FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	F 2021(596)		1
STATE	STATE DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

STATE OF TEXAS
TEXAS DEPARTMENT OF TRANSPORTATION

INDEX OF SHEETS

SHEET NO.	DESCRIPTION

(SEE SHEET 2 FOR INDEX OF SHEETS)

REGISTERED ACCESSIBILITY SPECIALIST (RAS) INSPECTION REQUIRED
TDLR NO: TABS2021011857

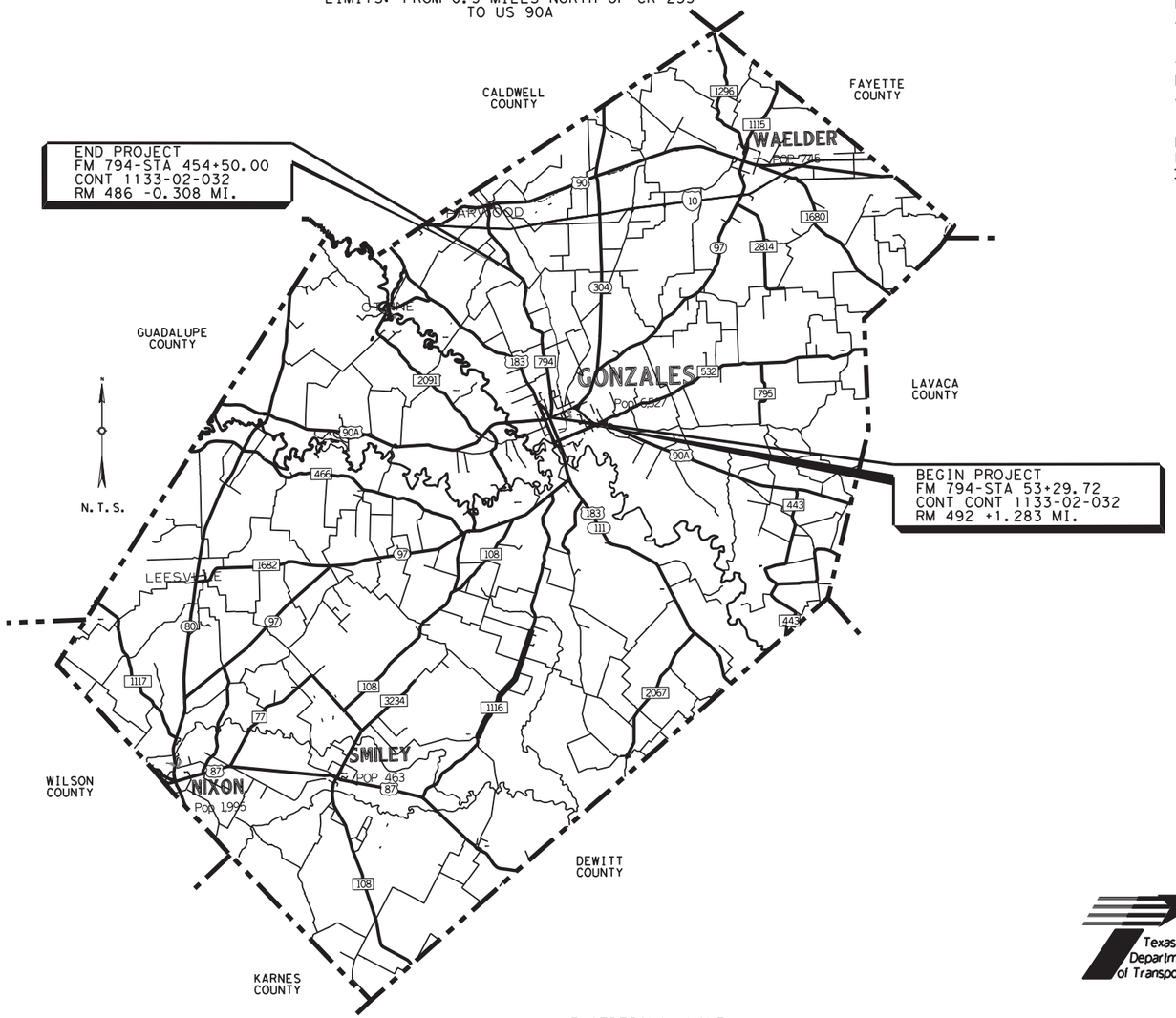
PLANS OF PROPOSED STATE HIGHWAY IMPROVEMENT

FOR THE CONSTRUCTION OF REHABILITATION OF EXISTING ROADWAY

CONSISTING OF WIDEN ROADWAY AND INSTALL CENTERLINE RUMBLE STRIPS

PROJECT NO. F 2021(596)

LIMITS: FROM 0.5 MILES NORTH OF CR 235 TO US 90A



GONZALES COUNTY
YOAKUM DISTRICT

EXCEPTIONS: NONE
RAILROAD CROSSINGS: NONE
EQUATIONS: NONE

HORIZONTAL CLEAR ZONE - 10 FT

CSJ: 1133-02-032 (FM 794)
TYPE OF WORK: WIDEN ROADWAY AND INSTALL CENTERLINE RUMBLE STRIPS.

HWY FUNCTION CLASS: MAJOR COLLECTOR

STA 53+29.72 TO STA 67+76.10
DESIGN SPEED: N/A

STA 67+76.10 TO STA 245+00.00
DESIGN SPEED: 40 MPH (URBAN)
ADT: 2,934 VPD (2019)
3,521 VPD (2039)

STA 245+00.00 TO STA 454+50.00
DESIGN SPEED: 30 MPH (RURAL)
ADT: 1,327 VPD (2019)
1,592 VPD (2039)

ROADWAY LENGTH = 39,945.40 FT = 7.565 MI
BRIDGE LENGTH = 174.88 FT = 0.033 MI
TOTAL LENGTH = 40,120.28 FT = 7.598 MI

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

LIST OF APPROVED FIELD CHANGES:

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

_____ _____
AREA ENGINEER DATE

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, MAY 2012).

STATE OF TEXAS
ERIN N. GONZALES
102407
LICENSED
PROFESSIONAL ENGINEER
Erin N. Gonzales

SUBMITTED FOR LETTING 3/25/2021
Erin N. Gonzales
PROJECT MANAGER

APPROVED FOR LETTING 4-2-21
Paul E. Roth P.E.
DISTRICT ENGINEER

Texas Department of Transportation

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

YOAKUM DISTRICT

Ykm01*TITLE.DGN

INDEX OF SHEETS

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

3/25/2021

Texas Department of Transportation

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

FM 794

INDEX OF SHEETS

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STATE	DIST.	COUNTY	
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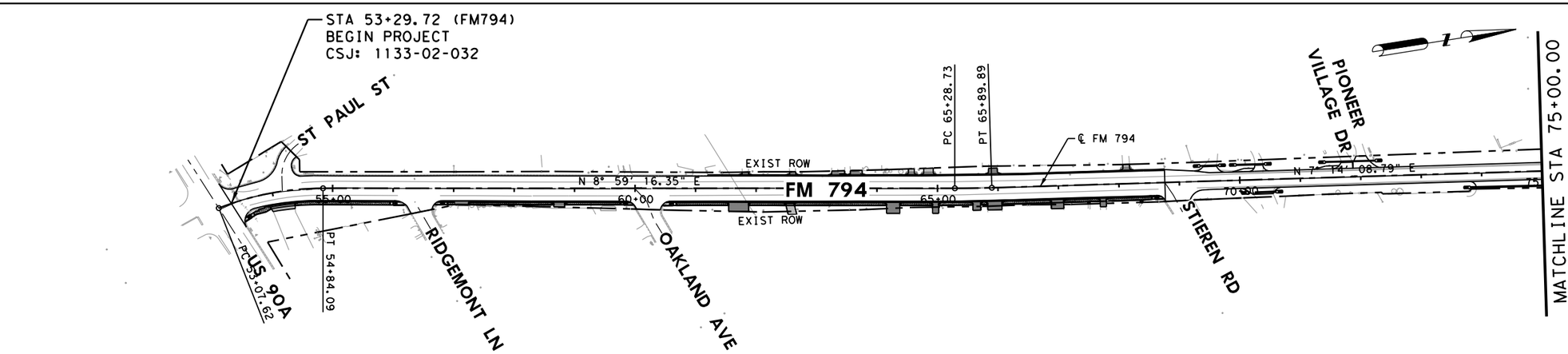
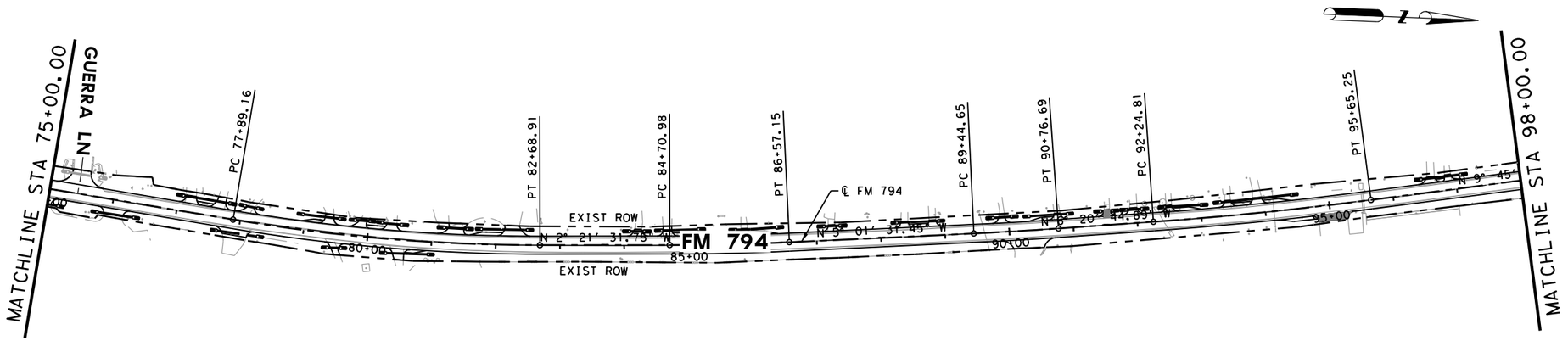
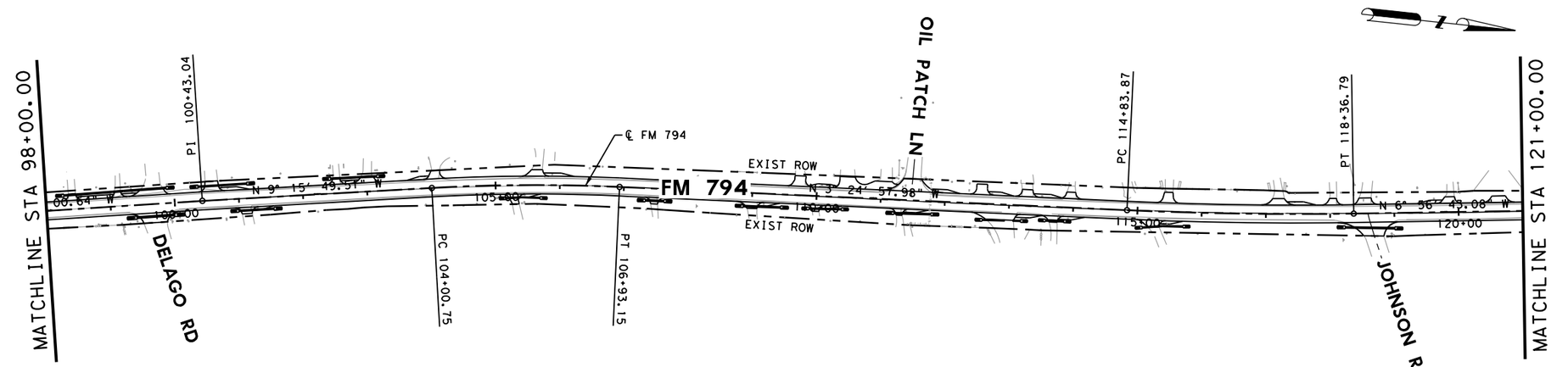
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794







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SCALE: 1"=200'

STATE OF TEXAS
JOHN W. TULEY
102441
LICENSED
PROFESSIONAL ENGINEER

3/25/2021

Texas Department of Transportation

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FM 794

PROJECT LAYOUT

SHEET 1 OF 6

FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
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STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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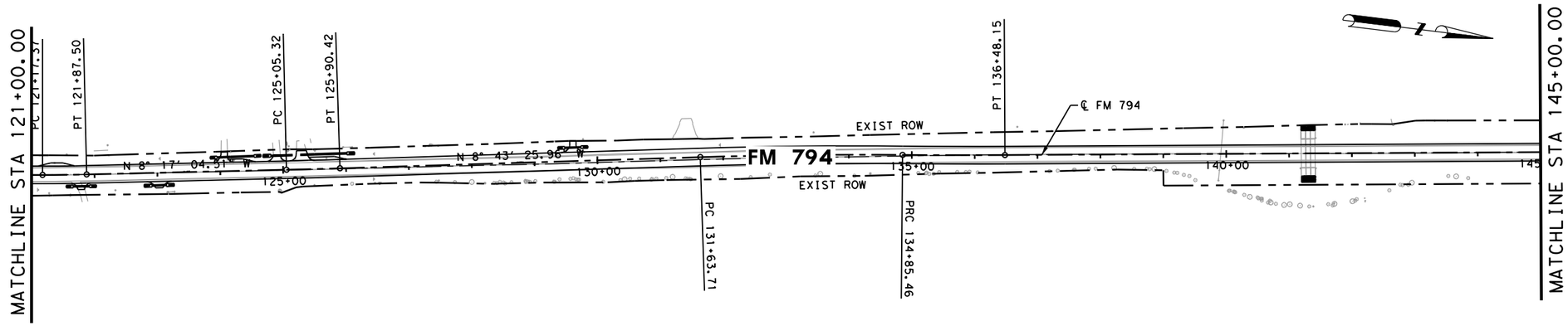

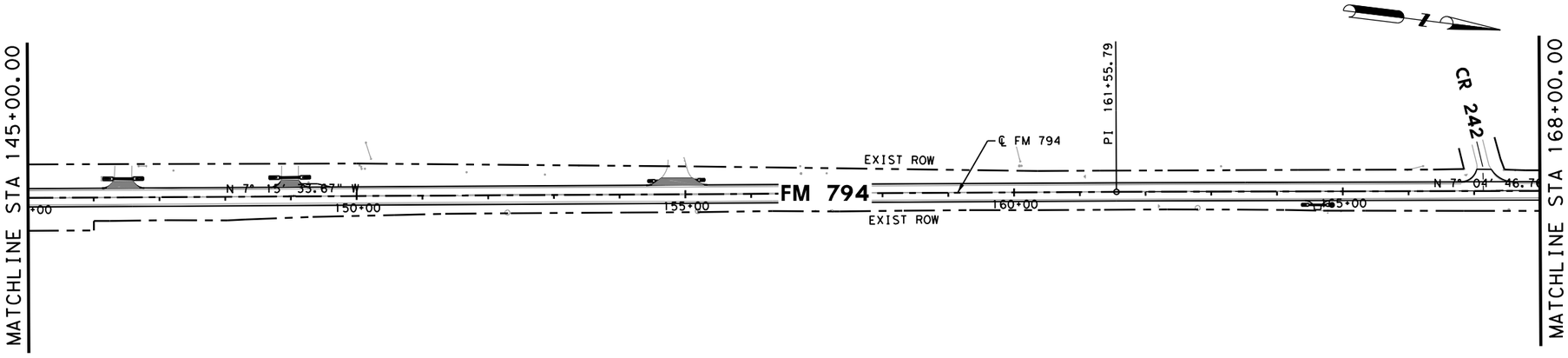

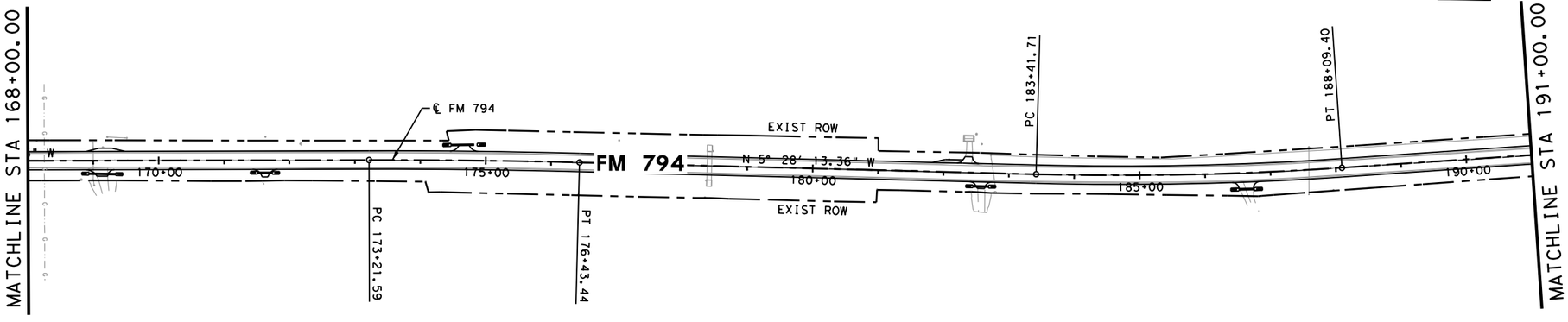

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STATE OF TEXAS
JOHN W. TULEY
102441
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3/25/2021

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FM 794

PROJECT LAYOUT

SHEET 2 OF 6

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
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STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
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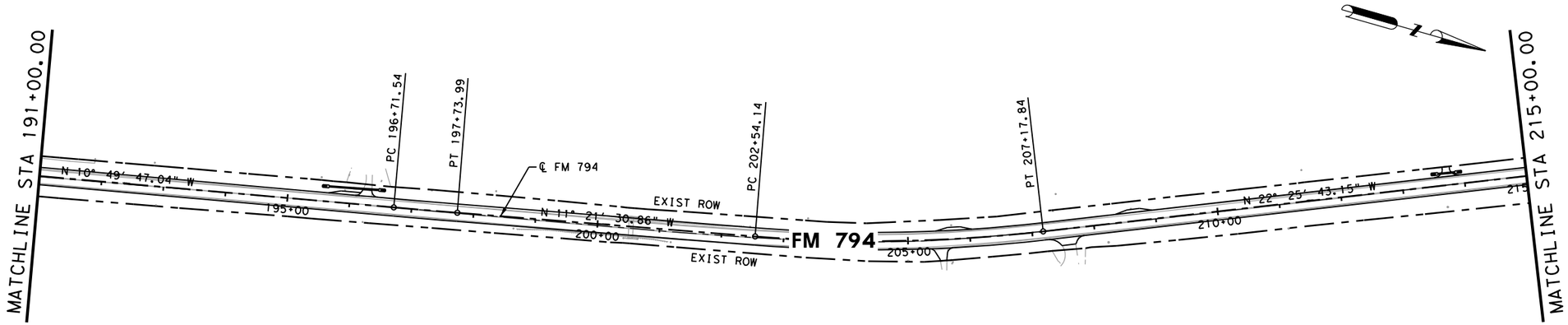

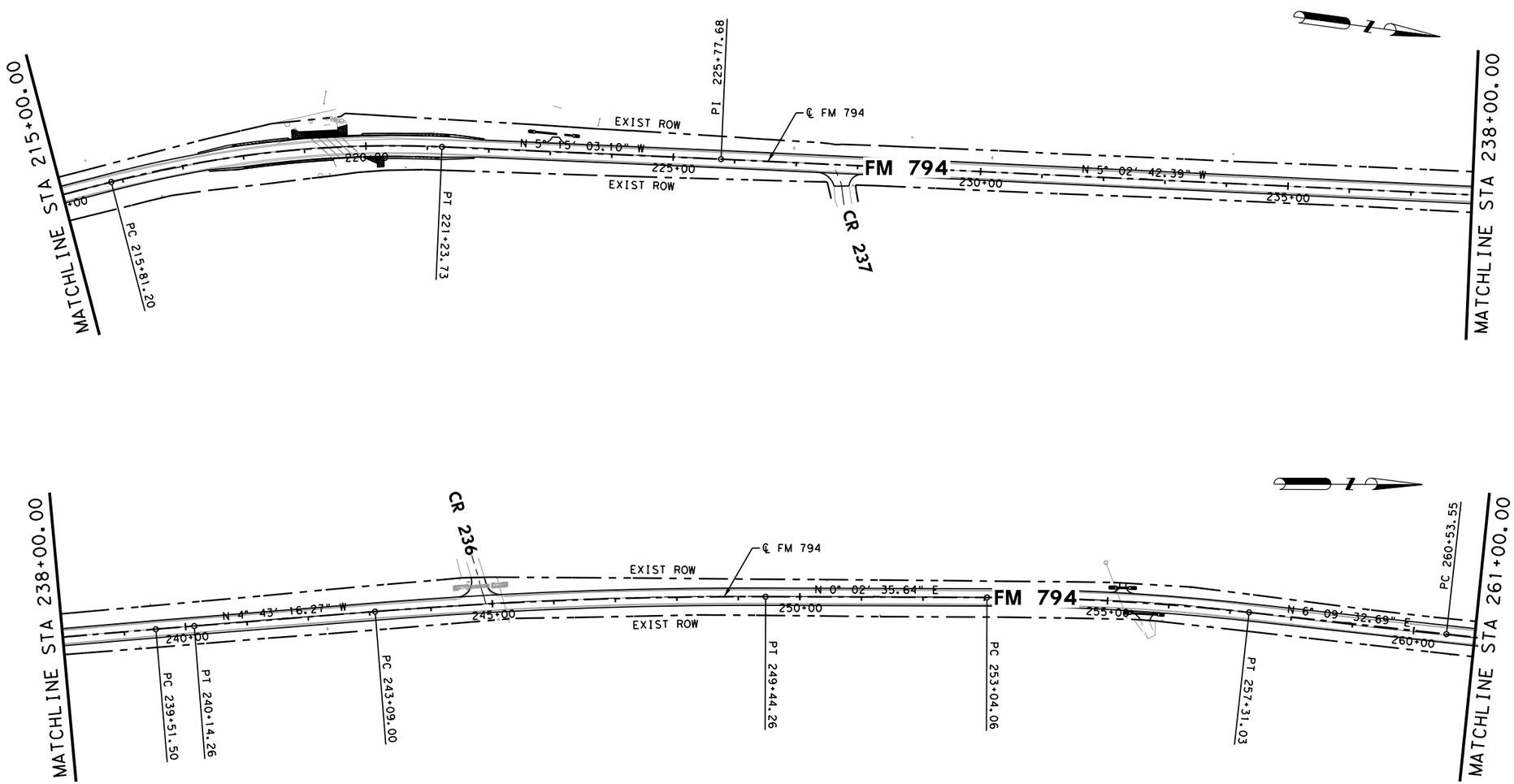

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STATE OF TEXAS
JOHN W. TULEY
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3/25/2021

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FM 794

PROJECT LAYOUT

SHEET 3 OF 6

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STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
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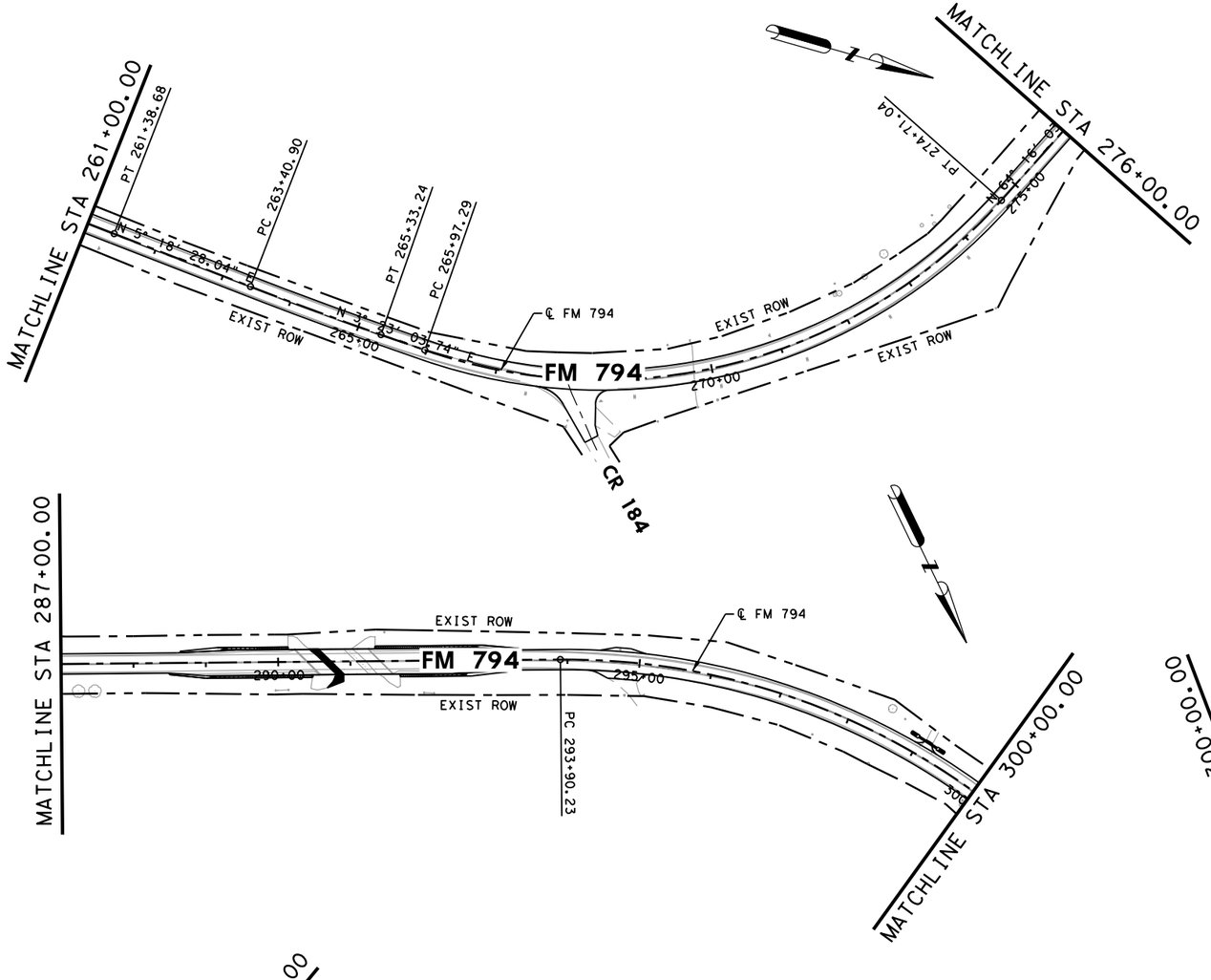

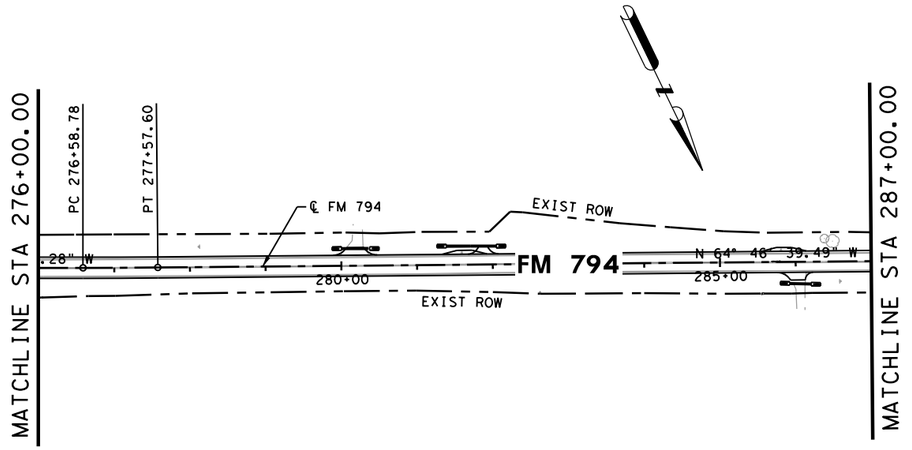

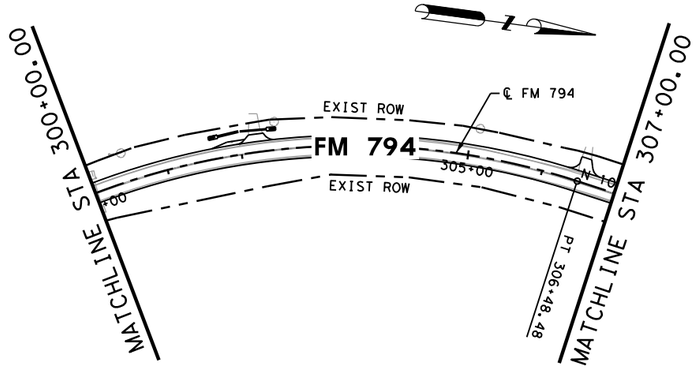

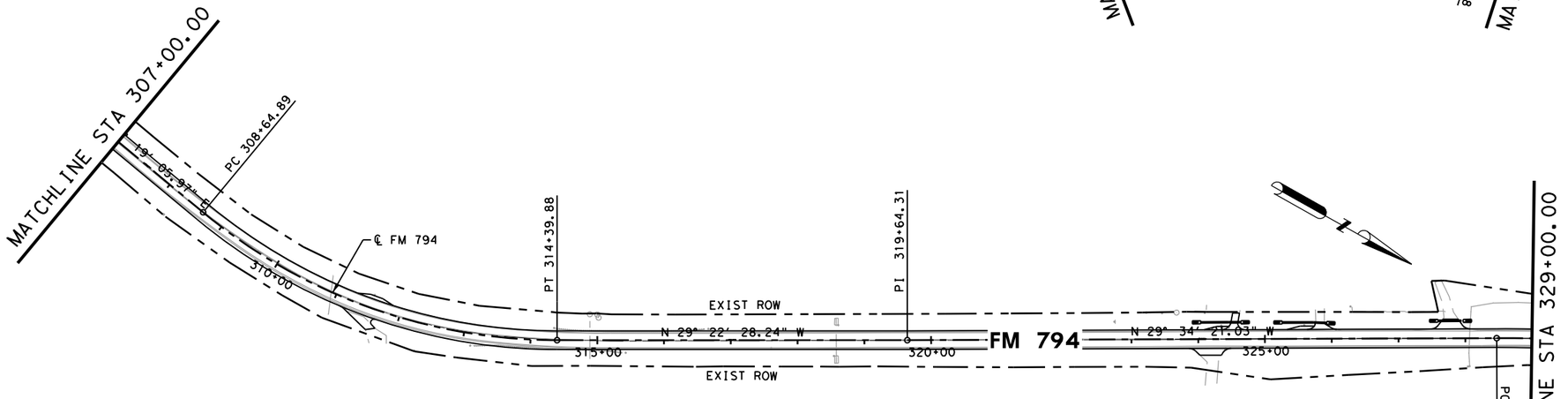

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STATE OF TEXAS
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3/25/2021

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FM 794

PROJECT LAYOUT

SHEET 4 OF 6

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
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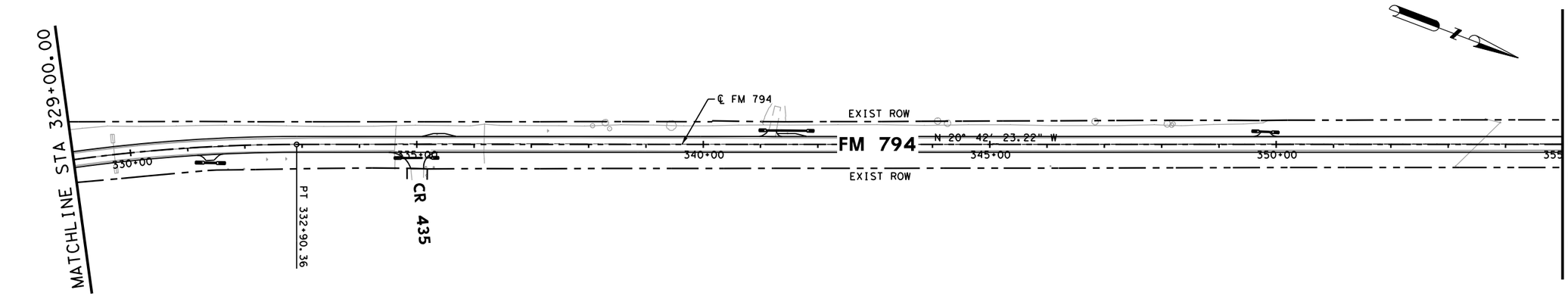
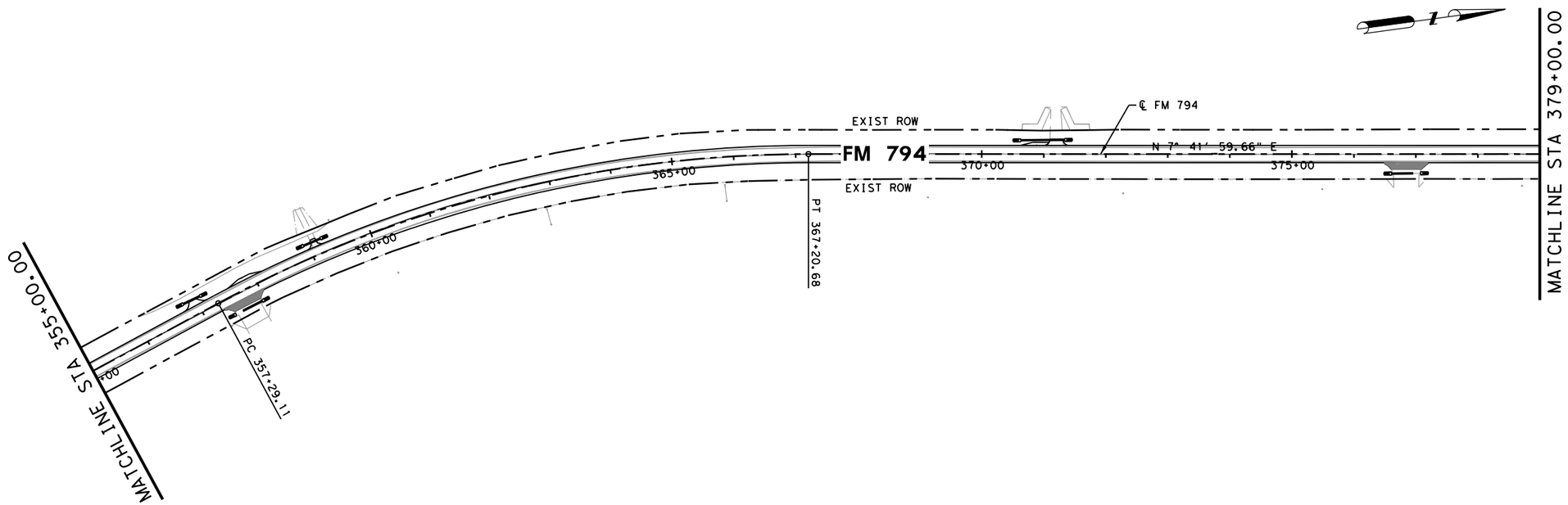
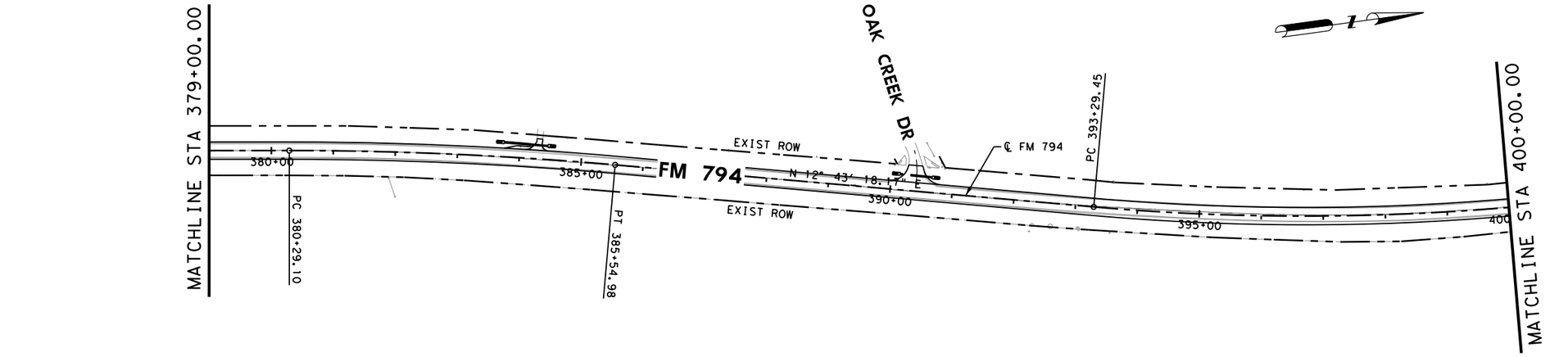
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794







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PROJECT LAYOUT

SHEET 5 OF 6

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
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STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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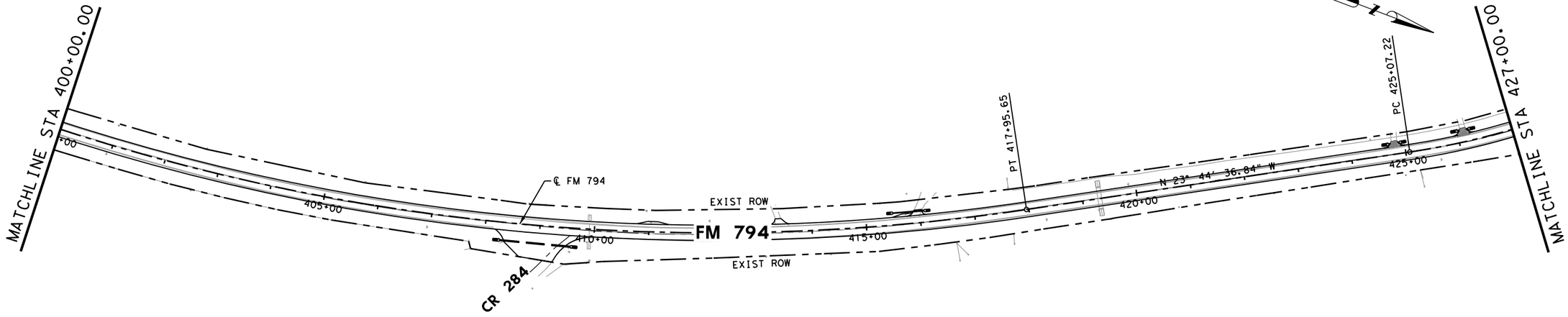

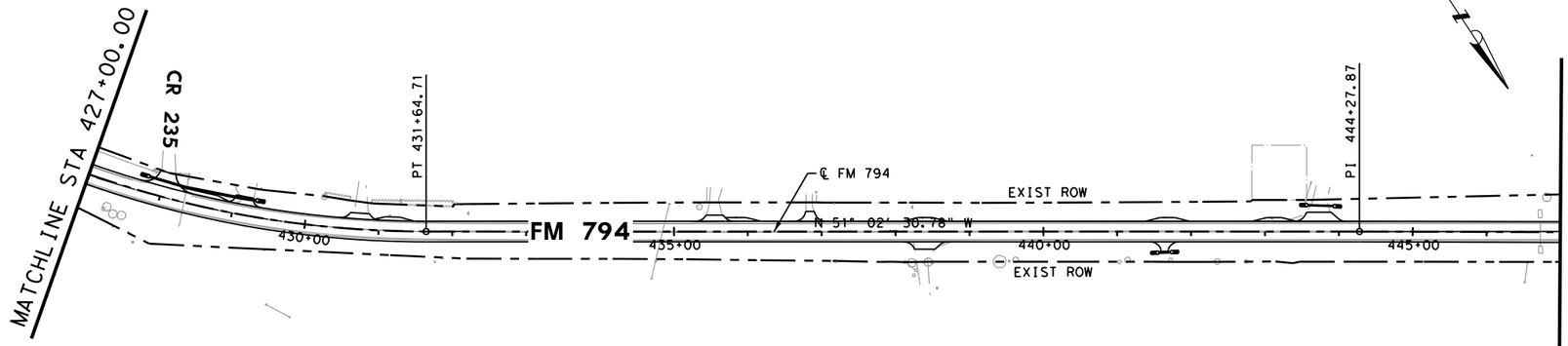

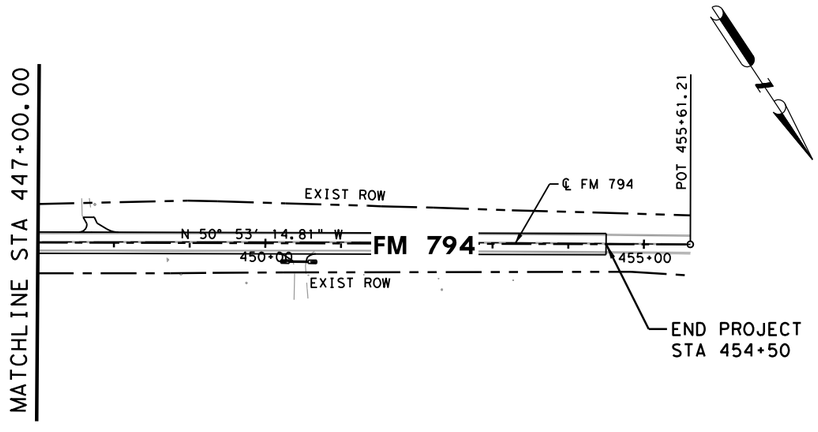

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SCALE: 1"=200'

STATE OF TEXAS
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PROJECT LAYOUT

SHEET 6 OF 6

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
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STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
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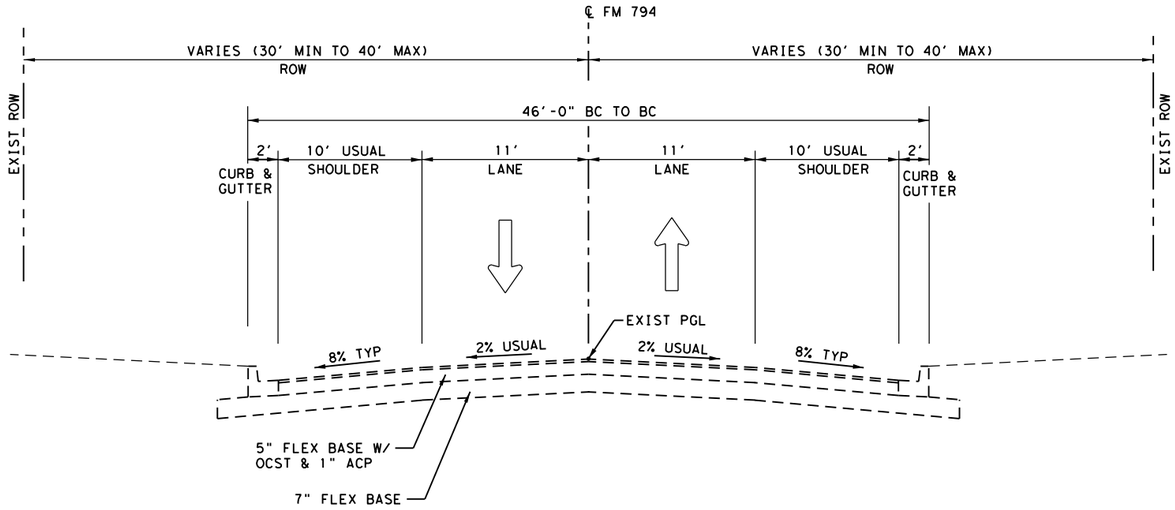
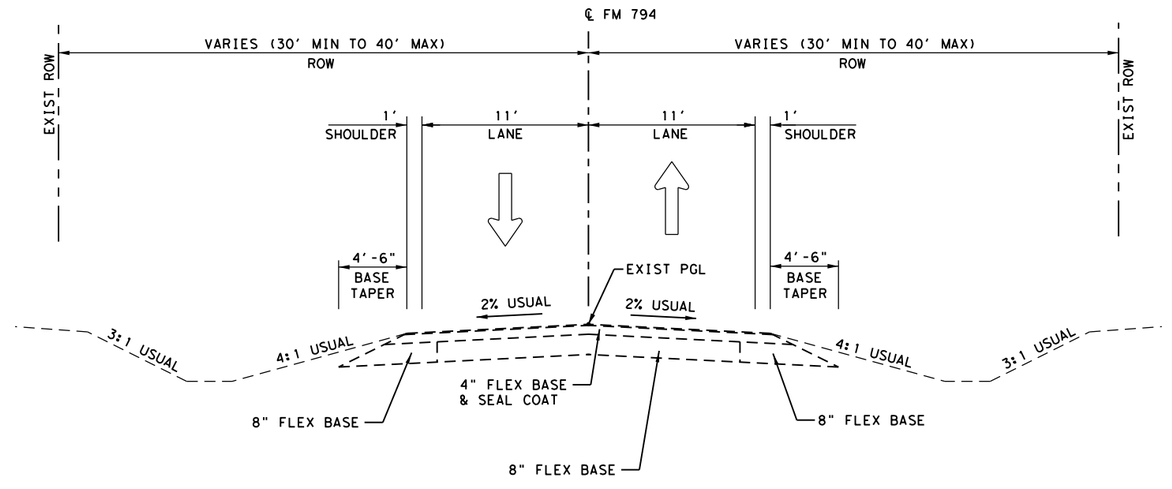


EXISTING TYPICAL SECTION

STA 53+29.72 TO STA 68+76.10



EXISTING TYPICAL SECTION

STA 68+76.10 TO STA 454+50.00

0 5 10

SCALE: 1"=10' H
1"=5' V

STATE OF TEXAS
JOHN W. TULEY
102441
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3/25/2021

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FM 794

TYPICAL SECTIONS

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STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
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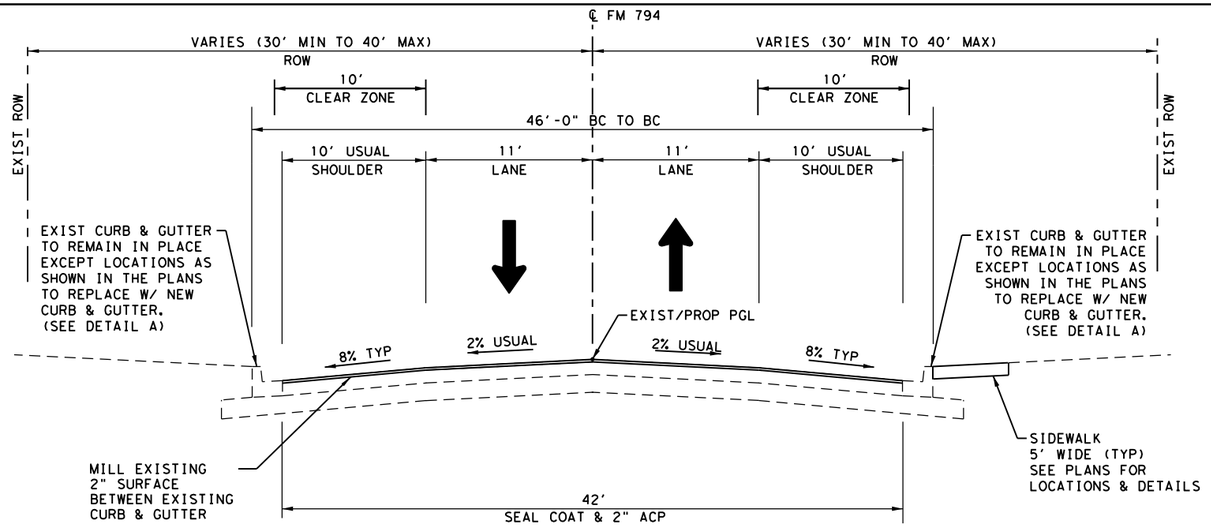
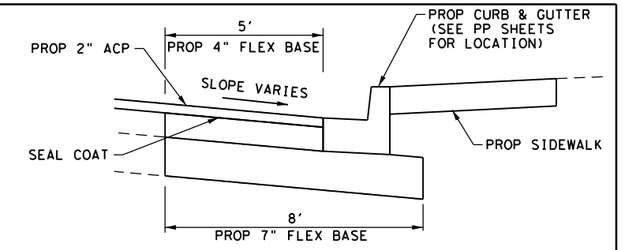


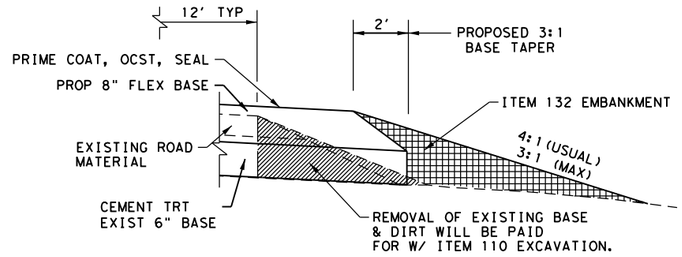
PROPOSED TYPICAL SECTION

STA 53+29.72 TO STA 68+76.10



DETAIL A

N.T.S.

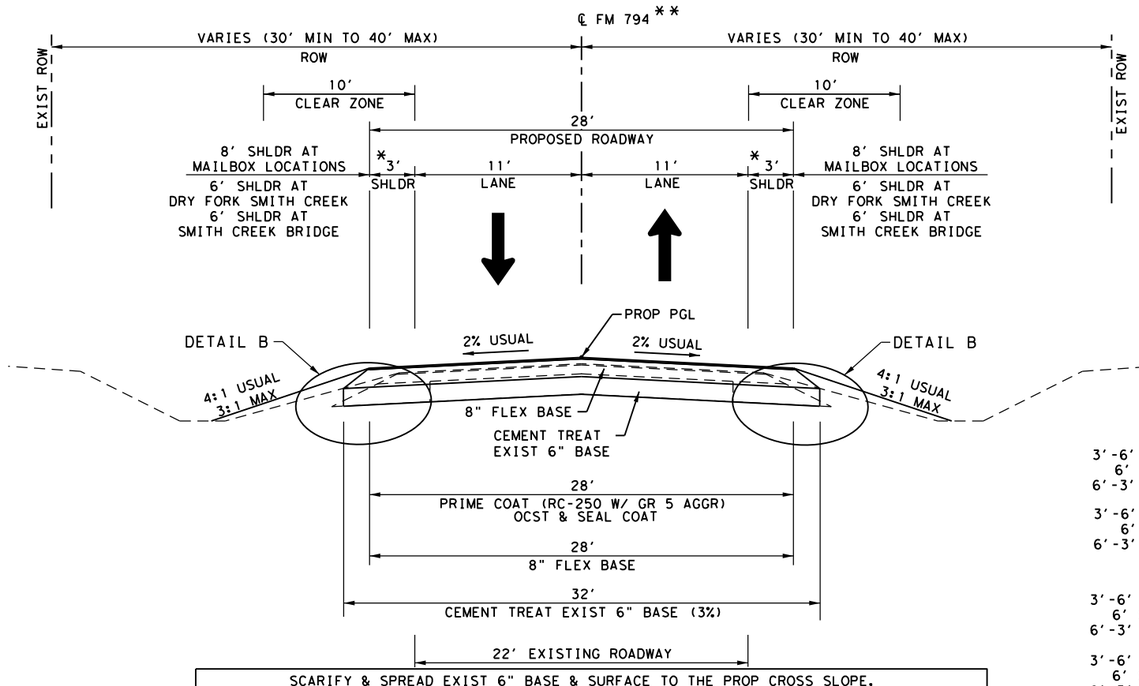


DETAIL B

N.T.S.

0 5 10

SCALE: 1"=10' H
1"=5' V



SCARIFY & SPREAD EXIST 6" BASE & SURFACE TO THE PROP CROSS SLOPE.
AREAS WITH HMCL ACP w/ DEPTHS 6" OR GREATER ON EXISTING SURFACE WILL REQUIRE MILLING.
(ALL THIS WORK WILL BE PAID FOR W/ ITEM 275 CEMENT TREATMENT).

PROPOSED TYPICAL SECTION

STA 68+76.10 TO STA 454+50.00 △

* (DRY FORK SMITH CREEK CULVERT)
3'-6' SHLDR TRANS FROM STA 217+18 TO STA 217+78 - LT
6' SHLDR WIDTH STA 217+78 - STA 221+42 - LT
6'-3' SHLDR TRANS FROM STA 221+42 TO STA 221+92 - LT

3'-6' SHLDR TRANS FROM STA 217+40 TO STA 217+90 -RT
6' SHLDR WIDTH RT STA 217+90 - STA 221+24 - RT
6'-3' SHLDR TRANS FROM STA 221+24 TO STA 221+84 - RT

* (SMITH CREEK BRIDGE)
3'-6' SHLDR TRANS FROM STA 288+60 TO STA 289+40 - LT
6' SHLDR WIDTH STA 289+40 - STA 292+83 - LT
6'-3' SHLDR TRANS FROM STA 292+83 TO STA 293+33 - LT

3'-6' SHLDR TRANS FROM STA 288+50 TO STA 289+00 - RT
6' SHLDR WIDTH STA 289+00 - STA 292+42 - RT
6'-3' SHLDR TRANS FROM STA 292+42 TO STA 293+22 - RT

** (FM 794 EXISTING CENTERLINE)
PROP CENTERLINE SHIFTS FROM EXIST STA 125+90.42 TO STA 136+48.15
PROP CENTERLINE SHIFTS FROM EXIST STA 196+71.54 TO STA 207+17.84

△ SMITH CREEK BRIDGE - STA 290+48.75 TO STA 291+51.25

STATE OF TEXAS
JOHN W. TULEY
102441
LICENSED
PROFESSIONAL ENGINEER

3/25/2021

Texas Department of Transportation

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Tel: 512-879-0400 • www.bgeinc.com
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FM 794

TYPICAL SECTIONS

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			10
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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GENERAL NOTES:

GENERAL:

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

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

All contractor questions will be reviewed by the Engineer. Once a response is developed, it will be posted to TxDOT's Public FTP at the following Address:
https://ftp.dot.state.tx.us/pub/txdot-info/Pre-Letting%20Responses/

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

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

City of Gonzales has an existing water line from Sta. 69+00 to 112+00 approximately 2' from existing edge of pavement on left side of roadway. Contractor to use caution when excavating in this area.

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

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

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

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

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

Existing manholes, water valves, water meters, etc., as shown in the plans, are to be removed, adjusted or relocated if necessary by others.

Project Number: **Sheet: 11**

County: Gonzales **Control: 1133-02-032**

Highway: FM 794

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

The following standard detail sheets have been modified:
RAC-R (MOD)
TRF (MOD)
T5/T501/T502TR(MOD)

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

Leave all intersecting side streets and entrances open at night unless otherwise directed. Should the contractor desire to close a side street or entrance overnight, approval will be required 48 hours in advance and the contractor will be required to coordinate the closure satisfactorily with any affected business or resident.

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

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

0 - 1500 = 16 feet
Over 1500 = 30 feet

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

Provide temporary pipe drains or culverts and take such other measures as directed to provide for continued drainage from all abutting property, the right of way and the roadway during construction operations. Labor and materials involved in this work will not be paid for directly, but will be considered subsidiary to the various bid items of the contract.

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

The Department will provide the cylinder testing machine for this project. Deliver the test specimens to the engineer's curing facilities as directed.

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

The contractor shall field verify all existing pipe, box culvert, and safety end treatments sizes prior to fabrication of related items.

ITEM 7: LEGAL RELATIONS AND RESPONSIBILITIES

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

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

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

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

No significant traffic generator events identified.

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

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

Temporary construction waterway crossings have been environmental cleared/permitted within Right of Way. Restrict construction operations in any water body to the necessary areas as shown on the plans or applicable permit, or as directed. Use temporary bridges, timber mats, or other structurally sound and non-eroding material for stream crossings. All temporary construction access materials shall be completely removed as soon as possible once temporary access is no longer required and affected areas shall be returned to preconstruction elevations and contours and revegetated in accordance with the SW3P. All work must comply with the General Conditions of the appropriate USACE permit.

ITEM 8: PROSECUTION AND PROGRESS

Provide progress schedule as a Bar Chart.

ITEM 100: PREPARING RIGHT-OF-WAY

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

Prepare right-of-way by the station will consist of pruning trees to fence line and 18' above the pavement at locations shown in the plans.

ITEM 110: EXCAVATION

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

ITEMS 110 & 132: EXCAVATION AND EMBANKMENT

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

ITEM 150: BLADING

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

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

ITEM 162: SODDING FOR EROSION CONTROL

Use block sodding in those areas behind the curb and gutter section at locations shown on the plans and as determined.

Use St. Augustine grass for this item.

ITEM 247: FLEXIBLE BASE

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

Correct 0.1-mi.sections having an average international roughness index (IRI) value greater than 115.0 in. per mile to an IRI value of 115.0 in. per mile or less for each wheelpath.

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

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

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

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

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

ITEMS 247 & 530: FLEXIBLE BASE & INTERSECTIONS, DRIVEWAYS AND TURNOUTS

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

ITEM 275: CEMENT TREATMENT (ROAD MIXED)

Scarify and spread existing 6" of surface and base to proposed cross slope. Areas with existing HMCL ACP of depths 6" or greater on existing surface will require milling. All this work will be subsidiary to item 275.

Pulverize the existing bituminous surface so that 100% of the material passes a 2 inch sieve and incorporate it into the 6 inch base course. Provide equipment capable of thoroughly mixing the materials full depth in a single pass. This work will not be paid for directly but will be subsidiary to this item.

ITEM 302: AGGREGATES FOR SURFACE TREATMENTS

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

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

ITEM 316: SEAL COAT

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

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

Remove daily excess aggregate in developed or curb and gutter sections with a pickup broom or other method as approved and dispose of at an approved site

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

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

ITEM 320: EQUIPMENT FOR ASPHALT CONCRETE PAVEMENT

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

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

ITEM 340: DENSE-GRADED HOT-MIX ASPHALT (SMALL QUANTITY)

Mixture designs, without additives, failing to meet the requirements of Table 6 will require the addition of a minimum 1.0% of Type A hydrated lime based on dry weight of the total aggregate.

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

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

RAP material generated on this project is available for the Contractor’s use in the Dense-Graded Hot-Mix Asphalt to be produced for this project. RAP delivered to the plant and not used, shall be returned to the stockpile locations shown in the plans.

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ITEM 351: FLEXIBLE PAVEMENT STRUCTURE REPAIR

The Engineer will select the locations. The repairs will consist of the removal of existing subgrade, base and surfacing and replacement with asphaltic concrete pavement conforming to Item 340, Dense Graded Hot-Mix Asphalt (Small Quantity), Type B, PG 64-22. All work and materials required to bring the repaired pavement section to its desired depth will be considered subsidiary to the item “Flexible Pavement Structure Repair”.

ITEM 354: PLANING AND TEXTURING PAVEMENT

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

RAP material generated on this project shall become property of the Contractor

ITEM 400: EXCAVATION AND BACKFILL FOR STRUCTURES

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

ITEM 427: SURFACE FINISHES FOR CONCRETE

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

ITEM 432: RIPRAP

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

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

ITEM 460: CORRUGATED METAL PIPE

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

ITEM 462: CONCRETE BOX CULVERTS AND DRAINS

Use precast concrete boxes at the following locations:
Sta. 95+52 and Sta. 314+95

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

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

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

ITEM 467: SAFETY END TREATMENT

Precast safety end treatment sections will not be allowed.

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

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

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

ITEM 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.

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Use the following sequence for each work section unless otherwise approved:

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

Complete steps 1 – 5 within one work section prior to advancing to the next section, unless otherwise approved. Work section station limits are defined as follows:

Section 8: 401+70.00 to 454+50.00 (1.00 Mi.)
Section 7: 348+90.00 to 401+70.00 (1.00 Mi.)
Section 6: 296+10.00 to 348+90.00 (1.00 Mi.)
Section 5: 243+30.00 to 296+10.00 (1.00 Mi.)
Section 4: 190+50.00 to 243+30.00 (1.00 Mi.)
Section 3: 137+70.00 to 190+50.00 (1.00 Mi.)
Section 2: 68+76.10 to 137+70.00 (1.30 Mi.)

Complete work sections 8 – 2 through one course surface treatment and work zone pavement markings prior to advancing to Section 1, unless otherwise approved. Work section 1 station limits are defined as follows:

Section 1: 53+29.72 to 68+76.10 (0.29 Mi.)

1. Construct curb & gutter and flex base at locations as shown in the plans and sidewalk w/ curb ramps.
2. Mill 2” of existing surface full width and place seal coat & 2” ACP by the end of each day with temporary roadway marker tabs. Any exposed base as a result of milling operations shall be covered with a prime coat RC-250 w/ GR-5 aggregate.

Upon completion of Sections 1 thru 8, place final seal coat on Sections 2 – 8 and construct final pavement markings on entire length.

Limit work sections to two (2) miles with no more than one (1) mile of roadway unsurfaced unless otherwise directed for all work beginning with scarifying the existing roadway through the one course surface treatment.

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

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

Use WZ(RS)-16 in conjunction with TCP(2-2).

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

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

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

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

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

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

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

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

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

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

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

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

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

Place plastic drums along the gutter line at curb ramp locations during non-working hours and barricades with "Sidewalk Closed" signs while ramps and/or sidewalks are under construction.

Provide a 3:1 slope or flatter from the pavement edge with 42” cones in all work areas during non-working hours. If adequate width is not available to set the 42” cones, the 3:1 edge build up shall be widened to accommodate 42” cone placement. Labor and materials involved in this work will not be paid for directly, but shall be considered subsidiary to the various bid items of the contract.

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

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

ITEM 504: FIELD OFFICE AND LABORATORY

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

ITEM 506: TEMPORARY EROSION, SEDIMENTATION, AND ENVIRONMENTAL CONTROLS

1. See SW3P plan sheet for total disturbed acreage.

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

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

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

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

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

ITEM 529: CONCRETE CURB, GUTTER, AND COMBINED CURB AND GUTTER

Taper the curb or curb and gutter from 5 3/4" to 0" in the last three feet when changing from a curb or curb and gutter section to an open section.

Reinforcement will be required for this item.

ITEM 530: INTERSECTIONS, DRIVEWAYS AND TURNOUTS

Notify property owners a minimum of 1 week in advance of beginning work on their driveway. Provide a list of each notification and contact prior to each closure. Only close driveways for reconstruction if duration and alternate access are approved. Install and maintain material across a work zone as temporary access. Temporary access must not have grade breaks that exceed 8%. This work is subsidiary.

Grade breaks must not exceed 10%. Sidewalk crossing will be 1.5% and 6 ft. wide with width reduction in approval locations.

Removal / Reworking of existing ACP and / or flexible base is included in the excavation and embankment required for Item 530 and is considered subsidiary to this item, "DRIVEWAYS".

ITEM 540: METAL BEAM GUARD FENCE

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

Furnish Type II rail elements at all locations.

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

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

ITEM 545: CRASH CUSHION ATTENUATORS

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

ITEM 560: MAILBOX ASSEMBLIES

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

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

ITEM 585: RIDE QUALITY FOR PAVEMENT SURFACES

Pay adjustments for ride quality on travel lanes shall be determined by Schedule 2.

ITEM 644: SMALL ROADSIDE SIGN SUPPORTS AND ASSEMBLIES

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

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

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

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

ITEM 662: WORK ZONE PAVEMENT MARKINGS

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

ITEM 666: REFLECTORIZED PAVEMENT MARKINGS

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

ITEM 668: PREFABRICATED PAVEMENT MARKINGS

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

ITEM 3076: DENSE-GRADED HOT-MIX ASPHALT

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

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

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

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

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

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

ITEM 6001: PORTABLE CHANGEABLE MESSAGE SIGN

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

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

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

QUANTITY SHEET

CONTROLLING PROJECT ID 1133-02-032 **DISTRICT** Yoakum **COUNTY** Gonzales
HIGHWAY FM 794

						TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB		**1133-02-032**			
		PROJECT ID		**A00133739**			
		COUNTY		**Gonzales**			
		HIGHWAY		**FM 794**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	100-6002	PREPARING ROW	STA	45.400		45.400	
	100-6004	PREPARING ROW(TREE)(12" TO 24" DIA)	EA	30.000		30.000	
	100-6011	PREPARING ROW(TREE)(24" TO 36" DIA.)	EA	10.000		10.000	
	104-6009	REMOVING CONC (RIPRAP)	SY	10.000		10.000	
	104-6017	REMOVING CONC (DRIVEWAYS)	SY	745.000		745.000	
	104-6022	REMOVING CONC (CURB AND GUTTER)	LF	1,268.000		1,268.000	
	110-6001	EXCAVATION (ROADWAY)	CY	19,896.000		19,896.000	
	132-6005	EMBANKMENT (FINAL)(ORD COMP)(TY C)	CY	7,972.000		7,972.000	
	150-6002	BLADING	HR	38.000		38.000	
	162-6002	BLOCK SODDING	SY	520.000		520.000	
	164-6003	BROADCAST SEED (PERM) (RURAL) (CLAY)	SY	2,050.000		2,050.000	
	164-6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	120,540.000		120,540.000	
	164-6041	DRILL SEEDING (TEMP) (WARM)	SY	30,140.000		30,140.000	
	164-6043	DRILL SEEDING (TEMP) (COOL)	SY	30,140.000		30,140.000	
	168-6001	VEGETATIVE WATERING	MG	1,018.500		1,018.500	
	247-6057	FL BS (CMP IN PLC)(TYE GR1-2)(FNAL POS)	CY	29,108.000		29,108.000	
	247-6137	FL BS (RDWY DEL) (TY E GR 1-2)	TON	1,488.000		1,488.000	
	275-6001	CEMENT	TON	1,266.000		1,266.000	
	275-6002	CEMENT TREAT (EXIST MATL) (6")	SY	137,796.000		137,796.000	
	316-6029	ASPH (RC-250)	GAL	24,120.000		24,120.000	
	316-6202	AGGR(TY-E GR-5 SAC-B)	CY	848.000		848.000	
	316-6246	AGGR(TY-PE GR-3 SAC-B)	CY	1,410.000		1,410.000	
	316-6249	AGGR(TY-PE GR-4 SAC-B)	CY	973.000		973.000	
	316-6400	ASPH (AC-15P OR AC-10-2TR OR CRS-2P)	GAL	91,763.000		91,763.000	
	351-6008	FLEXIBLE PAVEMENT STRUCTURE REPAIR(12")	SY	250.000		250.000	
	354-6021	PLANE ASPH CONC PAV(0" TO 2")	SY	7,217.000		7,217.000	
	400-6005	CEM STABIL BKFL	CY	218.000		218.000	
	400-6006	CUT & RESTORING PAV	SY	98.000		98.000	
	402-6001	TRENCH EXCAVATION PROTECTION	LF	40.000		40.000	
	403-6001	TEMPORARY SPL SHORING	SF	500.000		500.000	
	420-6066	CL C CONC (RAIL FOUNDATION)	CY	17.000		17.000	
	420-6136	CL C CONC (RAC-R)	CY	36.000		36.000	
	432-6002	RIPRAP (CONC)(5 IN)	CY	37.300		37.300	
	432-6026	RIPRAP (STONE COMMON)(DRY)(18 IN)	CY	99.000		99.000	
	451-6024	RETROFIT RAIL (TY SSTR)	LF	205.900		205.900	
	460-6002	CMP (GAL STL 18 IN)	LF	1,029.000		1,029.000	
	460-6003	CMP (GAL STL 24 IN)	LF	16.000		16.000	

QUANTITY SHEET

CONTROLLING PROJECT ID 1133-02-032 **DISTRICT** Yoakum **COUNTY** Gonzales
HIGHWAY FM 794

						TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB		**1133-02-032**			
		PROJECT ID		**A00133739**			
		COUNTY		**Gonzales**			
		HIGHWAY		**FM 794**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	460-6023	CMP (GAL STL 15 IN)	LF	286.000		286.000	
	462-6002	CONC BOX CULV (3 FT X 3 FT)	LF	60.000		60.000	
	462-6006	CONC BOX CULV (5 FT X 2 FT)	LF	36.000		36.000	
	462-6058	CONC BOX CULV (7 FT X 3 FT)(EXTEND)	LF	9.000		9.000	
	464-6002	RC PIPE (CL III)(15 IN)	LF	1,126.000		1,126.000	
	464-6003	RC PIPE (CL III)(18 IN)	LF	402.000		402.000	
	464-6005	RC PIPE (CL III)(24 IN)	LF	72.000		72.000	
	466-6179	WINGWALL (PW - 1) (HW=4 FT)	EA	1.000		1.000	
	467-6003	SET (REPLACE PIPE RUNNER ASSEMBLY)	EA	1.000		1.000	
	467-6004	SET (REPLACE PIPE RUNNER)	EA	1.000		1.000	
	467-6105	SET (TY I)(S=3 FT)(HW=3FT)(3:1)(C)	EA	1.000		1.000	
	467-6171	SET (TY I)(S= 5 FT)(HW= 3 FT)(3:1) (C)	EA	2.000		2.000	
	467-6244	SET (TY I)(S= 7 FT)(HW= 4 FT)(3:1) (C)	EA	4.000		4.000	
	467-6333	SET (TY II) (15 IN) (CMP) (6: 1) (P)	EA	30.000		30.000	
	467-6341	SET (TY II) (15 IN) (RCP) (6: 1) (P)	EA	46.000		46.000	
	467-6348	SET (TY II) (18 IN) (CMP) (6: 1) (P)	EA	60.000		60.000	
	467-6363	SET (TY II) (18 IN) (RCP) (6: 1) (P)	EA	28.000		28.000	
	467-6380	SET (TY II) (24 IN) (CMP) (6: 1) (P)	EA	4.000		4.000	
	467-6390	SET (TY II) (24 IN) (RCP) (4: 1) (C)	EA	2.000		2.000	
	467-6395	SET (TY II) (24 IN) (RCP) (6: 1) (P)	EA	2.000		2.000	
	496-6042	REMOV STR (SMALL)	EA	23.000		23.000	
	500-6001	MOBILIZATION	LS	100.00%		100.00%	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	12.000		12.000	
	506-6001	ROCK FILTER DAMS (INSTALL) (TY 1)	LF	150.000		150.000	
	506-6011	ROCK FILTER DAMS (REMOVE)	LF	150.000		150.000	
	506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	26,839.000		26,839.000	
	506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	26,839.000		26,839.000	
	506-6041	BIODEG EROSN CONT LOGS (INSTL) (12")	LF	50.000		50.000	
	506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	50.000		50.000	
	512-6067	PTB (FRN&INSTL)(F SHAPE)(TY 1) OR (STL)	LF	360.000		360.000	
	512-6069	PTB (MOVE)(F SHAPE)(TY 1) OR (STL)	LF	360.000		360.000	
	512-6071	PTB (REMOVE)(F SHAPE)(TY 1) OR (STL)	LF	360.000		360.000	
	529-6008	CONC CURB & GUTTER (TY II)	LF	861.000		861.000	
	530-6002	INTERSECTIONS (ACP)	SY	342.000		342.000	
	530-6003	INTERSECTIONS (SURF TREAT)	SY	1,934.000		1,934.000	
	530-6004	DRIVEWAYS (CONC)	SY	848.000		848.000	
	530-6005	DRIVEWAYS (ACP)	SY	480.000		480.000	

QUANTITY SHEET

CONTROLLING PROJECT ID 1133-02-032 **DISTRICT** Yoakum **COUNTY** Gonzales
HIGHWAY FM 794

						TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB		**1133-02-032**			
		PROJECT ID		**A00133739**			
		COUNTY		**Gonzales**			
		HIGHWAY		**FM 794**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	530-6006	DRIVEWAYS (SURF TREAT)	SY	2,641.000		2,641.000	
	530-6009	TURNOUTS (SURF TREAT)	SY	1,158.000		1,158.000	
	531-6002	CONC SIDEWALKS (5")	SY	544.000		544.000	
	531-6024	CURB RAMPS (TY 7)	SY	11.000		11.000	
	531-6027	CURB RAMPS (TY 10)	SY	62.000		62.000	
	540-6001	MTL W-BEAM GD FEN (TIM POST)	LF	400.000		400.000	
	540-6006	MTL BEAM GD FEN TRANS (THRIE-BEAM)	EA	8.000		8.000	
	542-6001	REMOVE METAL BEAM GUARD FENCE	LF	1,300.000		1,300.000	
	542-6002	REMOVE TERMINAL ANCHOR SECTION	EA	16.000		16.000	
	544-6001	GUARDRAIL END TREATMENT (INSTALL)	EA	8.000		8.000	
	545-6003	CRASH CUSH ATTEN (MOVE & RESET)	EA	2.000		2.000	
	545-6005	CRASH CUSH ATTEN (REMOVE)	EA	2.000		2.000	
	545-6019	CRASH CUSH ATTEN (INSTL)(S)(N)(TL3)	EA	2.000		2.000	
	560-6003	MAILBOX INSTALL-M (TWG-POST) TY 1	EA	5.000		5.000	
	560-6007	MAILBOX INSTALL-S (WC-POST) TY 3	EA	49.000		49.000	
	560-6008	MAILBOX INSTALL-D (WC-POST) TY 3	EA	14.000		14.000	
	644-6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	11.000		11.000	
	644-6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA	1.000		1.000	
	644-6030	IN SM RD SN SUP&AM TYS80(1)SA(T)	EA	1.000		1.000	
	644-6033	IN SM RD SN SUP&AM TYS80(1)SA(U)	EA	3.000		3.000	
	644-6035	IN SM RD SN SUP&AM TYS80(1)SA(U-2EXT)	EA	1.000		1.000	
	644-6060	IN SM RD SN SUP&AM TYTWT(1)WS(P)	EA	54.000		54.000	
	644-6061	IN SM RD SN SUP&AM TYTWT(1)WS(T)	EA	1.000		1.000	
	644-6076	REMOVE SM RD SN SUP&AM	EA	72.000		72.000	
	658-6013	INSTL DEL ASSM (D-SW)SZ (BRF)CTB	EA	6.000		6.000	
	658-6061	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2	EA	26.000		26.000	
	658-6073	INSTL OM ASSM (OM-2Y)(WC)GND(BI)	EA	30.000		30.000	
	662-6004	WK ZN PAV MRK NON-REMOV (W)4"(SLD)	LF	76,154.000		76,154.000	
	662-6032	WK ZN PAV MRK NON-REMOV (Y)4"(BRK)	LF	6,710.000		6,710.000	
	662-6034	WK ZN PAV MRK NON-REMOV (Y)4"(SLD)	LF	41,287.000		41,287.000	
	662-6111	WK ZN PAV MRK SHT TERM (TAB)TY Y-2	EA	11,947.000		11,947.000	
	666-6303	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	LF	12,536.000		12,536.000	
	666-6312	RE PM W/RET REQ TY I (Y)4"(BRK)(100MIL)	LF	1,202.000		1,202.000	
	666-6315	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF	6,869.000		6,869.000	
	666-6342	REF PROF PAV MRK TY I(W)4"(SLD)(100MIL)	LF	66,425.000		66,425.000	
	666-6344	REF PROF PAV MRK TY I(Y)4"(BRK)(100MIL)	LF	5,508.000		5,508.000	
	666-6345	REF PROF PAV MRK TY I(Y)4"(SLD)(100MIL)	LF	37,092.000		37,092.000	

QUANTITY SHEET

CONTROLLING PROJECT ID 1133-02-032 **DISTRICT** Yoakum **COUNTY** Gonzales
HIGHWAY FM 794

			CONTROL SECTION JOB	**1133-02-032**		TOTAL EST.	TOTAL FINAL
			PROJECT ID	**A00133739**			
			COUNTY	**Gonzales**			
			HIGHWAY	**FM 794**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	668-6076	PREFAB PAV MRK TY C (W) (24") (SLD)	LF	22.000		22.000	
	672-6009	REFL PAV MRKR TY II-A-A	EA	934.000		934.000	
	3076-6042	D-GR HMA TY-D SAC-B PG70-22	TON	793.000		793.000	
	6001-6002	PORTABLE CHANGEABLE MESSAGE SIGN	EA	2.000		2.000	
	6056-6002	PREFORMED CENTERLINE RUMBLE STRIP	LF	887.000		887.000	
	6185-6002	TMA (STATIONARY)	DAY	15.000		15.000	
	6185-6005	TMA (MOBILE OPERATION)	DAY	30.000		30.000	
	6350-6001	LEAD LED CHEVRON	EA	2.000		2.000	
	6350-6002	LED CHEVRON	EA	10.000		10.000	
	18	SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000		1.000	
		EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS	1.000		1.000	

SUMMARY OF TRAFFIC CONTROL ITEMS

LOCATION	512 PTB (FRN & INSTL) (F SHAPE)(TY 1) OR (STL) LF	512 PTB (MOVE) (F SHAPE)(TY 1) OR (STL) LF	512 PTB (REMOVE) (F SHAPE)(TY 1) OR (STL) LF	545 CRASH CUSH ATTEN (INSTL)(S)(N)(TL3) EA	545 CRASH CUSH ATTEN (MOVE & RESET) EA	545 CRASH CUSH ATTEN (REMOVE) EA	658 INSTL DEL ASSM (D-SW)SZ (BRF)CTB EA	PORTABLE TRAFFIC BARRIER LOCATION
DRY FORK SMITH CREEK (LT)	360			2			3	STA 217+78 - 221+38 (LT SIDE)
DRY FORK SMITH CREEK (RT)		360	360		2	2	3	STA 217+79 - 221+39 (RT SIDE)
PROJECT TOTALS	**360**	**360**	**360**	**2**	**2**	**2**	**6**	

NOTE: SEE PORTABLE TRAFFIC BARRIER LAYOUTS FOR DETAILS.

SUMMARY OF TRAFFIC CONTROL ITEMS

STATION LOCATION	662 WK ZN PAV MRK NON-REMOV (W)4" (SLD) LF	662 WK ZN PAV MRK NON-REMOV (Y)4" (BRK) LF	662 WK ZN PAV MRK NON-REMOV (Y)4" (SLD) LF	662 WK ZN PAV MRK SHT TERM (TAB)TY Y-2 EA	6001 PORTABLE CHANGEABLE MESSAGE SIGN EA	6185 TMA (STATIONARY) DAY	6185 TMA (MOBILE OPERATION) DAY
53+29.72 - 72+00	647		588	972			
72+00 - 94+00	4386	449	1910	618			
94+00 - 116+00	4237	516	1697	638			
116+00 - 138+00	4302	482	1919	638			
138+00 - 160+00	4400	422	2565	660			
160+00 - 182+00	4320	535	1346	602			
182+00 - 204+00	4400	526	2066	642			
204+00 - 226+00	4400	257	3372	660			
226+00 - 248+00	4255	527	720	560			
248+00 - 270+00	4299	465	2034	644			
270+00 - 292+00	4400		4400	660			
292+00 - 314+00	4400	42	4235	660			
314+00 - 336+00	4335	471	1984	628			
336+00 - 358+00	4400	510	1900	626			
358+00 - 380+00	4400	463	1958	616			
380+00 - 402+00	4324	535	822	562			
402+00 - 424+00	4222	334	2471	646			
424+00 - 446+00	4326	176	3599	660			
446+00 - 454+50	1701		1701	255			
PROJECT TOTALS	**76154**	**6710**	**41287**	**11947**	**2**	**15**	**30**

NOTE: WK ZN PAV MRK SHT TERM (TAB)TY Y-2 TO BE PLACED AFTER PRIME, O.C.S.T. & SEAL / ACP

Texas Department of Transportation

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TBPE Registration No. F-1046

FM 794

TCP SUMMARY

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			19
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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SUMMARY OF ROADWAY ITEMS

LOCATION	PAVEMENT SURFACE WIDTH	PAVEMENT SURFACE AREA	100 PREPARING ROW	100 PREPARING ROW(TREE) (12" TO 24" DIA)	100 PREPARING ROW(TREE) (24" TO 36" DIA.)	104 REMOVING CONC (CURB AND GUTTER)	247 FL BS (CMP IN PLC) (TYE GR1-2) (FNAL POS)	275 CEMENT 135 #/CF @ 3%	275 CEMENT TREAT (EXIST MATL) (6")	316 PRIME COAT ASPH (RC-250) 0.20 GAL/SY	316 PRIME COAT AGGR (TY-E GR-5 SAC-B) 1 CY/ 140 SY	316 OCST AGGR (TY-PE GR-3 SAC-B) 1 CY/ 85 SY	316 OCST ASPH (AC-15P OR AC-10-2TR OR CRS-2P) 0.40 GAL/SY	316 SEAL COAT AGGR (TY-PE GR-4 SAC-B) 1 CY/ 130 SY	316 SEAL COAT ASPH (AC-15P OR AC-10-2TR OR CRS-2P) 0.34 GAL/SY	351 FLEXIBLE PAVEMENT STRUCTURE REPAIR(12")	354 PLANE ASPH CONC PAV(0" TO 2")	496 REMOV STR (SMALL)	529 CONC CURB & GUTTER (TY II)	531 CONC SIDEWALKS (5")	531 CURB RAMPS (TY 7)	531 CURB RAMPS (TY 10)	3076 D-GR HMA TY-D SAC-B PG70-22 220 #/SY
	FT	SY	STA	EA	EA	LF	CY	TON	SY	GAL	CY	CY	GAL	CY	GAL	SY	SY	EA	LF	SY	SY	SY	TON
53+29.72 TO 55+50	42	1028												8	350		1028			81	11		113
55+50 TO 61+00	42	2567												20	873		2567			152		48	282
61+00 - 66+50	42	2567	1.4			910	213							20	873		2567		588	222			282
66+50 - 68+76	42	1055				358	84							8	359		1055		273	91		14	116
68+76 - 69+50	35	288					66	3	315	58	2	3	115	2	98								
69+50 - 72+00	28	778		1			186	8	892	156	6	9	311	6	264								
72+00 - 83+00	28	3422		3			815	36	3911	684	24	40	1369	26	1164			1					
83+00 - 94+00	28	3422					815	36	3911	684	24	40	1369	26	1164								
94+00 - 105+00	28	3422					815	36	3911	684	24	40	1369	26	1164								
105+00 - 116+00	28	3422					815	36	3911	684	24	40	1369	26	1164								
116+00 - 127+00	28	3422	2				815	36	3911	684	24	40	1369	26	1164								
127+00 - 138+00	28	3422	11				815	36	3911	684	24	40	1369	26	1164								
138+00 - 149+00	28	3422	8				815	36	3911	684	24	40	1369	26	1164								
149+00 - 160+00	28	3422	11				815	36	3911	684	24	40	1369	26	1164								
160+00 - 171+00	28	3422	5				815	36	3911	684	24	40	1369	26	1164								
171+00 - 182+00	28	3422	2				815	36	3911	684	24	40	1369	26	1164								
182+00 - 193+00	28	3422					815	36	3911	684	24	40	1369	26	1164								
193+00 - 204+00	28	3422	4				815	36	3911	684	24	40	1369	26	1164								
204+00 - 215+00	28	3422					815	36	3911	684	24	40	1369	26	1164								
215+00 - 226+00	28	3693	1	1			874	38	4182	739	26	43	1477	28	1255								
226+00 - 237+00	28	3422					815	36	3911	684	24	40	1369	26	1164								
237+00 - 248+00	28	3422					815	36	3911	684	24	40	1369	26	1164								
248+00 - 259+00	28	3422					815	36	3911	684	24	40	1369	26	1164								
259+00 - 270+00	28	3422					815	36	3911	684	24	40	1369	26	1164								
270+00 - 281+00	28	3422		3			815	36	3911	684	24	40	1369	26	1164								
281+00 - 292+00	28	3675		1	4		871	37	4165	735	26	43	1470	28	1250								
292+00 - 303+00	28	3497			3		831	36	3979	699	25	41	1399	27	1189								
303+00 - 314+00	28	3422			1		815	36	3911	684	24	40	1369	26	1164								
314+00 - 325+00	28	3422		4			815	36	3911	684	24	40	1369	26	1164								
325+00 - 336+00	28	3422					815	36	3911	684	24	40	1369	26	1164								
336+00 - 347+00	28	3422		3	2		815	36	3911	684	24	40	1369	26	1164								
347+00 - 358+00	28	3422		3			815	36	3911	684	24	40	1369	26	1164								
358+00 - 369+00	28	3422					815	36	3911	684	24	40	1369	26	1164								
369+00 - 380+00	28	3422					815	36	3911	684	24	40	1369	26	1164								
380+00 - 391+00	28	3422					815	36	3911	684	24	40	1369	26	1164								
391+00 - 402+00	28	3422		4			815	36	3911	684	24	40	1369	26	1164								
402+00 - 413+00	28	3422					815	36	3911	684	24	40	1369	26	1164								
413+00 - 424+00	28	3422					815	36	3911	684	24	40	1369	26	1164								
424+00 - 435+00	28	3422		5			815	36	3911	684	24	40	1369	26	1164								
435+00 - 446+00	28	3422		2			815	36	3911	684	24	40	1369	26	1164								
446+00 - 454+50	28	2644					630	28	3022	529	19	31	1058	20	899								
PROJECT TOTALS			**45.4**	**30**	**10**	**1268**	**29020**	**1266**	**137796**	**24120**	**848**	**1410**	**48269**	**973**	**43494**	**250**	**7217**	**1**	**861**	**544**	**11**	**62**	**793**

SUMMARY OF ROADWAY ITEMS (CONT.)

LOCATION	247 FL BS (RDWY DEL) (TYE GR 1-2) TONS
81+50.00	4
82+00.00	18
83+00.00	42
83+50.00	21
122+75.00	2
123+75.00	14
155+30.00	6
156+00.00	23
157+00.00	42
157+55.00	19
161+60.00	9
162+00.00	19
163+00.00	49
164+00.00	50

LOCATION	247 FL BS (RDWY DEL) (TYE GR 1-2) TONS
164+40.00	17
190+00.00	4
191+00.00	22
191+75.00	7
207+30.00	8
208+00.00	34
209+00.00	48
209+80.00	39
211+75.00	4
212+00.00	11
213+00.00	42
213+20.00	9
228+00.00	6
229+00.00	52

LOCATION	247 FL BS (RDWY DEL) (TYE GR 1-2) TONS
230+00.00	60
231+00.00	58
232+00.00	58
233+00.00	59
234+00.00	57
235+00.00	60
273+75.00	4
274+00.00	13
275+00.00	51
276+00.00	50
276+80.00	39
283+25.00	5
284+00.00	19
285+00.00	32

LOCATION	247 FL BS (RDWY DEL) (TYE GR 1-2) TONS
285+50.00	16
304+00.00	5
305+00.00	37
305+25.00	11
368+25.00	10
369+00.00	39
369+80.00	52
384+00.00	5
385+00.00	21
386+00.00	26
387+00.00	28
388+00.00	19
413+00.00	4
414+00.00	22

LOCATION	247 FL BS (RDWY DEL) (TYE GR 1-2) TONS
414+25.00	7
PROJECT TOTALS	1488

NOTE:
ITEM 247 - FLEX BASE (RDWY DEL) (TY E GR 1-2) TONS

SHALL BE USED IN AREAS WHERE ADDITIONAL MATERIAL & PROPOSED 8" FLEX BASE IS INADEQUATE TO MATCH PROPOSED PROFILE.

NOTES:

1. ITEM 100 - PREP ROW (STA) WILL CONSIST OF PRUNING TREES TO FENCE LINE AND 18' ABOVE THE PAVEMENT AT THE FOLLOWING LOCATIONS:
   STA 57+25 - 58+65
   STA 144+00 - 165+00
   STA 172+00 - 174+00
   STA 198+00 - 202+00
   THE REMAINING PREP ROW (STA) WILL BE COMPLETE TREE REMOVAL.

2. ITEM 351 - FLEXIBLE PAVEMENT STRUCTURE REPAIR (12") WILL CONSIST OF REMOVAL OF EXISTING BASE AND SURFACING AND REPLACEMENT WITH 12" TYPE E FLEX BASE AND PRIME COAT (RC-250 w/GR 5 AGGR).

Texas Department of Transportation

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TBPE Registration No. F-1046

FM 794

ROADWAY SUMMARY

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
6		20
STATE	DIST.	COUNTY
TEXAS	YKM	GONZALES
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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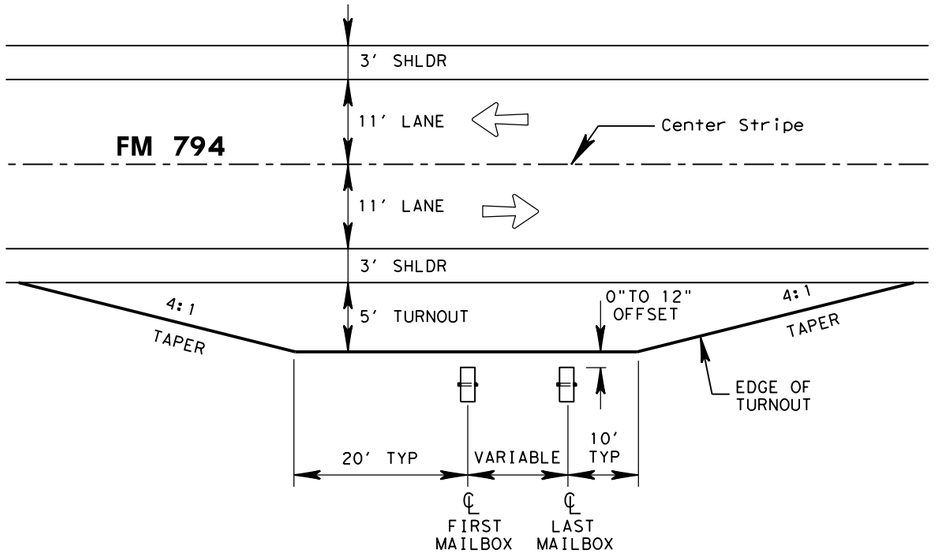
MAILBOX & MAILBOX TURNOUT SUMMARY						
			530	560	560	560
MAILBOX TURNOUT NUMBER	START-END STATION		TURNOUTS (SURF TREAT)	MAILBOX INSTALL-S (WC-POST) TY 3	MAILBOX INSTALL-D (WC-POST) TY 3	MAILBOX INSTALL-M (TWG-POST) TY 1
			SY	EA	EA	EA
1	69+88 - 70+24	LT	13	1		
2	71+22 - 71+65	LT	16		1	
3	77+29 - 77+56	LT	12			1
4	78+94 - 79+30	LT	13		1	
5	79+96 - 80+26	LT	15	1		
6	80+60 - 80+94	RT	12	1		
7	81+59 - 82+10	LT	22	1		
8	84+76 - 85+17	LT	16	1		
9	85+94 - 86+40	LT	19	1		
10	88+45 - 88+75	LT	14		1	1
11	90+30 - 90+70	LT	15	1		
12	92+56 - 93+01	LT	18		1	
13	93+49 - 93+80	LT	15		1	
14	93+97 - 94+42	LT	18	1		
15	94+21 - 94+80	RT	26		1	
16	96+69 - 96+83	LT	7		1	
17	98+48 - 99+06	LT	29	2		
18	99+18 - 99+42	LT	9	1		
19	100+71 - 101+17	LT	19	1		
20	101+21 - 101+54	RT	12	1		
21	102+60 - 102+88	LT	12	1	1	
22	103+62 - 103+97	LT	12	1		
23	105+37 - 105+70	RT	12	1		
24	105+75 - 106+23	LT	20	1		
25	109+10 - 109+44	RT	12	1		
26	109+87 - 110+32	LT	20			1
27	110+06 - 110+40	RT	12	1		
28	111+36 - 111+76	RT	15	1		
29	111+81 - 112+27	LT	16			1
30	112+67 - 113+07	LT	15	1		
31	113+10 - 113+52	RT	17	1		
32	113+38 - 113+82	LT	19		1	
33	113+77 - 114+18	RT	16	1		
34	115+36 - 115+72	RT	13	1		
35	117+32 - 117+78	LT	17			1
36	119+36 - 119+75	LT	15	1		
37	121+10 - 121+69	LT	22	1		
38	124+13 - 124+56	LT	17	1		
39	125+41 - 126+03	LT	27	1		
40	149+16 - 149+61	LT	17	1		
41	168+88 - 169+48	LT	22	1		
42	181+82 - 182+29	LT	19	1		
43	195+65 - 196+17	LT	22	1		
44	205+45 - 206+03	LT	22	1		
45	208+36 - 208+96	LT	22		1	
46	281+33 - 281+93	LT	22	1		
47	285+55 - 286+15	LT	22		1	
48	294+45 - 295+08	LT	23	1		
49	301+63 - 302+07	LT	17	1		
50	311+29 - 311+85	LT	21	1		
51	324+08 - 324+46	LT	14	1		
52	325+33 - 325+75	LT	16	1		
53	335+09 - 335+69	LT	22		1	
54	341+29 - 341+81	LT	22	1		
55	357+54 - 358+16	LT	23	1		
56	370+63 - 371+09	LT	19	1		
57	383+75 - 384+20	LT	18	1		
58	410+77 - 411+37	LT	22	1		
59	415+48 - 415+86	LT	14	1		
60	428+36 - 428+93	LT	23		1	
61	430+93 - 431+47	LT	21	1		
62	435+70 - 436+18	LT	20	1		
63	438+10 - 438+70	LT	22	1		
64	441+38 - 441+98	LT	22	1		
65	442+83 - 443+43	LT	22		1	
PROJECT TOTALS			1158	49	14	5

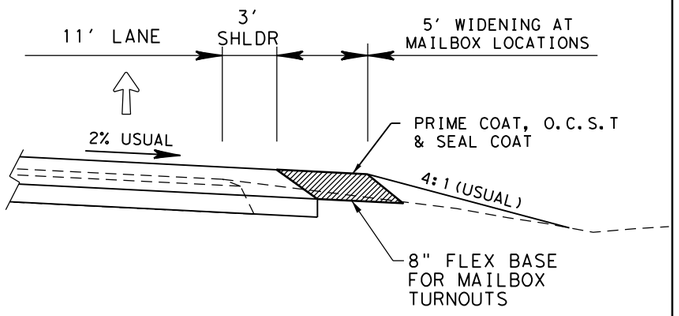


MAILBOX TURNOUT PLAN

(SEE MB-14(2) FOR ADDITIONAL DETAILS)

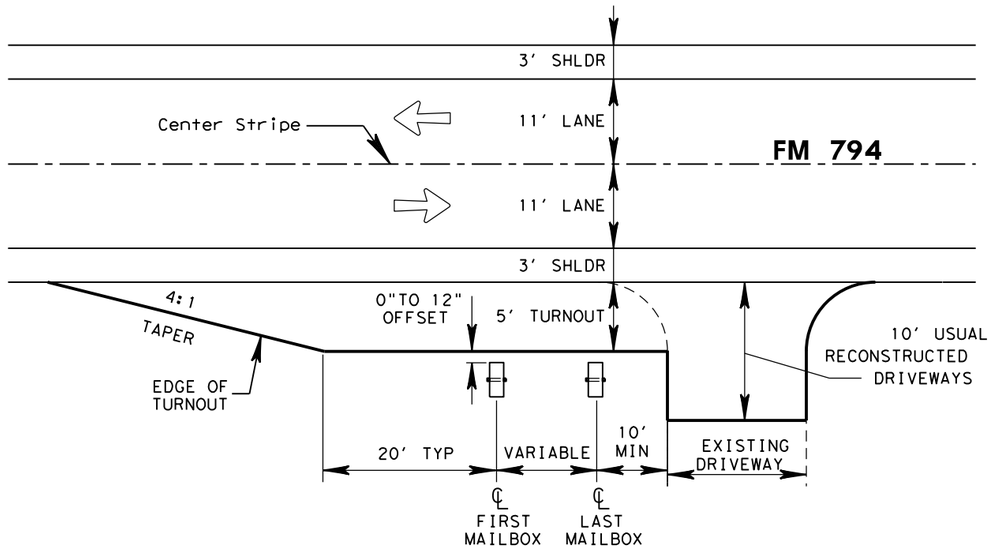
MAILBOX AND TURNOUTS NOTES:

1. ALL LOCATIONS ARE APPROXIMATE AND SHALL BE FIELD ADJUSTED TO MEET EXISTING CONDITIONS.
2. DIMENSIONS FOR EACH TURNOUT ARE TYPICAL AND MAY VARY DURING ACTUAL CONSTRUCTION TO MEET FIELD CONDITIONS.
3. THE TYPES & RATES OF MATERIALS SHALL CONFORM TO THE ROADWAY ITEMS.
4. TURNOUT LOCATIONS ADJACENT TO DRIVEWAYS SHALL BE CONNECTED TO DRIVEWAYS.
5. SEE MB-14(2) & MB-15(1) STANDARD SHEETS FOR MORE INFORMATION.



MAILBOX TURNOUT TYPICAL SECTION

(SEE MB-14(2) FOR ADDITIONAL DETAILS)



MAILBOX TURNOUT PLAN (ADJACENT TO DRIVEWAYS)

(SEE MB-14(2) FOR ADDITIONAL DETAILS)

STATE OF TEXAS
JOHN W. TULEY
102441
LICENSED PROFESSIONAL ENGINEER

3/25/2021

Texas Department of Transportation

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TBPE Registration No. F-1046

FM 794

MAILBOX TURNOUT SUMMARY AND DETAILS

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
6		21

STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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SUMMARY OF INTERSECTIONS

CROSS-STREET NAME	P&P SHEET NUMBER	CENTERLINE STATION		EXISTING MATERIAL	PROPOSED MATERIAL	AREA	WIDTH	DEPTH	R1	R2	* 247	* 316 (PRIME)		* 316 (OCST)		* 316 (SEAL COAT)		* 3076 (HMA)	530	530
											FLEX BASE TY E (GR 1-2)	ASPH (RC-250)	AGGR (TY-E GR-5)	ASPH (AC-15P OR AC-10-2TR OR CRS-2P)	AGGR (TY-PE GR-3)	ASPH (AC-15P OR AC-10-2TR OR CRS-2P)	AGGR (TY-PE GR-4)	D-GR HMA TY-D SAC-B PG70-22 (2")	INTERSECTIONS (ACP)	INTERSECTIONS (SURF TREAT)
											8"	0.20 GAL/SY	1 CY/140 SY	0.40 GAL/SY	1 CY/85 SY	0.34 GAL/SY	1 CY/130 SY	220 LB/SY		
CSJ: 1133-02-032						SY	FT	FT	FT	FT	CY	GAL	GAL	GAL	CY	GAL	CY	TON	SY	SY
ST PAUL ST	1	54+20	LT	ASPHALT	HMA	114.1	25.0	35	44	18				46	2			13	115	
RIDGEMONT LN	2	56+46	RT	ASPHALT	HMA	91.7	35.0	18	26	16				37	2			11	92	
OAKLAND AVE	2	60+22	RT	ASPHALT	HMA	63.9	41.0	12	18	16				26	1			8	64	
STIEREN RD	4	68+96	RT	ASPHALT	HMA	70.5	41.0	10	14	24				29	1			8	71	
PIONEER VILLAGE DR	4	72+02	LT	ASPHALT	SURF TREAT	62.9	18.0	20	24	46	14	13	1	26	1	22	1			63
GUERRA LN	5	75+45	LT	ASPHALT	SURF TREAT	96.5	27.0	23	24	24	22	20	1	39	2	33	1			97
DELAGO RD	7	99+68	RT	ASPHALT	SURF TREAT	78.7	36.0	15	20	20	18	16	1	32	1	27	1			79
OIL PATCH LN	8	111+49	LT	ASPHALT	SURF TREAT	103.2	28.0	20	40	40	23	21	1	42	2	36	1			104
JOHNSON RD	9	118+68	RT	ASPHALT	SURF TREAT	116.8	32.0	21	50	25	26	24	1	47	2	40	1			117
CR 242	13	167+15	LT	ASPHALT	SURF TREAT	81.2	22.0	20	25	40	19	17	1	33	1	28	1			82
CR 237	19	227+75	RT	ASPHALT	SURF TREAT	82.7	25.0	20	30	20	19	17	1	34	1	29	1			83
CR 236	20	244+80	LT	ASPHALT	SURF TREAT	103.9	22.0	30	25	25	24	21	1	42	2	36	1			104
CR 184	22	268+10	RT	ASPHALT	SURF TREAT	306.7	20.0	74	50	20	69	62	3	123	4	105	3			307
CR 435	28	335+00	RT	ASPHALT	SURF TREAT	117.3	22.0	28	40	25	27	24	1	47	2	40	1			118
OAK CREEK DR	33	390+40	LT	ASPHALT	SURF TREAT	115.2	23.0	28	30	30	26	24	1	47	2	40	1			116
CR 284	35	409+00	RT	ASPHALT	SURF TREAT	587.1	62.0	50	42	80	131	118	5	235	7	200	5			588
CR 235	37	428+04	LT	ASPHALT	SURF TREAT	75.3	20	20	22	32	17	16	1	31	1	26	1			76
										TOTALS	435	393	19	916	34	662	19	40	342	1934

NOTES:

REFER TO INTERSECTION DETAILS FOR ADDITIONAL INFORMATION.

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Texas Department of Transportation

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TBPE Registration No. F-1046

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INTERSECTION SUMMARY

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
6		22

STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

SUMMARY OF INTERSECTION STRUCTURES

CROSS-STREET NAME	P&P SHEET	CENTERLINE STATION		EXISTING STRUCTURE	✳ PROPOSED WORK	400		460	464		467 SET (TY II)			496
						CEMENT STAB BKFL	CUT & RESTORE PAV	CMP 18 IN	RCP 18 IN	RCP 24 IN	CMP 18 IN 6:1 (P)	RCP 18 IN 6:1 (P)	RCP 24 IN 6:1 (P)	REMOV STR (SMALL)
						CY	SY	LF	LF	LF	EA	EA	EA	EA
CSJ: 1133-02-032														
ST PAUL ST	1	54+20	LT	NO PIPE	N/A									
RIDGEMONT LN	2	56+46	RT	NO PIPE	N/A									
OAKLAND AVE	2	60+22	RT	NO PIPE	N/A									
STIEREN RD	4	68+96	RT	NO PIPE	N/A									
PIONEER VILLAGE DR	4	72+02	LT	NO PIPE	PROP 1-15" X 90 LF RCP w/SETs (QUANTITY LISTED UNDER DW #25)	7								
GUERRA LN	5	75+45	LT	1-15" CMP x 48 LF w/ SETs & RIPRAP	NO PROPOSED WORK									
DELAGO RD	7	99+68	RT	1-24" CMP x 52 LF w/ SETs & RIPRAP	REMOVE EXISTING STRUCTURE PROP 1-24" RCP x 60 LF w/ SETs	15	22			60			2	1
OIL PATCH LN	8	111+49	LT	NO PIPE	N/A									
JOHNSON RD	9	118+68	RT	1-18" CMP x 76 LF WITHOUT SETs	REMOVE EXISTING STRUCTURE PROP 1-18" RCP x 84 LF w/ SETs		20	84			2			
CR 242	13	167+15	LT	NO PIPE	N/A									
CR 237	19	227+75	RT	NO PIPE	N/A									
CR 236	20	244+80	LT	1-42" RCP x 40 LF w/ SETs & RIPRAP	NO PROPOSED WORK									
CR 184	22	268+10	RT	NO PIPE	N/A									
CR 435	28	335+00	RT	1-18" CMP x 50 LF WITHOUT SETs	EXTEND 4' LT & RT ADD SET LT & RT			8			2			
OAK CREEK DR	33	390+40	LT	1-18" CMP x 46 LF w/ SLOPE ENDS - No Riprap	EXTEND 8' LT & 4' RT ADD SET LT & RT			12			2			
CR 284	35	409+00	RT	1-18" CMP x 126 LF WITHOUT SETs	EXTEND 4' LT & 8' RT ADD SET LT & RT			12			2			
CR 235	37	428+04	LT	1-18" CMP x 52 LF WITHOUT SETs	REMOVE EXISTING STRUCTURE PROP 1-18" RCP x 68 LF w/ SET LT (CONNECT PROP 18" RCP TO DW #121)	8	24		68			1		1
PROJECT TOTAL						**30**	**66**	**116**	**68**	**60**	**8**	**1**	**2**	**2**

NOTES:

SEE MISCELLANEOUS DRAINAGE DETAIL SHEETS FOR THE CEMENT STABILIZED BACKFILL AND PIPE COLLAR DETAIL.

✳ USING SETP-PD STANDARD.

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FM 794

INTERSECTION STRUCTURES SUMMARY

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			23
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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SUMMARY OF DRIVEWAYS

DRIVEWAY NUMBER	P&P SHEET NUMBER	CENTERLINE STATION		EXISTING SURFACE	PROPOSED SURFACE	WIDTH	DEPTH	AREA	R1	R2	104	* 247	* 310 (PRIME)	* 316 (OCST)		* 3076	530		
											REMOVING CONC (DRIVEWAYS)	FLEX BASE TY E(GR1-2)	PRIME COAT (MC-30)	ASPH (AC-15P OR AC-10-2TR OR CRS-2P)	AGGR (TY-PE GR-4)	D-GR HMA (TY D) PG 70-22	DRIVEWAYS		
																	CONCRETE	ACP	SURF TREAT
												8"	0.20 GAL/SY	0.40 GAL/SY	1 CY/ 85 SY	220 LB/SY			
						FT	FT	SY	FT	FT	SY	CY	GAL	GAL	CY	TON	SY	SY	SY
CSJ: 1133-02-032																			
DW# 01	1	54+15	RT	ACP	CONCRETE	(SEE DRIVEWAY DETAILS SHEET 2 OF 2 FOR DETAILS)											45		
DW# 02	2	57+16	RT	CONCRETE	CONCRETE						15						12		
DW# 03	2	58+75	RT	CONCRETE	CONCRETE						11						17		
DW# 04	2	59+82	LT	CONCRETE	EX TO REMAIN														
DW# 05	3	61+06	LT	CONCRETE	EX TO REMAIN														
DW# 06	3	61+71	RT	CONCRETE	CONCRETE	(SEE DRIVEWAY DETAILS SHEET 2 OF 2 FOR DETAILS)					57						59		
DW# 07	3	61+82	LT	CONCRETE	CONCRETE						7						8		
DW# 08	3	62+57	RT	GRAVEL	CONCRETE												35		
DW# 09	3	62+61	LT	CONCRETE	CONCRETE						7						9		
DW# 10	3	63+31	LT	CONCRETE	CONCRETE						9						18		
DW# 11	3	63+64	LT	CONCRETE	CONCRETE						9						17		
DW# 12	3	64+26	RT	CONCRETE	CONCRETE						46						47		
DW# 13	3	64+57	LT	CONCRETE	CONCRETE						11						19		
DW# 14	3	64+85	LT	CONCRETE	CONCRETE						13						26		
DW# 15	3	64+96	RT	CONCRETE	CONCRETE						25						28		
DW# 16	3	65+65	RT	CONCRETE	CONCRETE						21						23		
DW# 17	3	65+93	RT	CONCRETE	CONCRETE						40						42		
DW# 18	3	65+92	LT	CONCRETE	CONCRETE						17						19		
DW# 19	4	66+98	RT	CONCRETE	CONCRETE						36						38		
DW# 20	4	67+73	RT	CONCRETE	CONCRETE						18						20		
DW# 21	4	68+12	LT	CONCRETE	CONCRETE						10						18		
DW# 22	4	69+51	LT	GRAVEL	SURF TRT	13	10	33	15	15		7	7	13	0.4				33
DW# 23	4	70+32	LT	GRAVEL	SURF TRT	13	10	20	10	10		4	4	8	0.3				20
DW# 24	4	70+39	RT	GRAVEL	SURF TRT	26	10	50	56	15		11	10	20	0.6				50
DW# 25	4	71+78	LT	GRAVEL	SURF TRT	15	10	31		15		7	6	13	0.4				31
DW# 26	5	74+48	RT	GRAVEL	SURF TRT	115	10	133	10	10		30	27	53	1.6				133
DW# 27	5	76+04	RT	GRAVEL	SURF TRT	30	10	38	10	10		8	8	15	0.5				38
DW# 28	5	77+19	LT	ACP	ACP	16	11.9	23	10	10		5	5	9	0.3	3		23	
DW# 29	5	77+67	LT	GRAVEL	SURF TRT	13	17.6	23	10	10		5	5	9	0.3				23
DW# 30	5	77+94	RT	GRAVEL	SURF TRT	20	10	49	15	10		11	10	20	0.6				49
DW# 31	5	78+14	LT	GRAVEL	SURF TRT	11	10	21	10	25		5	4	9	0.3				21
DW# 32	5	79+38	LT	GRAVEL	SURF TRT	14	15.1	20	10	10		5	4	8	0.3				20
DW# 33	5	79+51	RT	GRAVEL	SURF TRT	9	18.3	18	10	10		4	4	7	0.3				18
DW# 34	5	79+90	LT	ACP	ACP	12	12.9	20	32	15		4	4	8	0.3	2		20	
DW# 35	5	80+36	LT	ACP	ACP	16	10	23	10	10		5	5	9	0.3	2		23	
DW# 36	5	80+49	RT	GRAVEL	SURF TRT	14	17	24	10	10		5	5	10	0.3				24
DW# 37	5	81+37	LT	GRAVEL	SURF TRT	23	17	33	15	20		7	7	13	0.4				33
DW# 38	5	82+24	LT	GRAVEL	SURF TRT	22	16	37	25	10		8	7	15	0.5				37
DW# 39	6	84+22	LT	GRAVEL	SURF TRT	11	10	18	10	10		4	4	7	0.3				18
DW# 40	6	84+68	LT	GRAVEL	SURF TRT	14	10.7	19	10	10		4	4	8	0.3				19
DW# 41	6	85+87	LT	GRAVEL	SURF TRT	11	15.3	17	10	10		4	3	7	0.2				17
DW# 42	6	87+24	LT	ACP	ACP	11	10	17	10	10		4	3	7	0.2	2		17	
DW# 43	6	88+38	LT	GRAVEL	SURF TRT	12	10	17	10	10		4	3	7	0.3				17
DW# 44	6	88+81	LT	GRAVEL	SURF TRT	11	10	17	10	10		4	3	7	0.2				17
DW# 45	6	89+89	LT	GRAVEL	SURF TRT	10	10	16	10	10		4	3	6	0.2				16
DW# 46	6	90+29	RT	ACP	ACP	45	13.5	67	20	20		15	13	27	0.8	7		67	
DW# 47	6	90+77	LT	GRAVEL	SURF TRT	10	10	15	10	10		3	3	6	0.2				15
DW# 48	6	91+54	LT	CONCRETE	CONCRETE	9	10	14	10	10	14						14		
DW# 49	6	91+95	LT	GRAVEL	SURF TRT	11	10	19	10	10		4	4	8	0.3				19
DW# 50	6	92+50	LT	GRAVEL	SURF TRT	9	10	15	10	10		3	3	6	0.2				15
DW# 51	6	93+43	LT	GRAVEL	SURF TRT	10	10	15	10	10		3	3	6	0.2				15
DW# 52	6	93+89	LT	ACP	ACP	13	10	21	10	10		5	4	8	0.3	2		21	
DW# 53	7	95+04	RT	CONCRETE	CONCRETE	45	10	55	10	10	55						55		
DW# 54	7	96+62	LT	ACP	ACP	12	10	20	10	15		5	4	8	0.3	2		20	
DW# 55	7	96+88	LT	GRAVEL	SURF TRT	10	10	14	5	10		3	3	6	0.2				14
DW# 56	7	98+41	LT	GRAVEL	SURF TRT	11	10	17	10	10		4	3	7	0.3				17
DW# 57	7	99+12	LT	GRAVEL	SURF TRT	10	10	15	10	10		3	3	6	0.2				15
DW# 58	7	99+65	LT	GRAVEL	SURF TRT	21	10	50	10	35		11	10	20	0.6				50
DW# 59	7	100+59	LT	GRAVEL	SURF TRT	20	15.7	28	10	10		6	6	11	0.4				28
DW# 60	7	101+12	RT	GRAVEL	SURF TRT	16	10	23	10	10		5	5	9	0.3				23
DW# 61	7	102+53	LT	GRAVEL	SURF TRT	10	10	17	10	10		4	3	7	0.3				17
SHEET TOTALS											**421**	**233**	**212**	**423**	**14**	**20**	**524**	**191**	**862**

NOTES:

REFER TO INTERSECTION DETAILS FOR ADDITIONAL INFORMATION.

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FM 794

DRIVEWAY SUMMARY

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			24
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

SUMMARY OF DRIVEWAYS

DRIVEWAY NUMBER	P&P SHEET NUMBER	CENTERLINE STATION		EXISTING SURFACE	PROPOSED SURFACE	WIDTH	DEPTH	AREA	R1	R2	104	* 247	* 310 (PRIME)	* 316 (OCST)		* 3076	530		
											REMOVING CONC (DRIVEWAYS)	FLEX BASE TY E (GR1-2)	PRIME COAT (MC-30)	ASPH (AC-15P OR AC-10-2TR OR CRS-2P)	AGGR (TY-PE GR-4)	D-GR HMA (TY D) PG 70-22	DRIVEWAYS		
																	CONCRETE	ACP	SURF TREAT
												8"	0.20 GAL/SY	0.40 GAL/SY	1 CY/ 85 SY	220 LB/SY			
						FT	FT	SY	FT	FT	SY	CY	GAL	GAL	CY	TON	SY	SY	SY
DW# 62	7	103+01	LT	GRAVEL	SURF TRT	13	10	29	10	10		7	6	12	0.4				29
DW# 63	7	104+07	LT	GRAVEL	SURF TRT	12	13	22	10	10		5	4	9	0.3				22
DW# 64	8	105+29	RT	ACP	ACP	11	15.5	20	10	10		4	4	8	0.3	2		20	
DW# 65	8	105+65	LT	GRAVEL	SURF TRT	12	10	28	10	35		6	6	11	0.4				28
DW# 66	8	107+48	RT	GRAVEL	SURF TRT	11	10	17	10	10		4	3	7	0.3				17
DW# 67	8	109+00	RT	ACP	ACP	13	10	25	20	10		6	5	10	0.3	3		25	
DW# 68	8	109+64	LT	GRAVEL	SURF TRT	18	16.1	25	10	10		6	5	10	0.3				25
DW# 69	8	109+99	RT	GRAVEL	SURF TRT	10	10	17	10	10		4	3	7	0.2				17
DW# 70	8	110+50	LT	GRAVEL	SURF TRT	24	18	54	10	15		12	11	22	0.7				54
DW# 71	8	111+05	LT	GRAVEL	SURF TRT	19	13.5	38	15	40		8	8	15	0.5				38
DW# 72	8	111+30	RT	ACP	ACP	11	10	16	10	10		3	3	6	0.2	2		16	
DW# 73	8	112+57	LT	GRAVEL	SURF TRT	23	16.2	23	10	10		5	5	9	0.3				23
DW# 74	8	112+86	RT	ACP	ACP	30	10	61	62	10		14	12	25	0.8	7		61	
DW# 75	8	113+28	LT	GRAVEL	SURF TRT	17	11	23	10	10		5	5	9	0.3				23
DW# 76	8	113+70	RT	ACP	ACP	10	10	21	15	10		5	4	8	0.3	2		21	
DW# 77	8	113+96	LT	GRAVEL	SURF TRT	9	10	21	10	10		5	4	8	0.3				21
DW# 78	8	115+25	RT	GRAVEL	SURF TRT	15	10	30	63	10		7	6	12	0.4				30
DW# 79	8	115+47	LT	ACP	ACP	13	16.5	22	10	10		5	4	9	0.3	2		22	
DW# 80	9	117+20	LT	ACP	ACP	13	10	32	20	20		7	6	13	0.4	3		32	
DW# 81	9	118+05	LT	ACP	ACP	11	10	18	10	10		4	4	7	0.3	2		18	
DW# 82	9	118+55	LT	GRAVEL	SURF TRT	16	10	27	10	10		6	5	11	0.4				27
DW# 83	9	119+87	LT	GRAVEL	SURF TRT	8	10	24	10	10		5	5	10	0.3				24
DW# 83B	9	120+63	LT	GRAVEL	SURF TRT	10	10	33	15	15		7	7	13	0.4				33
DW# 84	9	121+79	RT	ACP	ACP	9	10	17	10	10		4	3	7	0.3	2		17	
DW# 84B	9	123+02	RT	GRAVEL	SURF TRT	8	10	22	15	15		5	4	9	0.3				22
DW# 85	9	124+06	LT	GRAVEL	SURF TRT	10	16.5	18	10	10		4	4	7	0.3				18
DW# 86	9	124+91	LT	GRAVEL	SURF TRT	11	10	18	10	10		4	4	7	0.3				18
DW# 87	9	125+30	LT	GRAVEL	SURF TRT	11	15.8	33	10	10		7	7	13	0.4				33
DW# 87B	10	129+61	LT	GRASS	SURF TRT	10	18	20	15	15		4	4	8	0.3				20
DW# 88	11	146+45	LT	CONCRETE	CONCRETE	26	10	44	20	20	44						44		
DW# 89	12	149+01	LT	CONCRETE	CONCRETE	25	10	40	20	20	40						40		
DW# 90	12	154+87	LT	CONCRETE	CONCRETE	30	10	69	30	30	69						69		
DW# 90B	13	164+62	RT	GRASS	SURF TRT	10	13.7	20	15	15		4	4	8	0.3				20
DW# 91	13	169+14	RT	GRAVEL	SURF TRT	15	10	26	20	10		6	5	11	0.4				26
DW# 91B	14	171+63	RT	GRAVEL	SURF TRT	10	11.6	20	15	15		4	4	8	0.3				20
DW# 91C	14	174+67	LT	GRAVEL	SURF TRT	15	10	25	15	15		6	5	10	0.3				25
DW# 92	15	182+37	LT	GRAVEL	SURF TRT	10	10	19	10	10		4	4	8	0.3				19
DW# 93	15	182+58	RT	GRAVEL	SURF TRT	10	10	19	10	10		4	4	8	0.3				19
DW# 94	15	186+62	RT	GRAVEL	SURF TRT	16	10	29	10	10		6	6	12	0.4				29
DW# 95	16	196+27	LT	GRAVEL	SURF TRT	11	10	22	10	10		5	4	9	0.3				22
DW# 96	17	205+54	RT	GRAVEL	SURF TRT	10	20	24	10	10		5	5	9	0.3				24
DW# 97	17	207+57	RT	GRAVEL	SURF TRT	20	12	39	25	15		9	8	16	0.5				39
DW# 97B	17	213+72	LT	GRASS	SURF TRT	12	15.6	22	15	15		5	4	9	0.3				22
DW# 97C	18	223+08	LT	GRAVEL	SURF TRT	12	10	22	15	15		5	4	9	0.3				22
DW# 97D	21	255+23	LT	GRASS	SURF TRT	10	16.34	20	15	15		4	4	8	0.3				20
DW# 98	21	255+63	RT	GRAVEL	SURF TRT	13	13.66	33	25	15		7	7	13	0.4				33
DW# 99	22	268+15	RT	GRAVEL	NO WORK	15	10	28											
DW# 100	23	280+19	LT	GRAVEL	SURF TRT	23	10	37	20	20		8	7	15	0.5				37
DW# 100B	24	281+87	LT	GRAVEL	SURF TRT	12	10	22	15	15		5	4	9	0.3				22
DW# 101	24	286+03	RT	GRAVEL	SURF TRT	11	10	30	20	10		7	6	12	0.4				30
DW# 102	25	294+79	RT	GRAVEL	SURF TRT	15	10	65	40	15		14	13	26	0.8				65
DW# 103	25	299+13	LT	GRAVEL	SURF TRT	15	10	60	15	15		13	12	24	0.8				60
DW# 104	25	302+22	LT	GRAVEL	SURF TRT	15	10	33	15	15		7	7	13	0.4				33
DW# 105	26	306+53	LT	GRAVEL	SURF TRT	15	18.6	28	15	15		6	6	11	0.4				28
DW# 106	26	311+52	RT	GRAVEL	SURF TRT	15	16.1	41	20	5		9	8	17	0.5				41
DW# 107	27	324+20	RT	GRAVEL	SURF TRT	17	10	47	15	15		10	9	19	0.6				47
DW# 108	27	324+54	LT	GRAVEL	SURF TRT	10	24.8	18	10	15		4	4	7	0.3				18
DW# 109	28	325+82	LT	GRAVEL	SURF TRT	13	10	25	15	15		6	5	10	0.3				25
DW# 110	28	327+78	LT	GRAVEL	SURF TRT	15	14.7	43	15	15		10	9	17	0.6				43
DW# 110B	28	331+38	RT	GRAVEL	SURF TRT	15	10	27	15	15		6	5	11	0.4				27
DW# 111	29	341+20	LT	GRAVEL	SURF TRT	12	10	24	10	15		5	5	10	0.3				24
DW# 111B	30	349+81	LT	GRAVEL	SURF TRT	13	8.5	21	15	15		5	4	8	0.3				21
DW# 111C	30	356+94	LT	GRAVEL	SURF TRT	12	10	24	15	15		5	5	10	0.3				24
SHEET TOTALS											**153**	**362**	**328**	**659**	**22.2**	**25**	**153**	**232**	**1407**

NOTES:

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FM 794

DRIVEWAY SUMMARY

FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
6		25

STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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SUMMARY OF DRIVEWAYS

DRIVEWAY NUMBER	P&P SHEET NUMBER	CENTERLINE STATION		EXISTING SURFACE	PROPOSED SURFACE	WIDTH	DEPTH	AREA	R1	R2	104	* 247	* 310 (PRIME)	* 316 (OCST)		* 3076	530		
																	DRIVEWAYS		
											REMOVING CONC (DRIVEWAYS)	FLEX BASE TY E(GR1-2)	PRIME COAT (MC-30)	ASPH (AC-15P OR AC-10-2TR OR CRS-2P)	AGGR (TY-PE GR-4)	D-GR HMA (TY D) PG 70-22	CONCRETE	ACP	SURF TREAT
												8"	0.20 GAL/SY	0.40 GAL/SY	1 CY/ 85 SY	220 LB/SY			
						FT	FT	SY	FT	FT	SY	CY	GAL	GAL	CY	TON	SY	SY	SY
DW# 112	30	357+71	RT	CONCRETE	CONCRETE	40	10	63	20	37	63						63		
DW# 113	31	359+05	LT	GRAVEL	SURF TRT	16	13	32	10	10		7	6	13	0.4				32
DW# 114	32	371+21	LT	GRAVEL	SURF TRT	19	10	28	10	10		6	6	11	0.4				28
DW# 115	32	376+85	RT	CONCRETE	CONCRETE	40	10	66	22	30	66						66		
DW# 116	33	384+30	LT	GRAVEL	SURF TRT	10	18.4	20	10	15		4	4	8	0.3				20
DW# 117	36	413+38	LT	GRAVEL	SURF TRT	10	10	21	15	10		5	4	8	0.3				21
DW# 118	36	415+98	LT	GRAVEL	SURF TRT	13	10	22	7	15		5	4	9	0.3				22
DW# 119	37	424+82	LT	CONCRETE	CONCRETE	10	10	20	15	15	20						20		
DW# 120	37	426+11	LT	CONCRETE	CONCRETE	10	11.1	22	15	15	22						22		
DW# 121	37	429+14	LT	GRAVEL	SURF TRT	28	11	35	12	10		8	7	14	0.5				35
DW# 122	37	430+74	LT	GRAVEL	SURF TRT	16	8	30	15	15		7	6	12	0.4				30
DW# 123	38	435+56	LT	ACP	ACP	16	8.35	29	15	15		6	6	12	0.4	3		29	
DW# 124	38	436+84	LT	ACP	ACP	10	13.27	28	15	15		6	6	11	0.4	3		28	
DW# 125	38	438+40	RT	GRAVEL	SURF TRT	14	10	41	15	15		9	8	17	0.5				41
DW# 125B	38	441+64	RT	GRAVEL	SURF TRT	10	13	20	15	15		4	4	8	0.3				20
DW# 126	38	443+72	LT	GRAVEL	SURF TRT	19	12.07	60	15	15		13	12	24	0.8				60
DW# 127	39	447+72	LT	GRAVEL	SURF TRT	13	19.7	33	30	10		7	7	13	0.4				33
DW# 128	39	450+46	RT	GRAVEL	SURF TRT	16	10	30	15	15		7	6	12	0.4				30
SHEET TOTALS											**171**	**94**	**86**	**172**	**5.8**	**6**	**171**	**57**	**372**
PROJECT TOTALS											**745**	**689**	**626**	**1254**	**42**	**51**	**848**	**480**	**2641**

NOTES:

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FM 794

DRIVEWAY SUMMARY

SHEET 3 OF 3

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			26
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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SUMMARY OF DRIVEWAY STRUCTURES

DRIVEWAY NUMBER	P&P SHEET	CENTERLINE STATION		EXISTING STRUCTURE	⚹ PROPOSED WORK	400	460			464		467 SET (TY II)					496
						CEMENT STAB BKFL	CMP 15 IN	CMP 18 IN	CMP 24 IN	RCP CL III 15 IN	RCP CL III 18 IN	CMP 15 IN 6:1 (P)	CMP 18 IN 6:1 (P)	CMP 24 IN 6:1 (P)	RCP 15 IN 6:1 (P)	RCP 18 IN 6:1 (P)	REMOV STR (SMALL)
						CY	LF	LF	LF	LF	LF	EA	EA	EA	EA	EA	EA
CSJ: 1133-02-032																	
DW# 01	1	54+15	RT	N/A													
DW# 02	2	57+16	RT	N/A													
DW# 03	2	58+75	RT	N/A													
DW# 04	2	59+82	LT	N/A													
DW# 05	3	61+06	LT	N/A													
DW# 06	3	61+71	RT	N/A													
DW# 07	3	61+82	LT	N/A													
DW# 08	3	62+57	RT	N/A													
DW# 09	3	62+61	LT	N/A													
DW# 10	3	63+31	LT	N/A													
DW# 11	3	63+64	LT	N/A													
DW# 12	3	64+26	RT	N/A													
DW# 13	3	64+57	LT	N/A													
DW# 14	3	64+85	LT	N/A													
DW# 15	3	64+96	RT	N/A													
DW# 16	3	65+65	RT	N/A													
DW# 17	3	65+93	RT	N/A													
DW# 18	3	65+92	LT	N/A													
DW# 19	4	66+98	RT	N/A													
DW# 20	4	67+73	RT	N/A													
DW# 21	4	68+12	LT	N/A													
DW# 22	4	69+51	LT	N/A	PROP 1-15" X 38 RCP ADD SET LT & RT	5				38					2		
DW# 23	4	70+32	LT	N/A	PROP 1-15" X 54 RCP ADD SET LT & RT	3				54					2		
DW# 24	4	70+39	RT	1-15" X 42' CMP	EXTEND 4' RT & 7' LT ADD SET RT & LT		11					2					
DW# 25	4	71+78	LT	N/A	PROP 1-15" X 90 RCP ADD SET RT & LT	5				90					2		
DW# 26	5	74+48	RT	1-12" X 133' CMP	REMOVE EXISTING STRUCTURE PROP 1-15"X 141' RCP ADD SET RT & LT	29				141					2		1
DW# 27	5	76+04	RT	1-8" X 53' CMP	REMOVE EXISTING STRUCTURE PROP 1-15"X 61 RCP ADD SET RT & LT	12				61					2		1
DW# 28	5	77+19	LT	1-15" X 25' CMP	REMOVE EXISTING STRUCTURE PROP 1-18"X50 CMP & CONNECT TO EX 18" CMP PIPE FROM DW#29 ADD SET LT	4		50					1				1
DW# 29	5	77+67	LT	1-18" X 26' CMP	REMOVE 4' RT & CONNECT LT TO PROP 18" CMP AT DW#28 ADD SET RT								1				
DW# 30	5	77+94	RT	1-15" X 60' CMP	EXTEND 4' LT & RT ADD SET LT & RT		8					2					
					SHEET TOTALS	58	19	50	0	384	0	4	2	0	10	0	3

NOTES:

SEE MISCELLANEOUS DRAINAGE DETAIL SHEETS FOR THE CEMENT STABILIZED BACKFILL AND PIPE COLLAR DETAIL.

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FM 794

DRIVEWAY STRUCTURES SUMMARY

SHEET 1 OF 6

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			27
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

SUMMARY OF DRIVEWAY STRUCTURES

DRIVEWAY NUMBER	P&P SHEET	CENTERLINE STATION		EXISTING STRUCTURE	✳ PROPOSED WORK	400	460			464		467 SET (TY II)					496
						CEMENT STAB BKFL	CMP 15 IN	CMP 18 IN	CMP 24 IN	RCP CL III 15 IN	RCP CL III 18 IN	CMP 15 IN 6:1 (P)	CMP 18 IN 6:1 (P)	CMP 24 IN 6:1 (P)	RCP 15 IN 6:1 (P)	RCP 18 IN 6:1 (P)	REMOV STR (SMALL)
						CY	LF	LF	LF	LF	LF	EA	EA	EA	EA	EA	EA
DW# 31	5	78+14	LT	1-15" X 18' CMP	EXTEND 4' RT & REMOVE 2' LT ADD SET RT & LT		4					2					
DW# 32	5	79+38	LT	1-15" X 28' CMP	EXTEND 32' LT & 2' RT ADD SET RT & LT		34					2					
DW# 33	5	79+51	RT	1-15" X 17' CMP	EXTEND 4' RT & 4' LT ADD SET RT & LT		8					2					
DW# 34	5	79+90	LT	1-15" X 22' CMP	REMOVE EXISTING STRUCTURE INSTALL PROP 1-15" X 26' RCP ADD SET RT & LT	3				26					2		1
DW# 35	5	80+36	LT	1-15" X 22' CMP	EXTEND 8' LT & 4' RT ADD SET RT & LT		12					2					
DW# 36	5	80+49	RT	1-15" X 30' RCP	EXTEND 36' LT & 4' RT ADD SET RT & LT					40					2		
DW# 37	5	81+37	LT	1-18" X 30' CMP	EXTEND 8' LT & 2' RT ADD SET RT & LT			10					2				
DW# 38	5	82+24	LT	1-15" X 36' CMP	EXTEND 33' LT & 6' RT ADD SET RT & LT		39					2					
DW# 39	6	84+22	LT	1-18" X 24' CMP	EXTEND 4' LT & REMOVE 4' RT ADD SET LT & RT			4					2				
DW# 40	6	84+68	LT	1-18" X 22' CMP	EXTEND 38' RT & REMOVE 3' LT ADD SET LT & RT			38					2				
DW# 41	6	85+87	LT	1-18" X 20' CMP	EXTEND 44' RT & 4' LT ADD SET LT & RT			48					2				
DW# 42	6	87+24	LT	1-18" X 20' CMP	EXTEND 4' LT & RT ADD SET LT & RT			8					2				
DW# 43	6	88+38	LT	1-15" X 20' CMP	CONNECT TO PROP 15" FROM DW#44 RT & EXTEND 4' LT ADD SET LT		4					1					
DW# 44	6	88+81	LT	1-15" X 15' CMP	EXTEND 4' RT & 26' LT CONNECT TO EXISTING PIPE ON DW#43 ADD SET RT		30					1					
DW# 45	6	89+89	LT	1-18" X 24' CMP	EXTEND 4' LT & RT ADD SET LT & RT			8					2				
DW# 46	6	90+29	RT	N/A													
DW# 47	6	90+77	LT	1-15" X 22' CMP	EXTEND 4' RT & 38' LT ADD SET LT & RT		42					2					
DW# 48	6	91+54	LT	1-18" X 15' CMP	EXTEND 2' RT & 4' LT ADD SET LT & RT			6					2				
DW# 49	6	91+95	LT	1-18" X 22' CMP	EXTEND 4' RT & REMOVE 4' LT ADD SET LT & RT			4					2				
					SHEET TOTALS	3	173	126	0	66	0	14	16	0	4	0	1

NOTES:

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FM 794

DRIVEWAY STRUCTURES SUMMARY

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			28
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

SUMMARY OF DRIVEWAY STRUCTURES

DRIVEWAY NUMBER	P&P SHEET	CENTERLINE STATION		EXISTING STRUCTURE	⚹ PROPOSED WORK	400	460			464		467 SET (TY II)					496
						CEMENT STAB BKFL	CMP 15 IN	CMP 18 IN	CMP 24 IN	RCP CL III 15 IN	RCP CL III 18 IN	CMP 15 IN 6:1 (P)	CMP 18 IN 6:1 (P)	CMP 24 IN 6:1 (P)	RCP 15 IN 6:1 (P)	RCP 18 IN 6:1 (P)	REMOV STR (SMALL)
						CY	LF	LF	LF	LF	LF	EA	EA	EA	EA	EA	EA
DW# 50	6	92+50	LT	1-18" X 15' CMP	EXTEND 45' RT & REMOVE 4' LT ADD SET LT & RT			45					2				
DW# 51	6	93+43	LT	1-18" X 24' CMP	EXTEND 19' RT & 4' LT CONNECT TO RT EXISTING PIPE ON DW#52 ADD SET LT			23					1				
DW# 52	6	93+89	LT	1-18" X 25' CMP	CONNECT TO PROP 18" FROM DW#51 LT & EXTEND 43' RT ADD SET RT			43					1				
DW# 53	7	95+04	RT	N/A													
DW# 54	7	96+62	LT	1-18" X 21' CMP	CONNECT RT TO PROP 18" FROM DW#55 EXTEND 4' LT ADD SET LT			4					1				
DW# 55	7	96+88	LT	1-15" X 20' CMP	REMOVE EXISTING STRUCTURE INSTALL PROP 1-18" X 40' CMP & CONNECT LT TO DW#54 ADD SET RT	3		40					1				1
DW# 56	7	98+41	LT	1-12" X 19' CMP	REMOVE EXISTING STRUCTURE INSTALL PROP 1-18" X 75' CMP & CONNECT RT TO DW#57 ADD SET LT.	3		75					1				1
DW# 57	7	99+12	LT	1-18" X 18' CMP	EXTEND 70' RT ADD SET RT			70					1				
DW# 58	7	99+65	LT	N/A	CONNECTED W/ DW#57	8											
DW# 59	7	100+59	LT	N/A	PROP 1-15" X 83 RCP ADD SET LT & RT					83					2		
DW# 60	7	101+12	RT	1-18" X 23' CMP	EXTEND 35' LT & 4' RT ADD SET LT & RT			39					2				
DW# 61	7	102+53	LT	N/A	CONNECTED W/ DW#62	3											
DW# 62	0	103+01	LT	1-18" X 31' CMP	EXTEND 44' RT & 4' LT ADD SET LT & RT			48					2				
DW# 63	0	104+07	LT	N/A													
DW# 64	7	105+29	RT	1-15" X 22' RCP	EXTEND 34' LT & 4' RT ADD SET LT & RT					38					2		
DW# 65	7	105+65	LT	N/A													
DW# 66	8	107+48	RT	1-18" X 28' RCP	EXTEND 4' LT & RT ADD SET LT & RT						8					2	
DW# 67	8	109+00	RT	1-18" X 26' RCP	EXTEND 35' LT & 4' RT ADD SET LT & RT						39					2	
DW# 68	8	109+64	LT	N/A													
DW# 69	8	109+99	RT	1-15" X 18' RCP	EXTEND 35' LT & 4' RT ADD SET LT & RT					39					2		
DW# 70	8	110+50	LT	N/A													
DW# 71	8	111+05	LT	N/A													
DW# 72	8	111+30	RT	1-18" X 16' RCP	EXTEND 45' LT & 4' RT ADD SET LT & RT						49					2	
					SHEET TOTALS	17	0	387	0	160	96	0	12	0	6	6	2

NOTES:

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FM 794

DRIVEWAY STRUCTURES SUMMARY

SHEET 3 OF 6

FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
6		29

STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

SUMMARY OF DRIVEWAY STRUCTURES

DRIVEWAY NUMBER	P&P SHEET	CENTERLINE STATION		EXISTING STRUCTURE	✳ PROPOSED WORK	400	460			464		467 SET (TY II)					496
						CEMENT STAB BKFL	CMP 15 IN	CMP 18 IN	CMP 24 IN	RCP CL III 15 IN	RCP CL III 18 IN	CMP 15 IN 6:1 (P)	CMP 18 IN 6:1 (P)	CMP 24 IN 6:1 (P)	RCP 15 IN 6:1 (P)	RCP 18 IN 6:1 (P)	REMOV STR (SMALL)
						CY	LF	LF	LF	LF	LF	EA	EA	EA	EA	EA	EA
DW# 73	8	112+57	LT	N/A													
DW# 74	8	112+86	RT	1-15" X 59' CMP	EXTEND 4' LT & RT ADD SET LT & RT		8					2					
DW# 75	8	113+28	LT	N/A													
DW# 76	8	113+70	RT	1-12" X 28' CMP	REMOVE EXISTING STRUCTURE PROP 1-15" X 36' RCP ADD SET LT & RT	3				36					2		1
DW# 77	8	113+96	LT	N/A													
DW# 78	8	115+25	RT	1-15" X 31' CMP	EXTEND 4' RT & 4' LT ADD SET LT & RT		8					2					
DW# 79	8	115+47	LT	N/A													
DW# 80	8	117+20	LT	N/A													
DW# 81	8	118+05	LT	N/A													
DW# 82	9	118+55	LT	N/A													
DW# 83	9	119+87	LT	N/A													
DW# 83B	9	120+63	LT	N/A													
DW# 84	9	121+79	RT	1-12" X 25' CMP	REMOVE EXISTING STRUCTURE PROP 1-15" X 33' RCP ADD SET LT & RT	4				33					2		1
DW# 84B	9	123+02	RT	1-18" X 22' RCP	EXTEND 4' RT & 4' LT ADD SET LT & RT						8					2	
DW# 85	9	124+06	LT	1-15" X 20' RCP	EXTEND 42' RT & 4' LT ADD SET LT & RT					46					2		
DW# 86	9	124+91	LT	1-18" X 70' CMP	EXTEND 55' RT & 4' LT ADD SET LT & RT			59					2				
DW# 87	9	125+30	LT	CONNECTED W DW#86	CONNECTED W/ DW#86												
DW# 87B	9	129+61	LT	1-15" X 25' RCP	EXTEND 4' LT & RT ADD SET LT & RT					8					2		
DW# 88	9	146+45	LT	1-24" X 31' CMP w/SETS	NO PROPOSED WORK												
DW# 89	10	149+01	LT	1-24" X 31' CMP	EXTEND 4' LT & RT ADD SET LT & RT				8					2			
DW# 90	11	154+87	LT	1-12" X 62' CMP	REMOVE EXISTING STRUCTURE PROP 1-15" X 72' RCP ADD SET LT & RT	13				72					2		1
DW# 90B	12	164+62	RT	1-15" X 26' CMP	EXTEND 4' LT & RT ADD SET LT & RT		8					2					
DW# 91	13	169+14	RT	1-12" X 40' CMP	REMOVE EXISTING STRUCTURE PROP 1-15" X 48' RCP ADD SET LT & RT	5				48					2		1
					SHEET TOTALS	25	24	59	8	243	8	6	2	2	12	2	4

NOTES:

SEE MISCELLANEOUS DRAINAGE DETAIL SHEETS FOR THE CEMENT STABILIZED BACKFILL AND PIPE COLLAR DETAIL.

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FM 794

DRIVEWAY STRUCTURES SUMMARY

SHEET 4 OF 6

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			30
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

SUMMARY OF DRIVEWAY STRUCTURES

DRIVEWAY NUMBER	P&P SHEET	CENTERLINE STATION		EXISTING STRUCTURE	⚹ PROPOSED WORK	400	460			464		467 SET (TY II)					496
						CEMENT STAB BKFL	CMP 15 IN	CMP 18 IN	CMP 24 IN	RCP CL III 15 IN	RCP CL III 18 IN	CMP 15 IN 6:1 (P)	CMP 18 IN 6:1 (P)	CMP 24 IN 6:1 (P)	RCP 15 IN 6:1 (P)	RCP 18 IN 6:1 (P)	REMOV STR (SMALL)
						CY	LF	LF	LF	LF	LF	EA	EA	EA	EA	EA	EA
DW# 91B	13	171+63	RT	1-12" X 21' RCP	REMOVE EXISTING STRUCTURE PROP 1-15" X 29' RCP ADD SET LT & RT	4				29					2		1
DW# 91C	13	174+67	LT	1-18" X 39' CMP	EXTEND 4' LT & RT ADD SET LT & RT			8					2				
DW# 92	14	182+37	LT	N/A													
DW# 93	14	182+58	RT	1-15" X 23' CMP	EXTEND 4' LT & RT ADD SET LT & RT		8					2					
DW# 94	15	186+62	RT	1-18" X 22' CMP	EXTEND 4' LT & RT ADD SET LT & RT			8					2				
DW# 95	15	196+27	LT	1-15" X 33' CMP	REMOVE EXISTING LT & RT SET EXTEND 4' RT & 50' LT ADD SET LT & RT		54					2					
DW# 96	15	205+54	RT	N/A													
DW# 97	16	207+57	RT	N/A													
DW# 97B	17	213+72	LT	1-12" X 16' RCP	REMOVE EXISTING STRUCTURE PROP 1-15" X 34' RCP ADD SET LT & RT	4				34					2		1
DW# 97C	17	223+08	LT	1-15" X 60' CMP	EXTEND 4' LT & RT ADD SET LT & RT		8					2					
DW# 97D	17	255+23	LT	1-18" X 18' RCP	EXTEND 4' LT & RT ADD SET LT & RT						8					2	
DW# 98	18	255+63	RT	1-12" X 40' CMP	REMOVE EXISTING STRUCTURE PROP 1-15" X 48' RCP ADD SET LT & RT	8				48					2		1
DW# 99	21	268+15	RT	N/A													
DW# 100	21	280+19	LT	1-18" X 36' RCP	EXTEND 4' LT & RT ADD SET LT & RT						8					2	
DW# 100B	22	281+87	LT	1-18" X 34' RCP	EXTEND 35' LT & 4' RT ADD SET LT & RT						39					2	
DW# 101	23	286+03	RT	1-18" X 27' RCP	EXTEND 4' LT & RT ADD SET LT & RT						8					2	
DW# 102	24	294+79	RT	N/A													
DW# 103	24	299+13	LT	1-18" X 28' RCP	EXTEND 4' LT & RT ADD SET LT & RT						8					2	
DW# 104	25	302+22	LT	1-18" X 36' CMP	EXTEND 4' RT & 32' LT ADD SET LT & RT			36					2				
DW# 105	25	306+53	LT	N/A													
DW# 106	25	311+52	RT	N/A													
DW# 107	26	324+20	RT	N/A													
DW# 108	26	324+54	LT	1-18" X 18' RCP	EXTEND 4' RT & 45' LT ADD SET LT & RT						49					2	
					SHEET TOTALS	16	70	52	0	111	120	6	6	0	6	12	3

NOTES:

SEE MISCELLANEOUS DRAINAGE DETAIL SHEETS FOR THE CEMENT STABILIZED BACKFILL AND PIPE COLLAR DETAIL.

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FM 794

DRIVEWAY STRUCTURES SUMMARY

SHEET 5 OF 6

FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
6		31

STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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SUMMARY OF DRIVEWAY STRUCTURES

DRIVEWAY NUMBER	P&P SHEET	CENTERLINE STATION		EXISTING STRUCTURE	✳ PROPOSED WORK	400	460			464		467 SET (TY II)					496
						CEMENT STAB BKFL	CMP 15 IN	CMP 18 IN	CMP 24 IN	RCP CL III 15 IN	RCP CL III 18 IN	CMP 15 IN 6:1 (P)	CMP 18 IN 6:1 (P)	CMP 24 IN 6:1 (P)	RCP 15 IN 6:1 (P)	RCP 18 IN 6:1 (P)	REMOV STR (SMALL)
						CY	LF	LF	LF	LF	LF	EA	EA	EA	EA	EA	EA
DW# 109	27	325+82	LT	1-18" X 20' CMP	EXTEND 4' RT & 50' LT ADD SET LT & RT			54					2				
DW# 110	27	327+78	LT	1-18" X 37' CMP	EXTEND 4' LT & RT ADD SET LT & RT			8					2				
DW# 110B	28	331+38	RT	1-24" X 21 CMP	EXTEND 4' LT & RT ADD SET LT & RT				8					2			
DW# 111	28	341+20	LT	1-18" X 24' CMP	EXTEND 50' RT & 4' LT ADD SET LT & RT			54					2				
DW# 111B	30	349+81	LT	1-18" X 20' CMP	EXTEND 4' LT & 6' RT ADD SET LT & RT			10					2				
DW# 111C	30	356+94	0	1-18" X 28' RCP	EXTEND 4' LT & RT ADD SET LT & RT						8					2	
DW# 112	30	357+71	RT	1-18" X 47' CMP w/SETs	NO PROPOSED WORK												
DW# 113	31	359+05	LT	1-18" X 26' CMP	EXTEND 4' RT & 6' LT ADD SET LT & RT			10					2				
DW# 114	32	371+21	LT	1-18" X 47' CMP	EXTEND 4' RT & 48' LT ADD SET LT & RT			52					2				
DW# 115	32	376+85	RT	1-18" X 47' CMP w/SETs	NO PROPOSED WORK												
DW# 116	33	384+30	LT	1-18" X 26' CMP	EXTEND 4' RT & 47' LT ADD SET LT & RT			51					2				
DW# 117	36	413+38	LT	N/A													
DW# 118	36	415+98	LT	1-12" X 22' CMP	REMOVE EXISTING STRUCTURE PROP 1-15" X 65' RCP ADD SET LT & RT	4				65					2		1
DW# 119	37	424+82	LT	1-18" X 19' RCP	EXTEND 4' LT & RT ADD SET LT & RT						8					2	
DW# 120	37	426+11	LT	1-18" X 19' RCP	EXTEND 4' LT & RT ADD SET LT & RT						8					2	
DW# 121	37	429+14	LT	1-18" X 20' CMP	REMOVE EXISTING STRUCTURE CONNECT LT TO PROPOSED 18" RCP FOR INTERSECTION AT STA 428+04 PROPOSED 1-18" X 86 RCP ADD SET RT	6					86					1	1
DW# 122	37	430+74	LT	N/A													
DW# 123	38	435+56	LT	N/A													
DW# 124	38	436+84	LT	N/A													
DW# 125	38	438+40	RT	N/A													
DW# 125B	38	441+64	RT	1-12" X 15' CMP	REMOVE EXISTING STRUCTURE PROP 1-15" X 23 RCP ADD SET LT & RT	2				23					2		1
DW# 126	38	443+72	LT	1-12" X 34' CMP	REMOVE EXISTING STRUCTURE PROP 1-15" X 42 RCP ADD SET LT & RT	6				42					2		1
DW# 127	39	447+72	LT	N/A													
DW# 128	39	450+46	RT	1-8" X 24' CMP	REMOVE EXISTING STRUCTURE PROP 1-15" X 32 RCP ADD SET LT & RT	4				32					2		1
					SHEET TOTALS	22	0	239	8	162	110	0	14	2	8	7	5
					PROJECT TOTAL	**141**	**286**	**913**	**16**	**1126**	**334**	**30**	**52**	**4**	**46**	**27**	**18**

NOTES:

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FM 794

DRIVEWAY STRUCTURES SUMMARY

SHEET 6 OF 6

FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
6		32

STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

ITEM	110	132		
DESCRIPTION	EXCAVATION (ROADWAY)	EMBANKMENT (FINAL) (ORD COMP) (TY C)	ACCUMULATIVE EXCAVATION	ACCUMULATIVE EMBANKMENT
STATION	CY	CY	CY	CY
54+00.00	0	0	0	0
55+00.00	10	1	10	1
57+00.00	10	0	20	1
58+00.00	4	1	24	2
59+00.00	3	1	27	3
60+00.00	3	0	30	3
62+00.00	40	6	70	9
63+00.00	53	9	123	18
64+00.00	53	6	176	24
65+00.00	53	3	229	27
66+00.00	55	1	284	28
67+00.00	56	1	340	29
68+00.00	43	1	383	30
69+00.00	89	1	472	31
70+00.00	124	6	596	37
71+00.00	90	12	686	49
72+00.00	99	13	785	62
73+00.00	84	8	869	70
74+00.00	75	2	944	72
75+00.00	93	0	1037	72
76+00.00	82	0	1119	72
77+00.00	70	0	1189	72
78+00.00	54	6	1243	78
79+00.00	41	21	1284	99
80+00.00	40	37	1324	136
81+00.00	39	57	1363	193
82+00.00	30	61	1393	254
83+00.00	25	42	1418	296
84+00.00	41	30	1459	326
85+00.00	57	31	1516	357
86+00.00	58	31	1574	388
87+00.00	56	23	1630	411
88+00.00	47	20	1677	431
89+00.00	51	12	1728	443
90+00.00	65	3	1793	446
91+00.00	68	1	1861	447
92+00.00	74	4	1935	451
93+00.00	69	4	2004	455
94+00.00	61	3	2065	458
95+00.00	80	15	2145	473
96+00.00	76	41	2221	514
97+00.00	59	32	2280	546
98+00.00	63	10	2343	556
99+00.00	60	22	2403	578
100+00.00	49	27	2452	605
101+00.00	46	21	2498	626
102+00.00	64	12	2562	638
103+00.00	87	3	2649	641
104+00.00	76	4	2725	645
105+00.00	47	13	2772	658
106+00.00	39	22	2811	680
107+00.00	37	21	2848	701
108+00.00	36	18	2884	719
109+00.00	45	9	2929	728
110+00.00	63	0	2992	728
111+00.00	67	4	3059	732
112+00.00	56	11	3115	743
113+00.00	69	11	3184	754
114+00.00	74	14	3258	768
115+00.00	66	12	3324	780
116+00.00	66	1	3390	781
117+00.00	64	2	3454	783
118+00.00	71	2	3525	785
119+00.00	70	2	3595	787
120+00.00	58	2	3653	789
121+00.00	50	9	3703	798
122+00.00	47	12	3750	810
123+00.00	44	9	3794	819
124+00.00	48	8	3842	827
125+00.00	57	4	3899	831

ITEM	110	132		
DESCRIPTION	EXCAVATION (ROADWAY)	EMBANKMENT (FINAL) (ORD COMP) (TY C)	ACCUMULATIVE EXCAVATION	ACCUMULATIVE EMBANKMENT
STATION	CY	CY	CY	CY
126+00.00	60	14	3959	845
127+00.00	59	35	4018	880
128+00.00	53	42	4071	922
129+00.00	41	49	4112	971
130+00.00	46	49	4158	1020
131+00.00	51	35	4209	1055
132+00.00	40	45	4249	1100
133+00.00	36	71	4285	1171
134+00.00	47	68	4332	1239
135+00.00	61	41	4393	1280
136+00.00	71	23	4464	1303
137+00.00	73	11	4537	1314
138+00.00	65	4	4602	1318
139+00.00	54	7	4656	1325
140+00.00	46	7	4702	1332
141+00.00	49	29	4751	1361
142+00.00	65	31	4816	1392
143+00.00	74	11	4890	1403
144+00.00	55	19	4945	1422
145+00.00	50	23	4995	1445
146+00.00	68	23	5063	1468
147+00.00	74	19	5137	1487
148+00.00	64	17	5201	1504
149+00.00	56	31	5257	1535
150+00.00	46	44	5303	1579
151+00.00	41	41	5344	1620
152+00.00	51	30	5395	1650
153+00.00	56	27	5451	1677
154+00.00	59	26	5510	1703
155+00.00	60	22	5570	1725
156+00.00	45	26	5615	1751
157+00.00	28	35	5643	1786
158+00.00	39	35	5682	1821
159+00.00	61	31	5743	1852
160+00.00	72	30	5815	1882
161+00.00	67	27	5882	1909
162+00.00	43	30	5925	1939
163+00.00	24	34	5949	1973
164+00.00	32	24	5981	1997
165+00.00	56	9	6037	2006
166+00.00	64	7	6101	2013
167+00.00	62	7	6163	2020
168+00.00	60	9	6223	2029
169+00.00	65	14	6288	2043
170+00.00	69	17	6357	2060
171+00.00	63	19	6420	2079
172+00.00	60	21	6480	2100
173+00.00	61	18	6541	2118
174+00.00	65	15	6606	2133
175+00.00	57	11	6663	2144
176+00.00	44	13	6707	2157
177+00.00	49	13	6756	2170
178+00.00	56	23	6812	2193
179+00.00	52	37	6864	2230
180+00.00	53	22	6917	2252
181+00.00	51	10	6968	2262
182+00.00	51	22	7019	2284
183+00.00	46	29	7065	2313
184+00.00	36	40	7101	2353
185+00.00	41	46	7142	2399
186+00.00	65	31	7207	2430
187+00.00	78	16	7285	2446
188+00.00	59	20	7344	2466
189+00.00	43	33	7387	2499
190+00.00	41	33	7428	2532
191+00.00	37	33	7465	2565
192+00.00	42	28	7507	2593
193+00.00	58	21	7565	2614
194+00.00	61	18	7626	2632
195+00.00	61	15	7687	2647

ITEM	110	132		
DESCRIPTION	EXCAVATION (ROADWAY)	EMBANKMENT (FINAL) (ORD COMP) (TY C)	ACCUMULATIVE EXCAVATION	ACCUMULATIVE EMBANKMENT
STATION	CY	CY	CY	CY
196+00.00	62	17	7749	2664
197+00.00	61	13	7810	2677
198+00.00	65	5	7875	2682
199+00.00	62	11	7937	2693
200+00.00	54	17	7991	2710
201+00.00	53	23	8044	2733
202+00.00	55	27	8099	2760
203+00.00	48	44	8147	2804
204+00.00	38	66	8185	2870
205+00.00	38	50	8223	2920
206+00.00	50	31	8273	2951
207+00.00	48	26	8321	2977
208+00.00	27	20	8348	2997
209+00.00	9	31	8357	3028
210+00.00	23	24	8380	3052
211+00.00	50	9	8430	3061
212+00.00	41	23	8471	3084
213+00.00	31	33	8502	3117
214+00.00	37	31	8539	3148
215+00.00	39	43	8578	3191
216+00.00	37	61	8615	3252
217+00.00	42	88	8657	3340
218+00.00	52	137	8709	3477
219+00.00	60	102	8769	3579
220+00.00	57	68	8826	3647
221+00.00	53	91	8879	3738
222+00.00	70	42	8949	3780
223+00.00	82	2	9031	3782
224+00.00	52	42	9083	3824
225+00.00	29	69	9112	3893
226+00.00	41	46	9153	3939
227+00.00	53	32	9206	3971
228+00.00	44	28	9250	3999
229+00.00	25	38	9275	4037
230+00.00	16	54	9291	4091
231+00.00	17	51	9308	4142
232+00.00	16	49	9324	4191
233+00.00	10	55	9334	4246
234+00.00	12	47	9346	4293
235+00.00	24	29	9370	4322
236+00.00	41	15	9411	4337
237+00.00	57	9	9468	4346
238+00.00	58	9	9526	4355
239+00.00	52	24	9578	4379
240+00.00	47	49	9625	4428
241+00.00	45	48	9670	4476
242+00.00	41	34	9711	4510
243+00.00	31	44	9742	4554
244+00.00	29	60	9771	4614
245+00.00	34	49	9805	4663
246+00.00	34	49	9839	4712
247+00.00	30	66	9869	4778
248+00.00	36	61	9905	4839
249+00.00	44	48	9949	4887
250+00.00	37	38	9986	4925
251+00.00	38	29	10024	4954
252+00.00	43	18	10067	4972
253+00.00	44	14	10111	4986
254+00.00	55	18	10166	5004
255+00.00	57	21	10223	5025
256+00.00	44	30	10267	5055
257+00.00	39	33	10306	5088
258+00.00	42	28	10348	5116
259+00.00	46	21	10394	5137
260+00.00	44	17	10438	5154
261+00.00	37	28	10475	5182
262+00.00	33	35	10508	5217
263+00.00	33	36	10541	5253
264+00.00	31	42	10572	5295
265+00.00	28	38	10600	5333

Texas Department of Transportation

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TBPE Registration No. F-1046

FM 794

EARTHWORK SUMMARY

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			33
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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ITEM	110	132		
DESCRIPTION	EXCAVATION (ROADWAY)	EMBANKMENT (FINAL) (ORD COMP) (TY C)	ACCUMULATIVE EXCAVATION	ACCUMULATIVE EMBANKMENT
STATION	CY	CY	CY	CY
266+00.00	36	32	10636	5365
267+00.00	49	33	10685	5398
268+00.00	58	15	10743	5413
269+00.00	85	0	10828	5413
270+00.00	106	0	10934	5413
271+00.00	77	4	11011	5417
272+00.00	49	8	11060	5425
273+00.00	52	6	11112	5431
274+00.00	46	28	11158	5459
275+00.00	31	35	11189	5494
276+00.00	33	11	11222	5505
277+00.00	43	6	11265	5511
278+00.00	51	6	11316	5517
279+00.00	49	10	11365	5527
280+00.00	39	22	11404	5549
281+00.00	44	26	11448	5575
282+00.00	56	12	11504	5587
283+00.00	47	6	11551	5593
284+00.00	21	18	11572	5611
285+00.00	17	17	11589	5628
286+00.00	38	37	11627	5665
287+00.00	51	55	11678	5720
288+00.00	54	23	11732	5743
289+00.00	124	31	11856	5774
290+00.00	58	0	11914	5774
291+00.00	35	0	11949	5774
292+00.00	39	0	11988	5774
293+00.00	66	33	12054	5807
294+00.00	44	15	12098	5822
295+00.00	43	14	12141	5836
296+00.00	50	6	12191	5842
297+00.00	43	14	12234	5856
298+00.00	38	16	12272	5872
299+00.00	47	7	12319	5879
300+00.00	36	30	12355	5909
301+00.00	26	36	12381	5945
302+00.00	32	12	12413	5957
303+00.00	39	6	12452	5963
304+00.00	39	5	12491	5968
305+00.00	31	10	12522	5978
306+00.00	39	12	12561	5990
307+00.00	49	5	12610	5995
308+00.00	47	2	12657	5997
309+00.00	55	7	12712	6004
310+00.00	64	12	12776	6016
311+00.00	61	8	12837	6024
312+00.00	57	6	12894	6030
313+00.00	55	9	12949	6039
314+00.00	55	22	13004	6061
315+00.00	56	52	13060	6113
316+00.00	59	36	13119	6149
317+00.00	63	1	13182	6150
318+00.00	64	1	13246	6151
319+00.00	61	7	13307	6158
320+00.00	45	17	13352	6175
321+00.00	38	19	13390	6194
322+00.00	47	11	13437	6205
323+00.00	52	7	13489	6212
324+00.00	55	5	13544	6217
325+00.00	54	2	13598	6219
326+00.00	50	4	13648	6223
327+00.00	37	8	13685	6231
328+00.00	32	12	13717	6243
329+00.00	46	12	13763	6255
330+00.00	46	13	13809	6268
331+00.00	45	22	13854	6290
332+00.00	46	27	13900	6317
333+00.00	42	21	13942	6338
334+00.00	40	14	13982	6352
335+00.00	52	6	14034	6358

ITEM	110	132		
DESCRIPTION	EXCAVATION (ROADWAY)	EMBANKMENT (FINAL) (ORD COMP) (TY C)	ACCUMULATIVE EXCAVATION	ACCUMULATIVE EMBANKMENT
STATION	CY	CY	CY	CY
336+00.00	58	1	14092	6359
337+00.00	54	2	14146	6361
338+00.00	50	10	14196	6371
339+00.00	44	15	14240	6386
340+00.00	39	14	14279	6400
341+00.00	38	9	14317	6409
342+00.00	48	2	14365	6411
343+00.00	41	6	14406	6417
344+00.00	24	13	14430	6430
345+00.00	24	13	14454	6443
346+00.00	30	9	14484	6452
347+00.00	31	10	14515	6462
348+00.00	40	8	14555	6470
349+00.00	54	3	14609	6473
350+00.00	56	1	14665	6474
351+00.00	49	2	14714	6476
352+00.00	48	2	14762	6478
353+00.00	50	1	14812	6479
354+00.00	55	1	14867	6480
355+00.00	54	1	14921	6481
356+00.00	49	1	14970	6482
357+00.00	46	1	15016	6483
358+00.00	44	24	15060	6507
359+00.00	52	24	15112	6531
360+00.00	55	1	15167	6532
361+00.00	43	7	15210	6539
362+00.00	38	11	15248	6550
363+00.00	39	11	15287	6561
364+00.00	44	12	15331	6573
365+00.00	51	9	15382	6582
366+00.00	44	23	15426	6605
367+00.00	38	40	15464	6645
368+00.00	34	31	15498	6676
369+00.00	20	26	15518	6702
370+00.00	24	26	15542	6728
371+00.00	48	14	15590	6742
372+00.00	66	7	15656	6749
373+00.00	61	6	15717	6755
374+00.00	49	7	15766	6762
375+00.00	45	10	15811	6772
376+00.00	47	10	15858	6782
377+00.00	64	4	15922	6786
378+00.00	90	0	16012	6786
379+00.00	98	0	16110	6786
380+00.00	76	3	16186	6789
381+00.00	54	14	16240	6803
382+00.00	58	18	16298	6821
383+00.00	65	19	16363	6840
384+00.00	53	19	16416	6859
385+00.00	37	22	16453	6881
386+00.00	31	26	16484	6907
387+00.00	39	17	16523	6924
388+00.00	48	8	16571	6932
389+00.00	50	5	16621	6937
390+00.00	54	6	16675	6943
391+00.00	66	6	16741	6949
392+00.00	72	12	16813	6961
393+00.00	65	29	16878	6990
394+00.00	49	51	16927	7041
395+00.00	35	57	16962	7098
396+00.00	42	46	17004	7144
397+00.00	56	27	17060	7171
398+00.00	54	14	17114	7185
399+00.00	48	12	17162	7197
400+00.00	51	8	17213	7205
401+00.00	53	8	17266	7213
402+00.00	44	14	17310	7227
403+00.00	43	13	17353	7240
404+00.00	49	5	17402	7245
405+00.00	46	4	17448	7249

ITEM	110	132		
DESCRIPTION	EXCAVATION (ROADWAY)	EMBANKMENT (FINAL) (ORD COMP) (TY C)	ACCUMULATIVE EXCAVATION	ACCUMULATIVE EMBANKMENT
STATION	CY	CY	CY	CY
406+00.00	43	6	17491	7255
407+00.00	41	6	17532	7261
408+00.00	47	9	17579	7270
409+00.00	83	9	17662	7279
410+00.00	84	11	17746	7290
411+00.00	51	20	17797	7310
412+00.00	46	15	17843	7325
413+00.00	47	5	17890	7330
414+00.00	38	5	17928	7335
415+00.00	42	5	17970	7340
416+00.00	56	5	18026	7345
417+00.00	50	12	18076	7357
418+00.00	44	13	18120	7370
419+00.00	51	5	18171	7375
420+00.00	54	3	18225	7378
421+00.00	55	3	18280	7381
422+00.00	64	1	18344	7382
423+00.00	56	2	18400	7384
424+00.00	51	2	18451	7386
425+00.00	54	6	18505	7392
426+00.00	51	14	18556	7406
427+00.00	52	14	18608	7420
428+00.00	53	6	18661	7426
429+00.00	51	12	18712	7438
430+00.00	46	15	18758	7453
431+00.00	52	13	18810	7466
432+00.00	54	11	18864	7477
433+00.00	53	3	18917	7480
434+00.00	54	2	18971	7482
435+00.00	50	2	19021	7484
436+00.00	55	3	19076	7487
437+00.00	64	1	19140	7488
438+00.00	58	2	19198	7490
439+00.00	42	4	19240	7494
440+00.00	31	8	19271	7502
441+00.00	37	10	19308	7512
442+00.00	50	8	19358	7520
443+00.00	46	25	19404	7545
444+00.00	48	24	19452	7569
445+00.00	48	9	19500	7578
446+00.00	19	66	19519	7644
447+00.00	0	136	19519	7780
448+00.00	29	94	19548	7874
449+00.00	47	21	19595	7895
450+00.00	39	7	19634	7902
451+00.00	53	7	19687	7909
452+00.00	56	22	19743	7931
453+00.00	54	26	19797	7957
454+00.00	66	10	19863	7967
454+50.00	33	5	19896	7972
PROJECT TOTAL	CY	CY		
	19896	7972		

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EARTHWORK SUMMARY

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			34
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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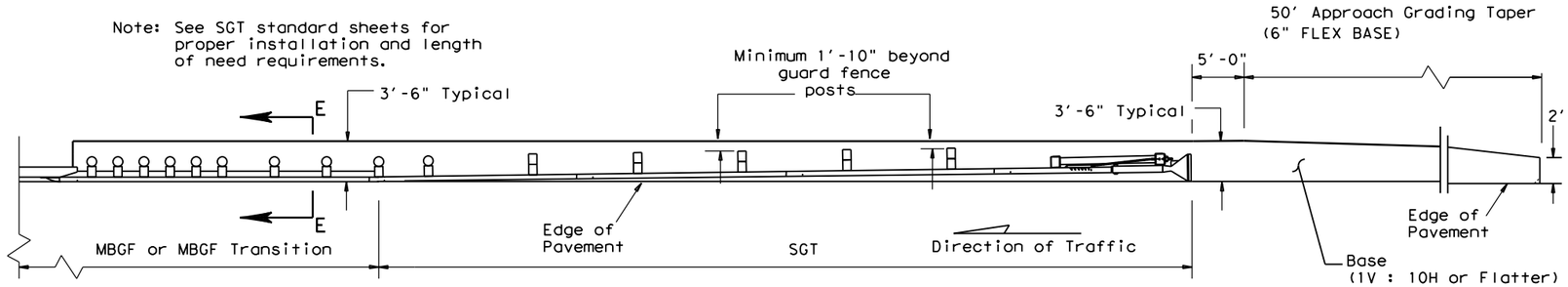
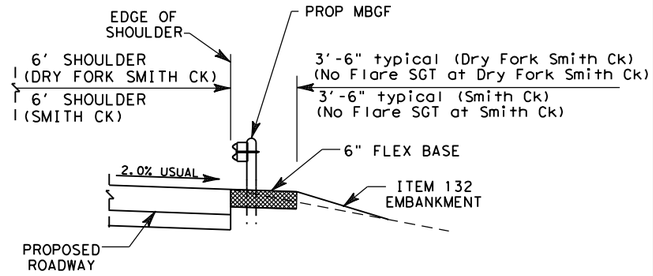


WIDENING FOR MBGF & GUARDRAIL END TREATMENTS

PLAN VIEW



ELEVATION VIEW

MBGF TYPICAL SECTION E-E

NOTE:
THIS DETAIL IS FOR WIDENING ONLY.
MBGF AND SGT SHALL BE INSTALLED ACCORDING TO THEIR APPLICABLE STANDARDS.

SUMMARY OF METAL BEAM GUARD FENCE ITEMS

STATION / LOCATION	247 FL BS (CMP IN PLC) (TYE GR1&2) (FNAL POS) CY	420 CL C CONC (RAIL FOUNDATION) CY	420 ✳ CL C CONC (RAC-R) CY	432 RIPRAP (CONC) (5 IN) CY	432 RIPRAP (STONE COMMON) (DRY) (18 IN) CY	451 RETROFIT RAIL (TY SSTR) LF	540 MTL W-BEAM GD FEN (TIM POST) LF	540 MTL BEAM GD FEN TRANS (THRIE-BEAM) EA	542 REMOVE METAL BEAM GUARD FENCE LF	542 REMOVE TERMINAL ANCHOR SECTION EA	544 GUARDRAIL END TREATMENT (INSTALL) EA	658 INSTL DEL ASSM (D-SW) SZ 1 (BRF) GF2 EA
STA 200+54 CULVERT 4 (LT)									200	2		
STA 200+54 CULVERT 4 (RT)									200	2		
STA 219+30.31 - 219+79.69 DRY FORK SMITH CREEK (LT) CULVERT 5 - NBI #130900113302006	21.2	11.2	27.2	16.5	31.0	120.5	100	2	125	2	2	6
STA 219+30.31 - 219+79.69 DRY FORK SMITH CREEK (RT) CULVERT 5 - NBI #130900113302006	21.4	5.6	8.6	14.0		85.4	100	2	125	2	2	6
STA 290+50.00 - 291+50.00 SMITH CREEK (LT) NBI #130900113302007	22.8				11.3		100	2	150	2	2	7
STA 290+50.00 - 291+50.00 SMITH CREEK (RT) NBI #130900113302007	22.8				20.7		100	2	150	2	2	7
STA 314+95 CULVERT 7 (LT)									175	2		
STA 314+95 CULVERT 7 (RT)									175	2		
PROJECT TOTALS	**88**	**17**	**36**	**31**	**63**	**205.9**	**400**	**8**	**1300**	**16**	**8**	**26**

✳ NOTE:
THIS QUANTITY IS FOR RAIL ANCHORAGE CURB.
(SEE RAC-R (MOD) FOR DETAILS)

STATE OF TEXAS
JOHN W. TULEY
102441
LICENSED
PROFESSIONAL ENGINEER

3/25/2021

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MBGF SUMMARY AND DETAILS

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
6		35

STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

SUMMARY OF CENTERLINE STRUCTURES

LOCATION	EXISTING STRUCTURE	PROPOSED WORK DESCRIPTION	104	400		402	432	462 CONC BOX CULV			464	466	467 SET (TY II)	467 SET (TY I)			496	658
			REMOVING CONC (RIPRAP)	CEMENT STABIL BKFL	CUT & RESTORE PAV	TRENCH EXCAVATION PROTECTION	RIPRAP (CONC) (5 IN)	(3 FT X 3 FT)	(5 FT X 2 FT)	(7 FT X 3 FT) (EXTEND)	RCP (CL III) (24 IN)	WINGWALL (PW - 1) (HW=4 FT)	(24 IN) RCP (4:1) (C)	(S= 3 FT) (HW= 3 FT) (3:1) (C)	(S= 5 FT) (HW= 3 FT) (3:1) (C)	(S= 7 FT) (HW= 4 FT) (3:1) (C)	REMOVE STR (SMALL)	INSTL OM ASSM (OM-2Y) (WC)GND (BI)
			SY	CY	SY	LF	CY	LF	LF	LF	LF	EA	EA	EA	EA	EA	EA	EA
CULVERT 0: STA 92+40	1 - 15" x 34' RCP w/ SETs	NO WORK																2
CULVERT 1: STA 95+52	2 - 24" x 37' CMP	REMOVE EXISTING 2-24" X 37 LF CMP. INSTALL PROPOSED 1 - 5'X2' X 36 LF CBC. ADD SET (TY 1) (S=5 FT) (HW=3 FT) (3:1) (C) LT & RT USING SCP-5, SCP-MD, SETB-CD & BCS	10	10	19				36						2		1	2
CULVERT 3: STA 178+43	1 - 7'x3' x 44' CBC w/ SETs	REMOVE SETs LT & RT. EXTEND 1-7'X3' CBC, 2' LT & RT. ADD SET (TY 1) (S=7 FT) (HW=4 FT) (3:1) (C) LT & RT USING SCC-7, SETB-FW-0, SCC-MD & BCS					3			4						2		2
CULVERT 4: STA 200+54	1 - 7'x3'x36.25' CBC w/ PW	REMOVE PW LT & RT. BREAK BACK CBC 4' RT & EXTEND 1-7'X3' CBC 2' LT & 3' RT. ADD SET (TY1) (S=7 FT) (HW=4 FT) (3:1) (C) LT & RT USING SCC-7, SCC-MD, SETB-FW-0 & BCS					2.6			5						2		2
CULVERT 6: STA 300+01	2 - 24" x 38' RCP w/ SETs	NO WORK																2
CULVERT 7: STA 314+95	1 - 36" x 56' CMP	EXISTING 36" X 56 LF CMP TO BE REMOVED. PROPOSED 3'X3' X 60 LF CBC. SET (TY1) (S=3 FT) (HW=3 FT) (3:1) (C) LT & WINGWALL (PW-1) (HW=4 FT) RT USING SCP-3, SCP-MD, SETB-FW-0, PW & BCS		37	13	40	0.7	60				1		1			1	2
CULVERT 8: STA 318+58	1 - 24" x 46' RCP w/ SETs	NO WORK																2
CULVERT 9: STA 329+72	1 - 36" x 38' RCP w/SETs	NO WORK																2
CULVERT 10: STA 409+91	1 - 30" x 40' RCP w/ SETs	NO WORK																2
CULVERT 11: STA 419+32	1 - 7'x3'x40' CBC w/SETs	NO WORK																2
CULVERT 12: STA 446+73	1 - 24" x 38' RCP w/SETs	REMOVE SET LT & RT. EXTEND 24" RCP 6' LT & 6' RT. ADD SET (TY II) (24" RCP) (4:1) (C) LT & RT USING SETP-CD									12		2					2
PROJECT TOTALS			10	47	32	40	6.3	60	36	9	12	1	2	1	2	4	2	22

NOTE: EMBANKMENT REQUIRED FOR CULVERT EXTENSIONS
IS INCLUDED WITH ITEM 132 IN ROADWAY QUANTITIES.

	403
	TEMPORARY SPL SHORING
	SF
LOCATIONS AS DIRECTED	
TOTAL	500

SUMMARY OF BRIDGE CLASS STRUCTURES

LOCATION	NBI #	EXISTING STRUCTURE	PROPOSED WORK DESCRIPTION	432	467 SET		658
				* RIPRAP (STONE COMMON) (DRY) (18 IN)	(REPLACE PIPE RUNNER ASSEMBLY)	(REPLACE PIPE RUNNER)	INSTL OM ASSM (OM-2Y) (WC)GND (BI)
				CY	EA	EA	EA
CULVERT 2: STA 141+20.50 - STA 141+43.50	13-090-0-1133-02-005	3 - 7'x3'x46' MBC w/SETs	REPLACE PIPE RUNNER ASSM LT & REPLACE PIPE RUNNER RT	36	1	1	4
CULVERT 5: STA 219+30.31 - STA 219+79.69	13-090-0-1133-02-006	4 - 8'x7'x 36' MBC w/ HEADWALLS & WINGWALLS	REPLACE RAIL - SEE MBGF LAYOUT	**			4
PROJECT TOTALS				36	1	1	8

* ADD STONE RIPRAP TO UPSTREAM (16 CY)
AND DOWNSTREAM (20 CY) AT TOEWALL EROSION.

** RIPRAP QUANTITY FOR THIS STRUCTURE
IS SHOWN ON MBGF SUMMARY & DETAIL SHEET

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DRAINAGE SUMMARY

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
6		36

STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

SUMMARY OF PAVEMENT MARKING ITEMS

SIGNING & PAVEMENT MARKING LAYOUT SHEET NO.	LOCATION	666	666	666	666	666	666	668	672	6056
		RE PM W/RET REQ TY I (W)4"(SLD) (100MIL)	RE PM W/RET REQ TY I (Y)4"(BRK) (100MIL)	RE PM W/RET REQ TY I (Y)4"(SLD) (100MIL)	REF PROF PAV MRK TY I (W)4"(SLD) (100MIL)	REF PROF PAV MRK TY I (Y)4"(BRK) (100MIL)	REF PROF PAV MRK TY I (Y)4"(SLD) (100MIL)	PREFAB PAV MRK TY C (W) (24") (SLD)	REFL PAV MRKR TY II-A-A	PREFORMED CENTERLINE RUMBLE STRIP
		LF	LF	LF	LF	LF	LF	LF	EA	LF
1	53+29.72 - 72+00	3454		3262				22	41	
2	72+00 - 94+00	4386	449	1910					47	69
3	94+00 - 116+00	4237	516	1697					52	46
4	116+00 - 118+50	459	237						6	
4	118+50 - 138+00				3843	245	1919		49	33
5	138+00 - 160+00				4400	422	2565		55	19
6	160+00 - 182+00				4320	535	1346		54	99
7	182+00 - 204+00				4400	526	2066		55	29
8	204+00 - 226+00				4400	257	3372		55	
9	226+00 - 248+00				4255	527	720		53	174
10	248+00 - 270+00				4299	465	2034		49	36
11	270+00 - 292+00				4400		4400		55	
12	292+00 - 314+00				4400	42	4235		55	
13	314+00 - 336+00				4335	471	1984		49	55
14	336+00 - 358+00				4400	510	1900		50	58
15	358+00 - 380+00				4400	463	1958		48	74
16	380+00 - 402+00				4324	535	822		37	165
17	402+00 - 424+00				4222	334	2471		48	30
18	424+00 - 446+00				4326	176	3599		54	
19	446+00 - 454+50				1701		1701		22	
PROJECT TOTALS		12536	1202	6869	66425	5508	37092	22	934	887

SUMMARY OF SIGNING ITEMS

SIGNING & PAVEMENT MARKING LAYOUT SHEET NO.	LOCATION	644	644	644	644	644	644	644	644	6350	6350
		IN SM RD SN SUP&AM TY10BWG(1) SA(P)	IN SM RD SN SUP&AM TY10BWG(1) SA(T)	IN SM RD SN SUP&AM TYS80(1)SA (T)	IN SM RD SN SUP&AM TYS80(1)SA (U)	IN SM RD SN SUP&AM TYS80(1)SA (U-2EXT)	IN SM RD SN SUP&AM TYTWT(1)WS (P)	IN SM RD SN SUP&AM TYTWT(1)WS (T)	REMOVE SM RD SN SUP&AM	LEAD LED CHEVRON	LED CHEVRON
		EA	EA	EA	EA	EA	EA	EA	EA	EA	EA
1	53+29.72 - 72+00	2	1	1	1	1	9	1	16		
2	72+00 - 94+00						5		5		
3	94+00 - 116+00	2					2		4		
4	116+00 - 138+00	1			1		4		6		
5	138+00 - 160+00										
6	160+00 - 182+00				1		3		4		
7	182+00 - 204+00										
8	204+00 - 226+00						1		1		
9	226+00 - 248+00						6		6		
10	248+00 - 270+00	2					4		6	1	3
11	270+00 - 292+00	2					5		7	1	7
12	292+00 - 314+00										
13	314+00 - 336+00	1					3		4		
14	336+00 - 358+00						1		1		
15	358+00 - 380+00										
16	380+00 - 402+00	1					1		2		
17	402+00 - 424+00						5		5		
18	424+00 - 446+00						4		4		
19	446+00 - 454+50						1		1		
PROJECT TOTALS		11	1	1	3	1	54	1	72	2	10

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SIGNING AND PAVEMENT MARKING SUMMARY

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
6		37

STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

SUMMARY OF SMALL SIGNS

SIGNING AND PAVEMENT MARKING LAYOUT SHEET NO.	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) TYPE N	TYPE S
1	1	R6-1L	ONE WAY	54 X 18	X		10BWG	1	SA	T			
		R6-1R	ONE WAY	54 X 18	X								
		R1-1	STOP	36 X 36	X								
	2	M3-2	EAST	24 X 12	X		S80	1	SA	U	2EXT		
		M4-1	ALTERNATE	24 X 12	X								
		M1-4	90	24 X 24	X								
		M1-6T	97 TEXAS	24 X 24	X								
		M6-3	FORWARD ARROW	21 X 15	X								
		M3-4	WEST	24 X 12	X								
		M4-1	ALTERNATE	24 X 12	X								
		M1-4	90	24 X 24	X								
		M1-6T	97 TEXAS	24 X 24	X								
		M6-1	RIGHT ARROW	21 X 15	X								
	3	R1-1	STOP	36 X 36	X		TWT	1	WS	P			
	4	D14-4T	ADOPT A HIGHWAY	48 X 48	X		S80	1	SA	U			
			NEXT 2 MILES										
			2ND 25TH JUDICIAL DIST.										
			INTERMEDIATE SANCTIONS FACILITIES										
	5	M3-1	NORTH	24 X 12	X		TWT	1	WS	P			
		M1-6F	FARM ROAD 794	24 X 24	X								
	6	R5-4aT	NO ENGINE BRAKE BY CITY ORDINANCE	36 X 48	X		S80	1	SA	T			
		R14-1	TRUCK ROUTE	24 X 18	X								
		M6-4	LEFT RIGHT ARROW	21 X 15	X								
	7	R1-1	STOP	36 X 36	X		TWT	1	WS	P			
	8		HARWOOD RD (Reuse sign face)				TWT	1	WS	P			
			RIDGEMONT LN (Reuse sign face)										
	9	R2-1	SPEED LIMIT 45	30 X 36	X		TWT	1	WS	P			
	10	R2-1	SPEED LIMIT 30	30 X 36	X		TWT	1	WS	P			
	11	R1-1	STOP	36 X 36	X		TWT	1	WS	P			
	12		OAKLAND AVE (Reuse sign face)				TWT	1	WS	P			
			HARWOOD RD (Reuse sign face)										
	13	W3-1	STOP SIGN WARNING	30 X 30	X		TWT	1	WS	P			
	14	D2-1	HARWOOD 11	78 X 18	X		TWT	1	WS	T			
	15	M2-1	JCT	21 X 15	X		10BWG	1	SA	P			
		M4-1	ALTERNATE	24 X 12	X								
		M1-4	90	24 X 24	X								
		M1-6T	97 TEXAS	24 X 24	X								
	16		HARWOOD RD (Reuse sign face)				10BWG	1	SA	P			
			STIEREN RD (Reuse sign face)										
		R1-1	STOP	36 X 36	X								
2	1	R2-1	SPEED LIMIT 50	30 X 36	X		TWT	1	WS	P			
	2	R2-1	SPEED LIMIT 45	30 X 36	X		TWT	1	WS	P			

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

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http://www.txdot.gov/

NOTE:

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3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).
4. Reference marker signs shall be relocated at their original location.

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

SHEET 1 OF 4

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	032	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		38

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DATE: 3/25/2021 8:37:59 AM
FILE: c:\pwworkdir\bge_pw\bwestmoreland\dms49507\SMALL SIGN SUMMARY16.dgn

SUMMARY OF SMALL SIGNS

SIGNING AND PAVEMENT MARKING LAYOUT SHEET NO.	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) TYPE N	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TYPE S
2	3	R2-1	SPEED LIMIT 50	30 X 36	X		TWT	1	WS	P			
	4	R2-1	SPEED LIMIT 50	30 X 36	X		TWT	1	WS	P			
	5		PIONEER VILLAGE DR (Reuse sign face)				TWT	1	WS	P			
3	1		DELAGO RD (Reuse sign face)				10BWG	1	SA	P			
			HARWOOD RD (Reuse sign face)										
		R1-1	STOP	36 X 36	X								
	2	R2-1	SPEED LIMIT 55	30 X 36	X		TWT	1	WS	P			
	3	R2-1	SPEED LIMIT 50	30 X 36	X		TWT	1	WS	P			
	4		OIL PATCH LN (Reuse sign face)				10BWG	1	SA	P			
			HARWOOD RD (Reuse sign face)										
		R1-1	STOP	36 X 36	X								
4	1		JOHNSON RD (Reuse sign face)				10BWG	1	SA	P			
			HARWOOD RD (Reuse sign face)										
		R1-1	STOP	36 X 36									
	2	M1-6F	FARM ROAD 794	24 X 24	X		TWT	1	WS	P			
		D10-7aT	492	3 X 10	X								
	3	I-2aT	GONZALES CITY LIMIT POP. 7237	66 X 36	X		S80	1	SA	U			
	4	R2-1	SPEED LIMIT 60	30 X 36	X		TWT	1	WS	P			
	5	R2-1	SPEED LIMIT 55	30 X 36	X		TWT	1	WS	P			
	6	W3-5	REDUCED SPEED AHEAD	36 X 36	X		TWT	1	WS	P			
6	1	D14-4T	ADOPT A HIGHWAY	48 X 48	X		S80	1	SA	U			
			NEXT 2 MILES										
			2ND 25TH JUDICIAL DIST.										
			INTERMEDIATE SANCTIONS FACILITIES										
	2	D20-1 TL	CO RD 242 ←	24 X 24	X		TWT	1	WS	P			
	3	R1-1	STOP	36 X 36	X		TWT	1	WS	P			
	4	D20-1 TR	CO RD 242 →	24 X 24	X		TWT	1	WS	P			
8	1	D20-1 TR	CO RD 237 →	24 X 24	X		TWT	1	WS	P			
9	1	M1-6F	FARM ROAD 794	24 X 24	X		TWT	1	WS	P			
		D10-7aT	490	3 X 10	X								
	2	R1-1	STOP	36 X 36	X		TWT	1	WS	P			
	3	D20-1 TL	CO RD 237 ←	24 X 24	X		TWT	1	WS	P			
	4	D20-1 TL	CO RD 236 ←	24 X 24	X		TWT	1	WS	P			
	5	R1-1	STOP	36 X 36	X		TWT	1	WS	P			
	6	D20-1 TR	CO RD 236 →	24 X 24	X		TWT	1	WS	P			

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

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NOTE:

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2. For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS)Standard Sheet.
3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).
4. Reference marker signs shall be relocated at their original location.

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

SHEET 2 OF 4

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	032	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		39

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DATE: 3/25/2021 8:38:00 AM
FILE: c:\pwworkdir\bge_pw\bwestmoreland\dms49507\SMALL SIGN SUMMARY16.dgn

SUMMARY OF SMALL SIGNS

SIGNING AND PAVEMENT MARKING LAYOUT SHEET NO.	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) TYPE N	TYPE S
10	1	W1-2L	LEFT CURVE	36 X 36	X		10BWG	1	SA	P			
		W13-1P	40 MPH	18 X 18	X								
	2	D20-1 TR	CO RD 184 →	24 X 24	X		TWT	1	WS	P			
	3	W1-8L	CHEVRON ALIGNMENT	18 X 24	X		TWT	1	WS	P			
		W1-8R	CHEVRON ALIGNMENT	18 X 24	X								
	4	W14-1	DEAD END	36 X 36	X		10BWG	1	SA	P			
		D3-3T	CR 184	8 X 30	X								
	5	R1-1	STOP	36 X 36	X		TWT	1	WS	P			
	6	W1-8L	CHEVRON ALIGNMENT	18 X 24	X		TWT	1	WS	P			
		W1-8R	CHEVRON ALIGNMENT	18 X 24	X								
11	1	W1-8L	CHEVRON ALIGNMENT	18 X 24	X		TWT	1	WS	P			
		W1-8R	CHEVRON ALIGNMENT	18 X 24	X								
	2	D20-1 TL	CO RD 184 ←	24 X 24	X		TWT	1	WS	P			
	3	W1-8L	CHEVRON ALIGNMENT	18 X 24	X		TWT	1	WS	P			
		W1-8R	CHEVRON ALIGNMENT	18 X 24	X								
	4	W1-8L	CHEVRON ALIGNMENT	18 X 24	X		TWT	1	WS	P			
		W1-8R	CHEVRON ALIGNMENT	18 X 24	X								
	5	W1-8L	CHEVRON ALIGNMENT	18 X 24	X		TWT	1	WS	P			
		W1-8R	CHEVRON ALIGNMENT	18 X 24	X								
	6	W1-2R	RIGHT CURVE	36 X 36	X		10BWG	1	SA	P			
		W13-1P	40 MPH	18 X 18	X								
	7	W1-4R	RIGHT CURVE TO STRAIGHT	36 X 36	X		10BWG	1	SA	P			
		W13-1P	50 MPH	18 X 18	X								
13	1	W1-4R	RIGHT CURVE TO STRAIGHT	36 X 36	X		10BWG	1	SA	P			
		W13-1P	50 MPH	18 X 18	X								
	2	M1-6F	FARM ROAD 794	24 X 24	X		TWT	1	WS	P			
		D10-7aT	488	3 X 10	X								
	3	D20-1 TR	CO RD 435 →	24 X 24	X		TWT	1	WS	P			
	4	R1-1	STOP	36 X 36	X		TWT	1	WS	P			
14	1	D20-1 TL	CO RD 435 ←	24 X 24	X		TWT	1	WS	P			
16	1	W14-1	DEAD END	36 X 36	X		10BWG	1	SA	P			
			OAK CREEK DR (Reuse sign face)	8 X 42	X								
	2	W11-10	TRUCK	36 X 36	X		TWT	1	WS	P			
17	1	D20-1 TR	CO RD 284 →	24 X 24	X		TWT	1	WS	P			
	2	D20-1 TL	CO RD 284 ←	24 X 24	X		TWT	1	WS	P			
	3	R1-1	STOP	36 X 36	X		TWT	1	WS	P			

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

SHEET 3 OF 4

FILE:	sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT	May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS		1133	02	032	FM 794
		DIST	COUNTY		SHEET NO.
		YKM	GONZALES		40

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DATE: 3/25/2021 8:38:02 AM
FILE: c:\pwworkdir\bge_pw\bwestmoreland\dms49507\SMALL SIGN SUMMARY16.dgn

SUMMARY OF SMALL SIGNS

SIGNING AND PAVEMENT MARKING LAYOUT SHEET NO.	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) TYPE N	TYPE S
	4	W1-2L	LEFT CURVE WARNING	36 X 36	X		TWT	1	WS	P			
	5	W11-10	TRUCK	36 X 36	X		TWT	1	WS	P			
18	1	D20-1 TL	CO RD 235 ←	24 X 24	X		TWT	1	WS	P			
	2	R1-1	STOP	36 X 36	X		TWT	1	WS	P			
	3	D20-1 TR	CO RD 235 →	24 X 24	X		TWT	1	WS	P			
	4	M1-6F	FARM ROAD 794	24 X 24	X		TWT	1	WS	P			
		D10-7aT	486	3 X 10	X								
19	1	W1-2R	RIGHT CURVE WARNING	36 X 36	X		TWT	1	WS	P			

ALUMINUM SIGN BLANKS THICKNESS	
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7.5 to 15	0.100"
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Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

SHEET 4 OF 4

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	032	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		41

18

DATE: 3/25/2021 8:38:03 AM
FILE: c:\pwworkdir\bge_pw\bwestmoreland\dms49507\SMALL SIGN SUMMARY16.dgn

SUMMARY OF EROSION CONTROL ITEMS

LOCATION	150	162	164	164	164	164	166	168	506	506	506	506	506	506
	BLADING	BLOCK SODDING EST	BROADCAST SEED (PERM) (RURAL) (CLAY)	DRILL SEEDING (PERM) (RURAL) (CLAY)	DRILL SEEDING (TEMP) (WARM)	DRILL SEEDING (TEMP) (COOL)	FERTILIZER	VEGETATIVE WATERING	ROCK FILTER DAMS (INSTALL) (TY 1)	ROCK FILTER DAMS (REMOVE)	TEMP SEDMT CONT FENCE (INSTALL)	TEMP SEDMT CONT FENCE (REMOVE)	BIODEG EROSN CONT LOGS (INSTL) (12")	BIODEG EROSN CONT LOGS (REMOVE)
	HR	SY	SY	SY	SY	SY	TON	MG	LF	LF	LF	LF	LF	LF
53+29.72 - 72+00	2	520		530	133	133	0.054	8.8					50	50
72+00 - 94+00	2		100	4155	1039	1039	0.215	35			1173	1173		
94+00 - 116+00	2		120	6120	1530	1530	0.316	51.5			1214	1214		
116+00 - 138+00	2			5430	1358	1358	0.28	45.7			890	890		
138+00 - 160+00	2		140	6620	1655	1655	0.342	55.7			2060	2060		
160+00 - 182+00	2		160	6890	1723	1723	0.356	58			2067	2067		
182+00 - 204+00	2		130	7335	1834	1834	0.379	61.7			2606	2606		
204+00 - 226+00	2		260	7335	1834	1834	0.379	61.7			2112	2112		
226+00 - 248+00	2			7335	1834	1834	0.379	61.7			115	115		
248+00 - 270+00	2			8155	2039	2039	0.421	68.6			2057	2057		
270+00 - 292+00	2		200	7820	1955	1955	0.404	65.8			1154	1154		
292+00 - 314+00	2		110	7335	1834	1834	0.379	61.7			1621	1621		
314+00 - 336+00	2		430	7335	1834	1834	0.379	61.7			1381	1381		
336+00 - 358+00	2			7335	1834	1834	0.379	61.7			862	862		
358+00 - 380+00	2			7335	1834	1834	0.379	61.7			2310	2310		
380+00 - 402+00	2			7335	1834	1834	0.379	61.7			1428	1428		
402+00 - 424+00	2		280	7335	1834	1834	0.379	61.7			1606	1606		
424+00 - 446+00	2			7335	1834	1834	0.379	61.7			1471	1471		
446+00 - 454+50	2		120	1470	368	368	0.076	12.4			712	712		
PROJECT TOTALS	**38**	**520**	**2050**	**120540**	**30140**	**30140**	6.3	**1018.5**	**150**	**150**	**26839**	**26839**	**50**	**50**

NOTES:

ITEM 164 - BROADCAST SEED TO BE PLACED AT CENTERLINE CULVERT LOCATIONS AFTER COMPLETION OF PROPOSED WORK.

ITEM 166 - FERTILIZER 500 LBS/ACRE FOR CONTRACTOR'S INFORMATION ONLY.

ITEM 168 - VEGETATIVE WATERING 13.58 MG/ACRE x 3 MONTHS.

Texas Department of Transportation

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

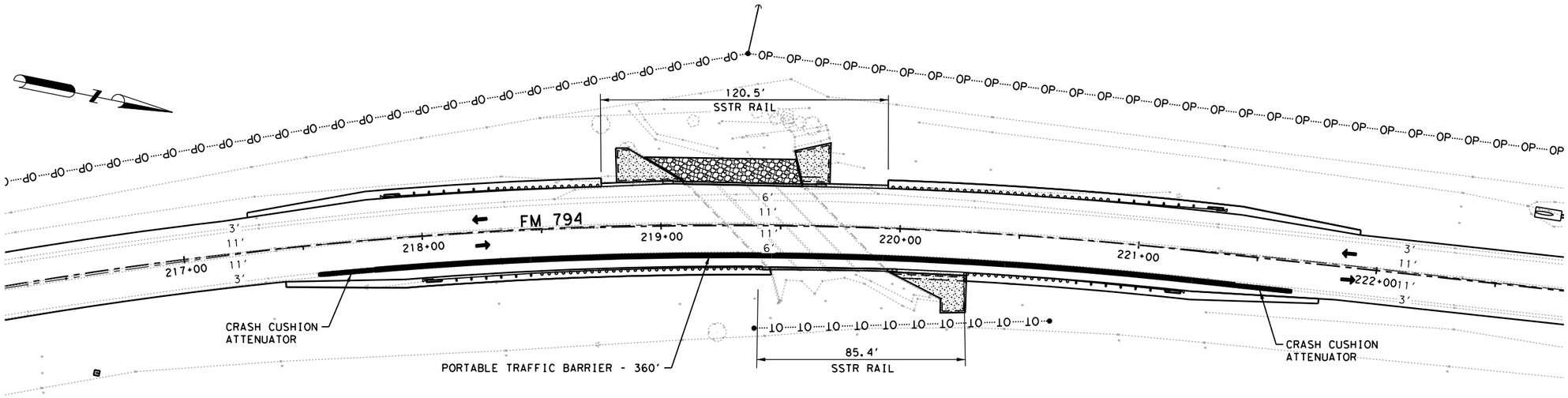
FM 794

EROSION CONTROL SUMMARY

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
6		42

STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794



PORTABLE TRAFFIC BARRIER LAYOUT

DRY FORK SMITH CREEK

NOTES:

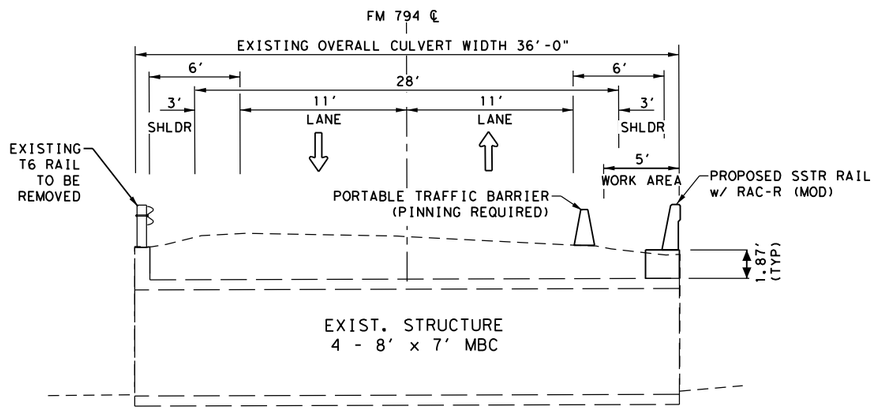
REFER TO SLED - 19 OR ABSORB(M)-19 STANDARD FOR ADDITIONAL DETAILS ON THE CRASH CUSHION ATTENUATOR.

ALL MATERIALS & WORK REQUIRED TO INSTALL CRASH CUSHION ATTENUATOR WILL NOT BE PAID FOR DIRECTLY, BUT WILL BE CONSIDERED SUBSIDIARY TO ITEM 545 "CRASH CUSHION ATTENUATOR".

REFER TO STANDARDS, FOR ADDITIONAL DETAILS ON THE PORTABLE TRAFFIC BARRIER.

REFER TO STANDARD TCP (2-2) FOR TRAFFIC CONTROL SET-UP, TAPER LENGTHS AND SPACING FOR SIGNS.

THE CRASH CUSHION ATTENUATOR WILL BE PLACED ON A FLAT SURFACE. ANY NECESSARY GRADING WILL BE CONSIDERED SUBSIDIARY TO ITEM 545-CRASH CUSHION ATTENUATOR.

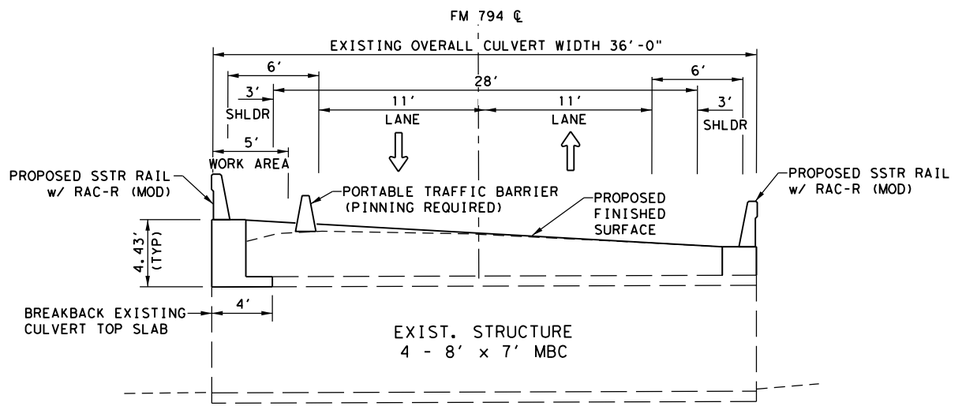


DRY FORK SMITH CREEK
TYPICAL STRUCTURE SECTION
PHASE 1

NOTE: STRUCTURE WILL BE WORKED ON ONE SIDE AT A TIME THROUGH COMPLETION BEFORE CONSTRUCTION WORK IS BEGUN ON THE OPPOSITE SIDE UNLESS OTHERWISE DIRECTED.

LAYOUT REPRESENTS ONE SIDE ONLY.

REFER TO TCP (2-2) ONE LANE CLOSURE FOR INSTALLING PORTABLE TRAFFIC BARRIER, ETC.



DRY FORK SMITH CREEK
TYPICAL STRUCTURE SECTION
PHASE 2

NOTE: STRUCTURE WILL BE WORKED ON ONE SIDE AT A TIME THROUGH COMPLETION BEFORE CONSTRUCTION WORK IS BEGUN ON THE OPPOSITE SIDE UNLESS OTHERWISE DIRECTED.

LAYOUT REPRESENTS ONE SIDE ONLY.

REFER TO TCP (2-2) ONE LANE CLOSURE FOR INSTALLING PORTABLE TRAFFIC BARRIER, ETC.

STATE OF TEXAS
JOHN W. TULEY
102441
LICENSED
PROFESSIONAL ENGINEER

3/25/2021

Texas Department of Transportation

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TBPE Registration No. F-1046

FM 794

PORTABLE TRAFFIC BARRIER LAYOUT

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			43
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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LOC NO.	TCP PHASE	PLAN SHEET NUMBER	LOCATION	STATION	TEST LEVEL	DIRECTION OF TRAFFIC (UNI/BI)	FOUNDATION PAD		BACKUP SUPPORT			AVAILABLE SITE LENGTH	CRASH CUSHION									
							PROPOSED MATERIAL	PROPOSED THICKNESS	DESCRIPTION	WIDTH	HEIGHT				MOVE / RESET		L	L	R	R	S	S
													INSTALL	REMOVE	MOVE/ RESET	FROM LOC.#	N	W	N	W	N	W
1	PHASE 1	35	DRY FORK SMITH CREEK	217+79 - 221+39 RT SIDE	TL-3	BI	EXISTING ROADWAY		PORTABLE TRAFFIC BARRIER	24"	32"	1000' MIN.	SEE TCP SUMMARY PLAN SHEET								X	
2	PHASE 2	35	DRY FORK SMITH CREEK	217+78 - 221+38 LT SIDE	TL-3	BI	EXISTING ROADWAY		PORTABLE TRAFFIC BARRIER	24"	32"	1000' MIN.	SEE TCP SUMMARY PLAN SHEET								X	
												TOTALS	SEE TCP SUMMARY PLAN SHEET									

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

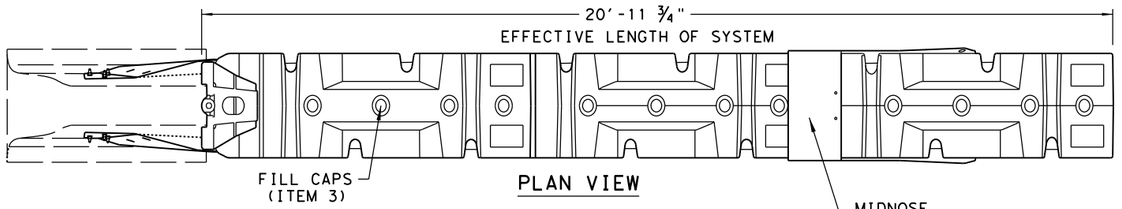
FOR DEFINITIONS SEE THE "CRASH CUSHION CATEGORIZATION CHART.PDF" AT THE DESIGN DIVISION (ROADWAY STANDARDS) WEBSITE. USE QUICK LINKS TO ACCESS ATTENUATORS / CRASH CUSHIONS SECTION.
http://www.dot.state.tx.us/insdtdot/orgchart/cmd/cserve/standard/rdwylse.htm

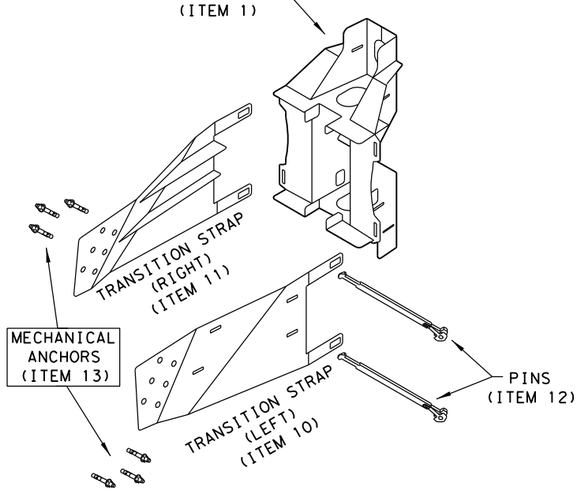
CRASH CUSHION SUMMARY SHEET

FILE: ccss.dgn	DN: TxDOT	CK:	CK:
© TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	032	FM 794
	DIST	COUNTY	
	YKM	GONZALES	
	FEDERAL AID PROJECT		SHEET NO.
			44

DATE: 3/25/2021
FILE: c:\pwworkdir\bge_pw\bwestmoreland\dms49513\absorbm19.dgn

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.

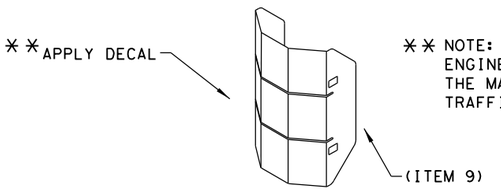
GENERAL NOTES

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



NOSE PLATE

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

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

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

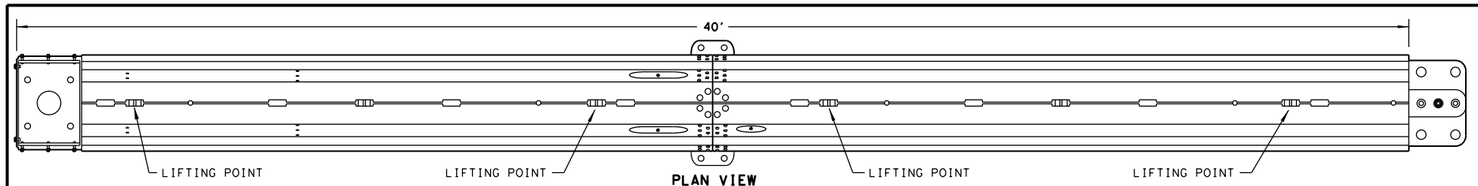
SACRIFICIAL

Texas Department of Transportation — Design Division Standard

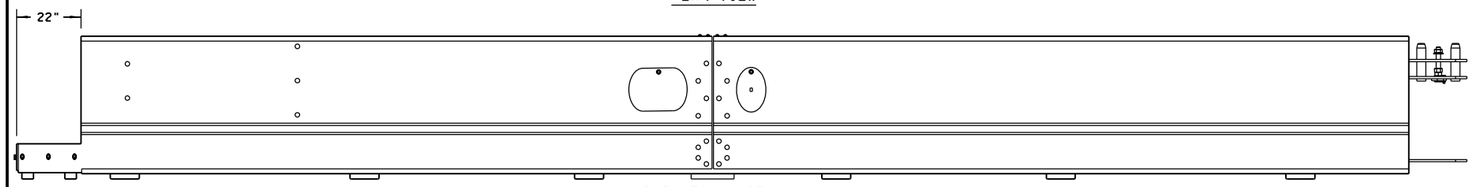
LINDSAY TRANSPORTATION SOLUTIONS
CRASH CUSHION
(MASH TL-3 & TL-2)
TEMPORARY - WORK ZONE
ABSORB(M)-19

FILE: absorbm19	DN: TxDOT	CK: KM	DW: VP	CK:
REVISIONS	CONT	SECT	JOB	HIGHWAY
	1133	02	032	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		45

DATE: 3/25/2021 8:38:52 AM
FILE: c:\pwworkdir\bge_pw\bwestmoreland\dms49513\barrierguard19.dgn

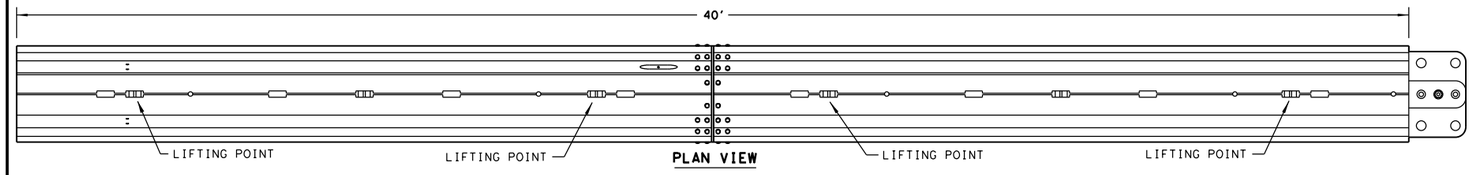


PLAN VIEW

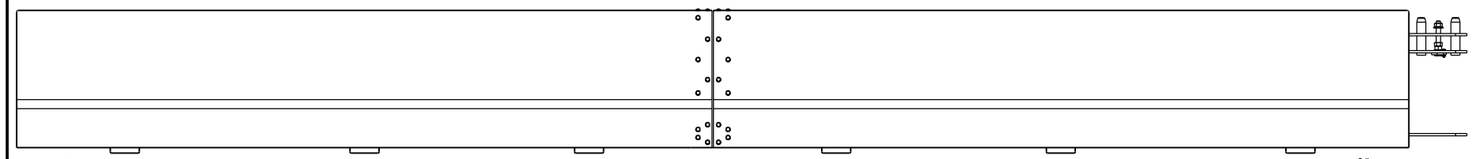


ELEVATION VIEW

BARRIERGUARD END SECTION - 40 FT. MALE OR FEMALE END SECTION

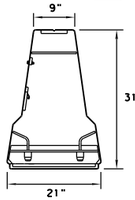


PLAN VIEW

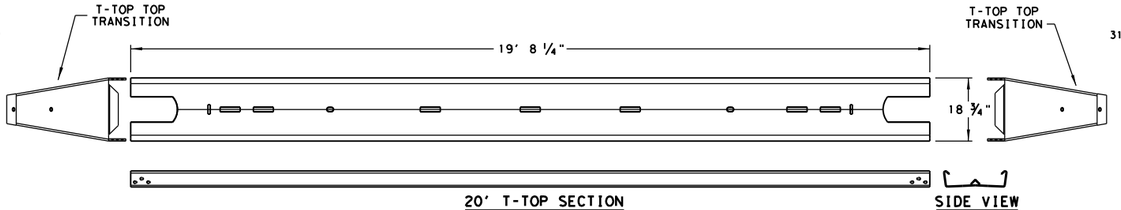


ELEVATION VIEW

BARRIERGUARD STANDARD SECTION - 40 FT.

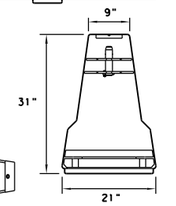


FEMALE END CROSS SECTION

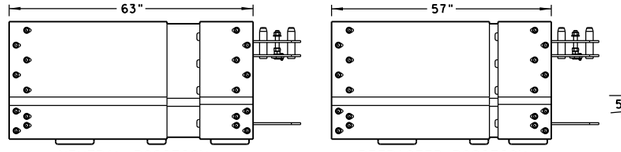


20' T-TOP SECTION

SIDE VIEW



MALE END CROSS SECTION



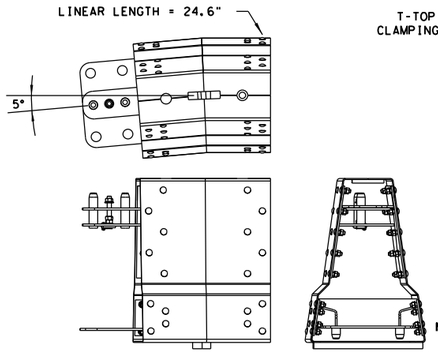
NEUTRAL POSITION

RETRACTED POSITION

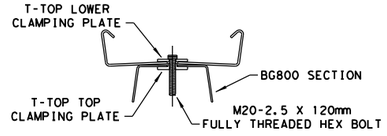
EXTENDED POSITION

SIDE VIEW

VARIABLE LENGTH BARRIER

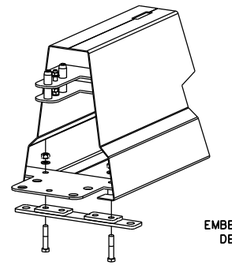


5° (LH) LEFT HAND ANGLE SECTION

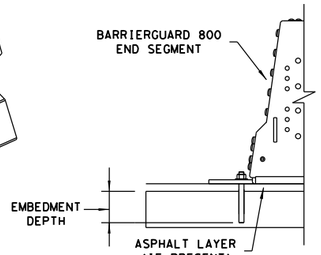


T-TOP MOUNTING DETAIL

NOTE: ADDITIONAL ANGLE SECTION AVAILABLE
5° (RH) RIGHT HAND ANGLE SECTION
10° (LH) LEFT HAND ANGLE SECTION
10° (RH) RIGHT HAND ANGLE SECTION



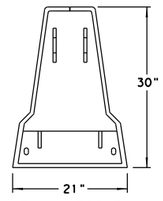
INTERMEDIATE ANCHOR AT QUICKLINK



SEE ANCHORING TABLE

GENERAL NOTES

1. THE SYSTEM SHOWN ON THIS DRAWING IS A PROPRIETARY BARRIER TRADED AS BARRIERGUARD 800 AND BARRIERGUARD 800 MDS AND HAS BEEN DESIGNED AND MANUFACTURED BY LAURA METAAL ROAD SAFETY INC. FOR TECHNICAL ASSISTANCE AND APPLICATION SUPPORT CONTACT LEE STUART AT LAURA METAAL ROAD SAFETY INC. AT (702) 664-2009 OR lstuart.laurametaal@outlook.com
2. THE BARRIERGUARD 800 SYSTEM HAS BEEN CRASH TESTED TO MASH AND HAS FHWA APPROVAL AS A TL-3 BARRIER. THE DEFLECTION TABLE OUTLINES BASIC SYSTEM PERFORMANCE AND COMPONENT ANCHORING REQUIREMENTS.
3. THIS DRAWING PACKAGE PROVIDES THE RELEVANT INFORMATION AND GENERAL GRAPHICS REQUIRED TO IDENTIFY THE COMPONENT PARTS OF BARRIERGUARD 800 AND THEIR INCORPORATION AS A WHOLE SYSTEM FOR DEPARTMENTAL STANDARD APPLICATIONS.
4. BARRIERGUARD 800 REQUIRES ANCHORING (PINNING) AT EACH END OF THE INSTALLED LENGTH. (INTERMEDIATE ANCHORS CAN BE USED TO REDUCE DEFLECTION).
5. INSTALLATION OF BARRIERGUARD 800 OR BARRIERGUARD 800 MDS, NORMALLY STARTS WITH A MALE TERMINAL SECTION AND IS FINISHED WITH A FEMALE TERMINAL SECTION. STANDARD SECTIONS ARE USED BETWEEN THE TERMINAL SECTIONS TO OBTAIN THE REQUIRED LENGTH OF POSITIVE BARRIER PROTECTION.
6. THE FULL HEIGHT TERMINAL (FHT) SECTIONS MAY BE CAPPED WITH A FHT COVER, HOWEVER IF EXPOSED TO ON-COMING TRAFFIC THE END SHOULD BE PROTECTED WITH A SUITABLE CRASH CUSHION. THE BARRIERGUARD 800 RANGE IS COMPATIBLE WITH MOST COMMONLY USED CRASH CUSHION END TREATMENTS. FOR DETAILS OF BARRIERGUARD 800 CRASH CUSHION CONNECTIONS THAT ARE NOT DETAILED WITHIN THESE DRAWINGS, PLEASE CONTACT LAURA METAAL ROAD SAFETY INC. FOR MORE DETAILS. THE FULL HEIGHT TERMINAL COVER IS SUITABLE FOR THE "DOWN STREAM" END OF A SYSTEM THAT DOES NOT HAVE EXPOSURE TO ON-COMING TRAFFIC.
7. WHEN INSTALLING THE MINIMUM DEFLECTION SYSTEM (MDS),THE SYSTEM CAN BE INSTALLED WITH ADDITIONAL INTERMEDIATE ANCHORS ALONG THE LENGTH OF THE BARRIER RUN AT INTERVALS SHOWN IN THE DEFLECTION TABLE. EACH BARRIER RUN CAN BE MADE UP OF ANY MIXTURE OF THE SYSTEMS BY THE INTRODUCTION OF INTERMEDIATE ANCHORS AND/OR T-TOP AS REQUIRED.
8. THERE ARE SEVERAL METHODS OF ACHIEVING RADIUS IN A LENGTH OF BARRIERGUARD 800. RADIUS CAN BE ACHIEVED USING VARIOUS METHODS AND THUS ALLOWING THE BARRIERGUARD TO FOLLOW THE DESIRED CURVATURE IN THE INSTALLATION, THESE METHODS ARE, THE MOVEMENT IN THE QUICKLINK, ADJUSTABLE 20FT. SECTIONS OR SHORT ANGLED SECTIONS WHICH ALLOW A RADIUS AS LOW AS 12FT. FOR FURTHER INFORMATION AND ADVICE CONTACT LAURA METAAL ROAD SAFETY INC.
9. A BARRIERGUARD 800 VARIABLE LENGTH BARRIER (VLB) SECTION SHOULD BE USED WHEN BARRIERGUARD 800 OR BARRIERGUARD 800 MDS IS ANCHORED ACROSS A BRIDGE EXPANSION JOINT. IF T-TOP IS TO BE USED IN CONJUNCTION WITH THE VLB, THE T-TOP SHOULD BE USED FOR MINIMUM 40FT ON EITHER SIDE OF THE VLB AND TERMINATED WITH TRANSITIONS. THE VLB SECTION PROVIDES APPROXIMATELY 7in OF EXTENSION AND 7in OF CONTRACTION. MULTIPLE VLB'S CAN BE LINKED TOGETHER TO PROVIDE MORE EXPANSION OR CONTRACTION. THE VLB'S SHOULD BE PLACED IN THE VICINITY OF THE EXPANSION JOINT. THE VLB DOES NOT NEED TO BE PLACED DIRECTLY OVER THE EXPANSION JOINT BUT MUST BE BETWEEN THE NEAREST ANCHORS ON EACH SIDE OF THE JOINT. IT IS RECOMMENDED THAT THE VLB IS PLACED WITHIN 40FT OF THE JOINT.
10. THE T-TOP CAN BE INSTALLED EITHER BEFORE OR AFTER THE BARRIERGUARD 800 HAS BEEN FULLY ASSEMBLED AND ANCHORED IN PLACE. T-TOP IS REQUIRED WHEN THE BARRIERGUARD 800 IS USED AS A MDS, ANCHORED EVERY 20FT, GATE SECTIONS AND VARIABLE LENGTH BARRIERS. THE T-TOP SHOULD EXTEND 40FT ON EITHER SIDE OF THESE CONDITIONS AND BE TERMINATED WITH TRANSITIONS.
11. THE BARRIERGUARD 800 RANGE HAS BEEN DESIGNED TO BE USED ON AND HAS BEEN TESTED ANCHORED ON ASPHALT, CONCRETE AND COMPACTED SUBBASE. CONTACT LAURA METAAL ROAD SAFETY INC. FOR FURTHER INFORMATION.
12. BARRIERGUARD 800 COMPONENTS ARE MANUFACTURED IN SI (METRIC) UNITS. ENGLISH UNITS SHOWN ARE APPROXIMATE. ALL COMPONENTS ARE FULLY GALVANIZED.
13. BARRIERGUARD 800 SYSTEMS SHALL BE ASSEMBLED AND INSTALLED IN ACCORDANCE WITH THE MANUFACTURERS DETAILED DRAWINGS, PROCEDURES AND SPECIFICATIONS. FOR ANY INSTALATIONS OUTSIDE OF THE SCOPE OF THESE DRAWINGS PLEASE CONTACT LAURA METAAL ROAD SAFETY INC. FOR DETAILS.



FULL HEIGHT TERMINAL COVER

BARRIERGUARD 800 DEFLECTION TABLE

	STANDARD SYSTEM	MINIMUM DEFLECTION SYSTEMS (MDS)
DESCRIPTION	ONLY ANCHORED AT THE EXTREME ENDS OF THE BARRIER LENGTH	ANCHORED EVERY 20 FT.
DEFLECTION AT MASH TL-3	5'-6"	18 1/2"
T-TOP REQUIREMENTS	NONE REQUIRED	REQUIRED FOR MDS SECTIONS

STANDARD ANCHORING REQUIREMENTS (TABLE)

	RESIN STUD ANCHORS			DRIVEN ANCHORS		Hilti HSL-3 SHALLOW MECHANICAL
	CONCRETE *	UNREINFORCED CONCRETE *	ASPHALT	ASPHALT	SUBBASE/SOIL	CONCRETE
ANCHOR DIAMETER	1 in.	1 in.	1 in.	1-3/16 in.	5-1/2 in.	**
EMBEDMENT DEPTH	6 in.	8 in.	16 in.	16 in.	32 in.	**
DRILL DIAMETER	1-1/8 in.	1-1/8 in.	1-1/8 in.	1-3/16 in.	DRIVEN	**
PULL OUT CAPACITY (MIN)	17500 lb	17500 lb	N/A	N/A	N/A	**
SHEAR CAPACITY (MIN)	25000 lb	25000 lb	N/A	N/A	N/A	**

* ALTERNATIVE ANCHORS INCLUDING MECHANICAL ANCHORS FOR CONCRETE MAYBE USED IF THEY MEET THE STRENGTH REQUIREMENTS LISTED, DETAILS WILL BE MANUFACTURER SPECIFIC.

** CONTACT: LAURA METAAL ROAD SAFETY INC. FOR SPECIFIC APPLICATION.

Texas Department of Transportation

Design Division Standard

BARRIERGUARD 800 SYSTEM
STEEL BARRIER
MASH TL-3
BARRIERGUARD-19

FILE: barrierguard19.dgn	DN: TxDOT	CK: KM	DW: VP	CK:
© TxDOT: JULY 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	032	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		46

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. As shown on BC(2), the OBEY WARNING SIGNS STATE LAW sign, STAY ALERT TALK OR TEXT LATER (see Sign Detail G20-10T) and the WORK ZONE TRAFFIC FINES DOUBLE sign with plaque shall be erected in advance of the CSJ limits. However, the TRAFFIC FINES DOUBLE sign will not be required on projects consisting solely of mobile operation work, such as striping or milling edgeline rumble strips. The BEGIN ROAD WORK NEXT X MILES, CONTRACTOR and END ROAD WORK signs shall be erected at or near the CSJ limits.

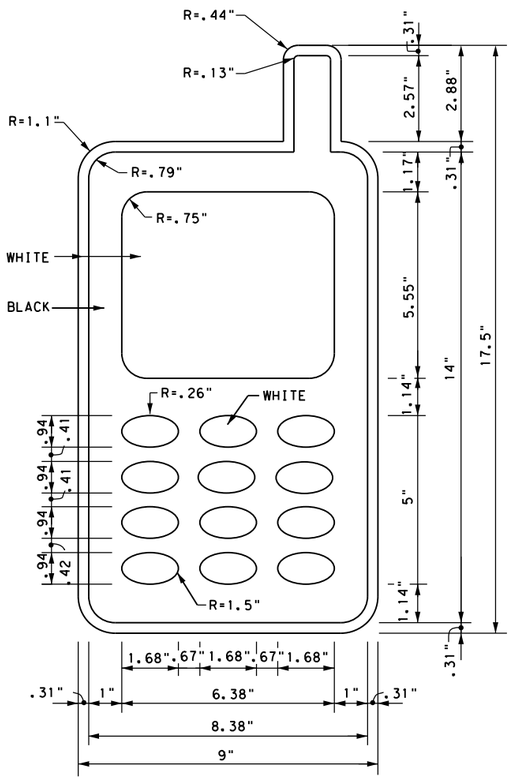
11. Except for devices required by Note 10, traffic control devices should be in place only while work is actually in progress or a definite need exists.

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

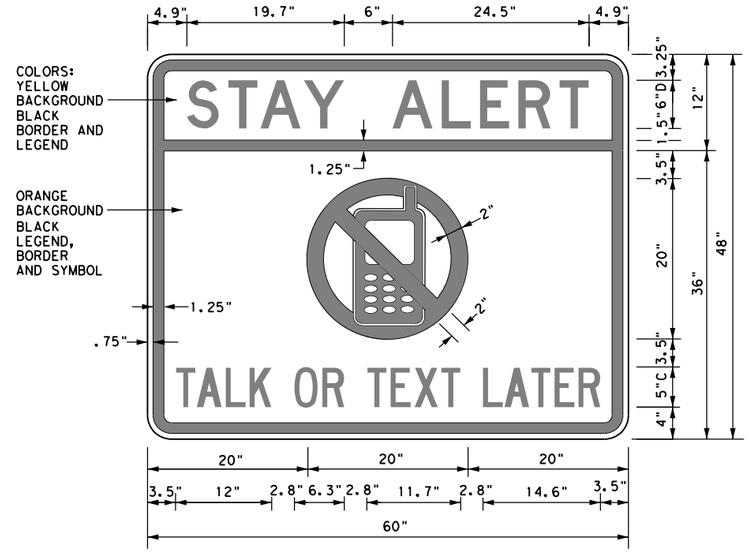
13. Inactive equipment and work vehicles, including workers' private vehicles must be parked away from travel lanes. They should be as close to the right-of-way line as possible, or located behind a barrier or guardrail, or as approved by the Engineer.

WORKER SAFETY APPAREL 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.



SIGN DETAIL (G20-10T)



3.0" Radius, 1.25" Border, 0.75" Indent, Black on Yellow;
[STAY ALERT] Font: D
3.0" Radius, 1.25" Border, 0.75" Indent, Black on Orange;
[TALK OR TEXT LATER] Font: C specified length;

Only pre-qualified products shall be used. The "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources and may be found on-line at the web address given below or by contacting:

Texas Department of Transportation
Traffic Operations Division - TE
Phone (512) 416-3118

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

Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	1133	02	032	FM 794
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9-07 7-13	YKM	GONZALES		47

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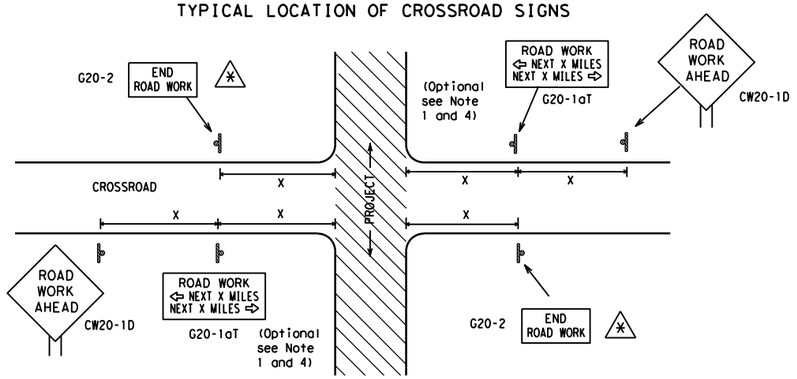
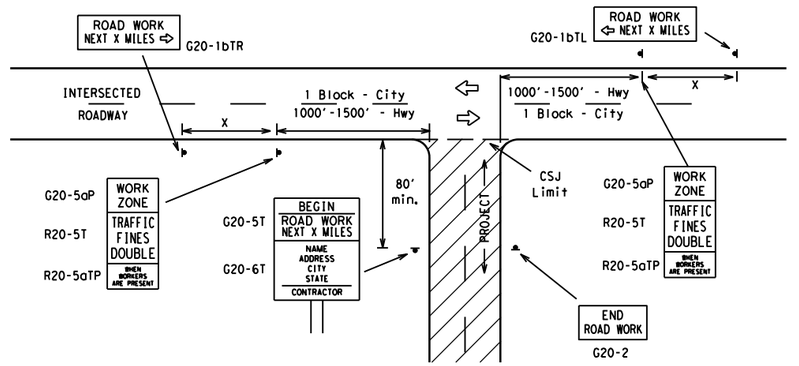
TYPICAL LOCATION OF CROSSROAD SIGNS



✱ 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. 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]

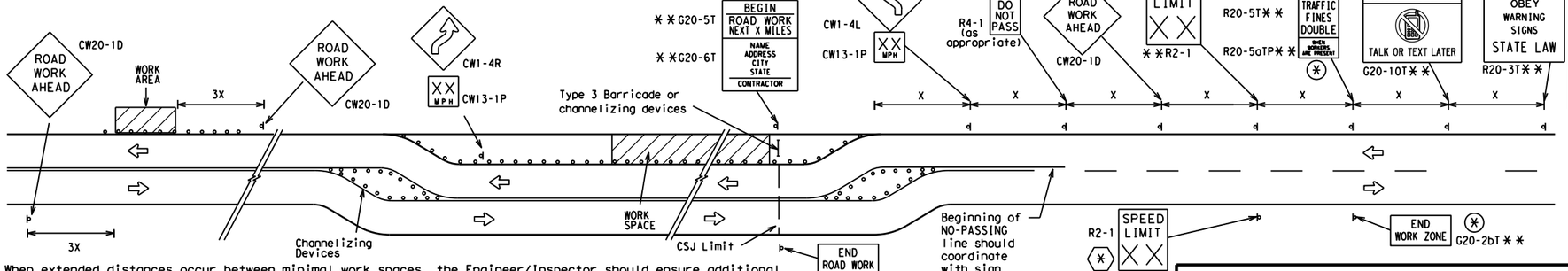
✱ For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

△ 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. See Note 2 under "Typical Location of Crossroad Signs".
5. Only diamond shaped warning sign sizes are indicated.
6. See sign size listing in "TMUTCD", Sign Appendix or the "Standard Highway Sign Designs for Texas" manual for complete list of available sign design sizes.

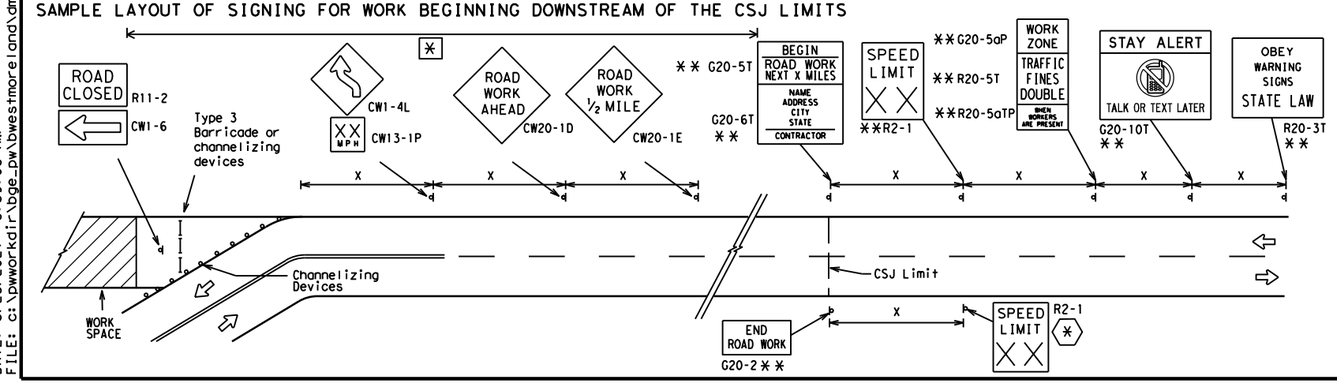
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



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

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS

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



NOTES

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

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

✱✱ Required CSJ Limit signing. See Note 10 on BC(1). TRAFFIC FINES DOUBLE signs will not be required on projects consisting solely of mobile operations work.

[✱] 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 Operations Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-14

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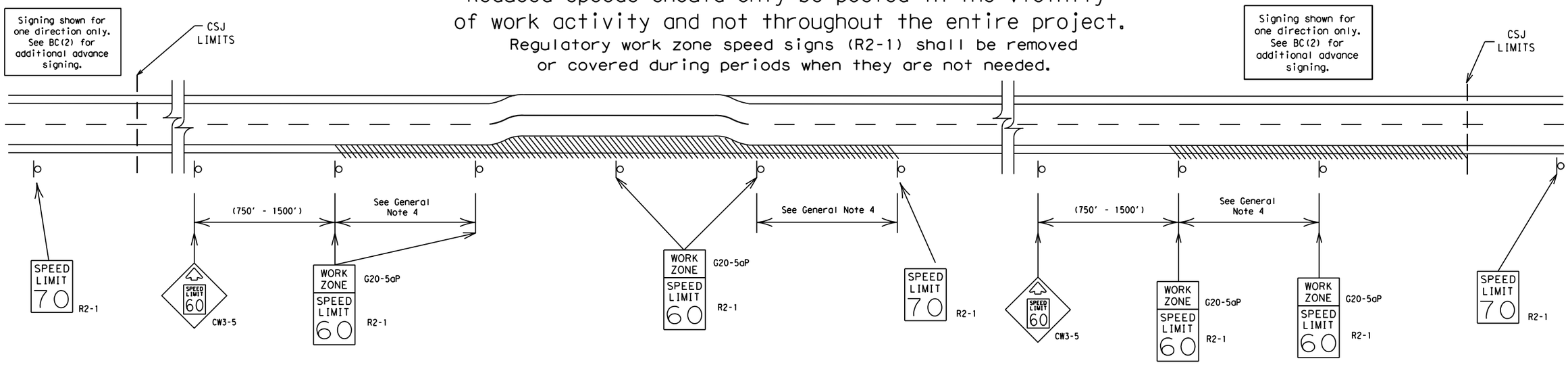
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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

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



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

SHORT TERM WORK ZONE SPEED LIMITS

This type of work zone speed limit may be included on the design of the traffic control plans when workers or equipment are not behind concrete barrier, when work activity is within 10 feet of the traveled way or actually in the travelled 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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BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-14

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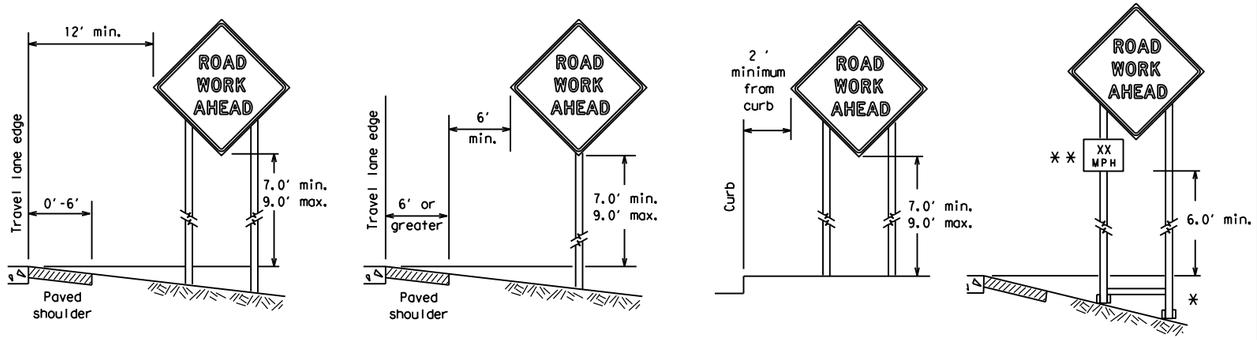
	YKM	GONZALES		49

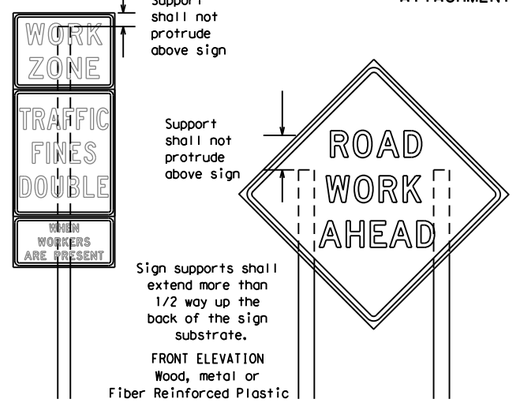
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

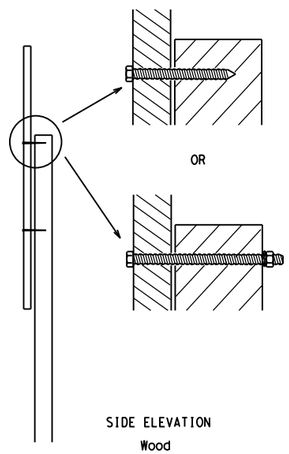


* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

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

ATTACHMENT FOR SIGN SUPPORTS





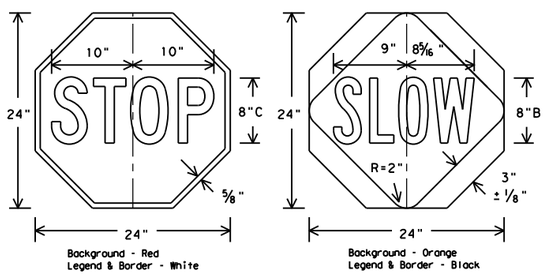
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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

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

STOP/SLOW PADDLES

1. STOP/SLOW paddles are the primary method to control traffic by flaggers. The STOP/SLOW paddle size should be 24" x 24" as detailed below.
2. When used at night, the STOP/SLOW paddle shall be retroreflectorized.
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.



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, 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.
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 sheets or the CWZTCD. The signs shall meet the required mounting heights shown on the BC Sheets or the SMD Standards 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). 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 Operations Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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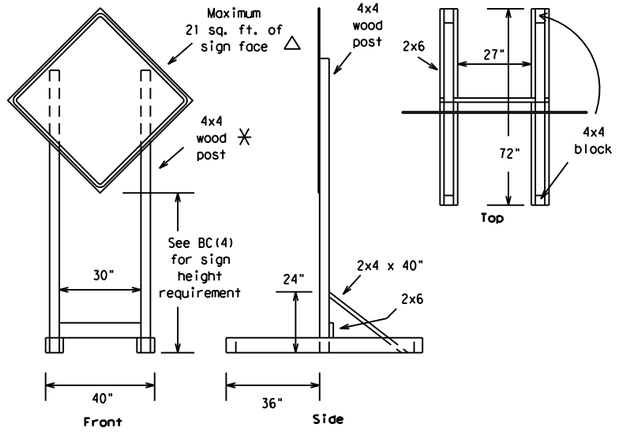
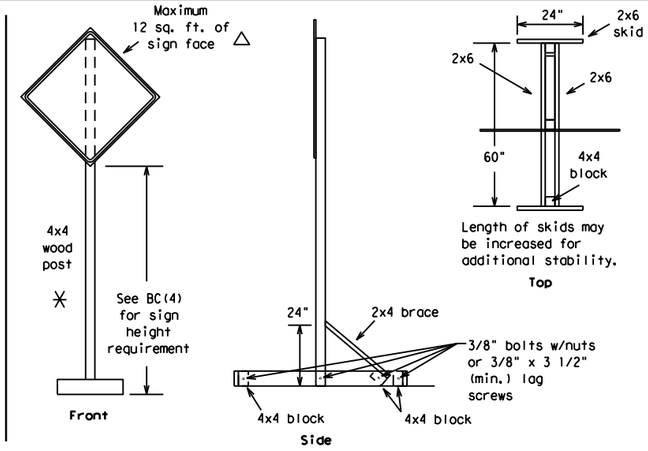
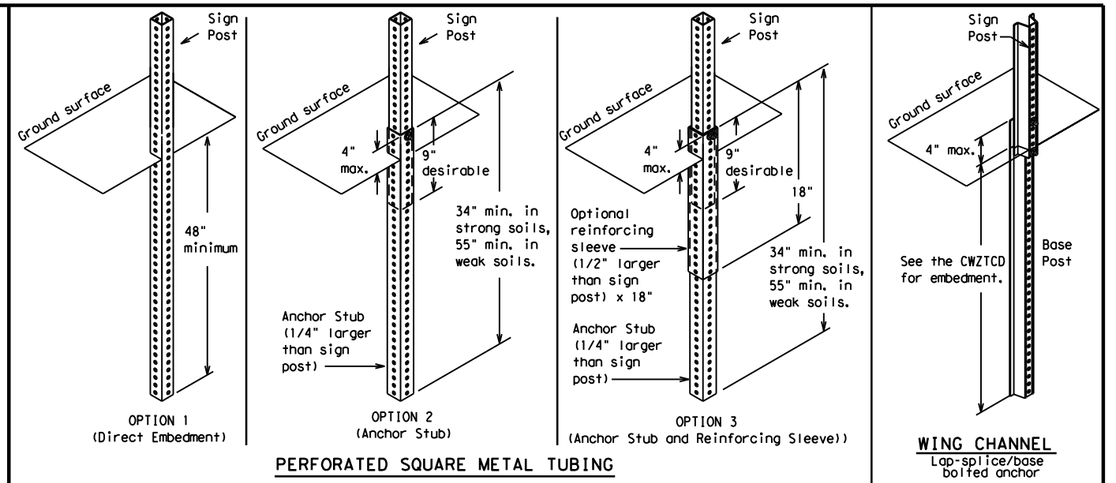




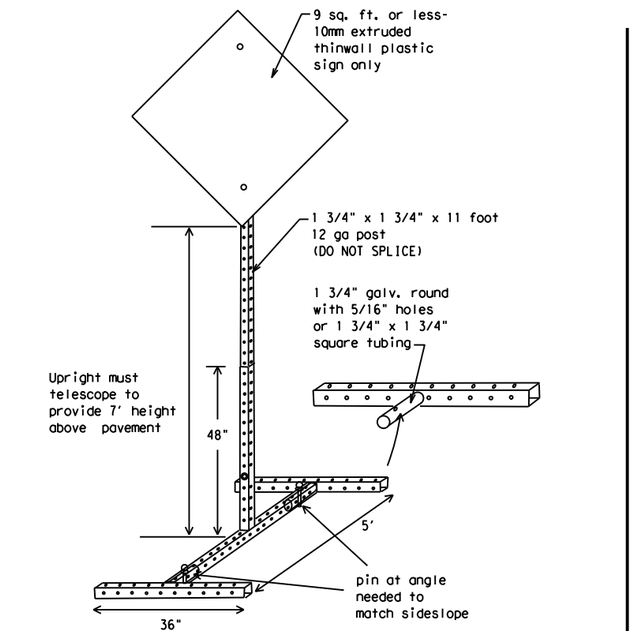
SKID MOUNTED WOOD SIGN SUPPORTS

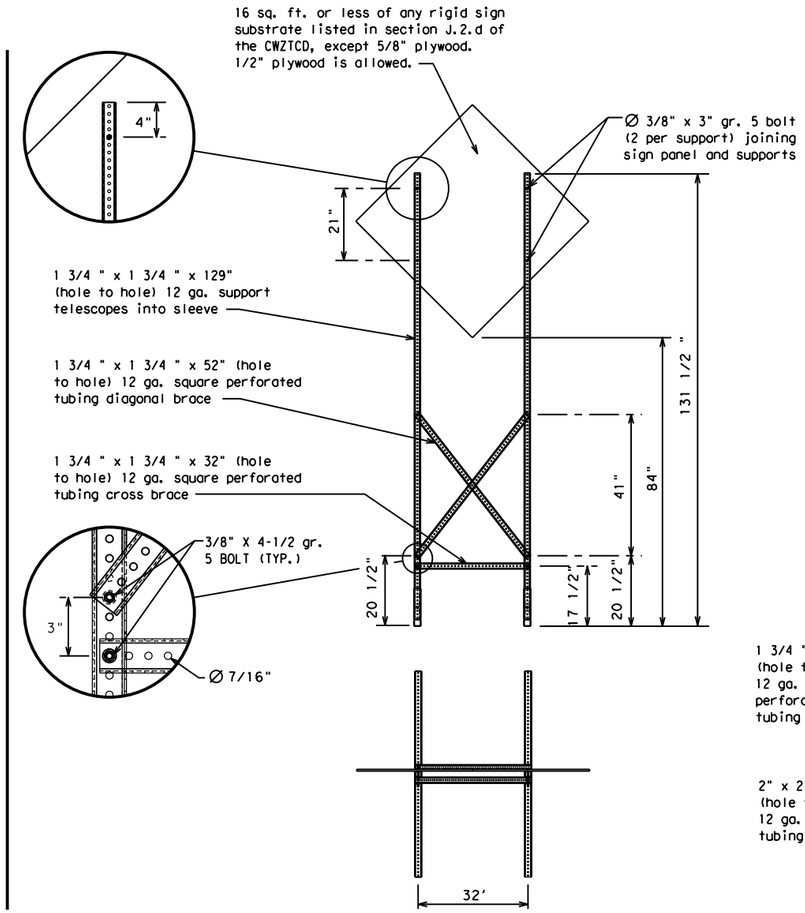
LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS □

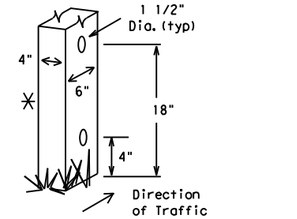


GROUND MOUNTED SIGN SUPPORTS

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

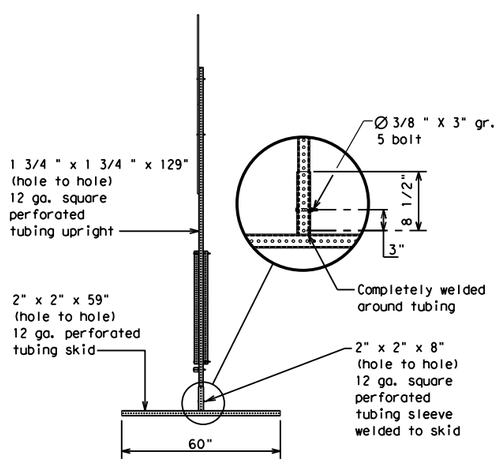






Nominal Post Size	Number of Posts	Maximum Sq. feet of Sign Face	Minimum Soil Embedment	Drilled Hole(s) Required
4 x 4	1	12	36"	NO
4 x 4	2	21	36"	NO
4 x 6	1	21	36"	YES
4 x 6	2	36	36"	YES

WOOD POST SYSTEM FOR GROUND MOUNTED SIGN SUPPORTS



SKID MOUNTED PERFORATED SQUARE STEEL TUBING 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 Operations Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	1133	02	032	FM 794
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13	YKM	GONZALES		51

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

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

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

Other Condition List

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

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

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

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

Location List

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

Warning List

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

** Advance Notice List

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

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

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

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

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

FULL MATRIX PCMS SIGNS

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

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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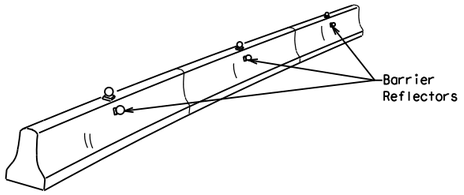
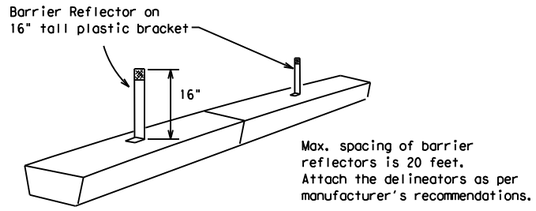
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost of the reflectors shall be considered subsidiary to Item 512.

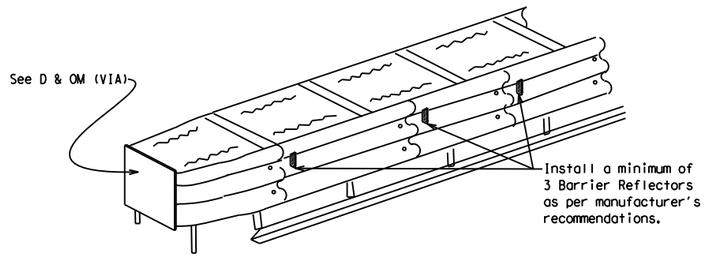


CONCRETE TRAFFIC BARRIER (CTB)

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.



LOW PROFILE CONCRETE BARRIER (LPCB)

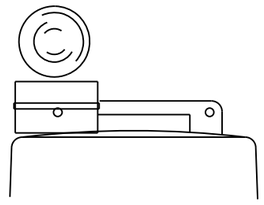


DELINEATION OF END TREATMENTS

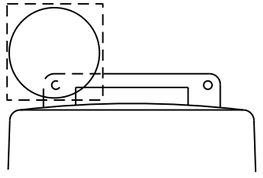
END TREATMENTS FOR CTB'S USED IN WORK ZONES

End treatments used on CTB's in work zones shall meet crashworthy standards as defined in the National Cooperative Highway Research Report 350. Refer to the CWZTCD List for approved end treatments and manufacturers.

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



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



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

WARNING LIGHTS

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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

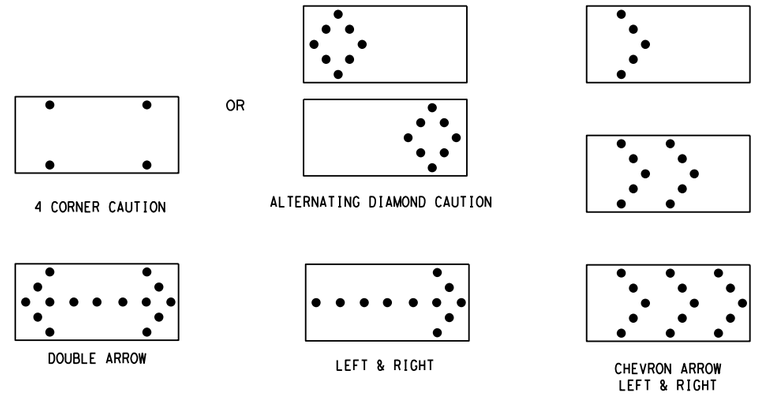
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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

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

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

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

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



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

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

ATTENTION

Flashing Arrow Boards shall be equipped with automatic dimming devices.

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

1. Truck-mounted attenuators (TMA) used on TxDOT facilities must meet the requirements outlined in the National Cooperative Highway Research Report No. 350 (NCHRP 350) or 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 Operations Division Standard

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

BC(7)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	032	FM 794
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13	YKM	GONZALES		53

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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:

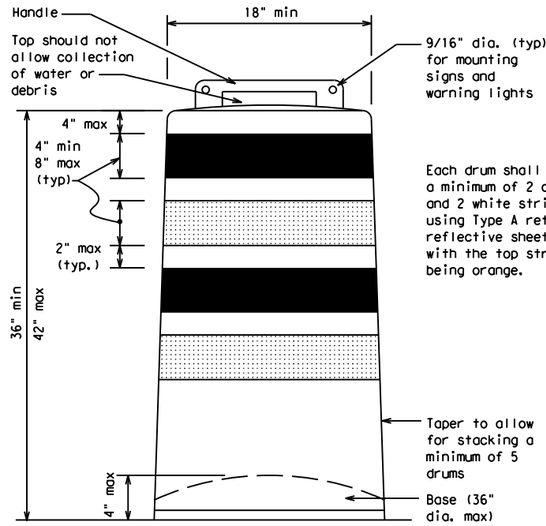
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

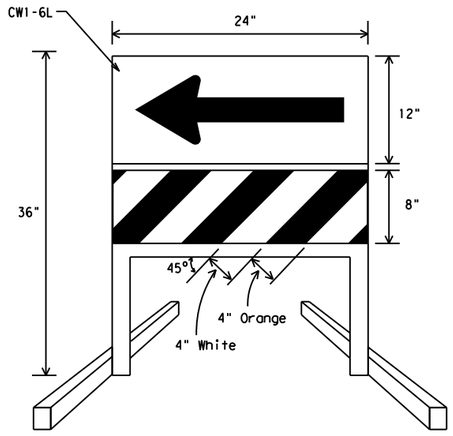
RETROREFLECTIVE SHEETING

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 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

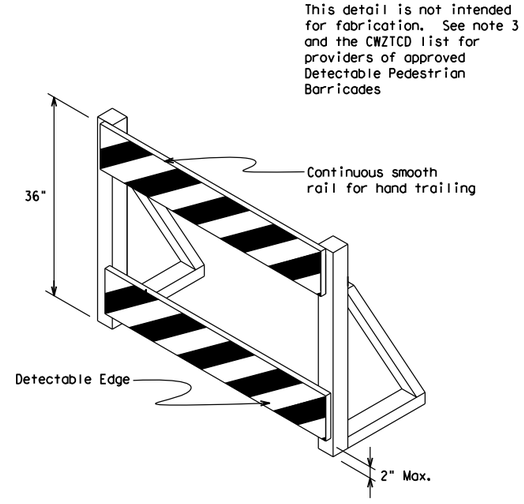
1. Unballasted bases shall be large enough to hold up to 50 lbs. of sand. This base, when filled with the ballast material, should weigh between 35 lbs (minimum) and 50 lbs (maximum). The ballast may be sand in one to three sandbags separate from the base, sand in a sand-filled plastic base, or other 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.





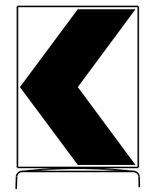
DIRECTION INDICATOR BARRICADE

1. The Direction Indicator Barricade may be used in tapers, transitions, and other areas where specific directional guidance to drivers is necessary.
2. If used, the Direction Indicator Barricade should be used in series to direct the driver through the transition and into the intended travel lane.
3. The Direction Indicator Barricade shall consist of One-Direction Large Arrow (CW1-6) sign in the size shown with a black arrow on a background of Type B_{FL} or Type C_{FL} Orange retroreflective sheeting above a rail with Type A retroreflective sheeting in alternating 4" white and orange stripes sloping downward at an angle of 45 degrees in the direction road users are to pass. Sheeting types shall be as per DMS 8300.
4. Double arrows on the Direction Indicator Barricade will not be allowed.
5. Approved manufacturers are shown on the CWZTCD List. Ballast shall be as approved by the manufacturers instructions.

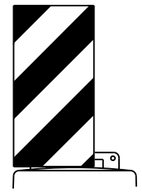


DETECTABLE PEDESTRIAN BARRICADES

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.
2. Where pedestrians with visual disabilities normally use the closed sidewalk, a device that is detectable by a person with a visual disability traveling with the aid of a long cane shall be placed across the full width of the closed sidewalk.
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 for Buildings and Facilities (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 may 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 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.

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Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-14

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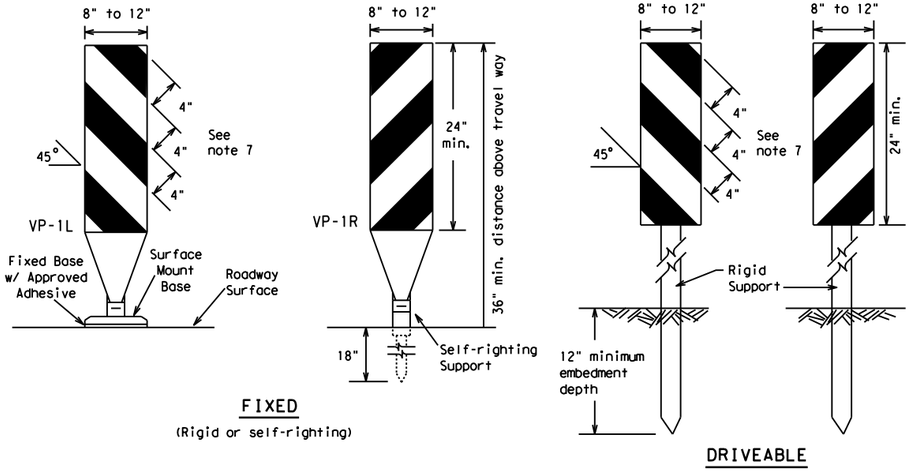
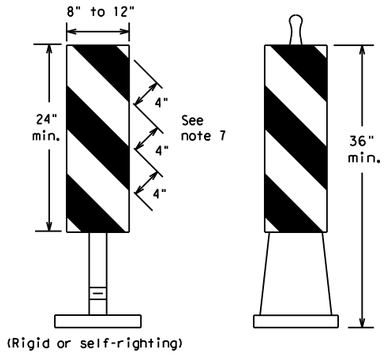


FIXED
(Rigid or self-righting)

DRIVEABLE

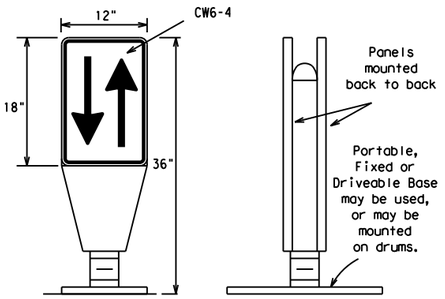


(Rigid or self-righting)

PORTABLE

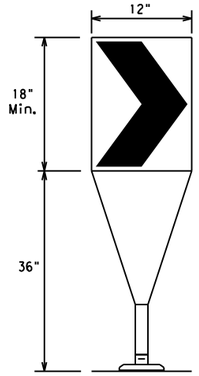
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is required. The Engineer/Inspector shall refer to the Roadway Design Manual Appendix B "Treatment of Pavement Drop-offs in Work Zones" for additional guidelines on the use of 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 conforming to Departmental Material Specification DMS-8300, unless noted otherwise.
7. Where the height of reflective material on the vertical panel is 36 inches or greater, a panel stripe of 6 inches shall be used.

VERTICAL PANELS (VPs)



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

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



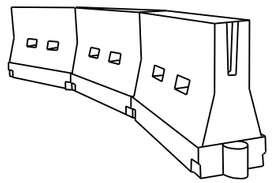
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

CHEVRONS

GENERAL NOTES

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



LONGITUDINAL CHANNELIZING DEVICES (LCD)

1. LCDs are crashworthy, lightweight, deformable devices that are highly visible, have good target value and can be connected together. They are not designed to contain or redirect a vehicle on impact.
2. LCDs may be used instead of a line of cones or drums.
3. LCDs shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
4. LCDs should not be used to provide positive protection for obstacles, pedestrians or workers.
5. LCDs shall be supplemented with retroreflective delineation as required for temporary barriers on BC(7) when placed roughly parallel to the travel lanes.
6. LCDs used as barricades placed perpendicular to traffic should have at least one row of reflective sheeting meeting the requirements for barricade rails as shown on BC(10) placed 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 NCHRP 350 crashworthiness requirements based on roadway speed and barrier application.
2. Water ballasted systems used to channelize vehicular traffic shall be supplemented with retroreflective delineation or channelizing devices to improve daytime/nighttime visibility. They may also be supplemented with pavement markings.
3. Water ballasted systems used as barriers shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
4. Water ballasted systems used as barriers should not be used for a merging taper except in low speed (less than 45 MPH) urban areas. When used on a taper in a low speed urban area, the taper shall be delineated and the taper length should be designed to optimize road user operations considering the available geometric conditions.
5. When water ballasted systems used as barriers have blunt ends exposed to traffic, they should be attenuated as per manufacturer recommendations or flared to a point outside the clear zone.

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

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

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

SHEET 9 OF 12

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BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-14

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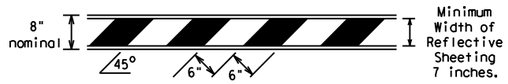
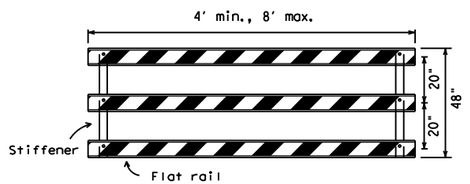
TYPE 3 BARRICADES

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 conforming to Departmental Material Specification DMS-8300 unless otherwise noted.

Barricades shall NOT be used as a sign support.



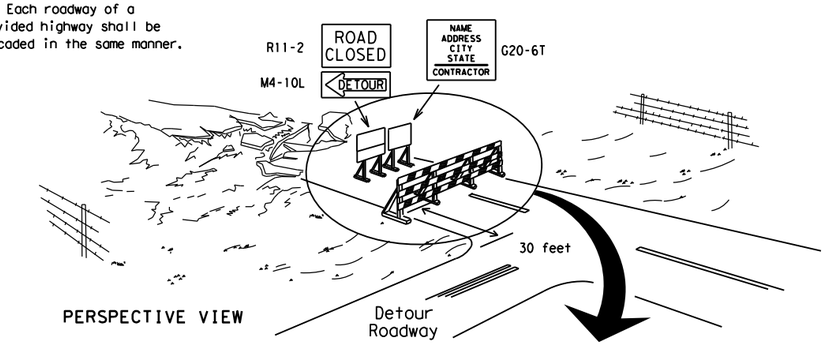
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

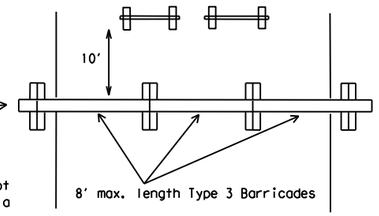
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

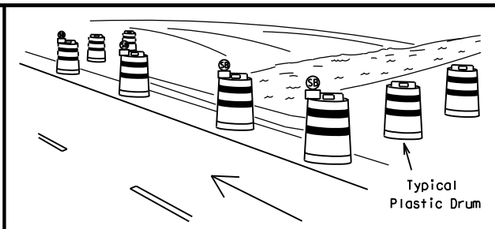
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



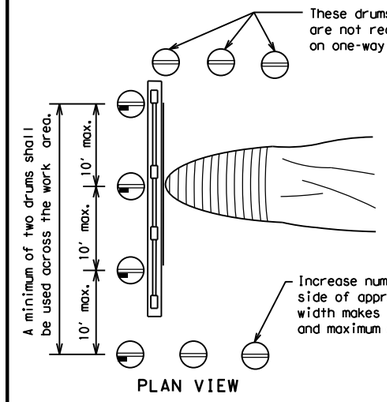
PLAN VIEW

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

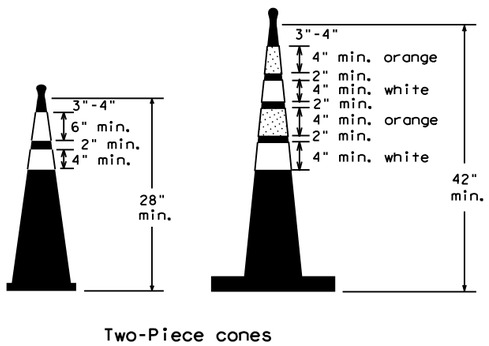


PLAN VIEW

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.

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

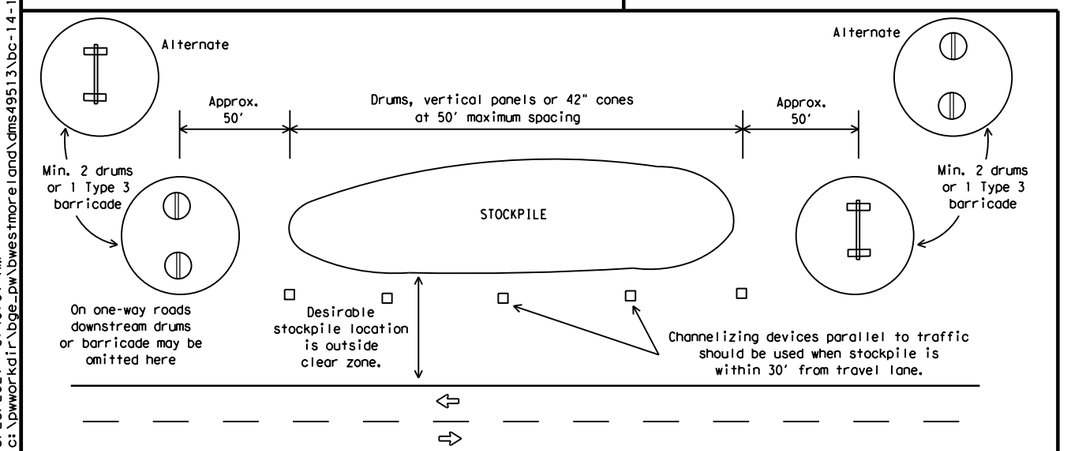
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



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

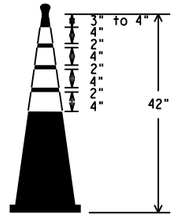
42" 2-piece cones shall have a minimum weight of 30 lbs. including base.

1. Traffic cones and tubular markers shall be predominantly orange, and meet the height and weight requirements shown above.
2. One-piece cones have the body and base of the cone molded in one consolidated unit. Two-piece cones have a cone shaped body and a separate rubber base, or ballast, that is added to keep the device upright and in place.
3. Two-piece cones may have a handle or loop extending up to 8" above the minimum height shown, in order to aid in retrieving the device.
4. Cones or tubular markers used at night 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.
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

THIS DEVICE SHALL NOT BE USED ON PROJECTS LET AFTER MARCH 2014.



1. This device is intended only for use in place of a vertical panel to channelize traffic by indicating the edge of the travel lane. It is not intended to be used in transitions or tapers.
2. This device shall not be used to separate lanes of traffic (opposing or otherwise) or warn of objects.
3. This device is based on a 42 inch, two-piece cone with an alternate striping pattern: four 4 inch retroreflective bands, with an approximate 2 inch gap between bands. The color of the band should correspond to the color of the edgeline (yellow for left edgeline, white for right edgeline) for which the device is substituted or for which it supplements. The reflectorized bands shall be retroreflective Type A conforming to Departmental Material Specification DMS-8300, unless otherwise noted.
4. The base must weigh a minimum of 30 lbs.

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BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-14

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	YKM	GONZALES		56

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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.

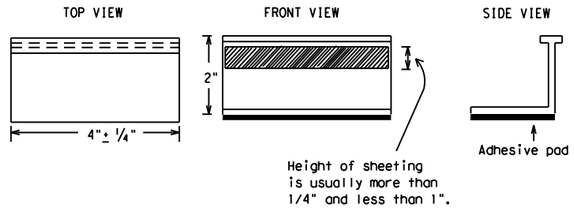
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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 Operations Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-14

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©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
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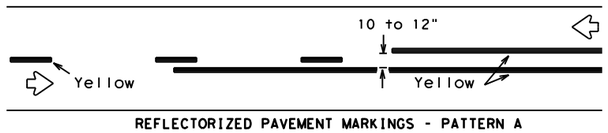
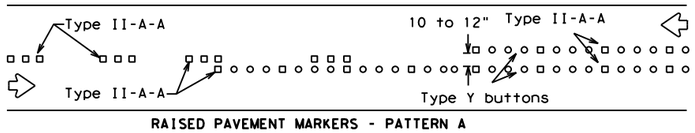
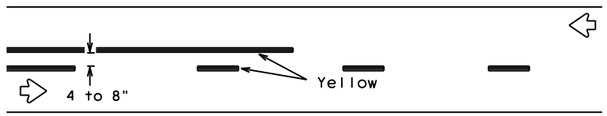
PAVEMENT MARKING PATTERNS



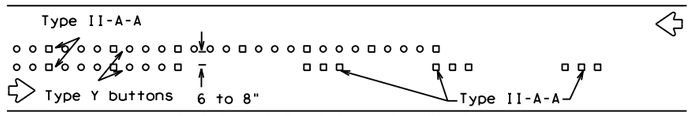
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



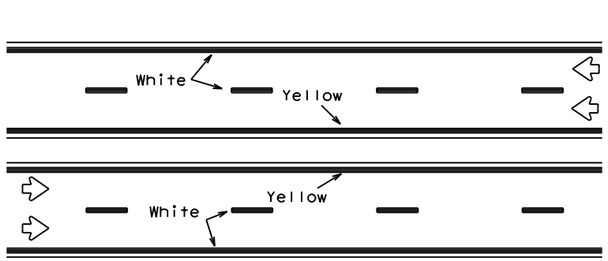
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



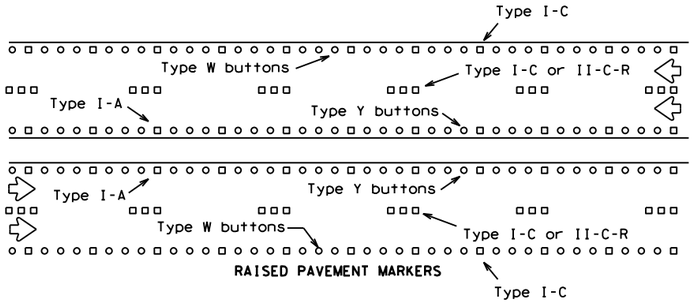
RAISED PAVEMENT MARKERS - PATTERN B

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



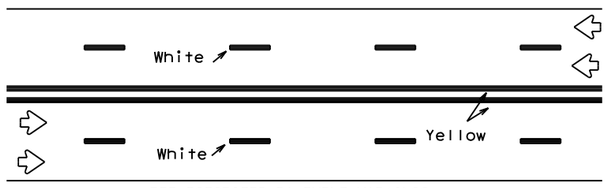
REFLECTORIZED PAVEMENT MARKINGS



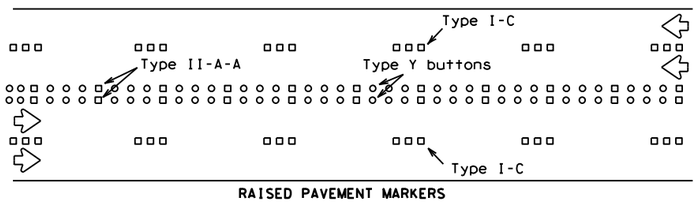
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



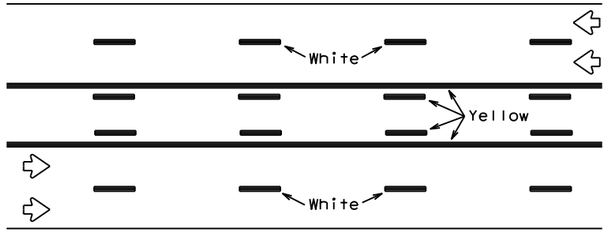
REFLECTORIZED PAVEMENT MARKINGS



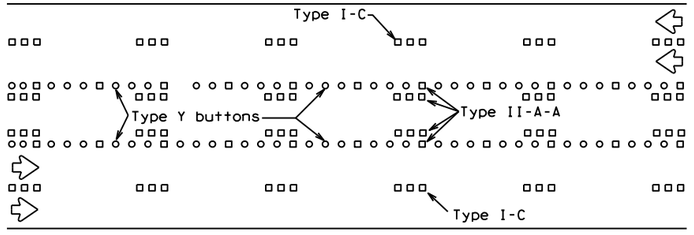
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS

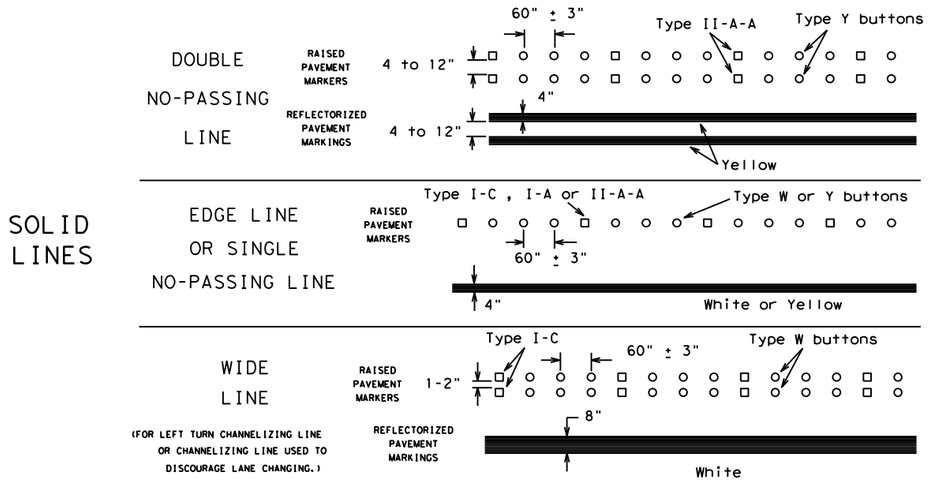


RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

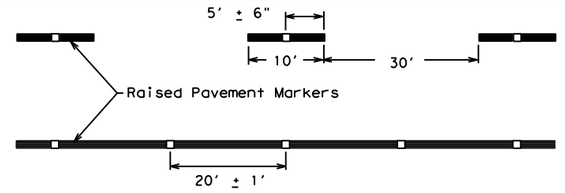
TWO-WAY LEFT TURN LANE

STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS



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 Operations Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-14

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2-98 7-13	YKM	GONZALES		58
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106

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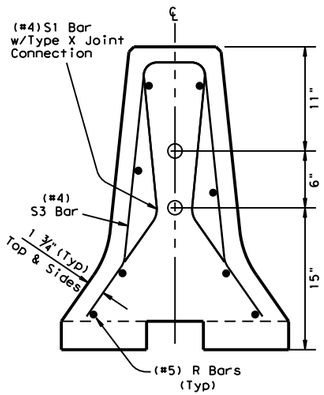
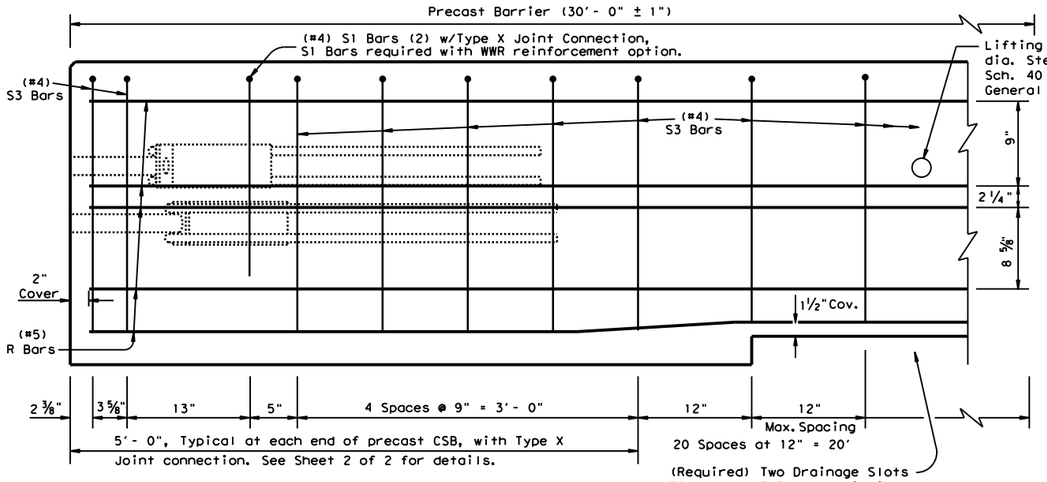


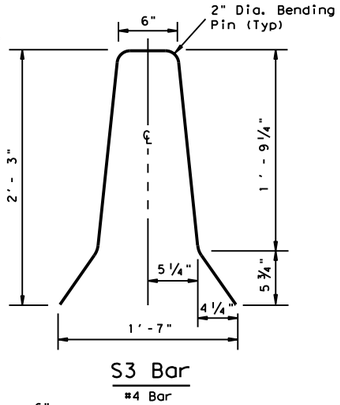
End View
Precast Barrier

See sheet 2 of 3 for Joint connection Type X

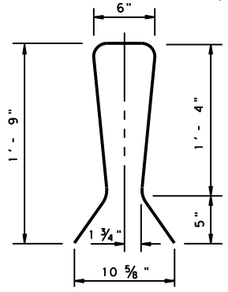


Reinforcement for Precast (CSB) Concrete Safety Barrier (Type 1)

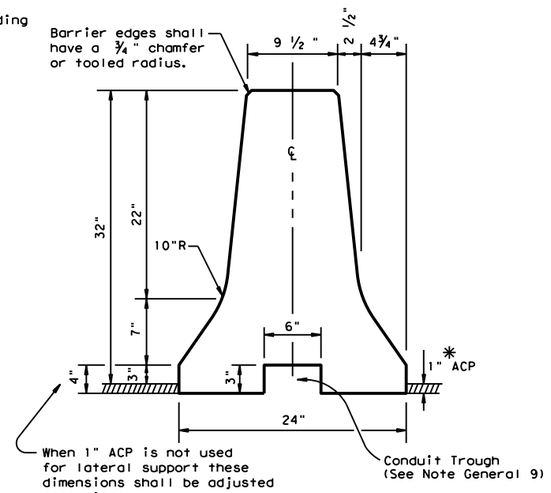
Showing reinforcement for Joint Type X



S3 Bar
#4 Bar



S1 Bar
#4 Bar (2)
(Joint Type X)

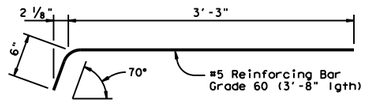


Concrete Safety Barrier

✱ 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.

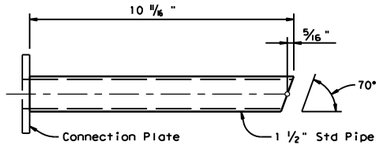
GENERAL NOTES

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.



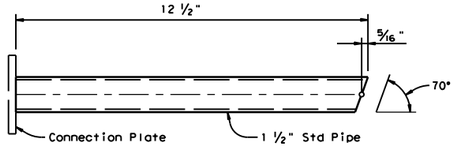
DEFORMED BAR ANCHOR DETAILS

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



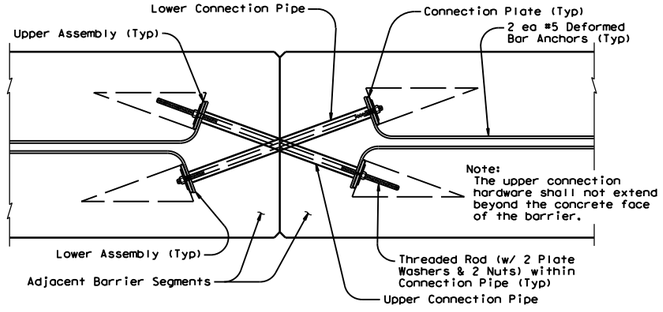
UPPER CONNECTION PIPE DETAILS

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.



TYPE X JOINT INSTALLATION DETAIL

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

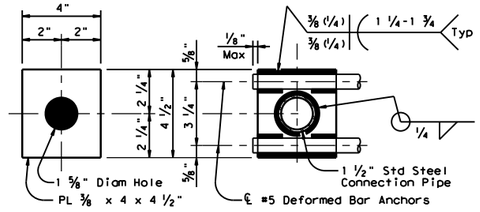
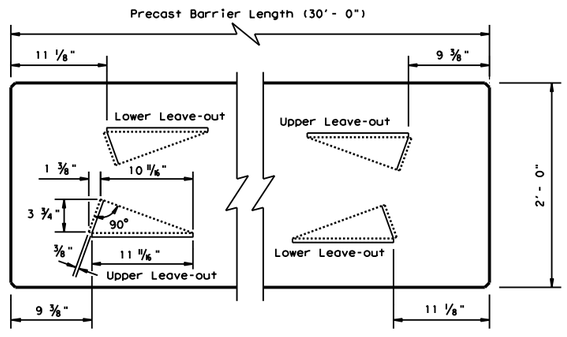


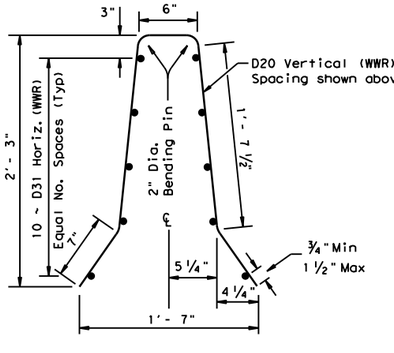
PLATE DIMENSIONS WELDING DETAILS

CONNECTION PLATE DETAILS

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



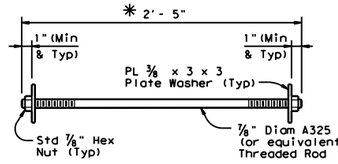
BARRIER PLAN AT END JOINTS



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

(WWR) General Notes

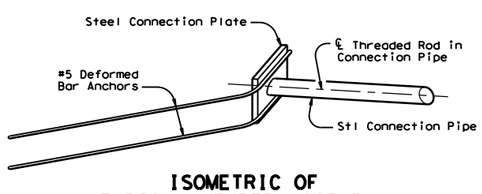
1. Deformed Welded Wire Reinforcement (WWR) shall conform to ASTM A497.
2. Welded wire cage may be cut or bent to accommodate the Type X joint connection and drainage slots, as directed by the Engineer.
3. All reinforcement shall comply with Item 440, "Reinforcing Steel."
4. Combinations of reinforcing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



CONNECTION BOLT OR THREADED ROD DETAIL

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

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



ISOMETRIC OF TYPICAL WELDED ASSEMBLY

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

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

SHEET 1 OF 2

Texas Department of Transportation

Design Division Standard

CONCRETE SAFETY BARRIER (F-SHAPE)

PRECAST BARRIER (TYPE 1)

CSB(1)-10

FILE: csb110.dgn	DN: TxDOT	CK: AM	DW: BD	CK: VP
©TxDOT December 2010	CONT	SECT	JOB	HIGHWAY
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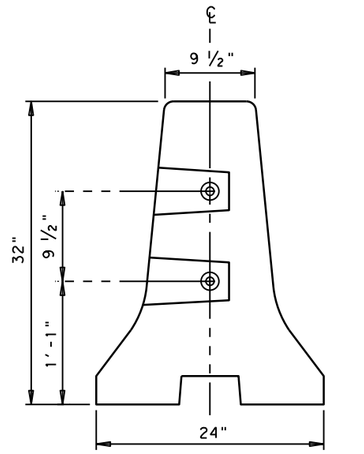
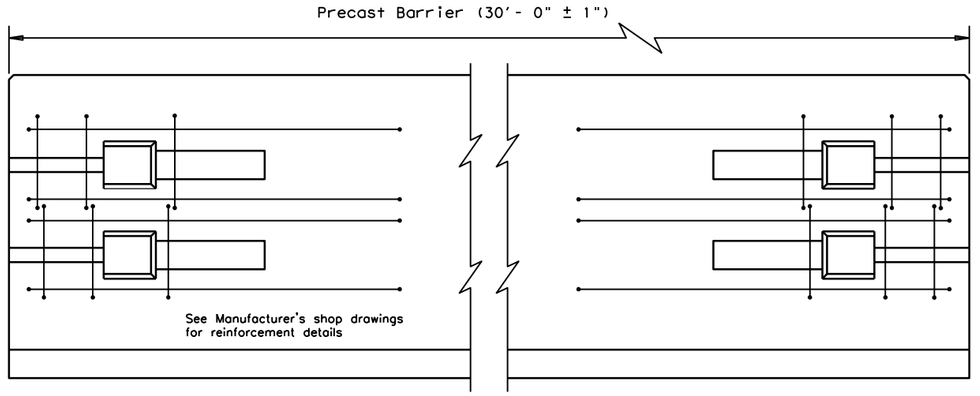
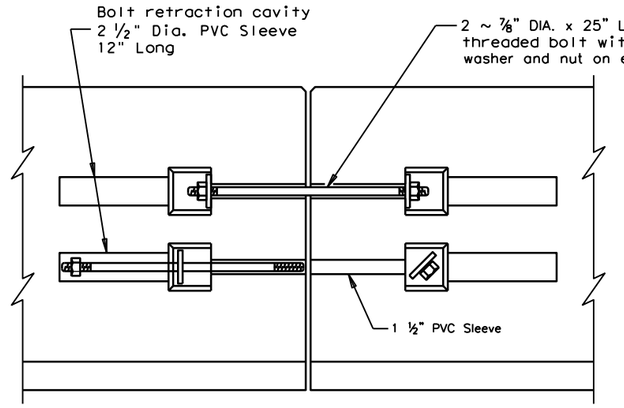


END VIEW (CSB) QUICK-BOLT
QUICK-BOLT POCKET LOCATIONS

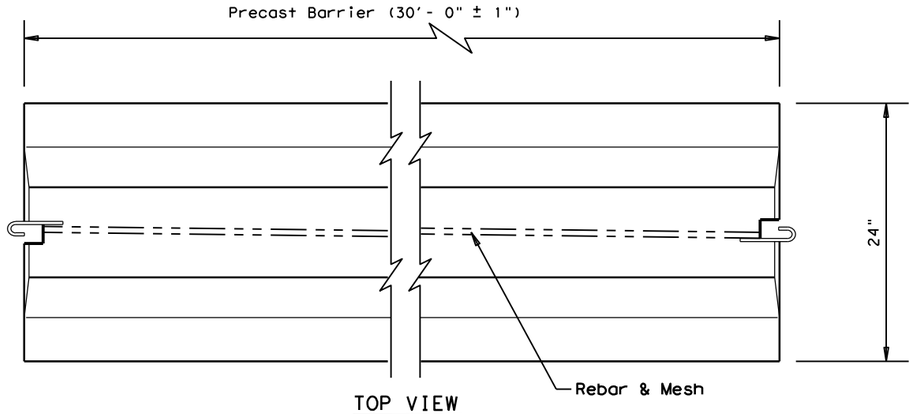


ELEVATION (CSB) QUICK-BOLT
See Manufacturer's shop drawing for additional details

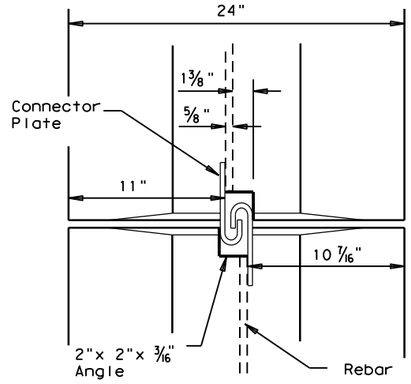


ELEVATION VIEW SHOWING JOINT CONNECTION
"QUICK-BOLT"

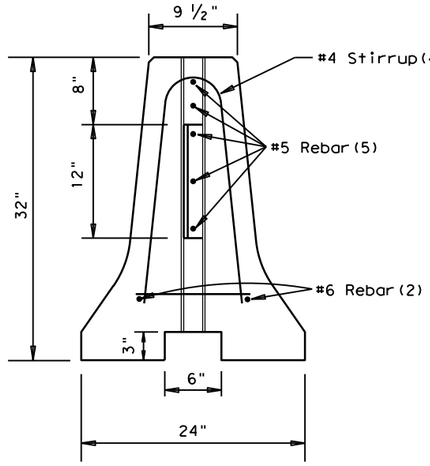
Joint Connection (Type Q)



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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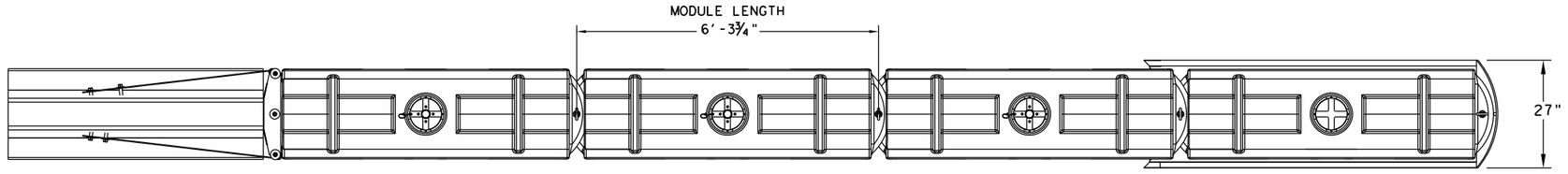
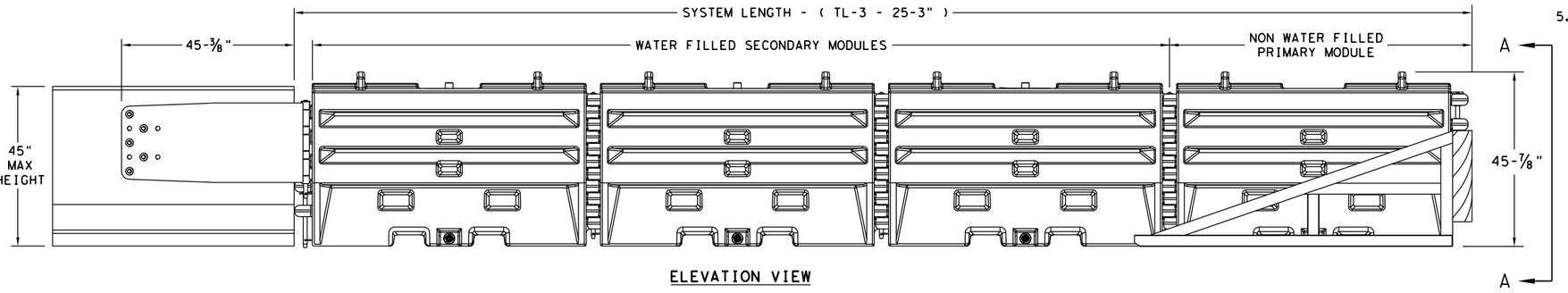


PLAN VIEW



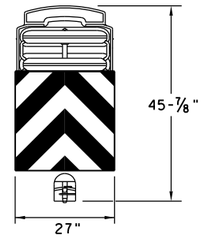
ELEVATION VIEW

GENERAL NOTES

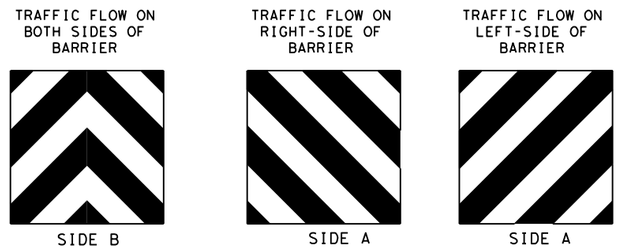
1. REFER TO THE INSTALLATION MANUAL FOR SPECIFIC SYSTEM ASSEMBLY AND MODULE ORIENTATION. FOR ADDITIONAL INFORMATION, CONTACT TRAFFIX, INC. AT (949) 361-5663.
2. THE SLED SYSTEM IS A MASH APPROVED TEST LEVEL 3 (TL-3) CRASH CUSHION APPROVED FOR USE IN TEMPORARY WORK ZONES. THE SLED SYSTEM IS A NON-REDIRECTIVE,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



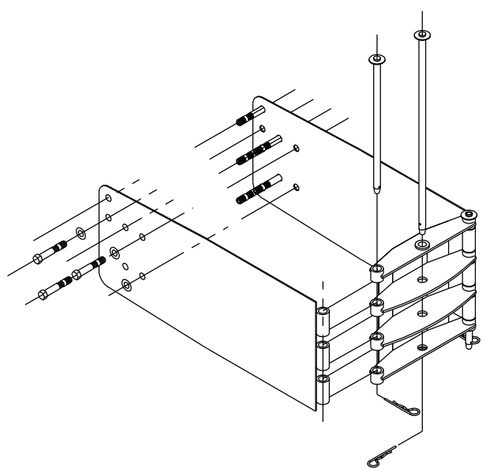
SECTION A-A



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	1133	02	032	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		61

DATE: 3/25/2021
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DATE: 3/25/2021 8:41:01 AM
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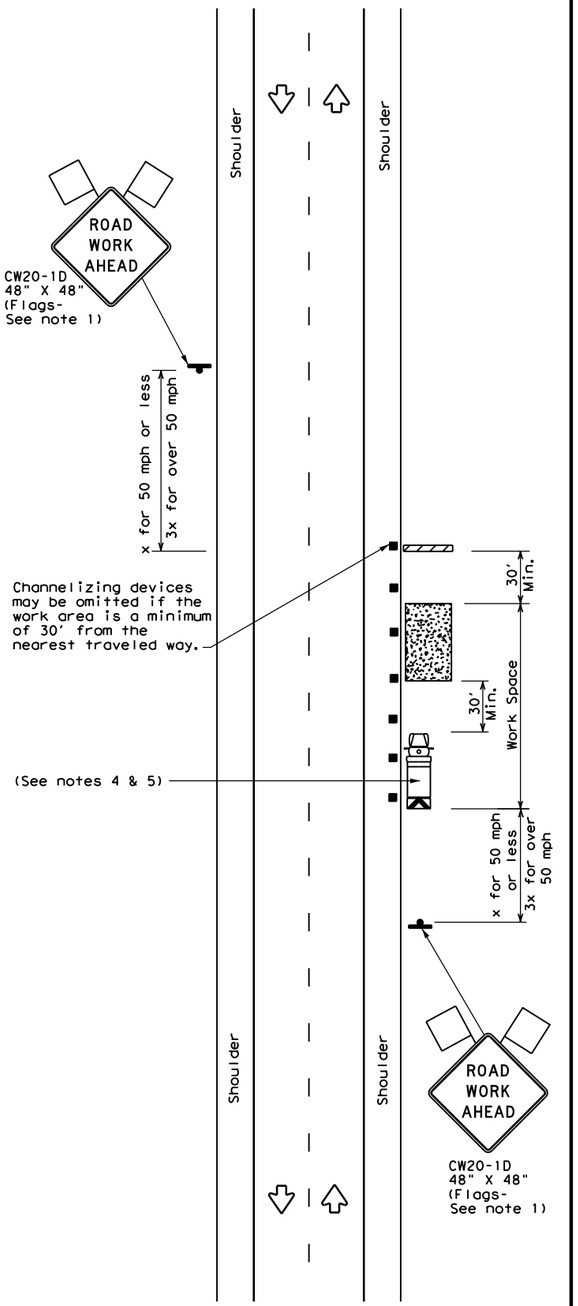
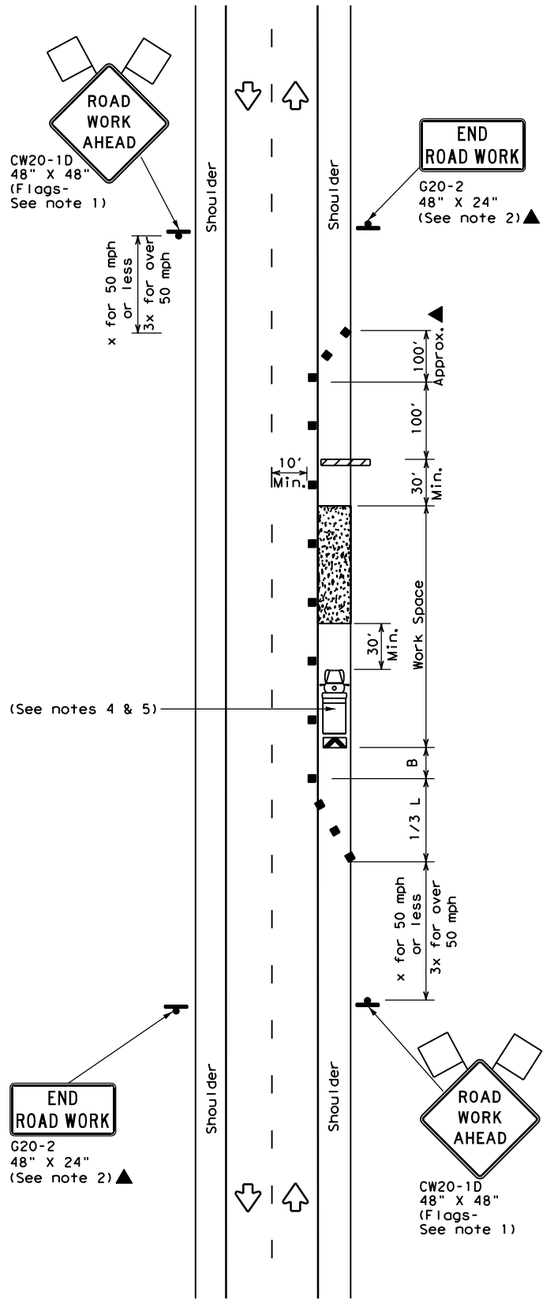


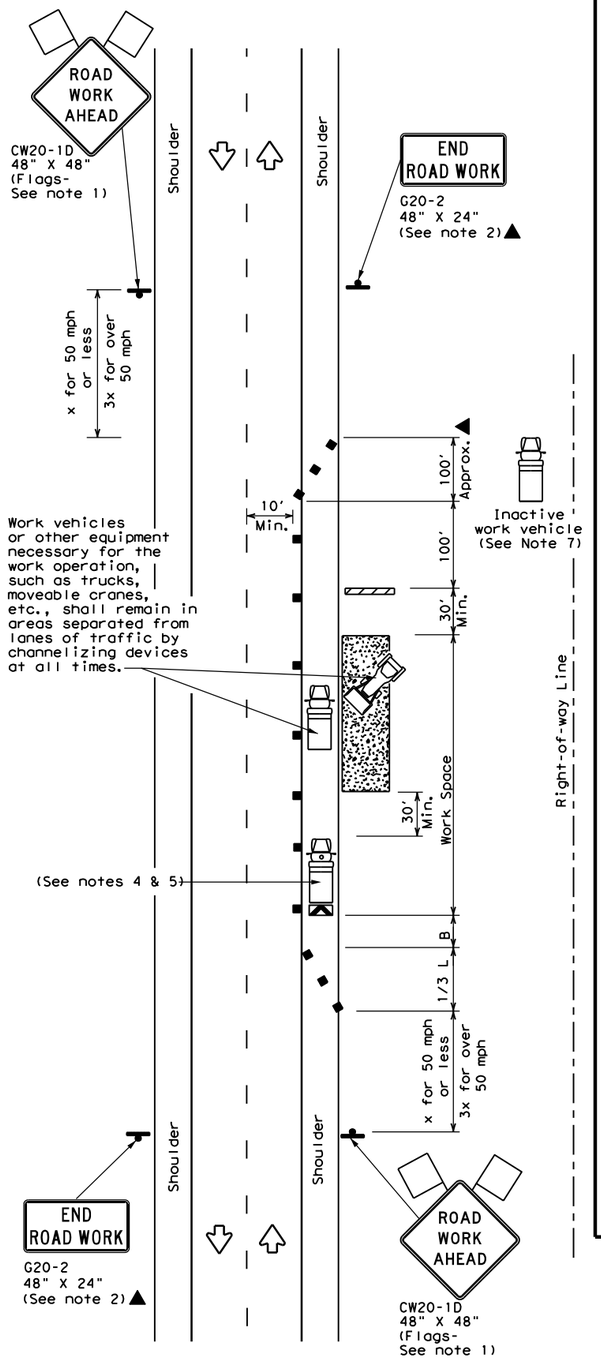
TCP (2-1a)

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 CW21-1D "ROAD WORK AHEAD" signs for shoulder work on conventional roadways.

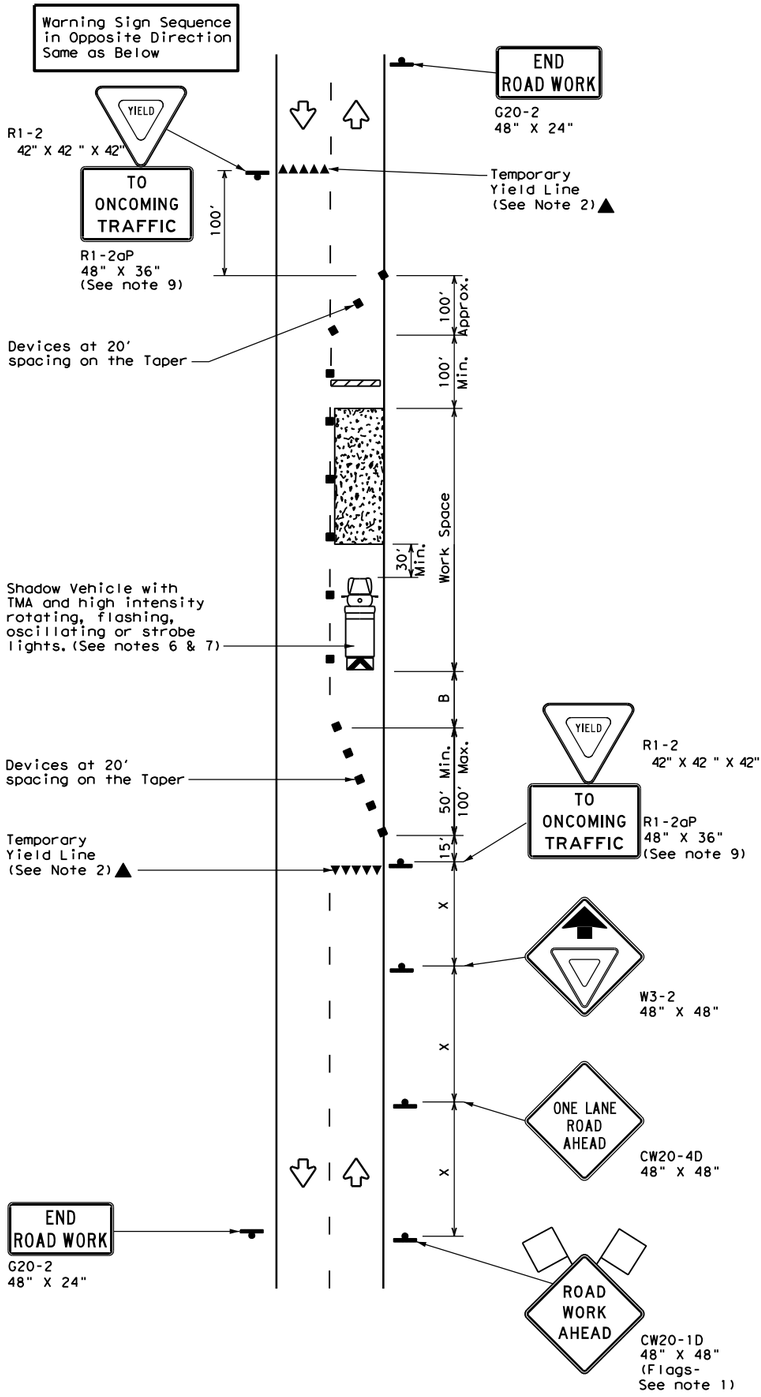
Texas Department of Transportation

Traffic Operations Division Standard

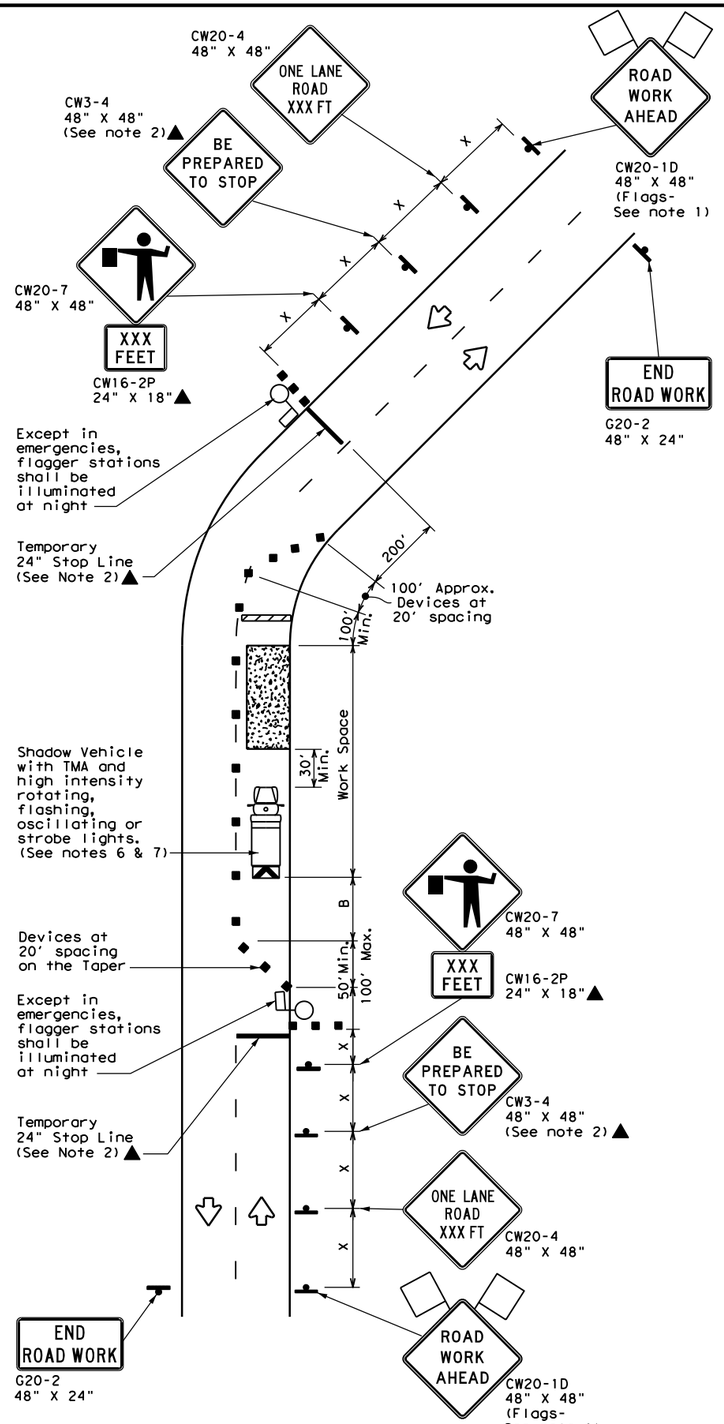
TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(2-1)-18

FILE: tcp2-1-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	032	FM 794
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	YKM	GONZALES		62
1-97 2-18				



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



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

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

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

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

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

GENERAL NOTES

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

TCP (2-2a)

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

TCP (2-2b)

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

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
ONE-LANE TWO-WAY
TRAFFIC CONTROL

TCP(2-2)-18

FILE: tcp2-2-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03	1133	02	032	FM 794
1-97 2-12	DIST	COUNTY		SHEET NO.
4-98 2-18	YKM	GONZALES		63

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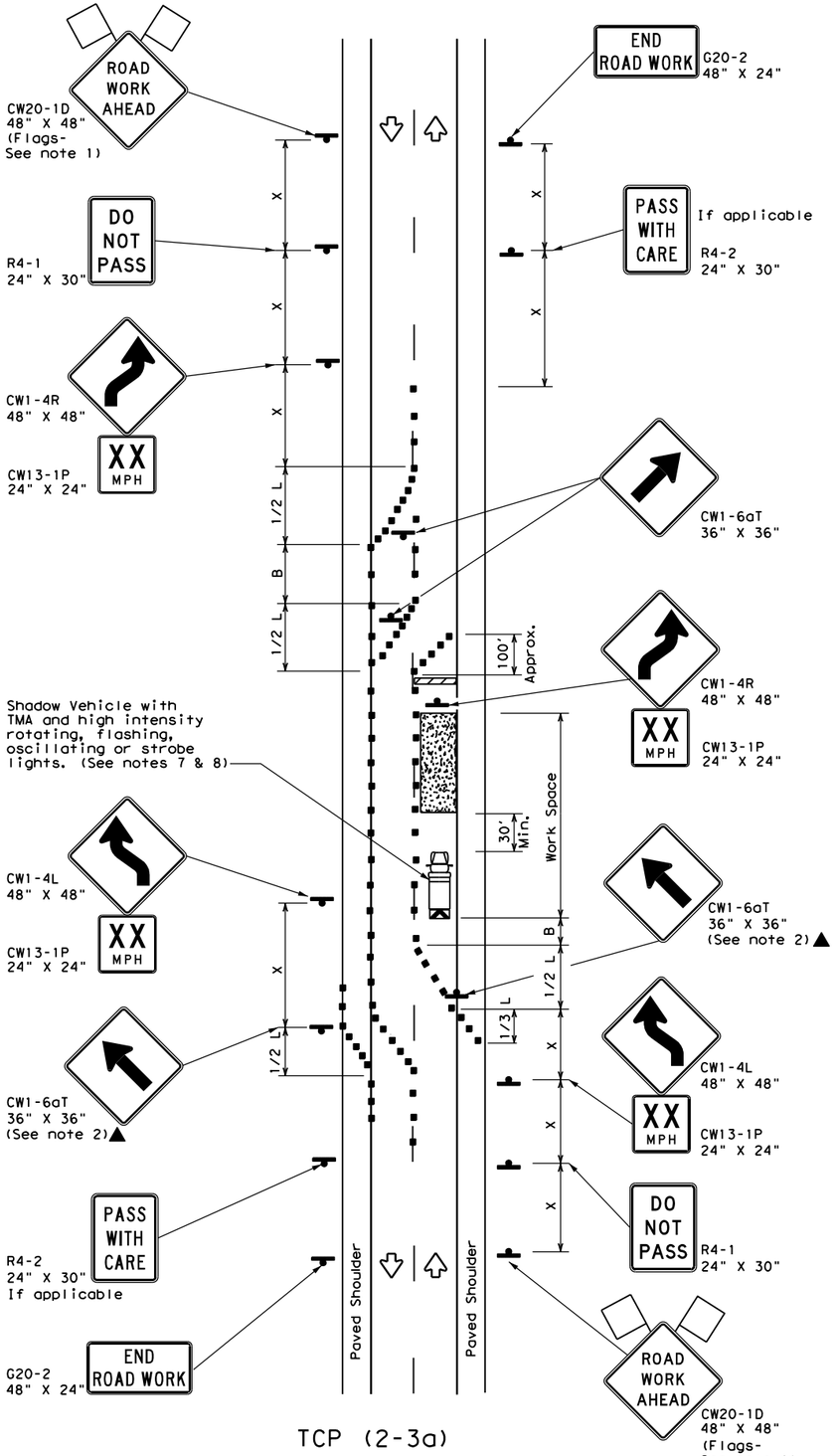
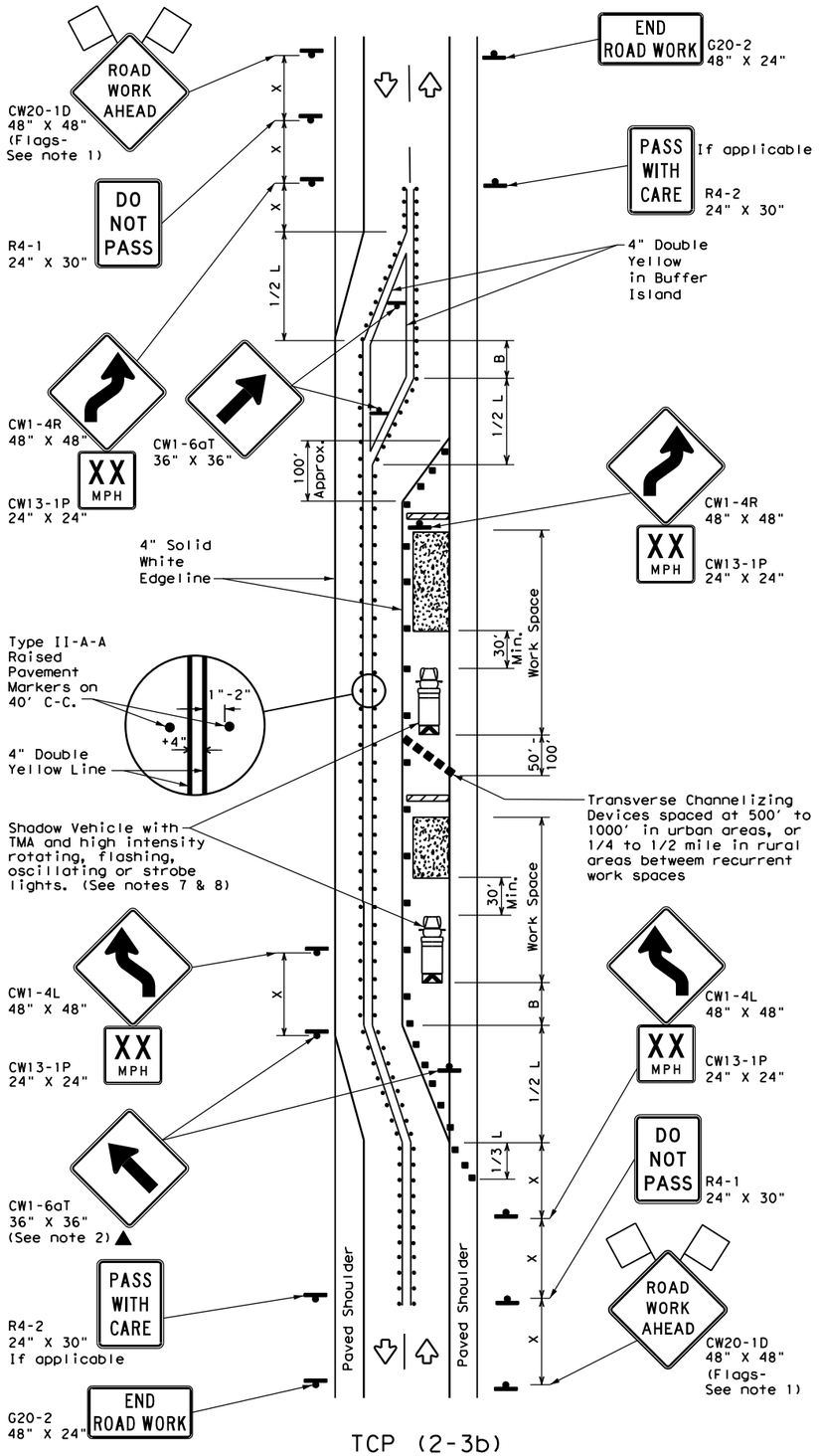


TCP (2-3a)
2-LANE ROADWAY WITH PAVED SHOULDERS

ONE LANE CLOSED
ADEQUATE FIELD OF VIEW



TCP (2-3b)
2-LANE ROADWAY WITH PAVED SHOULDERS

ONE LANE CLOSED
INADEQUATE FIELD OF VIEW

LEGEND			
	Type 3 Barricade	■ ■	Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	....	Raised Pavement Markers Ty II-AA
	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
				TCP(2-3b)ONLY
			✓	✓

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. When work space will be in place less than three days existing pavement markings may remain in place. Channelizing devices shall be used to separate traffic.
4. Flagger control should NOT be used unless roadway conditions or heavy traffic volume require additional emphasis to safely control traffic. Flagger should be positioned at end of traffic queue.
5. The R4-1 "DO NOT PASS," R4-2 " PASS WITH CARE" and construction regulatory speed zone signs may be installed within CW20-1D "ROAD WORK AHEAD" signs. Proper spacing of signs shall be maintained.
6. Conflicting pavement marking shall be removed for long term projects.
7. 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.
8. 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 (2-3a)

9. Conflicting pavement markings shall be removed for long-term projects. For shorter durations where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20' or 15' if posted speeds are 35 mph or slower, and for tangent sections, at 1/2(S) where S is the speed in mph. This tighter device spacing is intended for the area of the conflicting markings, not the entire work zone.

Texas Department of Transportation — Traffic Operations Division Standard

TRAFFIC CONTROL PLAN TRAFFIC SHIFTS ON TWO-LANE ROADS

TCP(2-3)-18

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©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	032	FM 794
8-95 3-03	DIST	COUNTY		SHEET NO.
1-97 2-12	YKM	GONZALES		64
4-98 2-18				

DATE: 3/25/2021 8:41:17 AM
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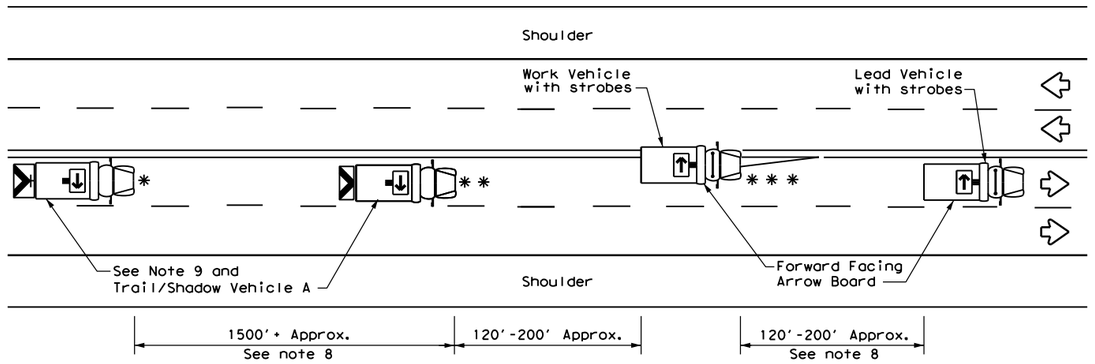
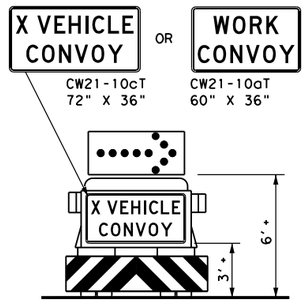


TCP (3-1a)

UNDIVIDED MULTILANE ROADWAY



TRAIL/SHADOW VEHICLE A

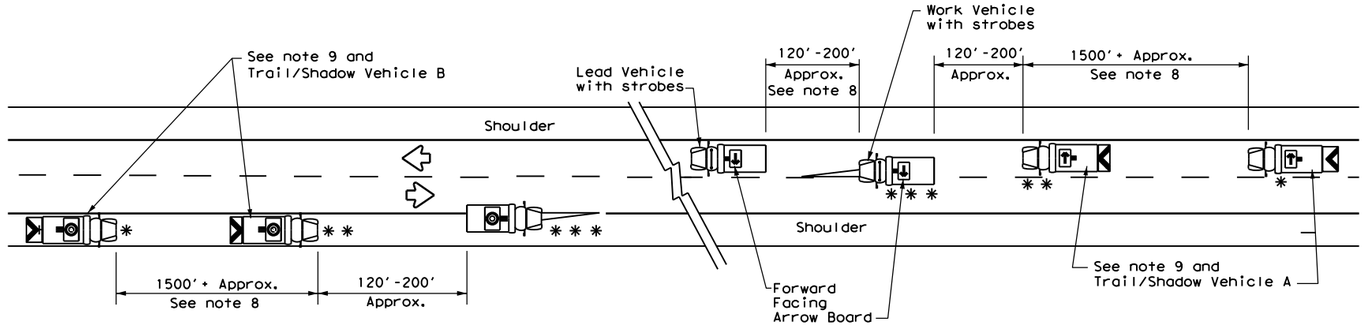
with RIGHT Directional display Flashing Arrow Board

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 equiped 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.

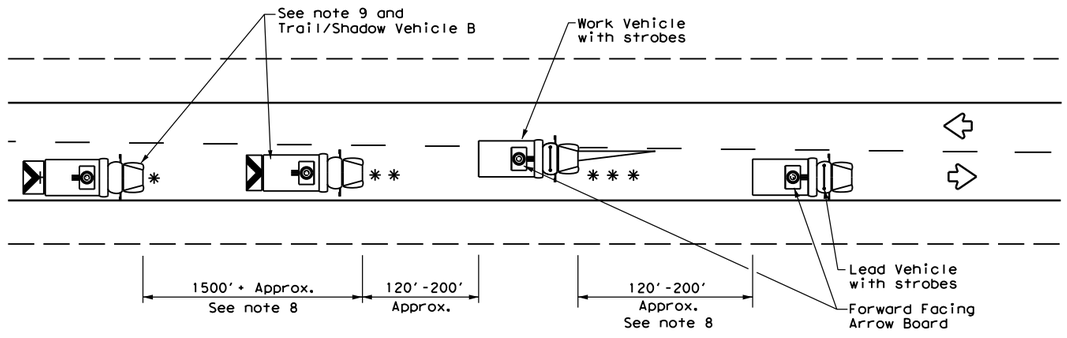


WORK ON SHOULDER

WORK ON TRAVEL LANE

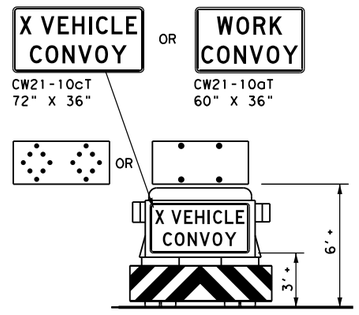
TCP (3-1b)

TWO-WAY ROADWAY WITH PAVED SHOULDERS



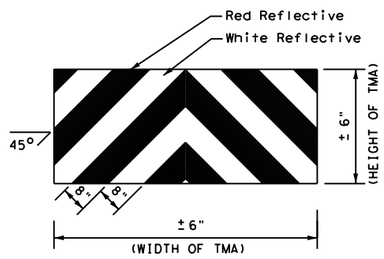
TCP (3-1c)

TWO-WAY ROADWAY WITHOUT PAVED SHOULDERS



TRAIL/SHADOW VEHICLE B

with Flashing Arrow Board in CAUTION display



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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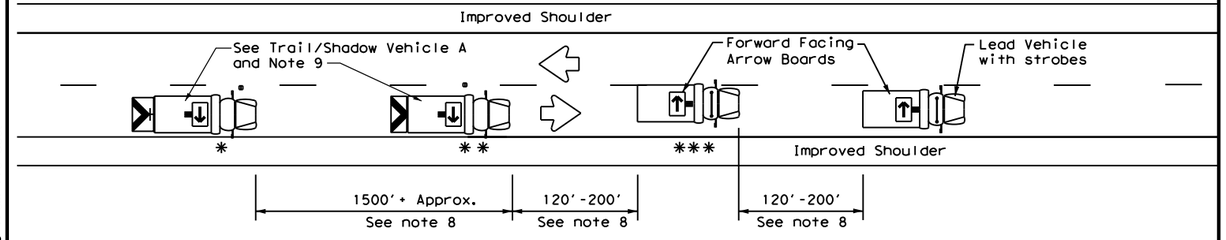
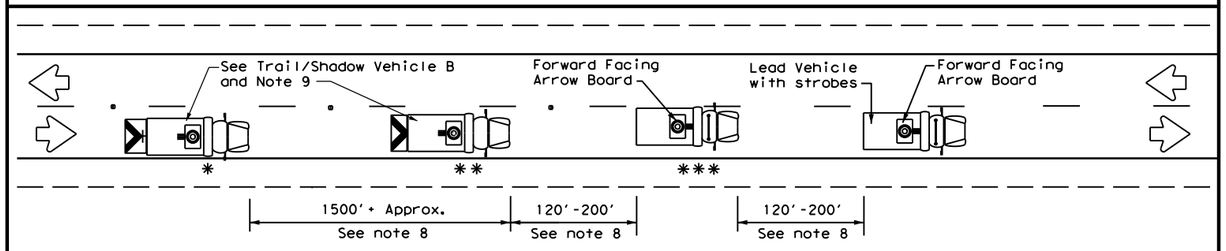
2-94 4-98 8-95 7-13 1-97	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		65



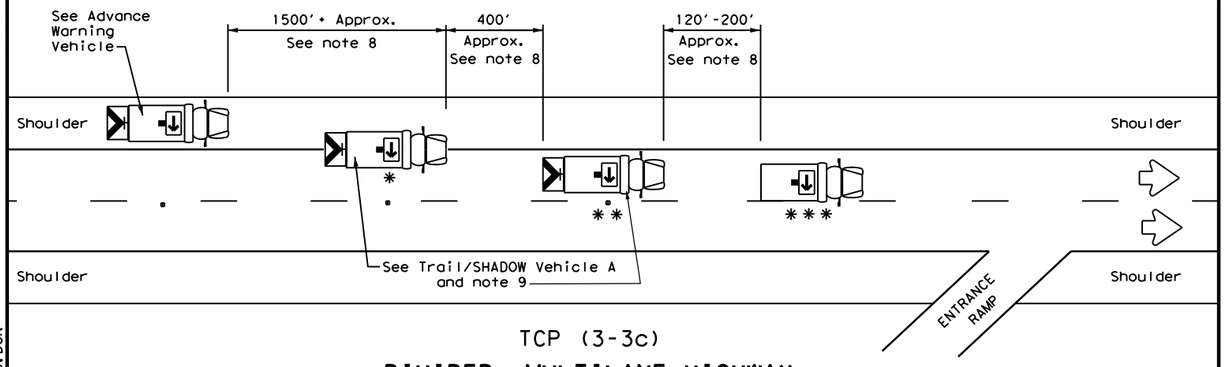
TCP (3-3a)

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



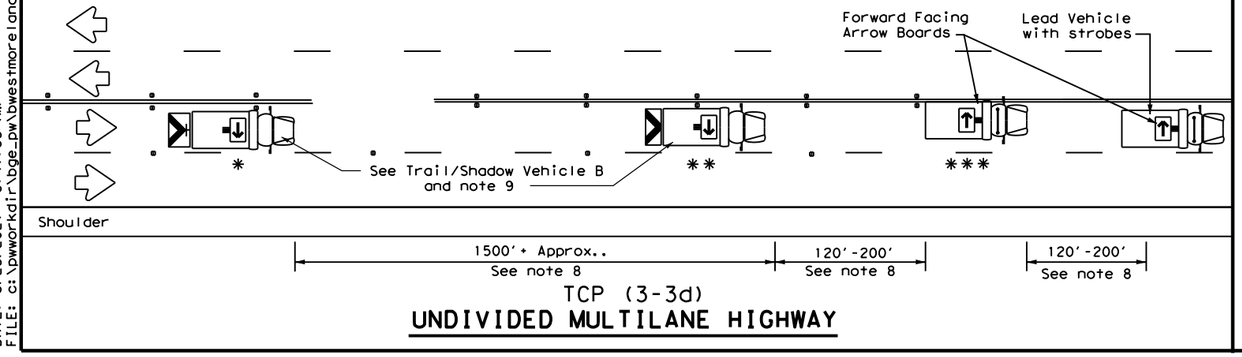
TCP (3-3b)

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



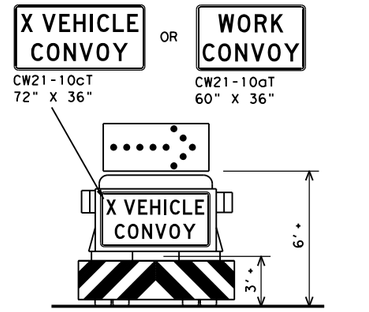
TCP (3-3c)

DIVIDED MULTILANE HIGHWAY



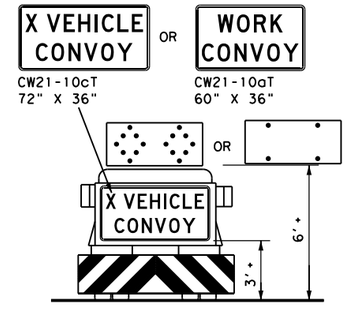
TCP (3-3d)

UNDIVIDED MULTILANE HIGHWAY



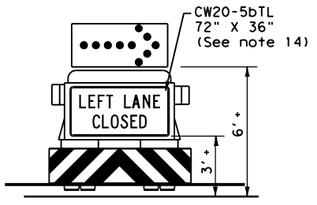
TRAIL/SHADOW VEHICLE A

with RIGHT Directional display
Flashing Arrow Board

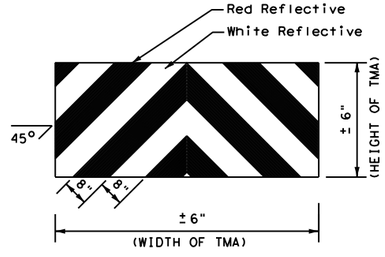


TRAIL/SHADOW VEHICLE B

with Flashing Arrow Board
in Caution Mode



ADVANCE WARNING VEHICLE



STRIPING FOR TMA

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS RAISED PAVEMENT MARKER INSTALLATION/ REMOVAL
TCP(3-3)-14

FILE: tcp3-3.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT September 1987	CONT	SECT	JOB	HIGHWAY
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2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 7-13	YKM	GONZALES		66
1-97 7-14				

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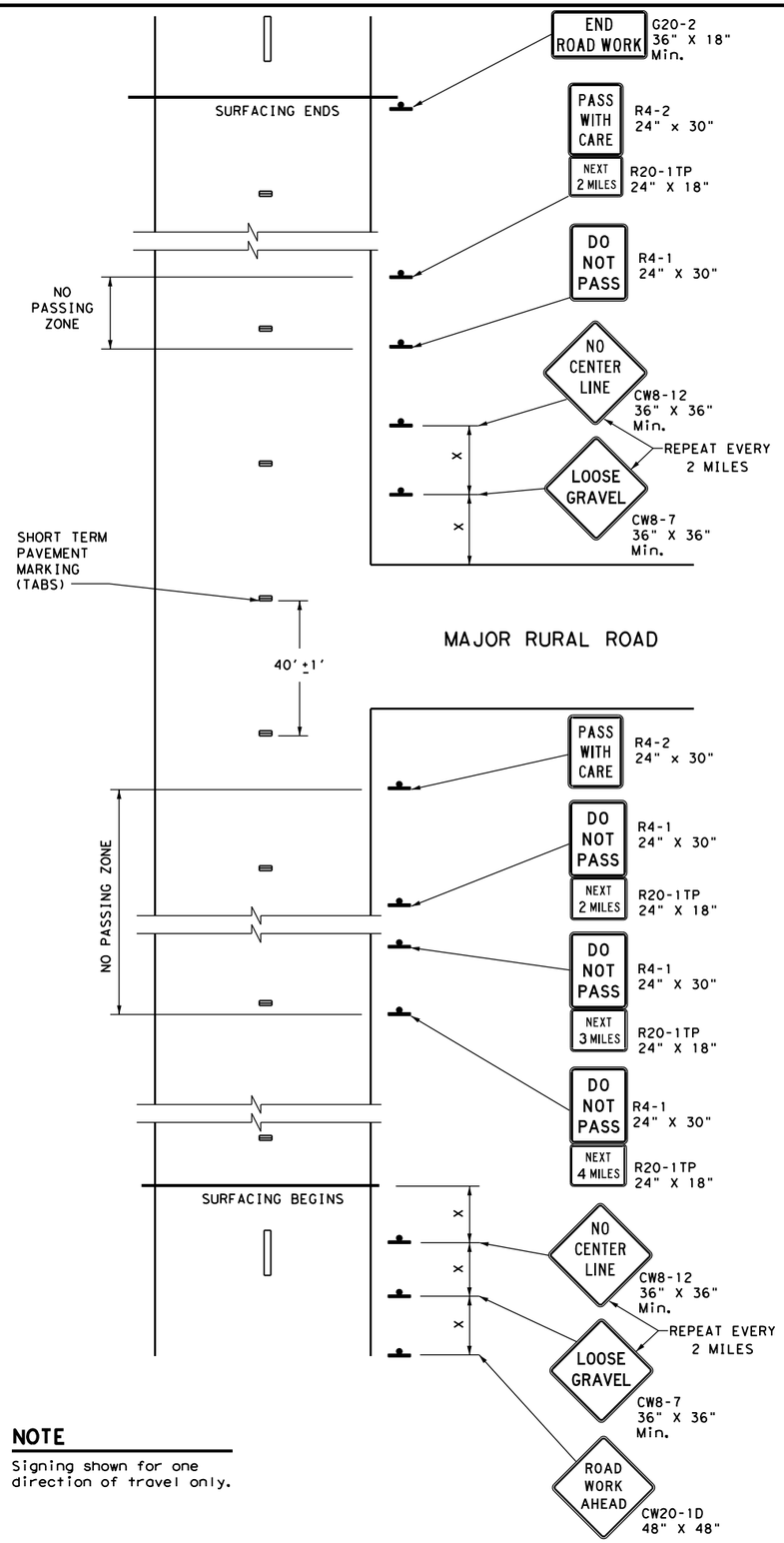
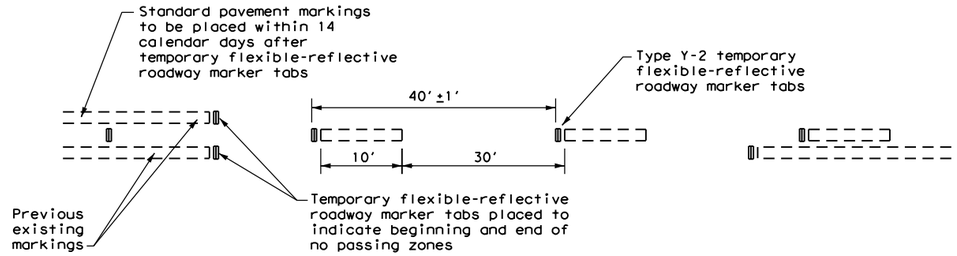


NOTE

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

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

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

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

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

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

"NO CENTER LINE" SIGN (CW8-12)

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

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

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

"LOOSE GRAVEL" SIGN (CW8-7)

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

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

PAVEMENT MARKINGS

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

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

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

COORDINATION OF SIGN LOCATIONS

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

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

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

* Conventional Roads Only

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL DETAILS FOR SURFACING OPERATIONS

TCP(7-1)-13

FILE: tcp7-1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT March 1991	CONT	SECT	JOB	HIGHWAY
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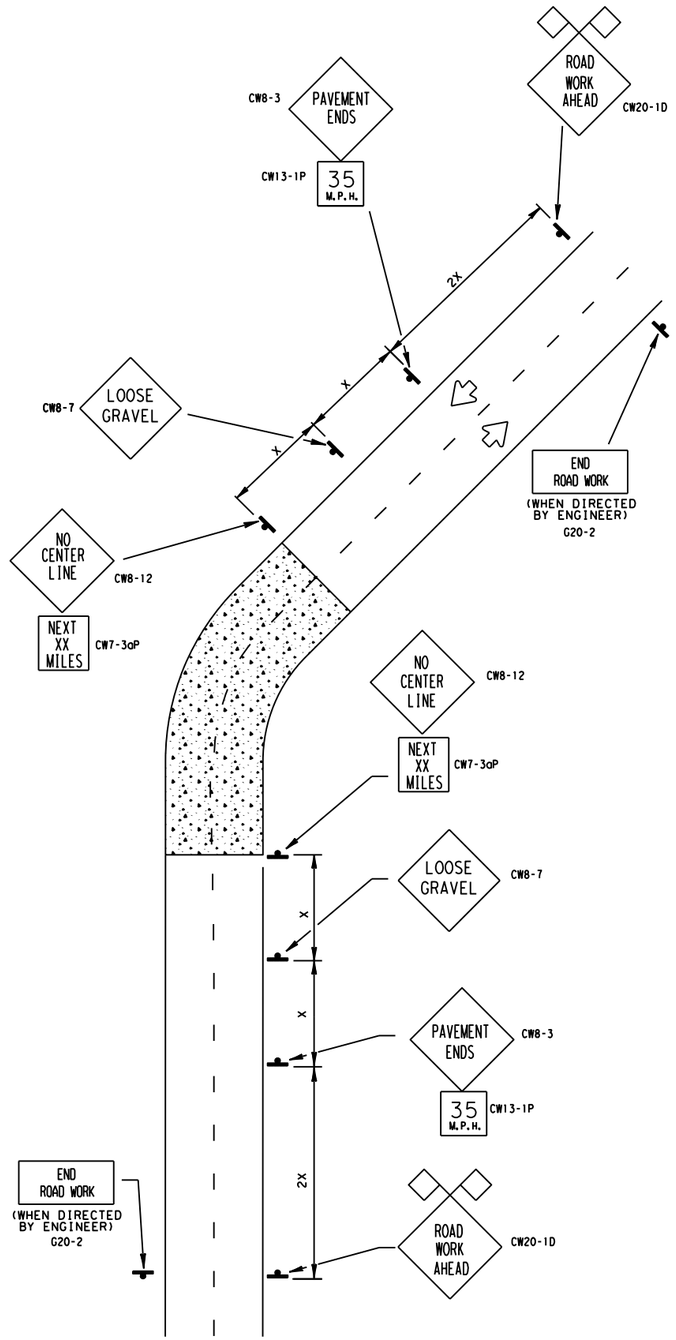
4-92 4-98	DIST	COUNTY		SHEET NO.
1-97 7-13	YKM	GONZALES		67

210



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

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

* Conventional Roads Only

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

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

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL PLAN

(YKM. DISTRICT)
TCP - UNSURFACED ROADWAY

ORIG DRAW DATE: December 1985	DN: LR	CK: MT	DW: DN	CK: MT	NEG NO.:

REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET
3-22-99	YKM	6		68
4-24-12	COUNTY		CONTROL SECTION JOB	HIGHWAY
5-14-13	GONZALES		1133 02 032	FM 794
10-13-15				

DATE: 3/25/2021 8:41:55 AM
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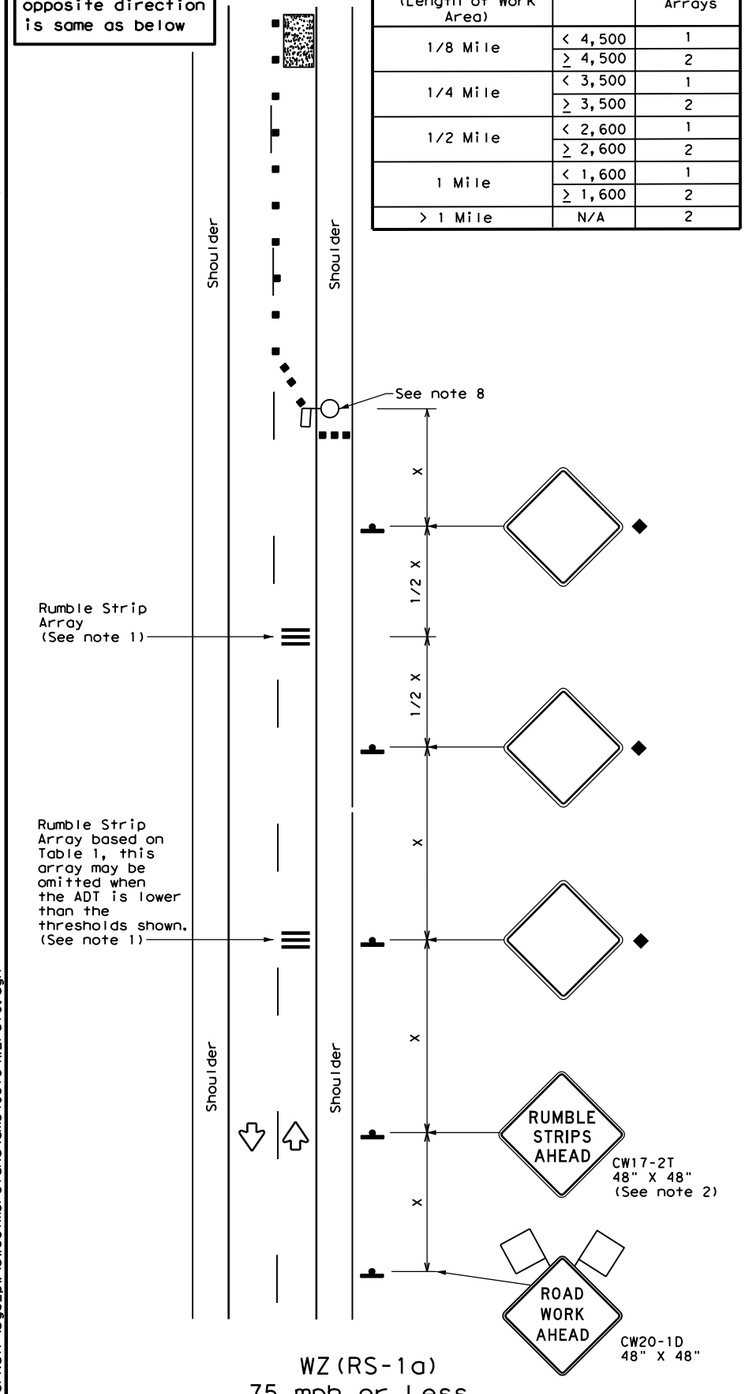
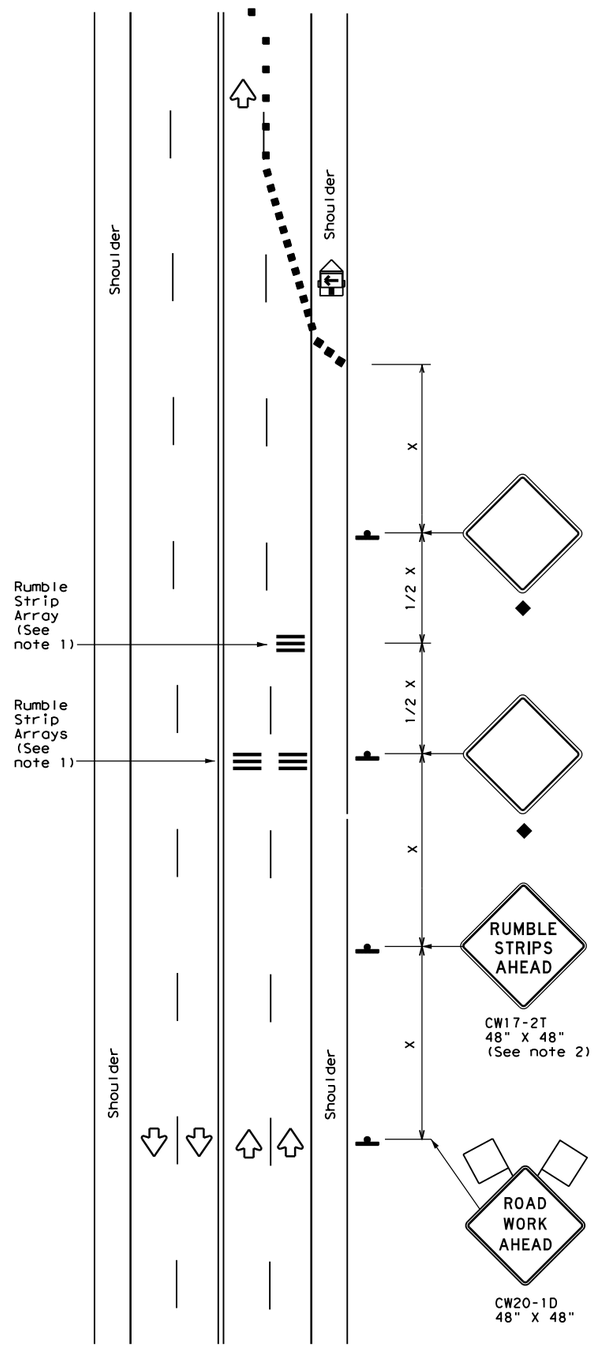
Warning sign and rumble strip sequence in opposite direction is same as below

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)
75 mph or Less

RUMBLE STRIPS ON ONE-LANE TWO-WAY APPLICATION



WZ(RS-1b)
75 mph or Less

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. Removal of the Temporary Rumble Strips should be accomplished before removing the advance 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 AFAD or a portable traffic signal.
9. Temporary Rumble Strips may be used on freeways or expressways based on engineering judgment.

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.

TABLE 2	
Speed	Approximate distance between strips in an Array
≤ 40 MPH	10'
> 40 MPH & ≤ 55 MPH	15'
> 55 MPH	20'

Texas Department of Transportation
Traffic Operations Division Standard

TEMPORARY RUMBLE STRIPS

WZ(RS)-16

FILE: wzrs16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	032	FM 794
2-14	DIST	COUNTY		SHEET NO.
4-16	YKM	GONZALES		69

3/25/2021 8:42:02 AM
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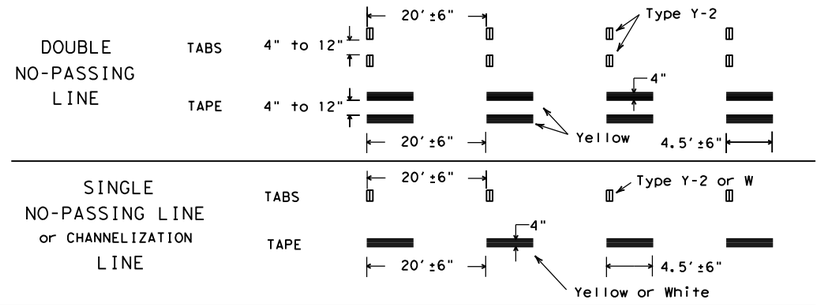
WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS



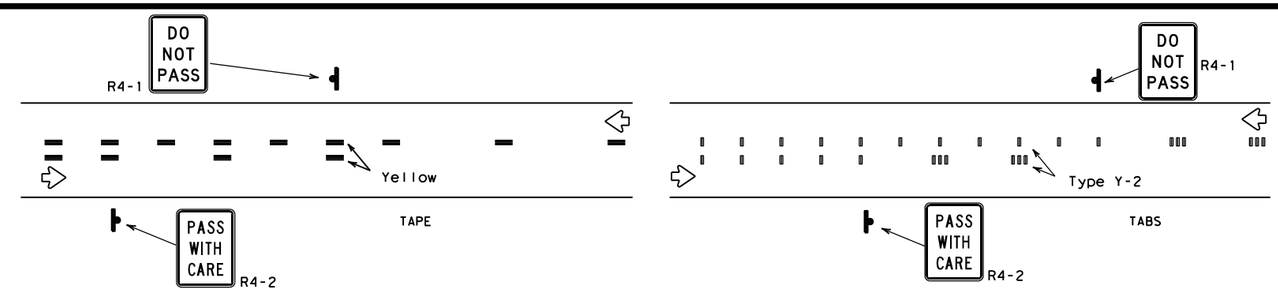
NOTES:

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

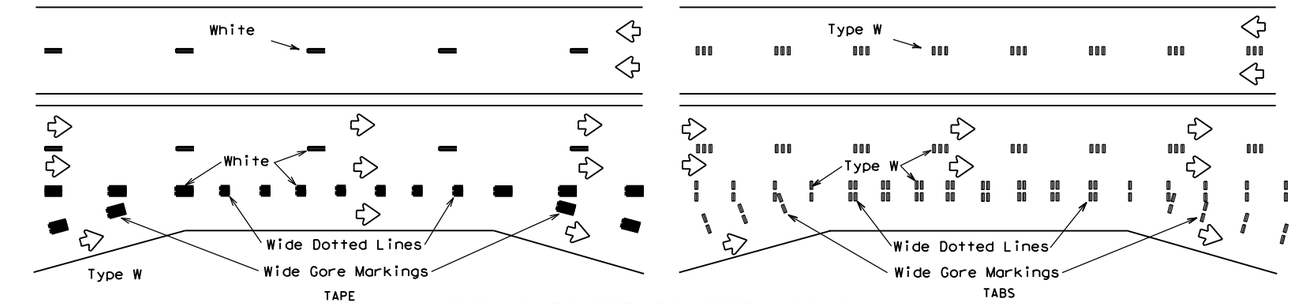
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS (TABS)

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

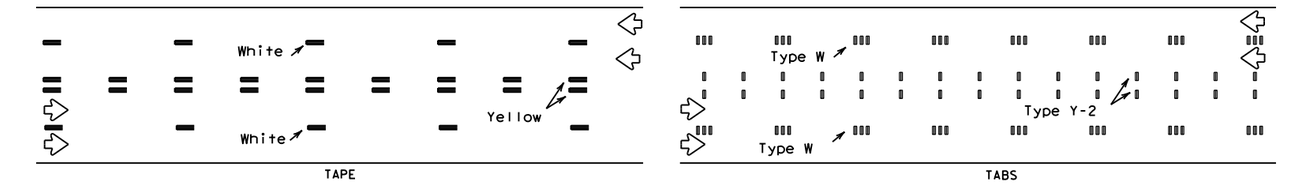
WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS



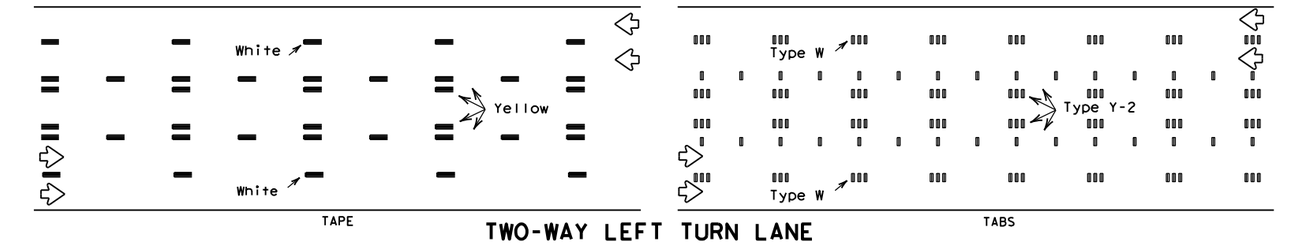
CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO LANE TWO-WAY HIGHWAYS



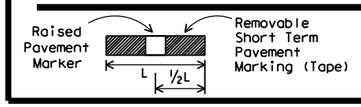
LANE LINES FOR DIVIDED HIGHWAY



LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



TWO-WAY LEFT TURN LANE



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

PREFABRICATED PAVEMENT MARKINGS

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

RAISED PAVEMENT MARKERS

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

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

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

Texas Department of Transportation

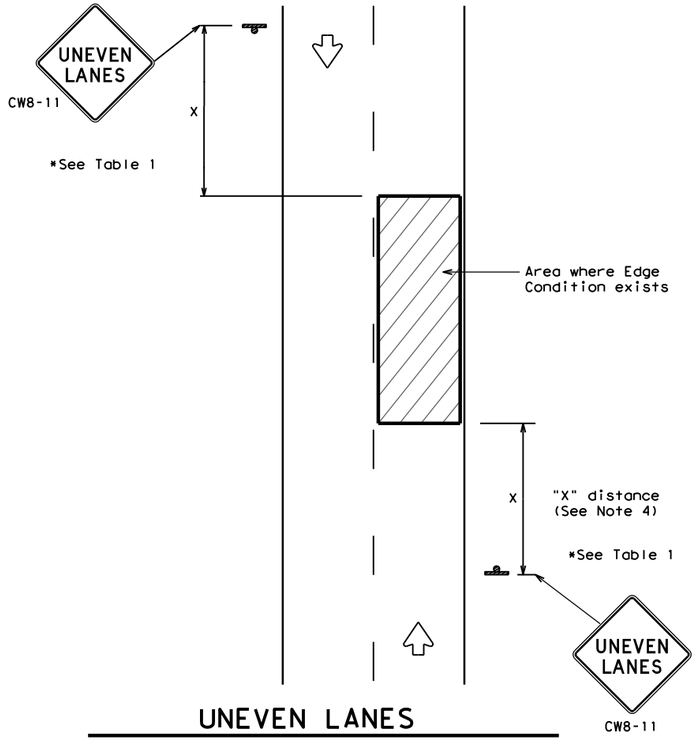
Traffic Operations Division Standard

WORK ZONE SHORT TERM PAVEMENT MARKINGS

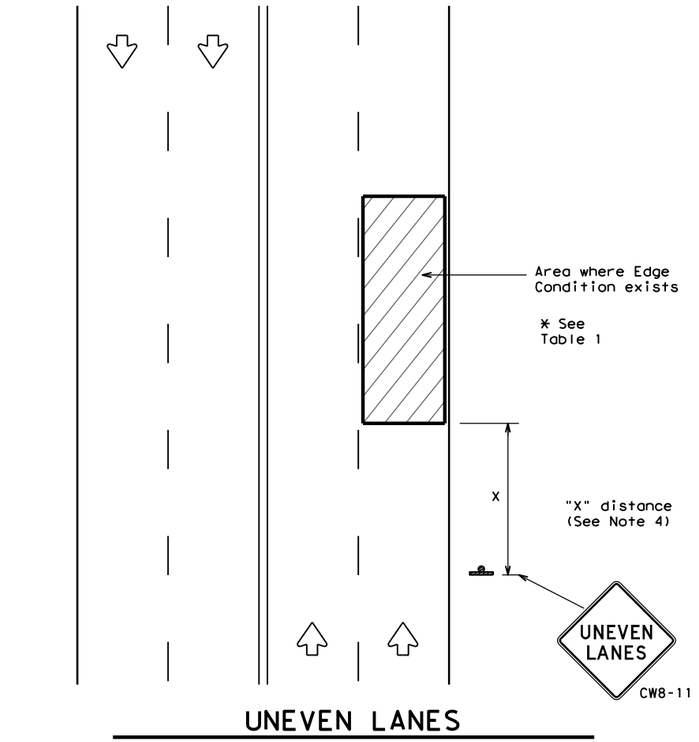
WZ(STPM)-13

FILE:	wzstpm-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT	April 1992	CONT	SECT	JOB	HIGHWAY
REVISIONS		1133	02	032	FM 794
1-97		DIST	COUNTY		SHEET NO.
3-03		YKM	GONZALES		70
7-13					

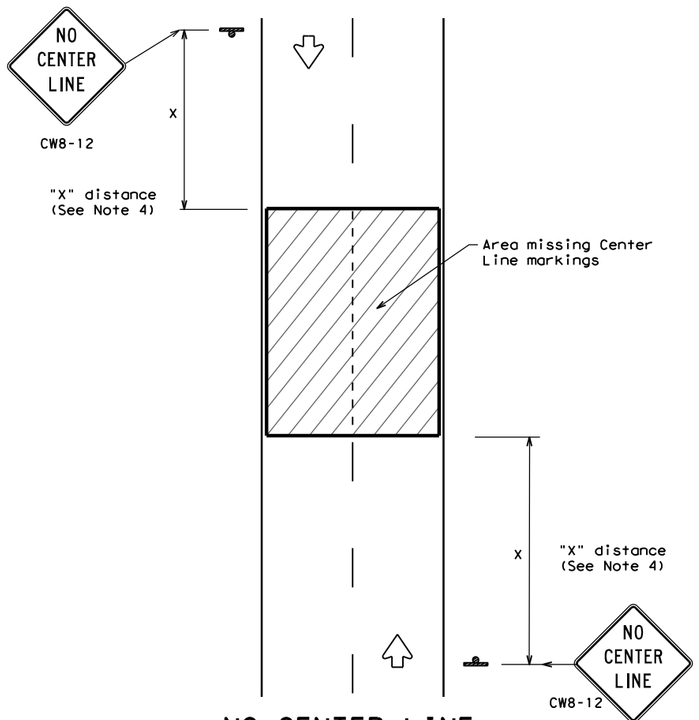
111



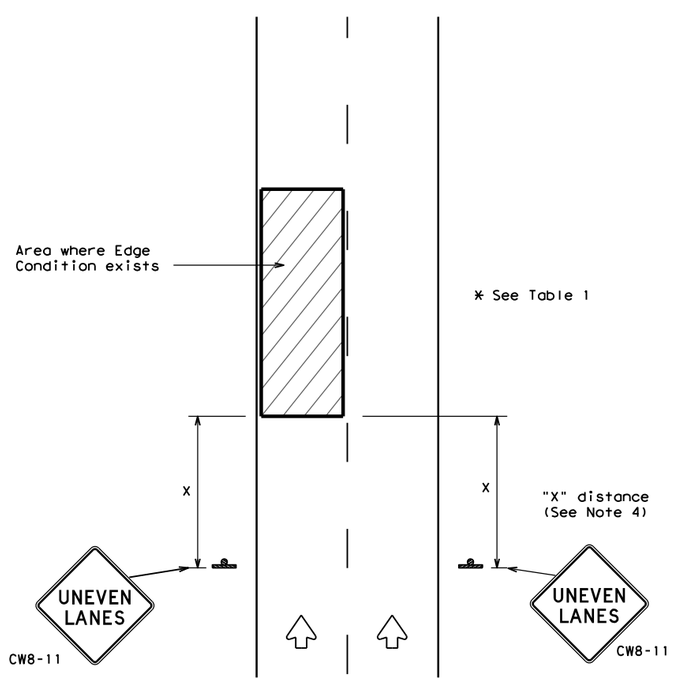
UNEVEN LANES
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
FOUR LANE CONVENTIONAL ROAD



NO CENTER LINE
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
DIVIDED ROADWAY

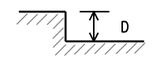
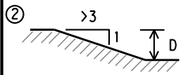
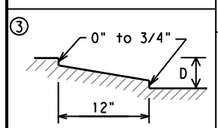
DEPARTMENTAL MATERIAL SPECIFICATIONS	
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240
TEMPORARY (REMOVABLE) PREFABRICATED PAVEMENT MARKINGS	DMS-8241
SIGN FACE MATERIALS	DMS-8300

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

GENERAL NOTES

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

TABLE 1

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

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

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

Texas Department of Transportation

Traffic Operations Division Standard

SIGNING FOR UNEVEN LANES

WZ(UL)-13

FILE: wzul-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 1992	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	032	FM 794
8-95 2-98 7-13	DIST	COUNTY		SHEET NO.
1-97 3-03	YKM	GONZALES		71

DATE: 3/25/2021 8:42:08 AM
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DATE: 3/25/2021
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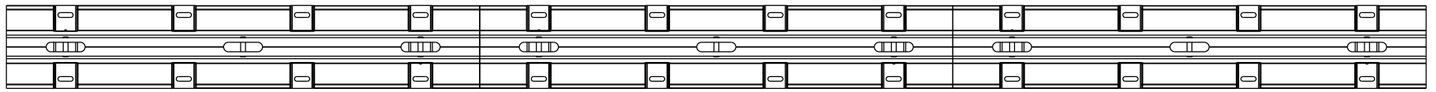
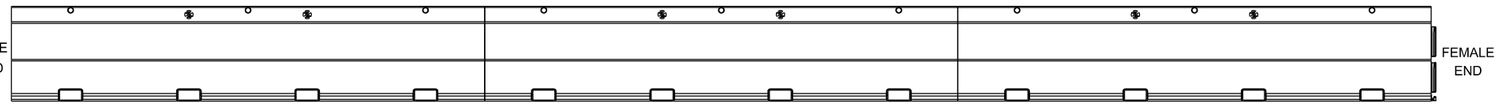
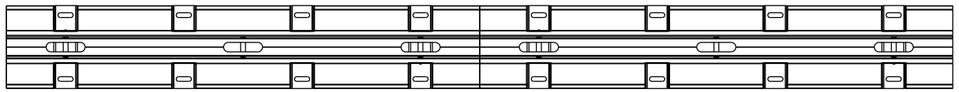


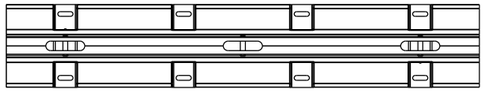
PLAN VIEW



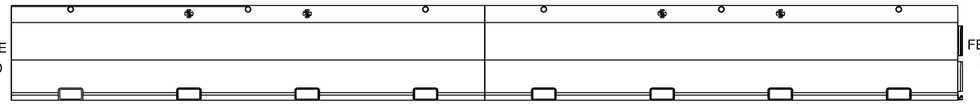
ELEVATION VIEW
ZONEGUARD STANDARD UNIT x 50'-0"



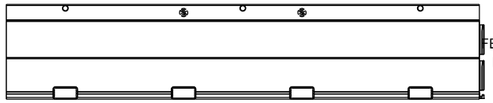
PLAN VIEW



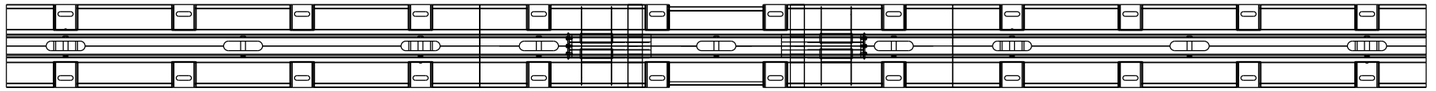
PLAN VIEW



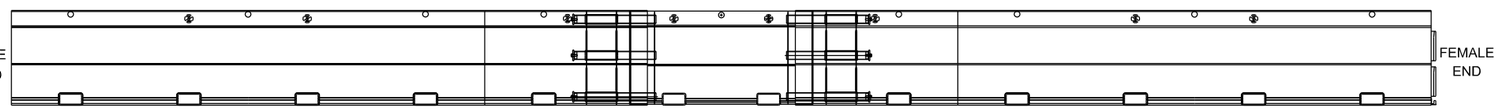
ELEVATION VIEW
ZONEGUARD STANDARD UNIT x 33'-4"



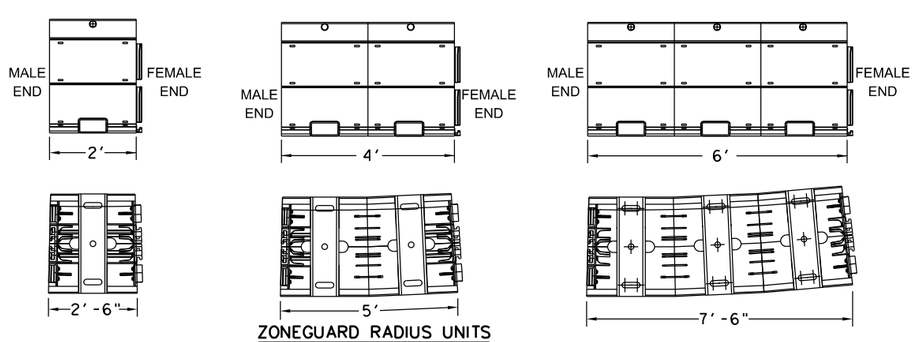
ELEVATION VIEW
ZONEGUARD STANDARD UNIT x 16'-8"



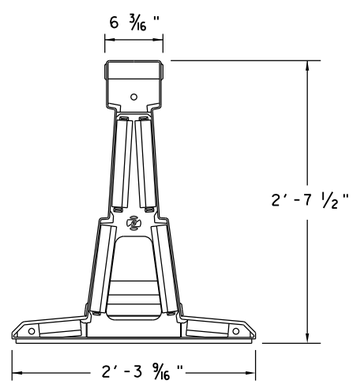
PLAN VIEW



ELEVATION VIEW
ZONEGUARD EXPANSION UNIT x 46'-5½"
(SEE GENERAL NOTE 5)



ZONEGUARD RADIUS UNITS



ZONEGUARD TYPICAL SECTION

GENERAL NOTES

1. FOR TECHNICAL AND APPLICATION SUPPORT PLEASE CONTACT HILL & SMITH INC. AT 614-340-6294.
2. ZONEGUARD HAS BEEN ACCEPTED BY FHWA AS A MASH TL-3 LONGITUDINAL BARRIER.
3. STANDARD INSTALLATIONS REQUIRE ANCHORING AT EACH END OF THE RUN. MINIMUM DEFLECTION INSTALLATIONS REQUIRE ANCHORING AT 33'-4 CENTERS. NO MODIFICATIONS ARE NECESSARY OTHER THAN INCREASED ANCHORING.
4. 50-0' UNITS CAN BE USED TO ACHIEVE DOWN TO AN 800' RADIUS CURVE. 16'-8" UNITS CAN BE USED TO ACHIEVE CURVES DOWN TO 250' RADIUS. SPECIAL SHORT UNITS (SHOWN) IN 2.5 DEGREE INCREMENTS CAN BE USED TO ACHIEVE DIRECTION CHANGES OR AT A FIXED RADIUS OF 47'-0".
5. HILL & SMITH OFFERS AN EXPANSION UNIT THAT CAN BE USED ACROSS A BRIDGE EXPANSION JOINT OR TO ACCOMMODATE THERMAL EXPANSION. THE UNIT IS ANCHORED IN THE MIDDLE, AND ADJUSTED ACCORDING TO THE TEMPERATURE AT THE TIME OF INSTALLATION. THE EXPANSION JOINT CAN BE USED WITH ENGINEER APPROVAL. THE EXPANSION UNIT HAS NOT BEEN ASSESSED TO MASH CRITERIA.
6. ANCHOR PINS ARE 1 ¼" DIAMETER. LENGTH IS 1'-8" FOR ASPHALT AND 1'-0" FOR CONCRETE. SEE ANCHORING TABLE FOR ADDITIONAL DETAILS.

	STANDARD INSTALLATION	MINIMUM DEFLECTION INSTALLATION CONCRETE	MINIMUM DEFLECTION INSTALLATION ASPHALT
	FOUR ANCHORS AT END OF THE RUN	TWO ANCHORS (ONE EACH SIDE) EVERY 33'-4"	TWO ANCHORS (ONE EACH SIDE) EVERY 33'-4"
MASH TL-3 DEFLECTION (2270 KG TRUCK @ 25° & 100 KM/HR)	6'-10"	5"	2'-0"

EXPECTED DEFLECTION TABLE

DESCRIPTION	ASPHALT	CONCRETE
1 1/4" PIN ANCHOR	1'-8" LONG, MINIMUM ASPHALT COVER OF 3"	1'-0" LONG, MINIMUM CONCRETE COVER OF 6"
1 1/4" ALL THREAD ANCHOR	-	1'-0" LONG, MINIMUM EMBEDMENT OF 6"

ANCHORING TABLE

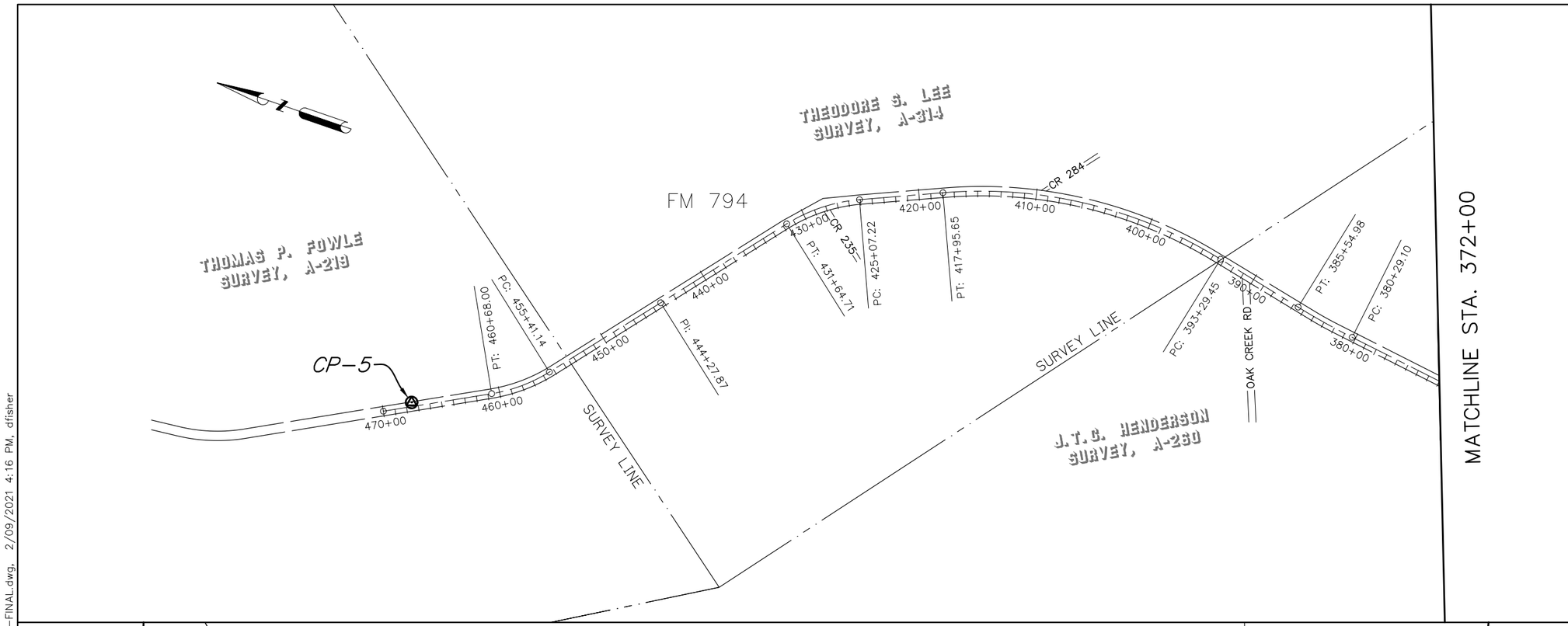
ALTERNATE ANCHORING METHODS CERTIFIED BY HILL & SMITH, INC. ARE AVAILABLE PER FHWA APPROVAL LETTER.

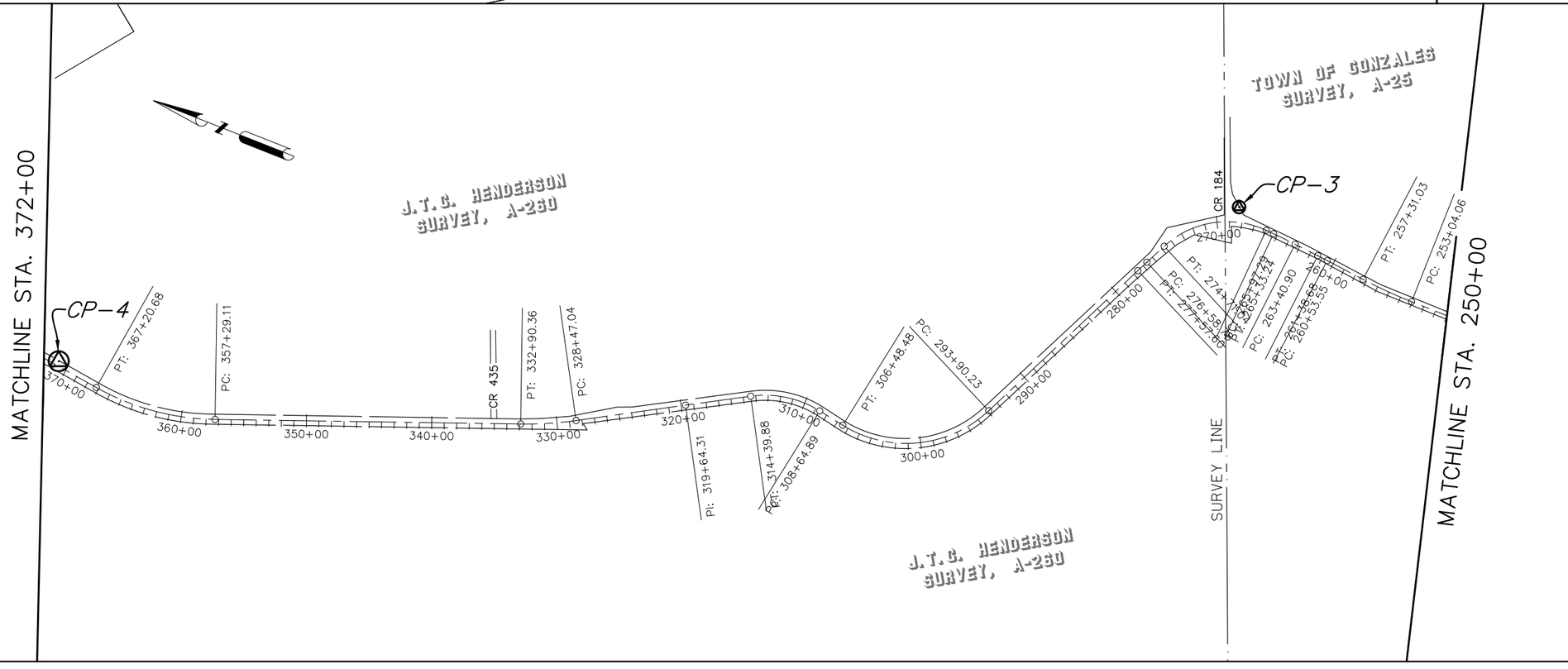
Texas Department of Transportation

Design Division Standard

ZONEGUARD SYSTEM
STEEL BARRIER
MASH TL-3
ZONEGUARD-19

FILE: zoneguard19	DN: TxDOT	CK: KM	DW: VP	CK: CGL
© TxDOT: JULY 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	032	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		72





GENERAL NOTES

1. ALL BEARINGS AND COORDINATES ARE REFERENCED TO THE TEXAS STATE PLANE COORDINATE SYSTEM OF 1983, TEXAS SOUTH CENTRAL ZONE 4204, NAD 83 (2011 ADJ.; EPOCK 2010.00) GEOID 12B, AND NAVD 88. ALL DISTANCES AND COORDINATES ARE SURFACE VALUES AND MAY BE CONVERTED TO GRID BY DIVIDING BY THE TXDOT COUNTYWIDE SURFACE ADJUSTMENT FACTOR OF 1.00013 (GONZALES COUNTY).
2. ALL PROJECT CONTROL ELEVATIONS ARE NAVD88 BASED ON GPS OBSERVATIONS USING THE TXDOT VRS SYSTEM. DIGITAL LEVEL LOOPS WERE RUN BETWEEN ALL CONTROL POINTS TO HOLD AN ELEVATION OF 409.44 ON CONTROL POINT 3.
3. ALL MEASUREMENTS ARE IN U.S. SURVEY FEET.
4. LAT/LONG GENERATED FROM GRID COORDINATES.

0 1000 2000

SCALE 1'=1000' (11"X17")
SCALE 1'=500' (22"X34")

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

2/9/2021

JONATHAN O. NOBLES RPLS NO. 5777
BGE, INC.
101 WEST LOUIS HENNA BLVD., SUITE 400
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Texas Department of Transportation

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FM 794

INDEX CONTROL

SHEET 1 OF 4

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			73
STATE	DIST.	COUNTY	
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CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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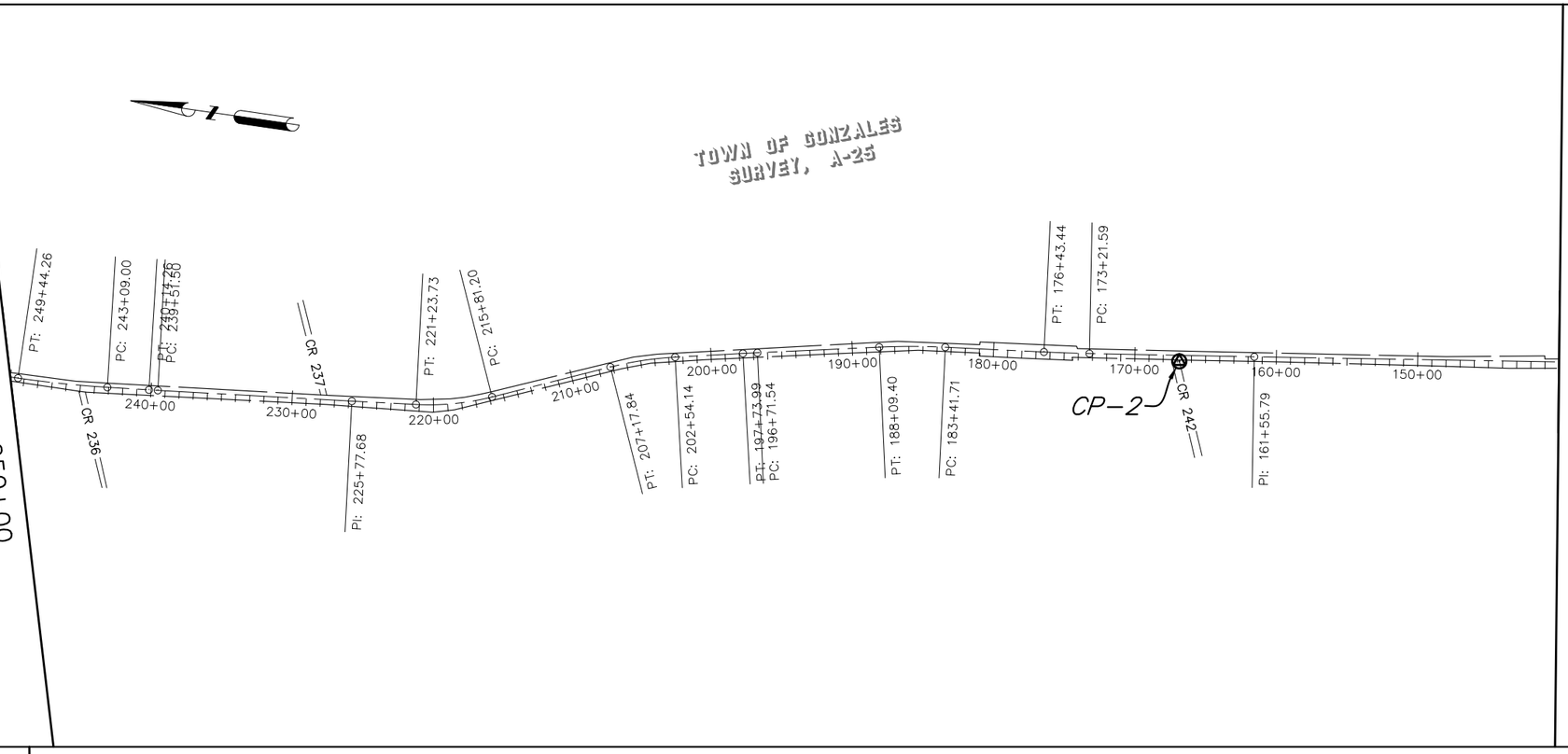

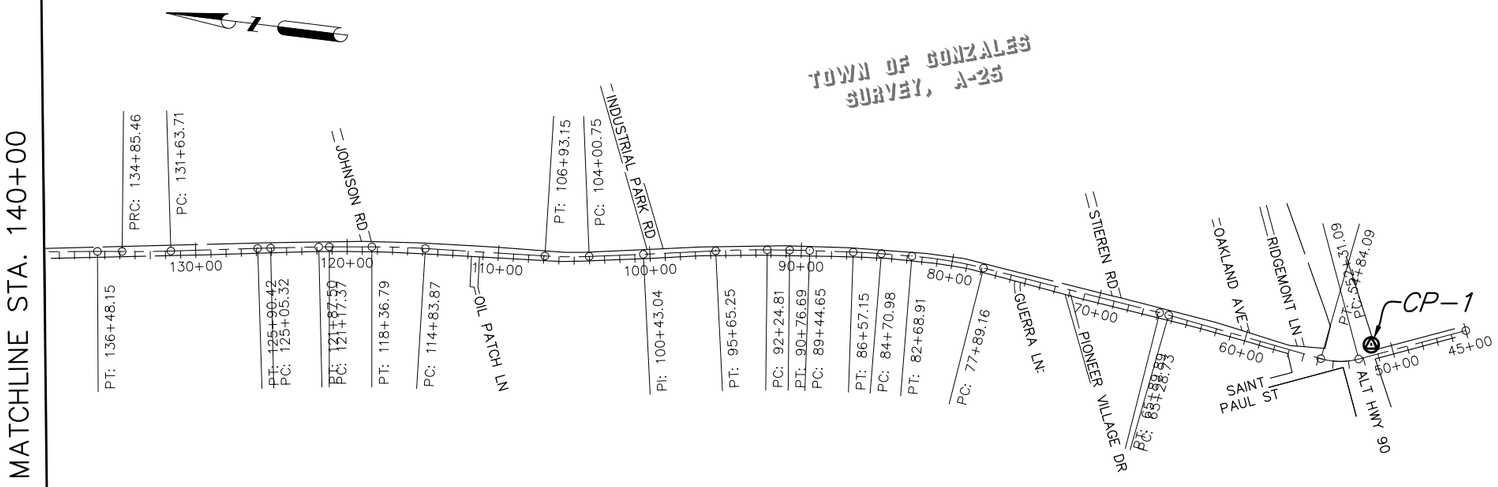

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INDEX CONTROL

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			74
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

CONTROL BEARING TABLE			
FROM	TO	BEARING	DISTANCE
CP–1	CP–2	N 04°10'44" W	11,456.74'
CP–2	CP–3	N 06°13'55" W	10,087.32'
CP–3	CP–4	N 29°00'04" W	9,498.77'
CP–4	CP–5	N 20°01'58" W	8,850.06'

POINT TABLE						
POINT NO.	NORTHING	EASTING	ELEVATION	STATION	OFFSET	DESCRIPTION
1	13,740,333.438	2,459,252.552	351.79'	51+27.27	69.26' RT	1/2" IRON ROD W/ "BGE TRAV" CAP IN CONCRETE
2	13,751,759.721	2,458,417.673	375.40'	166+85.38	42.73' LT	1/2" IRON ROD W/ "BGE TRAV" CAP IN CONCRETE
3	13,761,787.436	2,457,322.659	409.44'	268+37.33	121.72' RT	1/2" IRON ROD W/ "BGE TRAV" CAP IN CONCRETE
4	13,770,095.157	2,452,717.394	416.21'	370+85.00	36.24' RT	1/2" IRON ROD W/ "BGE TRAV" CAP IN CONCRETE
5	13,778,409.765	2,449,685.745	389.56'	467+51.25	35.10' RT	1/2" IRON ROD W/ "BGE TRAV" CAP IN CONCRETE

POINT TABLE (GRID/GEODETIC)				
POINT NO.	NORTHING	EASTING	LATITUDE	LONGITUDE
1	13,738,547.427	2,458,932.891	N29°30'59.16"	W97°27'28.41"
2	13,749,972.225	2,458,098.120	N29°32'52.37"	W97°27'36.16"
3	13,759,998.636	2,457,003.248	N29°34'31.77"	W97°27'47.06"
4	13,768,305.277	2,452,398.583	N29°35'54.60"	W97°28'37.99"
5	13,776,618.805	2,449,367.327	N29°37'17.29"	W97°29'11.10"

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STATE OF TEXAS
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INDEX CONTROL

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
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STATE	DIST.	COUNTY	
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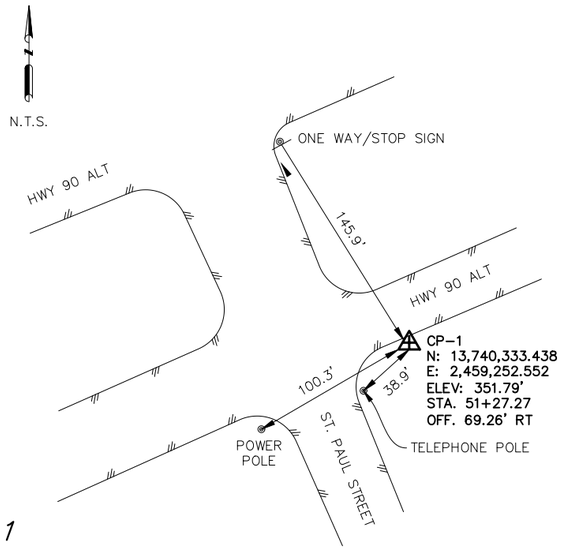
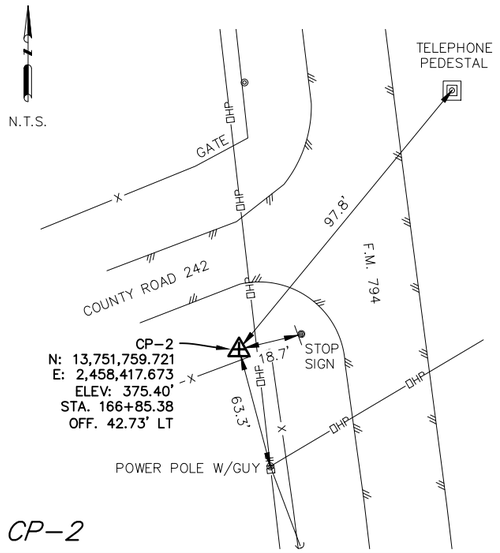
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794



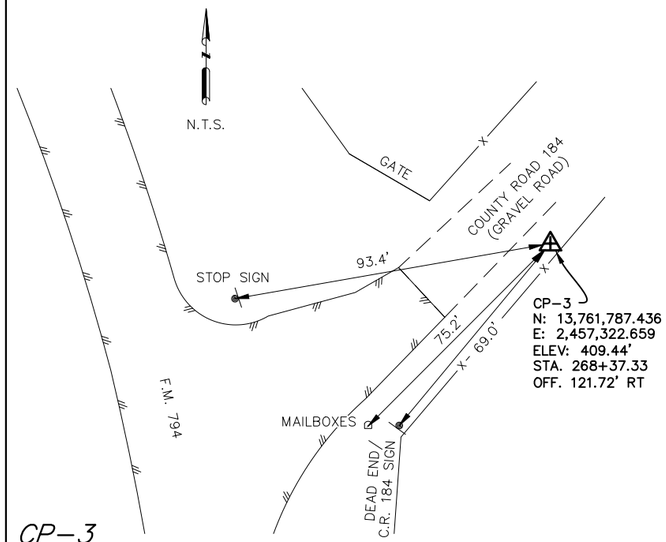
CP-1

SET 1/2-INCH IRON ROD WITH PLASTIC CAP STAMPED "BGE TRAV" IN CONCRETE ON THE SOUTH SIDE OF ALTERNATE HIGHWAY 90 AT THE SOUTHEAST CORNER OF THE INTERSECTION WITH ST PAUL ST, BEING 145.9 FEET SOUTHEAST OF A ONE WAY/STOP SIGN, 100.3 FEET NORTHEAST OF A POWER POLE, AND 38.9 FEET NORTHEAST OF A TELEPHONE POLE.
(ESTABLISHED 06/01/2020)



CP-2

SET 1/2-INCH IRON ROD WITH PLASTIC CAP STAMPED "BGE TRAV" IN CONCRETE ON THE WEST SIDE OF F.M. 794 AT THE SOUTHWEST CORNER OF THE INTERSECTION WITH COUNTY ROAD 242, BEING 97.8 FEET SOUTHWEST OF A TELEPHONE PEDESTAL LOCATED ON THE EAST SIDE OF F.M. 794, 63.3 FEET NORTH OF A POWER POLE WITH GUY ANCHOR, AND 18.7 FEET WEST OF A STOP SIGN.
(ESTABLISHED 06/06/2020)

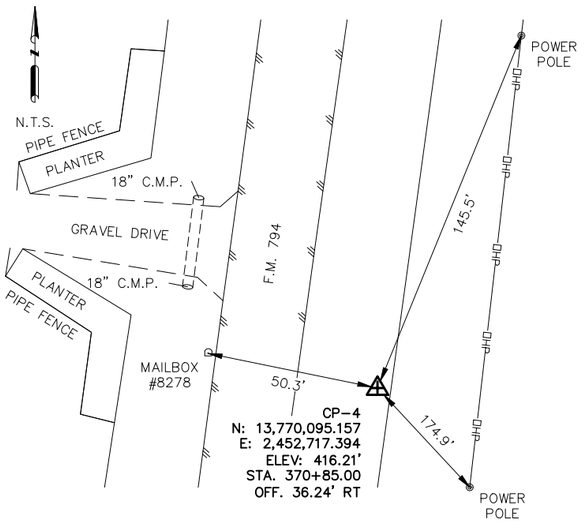


CP-3

SET 1/2-INCH IRON ROD WITH PLASTIC CAP STAMPED "BGE TRAV" IN CONCRETE ON THE SOUTHEAST SIDE OF COUNTY ROAD 184 AT THE EAST CORNER OF THE INTERSECTION WITH F.M. 794, BEING 93.4 FEET EAST OF A STOP SIGN, 75.2 FEET NORTHEAST OF A CLUSTER OF FOUR MAILBOXES, AND 69.0 FEET NORTHEAST OF A DEAD END/COUNTY ROAD 184 SIGN.
(ESTABLISHED 06/01/2020)

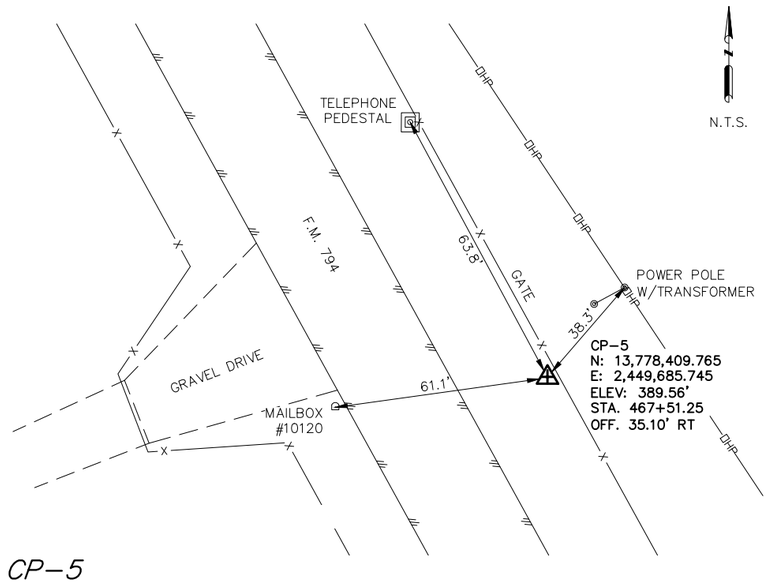
GENERAL NOTES

1. ALL BEARINGS AND COORDINATES ARE REFERENCED TO THE TEXAS STATE PLANE COORDINATE SYSTEM OF 1983, TEXAS SOUTH CENTRAL ZONE 4204, NAD 83 (2011 ADJ.; EPOCK 2010.00) GEOID 12B, AND NAVD 88. ALL DISTANCES AND COORDINATES ARE SURFACE VALUES AND MAY BE CONVERTED TO GRID BY DIVIDING BY THE TXDOT COUNTYWIDE SURFACE ADJUSTMENT FACTOR OF 1.00013 (GONZALES COUNTY).
2. ALL PROJECT CONTROL ELEVATIONS ARE NAVD88 BASED ON GPS OBSERVATIONS USING THE TXDOT VRS SYSTEM. DIGITAL LEVEL LOOPS WERE RUN BETWEEN ALL CONTROL POINTS TO HOLD AN ELEVATION OF 409.44 ON CONTROL POINT 3.
3. ALL MEASUREMENTS ARE IN U.S. SURVEY FEET.
4. LAT/LONG GENERATED FROM GRID COORDINATES.



CP-4

SET 1/2-INCH IRON ROD WITH PLASTIC CAP STAMPED "BGE TRAV" IN CONCRETE ON THE EAST SIDE OF F.M. 794, APPROXIMATELY 1,950 FEET SOUTH OF THE INTERSECTION WITH OAK CREEK DRIVE, BEING 174.9 FEET NORTHWEST OF A POWER POLE, 145.5 FEET SOUTHWEST OF A POWER POLE, AND 50.3 FEET EAST OF MAILBOX #8278.
(ESTABLISHED 06/06/2020)



CP-5

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

LEGEND

N.T.S.	NOT TO SCALE
	CONTROL POINT
	MAILBOX
	TELEPHONE PEDESTAL
	SIGN
	POWER POLE
	GUY ANCHOR
	EDGE OF ASPHALT
DHP	OVERHEAD POWER
X	BARBED WIRE FENCE

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

2/9/2021

JONATHAN O. NOBLES RPLS NO. 5777
BGE, INC.
101 WEST LOUIS HENNA BLVD., SUITE 400
AUSTIN, TEXAS 78728
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Texas Department of Transportation

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

FM 794

INDEX CONTROL

SHEET 4 OF 4

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			76
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

G:\TXC\Projects\TxDOT\7313-04 FM 794\06_Survey\04_Finals\Control Sheets\7313-04_Control Sheet Index-FINAL.dwg, 2/09/2021 4:16 PM, dfisher

HORIZONTAL ALIGNMENT DATA

FM 794

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*        1   DESCRIBE CHAIN FM794

Chain FM794 contains:
 FM794 CUR FM7941 CUR FM7942 CUR FM7943 CUR FM7944 CUR FM7945 CUR FM7946 FM795 -
CUR FM7947 CUR FM7948 CUR FM7949 CUR FM79410 CUR FM79411 CUR FM79412 FM796 CUR -
FM79413 CUR FM79414 CUR FM79415 CUR FM79416 CUR FM79417 FM797 CUR FM79418 CUR F-
M79419 CUR FM79420 CUR FM79421 CUR FM79422 CUR FM79423 CUR FM79424 CUR FM79425 -
CUR FM79426 FM798 CUR FM79427 CUR FM79428 CUR FM79429 CUR FM79430 CUR FM79431 F-
M799 CUR FM79432 FM802

Beginning chain FM794 description
================================================================================

Point FM794          N    13,739,725.46 E     2,459,421.77 Sta      45+00.00

Course from FM794 to PC FM7941 N 21° 51' 15.72" W Dist 731.09

                                  Curve Data
                                 *----------*
Curve FM7941
P.I.  Station            53+60.73  N       13,740,524.34  E       2,459,101.37
Delta       =       30° 50' 32.07" (RT)
Degree      =       12° 11' 26.13"
Tangent     =               129.65
Length      =               253.00
Radius      =               470.00
External    =                17.55
Long Chord  =               249.96
Mid. Ord.   =                16.92
P.C.  Station            52+31.09  N       13,740,404.01  E       2,459,149.63
P.T.  Station            54+84.09  N       13,740,652.39  E       2,459,121.62
C.C.                               N       13,740,578.97  E       2,459,585.85
Back        = N  21° 51' 15.72" W
Ahead       = N   8° 59' 16.35" E
Chord Bear  = N   6° 25' 59.68" W

Course from PT FM7941 to PC FM7942 N 8° 59' 16.35" E Dist 1,044.64

                                  Curve Data
                                 *----------*
Curve FM7942
P.I.  Station            65+59.31  N       13,741,714.41  E       2,459,289.60
Delta       =       1° 45' 07.56" (LT)
Degree      =       2° 51' 53.24"
Tangent     =                30.58
Length      =                61.16
Radius      =            2,000.00
External    =                 0.23
Long Chord  =                61.16
Mid. Ord.   =                 0.23
P.C.  Station            65+28.73  N       13,741,684.21  E       2,459,284.82
P.T.  Station            65+89.89  N       13,741,744.75  E       2,459,293.45
C.C.                               N       13,741,996.66  E       2,457,309.38
Back        = N   8° 59' 16.35" E
Ahead       = N   7° 14' 08.79" E
Chord Bear  = N   8° 06' 42.57" E

Course from PT FM7942 to PC FM7943 N 7° 14' 08.79" E Dist 1,199.27

                                  Curve Data
                                 *----------*
Curve FM7943
P.I.  Station            80+29.59  N       13,743,172.99  E       2,459,474.78
Delta       =       9° 35' 40.53" (LT)
Degree      =       1° 59' 59.72"
Tangent     =               240.44
Length      =               479.75
Radius      =            2,864.90
External    =                10.07
Long Chord  =               479.19
Mid. Ord.   =                10.04
P.C.  Station            77+89.16  N       13,742,934.47  E       2,459,444.50
P.T.  Station            82+68.91  N       13,743,413.22  E       2,459,464.89
C.C.                               N       13,743,295.31  E       2,456,602.42
Back        = N   7° 14' 08.79" E
Ahead       = N   2° 21' 31.75" W
Chord Bear  = N   2° 26' 18.52" E

Course from PT FM7943 to PC FM7944 N 2° 21' 31.75" W Dist 202.08
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FM 794 CONT.

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                                  Curve Data
                                 *----------*
Curve FM7944
P.I.  Station            85+64.08  N       13,743,708.15  E       2,459,452.74
Delta       =       2° 39' 59.70" (LT)
Degree      =       1° 25' 56.62"
Tangent     =                93.10
Length      =               186.16
Radius      =            4,000.00
External    =                 1.08
Long Chord  =               186.15
Mid. Ord.   =                 1.08
P.C.  Station            84+70.98  N       13,743,615.13  E       2,459,456.57
P.T.  Station            86+57.15  N       13,743,800.89  E       2,459,444.58
C.C.                               N       13,743,450.50  E       2,455,459.96
Back        = N   2° 21' 31.75" W
Ahead       = N   5° 01' 31.45" W
Chord Bear  = N   3° 41' 31.60" W

Course from PT FM7944 to PC FM7945 N 5° 01' 31.45" W Dist 287.50

                                  Curve Data
                                 *----------*
Curve FM7945
P.I.  Station            90+10.67  N       13,744,153.06  E       2,459,413.62
Delta       =       1° 19' 13.45" (LT)
Degree      =       0° 59' 59.99"
Tangent     =                66.02
Length      =               132.04
Radius      =            5,729.60
External    =                 0.38
Long Chord  =               132.04
Mid. Ord.   =                 0.38
P.C.  Station            89+44.65  N       13,744,087.29  E       2,459,419.40
P.T.  Station            90+76.69  N       13,744,218.68  E       2,459,406.32
C.C.                               N       13,743,585.39  E       2,453,711.82
Back        = N   5° 01' 31.45" W
Ahead       = N   6° 20' 44.89" W
Chord Bear  = N   5° 41' 08.17" W

Course from PT FM7945 to PC FM7946 N 6° 20' 44.89" W Dist 148.12

                                  Curve Data
                                 *----------*
Curve FM7946
P.I.  Station            93+95.08  N       13,744,535.11  E       2,459,371.13
Delta       =       3° 24' 15.74" (LT)
Degree      =       0° 59' 59.99"
Tangent     =               170.27
Length      =               340.44
Radius      =            5,729.60
External    =                 2.53
Long Chord  =               340.39
Mid. Ord.   =                 2.53
P.C.  Station            92+24.81  N       13,744,365.89  E       2,459,389.95
P.T.  Station            95+65.25  N       13,744,702.92  E       2,459,342.29
C.C.                               N       13,743,732.60  E       2,453,695.45
Back        = N   6° 20' 44.89" W
Ahead       = N   9° 45' 00.64" W
Chord Bear  = N   8° 02' 52.76" W

Course from PT FM7946 to FM795 N 9° 45' 00.64" W Dist 477.80

Point FM795          N    13,745,173.82 E     2,459,261.38 Sta     100+43.04

Course from FM795 to PC FM7947 N 9° 15' 49.51" W Dist 357.71

                                  Curve Data
                                 *----------*
Curve FM7947
P.I.  Station           105+47.08  N       13,745,671.28  E       2,459,180.24
Delta       =       5° 50' 51.52" (RT)
Degree      =       1° 59' 59.72"
Tangent     =               146.32
Length      =               292.39
Radius      =            2,864.90
External    =                 3.73
Long Chord  =               292.27
Mid. Ord.   =                 3.73
P.C.  Station           104+00.75  N       13,745,526.86  E       2,459,203.79
P.T.  Station           106+93.15  N       13,745,817.34  E       2,459,171.52
C.C.                               N       13,745,988.05  E       2,462,031.33
Back        = N   9° 15' 49.51" W
Ahead       = N   3° 24' 57.98" W
Chord Bear  = N   6° 20' 23.74" W

Course from PT FM7947 to PC FM7948 N 3° 24' 57.98" W Dist 790.72
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FM 794 CONT.

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                                  Curve Data
                                 *----------*
Curve FM7948
P.I.  Station           116+60.39  N       13,746,782.86  E       2,459,113.88
Delta       =       3° 31' 45.10" (LT)
Degree      =       0° 59' 59.99"
Tangent     =               176.52
Length      =               352.92
Radius      =            5,729.60
External    =                 2.72
Long Chord  =               352.86
Mid. Ord.   =                 2.72
P.C.  Station           114+83.87  N       13,746,606.66  E       2,459,124.40
P.T.  Station           118+36.79  N       13,746,958.08  E       2,459,092.54
C.C.                               N       13,746,265.25  E       2,453,404.98
Back        = N   3° 24' 57.98" W
Ahead       = N   6° 56' 43.08" W
Chord Bear  = N   5° 10' 50.53" W

Course from PT FM7948 to PC FM7949 N 6° 56' 43.08" W Dist 280.59

                                  Curve Data
                                 *----------*
Curve FM7949
P.I.  Station           121+52.44  N       13,747,271.42  E       2,459,054.37
Delta       =       1° 20' 21.43" (LT)
Degree      =       1° 54' 35.49"
Tangent     =                35.06
Length      =                70.12
Radius      =            3,000.00
External    =                 0.20
Long Chord  =                70.12
Mid. Ord.   =                 0.20
P.C.  Station           121+17.37  N       13,747,236.61  E       2,459,058.61
P.T.  Station           121+87.50  N       13,747,306.11  E       2,459,049.32
C.C.                               N       13,746,873.84  E       2,456,080.62
Back        = N   6° 56' 43.08" W
Ahead       = N   8° 17' 04.51" W
Chord Bear  = N   7° 36' 53.80" W

Course from PT FM7949 to PC FM79410 N 8° 17' 04.51" W Dist 317.82
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3/25/2021

Texas Department of Transportation

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TBPE Registration No. F-1046

FM 794

HORIZONTAL ALIGNMENT DATA

SHEET 1 OF 6

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			77
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

HORIZONTAL ALIGNMENT DATA

FM 794 CONT.

Curve Data

Curve FM79410						
P.I. Station	125+47.87	N	13,747,662.72	E	2,458,997.39	
Delta =	0° 26′ 21.45"	(LT)				
Degree =	0° 30′ 58.24"					
Tangent =	42.55					
Length =	85.10					
Radius =	11,100.00					
External =	0.08					
Long Chord =	85.10					
Mid. Ord. =	0.08					
P.C. Station	125+05.32	N	13,747,620.61	E	2,459,003.52	
P.T. Station	125+90.42	N	13,747,704.78	E	2,458,990.94	
C.C.		N	13,746,021.22	E	2,448,019.36	
Back = N	8° 17′ 04.51" W					
Ahead = N	8° 43′ 25.96" W					
Chord Bear = N	8° 30′ 15.24" W					

Course from PT FM79410 to PC FM79411 N 8° 43′ 25.96" W Dist 573.29

Curve Data

Curve FM79411						
P.I. Station	133+24.61	N	13,748,430.48	E	2,458,879.58	
Delta =	2° 18′ 15.55"	(RT)				
Degree =	0° 42′ 58.31"					
Tangent =	160.89					
Length =	321.74					
Radius =	8,000.00					
External =	1.62					
Long Chord =	321.72					
Mid. Ord. =	1.62					
P.C. Station	131+63.71	N	13,748,271.44	E	2,458,903.98	
P.T. Station	134+85.46	N	13,748,590.36	E	2,458,861.59	
C.C.		N	13,749,484.83	E	2,466,811.43	
Back = N	8° 43′ 25.96" W					
Ahead = N	6° 25′ 10.41" W					
Chord Bear = N	7° 34′ 18.19" W					

Curve Data

Curve FM79412						
P.I. Station	135+66.81	N	13,748,671.20	E	2,458,852.50	
Delta =	0° 50′ 23.26"	(LT)				
Degree =	0° 30′ 58.24"					
Tangent =	81.35					
Length =	162.69					
Radius =	11,100.00					
External =	0.30					
Long Chord =	162.69					
Mid. Ord. =	0.30					
P.C. Station	134+85.46	N	13,748,590.36	E	2,458,861.59	
P.T. Station	136+48.15	N	13,748,751.90	E	2,458,842.22	
C.C.		N	13,747,349.29	E	2,447,831.19	
Back = N	6° 25′ 10.41" W					
Ahead = N	7° 15′ 33.67" W					
Chord Bear = N	6° 50′ 22.04" W					

Course from PT FM79412 to FM796 N 7° 15′ 33.67" W Dist 2,507.64

Point FM796 N 13,751,239.43 E 2,458,525.35 Sta 161+55.79

Course from FM796 to PC FM79413 N 7° 04′ 46.76" W Dist 1,165.80

Curve Data

Curve FM79413						
P.I. Station	174+82.53	N	13,752,556.06	E	2,458,361.83	
Delta =	1° 36′ 33.40"	(RT)				
Degree =	0° 30′ 00.02"					
Tangent =	160.94					
Length =	321.85					
Radius =	11,459.00					
External =	1.13					
Long Chord =	321.84					
Mid. Ord. =	1.13					
P.C. Station	173+21.59	N	13,752,396.35	E	2,458,381.67	
P.T. Station	176+43.44	N	13,752,716.26	E	2,458,346.49	
C.C.		N	13,753,808.66	E	2,469,753.30	
Back = N	7° 04′ 46.76" W					
Ahead = N	5° 28′ 13.36" W					
Chord Bear = N	6° 16′ 30.06" W					

Course from PT FM79413 to PC FM79414 N 5° 28′ 13.36" W Dist 698.26

FM 794 CONT.

Curve Data

Curve FM79414						
P.I. Station	185+75.72	N	13,753,644.29	E	2,458,257.61	
Delta =	5° 21′ 33.68"	(LT)				
Degree =	1° 08′ 45.30"					
Tangent =	234.02					
Length =	467.69					
Radius =	5,000.00					
External =	5.47					
Long Chord =	467.52					
Mid. Ord. =	5.47					
P.C. Station	183+41.71	N	13,753,411.34	E	2,458,279.92	
P.T. Station	188+09.40	N	13,753,874.14	E	2,458,213.64	
C.C.		N	13,752,934.69	E	2,453,302.69	
Back = N	5° 28′ 13.36" W					
Ahead = N	10° 49′ 47.04" W					
Chord Bear = N	8° 09′ 00.20" W					

Course from PT FM79414 to PC FM79415 N 10° 49′ 47.04" W Dist 862.14

Curve Data

Curve FM79415						
P.I. Station	197+22.77	N	13,754,771.24	E	2,458,042.03	
Delta =	0° 31′ 43.82"	(LT)				
Degree =	0° 30′ 58.24"					
Tangent =	51.23					
Length =	102.45					
Radius =	11,100.00					
External =	0.12					
Long Chord =	102.45					
Mid. Ord. =	0.12					
P.C. Station	196+71.54	N	13,754,720.93	E	2,458,051.66	
P.T. Station	197+73.99	N	13,754,821.47	E	2,458,031.94	
C.C.		N	13,752,635.34	E	2,447,149.35	
Back = N	10° 49′ 47.04" W					
Ahead = N	11° 21′ 30.86" W					
Chord Bear = N	11° 05′ 38.95" W					

Course from PT FM79415 to PC FM79416 N 11° 21′ 30.86" W Dist 480.15

Curve Data

Curve FM79416						
P.I. Station	204+86.72	N	13,755,520.23	E	2,457,891.57	
Delta =	11° 04′ 12.29"	(LT)				
Degree =	2° 23′ 14.37"					
Tangent =	232.58					
Length =	463.70					
Radius =	2,400.00					
External =	11.24					
Long Chord =	462.98					
Mid. Ord. =	11.19					
P.C. Station	202+54.14	N	13,755,292.21	E	2,457,937.38	
P.T. Station	207+17.84	N	13,755,735.21	E	2,457,802.84	
C.C.		N	13,754,819.53	E	2,455,584.38	
Back = N	11° 21′ 30.86" W					
Ahead = N	22° 25′ 43.15" W					
Chord Bear = N	16° 53′ 37.00" W					

Course from PT FM79416 to PC FM79417 N 22° 25′ 43.15" W Dist 863.35

Curve Data

Curve FM79417						
P.I. Station	218+54.52	N	13,756,785.90	E	2,457,369.16	
Delta =	17° 10′ 40.05"	(RT)				
Degree =	3° 09′ 58.36"					
Tangent =	273.32					
Length =	542.53					
Radius =	1,809.60					
External =	20.52					
Long Chord =	540.50					
Mid. Ord. =	20.29					
P.C. Station	215+81.20	N	13,756,533.26	E	2,457,473.44	
P.T. Station	221+23.73	N	13,757,058.07	E	2,457,344.15	
C.C.		N	13,757,223.68	E	2,459,146.15	
Back = N	22° 25′ 43.15" W					
Ahead = N	5° 15′ 03.10" W					
Chord Bear = N	13° 50′ 23.12" W					

Course from PT FM79417 to FM797 N 5° 15′ 03.10" W Dist 453.95

Point FM797 N 13,757,510.11 E 2,457,302.60 Sta 225+77.68

Course from FM797 to PC FM79418 N 5° 02′ 42.39" W Dist 1,373.82

FM 794 CONT.

Curve Data

Curve FM79418						
P.I. Station	239+82.88	N	13,758,909.87	E	2,457,179.03	
Delta =	0° 19′ 26.12"	(RT)				
Degree =	0° 30′ 58.24"					
Tangent =	31.38					
Length =	62.75					
Radius =	11,100.00					
External =	0.04					
Long Chord =	62.75					
Mid. Ord. =	0.04					
P.C. Station	239+51.50	N	13,758,878.61	E	2,457,181.79	
P.T. Station	240+14.26	N	13,758,941.14	E	2,457,176.45	
C.C.		N	13,759,854.75	E	2,468,238.78	
Back = N	5° 02′ 42.39" W					
Ahead = N	4° 43′ 16.27" W					
Chord Bear = N	4° 52′ 59.33" W					

Course from PT FM79418 to PC FM79419 N 4° 43′ 16.27" W Dist 294.75

Curve Data

Curve FM79419						
P.I. Station	246+26.81	N	13,759,551.62	E	2,457,126.03	
Delta =	4° 45′ 51.91"	(RT)				
Degree =	0° 44′ 59.98"					
Tangent =	317.81					
Length =	635.26					
Radius =	7,639.50					
External =	6.61					
Long Chord =	635.08					
Mid. Ord. =	6.60					
P.C. Station	243+09.00	N	13,759,234.88	E	2,457,152.19	
P.T. Station	249+44.26	N	13,759,869.43	E	2,457,126.27	
C.C.		N	13,759,863.67	E	2,464,765.77	
Back = N	4° 43′ 16.27" W					
Ahead = N	0° 02′ 35.64" E					
Chord Bear = N	2° 20′ 20.31" W					

Course from PT FM79419 to PC FM79420 N 0° 02′ 35.64" E Dist 359.80

STATE OF TEXAS
JOHN W. TULEY
102441
LICENSED
PROFESSIONAL ENGINEER

3/25/2021

Texas Department of Transportation

BGE, Inc.
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TBPE Registration No. F-1046

FM 794

HORIZONTAL ALIGNMENT DATA

FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
6		78

STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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HORIZONTAL ALIGNMENT DATA

FM 794 CONT.

Curve Data

Curve FM79420					
P.I. Station	255+17.75	N	13,760,442.92	E	2,457,126.70
Delta =	6° 06′ 57.06" (RT)				
Degree =	1° 25′ 56.62"				
Tangent =	213.69				
Length =	426.97				
Radius =	4,000.00				
External =	5.70				
Long Chord =	426.76				
Mid. Ord. =	5.70				
P.C. Station	253+04.06	N	13,760,229.23	E	2,457,126.54
P.T. Station	257+31.03	N	13,760,655.37	E	2,457,149.63
C.C.		N	13,760,226.21	E	2,461,126.54
Back = N	0° 02′ 35.64" E				
Ahead = N	6° 09′ 32.69" E				
Chord Bear = N	3° 06′ 04.17" E				

Course from PT FM79420 to PC FM79421 N 6° 09′ 32.69" E Dist 322.52

Curve Data

Curve FM79421					
P.I. Station	260+96.11	N	13,761,018.35	E	2,457,188.80
Delta =	0° 51′ 04.66" (LT)				
Degree =	0° 59′ 59.99"				
Tangent =	42.57				
Length =	85.13				
Radius =	5,729.60				
External =	0.16				
Long Chord =	85.13				
Mid. Ord. =	0.16				
P.C. Station	260+53.55	N	13,760,976.03	E	2,457,184.23
P.T. Station	261+38.68	N	13,761,060.73	E	2,457,192.73
C.C.		N	13,761,590.75	E	2,451,487.70
Back = N	6° 09′ 32.69" E				
Ahead = N	5° 18′ 28.04" E				
Chord Bear = N	5° 44′ 00.37" E				

Course from PT FM79421 to PC FM79422 N 5° 18′ 28.04" E Dist 202.23

Curve Data

Curve FM79422					
P.I. Station	264+37.08	N	13,761,357.86	E	2,457,220.34
Delta =	1° 55′ 24.30" (LT)				
Degree =	0° 59′ 59.99"				
Tangent =	96.18				
Length =	192.34				
Radius =	5,729.60				
External =	0.81				
Long Chord =	192.33				
Mid. Ord. =	0.81				
P.C. Station	263+40.90	N	13,761,262.09	E	2,457,211.44
P.T. Station	265+33.24	N	13,761,453.87	E	2,457,226.02
C.C.		N	13,761,792.11	E	2,451,506.41
Back = N	5° 18′ 28.04" E				
Ahead = N	3° 23′ 03.74" E				
Chord Bear = N	4° 20′ 45.89" E				

Course from PT FM79422 to PC FM79423 N 3° 23′ 03.74" E Dist 64.04

Curve Data

Curve FM79423					
P.I. Station	270+93.16	N	13,762,012.81	E	2,457,259.07
Delta =	67° 39′ 07.02" (LT)				
Degree =	7° 44′ 33.62"				
Tangent =	495.87				
Length =	873.75				
Radius =	740.00				
External =	150.78				
Long Chord =	823.87				
Mid. Ord. =	125.26				
P.C. Station	265+97.29	N	13,761,517.80	E	2,457,229.80
P.T. Station	274+71.04	N	13,762,228.10	E	2,456,812.37
C.C.		N	13,761,561.49	E	2,456,491.09
Back = N	3° 23′ 03.74" E				
Ahead = N	64° 16′ 03.28" W				
Chord Bear = N	30° 26′ 29.77" W				

Course from PT FM79423 to PC FM79424 N 64° 16′ 03.28" W Dist 187.74

FM 794 CONT.

Curve Data

Curve FM79424					
P.I. Station	277+08.19	N	13,762,331.07	E	2,456,598.74
Delta =	0° 30′ 36.21" (LT)				
Degree =	0° 30′ 58.24"				
Tangent =	49.41				
Length =	98.81				
Radius =	11,100.00				
External =	0.11				
Long Chord =	98.81				
Mid. Ord. =	0.11				
P.C. Station	276+58.78	N	13,762,309.61	E	2,456,643.25
P.T. Station	277+57.60	N	13,762,352.12	E	2,456,554.04
C.C.		N	13,752,310.38	E	2,451,823.97
Back = N	64° 16′ 03.28" W				
Ahead = N	64° 46′ 39.49" W				
Chord Bear = N	64° 31′ 21.39" W				

Course from PT FM79424 to PC FM79425 N 64° 46′ 39.49" W Dist 1,632.63

Curve Data

Curve FM79425					
P.I. Station	301+28.14	N	13,763,362.29	E	2,454,409.51
Delta =	75° 05′ 45.46" (RT)				
Degree =	5° 58′ 05.92"				
Tangent =	737.91				
Length =	1,258.24				
Radius =	960.00				
External =	250.83				
Long Chord =	1,170.10				
Mid. Ord. =	198.87				
P.C. Station	293+90.23	N	13,763,047.84	E	2,455,077.07
P.T. Station	306+48.48	N	13,764,088.26	E	2,454,541.68
C.C.		N	13,763,916.31	E	2,455,486.15
Back = N	64° 46′ 39.49" W				
Ahead = N	10° 19′ 05.97" E				
Chord Bear = N	27° 13′ 46.76" W				

Course from PT FM79425 to PC FM79426 N 10° 19′ 05.97" E Dist 216.41

Curve Data

Curve FM79426					
P.I. Station	311+64.46	N	13,764,595.91	E	2,454,634.10
Delta =	39° 41′ 34.21" (LT)				
Degree =	6° 54′ 11.18"				
Tangent =	299.58				
Length =	575.00				
Radius =	830.00				
External =	52.41				
Long Chord =	563.57				
Mid. Ord. =	49.30				
P.C. Station	308+64.89	N	13,764,301.17	E	2,454,580.44
P.T. Station	314+39.88	N	13,764,856.97	E	2,454,487.15
C.C.		N	13,764,449.84	E	2,453,763.86
Back = N	10° 19′ 05.97" E				
Ahead = N	29° 22′ 28.24" W				
Chord Bear = N	9° 31′ 41.14" W				

Course from PT FM79426 to FM798 N 29° 22′ 28.24" W Dist 524.43

Point FM798 N 13,765,313.97 E 2,454,229.91 Sta 319+64.31

Course from FM798 to PC FM79427 N 29° 34′ 21.03" W Dist 882.73

Curve Data

Curve FM79427					
P.I. Station	330+69.14	N	13,766,274.88	E	2,453,684.65
Delta =	8° 51′ 57.81" (RT)				
Degree =	1° 59′ 59.72"				
Tangent =	222.10				
Length =	443.32				
Radius =	2,864.90				
External =	8.60				
Long Chord =	442.88				
Mid. Ord. =	8.57				
P.C. Station	328+47.04	N	13,766,081.71	E	2,453,794.26
P.T. Station	332+90.36	N	13,766,482.64	E	2,453,606.12
C.C.		N	13,767,495.61	E	2,456,285.96
Back = N	29° 34′ 21.03" W				
Ahead = N	20° 42′ 23.22" W				
Chord Bear = N	25° 08′ 22.12" W				

Course from PT FM79427 to PC FM79428 N 20° 42′ 23.22" W Dist 2,438.75

FM 794 CONT.

Curve Data

Curve FM79428					
P.I. Station	362+35.31	N	13,769,237.35	E	2,452,564.85
Delta =	28° 24′ 22.88" (RT)				
Degree =	2° 51′ 53.24"				
Tangent =	506.20				
Length =	991.57				
Radius =	2,000.00				
External =	63.06				
Long Chord =	981.44				
Mid. Ord. =	61.14				
P.C. Station	357+29.11	N	13,768,763.85	E	2,452,743.83
P.T. Station	367+20.68	N	13,769,738.98	E	2,452,632.67
C.C.		N	13,769,471.01	E	2,454,614.63
Back = N	20° 42′ 23.22" W				
Ahead = N	7° 41′ 59.66" E				
Chord Bear = N	6° 30′ 11.78" W				

Course from PT FM79428 to PC FM79429 N 7° 41′ 59.66" E Dist 1,308.42

Curve Data

Curve FM79429					
P.I. Station	382+92.21	N	13,771,296.34	E	2,452,843.23
Delta =	5° 01′ 18.51" (RT)				
Degree =	0° 57′ 17.75"				
Tangent =	263.11				
Length =	525.88				
Radius =	6,000.00				
External =	5.77				
Long Chord =	525.71				
Mid. Ord. =	5.76				
P.C. Station	380+29.10	N	13,771,035.61	E	2,452,807.98
P.T. Station	385+54.98	N	13,771,552.99	E	2,452,901.17
C.C.		N	13,770,231.70	E	2,458,753.88
Back = N	7° 41′ 59.66" E				
Ahead = N	12° 43′ 18.17" E				
Chord Bear = N	10° 12′ 38.91" E				

Course from PT FM79429 to PC FM79430 N 12° 43′ 18.17" E Dist 774.46

STATE OF TEXAS
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FM 794

HORIZONTAL ALIGNMENT DATA

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			79
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

HORIZONTAL ALIGNMENT DATA

FM 794 CONT.

Curve Data

Curve FM79430
P.I. Station 406+05.93 N 13,773,553.59 E 2,453,352.82
Delta = 36° 27′ 55.01" (LT)
Degree = 1° 28′ 42.96"
Tangent = 1,276.48
Length = 2,466.20
Radius = 3,875.00
External = 204.83
Long Chord = 2,424.79
Mid. Ord. = 194.55
P.C. Station 393+29.45 N 13,772,308.45 E 2,453,071.72
P.T. Station 417+95.65 N 13,774,722.03 E 2,452,838.85
C.C. N 13,773,161.78 E 2,449,291.85
Back = N 12° 43′ 18.17" E
Ahead = N 23° 44′ 36.84" W
Chord Bear = N 5° 30′ 39.34" W

Course from PT FM79430 to PC FM79431 N 23° 44′ 36.84" W Dist 723.71

Curve Data

Curve FM79431
P.I. Station 428+42.33 N 13,775,680.11 E 2,452,417.42
Delta = 27° 17′ 53.94" (LT)
Degree = 4° 18′ 28.63"
Tangent = 322.97
Length = 633.67
Radius = 1,330.00
External = 38.65
Long Chord = 627.70
Mid. Ord. = 37.56
P.C. Station 425+19.36 N 13,775,384.48 E 2,452,547.46
P.T. Station 431+53.03 N 13,775,883.18 E 2,452,166.27
C.C. N 13,774,848.96 E 2,451,330.03
Back = N 23° 44′ 36.84" W
Ahead = N 51° 02′ 30.78" W
Chord Bear = N 37° 23′ 33.81" W

Course from PT FM79431 to FM799 N 51° 02′ 30.78" W Dist 1,275.30

Point FM799 N 13,776,685.02 E 2,451,174.59 Sta 444+28.33

Course from FM799 to PC FM79432 N 50° 53′ 14.81" W Dist 1,113.28

Curve Data

Curve FM79432
P.I. Station 458+08.53 N 13,777,555.72 E 2,450,103.68
Delta = 22° 41′ 48.16" (RT)
Degree = 4° 18′ 28.63"
Tangent = 266.93
Length = 526.86
Radius = 1,330.00
External = 26.52
Long Chord = 523.42
Mid. Ord. = 26.00
P.C. Station 455+41.60 N 13,777,387.33 E 2,450,310.79
P.T. Station 460+68.46 N 13,777,790.99 E 2,449,977.58
C.C. N 13,778,419.29 E 2,451,149.82
Back = N 50° 53′ 14.81" W
Ahead = N 28° 11′ 26.65" W
Chord Bear = N 39° 32′ 20.73" W

Course from PT FM79432 to FM802 N 28° 11′ 26.65" W Dist 931.54

Point FM802 N 13,778,612.02 E 2,449,537.52 Sta 470+00.00

Ending chain FM794 description

SH 97

* 1 DESCRIBE CHAIN SH97

Chain SH97 contains:
SH971 SH973 SH974

Beginning chain SH97 description
Feature: Road Centerline

Point SH971 N 13,740,439.05 E 2,459,040.31 Sta 0+00.00

Course from SH971 to SH973 N 66° 17′ 25.51" E Dist 173.49

Point SH973 N 13,740,508.81 E 2,459,199.16 Sta 1+73.49

Course from SH973 to SH974 N 66° 05′ 42.58" E Dist 39.37

Point SH974 N 13,740,524.76 E 2,459,235.15 Sta 2+12.86

Ending chain SH97 description

ST PAUL ST

* 1 DESCRIBE CHAIN STPAUL

Chain STPAUL contains:
STPAUL1 CUR STPAUL 3

Beginning chain STPAUL description
Feature: ROAD CENTERLINE

Point STPAUL1 N 13,740,585.27 E 2,459,115.89 Sta 1+00.00

Course from STPAUL1 to PC STPAUL 3 N 82° 57′ 33.22" W Dist 24.42

Curve Data

Curve STPAUL 3
Feature: ROAD CENTERLINE
P.I. Station 1+59.08 N 13,740,592.52 E 2,459,057.26
Delta = 57° 35′ 33.90" (RT)
Degree = 90° 52′ 24.82"
Tangent = 34.66
Length = 63.38
Radius = 63.05
External = 8.90
Long Chord = 60.74
Mid. Ord. = 7.80
P.C. Station 1+24.42 N 13,740,588.27 E 2,459,091.65
P.T. Station 1+87.80 N 13,740,623.83 E 2,459,042.41
C.C. N 13,740,650.84 E 2,459,099.38
Back = N 82° 57′ 33.21" W
Ahead = N 25° 21′ 59.32" W
Chord Bear = N 54° 09′ 46.27" W

Ending chain STPAUL description

RIDGEMONT LN

* 1 DESCRIBE CHAIN RIDGEMONT

Chain RIDGEMONT contains:
RIDGEMONT1 RIDGEMONT4

Beginning chain RIDGEMONT description
Feature: ROAD CENTERLINE

Point RIDGEMONT1 N 13,740,789.63 E 2,459,143.33 Sta 1+00.00

Course from RIDGEMONT1 to RIDGEMONT4 N 68° 55′ 52.08" E Dist 94.73

Point RIDGEMONT4 N 13,740,823.68 E 2,459,231.72 Sta 1+94.73

Ending chain RIDGEMONT description

OAKLAND AVE

* 1 DESCRIBE CHAIN OAKLAND

Chain OAKLAND contains:
OAKLAND1 OAKLAND6

Beginning chain OAKLAND description
Feature: ROAD CENTERLINE

Point OAKLAND1 N 13,741,161.33 E 2,459,202.12 Sta 1+00.00

Course from OAKLAND1 to OAKLAND6 N 67° 41′ 43.16" E Dist 96.31

Point OAKLAND6 N 13,741,197.88 E 2,459,291.22 Sta 1+96.31

Ending chain OAKLAND description

STIEREN RD

* 1 DESCRIBE CHAIN STIEREN

Chain STIEREN contains:
STIEREN1 STIEREN4

Beginning chain STIEREN description
Feature: ROAD CENTERLINE

Point STIEREN1 N 13,742,030.95 E 2,459,329.79 Sta 1+00.00

Course from STIEREN1 to STIEREN4 N 70° 14′ 05.65" E Dist 55.83

Point STIEREN4 N 13,742,049.84 E 2,459,382.33 Sta 1+55.83

Ending chain STIEREN description

3/25/2021

Texas Department of Transportation

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FM 794

HORIZONTAL ALIGNMENT DATA

SHEET 4 OF 6

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			80
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

HORIZONTAL ALIGNMENT DATA

PIONEER VILLAGE DR

```
*        1    DESCRIBE CHAIN PIONEER

Chain PIONEER contains:
 PIONEER1 PIONEER2

Beginning chain PIONEER description
================================================================================

Point PIONEER1          N     13,742,362.64 E      2,459,371.90 Sta        1+00.00

Course from PIONEER1 to PIONEER2 S 80° 24' 07.23" W Dist 73.04

Point PIONEER2          N     13,742,350.47 E      2,459,299.88 Sta        1+73.04

================================================================================
Ending chain PIONEER description
```

GUERRA LN

```
*        1    DESCRIBE CHAIN GUERRA

Chain GUERRA contains:
 GUERRA1 GUERRA4

Beginning chain GUERRA description
Feature: ROAD CENTERLINE
================================================================================

Point GUERRA1           N     13,742,693.26 E      2,459,413.88 Sta        1+00.00

Course from GUERRA1 to GUERRA4 N 86° 06' 39.47" W Dist 57.39

Point GUERRA4           N     13,742,697.15 E      2,459,356.61 Sta        1+57.39

================================================================================
Ending chain GUERRA description
```

DELAGO RD

```
*        1    DESCRIBE CHAIN INDUSTRIAL

Chain INDUSTRIAL contains:
 INDUST1 INDUST2

Beginning chain INDUSTRIAL description
================================================================================

Point INDUST1           N     13,745,092.31 E      2,459,275.38 Sta        1+00.00

Course from INDUST1 to INDUST2 N 66° 11' 03.81" E Dist 77.28

Point INDUST2           N     13,745,123.52 E      2,459,346.08 Sta        1+77.28

================================================================================
Ending chain INDUSTRIAL description
```

OIL PATCH LN

```
*        1    DESCRIBE CHAIN OILPATCH

Chain OILPATCH contains:
 OILPATCH1 OILPATCH6

Beginning chain OILPATCH description
Feature: ROAD CENTERLINE
================================================================================

Point OILPATCH1         N     13,746,271.53 E      2,459,144.41 Sta        1+00.00

Course from OILPATCH1 to OILPATCH6 S 88° 04' 53.62" W Dist 64.27

Point OILPATCH6         N     13,746,269.38 E      2,459,080.18 Sta        1+64.27

================================================================================
Ending chain OILPATCH description
```

JOHNSON RD

```
*        1    DESCRIBE CHAIN JOHNSON

Chain JOHNSON contains:
 JOHNSON1 JOHNSON6

Beginning chain JOHNSON description
Feature: ROAD CENTERLINE
================================================================================

Point JOHNSON1          N     13,746,980.04 E      2,459,089.86 Sta        1+00.00

Course from JOHNSON1 to JOHNSON6 N 66° 52' 17.26" E Dist 73.38

Point JOHNSON6          N     13,747,008.86 E      2,459,157.35 Sta        1+73.38

================================================================================
Ending chain JOHNSON description
```

CR 242

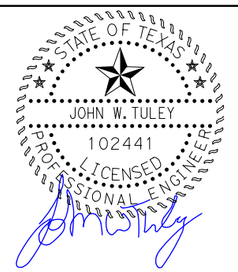
```
*        1    DESCRIBE CHAIN CR242

Chain CR242 contains:
 CR2421 CR2426

Beginning chain CR242 description
Feature: ROAD CENTERLINE
================================================================================

Point CR2421            N     13,751,801.23 E      2,458,455.58 Sta        1+00.00

Course from CR2421 to CR2426 S 69° 24' 17.68" W Dist 77.26

Point CR2426            N     13,751,774.05 E      2,458,383.26 Sta        1+77.26

================================================================================
Ending chain CR242 description
```

CR 237

```
*        1    DESCRIBE CHAIN CR237

Chain CR237 contains:
 CR2371 CR2376

Beginning chain CR237 description
Feature: ROAD CENTERLINE
================================================================================

Point CR2371            N     13,757,701.05 E      2,457,285.75 Sta        1+00.00

Course from CR2371 to CR2376 N 75° 00' 05.02" E Dist 66.07

Point CR2376            N     13,757,718.14 E      2,457,349.56 Sta        1+66.07

================================================================================
Ending chain CR237 description
```

CR 236

```
*        1    DESCRIBE CHAIN CR236

Chain CR236 contains:
 CR2361 CR23611 CR23612

Beginning chain CR236 description
Feature: ROAD CENTERLINE
================================================================================

Point CR2361            N     13,759,414.83 E      2,457,139.46 Sta        1+00.00

Course from CR2361 to CR23611 S 73° 45' 19.50" W Dist 70.38

Point CR23611           N     13,759,395.14 E      2,457,071.90 Sta        1+70.38

Course from CR23611 to CR23612 S 74° 38' 58.84" W Dist 13.00

Point CR23612           N     13,759,391.70 E      2,457,059.36 Sta        1+83.38

================================================================================
Ending chain CR236 description
```



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FM 794

HORIZONTAL ALIGNMENT DATA

SHEET 5 OF 6

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			81

STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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HORIZONTAL ALIGNMENT DATA

CR 184

```
*        1   DESCRIBE CHAIN CR184

Chain CR184 contains:
 CR1841 CR1843 CR1845 CR1847 CR1849 CR18410

Beginning chain CR184 description
Feature: ROAD CENTERLINE
================================================================================

Point CR1841          N    13,761,717.20 E     2,457,214.53 Sta       0+00.00

Course from CR1841 to CR1843 N 53° 52′ 05.54" E Dist 21.20

Point CR1843          N    13,761,729.71 E     2,457,231.65 Sta       0+21.20

Course from CR1843 to CR1845 N 50° 08′ 24.07" E Dist 33.54

Point CR1845          N    13,761,751.21 E     2,457,257.40 Sta       0+54.75

Course from CR1845 to CR1847 N 51° 10′ 28.71" E Dist 36.00

Point CR1847          N    13,761,773.78 E     2,457,285.45 Sta       0+90.75

Course from CR1847 to CR1849 N 48° 28′ 05.31" E Dist 19.64

Point CR1849          N    13,761,786.80 E     2,457,300.15 Sta       1+10.39

Course from CR1849 to CR18410 N 43° 35′ 34.55" E Dist 33.22

Point CR18410         N    13,761,810.85 E     2,457,323.05 Sta       1+43.60

================================================================================
Ending chain CR184 description
```

OAK CREEK DR

```
*        1   DESCRIBE CHAIN OAKCREEK

Chain OAKCREEK contains:
 OAKCREEK1 CUR OAKCREEK 3 OAKCREEK5

Beginning chain OAKCREEK description
Feature: ROAD CENTERLINE
================================================================================

Point OAKCREEK1       N    13,772,027.07 E     2,453,008.20 Sta       1+00.00

Course from OAKCREEK1 to PC OAKCREEK 3 N 77° 22′ 17.37" W Dist 21.05

                                   Curve Data
                                  *----------*
Curve OAKCREEK 3
Feature: ROAD CENTERLINE
P.I.  Station            1+46.86  N       13,772,037.31  E        2,452,962.47
Delta       =       28° 56′ 35.99" (LT)
Degree      =       57° 17′ 44.81"
Tangent     =                25.81
Length      =                50.52
Radius      =               100.00
External    =                 3.28
Long Chord  =                49.98
Mid. Ord.   =                 3.17
P.C.  Station            1+21.05  N       13,772,031.67  E        2,452,987.66
P.T.  Station            1+71.56  N       13,772,030.06  E        2,452,937.70
C.C.                              N       13,771,934.09  E        2,452,965.79
Back        = N  77° 22′ 17.37" W
Ahead       = S  73° 41′ 06.64" W
Chord Bear  = S  88° 09′ 24.64" W

Course from PT OAKCREEK 3 to OAKCREEK5 S 73° 41′ 06.64" W Dist 5.80

Point OAKCREEK5       N    13,772,028.43 E     2,452,932.13 Sta       1+77.37

================================================================================
Ending chain OAKCREEK description
```

CR 235

```
*        1   DESCRIBE CHAIN CR235

Chain CR235 contains:
 CR2351 CR2352

Beginning chain CR235 description
================================================================================

Point CR2351          N    13,775,635.59 E     2,452,400.67 Sta       1+00.00

Course from CR2351 to CR2352 S 40° 50′ 23.08" W Dist 87.40

Point CR2352          N    13,775,569.47 E     2,452,343.52 Sta       1+87.40

================================================================================
Ending chain CR235 description
```

CR 435

```
*        1   DESCRIBE CHAIN CR435

Chain CR435 contains:
 CR4351 CR4352

Beginning chain CR435 description
================================================================================

Point CR4351          N    13,766,677.56 E     2,453,532.44 Sta       1+00.00

Course from CR4351 to CR4352 N 66° 27′ 03.05" E Dist 85.29

Point CR4352          N    13,766,711.63 E     2,453,610.63 Sta       1+85.29

================================================================================
Ending chain CR435 description
```

CR 284

```
*        1   DESCRIBE CHAIN CR284

Chain CR284 contains:
 CR2841 CR2846

Beginning chain CR284 description
Feature: ROAD CENTERLINE
================================================================================

Point CR2841          N    13,773,933.86 E     2,453,089.15 Sta       1+00.00

Course from CR2841 to CR2846 S 58° 05′ 15.55" E Dist 154.58

Point CR2846          N    13,773,852.14 E     2,453,220.37 Sta       2+54.58

================================================================================
Ending chain CR284 description
```

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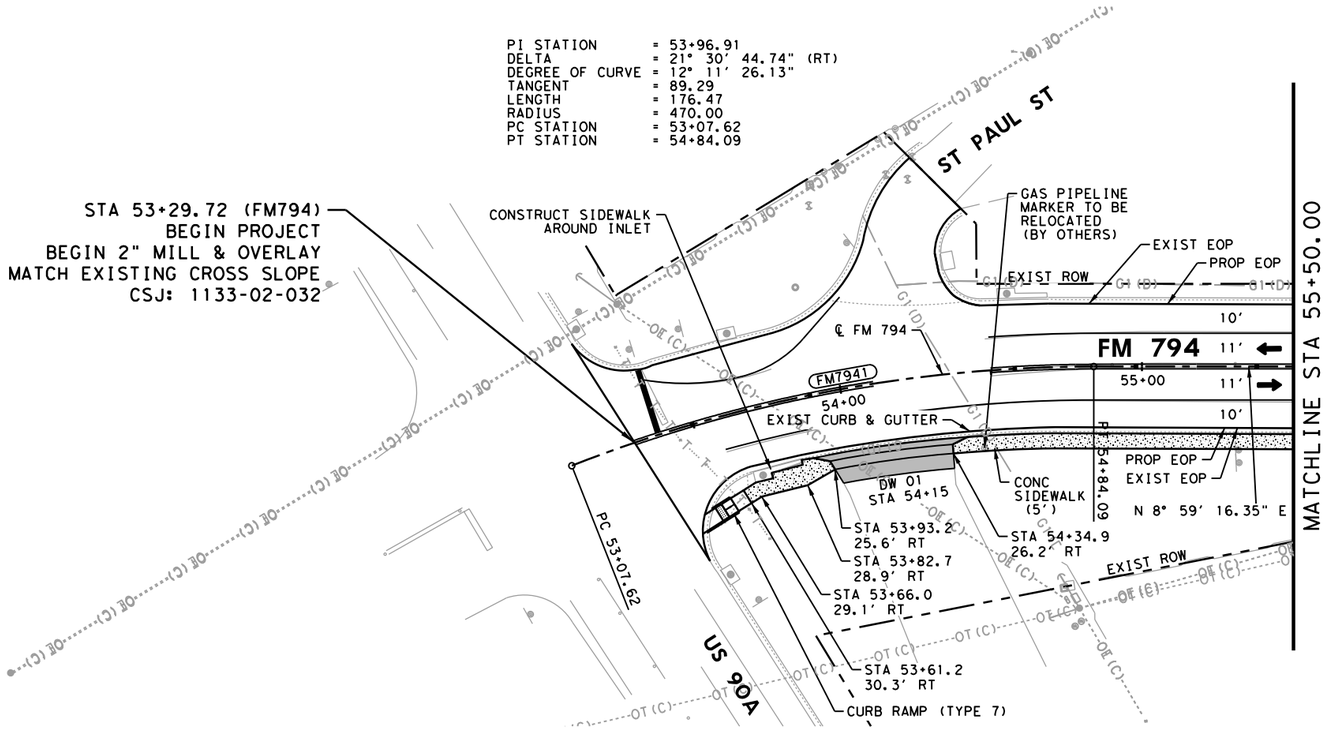
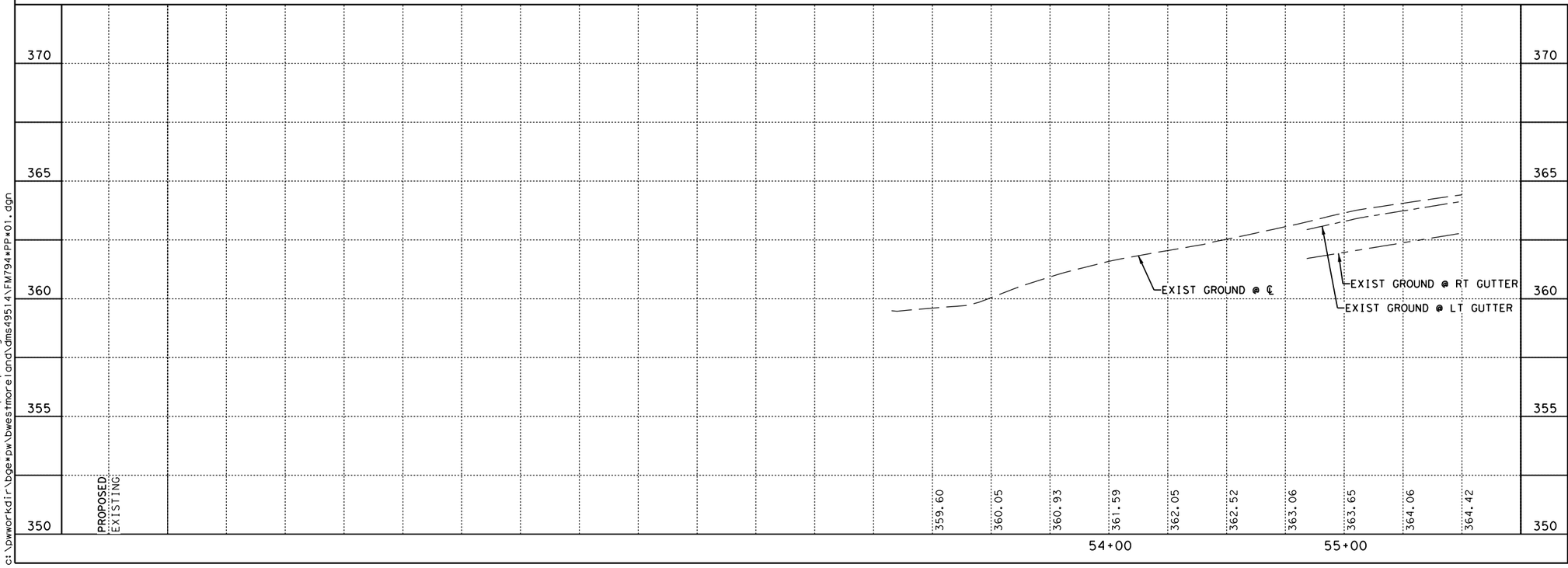
HORIZONTAL ALIGNMENT DATA

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			82
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794





LEGEND:

- DIRECTION OF TRAFFIC
- DW# DRIVEWAY NUMBER
- CURVE # ALIGNMENT CURVE NUMBER
- CONCRETE DRIVEWAY TO BE REMOVED
- CONCRETE DRIVEWAYS OR MAILBOX TURNOUTS

NOTES:

1. UTILITY LOCATIONS SHOWN ARE APPROXIMATE AND SHOULD BE FIELD VERIFIED BY THE CONTRACTOR BEFORE CONSTRUCTION

0 25 50
SCALE: 1"=50' H
1"=5' V

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ROADWAY PLAN & PROFILE

SHEET 1 OF 39

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			83
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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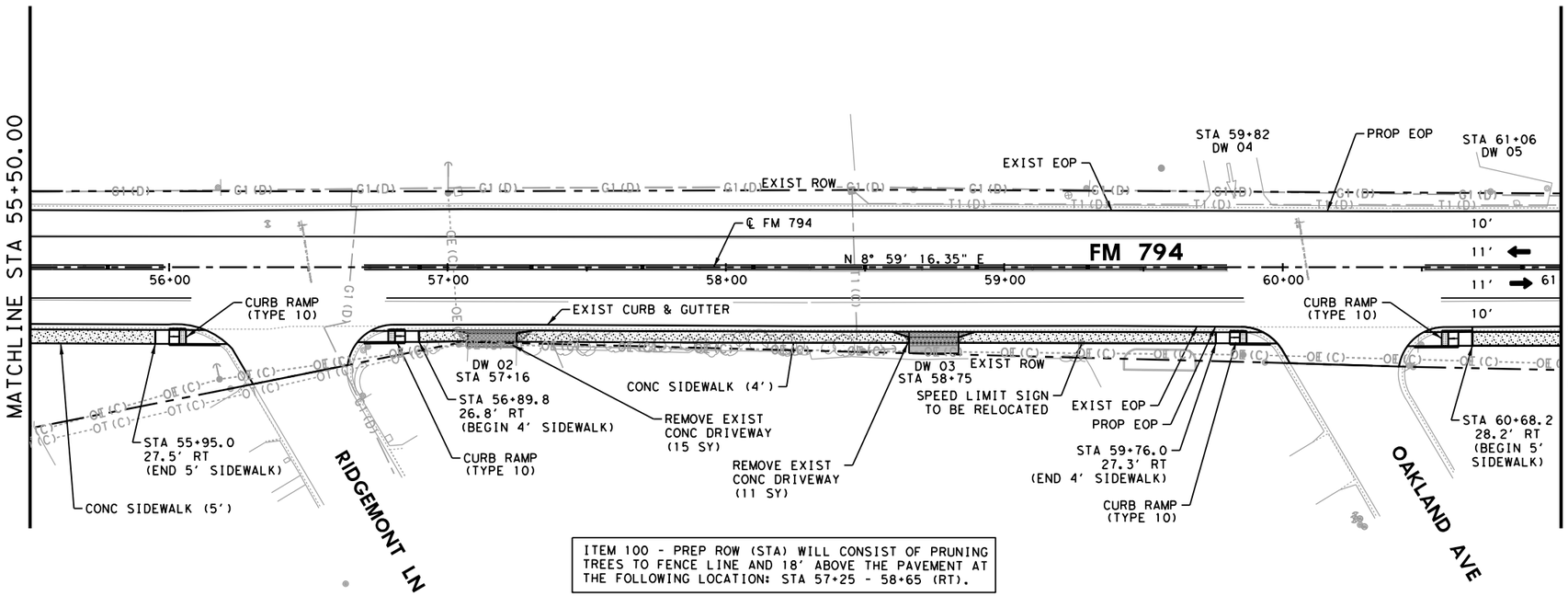

ITEM 100 - PREP ROW (STA) WILL CONSIST OF PRUNING TREES TO FENCE LINE AND 18' ABOVE THE PAVEMENT AT THE FOLLOWING LOCATION: STA 57+25 - 58+65 (RT).

LEGEND:

- DIRECTION OF TRAFFIC
- DW# DRIVEWAY NUMBER
- CURVE # ALIGNMENT CURVE NUMBER
- CONCRETE DRIVEWAY TO BE REMOVED
- CONCRETE DRIVEWAYS OR MAILBOX TURNOUTS

NOTES:

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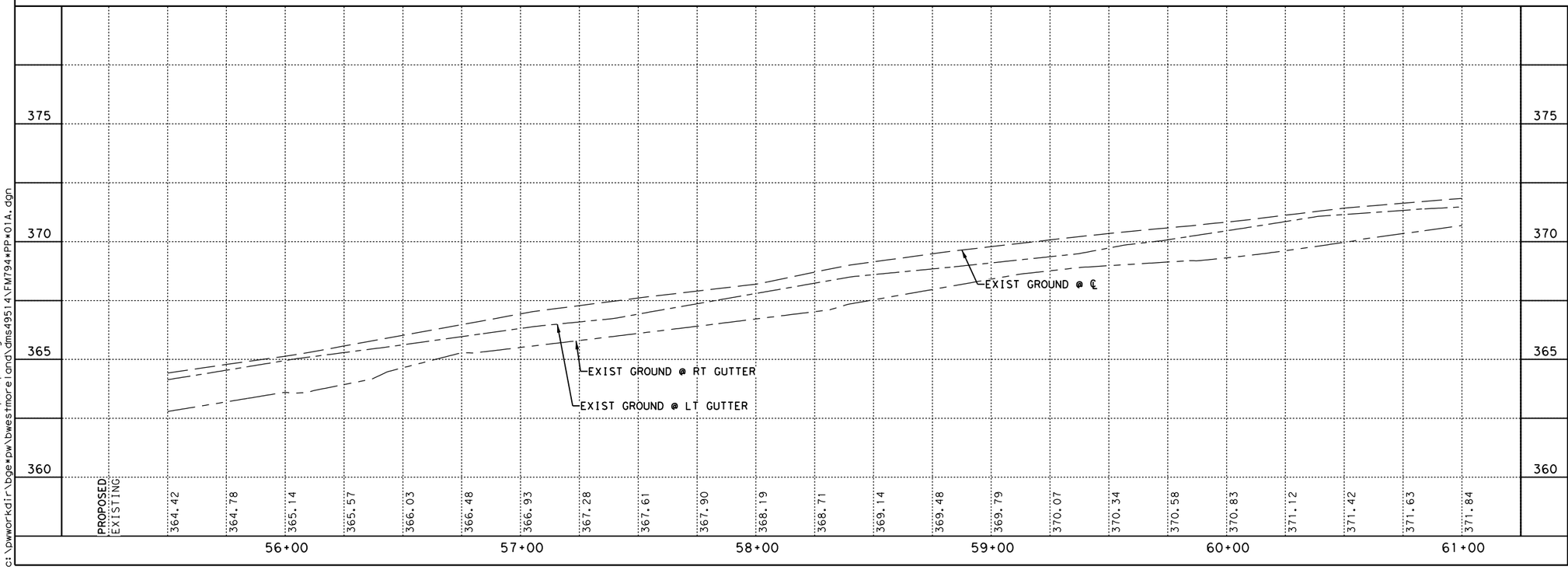
0 25 50
SCALE: 1"=50' H
1"=5' V



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ROADWAY PLAN & PROFILE

SHEET 2 OF 39

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			84
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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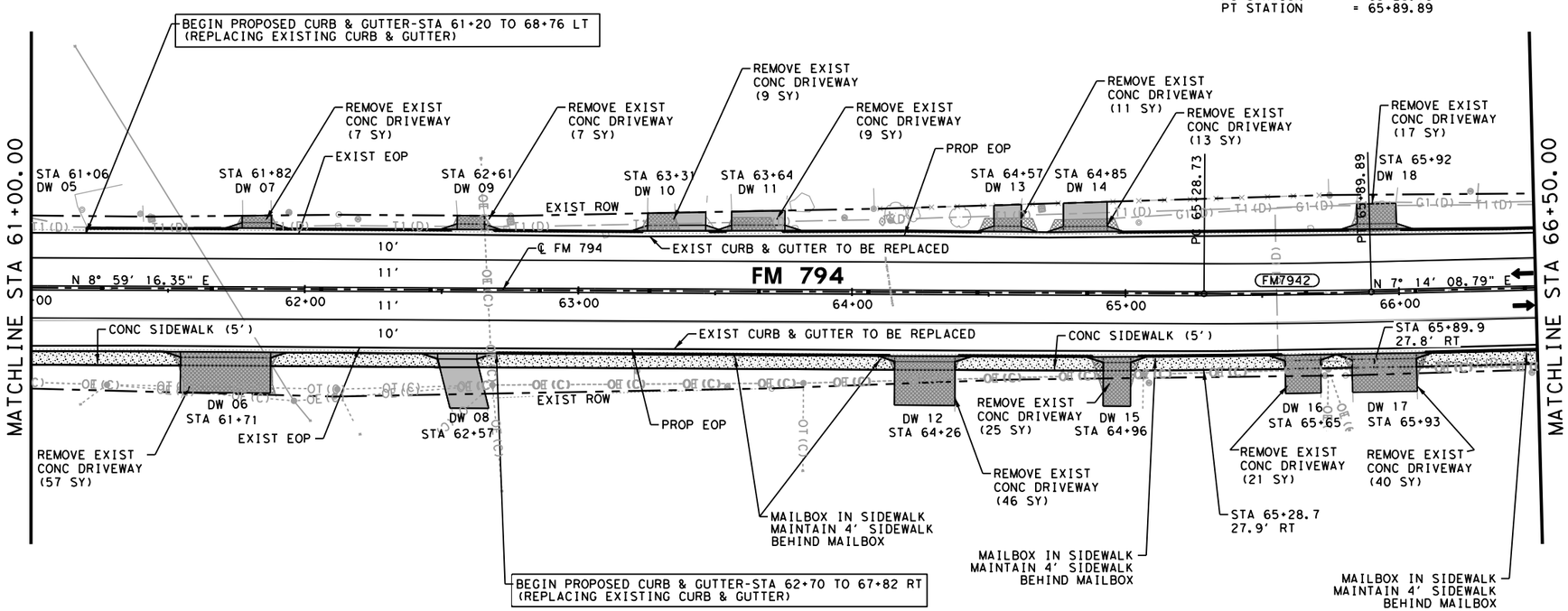
PI STATION = 65+59.31
DELTA = 1° 45' 07.56" (LT)
DEGREE OF CURVE = 2° 51' 53.24"
TANGENT = 30.58
LENGTH = 61.16
RADIUS = 2,000.00
PC STATION = 65+28.73
PT STATION = 65+89.89



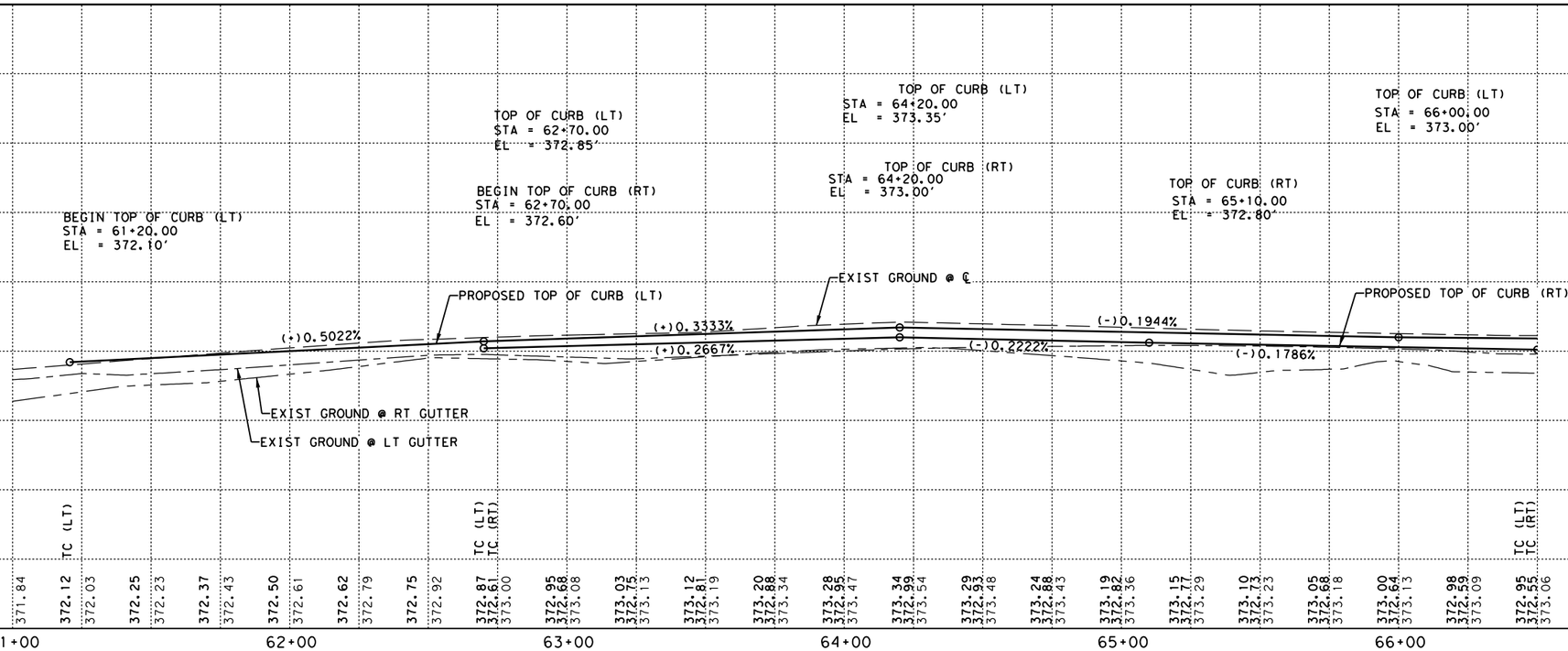
LEGEND:

- DIRECTION OF TRAFFIC
- DW# DRIVEWAY NUMBER
- CURVE # ALIGNMENT CURVE NUMBER
- CONCRETE DRIVEWAY TO BE REMOVED
- CONCRETE DRIVEWAYS OR MAILBOX TURNOUTS

NOTES:

1. UTILITY LOCATIONS SHOWN ARE APPROXIMATE AND SHOULD BE FIELD VERIFIED BY THE CONTRACTOR BEFORE CONSTRUCTION

0 25 50
SCALE: 1"=50' H
1"=5' V



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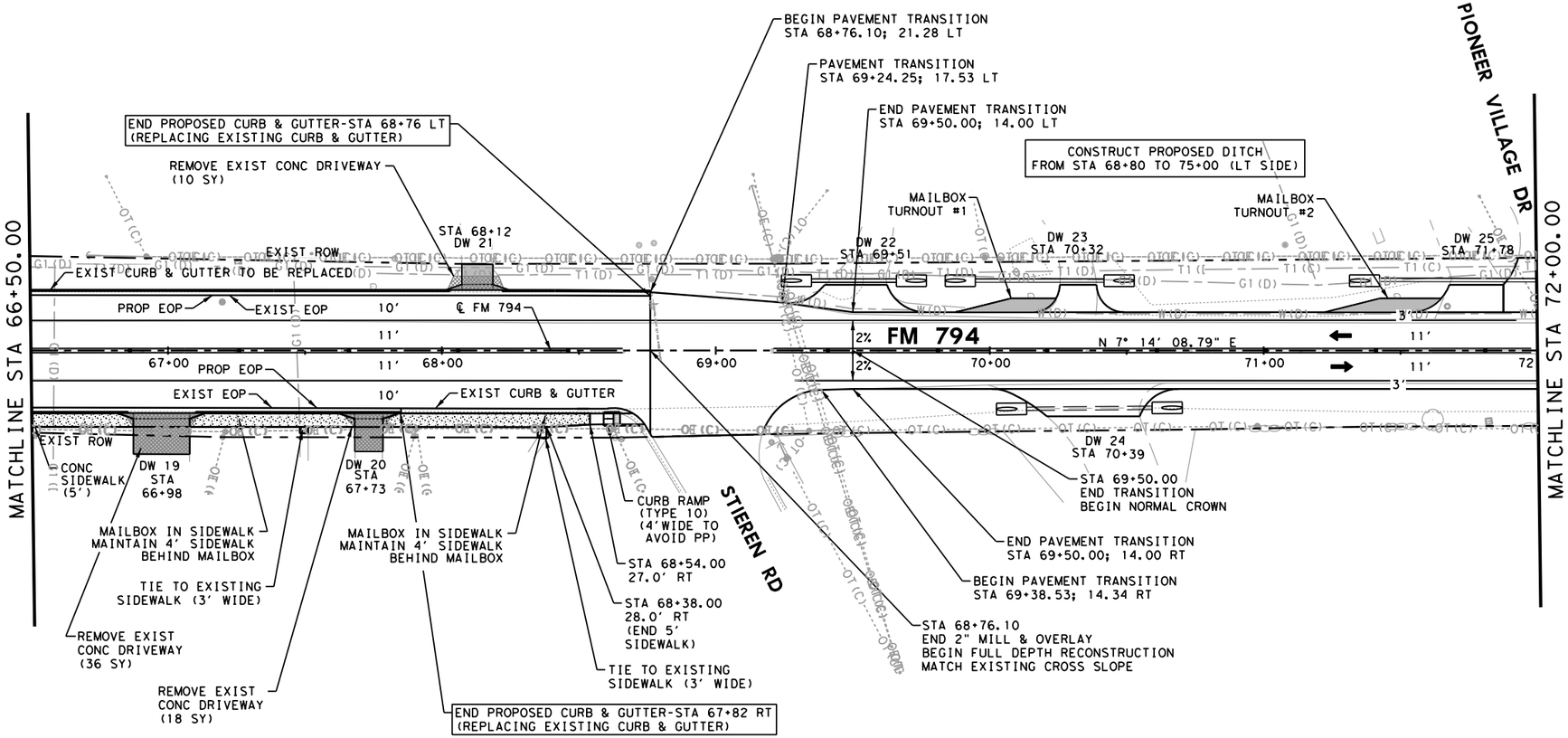
ROADWAY PLAN & PROFILE

SHEET 3 OF 39

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			85
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794



LEGEND:

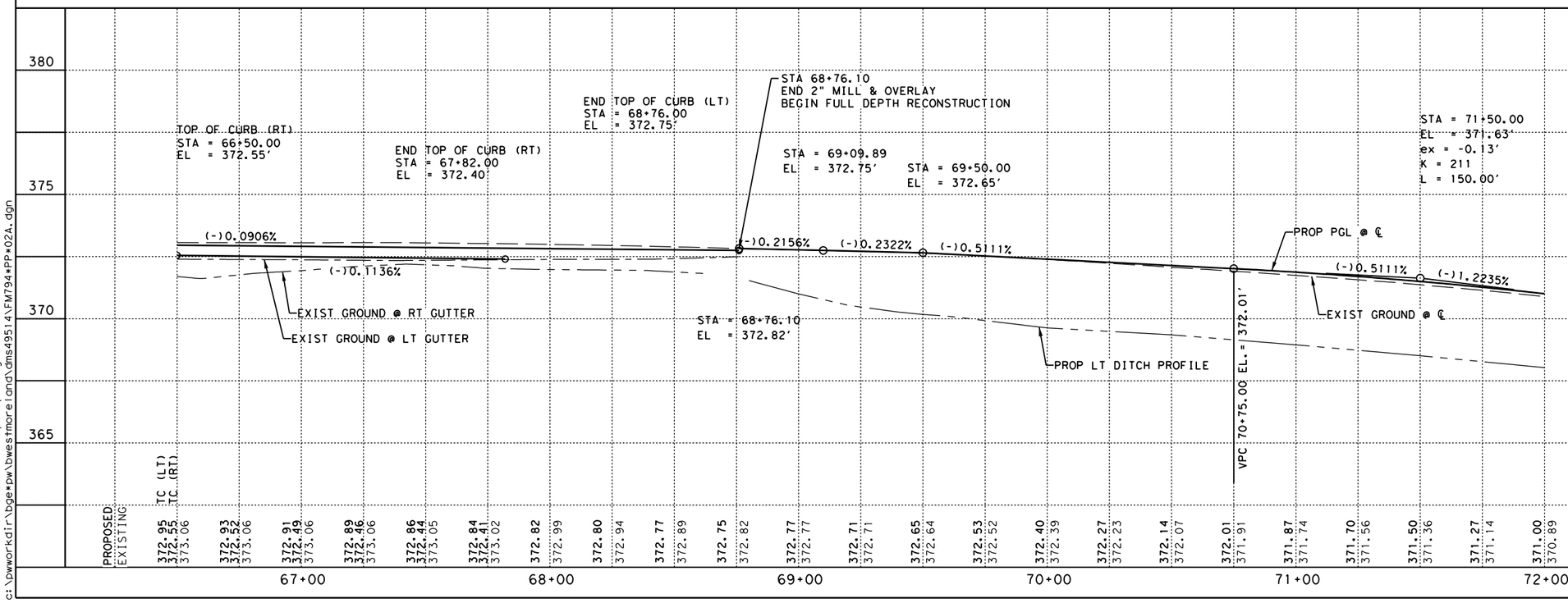
- DIRECTION OF TRAFFIC
- DW# DRIVEWAY NUMBER
- CURVE # ALIGNMENT CURVE NUMBER
- CONCRETE DRIVEWAY TO BE REMOVED
- CONCRETE DRIVEWAYS OR MAILBOX TURNOUTS

NOTES:

1. UTILITY LOCATIONS SHOWN ARE APPROXIMATE AND SHOULD BE FIELD VERIFIED BY THE CONTRACTOR BEFORE CONSTRUCTION

0 25 50

SCALE: 1"=50' H
1"=5' V



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ROADWAY PLAN & PROFILE

SHEET 4 OF 39

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			86
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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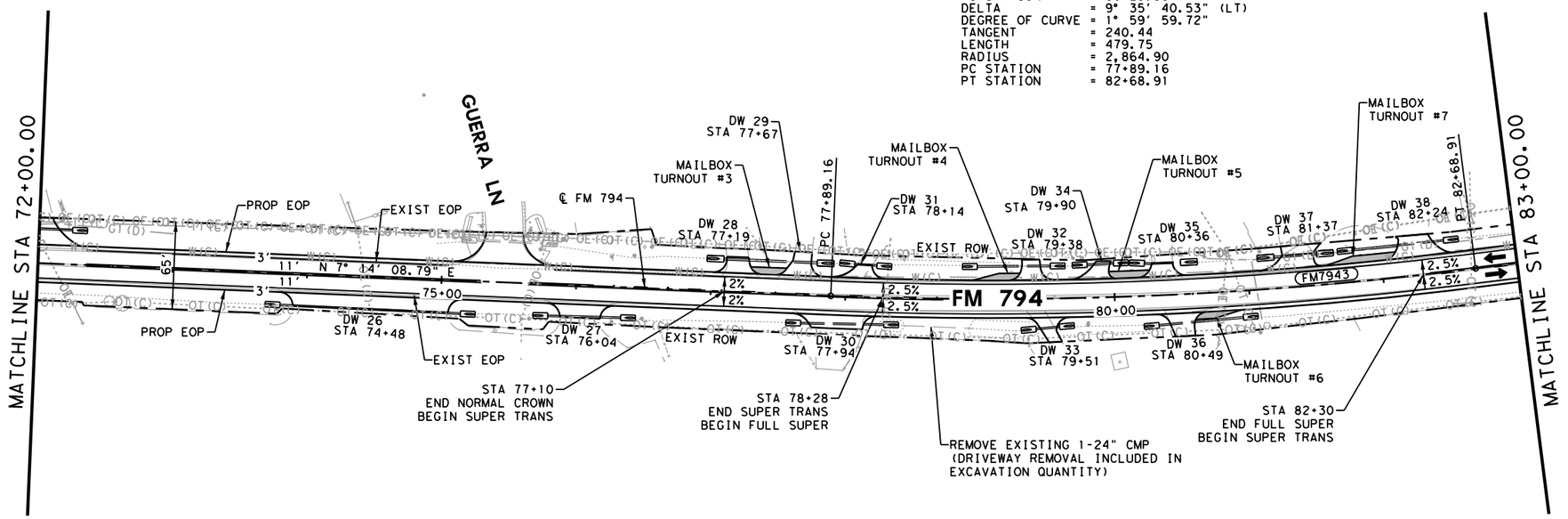


PI STATION = 80+29.59
DELTA = 9° 35' 40.53" (LT)
DEGREE OF CURVE = 1° 59' 59.72"
TANGENT = 240.44
LENGTH = 479.75
RADIUS = 2,864.90
PC STATION = 77+89.16
PT STATION = 82+68.91

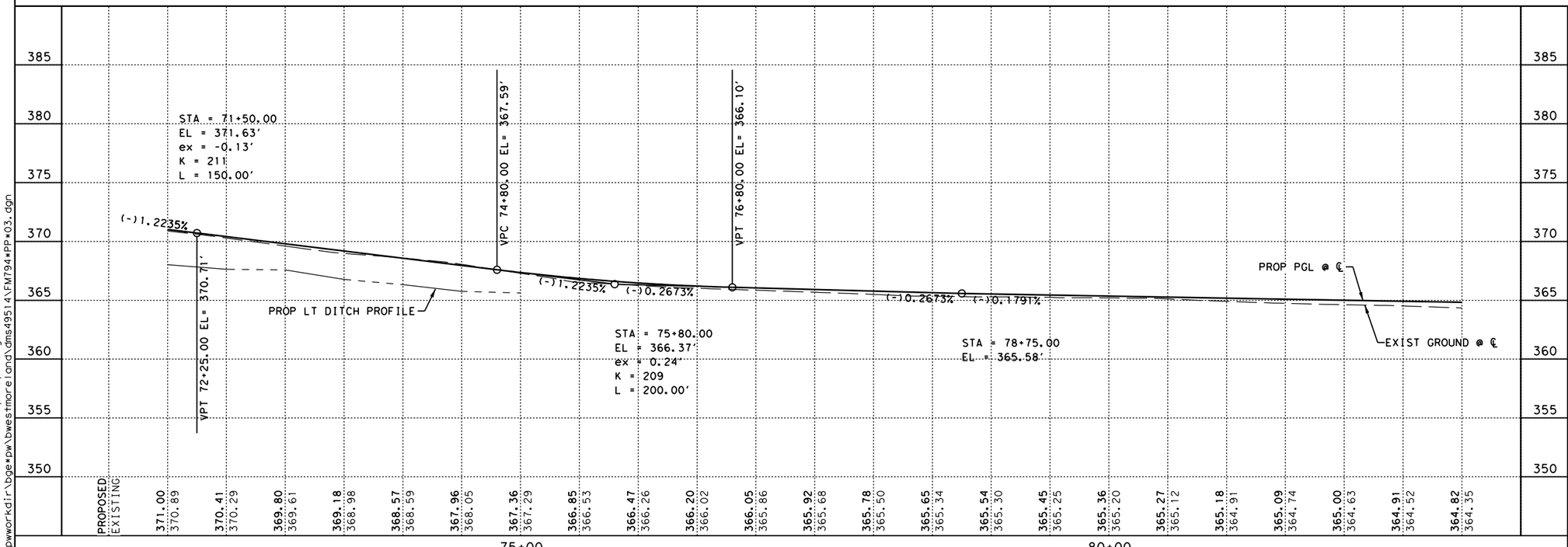
LEGEND:

- DIRECTION OF TRAFFIC
- DW# DRIVEWAY NUMBER
- CURVE # ALIGNMENT CURVE NUMBER
- CONCRETE DRIVEWAY TO BE REMOVED
- CONCRETE DRIVEWAYS OR MAILBOX TURNOUTS

NOTES:

1. UTILITY LOCATIONS SHOWN ARE APPROXIMATE AND SHOULD BE FIELD VERIFIED BY THE CONTRACTOR BEFORE CONSTRUCTION

0 50 100
SCALE: 1"=100' H
1"=10' V



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ROADWAY PLAN & PROFILE

SHEET 5 OF 39

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			87
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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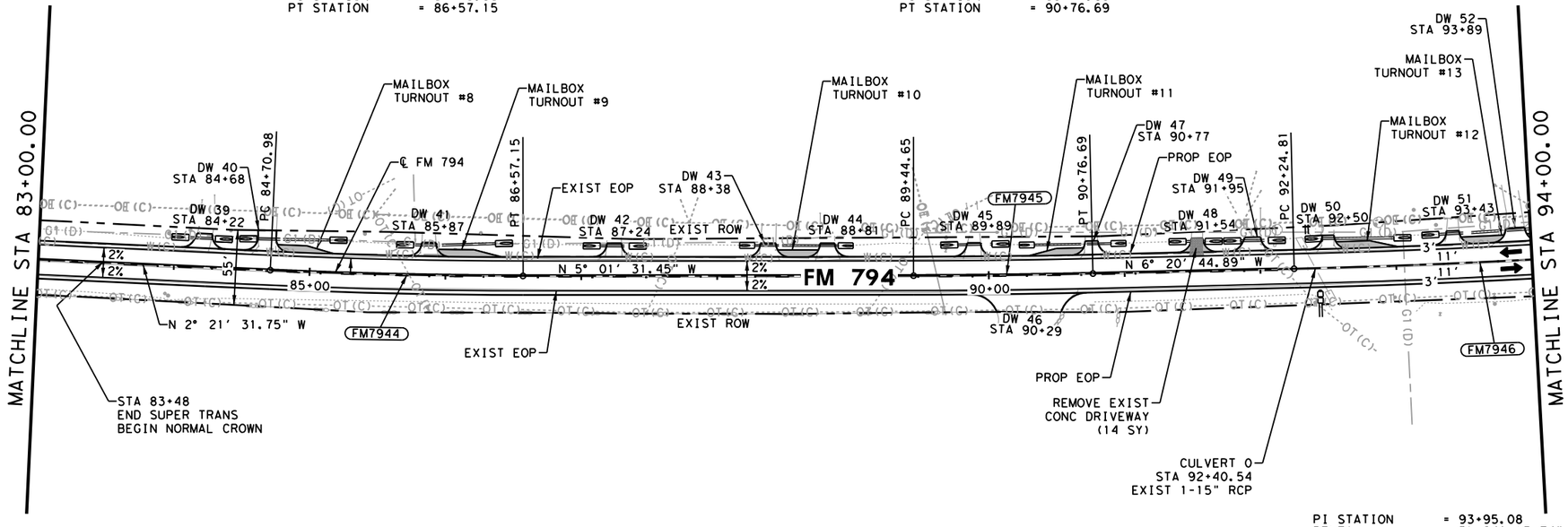
PI STATION = 85+64.08
DELTA = 2° 39' 59.70" (LT)
DEGREE OF CURVE = 1° 25' 56.62"
TANGENT = 93.10
LENGTH = 186.16
RADIUS = 4,000.00
PC STATION = 84+70.98
PT STATION = 86+57.15

PI STATION = 90+10.67
DELTA = 1° 19' 13.45" (LT)
DEGREE OF CURVE = 0° 59' 59.99"
TANGENT = 66.02
LENGTH = 132.04
RADIUS = 5,729.60
PC STATION = 89+44.65
PT STATION = 90+76.69



PI STATION = 93+95.08
DELTA = 3° 24' 15.74" (LT)
DEGREE OF CURVE = 0° 59' 59.99"
TANGENT = 170.27
LENGTH = 340.44
RADIUS = 5,729.60
PC STATION = 92+24.81
PT STATION = 95+65.25

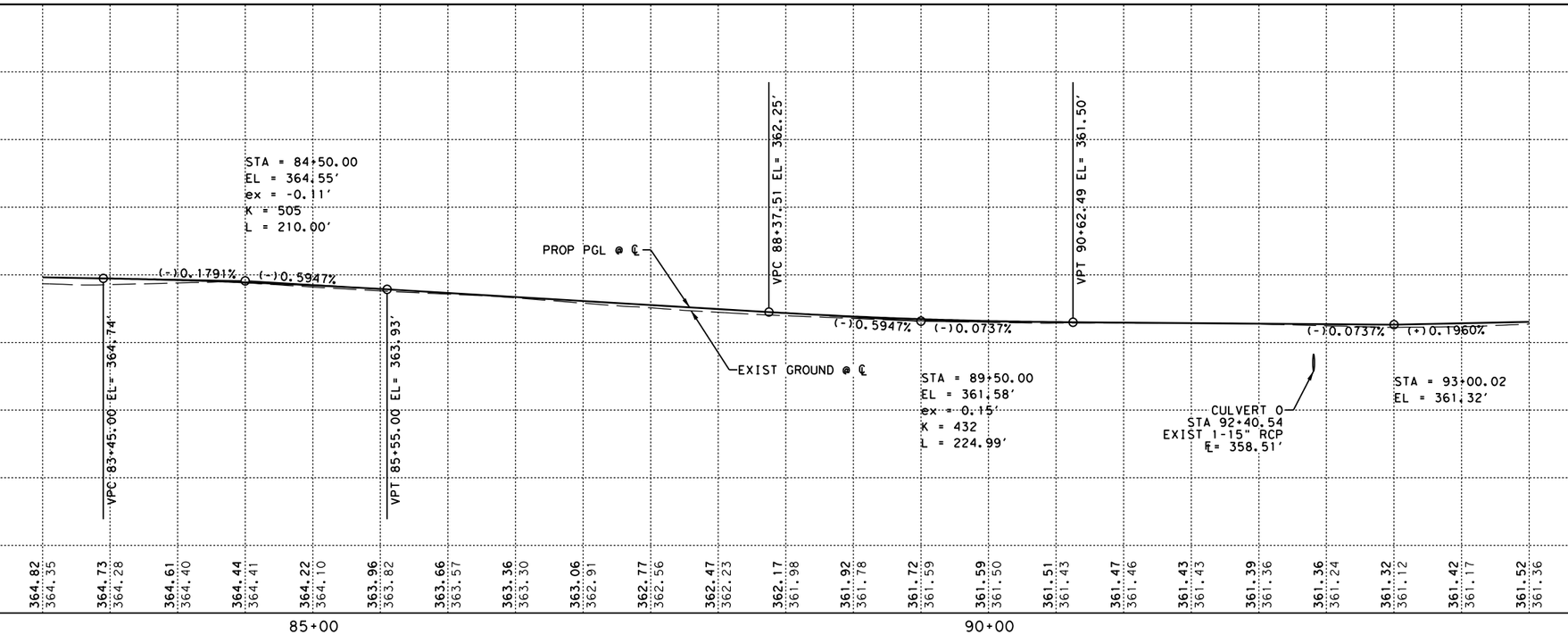
LEGEND:

- DIRECTION OF TRAFFIC
- DW# DRIVEWAY NUMBER
- CURVE # ALIGNMENT CURVE NUMBER
- CONCRETE DRIVEWAY TO BE REMOVED
- CONCRETE DRIVEWAYS OR MAILBOX TURNOUTS

NOTES:

1. UTILITY LOCATIONS SHOWN ARE APPROXIMATE AND SHOULD BE FIELD VERIFIED BY THE CONTRACTOR BEFORE CONSTRUCTION

0 50 100
SCALE: 1"=100' H
1"=10' V



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ROADWAY PLAN & PROFILE

SHEET 6 OF 39

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			88
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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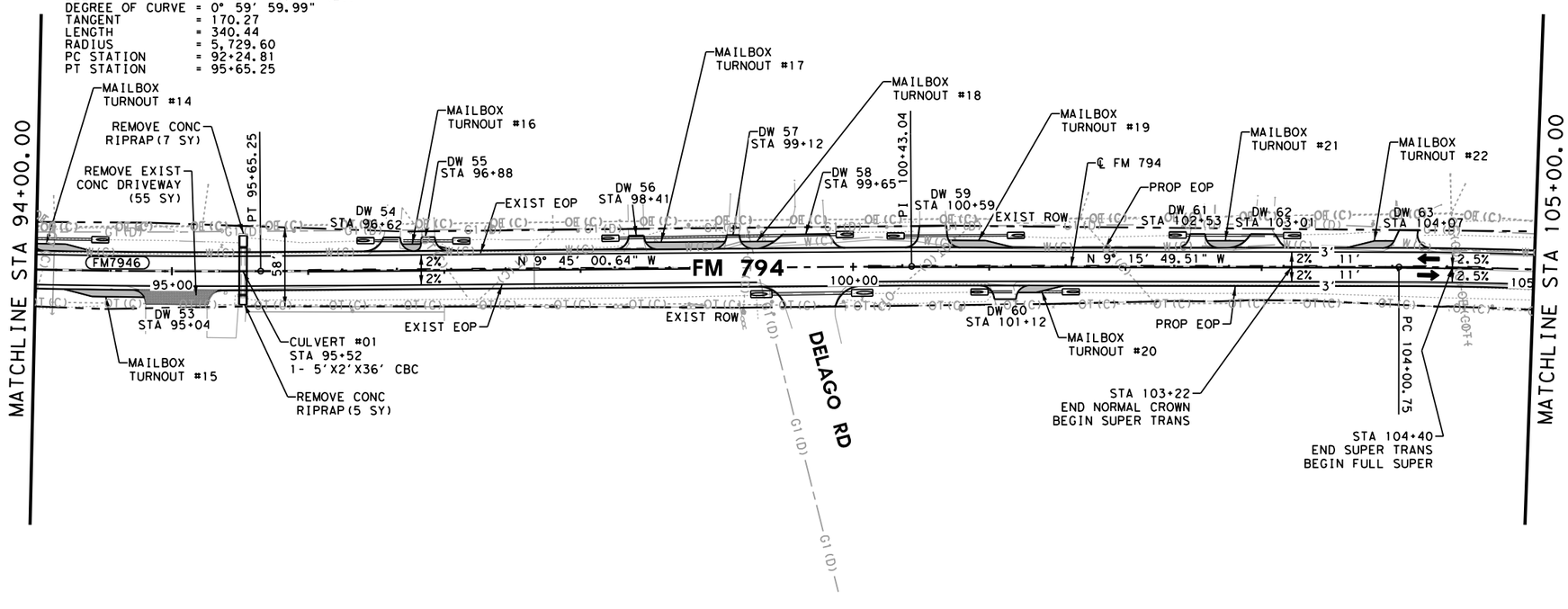
PI STATION = 93+95.08
DELTA = 3° 24' 15.74" (LT)
DEGREE OF CURVE = 0° 59' 59.99"
TANGENT = 170.27
LENGTH = 340.44
RADIUS = 5,729.60
PC STATION = 92+24.81
PT STATION = 95+65.25



LEGEND:

- DIRECTION OF TRAFFIC
- DW# DRIVEWAY NUMBER
- (CURVE #) ALIGNMENT CURVE NUMBER
- CONCRETE DRIVEWAY TO BE REMOVED
- CONCRETE DRIVEWAYS OR MAILBOX TURNOUTS

NOTES:

1. UTILITY LOCATIONS SHOWN ARE APPROXIMATE AND SHOULD BE FIELD VERIFIED BY THE CONTRACTOR BEFORE CONSTRUCTION

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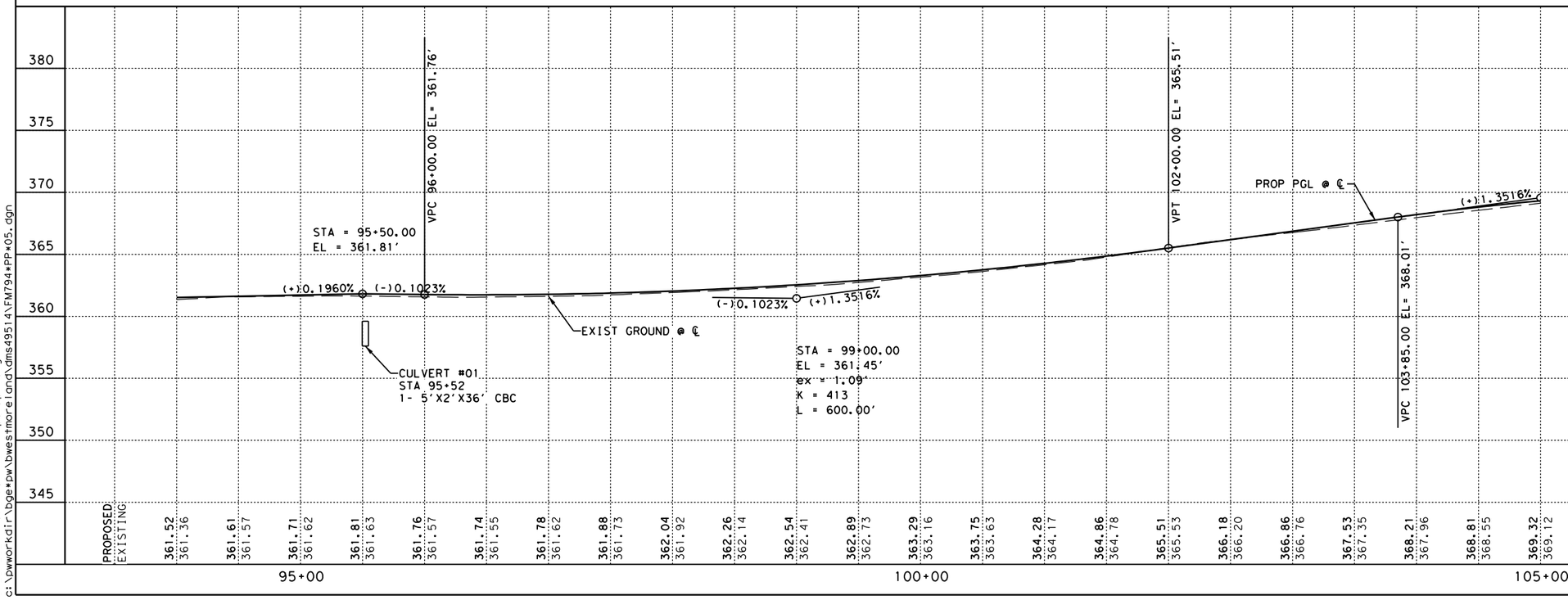
SCALE: 1"=100' H
1"=10' V



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ROADWAY PLAN & PROFILE

SHEET 7 OF 39

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			89
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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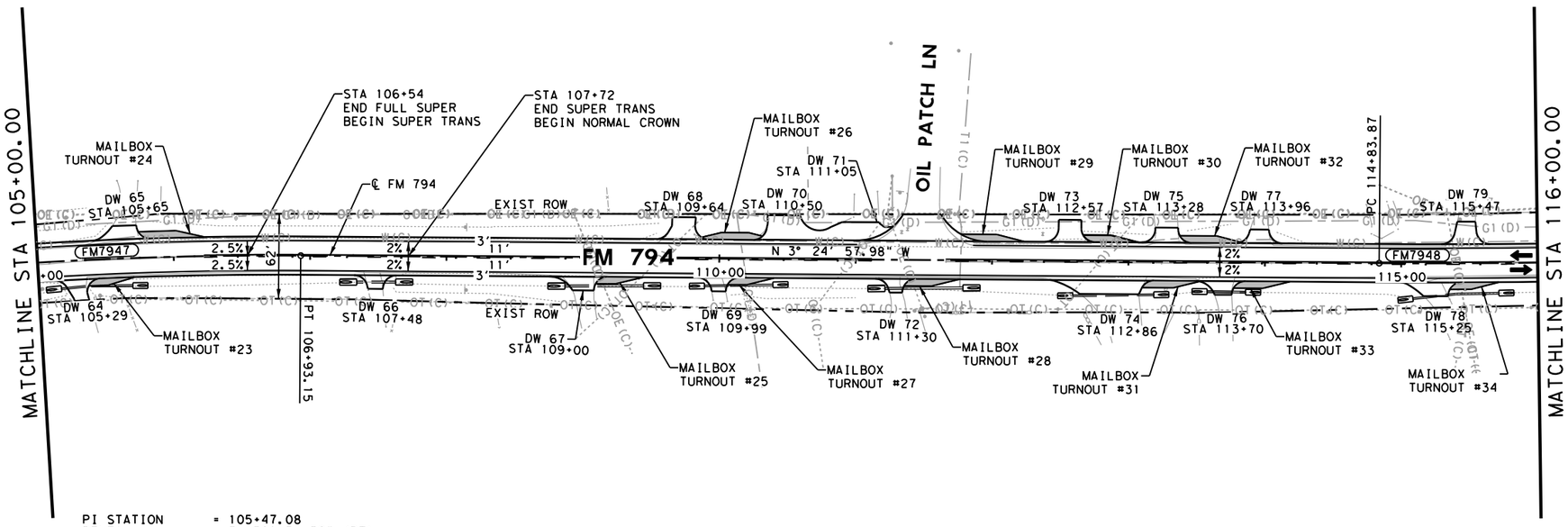


PI STATION = 105+47.08
DELTA = 5° 50' 51.52" (RT)
DEGREE OF CURVE = 1° 59' 59.72"
TANGENT = 146.32
LENGTH = 292.39
RADIUS = 2,864.90
PC STATION = 104+00.75
PT STATION = 106+93.15

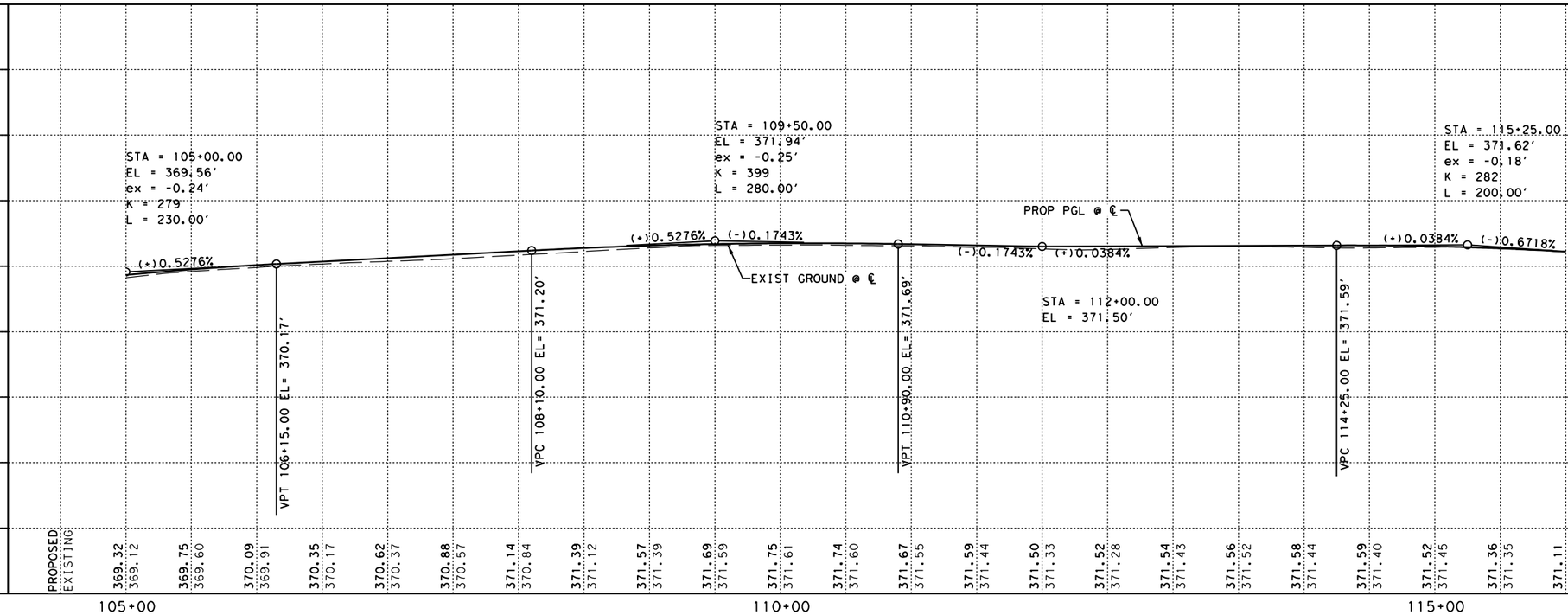
LEGEND:

- DIRECTION OF TRAFFIC
- DW# DRIVEWAY NUMBER
- (CURVE #) ALIGNMENT CURVE NUMBER
- CONCRETE DRIVEWAY TO BE REMOVED
- CONCRETE DRIVEWAYS OR MAILBOX TURNOUTS

NOTES:

1. UTILITY LOCATIONS SHOWN ARE APPROXIMATE AND SHOULD BE FIELD VERIFIED BY THE CONTRACTOR BEFORE CONSTRUCTION

0 50 100
SCALE: 1"=100' H
1"=10' V



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ROADWAY PLAN & PROFILE

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			90
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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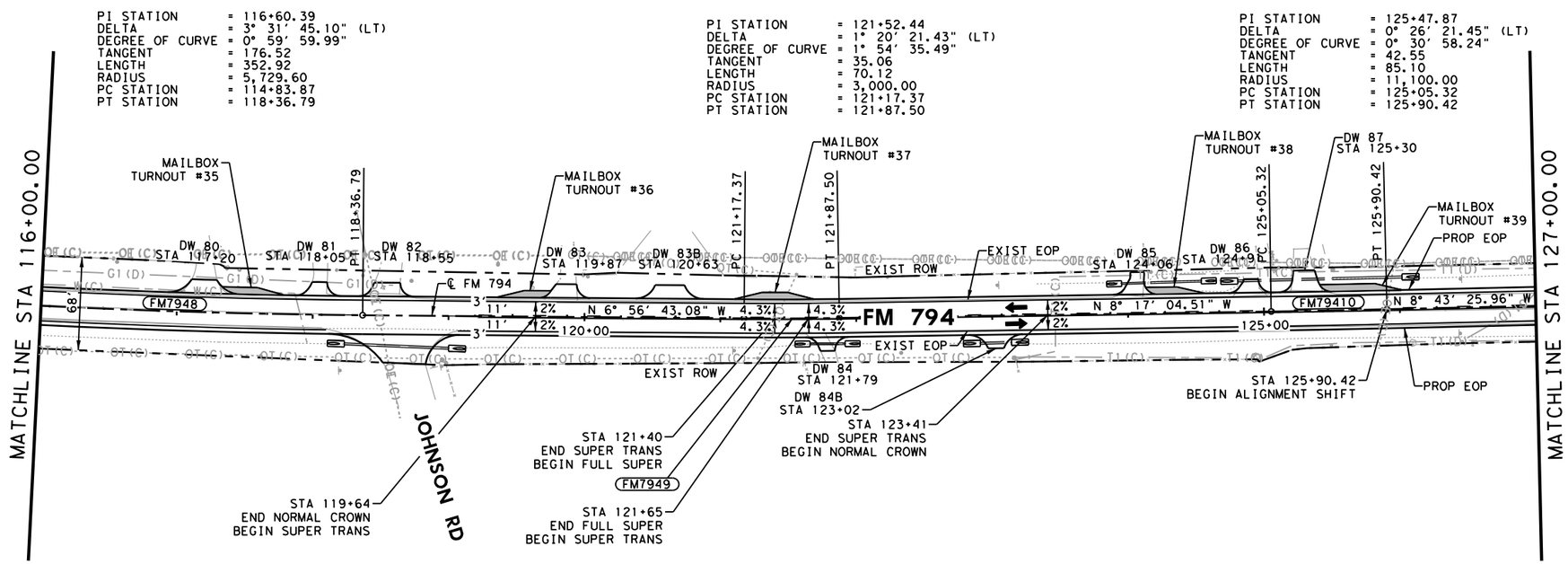

LEGEND:

- DIRECTION OF TRAFFIC
- DW# DRIVEWAY NUMBER
- (CURVE #) ALIGNMENT CURVE NUMBER
- CONCRETE DRIVEWAY TO BE REMOVED
- CONCRETE DRIVEWAYS OR MAILBOX TURNOUTS

NOTES:

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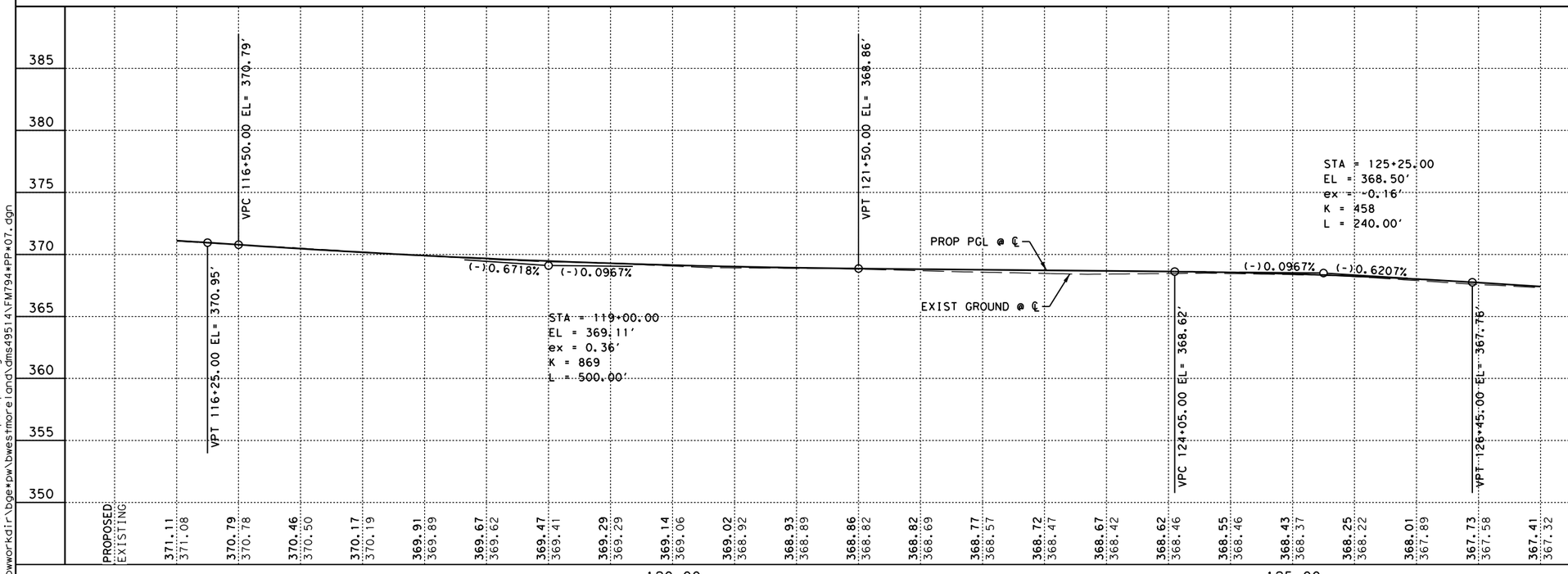
0 50 100

SCALE: 1"=100' H
1"=10' V



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ROADWAY PLAN & PROFILE

SHEET 9 OF 39

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			91
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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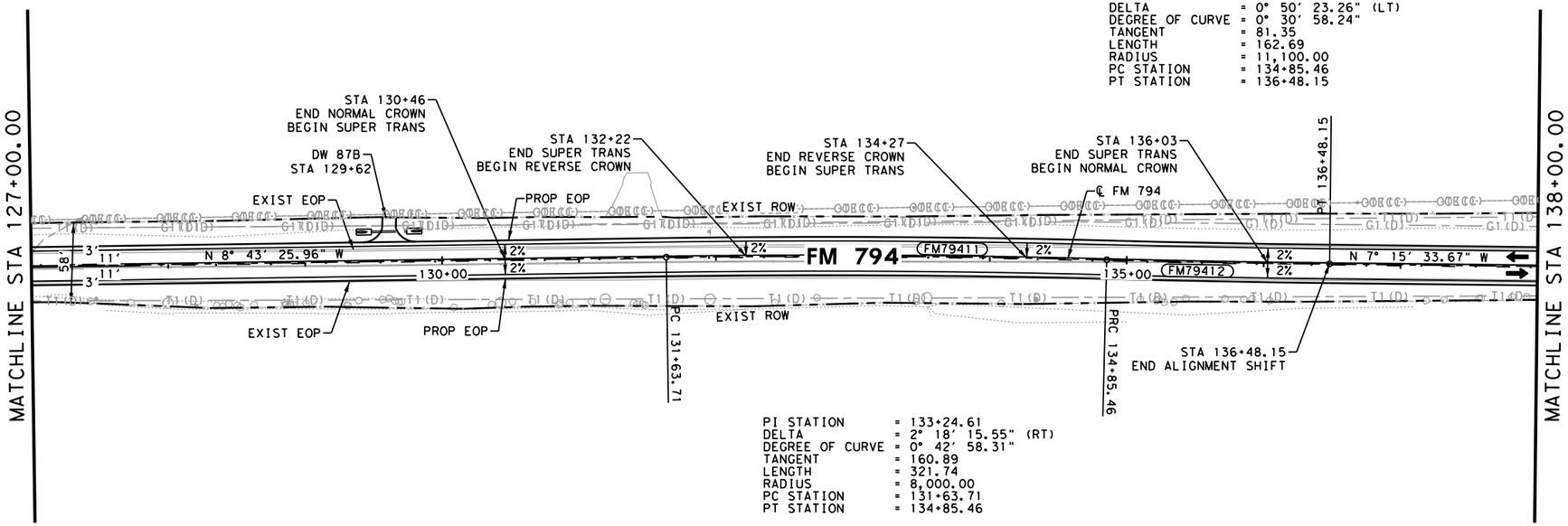

LEGEND:

- DIRECTION OF TRAFFIC
- DW# DRIVEWAY NUMBER
- (CURVE #) ALIGNMENT CURVE NUMBER
- CONCRETE DRIVEWAY TO BE REMOVED
- CONCRETE DRIVEWAYS OR MAILBOX TURNOUTS

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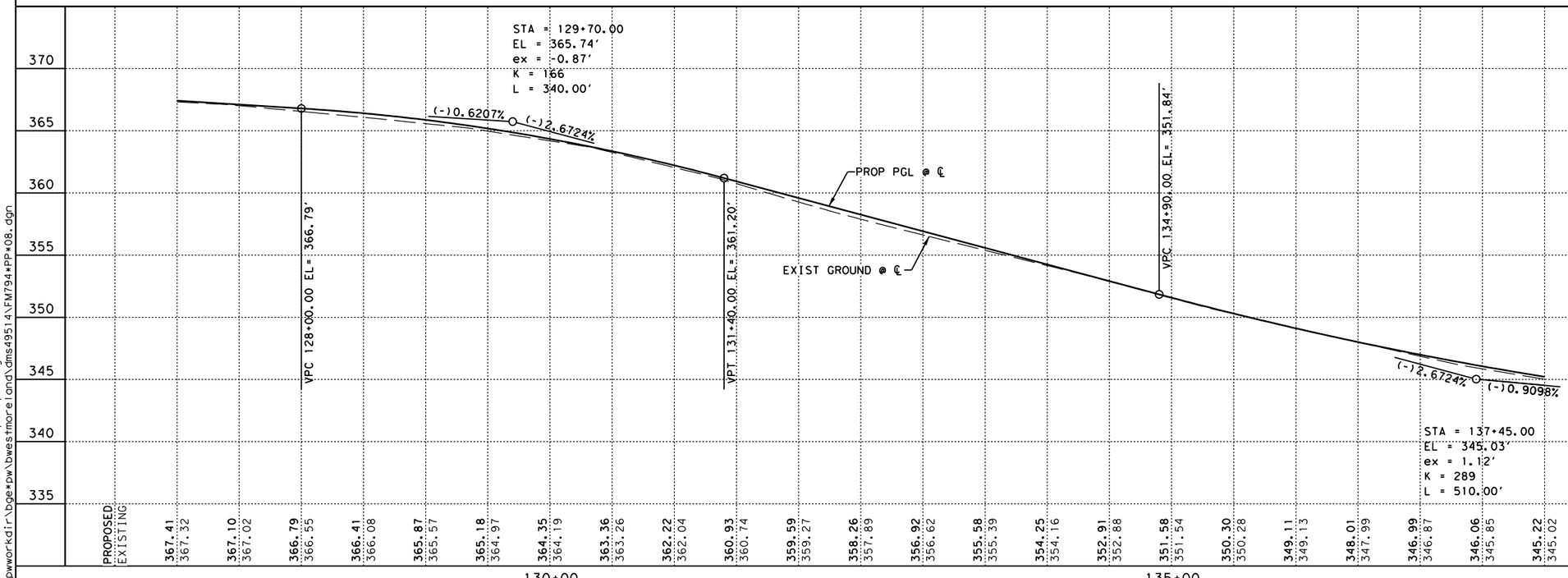
0 50 100

SCALE: 1"=100' H
1"=10' V



STATE OF TEXAS
JOHN W. TULEY
102441
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PROFESSIONAL ENGINEER

3/25/2021

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FM 794

ROADWAY PLAN & PROFILE

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			92
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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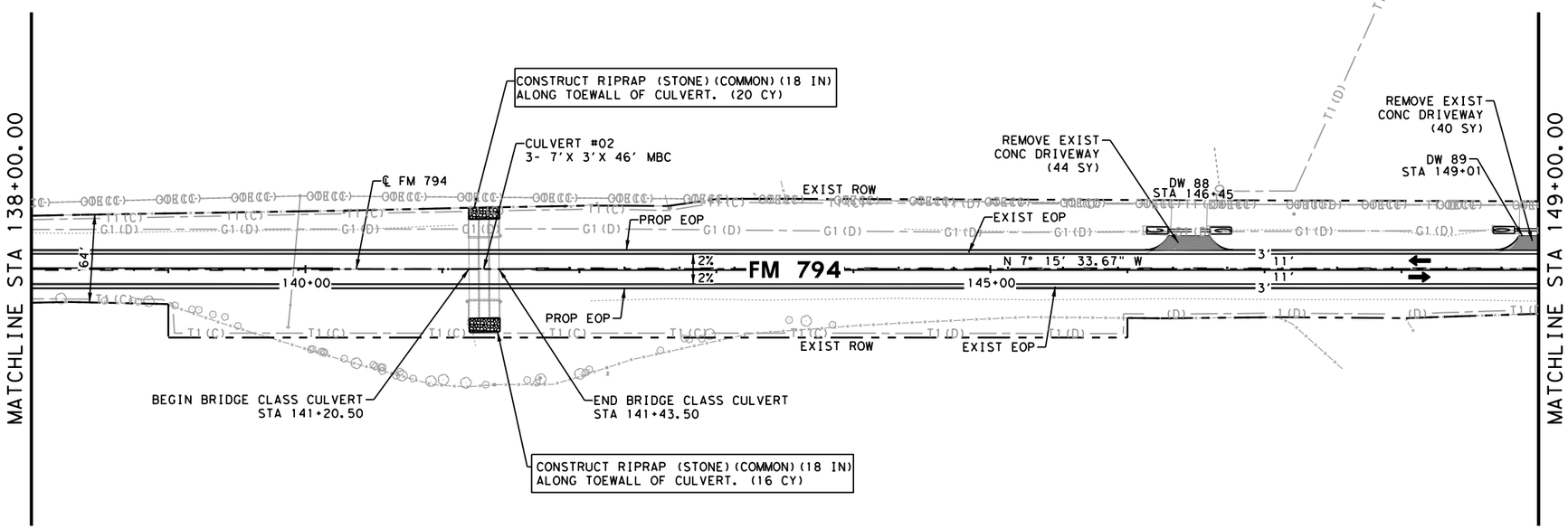


LEGEND:

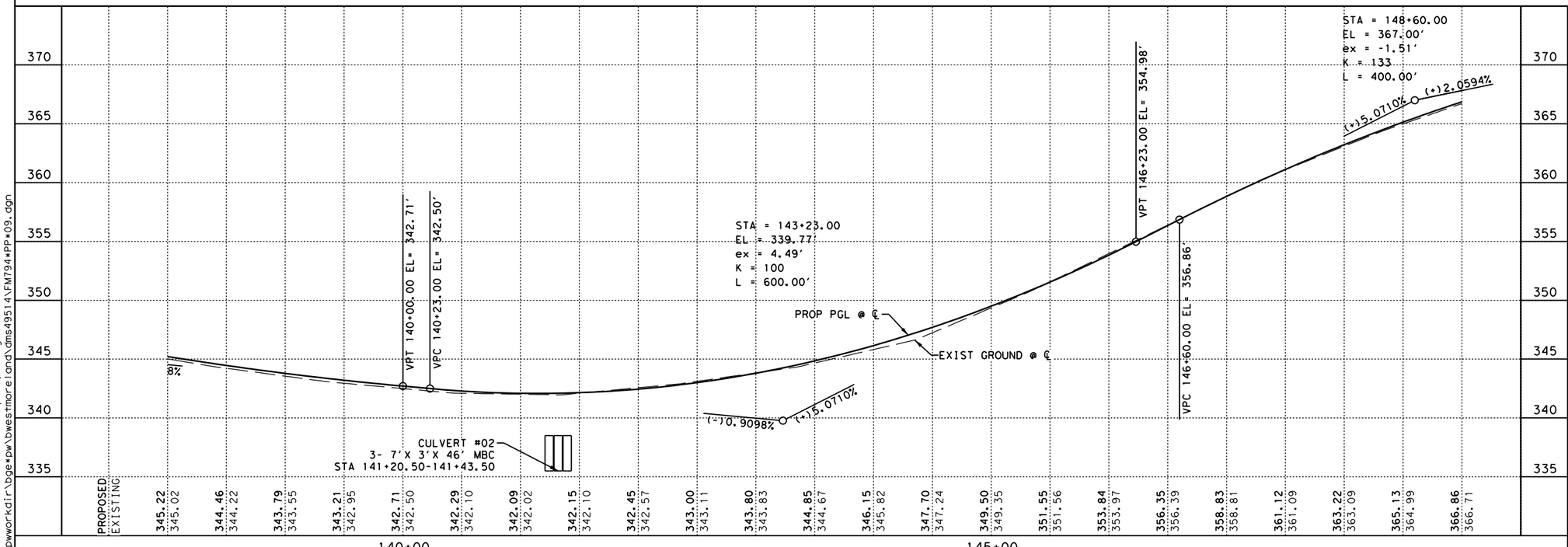
- DIRECTION OF TRAFFIC
- DW# DRIVEWAY NUMBER
- CURVE # ALIGNMENT CURVE NUMBER
- CONCRETE DRIVEWAY TO BE REMOVED
- CONCRETE DRIVEWAYS OR MAILBOX TURNOUTS

NOTES:

1. UTILITY LOCATIONS SHOWN ARE APPROXIMATE AND SHOULD BE FIELD VERIFIED BY THE CONTRACTOR BEFORE CONSTRUCTION

0 50 100

SCALE: 1"=100' H
1"=10' V



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ROADWAY PLAN & PROFILE

SHEET 11 OF 39

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			93
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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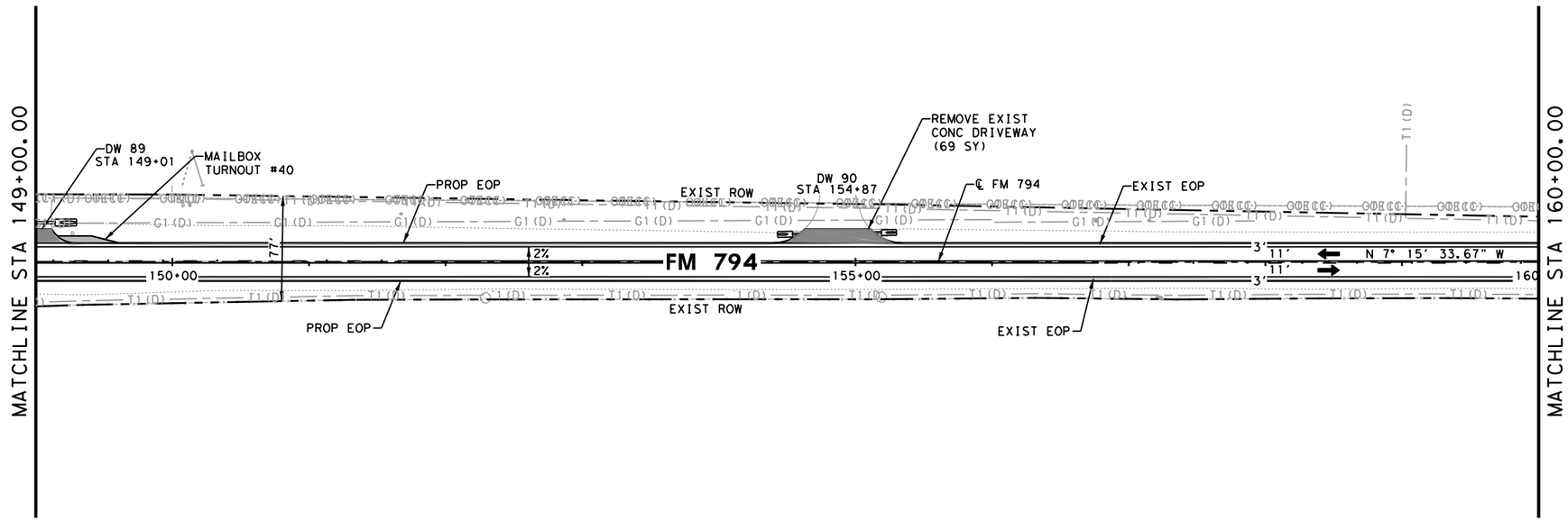

LEGEND:

- DIRECTION OF TRAFFIC
- DW# DRIVEWAY NUMBER
- CURVE # ALIGNMENT CURVE NUMBER
- CONCRETE DRIVEWAY TO BE REMOVED
- CONCRETE DRIVEWAYS OR MAILBOX TURNOUTS

NOTES:

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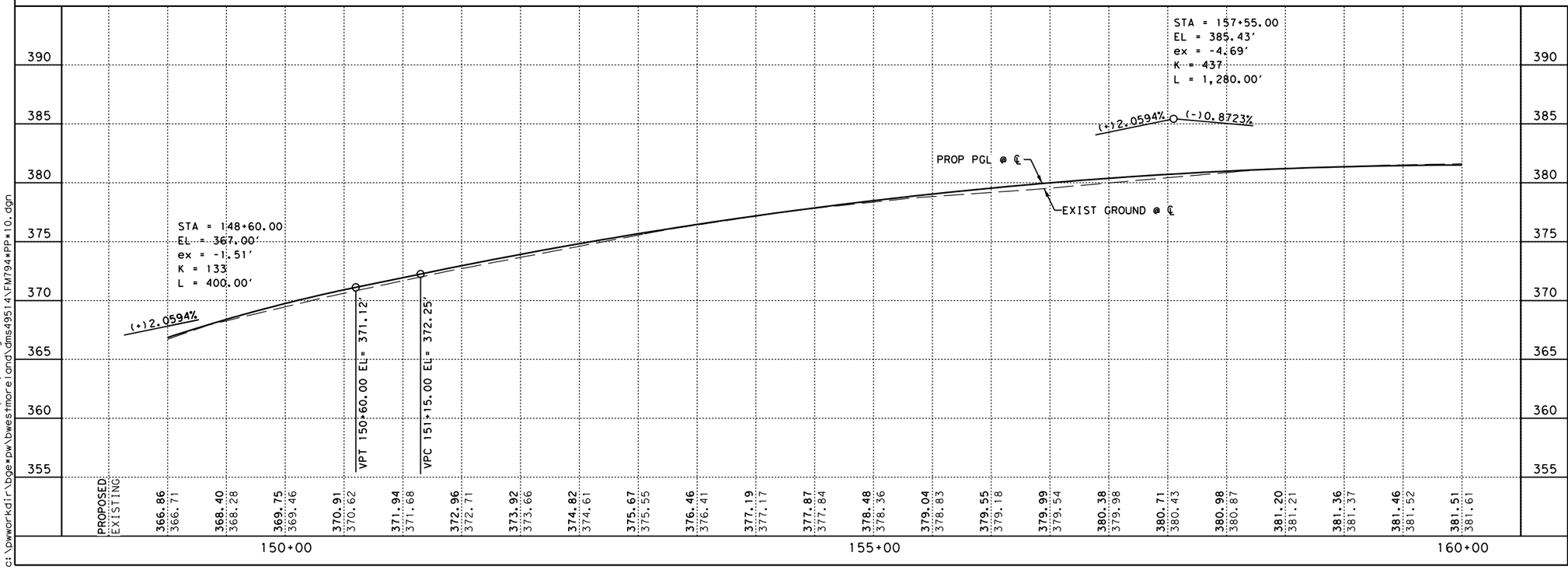
0 50 100

SCALE: 1"=100' H
1"=10' V



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ROADWAY PLAN & PROFILE

SHEET 12 OF 39

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			94
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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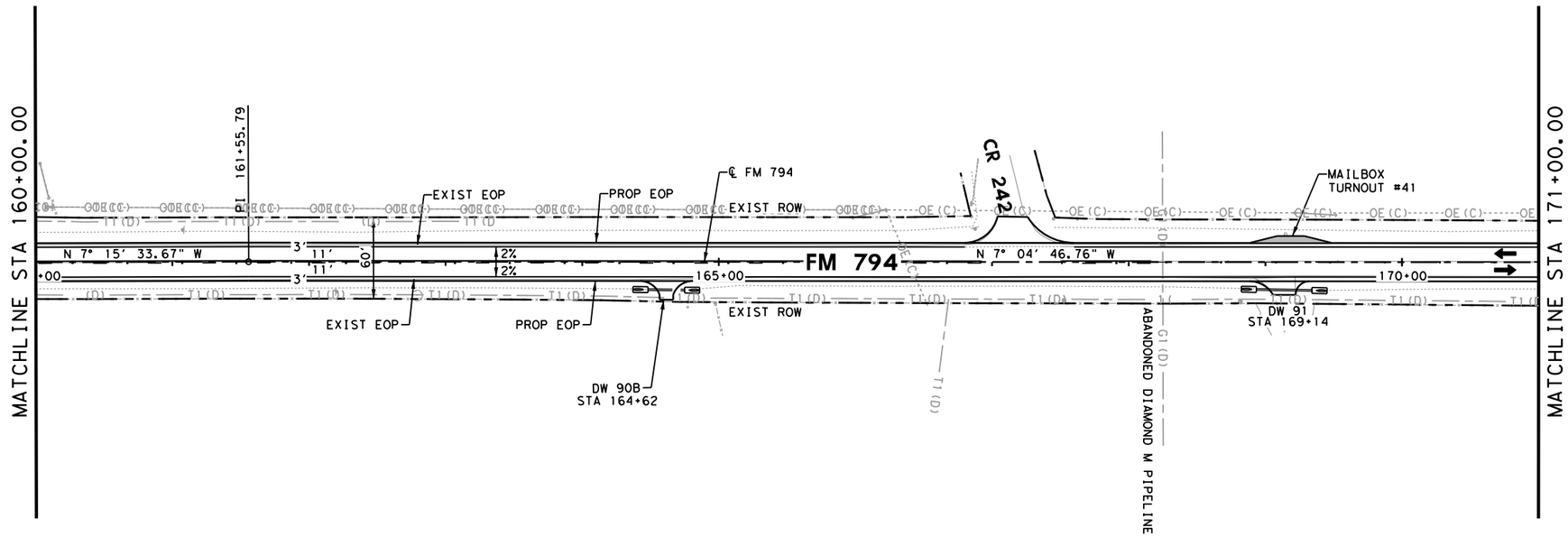

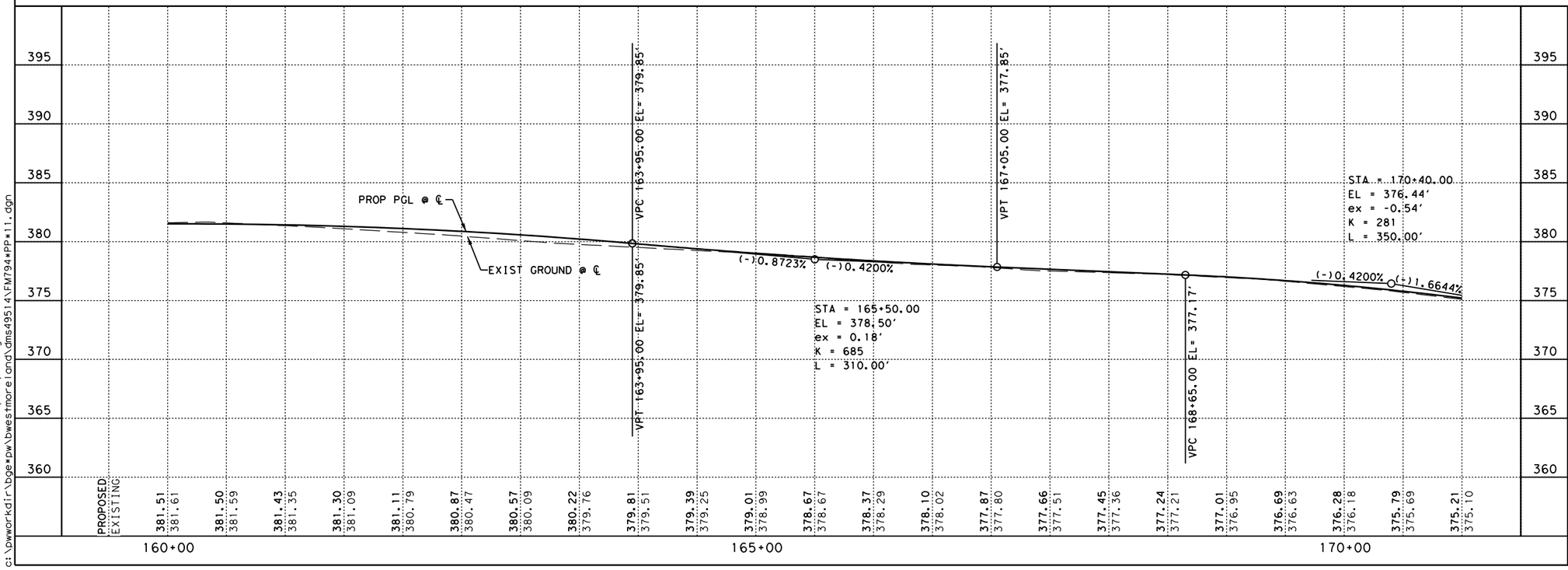

LEGEND:

- DIRECTION OF TRAFFIC
- DW# DRIVEWAY NUMBER
- CURVE # ALIGNMENT CURVE NUMBER
- CONCRETE DRIVEWAY TO BE REMOVED
- CONCRETE DRIVEWAYS OR MAILBOX TURNOUTS

NOTES:

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0 50 100

SCALE: 1"=100' H
1"=10' V

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ROADWAY PLAN & PROFILE

SHEET 13 OF 39

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			95
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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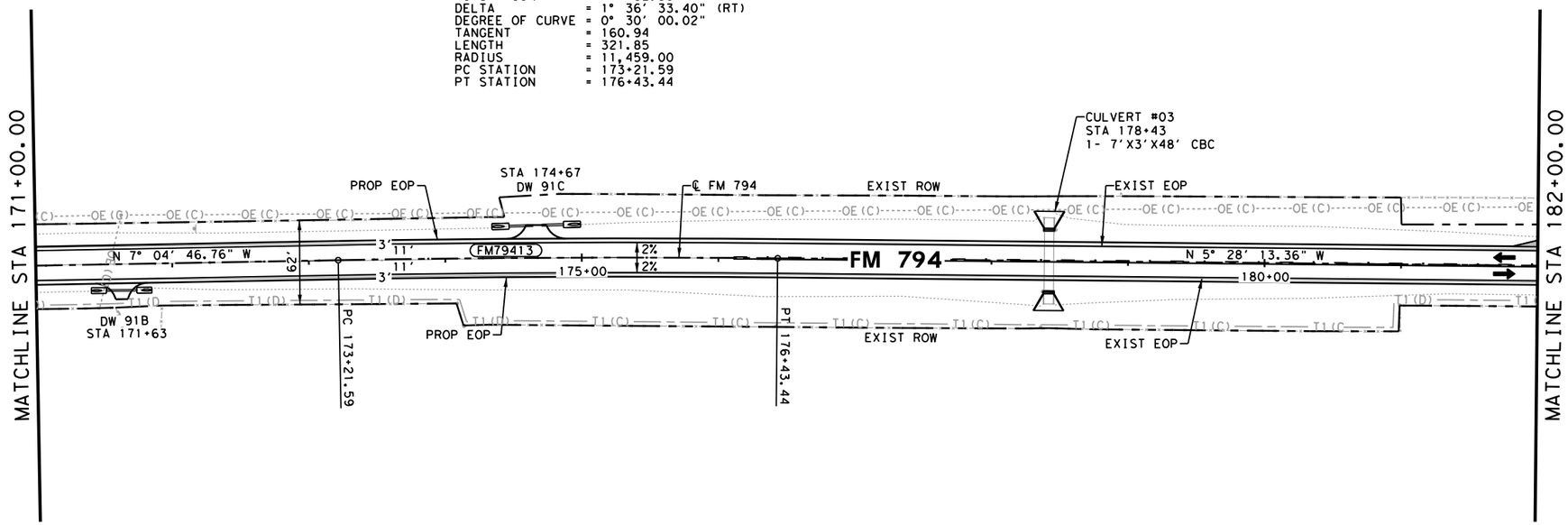

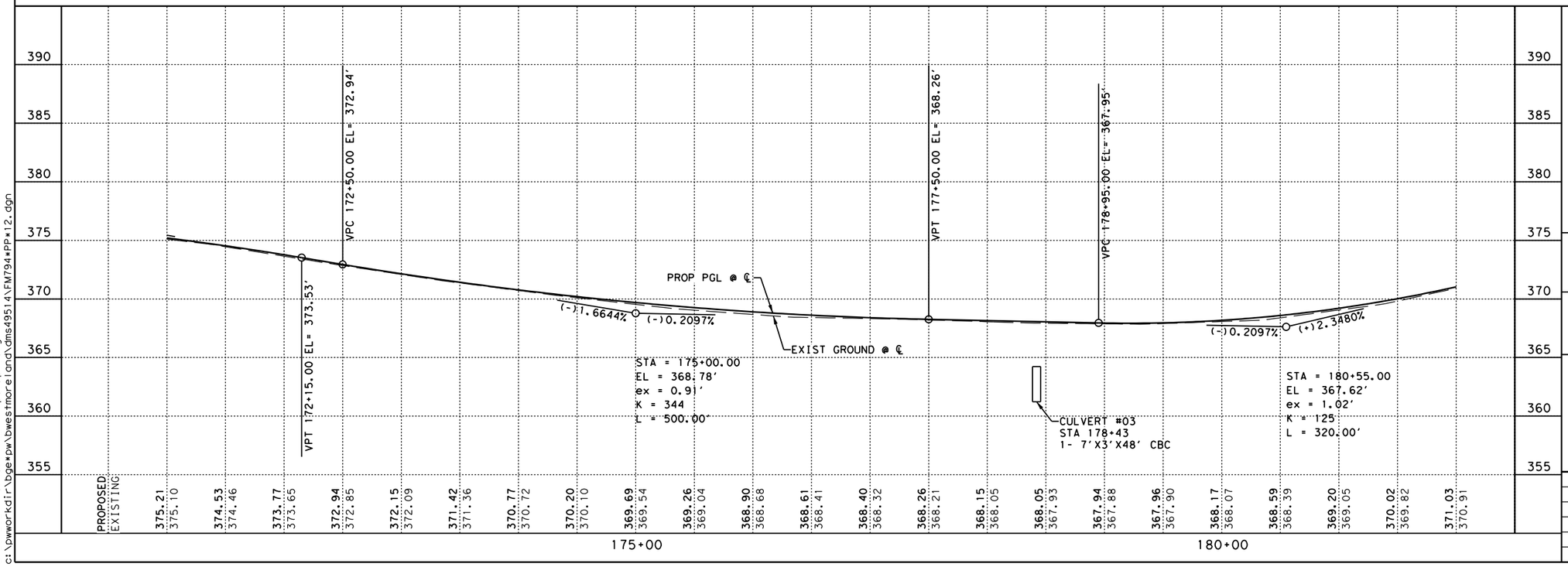

LEGEND:

- DIRECTION OF TRAFFIC
- DW# DRIVEWAY NUMBER
- (CURVE #) ALIGNMENT CURVE NUMBER
- CONCRETE DRIVEWAY TO BE REMOVED
- CONCRETE DRIVEWAYS OR MAILBOX TURNOUTS

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0 50 100

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1"=10' V

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ROADWAY PLAN & PROFILE

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			96
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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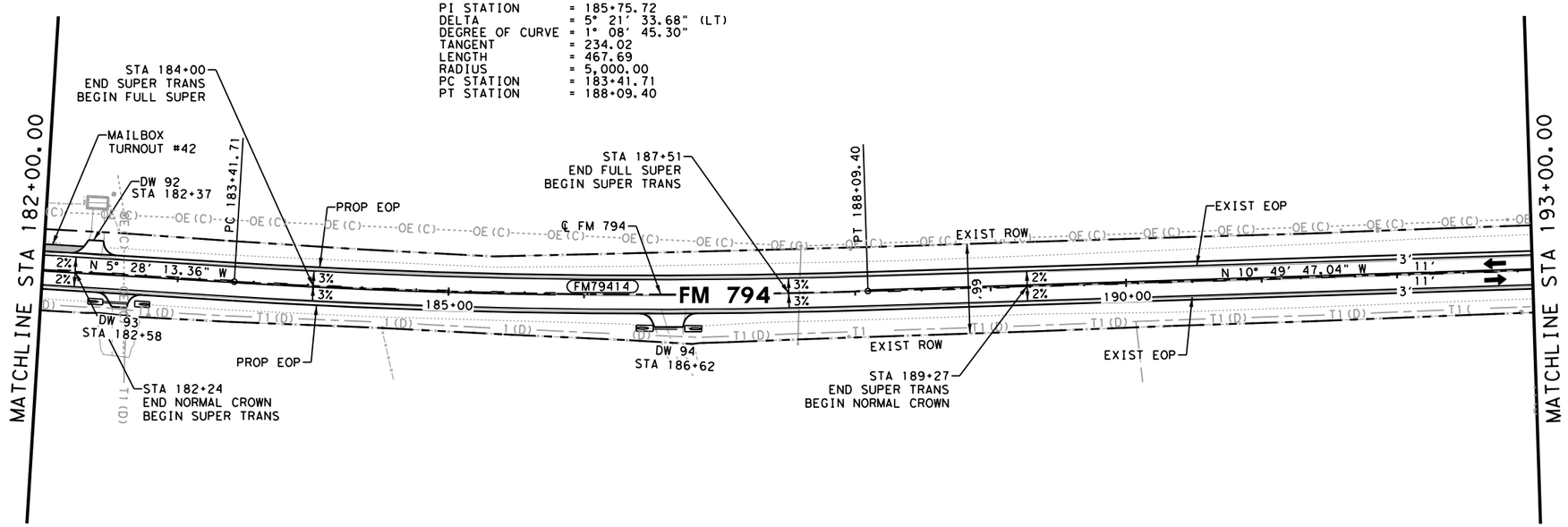

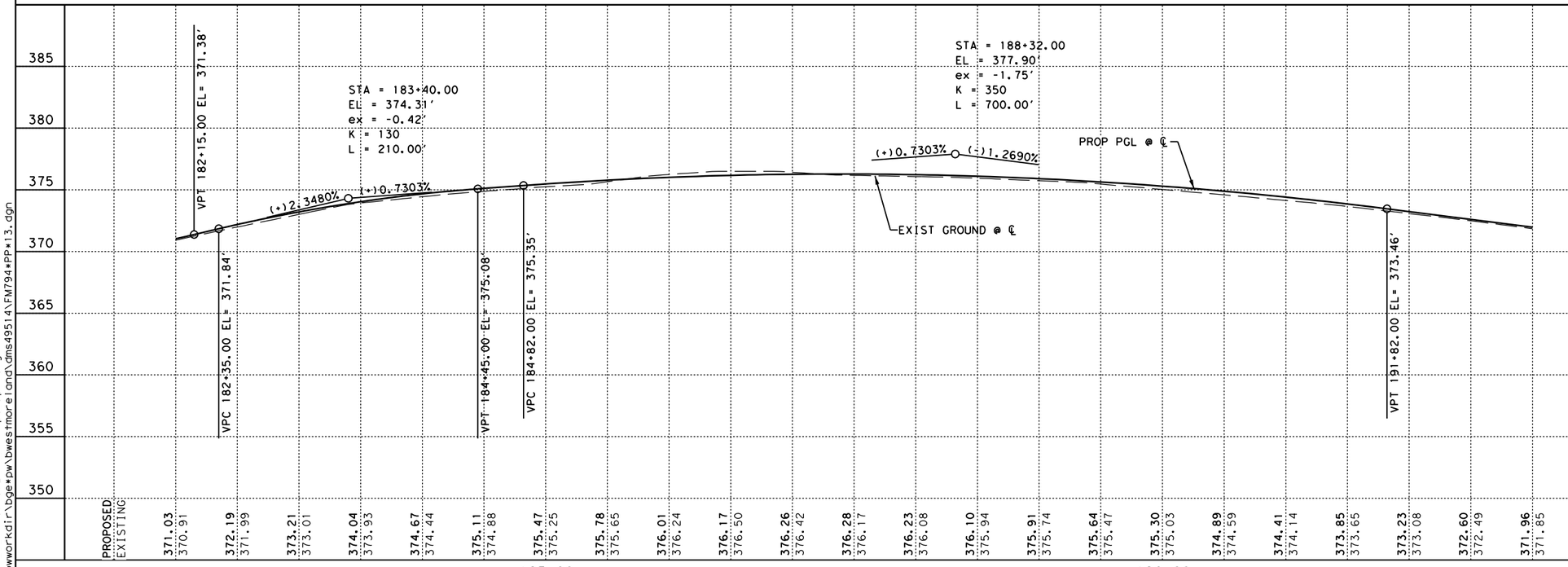

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1"=10' V

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ROADWAY PLAN & PROFILE

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			97
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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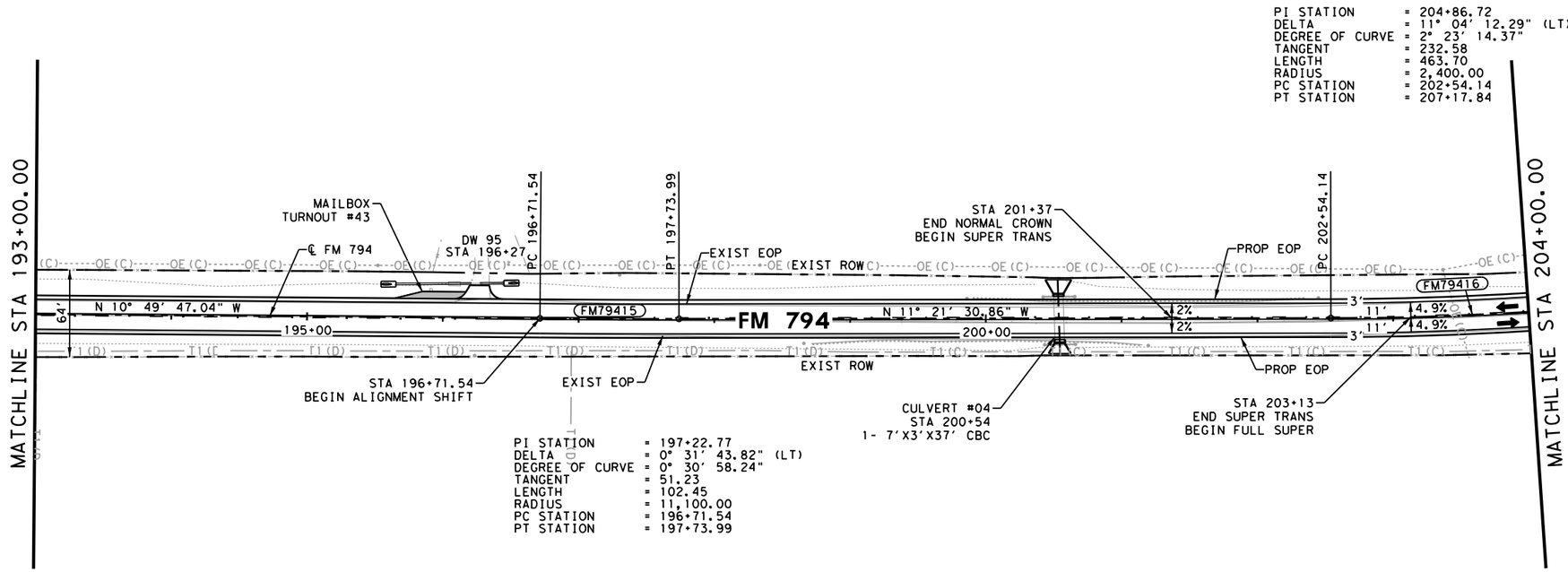

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- DIRECTION OF TRAFFIC
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- CURVE # ALIGNMENT CURVE NUMBER
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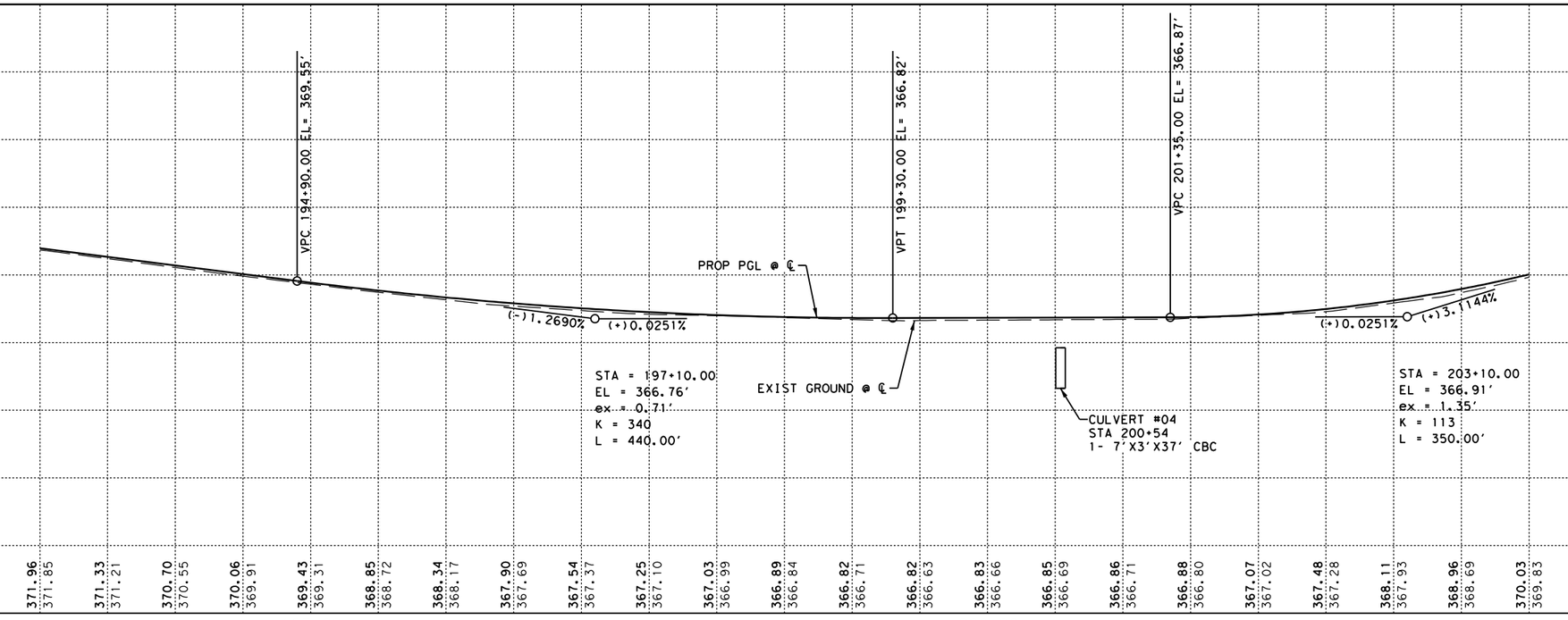
0 50 100

SCALE: 1"=100' H
1"=10' V



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ROADWAY PLAN & PROFILE

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			98
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

3/25/2021 8:45:37 AM pdf.pltcfg
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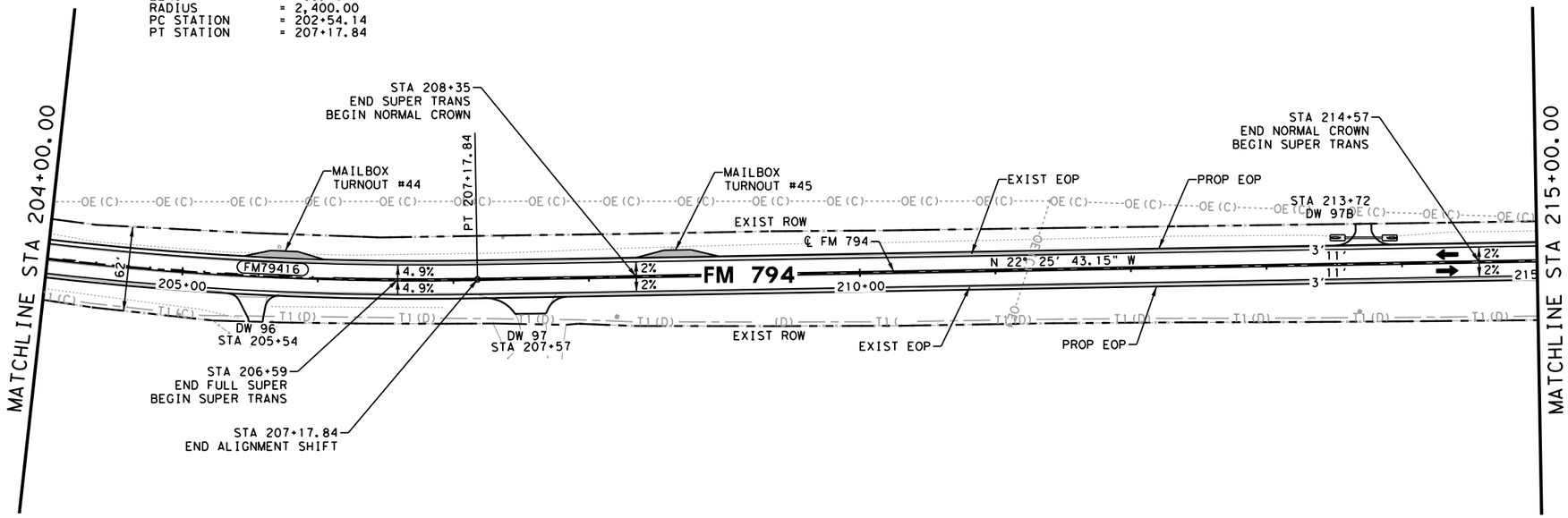
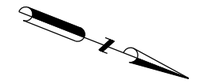
PI STATION = 204+86.72
DELTA = 11° 04' 12.29" (LT)
DEGREE OF CURVE = 2° 23' 14.37"
TANGENT = 232.58
LENGTH = 463.70
RADIUS = 2,400.00
PC STATION = 202+54.14
PT STATION = 207+17.84





LEGEND:

- DIRECTION OF TRAFFIC
- DW# DRIVEWAY NUMBER
- CURVE # ALIGNMENT CURVE NUMBER
- CONCRETE DRIVEWAY TO BE REMOVED
- CONCRETE DRIVEWAYS OR MAILBOX TURNOUTS

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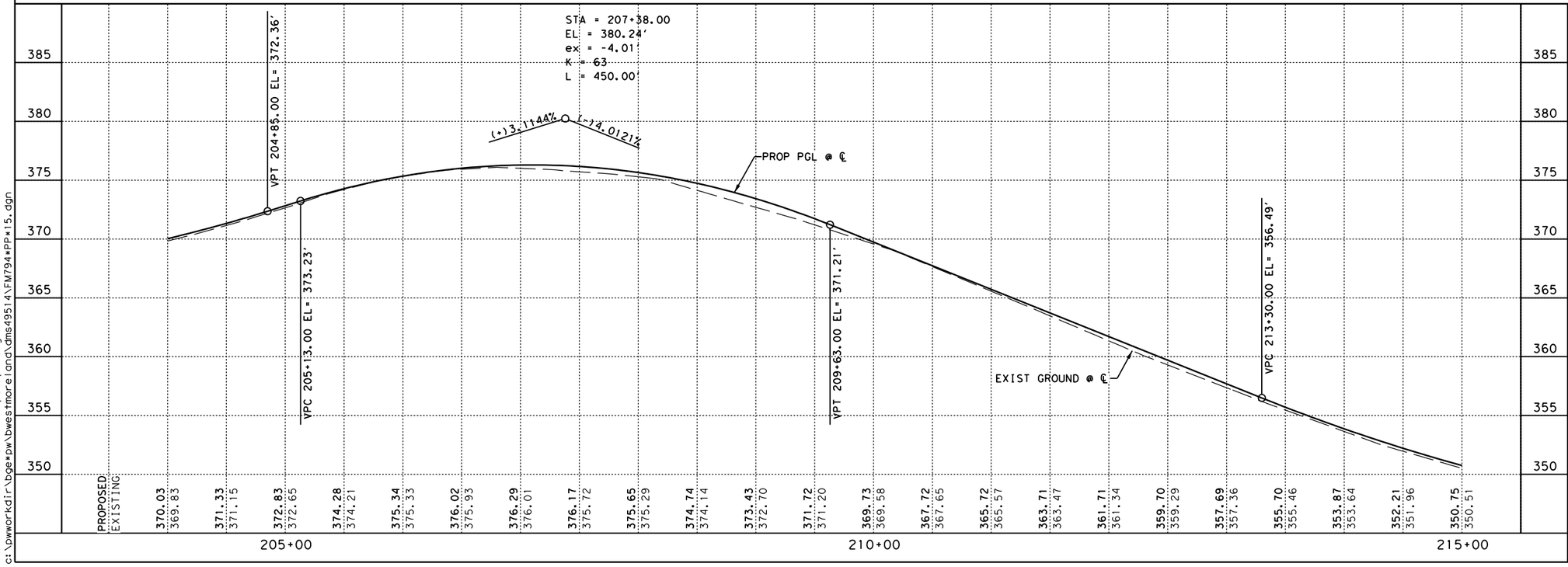
0 50 100
SCALE: 1"=100' H
1"=10' V



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ROADWAY PLAN & PROFILE

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			99
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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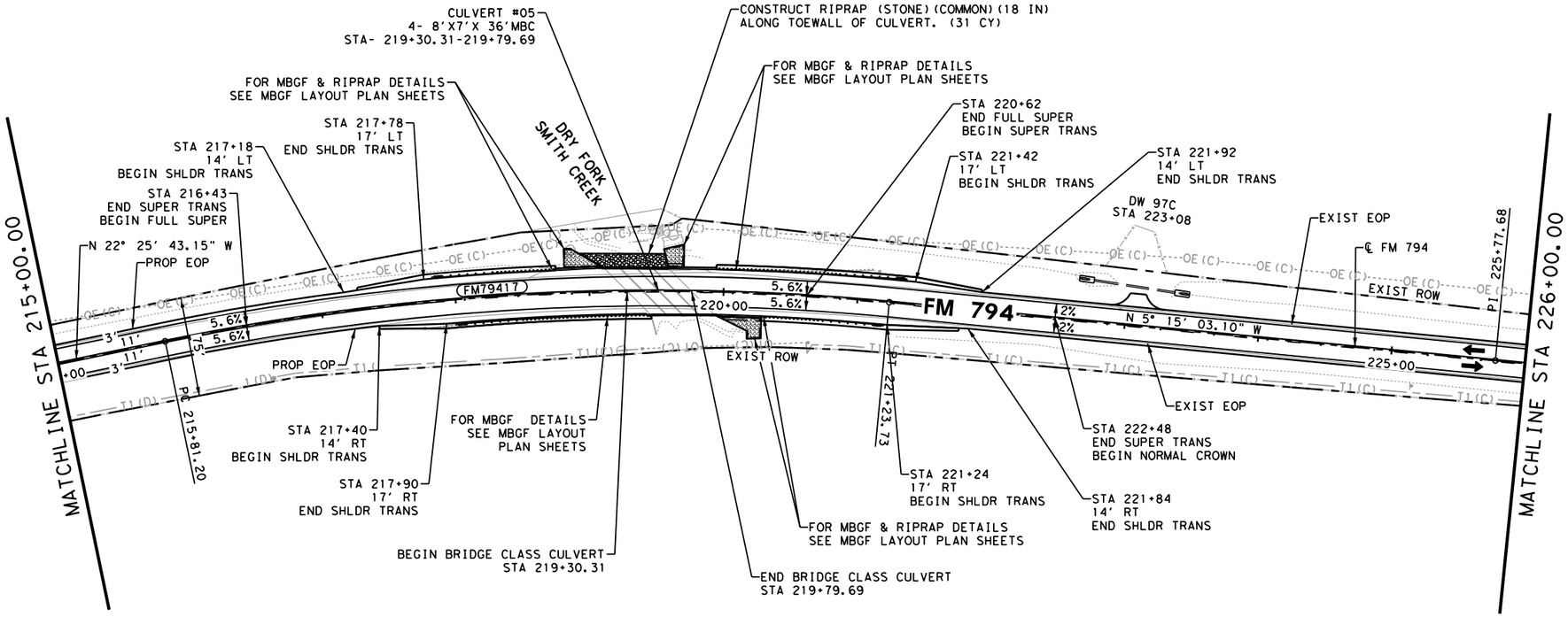

PI STATION = 218+54.52
DELTA = 17° 10' 40.05" (RT)
DEGREE OF CURVE = 3° 09' 58.36"
TANGENT = 273.32
LENGTH = 542.53
RADIUS = 1,809.60
PC STATION = 215+81.20
PT STATION = 221+23.73

LEGEND:

- DIRECTION OF TRAFFIC
- DW# DRIVEWAY NUMBER
- CURVE # ALIGNMENT CURVE NUMBER
- CONCRETE DRIVEWAY TO BE REMOVED
- CONCRETE DRIVEWAYS OR MAILBOX TURNOUTS

NOTES:

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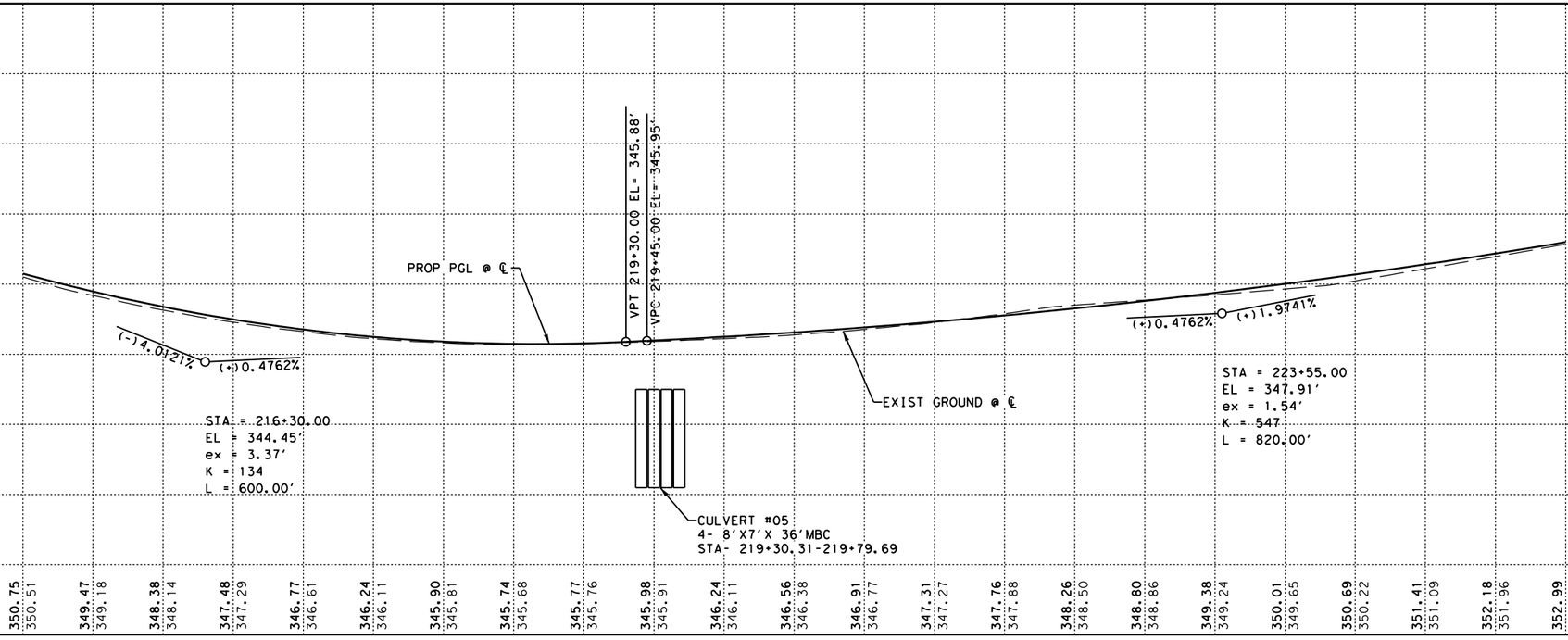
0 50 100
SCALE: 1"=100' H
1"=10' V



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ROADWAY PLAN & PROFILE

SHEET 18 OF 39

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			100
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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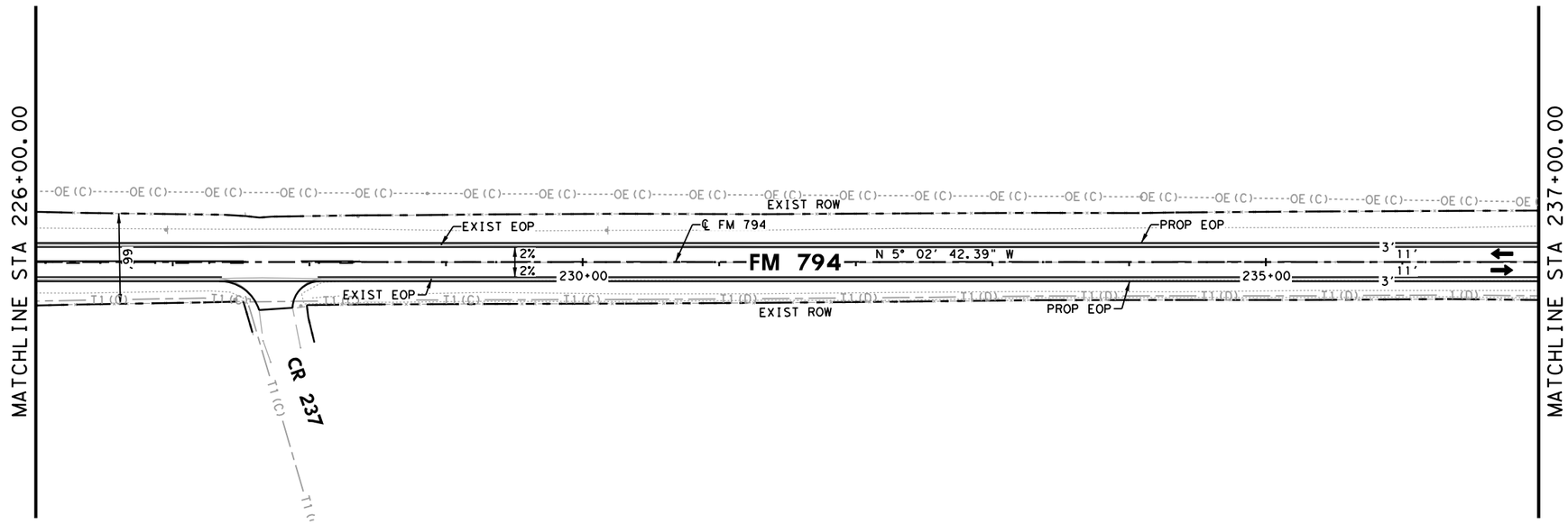

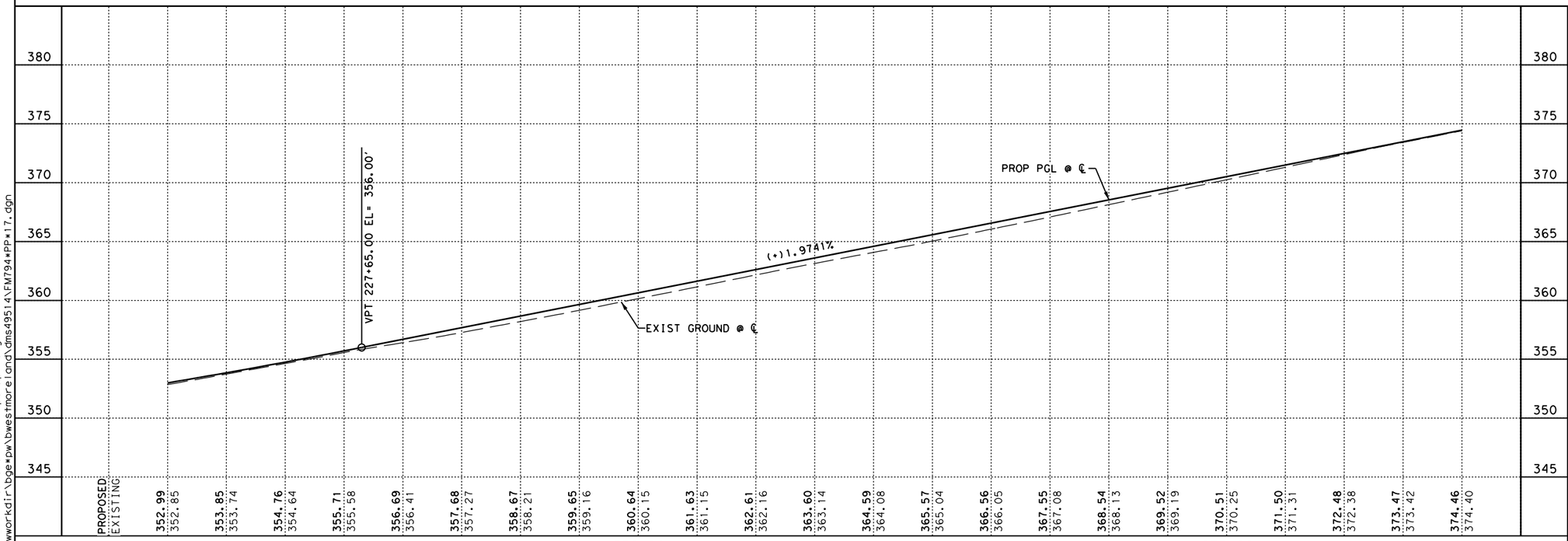

LEGEND:

- DIRECTION OF TRAFFIC
- DW# DRIVEWAY NUMBER
- CURVE # ALIGNMENT CURVE NUMBER
- CONCRETE DRIVEWAY TO BE REMOVED
- CONCRETE DRIVEWAYS OR MAILBOX TURNOUTS

NOTES:

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0 50 100
SCALE: 1"=100' H
1"=10' V

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ROADWAY PLAN & PROFILE

SHEET 19 OF 39

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			101
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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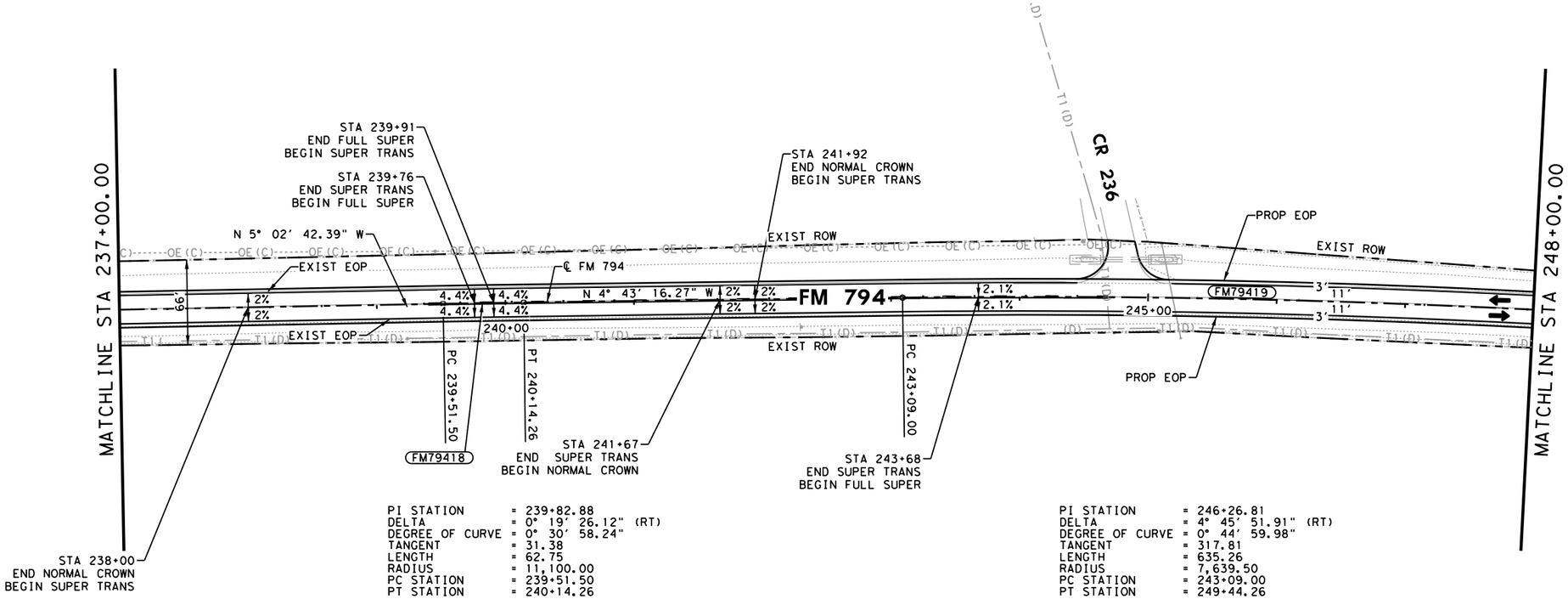


PI STATION = 239+82.88
DELTA = 0° 19' 26.12" (RT)
DEGREE OF CURVE = 0° 30' 58.24"
TANGENT = 31.38
LENGTH = 62.75
RADIUS = 11,100.00
PC STATION = 239+51.50
PT STATION = 240+14.26

PI STATION = 246+26.81
DELTA = 4° 45' 51.91" (RT)
DEGREE OF CURVE = 0° 44' 59.98"
TANGENT = 317.81
LENGTH = 635.26
RADIUS = 7,639.50
PC STATION = 243+09.00
PT STATION = 249+44.26

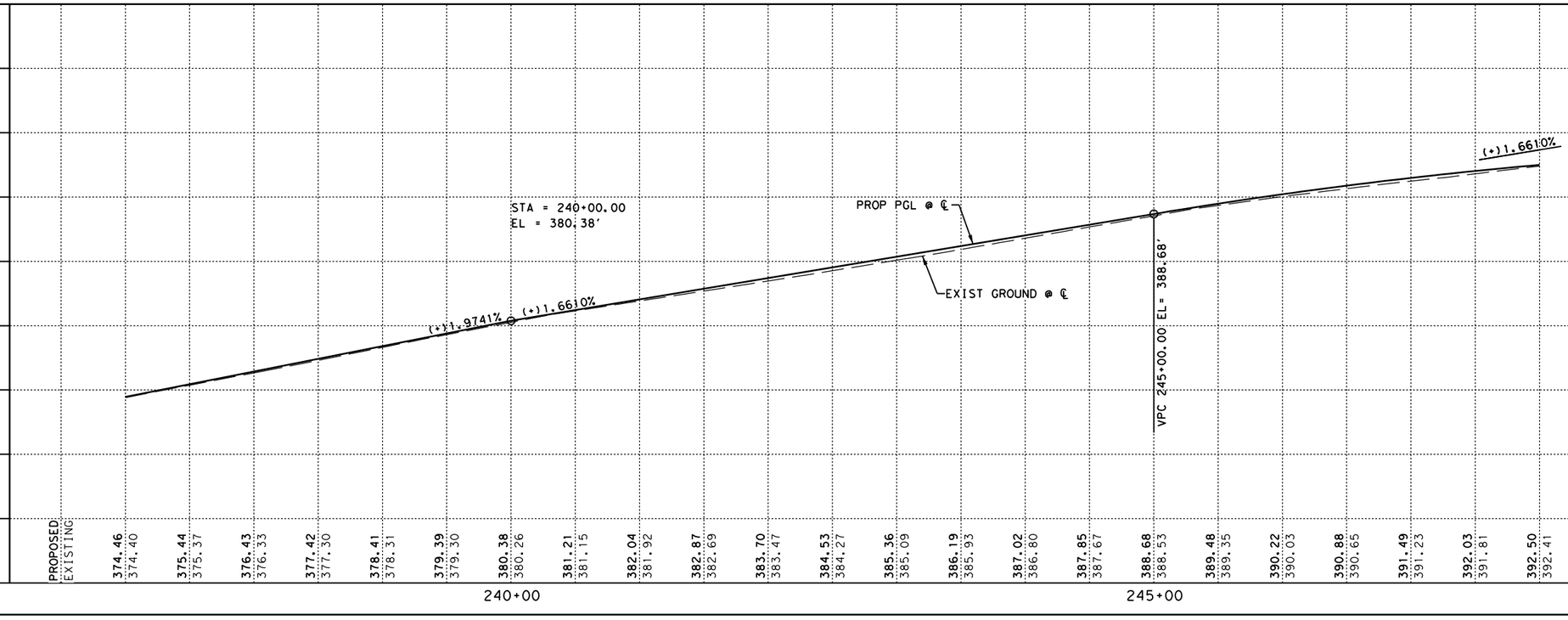
LEGEND:

- DIRECTION OF TRAFFIC
- DW# DRIVEWAY NUMBER
- CURVE # ALIGNMENT CURVE NUMBER
- CONCRETE DRIVEWAY TO BE REMOVED
- CONCRETE DRIVEWAYS OR MAILBOX TURNOUTS

NOTES:

1. UTILITY LOCATIONS SHOWN ARE APPROXIMATE AND SHOULD BE FIELD VERIFIED BY THE CONTRACTOR BEFORE CONSTRUCTION

0 50 100
SCALE: 1"=100' H
1"=10' V



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ROADWAY PLAN & PROFILE

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			102
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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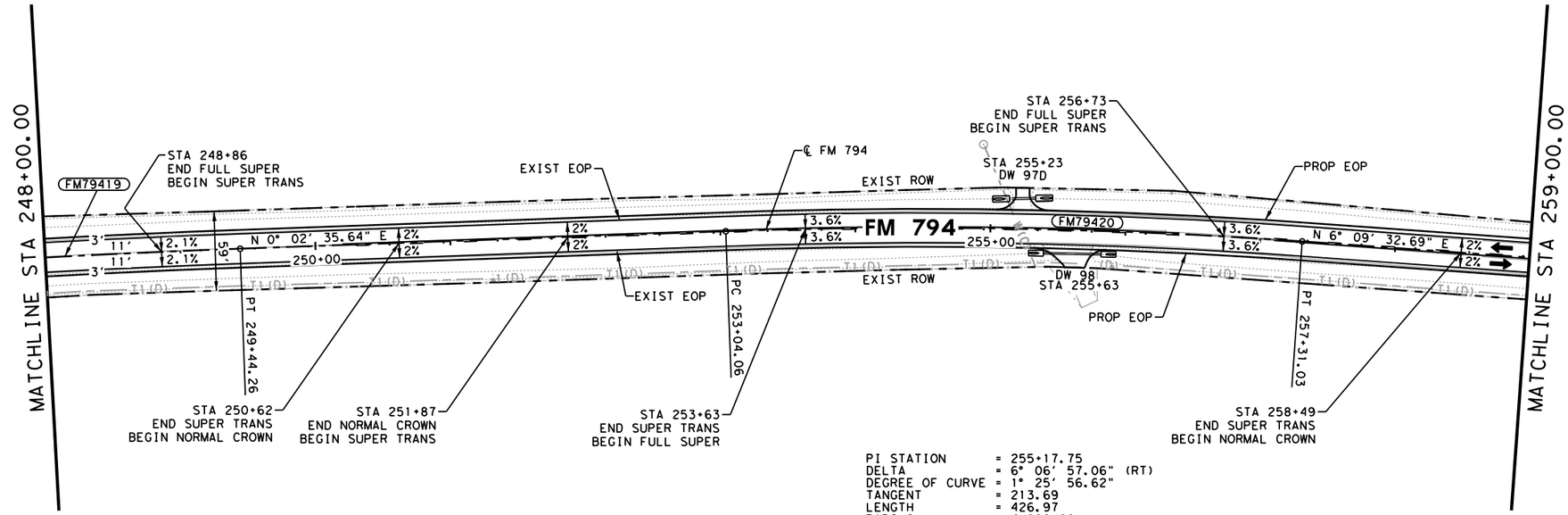

PI STATION = 255+17.75
DELTA = 6° 06' 57.06" (RT)
DEGREE OF CURVE = 1° 25' 56.62"
TANGENT = 213.69
LENGTH = 426.97
RADIUS = 4,000.00
PC STATION = 253+04.06
PT STATION = 257+31.03

LEGEND:

- DIRECTION OF TRAFFIC
- DW# DRIVEWAY NUMBER
- CURVE # ALIGNMENT CURVE NUMBER
- CONCRETE DRIVEWAY TO BE REMOVED
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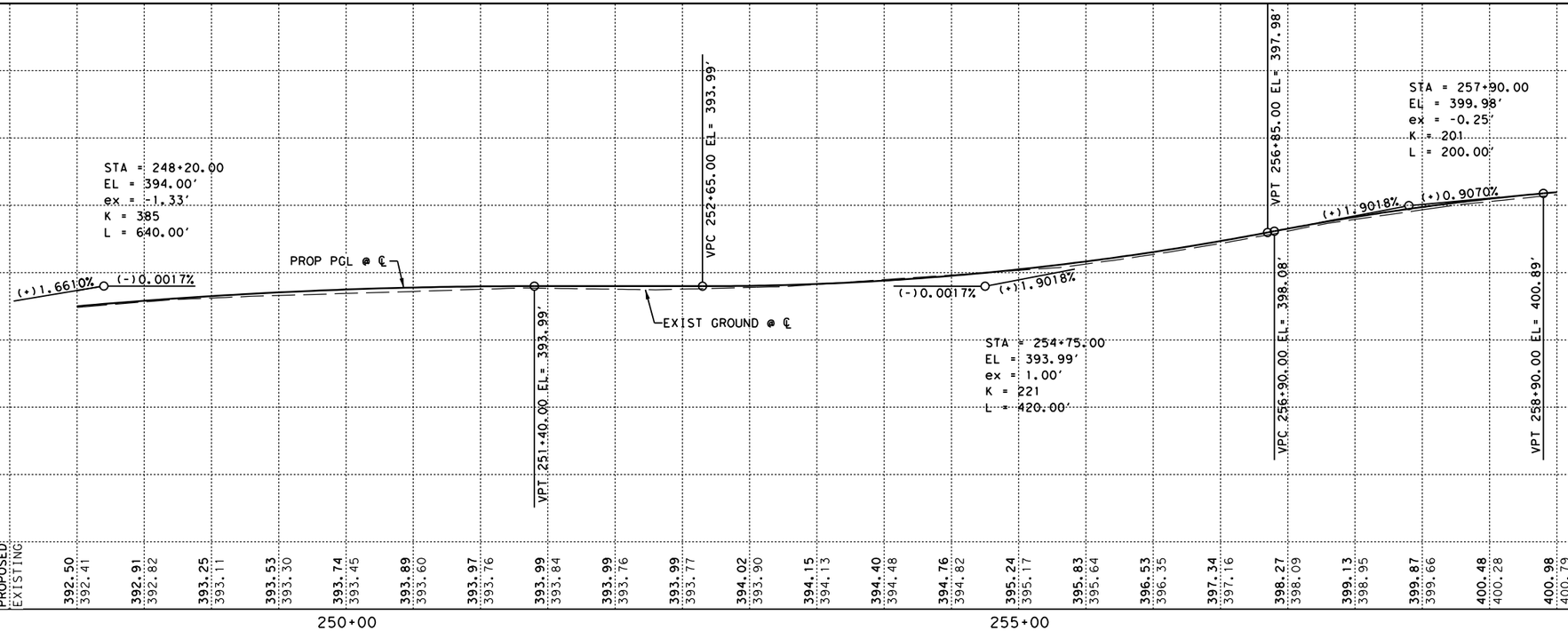
0 50 100
SCALE: 1"=100' H
1"=10' V



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FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			103
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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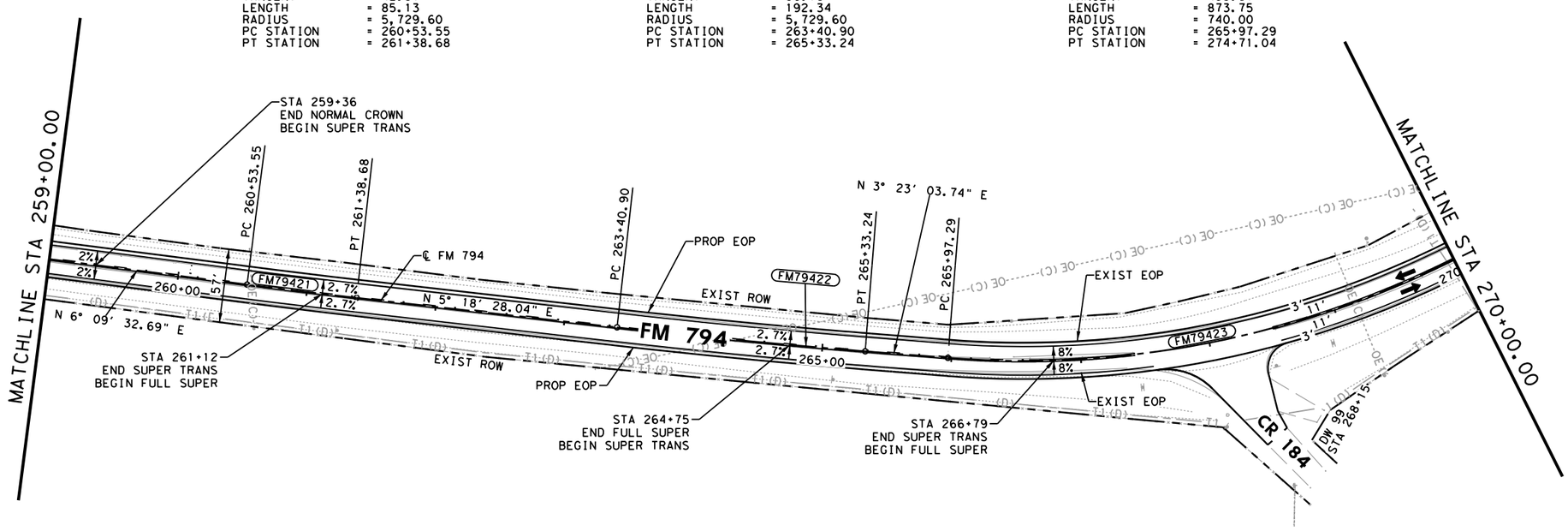
PI STATION = 260+96.11
DELTA = 0° 51' 04.66" (LT)
DEGREE OF CURVE = 0° 59' 59.99"
TANGENT = 42.57
LENGTH = 85.13
RADIUS = 5,729.60
PC STATION = 260+53.55
PT STATION = 261+38.68

PI STATION = 264+37.08
DELTA = 1° 55' 24.30" (LT)
DEGREE OF CURVE = 0° 59' 59.99"
TANGENT = 96.18
LENGTH = 192.34
RADIUS = 5,729.60
PC STATION = 263+40.90
PT STATION = 265+33.24

PI STATION = 270+93.16
DELTA = 67° 39' 07.02" (LT)
DEGREE OF CURVE = 7° 44' 33.62"
TANGENT = 495.87
LENGTH = 873.75
RADIUS = 740.00
PC STATION = 265+97.29
PT STATION = 274+71.04



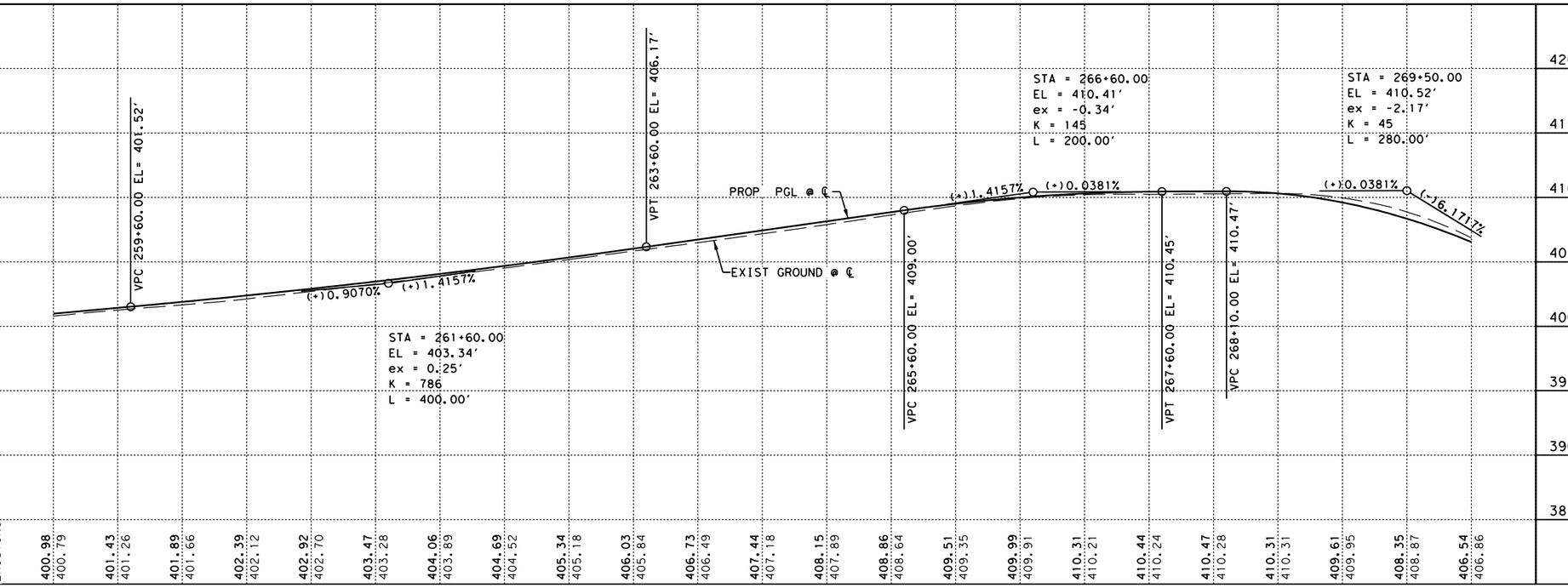
LEGEND:

- DIRECTION OF TRAFFIC
- DW# DRIVEWAY NUMBER
- (CURVE #) ALIGNMENT CURVE NUMBER
- CONCRETE DRIVEWAY TO BE REMOVED
- CONCRETE DRIVEWAYS OR MAILBOX TURNOUTS

NOTES:

1. UTILITY LOCATIONS SHOWN ARE APPROXIMATE AND SHOULD BE FIELD VERIFIED BY THE CONTRACTOR BEFORE CONSTRUCTION

0 50 100
SCALE: 1"=100' H
1"=10' V



STATE OF TEXAS
JOHN W. TULEY
102441
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3/25/2021

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FM 794

ROADWAY PLAN & PROFILE

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			104
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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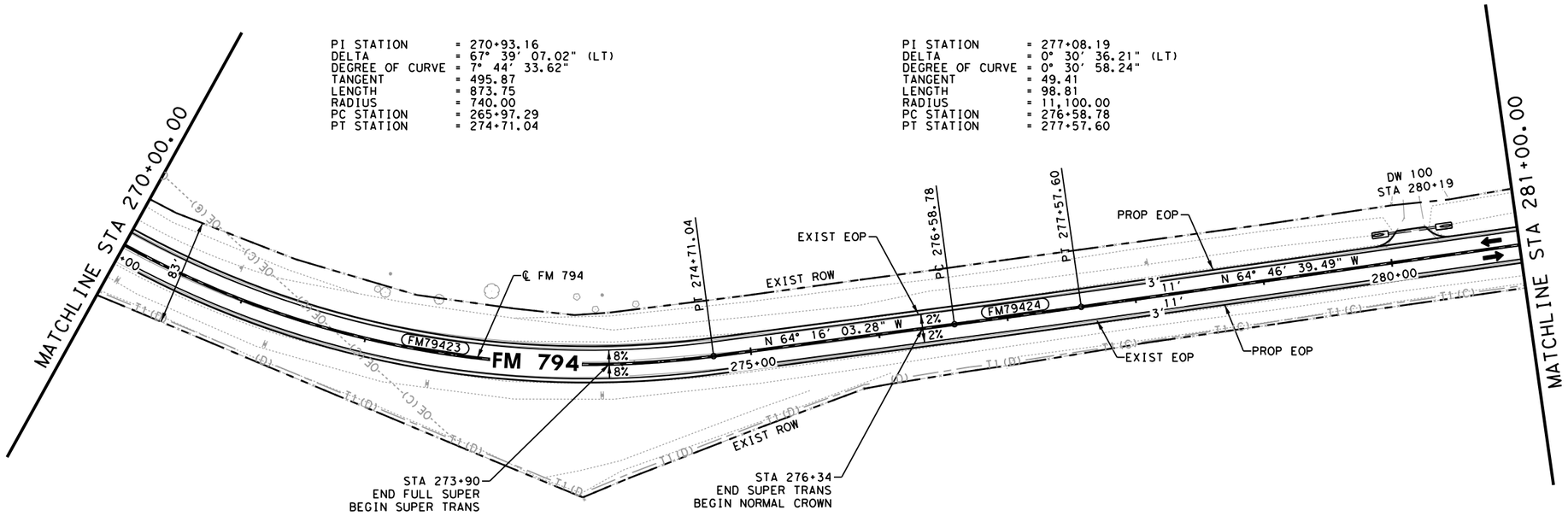

LEGEND:

- DIRECTION OF TRAFFIC
- DW# DRIVEWAY NUMBER
- CURVE # ALIGNMENT CURVE NUMBER
- CONCRETE DRIVEWAY TO BE REMOVED
- CONCRETE DRIVEWAYS OR MAILBOX TURNOUTS

NOTES:

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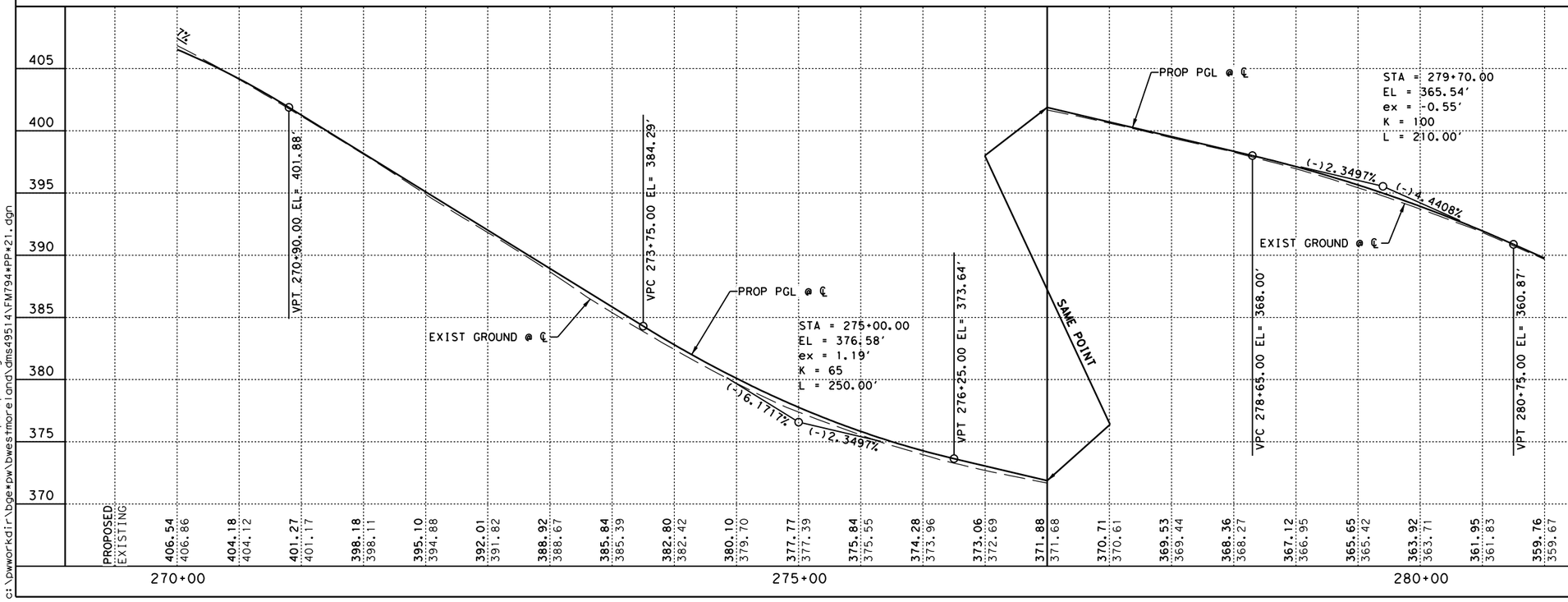
0 50 100

SCALE: 1"=100' H
1"=10' V



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ROADWAY PLAN & PROFILE

SHEET 23 OF 39

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			105
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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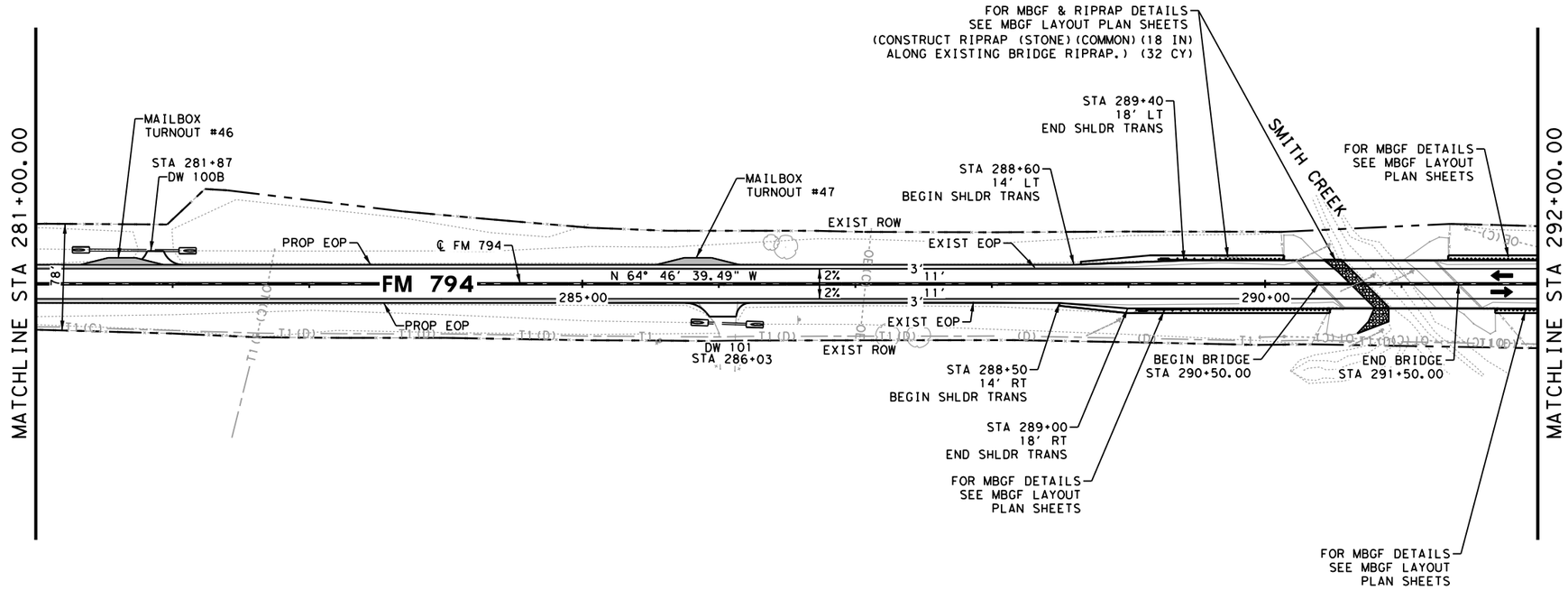

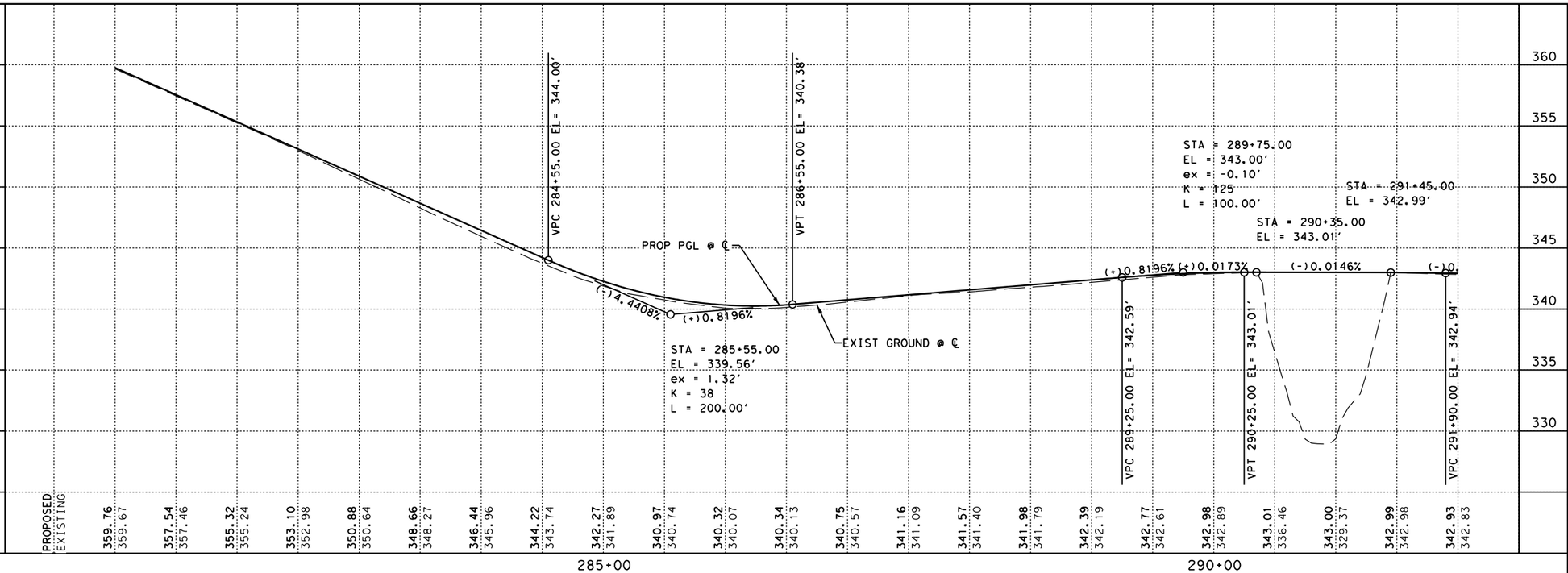

LEGEND:

- DIRECTION OF TRAFFIC
- DW# DRIVEWAY NUMBER
- (CURVE #) ALIGNMENT CURVE NUMBER
- CONCRETE DRIVEWAY TO BE REMOVED
- CONCRETE DRIVEWAYS OR MAILBOX TURNOUTS

NOTES:

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0 50 100

SCALE: 1"=100' H
1"=10' V

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ROADWAY PLAN & PROFILE

SHEET 24 OF 39

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			106
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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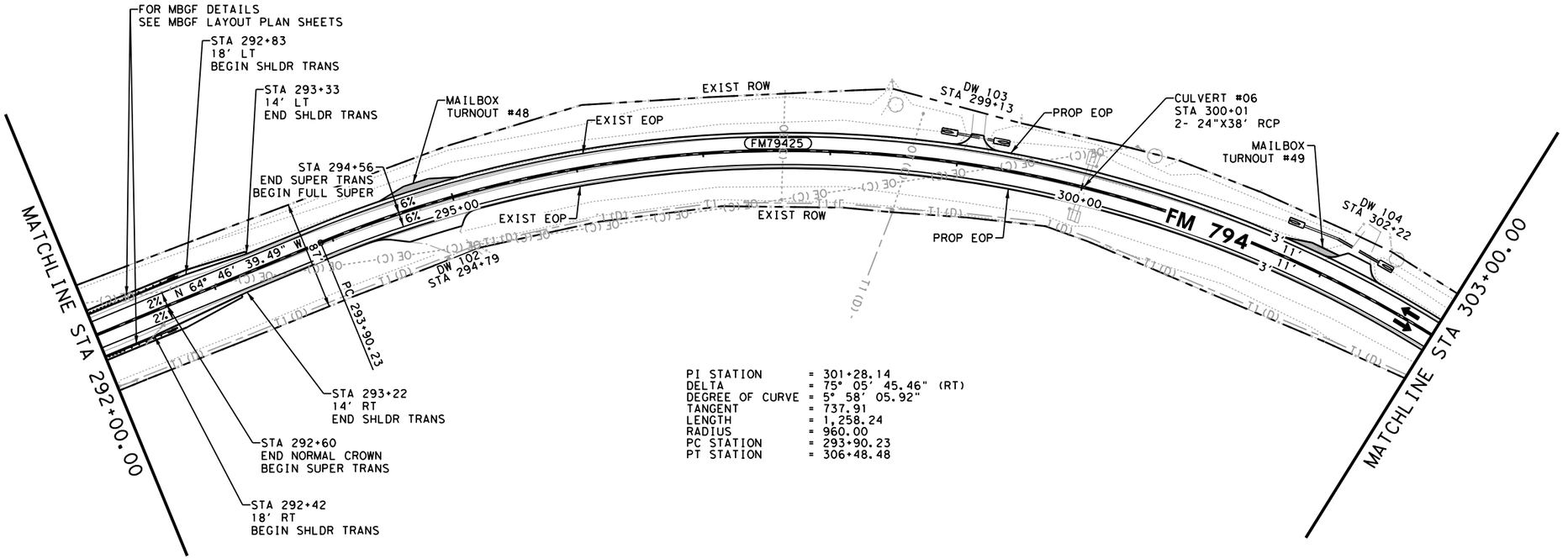


PI STATION = 301+28.14
DELTA = 75° 05' 45.46" (RT)
DEGREE OF CURVE = 5° 58' 05.92"
TANGENT = 737.91
LENGTH = 1,258.24
RADIUS = 960.00
PC STATION = 293+90.23
PT STATION = 306+48.48

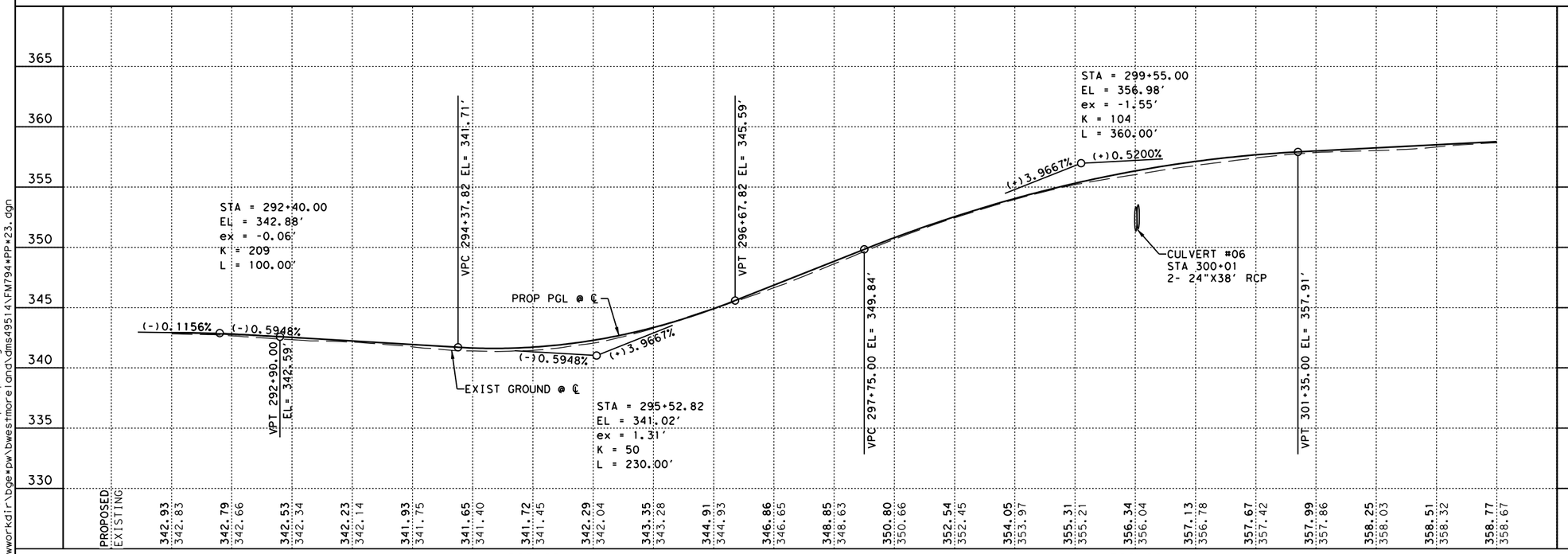
LEGEND:

- DIRECTION OF TRAFFIC
- DW# DRIVEWAY NUMBER
- (CURVE #) ALIGNMENT CURVE NUMBER
- CONCRETE DRIVEWAY TO BE REMOVED
- CONCRETE DRIVEWAYS OR MAILBOX TURNOUTS

NOTES:

1. UTILITY LOCATIONS SHOWN ARE APPROXIMATE AND SHOULD BE FIELD VERIFIED BY THE CONTRACTOR BEFORE CONSTRUCTION

0 50 100
SCALE: 1"=100' H
1"=10' V



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ROADWAY PLAN & PROFILE

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			107
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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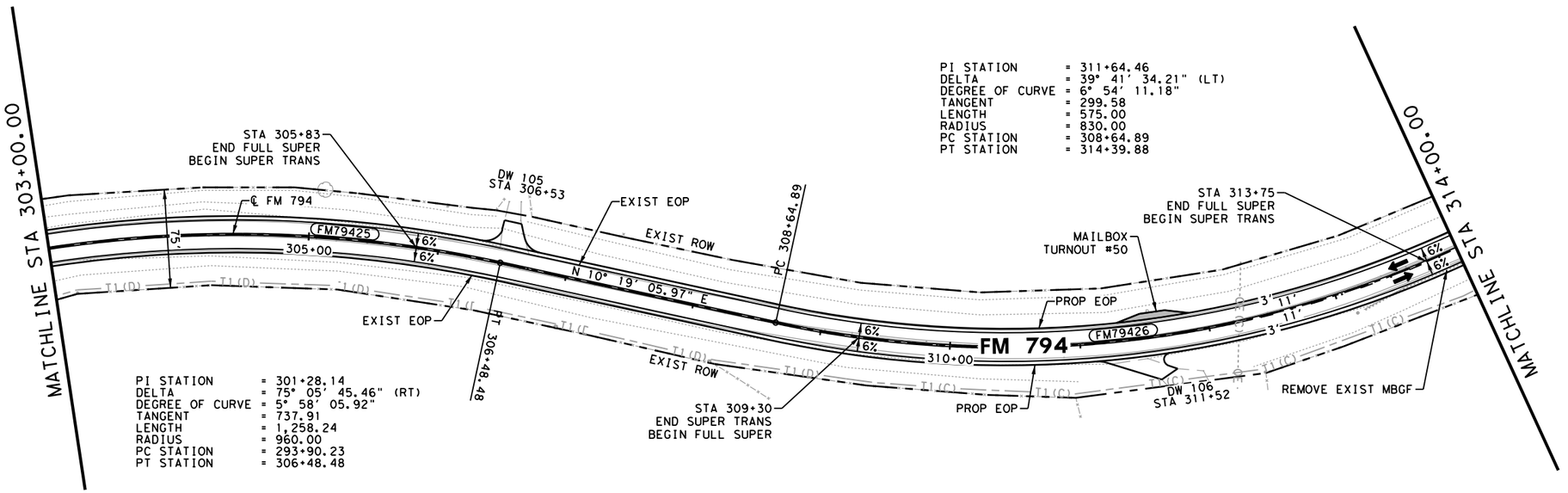


LEGEND:

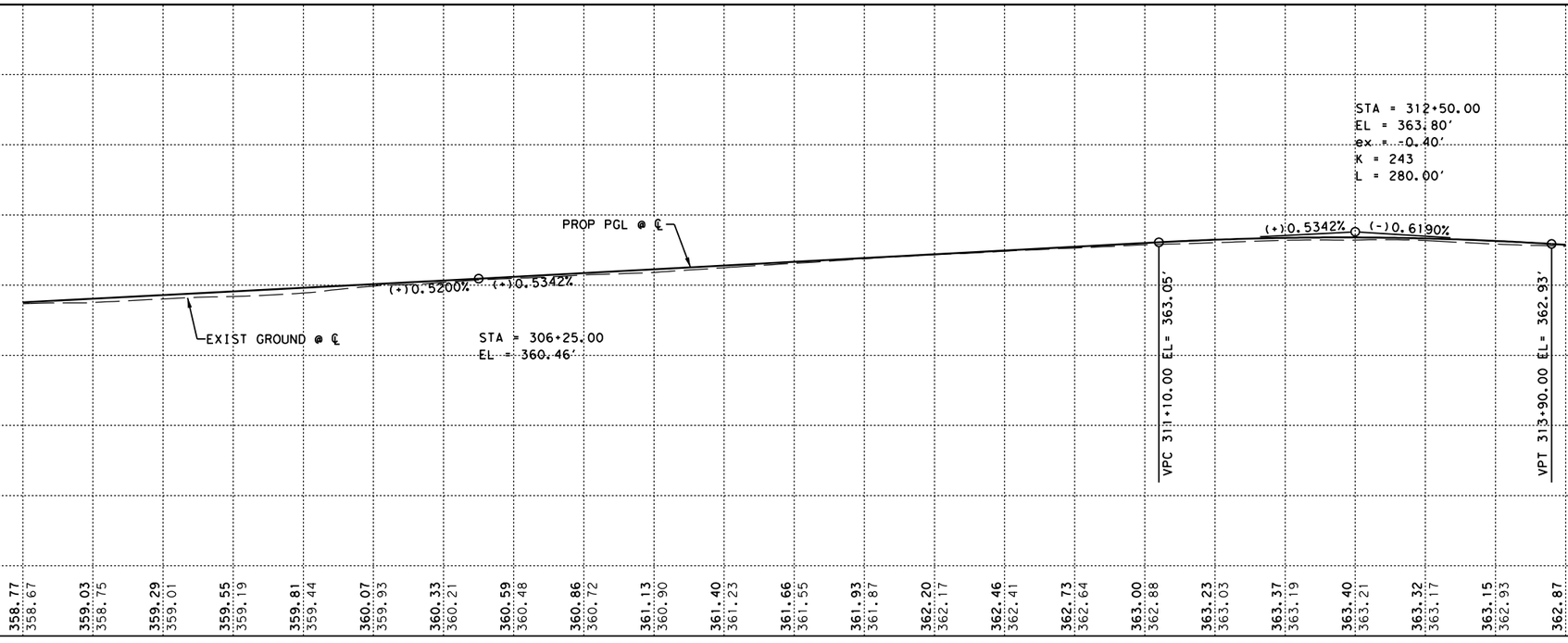
- DIRECTION OF TRAFFIC
- DW# DRIVEWAY NUMBER
- CURVE # ALIGNMENT CURVE NUMBER
- CONCRETE DRIVEWAY TO BE REMOVED
- CONCRETE DRIVEWAYS OR MAILBOX TURNOUTS

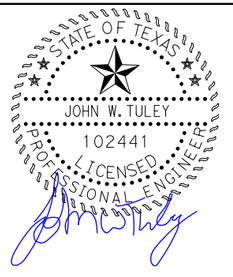
NOTES:

1. UTILITY LOCATIONS SHOWN ARE APPROXIMATE AND SHOULD BE FIELD VERIFIED BY THE CONTRACTOR BEFORE CONSTRUCTION

0 50 100

SCALE: 1"=100' H
1"=10' V





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ROADWAY PLAN & PROFILE

SHEET 26 OF 39

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			108
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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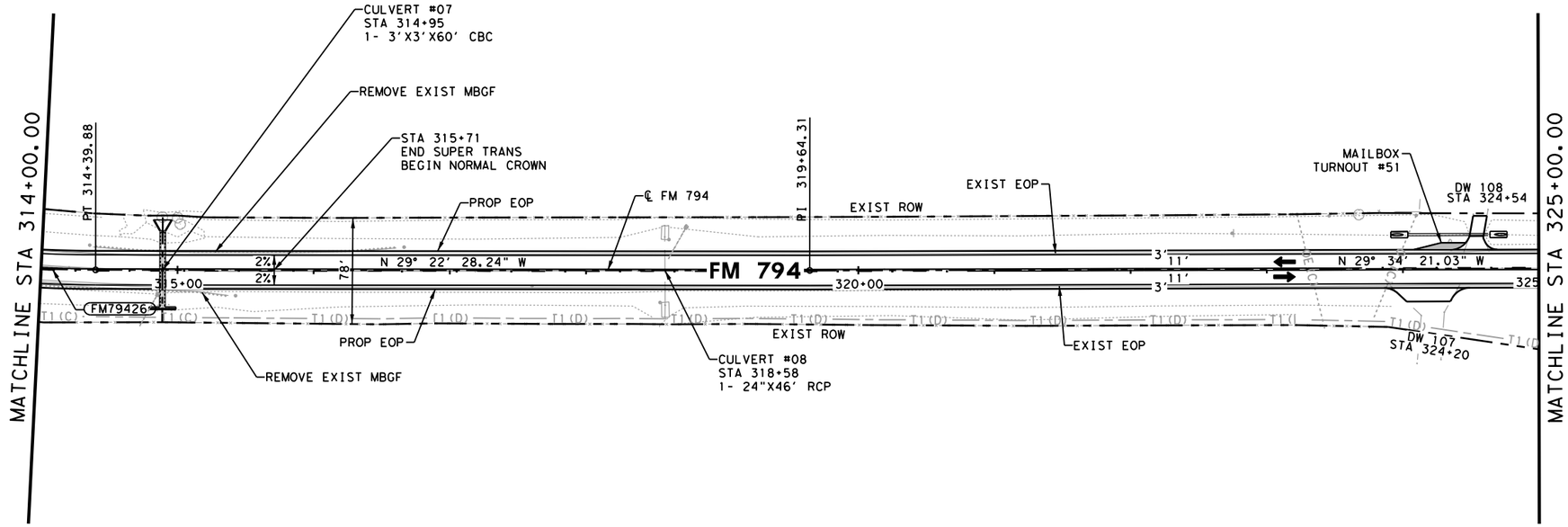

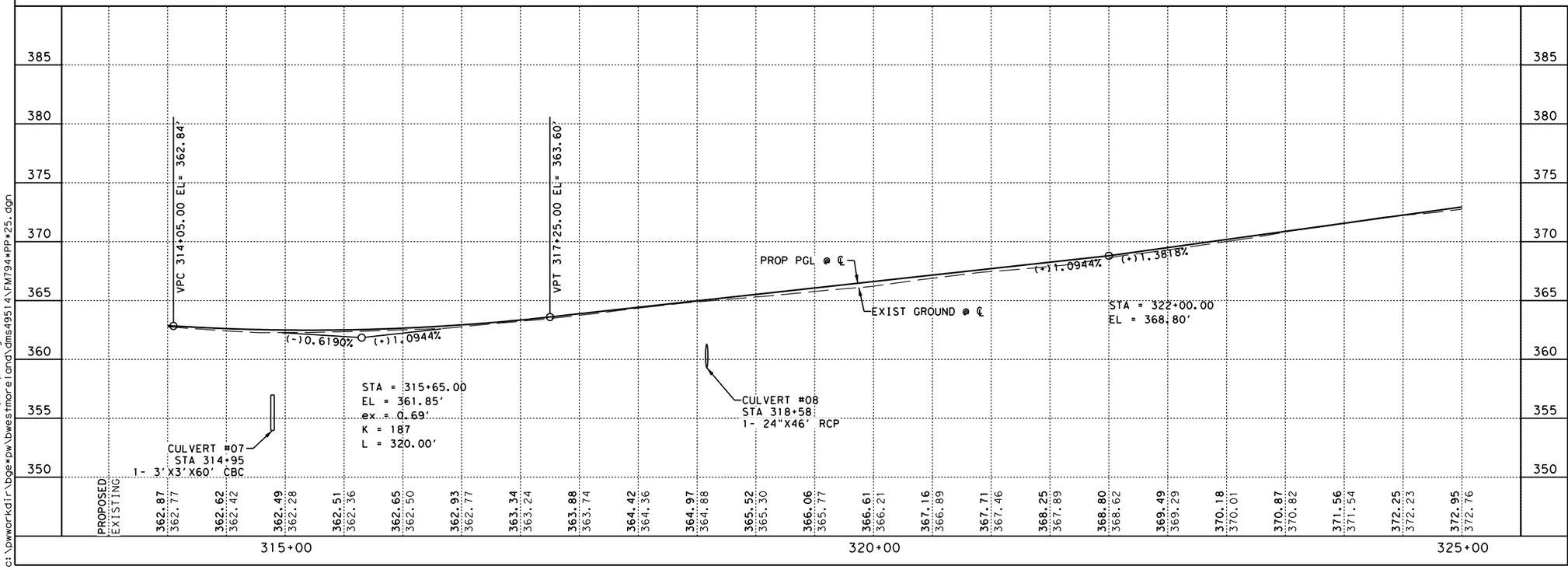

LEGEND:

- DIRECTION OF TRAFFIC
- DW# — DRIVEWAY NUMBER
- CURVE # — ALIGNMENT CURVE NUMBER
- CONCRETE DRIVEWAY TO BE REMOVED
- CONCRETE DRIVEWAYS OR MAILBOX TURNOUTS

NOTES:

1. UTILITY LOCATIONS SHOWN ARE APPROXIMATE AND SHOULD BE FIELD VERIFIED BY THE CONTRACTOR BEFORE CONSTRUCTION

0 50 100

SCALE: 1"=100' H
1"=10' V

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ROADWAY PLAN & PROFILE

SHEET 27 OF 39

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			109
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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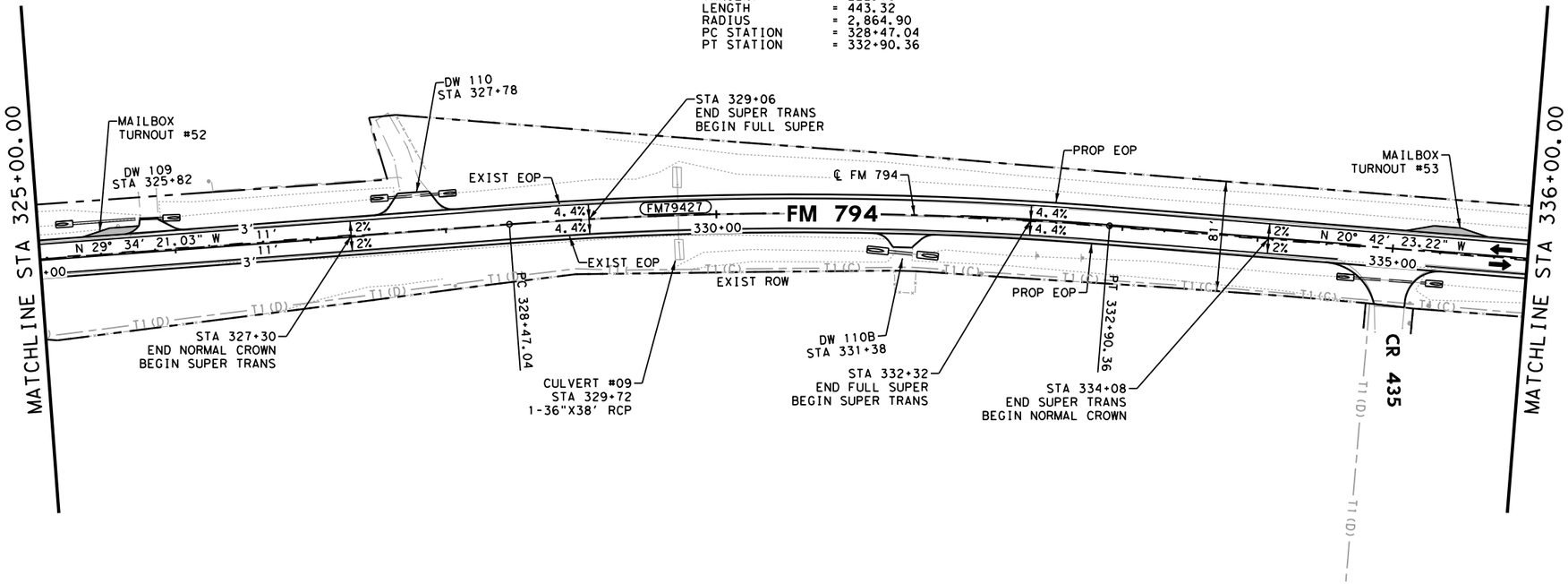
PI STATION = 330+69.14
DELTA = 8° 51' 57.81" (RT)
DEGREE OF CURVE = 1° 59' 59.72"
TANGENT = 222.10
LENGTH = 443.32
RADIUS = 2,864.90
PC STATION = 328+47.04
PT STATION = 332+90.36



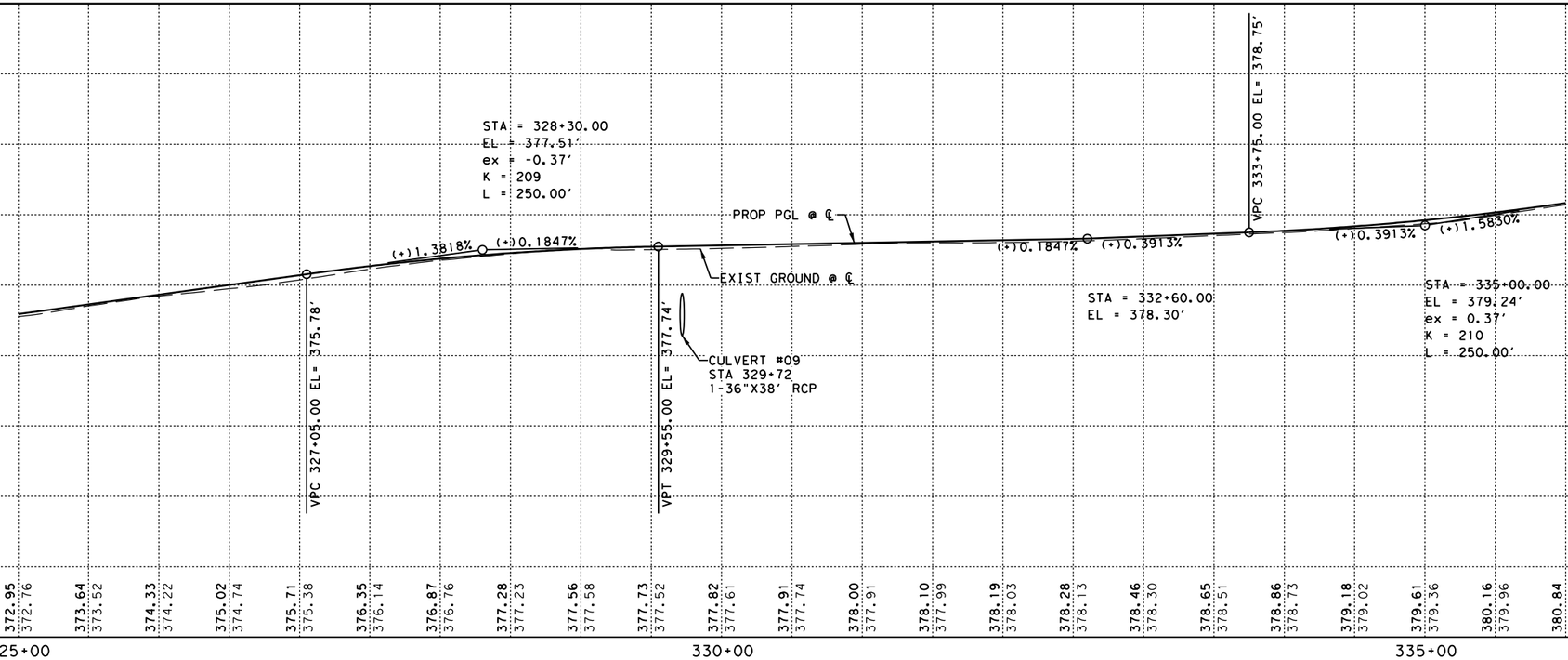
LEGEND:

- DIRECTION OF TRAFFIC
- DW# DRIVEWAY NUMBER
- CURVE # ALIGNMENT CURVE NUMBER
- CONCRETE DRIVEWAY TO BE REMOVED
- CONCRETE DRIVEWAYS OR MAILBOX TURNOUTS

NOTES:

1. UTILITY LOCATIONS SHOWN ARE APPROXIMATE AND SHOULD BE FIELD VERIFIED BY THE CONTRACTOR BEFORE CONSTRUCTION

0 50 100
SCALE: 1"=100' H
1"=10' V



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ROADWAY PLAN & PROFILE

SHEET 28 OF 39

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			110
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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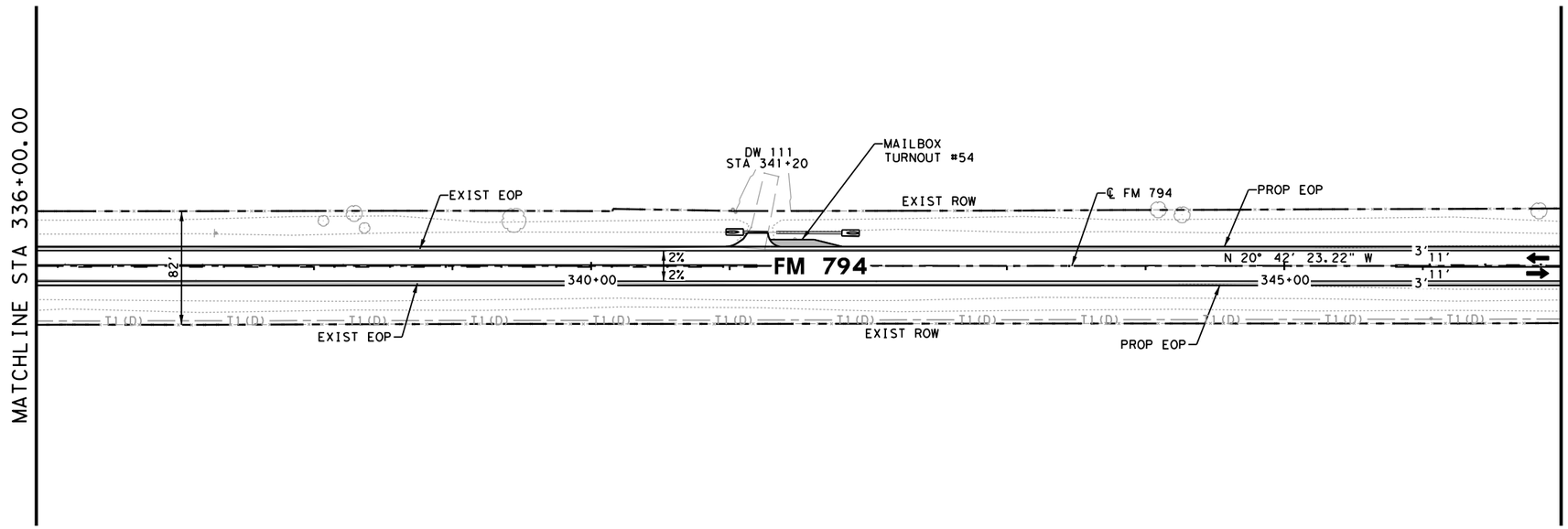

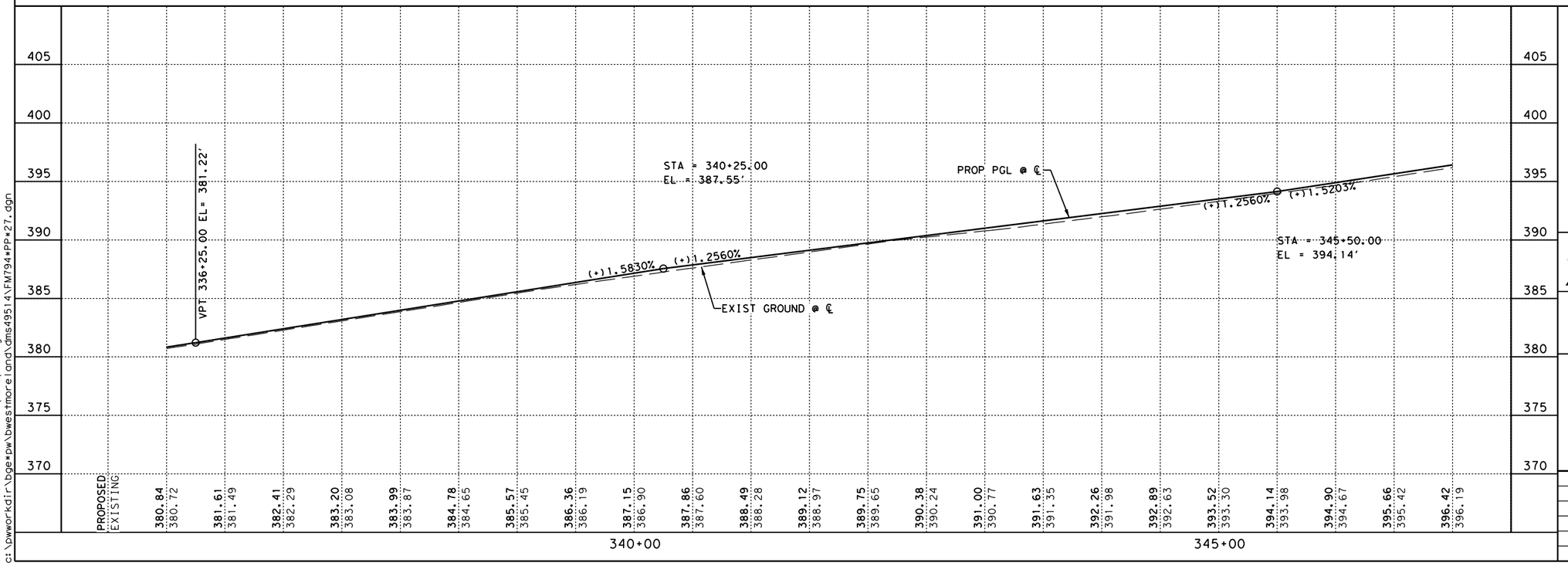

LEGEND:

- DIRECTION OF TRAFFIC
- DW# DRIVEWAY NUMBER
- CURVE # ALIGNMENT CURVE NUMBER
- CONCRETE DRIVEWAY TO BE REMOVED
- CONCRETE DRIVEWAYS OR MAILBOX TURNOUTS

NOTES:

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0 50 100
SCALE: 1"=100' H
1"=10' V

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ROADWAY PLAN & PROFILE

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			111
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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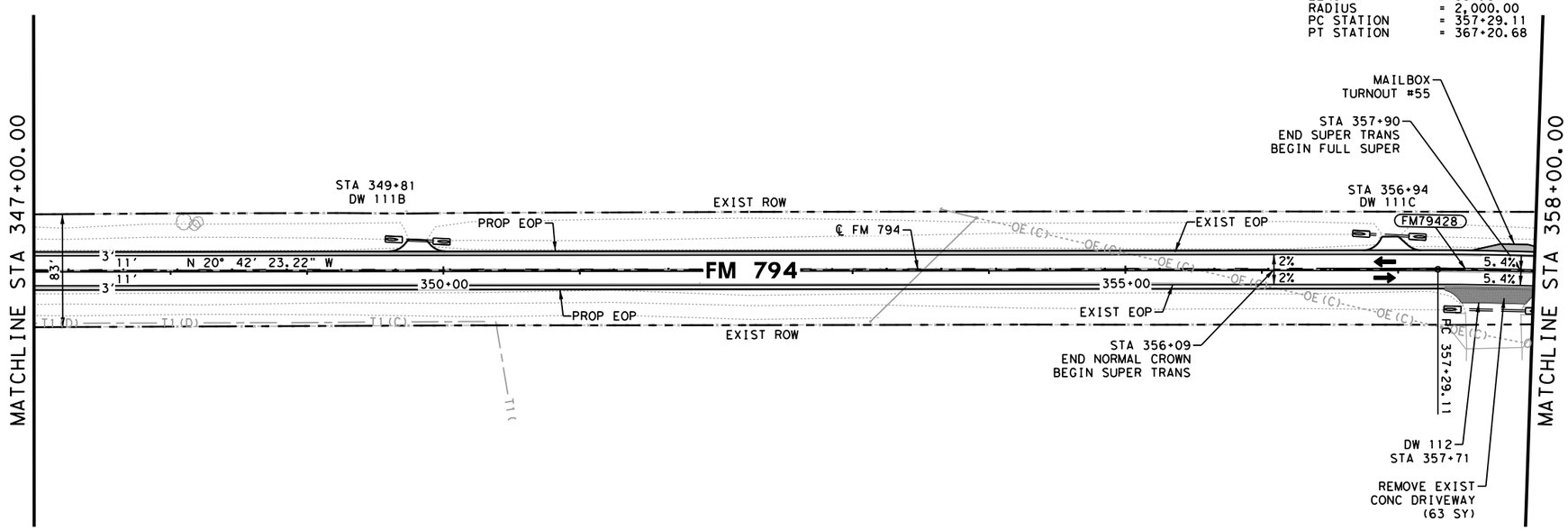
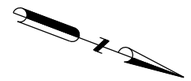
PI STATION = 362+35.31
DELTA = 28° 24' 22.88" (RT)
DEGREE OF CURVE = 2° 51' 53.24"
TANGENT = 506.20
LENGTH = 991.57
RADIUS = 2,000.00
PC STATION = 357+29.11
PT STATION = 367+20.68





LEGEND:

- DIRECTION OF TRAFFIC
- DW# DRIVEWAY NUMBER
- CURVE # ALIGNMENT CURVE NUMBER
- CONCRETE DRIVEWAY TO BE REMOVED
- CONCRETE DRIVEWAYS OR MAILBOX TURNOUTS

NOTES:

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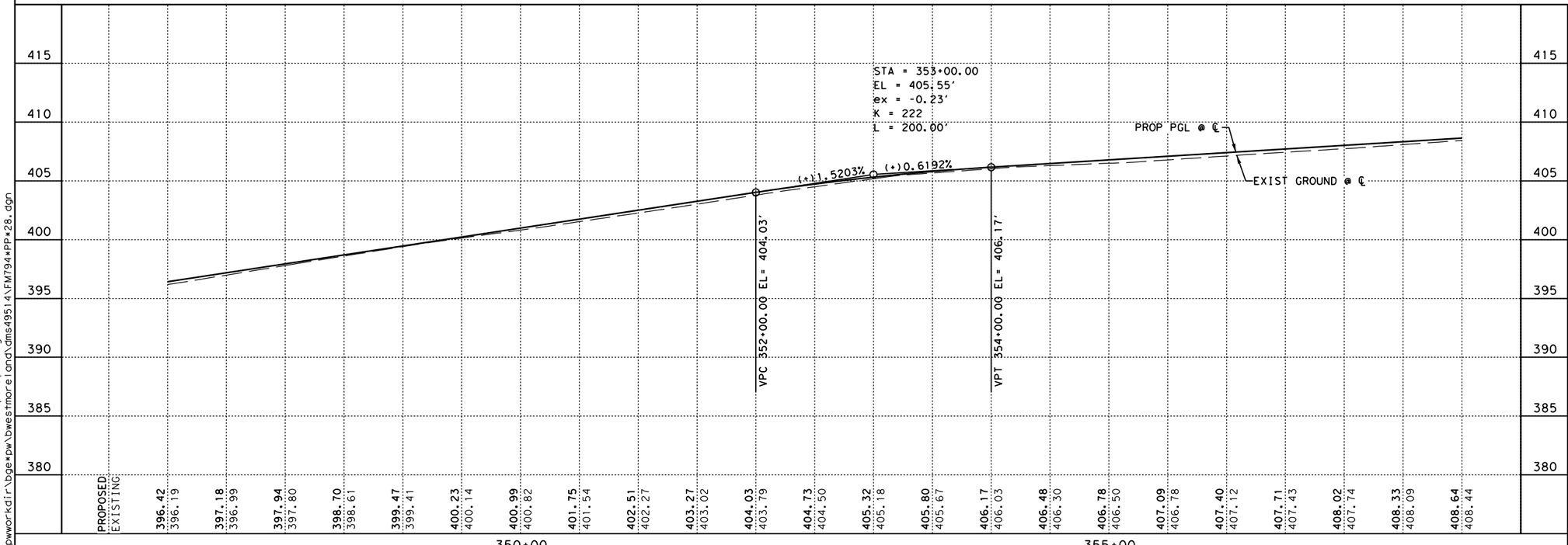
0 50 100
SCALE: 1"=100' H
1"=10' V



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ROADWAY PLAN & PROFILE

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			112
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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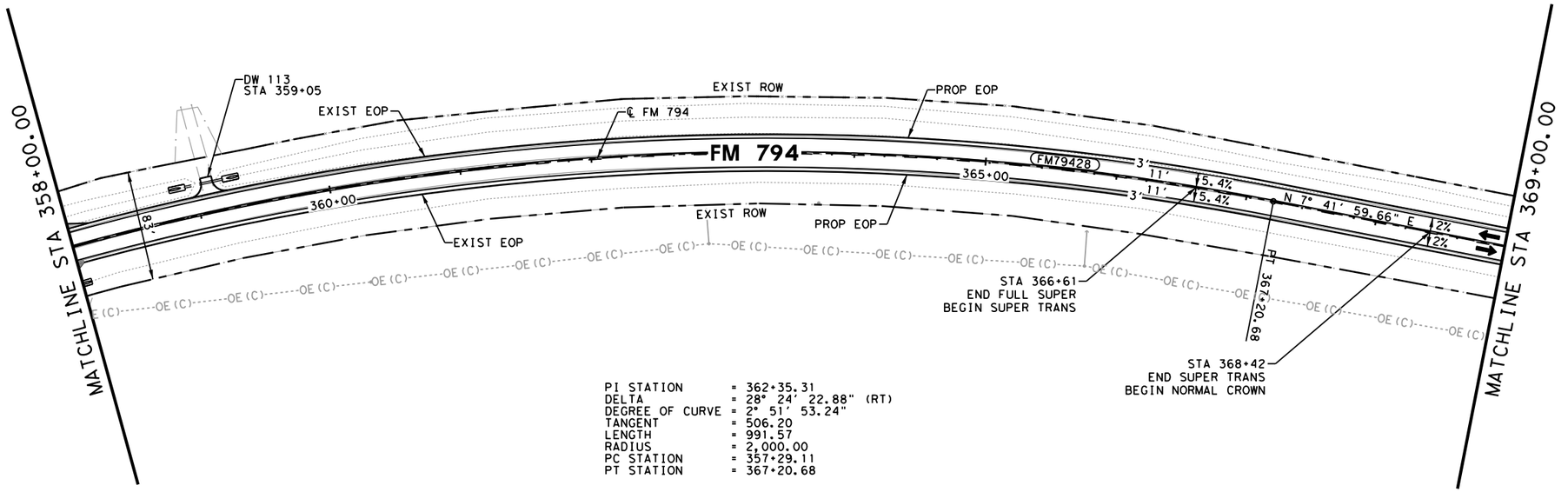

PI STATION = 362+35.31
DELTA = 28° 24' 22.88" (RT)
DEGREE OF CURVE = 2° 51' 53.24"
TANGENT = 506.20
LENGTH = 991.57
RADIUS = 2,000.00
PC STATION = 357+29.11
PT STATION = 367+20.68

LEGEND:

- DIRECTION OF TRAFFIC
- DW# DRIVEWAY NUMBER
- CURVE # ALIGNMENT CURVE NUMBER
- CONCRETE DRIVEWAY TO BE REMOVED
- CONCRETE DRIVEWAYS OR MAILBOX TURNOUTS

NOTES:

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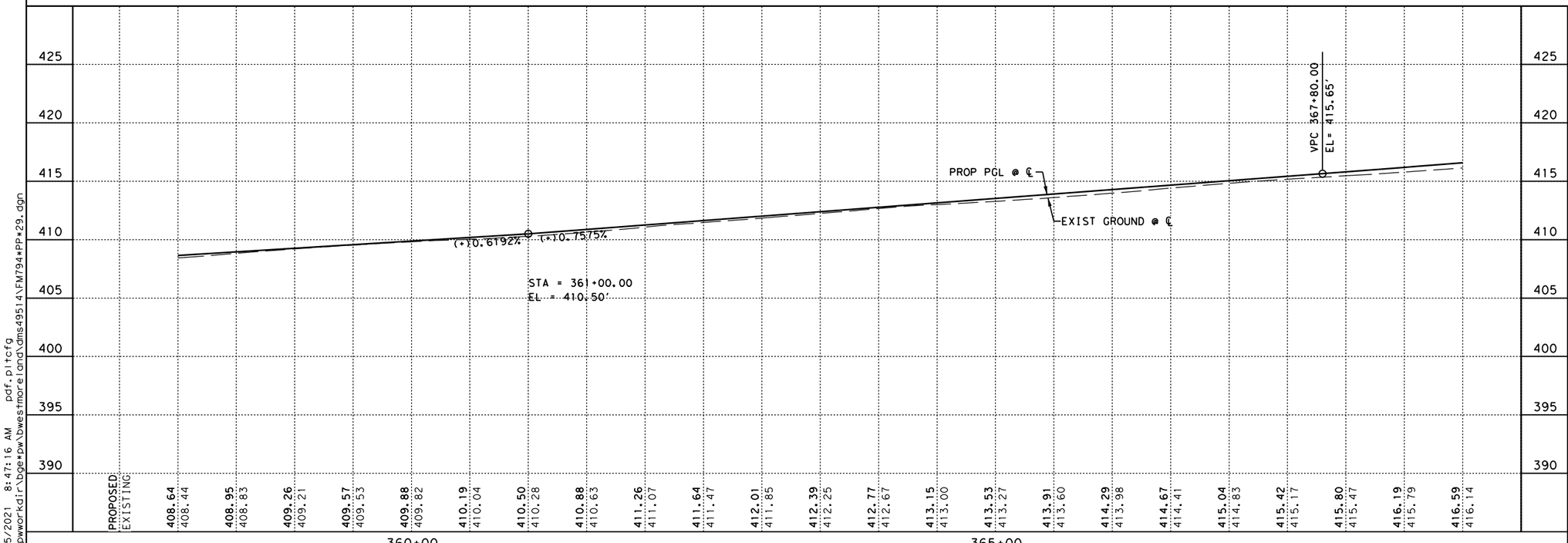
0 50 100
SCALE: 1"=100' H
1"=10' V



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ROADWAY PLAN & PROFILE

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			113
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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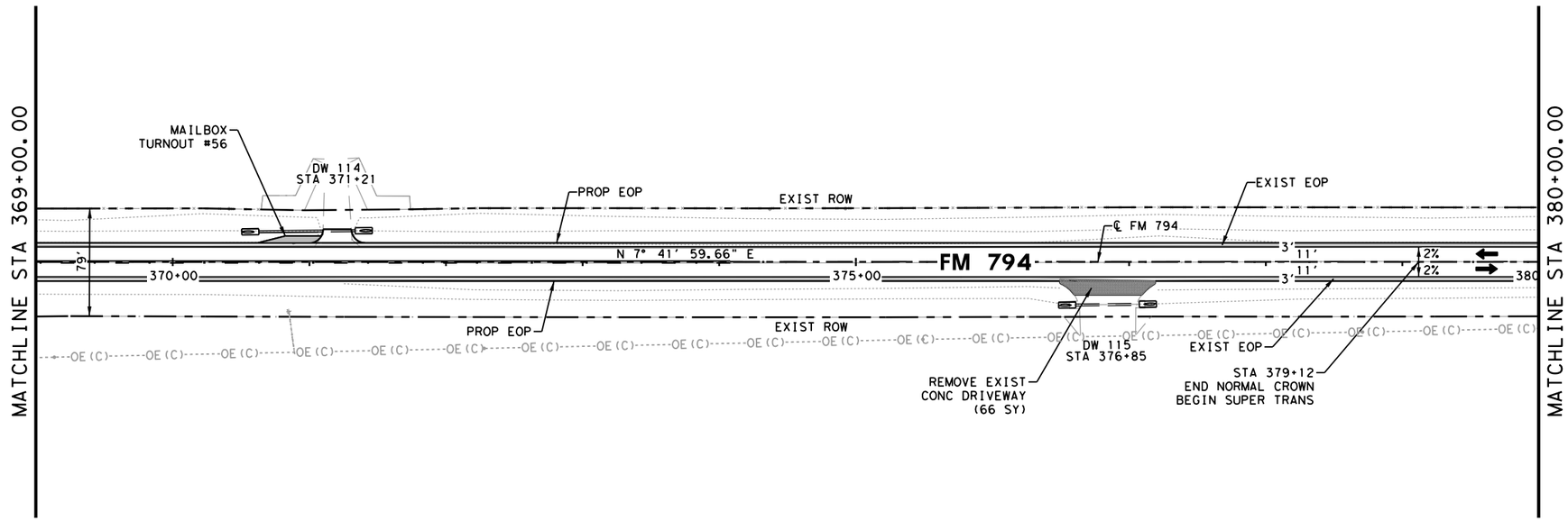

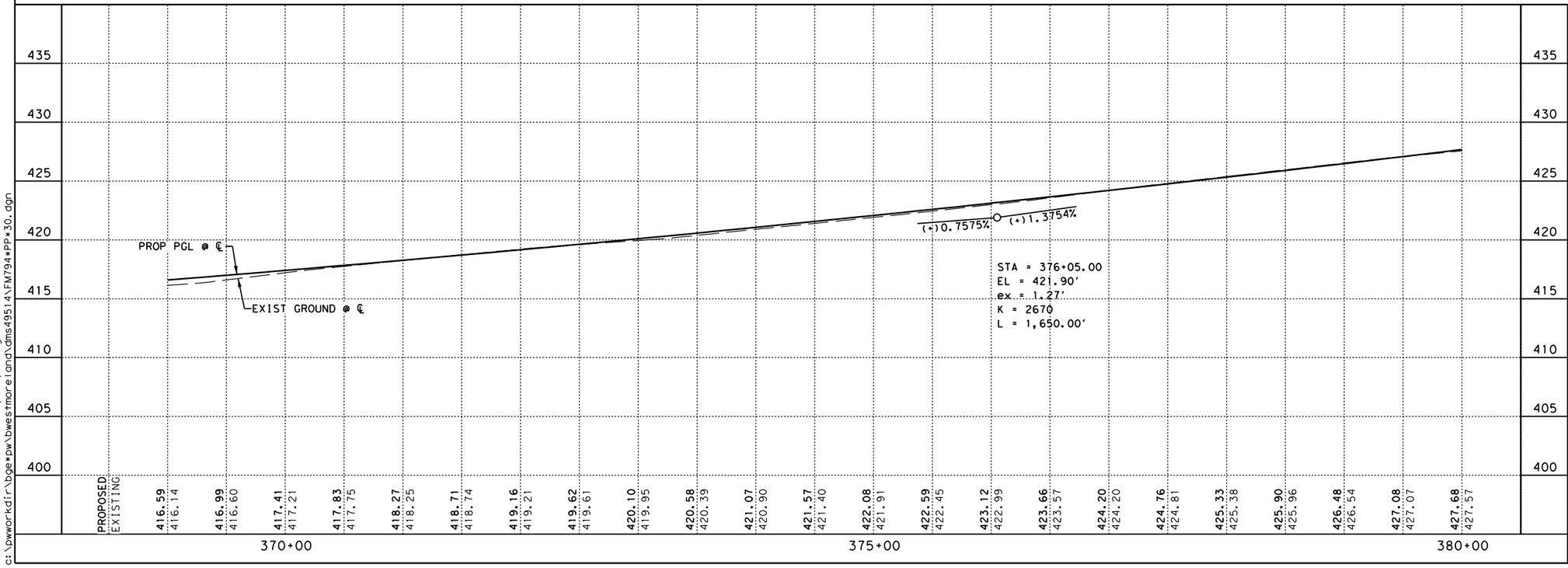

LEGEND:

- DIRECTION OF TRAFFIC
- DW# DRIVEWAY NUMBER
- CURVE # ALIGNMENT CURVE NUMBER
- CONCRETE DRIVEWAY TO BE REMOVED
- CONCRETE DRIVEWAYS OR MAILBOX TURNOUTS

NOTES:

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0 50 100

SCALE: 1"=100' H
1"=10' V

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ROADWAY PLAN & PROFILE

SHEET 32 OF 39

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			114
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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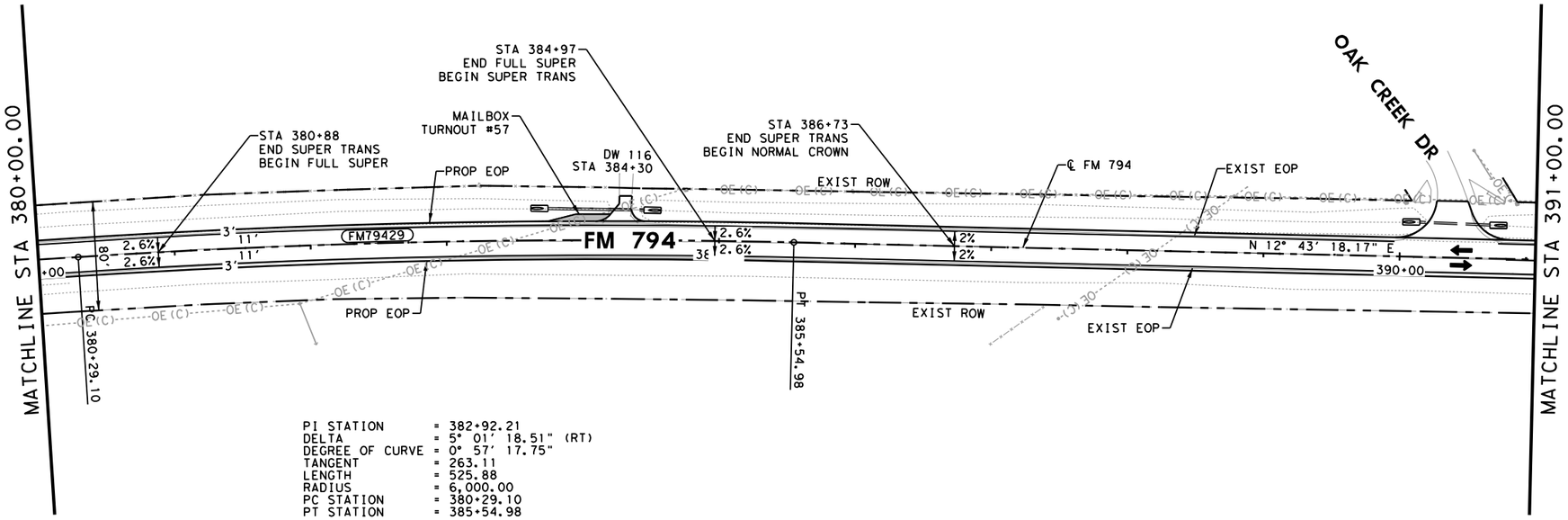
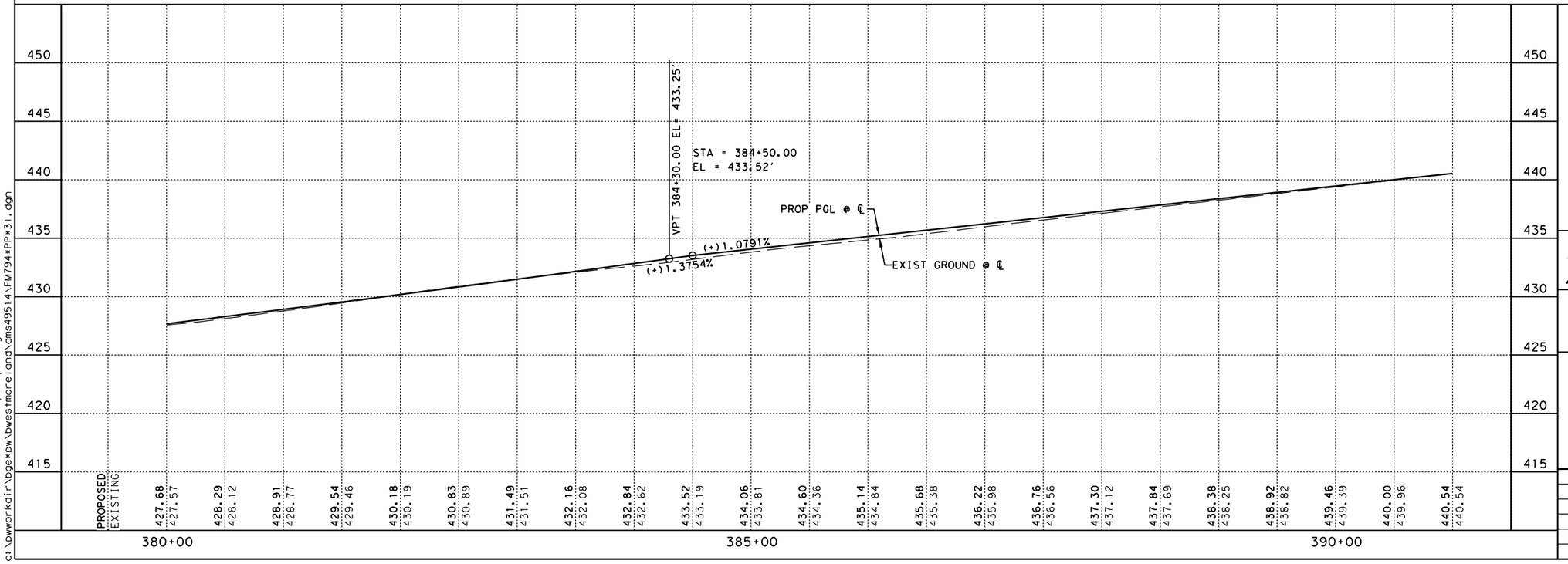


PI STATION = 382+92.21
DELTA = 5° 01' 18.51" (RT)
DEGREE OF CURVE = 0° 57' 17.75"
TANGENT = 263.11
LENGTH = 525.88
RADIUS = 6,000.00
PC STATION = 380+29.10
PT STATION = 385+54.98



LEGEND:

- DIRECTION OF TRAFFIC
- DW# DRIVEWAY NUMBER
- CURVE # ALIGNMENT CURVE NUMBER
- CONCRETE DRIVEWAY TO BE REMOVED
- CONCRETE DRIVEWAYS OR MAILBOX TURNOUTS

NOTES:

1. UTILITY LOCATIONS SHOWN ARE APPROXIMATE AND SHOULD BE FIELD VERIFIED BY THE CONTRACTOR BEFORE CONSTRUCTION

0 50 100
SCALE: 1"=100' H
1"=10' V

STATE OF TEXAS
JOHN W. TULEY
102441
LICENSED
PROFESSIONAL ENGINEER
3/25/2021

Texas Department of Transportation

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Tel: 512-879-0400 • www.bgeinc.com
TBPE Registration No. F-1046

FM 794

ROADWAY PLAN & PROFILE

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			115
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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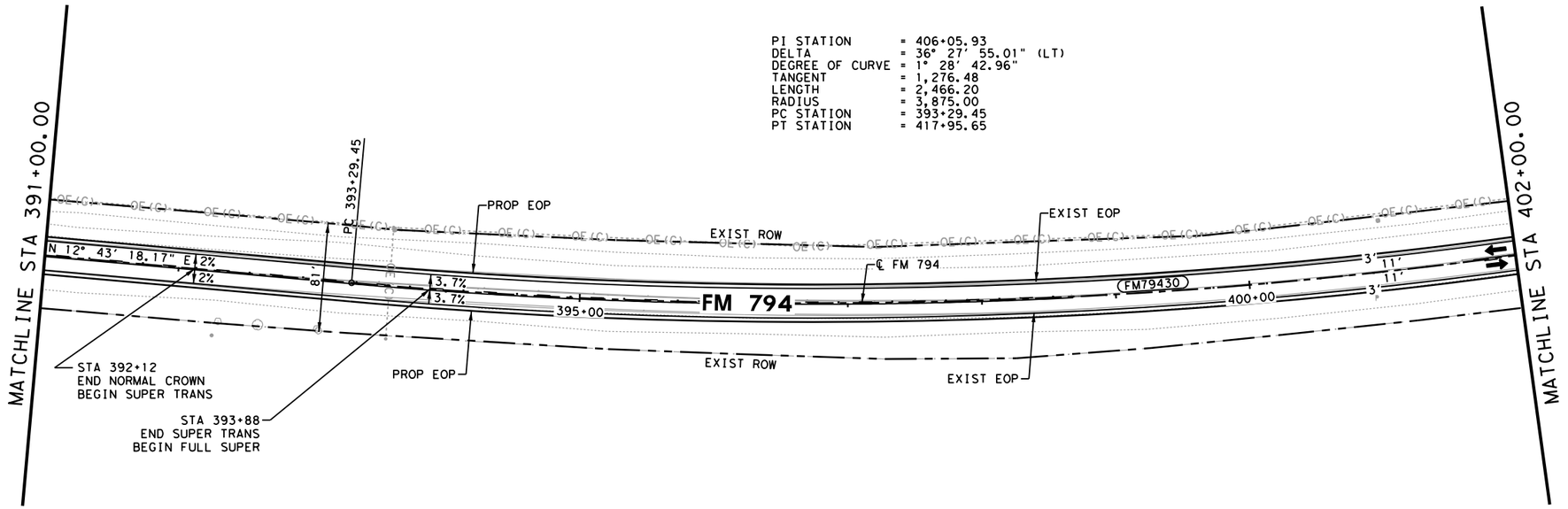

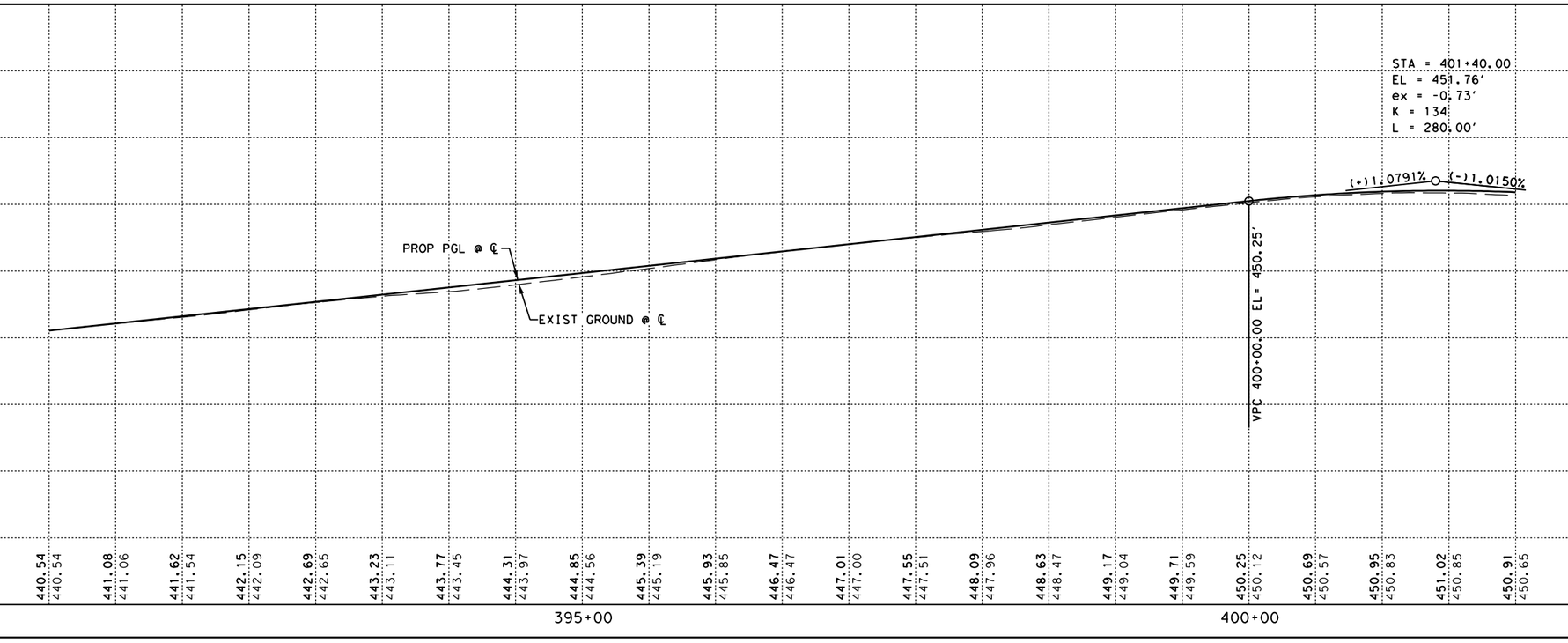

LEGEND:

- DIRECTION OF TRAFFIC
- DW# DRIVEWAY NUMBER
- CURVE # ALIGNMENT CURVE NUMBER
- CONCRETE DRIVEWAY TO BE REMOVED
- CONCRETE DRIVEWAYS OR MAILBOX TURNOUTS

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1"=10' V

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ROADWAY PLAN & PROFILE

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			116
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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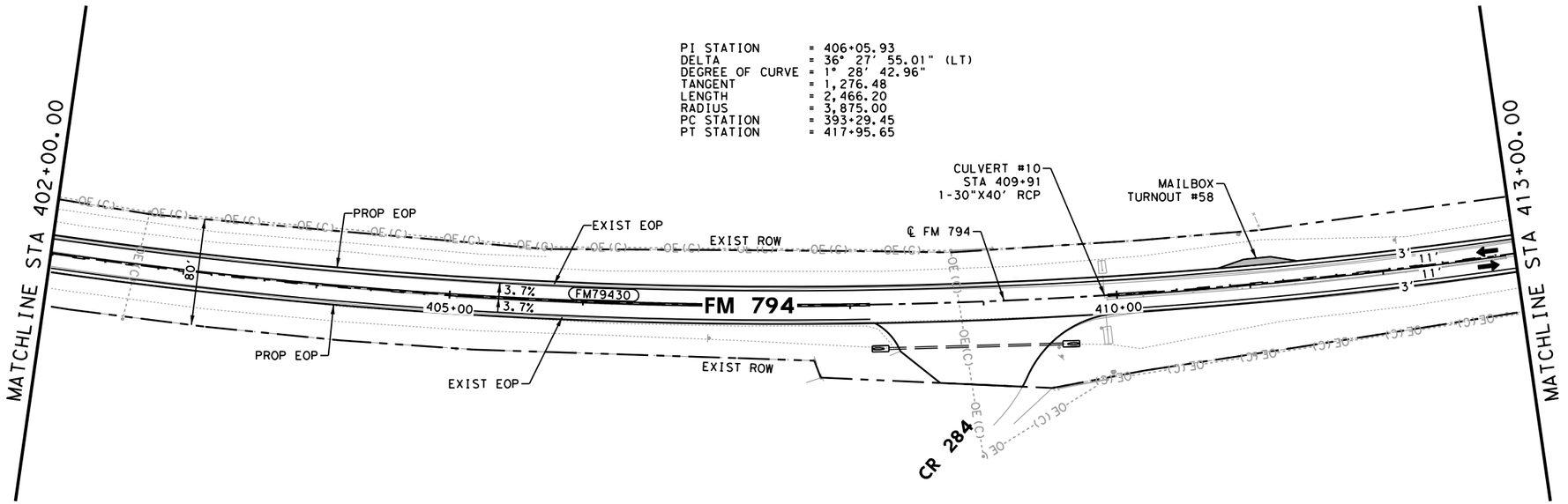

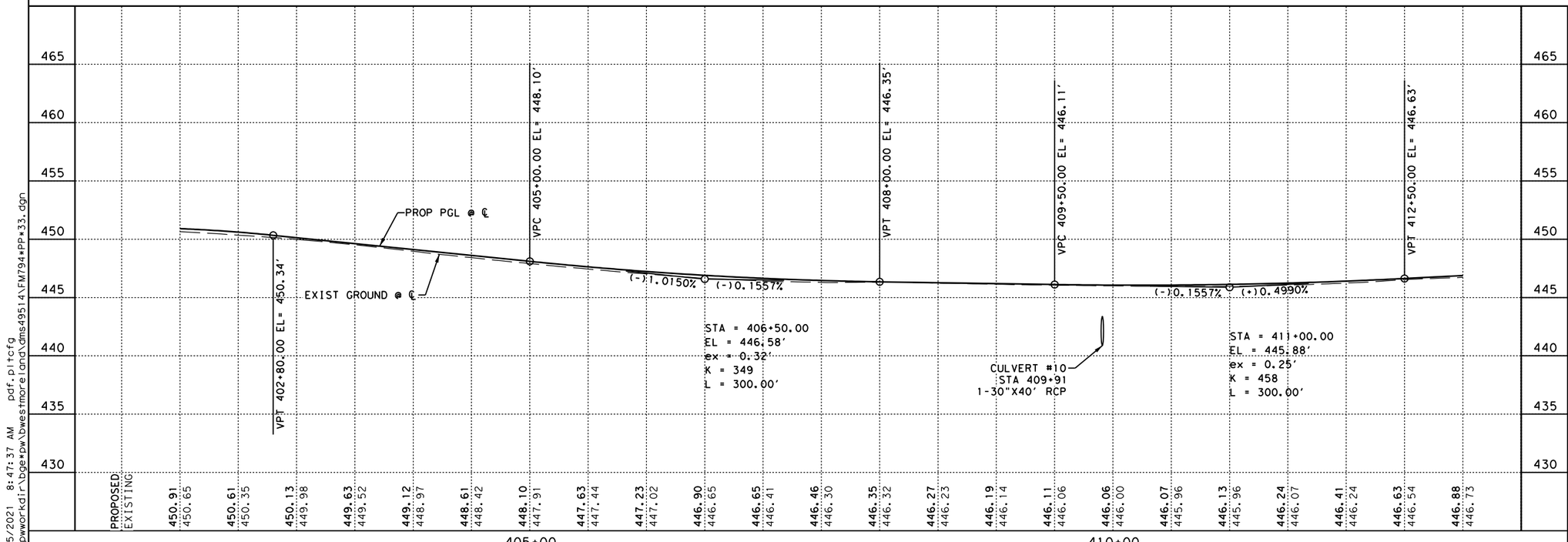

LEGEND:

- DIRECTION OF TRAFFIC
- DW# DRIVEWAY NUMBER
- (CURVE #) ALIGNMENT CURVE NUMBER
- CONCRETE DRIVEWAY TO BE REMOVED
- CONCRETE DRIVEWAYS OR MAILBOX TURNOUTS

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1"=10' V

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ROADWAY PLAN & PROFILE

SHEET 35 OF 39

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			117
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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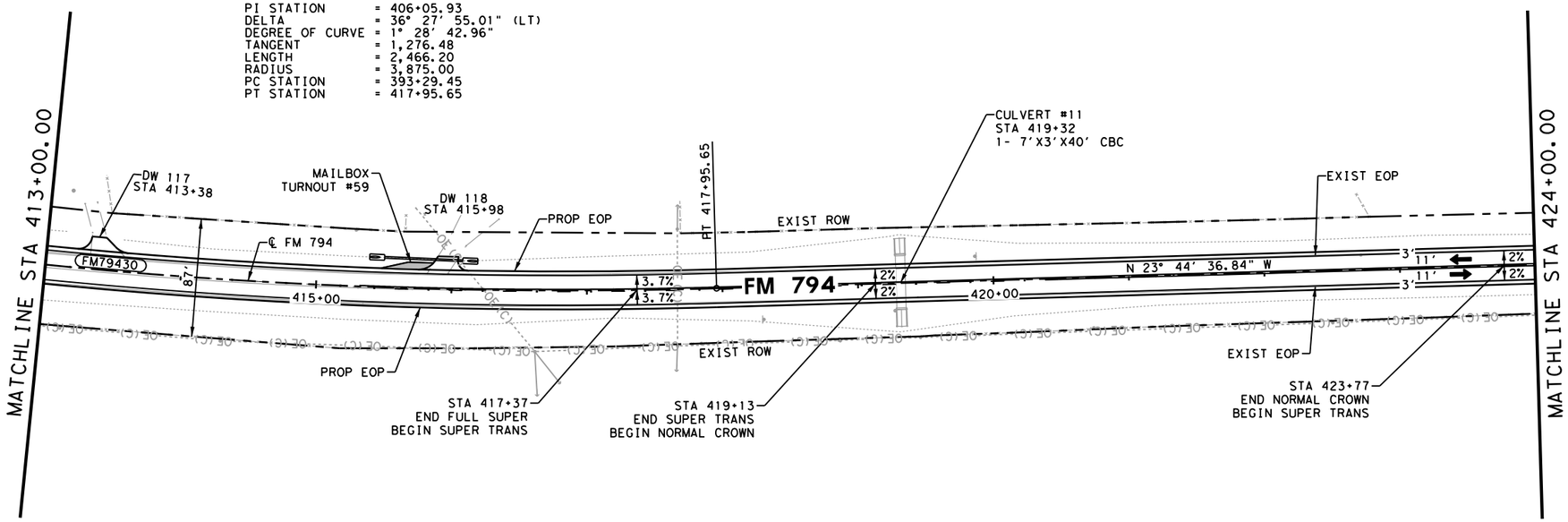
PI STATION = 406+05.93
DELTA = 36° 27' 55.01" (LT)
DEGREE OF CURVE = 1° 28' 42.96"
TANGENT = 1,276.48
LENGTH = 2,466.20
RADIUS = 3,875.00
PC STATION = 393+29.45
PT STATION = 417+95.65



LEGEND:

- DIRECTION OF TRAFFIC
- DW# DRIVEWAY NUMBER
- CURVE # ALIGNMENT CURVE NUMBER
- CONCRETE DRIVEWAY TO BE REMOVED
- CONCRETE DRIVEWAYS OR MAILBOX TURNOUTS

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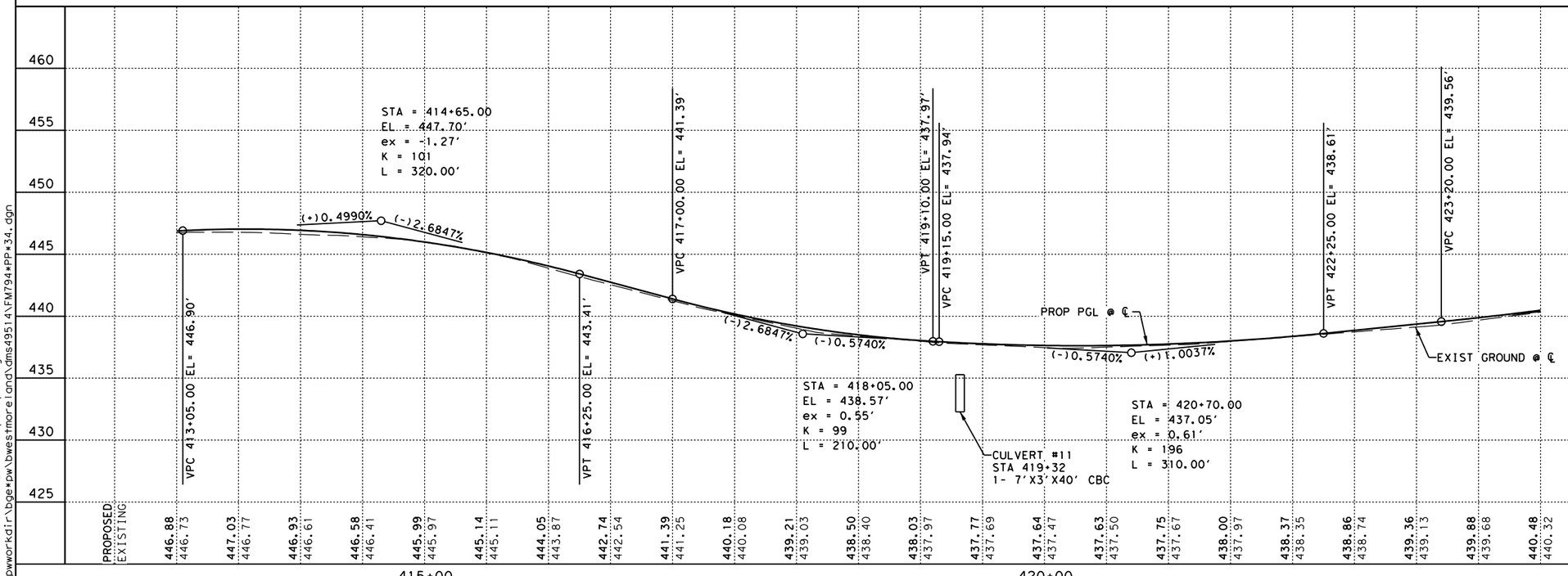
1"=10' V



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ROADWAY PLAN & PROFILE

SHEET 36 OF 39

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			118
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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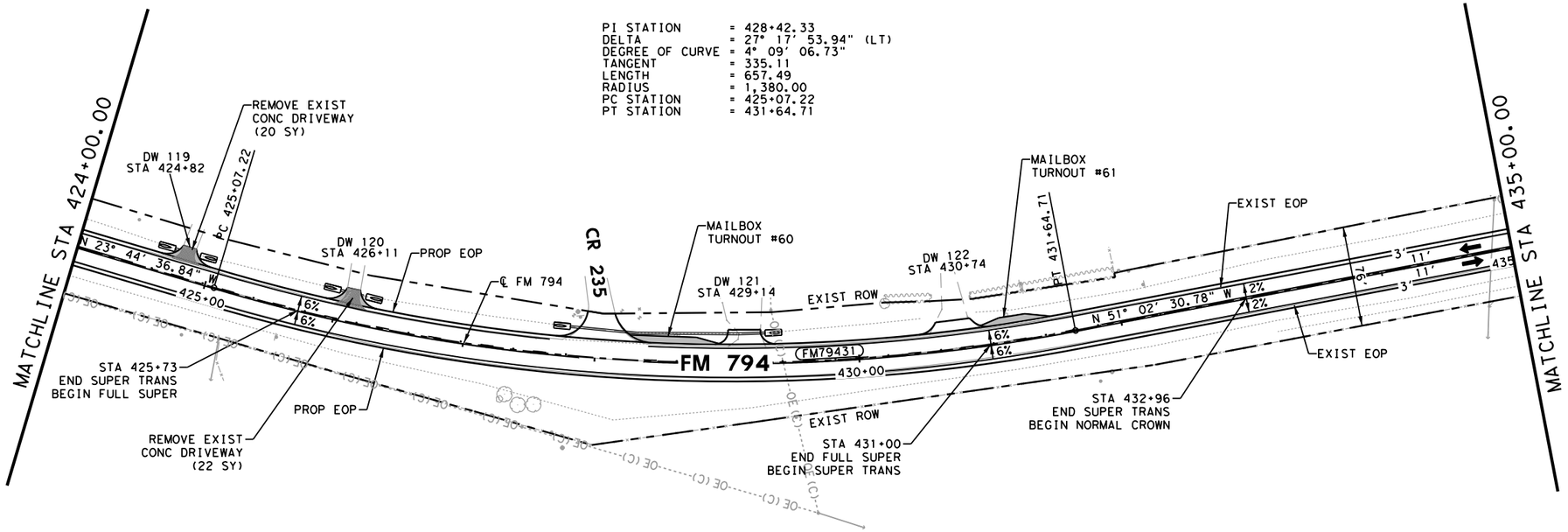

LEGEND:

- DIRECTION OF TRAFFIC
- DW# DRIVEWAY NUMBER
- (CURVE #) ALIGNMENT CURVE NUMBER
- CONCRETE DRIVEWAY TO BE REMOVED
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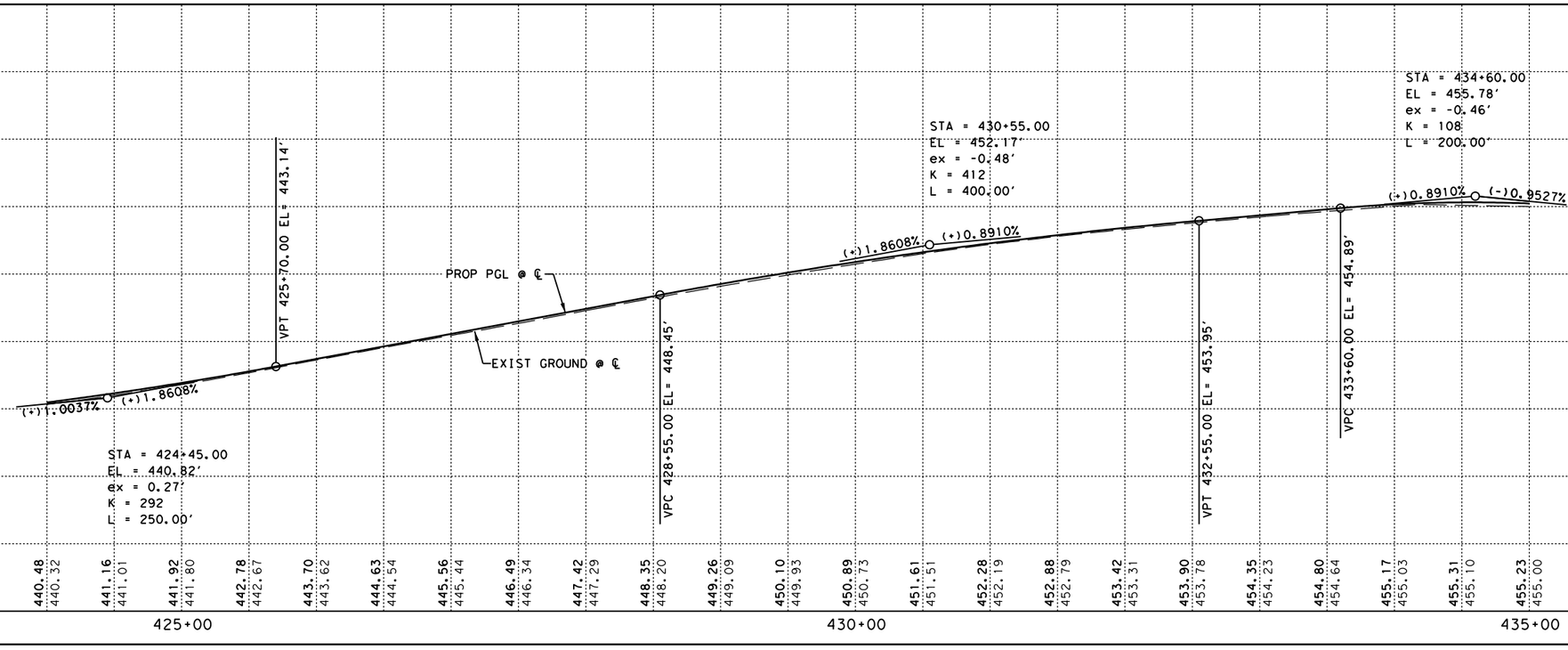

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ROADWAY PLAN & PROFILE

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			119
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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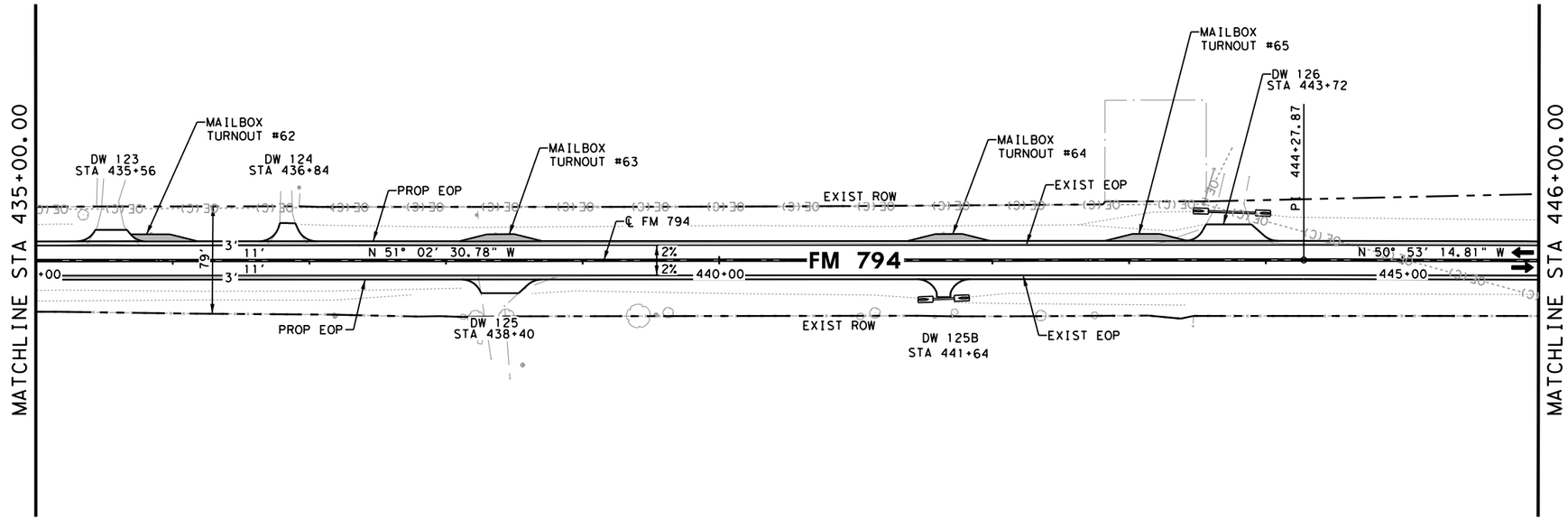

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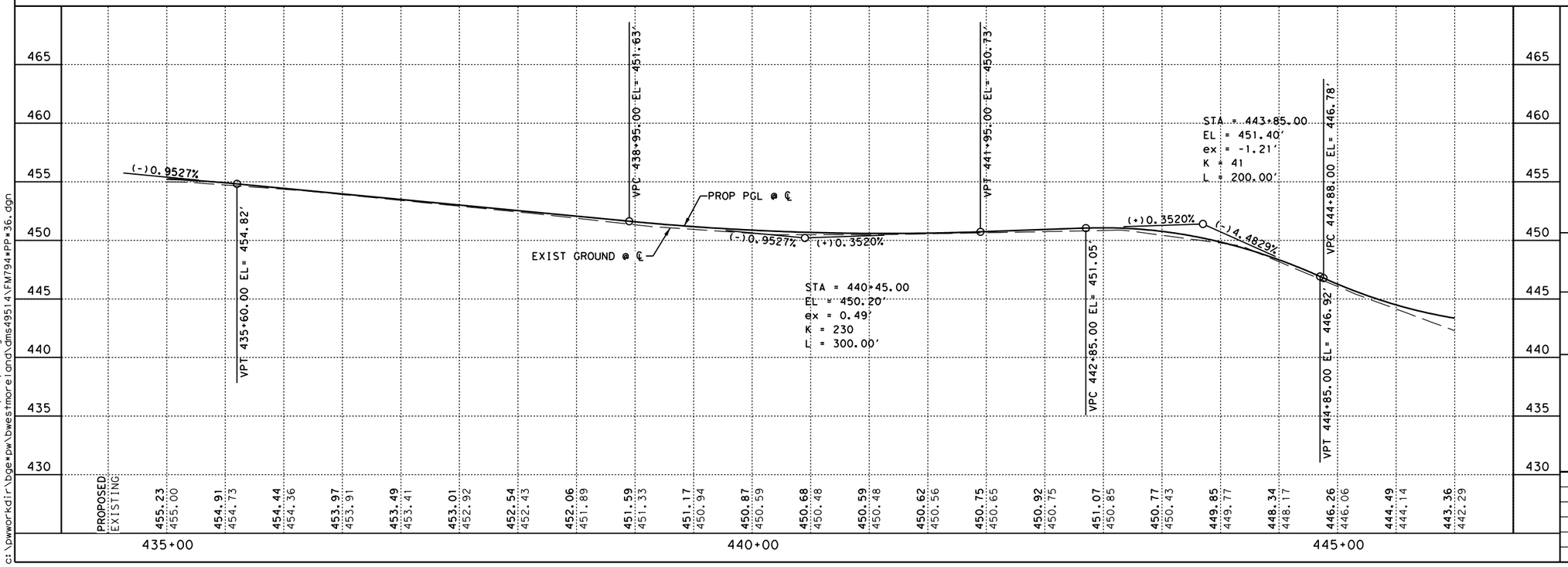

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ROADWAY PLAN & PROFILE

SHEET 38 OF 39

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			120
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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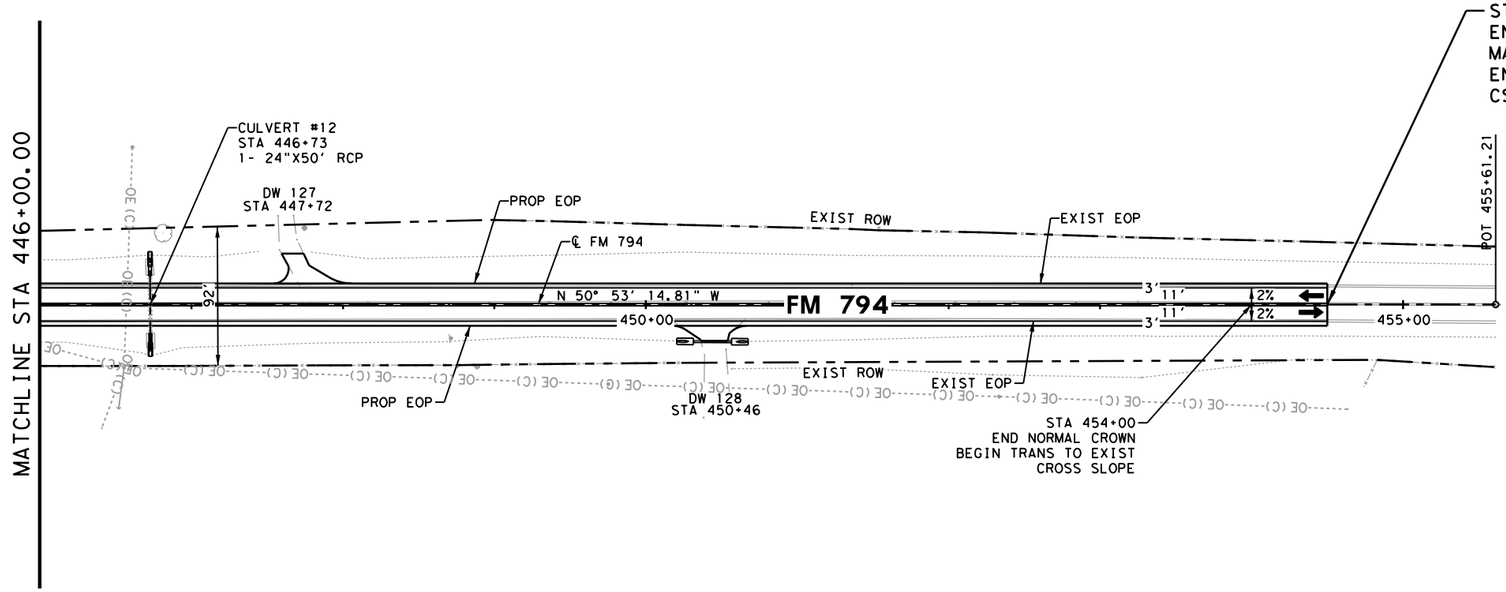

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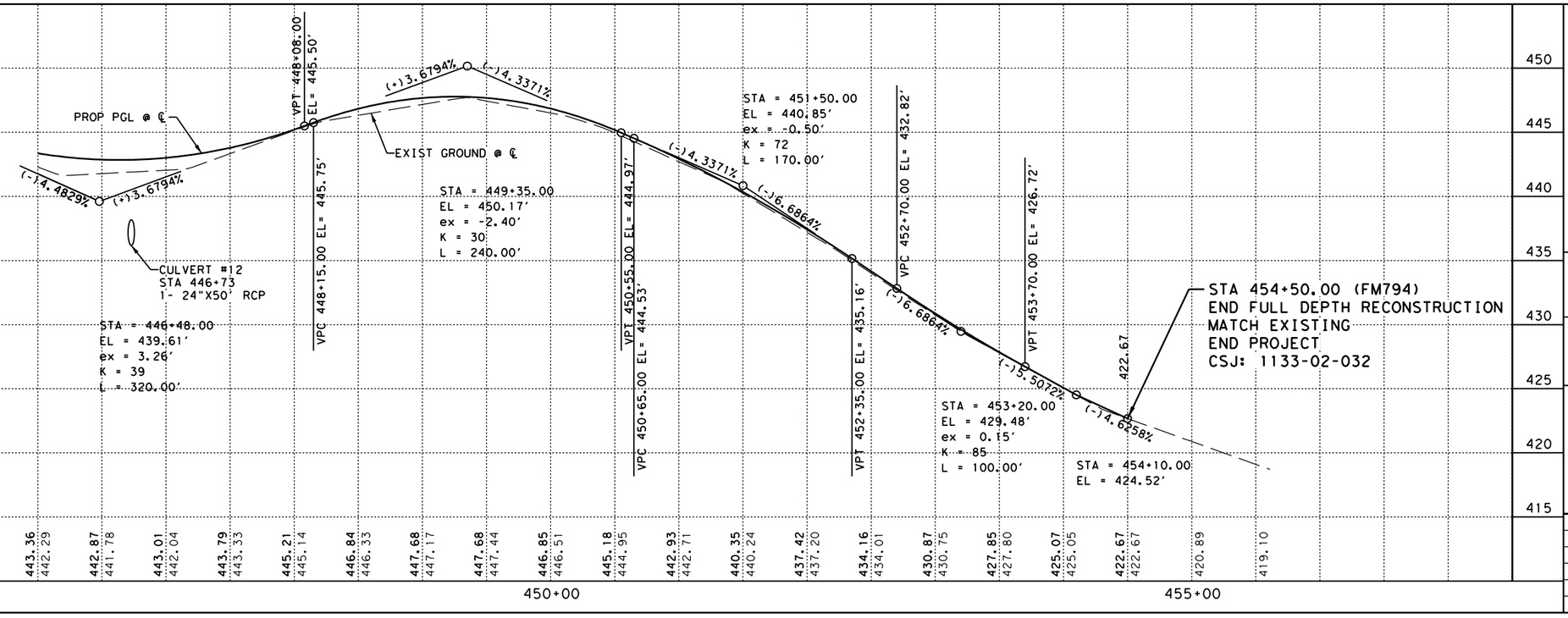
0 50 100

SCALE: 1"=100' H
1"=10' V



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ROADWAY PLAN & PROFILE

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			121
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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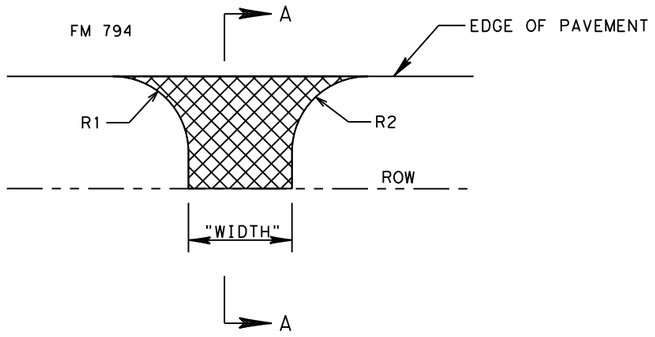
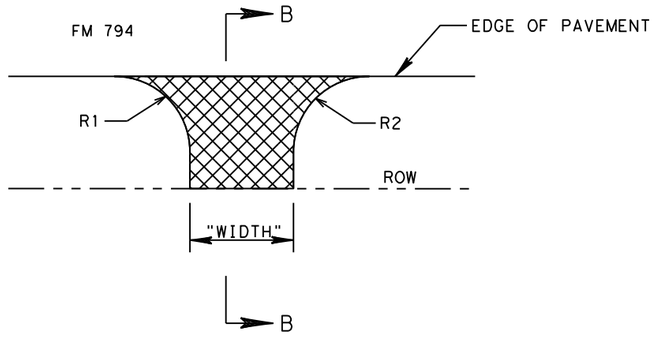


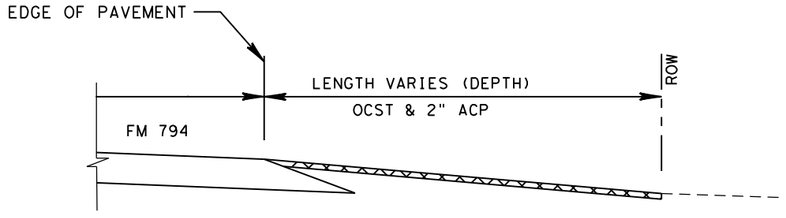
INTERSECTIONS (ACP)
PLAN



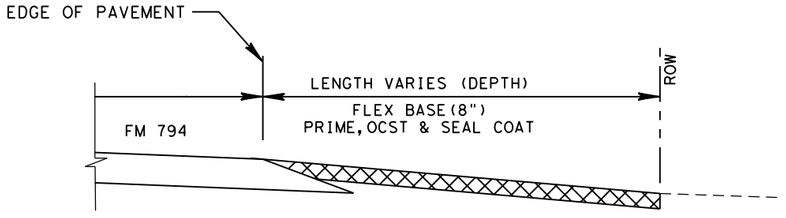
INTERSECTIONS (SURF TRT)
PLAN

NOTES:

1. DIMENSIONS FOR EACH INTERSECTION MAY VARY DURING ACTUAL CONSTRUCTION TO MEET FIELD CONDITIONS.
2. THE TYPES & RATES OF MATERIALS SHALL CONFORM TO THE ROADWAY ITEMS.



INTERSECTIONS (ACP)
SECTION A-A



INTERSECTIONS (SURF TRT)
SECTION B-B

3/25/2021

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TBPE Registration No. F-1046

FM 794

INTERSECTION DETAILS

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			122
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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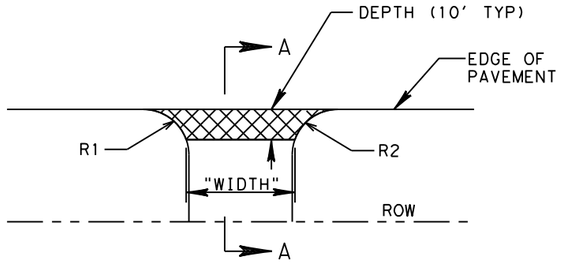
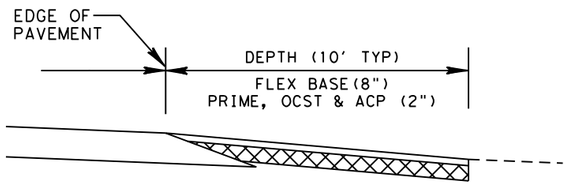
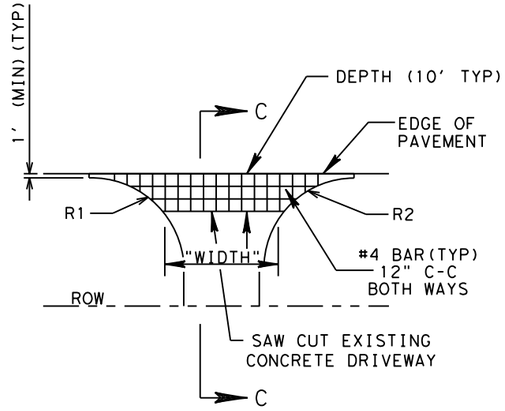


DRIVEWAYS (ACP)
PLAN



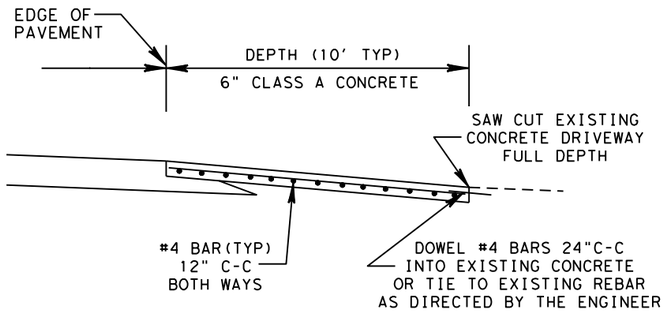
DRIVEWAYS (ACP)
SECTION A-A



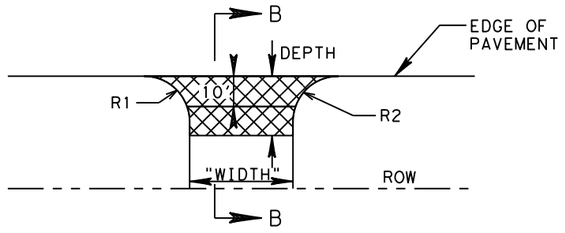
DRIVEWAYS (CONCRETE)
PLAN

NOTES:

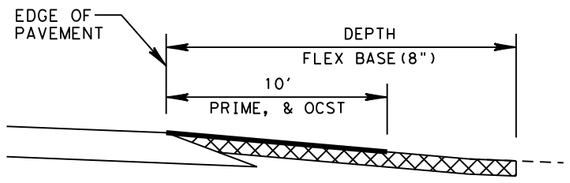
1. DIMENSIONS FOR EACH DRIVEWAY ARE TYPICAL AND MAY VARY DURING ACTUAL CONSTRUCTION TO MEET FIELD CONDITIONS.
2. THE TYPES & RATES OF MATERIALS SHALL CONFORM TO THE ROADWAY ITEMS.



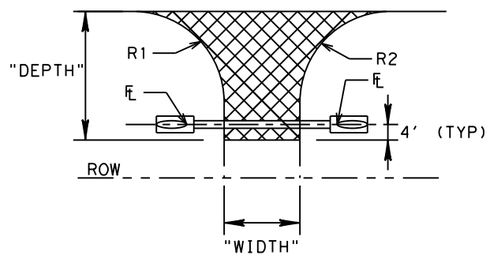
DRIVEWAYS (CONC)
SECTION C-C



DRIVEWAYS (SURF TRT)
PLAN



DRIVEWAYS (SUR TRT)
SECTION B-B



DRIVEWAY W/ NEW PIPE
PLAN

3/25/2021

Texas Department of Transportation

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FM 794

DRIVEWAY DETAILS

SHEET 1 OF 2

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			123
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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SUMMARY OF DRIVEWAYS WITH SIDEWALKS

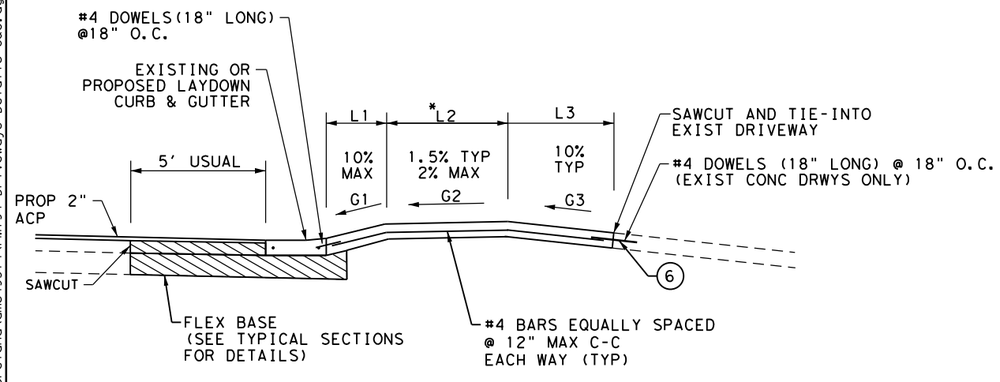
DRIVEWAY NUMBER	P&P SHEET NUMBER	CENTERLINE STATION		EXISTING SURFACE	PROPOSED SURFACE	DRIVEWAY WIDTH (W1) FT	SIDEWALK WIDTH (LW) FT	LENGTHS (L1) FT	(L2) FT	(L3) FT	GRADES (G1) %	(G2) %	(G3) %	EXIST GRADE %	DRIVEWAY TYPE	ELEV AT PROP TOP OF LAYDOWN CURB	ELEV AT TIE IN
DW# 01	1	54+15	RT	ACP	CONCRETE	49	5	2.0	3.0	5.0	9.50	1.50	0.40	1.70	COMMERCIAL	360.30	360.52
DW# 02	2	57+16	RT	CONCRETE	CONCRETE	30	4	1.0	3.0	2.0	10.00	1.50	10.00	4.43	RESIDENTIAL	365.66	366.02
DW# 03	2	58+75	RT	CONCRETE	CONCRETE	30	4	1.0	3.0	3.7	10.00	1.50	10.00	10.69	RESIDENTIAL	367.95	367.72
DW# 04	2	59+82	LT	CONCRETE	EXIST TO REMAIN										COMMERCIAL		
DW# 05	3	61+06	LT	CONCRETE	EXIST TO REMAIN										COMMERCIAL		
DW# 06	3	61+71	RT	CONCRETE	CONCRETE	46	5	2.0	3.0	10.0	10.00	1.50	10.00	7.59	RESIDENTIAL	371.56	370.80
DW# 07	3	61+82	LT	CONCRETE	CONCRETE	24		4.6			6.40			4.76	RESIDENTIAL	372.16	371.85
DW# 08	3	62+57	RT	GRAVEL	CONCRETE	27	5	2.0	3.0	5.0	10.00	1.50	13.20	13.21	RESIDENTIAL	372.46	370.72
DW# 09	3	62+61	LT	CONCRETE	CONCRETE	27		5.0			8.00			10.20	RESIDENTIAL	372.55	372.95
DW# 10	3	63+31	LT	CONCRETE	CONCRETE	32		6.5			1.38			5.07	RESIDENTIAL	372.80	372.89
DW# 11	3	63+64	LT	CONCRETE	CONCRETE	30		7.0			2.57			5.28	RESIDENTIAL	372.91	373.09
DW# 12	3	64+26	RT	CONCRETE	CONCRETE	35	5	2.0	3.0	13.0	10.00	1.50	15.00	16.76	RESIDENTIAL	372.74	371.30
DW# 13	3	64+57	LT	CONCRETE	CONCRETE	28		10.0			0.80			1.30	RESIDENTIAL	373.02	373.10
DW# 14	3	64+85	LT	CONCRETE	CONCRETE	32		10.0			1.80			2.51	RESIDENTIAL	372.97	373.15
DW# 15	3	64+96	RT	CONCRETE	CONCRETE	28	5	2.0	3.0	13.0	10.00	1.50	12.19	12.27	RESIDENTIAL	372.58	371.10
DW# 16	3	65+65	RT	CONCRETE	CONCRETE	24	5	2.0	3.0	9.0	10.00	1.50	10.00	3.36	RESIDENTIAL	372.45	371.96
DW# 17	3	65+93	RT	CONCRETE	CONCRETE	38	5	2.0	3.0	9.0	10.00	1.50	10.00	18.32	RESIDENTIAL	372.40	371.92
DW# 18	3	65+92	LT	CONCRETE	CONCRETE	28		10.0			8.40			8.30	RESIDENTIAL	372.76	373.60
DW# 19	4	66+98	RT	CONCRETE	CONCRETE	36	5	2.0	3.0	10.0	10.00	1.50	10.00	8.03	RESIDENTIAL	372.25	371.65
DW# 20	4	67+73	RT	CONCRETE	CONCRETE	26	5	2.0	3.0	9.0	10.00	1.50	10.00	9.59	RESIDENTIAL	372.16	371.65
DW# 21	4	68+12	LT	CONCRETE	CONCRETE	28		10.0			5.40			5.10	RESIDENTIAL	372.56	373.10

NOTES:
SEE DRIVEWAY SUMMARY SHEET FOR QUANTITIES ON DRIVEWAYS # 01 THRU #21
SEE DRIVEWAY SUMMARY, DRIVEWAY STRUCTURE SUMMARY AND PLAN / PROFILE SHEETS FOR DETAILS ON DRIVEWAYS #22 THRU #128.

GENERAL NOTES

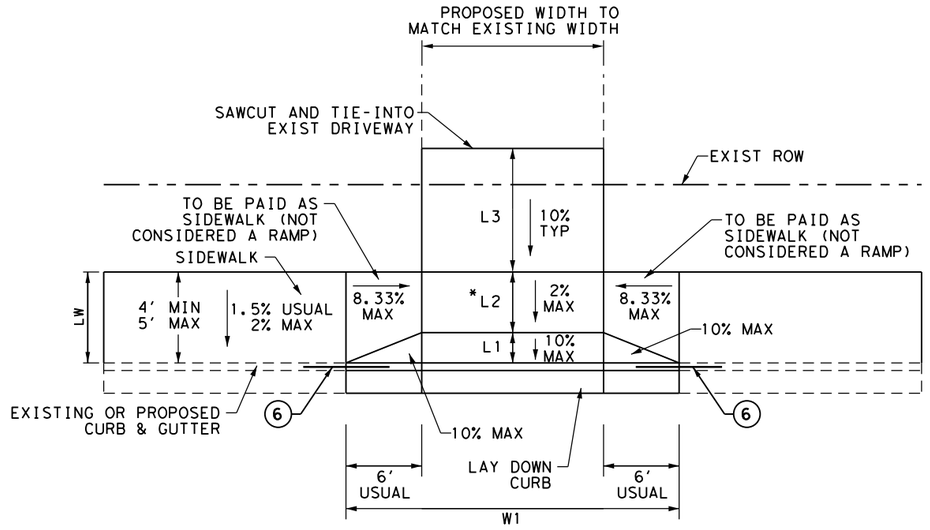
1. PROVIDE 1/2" DEEP TOOLED OR SAW CUT JOINTS EVENLY SPACED AT 5' TYP / 10' MAX SPACING. PROVIDE MEDIUM BROOM FINISH TO CONCRETE SURFACE.
2. PROVIDE EXPANSION JOINTS AT 40' MAX SPACING.
3. EMBANKMENT, SAND, AND FLEX BASE MATERIAL FOR SIDEWALK FOUNDATION ARE SUBSIDIARY TO ITEM 531.
4. DO NOT BLOCK EXISTING DRAINAGE PATHS OR APPURTENANCES WITH PROPOSED SIDEWALK.
5. IF CURB & GUTTER AND SIDEWALK ARE NOT PLACED MONOLITHICALLY, PROVIDE 1/2" EXPANSION JOINT MATERIAL AND JOINT SEALING COMPOUND BETWEEN SIDEWALK AND CURB & GUTTER.
6. DRILL AND EMBED 1/2" DIA DOWEL BAR INTO EXISTING CONCRETE DRIVWAY OR CURB AS APPROVED BY THE ENGINEER AND TIE TO PROPOSED REINFORCEMENT
7. AT EXISTING DRIVEWAYS WITH EXISTING LAYDOWN CURB, REMOVE EXISTING CURB TAPER AND REPLACE THE CURB TAPER AT 10% MAX SLOPE FROM OPEN SECTION TO 6" FULL CURB AND GUTTER SECTION
8. NOTIFY PROPERTY OWNERS A MINIMUM OF 1 WEEK IN ADVANCE TO CONFIRM EASEMENT, WHERE NECESSARY, PRIOR TO RECONSTRUCTING DRIVEWAYS.

G = DRIVEWAY GRADE (%)
L = HORIZONTAL LENGTH TO THE GRADE BREAK



DRIVEWAY DETAIL / SIDEWALK ADJACENT TO CURB
SECTION VIEW

NOTE *:
ACCESS ROUTE TO BE 3' MIN THRU DRIVEWAY WHEN SIDEWALK IS 4' OR 5' WIDE.



DRIVEWAY DETAIL / SIDEWALK ADJACENT TO CURB
PLAN VIEW

NOTE *:
ACCESS ROUTE TO BE 3' MIN THRU DRIVEWAY WHEN SIDEWALK IS 4' OR 5' WIDE.

STATE OF TEXAS
JOHN W. TULEY
102441
LICENSED
PROFESSIONAL ENGINEER

3/25/2021

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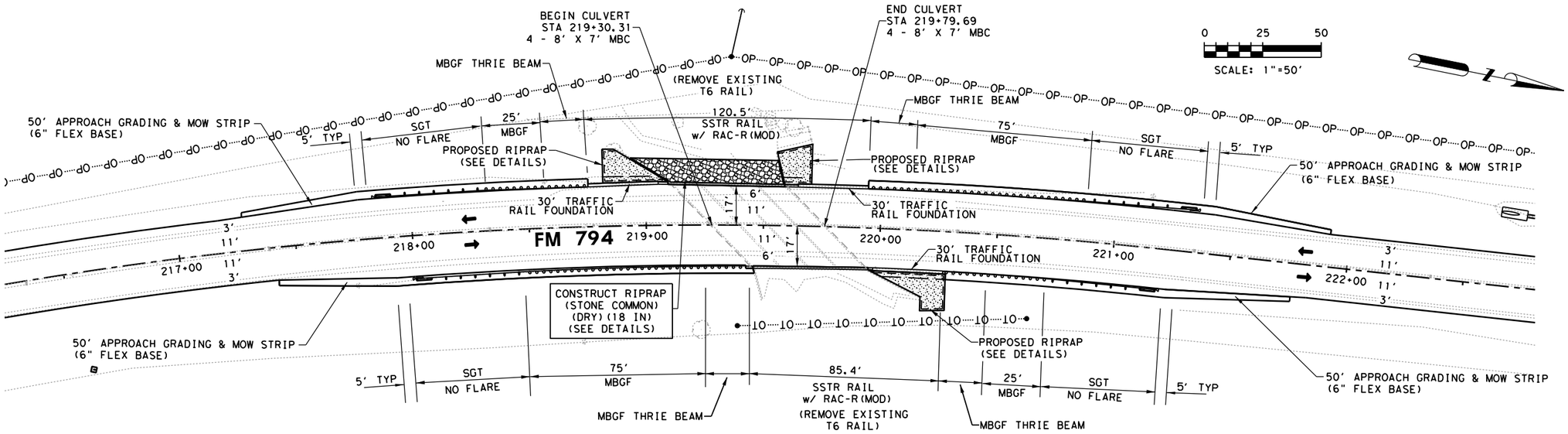
TBPE Registration No. F-1046

FM 794

DRIVEWAY DETAILS

SHEET 2 OF 2

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			124
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

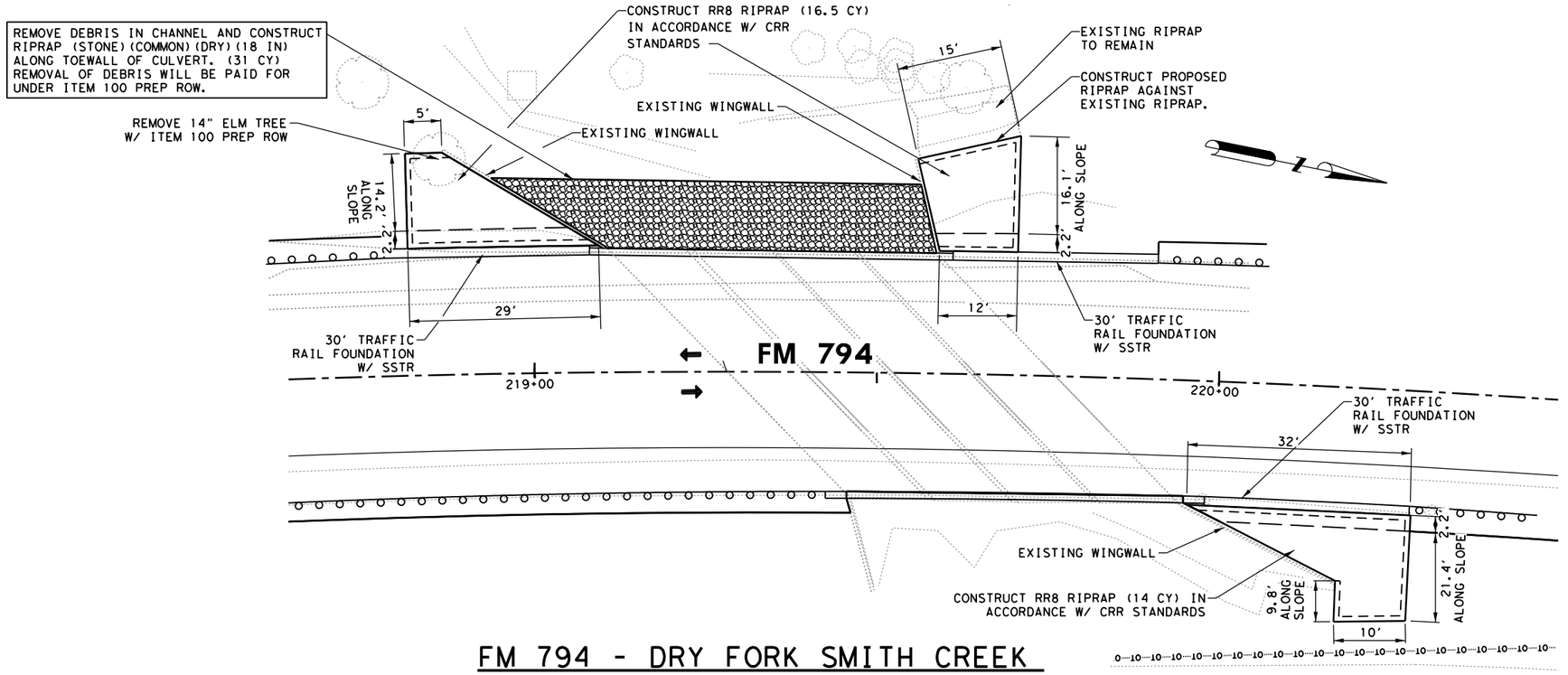


UTILITY LOCATIONS ARE APPROXIMATE AND SHOULD BE FIELD VERIFIED PRIOR TO CONSTRUCTION.

FM 794 - DRY FORK SMITH CREEK - CULVERT 5

NBI# 13-090-0-1133-02-006

STA 219+30.31 TO STA 219+79.69



FM 794 - DRY FORK SMITH CREEK

RIPRAP DETAILS

(NOT TO SCALE)

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FM 794

MBGF LAYOUT

SHEET 1 OF 2

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			125
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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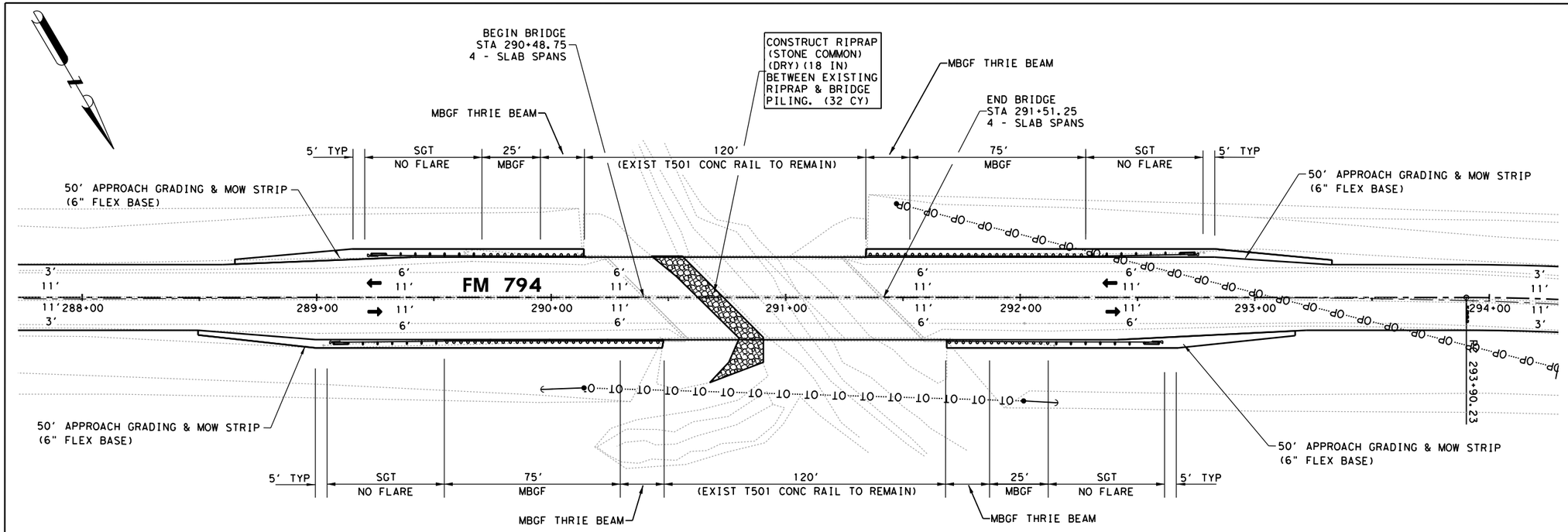

UTILITY LOCATIONS ARE APPROXIMATE AND SHOULD BE FIELD VERIFIED PRIOR TO CONSTRUCTION.

0 25 50

SCALE: 1"=50'

FM 794 - SMITH CREEK

NBI# 13-090-0-1133-02-007

STA 290+48.75 TO STA 291+51.25

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MBGF LAYOUT

SHEET 2 OF 2

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			126
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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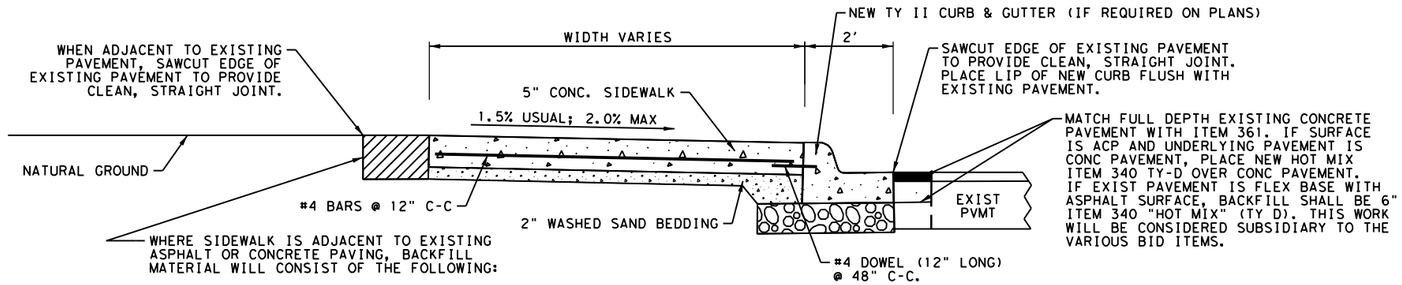
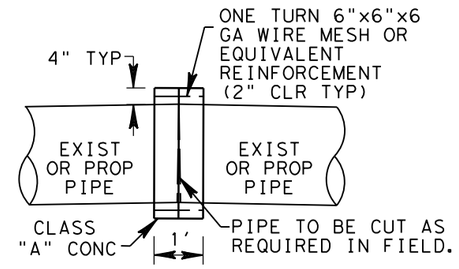
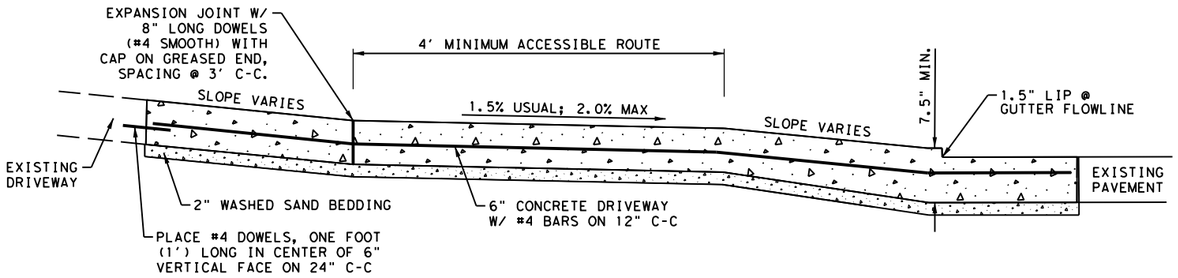


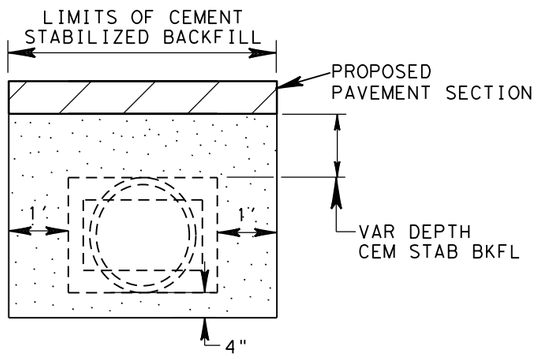
TYPICAL SIDEWALK SECTION - TY II CURB AND GUTTER ADJACENT TO CURB



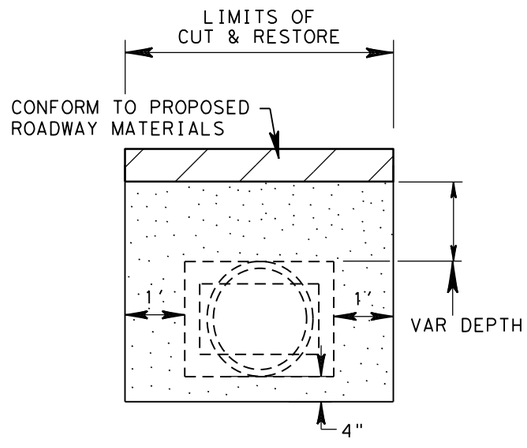
PIPE COLLAR DETAIL
N.T.S.



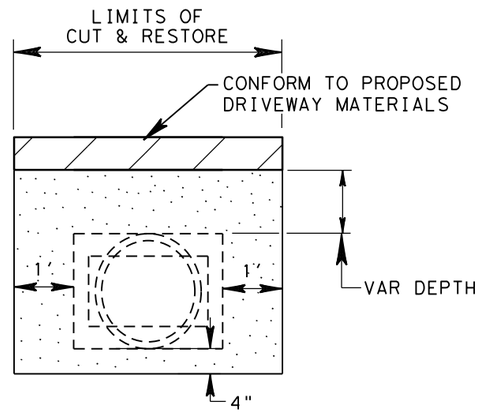
TYPICAL SIDEWALK SECTION ACROSS DRIVEWAY W/ TY II CURB AND GUTTER



CEMENT STABILIZED BACKFILL DETAIL
SECTION VIEW (N.T.S.)



CUT & RESTORE PAVEMENT DETAIL (CROSS CULVERT)
SECTION VIEW (N.T.S.)



CUT & RESTORE PAVEMENT DETAIL (DRIVEWAY & INTERSECTION CULVERTS)
SECTION VIEW (N.T.S.)

3/25/2021

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FM 794

MISCELLANEOUS DETAILS

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			127
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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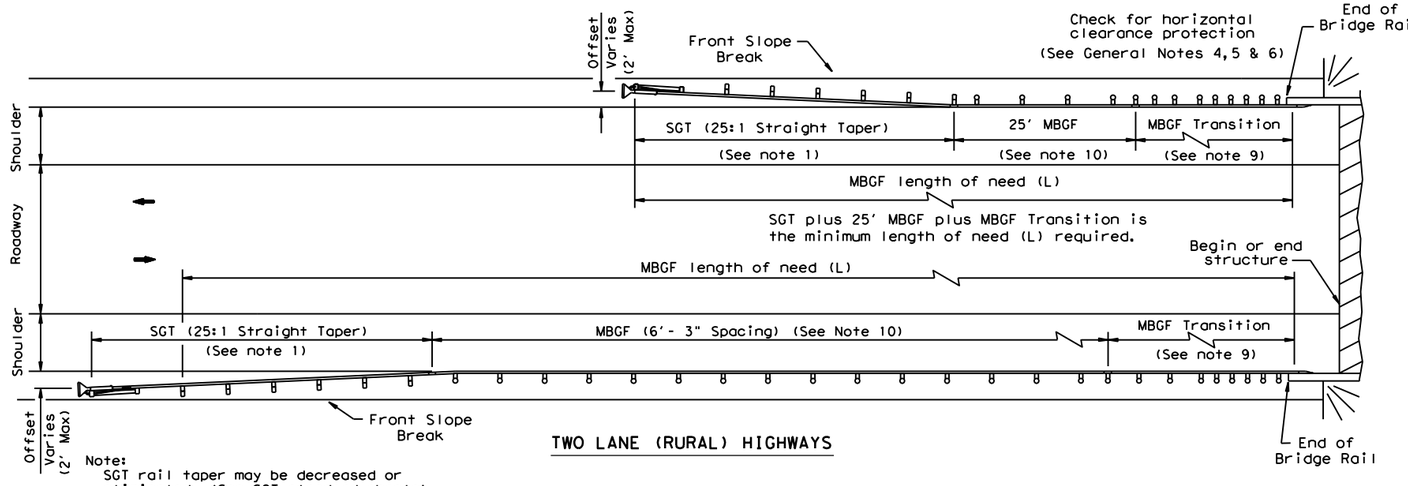
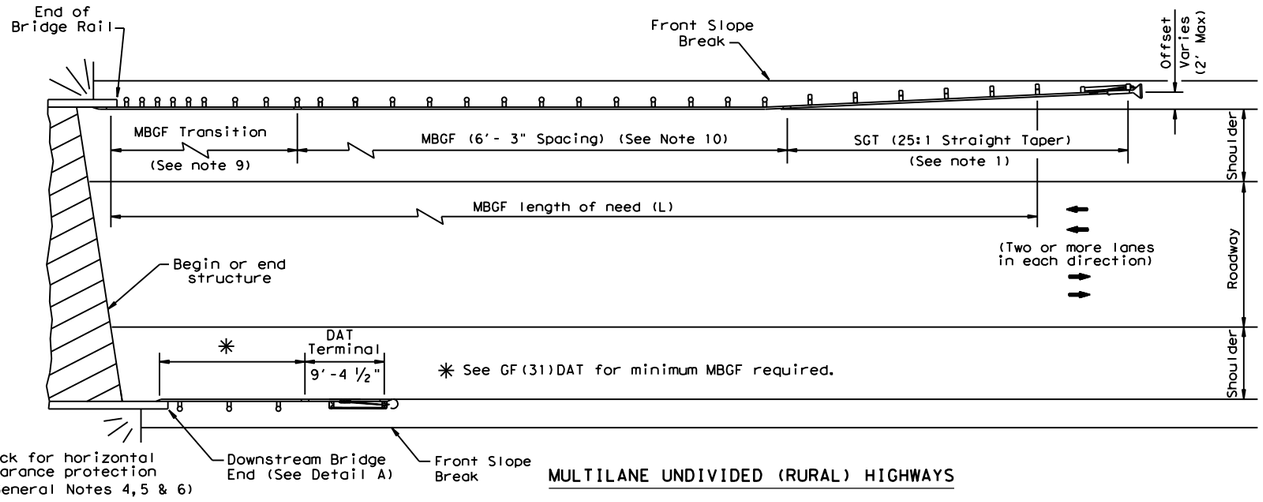
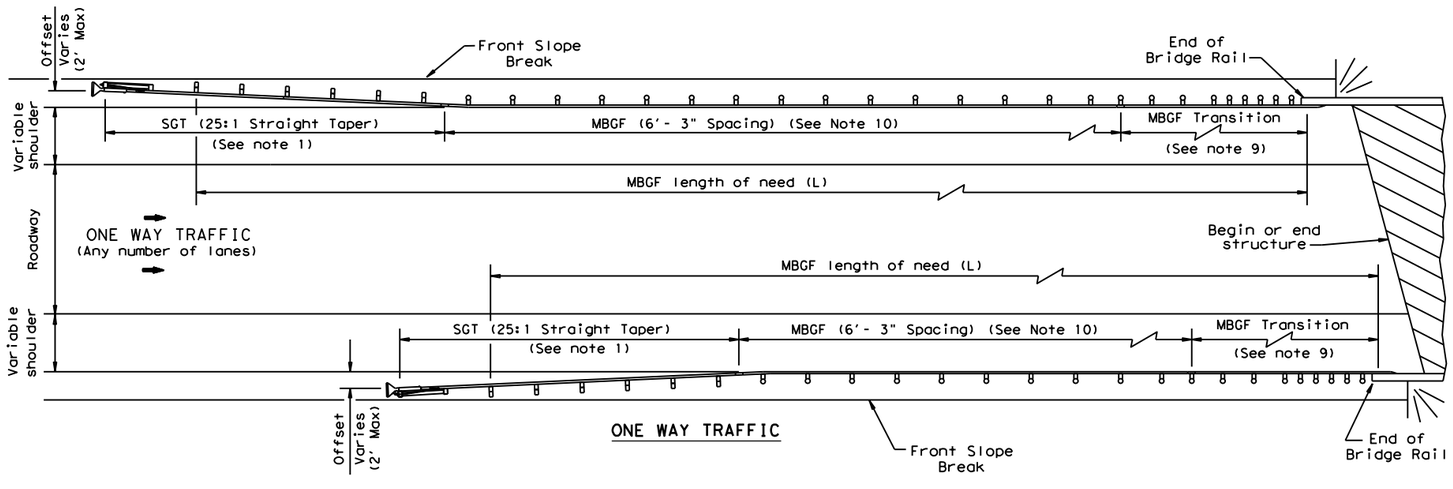


TWO LANE (RURAL) HIGHWAYS

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



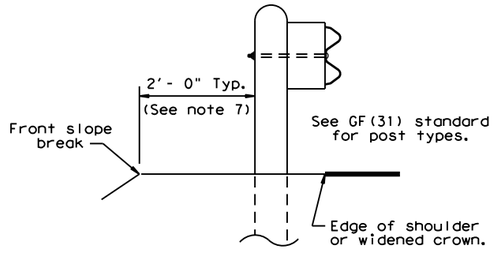
MULTILANE UNDIVIDED (RURAL) HIGHWAYS



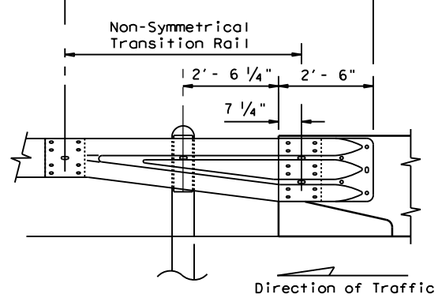
ONE WAY TRAFFIC

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
© TxDOT: December 2011	CONT	SECT	JOB	HIGHWAY
REVISIONS REVISED APRIL 2014 SEE (MEMO 0414)	1133	02	032	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		128

DATE: 3/25/2021
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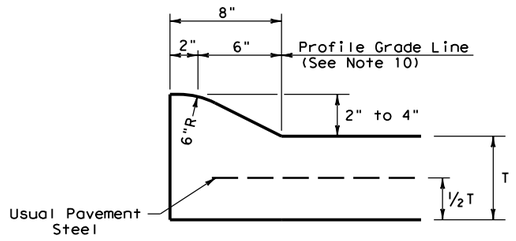
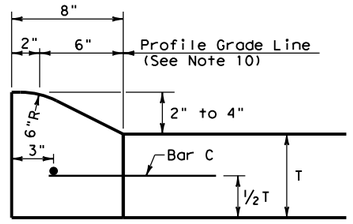
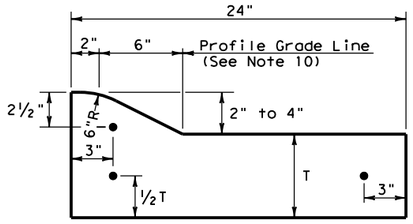


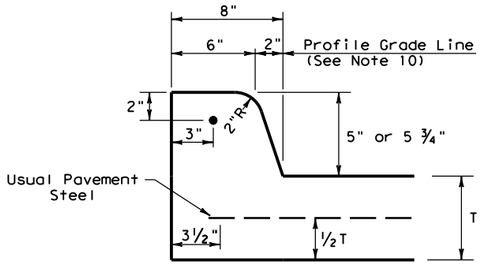
TYPE I CURB (MONOLITHIC)
2" - 4" HEIGHT



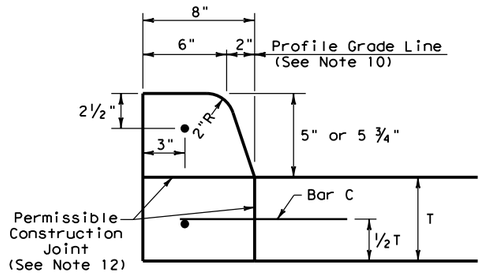
TYPE I CURB
2" - 4" HEIGHT



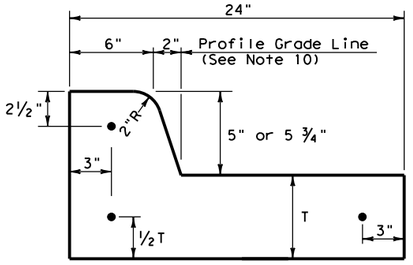
TYPE I CURB AND GUTTER
2" - 4" HEIGHT



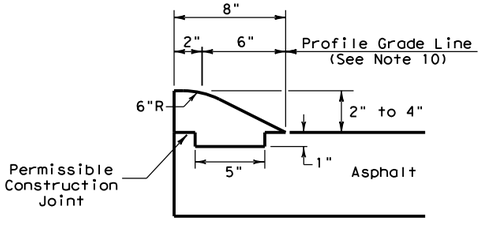
TYPE II CURB (MONOLITHIC)
5" - 5 ¾" HEIGHT



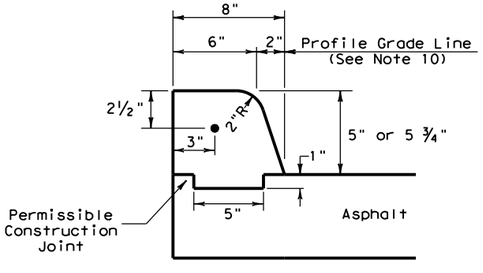
TYPE II CURB
5" - 5 ¾" HEIGHT



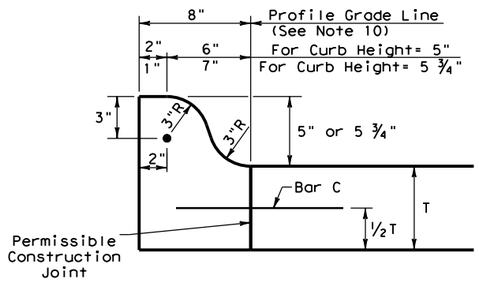
TYPE II CURB AND GUTTER
5" - 5 ¾" HEIGHT



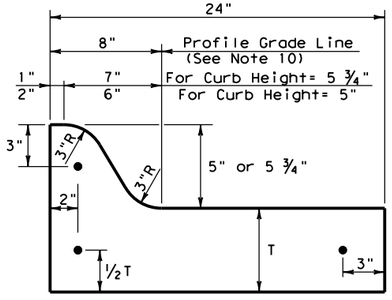
TYPE III CURB (KEYED)
2" - 4" HEIGHT



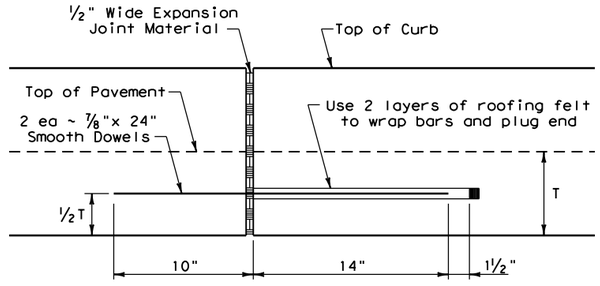
TYPE IV CURB (KEYED)
5" - 5 ¾" HEIGHT



TYPE IIa CURB
5" - 5 ¾" HEIGHT

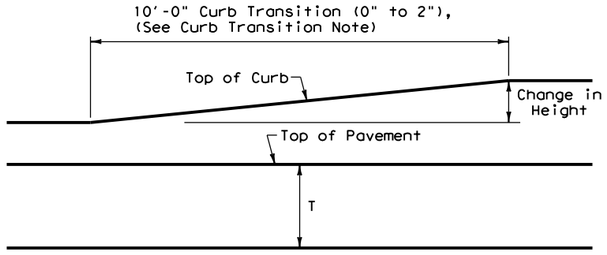


TYPE IIa CURB AND GUTTER
5" - 5 ¾" HEIGHT



EXPANSION JOINT DETAIL

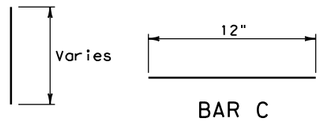
CURB TRANSITION NOTE:
Field conditions may require a longer or shorter transition, and shall be shown elsewhere in the plans, or as directed by the Engineer.



CURB TRANSITION
Note: To be paid for as Highest Curb

GENERAL NOTES

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



BAR B

BAR C

Texas Department of Transportation

Design Division Standard

CONCRETE CURB AND CURB AND GUTTER

CCCG-21

FILE: cccg21.dgn	DN: TXDOT	CK: AN	DW: SS	CK: KM
©TxDOT: FEBRUARY 2021 REVISIONS	CONT	SECT	JOB	HIGHWAY
	1133	02	032	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		129

DATE: 3/25/2021
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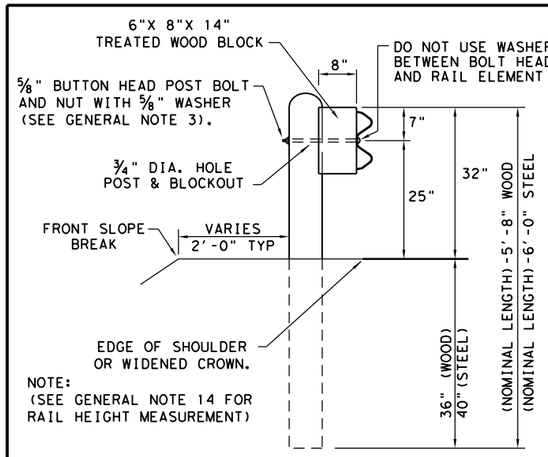
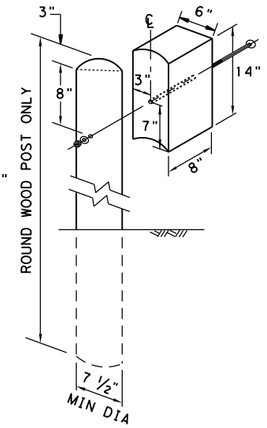
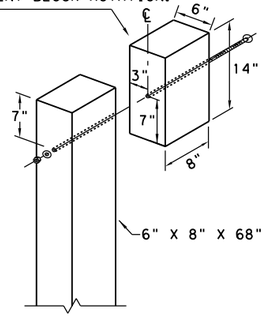


TYPICAL POST PLACEMENT

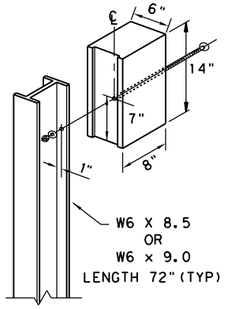


WOOD BLOCK TO
ROUND WOOD POST

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

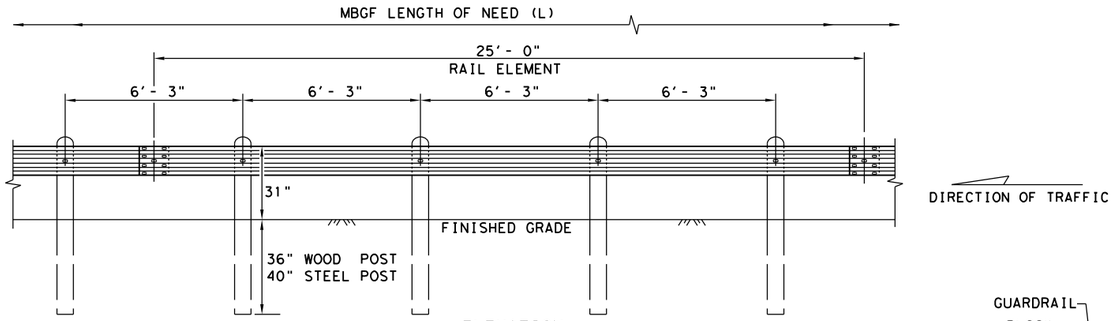


WOOD BLOCK TO
RECTANGULAR WOOD POST



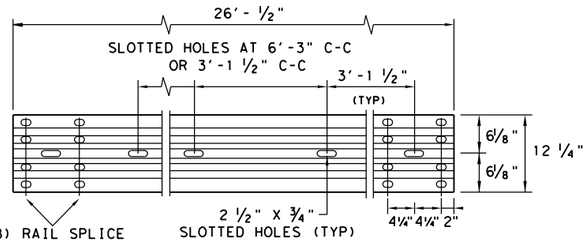
ROUTED WOOD BLOCK
TO I-BEAM STEEL POST

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



ELEVATION
MID-SPAN RAIL SPLICE

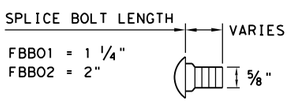
SHOWING A 25'- 0" SECTION OF W-BEAM RAIL. (SEE GENERAL NOTE 2)



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

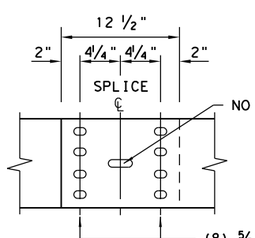
NOTES: SEE GENERAL NOTE 2 FOR ALLOWABLE RAIL TYPES.
SEE RAIL SPLICE DETAIL FOR REQUIRED HARDWARE.

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



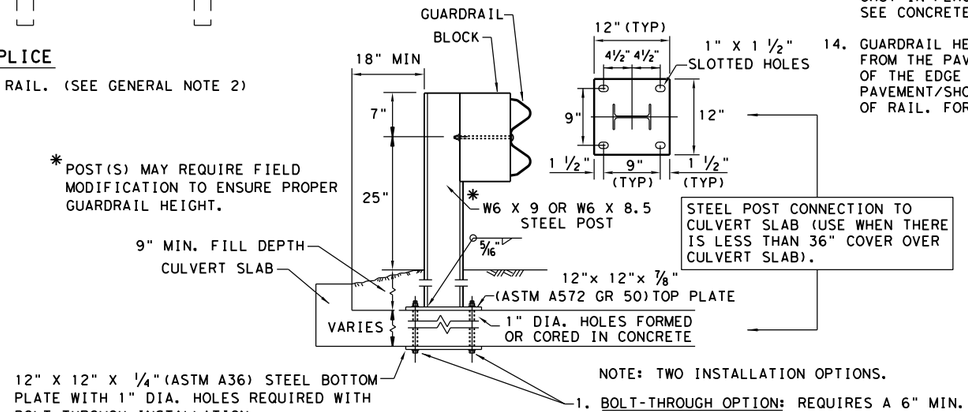
BUTTON HEAD BOLT

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



MID-SPAN
RAIL SPLICE DETAIL

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



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

12" X 12" X ¼"(ASTM A36) STEEL BOTTOM PLATE WITH 1" DIA. HOLES REQUIRED WITH BOLT-THROUGH INSTALLATION.

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.

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.

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.

Texas Department of Transportation — Design Division Standard

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

FILE: gf3119.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG	
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY	
REVISIONS	1133	02	032	FM 794	
	DIST	COUNTY		SHEET NO.	
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DATE: 3/25/2021
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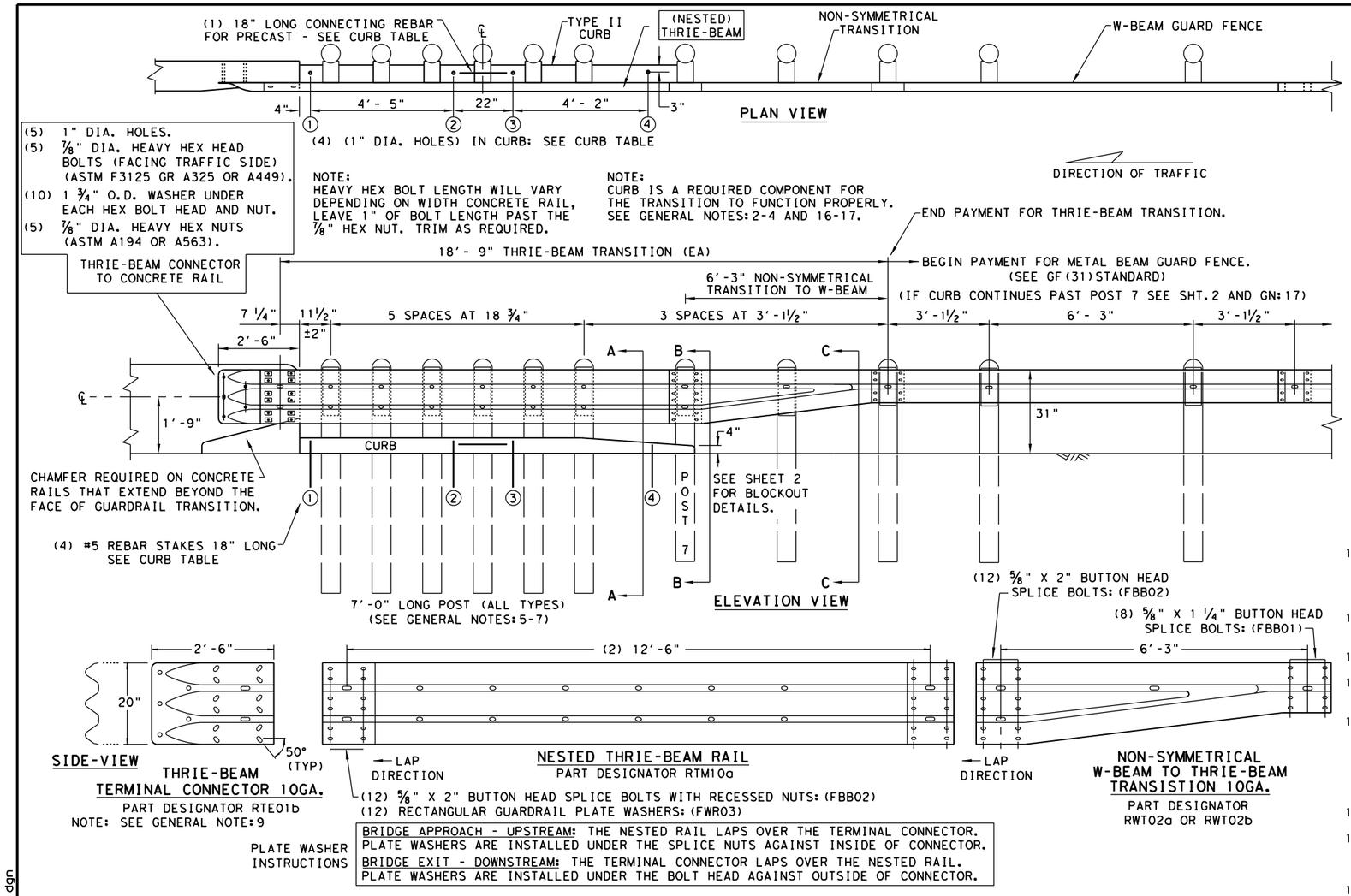
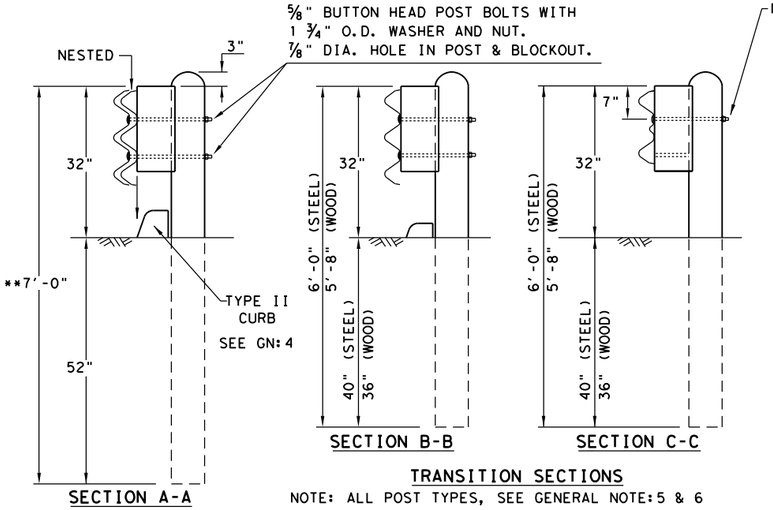
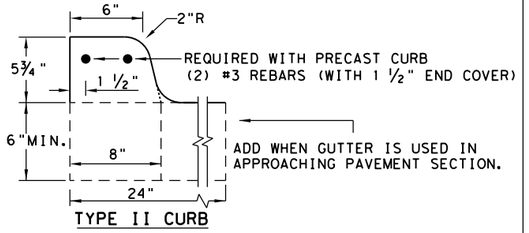


GENERAL NOTES

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



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



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

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

TYPE II CURB DETAILS

HIGH-SPEED TRANSITION

SHEET 1 OF 2

Texas Department of Transportation — Design Division Standard

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

GF(31)TR TL3-20

FILE: gf31trt1320.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	032	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		131

DATE: 3/25/2021
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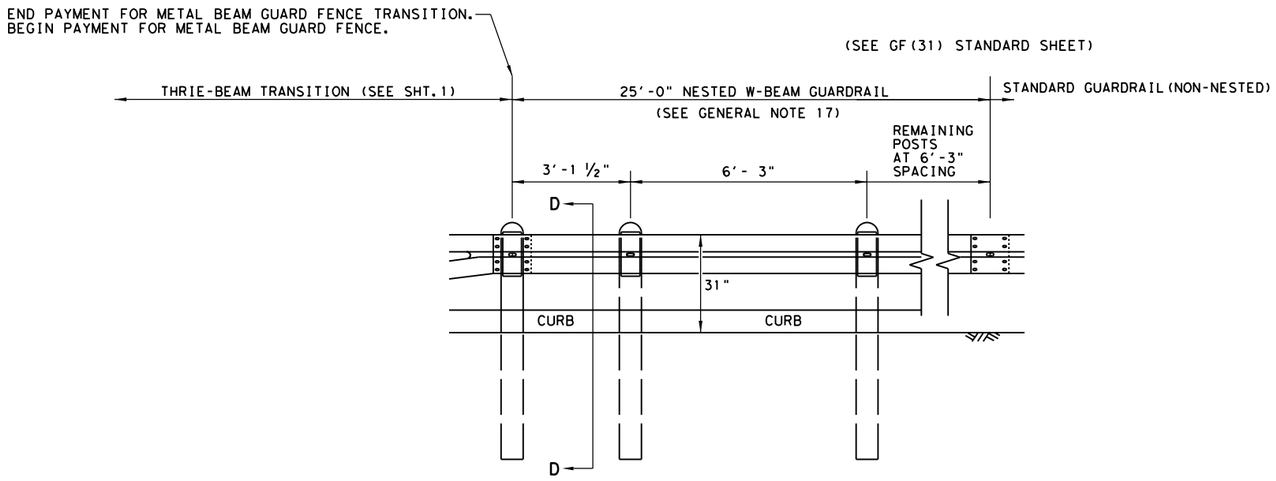
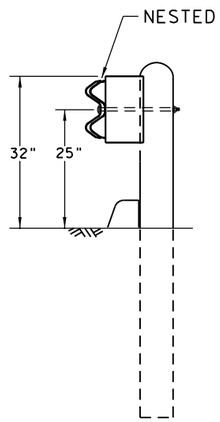
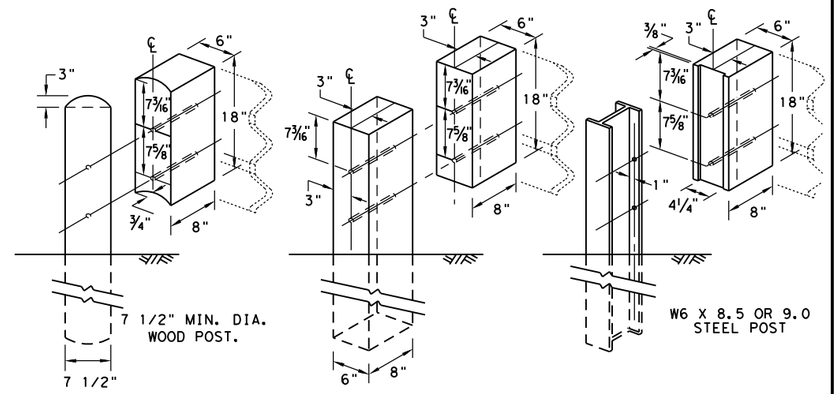
REQUIRED ALTERNATIVE FOR CONTINUOUS CURB EXTENDING PAST POST 7 (SEE SHT. 1 GENERAL NOTE 17)



ELEVATION VIEW



SECTION D-D



THRIE BEAM TRANSITION BLOCKOUT DETAILS

HIGH-SPEED TRANSITION

SHEET 2 OF 2

Texas Department of Transportation — Design Division Standard

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

GF(31)TR TL3-20

FILE: gf31tr1320.dgn	DN: TxDOT	CK: KM	DW: KM	CK: CGL/AG
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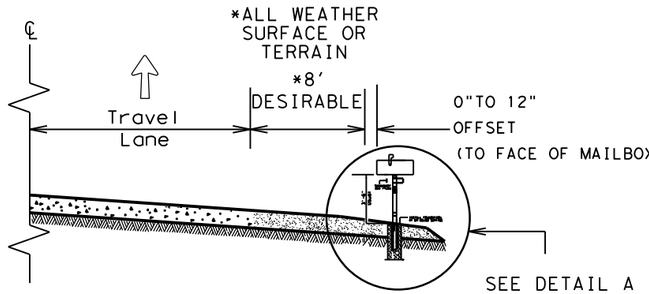
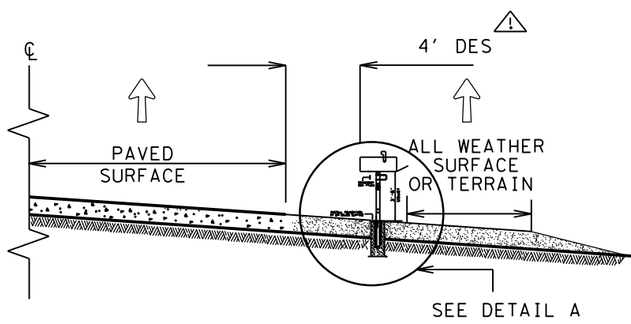
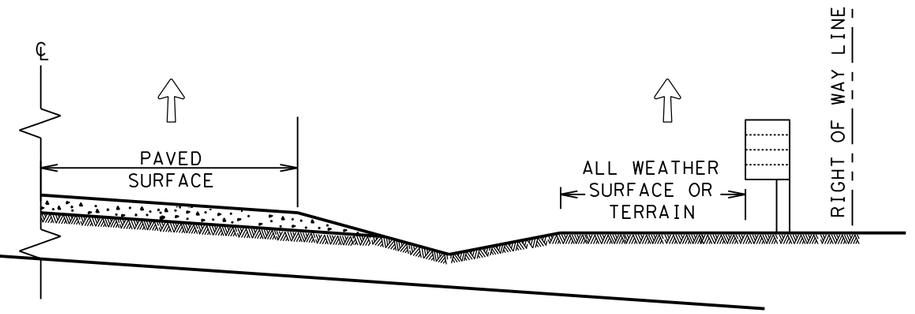


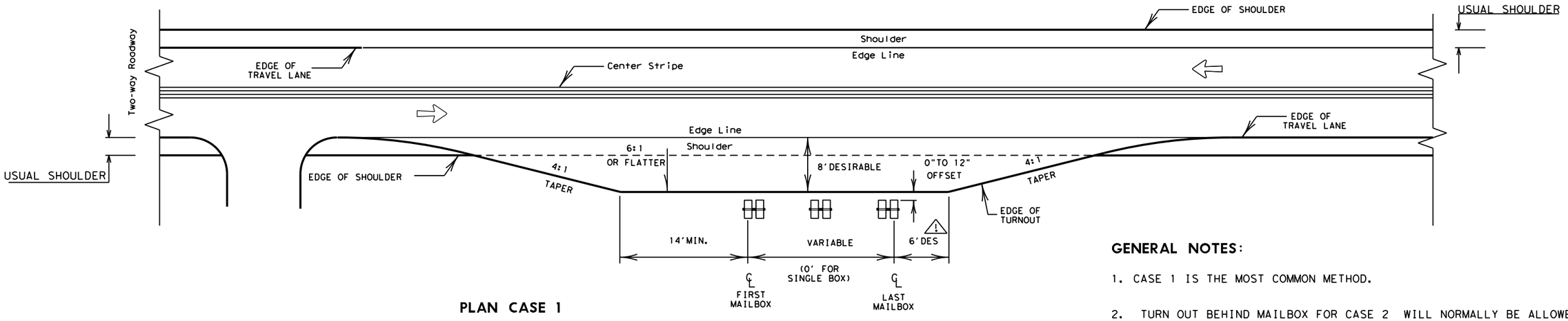
CASE 1. OFF TRAVEL WAY DELIVERY



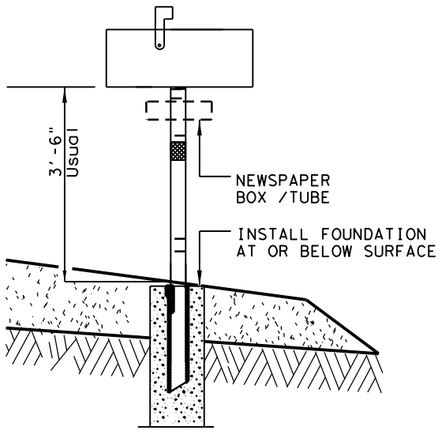
CASE 2. BACK SIDE DELIVERY



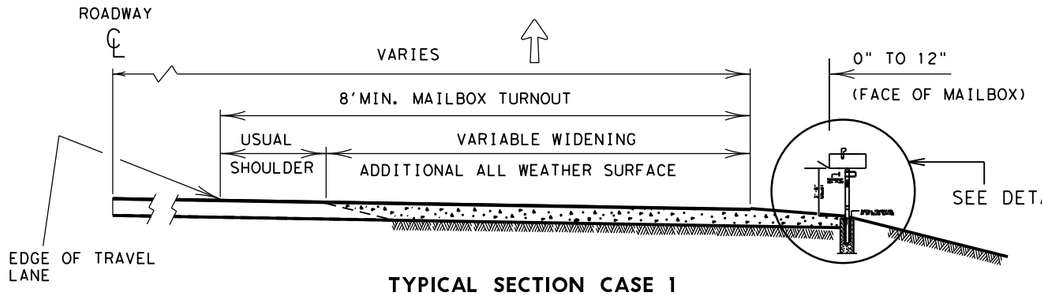
CASE 3. DELIVERY NEAR RIGHT OF WAY LINE



PLAN CASE 1



DETAIL A



TYPICAL SECTION CASE 1

MAIL DELIVERY VEHICLE TRAVEL DIRECTION

GENERAL NOTES:

1. CASE 1 IS THE MOST COMMON METHOD.
2. TURN OUT BEHIND MAILBOX FOR CASE 2 WILL NORMALLY BE ALLOWED FOR NATURAL TERRAIN THAT WILL SERVE AS AN ALL WEATHER SURFACE.
3. ALL WEATHER DRIVEWAYS FOR CASE 3 MAILBOXES LOCATED AT THE RIGHT OF WAY LINE SHOULD NORMALLY BE PLACED IN CONJUNCTION WITH COUNTY ROADS OR OTHER CONNECTING COMMUNITY ROADS OR STREETS. IF THE NUMBER OF MAILBOXES EXCEEDS FOUR, A COMMUNITY MAIL BOX SHOULD BE ENCOURAGED AT THESE LOCATIONS.

Texas Department of Transportation | Maintenance Division Standard

Guideline

MAILBOX SIDE ROAD PLACEMENT AND TURNOUTS
MB-14(2)

FILE: MB14(2).DGN		DN: JEO	CK:	DW: JEO		CK:	
©TxDOT MAY 2014		CONT	SECT	JOB		HIGHWAY	
REVISIONS DECEMBER 2012-NEW TXDOT TITLE BLOCK		1133	02	032		FM 794	
		DIST	COUNTY			SHEET NO.	
		YKM	GONZALES			133	

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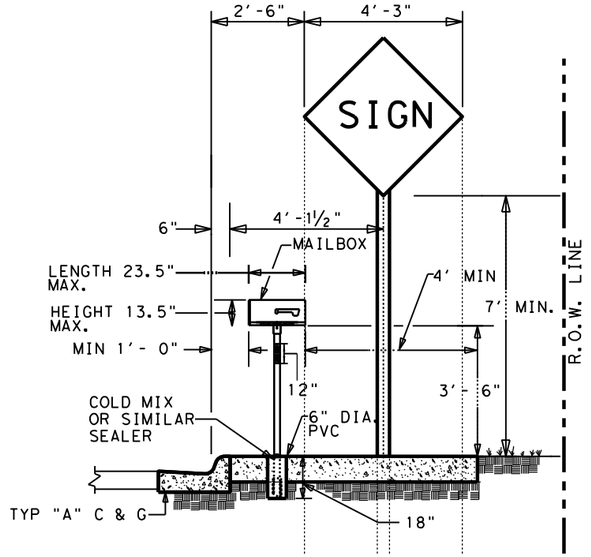
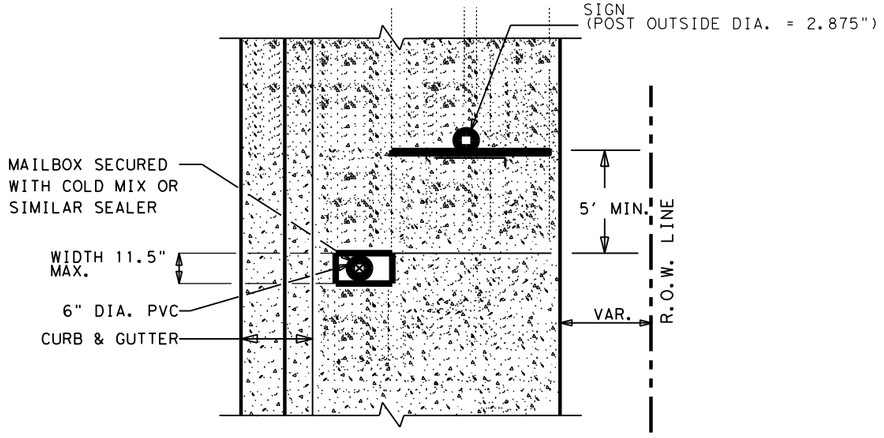
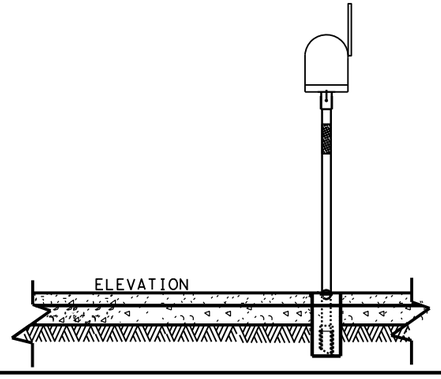
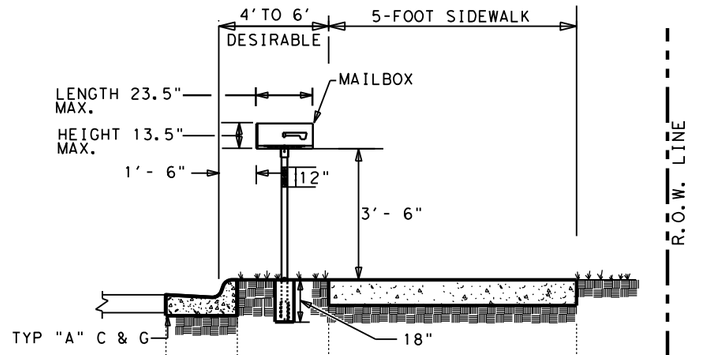


MAILBOX SIDEWALK INSTALLATION RELATIVE TO ANY OTHER OBSTRUCTION SUCH AS A SIGN
(MINIMUM BORDER DISTANCE)

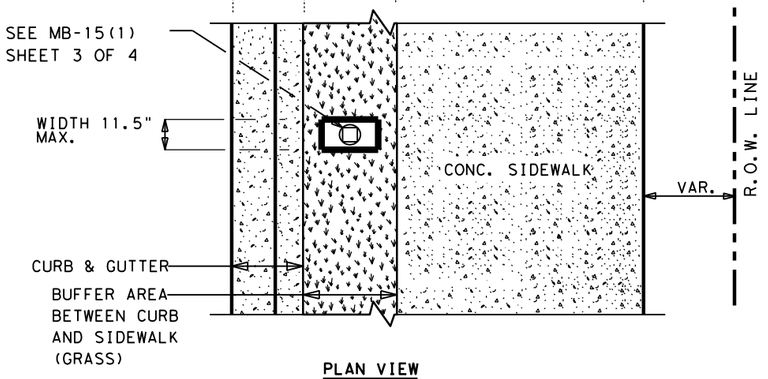


PLAN VIEW





MAILBOX SIDEWALK INSTALLATION
(DESIRABLE BORDER DISTANCE)



PLAN VIEW

Texas Department of Transportation | Maintenance Division Standard

SINGLE MAILBOX PLACEMENT BEHIND CURBS WITH OR WITHOUT SIDEWALKS

MB-14(2A)

FILE: MB-14(2A)	DN:	CK:	DW:	CK:
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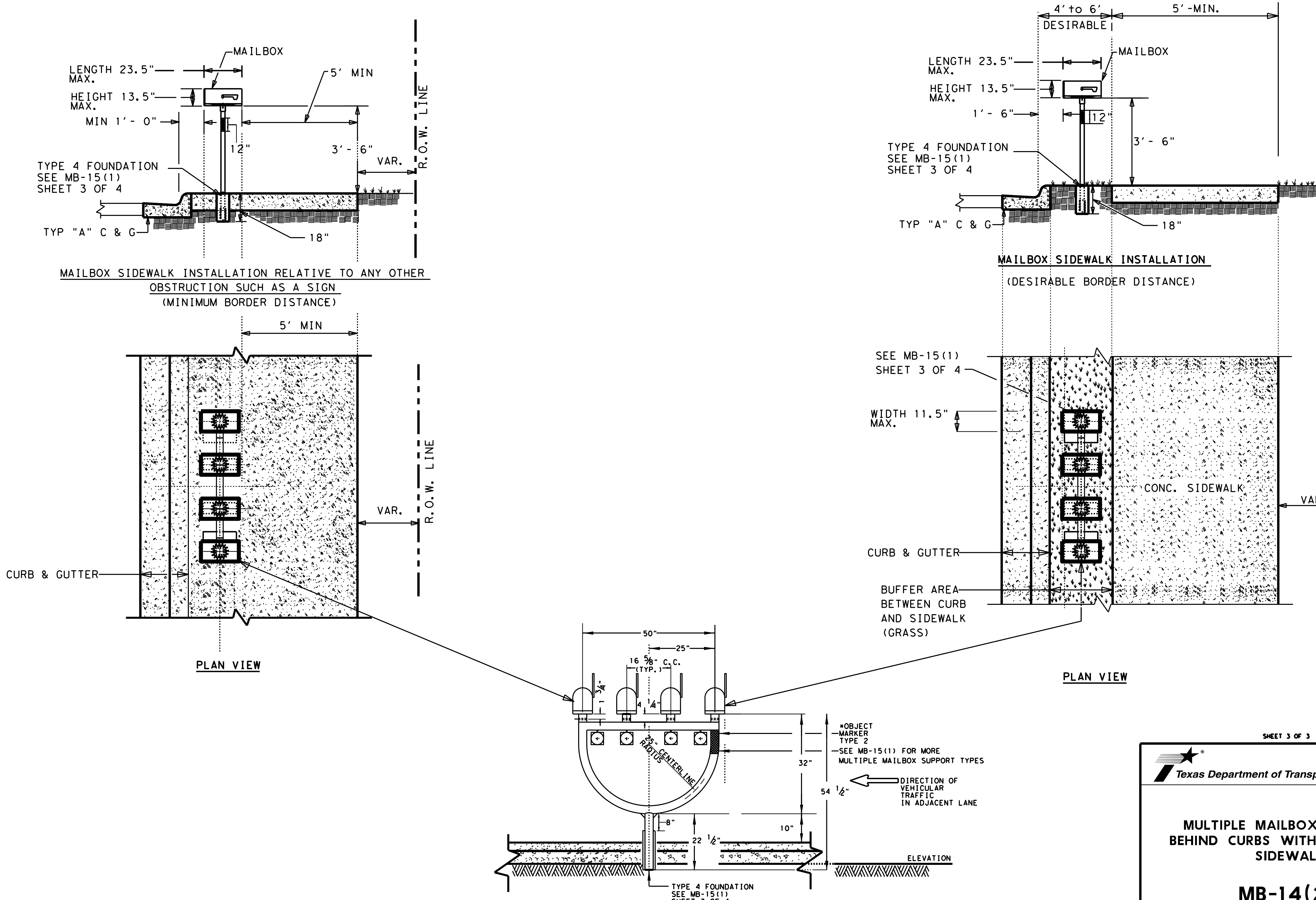

SHEET 3 OF 3

Texas Department of Transportation

Maintenance Division Standard

MULTIPLE MAILBOX PLACEMENT BEHIND CURBS WITH OR WITHOUT SIDEWALKS

MB-14(2B)

FILE: MB-14(2A)	DN:	CK:	DW:	CK:
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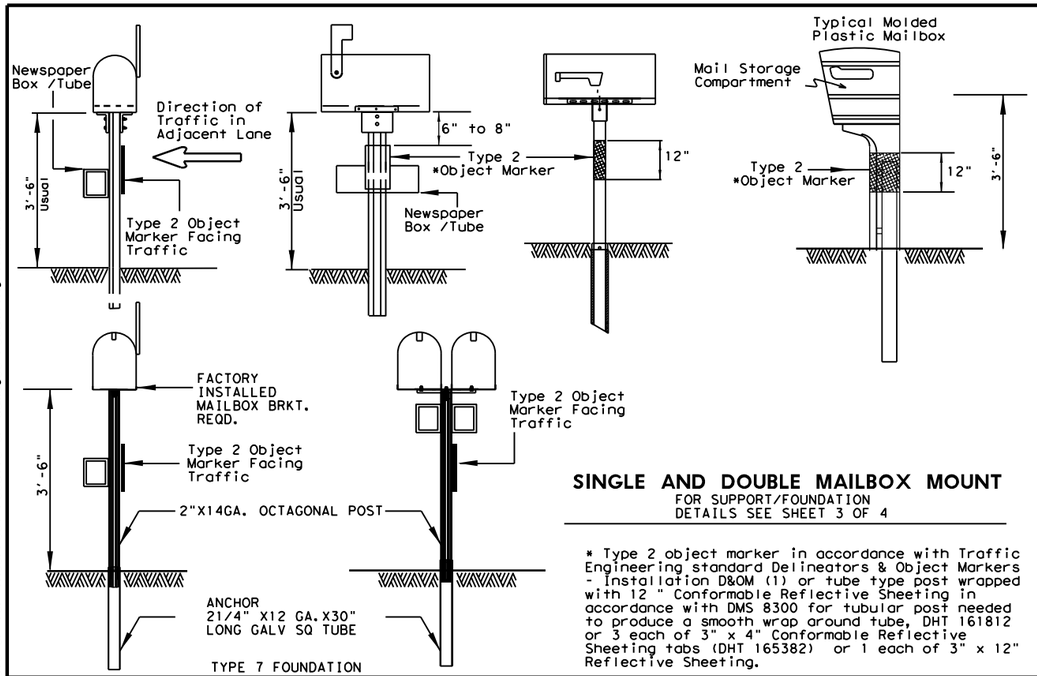


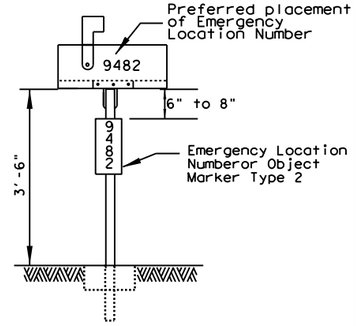
SINGLE AND DOUBLE MAILBOX MOUNT

FOR SUPPORT/FOUNDATION DETAILS SEE SHEET 3 OF 4

* Type 2 object marker in accordance with Traffic Engineering standard Delineators & Object Markers - Installation D&OM (1) or tube type post wrapped with 12 " Conformable Reflective Sheeting in accordance with DMS 8300 for tubular post needed to produce a smooth wrap around tube, DHT 161812 or 3 each of 3" x 4" Conformable Reflective Sheeting tabs (DHT 165382) or 1 each of 3" x 12" Reflective Sheeting.

Note: Mailbox installations in sidewalk areas shall be in accordance with the latest TxDOT Pedestrian Facilities Curb ramps standard *PED-XX for pedestrian facilities.

*PED-XX: XX is the standard year for example PED- 12 , PED-13,etc.



PLACEMENT OF EMERGENCY LOCATION NUMBER

Location Number shall be placed on: 1. A yellow, type A plate with class 1 flat surface reflective sheeting in accordance with DMS 8600. The color of numbers shall be black. or 2: A green or blue plate with white numbers attached to post beside the object marker. Other contrasting color configuration, as approved , may be used. (Use Same type plate as used for the type 2 Object Marker. Recommended sign size is 6" by 15")

MAILBOX SIZES

TYPICAL MAILBOX SIZE				LIGHT WEIGHT MATERIAL	
				SHEET METAL	**PLASTIC
SIZE	LENGTH (INCHES)	WIDTH (INCHES)	HEIGHT (INCHES)	MAXIMUM WEIGHT (POUNDS)	
SMALL	19 1/2	6	7	5	5
MEDIUM	22 1/2	8	11 1/2	7	7
LARGE	23 1/2*	11 1/2*	13 1/2*	10	10

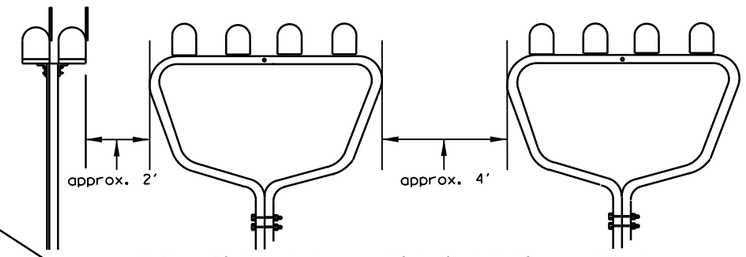
* Maximum allowed dimensions for mailbox
** Excluding Molded Plastic on 4 X 4 Post

LOCKABLE ARCHITECTURAL MAILBOX SIZE (INCHES)					
VIEW	TOP	BOTTOM	FRONT SIDE	BACK SIDE	WEIGHT (POUNDS)
SIDE	18	15	18.3	15	22.4
BACK	11 1/2	11 1/2		15	

SEE TOP RIGHT CORNER OF SHEET 2 OF 4

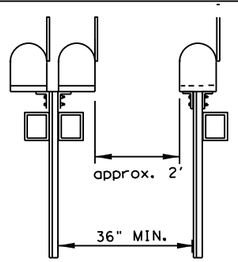
Mailboxes shall be made of light weight sheet metal or light weight plastic. Lockable architectural mailboxes shall meet the requirements of the above table.

Heavy steel, cast iron or decorative mailboxes shall not be used on the state highway system.



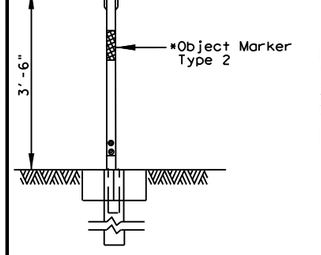
4' Clear Distance between multiple installations and 2' clearance between double or single installations and the multiple installation. DHT #'s 164116 or 149339.

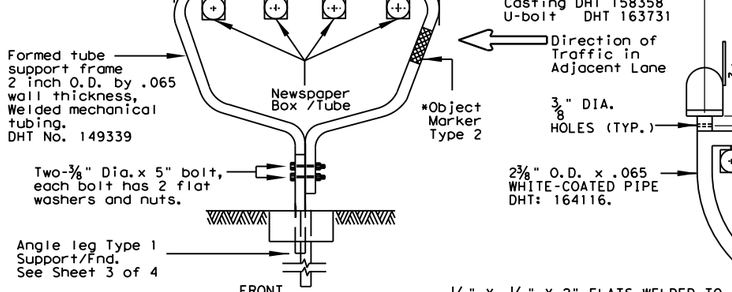
MULTIPLE MAILBOX PLACEMENT

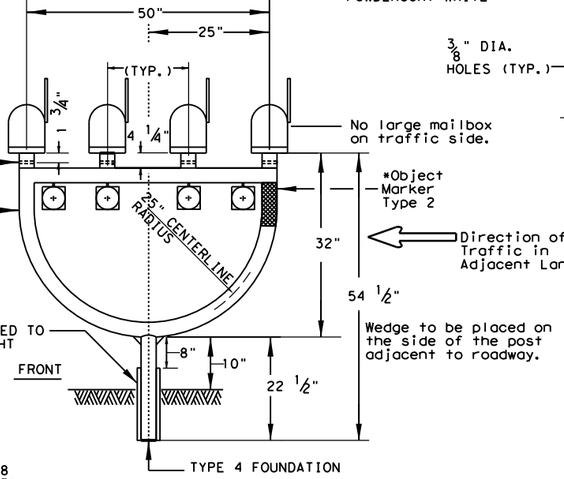


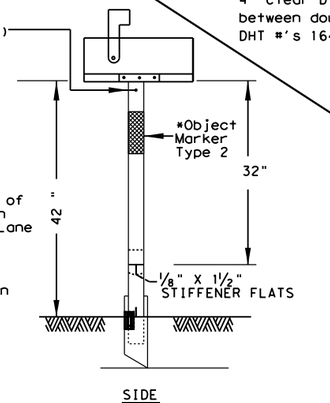
Clear Distance between single or double mounted posts. (Normally when 3 or more mailboxes are in one location, a multiple support is used).

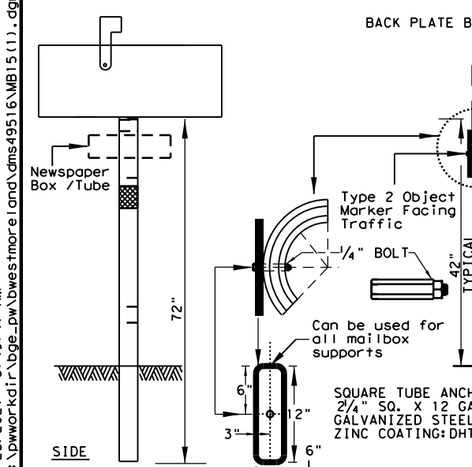
SINGLE & DOUBLE MAILBOX PLACEMENT

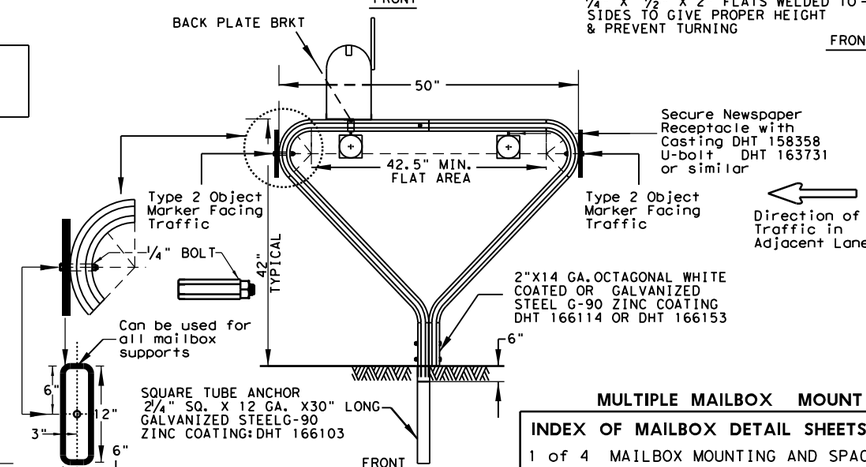












DOUBLE AND MULTIPLE MAILBOX MOUNT

FOR SUPPORT/FOUNDATION DETAILS SEE SHEET 3 OF 4 FOR DHT NUMBERS SEE SHEET 4 OF 4

NEWSPAPER RECEPTACLE

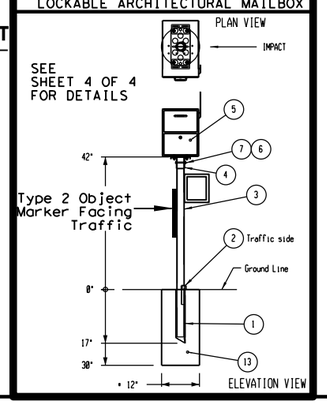
A light weight receptacle for newspaper delivery can be attached to mailbox posts as shown on this page if the receptacle:

- Does not touch the mailbox.
- Does not present a hazard to traffic or delivery of the mail.
- Does not extend beyond the front of the mailbox.
- Does not display advertising, except the publication title.
- Newspaper receptacles on separate supports are prohibited.

MULTIPLE MAILBOX MOUNT

INDEX OF MAILBOX DETAIL SHEETS

LOCKABLE ARCHITECTURAL MAILBOX



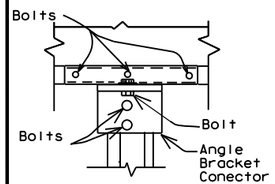
Texas Department of Transportation — Maintenance Division Standard

MAILBOX MOUNTING AND SPACING

MB-15(1)

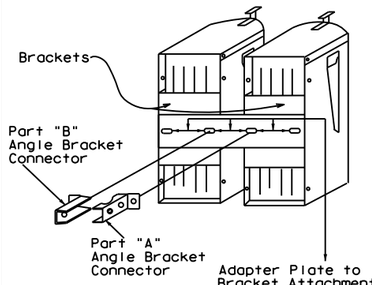
FILE: MB14(1).DGN	DN: JEO	CK: JEO	DW:	CK:
©TxDOT APRIL 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS: Added additional newspaper receptacle for double mailbox support	1133	02	032	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		136

3/25/2021 8:49:41 AM
c:\pwworkdir\bge_pw\bwestmore1and\dms49516\MB15(1).dgn



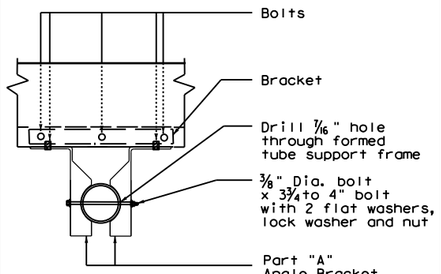
For bolt sizes see details below for "SMALL MAILBOX" and "MEDIUM AND LARGE MAILBOXES"

SINGLE MAILBOX

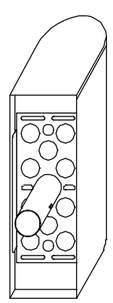


(Not permitted for Large Mailboxes)

DOUBLE MAILBOX

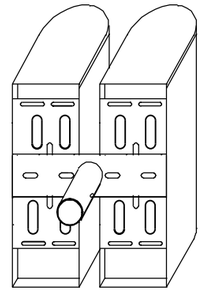


MULTIPLE MAILBOX



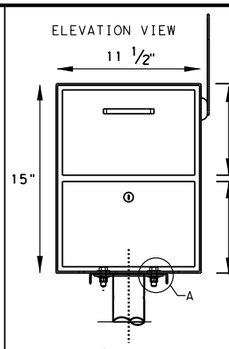
To be used with 2⅜" OD RR or thinwall Steel posts.

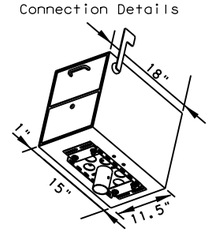
WELDED SINGLE MAILBOXBRACKET

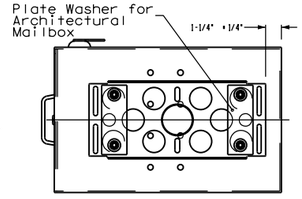


To be used with thinwall Steel posts. Not to be used with RR posts.

WELDED DOUBLE MAILBOX BRACKET WITHADAPTER PLATE

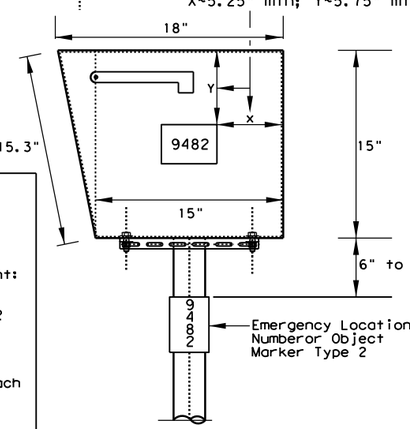






Preferred placement of Emergency Location Number

X~5.25" min; Y~5.75" min



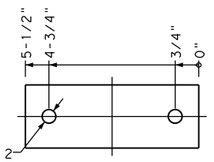
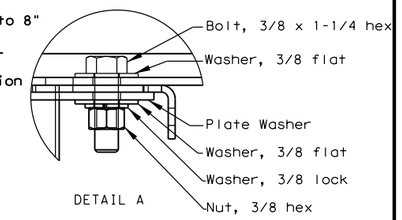
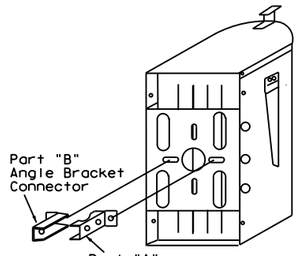
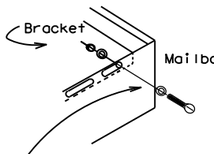


Plate Washer for Architectural Mailbox Plate, 2" x 1/8" ASTM A36 Steel



LOCKABLE ARCHITECTURAL MAILBOX CONNECTION DETAILS



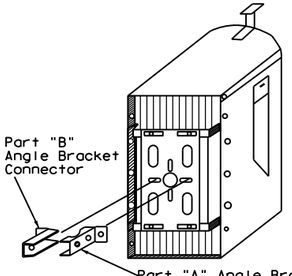


Bracket to mailbox attachment: 6 - ¼" Dia. x ¾" bolt w/ 2 flat washers and nut per each bolt.

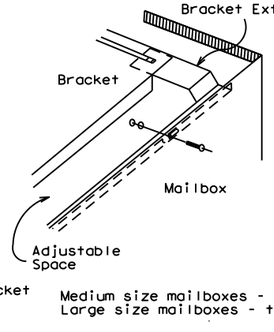
Angle to bracket attachment: 2 - ⅜" Dia. x ¾" bolt with 2 flat washers, lock washer and nut per each bolt.

Angle to 2 - ⅜" Dia. x 2½" bolt with 2 flat washers, lock washer and nut per each bolt.

SMALL MAILBOX



Use both Parts "A" and "B" Angle Bracket Connectors for Winged Channel Posts



Bracket to mailbox attachment: 6 - ¼" Dia. x ¾" bolt w/2 flat washers and nut per each bolt.

Bracket to bracket extension attachment: 2 - ¼" Dia. x ¾" carriage bolt w/ flat washer, lock washer and nut per bolt (4 bolts required if 2 bracket extensions are used).

Angle to bracket attachment: 2 - ⅜" Dia. x ¾" bolt w/2 flat washers, lock washer and nut per each bolt.

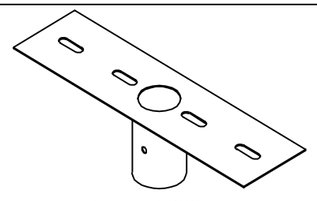
Angle to mailbox support attachment: 2 - ⅜" Dia. x 2½" bolt w/2 flat washers, lock washer, and nut per each bolt.

Medium size mailboxes - one extension bracket
Large size mailboxes - two extension brackets

MEDIUM AND LARGE MAILBOXES

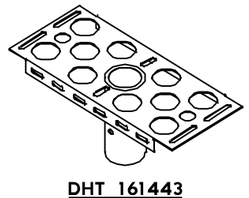
GENERAL NOTES

1. Connecting hardware detailed on this sheet is for the hardware that the Department stocks at the Regional Warehouses. This hardware is available to the contractor only when so stated elsewhere in the plans or specification.
2. Hardware for mounting mailboxes to the support/foundation furnished by industry should be used when shown on the Maintenance Divisions "Approved Products List." Only mailbox hardware that have been crash tested in accordance with NCHRP Report 350, will be on the approved list.
3. Hardware furnished by industry shall be erected in accordance with the manufacturer's recommendation.
4. Bracket and bracket extension shall be constructed of 14 gauge galvanized steel sheet metal.
5. The angles, brackets and adapter plates shall be constructed of 12 gauge galvanized steel sheet metal.
6. Items with evidence of damage to the galvanized coating or wet storage stains (white rust) will not be accepted.



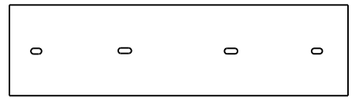
DHT 162323

For use with galvanized thinwall steel posts DHT # 143426 or powder-coated thinwall steel post DHT # 162911.



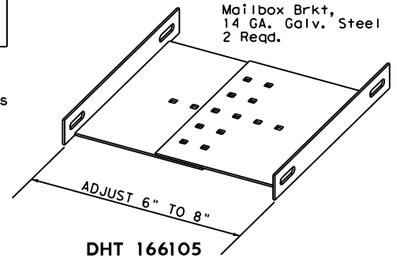
DHT 161443

For use with RCR post DHT # 161442 or galvanized thinwall steel post DHT # 143426 or powder-coated thinwall steel post. DHT # 162911.

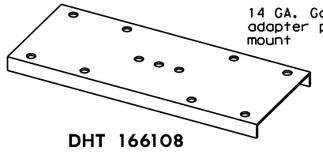


DHT #3789

Used for mounting two Mailboxes on the same post.

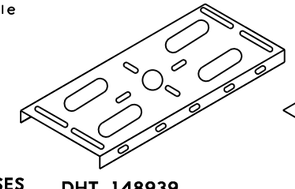


DHT 166105



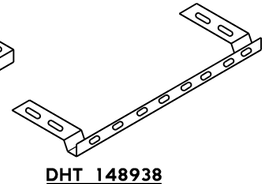
14 GA. Galv. Steel adapter plate for double mount

DHT 166108



DHT 148939

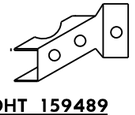
Mailbox Bracket



DHT 148938

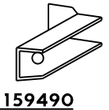
Used for extending 6" wide bracket to attach larger mailboxes.

Bracket Extension



DHT 159489

Part "A" Angle Bracket Connector



DHT 159490

Part "B" Angle Bracket Connector

DHT 2917

Angle Bracket For Temporary Mailbox

HARDWARE AT TXDOT REGIONAL WAREHOUSES

Brackets and adapter plate shown in this section should be available to the Contractor when stated elsewhere in plans or specifications.

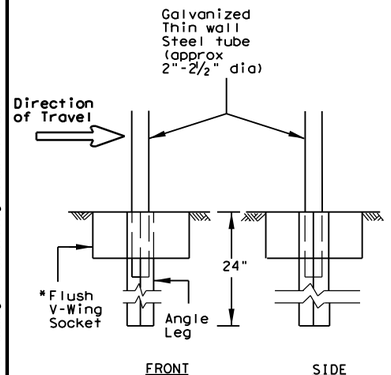
See Table of Applicable DHT Numbers on sheet 4 of 4 for DHT description and unit of measure.

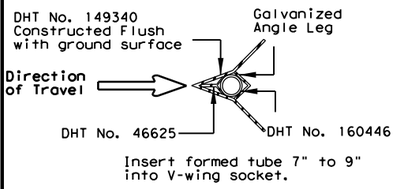
Texas Department of Transportation | Maintenance Division Standard

MAILBOX BRACKET CONNECTING DETAILS

MB-15(1)

FILE: MB14(1).DGN	DN: JEO		CK:	DW: JEO		CK:
©TxDOT APRIL 2015	CONT	SECT	JOB		HIGHWAY	
REVISIONS ADDED DHT 163730	1133	02	032		FM 794	
	DIST	COUNTY			SHEET NO.	
	YKM	GONZALES			137	

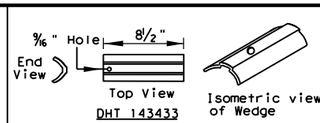




Insert formed tube 7" to 9" into V-wing socket.

TYPE 1 SUPPORT/FOUNDATION

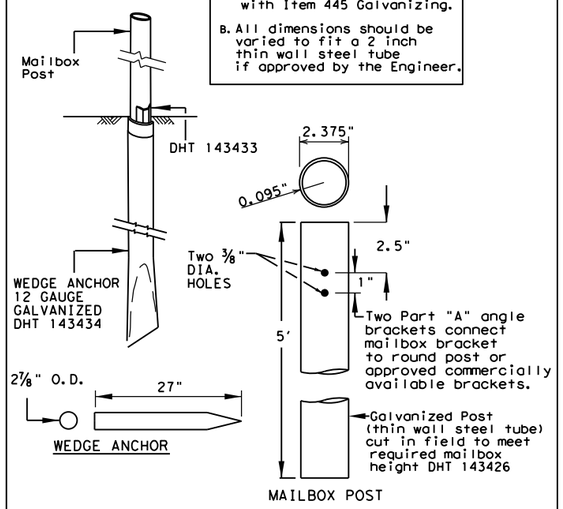
THIN WALL STEEL TUBE w/ V-LOC ANCHORAGE



NOTES FOR TYPE 2 SUPPORT/FOUNDATION

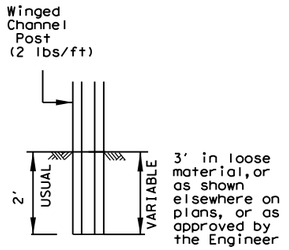
A. Galvanize steel support foundation in accordance with Item 445 Galvanizing.

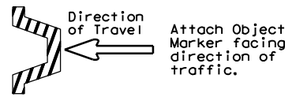
B. All dimensions should be varied to fit a 2 inch thin wall steel tube if approved by the Engineer.



TYPE 2 SUPPORT/FOUNDATION

THIN WALL STEEL TUBE w/ WEDGE ANCHOR SYSTEM



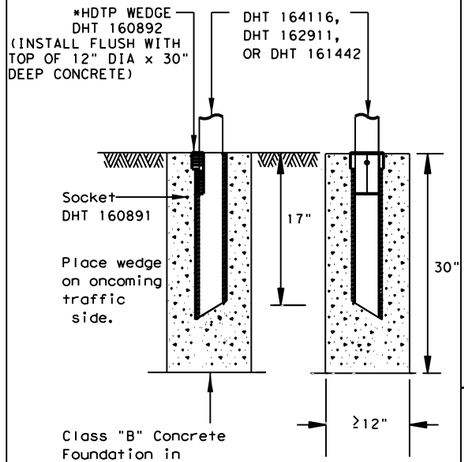


DHT No. 4289 to
ASTM A 1011
SS GRADE 50, STEEL.

TYPE 3 SUPPORT/FOUNDATION

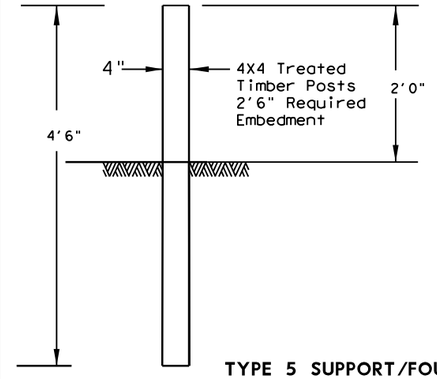
WINGED CHANNEL POST

Note on DHT Number
See Table of Applicable DHT Numbers on this sheet 4 for DHT description.



TYPE 4 SUPPORT/FOUNDATION

FOR WHITECOATED STEEL POST, MULTIPLE POST, AND RECYCLED RUBBER.

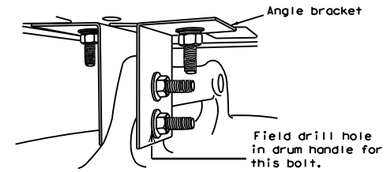


TYPE 5 SUPPORT/FOUNDATION

FOR ONE PIECE MOLDED PLASTIC MAILBOX

ONE PIECE MOLDED PLASTIC MAILBOXES

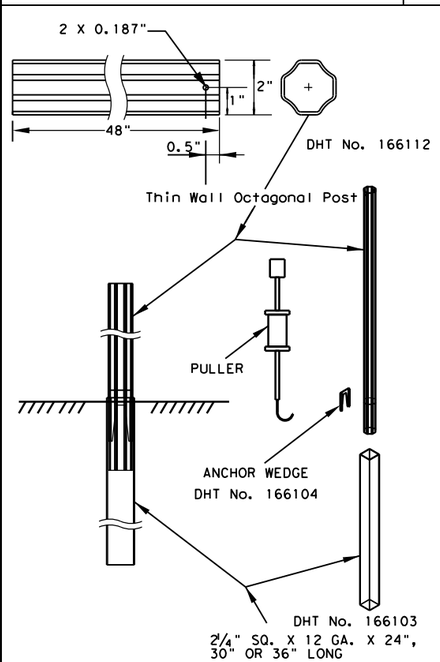
Molded Plastic Mailboxes shall be installed on 4"x4" treated timber posts only. The use of steel pipe or structural tubing in place of timber post is prohibited.



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

TYPE 6 TEMPORARY MAILBOX SUPPORT

CONNECTION DETAIL



TYPE 7 MAILBOX SUPPORT/FOUNDATION

CONNECTION DETAIL

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

Type of Mailbox
- S = Single
- D = Double
- M = Multiple
- SP = Single 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
- Ty 7 = Wedge Anchor

Type of Bracket
- AB = Angle Bracket.
- TB = 2.375" Tube Bracket

DOUBLE AND LARGE MAILBOXES MUST BE ON STEEL POST.

*HDTP: High density thermoplastic polyesters

GENERAL NOTES

1. Erect post plumb or vertical.
2. When galvanized part is required galvanize in accordance with Item 445.
3. type 1, 2, 3, 4 or 7 supports or foundation can be used for single or double mailbox installations. The RCR post should be used only for a single installation with a small mailbox. The Type 5 support/foundation is used for the single molded plastic mailbox. The Type 4 support/foundation is used for the 2.375" O.D. RR post, thin wall steel post, and white multiple mailbox post.
4. The Type 1 or type 7 support/foundation can be used for a multiple mailbox mount.
5. The Type 4 support should be used with thin wall steel pipe for the medium, large and double mailbox installations.
6. 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.

Texas Department of Transportation — Maintenance Division Standard

MAILBOX SUPPORT AND FOUNDATION

MB-15(1)

FILE: MB14(1).DGN	DN: JEO	CK:	DW: JEO	CK:
©TxDOT APRIL 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	032	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		138

LOCKABLE ARCHITECTURAL MAILBOX

SINGLE-MOUNT INSTALLATION PARTS			
#	PART NAME	PART/DHT #	QTY
1	SOCKET, TYPE 4 FOUNDATION	160891	1
2	WEDGE FOR TYPE 4 FOUNDATION	160892	1
3	THIN-WALL WHITE STEEL TUBE 2.375 OD	162911	1
4	BRACKET FOR ATTACHING MAILBOX	161443	1
5	ARCHITECTURAL MAILBOX	SEE NOTE	1
6	NUT, 5/16" HEX	NUT, 5/16" HEX	1
7	BOLT, 5/16 X 3 HEX	GRADE 5	1
8	PLATE WASHER FOR ARCHITECTURAL MAILBOX	SEE SEE SHEET 2	2
9	WASHER, 3/8 FLAT		8
10	WASHER, 3/8 LOCK		4
11	NUT, 3/8 HEX		4
12	BOLT, 3/8 X 1-1/4 HEX	GRADE 5	4
13	CONCRETE, CLASS B (2000 PSI)		1

LOCKABLE ARCHITECTURAL MAILBOX DETAILS

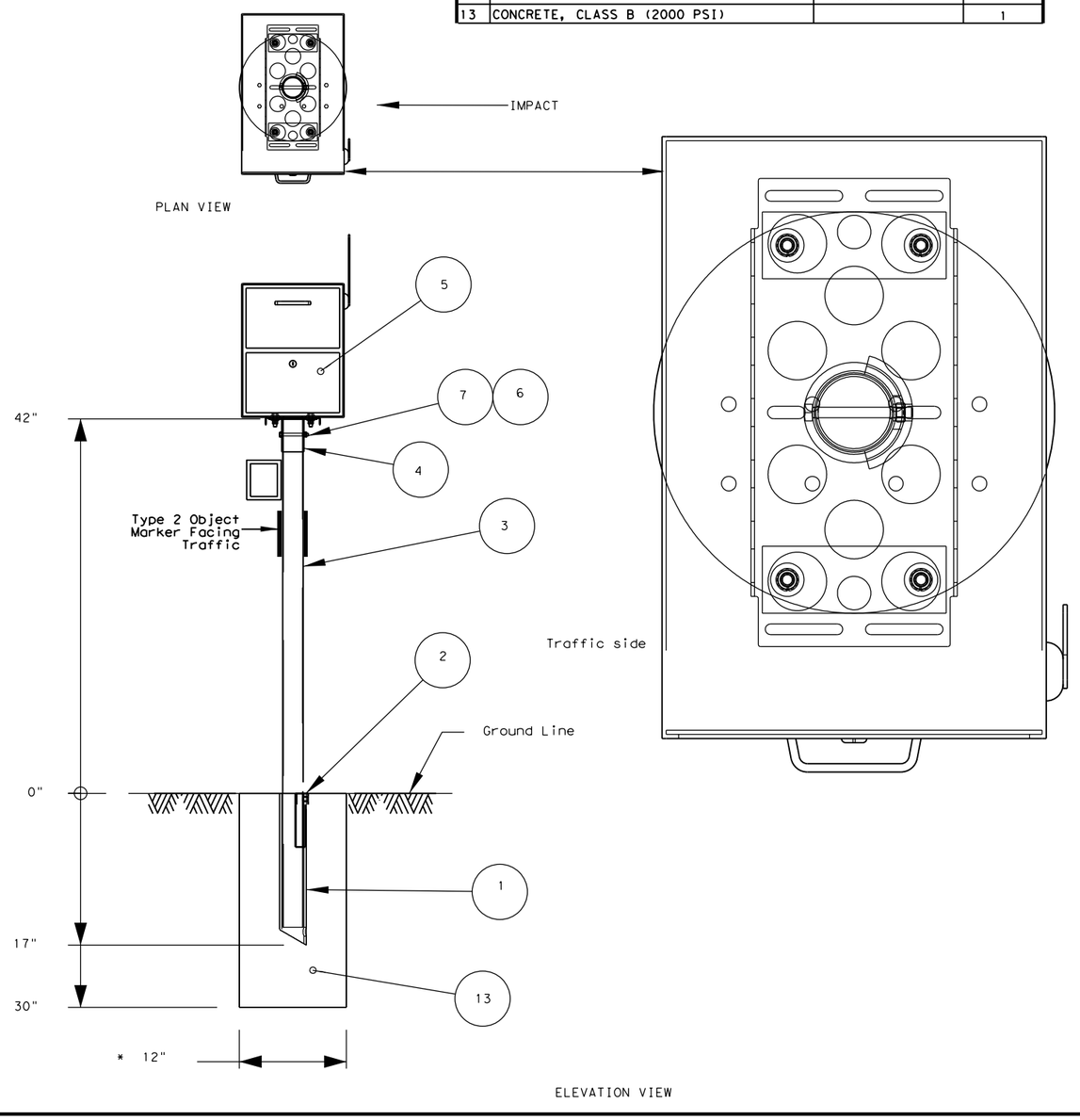


TABLE OF APPLICABLE DHT NUMBERS	
DHT NUMBER	DESCRIPTION
	FOUNDATIONS
46625	WEDGE FOR V-WING SOCKET FOR TYPE 1 FOUNDATION
149340	V-WING SOCKET FOR TYPE 1 FOUNDATION
143433	WEDGE FOR TYPE 2 FOUNDATION
143434	ANCHOR FOR TYPE 2 FOUNDATION
166103	ANCHOR FOR TYPE 7 FOUNDATION
160891	SOCKET FOR TYPE 4 FOUNDATION
160892	WEDGE FOR TYPE 4 FOUNDATION
166104	WEDGE FOR TYPE 7 FOUNDATION
	POSTS
4289	WINGED CHANNEL MAILBOX POST
149339	MULTIPLE MAILBOX POST (GALVANIZED TUBING)
164116	MULTIPLE MAILBOX POST (WHITE COATED)
166114	MULTIPLE MAILBOX POST (WHITE COATED OCTAGONAL)
166153	MULTIPLE MAILBOX POST (GALVANIZED OCTAGONAL)
161442	RECYCLED RUBBER POST. FOR SMALL MAILBOX ONLY
143426	THIN-WALL GALVANIZED STEEL TUBE 2.375" OUTER DIAMETER
162911	THINWALL WHITE STEEL TUBE 2.375" OUTER DIAMETER
166152	SINGLE OR DOUBLE THIN-WALL MAILBOX POST GALVANIZED 2" OCTAGONAL
166112	SINGLE OR DOUBLE THIN-WALL MAILBOX POST WHITECOATED 2" OCTAGONAL
	REFLECTIVE SHEETING
161812	REFLECTIVE SHEETING FOR EMERGENCY LOCATION NUMBER PANEL
	CONNECTING HARDWARE
2917	ANGLE BRACKET USED FOR TEMPORARY MAILBOX SUPPORT
166105	BRACKET FOR SINGLE MOUNTING OF MAILBOXES (MOUNTING KIT)
3789	PLATE FOR DOUBLE MOUNTING OF MAILBOXES
166108	BRACKET FOR DOUBLE MOUNTING OF MAILBOXES (MOUNTING KIT)
166111	BRACKET FOR MULTIPLE MOUNTING OF MAILBOXES (MOUNTING KIT)
148939	BRACKET FOR ATTACHING SMALL OR MEDIUM SIZE MAIL BOX
148938	EXTENDER TO BRACKET FOR ATTACHING LARGE MAILBOX
159489	ANGLE BRACKET PART A
159490	ANGLE BRACKET PART B
162323	BRACKET FOR DOUBLE MOUNTING OF MAILBOXES ON THINWALL STEEL POST, GALVANIZED OR POWDERCOATED.
161443	BRACKET FOR ATTACHING MAILBOX TO RECYCLED RUBBER POST AND TO MULTIPLE WHITE MAILBOX POST
158358	CASTING (NEWSPAPER RECEPTACLE BRACKET)
163731	U-BOLT (NEWSPAPER RECEPTACLE BRACKET)
160698	BOLT;HEX HEAD, GALV;3/8"DIA X 3/4"L HD, W/2-FLAT WASHERS
163750	BOLT;HEX HEAD, GALV;3/8" X 1-1/2, 16 NC, W/WASHERS
160701	BOLT;HEX HEAD, GALV;3/8"DIA X 2-1/2"L, HD, W/2-FLAT WASHERS
163730	BOLT;HEX HEAD, GALV;3/8" X 3-1/2", NC, W/NUT, 2 FLAT WASHERS
160699	BOLT;HEX HEAD, GALV;3/8"DIA X 3-3/4"L HD, W/2-FLAT WASHERS
160700	BOLT;HEX HEAD, GALV;3/8"DIA X 4"L HD, W/2-FLAT WASHERS

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Texas Department of Transportation — Maintenance Division Standard

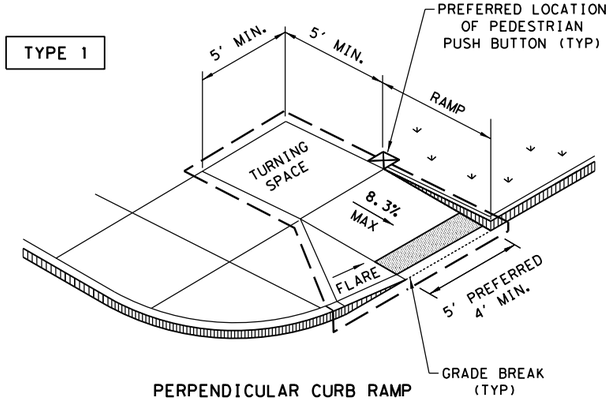
DHT NUMBERS TABLE

MB-15(1)

FILE:MB14(1).DGN	DN:	CK:	DW:	CK:
©TxDOT APRIL 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	032	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		139

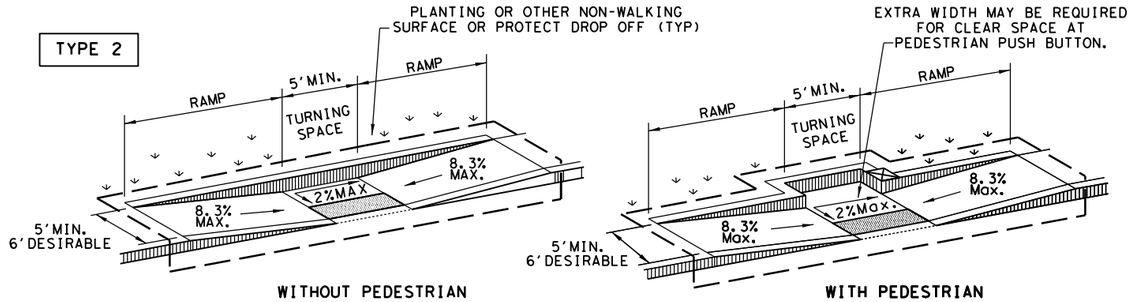
DATE: 3/25/2021
FILE: c:\pwworkdir\bge_pw\bwestmoreland\dms49516\ped18.dgn

TYPE 1



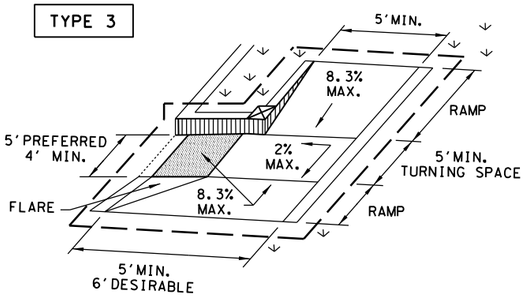
PERPENDICULAR CURB RAMP

TYPE 2

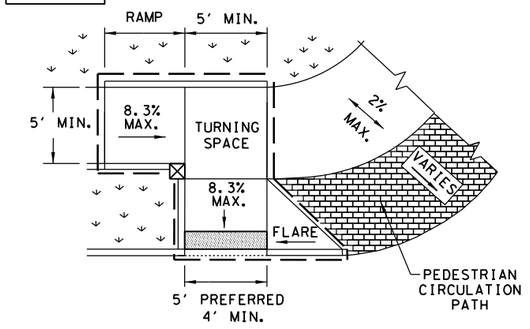


PARALLEL CURB RAMP

TYPE 3

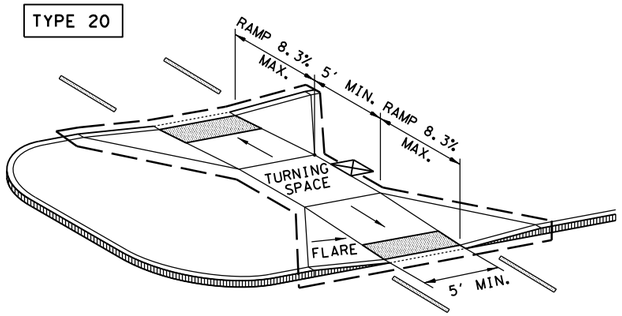


TYPE 6



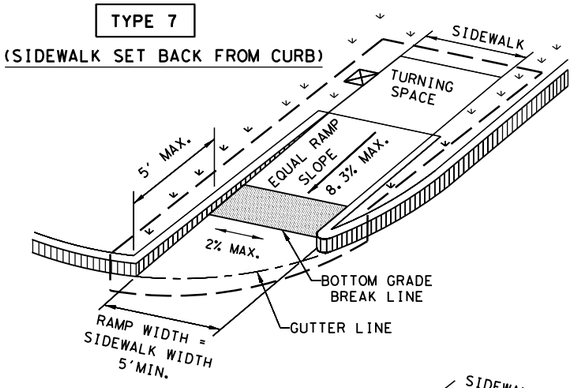
COMBINATION CURB RAMPS

TYPE 20

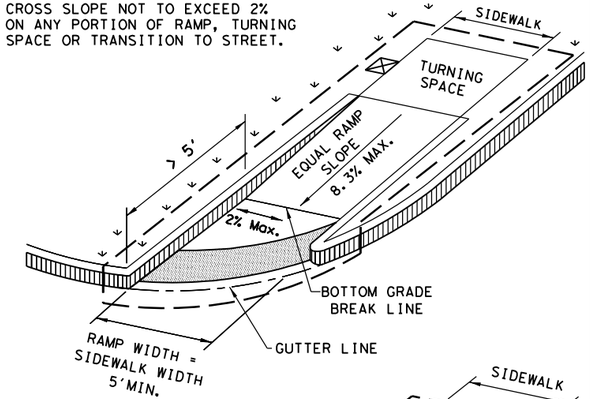


CURB RAMPS AT MEDIAN ISLANDS

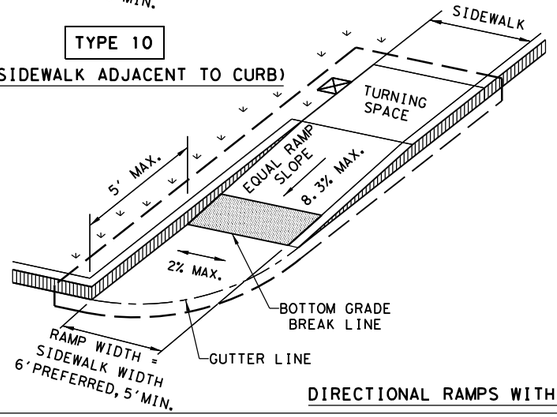
TYPE 7
(SIDEWALK SET BACK FROM CURB)



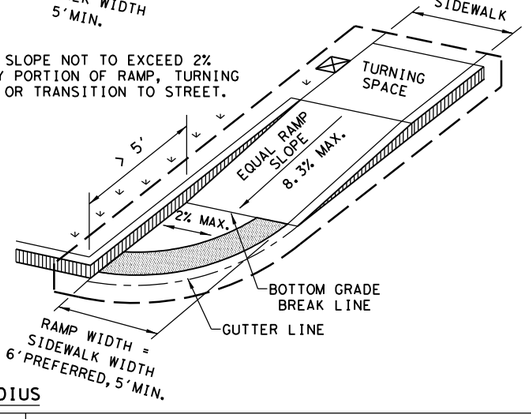
CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP, TURNING SPACE OR TRANSITION TO STREET.



TYPE 10
(SIDEWALK ADJACENT TO CURB)

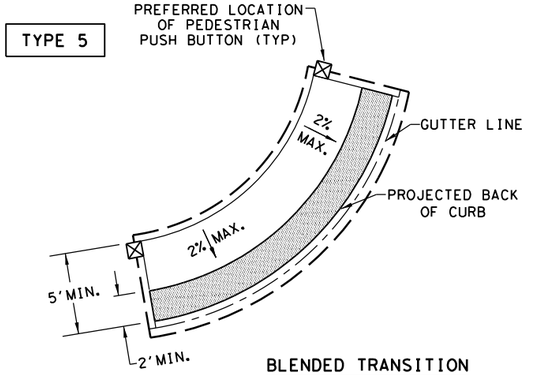


CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP, TURNING SPACE OR TRANSITION TO STREET.



DIRECTIONAL RAMPS WITHIN RADIUS

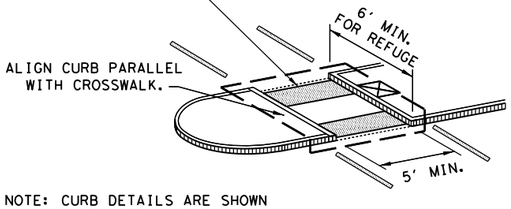
TYPE 5



BLENDED TRANSITION
(FLUSH LANDING)

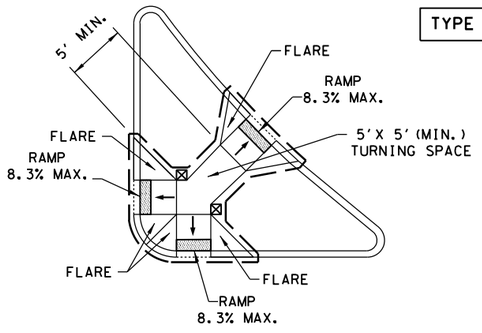
TYPE 21

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



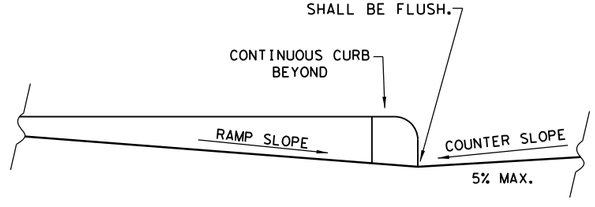
NOTE: CURB DETAILS ARE SHOWN ELSEWHERE IN THE PLANS.

TYPE 22



COMBINATION ISLAND RAMPS

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



TYPICAL SECTION OF PERPENDICULAR CURB RAMP AT CONNECTION TO ROADWAY

NOTES / LEGEND:

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

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

DETECTABLE WARNING SURFACE

DENOTES PREFERRED LOCATION OF PEDESTRIAN PUSH BUTTON IF APPLICABLE.

GUTTER LINE

GRADE BREAK

RAMP LIMITS OF PAYMENT

Texas Department of Transportation

Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-18

FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	032	FM 794
REVISED 08, 2005 REVISED 06, 2012 REVISED 01, 2018	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		140

DATE: 3/25/2021
FILE: c:\pwworkdir\bge_pw\bwestmoreland\dms49516\ped18.dgn

GENERAL NOTES

CURB RAMPS

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

DETECTABLE WARNING MATERIAL

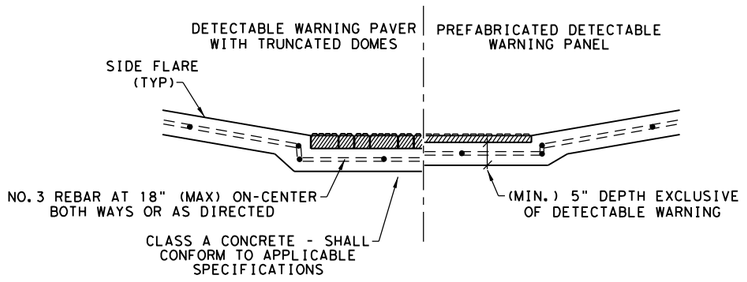
19. Curb ramps must contain a detectable warning surface that consists of raised truncated domes complying with PROWAG. The surface must contrast visually with adjoining surfaces, including side flares. Furnish and install an approved cast-in-place dark brown or dark red detectable warning surface material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

DETECTABLE WARNING PAVERS (IF USED)

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

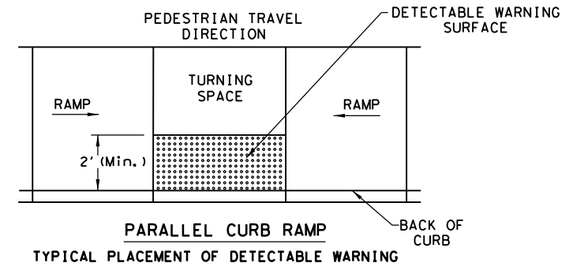
SIDEWALKS

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



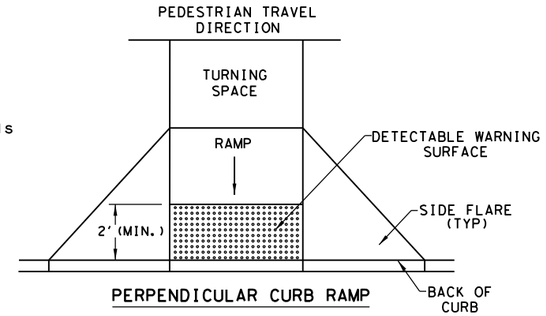
SECTION VIEW DETAIL
CURB RAMP AT DETECTIBLE WARNINGS

DETECTABLE WARNING SURFACE DETAILS



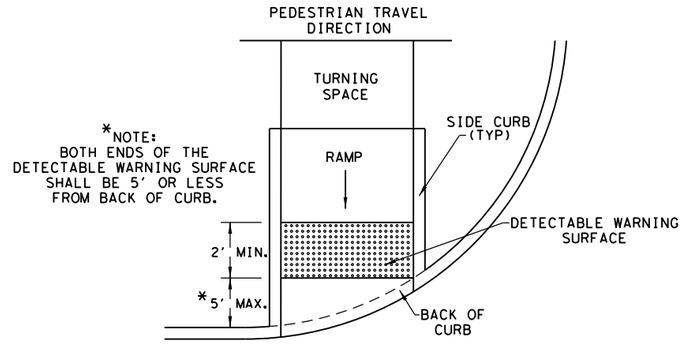
PARALLEL CURB RAMP

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



PERPENDICULAR CURB RAMP

TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON SLOPING RAMP RUN.



DIRECTIONAL CURB RAMP

TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON SLOPING RAMP RUN.

Texas Department of Transportation | Design Division Standard

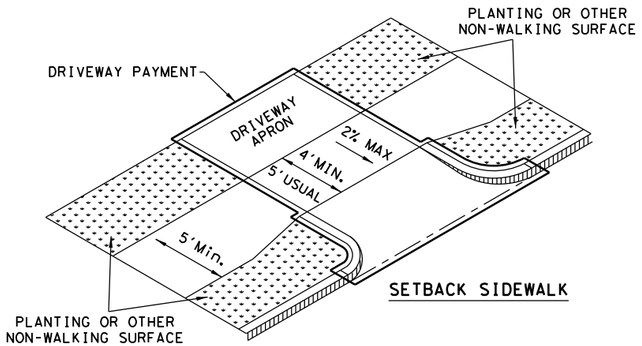
PEDESTRIAN FACILITIES
CURB RAMPS

PED-18

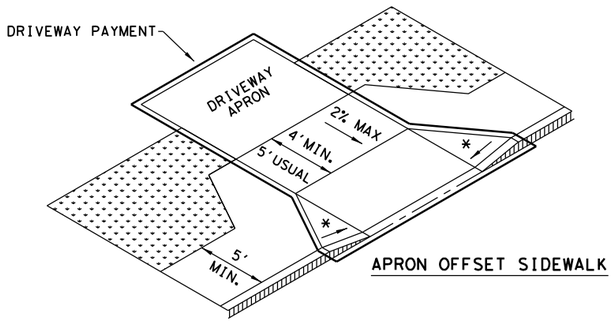
FILE: ped18	DN: TxDOT		DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB		HIGHWAY
REVISIONS REVISED 08, 2005 REVISED 06, 2012 REVISED 01, 2018	1133	02	032		FM 794
	DIST	COUNTY			SHEET NO.
	YKM	GONZALES			141

DATE: 3/25/2021
FILE: c:\pwworkdir\bge_pw\bwestmoreland\dms49516\ped18.dgn

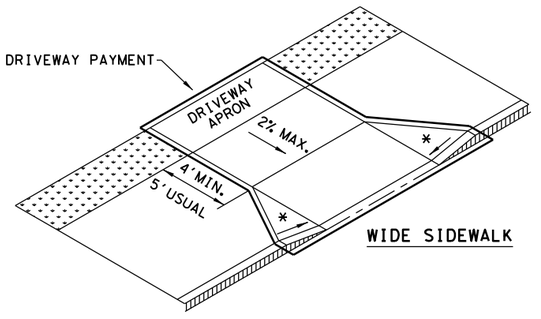
SIDEWALK TREATMENT AT DRIVEWAYS



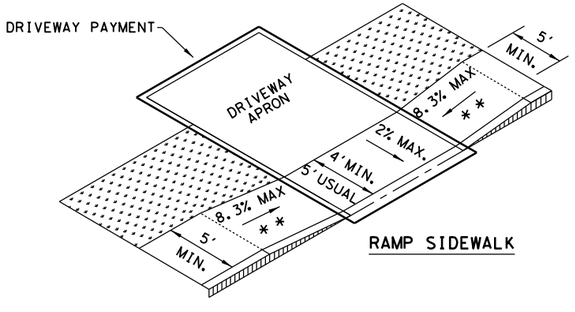
SETBACK SIDEWALK



APRON OFFSET SIDEWALK



WIDE SIDEWALK

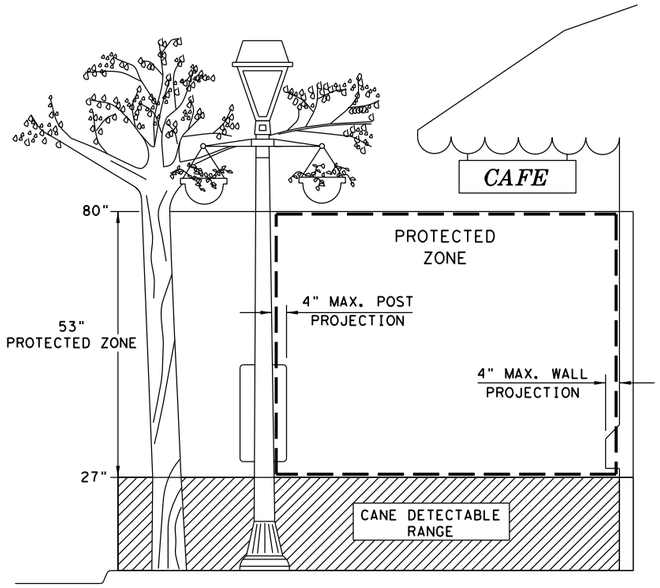


RAMP SIDEWALK

NOTES:

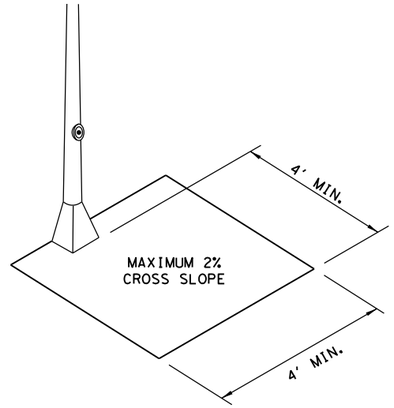
* WHERE DRIVEWAYS CROSS THE PEDESTRIAN ROUTE, SIDES SHALL BE FLARED AT 10% MAX SLOPE.

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

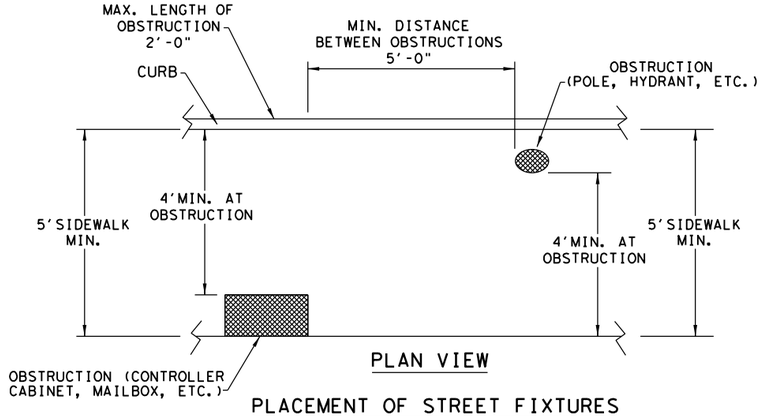


PROTECTED ZONE

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



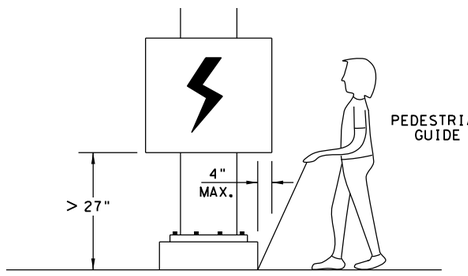
CLEAR SPACE ADJACENT TO PEDESTRIAN PUSH BUTTON



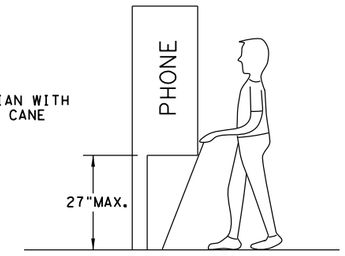
PLAN VIEW

PLACEMENT OF STREET FIXTURES

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



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



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

DETECTION BARRIER FOR VERTICAL CLEARANCE < 80"

Texas Department of Transportation | Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

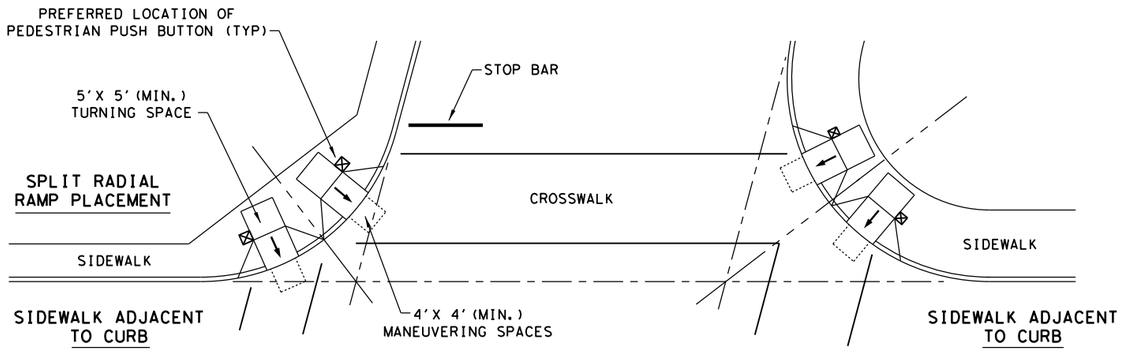
PED-18

FILE: ped18	DN: TxDOT		DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB		HIGHWAY
REVISIONS	1133	02	032		FM 794
REVISED 08, 2005 REVISED 06, 2012 REVISED 01, 2018	DIST	COUNTY			SHEET NO.
	YKM	GONZALES			142

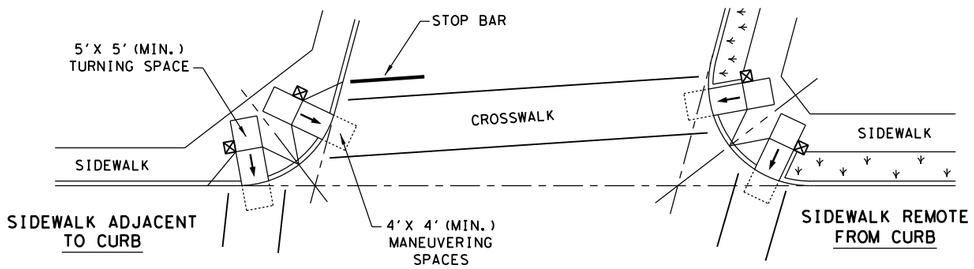
DATE: 3/25/2021
FILE: c:\pwworkdir\bge_pw\bwestmoreland\dms49516\ped18.dgn

TYPICAL CROSSING LAYOUTS

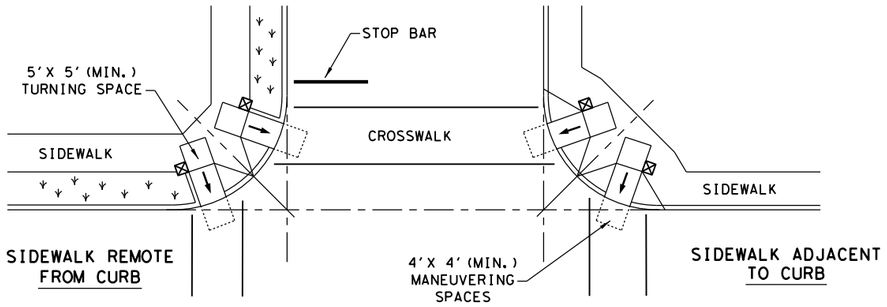
SEE SHEET 1 OF 4 FOR DETAILS AND DIMENSIONS



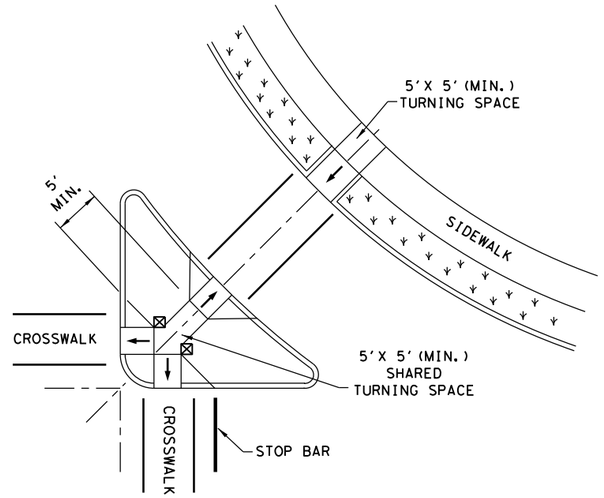
SKEWED INTERSECTION WITH "LARGE" RADIUS



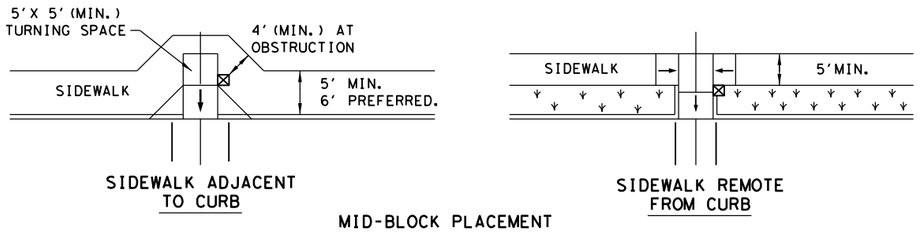
SKEWED INTERSECTION WITH "SMALL" RADIUS



NORMAL INTERSECTION WITH "SMALL" RADIUS



AT INTERSECTION
W/FREE RIGHT TURN & ISLAND



MID-BLOCK PLACEMENT
PERPENDICULAR RAMPS

LEGEND:

SHOWS DOWNWARD SLOPE. →

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

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

Texas Department of Transportation

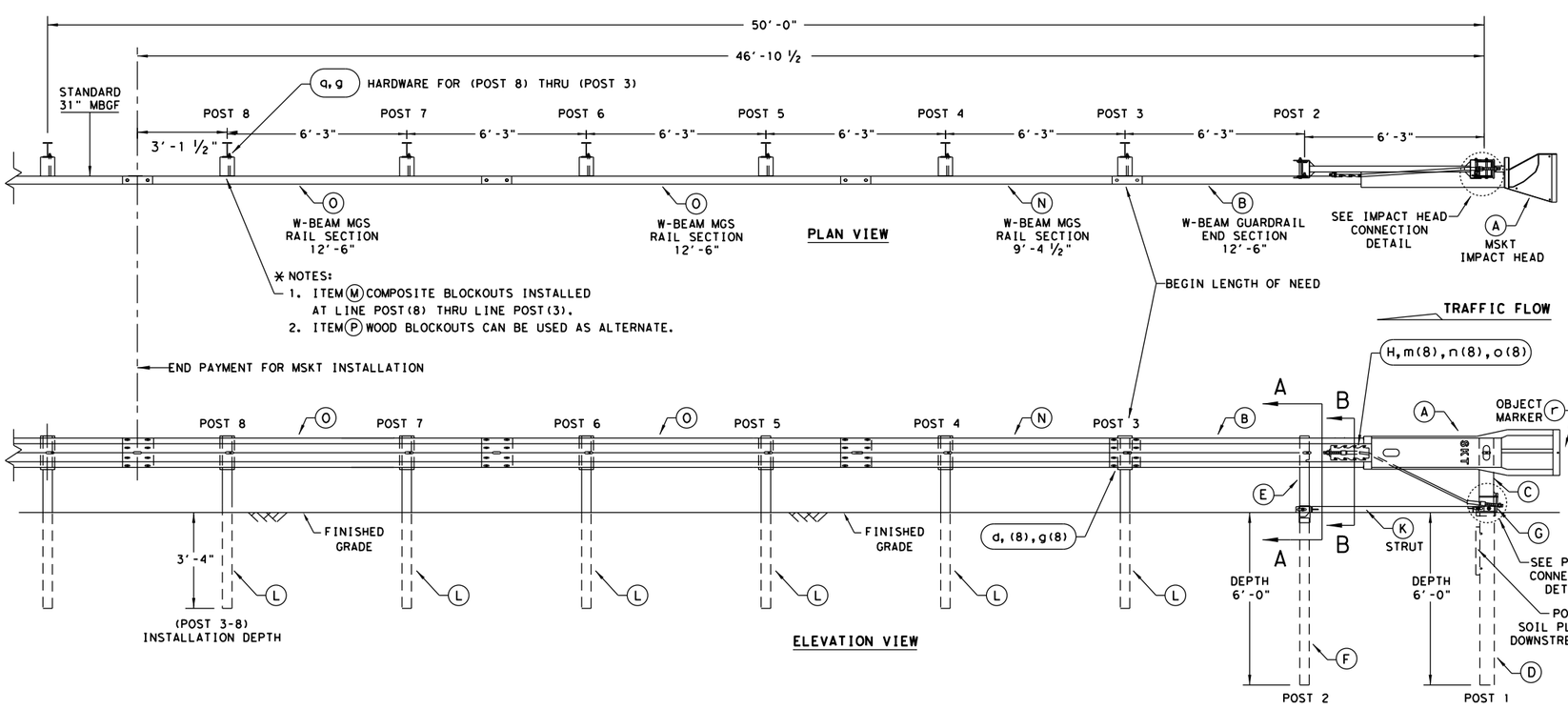
Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

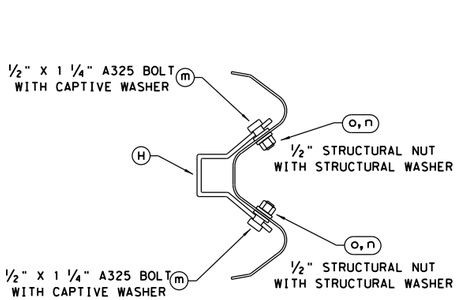
PED-18

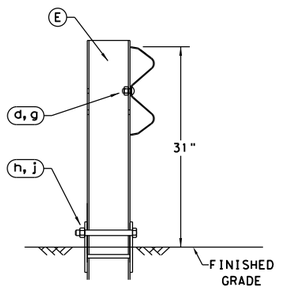
FILE: ped18	DN: TxDOT		DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB		HIGHWAY
REVISIONS	1133	02	032		FM 794
REVISED 08,2005 REVISED 06,2012 REVISED 01,2018	DIST	COUNTY			SHEET NO.
	YKM	GONZALES			143

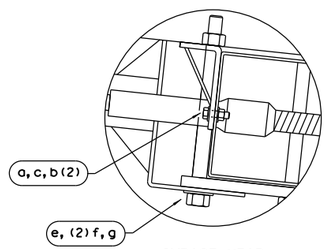
DATE: 3/25/2021
FILE: c:\pwworkdir\bge_pw\bwestmoreland\dms49516\sgt12s3118.dgn

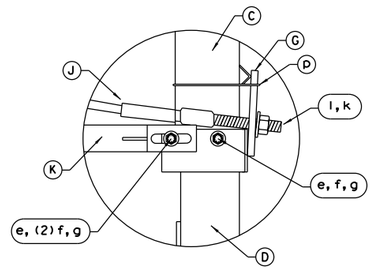


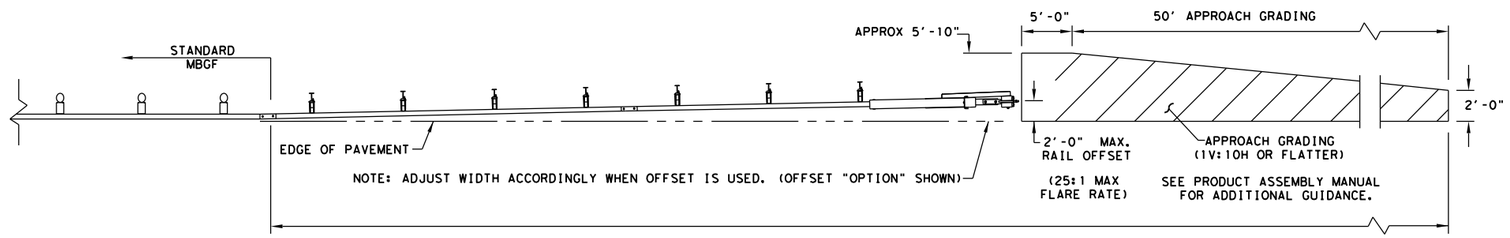
NOTE: SEE (GENERAL NOTE 14) FOR DRIVING CAP INFORMATION.











NOTE: ADJUST WIDTH ACCORDINGLY WHEN OFFSET IS USED. (OFFSET "OPTION" SHOWN)

APPROACH GRADING AT GUARDRAIL END TREATMENTS

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.

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 ⅛" TUBE)	MTPHP1A
D	1	POST 1 - BOTTOM (6' W6X15)	MTPHP1B
E	1	POST 2 - ASSEMBLY TOP	UHP2A
F	1	POST 2 - ASSEMBLY BOTTOM (6' W6X9)	HP2B
G	1	BEARING PLATE	E750
H	1	CABLE ANCHOR BOX	S760
J	1	BCT CABLE ANCHOR ASSEMBLY	E770
K	1	GROUND STRUT	MS785
L	6	W6x9 OR W6x8.5 STEEL POST	P621
M	6	COMPOSITE BLOCKOUTS	CBSP-14
N	1	W-BEAM MGS RAIL SECTION (9'-4 ½")	G12025
O	2	W-BEAM MGS RAIL SECTION (12'-6")	G1203A
P	6	WOOD BLOCKOUT 6" X 8" X 14"	P675
Q	1	W-BEAM MGS RAIL SECTION (25'-0")	G1209
		SMALL HARDWARE	
a	2	⅝" x 1" HEX BOLT (GRD 5)	B5160104A
b	4	⅝" WASHER	W0516
c	2	⅝" HEX NUT	N0516
d	25	⅝" Dia. x 1 ¼" SPLICE BOLT (POST 2)	B580122
e	2	⅝" Dia. x 9" HEX BOLT (GRD A449)	B580904A
f	3	⅝" WASHER	W050
g	33	⅝" Dia. H.G.R NUT	N050
h	1	¾" Dia. x 8 ½" HEX BOLT (GRD A449)	B340854A
j	1	¾" Dia. HEX NUT	N030
k	2	1 ANCHOR CABLE HEX NUT	N100
l	2	1 ANCHOR CABLE WASHER	W100
m	8	½" x 1 ¼" A325 BOLT WITH CAPTIVE WASHER	SB12A
n	8	½" STRUCTURAL NUTS	N012A
o	8	1 1/16" O.D. x ⅜" I.D. STRUCTURAL WASHERS	W012A
p	1	BEARING PLATE RETAINER TIE	CT-100ST
q	6	⅝" x 10" H.G.R. BOLT	B581002
r	1	OBJECT MARKER 18" X 18"	E3151

Texas Department of Transportation

Design Division Standard

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

FILE: sgt12s3118.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CL
© TxDOT: APRIL 2018	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	032	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		144

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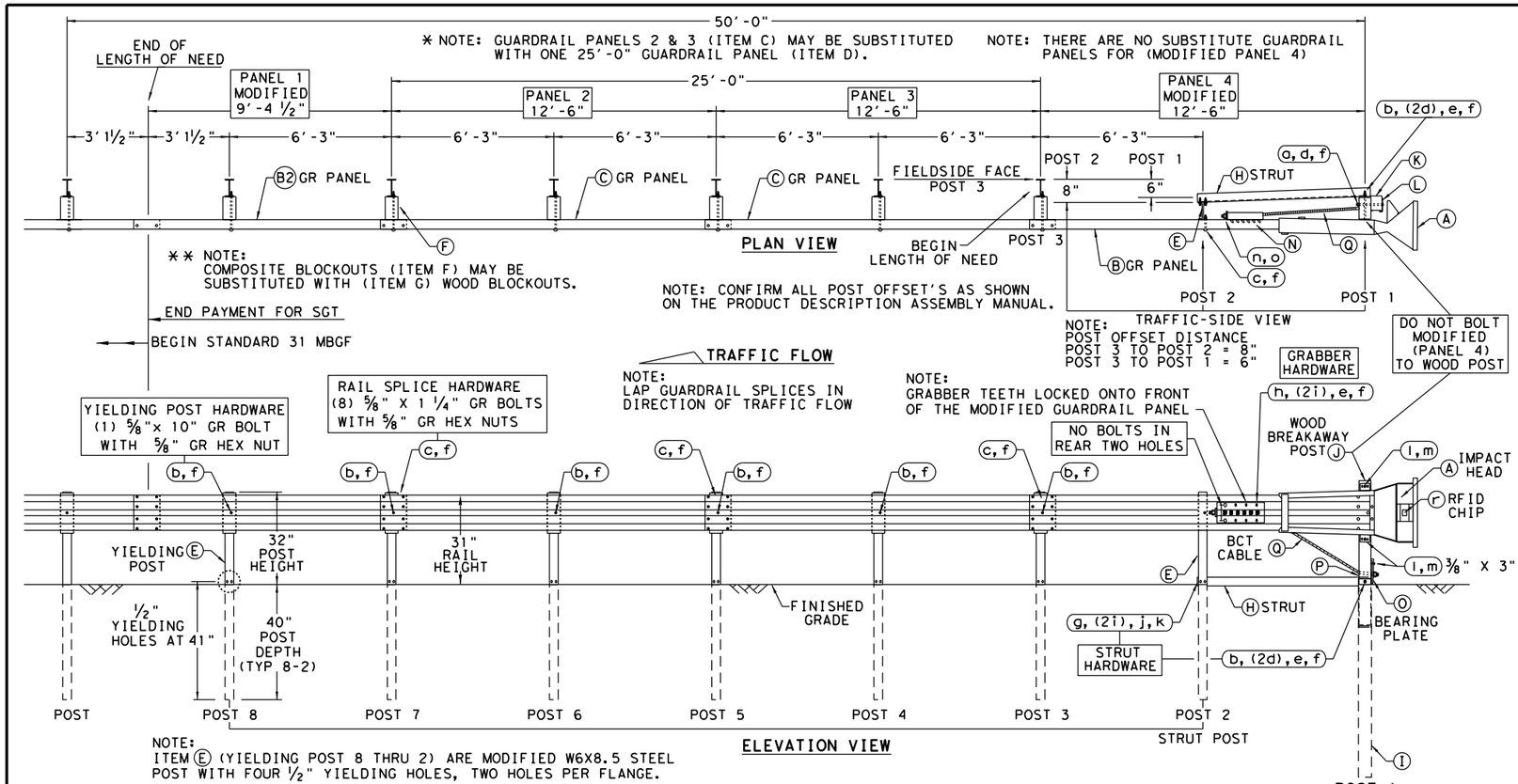
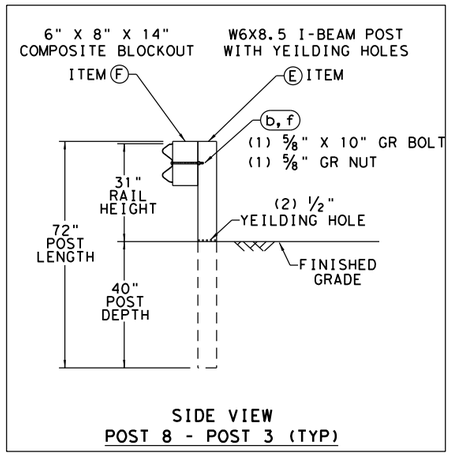


GENERAL NOTES

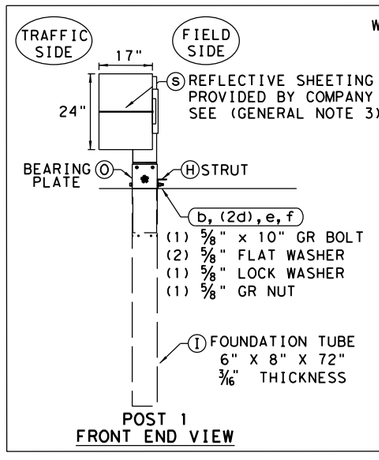
1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: SPIG INDUSTRY, INC. AT 1(267) 644-9510. 14675 INDUSTRIAL PARK RD; BRISTOL, VA 24202
2. FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO THE MANUFACTURER'S; SGET END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY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

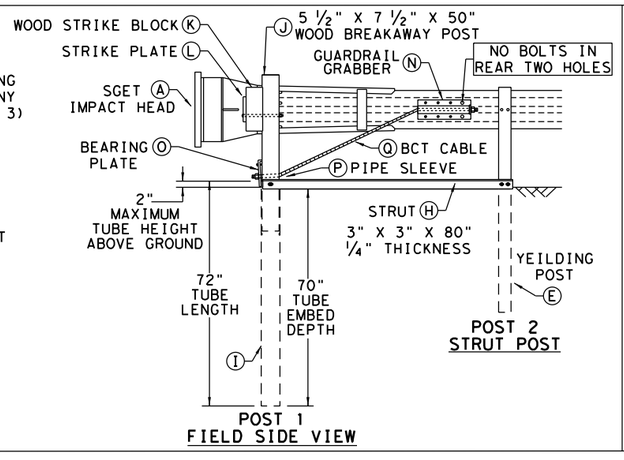
ALTERNATIVE ITEMS
NOTE: SEE PLAN VIEW



SIDE VIEW
POST 8 - POST 3 (TYP)

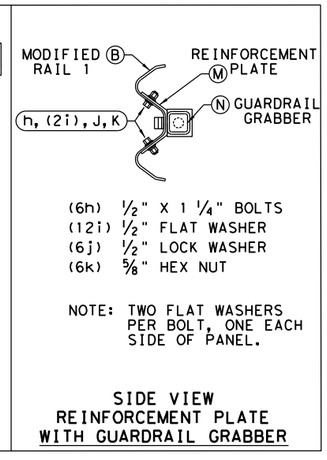


POST 1
FRONT END VIEW

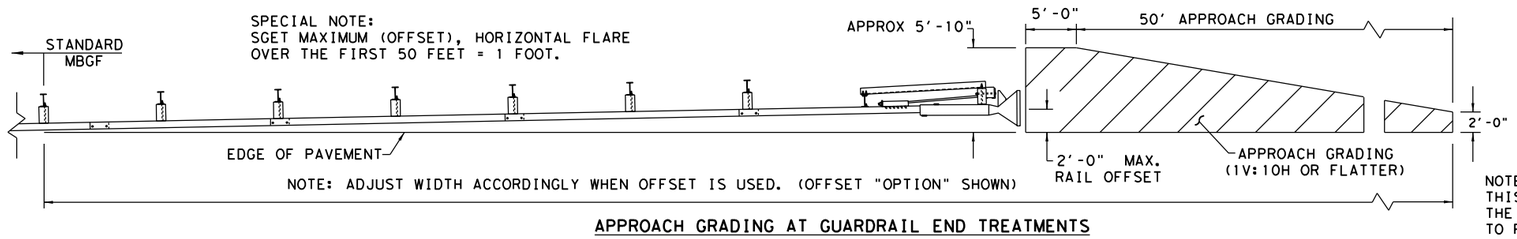


POST 1
FIELD SIDE VIEW

POST 2
STRUT POST



SIDE VIEW
REINFORCEMENT PLATE
WITH GUARDRAIL GRABBER



APPROACH GRADING AT GUARDRAIL END TREATMENTS

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

Texas Department of Transportation
Design Division Standard

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

FILE: sgt153120.dgn	DN: TxDOT	CK: KM	DW: VP	CK: VP
© TxDOT: APRIL 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	032	FM 794
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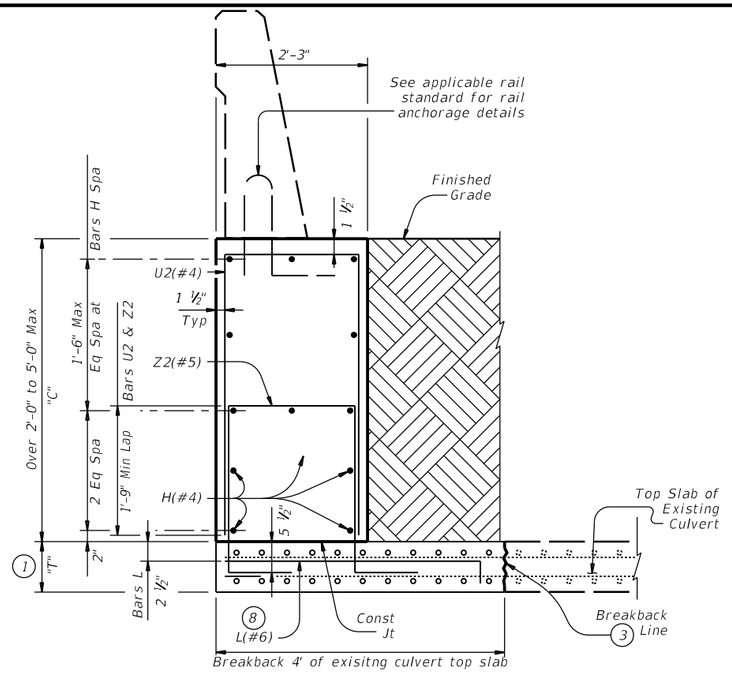
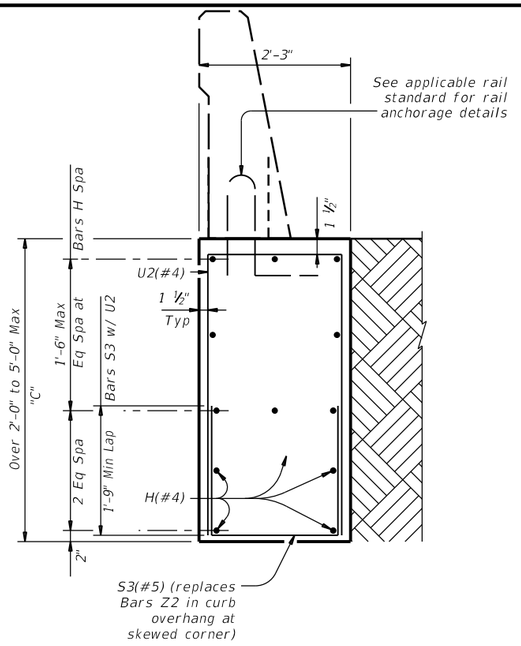
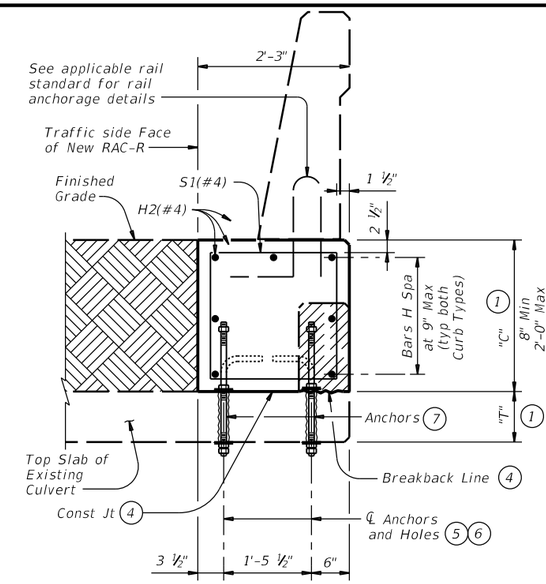
	YKM	GONZALES		145



SECTION A-A
(SEE SHEET 2 OF 2)



SECTION B-B
(SEE SHEET 2 OF 2)



CULVERT 5 - RIGHT SIDE

CULVERT 5 - LEFT SIDE

Used for curbs over 2'-0" to 5'-0" (Showing "C" = 4'-0").

1. "T" is equal to the existing culvert top slab thickness. If "T" is less than 6", a special design will be required. "C" is equal to the Retrofit Rail Anchorage Curb thickness.
2. The total thickness ("T" plus "C") must be 8" minimum in order to properly install the railing anchorage reinforcing.
3. Remove shaded portion of existing concrete to Breakback Line shown. Care must be taken so as to not damage existing reinforcing. Replace damaged reinforcing with new, like reinforcing. Clean existing reinforcing and incorporate into new concrete construction.
4. Saw cut (score) 1" deep flush with top of existing culvert slab, on the field side face of existing curb, if present. After scoring, remove shaded portion of existing concrete to Breakback Line shown. Do not damage existing reinforcing. Clean, bend and incorporate existing reinforcing into new concrete construction. Note that new anchors, as shown in the detail, are required even when existing reinforcing remains in use. Remove existing overlay and/or base material to flush with top of culvert in areas of new construction. Care must be taken to not damage the existing slab. In order to prevent existing asphalt remnants from acting as a bond breaker between the exposed, existing concrete and the retrofitted concrete curb, clean the newly exposed concrete with abrasive blasting or shot blasting. Remove all loose debris prior to placing new anchorage curb.
5. Core drill 1" diameter holes through existing slab. Percussion drilling is not permitted. Patch spalls, when directed by the Engineer, in accordance with Item 429, "Concrete Structure Repair", at the Contractor's expense. Tighten nuts snug tight.
6. Space field side anchors at 36" maximum. Space traffic side anchors at 11" maximum. Do not align field side and traffic side anchors transversely.
7. Use straight anchors if retrofit anchorage curb is 1'-2" or greater in thickness. Use hooked anchors for retrofit anchorage curb less than 1'-2" thick.
8. Tilt Bars L hook as necessary to maintain cover.

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.
The rail anchorage curb details have sufficient strength for use with all standard rail types.
See appropriate rail standard for approved speed restrictions, notes and details not shown.
For vehicle safety, the top of the new curb must be flush with the finished grade.
Removal and replacement of backfill, subgrade, and asphalt or concrete pavement necessary for this installation is considered subsidiary to the rail anchorage curb.
Payment for rail anchorage curb (including wingwall curb slab) will be by CY of Class "C" or Class "C"(HPC) concrete.
These details are for use with curbs that are 8" to 5'-0" tall only. Curb heights that are less than or greater than those shown will require special design.

Not all possible combinations of existing box culverts, curbs, wingwalls etc. have been shown on this sheet. Other combinations and reinforcement arrangements are permissible if they meet the same strength requirements as indicated on this sheet.

CONSTRUCTION NOTES:

Field verify dimensions before commencing work and ordering materials.
When using this anchorage curb, omit normal culvert curb reinforcing bars K and H shown on the culvert standard sheets.
For vehicle safety, the top of the curb must be flush with the finished grade.

MATERIAL NOTES:

Provide Class "C" concrete (f'c=3,600 psi). Provide Class "C" (HPC) concrete if shown elsewhere in the plans.
Chamfer all exposed corners ¾" unless shown otherwise.
Provide Grade 60 reinforcing steel.
Galvanize all reinforcing steel if required elsewhere.
Provide bar laps, where required, as follows: Uncoated or galvanized ~ #4 = 1'-11"
Galvanize ¾" Dia threaded rods, heavy hex nuts and plate washers, unless otherwise shown on plans.
Provide Class "C" concrete (f'c=3,600 psi). Provide Class "C" (HPC) concrete if shown elsewhere in the plans.

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

TABLE OF REINFORCING SPACING

Curb Height "C"	Section Type	Bars S, U, & Z Spa
Over 3'-0" to 5'-0"	3	5"

TABLE OF ESTIMATED QUANTITIES (*)

Curb Height "C"	Section Type	Reinf Steel (Lb/LF)	Class "C" Concrete (CY/LF)
3'-0"	3	44.6	0.250
4'-0"	3	56.8	0.333
5'-0"	3	60.0	0.417

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

STATE OF TEXAS
JOHN W. TULEY
102441
LICENSED
PROFESSIONAL ENGINEER
3/25/2021

SHEET 1 OF 2

Texas Department of Transportation — Bridge Division Standard

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

RAC-R (MOD)

FILE: racsts02-18.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS 05-11: Gen Notes, T101 Anchor Pt. 07-12: Width. 02-15: Payment note. 03-16: Notes and Typ Curb Plans. 03-18: Gen Notes, backfill and asphalt note.	1133	02	032	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		146

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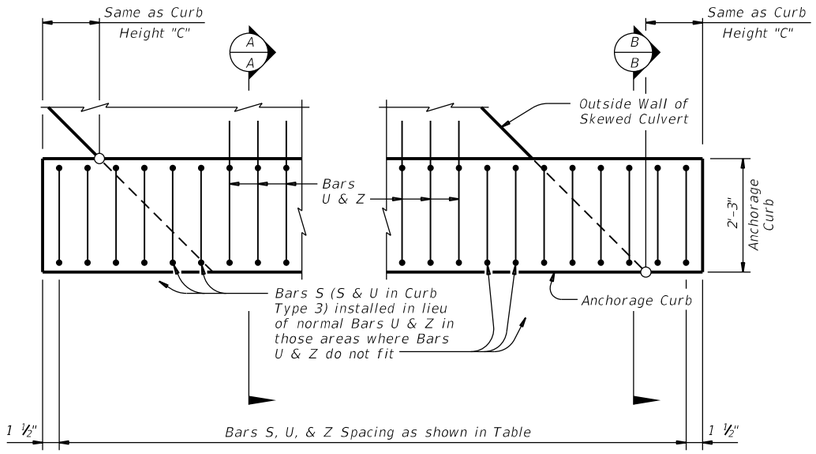
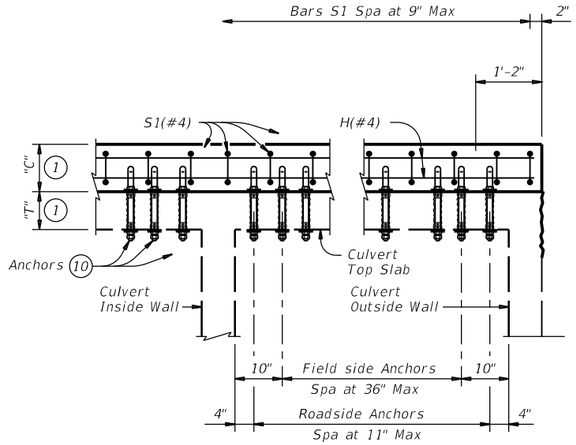


TYPICAL CURB PLAN
CULVERT 5 - LEFT SIDE

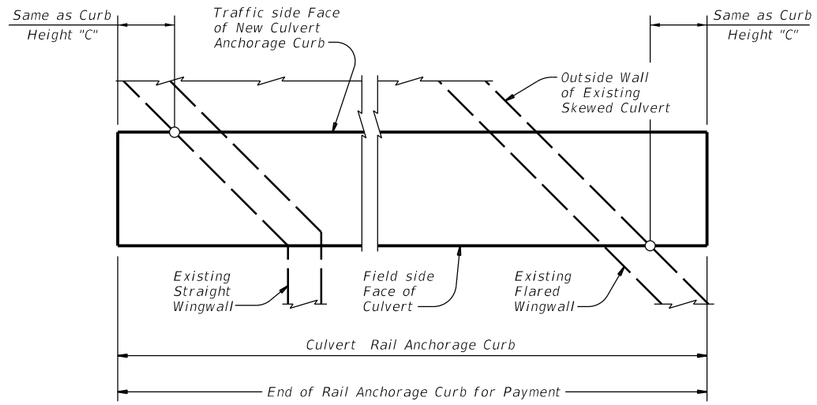
Showing typical installation on skewed culvert.



SHOWING CULVERT ANCHORAGE CURB

Showing Anchorage Curb Type 2. Anchor and Bars S spacing are the same for Anchorage Type 1.

TYPICAL ELEVATIONS OF INSTALLATION
CULVERT 5 - RIGHT SIDE



OPTION B ~ STRAIGHT WINGWALL AT SKEWED CULVERT (9)

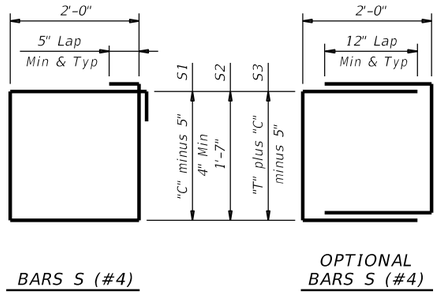
OPTION B ~ FLARED WINGWALL AT SKEWED CULVERT (9)

TYPICAL CURB PLAN
CULVERT 5 - RIGHT SIDE

Showing Geometry only. Reinforcing, Curb Anchors, and Railing not shown for clarity.

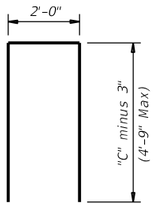
(9) *Use Option B if wingwalls will not be vertically raised when the curb height is increased. Verify adequacy of existing or proposed finished grade between end of rail anchorage curb and wingwall. Extension of rail anchorage curb beyond wingwall may need to be greater than "C" depending on side slope conditions.*

STRAIGHT ANCHOR (10)

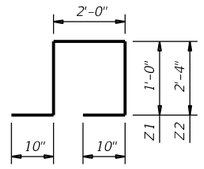


BARS S (#4)

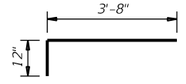
OPTIONAL BARS S (#4)



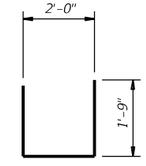
BARS U2 (#4)



BARS Z (#5)



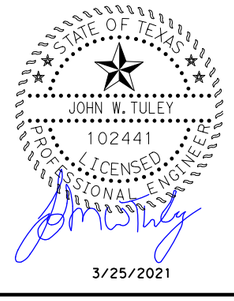
BARS L (#6) (8)
Spaced at 6" Max



BARS S3 (#5)

ANCHOR DETAILS
CULVERT 5 - RIGHT SIDE

(10) *Use straight anchors if retrofit anchorage curb is 1'-2" or greater in thickness.*



3/25/2021

SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

RAIL ANCHORAGE CURB RETROFIT GUIDE
BOX CULVERT RAIL MOUNTING DETAILS
(CURBS 8" TO 5'-0" TALL ONLY)
RAC-R (MOD)

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©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS 05-11: Gen Notes, T101 Anchor PL. 07-12: Width. 02-15: Payment note. 03-16: Notes and Typ Curb Plans. 03-18: Gen Notes, backfill and asphalt note.	1133	02	032	FM 794
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	YKM	GONZALES		147

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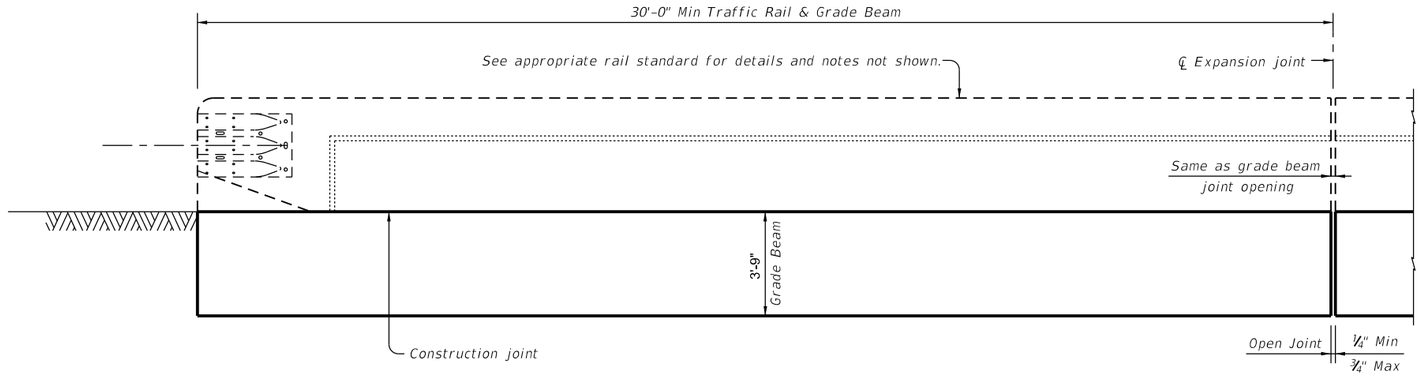
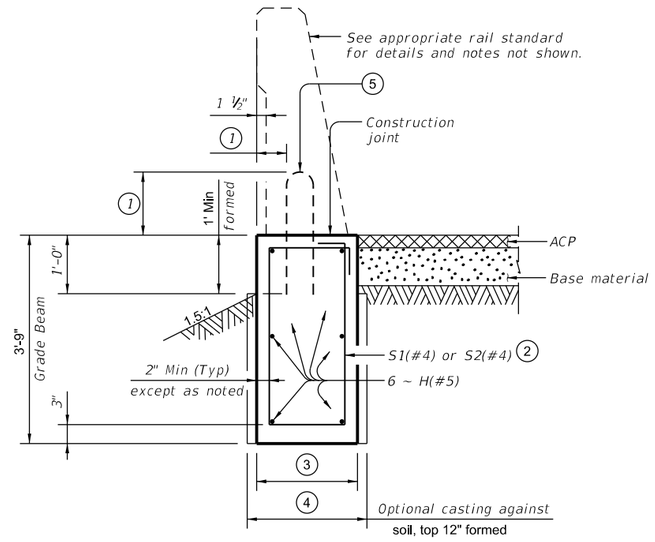


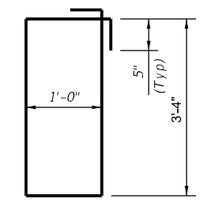
ROADWAY ELEVATION OF TRAFFIC RAIL ON GRADE BEAM (TRF-GB)

(Showing SSTR rail other rails are similar. Reinforcing not shown for clarity.)

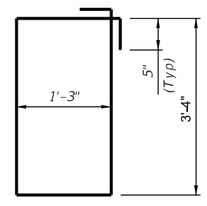


SECTION OF TRAFFIC RAIL ON GRADE BEAM (TRF-GB)

(Showing SSTR rail other rails are similar.)



BARS S1(#4)



BARS S2(#4)

1. See applicable bridge rail standard.
2. S1(#4) or S2(#4) spaced longitudinally along grade beam at 8" Max. (Spaced 2 ½" longitudinally from outside edge of grade beam).
3. Use bar S1(#4) with 1'-4" grade beam width and bridge rail types: All rails except for T224, C412, T66, C66, T80HT and T80SS. Approximate grade beam concrete = 0.18 CY/LF and reinforcement = 13.8 LB/LF.
4. 1'-6" for bridge rail types: All rails except for T224, C412, T66, C66, T80HT and T80SS.
5. Modify reinforcing on standard bridge rail anchorage if necessary by extending rail anchorage 12" Min, vertically into traffic rail

CONSTRUCTION NOTES:

Align grade beam (TRF-GB) open joints with rail open joints maintaining no less than minimum rail length.
Provide grade beam (TRF-GB) with open joints at no greater than 100' spacing unless otherwise shown on the plans or approved by the Engineer.

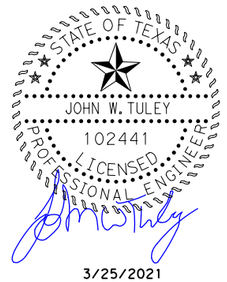
MATERIAL NOTES:

Provide Class "C" concrete. Provide Class "C" (HPC) if required elsewhere.
Provide Grade 60 reinforcing steel.
Epoxy coat or galvanize all reinforcing steel if required elsewhere.
Deformed Welded Wire Reinforcement (WWR) (ASTM A1064) of equal size and spacing may be substituted for bars S1(#4), S2(#4) and H(#5) unless noted otherwise. Provide the same laps as required for reinforcing bars.
Provide bar laps, where required, as follows:
Uncoated or galvanized ~ #5 = 2'-4"
Epoxy coated ~ #5 = 3'-6"

GENERAL NOTES:

Use of these details will result in a grade beam (TRF-GB) foundation that is acceptable for traffic rails which are MASH TL-2, TL-3, or TL-4 compliant.
The foundation design resistance is based on the current AASHTO bridge railing requirements with the assumption of fair to good soil support conditions. Poor soil conditions will require suitably deeper and/or wider foundations.
See appropriate rail standard for details and notes not shown.
Payment for grade beam (TRF-GB) will be by Class "C" concrete or Class "C" (HPC) concrete for rail foundations.
The associated bridge railing will be paid for by the linear foot which includes the concrete and reinforcement.
Excavation will be subsidiary to other Items.

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



3/25/2021

Texas Department of Transportation

Bridge Division Standard

TRAFFIC RAIL FOUNDATIONS
FOR MASH TL-2, TL-3 & TL-4 BRIDGE RAILS

TRF(MOD)

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©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	032	FM 794
07-20: Added moment slab with rail foundation lengths.	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		147A

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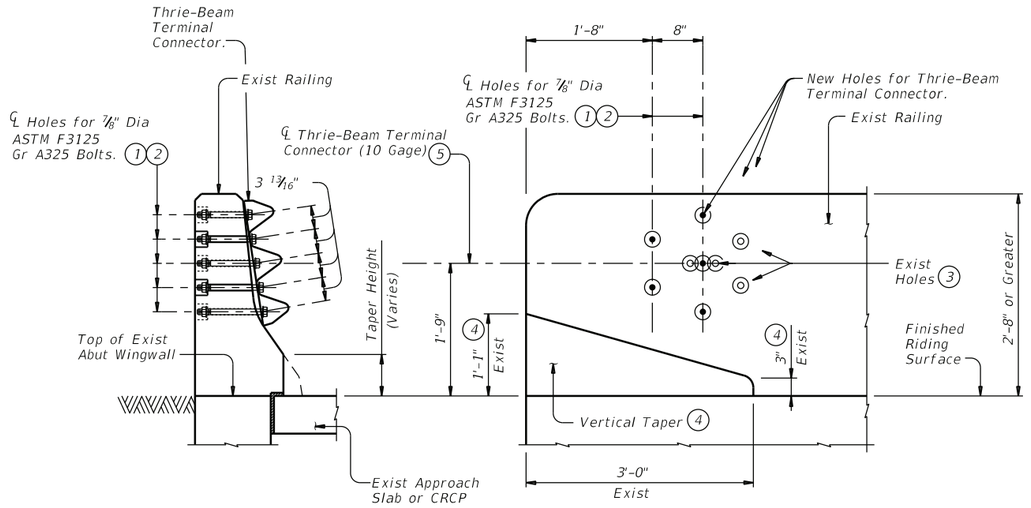


SECTION ELEVATION

TERMINAL CONNECTION ON EXISTING RAIL WITHOUT OVERLAY

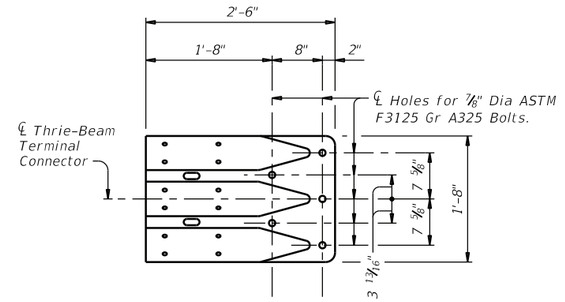
(1) ℄ 5 ~ 1" Dia holes and 2 ½" Dia x 2" deep recesses. Holes and recesses must be core drilled. Percussion drilling is not permitted. Concrete spalls in rail exceeding ½" from edge of holes will be patched in accordance with Item 429, "Concrete Structure Repair" at the contractor's expense. Bolt recesses are only required when pedestrian sidewalks are adjacent to back of rail.

(2) ℄ 5 ~ ⅞" Dia F3125 Gr A325 Bolts with two 1 ¾" O.D. washers. Place washer under each head and nut. The 5 Terminal Connection Bolts must be tightened in a well distributed pattern so to prevent damage or distortion of the Thrie-Beam Connection and the MBGF Transition. Bolts must be cut off after installation so as to extend no more than ¾" beyond nut. End of cut-off bolt must be painted with two coats of zinc-rich paint conforming to the Item "Galvanizing".

(3) Existing anchor bolt holes in rail that can not be utilized and are within 3" of a new bolt hole must be filled with an epoxy grout prior to coring new holes.

(4) If vertical taper is not present, then a vertical taper must be field cut to limits shown when the existing rail measurement is 2'-8". Rail measurement should be taken from behind rail as to not include overlay if present. If existing rail measurement is 2'-10" and existing rail does not have vertical taper, then add 2" to vertical dimensions and field cut vertical taper. Any exposed reinforcing steel from field cut taper must be ground flush and painted with two coats of zinc-rich paint conforming to the Item "Galvanizing".

(5) 10 Gage Terminal Connectors and associated hardware are to be paid for under the Item "Metal Beam Guard Fence". Metal Beam Guard Fence Transitions must be attached to the bridge rail and extended along the embankment unless otherwise shown in the plans.



THRIE-BEAM TERMINAL CONNECTORS (5)

CONSTRUCTION NOTES:

Field verify dimensions before commencing work and ordering materials.

Remove any MBGF (W-beam) and attachment hardware, from the face of rail if present, prior to installation of new MBGF Transition. Dispose of these materials as directed by the Engineer. Plugging of exposed existing bolt holes is not necessary except as stated herein or otherwise indicated on the plans. This work is considered subsidiary to the pertinent bid items.

If vertical taper is not present, then a vertical taper must be field cut to limits shown and debris removed.

Attach the MBGF Transition to the existing rail and extend along the embankment using the Thrie-Beam Terminal Connection unless shown otherwise on the plans. Splice the Approach Guard Rail and the Terminal Connection with the normal 12 connection bolts. Refer to Metal Beam Guard Fence detail sheets for additional details and information not shown herein.

MATERIAL NOTES:

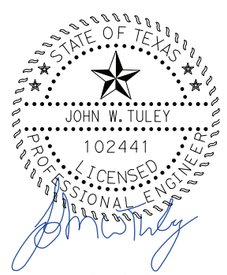
Galvanize all steel components unless otherwise noted.

GENERAL NOTES:

These details are shown for retrofitting MBGF transitions to existing rails only and not used for new construction.

Shop drawings are not required for this installation.

Materials, fabrication and installation of this assembly are to be included in the price bid for "Metal Beam Guard Fence."



3/25/2021

Texas Department of Transportation

Bridge Division Standard

T5/T501/T502 TRANSITION RETROFIT GUIDE

T5/T501/T502TR(MOD)

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©TxDOT	September 2019	CONT	SECT	JOB	HIGHWAY
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		YKM	GONZALES		147B

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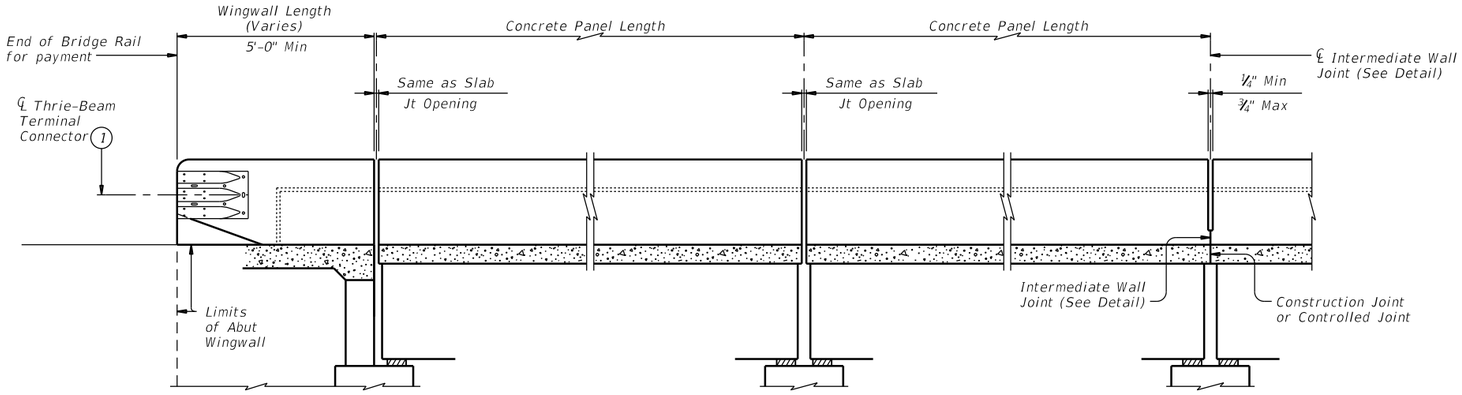
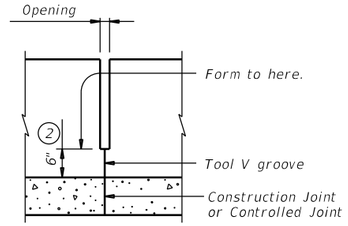


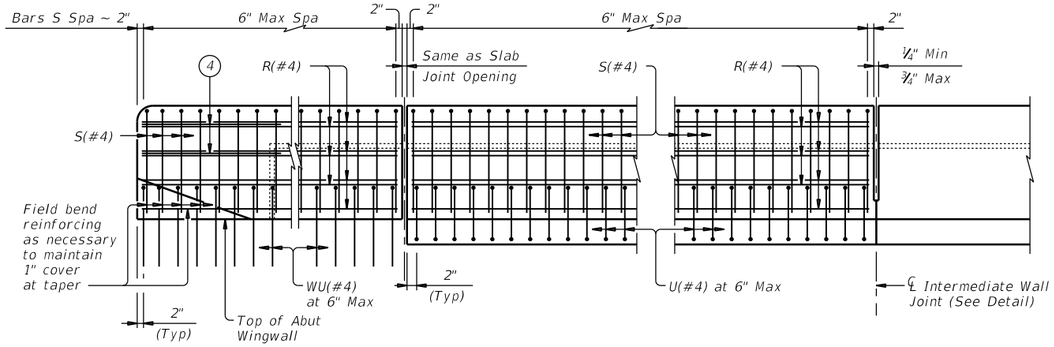
AT ABUTMENTS | AT BENTS WITH SLAB EXP JOINTS | AT BENTS WITHOUT SLAB EXP JOINTS

ROADWAY ELEVATION OF RAIL

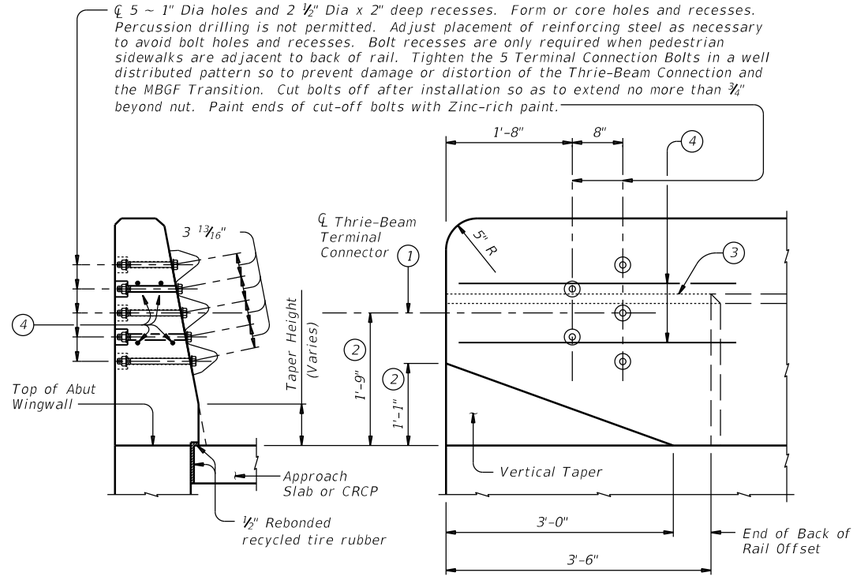


INTERMEDIATE WALL JOINT DETAIL

Provide at all interior bents without slab expansion joints.

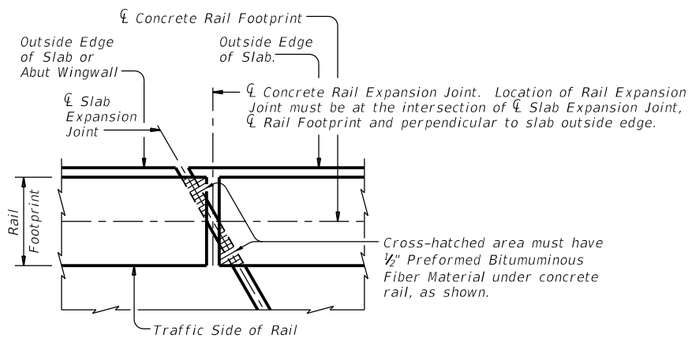


ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT



SECTION | ELEVATION

TERMINAL CONNECTION DETAILS



PLAN OF RAIL AT EXPANSION JOINTS

Example showing Slab Expansion Joints without breakbacks.

1. Terminal Connectors and associated hardware are to be paid for under the Item "Metal Beam Guard Fence". Attach Metal Beam Guard Fence Transitions to the bridge rail and extend along the embankment unless otherwise shown in the plans.
2. Increase 2" for structures with Overlay.
3. Back of rail offset may, with Engineer's approval, be continued to the end of the railing.
4. Place 4 additional Bars R(#4) 3'-8" in length inside Bars S(#4) and centered 2'-0" from end of rail when Terminal Connections are required.

Texas Department of Transportation | Bridge Division Standard

TRAFFIC RAIL SINGLE SLOPE

TYPE SSTR

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©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
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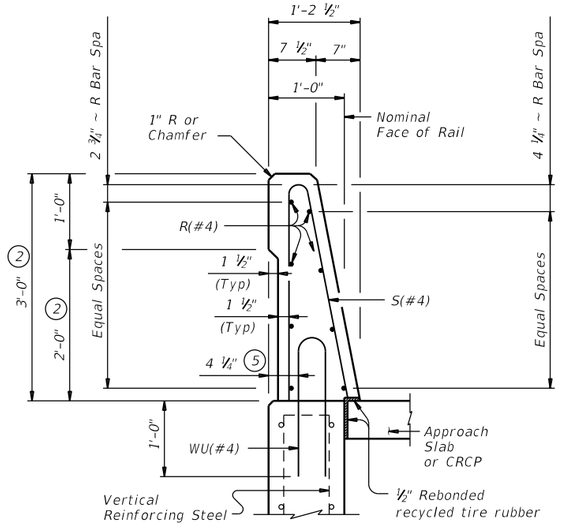
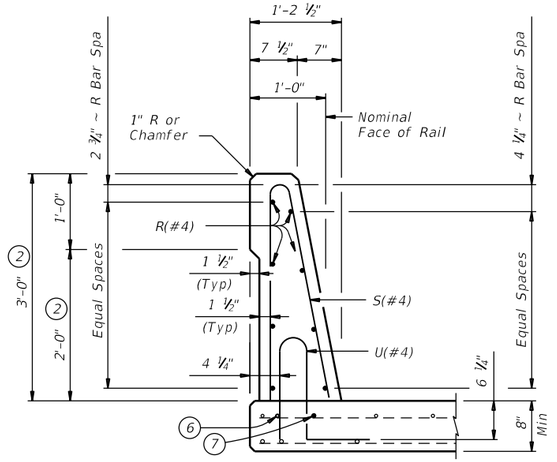


ON ABUTMENT WINGWALLS OR CIP RETAINING WALLS



ON BRIDGE SLAB

SECTIONS THRU RAIL

(2) Increase 2" for structures with Overlay.

(5) 5 ¼" when vertical reinforcing has closer clear cover over horizontal reinforcing in abutment wingwalls or retaining walls on traffic side of wall.

(6) As an aid in supporting reinforcement, additional longitudinal bars may be used in the slab with the approval of the Engineer. Such bars must be furnished at the Contractor's expense.

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

(8) No longitudinal wires may be within upper bend.

(9) Bend or cut as required to clear drain slots.

(10) Space U(#4) bars at 4" Max when end region of panel length is less than 6'-0" to side slot drain. Space U(#4) bars at 6" Max when end region of panel length is 6'-0" and greator to side slot drain.

CONSTRUCTION NOTES:

This railing may be constructed by the slipform process when approved by the Engineer, with equipment approved by the Engineer. Provide sensor control for both line and grade. Tack welding to provide bracing for slipform operations is acceptable. Welding may be performed at a minimum spacing of 3 ft between the cage and the anchorage. It is permissible to weld to bars U, WU and S at any location on the cage. If increased bracing is needed, provide additional anchorage devices and weld in the upper two thirds of the cage. Paint welded areas on epoxy coated and/or galvanized reinforcing with an organic zinc rich paint in accordance with Item 445 "Galvanizing".

If rail is slipformed, apply an heavy epoxy bead 1" behind toe of traffic side of rail to concrete deck just prior to slip forming. Provide a ⅜" width x ¼" tall heavy epoxy bead with Type III, Class C or a Type V epoxy.

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

MATERIAL NOTES:

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

Provide Grade 60 reinforcing steel.

Epoxy coat or galvanize all reinforcing steel if slab bars are epoxy coated or galvanized.

Deformed Welded Wire Reinforcement (WWR) (ASTM A1064) of equal size and spacing may be substituted for Bars U and WU unless noted otherwise. Deformed WWR (ASTM A1064) may be substituted for Bars R and S, as shown. Combinations of reinforcing steel and WWR or configurations of WWR other than shown are permitted if conditions in the table are satisfied. Provide the same laps as required for reinforcing bars.

Provide bar laps, where required, as follows:

Uncoated or galvanized ~ #4 = 1'-7"

Epoxy coated ~ #4 = 2'-5"

GENERAL NOTES:

This rail has been successfully evaluated by full-scale crash test to meet MASH TL-4 criteria. This rail can be used for speeds of 50 mph and greater when a TL-3 rated guard fence transition is used. When a TL-2 rated guard fence transition is used, this rail can only be used for speeds of 45 mph and less.

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

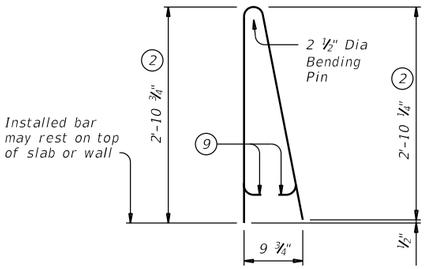
Rail anchorage details shown on this standard may require modification for select structure types. See appropriate details elsewhere in plans for these modifications.

Shop drawings will not be required for this rail.

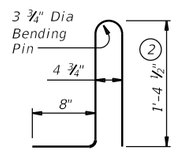
Average weight of railing with no overlay is 376 plf.

Cover dimensions are clear dimensions, unless noted otherwise.

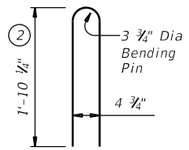
Reinforcing bar dimensions shown are out-to-out of bar.



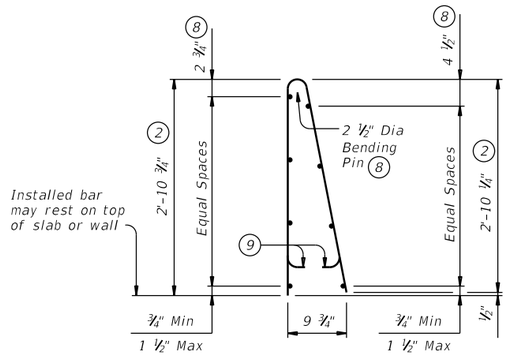
BARS S (#4)



BARS U (#4)

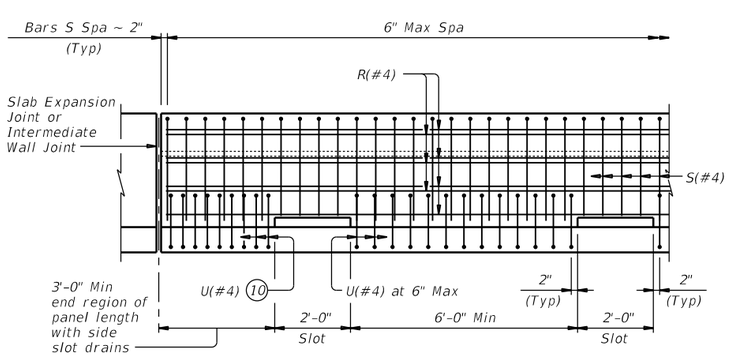


BARS WU (#4)



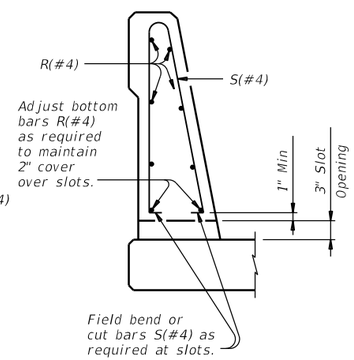
OPTIONAL WELDED WIRE REINFORCEMENT (WWR)

DESCRIPTION	LONGITUDINAL WIRES	VERTICAL WIRES
Minimum (Cumulative Total) Wire Area	1.067 Sq In.	0.267 Sq In. per Ft
	No. of Wires	Spacing
Minimum	8	4"
Maximum	10	8"
Maximum Wire Size Differential	The smaller wire must have an area of 40% or more of the larger wire.	



OPTIONAL SIDE SLOT DRAIN DETAIL

Note: Side Slot Drains may be used where shown elsewhere on the plans or as directed by the Engineer. Drains should not be placed over railroad tracks, lower roadways, or sidewalks. When this rail is used as a separator between a roadway surface and a sidewalk surface, side drain slots will not be permitted.



SECTION THRU OPTIONAL SIDE SLOT DRAIN

Texas Department of Transportation

Bridge Division Standard

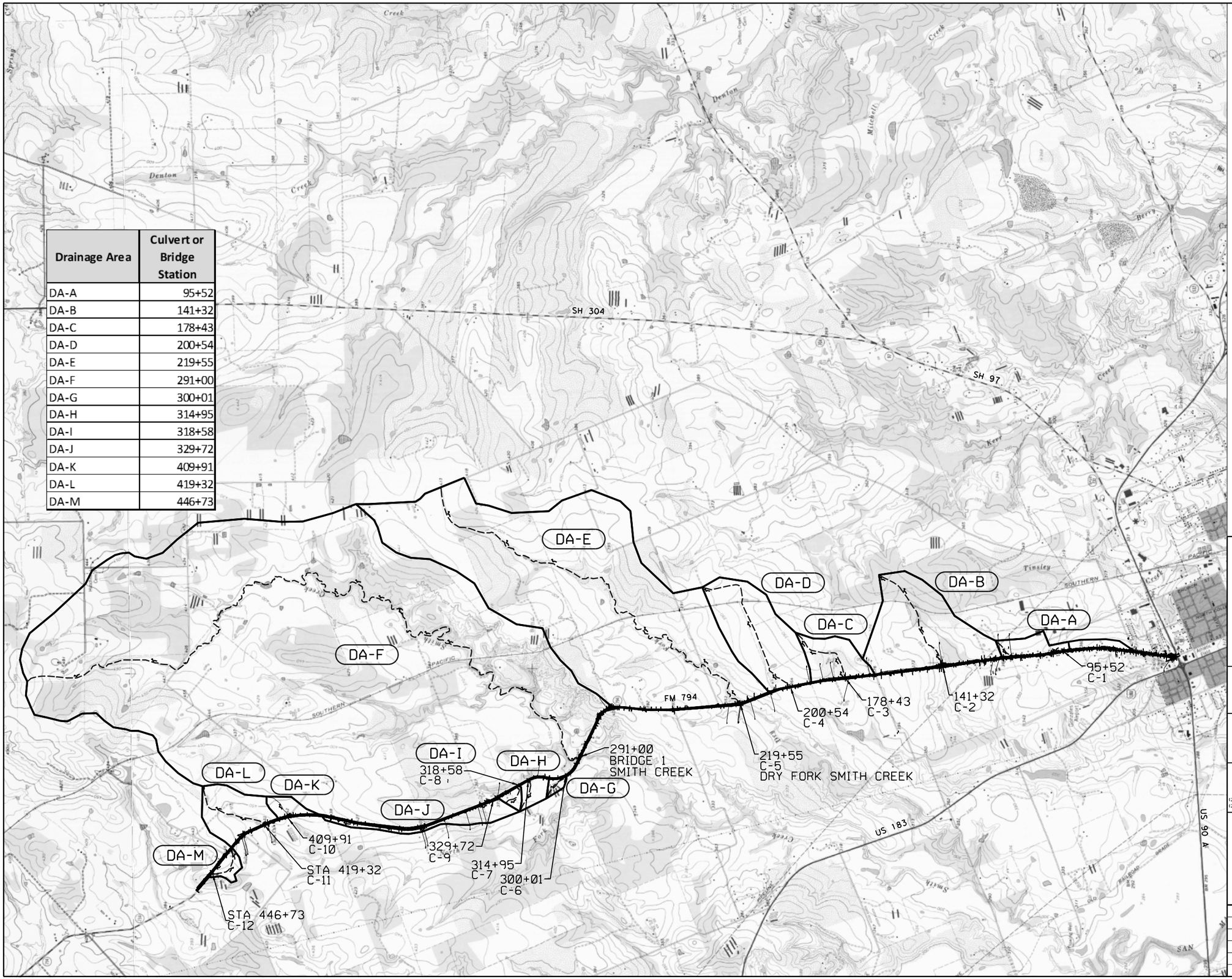
TRAFFIC RAIL SINGLE SLOPE

TYPE SSTR

FILE: r1std014-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	032	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		149

Design Filename: \\pcis-fs01\datagate\Jobs\19\048-S04\Techprod\WA04-FM794\Design\Data\4-Design\PlanSet\5*Drainage\FM794*DRN*MAP*SHEET.dgn Plotted on: 2/9/2021 3:26:08 PM

Drainage Area	Culvert or Bridge Station
DA-A	95+52
DA-B	141+32
DA-C	178+43
DA-D	200+54
DA-E	219+55
DA-F	291+00
DA-G	300+01
DA-H	314+95
DA-I	318+58
DA-J	329+72
DA-K	409+91
DA-L	419+32
DA-M	446+73



LEGEND	
SYMBOL	DESCRIPTION
XXXX	DRAINAGE AREA LABEL
	FLOW DIRECTION
	DRAINAGE AREA BOUNDARY

SCALE: 1" = 3600'

2/9/2021

STATE OF TEXAS
JOSE LUIS DIAZ JR
99365
LICENSED PROFESSIONAL ENGINEER

Texas Department of Transportation

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FM 794

EXTERNAL DRAINAGE AREA MAP

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			150
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

RATIONAL METHOD

Drainage Area	Culvert ID	Proposed Station	Proposed DA (Ac.)	Weighted Coefficient	Runoff Coefficient (table 4-11)				Time of Concentration										Rainfall Intensity-Duration-Frequency Coefficient for Texas					
									tc (min)	tsh				tsc			tch			50% (2-Year)	20% (5-Year)	10% (10-Year)	4% (25-Year)	2% (50-Year)	1% (100-Year)
					Cr	Ci	Cv	Cs		nol (Table 4-6)	Lsh	Ssh	tsh (hr)	Lsc	Ssc	tsc (hr)	Lch	V (ft/s)	tch (hr)						
DA-A	C-1	95+52	35.86	0.37	0.014	0.16	0.10	0.10	18.92	0.011	100	0.01216	0.02171	859.27	0.01047	0.11477	1931.53	3.00	0.17885	3.86	5.12	6.01	7.22	8.39	9.58
DA-C	C-3	178+43	76.45	0.31	0.10	0.08	0.05	0.08	32.92	0.150	100	0.00695	0.21966	1195.77	0.01254	0.18386	1567.37	3.00	0.14513	2.79	3.71	4.38	5.26	6.13	7.04
DA-D	C-4	200+54	221.83	0.31	0.10	0.08	0.05	0.08	51.82	0.150	100	0.00813	0.20629	1405.00	0.0059	0.315	3698.00	3.00	0.34241	2.07	2.75	3.26	3.92	4.58	5.28
DA-G	C-6	300+01	8.33	0.31	0.10	0.08	0.05	0.08	22.61	0.150	100	0.00696	0.21954	652.27	0.0092	0.11712	434.12	3.00	0.04020	3.50	4.64	5.46	6.55	7.63	8.73
DA-H	C-7	314+95	22.21	0.31	0.10	0.08	0.05	0.08	21.14	0.150	100	0.00968	0.19237	1003.13	0.01495	0.14127	201.69	3.00	0.01868	3.63	4.82	5.67	6.80	7.91	9.05
DA-I	C-8	318+58	11.03	0.31	0.10	0.08	0.05	0.08	14.66	0.150	100	0.01399	0.16605	91.00	0.04396	0.00747	764.77	3.00	0.07081	4.40	5.83	6.82	8.20	9.52	10.83
DA-J	C-9	329+72	52.26	0.31	0.10	0.08	0.05	0.08	47.10	0.150	100	0.01000	0.1899	735.63	0.01088	0.12148	5967.81	3.50	0.47364	2.21	2.94	3.48	4.18	4.88	5.62
DA-K	C-10	409+91	22.09	0.39	0.10	0.14	0.07	0.08	17.50	0.150	100	0.01529	0.16023	806.39	0.01736	0.10539	280.39	3.00	0.02596	4.02	5.33	6.26	7.51	8.73	9.96
DA-L	C-11	419+32	96.89	0.31	0.10	0.08	0.05	0.08	35.03	0.150	100	0.00698	0.21931	746.65	0.0067	0.15713	2239.92	3.00	0.20740	2.68	3.57	4.21	5.06	5.90	6.78
DA-M	C-12	446+73	18.92	0.31	0.10	0.08	0.05	0.08	24.30	0.150	100	0.00704	0.21849	1162.93	0.01634	0.15668	322.35	3.00	0.02985	3.36	4.46	5.24	6.29	7.33	8.39

FLOW TABLE

Drainage Area	Culvert ID	Proposed Station	Proposed Q (CFS)					
			Q (2-years)	Q (5-years)	Q (10-years)	Q (25-years)	Q (50-years)	Q (100-years)
DA-A	C-1	95+52	51.76	68.67	80.62	96.78	112.54	128.46
DA-C	C-3	178+43	66.15	87.97	103.79	124.55	145.29	166.89
DA-D	C-4	200+54	142.01	189.33	224.23	269.27	314.72	362.97
DA-G	C-6	300+01	9.03	11.99	14.09	16.92	19.69	22.53
DA-H	C-7	314+95	25.01	33.19	39.01	46.82	54.48	62.27
DA-I	C-8	318+58	15.02	19.91	23.32	28.02	32.52	37.00
DA-J	C-9	329+72	35.73	47.61	56.34	67.64	79.03	91.08
DA-K	C-10	409+91	34.65	45.95	53.91	64.73	75.24	85.79
DA-L	C-11	419+32	80.59	107.21	126.56	151.87	177.22	203.69
DA-M	C-12	446+73	19.68	26.14	30.76	36.91	42.99	49.22

NOTES
1. Q'S CALCULATED USING RATIONAL METHOD
2. TC CALCULATED USING NRCS METHOD
3. INTENSITY IS CALCULATED WITH ATLAS 14 RAINFALL DATA.

OMEGA EM REGRESSION EQUATIONS

Drainage Area	Culvert ID	Proposed Station	Proposed DA (mi2)	Mean Annual Precip. (in) Fig 4-6	Mean Channel Slope	Omega (If Applicable) Fig 4-5	Proposed Q (CFS)				
							Q2 (cfs)	Q10 (cfs)	Q25 (cfs)	Q50 (cfs)	Q100 (cfs)
DA-D	C-4	200+54	0.347	34.00	0.0043248	0.147	97.06	200.82	254.07	293.97	337.31
DA-E	C-5	219+55	2.193	34.00	0.0043248	0.147	335.28	877.50	1,218.06	1,499.50	1,821.11
DA-F	BRIDGE-1	291+00	6.220	34.00	0.0056461	0.147	721.92	2,173.55	3,176.07	4,048.74	5,081.54

3/25/2021

STATE OF TEXAS
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FM 794

HYDROLOGIC CALCULATIONS

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
6		151

STATE	DIST.	COUNTY
TEXAS	YKM	GONZALES

CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

HY-8 VERSION 7.60 EXISTING CULVERT ANALYSIS FM 794 CULVERT C-1

Culvert Summary Table: Culvert 1 STA 95+52

Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
2 year	51.76	42.95	361.72	3.595	4.046	7-M2c	2.000	1.658	1.658	1.346	7.714	7.144
5 year	68.67	43.79	361.81	3.690	4.141	7-M2c	2.000	1.672	1.672	1.496	7.807	7.668
10 year	80.62	44.19	361.87	3.735	4.197	7-M2c	2.000	1.678	1.678	1.589	7.852	7.981
25 year	96.78	44.77	361.93	3.801	4.261	7-M2t	2.000	1.687	1.702	1.702	7.857	8.354
50 year	112.54	45.05	361.99	3.833	4.319	7-M2t	2.000	1.692	1.801	1.801	7.561	8.675
100 year	128.46	45.19	362.04	3.850	4.374	7-M2t	2.000	1.694	1.892	1.892	7.346	8.967

****

Straight Culvert

Inlet Elevation (invert): 357.67 ft, Outlet Elevation (invert): 357.50 ft

Culvert Length: 37.27 ft, Culvert Slope: 0.0046

****

Site Data - Culvert 1 STA 95+52
- Site Data Option: Culvert Invert Data
- Inlet Station: 0.00 ft
- Inlet Elevation: 357.67 ft
- Outlet Station: 37.27 ft
- Outlet Elevation: 357.50 ft
- Number of Barrels: 2

Culvert Data Summary - Culvert 1 STA 95+52
- Barrel Shape: Circular
- Barrel Diameter: 2.00 ft
- Barrel Material: Corrugated Steel
- Embedment: 0.00 in
- Barrel Manning's n: 0.0240
- Culvert Type: Straight
- Inlet Configuration: Mitered to Conform to Slope
- Inlet Depression: None

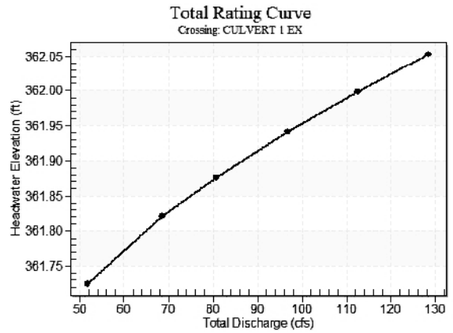
Tailwater Channel Data - CULVERT 1 EX
- Tailwater Channel Option: Triangular Channel
- Side Slope (H:V): 4.00 (_:1)
- Channel Slope: 0.0500
- Channel Manning's n: 0.0350
- Channel Invert Elevation: 357.50 ft

Roadway Data for Crossing: CULVERT 1 EX
- Roadway Profile Shape: Constant Roadway Elevation
- Crest Length: 100.00 ft
- Crest Elevation: 361.62 ft
- Roadway Surface: Paved
- Roadway Top Width: 26.20 ft

EXISTING CULVERT FLOW TABLE AT CROSSING C-1

Summary of Culvert Flows at Crossing: CULVERT 1 EX

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	Culvert 1 STA 95+52 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
361.72	2 year	51.76	42.95	8.64	10
361.81	5 year	68.67	43.79	24.72	5
361.87	10 year	80.62	44.19	36.25	4
361.93	25 year	96.78	44.77	51.95	4
361.99	50 year	112.54	45.05	67.27	3
362.04	100 year	128.46	45.19	83.17	3
361.62	Overtopping	42.15	42.15	0.00	Overtopping



HY-8 VERSION 7.60 PROPOSED CULVERT ANALYSIS FM 794 CULVERT C-1

Culvert Summary Table: Culvert 1 PR STA 95+52

Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
2 year	51.76	51.76	360.29	2.623	2.045	5-S2n	1.333	1.493	1.363	1.346	7.597	7.144
5 year	68.67	68.67	361.12	3.453	3.002	5-S2n	1.626	1.803	1.663	1.496	8.258	7.668
10 year	80.62	77.94	361.67	4.001	3.448	5-S2n	1.781	1.961	1.820	1.589	8.567	7.981
25 year	96.78	79.63	361.78	4.109	3.534	5-S2n	1.809	1.990	1.848	1.702	8.620	8.354
50 year	112.54	80.78	361.85	4.184	3.589	5-S2n	1.827	2.000	1.827	1.801	8.841	8.675
100 year	128.46	81.77	361.92	4.249	3.632	5-S2n	1.844	2.000	1.844	1.892	8.871	8.967

****

Straight Culvert

Inlet Elevation (invert): 357.67 ft, Outlet Elevation (invert): 357.50 ft

Culvert Length: 36.00 ft, Culvert Slope: 0.0047

****

Site Data - Culvert 1 PR STA 95+52
- Site Data Option: Culvert Invert Data
- Inlet Station: 0.00 ft
- Inlet Elevation: 357.67 ft
- Outlet Station: 36.00 ft
- Outlet Elevation: 357.50 ft
- Number of Barrels: 1

Culvert Data Summary - Culvert 1 PR STA 95+52
- Barrel Shape: Concrete Box
- Barrel Span: 5.00 ft
- Barrel Rise: 2.00 ft
- Barrel Material: Concrete
- Embedment: 0.00 in
- Barrel Manning's n: 0.0120
- Culvert Type: Straight
- Inlet Configuration: Square Edge (90°) Headwall
- Inlet Depression: None

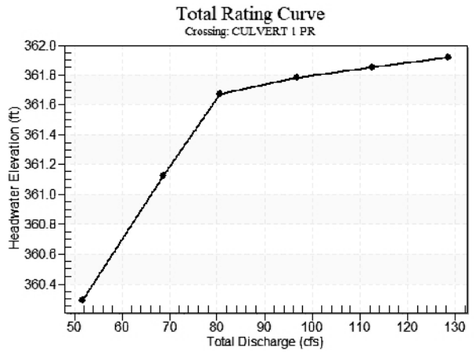
Tailwater Channel Data - CULVERT 1 PR
- Tailwater Channel Option: Triangular Channel
- Side Slope (H:V): 4.00 (_:1)
- Channel Slope: 0.0500
- Channel Manning's n: 0.0350
- Channel Invert Elevation: 357.50 ft

Roadway Data for Crossing: CULVERT 1 PR
- Roadway Profile Shape: Constant Roadway Elevation
- Crest Length: 100.00 ft
- Crest Elevation: 361.80 ft
- Roadway Surface: Paved
- Roadway Top Width: 28.00 ft

PROPOSED CULVERT FLOW TABLE AT CROSSING C-1

Summary of Culvert Flows at Crossing: CULVERT 1 PR

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	Culvert 1 PR STA 95+52 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
360.29	2 year	51.76	51.76	0.00	1
361.12	5 year	68.67	68.67	0.00	1
361.81	10 year	80.62	80.13	0.36	28
361.93	25 year	96.78	81.99	14.59	6
362.01	50 year	112.54	83.17	29.29	5
362.08	100 year	128.46	84.15	44.21	4
361.80	Overtopping	79.94	79.94	0.00	Overtopping



3/25/2021

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FM 794
HYDRAULIC CALCULATIONS
CULVERT No. 1
STA 95+52

SHEET 1 OF 3

FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
6		152

STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

HY-8 VERSION 7.60 EXISTING CULVERT ANALYSIS FM 794 CULVERT C-07

Culvert Summary Table: CULVERT 7 EX STA 314+95

Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
2 year	25.01	25.01	356.74	2.352	2.596	2-M2c	2.198	1.613	1.613	1.385	6.457	3.257
5 year	25.56	25.56	356.77	2.385	2.632	2-M2c	2.238	1.632	1.632	1.397	6.506	3.275
10 year	39.01	39.01	357.65	3.201	3.508	7-M2c	3.000	2.033	2.033	1.637	7.651	3.640
25 year	46.82	46.82	358.34	3.732	4.203	7-M2c	3.000	2.229	2.229	1.753	8.315	3.810
50 year	54.48	54.48	359.14	4.323	5.004	7-M2c	3.000	2.396	2.396	1.855	9.001	3.957
100 year	62.27	62.27	360.06	5.010	5.916	7-M2c	3.000	2.541	2.541	1.951	9.754	4.092

****

Straight Culvert

Inlet Elevation (invert): 354.14 ft, Outlet Elevation (invert): 353.80 ft

Culvert Length: 56.00 ft, Culvert Slope: 0.0061

****

Site Data - CULVERT 7 EX STA 314+95
- Site Data Option: Culvert Invert Data
- Inlet Station: 0.00 ft
- Inlet Elevation: 354.14 ft
- Outlet Station: 56.00 ft
- Outlet Elevation: 353.80 ft
- Number of Barrels: 1

Culvert Data Summary - CULVERT 7 EX STA 314+95
- Barrel Shape: Circular
- Barrel Diameter: 3.00 ft
- Barrel Material: Corrugated Steel
- Embedment: 0.00 in
- Barrel Manning's n: 0.0240
- Culvert Type: Straight
- Inlet Configuration: Square Edge with Headwall
- Inlet Depression: None

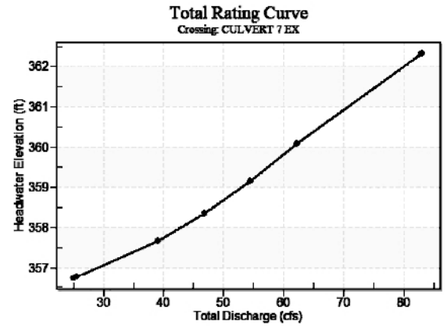
Tailwater Channel Data - CULVERT 7 EX
- Tailwater Channel Option: Triangular Channel
- Side Slope (H:V): 4.00 (_:1)
- Channel Slope: 0.0100
- Channel Manning's n: 0.0350
- Channel Invert Elevation: 353.80 ft

Roadway Data for Crossing: CULVERT 7 EX
- Roadway Profile Shape: Constant Roadway Elevation
- Crest Length: 100.00 ft
- Crest Elevation: 362.05 ft
- Roadway Surface: Paved
- Roadway Top Width: 22.85 ft

EXISTING CULVERT FLOW TABLE AT CROSSING C-07

Summary of Culvert Flows at Crossing: CULVERT 7 EX

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	CULVERT 7 EX STA 314+95 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
356.74	2 year	25.01	25.01	0.00	1
356.77	5 year	25.56	25.56	0.00	1
357.65	10 year	39.01	39.01	0.00	1
358.34	25 year	46.82	46.82	0.00	1
359.14	50 year	54.48	54.48	0.00	1
360.06	100 year	62.27	62.27	0.00	1
362.05	Overtopping	77.43	77.43	0.00	Overtopping



HY-8 VERSION 7.60 PROPOSED CULVERT ANALYSIS FM 794 CULVERT C-07

Culvert Summary Table: CULVERT 7 PR STA 314+95

Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
2 year	25.01	25.01	356.13	1.989	1.164	1-S2n	1.178	1.292	1.184	1.025	7.044	5.957
5 year	25.56	25.56	356.16	2.018	1.193	1-S2n	1.196	1.311	1.202	1.033	7.086	5.989
10 year	39.01	39.01	356.83	2.687	1.914	1-S2n	1.638	1.738	1.644	1.210	7.911	6.657
25 year	46.82	46.82	357.21	3.065	2.366	5-S2n	1.884	1.963	1.884	1.296	8.284	6.967
50 year	54.48	54.48	357.59	3.453	2.837	5-S2n	2.120	2.172	2.120	1.372	8.567	7.236
100 year	62.27	62.27	358.02	3.880	3.661	5-S2n	2.355	2.374	2.355	1.442	8.813	7.482

****

Straight Culvert

Inlet Elevation (invert): 354.14 ft, Outlet Elevation (invert): 353.80 ft

Culvert Length: 60.00 ft, Culvert Slope: 0.0057

****

Site Data - CULVERT 7 PR STA 314+95
- Site Data Option: Culvert Invert Data
- Inlet Station: 0.00 ft
- Inlet Elevation: 354.14 ft
- Outlet Station: 60.00 ft
- Outlet Elevation: 353.80 ft
- Number of Barrels: 1

Culvert Data Summary - CULVERT 7 PR STA 314+95
- Barrel Shape: Concrete Box
- Barrel Span: 3.00 ft
- Barrel Rise: 3.00 ft
- Barrel Material: Concrete
- Embedment: 0.00 in
- Barrel Manning's n: 0.0120
- Culvert Type: Straight
- Inlet Configuration: Square Edge (30-75º flare) Wingwall
- Inlet Depression: None

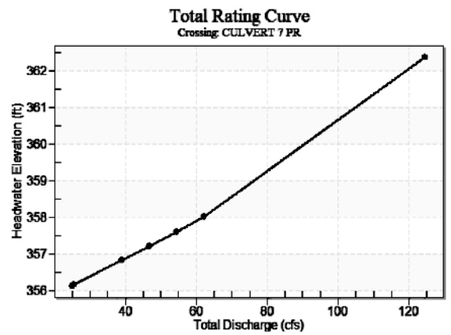
Tailwater Channel Data - CULVERT 7 PR
- Tailwater Channel Option: Triangular Channel
- Side Slope (H:V): 4.00 (_:1)
- Channel Slope: 0.0500
- Channel Manning's n: 0.0350
- Channel Invert Elevation: 353.80 ft

Roadway Data for Crossing: CULVERT 7 PR
- Roadway Profile Shape: Constant Roadway Elevation
- Crest Length: 100.00 ft
- Crest Elevation: 362.43 ft
- Roadway Surface: Paved
- Roadway Top Width: 28.00 ft

PROPOSED CULVERT FLOW TABLE AT CROSSING C-07

Summary of Culvert Flows at Crossing: CULVERT 7 PR

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	CULVERT 7 PR STA 314+95 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
356.13	2 year	25.01	25.01	0.00	1
356.16	5 year	25.56	25.56	0.00	1
356.83	10 year	39.01	39.01	0.00	1
357.21	25 year	46.82	46.82	0.00	1
357.59	50 year	54.48	54.48	0.00	1
358.02	100 year	62.27	62.27	0.00	1
362.43	Overtopping	115.74	115.74	0.00	Overtopping



STATE OF TEXAS
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99365
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3/25/2021

Texas Department of Transportation

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FM 794
HYDRAULIC CALCULATIONS
CULVERT No. 7
STA 314+95

SHEET 2 OF 3

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			153
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

HY-8 VERSION 7.60 EXISTING CULVERT ANALYSIS FM 794 CULVERT C-12

Culvert Summary Table: Culvert 12 EX STA 446+73

Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
2 year	19.68	19.68	440.38	3.206	3.041	7-M2c	2.000	1.594	1.594	1.266	7.330	3.068
5 year	26.14	26.14	441.89	4.718	4.134	7-M2c	2.000	1.789	1.789	1.409	8.816	3.294
10 year	30.76	26.56	442.00	4.828	4.212	7-M2c	2.000	1.799	1.799	1.497	8.925	3.430
25 year	36.91	26.74	442.05	4.875	4.241	7-M2c	2.000	1.803	1.803	1.603	8.971	3.590
50 year	42.99	26.89	442.08	4.913	4.273	7-M2c	2.000	1.806	1.806	1.697	9.009	3.730
100 year	49.22	27.02	442.12	4.947	4.297	7-M2c	2.000	1.808	1.808	1.786	9.042	3.858

****

Straight Culvert

Inlet Elevation (invert): 437.17 ft, Outlet Elevation (invert): 437.13 ft

Culvert Length: 38.00 ft, Culvert Slope: 0.0011

****

Site Data - Culvert 12 EX STA 446+73
- Site Data Option: Culvert Invert Data
- Inlet Station: 0.00 ft
- Inlet Elevation: 437.17 ft
- Outlet Station: 38.00 ft
- Outlet Elevation: 437.13 ft
- Number of Barrels: 1

Culvert Data Summary - Culvert 12 EX STA 446+73
- Barrel Shape: Circular
- Barrel Diameter: 2.00 ft
- Barrel Material: Concrete
- Embedment: 0.00 in
- Barrel Manning's n: 0.0120
- Culvert Type: Straight
- Inlet Configuration: Mitered to Conform to Slope
- Inlet Depression: None

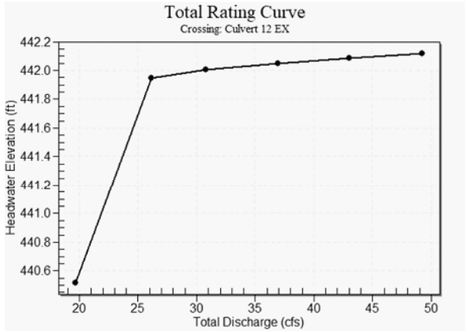
Tailwater Channel Data - Culvert 12 EX STA 446+73
- Tailwater Channel Option: Triangular Channel
- Side Slope (H:V): 4.00 (_:1)
- Channel Slope: 0.0100
- Channel Manning's n: 0.0350
- Channel Invert Elevation: 437.12 ft

Roadway Data for Crossing: Culvert 12 EX STA 446+73
- Roadway Profile Shape: Constant Roadway Elevation
- Crest Length: 100.00 ft
- Crest Elevation: 441.94 ft
- Roadway Surface: Paved
- Roadway Top Width: 24.00 ft

EXISTING CULVERT FLOW TABLE AT CROSSING C-12

Summary of Culvert Flows at Crossing: Culvert 12 EX STA 446+73

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	Culvert 12 EX STA 446+73 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
440.38	2 year	19.68	19.68	0.00	1
441.89	5 year	26.14	26.14	0.00	1
442.00	10 year	30.76	26.56	4.09	8
442.05	25 year	36.91	26.74	9.98	4
442.08	50 year	42.99	26.89	16.04	4
442.12	100 year	49.22	27.02	22.06	3
441.94	Overtopping	26.34	26.34	0.00	Overtopping



HY-8 VERSION 7.60 PROPOSED CULVERT ANALYSIS FM 794 CULVERT C-12

Culvert Summary Table: Culvert 12 PR STA 446+73

Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
2 year	19.68	19.68	440.39	3.206	3.097	7-M2c	2.000	1.594	1.594	1.266	7.330	3.068
5 year	26.14	26.14	441.90	4.718	4.249	7-M2c	2.000	1.789	1.789	1.409	8.816	3.294
10 year	30.76	29.77	442.87	5.692	4.992	7-M2c	2.000	1.859	1.859	1.497	9.781	3.430
25 year	36.91	29.99	442.93	5.751	5.038	7-M2c	2.000	1.862	1.862	1.603	9.841	3.590
50 year	42.99	30.14	442.97	5.793	5.071	7-M2c	2.000	1.865	1.865	1.697	9.883	3.730
100 year	49.22	30.27	443.01	5.829	5.099	7-M2c	2.000	1.866	1.866	1.786	9.919	3.858

****

Straight Culvert

Inlet Elevation (invert): 437.18 ft, Outlet Elevation (invert): 437.12 ft

Culvert Length: 50.00 ft, Culvert Slope: 0.0012

****

Site Data - Culvert 12 PR STA 446+73
- Site Data Option: Culvert Invert Data
- Inlet Station: 0.00 ft
- Inlet Elevation: 437.18 ft
- Outlet Station: 50.00 ft
- Outlet Elevation: 437.12 ft
- Number of Barrels: 1

Culvert Data Summary - Culvert 12 PR STA 446+73
- Barrel Shape: Circular
- Barrel Diameter: 2.00 ft
- Barrel Material: Concrete
- Embedment: 0.00 in
- Barrel Manning's n: 0.0120
- Culvert Type: Straight
- Inlet Configuration: Mitered to Conform to Slope
- Inlet Depression: None

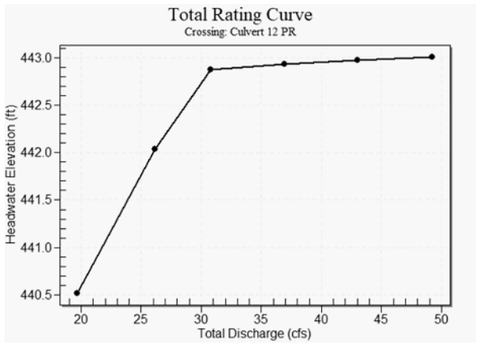
Tailwater Channel Data - Culvert 12 PR STA 446+73
- Tailwater Channel Option: Triangular Channel
- Side Slope (H:V): 4.00 (_:1)
- Channel Slope: 0.0100
- Channel Manning's n: 0.0350
- Channel Invert Elevation: 437.12 ft

Roadway Data for Crossing: Culvert 12 PR STA 446+73
- Roadway Profile Shape: Constant Roadway Elevation
- Crest Length: 100.00 ft
- Crest Elevation: 442.85 ft
- Roadway Surface: Paved
- Roadway Top Width: 28.00 ft

PROPOSED CULVERT FLOW TABLE AT CROSSING C-12

Summary of Culvert Flows at Crossing: Culvert 12 PR STA 446+73

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	Culvert 12 PR STA 446+73 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
440.39	2 year	19.68	19.68	0.00	1
441.90	5 year	26.14	26.14	0.00	1
442.87	10 year	30.76	29.77	0.94	8
442.93	25 year	36.91	29.99	6.78	5
442.97	50 year	42.99	30.14	12.75	4
443.01	100 year	49.22	30.27	18.74	3
442.85	Overtopping	29.69	29.69	0.00	Overtopping



3/25/2021

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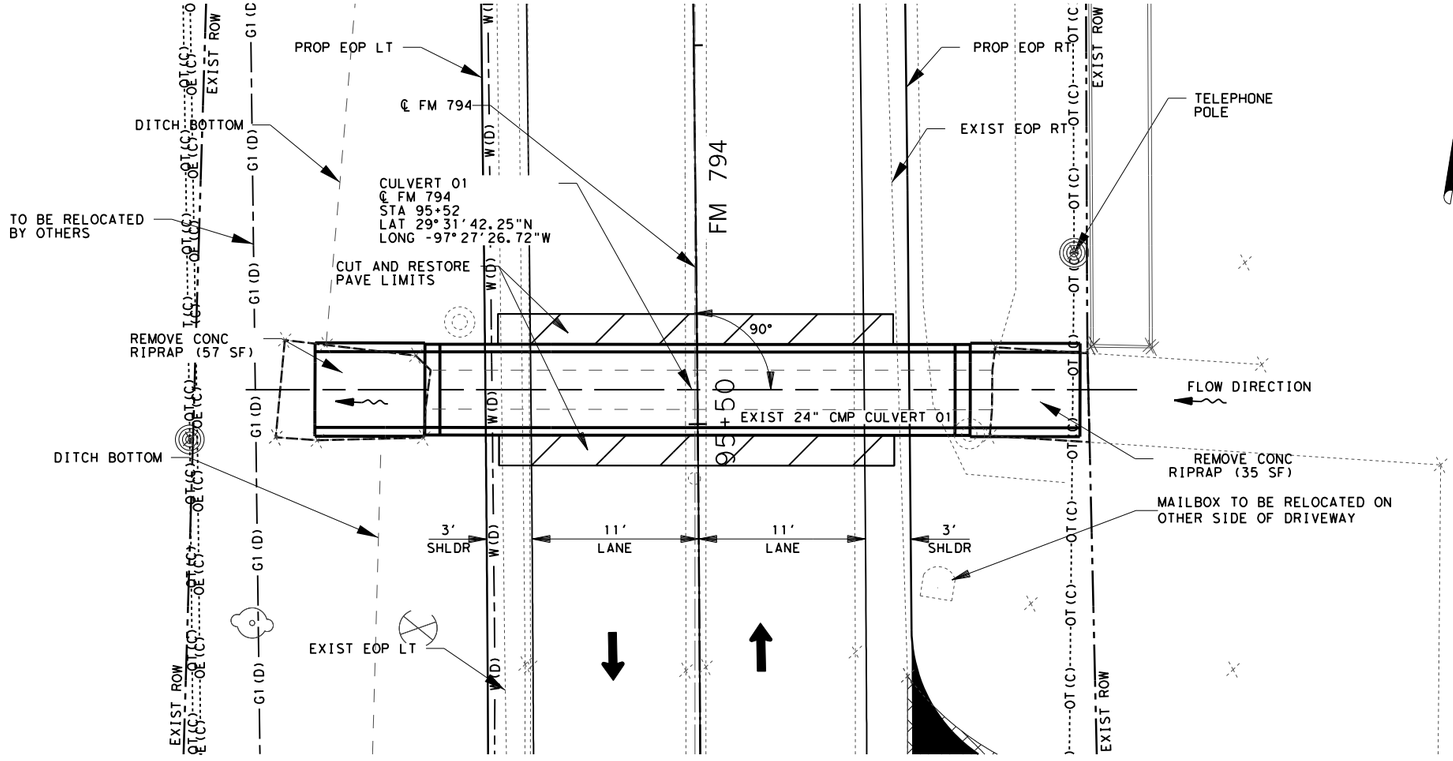
FM 794
HYDRAULIC CALCULATIONS
CULVERT No. 12
STA 446+73

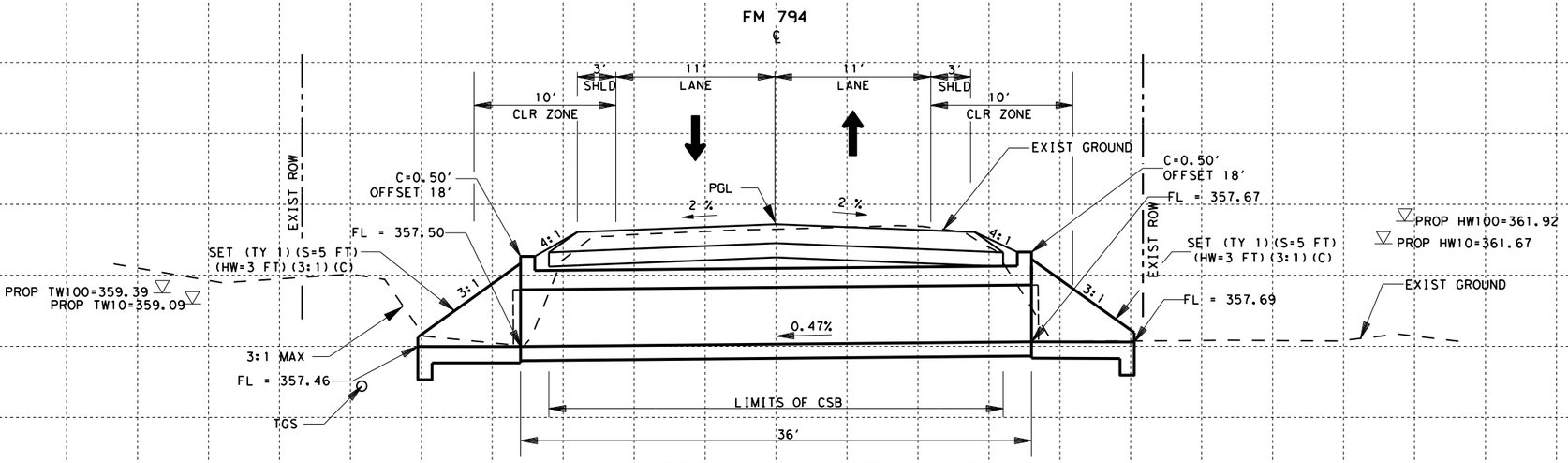
SHEET 3 OF 3

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			154
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794



NOTE:
UTILITY LOCATIONS SHOWN ARE APPROXIMATE AND SHOULD BE FIELD VERIFIED BY THE CONTRACTOR BEFORE CONSTRUCTION.

SCALE: 1"=10' H
1"=5' V



CULVERT NO. 01 STA 95+52
REMOVE EXISTING 2-24" X 37 LF CMP
INSTALL PROPOSED 1-5'X2'X36 LF CBC
ADD SET (TY 1)(S=5 FT)(HW=3 FT)(3:1)(C) LT&RT
USING SCP-5, SCP-MD, SETB-CD & BCS

STATE OF TEXAS
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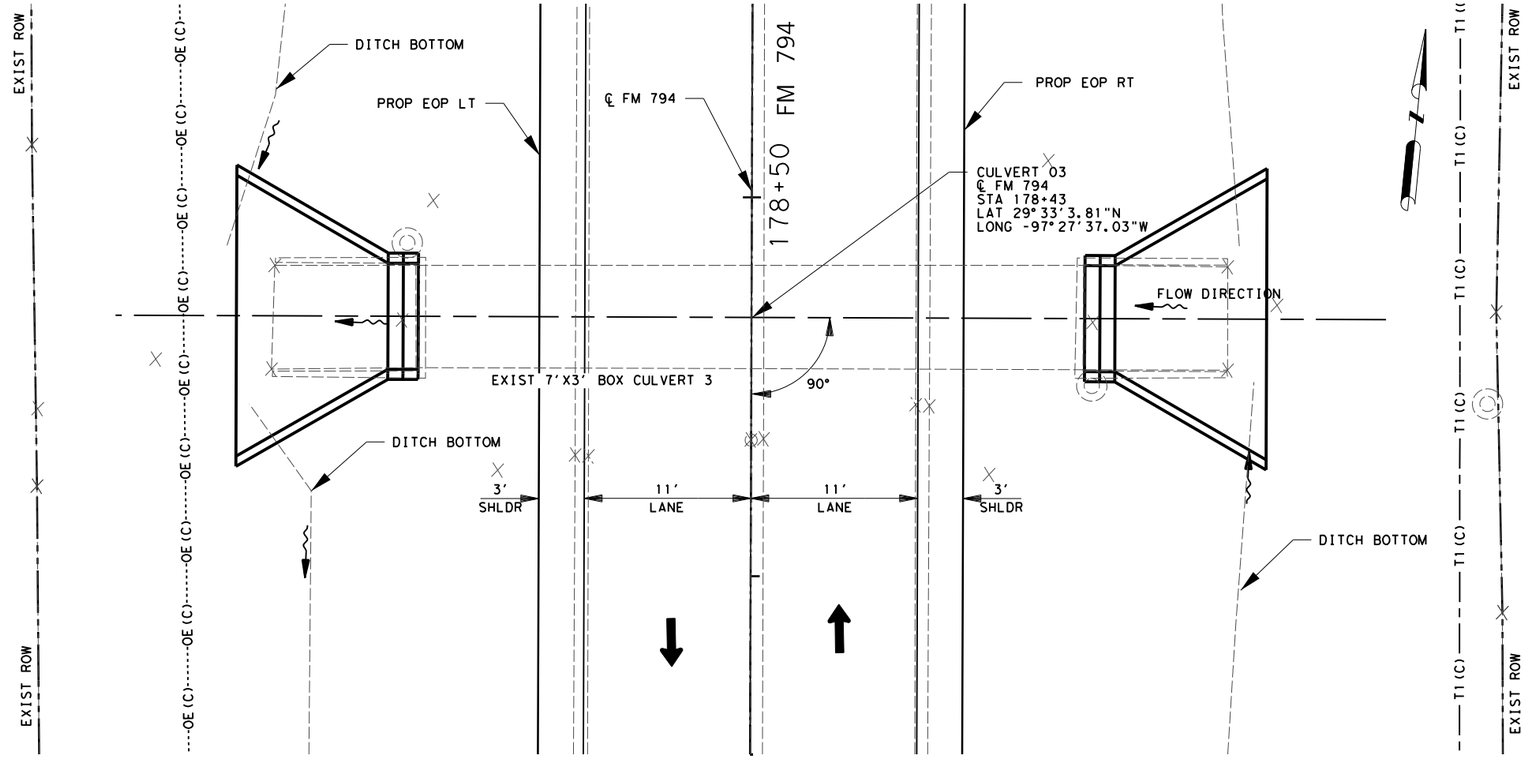
FM 794
CULVERT LAYOUTS
CULVERT NO. 01
STA 95+52

SHEET 1 OF 5

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			155
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794



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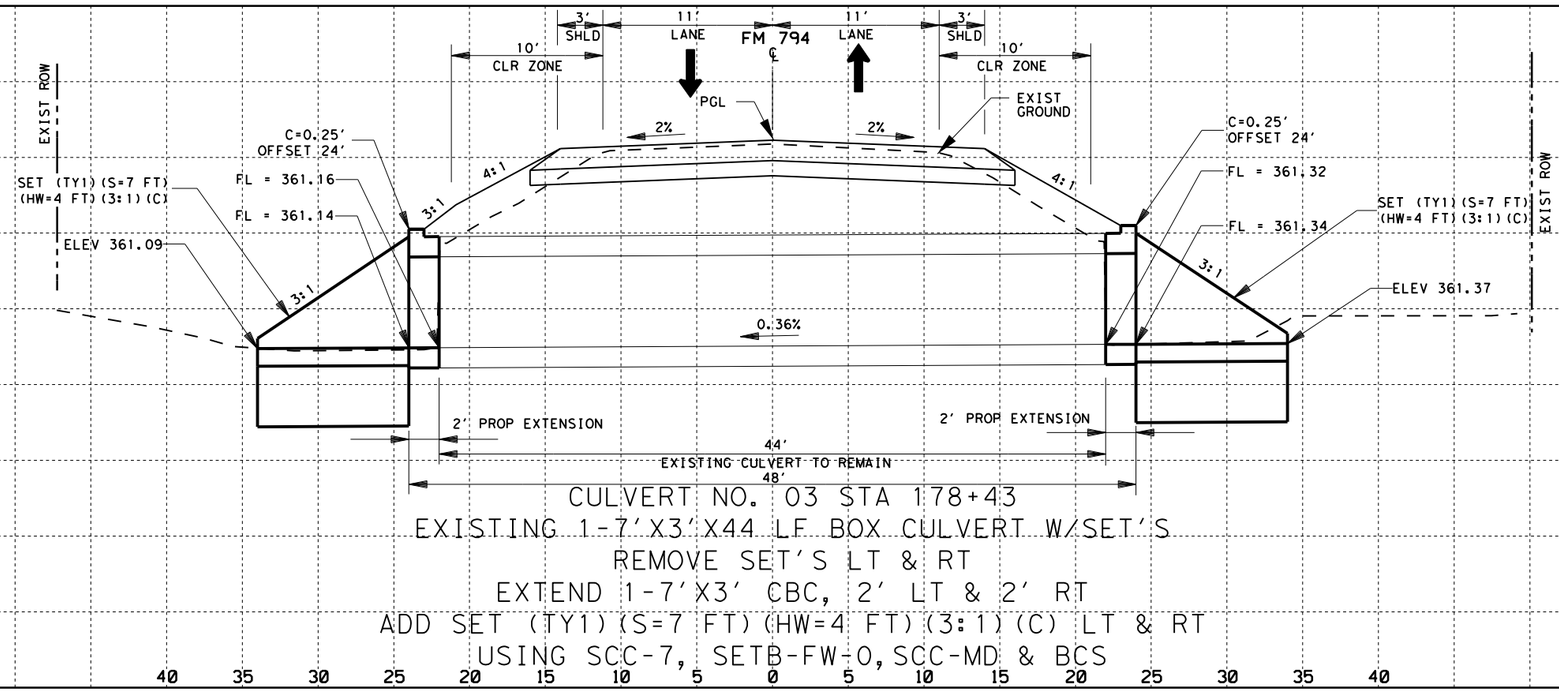
SCALE: 1"=10' H
1"=5' V



CULVERT NO. 03 STA 178+43
EXISTING 1-7'X3'X44 LF BOX CULVERT W/SET'S
REMOVE SET'S LT & RT
EXTEND 1-7'X3' CBC, 2' LT & 2' RT
ADD SET (TY1) (S=7 FT) (HW=4 FT) (3:1) (C) LT & RT
USING SCC-7, SETB-FW-0, SCC-MD & BCS

3/25/2021

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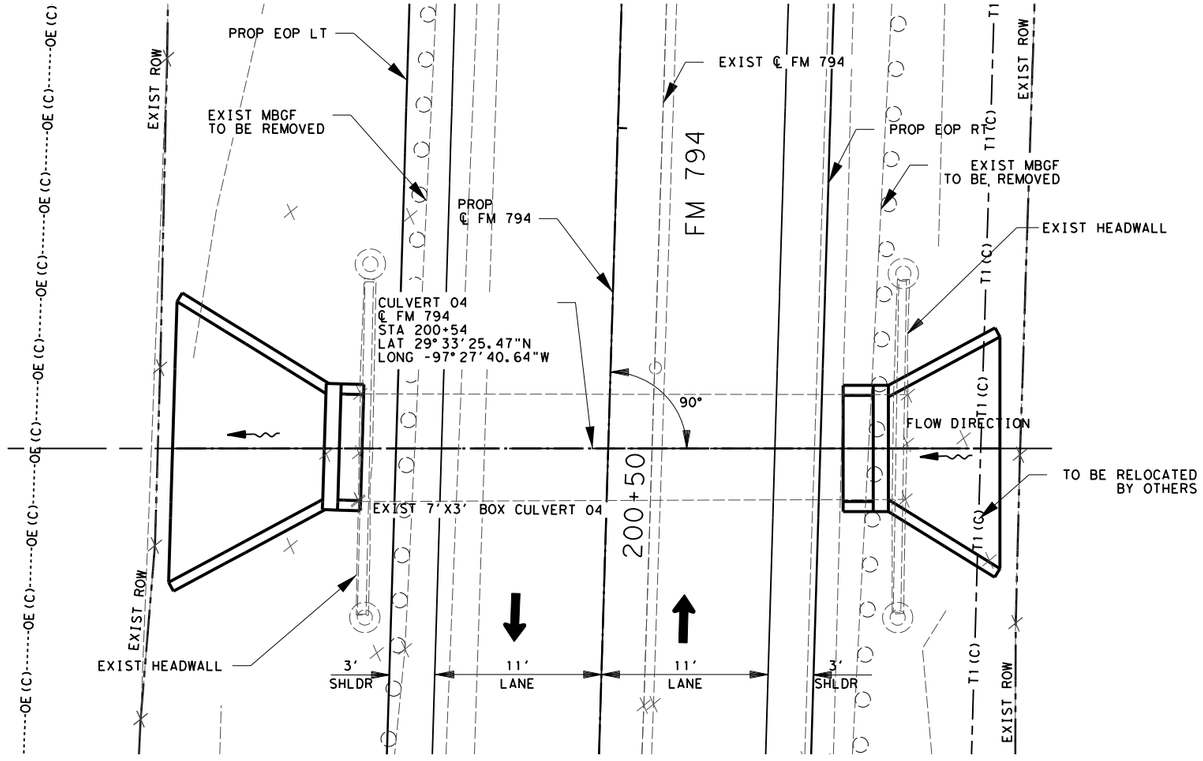
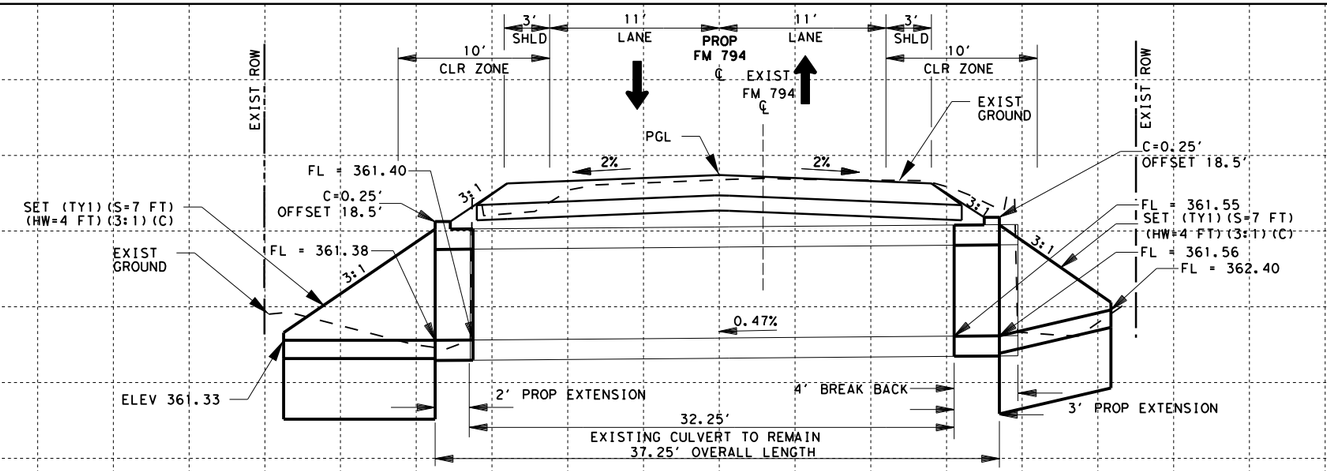
FM 794
CULVERT LAYOUTS
CULVERT NO. 03
STA 178+43

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			156
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794





CULVERT NO. 04 STA 200+54
EXISTING 1-7'X3'X36.25 LF BOX CULVERT W/PARALLEL WINGS
REMOVE PARALLEL WINGS LT & RT
BREAK BACK CBC 4' RT & EXTEND 1-7'X3' CBC, 2' LT & 3' RT
ADD SET (TY1) (S=7 FT) (HW=4 FT) (3:1) (C) LT & RT
USING SCC-7, SCC-MD, SETB-FW-0, & BCS

NOTE:
UTILITY LOCATIONS SHOWN ARE APPROXIMATE AND SHOULD BE FIELD VERIFIED BY THE CONTRACTOR BEFORE CONSTRUCTION.

0 5 10
SCALE: 1"=10' H
1"=5' V

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PROFESSIONAL ENGINEER
3/25/2021

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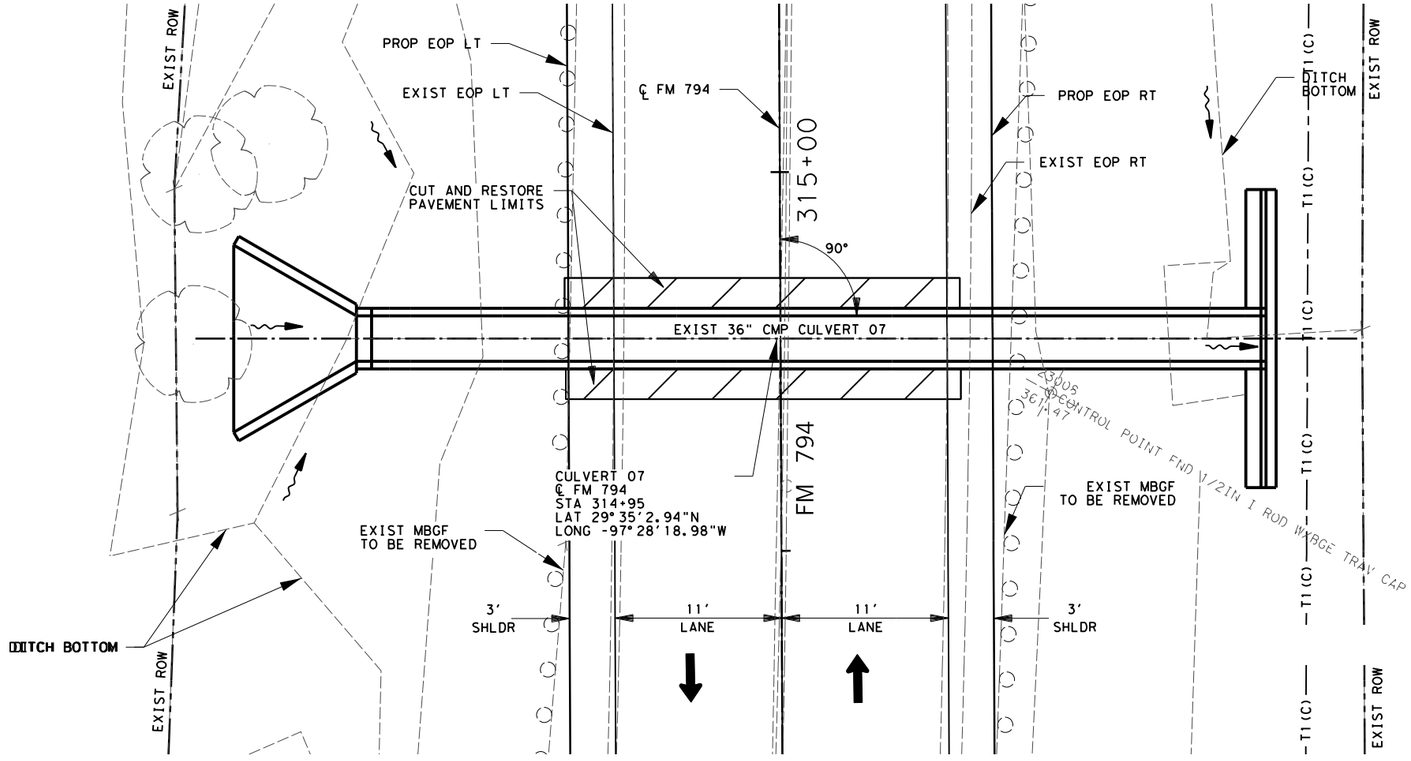
FM 794
CULVERT LAYOUTS
CULVERT NO. 04
STA 200+54

SHEET 3 OF 5

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			157
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794



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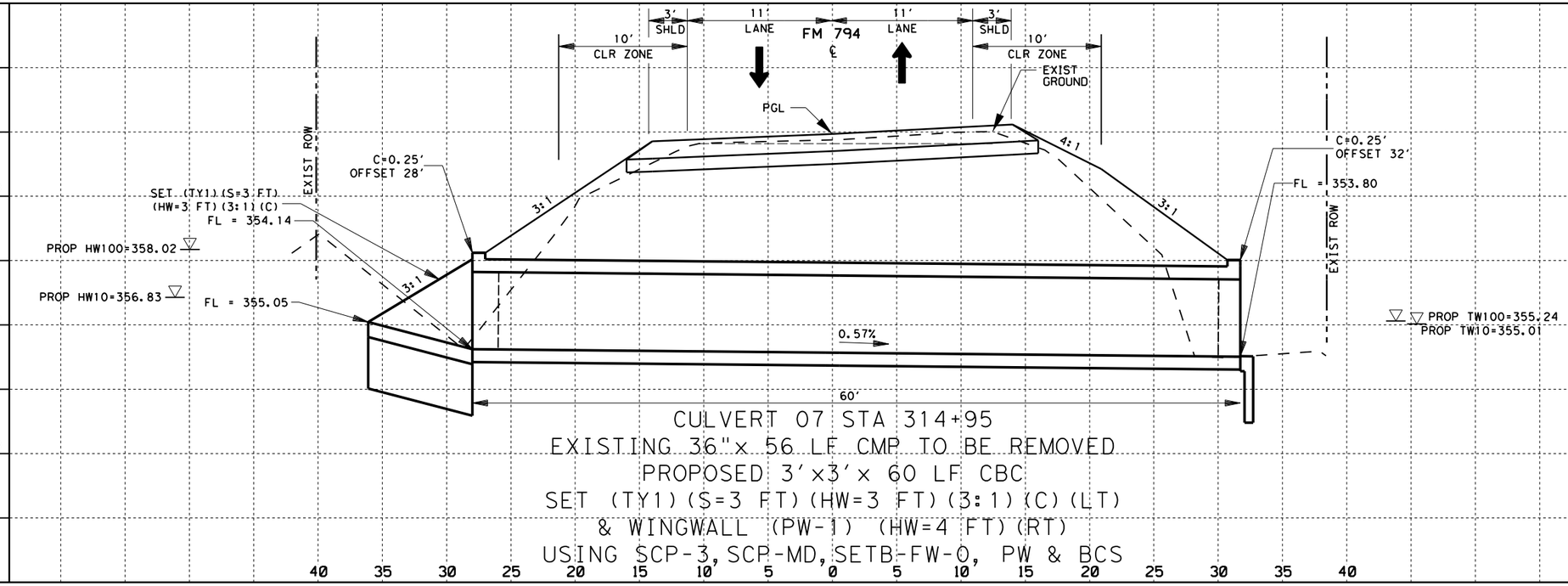
0 5 10
SCALE: 1"=10' H
1"=5' V



CULVERT 07 STA 314+95
EXISTING 36"x 56 LF CMP TO BE REMOVED
PROPOSED 3'x3'x 60 LF CBC
SET (TY1) (S=3 FT) (HW=3 FT) (3:1) (C) (LT)
& WINGWALL (PW-1) (HW=4 FT) (RT)
USING SCP-3, SCP-MD, SETB-FW-0, PW & BCS

3/25/2021

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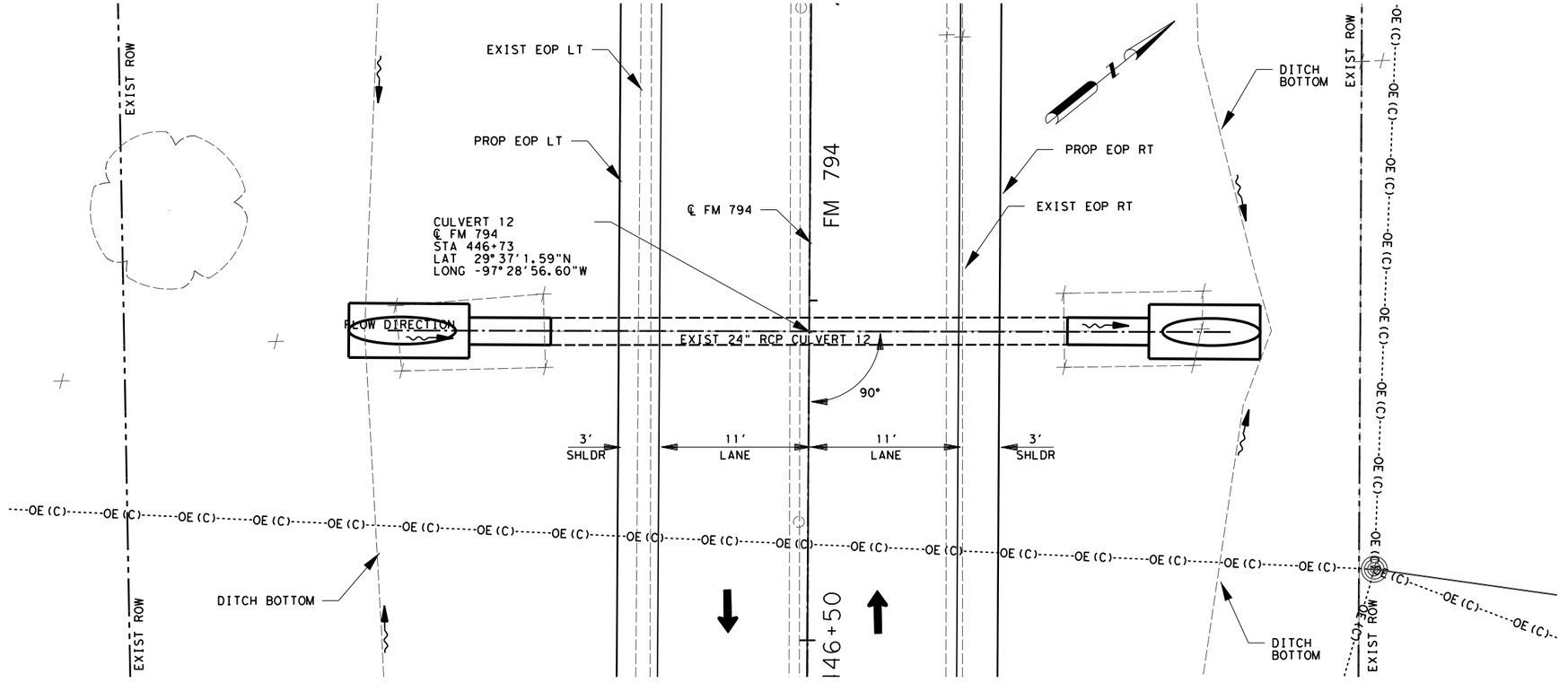
FM 794
CULVERT LAYOUTS
CULVERT NO. 07
STA 314+95

SHEET 4 OF 5

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			158
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794



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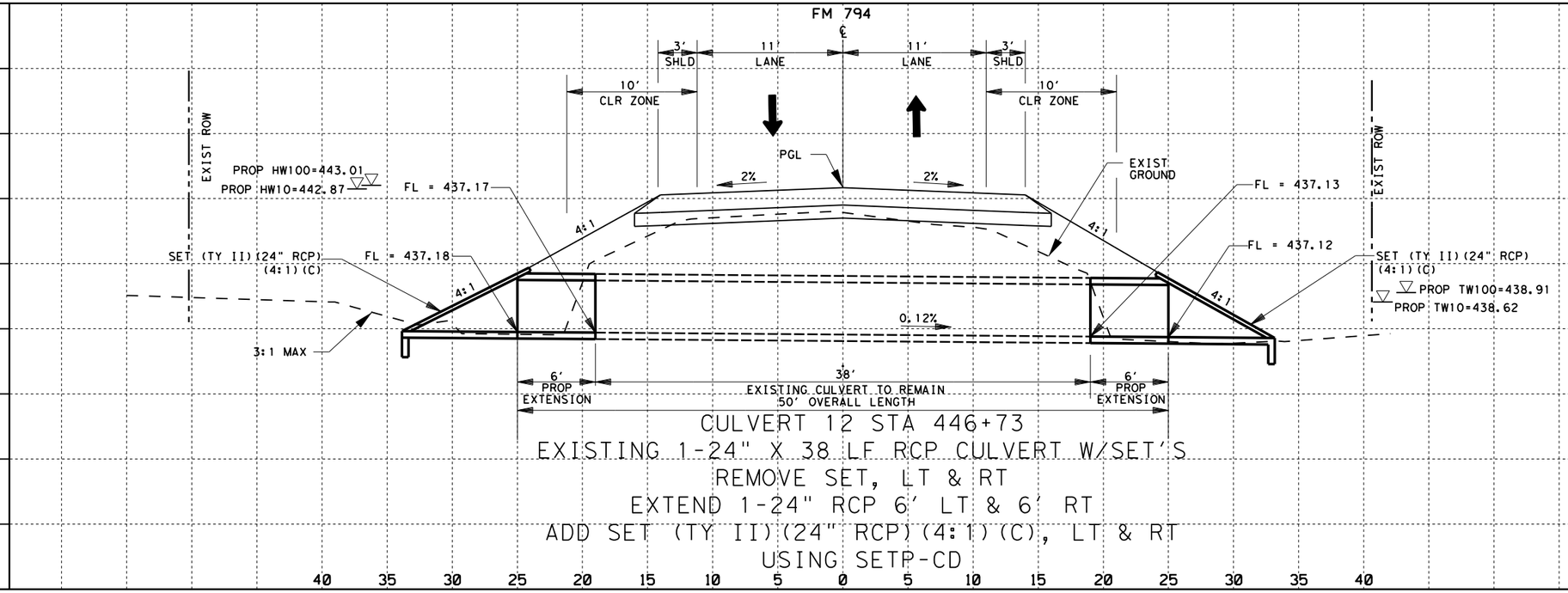
0 5 10
SCALE: 1"=10' H
1"=5' V



CULVERT 12 STA 446+73
EXISTING 1-24" X 38 LF RCP CULVERT W/SET'S
REMOVE SET, LT & RT
EXTEND 1-24" RCP 6' LT & 6' RT
ADD SET (TY II)(24" RCP)(4:1)(C), LT & RT
USING SETP-CD

3/25/2021

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FM 794
CULVERT LAYOUTS
CULVERT NO. 12
STA 446+73

SHEET 5 OF 5

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			159
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

Culvert Station and/or Creek Name followed by applicable end (Lt, Rt or Both)	Description of Box Culvert No. Spans ~ Span X Height	Max Fill Height (Ft)	Applicable Box Culvert Standard (4)	Applicable Wingwall or End Treatment Standard	Skew Angle (0°,15°, 30° or 45°)	Side Slope or Channel Slope Ratio (SL:1)	T Culvert Top Slab Thickness (In)	U Culvert Wall Thickness (In)	C Estimated Curb Height (Ft)	Hw (1) Height of Wingwall (Ft)	A Curb to End of Wingwall (Ft)	B Offset of End of Wingwall (Ft)	Lw Length of Longest Wingwall (Ft)	Ltw Culvert Toewall Length (Ft)	Atw Anchor Toewall Length (Ft)	Riprap Apron (CY)	Class "C" Conc (Curb) (2) (CY)	Class "C" Conc (Wingwall) (3) (CY)	Total Wingwall Area (SF)
STA. 95+52 (Both)	1 ~ 5' X 2'	2'	SCP-5	SETB-CD	0	3:1	6"	6"	0.500	2.750	N/A	N/A	7.250	N/A	6.167	0.0	0.2	3.2	N/A
STA. 178+43 (Both)	1 ~ 7' X 3'	2.5'	SCC-7	SETB-FW-0	0	3:1	8"	7"	0.250	3.667	10.000	5.774	11.547	N/A	18.547	3.0	0.2	9.0	N/A
STA. 200+54 (Lt)	1 ~ 7' X 3'	2'	SCC-7	SETB-FW-0	0	3:1	8"	7"	0.250	3.667	10.000	5.774	11.547	N/A	18.547	1.5	0.1	4.5	N/A
STA. 200+54 (Rt)	1 ~ 7' X 3'	2'	SCC-7	SETB-FW-0	0	3:1	8"	7"	0.250	3.667	7.36	3.96	8.36	N/A	15.299	1.1	0.1	3.30	N/A
STA. 314+95 (Lt)	1 ~ 3' X 3'	5'	SCP-3	SETB-FW-0	0	3:1	4"	4"	0.250	3.333	8.09	6.674	9.348	N/A	12.348	0.7	0.0	3.46	N/A
STA. 314+95 (Rt)	1 ~ 3' X 3'	5'	SCP-3	PW-1	0	2:1	4"	4"	0.250	3.583	N/A	N/A	7.167	3.667	N/A	0.0	0.0	4.10	51

DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE:
FILE:

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

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

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

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

C = Curb height

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

Hw = Height of wingwall

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

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

Lw = Length of longest wingwall.

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

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

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

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

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

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

2/9/2021

STATE OF TEXAS
JOSE LUIS DIAZ JR
99365
LICENSED PROFESSIONAL ENGINEER

Texas Department of Transportation

Bridge Division Standard

BOX CULVERT SUPPLEMENT
WINGS AND END TREATMENTS

BCS

FILE: bcsstde1-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	032	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		160

DATE: 3/25/2021 8:50:54 AM
FILE: c:\pwworkdir\bge_pw\bwestmoreland\dms49522\setbf0se-20.dgn

TABLE OF DIMENSIONS AND REINFORCING STEEL
(Wings for One Structure End)

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

TABLE OF WING WALL REINFORCING (Two~Wings)

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

TABLE OF ESTIMATED CULVERT TOEWALL QUANTITIES

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

TABLE OF ESTIMATED ANCHOR TOEWALL QUANTITIES

Bar	Size	No.	Spa
K	#4	~	1'-0"
N	#5	6	~
OL	#4	6	~
Reinf (Lb/Ft)			9.82
Conc (CY/Ft)			0.074

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

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

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

(4) Recommended values of slope are: 3:1, 4:1, and 6:1. Provide 3:1 or flatter slope.

(5) When shown elsewhere on the plans, construct 5" deep concrete riprap. Payment for riprap is as required by Item 432, "Riprap". Unless otherwise shown on the plans or directed by the Engineer, extend construction joints or grooved joints, oriented in the direction of 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 is not required.

(6) At Contractor's option, end the culvert toewall flush with wingwall toewall. Adjust reinforcing as needed.

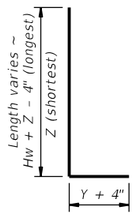
(7) 3" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures without railing and curbs taller than 1'-0", refer to the Extend Curb Details (ECD) standard sheet.

(8) For vehicle safety, reduce curb heights, if necessary, to provide a maximum 3" projection above finished grade. No changes will be made in quantities and no additional compensation will be allowed for this work.

(9) See Table of Maximum Wing Heights for various slopes. Height is limited based on a 33'-6" maximum safety pipe runner length.

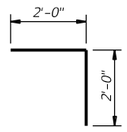
TABLE OF MAXIMUM WING HEIGHTS (9)

Side Slope	Hw Max
3:1	11'- 5"
4:1	8'-10"
6:1	6'- 1"

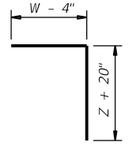


BARS J1

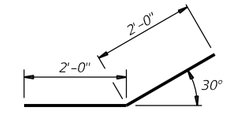
BARS V



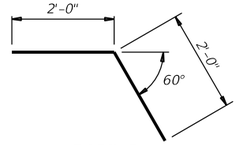
BARS L



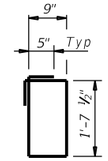
BARS J2



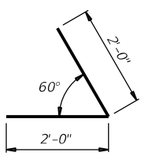
BARS D



BARS R



BARS K
(Length = 5'-5")



BARS OL

WING DIMENSION CALCULATIONS:

Hw = H + T + C - 0.250' (9)
A = (Hw - 0.333') (SL)
B = (A) (tan (30°))
Lw = (A) ÷ cos (30°))

For cast-in-place culverts:
Ltw = (N) (S) + (N + 1) (U)
For precast culverts:
Ltw = (N) (2U + S) + (N - 1) (0.500')

Lc = (Ltw) - (2U)
Atw = (Lc) + (2B)
Total Wingwall Area (two wings ~ SF) = (Hw + 0.333') (Lw)

Hw = Height of wingwall (feet)
Atw = Anchor toewall length (feet)
Lw = Length of wingwall (feet)
N = Number of culvert barrels
SL:1 = Side slope ratio (horizontal : 1 vertical)
Ltw = Culvert toewall length (feet)
Lc = Culvert curb between wings (feet)

See applicable box culvert standard for H, S, T, and U values.
See Table of Maximum Wall Heights for limits on Hw.

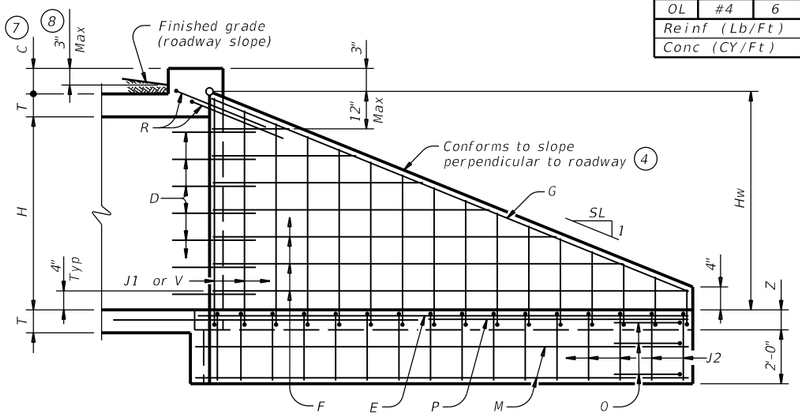
MATERIAL NOTES:

Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.
Synthetic 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 Class "C" concrete (f`c = 3,600 psi).
Adjust reinforcing as necessary to provide a minimum clear cover of 1 ½".
Provide pipe runners and anchor pipes meeting the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 Gr B, or API 5LX52.
Provide ASTM A307 bolts and nuts.
Provide ASTM A36 steel plates.
Galvanize all steel components, except reinforcing unless required elsewhere in the plans, after fabrication.
Repair galvanizing damaged during transport or construction in accordance with the Item 445, "Galvanizing".
For optional adhesive anchors, install adhesive anchorages in accordance with the manufacturer's instructions including hole size, drilling equipment and method, hole cleaning equipment and method, mixing and dispensing adhesive, and anchor insertion. Do not alter the manufacturer's mixing nozzle or dispenser. Provide anchorage rods that are clean and free of grease, oil, or any other foreign material. Demonstrate hole cleaning method to the Engineer for approval and continue the approved process for all anchorage locations. Test adhesive anchors in accordance with Item 450.3.3, "Tests." Test 3 anchors per 100 anchors installed.

GENERAL NOTES:

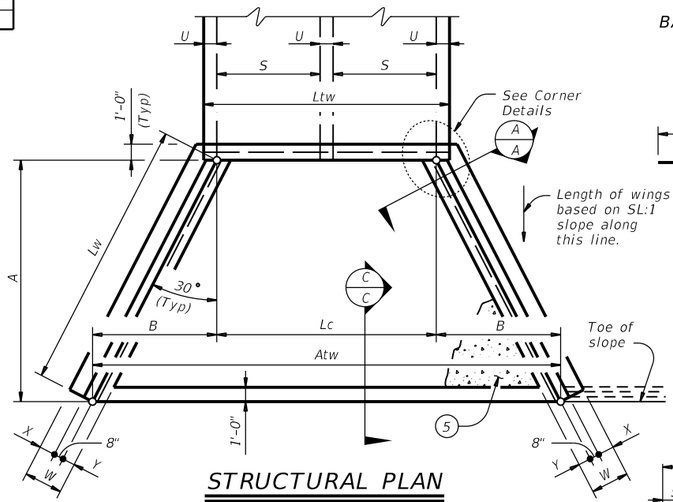
Designed according to AASHTO LRFD Bridge Design Specifications.
The safety end treatments shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the pipe runners.
Pipe runners are designed for a traversing load of 1,800 pounds at yield as recommended by Research Report 280-1, "Safety Treatment of Roadside Cross-Drainage Structures", Texas Transportation Institute, March 1981.
When structure is founded on solid rock, depth of toewalls for culverts and wingwalls may be reduced or eliminated as directed by the Engineer.
All bolts, nuts, washers, brackets, angles, and pipe runners are considered parts of the safety end treatment for payment.
The quantities for pipe runners, reinforcing steel, and concrete, resulting from the formulas given herein are for Contractor's information only.
See the Box Culvert Supplement (BCS) standard sheet for additional dimensions and information.

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



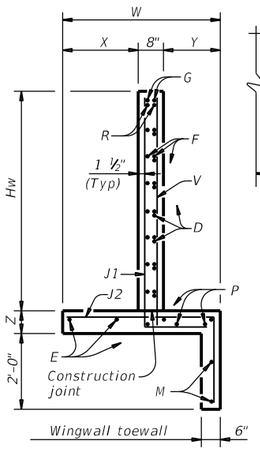
INSIDE ELEVATION OF WINGWALL

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

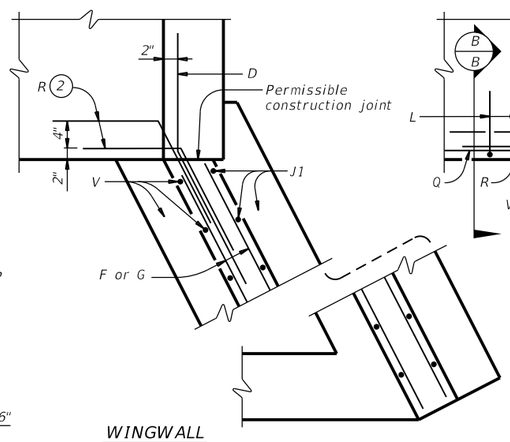


STRUCTURAL PLAN

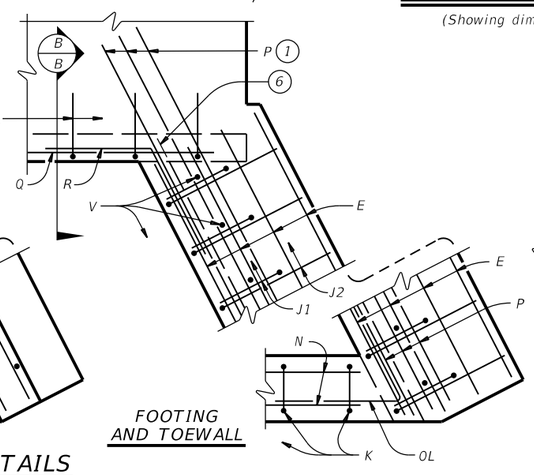
(Showing dimensions.)



SECTION A-A



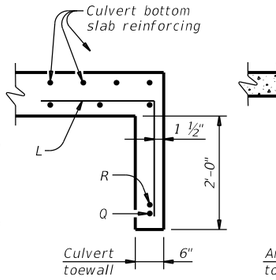
WINGWALL



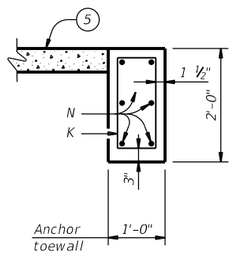
FOOTING AND TOEWALL

CORNER DETAILS

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



SECTION B-B (5)



SECTION C-C

SHEET 1 OF 3

Texas Department of Transportation

Bridge Division Standard

SAFETY END TREATMENT WITH FLARED WINGS

FOR 0° SKEW BOX CULVERTS
TYPE I ~ CROSS DRAINAGE

SETB-FW-0

FILE: setbf0se-20.dgn	DN: GAF	CK: CAT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	032	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		161

DATE: 3/25/2021 8:50:55 AM
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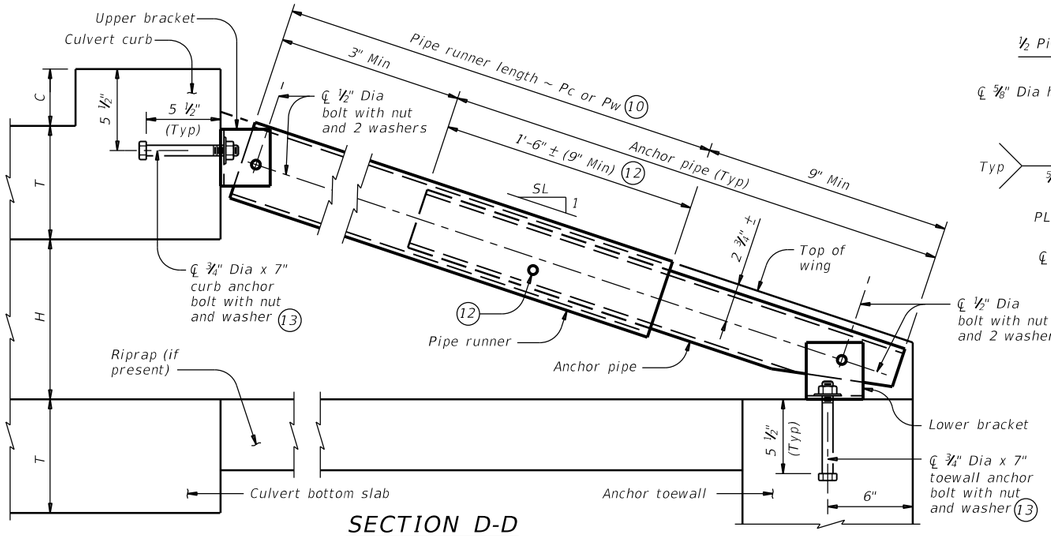
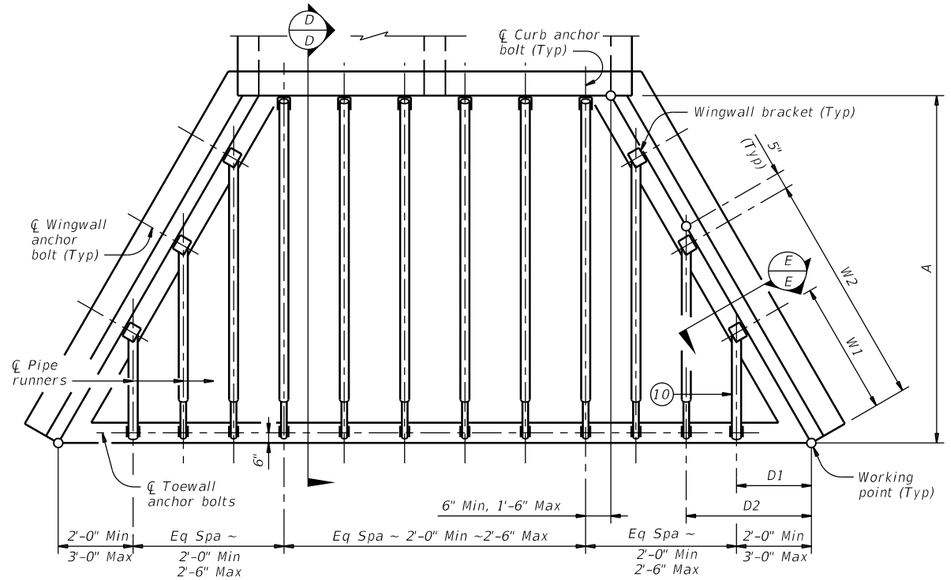
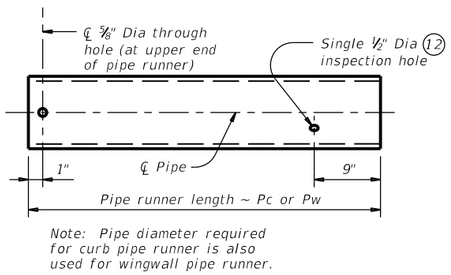


SECTION D-D

(Showing curb pipe runner. Except for upper bracket, wingwall pipe runners are similar.)

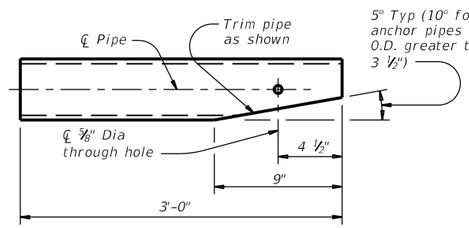


PIPE RUNNER PLAN

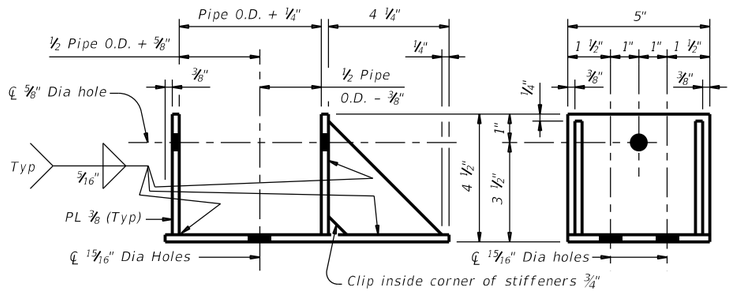


Note: Pipe diameter required for curb pipe runner is also used for wingwall pipe runner.

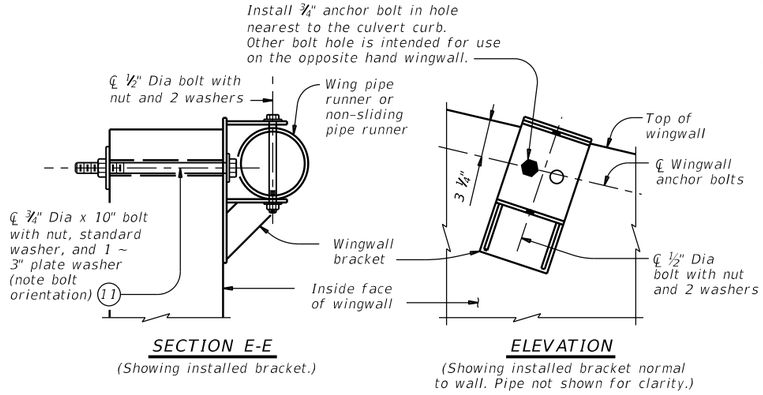
PIPE RUNNER DETAILS



ANCHOR PIPE DETAILS



ELEVATION SIDE VIEW

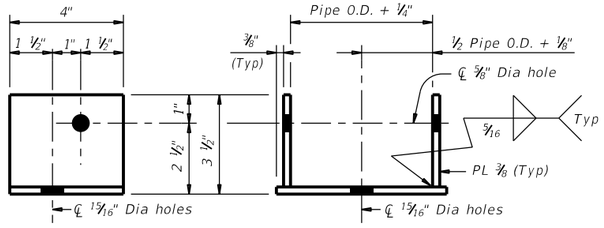


SECTION E-E
(Showing installed bracket.)

ELEVATION
(Showing installed bracket normal to wall. Pipe not shown for clarity.)

Note: Match wingwall bracket to the upper curb bracket size.

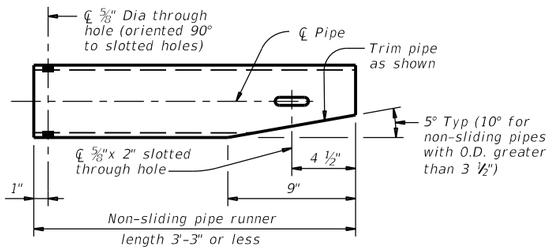
WINGWALL BRACKET DETAILS



SIDE VIEW ELEVATION

Note: Match upper and lower brackets, except for the brackets used with non-sliding pipe runners, to the required pipe diameters as shown in the table.

UPPER AND LOWER BRACKET DETAILS



Note: Pipe size is the same as required for curb pipe runner. Adjust the corresponding lower bracket accordingly.

NON-SLIDING PIPE RUNNER DETAILS

MAXIMUM PIPE RUNNER LENGTHS AND REQUIRED PIPE RUNNER SIZES

Maximum Pipe Runner Length (Pc or Pw)	Required Pipe Runner Size			Required Anchor Pipe Size		
	Pipe Size	Pipe O.D.	Pipe I.D.	Pipe Size	Pipe O.D.	Pipe I.D.
9'-4"	3" STD	3.500"	3.068"	2" STD	2.375"	2.067"
19'-0"	4" STD	4.500"	4.026"	3" STD	3.500"	3.068"
33'-6"	5" STD	5.563"	5.047"	4" STD	4.500"	4.026"

(10) If pipe runner length (Pw) is 1'-9" or less replace the normal pipe runner and anchor pipe with a single non-sliding pipe runner. See Non-Sliding Pipe Runner Details for additional information.

(11) At Contractor's option, ⅞" diameter hole may be formed or cored drilled. Percussion drilling is not permitted. Adjust placement of reinforcing steel as necessary to avoid bolt holes.

(12) After installation of pipe runner, use the ½" inspection hole to ensure that the lap of the anchor pipe with the pipe runner is adequate.

(13) At Contractor's option, an adhesive anchor may be used. Provide ¾" Dia adhesive anchors that meet the requirements of ASTM A307 Gr A fully threaded rods. Embed threaded rods into curb, wingwalls, and toewall using a Type III, Class C, D, E, or F anchor adhesive. Minimum embedment depth is 5 ½". Provide anchor adhesive able to achieve a basic bond strength in tension, Nba, of 20 kips. Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use.

PIPE RUNNER DIMENSION CALCULATIONS:

Wn = (2.000) (Dn) – (0.416')
Pwn = (Dn) (K2) – (2.063')
Pw1 Non-Sliding Pipe Runner (If required) = (D1) (K2) – (0.563')
Pc = (A) (K1) – (1.688')

Wn = Distance from working point to centerline anchor bolt measured along bottom inside face of wing (feet)
Dn = Distance from working point to centerline pipe runner measured along outside face of anchor toewall (feet)
Pw = Wingwall pipe runner length (feet)
Pc = Curb pipe runner length (feet)
K = Constant values for use in formulas

Slope SL:1	K1	K2
3:1	~ 1.054	~ 1.826
4:1	~ 1.031	~ 1.785
6:1	~ 1.014	~ 1.756

n = Wing pipe runner number

Texas Department of Transportation

Bridge Division Standard

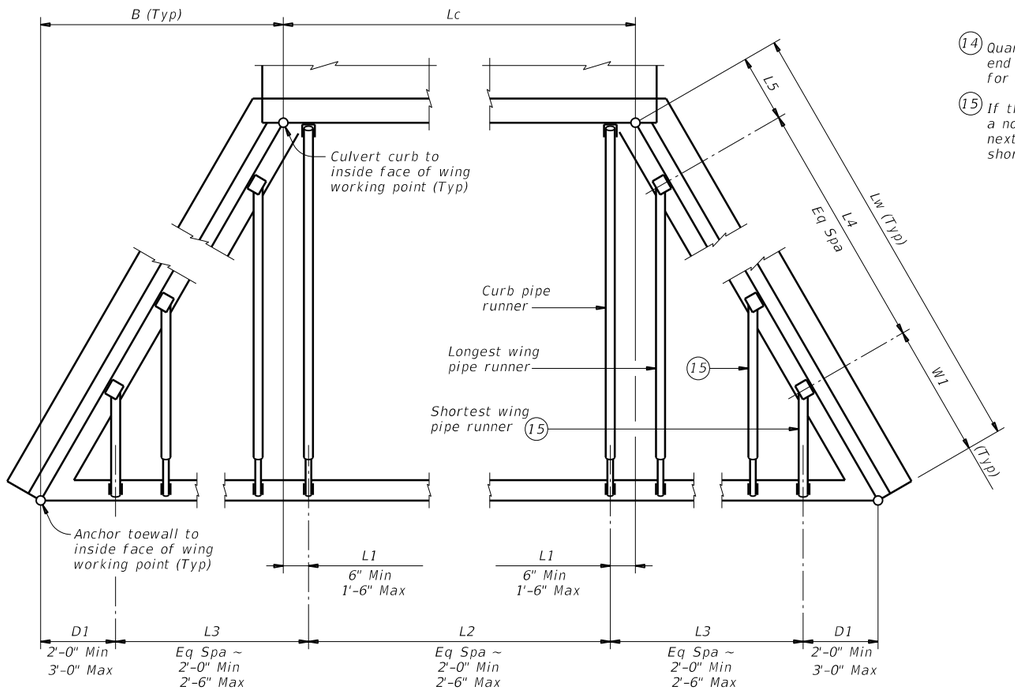
SAFETY END TREATMENT WITH FLARED WINGS

FOR 0° SKEW BOX CULVERTS
TYPE I ~ CROSS DRAINAGE

SETB-FW-0

FILE: setbf0se-20.dgn	DN: GAF	CK: CAT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	032	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		162

Culvert Station and/or Creek name followed by applicable end (Lt, Rt or Both) (14)	Lc	L1	L2			D1	L3			W1	L4			L5	Curb Pipe Runner (Pc)		Longest Wing Pipe Runner (Pw)	Shortest Wing Pipe Runner (Pw)	Non-Sliding Wing Pipe Runner (if applicable)	Curb, Wing, and/or Non-Sliding Pipe Runners		3'-0" Anchor Pipe	
			No. Spa	Spa at	Overall Length		No. Spa	Spa at	Overall Length		No. Spa	Spa at	Overall Length		No.	Length				Size (3",4" or 5")	Total Length (14)	Size (2",3" or 4")	Total Length (14)
	(Ft)	(Ft)		(Ft)	(Ft)	(Ft)		(Ft)	(Ft)	(Ft)		(Ft)	(Ft)	(Ft)		(Ft)	(Ft)	(Ft)	(Ft)				
STA. 178+43 (Both)	7.000	0.500	3	2.000	6.000	2.000	2	2.137	4.274	3.583	1	4.274	4.274	3.690	4	8.854	5.500	N/A	3.083	3"	105.167	2"	36.000
STA. 200+54 (Lt)	7.000	0.500	3	2.000	6.000	2.000	2	2.137	4.274	3.583	1	4.274	4.274	3.690	4	8.854	5.500	N/A	3.083	3"	52.583	2"	18.000
STA. 200+54 (Rt)	7.000	0.500	3	2.000	6.000	2.000	2	2.137	4.274	3.583	1	4.274	4.274	3.690	4	7.130	5.500	N/A	3.083	3"	45.687	2"	18.000
STA. 314+95 (Lt)	3.000	0.500	0	0.000	0.000	2.000	2	2.348	4.696	3.583	1	4.696	4.696	2.113	1	7.590	5.875	N/A	3.083	3"	24.990	2"	9.000



PIPE RUNNER LAYOUT

(14) Quantities shown are for one structure end if Lt or Rt. Quantities shown are for two structure ends if Both.

(15) If the outermost wing pipe runner is a non-sliding pipe runner, consider the next outermost wing pipe runner as the shortest.

DATE:
FILE:

2/9/2021

STATE OF TEXAS
JOSE LUIS DIAZ JR
99365
LICENSED
PROFESSIONAL ENGINEER

Texas Department of Transportation

Bridge Division Standard

SAFETY END TREATMENT WITH FLARED WINGS

FOR 0° SKEW BOX CULVERTS
TYPE I ~ CROSS DRAINAGE

SETB-FW-0

FILE: setbf0se-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
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	YKM	GONZALES		163

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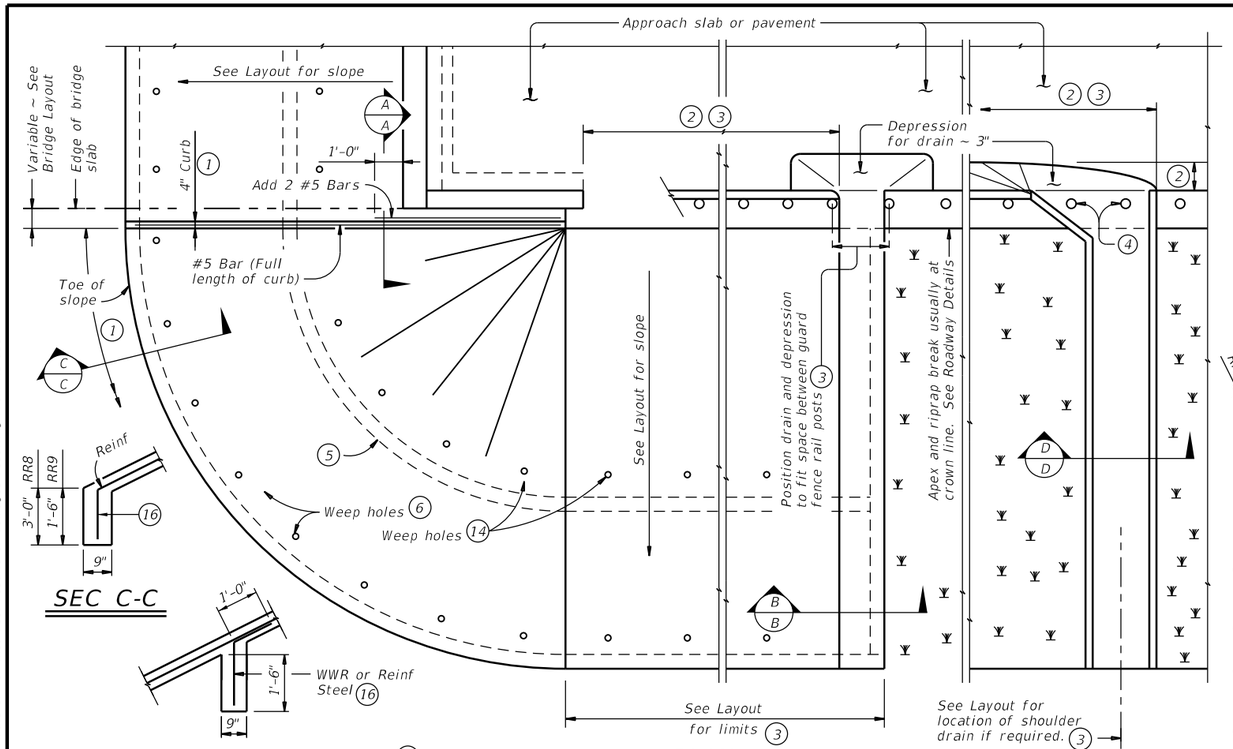
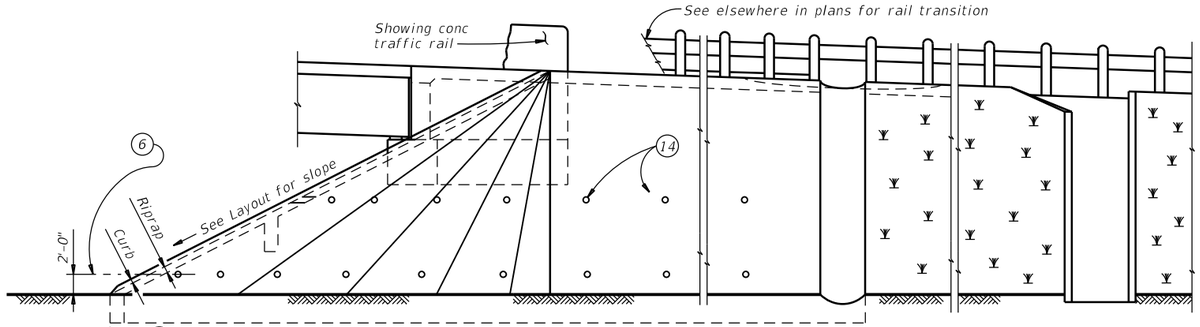
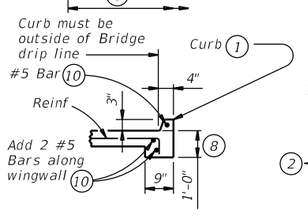
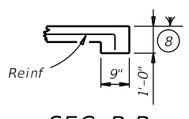
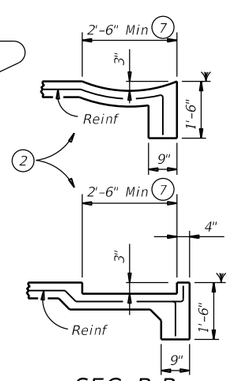
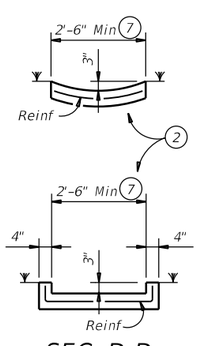


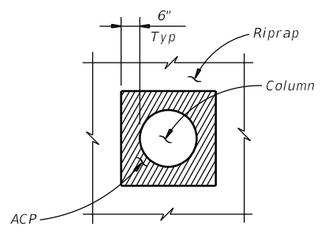


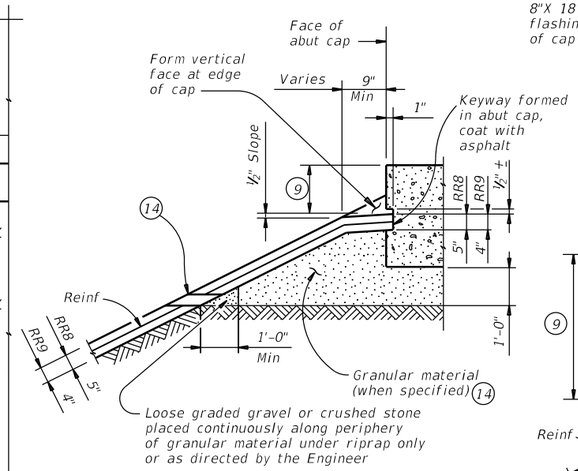


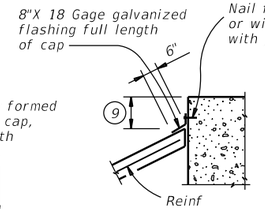


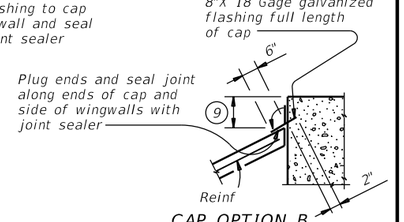


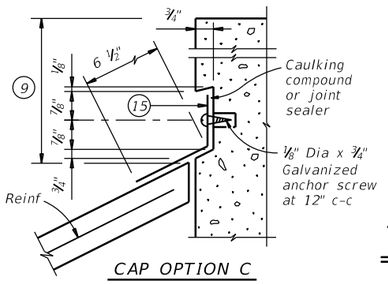


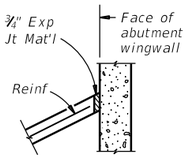






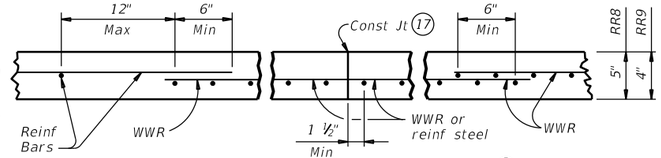






SECTIONS THRU RIPRAP AT CAP (11)

1. When riprap is shown extended around header on layout, extend slab and toewall as shown and eliminate 4" curb.
2. Limits and configuration of drains and depressions are as shown elsewhere in plans or as directed by the Engineer.
3. Location of shoulder drain must consider limitations imposed by rail transition. Do not locate shoulder drains at expansion joints between approach slab and concrete pavement.
4. See details elsewhere in plans for installation of guard fence posts through concrete riprap.
5. Provide intermediate toewall only when designated elsewhere in the plans or included in the specifications.
6. Provide lower level of 2" Dia weep holes at 10' c-c backed by 1 CF packet of gravel and galvanized hardware cloth at all locations unless directed by the Engineer to eliminate.
7. Use wider or other drain configurations if shown elsewhere in plans or if directed by the Engineer.
8. Wall extension may be reduced or modified if approved by the Engineer. Increase wall extension to 1'-6" whenever the optional intermediate toewall is called for in the plans.
9. Top of cap to top of riprap dimension varies as directed by the Engineer. Should be 9" Min for beam/slab type bridges and 1'-6" for slab span, box beam, or slab beam bridges.
10. #5 bars shown are required even when synthetic fiber reinforcing option is selected.
11. Provide sealing option for joint between the face of cap and riprap as designated by the Engineer or as shown elsewhere on plans.
12. Flashing (shown in Cap Option A) may be used at wingwall in addition to Exp Jt Mat'l if shown on plans or directed by the Engineer.
13. Provide #3 reinforcing bars at 18" Spa c-c. Provide Welded Wire Reinforcement (WWR) as 6x6-D2.9xD2.9 or D3xD3. Combinations of WWR and reinforcing bars may be used if both are permitted. Use lap splices of a minimum 6 inches, measured from the transverse wire of WWR, and the ends of reinforcing bars.
14. If granular material is specified, provide upper level of 2" Dia weep holes at 10' c-c backed by galvanized hardware cloth.
15. 8" x 18 Gage Galv Sheet Metal
16. Provide WWR or #3 bars, with 1'-0" extension into slope.
17. WWR or reinforcing steel is continuous through riprap construction joints. Provide WWR or reinforcing steel that extends 1'-1" minimum into adjacent riprap on each side of construction joint even if synthetic reinforcing fiber is utilized.



See General Notes for optional synthetic fiber reinforcement.

FOR CONTRACTOR'S INFORMATION ONLY:
5" of RR8 = 0.015 CY/SF
4" of RR9 = 0.012 CY/SF
#3 Reinf at 18" c-c = 0.501 Lbs/SF
6x6-D3xD3 = 0.408 Lbs/SF

GENERAL NOTES:

Provide Class "B" concrete (f'c = 2,000 psi) unless noted elsewhere in plans.

Provide Grade 60 reinforcing steel.

Provide deformed welded wire reinforcement (WWR) meeting ASTM A1064, unless otherwise shown.

Provide reinforcing bars, deformed WWR, or any suitable combination of both types for riprap reinforcing, unless specified elsewhere in the plans.

Optionally synthetic fibers may be used if approved by the Engineer. Provide synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) in lieu of steel reinforcing in riprap concrete.

Install construction joints or grooved joints extending the full slant slope height at intervals of approximately 20 feet unless otherwise directed by the Engineer.

Hardware cloth, loose grade stone behind weep holes, flashing, or other sealing material are subsidiary to the bid item "Riprap".

See Layout for limits of riprap.

RR8 is to be used on stream crossings.

RR9 is to be used on other embankments.

Texas Department of Transportation

Bridge Division Standard

CONCRETE RIPRAP AND SHOULDER DRAINS
EMBANKMENTS AT BRIDGE ENDS (TYPES RR8 & RR9)

CRR

FILE: crrstde1-19.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019 REVISIONS	CONT	SECT	JOB	HIGHWAY
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	YKM	GONZALES		164

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

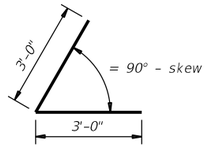
Dimensions					Variable Reinforcing				Estimated Quantities per ft of wing (2~wings) (4)		Estimated Quantities per ft of Toewall (1~toewall)	
					Bars J1		Bars J2					
Maximum Wingwall Height Hw	W	X	Y	Z	Size	Spa	Size	Spa	Reinf (Lb/Ft)	Conc (CY/Ft)	Reinf (Lb/Ft)	Conc (CY/Ft)
2'-6"	2'-10"	10"	1'-0"	7"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

TABLE OF WINGWALL REINFORCING
(2~wings)

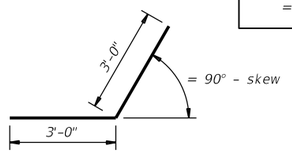
Bar	Size	No.	Spa
D1	#6	~	1'-0"
D2	#6	~	1'-0"
E1	#4	~	1'-0"
F	#4	~	1'-0"
G	#6	~	8"
M1	#4	4	~
P	#4	~	1'-0"
V	#4	~	1'-0"

TABLE OF TOEWALL REINFORCING

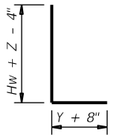
Bar	Size	No.	Spa
J3	#4	~	1'-0"
M2	#4	2	~
E2	#4	~	1'-0"



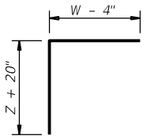
BARS D1



BARS D2



BARS J1



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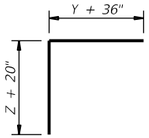

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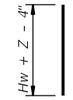


BARS V

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

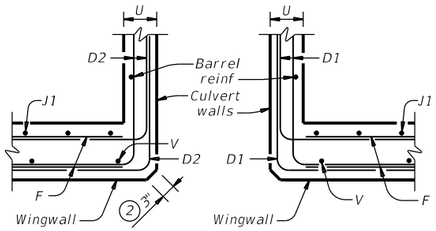
Hw = H + T + C
Lw = (Hw) (SL) ÷ cosine (θ) for Type PW-1
= (Hw - 1') (SL) ÷ cosine (θ) for Type PW-2 and Hw ≥ 4'
= (Hw - 0.5') (SL) ÷ cosine (θ) for Type PW-2 and Hw < 4'

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

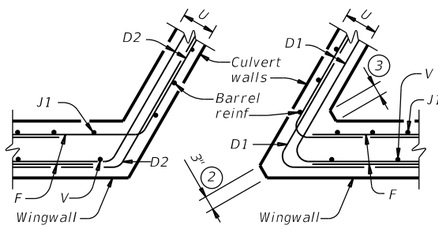
For precast culverts:
Ltw = [(N) (2 U + S) + (N - 1) (0.5')] ÷ cosine (θ)
Total Wingwall Area (two wings ~ SF)
= (2)(Hw)(Lw) for Type PW-1
= (2)(Hw)(Lw) - 6 SF for Type PW-2 and Hw ≥ 4'
= (2)(Hw)(Lw) - 1.5 SF for Type PW-2 and Hw < 4'

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

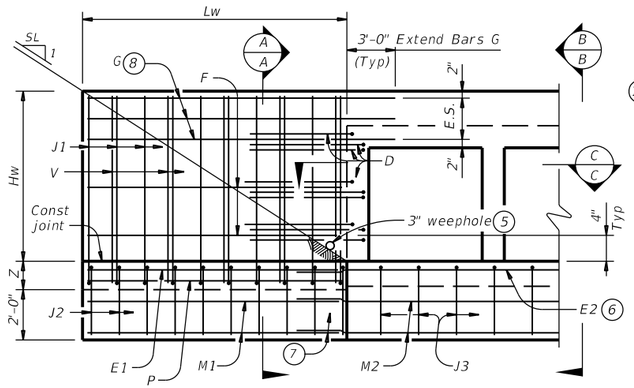
See applicable box culvert standard sheet for S, H, T, and U values.



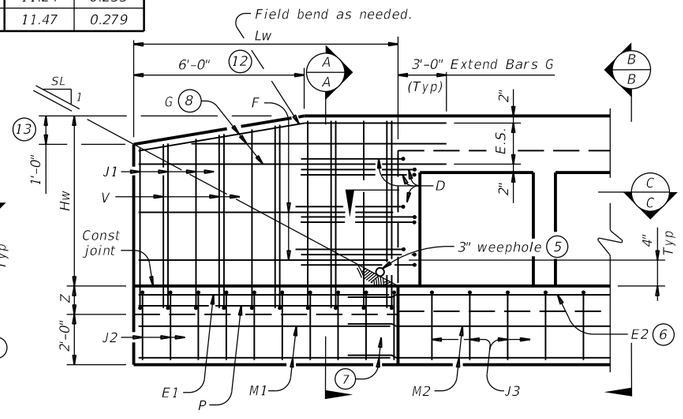
SECTION C-C - PW-1



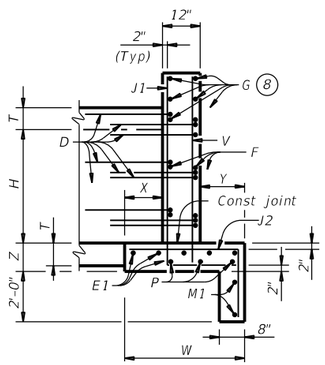
SECTION C-C - PW-2



PARTIAL ELEVATION - PW-1



PARTIAL ELEVATION - PW-2



SECTION A-A
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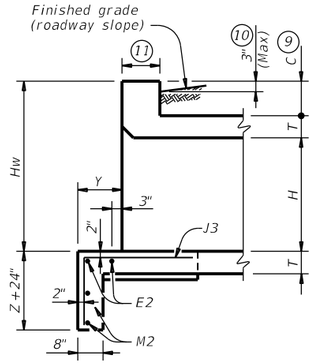

SECTION B-B
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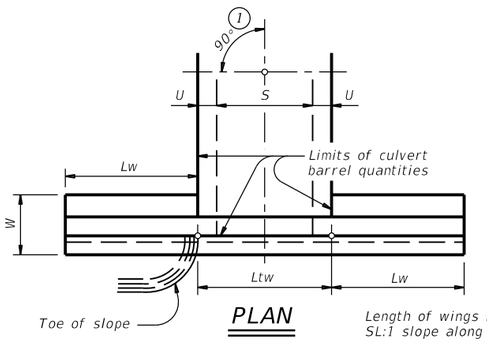
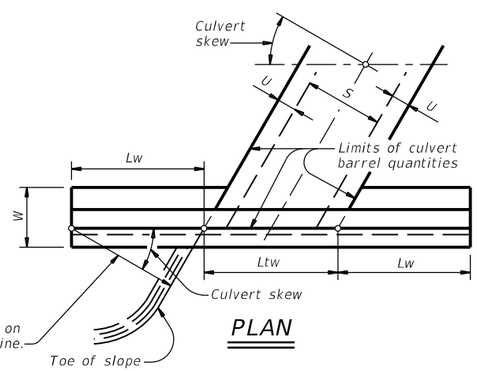


PLAN

DETAILS FOR NON-SKEWED BOX CULVERTS



PLAN

DETAILS FOR SKEWED BOX CULVERTS
(Showing 30° skew.)

1. Skew = 0°
2. At discharge end, chamfer may be ¾" minimum.
3. For 15° skew ~ 1"
   For 30° skew ~ 2"
   For 45° skew ~ 3"
4. Quantities shown are for two Type PW-1 wings. Adjust concrete volume for Type PW-2 wings. To determine estimated quantities for two wings, multiply the tabulated values by Lw. Quantities shown do not include weight of Bars D.
5. Provide weepholes for Hw = 5'-0" and greater. Fill around weepholes with coarse gravel.
6. Extend Bars E2 1'-6" minimum into the wingwall footing.
7. Lap Bars M1 1'-6" minimum with Bars M2.
8. Place Bars G as shown, equally spaced at 8" maximum. Provide at least two pairs of Bars G per wing.
9. 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'-0, refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Box Culvert Rail Mounting Details (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.
10. For vehicle safety, the following requirements must be met:
    - For structures without bridge rail, construct curbs no more than 3" above 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.

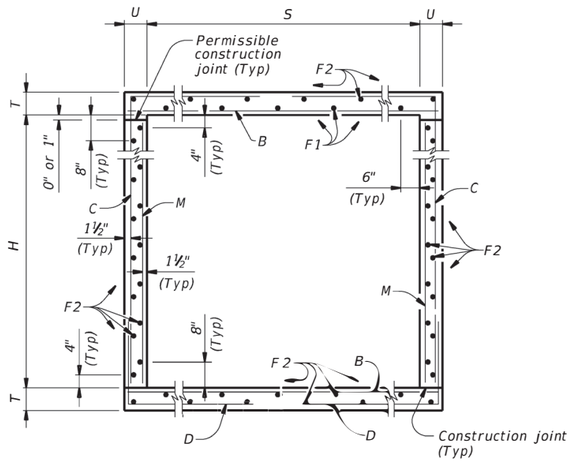
Texas Department of Transportation
Bridge Division Standard

CONCRETE WINGWALLS
WITH PARALLEL WINGS FOR BOX CULVERTS
TYPES PW-1 AND PW-2

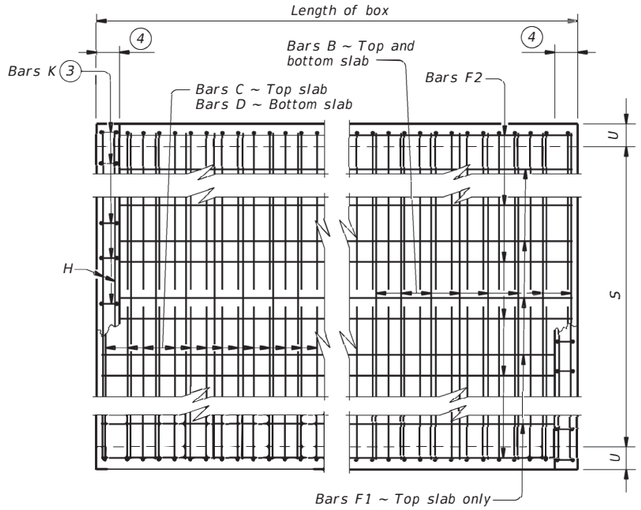
PW

FILE: pwstde01-20.dgn	DN: GAF	CK: CAT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	032	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		165

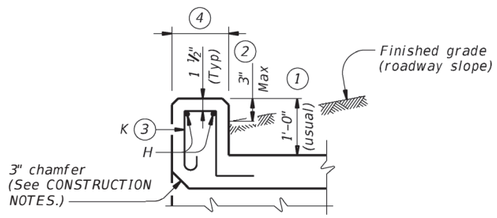
DATE:
FILE:



TYPICAL SECTION



PLAN OF REINF STEEL



SECTION THRU CURB

1 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'-0", refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Rail Anchorage Curb (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.

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

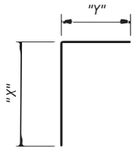
Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.
Provide Class C concrete (f'c = 3,600 psi) for culvert barrel and curb, with the following exceptions: provide Class S concrete (f'c = 4,000 psi) for top slabs of:
- culverts with overlay,
- culverts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

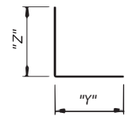
GENERAL NOTES:

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.

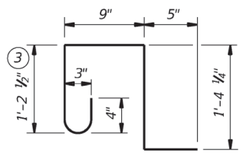
Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.



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	1133	02	032	FM 794
04/2021 Updated X values.	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		166

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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)
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	1133	02	032	FM 794
04/2021 Updated X values.	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		167

DATE:
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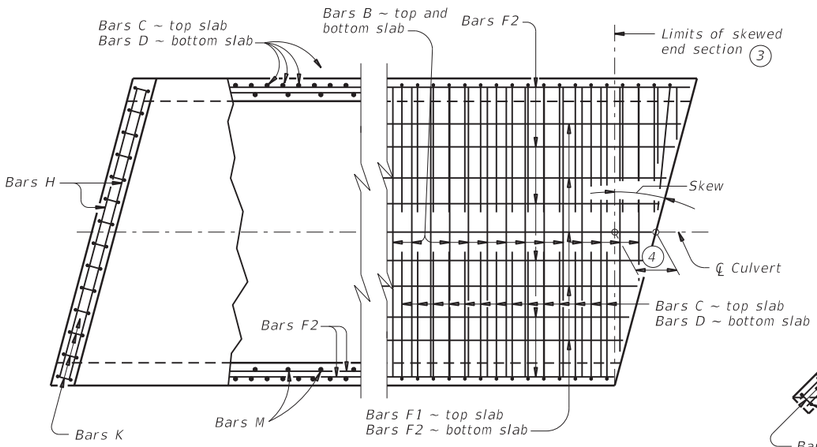
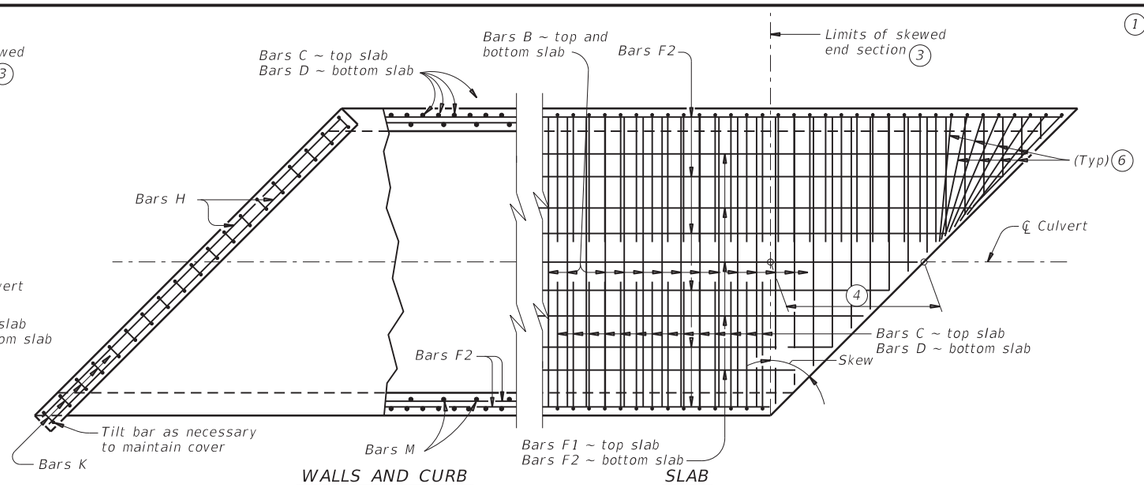
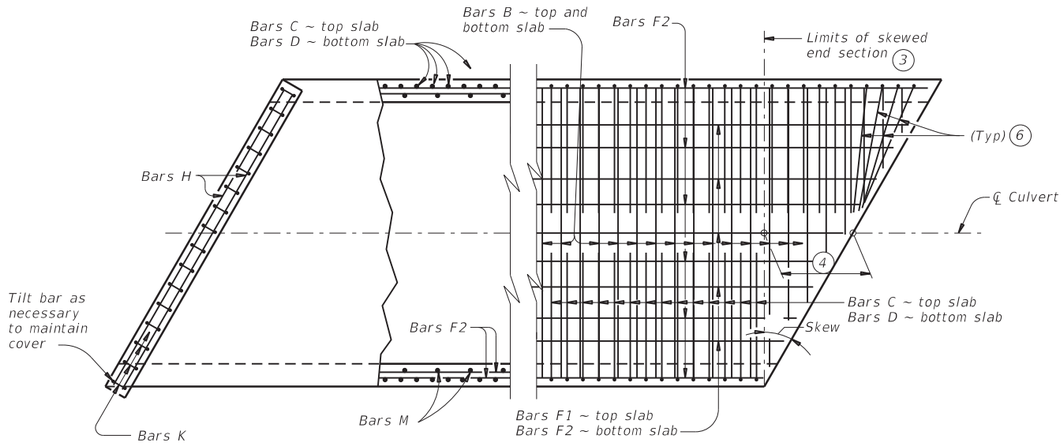


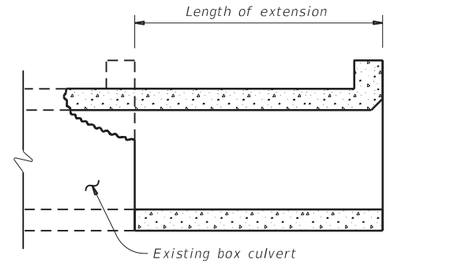
PLAN OF SKEWED ENDS ~ FROM 0° TO 15° (7)



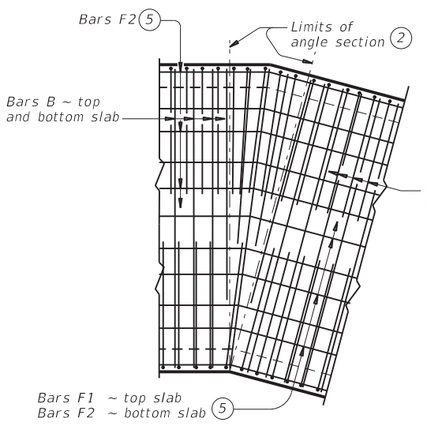
PLAN OF SKEWED ENDS ~ OVER 30° TO 45°



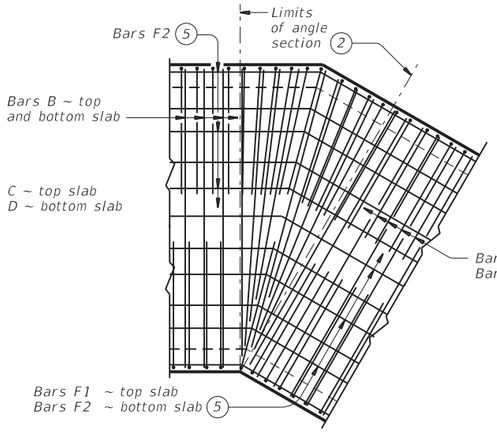
PLAN OF SKEWED ENDS ~ OVER 15° TO 30°



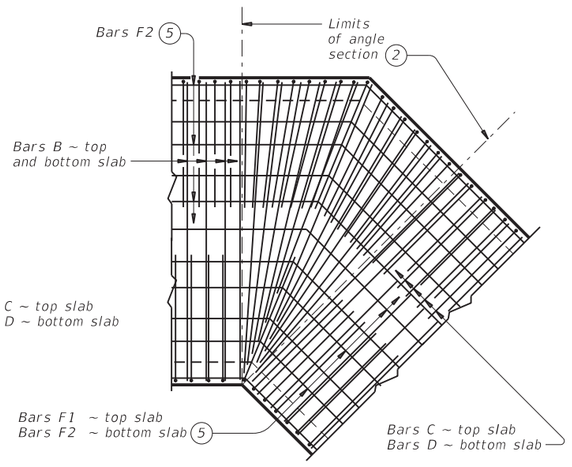
LENGTHENING DETAIL (1)



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 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	1133	02	032	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		168

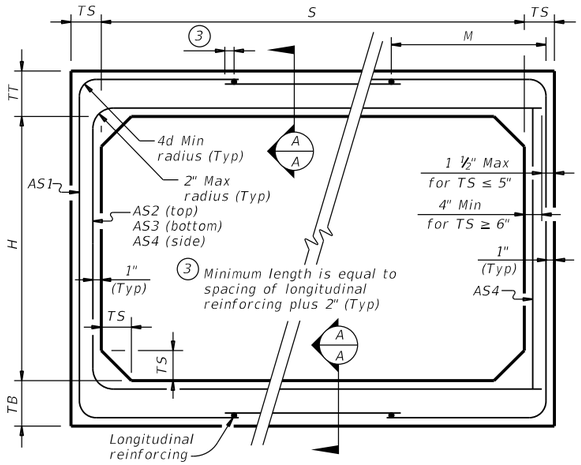
DATE: 3/25/2021 8:51:25 AM
FILE: c:\pwworkdir\bge_pw\bwestmoreland\dms49522\scp03sts-20.dgn

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)
3	2	7	6	4	< 2	–	0.17	0.25	0.16	0.10	0.17	0.17	0.14	3.3
3	2	4	4	4	2 < 3	31	0.13	0.19	0.18	0.10	–	–	–	2.4
3	2	4	4	4	3 – 5	31	0.10	0.11	0.12	0.10	–	–	–	2.4
3	2	4	4	4	10	31	0.10	0.10	0.10	0.10	–	–	–	2.4
3	2	4	4	4	15	31	0.10	0.13	0.13	0.10	–	–	–	2.4
3	2	4	4	4	20	31	0.11	0.17	0.17	0.10	–	–	–	2.4
3	2	4	4	4	25	31	0.14	0.21	0.21	0.10	–	–	–	2.4
3	2	4	4	4	30	31	0.17	0.25	0.25	0.10	–	–	–	2.4
3	2	4	4	4	35	31	0.20	0.29	0.30	0.10	–	–	–	2.4
3	3	7	6	4	< 2	–	0.17	0.27	0.17	0.10	0.17	0.17	0.14	3.7
3	3	4	4	4	2 < 3	31	0.10	0.22	0.21	0.10	–	–	–	2.8
3	3	4	4	4	3 – 5	31	0.10	0.14	0.14	0.10	–	–	–	2.8
3	3	4	4	4	10	31	0.10	0.11	0.11	0.10	–	–	–	2.8
3	3	4	4	4	15	31	0.10	0.14	0.15	0.10	–	–	–	2.8
3	3	4	4	4	20	31	0.10	0.18	0.19	0.10	–	–	–	2.8
3	3	4	4	4	25	31	0.10	0.23	0.23	0.10	–	–	–	2.8
3	3	4	4	4	30	31	0.12	0.27	0.28	0.10	–	–	–	2.8
3	3	4	4	4	35	31	0.14	0.32	0.32	0.10	–	–	–	2.8

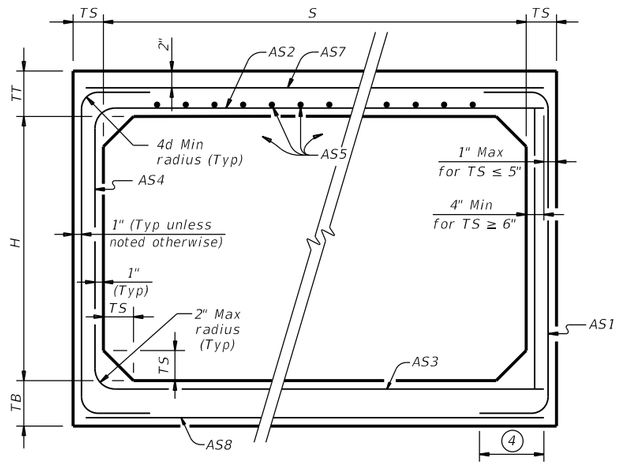
(1) For box length = 8'-0"

(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"

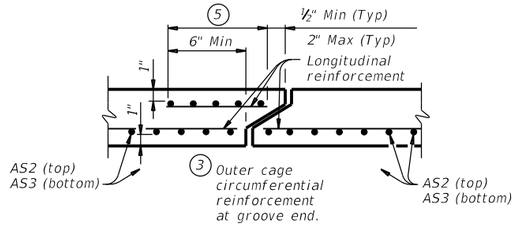
FILL HEIGHT 2 FT AND GREATER



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

3'-0" SPAN

SCP-3

FILE: scp03sts-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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	YKM	GONZALES		169

DATE: 3/25/2021 8:51:31 AM
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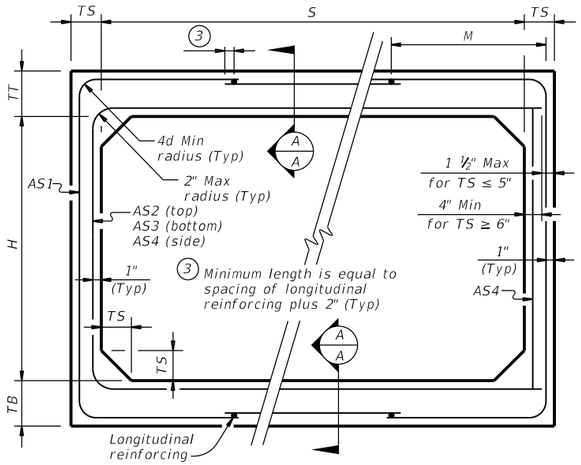
BOX DATA

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

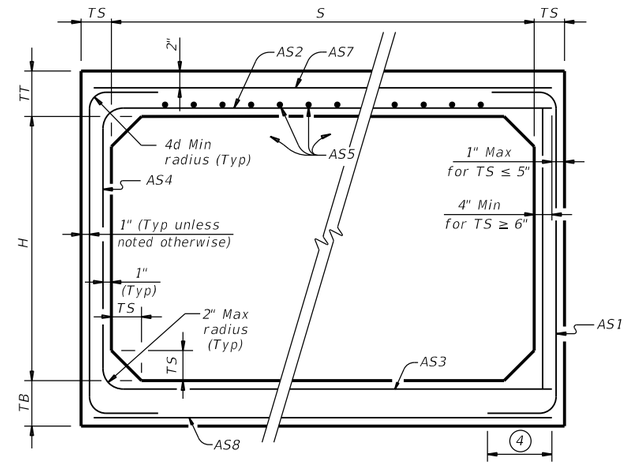
(1) For box length = 8'-0"

(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"

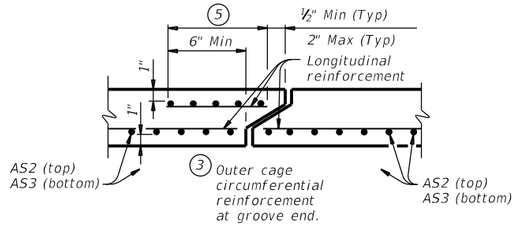
FILL HEIGHT 2 FT AND GREATER



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
©TxDOT February 2020 REVISIONS	CONT	SECT	JOB	HIGHWAY
	1133	02	032	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		170

DATE: 3/25/2021 8:51:36 AM
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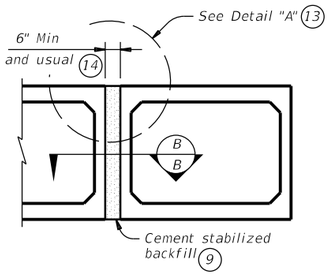
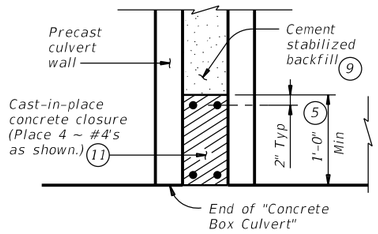
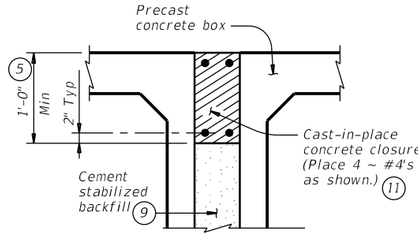


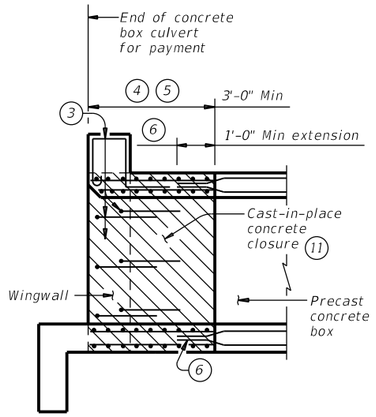
MULTIPLE UNIT PLACEMENT



SECTION B-B

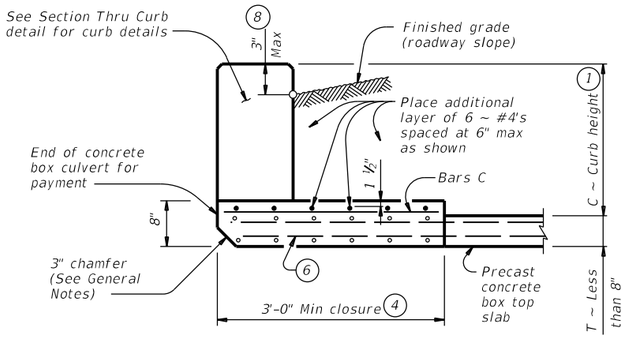


DETAIL "A" (13)

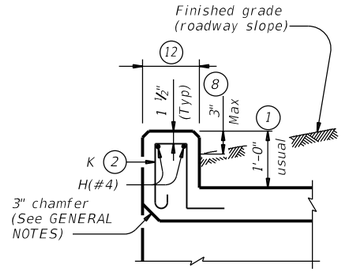


WINGWALL CONNECTION

(Also applies to safety end treatment.)

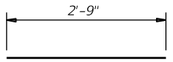


SECTION THRU TOP SLABS LESS THAN 8"

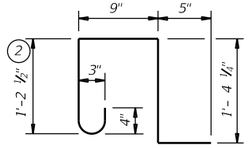


SECTION THRU CURB

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.

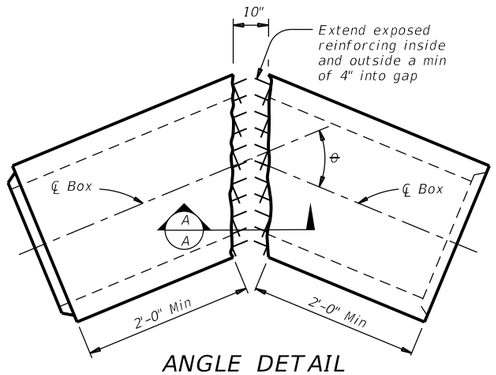
MATERIAL NOTES:

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.

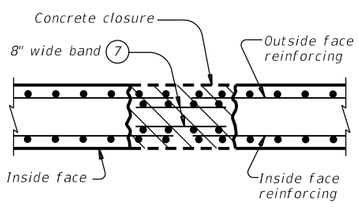
GENERAL NOTES:

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.

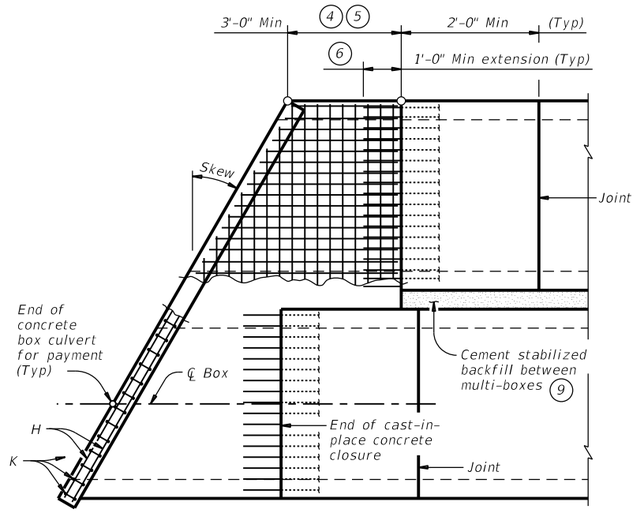
Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bars dimensions are out–to–out of bars.



ANGLE DETAIL



SECTION A-A



PLAN OF SKEWED ENDS

(Showing multi–box placement.)

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
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REVISIONS	1133	02	032	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		171

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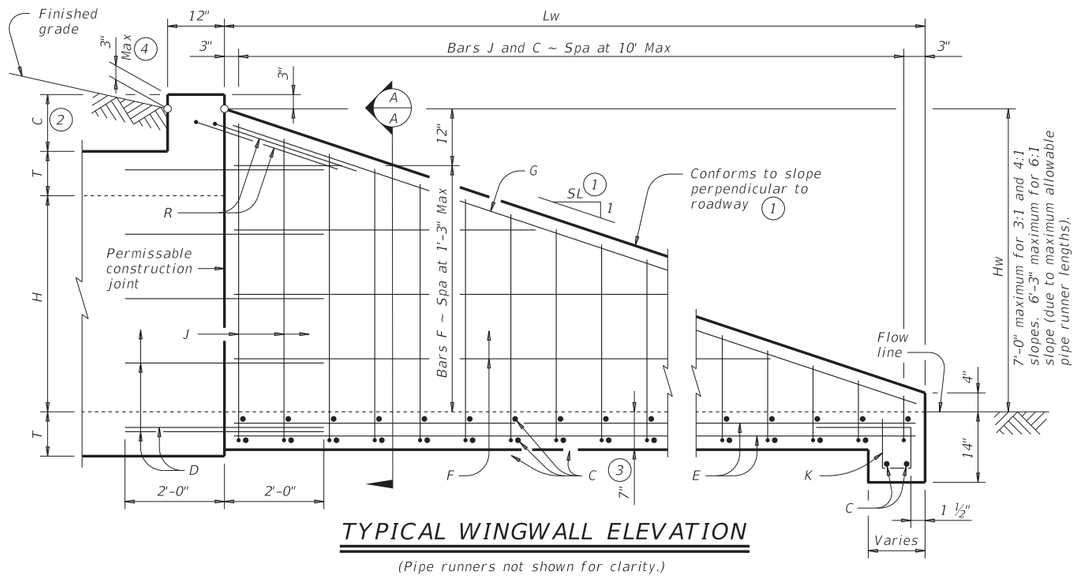
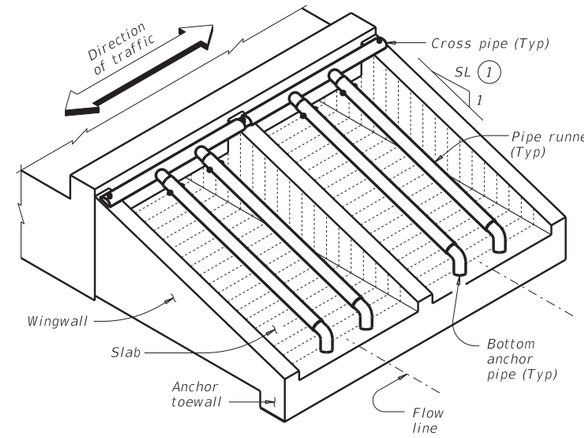


TYPICAL WINGWALL ELEVATION

(Pipe runners not shown for clarity.)



ISOMETRIC VIEW OF TYPICAL INSTALLATION

WING DIMENSION CALCULATIONS:

$Hw = H + T + C - 0.250'$

$Lw = (Hw - 0.333') (SL)$

For cast-in-place culverts:

$Atw = (N) (S) + (N + 1) (U)$

For precast culverts:

$Atw = (N) (2U + S) + (N - 1) (0.500')$

Total Wingwall Area (SF)
$= (0.5) (Hw + 0.333') (Lw) (N + 1)$

Total Concrete Volume (CY)
$= [(\text{Wingwall Area}) (0.583') + (Lw) (Atw) (0.583') + (Atw) (1.167') (1.167' - 0.583')] \div (27)$

PIPE RUNNER DIMENSION CALCULATIONS:

Pipe Runner Length
$= (Lw) (K1) - (1.917')$

Total Reinforcing (Lb)
$= (1.55) (Lw) (Atw) + (4.43) (Atw) + (K2) (Hw) (N + 1) (\sqrt{Lw})$

C = Height of curb above top of top slab (feet)
Hw = Height of wingwall (feet)
K = Constant value for use in formulas

Slope SL:1	K1	K2
3:1	~ 1.054 ~	7.45
4:1	~ 1.031 ~	8.49
6:1	~ 1.014 ~	10.30

Atw = Anchor toewall length (feet)
Lw = Length of wingwall (feet)
N = Number of culvert barrels
SL:1 = Side slope ratio (horizontal : 1 vertical)

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

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.

Provide galvanized reinforcing steel if required elsewhere in the plans.

Adjust reinforcing as necessary to provide a minimum clear cover of 1 ½".

Provide Class "C" concrete (f`c = 3,600 psi).

Provide pipe runners, cross pipes, and anchor pipes meeting the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 Gr B, or API 5LX52.

Provide ASTM A307 bolts.

Galvanize all steel components, except the concrete reinforcing, unless required elsewhere in the plans, after fabrication.

Repair galvanizing damaged during transport or construction in accordance with the Item 445, "Galvanizing".

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

The safety end treatments shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the pipe runners.

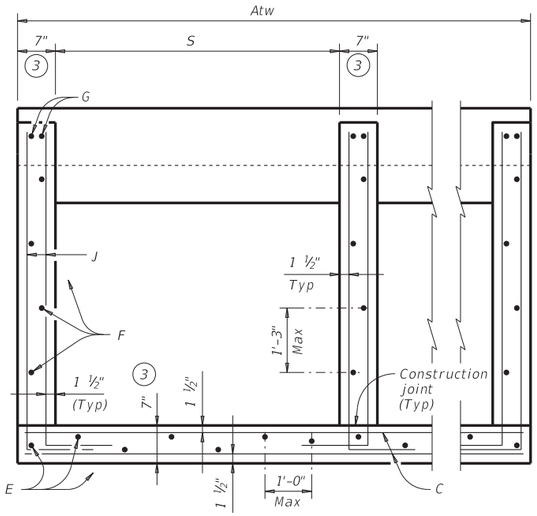
Pipe runners are designed for a traversing load of 1,800 pounds at yield as recommended by Research Report 280-1, "Safety Treatment of Roadside Cross-Drainage Structures", Texas Transportation Institute, March 1981.

The quantities for pipe runners, reinforcing steel, and concrete resulting from the formulas given herein are for Contractor's information only.

See the Box Culvert Supplement (BCS) standard sheet for additional dimensions and information.

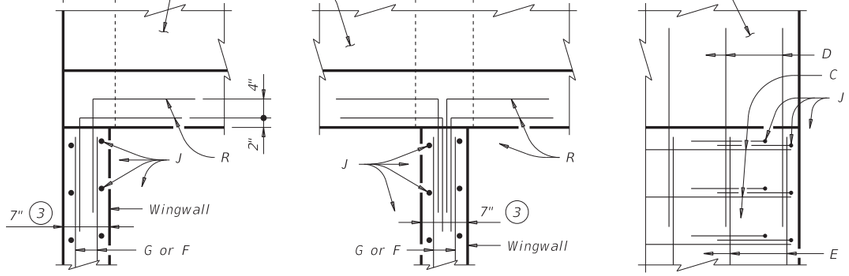
Alternate design drawings bearing the seal of a professional engineer will be acceptable for precast construction of the safety end treatments.

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



SECTION A-A

(Showing typical wingwall and wing slab reinforcing. Pipe runners not shown for clarity.)



AT TOP OF EXTERIOR WINGWALL

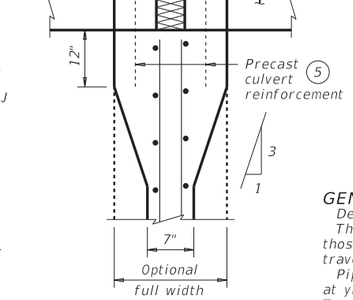
(Cast-in-place culvert)

AT TOP OF INTERIOR WINGWALL

(Cast-in-place culvert)

AT OUTSIDE OF BOTTOM SLAB

(Cast-in-place culvert)



AT INTERIOR WINGWALL

(Precast culvert)

PLAN VIEWS OF CORNER DETAILS

TABLE OF REINFORCING BAR SIZES AND SPACING		
Bar	Size	Spacing
C	#4	10" Max
D	#4	Match F and E
E	#4	1'-0" Max
F	#4	1'-3" Max
G	#6	As shown
J	#4	10" Max
K	#4	1'-0" Max
R	#4	As shown

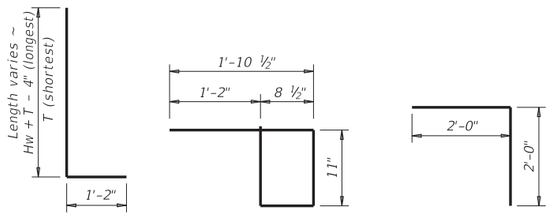
(1) Recommended values of slope are: 3:1, 4:1, and 6:1. Provide 3:1 or flatter slope.

(2) 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures without railing and curbs taller than 1'-0", refer to the Extended Curb Details (ECD) standard sheet.

(3) Wingwall and slab thicknesses may be the same as the adjacent culvert wall and slab thicknesses (7" minimum). If thicknesses greater than the minimum (7") are used, no changes will be made in quantities and no additional compensation will be allowed.

(4) For vehicle safety, reduce curb height, if necessary, to provide a maximum 3" projection. No changes will be made in quantities and no additional compensation will be allowed for this work.

(5) For culverts with C = 0", the precast culvert reinforcing may extend 1'-0" minimum into wingwall. Wingwall Bars D and R may be omitted. Otherwise, refer to the Wingwall Connection detail on the Box Culvert Precast Miscellaneous Details (SCP-MD) standard sheet.



BARS J | BARS K (Length = 4'-3") | BARS R

SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

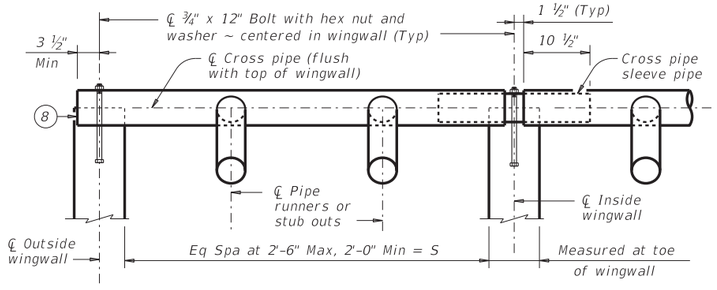
SAFETY END TREATMENT

FOR 0° SKEW BOX CULVERTS
(MAXIMUM Hw = 7'-0")
TYPE I ~ CROSS DRAINAGE

SETB-CD

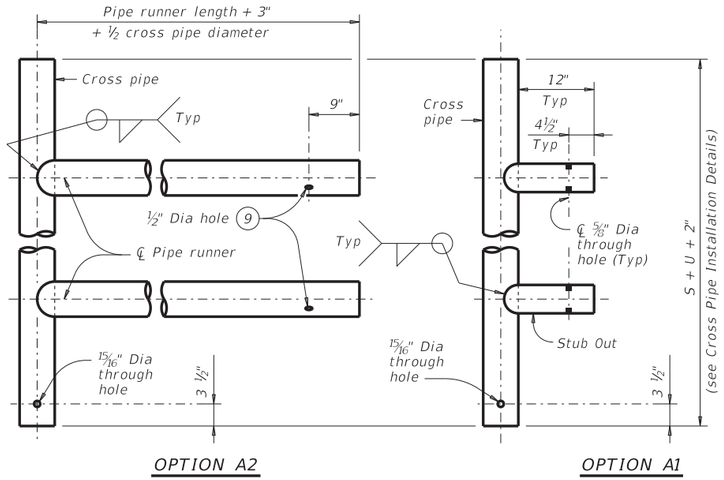
FILE: setbcdse-20.dgn	DN: GAF	CK: CAT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	032	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		172

DATE:
FILE:



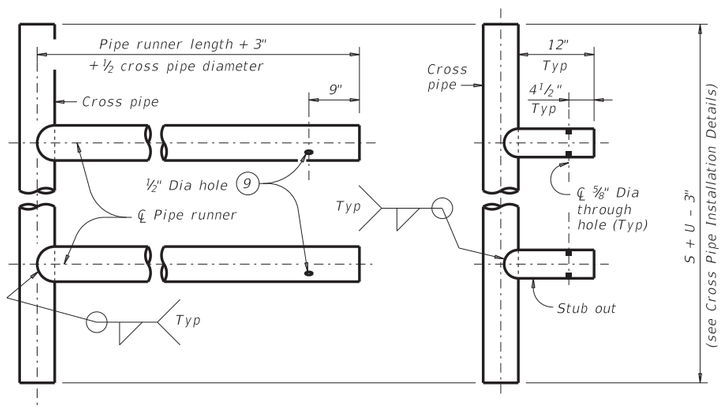
NOTE: At Contractor's option, make the cross pipe continuous across the inside wingwalls. If option is selected, omit the sleeve pipe and make a $^{15}/_{16}$" diameter through hole in the cross pipe to accept the anchor bolt at the centerline of each inside wingwall.

CROSS PIPE INSTALLATION DETAILS



OPTION A2 OPTION A1

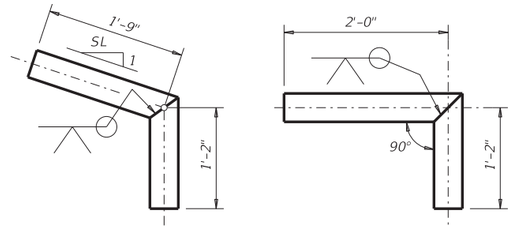
FOR USE IN OUTSIDE CULVERT BAY



OPTION A2 OPTION A1

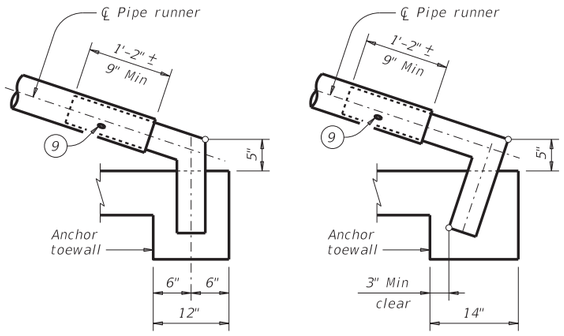
FOR USE IN INSIDE CULVERT BAY

CROSS PIPE AND CONNECTIONS DETAILS



OPTION A OPTION B

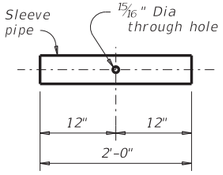
BOTTOM ANCHOR PIPE DETAILS (10)



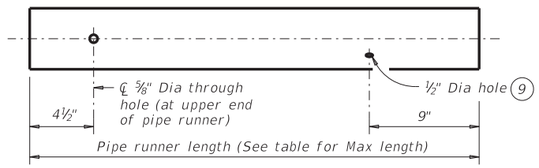
OPTION B1 OPTION B2

BOTTOM ANCHOR TOEWALL DETAILS

(Wingwall not shown for clarity.)

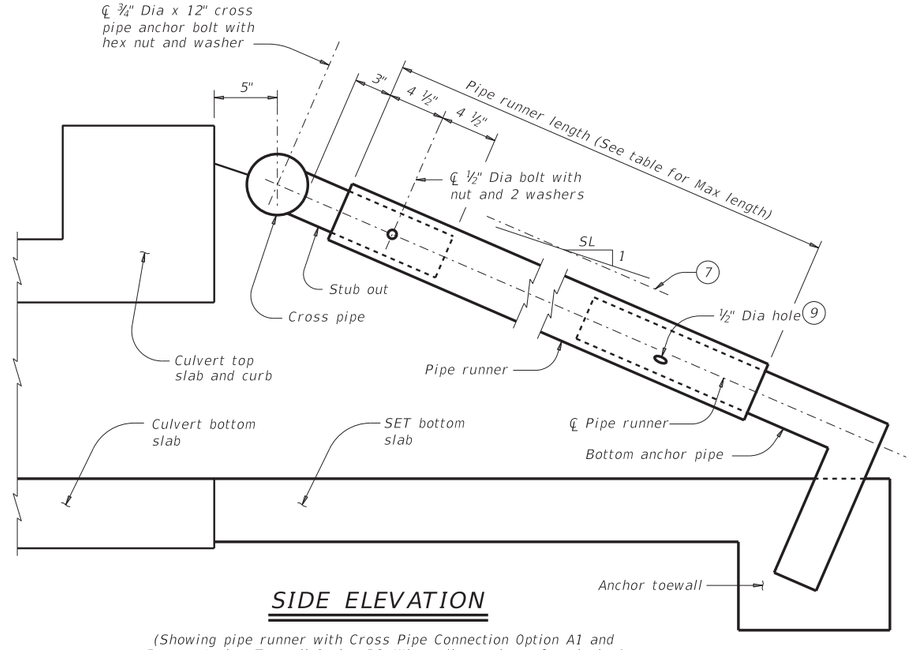


CROSS PIPE SLEEVE PIPE DETAILS



NOTE: The separate pipe runner shown is required when Cross Pipe Connection Option A1 is used.

PIPE RUNNER DETAILS



SIDE ELEVATION

(Showing pipe runner with Cross Pipe Connection Option A1 and Bottom Anchor Toewall Option B2. Wingwall not shown for clarity.)

(6) Cross pipe is the same size as the pipe runner. Cross pipe stub out is the same size as the anchor pipe.

(7) Note that actual slope of safety pipe runner may vary slightly from side slope.

(8) Take care to ensure that riprap concrete does not flow into the cross pipe so as to permit disassembly of the bolted connection to allow cleanout access.

(9) After installation, inspect the 1#2" hole to ensure that the lap of the safety pipe runner with the bottom anchor pipe is adequate.

(10) At fabricator's option, a heat bend to a smooth 5" radius or a manufactured elbow (of the same material as the runner) may be substituted for the mitered and welded joint in the bottom anchor pipe.

MAXIMUM PIPE RUNNER LENGTHS AND (6) REQUIRED PIPE RUNNER AND ANCHOR PIPE SIZES

Maximum Pipe Runner Length	Required Pipe Runner Size			Required Anchor Pipe Size		
	Pipe Size	Pipe O.D.	Pipe I.D.	Pipe Size	Pipe O.D.	Pipe I.D.
10'- 0"	3" STD	3.500"	3.068"	2" STD	2.375"	2.067"
19'- 8"	4" STD	4.500"	4.026"	3" STD	3.500"	3.068"
34'- 2"	5" STD	5.563"	5.047"	4" STD	4.500"	4.026"

SHEET 2 OF 2

Texas Department of Transportation

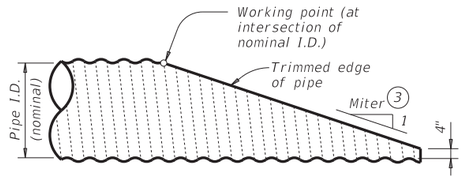
Bridge Division Standard

SAFETY END TREATMENT

FOR 0° SKEW BOX CULVERTS
(MAXIMUM Hw = 7'-0")
TYPE I ~ CROSS DRAINAGE

SETB-CD

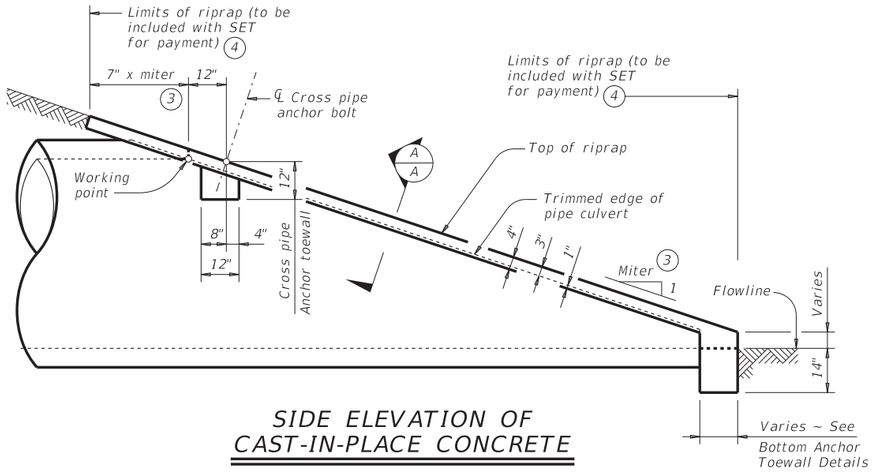
FILE: setbcdse-20.dgn	DN: GAF	CK: CAT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020 REVISIONS	CONT	SECT	JOB	HIGHWAY
	1133	02	032	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		173



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

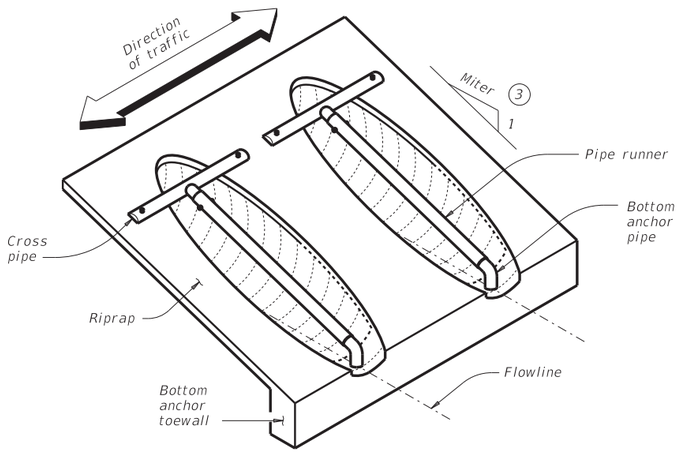
SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER

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



SIDE ELEVATION OF CAST-IN-PLACE CONCRETE

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



ISOMETRIC VIEW OF TYPICAL INSTALLATION

(Showing installation with no skew.)

CROSS PIPE LENGTHS AND PIPE RUNNER LENGTHS (1) (2)

Nominal Culvert I.D.	Pipe Culvert Spa ~ G	Cross Pipe Length	Pipe Runner Length											
			3:1 Side Slope				4:1 Side Slope				6:1 Side Slope			
			0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew
24"	1' – 7"	3' – 5"	N/A	N/A	N/A	5' – 10"	N/A	N/A	N/A	8' – 1"	N/A	N/A	N/A	12' – 9"
27"	1' – 8"	3' – 8"	N/A	N/A	5' – 5"	6' – 11"	N/A	N/A	7' – 7"	9' – 7"	N/A	N/A	11' – 11"	14' – 11"
30"	1' – 10"	3' – 11"	N/A	N/A	6' – 4"	8' – 0"	N/A	N/A	8' – 9"	11' – 0"	N/A	N/A	13' – 8"	17' – 0"
33"	1' – 11"	4' – 2"	6' – 2"	6' – 5"	7' – 3"	9' – 1"	8' – 6"	8' – 10"	10' – 0"	12' – 5"	13' – 3"	13' – 9"	15' – 5"	19' – 2"
36"	2' – 1"	4' – 5"	6' – 11"	7' – 3"	8' – 2"	10' – 2"	9' – 6"	9' – 11"	11' – 2"	13' – 10"	14' – 9"	15' – 3"	17' – 2"	21' – 3"
42"	2' – 4"	4' – 11"	8' – 6"	8' – 10"	9' – 11"	12' – 4"	11' – 7"	12' – 0"	13' – 6"	16' – 8"	17' – 9"	18' – 5"	20' – 8"	25' – 7"
48"	2' – 7"	5' – 5"	10' – 1"	10' – 5"	11' – 9"	N/A	13' – 7"	14' – 2"	15' – 10"	N/A	20' – 9"	21' – 6"	24' – 2"	N/A
54"	3' – 0"	5' – 11"	11' – 8"	12' – 1"	N/A	N/A	15' – 8"	16' – 3"	N/A	N/A	23' – 10"	24' – 8"	N/A	N/A
60"	3' – 3"	6' – 5"	13' – 3"	N/A	N/A	N/A	17' – 9"	N/A	N/A	N/A	26' – 10"	N/A	N/A	N/A

TYPICAL PIPE CULVERT MITERS (3)

Side Slope	0° Skew	15° Skew	30° Skew	45° Skew
3:1	3:1	3.106:1	3.464:1	4.243:1
4:1	4:1	4.141:1	4.619:1	5.657:1
6:1	6:1	6.212:1	6.928:1	8.485:1

CONDITIONS WHERE PIPE RUNNERS ARE NOT REQUIRED (2)

Nominal Culvert I.D.	Single Pipe Culvert	Multiple Pipe Culverts
12" thru 21"	Skews thru 45°	Skews thru 45°
24"	Skews thru 45°	Skews thru 30°
27"	Skews thru 30°	Skews thru 15°
30"	Skews thru 15°	Skews thru 15°
33"	Skews thru 15°	Always required
36"	Normal (no skew)	Always required
42" thru 60"	Always required	Always required

STANDARD PIPE SIZES AND MAX PIPE RUNNER LENGTHS (1)

Pipe Size	Pipe O.D.	Pipe I.D.	Max Pipe Runner Length
2" STD	2.375"	2.067"	N/A
3" STD	3.500"	3.068"	10' – 0"
4" STD	4.500"	4.026"	19' – 8"
5" STD	5.563"	5.047"	34' – 2"

ESTIMATED CONCRETE RIPRAP QUANTITIES (CY) (5)

Nominal Culvert I.D.	3:1 Side Slope				4:1 Side Slope				6:1 Side Slope			
	0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew
12"	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.6	0.7	0.7	0.7	0.8
15"	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.9
18"	0.5	0.5	0.6	0.6	0.6	0.7	0.7	0.8	0.8	0.8	0.9	1.0
21"	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.9	0.9	0.9	1.0	1.2
24"	0.6	0.7	0.7	0.8	0.8	0.8	0.8	1.0	1.0	1.0	1.1	1.3
27"	0.7	0.7	0.8	0.9	0.8	0.9	0.9	1.1	1.1	1.1	1.2	1.4
30"	0.8	0.8	0.8	0.9	0.9	0.9	1.0	1.2	1.2	1.2	1.3	1.6
33"	0.8	0.8	0.9	1.0	1.0	1.0	1.1	1.3	1.3	1.4	1.5	1.7
36"	0.9	0.9	0.9	1.1	1.1	1.1	1.2	1.4	1.4	1.5	1.6	1.8
42"	1.0	1.0	1.1	1.3	1.2	1.3	1.3	1.6	1.6	1.7	1.8	2.1
48"	1.1	1.1	1.2	N/A	1.4	1.4	1.5	N/A	1.9	1.9	2.1	N/A
54"	1.3	1.3	N/A	N/A	1.6	1.6	N/A	N/A	2.1	2.1	N/A	N/A
60"	1.4	N/A	N/A	N/A	1.7	N/A	N/A	N/A	2.3	N/A	N/A	N/A

(1) Provide pipe runner of the size shown in the tables. Provide cross pipe of the same size as the pipe runner. Provide cross pipe stub out and bottom anchor pipe of the next smaller size pipe as shown in the Standard Pipe Sizes and Max Pipe Runner Lengths table.

(2) This standard allows for the placement of only one pipe runner across each culvert pipe opening. In order to limit the clear opening to be traversed by an errant vehicle, the following conditions must be met:

For 60" culvert pipes, the skew must not exceed 0°.
For 54" culvert pipes, the skew must not exceed 15°.
For 48" culvert pipes, the skew must not exceed 30°.
For all culvert pipe sizes 42" and less, the skew must not exceed 45°.

If the above conditions cannot be met, the designer should consider using a safety end treatment with flared wings. For further information, refer to the TxDOT Roadway Design Manual.

(3) Miter = slope of mitered end of pipe culvert.

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

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

DATE:
FILE:

Texas Department of Transportation

Bridge Division Standard

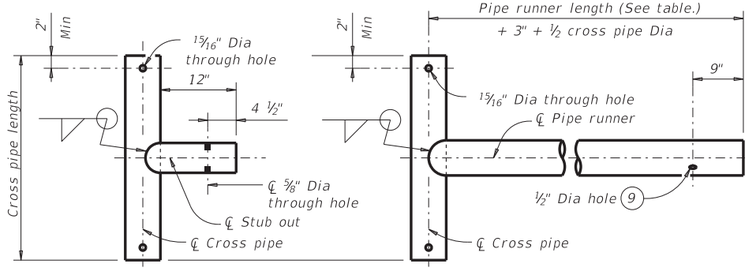
SAFETY END TREATMENT

FOR 12" DIA TO 60" DIA
PIPE CULVERTS
TYPE II ~ CROSS DRAINAGE

SETP-CD

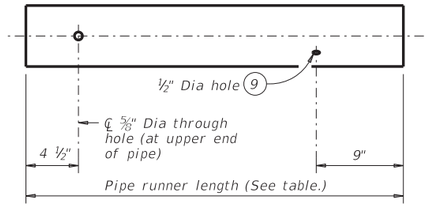
FILE: setpcdse-20.dgn	DN: GAF	CK: CAT	DW: JRP	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	032	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		174

DATE:
FILE:



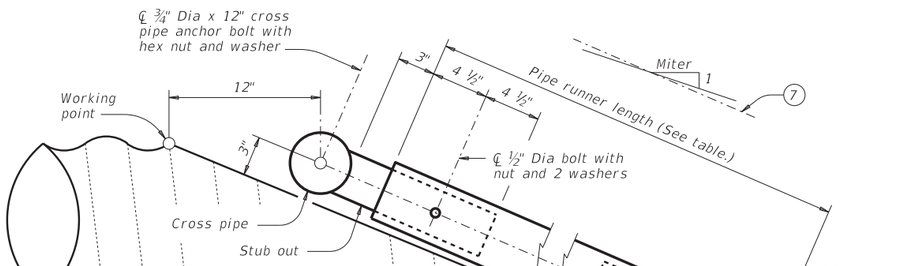
OPTION A1 OPTION A2

CROSS PIPE AND CONNECTIONS DETAILS



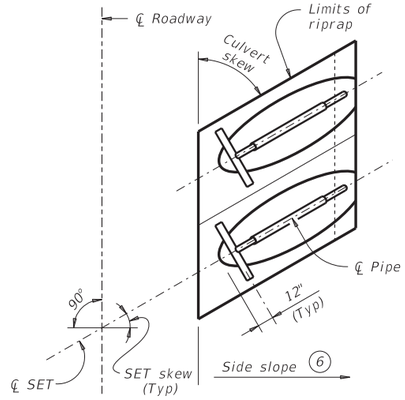
NOTE: The separate pipe runner shown is required when Cross Pipe Connection Option A1 is used.

PIPE RUNNER DETAILS

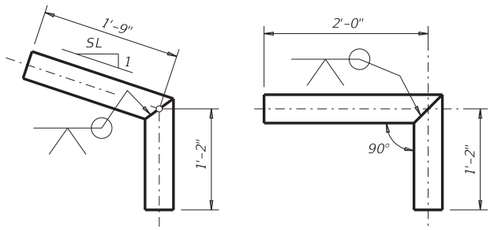


SIDE ELEVATION OF SAFETY END TREATMENT INSTALLATION

(Showing pipe runner with Cross Pipe Connection Option A1 and Anchor Pipe Option B2 on corrugated metal pipe (CMP) culvert. Reinforced concrete pipe culvert (RCP) details are similar. Riprap not shown for clarity)

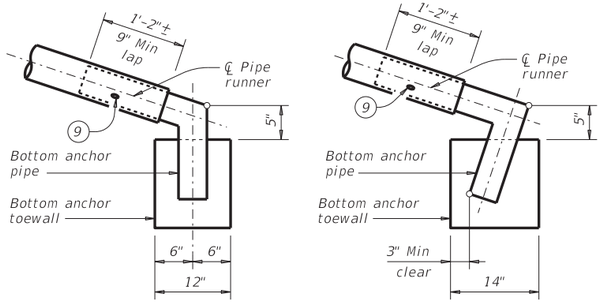


PLAN OF SKEWED INSTALLATION



OPTION B1 OPTION B2

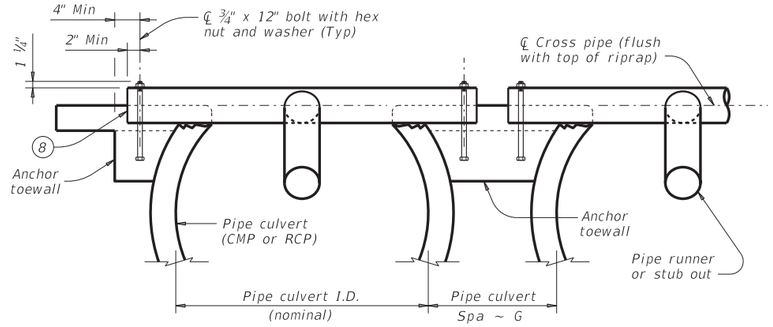
BOTTOM ANCHOR PIPE DETAILS (10)



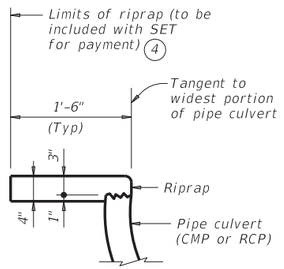
OPTION B1 OPTION B2

BOTTOM ANCHOR TOEWALL DETAILS

(Culvert and riprap not shown for clarity.)



SHOWING CROSS PIPE AND ANCHOR TOEWALL



SHOWING TYPICAL PIPE CULVERT AND RIPRAP

SECTION A-A

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

(6) Recommended values of side slope are 3:1, 4:1, and 6:1. All quantities, calculations, and dimensions shown herein are based on these recommended values. Slope of 3:1 or flatter is required for vehicle safety.

(7) Note that actual slope of pipe runner may vary slightly from side slope of riprap and trimmed culvert pipe edge.

(8) Ensure that riprap concrete does not flow into the cross pipe so as to permit disassembly of the bolted connection to allow cleanout access.

(9) After installation, inspect the 1/2" hole to ensure that the lap of the pipe runner with the bottom anchor pipe is adequate.

(10) At fabricator's option, a heat bend to a smooth 5" radius or a manufactured elbow (of the same material as the runner) may be substituted for the mitered and welded joint in the bottom anchor pipe.

MATERIAL NOTES:

Synthetic 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, cross pipes, and anchor pipes conforming to the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 Gr B, or API 5LX52.

Provide ASTM A307 bolts and nuts.

Galvanize all steel components, except concrete reinforcing, after fabrication.

Repair galvanizing damaged during transport or construction in accordance with the specifications.

GENERAL NOTES:

Pipe runners are designed for a traversing load of 1,800 pounds at yield as recommended by Research Report 280-1, "Safety Treatment of Roadside Cross-Drainage Structures", Texas Transportation Institute, March 1981.

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

Payment for riprap and toewall is included in the price bid for each safety end treatment.

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

Texas Department of Transportation

Bridge Division Standard

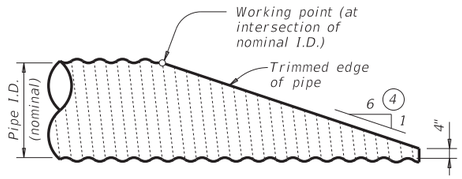
SAFETY END TREATMENT

FOR 12" DIA TO 60" DIA PIPE CULVERTS
TYPE II ~ CROSS DRAINAGE

SETP-CD

FILE: setpcdse-20.dgn	DN: GAF	CK: CAT	DW: JRP	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	032	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		175

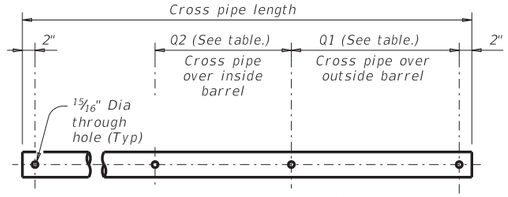
DATE:
FILE:



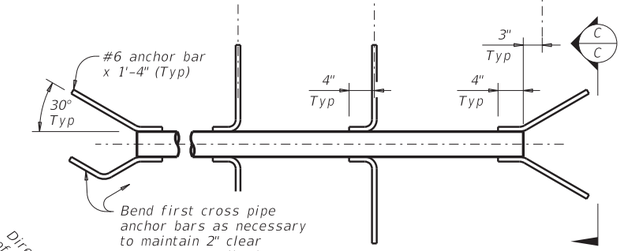
NOTE: All cross pipes, calculations, and dimensions are based on the pipe culverts mitered as shown in this detail. Alternate styles of mitered ends will require that appropriate adjustments be made to the values presented on this standard.

SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER

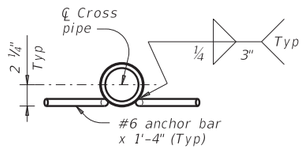
(Showing corrugated metal pipe (CMP) culvert Details at reinforced concrete pipe (RCP) culvert are similar.)



PIPE WITH BOLTED ANCHOR

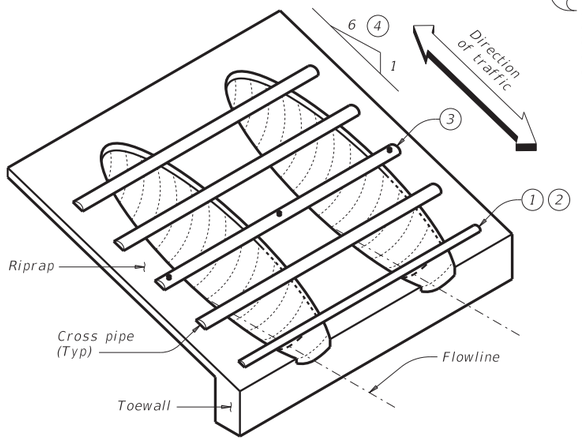


PIPE WITH ANCHOR BARS

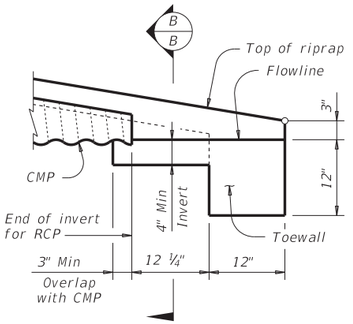


SECTION C-C

CROSS PIPE DETAILS

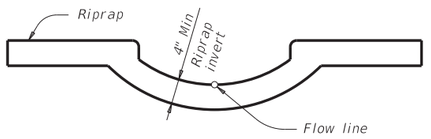


ISOMETRIC VIEW OF TYPICAL INSTALLATION



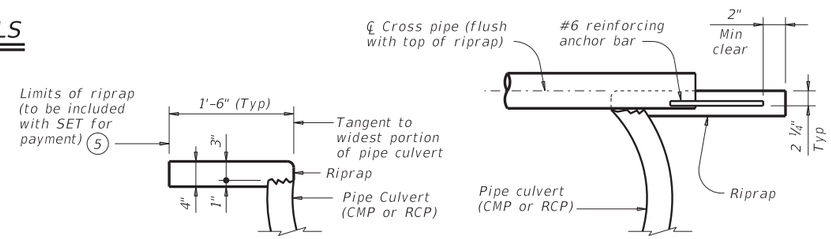
DETAIL "A"

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



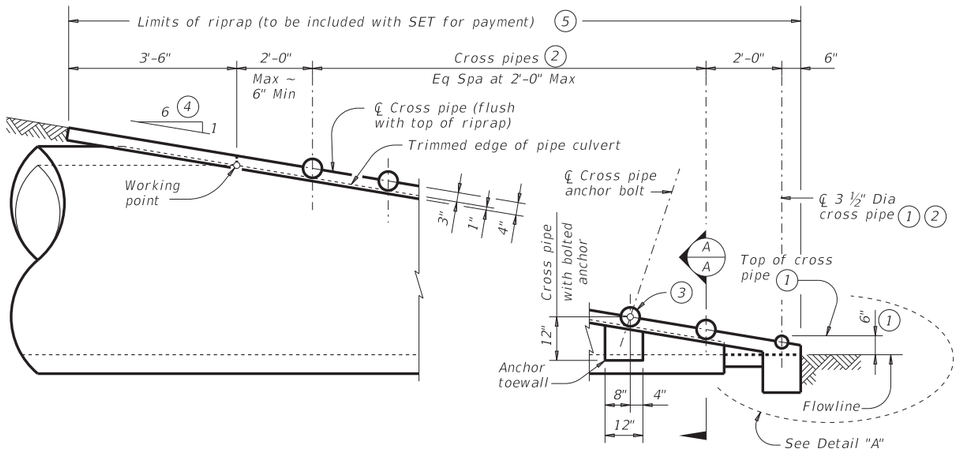
SECTION B-B

(Cross pipes not shown for clarity.)



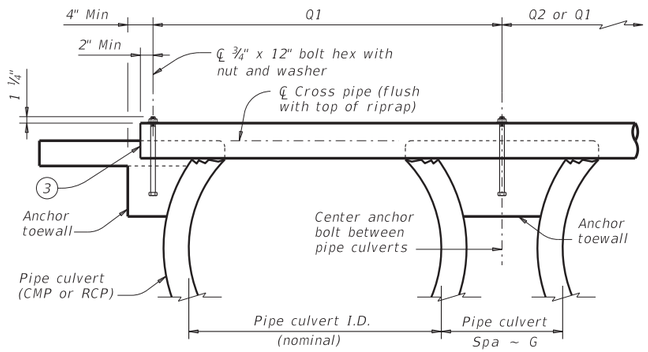
SHOWING TYPICAL PIPE CULVERT AND RIPRAP

SHOWING CROSS PIPE WITH ANCHOR BAR



SIDE ELEVATION OF CAST-IN-PLACE CONCRETE

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



SHOWING CROSS PIPE WITH BOLTED ANCHOR

SECTION A-A

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

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

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

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

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

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

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

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

MATERIAL NOTES:

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

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

Provide ASTM A307 bolts and nuts.

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

GENERAL NOTES:

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

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

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

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

Texas Department of Transportation

Bridge Division Standard

SAFETY END TREATMENT

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

SETP-PD

FILE: setppdse-20.dgn	DN: GAF	CK: CAT	DW: JRP	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
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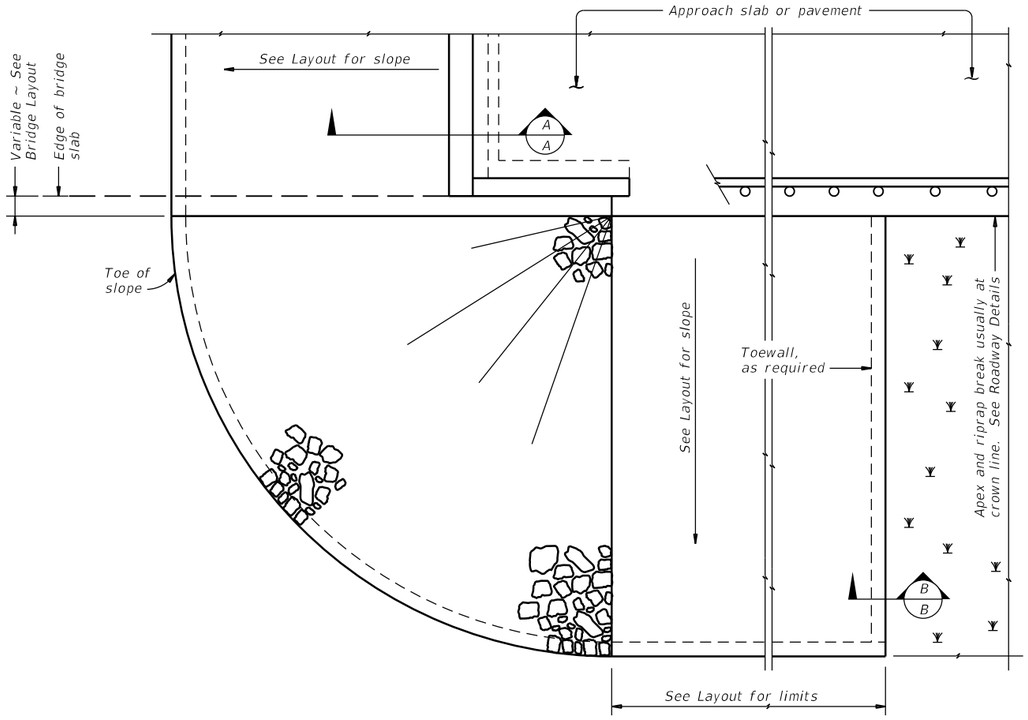
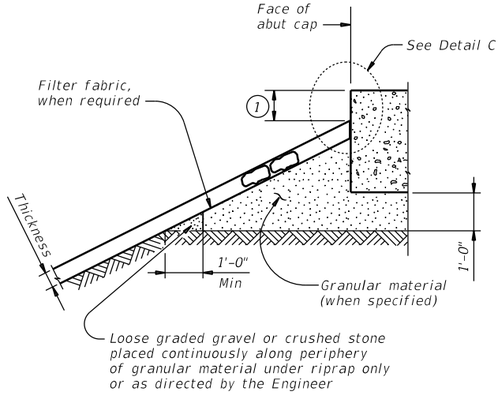
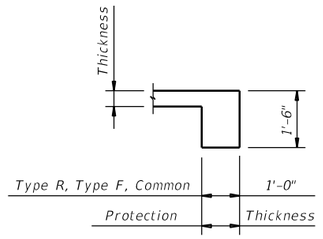
	YKM	GONZALES		176



PLAN

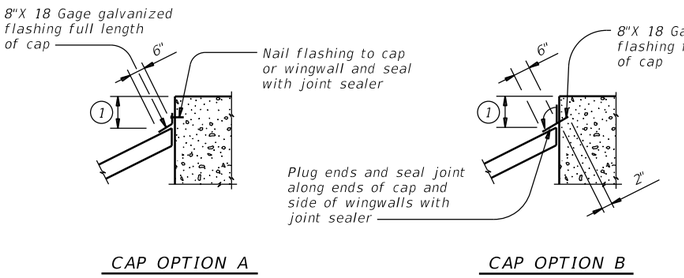


SECTION A-A AT CAP



SECTION B-B

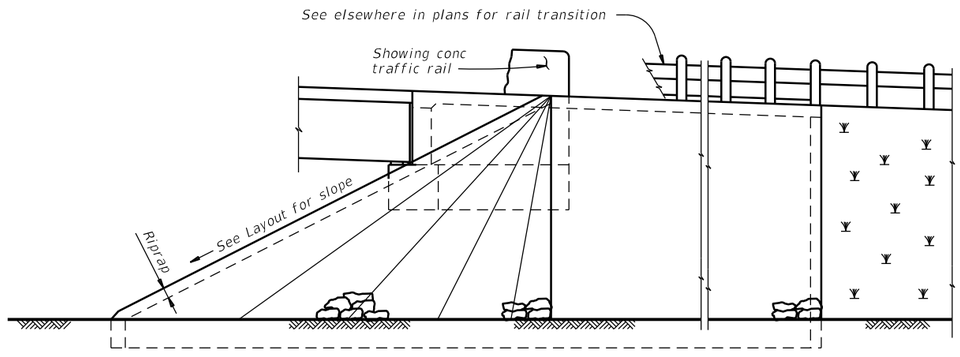
Provide toewall when shoulder drain is located adjacent to limits of stone riprap. Omit toewall when thickness of protection riprap is greater than 18".



CAP OPTION A

CAP OPTION B

DETAIL C



ELEVATION

1 Top of cap to top of riprap dimension varies as directed by the Engineer. Provide 9" Min for beam/slab type bridges and 1'-6" for slab span, box beam, or slab beam bridges.

GENERAL NOTES:

Refer to Item 432, "Riprap" for stone size and gradation, and construction details. See Layout for limits and thickness of riprap specified.

See elsewhere in plans for locations and details of shoulder drains.

Texas Department of Transportation

Bridge Division Standard

STONE RIPRAP

SRR

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©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY		
REVISIONS	1133	02	032	FM 794		
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	YKM	GONZALES		177		

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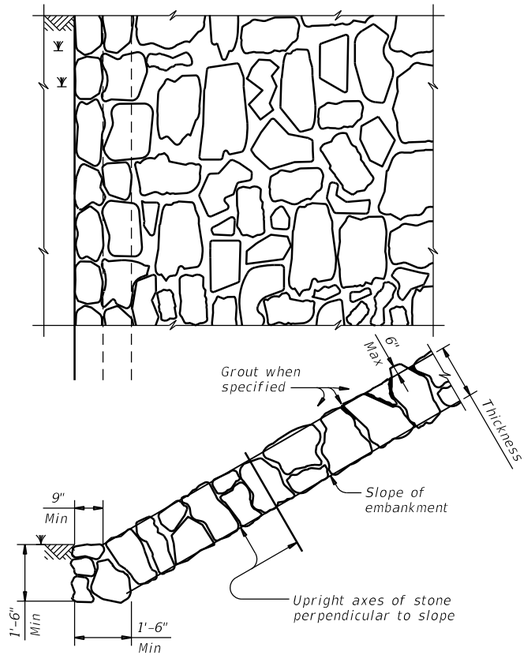


FIGURE 1 ~ TYPE R STONE RIPRAP

dry or grouted

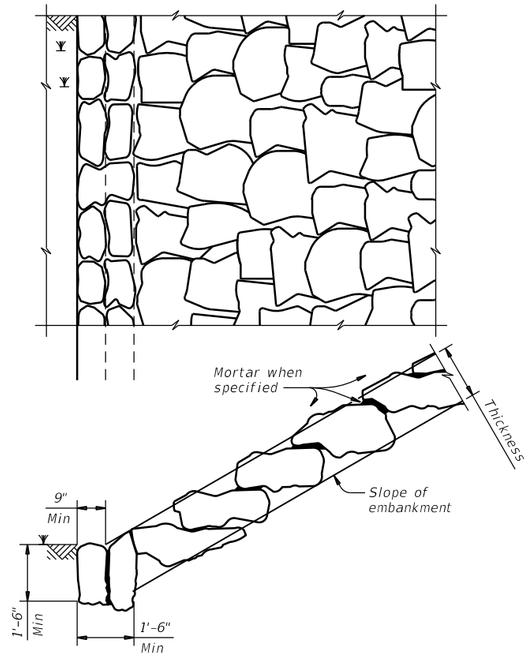


FIGURE 2 ~ TYPE F STONE RIPRAP

dry or mortared

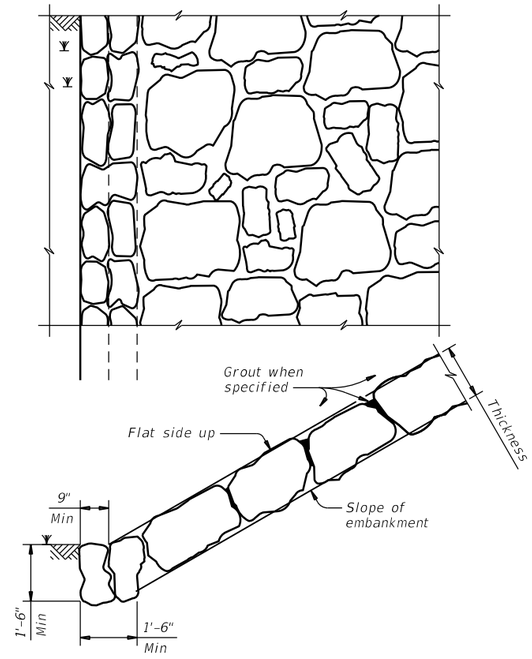


FIGURE 3 ~ TYPE F STONE RIPRAP

grouted

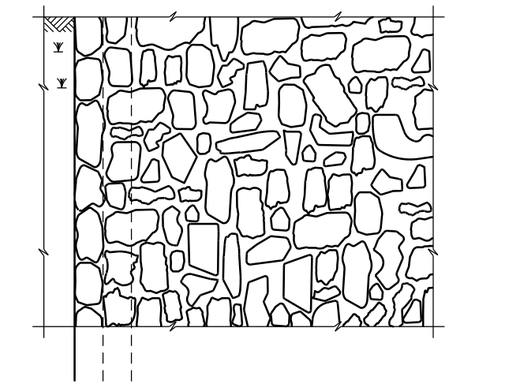


FIGURE 4 ~ COMMON STONE RIPRAP

dry or grouted

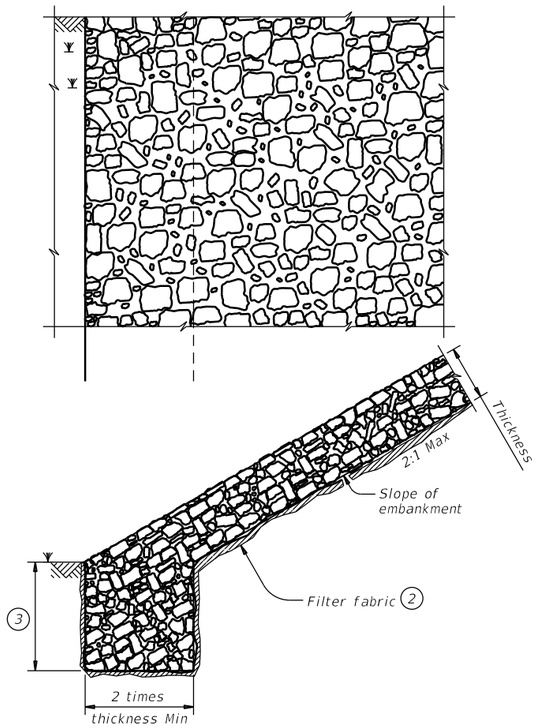


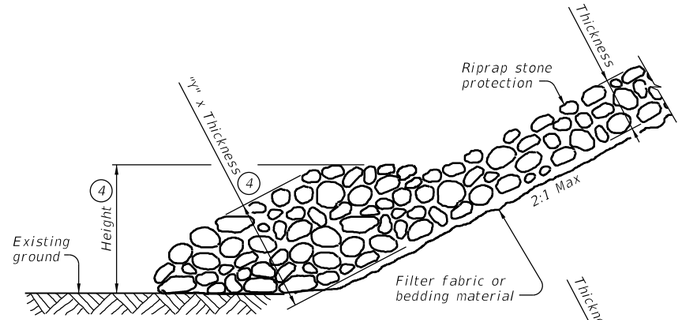
FIGURE 5 ~ PROTECTION STONE RIPRAP (5)

(2) Provide bedding material instead of filter fabric if shown elsewhere in plans. See Layout for thickness of bedding material.

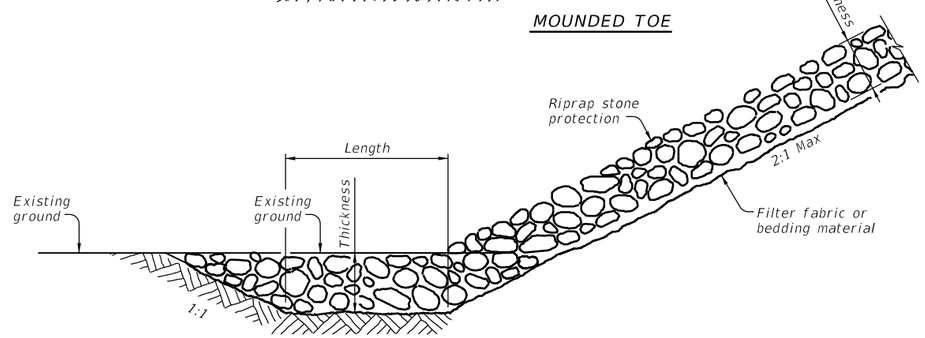
(3) Minimum toe depth is the larger of the maximum scour depth or 2 times the riprap thickness.

(4) "Y" and Height need to be defined. See layout or detail sheet for values if this option is used.

(5) List Stone Protection as size (XX inch) and thickness (YY inch) on the layout.
Example: Riprap (Stone Protection) XX inch, Thickness = YY inch.



MOUNDED TOE



EXTENDED ROCK FILLED TRENCH

PROTECTION STONE RIPRAP TOE OPTIONS (5)

Texas Department of Transportation

Bridge Division Standard

STONE RIPRAP

SRR

FILE: srrstdet-19.dgn	DN: AES	CK: JGD	DW: BWH	CK: AES
©TxDOT April 2019 REVISIONS	CONT	SECT	JOB	HIGHWAY
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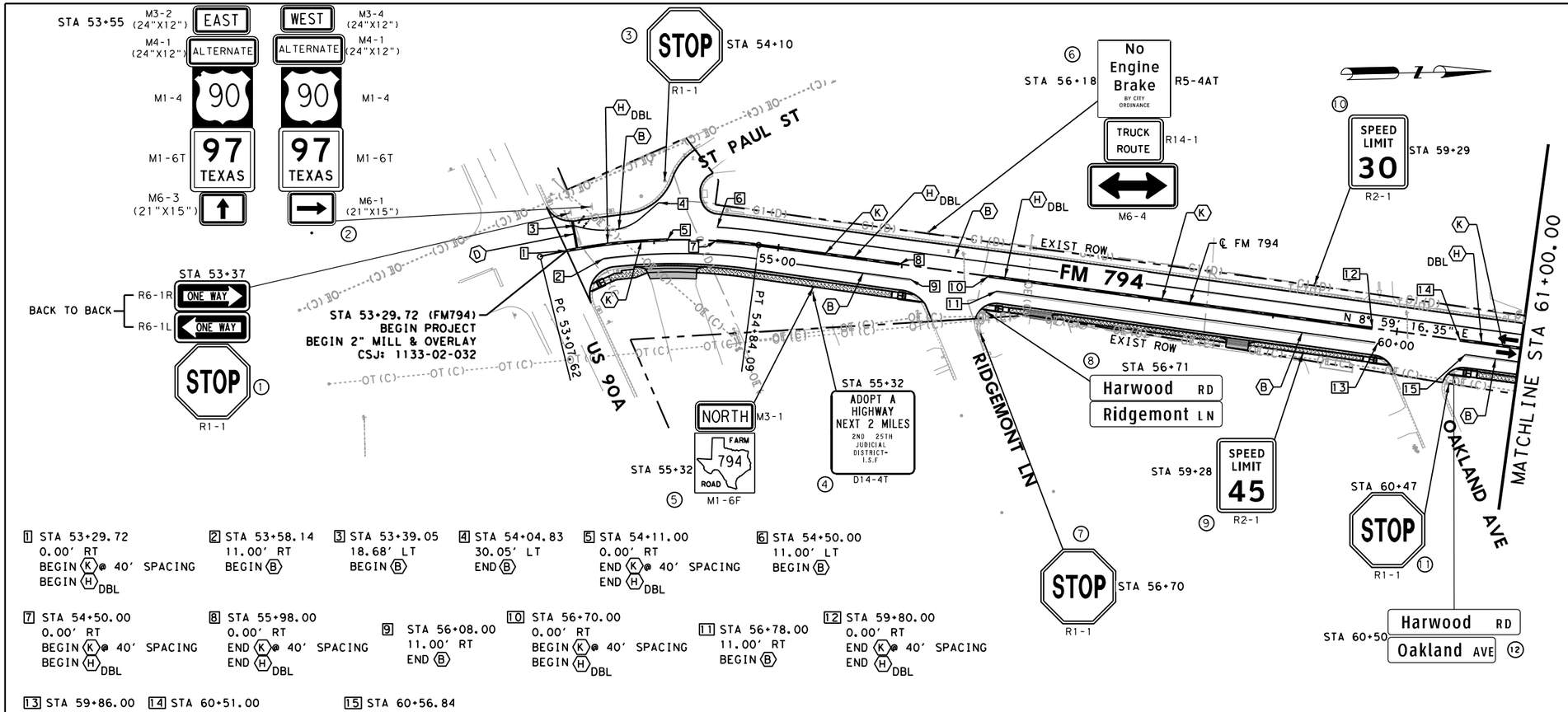
	YKM	GONZALES		178



1 STA 53+29.72
0.00' RT
BEGIN (K) @ 40' SPACING
BEGIN (H) DBL

2 STA 53+58.14
11.00' RT
BEGIN (B)

3 STA 53+39.05
18.68' LT
BEGIN (B)

4 STA 54+04.83
30.05' LT
END (B)

5 STA 54+11.00
0.00' RT
END (K) @ 40' SPACING
END (H) DBL

6 STA 54+50.00
11.00' LT
BEGIN (B)

7 STA 54+50.00
0.00' RT
BEGIN (K) @ 40' SPACING
BEGIN (H) DBL

8 STA 55+98.00
0.00' RT
END (K) @ 40' SPACING
END (H) DBL

9 STA 56+08.00
11.00' RT
END (B)

10 STA 56+70.00
0.00' RT
BEGIN (K) @ 40' SPACING
BEGIN (H) DBL

11 STA 56+78.00
11.00' RT
BEGIN (B)

12 STA 59+80.00
0.00' RT
END (K) @ 40' SPACING
END (H) DBL

13 STA 59+86.00
11.00' RT
END (B)

14 STA 60+51.00
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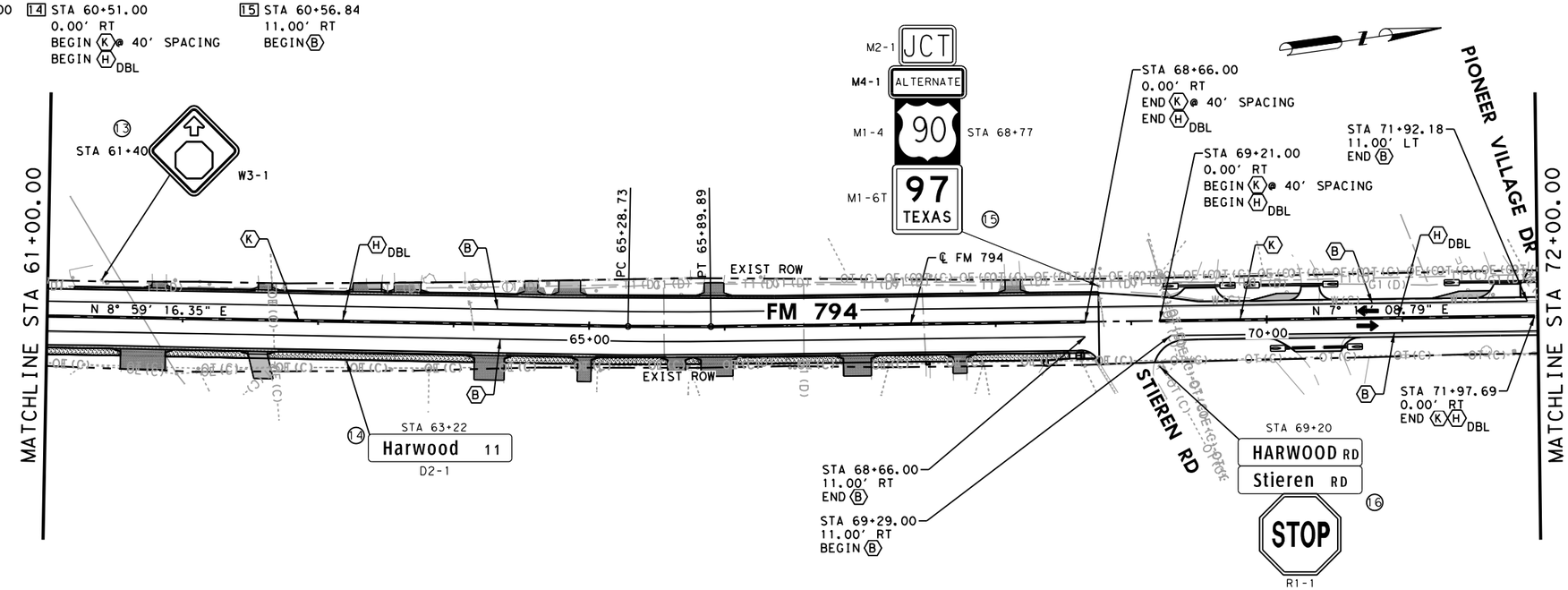
BEGIN (K) @ 40' SPACING
BEGIN (H) DBL

15 STA 60+56.84
11.00' RT
BEGIN (B)



LEGEND

(A)	W 4" BRK
(B)	W 4" SOLID
(C)	W 8" SOLID
(D)	W 24" SOLID
(E)	W ARROW
(F)	W WORD
(G)	Y 4" BRK
(H)	Y 4" SOLID
(I)	Y 12" SOLID
(J)	TY I-C
(K)	TY II-A-A
(L)	Y 24" SOLID
(M)	W DBL ARROW

OBJECT MARKER (OM-2Y) (WC) (GND)

PROPOSED SIGN POST

DELINEATOR (D-SW) (SZ1) (BRF) (GF2) (BI)

DELINEATOR (D-SW) (SZ) (BRF) (CTB) (BI)

DIRECTION OF TRAFFIC

0 50 100

SCALE: 1"=100'

NOTES:

1. UTILITY LOCATIONS SHOWN ARE APPROXIMATE AND SHOULD BE FIELD VERIFIED BY THE CONTRACTOR BEFORE CONSTRUCTION

STATE OF TEXAS
JOHN W. TULEY
102441
LICENSED
PROFESSIONAL ENGINEER

3/25/2021

Texas Department of Transportation

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FM 794

SIGNING AND PAVEMENT MARKING LAYOUT

SHEET 1 OF 19

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			179
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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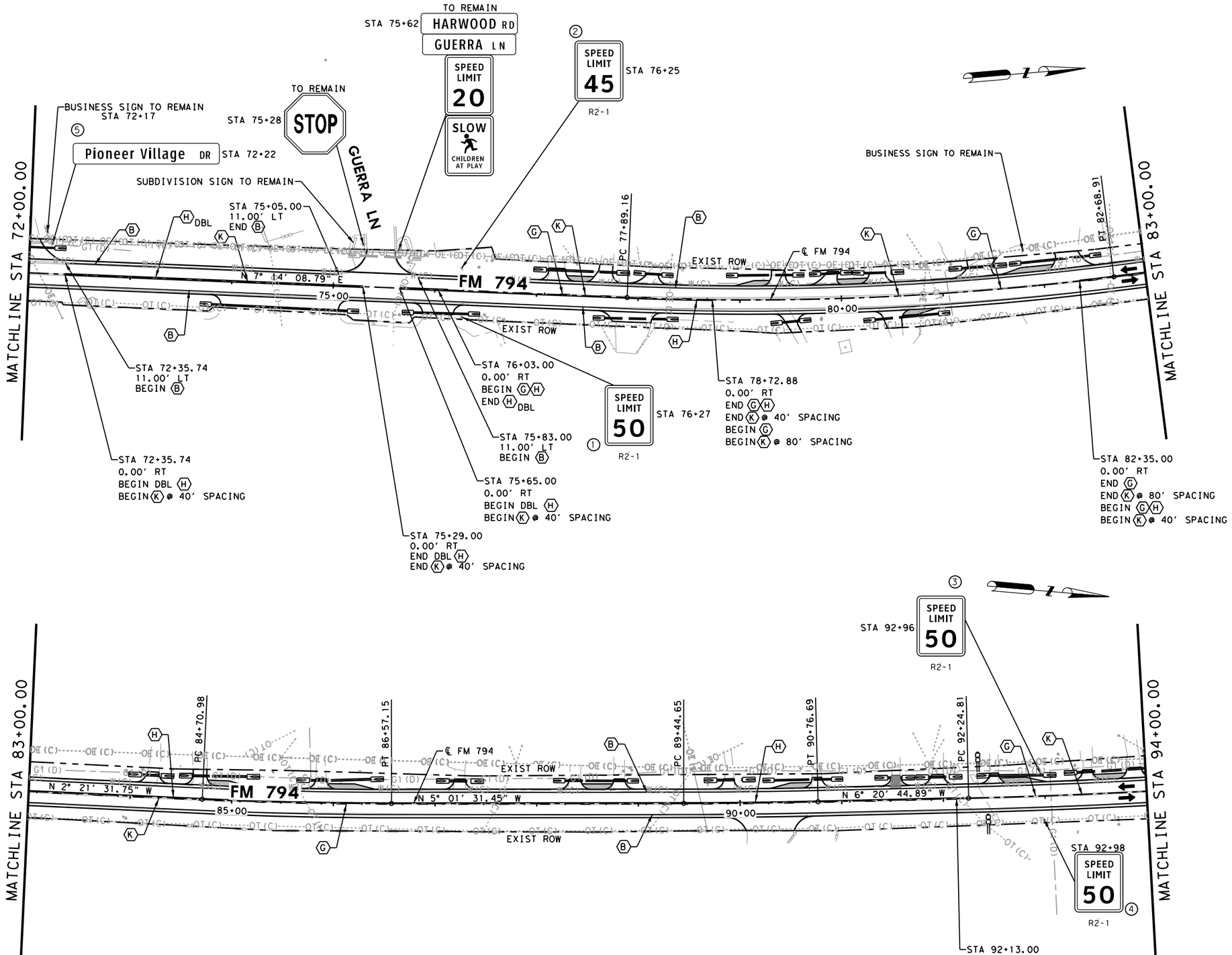

LEGEND

A	W 4" BRK
B	W 4" SOLID
C	W 8" SOLID
D	W 24" SOLID
E	W ARROW
F	W WORD
G	Y 4" BRK
H	Y 4" SOLID
I	Y 12" SOLID
J	TY I-C
K	TY II-A-A
L	Y 24" SOLID
M	W DBL ARROW

OBJECT MARKER (OM-2Y)(WC)(GND)

PROPOSED SIGN POST

DELINEATOR (D-SW)(SZ1)(BRF)(GF2)(BI)

DELINEATOR (D-SW)(SZ)(BRF)(CTB)(BI)

DIRECTION OF TRAFFIC

0 50 100

SCALE: 1"=100'

NOTES:

1. UTILITY LOCATIONS SHOWN ARE APPROXIMATE AND SHOULD BE FIELD VERIFIED BY THE CONTRACTOR BEFORE CONSTRUCTION

STATE OF TEXAS
JOHN W. TULEY
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FM 794

SIGNING AND PAVEMENT MARKING LAYOUT

SHEET 2 OF 19

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1133	02	032	FM 794

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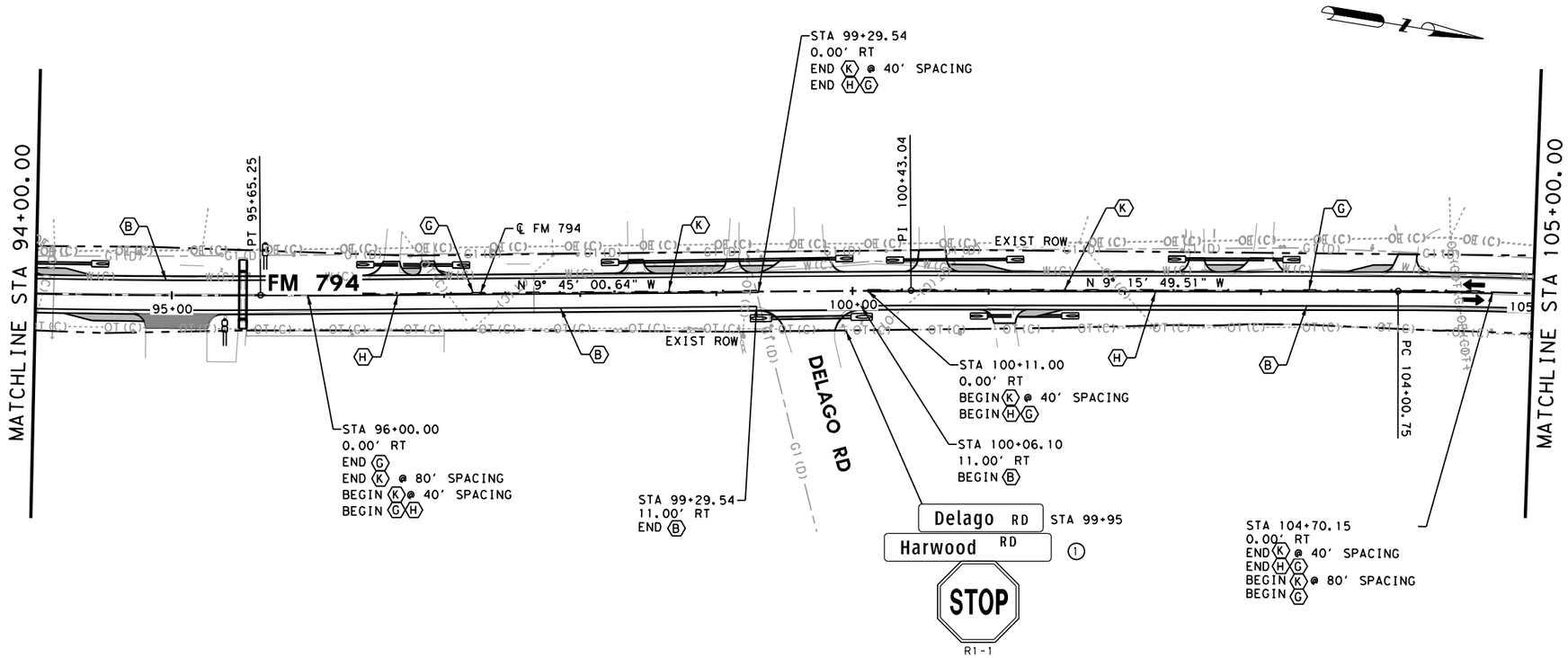

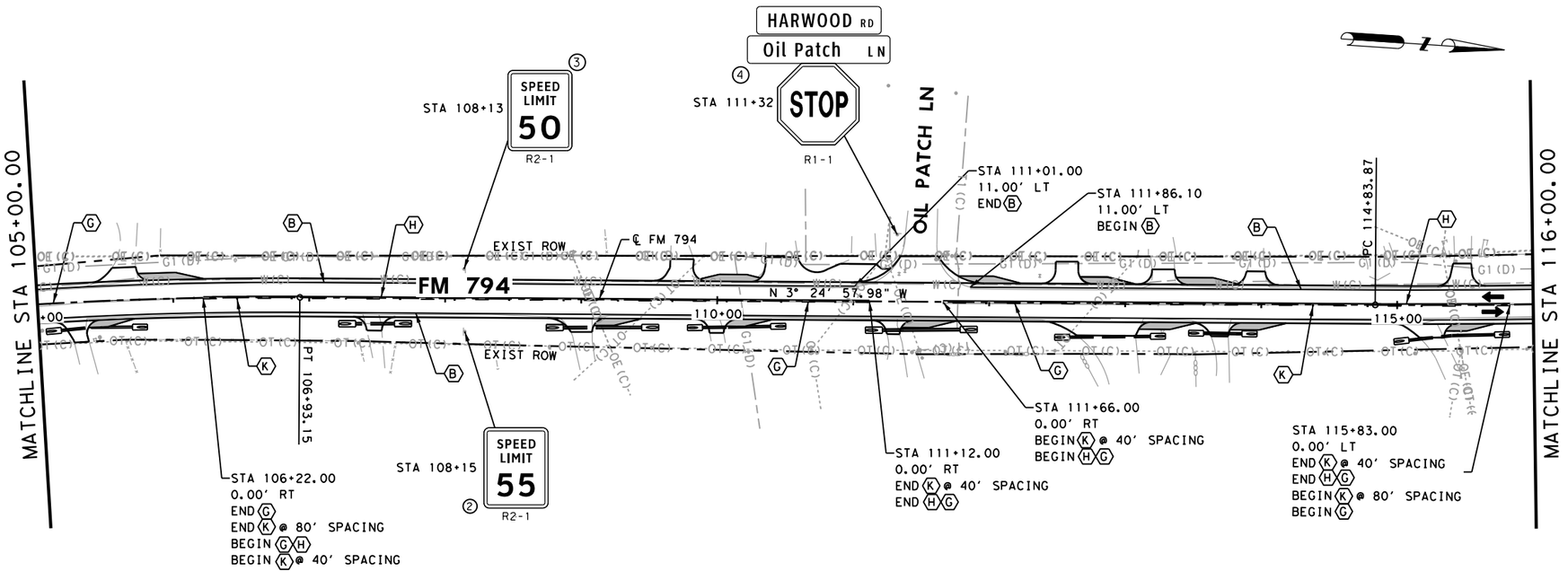

LEGEND

A	W 4" BRK
B	W 4" SOLID
C	W 8" SOLID
D	W 24" SOLID
E	W ARROW
F	W WORD
G	Y 4" BRK
H	Y 4" SOLID
I	Y 12" SOLID
J	TY I-C
K	TY II-A-A
L	Y 24" SOLID
M	W DBL ARROW

OBJECT MARKER (OM-2Y) (WC) (GND)

G PROPOSED SIGN POST

DELINEATOR (D-SW) (SZ1) (BRF) (GF2) (BI)

DELINEATOR (D-SW) (SZ) (BRF) (CTB) (BI)

DIRECTION OF TRAFFIC

0 50 100

SCALE: 1"=100'

NOTES:

1. UTILITY LOCATIONS SHOWN ARE APPROXIMATE AND SHOULD BE FIELD VERIFIED BY THE CONTRACTOR BEFORE CONSTRUCTION

STATE OF TEXAS
JOHN W. TULEY
102441
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FM 794

SIGNING AND PAVEMENT MARKING LAYOUT

SHEET 3 OF 19

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STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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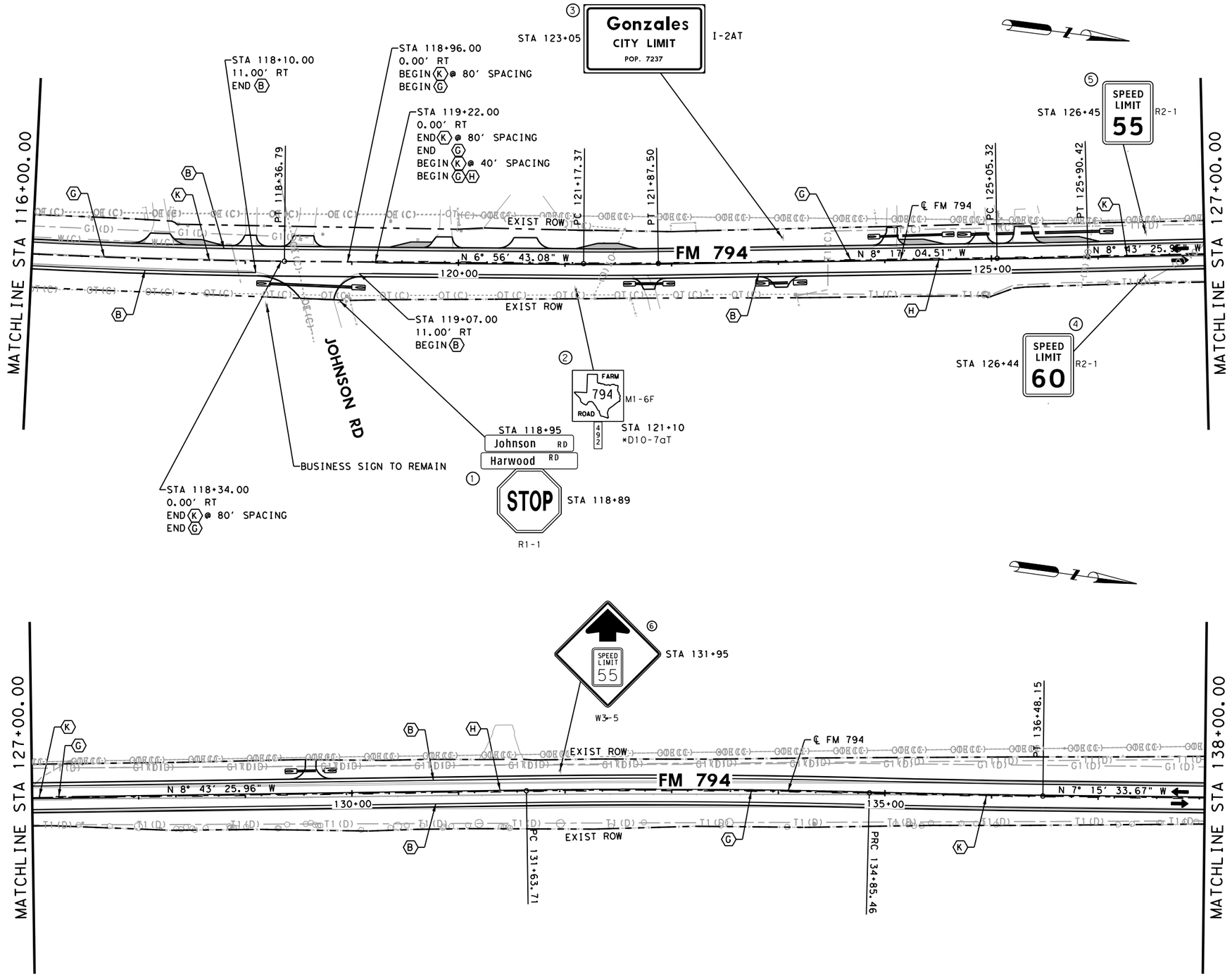

LEGEND

A	W 4" BRK
B	W 4" SOLID
C	W 8" SOLID
D	W 24" SOLID
E	W ARROW
F	W WORD
G	Y 4" BRK
H	Y 4" SOLID
I	Y 12" SOLID
J	TY I-C
K	TY II-A-A
L	Y 24" SOLID
M	W DBL ARROW

OBJECT MARKER (OM-2Y)(WC)(GND)

PROPOSED SIGN POST

DELINEATOR (D-SW)(SZ1)(BRF)(GF2)(BI)

DELINEATOR (D-SW)(SZ)(BRF)(CTB)(BI)

DIRECTION OF TRAFFIC

0 50 100

SCALE: 1"=100'

NOTES:

1. UTILITY LOCATIONS SHOWN ARE APPROXIMATE AND SHOULD BE FIELD VERIFIED BY THE CONTRACTOR BEFORE CONSTRUCTION

*REFERENCE MARKER SIGNS SHALL BE RELOCATED AT THEIR ORIGINAL LOCATION.

STATE OF TEXAS
JOHN W. TULEY
102441
LICENSED
PROFESSIONAL ENGINEER

3/25/2021

Texas Department of Transportation

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FM 794

SIGNING AND PAVEMENT MARKING LAYOUT

SHEET 4 OF 19

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			182
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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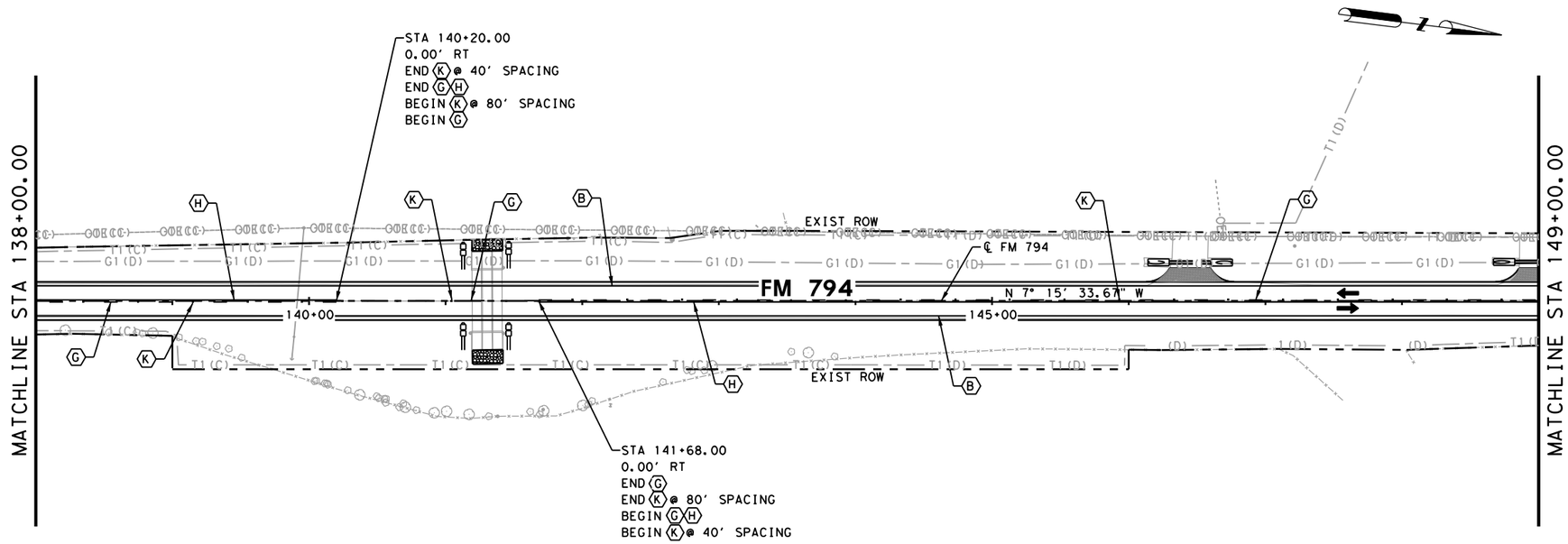

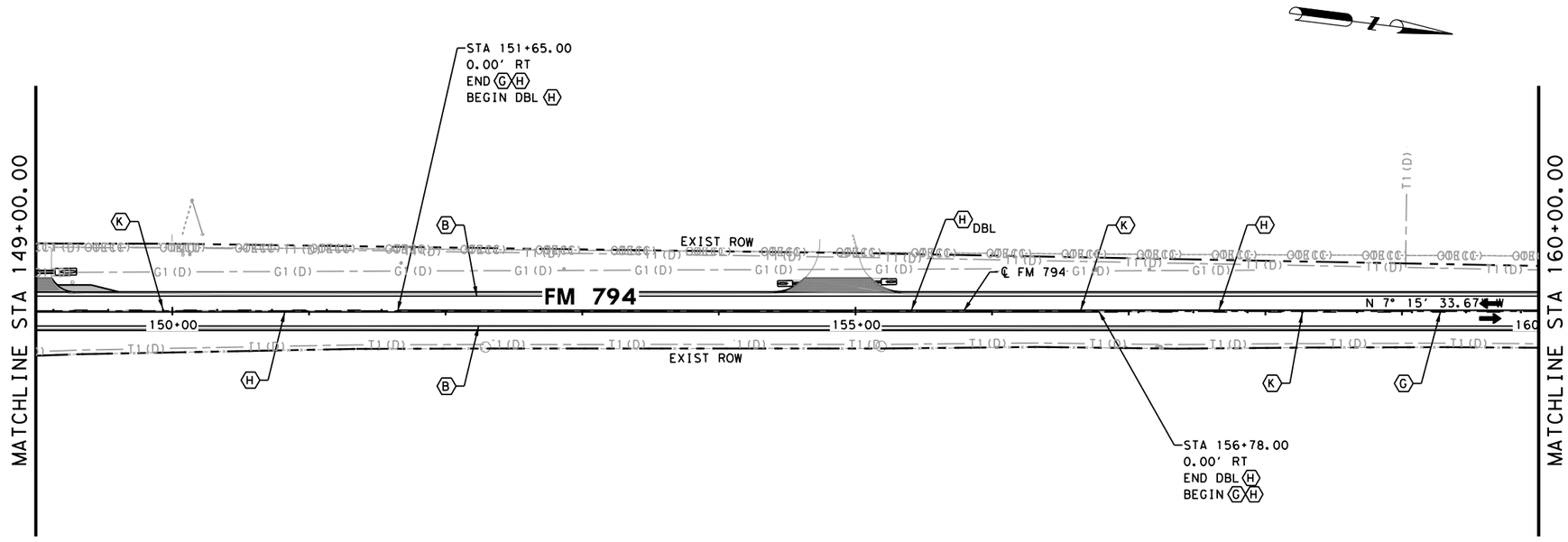

LEGEND

(A)	W 4" BRK
(B)	W 4" SOLID
(C)	W 8" SOLID
(D)	W 24" SOLID
(E)	W ARROW
(F)	W WORD
(G)	Y 4" BRK
(H)	Y 4" SOLID
(I)	Y 12" SOLID
(J)	TY I-C
(K)	TY II-A-A
(L)	Y 24" SOLID
(M)	W DBL ARROW

OBJECT MARKER (OM-2Y)(WC)(GND)

PROPOSED SIGN POST

DELINEATOR (D-SW)(SZ1)(BRF)(GF2)(BI)

DELINEATOR (D-SW)(SZ)(BRF)(CTB)(BI)

DIRECTION OF TRAFFIC

0 50 100

SCALE: 1"=100'

NOTES:

1. UTILITY LOCATIONS SHOWN ARE APPROXIMATE AND SHOULD BE FIELD VERIFIED BY THE CONTRACTOR BEFORE CONSTRUCTION

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SIGNING AND PAVEMENT MARKING LAYOUT

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			183
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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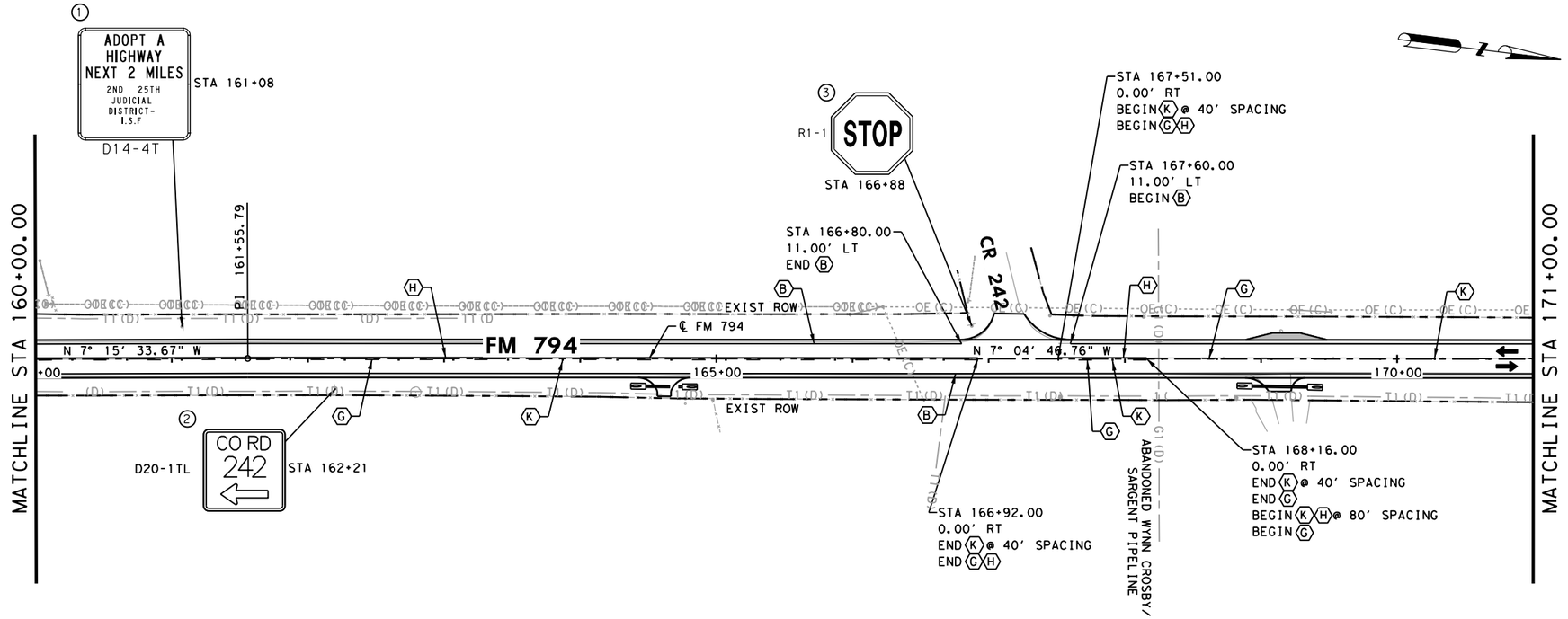

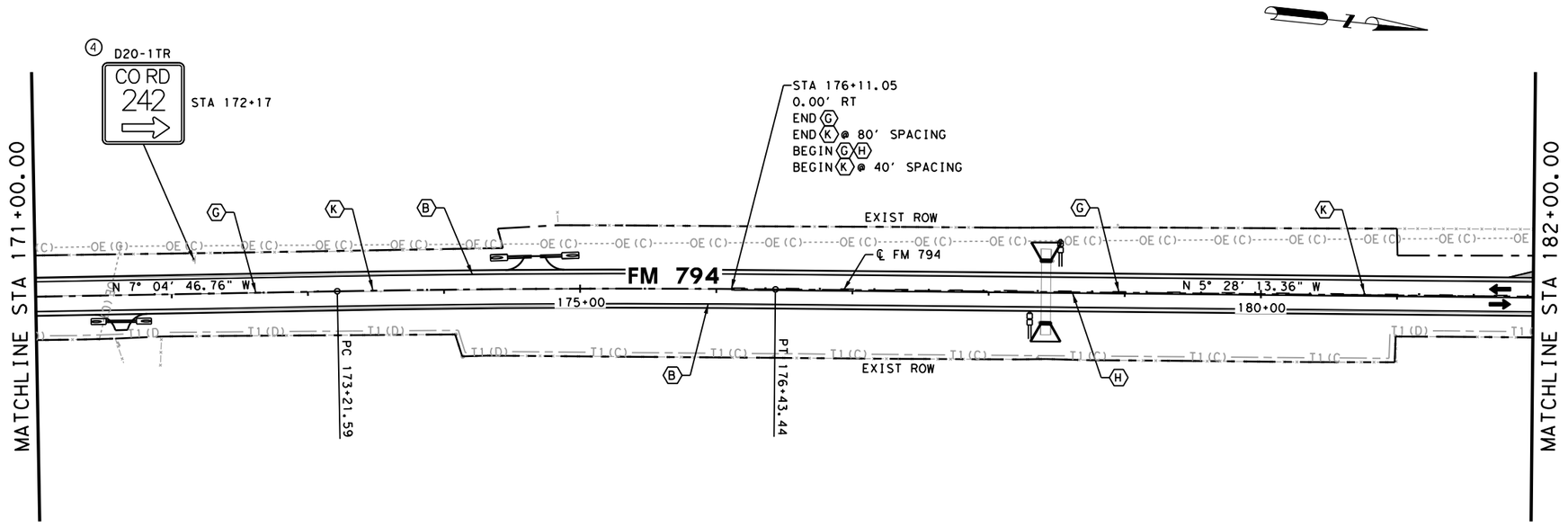

LEGEND

A	W 4" BRK
B	W 4" SOLID
C	W 8" SOLID
D	W 24" SOLID
E	W ARROW
F	W WORD
G	Y 4" BRK
H	Y 4" SOLID
I	Y 12" SOLID
J	TY I-C
K	TY II-A-A
L	Y 24" SOLID
M	W DBL ARROW

OBJECT MARKER (OM-2Y)(WC)(GND)

PROPOSED SIGN POST

DELINEATOR (D-SW)(SZ1)(BRF)(GF2)(BI)

DELINEATOR (D-SW)(SZ)(BRF)(CTB)(BI)

DIRECTION OF TRAFFIC

0 50 100

SCALE: 1"=100'

NOTES:

1. UTILITY LOCATIONS SHOWN ARE APPROXIMATE AND SHOULD BE FIELD VERIFIED BY THE CONTRACTOR BEFORE CONSTRUCTION

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SIGNING AND PAVEMENT MARKING LAYOUT

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			184
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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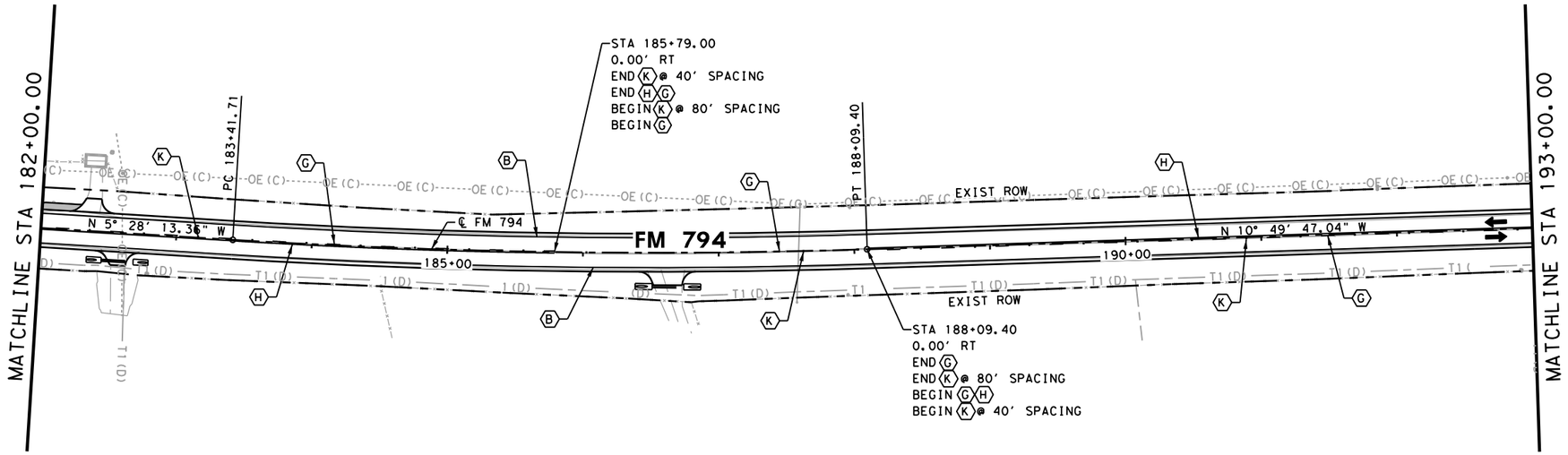

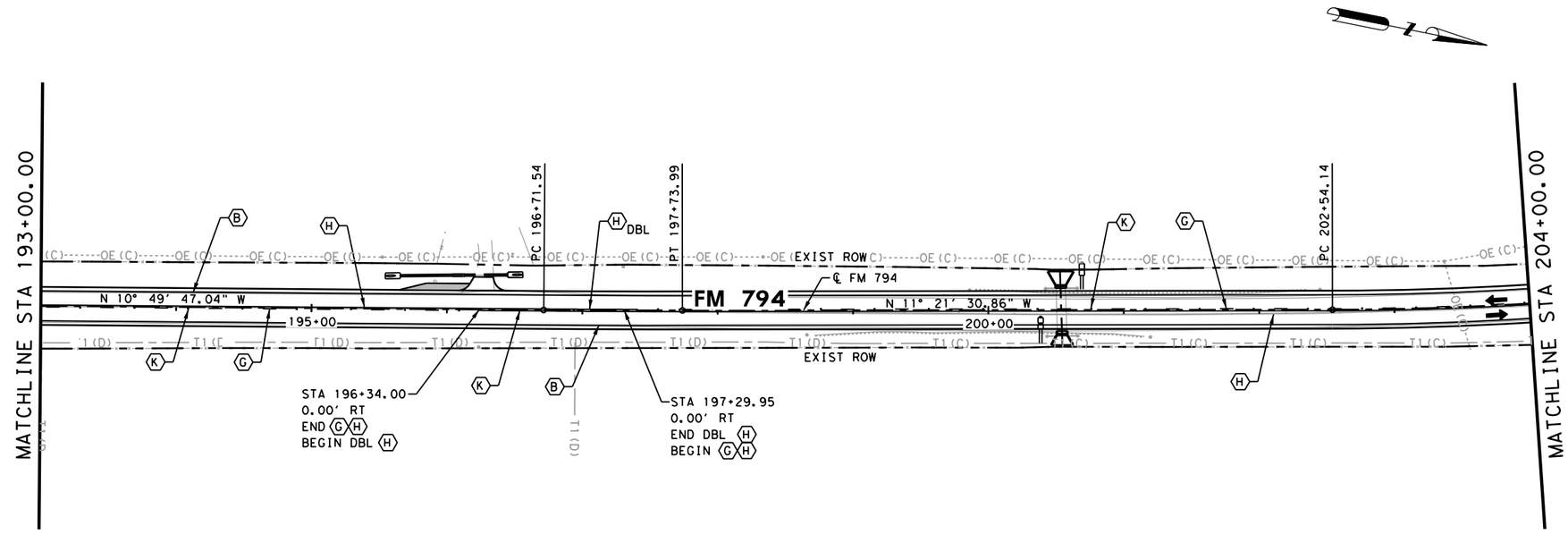

LEGEND

(A)	W 4" BRK
(B)	W 4" SOLID
(C)	W 8" SOLID
(D)	W 24" SOLID
(E)	W ARROW
(F)	W WORD
(G)	Y 4" BRK
(H)	Y 4" SOLID
(I)	Y 12" SOLID
(J)	TY I-C
(K)	TY II-A-A
(L)	Y 24" SOLID
(M)	W DBL ARROW

OBJECT MARKER (OM-2Y)(WC)(GND)

PROPOSED SIGN POST

DELINEATOR (D-SW)(SZ1)(BRF)(GF2)(BI)

DELINEATOR (D-SW)(SZ)(BRF)(CTB)(BI)

DIRECTION OF TRAFFIC

0 50 100

SCALE: 1"=100'

NOTES:

1. UTILITY LOCATIONS SHOWN ARE APPROXIMATE AND SHOULD BE FIELD VERIFIED BY THE CONTRACTOR BEFORE CONSTRUCTION

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SIGNING AND PAVEMENT MARKING LAYOUT

SHEET 7 OF 19

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			185
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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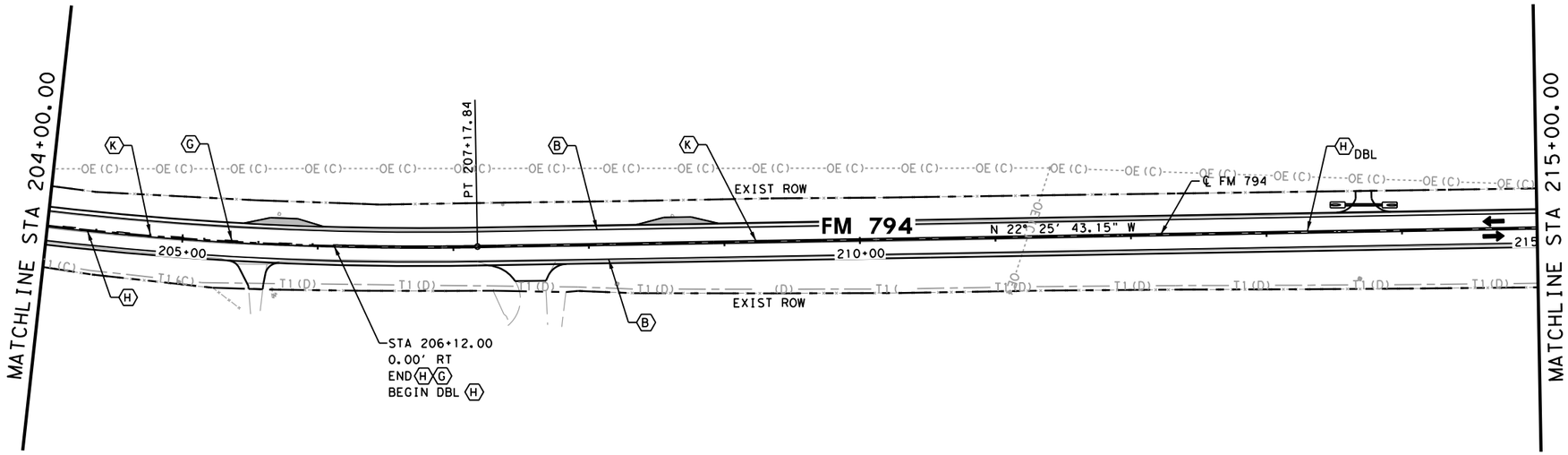

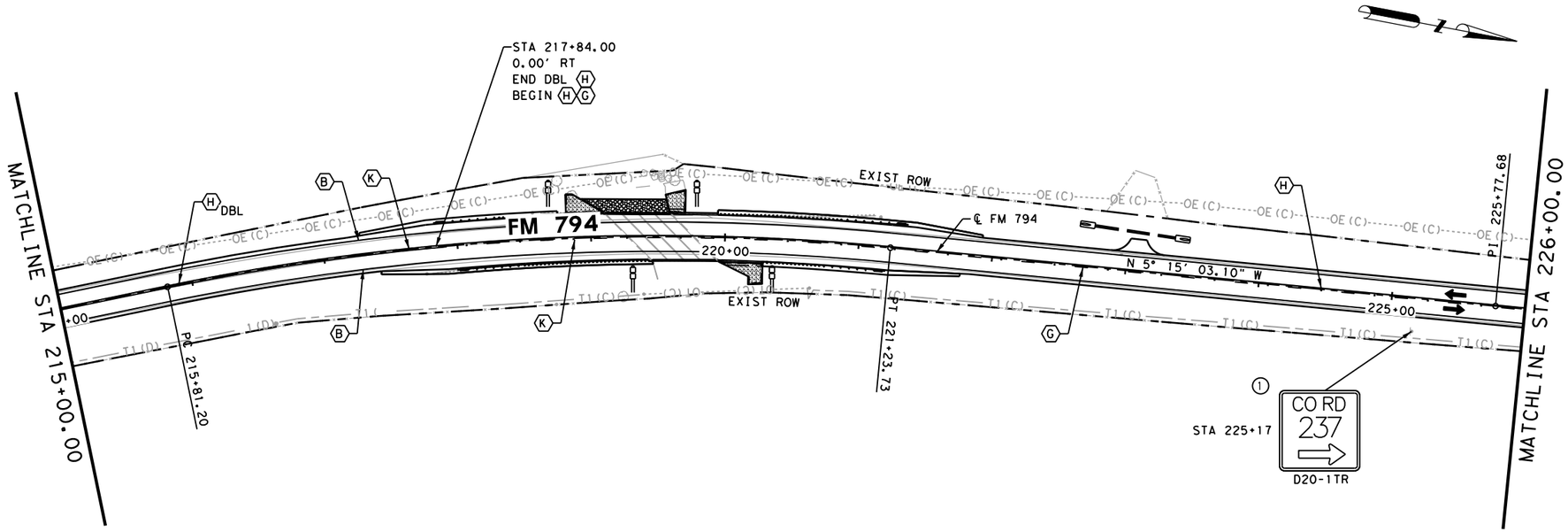

LEGEND

A	W 4" BRK
B	W 4" SOLID
C	W 8" SOLID
D	W 24" SOLID
E	W ARROW
F	W WORD
G	Y 4" BRK
H	Y 4" SOLID
I	Y 12" SOLID
J	TY I-C
K	TY II-A-A
L	Y 24" SOLID
M	W DBL ARROW

OBJECT MARKER (OM-2Y)(WC)(GND)

PROPOSED SIGN POST

DELINEATOR (D-SW)(SZ1)(BRF)(GF2)(BI)

DELINEATOR (D-SW)(SZ)(BRF)(CTB)(BI)

DIRECTION OF TRAFFIC

0 50 100

SCALE: 1"=100'

NOTES:

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SIGNING AND PAVEMENT MARKING LAYOUT

SHEET 8 OF 19

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			186
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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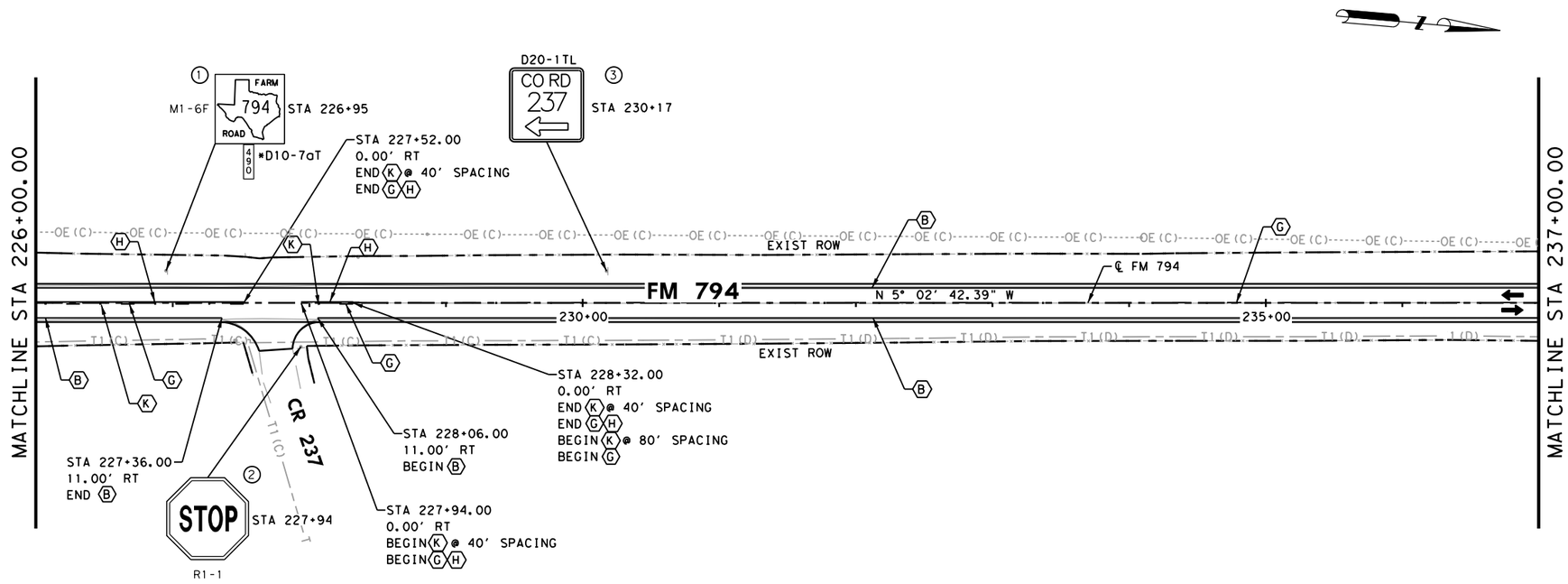

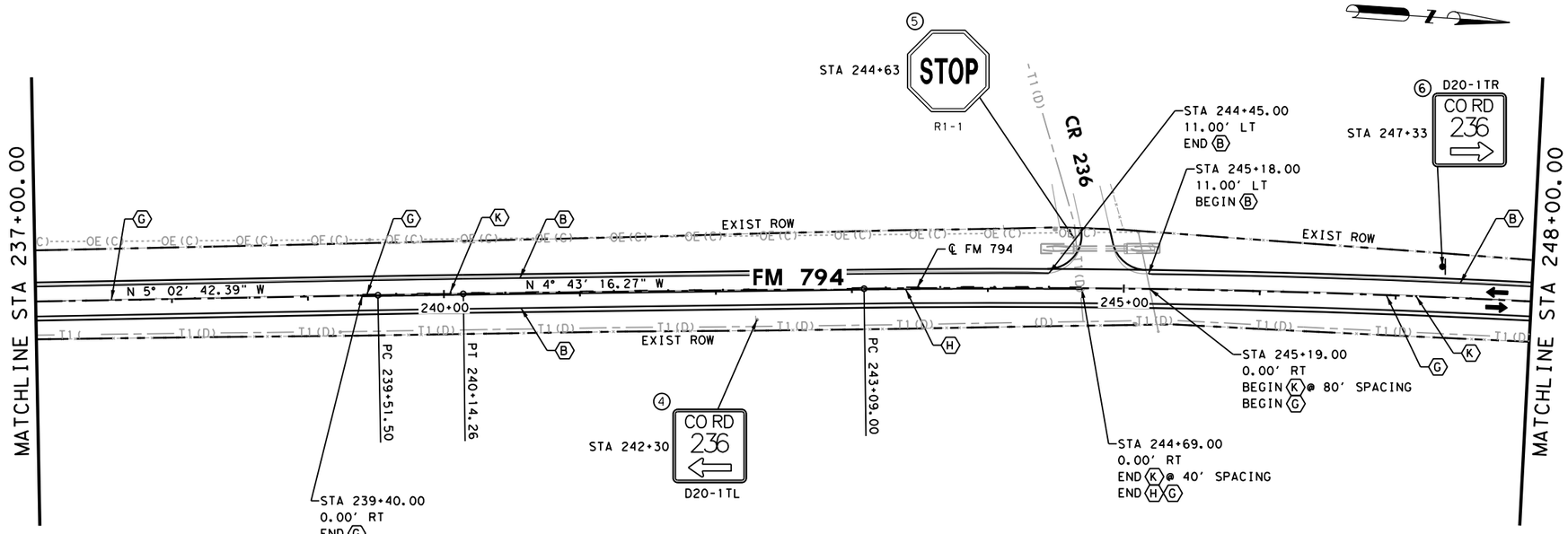

*REFERENCE MARKER SIGNS SHALL BE RELOCATED AT THEIR ORIGINAL LOCATION.

LEGEND

(A)	W 4" BRK
(B)	W 4" SOLID
(C)	W 8" SOLID
(D)	W 24" SOLID
(E)	W ARROW
(F)	W WORD
(G)	Y 4" BRK
(H)	Y 4" SOLID
(I)	Y 12" SOLID
(J)	TY I-C
(K)	TY II-A-A
(L)	Y 24" SOLID
(M)	W DBL ARROW

OBJECT MARKER (OM-2Y) (WC) (GND)

PROPOSED SIGN POST

DELINEATOR (D-SW) (SZ1) (BRF) (GF2) (BI)

DELINEATOR (D-SW) (SZ) (BRF) (CTB) (BI)

DIRECTION OF TRAFFIC

0 50 100

SCALE: 1"=100'

NOTES:

1. UTILITY LOCATIONS SHOWN ARE APPROXIMATE AND SHOULD BE FIELD VERIFIED BY THE CONTRACTOR BEFORE CONSTRUCTION

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SIGNING AND PAVEMENT MARKING LAYOUT

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			187
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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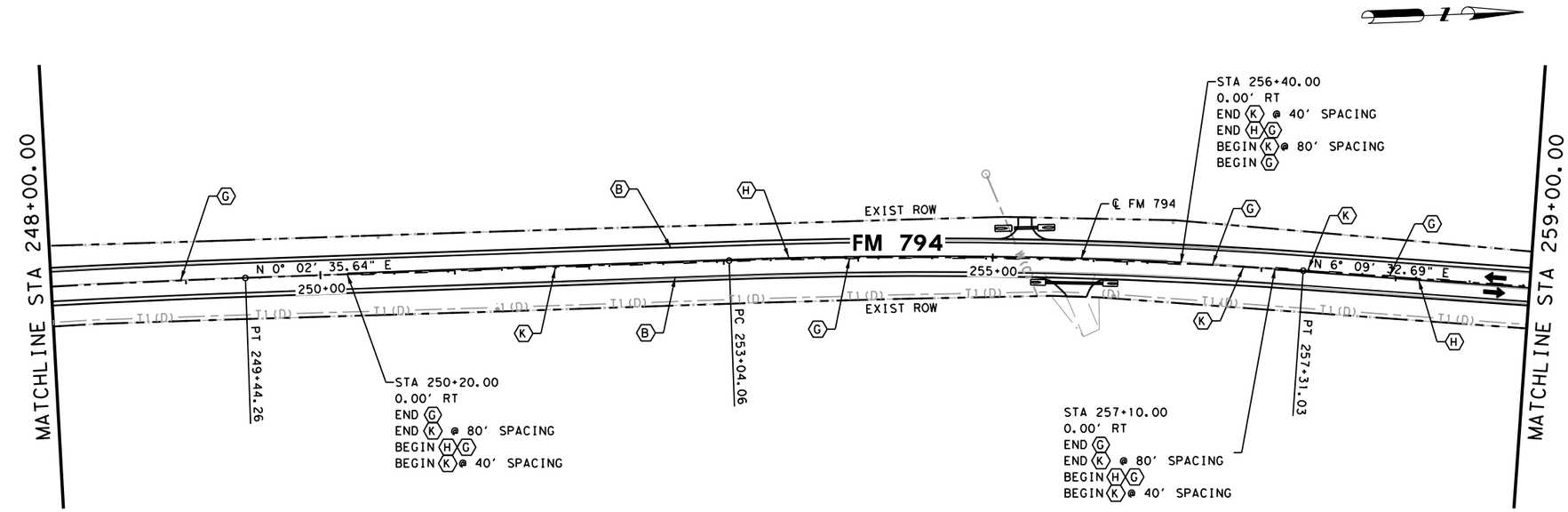

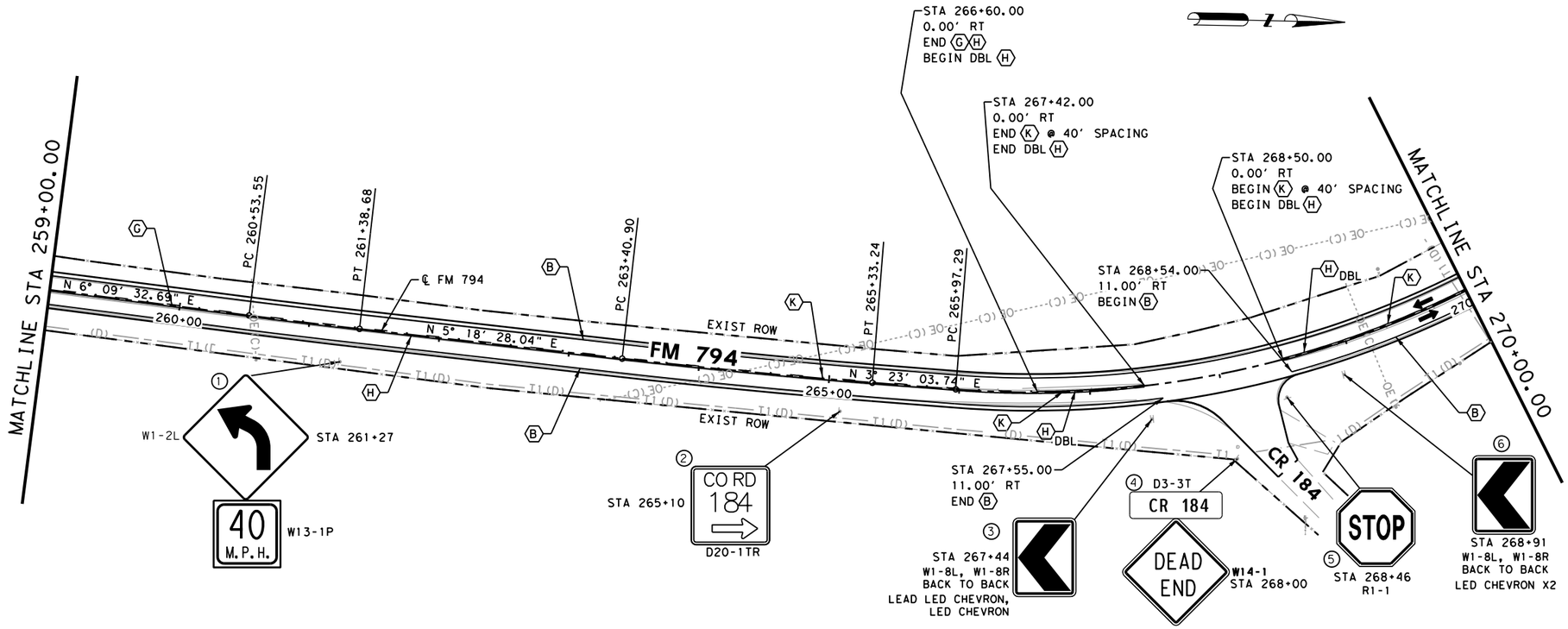

LEGEND

A	W 4" BRK
B	W 4" SOLID
C	W 8" SOLID
D	W 24" SOLID
E	W ARROW
F	W WORD
G	Y 4" BRK
H	Y 4" SOLID
I	Y 12" SOLID
J	TY I-C
K	TY II-A-A
L	Y 24" SOLID
M	W DBL ARROW

OBJECT MARKER (OM-2Y)(WC)(GND)

PROPOSED SIGN POST

DELINEATOR (D-SW)(SZ1)(BRF)(GF2)(BI)

DELINEATOR (D-SW)(SZ)(BRF)(CTB)(BI)

DIRECTION OF TRAFFIC

0 50 100

SCALE: 1"=100'

NOTES:

1. UTILITY LOCATIONS SHOWN ARE APPROXIMATE AND SHOULD BE FIELD VERIFIED BY THE CONTRACTOR BEFORE CONSTRUCTION

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SIGNING AND PAVEMENT MARKING LAYOUT

SHEET 10 OF 19

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			188
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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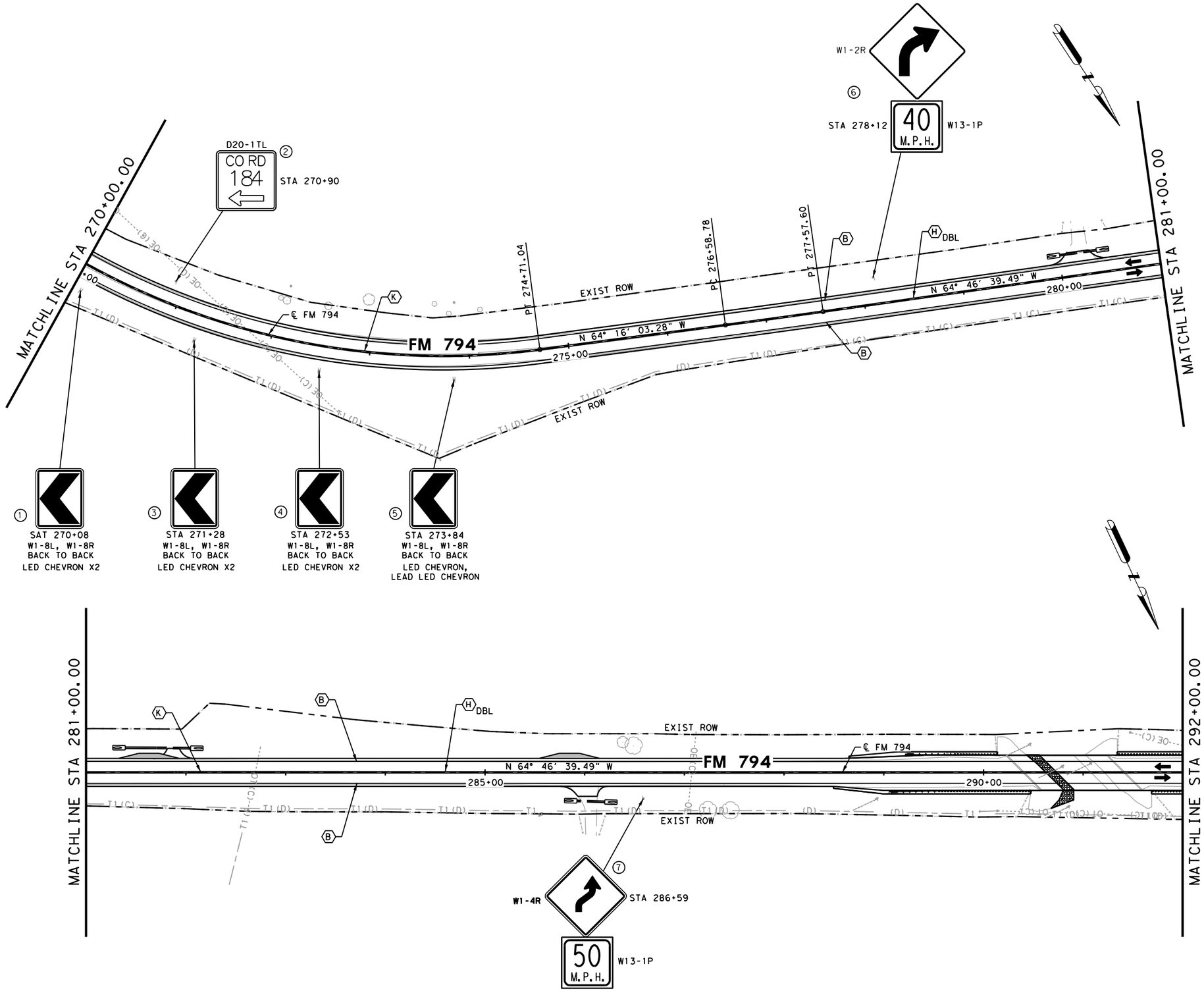

LEGEND

(A)	W 4" BRK
(B)	W 4" SOLID
(C)	W 8" SOLID
(D)	W 24" SOLID
(E)	W ARROW
(F)	W WORD
(G)	Y 4" BRK
(H)	Y 4" SOLID
(I)	Y 12" SOLID
(J)	TY I-C
(K)	TY II-A-A
(L)	Y 24" SOLID
(M)	W DBL ARROW

OBJECT MARKER (OM-2Y)(WC)(GND)

PROPOSED SIGN POST

DELINEATOR (D-SW)(SZ1)(BRF)(GF2)(BI)

DELINEATOR (D-SW)(SZ)(BRF)(CTB)(BI)

DIRECTION OF TRAFFIC

0 50 100

SCALE: 1"=100'

NOTES:

1. UTILITY LOCATIONS SHOWN ARE APPROXIMATE AND SHOULD BE FIELD VERIFIED BY THE CONTRACTOR BEFORE CONSTRUCTION

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SIGNING AND PAVEMENT MARKING LAYOUT

SHEET 11 OF 19

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			189
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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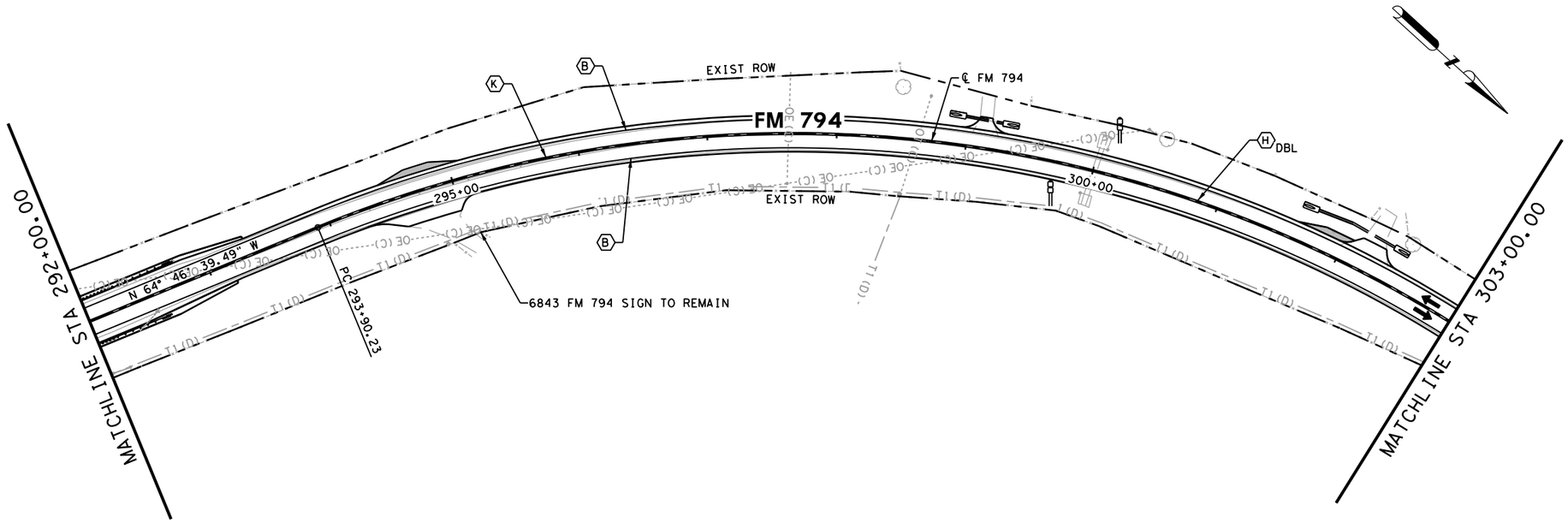

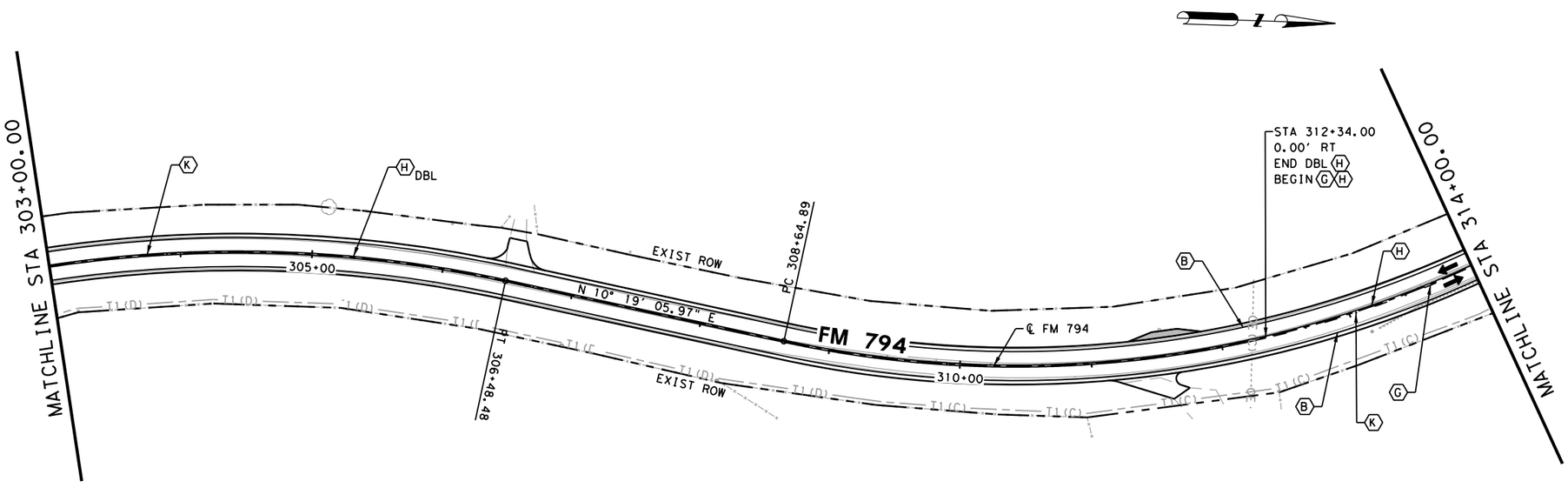

LEGEND

A	W 4" BRK
B	W 4" SOLID
C	W 8" SOLID
D	W 24" SOLID
E	W ARROW
F	W WORD
G	Y 4" BRK
H	Y 4" SOLID
I	Y 12" SOLID
J	TY I-C
K	TY II-A-A
L	Y 24" SOLID
M	W DBL ARROW

OBJECT MARKER (OM-2Y)(WC)(GND)

PROPOSED SIGN POST

DELINEATOR (D-SW)(SZ1)(BRF)(GF2)(BI)

DELINEATOR (D-SW)(SZ)(BRF)(CTB)(BI)

DIRECTION OF TRAFFIC

0 50 100

SCALE: 1"=100'

NOTES:

1. UTILITY LOCATIONS SHOWN ARE APPROXIMATE AND SHOULD BE FIELD VERIFIED BY THE CONTRACTOR BEFORE CONSTRUCTION

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FM 794

SIGNING AND PAVEMENT MARKING LAYOUT

SHEET 12 OF 19

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			190
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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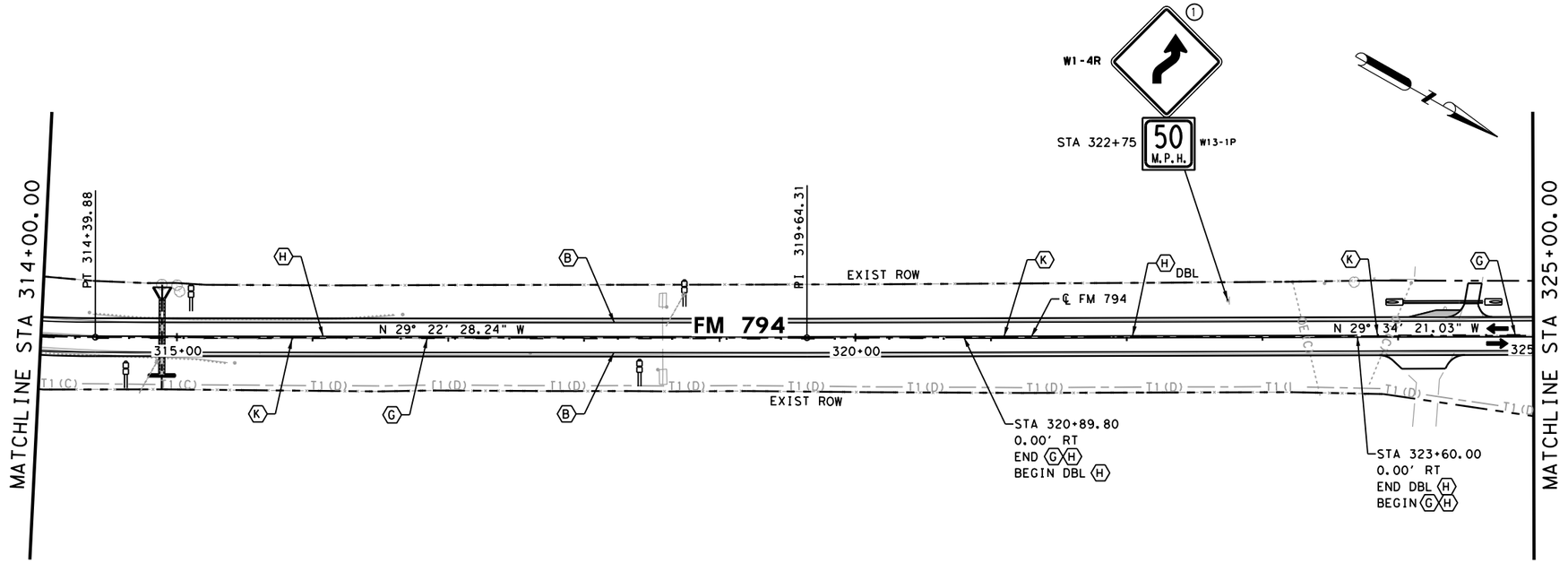

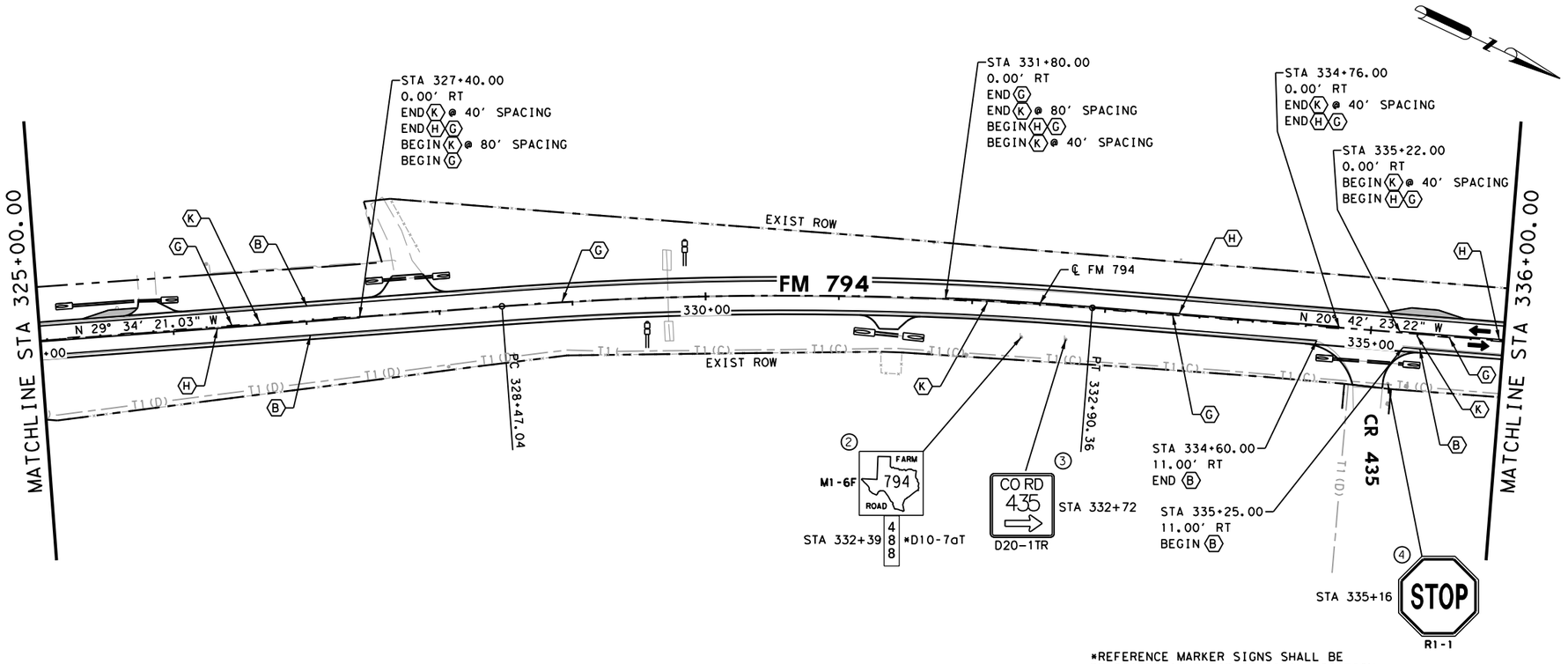

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LEGEND

A	W 4" BRK
B	W 4" SOLID
C	W 8" SOLID
D	W 24" SOLID
E	W ARROW
F	W WORD
G	Y 4" BRK
H	Y 4" SOLID
I	Y 12" SOLID
J	TY I-C
K	TY II-A-A
L	Y 24" SOLID
M	W DBL ARROW

OBJECT MARKER (OM-2Y)(WC)(GND)

PROPOSED SIGN POST

DELINEATOR (D-SW)(SZ1)(BRF)(GF2)(BI)

DELINEATOR (D-SW)(SZ)(BRF)(CTB)(BI)

DIRECTION OF TRAFFIC

0 50 100

SCALE: 1"=100'

NOTES:

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SIGNING AND PAVEMENT MARKING LAYOUT

SHEET 13 OF 19

FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
6		191

STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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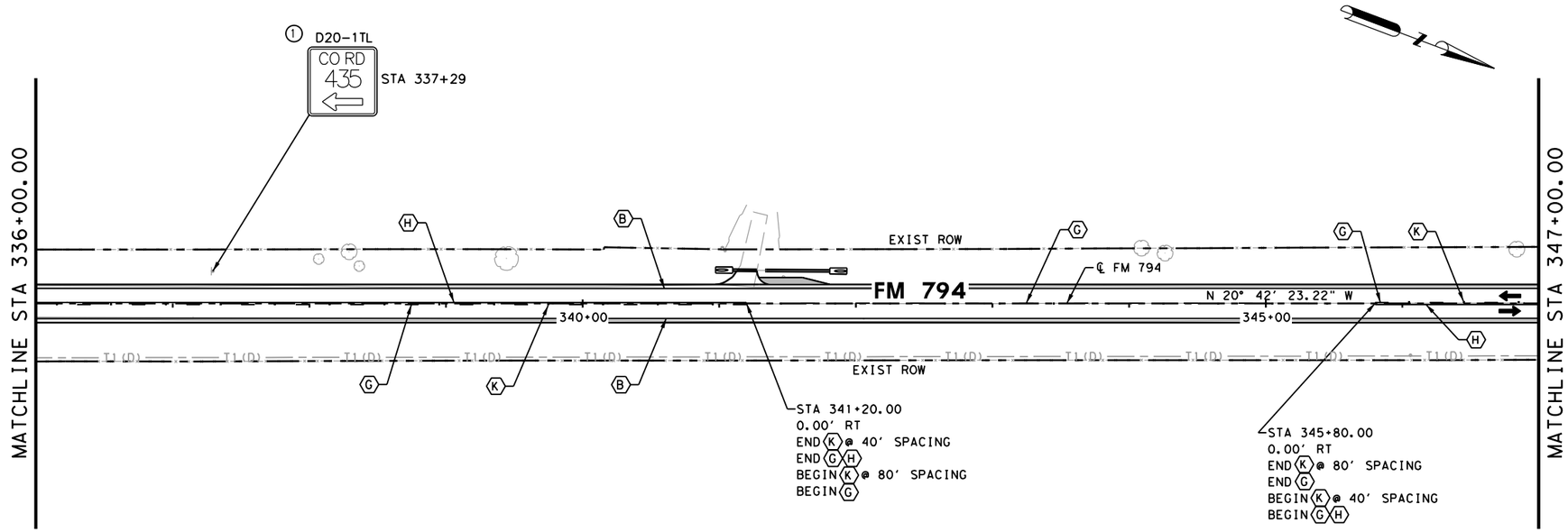

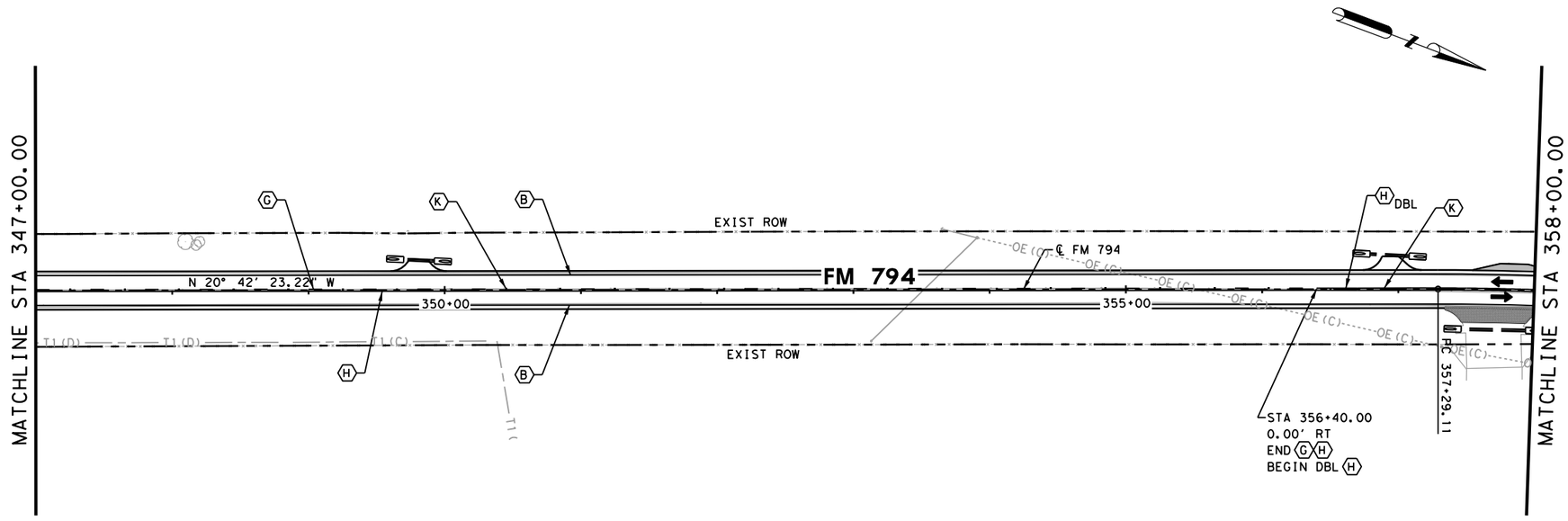

LEGEND

A	W 4" BRK
B	W 4" SOLID
C	W 8" SOLID
D	W 24" SOLID
E	W ARROW
F	W WORD
G	Y 4" BRK
H	Y 4" SOLID
I	Y 12" SOLID
J	TY I-C
K	TY II-A-A
L	Y 24" SOLID
M	W DBL ARROW

OBJECT MARKER (OM-2Y)(WC)(GND)

PROPOSED SIGN POST

DELINEATOR (D-SW)(SZ1)(BRF)(GF2)(BI)

DELINEATOR (D-SW)(SZ)(BRF)(CTB)(BI)

DIRECTION OF TRAFFIC

0 50 100

SCALE: 1"=100'

NOTES:

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STATE OF TEXAS
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LICENSED
PROFESSIONAL ENGINEER

3/25/2021

Texas Department of Transportation

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

FM 794

SIGNING AND PAVEMENT MARKING LAYOUT

FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
6		192

STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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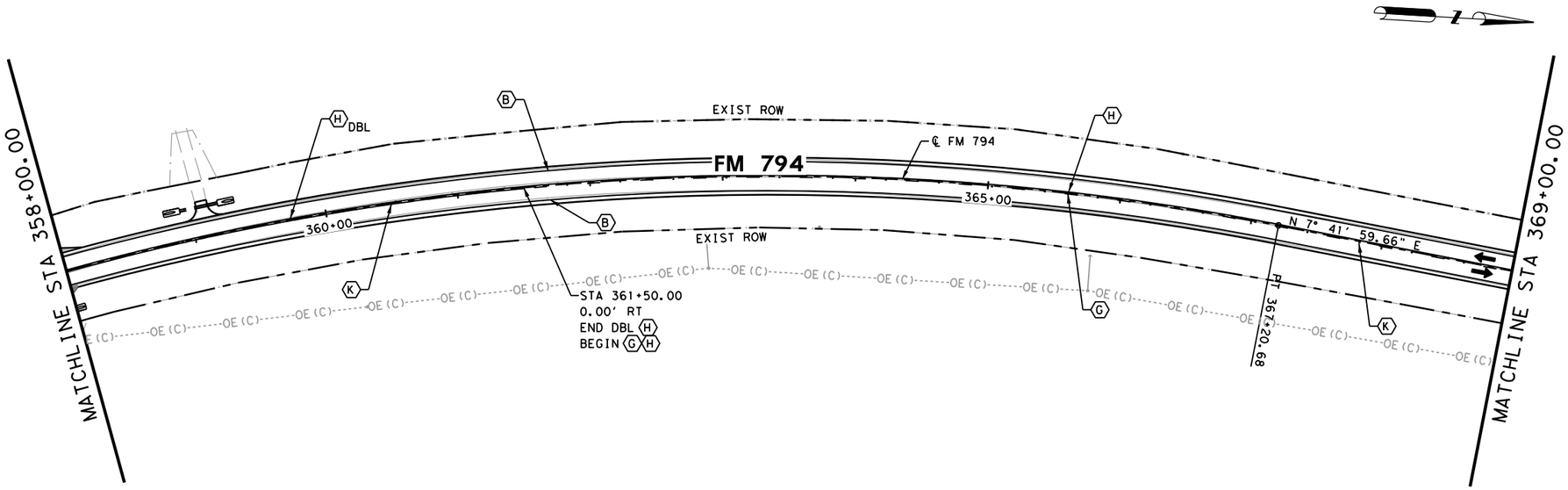

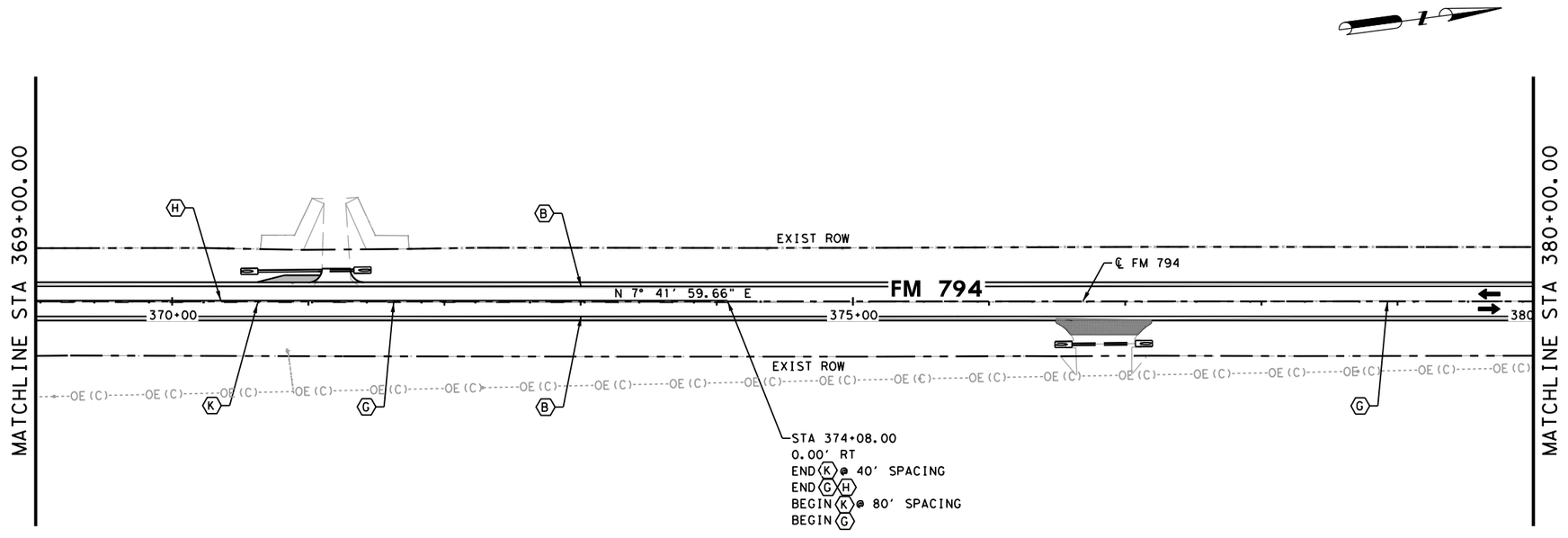

LEGEND

A	W 4" BRK
B	W 4" SOLID
C	W 8" SOLID
D	W 24" SOLID
E	W ARROW
F	W WORD
G	Y 4" BRK
H	Y 4" SOLID
I	Y 12" SOLID
J	TY I-C
K	TY II-A-A
L	Y 24" SOLID
M	W DBL ARROW

OBJECT MARKER (OM-2Y)(WC)(GND)

PROPOSED SIGN POST

DELINEATOR (D-SW)(SZ1)(BRF)(GF2)(BI)

DELINEATOR (D-SW)(SZ)(BRF)(CTB)(BI)

DIRECTION OF TRAFFIC

0 50 100

SCALE: 1"=100'

NOTES:

1. UTILITY LOCATIONS SHOWN ARE APPROXIMATE AND SHOULD BE FIELD VERIFIED BY THE CONTRACTOR BEFORE CONSTRUCTION

STATE OF TEXAS
JOHN W. TULEY
102441
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SIGNING AND PAVEMENT MARKING LAYOUT

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			193
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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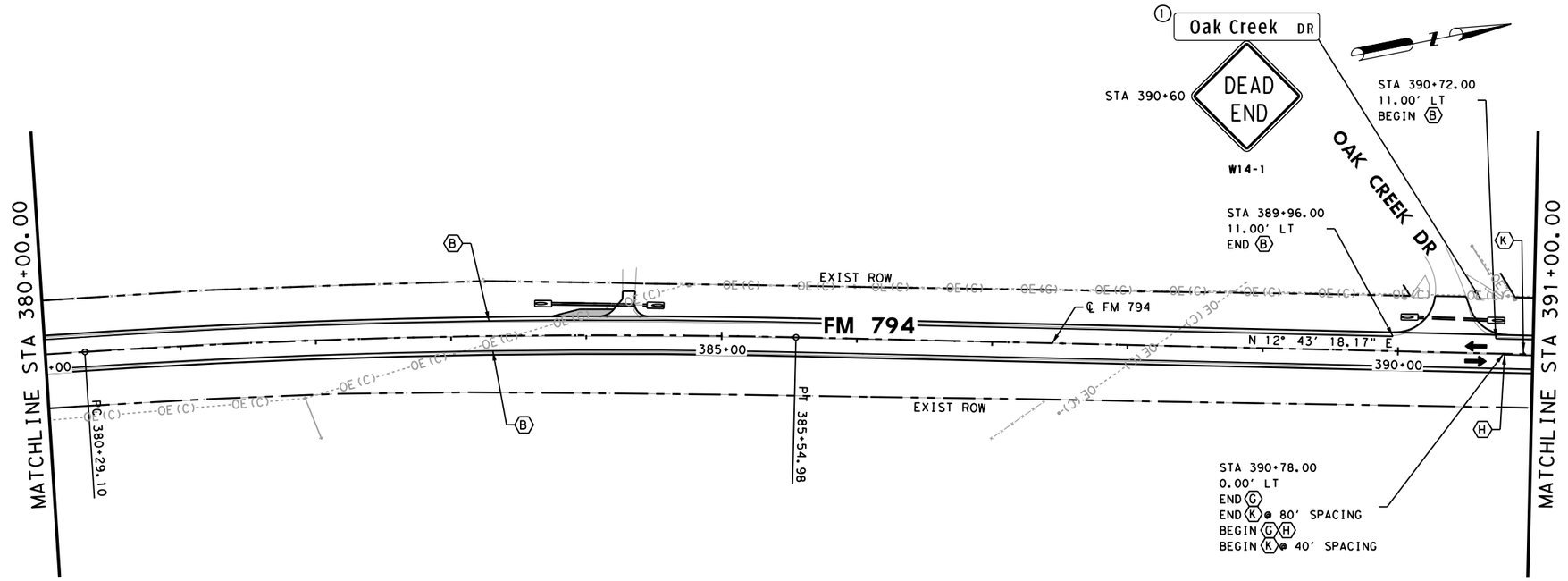

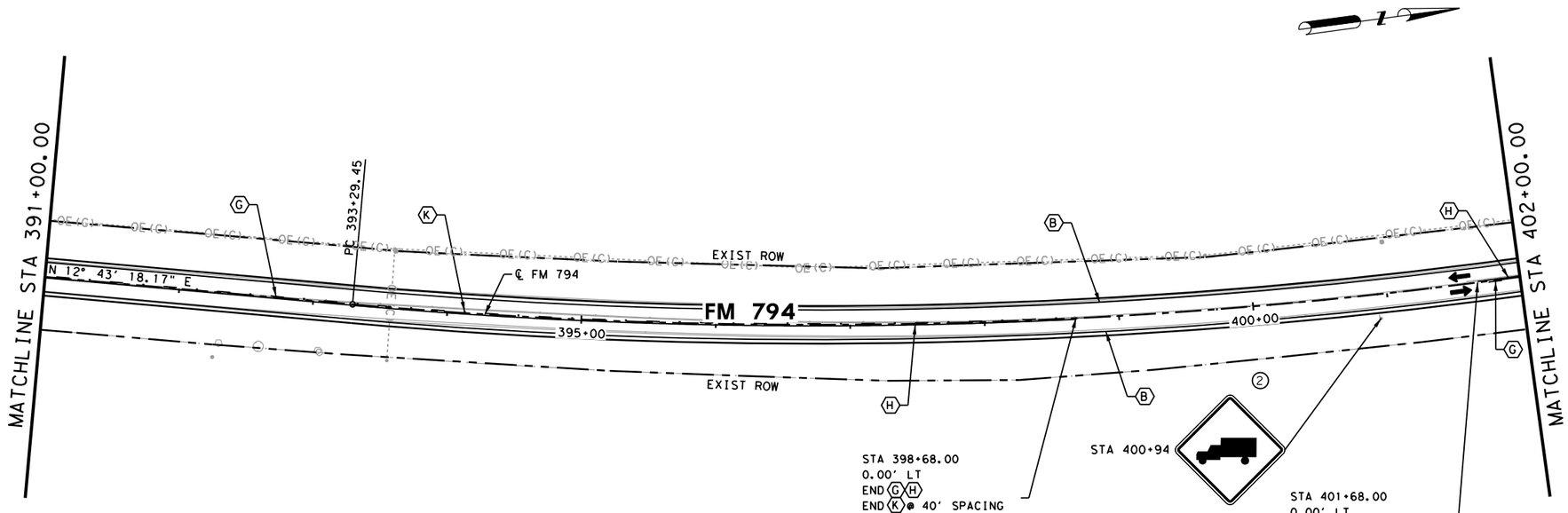

LEGEND

(A)	W 4" BRK
(B)	W 4" SOLID
(C)	W 8" SOLID
(D)	W 24" SOLID
(E)	W ARROW
(F)	W WORD
(G)	Y 4" BRK
(H)	Y 4" SOLID
(I)	Y 12" SOLID
(J)	TY I-C
(K)	TY II-A-A
(L)	Y 24" SOLID
(M)	W DBL ARROW

OBJECT MARKER (OM-2Y) (WC) (GND)

PROPOSED SIGN POST

DELINEATOR (D-SW) (SZ1) (BRF) (GF2) (BI)

DELINEATOR (D-SW) (SZ) (BRF) (CTB) (BI)

DIRECTION OF TRAFFIC

0 50 100

SCALE: 1"=100'

NOTES:

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SIGNING AND PAVEMENT MARKING LAYOUT

SHEET 16 OF 19

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			194
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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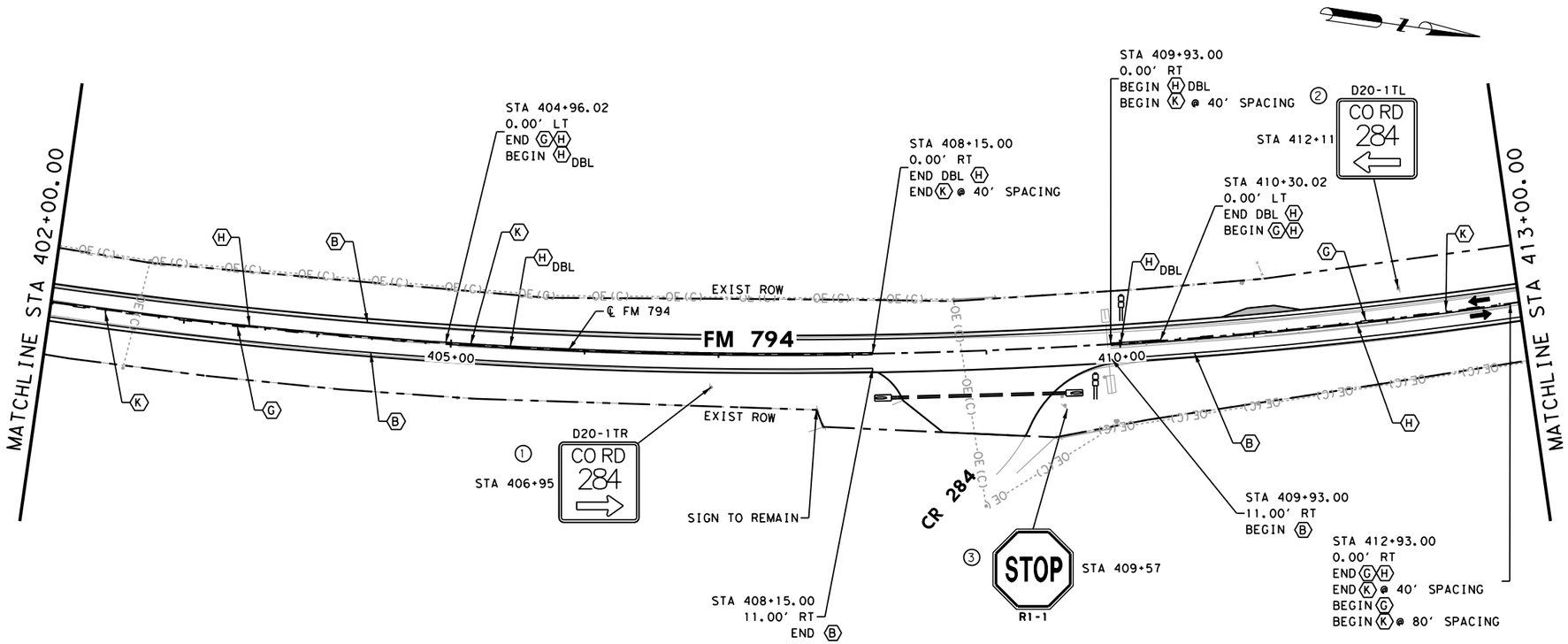

LEGEND

(A)	W 4" BRK
(B)	W 4" SOLID
(C)	W 8" SOLID
(D)	W 24" SOLID
(E)	W ARROW
(F)	W WORD
(G)	Y 4" BRK
(H)	Y 4" SOLID
(I)	Y 12" SOLID
(J)	TY I-C
(K)	TY II-A-A
(L)	Y 24" SOLID
(M)	W DBL ARROW

OBJECT MARKER (OM-2Y)(WC)(GND)

PROPOSED SIGN POST

DELINEATOR (D-SW)(SZ1)(BRF)(GF2)(BI)

DELINEATOR (D-SW)(SZ)(BRF)(CTB)(BI)

DIRECTION OF TRAFFIC

0 50 100

SCALE: 1"=100'

NOTES:

1. UTILITY LOCATIONS SHOWN ARE APPROXIMATE AND SHOULD BE FIELD VERIFIED BY THE CONTRACTOR BEFORE CONSTRUCTION

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SIGNING AND PAVEMENT MARKING LAYOUT

SHEET 17 OF 19

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			195
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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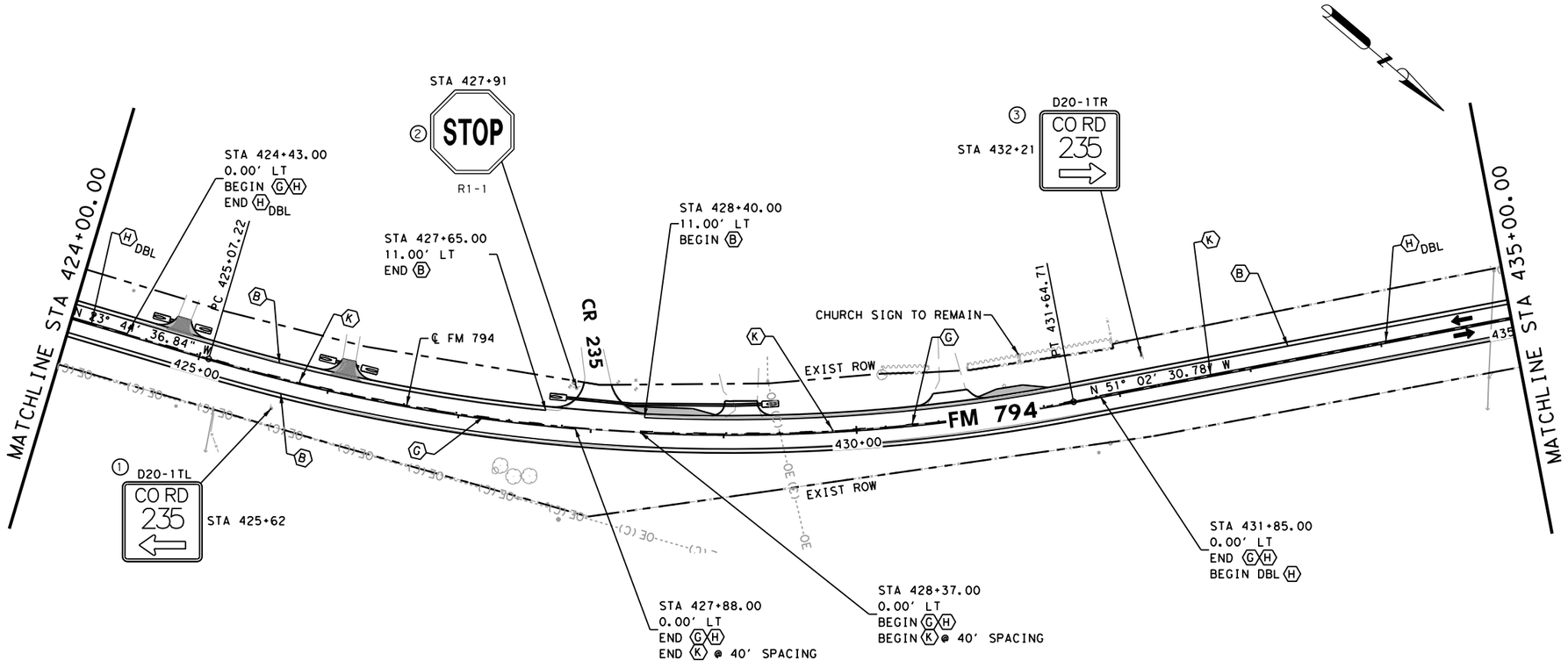

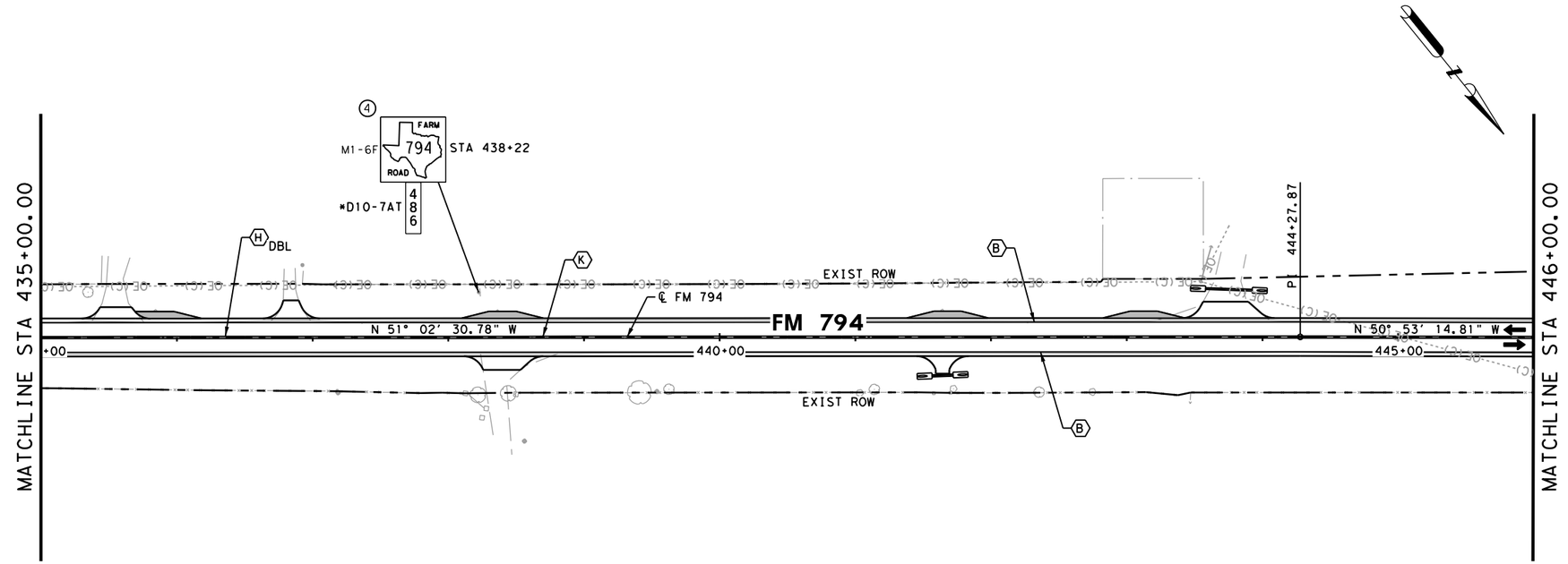

*REFERENCE MARKER SIGNS SHALL BE RELOCATED AT THEIR ORIGINAL LOCATION.

LEGEND

A	W 4" BRK
B	W 4" SOLID
C	W 8" SOLID
D	W 24" SOLID
E	W ARROW
F	W WORD
G	Y 4" BRK
H	Y 4" SOLID
I	Y 12" SOLID
J	TY I-C
K	TY II-A-A
L	Y 24" SOLID
M	W DBL ARROW

OBJECT MARKER (OM-2Y)(WC)(GND)

PROPOSED SIGN POST

DELINEATOR (D-SW)(SZ1)(BRF)(GF2)(BI)

DELINEATOR (D-SW)(SZ)(BRF)(CTB)(BI)

DIRECTION OF TRAFFIC

0 50 100

SCALE: 1"=100'

NOTES:

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SIGNING AND PAVEMENT MARKING LAYOUT

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			196
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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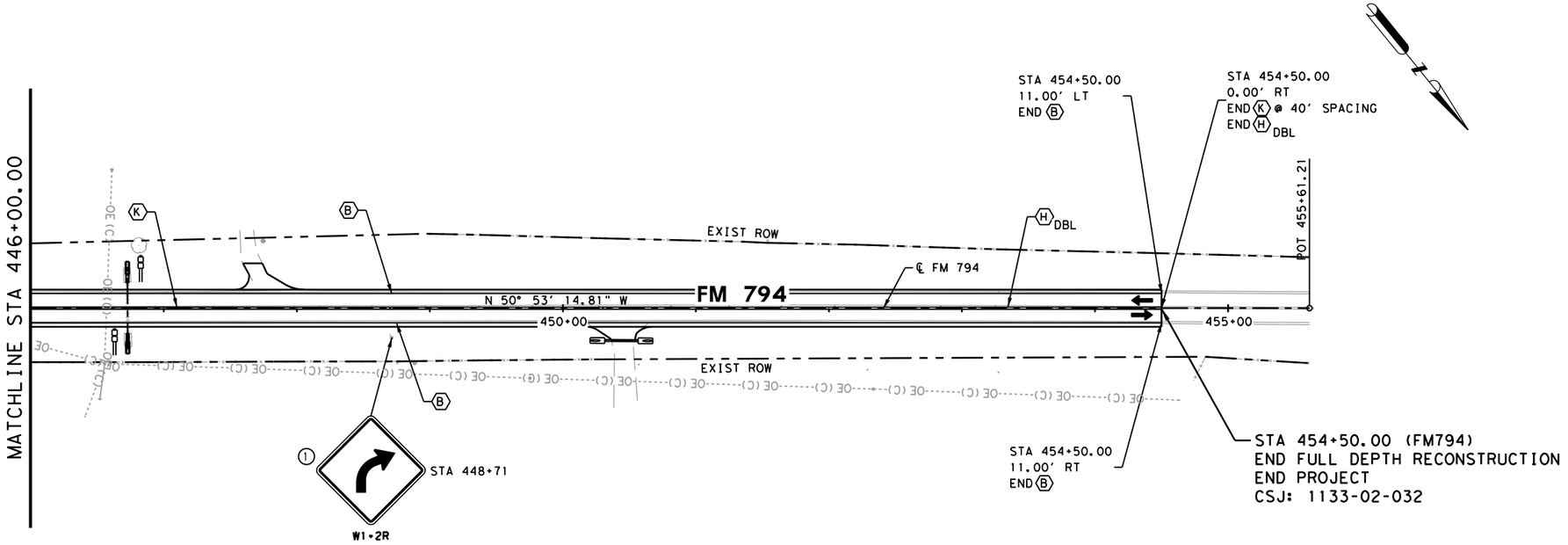

LEGEND

A	W 4" BRK
B	W 4" SOLID
C	W 8" SOLID
D	W 24" SOLID
E	W ARROW
F	W WORD
G	Y 4" BRK
H	Y 4" SOLID
I	Y 12" SOLID
J	TY I-C
K	TY II-A-A
L	Y 24" SOLID
M	W DBL ARROW

OBJECT MARKER (OM-2Y)(WC)(GND)

PROPOSED SIGN POST

DELINEATOR (D-SW)(SZ1)(BRF)(GF2)(BI)

DELINEATOR (D-SW)(SZ)(BRF)(CTB)(BI)

DIRECTION OF TRAFFIC

0 50 100

SCALE: 1"=100'

NOTES:

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SIGNING AND PAVEMENT MARKING LAYOUT

SHEET 19 OF 19

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			197
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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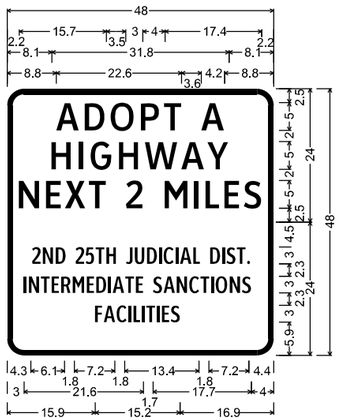
SHT 1 OF 19 SIGN (4)

SHT 6 OF 19 SIGN (1)

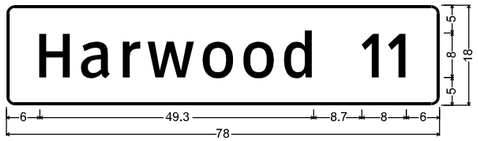


D14-4T-2_48x48;

3.0" Radius, 1.0" Border, White on, Blue;
"ADOPT A", ClearviewHwy-3-W;
"HIGHWAY", ClearviewHwy-3-W;
"NEXT 2 MILES", ClearviewHwy-3-W 80% spacing;

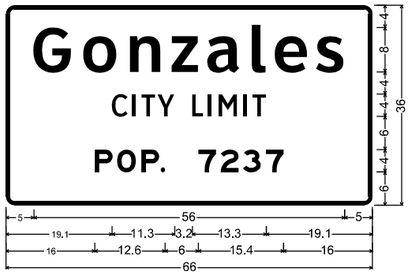
3.0" Radius, 1.0" Border, White on, Blue;
"2ND 25TH JUDICIAL DIST. ", ClearviewHwy-2-W 50% spacing;
"INTERMEDIATE SANCTIONS", ClearviewHwy-2-W 50% spacing;
"FACILITIES", ClearviewHwy-2-W 50% spacing;

SHT 1 OF 19 SIGN (14)



D2-1 8in;
1.5" Radius, 0.5" Border, White on, Green;
"Harwood", ClearviewHwy-3-W; "11", ClearviewHwy-3-W;

SHT 4 OF 19 SIGN (3)



I-2aT 8in;
1.5" Radius, 0.8" Border, White on, Green;
"Gonzales", ClearviewHwy-5-W-R; "CITY LIMIT", ClearviewHwy-3-W;
"POP. 7237", E Mod;

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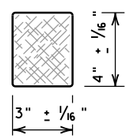
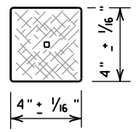
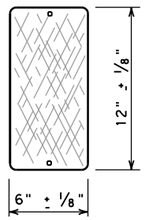
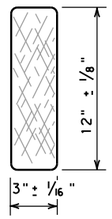
SIGN DETAIL

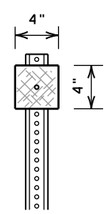
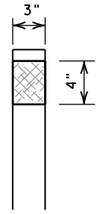
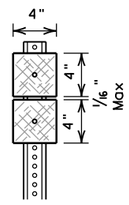
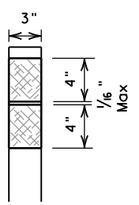
SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			198
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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

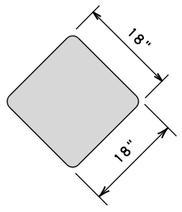
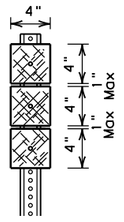
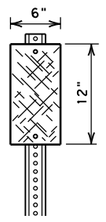
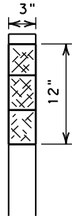
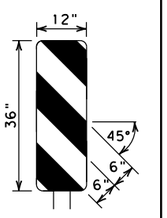
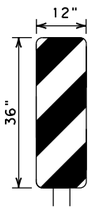
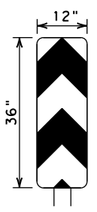
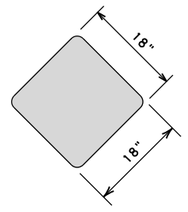
NUMBER OF REFLECTORS OR DIRECTION
X = 3-Size 2 reflector units (Type 2 only)
Y = 1-Size 3 reflector unit (Type 2 only)
Z = 3-Size 1 or 1-Size 4 reflector unit(s) (Type 2 only)
L = Left Side (Type 3 Object Marker only)
R = Right Side (Type 3 Object Marker only)
C = Center (Type 3 Object Marker only)

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

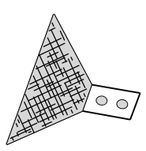
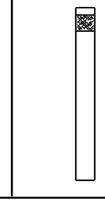
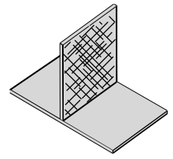
OBJECT MARKERS

	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

DEPARTMENTAL MATERIAL SPECIFICATIONS

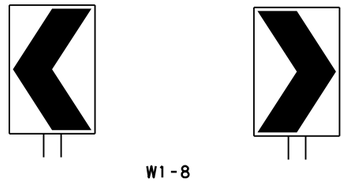
FLEXIBLE DELINEATOR & OBJECT MARKER POSTS (EMBEDDED & SURFACE MOUNT TYPES)	DMS-4400
SIGN FACE MATERIALS	DMS-8300
DELINEATORS, OBJECT MARKERS AND BARRIER REFLECTORS	DMS-8600

BARRIER REFLECTORS (BRF)

	GF1	GF2	CTB
DEVICE			
	1. Barrier reflectors shall meet the requirements of DMS 8600. 2. Approved Barrier Reflectors are listed on the "Barrier Reflectors" Material Producer List at: www.txdot.gov.		
SHEETING	Yellow, White, Red		
NOTE	1. Reflective sheeting shall have a minimum dimension of 3 inches and minimum surface area of 9 square inches.		

CHEVRONS

DEVICE



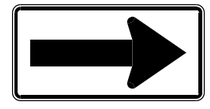
W1-8

SIZE (W x L)	18"x 24" (Conventional)	24"x 30" (Conventional Oversize)	30"x 36" (Expressway)	36" x 48" (Freeway)
MOUNTING HEIGHT	4'-0" or 7'-0"		7'-0" Only	

NOTE
1. CHEVRON (W1-8) signs and ONE DIRECTION LARGE ARROW (W1-6) Signs shall be installed per Sign Mounting Details (SMD) Standard Sheets and paid under Item 644 (Small Roadside Sign Assemblies).
2. When there is a need to increase conspicuity, the Texas version of the ONE DIRECTION LARGE ARROW sign (W1-9T) may be used instead of the ONE DIRECTION LARGE ARROW (W1-6).

ONE DIRECTION LARGE ARROW

DEVICE



W1-6

SIZE (W x L)	48" x 24" (Conventional)	60" x 30" (Expressway & Freeway)
MOUNTING HEIGHT	7'-0"	

NOTE:

Delineator and object marker substrates and sign substrates shall be 0.080" Aluminum sign blank to conform to ASTM B-209 Alloy 6061-T6 or approved alternative.

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DELINEATOR & OBJECT MARKER MATERIAL DESCRIPTION

D & OM(1)-20

FILE: dom1-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	032	FM 794
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	YKM	GONZALES		199

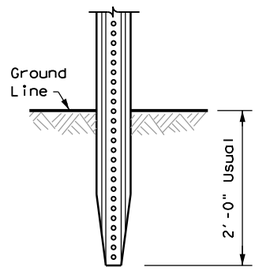
20A

DATE: 3/25/2021 8:53:51 AM
FILE: c:\pwworkdir\bge_pw\bwestmoreland\dms49528\dom1-20.dgn

POST TYPE AND SUPPORT FOUNDATION DETAILS

WING CHANNEL (WC)

GND

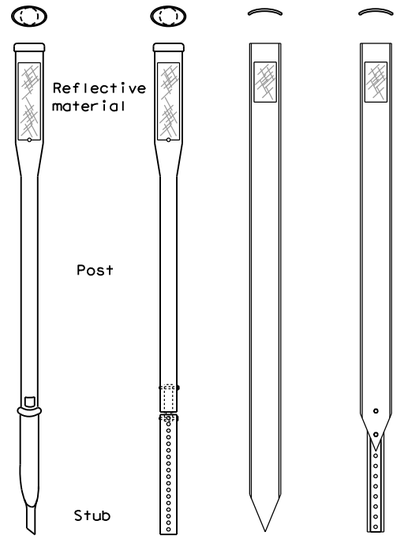


NOTES

1. Embedded Wing Channel (WC) post option may be used for Type 2 Object Markers and Delineators only.
2. 1.12 lbs/ft steel per ASTM A 1011 SS Gr. 50, or ASTM A499.

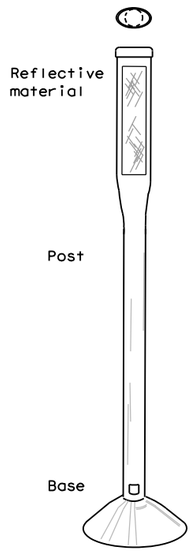
FLEXIBLE POSTS (YFLX, WFLX)

GND



EMBEDDED

SRF



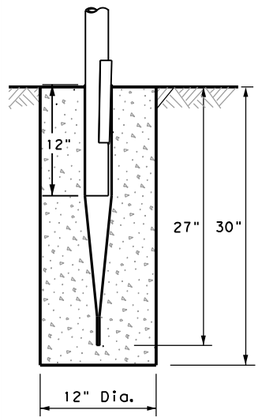
SURFACE MOUNT

NOTES

1. See "Flexible Delineator and Object Marker Posts" Material Producer List for approved devices.
2. Install per manufacturer's recommendations.
3. Post length may vary to meet field conditions.
4. When using yellow delineators with flexible posts to separate opposing direction of travel, such as centerline or median use, the flexible posts shall be yellow.

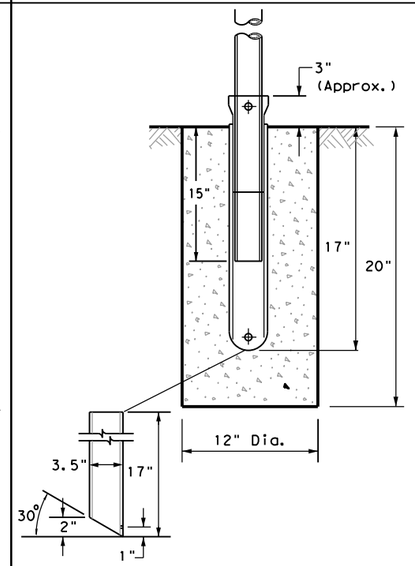
WEDGE ANCHOR SYSTEMS

WAS



STEEL

WAP



PLASTIC

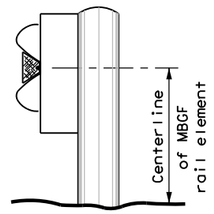
NOTE

1. Install per manufacturer's recommendations.

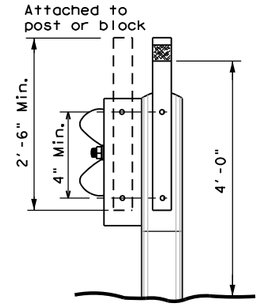
TYPE OF BARRIER MOUNTS

GUARD FENCE ATTACHMENT

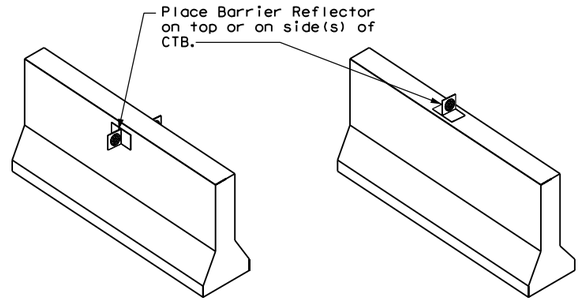
GF1



GF2



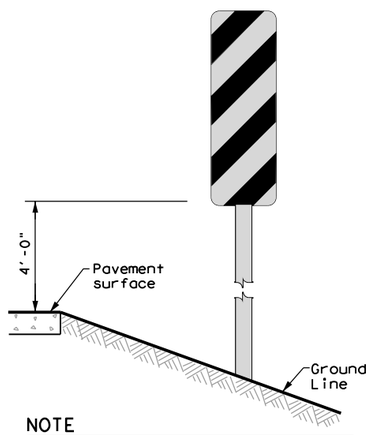
CONCRETE TRAFFIC BARRIER (CTB)



GENERAL NOTES

1. Place delineators on a section of roadway at a consistent distance from the edge of pavement.
2. Where a restriction prevents consistent placement from the pavement edge, place the affected object markers in line with the innermost edge of the obstruction.
3. When Type 2 object markers and delineators are more than 8'-0" from the edge of the pavement, it may not be possible to maintain a height of approximately 4'-0". If this is the case, place the object marker or delineator as close to the desired height as possible.
4. Install all delineators, object markers and barrier reflectors in accordance with the manufacturer's recommendation.
5. Barrier reflectors should be installed a minimum of 18 inches above the edge of the pavement surface.
6. Diagonal stripes on Type 3 object markers shall slope down toward the intended travel lane.

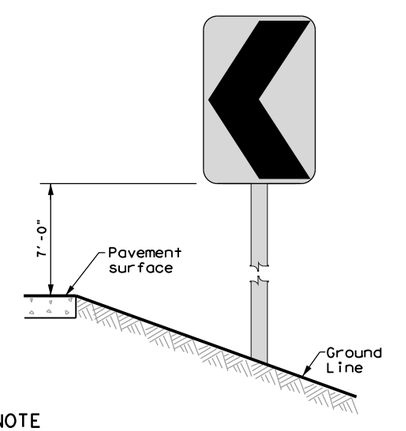
TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS



NOTE

Mounting at 4 feet to the bottom of the chevron is permitted for chevrons that will not exceed a height of 6'-6" to the top of the chevron (sizes 24" x 30" and smaller)

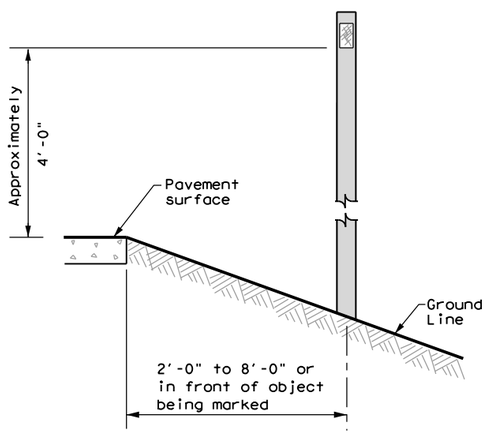
CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN



NOTE

Chevrons 30" x 36" and larger shall be mounted at a height of 7' to the bottom of the chevron. Chevron sign and ONE DIRECTION LARGE ARROW sign (W1-9T) shall be installed per SMD standard sheets and paid under item 644.

DELINEATORS AND TYPE 2 OBJECT MARKERS



See general notes 1, 2 and 3.

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER INSTALLATION

D & OM(2)-20

FILE: dom2-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	032	FM 794
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	YKM	GONZALES		200

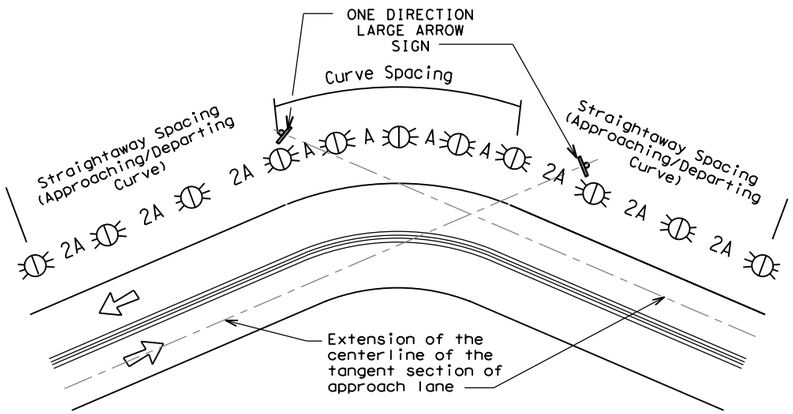
20B

DATE: 3/25/2021 8:53:56 AM
FILE: c:\pwworkdir\bge_pw\bwestmoreland\dms49528\dom2-20.dgn

MINIMUM WARNING DEVICES AT CURVES WITH ADVISORY SPEEDS

Amount by which Advisory Speed is less than Posted Speed	Curve Advisory Speed	
	Turn (30 MPH or less)	Curve (35 MPH or more)
5 MPH & 10 MPH	• RPMs	• RPMs
15 MPH & 20 MPH	• RPMs and One Direction Large Arrow sign	• RPMs and Chevrons; or • RPMs and One Direction Large Arrow sign where geometric conditions or roadside obstacles prevent the installation of chevrons.
25 MPH & more	• RPMs and Chevrons; or • RPMs and One Direction Large Arrow sign where geometric conditions or roadside obstacles prevent the installation of chevrons	• RPMs and Chevrons

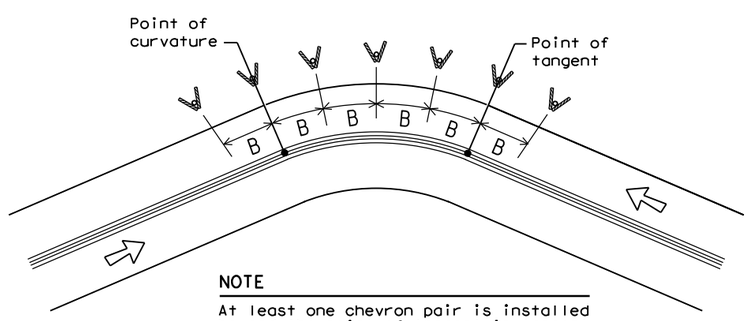
SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES



NOTE

ONE DIRECTION LARGE ARROW (W1-6) sign should be located at approximately and perpendicular to the extension of the centerline of the tangent section of approach lane.

SUGGESTED SPACING FOR CHEVRONS ON HORIZONTAL CURVES



NOTE

At least one chevron pair is installed beyond the point of tangent in tangent section.

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS KNOWN

Degree of Curve	FEET			
	Radius of Curve	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
		A	2A	B
1	5730	225	450	——
2	2865	160	320	——
3	1910	130	260	200
4	1433	110	220	160
5	1146	100	200	160
6	955	90	180	160
7	819	85	170	160
8	716	75	150	160
9	637	75	150	120
10	573	70	140	120
11	521	65	130	120
12	478	60	120	120
13	441	60	120	120
14	409	55	110	80
15	382	55	110	80
16	358	55	110	80
19	302	50	100	80
23	249	40	80	80
29	198	35	70	40
38	151	30	60	40
57	101	20	40	40

Curve delineator approach and departure spacing should include 3 delineators spaced at 2A. This spacing should be used during design preparation or when the degree of curve is known.

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS NOT KNOWN

Advisory Speed (MPH)	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
	A	2xA	B
65	130	260	200
60	110	220	160
55	100	200	160
50	85	170	160
45	75	150	120
40	70	140	120
35	60	120	120
30	55	110	80
25	50	100	80
20	40	80	80
15	35	70	40

If the degree of curve is not known, delineator spacing may be determined based on the Advisory Speed of the curve. Use the delineator curve spacing for each Advisory Speed (MPH).

DELINEATOR AND OBJECT MARKER APPLICATION AND SPACING

CONDITION	REQUIRED TREATMENT	MINIMUM SPACING
Frwy./Exp. Tangent	RPMs	See PM-series and FPM-series standard sheets
Frwy./Exp. Curve	Single delineators on right side	See delineator spacing table
Frwy/Exp.Ramp	Single delineators on at least one side of ramp (should be on outside of curves) (see Detail 3 on D&OM(4))	100 feet on ramp tangents Use delineator spacing table for ramp curves ("straightway spacing" does not apply to ramp curves)
Acceleration/Deceleration Lane	Double delineators (see Detail 3 on D&OM(4))	100 feet (See Detail 3 on D & OM (4))
Truck Escape Ramp	Single red delineators on both sides	50 feet
Bridge Rail (steel or concrete)and Metal Beam Guard Fence	Bi-Directional Delineators when undivided with one lane each direction Single Delineators when multiple lanes each direction	Equal spacing (100'max) but not less than 3 delineators
Concrete Traffic Barrier (CTB) or Steel Traffic Barrier	Barrier reflectors matching the color of the edge line	Equal spacing 100' max
Cable Barrier	Reflectors matching the color of the edge line	Every 5th cable barrier post (up to 100'max)
Guard Rail Terminus/Impact Head	Divided highway - Object marker on approach end Undivided 2-lane highways - Object marker on approach and departure end	Requires reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end See D & OM (5) and D & OM (6)
Bridges with no Approach Rail	Type 3 Object Marker (OM-3) at end of rail and 3 single delineators approaching rail	See D & OM(5)
Reduced Width Approaches to Bridge Rail	Type 2 and Type 3 Object Markers (OM-3) and 3 single delineators approaching bridge	Requires reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end See D & OM (5)
Culverts without MBGF	Type 2 Object Markers	See Detail 2 on D & OM(4)
Crossovers	Double yellow delineators and RPMs	See Detail 1 on D & OM (4)
Pavement Narrowing (lane merge) on Freeways/Expressway	Single delineators adjacent to affected lane for full length of transition	100 feet

NOTES

1. Unless indicated otherwise, the delineator or barrier reflector color shall conform to the color of the pavement edge line on the side of the road where the delineators or barrier reflectors are placed.
2. Barrier reflectors may be used to replace required delineators.
3. Single red delineators may be mounted on the back side of delineator posts for wrong way driver applications

LEGEND	
	Bi-directional Delineator
	Delineator
	Sign

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(3)-20

FILE: dom3-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
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REVISIONS	1133	02	032	FM 794
3-15 8-15 8-15 7-20	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		201

20C

DATE: 3/25/2021 8:54:03 AM
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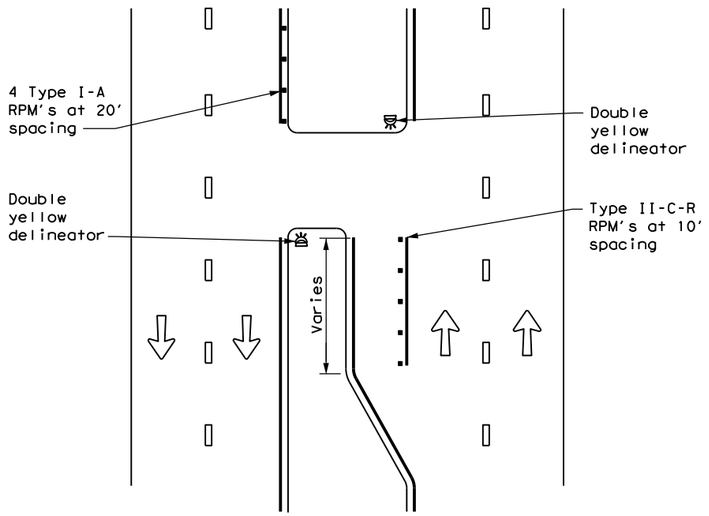
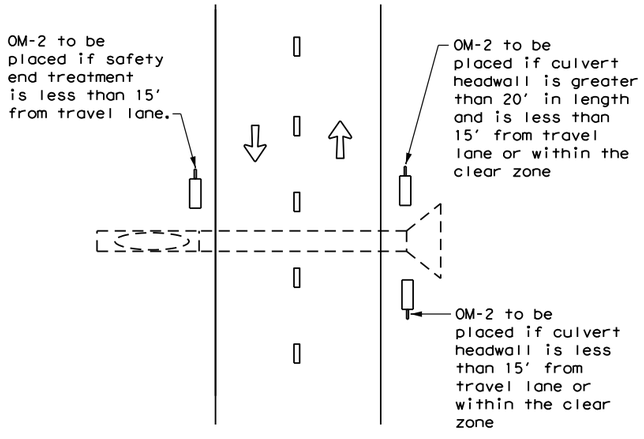
CROSSOVERS



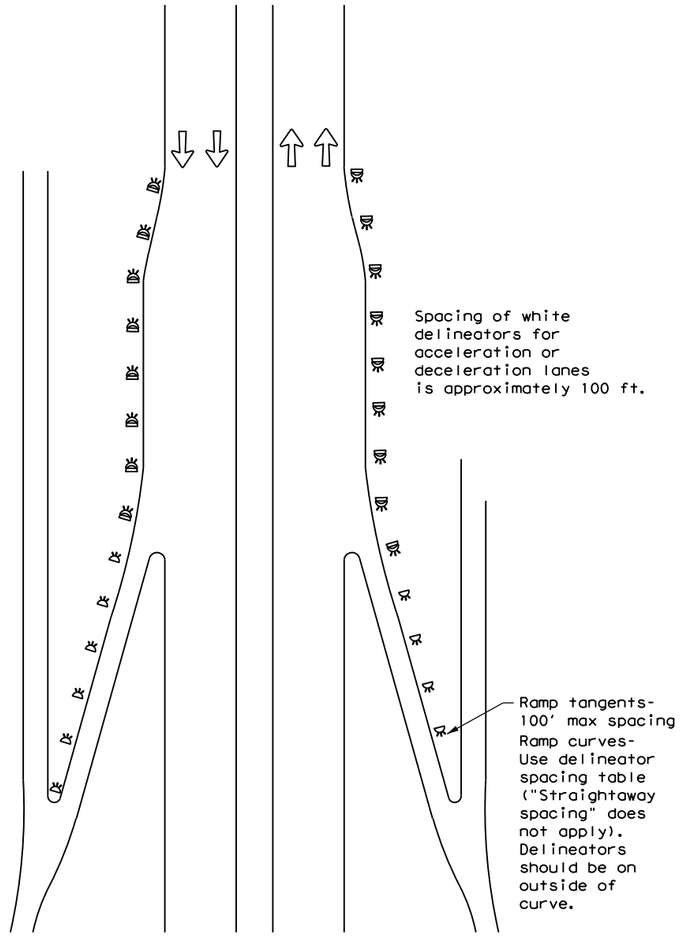
DETAIL 1

FOR CULVERTS WITHOUT MBGF



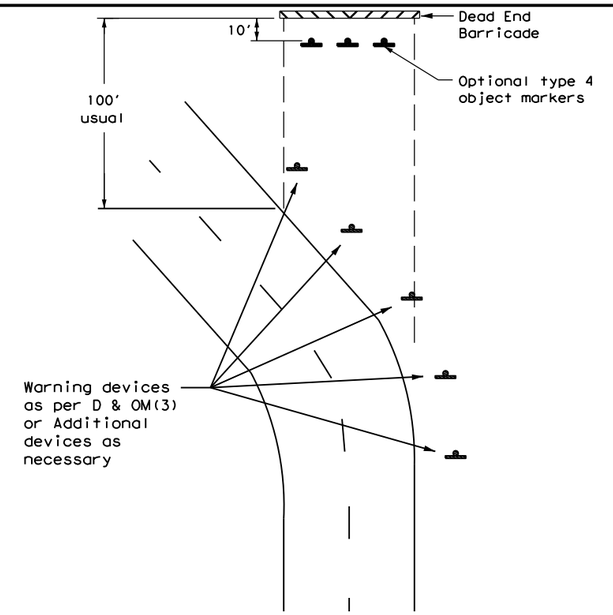
DETAIL 2

FREEWAY DELINEATION FOR RAMPS AND ACCELERATION/DECELERATION LANES



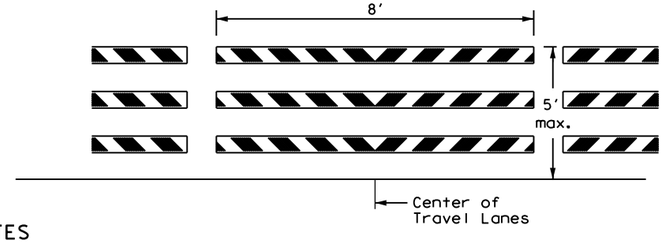
DETAIL 3

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
REVISIONS	1133	02	032	FM 794
3-15	DIST	COUNTY		SHEET NO.
7-20	YKM	GONZALES		202

20D

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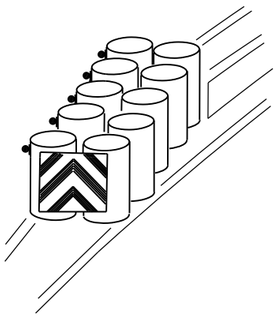
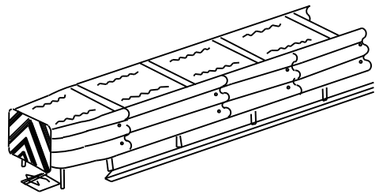
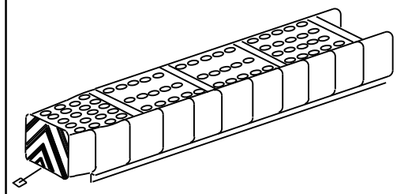
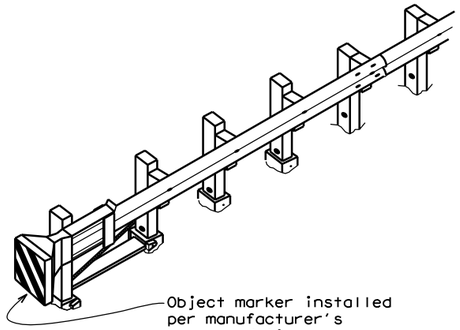
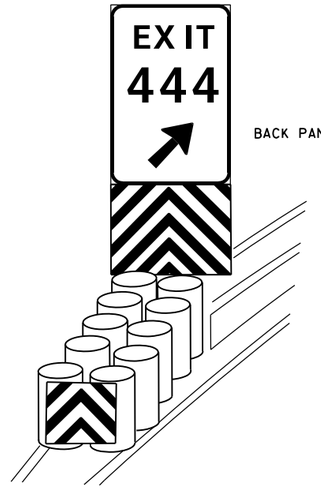




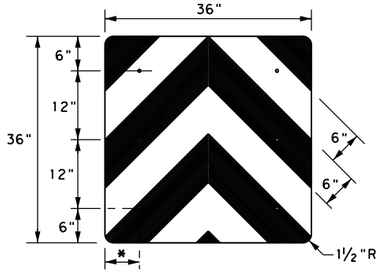


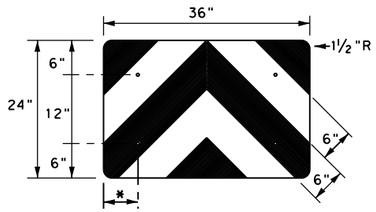


Object marker installed per manufacturer's recommendations.

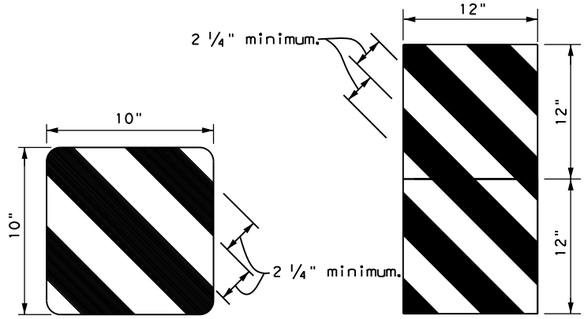


BACK PANEL (OPTIONAL)

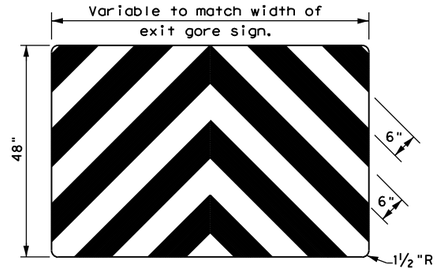


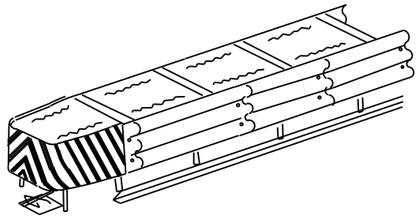


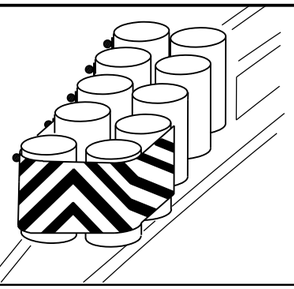
* Adjust to fit attenuator per manufacturer's recommendation, or as directed by the Engineer

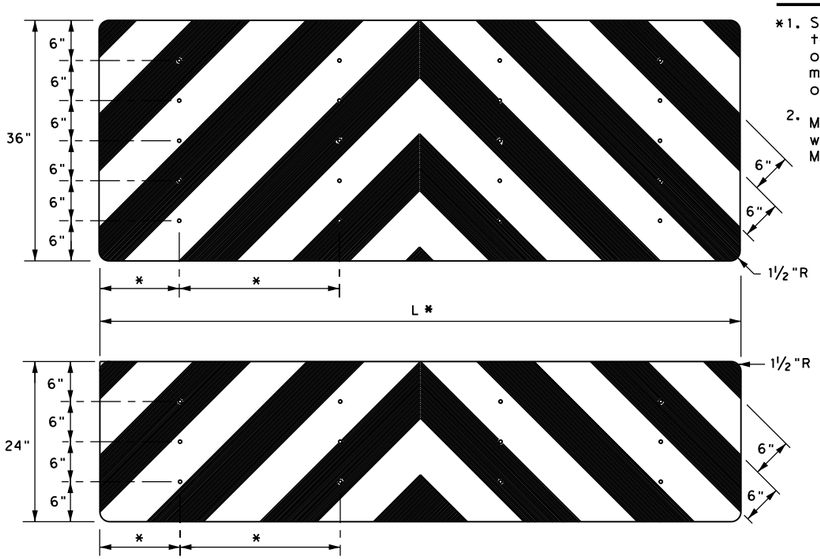


OBJECT MARKERS SMALLER THAN 3 FT^2









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	YKM	GONZALES		203
4-98 7-20				
20G				

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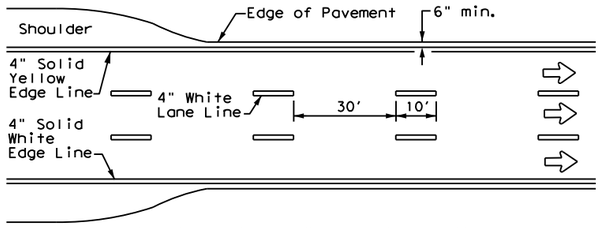
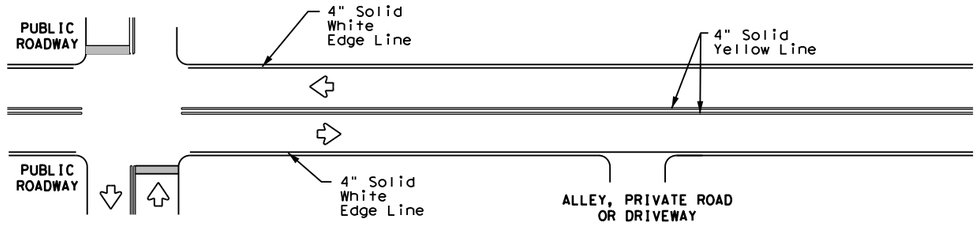
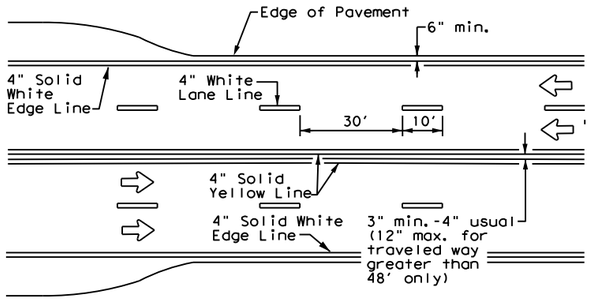


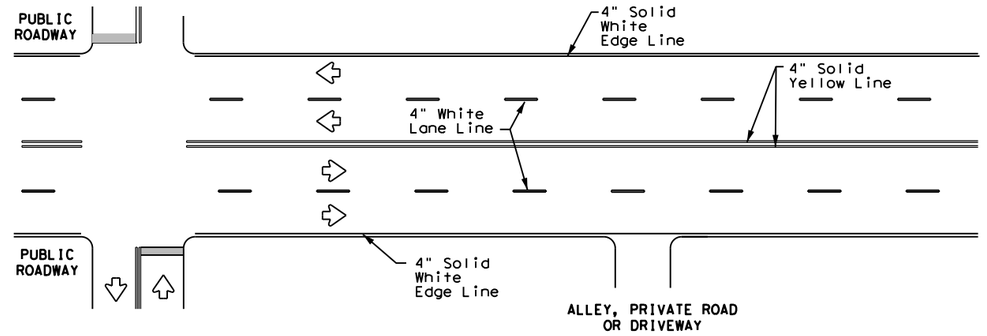
EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS



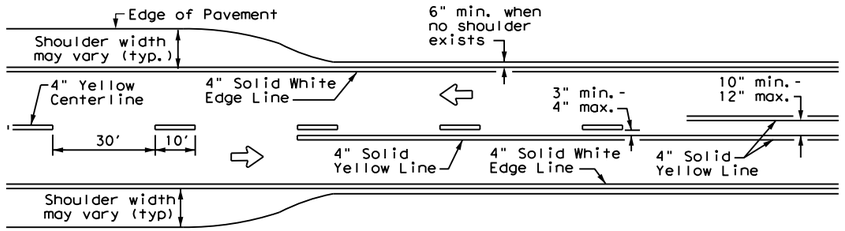
TYPICAL TWO-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS



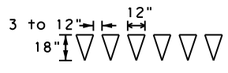
CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



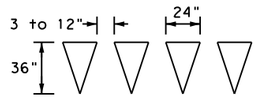
TYPICAL MULTI-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS



TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS

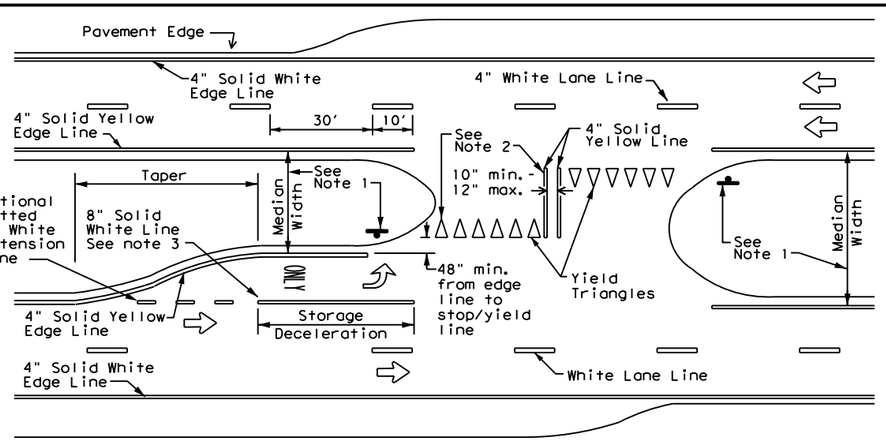


For posted speed on road being marked equal to or less than 40 MPH.



For posted speed on road being marked equal to or greater than 45 MPH.

YIELD LINES



FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

1. Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections. Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling width to determine if signs are required. Yield signs are the typical intersection control. Stop signs are optional as determined by the Engineer.

2. Install median striping (double yellow centerlines and stop bars/yield triangles) when a 50' or greater median centerline can be placed. Stop bars shall only be used with stop signs. Yield traingles shall only be used with yield signs.

3. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

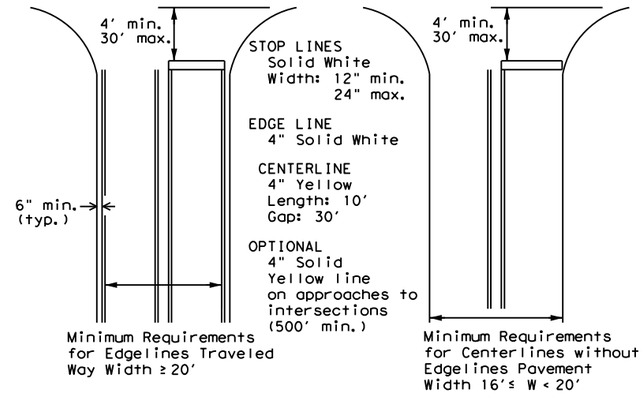
GENERAL NOTES

1. Edgeline striping shall be as shown in the plans or as directed by the Engineer. The edgeline should not be placed less less than 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edgelines are not required in curb and gutter sections of roadways.

2. The traveled way includes only that portion of the roadway used for vehicular travel. It does not include the parking lanes, sidewalks, berms and shoulders. The traveled ways shall be measured from the inside of edgeline to the inside of edgeline of a two lane roadway.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



GUIDE FOR PLACEMENT OF STOP LINES, EDGE LINE & CENTERLINE

Based on Traveled Way and Pavement Widths for Undivided Highways

Texas Department of Transportation

Traffic Safety Division Standard

TYPICAL STANDARD PAVEMENT MARKINGS

PM(1)-20

FILE: pm1-20.dgn	DN:	CK:	DW:	CK:
©TxDOT November 1978	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03	1133	02	032	FM 794
5-00 2-12	DIST	COUNTY		SHEET NO.
8-00 6-20	YKM	GONZALES		204

22B

DATE: 3/25/2021 8:54:19 AM
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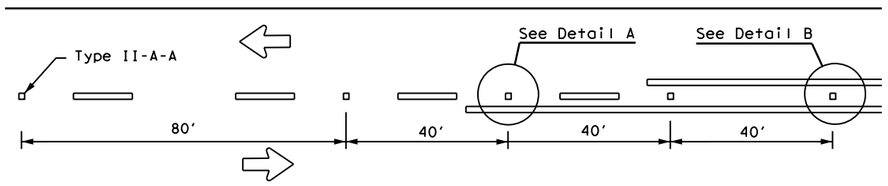
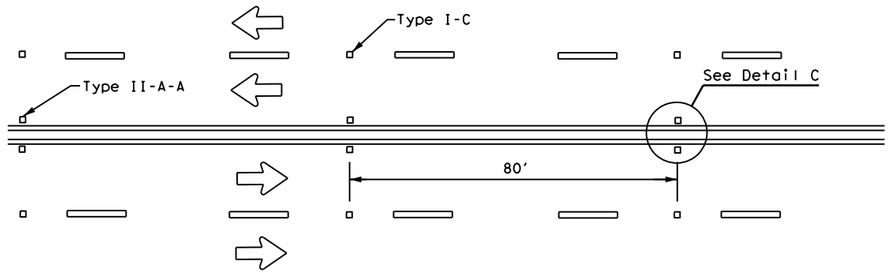
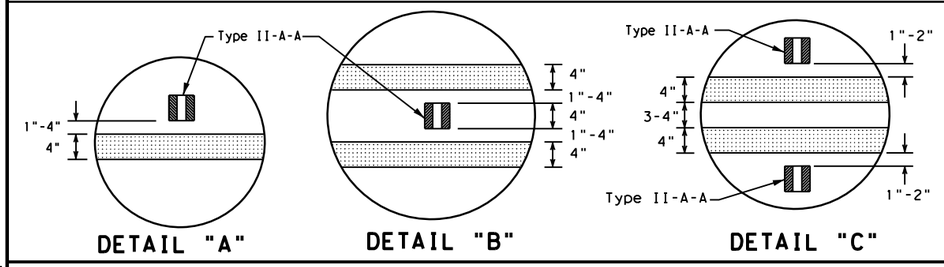
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE



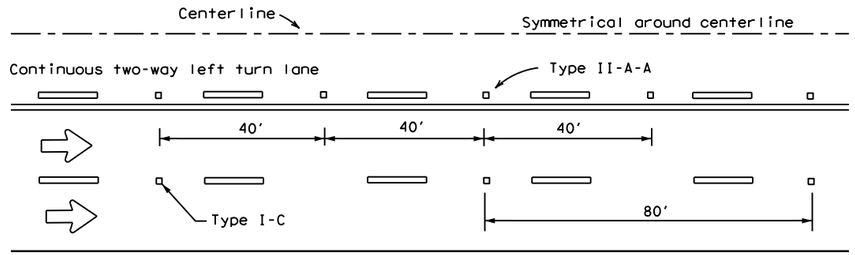
CENTERLINE FOR ALL TWO LANE ROADWAYS



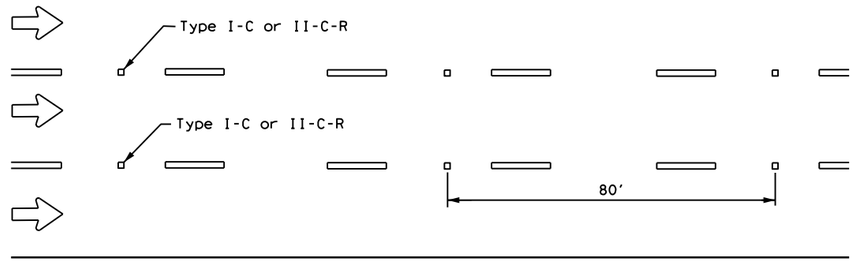
CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY HIGHWAYS



DETAIL "A" DETAIL "B" DETAIL "C"



CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE

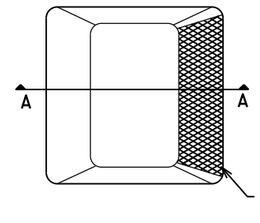


LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

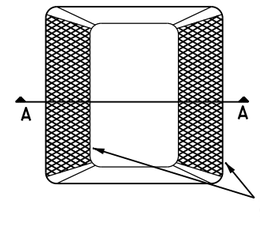
Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

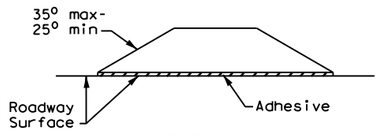
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)

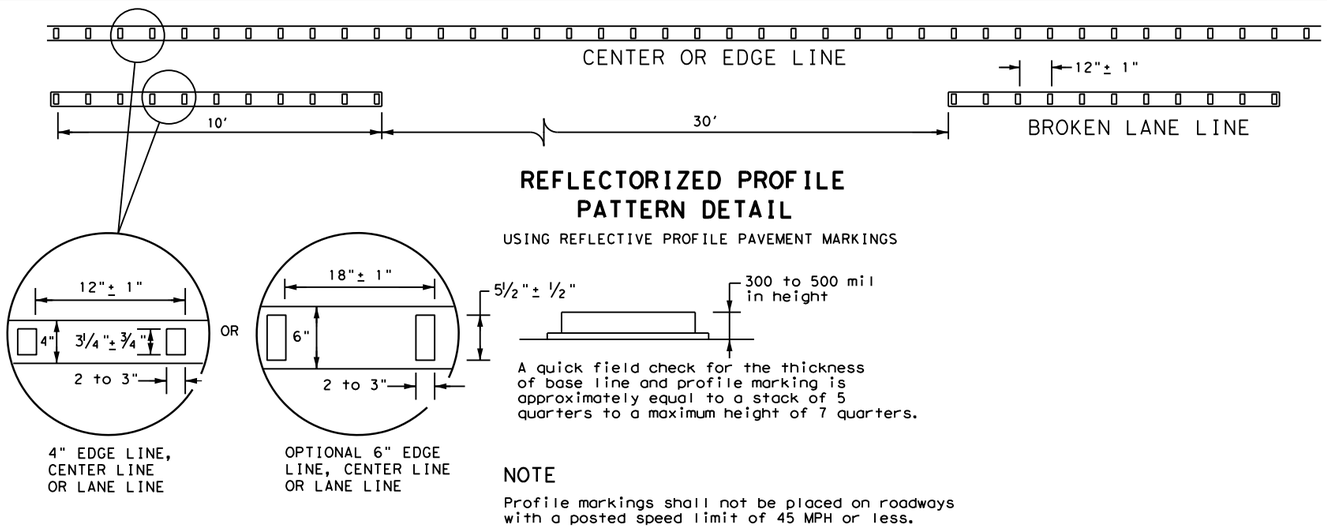


Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS



REFLECTORIZED PROFILE PATTERN DETAIL

USING REFLECTIVE PROFILE PAVEMENT MARKINGS

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.

4" EDGE LINE, CENTER LINE OR LANE LINE

OPTIONAL 6" EDGE LINE, CENTER LINE OR LANE LINE

NOTE

Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

GENERAL NOTES

1. All raised pavement markers placed in broken lines shall be placed in line with and midway between the stripes.
2. On concrete pavements the raised pavement markers should be placed to one side of the longitudinal joints.

Texas Department of Transportation

Traffic Safety Division Standard

POSITION GUIDANCE USING RAISED MARKERS RELECTORIZED PROFILE MARKINGS PM(2)-20

FILE: pm2-20.dgn	DN:	CK:	DW:	CK:
©TxDOT April 1977	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-92 2-10 5-00 2-12 8-00 6-20	1133	02	032	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		205

22B

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DATE: 3/25/2021 8:54:29 AM
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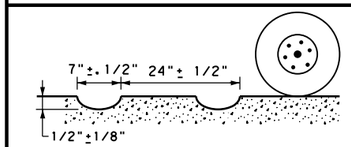
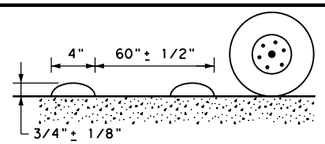
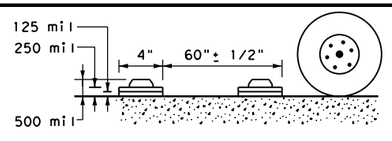
CENTERLINE RUMBLE STRIPS



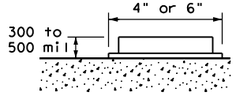
MILLED RUMBLE STRIPS



RAISED TRAFFIC BUTTONS

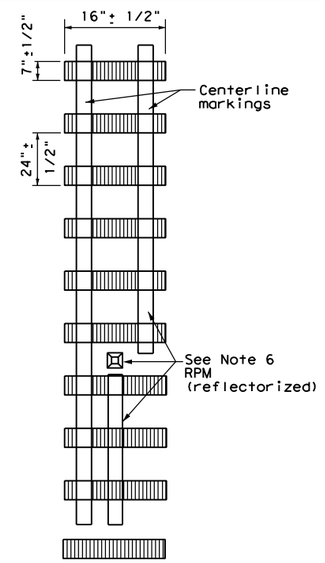


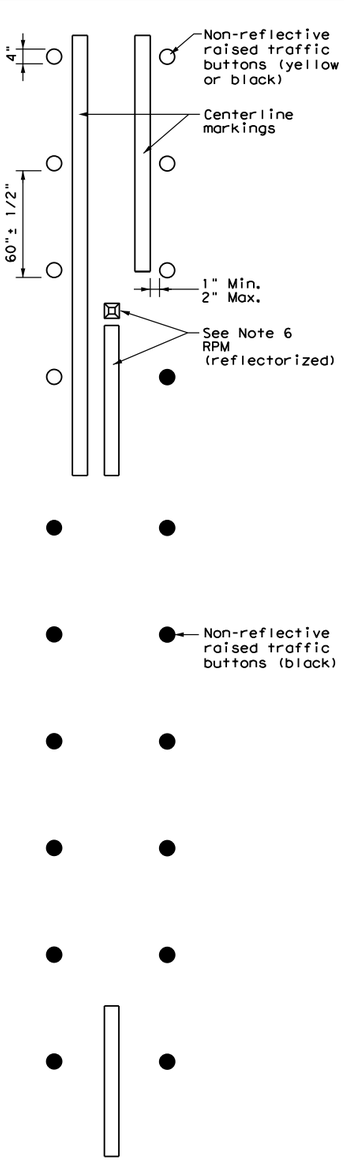
PREFORMED THERMOPLASTIC STRIPS

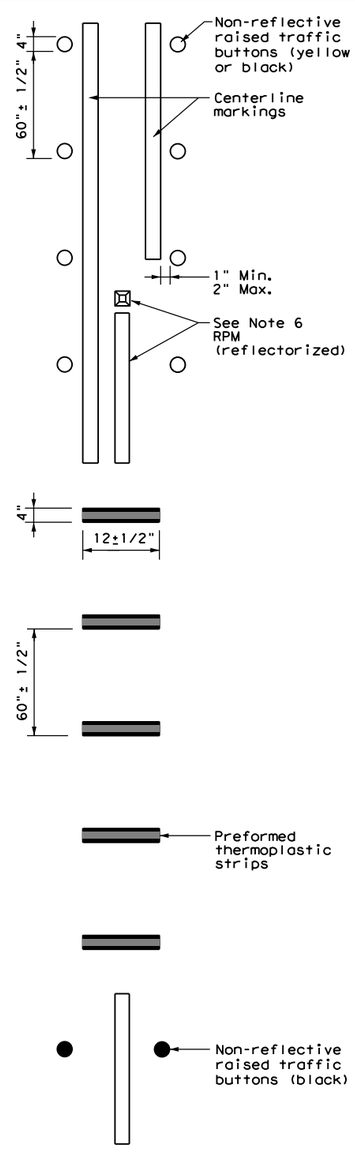


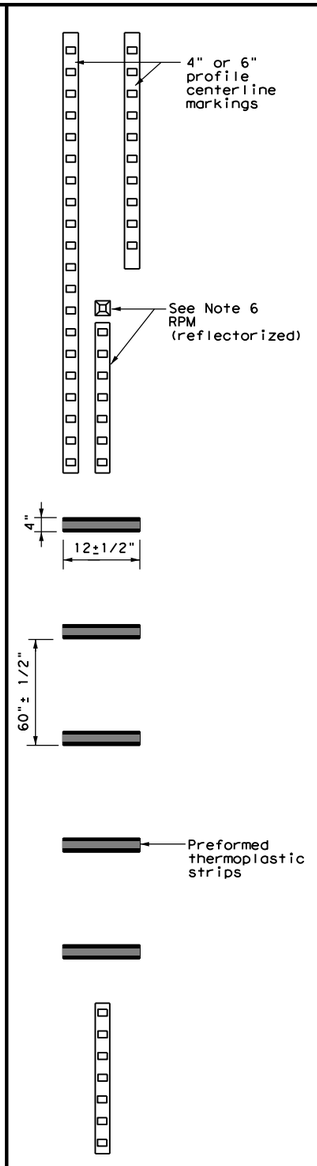
PROFILE MARKINGS

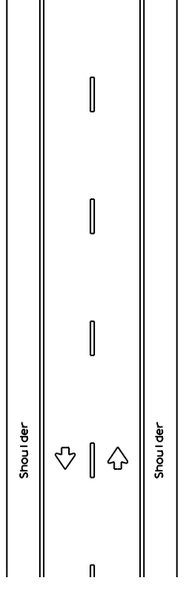
PROFILE VIEW



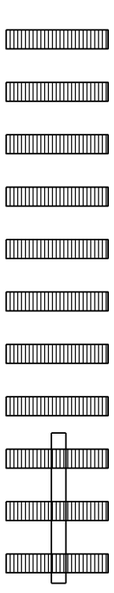








TWO LANE TWO-WAY ROADWAYS


PLAN VIEW
OPTION 1
MILLED CENTERLINE RUMBLE STRIPS

PLAN VIEW
OPTION 2
RAISED CENTERLINE RUMBLE STRIPS

PLAN VIEW
OPTION 3
RAISED CENTERLINE RUMBLE STRIPS AND PREFORMED THERMOPLASTIC STRIPS

PLAN VIEW
OPTION 4
PROFILE CENTERLINE MARKINGS AND PREFORMED THERMOPLASTIC 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 edgeline 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 Operations 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 and driveways with high usage of large trucks.
6. Use Standard Sheet PM(2) for positioning, dimensioning, and spacing of all reflective raised pavement markers, and dimensions pavement markings and profile markings.
7. Consideration should be given to noise levels when centerline rumble strips are installed near residential areas, schools, churches, etc. A minimum of 3/8 inch depth of 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.

WHEN INSTALLING EDGELINE RUMBLE STRIPS WITH OR WITHOUT CENTERLINE RUMBLE STRIPS ON UNDIVIDED HIGHWAYS:

12. See standard sheet RS(4).

Texas Department of Transportation®
Traffic Operations Division Standard

CENTERLINE RUMBLE STRIPS ON TWO LANE TWO-WAY HIGHWAYS

RS(3)-13

FILE: rs(3)-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2013	CONT	SECT	JOB	HIGHWAY
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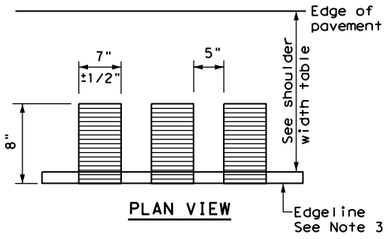
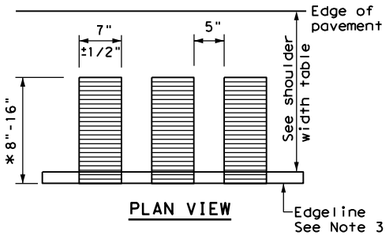
	YKM	GONZALES		206



PROFILE VIEW
OPTION 1

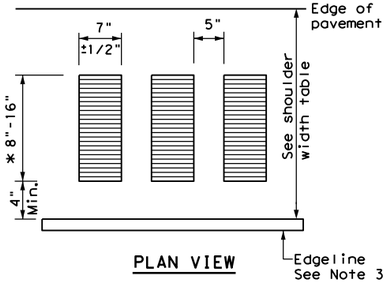
CONTINUOUS MILLED DEPRESSIONS
(Rumble Stripes)



* This distance may vary based on width of shoulder

PROFILE VIEW
OPTION 2

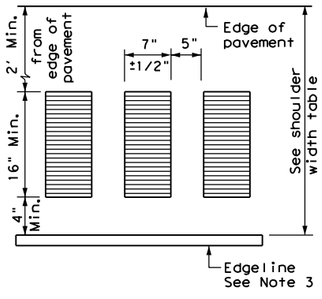
CONTINUOUS MILLED DEPRESSIONS
(Rumble Stripes)



* This distance may vary based on width of shoulder

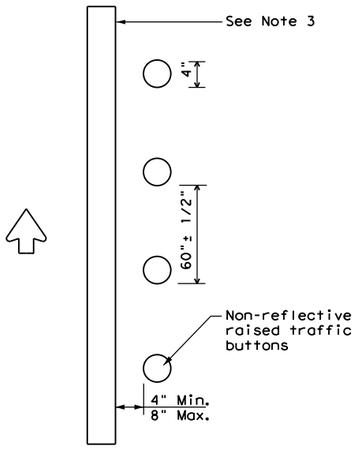
PROFILE VIEW
OPTION 3

CONTINUOUS MILLED DEPRESSIONS
(Rumble Strips)



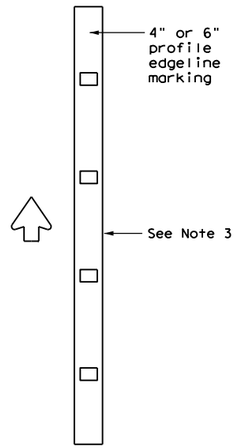
PROFILE VIEW
OPTION 4

CONTINUOUS MILLED DEPRESSIONS
(Rumble Strips)



PLAN VIEW
OPTION 5

RAISED EDGELINE RUMBLE STRIPS



PLAN VIEW
OPTION 6

PROFILE EDGELINE MARKINGS

SHOULDER WIDTH TABLE		
EQUAL TO OR LESS THAN 2 FEET	GREATER THAN 2 FEET LESS THAN 4 FEET	EQUAL TO OR GREATER THAN 4 FEET
Option 1, 5 OR 6	Option 1, 2, 3 5 OR 6	Option 2, 4, 5 OR 6

GENERAL NOTES

1. Rumble strips and profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.
2. Milled rumble strips are preferred when adequate pavement depth is available. If pavement thickness is less than 2 inches, milled rumble strips shall not be used. Rumble strips shall not be milled or depressed into bridge decks.
3. Use Standard Sheet PM(2) for positioning, dimensioning, and spacing of all reflective raised pavement markers, pavement markings, and profile markings.
4. See the table below for determining what options may be used for edgeline rumble strips.

WHEN INSTALLING MILLED DEPRESSION EDGELINE RUMBLE STRIPS:

5. See dimensions for milled rumble strips. Other shapes and dimensions may be used if approved by the Traffic Operations Division.
6. Pavement markings can be applied over milled shoulder rumble strips to create an edgeline rumble stripe.
7. Breaks in edgeline rumble strips shall occur at least 50 feet and no more than 150 feet in advance of bridges, railroad crossings, intersections and driveways with high usage of large trucks when installed on conventional highways.
8. Rumble strips shall not be placed across exit or entrance ramps, acceleration and deceleration lanes, crossovers, gore areas or intersections with other roadways.
9. Consideration should be given to noise levels when edgeline rumble strips are installed near residential areas, schools, churches, etc. A minimum of 3/8 inches depth of milled rumble strip may be considered in these areas.
10. On roadways with high bicycle activity, consideration should be given before the installation of edgeline rumble strips. Things to consider include size of rumble strips, rumble strip material and location of rumble strips on the shoulder. If the designer determines that gaps are needed in the rumble strips due to bicycle use of the road, then follow the requirement shown in FHWA Technical Advisory T5040.39, or latest version. A detail of the spacing shall be included in the plans.

WHEN INSTALLING RAISED OR PROFILE EDGELINE RUMBLE STRIPS:

11. Raised rumble strips consisting of non-reflective raised traffic buttons may be used. Non-reflective raised traffic buttons can be affixed to asphalt or concrete with bitumen or adhesives, as per the manufacturer's recommendations.
12. Non-reflective traffic buttons shall be placed adjacent to the pavement marking delineating the edgeline when used as a rumble strip. The color of the button should match the color of the adjacent edgeline marking (white or yellow). The buttons will be paid for under Item 672, "Raised Pavement Markers." Non-reflective traffic buttons must meet the requirements of DMS-4300.
13. Non-reflective traffic buttons shall not be placed across exit or entrance ramps, acceleration and deceleration lanes, crossovers, gore areas or intersections with other roadways.
14. Breaks in edgeline rumble strips using raised traffic buttons shall occur at least 50 feet and no more than 150 feet in advance of bridges, railroad crossing, intersections and driveways with high usage of large trucks when installed on conventional highways.
15. The minimum distance between the edgeline and the buttons should be used if the shoulder is less than 8 feet in width.
16. Raised profile thermoplastic markings used as edgelines may substitute for buttons.

Texas Department of Transportation

Traffic Operations Division Standard

EDGELINE RUMBLE STRIPS ON UNDIVIDED OR TWO LANE HIGHWAYS RS(4)-13

FILE: rs(4)-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2013	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	032	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		207

DATE: 3/25/2021 8:54:33 AM
FILE: c:\pwworkdir\bge_pw\bwestmoreland\dms49528\rs(4)-13.dgn

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)

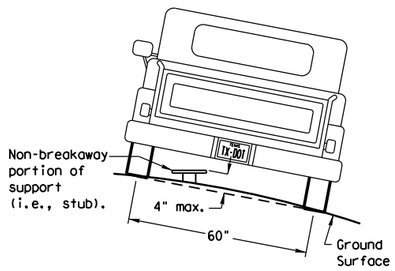
Anchor Type

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) to (SLIP-3))

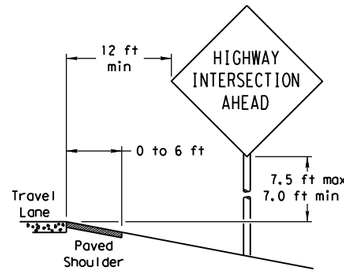
REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



To avoid vehicle undercarriage snagging, any substantial remains of a breakaway support, when it is broken away, should not project more than 4 inches above a 60-inch chord (i.e., typical space between wheel paths).

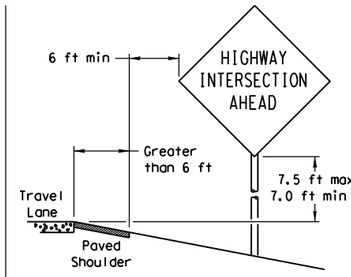
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

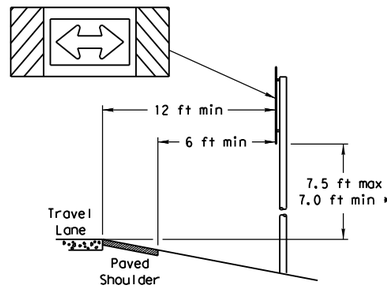
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



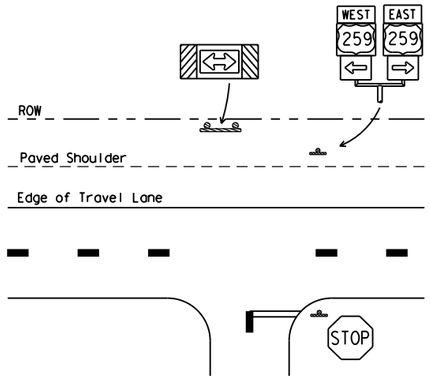
GREATER THAN 6 FT. WIDE

When the shoulder is greater than 6 ft in width, the sign must be placed at least 6 ft. from the edge of the shoulder.

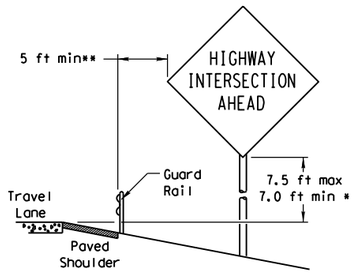
T-INTERSECTION



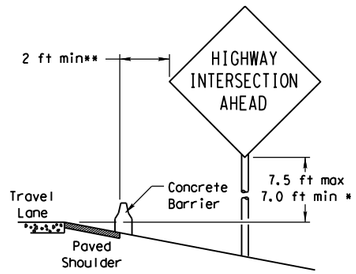
When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.



BEHIND BARRIER



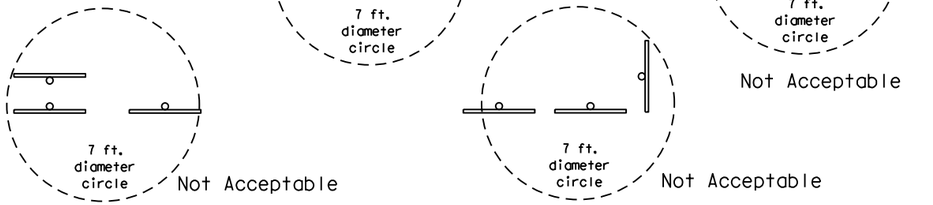
BEHIND GUARDRAIL



BEHIND CONCRETE BARRIER

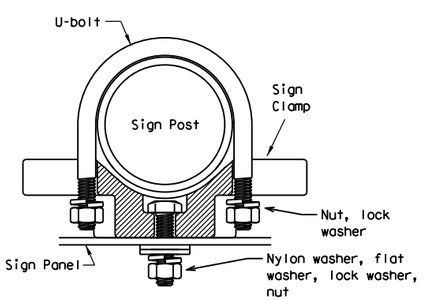
****Sign clearance based on distance required for proper guard rail or concrete barrier performance.**

No more than 2 sign posts should be located within a 7 ft. circle.



TYPICAL SIGN ATTACHMENT DETAIL

Single Signs

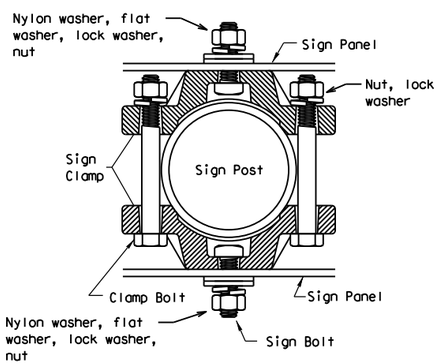


Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

When two sign clamps are used to mount signs back-to-back, use a 5/16-18 UNC galvanized hex head per ASTM A307 with nut and helical-spring lock washer. The approximate bolt lengths for various post sizes and sign clamp types are given in the table at right. The bolt length may need to be adjusted depending upon field conditions.

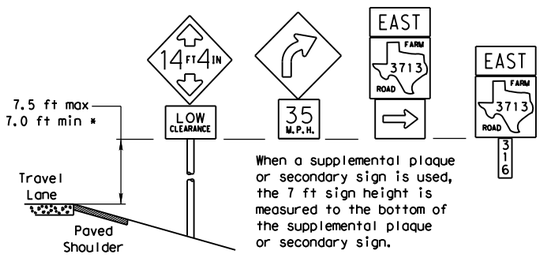
Sign clamps may be either the specific size clamp or the universal clamp.

Back-to-Back Signs



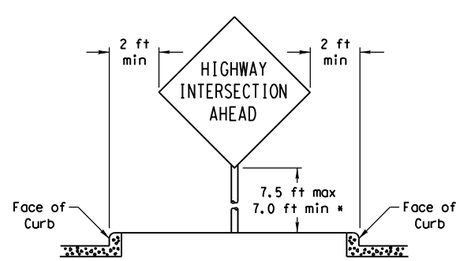
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



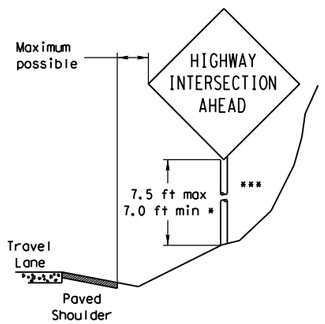
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

CURB & GUTTER OR RAISED ISLAND



RESTRICTED RIGHT-OF-WAY

(When 6 ft min. is not possible.)



Right-of-way restrictions may be created by rocks, water, vegetation, forest, buildings, a narrow island, or other factors.

In situations where a lateral restriction prevents the minimum horizontal clearance from the edge of the travel lane, signs should be placed as far from the travel lane as practical.

*** Post may be shorter if protected by guardrail or if Engineer determines the post could not be hit due to extreme slope.

* Signs shall be mounted using the following condition that results in the greatest sign elevation:

(1) a minimum of 7 to a maximum of 7.5 feet above the edge of the travel lane or

(2) a minimum of 7 to a maximum of 7.5 feet above the grade at the base of the support when sign is installed on the backslope.

The maximum values may be increased when directed by the Engineer.

See the Traffic Operations Division website for detailed drawings of sign clamps, Triangular Slipbase System components and Wedge Anchor System components.

The website address is:
http://www.txdot.gov/publications/traffic.htm

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

SMD(GEN)-08

REVISIONS
9-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

CONT	SECT	JOB	HIGHWAY
1133	02	032	FM 794

DIST	COUNTY	SHEET NO.
YKM	GONZALES	208

DATE: 3/25/2021 8:54:38 AM
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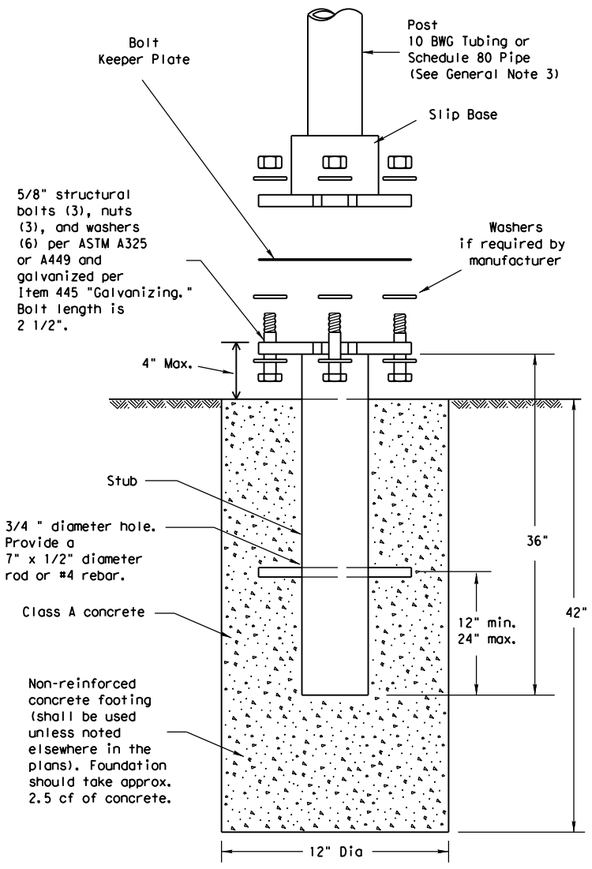
TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS



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.

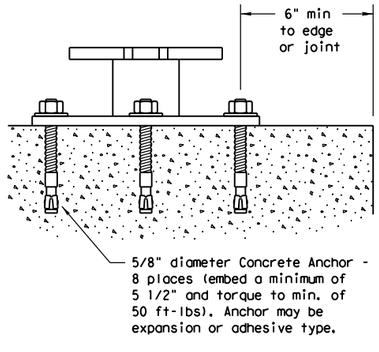
   Schedule 80 Pipe (2.875" outside diameter)
   - 0.276" nominal wall thickness
   - Steel tubing per ASTM A500 Gr C
   - Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the following:
     - 46,000 PSI minimum 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

9-08 REVISIONS

CONT	SECT	JOB	HIGHWAY
1133	02	032	FM 794

DIST	COUNTY	SHEET NO.
YKM	GONZALES	209

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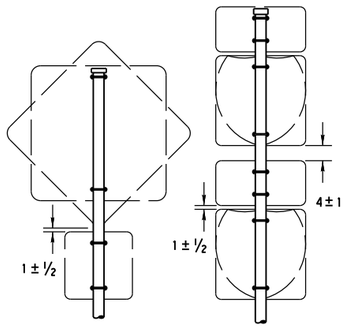
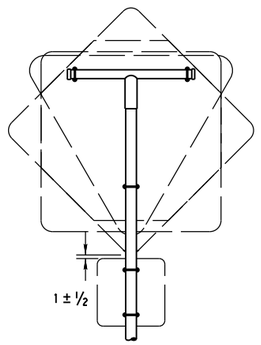


SM RD SGN ASSM TY XXXXX(1)XX(P)



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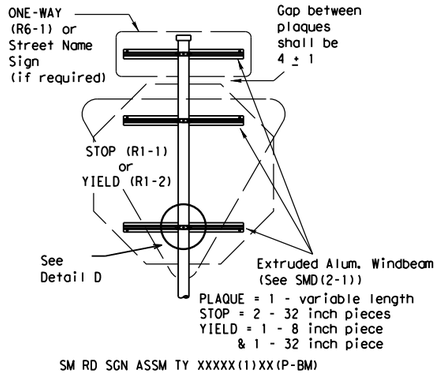
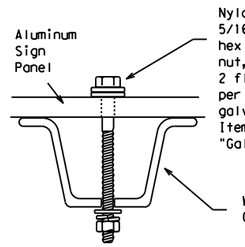
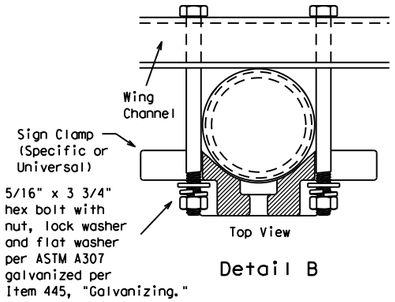


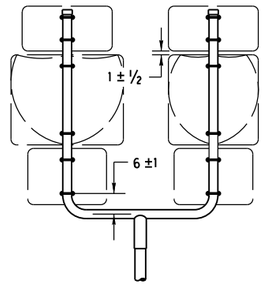
SM RD SGN ASSM TY XXXXX(1)XX(P-BM)



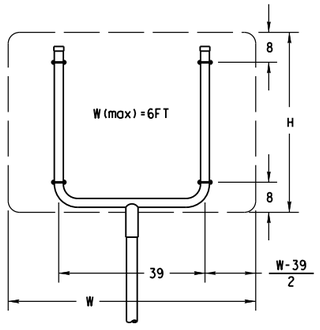
Detail A



Detail B



SM RD SGN ASSM TY XXXXX(1)XX(U)



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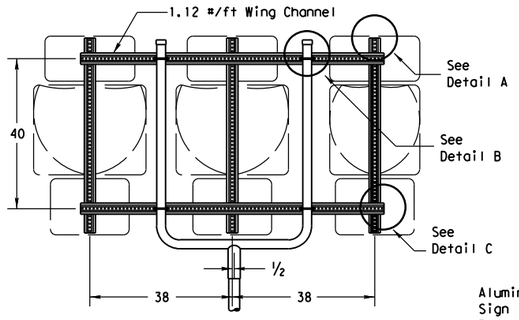
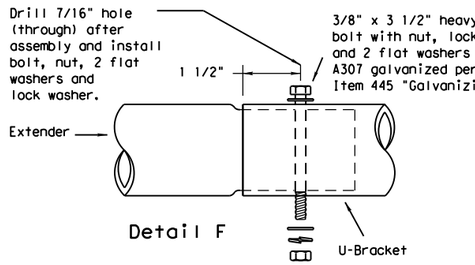
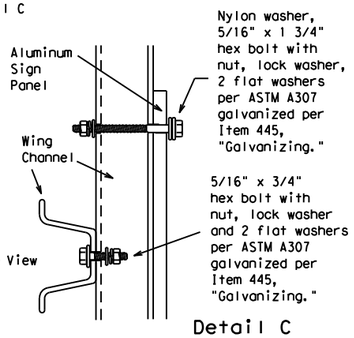


SM RD SGN ASSM TY XXXXX(1)XX(U-WC)
(See Note 11)

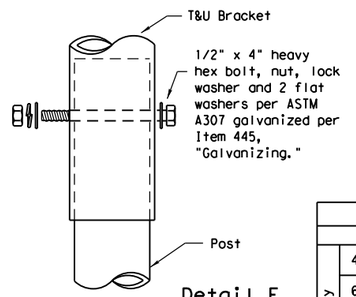


Detail F

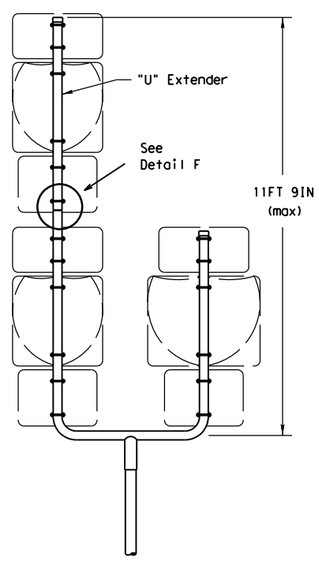
Splices shall only be allowed behind the sign substrate.



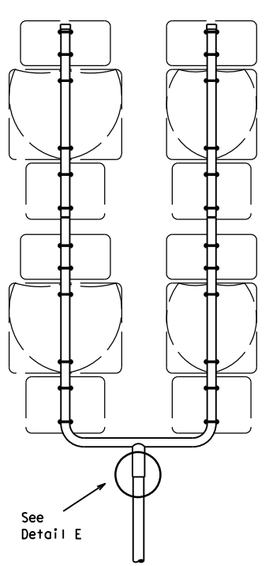
Detail C



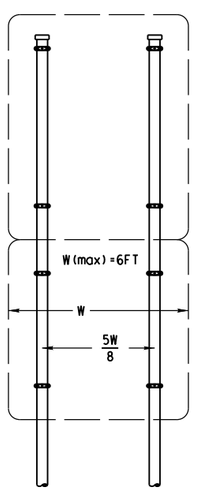
Detail E



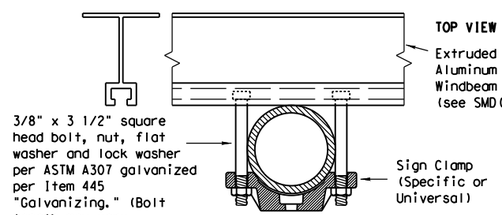
SM RD SGN ASSM TY S80(1)XX(U-1EXT)



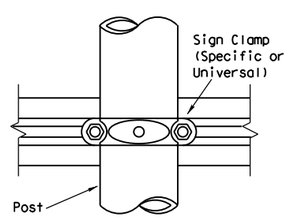
SM RD SGN ASSM TY S80(1)XX(U-2EXT)

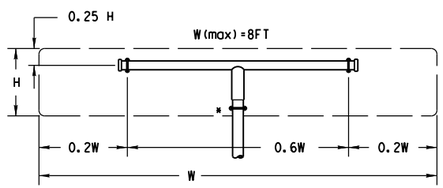


SM RD SGN ASSYM TY XXXXX(2)XX(P)



Detail D

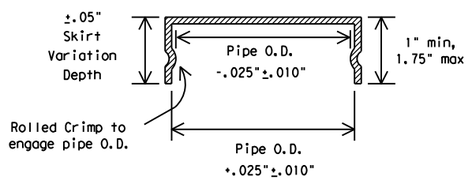




SM RD SGN ASSM TY XXXXX(1)XX(T)
(* - See Note 12)

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	TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08	CONT	SECT	JOB	HIGHWAY
	1133	02	032	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		210

DATE: 3/25/2021 8:54:48 AM
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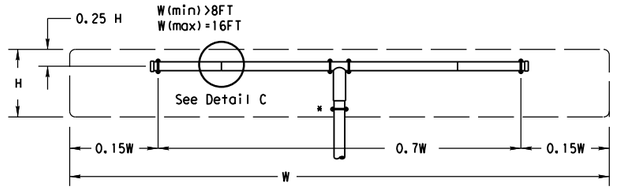
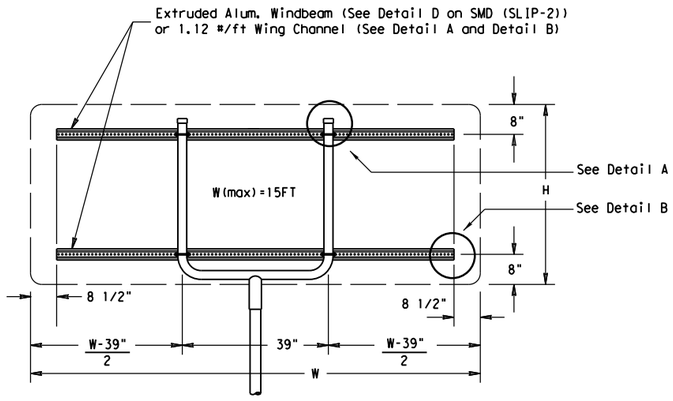
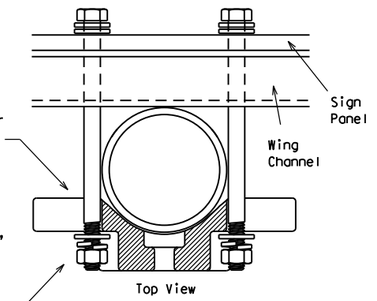


SM RD SGN ASSM TY XXXXX(1)XX(T-2EXT)
(* - See Note 12)

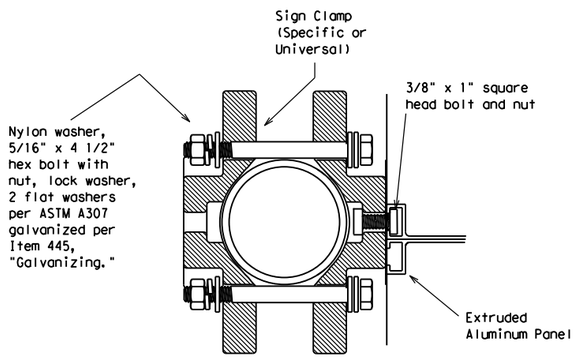


SM RD SGN ASSM TY XXXXX(1)XX(U-XX)

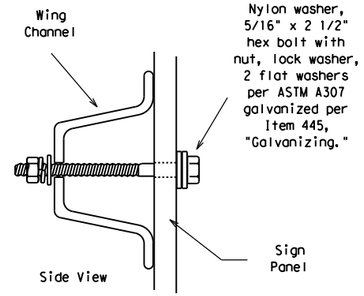


Top View

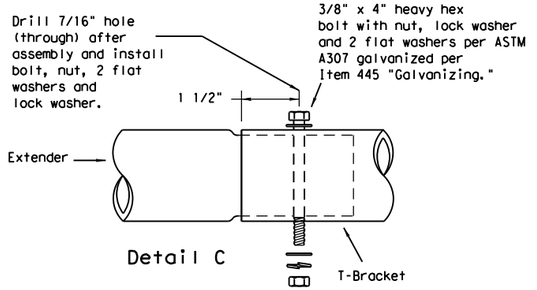
Detail A



Detail D
EXTRUDED ALUMINUM SIGN WITH T BRACKET

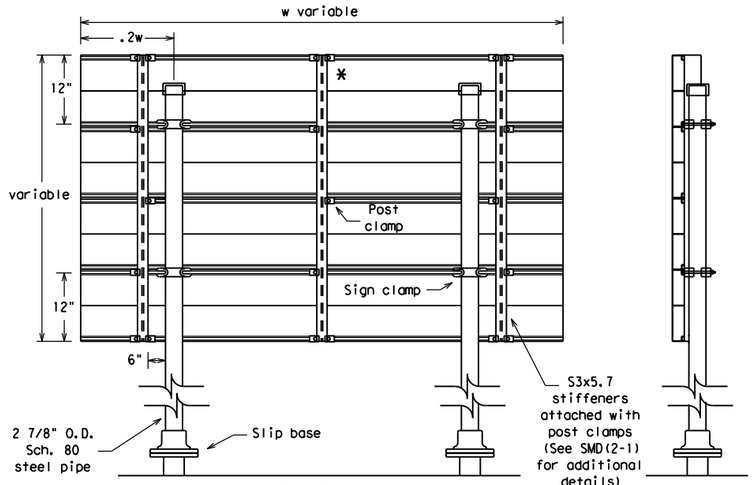


Detail B



Detail C

Splices shall only be allowed behind the sign substrate.

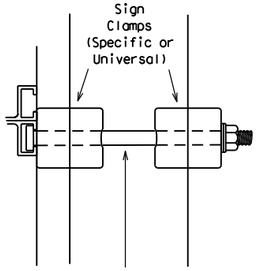


Typical Sign Mount

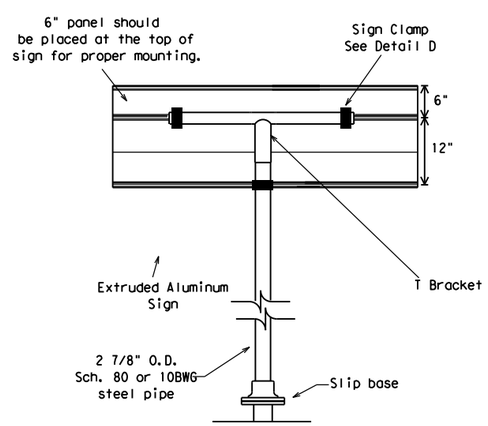
SM RD SGN ASSM TY S80(2)XX(P-EXAL)

* Additional stiffener placed at approximate center of signs when sign width is greater than 10'.

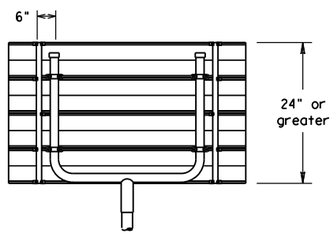
See Detail E
for clamp installation



Detail E



Extruded Aluminum Sign
With T Bracket



Use Extruded Alum. Windbeam as stiffeners
See SMD (2-1) for additional details

See Detail E
for clamp installation

GENERAL NOTES:

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Sign blanks shall be the sizes and shapes shown on the plans.
11. Additional sign clamp required on the "T-bracket" post for 24 inch high signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.

REQUIRED SUPPORT

	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-3)-08

REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08	CONT	SECT	JOB	HIGHWAY
	1133	02	032	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		211

DATE: 3/25/2021 8:54:53 AM
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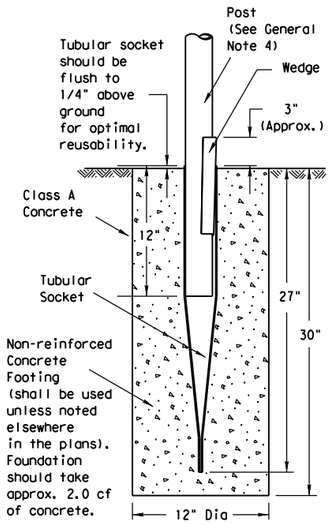
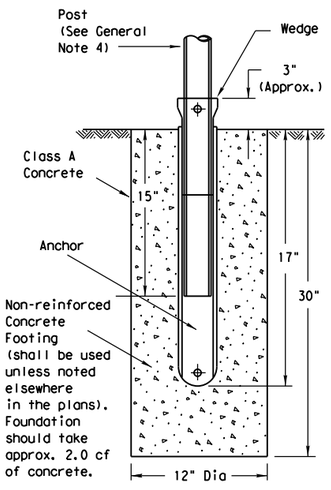
Wedge Anchor Steel System



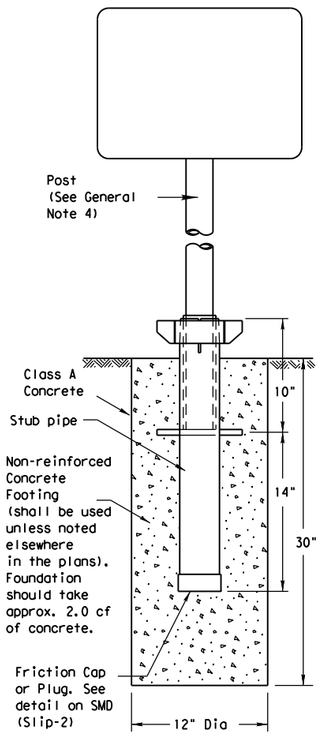
SM RD SGN ASSM TY TWT(X)WS(X)

Wedge Anchor High Density Polyethylene (HDPE) System

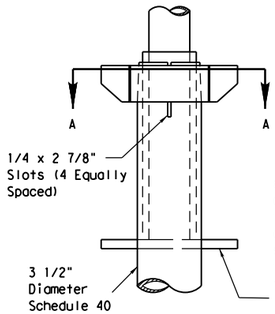


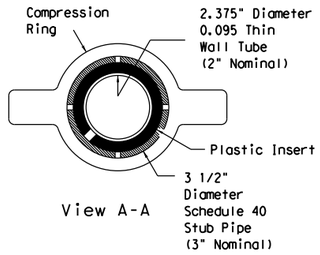
SMD RD SGN ASSM TY TWT(X)WP(X)

Universal Anchor System with Thin-Walled Tubing Post



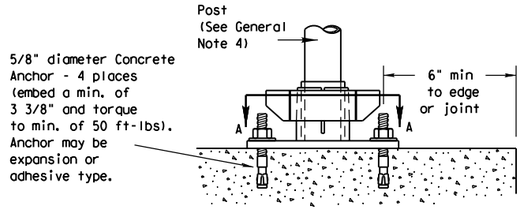
SM RD SGN ASSM TY TWT(X)UA(P)



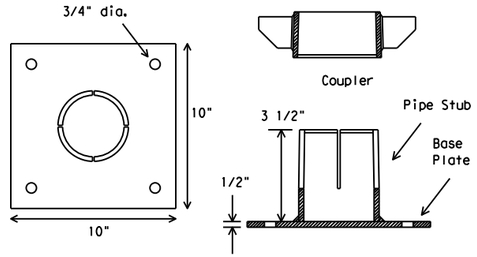


View A-A

Plastic insert must be used when using the TWT with either the Universal Anchor System or the Bolt Down Universal Anchor System. The insert should be approx. 10" long and cover the tubing from just above the top of the stub pipe to the bottom of the sign post when using the Universal Anchor System. The insert should be cut to approx. 4 1/2" when used with the Bolt Down Universal Anchor System.

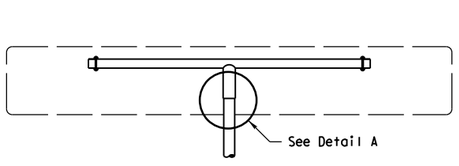


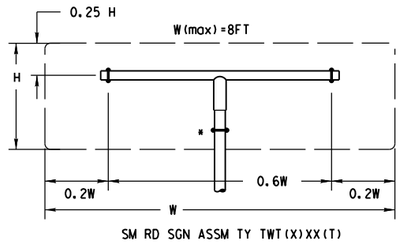
Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. A heavy hex nut per ASTM A563 and hardened washer per ASTM F436. The stud bolt shall have minimum yield and ultimate tensile strengths of 50 and 75 ksi, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Top of bolt shall extend at least flush with top of nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 3 3/8" minimum embedment, shall have a minimum allowable tension and shear of 2450 and 1525 psi, respectively. Adhesive type anchors shall have stud bolts installed with Type III epoxy per DMS-6100, "Epoxies and Adhesives." Adhesive anchors may be loaded after adequate epoxy cure time per the manufacturer's recommendations.



SM RD SGN ASSM TY TWT(X)UB(P)

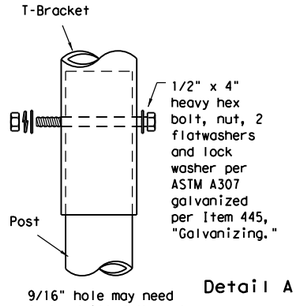
Sign Installation Using a Prefabricated T-Bracket for Thin-Wall Tubing Post





SM RD SGN ASSM TY TWT(X)XX(T)

(* - See General Note 6)



Detail A

9/16" hole may need to be drilled through post to accommodate bolt.

NOTE

The devices shall be installed per manufacturer's recommendations.
Installation procedures shall be provided to the Engineer by Contractor.

GENERAL NOTES:

1. The Wedge Anchor System and the Universal Anchor System with thin wall tubing post may be used to support up to 10 square feet of sign area.
2. The tubular socket, wedge and prefabricated T-bracket shall be permanently marked to indicate manufacturer. Method, design, and location of marking are subject to the approval of the TxDOT Traffic Standards Engineer.
3. Except for posts (13 BWG Tubing), clamps, nuts and bolts, all components shall be prequalified. A list of prequalified vendors may be obtained from the Material Producer List web page. The website address is: http://www.txdot.gov/business/producer list.htm
4. Material used as post with this system shall conform to the following specifications:
   13 BWG Tubing (2.375" outside diameter) (TWT)
   0.095" nominal wall thickness
   Seamless or electric-resistance welded steel tubing
   Steel shall be HSLAS Gr 55 per ASTM A1011 or ASTM A1008
   Other steels may be used if they meet the following:
   55,000 PSI minimum yield strength
   70,000 PSI minimum tensile strength
   18% minimum elongation in 2"
   Wall thickness (uncoated) shall be within the range of .083" to .099"
   Outside diameter (uncoated) shall be within the range of 2.369" to 2.381"
   Galvanization per ASTM 123 or ASTM A653 G210. For precoated steel tubing (ASTM A653), recoat tube outside diameter weld seam by metallizing with zinc wire per ASTM B833.
5. Sign blanks shall be the sizes and shapes shown on the plans.
6. Additional sign clamp required on the "T-bracket" post for 24" high signs. Place clamp at least 3" above bottom of sign when possible.
7. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
8. See the Traffic Operations Division website for detailed drawings of sign clamps and Wedge Anchor System components. The website address is: http://www.txdot.gov/publications/traffic.htm

WEDGE ANCHOR SYSTEM INSTALLATION PROCEDURE

1. Dig foundation hole. Where solid rock is encountered at ground level, the foundation shall be a minimum depth of 18". When solid rock is encountered below ground level, the foundation shall extend in the solid rock a minimum depth of 18" or provide a minimum foundation depth of 30". If solid rock is encountered, the socket/stub may be reduced in length as required to a minimum length of 18". Any material removed from the socket/stub shall be from the bottom and the clearance requirements given on SMD(GEN) must be followed. The inner surfaces of the socket/stub must remain free of concrete or other debris.
2. The Engineer may permit batches of concrete less than 2 cubic yards to be mixed with a portable, motor driven concrete mixer. For small placements less than 0.5 cubic yards, hand mixing in a suitable container may be allowed by Engineer. Place concrete into hole until it is approximately flush with the ground. Concrete shall be Class A.
3. Insert tubular socket into concrete until top of socket is approximaely 1/4 " above the concrete footing.
4. Plumb the socket. Allow a minimum 4 days for concrete to set, unless otherwise directed by Engineer..
5. Attach the sign to the sign post.
6. Insert the sign post into socket and align sign face with roadway.
7. Drive the wedge into the socket to secure post. This will leave approximately 3 inches of the wedge exposed.

UNIVERSAL ANCHOR SYSTEM INSTALLATION PROCEDURE

1. Dig foundation hole. Where solid rock is encountered at ground level, the foundation shall be a minimum depth of 18". When solid rock is encountered below ground level, the foundation shall extend in the solid rock a minimum depth of 18" or provide a minimum foundation depth of 30". If solid rock is encountered, the socket/stub may be reduced in length as required to a minimum length of 18". Any material removed from the socket/stub shall be from the bottom and the clearance requirements given on SMD(GEN) must be followed. The inner surfaces of the socket/stub must remain free of concrete or other debris.
2. Insert base post in hole to depths shown and backfill hole with concrete.
3. Level and plumb the base post using a torpedo level and allow concrete adequate time to set. The bottom of the slots provided in the stub pipe shall remain above the top of the concrete foundation.
4. Attach the sign to the sign post.
5. Install plastic insert around bottom of post.
6. Insert sign post into base post. Lower until the post comes to rest on steel rod.
7. Seat compression ring using a hammer. Typically, the top of compression ring will be approximately level with top of stub post when optimally installed.
8. Check sign post by hand to ensure it is unable to turn. If loose, increase the tightening of the compression ring.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS WEDGE & UNIVERSAL ANCHOR WITH THIN WALL TUBING POST

SMD(TWT)-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

9-08 REVISIONS

CONT	SECT	JOB	HIGHWAY
1133	02	032	FM 794
DIST	COUNTY		SHEET NO.
YKM	GONZALES		212

26E

DATE: 3/25/2021 8:54:58 AM
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DATE: 3/25/2021 8:55:03 AM
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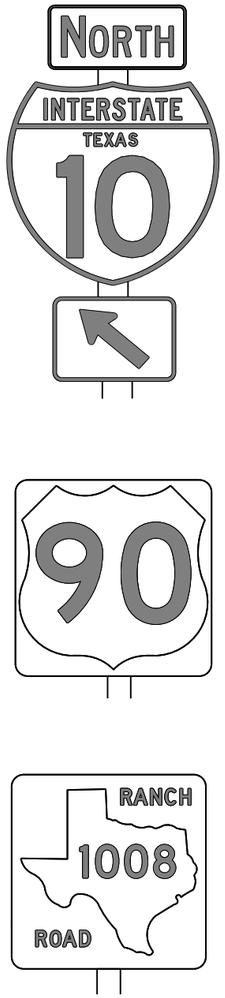
REQUIREMENTS FOR INDEPENDENT MOUNTED ROUTE SIGNS

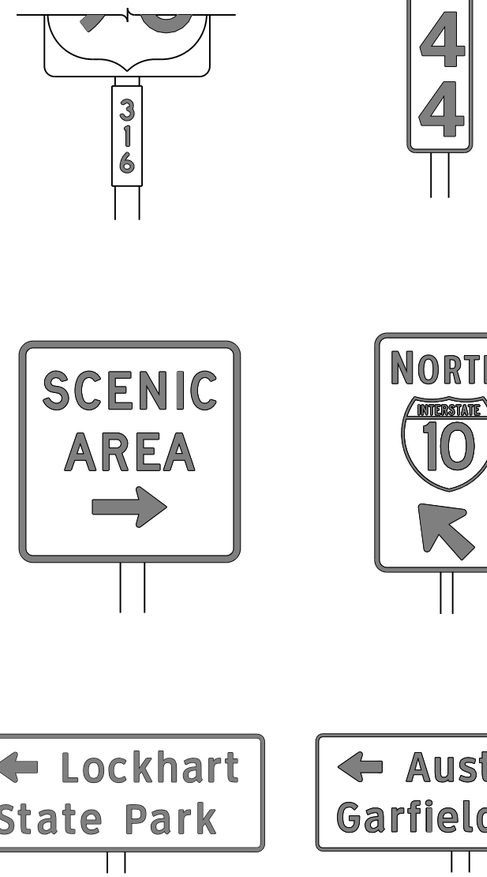
SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE A SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & BORDERS	ALL OTHERS	TYPE B or C SHEETING



TYPICAL EXAMPLES

REQUIREMENTS FOR BLUE, BROWN & GREEN D AND I SERIES GUIDE SIGNS

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	ALL	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE D SHEETING
LEGEND, SYMBOLS & BORDERS	ALL OTHERS	TYPE B OR C SHEETING



TYPICAL EXAMPLES

GENERAL NOTES

1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).

2. White legend shall use the Clearview Alphabet. The following Clearview fonts shall be used to replace the existing white Federal Highway Administration (FHWA) Standard Highway Alphabets, when not specified in the SHSD, or in the plans.

B	CV-1W
C	CV-2W
D	CV-3W
E	CV-4W
Emod	CV-5WR
F	CV-6W

3. Route sign legend (ie. IH, US, SH and FM shields) shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets B, C, D, E, Emod or F).

4. Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.

5. Independent mounted route sign with white or colored legend and borders shall be applied by screening process with transparent color ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof. White legend, symbols and borders on all other signs shall be cut-out white sheeting applied to colored background sheeting.

6. Information regarding borders and radii for signs is found in the "Standard Highway Sign Designs for Texas". Dimensions shown and described for borders and corner radii on parent sign are nominal. Borders may vary in width as much as 1/2 inch. Corner radii above 3 inches may vary in width as much as 1 inch. Borders and corner radii within a parent sign must be of matching widths. The sign area outside the corner radius should be trimmed or rounded.

7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.

8. Mounting details of roadside signs are shown in the "SMD series" Standard Plan Sheets.

DEPARTMENTAL MATERIAL SPECIFICATIONS	
ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300

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

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

http://www.txdot.gov/

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

TSR(3)-13

FILE: tsr3-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	032	FM 794
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	YKM	GONZALES		213

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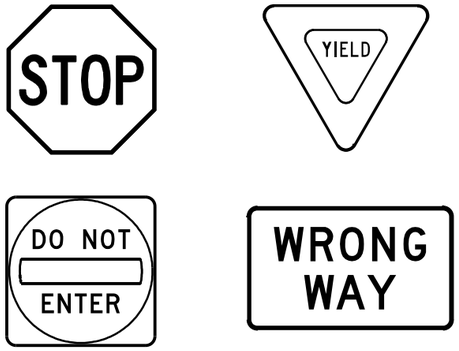
REQUIREMENTS FOR RED BACKGROUND REGULATORY SIGNS

(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.

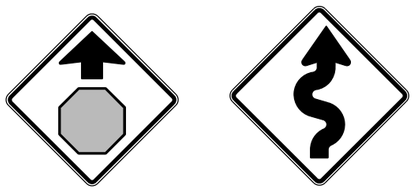
ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080
7.5 to 15	0.100
Greater than 15	0.125

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

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REVISIONS	1133	02	032	FM 794
12-03 7-13 9-08	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		214

SITE DESCRIPTION

PROJECT LIMITS: *From 0.5 Miles North of County Road 235 to US 90A.*

PROJECT DESCRIPTION: *Rehabilitation of existing roadway.*

MAJOR SOIL DISTURBING ACTIVITIES: *Major soil disturbing activities may include but are not limited to: Excavation and Embankment for roadway and structures, final grading of front slope and placement of topsoil.*

Storm Water Pollution Prevention Plans (SW3P) are a part of a project's construction plans and the construction plans contain information that supplements a project SW3P; project plans provide information on changes in elevations, the locations where dirt has been removed and where dirt has been added, on construction sequencing and scheduling and other data that may be important to a full understanding of TCEQ storm water requirements and the project SW3P.

TOTAL PROJECT AREA: *Approximately 63.8 acres.*

TOTAL AREA TO BE DISTURBED: *Approximately 25.1 acres.*

EXISTING CONDITION OF SOIL & VEGETATIVE COVER AND % OF EXISTING VEGETATIVE COVER: *The existing project site consists of Rosanky fine sandy loam series & Luling clay series. These series consists of gently sloping and well drained soils. These areas have good coverage of native and improved grasses. Vegetation is uniformally established grass covering approximately 80% of the surface area.*

NAME OF RECEIVING WATERS: *The waters from this project flow into Smith Creek and tributaries of Smith Creek. Smith Creek then flows into the San Marcos River Stream Segment No. 1808. The San Marcos River flows into the Guadalupe River Stream Segment 1804. Guadalupe River then flows into San Antonio Bay Stream Segment 2462.*

EROSION AND SEDIMENT CONTROLS

SOIL STABILIZATION PRACTICES:

- [x] TEMPORARY SEEDING
- [x] PERMANENT PLANTING, SODDING, OR SEEDING
- [ ] MULCHING
- [ ] SOIL RETENTION BLANKET
- [ ] BUFFER ZONES
- [ ] OTHER

NOTE: *Stabilization measures must be initiated immediately in portions of the site where construction activities have temporarily ceased and will not resume for a period exceeding 14 calendar days. Stabilization measures that provide a protective cover must be initiated immediately in portions of the site where construction activities have permanently ceased.*

STRUCTURAL PRACTICES:

- [x] SILT FENCES
- [ ] HAY BALES
- [ ] SANDBAGS
- [ ] DIVERSION, INTERCEPTOR, OR PERIMETER DIKES
- [ ] DIVERSION, INTERCEPTOR, OR PERIMETER SWALES
- [ ] DIVERSION DIKE AND SWALE COMBINATIONS
- [x] ROCK FILTER DAMS
- [ ] PAVED FLUMES/RIPRAP
- [ ] ROCK BEDDING AT CONSTRUCTION EXIT
- [ ] TIMBER MATTING AT CONSTRUCTION EXIT
- [ ] CHANNEL LINERS
- [ ] SEDIMENT TRAPS/BASINS
- [ ] GABIONS
- [ ] STORM INLET SEDIMENT TRAP
- [ ] STONE OUTLET STRUCTURES
- [ ] CURBS AND GUTTERS
- [ ] STORM SEWERS
- [x] VELOCITY CONTROL DEVICES
- [x] BIODEGRADABLE EROSION CONTROL LOGS

STATE OF TEXAS
JOHN W. TULEY
102441
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PROFESSIONAL ENGINEER
3/25/2021

OTHER:

NARRATIVE - SEQUENCE OF CONSTRUCTION (STORM WATER MANAGEMENT) ACTIVITIES:

The order of activities will be as follows:

1. *Install structural practices as indicated above in ditches at structure locations.*
2. *Existing topsoil will be bladed and windrowed.*
3. *Construction activities begin.*
4. *Windrowed topsoil will be bladed back onto completed front slope. Then seed all disturbed areas.*
5. *Remove all temporary controls and reseed any areas disturbed by their removal.*

Contractor-generated schedules are incorporated into the projects SW3P by reference.

For construction projects, the Yoakum District of the Texas Department of Transportation uses SiteManager, a computer based construction record-keeping system. Documentation describing major grading activities, temporary or permanent cessation of construction, and stabilization measures is a part of this system and is incorporated by reference into this SW3P.

For RMC/Maintenance projects, documentation describing major grading activities, temporary or permanent cessation of construction, and stabilization measures is recorded in a project diary, and is incorporated by reference into this SW3P.

STORM WATER MANAGEMENT: *Storm Water Drainage will be provided by grass "flat bottom & V bottom" ditches. This system will carry drainage within the right of way to lows in the highway where cross drainage occurs. The cross drainage structures will be protected with structural practices as indicated above.*

Sediment control devices will remain in place until at least 70% regrowth of vegetation has occurred. At this time the new vegetation will act as a filter strip for post construction TSS control upon removal of the device.

A site (visual & odor) assessment of water quality leaving the project site: water quality leaving the construction site has been of good quality, with no visually apparent sediments, litter, fertilizers, or surfactants. The water has no petroleum or other odor. Even so, it might be expected that some sediment and litter will escape the project site and that petroleum products leaking from motor vehicles that travel through the site may lower the quality of runoff water.

OTHER EROSION AND SEDIMENT CONTROLS:

MAINTENANCE: *All erosion and sediment controls will be maintained in good working order. If a repair is necessary, it will be done at the earliest date possible, but no later than 7 calendar days after the surrounding exposed ground has dried sufficiently to prevent further damage from heavy equipment. The areas adjacent to creeks and drainage ways shall have priority followed by devices protecting storm sewer inlets. Sediment must be removed from control measures when the design capacity is reduced by 50 percent. If sediment escapes the construction site, off site accumulation of sediment must be removed at a frequency to minimize off-site impacts.*

INSPECTION: *An inspection will be performed by a TxDOT inspector at least every 7 calendar days. An Inspection and Maintenance Report will be made per each inspection. Based on the inspection results, the controls shall be revised per the inspection report.*

WASTE MATERIALS: *The contractor shall adequately store all construction waste materials to prevent these materials from becoming pollutants and to minimize pollutant discharges from the storage locations. No construction waste material will be buried on site. Litter and construction chemicals shall be properly contained and prevented from becoming a pollutant in storm water discharge.*

Potential pollutants will primarily be from the sediments leaving the project right-of-way and petroleum products. Principal sources of pollution will be disturbed soil from grading and excavating and other roadway construction activities, litter and debris from construction activities, gasoline, oil, and grease from asphalt distributor vehicles, scrappers, trucks, rollers, compactors, and fuel trucks during daily, routine operations.

The contractor will maintain a clean, orderly construction site. Construction waste including trash, rubble, scrap and vegetation shall be disposed of in lidded dumpsters or in a manner approved by the Project Engineer. Disposal methods must meet Federal, State, and Local waste management guidelines. No construction waste will be buried or burned on site. Spoils disposal, material storage, and material resulting from the destruction of existing roads and structures shall be stored in areas approved by the Project Engineer and protected from runoff. All waterways shall be cleared of temporary embankment, temporary bridges, matting, false work piling, debris, or other obstructions placed during construction operations, that are not part of the finished work, as soon as practicable. All excess soil generated by the construction will be collected and disposed of by the contractor. Disposal areas, stockpiles, and haul roads shall be constructed in a manner that will minimize and control the amount of sediment that may enter receiving waters. Disposal areas shall not be located in any wetland, water body, or stream bed.

HAZARDOUS WASTE (INCLUDING SPILL REPORTING): *At a minimum, any product in the following categories are considered to be hazardous: Paints, Acids for cleaning masonry surfaces, Cleaning Solvents, Asphalt Products, Chemical Additives for soil stabilization, or Concrete Curing Compounds and additives. In event of a spill which may be hazardous, the Spill Coordinator should be contacted immediately.*

SANITARY WASTE: *All sanitary waste will be collected from the portable units as necessary or as required by local regulation by a licensed sanitary waste management contractor.*

OFFSITE VEHICLE TRACKING:

- [ ] HAUL ROADS DAMPENED FOR DUST CONTROL
- [x] LOADED HAUL TRUCKS TO BE COVERED WITH TARPAULIN
- [x] EXCESS DIRT ON ROAD REMOVED DAILY
- [ ] STABILIZED CONSTRUCTION ENTRANCE

OTHER:

REMARKS: *Disposal areas, stockpiles, and haul roads shall be constructed in a manner that will minimize and control the amount of sediment that may enter receiving waters. Disposal areas shall not be located in any wetland, waterbody or streambed.*

On and off site project specific locations including borrow pits and equipment staging areas are under the control of the contractor. The contractor will be obligated to comply with the requirements of the construction general permit.

All waterways shall be cleared as soon as practicable of temporary embankment, temporary bridges, matting, falsework, piling, debris or other obstructions placed during construction operations that are not a part of the finished work.

FM 794
STORM WATER POLLUTION PREVENTION PLAN (SW3P)

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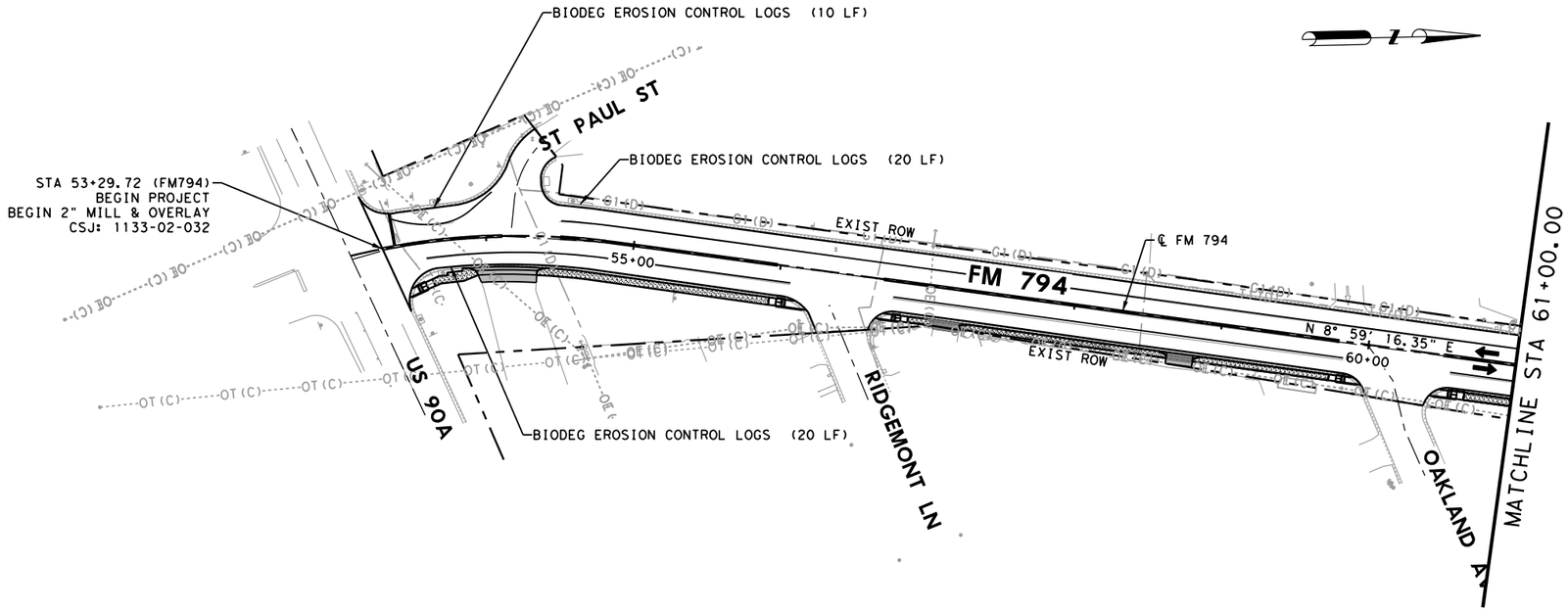
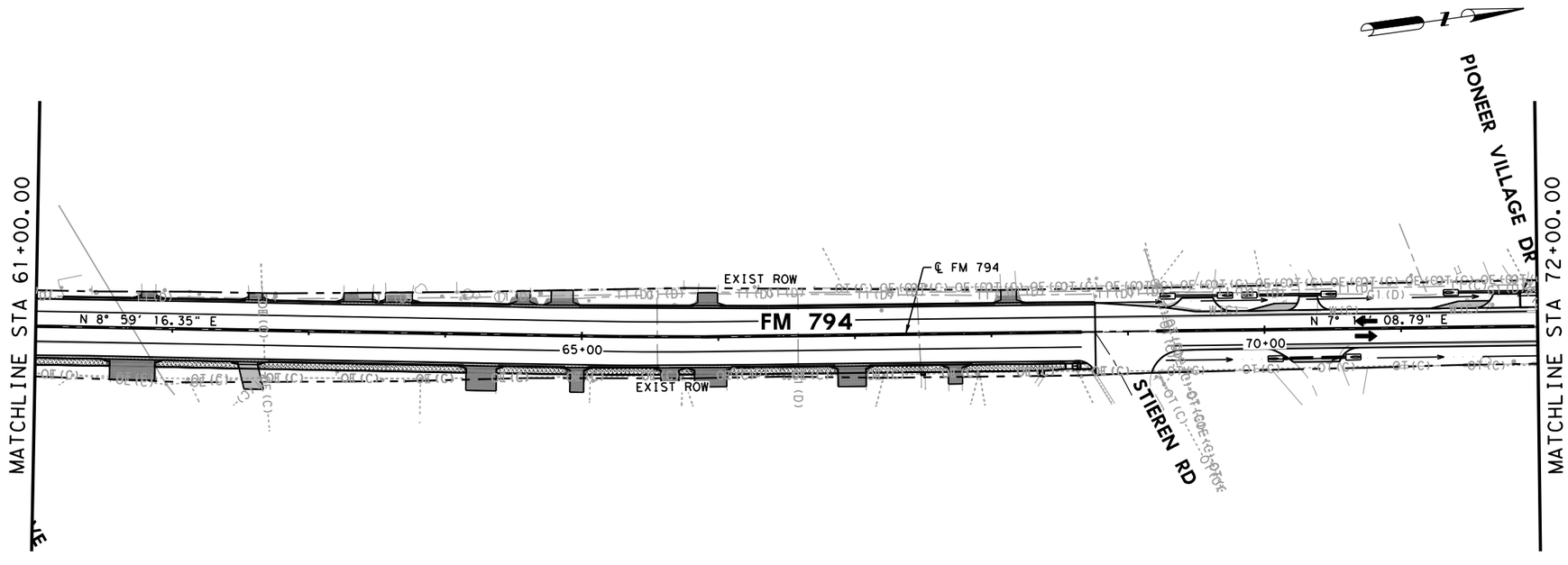
Rev: 04/16/13

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
6			FM 794
STATE	DISTRICT	COUNTY	
TEXAS	YKM	GONZALES	
CONTROL	SECTION	JOB	SHEET NO.
1133	02	032	215





LEGEND

- DITCH FLOW
- SCF — SILT CONTROL FENCE
- CONSTRUCTION AREA
- CULVERT FLOW DIRECTION

NOTES:

1. UTILITY LOCATIONS SHOWN ARE APPROXIMATE AND SHOULD BE FIELD VERIFIED BY THE CONTRACTOR BEFORE CONSTRUCTION

0 50 100

SCALE: 1"=100'

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JOHN W. TULEY
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PROFESSIONAL ENGINEER

3/25/2021

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SW3P LAYOUT

SHEET 1 OF 19

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			216
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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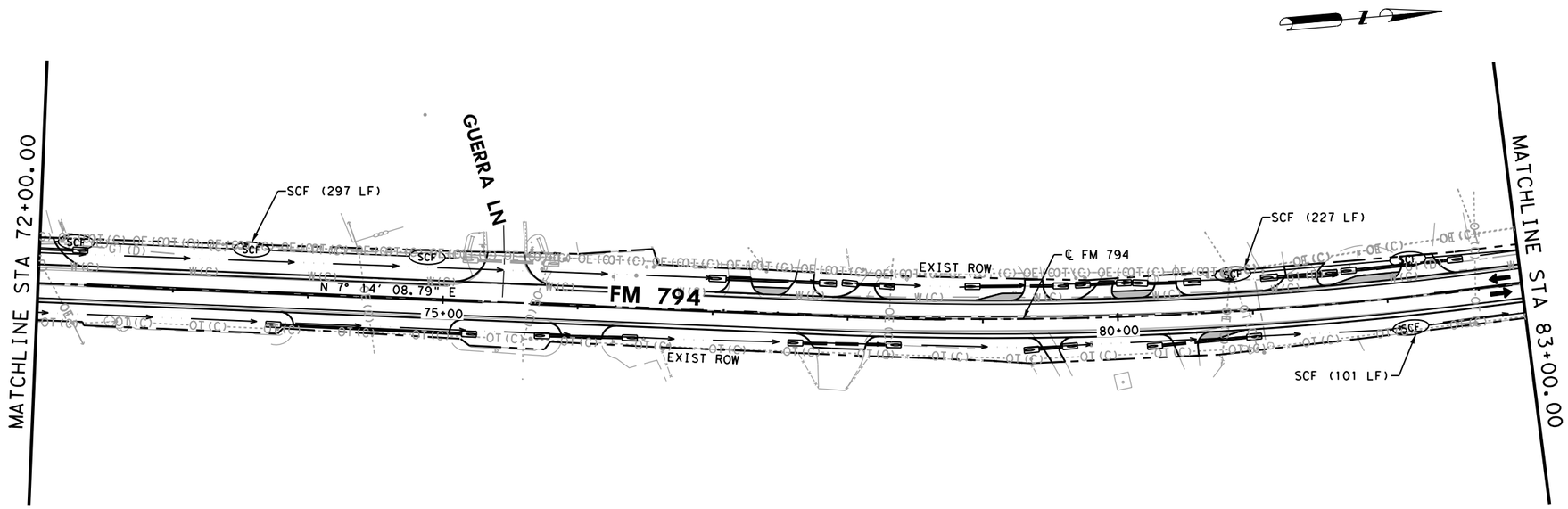

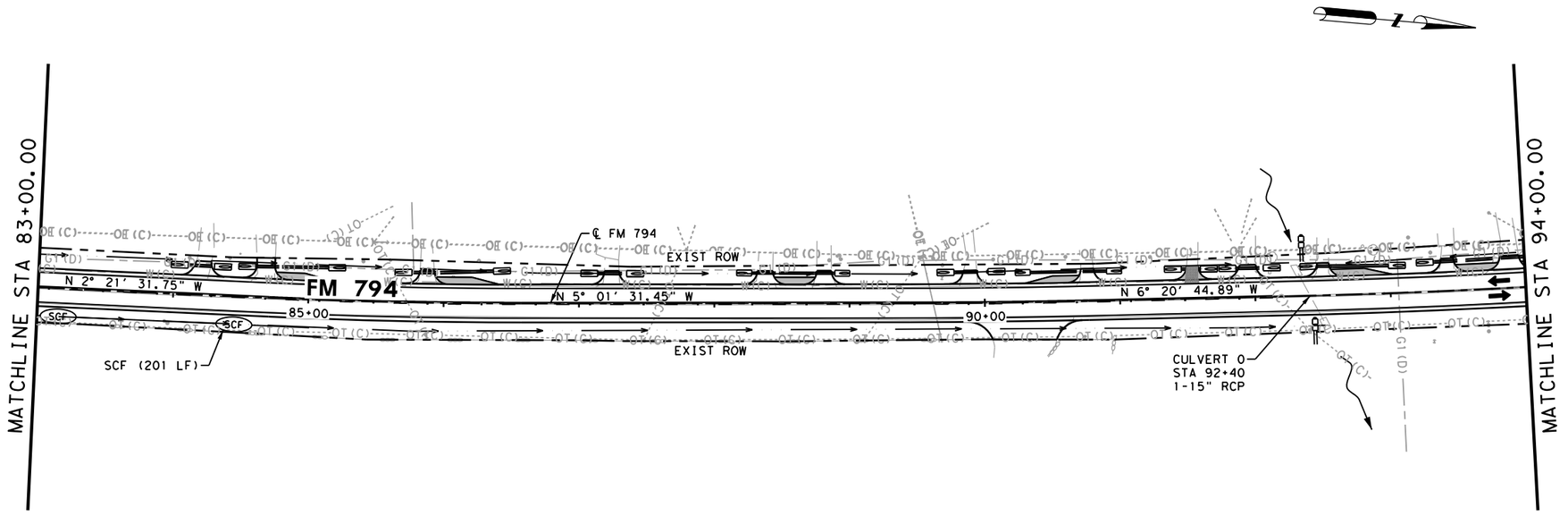

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SW3P LAYOUT

SHEET 2 OF 19

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			217
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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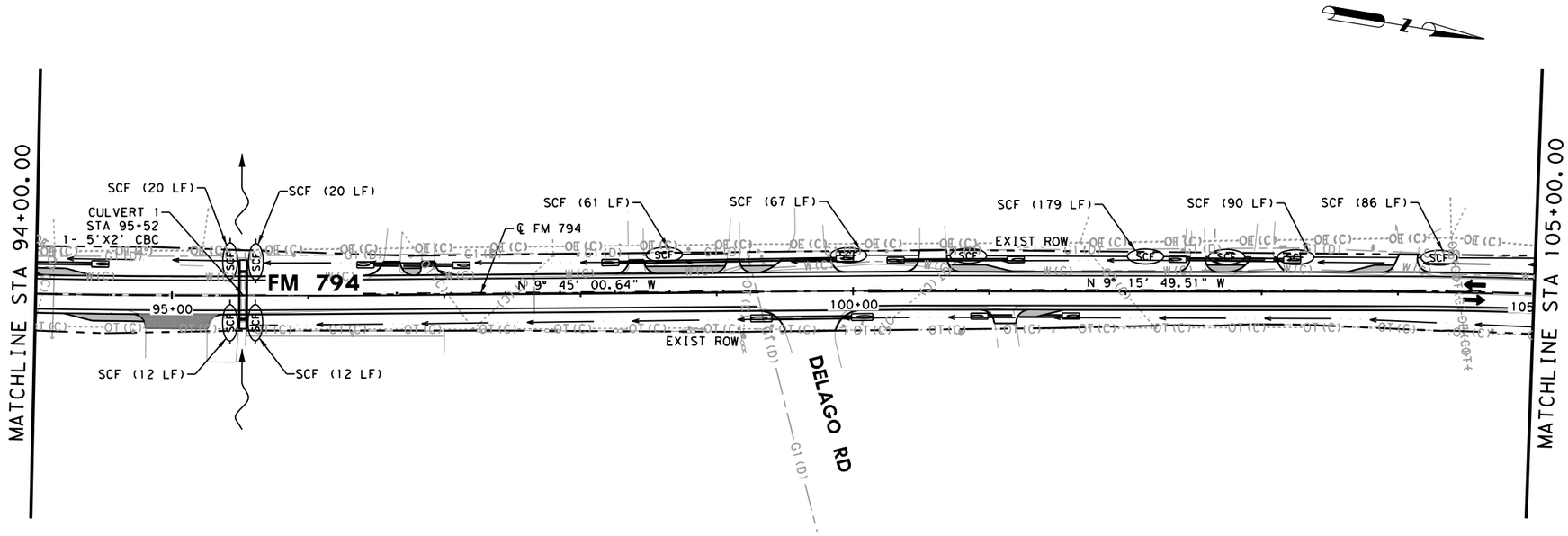

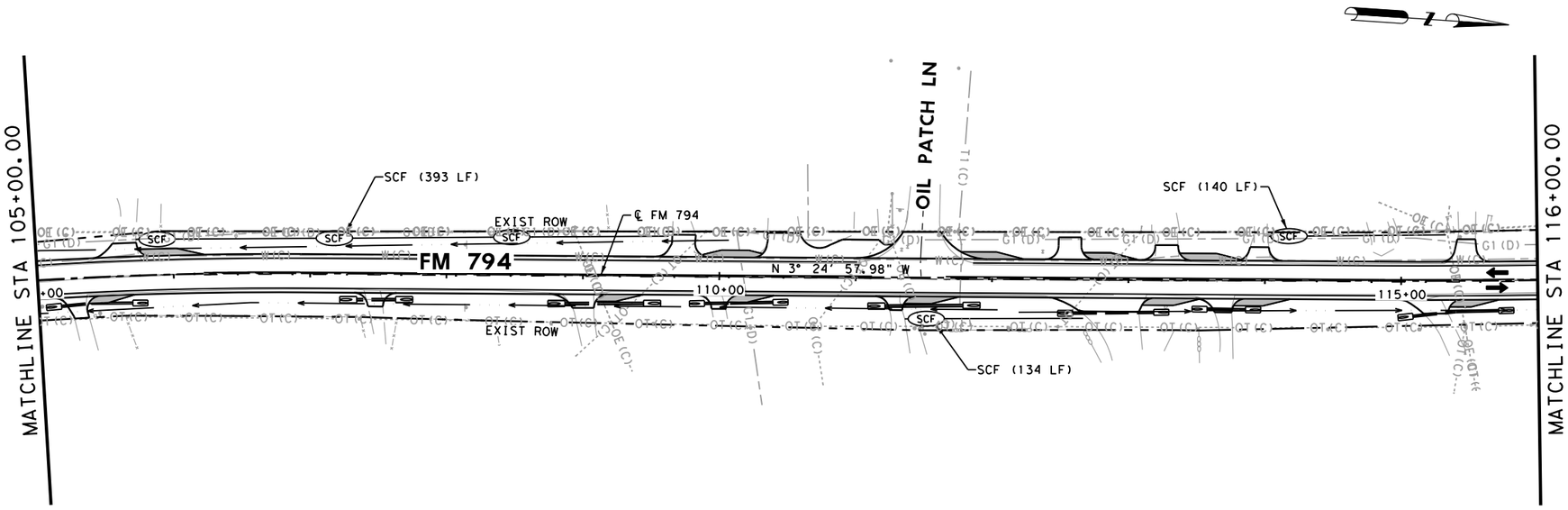

LEGEND

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SHEET 3 OF 19

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			218
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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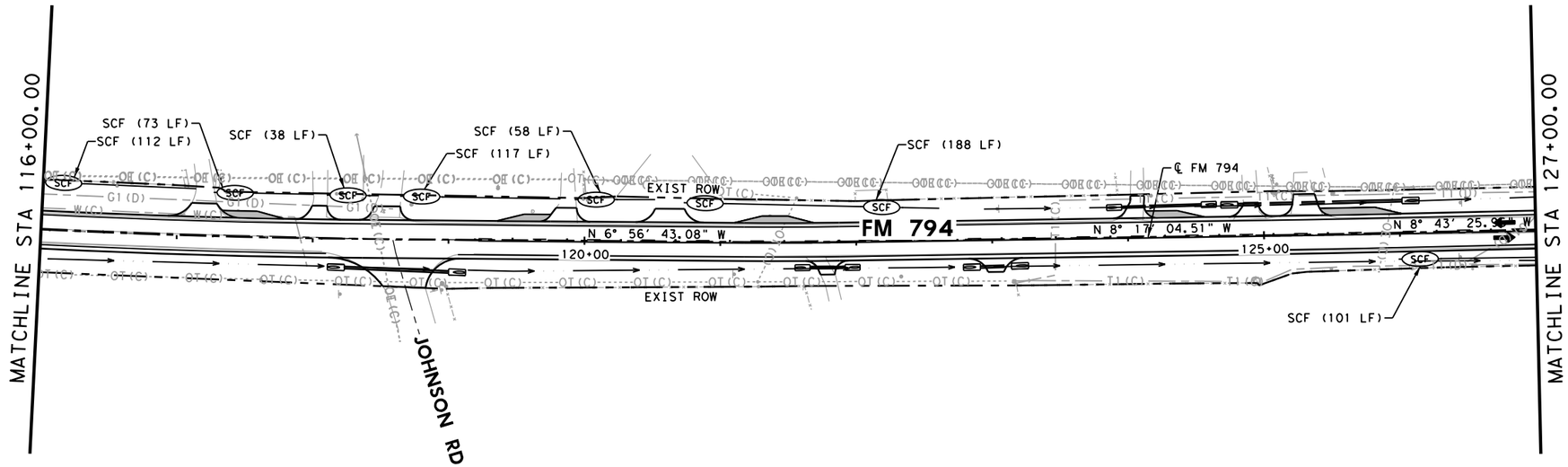

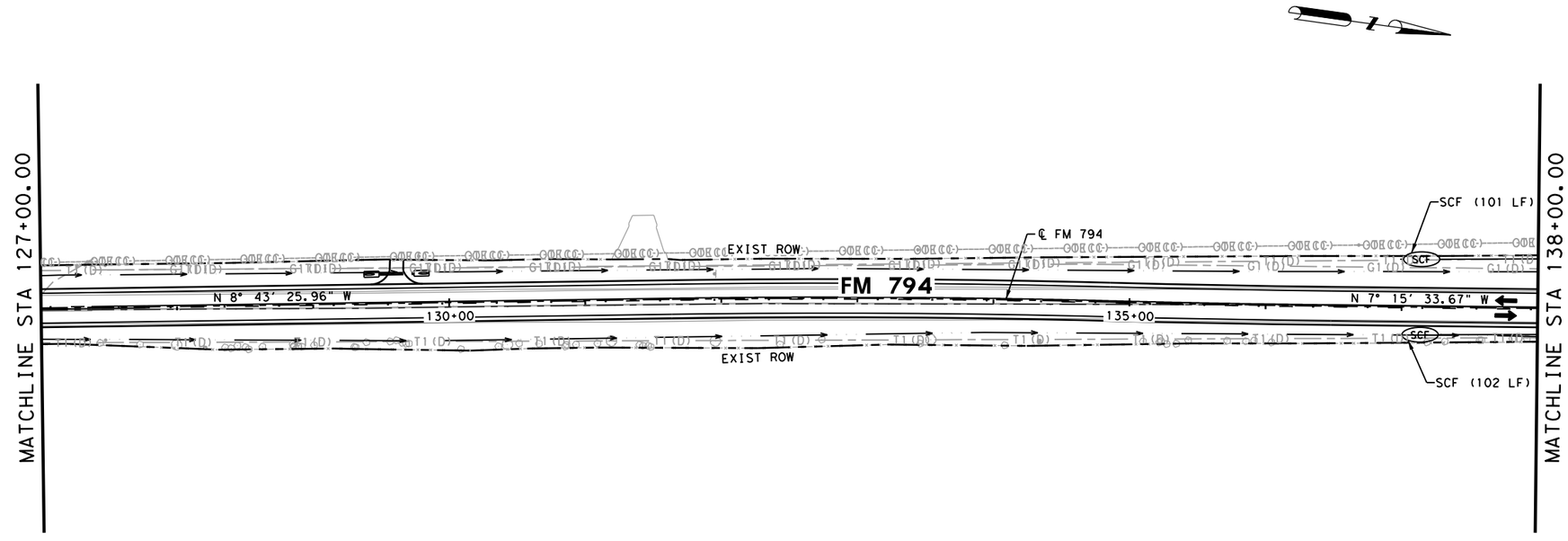

LEGEND

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- SCF — SILT CONTROL FENCE
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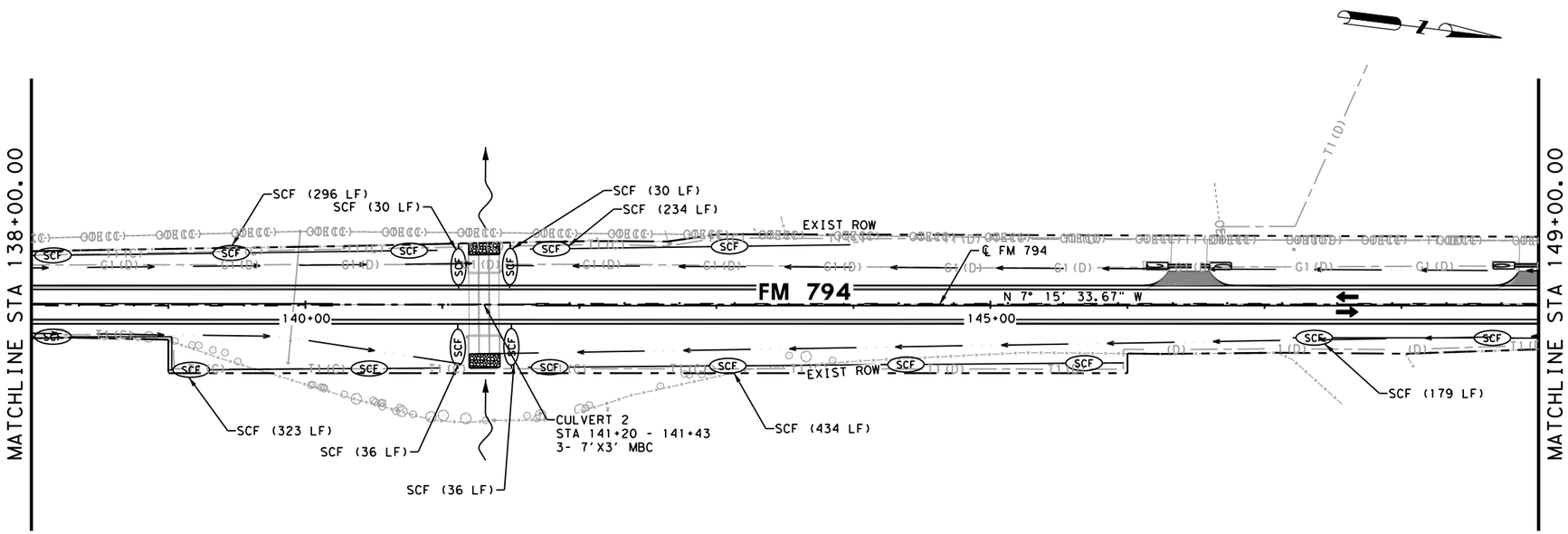
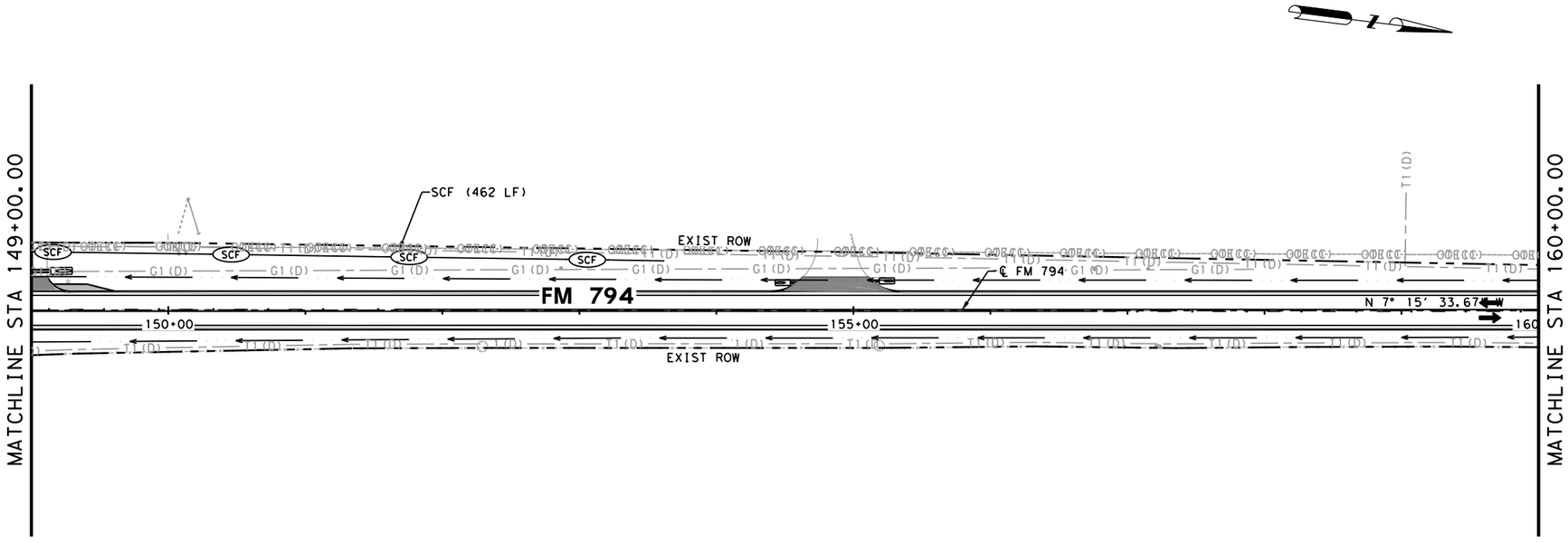
SHEET 4 OF 19

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			219
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794





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SHEET 5 OF 19

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			220
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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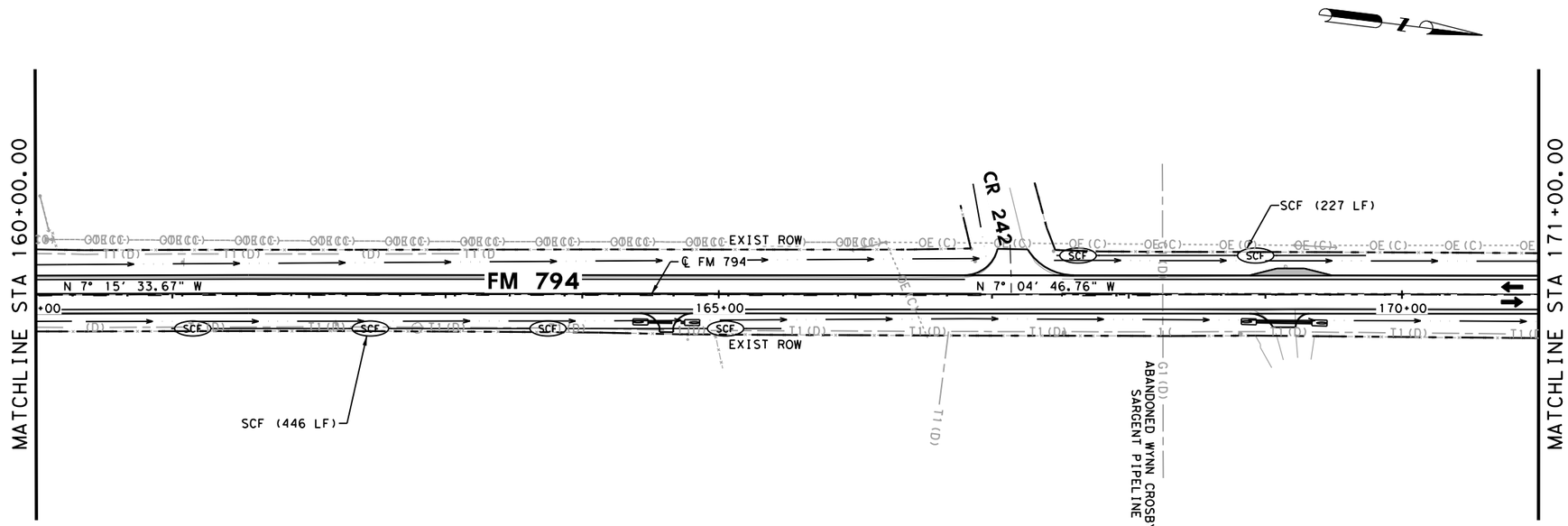

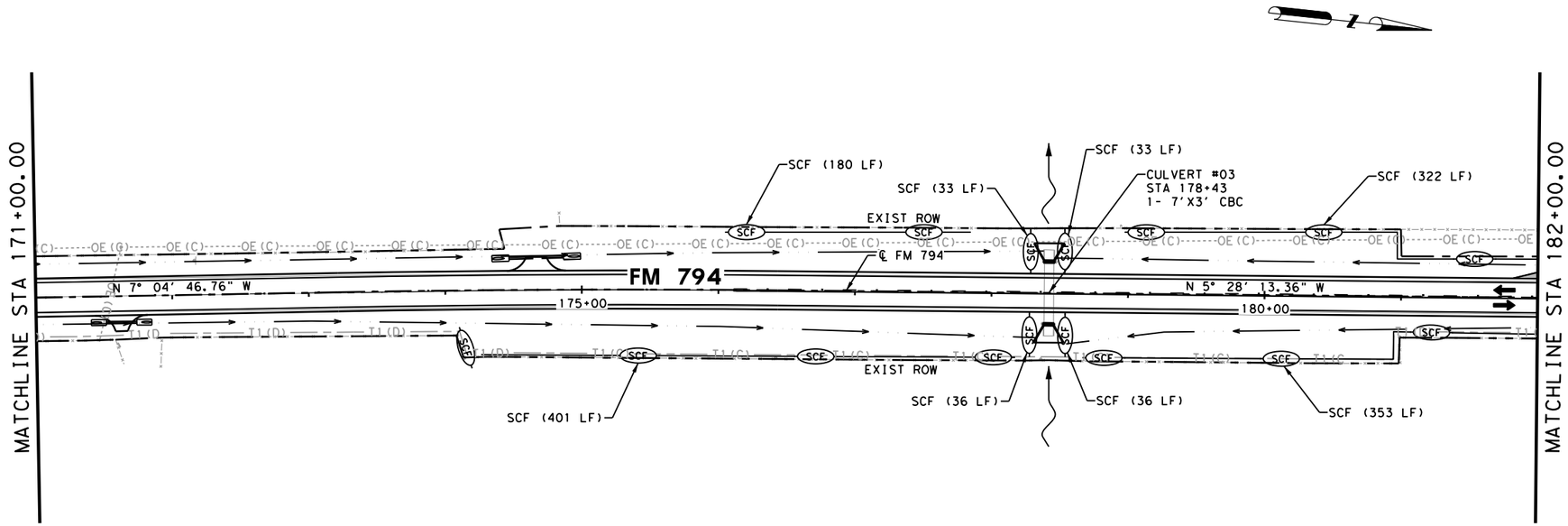

LEGEND

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SW3P LAYOUT

SHEET 6 OF 19

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			221
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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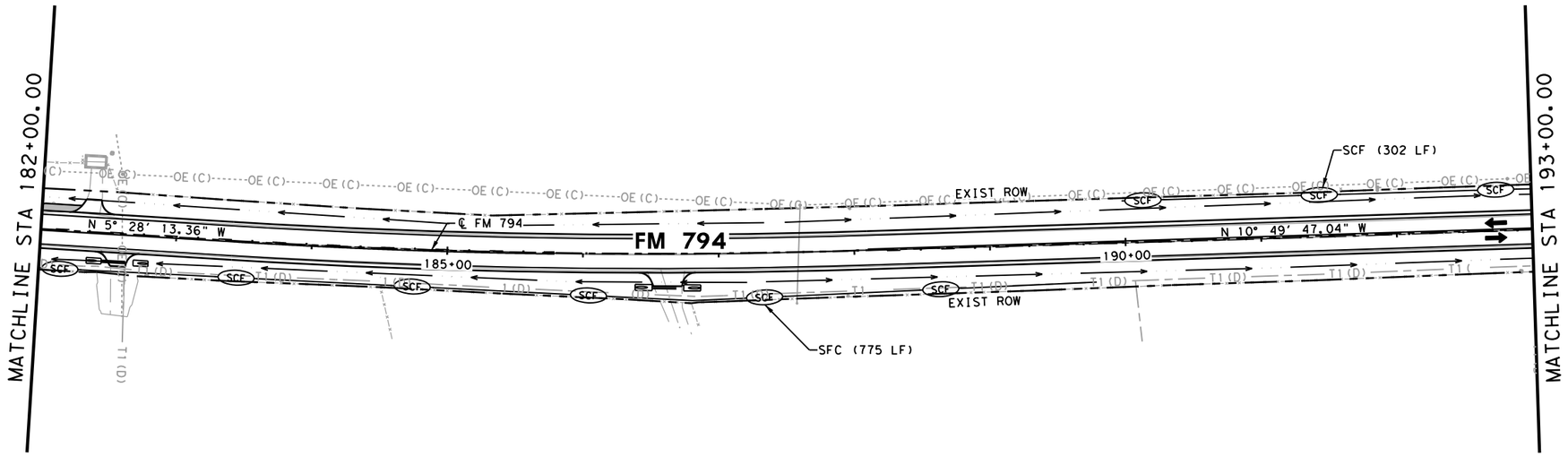

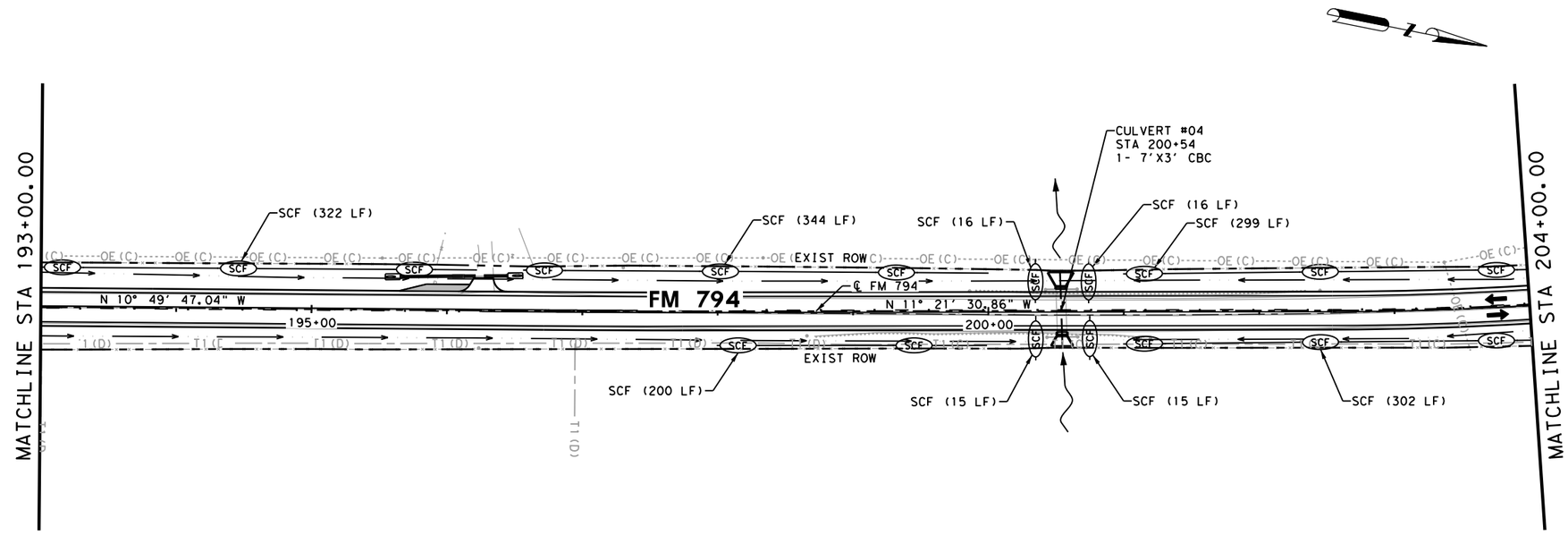

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SW3P LAYOUT

SHEET 7 OF 19

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			222
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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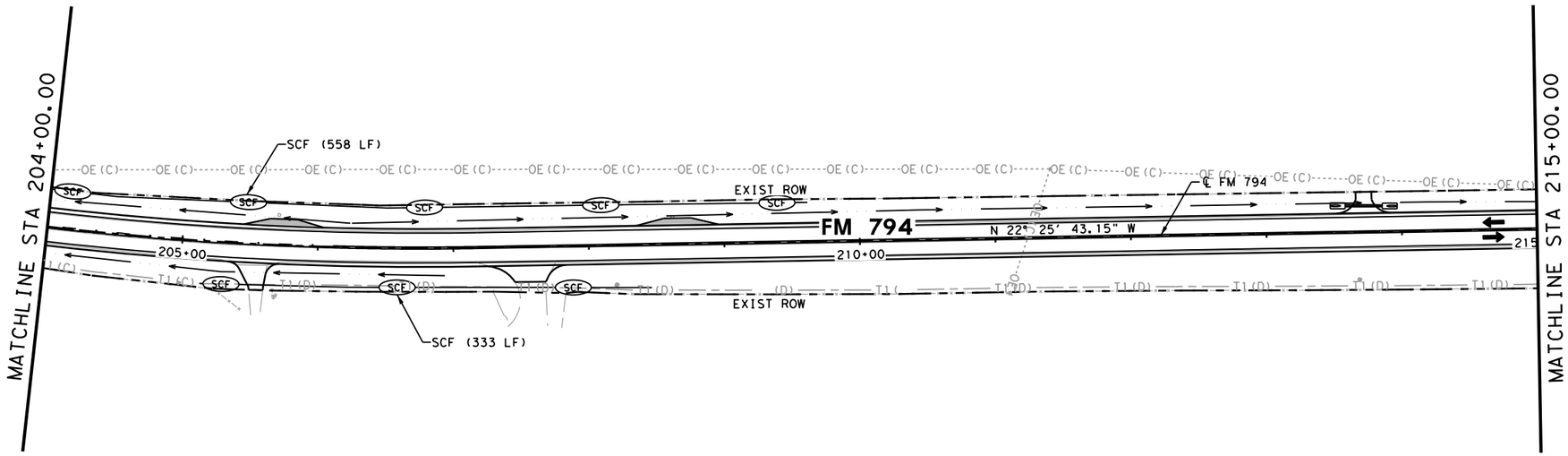

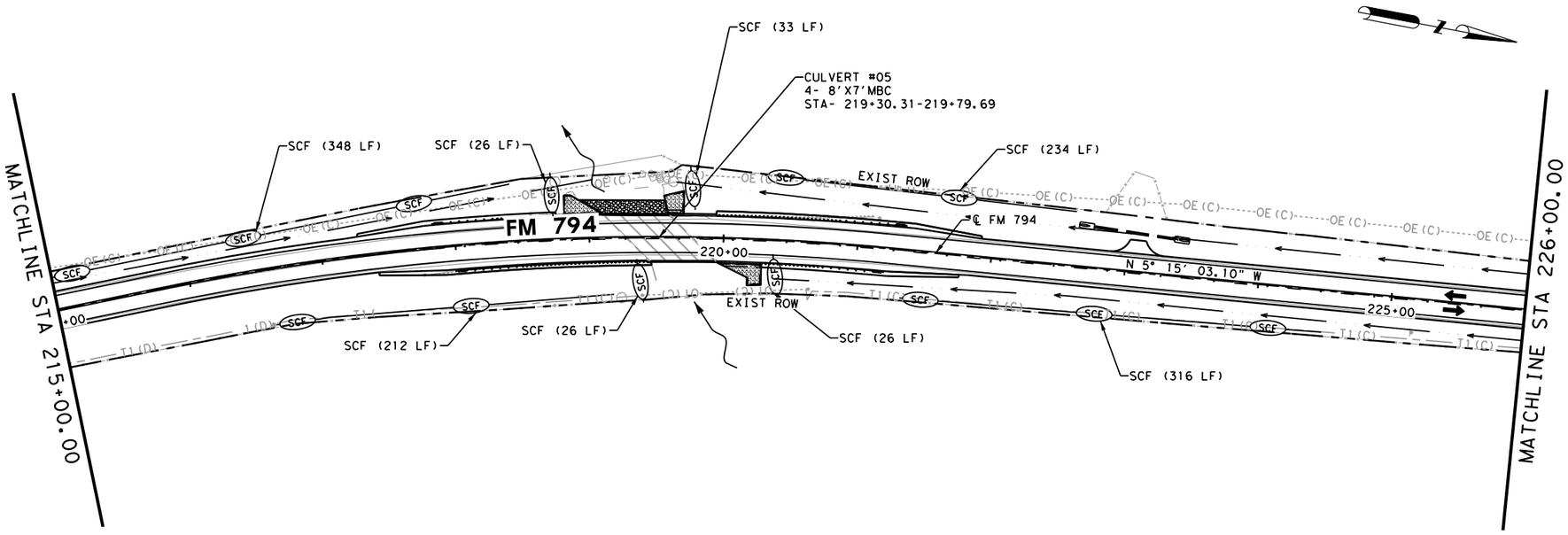

LEGEND

- DITCH FLOW
- SCF — SILT CONTROL FENCE
- CONSTRUCTION AREA
- CULVERT FLOW DIRECTION

NOTES:

1. UTILITY LOCATIONS SHOWN ARE APPROXIMATE AND SHOULD BE FIELD VERIFIED BY THE CONTRACTOR BEFORE CONSTRUCTION

0 50 100

SCALE: 1"=100'

STATE OF TEXAS
JOHN W. TULEY
102441
LICENSED
PROFESSIONAL ENGINEER

3/25/2021

Texas Department of Transportation

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FM 794

SW3P LAYOUT

SHEET 8 OF 19

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			223
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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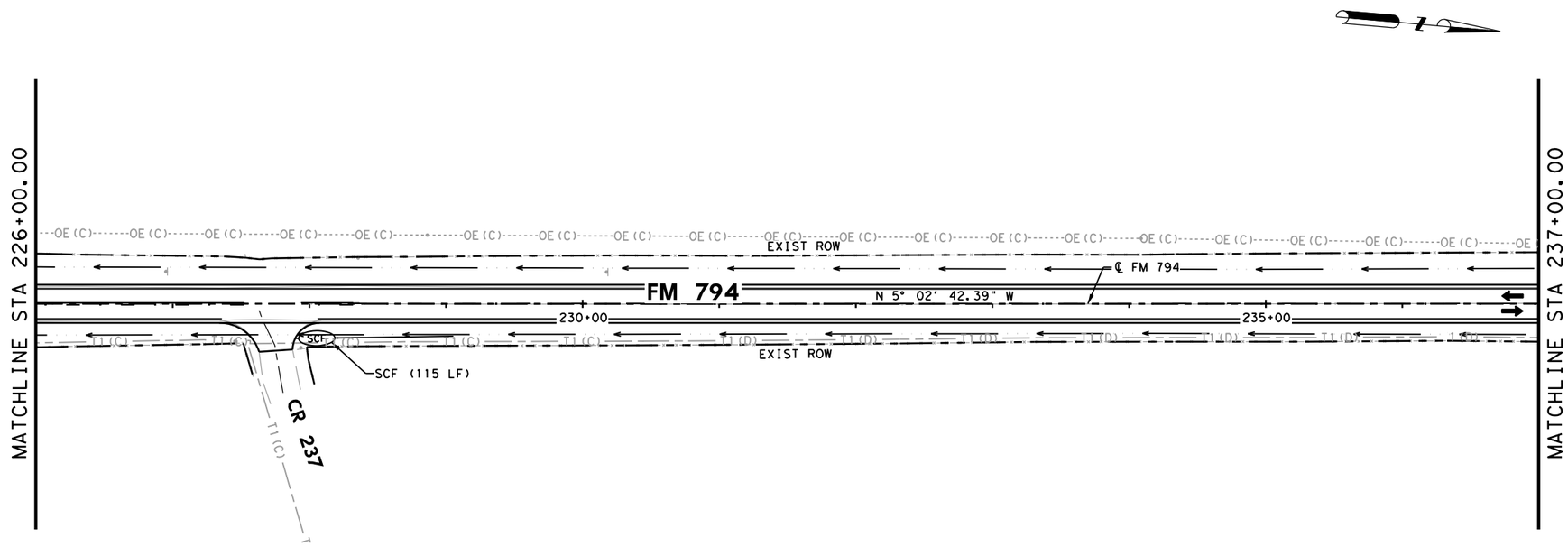

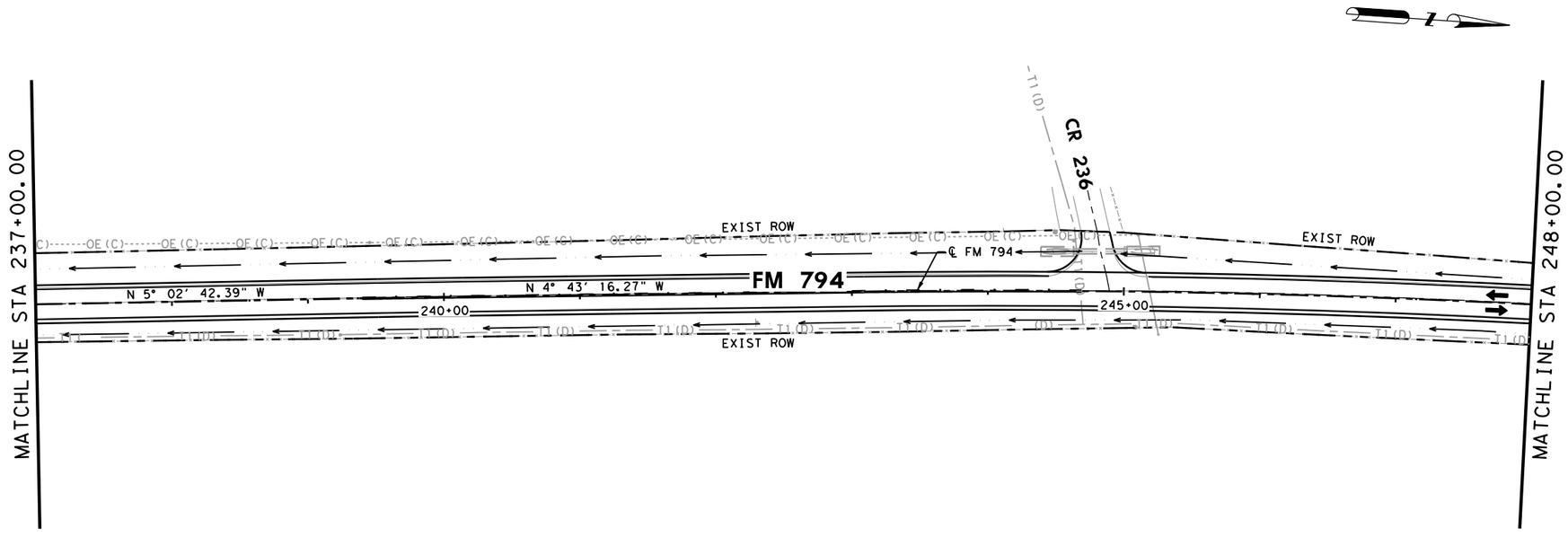

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SW3P LAYOUT

SHEET 9 OF 19

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			224
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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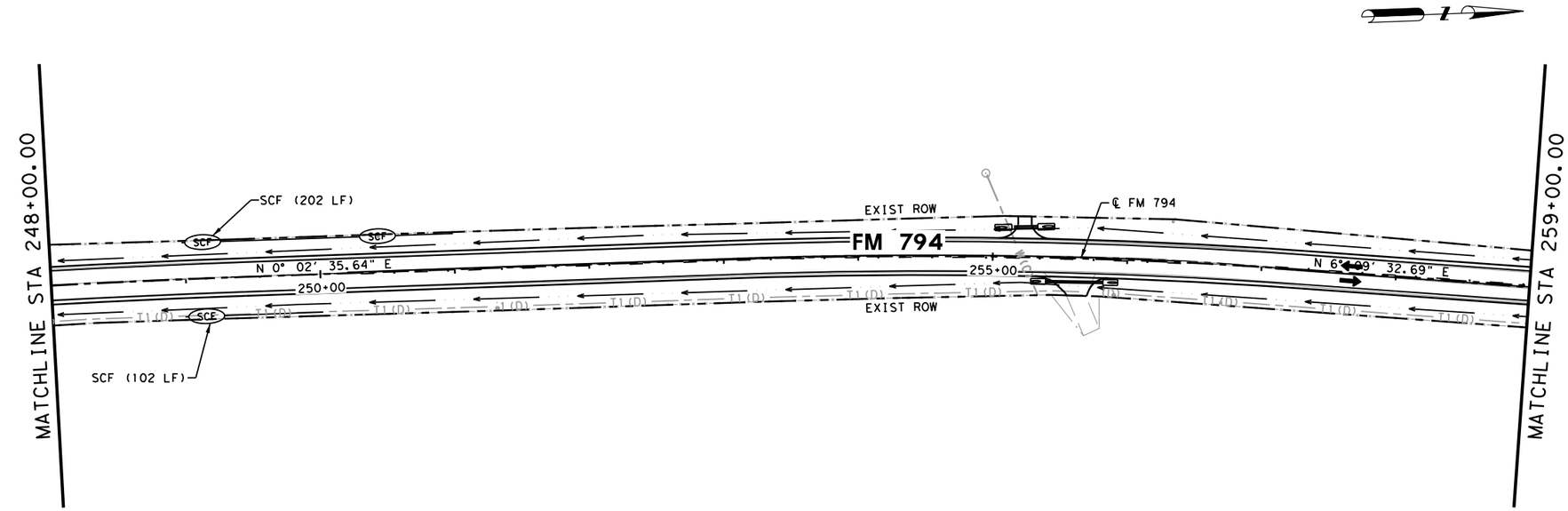

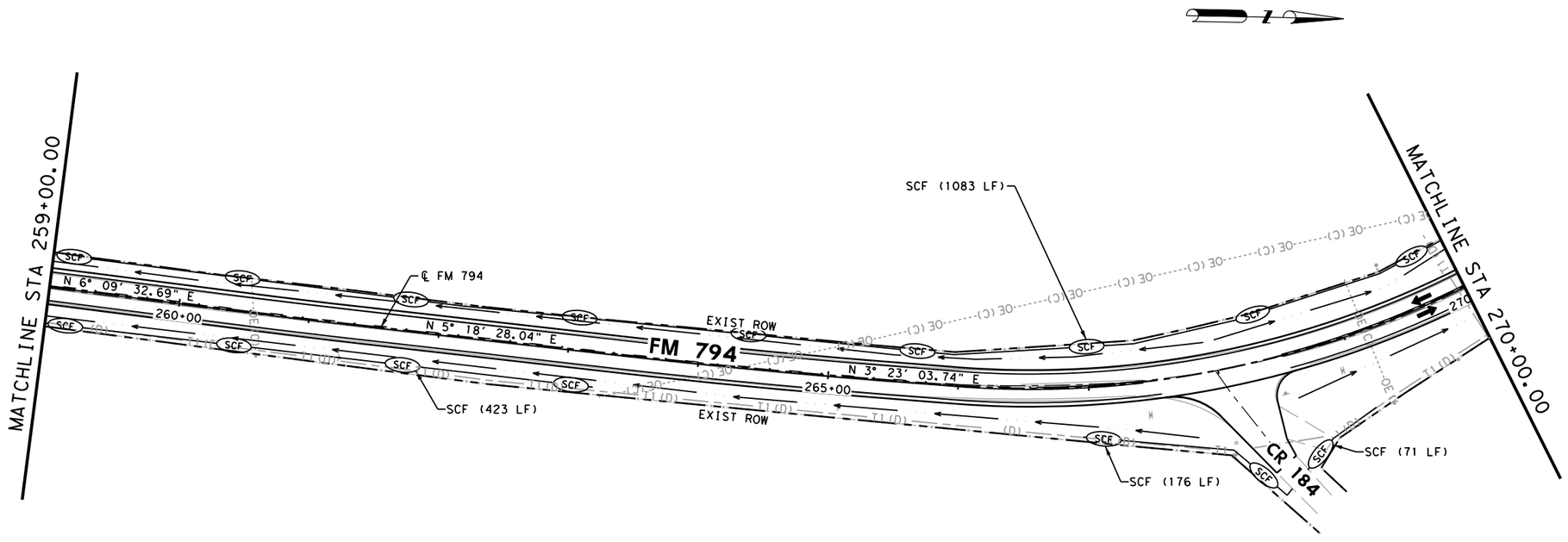

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SW3P LAYOUT

SHEET 10 OF 19

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			225
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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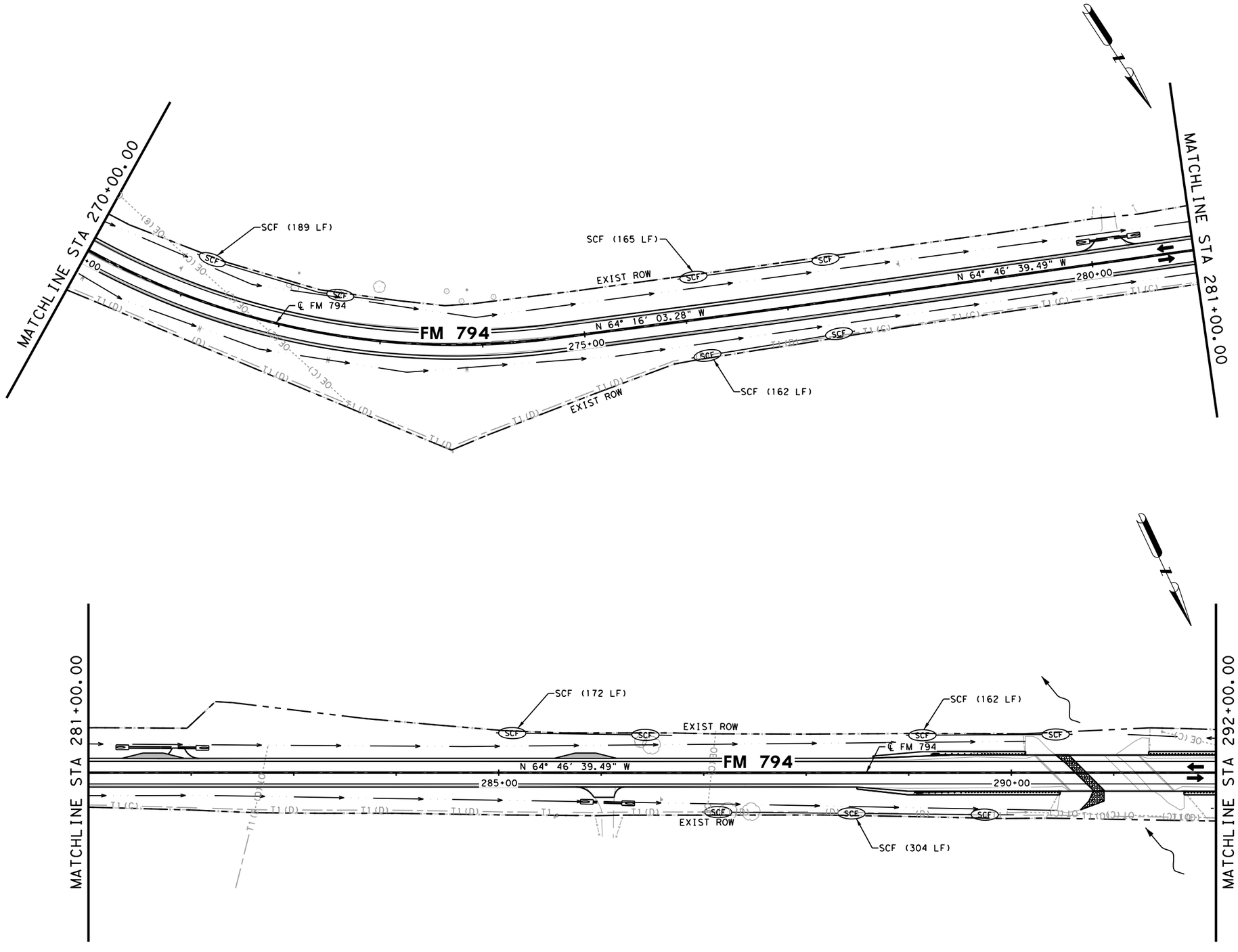

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SW3P LAYOUT

SHEET 11 OF 19

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			226
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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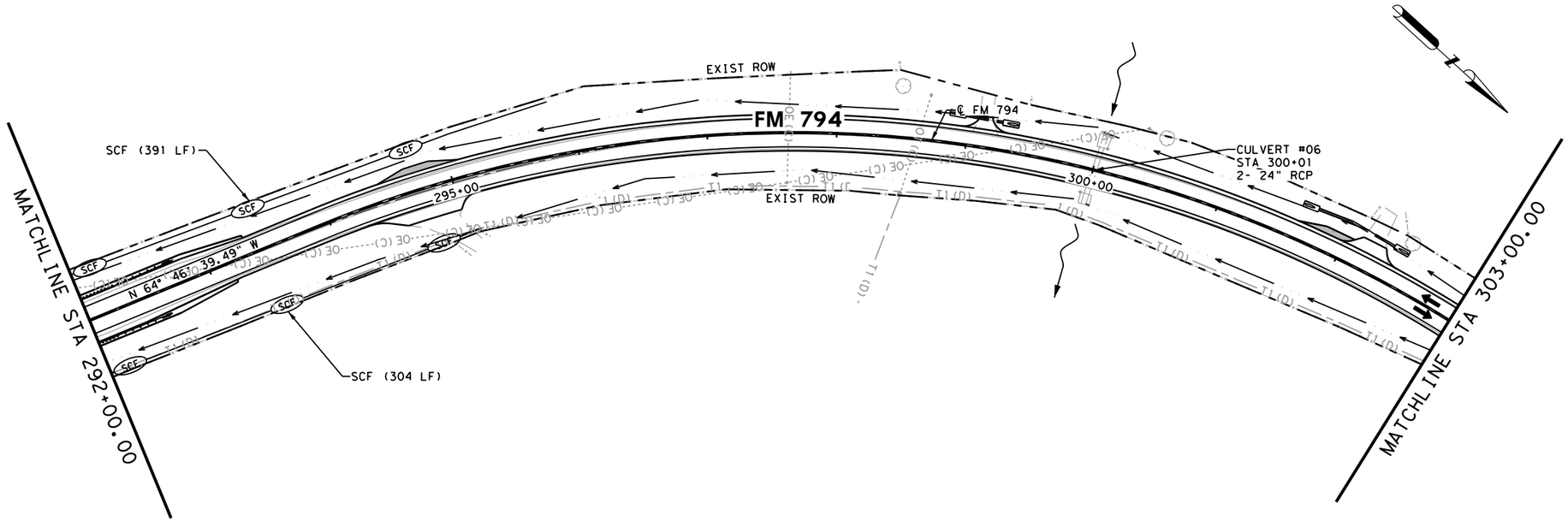

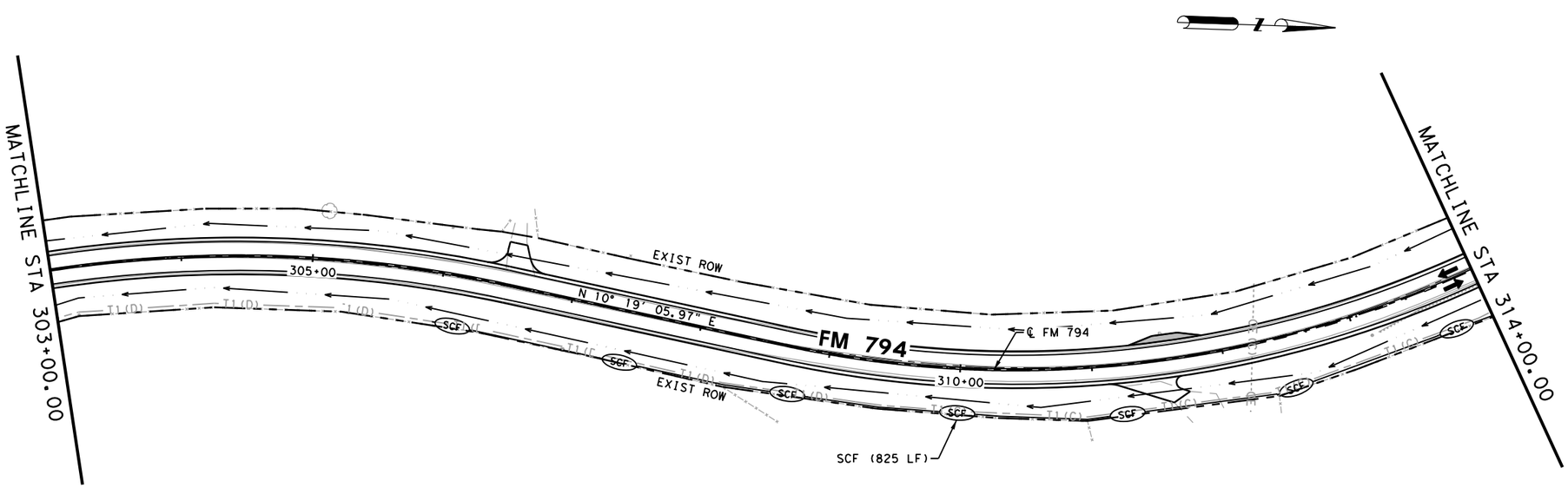

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SW3P LAYOUT

SHEET 12 OF 19

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			227
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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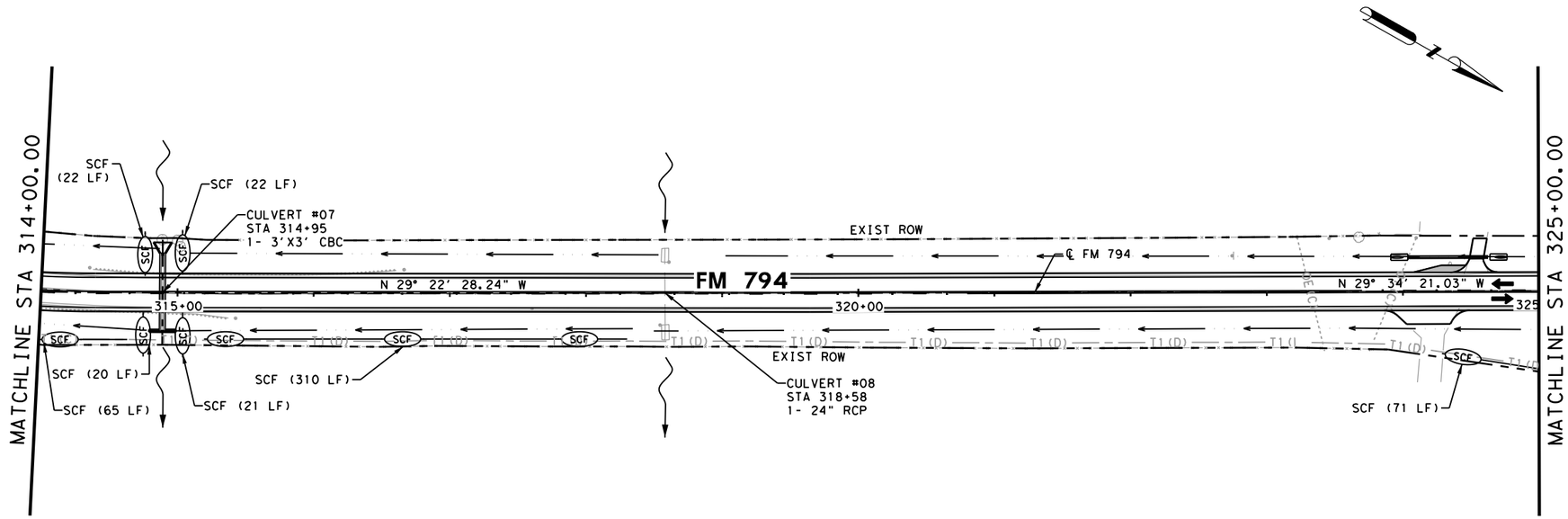

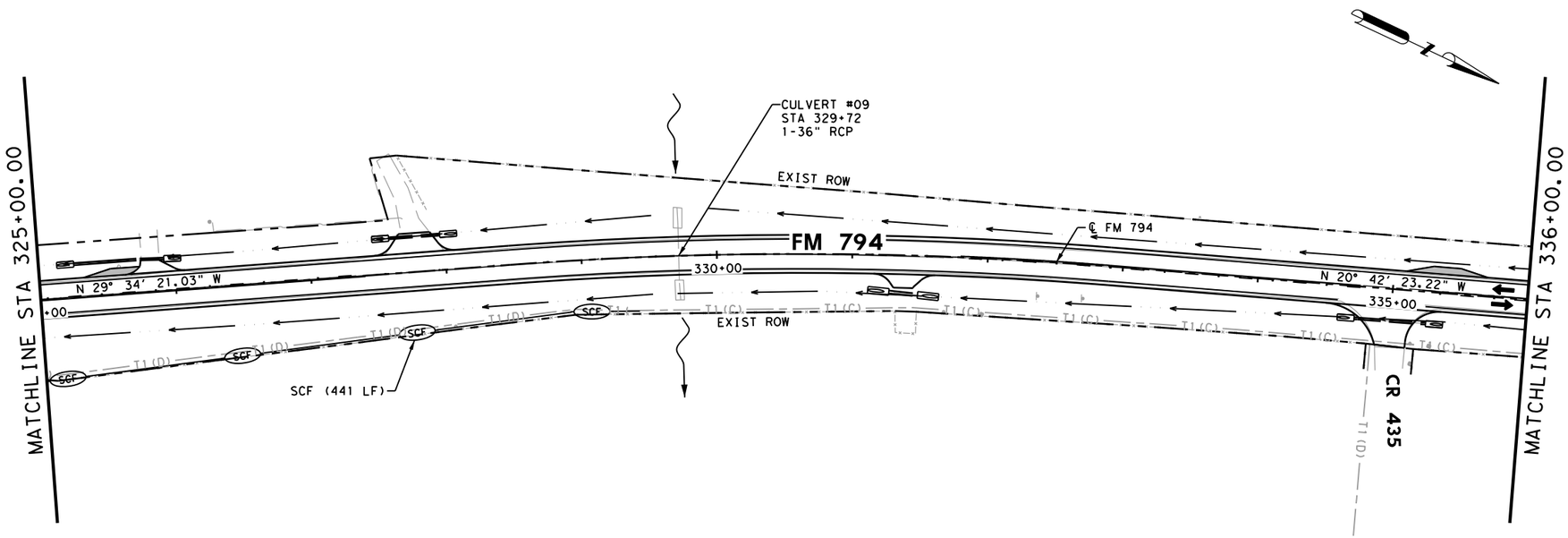

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SW3P LAYOUT

SHEET 13 OF 19

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			228
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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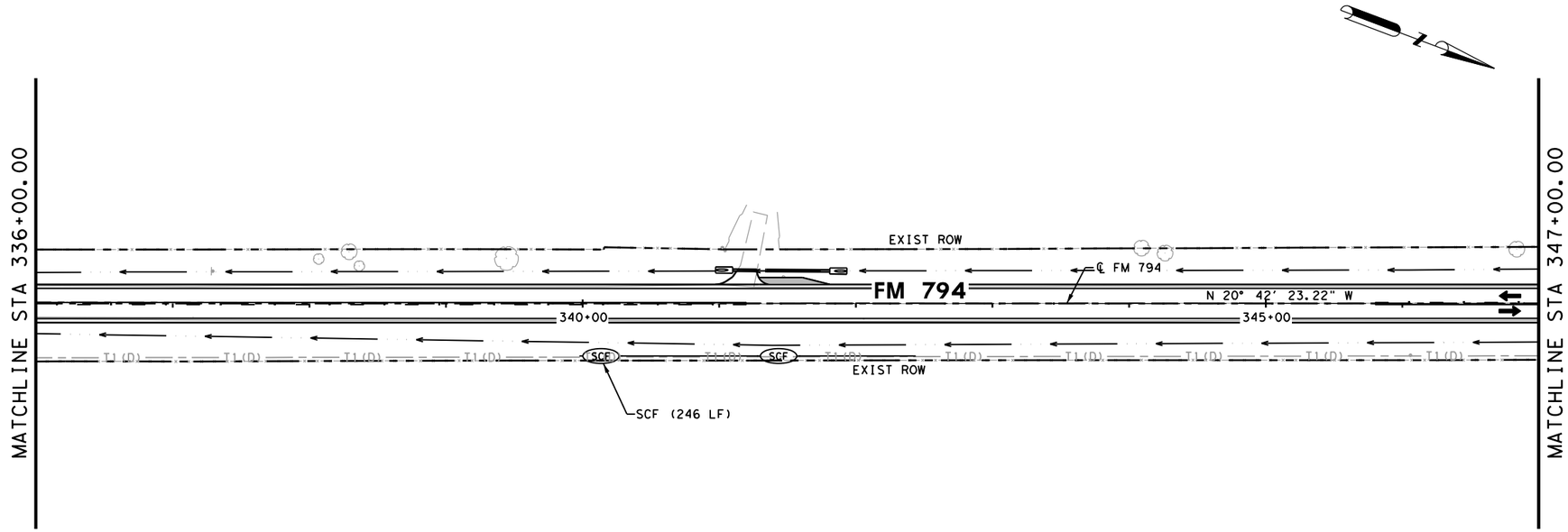

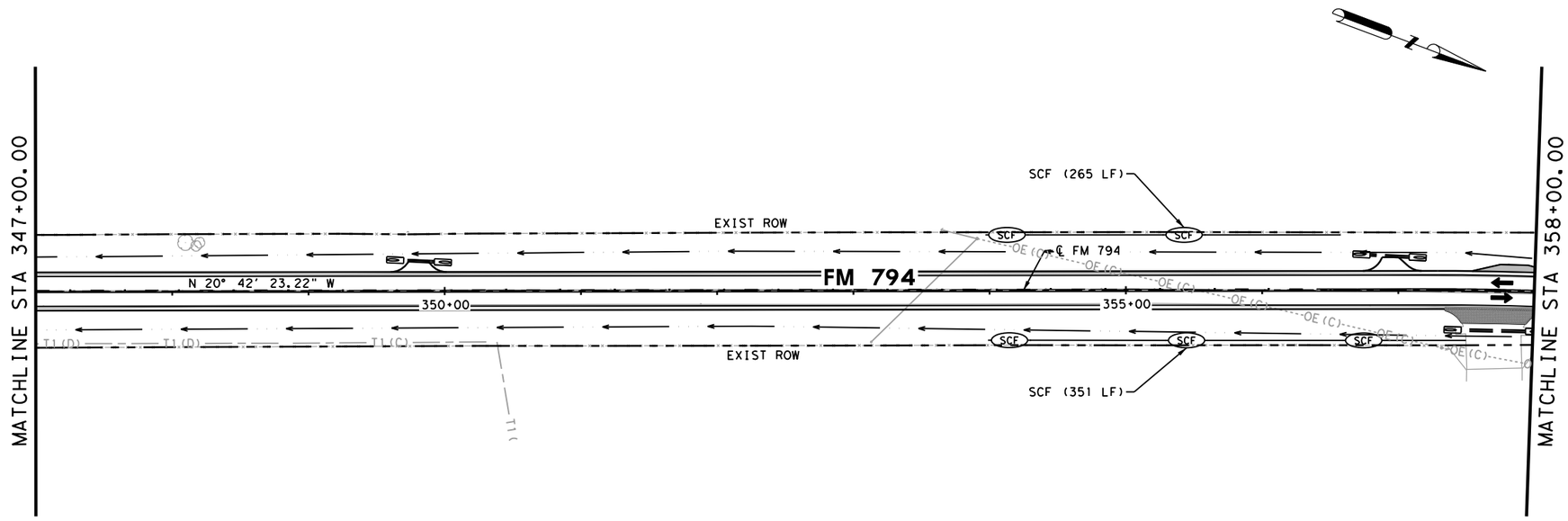

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SW3P LAYOUT

SHEET 14 OF 19

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			229
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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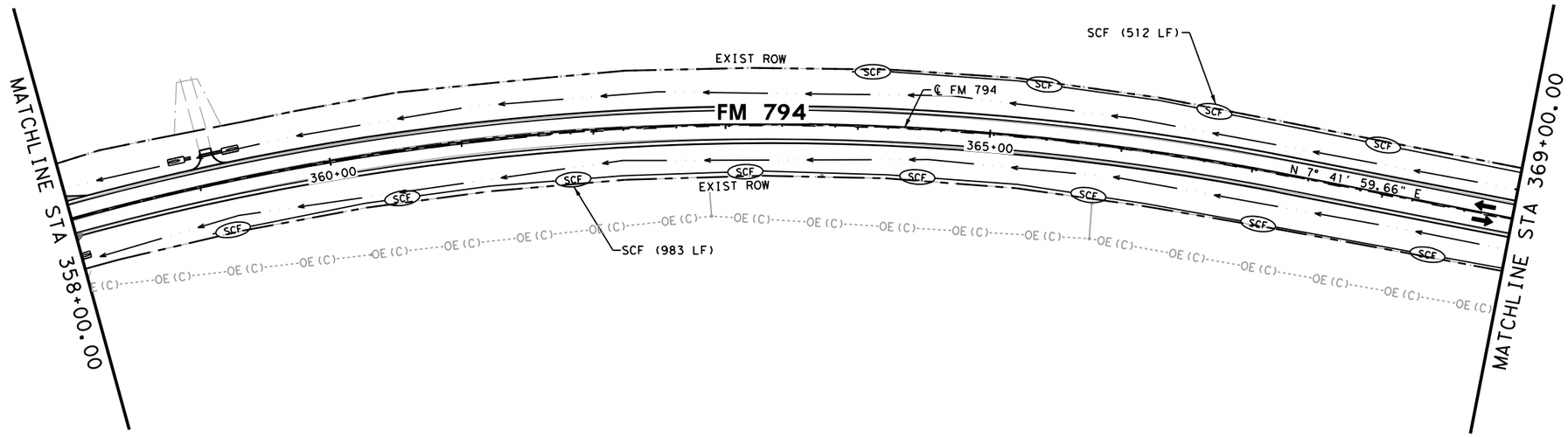

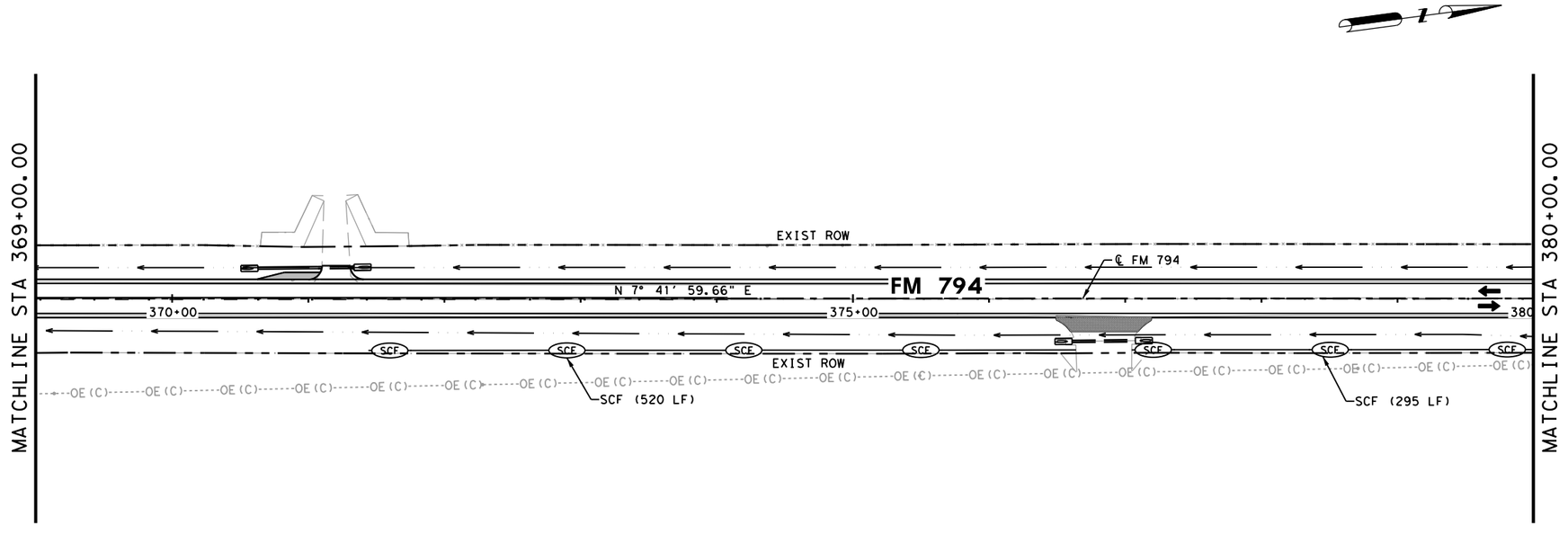

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SW3P LAYOUT

SHEET 15 OF 19

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			230
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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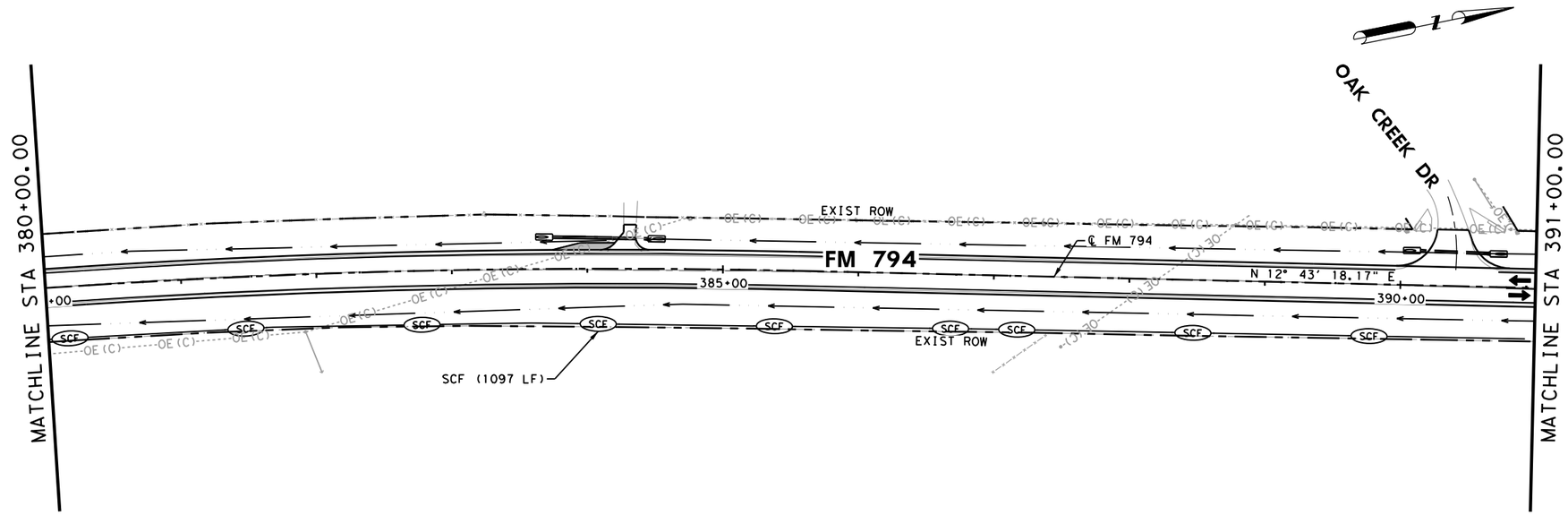

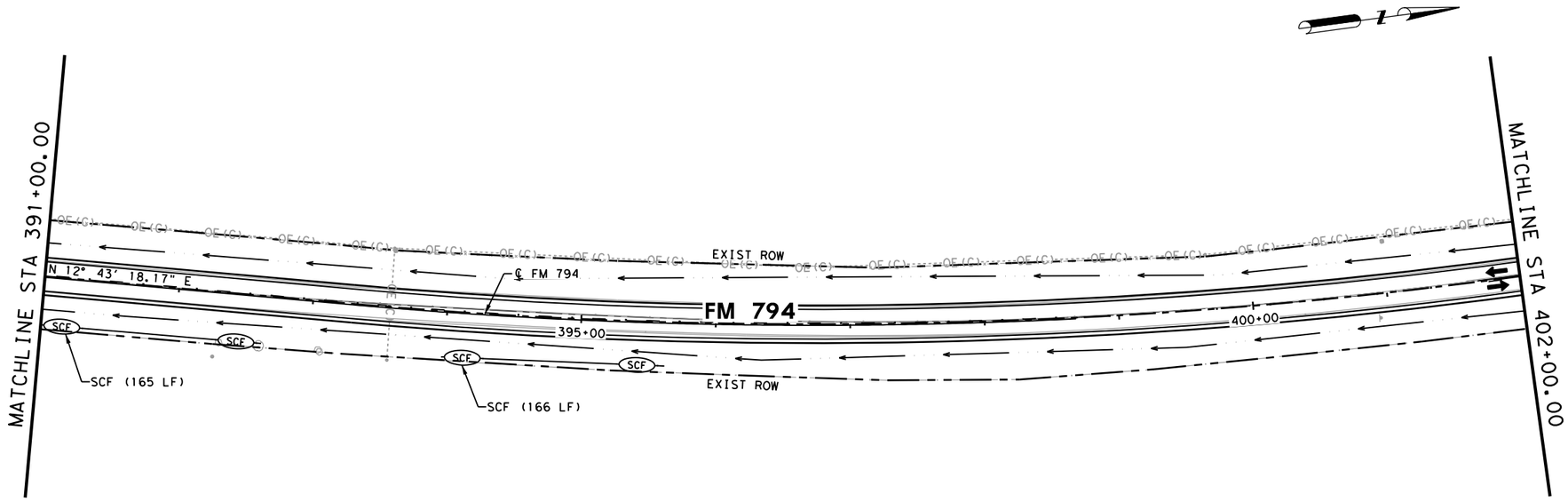

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- CULVERT FLOW DIRECTION

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SW3P LAYOUT

SHEET 16 OF 19

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			231
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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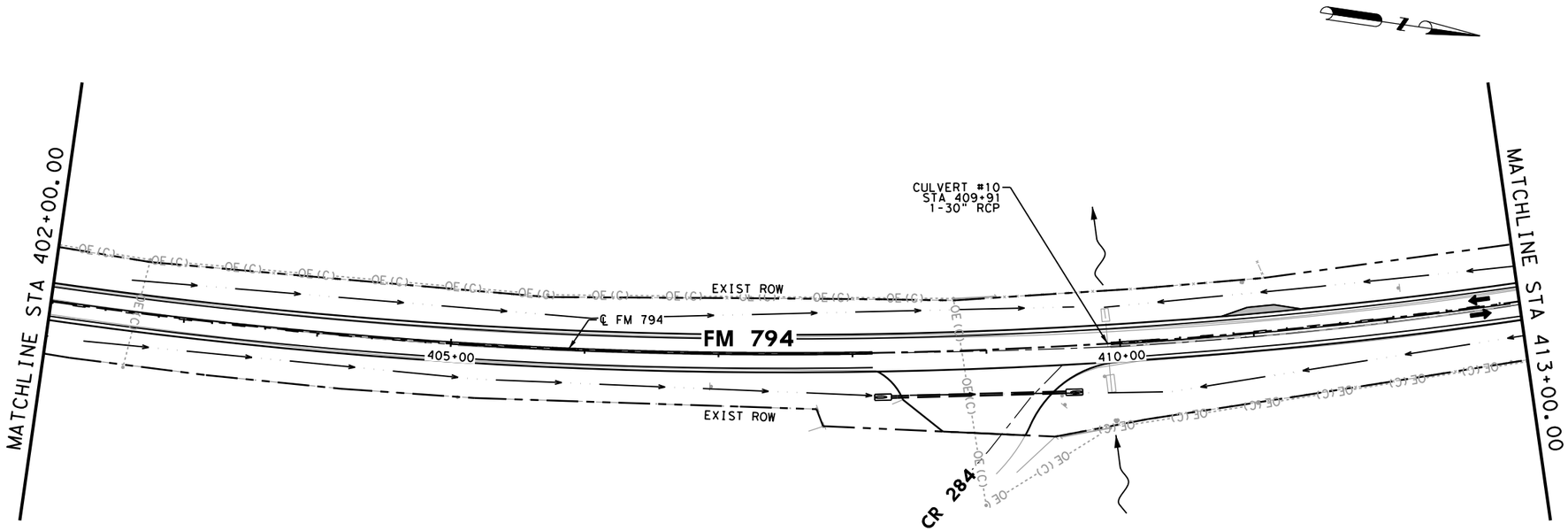

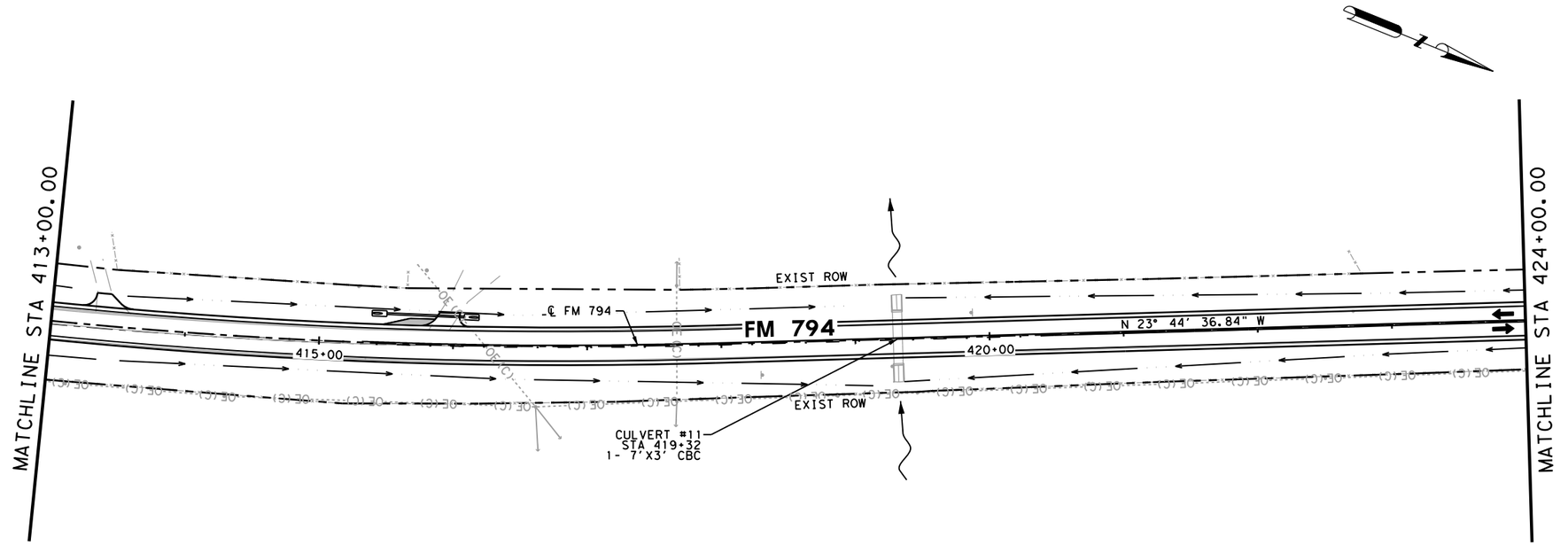

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SW3P LAYOUT

SHEET 17 OF 19

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			232
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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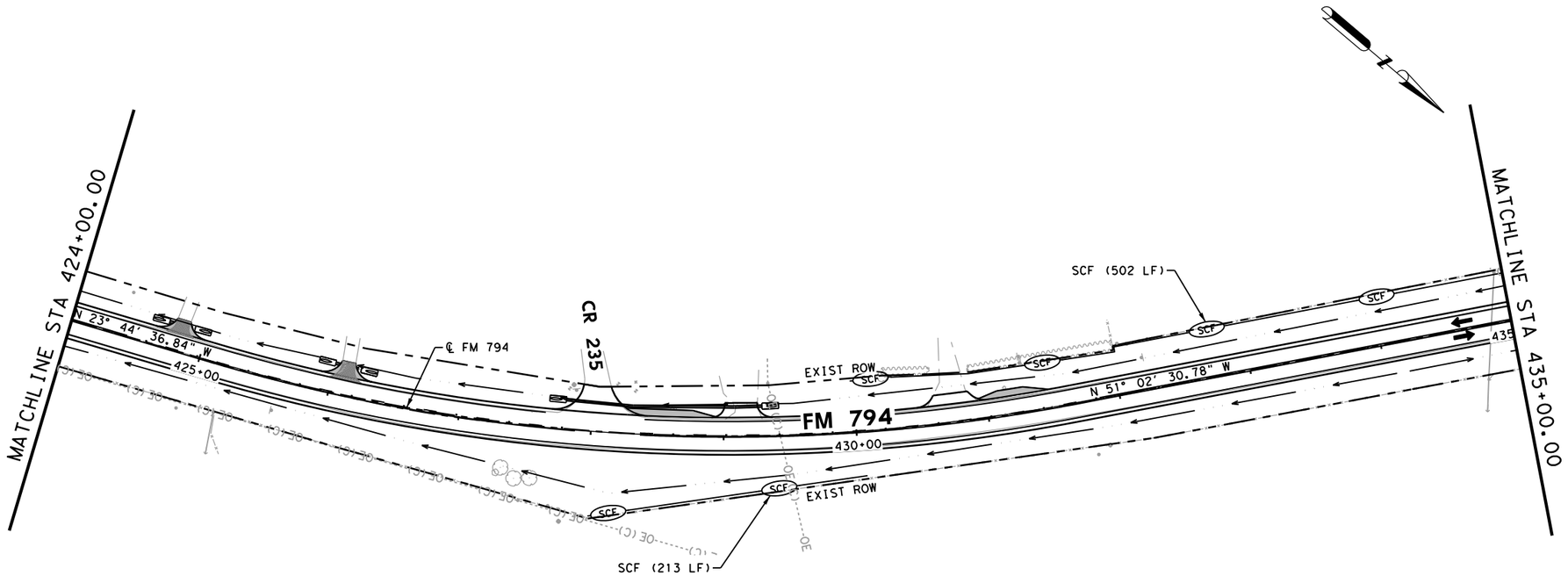

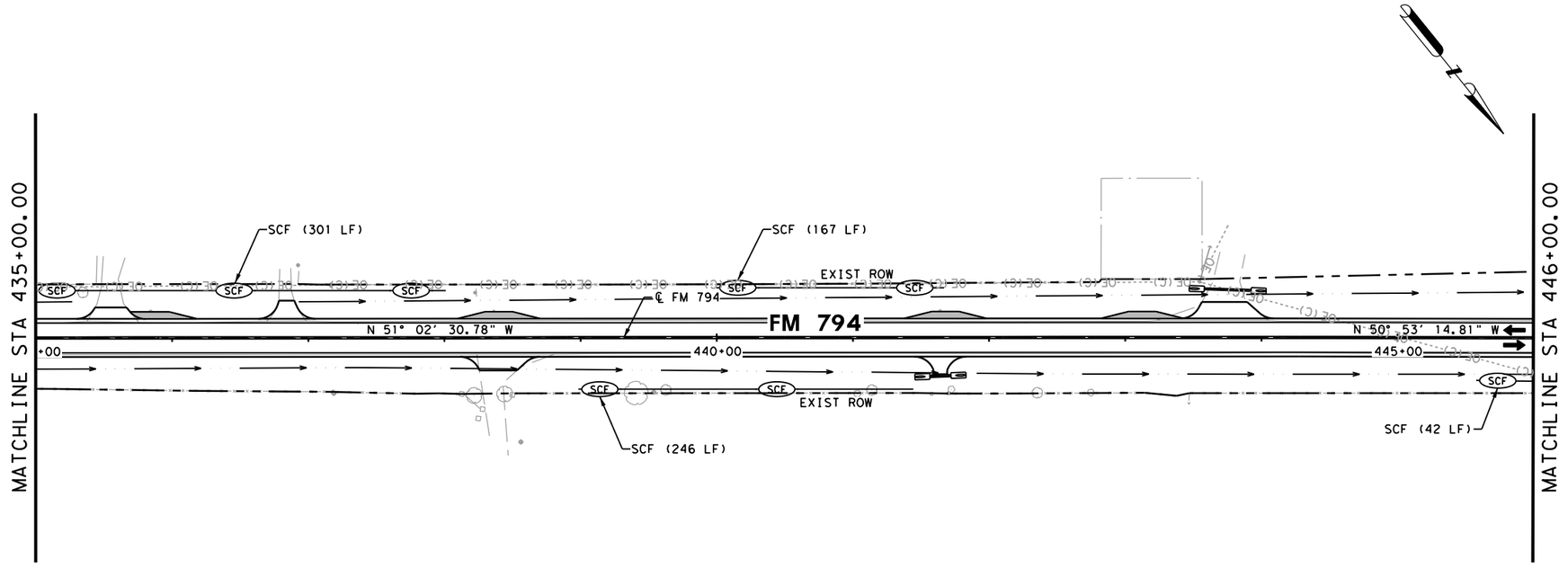

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SHEET 18 OF 19

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			233
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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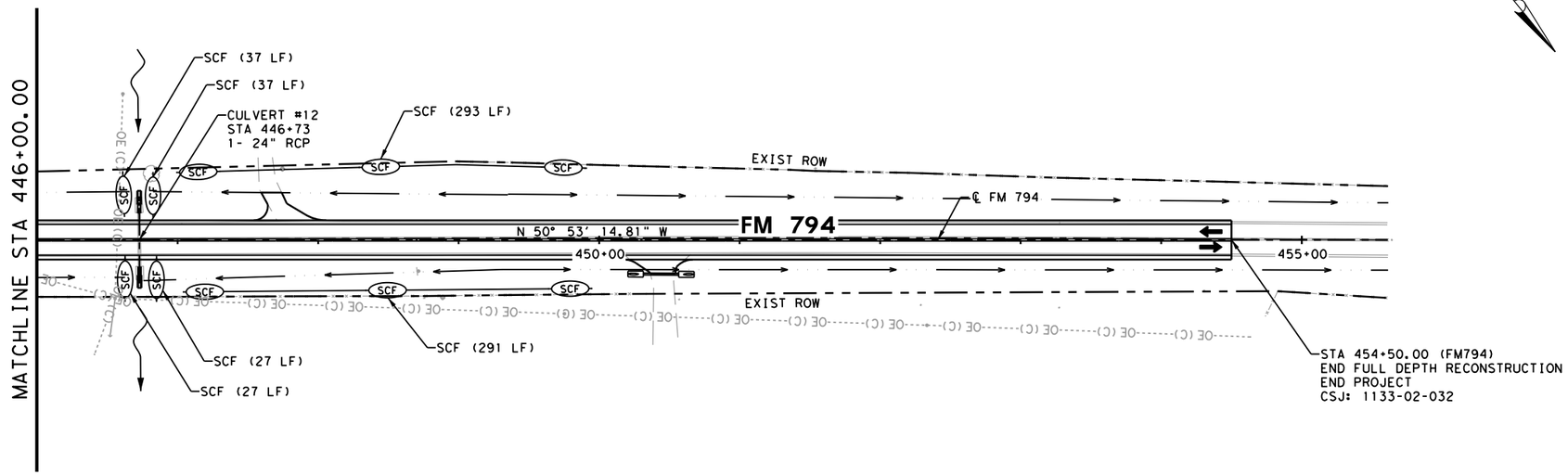

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SW3P LAYOUT

SHEET 19 OF 19

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			234
STATE	DIST.	COUNTY	
TEXAS	YKM	GONZALES	
CONT.	SECT.	JOB	HIGHWAY NO.
1133	02	032	FM 794

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DATE:
FILE:

I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

TPDES TXR 150000: Stormwater Discharge Permit or Construction General Permit required for projects with 1 or more acres disturbed soil. Projects with any disturbed soil must protect for erosion and sedimentation in accordance with Item 506.

List MS4 Operator(s) that may receive discharges from this project. They may need to be notified prior to construction activities.

1.

2.

☐ No Action Required ☒ Required Action

Action No.

1. Prevent stormwater pollution by controlling erosion and sedimentation in accordance with TPDES Permit TXR 150000
2. Comply with the SW3P and revise when necessary to control pollution or required by the Engineer.
3. Post Construction Site Notice (CSN) with SW3P information on or near the site, accessible to the public and TCEQ, EPA or other inspectors.
4. When Contractor project specific locations (PSL's) increase disturbed soil area to 5 acres or more, submit NOI to TCEQ and the Engineer.

II. WORK IN OR NEAR STREAMS, WATERBODIES AND WETLANDS CLEAN WATER ACT SECTIONS 401 AND 404

USACE Permit required for filling, dredging, excavating or other work in any water bodies, rivers, creeks, streams, wetlands or wet areas.

The Contractor must adhere to all of the terms and conditions associated with the following permit(s):

☒ Nationwide Permit 14 - PCN Not Required

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. STA 178+43: Un-named Draw

2. STA 200+54: Un-named Draw

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

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

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

- Minimize the amount of vegetation proposed for clearing. Removal of native vegetation, particularly mature native trees and shrubs will be avoided to the greatest extent possible.
- The use of any non-native plant species in revegetation will be discouraged.
- Avoid vegetation clearing activities during the general nesting season, March through August, to minimize adverse impacts to birds.

V. FEDERAL LISTED, PROPOSED THREATENED, ENDANGERED SPECIES, CRITICAL HABITAT, STATE LISTED SPECIES, CANDIDATE SPECIES AND MIGRATORY BIRDS.

☐ No Action Required ☒ Required Action

BIRD BMPs

1. Prior to construction, perform daytime surveys for nests including under bridges and in culverts to determine if they are active before removal. Nests that are active should not be disturbed.
2. Do not disturb, destroy, or remove active nests, including ground nesting birds, during the nesting season (February 15 - October 1 as established by the Migratory Bird Treaty Act).
3. Avoid the removal of unoccupied, inactive nests, as practicable.
4. Prevent the establishment of active nests during the nesting season on TxDOT owned and operated facilities and structures proposed for replacement or repair.
5. Do not collect, capture, relocate, or transport birds, eggs, young, or active nests without a permit.

VI. GENERAL NOTES

THE CONTRACTOR'S ATTENTION IS DIRECTED TO THE FACT THAT DISCHARGE OF PERMANENT OR TEMPORARY FILL MATERIAL INTO THE WATERS OF THE UNITED STATES (U.S.), INCLUDING JURISDICTIONAL WETLANDS, AS NECESSARY FOR CONSTRUCTION, WILL REQUIRE SPECIFIC APPROVAL OF THE U.S. ARMY CORPS OF ENGINEERS (USACE) UNDER SECTION 404 OF THE CLEAN WATER ACT.

THE DEPARTMENT WILL OBTAIN THE APPROPRIATE PERMIT(S), NATIONWIDE OR INDIVIDUAL, WHEN NECESSARY AS DICTATED BY THE PROPOSED ACTIONS FOR THE PROJECT AND IT'S POTENTIAL TO AFFECT USACE JURISDICTIONAL AREAS. THE CONTRACTOR MAY REVIEW THE PERMITTED PLANS AT THE OFFICE OF THE AREA ENGINEER IN CHARGE OF CONSTRUCTION. THE DEPARTMENT WILL HOLD THE CONTRACTOR RESPONSIBLE FOR FOLLOWING ALL CONDITIONS OF THE APPROVED PERMIT. IF THE CONTRACTOR CANNOT WORK WITHIN THE LIMITS OF THIS PERMIT(S), THEN IT BECOMES THE CONTRACTOR'S ENTIRE RESPONSIBILITY TO CONSULT WITH THE USACE PERTAINING TO THE NEED FOR CHANGES OR AMENDMENTS TO THE CONDITIONS OF THE EXISTING PERMIT(S) AS ORIGINALLY OBTAINED BY THE DEPARTMENT.

PARTICULAR IMPORTANCE IS STRESSED ON THE FACT THAT ANY IMPACTS TO USACE JURISDICTIONAL WATERS OF THE U.S., INCLUDING JURISDICTIONAL WETLANDS, BE THE MINIMUM NECESSARY TO COMPLETE THE PROPOSED WORK. CONTRACTOR SHALL MAINTAIN NEAR NORMAL FLOW OF ANY JURISDICTIONAL WATERS OF THE U.S. AT ALL TIMES DURING CONSTRUCTION. IF THE CONTRACTOR NEEDS FURTHER EXPLANATION OF THE CONDITIONS OF THE PERMIT, INCLUDING MEANS OF COMPLIANCE, THEY MAY CONTACT THE YOAKUM DISTRICT ENVIRONMENTAL COORDINATOR.

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

VII. 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.

VIII. OTHER ENVIRONMENTAL ISSUES

(includes regional issues such as Edwards Aquifer District, etc.)

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

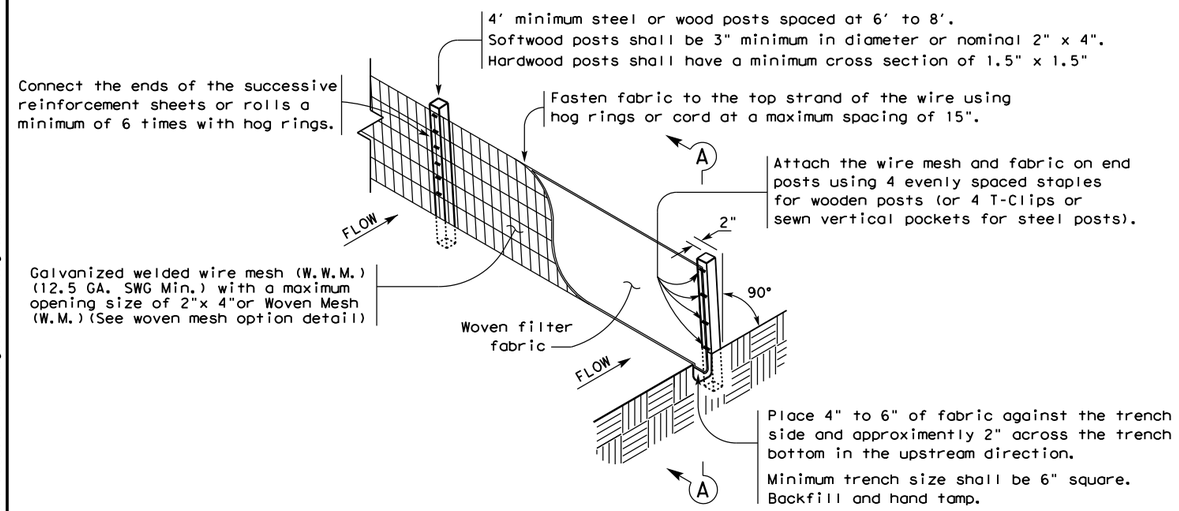
Texas Department of Transportation

Design Division Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

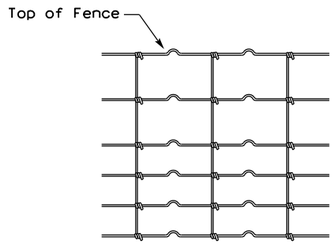
EPIC

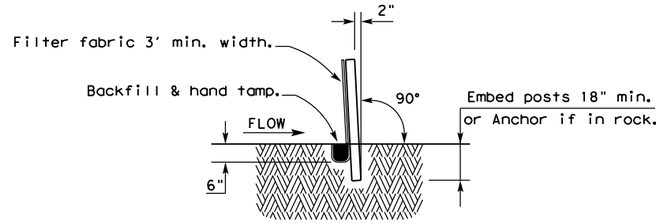
FILE: epic.dgn	DN: TxDOT	CK: RG	DW: VP	CK: AR		
©TxDOT: February 2015	CONT	SECT	JOB	HIGHWAY		
REVISIONS	1133	02	032	FM 794		
12-12-2011 (DS)	DIST	COUNTY		SHEET NO.		
05-07-14 ADDED NOTE SECTION IV.	YKM	GONZALES		235		
01-23-2015 SECTION I (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.						



TEMPORARY SEDIMENT CONTROL FENCE

SCF





SECTION A-A

HINGE JOINT KNOT WOVEN MESH (OPTION) DETAIL

Galvanized hinge joint knot woven mesh (12.5 GA.SWG Min.) requires a minimum of five horizontal wires spaced at a maximum of 12 inches apart and all vertical wires spaced at a maximum of 12 inches apart.

SEDIMENT CONTROL FENCE USAGE GUIDELINES

A sediment control fence may be constructed near the downstream perimeter of a disturbed area along a contour to intercept sediment from overland runoff. A 2 year storm frequency may be used to calculate the flow rate to be filtered.

Sediment control fence should be sized to filter a maximum flow through rate of 100 GPM/FT^2. Sediment control fence is not recommended to control erosion from a drainage area larger than 2 acres.

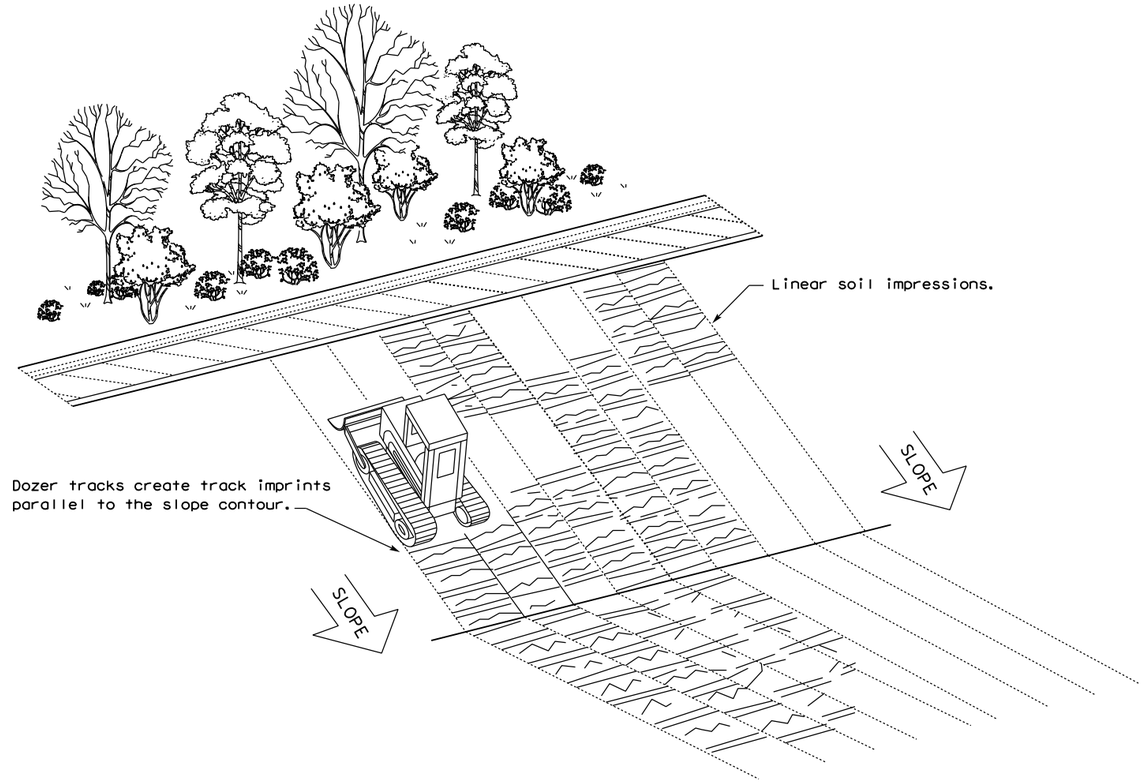
LEGEND

Sediment Control Fence

SCF

GENERAL NOTES

1. Vertical tracking is required on projects where soil distributing activities have occurred unless otherwise approved.
2. Perform vertical tracking on slopes to temporarily stabilize soil.
3. Provide equipment with a track undercarriage capable of producing linear soil impressions measuring a minimum of 12" in length by 2" to 4" in width by 1/2" to 2" in depth.
4. Do not exceed 12" between track impressions.
5. Install continous linear track impressions where the minimum 12" length impressions are perpendicular to the slope or direction of water flow.



VERTICAL TRACKING

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

FENCE & VERTICAL TRACKING

EC(1)-16

FILE: ec116	DN: TxDOT		CK: KM		DW: VP	DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY	
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	DIST	COUNTY			SHEET NO.	
	YKM	GONZALES			236	

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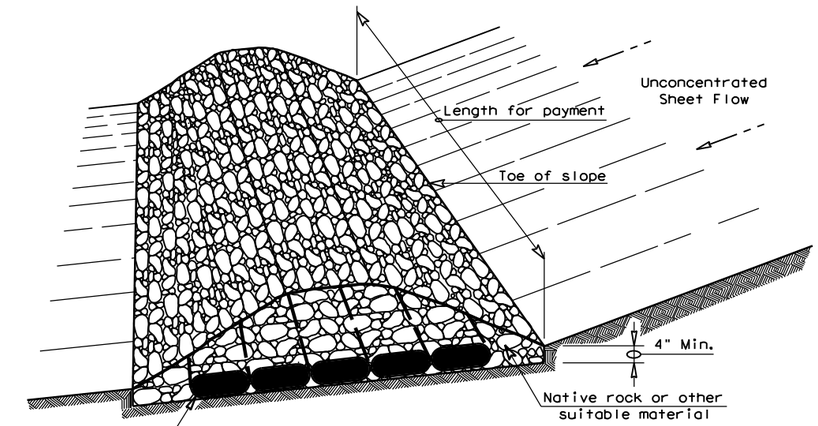
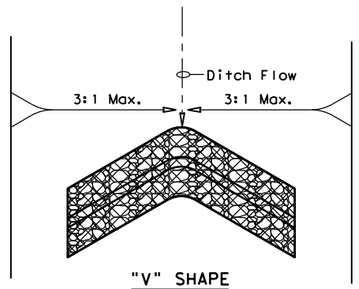
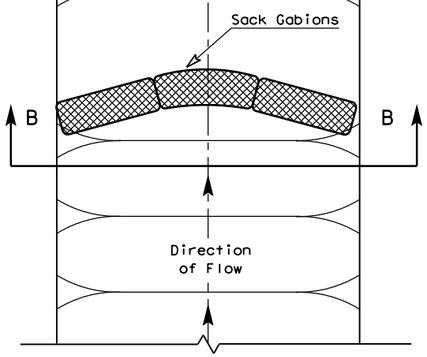


FILTER DAM AT TOE OF SLOPE

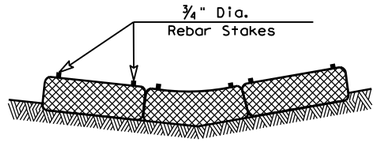
RFD1



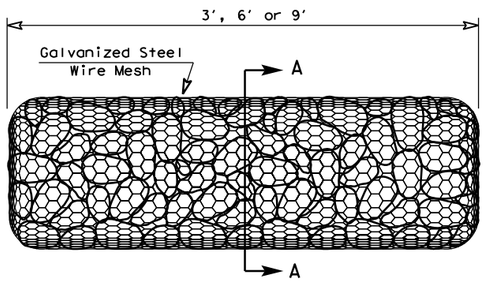
"V" SHAPE PLAN VIEW



PLAN VIEW

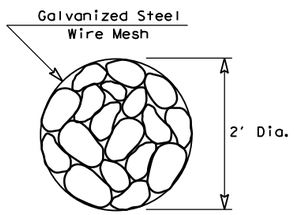


SECTION B-B

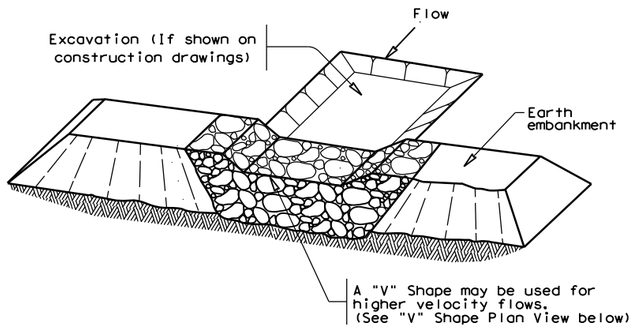


TYPE 4 (SACK GABIONS)

RFD4

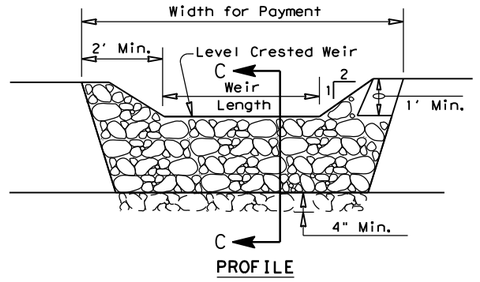


SECTION A-A

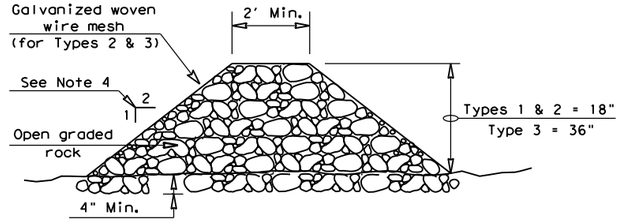


FILTER DAM AT SEDIMENT TRAP

RFD1 — OR — RFD2



PROFILE



SECTION C-C

ROCK FILTER DAM USAGE GUIDELINES

Rock Filter Dams should be constructed downstream from disturbed areas to intercept sediment from overland runoff and/or concentrated flow. The dams should be sized to filter a maximum flow through rate of 60 GPM/FT^2 of cross sectional area. A 2 year storm frequency may be used to calculate the flow rate.

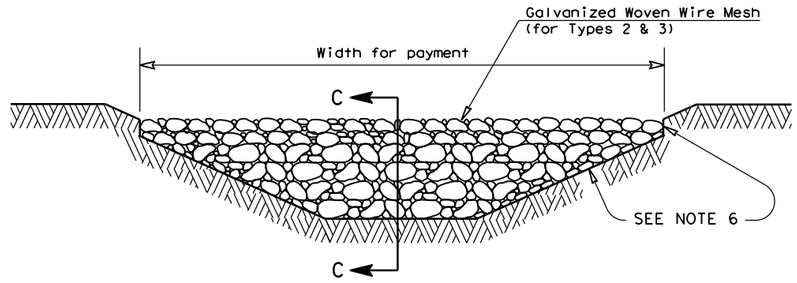
Type 1 (18" high with no wire mesh) (3" to 6" aggregate): Type 1 may be used at the toe of slopes, around inlets, in small ditches, and at dike or swale outlets. This type of dam is recommended to control erosion from a drainage area of 5 acres or less. Type 1 may not be used in concentrated high velocity flows (approximently 8 Ft/Sec or more) in which aggregate wash out may occur. Sandbags may be used at the embedded foundation (4" deep min.) for better filtering efficiency of low flows if called for on the plans or directed by the Engineer.

Type 2 (18" high with wire mesh) (3" to 6" aggregate): Type 2 may be used in ditches and at dike or swale outlets.

Type 3 (36" high with wire mesh) (4" to 8" aggregate): Type 3 may be used in stream flow and should be secured to the stream bed.

Type 4 (Sack gabions) (3" to 6" aggregate): Type 4 May be used in ditches and smaller channels to form an erosion control dam.

Type 5: Provide rock filter dams as shown on plans.



FILTER DAM AT CHANNEL SECTIONS

RFD1 — OR — RFD2 — OR — RFD3

GENERAL NOTES

1. If shown on the plans or directed by the Engineer, filter dams should be placed near the toe of slopes where erosion is anticipated, upstream and/or downstream at drainage structures, and in roadway ditches and channels to collect sediment.
2. Materials (aggregate, wire mesh, sandbags, etc.) shall be as indicated by the specification for "Rock Filter Dams for Erosion and Sedimentation Control".
3. The rock filter dam dimensions shall be as indicated on the SW3P plans.
4. Side slopes should be 2:1 or flatter. Dams within the safety zone shall have sideslopes of 6:1 or flatter.
5. Maintain a minimum of 1' between top of rock filter dam weir and top of embankment for filter dams at sediment traps.
6. Filter dams should be embedded a minimum of 4" into existing ground.
7. The sediment trap for ponding of sediment laden runoff shall be of the dimensions shown on the plans.
8. Rock filter dam types 2 & 3 shall be secured with 20 gauge galvanized woven wire mesh with 1" diameter hexagonal openings. The aggregate shall be placed on the mesh to the height & slopes specified. The mesh shall be folded at the upstream side over the aggregate and tightly secured to itself on the downstream side using wire ties or hog rings. For in stream use, the mesh should be secured or staked to the stream bed prior to aggregate placement.
9. Sack Gabions should be staked down with ¾" dia. rebar stakes, and have a double-twisted hexagonal weave with a nominal mesh opening of 2 ½" x 3 ¼"
10. Flow outlet should be onto a stabilized area (vegetation, rock, etc.).
11. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

PLAN SHEET LEGEND

Type 1 Rock Filter Dam	RFD1
Type 2 Rock Filter Dam	RFD2
Type 3 Rock Filter Dam	RFD3
Type 4 Rock Filter Dam	RFD4

Texas Department of Transportation — Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

ROCK FILTER DAMS

EC(2)-16

FILE: ec216	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	032	FM 794
	DIST	COUNTY		SHEET NO.
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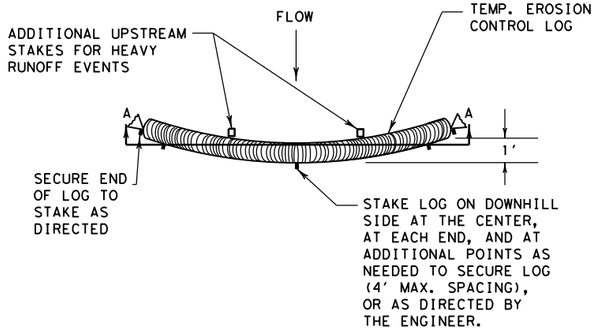
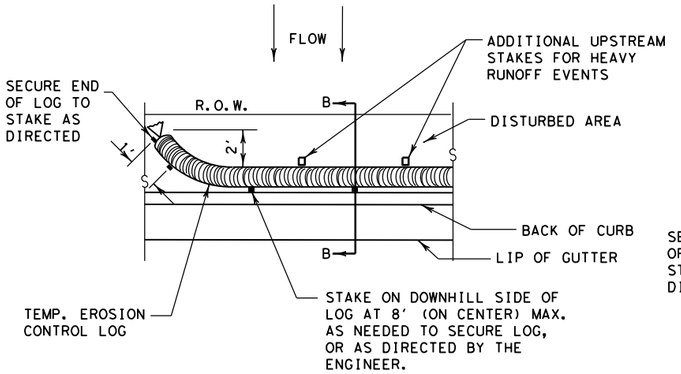


PLAN VIEW



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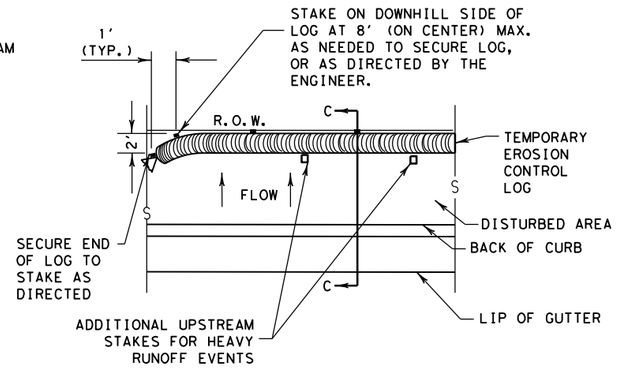
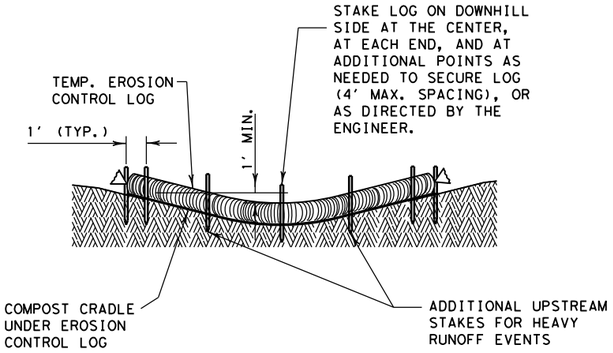


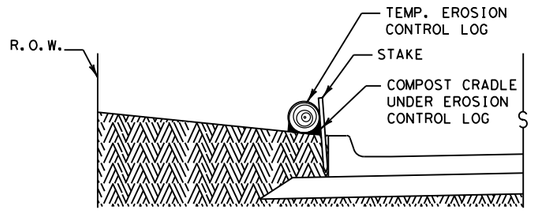
PLAN VIEW



SECTION A-A

EROSION CONTROL LOG DAM

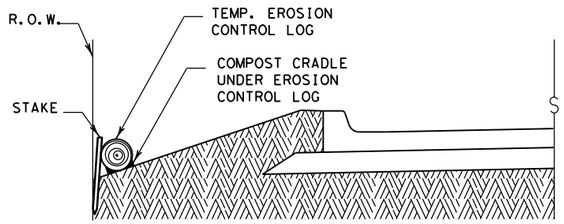
CL-D



SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

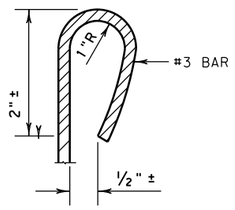
CL-BOC



SECTION C-C

EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

CL-ROW



REBAR STAKE DETAIL

LEGEND

- CL-D — EROSION CONTROL LOG DAM
- CL-BOC — EROSION CONTROL LOG AT BACK OF CURB
- CL-ROW — EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY
- CL-SST — EROSION CONTROL LOGS ON SLOPES STAKE AND TRENCHING ANCHORING
- CL-SSL — EROSION CONTROL LOGS ON SLOPES STAKE AND LASHING ANCHORING
- CL-DI — EROSION CONTROL LOG AT DROP INLET
- CL-CI — EROSION CONTROL LOG AT CURB INLET
- CL-GI — EROSION CONTROL LOG AT CURB & GRATE INLET

GENERAL NOTES:

1. EROSION CONTROL LOGS SHALL BE INSTALLED IN ACCORDANCE WITH MANFACTURER'S RECOMMENDATIONS, OR AS DIRECTED BY THE ENGINEER.
2. LENGTHS OF EROSION CONTROL LOGS SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND AS REQUIRED FOR THE PURPOSE INTENDED.
3. UNLESS OTHERWISE DIRECTED, USE BIODEGRADABLE OR PHOTODEGRADABLE CONTAINMENT MESH ONLY WHERE LOG WILL REMAIN IN PLACE AS PART OF A VEGETATIVE SYSTEM. FOR TEMPORARY INSTALLATIONS, USE RECYCLABLE CONTAINMENT MESH.
4. FILL LOGS WITH SUFFICIENT FILTER MATERIAL TO ACHIEVE THE MINIMUM COMPACTED DIAMETER SPECIFIED IN THE PLANS WITHOUT EXCESSIVE DEFORMATION.
5. STAKES SHALL BE 2" X 2" WOOD OR #3 REBAR, 2'-4' LONG, EMBEDDED SUCH THAT 2" PROTRUDES ABOVE LOG, OR AS DIRECTED BY THE ENGINEER.
6. DO NOT PLACE STAKES THROUGH CONTAINMENT MESH.
7. COMPOST CRADLE MATERIAL IS INCIDENTAL & WILL NOT BE PAID FOR SEPARATELY.
8. SANDBAGS USED AS ANCHORS SHALL BE PLACED ON TOP OF LOGS & SHALL BE OF SUFFICIENT SIZE TO HOLD LOGS IN PLACE.
9. TURN THE ENDS OF EACH ROW OF LOGS UPSLOPE TO PREVENT RUNOFF FROM FLOWING AROUND THE LOG.
10. FOR HEAVY RUNOFF EVENTS, ADDITIONAL UPSTREAM STAKES MAY BE NECESSARY TO KEEP LOG FROM FOLDING IN ON ITSELF.

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.

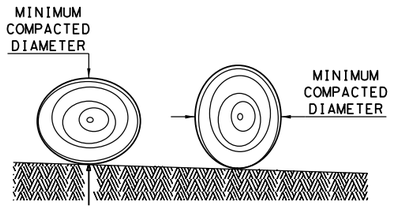
Log Traps: The drainage area for a sediment trap should not exceed 5 acres. The trap capacity should be 1800 CF/Acre (0.5" over the drainage area).

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.



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS

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		
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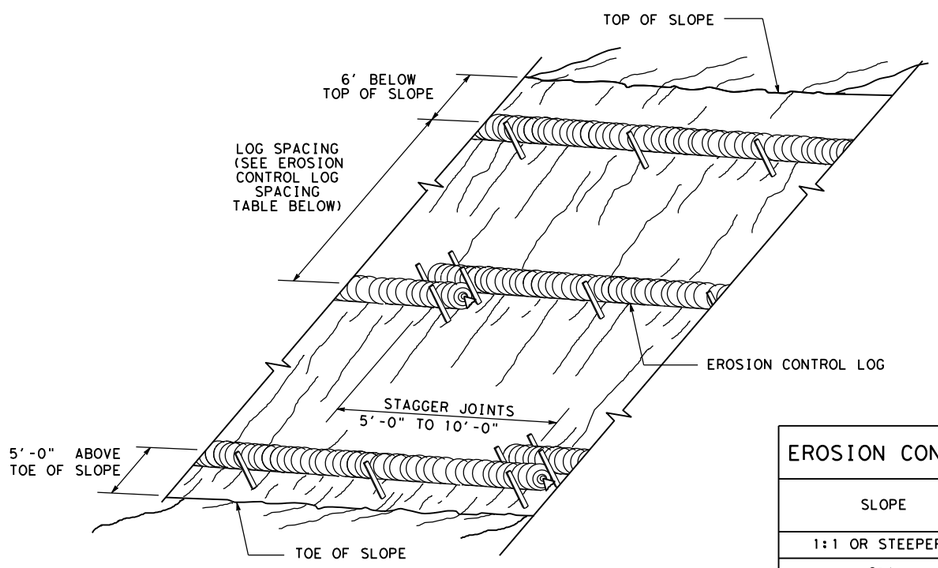
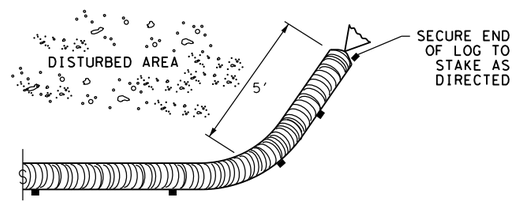


EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING

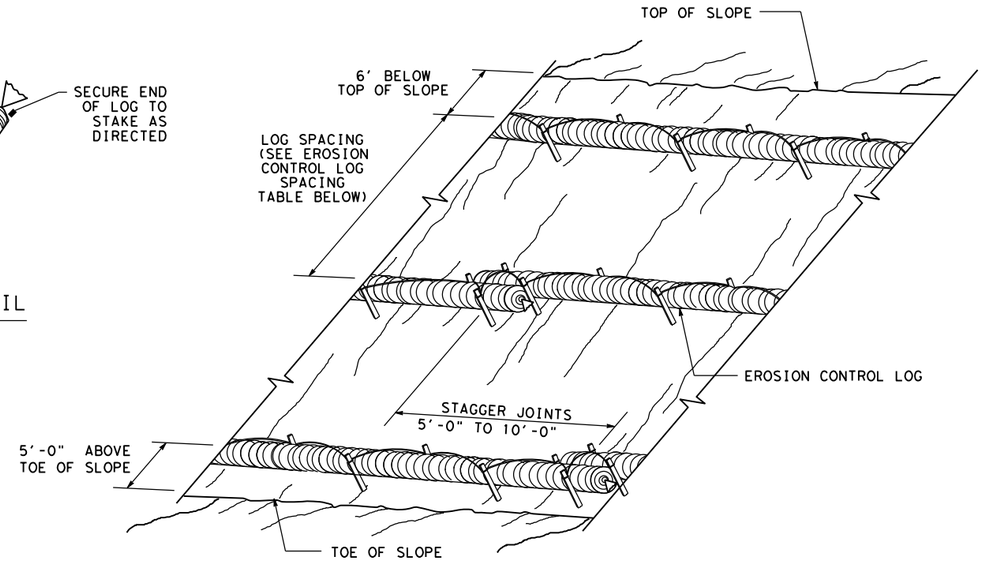
CL-SST



END SECTION RAP DETAIL

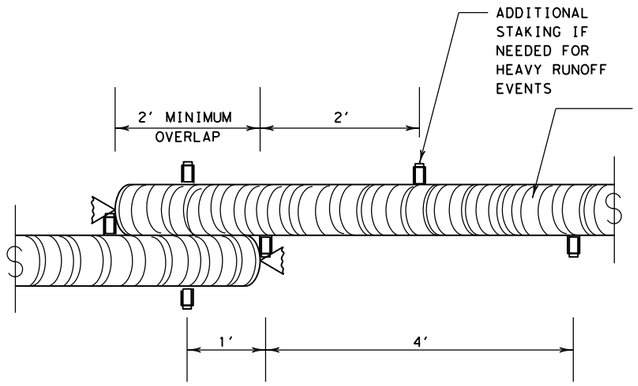
EROSION CONTROL LOG SPACING TABLE				
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5'	10'	15'	20'
2:1	10'	20'	30'	40'
3:1	15'	30'	45'	60'
4:1 OR FLATTER	20'	40'	60'	80'

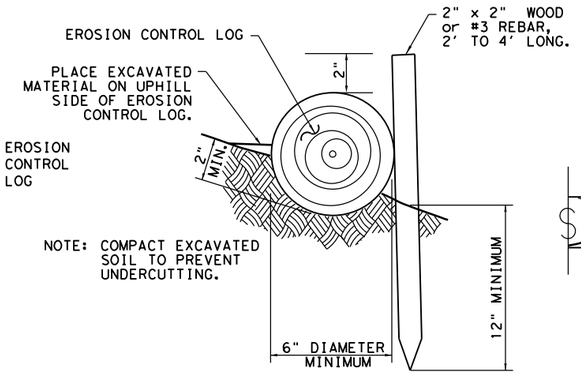
* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;
HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART



EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING

CL-SSL

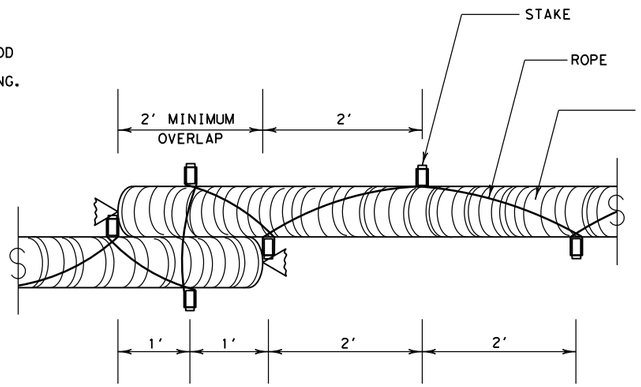


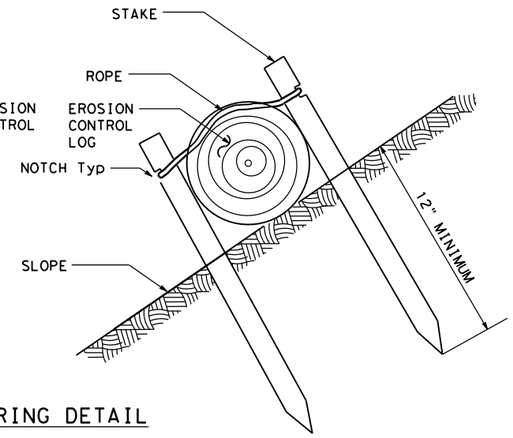


STAKE AND TRENCHING ANCHORING DETAIL

CL-SST

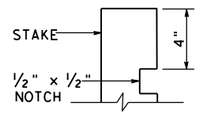
TRENCH DEPTH TABLE	
LOG DIAMETER	DEPTH
6"	2"
8"	3"
12"	4"
18"	5"





STAKE AND LASHING ANCHORING DETAIL

CL-SSL



STAKE NOTCH DETAIL

Texas Department of Transportation | Design Division Standard

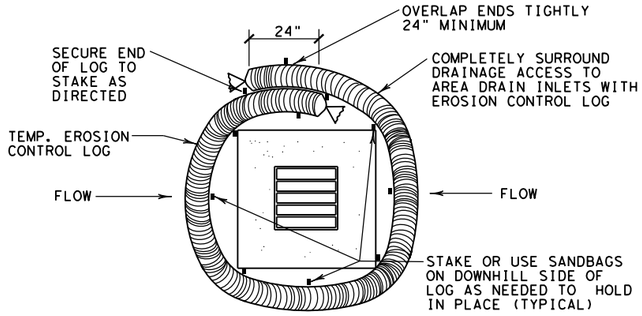
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

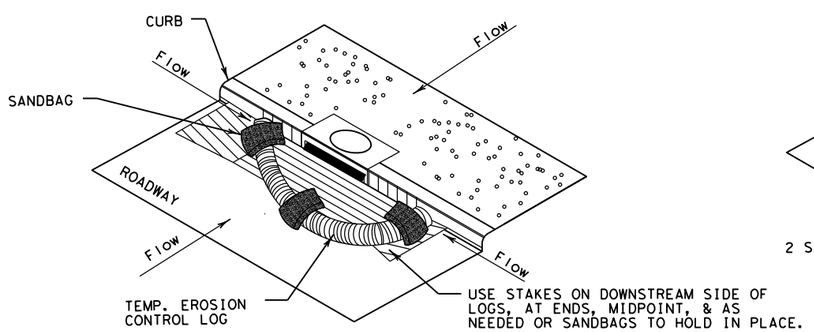
FILE: ec116	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	1133	02	032	FM 794
	DIST	COUNTY		SHEET NO.
	YKM	GONZALES		239

DATE: 3/25/2021
FILE: c:\pwworkdir\bge_pw\bwestmoreland\dms49537\ec916.dgn



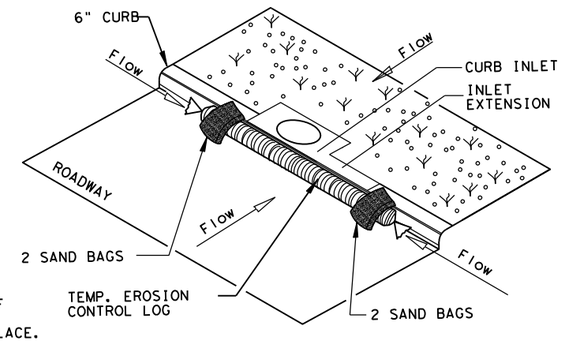
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

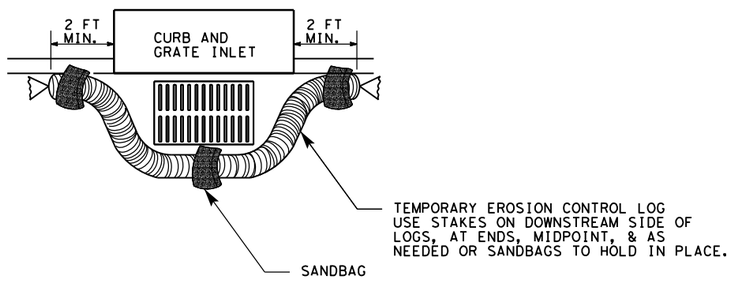
CL-CI



EROSION CONTROL LOG AT CURB INLET

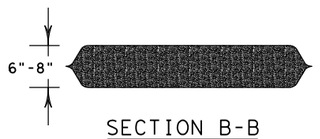
CL-CI

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.

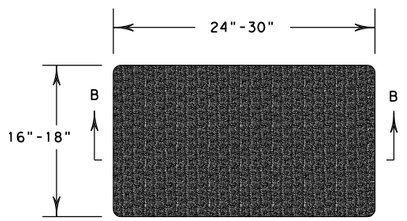


EROSION CONTROL LOG AT CURB & GRADE INLET

CL-GI



SECTION B-B



SANDBAG DETAIL

SHEET 3 OF 3

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	1133	02	032	FM 794	
	DIST	COUNTY		SHEET NO.	
	YKM	GONZALES		240	