X 52.6' SBC TO BE EXTENDED
PROP RIGHT EXTEND 2' W/FW-0
PROP LEFT EXTEND 4' W/FW-0

STANDARDS: FW-0, SCC-8, SCC-MD

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FM 512

CULVERT LAYOUT 10
STA 257+32.72

SHEET 1 OF 1

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	111
CONTROL	SECTION	JOB	
0579	02	014	

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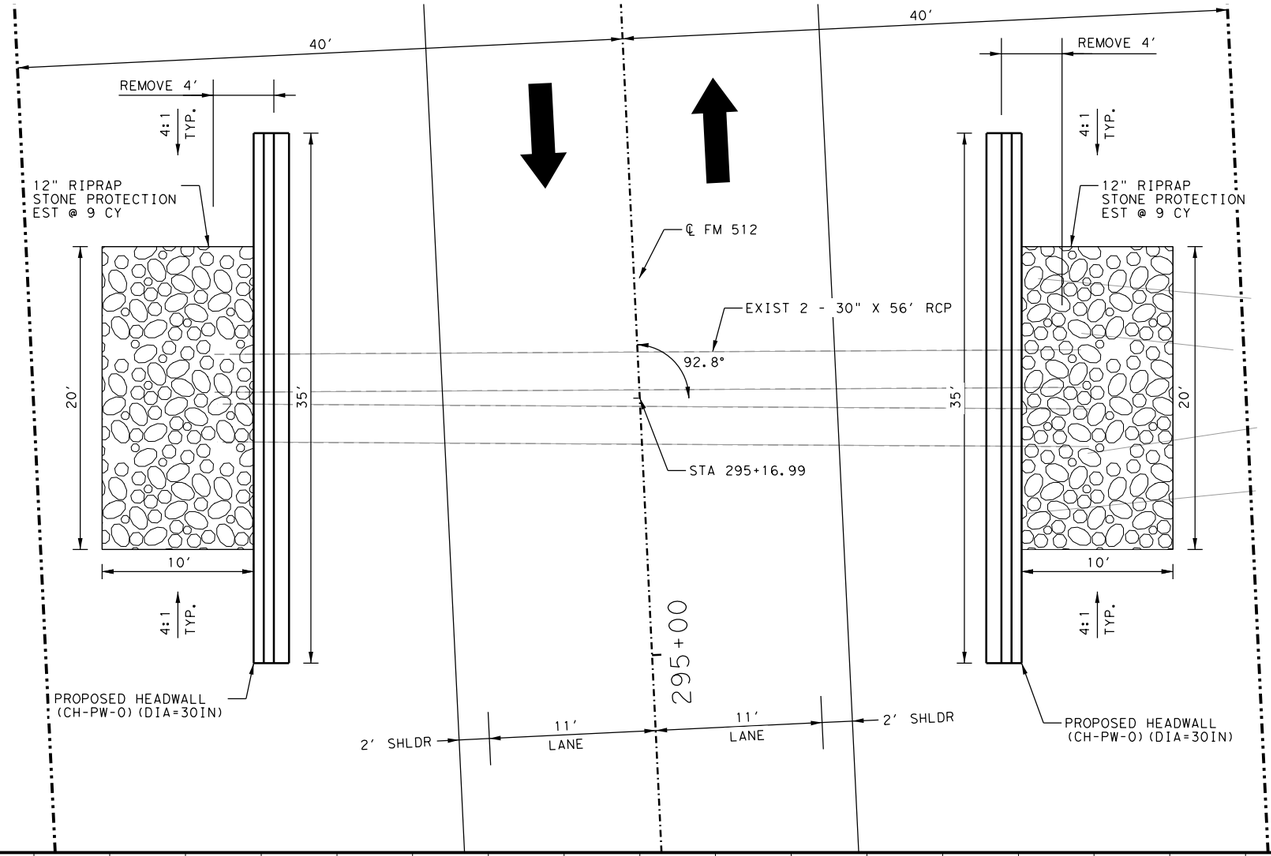

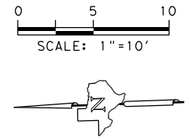

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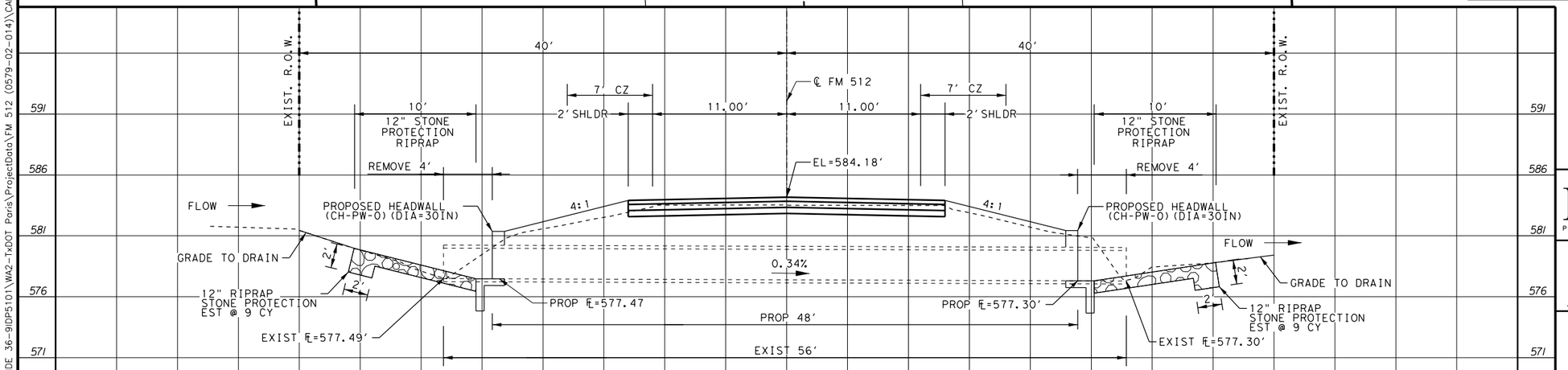
ESTIMATED QUANTITIES			
ITEM	DESCRIPTION	UNIT	QTY
132 6019	EMBANKMENT (VEHICLE)(ORD COMP)(TY B)	CY	14
432 6031	RIPRAP (STONE PROTECTION)(12 IN)	CY	18
466 6099	HEADWALL (CH-PW-0)(DIA=30IN)	EA	2
480 6001	CLEAN EXIST CULVERTS	EA	1
496 6007	REMOV STR (PIPE)	LF	16



ELEVATION

CULVERT 11
℄ FM 512 STA 295+16.99
EXIST 2 - 30" X 56' RCP
PROP RIGHT REMOVE 4', ADD W/CH-PW-0
PROP LEFT REMOVE 4', ADD W/CH-PW-0

STANDARDS: CH-PW-0, SRR

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FM 512

CULVERT LAYOUT 11
STA 295+16.99

SHEET 1 OF 1

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	112
CONTROL	SECTION	JOB	
0579	02	014	

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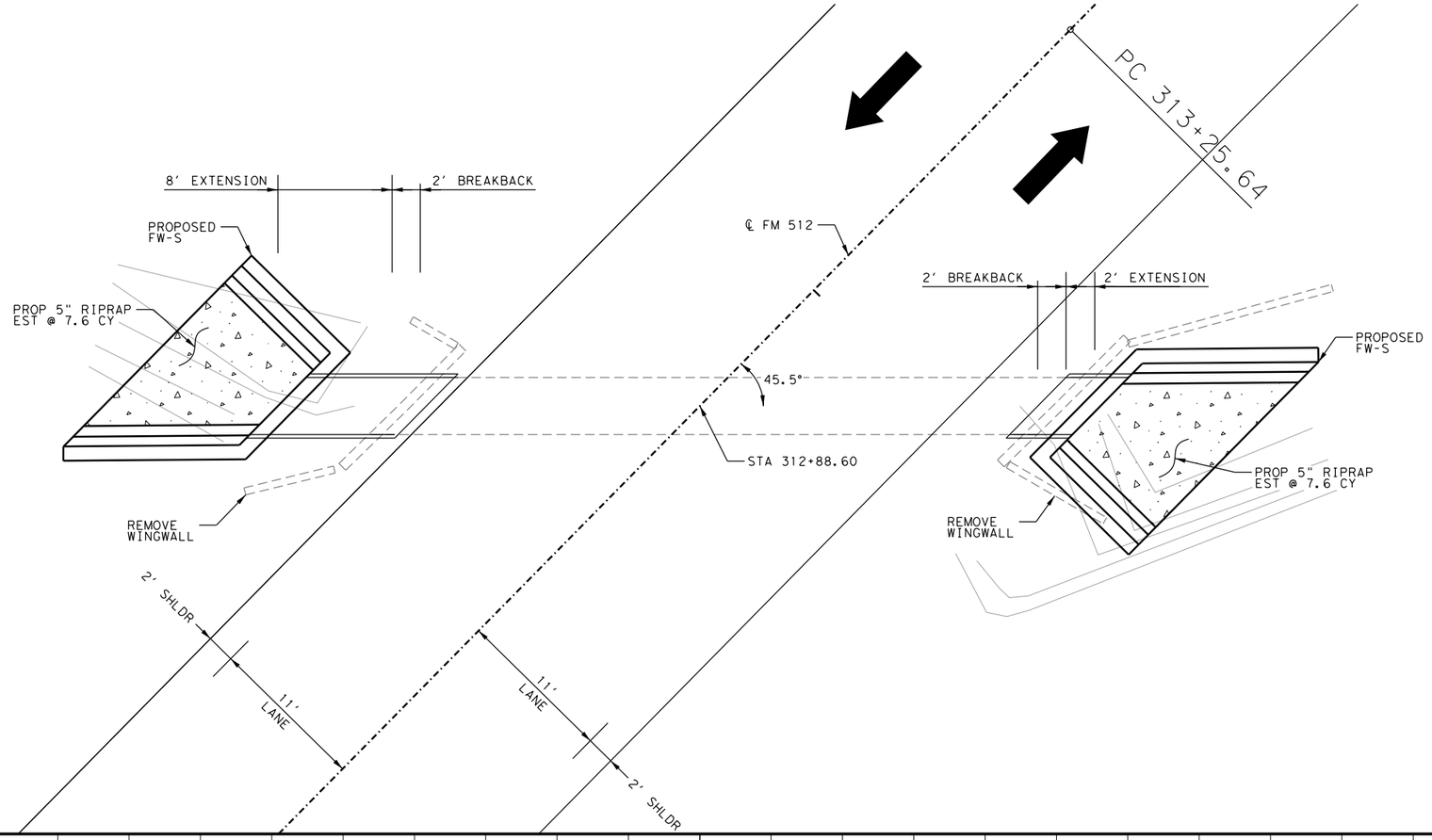

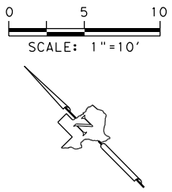

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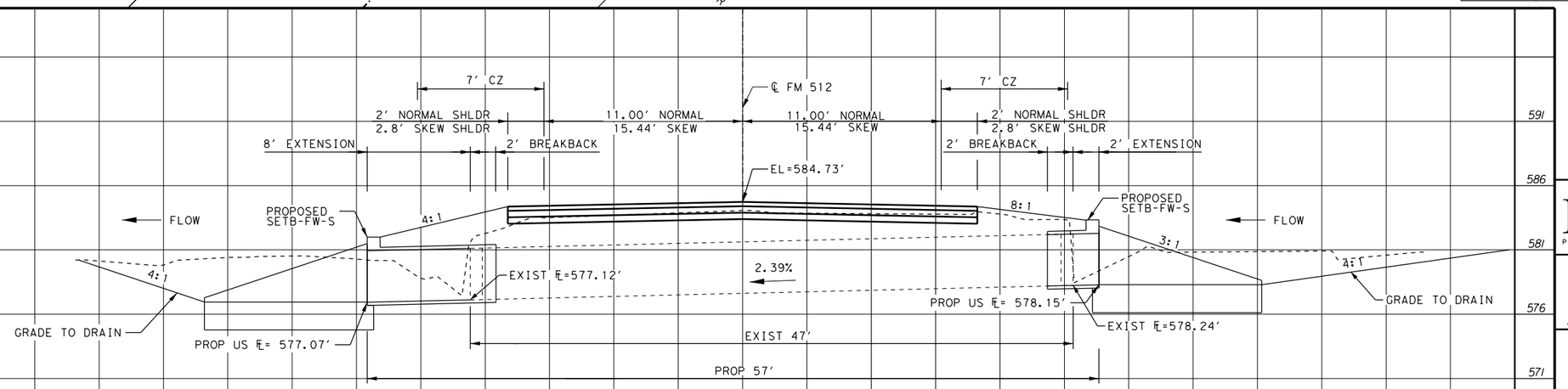
ESTIMATED QUANTITIES			
ITEM	DESCRIPTION	UNIT	QTY
132 6019	EMBANKMENT (VEHICLE)(ORD COMP)(TY B)	CY	10
403 6001	TEMPORARY SPECIAL SHORING	SF	100
432 6002	RIPRAP (CONC)(5 IN)	CY	15.2
462 6063	CONC BOX CULV (8 FT X 4 FT)(EXTEND)	LF	10
466 6166	WINGWALL (FW - S) (HW=5 FT)	EA	2
480 6001	CLEAN EXIST CULVERTS	EA	1
496 6005	REMOV STR (WINGWALL)	EA	2



ELEVATION

CULVERT 13
℄ FM 512 STA 312+88.60
EXIST 1 - 8' X 4' X 47' SBC TO BE EXTENDED
PROP RIGHT EXTEND 2' W/FW-S
PROP LEFT EXTEND 8' W/FW-S

STANDARDS: FW-S, SCC-8, SCC-MD

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FM 512

CULVERT LAYOUT 13
STA 312+88.60

SHEET 1 OF 1

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	113
CONTROL	SECTION	JOB	
0579	02	014	

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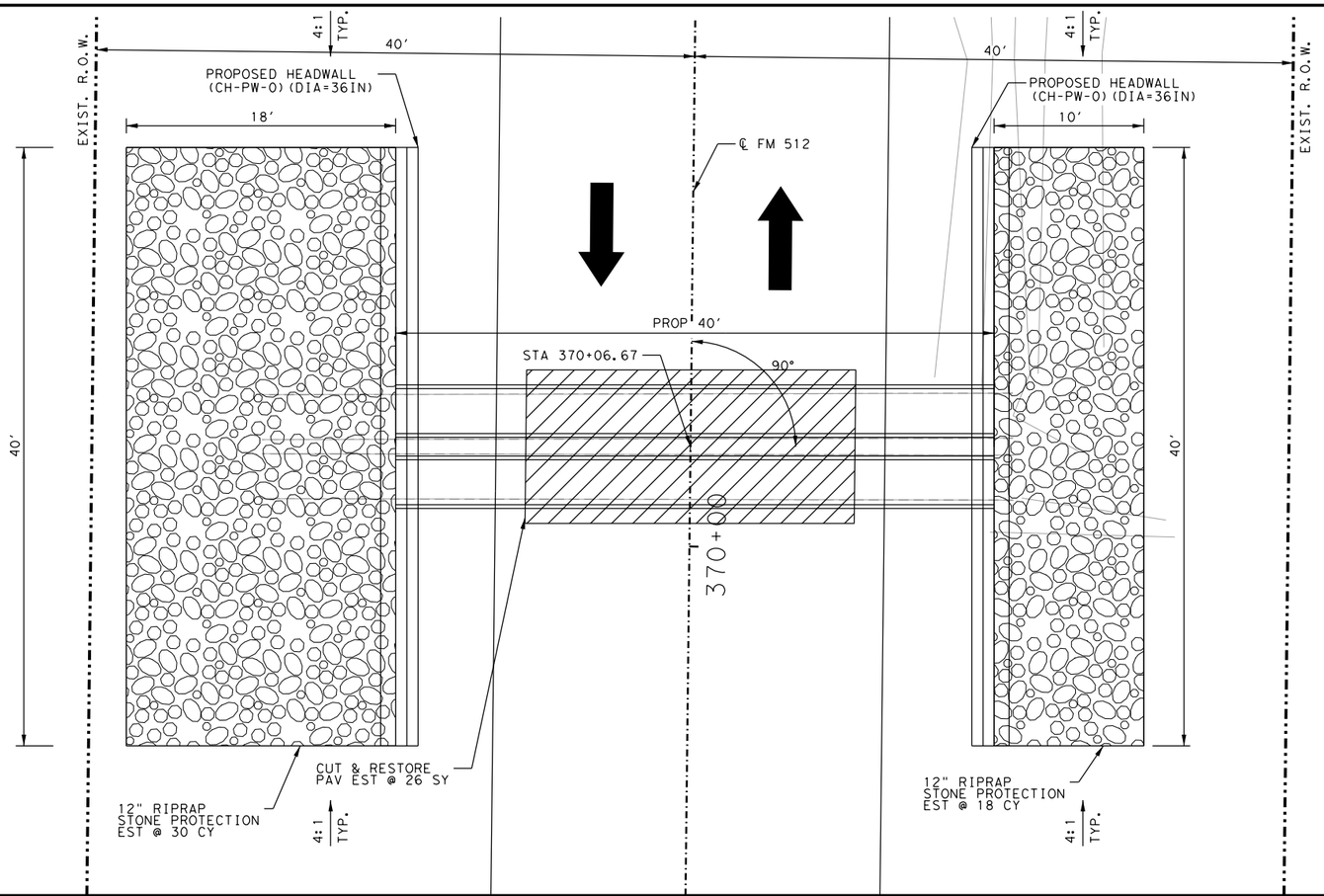

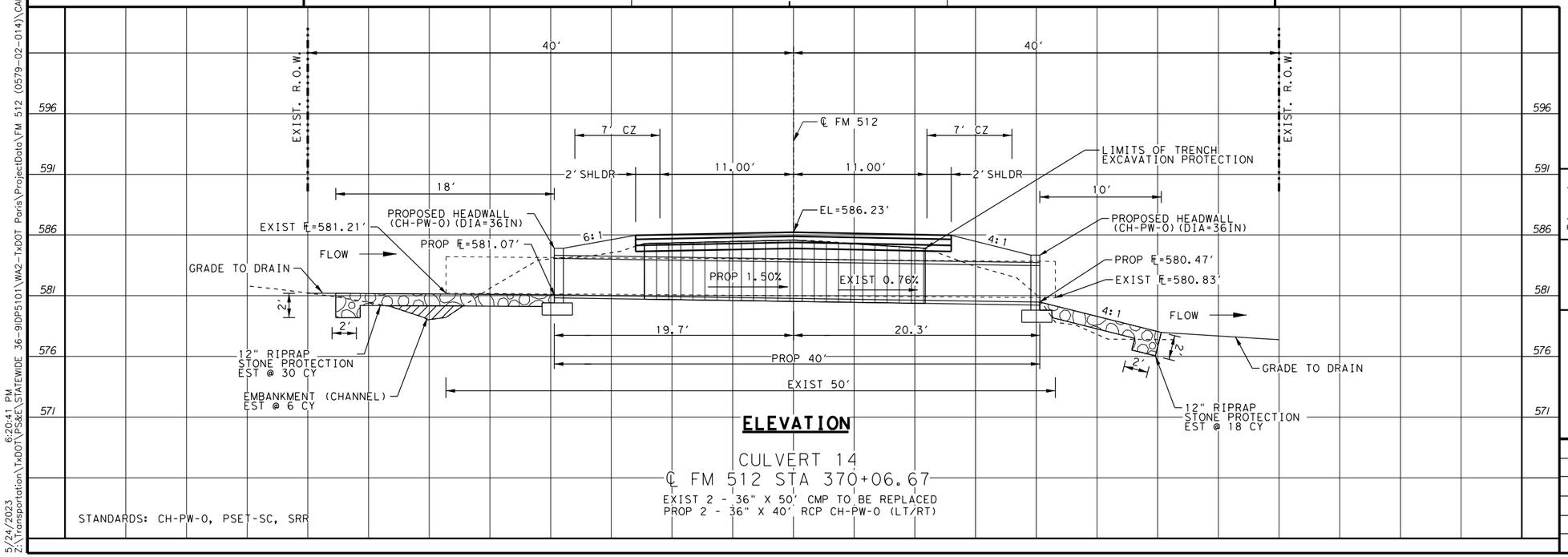

ELEVATION

CULVERT 14
℄ FM 512 STA 370+06.67
EXIST 2 - 36" X 50' CMP TO BE REPLACED
PROP 2 - 36" X 40' RCP CH-PW-O (LT/RT)

STANDARDS: CH-PW-O, PSET-SC, SRR

0 5 10
SCALE: 1"=10'

NOTES:

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ESTIMATED QUANTITIES			
ITEM	DESCRIPTION	UNIT	QTY
132 6019	EMBANKMENT (VEHICLE) (ORD COMP) (TY B)	CY	27
400 6006	CUT & RESTORING PAV	SY	26
402 6001	TRENCH EXCAVATION PROTECTION	LF	22
432 6031	RIPRAP (STONE PROTECTION) (12IN)	CY	48
464 6008	RC PIPE (CL III) (36 IN)	LF	80
466 6101	HEADWALL (CH-PW-O) (DIA=36IN)	EA	2
496 6007	REMOV STR (PIPE)	LF	100

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FM 512

CULVERT LAYOUT 14
STA 370+06.67

SHEET 1 OF 1

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	114
CONTROL	SECTION	JOB	
0579	02	014	

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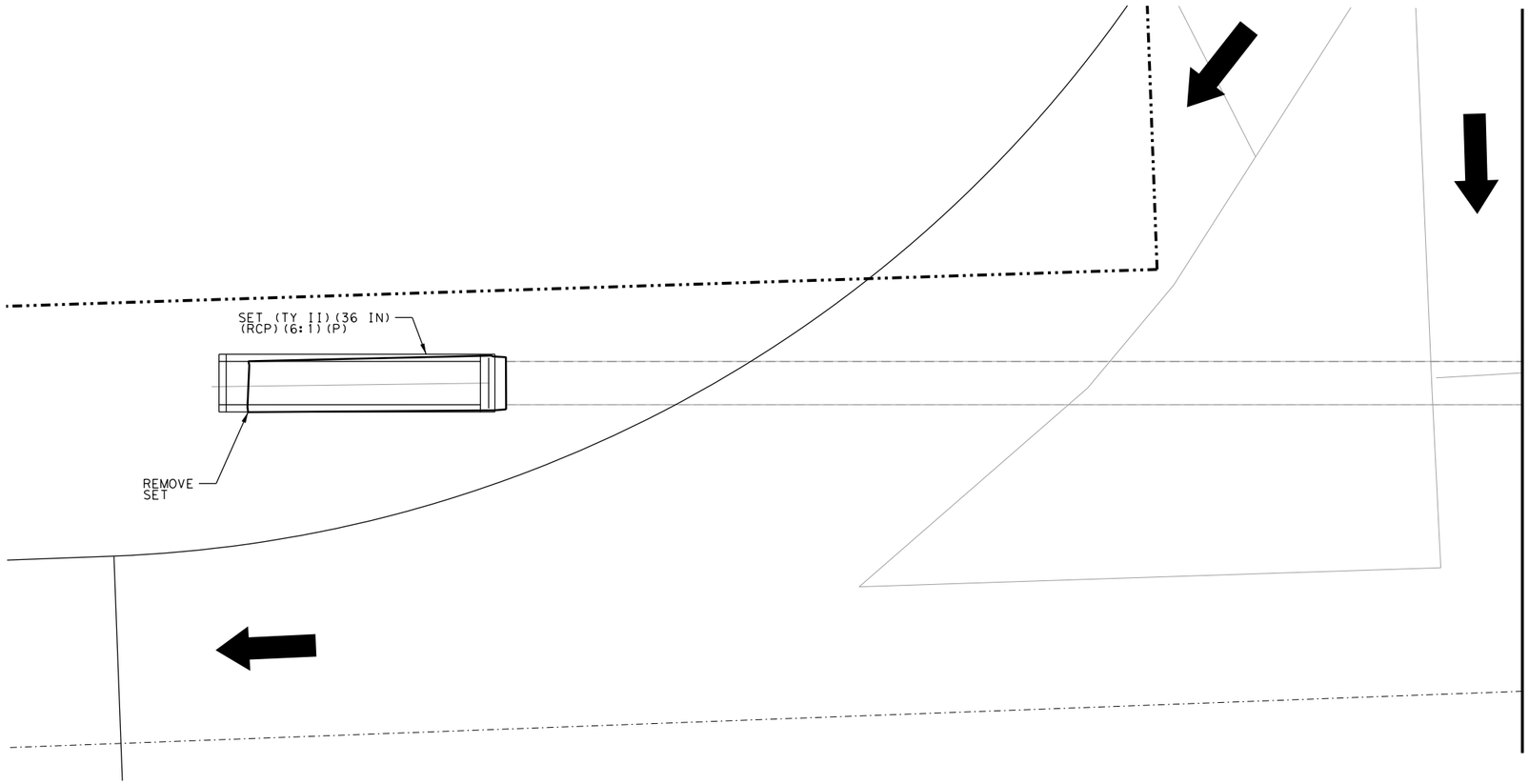

0 5 10
SCALE: 1"=10'

NOTES:

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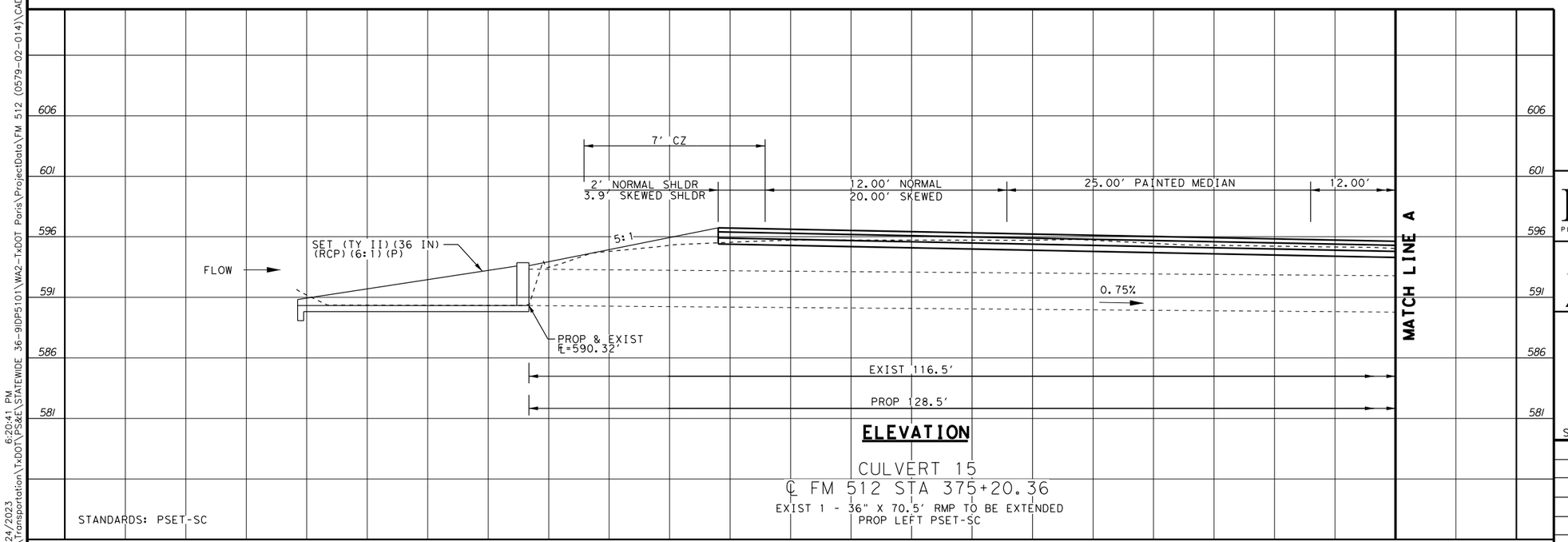
ESTIMATED QUANTITIES			
ITEM	DESCRIPTION	UNIT	QTY
132 6019	EMBANKMENT (VEHICLE)(ORD COMP)(TY B)	CY	3
467 6454	SET (TY II) (36 IN) (RCP) (6:1) (P)	EA	1
480 6001	CLEAN EXIST CULVERTS	EA	1
496 6004	REMOV STR (SET)	EA	1



ELEVATION

CULVERT 15
℄ FM 512 STA 375+20.36
EXIST 1 - 36" X 70.5' RMP TO BE EXTENDED
PROP LEFT PSET-SC

STANDARDS: PSET-SC

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FM 512

CULVERT LAYOUT 15
STA 375+20.36

SHEET 1 OF 2

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	115
CONTROL	SECTION	JOB	
0579	02	014	

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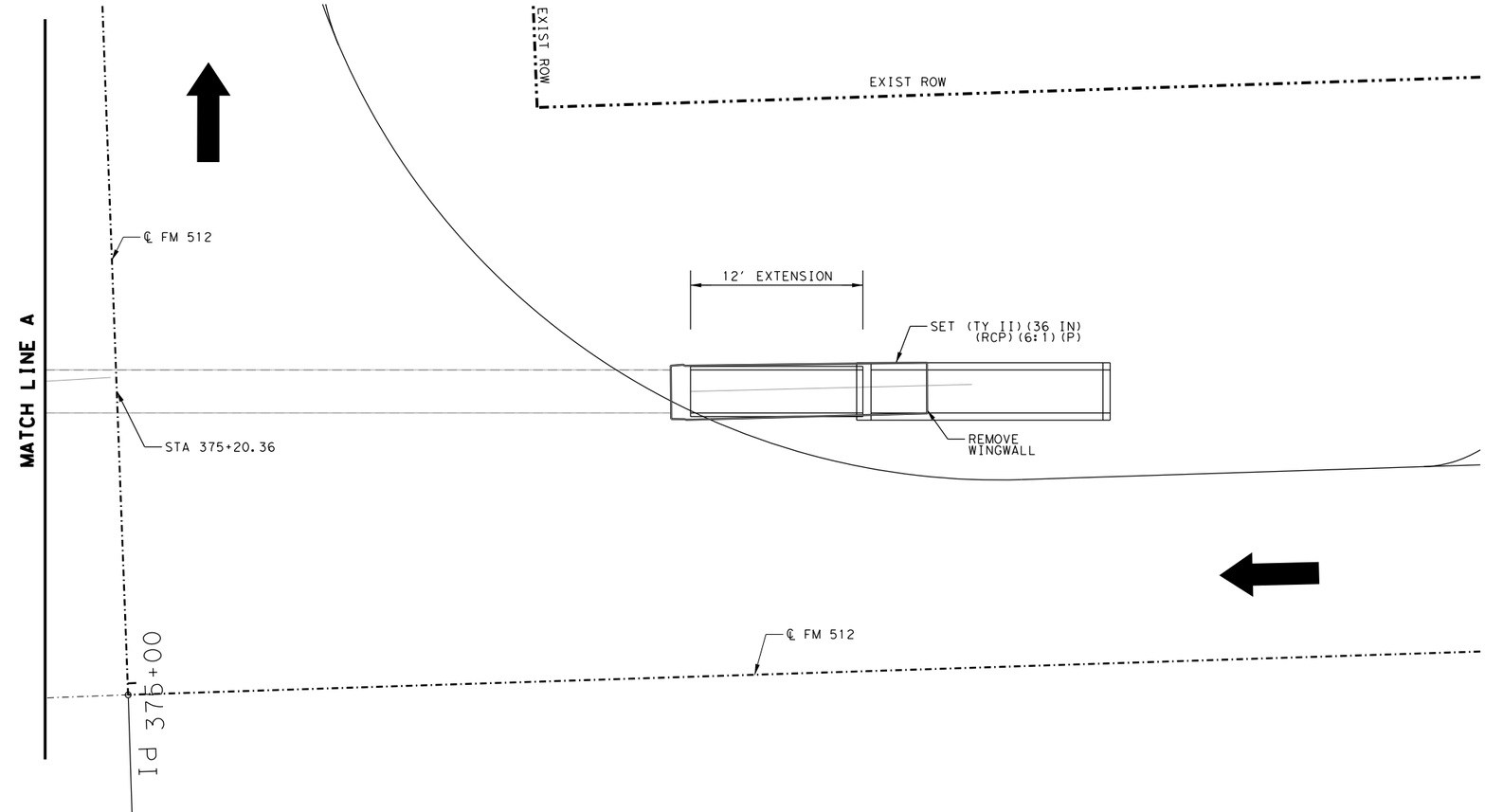

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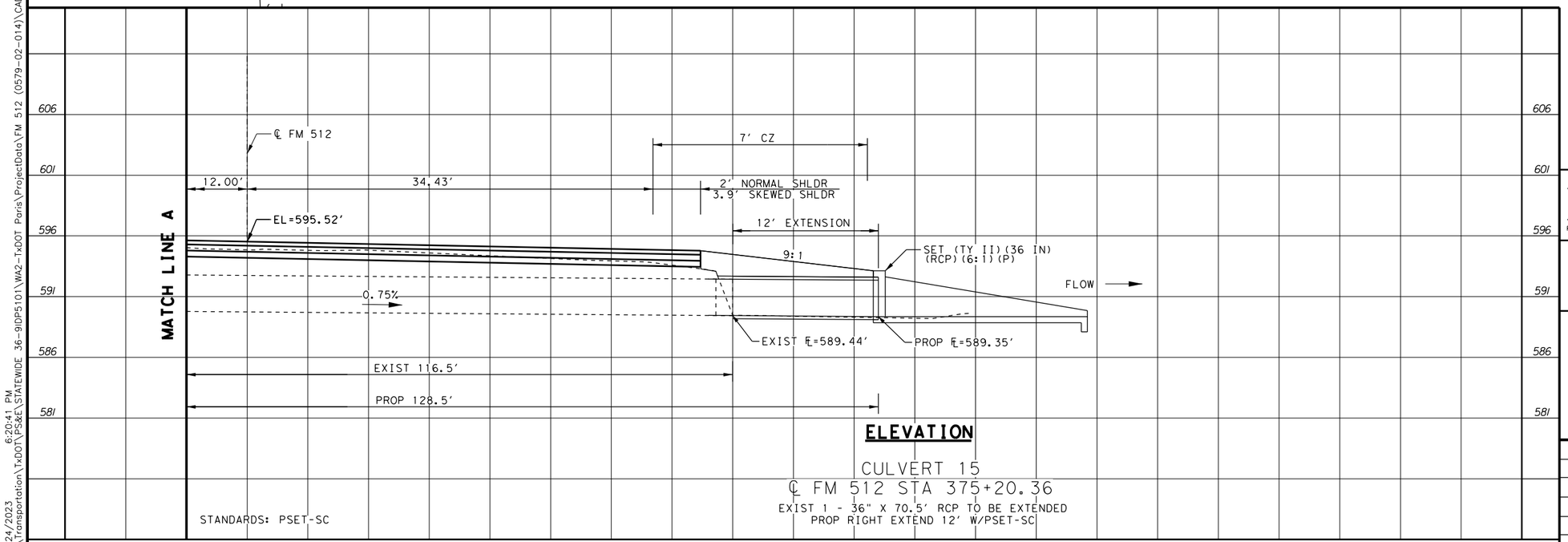
ESTIMATED QUANTITIES			
ITEM	DESCRIPTION	UNIT	QTY
132 6019	EMBANKMENT (VEHICLE)(ORD COMP)(TY B)	CY	7
464 6008	RC PIPE (CL III) (36 IN)	LF	12
467 6454	SET (TY II) (36 IN) (RCP) (6:1) (P)	EA	1
496 6004	REMOV STR (SET)	EA	1



ELEVATION

CULVERT 15
℄ FM 512 STA 375+20.36
EXIST 1 - 36" X 70.5' RCP TO BE EXTENDED
PROP RIGHT EXTEND 12' W/PSET-SC

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FM 512

CULVERT LAYOUT 15
STA 375+20.36

SHEET 2 OF 2

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	116
CONTROL	SECTION	JOB	
0579	02	014	

FM512_DRCULV_15-2.dgn

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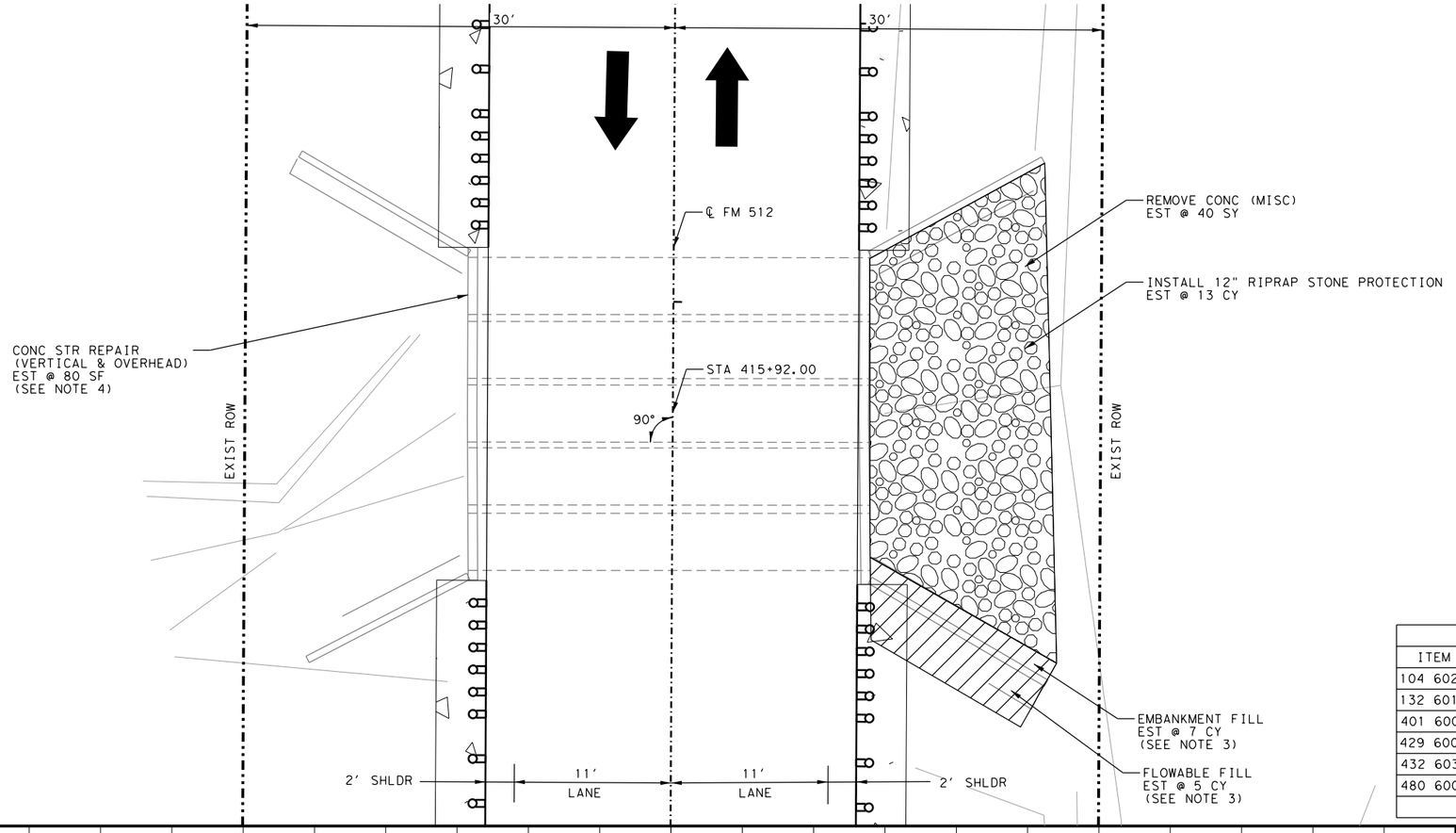

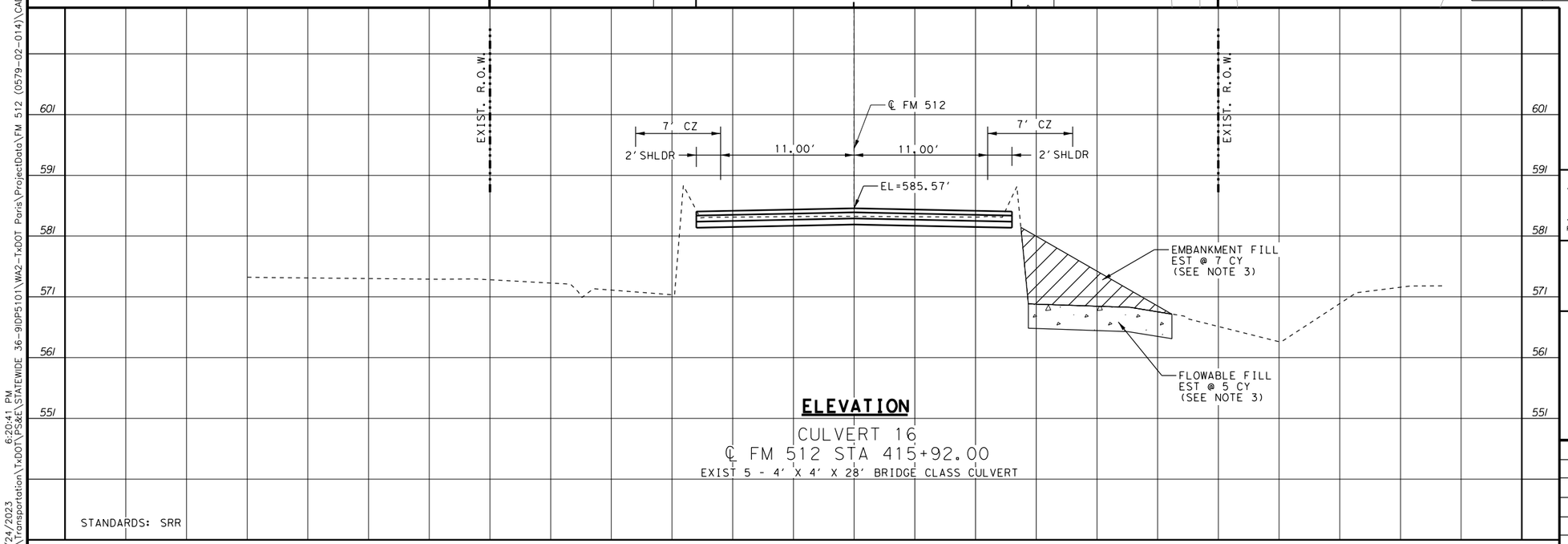

ELEVATION

CULVERT 16
℄ FM 512 STA 415+92.00
EXIST 5 - 4' X 4' X 28' BRIDGE CLASS CULVERT

STANDARDS: SRR

0 5 10
SCALE: 1"=10'

NOTES:

1. HORIZONTAL ALIGNMENT DATA IS FOR INFORMATION ONLY. MATCH EXISTING ROADWAY.
2. CONTRACTOR TO FIELD VERIFY ELEVATIONS AND CONSTRUCT PROPOSED STRUCTURES TO ALLOW PROPER DRAINAGE FLOW.
3. 2' DEEP FLOWABLE FILL AROUND AND UNDER THE APRON THEN FILL WITH DIRT (EMBANKMENT)
4. TYPICAL 8 SF OF CONCRETE SPALLING REPAIR ON EACH END OF EACH BARREL.

ESTIMATED QUANTITIES			
ITEM	DESCRIPTION	UNIT	QTY
104 6028	REMOVING CONC (MISC)	SY	40
132 6019	EMBANKMENT (VEHICLE)(ORD COMP)(TY B)	CY	7
401 6001	FLOWABLE BACKFILL	CY	5
429 6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	SF	80
432 6031	RIPRAP (STONE PROTECTION) (12IN)	CY	13
480 6001	CLEAN EXIST CULVERTS	EA	1

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PAUL A. WARDEN
101319
LICENSED
PROFESSIONAL ENGINEER

Paul A. Warden, P.E. 5/24/2023

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Texas Department of Transportation

FM 512
CULVERT LAYOUT 16
BRIDGE CLASS
STA 415+92.00
NBI: 01-117-0-0579-02-004

SHEET 1 OF 1

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	117
CONTROL	SECTION	JOB	
0579	02	014	

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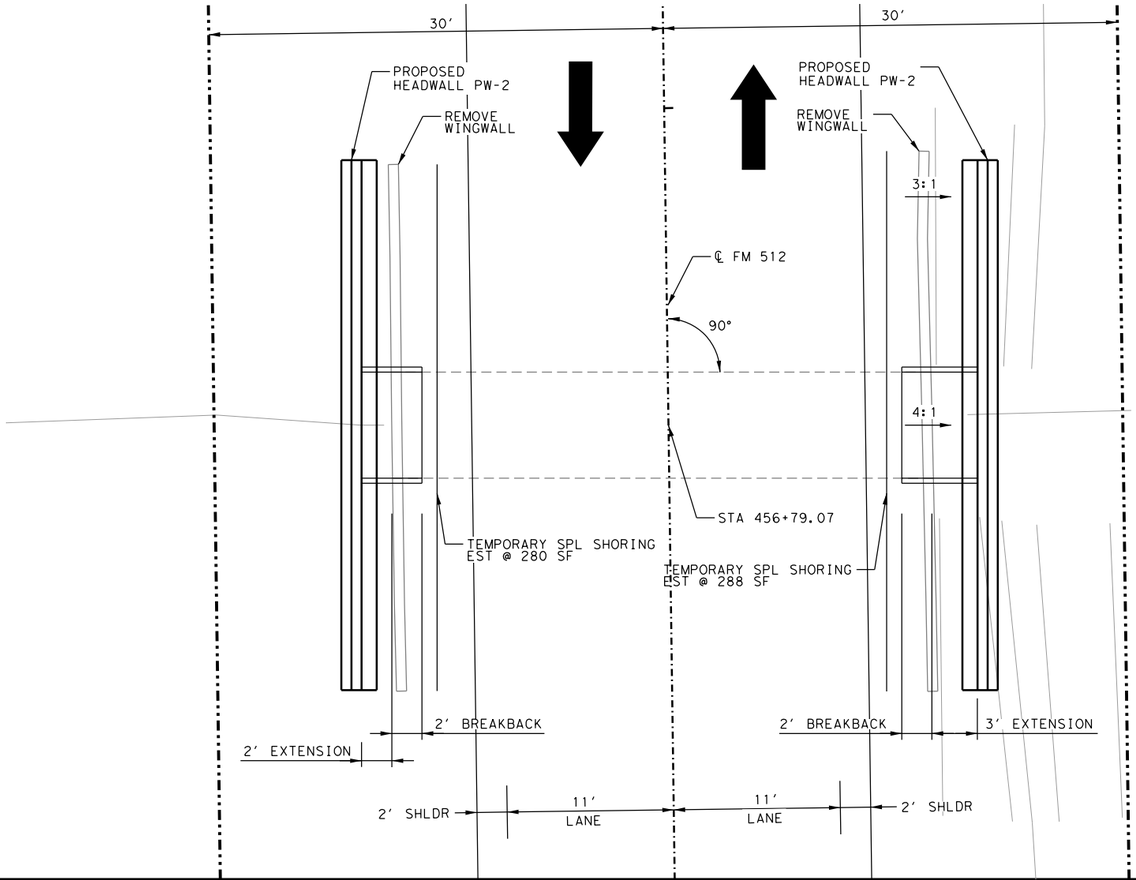

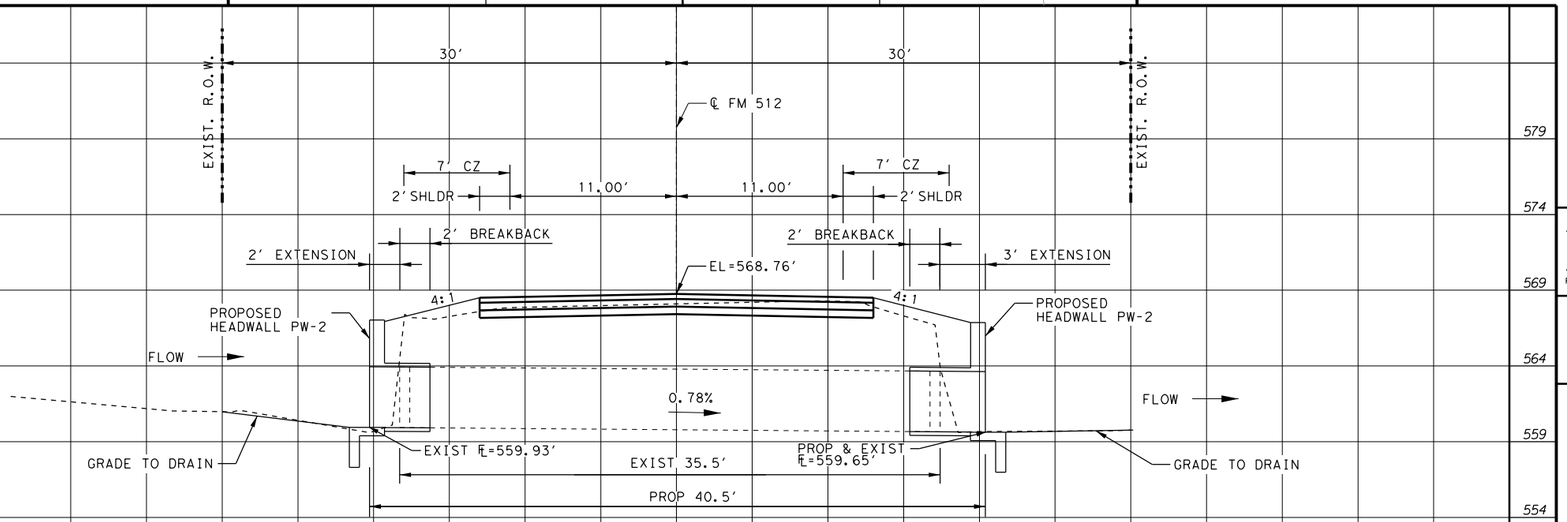

ELEVATION

CULVERT 17
℄ FM 512 STA 456+79.07
EXIST 1 - 7' X 4' X 35.5' SBC TO BE EXTENDED
PROP RIGHT EXTEND 3' W/PW-2
PROP LEFT EXTEND 2' W/PW-2

STANDARDS: PW, SCC-7, SCC-MD, ECD

0 5 10
SCALE: 1"=10'

NOTES:

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2. CONTRACTOR TO FIELD VERIFY ELEVATIONS AND CONSTRUCT PROPOSED STRUCTURES TO ALLOW PROPER DRAINAGE FLOW.

ESTIMATED QUANTITIES			
ITEM	DESCRIPTION	UNIT	QTY
132 6019	EMBANKMENT (VEHICLE)(ORD COMP)(TY B)	CY	2
403 6001	TEMPORARY SPL SHORING	SF	568
462 6059	CONC BOX CULV (7 FT X 4 FT)(EXTEND)	LF	5
466 6194	WINGWALL (PW - 2) (HW=5 FT)	EA	2
480 6001	CLEAN EXIST CULVERTS	EA	1
496 6005	REMOV STR (WINGWALL)	EA	2

STATE OF TEXAS
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Texas Department of Transportation

FM 512

CULVERT LAYOUT 17
STA 456+79.07

SHEET 1 OF 1

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	118
CONTROL	SECTION	JOB	
0579	02	014	

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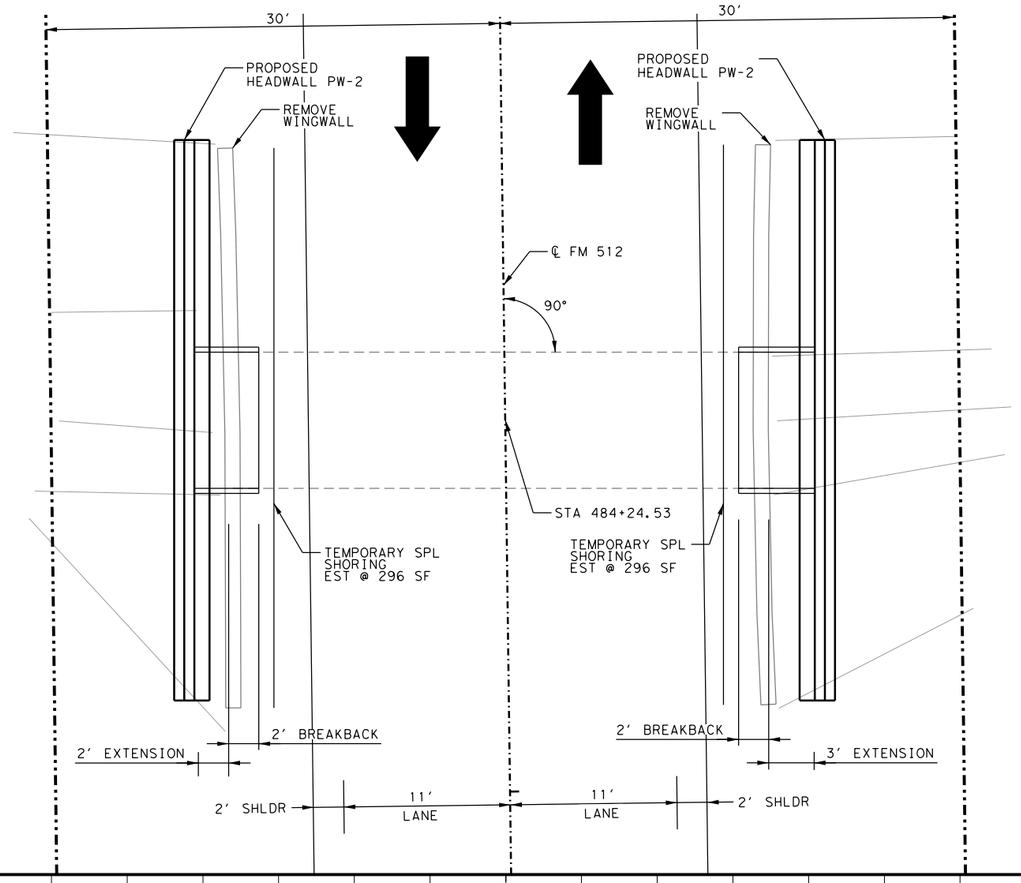
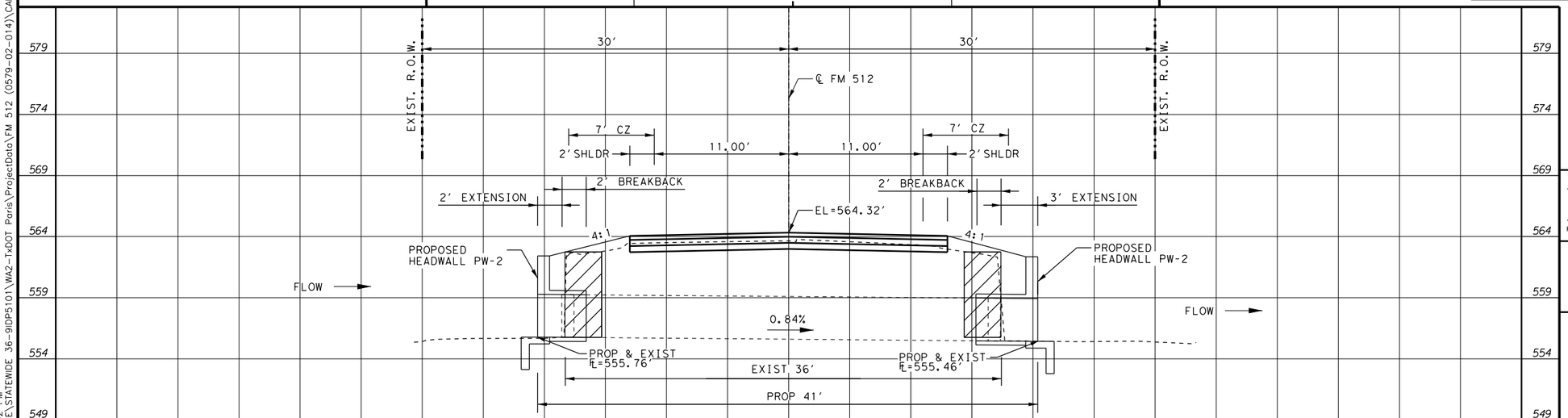


NOTES:

1. HORIZONTAL ALIGNMENT DATA IS FOR INFORMATION ONLY. MATCH EXISTING ROADWAY.
2. CONTRACTOR TO FIELD VERIFY ELEVATIONS AND CONSTRUCT PROPOSED STRUCTURES TO ALLOW PROPER DRAINAGE FLOW.

ESTIMATED QUANTITIES			
ITEM	DESCRIPTION	UNIT	QTY
132 6019	EMBANKMENT (VEHICLE)(ORD COMP)(TY B)	CY	3
403 6001	TEMPORARY SPL SHORING	SF	592
462 6100	CONC BOX CULV (9 FT X 4 FT)(EXTEND)	LF	5
466 6194	WINGWALL (PW - 2) (HW=5 FT)	EA	2
480 6001	CLEAN EXIST CULVERTS	EA	1
496 6005	REMOV STR (WINGWALL)	EA	2



ELEVATION

CULVERT 18
℄ FM 512 STA 484+24.53
EXIST 1 - 9' X 4' X 36' SBC TO BE EXTENDED
PROP RIGHT EXTEND 3' W/PW-2
PROP LEFT EXTEND 2' W/PW-2

STANDARDS: PW, SCC-9, SCC-MD, ECD

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FM 512

CULVERT LAYOUT 18
STA 484+24.53

SHEET 1 OF 1

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	119
CONTROL	SECTION	JOB	
0579	02	014	

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Culvert Station and/or Creek Name followed by applicable end (Lt, Rt or Both)	Description of Box Culvert No. Spans ~ Span X Height	Max Fill Height (Ft)	Applicable Box Culvert Standard (4)	Applicable Wingwall or End Treatment Standard	Skew Angle (0°,15°, 30° or 45°)	Side Slope or Channel Slope Ratio (SL:1)	T Culvert Top Slab Thickness (In)	U Culvert Wall Thickness (In)	C Estimated Curb Height (Ft)	Hw Height of Wingwall (1) (Ft)	A Curb to End of Wingwall (Ft)	B Offset of End of Wingwall (Ft)	Lw Length of Longest Wingwall (Ft)	Ltw Culvert Toewall Length (Ft)	Atw Anchor Toewall Length (Ft)	Riprap Apron (CY)	Class "C" Conc (Curb) (2) (CY)	Class "C" Conc (Wingwall) (3) (CY)	Total Wingwall Area (SF)
CULVERT 02 - STA 44+89.85 (BOTH)	1 ~ 5' x 3'	4'	SCC-5&6	FW-0	0	4:1	8"	7"	0.7	3.917	14.333	8.275	16.551	N/A	N/A	6.0	0.2	9.4	140
CULVERT 03 - STA 76+57.36 (BOTH)	1 ~ 6' x 4'	5'	SCC-5&6	FW-0	0	4:1	8"	7"	0.7	4.917	18.333	10.585	21.170	N/A	N/A	9.0	0.2	14.6	222
CULVERT 05 - STA 162+95.74 (BOTH)	1 ~ 5' x 2.5'	3.5'	SCC-5&6	FW-0	0	4:1	8"	7"	0.7	3.417	12.333	7.121	14.241	N/A	N/A	4.6	0.2	7.8	106
CULVERT 07 - STA 228+99.24 (BOTH)	1 ~ 8' x 8'	9'	SCC-8	FW-0	0	4:1	8"	7"	0.7	8.917	34.333	19.822	39.645	N/A	N/A	27.0	0.4	42.4	734
CULVERT 08 - STA 231+94.15 (BOTH)	1 ~ 5' x 4'	5'	SCC-5&6	FW-0	0	4:1	8"	7"	0.8	4.917	18.333	10.585	21.170	N/A	N/A	8.4	0.2	14.6	222
CULVERT 10 - STA 257+32.72 (BOTH)	1 ~ 8' x 7'	8'	SCC-8	FW-0	0	4:1	8"	7"	0.8	7.917	30.333	17.513	35.026	N/A	N/A	22.2	0.4	34.0	288
CULVERT 13 - STA 312+88.60 (BOTH)	1 ~ 8' x 4'	5'	SCC-7	FW-S	45	4:1	8"	7"	0.8	4.917	18.333	31.754	36.667	N/A	N/A	15.2	0.4	18.8	332
CULVERT 17 - STA 456+79.07 (BOTH)	1 ~ 7' x 4'	5'	SCC-7	PW-2	0	4:1	8"	7"	2.9	5.167	N/A	N/A	16.667	8.167	N/A	0.0	0.4	23.0	332
CULVERT 18 - STA 484+24.53 (BOTH)	1 ~ 9' x 4'	5'	SCC-9	PW-2	0	4:1	8"	7"	2.9	5.167	N/A	N/A	16.667	10.167	N/A	0.0	0.4	23.4	332

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

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

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

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

C = Curb height

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

Hw = Height of wingwall

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

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

Lw = Length of longest wingwall.

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

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

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

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

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

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

STATE OF TEXAS
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5/24/2023

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	0579	02	014	FM 512
	DIST	COUNTY		SHEET NO.
	PARIS	HUNT		120

DATE: 5/24/2023 6:20:42 PM
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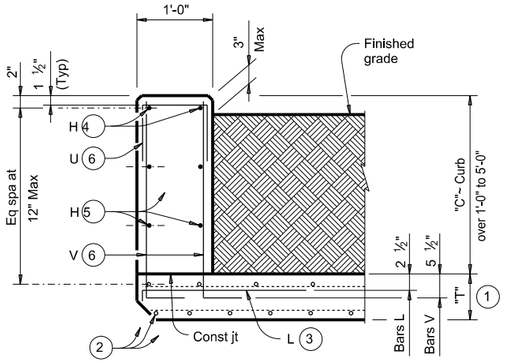
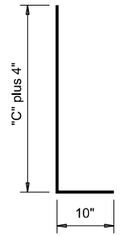


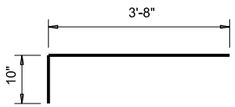
TYPICAL SECTION

Used for curbs over 1'-0" to 5'-0"



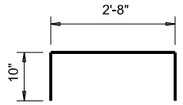
BARS V (#5) (6)

Spaced at 12" Max



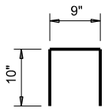
BARS L (#5) (3)

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 finished 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 Specifications.

These extended curb details have sufficient strength to allow for future retrofit 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: ecdstde1-20.dgn	DN: GAF	CK: TxDOT	DW: TxDOT	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
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	DIST	COUNTY		SHEET NO.
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TABLE OF DIMENSIONS AND REINFORCING STEEL
(Wings for one structure end)

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

TABLE OF WINGWALL REINFORCING
(2~wings)

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

TABLE OF ESTIMATED CULVERT TOEWALL QUANTITIES

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

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

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

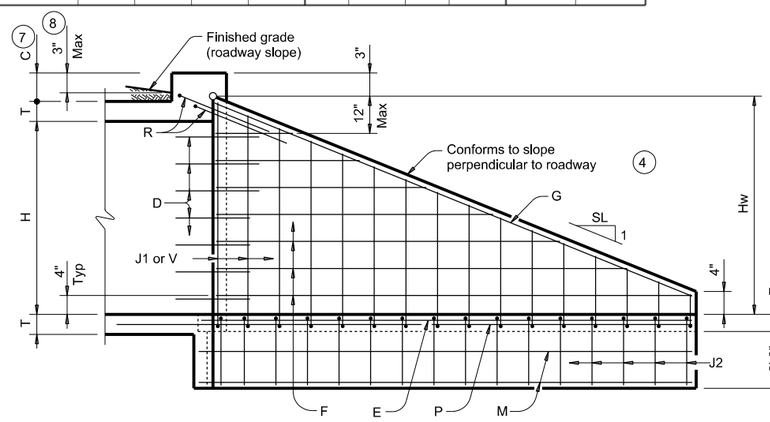
For cast-in-place culverts:
Ltw = (N) (S) + (N + 1) (U)

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

Total wingwall area (two wings ~ SF) = (Hw + 0.333') (Lw)

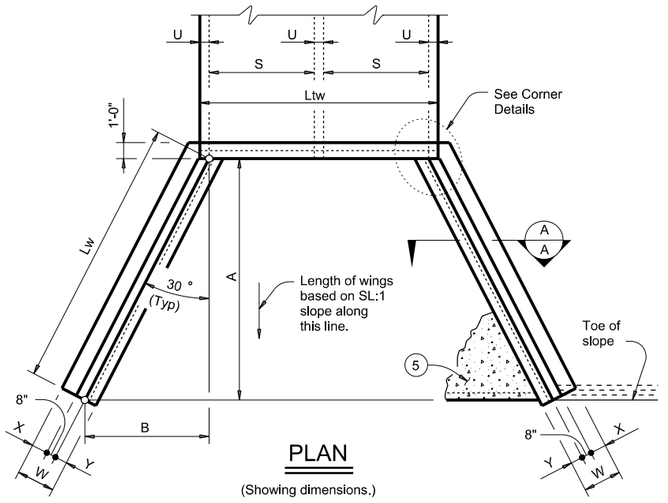
Hw = Height of wingwall
SL:1 = Side slope ratio (horizontal:1 vertical)
Lw = Length of wingwall
Ltw = Culvert toewall length
N = Number of culvert spans

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



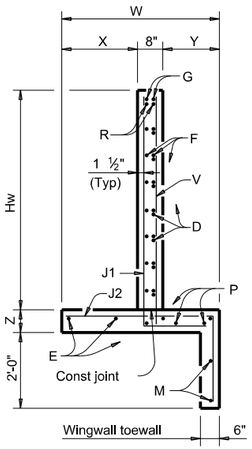
INSIDE ELEVATION

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

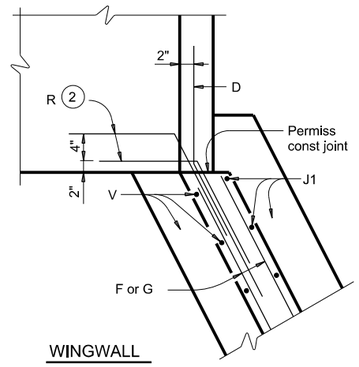


PLAN

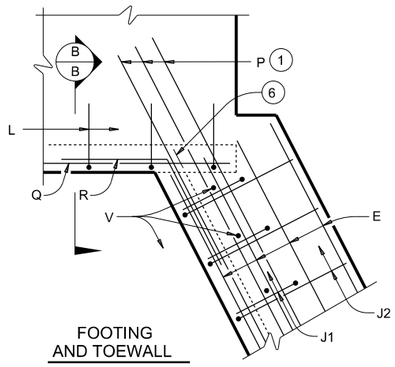
(Showing dimensions.)



SECTION A-A



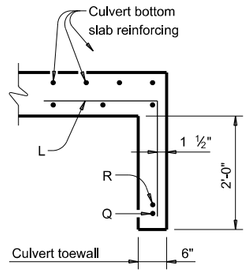
WINGWALL



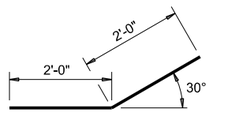
FOOTING AND TOEWALL

CORNER DETAILS

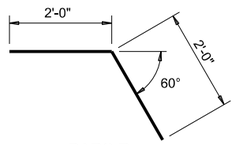
(Culvert and culvert toewall reinforcing not shown for clarity.)



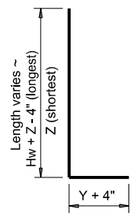
SECTION B-B (5)



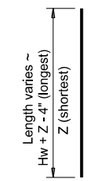
BARS D



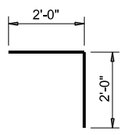
BARS R



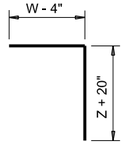
BARS J1



BARS V



BARS L



BARS J2

1. Extend Bars P 3'-0" minimum into bottom slab of box culvert.
2. Adjust as necessary to maintain 1 1#2" clear cover and 4" minimum between bars.
3. Quantities shown are based on an average wing height for two wings (one structure end). To determine total quantities for two wings, multiply the tabulated values by Lw.
4. Recommended values of side slope are: 2:1, 3:1, 4:1, and 6:1.
5. When shown elsewhere on the plans, construct 5" deep concrete riprap. Payment for riprap is as required by Item 432, "Riprap". Unless otherwise shown on the plans or directed by the Engineer, provide a 6" wide by 1'-6" deep reinforced concrete toewall along all edges of the riprap adjacent to natural ground; reinforce the toewall by extending typical riprap reinforcing into the toewall; and extend construction joints or grooved joints oriented in the direction of flow across the full distance of the riprap at intervals of approximately 20'. When such riprap is provided, the culvert toewall shown in SECTION B-B will not be required.
6. At Contractor's option, culvert toewall may be ended flush with wingwall toewall. Adjust reinforcing as needed.
7. 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'-0, refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Box Culvert Rail Mounting Details (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.
8. For vehicle safety, the following requirements must be met:
   - For structures without bridge rail, construct curbs no more than 3" above finished grade.
   - For structures with bridge rail, construct curbs flush with finished grade.

   Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

MATERIAL NOTES:
Provide Class C concrete (f'c=3,600 psi).
Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.
In riprap concrete synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing unless noted otherwise.

GENERAL NOTES:
Designed according to AASHTO LRFD Bridge Design Specifications.
When structure is founded on solid rock, depth of toewalls for culverts and wingwalls may be reduced or eliminated as directed by the Engineer.
See Box Culvert Supplement (BCS) standard sheet for additional dimensions and information.
The quantities for concrete and reinforcing steel resulting from the formulas given on this sheet are for Contractor's information only.

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

Texas Department of Transportation

Bridge Division Standard

CONCRETE WINGWALLS
WITH FLARED WINGS FOR 0° SKEW BOX CULVERTS

FW-0

FILE: fw-0stde-20.dgn	DN: GAF	CK: CAT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0579	02	014	FM 512
	DIST	COUNTY		SHEET NO.
	PARIS	HUNT		122

DATE: 5/24/2023 6:20:43 PM
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TABLE OF DIMENSIONS AND REINFORCING STEEL
(Wings for one structure end)

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

TABLE OF WINGWALL REINFORCING
(2~wings)

Bar	Size	No.	Spa
DL	#5	~	1'-0"
DS	#5	~	1'-0"
E	#4	~	1'-0"
F	#4	~	1'-0"
G	#6	4	~
M	#4	4	~
P	#4	~	1'-0"
RS	#5	3	~
RL	#5	3	~
V	#4	~	1'-0"

TABLE OF ESTIMATED CULVERT TOEWALL QUANTITIES

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

WING DIMENSION FORMULAS:

(All values are in feet.)

Hw = H + T + C - 0.250'
A = (Hw - 0.333')(SL)
B = (A) [tanget (θ + 15°)]
Lw = (A) ÷ [cosine (θ + 15°)]

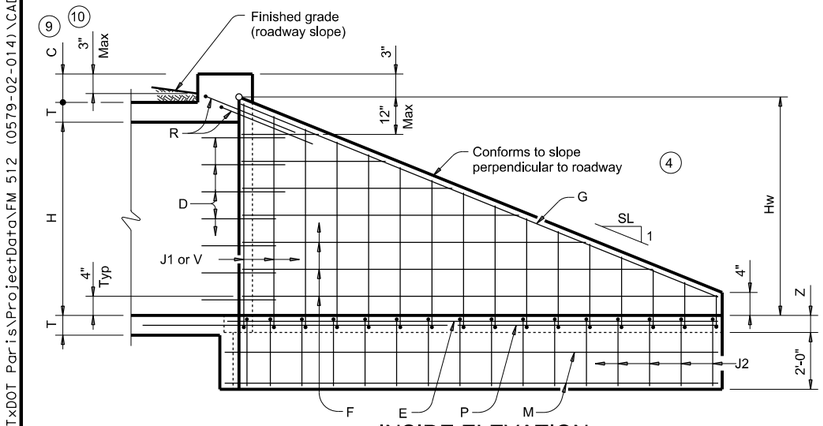
For cast-in-place culverts:
Ltw = [(N) (S) + (N + 1) (U)] ÷ cosine θ

For precast culverts:
Ltw = [(N) (2U + S) + (N - 1) (0.5')] ÷ cosine θ

Total wingwall area (two wings ~ SF) = 0.5 (Hw + 0.333') (Lw + A)

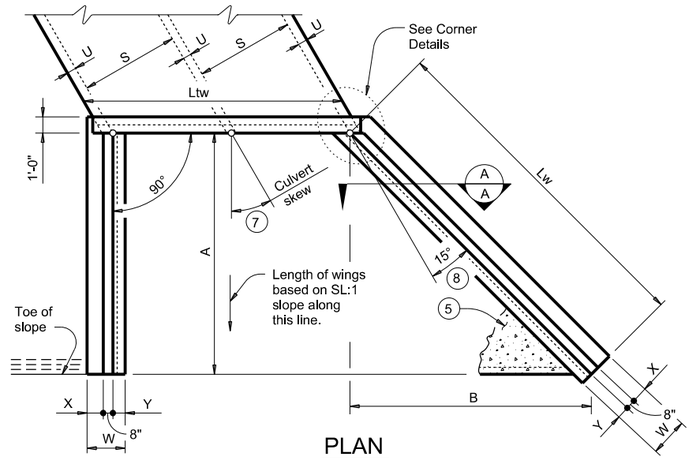
Hw = Height of wingwall
SL:1 = Side slope ratio (horizontal:1 vertical)
A = Length of short wingwalls
Lw = Length of long wingwall
Ltw = Culvert toewall length
N = Number of culvert spans
θ = Culvert skew

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



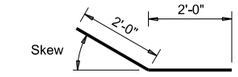
INSIDE ELEVATION

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

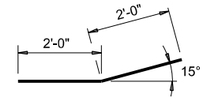


PLAN

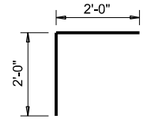
(Showing dimensions and 30° skew.)



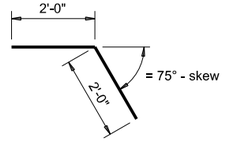
BARS DS
(Short wing)



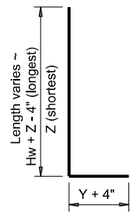
BARS DL
(Long wing)



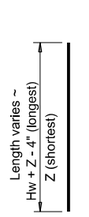
BARS RS
(Short wing)



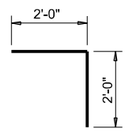
BARS RL
(Long wing)



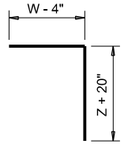
BARS J 1



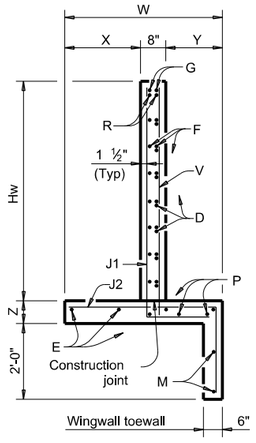
BARS V



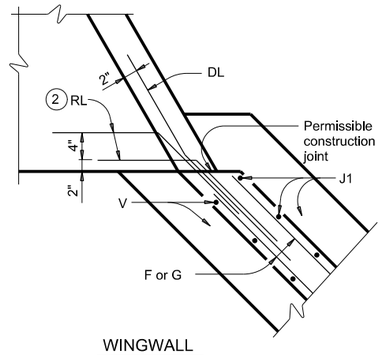
BARS L



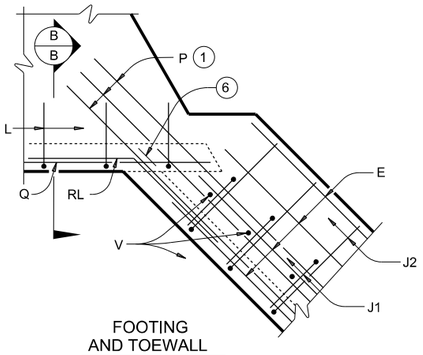
BARS J2



SECTION A-A



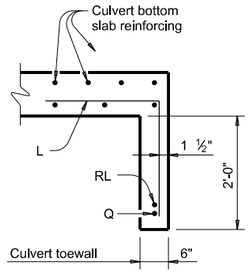
WINGWALL



FOOTING AND TOEWALL

CORNER DETAILS

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



SECTION B-B ⑤

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

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

③ Quantities shown are based on an average wing height for two wings (one structure end). To determine total quantities for two wings, multiply the tabulated values by 0.5 x (A + Lw).

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

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

⑥ At Contractor's option, culvert toewall may be ended flush with wingwall toewall. Adjust reinforcing as needed.

⑦ Applicable values of skew are: 15°, 30°, and 45°.

⑧ Typical wingwall angle for all skews.

⑨ 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'-0, refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Box Culvert Rail Mounting Details (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.

⑩ For vehicle safety, the following requirements must be met:
- For structures without bridge rail, construct curbs no more than 3" above finished grade.
- For structures with bridge rail, construct curbs flush with finished grade.

Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

MATERIAL NOTES:

Provide Class C concrete (f'c=3,600 psi).
Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.
In riprap concrete, synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise.

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.
When structure is founded on solid rock, depth of toewalls for culverts and wingwalls may be reduced or eliminated as directed by the Engineer.
See Box Culvert Supplement (BCS) standard sheet for additional dimensions and information.
The quantities for concrete and reinforcing steel resulting from the formulas given on this sheet are for Contractor's information only.

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

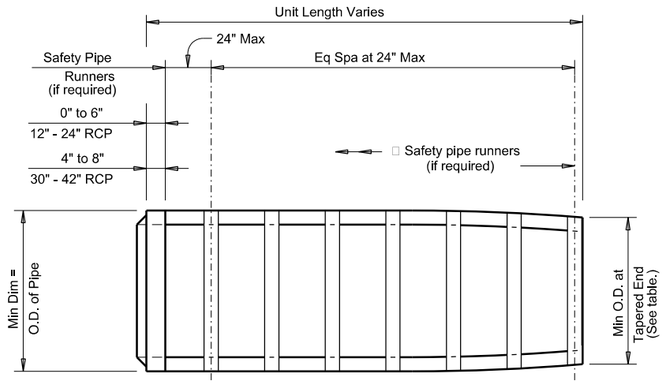
Texas Department of Transportation

Bridge Division Standard

CONCRETE WINGWALLS
WITH FLARED WINGS FOR SKEWED BOX CULVERTS

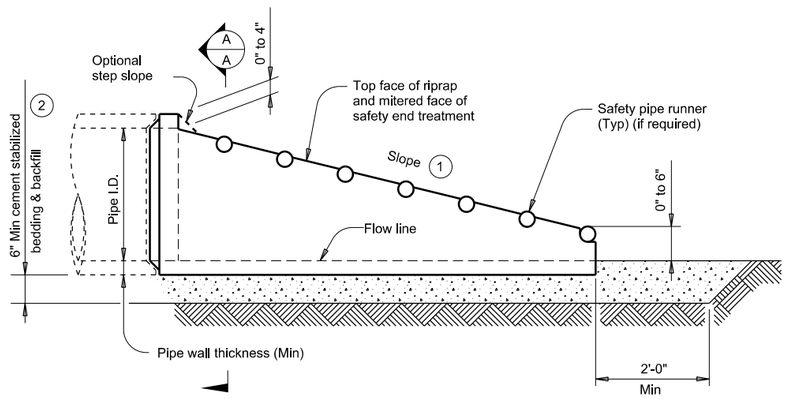
FW-S

FILE: fw-sstde-20.dgn	DN: GAF	CK: CAT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020 REVISIONS	CONT	SECT	JOB	HIGHWAY
	0579	02	014	FM 512
	DIST	COUNTY		SHEET NO.
	PARIS	HUNT		123



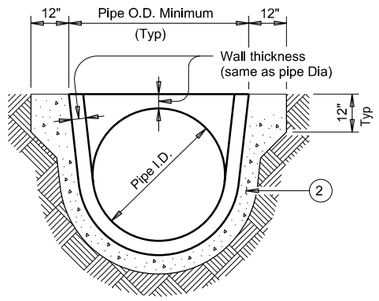
PLAN VIEW - 12" THRU 24"

(Showing spigot end connection.)

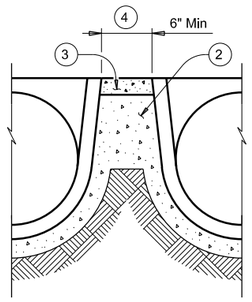


LONGITUDINAL ELEVATION - 12" THRU 24"

(Showing spigot end connection.)

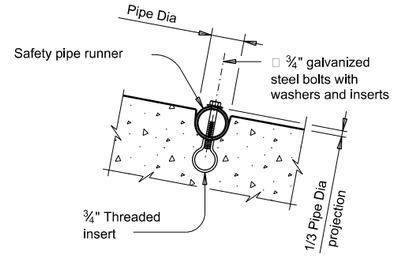


SECTION A-A



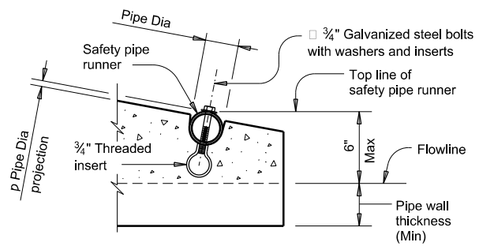
MULTIPLE PIPE INSTALLATION

1. Slope as shown elsewhere in the plans. Slope of 6:1 or flatter is required for vehicle safety.
2. Provide cement stabilized bedding and backfill in accordance with the Item, "Excavation and Backfill for Structures". Bedding and backfill is considered subsidiary to the Item 467, "Safety End Treatment". When concrete riprap is specified around the safety end treatment, backfill as directed by Engineer.
3. Fill the top 4" of void between precast end treatments with concrete riprap. Concrete riprap is considered subsidiary to the Item 467, "Safety End Treatment".
4. Adjust clear distance between pipes to provide for the minimum distance between safety end treatments.
5. Safety pipe runners are required for multiple pipe culverts with more than two pipes.

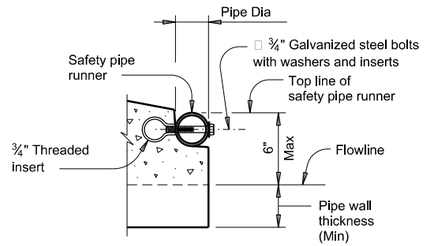


INSTALLATION DETAIL FOR SAFETY PIPE RUNNERS

(If required)



OPTION A



OPTION B

END DETAILS FOR INSTALLATION OF SAFETY PIPE RUNNERS

(If required)

REQUIREMENTS FOR CULVERT PIPES AND SAFETY PIPE RUNNERS

Pipe I.D.	Min Wall Thickness	Min O.D.	Min O.D. at Tapered End	Min Reinf Requirements (sq. in. per ft. of Pipe)	Max Slope	Min Length of Unit	Pipe Runner Requirements		Required Pipe Runner Sizes		
							Single Pipe	Multiple Pipe	Nominal Dia	O.D.	I.D.
12"	2"	16"	16"	0.07 Circ.	6:1	4' - 0"	No	(5)	3" STD	3.500"	3.068"
15"	2 ¼"	19 ½"	19"	0.07 Circ.	6:1	5' - 8"	No	(5)	3" STD	3.500"	3.068"
18"	2 ½"	23"	21 ½"	0.07 Circ.	6:1	7' - 3"	No	(5)	3" STD	3.500"	3.068"
24"	3"	30"	27"	0.07 Circ.	6:1	10' - 6"	No	(5)	3" STD	3.500"	3.068"
30"	3 ½"	37"	31"	0.18 Circ.	6:1	12' - 1"	No	Yes	4" STD	4.500"	4.026"
36"	4"	44"	36"	0.19 Ellip.	6:1	15' - 4"	Yes	Yes	4" STD	4.500"	4.026"
42"	4 ½"	51"	41 ½"	0.23 Ellip.	6:1	18' - 7"	Yes	Yes	4" STD	4.500"	4.026"

MATERIAL NOTES:

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

Provide pipe runners meeting the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 Gr B, or API 5LX52.

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

GENERAL NOTES:

Precast safety end treatment for reinforced concrete pipe (RCP) may be used for TYPE II end treatment as specified in Item 467, "Safety End Treatment".

When precast safety end treatment is used as a Contractor's alternate to mitered RCP, riprap will not be required unless noted otherwise on the plans.

Manufacture precast concrete end sections in accordance with Item 464, "Reinforced Concrete Pipe" and in accordance with ASTM Specification C-76, Class III, Wall B for circular pipe.

Provide precast concrete end sections with a spigot or bell end for compatibility to upstream or downstream end conditions with sufficient annular space to allow for grout, mortar, cold applied asphalt joint compound or pre-formed plastic gasket material.

Methods of lifting shall be provided by the manufacturer for ease of loading, unloading and installation.

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

Texas Department of Transportation

Bridge Division Standard

PRECAST SAFETY END TREATMENT

TYPE II ~ PARALLEL DRAINAGE

PSET-RP

FILE: psetrpss-20.dgn	DN: RLW	CK: KLR	DW: JTR	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0579	02	014	FM 512
	DIST	COUNTY		SHEET NO.
	PARIS	HUNT		124

DATE: 5/24/2023 6:20:44 PM
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DATE: 5/24/2023 6:20:44 PM
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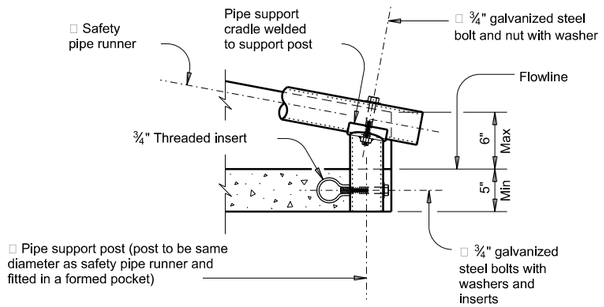
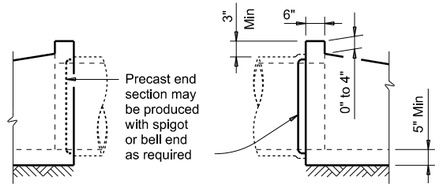
REQUIREMENTS FOR CULVERT PIPES AND SAFETY PIPE RUNNERS

Pipe I.D.	RCP Wall "B" Thickness	TP Wall Thickness (8)	"D" (1)	Slope	Min Length of Unit	Single Pipe		Multiple Pipes	
						Skew	Pipe Runners Required	Skew	Pipe Runners Required
12"	2"	1.15"	17.00"	3:1	2' - 11"	≤ 45°	No	≤ 45°	No
				4:1	3' - 6"				
				6:1	4' - 9"				
15"	2 ¼"	1.30"	20.50"	3:1	3' - 8"	≤ 45°	No	≤ 45°	No
				4:1	4' - 7"				
				6:1	6' - 5"				
18"	2 ½"	1.60"	24.00"	3:1	4' - 6"	≤ 45°	No	≤ 45°	No
				4:1	5' - 8"				
				6:1	8' - 0"				
24"	3"	1.95"	31.00"	3:1	6' - 2"	≤ 45°	No	= 30°	No
				4:1	7' - 10"			> 30°	Yes
				6:1	11' - 3"				
30"	3 ½"	2.65"	38.50"	3:1	7' - 10"	= 15°	No	= 15°	No
				4:1	10' - 1"	> 15°	Yes	> 15°	Yes
				6:1	14' - 8"				
36"	4"	2.75"	45.50"	3:1	9' - 5"	= 0°	No	≥ 0°	Yes
				4:1	12' - 3"	> 0°	Yes		
				6:1	17' - 11"				
42"	4 ½"	2.7"	52.50"	3:1	11' - 1"	≥ 0°	Yes	≥ 0°	Yes
				4:1	14' - 5"				
				6:1	21' - 2"				



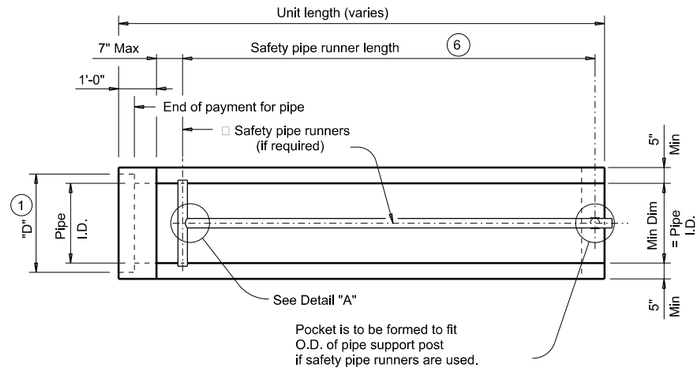
END DETAIL FOR INSTALLATION OF SAFETY PIPE RUNNERS

(If required)



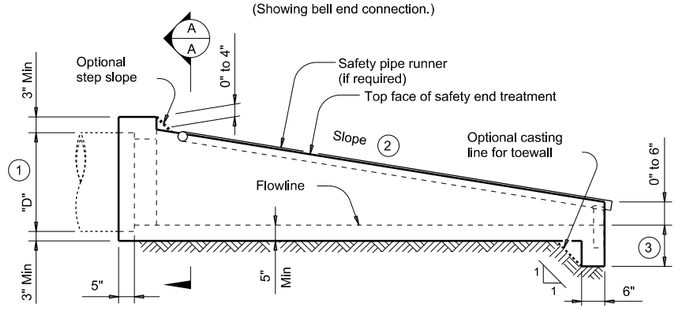
OPTIONAL JOINT FOR RCP

(Showing joint between RCP and precast safety end treatment)



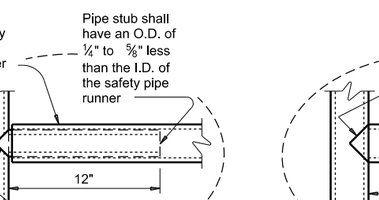
PLAN

(Showing bell end connection.)



LONGITUDINAL ELEVATION

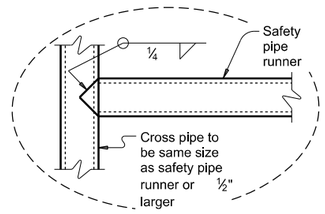
(Showing bell end connection.)



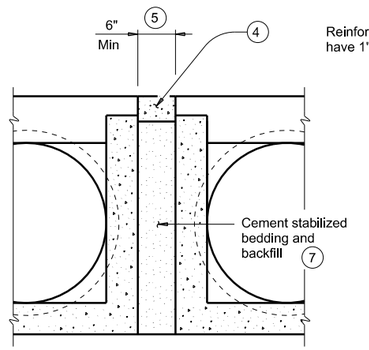
OPTION A

DETAIL A

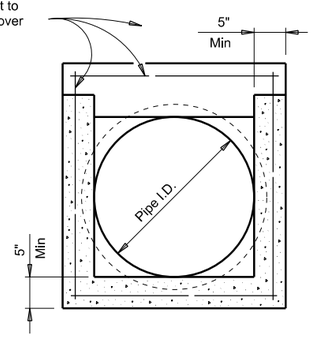
(If required)



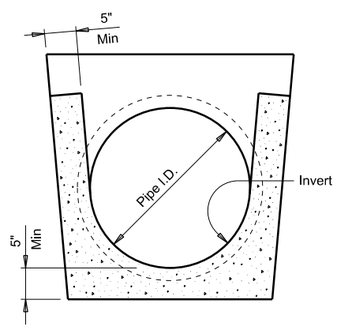
OPTION B



MULTIPLE PIPE INSTALLATION

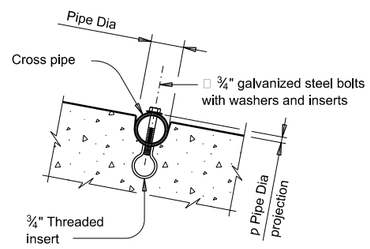


OPTION WITH SQUARE BOTTOM



OPTION WITH INVERT BOTTOM

SECTION A-A



INSTALLATION DETAIL FOR SAFETY PIPE RUNNERS

(If required)

SAFETY PIPE RUNNER DIMENSIONS

Max Safety Pipe Runner Length	Required Pipe Runner Size		
	Pipe Size	Pipe O.D.	Pipe I.D.
11' - 2"	3" STD	3.500"	3.068"
15' - 6"	3 ½" STD	4.000"	3.548"
20' - 10"	4" STD	4.500"	4.026"
35' - 4"	5" STD	5.563"	5.047"

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

(2) Slope as shown elsewhere in plans. Slope of 3:1 or flatter is required for vehicle safety.

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

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

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

(6) Measured along slope.

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

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

GENERAL NOTES:

Precast safety end treatment for reinforced concrete pipe (RCP), and thermoplastic pipe (TP) may be used for TYPE II end treatment as specified in Item "Safety End Treatment".

When precast safety end treatment is used as a Contractor's alternate to mitered RCP, riprap will not be required unless noted otherwise on the plans.

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

Manufacture this product in accordance with Item 467, "Safety End Treatment" except as noted below :

A. Provide minimum reinforcing of #4 at 6" (Grade 40) or #4 at 9" (Grade 60) each way or 6"x6" - D12 x D12 or 5"x5" - D10 x D10 welded wire reinforcement (WWR).

B. For precast (steel formed) sections, provide Class "C" concrete (f'c = 3,600 psi).

At the option and expense of the Contractor, the next larger size of safety end treatment may be furnished as long as the "D" dimension cast is that of the required size of pipe.

Pipe runners are designed for a traversing load of 1,800 Lbs at yield as recommended by Research Report 280-1, "Safety Treatment of Roadside Cross-Drainage Structures", Texas Transportation Institute, March 1981.

Provide safety pipe runners, cross pipes, pipe support posts, and pipe stubs meeting the requirements of ASTM A53 (Type E or S, Grade B), ASTM A500 (Grade B), or API 5LX52.

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

Connect RCP using the Optional Joint for RCP detail shown or in accordance with Item 464 "Reinforced Concrete Pipe". Connect TP by grouting. See Pipe and Box Grouted Connections (PBGC) standard for grouted connections with TP and precast safety end treatment.

Texas Department of Transportation

Bridge Division Standard

PRECAST SAFETY END TREATMENT

TYPE II ~ CROSS DRAINAGE

PSET-SC

FILE: psetscss-21.dgn	DN: RLW	CK: KLR	DW: JTR	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS 12-21: Added 42" TP	0579	02	014	FM 512
	DIST	COUNTY		SHEET NO.
	PARIS	HUNT		125

DATE: 5/24/2023 6:20:44 PM
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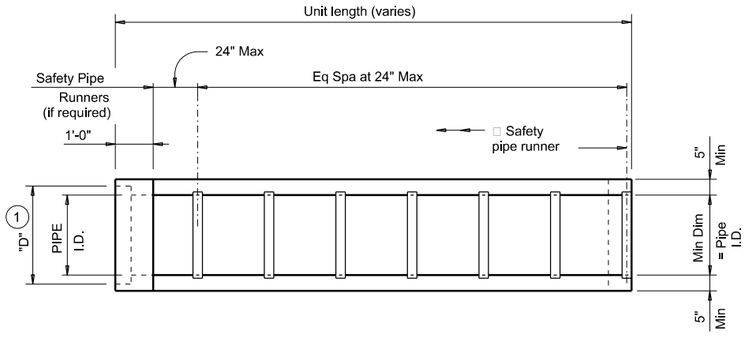
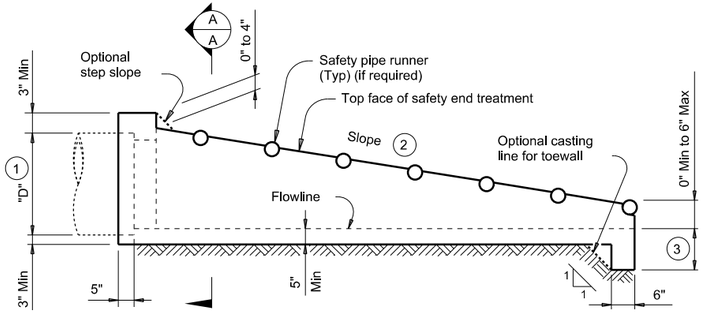


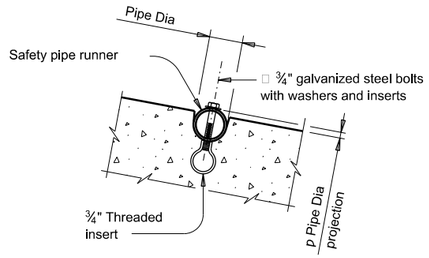
PLAN

(Showing bell end connection.)



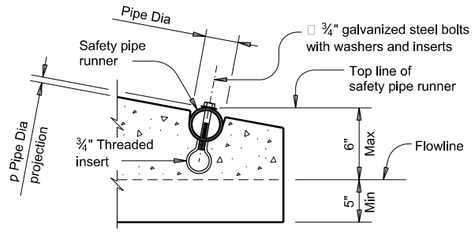
LONGITUDINAL ELEVATION

(Showing bell end connection.)

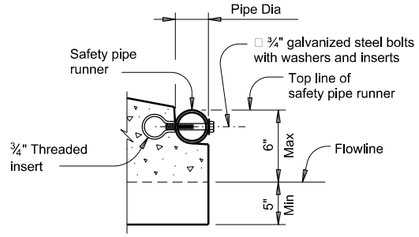


INSTALLATION DETAIL FOR SAFETY PIPE RUNNERS

(If required)



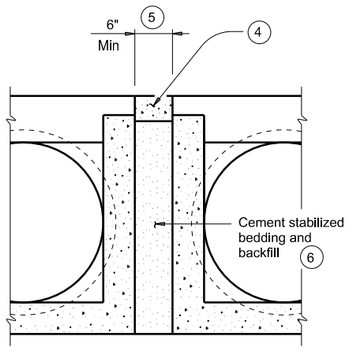
OPTION A



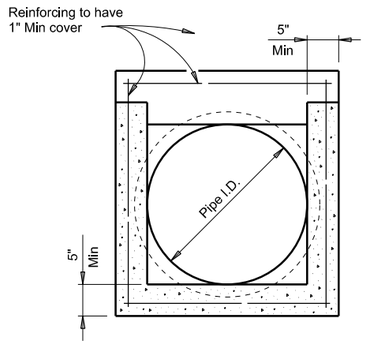
OPTION B

END DETAILS FOR INSTALLATION OF SAFETY PIPE RUNNERS

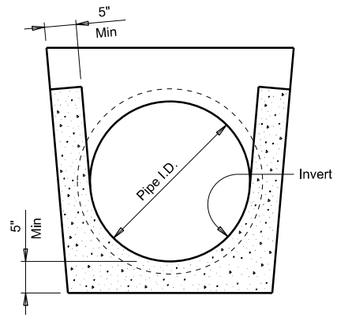
(If required)



MULTIPLE PIPE INSTALLATION

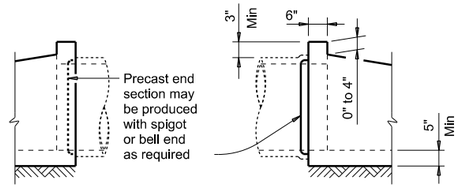


OPTION WITH SQUARE BOTTOM



OPTION WITH INVERT BOTTOM

SECTION A-A



OPTIONAL JOINT FOR RCP

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

REQUIREMENTS FOR CULVERT PIPES AND SAFETY PIPE RUNNERS

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

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

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

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

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

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

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

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

GENERAL NOTES:

Precast safety end treatment for reinforced concrete pipe (RCP), and thermoplastic pipe (TP) may be used for TYPE II end treatment as specified in Item "Safety End Treatment".

When precast safety end treatment is used as a Contractor's alternate to mitered RCP, riprap will not be required unless noted otherwise on the plans.

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

Manufacture this product in accordance with Item 467, "Safety End Treatment" except as noted below :

A. Provide minimum reinforcing of #4 at 6" (Grade 40) or #4 at 9" (Grade 60) each way or 6"x6" - D12 x D12 or 5"x5" - D10 x D10 welded wire reinforcement (WWR).

B. For precast (steel formed) sections, provide Class "C" concrete (f'c = 3,600 psi).

At the option and expense of the Contractor the next larger size of safety end treatment may be furnished; as long as the "D" dimension cast is that of the required size of pipe.

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

Provide pipe runners meeting the requirements of ASTM A53 (Type E or S, Grade B), ASTM A500 (Grade B), or API 5LX52.

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

Connect RCP using the Optional Joint for RCP detail shown or in accordance with Item 464, "Reinforced Concrete Pipe". Connect TP by grouting. See Pipe and Box Grouted Connections (PBGC) standard for grouted connections with TP and precast safety end treatment.

Texas Department of Transportation

Bridge Division Standard

PRECAST SAFETY END TREATMENT

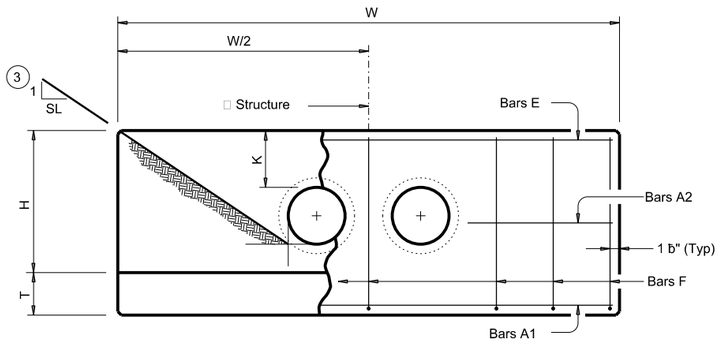
TYPE II ~ PARALLEL DRAINAGE

PSET-SP

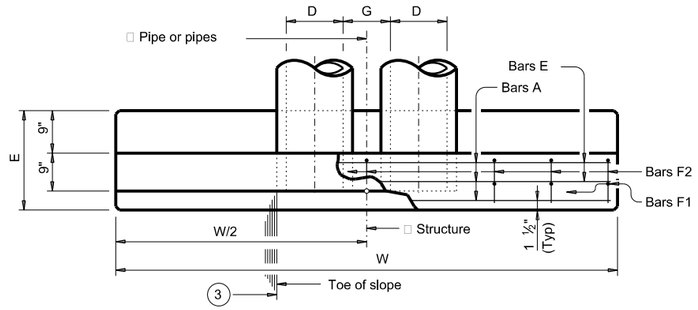
FILE: psetspss-21.dgn	DN: RLW	CK: KLR	DW: JTR	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS 12-21: Added 42" TP	0579	02	014	FM 512
	DIST	COUNTY		SHEET NO.
	PARIS	HUNT		126

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

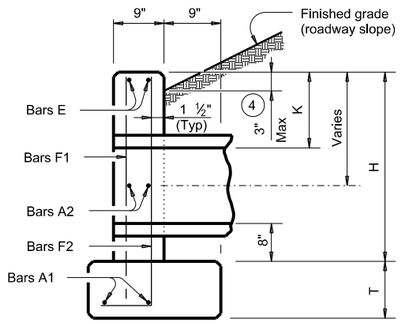
Slope	Dia of Pipe (D)	Values for One Pipe			Values To Be Added for Each Addt'l Pipe		
		W	Reinf (Lbs) (1)	Conc (CY) (2)	W	Reinf (Lbs) (1)	Conc (CY) (2)
2:1	12"	9' - 0"	122	1.1	1' - 9"	15	0.2
	15"	10' - 3"	136	1.3	2' - 2"	16	0.2
	18"	11' - 6"	163	1.5	2' - 8"	19	0.3
	21"	12' - 9"	200	1.8	3' - 1"	31	0.4
	24"	14' - 0"	217	2.1	3' - 7"	34	0.4
	27"	15' - 3"	254	2.4	3' - 11"	37	0.5
	30"	16' - 6"	272	2.7	4' - 4"	40	0.6
	33"	17' - 9"	314	3.1	4' - 8"	43	0.6
	36"	19' - 0"	371	3.9	5' - 1"	46	0.8
	42"	21' - 6"	442	4.9	5' - 10"	52	1.0
	48"	25' - 0"	569	6.4	6' - 7"	59	1.3
	54"	27' - 6"	701	7.5	7' - 6"	82	1.6
	60"	30' - 0"	794	8.8	8' - 3"	90	1.8
	66"	32' - 6"	894	10.2	8' - 9"	96	2.0
	72"	35' - 0"	1,055	11.7	9' - 4"	103	2.3
3:1	12"	13' - 0"	175	1.6	1' - 9"	14	0.2
	15"	14' - 9"	193	1.9	2' - 2"	17	0.2
	18"	16' - 6"	228	2.2	2' - 8"	19	0.3
	21"	18' - 3"	299	2.6	3' - 1"	31	0.4
	24"	20' - 0"	323	3.0	3' - 7"	33	0.4
	27"	21' - 9"	371	3.5	3' - 11"	37	0.5
	30"	23' - 6"	415	4.0	4' - 4"	40	0.5
	33"	25' - 3"	469	4.6	4' - 8"	43	0.6
	36"	27' - 0"	556	5.7	5' - 1"	46	0.8
	42"	30' - 6"	675	7.1	5' - 10"	52	1.0
	48"	35' - 6"	837	9.2	6' - 7"	59	1.3
	54"	39' - 0"	1,015	11.0	7' - 6"	84	1.6
	60"	42' - 6"	1,171	12.9	8' - 3"	91	1.8
	66"	46' - 0"	1,298	14.9	8' - 9"	98	2.0
	72"	49' - 6"	1,561	17.1	9' - 4"	103	2.3
4:1	12"	17' - 0"	229	2.0	1' - 9"	15	0.2
	15"	19' - 3"	266	2.4	2' - 2"	17	0.2
	18"	21' - 6"	308	2.9	2' - 8"	19	0.3
	21"	23' - 9"	382	3.5	3' - 1"	31	0.3
	24"	26' - 0"	430	3.9	3' - 7"	34	0.4
	27"	28' - 3"	486	4.7	3' - 11"	37	0.5
	30"	30' - 6"	539	5.2	4' - 4"	40	0.6
	33"	32' - 9"	603	6.0	4' - 8"	42	0.6
	36"	35' - 0"	738	7.5	5' - 1"	47	0.8
	42"	39' - 6"	881	9.3	5' - 10"	52	1.0
	48"	46' - 0"	1,102	12.1	6' - 7"	61	1.3
	54"	50' - 6"	1,364	14.4	7' - 6"	84	1.6
	60"	55' - 0"	1,547	16.9	8' - 3"	91	1.8
	66"	59' - 6"	1,741	19.5	8' - 9"	98	2.0
	72"	64' - 0"	2,077	22.4	9' - 4"	102	2.3
6:1	12"	25' - 0"	336	3.0	1' - 9"	14	0.2
	15"	28' - 3"	384	3.6	2' - 2"	17	0.2
	18"	31' - 6"	452	4.2	2' - 8"	19	0.3
	21"	34' - 9"	581	5.1	3' - 1"	31	0.4
	24"	38' - 0"	644	5.8	3' - 7"	34	0.4
	27"	41' - 3"	737	6.9	3' - 11"	37	0.5
	30"	44' - 6"	807	7.7	4' - 4"	39	0.6
	33"	47' - 9"	912	8.9	4' - 8"	44	0.6
	36"	51' - 0"	1,108	11.0	5' - 1"	48	0.8
	42"	57' - 6"	1,318	13.7	5' - 10"	54	1.0
	48"	67' - 0"	1,682	17.9	6' - 7"	59	1.3
	54"	73' - 6"	2,072	21.3	7' - 6"	83	1.6
	60"	80' - 0"	2,351	24.9	8' - 3"	89	1.8
	66"	86' - 6"	2,643	28.9	8' - 9"	96	2.0
	72"	93' - 0"	3,121	33.1	9' - 4"	101	2.3



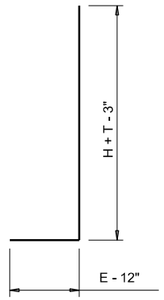
ELEVATION



PLAN OF NON-SKEWED PIPES



SECTION AT CENTER OF PIPE



BARS F2

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

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

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

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

(5) Dimensions shown are usual and maximum.

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

TABLE OF CONSTANT DIMENSIONS

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

TABLE OF REINFORCING STEEL (6)

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

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

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

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

Texas Department of Transportation

Bridge Division Standard

CONCRETE HEADWALLS WITH PARALLEL WINGS FOR NON-SKEWED PIPE CULVERTS

CH-PW-0

FILE: chpw0ste-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0579	02	014	FM 512
	DIST	COUNTY		SHEET NO.
	PARIS	HUNT		127

DATE: 5/24/2023 6:20:45 PM
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TABLE OF DIMENSIONS AND REINFORCING STEEL
(Wings for one structure end)

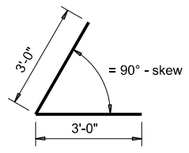
Dimensions					Variable Reinforcing				Estimated Quantities per ft of wing (2~wings) (4)		Estimated Quantities per ft of Toewall (1~toewall)	
Maximum Wingwall Height Hw	W	X	Y	Z	Bars J1		Bars J2					
					Size	Spa	Size	Spa	Reinf (Lb/Ft)	Conc (CY/Ft)	Reinf (Lb/Ft)	Conc (CY/Ft)
2'-6"	2'-10"	10"	1'-0"	7"	#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"	#6	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)

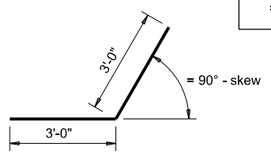
Bar	Size	No.	Spa
D1	#6	~	1'-0"
D2	#6	~	1'-0"
E1	#4	~	1'-0"
F	#4	~	1'-0"
G	#6	~	8"
M1	#4	4	~
P	#4	~	1'-0"
V	#4	~	1'-0"

TABLE OF TOEWALL REINFORCING

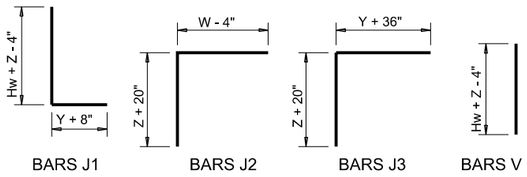
Bar	Size	No.	Spa
J3	#4	~	1'-0"
M2	#4	2	~
E2	#4	~	1'-0"



BARS D1



BARS D2



BARS J1 BARS J2 BARS J3 BARS V

WING DIMENSION FORMULAS:

(All values are in feet.)

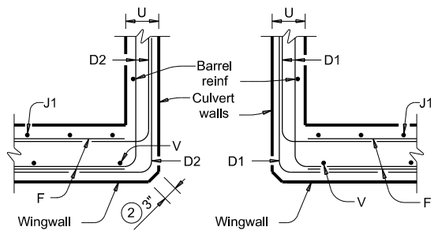
Hw = H + T + C
Lw = (Hw) (SL) ÷ cosine (θ) for Type PW-1
= (Hw - 1') (SL) ÷ cosine (θ) for Type PW-2 and Hw ≤ 4'
= (Hw - 0.5') (SL) ÷ cosine (θ) for Type PW-2 and Hw > 4'

For cast-in-place culverts:
Ltw = [(N) (S) + (N + 1) (U)] ÷ cosine (θ)

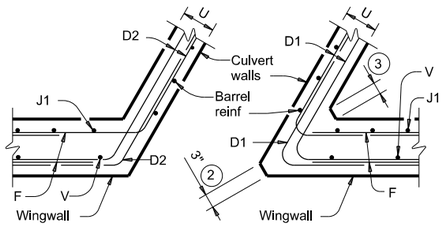
For precast culverts:
Ltw = [(N) (2 U + S) + (N - 1) (0.5')] ÷ cosine (θ)
Total Wingwall Area (two wings ~ SF)
= (2)(Hw)(Lw) for Type PW-1
= (2)(Hw)(Lw) - 6 SF for Type PW-2 and Hw ≤ 4'
= (2)(Hw)(Lw) - 1.5 SF for Type PW-2 and Hw > 4'

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

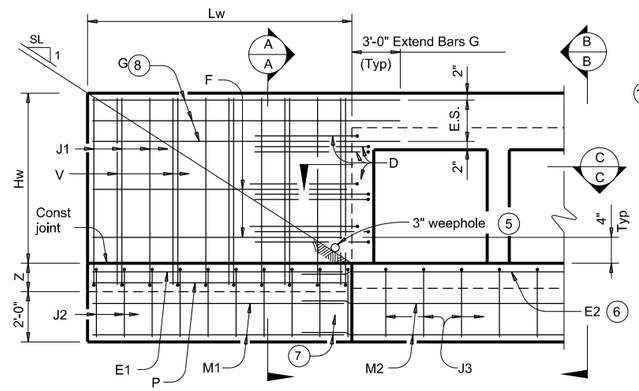
See applicable box culvert standard sheet for S, H, T, and U values.



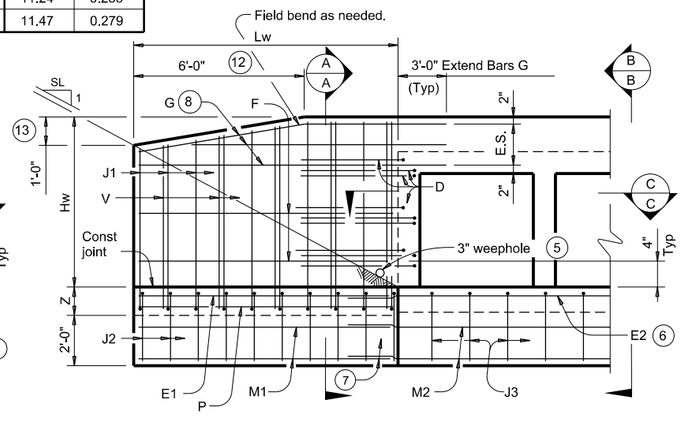
SECTION C-C - PW-1



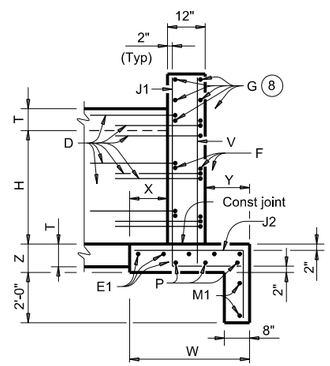
SECTION C-C - PW-2



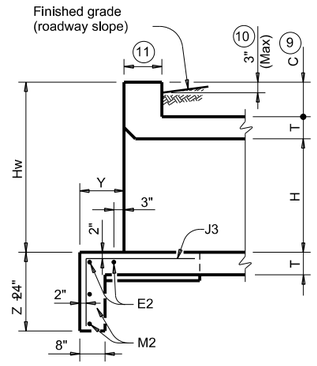
PARTIAL ELEVATION - PW-1



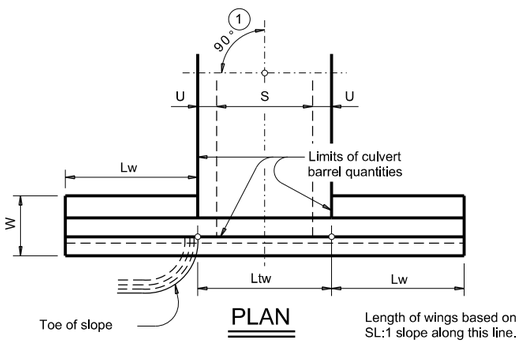
PARTIAL ELEVATION - PW-2



SECTION A-A
(Showing wing reinforcement.)



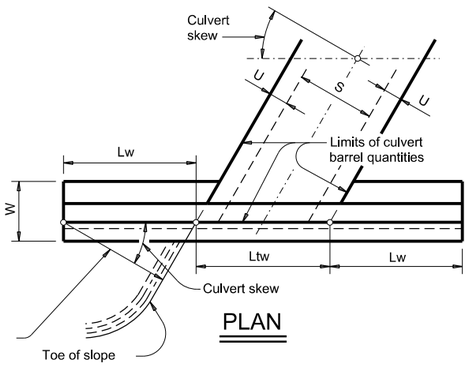
SECTION B-B
(Showing wing reinforcement.)



PLAN

Length of wings based on SL:1 slope along this line.

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 finished grade.
    - For structures with bridge rail, construct curbs flush with finished grade.

    Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.
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 Specifications.
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	0579	02	014	FM 512
	DIST	COUNTY		SHEET NO.
	PARIS	HUNT		128

DATE: 5/24/2023 6:20:46 PM
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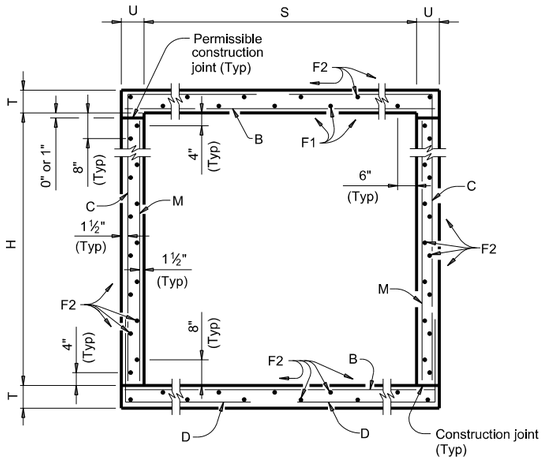
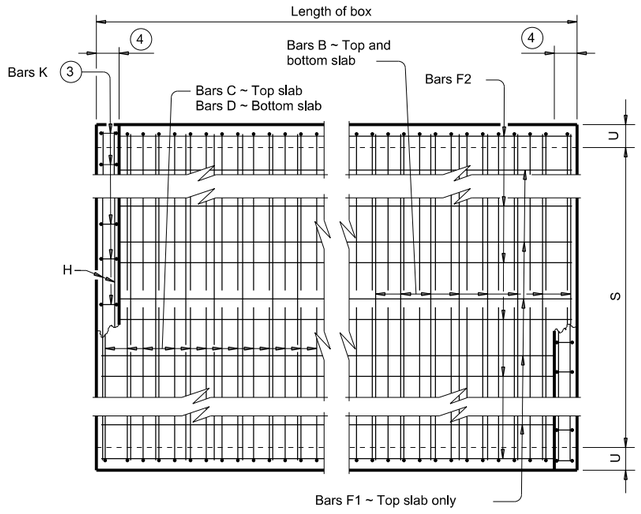
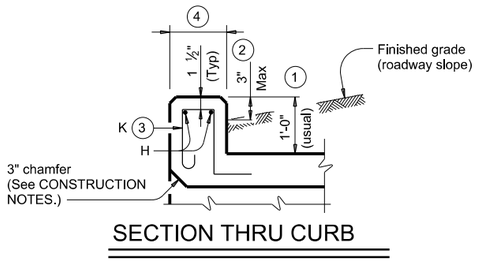


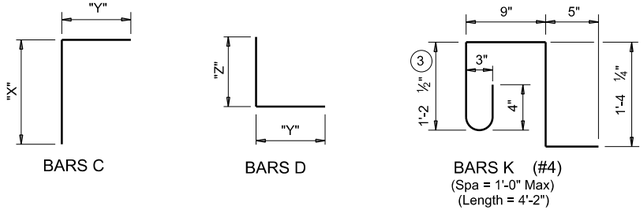
TYPICAL SECTION



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 finished grade.
   · For structures with bridge rail, construct curbs flush with finished grade.
   Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

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 flow line by a maximum of 6". If this option is taken, Bars M may be cut off 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 final riding surface.
Provide bar laps, where required, as follows:
· Uncoated or galvanized ~ #4 = 1'-8" Min
· Uncoated or galvanized ~ #5 = 2'-1" Min

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications for the range of fill 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.

HL93 LOADING SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

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

SCC-3 & 4

FILE: scc34ste-21.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0579	02	014	FM 512
04/2021 Updated X values.	DIST	COUNTY		SHEET NO.
	PARIS	HUNT		129

SECTION DIMENSIONS				⑤ FILL HEIGHT	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)
3' - 0"	2' - 0"	8"	7"	30'	108	#5	9"	3' - 11"	441	108	#4	9"	5' - 4"	385	2' - 6"	2' - 10"	108	#4	9"	5' - 1"	367	2' - 10"	2' - 3"	108	9"	2' - 0"	144	3	39' - 9"	80	19	39' - 9"	505	3' - 11"	10	10	28	0.292	48.1	0.3	38	12.0	1,960
3' - 0"	3' - 0"	8"	7"	30'	108	#5	9"	3' - 11"	441	108	#4	9"	6' - 4"	457	3' - 6"	2' - 10"	108	#4	9"	5' - 1"	367	2' - 10"	2' - 3"	108	9"	3' - 0"	216	3	39' - 9"	80	23	39' - 9"	611	3' - 11"	10	10	28	0.335	54.3	0.3	38	13.7	2,210
4' - 0"	2' - 0"	8"	7"	30'	108	#5	9"	4' - 11"	554	162	#4	6"	5' - 8"	613	2' - 6"	3' - 2"	162	#4	6"	5' - 5"	586	3' - 2"	2' - 3"	108	9"	2' - 0"	144	3	39' - 9"	80	21	39' - 9"	558	4' - 11"	13	12	33	0.342	63.4	0.4	46	14.1	2,581
4' - 0"	3' - 0"	8"	7"	30'	108	#5	9"	4' - 11"	554	162	#4	6"	6' - 8"	721	3' - 6"	3' - 2"	162	#4	6"	5' - 5"	586	3' - 2"	2' - 3"	108	9"	3' - 0"	216	3	39' - 9"	80	25	39' - 9"	664	4' - 11"	13	12	33	0.385	70.5	0.4	46	15.8	2,867
4' - 0"	4' - 0"	8"	7"	30'	108	#5	9"	4' - 11"	554	162	#4	6"	7' - 8"	830	4' - 6"	3' - 2"	162	#4	6"	5' - 5"	586	3' - 2"	2' - 3"	108	9"	4' - 0"	289	3	39' - 9"	80	25	39' - 9"	664	4' - 11"	13	12	33	0.428	75.1	0.4	46	17.5	3,049

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

DATE: 5/24/2023 6:20:46 PM
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HL93 LOADING SHEET 2 OF 2

Texas Department of Transportation

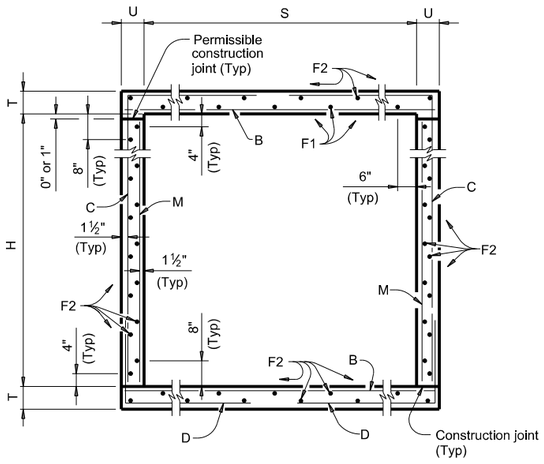
Bridge Division Standard

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

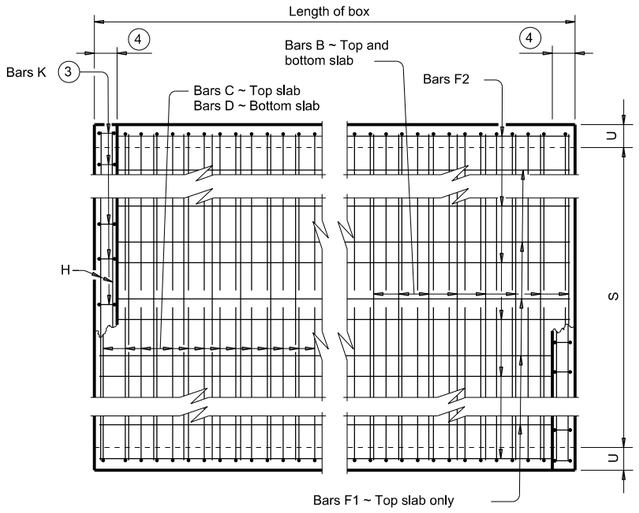
SCC-3 & 4

FILE: scc34ste-21.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0579	02	014	FM 512
04/2021 Updated X values.	DIST	COUNTY		SHEET NO.
	PARIS	HUNT		130

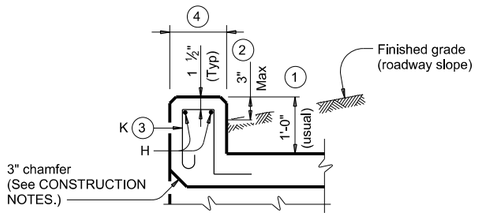
DATE: 5/24/2023 6:20:46 PM
FILE: Z:\Transportation\TxDOT\PS&E\STATEWIDE 36-91DP5101\WA2-TxDOT Paris\ProjectData\FM 512 (0579-02-014)\CADD\DGN\05_DRAINAGE\StdDetails\(10)scc56ste-21.dgn



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 finished grade.
   · For structures with bridge rail, construct curbs flush with finished grade.
   Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

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 flow line by a maximum of 6". If this option is taken, Bars M may be cut off 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 final 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:

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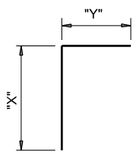
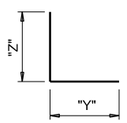
See the Single Box Culverts Cast-In-Place Miscellaneous Detail (SCC-MD) standard sheet for details pertaining to skewed ends, angle sections, and lengthening.

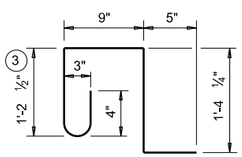
Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.



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
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REVISIONS	0579	02	014	FM 512
04/2021 Updated X values.	DIST	COUNTY		SHEET NO.
	PARIS	HUNT		131

SECTION DIMENSIONS				(5) FILL HEIGHT	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 traffic culverts (fill height ≤ 2 ft.), identify the required box size and select the option with the minimum fill 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	0579	02	014	FM 512
04/2021 Updated X values.	DIST	COUNTY		SHEET NO.
	PARIS	HUNT		132

DATE: 5/24/2023 6:20:46 PM
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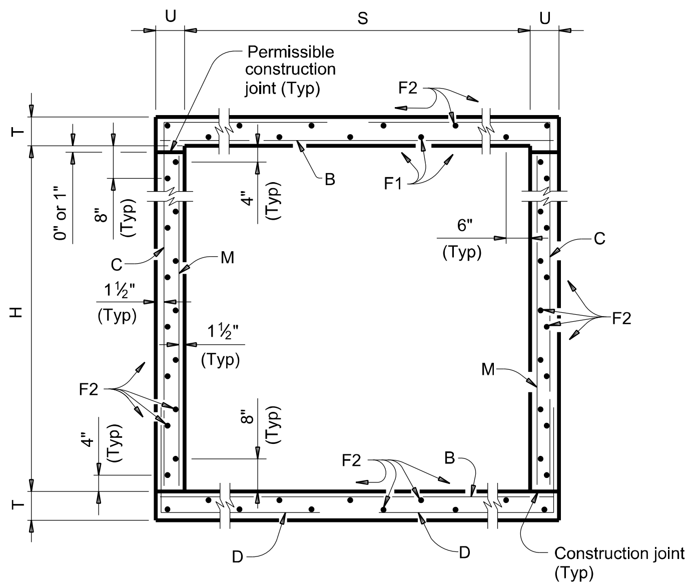
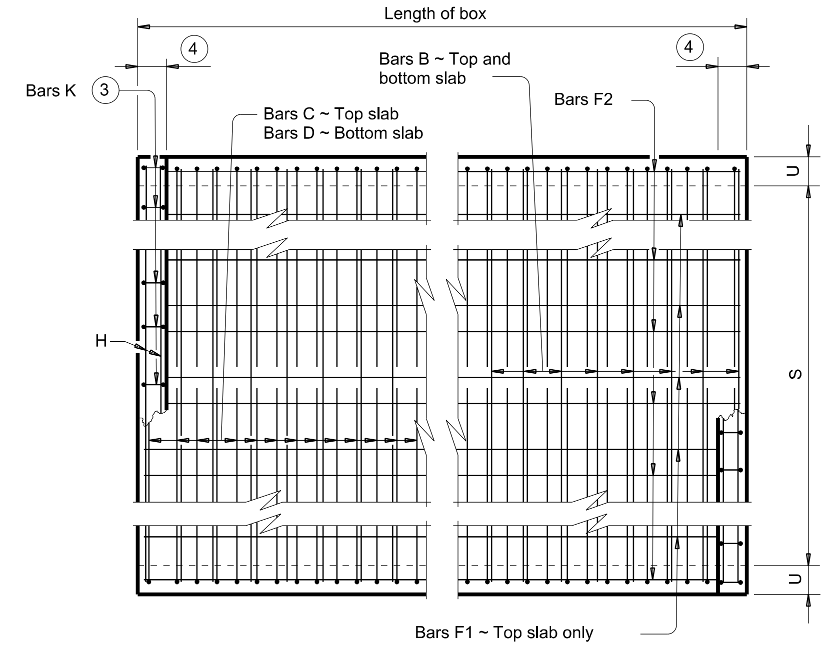
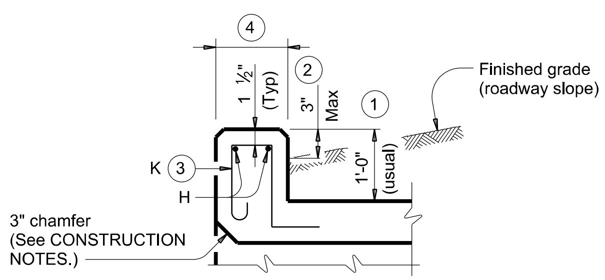


TYPICAL SECTION



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 finished grade.
   - For structures with bridge rail, construct curbs flush with finished grade.

   Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.
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).

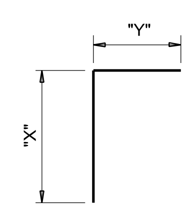
CONSTRUCTION NOTES:
Do not use permanent forms.
Chamfer the bottom edge of the top slab 3" at the entrance.
Optionally, raise construction joints shown at the flow line by a maximum of 6". If this option is taken, Bars M may be cut off or raised, Bars C and D may be reversed.

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 final riding surface.

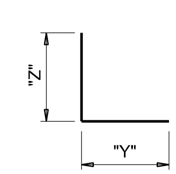
Provide bar laps, where required, as follows:
- Uncoated or galvanized ~ #4 = 1'-8" Min
- Uncoated or galvanized ~ #5 = 2'-1" Min
- Uncoated or galvanized ~ #6 = 2'-6" Min

GENERAL NOTES:
Designed according to AASHTO LRFD Bridge Design Specifications for the range of fill 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.

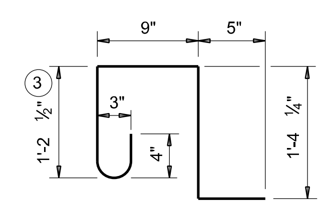
Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.



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-7

FILE: scc07ste-21.dgn	DN: TBE		CK: BMP	DW: TxDOT		CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB		HIGHWAY	
REVISIONS	0579	02	014		FM 512	
04/2021 Updated X values.	DIST		COUNTY			SHEET NO.
	PARIS		HUNT			133

DATE: 5/24/2023 6:20:47 PM
FILE: Z:\Transportation\TxDOT\PS&E\STATEWIDE 36-9IDP5101\WA2-TxDOT Paris\P...\StdDetails\(11)scc07ste-21.dgn

SECTION DIMENSIONS				(5) FILL HEIGHT	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)
7' - 0"	3' - 0"	8"	7"	16'	108	#6	9"	7' - 11"	1,284	162	#5	6"	7' - 11"	1,338	3' - 6"	4' - 5"	162	#5	6"	7' - 1"	1,197	4' - 5"	2' - 8"	108	9"	3' - 0"	216	5	39' - 9"	133	31	39' - 9"	823	7' - 11"	21	18	50	0.533	124.8	0.6	71	21.9	5,062
7' - 0"	3' - 0"	9"	7"	20'	108	#6	9"	7' - 11"	1,284	162	#5	6"	8' - 0"	1,352	3' - 7"	4' - 5"	162	#5	6"	7' - 2"	1,211	4' - 5"	2' - 9"	108	9"	3' - 0"	216	5	39' - 9"	133	31	39' - 9"	823	7' - 11"	21	18	50	0.583	125.5	0.6	71	23.9	5,090
7' - 0"	3' - 0"	10"	8"	23'	108	#6	9"	8' - 1"	1,311	162	#5	6"	8' - 2"	1,380	3' - 8"	4' - 6"	162	#5	6"	7' - 4"	1,239	4' - 6"	2' - 10"	82	12"	3' - 0"	164	5	39' - 9"	133	31	39' - 9"	823	8' - 1"	22	20	56	0.663	126.3	0.6	78	27.1	5,128
7' - 0"	3' - 0"	11"	8"	30'	108	#6	9"	8' - 1"	1,311	162	#5	6"	8' - 3"	1,394	3' - 9"	4' - 6"	162	#5	6"	7' - 5"	1,253	4' - 6"	2' - 11"	82	12"	3' - 0"	164	5	39' - 9"	133	31	39' - 9"	823	8' - 1"	22	20	56	0.714	127.0	0.6	78	29.2	5,156
7' - 0"	4' - 0"	8"	7"	16'	108	#6	9"	7' - 11"	1,284	162	#5	6"	8' - 11"	1,507	4' - 6"	4' - 5"	162	#5	6"	7' - 1"	1,197	4' - 5"	2' - 8"	108	9"	4' - 0"	289	5	39' - 9"	133	31	39' - 9"	823	7' - 11"	21	18	50	0.576	130.8	0.6	71	23.6	5,304
7' - 0"	4' - 0"	9"	7"	20'	108	#6	9"	7' - 11"	1,284	162	#5	6"	9' - 0"	1,521	4' - 7"	4' - 5"	162	#5	6"	7' - 2"	1,211	4' - 5"	2' - 9"	108	9"	4' - 0"	289	5	39' - 9"	133	31	39' - 9"	823	7' - 11"	21	18	50	0.627	131.5	0.6	71	25.7	5,332
7' - 0"	4' - 0"	10"	8"	23'	108	#6	9"	8' - 1"	1,311	162	#5	6"	9' - 2"	1,549	4' - 8"	4' - 6"	162	#5	6"	7' - 4"	1,239	4' - 6"	2' - 10"	82	12"	4' - 0"	219	5	39' - 9"	133	31	39' - 9"	823	8' - 1"	22	20	56	0.712	131.9	0.6	78	29.1	5,352
7' - 0"	4' - 0"	11"	8"	30'	162	#6	6"	8' - 1"	1,967	162	#5	6"	9' - 3"	1,563	4' - 9"	4' - 6"	162	#5	6"	7' - 5"	1,253	4' - 6"	2' - 11"	82	12"	4' - 0"	219	5	39' - 9"	133	31	39' - 9"	823	8' - 1"	22	20	56	0.763	149.0	0.6	78	31.1	6,036
7' - 0"	5' - 0"	8"	7"	16'	108	#6	9"	7' - 11"	1,284	162	#5	6"	9' - 11"	1,676	5' - 6"	4' - 5"	162	#5	6"	7' - 1"	1,197	4' - 5"	2' - 8"	108	9"	5' - 0"	361	5	39' - 9"	133	35	39' - 9"	929	7' - 11"	21	18	50	0.619	139.5	0.6	71	25.4	5,651
7' - 0"	5' - 0"	9"	7"	20'	108	#6	9"	7' - 11"	1,284	162	#5	6"	10' - 0"	1,690	5' - 7"	4' - 5"	162	#5	6"	7' - 2"	1,211	4' - 5"	2' - 9"	108	9"	5' - 0"	361	5	39' - 9"	133	35	39' - 9"	929	7' - 11"	21	18	50	0.670	140.2	0.6	71	27.4	5,679
7' - 0"	5' - 0"	10"	8"	23'	108	#6	9"	8' - 1"	1,311	162	#5	6"	10' - 2"	1,718	5' - 8"	4' - 6"	162	#5	6"	7' - 4"	1,239	4' - 6"	2' - 10"	82	12"	5' - 0"	274	5	39' - 9"	133	35	39' - 9"	929	8' - 1"	22	20	56	0.761	140.1	0.6	78	31.1	5,682
7' - 0"	5' - 0"	11"	8"	30'	162	#6	6"	8' - 1"	1,967	162	#5	6"	10' - 3"	1,732	5' - 9"	4' - 6"	162	#5	6"	7' - 5"	1,253	4' - 6"	2' - 11"	82	12"	5' - 0"	274	5	39' - 9"	133	35	39' - 9"	929	8' - 1"	22	20	56	0.813	157.2	0.6	78	33.1	6,366
7' - 0"	6' - 0"	8"	7"	16'	108	#6	9"	7' - 11"	1,284	162	#5	6"	10' - 11"	1,845	6' - 6"	4' - 5"	162	#5	6"	7' - 1"	1,197	4' - 5"	2' - 8"	108	9"	6' - 0"	433	5	39' - 9"	133	39	39' - 9"	1,036	7' - 11"	21	18	50	0.663	148.2	0.6	71	27.1	5,999
7' - 0"	6' - 0"	9"	7"	20'	108	#6	9"	7' - 11"	1,284	162	#5	6"	11' - 0"	1,859	6' - 7"	4' - 5"	162	#5	6"	7' - 2"	1,211	4' - 5"	2' - 9"	108	9"	6' - 0"	433	5	39' - 9"	133	39	39' - 9"	1,036	7' - 11"	21	18	50	0.713	148.9	0.6	71	29.1	6,027
7' - 0"	6' - 0"	10"	8"	23'	108	#6	9"	8' - 1"	1,311	162	#5	6"	11' - 2"	1,887	6' - 8"	4' - 6"	162	#5	6"	7' - 4"	1,239	4' - 6"	2' - 10"	82	12"	6' - 0"	329	5	39' - 9"	133	39	39' - 9"	1,036	8' - 1"	22	20	56	0.811	148.4	0.6	78	33.1	6,013
7' - 0"	6' - 0"	11"	8"	30'	162	#6	6"	8' - 1"	1,967	162	#5	6"	11' - 3"	1,901	6' - 9"	4' - 6"	162	#5	6"	7' - 5"	1,253	4' - 6"	2' - 11"	82	12"	6' - 0"	329	5	39' - 9"	133	39	39' - 9"	1,036	8' - 1"	22	20	56	0.862	165.5	0.6	78	35.1	6,697
7' - 0"	7' - 0"	8"	7"	16'	108	#6	9"	7' - 11"	1,284	162	#5	6"	11' - 11"	2,014	7' - 6"	4' - 5"	162	#5	6"	7' - 1"	1,197	4' - 5"	2' - 8"	108	9"	7' - 0"	505	5	39' - 9"	133	39	39' - 9"	1,036	7' - 11"	21	18	50	0.706	154.2	0.6	71	28.8	6,240
7' - 0"	7' - 0"	9"	7"	20'	108	#6	9"	7' - 11"	1,284	162	#5	6"	12' - 0"	2,028	7' - 7"	4' - 5"	162	#5	6"	7' - 2"	1,211	4' - 5"	2' - 9"	108	9"	7' - 0"	505	5	39' - 9"	133	39	39' - 9"	1,036	7' - 11"	21	18	50	0.756	154.9	0.6	71	30.8	6,268
7' - 0"	7' - 0"	10"	8"	23'	108	#6	9"	8' - 1"	1,311	162	#5	6"	12' - 2"	2,056	7' - 8"	4' - 6"	162	#5	6"	7' - 4"	1,239	4' - 6"	2' - 10"	108	9"	7' - 0"	505	5	39' - 9"	133	39	39' - 9"	1,036	8' - 1"	22	20	56	0.860	157.0	0.6	78	35.0	6,358
7' - 0"	7' - 0"	11"	8"	30'	162	#6	6"	8' - 1"	1,967	162	#5	6"	12' - 3"	2,070	7' - 9"	4' - 6"	162	#5	6"	7' - 5"	1,253	4' - 6"	2' - 11"	108	9"	7' - 0"	505	5	39' - 9"	133	39	39' - 9"	1,036	8' - 1"	22	20	56	0.912	174.1	0.6	78	37.1	7,042

(5) For direct traffic culverts (fill height ≤ 2 ft.), identify the required box size and select the option with the minimum fill 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-7

FILE: scc07ste-21.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0579	02	014	FM 512
04/2021 Updated X values.	DIST	COUNTY		SHEET NO.
	PARIS	HUNT		134

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DATE: 5/24/2023 6:20:47 PM
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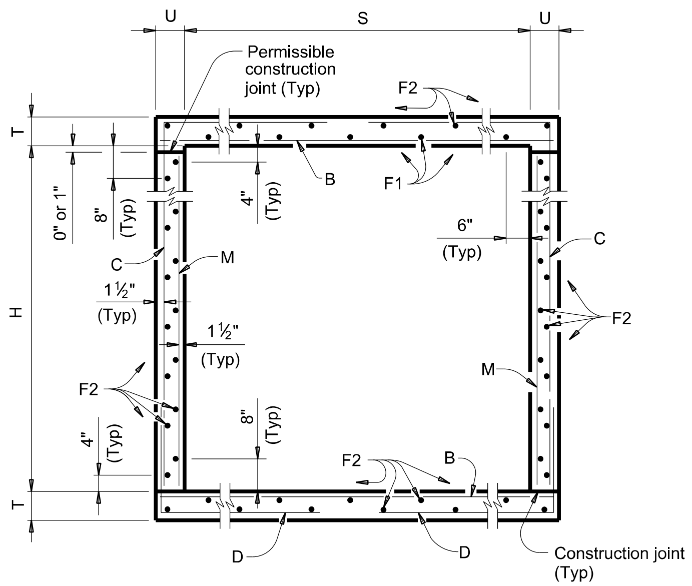
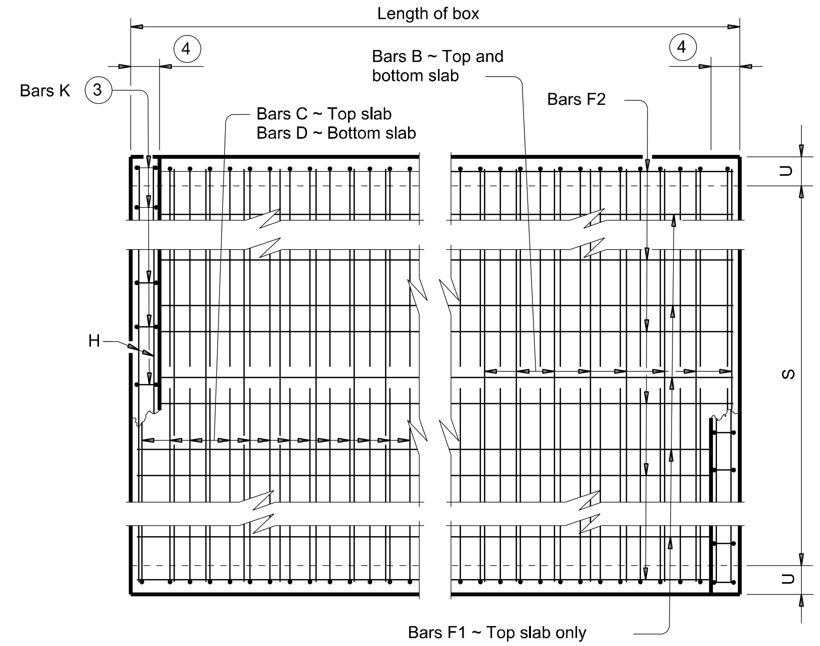
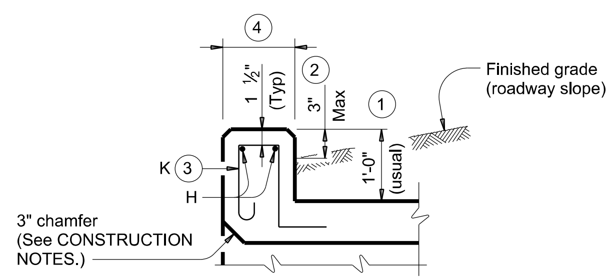


TYPICAL SECTION



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 finished grade.
   - For structures with bridge rail, construct curbs flush with finished grade.

   Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.
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 flow line by a maximum of 6". If this option is taken, Bars M may be cut off or raised, Bars C and D may be reversed.

MATERIAL NOTES:

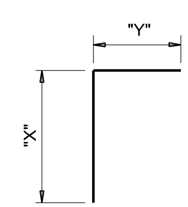
Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.
Provide Class C concrete (f'c = 3,600 psi) for culvert barrel and curb, with the following exceptions: provide Class S concrete (f'c = 4,000 psi) for top slabs of:
- culverts with overlay,
- culverts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

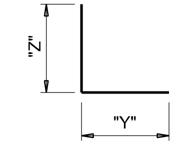
GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications for the range of fill 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.

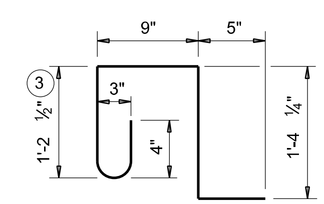
Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.



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-8

FILE: scc08ste-21.dgn		DN: TBE	CK: BMP	DW: TxDOT		CK: TxDOT
©TxDOT February 2020		CONT	SECT	JOB		HIGHWAY
REVISIONS		0579	02	014		FM 512
04/2021 Updated X values.		DIST		COUNTY		SHEET NO.
		PARIS		HUNT		135

DATE: 5/24/2023 6:20:48 PM
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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)
8' - 0"	3' - 0"	8"	7"	13'	162	#6	6"	8' - 11"	2,170	108	#6	9"	8' - 8"	1,406	3' - 6"	5' - 2"	108	#6	9"	8' - 3"	1,338	5' - 2"	3' - 1"	108	9"	3' - 0"	216	6	39' - 9"	159	32	39' - 9"	850	8' - 11"	24	20	56	0.582	153.5	0.7	80	24.0	6,219
8' - 0"	3' - 0"	8"	7"	16'	162	#6	6"	8' - 11"	2,170	108	#6	9"	8' - 8"	1,406	3' - 6"	5' - 2"	108	#6	9"	8' - 3"	1,338	5' - 2"	3' - 1"	108	9"	3' - 0"	216	6	39' - 9"	159	32	39' - 9"	850	8' - 11"	24	20	56	0.582	153.5	0.7	80	24.0	6,219
8' - 0"	3' - 0"	10"	8"	20'	162	#6	6"	9' - 1"	2,210	108	#6	9"	8' - 10"	1,433	3' - 8"	5' - 2"	108	#6	9"	8' - 5"	1,365	5' - 2"	3' - 3"	82	12"	3' - 0"	164	6	39' - 9"	159	32	39' - 9"	850	9' - 1"	24	22	61	0.724	154.5	0.7	85	29.6	6,266
8' - 0"	3' - 0"	11"	8"	23'	162	#6	6"	9' - 1"	2,210	108	#6	9"	8' - 11"	1,446	3' - 9"	5' - 2"	108	#6	9"	8' - 6"	1,379	5' - 2"	3' - 4"	82	12"	3' - 0"	164	6	39' - 9"	159	32	39' - 9"	850	9' - 1"	24	22	61	0.782	155.2	0.7	85	32.0	6,293
8' - 0"	3' - 0"	13"	9"	30'	162	#6	6"	9' - 3"	2,251	108	#6	9"	9' - 2"	1,487	3' - 11"	5' - 3"	108	#6	9"	8' - 9"	1,419	5' - 3"	3' - 6"	108	9"	3' - 0"	216	6	39' - 9"	159	32	39' - 9"	850	9' - 3"	25	22	61	0.929	159.6	0.7	86	37.9	6,468
8' - 0"	4' - 0"	8"	7"	13'	162	#6	6"	8' - 11"	2,170	108	#6	9"	9' - 8"	1,568	4' - 6"	5' - 2"	108	#6	9"	8' - 3"	1,338	5' - 2"	3' - 1"	108	9"	4' - 0"	289	6	39' - 9"	159	32	39' - 9"	850	8' - 11"	24	20	56	0.626	159.4	0.7	80	25.7	6,454
8' - 0"	4' - 0"	8"	7"	16'	162	#6	6"	8' - 11"	2,170	108	#6	9"	9' - 8"	1,568	4' - 6"	5' - 2"	108	#6	9"	8' - 3"	1,338	5' - 2"	3' - 1"	108	9"	4' - 0"	289	6	39' - 9"	159	32	39' - 9"	850	8' - 11"	24	20	56	0.626	159.4	0.7	80	25.7	6,454
8' - 0"	4' - 0"	10"	8"	20'	162	#6	6"	9' - 1"	2,210	108	#6	9"	9' - 10"	1,595	4' - 8"	5' - 2"	108	#6	9"	8' - 5"	1,365	5' - 2"	3' - 3"	82	12"	4' - 0"	219	6	39' - 9"	159	32	39' - 9"	850	9' - 1"	24	22	61	0.774	160.0	0.7	85	31.6	6,483
8' - 0"	4' - 0"	11"	8"	23'	162	#6	6"	9' - 1"	2,210	108	#6	9"	9' - 11"	1,609	4' - 9"	5' - 2"	108	#6	9"	8' - 6"	1,379	5' - 2"	3' - 4"	82	12"	4' - 0"	219	6	39' - 9"	159	32	39' - 9"	850	9' - 1"	24	22	61	0.831	160.7	0.7	85	33.9	6,511
8' - 0"	4' - 0"	13"	9"	30'	162	#6	6"	9' - 3"	2,251	108	#6	9"	10' - 2"	1,649	4' - 11"	5' - 3"	108	#6	9"	8' - 9"	1,419	5' - 3"	3' - 6"	108	9"	4' - 0"	289	6	39' - 9"	159	32	39' - 9"	850	9' - 3"	25	22	61	0.985	165.4	0.7	86	40.1	6,703
8' - 0"	5' - 0"	8"	7"	13'	162	#6	6"	8' - 11"	2,170	108	#6	9"	10' - 8"	1,730	5' - 6"	5' - 2"	108	#6	9"	8' - 3"	1,338	5' - 2"	3' - 1"	108	9"	5' - 0"	361	6	39' - 9"	159	36	39' - 9"	956	8' - 11"	24	20	56	0.669	167.9	0.7	80	27.4	6,794
8' - 0"	5' - 0"	8"	7"	16'	162	#6	6"	8' - 11"	2,170	108	#6	9"	10' - 8"	1,730	5' - 6"	5' - 2"	108	#6	9"	8' - 3"	1,338	5' - 2"	3' - 1"	108	9"	5' - 0"	361	6	39' - 9"	159	36	39' - 9"	956	8' - 11"	24	20	56	0.669	167.9	0.7	80	27.4	6,794
8' - 0"	5' - 0"	10"	8"	20'	162	#6	6"	9' - 1"	2,210	108	#6	9"	10' - 10"	1,757	5' - 8"	5' - 2"	108	#6	9"	8' - 5"	1,365	5' - 2"	3' - 3"	82	12"	5' - 0"	274	6	39' - 9"	159	36	39' - 9"	956	9' - 1"	24	22	61	0.823	168.0	0.7	85	33.6	6,806
8' - 0"	5' - 0"	11"	8"	23'	162	#6	6"	9' - 1"	2,210	108	#6	9"	10' - 11"	1,771	5' - 9"	5' - 2"	108	#6	9"	8' - 6"	1,379	5' - 2"	3' - 4"	82	12"	5' - 0"	274	6	39' - 9"	159	36	39' - 9"	956	9' - 1"	24	22	61	0.881	168.7	0.7	85	35.9	6,834
8' - 0"	5' - 0"	13"	9"	30'	162	#6	6"	9' - 3"	2,251	108	#6	9"	11' - 2"	1,811	5' - 11"	5' - 3"	108	#6	9"	8' - 9"	1,419	5' - 3"	3' - 6"	108	9"	5' - 0"	361	6	39' - 9"	159	36	39' - 9"	956	9' - 3"	25	22	61	1.040	173.9	0.7	86	42.3	7,043
8' - 0"	6' - 0"	8"	7"	13'	162	#6	6"	8' - 11"	2,170	108	#6	9"	11' - 8"	1,893	6' - 6"	5' - 2"	108	#6	9"	8' - 3"	1,338	5' - 2"	3' - 1"	108	9"	6' - 0"	433	6	39' - 9"	159	40	39' - 9"	1,062	8' - 11"	24	20	56	0.712	176.4	0.7	80	29.2	7,135
8' - 0"	6' - 0"	8"	7"	16'	162	#6	6"	8' - 11"	2,170	108	#6	9"	11' - 8"	1,893	6' - 6"	5' - 2"	108	#6	9"	8' - 3"	1,338	5' - 2"	3' - 1"	108	9"	6' - 0"	433	6	39' - 9"	159	40	39' - 9"	1,062	8' - 11"	24	20	56	0.712	176.4	0.7	80	29.2	7,135
8' - 0"	6' - 0"	10"	8"	20'	162	#6	6"	9' - 1"	2,210	108	#6	9"	11' - 10"	1,920	6' - 8"	5' - 2"	108	#6	9"	8' - 5"	1,365	5' - 2"	3' - 3"	82	12"	6' - 0"	329	6	39' - 9"	159	40	39' - 9"	1,062	9' - 1"	24	22	61	0.872	176.1	0.7	85	35.6	7,130
8' - 0"	6' - 0"	11"	8"	23'	162	#6	6"	9' - 1"	2,210	108	#6	9"	11' - 11"	1,933	6' - 9"	5' - 2"	108	#6	9"	8' - 6"	1,379	5' - 2"	3' - 4"	82	12"	6' - 0"	329	6	39' - 9"	159	40	39' - 9"	1,062	9' - 1"	24	22	61	0.930	176.8	0.7	85	37.9	7,157
8' - 0"	6' - 0"	13"	9"	30'	162	#6	6"	9' - 3"	2,251	108	#6	9"	12' - 2"	1,974	6' - 11"	5' - 3"	108	#6	9"	8' - 9"	1,419	5' - 3"	3' - 6"	108	9"	6' - 0"	433	6	39' - 9"	159	40	39' - 9"	1,062	9' - 3"	25	22	61	1.096	182.5	0.7	86	44.5	7,384
8' - 0"	7' - 0"	8"	7"	13'	162	#6	6"	8' - 11"	2,170	108	#6	9"	12' - 8"	2,055	7' - 6"	5' - 2"	108	#6	9"	8' - 3"	1,338	5' - 2"	3' - 1"	108	9"	7' - 0"	505	6	39' - 9"	159	40	39' - 9"	1,062	8' - 11"	24	20	56	0.755	182.2	0.7	80	30.9	7,369
8' - 0"	7' - 0"	8"	7"	16'	162	#6	6"	8' - 11"	2,170	162	#6	6"	12' - 8"	3,082	7' - 6"	5' - 2"	162	#6	6"	8' - 3"	2,007	5' - 2"	3' - 1"	108	9"	7' - 0"	505	6	39' - 9"	159	40	39' - 9"	1,062	8' - 11"	24	20	56	0.755	224.6	0.7	80	30.9	9,065
8' - 0"	7' - 0"	10"	8"	20'	162	#6	6"	9' - 1"	2,210	162	#6	6"	12' - 10"	3,123	7' - 8"	5' - 2"	162	#6	6"	8' - 5"	2,048	5' - 2"	3' - 3"	82	12"	7' - 0"	383	6	39' - 9"	159	40	39' - 9"	1,062	9' - 1"	24	22	61	0.922	224.6	0.7	85	37.6	9,070
8' - 0"	7' - 0"	11"	8"	23'	162	#6	6"	9' - 1"	2,210	162	#6	6"	12' - 11"	3,143	7' - 9"	5' - 2"	162	#6	6"	8' - 6"	2,068	5' - 2"	3' - 4"	82	12"	7' - 0"	383	6	39' - 9"	159	40	39' - 9"	1,062	9' - 1"	24	22	61	0.979	225.6	0.7	85	39.8	9,110
8' - 0"	7' - 0"	13"	9"	30'	162	#6	6"	9' - 3"	2,251	162	#6	6"	13' - 2"	3,204	7' - 11"	5' - 3"	162	#6	6"	8' - 9"	2,129	5' - 3"	3' - 6"	108	9"	7' - 0"	505	6	39' - 9"	159	40	39' - 9"	1,062	9' - 3"	25	22	61	1.151	232.8	0.7	86	46.7	9,396
8' - 0"	8' - 0"	8"	7"	13'	162	#6	6"	8' - 11"	2,170	108	#6	9"	13' - 8"	2,217	8' - 6"	5' - 2"	108	#6	9"	8' - 3"	1,338	5' - 2"	3' - 1"	108	9"	8' - 0"	577	6	39' - 9"	159	44	39' - 9"	1,168	8' - 11"	24	20	56	0.798	190.7	0.7	80	32.6	7,709
8' - 0"	8' - 0"	8"	7"	16'	162	#6	6"	8' - 11"	2,170	162	#6	6"	13' - 8"	3,325	8' - 6"	5' - 2"	162	#6	6"	8' - 3"	2,007	5' - 2"	3' - 1"	108	9"	8' - 0"	577	6	39' - 9"	159	44	39' - 9"	1,168	8' - 11"	24	20	56	0.798	235.2	0.7	80	32.6	9,486
8' - 0"	8' - 0"	10"	8"	20'	162	#6	6"	9' - 1"	2,210	162	#6	6"	13' - 10"	3,366	8' - 8"	5' - 2"	162	#6	6"	8' - 5"	2,048	5' - 2"	3' - 3"	108	9"	8' - 0"	577	6	39' - 9"	159	44	39' - 9"	1,168	9' - 1"	24	22	61	0.971	238.2	0.7	85	39.5	9,613
8' - 0"	8' - 0"	11"	8"	23'	162	#6	6"	9' - 1"	2,210	162	#6	6"	13' - 11"	3,386	8' - 9"	5' - 2"	162	#6	6"	8' - 6"	2,068	5' - 2"	3' - 4"	162	6"	8' - 0"	866	6	39' - 9"	159	44	39' - 9"	1,168	9' - 1"	24	22	61	1.029	246.4	0.7	85	41.8	9,942
8' - 0"	8' - 0"	13"	9"	30'	162	#6	6"	9' - 3"	2,251	162	#6	6"	14' - 2"	3,447	8' - 11"	5' - 3"	162	#6	6"	8' - 9"	2,129	5' - 3"	3' - 6"	162	6"	8' - 0"	866	6	39' - 9"	159	44	39' - 9"	1,168	9' - 3"	25	22	61	1.207	250.5	0.7	86	49.0	10,106

(5) For direct traffic culverts (fill height ≤ 2 ft.), identify the required box size and select the option with the minimum fill 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-8

FILE: scc08ste-21.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT		
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY		
REVISIONS	0579	02	014	FM 512		
04/2021 Updated X values.	DIST	COUNTY		SHEET NO.		
	PARIS	HUNT		136		

DATE: 5/24/2023 6:20:48 PM
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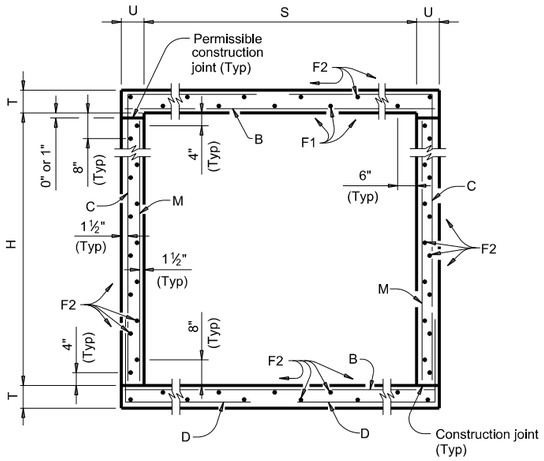
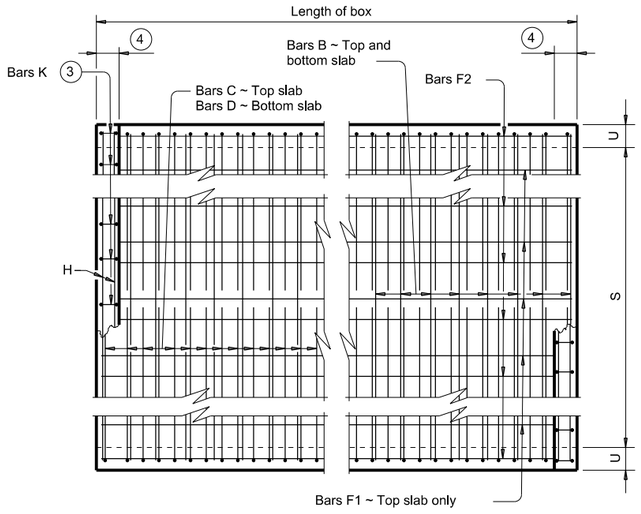
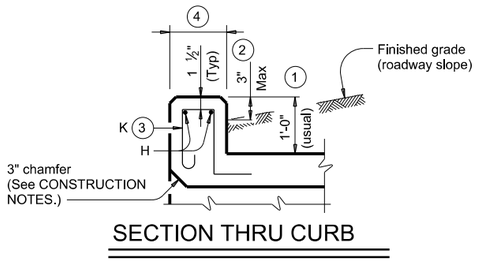


TYPICAL SECTION



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 finished grade.
   · For structures with bridge rail, construct curbs flush with finished grade.
   Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

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 flow line by a maximum of 6". If this option is taken, Bars M may be cut off or raised, Bars C and D may be reversed.

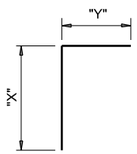
MATERIAL NOTES:

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 final 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

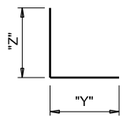
GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications for the range of fill 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.

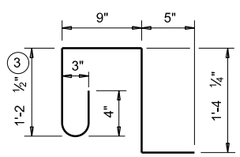
Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.



BARS C



BARS D



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

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

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

SCC-9

FILE: scc09ste-20.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0579	02	014	FM 512
04/2021 Updated X values.	DIST	COUNTY		SHEET NO.
	PARIS	HUNT		137

SECTION DIMENSIONS				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	FILL HEIGHT	No.	Size	Spa	Length	Weight	No.	Size	Spa	Length	Weight	" X "	" Y "	No.	Size	Spa	Length	Weight	" Y "	" Z "	No.	Spa	Length	Wt	No.	Length	Wt	No.	Length	Weight	Length	Wt	No.	Wt	Conc (CY)	Reinf (Lb)	Conc (CY)	Reinf (Lb)	Conc (CY)	Reinf (Lb)
9' - 0"	4' - 0"	8"	7"	10'	162	#6	6"	9' - 11"	2,413	108	#6	9"	10' - 0"	1,622	4' - 6"	5' - 6"	108	#6	9"	8' - 7"	1,392	5' - 6"	3' - 1"	108	9"	4' - 0"	289	7	39' - 9"	186	35	39' - 9"	929	9' - 11"	26	22	61	0.675	170.8	0.8	87	27.8	6,918
9' - 0"	4' - 0"	8"	7"	13'	162	#6	6"	9' - 11"	2,413	162	#6	6"	10' - 0"	2,433	4' - 6"	5' - 6"	162	#6	6"	8' - 7"	2,089	5' - 6"	3' - 1"	108	9"	4' - 0"	289	7	39' - 9"	186	35	39' - 9"	929	9' - 11"	26	22	61	0.675	208.5	0.8	87	27.8	8,426
9' - 0"	4' - 0"	9"	8"	16'	162	#6	6"	10' - 1"	2,454	162	#6	6"	10' - 2"	2,474	4' - 7"	5' - 7"	162	#6	6"	8' - 9"	2,129	5' - 7"	3' - 2"	82	12"	4' - 0"	219	7	39' - 9"	186	35	39' - 9"	929	10' - 1"	27	24	67	0.772	209.8	0.8	94	31.6	8,485
9' - 0"	4' - 0"	11"	8"	20'	162	#6	6"	10' - 1"	2,454	162	#6	6"	10' - 4"	2,514	4' - 9"	5' - 7"	162	#6	6"	8' - 11"	2,170	5' - 7"	3' - 4"	82	12"	4' - 0"	219	7	39' - 9"	186	35	39' - 9"	929	10' - 1"	27	24	67	0.899	211.8	0.8	94	36.7	8,566
9' - 0"	4' - 0"	12"	9"	23'	162	#6	6"	10' - 3"	2,494	162	#6	6"	10' - 5"	2,535	4' - 10"	5' - 7"	162	#6	6"	9' - 0"	2,190	5' - 7"	3' - 5"	108	9"	4' - 0"	289	7	39' - 9"	186	35	39' - 9"	929	10' - 3"	27	24	67	1.000	215.6	0.8	94	40.8	8,717
9' - 0"	4' - 0"	13"	10"	26'	162	#6	6"	10' - 5"	2,535	162	#6	6"	10' - 7"	2,575	4' - 11"	5' - 8"	162	#6	6"	9' - 2"	2,230	5' - 8"	3' - 6"	108	9"	4' - 0"	289	7	39' - 9"	186	35	39' - 9"	929	10' - 5"	28	24	67	1.103	218.6	0.8	95	44.9	8,839
9' - 0"	4' - 0"	14"	11"	30'	162	#6	6"	10' - 7"	2,575	162	#6	6"	10' - 9"	2,616	5' - 0"	5' - 9"	162	#6	6"	9' - 4"	2,271	5' - 9"	3' - 7"	108	9"	4' - 0"	289	7	39' - 9"	186	35	39' - 9"	929	10' - 7"	28	24	67	1.208	221.7	0.8	95	49.1	8,961
9' - 0"	5' - 0"	8"	7"	10'	162	#6	6"	9' - 11"	2,413	108	#6	9"	11' - 0"	1,784	5' - 6"	5' - 6"	108	#6	9"	8' - 7"	1,392	5' - 6"	3' - 1"	108	9"	5' - 0"	361	7	39' - 9"	186	39	39' - 9"	1,036	9' - 11"	26	22	61	0.718	179.3	0.8	87	29.5	7,259
9' - 0"	5' - 0"	8"	7"	13'	162	#6	6"	9' - 11"	2,413	162	#6	6"	11' - 0"	2,677	5' - 6"	5' - 6"	162	#6	6"	8' - 7"	2,089	5' - 6"	3' - 1"	108	9"	5' - 0"	361	7	39' - 9"	186	39	39' - 9"	1,036	9' - 11"	26	22	61	0.718	219.1	0.8	87	29.5	8,849
9' - 0"	5' - 0"	9"	8"	16'	162	#6	6"	10' - 1"	2,454	162	#6	6"	11' - 2"	2,717	5' - 7"	5' - 7"	162	#6	6"	8' - 9"	2,129	5' - 7"	3' - 2"	82	12"	5' - 0"	274	7	39' - 9"	186	39	39' - 9"	1,036	10' - 1"	27	24	67	0.821	219.9	0.8	94	33.6	8,890
9' - 0"	5' - 0"	11"	8"	20'	162	#6	6"	10' - 1"	2,454	162	#6	6"	11' - 4"	2,758	5' - 9"	5' - 7"	162	#6	6"	8' - 11"	2,170	5' - 7"	3' - 4"	82	12"	5' - 0"	274	7	39' - 9"	186	39	39' - 9"	1,036	10' - 1"	27	24	67	0.949	222.0	0.8	94	38.7	8,972
9' - 0"	5' - 0"	12"	9"	23'	162	#6	6"	10' - 3"	2,494	162	#6	6"	11' - 5"	2,778	5' - 10"	5' - 7"	162	#6	6"	9' - 0"	2,190	5' - 7"	3' - 5"	108	9"	5' - 0"	361	7	39' - 9"	186	39	39' - 9"	1,036	10' - 3"	27	24	67	1.056	226.1	0.8	94	43.0	9,139
9' - 0"	5' - 0"	13"	10"	26'	162	#6	6"	10' - 5"	2,535	162	#6	6"	11' - 7"	2,819	5' - 11"	5' - 8"	162	#6	6"	9' - 2"	2,230	5' - 8"	3' - 6"	108	9"	5' - 0"	361	7	39' - 9"	186	39	39' - 9"	1,036	10' - 5"	28	24	67	1.165	229.2	0.8	95	47.4	9,262
9' - 0"	5' - 0"	14"	11"	30'	162	#6	6"	10' - 7"	2,575	162	#6	6"	11' - 9"	2,859	6' - 0"	5' - 9"	162	#6	6"	9' - 4"	2,271	5' - 9"	3' - 7"	108	9"	5' - 0"	361	7	39' - 9"	186	39	39' - 9"	1,036	10' - 7"	28	24	67	1.276	232.2	0.8	95	51.8	9,383
9' - 0"	6' - 0"	8"	7"	10'	162	#6	6"	9' - 11"	2,413	108	#6	9"	12' - 0"	1,947	6' - 6"	5' - 6"	108	#6	9"	8' - 7"	1,392	5' - 6"	3' - 1"	108	9"	6' - 0"	433	7	39' - 9"	186	43	39' - 9"	1,142	9' - 11"	26	22	61	0.761	187.8	0.8	87	31.2	7,600
9' - 0"	6' - 0"	8"	7"	13'	162	#6	6"	9' - 11"	2,413	162	#6	6"	12' - 0"	2,920	6' - 6"	5' - 6"	162	#6	6"	8' - 7"	2,089	5' - 6"	3' - 1"	108	9"	6' - 0"	433	7	39' - 9"	186	43	39' - 9"	1,142	9' - 11"	26	22	61	0.761	229.6	0.8	87	31.2	9,270
9' - 0"	6' - 0"	9"	8"	16'	162	#6	6"	10' - 1"	2,454	162	#6	6"	12' - 2"	2,960	6' - 7"	5' - 7"	162	#6	6"	8' - 9"	2,129	5' - 7"	3' - 2"	82	12"	6' - 0"	329	7	39' - 9"	186	43	39' - 9"	1,142	10' - 1"	27	24	67	0.870	230.0	0.8	94	35.6	9,294
9' - 0"	6' - 0"	11"	8"	20'	162	#6	6"	10' - 1"	2,454	162	#6	6"	12' - 4"	3,001	6' - 9"	5' - 7"	162	#6	6"	8' - 11"	2,170	5' - 7"	3' - 4"	82	12"	6' - 0"	329	7	39' - 9"	186	43	39' - 9"	1,142	10' - 1"	27	24	67	0.998	232.1	0.8	94	40.7	9,376
9' - 0"	6' - 0"	12"	9"	23'	162	#6	6"	10' - 3"	2,494	162	#6	6"	12' - 5"	3,021	6' - 10"	5' - 7"	162	#6	6"	9' - 0"	2,190	5' - 7"	3' - 5"	108	9"	6' - 0"	433	7	39' - 9"	186	43	39' - 9"	1,142	10' - 3"	27	24	67	1.111	236.7	0.8	94	45.2	9,560
9' - 0"	6' - 0"	13"	10"	26'	162	#6	6"	10' - 5"	2,535	162	#6	6"	12' - 7"	3,062	6' - 11"	5' - 8"	162	#6	6"	9' - 2"	2,230	5' - 8"	3' - 6"	108	9"	6' - 0"	433	7	39' - 9"	186	43	39' - 9"	1,142	10' - 5"	28	24	67	1.226	239.7	0.8	95	49.8	9,683
9' - 0"	6' - 0"	14"	11"	30'	162	#6	6"	10' - 7"	2,575	162	#6	6"	12' - 9"	3,102	7' - 0"	5' - 9"	162	#6	6"	9' - 4"	2,271	5' - 9"	3' - 7"	108	9"	6' - 0"	433	7	39' - 9"	186	43	39' - 9"	1,142	10' - 7"	28	24	67	1.344	242.7	0.8	95	54.6	9,804
9' - 0"	7' - 0"	8"	7"	10'	162	#6	6"	9' - 11"	2,413	108	#6	9"	13' - 0"	2,109	7' - 6"	5' - 6"	108	#6	9"	8' - 7"	1,392	5' - 6"	3' - 1"	108	9"	7' - 0"	505	7	39' - 9"	186	43	39' - 9"	1,142	9' - 11"	26	22	61	0.805	193.7	0.8	87	33.0	7,834
9' - 0"	7' - 0"	8"	7"	13'	162	#6	6"	9' - 11"	2,413	162	#6	6"	13' - 0"	3,163	7' - 6"	5' - 6"	162	#6	6"	8' - 7"	2,089	5' - 6"	3' - 1"	108	9"	7' - 0"	505	7	39' - 9"	186	43	39' - 9"	1,142	9' - 11"	26	22	61	0.805	237.5	0.8	87	33.0	9,585
9' - 0"	7' - 0"	9"	8"	16'	162	#6	6"	10' - 1"	2,454	162	#6	6"	13' - 2"	3,204	7' - 7"	5' - 7"	162	#6	6"	8' - 9"	2,129	5' - 7"	3' - 2"	82	12"	7' - 0"	383	7	39' - 9"	186	43	39' - 9"	1,142	10' - 1"	27	24	67	0.920	237.5	0.8	94	37.6	9,592
9' - 0"	7' - 0"	11"	8"	20'	162	#6	6"	10' - 1"	2,454	162	#6	6"	13' - 4"	3,244	7' - 9"	5' - 7"	162	#6	6"	8' - 11"	2,170	5' - 7"	3' - 4"	82	12"	7' - 0"	383	7	39' - 9"	186	43	39' - 9"	1,142	10' - 1"	27	24	67	1.047	239.5	0.8	94	42.6	9,673
9' - 0"	7' - 0"	12"	9"	23'	162	#6	6"	10' - 3"	2,494	162	#6	6"	13' - 5"	3,265	7' - 10"	5' - 7"	162	#6	6"	9' - 0"	2,190	5' - 7"	3' - 5"	108	9"	7' - 0"	505	7	39' - 9"	186	43	39' - 9"	1,142	10' - 3"	27	24	67	1.167	244.6	0.8	94	47.5	9,876
9' - 0"	7' - 0"	13"	10"	26'	162	#6	6"	10' - 5"	2,535	162	#6	6"	13' - 7"	3,305	7' - 11"	5' - 8"	162	#6	6"	9' - 2"	2,230	5' - 8"	3' - 6"	108	9"	7' - 0"	505	7	39' - 9"	186	43	39' - 9"	1,142	10' - 5"	28	24	67	1.288	247.6	0.8	95	52.3	9,998
9' - 0"	7' - 0"	14"	11"	30'	162	#6	6"	10' - 7"	2,575	162	#6	6"	13' - 9"	3,346	8' - 0"	5' - 9"	162	#6	6"	9' - 4"	2,271	5' - 9"	3' - 7"	108	9"	7' - 0"	505	7	39' - 9"	186	43	39' - 9"	1,142	10' - 7"	28	24	67	1.412	250.6	0.8	95	57.3	10,120
9' - 0"	8' - 0"	8"	7"	10'	162	#6	6"	9' - 11"	2,413	108	#6	9"	14' - 0"	2,271	8' - 6"	5' - 6"	108	#6	9"	8' - 7"	1,392	5' - 6"	3' - 1"	108	9"	8' - 0"	577	7	39' - 9"	186	47	39' - 9"	1,248	9' - 11"	26	22	61	0.848	202.2	0.8	87	34.7	8,174
9' - 0"	8' - 0"	8"	7"	13'	162	#6	6"	9' - 11"	2,413	162	#6	6"	14' - 0"	3,407	8' - 6"	5' - 6"	162	#6	6"	8' - 7"	2,089	5' - 6"	3' - 1"	108	9"	8' - 0"	577	7	39' - 9"	186	47	39' - 9"	1,248	9' - 11"	26	22	61	0.848	248.0	0.8	87	34.7	10,007
9' - 0"	8' - 0"	9"	8"	16'	162	#6	6"	10' - 1"	2,454	162	#6	6"	14' - 2"	3,447	8' - 7"	5' - 7"	162	#6	6"	8' - 9"	2,129	5' - 7"	3' - 2"	108	9"	8' - 0"	577	7	39' - 9"	186	47	39' - 9"	1,248	10' - 1"	27	24	67	0.969	251.0	0.8	94	39.5	10,135
9' - 0"	8' - 0"	11"	8"	20'	162	#6	6"	10' - 1"	2,454	162	#6	6"	14' - 4"	3,488	8' - 9"	5' - 7"	162	#6	6"	8' - 11"	2,170	5' - 7"	3' - 4"	108	9"	8' - 0"	577	7	39' - 9"	186	47	39' - 9"	1,248	10' - 1"	27	24	67	1.097	253.1	0.8	94	44.6	10,217
9' - 0"	8' - 0"	12"	9"	23'	162	#6	6"	10' - 3"	2,494	162	#6	6"	14' - 5"	3,508	8' - 10"	5' - 7"	162	#6	6"	9' - 0"	2,190	5' - 7"	3' - 5"	108	9"	8' - 0"	577	7	39' - 9"	186	47	39' - 9"	1,248	10' - 3"	27	24	67	1.222	255.1	0.8	94	49.7	10,297
9' - 0"	8' - 0"	13"	10"	26'	162	#6	6"	10' - 5"	2,535	162	#6	6"	14' - 7"	3,548	8' - 11"	5' - 8"	162	#6	6"	9' - 2"	2,230	5' - 8"	3' - 6"	108	9"	8' - 0"	577	7	39' - 9"	186	47	39' - 9"	1,248	10' - 5"	28	24	67	1.350	258.1	0.8	95	54.8	10,419
9' - 0"	8' - 0"	14"	11"	30'	162	#6	6"	10' - 7"	2,575	162	#6	6"	14' - 9"	3,589	9' - 0"	5' - 9"	162	#6	6"	9' - 4"	2,271	5' - 9"	3' - 7"	108	9"	8' - 0"	577	7	39' - 9"	186	47	39' - 9"	1,248	10' - 7"	28	24	67	1.479	261.2	0.8	95	60.0	10,541
9' - 0"	9' - 0"	8"	7"	10'	162	#6	6"	9' - 11"	2,413	108	#6	9"	15' - 0"	2,433	9' - 6"	5' - 6"	108	#6	9"	8' - 7"	1,392	5' - 6"	3' - 1"	162	6"	9' - 0"	974	7	39' - 9"	186	51	39' - 9"	1,354	9' - 11"	26	22	61	0.891	218.8	0.8	87	36.4	8,839
9' - 0"	9' - 0"	8"	7"	13'	162	#6	6"	9' - 11"	2,413	162	#6	6"	15' - 0"	3,650	9' - 6"	5' - 6"	162	#6	6"	8' - 7"	2,089	5' - 6"	3' - 1"	162	6"	9' - 0"	974	7	39' - 9"	186	51	39' - 9"	1,354	9' - 11"	26	22	61	0.891	266.7	0.8	87	36.4	10,753
9' - 0"	9' - 0"	9"	8"	16'	162	#6	6"	10' - 1"	2,454	162	#6	6"	15' - 2"	3,690	9' - 7"	5' - 7"	162	#6	6"	8' - 9"	2,129	5' - 7"	3' - 2"	162	6"	9' - 0"	974	7	39' - 9"	186	51	39' - 9"	1,354	10' - 1"	27	24	67	1.019	269.7	0.8	94	41.5	10,881
9' - 0"	9' - 0"	11"	8"	20'	162	#6	6"	10' - 1"	2,454	162	#6	6"	15' - 4"	3,731	9' - 9"	5' - 7"	162	#6	6"	8' - 11"	2,170	5' - 7"	3' - 4"	162	6"	9' - 0"	974	7	39' - 9"	186	51	39' - 9"	1,354	10' - 1"	27	24	67	1.146	271.7	0.8	94	46.6	10,963
9' - 0"	9' - 0"	12"	9"	23'	162	#6	6"	10' - 3"	2,494	162	#6	6"	15' - 5"	3,751	9' - 10"	5' - 7"	162	#6	6"	9' - 0"	2,190	5' - 7"	3' - 5"	162	6"	9' - 0"	974	7	39' - 9"	186	51	39' - 9"	1,354	10' - 3"	27	24	67	1.278	273.7	0.8	94	51.9	11,043
9' - 0"	9' - 0"	13"	10"	26'	162	#6	6"	10' - 5"	2,535	162	#6	6"	15' - 7"	3,792	9' - 11"	5' - 8"	162	#6	6"	9' - 2"	2,230	5' - 8"	3' - 6"	162	6"	9' - 0"	974	7	39' - 9"	186	51	39' - 9"	1,354	10' - 5"	28	24	67	1.412	276.8	0.8	95	57.3	11,166
9' - 0"	9' - 0"	14"	11"	30'	162	#6	6"	10' - 7"	2,575	162	#6	6"	15' - 9"	3,832	10' - 0"	5' - 9"	162	#6	6"	9' - 4"	2,271	5' - 9"	3' - 7"	162	6"	9' - 0"	974	7	39' - 9"	186	51	39' - 9"	1,354	10' - 7"	28	24	67	1.547	279.8	0.8	95	62.7	11,287

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

HL93 LOADING

SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

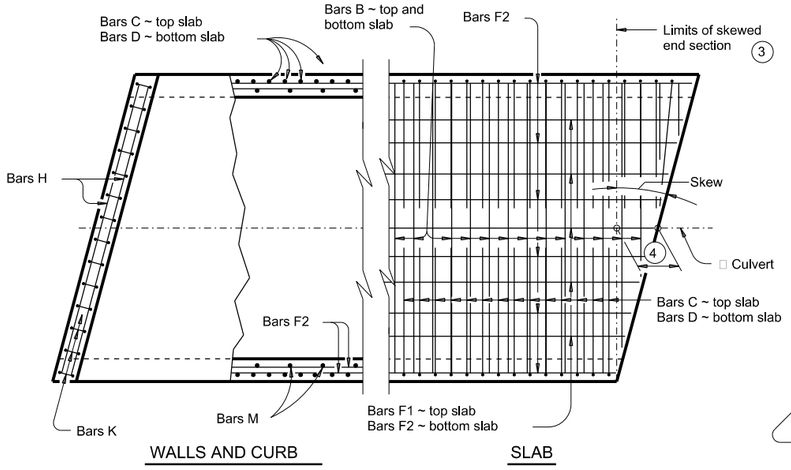
SINGLE BOX CULVERTS CAST-IN-PLACE

0' TO 30' FILL

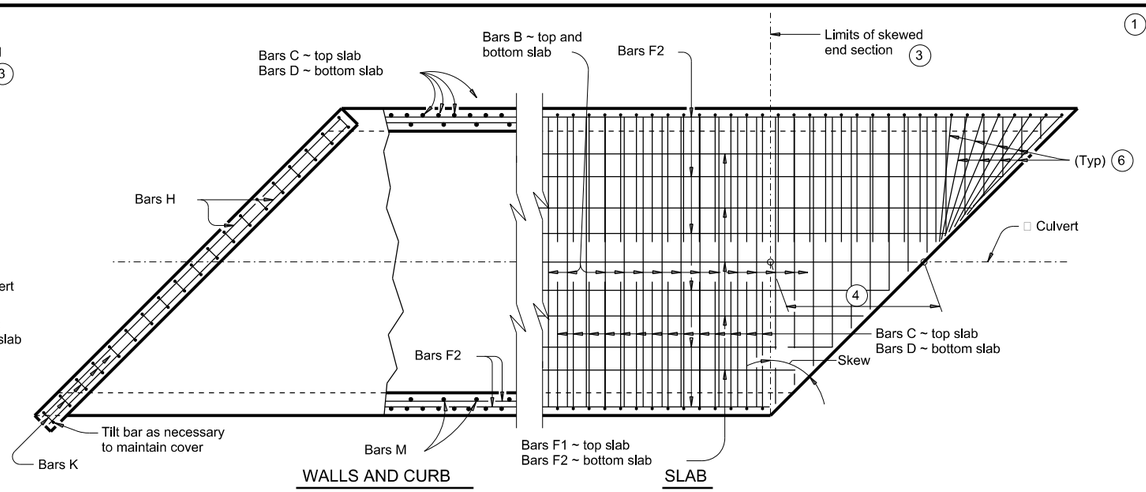
SCC-9

FILE: scc09ste-21.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0579	02	014	FM 512
04/2021 Updated X values.	DIST	COUNTY		SHEET NO.
	PARIS	HUNT		138

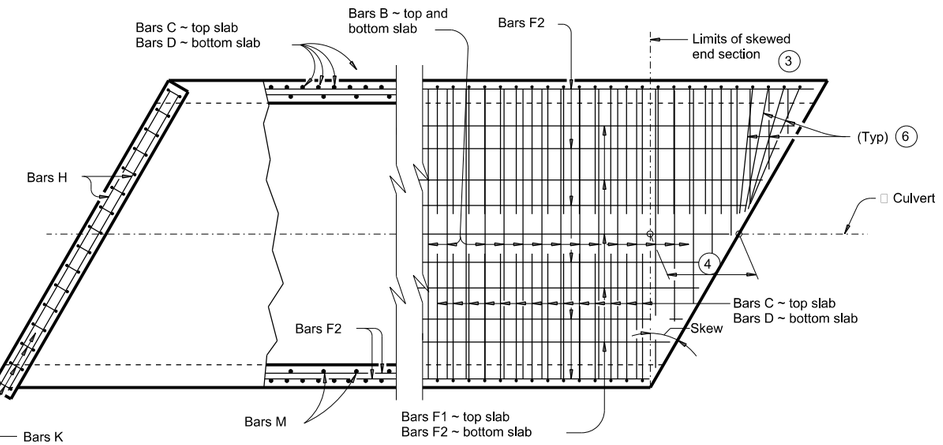
DATE: 5/24/2023 6:20:49 PM
FILE: Z:\Transportation\TxDOT\PS&E\STATEWIDE 36-91DP5101\WA2-TxDOT Paris\Preliminary\Standards\scc09ste-21.dgn



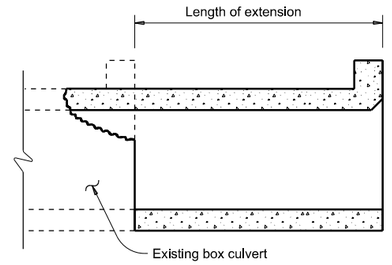
PLAN OF SKEWED ENDS ~ FROM 0° TO 15° (7)



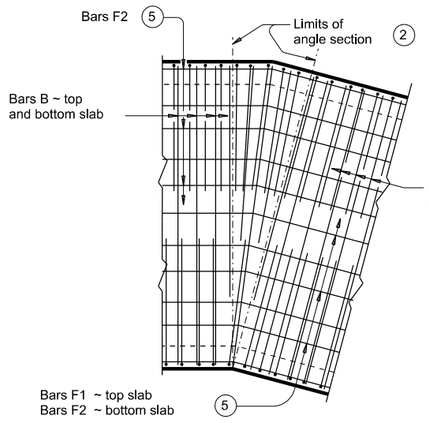
PLAN OF SKEWED ENDS ~ OVER 30° TO 45°



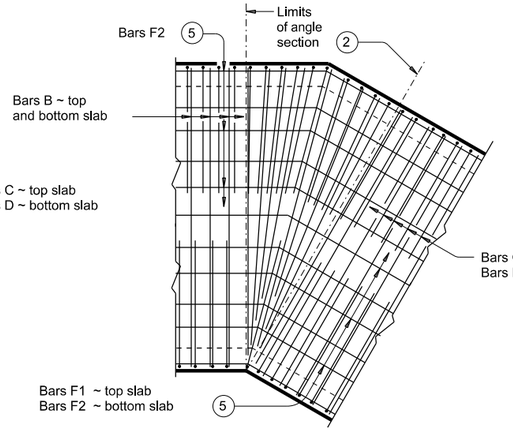
PLAN OF SKEWED ENDS ~ OVER 15° TO 30°



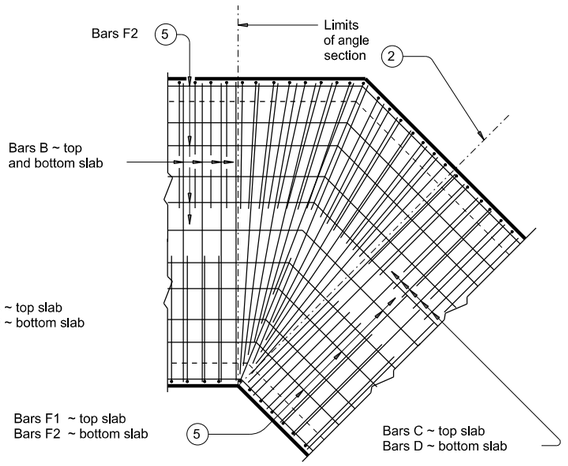
LENGTHENING DETAIL (1)



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 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, 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 becomes less than half of the normal spacing, cut bars to avoid conflict.

(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 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, 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 final riding surface.

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

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	0579	02	014	FM 512
	DIST	COUNTY		SHEET NO.
	PARIS	HUNT		139

DATE: 5/24/2023 6:20:49 PM
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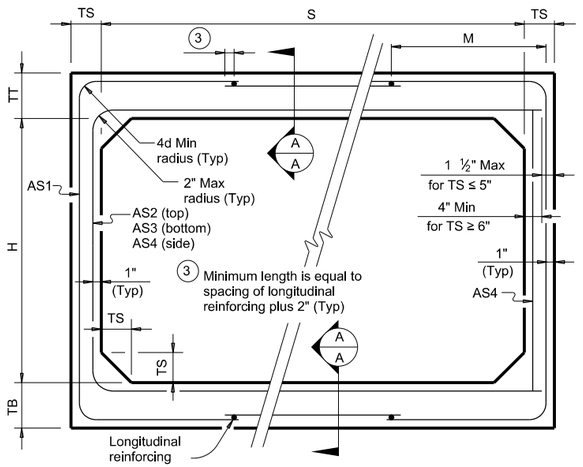
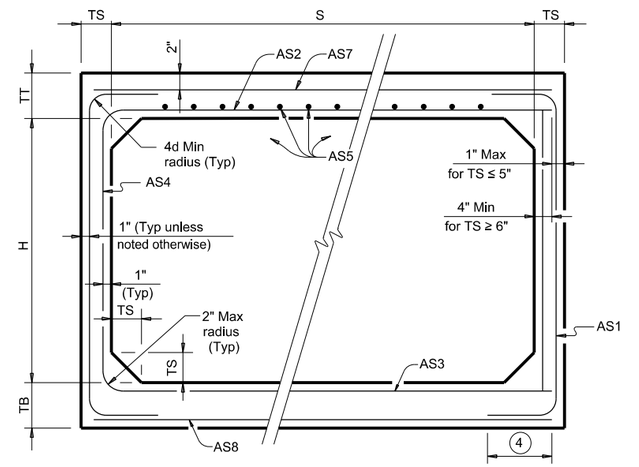
BOX DATA

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



CORNER OPTION "A" CORNER OPTION "B"

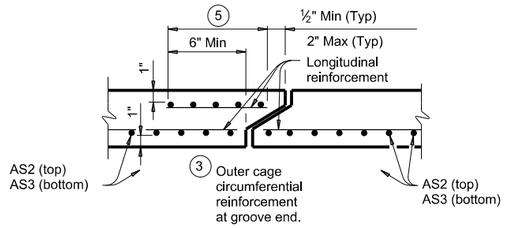
FILL HEIGHT 2 FT AND GREATER



CORNER OPTION "A" CORNER OPTION "B"

FILL HEIGHT LESS THAN 2 FT

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



SECTION A-A

(Showing top and bottom slab joint reinforcement.)

MATERIAL NOTES:

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

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

GENERAL NOTES:

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

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

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

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.

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

SINGLE BOX CULVERTS PRECAST

4'-0" SPAN

SCP-4

FILE: scp04sts-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
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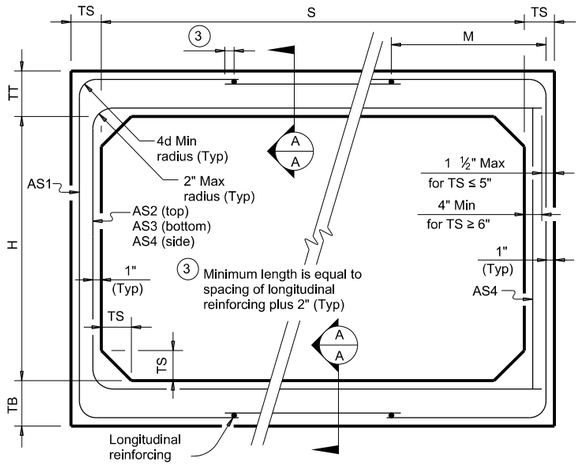
BOX DATA

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)
5	2	8	7	6	< 2	-	0.19	0.27	0.18	0.14	0.19	0.19	0.17	6.0
5	2	6	6	6	2 < 3	44	0.22	0.20	0.16	0.14	-	-	-	5.1
5	2	6	6	6	3 - 5	44	0.16	0.14	0.14	0.14	-	-	-	5.1
5	2	6	6	6	10	36	0.15	0.14	0.14	0.14	-	-	-	5.1
5	2	6	6	6	15	36	0.20	0.18	0.18	0.14	-	-	-	5.1
5	2	6	6	6	20	36	0.26	0.23	0.24	0.14	-	-	-	5.1
5	2	6	6	6	25	36	0.33	0.29	0.29	0.14	-	-	-	5.1
5	2	6	6	6	30	36	0.39	0.34	0.35	0.14	-	-	-	5.1
5	3	8	7	6	< 2	-	0.19	0.31	0.21	0.14	0.19	0.19	0.17	6.6
5	3	6	6	6	2 < 3	45	0.18	0.24	0.19	0.14	-	-	-	5.7
5	3	6	6	6	3 - 5	36	0.14	0.17	0.16	0.14	-	-	-	5.7
5	3	6	6	6	10	36	0.14	0.16	0.17	0.14	-	-	-	5.7
5	3	6	6	6	15	35	0.16	0.21	0.22	0.14	-	-	-	5.7
5	3	6	6	6	20	35	0.21	0.27	0.28	0.14	-	-	-	5.7
5	3	6	6	6	25	35	0.26	0.34	0.34	0.14	-	-	-	5.7
5	3	6	6	6	30	35	0.31	0.41	0.41	0.14	-	-	-	5.7
5	4	8	7	6	< 2	-	0.19	0.33	0.24	0.14	0.19	0.19	0.17	7.2
5	4	6	6	6	2 < 3	45	0.16	0.27	0.22	0.14	-	-	-	6.3
5	4	6	6	6	3 - 5	45	0.14	0.19	0.18	0.14	-	-	-	6.3
5	4	6	6	6	10	36	0.14	0.18	0.18	0.14	-	-	-	6.3
5	4	6	6	6	15	35	0.14	0.23	0.24	0.14	-	-	-	6.3
5	4	6	6	6	20	35	0.17	0.30	0.31	0.14	-	-	-	6.3
5	4	6	6	6	25	35	0.21	0.37	0.38	0.14	-	-	-	6.3
5	4	6	6	6	30	35	0.25	0.44	0.45	0.14	-	-	-	6.3
5	5	8	7	6	< 2	-	0.19	0.35	0.26	0.14	0.19	0.19	0.17	7.8
5	5	6	6	6	2 < 3	45	0.14	0.29	0.24	0.14	-	-	-	6.9
5	5	6	6	6	3 - 5	45	0.14	0.21	0.20	0.14	-	-	-	6.9
5	5	6	6	6	10	45	0.14	0.19	0.20	0.14	-	-	-	6.9
5	5	6	6	6	15	36	0.14	0.24	0.25	0.14	-	-	-	6.9
5	5	6	6	6	20	35	0.15	0.31	0.32	0.14	-	-	-	6.9
5	5	6	6	6	25	35	0.18	0.38	0.39	0.14	-	-	-	6.9
5	5	6	6	6	30	35	0.21	0.46	0.47	0.14	-	-	-	6.9

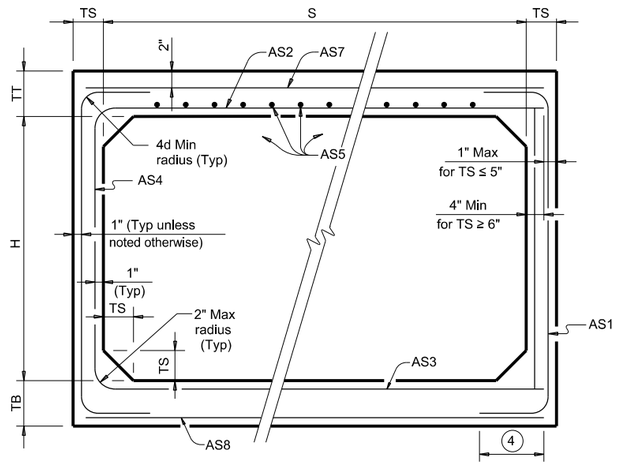
(1) For box length = 8'-0"

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



CORNER OPTION "A" CORNER OPTION "B"

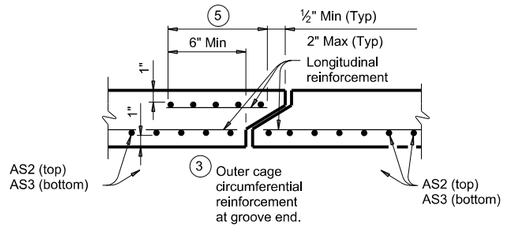
FILL HEIGHT 2 FT AND GREATER



CORNER OPTION "A" CORNER OPTION "B"

FILL HEIGHT LESS THAN 2 FT

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



SECTION A-A

(Showing top and bottom slab joint reinforcement.)

MATERIAL NOTES:

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

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

GENERAL NOTES:

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

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

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

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

SINGLE BOX CULVERTS PRECAST

5'-0" SPAN

SCP-5

FILE: scp05sts-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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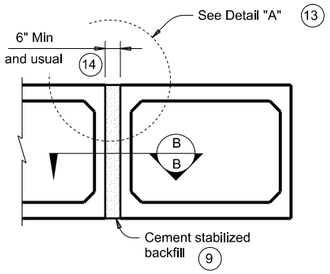
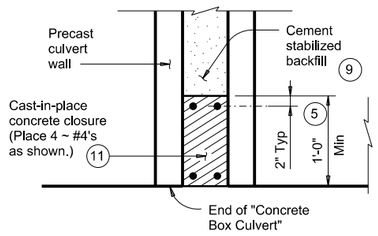
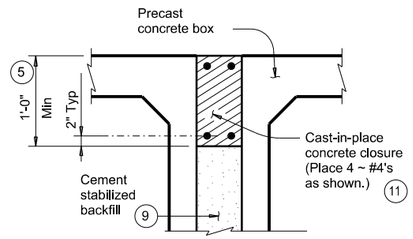


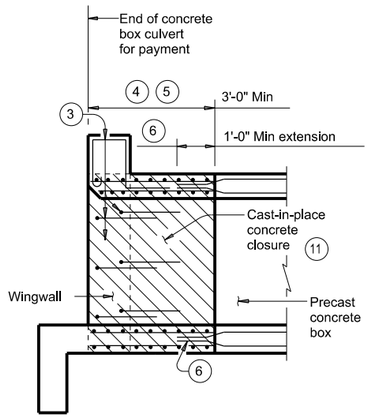
MULTIPLE UNIT PLACEMENT



SECTION B-B

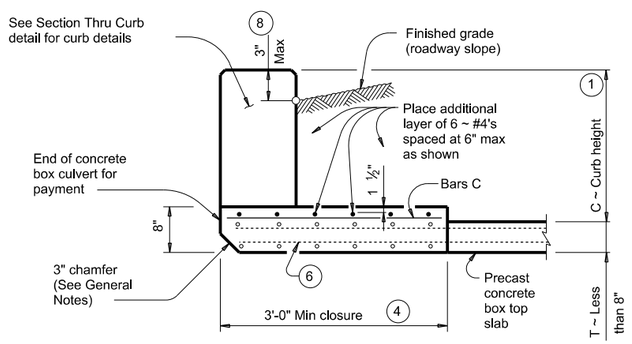


DETAIL "A" 13

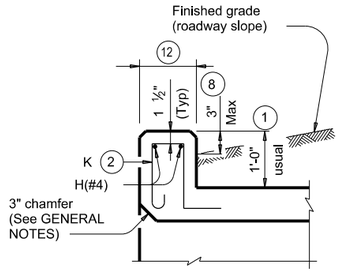


WINGWALL CONNECTION

(Also applies to safety end treatment.)

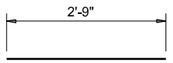


SECTION THRU TOP SLABS LESS THAN 8"

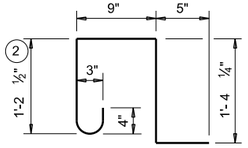


SECTION THRU CURB

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



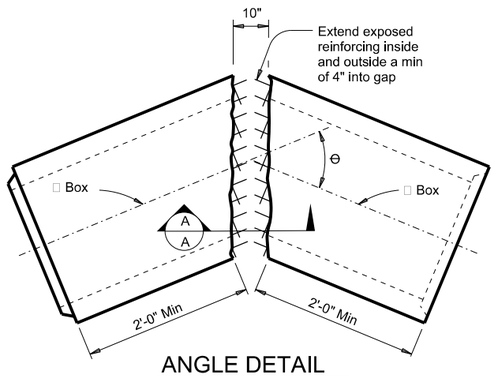
BARS C (#4)
(Spa = 1'-0" Max)



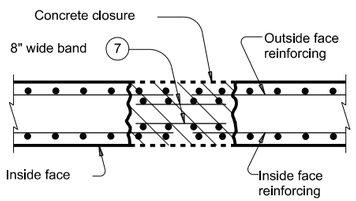
BARS K (#4)
(Spa = 1'-0" Max)
(Length = 4'-2")

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

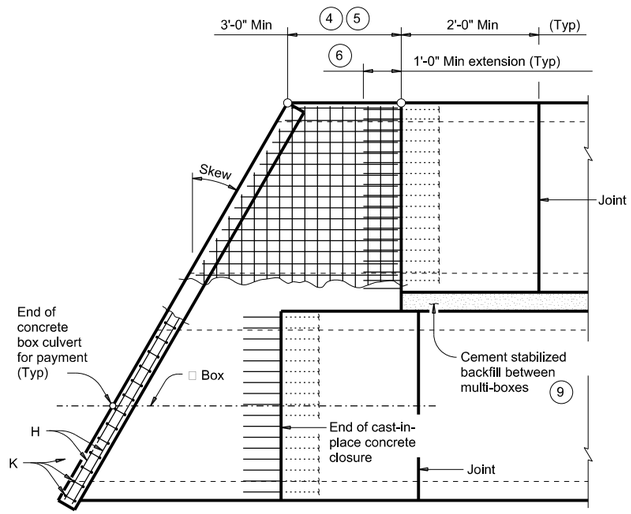
   Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.
9. Cement stabilized backfill between boxes is considered part of the box culvert for payment.
10. All curb concrete and reinforcing is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



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 backfill meeting the requirements of Item 400, "Excavation and Backfill for Structures."
Any additional concrete required for the closures will be considered subsidiary to the box culvert.

GENERAL NOTES:

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

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

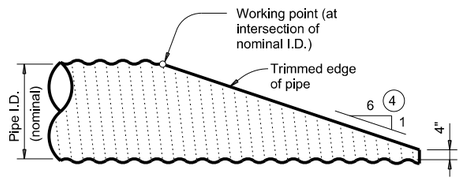
HL93 LOADING

Texas Department of Transportation | Bridge Division Standard

BOX CULVERTS PRECAST MISCELLANEOUS DETAILS

SCP-MD

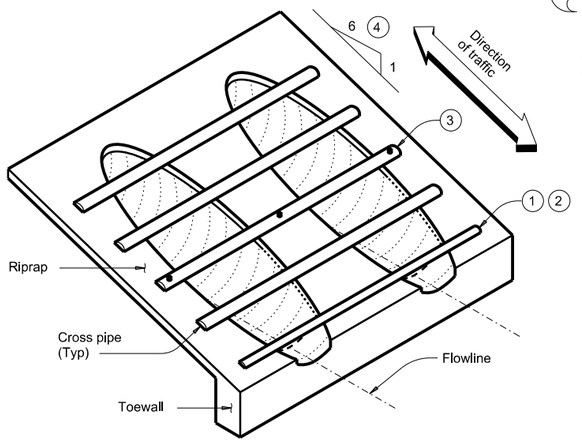
FILE: scpmdsts-20.dgn	DN: GAF	CK: LMW	DW: BWH/TxDOT	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0579	02	014	FM 512
	DIST	COUNTY		SHEET NO.
	PARIS	HUNT		142



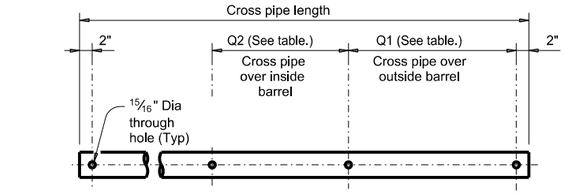
NOTE: All cross pipes, calculations, and dimensions are based on the pipe culverts mitered as shown in this detail. Alternate styles of mitered ends will require that appropriate adjustments be made to the values presented on this standard.

SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER

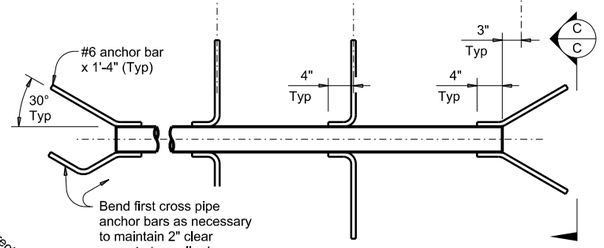
(Showing corrugated metal pipe (CMP) culvert Details at reinforced concrete pipe (RCP) culvert are similar.)



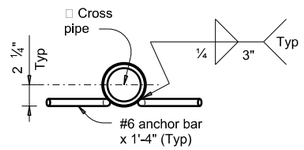
ISOMETRIC VIEW OF TYPICAL INSTALLATION



PIPE WITH BOLTED ANCHOR

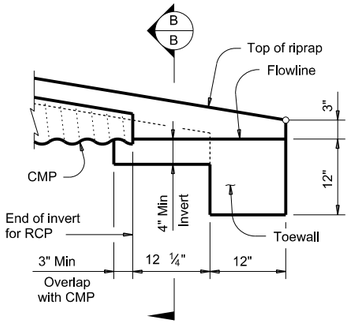


PIPE WITH ANCHOR BARS



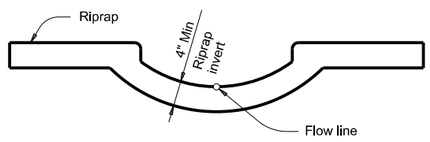
SECTION C-C

CROSS PIPE DETAILS



DETAIL "A"

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



SECTION B-B

(Cross pipes not shown for clarity.)

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

Nominal Culvert I.D.	Conc Riprap (CY) (6)	Pipe Culvert Spa ~ G	Single Barrel ~ Q1	Multi-Barrel ~ Q1	Q2	Conditions for Use of Cross Pipes	Cross Pipe Sizes
12"	0.6	0' - 9"	N/A	2' - 1"	1' - 9"	3 or more pipe culverts	3" Std (3.500" O.D.)
15"	0.7	0' - 11"	N/A	2' - 5"	2' - 2"		
18"	0.8	1' - 2"	N/A	2' - 10"	2' - 8"		
21"	0.9	1' - 4"	N/A	3' - 2"	3' - 1"		
24"	0.9	1' - 7"	N/A	3' - 6"	3' - 7"		
27"	1.0	1' - 8"	N/A	3' - 10"	3' - 11"	3 or more pipe culverts	3 ½" Std (4.000" O.D.)
30"	1.1	1' - 10"	N/A	4' - 2"	4' - 4"	2 or more pipe culverts	
33"	1.2	1' - 11"	4' - 2"	4' - 5"	4' - 8"	All pipe culverts	
36"	1.3	2' - 1"	4' - 5"	4' - 9"	5' - 1"	All pipe culverts	4" Std (4.500" O.D.)
42"	1.5	2' - 4"	4' - 11"	5' - 5"	5' - 10"		
48"	1.7	2' - 7"	5' - 5"	6' - 0"	6' - 7"	All pipe culverts	5" Std (5.563" O.D.)
54"	2.0	3' - 0"	5' - 11"	6' - 9"	7' - 6"		
60"	2.2	3' - 3"	6' - 5"	7' - 4"	8' - 3"		
66"	2.4	3' - 3"	6' - 11"	7' - 10"	8' - 9"		
72"	2.7	3' - 4"	7' - 5"	8' - 5"	9' - 4"		

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

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

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

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

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

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

MATERIAL NOTES:

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

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

Provide ASTM A307 bolts and nuts.

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

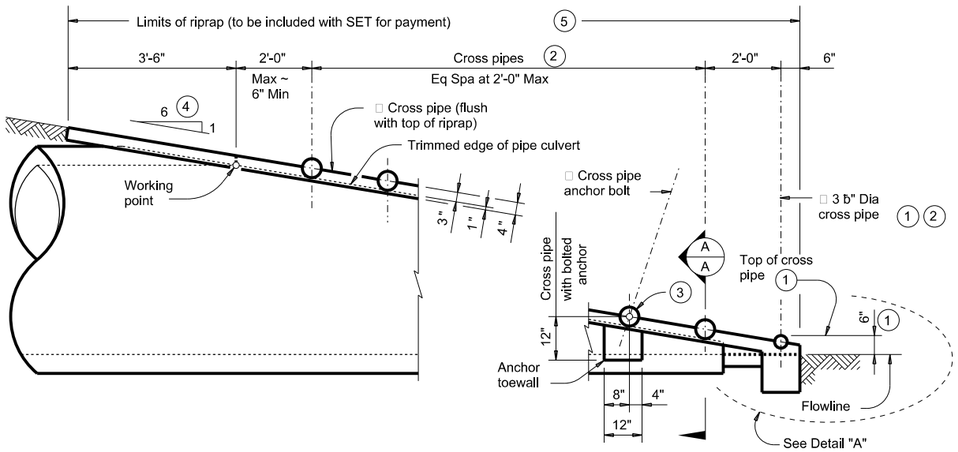
GENERAL NOTES:

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

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

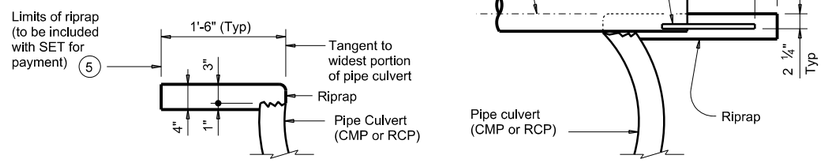
Construct concrete riprap and all necessary inverts in accordance with the requirements of Item 432, "Riprap".

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



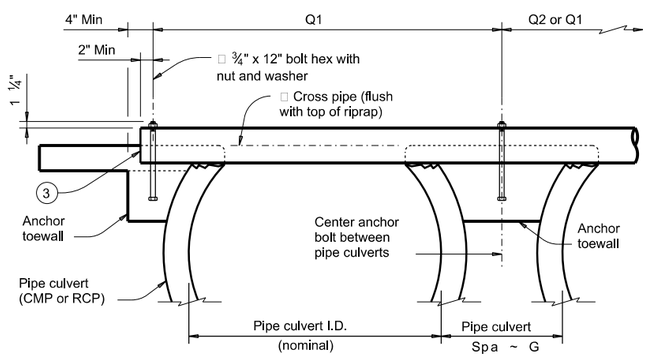
SIDE ELEVATION OF CAST-IN-PLACE CONCRETE

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



SHOWING CROSS PIPE WITH ANCHOR BAR

SHOWING TYPICAL PIPE CULVERT AND RIPRAP



SHOWING CROSS PIPE WITH BOLTED ANCHOR

SECTION A-A

Texas Department of Transportation

Bridge Division Standard

SAFETY END TREATMENT

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

SETP-PD

FILE: setppdse-20.dgn	DN: GAF	CK: CAT	DW: JRP	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0579	02	014	FM 512
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	PARIS	HUNT		143

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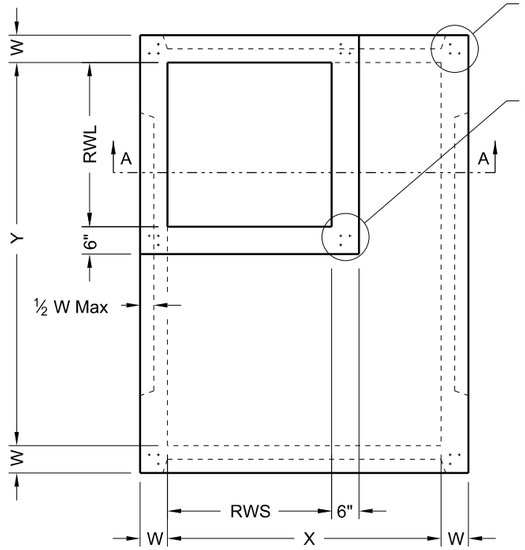
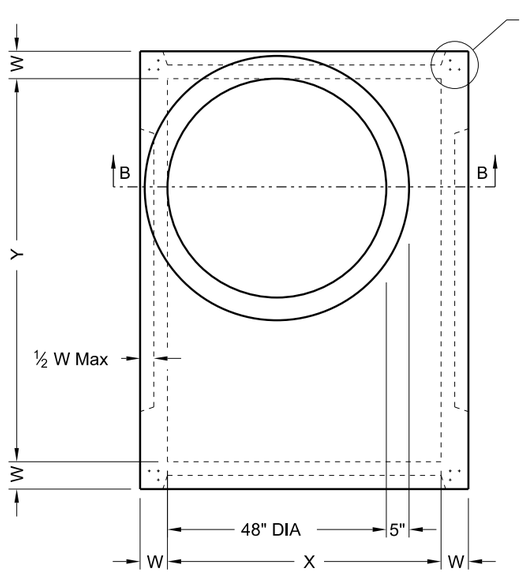


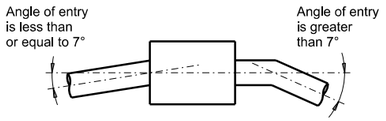
PLAN VIEW "A"

SQUARE REDUCED RISER OPTION



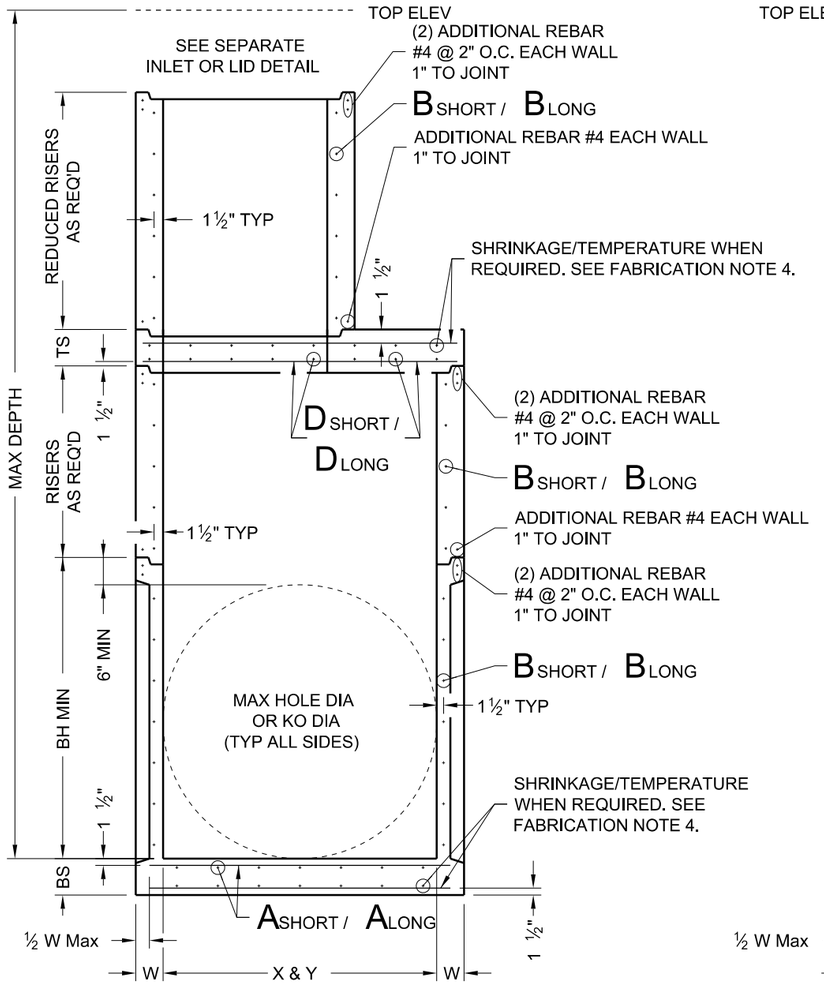
PLAN VIEW "B"

ROUND REDUCED RISER OPTION



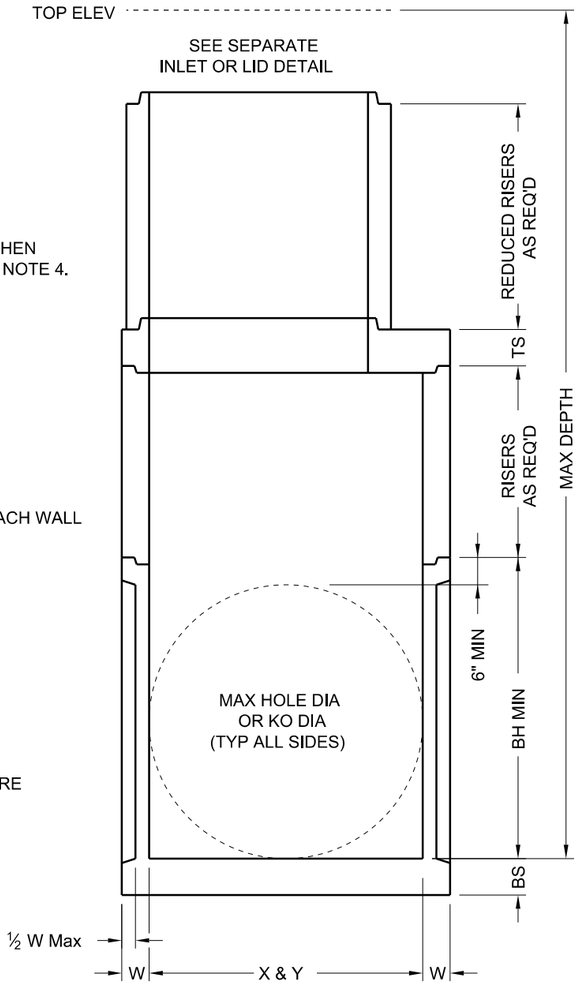
PIPE CONNECTION DETAIL

Connect pipes within 7° of normal to PB wall.
If necessary, use pipe elbow or curved approach alignment to stay within this limit.



SECTION A-A

SQUARE REDUCED RISER OPTION



SECTION B-B

ROUND REDUCED RISER OPTION

FABRICATION NOTES:

1. Provide Class "H" concrete in accordance with Item 421 and having a minimum compressive strength of 5,000 psi.
2. Provide Grade 60 reinforcing steel or equivalent area of WWR.
3. Provide typical clear cover of 1 ½" to reinforcing steel at interior or exterior walls.
4. Walls or slabs with a thickness of 8" or greater require shrinkage and temperature reinforcing steel. Provide steel area = 0.11 in²/ft each way.
5. No substitution is allowed for vertical and horizontal #4 bars in corners.
6. Manufacture base and risers to nearest 3" increment.
7. Design tongue and groove joints for full closure on both shoulders. Minimum spigot depth is ¾".
8. Provide lifting devices in conformance with Manufacturer's recommendations.
9. See sheet PDD for sizes, dimensions, and reinforcing steel not shown.

INSTALLATION NOTES:

1. If required elsewhere. Inverts (benching) to be provided by Contractor. Concrete or mortar used for invert is subsidiary to specified inlet or manhole.
2. Seal tongue and groove joints with preformed or bulk mastic in conformance with Manufacturer's recommendations. Tongue and groove joints may be grouted no more than 1" between each section, or ½ the joint depth, whichever is greater.
3. Do not grout rubber gasket joints without Manufacturer's recommendation.
4. For rigid pipe, cut hole in thin wall panel (KO) 4" Max, 2" Min larger than pipe OD.
5. For flexible pipe, consult boot/seal Manufacturer's specification for placement tolerance and hole size. Center pipe in hole and install boot/seal per Manufacturer's specification.

GENERAL NOTES:

1. Precast Base consists of base slab, base unit, risers (as required), reducing slab (as required), and reduced risers (as required). See sheet PDD for sizes.
2. Designed according to ASTM C913.
3. Payment for precast base is subsidiary to the specified inlet, per Item 465, "Junction Boxes, Manholes, and Inlets."

Cover dimensions are clear dimensions, unless noted otherwise.

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

PRECAST BASE

PB

FILE: prestd01-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0579	02	014	FM 512
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	PARIS	HUNT		144

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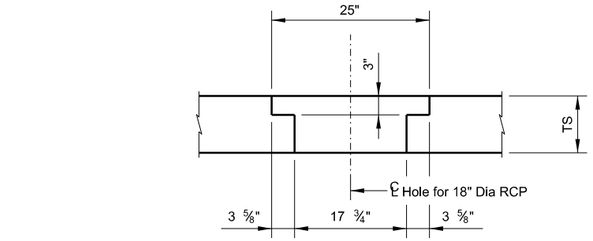
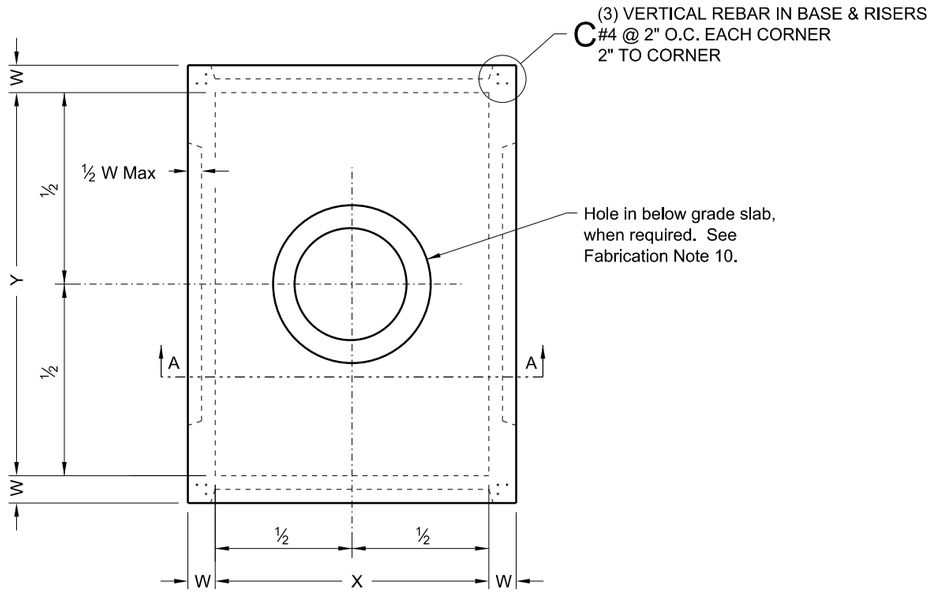
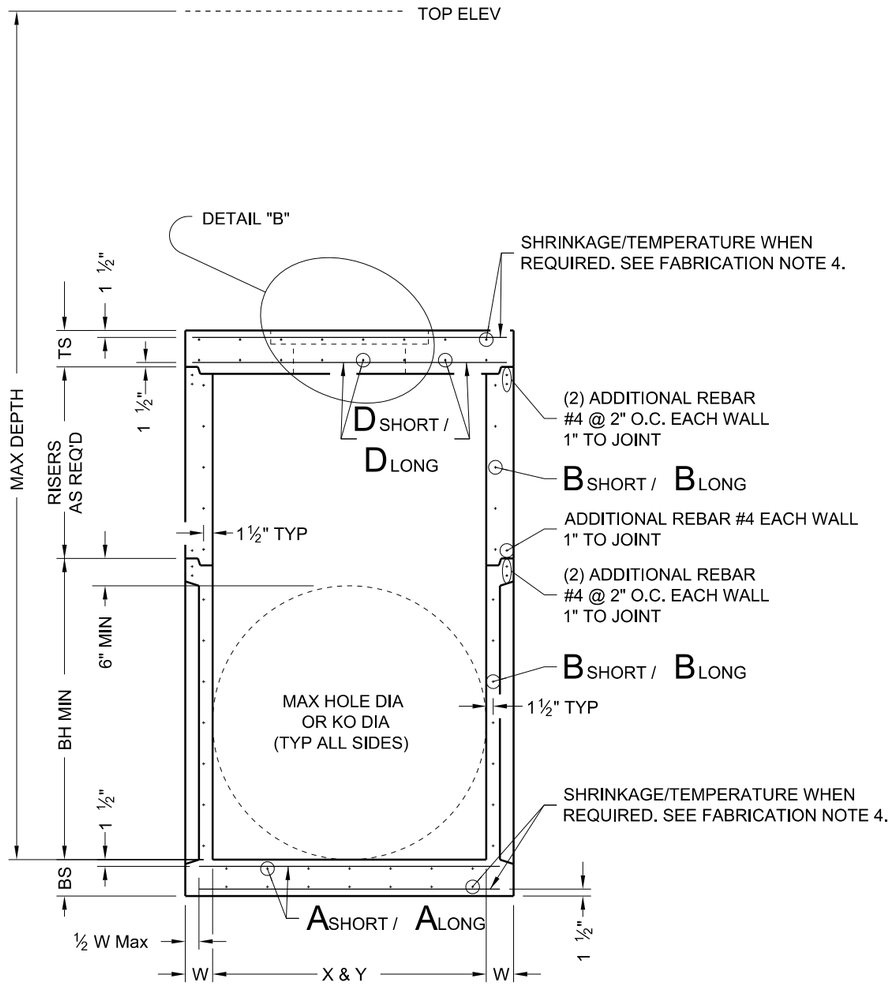


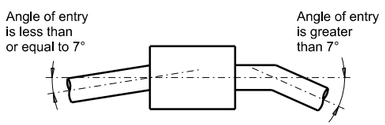
DETAIL "B"



PLAN VIEW



SECTION A-A



PIPE CONNECTION DETAIL

Connect pipes within 7° of normal to PJB wall.
If necessary, use pipe elbow or curved approach
alignment to stay within this limit.

FABRICATION NOTES:

1. Provide Class "H" concrete in accordance with Item 421 and having a minimum compressive strength of 5,000 psi.
2. Provide Grade 60 reinforcing steel or equivalent area of WWR.
3. Provide typical clear cover of 1 ½" to reinforcing steel at interior or exterior walls.
4. Walls or slabs with a thickness of 8" or greater require shrinkage and temperature reinforcing steel. Provide steel area = 0.11 in²/ft each way.
5. No substitution is allowed for vertical and horizontal #4 bars in corners.
6. Manufacture base and risers to nearest 3" increment.
7. Design tongue and groove joints for full closure on both shoulders. Minimum spigot depth is ¾".
8. Provide lifting devices in conformance with Manufacturer's recommendations.
9. See sheet PDD for sizes, dimensions, and reinforcing steel not shown.
10. Provide hole in below grade slab only when PJB is installed with inlet type POD.

INSTALLATION NOTES:

1. Inverts (benching) to be provided by Contractor. Concrete or mortar used for invert is subsidiary to junction box.
2. Seal tongue and groove joints with preformed or bulk mastic in conformance with Manufacturer's recommendations. Tongue and groove joints may be grouted no more than 1" between each section, or ½ the joint depth, whichever is greater.
3. Do not grout rubber gasket joints without Manufacturer's recommendation.
4. For rigid pipe, cut hole in thin wall panel (KO) 4" Max, 2" Min larger than pipe OD.
5. For flexible pipe, consult boot/seal Manufacturer's specification for placement tolerance and hole size. Center pipe in hole and install boot/seal per Manufacturer's specification.

GENERAL NOTES:

1. Precast Junction Box consists of base slab, base unit, risers (as required), and below grade slab. See sheet PDD for sizes.
2. Designed according to ASTM C913.
3. Payment for junction box is per Item 465 "Junction Boxes, Manholes, and Inlets" by type and size.

Cover dimensions are clear dimensions, unless noted otherwise.

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

PRECAST JUNCTION BOX

PJB

FILE: prestd09-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0579	02	014	FM 512
	DIST	COUNTY		SHEET NO.
	PARIS	HUNT		145

	Size	MAX DEPTH = 15 ft. to top of BASE SLAB										MAX DEPTH = 25 ft. to top of BASE SLAB										Min Height (See Gen Note 3)	Max HOLE DIA (See Fab Note 2)	Max KO DIA (See Fab Note 2)
		Base Slab			Base Unit or Riser Walls			Below Grade Slab (w/PJB) Reducing Slab (w/PB)				Base Slab			Base Unit or Riser Walls			Below Grade Slab (w/PJB) Reducing Slab (w/PB)						
		Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness	Reduced Riser Size	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness	Reduced Riser Size	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness			
	X x Y	Ashort	Along	BS	Bshort	Blong	W	RWSxRWL or ID	Dshort	Dlong	TS	Ashort	Along	BS	Bshort	Blong	W	RWSxRWL or ID	Dshort	Dlong	TS	BH MIN	HOLE DIA	KO DIA
	ft.	in^2/ft	in^2/ft	in.	in^2/ft	in^2/ft	in.	ft. **	in^2/ft	in^2/ft	in.	in^2/ft	in^2/ft	in.	in^2/ft	in^2/ft	in.	ft. **	in^2/ft	in^2/ft	in.	ft.	in.	in.
Precast Junction Box (PJB)	3x3	0.23	0.23	6	0.19	0.19	6	N/A	0.37	0.37	9	0.29	0.29	6	0.24	0.24	6	N/A	0.37	0.37	9	3.5	36	36
	4x4	0.29	0.29	6	0.24	0.24	6	N/A	0.41	0.41	9	0.47	0.47	6	0.38	0.38	6	N/A	0.41	0.41	9	4.5	48	48
	3x5	0.29	0.18	6	0.19	0.35	6	N/A	0.48	0.48	9	0.39	0.18	6	0.23	0.59	6	N/A	0.48	0.48	9	3.5	36/60	36/60
	4x5	0.36	0.18	6	0.22	0.34	6	N/A	0.42	0.42	9	0.53	0.26	6	0.39	0.59	6	N/A	0.42	0.42	9	4.5	48/60	48/60
	5x5	0.36	0.36	6	0.34	0.34	6	N/A	0.43	0.43	9	0.62	0.62	6	0.59	0.59	6	N/A	0.43	0.43	9	5.5	60	60
	5x6	0.27	0.27	9	0.34	0.45	6	N/A	0.48	0.48	9	0.47	0.45	9	0.38	0.54	8	N/A	0.48	0.48	9	5.5	60/72	60/72
	6x6	0.27	0.27	9	0.45	0.45	6	N/A	0.56	0.56	9	0.52	0.52	9	0.54	0.54	8	N/A	0.56	0.56	9	6.5	72	72
	8x8	0.46	0.46	9	0.51	0.51	8	N/A	0.45	0.45	12	0.87	0.87	9	0.59	0.59	10	N/A	0.45	0.45	12	8.5	96	72
Precast Base (PB)	3x3	0.23	0.23	6	0.19	0.19	6	N/A	N/A	N/A	N/A	0.29	0.29	6	0.24	0.24	6	N/A	N/A	N/A	N/A	3.5	36	36
	4x4	0.29	0.29	6	0.24	0.24	6	N/A	N/A	N/A	N/A	0.47	0.47	6	0.38	0.38	6	N/A	N/A	N/A	N/A	4.5	48	48
	3x5	0.29	0.18	6	0.19	0.35	6	3x3	0.30	0.34	9	0.39	0.18	6	0.23	0.59	6	3x3	0.40	0.40	9	3.5	36/60	36/60
	4x5	0.36	0.18	6	0.22	0.34	6	3x3	0.30	0.30	9	0.53	0.26	6	0.39	0.59	6	3x3	0.46	0.37	9	4.5	48/60	48/60
	4x5	0.36	0.18	6	0.22	0.34	6	4x4	0.30	0.30	9	0.53	0.26	6	0.39	0.59	6	4x4	0.39	0.39	9	4.5	48/60	48/60
	4x5	0.36	0.18	6	0.22	0.34	6	48"	0.39	0.39	9	0.53	0.26	6	0.39	0.59	6	48"	0.47	0.47	9	4.5	48/60	48/60
	4x5	0.36	0.18	6	0.22	0.34	6	3x5	0.33	0.40	9	0.53	0.26	6	0.39	0.59	6	3x5	0.48	0.48	9	4.5	48/60	48/60
	5x5	0.36	0.36	6	0.34	0.34	6	3x3	0.34	0.34	9	0.62	0.62	6	0.59	0.59	6	3x3	0.53	0.53	9	5.5	60	60
	5x5	0.36	0.36	6	0.34	0.34	6	4x4	0.36	0.36	9	0.62	0.62	6	0.59	0.59	6	4x4	0.64	0.64	9	5.5	60	60
	5x5	0.38	0.38	6	0.34	0.34	6	48"	0.36	0.36	9	0.62	0.62	6	0.59	0.59	6	48"	0.64	0.64	9	5.5	60	60
	5x5	0.36	0.36	6	0.34	0.34	6	3x5	0.34	0.40	9	0.62	0.62	6	0.59	0.59	6	3x5	0.53	0.53	9	5.5	60	60
	5x6	0.31	0.31	9	0.34	0.45	6	3x3	0.34	0.34	9	0.47	0.45	9	0.38	0.54	8	3x3	0.61	0.50	9	5.5	60/72	60/72
	5x6	0.27	0.27	9	0.34	0.45	6	4x4	0.36	0.45	9	0.47	0.45	9	0.38	0.54	8	4x4	0.74	0.57	9	5.5	60/72	60/72
	5x6	0.29	0.29	9	0.34	0.45	6	48"	0.36	0.45	9	0.47	0.45	9	0.38	0.54	8	48"	0.74	0.57	9	5.5	60/72	60/72
	5x6	0.29	0.29	9	0.34	0.45	6	3x5	0.45	0.45	9	0.47	0.45	9	0.38	0.54	8	3x5	0.61	0.61	9	5.5	60/72	60/72
	6x6	0.29	0.29	9	0.45	0.45	6	3x3	0.41	0.41	9	0.52	0.52	9	0.54	0.54	8	3x3	0.74	0.74	9	6.5	72	72
	6x6	0.27	0.27	9	0.45	0.45	6	4x4	0.45	0.45	9	0.52	0.52	9	0.54	0.54	8	4x4	0.87	0.87	9	6.5	72	72
	6x6	0.29	0.29	9	0.45	0.45	6	48"	0.45	0.45	9	0.52	0.52	9	0.54	0.54	8	48"	0.87	0.87	9	6.5	72	72
	6x6	0.29	0.29	9	0.45	0.45	6	3x5	0.45	0.45	9	0.52	0.52	9	0.54	0.54	8	3x5	0.87	0.87	9	6.5	72	72
	8x8	0.52	0.52	9	0.51	0.51	8	3x3	0.61	0.61	12	0.91	0.91	9	0.70	0.70	10	3x3	0.85	0.85	12	8.5	96	72
	8x8	0.52	0.52	9	0.51	0.51	8	4x4	0.70	0.70	12	0.87	0.87	9	0.70	0.70	10	4x4	1.01	1.01	12	8.5	96	72
	8x8	0.52	0.52	9	0.51	0.51	8	48"	0.70	0.70	12	0.87	0.87	9	0.70	0.70	10	48"	1.01	1.01	12	8.5	96	72
	8x8	0.52	0.52	9	0.51	0.51	8	3x5	0.70	0.85	12	0.87	0.87	9	0.70	0.70	10	3x5	1.01	1.01	12	8.5	96	72

** Unless otherwise indicated.

FABRICATION NOTES:
1. Maximum spacing of reinforcement is 8".
2. At manufacturer's option, provide cast or cored holes or thin wall panels (KO) to the maximum diameter shown for each. When no penetration is required, it is acceptable to provide a wall with no sectional reduction.

GENERAL NOTES:
1. Precast Junction Box consists of base slab, base unit, risers (as required), and below grade slab. See sheet PJB for details.
2. Precast Base consists of base slab, base unit, risers (as required), reducing slab (as required), and reduced risers (as required). See sheet PB for details.
3. Min Height shown is for stock base units. Use stock base units whenever practical. Smaller height base units can be used in special installation circumstances, when noted elsewhere in the plans. Absolute minimum height of base units is 2'-6".

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

DESIGN DATA FOR PRECAST BASE AND JUNCTION BOX

PDD

FILE: prestd10-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0579	02	014	FM 512
	DIST	COUNTY		SHEET NO.
	PARIS	HUNT		146

DATE: 5/24/2023 6:20:52 PM
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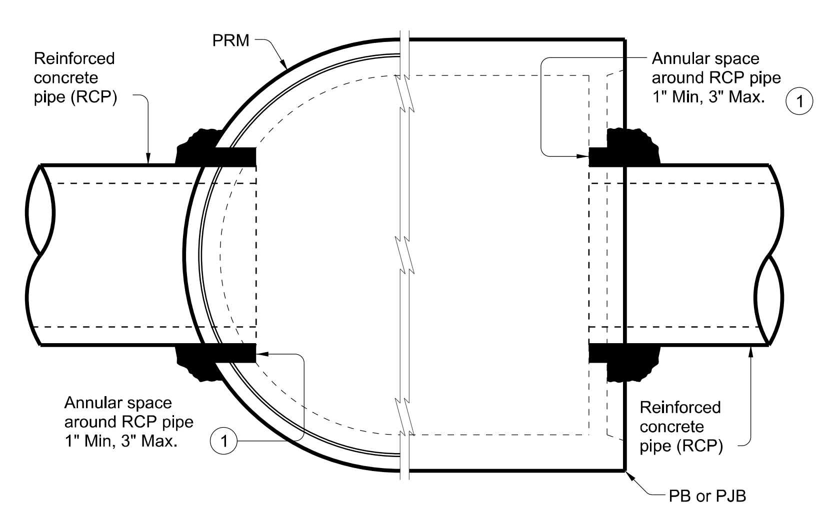
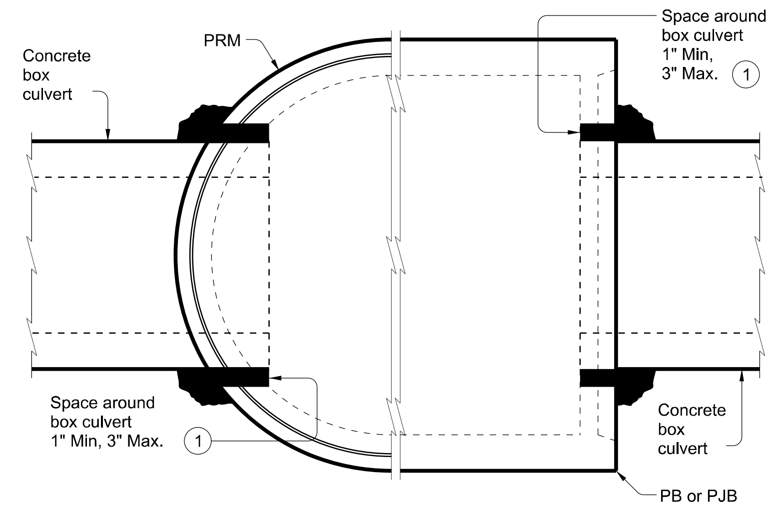


PRECAST ROUND MANHOLE (PRM) WITH THROUGH-HOLE

PRECAST BASE (PB) OR PRECAST JUNCTION BOX (PJB) WITH THIN-WALL KNOCK-OUT

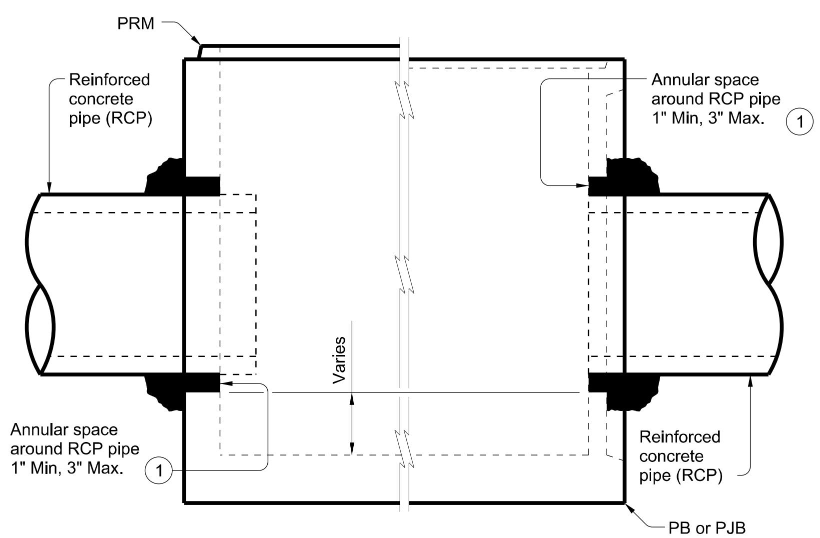
TYPICAL HALF PLAN



PRECAST ROUND MANHOLE (PRM) WITH THROUGH-HOLE

PRECAST BASE (PB) OR PRECAST JUNCTION BOX (PJB) WITH THIN-WALL KNOCK-OUT

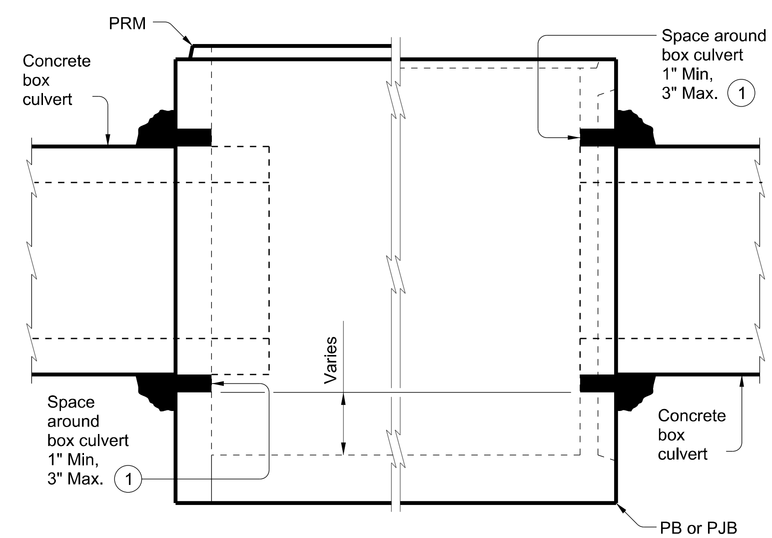
TYPICAL HALF PLAN



PRECAST ROUND MANHOLE (PRM) WITH THROUGH-HOLE

PRECAST BASE (PB) OR PRECAST JUNCTION BOX (PJB) WITH THIN-WALL KNOCK-OUT

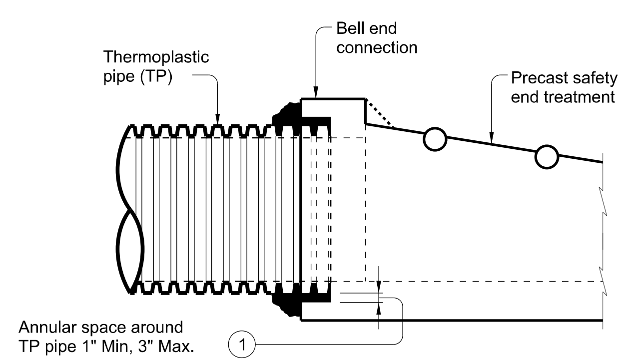
TYPICAL HALF ELEVATION



PRECAST ROUND MANHOLE (PRM) WITH THROUGH-HOLE

PRECAST BASE (PB) OR PRECAST JUNCTION BOX (PJB) WITH THIN-WALL KNOCK-OUT

TYPICAL HALF ELEVATION



TYPICAL PARTIAL ELEVATION OF PRECAST SAFETY END TREATMENTS

Showing square PSET for parallel drainage, cross drainage shown similar.

(1) Completely fill the void between the precast structure and the connecting pipe or box with cementitious grouts and mortars in accordance with DMS-4675 "Cementitious Grouts and Mortars for Miscellaneous Application".

CONSTRUCTION NOTES:

Do not grout rubber gasket joints without Manufacturer's recommendations.

Do not use bricks, masonry blocks, native stone, or similar materials in conjunction with grouted connections when filling void spaces around pipes or box culverts.

MATERIAL NOTES:

Provide grouted connections in accordance with DMS-4675 "Cementitious Grouts and Mortars for Miscellaneous Application".

GENERAL NOTES:

See applicable standards for notes and details not shown:
- Precast Base (PB)
- Precast Junction Box (PJB)
- Precast Round Manhole (PRM)
- Precast Safety End Treatments C/D Square (PSET-SC)
- Precast Safety End Treatments P/D Square (PSET-SP)

Provide Concrete Box Culverts in accordance with Item 462 "Concrete Box Culverts and Drains".

Provide Reinforced Concrete Pipe (RCP) in accordance with Item 464 "Reinforced Concrete Pipe".

Provide Thermoplastic Pipe (TP) in accordance with Special Specification Thermoplastic Pipe.

Payment for grouted connections is considered subsidiary to other bid Items.

Texas Department of Transportation

Bridge Division Standard

PIPE AND BOX GROUTED CONNECTIONS FOR PRECAST STRUCTURES

PBGC

FILE: pbgcstd1-20.dgn	DN: TxDOT	CK: TAR	DW: JTR	CK: TAR
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0579	02	014	FM 512
	DIST		COUNTY	SHEET NO.
	PARIS		HUNT	147

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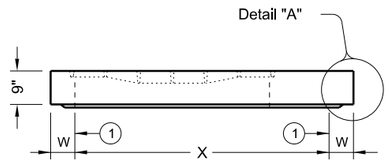
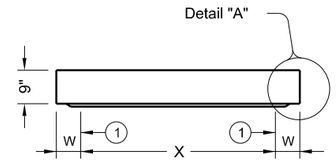
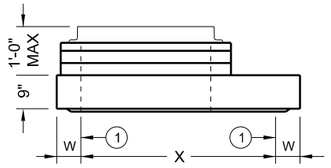


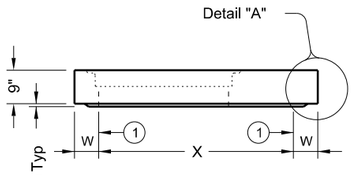
STYLE 'FG'



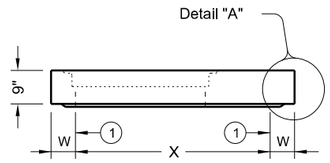
ELEVATION VIEW



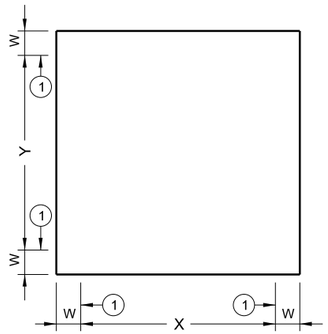
ELEVATION VIEW



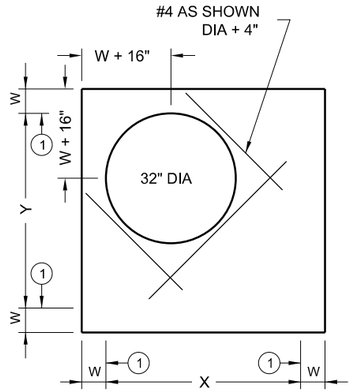
ELEVATION VIEW



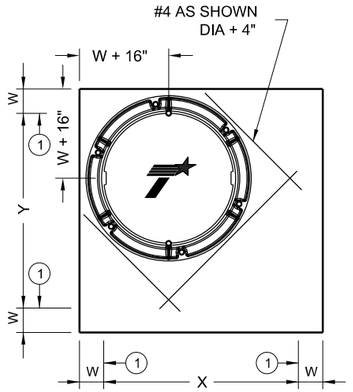
ELEVATION VIEW



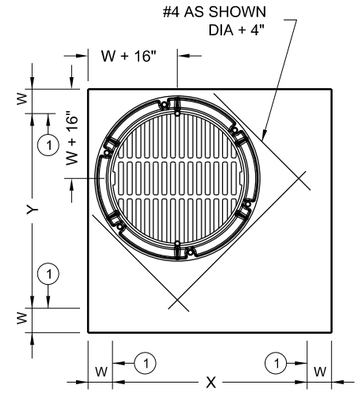
PLAN VIEW
NO OPENINGS
STYLE 'SL'



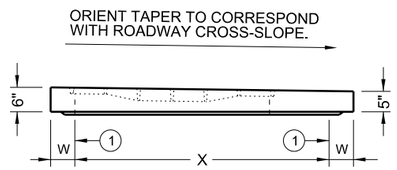
PLAN VIEW
SHIP LOOSE RING & COVER
STYLE 'RH'



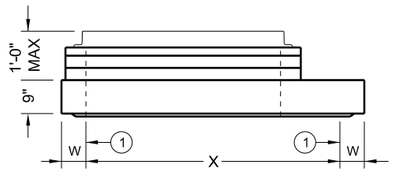
PLAN VIEW
32" DIA CAST-IN RING & COVER
STYLE 'RC'



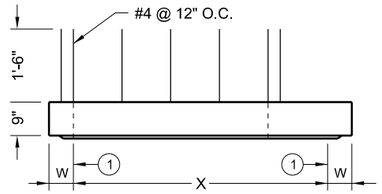
PLAN VIEW
32" DIA CAST-IN RING & GRATE
STYLE 'RG'



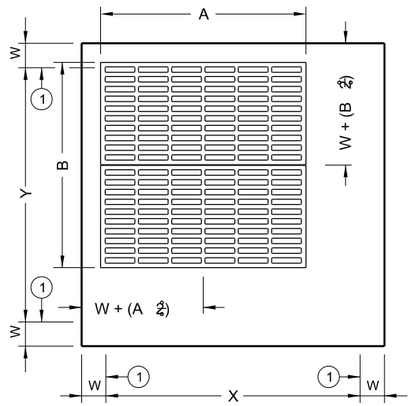
STYLE 'SFG'
ELEVATION VIEW



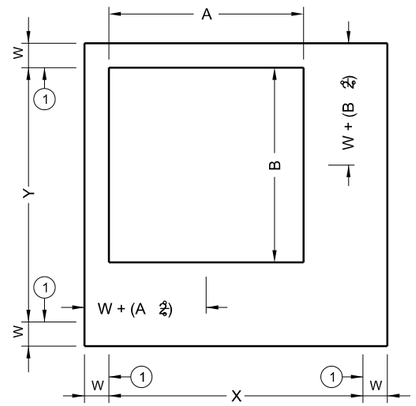
ELEVATION VIEW



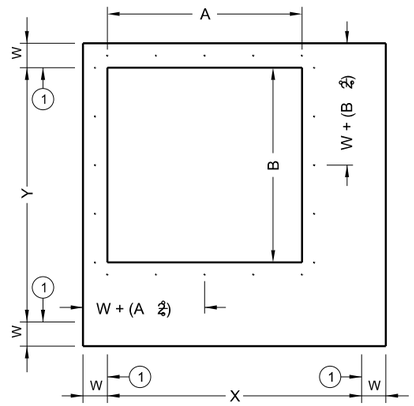
ELEVATION VIEW



PLAN VIEW
CAST-IN FRAME & GRATE
STYLES 'FG' & 'SFG'



PLAN VIEW
SHIP LOOSE FRAME & GRATE
STYLE 'SH'



PLAN VIEW
EXPOSED REBAR
STYLE 'S1'

(1) Matches inside face of wall of precast base or riser below inlet.

HL93 LOADING SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

PRECAST SLAB LID

PSL

FILE: prestd05-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0579	02	014	FM 512
	DIST	COUNTY		SHEET NO.
	PARIS	HUNT		148

DATE: 5/24/2023 6:20:53 PM
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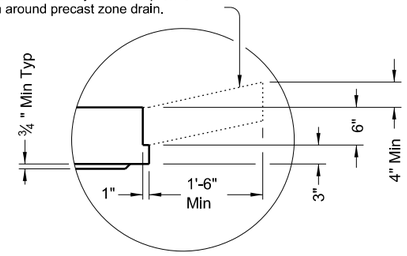
Style	Size (X x Y)	W (2)	A x B (nominal)	Short Span Reinf Steel Area	Long Span Reinf Steel Area
SL	3'x3'	6"	n/a	0.37 in□/ft	0.37 in□/ft
RH,RC,RG,SH,S1,FG	3'x3'	6"	3'x3' or 32" Dia	0.37 in□/ft	0.37 in□/ft
SFG	3'x3'	6"	3'x3'	0.32 in□/ft	0.32 in□/ft
SL	4'x4'	6"	n/a	0.34 in□/ft	0.34 in□/ft
RH,RC,RG,SH,S1,FG	4'x4'	6"	3'x3' or 32" Dia	0.41 in□/ft	0.41 in□/ft
SH,S1,FG	4'x4'	6"	4'x4'	0.41 in□/ft	0.41 in□/ft
SFG	4'x4'	6"	4'x4'	0.32 in□/ft	0.32 in□/ft
SL	3'x5'	6"	n/a	0.39 in□/ft	0.39 in□/ft
RH,RC,RG,SH,S1,FG	3'x5'	6"	3'x3' or 32" Dia	0.48 in□/ft	0.48 in□/ft
SH,S1,FG	3'x5'	6"	3'x5'	0.48 in□/ft	0.48 in□/ft
SFG	3'x5'	6"	3'x5'	0.32 in□/ft	0.32 in□/ft
SL	4'x5'	6"	n/a	0.42 in□/ft	0.42 in□/ft
RH,RC,RG,SH,S1,FG	4'x5'	6"	3'x3' or 32" Dia	0.42 in□/ft	0.42 in□/ft
SH,S1,FG	4'x5'	6"	4'x4'	0.63 in□/ft	0.63 in□/ft
SH,S1,FG	4'x5'	6"	3'x5'	0.66 in□/ft	0.66 in□/ft
SL	5'x5'	6"	n/a	0.36 in□/ft	0.36 in□/ft
RH,RC,RG,SH,S1,FG	5'x5'	6"	3'x3' or 32" Dia	0.43 in□/ft	0.43 in□/ft
SH,S1,FG	5'x5'	6"	4'x4'	0.63 in□/ft	0.63 in□/ft
SH,S1,FG	5'x5'	6"	3'x5'	0.63 in□/ft	0.63 in□/ft
SL	5'x6'	6"/8"	n/a	0.48 in□/ft	0.48 in□/ft
RH,RC,RG,SH,S1,FG	5'x6'	6"/8"	3'x3' or 32" Dia	0.48 in□/ft	0.48 in□/ft
SH,S1,FG	5'x6'	6"/8"	4'x4'	0.60 in□/ft	0.60 in□/ft
SH,S1,FG	5'x6'	6"/8"	3'x5'	0.60 in□/ft	0.60 in□/ft
SL	6'x6'	6"/8"	n/a	0.43 in□/ft	0.43 in□/ft
RH,RC,RG,SH,S1,FG	6'x6'	6"/8"	3'x3' or 32" Dia	0.56 in□/ft	0.56 in□/ft
SH,S1,FG	6'x6'	6"/8"	4'x4'	0.56 in□/ft	0.56 in□/ft
SH,S1,FG	6'x6'	6"/8"	3'x5'	0.59 in□/ft	0.59 in□/ft
SL	8'x8'	8"/10"	n/a	0.45 in□/ft	0.45 in□/ft
RH,RC,RG,SH,S1,FG	8'x8'	8"/10"	3'x3' or 32" Dia	0.45 in□/ft	0.45 in□/ft
SH,S1,FG	8'x8'	8"/10"	4'x4'	0.45 in□/ft	0.45 in□/ft
SH,S1,FG	8'x8'	8"/10"	3'x5'	0.45 in□/ft	0.45 in□/ft

(2) See sheet PDD for corresponding wall thickness (W) of base unit or riser.

Construct cast-in-place reinforced concrete apron, when shown elsewhere in plans. Use Class "A" concrete. Apron is subsidiary to PSL. Apron is 1'-6" Min width around precast zone drain.



DETAIL "A"

(Reinforcing not shown for clarity)

When an apron is to be cast around PSL, use detail above to create an apron ledge on all 4 sides.

FABRICATION NOTES:

1. Locate penetration (Style 'RH'), ring and cover (Style 'RC'), ring and grate (Style 'RG'), and frame and grate (Style 'FG') in a corner. Only one penetration is allowed per slab lid.
2. Provide Class "H" concrete in accordance with Item 421 and having a minimum compressive strength of 5,000 psi.
3. Provide Grade 60 reinforcing steel or equivalent area of WWR.
4. Provide clear cover of ¾" to reinforcing from lower outside shoulder of slab for structural reinforcement, and 2" from top of slab for shrinkage and temperature reinforcement. Place short span reinforcing closest to surface.
5. Slabs with a thickness of 8" or greater require shrinkage and temperature reinforcing. Provide steel area = 0.11 in²/ft each way.
6. No substitution is allowed for diagonal #4 bars around openings.
7. Design tongue and groove joints for full closure on both shoulders. Minimum spigot depth is ¾".
8. Provide lifting devices in conformance with Manufacturer's recommendations.

INSTALLATION NOTES:

1. Precast slab lids are intended for direct traffic and may be placed in roadway.
2. Seal tongue and groove joints with preformed or bulk mastic in conformance with Manufacturer's recommendations. Tongue and groove joints may be grouted no more than 1" between each section, or ½ the joint depth, whichever is greater.
3. Do not grout rubber gasket joints without Manufacturer's recommendation.
4. Initial installation of grade adjustment rings for Styles 'RH' and 'SH' is limited to 1'-0" Max as shown.
5. Grade adjustment rings for Styles 'RH' and 'SH' may be increased to 2'-0" Max when future construction affects final grade of structure. Make adjustments greater than 2'-0" with additional risers. Adjustments can be made up to Max depth shown on sheet PDD. Structure must be evaluated if Max depth will be exceeded.
6. Orient long dimension of grate slots perpendicular to traffic, unless noted otherwise on plans

GENERAL NOTES:

1. Designed according to ASTM C913.
2. Payment for lid is per Item 465, "Junction Boxes, Manholes, and Inlets" by type, style, size, and opening size (when applicable).

Cover dimensions are clear dimensions, unless noted otherwise.

HL93 LOADING SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

PRECAST SLAB LID

PSL

FILE: prestd05-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0579	02	014	FM 512
	DIST	COUNTY		SHEET NO.
	PARIS	HUNT		149

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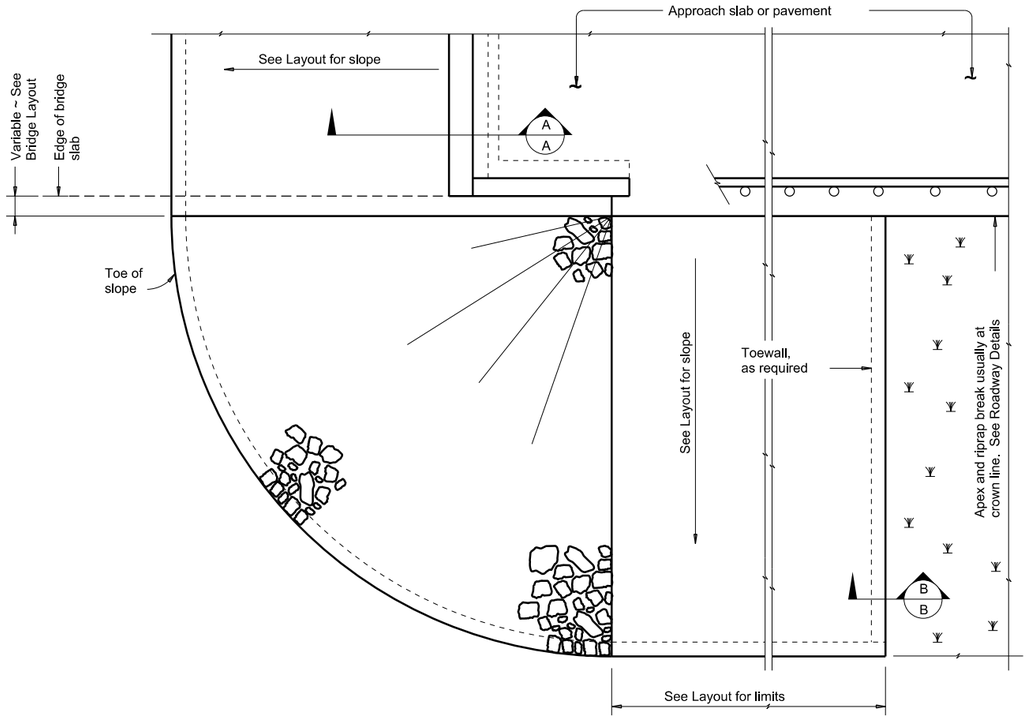
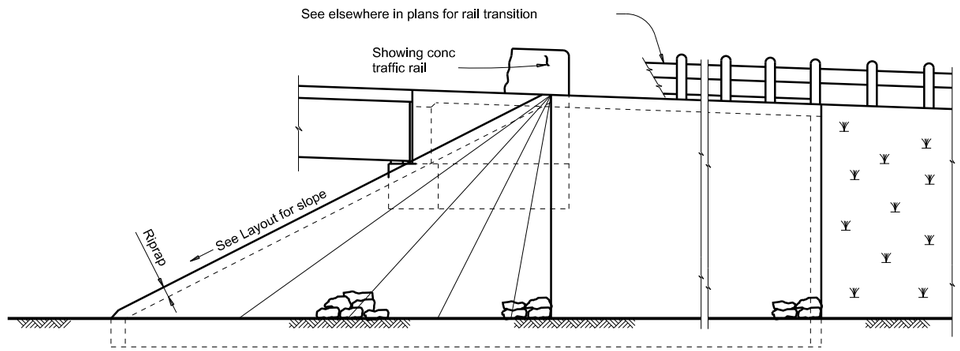
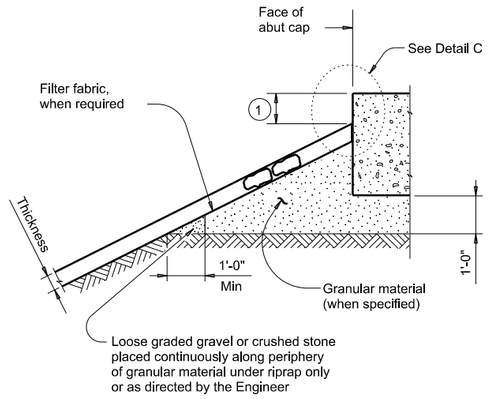


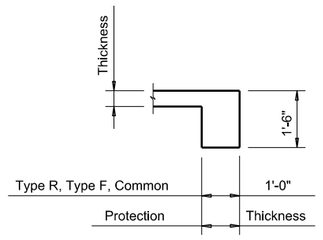
PLAN



ELEVATION

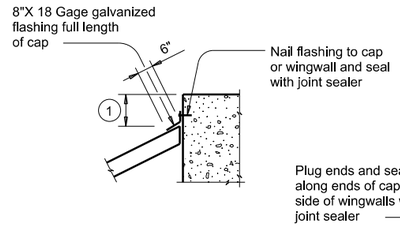


SECTION A-A AT CAP

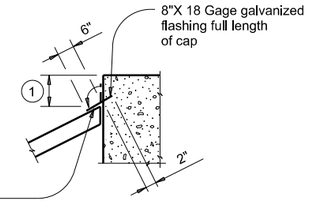


SECTION B-B

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

(1) Top of cap to top of riprap dimension varies as directed by the Engineer. Provide 9" Min for beam/slab type bridges and 1'-6" for slab span, box beam, or slab beam bridges.

GENERAL NOTES:
Refer to Item 432, "Riprap" for stone size and gradation, and construction details. See Layout for limits and thickness of riprap specified.
See elsewhere in plans for locations and details of shoulder drains.

Texas Department of Transportation

Bridge Division Standard

STONE RIPRAP

SRR

FILE: srrstde1-19.dgn	DN: AES	CK: JGD	DW: BWH	CK: AES
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0579	02	014	FM 512
	DIST	COUNTY		SHEET NO.
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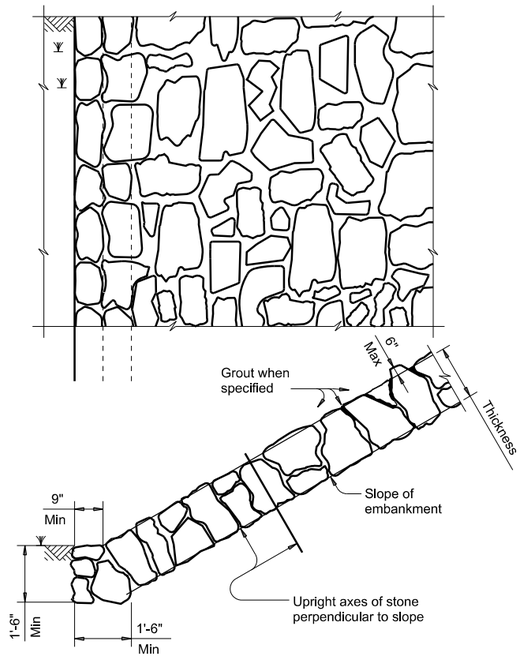


FIGURE 1 ~ TYPE R STONE RIPRAP

dry or grouted

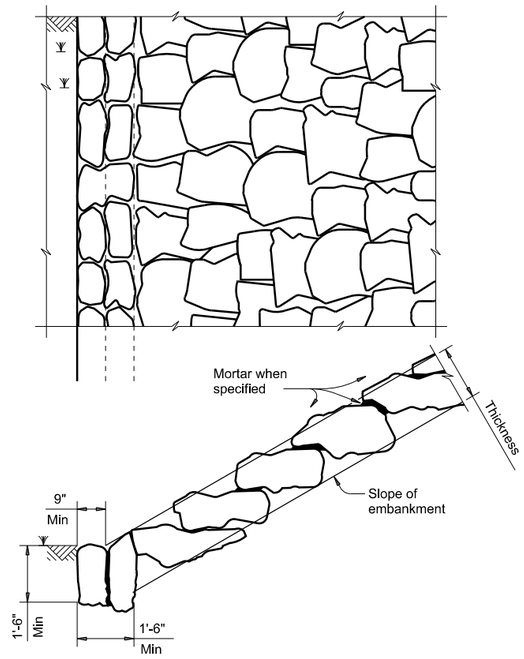


FIGURE 2 ~ TYPE F STONE RIPRAP

dry or mortared

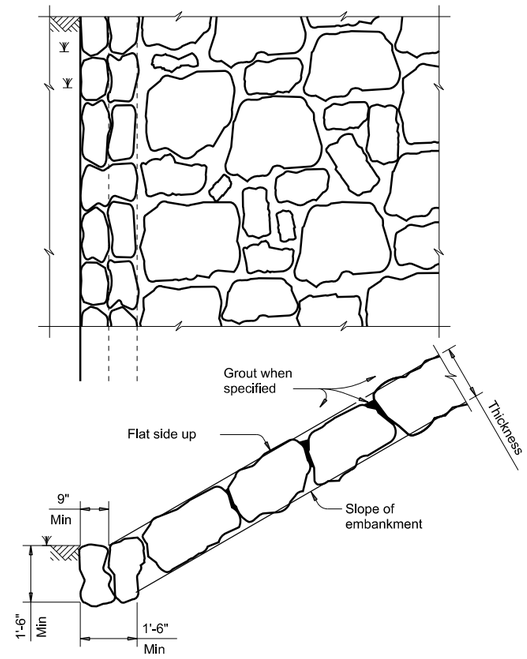


FIGURE 3 ~ TYPE F STONE RIPRAP

grouted

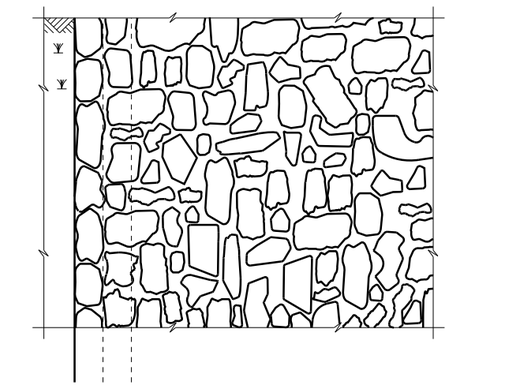


FIGURE 4 ~ COMMON STONE RIPRAP

dry or grouted

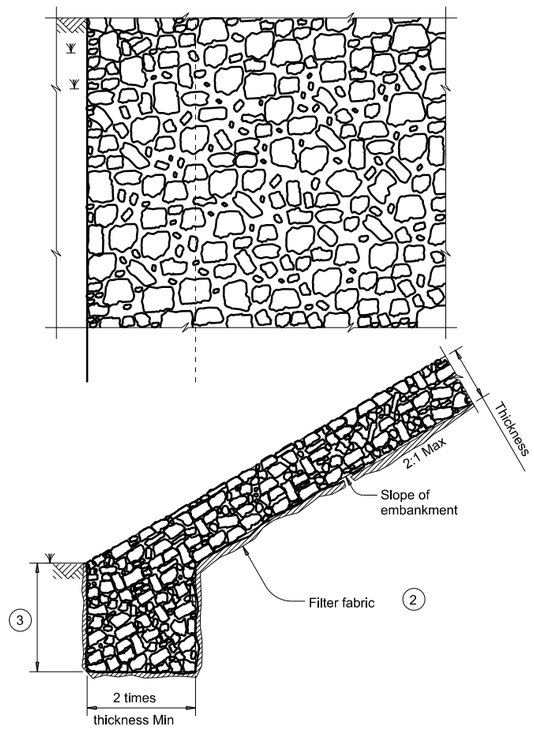


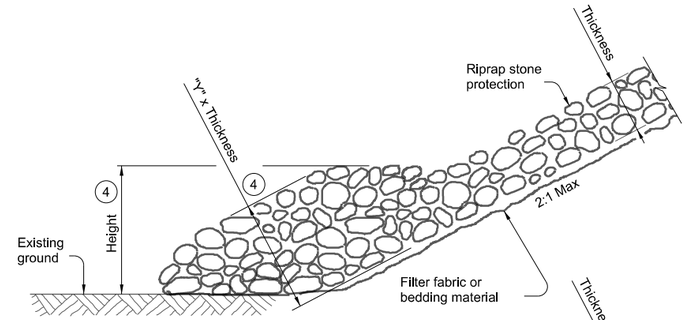
FIGURE 5 ~ PROTECTION STONE RIPRAP 5

2 Provide bedding material instead of filter fabric if shown elsewhere in plans. See Layout for thickness of bedding material.

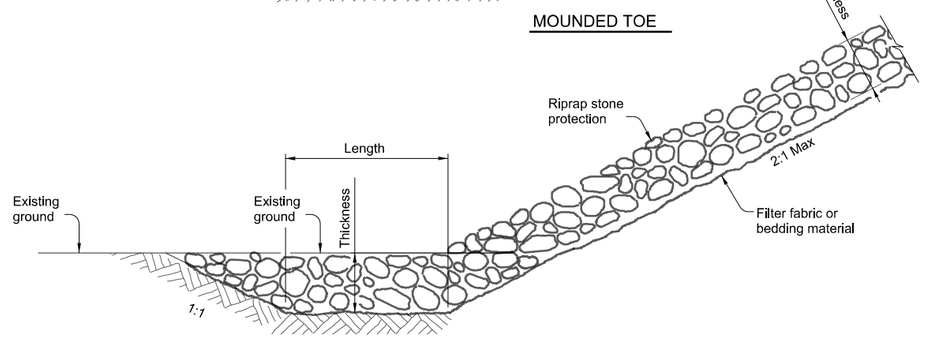
3 Minimum toe depth is the larger of the maximum scour depth or 2 times the riprap thickness.

4 "Y" and Height need to be defined. See layout or detail sheet for values if this option is used.

5 List Stone Protection as size (XX inch) and thickness (YY inch) on the layout.
Example: Riprap (Stone Protection) XX inch, Thickness = YY inch.



MOUNDED TOE



EXTENDED ROCK FILLED TRENCH

PROTECTION STONE RIPRAP TOE OPTIONS 5

SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

STONE RIPRAP

SRR

FILE: srrstde1-19.dgn	DN: AES		CK: JGD	DW: BWH		CK: AES	
©TxDOT April 2019	CONT	SECT	JOB		HIGHWAY		
REVISIONS	0579	02	014		FM 512		
	DIST	COUNTY			SHEET NO.		
	PARIS	HUNT			151		

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SUBMITTAL

PLAN SHEET NO.	SIGN NO.	SIGN	REMOVE
1	1	SOUTH/TEXAS 34/ARROW UP/NORTH/TEXAS 34/ARROW RIGHT	X
1	2	WEIGHT/LIMIT/GROSS/58420/LBS	X
1	3	STOP	X
1	4	SOUTH/FARM ROAD 512/224	X
1	5	ARROW UP GREENVILLE/HONEY GROVE ARROW RIGHT	X
1	6	STOP	X
1	7	ARROW RIGHT (SYMBOL)/20 MPH	X
1	8	STOP	X
1	9	E CROCKETT ST/S GREENVILLE ST/STOP	X
1	10	SPEED LIMIT 35	X
1	11	CHEVRON/CHEVRON	X
1	12	CHEVRON/CHEVRON	X
1	13	STOP	X
1	14	ARROW RIGHT/ARROW LEFT	X
1	15	CHEVRON/CHEVRON	X
1	16	CHEVRON/CHEVRON	X
1	17	ABERFOYLE 7/COMMERCE 18	X
1	18	JCT/TEXAS 37	X
1	19	ARROW LEFT(SYMBOL)/20 MPH	X
2	1	SPEED LIMIT 55	X
2	2	SPEED LIMIT 35	X
3	1	WOLFE CITY/CITY LIMIT/POP 1412	X
3	2	SPEED LIMIT 55	X
3	3	SPEED LIMIT 50	X
3	4	SPEED LIMIT 50 AHEAD (SYMBOL)	X
4	1	CO RD/4817/ARROW RIGHT	X
4	2	HUNT COUNTY/4817/STOP	X
4	3	MULTIPLE CURVE LEFT (SYMBOL)/40 MPH	X
4	4	CO RD/4817/ARROW LEFT	X

PLAN SHEET NO.	SIGN NO.	SIGN	REMOVE
5	1	CHEVRON/CHEVRON	X
5	2	CHEVRON/CHEVRON	X
5	3	CHEVRON/CHEVRON	X
5	4	CHEVRON/CHEVRON	X
5	5	CHEVRON/CHEVRON	X
5	6	CHEVRON/CHEVRON	X
5	7	CHEVRON/CHEVRON	X
5	8	CHEVRON/CHEVRON	X
5	9	CHEVRON/CHEVRON	X
5	10	CHEVRON/CHEVRON	X
5	11	CHEVRON/CHEVRON	X
5	12	CHEVRON/CHEVRON	X
5	13	CHEVRON/CHEVRON	X
5	14	CHEVRON/CHEVRON	X
5	15	CO RD/4719/ARROW LEFT	X
5	16	CHEVRON/CHEVRON	X
5	17	CHEVRON/CHEVRON	X
5	18	CHEVRON/CHEVRON	X
5	19	CHEVRON/CHEVRON	X
5	20	HUNT COUNTY/4719/STOP	X
6	1	CHEVRON/CHEVRON	X
6	2	CHEVRON/CHEVRON	X
6	3	CHEVRON/CHEVRON	X
6	4	CHEVRON/CHEVRON	X
6	5	CO RD/4719/ARROW RIGHT	X
6	6	CHEVRON/CHEVRON	X
6	7	CHEVRON/CHEVRON	X
6	8	CHEVRON/CHEVRON	X
6	9	FARM ROAD 512/226	X
6	10	MULTIPLE CURVE LEFT (SYMBOL)/40 MPH	X
8	1	HUNTY COUNTY 4816	
8	2	STOP	X
8	3	CO RD/4816/ARROW LEFT	X
9	1	CURVE LEFT (SYMBOL)/45 MPH	X

PAGE TOTAL: 63

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Texas Department of Transportation

FM 512

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SHEET 1 OF 4

			HIGHWAY NO.
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STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	PARIS	HUNT	152
CONTROL	SECTION	JOB	
0579	02	014	

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SUBMITTAL

PLAN SHEET NO.	SIGN NO.	SIGN	REMOVE
10	1	CHEVRON/CHEVRON	X
10	2	BRIDGE/MAY ICE IN/COLD/WEATHER	X
10	3	CHEVRON/CHEVRON	X
10	4	CHEVRON/CHEVRON	X
10	5	CHEVRON/CHEVRON	X
10	6	CHEVRON/CHEVRON	X
10	7	TURKEY/CREEK	X
10	8	CHEVRON/CHEVRON	X
10	9	CHEVRON/CHEVRON	X
10	10	CHEVRON/CHEVRON	X
10	11	CHEVRON/CHEVRON	X
10	12	CHEVRON/CHEVRON	X
11	1	CURVE RIGHT (SYMBOL)/45 MPH	X
11	2	CURVE RIGHT (SYMBOL)/45 MPH	X
11	3	FARM ROAD 512/228	X
11	4	PASS WITH CARE	X
12	1	CURVE LEFT (SYMBOL)/50 MPH	X
12	2	CURVE LEFT (SYMBOL)/50 MPH	X
12	3	CO RD/4727/ARROW RIGHT	X
12	4	HUNT COUNTY/4727/STOP	X
12	5	PASS WITH CARE	X
12	6	CO RD/4727/ARROW LEFT	X
12	7	DO NOT PASS	X
13	1	CURVE RIGHT (SYMBOL)/50 MPH	X
13	2	DOUBLE CURVE RIGHT (SYMBOL)/40 MPH	X
13	3	DO NOT PASS	X
13	4	CO RD/4722/ARROW LEFT	X
13	5	BUS STOP AHEAD	X
13	6	HUNT COUNTY/4722/STOP	X
13	7	CHEVRON/CHEVRON	X
13	8	PASS WITH CARE	X
13	9	CHEVRON/CHEVRON	X
13	10	CHEVRON/CHEVRON	X
13	11	CHEVRON/CHEVRON	X
13	12	CHEVRON/CHEVRON	X
13	13	CHEVRON/CHEVRON	X
13	14	CHEVRON/CHEVRON	X

PLAN SHEET NO.	SIGN NO.	SIGN	REMOVE
14	1	CHEVRON/CHEVRON	X
14	2	ADOPT A/HIGHWAY/NEXT 2 MILES/ABERFOYLE/BAPTIST/CHURCH	X
14	3	CHEVRON/CHEVRON	X
14	4	CHEVRON/CHEVRON	X
14	5	CHEVRON/CHEVRON	X
14	6	DOUBLE CURVE RIGHT SYMBOL)/40 MPH	X
14	7	DOUBLE CURVE RIGHT SYMBOL)/40 MPH	X
14	8	CHEVRON/CHEVRON	X
14	9	CHEVRON/CHEVRON	X
14	10	CHEVRON/CHEVRON	X
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15	4	CHEVRON/CHEVRON	X
15	5	CHEVRON/CHEVRON	X
15	6	CHEVRON/CHEVRON	X
15	7	CHEVRON/CHEVRON	X
15	8	CHEVRON/CHEVRON	X
15	9	CHEVRON/CHEVRON	X
15	10	CHEVRON/CHEVRON	X
15	11	PASS WITH CARE	X
15	12	SPEED LIMIT 55	X
15	13	ABERFOYLE	X
16	1	DOUBLE CURVE RIGHT (SYMBOL)/40 MPH	X
16	2	DO NOT PASS	X
16	3	DOUBLE CURVE RIGHT (SYMBOL)/50 MPH	X
16	4	DO NOT PASS	X
16	5	GARDNER LN/STOP	X
16	6	PASS WITH CARE	X
PAGE TOTAL: 70			

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SHEET 2 OF 4

			HIGHWAY NO.
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STATE	DISTRICT	COUNTY	SHEET NO.
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CONTROL	SECTION	JOB	
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17	2	HUNT COUNTY/4617/STOP	X
17	3	HUNT COUNTY/4502/STOP	X
17	4	CO RD/ARROW LEFT 4502/4617 ARROW RIGHT	X
17	5	ARROW RIGHT (SYMBOL)/35 MPH	X
17	6	DOUBLE CURVE LEFT (SYMBOL)/50 MPH	X
17	7	CHEVRON/CHEVRON	X
17	8	CHEVRON/CHEVRON	X
17	9	CHEVRON/CHEVRON	X
17	10	CHEVRON/CHEVRON	X
17	11	CHEVRON/CHEVRON	X
17	12	CHEVRON/CHEVRON	X
17	13	CHEVRON/CHEVRON	X
18	1	CHEVRON/CHEVRON	X
18	2	PASS WITH CARE	X
18	3	CHEVRON/CHEVRON	X
18	4	CHEVRON/CHEVRON	X
18	5	DO NOT PASS	X
18	6	ARROW LEFT (SYMBOL)/30 MPH	X
18	7	DO NOT PASS	X
18	8	JCT/FARM ROAD 512	X
19	1	CHEVRON/CHEVRON	X
19	2	PASS WITH CARE	X
19	3	CHEVRON/CHEVRON	X
19	4	CHEVRON/CHEVRON	X
19	5	SPEED LIMIT 55	X
19	6	CHEVRON/CHEVRON	X
19	7	CHEVRON/CHEVRON	X
19	8	CHEVRON/CHEVRON	X
19	9	ARROW UP FAIRLIE/SOUTH SULPHER ARROW RIGHT	X
20	1	FARM ROAD 512	X
20	2	CHEVRON/CHEVRON	X
20	3	ADOPT A/HIGHWAY/NEXT 2 MILES/ABERFOYLE/BAPTIST/CHURCH	X
20	4	DO NOT PASS	X
20	5	EAST/FARM ROAD 2655/ARROW UP/SOUTH/FARM ROAD 512/ARROW RIGHT	X
20	6	ARROW RIGHT (SYMBOL)/30 MPH	X
20	7	ARROW LEFT RIGHT	X
20	8	NORTH/FARM ROAD 512/ARROW LEFT/EAST/FARM ROAD 2655/ARROW RIGHT	X
20	9	STOP	X
20	10	YIELD	X

PLAN SHEET NO.	SIGN NO.	SIGN	REMOVE
21	1	DO NOT PASS	X
21	2	FARM ROAD 512	X
21	3	SPEED LIMIT 55	X
21	4	STOP AHEAD (SYMBOL)	X
21	5	PASS WITH CARE	X
21	6	JCT/FARM ROAD 2655	X
21	7	DO NOT PASS	X
22	1	ARROW LEFT (SYMBOL)/35 MPH	X
22	2	DO NOT PASS	X
22	3	CHEVRON/CHEVRON	X
22	4	CO RD/4600/ARROW RIGHT	X
22	5	PASS WITH CARE	X
22	6	CHEVRON/CHEVRON	X
22	7	ARROW LEFT/CHEVRON	X
22	8	CHEVRON/CHEVRON	X
22	9	HUNT COUNTY/4600/STOP	X
22	10	WESLEY CHAPEL/CEMETERY/ARROW LEFT/WESLEY CHAPEL/CEMETERY/ARROW RIGHT	X
22	11	CHEVRON/ARROW LEFT	X
22	12	PASS WITH CARE	X
22	13	CHEVRON/CHEVRON	X
22	14	CHEVRON/CHEVRON	X
22	15	CO RD/4600/ARROW LEFT	X
22	16	WEIGHT/LIMIT/GROSS/58420/LBS	X
22	17	WEIGHT/LIMIT/GROSS/58420/LBS	X
22	18	ARROW RIGHT (SYMBOL)/35 MPH	X
23	1	DO NOT PASS	X
23	2	DO NOT PASS	X
23	3	ARROW RIGHT (SYMBOL)/30 MPH	X
23	4	FARM ROAD 512/232	X
23	5	CO RD/4601/ARROW LEFT	X
23	6	CHEVRON/CHEVRON	X
23	7	CHEVRON/CHEVRON	X
23	8	PASS WITH CARE	X
23	9	CHEVRON/CHEVRON	X
23	10	ARROW LEFT/CHEVRON	X
23	11	HUNT COUNTY/4601/STOP	X
23	12	CHEVRON/ARROW LEFT	X
23	13	PASS WITH CARE	X
23	14	CHEVRON/CHEVRON	X
23	15	DO NOT PASS	X

PAGE TOTAL: 80

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SHEET 3 OF 4

			HIGHWAY NO
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TEXAS	PARIS	HUNT	154
CONTROL	SECTION	JOB	
0579	02	014	

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PLAN SHEET NO.	SIGN NO.	SIGN	REMOVE
23	16	ARROW LEFT (SYMBOL)/30 MPH	X
24	1	ARROW RIGHT (SYMBOL)/40 MPH	X
24	2	DO NOT PASS	X
24	3	BRIDGE/MAY ICE IN/COLD/WEATHER	X
24	4	CHEVRON/CHEVRON	X
24	5	PASS WITH CARE	X
24	6	CHEVRON/CHEVRON	X
24	7	CHEVRON/CHEVRON	X
24	8	CHEVRON/CHEVRON	X
24	9	CHEVRON/CHEVRON	X
24	10	SCHOOL/BUS STOP/AHEAD	X
24	11	ARROW LEFT (SYMBOL)/40 MPH	X
24	12	DO NOT PASS	X
24	13	DO NOT PASS	X
25	1	BRIDGE/MAY ICE IN/COLD/WEATHER	X
25	2	SOUTH SULPHER	X
26	1	MULTIPLE CURVE LEFT (SYMBOL)/35 MPH	X
26	2	DO NOT PASS	X
26	3	CO RD/4507/ARROW LEFT	X
26	4	CHEVRON/CHEVRON	X
26	5	CHEVRON/CHEVRON	X
26	6	HUNT COUNTY/4507/STOP	X
26	7	CHEVRON/CHEVRON	X
26	8	JCT/FARM ROAD 118	X
26	9	CHEVRON/CHEVRON	X
26	10	PASS WITH CARE	X
26	11	CHEVRON/CHEVRON	X
26	12	CO RD/4507/ARROW RIGHT	X
26	13	CHEVRON/CHEVRON	X
26	14	CHEVRON/CHEVRON	X
26	15	CHEVRON/CHEVRON	X
26	16	CHEVRON/CHEVRON	X
27	1	SPEED LIMIT 55	X
27	2	CHEVRON/CHEVRON	X
27	3	CHEVRON/CHEVRON	X
27	4	NORTH/FARM ROAD 512	X
27	5	CHEVRON/CHEVRON	X
27	6	CHEVRON/CHEVRON	X
27	7	CHEVRON/CHEVRON	X
27	8	CHEVRON/CHEVRON	X
27	9	SOUTH/FARM ROAD 512/ARROW UP/SOUTH/FARM ROAD 118/ARROW RIGHT	X
27	10	ARROW LEFT RIGHT	X
27	11	STOP/CROSS TRAFFIC/DOES NOT STOP	X
PAGE TOTAL: 43			
PROJECT TOTALS: 256			

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EXISTING SMALL SIGN INVENTORY

SHEET 4 OF 4

			HIGHWAY NO.
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TEXAS	PARIS	HUNT	155
CONTROL	SECTION	JOB	
0579	02	014	

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SUMMARY OF SMALL SIGNS

STATION	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	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=Universal Conc, UB=Universal Bolt, SA=Slipbase-Conc, SB=Slipbase-Bolt, WS=Wedge Steel, WP=Wedge Plastic)	MOUNTING DESIGNATION: PREFABRICATED (P = "Plain", T = "T", U = "U")	MOUNTING DESIGNATION: 1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE (TY N, TY S)
0+63 LT	1	M3-3	SOUTH	24 x 12	X		S80	1	SA	U		
		M1-6T	TEXAS 34	24 x 24								
		M6-3	ARROW UP	21 x 15								
		M3-1	NORTH	24 x 12								
		M1-6T	TEXAS 34	24 x 24								
		M6-1R	ARROW RIGHT	21 x 15								
3+18 RT	2	R12-1T	WEIGHT/LIMIT/GROSS/58420/LBS	24 x 36	X		10BWG	1	SA	P		
3+51 LT	3	R1-1	STOP	30 x 30	X		10BWG	1	SA	P		
5+98 RT	4	M3-3	SOUTH	24 x 12	X		10BWG	1	SA	P		
		M1-6F	FARM ROAD 512	24 x 24								
		D10-7aT	224	3 x 10								
7+23 LT	5	D1-2	ARROW UP/GREENVILLE/HONEY GROVE/ARROW RIGHT	108 x 30	X		S80	1	SA	U	WC	
7+30 LT	6	R1-1	STOP	30 x 30	X		10BWG	1	SA	P		
8+72 RT	7	R1-1	STOP	30 x 30	X		10BWG	1	SA	P		
9+40 LT	8	*	E/CROCKETTT/ST		X		10BWG	1	SA	P		
		*	S/GREENVILLE/ST									
		R1-1	STOP	30 x 30								
9+66 RT	9	R2-1	SPEED LIMIT 35	30 x 36	X		10BWG	1	SA	P		
10+32 RT	10	W1-1R	RIGHT TURN (SYMBOL)	36 x 36	X		10BWG	1	SA	P		
		W13-1P	XX MPH	18 x 18								
11+32 LT	11	W1-8R	CHEVRON RIGHT	18 x 24	X		10BWG	1	SA	P		
		W1-8L	CHEVRON LEFT	18 x 24								
11+70 LT	12	W1-8R	CHEVRON RIGHT	18 x 24	X		10BWG	1	SA	P		
		W1-8L	CHEVRON LEFT	18 x 24								
11+96 LT	13	R1-1	STOP	30 x 30	X		10BWG	1	SA	P		
12+30 LT	14	W1-6R	ARROW RIGHT	36 x 18	X		10BWG	1	SA	U		
		W1-6L	ARROW LEFT	36 x 18								
12+47 LT	15	W1-8R	CHEVRON RIGHT	18 x 24	X		10BWG	1	SA	P		
		W1-8L	CHEVRON LEFT	18 x 24								
12+87 LT	16	W1-8R	CHEVRON RIGHT	18 x 24	X		10BWG	1	SA	P		
		W1-8L	CHEVRON LEFT	18 x 24								
14+10 RT	17	W1-1L	LEFT TURN (SYMBOL)	36 x 36	X		10BWG	1	SA	P		
		W13-1P	XX MPH	18 x 18								
15+13 RT	18	D2-2	ABERFOYLE 7/COMMERCE 18	90 x 30	X		S80	1	SA	U	WC	
17+12 LT	19	M2-1	JCT	21 x 15	X		10BWG	1	SA	P		
		M1-6T	TEXAS 34	24 x 24								
21+62 RT	20	R1-1	STOP	30 x 30	X		10BWG	1	SA	P		
21+77 RT	21	R2-1	SPEED LIMIT 50	30 x 36	X		10BWG	1	SA	P		
21+79 LT	22	R2-1	SPEED LIMIT 35	30 x 36	X		10BWG	1	SA	P		

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STATE OF TEXAS
PAUL A. WARDEN
101319
LICENSED
PROFESSIONAL ENGINEER
Paul A. Warden, P.E. 5/24/2023

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
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Texas Department of Transportation — Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0579	02	014	FM 512
4-16	DIST	COUNTY		SHEET NO.
8-16	PARIS	HUNT		156

TB

SUMMARY OF SMALL SIGNS

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39+52 RT	23	R2-1	SPEED LIMIT 55	30 x 36	X		10BWG	1	SA	P		
39+52 LT	24	I-2aT	WOLFE CITY/CITY LIMIT/POP 1390	60 x 24	X		10BWG	1	SA	T		
39+55 LT	25	R2-1	SPEED LIMIT 50	30 x 36	X		10BWG	1	SA	P		
42+50 LT	26	W3-5	SPEED LIMIT 50 AHEAD (SYMBOL)	36 x 36	X		10BWG	1	SA	P		
68+91 RT	27	D20-1TR	CO RD/4817/ARROW RIGHT	24 x 24	X		10BWG	1	SA	P		
71+44 RT	28	*	HUNT/COUNTY/4817		X		10BWG	1	SA	P		
		R1-1	STOP	30 x 30								
73+31 LT	29	D20-1TL	CO RD/4817/ARROW LEFT	24 x 24	X		10BWG	1	SA	P		
78+15 RT	30	W1-5L	S-CURVE LEFT (SYMBOL)	36 x 36	X		10BWG	1	SA	P		
		W13-1P	XX MPH	18 x 18								
79+44 RT	31	W1-8L	CHEVRON LEFT	18 x 24	X		10BWG	1	SA	P		
		W1-8R	CHEVRON RIGHT	18 x 24								
80+72 RT	32	W1-8L	CHEVRON LEFT	18 x 24	X		10BWG	1	SA	P		
		W1-8R	CHEVRON RIGHT	18 x 24								
81+87 RT	33	W1-8L	CHEVRON LEFT	18 x 24	X		10BWG	1	SA	P		
		W1-8R	CHEVRON RIGHT	18 x 24								
83+76 LT	34	W1-8R	CHEVRON RIGHT	18 x 24	X		10BWG	1	SA	P		
		W1-8L	CHEVRON LEFT	18 x 24								
84+67 LT	35	W1-8R	CHEVRON RIGHT	18 x 24	X		10BWG	1	SA	P		
		W1-8L	CHEVRON LEFT	18 x 24								
85+58 LT	36	W1-8R	CHEVRON RIGHT	18 x 24	X		10BWG	1	SA	P		
		W1-8L	CHEVRON LEFT	18 x 24								
86+50 LT	37	W1-8R	CHEVRON RIGHT	18 x 24	X		10BWG	1	SA	P		
		W1-8L	CHEVRON LEFT	18 x 24								
91+29 RT	38	W1-8L	CHEVRON LEFT	18 x 24	X		10BWG	1	SA	P		
		W1-8R	CHEVRON RIGHT	18 x 24								
92+33 RT	39	W1-8L	CHEVRON LEFT	18 x 24	X		10BWG	1	SA	P		
		W1-8R	CHEVRON RIGHT	18 x 24								
93+37 RT	40	W1-8L	CHEVRON LEFT	18 x 24	X		10BWG	1	SA	P		
		W1-8R	CHEVRON RIGHT	18 x 24								
94+38 RT	41	W1-8L	CHEVRON LEFT	18 x 24	X		10BWG	1	SA	P		
		W1-8R	CHEVRON RIGHT	18 x 24								
95+65 RT	42	W1-8L	CHEVRON LEFT	18 x 24	X		10BWG	1	SA	P		
		W1-8R	CHEVRON RIGHT	18 x 24								
96+40 RT	43	D20-1TL	CO RD/4719/ARROW LEFT	24 x 24	X		10BWG	1	SA	P		
98+28 LT	44	W1-8R	CHEVRON RIGHT	18 x 24	X		10BWG	1	SA	P		
		W1-8L	CHEVRON LEFT	18 x 24								

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PROFESSIONAL ENGINEER
STATE OF TEXAS
Paul A. Warden, P.E. 5/24/2023

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Square Feet	Minimum Thickness
Less than 7.5	0.080"
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Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0579	02	014	FM 512
4-16 8-16	DIST	COUNTY		SHEET NO.
	PARIS	HUNT		157

18

SUMMARY OF SMALL SIGNS

STATION	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	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=Universal Conc, UB=Universal Bolt, SA=Slipbase-Conc, SB=Slipbase-Bolt, WS=Wedge Steel, WP=Wedge Plastic	MOUNTING DESIGNATION: PREFABRICATED P = "Plain", T = "T", U = "U"	MOUNTING DESIGNATION: 1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE: TY N, TY S
98+47 LT	45	*	HUNT/COUNTY/4719		X		10BWG	1	SA	P		
		R1-1	STOP	30 x 30								
99+74 LT	46	W1-8R	CHEVRON RIGHT	18 x 24	X		10BWG	1	SA	P		
		W1-8L	CHEVRON LEFT	18 x 24								
100+80 LT	47	D20-1TR	CO RD/4719/ARROW RIGHT	24 x 24	X		10BWG	1	SA	P		
100+86 LT	48	W1-8R	CHEVRON RIGHT	18 x 24	X		10BWG	1	SA	P		
		W1-8L	CHEVRON LEFT	18 x 24								
101+98 LT	49	W1-8R	CHEVRON RIGHT	18 x 24	X		10BWG	1	SA	P		
		W1-8L	CHEVRON LEFT	18 x 24								
103+10 LT	50	W1-8R	CHEVRON RIGHT	18 x 24	X		10BWG	1	SA	P		
		W1-8L	CHEVRON LEFT	18 x 24								
104+37 LT	51	M1-6F	FARM ROAD 512	24 x 24	X		10BWG	1	SA	P		
		D10-7aT	226	3 x 10								
105+40 LT	52	W1-5L	S-CURVE LEFT (SYMBOL)	36 x 36	X		10BWG	1	SA	P		
		W13-1P	XX MPH	18 x 18								
148+61 RT	53	D20-1TR	CO RD/4816/ARROW RIGHT	24 x 24	X		10BWG	1	SA	P		
150+90 RT	54	*	HUNT/COUNTY/4816		X		10BWG	1	SA	P		
		R1-1	STOP	30 x 30								
152+81 LT	55	D20-1TL	CO RD/4816/ARROW LEFT	24 x 24	X		10BWG	1	SA	P		
176+20 RT	56	W1-2L	CURVE LEFT (SYMBOL)	36 x 36	X		10BWG	1	SA	P		
		W13-1P	XX MPH	18 x 18								
183+00 RT	57	W1-8L	CHEVRON LEFT	18 x 24	X		10BWG	1	SA	P		
		W1-8R	CHEVRON RIGHT	18 x 24								
184+55 RT	58	W1-8L	CHEVRON LEFT	18 x 24	X		10BWG	1	SA	P		
		W1-8R	CHEVRON RIGHT	18 x 24								
184+98 RT	59	W8-13aT	BRIDGE/MAY ICE IN/COLD/WEATHER	36 x 36	X		10BWG	1	SA	P		
186+10 RT	60	W1-8L	CHEVRON LEFT	18 x 24	X		10BWG	1	SA	P		
		W1-8R	CHEVRON RIGHT	18 x 24								
187+65 RT	61	W1-8L	CHEVRON LEFT	18 x 24	X		10BWG	1	SA	P		
		W1-8R	CHEVRON RIGHT	18 x 24								
189+20 RT	62	W1-8L	CHEVRON LEFT	18 x 24	X		10BWG	1	SA	P		
		W1-8R	CHEVRON RIGHT	18 x 24								
190+05 LT	63	I-3	TURKEY/CREEK	18 x VAR	X		10BWG	1	SA	P		
190+75 RT	64	W1-8L	CHEVRON LEFT	18 x 24	X		10BWG	1	SA	P		
		W1-8R	CHEVRON RIGHT	18 x 24								
192+30 RT	65	W1-8L	CHEVRON LEFT	18 x 24	X		10BWG	1	SA	P		
		W1-8R	CHEVRON RIGHT	18 x 24								
193+85 RT	66	W1-8L	CHEVRON LEFT	18 x 24	X		10BWG	1	SA	P		
		W1-8R	CHEVRON RIGHT	18 x 24								

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STATE OF TEXAS
Paul A. Warden, P.E. 5/24/2023

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Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

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©TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0579	02	014	FM 512
4-16	DIST	COUNTY		SHEET NO.
8-16	PARIS	HUNT		158

SUMMARY OF SMALL SIGNS

STATION	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	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=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic)	MOUNTING DESIGNATION PREFABRICATED (P = "Plain" T = "T" U = "U")	MOUNTING DESIGNATION 1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE (TY N TY S)
194+11 LT	67	W8-13aT	BRIDGE/MAY ICE IN/COLD/WEATHER	36 x 36	X		10BWG	1	SA	P		
195+40 RT	68	W1-8L	CHEVRON LEFT	18 x 24	X		10BWG	1	SA	P		
		W1-8R	CHEVRON RIGHT	18 x 24								
197+00 RT	69	W1-8L	CHEVRON LEFT	18 x 24	X		10BWG	1	SA	P		
		W1-8R	CHEVRON RIGHT	18 x 24								
199+25 LT	70	W1-2R	CURVE RIGHT (SYMBOL)	36 x 36	X		10BWG	1	SA	P		
		W13-1P	XX MPH	18 x 18								
211+41 RT	71	M1-6F	FARM ROAD 512	24 x 24	X		10BWG	1	SA	P		
		D10-7aT	228	3 x 10								
214+00 RT	72	W1-2R	CURVE RIGHT (SYMBOL)	36 x 36	X		10BWG	1	SA	P		
		W13-1P	XX MPH	18 x 18								
217+34 LT	73	R4-2	PASS WITH CARE	18 x 24	X		10BWG	1	SA	P		
218+50 LT	74	W1-2L	CURVE LEFT (SYMBOL)	36 x 36	X		10BWG	1	SA	P		
		W13-1P	XX MPH	18 x 18								
229+25 RT	75	W1-2L	CURVE LEFT (SYMBOL)	36 x 36	X		10BWG	1	SA	P		
		W13-1P	XX MPH	18 x 18								
229+43 RT	76	D20-1TR	CO RD/4727/ARROW RIGHT	24 x 24	X		10BWG	1	SA	P		
231+80 RT	77	*	HUNT/COUNTY/4727		X		10BWG	1	SA	P		
		R1-1	STOP	30 x 30								
232+13 RT	78	R4-2	PASS WITH CARE	18 x 24	X		10BWG	1	SA	P		
233+20 LT	79	W1-2R	CURVE RIGHT (SYMBOL)	36 x 36	X		10BWG	1	SA	P		
		W13-1P	XX MPH	18 x 18								
233+65 LT	80	D20-1TL	CO RD/4727/ARROW LEFT	24 x 24	X		10BWG	1	SA	P		
238+56 LT	81	R4-1	DO NOT PASS	18 x 24	X		10BWG	1	SA	P		
240+20 RT	82	R4-1	DO NOT PASS	18 x 24	X		10BWG	1	SA	P		
244+32 LT	83	S3-1T	SCHOOL BUS STOP AHEAD	36 x 36	X		10BWG	1	SA	P		
242+74 RT	84	D20-1TL	CO RD/4722/ARROW LEFT	24 x 24	X		10BWG	1	SA	P		
246+86 LT	85	*	HUNT/COUNTY/4722		X		10BWG	1	SA	P		
		R1-1	STOP	30 x 30								
247+00 RT	86	W1-4R	DOUBLE-CURVE RIGHT (SYMBOL)	36 x 36	X		10BWG	1	SA	P		
		W13-1P	XX MPH	18 x 18								
249+02 LT	87	W1-8R	CHEVRON RIGHT	18 x 24	X		10BWG	1	SA	P		
		W1-8L	CHEVRON LEFT	18 x 24								
249+16 LT	88	D20-1TR	CO RD/4722/ARROW RIGHT	24 x 24	X		10BWG	1	SA	P		
249+26 LT	89	R4-2	PASS WITH CARE	18 x 24	X		10BWG	1	SA	P		

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250+12 LT	90	W1-8R	CHEVRON RIGHT	18 x 24	X		10BWG	1	SA	P		
		W1-8L	CHEVRON LEFT	18 x 24								
251+22 LT	91	W1-8R	CHEVRON RIGHT	18 x 24	X		10BWG	1	SA	P		
		W1-8L	CHEVRON LEFT	18 x 24								
252+32 LT	92	W1-8R	CHEVRON RIGHT	18 x 24	X		10BWG	1	SA	P		
		W1-8L	CHEVRON LEFT	18 x 24								
253+42 LT	93	W1-8R	CHEVRON RIGHT	18 x 24	X		10BWG	1	SA	P		
		W1-8L	CHEVRON LEFT	18 x 24								
259+47 RT	94	W1-8L	CHEVRON LEFT	18 x 24	X		10BWG	1	SA	P		
		W1-8R	CHEVRON RIGHT	18 x 24								
260+56 RT	95	W1-8L	CHEVRON LEFT	18 x 24	X		10BWG	1	SA	P		
		W1-8R	CHEVRON RIGHT	18 x 24								
260+85 RT	96	D14-4T	ADOPT A HIGHWAY NEXT 2 MILES	48 x 48	X		10BWG	1	SA	P		
			ABERFOYLE BAPTIST CHURCH									
261+68 RT	97	W1-8L	CHEVRON LEFT	18 x 24	X		10BWG	1	SA	P		
		W1-8R	CHEVRON RIGHT	18 x 24								
262+74 RT	98	W1-8L	CHEVRON LEFT	18 x 24	X		10BWG	1	SA	P		
		W1-8R	CHEVRON RIGHT	18 x 24								
263+84 RT	99	W1-8L	CHEVRON LEFT	18 x 24	X		10BWG	1	SA	P		
		W1-8R	CHEVRON RIGHT	18 x 24								
265+10 LT	100	W1-4R	DOUBLE-CURVE RIGHT (SYMBOL)	36 x 36	X		10BWG	1	SA	P		
		W13-1P	XX MPH	18 x 18								
269+05 RT	101	W1-4R	DOUBLE-CURVE RIGHT (SYMBOL)	36 x 36	X		10BWG	1	SA	P		
		W13-1P	XX MPH	18 x 18								
270+34 LT	102	W1-8R	CHEVRON RIGHT	18 x 24	X		10BWG	1	SA	P		
		W1-8L	CHEVRON LEFT	18 x 24								
271+47 LT	103	W1-8R	CHEVRON RIGHT	18 x 24	X		10BWG	1	SA	P		
		W1-8L	CHEVRON LEFT	18 x 24								
272+60 LT	104	W1-8R	CHEVRON RIGHT	18 x 24	X		10BWG	1	SA	P		
		W1-8L	CHEVRON LEFT	18 x 24								
273+73 LT	105	W1-8R	CHEVRON RIGHT	18 x 24	X		10BWG	1	SA	P		
		W1-8L	CHEVRON LEFT	18 x 24								
274+86 LT	106	W1-8R	CHEVRON RIGHT	18 x 24	X		10BWG	1	SA	P		
		W1-8L	CHEVRON LEFT	18 x 24								
275+99 LT	107	W1-8R	CHEVRON RIGHT	18 x 24	X		10BWG	1	SA	P		
		W1-8L	CHEVRON LEFT	18 x 24								
277+12 LT	108	W1-8R	CHEVRON RIGHT	18 x 24	X		10BWG	1	SA	P		
		W1-8L	CHEVRON LEFT	18 x 24								
278+25 LT	109	W1-8R	CHEVRON RIGHT	18 x 24	X		10BWG	1	SA	P		
		W1-8L	CHEVRON LEFT	18 x 24								

DATE: 5/24/2023
FILE: Z:\Transportation\TxDOT\PS&E\STATEWIDE 36-9IDP5101\WA2-TxDOT Paris\Project Data\FM 512 (0579-02-014)\CADD\DGN\08_TRAFFIC\sums16.dgn 6:20:56 PM

PAUL A. WARDEN
101319
LICENSED
PROFESSIONAL ENGINEER
STATE OF TEXAS
Paul A. Warden, P.E. 5/24/2023

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"

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Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0579	02	014	FM 512
4-16 8-16	DIST	COUNTY		SHEET NO.
	PARIS	HUNT		160

18

SUMMARY OF SMALL SIGNS

STATION	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	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=Universal Conc, UB=Universal Bolt, SA=Slipbase-Conc, SB=Slipbase-Bolt, WS=Wedge Steel, WP=Wedge Plastic	MOUNTING DESIGNATION: PREFABRICATED: P = "Plain", T = "T", U = "U"	MOUNTING DESIGNATION: 1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE: TY N, TY S
279+39 LT	110	W1-8R	CHEVRON RIGHT	18 x 24	X		10BWG	1	SA	P		
		W1-8L	CHEVRON LEFT	18 x 24								
284+56 RT	111	W1-8L	CHEVRON LEFT	18 x 24	X		10BWG	1	SA	P		
		W1-8R	CHEVRON RIGHT	18 x 24								
285+69 RT	112	W1-8L	CHEVRON LEFT	18 x 24	X		10BWG	1	SA	P		
		W1-8R	CHEVRON RIGHT	18 x 24								
286+82 RT	113	W1-8L	CHEVRON LEFT	18 x 24	X		10BWG	1	SA	P		
		W1-8R	CHEVRON RIGHT	18 x 24								
287+95 RT	114	W1-8L	CHEVRON LEFT	18 x 24	X		10BWG	1	SA	P		
		W1-8R	CHEVRON RIGHT	18 x 24								
289+10 RT	115	W1-8L	CHEVRON LEFT	18 x 24	X		10BWG	1	SA	P		
		W1-8R	CHEVRON RIGHT	18 x 24								
290+21 RT	116	W1-8L	CHEVRON LEFT	18 x 24	X		10BWG	1	SA	P		
		W1-8R	CHEVRON RIGHT	18 x 24								
291+34 RT	117	W1-8L	CHEVRON LEFT	18 x 24	X		10BWG	1	SA	P		
		W1-8R	CHEVRON RIGHT	18 x 24								
292+47 RT	118	W1-8L	CHEVRON LEFT	18 x 24	X		10BWG	1	SA	P		
		W1-8R	CHEVRON RIGHT	18 x 24								
293+61 RT	119	W1-8L	CHEVRON LEFT	18 x 24	X		10BWG	1	SA	P		
		W1-8R	CHEVRON RIGHT	18 x 24								
301+12 LT	120	W1-4R	DOUBLE-CURVE RIGHT (SYMBOL)	36 x 36	X		10BWG	1	SA	P		
		W13-1P	XX MPH	18 x 18								
295+96 RT	121	R4-2	PASS WITH CARE	18 x 24	X		10BWG	1	SA	P		
296+91 RT	122	R2-1	SPEED LIMIT 55	30 x 36	X		10BWG	1	SA	P		
298+81 RT	123	I-2cT	ABERFOYLE	60 x 12	X		10BWG	1	SA	T		
304+34 LT	124	R4-1	DO NOT PASS	18 x 24	X		10BWG	1	SA	P		
307+27 RT	125	R4-1	DO NOT PASS	18 x 24	X		10BWG	1	SA	P		
311+83 RT	126	D3-1	GARDNER LN	VAR x VAR	X		10BWG	1	SA	P		
		R1-1	STOP	30 x 30								
312+20 RT	127	W1-2R	CURVE RIGHT (SYMBOL)	36 x 36	X		10BWG	1	SA	P		
		W13-1P	XX MPH	18 x 18								
313+87 LT	128	R4-2	PASS WITH CARE	18 x 24	X		10BWG	1	SA	P		
316+10 LT	129	W1-2L	CURVE LEFT (SYMBOL)	36 x 36	X		10BWG	1	SA	P		
		W13-1P	XX MPH	18 x 18								
322+33 RT	130	D20-5T(L,R)	CO RD/4617/ARROW LEFT	24 x 42	X		10BWG	1	SA	P		
			4502/ARROW RIGHT									
323+00 RT	131	W1-2R	CURVE RIGHT (SYMBOL)	36 x 36	X		10BWG	1	SA	P		
		W13-1P	XX MPH	18 x 18								

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FILE: Z:\Transportation\TxDOT\PS&E\STATEWIDE 36-91DP5101\WA2-TxDOT Paris\Project Data\FM 512 (0579-02-014)\CADD\DGN\08_TRAFFIC\sums16.dgn 6:20:57 PM

STATE OF TEXAS
PAUL A. WARDEN
101319
LICENSED
PROFESSIONAL ENGINEER
Paul A. Warden, P.E. 5/24/2023

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
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Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0579	02	014	FM 512
4-16	DIST	COUNTY		SHEET NO.
8-16	PARIS	HUNT		161

SUMMARY OF SMALL SIGNS

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

STATION	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE TY N TY S
323+80 LT	132	W1-8R	CHEVRON RIGHT	18 x 24	X		10BWG	1	SA	P		
		W1-8L	CHEVRON LEFT	18 x 24								
324+16 LT	133	*	HUNT/COUNTY/4617		X		10BWG	1	SA	P		
		R1-1	STOP	30 x 30								
324+76 RT	134	*	HUNT/COUNTY/4502		X		10BWG	1	SA	P		
		R1-1	STOP	30 x 30								
325+31 LT	135	W1-8R	CHEVRON RIGHT	18 x 24	X		10BWG	1	SA	P		
		W1-8L	CHEVRON LEFT	18 x 24								
326+51 LT	136	W1-8R	CHEVRON RIGHT	18 x 24	X		10BWG	1	SA	P		
		W1-8L	CHEVRON LEFT	18 x 24								
326+61 LT	137	D20-5T(L,R)	CO RD/4502/ARROW LEFT	24 x 42	X		10BWG	1	SA	P		
			4617/ARROW RIGHT									
327+80 LT	138	W1-2L	CURVE LEFT (SYMBOL)	36 x 36	X		10BWG	1	SA	P		
		W13-1P	XX MPH	18 x 18								
332+65 RT	139	W1-1R	RIGHT TURN (SYMBOL)	36 x 36	X		10BWG	1	SA	P		
		W13-1P	XX MPH	18 x 18								
334+17 LT	140	W1-8R	CHEVRON RIGHT	18 x 24	X		10BWG	1	SA	P		
		W1-8L	CHEVRON LEFT	18 x 24								
335+17 LT	141	W1-8R	CHEVRON RIGHT	18 x 24	X		10BWG	1	SA	P		
		W1-8L	CHEVRON LEFT	18 x 24								
336+17 LT	142	W1-8R	CHEVRON RIGHT	18 x 24	X		10BWG	1	SA	P		
		W1-8L	CHEVRON LEFT	18 x 24								
337+00 LT	143	W1-8R	CHEVRON RIGHT	18 x 24	X		10BWG	1	SA	P		
		W1-8L	CHEVRON LEFT	18 x 24								
338+17 LT	144	W1-8R	CHEVRON RIGHT	18 x 24	X		10BWG	1	SA	P		
		W1-8L	CHEVRON LEFT	18 x 24								
339+17 LT	145	W1-8R	CHEVRON RIGHT	18 x 24	X		10BWG	1	SA	P		
		W1-8L	CHEVRON LEFT	18 x 24								
339+19 RT	146	R4-2	PASS WITH CARE	18 x 24	X		10BWG	1	SA	P		
341+20 LT	147	W1-2L	LEFT TURN (SYMBOL)	36 x 36	X		10BWG	1	SA	P		
		W13-1P	XX MPH	18 x 18								
343+95 LT	148	R4-1	DO NOT PASS	18 x 24	X		10BWG	1	SA	P		
349+09 LT	149	I-2cT	ABERFOYLE	60 x 12	X		10BWG	1	SA	T		
356+80 RT	150	R4-1	DO NOT PASS	18 x 24	X		10BWG	1	SA	P		
358+38 RT	151	M2-1	JCT	21 x 15	X		10BWG	1	SA	P		
		M1-6F	FARM ROAD 2653	24 x 24								
361+76 RT	152	W1-2L	LEFT TURN (SYMBOL)	36 x 36	X		10BWG	1	SA	P		
		W13-1P	XX MPH	18 x 18								

DATE: 5/24/2023
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PAUL A. WARDEN
101319
LICENSED
PROFESSIONAL ENGINEER
STATE OF TEXAS
Paul A. Warden, P.E. 5/24/2023

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
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* Existing city/county road topper signs installed on new stop sign post. Subsidary to item 644.

SHEET 7 OF 12

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0579	02	014	FM 512
4-16 8-16	DIST	COUNTY		SHEET NO.
	PARIS	HUNT		162

SUMMARY OF SMALL SIGNS

STATION	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	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=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION: PREFABRICATED P = "Plain" T = "T" U = "U"	1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE TY N TY S
363+07 RT	153	M3-3	SOUTH	24 x 12	X		10BWG	1	SA	P		
		M1-6F	FARM ROAD 512	24 x 24								
		M5-1R	ARROW RIGHT	21 x 15								
363+54 LT	154	R4-2	PASS WITH CARE	18 x 24	X		10BWG	1	SA	P		
363+76 RT	155	W1-8L	CHEVRON LEFT	18 x 24	X		10BWG	1	SA	P		
		W1-8R	CHEVRON RIGHT	18 x 24								
364+53 RT	156	W1-8L	CHEVRON LEFT	18 x 24	X		10BWG	1	SA	P		
		W1-8R	CHEVRON RIGHT	18 x 24								
365+30 RT	157	W1-8L	CHEVRON LEFT	18 x 24	X		10BWG	1	SA	P		
		W1-8R	CHEVRON RIGHT	18 x 24								
366+07 RT	158	W1-8L	CHEVRON LEFT	18 x 24	X		10BWG	1	SA	P		
		W1-8R	CHEVRON RIGHT	18 x 24								
366+84 RT	159	W1-8L	CHEVRON LEFT	18 x 24	X		10BWG	1	SA	P		
		W1-8R	CHEVRON RIGHT	18 x 24								
367+61 RT	160	W1-8L	CHEVRON LEFT	18 x 24	X		10BWG	1	SA	P		
		W1-8R	CHEVRON RIGHT	18 x 24								
368+00 RT	161	D1-2	ARROW UP FARLIE/SOUTH SULPHER ARROW RIGHT	114 x 30	X		S80	1	SA	U	WC	
368+38 RT	162	W1-8L	CHEVRON LEFT	18 x 24	X		10BWG	1	SA	P		
		W1-8R	CHEVRON RIGHT	18 x 24								
368+92 LT	163	R2-1	SPEED LIMIT 55	30 x 36	X		10BWG	1	SA	P		
369+17 RT	164	W1-8L	CHEVRON LEFT	18 x 24	X		10BWG	1	SA	P		
		W1-8R	CHEVRON RIGHT	18 x 24								
371+17 LT	165	W1-1R	RIGHT TURN (SYMBOL)	36 x 36	X		10BWG	1	SA	P		
		W13-1P	XX MPH	18 x 18								
371+31 LT	166	D14-4T	ADOPT A HIGHWAY NEXT 2 MILES	48 x 48	X		10BWG	1	SA	P		
			ABERFOYLE BAPTIST CHURCH									
372+17 LT	167	M1-6F	FARM ROAD 512	24 x 24	X		10BWG	1	SA	P		
372+91 LT	168	R4-1	DO NOT PASS	18 x 24	X		10BWG	1	SA	P		
374+40 RT	169	M3-2	EAST	24 x 12	X		S80	1	SA	U		
		M1-6F	FARM ROAD 2655	24 x 24								
		M6-3	ARROW UP	21 x 15								
		M3-3	SOUTH	24 x 12								
		M1-6F	FARM ROAD 512	24 x 24								
		M6-1R	ARROW RIGHT	21 x 15								
374+92 LT	170	W1-7T	ARROW LEFT-RIGHT	96 x 36	X		S80	1	SA	U	WC	
374+99 LT	171	M3-1	NORTH	24 x 12	X		S80	1	SA	U		
		M1-6F	FARM ROAD 512	24 x 24								
		M6-1L	ARROW LEFT	21 x 15								
		M3-2	EAST	24 x 12								
		M1-6F	FARM ROAD 2655	24 x 24								
		M6-1R	ARROW RIGHT	21 x 15								

DATE: 5/24/2023
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PAUL A. WARDEN 101319 LICENSED PROFESSIONAL ENGINEER
Paul A. Warden, P.E. 5/24/2023

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
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Texas Department of Transportation | Traffic Operations Division Standard

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SOSS

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-16 8-16	0579	02	014	FM 512
	DIST	COUNTY		SHEET NO.
	PARIS	HUNT		163

18

SUMMARY OF SMALL SIGNS

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

STATION	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE TY N TY S
375+19 LT	172	R1-1	STOP	36 x 36	X		10BWG	1	SA	P		
		W4-4P	CROSS TRAFFIC/DOES NOT STOP	24 x 12								
375+46 LT	173	R1-2	YIELD	36 x 36 x 36	X		10BWG	1	SA	P		
378+00 RT	174	M1-6F	FARM ROAD 512	24 x 24	X		10BWG	1	SA	P		
379+25 RT	175	R4-1	DO NOT PASS	18 x 24	X		10BWG	1	SA	P		
381+25 RT	176	R2-1	SPEED LIMIT 55	30 x 36	X		10BWG	1	SA	P		
382+63 LT	177	D1-2	ARROW LEFT ABERFOYLE/FARLIE ARROW RIGHT	90 x 30	X		S80	1	SA	U	WC	
385+10 LT	178	W3-1	STOP AHEAD (SYMBOL)	36 x 36	X		10BWG	1	SA	P		
386+18 RT	179	R4-2	PASS WITH CARE	18 x 24	X		10BWG	1	SA	P		
388+30 LT	180	M3-1	NORTH	24 x 12	X		10BWG	1	SA	P		
		M1-6F	FARM ROAD 512	24 x 24								
		M5-1L	ARROW LEFT	21 x 15								
391+48 LT	181	M2-1	JCT	21 x 15	X		10BWG	1	SA	P		
		M1-6F	FARM ROAD 2653	24 x 24								
395+24 LT	182	R4-1	DO NOT PASS	18 x 24	X		10BWG	1	SA	P		
402+54 RT	183	R4-1	DO NOT PASS	18 x 24	X		10BWG	1	SA	P		
405+40 RT	184	W1-1R	LEFT TURN (SYMBOL)	36 x 36	X		10BWG	1	SA	P		
		W13-1P	XX MPH	18 x 18								
406+82 LT	185	R4-2	PASS WITH CARE	18 x 24	X		10BWG	1	SA	P		
407+42 RT	186	W1-8L	CHEVRON LEFT	18 x 24	X		10BWG	1	SA	P		
		W1-8R	CHEVRON RIGHT	18 x 24								
408+13 RT	187	W1-8L	CHEVRON LEFT	18 x 24	X		10BWG	1	SA	P		
		W1-8R	CHEVRON RIGHT	18 x 24								
408+63 RT	188	D20-1TR	CO RD/4600/ARROW RIGHT	24 x 24	X		10BWG	1	SA	P		
408+84 RT	189	W1-8L	CHEVRON LEFT	18 x 24	X		10BWG	1	SA	P		
		W1-8R	CHEVRON RIGHT	18 x 24								
409+55 RT	190	W1-6L	ARROW LEFT	18 x 36	X		10BWG	1	SA	P		
		W1-8R	CHEVRON RIGHT	18 x 24								
410+26 RT	191	W1-8L	CHEVRON LEFT	18 x 24	X		10BWG	1	SA	P		
		W1-8R	CHEVRON RIGHT	18 x 24								
410+88 RT	192	*	HUNT/COUNTY/4600		X		10BWG	1	SA	P		
		R1-1	STOP	30 x 30								
411+02 LT	193	D3-3bTR	WESLEY CHAPEL/CEMETERY/ARROW RIGHT	78 x 36	X		S80	1	SA	U	WC	
		D3-3bTL	WESLEY CHAPEL/CEMETERY/ARROW LEFT	78 x 36								
411+10 RT	194	W1-8L	CHEVRON LEFT	18 x 24	X		10BWG	1	SA	P		
		W1-6R	ARROW RIGHT	18 x 36								

DATE: 5/24/2023
FILE: Z:\Transportation\TxDOT\PS&E\STATEWIDE 36-9IDP5101\WA2-TxDOT Paris\ProjectData\FM 512 (0579-02-014)\CADD\DGN\08_TRAFFIC\sums16.dgn 6:20:57 PM

PAUL A. WARDEN 101319 LICENSED PROFESSIONAL ENGINEER
Paul A. Warden, P.E. 5/24/2023

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"

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Texas Department of Transportation | Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0579	02	014	FM 512
4-16	DIST	COUNTY		SHEET NO.
8-16	PARIS	HUNT		164

18

SUMMARY OF SMALL SIGNS

STATION	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	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=Universal Conc, UB=Universal Bolt, SA=Slipbase-Conc, SB=Slipbase-Bolt, WS=Wedge Steel, WP=Wedge Plastic	MOUNTING DESIGNATION: PREFABRICATED P = "Plain", T = "T", U = "U"	MOUNTING DESIGNATION: 1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE: TY N, TY S
411+63 RT	195	R4-2	PASS WITH CARE	18 x 24	X		10BWG	1	SA	P		
411+76 RT	196	W1-8L	CHEVRON LEFT	18 x 36	X		10BWG	1	SA	P		
		W1-8R	CHEVRON RIGHT	18 x 24								
412+41 RT	197	W1-8L	CHEVRON LEFT	18 x 36	X		10BWG	1	SA	P		
		W1-8R	CHEVRON RIGHT	18 x 24								
413+00 LT	198	D20-1TL	CO RD/4600/ARROW LEFT	24 x 24	X		10BWG	1	SA	P		
414+45 LT	199	W1-1R	RIGHT TURN (SYMBOL)	36 x 36	X		10BWG	1	SA	P		
		W13-1P	XX MPH	18 x 18								
414+85 RT	200	R12-1T	WEIGHT/LIMIT/GROSS/58420/LBS	24 x 36	X		10BWG	1	SA	P		
416+99 LT	201	R12-1T	WEIGHT/LIMIT/GROSS/58420/LBS	24 x 36	X		10BWG	1	SA	P		
419+16 RT	202	R4-1	DO NOT PASS	18 x 24	X		10BWG	1	SA	P		
419+18 LT	203	R4-1	DO NOT PASS	18 x 24	X		10BWG	1	SA	P		
422+00 RT	204	W1-1R	RIGHT TURN (SYMBOL)	36 x 36	X		10BWG	1	SA	P		
		W13-1P	XX MPH	18 x 18								
423+01 RT	205	M1-6F	FARM ROAD 512	24 x 24	X		10BWG	1	SA	P		
		D10-7aT	232	3 x 10								
425+80 RT	206	D20-1TL	CO RD/4601/ARROW LEFT	24 x 24	X		10BWG	1	SA	P		
426+07 LT	207	W1-8R	CHEVRON RIGHT	18 x 24	X		10BWG	1	SA	P		
		W1-8L	CHEVRON LEFT	18 x 24								
426+19 LT	208	R4-2	PASS WITH CARE	18 x 24	X		10BWG	1	SA	P		
426+79 LT	209	W1-8R	CHEVRON RIGHT	18 x 24	X		10BWG	1	SA	P		
		W1-8L	CHEVRON LEFT	18 x 24								
427+51 LT	210	W1-8R	CHEVRON RIGHT	18 x 24	X		10BWG	1	SA	P		
		W1-8L	CHEVRON LEFT	18 x 24								
428+05 LT	211	*	HUNT/COUNTY/4601		X		10BWG	1	SA	P		
		R1-1	STOP	30 x 30								
428+37 LT	212	W1-8R	CHEVRON RIGHT	18 x 24	X		10BWG	1	SA	P		
		W1-8L	CHEVRON LEFT	18 x 24								
428+95 LT	213	W1-8R	CHEVRON RIGHT	18 x 24	X		10BWG	1	SA	P		
		W1-8L	CHEVRON LEFT	18 x 24								
429+66 LT	214	W1-8R	CHEVRON RIGHT	18 x 24	X		10BWG	1	SA	P		
		W1-8L	CHEVRON LEFT	18 x 24								
429+96 RT	215	R4-2	PASS WITH CARE	18 x 24	X		10BWG	1	SA	P		
430+67 LT	216	D20-1TR	CO RD/4601/ARROW RIGHT	24 x 24	X		10BWG	1	SA	P		
431+70 LT	217	W1-1L	LEFT TURN (SYMBOL)	36 x 36	X		10BWG	1	SA	P		
		W13-1P	XX MPH	18 x 18								

DATE: 5/24/2023
FILE: Z:\Transportation\TxDOT\PS&E\STATEWIDE 36-9IDP5101\WA2-TxDOT Paris\ProjectData\FM 512 (0579-02-014)\CADD\DGN\08_TRAFFIC\sums16.dgn 6:20:58 PM

PAUL A. WARDEN 101319 LICENSED PROFESSIONAL ENGINEER
Paul A. Warden, P.E. 5/24/2023

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.
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NOTE:

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* Existing city/county road topper signs installed on new stop sign post. Subsidary to item 644.

Texas Department of Transportation — Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0579	02	014	FM 512
4-16	DIST	COUNTY		SHEET NO.
8-16	PARIS	HUNT		165

18

SUMMARY OF SMALL SIGNS

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

STATION	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE (FRP = Fiberglass, TWT = Thin-Wall, 10BWG = 10 BWG, S80 = Sch 80)	POSTS (1 or 2)	ANCHOR TYPE (UA=Universal Conc, UB=Universal Bolt, SA=Slipbase-Conc, SB=Slipbase-Bolt, WS=Wedge Steel, WP=Wedge Plastic)	MOUNTING DESIGNATION: PREFABRICATED (P = "Plain", T = "T", U = "U")	MOUNTING DESIGNATION: 1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE (TY N, TY S)
435+36 LT	218	R4-1	DO NOT PASS	18 x 24	X		10BWG	1	SA	P		
439+14 RT	219	R4-1	DO NOT PASS	18 x 24	X		10BWG	1	SA	P		
445+30 RT	220	W1-2R	CURVE RIGHT (SYMBOL)	36 x 36	X		10BWG	1	SA	P		
		W13-1P	XX MPH	18 x 18								
445+98 LT	221	R4-2	PASS WITH CARE	18 x 24	X		10BWG	1	SA	P		
446+60 LT	222	W1-8R	CHEVRON RIGHT	18 x 24	X		10BWG	1	SA	P		
		W1-8L	CHEVRON LEFT	18 x 24								
447+72 LT	223	W1-8R	CHEVRON RIGHT	18 x 24	X		10BWG	1	SA	P		
		W1-8L	CHEVRON LEFT	18 x 24								
448+20 RT	224	W8-13aT	BRIDGE/MAY ICE IN/COLD/WEATHER	36 x 36	X		10BWG	1	SA	P		
448+86 LT	225	W1-8R	CHEVRON RIGHT	18 x 24	X		10BWG	1	SA	P		
		W1-8L	CHEVRON LEFT	18 x 24								
450+00 LT	226	W1-2L	CURVE LEFT (SYMBOL)	36 x 36	X		10BWG	1	SA	P		
		W13-1P	XX MPH	18 x 18								
451+24 RT	227	W5-2	NARROW BRIDGE	36 x 36	X		10BWG	1	SA	P		
454+79 LT	228	S3-1T	SCHOOL BUS STOP AHEAD	36 x 36	X		10BWG	1	SA	P		
455+79 LT	229	W5-2	NARROW BRIDGE	36 x 36	X		10BWG	1	SA	P		
457+60 LT	230	W8-13aT	BRIDGE/MAY ICE IN/COLD/WEATHER	36 x 36	X		10BWG	1	SA	P		
457+79 LT	231	R4-1	DO NOT PASS	18 x 24	X		10BWG	1	SA	P		
458+28 RT	232	R4-1	DO NOT PASS	18 x 24	X		10BWG	1	SA	P		
474+10 RT	233	I-2cT	SOUTH/SULPHER	54 x 24	X		10BWG	1	SA	T		
481+61 RT	234	R4-1	DO NOT PASS	18 x 24	X		10BWG	1	SA	P		
487+00 RT	235	D20-1TL	CO RD/4507/ARROW LEFT	24 x 24	X		10BWG	1	SA	P		
488+91 LT	236	*	HUNT/COUNTY/4507		X		10BWG	1	SA	P		
		R1-1	STOP	30 x 30								
490+06 RT	237	M2-1	JCT	21 x 15	X		10BWG	1	SA	P		
		M1-6F	FARM ROAD 118	24 x 24								
490+38 LT	238	R4-2	PASS WITH CARE	18 x 24	X		10BWG	1	SA	P		
491+20 LT	239	D20-1TR	CO RD/4507/ARROW RIGHT	24 x 24	X		10BWG	1	SA	P		
493+80 RT	240	W1-2R	CURVE RIGHT (SYMBOL)	36 x 36	X		10BWG	1	SA	P		
		W13-1P	XX MPH	18 x 18								
494+87 LT	241	W1-8R	CHEVRON RIGHT	18 x 24	X		10BWG	1	SA	P		
		W1-8L	CHEVRON LEFT	18 x 24								
496+15 LT	242	W1-8R	CHEVRON RIGHT	18 x 24	X		10BWG	1	SA	P		
		W1-8L	CHEVRON LEFT	18 x 24								

DATE: 5/24/2023
FILE: Z:\Transportation\TxDOT\PS&E\STATEWIDE 36-9IDP5101\WA2-TxDOT Paris\ProjectData\FM 512 (0579-02-014)\CADD\DGN\08_TRAFFIC\sums16.dgn 6:20:58 PM

STATE OF TEXAS
PAUL A. WARDEN
101319
LICENSED
PROFESSIONAL ENGINEER
Paul A. Warden, P.E. 5/24/2023

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
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Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0579	02	014	FM 512
4-16	DIST	COUNTY		SHEET NO.
8-16	PARIS	HUNT		166

SUMMARY OF SMALL SIGNS

STATION	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	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=Universal Conc, UB=Universal Bolt, SA=Slipbase-Conc, SB=Slipbase-Bolt, WS=Wedge Steel, WP=Wedge Plastic	MOUNTING DESIGNATION: PREFABRICATED: P = "Plain", T = "T", U = "U"	MOUNTING DESIGNATION: 1EXT or 2EXT = # of Ext, BM = Extruded Wind Beam, WC = 1.12 #/ft Wing Channel, EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE: TY N, TY S
497+43 LT	243	W1-8R	CHEVRON RIGHT	18 x 24	X		10BWG	1	SA	P		
		W1-8L	CHEVRON LEFT	18 x 24								
498+72 LT	244	W1-8R	CHEVRON RIGHT	18 x 24	X		10BWG	1	SA	P		
		W1-8L	CHEVRON LEFT	18 x 24								
499+75 LT	245	W1-2L	CURVE LEFT (SYMBOL)	36 x 36	X		10BWG	1	SA	P		
		W13-1P	XX MPH	18 x 18								
500+75 LT	246	R2-1	SPEED LIMIT 55	30 x 36	X		10BWG	1	SA	P		
501+50 RT	247	W1-2L	CURVE LEFT (SYMBOL)	36 x 36	X		10BWG	1	SA	P		
		W13-1P	XX MPH	18 x 18								
504+00 LT	248	M3-1	NORTH	21 x 15	X		10BWG	1	SA	P		
		M1-6F	FARM ROAD 512	24 x 24								
501+50 RT	249	W1-1L	LEFT TURN (SYMBOL)	36 x 36	X		10BWG	1	SA	P		
		W13-1P	XX MPH	18 x 18								
506+05 RT	250	W1-8L	CHEVRON LEFT	18 x 24	X		10BWG	1	SA	P		
		W1-8R	CHEVRON RIGHT	18 x 24								
506+86 RT	251	W1-8L	CHEVRON LEFT	18 x 24	X		10BWG	1	SA	P		
		W1-8R	CHEVRON RIGHT	18 x 24								
506+88 RT	252	M3-3	SOUTH	24 x 12	X		S80	1	SA	U		
		M1-6F	FARM ROAD 512	24 x 24								
		M6-3	ARROW UP	21 x 15								
		M3-1	SOUTH	24 x 12								
		M1-6F	FARM ROAD 118	24 x 24								
		M6-1R	ARROW RIGHT	21 x 15								
507+56 LT	253	W1-7T	ARROW LEFT-RIGHT	96 x 36	X		S80	1	SA	U	WC	
507+73 LT	254	M1-6F	FARM ROAD 512	24 x 24	X		10BWG	1	SA	P		
		M6-4	ARROW LEFT-RIGHT	21 x 15								
508+05 RT	255	R1-1	STOP	36 x 36	X		10BWG	1	SA	P		
		W4-4P	CROSS TRAFFIC/DOES NOT STOP	24 x 12								

PAUL A. WARDEN
101319
LICENSED
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STATE OF TEXAS
Paul A. Warden, P.E. 5/24/2023

ALUMINUM SIGN BLANKS THICKNESS	
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SHEET 12 OF 12

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0579	02	014	FM 512
4-16	DIST	COUNTY		SHEET NO.
8-16	PARIS	HUNT		167

18

DATE: 5/24/2023
FILE: Z:\Transportation\TxDOT\PS&E\STATEWIDE 36-91DP5101\WA2-TxDOT Paris\ProjectData\FM 512 (0579-02-014)\CADD\DGN\08_TRAFFIC\sums16.dgn
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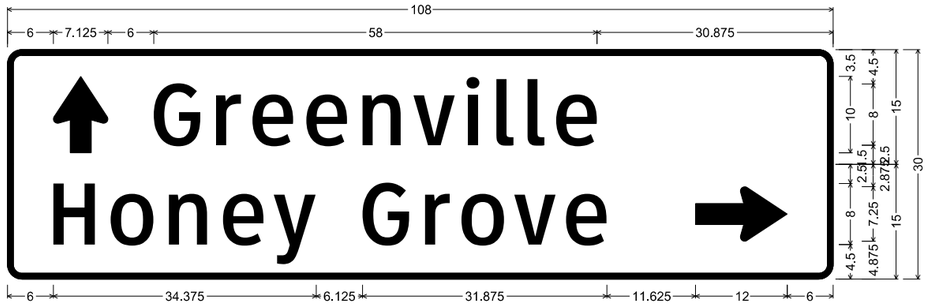
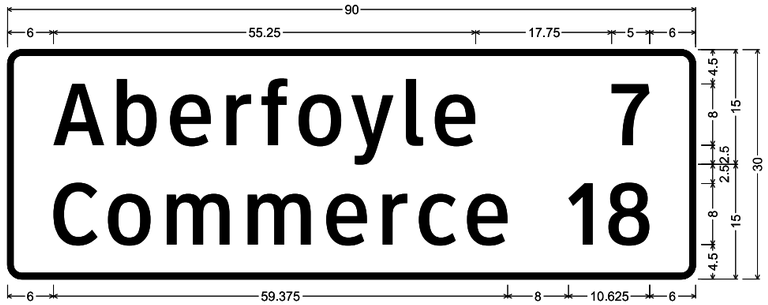


D1-2 8in UP-RT;

1.875" Radius, 0.750" Border, White on Green;
Standard Arrow Custom 10.000" X 7.125" 90°; "Greenville", ClearviewHwy-3-W;

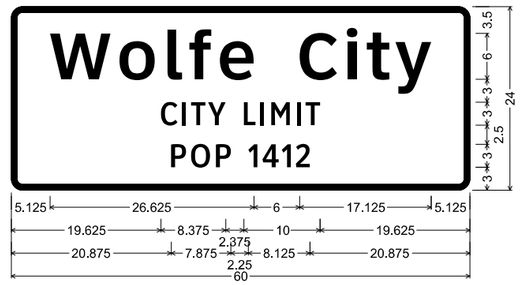
1.875" Radius, 0.750" Border, White on Green;
"Honey Grove", ClearviewHwy-3-W; Standard Arrow Custom 12.000" X 7.125" 0°;



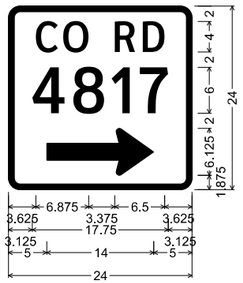
D2-2 8in;

1.875" Radius, 0.750" Border, White on Green;
"Aberfoyle", ClearviewHwy-3-W; "7", ClearviewHwy-3-W;

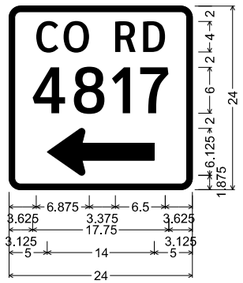
1.875" Radius, 0.750" Border, White on Green;
"Commerce", ClearviewHwy-3-W; "18", ClearviewHwy-3-W;



I-2aT 6in;
1.500" Radius, 0.750" Border, White on Green;
"Wolfe City", ClearviewHwy-5-W-R; "CITY LIMIT", ClearviewHwy-3-W;
"POP 1412", ClearviewHwy-3-W;

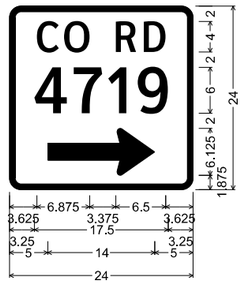


D20-1TR_24x24;
1.500" Radius, 0.750" Border, White on Green;
"CO RD", ClearviewHwy-3-W;
"4817", ClearviewHwy-3-W;
Standard Arrow Custom 14.000" X 6.125" 0°;

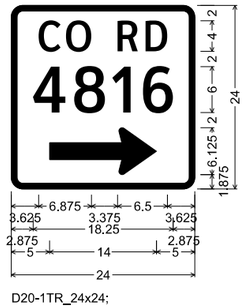


D20-1TL_24x24;
1.500" Radius, 0.750" Border, White on Green;
"CO RD", ClearviewHwy-3-W;
"4817", ClearviewHwy-3-W;
Standard Arrow Custom 14.000" X 6.125" 180°;

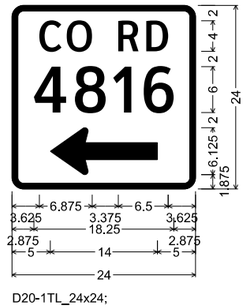
D20-1TL_24x24;
1.500" Radius, 0.750" Border, White on Green;
"CO RD", ClearviewHwy-3-W;
"4719", ClearviewHwy-3-W;
Standard Arrow Custom 14.000" X 6.125" 180°;



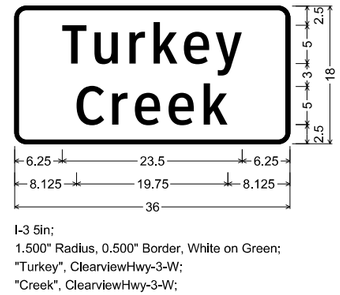
D20-1TR_24x24;
1.500" Radius, 0.750" Border, White on Green;
"CO RD", ClearviewHwy-3-W;
"4719", ClearviewHwy-3-W;
Standard Arrow Custom 14.000" X 6.125" 0°;



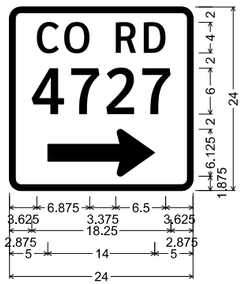
D20-1TR_24x24;
1.500" Radius, 0.750" Border, White on Green;
"CO RD", ClearviewHwy-3-W;
"4816", ClearviewHwy-3-W;
Standard Arrow Custom 14.000" X 6.125" 0°;



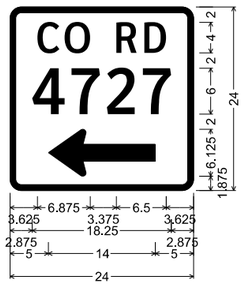
D20-1TL_24x24;
1.500" Radius, 0.750" Border, White on Green;
"CO RD", ClearviewHwy-3-W;
"4816", ClearviewHwy-3-W;
Standard Arrow Custom 14.000" X 6.125" 180°;



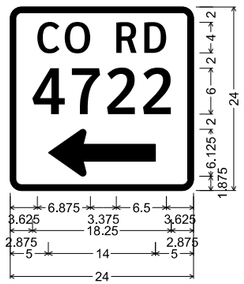
I-3 5in;
1.500" Radius, 0.500" Border, White on Green;
"Turkey", ClearviewHwy-3-W;
"Creek", ClearviewHwy-3-W;



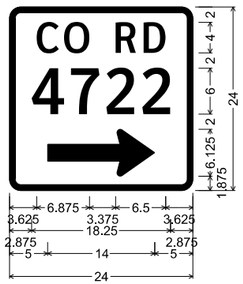
D20-1TR_24x24;
1.500" Radius, 0.750" Border, White on Green;
"CO RD", ClearviewHwy-3-W;
"4727", ClearviewHwy-3-W;
Standard Arrow Custom 14.000" X 6.125" 0°;



D20-1TL_24x24;
1.500" Radius, 0.750" Border, White on Green;
"CO RD", ClearviewHwy-3-W;
"4727", ClearviewHwy-3-W;
Standard Arrow Custom 14.000" X 6.125" 180°;



D20-1TL_24x24;
1.500" Radius, 0.750" Border, White on Green;
"CO RD", ClearviewHwy-3-W;
"4722", ClearviewHwy-3-W;
Standard Arrow Custom 14.000" X 6.125" 180°;

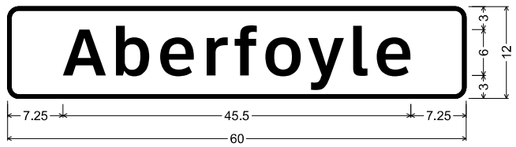


D20-1TR_24x24;
1.500" Radius, 0.750" Border, White on Green;
"CO RD", ClearviewHwy-3-W;
"4722", ClearviewHwy-3-W;
Standard Arrow Custom 14.000" X 6.125" 0°;

D14-4T-2_48x48;

3.000" Radius, 1.000" Border, White on Blue;
"ADOPT A", ClearviewHwy-1-W;
"HIGHWAY", ClearviewHwy-1-W;
"NEXT 2 MILES", ClearviewHwy-1-W;

3.000" Radius, 1.000" Border, White on Blue;
"ABERFOYLE", ClearviewHwy-1-W;
"BAPTIST", ClearviewHwy-1-W;
"CHURCH", ClearviewHwy-1-W;



I-2cT 6in;
1.500" Radius, 0.500" Border, White on Green;
"Aberfoyle", ClearviewHwy-5-W-R;

STATE OF TEXAS
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62999
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5/24/2023

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FIRM # F-6825

Texas Department of Transportation

FM 512

SIGN DETAILS

SHEET 1 OF 3

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	168
CONTROL	SECTION	JOB	
0579	02	014	

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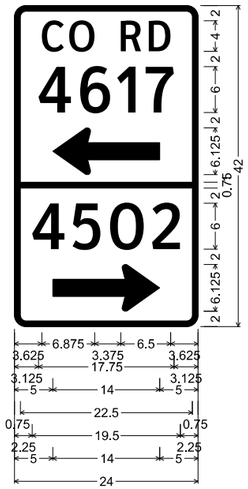
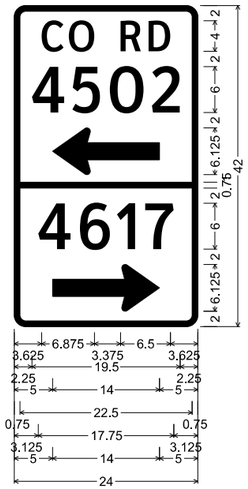
SUBMITTAL



D20-5T_24x42;
1.500" Radius, 0.750" Border, White on Green;
"CO RD", ClearviewHwy-3-W;
"4617", ClearviewHwy-3-W;
Standard Arrow Custom 14.000" X 6.125" 180°;
"4502", ClearviewHwy-3-W;
Standard Arrow Custom 14.000" X 6.125" 0°;

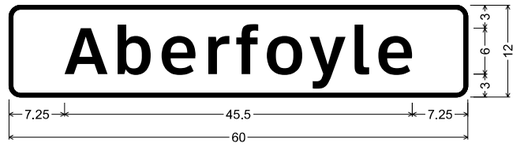


D20-5T_24x42;
1.500" Radius, 0.750" Border, White on Green;
"CO RD", ClearviewHwy-3-W;
"4502", ClearviewHwy-3-W;
Standard Arrow Custom 14.000" X 6.125" 180°;
"4617", ClearviewHwy-3-W;
Standard Arrow Custom 14.000" X 6.125" 0°;

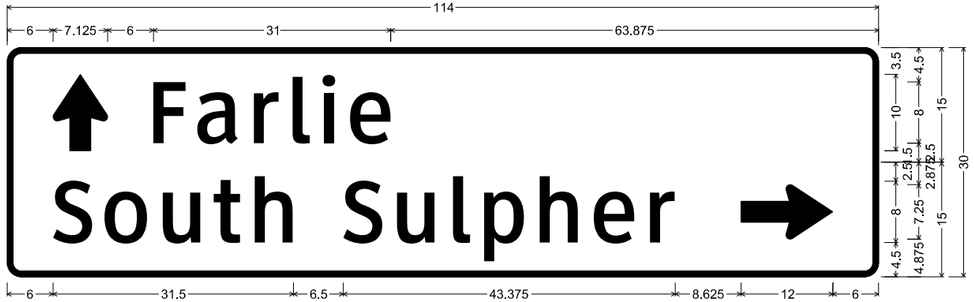
D14-4T-2_48x48;

3.000" Radius, 1.000" Border, White on Blue;
"ADOPT A", ClearviewHwy-1-W;
"HIGHWAY", ClearviewHwy-1-W;
"NEXT 2 MILES", ClearviewHwy-1-W;

3.000" Radius, 1.000" Border, White on Blue;
"ABERFOYLE", ClearviewHwy-1-W;
"BAPTIST", ClearviewHwy-1-W;
"CHURCH", ClearviewHwy-1-W;



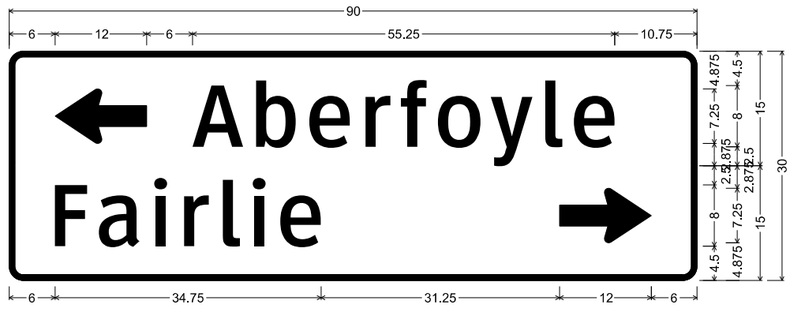
I-2cT 6in;
1.500" Radius, 0.500" Border, White on Green;
"Aberfoyle", ClearviewHwy-5-W-R;



D1-2 8in UP-RT;

1.875" Radius, 0.750" Border, White on Green;
Standard Arrow Custom 10.000" X 7.125" 90°; "Farlie", ClearviewHwy-3-W;

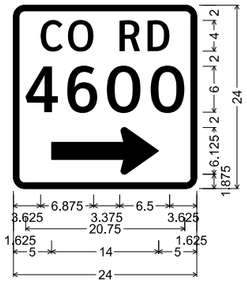
1.875" Radius, 0.750" Border, White on Green;
"South Sulpher", ClearviewHwy-3-W; Standard Arrow Custom 12.000" X 7.125" 0°;



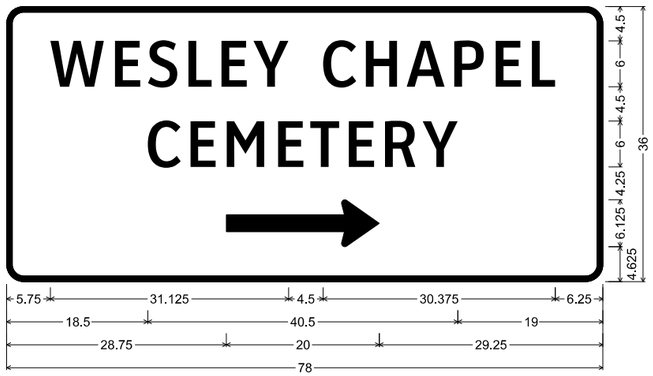
D1-2 8in LT-RT;

1.875" Radius, 0.750" Border, White on Green;
Standard Arrow Custom 12.000" X 7.125" 180°; "Aberfoyle", ClearviewHwy-3-W;

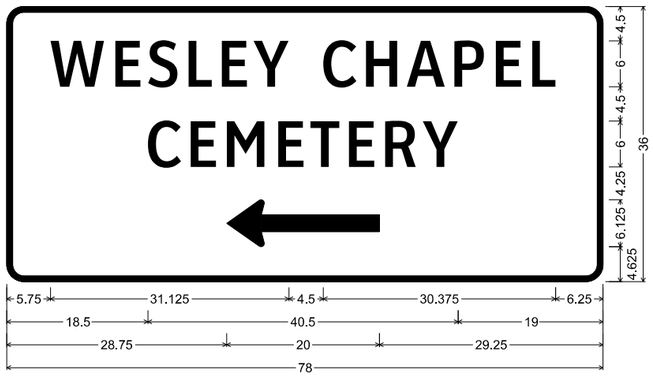
1.875" Radius, 0.750" Border, White on Green;
"Fairlie", ClearviewHwy-3-W; Standard Arrow Custom 12.000" X 7.125" 0°;



D20-1TR_24x24;
1.500" Radius, 0.750" Border, White on Green;
"CO RD", ClearviewHwy-3-W;
"4600", ClearviewHwy-3-W;
Standard Arrow Custom 14.000" X 6.125" 0°;



D3-3bTR_VARx36;
2.250" Radius, 0.750" Border, White on Green;
"WESLEY CHAPEL", ClearviewHwy-3-W; "CEMETERY", ClearviewHwy-3-W;
Standard Arrow Custom 20.000" X 6.125" 0°;



D3-3bTL_VARx36;
2.250" Radius, 0.750" Border, White on Green;
"WESLEY CHAPEL", ClearviewHwy-3-W; "CEMETERY", ClearviewHwy-3-W;
Standard Arrow Custom 20.000" X 6.125" 180°;

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Texas Department of Transportation

FM 512

SIGN DETAILS

SHEET 2 OF 3

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	
CONTROL	SECTION	JOB	169
0579	02	014	

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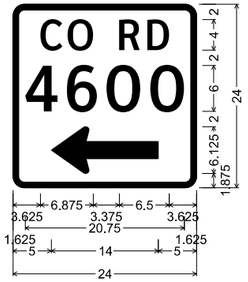
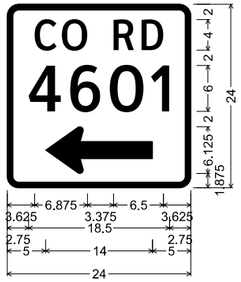
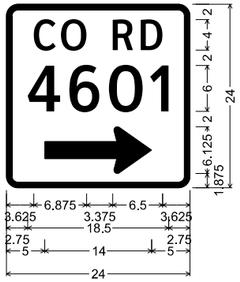


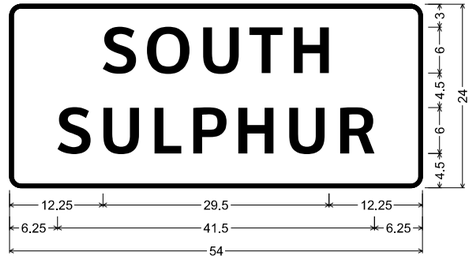
D20-1TL_24x24;
1.500" Radius, 0.750" Border, White on Green;
"CO RD", ClearviewHwy-3-W;
"4600", ClearviewHwy-3-W;
Standard Arrow Custom 14.000" X 6.125" 180°;



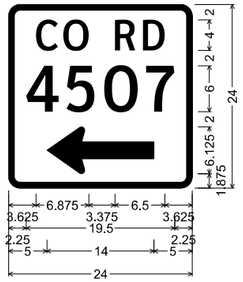
D20-1TL_24x24;
1.500" Radius, 0.750" Border, White on Green;
"CO RD", ClearviewHwy-3-W;
"4601", ClearviewHwy-3-W;
Standard Arrow Custom 14.000" X 6.125" 180°;



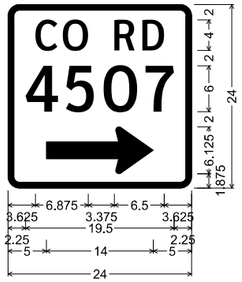
D20-1TR_24x24;
1.500" Radius, 0.750" Border, White on Green;
"CO RD", ClearviewHwy-3-W;
"4601", ClearviewHwy-3-W;
Standard Arrow Custom 14.000" X 6.125" 0°;



I-2cT 6in;
1.500" Radius, 0.500" Border, White on Green;
"SOUTH", ClearviewHwy-5-W-R;
"SULPHUR", ClearviewHwy-5-W-R;



D20-1TL_24x24;
1.500" Radius, 0.750" Border, White on Green;
"CO RD", ClearviewHwy-3-W;
"4507", ClearviewHwy-3-W;
Standard Arrow Custom 14.000" X 6.125" 180°;



D20-1TR_24x24;
1.500" Radius, 0.750" Border, White on Green;
"CO RD", ClearviewHwy-3-W;
"4507", ClearviewHwy-3-W;
Standard Arrow Custom 14.000" X 6.125" 0°;

STATE OF TEXAS
CHARLES M. SHINE
62999
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PROFESSIONAL ENGINEER

5/24/2023

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FIRM # F-6825

Texas Department of Transportation

FM 512

SIGN DETAILS

SHEET 3 OF 3

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	170
CONTROL	SECTION	JOB	
0579	02	014	

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SIGN SUPPORT DESCRIPTIVE CODES

(Descriptive Codes correspond to project estimate and quantities sheets)

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

Post Type

FRP = Fiberglass Reinforced Plastic Pipe (see SMD(FRP))
TWT = Thin-Walled Tubing (see SMD(TWT))
10BWG = 10 BWG Tubing (see SMD(SLIP-1) to (SLIP-3))
S80 = Schedule 80 Pipe (see SMD(SLIP-1) to (SLIP-3))

Number of Posts (1 or 2)

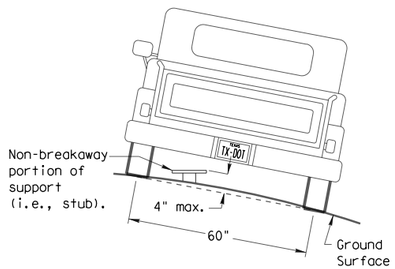
Anchor Type

UA = Universal Anchor - Concreted (see SMD(FRP) and (TWT))
UB = Universal Anchor - Bolted down (see SMD(FRP) and (TWT))
WS = Wedge Anchor Steel - (see SMD(TWT))
WP = Wedge Anchor Plastic (see SMD(TWT))
SA = Slipbase - Concreted (see SMD(SLIP-1) to (SLIP-3))
SB = Slipbase - Bolted Down (see SMD(SLIP-1) to (SLIP-3))

Sign Mounting Designation

P = Prefab. "Plain" (see SMD(SLIP-1) to (SLIP-3), (TWT), (FRP))
T = Prefab. "T" (see SMD(SLIP-1) to (SLIP-3), (TWT))
U = Prefab. "U" (see SMD(SLIP-1) to (SLIP-3))
IF REQUIRED
1EXT or 2EXT = Number of Extensions (see SMD(SLIP-1) to (SLIP-3), (TWT))
BM = Extruded Wind Beam (see SMD(SLIP-1) to (SLIP-3))
WC = 1.12 #/ft Wing Channel (see SMD(SLIP-1) to (SLIP-3))
EXAL = Extruded Aluminum Sign Panels (see SMD(SLIP-1))

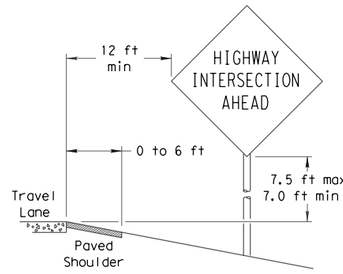
REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



To avoid vehicle undercarriage snagging, any substantial remains of a breakaway support, when it is broken away, should not project more than 4 inches above a 60-inch chord (i.e., typical space between wheel paths).

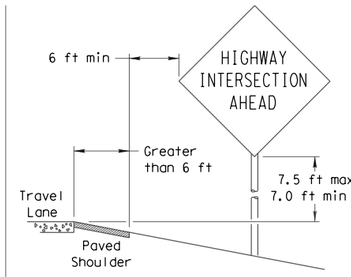
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

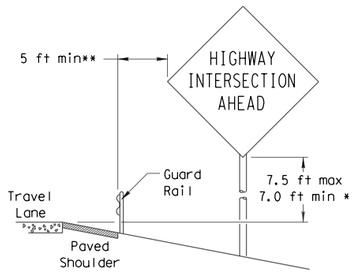
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



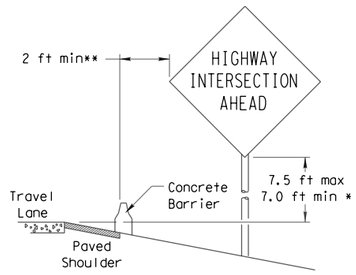
GREATER THAN 6 FT. WIDE

When the shoulder is greater than 6 ft in width, the sign must be placed at least 6 ft. from the edge of the shoulder.

BEHIND BARRIER



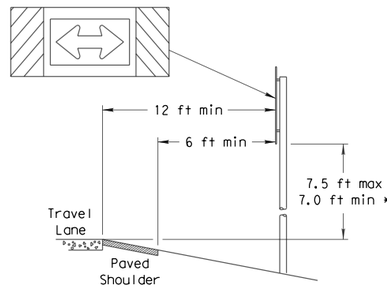
BEHIND GUARDRAIL



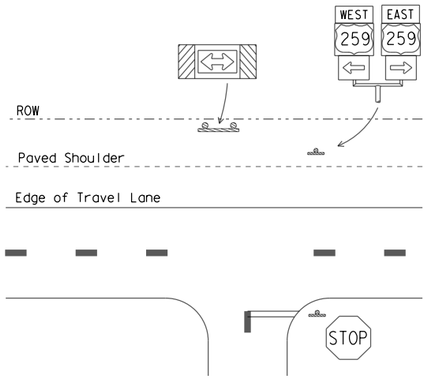
BEHIND CONCRETE BARRIER

**Sign clearance based on distance required for proper guard rail or concrete barrier performance.

T-INTERSECTION



When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.



* Signs shall be mounted using the following condition that results in the greatest sign elevation:

(1) a minimum of 7 to a maximum of 7.5 feet above the edge of the travel lane or

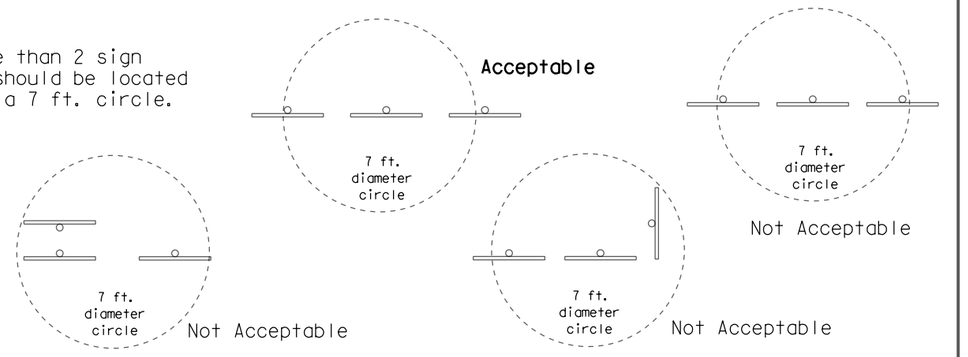
(2) a minimum of 7 to a maximum of 7.5 feet above the grade at the base of the support when sign is installed on the backslope.

The maximum values may be increased when directed by the Engineer.

See the Traffic Operations Division website for detailed drawings of sign clamps, Triangular Slipbase System components and Wedge Anchor System components.

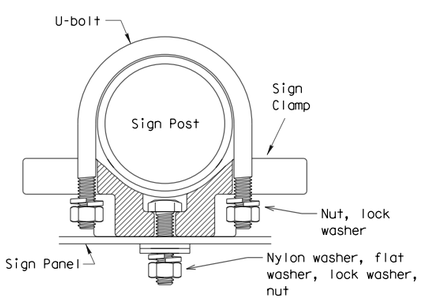
The website address is:
http://www.txdot.gov/publications/traffic.htm

No more than 2 sign posts should be located within a 7 ft. circle.



TYPICAL SIGN ATTACHMENT DETAIL

Single Signs

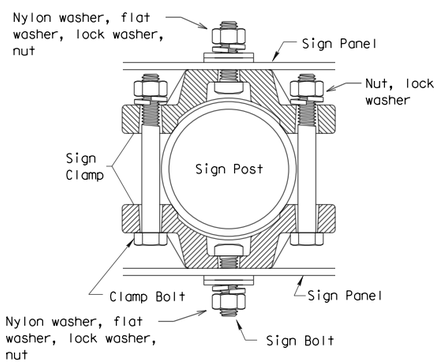


Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

When two sign clamps are used to mount signs back-to-back, use a 5/16-18 UNC galvanized hex head per ASTM A307 with nut and helical-spring lock washer. The approximate bolt lengths for various post sizes and sign clamp types are given in the table at right. The bolt length may need to be adjusted depending upon field conditions.

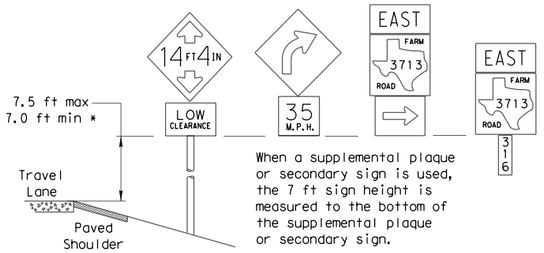
Sign clamps may be either the specific size clamp or the universal clamp.

Back-to-Back Signs



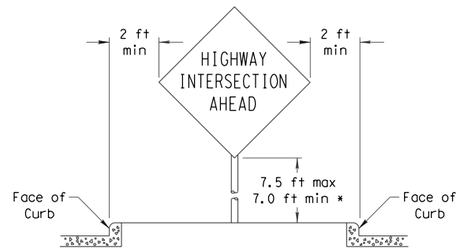
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



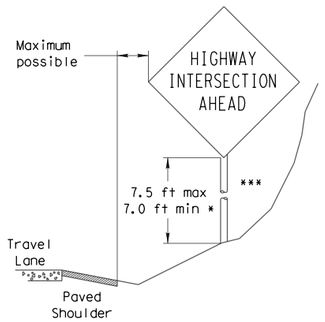
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

CURB & GUTTER OR RAISED ISLAND



RESTRICTED RIGHT-OF-WAY

(When 6 ft min. is not possible.)



Right-of-way restrictions may be created by rocks, water, vegetation, forest, buildings, a narrow island, or other factors.

In situations where a lateral restriction prevents the minimum horizontal clearance from the edge of the travel lane, signs should be placed as far from the travel lane as practical.

*** Post may be shorter if protected by guardrail or if Engineer determines the post could not be hit due to extreme slope.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

SMD(GEN)-08

REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08	CONT	SECT	JOB	HIGHWAY
	0579	02	014	FM 512
	DIST	COUNTY		SHEET NO.
	PARIS	HUNT		171

DATE: 5/24/2023 6:21:02 PM
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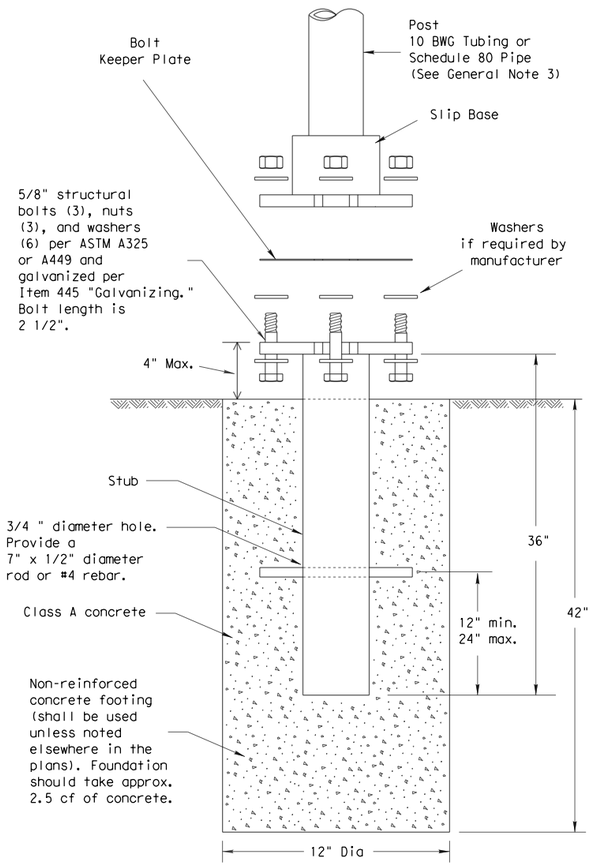
TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS



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

NOTE

There are various devices approved for the Triangular Slipbase System. Please reference the Material Producer List for approved slip base systems. http://www.txdot.gov/business/producer_list.htm The devices shall be installed per manufacturers' recommendations. Installation procedures shall be provided to the Engineer by Contractor.

GENERAL NOTES:

1. Slip base shall be permanently marked to indicate manufacturer. Method, design, and location of marking are subject to approval of the TxDOT Traffic Standards Engineer.
2. Material used as post with this system shall conform to the following specifications:
   10 BWG Tubing (2.875" outside diameter)
   - 0.134" nominal wall thickness
   - Seamless or electric-resistance welded steel tubing or pipe
   - Steel shall be HSLAS Gr 55 per ASTM A1011 or ASTM A1008
   - Other steels may be used if they meet the following:
     - 55,000 PSI minimum yield strength
     - 70,000 PSI minimum tensile strength
     - 20% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of 0.122" to 0.138"
   - Outside diameter (uncoated) shall be within the range of 2.867" to 2.883"
   - Galvanization per ASTM A123 or ASTM A653 G210. For precoated steel tubing (ASTM A653), recoat tube outside diameter weld seam by metallizing with zinc wire per ASTM B833.

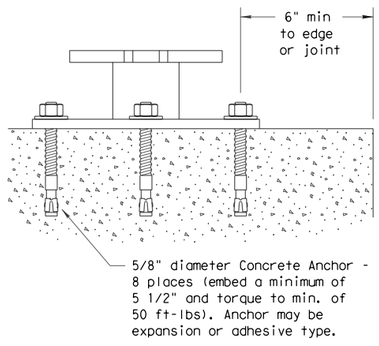
   Schedule 80 Pipe (2.875" outside diameter)
   - 0.276" nominal wall thickness
   - Steel tubing per ASTM A500 Gr C
   - Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the following:
     - 46,000 PSI minimum yield strength
     - 62,000 PSI minimum tensile strength
     - 21% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of 0.248" to 0.304"
   - Outside diameter (uncoated) shall be within the range of 2.855" to 2.895"
   - Galvanization per ASTM A123
3. See the Traffic Operations Division website for detailed drawings of sign clamps and Texas Universal Triangular Slipbase System components. The website address is: http://www.txdot.gov/publications/traffic.htm
4. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.

ASSEMBLY PROCEDURE

Foundation
1. Prepare 12-inch diameter by 42-inch deep hole. If solid rock is encountered, the depth of the foundation may be reduced such that it is embedded a minimum of 18 inches into the solid rock.
2. The Engineer may permit batches of concrete less than 2 cubic yards to be mixed with a portable, motor-driven concrete mixer. For small placements less than 0.5 cubic yards, hand mixing in a suitable container may be allowed by Engineer. Concrete shall be Class A.
3. Push the pipe end of the slip base stub into the center of the concrete. Rotate the stub back and forth while pushing it down into the concrete to assure good contact between the concrete and stub. Continue to work the stub into the concrete until it is between 2 to 4 inches above the ground.
4. Plumb the stub. Allow a minimum of 4 days to set, unless otherwise directed by the Engineer.
5. The triangular slipbase system is multidirectional and is designed to release when struck from any direction.

Support
1. Cut support so that the bottom of the sign will be 7 to 7.5 feet above the edge of the travelway (i.e., edge of the closest lane) when slip plate is below the edge of pavement or 7 to 7.5 feet above slip plate when the slip plate is above the edge of the travelway. The cut shall be plumb and straight.
2. Attach sign to support using connections shown. When multiple signs are installed on the same support, ensure the minimum clearance between each sign is maintained. See SMD(SLIP-2) for clearances based on sign types.

CONCRETE ANCHOR



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

Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. Heavy hex nut per ASTM A563, and hardened washer per ASTM F436. The stud bolt shall have a minimum yield and ultimate tensile strength of 50 and 75 KSI, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Adhesive type anchors shall have stud bolts installed with Type III epoxy per DMS-6100, "Epoxies and Adhesives." Adhesive anchors may be loaded after adequate epoxy cure time per the manufacturer's recommendations. Top of bolt shall extend at least flush with top of the nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 5 1/2" minimum embedment, shall have a minimum allowable tension and shear of 3900 and 3100 psi, respectively.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-1)-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS
9-08

CONT	SECT	JOB	HIGHWAY
0579	02	014	FM 512

DIST	COUNTY	SHEET NO.
PARIS	HUNT	172

DATE: 5/24/2023 6:21:02 PM
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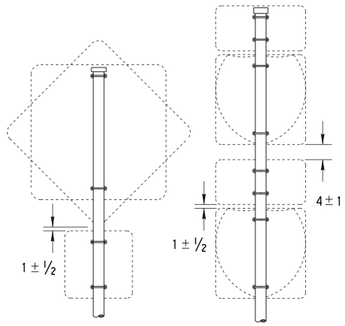
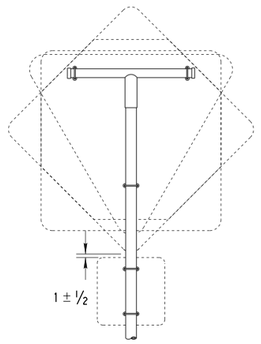


SM RD SGN ASSM TY XXXXX(1)XX(P)



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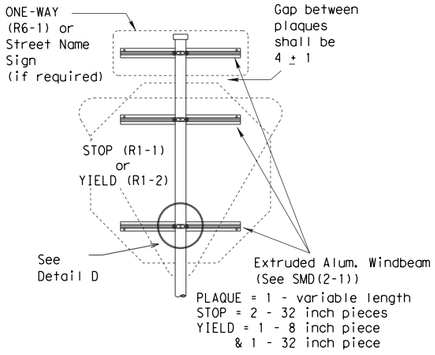

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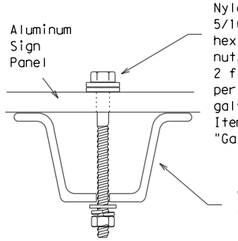
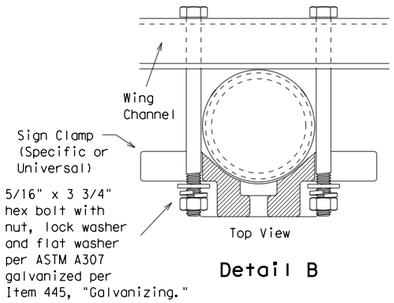
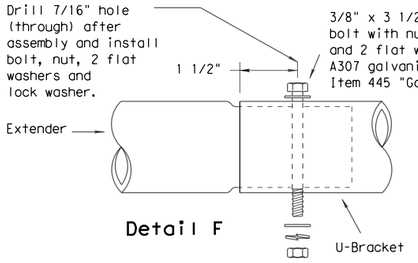


Detail A

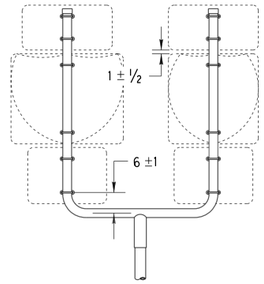


Detail B

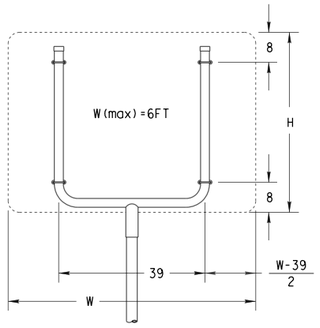


Detail F

Splices shall only be allowed behind the sign substrate.



SM RD SGN ASSM TY XXXXX(1)XX(U)



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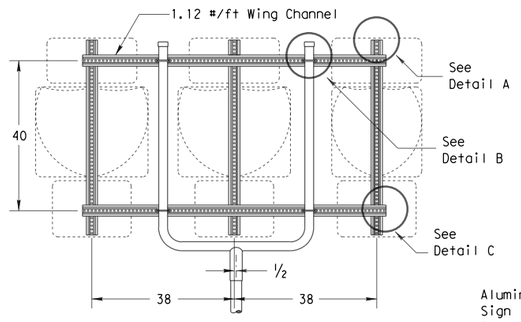
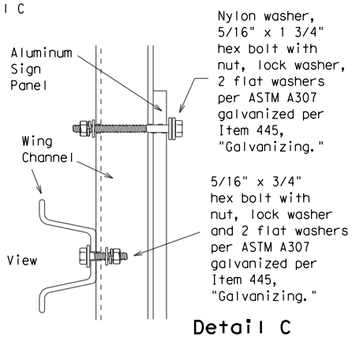
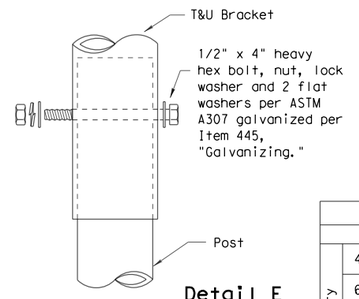


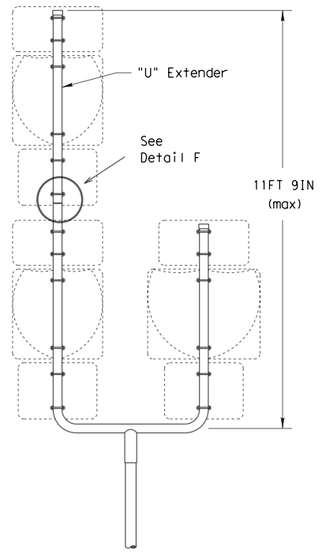
SM RD SGN ASSM TY XXXXX(1)XX(U-WC)
(See Note 11)



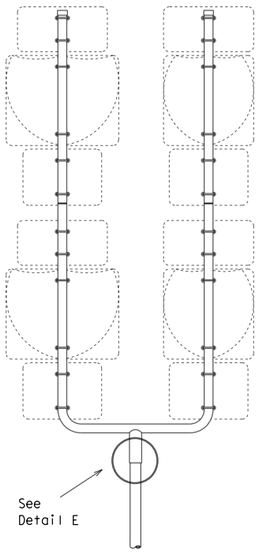
Detail C



Detail E



SM RD SGN ASSM TY S80(1)XX(U-1EXT)



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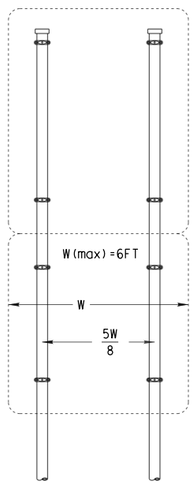
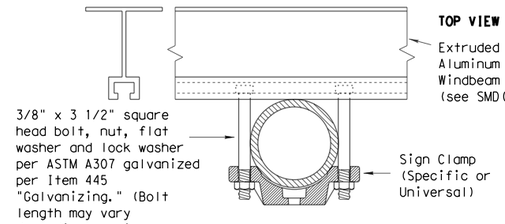
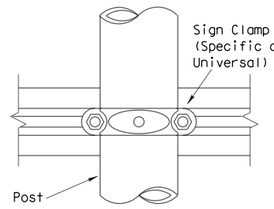


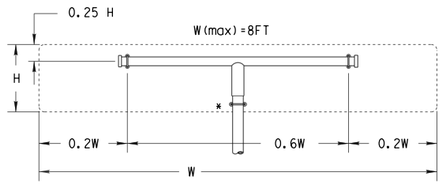
SM RD SGN ASSYM TY XXXXX(2)XX(P)

SIDE VIEW



Detail D

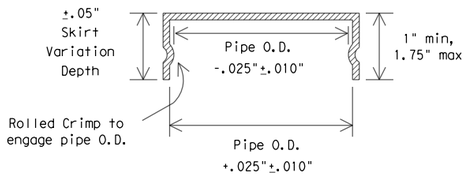




SM RD SGN ASSM TY XXXXX(1)XX(T)
(* - See Note 12)

All dimensions are in english unless detailed otherwise.

FRICTION CAP DETAIL



Friction caps may be manufactured from hot rolled or cold rolled steel sheets. The minimum sheet metal thickness shall be 24 gauge for all cap sizes.

The rim edges shall be reasonably straight and smooth. Caps shall be sized and formed in such a manner as to produce a drive-on friction fit and have no tendency to rock when seated on the pipe. The depth shall be sufficient to give positive protection against entrance of rainwater. They shall be free of sharp creases or indentations and show no evidence of metal fracture.

Caps shall have an electrodeposited coating of zinc in accordance with the requirements of ASTM B633 Class FE/ZN 8.

GENERAL NOTES:

1.

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Additional route markers may be added vertically, provided the total sign area does not exceed the maximum allowable amount per Note 1.
11. Additional sign clamp required on the "T-bracket" post for 24 inch height signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.
13. Sign blanks shall be the sizes and shapes shown on the plans.

REQUIRED SUPPORT

	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-2)-08

REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08	CONT	SECT	JOB	HIGHWAY
	0579	02	014	FM 512
	DIST	COUNTY		SHEET NO.
	PARIS	HUNT		173

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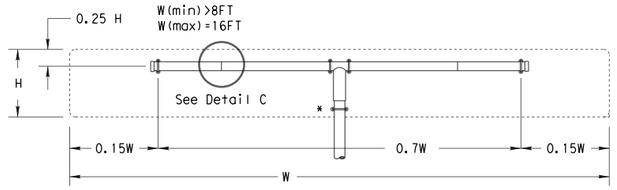
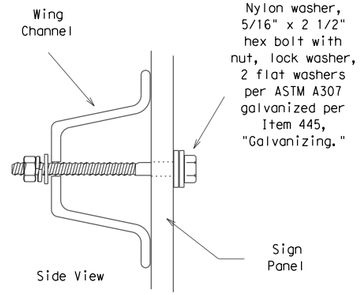
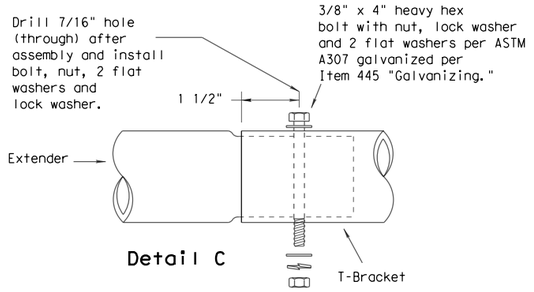


SM RD SGN ASSM TY XXXXX(1)XX(T-2EXT)
(* - See Note 12)



Detail B



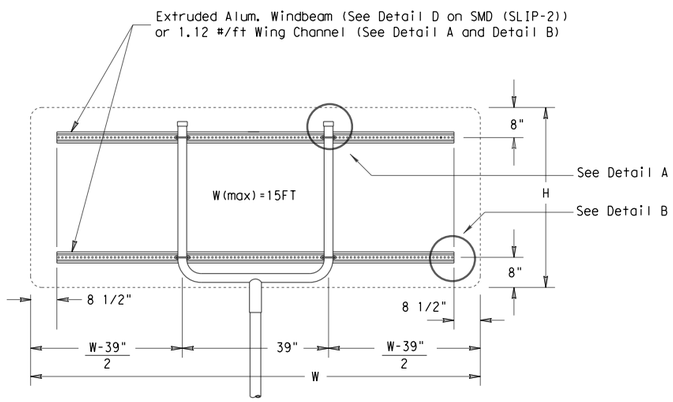
Detail C

Splices shall only be allowed behind the sign substrate.

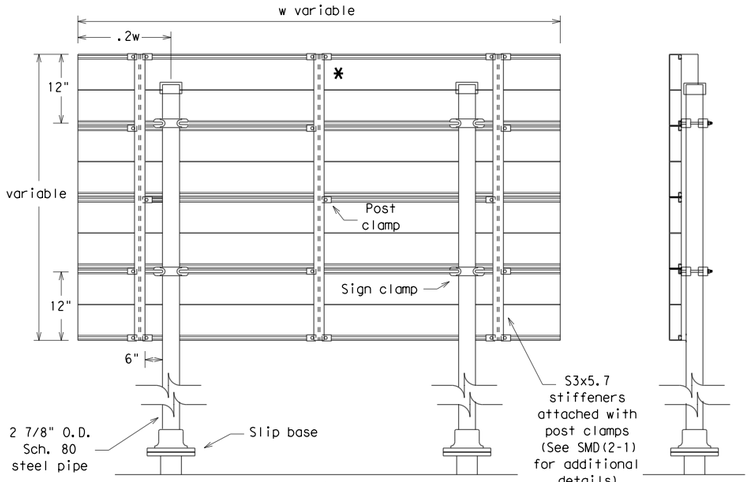
GENERAL NOTES:

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Sign blanks shall be the sizes and shapes shown on the plans.
11. Additional sign clamp required on the "T-bracket" post for 24 inch high signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.



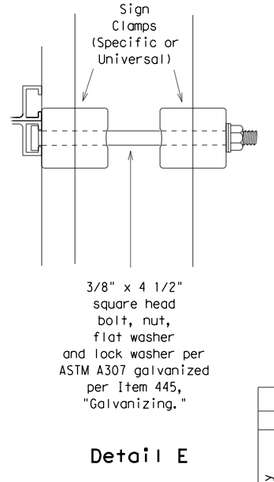
SM RD SGN ASSM TY XXXXX(1)XX(U-XX)



Typical Sign Mount

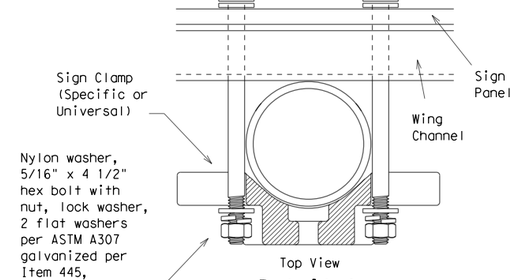
SM RD SGN ASSM TY S80(2)XX(P-EXAL)

✱ Additional stiffener placed at approximate center of signs when sign width is greater than 10'.

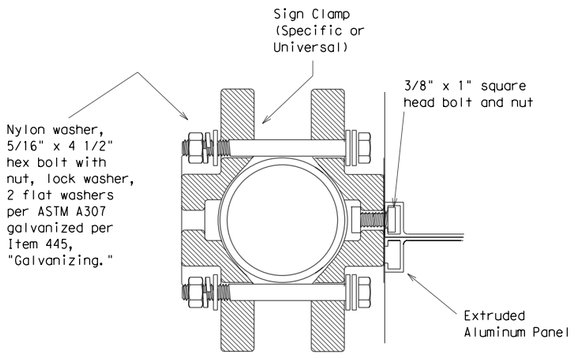


See Detail E
for clamp installation

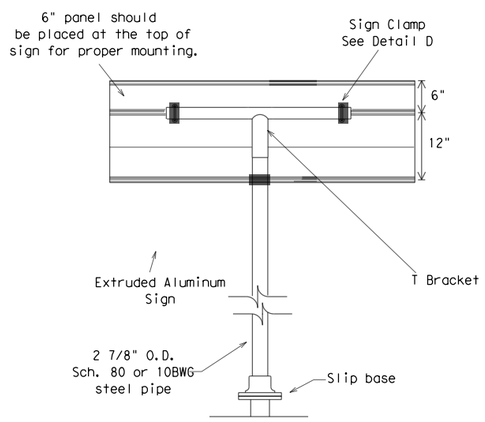
Detail E



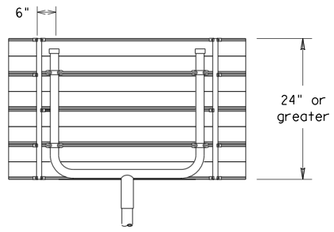
Detail A



Detail D
EXTRUDED ALUMINUM SIGN WITH T BRACKET



Extruded Aluminum Sign
With T Bracket



Use Extruded Alum. Windbeam as stiffeners
See SMD (2-1) for additional details

See Detail E
for clamp installation

REQUIRED SUPPORT		
	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-3)-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS
9-08

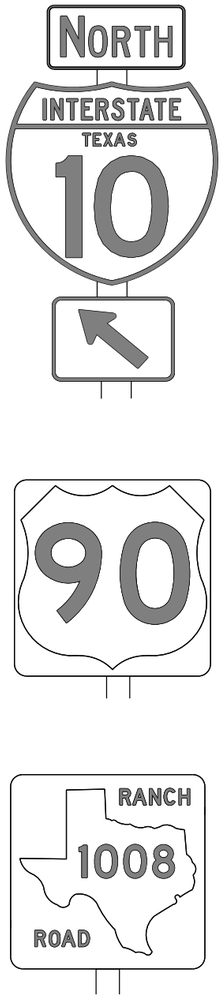
CONT	SECT	JOB	HIGHWAY
0579	02	014	FM 512

DIST	COUNTY	SHEET NO.
PARIS	HUNT	174

DATE: 5/24/2023 6:21:03 PM
FILE: Z:\Transportation\TxDOT\PS&E\STATEWIDE 36-91DP510\WA2-TxDOT Paris\ProjectData\FM 512 (0579-02-014)\CADD\DGN\08_TRAFFIC\StdDetails\tsr3-13.dgn

REQUIREMENTS FOR INDEPENDENT MOUNTED ROUTE SIGNS

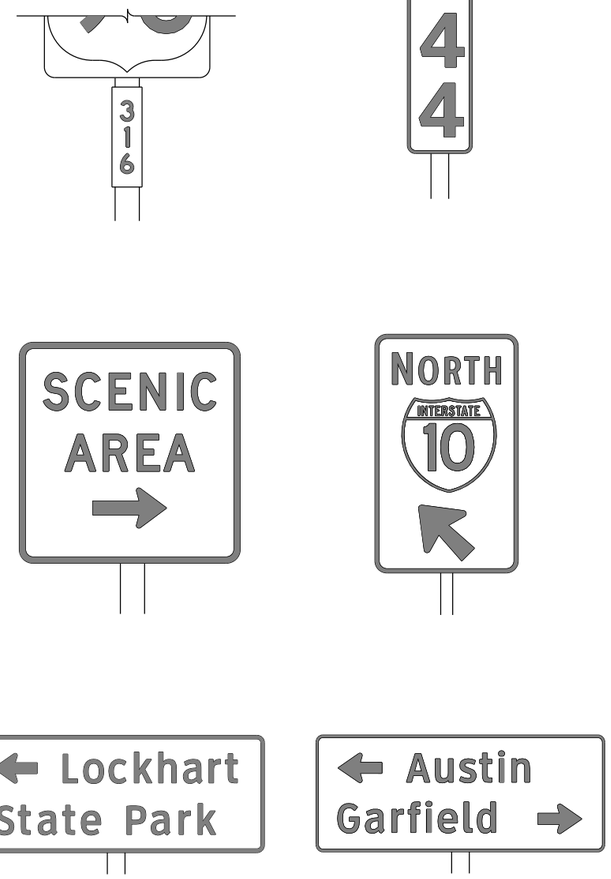
SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE A SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & BORDERS	ALL OTHERS	TYPE B or C SHEETING



TYPICAL EXAMPLES

REQUIREMENTS FOR BLUE, BROWN & GREEN D AND I SERIES GUIDE SIGNS

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	ALL	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE D SHEETING
LEGEND, SYMBOLS & BORDERS	ALL OTHERS	TYPE B OR C SHEETING



TYPICAL EXAMPLES

GENERAL NOTES

1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).

2. White legend shall use the Clearview Alphabet. The following Clearview fonts shall be used to replace the existing white Federal Highway Administration (FHWA) Standard Highway Alphabets, when not specified in the SHSD, or in the plans.

B	CV-1W
C	CV-2W
D	CV-3W
E	CV-4W
Emod	CV-5WR
F	CV-6W

3. Route sign legend (ie. IH, US, SH and FM shields) shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets B, C, D, E, Emod or F).

4. Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.

5. Independent mounted route sign with white or colored legend and borders shall be applied by screening process with transparent color ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof. White legend, symbols and borders on all other signs shall be cut-out white sheeting applied to colored background sheeting.

6. Information regarding borders and radii for signs is found in the "Standard Highway Sign Designs for Texas". Dimensions shown and described for borders and corner radii on parent sign are nominal. Borders may vary in width as much as 1/2 inch. Corner radii above 3 inches may vary in width as much as 1 inch. Borders and corner radii within a parent sign must be of matching widths. The sign area outside the corner radius should be trimmed or rounded.

7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.

8. Mounting details of roadside signs are shown in the "SMD series" Standard Plan Sheets.

DEPARTMENTAL MATERIAL SPECIFICATIONS	
ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300

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

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

http://www.txdot.gov/

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

TSR(3)-13

FILE: tsr3-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	0579	02	014	FM 512
12-03 7-13 9-08	DIST	COUNTY		SHEET NO.
	PARIS	HUNT		175

DATE: 5/24/2023 6:21:03 PM
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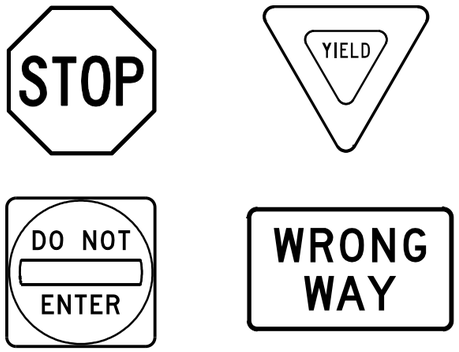
REQUIREMENTS FOR RED BACKGROUND REGULATORY SIGNS

(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

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.

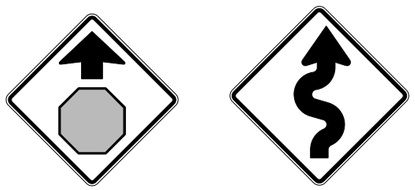
ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080
7.5 to 15	0.100
Greater than 15	0.125

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/

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

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	0579	02	014	FM 512
12-03 7-13 9-08	DIST	COUNTY		SHEET NO.
	PARIS	HUNT		176

4

DATE: 5/24/2023 6:21:03 PM
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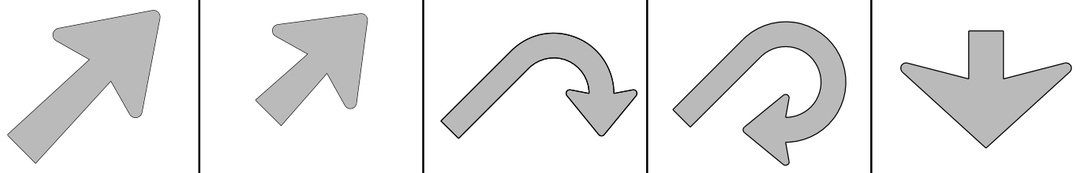
ARROW DETAILS

for Large Ground-Mounted and Overhead Guide Signs



TYPE	LETTER SIZE	USE
A-1	10.67" U/L and 10" Caps	Single Lane Exits
A-2	13.33" U/L and 12" Caps	
A-3	16" & 20" U/L	
B-1	10.67" U/L and 10" Caps	Multiple Lane Exits
B-2	13.33" U/L and 12" Caps	
B-3	16" & 20" U/L	

CODE	USED ON SIGN NO.
E-3	E5-1aT
E-4	E5-1bT

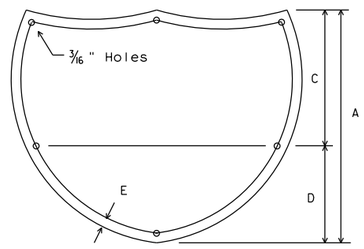
NOTE

Arrow dimensions are shown in the "Standard Highway Sign Designs for Texas" manual.

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

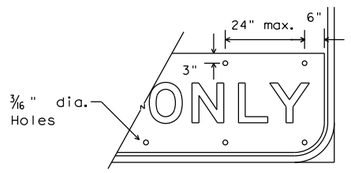
http://www.txdot.gov/

SIGN BLANK PUNCHING DETAILS FOR ATTACHMENTS WHEN SPECIFIED TO BE TYPE A ALUMINUM SIGNS (FOR MOUNTING TO GUIDE SIGN FACE)

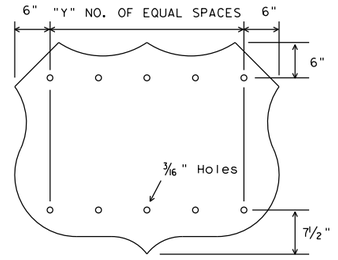


INTERSTATE ROUTE MARKERS

A	C	D	E
36	21	15	11/2
48	28	20	13/4

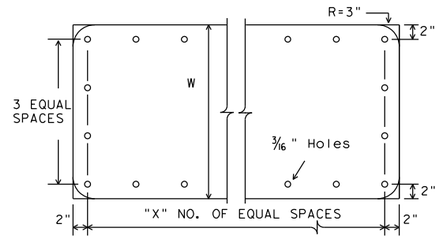


EXIT ONLY PANEL



U.S. ROUTE MARKERS

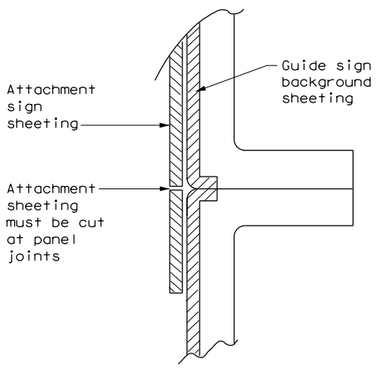
Sign Size	"Y"
24x24	2
30x24	3
36x36	3
45x36	4
48x48	4
60x48	5



STATE ROUTE MARKERS

No. of Digits	W	X
4	24	4
4	36	5
4	48	6
3	24	3
3	36	4
3	48	5

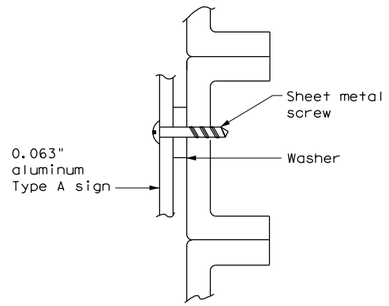
MOUNTING DETAILS OF ATTACHMENTS TO GUIDE SIGN FACE ("EXIT ONLY" AND "LEFT EXIT" PANELS, ROUTE MARKERS AND OTHER ATTACHMENTS)



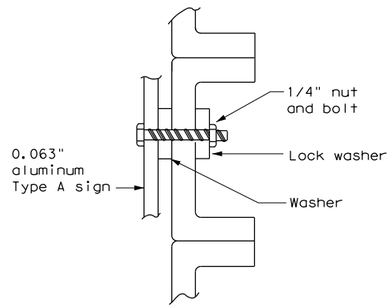
DIRECT APPLIED ATTACHMENT

NOTE:

1. Sheeting for legend, symbols, and borders must be cut at panel joints.
2. Direct applied attachment signs will be subsidiary to "Aluminum Signs" or "Fiberglass Signs".



SCREW ATTACHMENT



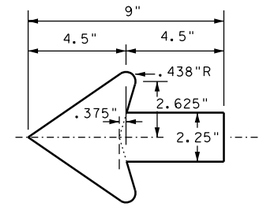
NUT/BOLT ATTACHMENT

NOTE:

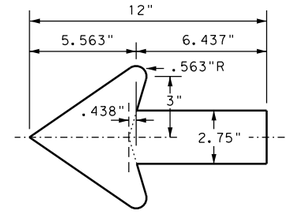
Furnish Type A aluminum sign attachments only when specified in the plans. These signs will be paid for under "Aluminum Signs".

ARROW DETAILS

for Destination Signs (Type D)



Standard arrow to be used with 6 inch letters.



Standard arrow to be used with 8 inch letters.

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

TSR(5)-13

FILE: tsr5-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	0579	02	014	FM 512
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	PARIS	HUNT		177

DATE: 5/24/2023 6:21:04 PM
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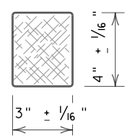
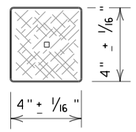
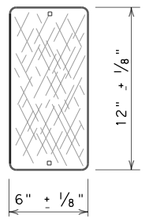
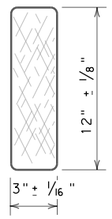
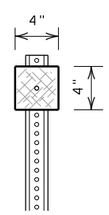
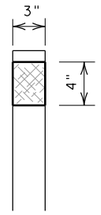
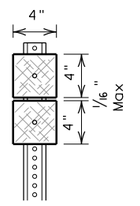
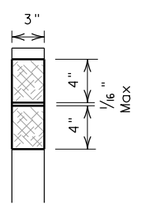
REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS

	SIZE 1	SIZE 2	SIZE 3	SIZE 4
DEVICE				
SHEETING	Yellow, White or Red Type B or C reflective sheeting			
NOTE	1. Size 1 and 4 - Direct applied reflective sheeting for use on flexible post (flx). 2. Size 2 and 3 - For use on wing channel (wc) post only. Use approved metal, plastic or fiberglass backplate with 17/64" mounting holes.			

DELINEATORS

	SINGLE		DOUBLE	
DEVICE				
	1-Size 2 reflector unit	1-Size 1 reflector unit	2-Size 2 reflector units	2-Size 1 reflector units
SHEETING	Yellow, White or Red Type B or C Reflective Sheeting			
POST TYPE	WC	YFLX, WFLX	WC	YFLX, WFLX
MOUNT TYPE	GND	GND, SRF	GND	GND, SRF

D & OM DESCRIPTIVE CODES

INSTL DEL ASSM (D-XX)SZ X (XXXX)XXX(XX)

NUMBER OF REFLECTORS
S = Single
D = Double

COLOR OF REFLECTORS
W = White
Y = Yellow
R = Red

REFLECTOR UNIT SIZE
1 or 2

TYPE OF POST OR DELINEATOR
WC = Wing Channel Post
YFLX = Yellow Flexible Post
WFLX = White Flexible Post
BRF = Barrier Reflector

TYPE OF MOUNT
GND = Embedded (drivable or set in concrete)
CTB = Concrete Barrier Mount
GF1 or GF2 = Guard Fence Attachment
SRF = Surface Mount

DIRECTION
If Required
BI = Bi-Directional
BR = Bi-Directional with red on back

INSTL OM ASSM (OM-XX) (XXXX)XXX(XX)

TYPE OF OBJECT MARKER
1, 2, 3, or 4

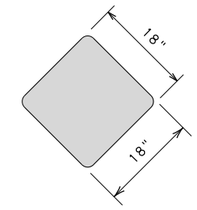
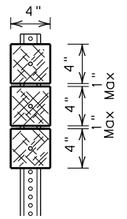
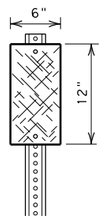
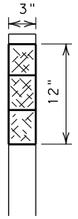
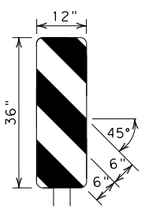
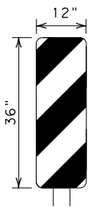
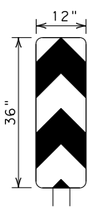
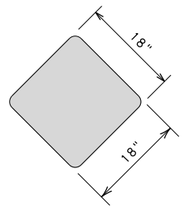
NUMBER OF REFLECTORS OR DIRECTION
X = 3-Size 2 reflector units (Type 2 only)
Y = 1-Size 3 reflector unit (Type 2 only)
Z = 3-Size 1 or 1-Size 4 reflector unit(s)(Type 2 only)
L = Left Side (Type 3 Object Marker only)
R = Right Side (Type 3 Object Marker only)
C = Center (Type 3 Object Marker only)

TYPE OF POST
WC = Wing Channel Post
WFLX = White Flexible Post
TWT = Thin Walled Tubing

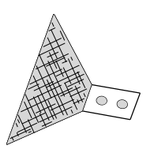
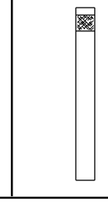
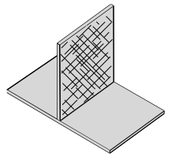
TYPE OF MOUNT
GND = Embedded (drivable)
SRF = Surface Mount
WAS = Wedge Anchor Steel
WAP = Wedge Anchor Plastic

DIRECTION
If Required
BI = Bi-Directional

OBJECT MARKERS

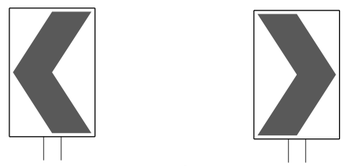
	Type 1 (OM-1)	Type 2 (OM-2)			Type 3 (OM-3)			Type 4 (OM-4)
	OM-1	OM-2X	OM-2Y	OM-2Z	OM-3L	OM-3R	OM-3C	OM-4
DEVICE								
		3-Size 2 reflector units	1-Size 3 reflector unit	3-Size 1 reflector units or 1-Size 4 reflector unit				
SHEETING	Yellow-Type B_{FL} or C_{FL} Sheeting	Yellow - Type B or C Sheeting			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			
NOTE	1. Barrier reflectors shall meet the requirements of DMS 8600. 2. Approved Barrier Reflectors are listed on the "Barrier Reflectors" Material Producer List at: www.txdot.gov.		
SHEETING	Yellow, White, Red		
NOTE	1. Reflective sheeting shall have a minimum dimension of 3 inches and minimum surface area of 9 square inches.		

CHEVRONS

DEVICE



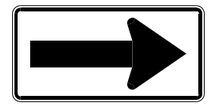
W1-8

SIZE (W x L)	18"x 24" (Conventional)	24"x 30" (Conventional Oversize)	30"x 36" (Expressway)	36" x 48" (Freeway)
MOUNTING HEIGHT	4'-0" or 7'-0"		7'-0" Only	

NOTE
1. CHEVRON (W1-8) signs and ONE DIRECTION LARGE ARROW (W1-6) Signs shall be installed per Sign Mounting Details (SMD) Standard Sheets and paid under Item 644 (Small Roadside Sign Assemblies).
2. When there is a need to increase conspicuity, the Texas version of the ONE DIRECTION LARGE ARROW sign (W1-9T) may be used instead of the ONE DIRECTION LARGE ARROW (W1-6).

ONE DIRECTION LARGE ARROW

DEVICE



W1-6

SIZE (W x L)	48" x 24" (Conventional)	60" x 30" (Expressway & Freeway)
MOUNTING HEIGHT	7'-0"	

DEPARTMENTAL MATERIAL SPECIFICATIONS

FLEXIBLE DELINEATOR & OBJECT MARKER POSTS (EMBEDDED & SURFACE MOUNT TYPES)	DMS-4400
SIGN FACE MATERIALS	DMS-8300
DELINEATORS, OBJECT MARKERS AND BARRIER REFLECTORS	DMS-8600

NOTE:

Delineator and object marker substrates and sign substrates shall be 0.080" Aluminum sign blank to conform to ASTM B-209 Alloy 6061-T6 or approved alternative.

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
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10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	PARIS	HUNT		178

20A

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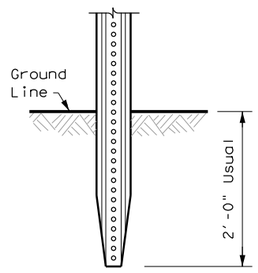
POST TYPE AND SUPPORT FOUNDATION DETAILS

WING CHANNEL (WC)

GND

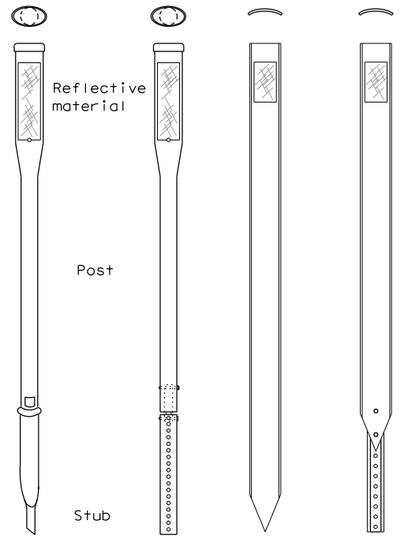


NOTES

1. Embedded Wing Channel (WC) post option may be used for Type 2 Object Markers and Delineators only.
2. 1.12 lbs/ft steel per ASTM A 1011 SS Gr. 50, or ASTM A499.

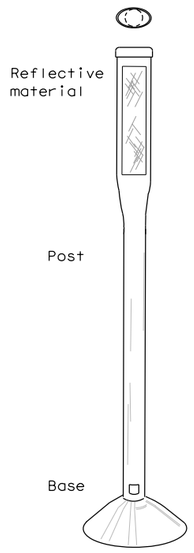
FLEXIBLE POSTS (YFLX, WFLX)

GND



EMBEDDED

SRF



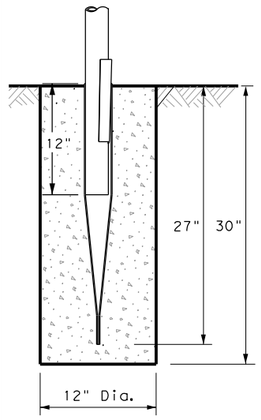
SURFACE MOUNT

NOTES

1. See "Flexible Delineator and Object Marker Posts" Material Producer List for approved devices.
2. Install per manufacturer's recommendations.
3. Post length may vary to meet field conditions.
4. When using yellow delineators with flexible posts to separate opposing direction of travel, such as centerline or median use, the flexible posts shall be yellow.

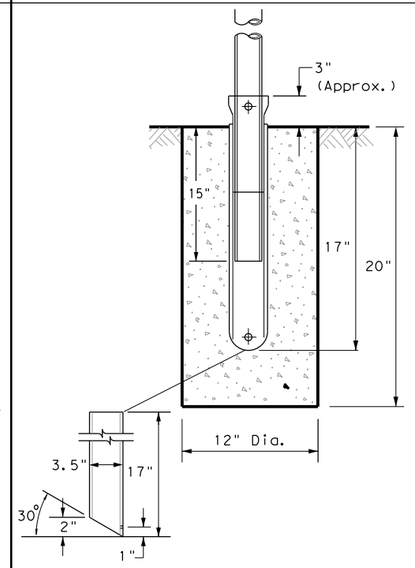
WEDGE ANCHOR SYSTEMS

WAS



STEEL

WAP



PLASTIC

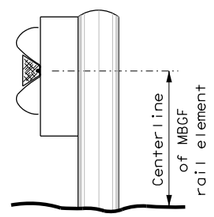
NOTE

1. Install per manufacturer's recommendations.

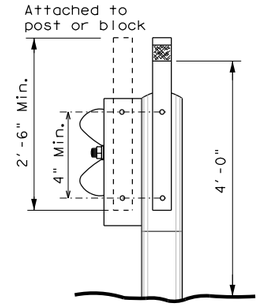
TYPE OF BARRIER MOUNTS

GUARD FENCE ATTACHMENT

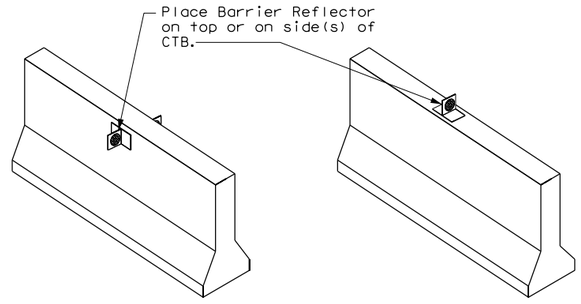
GF1



GF2



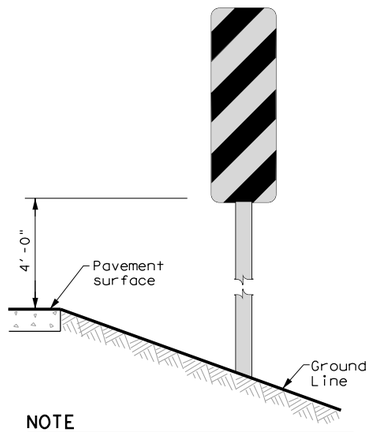
CONCRETE TRAFFIC BARRIER (CTB)



GENERAL NOTES

1. Place delineators on a section of roadway at a consistent distance from the edge of pavement.
2. Where a restriction prevents consistent placement from the pavement edge, place the affected object markers in line with the innermost edge of the obstruction.
3. When Type 2 object markers and delineators are more than 8'-0" from the edge of the pavement, it may not be possible to maintain a height of approximately 4'-0". If this is the case, place the object marker or delineator as close to the desired height as possible.
4. Install all delineators, object markers and barrier reflectors in accordance with the manufacturer's recommendation.
5. Barrier reflectors should be installed a minimum of 18 inches above the edge of the pavement surface.
6. Diagonal stripes on Type 3 object markers shall slope down toward the intended travel lane.

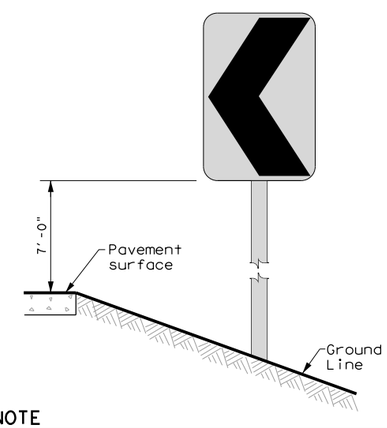
TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS



NOTE

Mounting at 4 feet to the bottom of the chevron is permitted for chevrons that will not exceed a height of 6'-6" to the top of the chevron (sizes 24" x 30" and smaller)

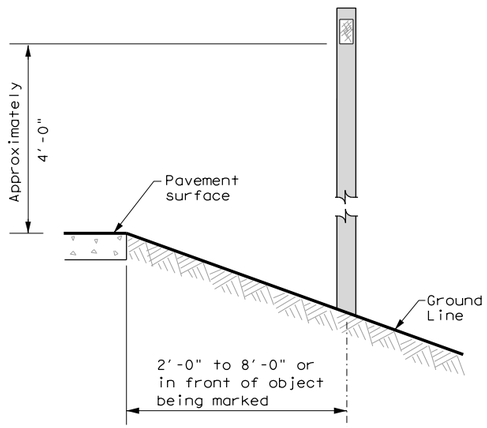
CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN



NOTE

Chevrons 30" x 36" and larger shall be mounted at a height of 7' to the bottom of the chevron. Chevron sign and ONE DIRECTION LARGE ARROW sign (W1-9T) shall be installed per SMD standard sheets and paid under item 644.

DELINEATORS AND TYPE 2 OBJECT MARKERS



See general notes 1, 2 and 3.

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER INSTALLATION

D & OM(2)-20

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© TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
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10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	PARIS	HUNT		179

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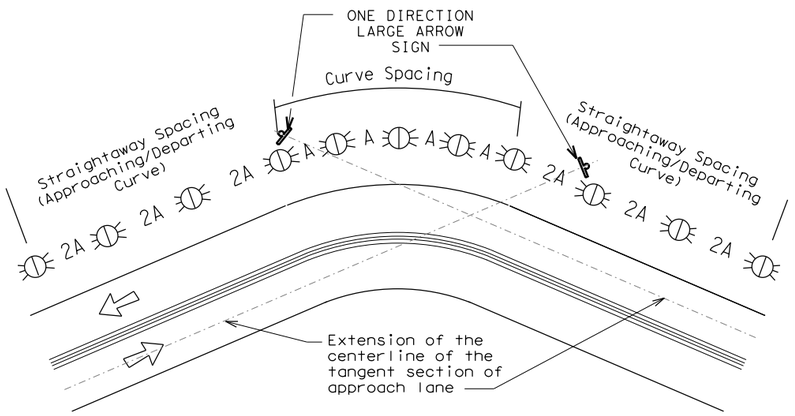
MINIMUM WARNING DEVICES AT CURVES WITH ADVISORY SPEEDS

Amount by which Advisory Speed is less than Posted Speed	Curve Advisory Speed	
	Turn (30 MPH or less)	Curve (35 MPH or more)
5 MPH & 10 MPH	• RPMs	• RPMs
15 MPH & 20 MPH	• RPMs and One Direction Large Arrow sign	• RPMs and Chevrons; or • RPMs and One Direction Large Arrow sign where geometric conditions or roadside obstacles prevent the installation of chevrons.
25 MPH & more	• RPMs and Chevrons; or • RPMs and One Direction Large Arrow sign where geometric conditions or roadside obstacles prevent the installation of chevrons	• RPMs and Chevrons

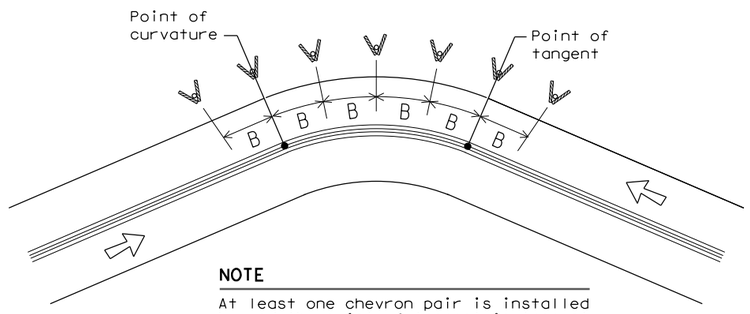
SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES



NOTE

ONE DIRECTION LARGE ARROW (W1-6) sign should be located at approximately and perpendicular to the extension of the centerline of the tangent section of approach lane.

SUGGESTED SPACING FOR CHEVRONS ON HORIZONTAL CURVES



NOTE

At least one chevron pair is installed beyond the point of tangent in tangent section.

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS KNOWN

Degree of Curve	FEET			
	Radius of Curve	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
		A	2A	B
1	5730	225	450	——
2	2865	160	320	——
3	1910	130	260	200
4	1433	110	220	160
5	1146	100	200	160
6	955	90	180	160
7	819	85	170	160
8	716	75	150	160
9	637	75	150	120
10	573	70	140	120
11	521	65	130	120
12	478	60	120	120
13	441	60	120	120
14	409	55	110	80
15	382	55	110	80
16	358	55	110	80
19	302	50	100	80
23	249	40	80	80
29	198	35	70	40
38	151	30	60	40
57	101	20	40	40

Curve delineator approach and departure spacing should include 3 delineators spaced at 2A. This spacing should be used during design preparation or when the degree of curve is known.

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS NOT KNOWN

Advisory Speed (MPH)	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
	A	2xA	B
65	130	260	200
60	110	220	160
55	100	200	160
50	85	170	160
45	75	150	120
40	70	140	120
35	60	120	120
30	55	110	80
25	50	100	80
20	40	80	80
15	35	70	40

If the degree of curve is not known, delineator spacing may be determined based on the Advisory Speed of the curve. Use the delineator curve spacing for each Advisory Speed (MPH).

DELINEATOR AND OBJECT MARKER APPLICATION AND SPACING

CONDITION	REQUIRED TREATMENT	MINIMUM SPACING
Frwy./Exp. Tangent	RPMs	See PM-series and FPM-series standard sheets
Frwy./Exp. Curve	Single delineators on right side	See delineator spacing table
Frwy/Exp.Ramp	Single delineators on at least one side of ramp (should be on outside of curves) (see Detail 3 on D&OM(4))	100 feet on ramp tangents Use delineator spacing table for ramp curves ("straightway spacing" does not apply to ramp curves)
Acceleration/Deceleration Lane	Double delineators (see Detail 3 on D&OM(4))	100 feet (See Detail 3 on D & OM (4))
Truck Escape Ramp	Single red delineators on both sides	50 feet
Bridge Rail (steel or concrete)and Metal Beam Guard Fence	Bi-Directional Delineators when undivided with one lane each direction Single Delineators when multiple lanes each direction	Equal spacing (100'max) but not less than 3 delineators
Concrete Traffic Barrier (CTB) or Steel Traffic Barrier	Barrier reflectors matching the color of the edge line	Equal spacing 100' max
Cable Barrier	Reflectors matching the color of the edge line	Every 5th cable barrier post (up to 100'max)
Guard Rail Terminus/Impact Head	Divided highway - Object marker on approach end Undivided 2-lane highways - Object marker on approach and departure end	Requires reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end See D & OM (5) and D & OM (6)
Bridges with no Approach Rail	Type 3 Object Marker (OM-3) at end of rail and 3 single delineators approaching rail	See D & OM(5)
Reduced Width Approaches to Bridge Rail	Type 2 and Type 3 Object Markers (OM-3) and 3 single delineators approaching bridge	Requires reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end See D & OM (5)
Culverts without MBGF	Type 2 Object Markers	See Detail 2 on D & OM(4)
Crossovers	Double yellow delineators and RPMs	See Detail 1 on D & OM (4)
Pavement Narrowing (lane merge) on Freeways/Expressway	Single delineators adjacent to affected lane for full length of transition	100 feet

NOTES

1. Unless indicated otherwise, the delineator or barrier reflector color shall conform to the color of the pavement edge line on the side of the road where the delineators or barrier reflectors are placed.
2. Barrier reflectors may be used to replace required delineators.
3. Single red delineators may be mounted on the back side of delineator posts for wrong way driver applications

LEGEND

	Bi-directional Delineator
	Delineator
	Sign

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(3)-20

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8-15 7-20	PARIS	HUNT		180

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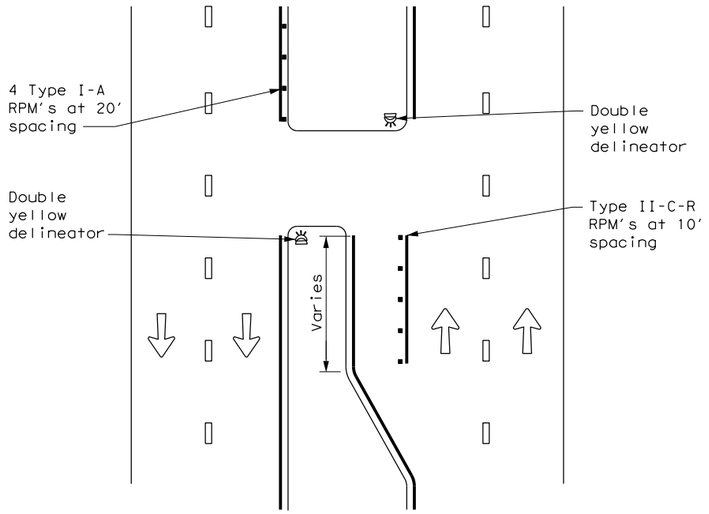
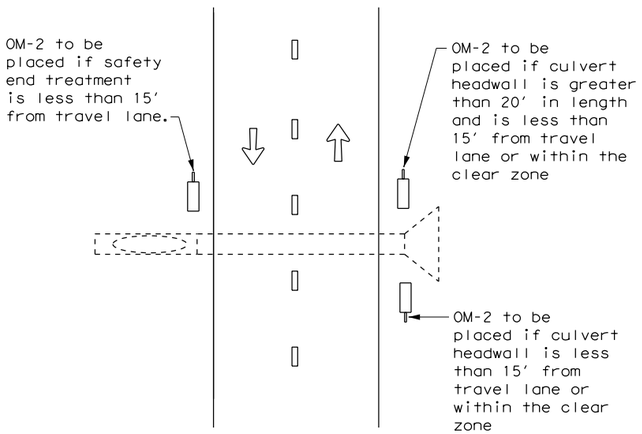
CROSSOVERS



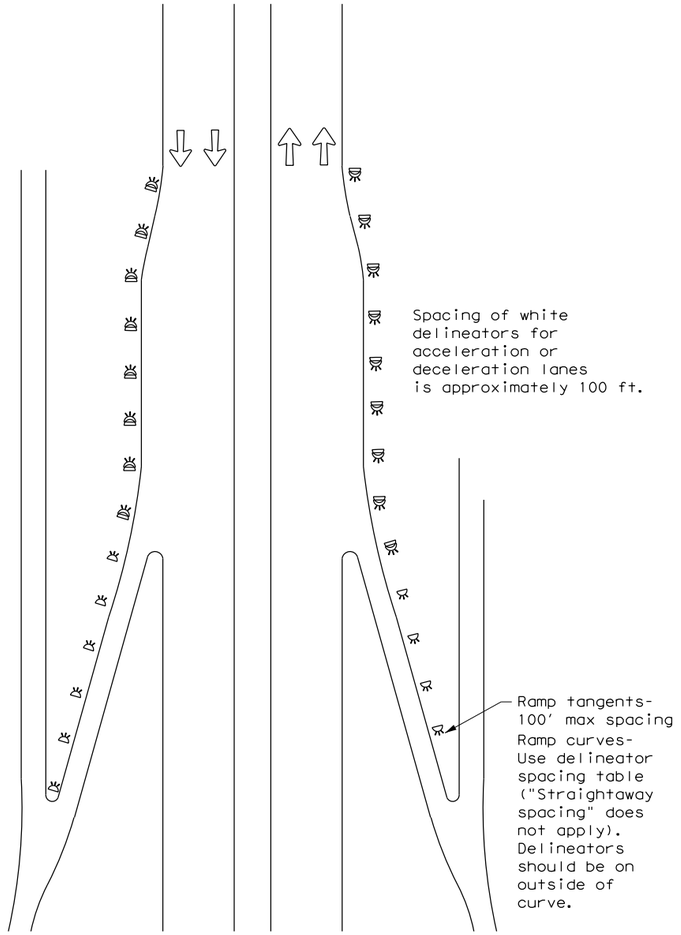
DETAIL 1

FOR CULVERTS WITHOUT MBGF



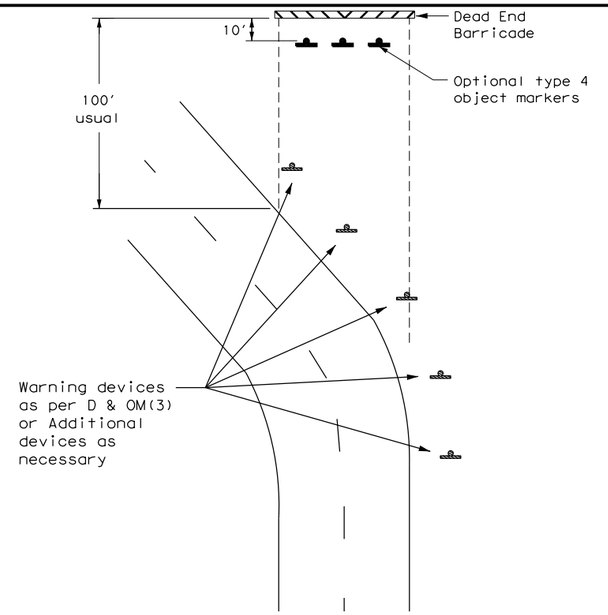
DETAIL 2

FREEWAY DELINEATION FOR RAMPS AND ACCELERATION/DECELERATION LANES



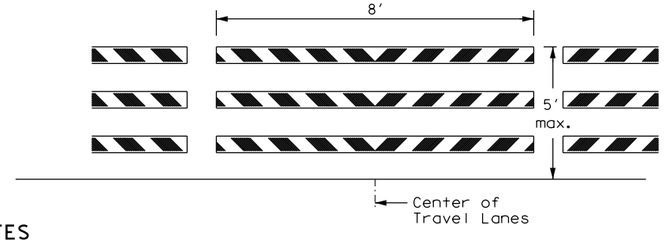
DETAIL 3

TYPICAL APPLICATION OF DEAD END BARRICADE



DETAIL 4

TYPICAL DEAD END BARRICADE INSTALLATION



NOTES

1. Barricade striping shall be red and white reflective sheeting for all permanent road closures.
2. Barricade striping is red and white sloping toward the center of the roadway.
3. Type 3 Barricade Supports should be anchored to soil or pavement as described in compliant Work Zone Traffic Control Devices List, section D.2.f and D.2.g.

DETAIL 5

LEGEND	
	Bidirectional Delineator
	Delineator
	OM-3
	Barricade
	Sign
	OM-2
	Double Delineator

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(4)-20

FILE: dom4-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
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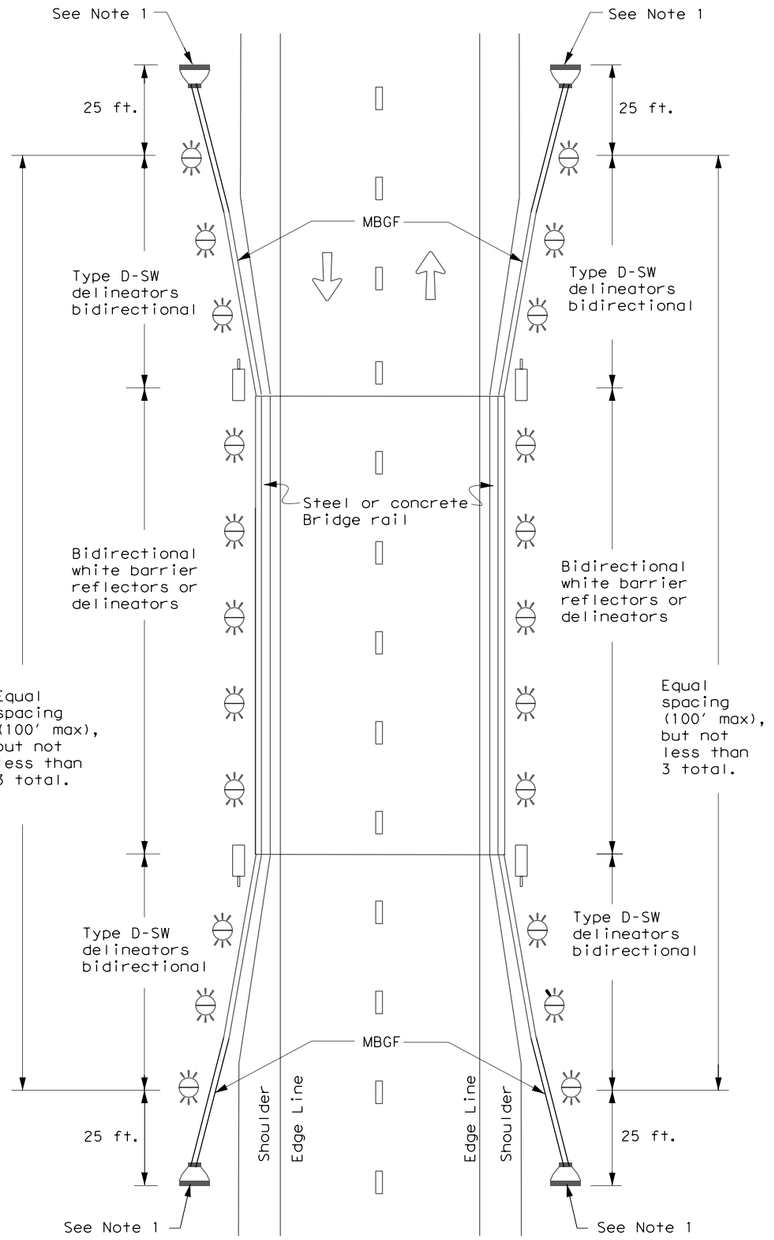
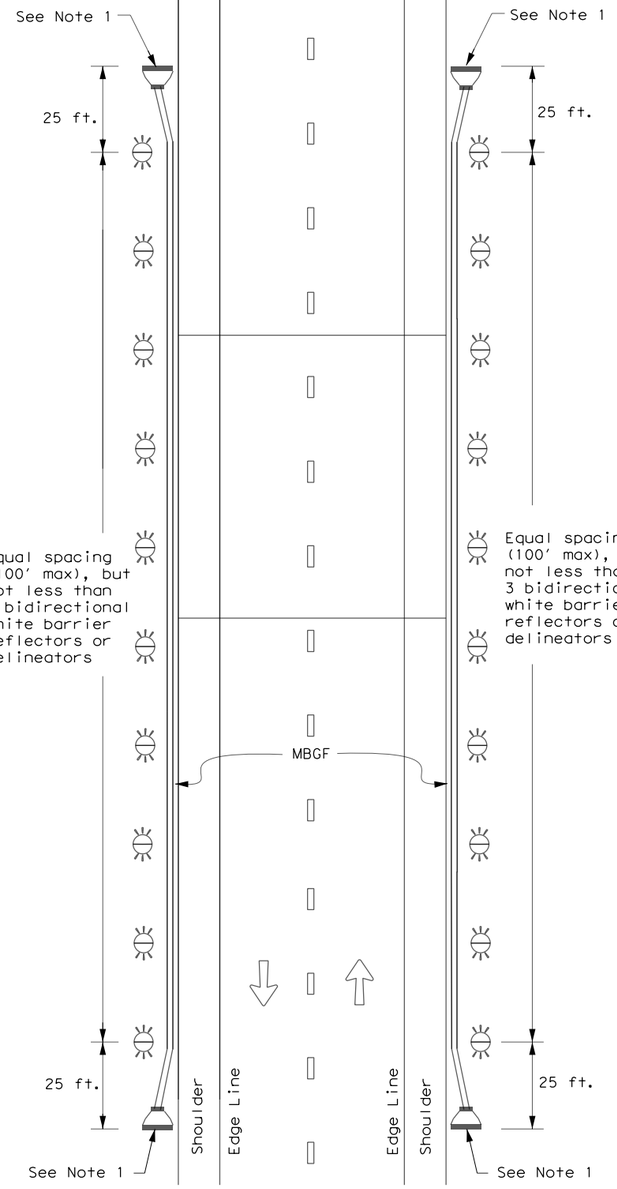
TWO-WAY, TWO LANE ROADWAY WITH REDUCED WIDTH APPROACH RAIL



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.

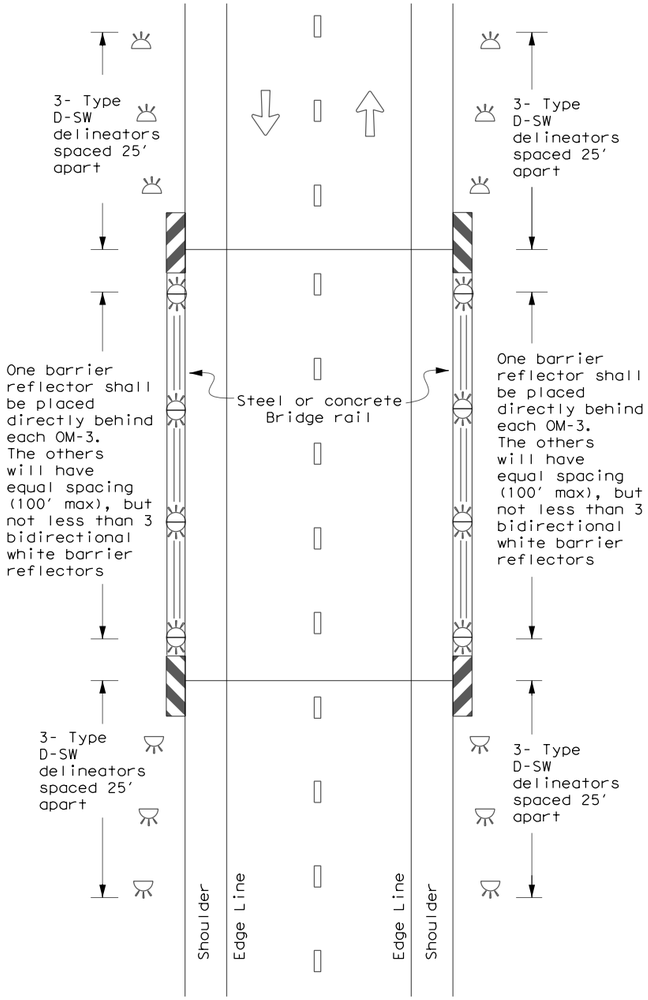
TWO-WAY, TWO LANE ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



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

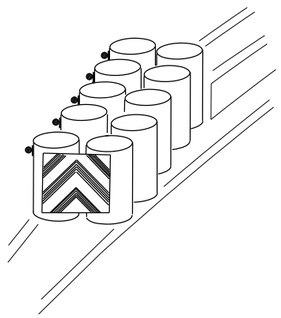
Traffic Safety Division Standard

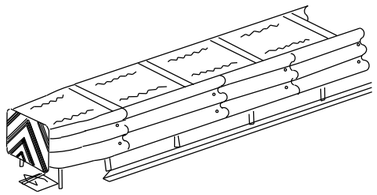
DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

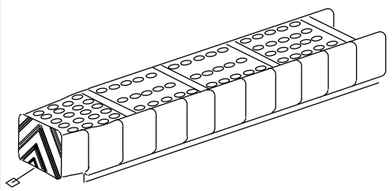
D & OM(5)-20

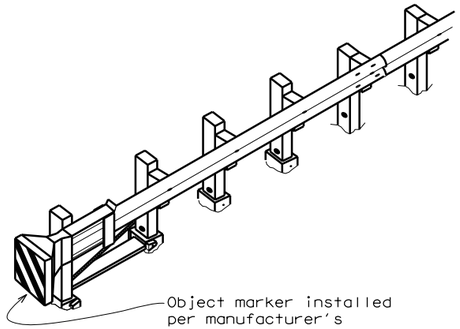
FILE: dom5-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	0579	02	014	FM 512
7-20	DIST	COUNTY		SHEET NO.
	PARIS	HUNT		182

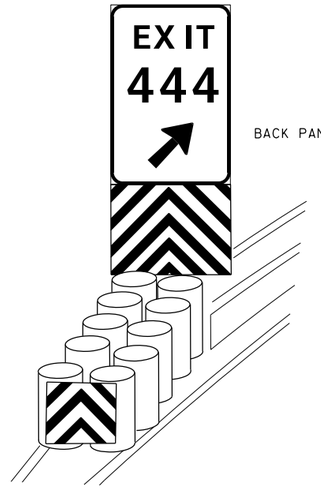
20E

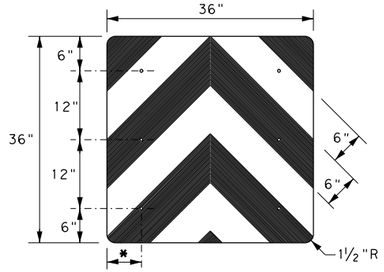


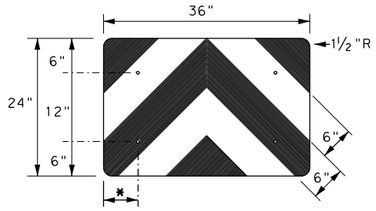




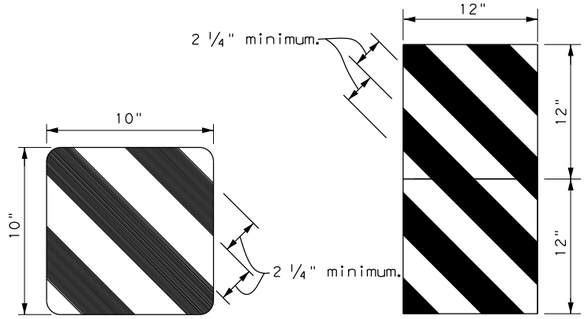




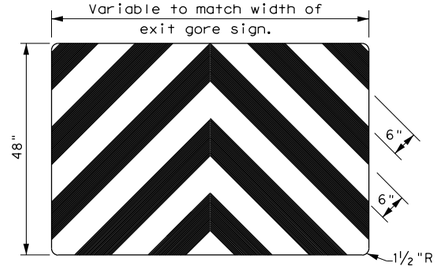


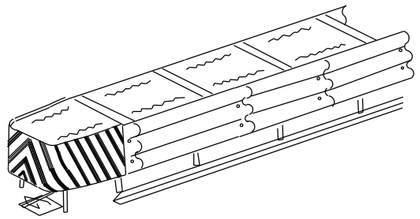


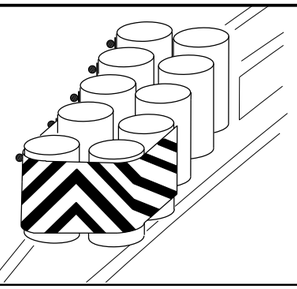
* Adjust to fit attenuator per manufacturer's recommendation, or as directed by the Engineer

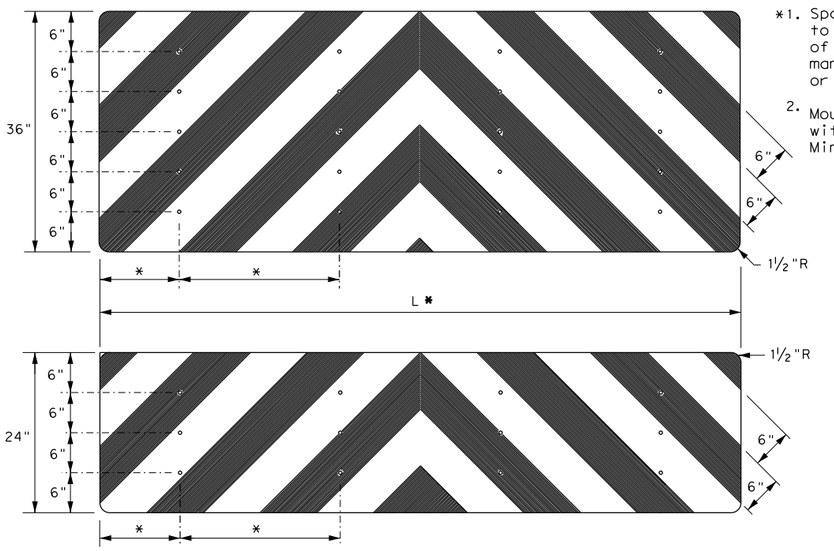


OBJECT MARKERS SMALLER THAN 3 FT^2









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
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4-92 8-04	DIST	COUNTY		SHEET NO.
8-95 3-15	PARIS	HUNT		183
4-98 7-20				

20G

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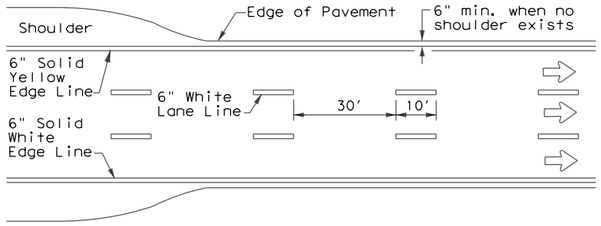
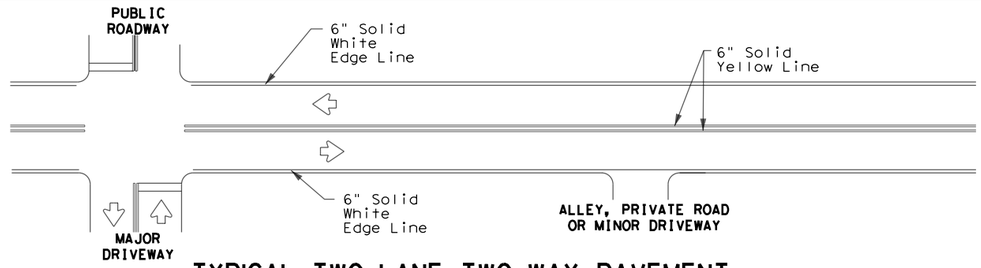
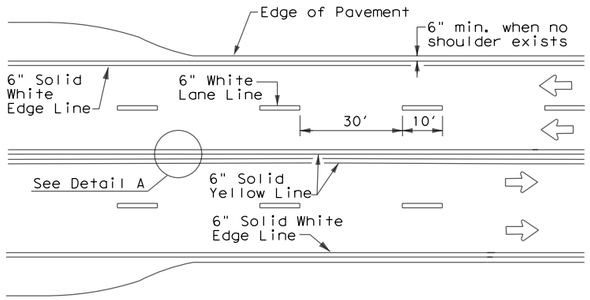
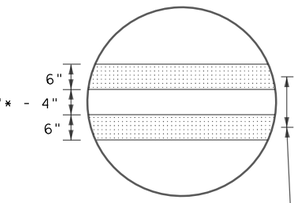


EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS



TYPICAL TWO-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS





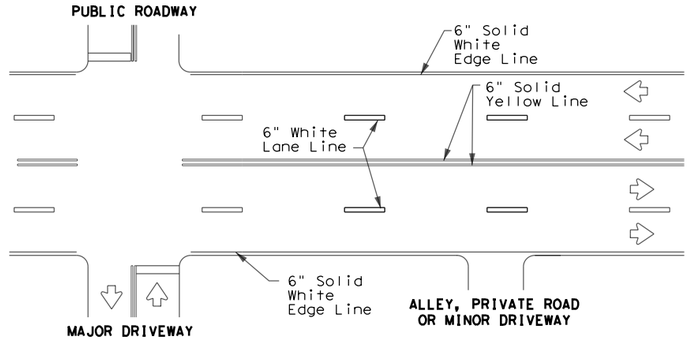
DETAIL "A"

9"** min. - 10" typ.
(18" max. for traveled way greater than 48' only)

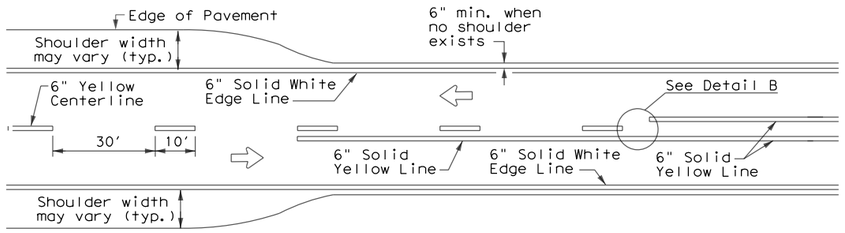
CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS

* 2" minimum for restripe projects when approved by the Engineer.

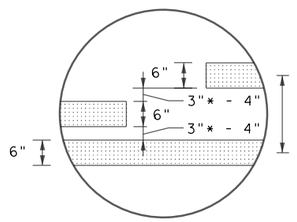
** 8" minimum for restripe projects when approved by the Engineer.



TYPICAL MULTI-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS

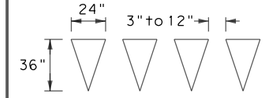


TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



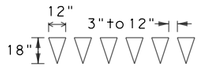
DETAIL "B"

* 2" minimum for restripe projects when approved by the Engineer.

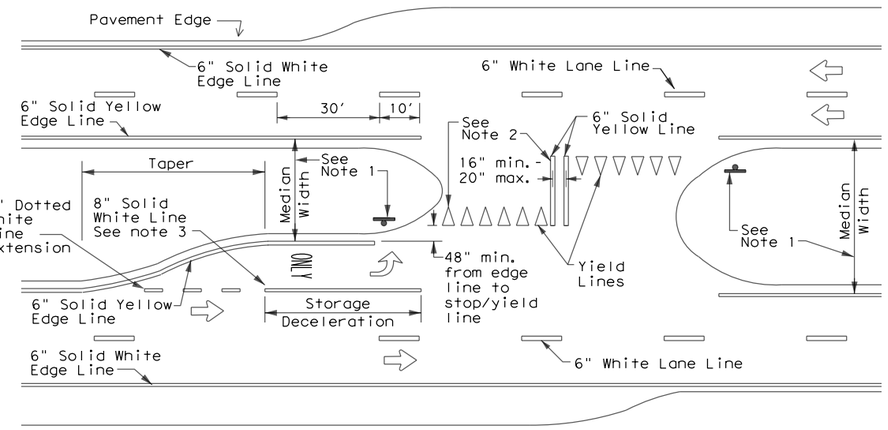


For posted speed on road being marked equal to or greater than 45 MPH.

YIELD LINES



For posted speed on road being marked equal to or less than 40 MPH.



FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

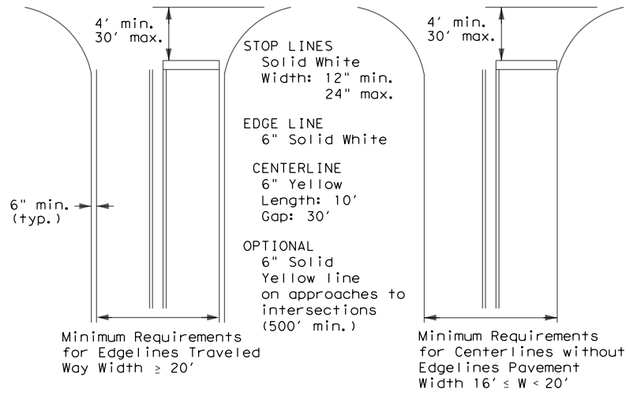
1. Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections.
   Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling width to determine if signs are required. Yield signs are the typical intersection control. Stop signs and stop bars are optional as determined by the Engineer.
2. Install median striping (double yellow centerlines and stop lines/yield lines) when a 50' or greater median centerline can be placed. Stop lines shall only be used with stop signs. Yield lines shall only be used with yield signs.
3. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

GENERAL NOTES

1. Edge line striping shall be as shown in the plans or as directed by the Engineer. The edge line should not be placed less than 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edge lines are not required in curb and gutter sections of roadways.
2. The traveled way includes only that portion of the roadway used for vehicular travel. It does not include the parking lanes, sidewalks, berms and shoulders. The traveled ways shall be measured from the center of edge line to the center of edge line of a two lane roadway.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



NOTE: Traveled way is exclusive of shoulder widths. Refer to General Note 2 for additional details.

GUIDE FOR PLACEMENT OF STOP LINES, EDGE LINE & CENTERLINE

Based on Traveled Way and Pavement Widths for Undivided Roadways

Texas Department of Transportation

Traffic Safety Division Standard

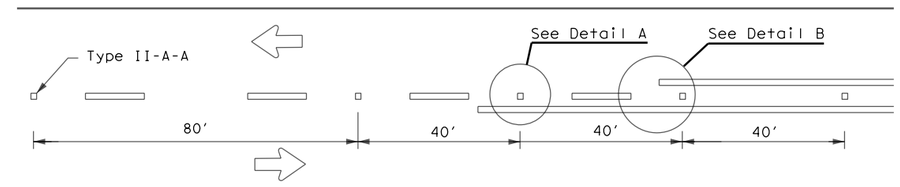
TYPICAL STANDARD PAVEMENT MARKINGS

PM(1)-22

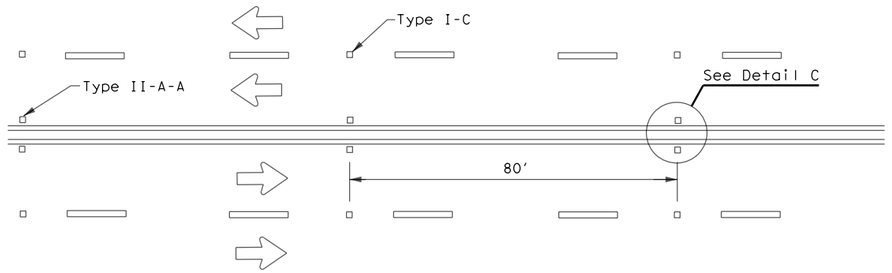
FILE: pm1-22.dgn	DN:	CK:	DW:	CK:
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 11-78 8-00 6-20	0579	02	014	FM 512
8-95 3-03 12-22	DIST	COUNTY		SHEET NO.
5-00 2-12	PARIS	HUNT		184

22A

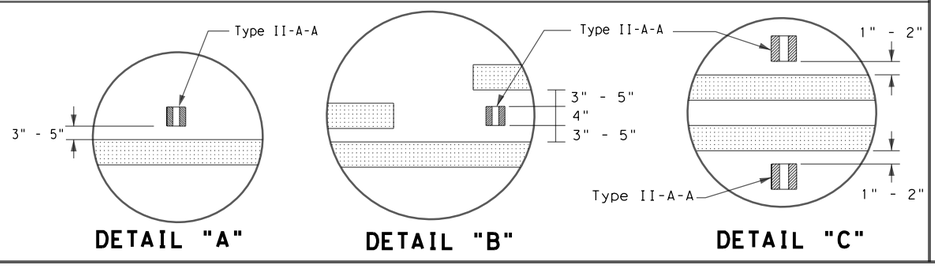
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE



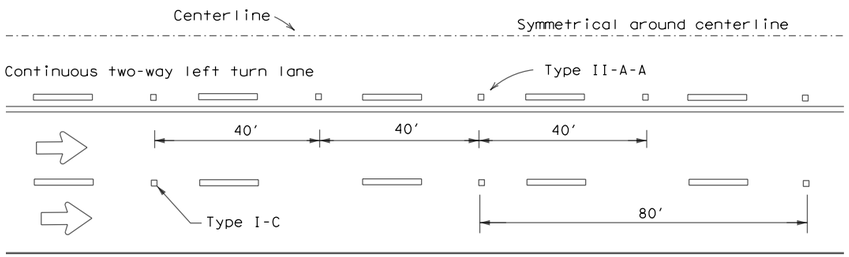
CENTERLINE FOR ALL TWO LANE TWO-WAY ROADWAYS



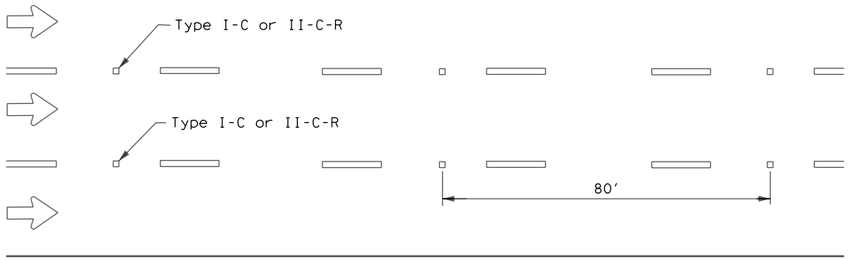
CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY ROADWAYS



DETAIL "A" **DETAIL "B"** **DETAIL "C"**



CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



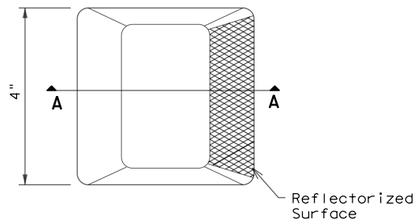
LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.

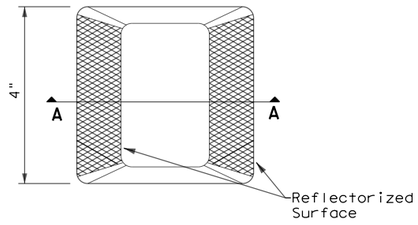
See Note 3.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

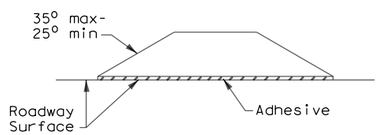
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)

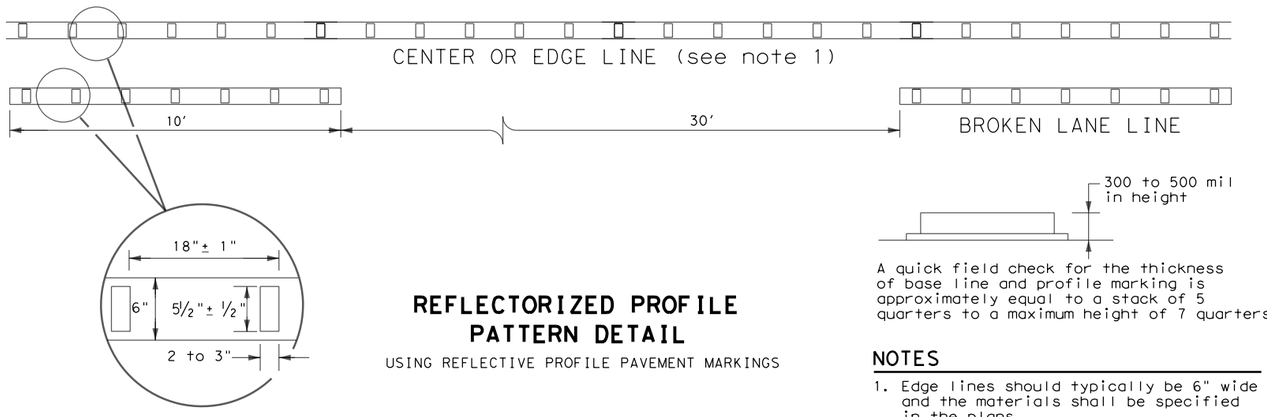


Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS



6" EDGE LINE, 6" CENTERLINE OR 6" LANE LINE

REFLECTORIZED PROFILE PATTERN DETAIL

USING REFLECTIVE PROFILE PAVEMENT MARKINGS

A quick field check for the thickness of base line and profile marking is approximately equal to a stack of 5 quarters to a maximum height of 7 quarters.

NOTES

1. Edge lines should typically be 6" wide and the materials shall be specified in the plans.
2. Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

GENERAL NOTES

1. All raised pavement markers placed along broken lines shall be placed in line with and midway between the stripes.
2. On concrete pavements the raised pavement markers should be placed to one side of the longitudinal joints.
3. Use raised pavement marker Type I-C with undivided roadways, flush medians and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.

Texas Department of Transportation

Traffic Safety Division Standard

POSITION GUIDANCE USING RAISED MARKERS RELECTORIZED PROFILE MARKINGS PM(2)-22

FILE: pm2-22.dgn	DN:	CK:	DW:	CK:
©TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
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	DIST	COUNTY		SHEET NO.
	PARIS	HUNT		185

22B

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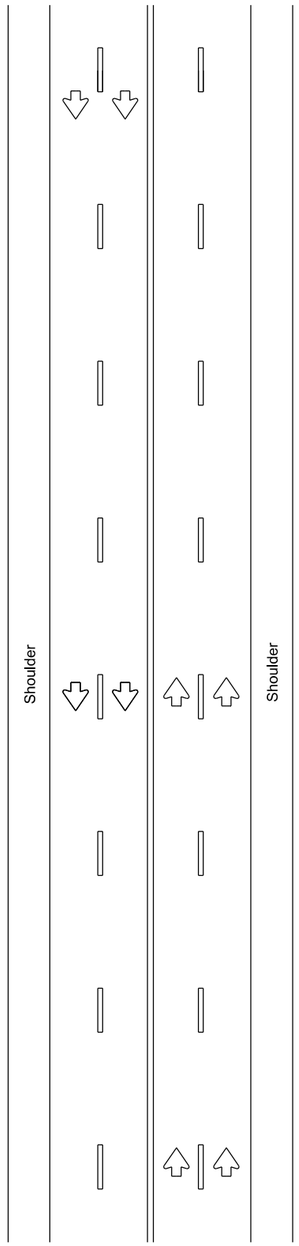
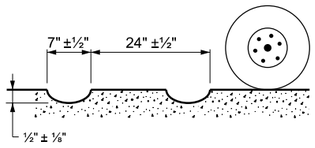
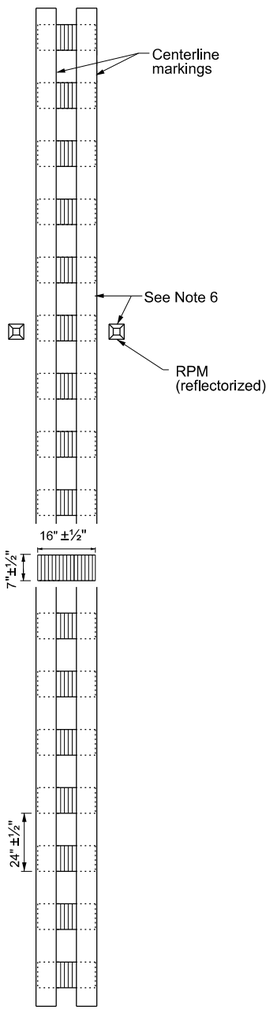
CENTERLINE RUMBLE STRIPS



MULTILANE UNDIVIDED HIGHWAY WITH SHOULDER

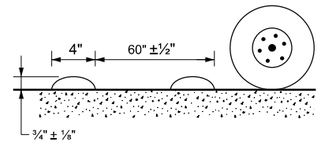


PROFILE VIEW

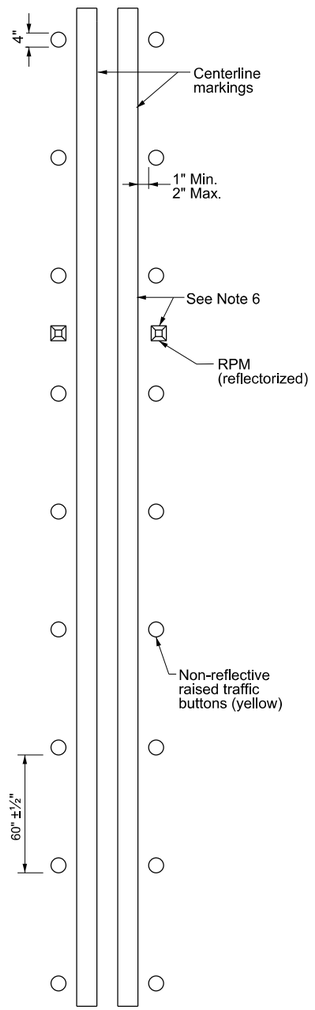


PLAN VIEW
OPTION 1

MILLED CENTERLINE RUMBLE STRIPS

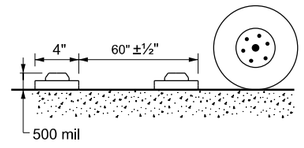


PROFILE VIEW

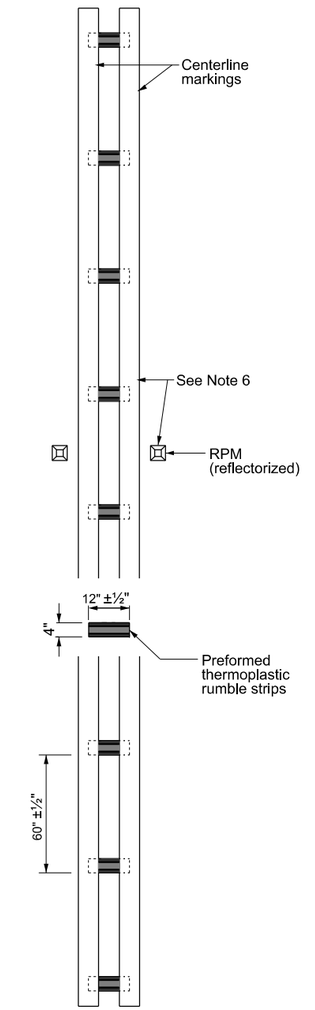


PLAN VIEW
OPTION 2

RAISED CENTERLINE RUMBLE STRIPS

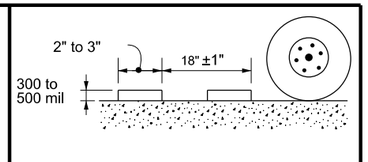


PROFILE VIEW

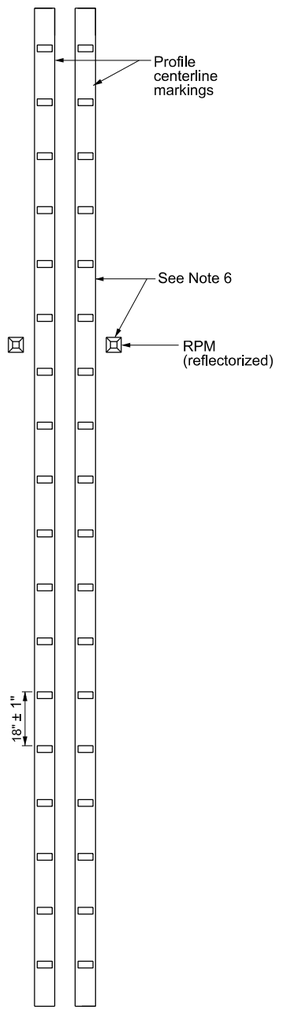


PLAN VIEW
OPTION 3

PREFORMED THERMOPLASTIC RUMBLE STRIPS



PROFILE VIEW



PLAN VIEW
OPTION 4

PROFILE CENTERLINE MARKINGS

GENERAL NOTES

1. This standard sheet provides guidelines for installing centerline rumble strips on multilane undivided highways.
2. Centerline and edge line rumble strips or profile markings shall not be placedon 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 beused if approved by the Traffic Safety Division.
5. Breaks in milled centerline rumble strips shall occur at least 50 feet and nomore than 150 feet in advance of bridges, railroad crossing, intersections ordriveways 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 for normal centerline spacing. For wider medians, specify in the plans the exact placement of the rumble strips. Place the rumble strips under each centerline marking or centered in the middle of the median.

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 color of the button should be yellow for a continuous no passing roadway. The button will be paid for under Item 672, "Raised Pavement Markers." Non-reflective traffic buttons must meet the requirements of DMS-4300.
11. Consideration shall be given to bicyclists. See RS(6).

WHEN INSTALLING EDGE LINE RUMBLE STRIPS WITH OR WITHOUT CENTERLINE RUMBLE STRIPS ON UNDIVIDED HIGHWAYS:

12. See standard sheet RS(2).

Texas Department of Transportation

Traffic Safety Division Standard

CENTERLINE RUMBLE STRIPS ON MULTILANE UNDIVIDED HIGHWAYS RS(3)-23

FILE: rs(3)-23.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT January 2023	CONT	SECT	JOB	HIGHWAY
REVISIONS	0579	02	014	FM 512
10-13 1-23	DIST	COUNTY		SHEET NO.
	PARIS	HUNT		186

DATE: 5/24/2023 6:21:06 PM
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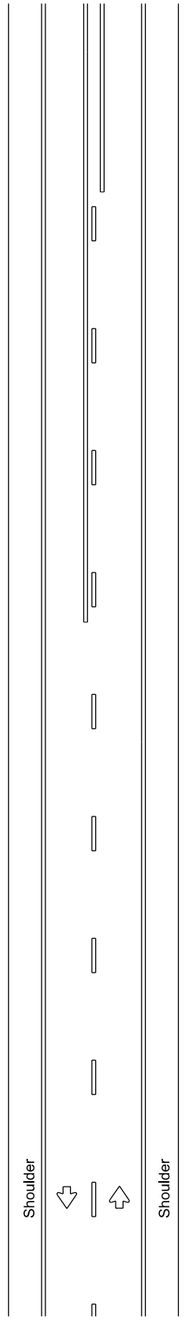
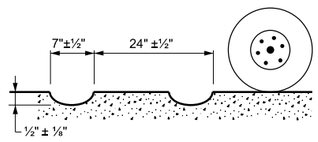
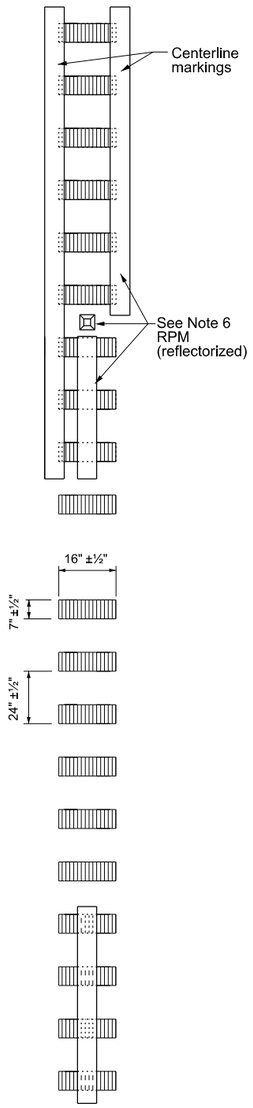


TWO LANE TWO-WAY HIGHWAYS

CENTERLINE RUMBLE STRIPS

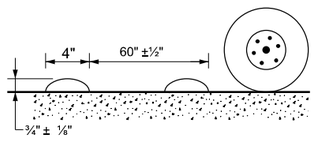


PROFILE VIEW

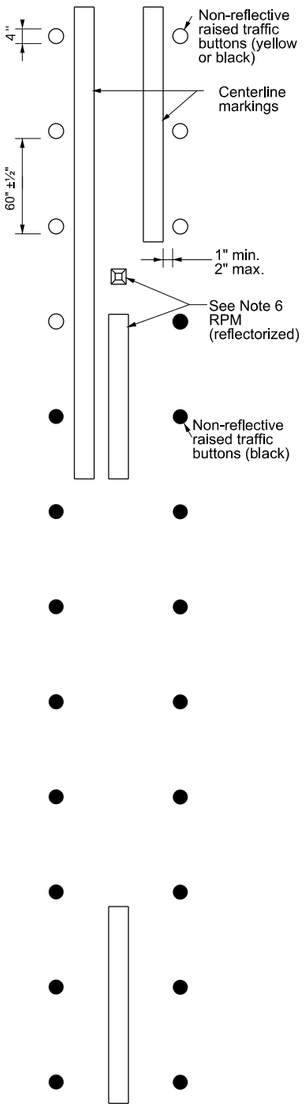


PLAN VIEW
OPTION 1

MILLED CENTERLINE RUMBLE STRIPS

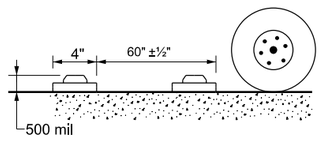


PROFILE VIEW

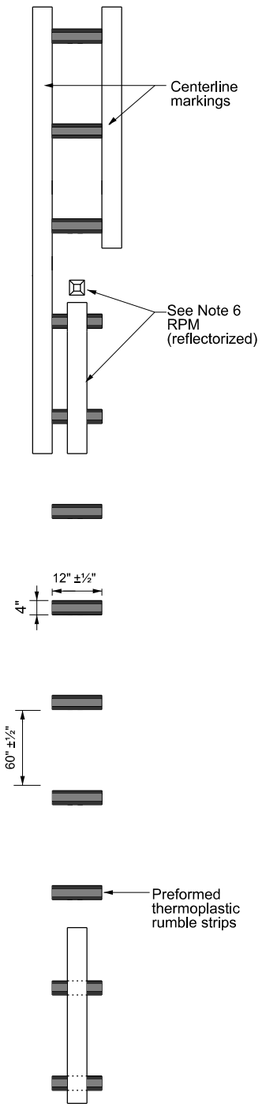


PLAN VIEW
OPTION 2

RAISED CENTERLINE RUMBLE STRIPS

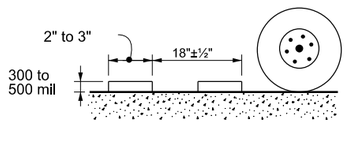


PROFILE VIEW

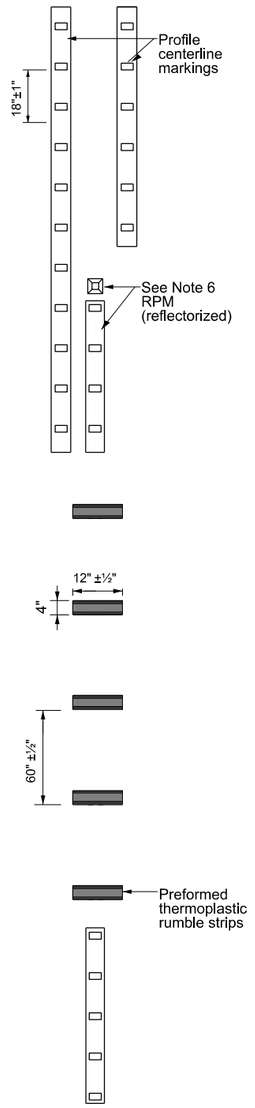


PLAN VIEW
OPTION 3

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	0579	02	014	FM 512
10-13	DIST	COUNTY		SHEET NO.
1-23	PARIS	HUNT		187

STORMWATER POLLUTION PREVENTION PLAN (SWP3):

This SWP3 has been developed in accordance with the TPDES Construction General Permit TXR150000 (CGP). The Texas Department of Transportation (TxDOT) ensures that project specifications include adequate best management practices (BMPs) for this project.

For all projects with any soil disturbing activities, TxDOT will maintain a SWP3 with all pertinent records, correspondence, environmental documents, etc. at the project field office. If no field office is available, then this SWP3 shall be kept in the appropriate TxDOT Area Office.

This SWP3 is consistent with requirements specified in applicable stormwater plans and the projects environmental permits, issues, and commitments (EPICs). A copy of the CGP is included in Attachment 2.12 of the SWP3 binder.

1.0 SITE/PROJECT DESCRIPTION

1.1 PROJECT CONTROL SECTION JOB (CSJ):
0579-02-014

1.2 PROJECT LIMITS:
From: SH 34

To: FM 118

1.3 PROJECT COORDINATES:
BEGIN: (Lat) 33.362623 ,(Long) -96.070109

END: (Lat) 33.265105 ,(Long) -96.009922

1.4 TOTAL PROJECT AREA (Acres): 104.86

1.5 TOTAL AREA TO BE DISTURBED (Acres): 45.55

1.6 NATURE OF CONSTRUCTION ACTIVITY:
RECONSTRUCTION OF EXISTING ROADWAY CONSISTING OF REWORKING BASE, GEOGRID, FLEXBASE, SURFACE TREATMENTS AND STRUCTURES

1.7 MAJOR SOIL TYPES:

Soil Type	Description
CROCKETT LOAM	1 TO 3 PERCENT SLOPES, ERODED
LESON CLAY	1 TO 3 PERCENT SLOPES
WILSON SILT LOAM	0 TO 1 PERCENT SLOPES

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
OYSTER CREEK TO UPPER SULPHUR RIVER	CLASSIFIED IMPAIRED SEGMENT 0306
TURKEY CREEK TO UPPER SULPHUR RIVER	CLASSIFIED IMPAIRED SEGMENT 0306
RAYS CREEK TO UPPER SULPHUR RIVER	CLASSIFIED IMPAIRED SEGMENT 0306

* 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
PAUL A. WARDEN
101319
LICENSED
PROFESSIONAL ENGINEER

Paul A. Warden, P.E. 5/24/2023

STORMWATER POLLUTION PREVENTION PLAN (SWP3)

Sheet 1 of 2

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
			188
STATE	STATE DIST.	COUNTY	
TEXAS	PARIS	HUNT	
CONT.	SECT.	JOB	HIGHWAY NO.
0579	02	014	FM 512

STORMWATER POLLUTION PREVENTION PLAN (SWP3):

2.0 BEST MANAGEMENT PRACTICES (BMPs) AND CONTROLS, INSPECTION, AND MAINTENANCE

The Contractor shall be the responsible party for implementing the BMPs described herein and for complying with the SWP3 for control of erosion and sedimentation during day-to-day operations. The Contractor shall implement changes to this SWP3 approved by TxDOT within the times specified in this SWP3 or the CGP.

2.1 EROSION CONTROL AND SOIL STABILIZATION BMPs:

T / P

- [X] [ ] Protection of Existing Vegetation
- [X] [ ] Vegetated Buffer Zones
- [ ] [ ] Soil Retention Blankets
- [ ] [ ] Geotextiles
- [ ] [ ] Mulching/ Hydromulching
- [ ] [ ] Soil Surface Treatments
- [X] [ ] Temporary Seeding
- [ ] [X] Permanent Planting, Sodding or Seeding
- [ ] [ ] Biodegradable Erosion Control Logs
- [X] [ ] Rock Filter Dams/ Rock Check Dams
- [X] [ ] Vertical Tracking
- [ ] [ ] Interceptor Swale
- [ ] [X] Riprap
- [ ] [ ] Diversion Dike
- [ ] [ ] Temporary Pipe Slope Drain
- [ ] [ ] Embankment for Erosion Control
- [ ] [ ] Paved Flumes
- [ ] [ ] Other: _____
- [ ] [ ] Other: _____
- [ ] [ ] Other: _____
- [ ] [ ] Other: _____

2.2 SEDIMENT CONTROL BMPs:

T / P

- [X] [ ] Biodegradable Erosion Control Logs
- [ ] [ ] Dewatering Controls
- [ ] [ ] Inlet Protection
- [X] [ ] Rock Filter Dams/ Rock Check Dams
- [ ] [ ] Sandbag Berms
- [X] [ ] Sediment Control Fence
- [ ] [ ] Stabilized Construction Exit
- [ ] [ ] Floating Turbidity Barrier
- [ ] [ ] Vegetated Buffer Zones
- [ ] [ ] Vegetated Filter Strips
- [ ] [ ] Other: _____
- [ ] [ ] Other: _____
- [ ] [ ] Other: _____
- [ ] [ ] Other: _____

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

Sediment control BMPs requiring design capacity calculations (See SWP3 Attachment 1.3.):

T / P

- [ ] [ ] Sediment Trap
  - [ ] Calculated volume runoff from 2-year, 24-hour storm for each acre of disturbed area
  - [ ] 3,600 cubic feet of storage per acre drained
- [ ] [ ] Sedimentation Basin
  - [ ] 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
  - [X] Required (>10 acres), but not feasible due to:
    - [X] 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
PERMANENT SEEDING	0+50	508+53

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.4 OFFSITE VEHICLE TRACKING CONTROLS:

- [X] Excess dirt/mud on road removed daily
- [X] Haul roads dampened for dust control
- [X] Loaded haul trucks to be covered with tarpaulin
- [ ] Stabilized construction exit
- [ ] Other: _____
- [ ] Other: _____
- [ ] Other: _____
- [ ] Other: _____

2.5 POLLUTION PREVENTION MEASURES:

- [X] Chemical Management
- [X] Concrete and Materials Waste Management
- [X] Debris and Trash Management
- [X] Dust Control
- [X] Sanitary Facilities
- [ ] Other: _____
- [ ] Other: _____
- [ ] Other: _____
- [ ] Other: _____
- [ ] Other: _____

2.6 VEGETATED BUFFER ZONES:

Natural vegetated buffers shall be maintained as feasible to protect adjacent surface waters. If vegetated natural buffer zones are not feasible due to site geometry, the appropriate additional sediment control measures have been incorporated into this SWP3.

Type	Stationing	
	From	To
BETWEEN ROW AND WINDROWED TOPSOIL BERM	0+50	508+53

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.7 ALLOWABLE NON-STORMWATER DISCHARGES:

- [X] Fire hydrant flushings
- [X] Irrigation drainage
- [X] Pavement washwater (where spills or leaks have not occurred, and detergents are not used)
- [X] Potable water sources
- [X] Springs
- [X] Uncontaminated groundwater
- [X] Water used to wash vehicles or control dust
- [X] Other allowable non-stormwater discharges as allowed by TPDES GP TXR150000.

2.8 INSPECTIONS:

All disturbed areas and erosion and sediment control devices shall be inspected at least once every seven (7) days. Inspections shall be performed by TxDOT as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.5 of this SWP3 .

2.9 MAINTENANCE:

Control measures shall be properly installed according to specifications. If it is determined that a BMP or control measure is not operating effectively, maintenance must be accomplished as soon as possible and before the next anticipated rain event, but in no case later than 7 calendar days after being able to access the site. Maintenance shall be performed by the Contractor as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.5 of this SWP3.

STORMWATER POLLUTION PREVENTION PLAN (SWP3)

Sheet 2 of 2

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
			189
STATE	STATE DIST.	COUNTY	
TEXAS	PARIS	HUNT	
CONT.	SECT.	JOB	HIGHWAY NO.
0579	02	014	FM 512

DATE: 5/24/2023
FILE: Z:\Transportation\TxDOT\PS&E\STATEWIDE 36-9IDP5101\VA2-TxDOT Paris\ProjectData\FM 512 (0579-02-014)\CADD\DGN\09_ENVIRONMENTAL\epic.dgn

I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

TPDES TXR 150000: Stormwater Discharge Permit or Construction General Permit required for projects with 1 or more acres disturbed soil. Projects with any disturbed soil must protect for erosion and sedimentation in accordance with Item 506.

List MS4 Operator(s) that may receive discharges from this project. They may need to be notified prior to construction activities.

1.

2.

☐ No Action Required ☒ Required Action

Action No.

1. Prevent stormwater pollution by controlling erosion and sedimentation in accordance with TPDES Permit TXR 150000

2. Comply with the SW3P and revise when necessary to control pollution or required by the Engineer.

3. Post Construction Site Notice (CSN) with SW3P information on or near the site, accessible to the public and TCEQ, EPA or other inspectors.

4. When Contractor project specific locations (PSL's) increase disturbed soil area to 5 acres or more, submit NOI to TCEQ and the Engineer.

II. WORK IN OR NEAR STREAMS, WATERBODIES AND WETLANDS CLEAN WATER ACT SECTIONS 401 AND 404

USACE Permit required for filling, dredging, excavating or other work in any water bodies, rivers, creeks, streams, wetlands or wet areas.

The Contractor must adhere to all of the terms and conditions associated with the following permit(s):

☐ No Permit Required

☒ Nationwide Permit 14 - PCN not Required (less than 1/10th acre waters or wetlands affected)

☐ Nationwide Permit 14 - PCN Required (1/10 to <1/2 acre, 1/3 in tidal waters)

☐ Individual 404 Permit Required

☐ Other Nationwide Permit Required: NWP# _____

Required Actions: List waters of the US permit applies to, location in project and check Best Management Practices planned to control erosion, sedimentation and post-project TSS.

1.

2.

3.

4.

The elevation of the ordinary high water marks of any areas requiring work to be performed in the waters of the US requiring the use of a nationwide permit can be found on the Bridge Layouts.

Best Management Practices:

Erosion	Sedimentation	Post-Construction TSS
☒ Temporary Vegetation	☒ Silt Fence	☐ Vegetative Filter Strips
☐ Blankets/Matting	☒ Rock Berm	☐ Retention/Irrigation Systems
☐ Mulch	☐ Triangular Filter Dike	☐ Extended Detention Basin
☐ Sodding	☐ Sand Bag Berm	☐ Constructed Wetlands
☐ Interceptor Swale	☐ Straw Bale Dike	☐ Wet Basin
☐ Diversion Dike	☐ Brush Berms	☐ Erosion Control Compost
☐ Erosion Control Compost	☐ Erosion Control Compost	☐ Mulch Filter Berm and Socks
☐ Mulch Filter Berm and Socks	☐ Mulch Filter Berm and Socks	☐ Compost Filter Berm and Socks
☐ Compost Filter Berm and Socks	☐ Compost Filter Berm and Socks	☒ Vegetation Lined Ditches
	☐ Stone Outlet Sediment Traps	☐ Sand Filter Systems
	☐ Sediment Basins	☐ Grassy Swales

III. CULTURAL RESOURCES

Refer to TxDOT Standard Specifications in the event historical issues or archeological artifacts are found during construction. Upon discovery of archeological artifacts (bones, burnt rock, flint, pottery, etc.) cease work in the immediate area and contact the Engineer immediately.

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

4.

IV. VEGETATION RESOURCES

Preserve native vegetation to the extent practical.
Contractor must adhere to Construction Specification Requirements Specs 162, 164, 192, 193, 506, 730, 751, 752 in order to comply with requirements for invasive species, beneficial landscaping, and tree/brush removal commitments.

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

4.

V. FEDERAL LISTED, PROPOSED THREATENED, ENDANGERED SPECIES, CRITICAL HABITAT, STATE LISTED SPECIES, CANDIDATE SPECIES AND MIGRATORY BIRDS.

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

4.

If any of the listed species are observed, cease work in the immediate area, do not disturb species or habitat and contact the Engineer immediately. The work may not remove active nests from bridges and other structures during nesting season of the birds associated with the nests. If caves or sinkholes are discovered, cease work in the immediate area, and contact the Engineer immediately.

LIST OF ABBREVIATIONS

BMP:	Best Management Practice	SPCC:	Spill Prevention Control and Countermeasure
CGP:	Construction General Permit	SW3P:	Storm Water Pollution Prevention Plan
DSHS:	Texas Department of State Health Services	PCN:	Pre-Construction Notification
FHWA:	Federal Highway Administration	PSL:	Project Specific Location
MOA:	Memorandum of Agreement	TCEQ:	Texas Commission on Environmental Quality
MOU:	Memorandum of Understanding	TPDES:	Texas Pollutant Discharge Elimination System
MS4:	Municipal Separate Stormwater Sewer System	TPWD:	Texas Parks and Wildlife Department
MBTA:	Migratory Bird Treaty Act	TxDOT:	Texas Department of Transportation
NOT:	Notice of Termination	T&E:	Threatened and Endangered Species
NWP:	Nationwide Permit	USACE:	U.S. Army Corps of Engineers
NOI:	Notice of Intent	USFWS:	U.S. Fish and Wildlife Service

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

General (applies to all projects):

Comply with the Hazard Communication Act (the Act) for personnel who will be working with hazardous materials by conducting safety meetings prior to beginning construction and making workers aware of potential hazards in the workplace. Ensure that all workers are provided with personal protective equipment appropriate for any hazardous materials used.

Obtain and keep on-site Material Safety Data Sheets (MSDS) for all hazardous products used on the project, which may include, but are not limited to the following categories: Paints, acids, solvents, asphalt products, chemical additives, fuels and concrete curing compounds or additives. Provide protected storage, off bare ground and covered, for products which may be hazardous. Maintain product labelling as required by the Act.

Maintain an adequate supply of on-site spill response materials, as indicated in the MSDS. In the event of a spill, take actions to mitigate the spill as indicated in the MSDS, in accordance with safe work practices, and contact the District Spill Coordinator immediately. The Contractor shall be responsible for the proper containment and cleanup of all product spills.

Contact the Engineer if any of the following are detected:
* Dead or distressed vegetation (not identified as normal)
* Trash piles, drums, canister, barrels, etc.
* Undesirable smells or odors
* Evidence of leaching or seepage of substances

Does the project involve any bridge class structure rehabilitation or replacements (bridge class structures not including box culverts)?

☐ Yes ☒ No

If "No", then no further action is required.
If "Yes", then TxDOT is responsible for completing asbestos assessment/inspection.

Are the results of the asbestos inspection positive (is asbestos present)?

☐ Yes ☐ No

If "Yes", then TxDOT must retain a DSHS licensed asbestos consultant to assist with the notification, develop abatement/mitigation procedures, and perform management activities as necessary. The notification form to DSHS must be postmarked at least 15 working days prior to scheduled demolition.

If "No", then TxDOT is still required to notify DSHS 15 working days prior to any scheduled demolition.

In either case, the Contractor is responsible for providing the date(s) for abatement activities and/or demolition with careful coordination between the Engineer and asbestos consultant in order to minimize construction delays and subsequent claims.

Any other evidence indicating possible hazardous materials or contamination discovered on site. Hazardous Materials or Contamination Issues Specific to this Project:

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

VII. OTHER ENVIRONMENTAL ISSUES

(includes regional issues such as Edwards Aquifer District, etc.)

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

Texas Department of Transportation — Design Division Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

EPIC

FILE: epic.dgn	DN: TxDOT	CK: RG	DW: VP	CK: AR
©TxDOT: February 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	0579	02	014	FM 512
12-12-2011 (DS)	DIST	COUNTY		SHEET NO.
05-07-14 ADDED NOTE SECTION IV.	PARIS	HUNT		190
01-23-2015 SECTION I (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.				

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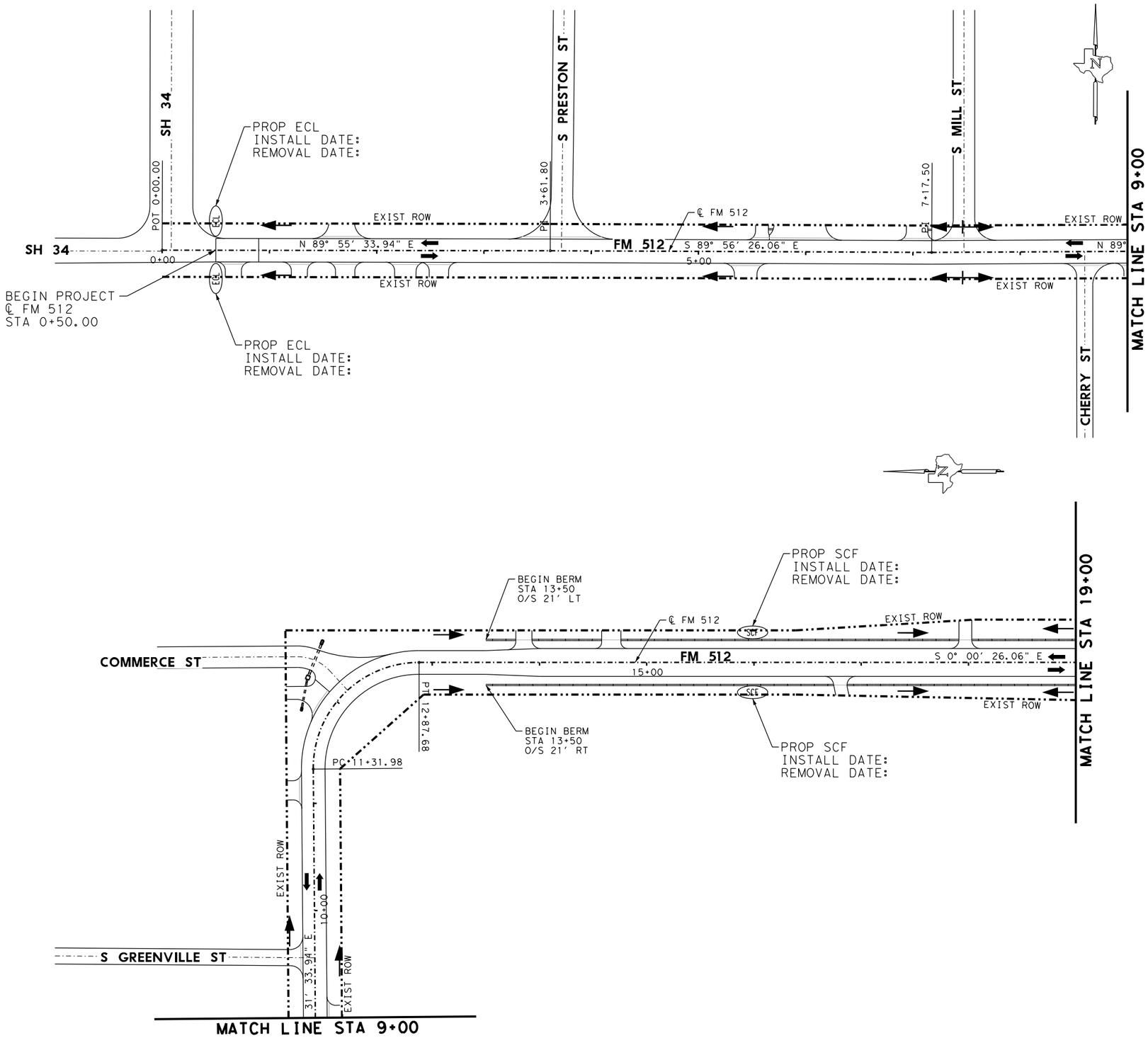

LEGEND:

- SCF — SEDIMENT CONTROL FENCE EST. @ 15 LF
- RFD2 — ROCK FILTER DAM (TY-2) EST. @ 15 LF
- ECL — EROSION CONTROL LOGS EST. @ 10 LF
- WATER FLOW DIRECTION
- CULVERT
- BERM

0 25 50 100
SCALE: 1"=100'

STATE OF TEXAS
PAUL A. WARDEN
101319
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Paul A. Warden, P.E. 5/24/2023

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FIRM # F-6825

Texas Department of Transportation

FM 512

EROSION CONTROL MEASURES LAYOUT

SHEET 1 OF 26

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	191
CONTROL	SECTION	JOB	
0579	02	014	

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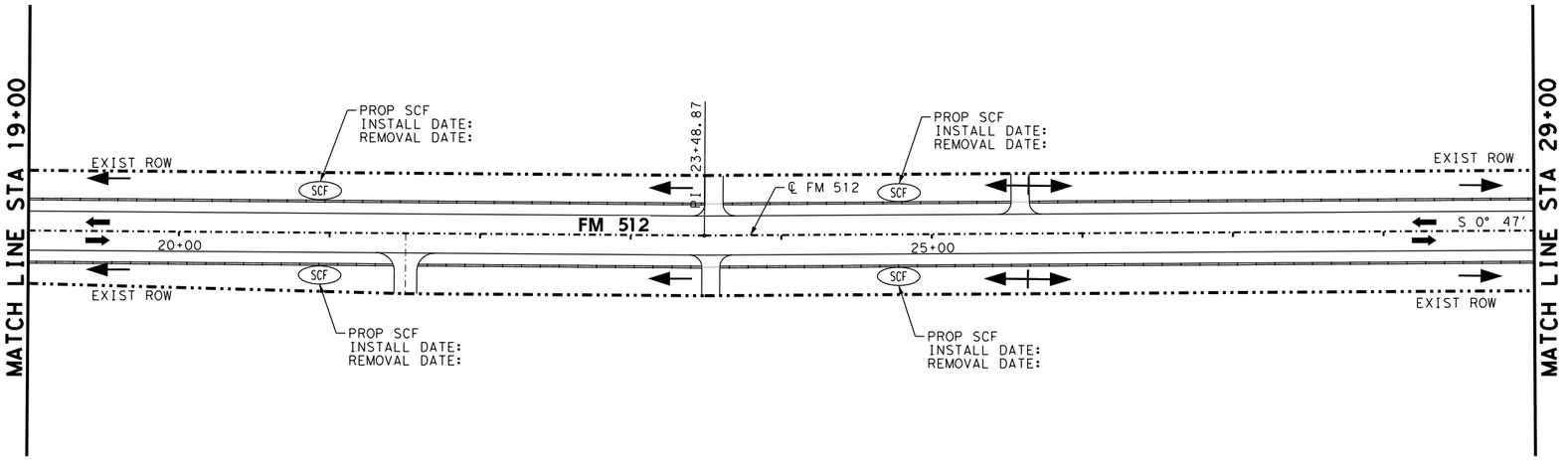

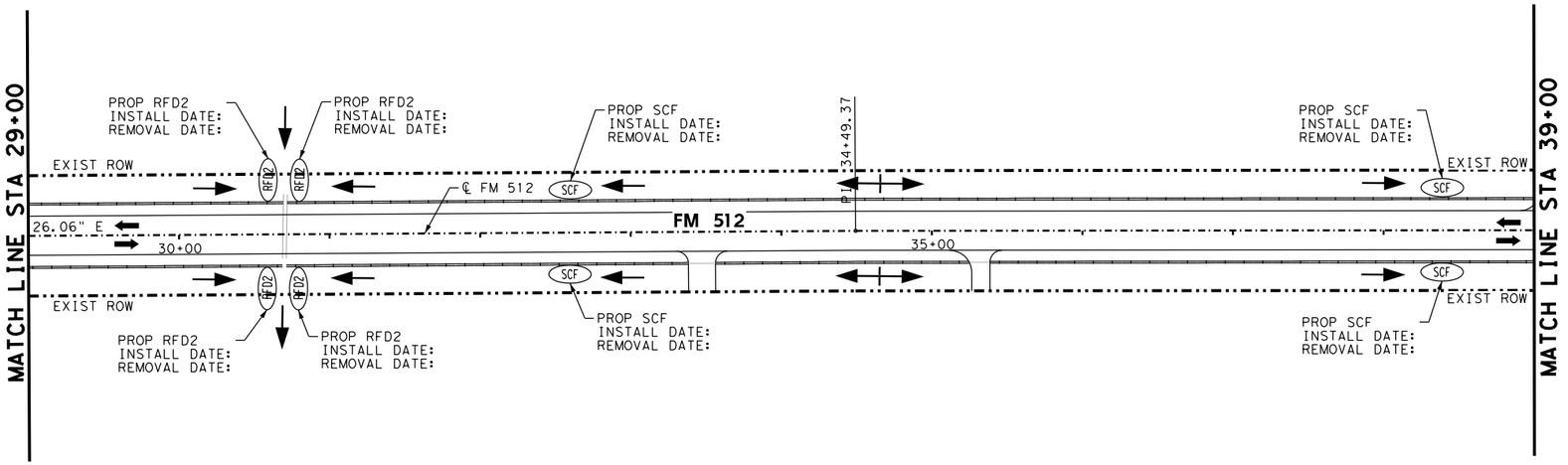

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FM 512

EROSION CONTROL MEASURES LAYOUT

SHEET 2 OF 26

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	192
CONTROL	SECTION	JOB	
0579	02	014	

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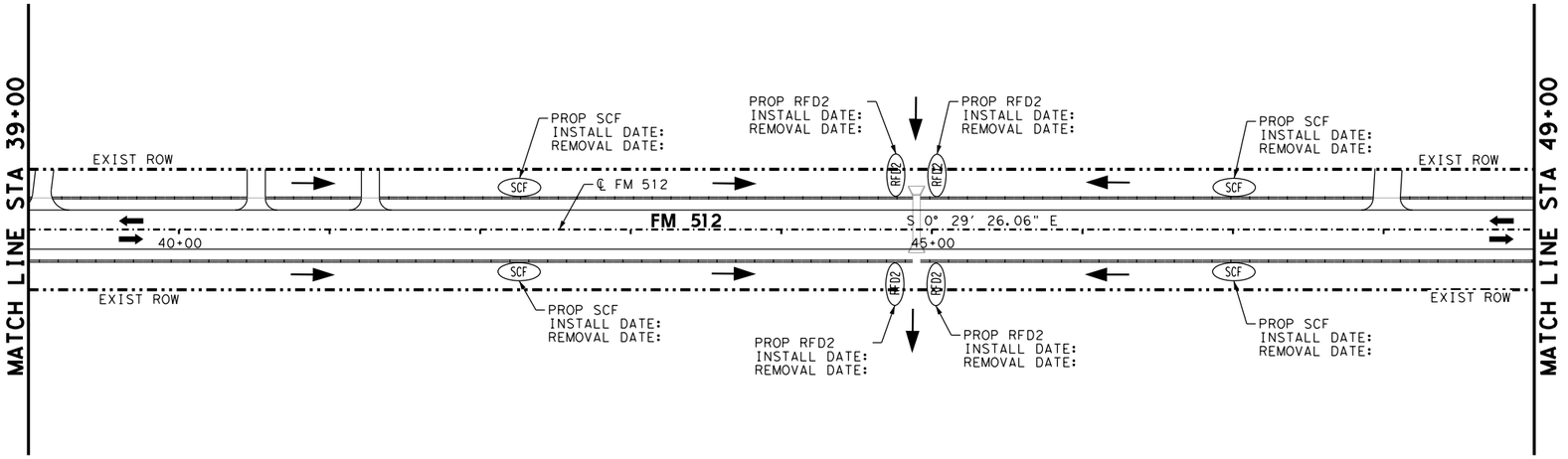

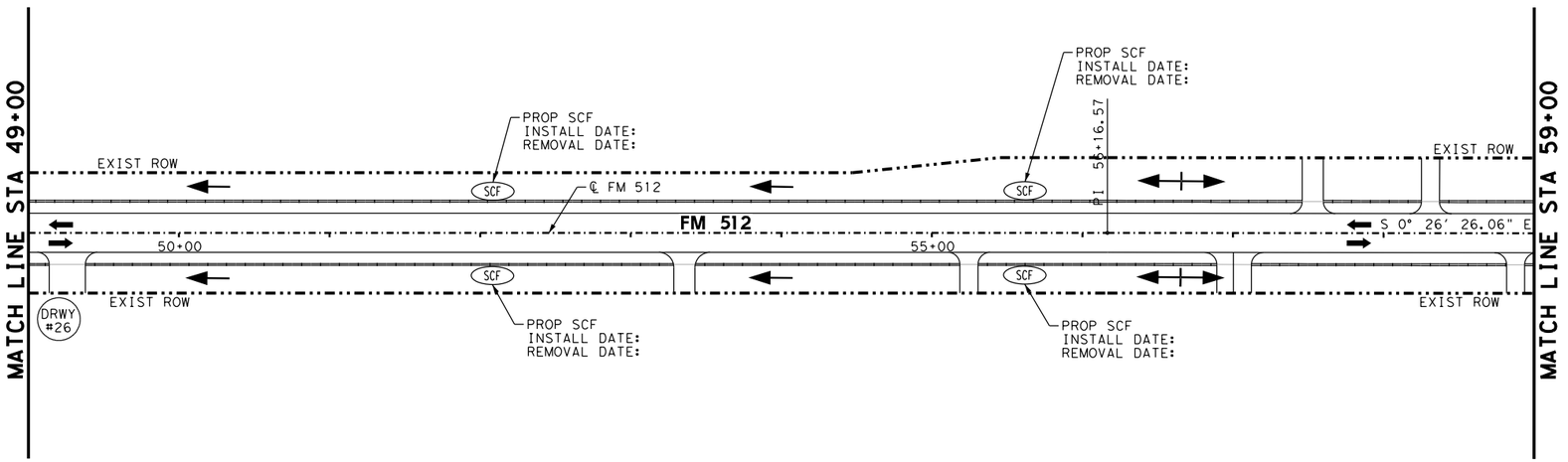

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EROSION CONTROL MEASURES LAYOUT

SHEET 3 OF 26

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STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	193
CONTROL	SECTION	JOB	
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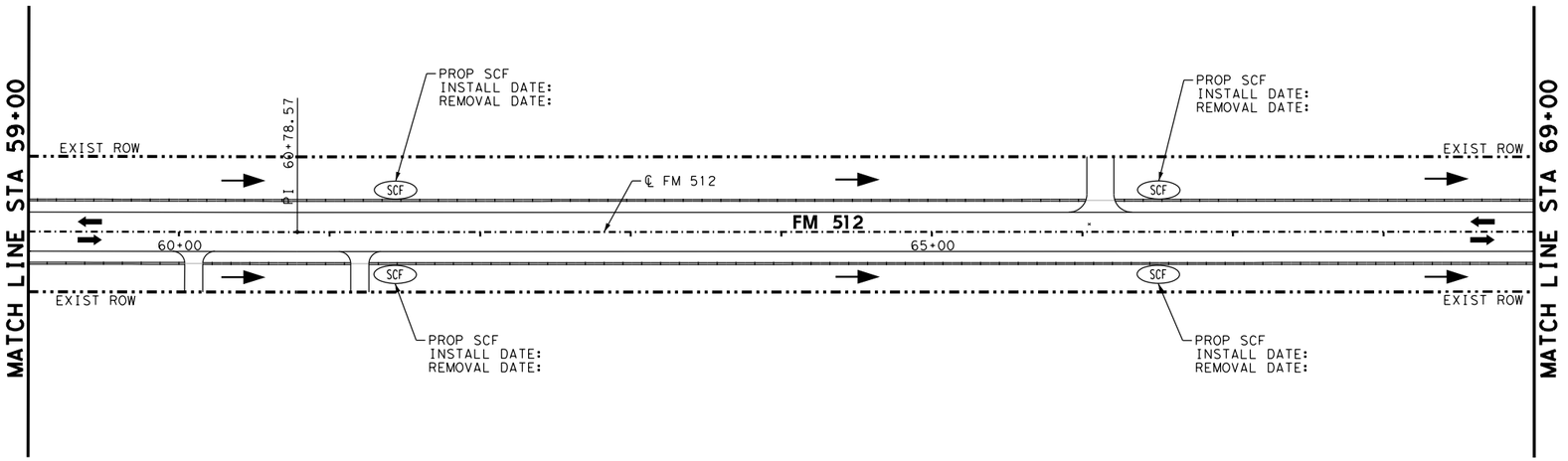

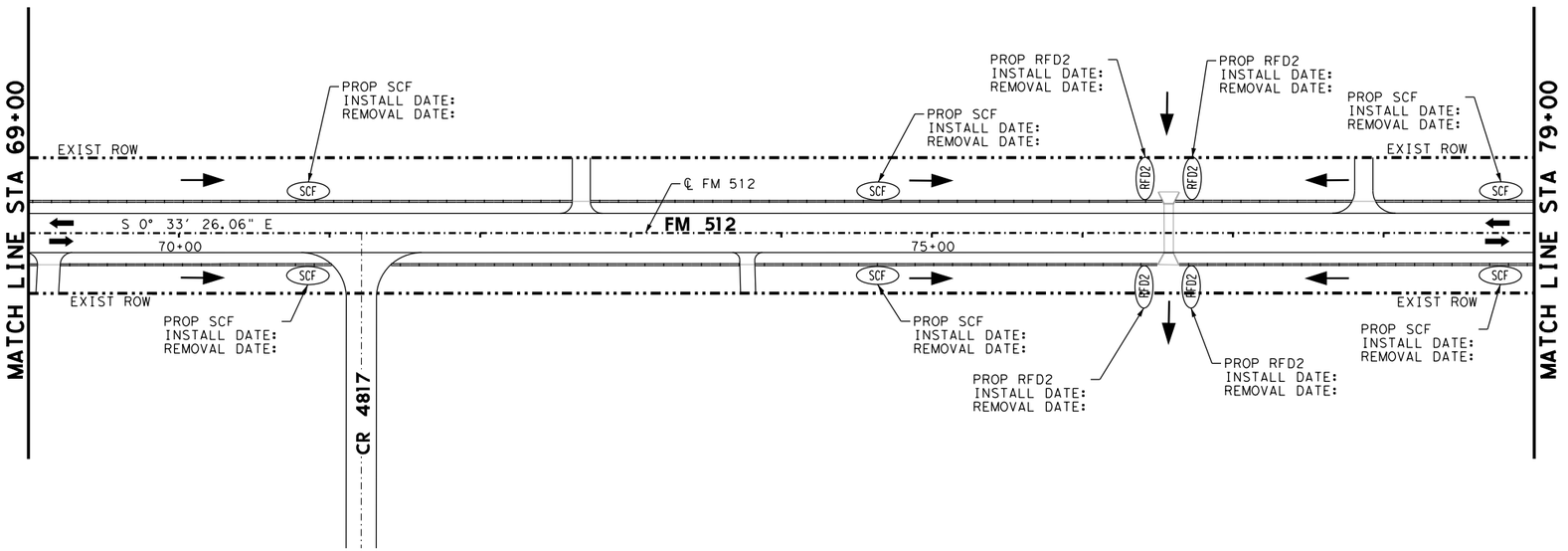

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EROSION CONTROL MEASURES LAYOUT

SHEET 4 OF 26

			HIGHWAY NO
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TEXAS	PARIS	HUNT	
CONTROL	SECTION	JOB	194
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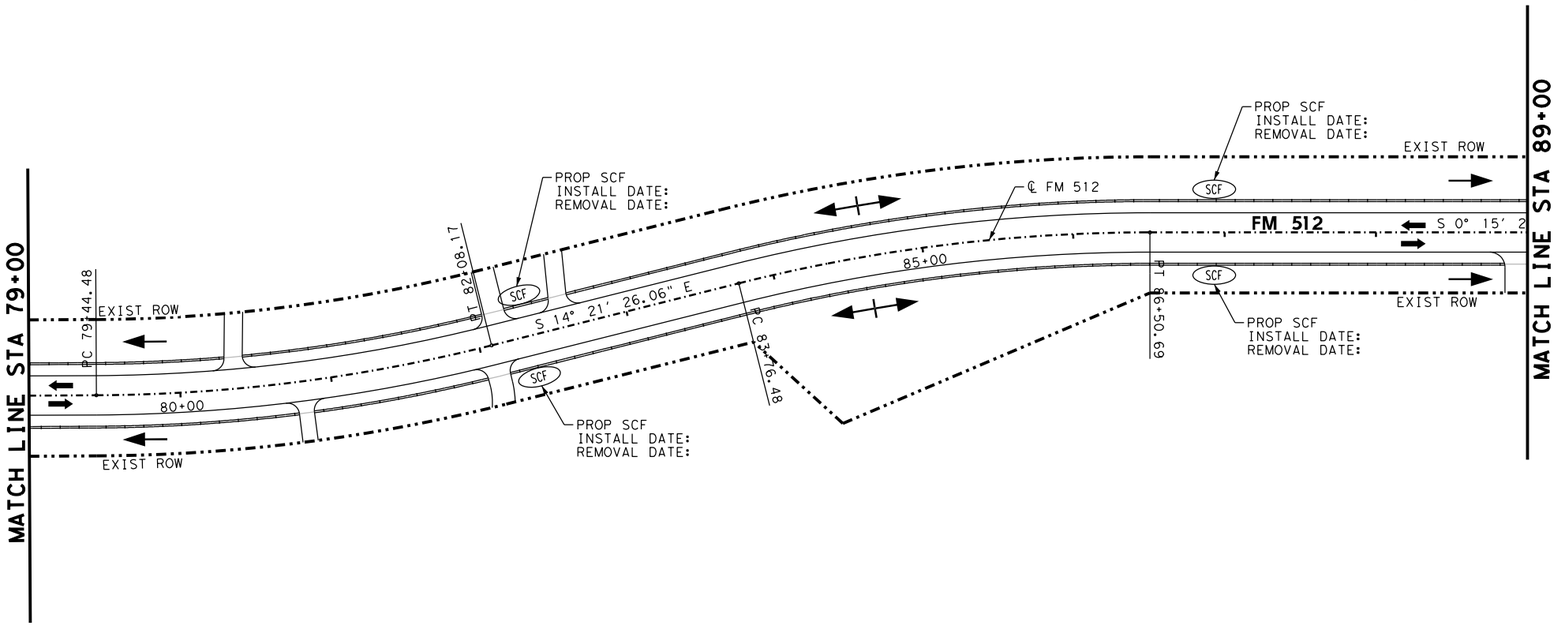

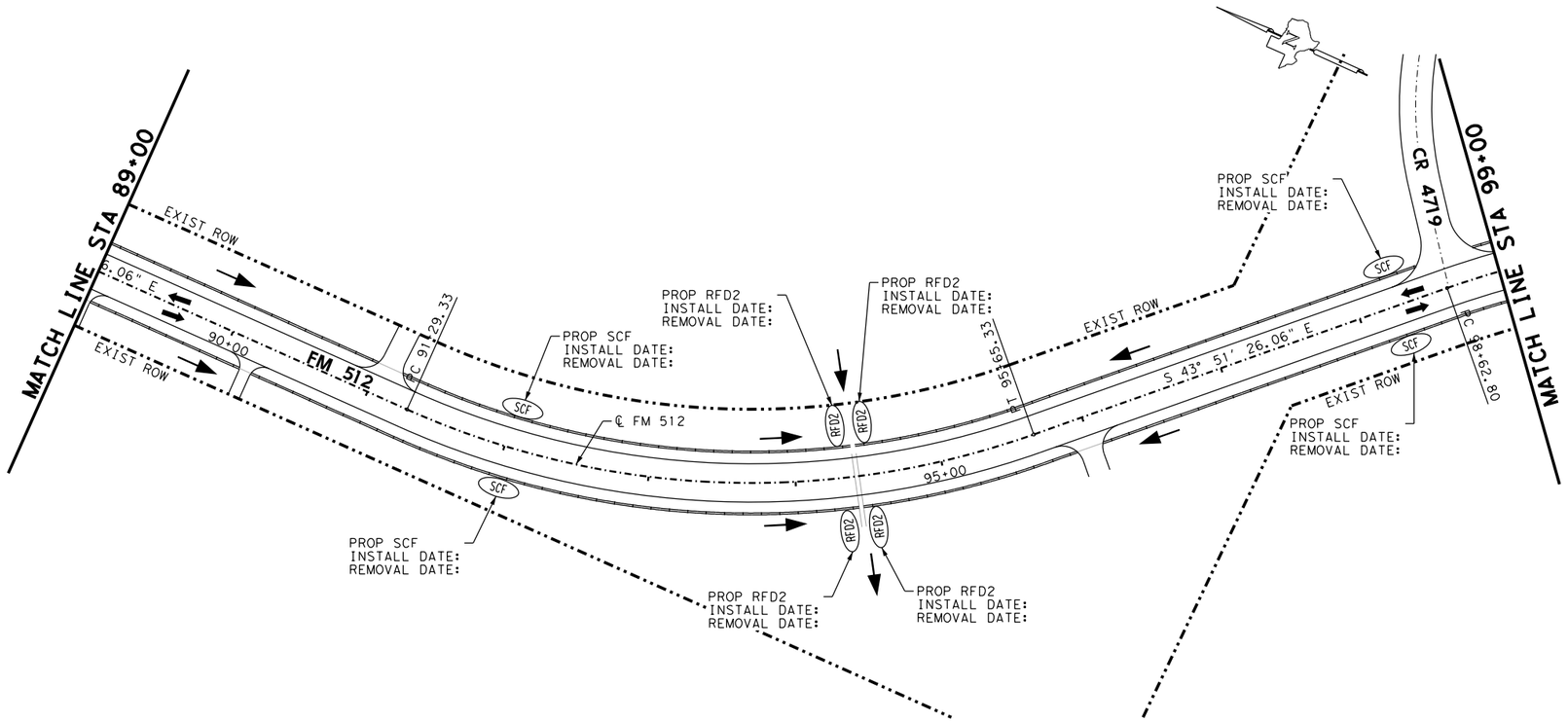

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SHEET 5 OF 26

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CONTROL	SECTION	JOB	
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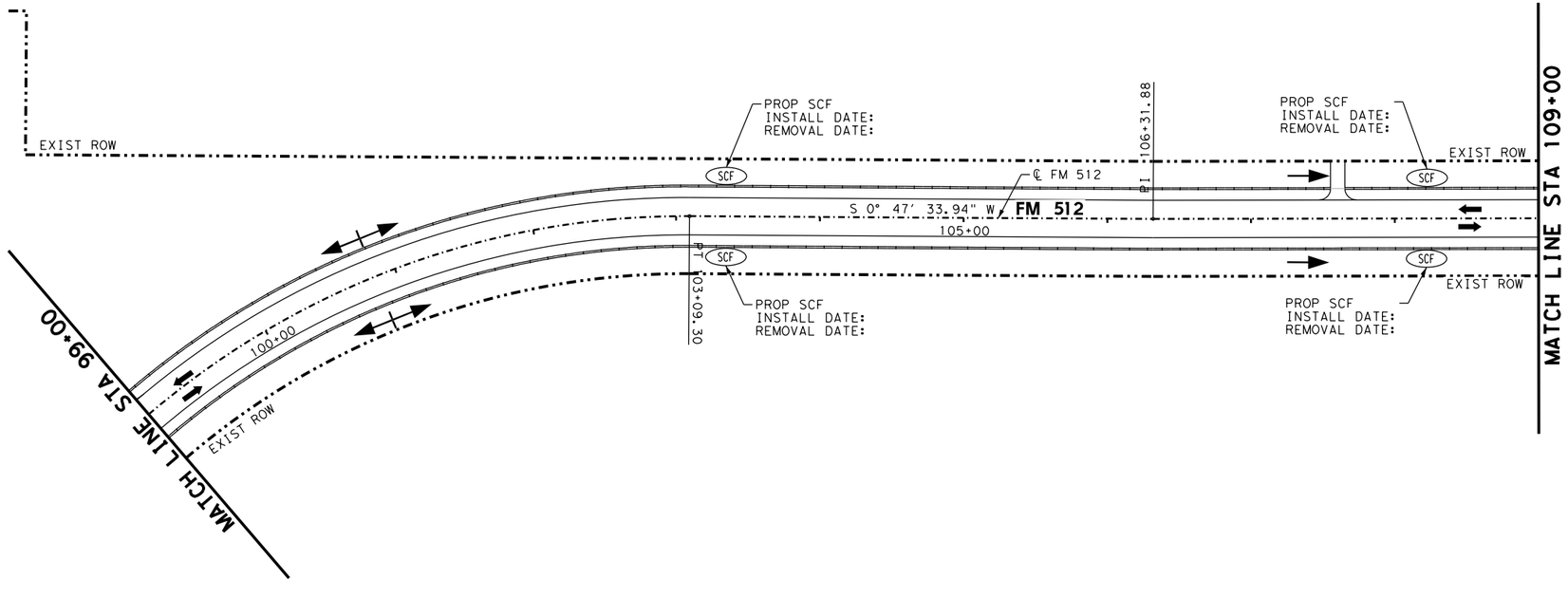

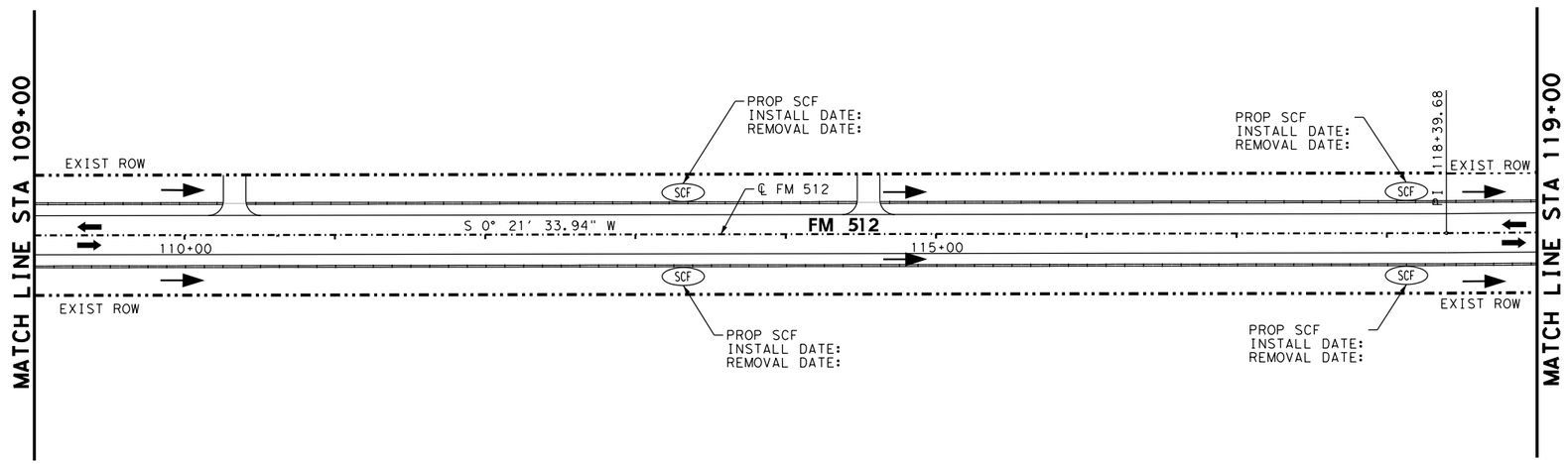

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SHEET 6 OF 26

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CONTROL	SECTION	JOB	
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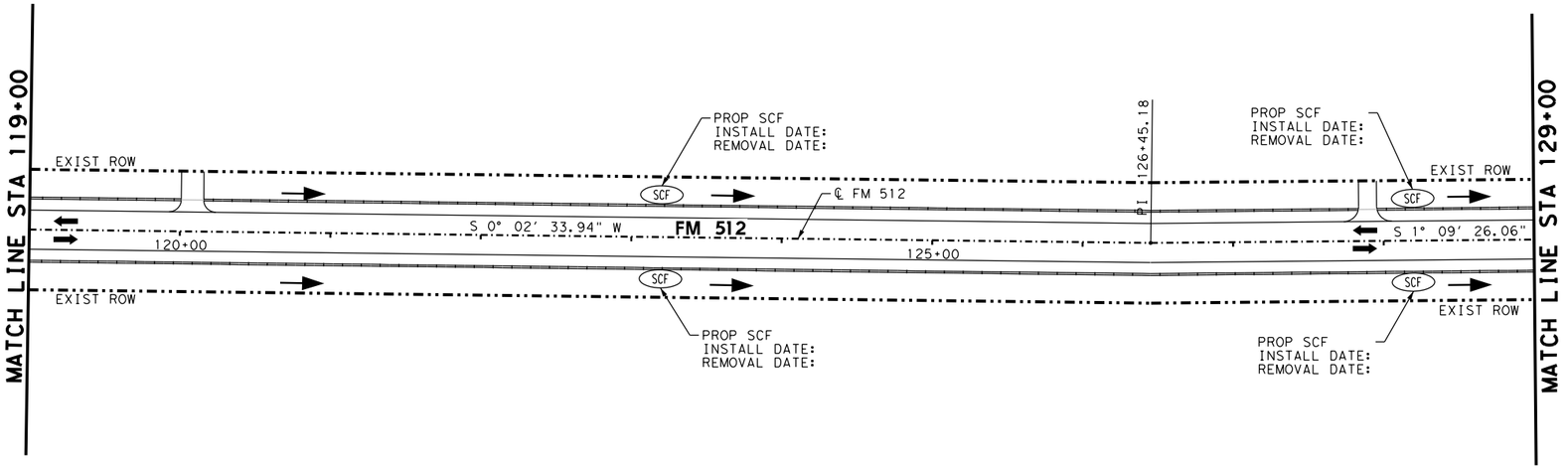

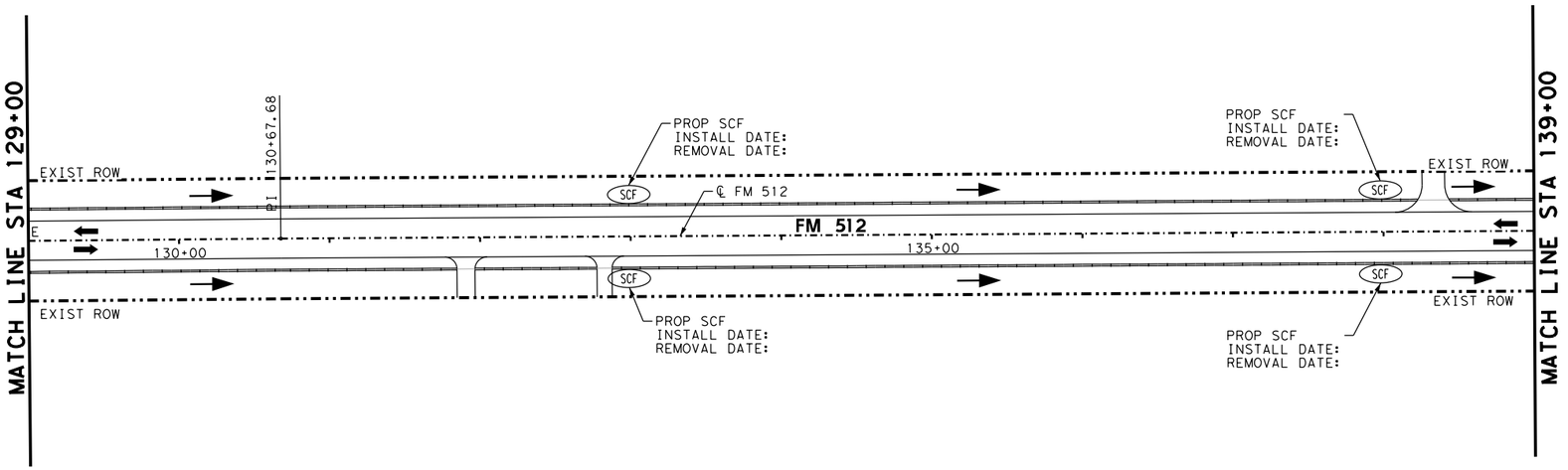

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EROSION CONTROL MEASURES LAYOUT

SHEET 7 OF 26

			HIGHWAY NO
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STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	197
CONTROL	SECTION	JOB	
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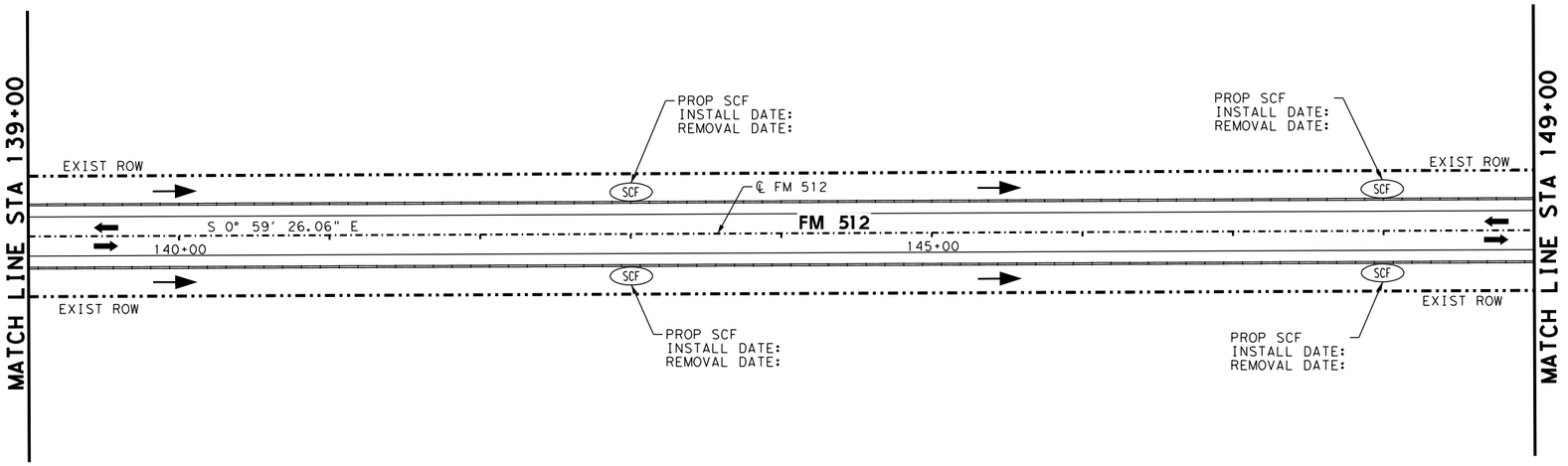

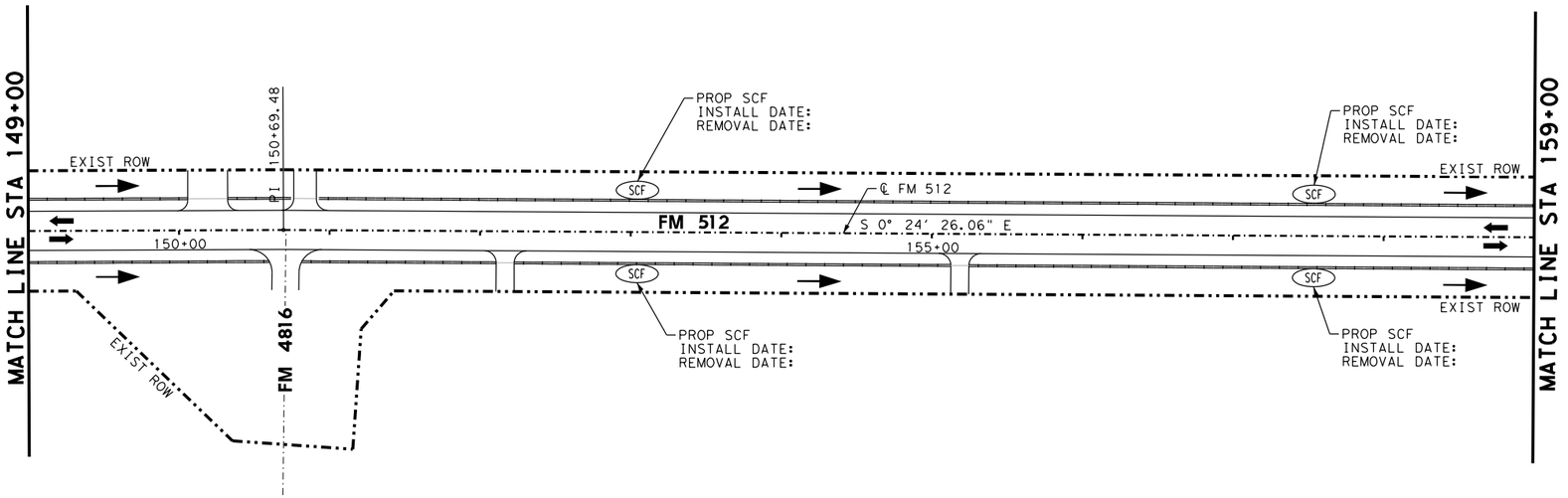

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FM 512

EROSION CONTROL MEASURES LAYOUT

SHEET 8 OF 26

			HIGHWAY NO
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STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	198
CONTROL	SECTION	JOB	
0579	02	014	

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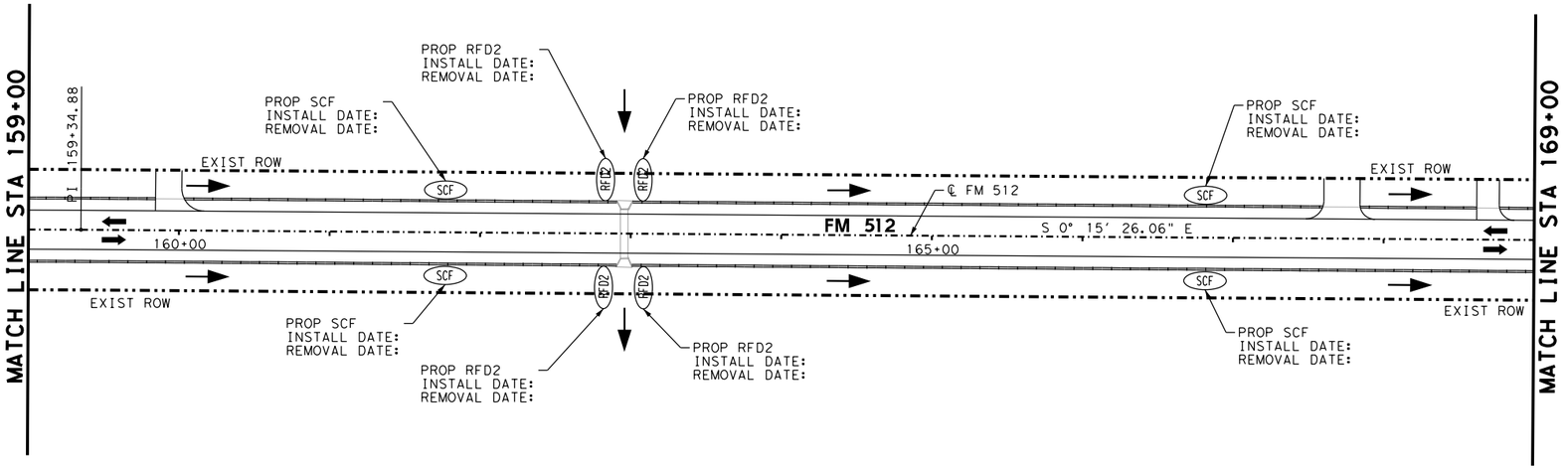

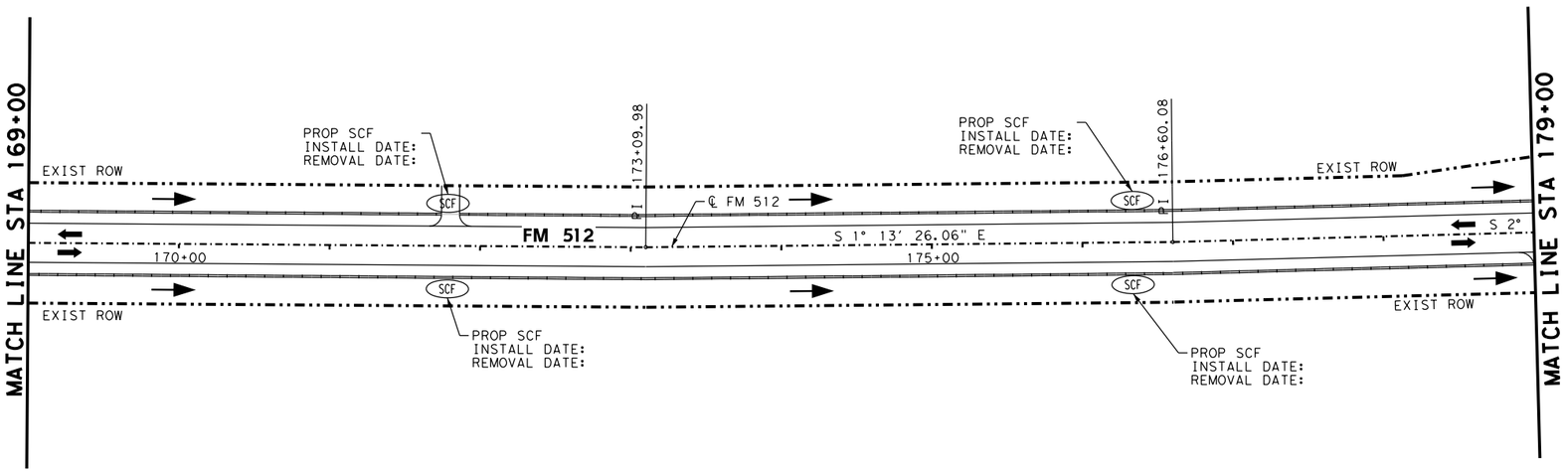

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FM 512

EROSION CONTROL MEASURES LAYOUT

SHEET 9 OF 26

			HIGHWAY NO.
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	PARIS	HUNT	199
CONTROL	SECTION	JOB	
0579	02	014	

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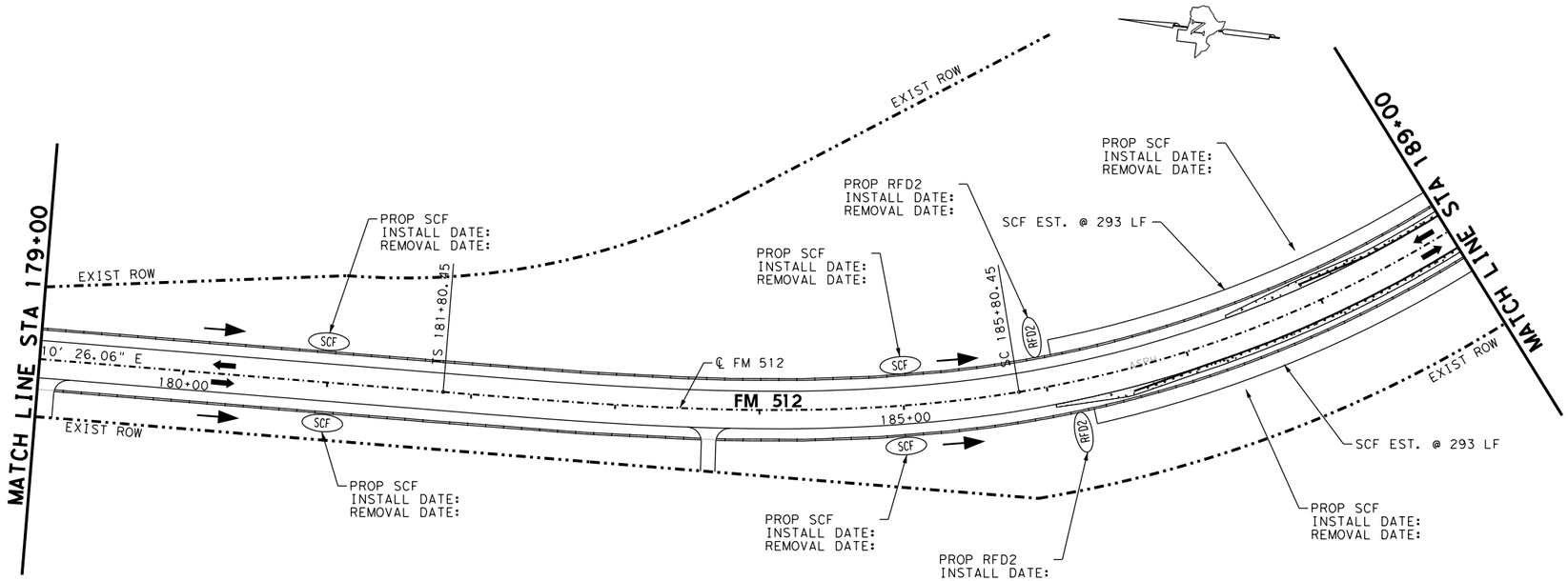

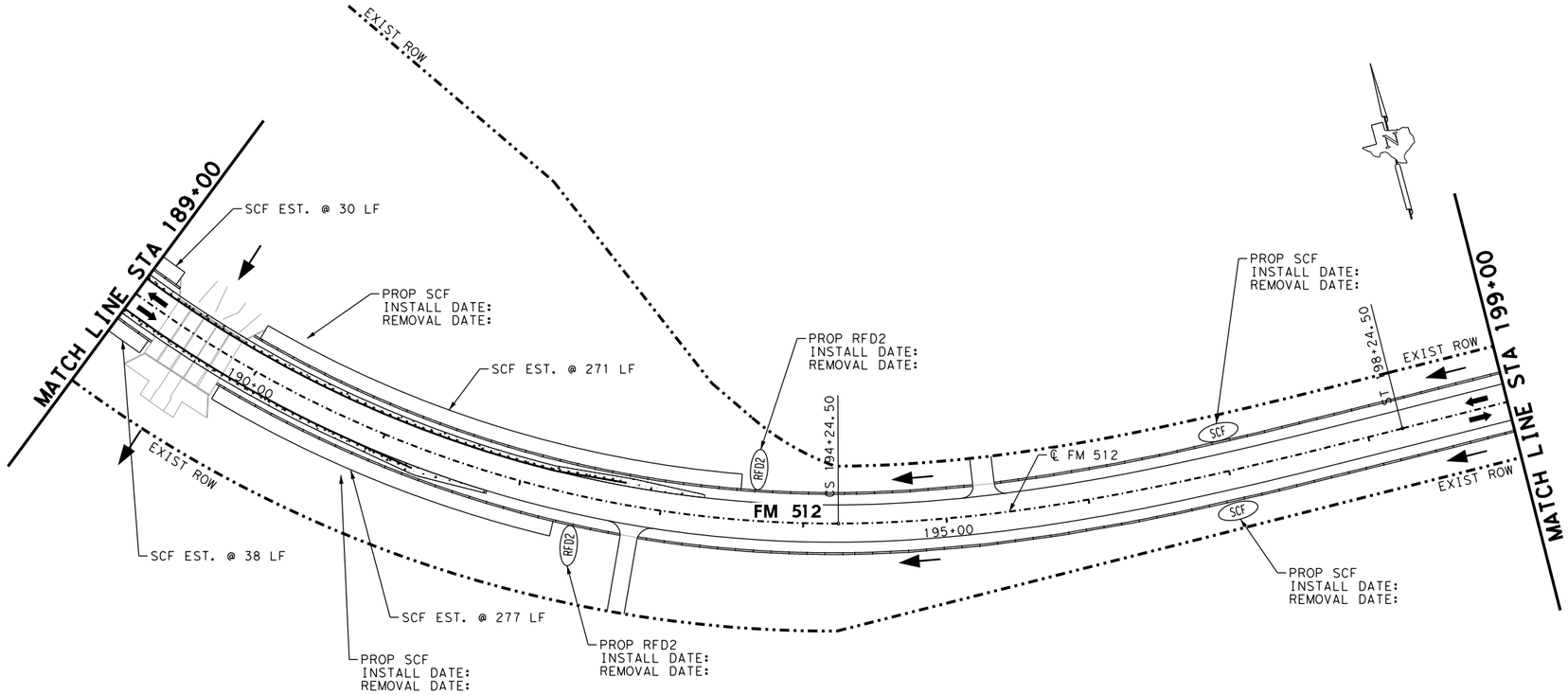

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EROSION CONTROL MEASURES LAYOUT

SHEET 10 OF 26

			HIGHWAY NO
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STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	200
CONTROL	SECTION	JOB	
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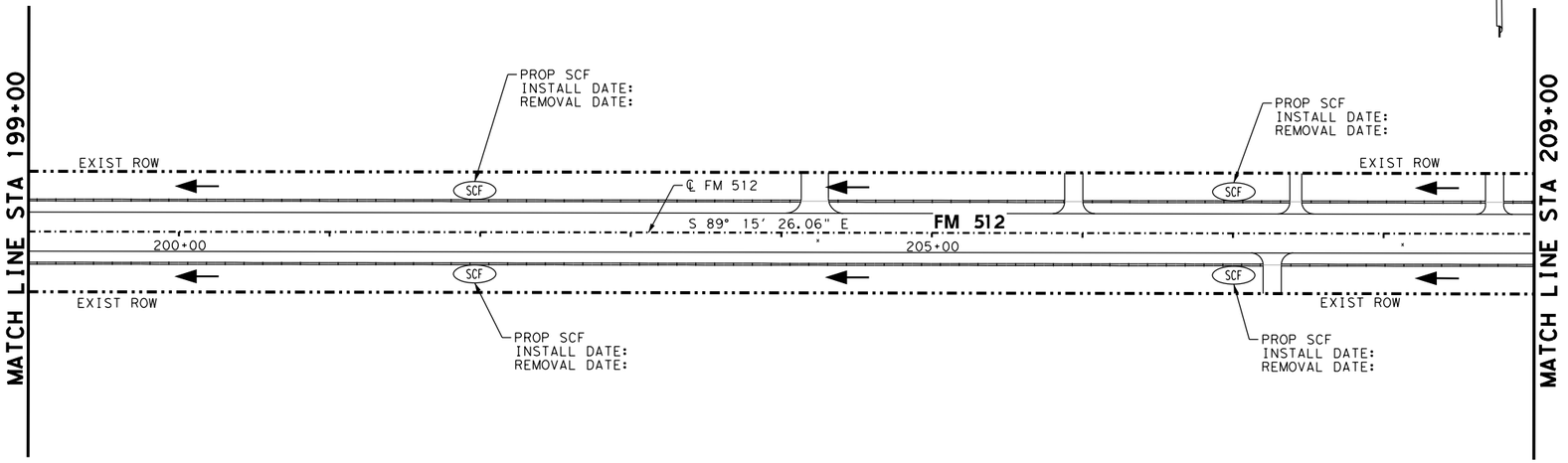

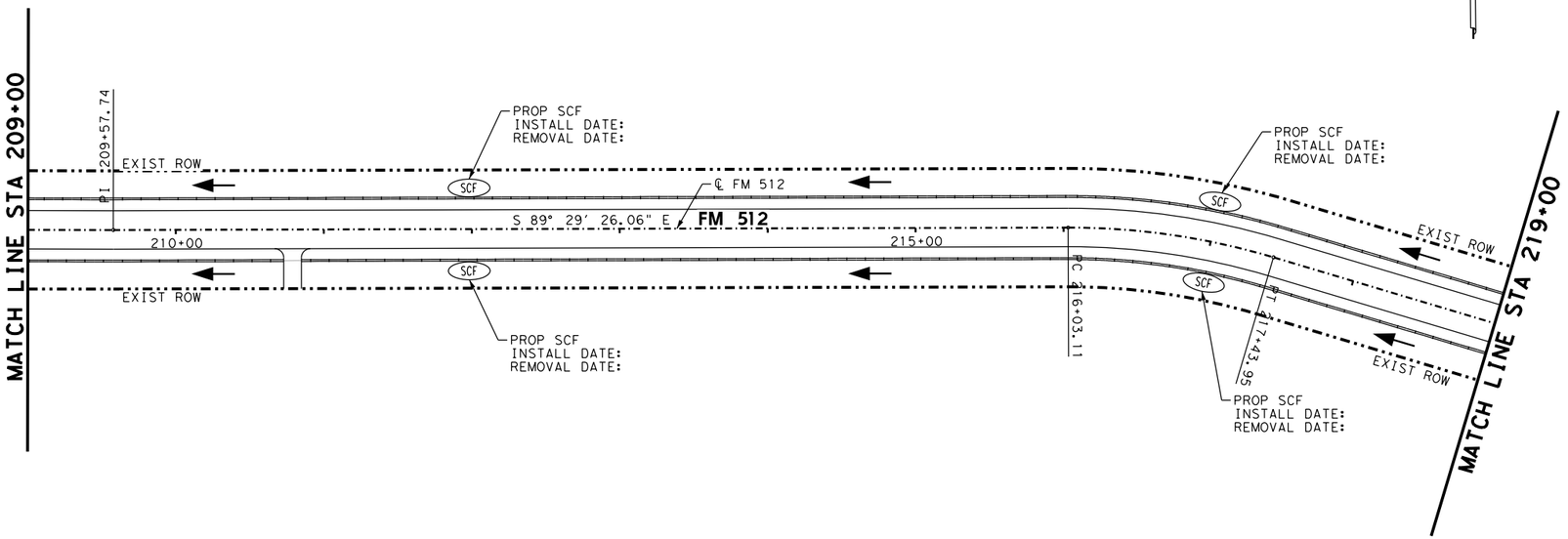

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- ECL — EROSION CONTROL LOGS EST. @ 10 LF
- WATER FLOW DIRECTION
- CULVERT
- BERM

0 25 50 100
SCALE: 1"=100'

STATE OF TEXAS
PAUL A. WARDEN
101319
LICENSED
PROFESSIONAL ENGINEER

Paul A. Warden, P.E. 5/24/2023

IDCUS
PLANNERS ENGINEERS MANAGERS
8632 Fredericksburg Rd.
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(210) 448-1800
FIRM # F-6825

Texas Department of Transportation

FM 512

EROSION CONTROL MEASURES LAYOUT

SHEET 11 OF 26

			HIGHWAY NO.
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	PARIS	HUNT	201
CONTROL	SECTION	JOB	
0579	02	014	

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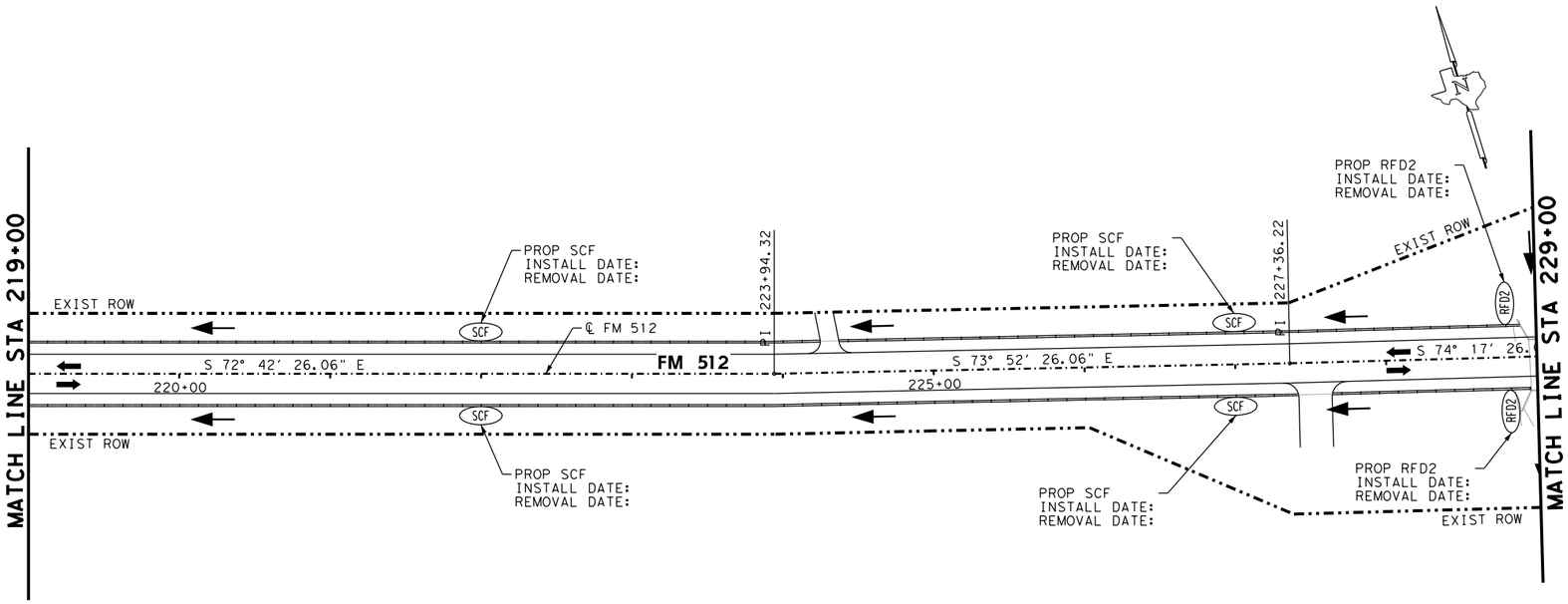

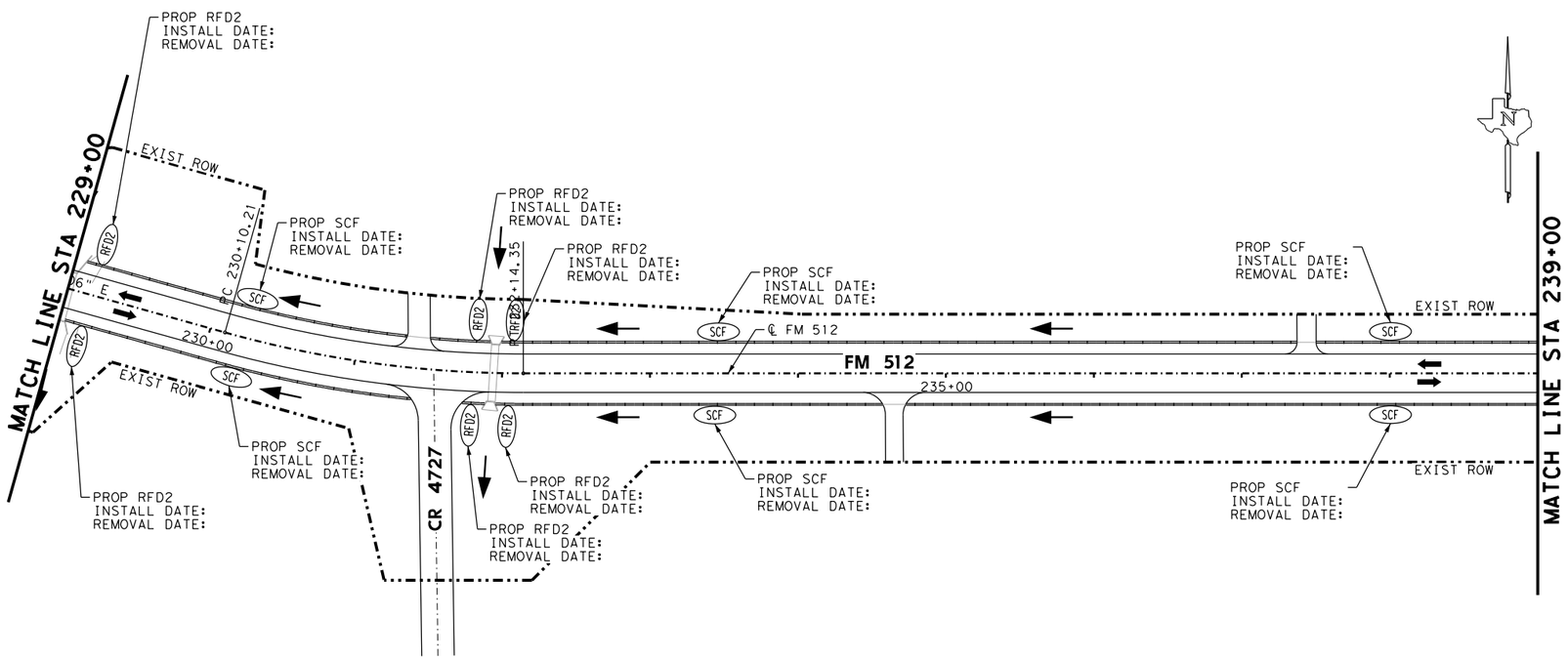

LEGEND:

- SCF — SEDIMENT CONTROL FENCE EST. @ 15 LF
- RFD2 — ROCK FILTER DAM (TY-2) EST. @ 15 LF
- ECL — EROSION CONTROL LOGS EST. @ 10 LF
- WATER FLOW DIRECTION
- CULVERT
- BERM

0 25 50 100
SCALE: 1"=100'

STATE OF TEXAS
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FM 512

EROSION CONTROL MEASURES LAYOUT

SHEET 12 OF 26

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	
CONTROL	SECTION	JOB	202
0579	02	014	

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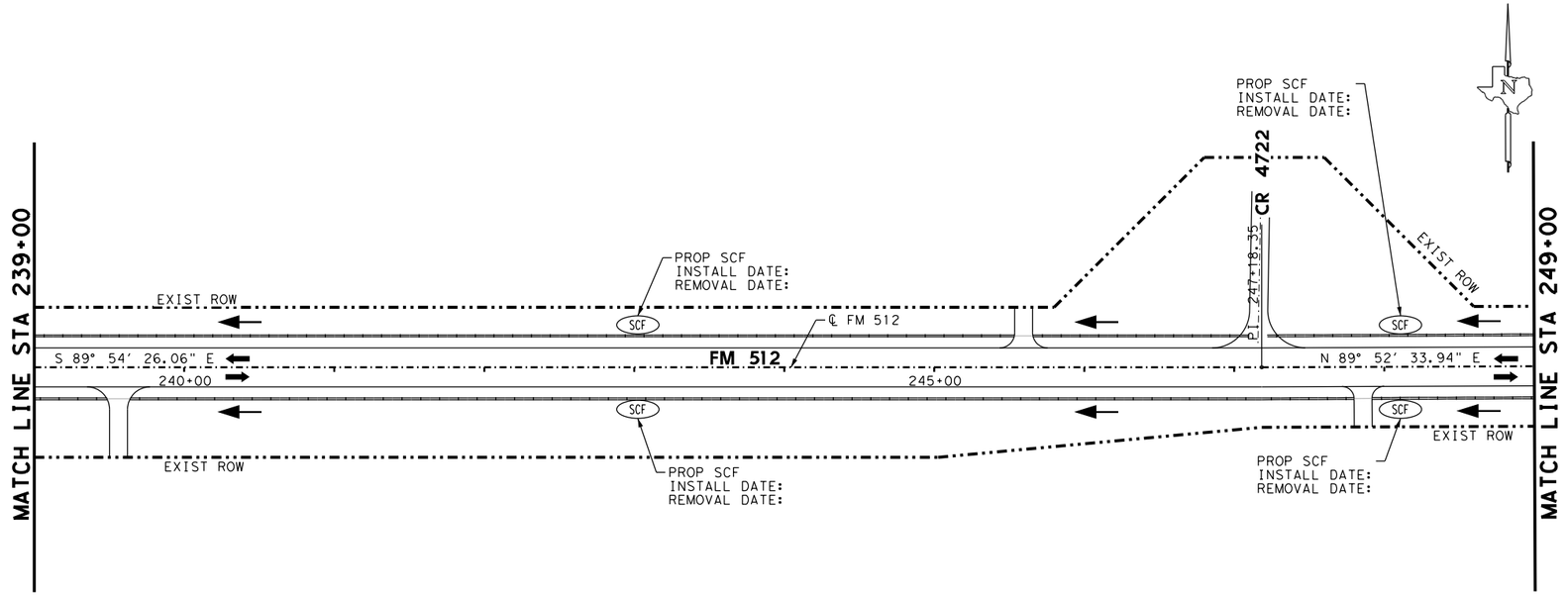

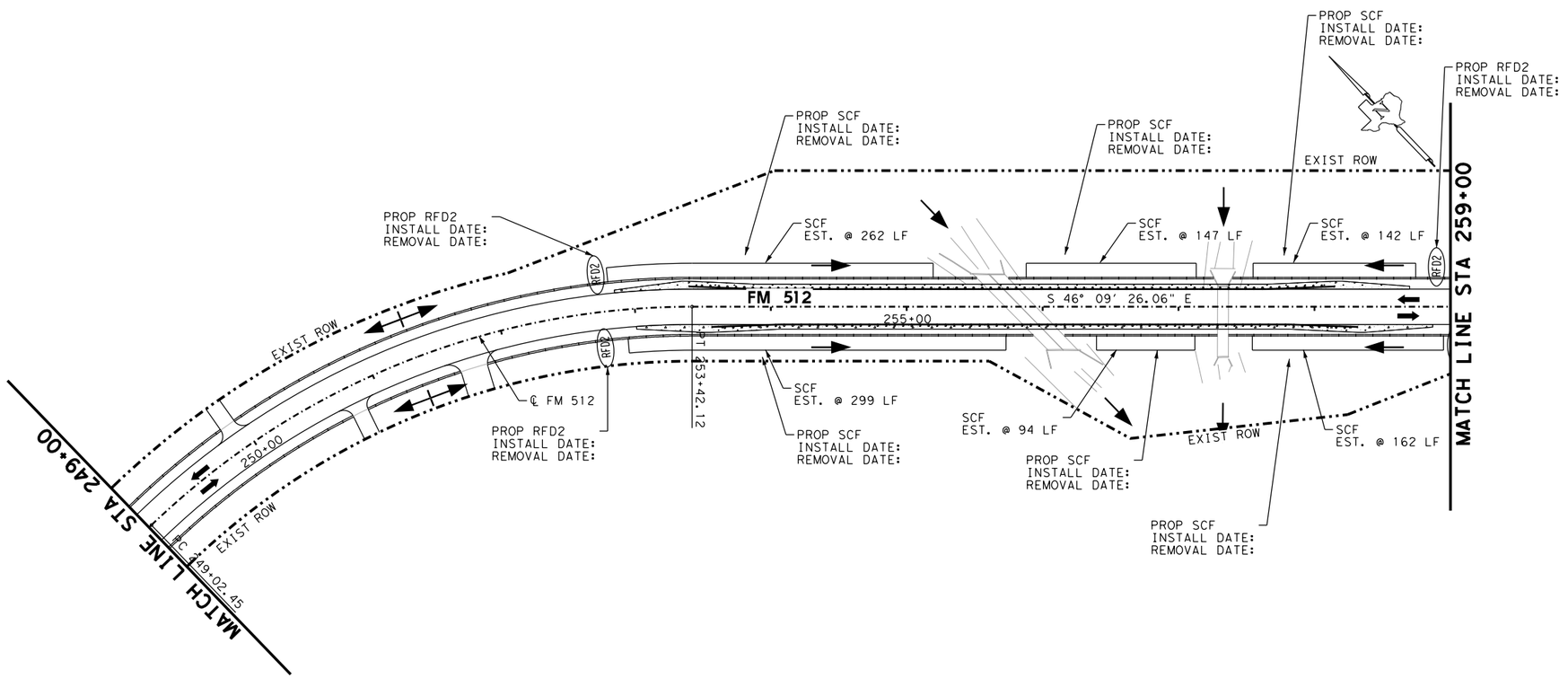

LEGEND:

- SCF — SEDIMENT CONTROL FENCE EST. @ 15 LF
- RFD2 — ROCK FILTER DAM (TY-2) EST. @ 15 LF
- ECL — EROSION CONTROL LOGS EST. @ 10 LF
- WATER FLOW DIRECTION
- CULVERT
- BERM

0 25 50 100
SCALE: 1"=100'

STATE OF TEXAS
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Texas Department of Transportation

FM 512

EROSION CONTROL MEASURES LAYOUT

SHEET 13 OF 26

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	203
CONTROL	SECTION	JOB	
0579	02	014	

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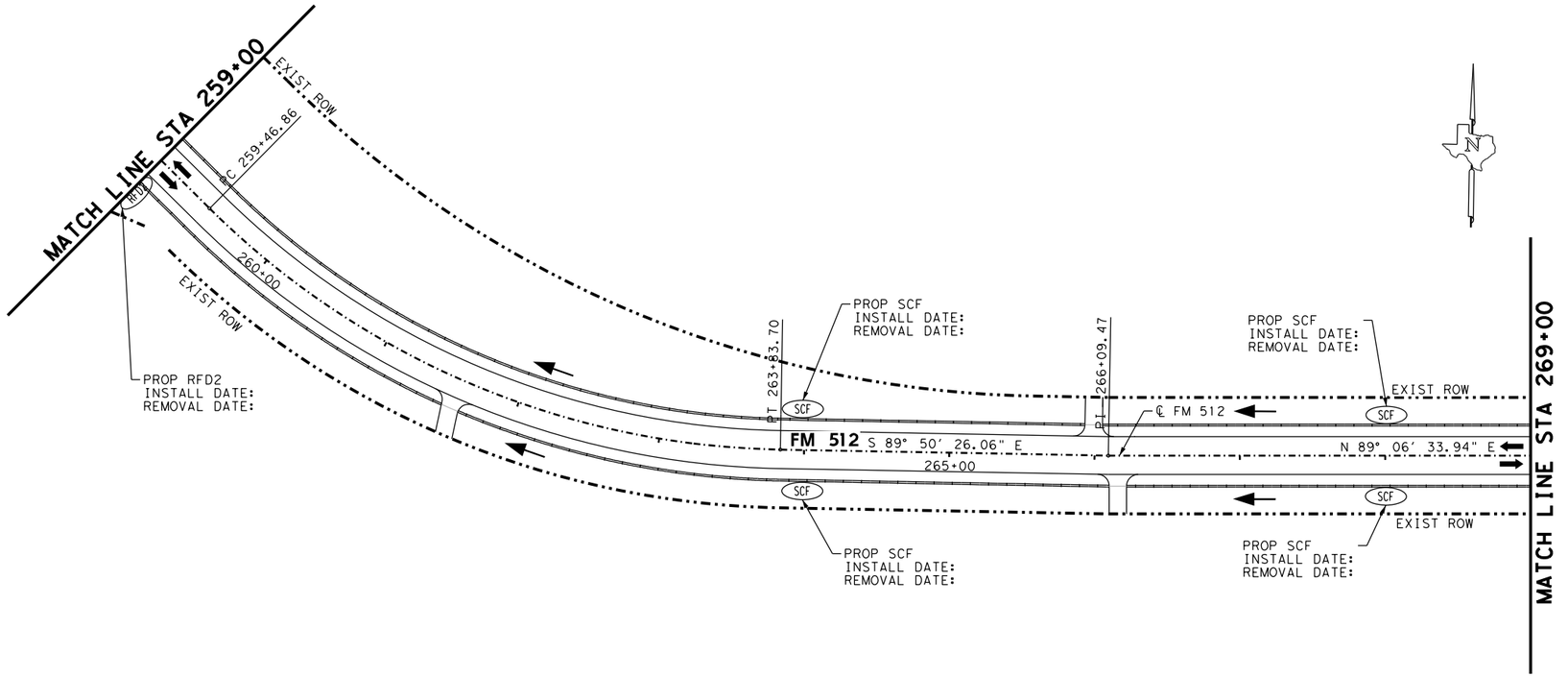

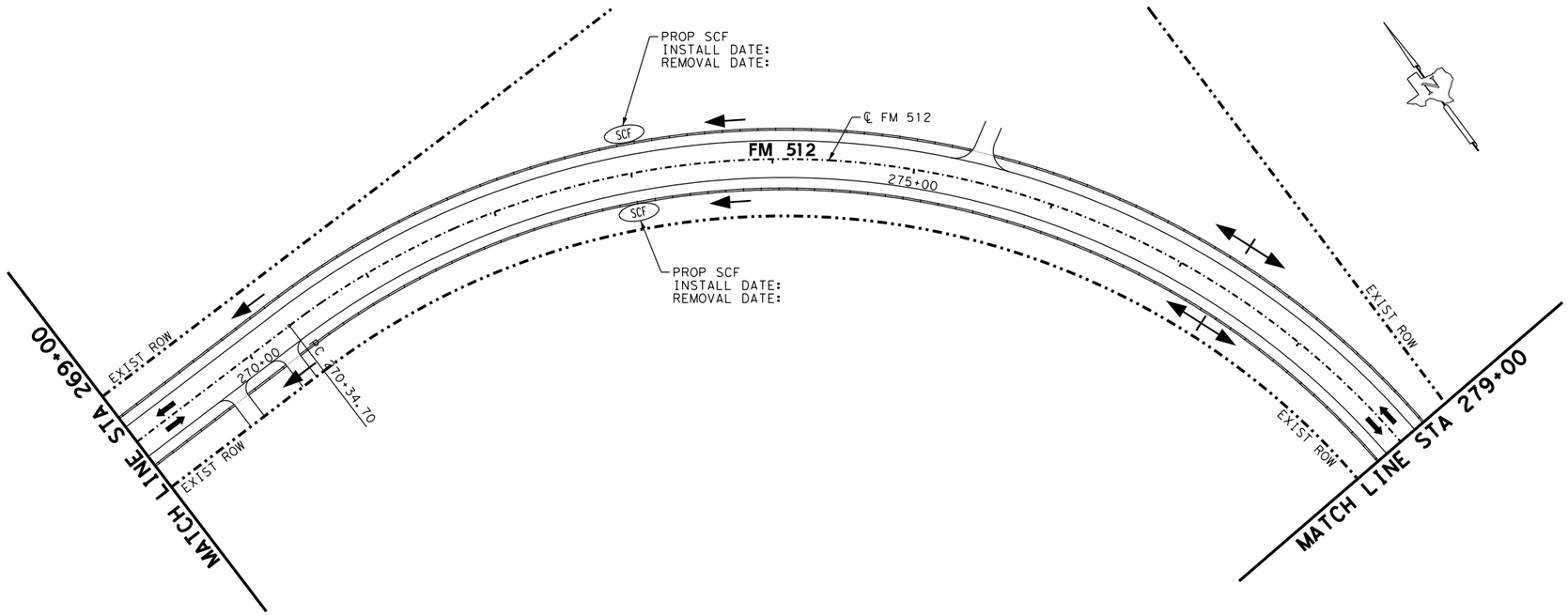

LEGEND:

- SCF — SEDIMENT CONTROL FENCE EST. @ 15 LF
- RFD2 — ROCK FILTER DAM (TY-2) EST. @ 15 LF
- ECL — EROSION CONTROL LOGS EST. @ 10 LF
- WATER FLOW DIRECTION
- CULVERT
- BERM

0 25 50 100
SCALE: 1"=100'

STATE OF TEXAS
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Texas Department of Transportation

FM 512

EROSION CONTROL MEASURES LAYOUT

SHEET 14 OF 26

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	204
CONTROL	SECTION	JOB	
0579	02	014	

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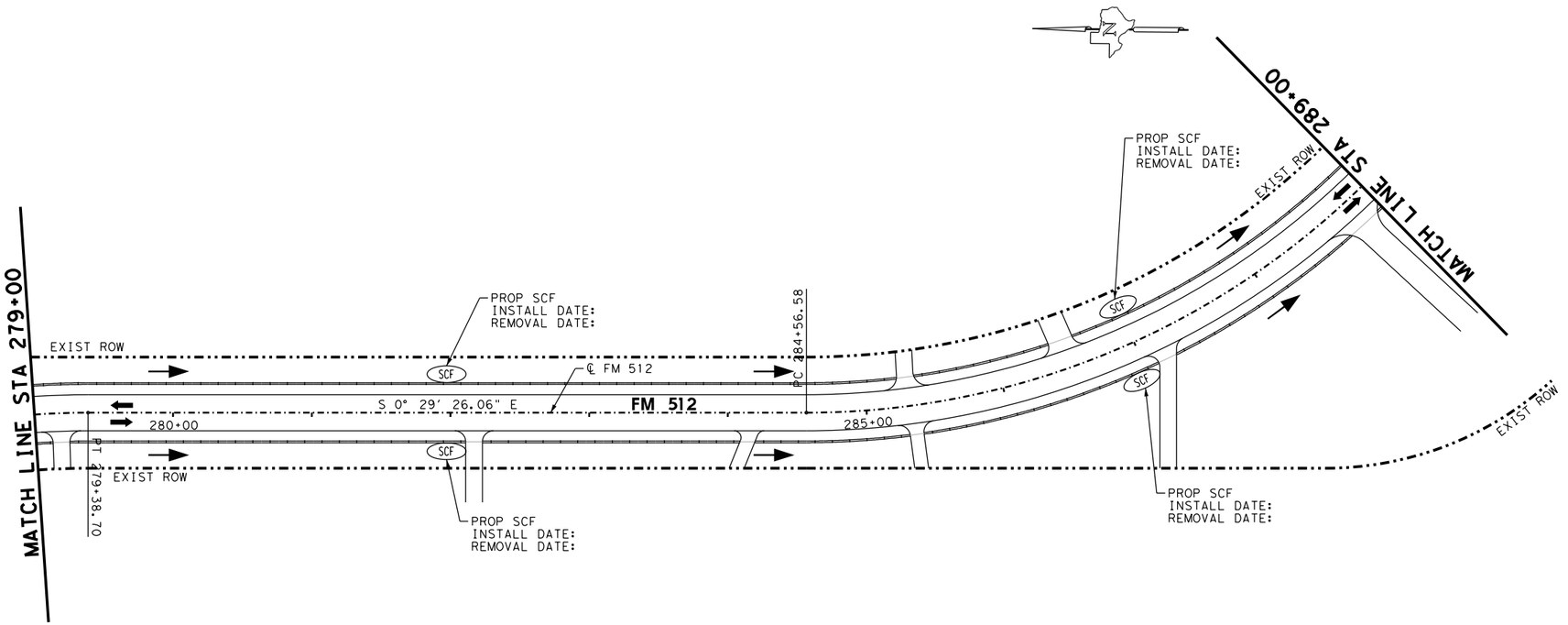

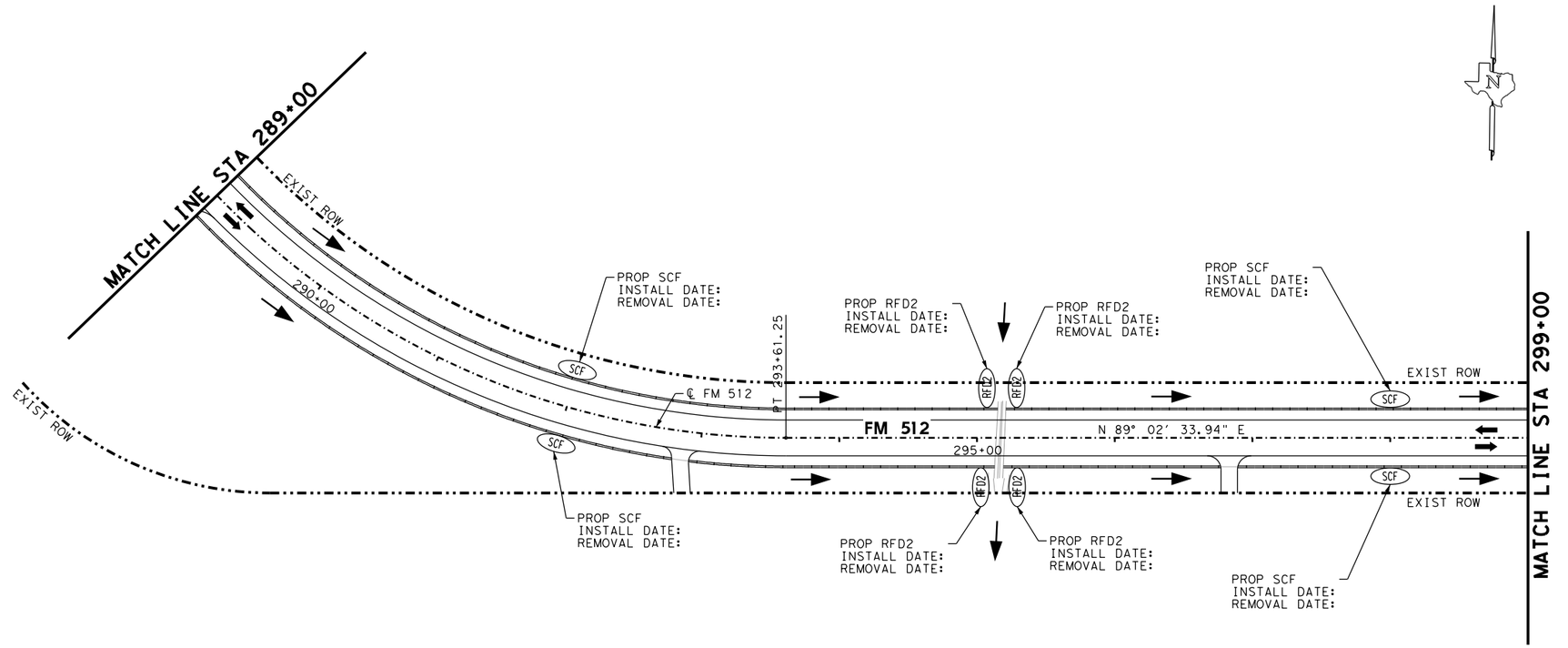

LEGEND:

- SCF — SEDIMENT CONTROL FENCE EST. @ 15 LF
- RFD2 — ROCK FILTER DAM (TY-2) EST. @ 15 LF
- ECL — EROSION CONTROL LOGS EST. @ 10 LF
- WATER FLOW DIRECTION
- CULVERT
- BERM

0 25 50 100
SCALE: 1"=100'

STATE OF TEXAS
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FM 512

EROSION CONTROL MEASURES LAYOUT

SHEET 15 OF 26

			HIGHWAY NO.
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	PARIS	HUNT	205
CONTROL	SECTION	JOB	
0579	02	014	

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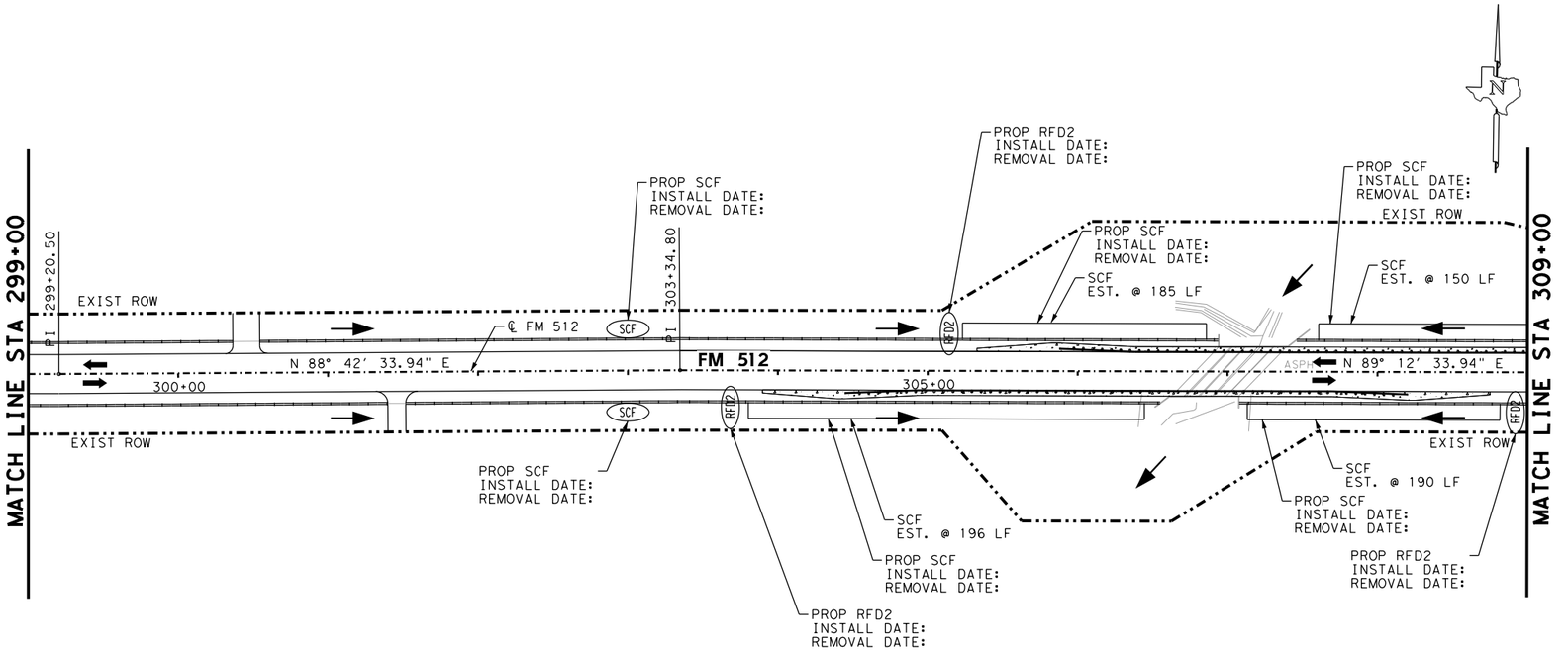

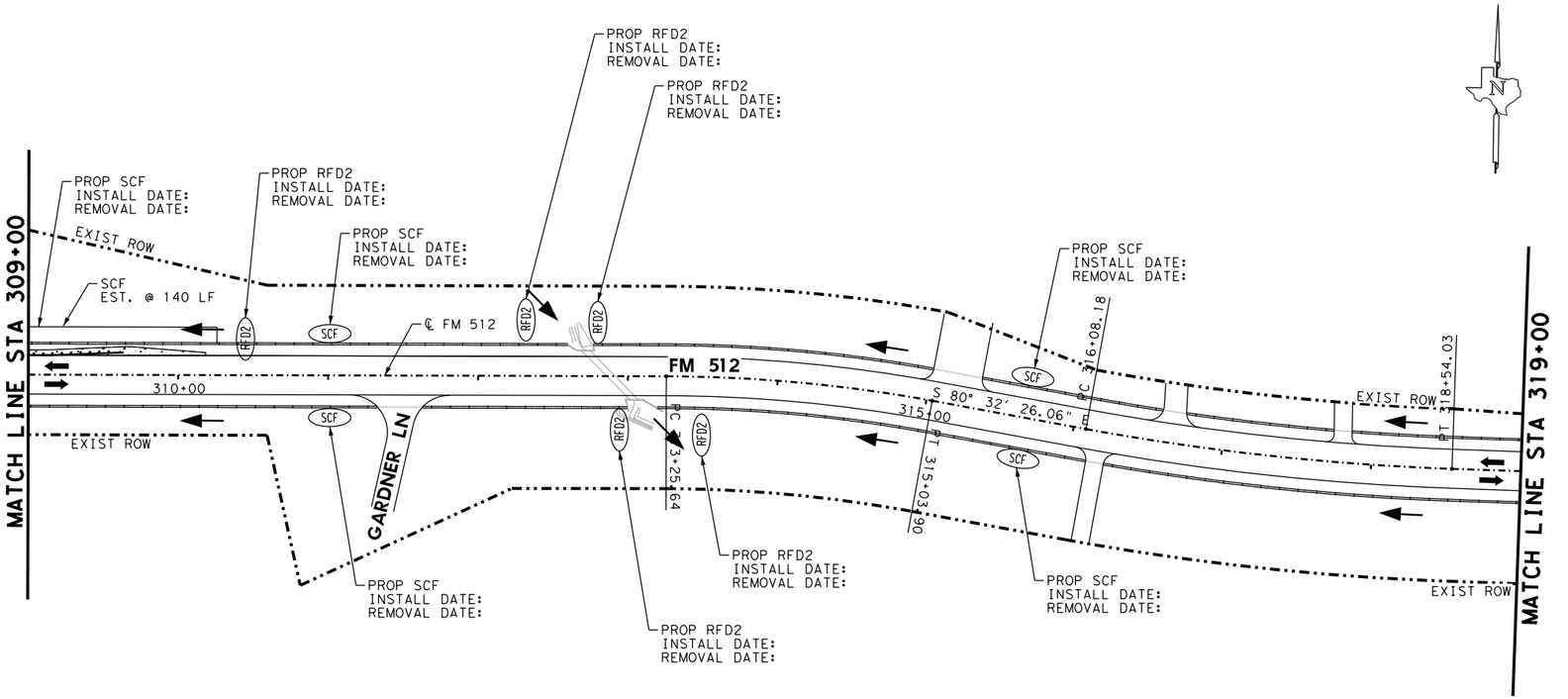

LEGEND:

- SCF — SEDIMENT CONTROL FENCE EST. @ 15 LF
- RFD2 — ROCK FILTER DAM (TY-2) EST. @ 15 LF
- ECL — EROSION CONTROL LOGS EST. @ 10 LF
- WATER FLOW DIRECTION
- CULVERT
- BERM

0 25 50 100
SCALE: 1"=100'

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EROSION CONTROL MEASURES LAYOUT

SHEET 16 OF 26

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	206
CONTROL	SECTION	JOB	
0579	02	014	

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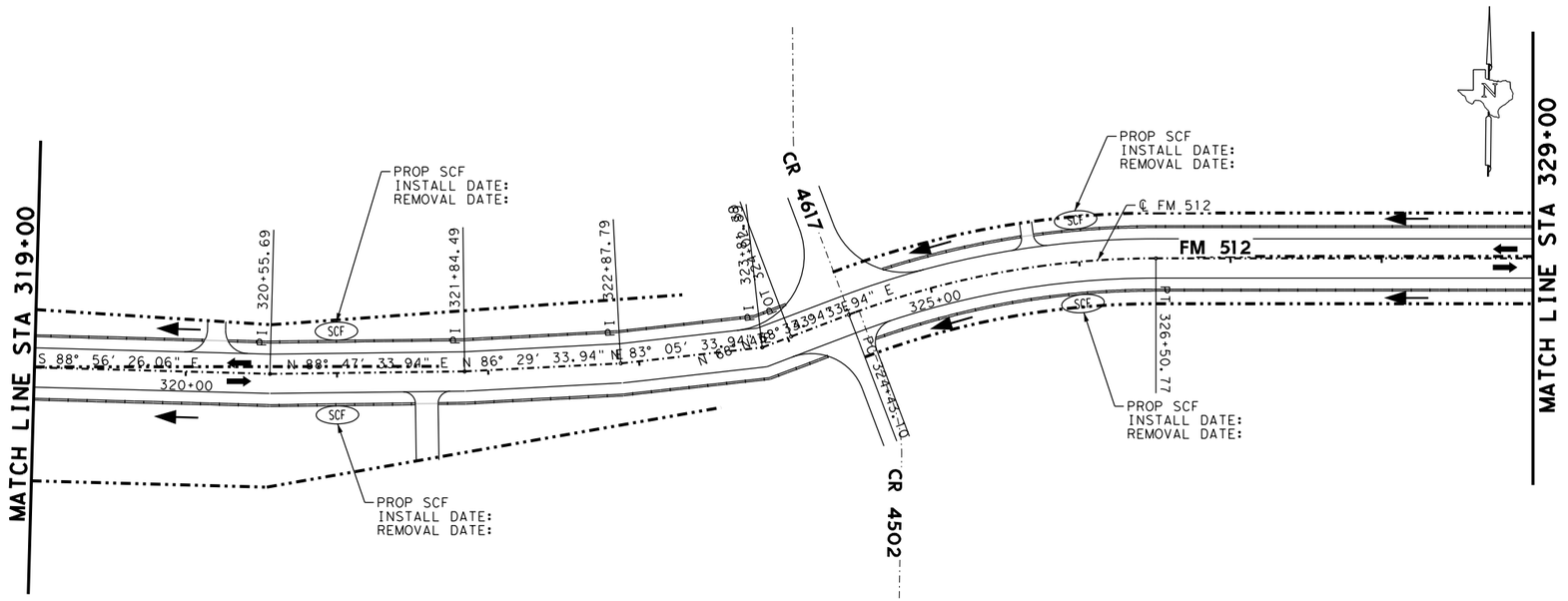

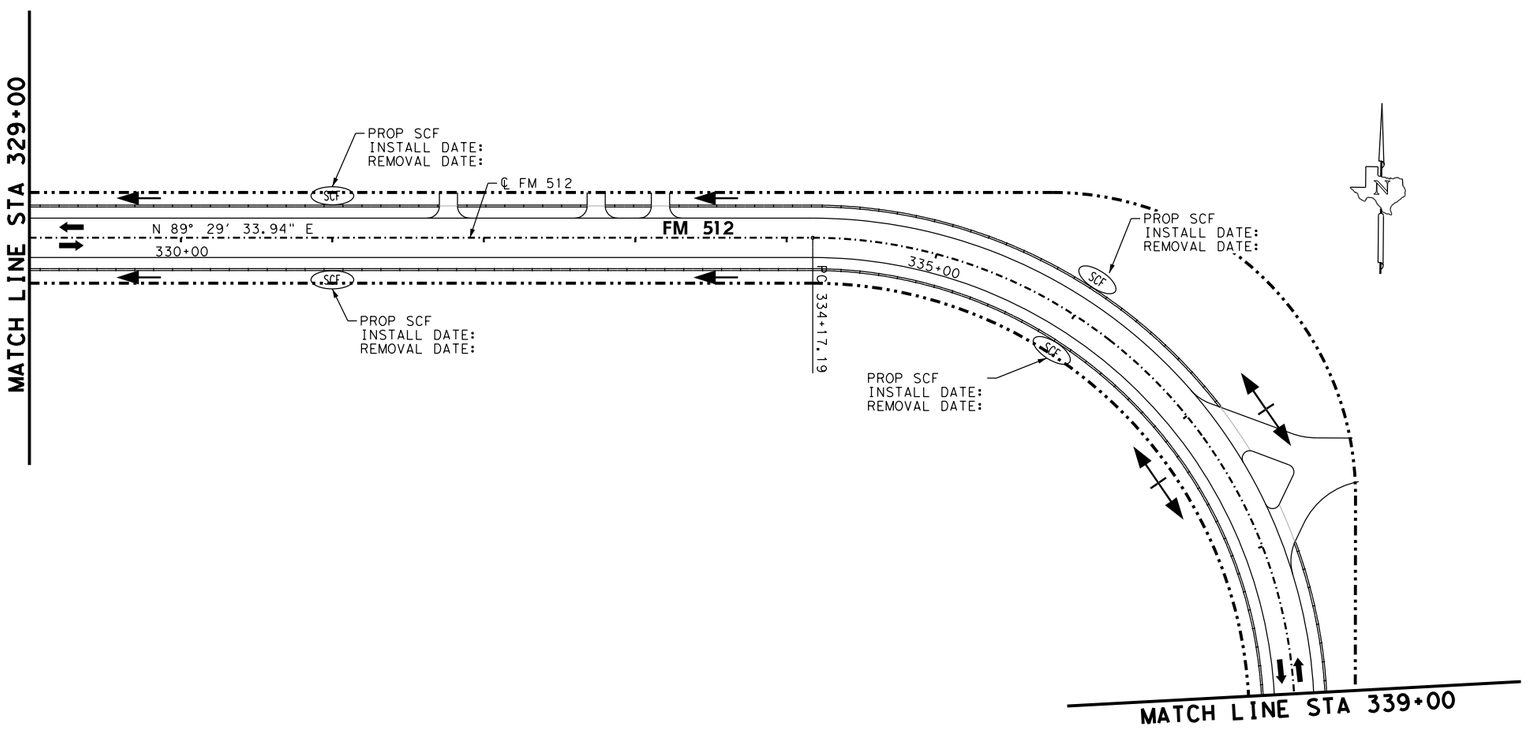

LEGEND:

- SCF — SEDIMENT CONTROL FENCE EST. @ 15 LF
- RFD2 — ROCK FILTER DAM (TY-2) EST. @ 15 LF
- ECL — EROSION CONTROL LOGS EST. @ 10 LF
- WATER FLOW DIRECTION
- CULVERT
- BERM

0 25 50 100
SCALE: 1"=100'

STATE OF TEXAS
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FM 512

EROSION CONTROL MEASURES LAYOUT

SHEET 17 OF 26

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	
CONTROL	SECTION	JOB	207
0579	02	014	

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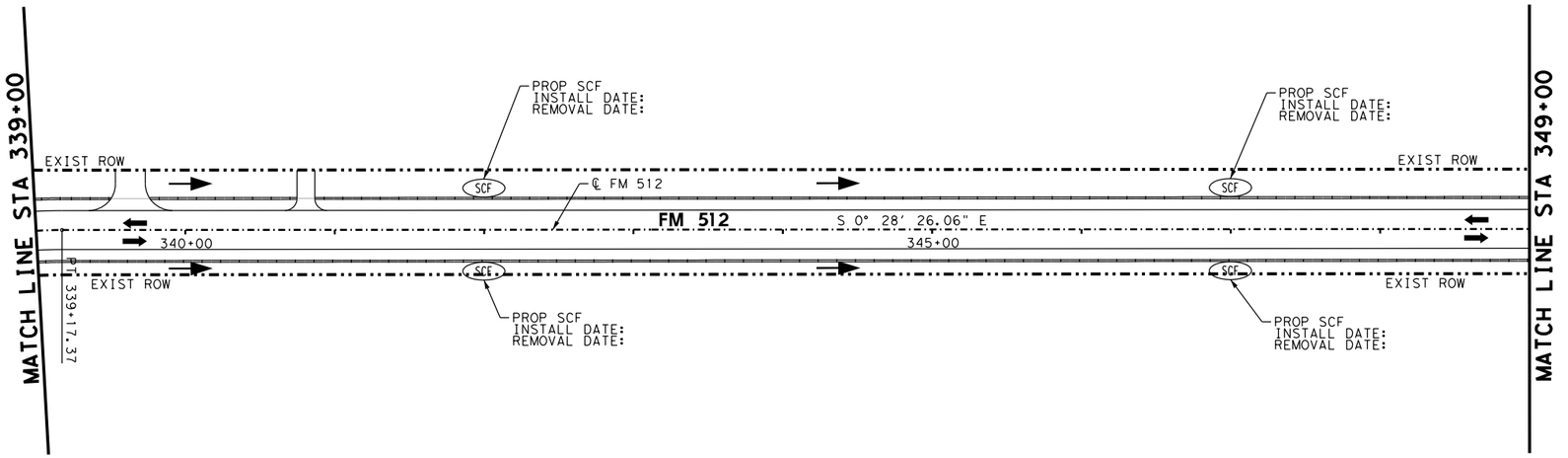

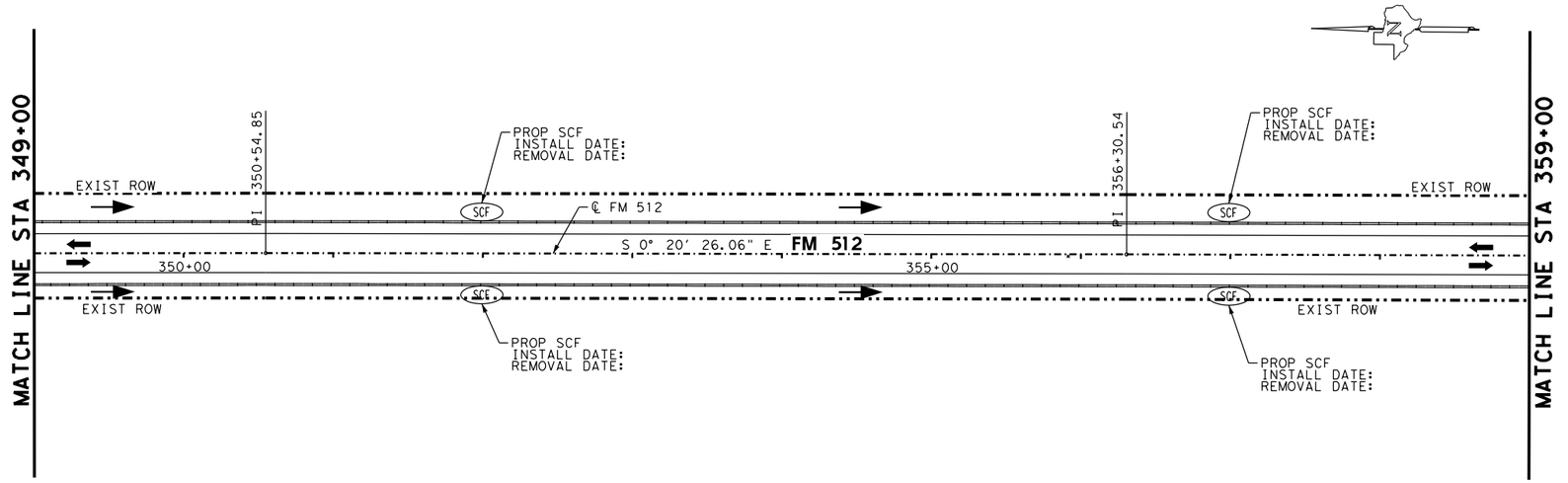

LEGEND:

- SCF — SEDIMENT CONTROL FENCE EST. @ 15 LF
- RFD2 — ROCK FILTER DAM (TY-2) EST. @ 15 LF
- ECL — EROSION CONTROL LOGS EST. @ 10 LF
- WATER FLOW DIRECTION
- CULVERT
- BERM

0 25 50 100
SCALE: 1"=100'

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FM 512

EROSION CONTROL MEASURES LAYOUT

SHEET 18 OF 26

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	208
CONTROL	SECTION	JOB	
0579	02	014	

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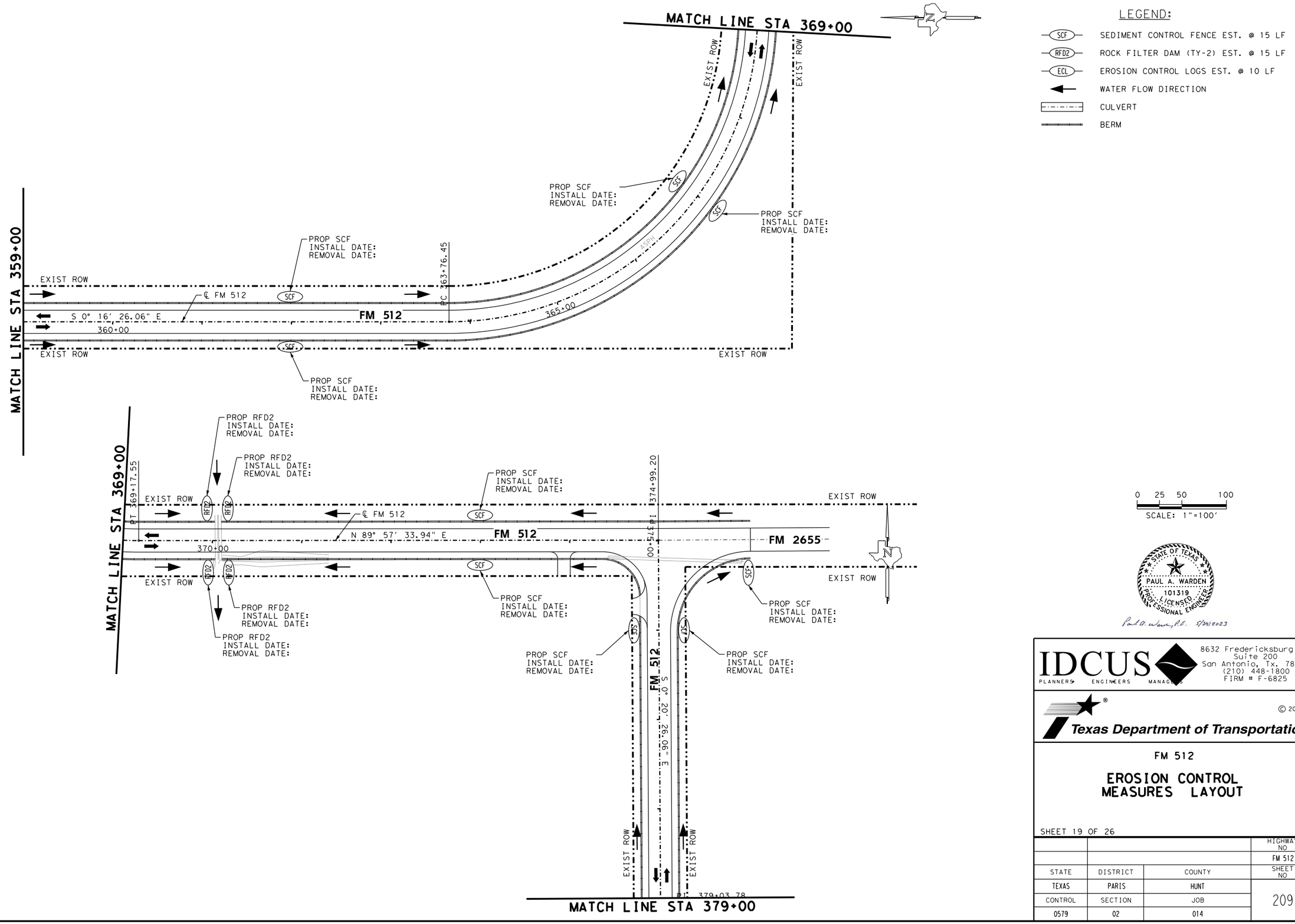

LEGEND:

- SCF — SEDIMENT CONTROL FENCE EST. @ 15 LF
- RFD2 — ROCK FILTER DAM (TY-2) EST. @ 15 LF
- ECL — EROSION CONTROL LOGS EST. @ 10 LF
- WATER FLOW DIRECTION
- CULVERT
- BERM

0 25 50 100
SCALE: 1"=100'

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FM 512

EROSION CONTROL MEASURES LAYOUT

SHEET 19 OF 26

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	209
CONTROL	SECTION	JOB	
0579	02	014	

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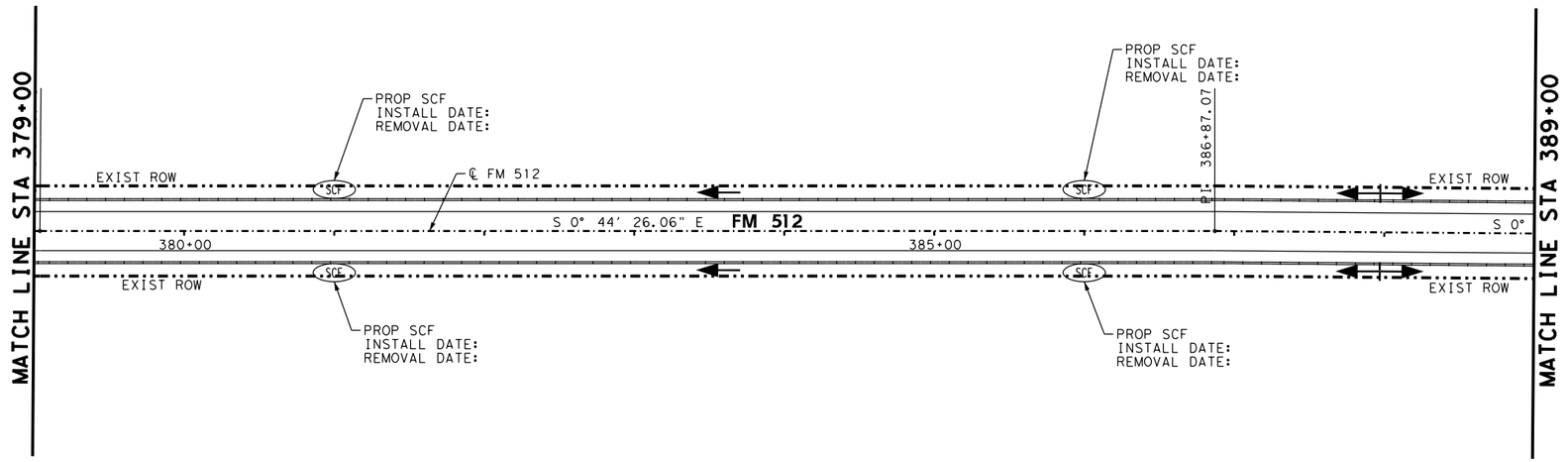

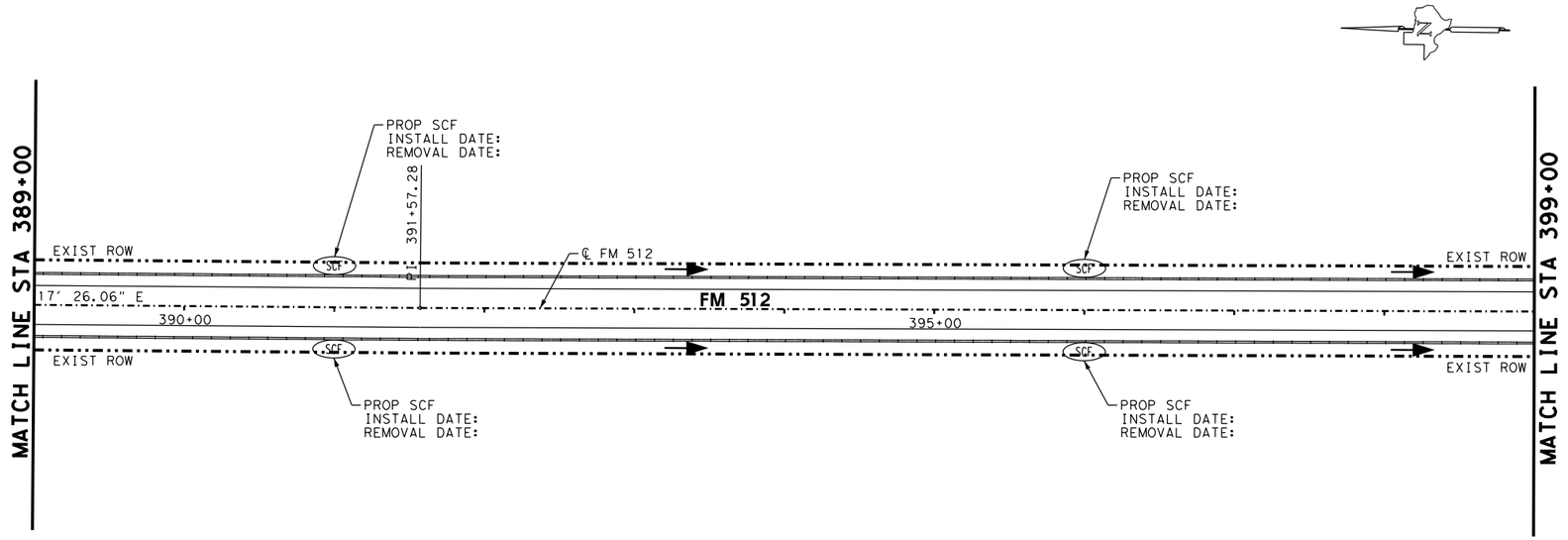

LEGEND:

- SCF — SEDIMENT CONTROL FENCE EST. @ 15 LF
- RFD2 — ROCK FILTER DAM (TY-2) EST. @ 15 LF
- ECL — EROSION CONTROL LOGS EST. @ 10 LF
- WATER FLOW DIRECTION
- CULVERT
- BERM

0 25 50 100
SCALE: 1"=100'

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FM 512

EROSION CONTROL MEASURES LAYOUT

SHEET 20 OF 26

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	210
CONTROL	SECTION	JOB	
0579	02	014	

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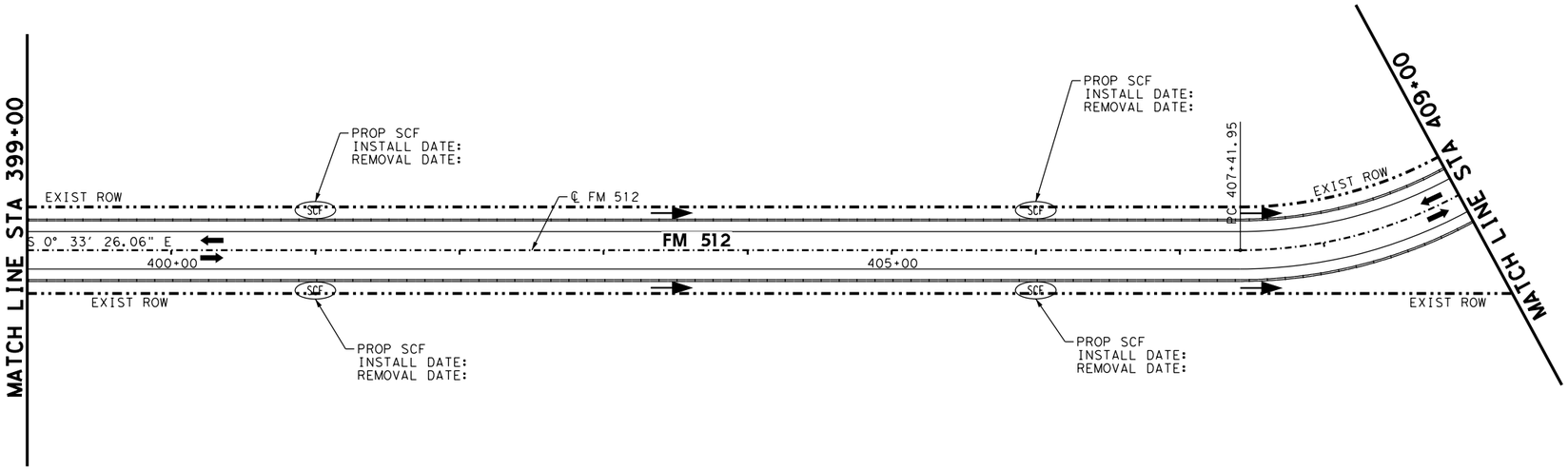

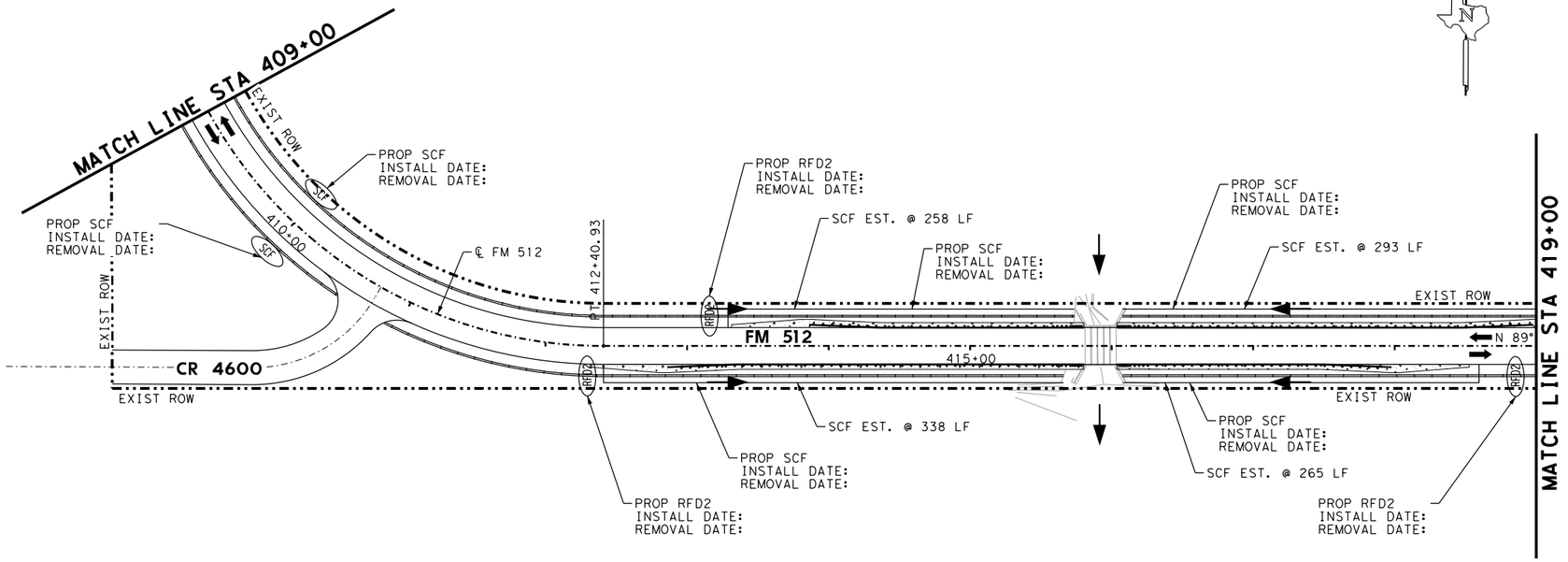

LEGEND:

- SCF — SEDIMENT CONTROL FENCE EST. @ 15 LF
- RFD2 — ROCK FILTER DAM (TY-2) EST. @ 15 LF
- ECL — EROSION CONTROL LOGS EST. @ 10 LF
- WATER FLOW DIRECTION
- CULVERT
- BERM

0 25 50 100
SCALE: 1"=100'

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EROSION CONTROL MEASURES LAYOUT

SHEET 21 OF 26

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	
CONTROL	SECTION	JOB	211
0579	02	014	

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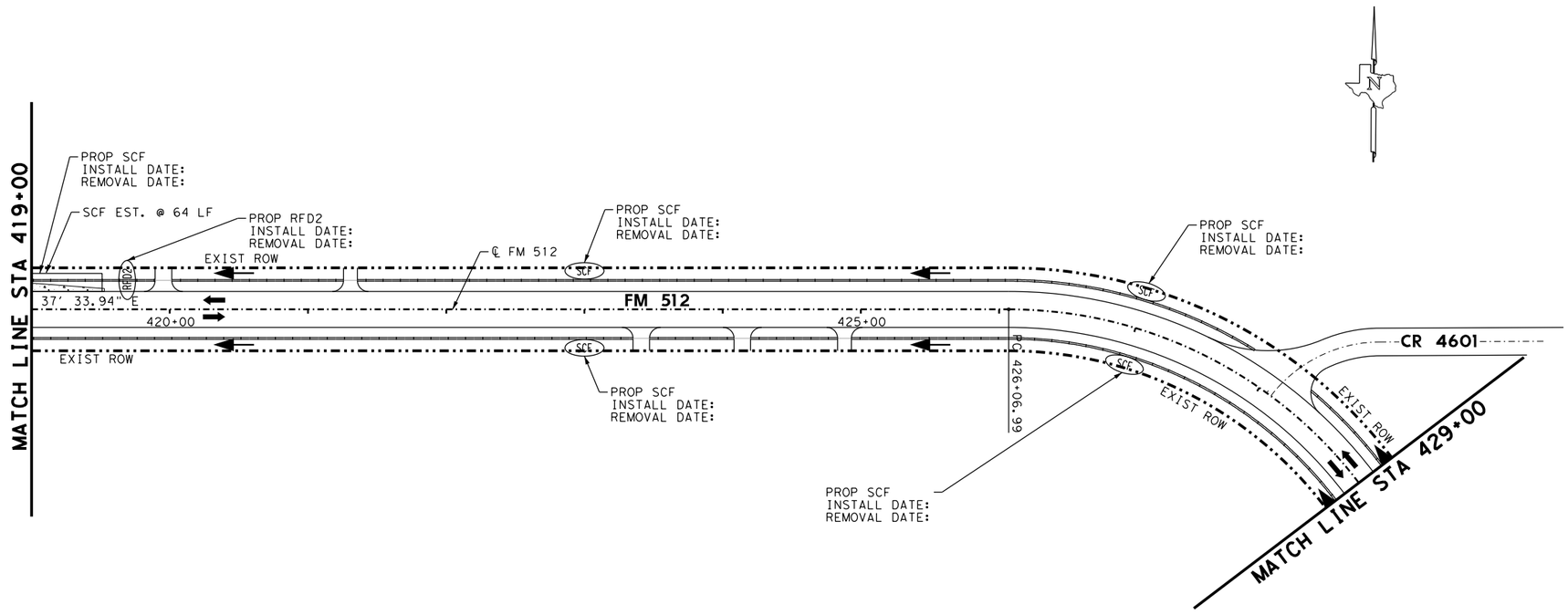

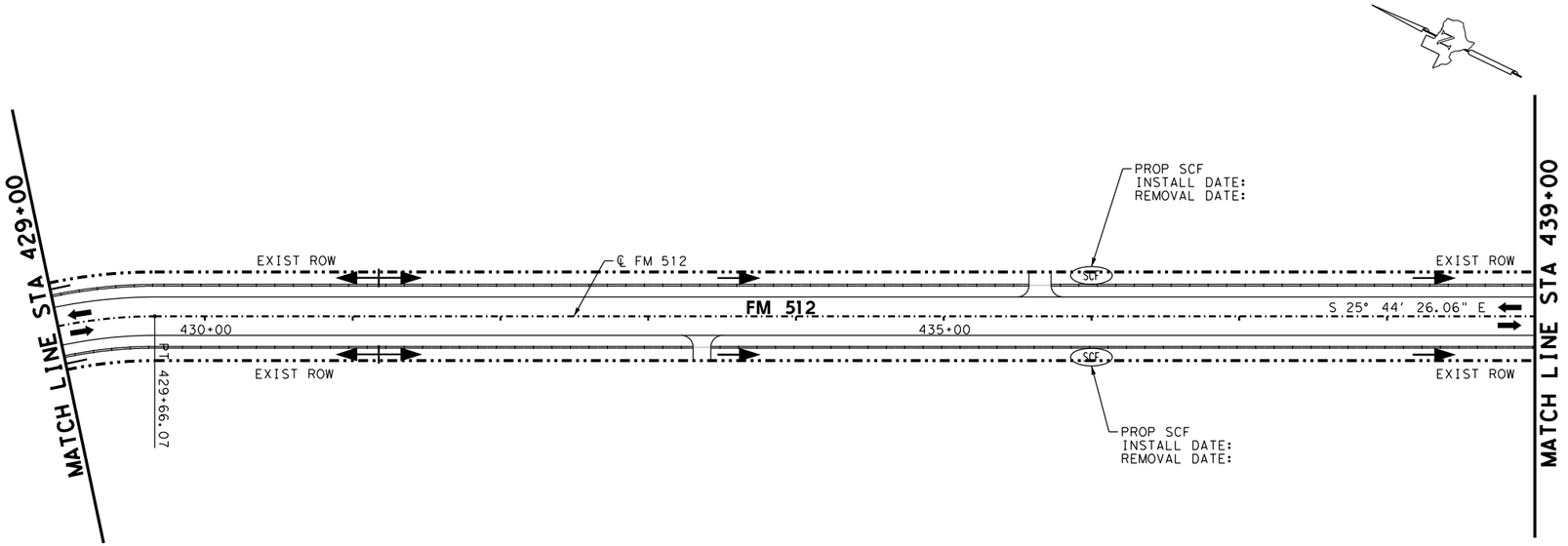

LEGEND:

- SCF — SEDIMENT CONTROL FENCE EST. @ 15 LF
- RFD2 — ROCK FILTER DAM (TY-2) EST. @ 15 LF
- ECL — EROSION CONTROL LOGS EST. @ 10 LF
- WATER FLOW DIRECTION
- CULVERT
- BERM

0 25 50 100
SCALE: 1"=100'

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FM 512

EROSION CONTROL MEASURES LAYOUT

SHEET 22 OF 26

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	212
CONTROL	SECTION	JOB	
0579	02	014	

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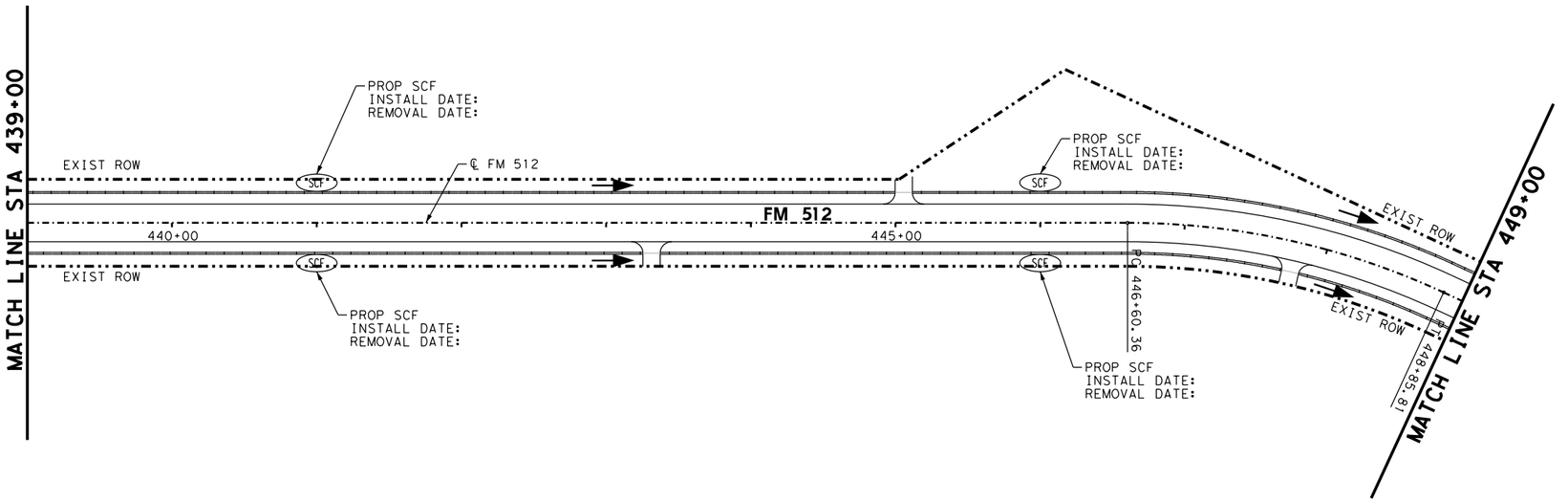

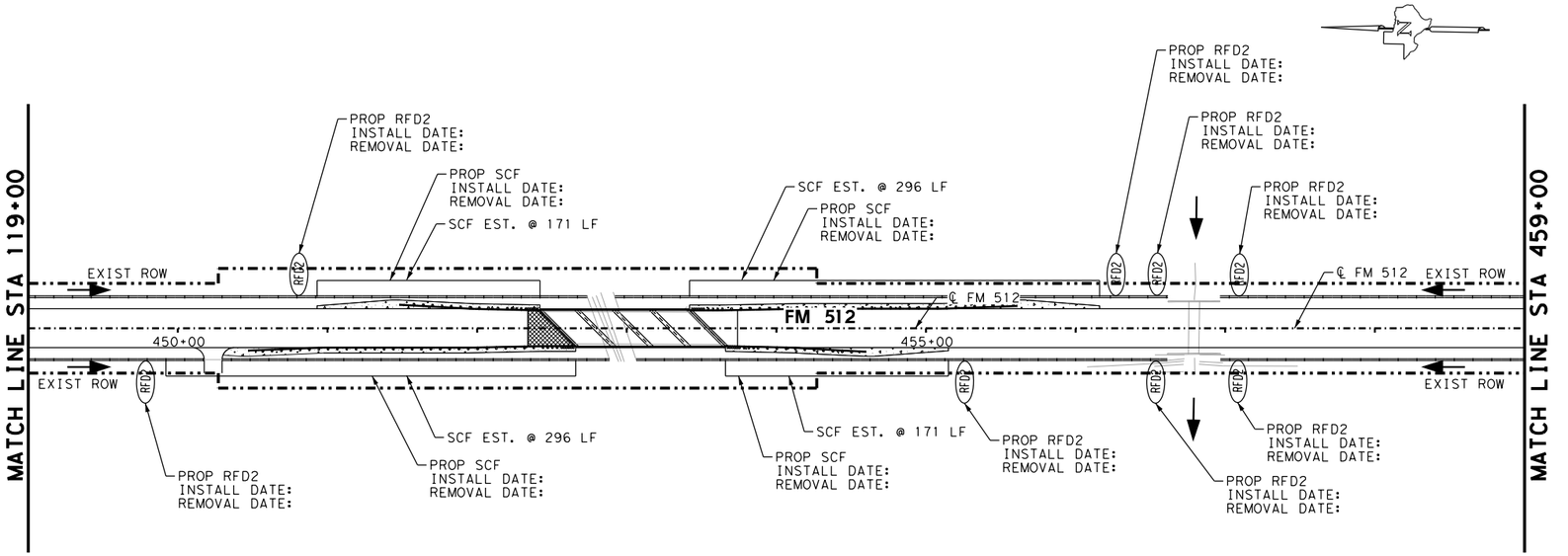

LEGEND:

- SCF — SEDIMENT CONTROL FENCE EST. @ 15 LF
- RFD2 — ROCK FILTER DAM (TY-2) EST. @ 15 LF
- ECL — EROSION CONTROL LOGS EST. @ 10 LF
- WATER FLOW DIRECTION
- CULVERT
- BERM

0 25 50 100
SCALE: 1"=100'

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FM 512

EROSION CONTROL MEASURES LAYOUT

SHEET 23 OF 26

			HIGHWAY NO.
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	PARIS	HUNT	213
CONTROL	SECTION	JOB	
0579	02	014	

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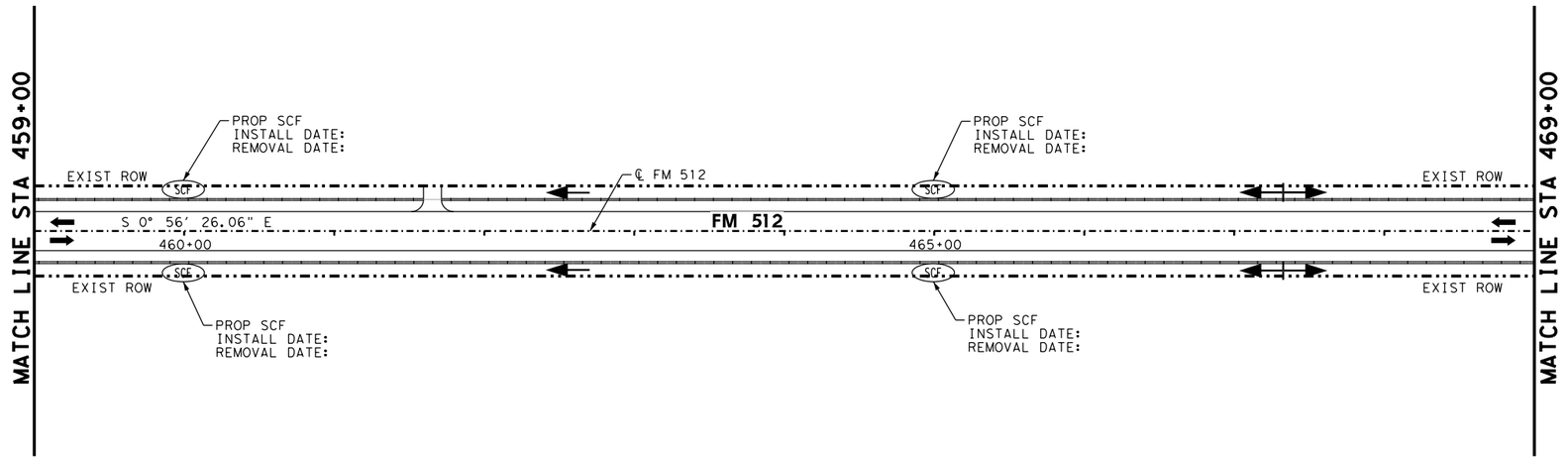

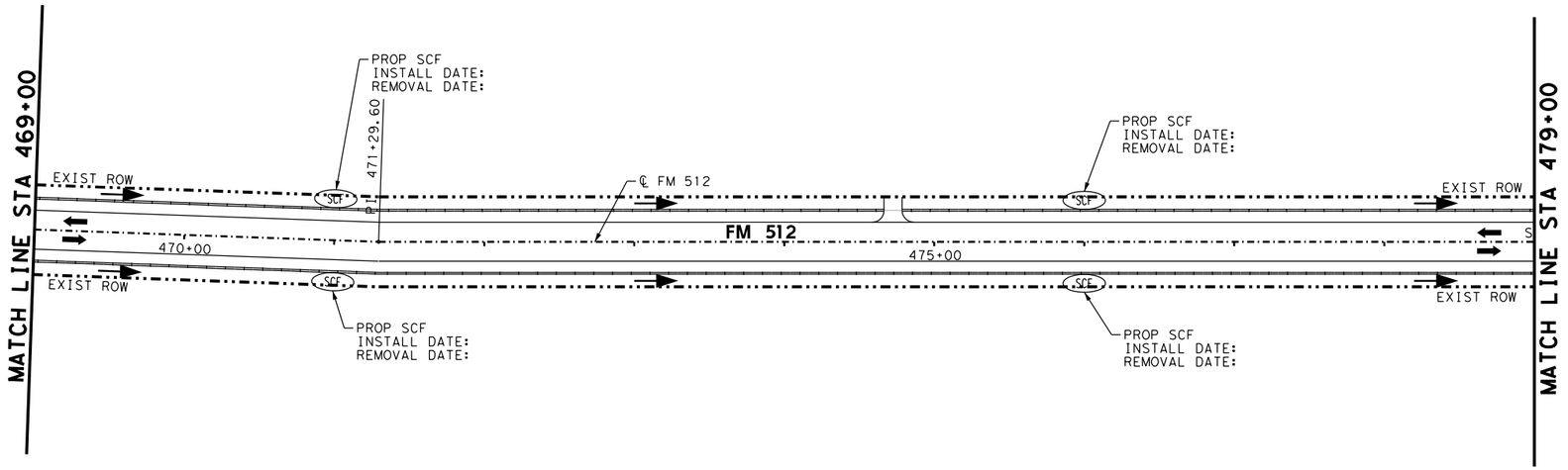

LEGEND:

- SCF — SEDIMENT CONTROL FENCE EST. @ 15 LF
- RFD2 — ROCK FILTER DAM (TY-2) EST. @ 15 LF
- ECL — EROSION CONTROL LOGS EST. @ 10 LF
- WATER FLOW DIRECTION
- CULVERT
- BERM

0 25 50 100
SCALE: 1"=100'

STATE OF TEXAS
PAUL A. WARDEN
101319
LICENSED
PROFESSIONAL ENGINEER

Paul A. Warden, P.E. 5/24/2023

IDCUS PLANNERS ENGINEERS MANAGERS
8632 Fredericksburg Rd.
Suite 200
San Antonio, Tx. 78240
(210) 448-1800
FIRM # F-6825

Texas Department of Transportation

FM 512

EROSION CONTROL MEASURES LAYOUT

SHEET 24 OF 26

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	214
CONTROL	SECTION	JOB	
0579	02	014	

FM512_EN_SW3P_24.dgn

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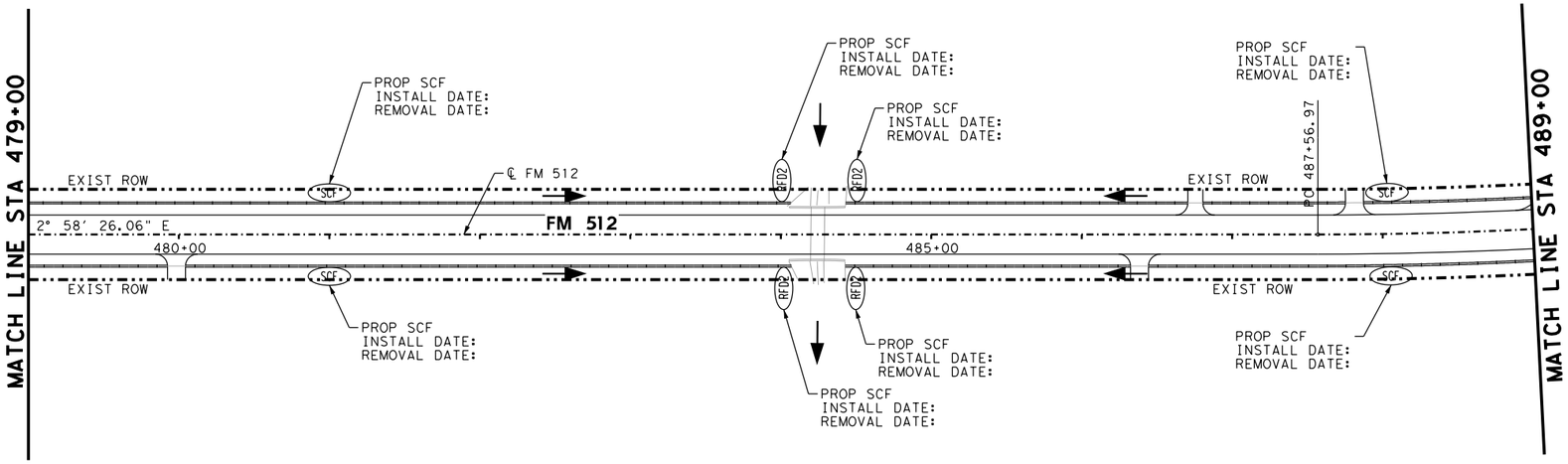

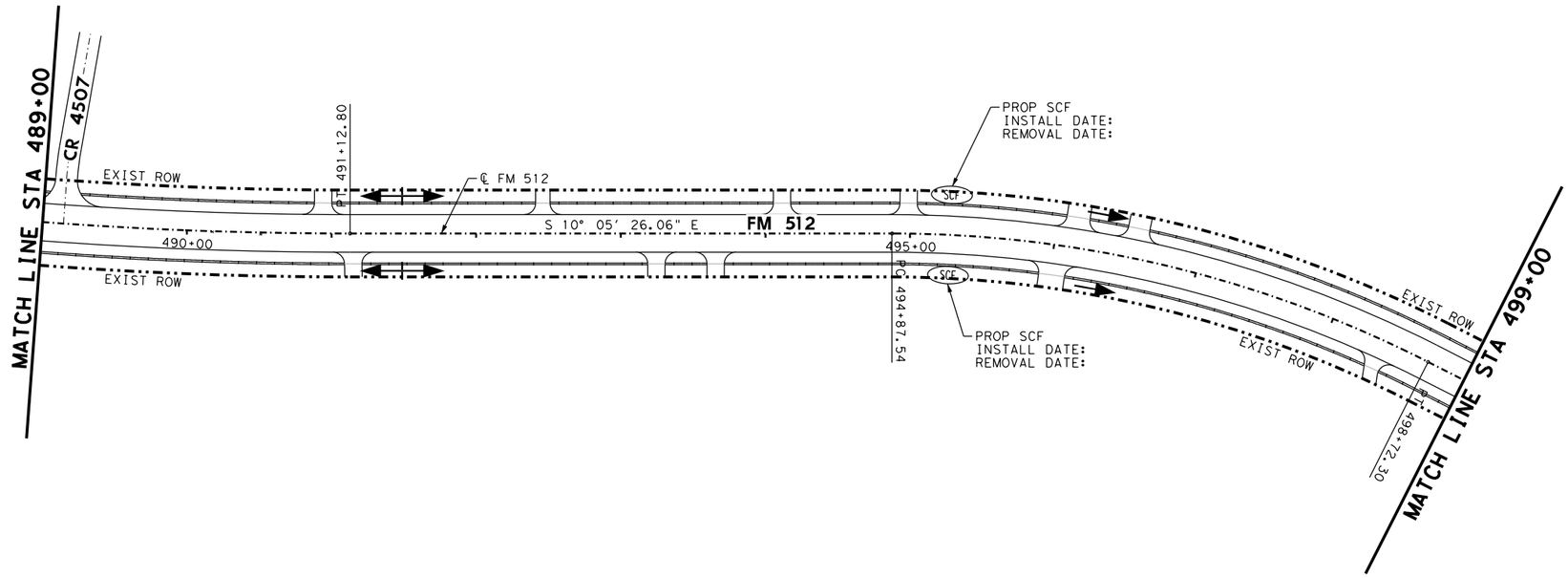

LEGEND:

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- RFD2 — ROCK FILTER DAM (TY-2) EST. @ 15 LF
- ECL — EROSION CONTROL LOGS EST. @ 10 LF
- WATER FLOW DIRECTION
- CULVERT
- BERM

0 25 50 100
SCALE: 1"=100'

STATE OF TEXAS
PAUL A. WARDEN
101319
LICENSED
PROFESSIONAL ENGINEER

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Texas Department of Transportation

FM 512

EROSION CONTROL MEASURES LAYOUT

SHEET 25 OF 26

			HIGHWAY NO
			FM 512
STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	215
CONTROL	SECTION	JOB	
0579	02	014	

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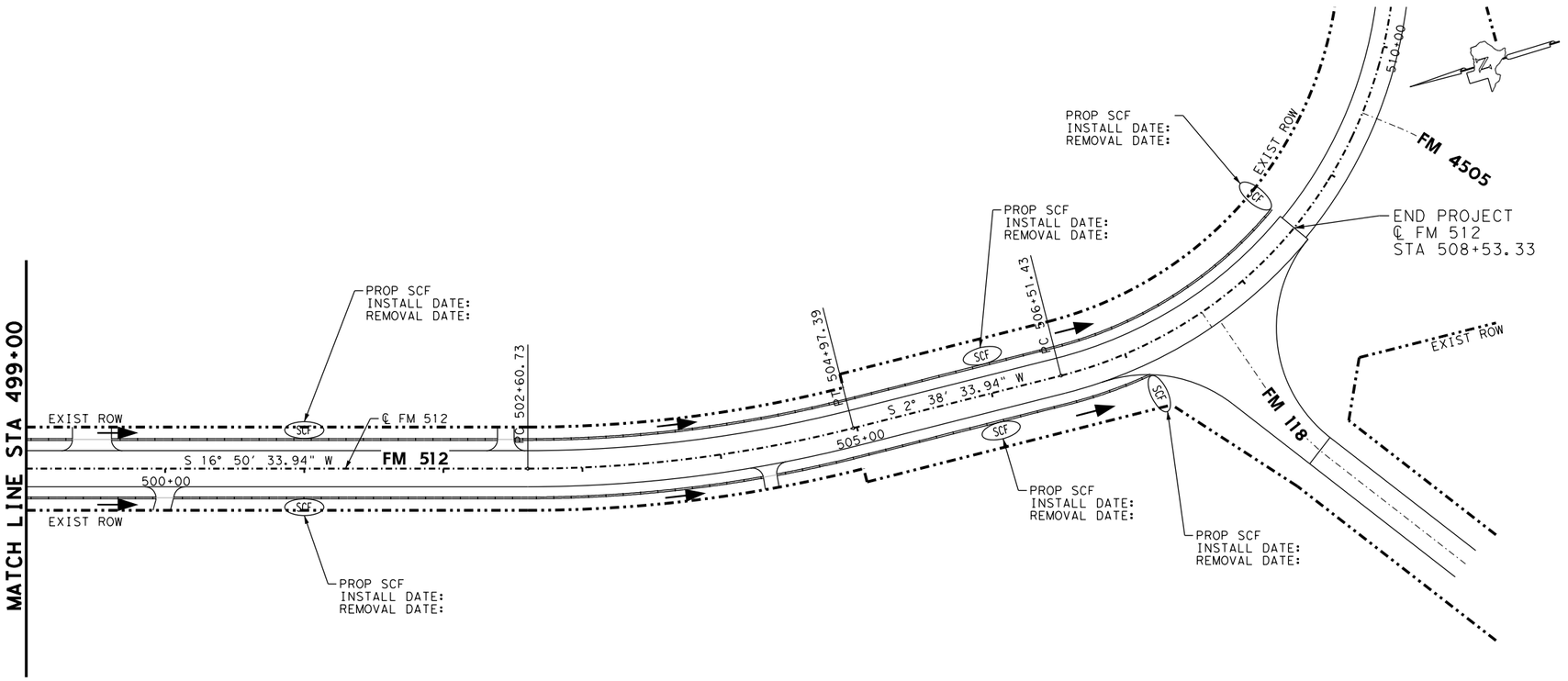

LEGEND:

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- RFD2 — ROCK FILTER DAM (TY-2) EST. @ 15 LF
- ECL — EROSION CONTROL LOGS EST. @ 10 LF
- WATER FLOW DIRECTION
- CULVERT
- BERM

0 25 50 100
SCALE: 1"=100'

STATE OF TEXAS
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101319
LICENSED
PROFESSIONAL ENGINEER

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FIRM # F-6825

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FM 512

EROSION CONTROL MEASURES LAYOUT

SHEET 26 OF 26

			HIGHWAY NO
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STATE	DISTRICT	COUNTY	SHEET NO
TEXAS	PARIS	HUNT	216
CONTROL	SECTION	JOB	
0579	02	014	

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DATE: 5/24/2023
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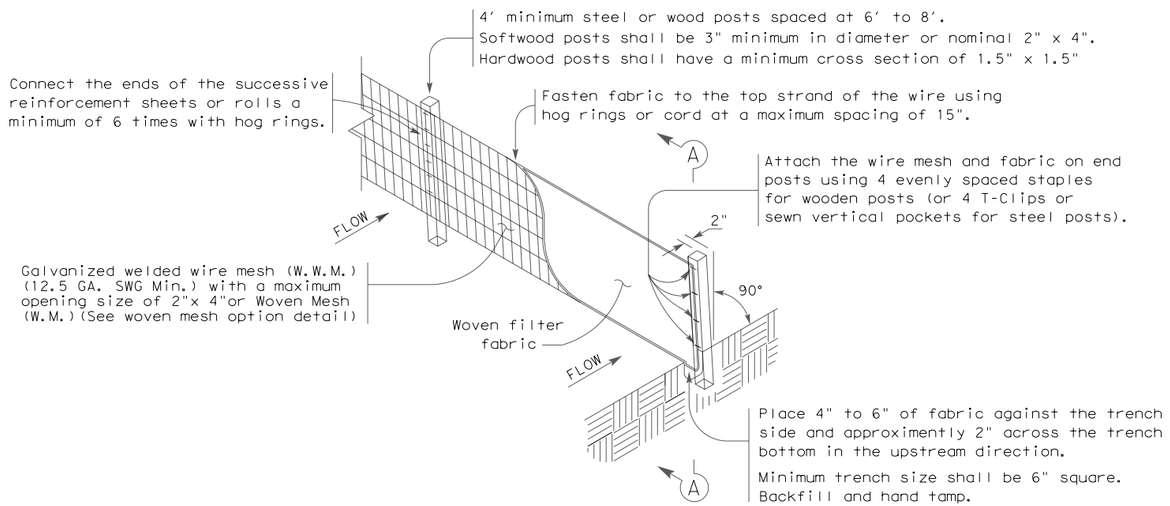
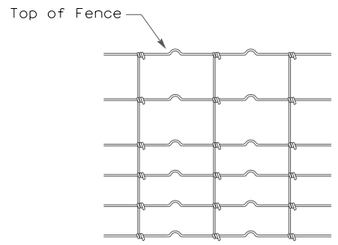
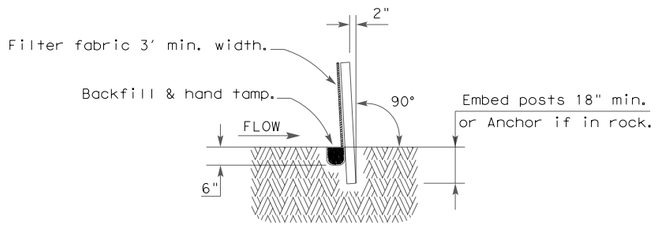


TEMPORARY SEDIMENT CONTROL FENCE

SCF





SECTION A-A

HINGE JOINT KNOT WOVEN MESH (OPTION) DETAIL

Galvanized hinge joint knot woven mesh (12.5 GA.SWG Min.) requires a minimum of five horizontal wires spaced at a maximum of 12 inches apart and all vertical wires spaced at a maximum of 12 inches apart.

SEDIMENT CONTROL FENCE USAGE GUIDELINES

A sediment control fence may be constructed near the downstream perimeter of a disturbed area along a contour to intercept sediment from overland runoff. A 2 year storm frequency may be used to calculate the flow rate to be filtered.

Sediment control fence should be sized to filter a maximum flow through rate of 100 GPM/FT^2. Sediment control fence is not recommended to control erosion from a drainage area larger than 2 acres.

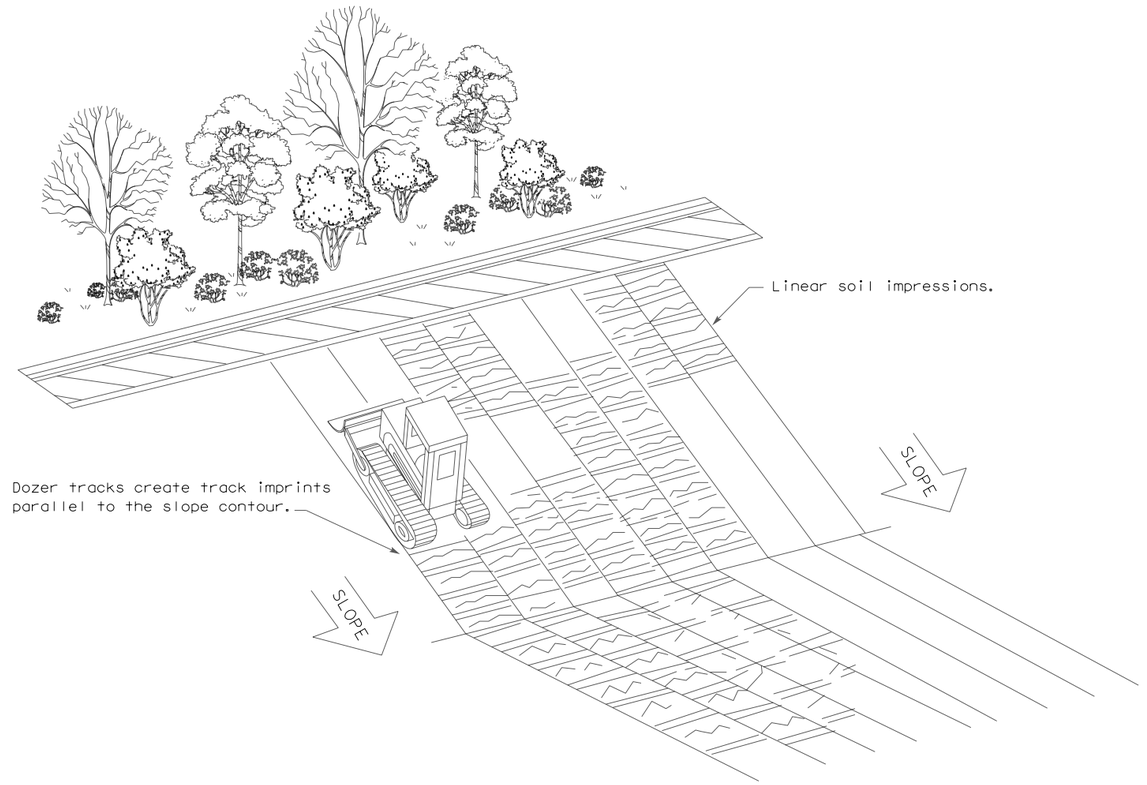
LEGEND

Sediment Control Fence

SCF

GENERAL NOTES

1. Vertical tracking is required on projects where soil distributing activities have occurred unless otherwise approved.
2. Perform vertical tracking on slopes to temporarily stabilize soil.
3. Provide equipment with a track undercarriage capable of producing linear soil impressions measuring a minimum of 12" in length by 2" to 4" in width by 1/2" to 2" in depth.
4. Do not exceed 12" between track impressions.
5. Install continous linear track impressions where the minimum 12" length impressions are perpendicular to the slope or direction of water flow.



VERTICAL TRACKING

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

FENCE & VERTICAL TRACKING

EC(1)-16

FILE: ec116	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0579	02	014	FM 512
	DIST	COUNTY		SHEET NO.
	PARIS	HUNT		217

DATE: 5/24/2023
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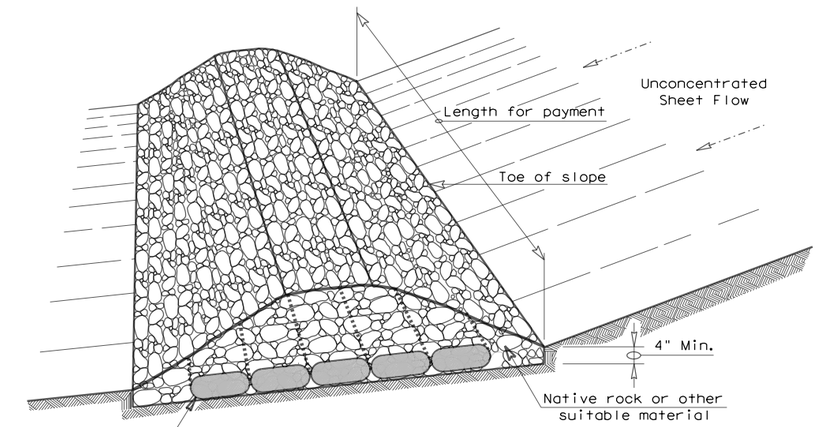
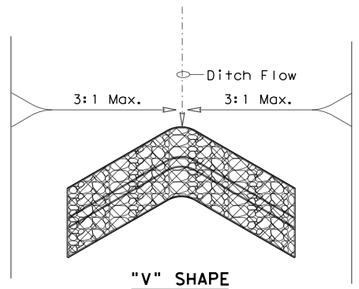
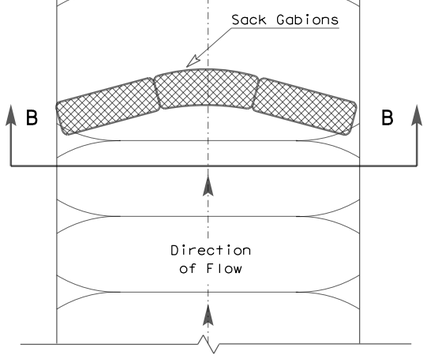


FILTER DAM AT TOE OF SLOPE

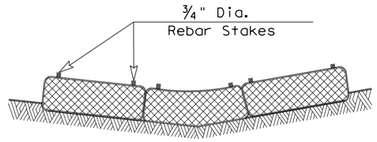
RFD1



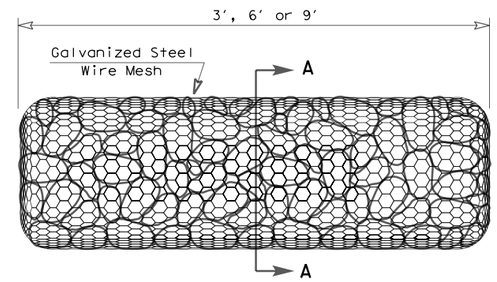
"V" SHAPE PLAN VIEW



PLAN VIEW

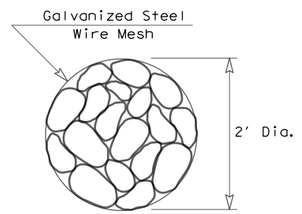


SECTION B-B

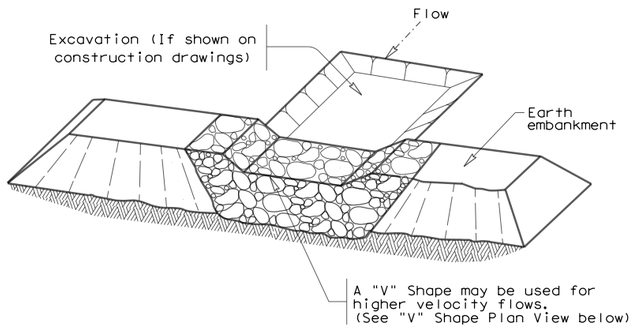


TYPE 4 (SACK GABIONS)

RFD4

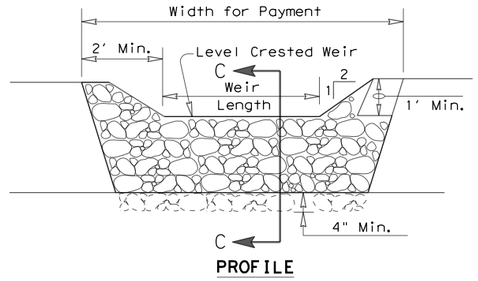


SECTION A-A

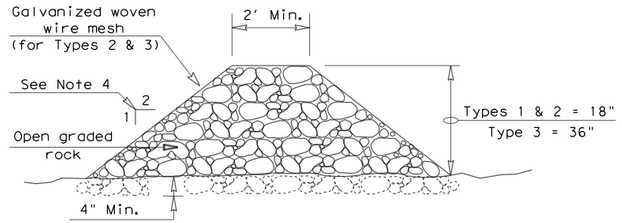


FILTER DAM AT SEDIMENT TRAP

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.

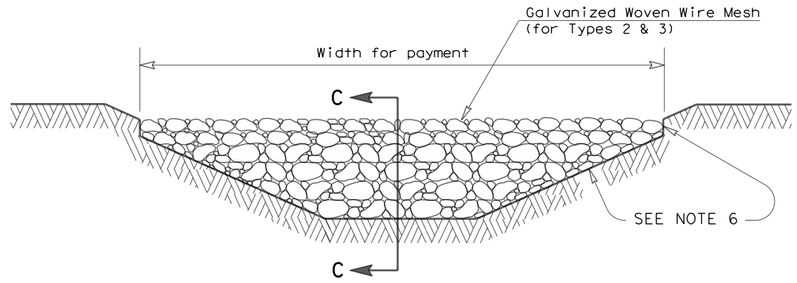
Type 1 (18" high with no wire mesh) (3" to 6" aggregate): Type 1 may be used at the toe of slopes, around inlets, in small ditches, and at dike or swale outlets. This type of dam is recommended to control erosion from a drainage area of 5 acres or less. Type 1 may not be used in concentrated high velocity 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	0579	02	014	FM 512
	DIST	COUNTY		SHEET NO.
	PARIS	HUNT		218

DATE: 5/24/2023
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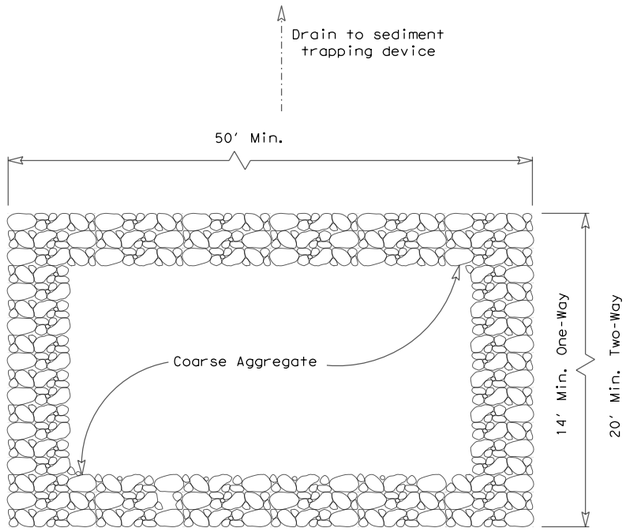
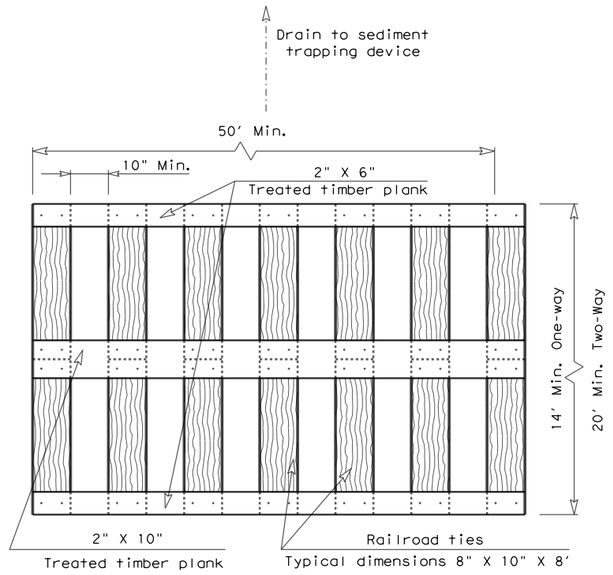


PLAN VIEW



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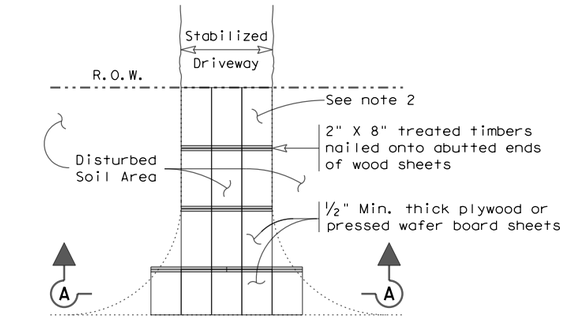

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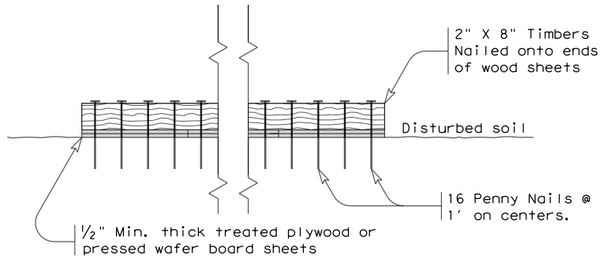
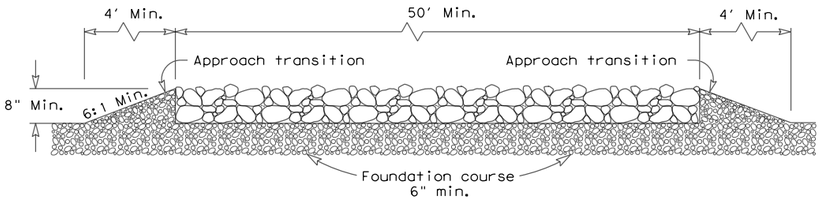


SECTION A-A

CONSTRUCTION EXIT (TYPE 3)

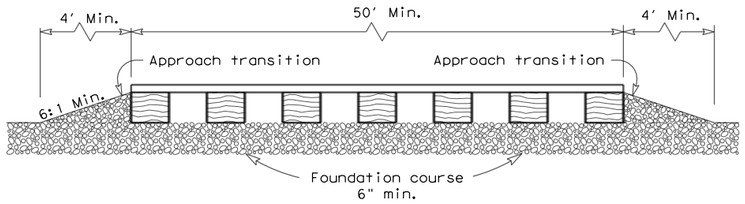
SHORT TERM



ELEVATION VIEW

CONSTRUCTION EXIT (TYPE 1)

ROCK CONSTRUCTION (LONG TERM)



ELEVATION VIEW

CONSTRUCTION EXIT (TYPE 2)

TIMBER CONSTRUCTION (LONG TERM)

GENERAL NOTES (TYPE 1)

1. The length of the type 1 construction exit shall be as indicated on the plans, but not less than 50′.
2. The coarse aggregate should be open graded with a size of 4" to 8".
3. The approach transitions should be no steeper than 6:1 and constructed as directed by the Engineer.
4. The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other materialas approved by the Engineer.
5. The construction exit shall be graded to allow drainage to a sediment trapping device.
6. The guidelines shown hereon are suggestions only and may be modified by the Engineer.
7. Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.

GENERAL NOTES (TYPE 2)

1. The length of the type 2 construction exit shall be as indicated on the plans, but not less than 50′.
2. The treated timber planks shall be attached to the railroad ties with ½"x 6" min. lag bolts. Other fasteners may be used as approved by the Engineer.
3. The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
4. The approach transitions shall be no steeper than 6:1 and constructed as directed by the Engineer.
5. The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other material as approved by the Engineer.
6. The construction exit should be graded to allow drainage to a sediment trapping device.
7. The guidelines shown hereon are suggestions only and may be modified by the Engineer.
8. Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.

GENERAL NOTES (TYPE 3)

1. The length of the type 3 construction exit shall be as shown on the plans, or as directed by the Engineer.
2. The type 3 construction exit may be constructed from open graded crushed stone with a size of two to four inches spread a min. of 4" thick to the limits shown on the plans.
3. The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
4. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

CONSTRUCTION EXITS

EC(3)-16

FILE: ec316	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
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REVISIONS	0579	02	014	FM 512
	DIST	COUNTY		SHEET NO.
	PARIS	HUNT		219

DATE: 5/24/2023
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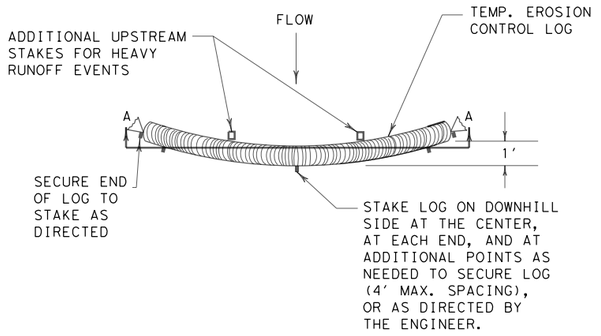
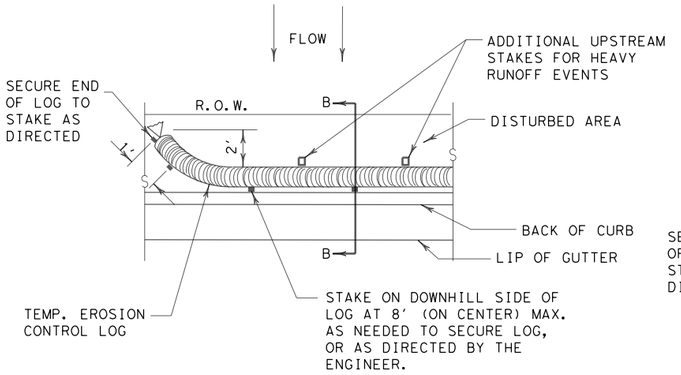


PLAN VIEW



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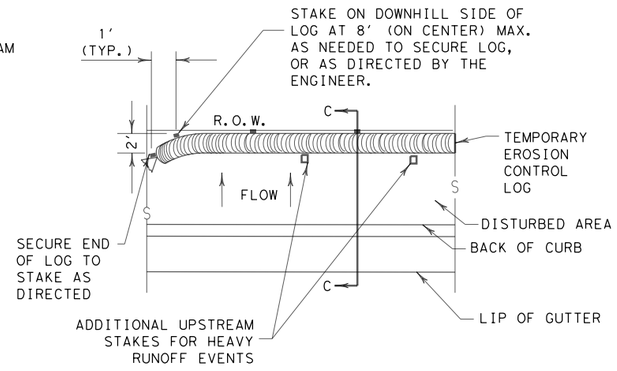

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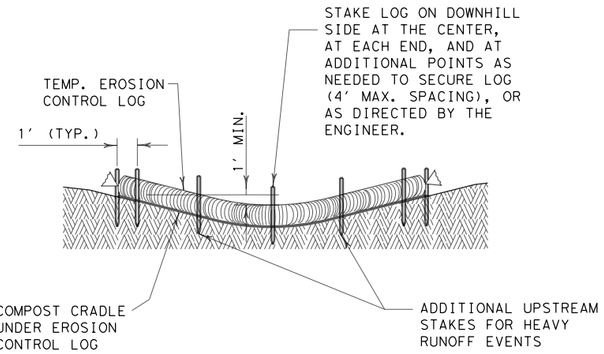
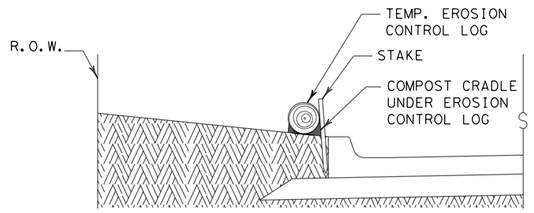


SECTION A-A

EROSION CONTROL LOG DAM

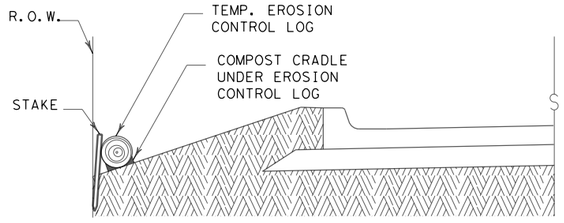
CL-D



SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

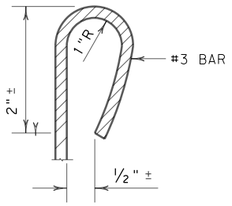
CL-BOC



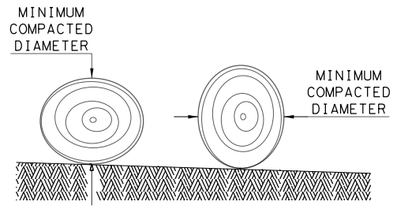
SECTION C-C

EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

CL-ROW



REBAR STAKE DETAIL



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS

GENERAL NOTES:

1. EROSION CONTROL LOGS SHALL BE INSTALLED IN ACCORDANCE WITH MANFACTURER'S RECOMMENDATIONS, OR AS DIRECTED BY THE ENGINEER.
2. LENGTHS OF EROSION CONTROL LOGS SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND AS REQUIRED FOR THE PURPOSE INTENDED.
3. UNLESS OTHERWISE DIRECTED, USE BIODEGRADABLE OR PHOTODEGRADABLE CONTAINMENT MESH ONLY WHERE LOG WILL REMAIN IN PLACE AS PART OF A VEGETATIVE SYSTEM. FOR TEMPORARY INSTALLATIONS, USE RECYCLABLE CONTAINMENT MESH.
4. FILL LOGS WITH SUFFICIENT FILTER MATERIAL TO ACHIEVE THE MINIMUM COMPACTED DIAMETER SPECIFIED IN THE PLANS WITHOUT EXCESSIVE DEFORMATION.
5. STAKES SHALL BE 2" X 2" WOOD OR #3 REBAR, 2'-4' LONG, EMBEDDED SUCH THAT 2" PROTRUDES ABOVE LOG, OR AS DIRECTED BY THE ENGINEER.
6. DO NOT PLACE STAKES THROUGH CONTAINMENT MESH.
7. COMPOST CRADLE MATERIAL IS INCIDENTAL & WILL NOT BE PAID FOR SEPARATELY.
8. SANDBAGS USED AS ANCHORS SHALL BE PLACED ON TOP OF LOGS & SHALL BE OF SUFFICIENT SIZE TO HOLD LOGS IN PLACE.
9. TURN THE ENDS OF EACH ROW OF LOGS UPSLOPE TO PREVENT RUNOFF FROM FLOWING AROUND THE LOG.
10. FOR HEAVY RUNOFF EVENTS, ADDITIONAL UPSTREAM STAKES MAY BE NECESSARY TO KEEP LOG FROM FOLDING IN ON ITSELF.

LEGEND

CL-D	EROSION CONTROL LOG DAM
CL-BOC	EROSION CONTROL LOG AT BACK OF CURB
CL-ROW	EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY
CL-SST	EROSION CONTROL LOGS ON SLOPES STAKE AND TRENCHING ANCHORING
CL-SSL	EROSION CONTROL LOGS ON SLOPES STAKE AND LASHING ANCHORING
CL-DI	EROSION CONTROL LOG AT DROP INLET
CL-CI	EROSION CONTROL LOG AT CURB INLET
CL-GI	EROSION CONTROL LOG AT CURB & GRATE INLET

SEDIMENT BASIN & TRAP USAGE GUIDELINES

An erosion control log sediment trap may be used to filter sediment out of runoff draining from an unstabilized area.

Log Traps: The drainage area for a sediment trap should not exceed 5 acres. The trap capacity should be 1800 CF/Acre (0.5" over the drainage area).

Control logs should be placed in the following locations:
1. Within drainage ditches spaced as needed or min. 500' on center
2. Immediately preceding ditch inlets or drain inlets
3. Just before the drainage enters a water course
4. Just before the drainage leaves the right of way
5. Just before the drainage leaves the construction limits where drainage flows away from the project.

The logs should be cleaned when the sediment has accumulated to a depth of 1/2 the log diameter.

Cleaning and removal of accumulated sediment deposits is incidental and will not be paid for separately.

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec916		DN: TxDOT		CK: KM		DW: LS/PT	CK: LS
© TxDOT: JULY 2016		CONT	SECT	JOB		HIGHWAY	
REVISIONS		0579	02	014		FM 512	
		DIST		COUNTY			SHEET NO.
		PARIS		HUNT			220

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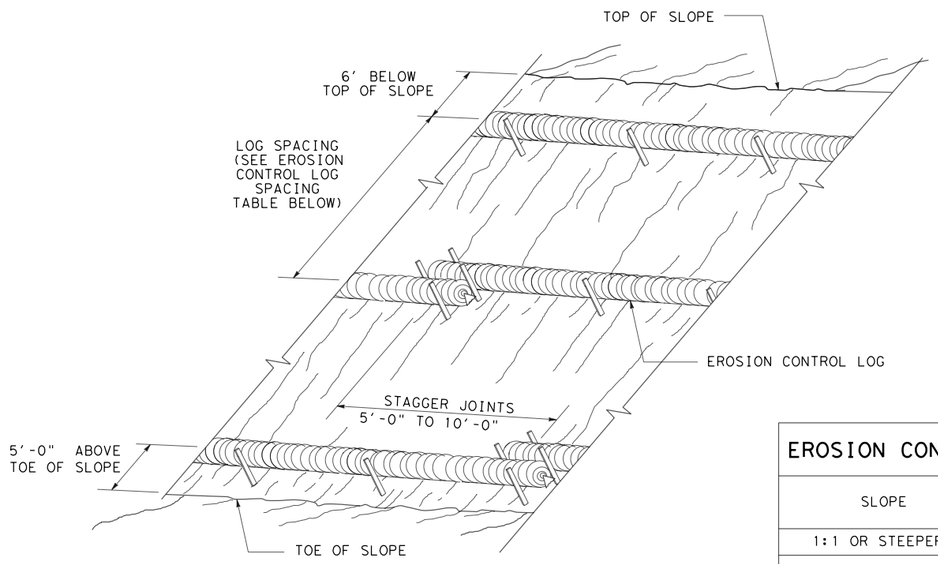
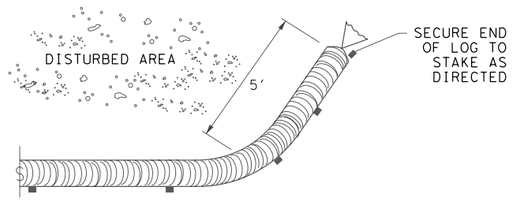


EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING

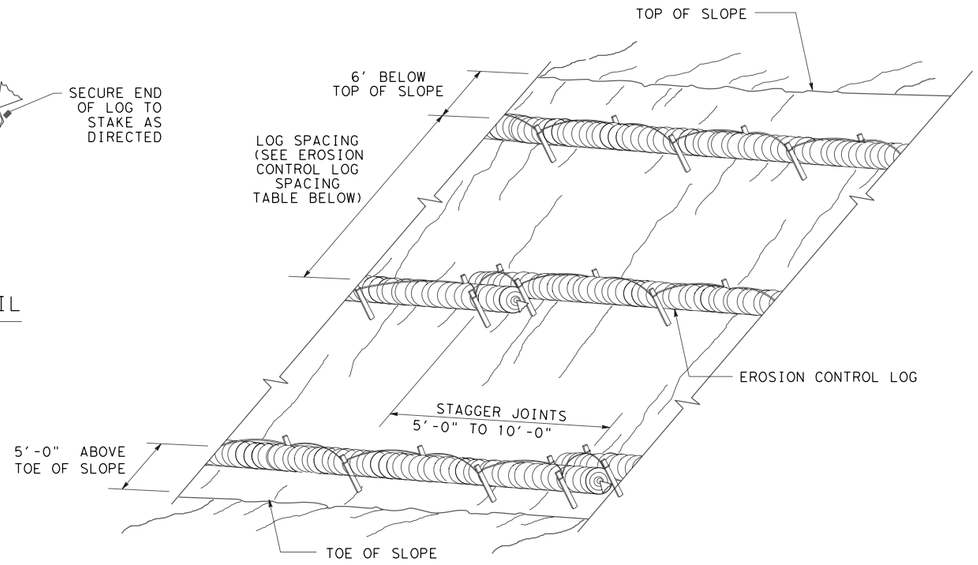
CL-SST



END SECTION RAP DETAIL

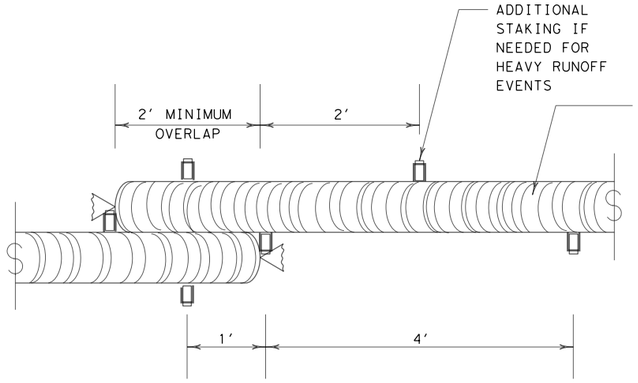
EROSION CONTROL LOG SPACING TABLE				
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5'	10'	15'	20'
2:1	10'	20'	30'	40'
3:1	15'	30'	45'	60'
4:1 OR FLATTER	20'	40'	60'	80'

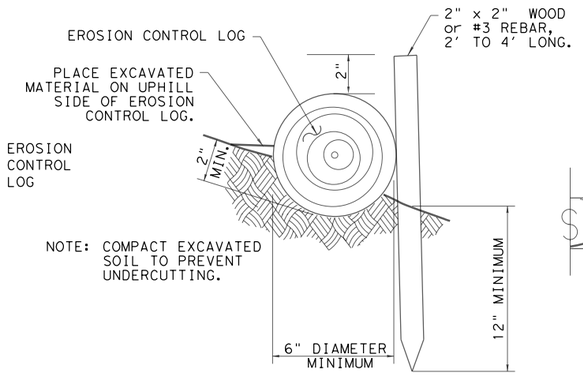
* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;
HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART



EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING

CL-SSL

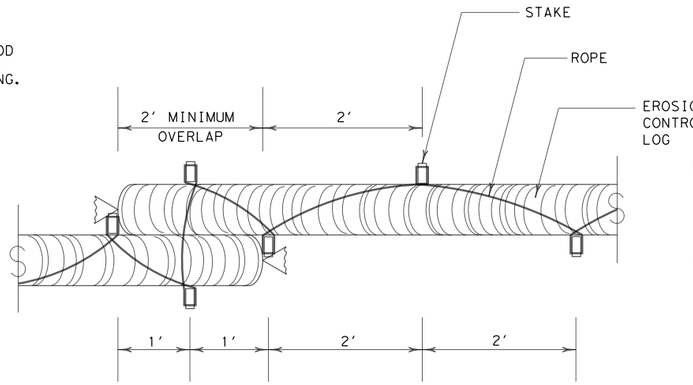




STAKE AND TRENCHING ANCHORING DETAIL

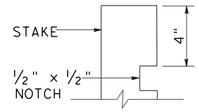
CL-SST

TRENCH DEPTH TABLE	
LOG DIAMETER	DEPTH
6"	2"
8"	3"
12"	4"
18"	5"

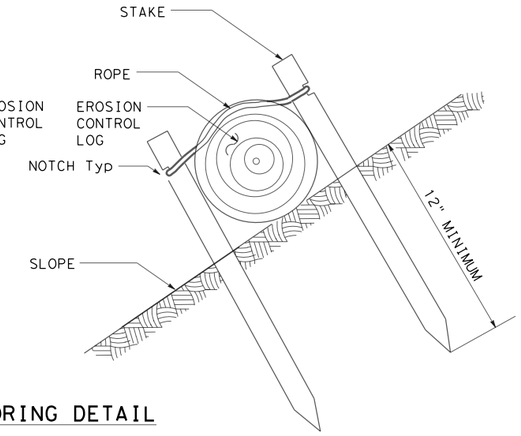


STAKE AND LASHING ANCHORING DETAIL

CL-SSL



STAKE NOTCH DETAIL



Texas Department of Transportation — Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES
EROSION CONTROL LOG
EC(9)-16

FILE: ec116	DN: TxDOT		CK: KM		DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY	
REVISIONS	0579	02	014		FM 512	
	DIST	COUNTY			SHEET NO.	
	PARIS	HUNT			221	

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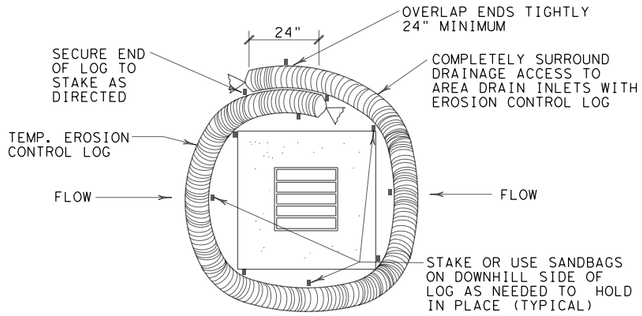
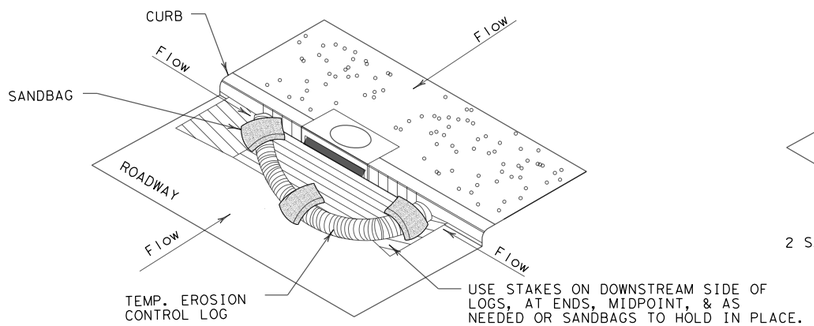


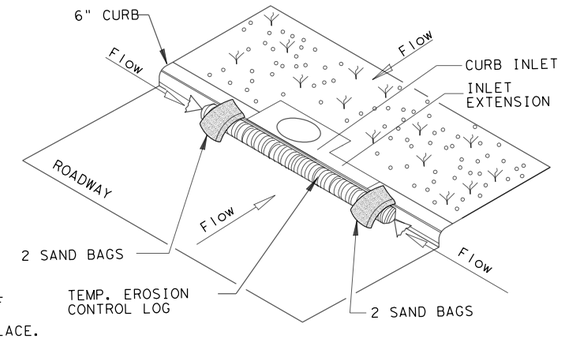
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

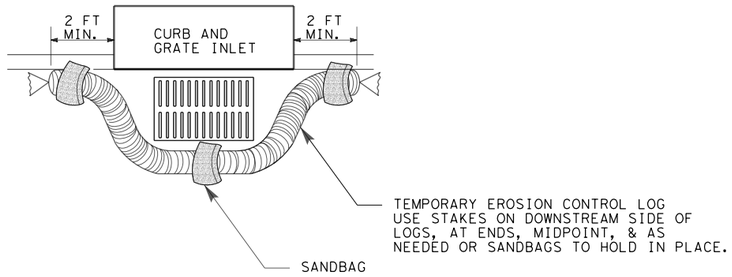
CL-CI



EROSION CONTROL LOG AT CURB INLET

CL-CI

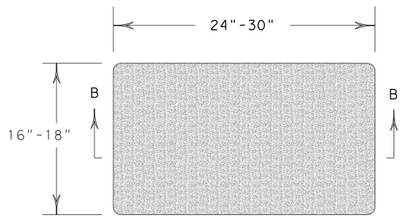
NOTE:
EROSION CONTROL LOGS USED AT CURB INLETS SHOULD ONLY BE USED IF THEY WILL NOT IMPEDE TRAFFIC OR FLOOD THE ROADWAY OR WHEN THE STORM SEWER SYSTEM IS NOT FULLY FUNCTIONAL.



EROSION CONTROL LOG AT CURB & GRADE INLET

CL-GI

SECTION B-B



SANDBAG DETAIL

Texas Department of Transportation | Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec916	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS
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REVISIONS	0579	02	014	FM 512
	DIST	COUNTY		SHEET NO.
	PARIS	HUNT		222