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STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION
PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

PROJECT NO. BR 2022 (244)

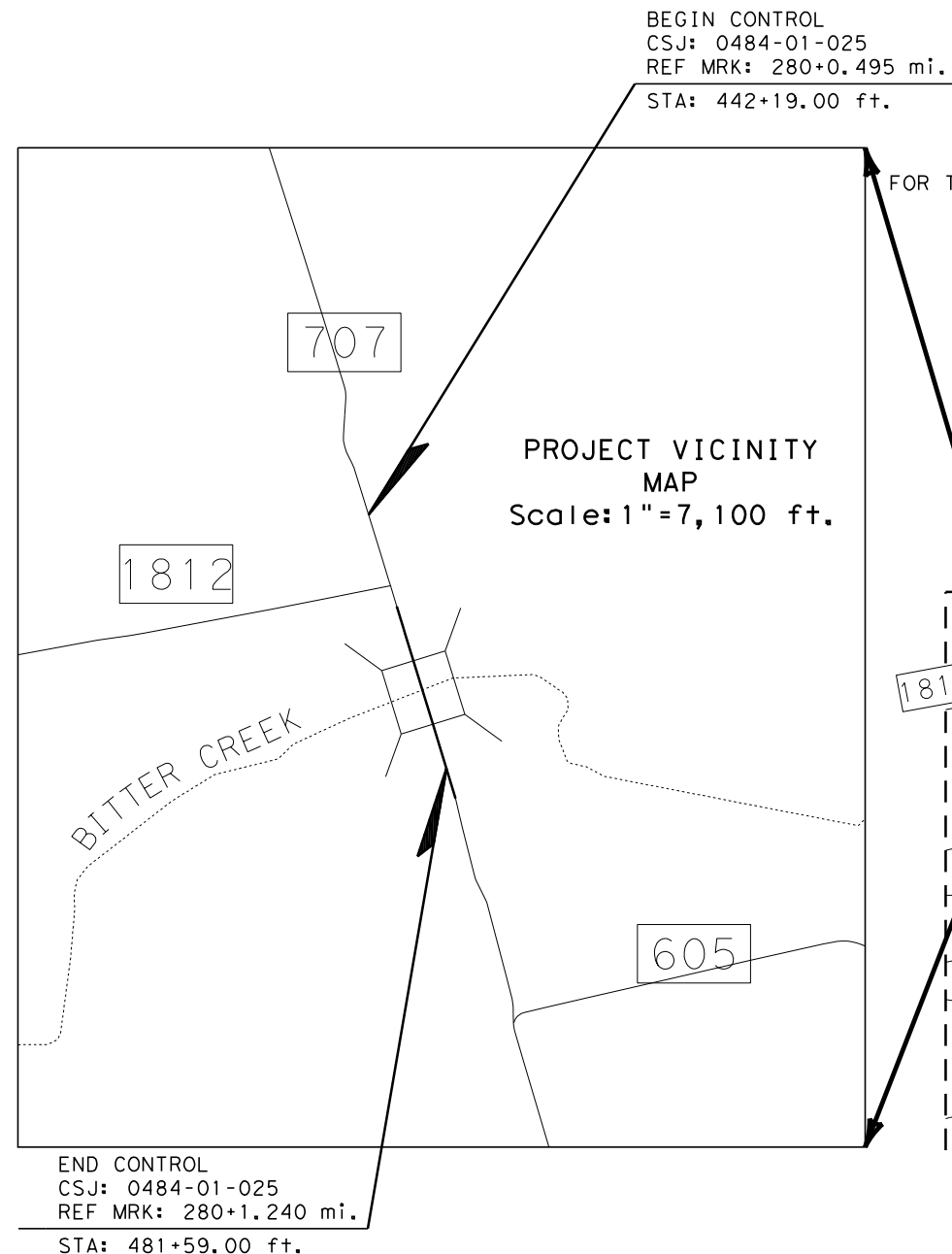
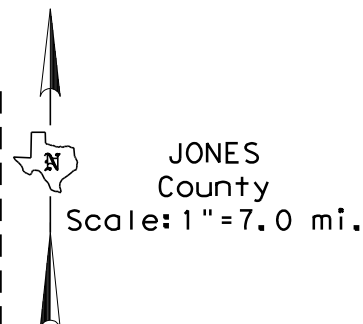
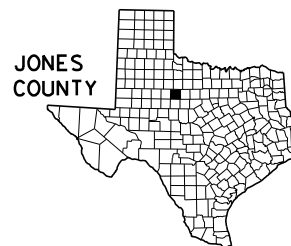
NET LENGTH OF ROADWAY= 1210.00 ft = 0.230 mi
NET LENGTH OF BRIDGE = 150.00 ft = 0.028 mi
NET LENGTH OF PROJECT= 1360.00 ft = 0.258 mi

FM 707
JONES COUNTY

LIMITS: BITTER CREEK BRIDGE REPLACEMENT

FOR THE CONSTRUCTION OF: FM 707 AT BITTER CREEK

CONSISTING OF: BRIDGE REPLACEMENT AND RECONSTRUCTION OF APPROACHES



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

DESIGN SPEED: 60 mph
CURRENT A.D.T. (2020) = 742 vpd
PROJECTED A.D.T. (2040) = 1,039 vpd
FUNCTIONAL CLASS: RURAL MAJOR COLLECTOR
EXISTING NBI# = 08-128-0-0484-01-002
PROPOSED NBI# = 08-128-0-0484-01-005

FHWA TEXAS DIVISION	PROJECT NO.		SHEET NO.
	BR 2022 (244)		01
STATE	DISTRICT	COUNTY	
TEXAS	ABL	JONES	
CONTROL	SECTION	JOB	HIGHWAY NO.
0484	01	025	FM707

FINAL PLANS

LETTING DATE: APRIL 2022
DATE CONTRACTOR BEGAN WORK: _____
DATE WORK WAS COMPLETED: _____
DATE WORK WAS ACCEPTED: _____
FINAL CONTRACT COST: \$ _____
CONTRACTOR : _____

CERTIFICATION FOR FINAL PLANS

THIS PROJECT WAS BUILT ACCORDING TO THE PLANS AND SPECIFICATIONS. THESE FINAL PLANS REFLECT THE WORK DONE AND THE QUANTITIES SHOWN THEREON AND ON THE FINAL ESTIMATE ARE FINAL QUANTITIES.

AREA ENGINEER DATE

THE DISTRICT TRAFFIC SAFETY COMMITTEE HAS REVIEWED THE TRAFFIC CONTROL PLAN FOR THIS PROJECT AND IT IS IN COMPLIANCE WITH CURRENT TRAFFIC CONTROL STANDARDS.

DocuSigned by:
Casey L. Mc Gee, P.E. 2/3/2022
COMMITTEE CHAIRMAN DATE



CONCURRENCE: 2/2/2022
DocuSigned by: *Dale Spurgin*
THE HONORABLE DALE SPURGIN
JONES COUNTY JUDGE

RECOMMENDED FOR LETTING: 2/3/2022
DocuSigned by: *Paul N. Norman, P.E.*
PAUL N. NORMAN, P.E.
AREA ENGINEER

SUBMITTED FOR LETTING: 1/31/2022
DocuSigned by: *Aaron Tainter*
AARON D. TAINTER, P.E.
BRIDGEFARMER PROJECT MANAGER

RECOMMENDED FOR LETTING: 2/3/2022
DocuSigned by: *Michael Roetheli*
MICHAEL A. ROETHELI, E.I.T.
TXDOT PROJECT MANAGER

RECOMMENDED FOR LETTING: 2/3/2022
DocuSigned by: *Michael A. Haithcock*
MICHAEL A. HAITHCOCK, P.E.
DIRECTOR OF T P & D

APPROVED FOR LETTING: 2/3/2022
DocuSigned by: *Thomas J. Allbritton, P.E.*
THOMAS J. ALLBRITTON, P.E.
DISTRICT ENGINEER

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 1, 2012).

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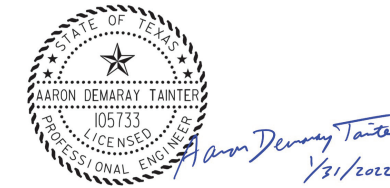
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THE STANDARD SHEETS SPECIFICALLY IDENTIFIED ON THIS SHEET WITH A "##" HAVE BEEN SELECTED BY ME OR UNDER MY RESPONSIBLE SUPERVISION AS BEING APPLICABLE TO THIS PROJECT.



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



BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPB REGISTRATION NO. 264

Texas Department of Transportation
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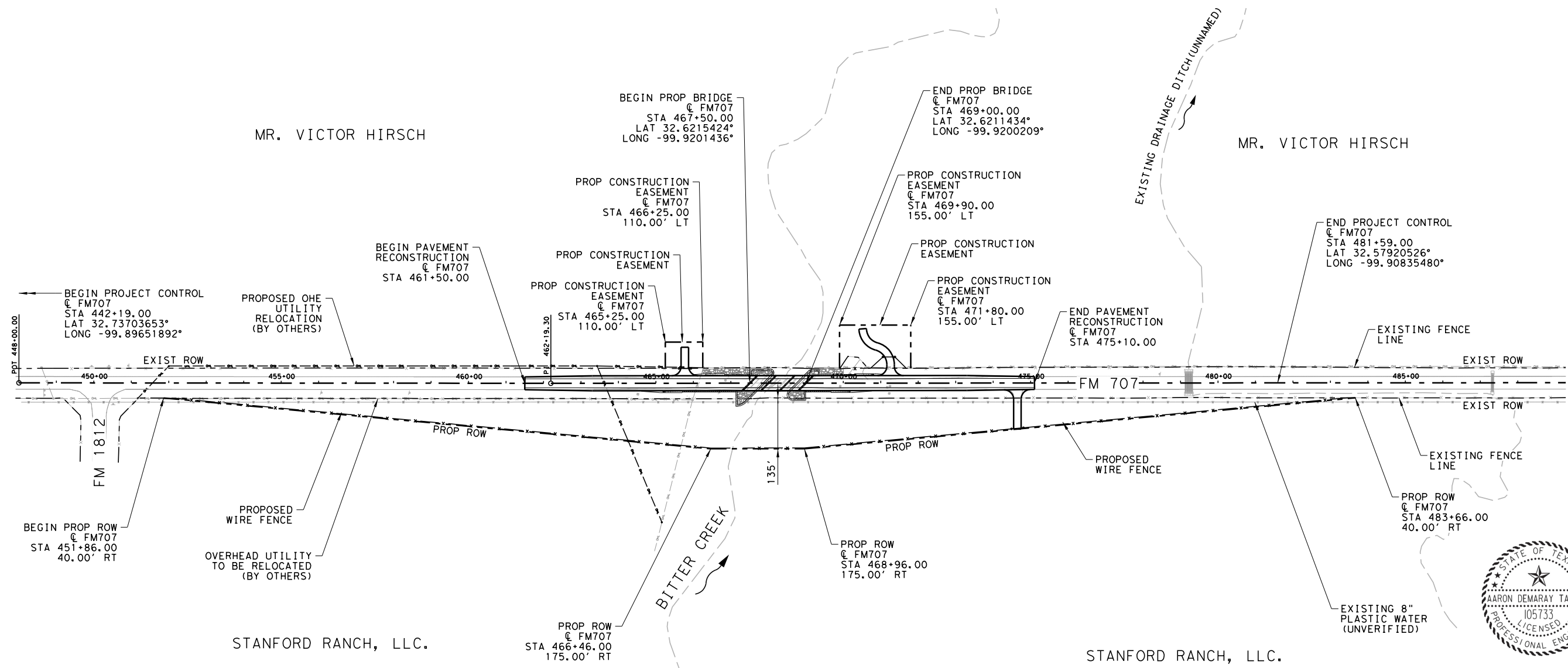
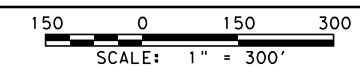
FM 707

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DW:	AM	CK:	AT	DIST:	ABL	COUNTY:	JONES	SHEET NO.:	2		

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STATE OF TEXAS
 AARON DEMARAY TANTER
 105733
 LICENSED
 PROFESSIONAL ENGINEER
Aaron Demaray Tainter
 1/31/2022

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 CONSULTING ENGINEERS
 TBPE REGISTRATION NO. 264

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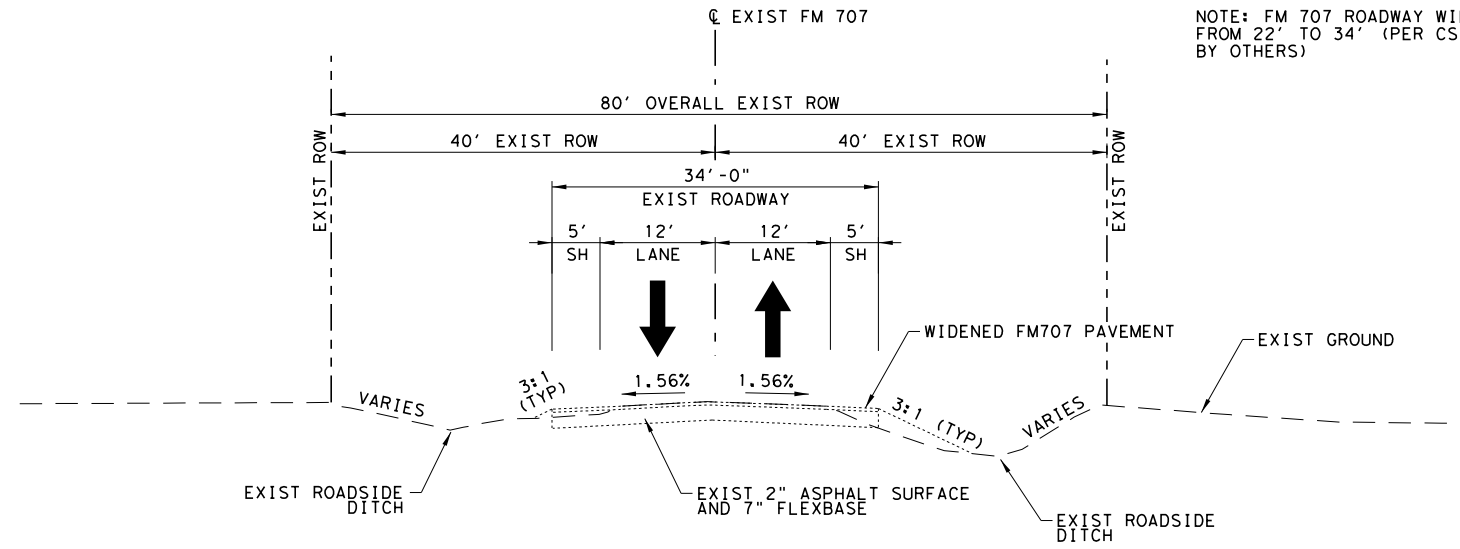
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PROJECT LAYOUT

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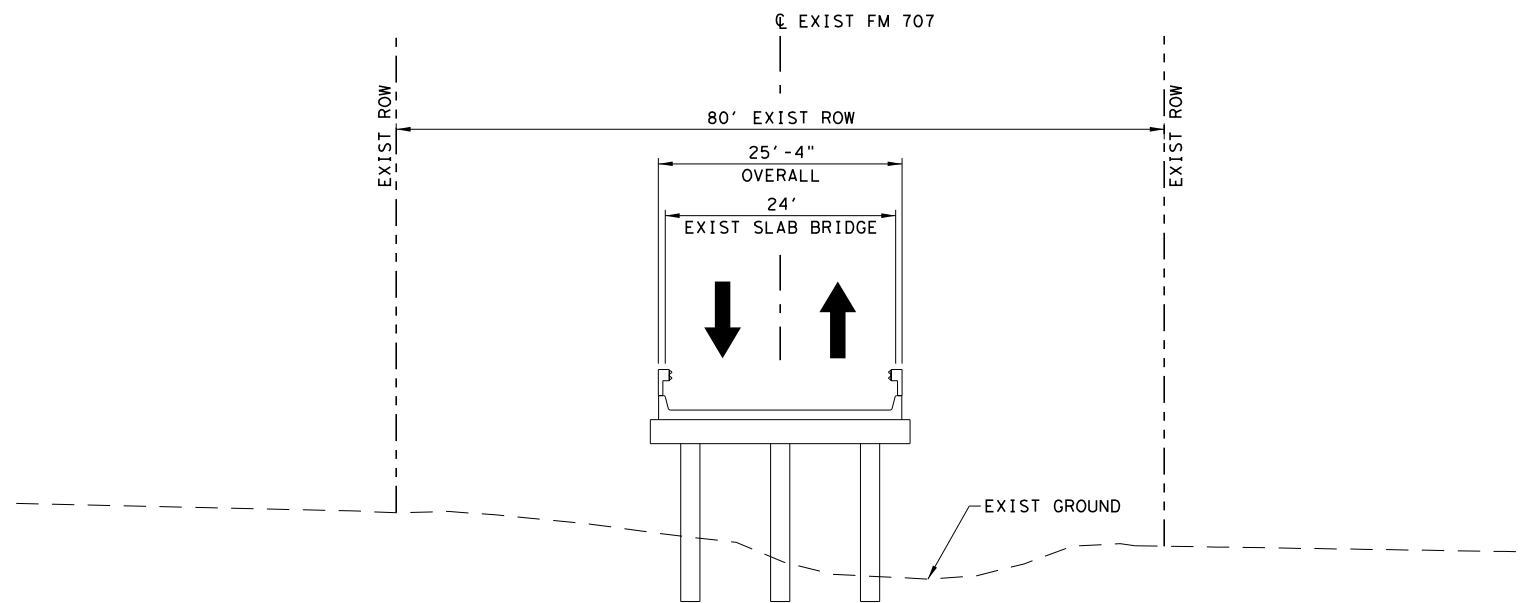
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EXISTING ROADWAY TYPICAL SECTION

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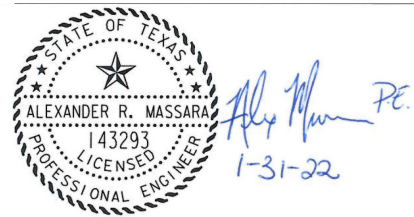
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AND
STA 468+87.80 TO 475+10.00



EXISTING BRIDGE TYPICAL SECTION

FM 707

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CONSULTING ENGINEERS
TBPB REGISTRATION NO. 264

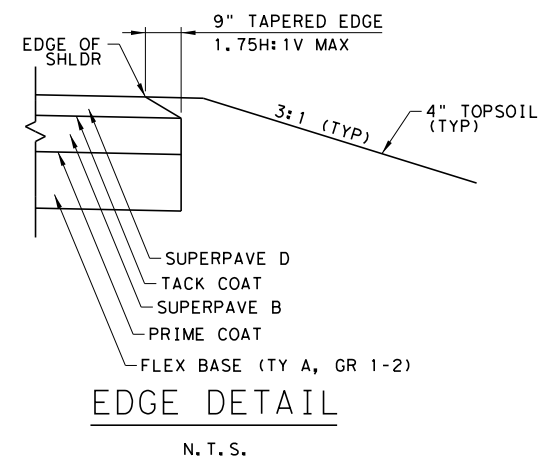
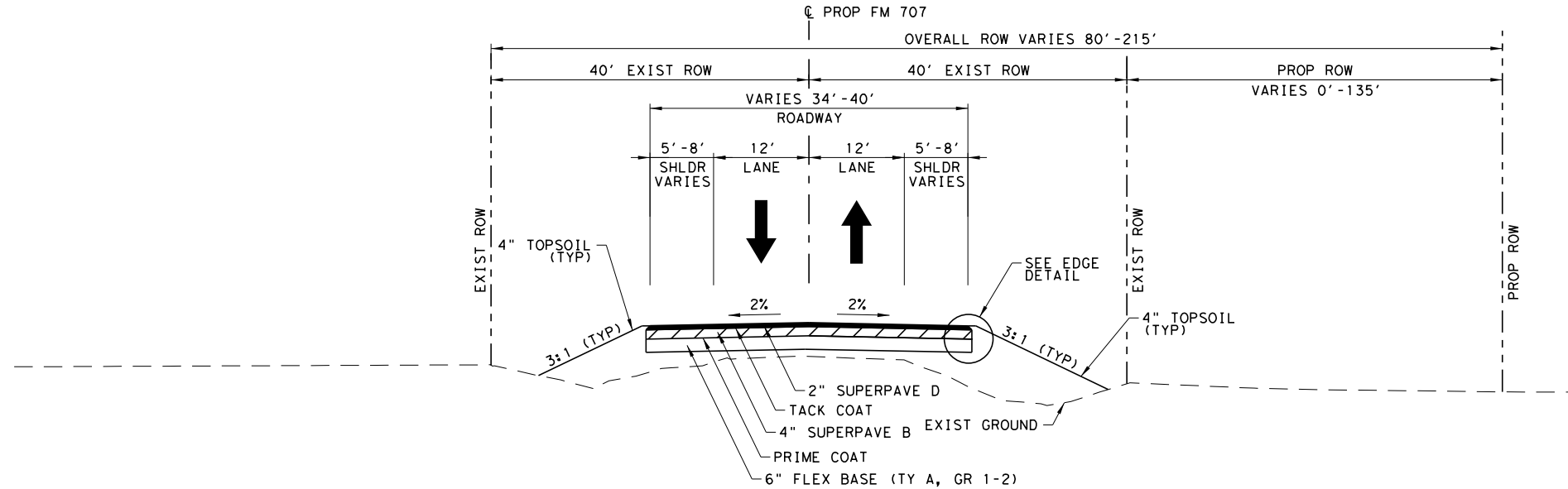


FM 707
TYPICAL SECTIONS

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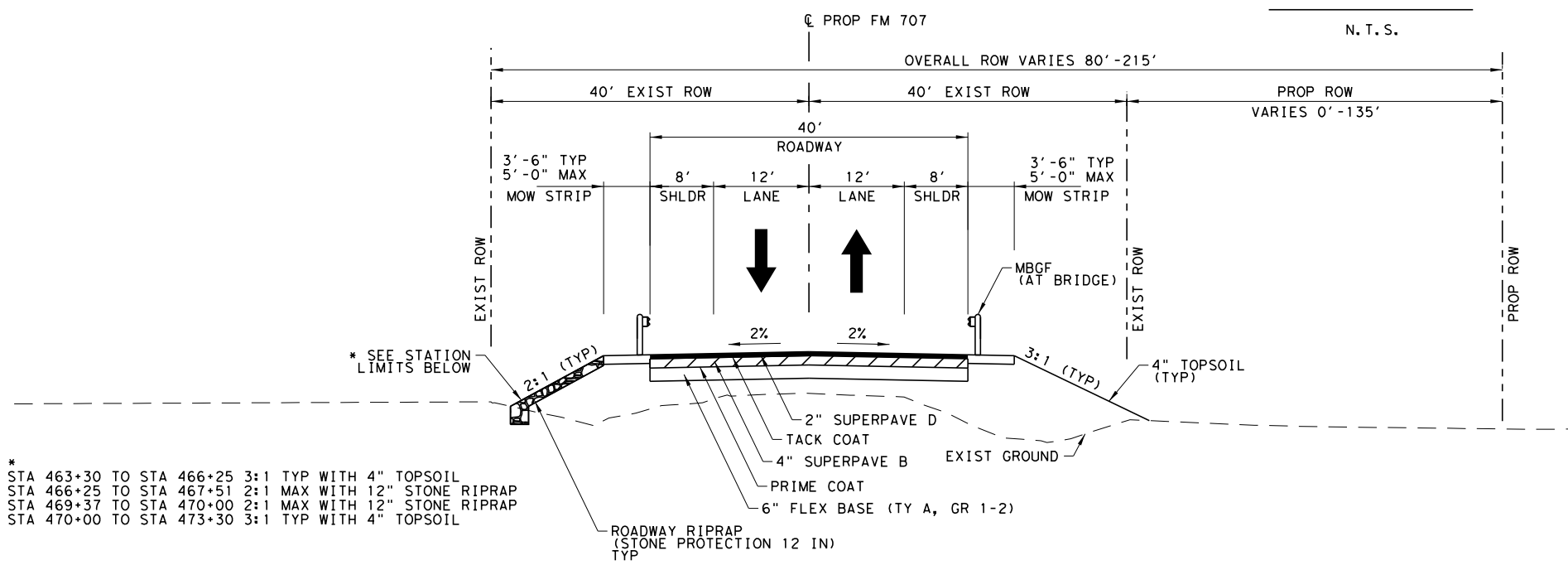
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PROPOSED ROADWAY TYPICAL SECTION
FM 707

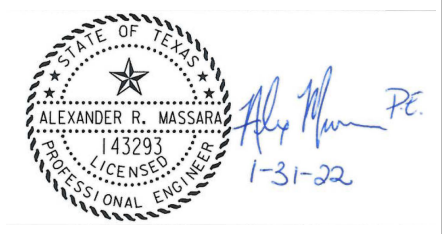
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AND
STA 473+30.00 TO 475+10.00



* SEE STATION LIMITS BELOW
STA 463+30 TO STA 466+25 3:1 TYP WITH 4" TOPSOIL
STA 466+25 TO STA 467+51 2:1 MAX WITH 12" STONE RIPRAP
STA 469+37 TO STA 470+00 2:1 MAX WITH 12" STONE RIPRAP
STA 470+00 TO STA 473+30 3:1 TYP WITH 4" TOPSOIL

PROPOSED ROADWAY TYPICAL SECTION
FM 707

STA 463+30.00 TO 467+50.00
AND
STA 469+00.00 TO 473+30.00
NOTE:
SEE BRIDGE SHEETS
FOR AP SLAB LIMITS



FM 707
TYPICAL SECTIONS

SCALE: 1" = 20' SHEET 2 OF 2

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Project Number: See Title Sheet
Control: 0484-01-025
County: Jones
Highway: FM707

**ABILENE DISTRICT GENERAL NOTES
2014 SPECIFICATIONS**

General

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

Paul Norman, P.E.: Paul.Norman@txdot.gov
Chad Carter, P.E.: Chad.W.Carter@txdot.gov
(Abilene Area Office)

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.

Failure to make necessary corrections to SW3P based on SW3P inspections will be cause for withholding the monthly estimate until such corrections have been made.

Failure to make necessary corrections to traffic control items based on barricade inspections will be cause for withholding the monthly estimate until such corrections have been made.

Provide ingress/egress to the adjacent properties in areas under construction. Phased construction of driveways and streets shall be required to provide uninterrupted access to adjacent properties. Coordinate work with the property owners before beginning any construction in the vicinity of the drive.

Cut neat, straight lines with vertical faces along pavement edges or along joints between existing asphalt or concrete pavement and new pavement perpendicular or parallel to the direction of traffic by methods described in applicable bid items, or as directed. Provide clean edges or joints without jagged appearance or chunks broken out. This work is considered subsidiary to various bid items.

General Notes

Sheet A

Project Number: See Title Sheet
Control: 0484-01-025
County: Jones
Highway: FM707

Environmental

Endangered and Protected Species

1. Migratory Birds
 - a. **Bird nesting season is typically 15Feb through 15Sep annually.**
 - b. The Contractor will avoid disturbing, destroying, removing, or relocating migratory birds and active nests found in trees, culverts, bridges, on the ground, or anywhere they are encountered.
 - c. Perform all tree trimming and other vegetation clearing activities during the non-breeding season (typically 15Sep-15Feb annually). Perform any inactive nest removal and bird exclusion methods to prevent birds from establishing nests. Phasing of work during construction may be necessary to stay in compliance.
 - d. When active nests are unexpectedly encountered on-site during construction, the Contractor will stop work and immediately notify the Engineer. Take measures to avoid disturbance of these birds, their occupied nest, eggs, and/or young, in accordance with the Migratory Bird Treaty Act, Texas Parks and Wildlife Code, and TxDOT policy.
 - e. The Engineer will notify the Contractor when work may resume.
 - f. The Contractor should be prepared to prevent migratory birds from building nests by utilizing nest prevention methods, such as bird-deterrent netting and bird-repelling sprays and/or gels, between 15Feb and 15Sep. The Contractor can discuss other preventative measures with the Engineer and/or District Environmental Staff.

Best Management Practices

1. Bird BMPs
 - a. Not disturbing, destroying, or removing active nests, including ground nesting birds, during the nesting season;
 - b. Avoiding the removal of unoccupied, inactive nests, as practicable;
 - c. Preventing the establishment of active nests during the nesting season on TxDOT owned and operated facilities and structures proposed for replacement or repair;
 - d. Not collecting, capturing, relocating, or transporting birds, eggs, young, or active nests without a permit.

Item 5, "Control of Work"

Use Method C for construction surveying.

All known utilities are identified in the plans, including the crossing of power lines. Use this information to identify potential issues with power poles and power lines prior to bidding. Make necessary arrangements with utility owners regarding temporary protections such as bracing power poles, and de-energizing power lines. The Department will not reimburse the cost of such temporary protections to the Contractor, unless the Engineer determines that inadequate information was available at the time the project was bid. **"Call Before You Dig" "Call 811"**

General Notes

Sheet B

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CONT	SECT	JOB	HIGHWAY
0484	01	025	FM707
DIST	COUNTY		SHEET NO.
ABL	JONES		6

Project Number: See Title Sheet
Control: 0484-01-025
County: Jones
Highway: FM707

Provide notification to the District Traffic Engineering Section by telephone at 325-676-6991 and by email at ABL_TrafficFix@txdot.gov when planning drilling or excavation work in areas where existing TxDOT underground utilities exist. Visual evidence of TxDOT underground utilities in the area include illumination poles, ground boxes, flashing beacons, traffic signals, etc. This notification must be provided 72 hours in advance of performing the work.

Drilled shaft locations or excavation areas must be staked prior to the notification so that the underground utilities can be located in relationship to the proposed work. Preserve and document the marked utility locations to prevent unnecessary secondary notifications. Notify the Engineer of conflicts between proposed work and underground utilities.

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

Item 6, "Control of Materials"

The use of flame or saw-cutting to dismantle the steel beams will not be allowed. Unbolting, shearing or other method approved by the Engineer will be allowed.

Item 7, "Legal Relations and Responsibilities"

Do not initiate activities in a project specific location (PSL), associated with a U.S. Army Corps of Engineers (USACE) permit area that has not been previously evaluated by the USACE as part of the permit review of this project. Such activities include, but are not limited to, haul roads, equipment staging areas, borrow and disposal sites. Associated defined here means materials are delivered to or from the PSL. The permit area includes all waters of the U.S. or associated wetlands affected by activities associated with this project. Special restrictions may be required for such work. Be responsible for any and all consultations with the USACE regarding activities, including project specific locations (PSLs) that have not been previously evaluated by the USACE. Provide the department with a copy of all consultation(s) or approval(s) from the USACE prior to initiating activities.

The contractor may proceed with activities in PSLs that do not affect a USACE permit area if a self determination has been made that the PSL is non-jurisdictional or proper USACE clearances have been obtained in jurisdictional areas or have been previously evaluated by the USACE as part of the permit review of this project. The contractor is solely responsible for documenting any determination(s) that their activities do not affect a USACE permit area. Maintain copies of their determination(s) for review by the department or any regulatory agency. Document and coordinate with the USACE, if required, prior to any excavation hauled from or embankment hauled into a USACE permit area by either (1) or (2) below.

(1) Restricted Use of Materials for the Previously Evaluated Permit Areas.

Document both the project specific location (PSL) and their authorization. Maintain

General Notes

Sheet C

Project Number: See Title Sheet
Control: 0484-01-025
County: Jones
Highway: FM707

copies for review by the department or any regulatory agency. When an area within the project limits has been evaluated by the USACE as part of the permit process for this project:

- a. Suitable excavation of required material in the areas shown on the plans and cross sections as specified in Item 110 is used for permanent or temporary fill (Item 132, Embankment) within a USACE permit area;
- b. Suitable embankment (Item 132) from within the USACE permit area is used as fill within a USACE evaluated area; and,
- c. Unsuitable excavation or excess excavation ["Waste"] (Item 110) that is disposed of at a location approved by the Engineer within a USACE evaluated area.

(2) Contractor Materials from Areas Other than Previously Evaluated Areas.

Provide the department with a copy of all USACE coordination or approval(s) prior to initiating any activities for an area within the project limits that has not been evaluated by the USACE or for any off right of way locations used for the following, but not limited to, haul roads, equipment staging areas, borrow and disposal sites:

- a. Item 132, Embankment, used for temporary or permanent fill within a USACE permit area; and,
- b. Unsuitable excavation or excess excavation ["Waste"] (Item 110, Excavation) that is disposed of outside a USACE evaluated area.

The total area disturbed for this project is **9.60** acres. The disturbed area in this project, all project locations in the Contract, and the Contractor project specific locations (PSLs), within 1 mile of the project limits, for the Contract will further establish the authorization requirements for storm water discharges. The Department will obtain an authorization to discharge storm water from the Texas Commission on Environmental Quality (TCEQ) for the construction activities shown on the plans. The Contractor is to obtain required authorization from the TCEQ for Contractor PSLs for construction support activities on or off the ROW. When the total area disturbed in the Contract and PSLs within 1 mile of the project limits exceeds 5 acres, provide a copy of the Contractor NOI for PSLs on the ROW to the Engineer and to the government that operates a separate storm sewer system.

Provide one SW3P Notification Board for this project. Notification Boards are to be placed at locations within the right-of-way but outside the clear zone as directed by the Engineer. Consider this work to be subsidiary to the various bid items of the contract.

The Contractor's attention is directed to the Texas Aggregate Quarry Pit Safety Act. Any pit or quarry meeting the definition of an unacceptable unsafe location as defined in the Act is subject to regulations set forth in this Act. A copy of the Texas Administrative Code, Title 43, Part, 1, Chapter 21, Subchapter M may be viewed at [http://info.sos.state.tx.us/pls/pub/readtac\\$ext.ViewTAC](http://info.sos.state.tx.us/pls/pub/readtac$ext.ViewTAC).

No significant traffic generator events identified.

General Notes

Sheet D

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GENERAL NOTES

CONT	SECT	JOB	HIGHWAY
0484	01	025	FM707
DIST	COUNTY		SHEET NO.
ABL	JONES		6A

Project Number: See Title Sheet
Control: 0484-01-025
County: Jones
Highway: FM707

Hard hats are required at all times during construction when construction personnel are in TxDOT Right-of-Way.

Item 8 “Prosecution and Progress”

Each contract awarded by the Department stands on its own and as such, is separate from other contracts. A Contractor awarded multiple contracts must be capable and sufficiently staffed to concurrently process and/or execute all contracts at the same time.

The Contractor is hereby authorized to begin work prior to the expiration of the number of calendar days provided in the Special Provision to Item 8, Article 8.1. Notify the Engineer in writing of the date to begin work. Time charges will commence when work begins or on the expiration of the number of calendar days provided, whichever occurs first.

Maintain and submit a project schedule monthly. Submit to the Engineer the updated project schedule no later than the 25th calendar day of the following month.

Coordinate and update the work schedule with the project inspector daily. Give a minimum of 24 hours of notice to project inspector if work requiring inspection or testing is to be performed. Failure to do so may cause that work to be delayed or postponed if TxDOT personnel are not available. Work performed without suitable inspection, as determined by the Engineer, may be ordered removed and replaced at Contractor’s expense.

A **Disincentive for Failure to Substantially Complete Work on Time** will apply to this contract in accordance with section 8.9.2 of special provision 008-006 using a daily road-user cost (RUC) of \$14,500.00. Failure to Substantially Complete Work within 129 working days will result in the assessment of disincentives.

Item 9, “Measurement and Payment”

The progress payment period shall end on the 25th of each month, unless directed by the Area Office Engineer. Material on Hand (MOH) is due two business days before estimate cut off.

Item 100, “Preparing Right of Way”

The Contractor's attention is directed to potential regulations against burning within the project limits. Abide by all local ordinances and county imposed burn bans. When burning is prohibited, dispose of material in accordance with regulations set forth by other regulatory agencies including the Texas Commission for Environmental Quality. The cost of burning or disposal of any product is subsidiary to various bid items.

Item 112, "Subgrade Widening"

Material removed from cut sections shall be used for embankment and will not be measured for payment as embankment. Additional material required for embankment from sources off the ROW will be measured for payment and will be paid for under item 132.

General Notes

Sheet E

Project Number: See Title Sheet
Control: 0484-01-025
County: Jones
Highway: FM707

Item 134, “Backfilling”

Backfill pavement edges no later than 2 weeks after the construction of the final surface.

Apply emulsion at a 50/50 of water to emulsion; emulsion rate = 0.15 gal/sy residual emulsion.

Provide material meeting the requirements of Article 160.2

Item 160, “Topsoil”

Salvage existing topsoil in windrows along the limits of the disturbed area, or as directed.

Item 164, “Seed for Erosion Control”

Quantities shown are approximate; limits of the temporary and permanent seeding will be determined during construction.

Temporary seeding will be required in several small areas as work progresses to comply with the storm water pollution prevention plan and may require multiple mobilizations of seeding crew.

Item 168, “Vegetation Watering”

Water rate for this project shall be ¼” of water per acre every two weeks for a 3-month period.

Item 204, “Sprinkling for Dust Control”

Sprinkle for dust control as directed. Payment for this item will be subsidiary to the various bid items.

Item 216, “Proof Rolling”

Perform proof rolling only as directed. Payment for this item will be made only when proof rolling is performed as directed.

Item 247, “Flexible Base”

If in the opinion of the Engineer, the material is of satisfactory quality the addition of four (4) percent fly ash by weight may be used to meet strength requirements. Modify the construction methods in accordance with Item 265 “Fly Ash or Lime-Fly Ash Treatment (Road Mixed)”. Provide materials from an approved source. Meet all other material requirements of item 247. This work is subsidiary to item 247.

The flexible base material in this contract has been estimated to be **1020** cubic yards (compacted). The estimated quantity of flexible base is for the roadway and driveways. The measured area for payment is the crown width only. The tapers, etc., are not included in the measurements for the flexible base and are considered subsidiary to this item.

Item 251, “Reworking Base Courses”

Some patches of asphalt material or stabilized base may be encountered while reconditioning the existing base. When such material is encountered, remove and dispose of as directed. This work is considered subsidiary to this item.

General Notes

Sheet F

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GENERAL NOTES

CONT	SECT	JOB	HIGHWAY
0484	01	025	FM707
DIST	COUNTY		SHEET NO.
ABL	JONES		6B

Project Number: See Title Sheet
Control: 0484-01-025
County: Jones
Highway: FM707

Item 292, "Asphalt Treatment (Plant-Mixed)"

Use PG 64-22 binder for this item.

Provide Grade 2 Asphalt Treatment.

Item 302, "Aggregates for Surface Treatments"

Aggregate Gradation Requirements (Cumulative % Retained¹)

Sieve	Grade
	4M
1"	-
7/8"	-
3/4"	-
5/8"	0
1/2"	0 – 15
3/8"	35 – 65
1/4"	-
#4	95 – 100
#8	98 – 100

1.Round test results to the nearest whole number.

Grade 4M will have 98.5% to 100% retained on a No. 200 sieve.

Item 316, "Surface Treatments"

The Engineer must authorize work if the wind exceeds 20 mph.

When cutback asphalt is used, delay the second surface treatment course or ACP overlay 14 days or as directed by the Engineer.

When cool season emulsion asphalt is used, delay the second surface treatment course or ACP overlay 7 days.

Seal driveways, mailbox turnouts, and intersections prior to sealing the roadway, unless otherwise approved.

Cover or protect any sealed expansion joints or rail on bridges and any railroad tracks encountered on this project, as directed by the Engineer. Clean any of these items not properly protected. This work will not be paid for directly but will be considered subsidiary to Item 316.

For items of work that include both summer and winter materials or the Asphalt (Multi Option), the Engineer will determine which asphalt to apply based on timing and prevailing weather conditions. The Asphalt (Multi Option) shall consist of the following choices and rates.

ASPH (AC-20-5TR) @ .40 GAL/SY

General Notes

Sheet G

Project Number: See Title Sheet
Control: 0484-01-025
County: Jones
Highway: FM707

ASPH (AC-20-XP) @ .40 GAL/SY

AGGREGATES

AGGR (TY-PB GR-3 SAC –B) – 1 CY/115 SY

The rates shown are for estimating purposes and the engineer can dictate higher or lower rates based on roadway conditions.

Item 346, "Stone Matrix Asphalt"

A minimum of 6.0% asphalt content is required for all SMA mixtures.

Provide additional SGC molds as necessary to allow for proper cooling and testing of laboratory densities.

Furnish aggregate for final surfaces with a surface aggregate classification of "A".

The Engineer reserves the right to test all sources even if the source is listed in the Bituminous Source Rated Quality Catalog.

Provide the testing lab samples to calibrate the ignition oven no later than five (5) working days prior to mix design verification.

Do not exceed a laydown width of 16' per pass.

RAP will not be allowed for this project.

The use of a tapered longitudinal joint will be required for pavement thicker than 2 inches.

Use a self-propelled, wheel-mounted material transfer vehicle (MTV) capable of receiving hot mix from the haul trucks separate from the paver on this project. Minimum requirements for the MTV are a storage capacity of approximately 25 tons, a pivoting discharge conveyor, and a means of completely remixing the ACP prior to placement.

Provide PG 64-22 tack coat at a rate of 0.10 gal/sy.

The Contractor will be required to tack 100% of the surfaces with uniform coverage prior to the subsequent lift. The type and grade of tack will be approved by the Engineer prior to use.

Tack all vertical joints unless otherwise directed.

Cement and kiln dust will not be allowed to be used as mineral fillers.

Shoulders shall not be placed prior to adjoining main lanes.

General Notes

Sheet H

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CONT	SECT	JOB	HIGHWAY
0484	01	025	FM707
DIST	COUNTY		SHEET NO.
ABL	JONES		6C

Project Number: See Title Sheet
Control: 0484-01-025
County: Jones
Highway: FM707

Final surface of driveway shall not be placed prior to adjoining surface.

Item 416, “Drilled Shaft Foundations”

All soil, water, and slurry removed from drilled shafts shall be captured and disposed of properly. No discharge of these materials into, or in close proximity to, the surrounding water will be allowed.

Item 420, “Concrete Substructures”

In addition to the elements shown in Table 1, the following elements are Plans Quantity Elements.

- Bent Concrete

Item 420, 427, “Concrete Substructures” & “Surface Finishes for Concrete”

Provide a Surface Area 1 finish using an Adhesive Grout Coating or Rub Finish as directed.

Item 421, “Hydraulic Cement Concrete”

Use a cement meeting the requirements of Ty II when Mix Design Option 7 is selected for cast in place concrete.

Class C fly ash and Type I cement will not be allowed for any mix unless approved by the Engineer.

As a minimum, curing facility includes concrete curing tank, heater and a concrete recording thermometer. Provide a recorder with the capability to chart temperatures for 24 hours, 7 days and 30 day periods of time.

Air Entrainment requirements are waived with exception to bridge deck concrete, and rails, top slabs of direct traffic culverts and approach slabs. Air Entrainment is required for all slip formed concrete (bridge rail, concrete traffic barrier, pavement, etc.).

Precast SET’s are not allowed on skewed structures on this project.

Precast units are not allowed for extending box culvert on this project.

Item 432, “Riprap”

Provide structural fiber reinforced or conventionally reinforced concrete for formed M.B.G.F. concrete mow strip.

Meet the following requirements when using structural fiber reinforcement:

- If slip forming, use an approved method that ensures adequate concrete consolidation. Sprinkle and consolidate the subgrade before the concrete is placed. Finish the surface with a wood float or broom finish as approved. Immediately after finishing operation, cure the riprap according to Item 420, “Concrete Structures”.

General Notes

Sheet I

Project Number: See Title Sheet
Control: 0484-01-025
County: Jones
Highway: FM707

Item 440, “Reinforcement for Concrete”

Provide epoxy coated reinforcement for all reinforcement in abutment caps, wingwalls, and backwalls (drilled shaft reinforcement excluded); interior bent caps (column and drilled shaft reinforcement excluded); cast-in-place portions of bridge deck (PCP reinforcement and bridge girder reinforcement excluded); bridge railing; and approach slab.

Item 502, “Barricades, Signs and Traffic Handling”

Mobile traffic control in accordance with TPC 3 series will be required for placement of short duration, short term, intermediate term, and long-term traffic control.

Provide the Engineer with written notification seven (7) days in advance of major traffic changes. A major traffic change is defined as the temporary (greater than one day) or permanent relocation of traffic lanes typically in an urban setting. The notice will, at a minimum, include the expected date, time and scope of the traffic change. The Department will utilize the information provided to inform the traveling public of the changes. Failure to provide advance notice, or to provide accurate information, will result in delaying the work until such time that the public has been notified.

Additional signs, barricades and traffic handling may be necessary to complete the work shown herein and will be provided by the contractor as required and will be considered subsidiary to this item.

Provide separate attenuators for each work area within a common lane closure as approved or directed by the Engineer.

In sections where traffic is restricted to one lane, two-way traffic, flaggers will be stationed at each end of that section with two-way communication devices and a pilot car will control operations.

Relocate existing roadside signs to temporary supports as approved by the engineer.

All safety appurtenances such as signs, delineators, object markers and route markers will be in place prior to opening each phase of the construction to traffic, unless otherwise directed.

During construction on all underpass structures erect and maintain accurate clearance signs in accordance with the “Texas Manual on Uniform Traffic Control Device for Streets and Highways”. The mounting method for the temporary clearance sign is subject to approval of the Engineer. Temporary clearance signs are considered subsidiary to the various bid items. Movement of construction equipment and haul trucks will be prohibited from crossing the median unless specifically authorized by the Engineer. Ingress and egress to main lanes will be at entrance and exit ramps.

General Notes

Sheet J

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CONT	SECT	JOB	HIGHWAY
0484	01	025	FM707
DIST	COUNTY		SHEET NO.
ABL	JONES		6D

Project Number: See Title Sheet
Control: 0484-01-025
County: Jones
Highway: FM707

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

The Contractor's person responsible for TCP compliance must be available by local telephone and have a response time within 45 minutes.

Work will not be allowed on both sides of the roadbed at the same time.

Equip all work vehicles within 30 feet of the traveled way with a functioning amber strobe light or rotating beacon visible from all directions.

Repair barricades within the timeline shown on the barricade inspection report. Failure to comply will cease all work until barricades are repaired to the satisfaction of the Department.

Replace all damaged traffic control devices immediately. Remove any damaged traffic control devices from the project within 24 hours.

Conflicting guide signs shall be covered as approved by the Engineer.

Pilot car is subsidiary to item 502.

Reduced regulatory speed limit signs should only be posted in the vicinity of ongoing work activity as shown on BC (3)-14 and not throughout the entire project. Removing, relocating or covering speed limit signs shall be considered subsidiary to item 502.

Item 504, "Field Office for Laboratory"

Field Laboratory:

Furnish a "Type D" structure for the asphalt mix control laboratory for the Engineer's exclusive use. In addition to the requirements of Item 504, furniture and equipment to be furnished by the Contractor shall include:

- eye wash station
- first-aid kit
- two fire extinguishers
- Provide internet connectivity for use by TxDOT lab testing personnel at all laboratory structures on this project.

Field Office:

General Notes

Sheet K

Project Number: See Title Sheet
Control: 0484-01-025
County: Jones
Highway: FM707

Provide a Type C Structure (Field Office). This field office shall be equipped with a printer/fax/scan/copier and internet service capable of 30 Mb/sec.

Item 506, "Temporary Erosion, Sedimentation, and Environmental Controls"

On site concrete washout shall not be allowed on this project.

Item 514, "Permanent Concrete Traffic Barrier"

Use Class "C" concrete with air entrainment for Permanent Concrete Traffic Barrier.

Item 530, "Intersections, Driveways, and Turnouts"

Excavation and embankment necessary to construct the intersections and driveways according to the details shown elsewhere shall be considered subsidiary to this item.

Item 540, "Metal Beam Guard Fence"

Steel posts for metal beam guard fence may be field cut to proper rail height with a power saw when approved by the engineer.

Core drill 1 ¼ diameter holes through existing slab. Percussion or impact drilling is not permitted. Patch spalls, when directed by the engineer, in accordance with item 429, "Concrete Structure Repair", at the contractor's expense.

Item 585, "Ride Quality for Pavement Surfaces"

Use surface test Type A.

The Engineer reserves the right to prohibit corrective work and assess the penalty for each occurrence of localized roughness per Article 585.3.4.2.3.2.

Item 644, "Small Roadside Sign Supports and Assemblies"

Use the latest edition of the "Standard Highway Sign Designs for Texas" for Sign types for which design details are not shown on the plans.

Sign placement shall be in accordance with the latest edition of the TMUTCD & TxDOT's Sign Crew Field Book located at the following addresses.

TMUTCD - <https://www.txdot.gov/business/resources/signage/tmutcd.html>

TxDOT's Sign Crew Field Book - <http://onlinemanuals.txdot.gov/txdotmanuals/sfb/index.htm>

Before final sign installation, stake all sign locations for approval by the engineer.

All triangle slip base small sign mounts installed under this item shall utilize clamp type bases.

Remove entire small sign foundation.

General Notes

Sheet L

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CONT	SECT	JOB	HIGHWAY
0484	01	025	FM707
DIST	COUNTY		SHEET NO.
ABL	JONES		6F

Project Number: See Title Sheet
Control: 0484-01-025
County: Jones
Highway: FM707

Deliver and stockpile all signs to be salvaged to the Jones county maintenance yard, located approximately 12 miles from the northern end of the project.

Item 658, “Delineator and Object Marker Assemblies”

Delineators and object marker assemblies will use winged channel posts. The winged channel posts will be 1.12 lb/ft and 6.5 ft in length.

All MBGF delineation shall be GF2 mounted on posts.

Use a minimum 2 inch long lag screws with washers to attach flexible GF2 barrier reflectors to wooden post. For steel posts, use an approved adhesive, or other method approved by Engineer.

Concrete Barrier Reflectors shall be equivalent to Shure-tite CTB “Cup Mount” Delineator (8”). Attach delineators to concrete rail with concrete anchors as approved by the Engineer.

Item 662, “Work Zone Pavement Markings”

Place work zone pavement markings (flexible tabs) prior to the seal coat operation.

Dispose of tabs and paper in an approved trash receptacle. (Reference Standard **SW3P**, waste material)

Use traffic paint for non-removable work zone pavement markings.

Item 666, “Retro reflectorized Pavement Markings”

Provide a complete system of thermoplastic pavement markings at locations indicated on the plans and as directed by the engineer. The plans are intended to show typical conditions, which can be extended to similar conditions throughout this project as approved or directed.

Establish a true and correct alignment with a method approved by the Engineer. This work will be considered subsidiary.

Contractor is responsible for re-establishing location and alignment for new pavement markings matching pavement marking alignment prior to construction activities. This work will be considered subsidiary.

Item 672, “Raised Pavement Markers”

Provide a complete system of raised pavement markers at locations indicated on the plans and as directed by the engineer. The plans are intended to show typical conditions, which can be extended to similar conditions throughout this project as approved or directed.

Bituminous adhesive shall be used on this project.

General Notes

Sheet M

Project Number: See Title Sheet
Control: 0484-01-025
County: Jones
Highway: FM707

Item 677, “Eliminating Existing Pavement Markings and Markers”

Remove the existing raised pavement markings (RPMs) and profile pavement markings as the work progresses, or as directed by the Engineer. Removal methods shall be approved by the Engineer. Properly dispose of materials removed. Removal of existing profile pavement markings will be paid for directly. Removal of RPMs will not be paid for directly but will be subsidiary to the pertinent bid items.

Item 3077, “Superpave Mixtures”

Furnish aggregate for final surfaces with a minimum surface aggregate classification of “B”. Provide an SP-D Fine Mixture with a minimum design VMA of 17.0% and a minimum plant-produced VMA of 16.5%.

The Engineer reserves the right to test all sources even if the source is listed in the Bituminous Source Rated Quality Catalog.

Provide the testing lab samples to calibrate the ignition oven no later than five (5) working days prior to mix design verification.

Meet the minimum Hamburg Wheel Test requirements shown below:

- PG 64 or lower – 5,000 passes
- PG 70 – 10,000 passes
- PG 76 – 20,000 passes

Paving operations will not be allowed to begin until TxDOT has tested and obtained passing Hamburg results on the trial batch.

A maximum of 0.50% anti-stripping agent will be allowed for each specified mix type.

Dilution of tack coat is not allowed.

Do not exceed a laydown width of 16’ per pass.

Substitute Binders will not be allowed unless RAP or RAS is used in the production of the mixture.

RAS will not be allowed in surface mixes.

A warm mix additive will be required for hotmix hauls over 50 miles.

Unless otherwise directed by the engineer, a warm mix additive will be required when paving during November 1st through March 15th.

The maximum allowable dust / asphalt ratio that will be allowed is 0.6 to 1.2.

General Notes

Sheet N

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CONT	SECT	JOB	HIGHWAY
0484	01	025	FM707
DIST	COUNTY		SHEET NO.
ABL	JONES		6F

Project Number: See Title Sheet
Control: 0484-01-025
County: Jones
Highway: FM707

The use of a tapered longitudinal joint will be required for pavement thicker than 2 inches.

Use a self-propelled, wheel-mounted material transfer vehicle (MTV) capable of receiving hot mix from the haul trucks separate from the paver on this project. Minimum requirements for the MTV are a storage capacity of approximately 25 tons, a pivoting discharge conveyor, and a means of completely remixing the ACP prior to placement.

Provide PG 64-22 tack coat at a rate of 0.10 gal/sy.

The Contractor will be required to tack 100% of the surfaces with uniform coverage prior to the subsequent lift. The type and grade of tack will be approved by the Engineer prior to use.

Tack all vertical joints unless otherwise directed.

Cement and kiln dust will not be allowed to be used as mineral fillers.

Shoulders shall not be placed prior to adjoining main lanes.
 Final surface of driveway shall not be placed prior to adjoining surface.

Item 6185, “Truck Mounted Attenuator (TMA) and Trailer Attenuator (TA)”

Truck Mounted Attenuator (TMA) and Trailer Attenuator (TA) will not be considered a major item of work on this project.

TMA,s will only be paid while workers are present or to protect a blunt object.

BASIS OF ESTIMATE FOR STATIONARY TMAs				
		TMA (Stationary)		
Phase	Standard	Required	Additional	TOTAL
I	TCP (I-I)-18	2		2
Basis of Estimate for Mobile TMAs				
		TMA (Mobile)		
Phase	Standard	Required	Additional	TOTAL

The contractor will be responsible for determining if one or more of these operations will be ongoing at the same time to determine the total number of TMAs needed for the project. The Contractor must get approval from the Engineer for any changes in the number of TMA as shown in the plans.

If a TMA is used for both mobile and stationary traffic control on the same day, it will be paid for as stationary for that day.



Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0484-01-025

DISTRICT Abilene
HIGHWAY FM 707

COUNTY Jones

CONTROL SECTION JOB				0484-01-025		TOTAL EST.	TOTAL FINAL
PROJECT ID				A00129102			
COUNTY				Jones			
HIGHWAY				FM 707			
ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL		
	100-6002	PREPARING ROW	STA	32.000		32.000	
	105-6037	REMOVING STAB BASE AND ASPH PAV(0"-16")	SY	3,841.000		3,841.000	
	110-6001	EXCAVATION (ROADWAY)	CY	140.000		140.000	
	132-6004	EMBANKMENT (FINAL)(DENS CONT)(TY B)	CY	5,515.000		5,515.000	
	160-6001	FURNISHING AND PLACING TOPSOIL (4")	STA	26.000		26.000	
	164-6033	DRILL SEEDING (PERM) (RURAL) (SANDY)	SY	33,512.000		33,512.000	
	169-6001	SOIL RETENTION BLANKETS (CL 1) (TY A)	SY	2,555.000		2,555.000	
	247-6041	FL BS (CMP IN PLC)(TYA GR1-2)(FNAL POS)	CY	862.000		862.000	
	310-6009	PRIME COAT (MC-30)	GAL	1,551.000		1,551.000	
	400-6005	CEM STABIL BKFL	CY	224.000		224.000	
	416-6001	DRILL SHAFT (18 IN)	LF	134.000		134.000	
	416-6004	DRILL SHAFT (36 IN)	LF	700.000		700.000	
	420-6014	CL C CONC (ABUT)(HPC)	CY	70.600		70.600	
	420-6030	CL C CONC (CAP)(HPC)	CY	54.600		54.600	
	420-6038	CL C CONC (COLUMN)(HPC)	CY	20.900		20.900	
	422-6002	REINF CONC SLAB (HPC)	SF	6,300.000		6,300.000	
	422-6016	APPROACH SLAB (HPC)	CY	128.200		128.200	
	425-6035	PRESTR CONC GIRDER (TX28)	LF	741.500		741.500	
	432-6031	RIPRAP (STONE PROTECTION)(12 IN)	CY	142.000		142.000	
	432-6033	RIPRAP (STONE PROTECTION)(18 IN)	CY	893.000		893.000	
	432-6046	RIPRAP (MOW STRIP)(5 IN)	CY	47.000		47.000	
	450-6007	RAIL (TY T223)(HPC)	LF	372.000		372.000	
	454-6004	ARMOR JOINT (SEALED)	LF	108.000		108.000	
	496-6010	REMOV STR (BRIDGE 100 - 499 FT LENGTH)	EA	1.000		1.000	
	496-6031	REMOV STR (CATTLE GUARD)	EA	1.000		1.000	
	500-6001	MOBILIZATION	LS	1.000		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	8.000		8.000	
	506-6002	ROCK FILTER DAMS (INSTALL) (TY 2)	LF	80.000		80.000	
	506-6011	ROCK FILTER DAMS (REMOVE)	LF	80.000		80.000	
	506-6021	CONSTRUCTION EXITS (INSTALL) (TY 2)	SY	156.000		156.000	
	506-6024	CONSTRUCTION EXITS (REMOVE)	SY	156.000		156.000	
	506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	1,750.000		1,750.000	
	506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	1,750.000		1,750.000	
	506-6041	BIODEG EROSN CONT LOGS (IN STL) (12")	LF	430.000		430.000	
	506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	430.000		430.000	
	530-6005	DRIVEWAYS (ACP)	SY	850.000		850.000	
	540-6001	MTL W-BEAM GD FEN (TIM POST)	LF	300.000		300.000	



DISTRICT	COUNTY	CCSJ	SHEET
Abilene	Jones	0484-01-025	7



Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0484-01-025

DISTRICT Abilene

COUNTY Jones

HIGHWAY FM 707

CONTROL SECTION JOB				0484-01-025		TOTAL EST.	TOTAL FINAL
PROJECT ID				A00129102			
COUNTY				Jones			
HIGHWAY				FM 707			
ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL		
	540-6006	MTL BEAM GD FEN TRANS (THRIE-BEAM)	EA	4.000		4.000	
	542-6001	REMOVE METAL BEAM GUARD FENCE	LF	325.000		325.000	
	544-6001	GUARDRAIL END TREATMENT (INSTALL)	EA	4.000		4.000	
	544-6003	GUARDRAIL END TREATMENT (REMOVE)	EA	4.000		4.000	
	552-6005	GATE (TY 1)	EA	6.000		6.000	
	644-6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	1.000		1.000	
	644-6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA	2.000		2.000	
	658-6014	INSTL DEL ASSM (D-SW)SZ (BRF)CTB (BI)	EA	8.000		8.000	
	658-6062	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2(BI)	EA	11.000		11.000	
	666-6170	REFL PAV MRK TY II (W) 4" (SLD)	LF	2,720.000		2,720.000	
	666-6205	REFL PAV MRK TY II (Y) 4" (BRK)	LF	341.000		341.000	
	672-6009	REFL PAV MRKR TY II-A-A	EA	18.000		18.000	
	678-6001	PAV SURF PREP FOR MRK (4")	LF	3,061.000		3,061.000	
	3077-6007	SP MIXESSP-BSAC-B PG70-22	TON	1,137.000		1,137.000	
	3077-6053	SP MIXESSP-DSAC-B PG70-22	TON	550.000		550.000	
	6001-6002	PORTABLE CHANGEABLE MESSAGE SIGN	EA	2.000		2.000	
	6185-6002	TMA (STATIONARY)	DAY	260.000		260.000	
	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	

TRAFFIC CONTROL PLAN SUMMARY

SUMMARY OF WORKZONE TRAFFIC CONTROL ITEMS		
LOCATION	6001 6002	6185 6002
	PORTABLE CHANGEABLE MESSAGE SIGN	TMA (STATIONARY)
	EA	DAY
FM 707		
AS DIRECTED	2	260
PROJECT TOTALS	2	260

REMOVAL SUMMARY

SUMMARY OF REMOVAL ITEMS					
LOCATION	105 6037	496 6010	496 6031	542 6001	544 6003
	REMOVING STAB BASE AND ASPH PAV (0" - 16")	REMOV STR (BRIDGE 100 - 499 FT LENGTH)	REMOV STR (CATTLE GUARD)	REMOVE METAL BEAM GUARD FENCE	GUARDRAIL END TREATMENT (REMOVE)
	SY	EA	EA	LF	EA
FM 707					
FM 707 REMOVAL LAYOUT SHEET 1 OF 4					
FM 707 REMOVAL LAYOUT SHEET 2 OF 4	1787			125	2
FM 707 REMOVAL LAYOUT SHEET 3 OF 4	2054	1	1	200	2
FM 707 REMOVAL LAYOUT SHEET 4 OF 4					
PROJECT TOTALS	3841	1	1	325	4

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

 **Texas Department of Transportation**
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FM 707

QUANTITY SUMMARIES

SHEET 1 OF 3

DS:	CK:	CONT	SECT	JOB	HIGHWAY
AM	DH	0484	01	025	FM 707
DW:	CK:	DIST	COUNTY	SHEET NO.	
AM	AT	ABL	JONES	8	

ROADWAY SUMMARY

SUMMARY OF ROADWAY ITEMS															
LOCATION	100 6002	110 6001	132 6004	160 6001	247 6041	310 6009	3077 6007	3077 6053	432 6031	432 6046	530 6005	540 6001	540 6006	544 6001	552 6005
	PREPARING ROW	EXCAVATION (ROADWAY)	EMBANKMENT (FINAL) (DENS CONT) (TY B)	FURNISHING AND PLACING TOPSOIL (4")	FL BS (CMP IN PLC) (TYA GR1-2) (FNAL POS)	PRIME COAT (MC-30)	SP MIXES SP-B SAC-B PG70-22	SP MIXES SP-D SAC-B PG70-22	RIPRAP (STONE PROTECTION) (12 IN)	RIPRAP (MOW STRIP) (5 IN)	DRIVEWAYS (ACP)	MTL W-BEAM GD FEN (TIM POST)	MTL BEAM GD FEN TRANS (THRIE-BEAM)	GUARDRAIL END TREATMENT (INSTALL)	GATE (TY 1)
	STA	CY	CY	STA	CY	GAL	TON	TON	CY	CY	SY	LF	EA	EA	EA
FM 707		140	5515												
FM 707 PLAN SHEET 1 OF 4	6			4											
FM 707 PLAN SHEET 2 OF 4	9			9	418	739	541	262	52	22	198	150		2	2
FM 707 PLAN SHEET 3 OF 4	9			7.5	444	812	596	288	90	25	652	150	4	2	4
FM 707 PLAN SHEET 4 OF 4	8			5.5											
PROJECT TOTALS	32	140	5515	26	862	1551	1137	550	142	47	850	300	4	4	6

BASIS OF ESTIMATE (ROADWAY ITEMS)

BASIS OF ESTIMATE					
ITEM	DESCRIPTION	RATE	AREA (SY)	QUANTITY	UNIT
247	FL BS (CMP IN PLC) (TYA GR1-2) (FNAL POS)	6" TH	5170	862	CY
310	PRIME COAT (MC-30)	0.30 GAL/SY	5170	1551	GAL
3077	SP MIXES SP-B SAC-B PG70-22	440 LBS/SY (4" TH)	5170	1137	TON
3077	SP MIXES SP-D SAC-B PG70-22	220 LBS/SY (2" TH)	5000	550	TON
3077	TACK COAT	0.10 GAL/SY	5000	500	GAL

BASIS OF ESTIMATE IS FOR CONTRACTOR'S INFORMATION ONLY

SIGNING AND PAVEMENT MARKINGS SUMMARY

SUMMARY OF PAVEMENT MARKING ITEMS								
LOCATION	644 6001	644 6004	658 6014	658 6062	666 6170	666 6205	672 6009	678 6001
	IN SM RD SN SUP&AM TY10BWG(1) SA(P)	IN SM RD SN SUP&AM TY10BWG(1) SA(T)	IN STL DEL ASSM (D-SW) SZ (BRF) CTB (BI)	IN STL DEL ASSM (D-SW) SZ 1 (BRF) GF2 (BI)	REFL PAV MRK TY II (W) 4" (SLD)	REFL PAV MRK TY II (Y) 4" (BRK)	REFL PAV MRKR TY 11-A-A	PAV SURF PREP FOR MRK (4")
	EA	EA	EA	EA	LF	LF	EA	LF
FM 707								
FM 707 SIGN & PM PLAN SHEET 1 OF 4				5	1100	138	7	1238
FM 707 SIGN & PM PLAN SHEET 2 OF 4	1	1		6	1620	203	11	1823
FM 707 SIGN & PM PLAN SHEET 3 OF 4		1	8					
FM 707 SIGN & PM PLAN SHEET 4 OF 4								
PROJECT TOTALS	1	2	8	11	2720	341	18	3061

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FM 707
QUANTITY SUMMARIES

SHEET 2 OF 3			
CONT	SECT	JOB	HIGHWAY
AM	DH	0484 01 025	FM 707
DIST	COUNTY		SHEET NO.
AM	AT	ABL JONES	9

EARTHWORK SUMMARY TABLE

EARTHWORK - FM 707

STA	Area			Volume			
	Dist	Cut	Fill	Incr. Cut	Cumul. Cut	Incr. Fill	Cumul. Fill
	(FT)	(SF)	(SF)	(CY)	(CY)	(CY)	(CY)
460+00		0	0				
460+50	50	0	0	0	0	0	0
461+00	50	0	0	0	0	0	0
461+50	50	14	5	13	13	5	5
462+00	50	10	8	22	35	12	17
462+50	50	4	13	13	48	19	36
463+00	50	1	29	5	53	39	75
463+50	50	0	59	1	54	81	156
464+00	50	0	101	0	54	148	304
464+50	50	0	148	0	54	231	535
465+00	50	0	202	0	54	324	859
465+50	50	0	236	0	54	406	1,265
466+00	50	0	267	0	54	466	1,731
466+50	50	0	298	0	54	523	2,254
467+00	50	0	336	0	54	587	2,841
467+50	50	0	102	0	54	406	3,247
468+00	50	0	0	0	54	94	3,341
468+50	50	0	0	0	54	0	3,341
469+00	50	0	160	0	54	148	3,489
469+50	50	0	201	0	54	334	3,823
470+00	50	0	177	0	54	350	4,173
470+50	50	0	187	0	54	337	4,510
471+00	50	0	151	0	54	313	4,823
471+50	50	0	115	0	54	246	5,069
472+00	50	0	83	0	54	183	5,252
472+50	50	0	55	0	54	128	5,380
473+00	50	2	27	2	56	76	5,456
473+50	50	5	9	6	62	33	5,489
474+00	50	13	4	17	79	12	5,501
474+50	50	17	3	28	107	6	5,507
475+00	50	14	3	29	136	6	5,513
475+10	10	0	0	3	139	1	5,514
TOTAL				139		5,514	

EROSION CONTROL SUMMARY

SUMMARY OF EROSION CONTROL AND LANDSCAPE ITEMS										
LOCATION	164 6033	169 6001	506 6002	506 6011	506 6021	506 6024	506 6038	506 6039	506 6041	506 6043
	DRILL SEEDING (PERM) (RURAL) (SANDY)	SOIL RETENTION BLANKETS (CL 1) (TY A)	ROCK FILTER DAMS (INSTALL) (TY 2)	ROCK FILTER DAMS (REMOVE)	CONSTRUCTION EXITS (INSTALL) (TY 2)	CONSTRUCTION EXITS (REMOVE)	TEMP SEDMT CONT FENCE (INSTALL)	TEMP SEDMT CONT FENCE (REMOVE)	BIODEG EROSN CONT LOGS (INSTL) (12")	BIODEG EROSN CONT LOGS (REMOVE)
	SY	SY	LF	LF	SY	SY	LF	LF	LF	LF
FM 707										
FM 707 SW3P PLAN SHEET 1 OF 4	3027									
FM 707 SW3P PLAN SHEET 2 OF 4	12475	1210			78		740		15	
FM 707 SW3P PLAN SHEET 3 OF 4	13570	1345	40		78		1010		415	
FM 707 SW3P PLAN SHEET 4 OF 4	4440		40							
END PROJECT				80		156		1750		430
PROJECT TOTALS	33512	2555	80	80	156	156	1750	1750	430	430

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FM 707

QUANTITY SUMMARIES

SHEET 3 OF 3

DS:	AM	CK:	DH	CONT	0484	SECT	01	JOB	025	HIGHWAY	FM 707
DW:	AM	CK:	AT	DIST	ABL	COUNTY		JONES		SHEET NO. 10	

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SUMMARY OF BRIDGES

CSJ	PLAN PROFILE SHEET	BRIDGE NBI #		DESIGN		BRIDGE LOCATION	STATION		LENGTH	CLEAR RDWY WIDTH	LOADING	400-6005	416-6001	416-6004	420-6014
		EXISTING	PROPOSED	EXISTING	PROPOSED		BEGIN	END				FT	FT	CSAB	DRILL SHAFT (18 IN)
0484-01-025	88	08-128-0-0484-01-002	08-128-0-0484-01-005	125' (5 SPANS @ 25') CONC. SLAB SPAN W/ CONC. CAP AND STEEL H-PILES	150' (3 SPANS @ 50') CONC. TX28, 45° SKEWED BRIDGE SUPPORTED ON STUB ABUTMENTS WITH/ BKWL AT THE ENDS AND TWO RECTANGULAR MULTI-COLUMN BENT CAPS AS THE INTERMEDIATE PIERS.	FM707 AT/OVER BITTER CREEK	467+50	469+00	150'	40'	HL-93	224	134	700	70.6
TOTALS												224	134	700	70.6

CSJ (CONT'D FROM ABOVE)	420-6030 CL C CONC (CAP) (HPC)	420-6038 CL C CONC (COLUMN) (HPC)	422-6002 REINF CONC SLAB (HPC)	422-6016 APPROACH SLAB (HPC)	425-6035 PRESTR CONC BEAM (TX28)	432-6033 RIPRAP (STONE PROTECTION) (18IN)	450-6007 RAIL (TY T223) (HPC)	454-6004 ARMOR JOINT (SEALED)
	CY	CY	SF	CY	LF	CY	LF	LF
0484-01-025	54.6	20.9	6300	128.2	741.50	893	372.0	108
TOTALS	54.6	20.9	6300	128.2	741.50	893	372.0	108

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FM 707

BRIDGE SUMMARY

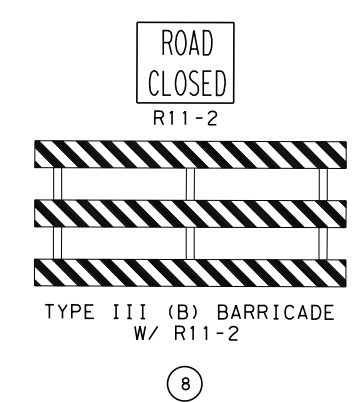
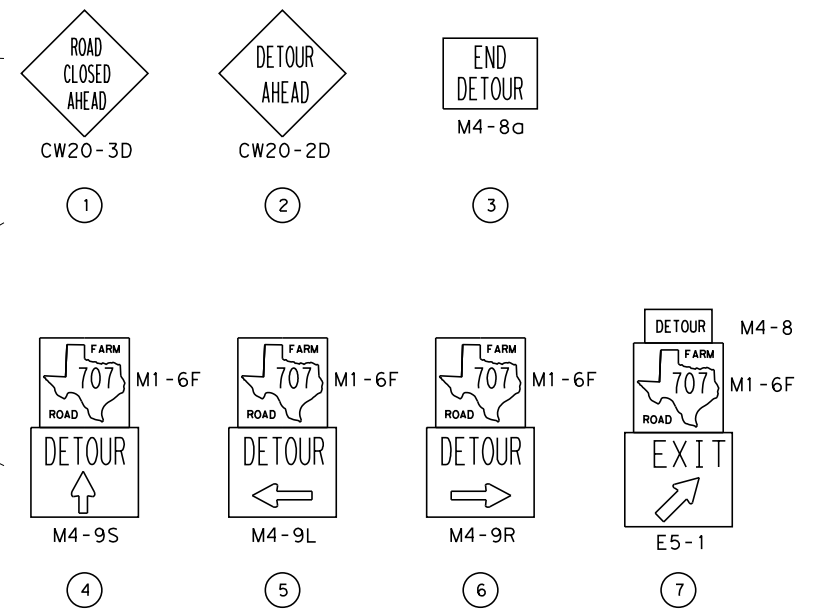
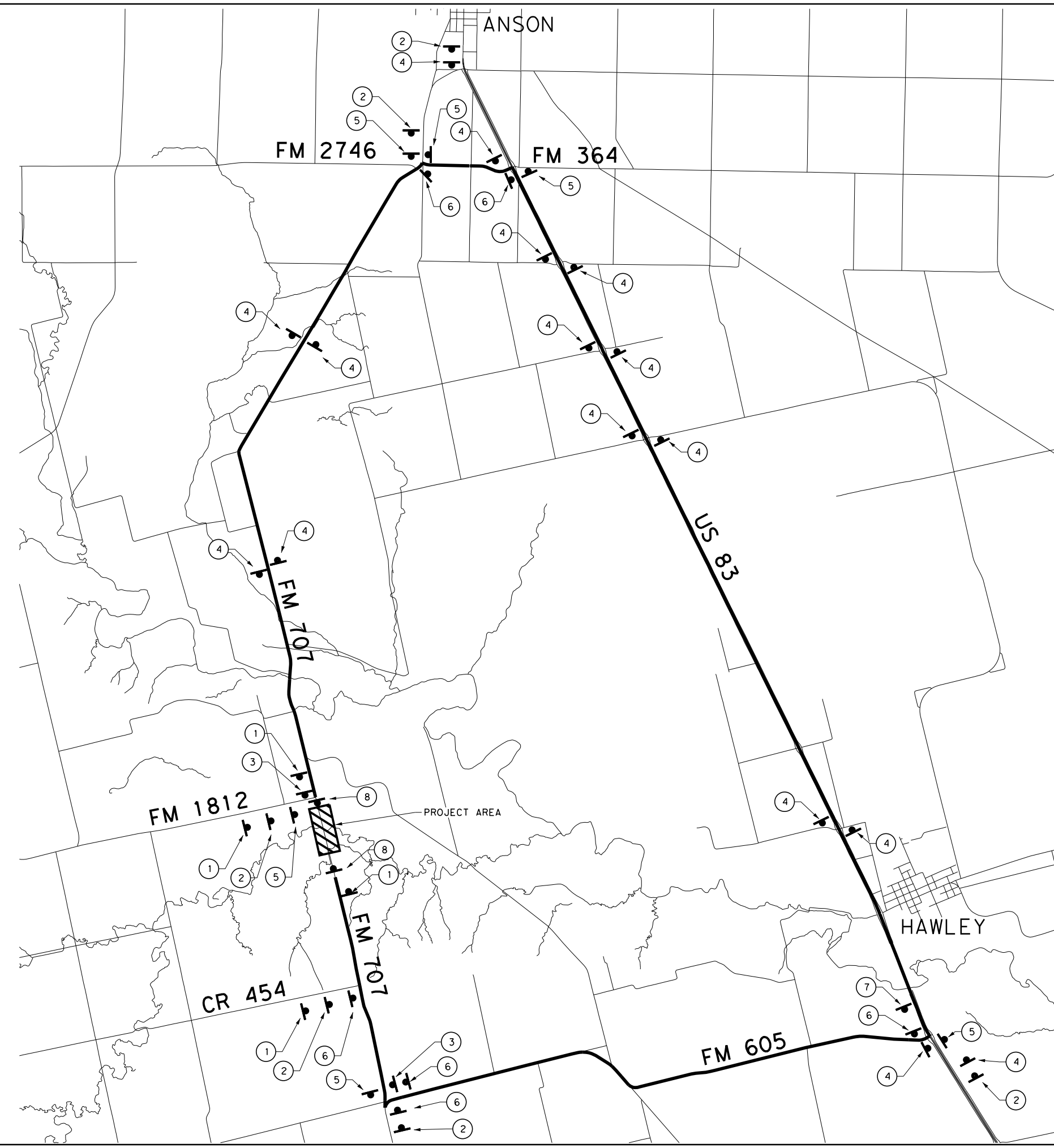
SHEET 1 OF 1

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DW:	CK:	DIST	COUNTY		SHEET NO.
RZ	RZ	ABL	JONES		11

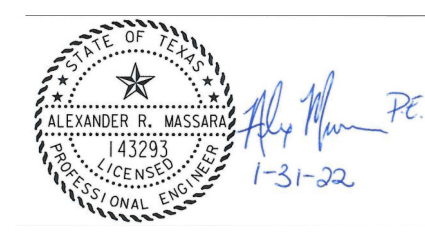
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3000 0 3000 6000
SCALE: 1" = 6000'



- NOTES:**
1. TRAFFIC CONTROL SHOWN HEREON IS THE MINIMUM REQUIREMENT FOR THIS PROJECT. ALL TRAFFIC CONTROL DEVICES FOR THIS PROJECT WILL BE IN ACCORDANCE WITH THE LATEST REVISION OF THE TEXAS MUTCD AND STANDARD (BC) SHEETS.
 2. IF THE CONSTRAINTS DO NOT ALLOW COMPLETION OF ALL CONSTRUCTION PRIOR TO OPENING THE ROADWAY TO TRAFFIC, ADVANCE SIGNS AS DIRECTED BY ENGINEER WILL BE INSTALLED AND MAINTAINED BY THE CONTRACTOR UNTIL CONSTRUCTION IS COMPLETED.
 3. REFER TO GENERAL NOTES FOR ADDITIONAL INFORMATION.
 4. CONTRACTOR SHALL MAINTAIN ACCESS TO PROPERTIES AT ALL TIMES DURING CONSTRUCTION.



- SEQUENCE OF CONSTRUCTION:**
1. PLACE ADVANCE WARNING SIGNS, TRAFFIC CONTROL DEVICES, TEMPORARY EROSION CONTROL DEVICES, AND CLOSE ROAD TO TRAFFIC.
 2. REMOVE EXISTING STRUCTURE.
 3. CONSTRUCT NEW BRIDGE AND APPROACHES.
 4. PLACE PAVEMENT MARKINGS, OBJECT MARKERS, TOPSOIL SEEDING, AND PERMANENT EROSION CONTROL DEVICES.
 5. REMOVE TEMPORARY TRAFFIC CONTROL DEVICES, ADVANCE WARNING SIGNS, TEMPORARY EROSION CONTROL DEVICES, AND OPEN ROAD TO TRAFFIC.

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FM 707 ROAD CLOSURE & DETOUR PLAN

SHEET 1 OF 1

DES:	CK:	CONT:	SECT:	JOB:	HIGHWAY:
AM	DH	0484	01	025	FM 707
DW:	CK:	DIST:		COUNTY:	SHEET NO.
AM	AT	ABL		JONES	12

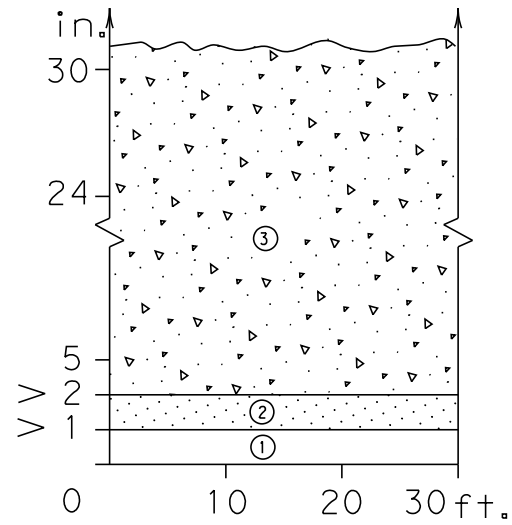
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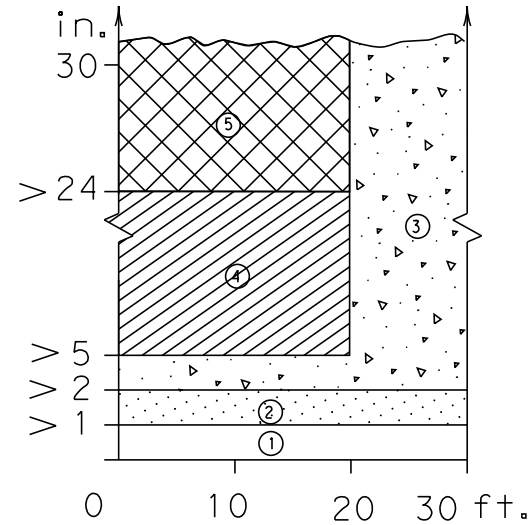
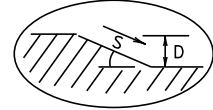
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 alex.massara@txdot.gov

DEFINITION OF TREATMENT ZONES FOR VARIOUS EDGE CONDITIONS

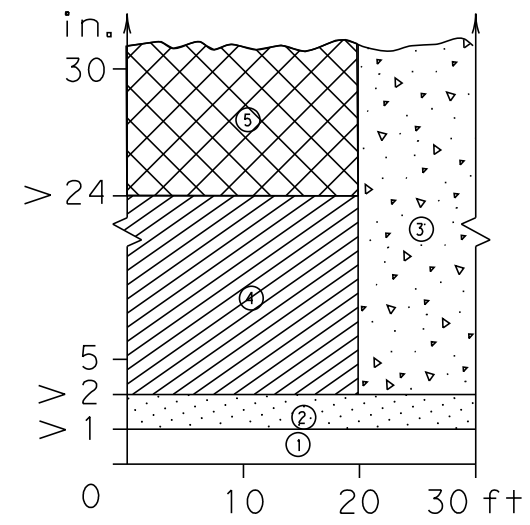
Edge Height (D) in Inches versus Lateral Clearance (Y) in Feet



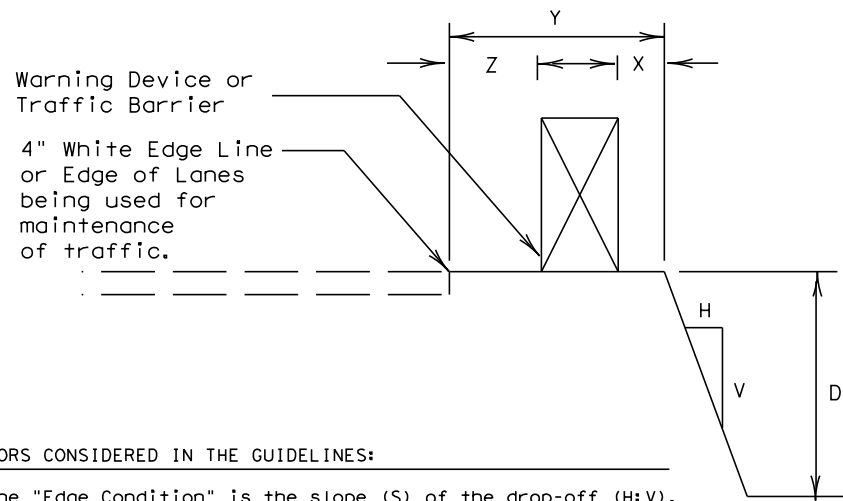
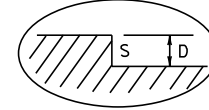
Edge Condition I
 $S = (3:1)$ (or flatter)



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



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



FACTORS CONSIDERED IN THE GUIDELINES:

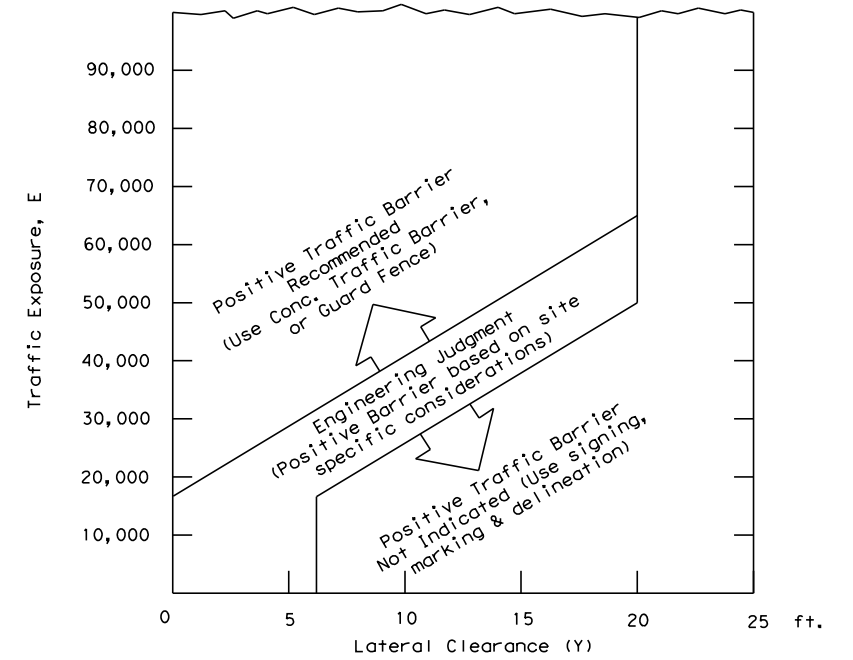
- The "Edge Condition" is the slope (S) of the drop-off (H:V). The "Edge Height" is the depth of the drop-off "D".
- Distance "X" is to be the maximum practical under job conditions. Two feet minimum for high speed conditions. Distance "Y" is the lateral clearance from edge of travel lane to edge of dropoff. Distance "Z" does not have a minimum.
- In addition to the factors considered in the guidelines, each construction zone drop-off situation should be analyzed individually, taking into account other variables, such as: traffic mix, posted speed in the construction zone, horizontal curvature, and the practicality of the treatment options.
- The conditions for indicating the use of positive or protective barriers are given by Zone-5 and Figure-1. Traffic barriers are primarily applicable for high speed conditions. Urban areas with speeds of 30 mph or less may have a lesser need for signing, delineation, and barriers. Right-angled edges, however, with "D" greater than 2 inches and located within a lateral offset of 6 feet, may indicate a higher level of treatment.
- If the distance "Y" must be less than 3 feet, the use of a positive barrier may not be feasible. In such a case, consider either: 1) narrowing the lanes to a desired 11 to 12 feet or 10 foot minimum (see CW20-8 sign), or 2) provide an edge slope such as Edge Condition I.

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

Edge Condition Notes:

- Edge Condition I: Most vehicles are able to traverse an edge condition with a slope rate of (3 to 1) or flatter. The slope must be constructed with a compacted material capable of supporting vehicles.
- Edge Condition II: Most vehicles are able to traverse an edge condition with a slope between (2.99 to 1) and (1 to 1) so long as "D" does not exceed 5 inches. Under-carriage drag on most automobiles will occur when "D" exceeds 6 inches. As "D" exceeds 24 inches, the possibility for rollover is greater in most vehicles.
- Edge Condition III: When slopes are greater than (1 to 1) and where "D" is greater than 2 inches, a more difficult control factor may exist for some vehicles, if not properly treated. For example, where "D" is greater than 2 inches and up to 24 inches different types of vehicles may experience different steering control at different edge heights. Automobiles might experience more steering control differential when "D" is greater than 2 inches and up to 5 inches. Trucks, particularly those with high loads, have more steering control differential when "D" is greater than 5 inches and up to 24 inches. When "D" exceeds 24 inches, the possibility of rollover is greater for most vehicles.
- Milling or overlay operations that result in Edge Condition III should not be in place without appropriate warning treatments, and these conditions should not be left in place for extended periods of time.

FIGURE-1: CONDITIONS INDICATING USE OF POSITIVE BARRIER FOR ZONE 5 ([Cross-hatched symbol])



- $E = ADT \times T$
 Where ADT is that portion of the average daily traffic volume traveling within 20 feet (generally two adjacent lanes) of the edge dropoff condition; and, T is the duration time in years of the dropoff condition.
- Figure-1 provides a practical approach to the use of positive barriers for the protection of vehicles from pavement drop-offs. Other factors, such as the presence of heavy machinery, construction workers, or the mix and volume of traffic may make the use of positive barriers appropriate, even when the edge condition alone may not justify the use of a barrier.
- An approved end treatment should be provided for any positive barrier end located within a lateral offset of 20 feet from the edge of the travel lane.

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

Engineer's Seal

Alexander R. Massara PE
 1-31-22

Date _____

Texas Department of Transportation
 Traffic Operations Division

TREATMENT FOR VARIOUS EDGE CONDITIONS

© TxDOT August 2000		DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
REVISIONS					
CONTRACT NO.	SECTION	JOB NO.	HIGHWAY		
0484	01	025	FM 707		
DISTRICT	COUNTY	SHEET NO.			
ABL	JONES	28			

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BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

1. The Barricade and Construction Standard Sheets (BC sheets) are intended to show typical examples for placement of temporary traffic control devices, construction pavement markings, and typical work zone signs. The information contained in these sheets meet or exceed the requirements shown in the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
2. The development and design of the Traffic Control Plan (TCP) is the responsibility of the Engineer.
3. The Contractor may propose changes to the TCP that are signed and sealed by a licensed professional engineer for approval. The Engineer may develop, sign and seal Contractor proposed changes.
4. The Contractor is responsible for installing and maintaining the traffic control devices as shown in the plans. The Contractor may not move or change the approximate location of any device without the approval of the Engineer.
5. Geometric design of lane shifts and detours should, when possible, meet the applicable design criteria contained in manuals such as the American Association of State Highway and Transportation Officials (AASHTO), "A Policy on Geometric Design of Highways and Streets," the TxDOT "Roadway Design Manual" or engineering judgment.
6. When projects abut, the Engineer(s) may omit the END ROAD WORK, TRAFFIC FINES DOUBLE, and other advance warning signs if the signing would be redundant and the work areas appear continuous to the motorists. If the adjacent project is completed first, the Contractor shall erect the necessary warning signs as shown on these sheets, the TCP sheets or as directed by the Engineer. The BEGIN ROAD WORK NEXT X MILES sign shall be revised to show appropriate work zone distance.
7. The Engineer may require duplicate warning signs on the median side of divided highways where median width will permit and traffic volumes justify the signing.
8. All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition. Sign details not shown in this manual shall be shown in the plans or the Engineer shall provide a detail to the Contractor before the sign is manufactured.
9. The temporary traffic control devices shown in the illustrations of the BC sheets are examples. As necessary, the Engineer will determine the most appropriate traffic control devices to be used.
10. Where highway construction or maintenance work is being undertaken, other than mobile operations as defined by the Texas Manual on Uniform Traffic Control Devices, CSJ limit signs are required. CSJ limit signs are shown on BC(2). The OBEY WARNING SIGNS STATE LAW sign, STAY ALERT TALK OR TEXT LATER and the WORK ZONE TRAFFIC FINES DOUBLE sign with plaque shall be erected in advance of the CSJ limits. The BEGIN ROAD WORK NEXT X MILES, CONTRACTOR and END ROAD WORK signs shall be erected at or near the CSJ limits. For mobile operations, CSJ limit signs are not required.
11. Traffic control devices should be in place only while work is actually in progress or a definite need exists.
12. The Engineer has the final decision on the location of all traffic control devices.
13. Inactive equipment and work vehicles, including workers' private vehicles must be parked away from travel lanes. They should be as close to the right-of-way line as possible, or located behind a barrier or guardrail, or as approved by the Engineer.

WORKER SAFETY NOTES:

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

1. Only pre-qualified products shall be used. The "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources.
2. Work zone traffic control devices shall be compliant with the Manual for Assessing safety Hardware (MASH).

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

SHEET 1 OF 12



**BARRICADE AND CONSTRUCTION
GENERAL NOTES
AND REQUIREMENTS**

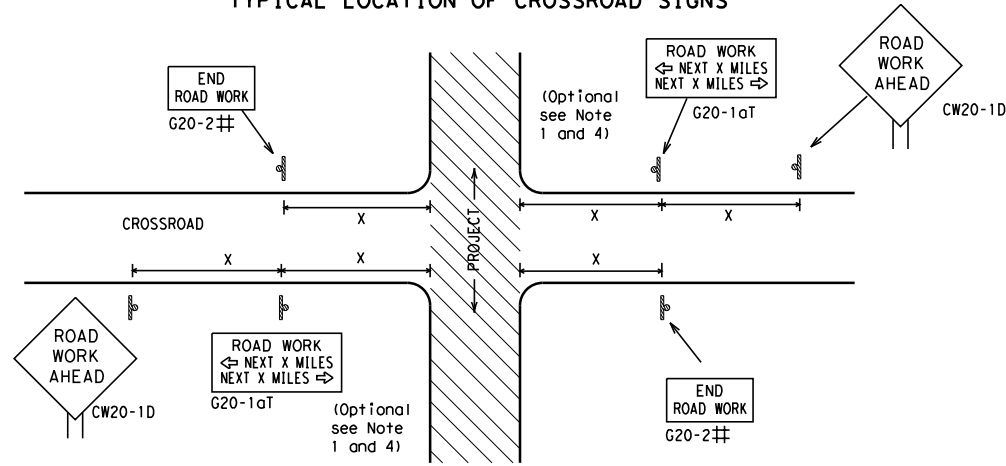
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4-03	7-13	DIST	COUNTY		SHEET NO.				
9-07	8-14	ABL	JONES		29				
5-10	5-21								

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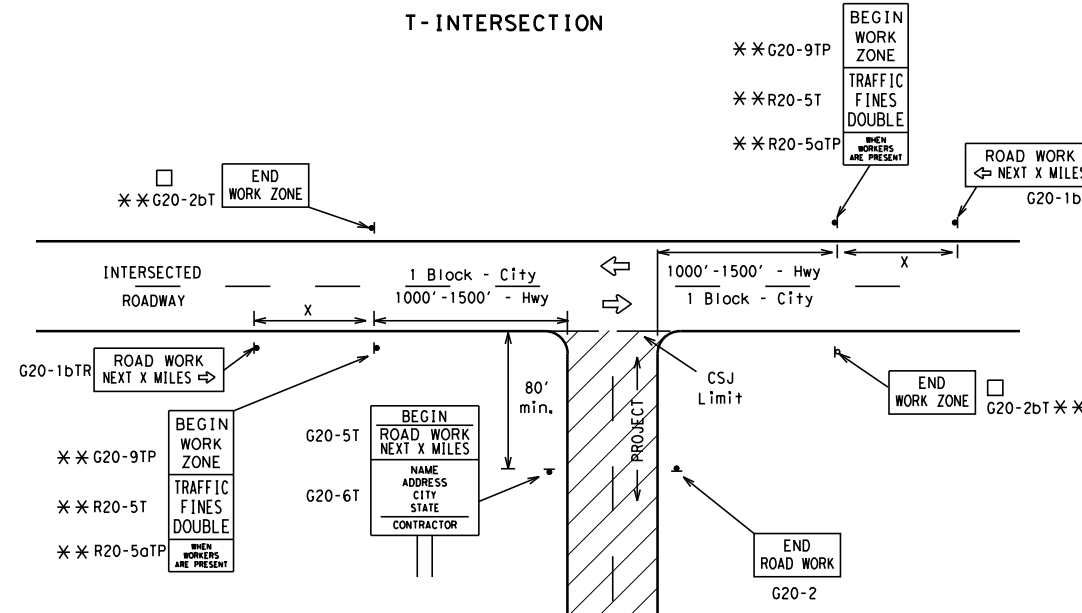
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TYPICAL LOCATION OF CROSSROAD SIGNS



- ## May be mounted on back of "ROAD WORK AHEAD" (CW20-1D) sign with approval of Engineer. (See note 2 below)
- 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.
 - The Engineer may use the reduced size 36" x 36" ROAD WORK AHEAD (CW20-1D) sign mounted back to back with the reduced size 36" x 18" "END ROAD WORK" (G20-2) sign on low volume crossroads (see Note 4 under "Typical Construction Warning Sign Size and Spacing"). See the "Standard Highway Sign Designs for Texas" manual for sign details. The Engineer may omit the advance warning signs on low volume crossroads. The Engineer will determine whether a road is low volume as per TMUTCD Part 5. This information shall be shown in the plans.
 - 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.
 - 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.
 - Additional traffic control devices may be shown elsewhere in the plans for higher volume crossroads.
 - 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

- 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.
- 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}

Sign Number or Series	SIZE		SPACING	
	Conventional Road	Expressway/Freeway	Posted Speed MPH	Sign Δ Spacing "X" Feet (Apprx.)
CW20 ⁴	48" x 48"	48" x 48"	30	120
CW21			35	160
CW22			40	240
CW23			45	320
CW25			50	400
CW1, CW2, CW7, CW8, CW9, CW11, CW14	36" x 36"	48" x 48"	55	500 ²
CW3, CW4, CW5, CW6, CW8-3, CW10, CW12	48" x 48"	48" x 48"	60	600 ²
			65	700 ²
			70	800 ²
			80	1000 ²
*			*	* ³

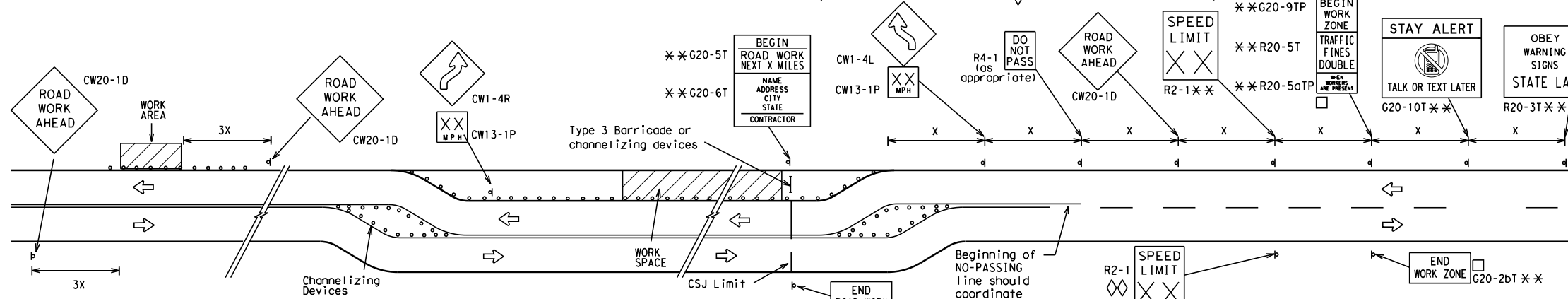
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

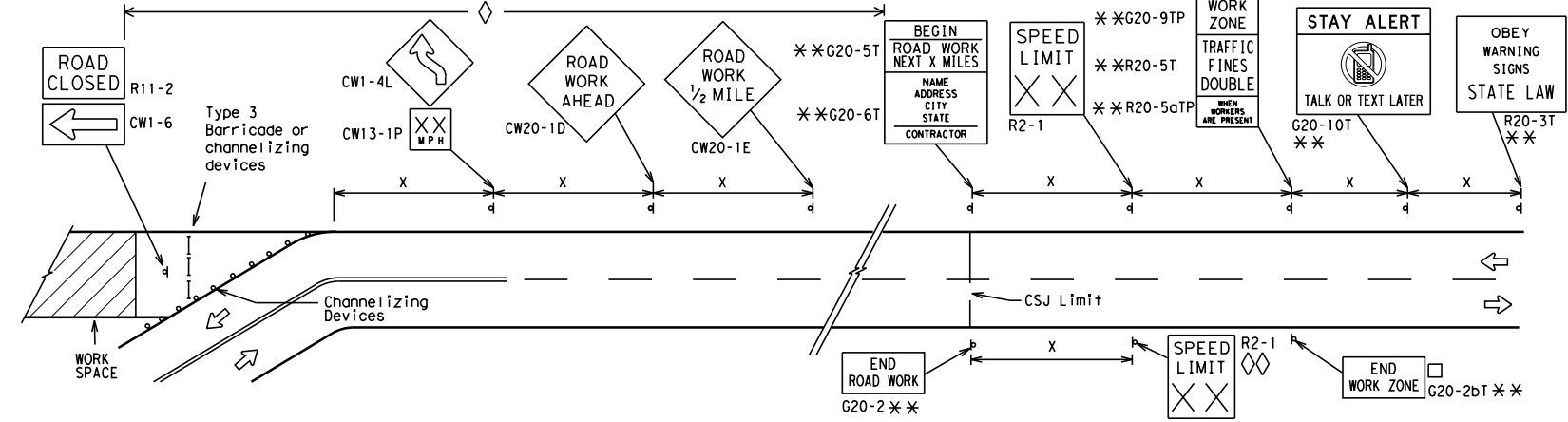
- Special or larger size signs may be used as necessary.
- Distance between signs should be increased as required to have 1500 feet advance warning.
- Distance between signs should be increased as required to have 1/2 mile or more advance warning.
- 36" x 36" "ROAD WORK AHEAD" (CW20-1D) signs may be used on low volume crossroads at the discretion of the Engineer as per TMUTCD Part 5. See Note 2 under "Typical Location of Crossroad Signs".
- Only diamond shaped warning sign sizes are indicated.
- 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

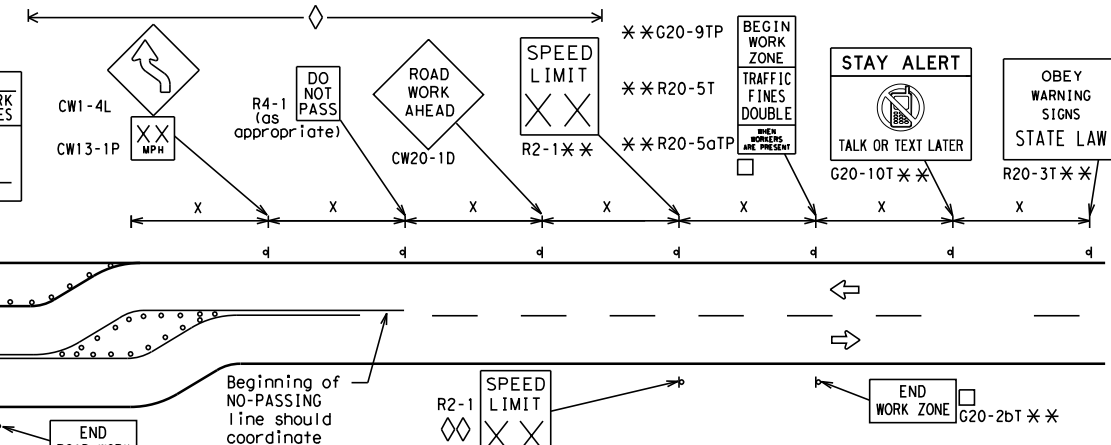


When extended distances occur between minimal work spaces, the Engineer/Inspector should ensure additional "ROAD WORK AHEAD" (CW20-1D) signs are placed in advance of these work areas to remind drivers they are still within the project limits. See the applicable TCP sheets for exact location and spacing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

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



SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS



NOTES

- The Contractor shall determine the appropriate distance to be placed on the G20-1 series signs and "BEGIN ROAD WORK NEXT X MILES" (G20-5T) sign for each specific project. This distance shall replace the "X" and shall be rounded to the nearest whole mile with the approval of the Engineer. No decimals shall be used.
- The "BEGIN WORK ZONE" (G20-9TP) and "END WORK ZONE" (G20-2bT) shall be used as shown on the sample layout when advance signs are required outside the CSJ Limits. They inform the motorist of entering or leaving a part of the work zone lying outside the CSJ Limits where traffic fines may double if workers are present.
 - ** CSJ limit signing is required for highway construction and maintenance work, with the exception of mobile operations.
 - ◇ Area for placement of "ROAD WORK AHEAD" (CW20-1D) sign and other signs or devices as called for on the Traffic Control Plan.
 - ◇◇ Contractor will install a regulatory speed limit sign at the end of the work zone.

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

SHEET 2 OF 12



BARRICADE AND CONSTRUCTION PROJECT LIMIT

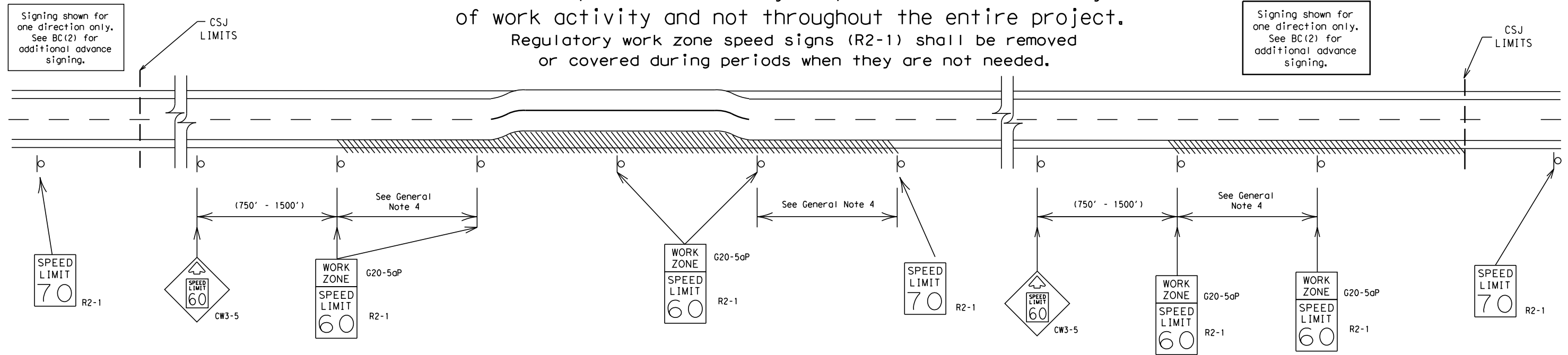
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TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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:

- rough road or damaged pavement surface
- substantial alteration of roadway geometrics (diversions)
- construction detours
- grade
- width
- other conditions readily apparent to the driver

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

- Regulatory work zone speed limits should be used only for sections of construction projects where speed control is of major importance.
- Regulatory work zone speed limit signs shall be placed on supports at a 7 foot minimum mounting height.
- Speed zone signs are illustrated for one direction of travel and are normally posted for each direction of travel.
- 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
- Regulatory speed limit signs shall have black legend and border on a white reflective background (See "Reflective Sheeting" on BC(4)).
- 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.
- Turning signs from view, laying signs over or down will not be allowed, unless as otherwise noted under "REMOVING OR COVERING" on BC(4).
- Techniques that may help reduce traffic speeds include but are not limited to:
 - Law enforcement.
 - Flagger stationed next to sign.
 - Portable changeable message sign (PCMS).
 - Low-power (drone) radar transmitter.
 - Speed monitor trailers or signs.
- Speeds shown on details above are for illustration only. Work Zone Speed Limits should only be posted as approved for each project.
- For more specific guidance concerning the type of work, work zone conditions and factors impacting allowable regulatory construction speed zone reduction see TxDOT form #1204 in the TxDOT e-form system.

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SHEET 3 OF 12



BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

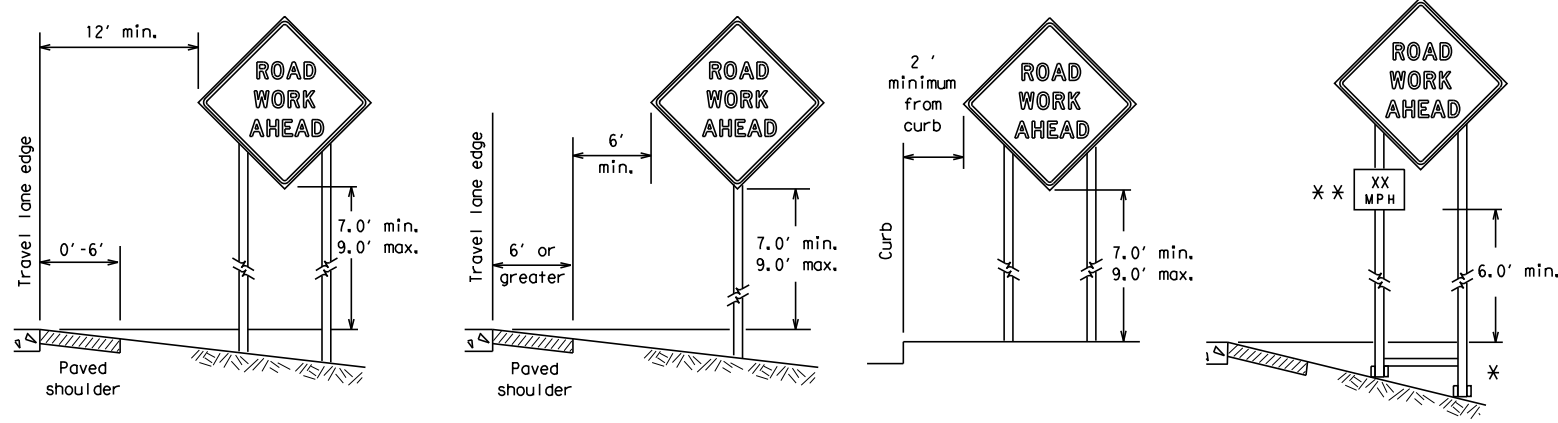
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7-13	5-21	ABL	JONES		31				

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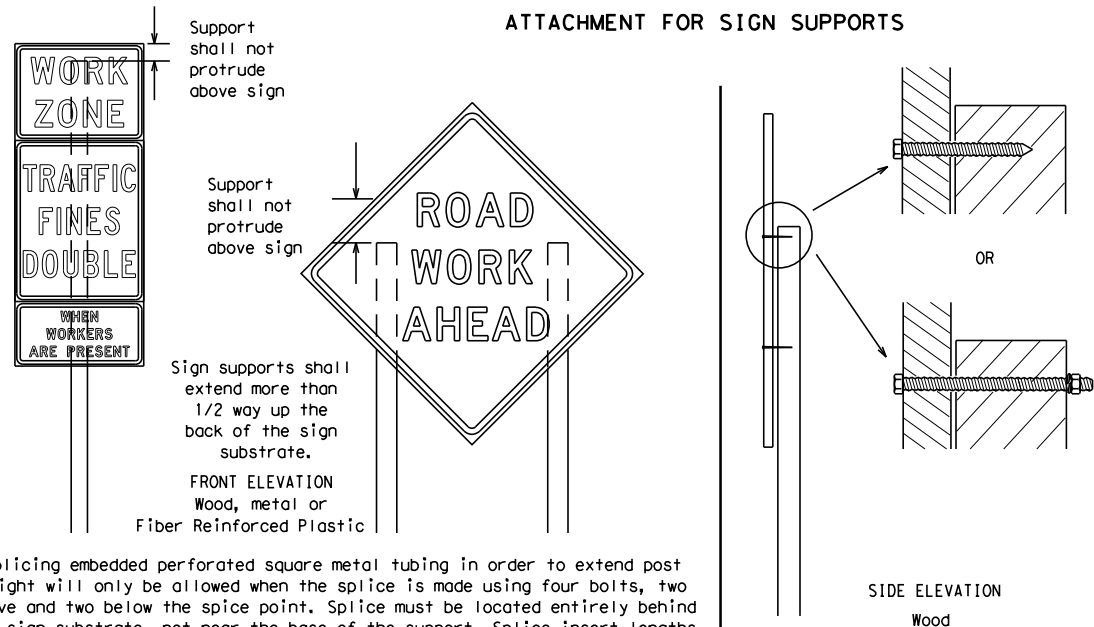
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS



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

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

ATTACHMENT FOR SIGN SUPPORTS



Splicing embedded perforated square metal tubing in order to extend post height will only be allowed when the splice is made using four bolts, two above and two below the splice 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.

GENERAL NOTES FOR WORK ZONE SIGNS

- Contractor shall install and maintain signs in a straight and plumb condition and/or as directed by the Engineer.
- Wooden sign posts shall be painted white.
- Barricades shall NOT be used as sign supports.
- 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.
- 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.
- The Contractor shall furnish sign supports listed in the "Compliant Work Zone Traffic Control Device List" (CWZTCD) for small roadside signs. Supports for temporary large roadside signs shall meet the requirements detailed on the Temporary Large Roadside Signs (TLRS) standard sheets. The Contractor shall install the sign support in accordance with the manufacturer's recommendations. If there is a question regarding installation procedures, the Contractor shall furnish the Engineer a copy of the manufacturer's installation recommendations so the Engineer can verify the correct procedures are being followed.
- 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.
- 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.
- 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)

- 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.
 - Long-term stationary - work that occupies a location more than 3 days.
 - 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.
 - Short-term stationary - daytime work that occupies a location for more than 1 hour in a single daylight period.
 - Short, duration - work that occupies a location up to 1 hour.
 - Mobile - work that moves continuously or intermittently (stopping for up to approximately 15 minutes.)

SIGN MOUNTING HEIGHT

- 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.
- 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.
- Long-term/Intermediate-term Signs may be used in lieu of Short-term/Short Duration signing.
- 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.
- 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

- 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

- 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.
- "Mesh" type materials are NOT an approved sign substrate, regardless of the tightness of the weave.
- 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

- 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).
- White sheeting, meeting the requirements of DMS-8300 Type A, shall be used for signs with a white background.
- 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

- 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

- When sign messages may be confusing or do not apply, the signs shall be removed or completely covered.
- 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.
- 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.
- 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.
- Burlap shall NOT be used to cover signs.
- Duct tape or other adhesive material shall NOT be affixed to a sign face.
- Signs and anchor stubs shall be removed and holes backfilled upon completion of work.

SIGN SUPPORT WEIGHTS

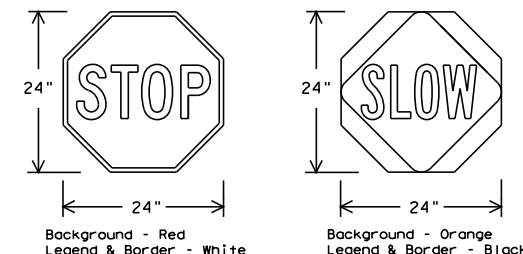
- Where sign supports require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand should be used.
- The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
- Rock, concrete, iron, steel or other solid objects shall not be permitted for use as sign support weights.
- 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.
- 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.
- 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.
- Sandbags shall NOT be placed under the skid and shall not be used to level sign supports placed on slopes.

FLAGS ON SIGNS

- 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.

STOP/SLOW PADDLES

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



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

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

- Permanent signs are used to give notice of traffic laws or regulations, call attention to conditions that are potentially hazardous to traffic operations, show route designations, destinations, directions, distances, services, points of interest, and other geographical, recreational, specific service (LOGO), or cultural information. Drivers proceeding through a work zone need the same, if not better route guidance as normally installed on a roadway without construction.
- When permanent regulatory or warning signs conflict with work zone conditions, remove or cover the permanent signs until the permanent sign message matches the roadway condition. For details for covering large guide signs see the TS-CD standard.
- When existing permanent signs are moved and relocated due to construction purposes, they shall be visible to motorists at all times.
- 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.
- If permanent signs are to be removed and relocated using temporary supports, the Contractor shall use crashworthy supports as shown on the BC standard sheets, TLRS standard sheets or the CWZTCD list. The signs shall meet the required mounting heights shown on the BC, or the SMD standard sheets during construction. This work should be paid for under the appropriate pay item for relocating existing signs.
- 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.

SHEET 4 OF 12

Texas Department of Transportation
 Traffic Safety Division Standard

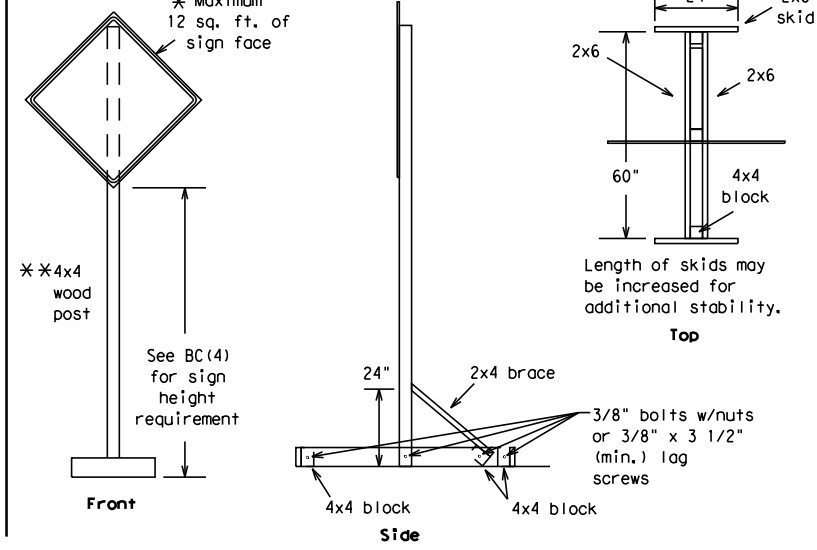
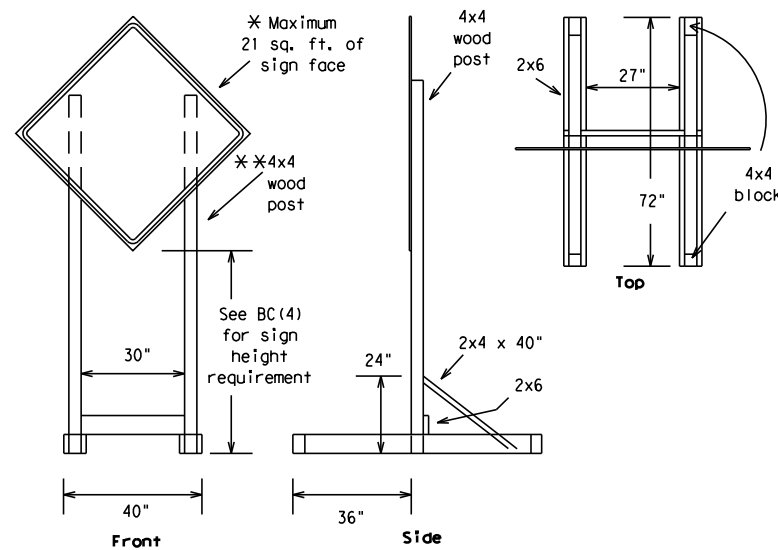
BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC (4) - 21

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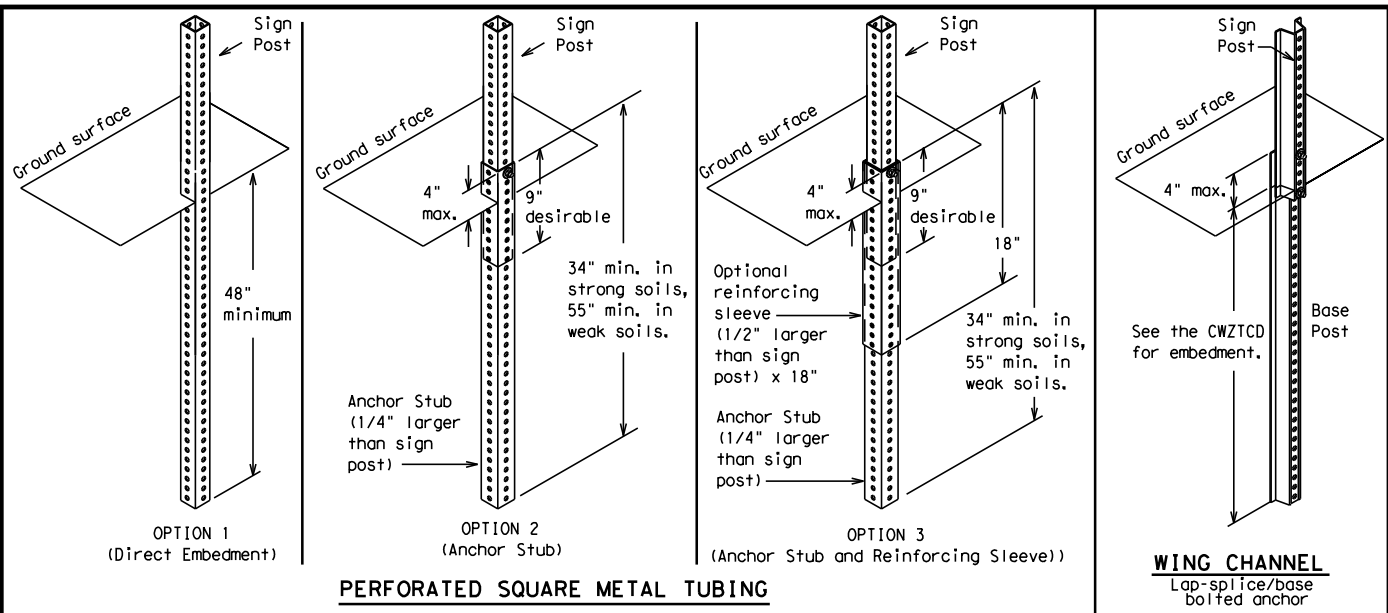
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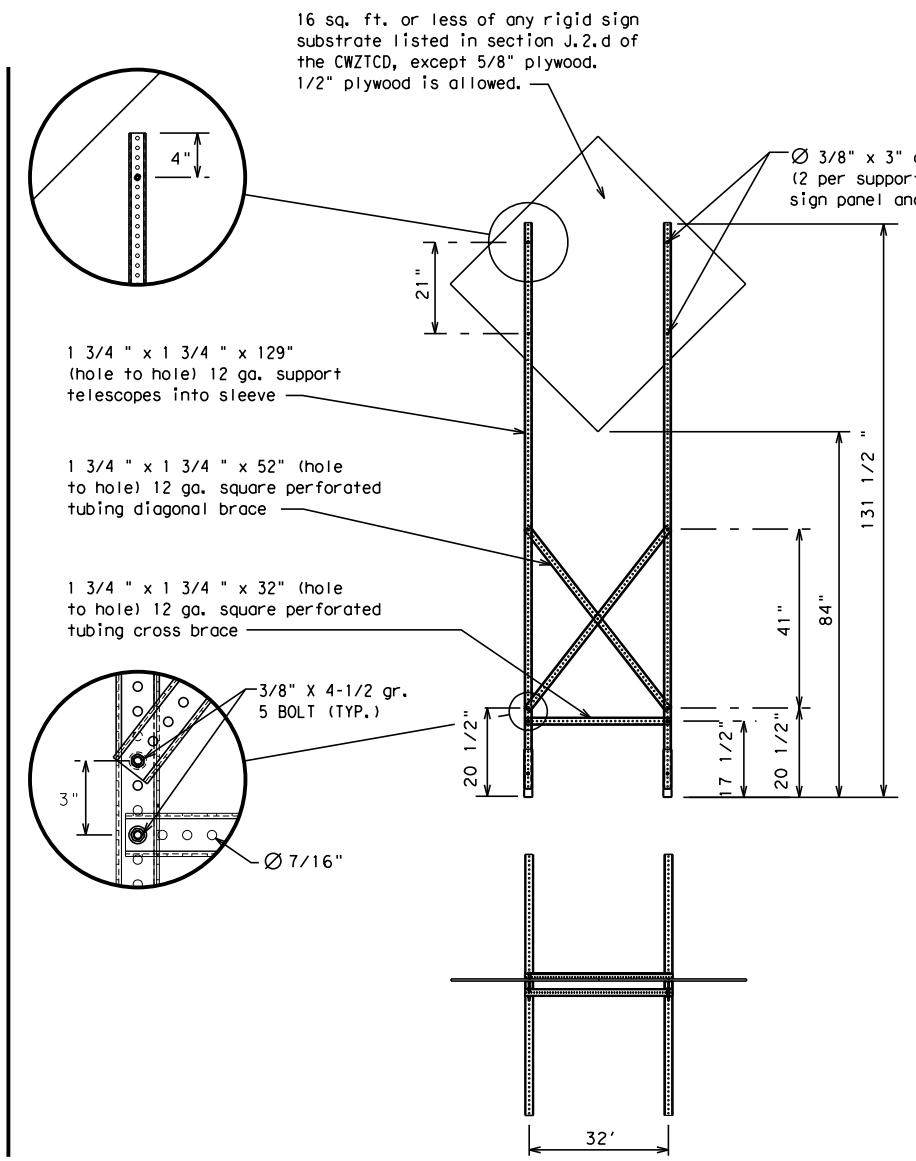
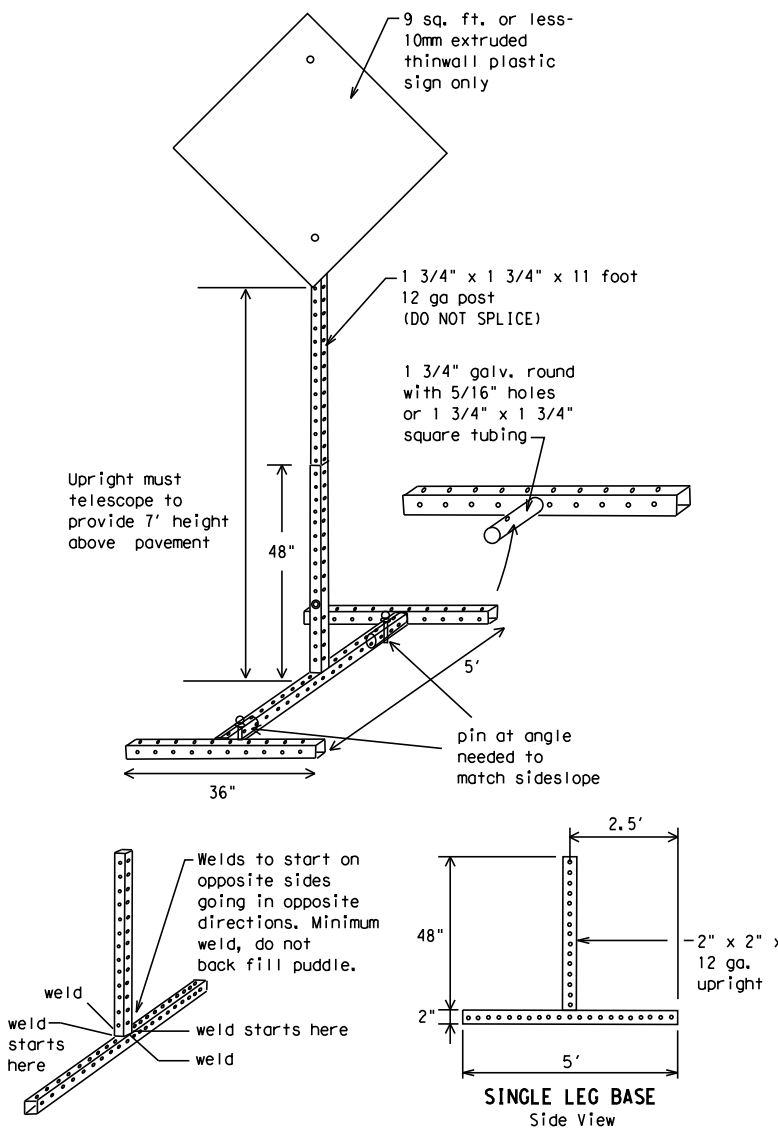
SKID MOUNTED WOOD SIGN SUPPORTS

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



GROUND MOUNTED SIGN SUPPORTS

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



SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

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

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

- GENERAL NOTES**
- 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.
 - No more than 2 sign posts shall be placed within a 7 ft. circle, except for specific materials noted on the CWZTCD List.
 - 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.

SHEET 5 OF 12



BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5) - 21

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

PORTABLE CHANGEABLE MESSAGE SIGNS

- The Engineer/Inspector shall approve all messages used on portable changeable message signs (PCMS).
- 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.
- 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.
- Use the word "EXIT" to refer to an exit ramp on a freeway; i.e., "EXIT CLOSED." Do not use the term "RAMP."
- Always use the route or interstate designation (IH, US, SH, FM) along with the number when referring to a roadway.
- When in use, the bottom of a stationary PCMS message panel should be a minimum 7 feet above the roadway, where possible.
- 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.
- 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.
- Do not "flash" messages or words included in a message. The message should be steady burn or continuous while displayed.
- 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.
- Do not use the word "Danger" in message.
- Do not display the message "LANES SHIFT LEFT" or "LANES SHIFT RIGHT" on a PCMS. Drivers do not understand the message.
- Do not display messages that scroll horizontally or vertically across the face of the sign.
- 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.
- 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.
- Each line of text should be centered on the message board rather than left or right justified.
- 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.

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

FREEWAY CLOSED X MILE
ROAD CLOSED AT SH XXX
ROAD CLSD AT FM XXXX
RIGHT X LANES CLOSED
CENTER LANE CLOSED
NIGHT LANE CLOSURES
VARIOUS LANES CLOSED
EXIT CLOSED
MALL DRIVEWAY CLOSED
XXXXXXXX BLVD CLOSED

Other Condition List

FRONTAGE ROAD CLOSED
SHOULDER CLOSED XXX FT
RIGHT LN CLOSED XXX FT
RIGHT X LANES OPEN
DAYTIME LANE CLOSURES
I-XX SOUTH EXIT CLOSED
EXIT XXX CLOSED X MILE
RIGHT LN TO BE CLOSED
X LANES CLOSED TUE - FRI
ROADWORK XXX FT
FLAGGER XXXX FT
RIGHT LN NARROWS XXXX FT
MERGING TRAFFIC XXXX FT
LOOSE GRAVEL XXXX FT
DETOUR X MILE
ROADWORK PAST SH XXXX
BUMP XXXX FT
TRAFFIC SIGNAL XXXX FT
ROAD REPAIRS XXXX FT
LANE NARROWS XXXX FT
TWO-WAY TRAFFIC XX MILE
CONST TRAFFIC XXX FT
UNEVEN LANES XXXX FT
ROUGH ROAD XXXX FT
ROADWORK NEXT FRI-SUN
US XXX EXIT X MILES
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
DETOUR NEXT X EXITS
USE EXIT XXX
STAY ON US XXX SOUTH
TRUCKS USE US XXX N
WATCH FOR TRUCKS
EXPECT DELAYS
REDUCE SPEED XXX FT
USE OTHER ROUTES
STAY IN LANE *
FORM X LINES RIGHT
USE XXXXX RD EXIT
USE EXIT I-XX NORTH
USE I-XX E TO I-XX N
WATCH FOR TRUCKS
EXPECT DELAYS
END SHOULDER USE
WATCH FOR WORKERS

Location List

AT FM XXXX
BEFORE RAILROAD CROSSING
NEXT X MILES
PAST US XXX EXIT
XXXXXXXX TO XXXXXX
US XXX TO FM XXXX

Warning List

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

** Advance Notice List

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

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

- Only 1 or 2 phases are to be used on a PCMS.
- The 1st phase (or both) should be selected from the "Road/Lane/Ramp Closure List" and the "Other Condition List".
- A 2nd phase can be selected from the "Action to Take/Effect on Travel, Location, General Warning, or Advance Notice Phase Lists".
- A Location Phase is necessary only if a distance or location is not included in the first phase selected.
- 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.
- 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

- The words RIGHT, LEFT and ALL can be interchanged as appropriate.
- Roadway designations IH, US, SH, FM and LP can be interchanged as appropriate.
- EAST, WEST, NORTH and SOUTH (or abbreviations E, W, N and S) can be interchanged as appropriate.
- Highway names and numbers replaced as appropriate.
- ROAD, HIGHWAY and FREEWAY can be interchanged as needed.
- AHEAD may be used instead of distances if necessary.
- FT and MI, MILE and MILES interchanged as appropriate.
- AT, BEFORE and PAST interchanged as needed.
- 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

- 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.
- 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.
- 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.
- 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.

WORD OR PHRASE	ABBREVIATION	WORD OR PHRASE	ABBREVIATION
Access Road	ACCS RD	Major	MAJ
Alternate	ALT	Miles	MI
Avenue	AVE	Miles Per Hour	MPH
Best Route	BEST RTE	Minor	MNR
Boulevard	BLVD	Monday	MON
Bridge	BRDG	Normal	NORM
Canot	CANT	North	N
Center	CTR	Northbound	(route) N
Construction Ahead	CONST AHD	Parking	PKING
CROSSING	XING	Road	RD
Detour Route	DETOUR RTE	Right Lane	RT LN
Do Not	DONT	Saturday	SAT
East	E	Service Road	SERV RD
Eastbound	(route) E	Shoulder	SHLDR
Emergency	EMER	Slippery	SLIP
Emergency Vehicle	EMER VEH	South	S
Entrance, Enter	ENT	Southbound	(route) S
Express Lane	EXP LN	Speed	SPD
Expressway	EXPWY	Street	ST
XXXX Feet	XXXX FT	Sunday	SUN
Fog Ahead	FOG AHD	Telephone	PHONE
Freeway	FRWY, FWY	Temporary	TEMP
Freeway Blocked	FWY BLKD	Thursday	THURS
Friday	FRI	To Downtown	TO DWNTN
Hazardous Driving	HAZ DRIVING	Traffic	TRAF
Hazardous Material	HAZMAT	Travelers	TRVLR
High-Occupancy Vehicle	HOV	Tuesday	TUES
Highway	HWY	Time Minutes	TIME MIN
Hour(s)	HR, HRS	Upper Level	UPR LEVEL
Information	INFO	Vehicles (s)	VEH, VEHS
It Is	ITS	Warning	WARN
Junction	JCT	Wednesday	WED
Left	LFT	Weight Limit	WT LIMIT
Left Lane	LFT LN	West	W
Lane Closed	LN CLOSED	Westbound	(route) W
Lower Level	LWR LEVEL	Wet Pavement	WET PVMT
Maintenance	MAINT	Will Not	WONT

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



BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC (6) - 21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0484	01	025	FM 707
9-07 8-14	DIST	COUNTY	SHEET NO.	
7-13 5-21	ABL	JONES	34	

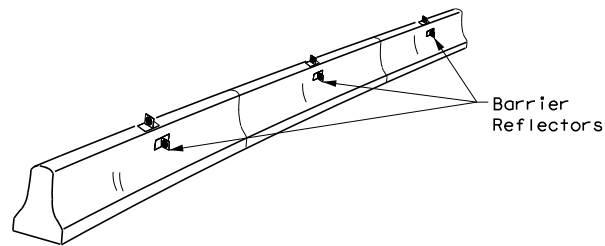
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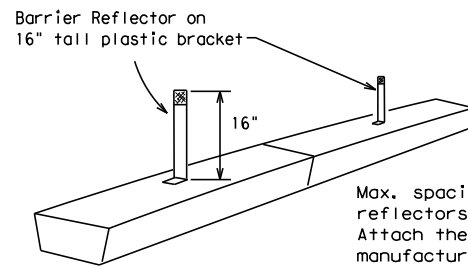
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- Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
- Color of Barrier Reflectors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



CONCRETE TRAFFIC BARRIER (CTB)

- 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.
- 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.
- When CTB separates traffic traveling in the same direction, no barrier reflectors will be required on top of the CTB.
- Barrier Reflector units shall be yellow or white in color to match the edgeline being supplemented.
- Maximum spacing of Barrier Reflectors is forty (40) feet.
- Pavement markers or temporary flexible-reflective roadway marker tabs shall NOT be used as CTB delineation.
- Attachment of Barrier Reflectors to CTB shall be per manufacturer's recommendations.
- Missing or damaged Barrier Reflectors shall be replaced as directed by the Engineer.
- Single slope barriers shall be delineated as shown on the above detail.

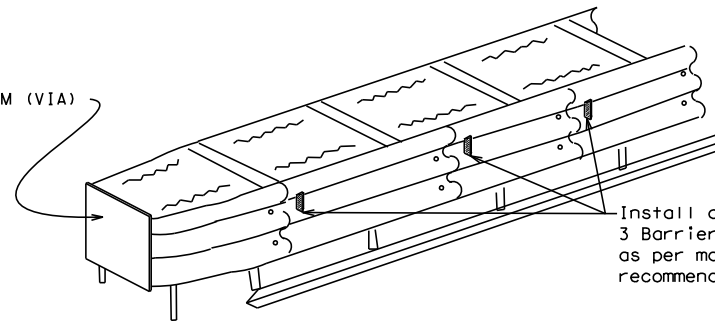


LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

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

LOW PROFILE CONCRETE BARRIER (LPCB)



DELINEATION OF END TREATMENTS

END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS

WARNING LIGHTS

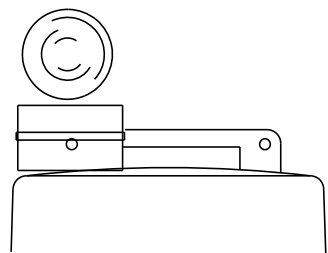
- Warning lights shall meet the requirements of the TMUTCD.
- Warning lights shall NOT be installed on barricades.
- Type A-Low Intensity Flashing Warning Lights are commonly used with drums. They are intended to warn of or mark a potentially hazardous area. Their use shall be as indicated on this sheet 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.
- 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".
- The Engineer/Inspector or the plans shall specify the location and type of warning lights to be installed on the traffic control devices.
- 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.
- 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.
- The location of warning lights and warning reflectors on drums shall be as shown elsewhere in the plans.

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

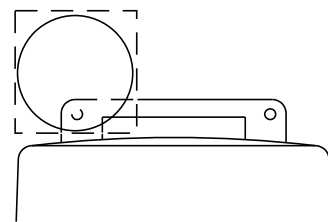
- Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
- Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
- A series of sequential flashing warning lights placed on channelizing 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.
- 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.
- Type A, Type C and Type D warning lights shall be installed at locations as detailed on other sheets in the plans.
- Warning lights shall not be installed on a drum that has a sign, chevron or vertical panel.
- 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

- 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.
- 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.
- The warning reflector shall have a minimum retroreflective surface area (one-side) of 30 square inches.
- Round reflectors shall be fully reflectorized, including the area where attached to the drum.
- 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.
- 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.
- When used near two-way traffic, both sides of the warning reflector shall be reflectorized.
- The warning reflector should be mounted on the side of the handle nearest approaching traffic.
- The maximum spacing for warning reflectors should be identical to the channelizing device spacing requirements.



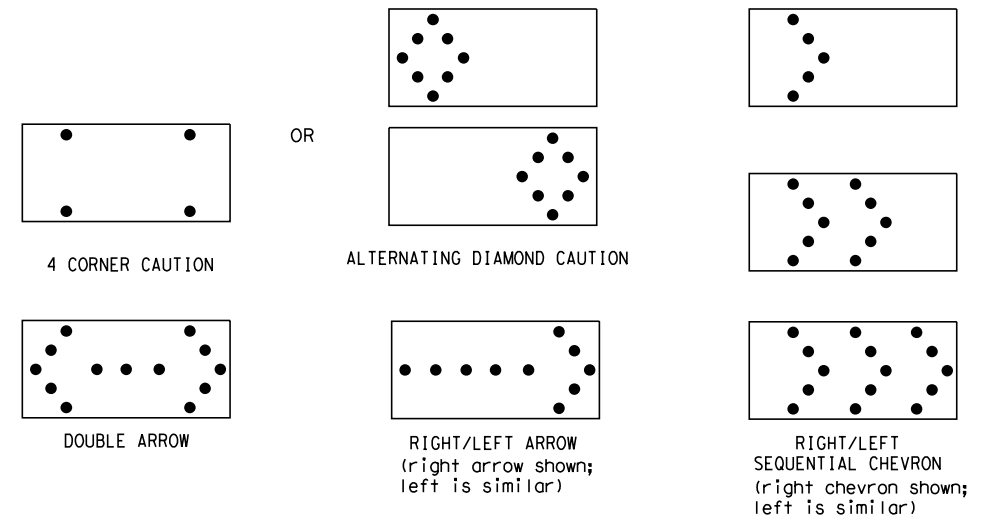
Type C Warning Light or approved substitute mounted on a drum adjacent to the travel way.



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

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.

- 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.
- 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.
- 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.
- The Flashing Arrow Board should be able to display the following symbols:



- The "CAUTION" display consists of four corner lamps flashing simultaneously, or the Alternating Diamond Caution mode as shown.
- The straight line caution display is NOT ALLOWED.
- 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.
- 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.
- The sequential arrow display is NOT ALLOWED.
- The flashing arrow display is the TxDOT standard; however, the sequential chevron display may be used during daylight operations.
- The Flashing Arrow Board shall be mounted on a vehicle, trailer or other suitable support.
- A Flashing Arrow Board SHALL NOT BE USED to laterally shift traffic.
- 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.
- 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

- Truck-mounted attenuators (TMA) used on TxDOT facilities must meet the requirements outlined in the Manual for Assessing Safety Hardware (MASH).
- Refer to the CWZTCD for the requirements of Level 2 or Level 3 TMAs.
- Refer to the CWZTCD for a list of approved TMAs.
- TMAs are required on freeways unless otherwise noted in the plans.
- 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.
- 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.

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

BC (7) - 21

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© TxDOT	November 2002	CONT	SECT	JOB	HIGHWAY				
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9-07	8-14	DIST	COUNTY		SHEET NO.				
7-13	5-21	ABL	JONES		35				

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GENERAL NOTES

- For long term stationary work zones on freeways, drums shall be used as the primary channelizing device.
- 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.
- 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.
- 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).
- 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.
- 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:

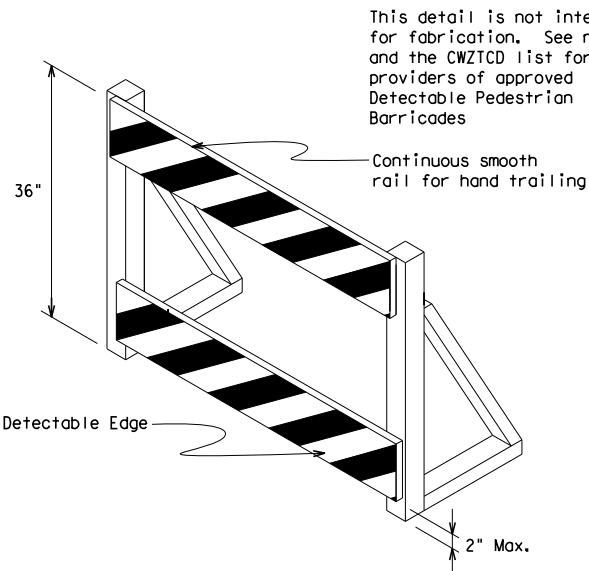
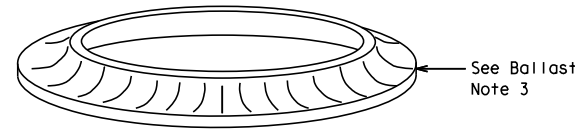
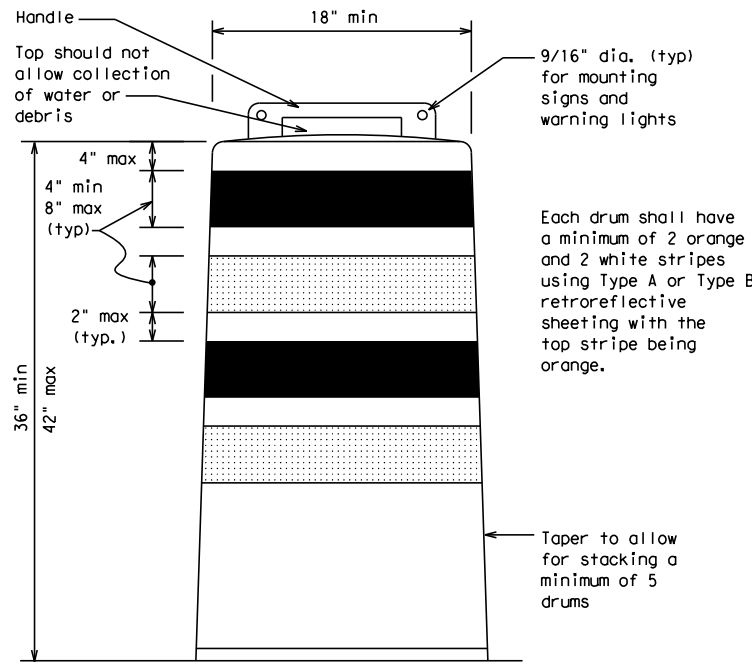
- Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
- The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents accidental separation due to normal handling and/or air turbulence created by passing vehicles.
- 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.
- 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.
- 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.
- 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.
- 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.
- Plastic drums shall be constructed of ultra-violet stabilized, orange, high-density polyethylene (HDPE) or other approved material.
- Drum body shall have a maximum unballasted weight of 11 lbs.
- Drum and base shall be marked with manufacturer's name and model number.

RETROREFLECTIVE SHEETING

- The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
- 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.

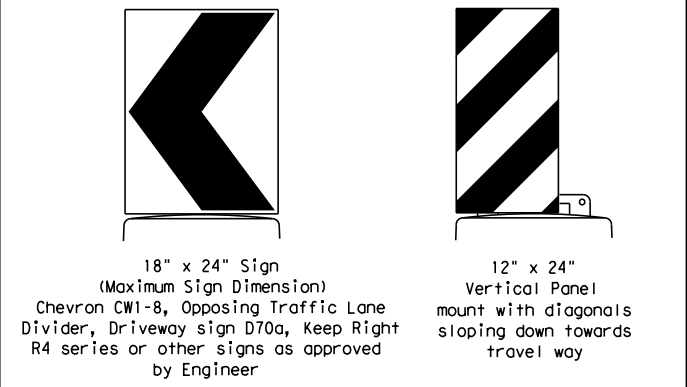
BALLAST

- 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.
- 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.
- Recycled truck tire sidewalls may be used for ballast on drums approved for this type of ballast on the CWZTCD list.
- 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.
- 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.
- Ballast shall not be placed on top of drums.
- Adhesives may be used to secure base of drums to pavement.



DETECTABLE PEDESTRIAN BARRICADES

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



18" x 24" Sign (Maximum Sign Dimension)
 Chevron CW1-8, Opposing Traffic Lane Divider, Driveway sign D70a, Keep Right R4 series or other signs as approved by Engineer
 12" x 24" Vertical Panel
 mount with diagonals sloping down towards travel way

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

- Signs used on plastic drums shall be manufactured using substrates listed on the CWZTCD.
- 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.
- Vertical Panels shall be manufactured with orange and white sheeting meeting the requirements of DMS-8300 Type A or Type B. Diagonal stripes on Vertical Panels shall slope down toward the intended traveled lane.
- 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.
- Signs shall be installed using a 1/2 inch bolt (nominal) and nut, two washers, and one locking washer for each connection.
- Mounting bolts and nuts shall be fully engaged and adequately torqued. Bolts should not extend more than 1/2 inch beyond nuts.
- 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.
- 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.

SHEET 8 OF 12

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC (8) - 21

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4-03 8-14	DIST	COUNTY	SHEET NO.	
9-07 5-21	ABL	JONES	36	
7-13				

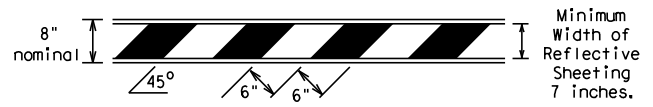
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DATE: 1/28/2022 5:01:35 PM
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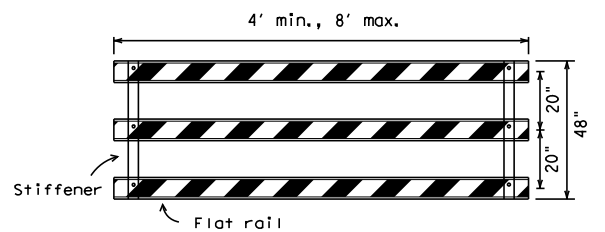
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.

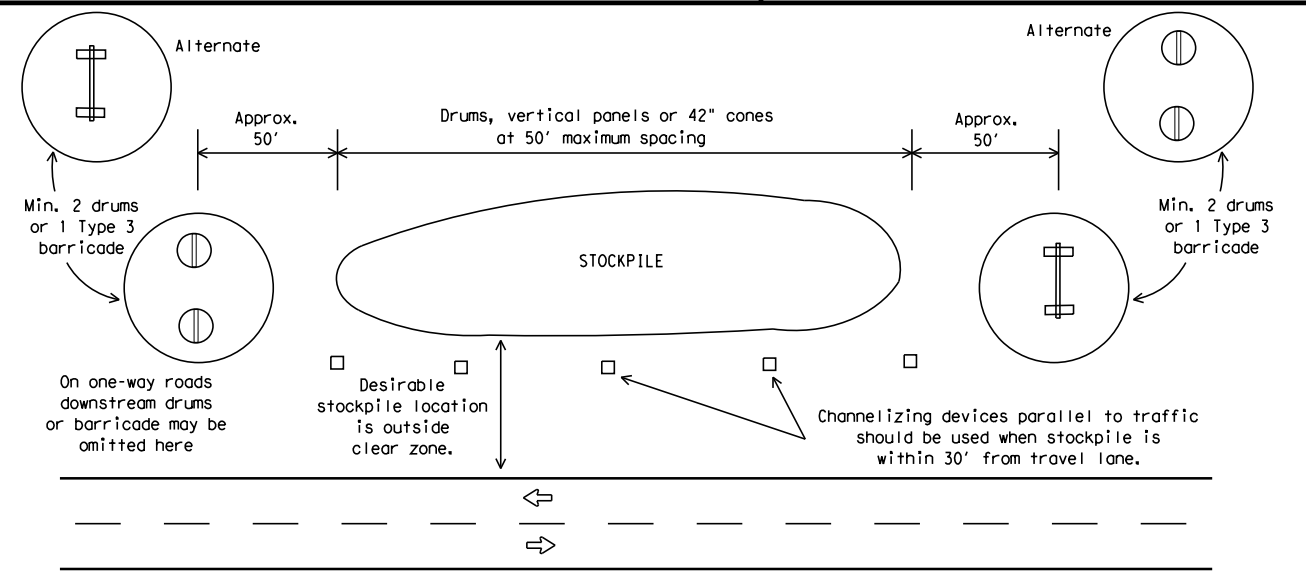


TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



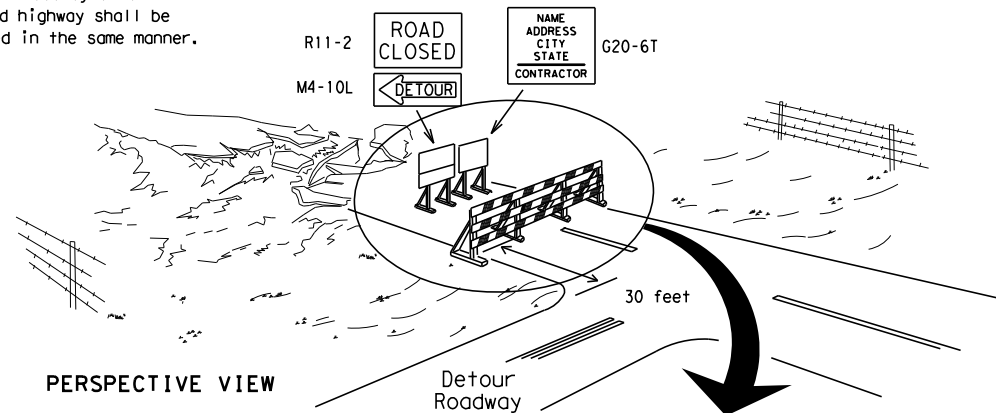
Stiffener may be inside or outside of support, but no more than 2 stiffeners shall be allowed on one barricade.

TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES



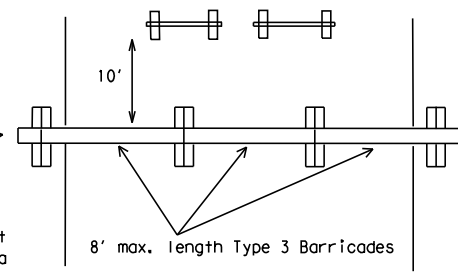
TRAFFIC CONTROL FOR MATERIAL STOCKPILES

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



PERSPECTIVE VIEW

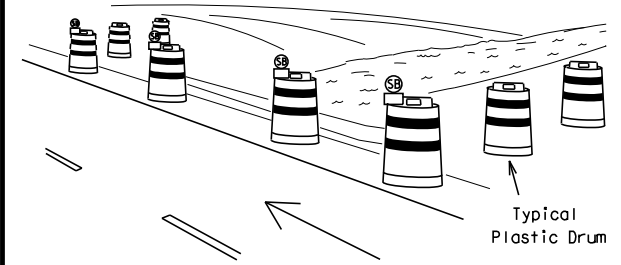
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic. Barricade striping should slant downward in the direction of detour.



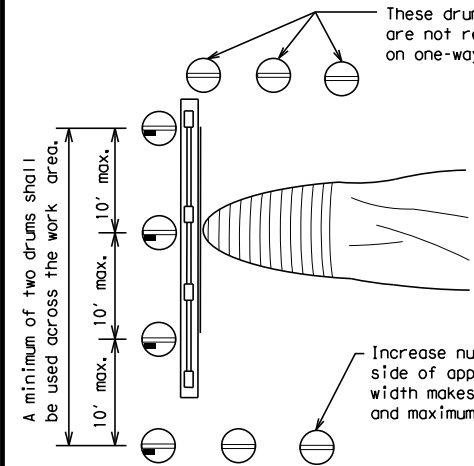
PLAN VIEW

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



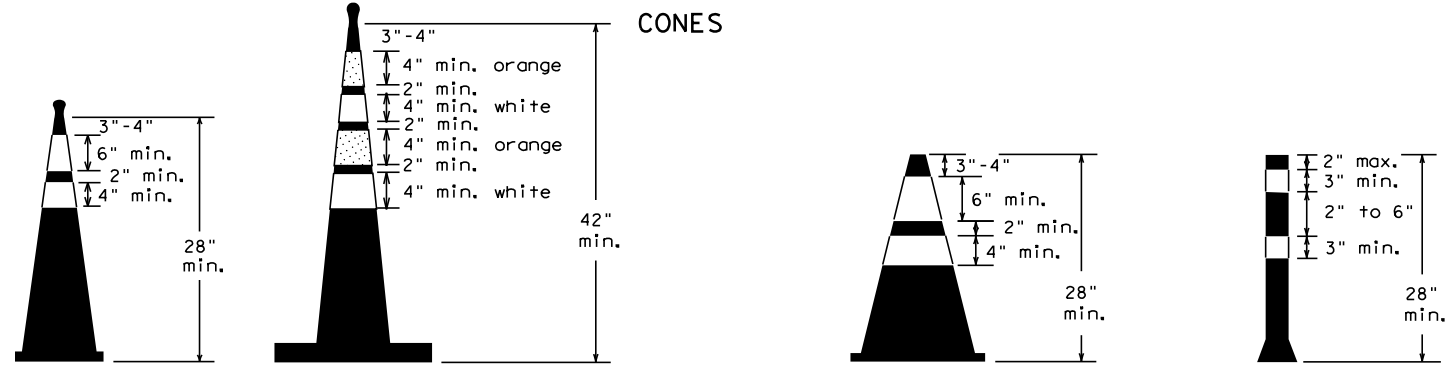
PLAN VIEW

Increase number of plastic drums on the side of approaching traffic if the crown width makes it necessary. (minimum of 2 and maximum of 4 drums)

1. Where positive redirection 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
	Steady burn warning light or yellow warning reflector

CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



Two-Piece cones

One-Piece cones

Tubular Marker

28" Cones shall have a minimum weight of 9 1/2 lbs.
 42" 2-piece cones shall have a minimum weight of 30 lbs. including base.

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

Texas Department of Transportation
 Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC (10) - 21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0484	01	025	FM 707
9-07 8-14	DIST	COUNTY	SHEET NO.	
7-13 5-21	ABL	JONES	38	

WORK ZONE PAVEMENT MARKINGS

GENERAL

- 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.
- Color, patterns and dimensions shall be in conformance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
- Additional supplemental pavement marking details may be found in the plans or specifications.
- Pavement markings shall be installed in accordance with the TMUTCD and as shown on the plans.
- 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).
- 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.
- All work zone pavement markings shall be installed in accordance with Item 662, "Work Zone Pavement Markings."

RAISED PAVEMENT MARKERS

- Raised pavement markers are to be placed according to the patterns on BC(12).
- 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

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

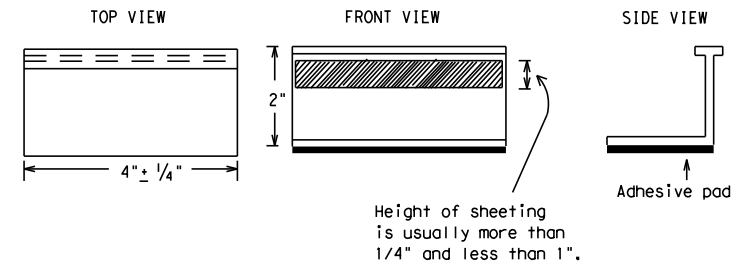
MAINTAINING WORK ZONE PAVEMENT MARKINGS

- The Contractor will be responsible for maintaining work zone pavement markings within the work limits.
- 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.
- 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.
- 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

- 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.
- 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.
- 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".
- The removal of pavement markings may require resurfacing or seal coating portions of the roadway as described in Item 677.
- Subject to the approval of the Engineer, any method that proves to be successful on a particular type pavement may be used.
- Blast cleaning may be used but will not be required unless specifically shown in the plans.
- Over-painting of the markings SHALL NOT BE permitted.
- Removal of raised pavement markers shall be as directed by the Engineer.
- 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.
- 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**

- Temporary flexible-reflective roadway marker tabs used as guidemarks shall meet the requirements of DMS-8242.
- 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.
 - 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.
 - 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.
- Small design variances may be noted between tab manufacturers.
- 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

- Raised pavement markers used as guidemarks shall be from the approved product list, and meet the requirements of DMS-4200.
- All temporary construction raised pavement markers provided on a project shall be of the same manufacturer.
- 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).

SHEET 11 OF 12



BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

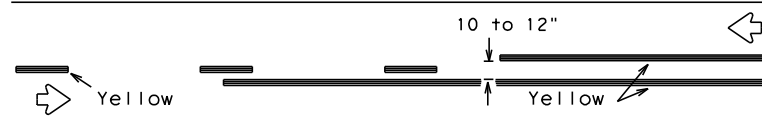
BC(11) - 21

FILE:	bc-21.dgn	DN:	TxDOT	CK:	TxDOT	DW:	TxDOT	CK:	TxDOT
© TxDOT	February 1998	CONT	SECT	JOB	HIGHWAY				
REVISIONS		0484	01	025	FM 707				
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1-02	7-13								
11-02	8-14	ABL	JONES		SHEET NO.		39		

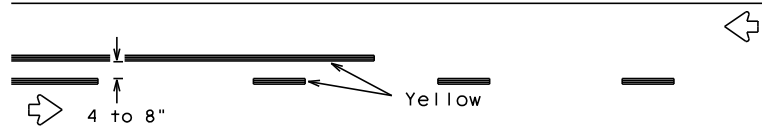
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 alex.massara@txdot.gov

PAVEMENT MARKING PATTERNS

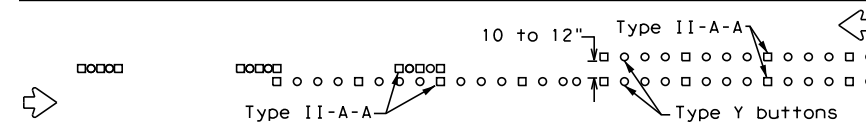


REFLECTORIZED PAVEMENT MARKINGS - PATTERN A

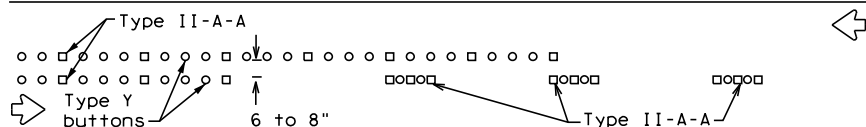


REFLECTORIZED PAVEMENT MARKINGS - PATTERN B

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.

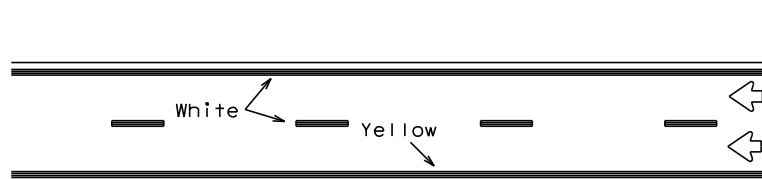


RAISED PAVEMENT MARKERS - PATTERN A



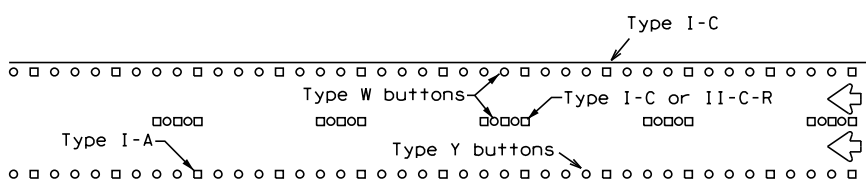
RAISED PAVEMENT MARKERS - PATTERN B

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



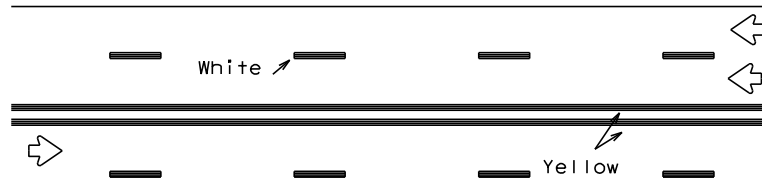
REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectorized pavement markings.



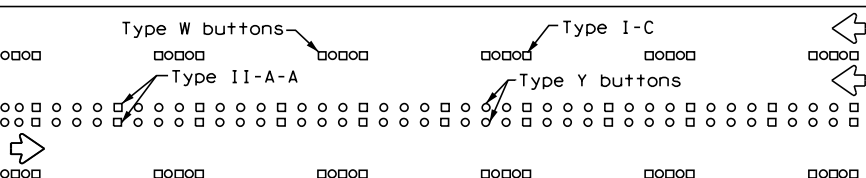
RAISED PAVEMENT MARKERS

EDGE & LANE LINES FOR DIVIDED HIGHWAY



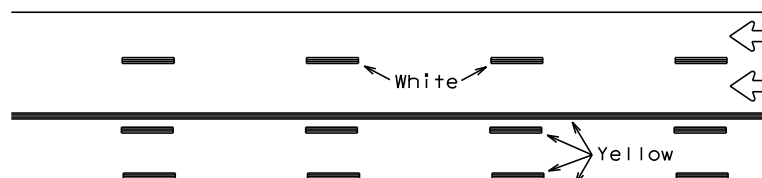
REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectorized pavement markings.



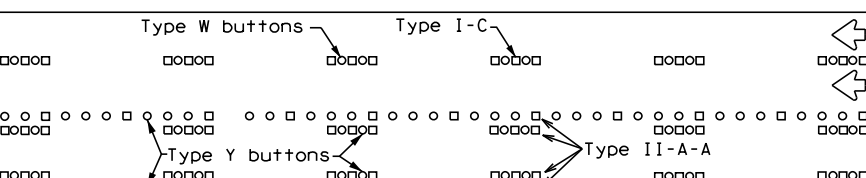
RAISED PAVEMENT MARKERS

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS

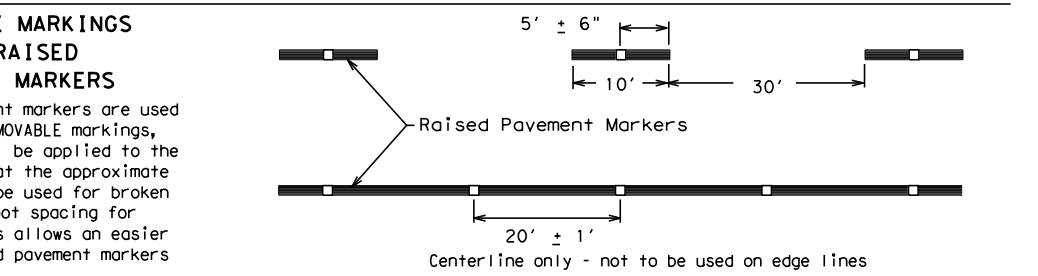
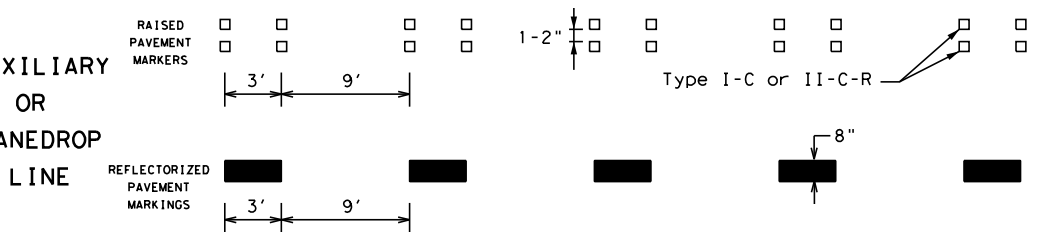
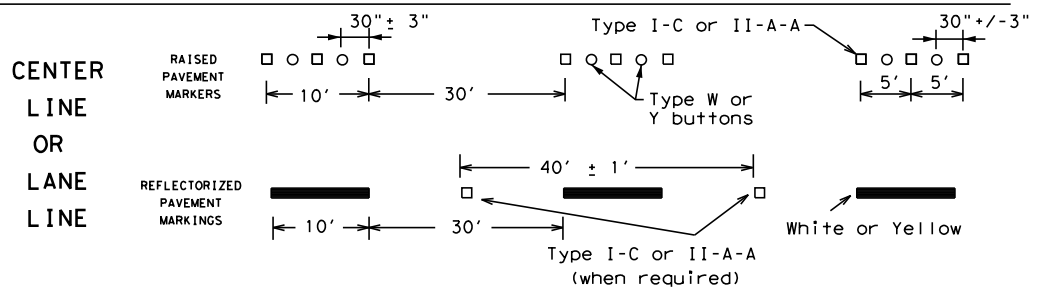
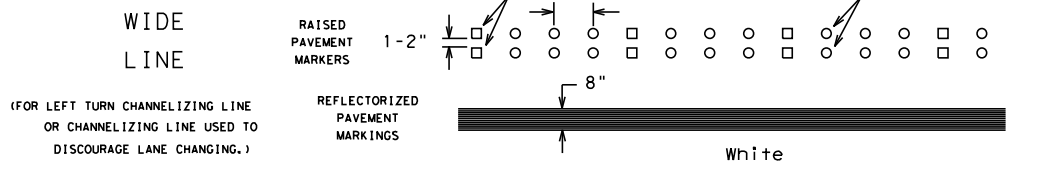
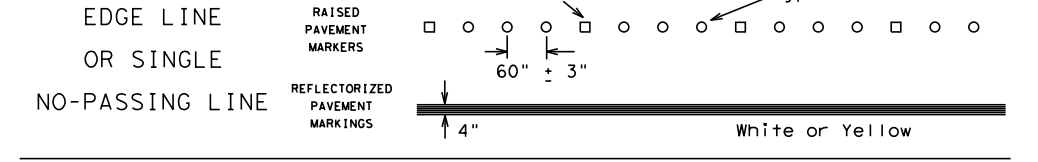
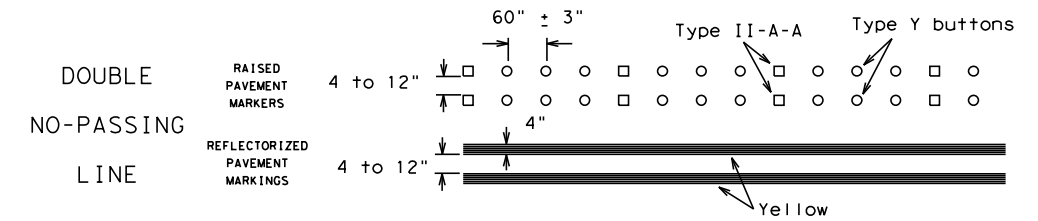
Prefabricated markings may be substituted for reflectorized pavement markings.



RAISED PAVEMENT MARKERS

TWO-WAY LEFT TURN LANE

STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS



SHEET 12 OF 12



BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
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2-98 7-13				
11-02 8-14	ABL		JONES	SHEET NO. 40

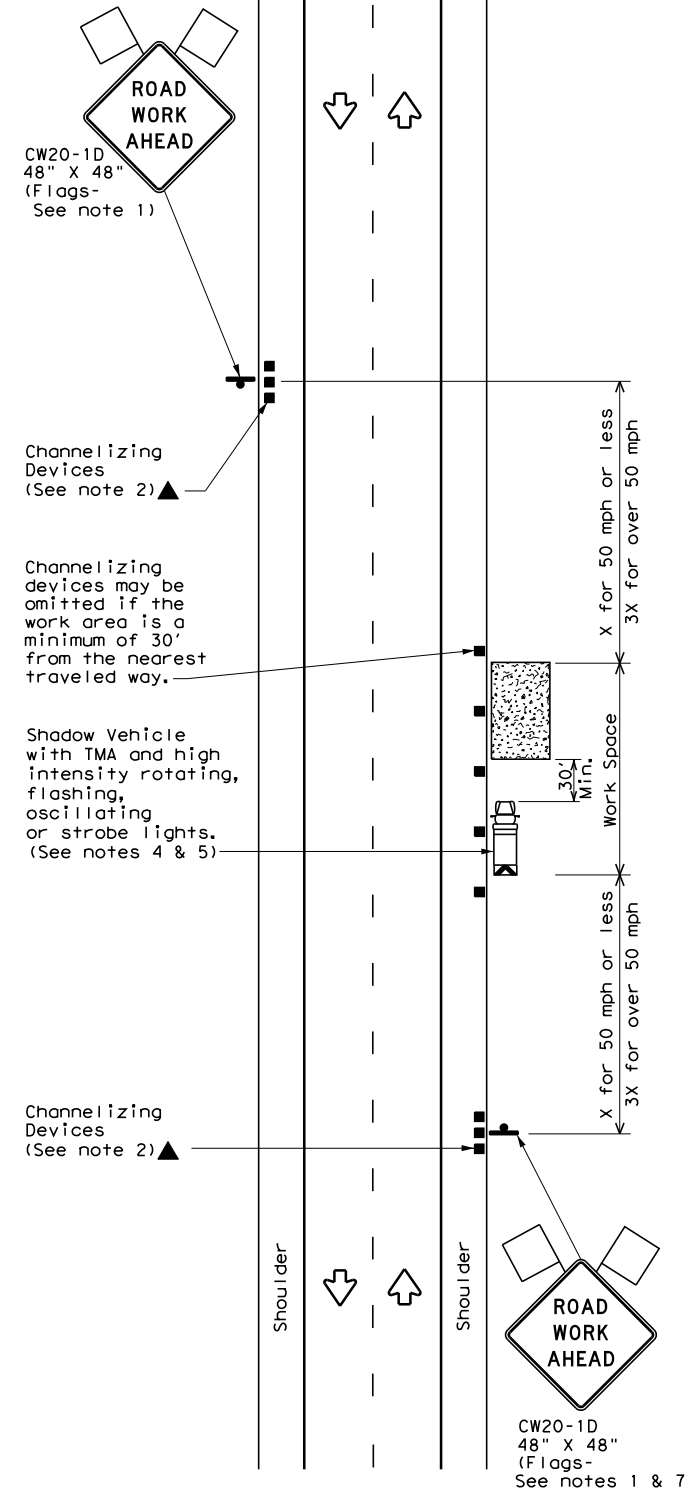
Raised pavement markers used as standard pavement markings shall be from the approved products list and meet the requirements of Item 672 "RAISED PAVEMENT MARKERS."

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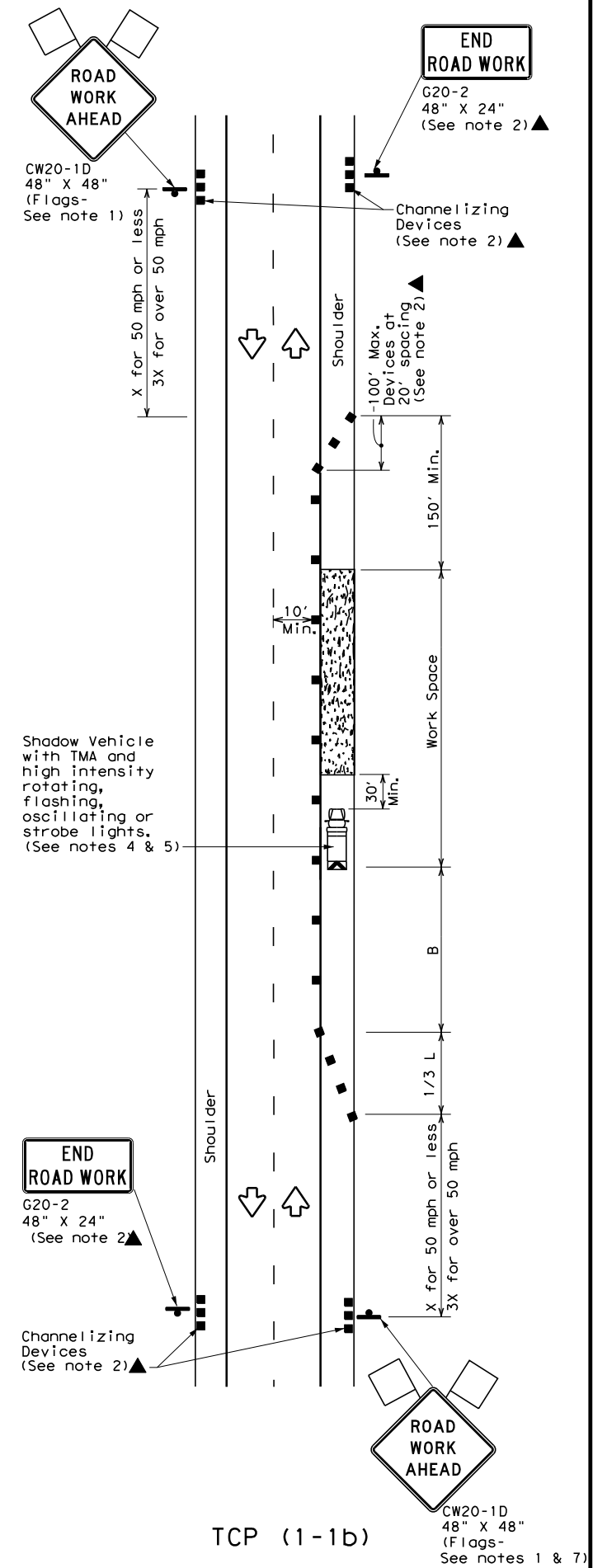
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 alex.massara@texas.gov alex.massara@texas.gov



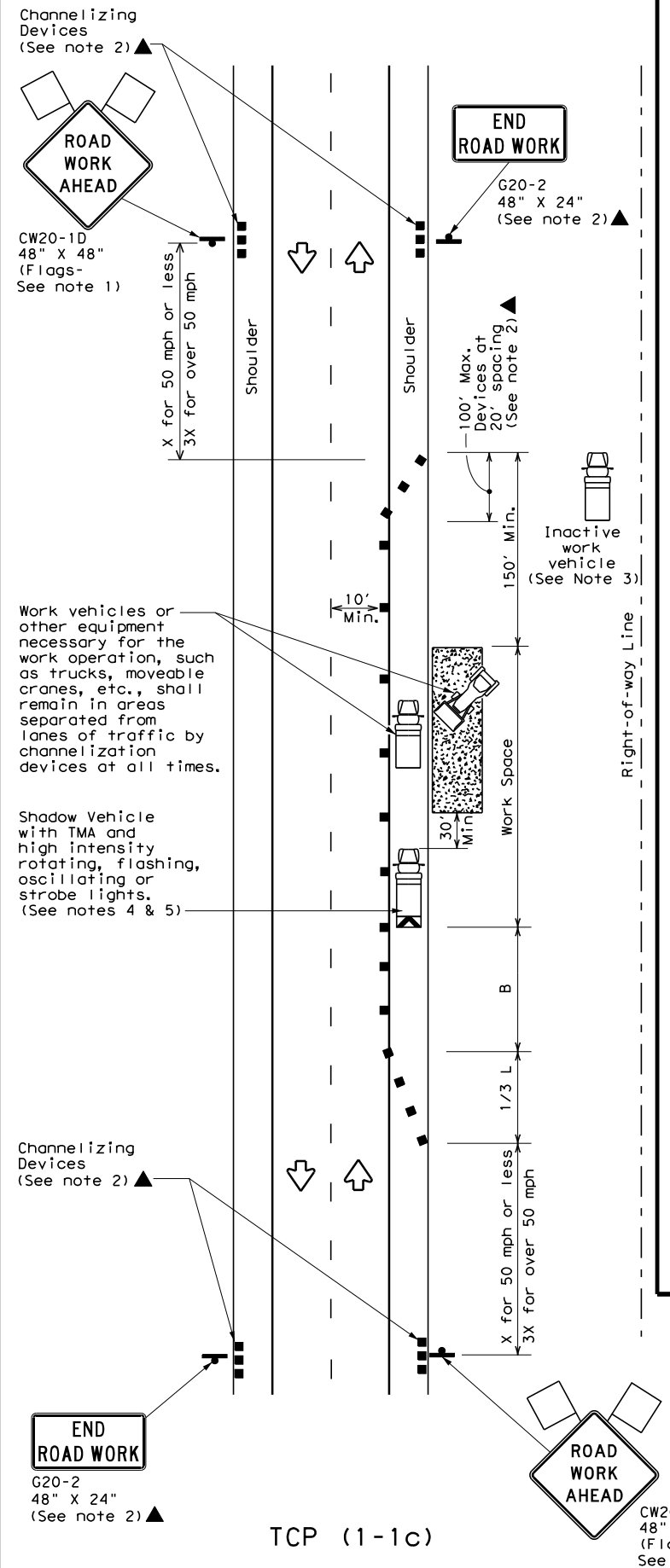
TCP (1-1a)

WORK SPACE NEAR SHOULDER
 Conventional Roads



TCP (1-1b)

WORK SPACE ON SHOULDER
 Conventional Roads



TCP (1-1c)

WORK VEHICLES ON SHOULDER
 Conventional Roads

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

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent		
30	L = 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**
- Flags attached to signs where shown are REQUIRED.
 - 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.
 - Inactive work vehicles or other equipment should be parked near the right-of-way line and not parked on the paved shoulder.
 - 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.
 - Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.
 - See TCP(5-1) for shoulder work on divided highways, expressways and freeways.
 - CW21-5 "SHOULDER WORK" signs may be used in place of CW20-1D "ROAD WORK AHEAD" signs for shoulder work on conventional roadways.



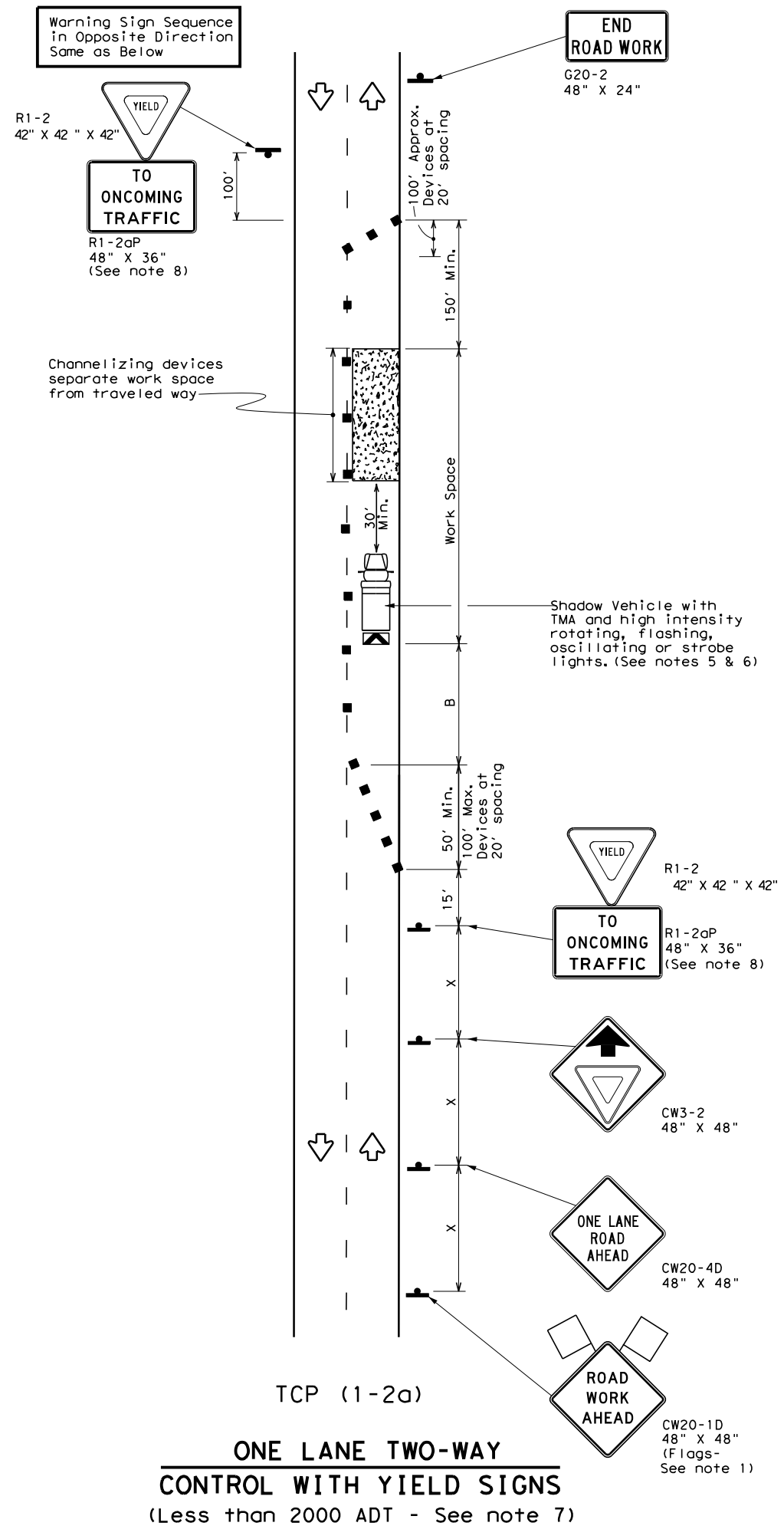
TRAFFIC CONTROL PLAN
CONVENTIONAL ROAD
SHOULDER WORK

TCP (1-1) - 18

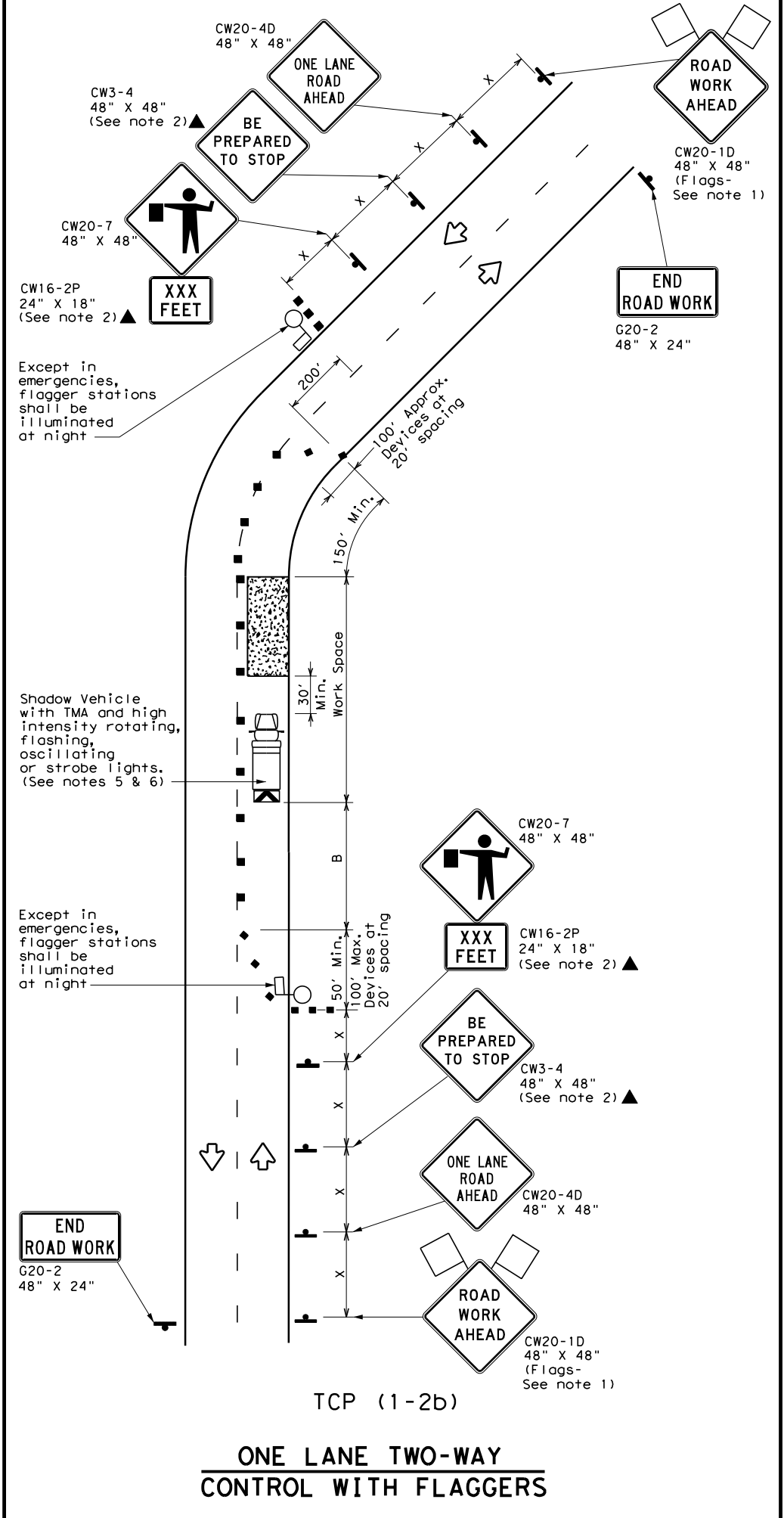
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© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0484	01	025	FM 707
2-94 4-98	DIST	COUNTY	SHEET NO.	
8-95 2-12	ABL	JONES	43	
1-97 2-18				

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 alex.massara@dot.state.tx.us



TCP (1-2a)
ONE LANE TWO-WAY
CONTROL WITH YIELD SIGNS
 (Less than 2000 ADT - See note 7)



TCP (1-2b)
ONE LANE TWO-WAY
CONTROL WITH FLAGGERS

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

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

- Flags attached to signs where shown are REQUIRED.
- 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.
- The CW3-4 "BE PREPARED TO STOP" sign may be installed after the CW20-4D "ONE LANE ROAD AHEAD" sign, but proper sign spacing shall be maintained.
- Sign spacing may be increased or an additional CW20-1D "ROAD WORK AHEAD" sign may be used if advance warning ahead of the flagger or R1-2 "YIELD" sign is less than 1500 feet.
- 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.
- Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.

TCP (1-2a)

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

TCP (1-2b)

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

Texas Department of Transportation

Traffic Operations Division Standard

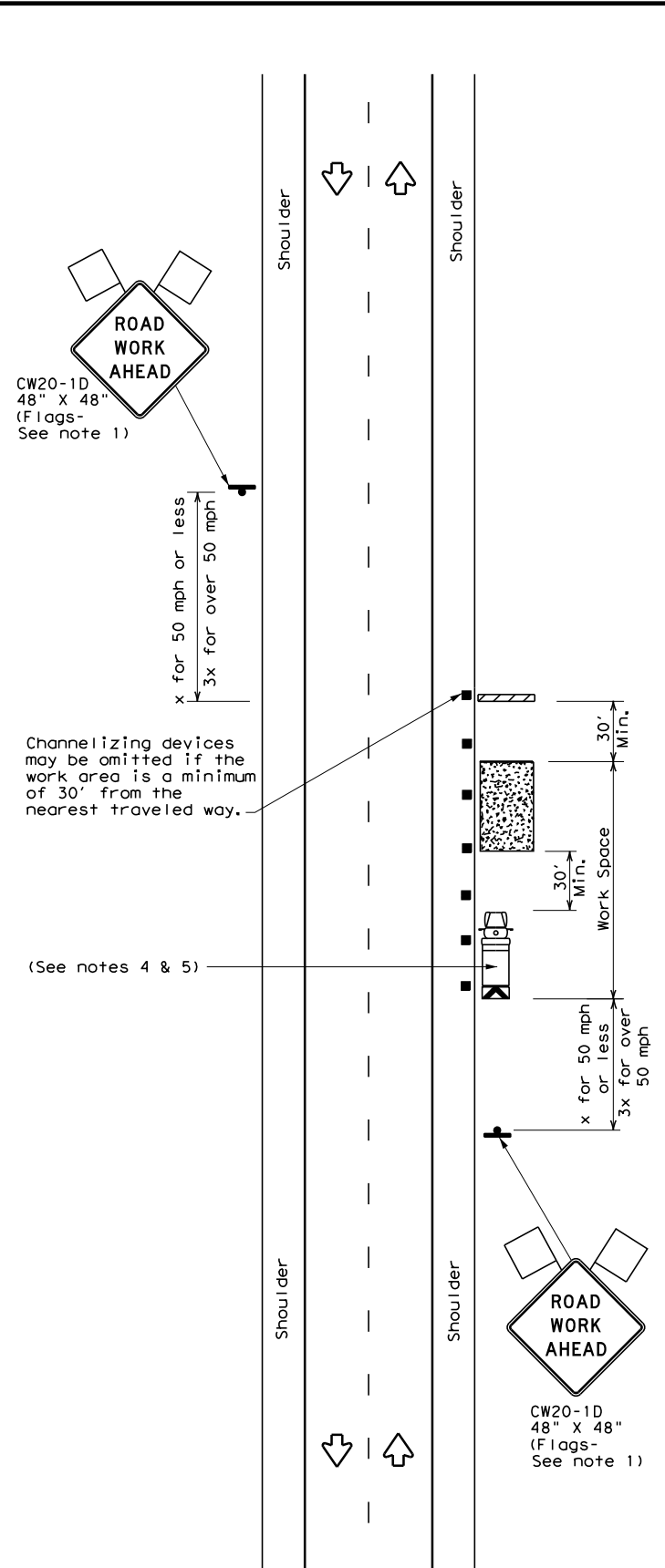
TRAFFIC CONTROL PLAN
ONE-LANE TWO-WAY
TRAFFIC CONTROL

TCP (1-2) - 18

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© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
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1-97 2-18				

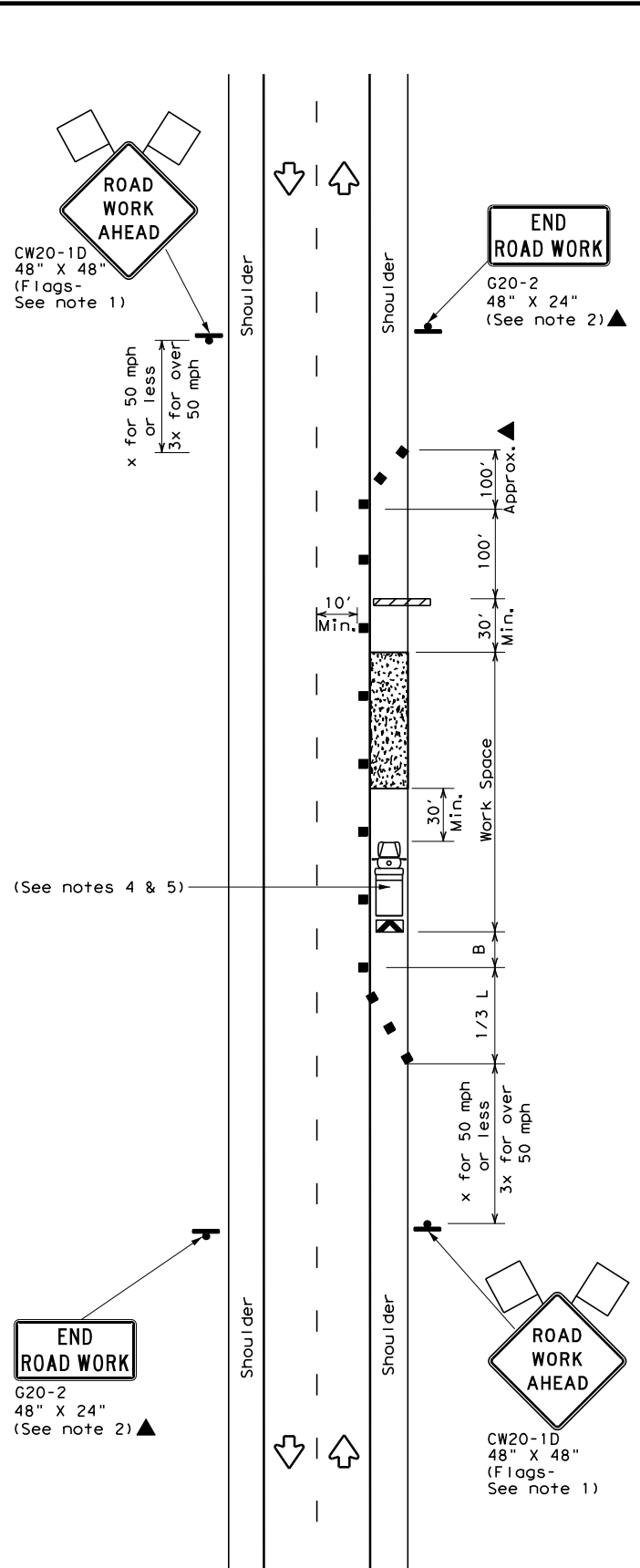
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 alex.massara@texas.gov alex.massara@texas.gov



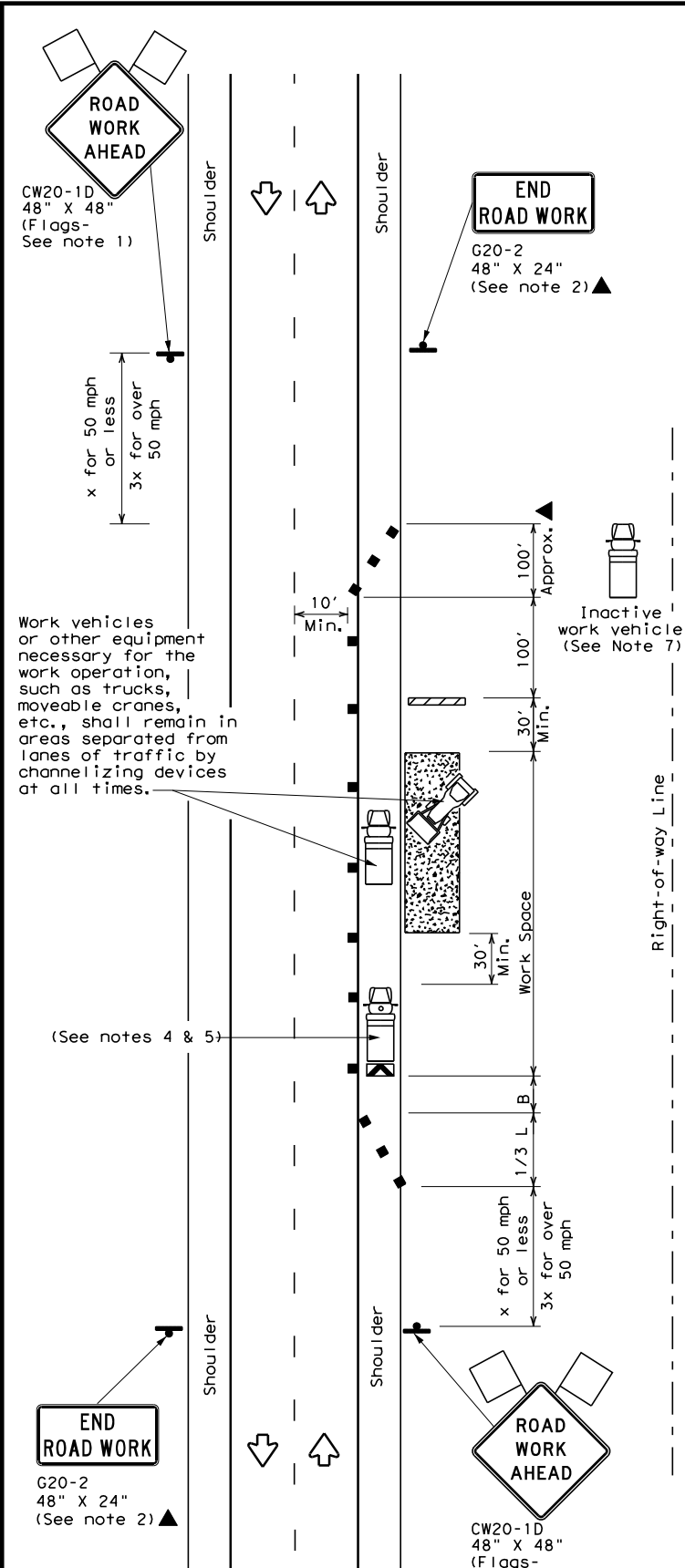
TCP (2-1a)

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		Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "x" Distance	Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent		
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**
- Flags attached to signs where shown, are REQUIRED.
 - 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.
 - Stockpiled material should be placed a minimum of 30 feet from nearest traveled way.
 - 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.
 - Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.
 - See TCP(5-1) for shoulder work on divided highways, expressways and freeways.
 - Inactive work vehicles or other equipment should be parked near the right-of-way line and not parked on the paved shoulder.
 - CW21-5 "SHOULDER WORK" signs may be used in place of CW20-1D "ROAD WORK AHEAD" signs for shoulder work on conventional roadways.



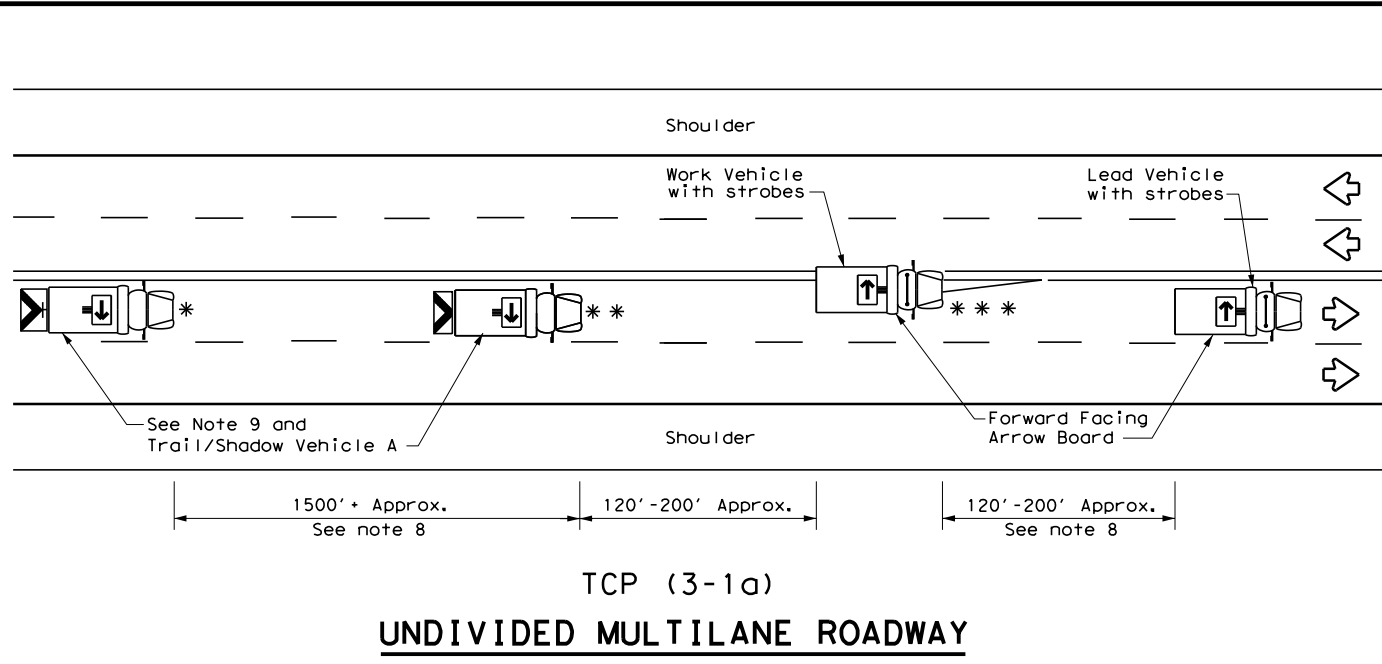
TRAFFIC CONTROL PLAN
CONVENTIONAL ROAD
SHOULDER WORK

TCP (2-1) - 18

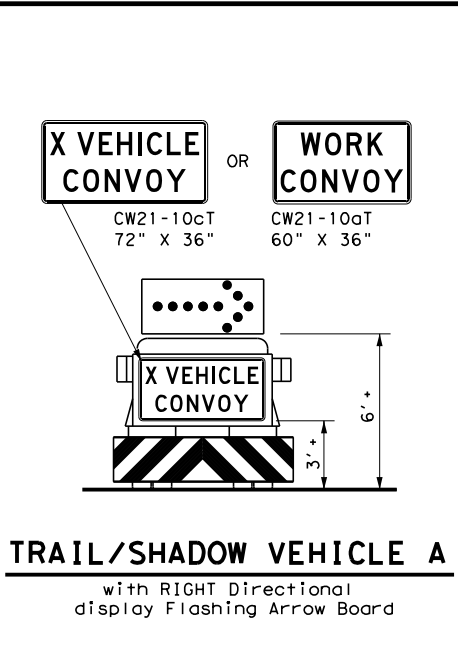
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© TxDOT December 1985	CON:	SECT:	JOB:	HIGHWAY:
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2-94 4-98	DIST:	COUNTY:	SHEET NO.:	
8-95 2-12	ABL	JONES	45	
1-97 2-18				

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 Alex Massara



TCP (3-1a)
UNDIVIDED MULTILANE ROADWAY



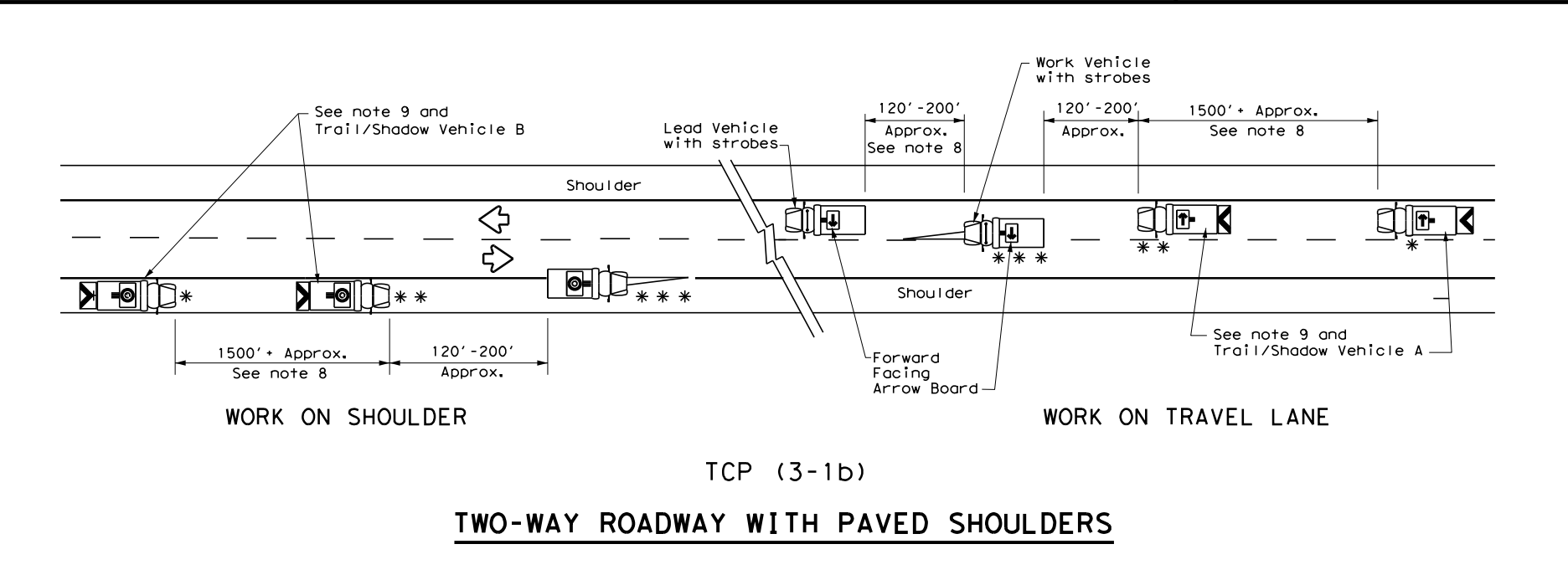
TRAIL/SHADOW VEHICLE A
 with RIGHT Directional display Flashing Arrow Board

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)

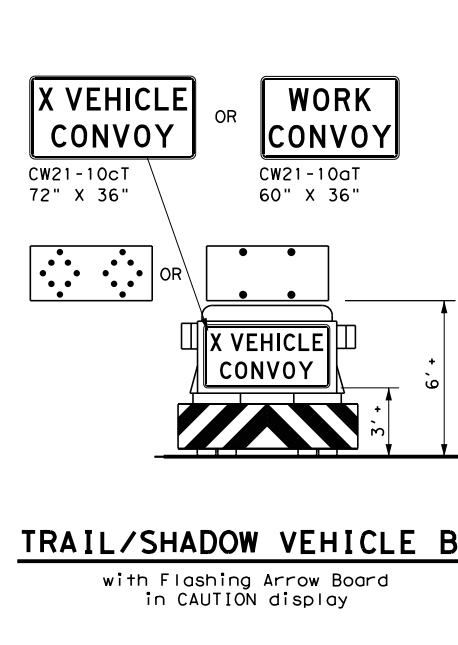
TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
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GENERAL NOTES

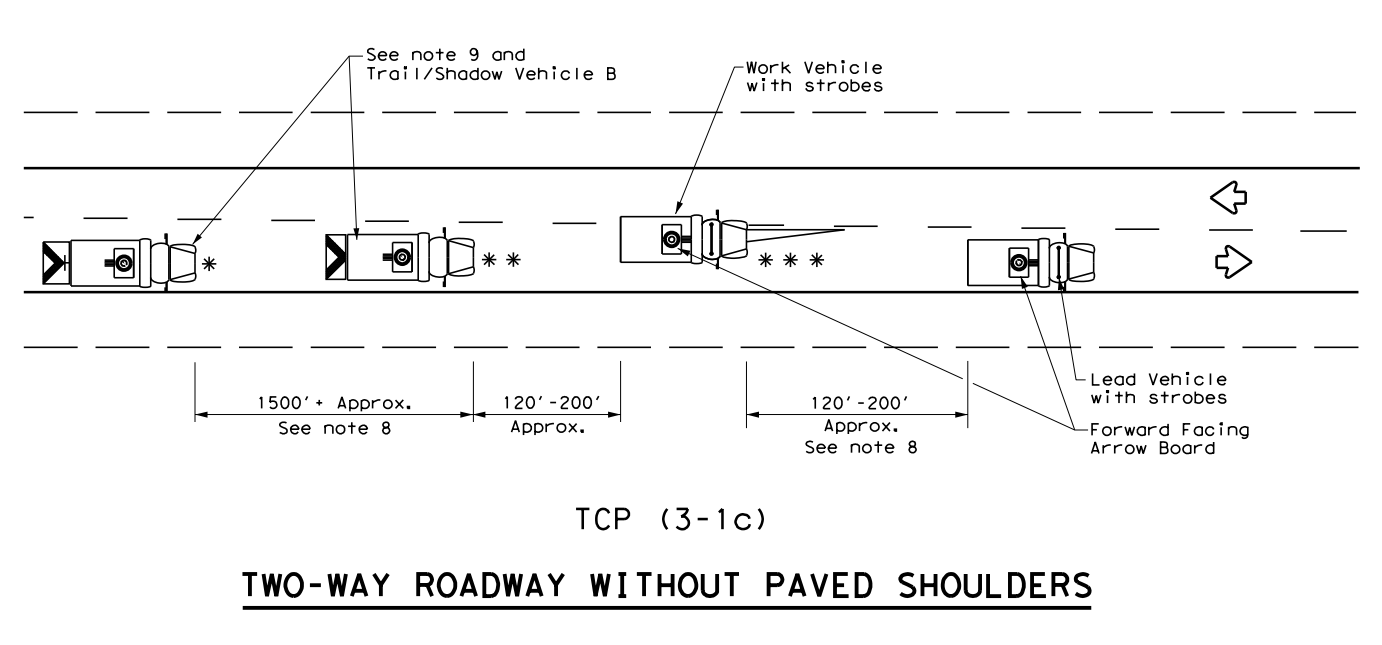
1. TRAIL, SHADOW, and LEAD vehicles shall be equipped with arrow boards as illustrated. When a LEAD vehicle is not used the WORK vehicle must be equipped with an arrow board. The Engineer will determine if the LEAD VEHICLE and/or TRAIL VEHICLE are required based on prevailing roadway conditions, traffic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



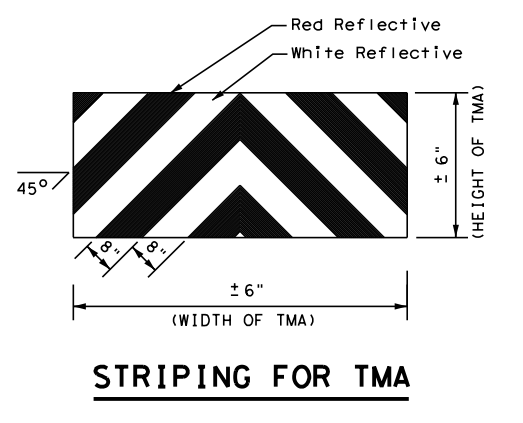
TCP (3-1b)
TWO-WAY ROADWAY WITH PAVED SHOULDERS



TRAIL/SHADOW VEHICLE B
 with Flashing Arrow Board in CAUTION display



TCP (3-1c)
TWO-WAY ROADWAY WITHOUT PAVED SHOULDERS



STRIPING FOR TMA

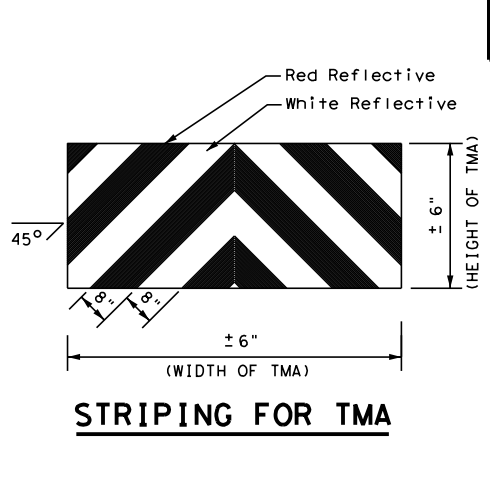
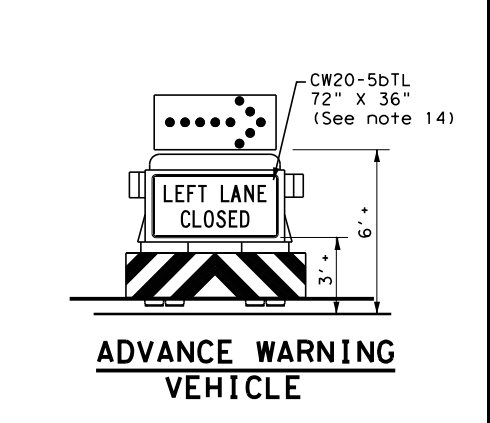
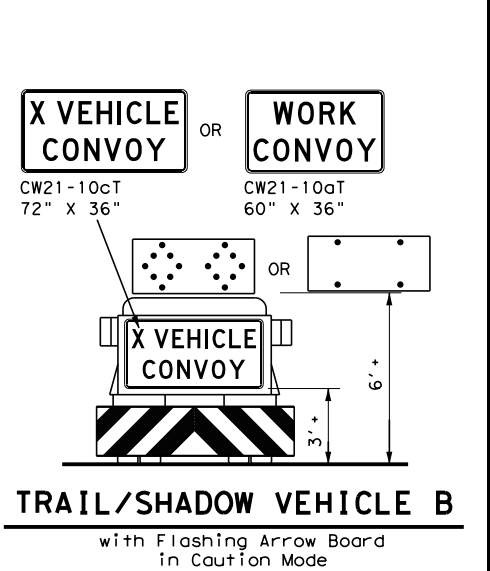
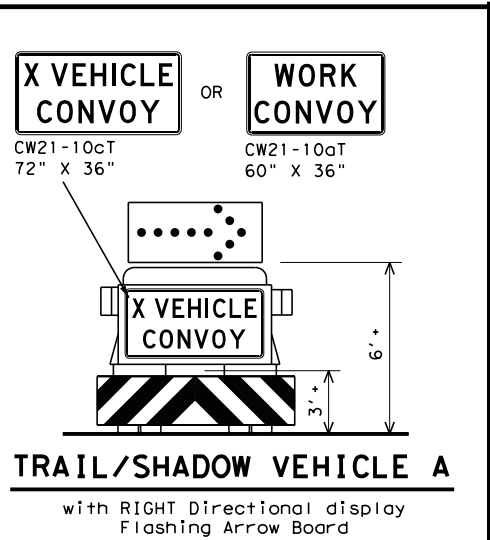
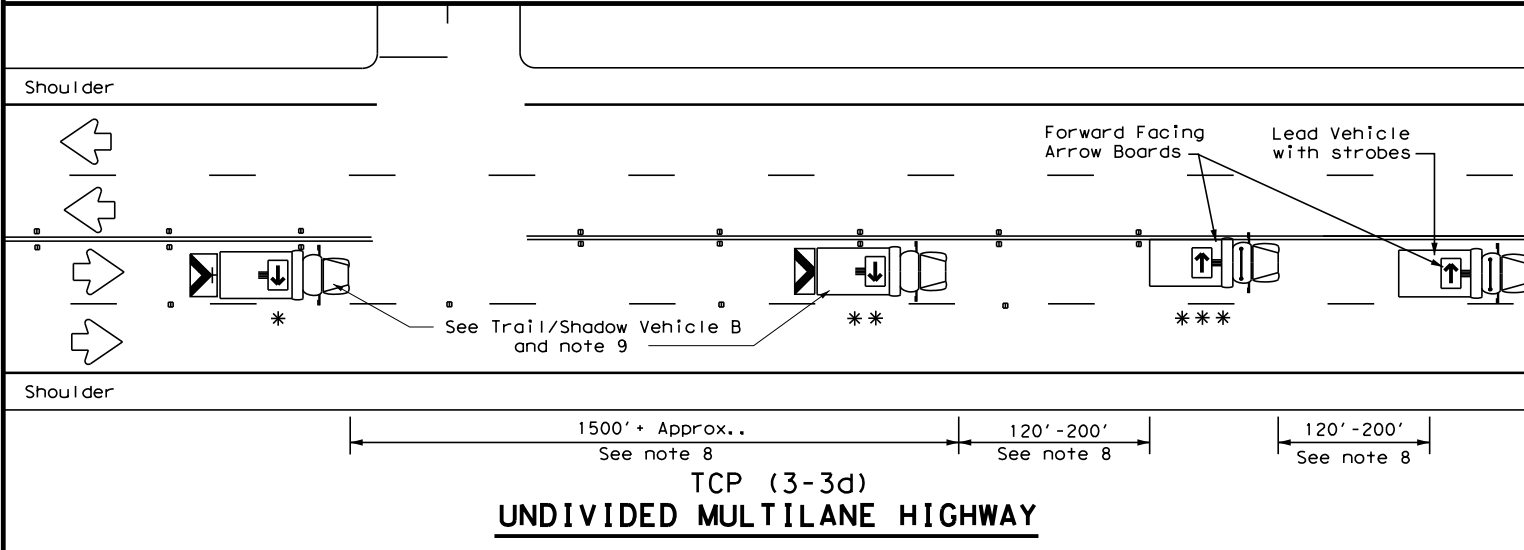
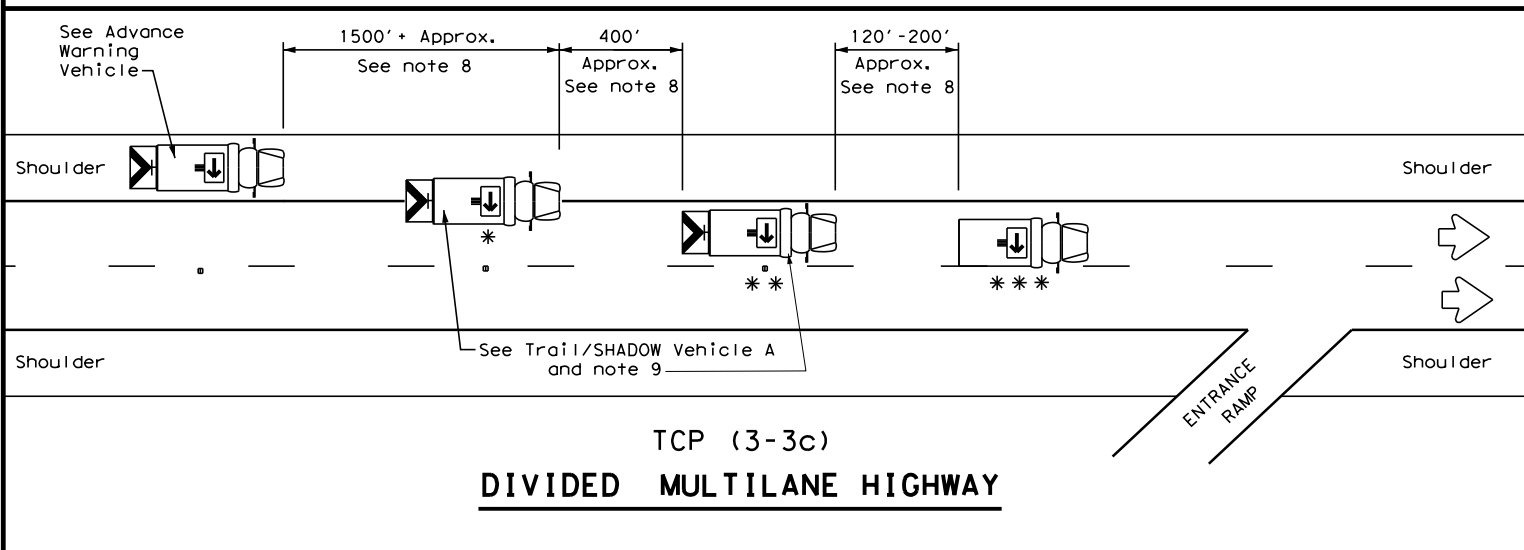
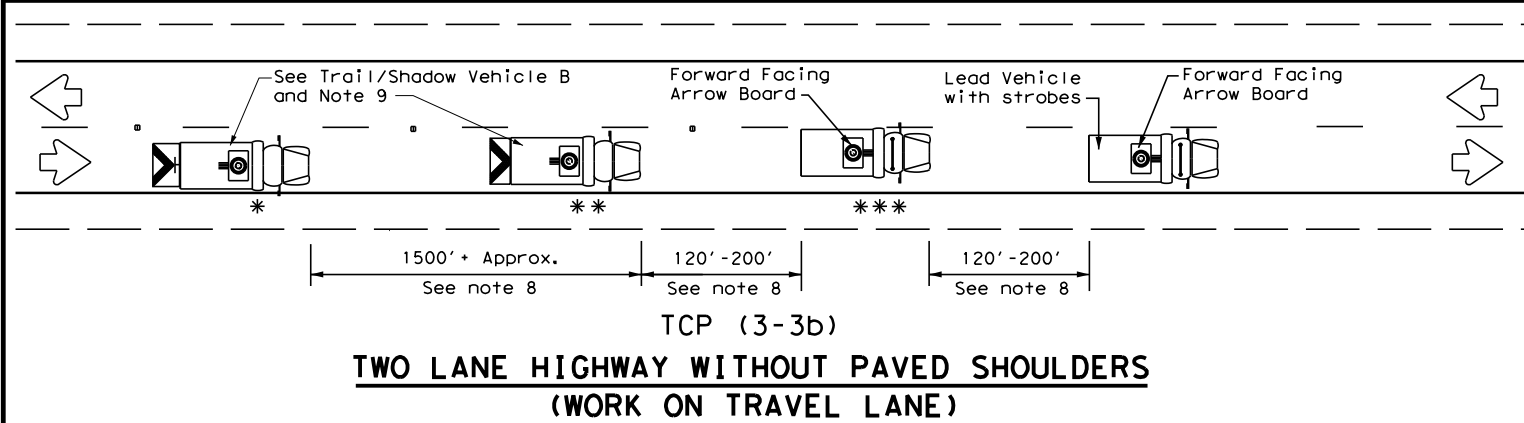
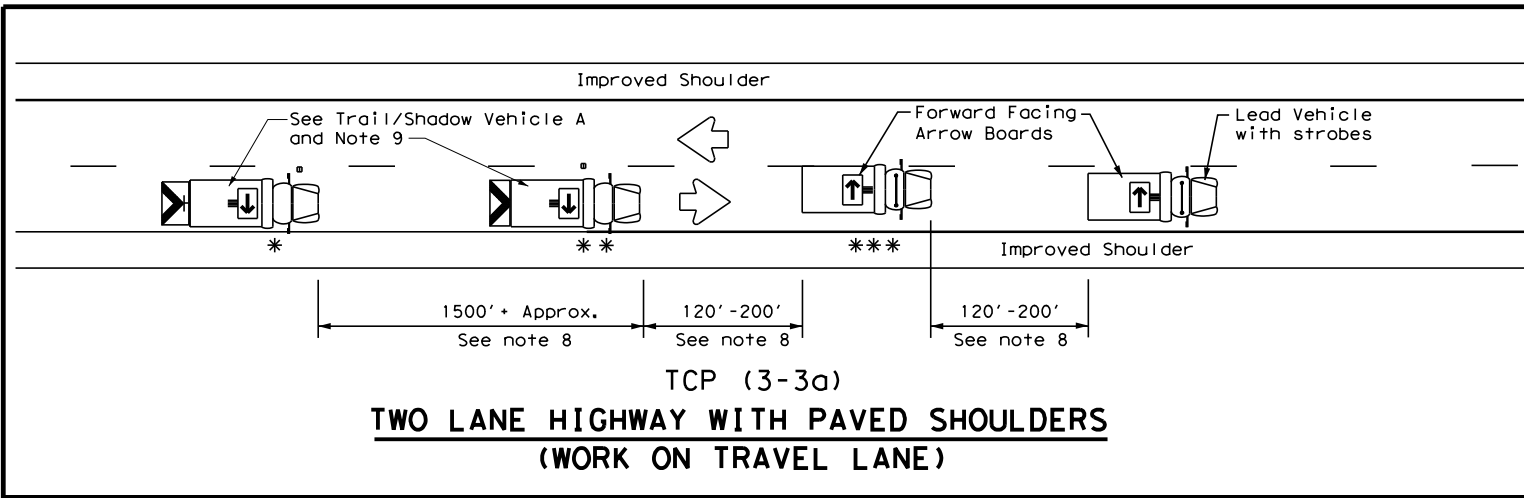
Texas Department of Transportation
 Traffic Operations Division Standard

**TRAFFIC CONTROL PLAN
 MOBILE OPERATIONS
 UNDIVIDED HIGHWAYS**

TCP (3-1) - 13

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© TxDOT	December 1985	CONT	SECT	JOB	HIGHWAY				
REVISIONS		0484	01	025	FM 707				
2-94	4-98	DIST	COUNTY	SHEET NO.					
8-95	7-13	ABL	JONES	47					
1-97									

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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

- 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.
- 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.
- The use of truck mounted attenuators (TMA) on the SHADOW VEHICLE, ADVANCE WARNING and TRAIL VEHICLE are required.
- 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.
- 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.
- Each vehicle shall have two-way radio communication capability.
- When work convoys must change lanes, the TRAIL VEHICLE should change lanes first to shadow the other convoy vehicles.
- 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.
- 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.
- 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.
- A double arrow shall not be displayed on the arrow board on the Advance Warning Vehicle.
- For divided highways with three or four lanes in each direction, use TCP(3-2).
- Standard diamond shape versions of the CW20-5 series signs may be used as an option if the rectangular signs shown are not available.
- The Advance Warning Vehicle may straddle the edgeline when Shoulder width makes it necessary.
- On two-lane two-way roadways, the work and protection vehicles should pull over periodically to allow motor vehicle traffic to pass. If motorists are not allowed to pass the work convoy, a DO NOT PASS (R4-1) sign should be placed on the back of the rearmost protection vehicle.

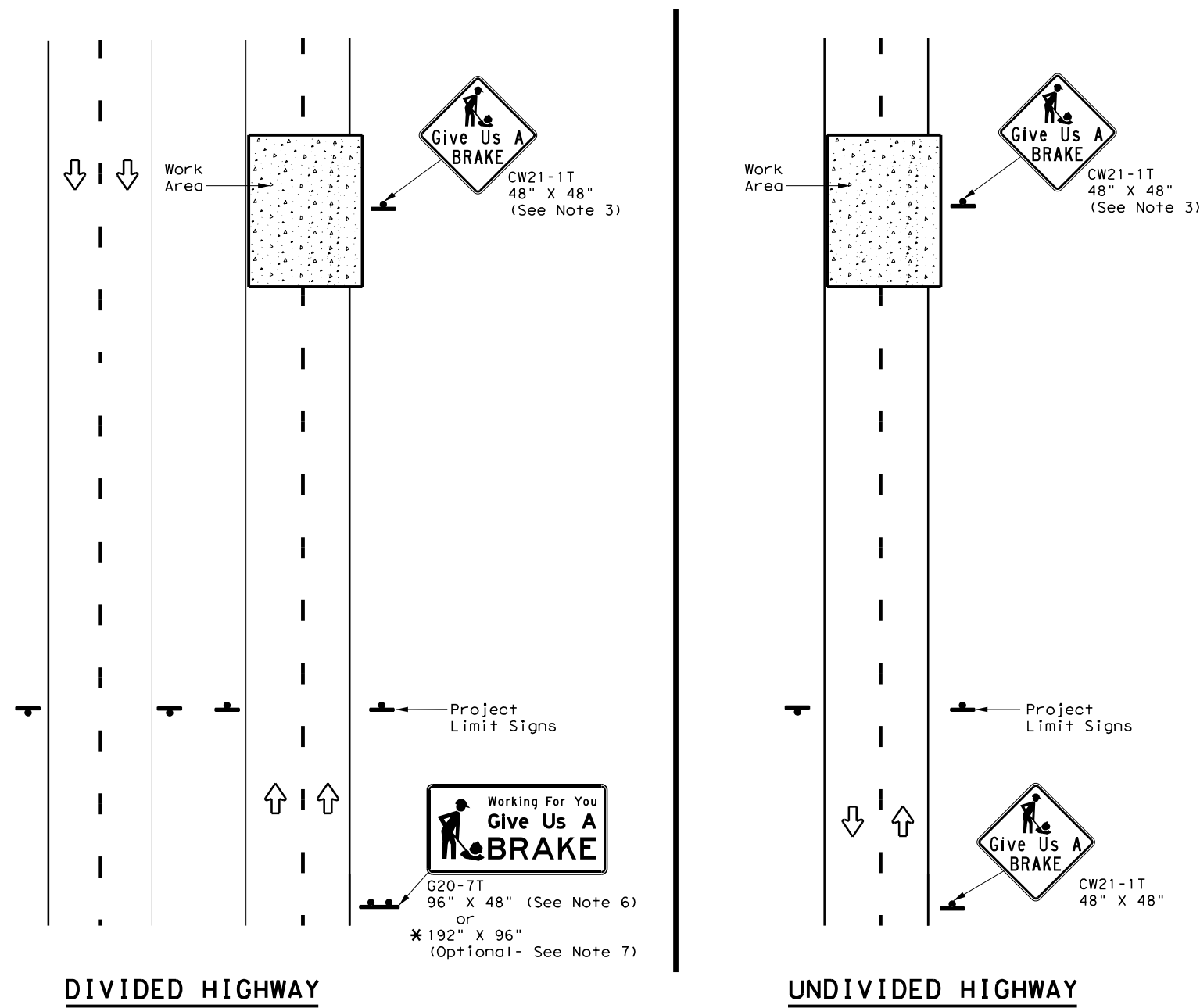
Texas Department of Transportation
Traffic Operations Division Standard

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

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© TxDOT September 1987	CONT	SECT	JOB	HIGHWAY
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1-97 7-14				

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 Alex.Massara



SIGNS ARE SHOWN FOR ONE DIRECTION OF TRAVEL

* When the optional larger WORKING FOR YOU GIVE US A BRAKE (G20-7T) 192" x 96" sign is required, the locations shall be noted elsewhere in the plans.

SUMMARY OF LARGE SIGNS

BACKGROUND COLOR	SIGN DESIGNATION	SIGN	SIGN DIMENSIONS	REFLECTIVE SHEETING	SQ FT	GALVANIZED STRUCTURAL STEEL		DRILLED SHAFT
						Size	(LF)	
							① ②	24" DIA. (LF)
Orange	G20-7T		96" X 48"	Type B _{FL} or C _{FL}	32	▲	▲ ▲	▲
Orange	G20-7T		192" X 96"	Type B _{FL} or C _{FL}	128	W8x18	16 17	12

▲ See Note 6 Below

LEGEND

	Sign
	Large Sign
	Traffic Flow

DEPARTMENTAL MATERIAL SPECIFICATIONS

PLYWOOD SIGN BLANKS	DMS-7100
ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300

COLOR	USAGE	SHEETING MATERIAL
ORANGE	BACKGROUND	TYPE B _{FL} OR TYPE C _{FL}
BLACK	LEGEND & BORDERS	NON-REFLECTIVE ACRYLIC FILM

GENERAL NOTES

- See BC and SMD sheets for additional sign support details.
- Sign locations shall be approved by the Engineer.
- For projects more than two miles in length, Give Us a BRAKE signs should be repeated halfway through the project. The Give Us a Brake (CW21-1T) may be used for this purpose.
- Work zone speed limits are sometimes used in conjunction with GIVE US A BRAKE signing. See BC(3) for location and spacing of construction speed zone signing when required.
- Give Us a Brake (CW21-1T) signs and supports shall be considered subsidiary to Item 502, "Barricades, Signs and Traffic Handling."
- The 96" X 48" Working For You Give Us A BRAKE (G20-7T) may use a 1/2" or 5/8" plywood substrate or 0.125" aluminum sheeting substrate and may be supported by two 4" x 6" wood posts with drilled holes for breakaway as per BC(5) and will be subsidiary to Item 502.
- The Working For You Give Us A BRAKE (G20-7T) 192" X 96" sign shall be paid for under the following specification items:
 Item 636 - Aluminum Signs
 Item 647 - Large Roadside Sign Supports and Assemblies.
 Item 416 - Drilled Shaft Foundations
- 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.

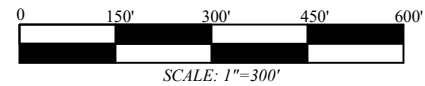


**WORK ZONE
 "GIVE US A BRAKE"
 SIGNS**



WZ (BRK) - 13

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© TxDOT August 1995	CONT	SECT	JOB	HIGHWAY
REVISIONS	0484	01	025	FM 707
6-96 5-98 7-13	DIST	COUNTY	SHEET NO.	
8-96 3-03	ABL	JONES	49	

CONTROL POINT	NORTHING	EASTING	ELEVATION	STATION	OFFSET
100	6914513.46	1531093.89	1684.47	450+42	32.24' LT
102	6913699.19	1531297.27	1683.77	458+82	36.48' LT
104	6912618.05	1531549.62	1681.89	469+92	23.80' LT
107	6911733.80	1531783.02	1676.17	479+06	39.26' LT



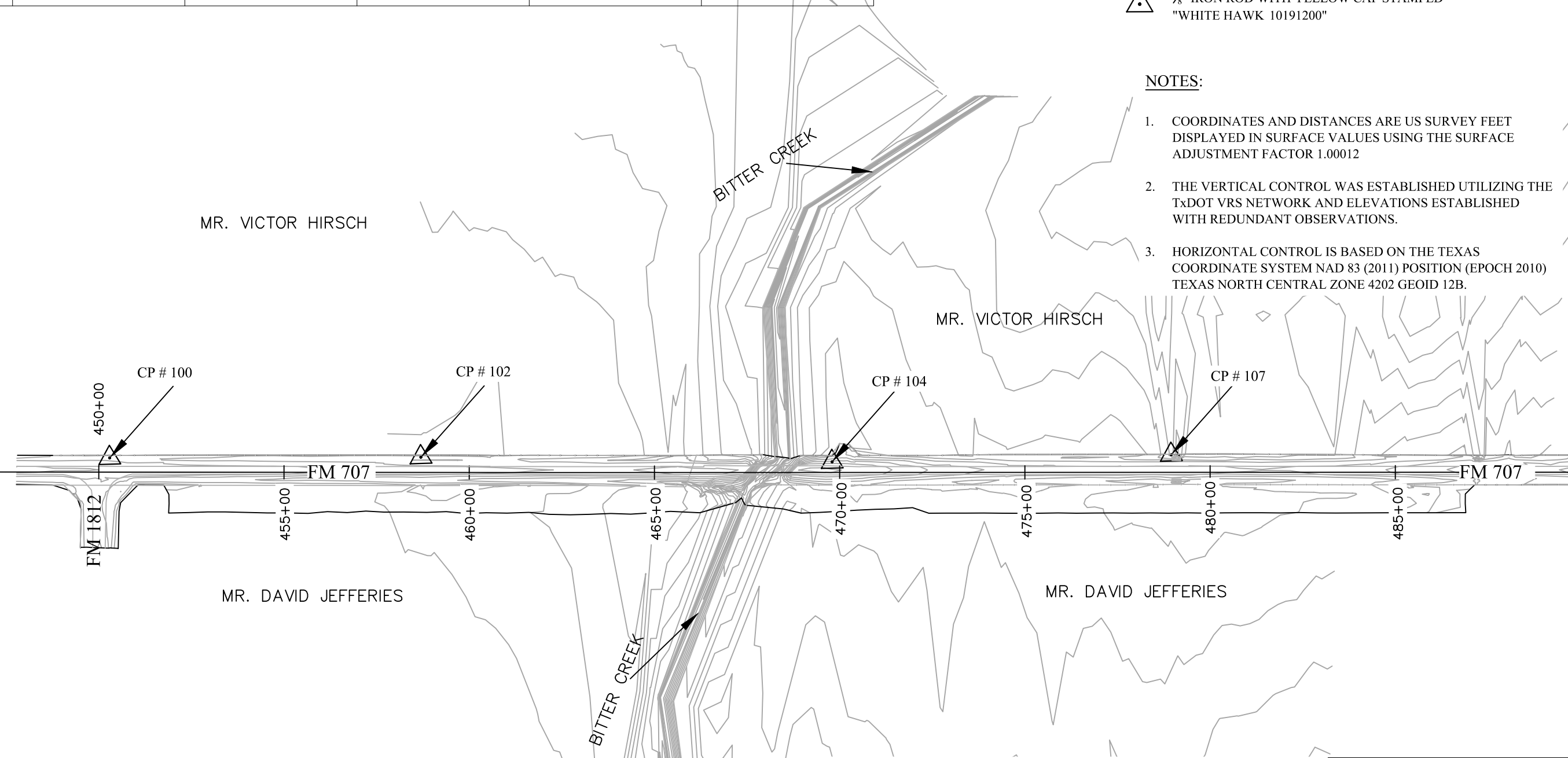
LEGEND:

-  CONTROL POINT
-  5/8" IRON ROD WITH YELLOW CAP STAMPED "WHITE HAWK 10191200"

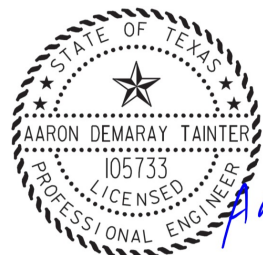
NOTES:

1. COORDINATES AND DISTANCES ARE US SURVEY FEET DISPLAYED IN SURFACE VALUES USING THE SURFACE ADJUSTMENT FACTOR 1.00012
2. THE VERTICAL CONTROL WAS ESTABLISHED UTILIZING THE TxDOT VRS NETWORK AND ELEVATIONS ESTABLISHED WITH REDUNDANT OBSERVATIONS.
3. HORIZONTAL CONTROL IS BASED ON THE TEXAS COORDINATE SYSTEM NAD 83 (2011) POSITION (EPOCH 2010) TEXAS NORTH CENTRAL ZONE 4202 GEOID 12B.

\$TIME\$
\$DATE\$
\$USER\$
\$FILE\$



THE SURVEY AND CONTROL INFORMATION HAS BEEN ACCEPTED AND INCORPORATED INTO THIS PS&E



Aaron Demaray Tainter
11/1/2021

THE CONTROL POINTS SHOWN HEREON WERE DETERMINED BY A SURVEY MADE ON THE GROUND UNDER MY DIRECT SUPERVISION.

WHITE HAWK ENGINEERING AND DESIGN
TBPLS FIRM NO. 10191200



Jeremy J. Katerberg
11/01/2021



**FM 707
HORIZONTAL AND
VERTICAL CONTROL**

SHEET 1 OF 1					
DS: JJK	CK: JJK	CONT: 0484	SECT: 01	JOB: 025	HIGHWAY: FM 707
DW: JJK	CK: JJK	DIST: ABL	COUNTY: JONES	SHEET NO. 54	

FM 707

Chain FM707 contains:
FM707001 FM707002 FM707003

Beginning chain FM707 description

```

Point FM707001      X   1,531,005.0534 Y   6,914,741.1579 Sta   448+00.00
Course from FM707001 to FM707002 S 13° 44' 04.00" E Dist 1,419.3000
Point FM707002      X   1,531,342.0267 Y   6,913,362.4406 Sta   462+19.30
Course from FM707002 to FM707003 S 13° 49' 04.00" E Dist 3,782.1362
Point FM707003      X   1,532,245.3324 Y   6,909,689.7586 Sta   500+01.44
    
```

Ending chain FM707 description

DW01

Chain DW01 contains:
DW0101 DW0102

Beginning chain DW01 description

```

Point DW0101      X   1,531,583.8802 Y   6,913,053.5301 Sta   10+00.00
Course from DW0101 to DW0102 S 76° 10' 56.00" W Dist 161.0758
Point DW0102      X   1,531,427.4660 Y   6,913,015.0596 Sta   11+61.08
    
```

Ending chain DW01 description

DW03

Chain DW03 contains:
DW03100 DW03101

Beginning chain DW03 description

```

Point DW03100      X   1,531,639.4236 Y   6,912,153.2772 Sta   10+00.00
Course from DW03100 to DW03101 S 76° 10' 56.00" W Dist 130.0000
Point DW03101      X   1,531,513.1857 Y   6,912,122.2287 Sta   11+30.00
    
```

Ending chain DW03 description

DW02

Chain DW02 contains:
DW0201 CUR DW021 CUR DW022 DW0202

Beginning chain DW02 description

```

Point DW0201      X   1,531,700.3948 Y   6,912,595.5293 Sta   10+00.00
Course from DW0201 to PC DW021 S 70° 22' 53.72" W Dist 23.9584
    
```

Curve Data

```

Curve DW021
P.I. Station      10+58.47 X   1,531,645.3146 Y   6,912,575.8962
Delta             =   69° 14' 11.75" (LT)
Degree            =  114° 35' 29.61"
Tangent           =   34.5163
Length            =   60.4203
Radius            =  50.0000
External          =   10.7567
Long Chord        =   56.8107
Mid. Ord.         =    8.8523
P.C. Station      10+23.96 X   1,531,677.8272 Y   6,912,587.4852
P.T. Station      10+84.38 X   1,531,644.6249 Y   6,912,541.3868
C.C.              X   1,531,694.6149 Y   6,912,540.3877
Back              = S 70° 22' 53.72" W
Ahead             = S 1° 08' 41.97" W
Chord Bear        = S 35° 45' 47.84" W
    
```

Curve Data

```

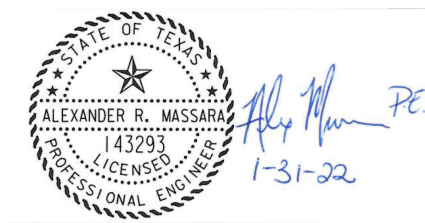
Curve DW022
P.I. Station      11+22.77 X   1,531,643.8577 Y   6,912,503.0023
Delta             =   75° 02' 14.03" (RT)
Degree            =  114° 35' 29.61"
Tangent           =   38.3922
Length            =   65.4823
Radius            =  50.0000
External          =   13.0393
Long Chord        =   60.9019
Mid. Ord.         =   10.3422
P.C. Station      10+84.38 X   1,531,644.6249 Y   6,912,541.3868
P.T. Station      11+49.86 X   1,531,606.5766 Y   6,912,493.8329
C.C.              X   1,531,594.6349 Y   6,912,542.3859
Back              = S 1° 08' 41.97" W
Ahead             = S 76° 10' 56.00" W
Chord Bear        = S 38° 39' 48.98" W
    
```

Course from PT DW022 to DW0202 S 76° 10' 56.00" W Dist 49.4402

```

Point DW0202      X   1,531,558.5672 Y   6,912,482.0249 Sta   11+99.30
    
```

Ending chain DW02 description





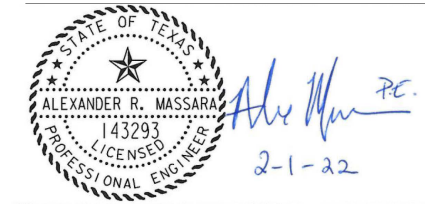
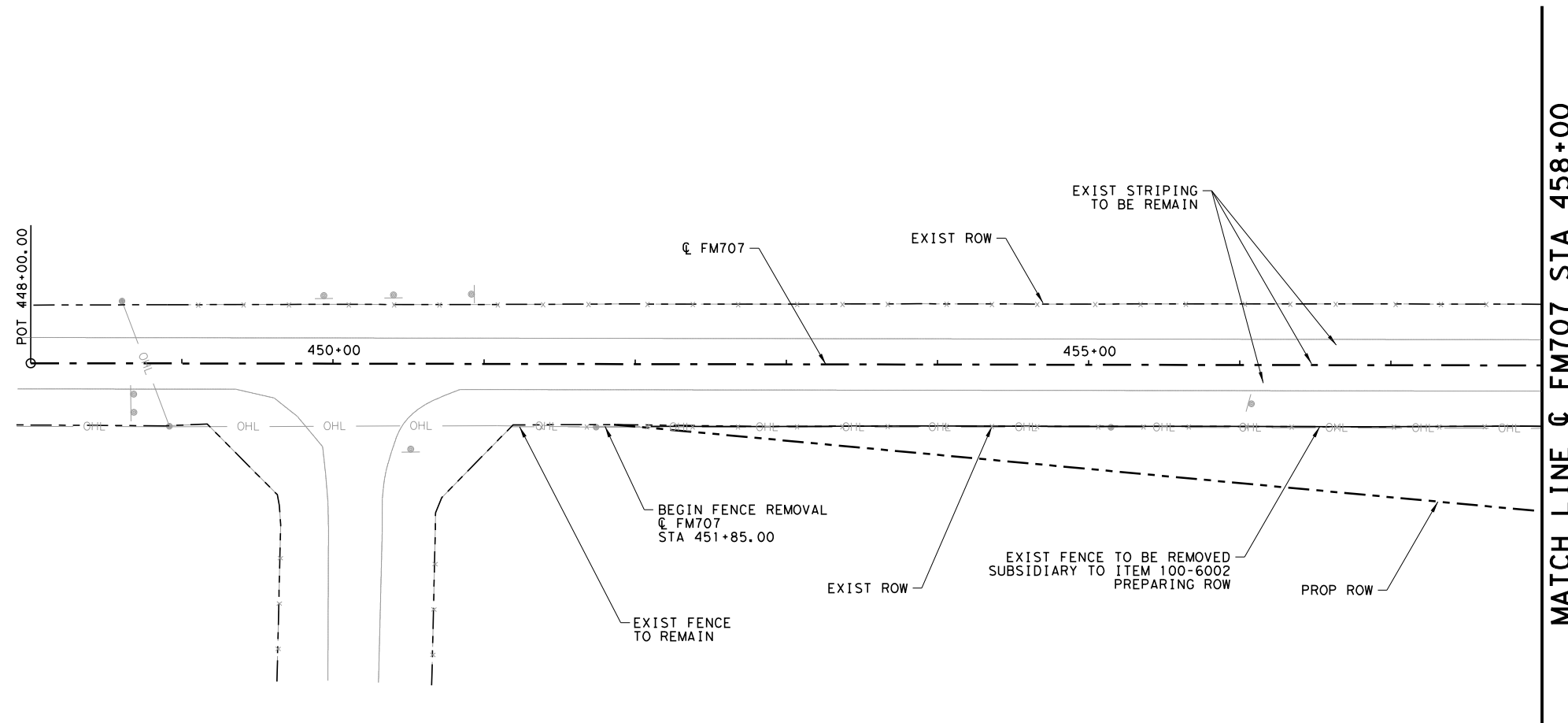
FM 707
HORIZONTAL
ALIGNMENT DATA

		SHEET 1 OF 1	
DS:	AM	CK:	DH
		0484	01
DW:	AM	CK:	AT
		ABL	
		CONT	SECT
		JOB	HIGHWAY
		025	FM 707
		DIST	COUNTY
		JONES	SHEET NO.
			55



LEGEND

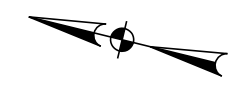
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-  REMOVE EXISTING DRIVEWAY





FM 707
REMOVAL LAYOUT

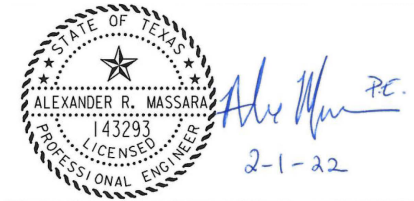
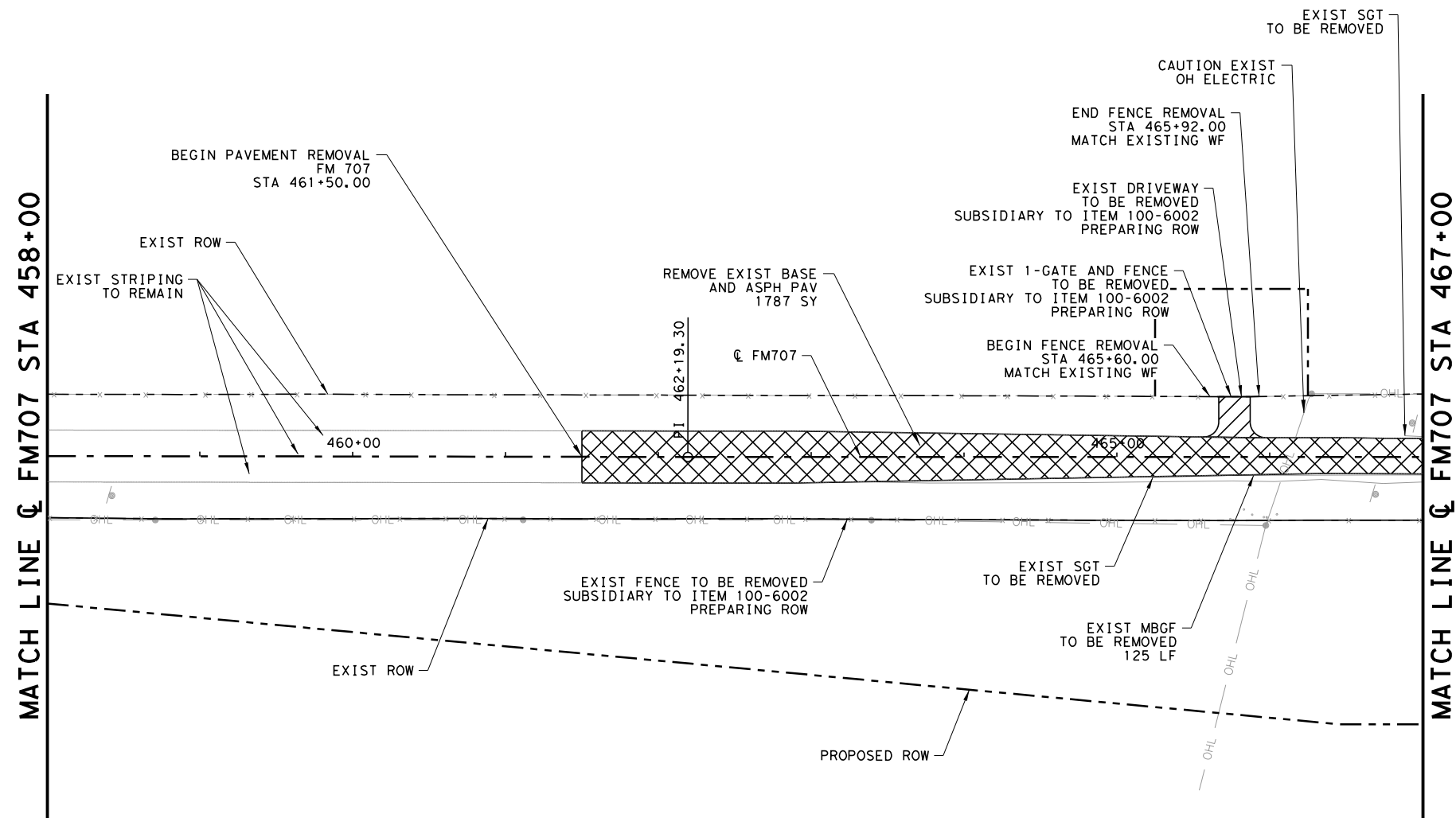
SCALE: 1" = 100' SHEET 1 OF 4

DS:	CK:	CONT	SECT	JOB	HIGHWAY
AM	DH	0484	01	025	FM 707
DW:	CK:	DIST	COUNTY		SHEET NO.
AM	AT	ABL	JONES		56



LEGEND

-  REMOVE EXISTING ASPHALT PAVEMENT AND BASE MATERIAL
-  REMOVE EXISTING DRIVEWAY



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FM 707
REMOVAL LAYOUT

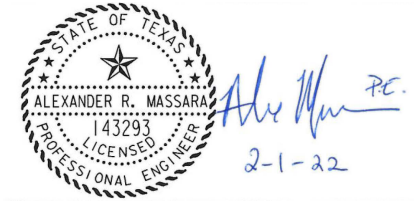
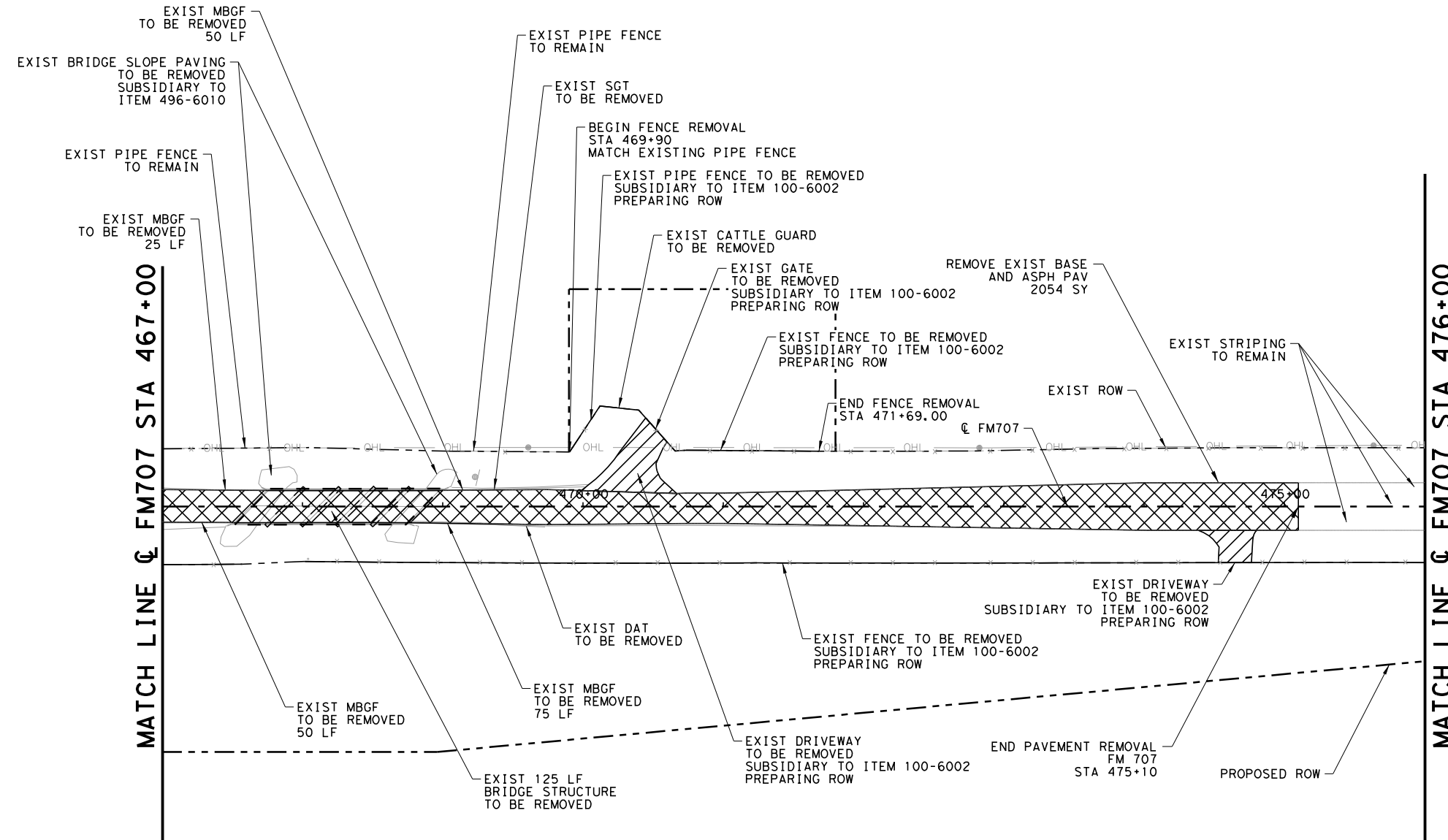
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DS:	CK:	CONT	SECT	JOB	HIGHWAY
AM	DH	0484	01	025	FM 707
DW:	CK:	DIST		COUNTY	SHEET NO.
AM	AT	ABL		JONES	57



LEGEND

-  REMOVE EXISTING ASPHALT PAVEMENT AND BASE MATERIAL
-  REMOVE EXISTING DRIVEWAY



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
FM 707
REMOVAL LAYOUT

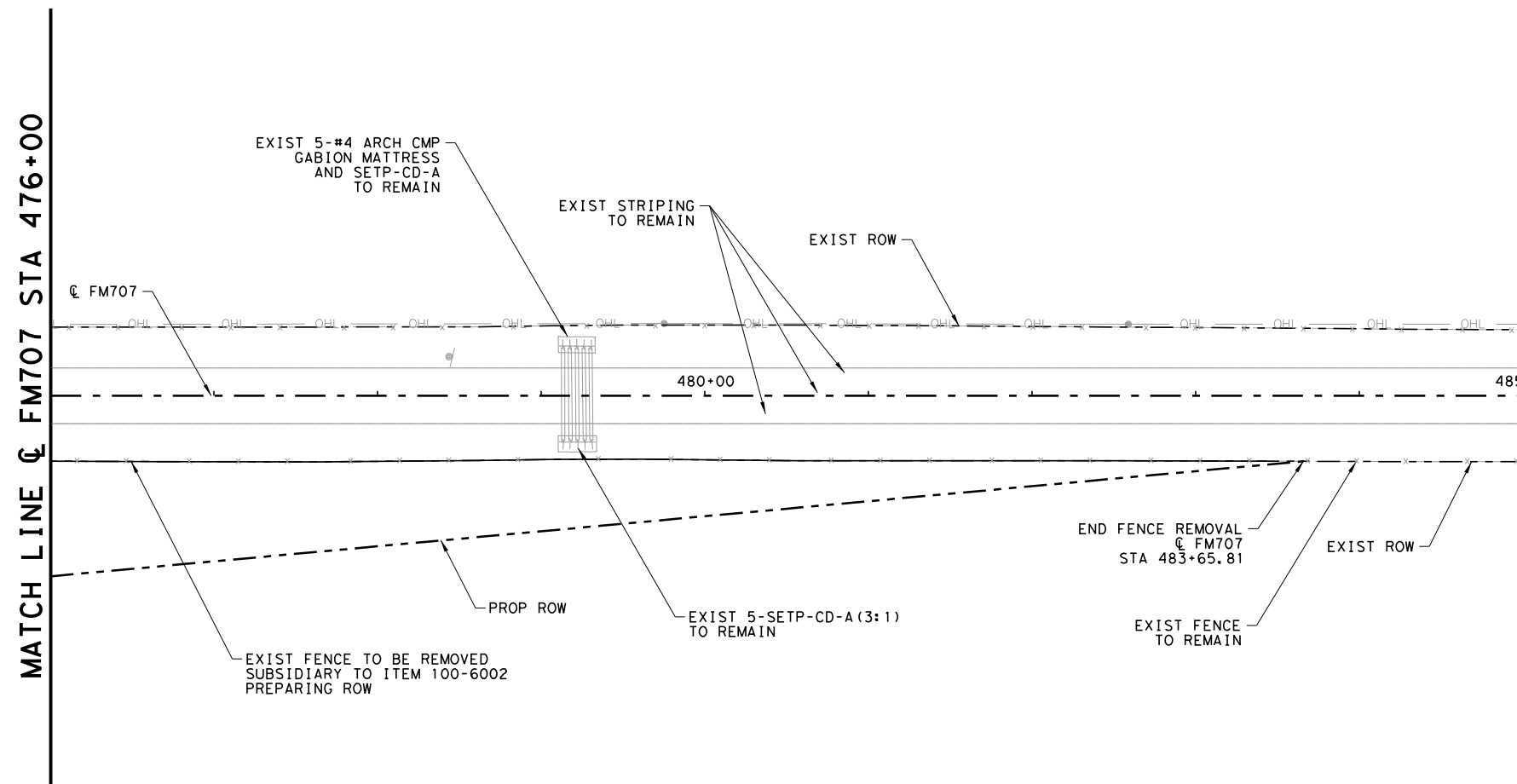
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AM	JK	0484	01	025	FM 707
DW:	CK:	DIST	COUNTY		SHEET NO.
AM	AT	ABL	JONES		58



LEGEND

-  REMOVE EXISTING ASPHALT PAVEMENT AND BASE MATERIAL
-  REMOVE EXISTING DRIVEWAY



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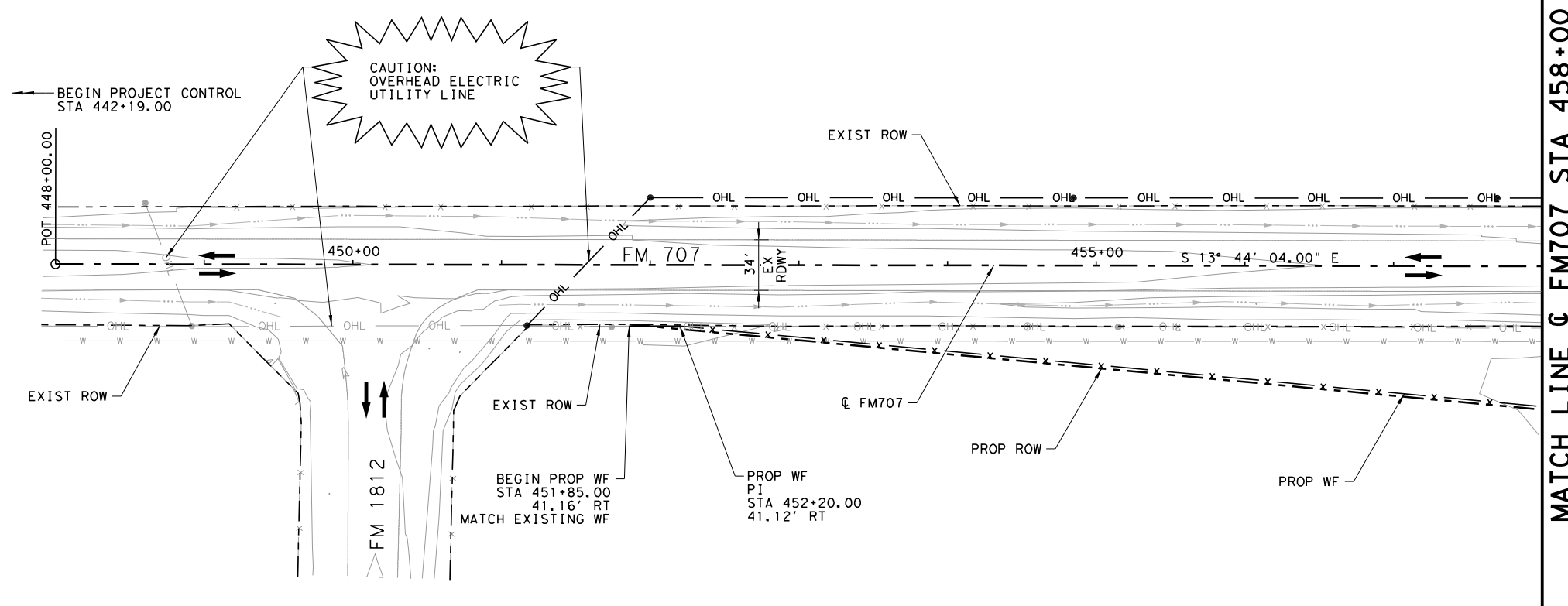
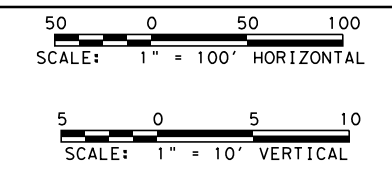
FM 707

REMOVAL LAYOUT

SCALE: 1" = 100' SHEET 4 OF 4

DS:	CK:	CONT	SECT	JOB	HIGHWAY
AM	JK	0484	01	025	FM 707
DW:	CK:	DIST	COUNTY	SHEET NO.	
AM	AT	ABL	JONES	59	

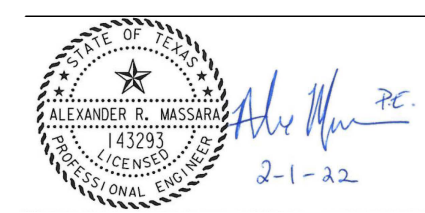
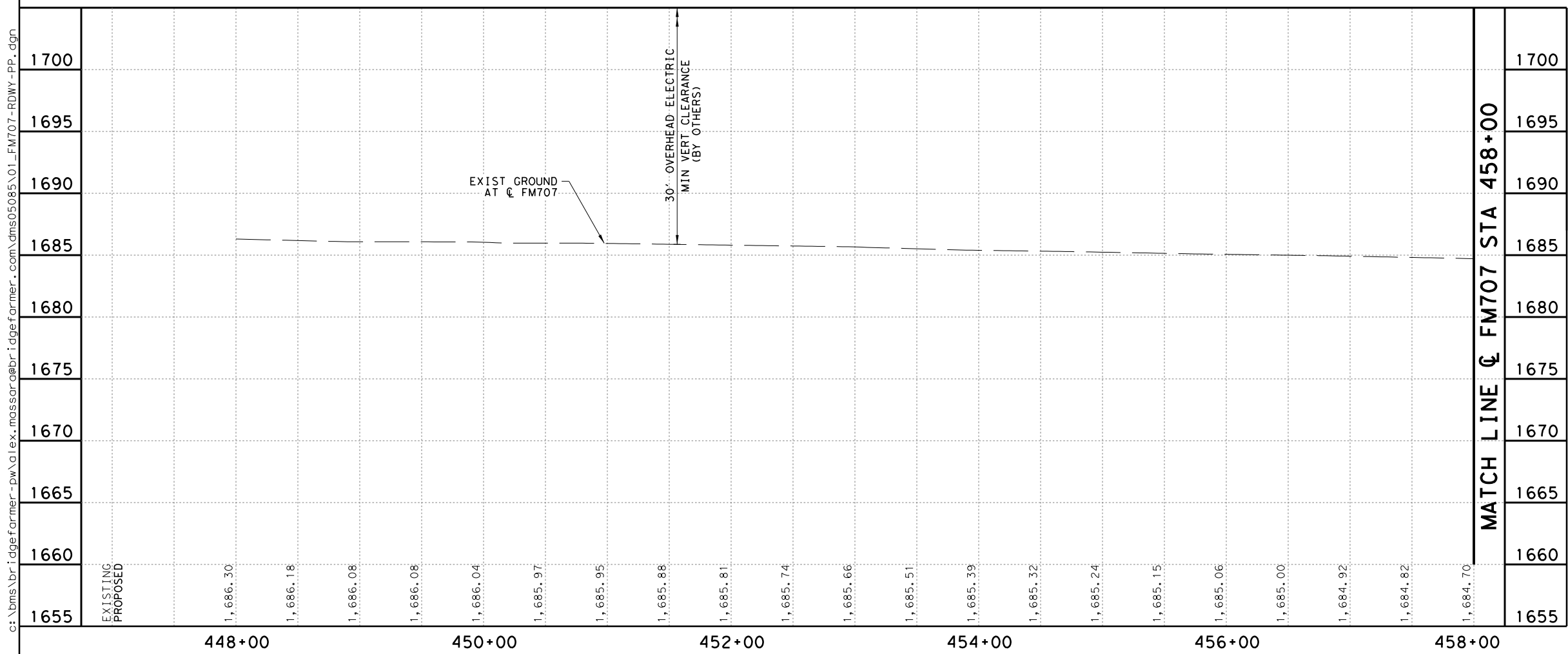
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- LEGEND**
- ← PROPOSED DIRECTION ARROWS
 - (XX) PROPOSED DRIVEWAY NUMBER
 - x - PROPOSED FENCE
 - w - EXIST WATER LINE (PLASTIC)
 - OHL - EXIST OVERHEAD ELECTRIC
 - OHL - PROPOSED OVERHEAD ELECTRIC
 - o - o PROPOSED GATE
 - - - PROPOSED RIGHT-OF-WAY / EASEMENT

- NOTES:**
1. REFER TO "HORIZONTAL ALIGNMENT DATA" SHEETS FOR HORIZONTAL ALIGNMENT INFORMATION.
 2. SEE "DRIVEWAY DETAILS" SHEET FOR MORE INFORMATION ON DRIVEWAY AND FENCE REPLACEMENT.
 3. UTILITIES SHOWN ARE FOR REFERENCE ONLY.
 4. PROPOSED WIRE FENCE (WF) SUBSIDIARY TO ITEM 100-6002 PREPARING ROW.

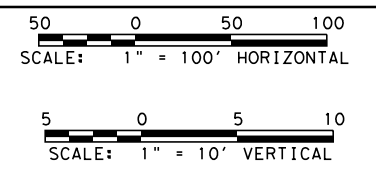
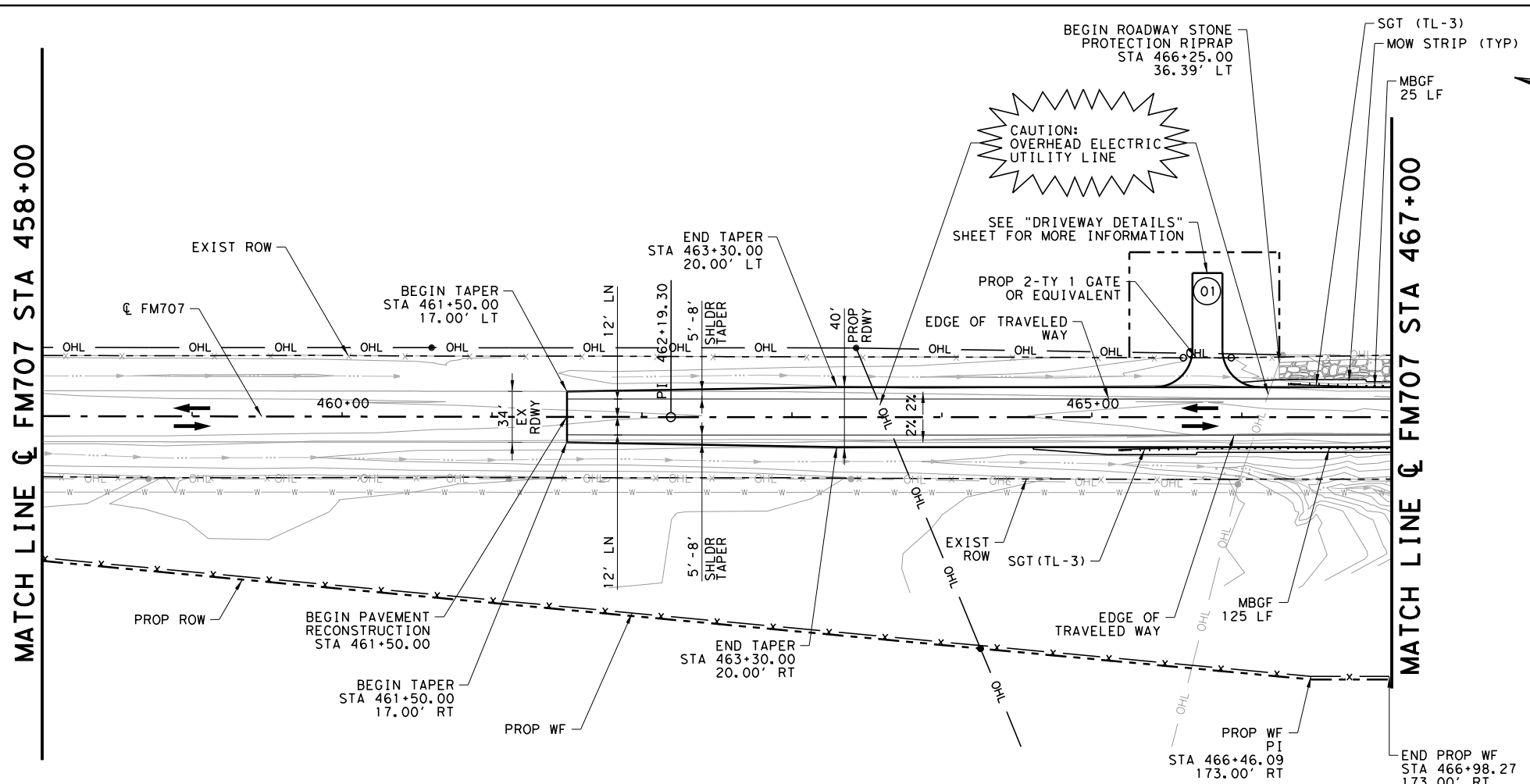
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**FM 707
ROADWAY PLAN
AND PROFILE
448+00 TO 458+00**

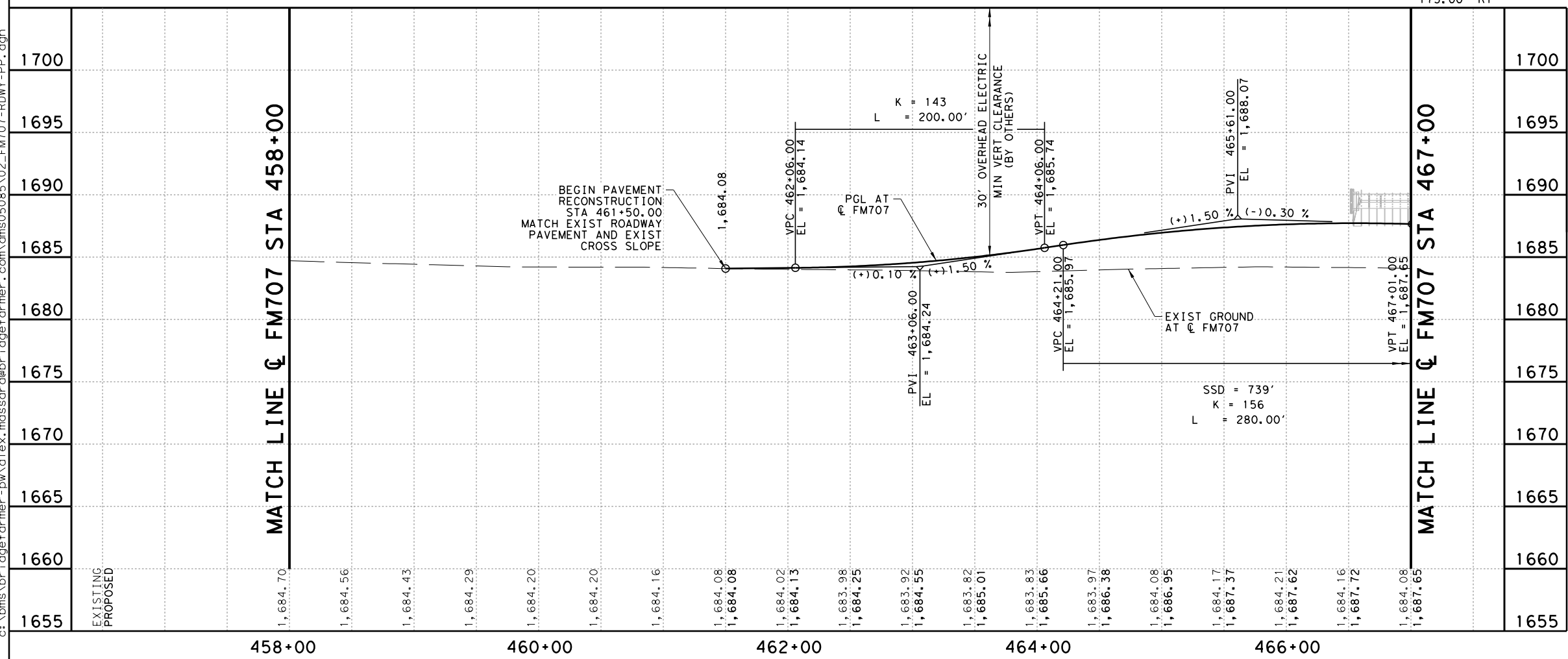
SHEET 1 OF 4

DES:	AM	CK:	DH	CONT:	0484	SECT:	01	JOB:	025	HIGHWAY:	FM 707
DW:	AM	CK:	AT	DIST:	ABL	COUNTY:	JONES	SHEET NO.:	60		



- LEGEND**
- ← PROPOSED DIRECTION ARROWS
 - (XX) PROPOSED DRIVEWAY NUMBER
 - x- PROPOSED FENCE
 - w- EXIST WATER LINE (PLASTIC)
 - o- EXIST OVERHEAD ELECTRIC
 - OHL- PROPOSED OVERHEAD ELECTRIC
 - o-o PROPOSED GATE
 - - - PROPOSED RIGHT-OF-WAY / EASEMENT

- NOTES:**
1. REFER TO "HORIZONTAL ALIGNMENT DATA" SHEETS FOR HORIZONTAL ALIGNMENT INFORMATION.
 2. SEE "DRIVEWAY DETAILS" SHEET FOR MORE INFORMATION ON DRIVEWAY AND FENCE REPLACEMENT.
 3. UTILITIES SHOWN ARE FOR REFERENCE ONLY.
 4. PROPOSED WIRE FENCE (WF) SUBSIDIARY TO ITEM 100-6002 PREPARING ROW.



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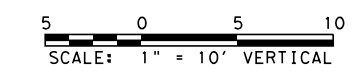
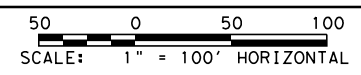
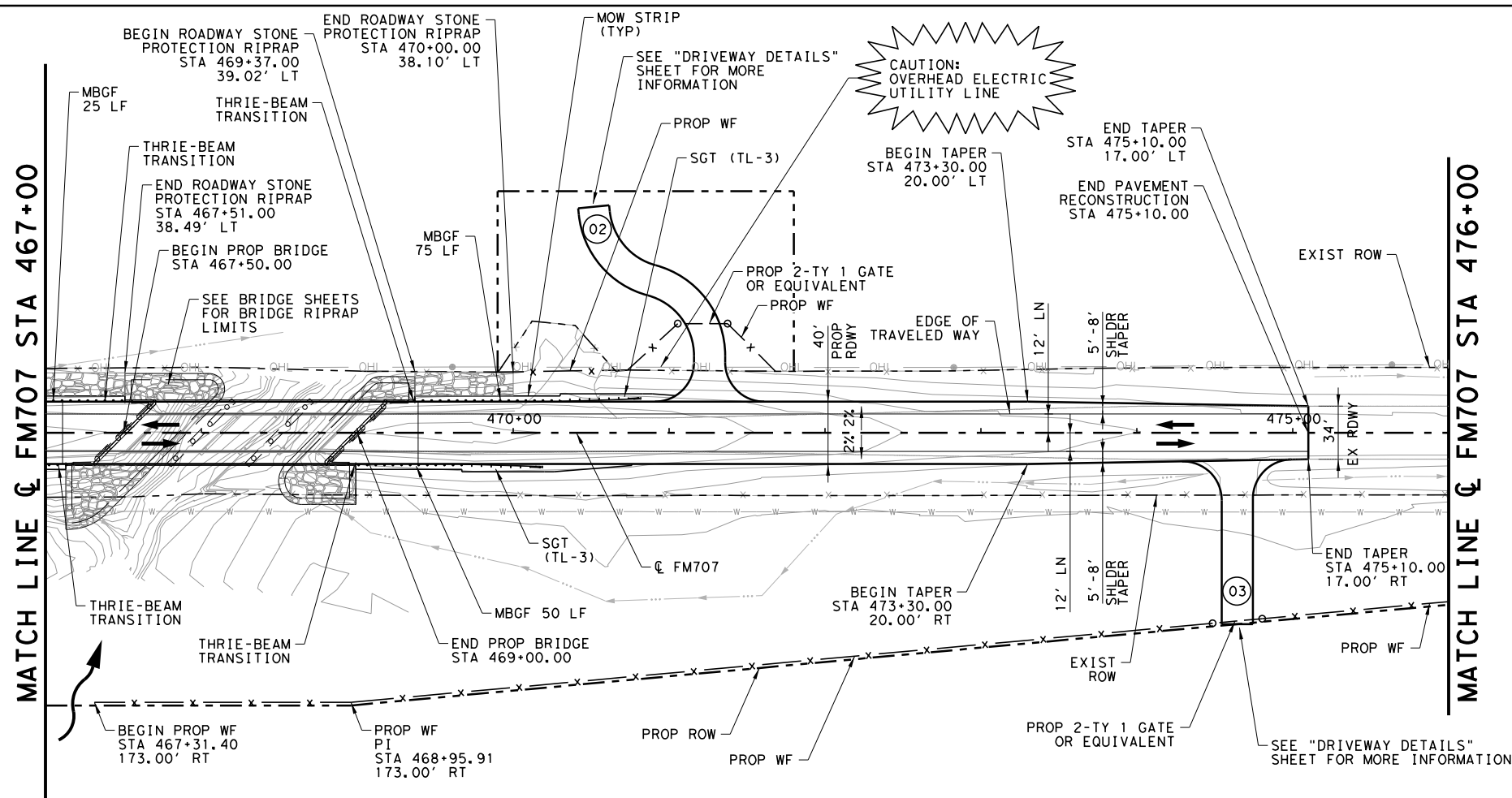
**FM 707
ROADWAY PLAN
AND PROFILE
458+00 TO 467+00**

SHEET 2 OF 4

DS:	AM	CK:	DH	CONT	0484	SECT	01	JOB	025	HIGHWAY	FM 707
DW:	AM	CK:	AT	DIST	ABL	COUNTY	JONES	SHEET NO.	61		

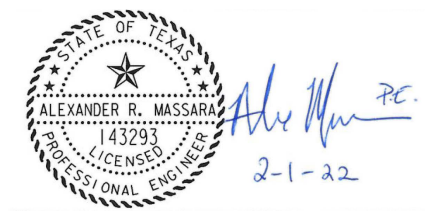
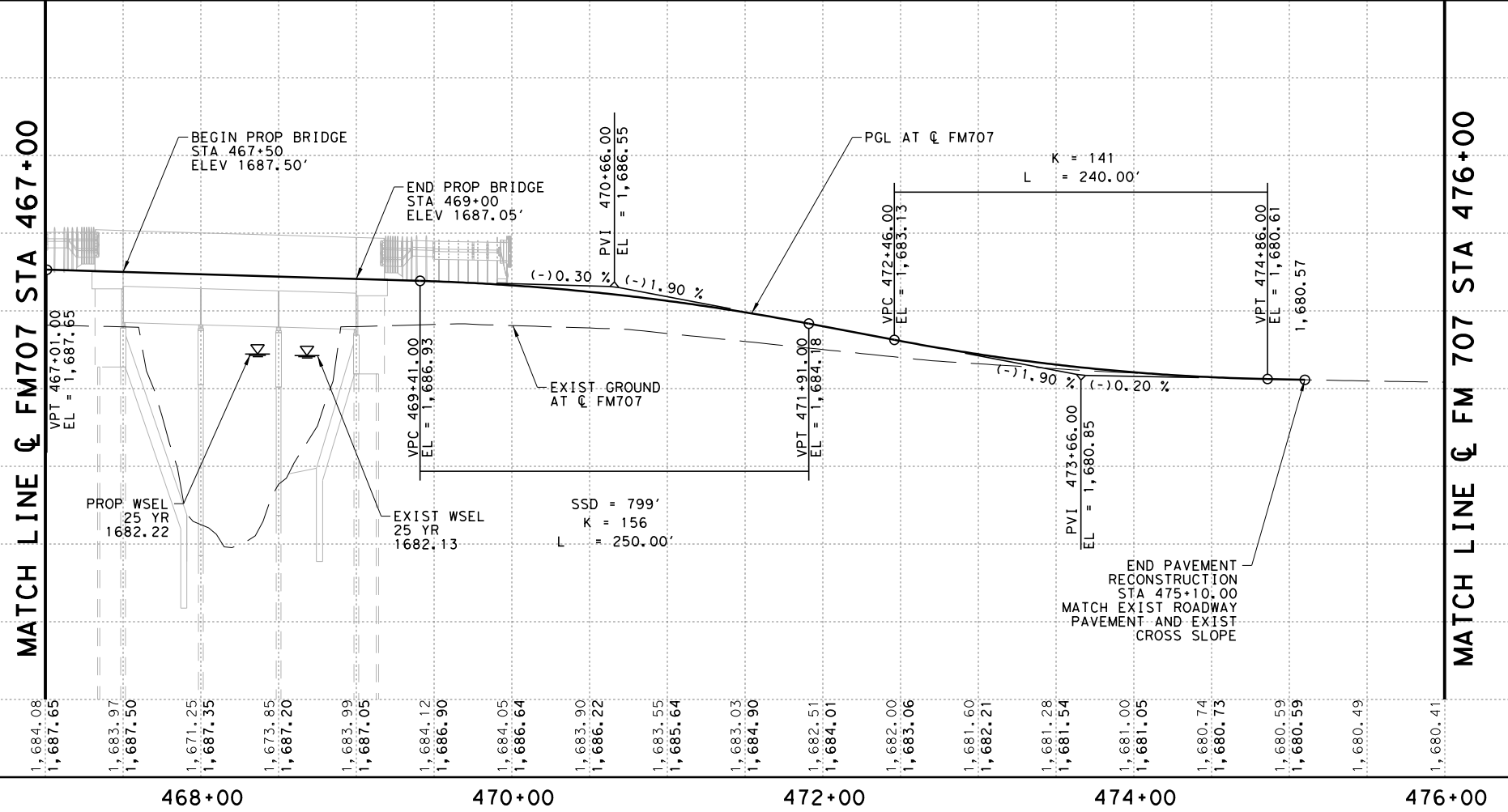
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- LEGEND**
- ← PROPOSED DIRECTION ARROWS
 - (XX) PROPOSED DRIVEWAY NUMBER
 - x - PROPOSED FENCE
 - w - EXIST WATER LINE (PLASTIC)
 - OHL - EXIST OVERHEAD ELECTRIC
 - OHL - PROPOSED OVERHEAD ELECTRIC
 - o - o PROPOSED GATE
 - - - PROPOSED RIGHT-OF-WAY / EASEMENT

- NOTES:**
1. REFER TO "HORIZONTAL ALIGNMENT DATA" SHEETS FOR HORIZONTAL ALIGNMENT INFORMATION.
 2. SEE "DRIVEWAY DETAILS" SHEET FOR MORE INFORMATION ON DRIVEWAY AND FENCE REPLACEMENT.
 3. UTILITIES SHOWN ARE FOR REFERENCE ONLY.
 4. PROPOSED WIRE FENCE (WF) SUBSIDIARY TO ITEM 100-6002 PREPARING ROW.



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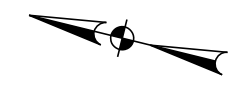
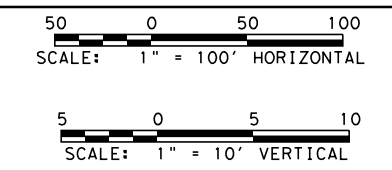
**FM 707
ROADWAY PLAN
AND PROFILE
467+00 TO 476+00**

SHEET 3 OF 4

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DW:	AM	CK:	AT	DIST:		COUNTY:		JONES		SHEET NO.:	62

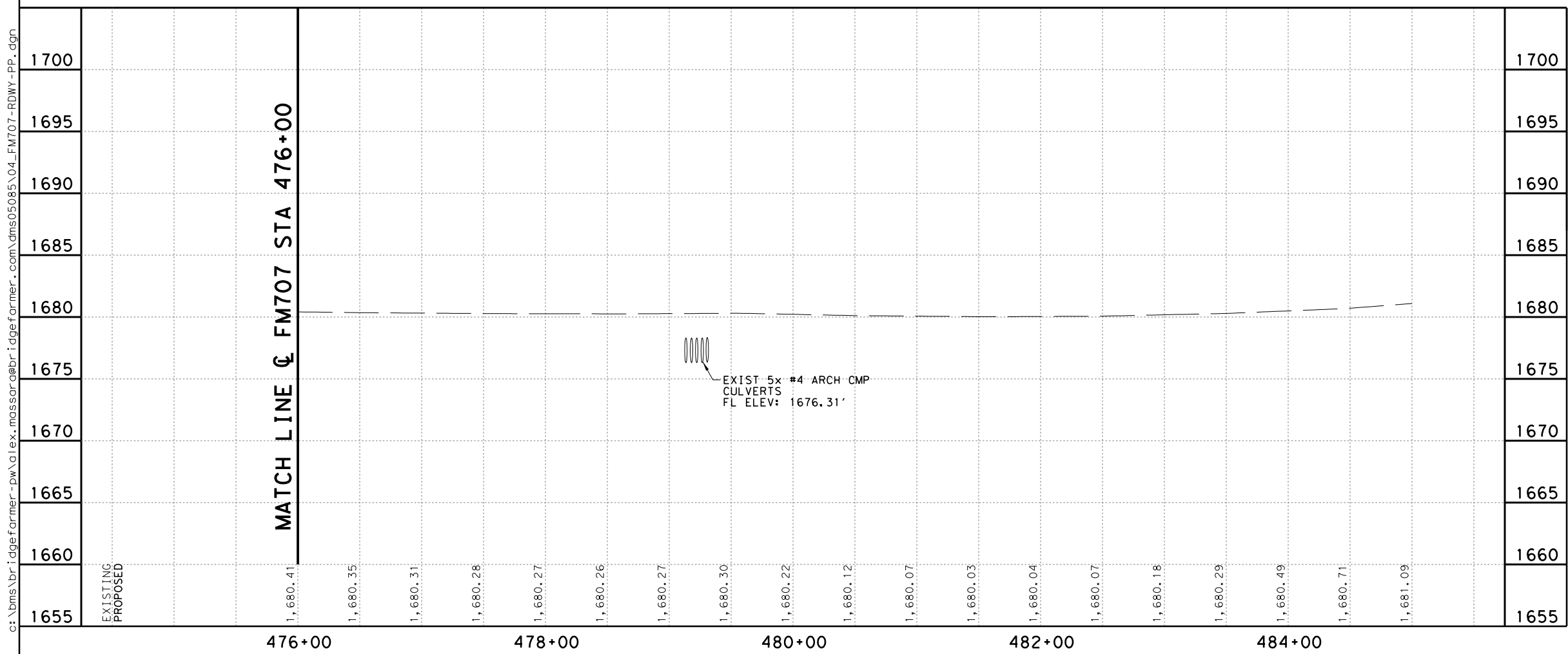
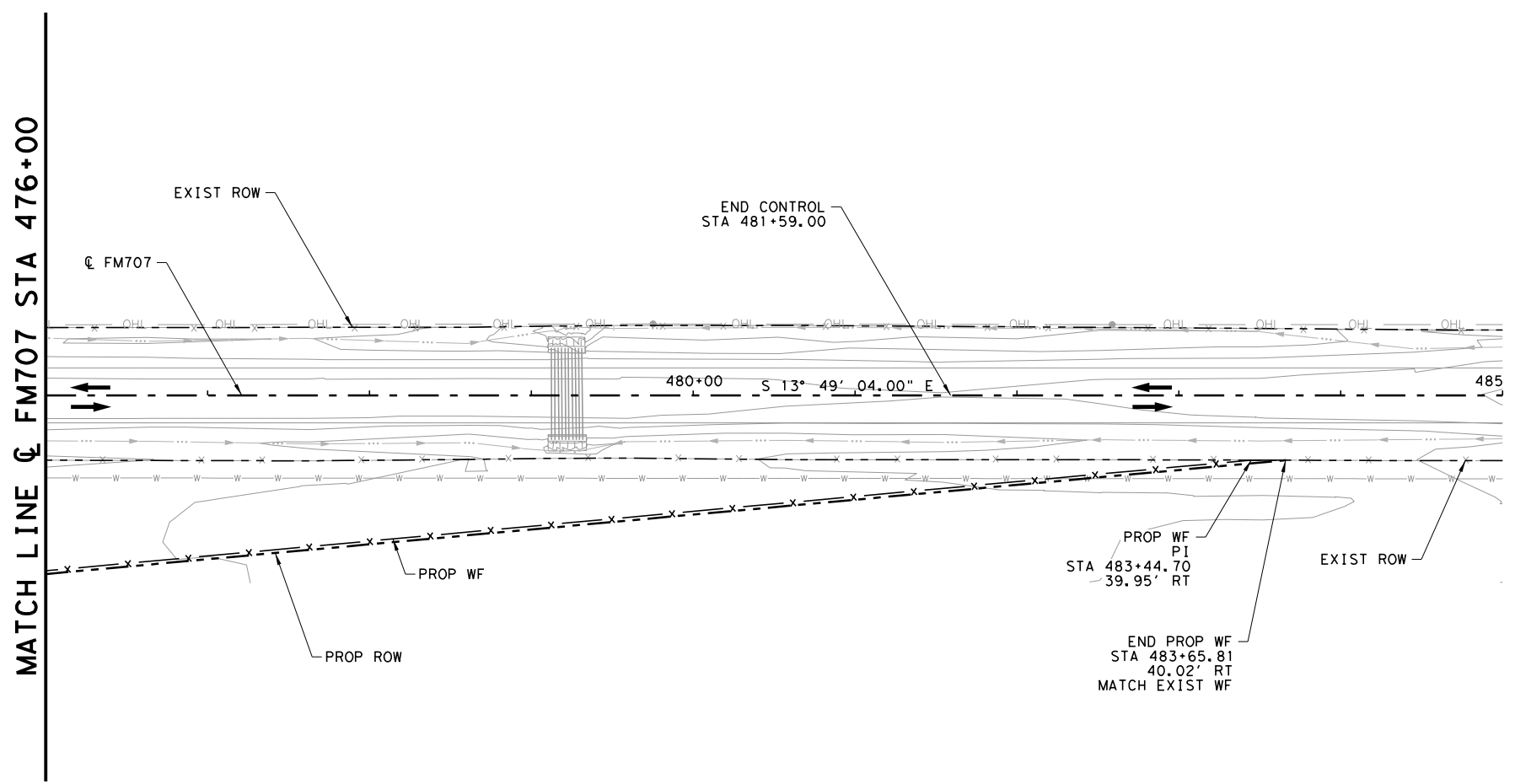
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- LEGEND**
- ← PROPOSED DIRECTION ARROWS
 - (XX) PROPOSED DRIVEWAY NUMBER
 - x - PROPOSED FENCE
 - w - EXIST WATER LINE (PLASTIC)
 - OHL - EXIST OVERHEAD ELECTRIC
 - OHL - PROPOSED OVERHEAD ELECTRIC
 - o - o PROPOSED GATE
 - - - PROPOSED RIGHT-OF-WAY / EASEMENT

- NOTES:**
1. REFER TO "HORIZONTAL ALIGNMENT DATA" SHEETS FOR HORIZONTAL ALIGNMENT INFORMATION.
 2. SEE "DRIVEWAY DETAILS" SHEET FOR MORE INFORMATION ON DRIVEWAY AND FENCE REPLACEMENT.
 3. UTILITIES SHOWN ARE FOR REFERENCE ONLY.
 4. PROPOSED WIRE FENCE (WF) SUBSIDIARY TO ITEM 100-6002 PREPARING ROW.



Professional Engineer Seal for Alexander R. Massarra, License No. 143293, dated 2-1-22.

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TBPB REGISTRATION NO. 264

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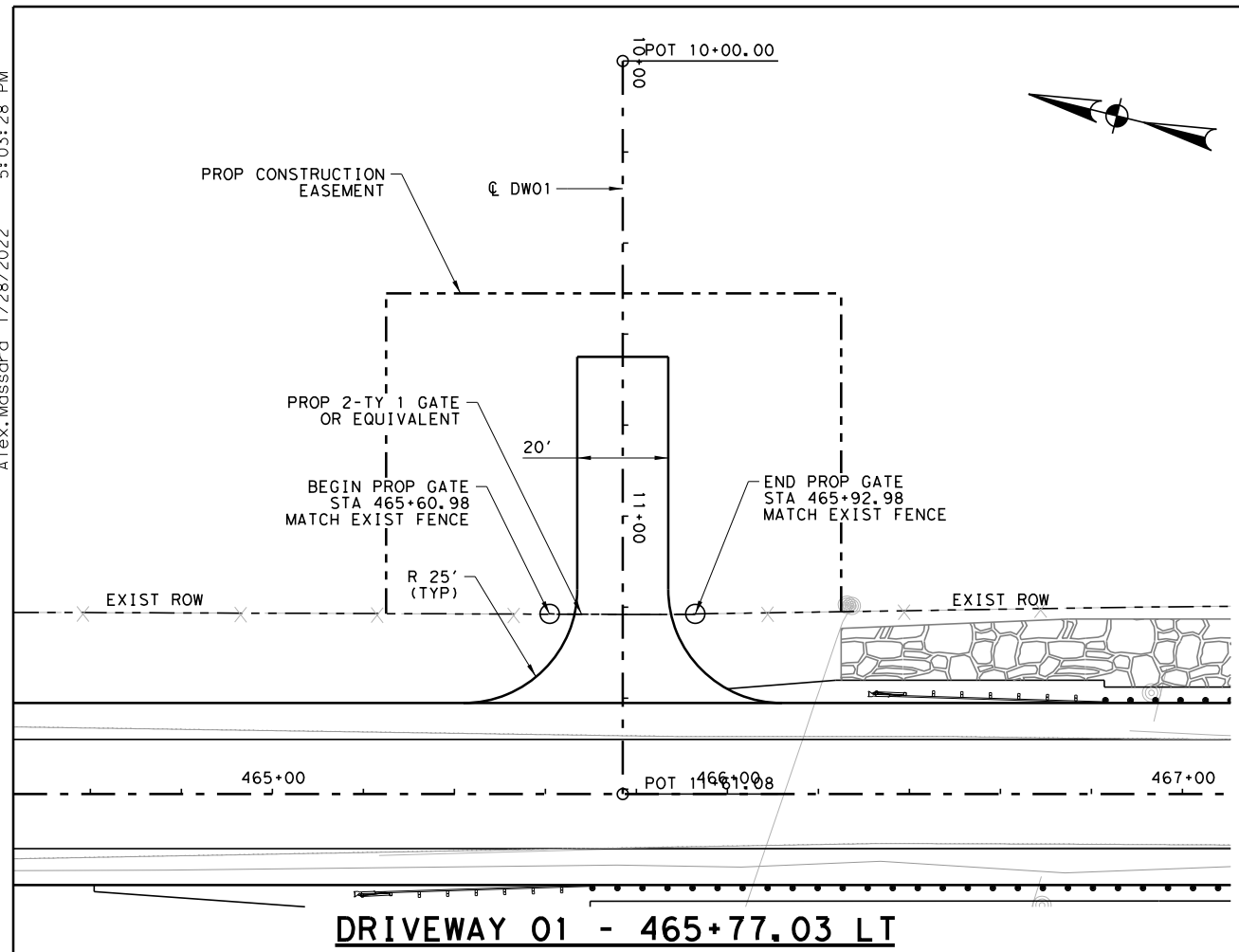
**FM 707
ROADWAY PLAN
AND PROFILE
476+00 TO 485+00**

SHEET 4 OF 4

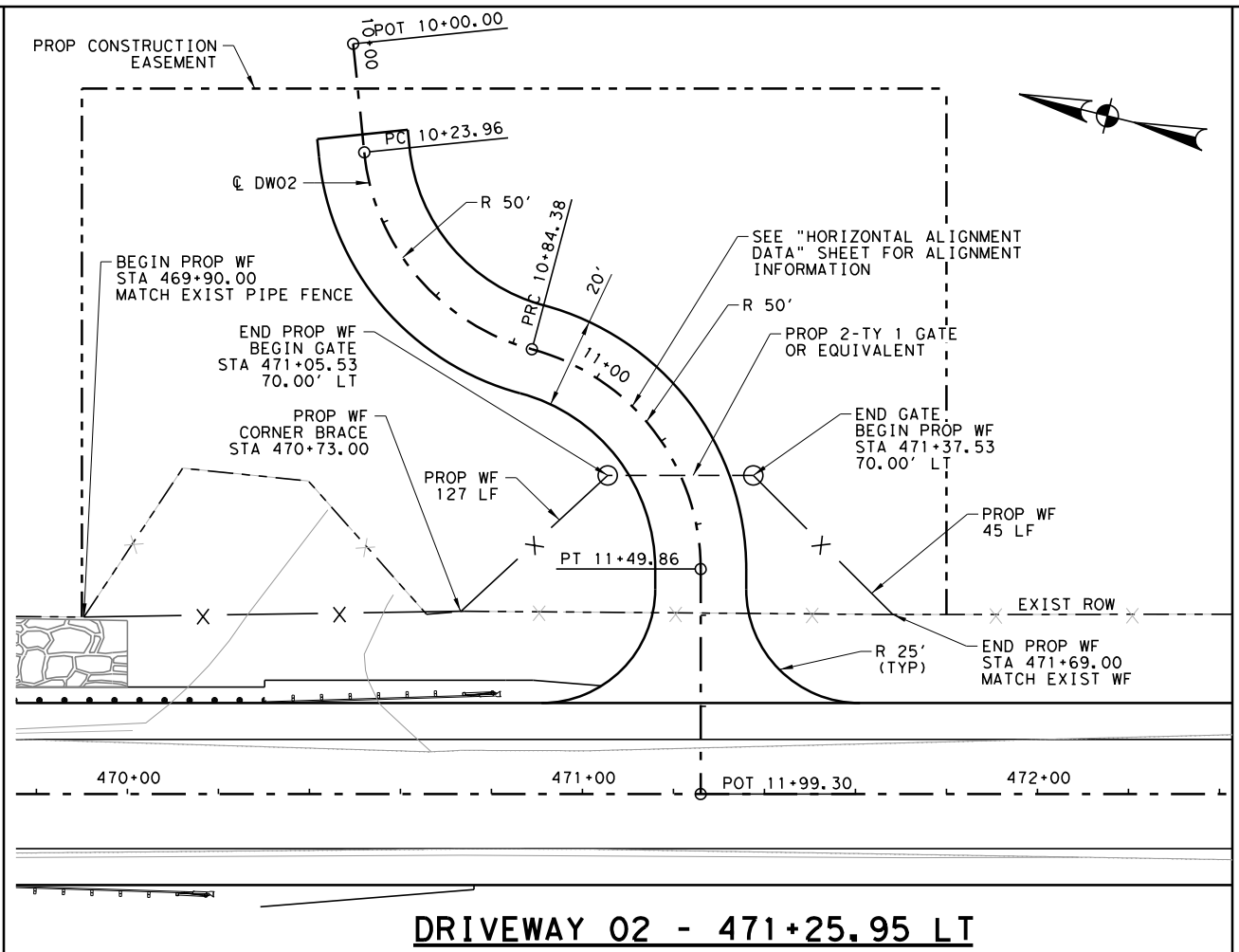
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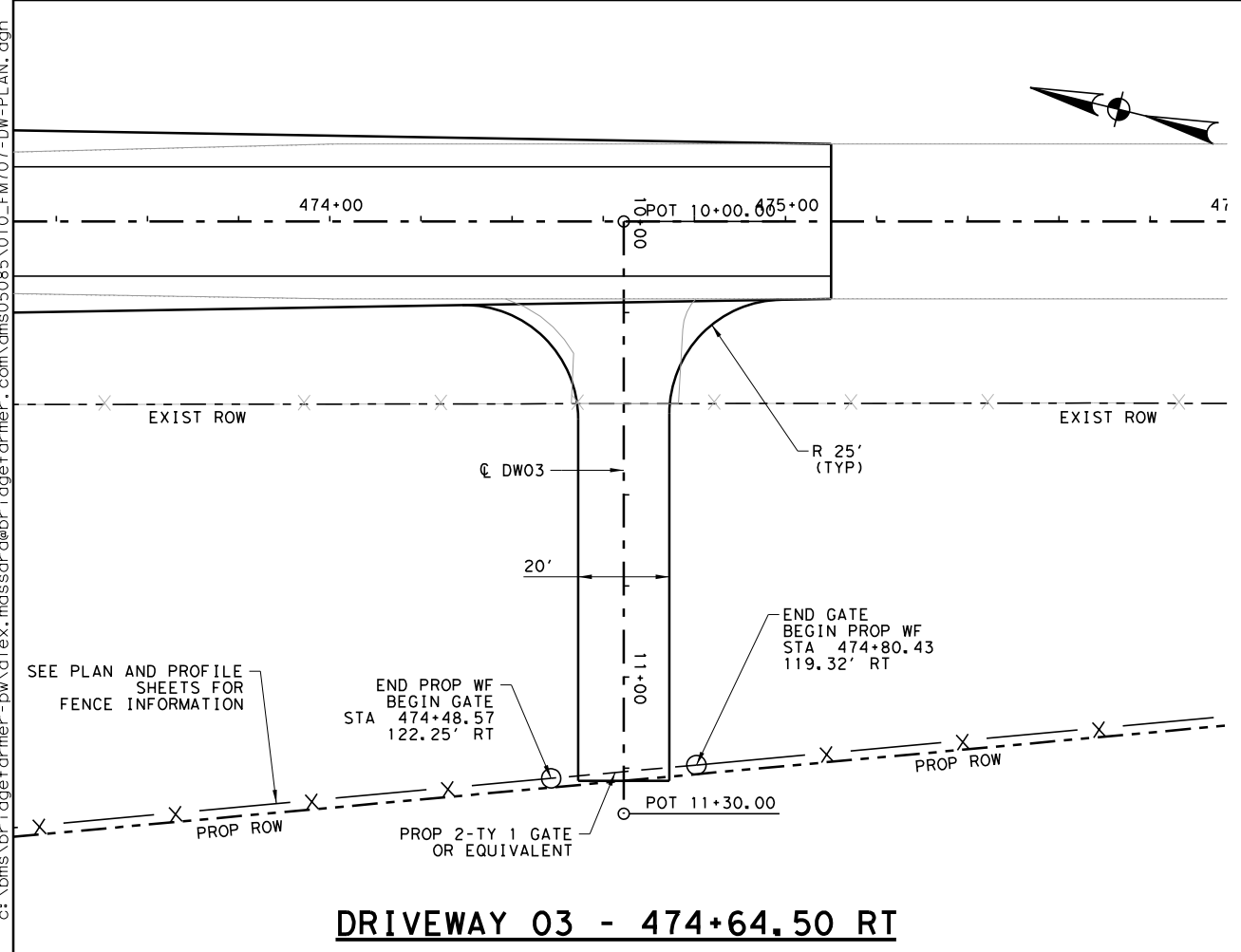
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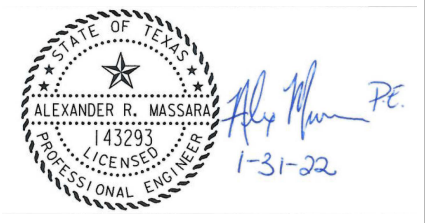
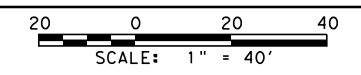
DRIVEWAY 01 - 465+77.03 LT



DRIVEWAY 02 - 471+25.95 LT



DRIVEWAY 03 - 474+64.50 RT



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CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264



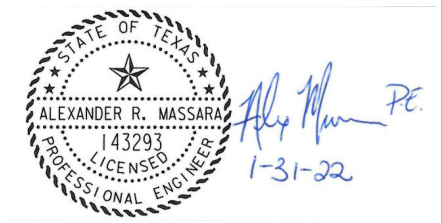
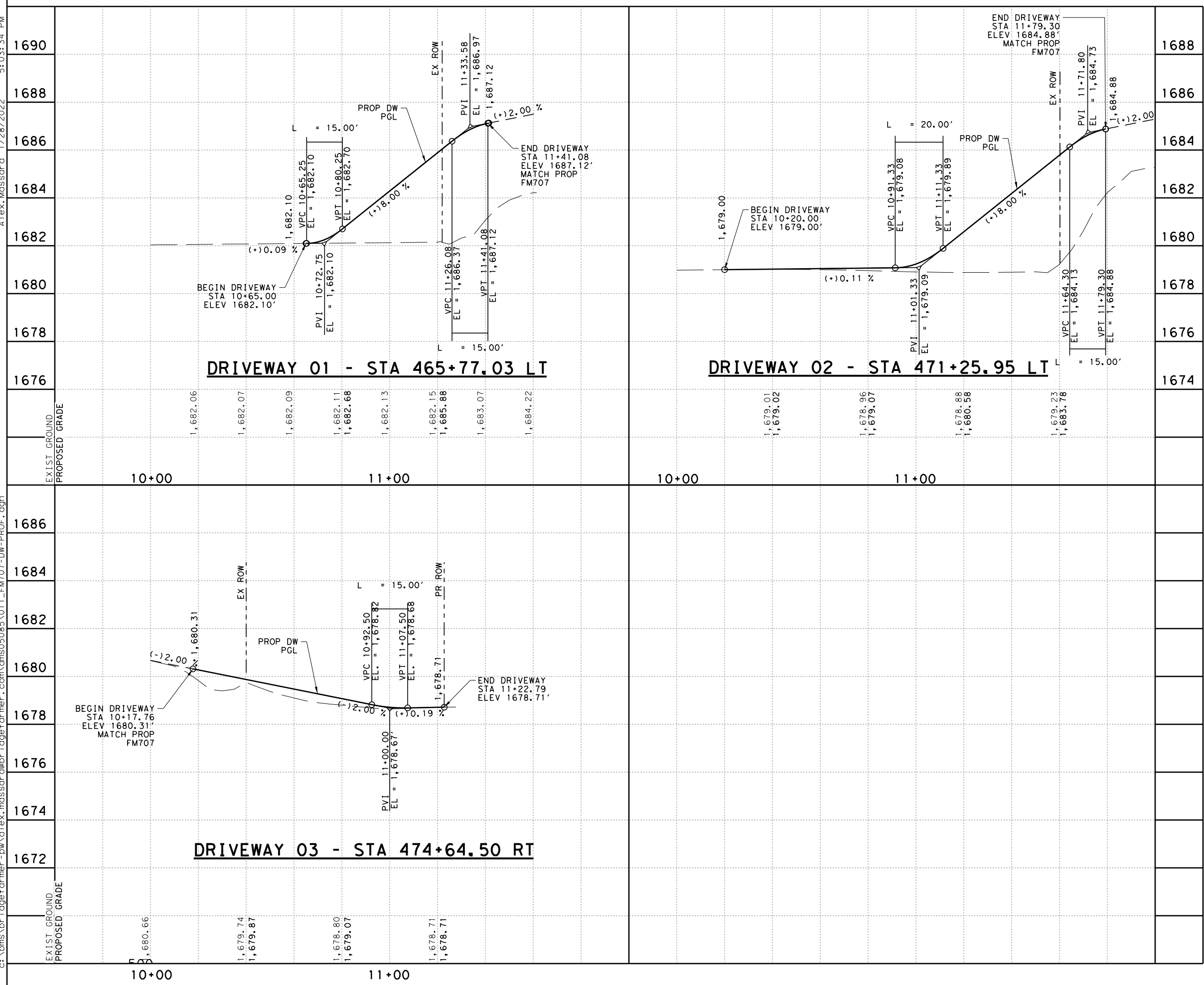
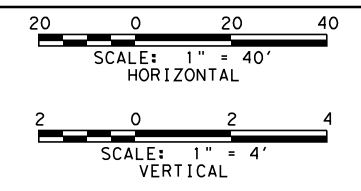
FM 707
DRIVEWAY DETAILS

SCALE: 1" = 40' SHEET 1 OF 2

DS:	CK:	CONT	SECT	JOB	HIGHWAY
AM	DH	0484	01	025	FM 707
DW:	CK:	DIST	COUNTY	SHEET NO.	
CG	AT	ABL	JONES	64	

Alex.Massar-a 1/28/2022 5:03:34 PM

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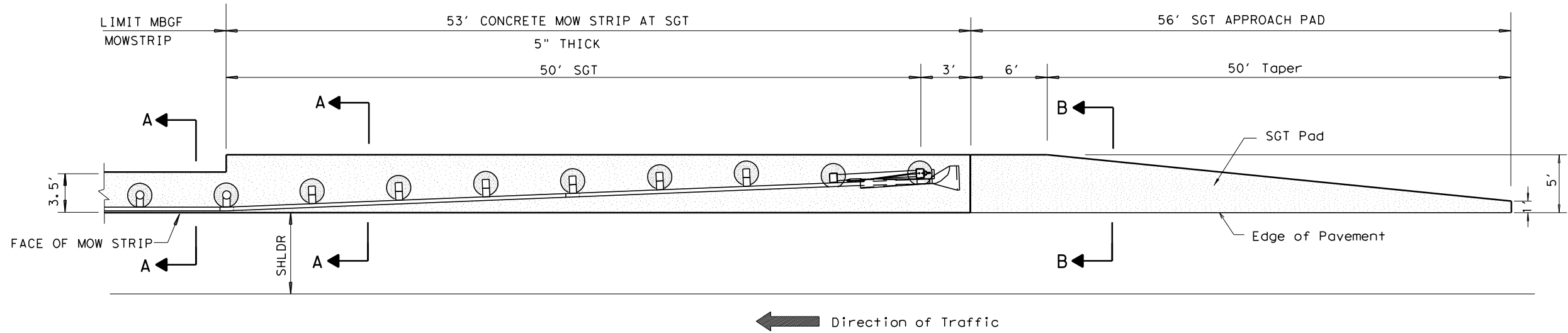
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FM 707
DRIVEWAY DETAILS

SHEET 1 OF 1

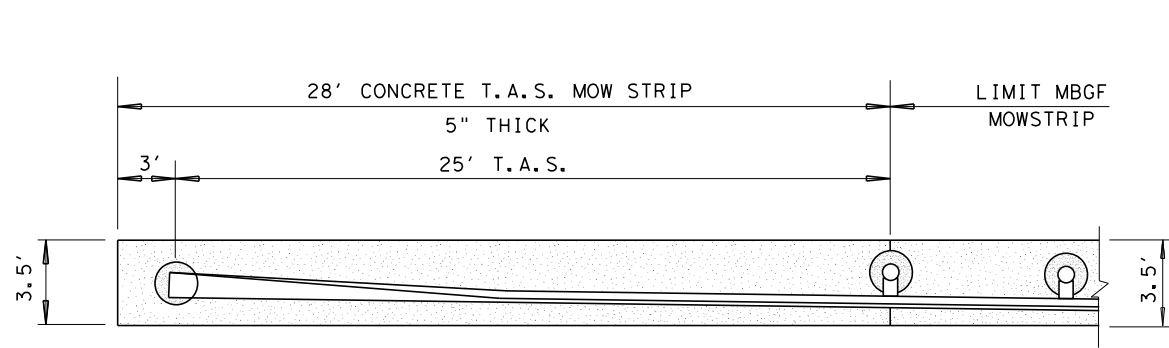
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(SGT Approach Pad Quantity = 2.8 CY)

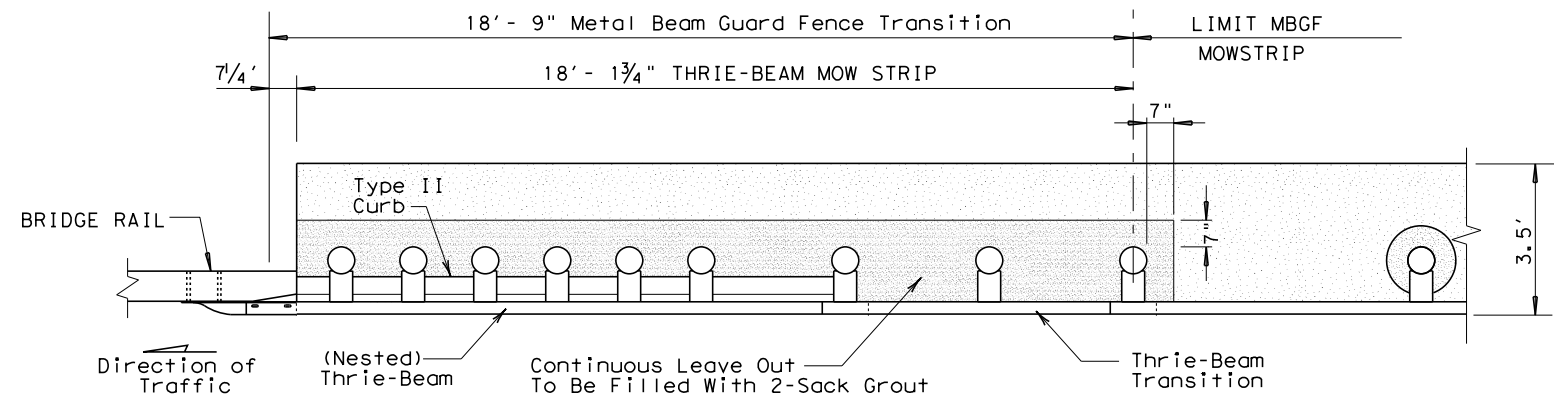


PLAN VIEW OF MOW STRIP AT SGT

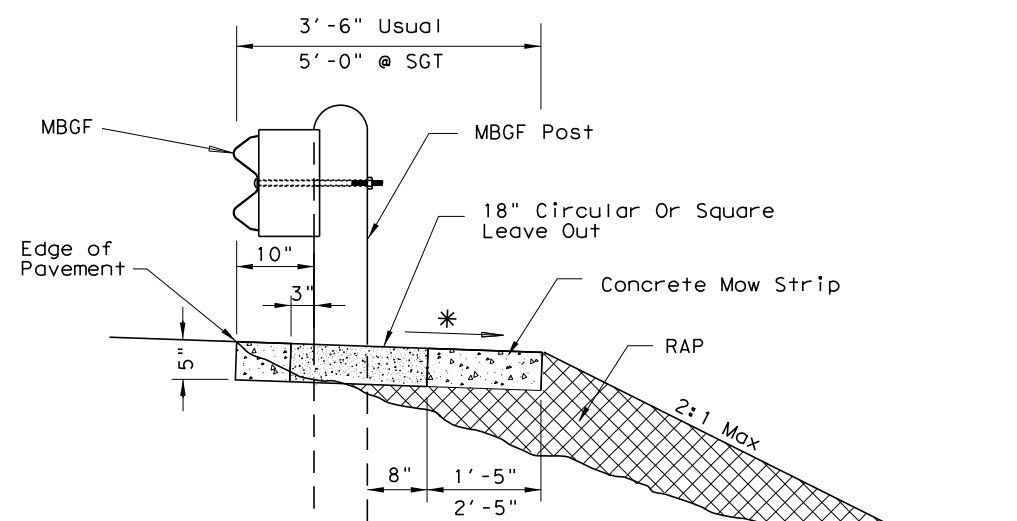
PLAN VIEW OF SGT APPROACH PAD



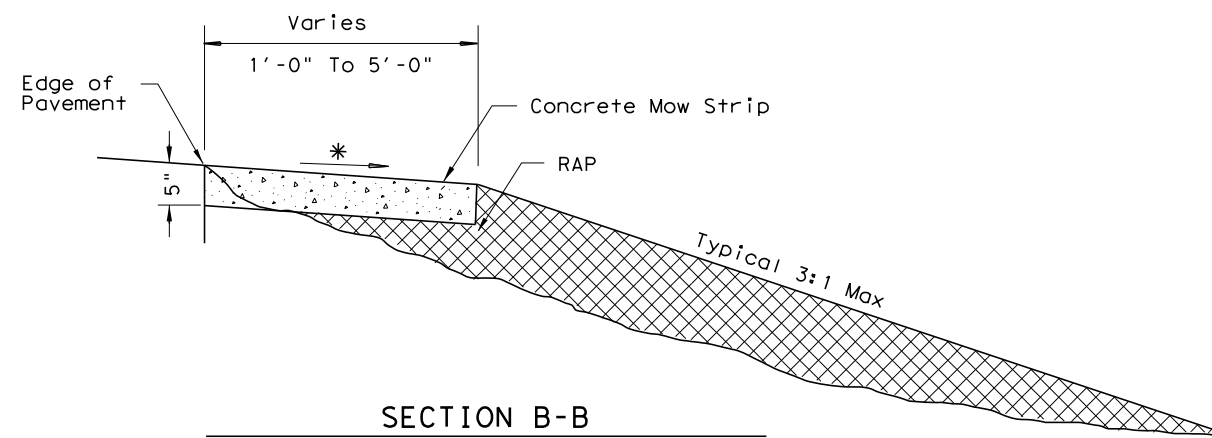
PLAN VIEW OF MOW STRIP AT TAS



PLAN VIEW OF THRIE-BEAM MOW STRIP



SECTION A-A
Mow Strip @ MBGF & SGT

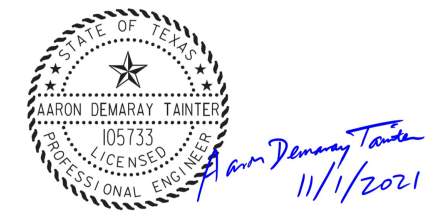


SECTION B-B
Mow Strip @ SGT Approach Pad

General Notes:

RAP Will Be Provided By TxDOT.
Transportation To The Site and
Placement Of RAP Will Be Subsidiary
To Items 540 & 544.

* Match Roadway Slope (10:1 Max.)



CMS-09

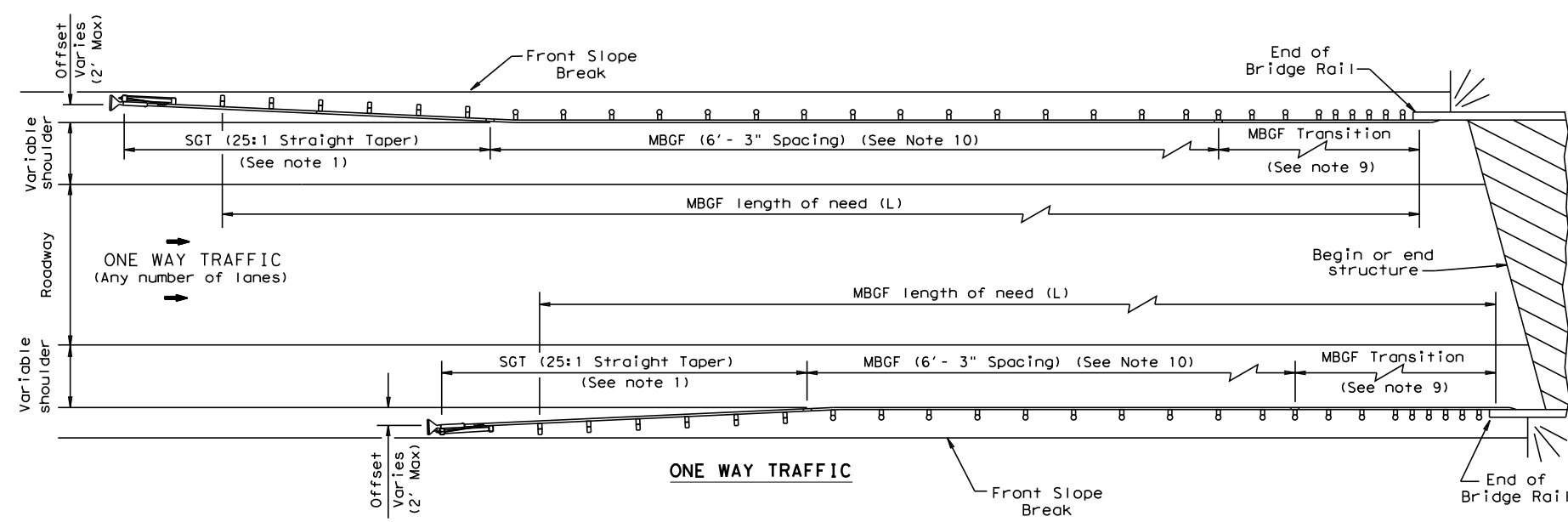
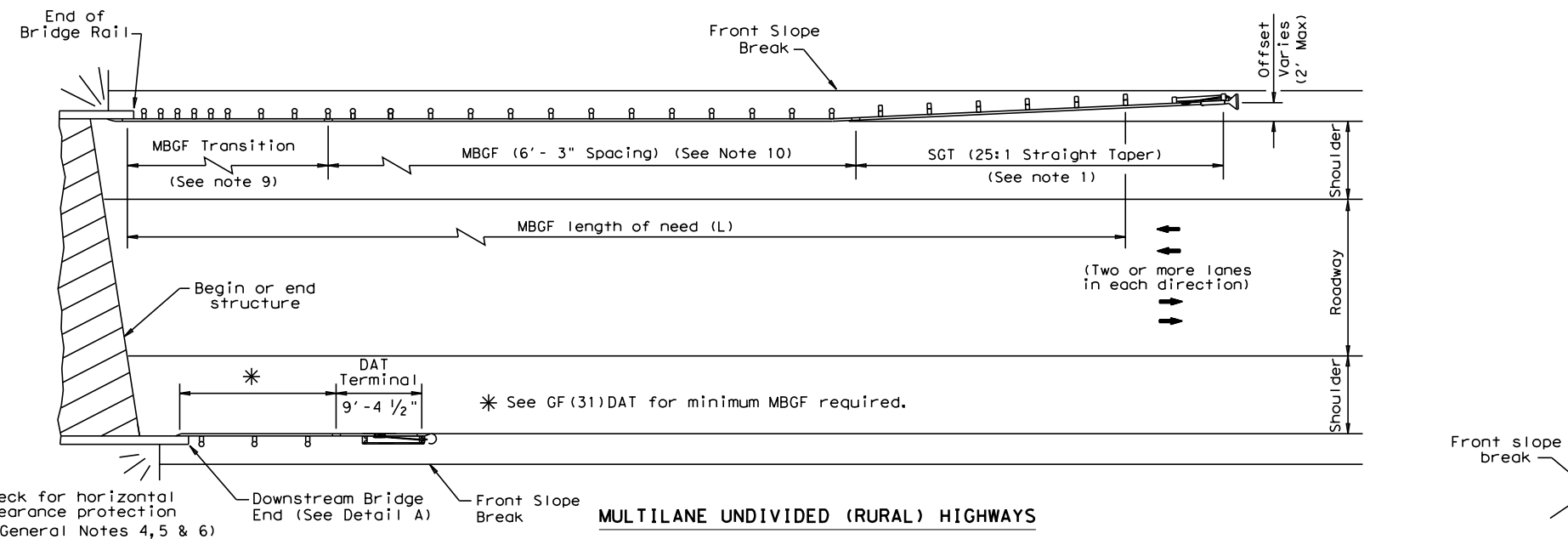
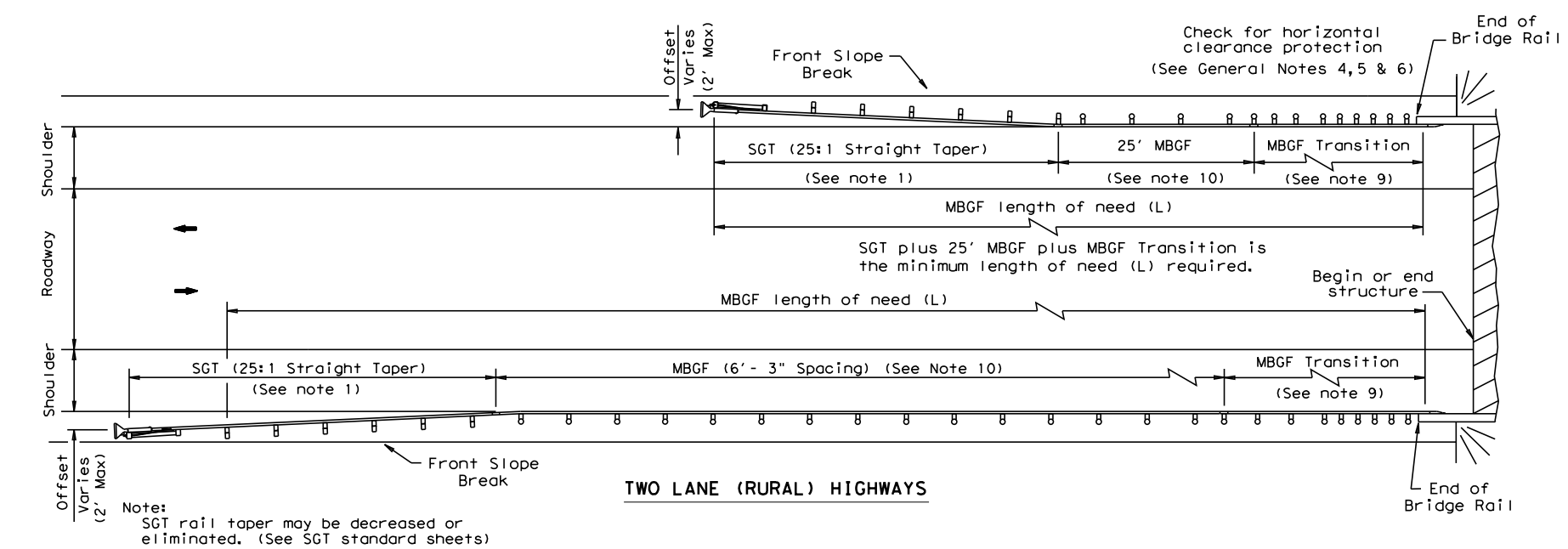
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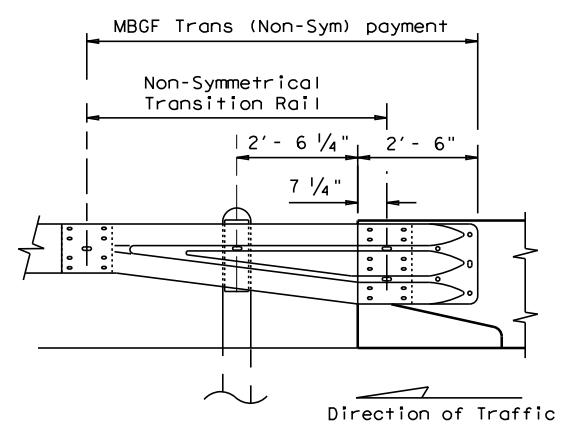
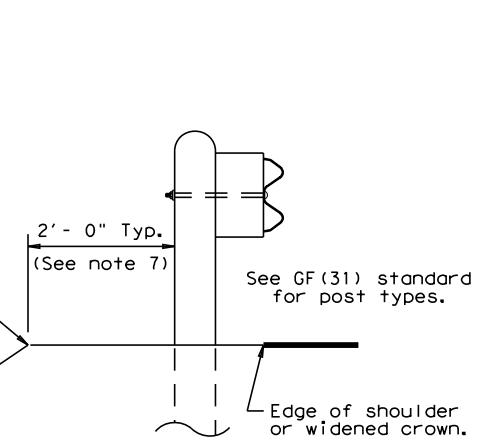
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		SEE TITLE SHEET		FM 707
		COUNTY		SHEET NO.
		JONES		
DIST	CONT	SECT	JOB	67
ABL	0484	01	025	

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- GENERAL NOTES**
- For more detail: See GF(31), SGT()31, GF(31)TR, and GF(31)TL2 standard sheets.
 - Quantities of metal beam guard fence (MBGF) at individual bridge ends are as shown in the plans.
 - 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.
 - 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.
 - Downstream anchor terminals (DAT) are only for downstream end anchorage use, outside the horizontal clearance area of opposing traffic.
 - 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)
 - 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).
 - 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.
 - Transition length and post spacing will vary depending on the transition type. Transition type will be shown elsewhere in the plans.
 - A minimum 25' length of MBGF will be required.



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

Texas Department of Transportation Design Division Standard

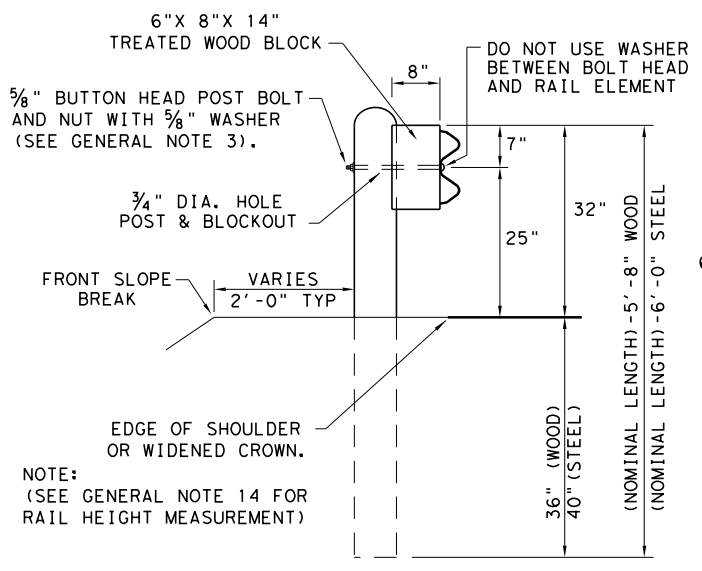
BRIDGE END DETAILS
 (METAL BEAM GUARD FENCE APPLICATIONS TO RIGID RAILS)

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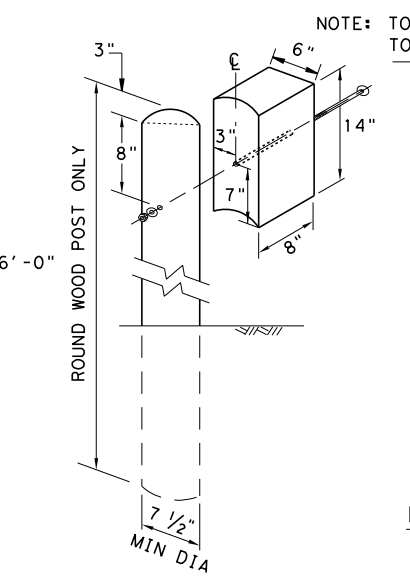
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REVISED APRIL 2014 SEE (MEMO 0414)	0484	01	025	FM 707
	DIST	COUNTY		SHEET NO.
	ABL	JONES		68

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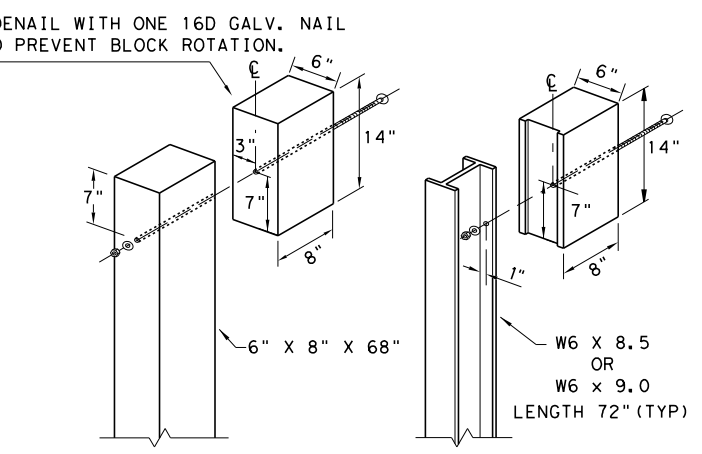
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 Alex.Massara



TYPICAL POST PLACEMENT



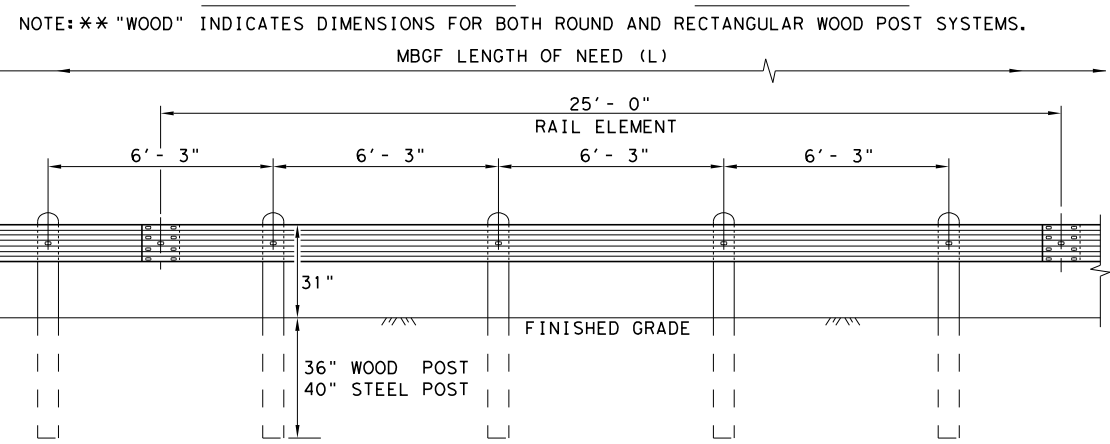
WOOD BLOCK TO ROUND WOOD POST



WOOD BLOCK TO RECTANGULAR WOOD POST

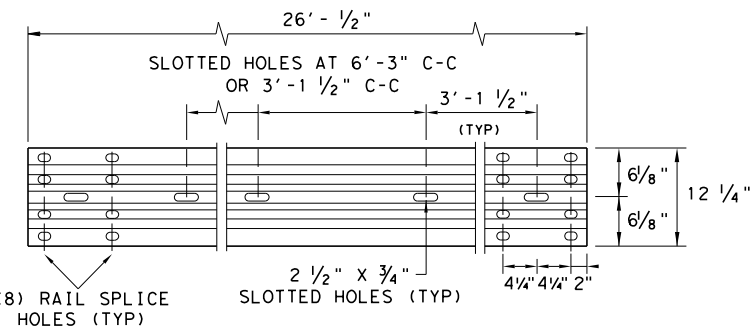
ROUTED WOOD BLOCK TO I-BEAM STEEL POST

- GENERAL NOTES**
1. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST, OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. THE EXACT POSITION OF MBGF SHALL BE SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. STEEL POSTS TO BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING."
 2. RAIL ELEMENTS SHALL MEET THE REQUIREMENTS OF ITEM 540, "METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED IN THE PLANS. THE CONTRACTOR MAY FURNISH RAIL ELEMENTS OF 25'-0", OR 12'-6" (NOM.) LENGTHS. RAIL ELEMENTS MAY HAVE SLOTTED HOLES AT 3'-1 1/2" C-C OR 6'-3" C-C. A SPECIAL LENGTH OF RAIL MAY BE MANUFACTURED TO ACCOMMODATE THE DOWNSTREAM ANCHOR TERMINAL (DAT) AND THE TRANSITION SECTIONS OF GUARDRAIL.
 3. BUTTON HEAD "POST BOLTS & NUTS" SHALL MEET THE REQUIREMENTS OF (ASTM A307), AND SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND 5/8" WASHER (FWC16G) 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.



ELEVATION MID-SPAN RAIL SPLICE

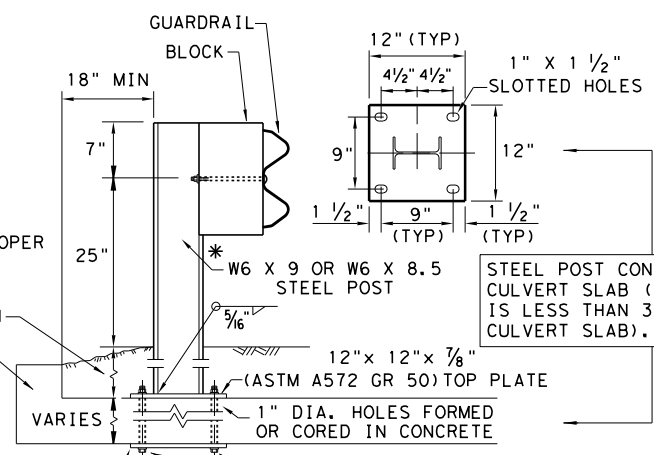
SHOWING A 25'-0" SECTION OF W-BEAM RAIL. (SEE GENERAL NOTE 2)



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

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

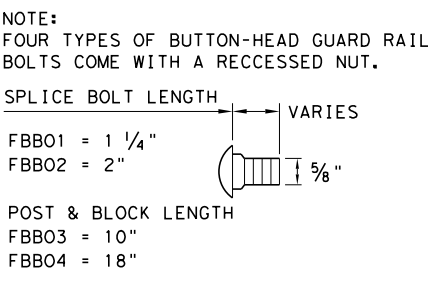
* POST(S) MAY REQUIRE FIELD MODIFICATION TO ENSURE PROPER GUARDRAIL HEIGHT.



LOW FILL CULVERT POST

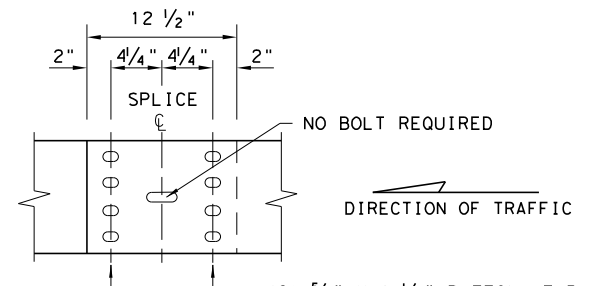
- NOTE: TWO INSTALLATION OPTIONS.
1. **BOLT-THROUGH OPTION:** REQUIRES A 6" MIN. SLAB THICKNESS. 7/8" DIA (ASTM A449) HEAVY HEX BOLTS WITH TWO HARDENED WASHER EACH AND HEAVY HEX NUTS. NOTE: BOLT LENGTH = SLAB PLUS 2 1/4" MIN.
 2. **EPOXY ANCHOR OPTION:** THIS OPTION MAY ONLY BE USED IF THE CULVERT SLAB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

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



BUTTON HEAD BOLT

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

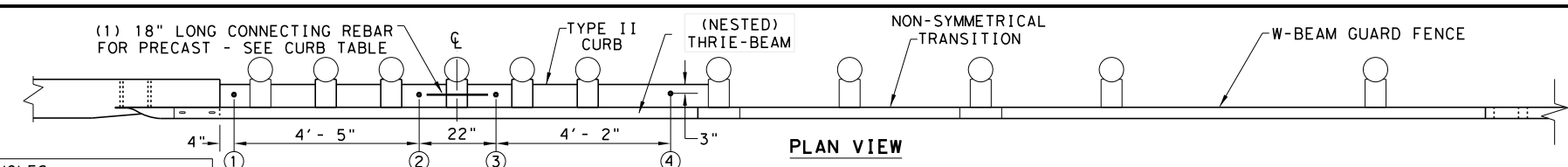


MID-SPAN RAIL SPLICE DETAIL

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

				Design Division Standard
METAL BEAM GUARD FENCE TL-3 MASH COMPLIANT GF(31)-19				
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	ABL	JONES	69	

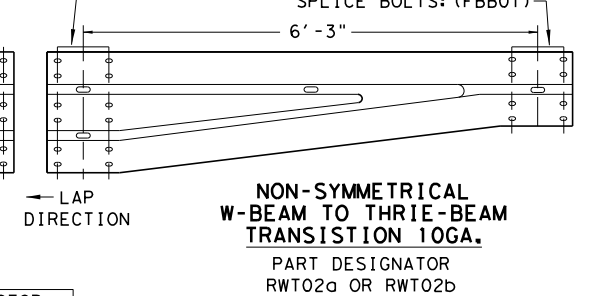
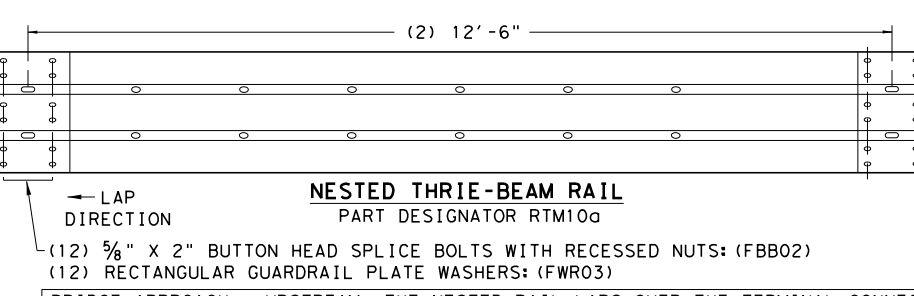
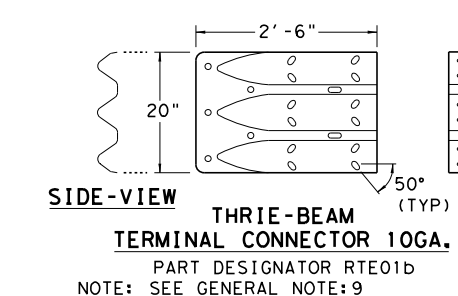
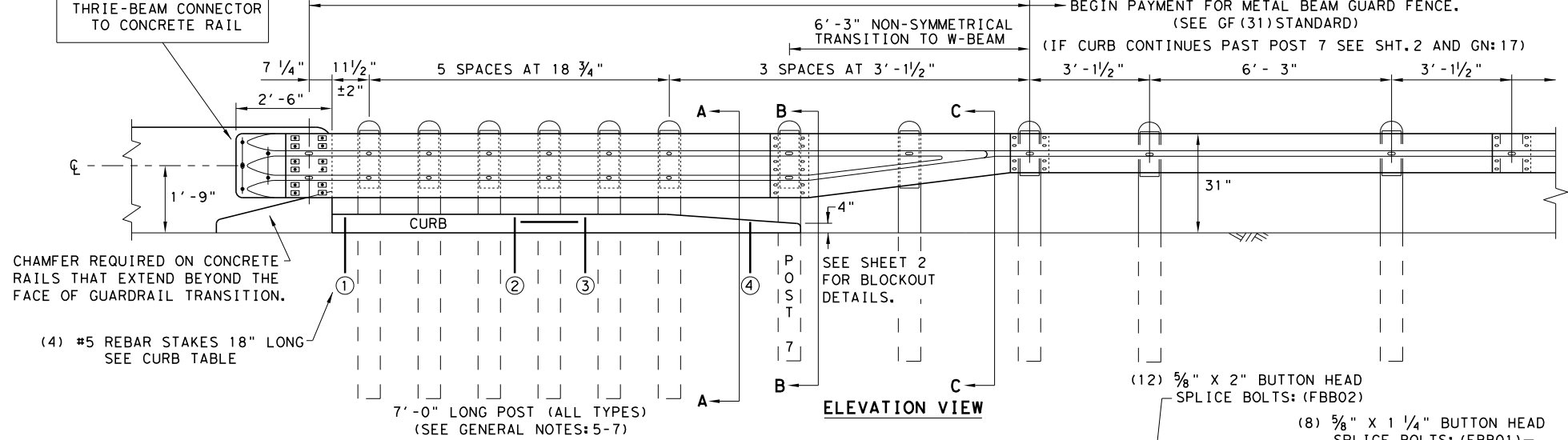
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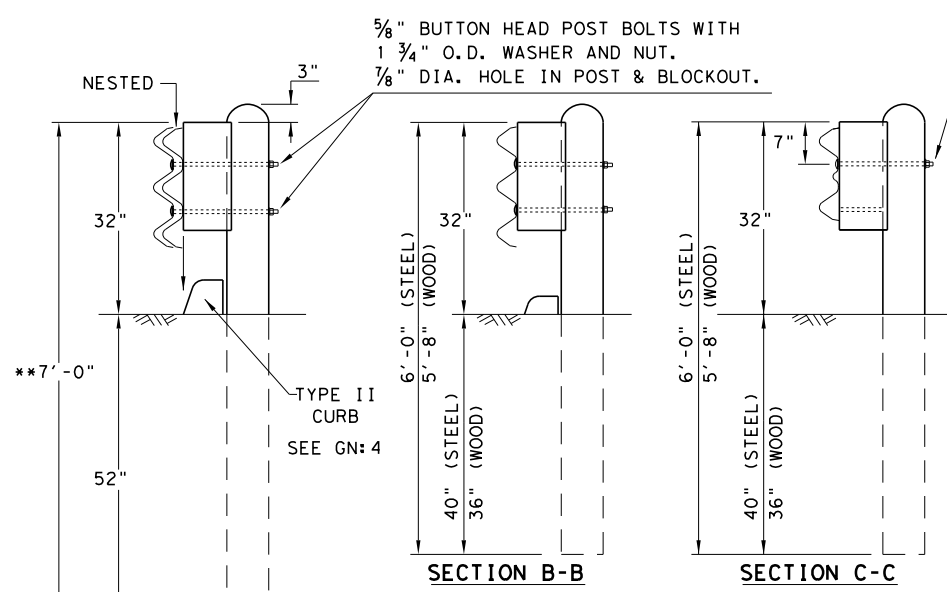
- (5) 1" DIA. HOLES.
- (5) 5/8" DIA. HEAVY HEX HEAD BOLTS (FACING TRAFFIC SIDE) (ASTM F3125 GR A325 OR A449).
- (10) 1 3/4" O.D. WASHER UNDER EACH HEX BOLT HEAD AND NUT.
- (5) 5/8" DIA. HEAVY HEX NUTS (ASTM A194 OR A563).

NOTE:
HEAVY HEX BOLT LENGTH WILL VARY DEPENDING ON WIDTH CONCRETE RAIL, LEAVE 1" OF BOLT LENGTH PAST THE 5/8" HEX NUT. TRIM AS REQUIRED.

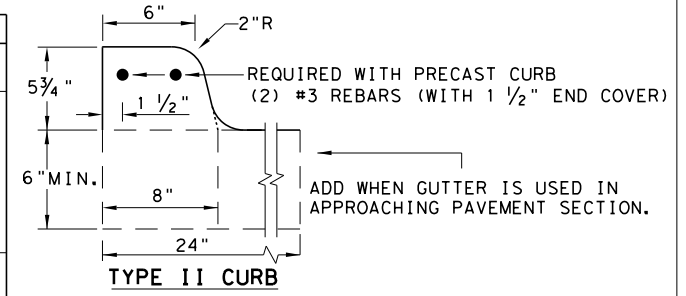
NOTE:
CURB IS A REQUIRED COMPONENT FOR THE TRANSITION TO FUNCTION PROPERLY. SEE GENERAL NOTES: 2-4 AND 16-17.



BRIDGE APPROACH - UPSTREAM: THE NESTED RAIL LAPS OVER THE TERMINAL CONNECTOR. PLATE WASHERS ARE INSTALLED UNDER THE SPLICE NUTS AGAINST INSIDE OF CONNECTOR.
 BRIDGE EXIT - DOWNSTREAM: THE TERMINAL CONNECTOR LAPS OVER THE NESTED RAIL. PLATE WASHERS ARE INSTALLED UNDER THE BOLT HEAD AGAINST OUTSIDE OF CONNECTOR.



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



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

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

GENERAL NOTES

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

**HIGH-SPEED TRANSITION
SHEET 1 OF 2**

		<i>Design Division Standard</i>	
METAL BEAM GUARD FENCE THRIE-BEAM TRANSITION TL-3 MASH COMPLIANT GF (31) TR TL3-20			
FILE: gf31-tr+1320.dgn	DN: TxDOT	CK: KM	DW: VP
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	DIST	COUNTY	SHEET NO.
	ABL	JONES	70

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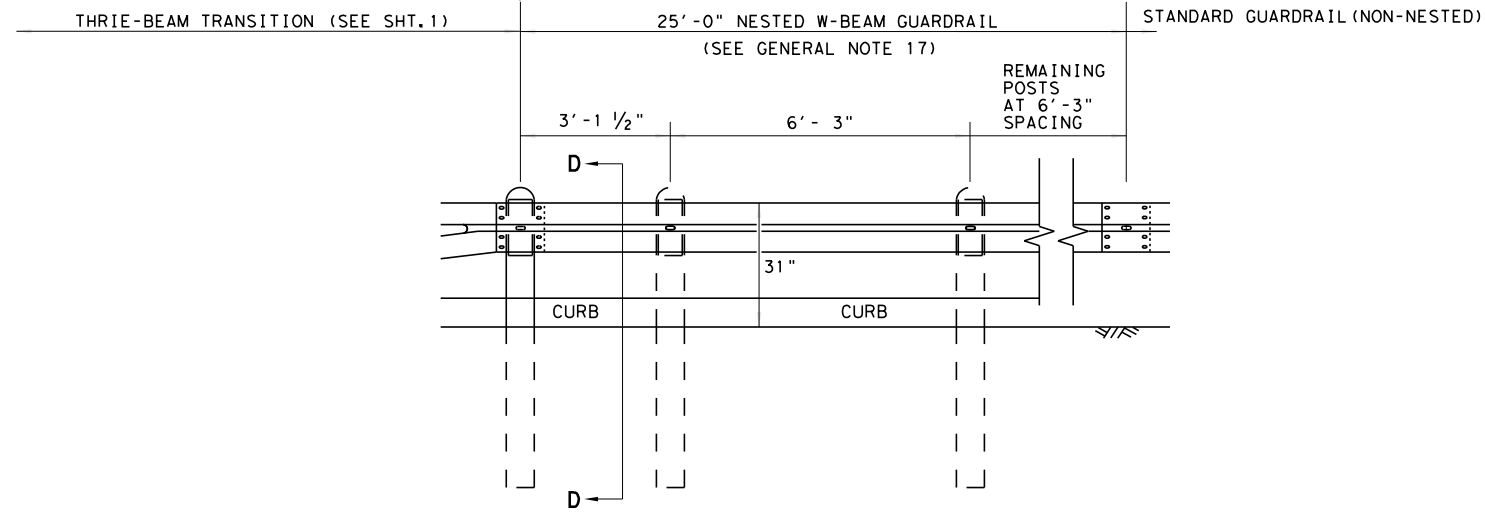
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 Alex.Massara
 alex.massara@bridegfarmer.com

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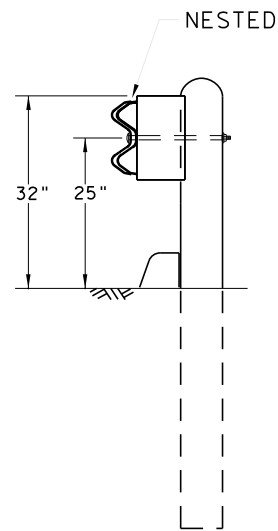
REQUIRED ALTERNATIVE FOR CONTINUOUS CURB EXTENDING PAST POST 7 (SEE SHT. 1 GENERAL NOTE 17)

END PAYMENT FOR METAL BEAM GUARD FENCE TRANSITION.
 BEGIN PAYMENT FOR METAL BEAM GUARD FENCE.

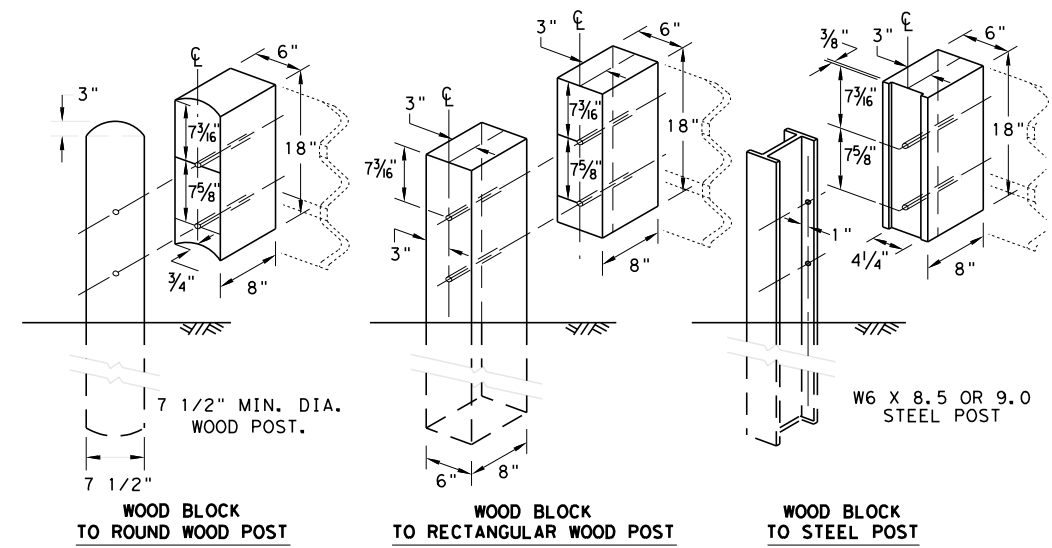
(SEE GF (31) STANDARD SHEET)



ELEVATION VIEW



SECTION D-D



THREE BEAM TRANSITION BLOCKOUT DETAILS

HIGH-SPEED TRANSITION

SHEET 2 OF 2



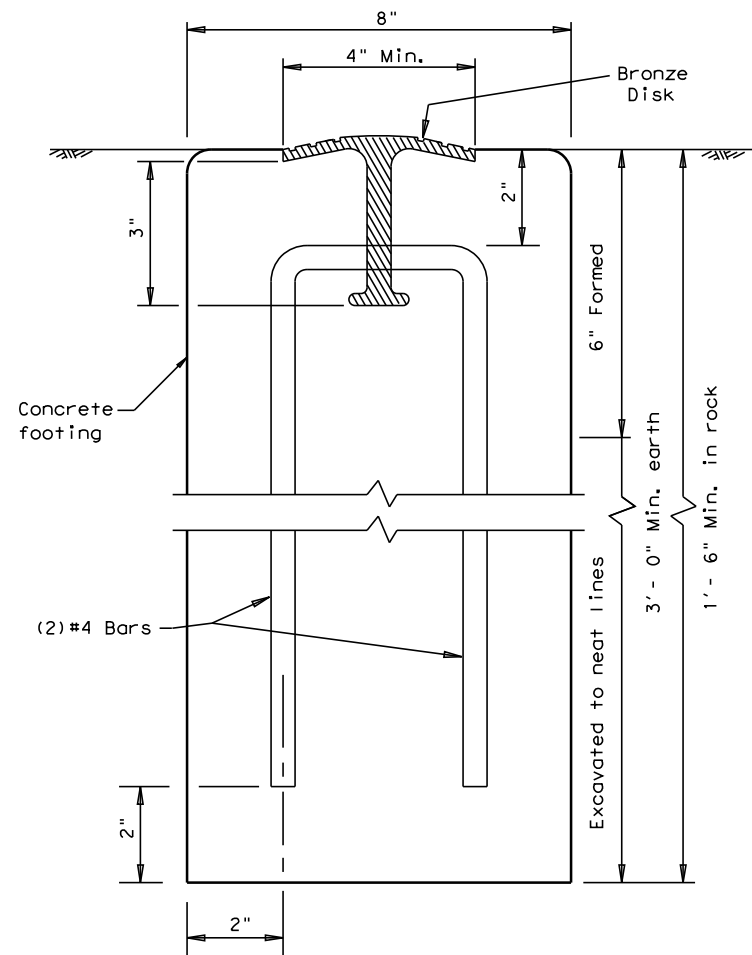
METAL BEAM GUARD FENCE
 THREE-BEAM TRANSITION
 TL-3 MASH COMPLIANT

GF (31) TR TL3-20

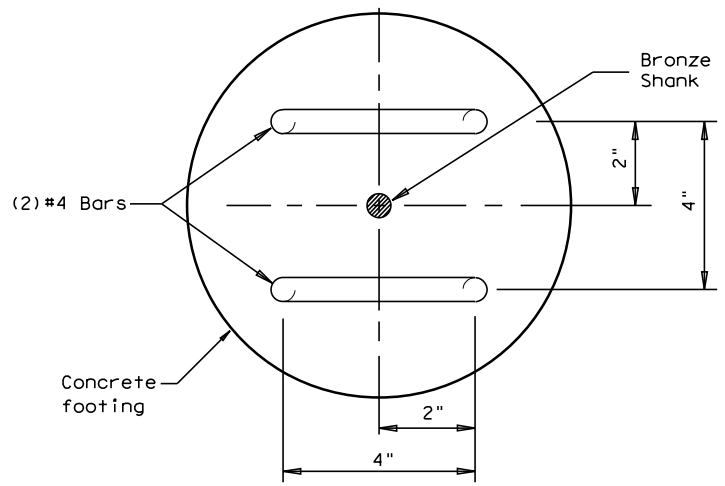
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© TXDOT: NOVEMBER 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0484	01	025	FM 707
	DIST	COUNTY	SHEET NO.	
	ABL	JONES	71	

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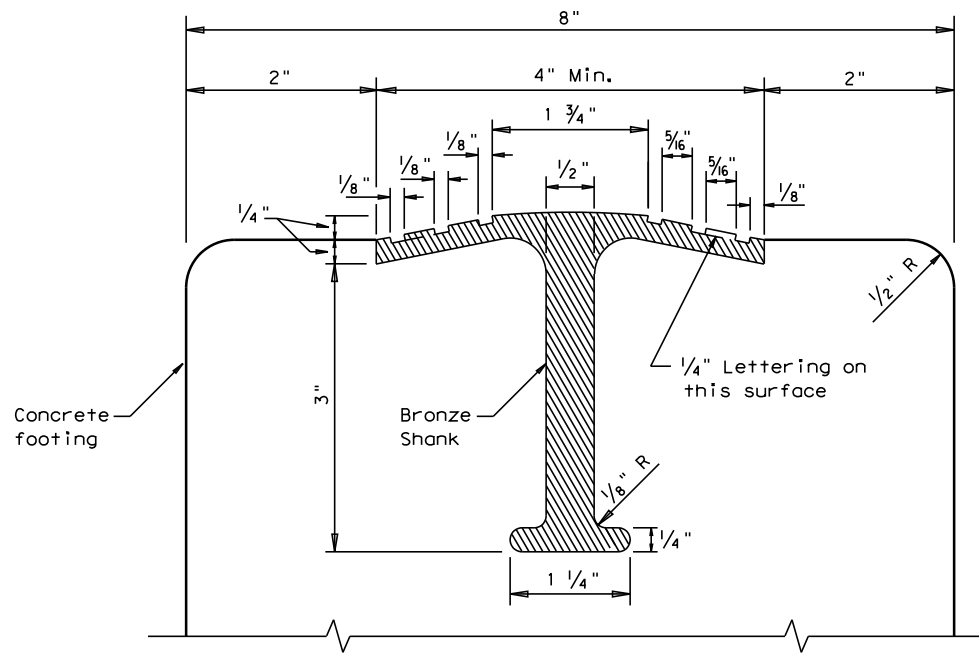
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SECTION A-A

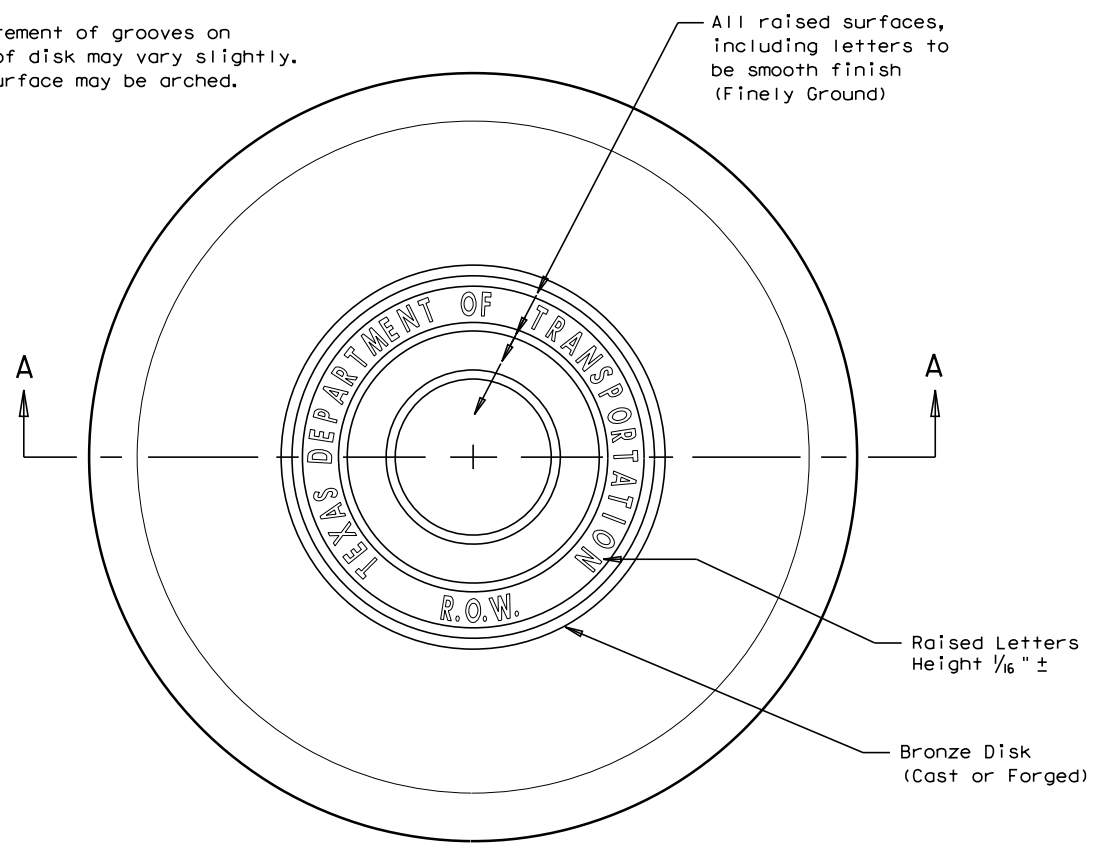


CROSS SECTION THRU MARKER



SECTION THRU TOP OF ROW MARKER

Note:
 Measurement of grooves on face of disk may vary slightly. Top surface may be arched.



TOP VIEW OF ROW MARKER

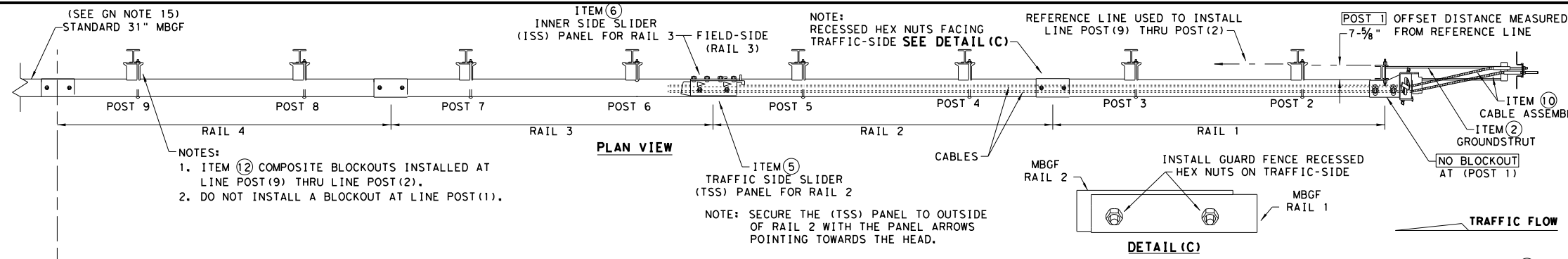
GENERAL NOTES

1. All materials and construction shall be in accordance with Item 538, "Right of way markers."
2. Right-of-Way marker concrete shall be poured in place. The bronze disks shall be set to the correct line and grade, as directed by the Engineer.
3. The bronze disk shall be of architectural bronze with the following composition: Copper 85%, Tin 5%, Lead 5%, Zinc 5%. Excavation of the marker locations shall be made of uniform lines except for the top of 6 inches which shall be formed with removable forms. The top part of the marker around the bronze disk shall receive a trowel finish.
4. Once the concrete has set, the Engineer will stencil the required survey data and, with a chisel or center punch, cut across marker the exact location of the Right-of-Way line in the bronze disk.

		Design Division Standard	
<h2>RIGHT-OF-WAY MARKER</h2> <h3>M-10</h3>			
FILE: m10.dgn	DN: TxDOT	CK: AM	DW: BD/VP
© TxDOT February 1992	CONT	SECT	JOB
REVISIONS	0484	01	025
	DIST	COUNTY	SHEET NO.
	ABL	JONES	72

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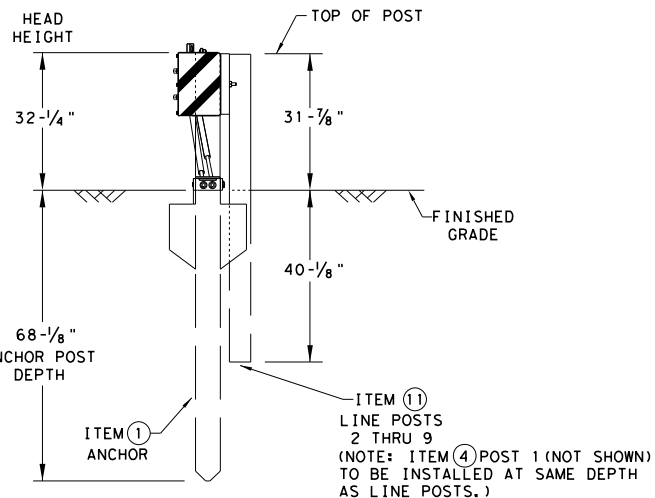
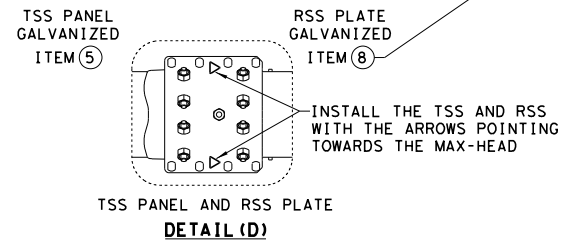
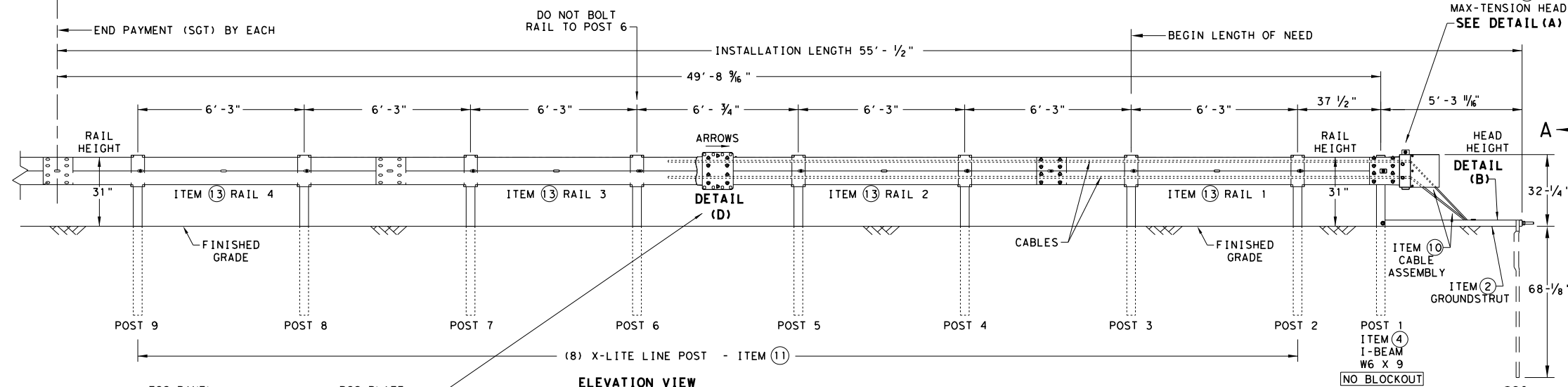
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 alex.massara@texas.gov



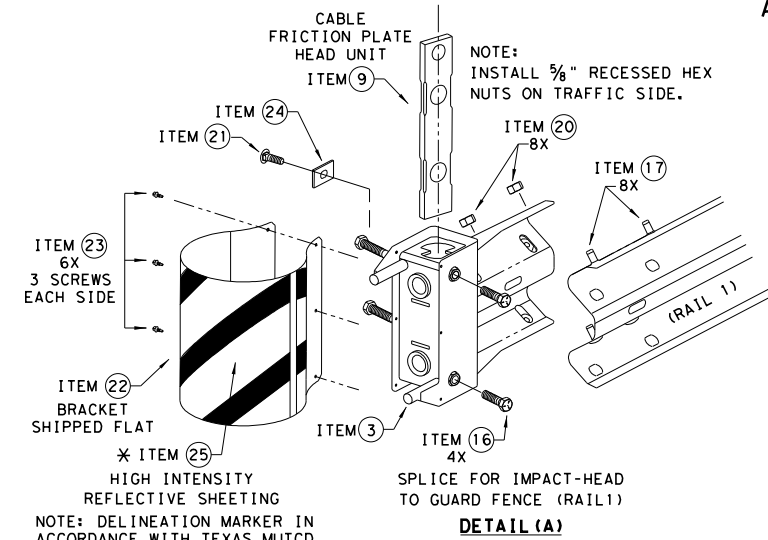
- NOTES:
- ITEM 10 COMPOSITE BLOCKOUTS INSTALLED AT LINE POST (9) THRU LINE POST (2).
 - DO NOT INSTALL A BLOCKOUT AT LINE POST (1).

NOTE: SECURE THE (TSS) PANEL TO OUTSIDE OF RAIL 2 WITH THE PANEL ARROWS POINTING TOWARDS THE HEAD.

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

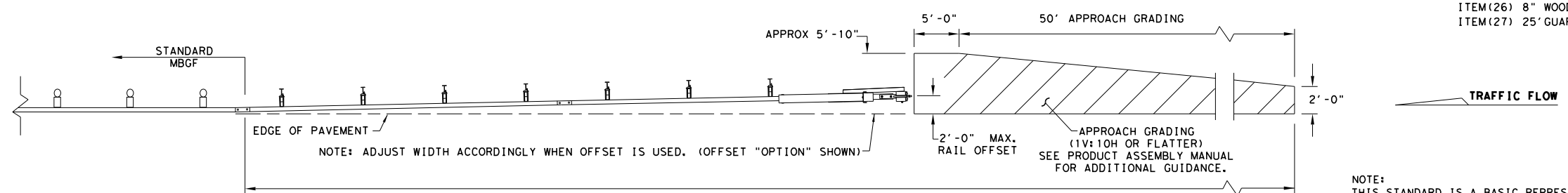


SOIL ANCHOR, POST 1 & LINE POST 2 THRU 9



* TO BE PROVIDED BY DISTRIBUTOR OR CONTRACTOR.
 ** ALTERNATIVE ITEMS NOT SHOWN. ITEM (26) 8" WOOD-BLOCKOUTS ITEM (27) 25' GUARD FENCE PANELS

ITEM#	PART NUMBER	DESCRIPTION	QTY
1	BSI-1610060-00	SOIL ANCHOR - GALVANIZED	1
2	BSI-1610061-00	GROUND STRUT - GALVANIZED	1
3	BSI-1610062-00	MAX-TENSION IMPACT HEAD	1
4	BSI-1610063-00	W6x9 I-BEAM POST 6FT. -GALVANIZED	1
5	BSI-1610064-00	TSS PANEL - TRAFFIC SIDE SLIDER	1
6	BSI-1610065-00	ISS PANEL - INNER SIDE SLIDER	1
7	BSI-1610066-00	TOOTH - GEOMET	1
8	BSI-1610067-00	RSS PLATE - REAR SIDE SLIDER	1
9	B061058	CABLE FRICTION PLATE - HEAD UNIT	1
10	BSI-1610069-00	CABLE ASSEMBLY - MASH X-TENSION	2
11	BSI-1012078-00	X-LITE LINE POST-GALVANIZED	8
12	B090534	8" W-BEAM COMPOSITE-BLOCKOUT XT110	8
13	BSI-4004386	12'-6" W-BEAM GUARD FENCE PANELS 12GA.	4
14	BSI-1102027-00	X-LITE SQUARE WASHER	1
15	BSI-2001886	5/8" X 7" THREAD BOLT HH (GR.5)GEOMET	1
16	BSI-2001885	3/4" X 3" ALL-THREAD BOLT HH (GR.5)GEOMET	4
17	4001115	5/8" X 1 1/4" GUARD FENCE BOLTS (GR.2)MGAL	48
18	2001840	5/8" X 10" GUARD FENCE BOLTS MGAL	8
19	2001636	5/8" WASHER F436 STRUCTURAL MGAL	2
20	4001116	5/8" RECESSED GUARD FENCE NUT (GR.2)MGAL	59
21	BSI-2001888	5/8" X 2" ALL THREAD BOLT (GR.5)GEOMET	1
22	BSI-1701063-00	DELINEATION MOUNTING (BRACKET)	1
23	BSI-2001887	1/4" X 3/4" SCREW SD HH 410SS	7
24	4002051	GUARDRAIL WASHER RECT AASHTO FWRO3	1
25	SEE NOTE BELOW	HIGH INTENSITY REFLECTIVE SHEETING	1
26	4002337	8" W-BEAM TIMBER-BLOCKOUT, PDB01B	8
27	BSI-4004431	25' W-BEAM GUARDRAIL PANEL, 8-SPACE, 12GA.	2
28	MANMAX Rev-(D)	MAX-TENSION INSTALLATION INSTRUCTIONS	1



APPROACH GRADING AT GUARDRAIL END TREATMENTS

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

Texas Department of Transportation Design Division Standard

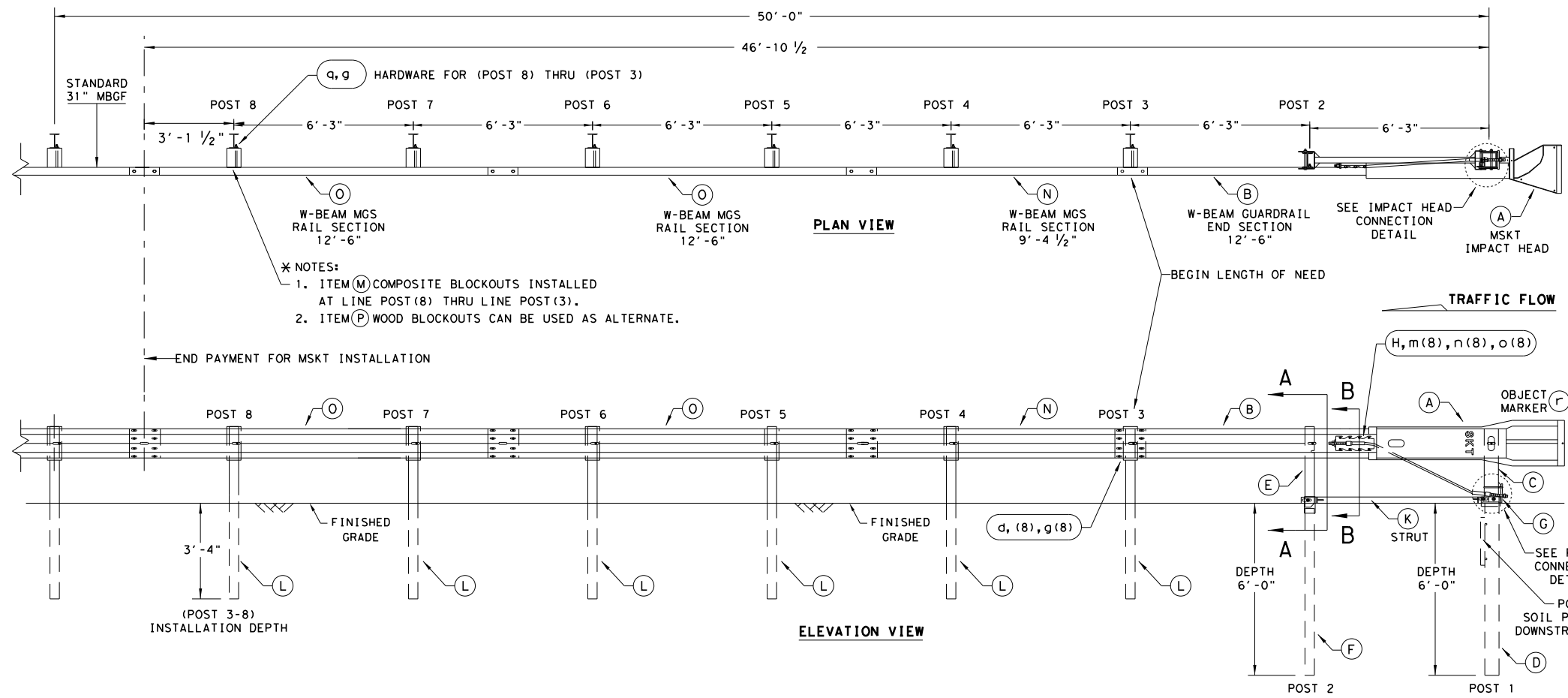
MAX-TENSION END TERMINAL

MASH - TL-3

SGT (11S) 31-18

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© TxDOT: FEBRUARY 2018	CONT	SECT	JOB	HIGHWAY
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	DIST	COUNTY		SHEET NO.
	ABL	JONES		74

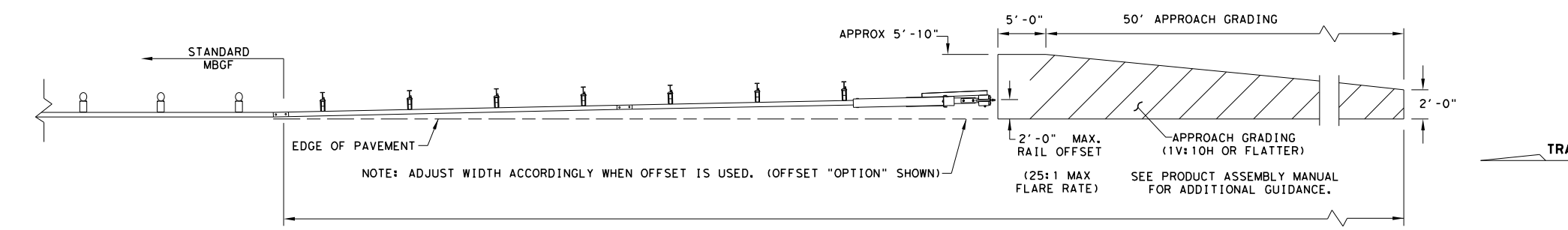
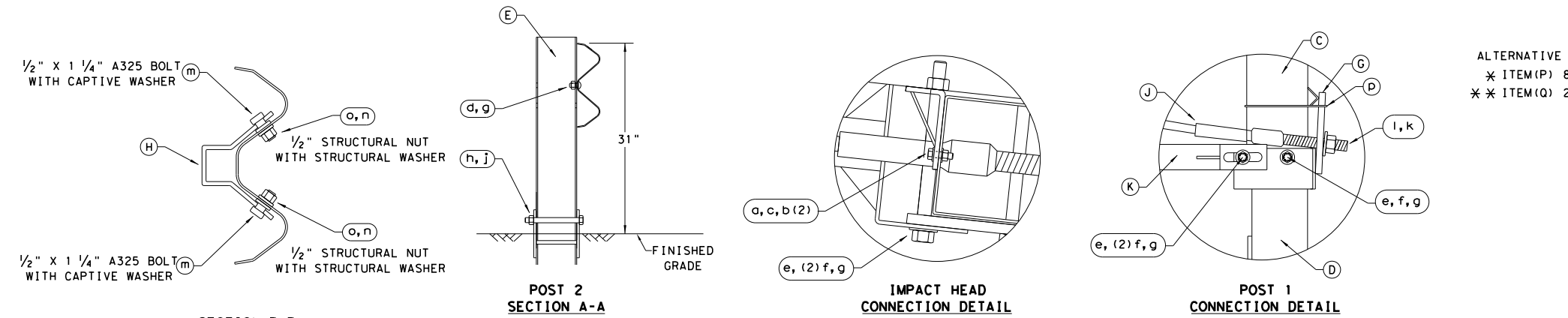
DISCLAIMER: THIS STANDARD IS GOVERNED BY THE "TEXAS ENGINEERING PRACTICE ACT". NO WARRANTY OF ANY KIND IS MADE BY TXDOT FOR ANY PURPOSE WHATSOEVER. THE USE OF THIS STANDARD BY ANY ENTITY DOES NOT CONSTITUTE AN ENDORSEMENT OR A GUARANTEE OF THE ACCURACY, COMPLETENESS, OR RESPONSIBILITY FOR THE CONVERSION OF THIS STANDARD TO OTHER FORMATS OR FOR INCORRECT RESULTS OR DAMAGES RESULTING FROM ITS USE.
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 COUNTY: JONES
 SHEET NO. 75
 DRAWN BY: ABL
 CHECKED BY: JONES
 DATE: 04/25/18
 PROJECT: 0484-01-025
 COUNTY: JONES
 SHEET NO. 75



- GENERAL NOTES**
- 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
 - FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO THE: MSKT END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY MANUAL (PUBLICATION-062717).
 - 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.
 - FOR POST (LEAVE-OUT) INSTALLATION AND GUIDANCE SEE TXDOT'S LATEST ROADWAY MOW STRIP STANDARD.
 - HARDWARE (BOLTS, NUTS, & WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
 - SYSTEM SHOWN USING STEEL WIDE FLANGE POSTS WITH COMPOSITE BLOCKOUTS.
 - 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.
 - 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.
 - POSTS SHALL NOT BE SET IN CONCRETE.
 - SYSTEM MUST BE ATTACHED TO STANDARD 31" MBGF.
 - UNDER NO CIRCUMSTANCES SHALL THE GUARDRAIL WITHIN THE MSKT SYSTEM BE CURVED.
 - 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.
 - THE SYSTEM IS SHOWN WITH TWO 12'-6" MBGF PANELS, ONE 25'-0" MBGF PANEL IS ALSO ALLOWED IN THEIR PLACE.
 - A DRIVING CAP WITH A TIMBER OR PLASTIC INSERT SHALL BE USED WHEN DRIVING POSTS 3-8 TO PREVENT DAMAGE TO THE GALVANIZING ON TOP OF THE POST. SPECIAL DRIVING CAP TO BE USED ON LOWER POSTS 1 & 2 TO PREVENT DAMAGE TO THE WELDED PLATES.

ITEM	QTY	MAIN SYSTEM COMPONENTS	ITEM NUMBERS
A	1	MSKT IMPACT HEAD	MS3000
B	1	W-BEAM GUARDRAIL END SECTION, 12 Ga.	SF1303
C	1	POST 1 - TOP (6" X 6" X 1/8" TUBE)	MTPHP1A
D	1	POST 1 - BOTTOM (6' W6X15)	MTPHP1B
E	1	POST 2 - ASSEMBLY TOP	UHP2A
F	1	POST 2 - ASSEMBLY BOTTOM (6' W6X9)	HP2B
G	1	BEARING PLATE	E750
H	1	CABLE ANCHOR BOX	S760
J	1	BCT CABLE ANCHOR ASSEMBLY	E770
K	1	GROUND STRUT	MS785
L	6	W6X9 OR W6X8.5 STEEL POST	P621
M	6	COMPOSITE BLOCKOUTS	CBSP-14
N	1	W-BEAM MGS RAIL SECTION (9'-4 1/2")	G12025
O	2	W-BEAM MGS RAIL SECTION (12'-6")	G1203A
P	6	WOOD BLOCKOUT 6" X 8" X 14"	P675
Q	1	W-BEAM MGS RAIL SECTION (25'-0")	G1209

SMALL HARDWARE			
a	2	5/8" x 1" HEX BOLT (GRD 5)	B5160104A
b	4	5/8" WASHER	W0516
c	2	5/8" HEX NUT	N0516
d	25	5/8" Dia. x 1 1/4" SPLICE BOLT (POST 2)	B580122
e	2	5/8" Dia. x 9" HEX BOLT (GRD A449)	B580904A
f	3	5/8" WASHER	W050
g	33	5/8" Dia. H.G.R NUT	N050
h	1	3/4" Dia. x 8 1/2" HEX BOLT (GRD A449)	B340854A
j	1	3/4" Dia. HEX NUT	N030
k	2	1 ANCHOR CABLE HEX NUT	N100
l	2	1 ANCHOR CABLE WASHER	W100
m	8	1/2" x 1 1/4" A325 BOLT WITH CAPTIVE WASHER	SB12A
n	8	1/2" STRUCTURAL NUTS	N012A
o	8	1 1/8" O.D. x 3/8" I.D. STRUCTURAL WASHERS	W012A
p	1	BEARING PLATE RETAINER TIE	CT-100ST
q	6	5/8" x 10" H.G.R. BOLT	B581002
r	1	OBJECT MARKER 18" X 18"	E3151



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

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

Design Division Standard

SINGLE GUARDRAIL TERMINAL

MSKT-MASH-TL-3

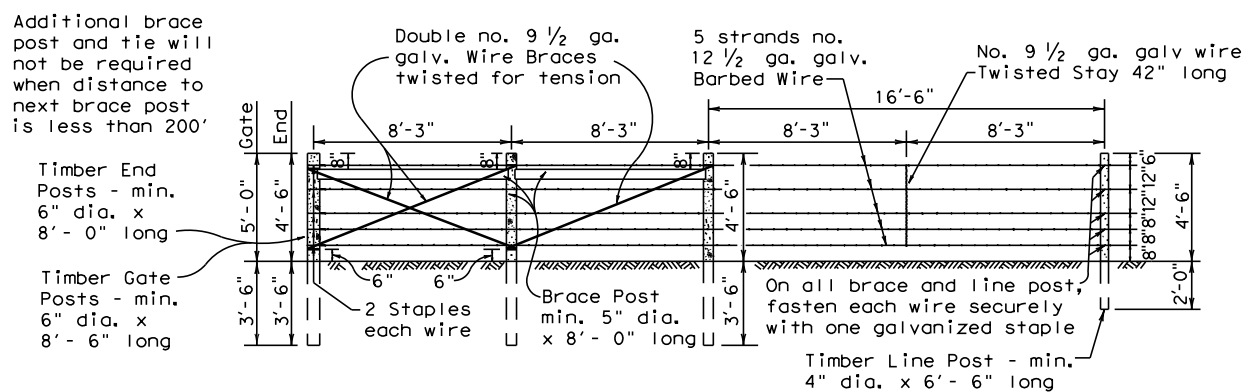
SGT (12S) 31-18

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REVISIONS	0484	01	025	FM 707
	DIST	COUNTY		SHEET NO.
	ABL	JONES		75

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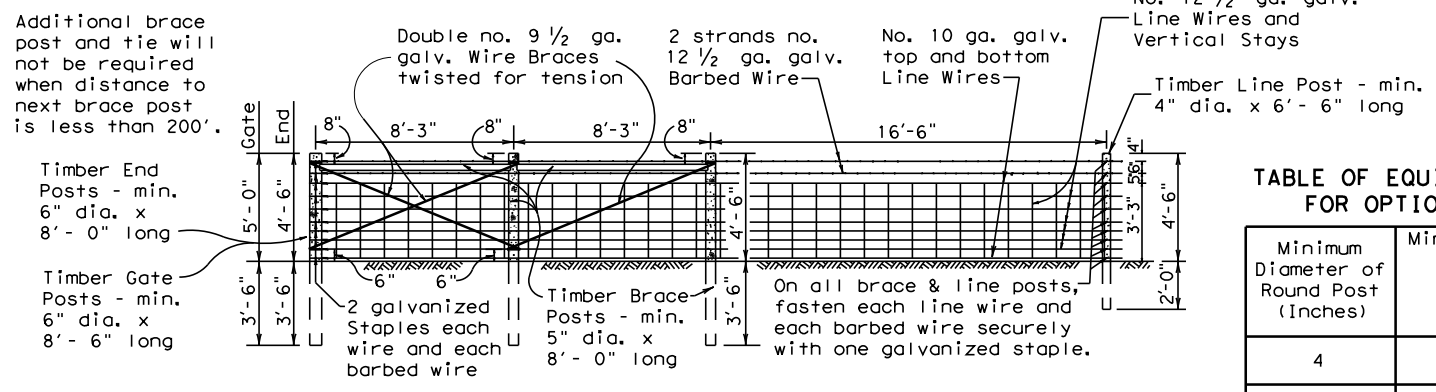
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SECTION GALVANIZED BARBED WIRE FENCE WITH WOOD POSTS
Bracing Detail Used at Ends and Gates

TYPE "A" FENCE
(See General Note 6)



SECTION GALVANIZED WOVEN WIRE FENCE WITH WOOD POSTS
Bracing Detail Used at Ends and Gates

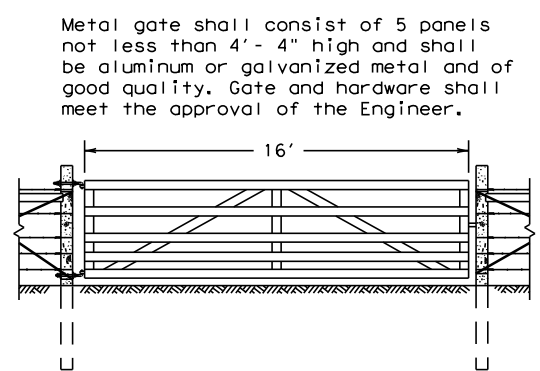
TYPE "B" FENCE
(See General Note 6)

TABLE OF EQUIVALENT SIZES FOR OPTIONAL SHAPE

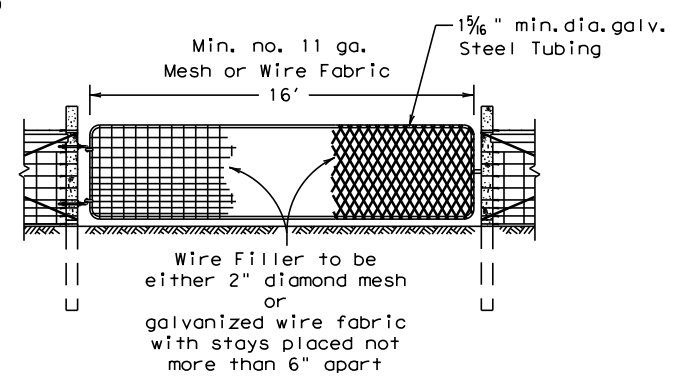
Minimum Diameter of Round Post (Inches)	Minimum Equivalent Dimension for Each Side of Square Post (Inches)
4	3 1/2
5	4 1/2
6	5 1/4

GENERAL NOTES

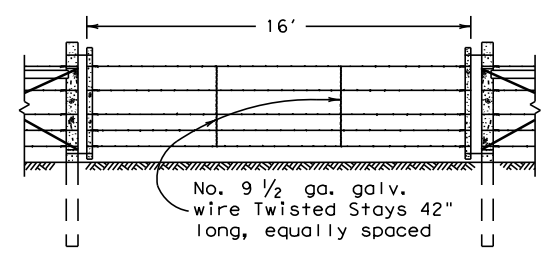
- Any high point which interferes with the placing of wire mesh shall be excavated to provide 2" clearance.
 - Latches for Type 1 and Type 2 gates shall be good commercial quality and design latches of the spring, fork or chain type. All latches shall be suitable for the gate and shall be approved by the Engineer.
 - Hinges for Type 2 gates shall be commercial design approved by the Engineer suitable for post and gate.
 - Concrete shall be of the design and consistency approved by the Engineer and shall contain not less than 4 sacks of cement per cubic yard. Concrete footings are to be crowned at the top to shed water.
 - If rock is encountered at a depth less than the embedded depth required, a 15" or larger diameter hole shall be drilled for the post and the post shall be set in concrete. If rock is encountered at a depth of 1'-6" or more below the ground surface, the hole shall be drilled to the required depth. If rock is encountered at a depth less than 1'-6" below the ground surface, the holes shall be drilled a minimum of 2'-0" into the rock or to the depth whichever is the lesser depth.
 - Barbed wire shall be in accordance with ASTM A 121 (Class 1) Design designation 12-2-4-1 4R or 12-2-5-1 4R, or as approved by the Engineer.
- Woven Wire Fence (Type B) shall be in accordance with ASTM A 116 (Class 1) No. 12-1/2 Grade 60 (See Table 1 ASTM A 116) to the height and design shown on the plans, or as approved by the Engineer.
- The location of gates and corner posts will be as indicated elsewhere on these plans.
 - Square wood posts may be used in lieu of round posts provided minimum equivalent size requirements, as shown are met. All wood posts shall be in accordance with Item 552, "Wire Fence."



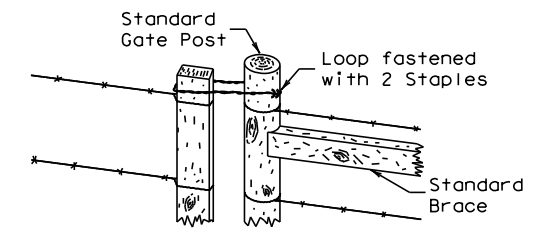
DETAIL TYPE 1 GATE



DETAIL TYPE 2 GATE

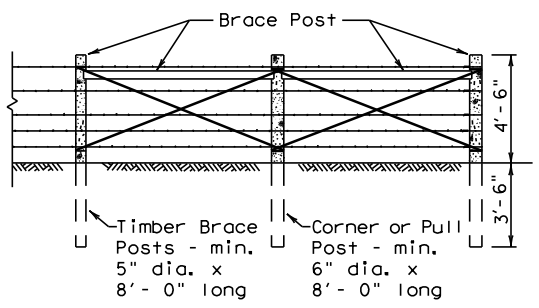


DETAIL TYPE 3 GATE

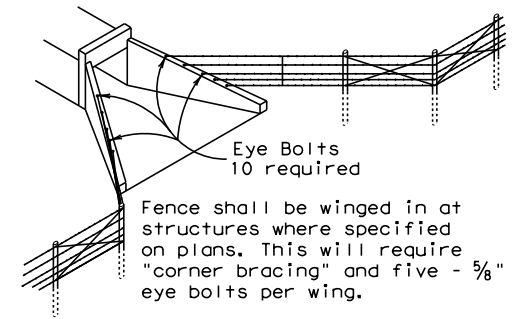


Loop to be made from two strands twisted no. 9 1/2 ga. galv. smooth wire, and to be securely fastened to gate post with two galv. staples.

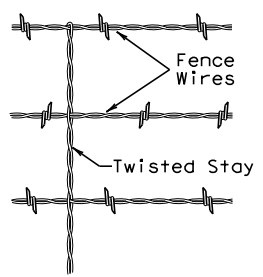
DETAIL FASTENER TYPE 3 GATE



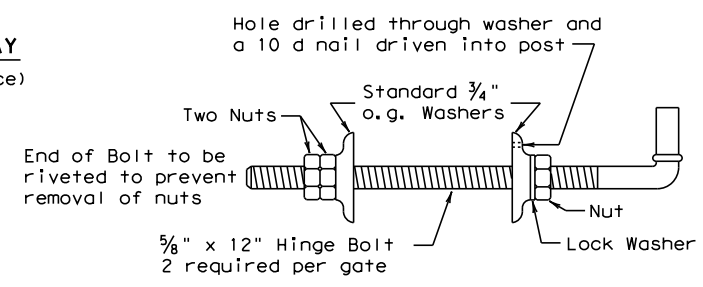
CORNER OR PULL POST ASSEMBLY



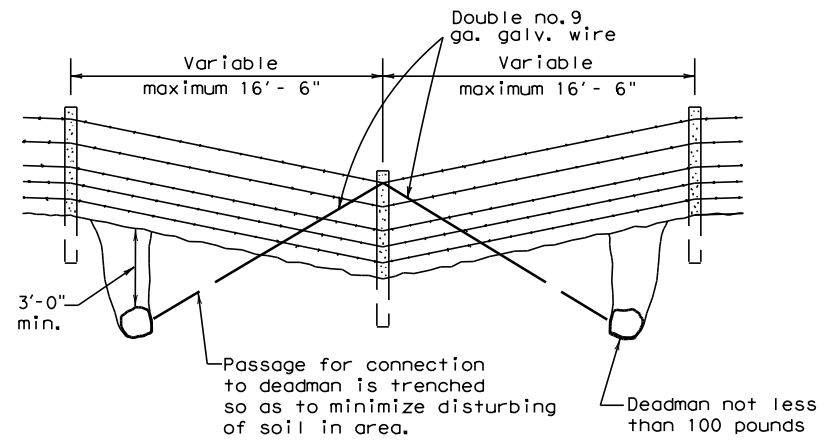
DETAIL OF FENCE TREATMENT AT STRUCTURES



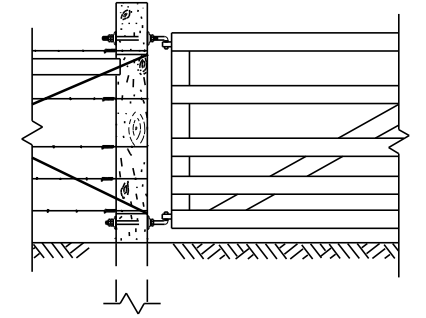
DETAIL OF STAY
(Barbed wire fence)



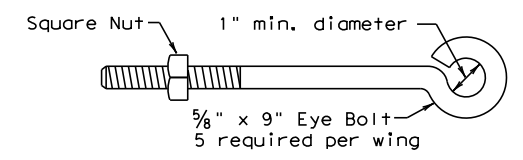
DETAIL OF GATE HINGE BOLT ASSEMBLY



DETAIL OF FENCE SAG
(Single Line Connection)



DETAIL SHOWING INSTALLATION OF HINGES OF TYPE 1 & 2 GATE



DETAIL OF EYE BOLT

Texas Department of Transportation Design Division Standard

BARBED WIRE AND WOVEN WIRE FENCE (WOOD POSTS) WF (1) - 10

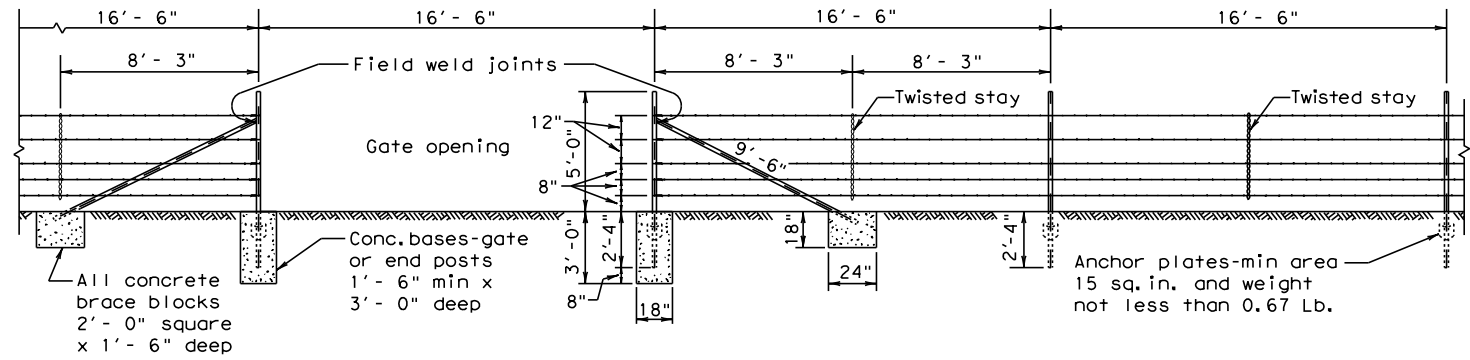
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	DIST	COUNTY		SHEET NO.
	ABL	JONES		76

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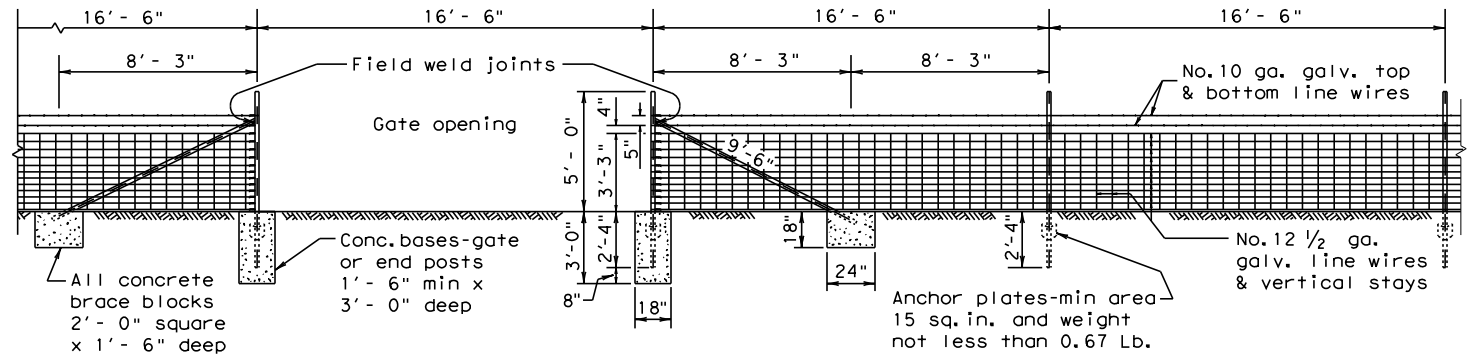
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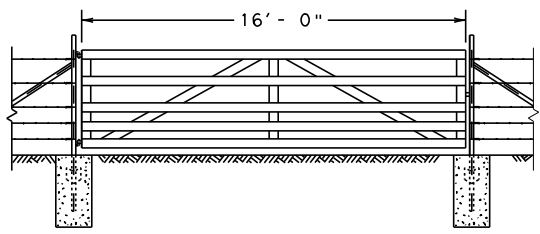
SECTION GALVANIZED BARBED WIRE FENCE WITH METAL POSTS
BRACING DETAIL USED AT ENDS AND GATES
TYPE "C" FENCE
(See General Note 8)



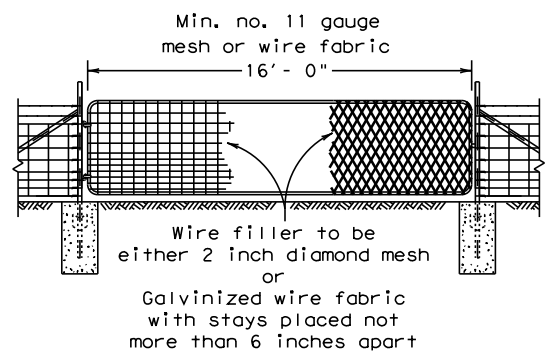
SECTION GALVANIZED WOVEN WIRE FENCE WITH METAL POSTS
BRACING DETAIL USED AT ENDS AND GATES
TYPE "D" FENCE
(See General Note 8)

Note:
For Steel pipe and T-Post requirements.
(See General Notes 6 & 7)

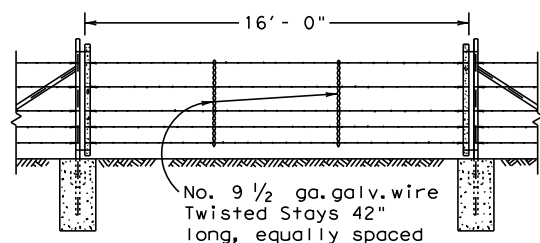
Metal gate shall consist of 5 panels not less than 4'-4" high and shall be aluminum or galvanized metal and of good quality. Gate and hardware shall meet the approval of the engineer.



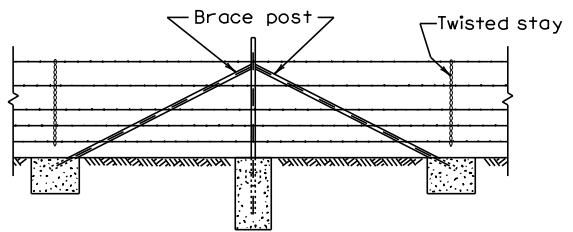
DETAIL TYPE 1 GATE



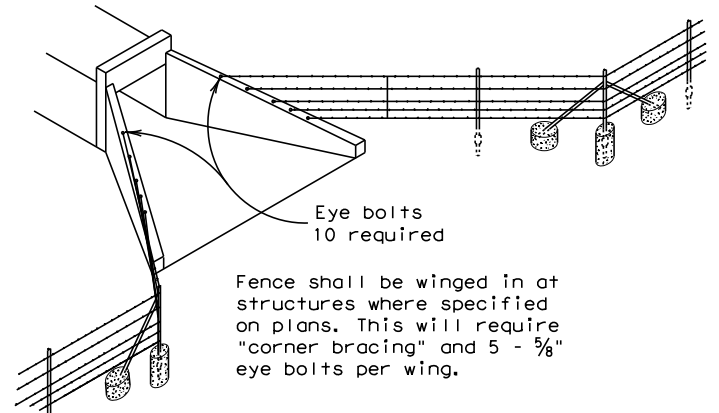
DETAIL TYPE 2 GATE



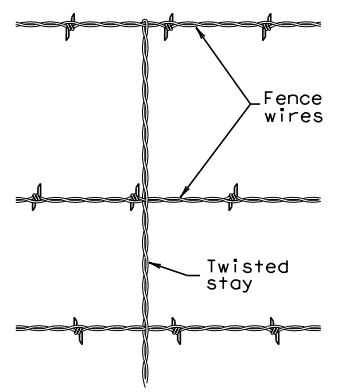
DETAIL TYPE 3 GATE



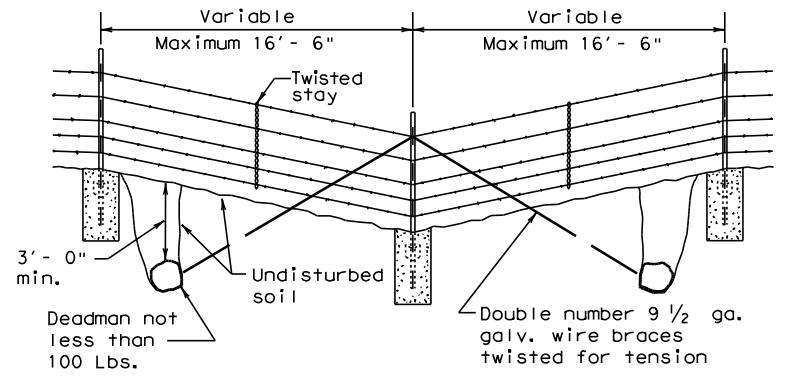
CORNER OR PULL POST ASSEMBLY



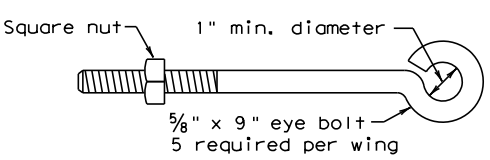
DETAIL OF FENCE TREATMENT AT STRUCTURES



DETAIL OF STAY (Barbed Wire Fence)



DETAIL OF FENCE SAG



DETAIL OF EYE BOLT

GENERAL NOTES

- Any high point which interferes with the placing of wire mesh shall be excavated to provide a 2 inch clearance.
- Latches for Type 1 and Type 2 gates shall be good commercial quality and design latch of the spring, fork or chain type. All latches shall be suitable to the gate and shall be approved by the Engineer.
- Hinges for Type 2 gates shall be a commercial design approved by the Engineer suitable for post and gate.
- Concrete shall be of the design and consistency approved by the Engineer and shall contain not less than 4 sacks of cement per cubic yard. Concrete footings are to be crowned at the top to shed water.
- Steel anchor plates shall be of a design and thickness sufficient to prevent turning of the post in firm soil.
- Steel pipe end posts, corner and pull posts shall be a minimum of 2" Std. pipe (2.375" O.D., 0.154" wall thickness) with a 1/4" Std. pipe brace (1.660" O.D., 0.140" wall thickness), with a 2"x2"x1/4" angle, or other as approved by the Engineer. Fasteners for securing barbed wire or woven wire fence to metal posts shall be a minimum of 11 gauge galvanized steel wire. Tubular posts shall be fitted with water malleable iron caps.
- If Steel pipe is used for posts and braces, use standard pipe in accordance with ASTM A 53, Class B or A 501. For T-Posts use steel that meets ASTM A 702. Metal line posts shall be not less than 6'-6" in length and shall weigh not less than (1.33 lbs./lin.ft.). These items shall be in accordance with Item 552, "Wire Fence."
- Barbed Wire shall be in accordance with ASTM A 121, Class 1 Design designation 12-2-4-1 4R or 12-2-5-1 4R, or as approved by the Engineer.
- Woven Wire Fence (Type D) shall be in accordance with ASTM A 116, Class 1 No. 12-1/2 Grade 60 (See Table 1 ASTM A 116) to the height and design shown on the plans, or as approved by the Engineer.
- The location of gates and corner posts will be as indicated elsewhere in these plans.

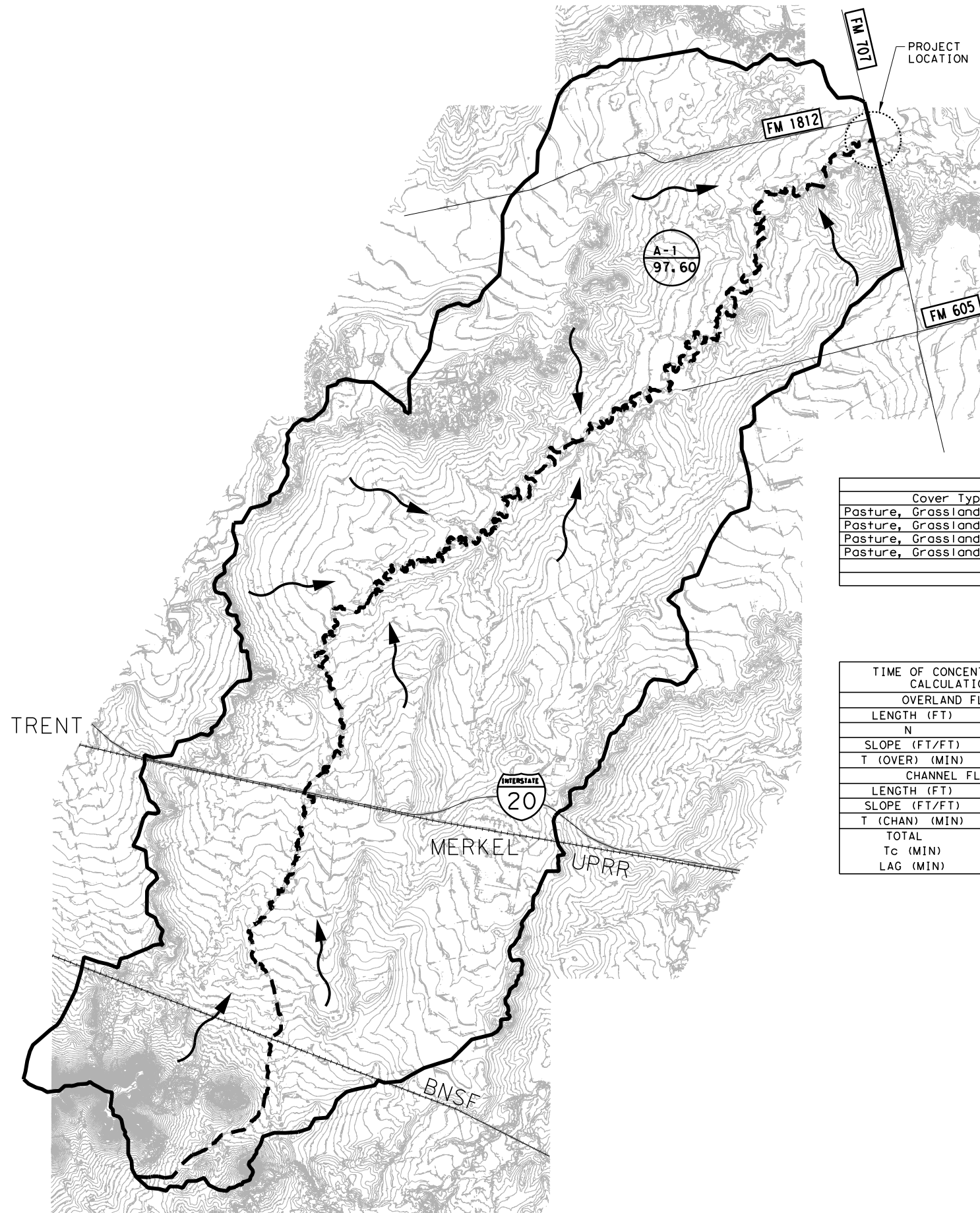
		Design Division Standard	
BARBED WIRE AND WOVEN WIRE FENCE (STEEL POSTS)			
WF (2) - 10			
FILE: wf210.dgn	DN: TxDOT	CK: AM	DW: VP
© TxDOT 1996	CONT	SECT	JOB
REVISIONS	0484	01	025
	DIST	COUNTY	HIGHWAY
	ABL	JONES	FM 707
			SHEET NO.
			77

5,000 0 5,000 10,000
SCALE: 1" = 10,000'



LEGEND

- OVERLAND FLOW DIRECTION
- DRAINAGE AREA INFORMATION



CURVE NUMBER CALCULATION				
Cover Type	Condition	Soil Type	% of Area	CN
Pasture, Grassland, or Range	Fair	A	3	49
Pasture, Grassland, or Range	Fair	B	19.1	69
Pasture, Grassland, or Range	Fair	C	70.3	79
Pasture, Grassland, or Range	Fair	D	7.6	84
UNADJUSTED CN				79
CLIMATIC ADJUSTMENT CN				71

TIME OF CONCENTRATION CALCULATION	
OVERLAND FLOW	
LENGTH (FT)	1,200
N	0.2
SLOPE (FT/FT)	0.0133
T (OVER) (MIN)	29.53
CHANNEL FLOW	
LENGTH (FT)	195,170
SLOPE (FT/FT)	0.0020
T (CHAN) (MIN)	1014.50
TOTAL	1044.03
Tc (MIN)	1045
LAG (MIN)	626.4

HEC-HMS PEAK FLOWS	
EVENT	PEAK FLOW DISCHARGE (cfs)
2 YR	3480.7
5 YR	5919.5
10 YR	8345.9
25 YR	12175
50 YR	15519.6
100 YR	19292.5



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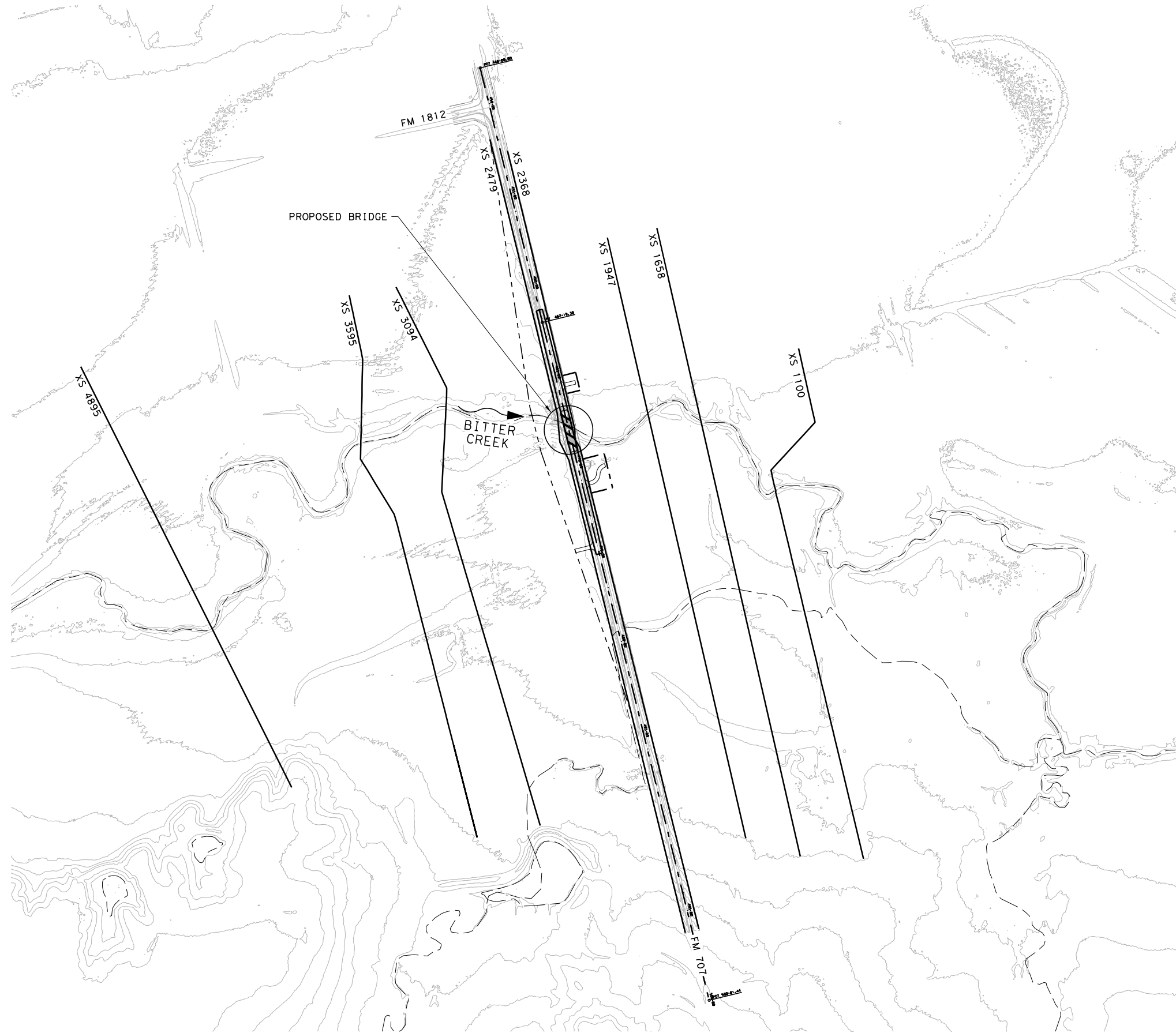
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FM 707
DRAINAGE AREA MAP

SHEET 1 OF 1

DS:	CK:	CONT	SECT	JOB	HIGHWAY
AM	DH	0484	01	025	FM 707
DW:	CK:	DIST	COUNTY		SHEET NO.
AM	AT	ABL	JONES		78

HEC-RAS CROSS SECTION PLAN VIEW



NOTES:

1. HEC-RAS VERSION 5.0.7 WAS USED TO MODEL STORMWATER FLOWS AT THIS BRIDGE SITE FOR EXISTING AND PROPOSED CONDITIONS.
2. CRITICAL HYDRAULIC DATA CALCULATED FOR EXISTING AND PROPOSED STRUCTURES ARE PROVIDED IN THE TABLES ON THE FOLLOWING HYDRAULIC DATA SHEETS.
3. THIS SITE IS LOCATED IN FEMA ZONE "A" AS SHOWN ON FIRM PANEL 48253C0525F, EFFECTIVE OCTOBER 4, 2011. COORDINATION WITH THE LOCAL FLOODPLAIN ADMINISTRATOR OCCURED ON 11/1/2021, IN THE FORM OF PLANS SENT TO THE HONORABLE DALE SPURGIN, JONES COUNTY FLOODPLAIN ADMINISTRATOR.



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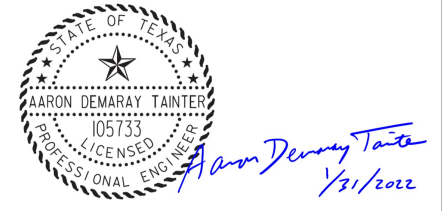
FM 707
HYDRAULIC DATA

SHEET 1 OF 4

DES:	AM	CK:	DH	CONT:	0484	SECT:	01	JOB:	025	HIGHWAY:	FM 707
DW:	AM	CK:	AT	DIST:	ABL	COUNTY:	JONES	SHEET NO.:	79		

HEC-RAS CROSS SECTION OUTPUT

Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
BITTCREEK	4895.375	002 yr	01-EX	3480.7	1675.11	1681.64	1681.64	1683.48	0.01377	10.9	323.23	100	0.95
BITTCREEK	4895.375	002 yr	03-PR-Cl imAdj	3480.7	1675.11	1681.93	1681.64	1683.49	0.01134	10.08	355.18	117.5	0.87
BITTCREEK	4895.375	025 yr	01-EX	12175	1675.11	1685.06	1685.06	1685.76	0.007652	7.75	2012.83	1520.78	0.71
BITTCREEK	4895.375	025 yr	03-PR-Cl imAdj	12175	1675.11	1685.06	1685.06	1685.76	0.007652	7.75	2012.83	1520.78	0.71
BITTCREEK	4895.375	100 yr	01-EX	19292.5	1675.11	1685.64	1685.64	1686.4	0.007829	8.29	2979.37	1872.63	0.73
BITTCREEK	4895.375	100 yr	03-PR-Cl imAdj	19292.5	1675.11	1685.64	1685.64	1686.4	0.007829	8.29	2979.37	1872.63	0.73
BITTCREEK	3595.375	002 yr	01-EX	3480.7	1671.45	1681.49		1681.52	0.00031	1.63	2645.25	1438.56	0.14
BITTCREEK	3595.375	002 yr	03-PR-Cl imAdj	3480.7	1671.45	1681.02		1681.08	0.000585	2.17	2002.52	1307.86	0.2
BITTCREEK	3595.375	025 yr	01-EX	12175	1671.45	1682.84		1682.94	0.000722	3	5107.06	2097.9	0.23
BITTCREEK	3595.375	025 yr	03-PR-Cl imAdj	12175	1671.45	1682.89		1682.99	0.000679	2.93	5217.21	2109.14	0.22
BITTCREEK	3595.375	100 yr	01-EX	19292.5	1671.45	1683.61		1683.74	0.000803	3.47	6788.64	2287.35	0.25
BITTCREEK	3595.375	100 yr	03-PR-Cl imAdj	19292.5	1671.45	1683.67		1683.8	0.000754	3.38	6941.09	2303.9	0.24
BITTCREEK	3094.412	002 yr	01-EX	3480.7	1670.09	1681.38		1681.4	0.000267	1.55	3087.48	1969.69	0.13
BITTCREEK	3094.412	002 yr	03-PR-Cl imAdj	3480.7	1670.09	1680.67		1680.75	0.001035	2.81	1822.19	1618.25	0.26
BITTCREEK	3094.412	025 yr	01-EX	12175	1670.09	1682.62		1682.69	0.000546	2.55	5673.04	2226.99	0.2
BITTCREEK	3094.412	025 yr	03-PR-Cl imAdj	12175	1670.09	1682.69		1682.76	0.000504	2.47	5826.4	2243.93	0.19
BITTCREEK	3094.412	100 yr	01-EX	19292.5	1670.09	1683.37		1683.48	0.000619	2.96	7397.6	2384.56	0.22
BITTCREEK	3094.412	100 yr	03-PR-Cl imAdj	19292.5	1670.09	1683.45		1683.55	0.000571	2.87	7600.02	2401.02	0.21
BITTCREEK	2479.366	002 yr	01-EX	3480.7	1670.33	1681.33	1678.38	1681.33	0.000049	0.82	5662.88	2377.56	0.06
BITTCREEK	2479.366	002 yr	03-PR-Cl imAdj	3480.7	1670.33	1680.5	1678.38	1680.52	0.000159	1.33	3777.02	2179.61	0.11
BITTCREEK	2479.366	025 yr	01-EX	12175	1670.33	1682.46	1679.66	1682.49	0.000179	1.77	8530.96	2689.99	0.12
BITTCREEK	2479.366	025 yr	03-PR-Cl imAdj	12175	1670.33	1682.54	1679.66	1682.57	0.000166	1.72	8749.94	2705.41	0.12
BITTCREEK	2479.366	100 yr	01-EX	19292.5	1670.33	1683.16	1680.11	1683.22	0.000244	2.21	10472.89	2828.58	0.14
BITTCREEK	2479.366	100 yr	03-PR-Cl imAdj	19292.5	1670.33	1683.27	1680.11	1683.32	0.000224	2.14	10761.05	2845.39	0.14
BITTCREEK	2408			Bridge									
BITTCREEK	2368.931	002 yr	01-EX	3480.7	1669.49	1677.9		1678.19	0.004132	5.28	890.86	688.5	0.51
BITTCREEK	2368.931	002 yr	03-PR-Cl imAdj	3480.7	1669.49	1677.9		1678.19	0.004131	5.28	890.94	688.54	0.51
BITTCREEK	2368.931	025 yr	01-EX	12175	1669.49	1679.37	1678.84	1679.68	0.004219	5.16	2742.64	1620.35	0.51
BITTCREEK	2368.931	025 yr	03-PR-Cl imAdj	12175	1669.49	1679.37	1678.84	1679.68	0.004219	5.16	2742.64	1620.35	0.51
BITTCREEK	2368.931	100 yr	01-EX	19292.5	1669.49	1679.91	1679.3	1680.34	0.004697	5.66	3707.85	1928.19	0.54
BITTCREEK	2368.931	100 yr	03-PR-Cl imAdj	19292.5	1669.49	1679.91	1679.3	1680.34	0.004698	5.66	3707.62	1928.11	0.54
BITTCREEK	1947.132	002 yr	01-EX	3480.7	1668.57	1676.49		1676.69	0.003294	4.76	1074.92	967.49	0.45
BITTCREEK	1947.132	002 yr	03-PR-Cl imAdj	3480.7	1668.57	1676.49		1676.69	0.003295	4.76	1074.8	967.45	0.45
BITTCREEK	1947.132	025 yr	01-EX	12175	1668.57	1677.79		1678.07	0.003912	5.76	2967.76	2008.46	0.51
BITTCREEK	1947.132	025 yr	03-PR-Cl imAdj	12175	1668.57	1677.79		1678.07	0.003912	5.76	2967.76	2008.46	0.51
BITTCREEK	1947.132	100 yr	01-EX	19292.5	1668.57	1678.4		1678.73	0.003497	5.98	4253.76	2225.21	0.49
BITTCREEK	1947.132	100 yr	03-PR-Cl imAdj	19292.5	1668.57	1678.4		1678.73	0.003498	5.98	4253.49	2225.16	0.49
BITTCREEK	1658.387	002 yr	01-EX	3480.7	1668.13	1675.78		1675.91	0.002314	3.89	1312.53	1186.62	0.38
BITTCREEK	1658.387	002 yr	03-PR-Cl imAdj	3480.7	1668.13	1675.78		1675.91	0.002311	3.89	1313.25	1187.05	0.38
BITTCREEK	1658.387	025 yr	01-EX	12175	1668.13	1677.2		1677.34	0.00178	3.26	4031.85	2231	0.33
BITTCREEK	1658.387	025 yr	03-PR-Cl imAdj	12175	1668.13	1677.2		1677.34	0.001781	3.26	4031.58	2230.99	0.33
BITTCREEK	1658.387	100 yr	01-EX	19292.5	1668.13	1677.89		1678.08	0.001556	3.4	5605.54	2299.53	0.32
BITTCREEK	1658.387	100 yr	03-PR-Cl imAdj	19292.5	1668.13	1677.89		1678.08	0.001556	3.4	5605.26	2299.52	0.32
BITTCREEK	1100.85	002 yr	01-EX	3480.7	1668.37	1675.28	1674.43	1675.34	0.001002	2.85	1875.59	1511.06	0.25
BITTCREEK	1100.85	002 yr	03-PR-Cl imAdj	3480.7	1668.37	1675.28	1674.43	1675.34	0.001002	2.85	1875.59	1511.06	0.25
BITTCREEK	1100.85	025 yr	01-EX	12175	1668.37	1676.76	1675.34	1676.88	0.001001	3.37	4574.94	2263.56	0.26
BITTCREEK	1100.85	025 yr	03-PR-Cl imAdj	12175	1668.37	1676.76	1675.34	1676.88	0.001001	3.37	4574.94	2263.56	0.26
BITTCREEK	1100.85	100 yr	01-EX	19292.5	1668.37	1677.48	1675.82	1677.64	0.001	3.66	6295.94	2467.25	0.26
BITTCREEK	1100.85	100 yr	03-PR-Cl imAdj	19292.5	1668.37	1677.48	1675.82	1677.64	0.001	3.66	6295.94	2467.25	0.26



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HYDRAULIC DATA

SHEET 2 OF 4

DES: AM	CK: DH	CONT: 0484	SECT: 01	JOB: 025	HIGHWAY: FM 707
DW: AM	CK: AT	DIST: ABL	COUNTY: JONES	SHEET NO. 80	

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 Alex.Massara 1/28/2022 5:05:44 PM

BRIDGE OUTPUT: EXISTING 25-YEAR

Plan: 01-EX 361 BITTCREEK RS: 2408 Profile: 025 yr

E.G. US. (ft)	1682.49	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	1682.46	E.G. Elev (ft)	1682.44	1682.24
Q Total (cfs)	12175	W.S. Elev (ft)	1682.13	1681.61
Q Bridge (cfs)	2808.57	Crit W.S. (ft)	1681.61	1681.61
Q Weir (cfs)		Max Chl Dpth (ft)	11.79	12.12
Weir Sta Lft (ft)		Vel Total (ft/s)	4.46	6.12
Weir Sta Rgt (ft)		Flow Area (sq ft)	2727.43	1990.43
Weir Submerg		Froude # Chl	0.23	0.32
Weir Max Depth (ft)		Specif Force (cu ft)	5958.35	5536.19
Min El Weir Flow (ft)	1680	Hydr Depth (ft)	1.8	1.46
Min El Prs (ft)	1682.59	W.P. Total (ft)	1625.68	1465.12
Delta EG (ft)	2.82	Conv. Total (cfs)	184658.6	119373.4
Delta WS (ft)	3.09	Top Width (ft)	1518.62	1363.01
BR Open Area (sq ft)	577.83	Frctn Loss (ft)	0.17	0.22
BR Open Vel (ft/s)	5.4	C & E Loss (ft)	0.03	0.1
BR Sluice Coef		Shear Total (lb/sq ft)	0.46	0.88
BR Sel Method	Energy only	Power Total (lb/ft s)	2.03	5.4

BRIDGE OUTPUT: EXISTING 100-YEAR

Plan: 01-EX 361 BITTCREEK RS: 2408 Profile: 100 yr

E.G. US. (ft)	1683.22	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	1683.16	E.G. Elev (ft)	1683.15	1682.91
Q Total (cfs)	19292.5	W.S. Elev (ft)	1682.72	1682.08
Q Bridge (cfs)	2676.69	Crit W.S. (ft)	1682.09	1682.08
Q Weir (cfs)		Max Chl Dpth (ft)	12.39	12.59
Weir Sta Lft (ft)		Vel Total (ft/s)	5.24	7.23
Weir Sta Rgt (ft)		Flow Area (sq ft)	3684.09	2666.97
Weir Submerg		Froude # Chl	0.26	0.36
Weir Max Depth (ft)		Specif Force (cu ft)	9304.97	8621.49
Min El Weir Flow (ft)	1680	Hydr Depth (ft)	2.15	1.77
Min El Prs (ft)	1682.59	W.P. Total (ft)	1973.21	1612.53
Delta EG (ft)	2.88	Conv. Total (cfs)	265339.3	179174.7
Delta WS (ft)	3.25	Top Width (ft)	1715.93	1505.67
BR Open Area (sq ft)	577.83	Frctn Loss (ft)	0.2	0.24
BR Open Vel (ft/s)	4.83	C & E Loss (ft)	0.04	0.12
BR Sluice Coef		Shear Total (lb/sq ft)	0.62	1.2
BR Sel Method	Energy only	Power Total (lb/ft s)	3.23	8.66

BRIDGE OUTPUT: PROPOSED 25-YEAR

Plan: 03-PR-ClimAdj 361 BITTCREEK RS: 2408 Profile: 025 yr

E.G. US. (ft)	1682.57	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	1682.54	E.G. Elev (ft)	1682.52	1682.31
Q Total (cfs)	12175	W.S. Elev (ft)	1682.22	1681.66
Q Bridge (cfs)	4013.3	Crit W.S. (ft)	1681.64	1681.66
Q Weir (cfs)		Max Chl Dpth (ft)	11.89	12.17
Weir Sta Lft (ft)		Vel Total (ft/s)	4.19	5.7
Weir Sta Rgt (ft)		Flow Area (sq ft)	2903.32	2136.44
Weir Submerg		Froude # Chl	0.23	0.33
Weir Max Depth (ft)		Specif Force (cu ft)	6624.42	6016.7
Min El Weir Flow (ft)	1680	Hydr Depth (ft)	1.99	1.63
Min El Prs (ft)	1684.13	W.P. Total (ft)	1511.58	1360.82
Delta EG (ft)	2.9	Conv. Total (cfs)	222958.3	150623.6
Delta WS (ft)	3.18	Top Width (ft)	1457.91	1314.29
BR Open Area (sq ft)	877.25	Frctn Loss (ft)	0.18	0.1
BR Open Vel (ft/s)	6.06	C & E Loss (ft)	0.03	0.1
BR Sluice Coef		Shear Total (lb/sq ft)	0.36	0.64
BR Sel Method	Energy only	Power Total (lb/ft s)	1.5	3.65

BRIDGE OUTPUT: PROPOSED 100-YEAR

Plan: 03-PR-ClimAdj 361 BITTCREEK RS: 2408 Profile: 100 yr

E.G. US. (ft)	1683.32	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	1683.27	E.G. Elev (ft)	1683.25	1682.99
Q Total (cfs)	19292.5	W.S. Elev (ft)	1682.85	1682.15
Q Bridge (cfs)	4981.93	Crit W.S. (ft)	1682.15	1682.15
Q Weir (cfs)		Max Chl Dpth (ft)	12.51	12.66
Weir Sta Lft (ft)		Vel Total (ft/s)	4.94	6.83
Weir Sta Rgt (ft)		Flow Area (sq ft)	3902.2	2822.7
Weir Submerg		Froude # Chl	0.26	0.36
Weir Max Depth (ft)		Specif Force (cu ft)	10139.18	9191.68
Min El Weir Flow (ft)	1680	Hydr Depth (ft)	2.25	1.96
Min El Prs (ft)	1684.13	W.P. Total (ft)	1791.49	1492.45
Delta EG (ft)	2.98	Conv. Total (cfs)	322176.4	216432.9
Delta WS (ft)	3.35	Top Width (ft)	1734.01	1442.92
BR Open Area (sq ft)	877.25	Frctn Loss (ft)	0.22	0.11
BR Open Vel (ft/s)	7	C & E Loss (ft)	0.04	0.12
BR Sluice Coef		Shear Total (lb/sq ft)	0.49	0.94
BR Sel Method	Energy only	Power Total (lb/ft s)	2.41	6.41



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FM 707

HYDRAULIC DATA

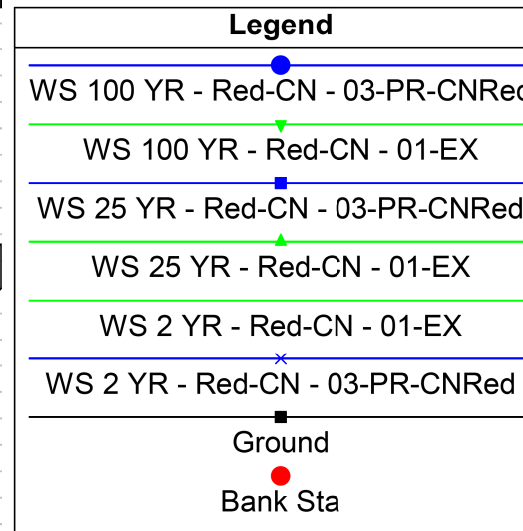
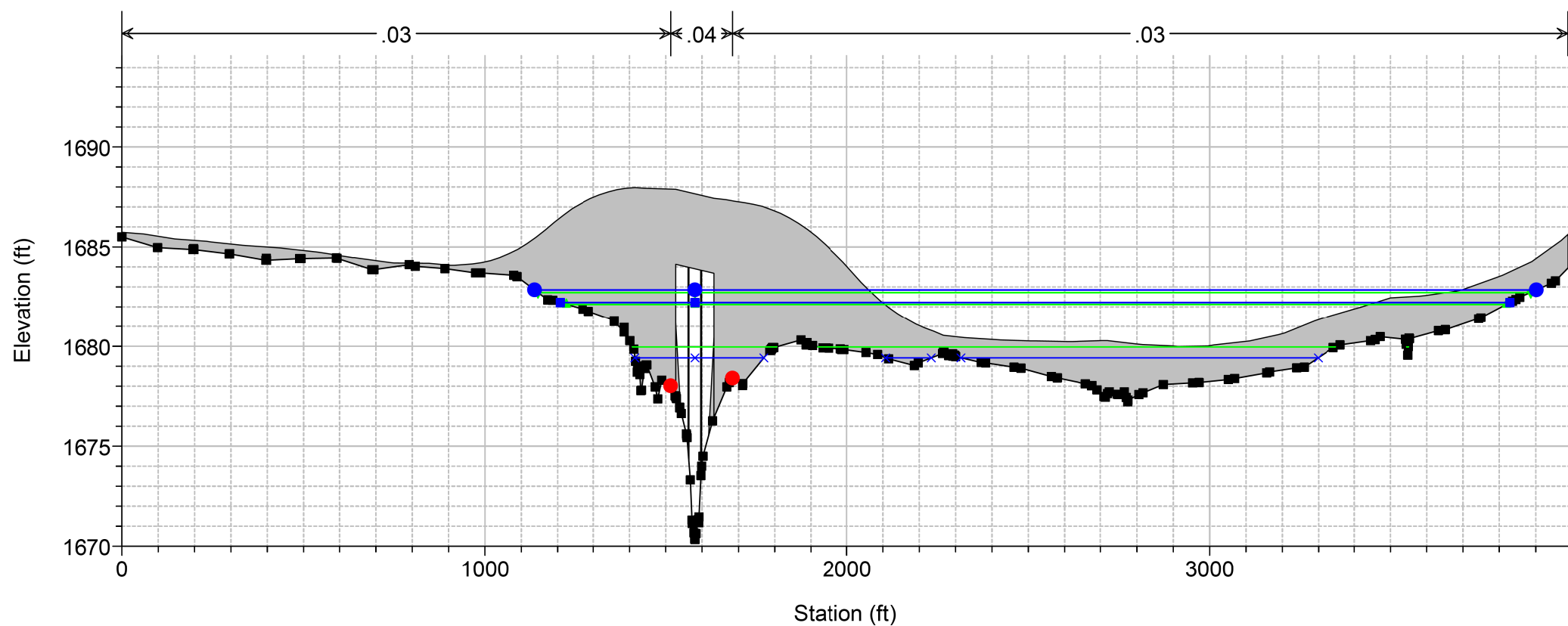
SHEET 3 OF 4

DS:	AM	CK:	DH	0484	01	025	FM 707
DW:	AM	CK:	AT	ABL	JONES		81

A:\lex_Mossara 1/28/2022 5:06:03 PM
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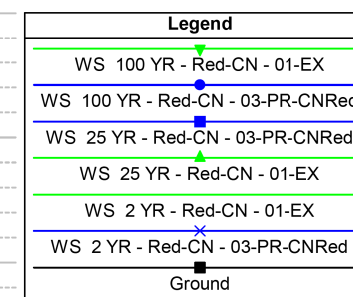
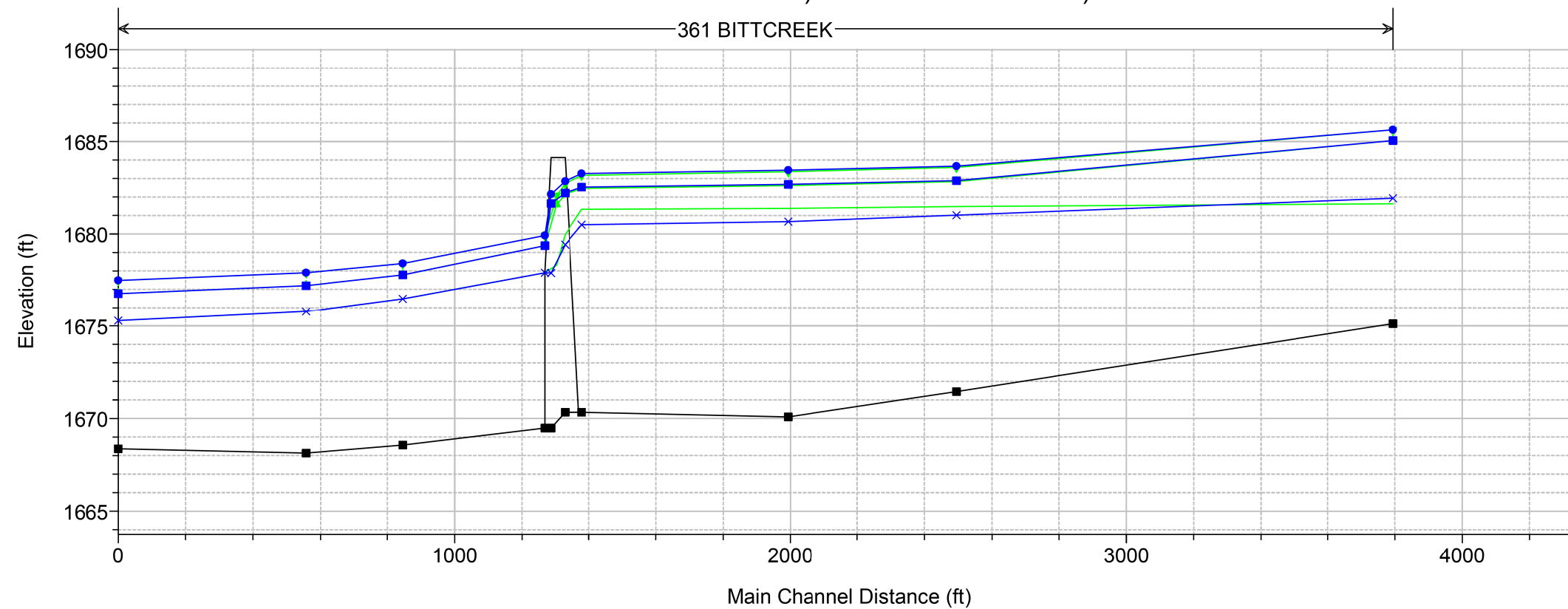
HEC-RAS CROSS-SECTION OUTPUT

FM707-BitterCrk Plan: 1) 01-EX 4/16/2021 2) 03-PR-CNRed 6/1/2021



HEC-RAS PROFILE OUTPUT

FM707-BitterCrk Plan: 1) 01-EX 4/16/2021 2) 03-PR-CNRed 6/1/2021



Aaron Demaray Tainter
1/31/2022



FM 707
HYDRAULIC DATA

SHEET 4 OF 4

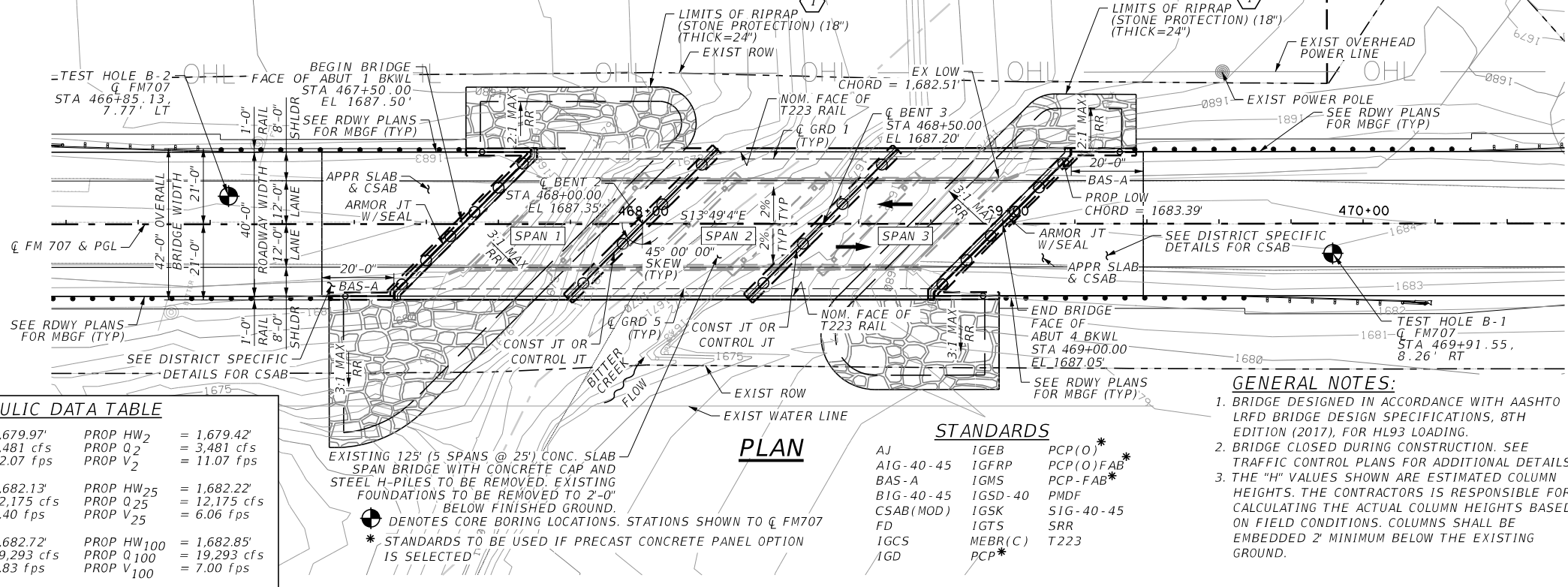
DS:	CK:	CONT	SECT	JOB	HIGHWAY
AM	DH	0484	01	025	FM 707
DW:	CK:	DIST	COUNTY	SHEET NO.	
AM	AT	ABL	JONES	82	

11/1/2021 5:08:17 PM AT

ALL ABUTMENTS AND BENTS ARE ALONG BEARING OF S58°49'4"E

FOUNDATION NOTES:

1. FOUND DRILLED SHAFTS AT THE LENGTHS SHOWN OR DEEPER AS NECESSARY TO OBTAIN MINIMUM ONE DS DIAMETER PENETRATION INTO HARD OR VERY HARD CLAY.
2. CONCRETE FOR DRILLED SHAFTS SHALL BE PLACED IMMEDIATELY AFTER COMPLETED FOUNDATION EXCAVATION. UNDER NO CIRCUMSTANCES, COMPLETED FOUNDATION EXCAVATION REMAINS OPEN OVERNIGHT.
3. SEE BORING LOG LAYOUT SHEET FOR BORE LOG DETAILS.
4. DRILLED SHAFT DESIGN LOADS:
 ABUTMENTS = 51 TON/DS
 BENTS = 126 TON/DS
 ABUT. WING WALL = 15 TON/DS



HYDRAULIC DATA TABLE

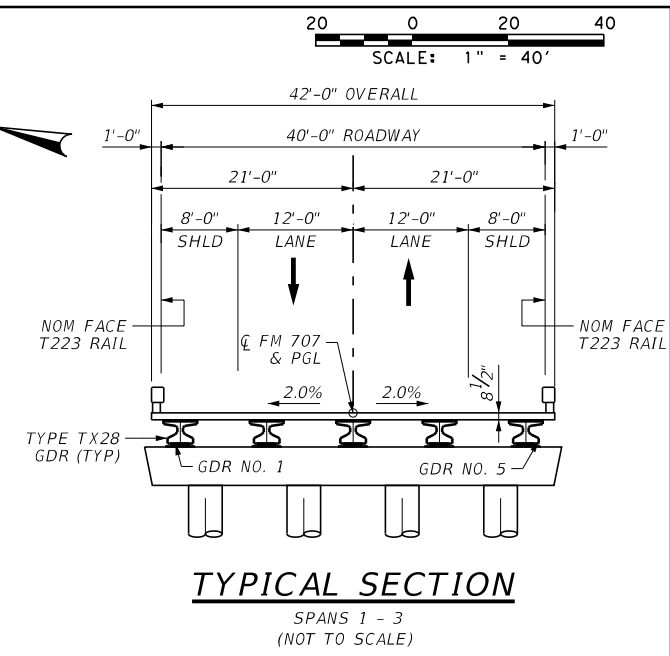
EXIST HW ₂ = 1,679.97'	PROP HW ₂ = 1,679.42'
EXIST Q ₂ = 3,481 cfs	PROP Q ₂ = 3,481 cfs
EXIST V ₂ = 12.07 fps	PROP V ₂ = 11.07 fps
EXIST HW ₂₅ = 1,682.13'	PROP HW ₂₅ = 1,682.22'
EXIST Q ₂₅ = 12,175 cfs	PROP Q ₂₅ = 12,175 cfs
EXIST V ₂₅ = 5.40 fps	PROP V ₂₅ = 6.06 fps
EXIST HW ₁₀₀ = 1,682.72'	PROP HW ₁₀₀ = 1,682.85'
EXIST Q ₁₀₀ = 19,293 cfs	PROP Q ₁₀₀ = 19,293 cfs
EXIST V ₁₀₀ = 4.83 fps	PROP V ₁₀₀ = 7.00 fps

STANDARDS

AJ	IGEB	PCP(O)*
AIG-40-45	IGFRP	PCP(O)FAB*
BAS-A	IGMS	PCP-FAB*
BIG-40-45	IGSD-40	PMD
CSAB(MOD)	IGSK	SIG-40-45
FD	IGTS	SRR
IGCS	MEBR(C)	T223
IGD	PCP*	

GENERAL NOTES:

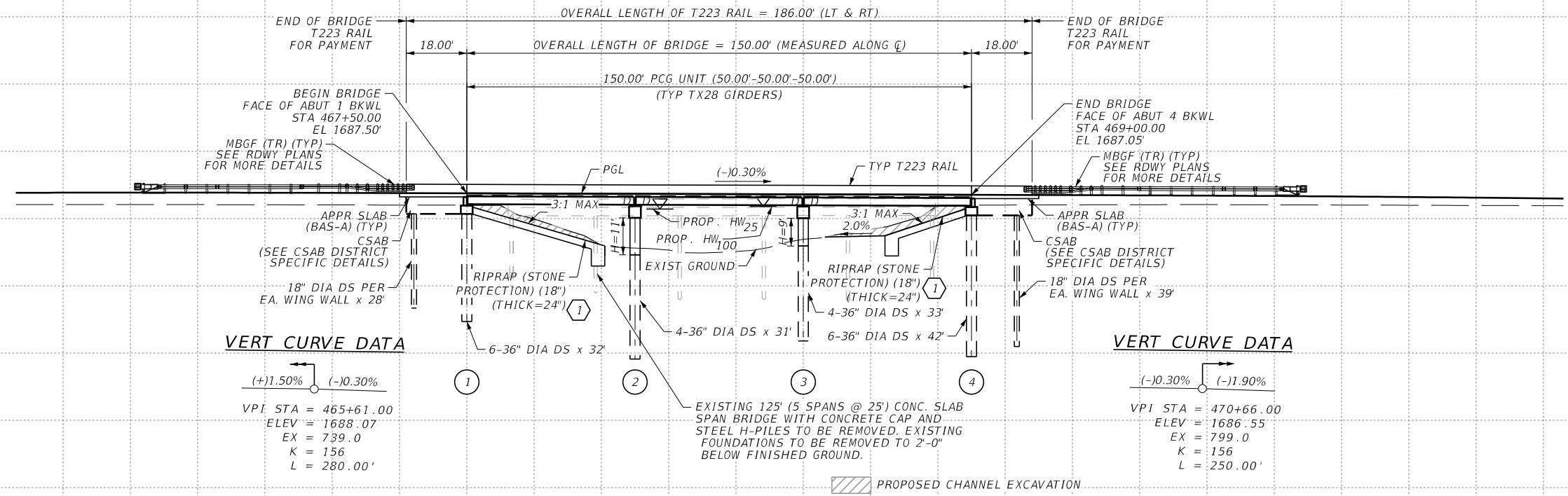
1. BRIDGE DESIGNED IN ACCORDANCE WITH AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 8TH EDITION (2017), FOR HL93 LOADING.
2. BRIDGE CLOSED DURING CONSTRUCTION. SEE TRAFFIC CONTROL PLANS FOR ADDITIONAL DETAILS.
3. THE "H" VALUES SHOWN ARE ESTIMATED COLUMN HEIGHTS. THE CONTRACTOR IS RESPONSIBLE FOR CALCULATING THE ACTUAL COLUMN HEIGHTS BASED ON FIELD CONDITIONS. COLUMNS SHALL BE EMBEDDED 2' MINIMUM BELOW THE EXISTING GROUND.
4. SEE EXISTING UTILITY LAYOUTS FOR IDENTIFICATION OF EXISTING UTILITIES.
5. SEE BRIDGE QUANTITY SUMMARY SHEET FOR BRIDGE ESTIMATED QUANTITIES, BEARING SEAT ELEVATIONS, AND MATERIAL NOTES FOR BRIDGE VARIOUS ELEMENTS.
6. SEE HYDRAULIC DATA SHEETS FOR ADDITIONAL INFORMATION.
7. SAW CUT GROOVING OF THE BRIDGE DECK AND APPROACH SLAB IS REQUIRED.
8. D DENOTES BENTS WITH DOWEL BARS FOR EXTERIOR BEAMS WITH SLOTTED HOLES



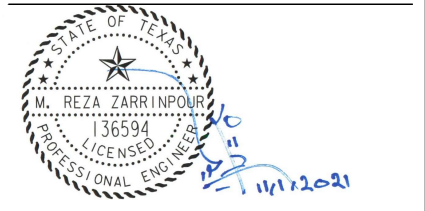
CONTRACTOR IS CAUTIONED THAT THE GROUNDWATER ENCOUNTERED DURING SOIL EXPLORATIONS WILL VARY DEPENDING ON CLIMATIC CONDITIONS. VARYING GROUNDWATER LEVELS DURING CONSTRUCTION WILL NOT BE A BASIS FOR A CLAIM OF CHANGED SITE CONDITIONS.

THE CONTRACTOR'S ATTENTION IS DRAWN TO THE WATER BEARING COARSE GRAINED SOILS SHOWN IN BORING LOGS. THE USE OF TEMPORARY CASING AND/OR DRILLING SLURRY WILL BE NECESSARY TO INSTALL THE DRILLED SHAFT TO THE REQUIRED PENETRATION. CASING SHALL BE SUBSIDIARY TO ITEM 416 -DRILLED SHAFT FOUNDATIONS.

① DEPTH AND WIDTH OF RIPRAP TOE SHALL BE 4' MINIMUM.



DESIGN SPEED: 60 MPH
 FUNCTIONAL CLASS: MAJOR COLLECTOR
 2020 ADT: 742
 2040 ADT: 1,039
 EXIST NBI NO. 08-128-0-0484-01-002
 PROP NBI NO. 08-128-0-0484-01-005



HL 93 LOADING

BRIDGEFARMER & ASSOCIATES, INC.
 CONSULTING ENGINEERS
 TBPE REGISTRATION NO. 264



FM 707
BRIDGE LAYOUT
(BITTER CREEK)

SCALE: 1" = 40' SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0484	01	025	FM 707
DIST	COUNTY	SHEET NO.	
ABL	JONES	88	

FM707 BRIDGE QUANTITIES

BID CODES	0400-6005	0416-6001	0416-6004	0420-6014	0420-6030	0420-6038
BID ITEM DESCRIPTION	CEM STABIL BKFL	DRILL SHAFT (18 IN)	DRILL SHAFT (36 IN)	CL C CONC (ABUT)(HPC) ^①	CL C CONC (CAP)(HPC) ^②	CL C CONC (COLUMN)(HPC)
BRIDGE ELEMENT	CY	LF	LF	CY	CY	CY
2 ~ ABUTMENTS	224	134	444	70.6		
2 ~ INTERIOR BENTS			256		54.6	20.9
1 ~ 150.00' PRESTR CONC TX-28 GIRDER UNIT						
TOTAL	224	134	700	70.6	54.6	20.9

BID CODES	0422-6002	0422-6016	0425-6035	0432-6033	0450-6007	0454-6004
BID ITEM DESCRIPTION	REINF CONC SLAB (HPC)	APPROACH SLAB (HPC)	PRESTR CONC GIRDER (TX28)	RIPRAP (STONE PROTECTION)(18 IN)	RAIL (TY T223)(HPC)	ARMOR JOINT (SEALED)
BRIDGE ELEMENT	SF	CY	LF	CY	LF	LF
2 ~ ABUTMENTS		128.2		893		108
2 ~ INTERIOR BENTS						
1 ~ 150.00' PRESTR CONC TX-28 GIRDER UNIT	6300		741.50			
TOTAL	6300	128.2	741.50	893	372.0	108

- ① QUANTITY INCLUDES 0.9 CY FOR TWO SHEAR KEYS SEE IGSK STANDARD SHEET FOR SHEAR KEY LOCATION, DETAILS, AND NOTES.
- ② QUANTITY INCLUDES 1.8 CY FOR TWO SHEAR KEYS SEE IGSK STANDARD SHEET FOR SHEAR KEY LOCATION, DETAILS, AND NOTES.

MATERIAL NOTES:

1. MATERIAL NOTES PROVIDED ON THIS SHEET SHALL BE PRECEDENT TO THOSE ON TXDOT STANDARD SHEETS INCLUDED IN THE SET OF BRIDGE PLANS.
2. PROVIDE CLASS C (HPC) CONCRETE FOR ALL BRIDGE SUBSTRUCTURE ELEMENTS.
3. PROVIDE CLASS 5 (HPC) FOR BRIDGE APPROACH SLAB AND CIP PORTION OF DECKS.
4. PROVIDE CLASS C (HPC) FOR BRIDGE T223 TYPE RAIL.
5. REINFORCING STEEL FOR BRIDGE APPROACH SLAB, DECK SLAB, AND RAIL SHALL BE EPOXY COATED GRADE 60 REINFORCING STEEL.
6. REINFORCING STEEL FOR BRIDGE ABUTMENT AND BENT CAPS SHALL BE EPOXY COATED GRADE 60 REINFORCING STEEL.

BEARING SEAT ELEVATIONS

			GIRDER 1	GIRDER 2	GIRDER 3	GIRDER 4	GIRDER 5
ABUT	1	(FWD)	1683.605	1683.812	1684.019	1683.866	1683.713
BENT	2	(BK)	1683.462	1683.669	1683.876	1683.723	1683.570
		(FWD)	1683.456	1683.663	1683.870	1683.717	1683.564
BENT	3	(BK)	1683.312	1683.519	1683.726	1683.573	1683.420
		(FWD)	1683.306	1683.513	1683.720	1683.567	1683.414
ABUT	4	(BK)	1683.164	1683.371	1683.578	1683.425	1683.272



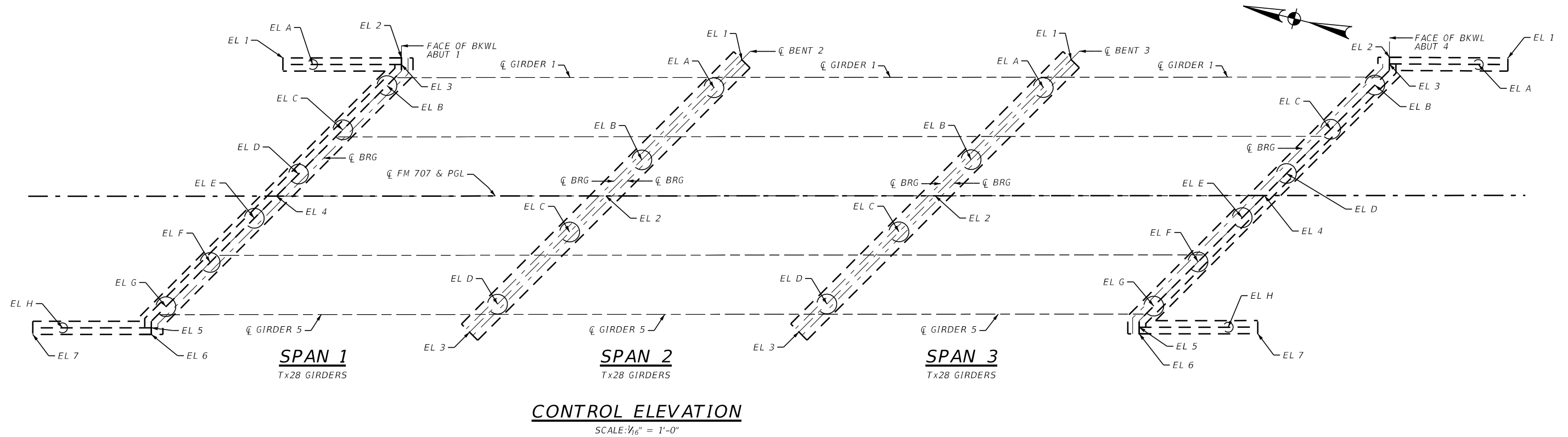
HL 93 LOADING



**FM 707
BRIDGE QUANTITY
& BEARING SEAT
ELEVATIONS**

SCALE: 1" = 10' SHEET 01 OF 01

DS:	CK:	CONT	SECT	JOB	HIGHWAY
MRZ	QL	0484	01	025	FM 707
DW:	CK:	DIST	COUNTY	SHEET NO.	
SD	MRZ	ABL	JONES	89	



ABUT 1 CONTROL ELEVATIONS							
TOP OF WINGWALL							
EL 1	EL 2	EL 3	EL 5	EL 6	EL 7		
1687.079	1687.026	1687.046	1687.159	1687.139	1687.193		
TOP OF BACKWALL							
EL 3	EL 4	EL 5					
1685.962	1686.419	1686.076					
TOP OF DRILLED SHAFT							
EL A	EL B	EL C	EL D	EL E	EL F	EL G	EL H
1680.982	1681.012	1681.167	1681.321	1681.341	1681.227	1681.113	1681.096

ABUT 4 CONTROL ELEVATIONS							
TOP OF WINGWALL							
EL 1	EL 2	EL 3	EL 5	EL 6	EL 7		
1686.524	1686.576	1686.595	1686.709	1686.689	1686.635		
TOP OF BACKWALL							
EL 3	EL 4	EL 5					
1685.512	1685.969	1685.626					
TOP OF DRILLED SHAFT							
EL A	EL B	EL C	EL D	EL E	EL F	EL G	EL H
1680.453	1680.562	1680.717	1680.871	1680.891	1680.777	1680.663	1680.565

CAP CONTROL ELEVATIONS							
	TOP OF CAP			TOP OF COLUMN			
	EL 1	EL 2	EL 3	EL A	EL B	EL C	EL D
BENT 2	1683.270	1683.745	1683.394	1679.867	1680.119	1680.152	1679.966
BENT 3	1683.120	1683.595	1683.244	1679.717	1679.969	1680.002	1679.816



HL 93 LOADING

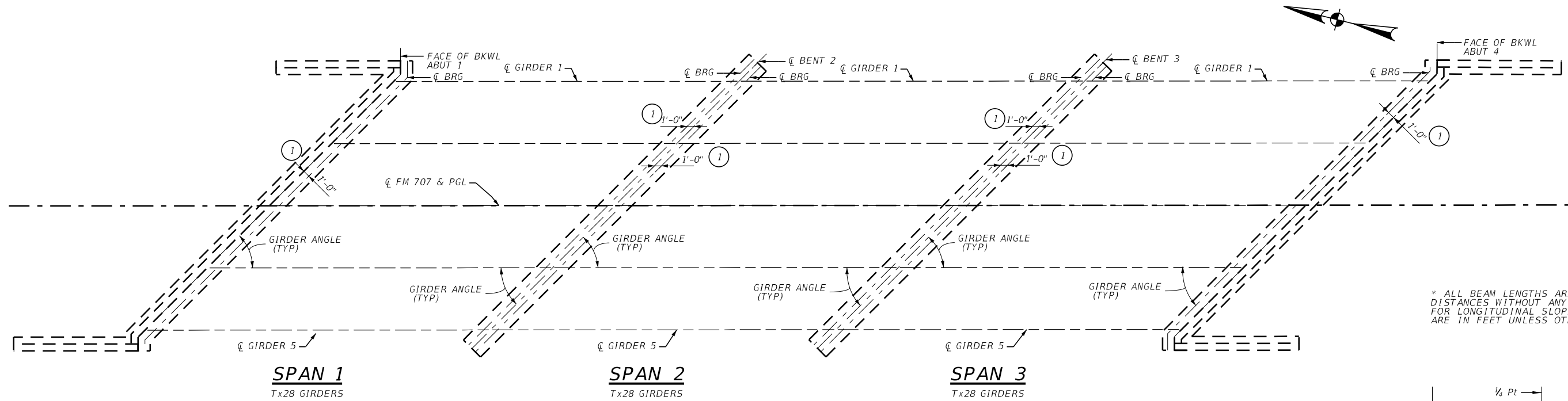
BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPB REGISTRATION NO. 264

Texas Department of Transportation
© 2021

**FM 707
BRIDGE ABUTMENT & BENT
CONTROL ELEVATIONS
(BITTER CREEK)**

SHEET 01 OF 01

DS:	CK:	CONT	SECT	JOB	HIGHWAY
MRZ	QL	0484	01	025	FM 707
DW:	CK:	DIST	COUNTY	SHEET NO.	
SD	MRZ	ABL	JONES	90	



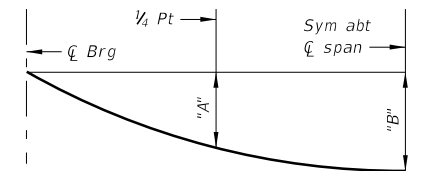
FRAMING PLAN

SCALE: 1/8" = 1'-0"

TABLE OF SECTION DEPTHS

SPAN NO.	"X" @ C/L BRG	"Y" @ C/L BRG	"Z" @ MIDSPAN
1	11"	3'-3"	9 3/4"
2	11"	3'-3"	9 3/4"
3	11"	3'-3"	9 3/4"

* ALL BEAM LENGTHS ARE HORIZONTAL DISTANCES WITHOUT ANY ADJUSTMENT MADE FOR LONGITUDINAL SLOPE. ALL DIMENSIONS ARE IN FEET UNLESS OTHERWISE NOTED.



DEAD LOAD DEFLECTION DIAGRAM

CALCULATED DEFLECTIONS SHOWN ARE DUE TO THE CONCRETE SLAB ONLY ASSUMING $E_c = 5000$ ksi. THESE VALUES MAY REQUIRE FIELD VERIFICATION.

- 1 SEE IEGB STANDARD FOR ORIENTATION OF DIMENSION.
- 2 BEAM LENGTH SHOWN ARE BOTTOM BEAM FLANGE LENGTHS WITH ADJUSTMENTS MADE FOR BEAM SLOPE.
- 3 "Y" VALUES SHOWN ADJUSTED FOR ROADWAY VERTICAL CURVE AND SHALL SUPERSEDE THE VALUE ON STANDARD SHEET (SIG-40-45) FOR TX28 GIRDER.
- 4 "X" & "Z" VALUES ARE DISTANCES FROM RDWY TOP SURFACE TO TOP OF GIRDER. THE VALUES SHOWN HERE SUPERSEDE THE VALUE ON STANDARD SHEET (SIG-40-45) FOR TX28 GIRDER.
- 5 DEAD LOAD DEFLECTION A & B VALUES SHOWN SHALL SUPERSEDE THE RESPECTIVE VALUES ON STANDARD SHEET (SIG-40-45) FOR TX28 WITH 50' SPAN LENGTH

BENT REPORT

ABUT NO.1 (S 58 49 04 E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1 25.456 L

SPAN	GIRDER	GIRDER SPAC. (ABUT BKWL)	GIRDER ANGLE		
			D	M	S
SPAN 1	GIRDER 1	0.000	45	00	00
	GIRDER 2	12.728	45	00	00
	GIRDER 3	12.728	45	00	00
	GIRDER 4	12.728	45	00	00
	GIRDER 5	12.728	45	00	00
TOTAL		50.912			

BENT NO.2 (S 58 49 04 E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1 25.456 L

SPAN	GIRDER	GIRDER SPAC. (C.L. BENT)	GIRDER ANGLE		
			D	M	S
SPAN 1	GIRDER 1	0.000	45	00	00
	GIRDER 2	12.728	45	00	00
	GIRDER 3	12.728	45	00	00
	GIRDER 4	12.728	45	00	00
	GIRDER 5	12.728	45	00	00
TOTAL		50.912			

BENT NO.2 (S 58 49 04 E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1 25.456 L

SPAN	GIRDER	GIRDER SPAC. (C.L. BENT)	GIRDER ANGLE		
			D	M	S
SPAN 2	GIRDER 1	0.000	45	00	00
	GIRDER 2	12.728	45	00	00
	GIRDER 3	12.728	45	00	00
	GIRDER 4	12.728	45	00	00
	GIRDER 5	12.728	45	00	00
TOTAL		50.912			

BENT NO.3 (S 58 49 04 E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1 25.456 L

SPAN	GIRDER	GIRDER SPAC. (C.L. BENT)	GIRDER ANGLE		
			D	M	S
SPAN 2	GIRDER 1	0.000	45	00	00
	GIRDER 2	12.728	45	00	00
	GIRDER 3	12.728	45	00	00
	GIRDER 4	12.728	45	00	00
	GIRDER 5	12.728	45	00	00
TOTAL		50.912			

BENT NO.3 (S 58 49 04 E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1 25.456 L

SPAN	GIRDER	GIRDER SPAC. (C.L. BENT)	GIRDER ANGLE		
			D	M	S
SPAN 3	GIRDER 1	0.000	45	00	00
	GIRDER 2	12.728	45	00	00
	GIRDER 3	12.728	45	00	00
	GIRDER 4	12.728	45	00	00
	GIRDER 5	12.728	45	00	00
TOTAL		50.912			

ABUT NO.4 (S 58 49 04 E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1 25.456 L

SPAN	GIRDER	GIRDER SPAC. (ABUT BKWL)	GIRDER ANGLE		
			D	M	S
SPAN 3	GIRDER 1	0.000	45	00	00
	GIRDER 2	12.728	45	00	00
	GIRDER 3	12.728	45	00	00
	GIRDER 4	12.728	45	00	00
	GIRDER 5	12.728	45	00	00
TOTAL		50.912			

GIRDER REPORT

GIRDER REPORT, SPAN 1

GIRDER	HORIZONTAL DISTANCE *			TRUE LENGTH	GIRDER SLOPE	DEFLECTIONS	
	C-C BENT	E-E BM.	C-C BRG.			A	B
GIRDER 1	50.000	49.40	47.586	49.40	-0.0030	0.021	0.029
GIRDER 2	50.000	49.40	47.586	49.40	-0.0030	0.025	0.035
GIRDER 3	50.000	49.40	47.586	49.40	-0.0030	0.025	0.035
GIRDER 4	50.000	49.40	47.586	49.40	-0.0030	0.025	0.035
GIRDER 5	50.000	49.40	47.586	49.40	-0.0030	0.021	0.029
TOTAL				246.98			

GIRDER REPORT, SPAN 2

GIRDER	HORIZONTAL DISTANCE *			TRUE LENGTH	GIRDER SLOPE	DEFLECTIONS	
	C-C BENT	E-E BM.	C-C BRG.			A	B
GIRDER 1	50.000	49.50	48.000	49.50	-0.0030	0.021	0.030
GIRDER 2	50.000	49.50	48.000	49.50	-0.0030	0.026	0.036
GIRDER 3	50.000	49.50	48.000	49.50	-0.0030	0.026	0.036
GIRDER 4	50.000	49.50	48.000	49.50	-0.0030	0.026	0.036
GIRDER 5	50.000	49.50	48.000	49.50	-0.0030	0.021	0.030
TOTAL				247.50			

GIRDER REPORT, SPAN 3

GIRDER	HORIZONTAL DISTANCE *			TRUE LENGTH	GIRDER SLOPE	DEFLECTIONS	
	C-C BENT	E-E BM.	C-C BRG.			A	B
GIRDER 1	50.000	49.40	47.586	49.40	-0.0030	0.021	0.029
GIRDER 2	50.000	49.40	47.586	49.40	-0.0030	0.025	0.035
GIRDER 3	50.000	49.40	47.586	49.40	-0.0030	0.025	0.035
GIRDER 4	50.000	49.40	47.586	49.40	-0.0030	0.025	0.035
GIRDER 5	50.000	49.40	47.586	49.40	-0.0030	0.021	0.029
TOTAL				246.98			



HL 93 LOADING



FM 707 BRIDGE FRAMING PLAN (BITTER CREEK)

SHEET 01 OF 01

DS:	CK:	CONT	SECT	JOB	HIGHWAY
MRZ	QL	0484	01	025	FM 707
DW:	CK:	DIST	COUNTY		SHEET NO.
SD	MRZ	ABL	JONES		91

9/3/2021 7:09:59 PM AT c:\bms\br\dgefarmer-pw\caron.t\inter\dms05102\01_boringlogs.dgn



DRILLING LOG

1 of 2

WinCore Version 3.3
 County Jones
 Highway FM 707
 CSJ 0484-02-036
 Hole B-1
 Structure Bridge
 Station 476+36.64
 Offset 7.67 ft RT
 District Abilene
 Date 09/24/19
 Grnd. Elev. 1683.97 ft
 GW Elev. 1667.07 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
1683.6			CHIPSEAL (10 IN) BASE (3.5 IN) FILL: CLAY, Sandy Lean, dry, reddish brown to 2.5', dark brown thereafter, few Gravel (CL)			3				SSS@1.8', N=6 #200=56.5%
1680.5		6 (6) 9 (6)	CLAY, Sandy Lean, soft, moist, reddish brown (CL)	0	57.7	13			134	PTS@7', PP=4.0
1675.10		10 (6) 10 (6)	CLAY, Lean, soft, moist, reddish brown (CL)			15	40	24	128	PTS@9', PP=4.5+, #200=87.3%
1669.15		8 (6) 10 (6)	CLAY, Sandy Lean, soft, moist, reddish brown (CL)	0	21.5	19	35	19	131	PTS@13', PP=3.5, #200=90.8% Sulfate Content=720 ppm
1664.5		50 (4.75) 50 (4.625)	GRAVEL, Clayey with Sand, dense, wet, reddish brown, fine grained (GC)			17	41	25	129	PTS@18', PP=2.5, #200=67.4%
1662.25		46 (6) 48 (6)	CLAY, Lean, hard, moist, reddish brown (CL)			18				SSS@26.2', N=70
1654.30		50 (2.5) 50 (2)	CLAY, Lean, very hard, moist, reddish brown (CL)			14	36	18		SSS@30.6', N=50/6, #200=99.1%
1652.5		45 (6) 50 (4.75)	CLAY, Lean, hard, moist, reddish brown (CL)			17				SSS@36.1', N=30, 50/4.5
1644.5		50 (1.875) 50 (0.5)								

Remarks: Drill Rig: CME 75 with TxDOT 170-pound Automatic Hammer; SSS: Split Spoon Sample; PTS: Push Tube Sample; PP: Pocket Penetrometer Reading (tsf); Drilling Method: CFA to 18.0', then Mud Rotary; Latitude: 32.620894, Longitude: -99.919972

Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.

Driller: Bill Holloway Logger: Julia Payne Organization: Corsair Consulting LLC

X:\Shared\Projects\2019\1900555 FM 707 at Blitter Creek BF\Logs\Draft\90%B-1.CLG



DRILLING LOG

2 of 2

WinCore Version 3.3
 County Jones
 Highway FM 707
 CSJ 0484-02-036
 Hole B-1
 Structure Bridge
 Station 476+36.64
 Offset 7.67 ft RT
 District Abilene
 Date 09/24/19
 Grnd. Elev. 1683.97 ft
 GW Elev. 1667.07 ft

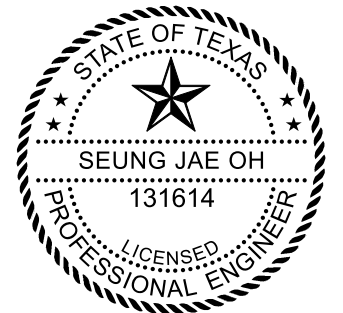
Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
1627.5			CLAY, Lean with Sand, hard to very hard, moist, reddish brown (CL)							SSS@40.3', N=50/3.5
45		50 (0.5) 50 (0.125)								SSS@45.1', N=50/3.75
50		50 (2) 50 (1.25)				14				SSS@50.5', N=50/6
55		50 (1.25) 50 (0.5)								SSS@55.3', N=50/4
60		50 (3.125) 50 (2.75)				17	48	28		SSS@60.6', N=35, 50/4.5, #200=71.1
65		50 (1.375) 50 (0.5)								SSS@65.3', N=50/4
1613.70		50 (1) 50 (0.5)								Boring Terminated at 70.3'
75										
80										

Remarks: Drill Rig: CME 75 with TxDOT 170-pound Automatic Hammer; SSS: Split Spoon Sample; PTS: Push Tube Sample; PP: Pocket Penetrometer Reading (tsf); Drilling Method: CFA to 18.0', then Mud Rotary; Latitude: 32.620894, Longitude: -99.919972

Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.

Driller: Bill Holloway Logger: Julia Payne Organization: Corsair Consulting LLC

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Seung Jae Oh
 9/16/2021

100% SUBMITTAL
 CORSAIR CONSULTING LLC
 SEPTEMBER 2021



FM 707
 BORING LOGS

SHEET 1 OF 2				
DS:	CC	AT	0484 01	025 FM 707
DW:	AM	CC	ABL	JONES 92

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DRILLING LOG

1 of 2

WinCore Version 3.3
 County Jones
 Highway FM 707
 CSJ 0484-02-036
 Hole B-2
 Structure Bridge
 Station 473+29.20
 Offset 8.21 ft LT
 District Abilene
 Date 09/25/19
 Grnd. Elev. 1683.94 ft
 GW Elev. 1668.24 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
1683.5			CHIPSEAL (1.0 IN) BASE (3.5 IN) FILL: CLAY, Lean with Sand to Sandy Lean, dry, reddish brown (CL)			2				SSS@1.4', N=7 -#200=62.4%, trace Gravel
1680.4		23 (6) 18 (6)	CLAY, Lean, very stiff, moist, reddish brown, 2" SC seam at 4.5' (CL)			8				PTS@4', PP=4.5+
1674.9		20 (6) 20 (6)	CLAY, Sandy Lean, stiff, moist, brown, few Gravel (CL)	0	150	13	33	16	131	PTS@7', PP=4.5+, -#200=86.2% Sulfate Content<100 ppm
1670.9		40 (6) 50 (3.5)	GRAVEL, Clayey with Sand, dense, dry, reddish brown to 14.3', brown thereafter, fine grained (GC)			10				PTS@9', PP=4.5+, -#200=57.5%
1667.9		20 (6) 24 (6)	GRAVEL, Clayey with Sand, compact, wet, reddish brown, fine grained, (GC)			1				PTS@13', PP=4.5+
1661.8		50 (5.875) 50 (3.5)	CLAY, Lean, hard, moist, reddish brown (CL)			3				SSS@13.7', N=60, -#200=14.9% -#200=20.1%
		50 (4.5) 50 (2)				7				SSS@21.5', N=52
		50 (4.5) 50 (2.5)				15	39	13		SSS@26.1', N=78, -#200=95.7% Sulfate Content=260 ppm
		50 (1.25) 50 (0.25)								SSS@30.9', N=50/6
						16				SSS@35.8', N=24,50/6

Remarks: Drill Rig: CME 75 with TxDOT 170-pound Automatic Hammer; SSS: Split Spoon Sample; PTS: Push Tube Sample; PP: Pocket Penetrometer Reading (tsf); Drilling Method: CFA to 23', then Mud Rotary; Latitude: 32.621720, Longitude: -99.920172

Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.

Driller: Bill Holloway Logger: Julia Payne Organization: Corsair Consulting LLC

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DRILLING LOG

2 of 2

WinCore Version 3.3
 County Jones
 Highway FM 707
 CSJ 0484-02-036
 Hole B-2
 Structure Bridge
 Station 473+29.20
 Offset 8.21 ft LT
 District Abilene
 Date 09/25/19
 Grnd. Elev. 1683.94 ft
 GW Elev. 1668.24 ft

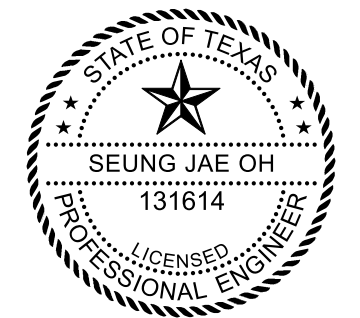
Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
			CLAY, Lean, very hard, moist, reddish brown to 45.5' and below 55.3', grayish brown from 50.3' to 50.6' (CL)							SSS@40.2', N=50/3
		50 (0.5) 50 (1)								SSS@45.3', N=50/2.5
		50 (0.5) 50 (0.125)				13				SSS@50.3', N=50/3, -#200=85.5%
		50 (1.75) 50 (0.5)				14				SSS@55.3', N=50/3
1627.9			CLAY, Lean, hard, moist, reddish brown (CL)							SSS@60.7', N=50/6
		50 (3.25) 50 (3.5)								
1619.4		50 (0.125) 50 (1)	CLAY, Lean, very hard, moist, reddish brown (CL)			14				SSS@65.2', N=50/3.5
1613.6		50 (0.25) 50 (1.5)								Boring Terminated at 70.3'

Remarks: Drill Rig: CME 75 with TxDOT 170-pound Automatic Hammer; SSS: Split Spoon Sample; PTS: Push Tube Sample; PP: Pocket Penetrometer Reading (tsf); Drilling Method: CFA to 23', then Mud Rotary; Latitude: 32.621720, Longitude: -99.920172

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Driller: Bill Holloway Logger: Julia Payne Organization: Corsair Consulting LLC

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Seung Jae Oh
9/16/2021

100% SUBMITTAL

CORSAIR CONSULTING LLC
SEPTEMBER 2021

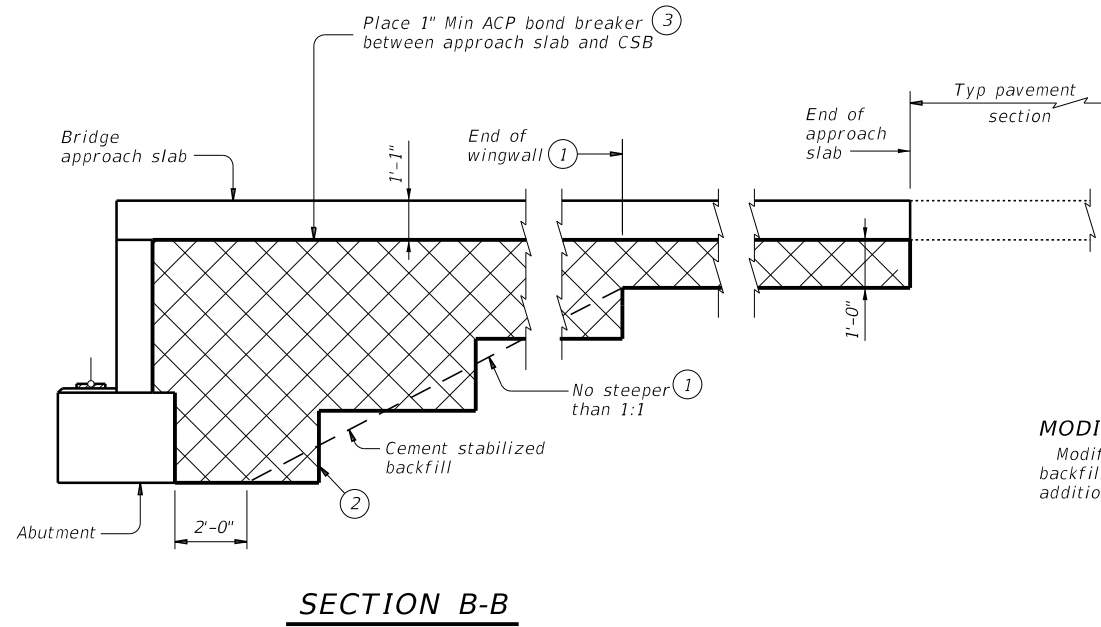
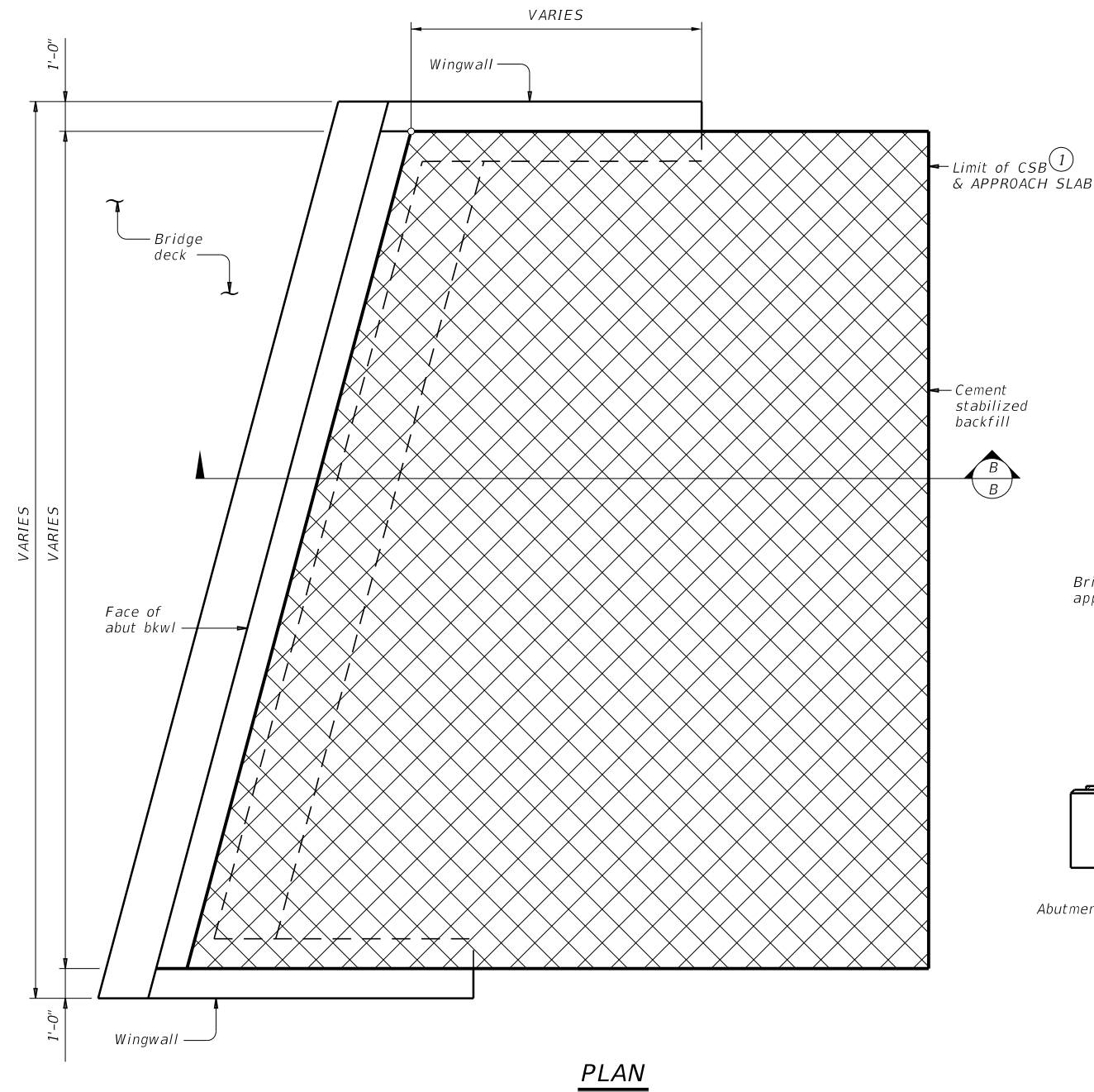


FM 707
BORING LOGS

SHEET 2 OF 2				
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DW:	AM	CC	ABL	JONES 93

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- ① Usual limit of Cement Stabilized Backfill is at end of wingwall. However, extend limits to the end of the Approach Slab.
- ② Bench backfill as shown with 12" (approximate) bench depths.
- ③ Other materials can be used as a bond breaker if permitted by the Engineer. 2 layers of 30 Lb roofing felt or 2 layers of heavy mil polyethylene sheeting are examples.

GENERAL NOTES:
 Provide Cement Stabilized Backfill meeting the requirements of Item 400, "Excavation and Backfill for Structures", to the limits shown at bridge abutments.
 Details are drawn showing left forward skew. See Bridge Layout for actual skew direction. These details do not apply when MSE or Concrete Block retaining walls are used in lieu of wingwalls.

MODIFICATION
 Modifications are extending cement stabilized abutment backfill to the end of the Approach Slab, Note 1, and addition of Note 3.

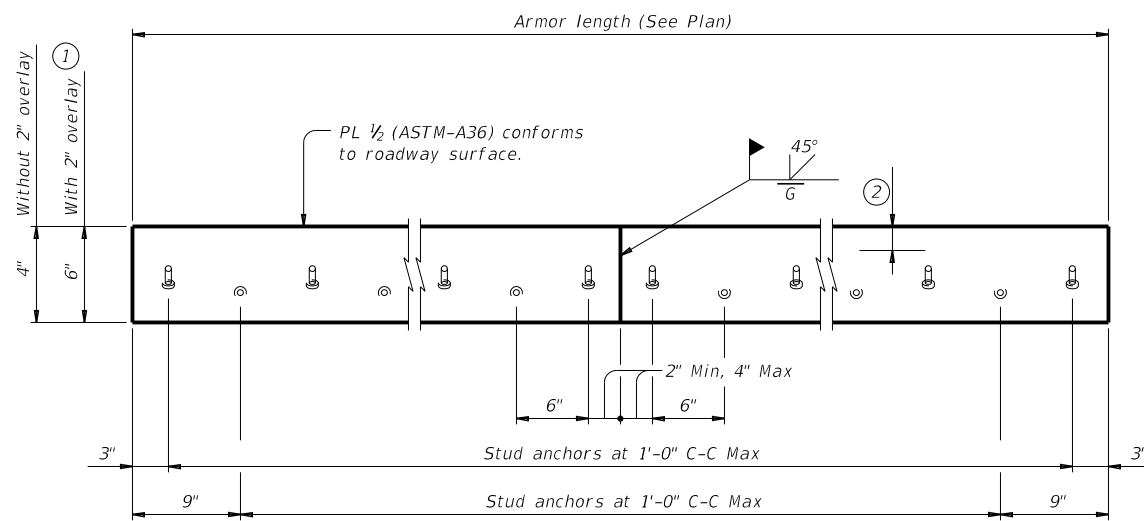
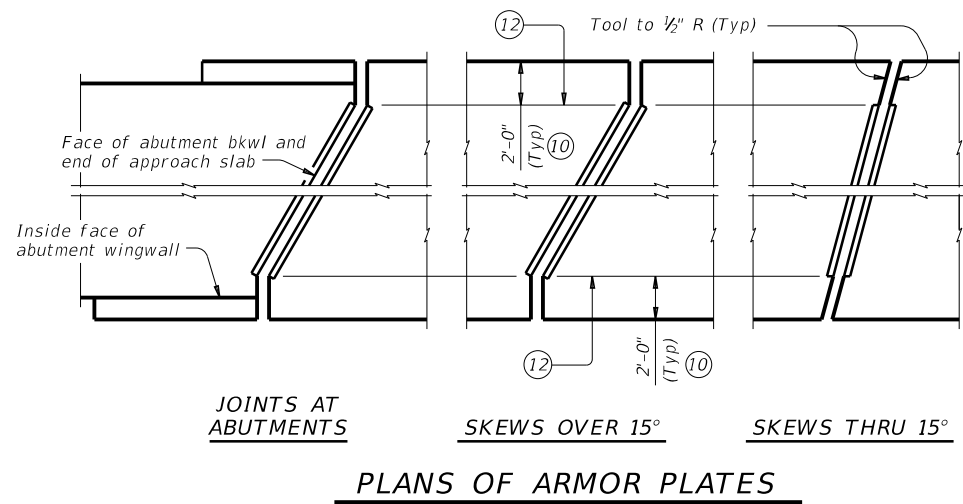
SHEET 1 OF 1



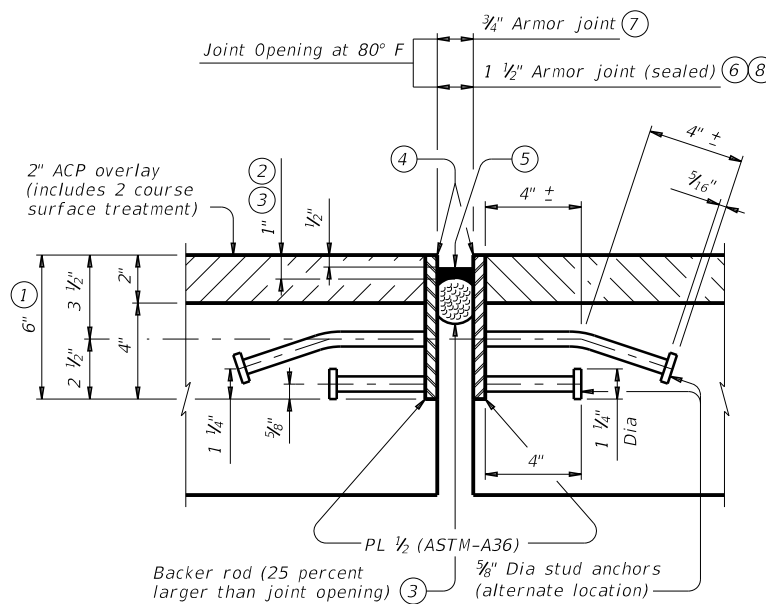
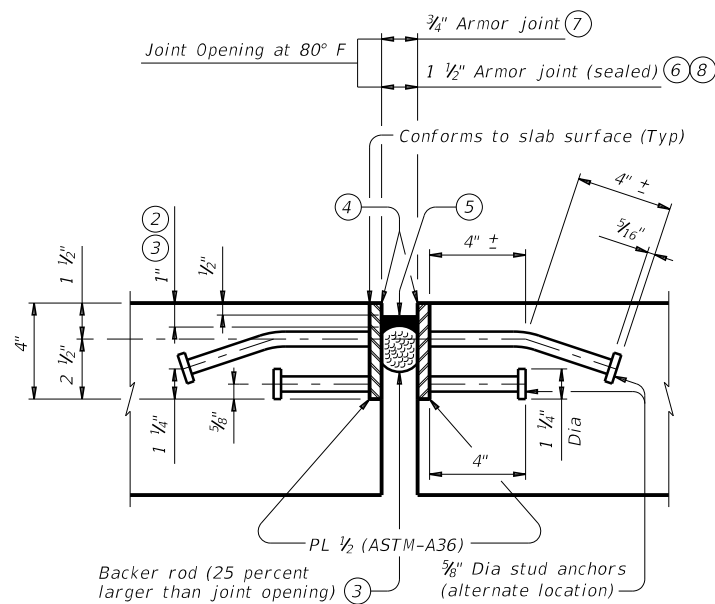
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CEMENT STABILIZED ABUTMENT BACKFILL BRIDGE ABUTMENT			
CSAB (MOD)			
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©TxDOT	April 2019	CON: 0484	SECT: 01
REVISIONS		JOB: 025	HIGHWAY: FM 707
02-20: Added Option 2.	DIST: ABL	COUNTY: JONES	SHEET NO: 94

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- ① Adjust 6" plate height for overlay thicknesses other than the 2" shown. Adjust weight by 1.70 plf for each 1/2" variation in thickness.
- ② Do not paint top 1/2" of plate if using sealed armor joint.
- ③ Set top of backer rod 1" below top of armor plate. Backer rod must be compatible with joint sealant. Use of multiple pieces to create a backer rod cross section is not permitted. Top of backer rod must be convex as shown.
- ④ Blast clean entire contact area between sealant and plate (SSPC-SP10) before installing sealant. Light brush blast and thoroughly clean all dust and debris from concrete surfaces in contact with joint sealant before application of silicone seal.
- ⑤ Use Class 7 joint sealant that conforms to DMS-6310.
- ⑥ Place sealant while ambient temperature is between 55°F and 80°F and is rising.
- ⑦ Armor joint does not include joint sealant or backer rod.
- ⑧ Armor joint (sealed) includes Class 7 joint sealant and backer rod.
- ⑨ Form vertical leg of seal as per the Manufacturer's recommendations. Use Class 4 joint sealant if Class 7 cannot be installed correctly. Install according to Manufacturer's recommendations.
- ⑩ Unless shown otherwise, terminate armor plate at slab break point if break is more than 2'-0" from slab edge.
- ⑪ See "Plans of Armor Plates".
- ⑫ At Fabricator's option, armor plate may extend up to 6" beyond this point for skews through 15°.
- ⑬ Align shipping angle perpendicular to joint.



FABRICATION NOTES:

Match mark corresponding plate sections and secure together for shipment with shipping angle. Do not use erection bolts. Ship armor joints in convenient lengths of 10'-0" Min and 24'-0" Max unless necessary for stage construction or widenings. One shop splice is permitted in each shipping length provided no piece is less than 2'-0" long and sufficient studs are added to limit the stud to shop splice distance to 2" Min and 4" Max. Weld studs in accordance with AWS D1.1. Use groove welds for all shop and field butt splices. Grind smooth areas in contact with seal. Make all necessary field splice joint preparations in the shop. Paint the entire steel section, except as stated in Note 2, with System II or IV primer in accordance with Item 446 "Field Cleaning and Painting Steel." Provide paints in accordance with Item 446.2. Prepare steel and apply paint in accordance with Items 446.4.7.3 and 446.4.7.4. Shop drawings for the fabrication of armor joints will not require the Engineer's approval if fabrication is in accordance with the details shown on this standard.

CONSTRUCTION NOTES:

Secure armor joints in position and place to proper grade and alignment by welding braces to adjacent reinforcing steel, to prestressed beam stirrups, or to anchors cast in concrete diaphragms. Include cost of temporary bracing in the price bid for Armor Joint. Remove shipping angle immediately after each joint half is secured in place. Grind smooth, and touch up with organic zinc-rich paint.

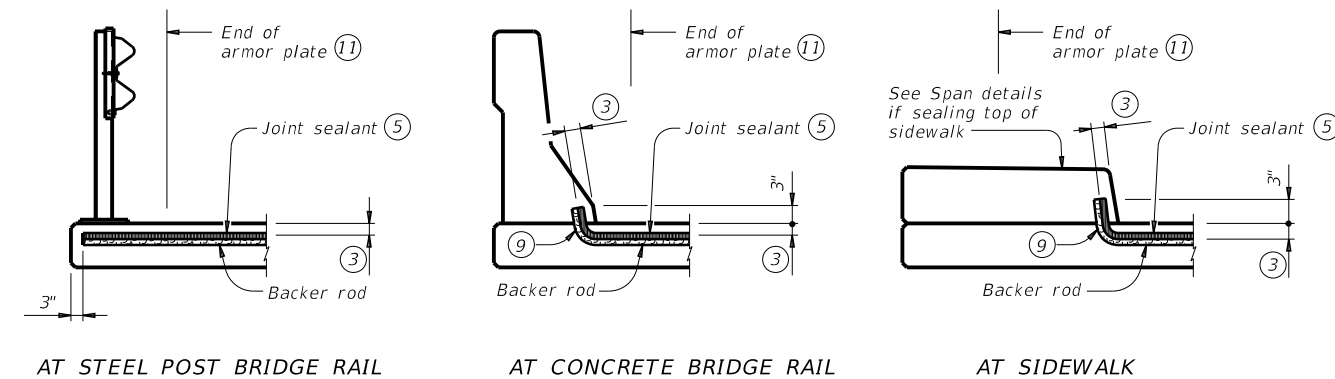
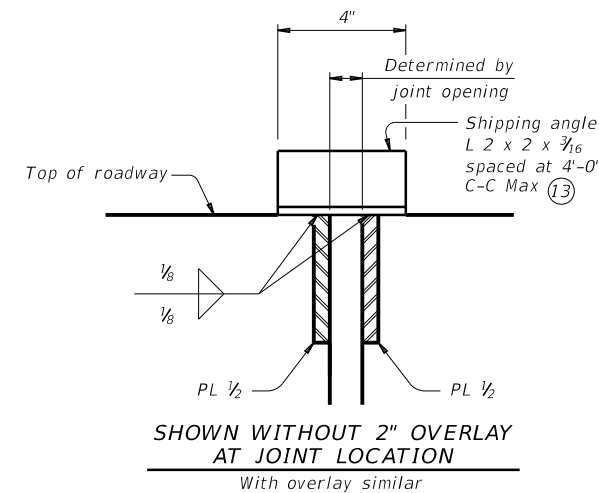
GENERAL NOTES:

Provide armor joints at locations shown on the plans. Provide the seal when "Armor Joint (Sealed)" is noted on the plans. These joint details accommodate a joint movement range of 1 3/8" (3/4" opening movement and 5/8" closure movement). Payment for armor joint, with or without seal, is based on length of armor plate.

WEIGHTS FOR ONE ARMOR JOINT (2 PLATES)	
WITHOUT OVERLAY	16.10 plf
WITH 2" OVERLAY ①	22.90 plf

SHOWN WITHOUT 2" OVERLAY AT JOINT LOCATION

SHOWN WITH 2" OVERLAY AT JOINT LOCATION ①



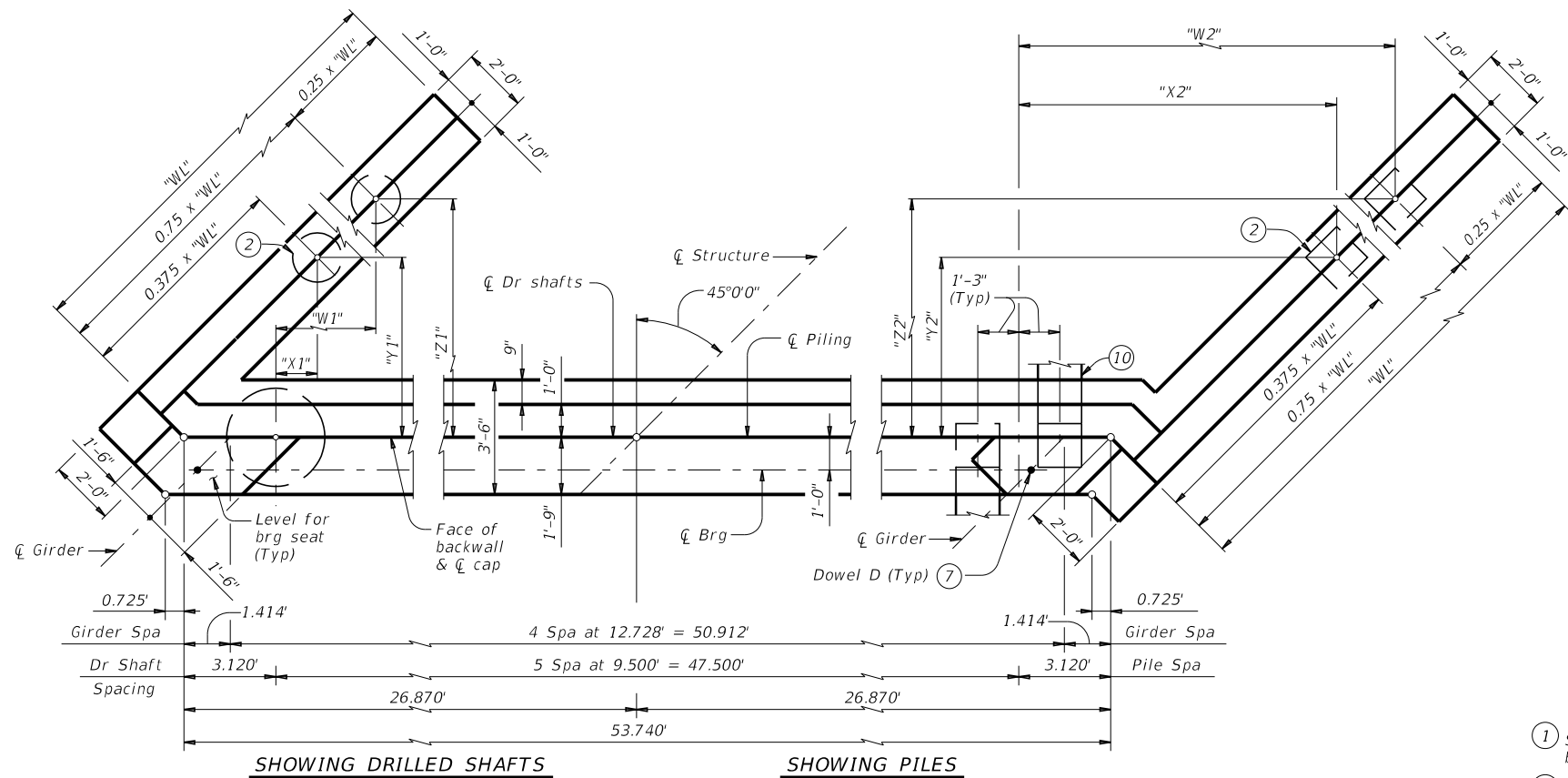
An alternate method of securing joint sections may be used if approved by the Bridge Division. Erection bolts are not allowed.

				Bridge Division Standard	
<h2>ARMOR JOINT DETAILS</h2>					
AJ					
FILE: ajstd01-19.dgn	DN: TxDOT	CK: TxDOT	OW: TxDOT	CK: TxDOT	
©TxDOT	April 2019	CONT	SECT	JOB	HIGHWAY
	REVISIONS	0484	01	025	FM 707
		DIST	COUNTY		SHEET NO.
		ABL	JONES		95

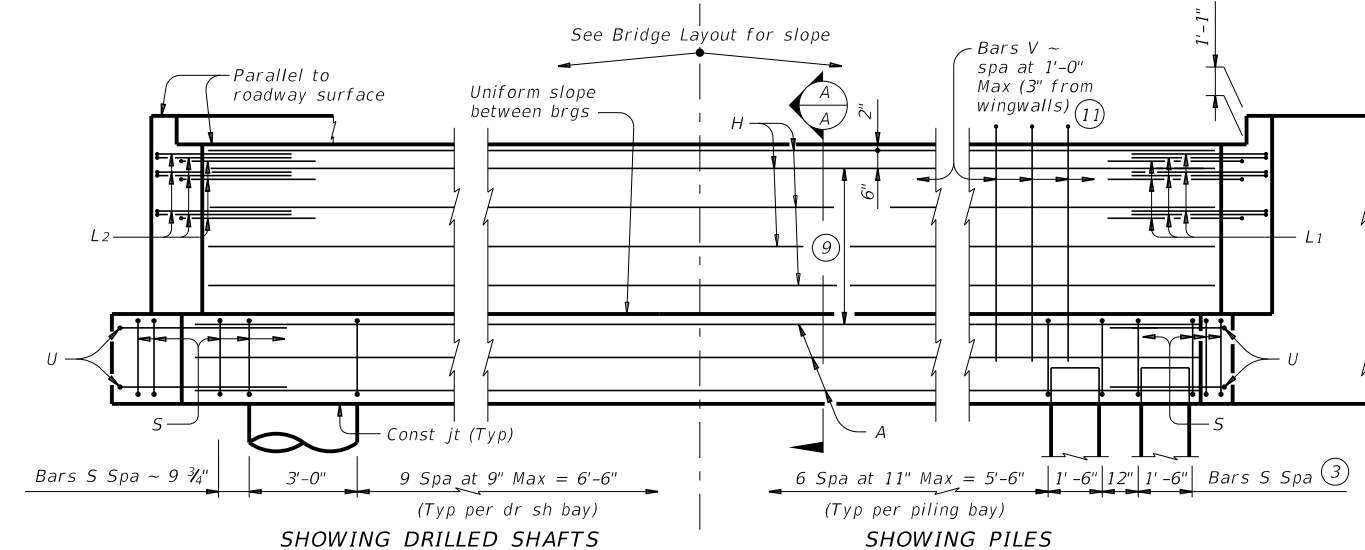
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PLAN 1

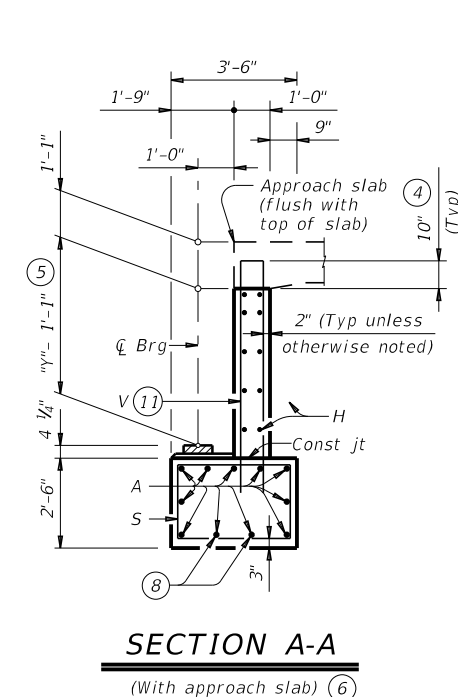


ELEVATION

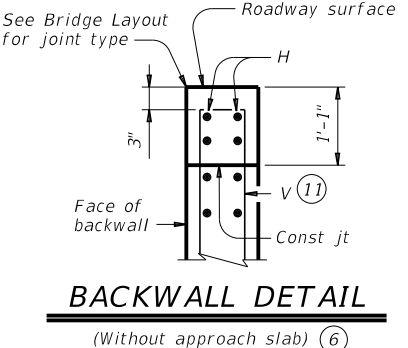
Header Slope	Girder Type	Wingwall Type	Wingwall Lgth "WL"	"W1"	"X1"	"Y1"	"Z1"	"W2"	"X2"	"Y2"	"Z2"				
2:1	Tx28	Founded	13.000'	3.067'	Not Applicable		7.601'	10.721'	Not Applicable		6.187'				
	Tx34		14.000'	3.598'			8.132'	11.252'			6.718'				
	Tx40		16.000'	4.658'			9.192'	12.312'			7.778'				
	Tx46		17.000'	5.189'			9.723'	12.843'			8.309'				
	Tx54		19.000'	6.249'		10.783'	13.903'			9.369'					
3:1	Tx28	Founded	18.000'	5.719'	Not Applicable		10.253'	13.373'	Not Applicable		8.839'				
	Tx34		20.000'	6.779'			11.314'	14.434'			9.899'				
	Tx40		22.000'	7.840'			12.374'	15.494'			10.960'				
	Tx46		25.000'	9.431'			2.802'	7.336'			13.965'	17.085'	10.456'	5.922'	12.551'
	Tx54		27.000'	10.492'			3.332'	7.867'			15.026'	18.146'	10.987'	6.452'	13.612'

Span Length	All Girder Types	
	Tons/Shaft	Tons/Pile
40	46	46
45	49	47
50	51	49
55	54	50
60	57	52
65	60	53
70	62	54
75	65	56
80	67	57
85	70	58
90	73	60
95	75	61
100	78	62
105	80	64
110	83	65
115	85	66
120	88	68

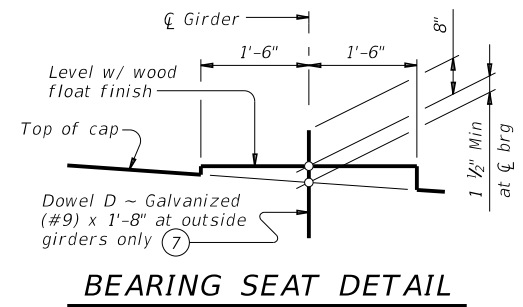
- 1 See Table A for variable dimensions based on header slope and girder type.
- 2 See Table A to determine if wingwall foundations are required.
- 3 For piling larger than 16" adjust Bars S spacing as required to avoid piling.
- 4 Increase as required to maintain 3" from finished grade.
- 5 See Span details for "Y" value.
- 6 See Bridge Layout to determine if approach slab is present.
- 7 Omit Dowels D at end of multi-span unit. Adjust reinforcing steel total accordingly.
- 8 With pile foundations, move Bars A shown to clear piles.
- 9 Spacing based on girder type:
 Tx28 ~ 3 spaces at 1'-0" Max
 Tx34 ~ 3 spaces at 1'-0" Max
 Tx40 ~ 4 spaces at 1'-0" Max
 Tx46 ~ 4 spaces at 1'-0" Max
 Tx54 ~ 5 spaces at 1'-0" Max
- 10 See Detail A on FD standard.
- 11 Field bend as needed to clear piles.



SECTION A-A



BACKWALL DETAIL



BEARING SEAT DETAIL

GENERAL NOTES:
 Designed according to AASHTO LRFD Bridge Design Specifications.
 See Bridge Layout for header slope and foundation type, size and length.
 See Common Foundation Details (FD) standard sheet for all foundation details and notes.
 See Concrete Riprap (CRR) standard sheet or Stone Riprap (SRR) standard sheet for riprap attachment details, if applicable.
 See applicable rail details for rail anchorage in wingwalls.
 Details are drawn showing right forward skew. See Bridge Layout for actual skew direction.
 These abutment details may be used with standard SIG-40-45 only.

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

MATERIAL NOTES:
 Provide Class C concrete (f'c = 3,600 psi).
 Provide Class C (HPC) concrete if shown elsewhere in the plans.
 Provide Grade 60 reinforcing steel.
 Galvanize dowel bars D.

HL93 LOADING SHEET 1 OF 3

Texas Department of Transportation Bridge Division Standard

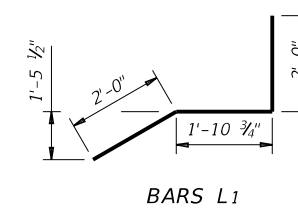
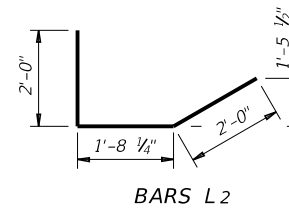
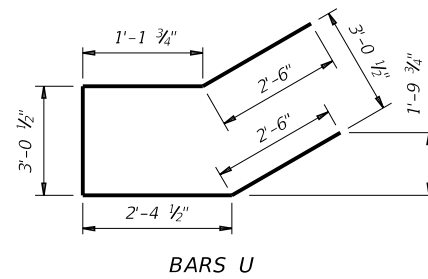
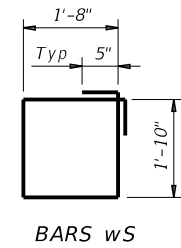
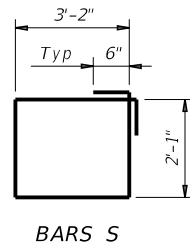
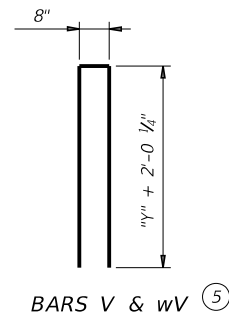
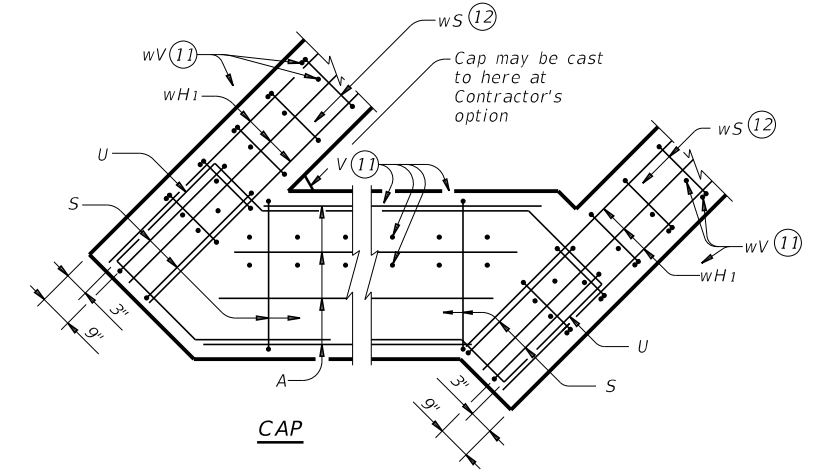
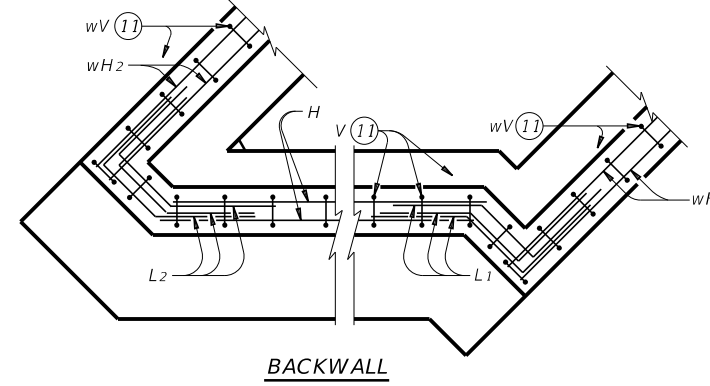
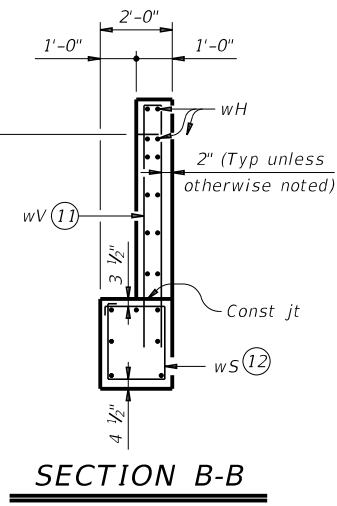
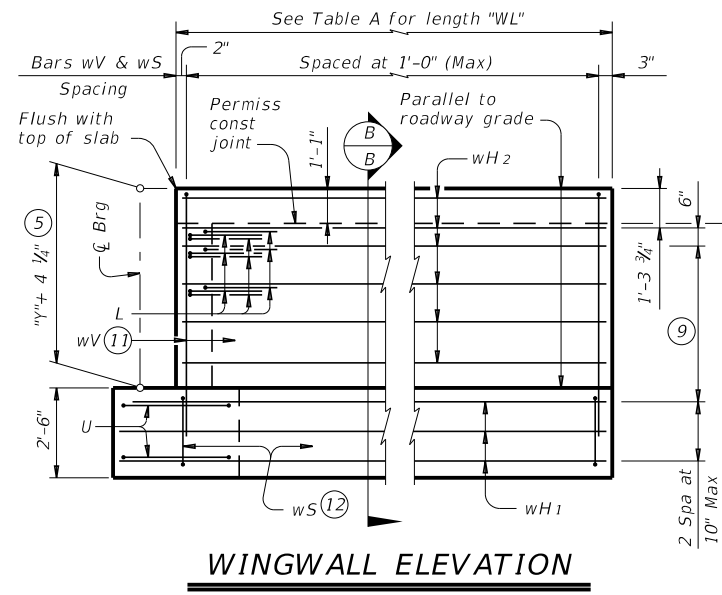
ABUTMENTS
 TYPE TX28 THRU TX54
 PRESTR CONC I-GIRDERS
 40' ROADWAY 45° SKEW

AIG-40-45

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©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0484	01	025	FM 707
	DIST	COUNTY	SHEET NO.	
	ABL	JONES	96	

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⑤ See Span details for "y" value.

⑨ Spacing based on girder type:
 Tx28 ~ 3 spaces at 1'-0" Max
 Tx34 ~ 3 spaces at 1'-0" Max
 Tx40 ~ 4 spaces at 1'-0" Max
 Tx46 ~ 4 spaces at 1'-0" Max
 Tx54 ~ 5 spaces at 1'-0" Max

⑪ Field bend as needed to clear piles.

⑫ Adjust as required to avoid piling.

HL93 LOADING SHEET 2 OF 3

		Bridge Division Standard	
ABUTMENTS TYPE TX28 THRU TX54 PRESTR CONC I-GIRDERS 40' ROADWAY 45° SKEW AIG-40-45			
FILE: aig48sts-17.dgn	DN: TAR	CK: KCM	DW: JTR
©TxDOT August 2017	CONT	SECT	JOB
REVISIONS	0484	01	025
DIST	COUNTY		SHEET NO.
ABL	JONES		97

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TABLES OF ESTIMATED QUANTITIES WITH 2:1 HEADER SLOPE (13)


TYPE Tx28 Girders					TYPE Tx34 Girders					TYPE Tx40 Girders					TYPE Tx46 Girders					TYPE Tx54 Girders									
Bar	No.	Size	Length	Weight	Bar	No.	Size	Length	Weight	Bar	No.	Size	Length	Weight	Bar	No.	Size	Length	Weight	Bar	No.	Size	Length	Weight					
A	11	#11	53'-9"	3,141	A	11	#11	53'-9"	3,141	A	11	#11	53'-9"	3,141	A	11	#11	53'-9"	3,141	A	11	#11	53'-9"	3,141					
D(7)	2	#9	1'-8"	11	D(7)	2	#9	1'-8"	11	D(7)	2	#9	1'-8"	11	D(7)	2	#9	1'-8"	11	D(7)	2	#9	1'-8"	11					
H	8	#6	53'-9"	646	H	8	#6	53'-9"	646	H	10	#6	53'-9"	807	H	10	#6	53'-9"	807	H	12	#6	53'-9"	969					
L1	9	#6	5'-11"	80	L1	9	#6	5'-11"	80	L1	9	#6	5'-11"	80	L1	9	#6	5'-11"	80	L1	9	#6	5'-11"	80					
L2	9	#6	5'-9"	78	L2	9	#6	5'-9"	78	L2	9	#6	5'-9"	78	L2	9	#6	5'-9"	78	L2	9	#6	5'-9"	78					
S	58	#5	11'-6"	696	S	58	#5	11'-6"	696	S	58	#5	11'-6"	696	S	58	#5	11'-6"	696	S	58	#5	11'-6"	696					
U	4	#6	11'-7"	70	U	4	#6	11'-7"	70	U	4	#6	11'-7"	70	U	4	#6	11'-7"	70	U	4	#6	11'-7"	70					
V	57	#5	11'-4"	674	V	57	#5	12'-4"	733	V	57	#5	13'-4"	793	V	57	#5	14'-4"	852	V	57	#5	15'-8"	931					
wH1	14	#6	14'-5"	303	wH1	14	#6	15'-5"	324	wH1	14	#6	17'-5"	366	wH1	14	#6	18'-5"	387	wH1	14	#6	20'-5"	429					
wH2	20	#6	12'-8"	381	wH2	20	#6	13'-8"	411	wH2	24	#6	15'-8"	565	wH2	24	#6	16'-8"	601	wH2	28	#6	18'-8"	785					
wS	28	#4	7'-10"	147	wS	30	#4	7'-10"	157	wS	34	#4	7'-10"	178	wS	36	#4	7'-10"	188	wS	40	#4	7'-10"	209					
wV	28	#5	11'-4"	331	wV	30	#5	12'-4"	386	wV	34	#5	13'-4"	473	wV	36	#5	14'-4"	538	wV	40	#5	15'-8"	654					
Reinforcing Steel				Lb	6,558	Reinforcing Steel				Lb	6,733	Reinforcing Steel				Lb	7,258	Reinforcing Steel				Lb	7,449	Reinforcing Steel				Lb	8,053
Class "C" Concrete				CY	31.8	Class "C" Concrete				CY	34.0	Class "C" Concrete				CY	37.0	Class "C" Concrete				CY	39.3	Class "C" Concrete				CY	43.1

TABLES OF ESTIMATED QUANTITIES WITH 3:1 HEADER SLOPE (13)

TYPE Tx28 Girders					TYPE Tx34 Girders					TYPE Tx40 Girders					TYPE Tx46 Girders					TYPE Tx54 Girders									
Bar	No.	Size	Length	Weight	Bar	No.	Size	Length	Weight	Bar	No.	Size	Length	Weight	Bar	No.	Size	Length	Weight	Bar	No.	Size	Length	Weight					
A	11	#11	53'-9"	3,141	A	11	#11	53'-9"	3,141	A	11	#11	53'-9"	3,141	A	11	#11	53'-9"	3,141	A	11	#11	53'-9"	3,141					
D(7)	2	#9	1'-8"	11	D(7)	2	#9	1'-8"	11	D(7)	2	#9	1'-8"	11	D(7)	2	#9	1'-8"	11	D(7)	2	#9	1'-8"	11					
H	8	#6	53'-9"	646	H	8	#6	53'-9"	646	H	10	#6	53'-9"	807	H	10	#6	53'-9"	807	H	12	#6	53'-9"	969					
L1	9	#6	5'-11"	80	L1	9	#6	5'-11"	80	L1	9	#6	5'-11"	80	L1	9	#6	5'-11"	80	L1	9	#6	5'-11"	80					
L2	9	#6	5'-9"	78	L2	9	#6	5'-9"	78	L2	9	#6	5'-9"	78	L2	9	#6	5'-9"	78	L2	9	#6	5'-9"	78					
S	58	#5	11'-6"	696	S	58	#5	11'-6"	696	S	58	#5	11'-6"	696	S	58	#5	11'-6"	696	S	58	#5	11'-6"	696					
U	4	#6	11'-7"	70	U	4	#6	11'-7"	70	U	4	#6	11'-7"	70	U	4	#6	11'-7"	70	U	4	#6	11'-7"	70					
V	57	#5	11'-4"	674	V	57	#5	12'-4"	733	V	57	#5	13'-4"	793	V	57	#5	14'-4"	852	V	57	#5	15'-8"	931					
wH1	14	#6	19'-5"	408	wH1	14	#6	21'-5"	450	wH1	14	#6	23'-5"	492	wH1	14	#6	26'-5"	555	wH1	14	#6	28'-5"	598					
wH2	20	#6	17'-8"	531	wH2	20	#6	19'-8"	591	wH2	24	#6	21'-8"	781	wH2	24	#6	24'-8"	889	wH2	28	#6	26'-8"	1,121					
wS	38	#4	7'-10"	199	wS	42	#4	7'-10"	220	wS	46	#4	7'-10"	241	wS	52	#4	7'-10"	272	wS	56	#4	7'-10"	293					
wV	38	#5	11'-4"	449	wV	42	#5	12'-4"	540	wV	46	#5	13'-4"	640	wV	52	#5	14'-4"	777	wV	56	#5	15'-8"	915					
Reinforcing Steel				Lb	6,983	Reinforcing Steel				Lb	7,256	Reinforcing Steel				Lb	7,830	Reinforcing Steel				Lb	8,228	Reinforcing Steel				Lb	8,903
Class "C" Concrete				CY	35.0	Class "C" Concrete				CY	38.0	Class "C" Concrete				CY	41.2	Class "C" Concrete				CY	45.3	Class "C" Concrete				CY	49.6

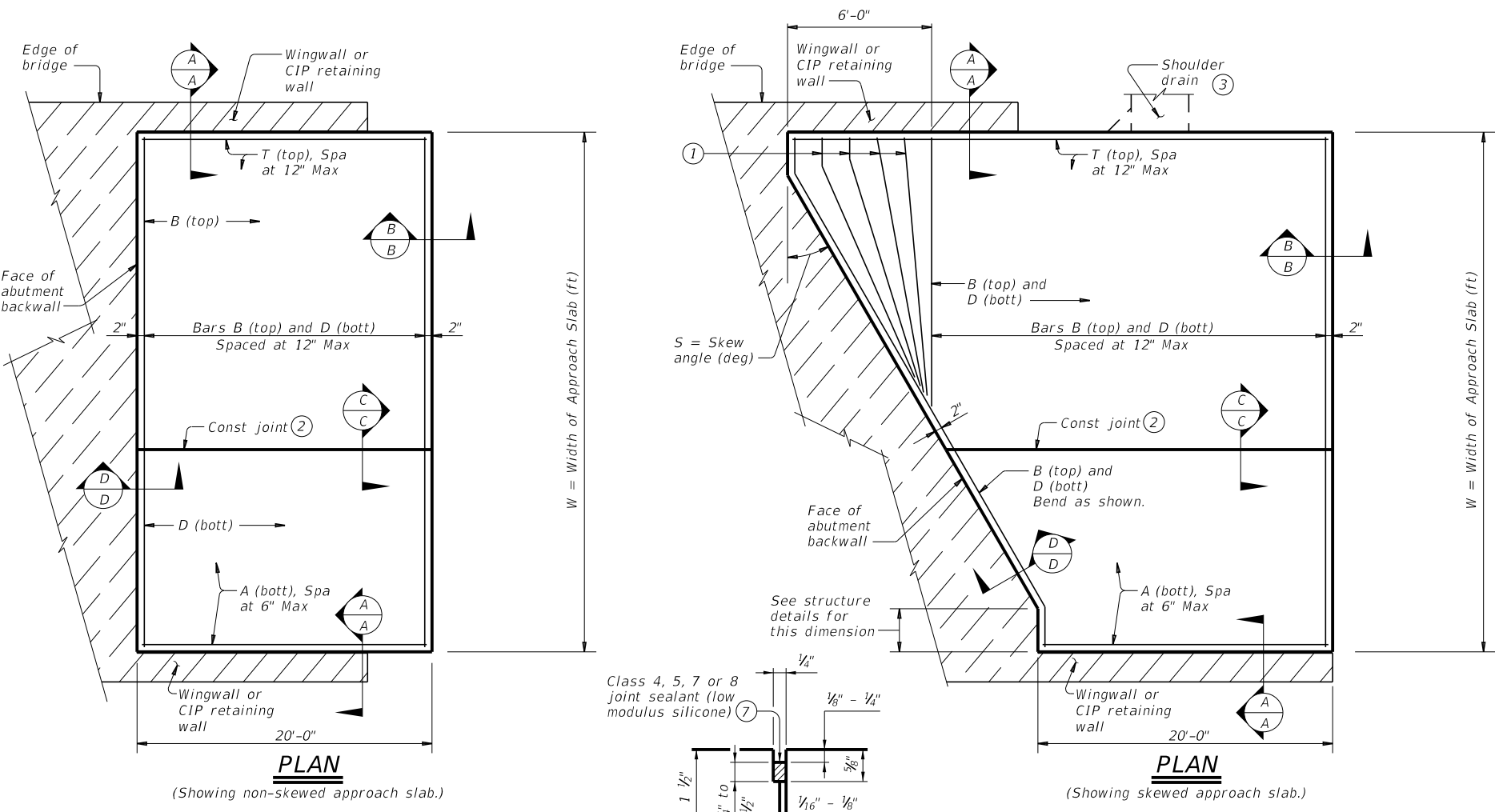
(7) Omit Dowels D at end of multi-span unit. Adjust reinforcing steel total accordingly.

(13) Quantities shown are for one abutment only (with approach slab). With no approach slab, add 2.2 CY Class "C" concrete and 323 lbs reinforcing steel for 4 additional Bars H.

				Bridge Division Standard	
ABUTMENTS TYPE TX28 THRU TX54 PRESTR CONC I-GIRDERS 40' ROADWAY 45° SKEW AIG-40-45					
FILE:	aig48sts-17.dgn	DN:	TAR	CK:	KCM
REV:	August 2017	CON:	SECT	JOB:	HIGHWAY
0484	01	025	FM 707		
DIST:	JONES	COUNTY:	JONES	SHEET NO.:	98

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DATE: 11/1/2021
 FILE: c:\bms\br\edger\former-pw\qaron.tg\inter\dms05103\0369-BR-01-BAS-A-01.dgn
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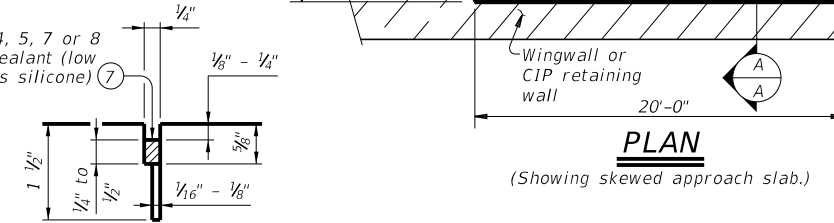


BAR TABLE	
BAR	SIZE
A	#8
B	#5
D	#5
T	#5

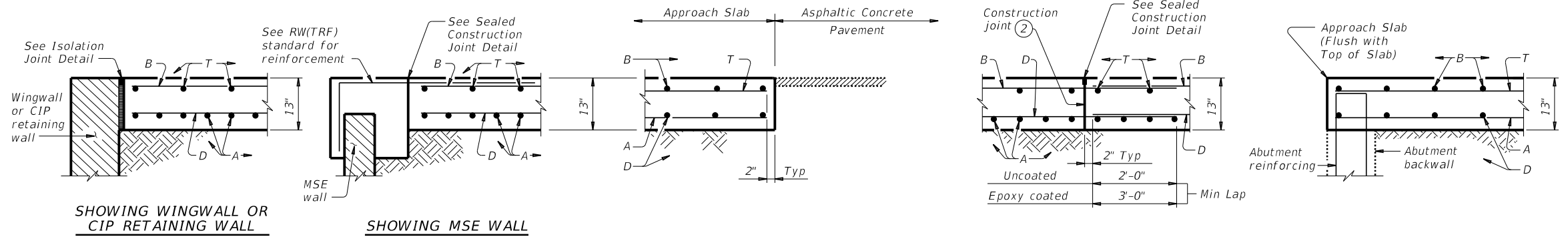
APPROXIMATE QUANTITIES ⁽⁴⁾	
Reinf steel weight = 8.5 Lbs/SF of Approach Slab	
Volume of Appr Slab Conc (CY) = 0.802W + 0.02W ² Tan S	
W = Width of Approach Slab (ft)	
S = Skew Angle (deg)	

- Flare Bars B and D in this region (1'-6" Max Spa, 3" Min Spa). Minimum flared bar length = 2'-6". Bend bars as necessary.
- Provide longitudinal construction joints that align with longitudinal construction joints in the bridge slab with bridges built in stages. Other longitudinal construction joints must receive approval of the Engineer.
- See details elsewhere in plans for shoulder drain location and details.
- For Contractor's information only. Quantities shown are for one approach slab.
- Multiple piece tie bars are acceptable at longitudinal construction joints provided minimum laps shown are achieved.
- See details elsewhere in plans for required cross-slope.
- Place in accordance with Item 438.
- Provide backer rod that is 25% larger than joint opening and compatible with the sealant.
- If bridge rail is present at the wingwall or CIP retaining wall, place 1/2" rebonded recycled tire rubber between concrete railing and top of approach slab as shown when concrete railing projects over the approach slab.

LONGITUDINAL SAW CUT JOINT DETAIL



GENERAL NOTES:
 Construct approach slab in accordance with Item 422.
 Provide Class "S" concrete with a minimum compressive strength of 4,000 psi.
 Provide Grade 60 reinforcing steel.
 Provide longitudinal joints as shown on the Longitudinal Saw Cut Joint Detail at lane lines and shoulders when width between longitudinal construction joints or edges of approach slab exceeds 16 feet. Saw cut joints within 24 hours of concrete placement to a depth of 1 1/2" and seal in accordance with Item 438. Alternately, provide a controlled joint consisting of 1 1/2" vinyl or plastic joint former (Stress Cap, Zip Strip, Stress Lock, or equal as approved by the Engineer.)
 Provide rebonded recycled tire rubber joint filler that meets the requirements of DMS-6310. "Joint Sealants and Fillers."
 Construct the subgrade or subbase away from the bridge for a minimum distance of 100 feet prior to the approach slab, unless otherwise indicated on the plans.
 Compact and finish the subgrade or foundation for the approach slab to the typical cross-section and to the lines and grades shown on the plans.
 Cure for 4 days using water or membrane curing per Item 422.
 All details shown herein are subsidiary to bridge approach slab.
 Cover dimensions are clear dimensions, unless noted otherwise.

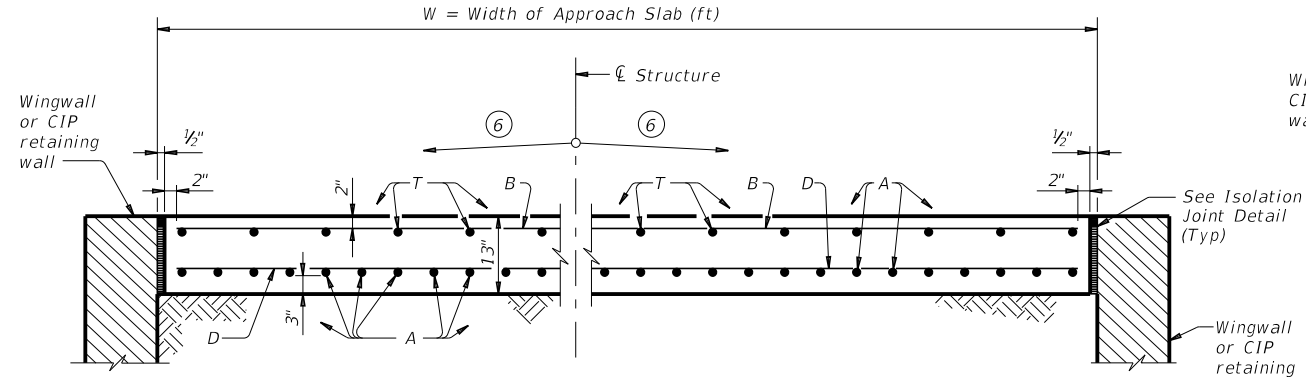


SECTION A-A

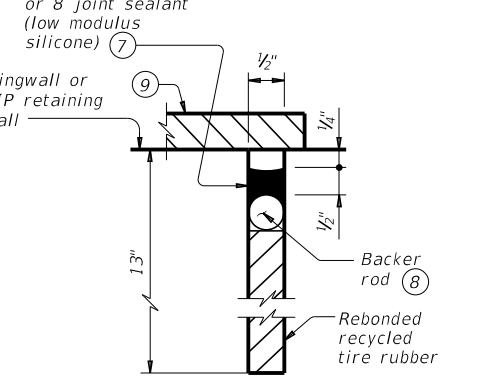
SECTION B-B

SECTION C-C ⁽⁵⁾

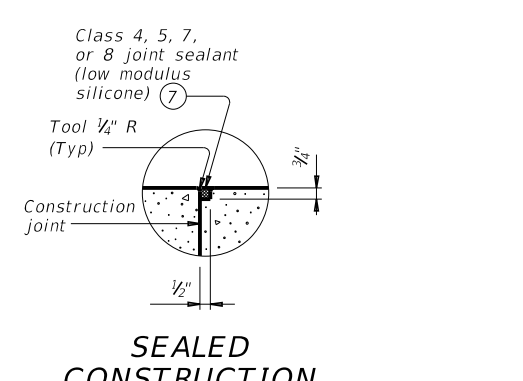
SECTION D-D



TYPICAL TRANSVERSE SECTION



ISOLATION JOINT DETAIL

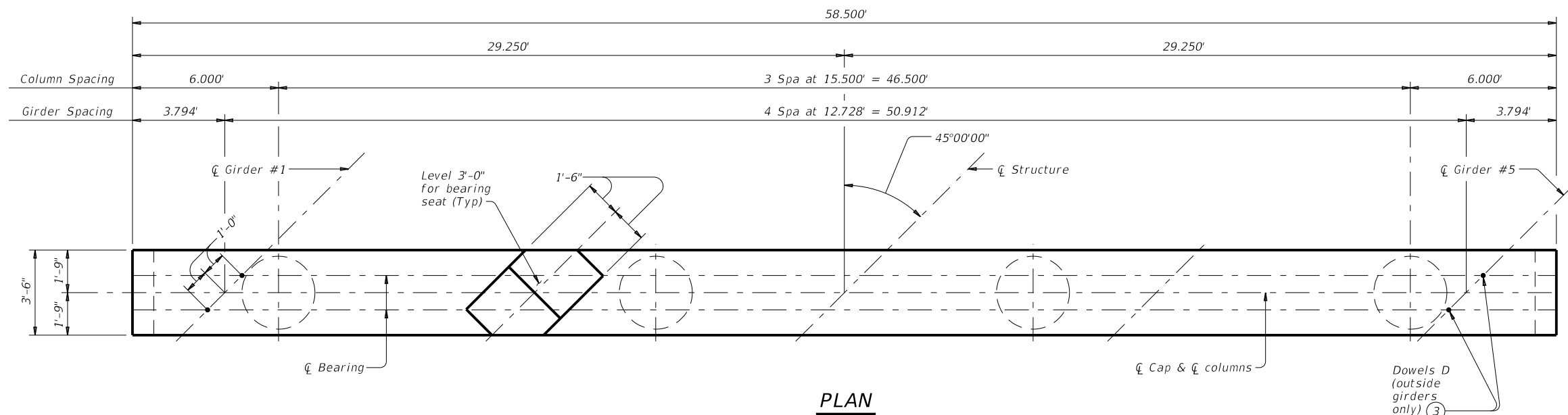


SEALED CONSTRUCTION JOINT DETAIL

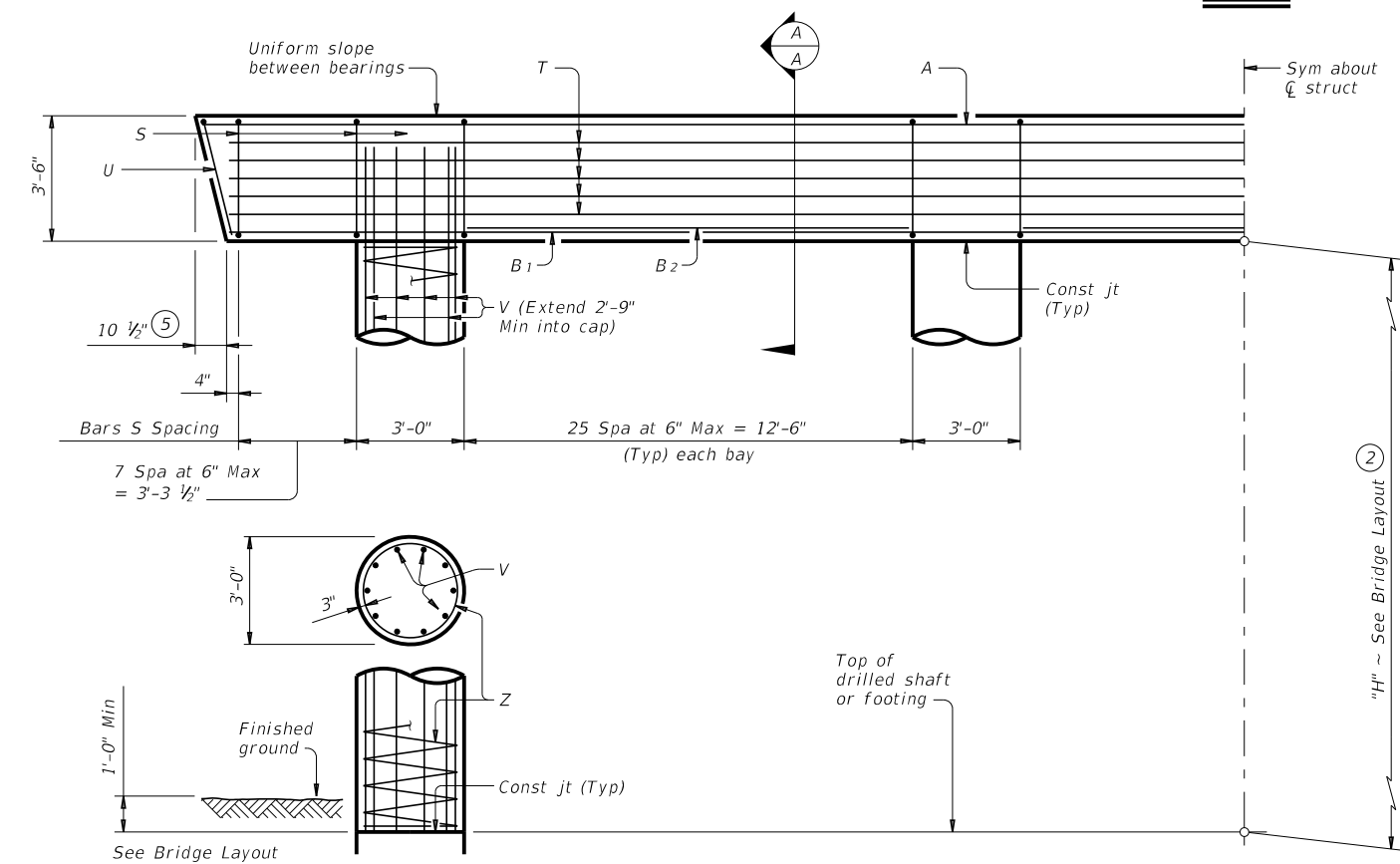
		Bridge Division Standard	
BRIDGE APPROACH SLAB ASPHALTIC CONCRETE PAVEMENT			
BAS-A			
FILE: basaste1-20.dgn	DN: TxDOT	CK: TxDOT	OW: TxDOT
©TxDOT April 2019	CONT	SECT	JOB
REVISIONS	0484	01	025
02-20: Removed stress relieving pad.	DIST	COUNTY	SHEET NO.
ABL	JONES		99

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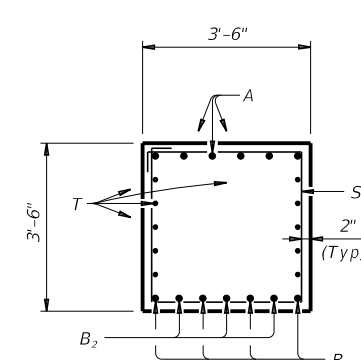
DATE: 11/11/2021 5:09:34 PM
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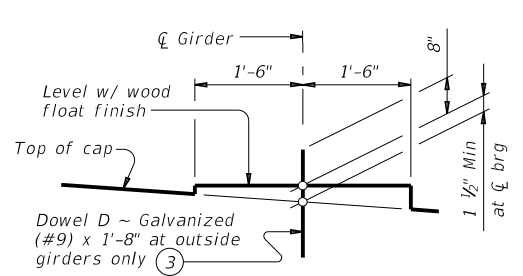
PLAN



HALF ELEVATION



SECTION A-A



BEARING SEAT DETAIL

(Bearing surface must be clean and free of all loose material before placing bearing pad.)

TABLE OF ESTIMATED QUANTITIES ①					
Bar	No.	Size	Length	Weight	
A	6	#11	58'-0"	1,849	
B ₁	4	#11	56'-6"	1,201	
B ₂	9	#11	12'-6"	598	
D ③	4	#9	1'-8"	23	
S	94	#5	13'-8"	1,340	
T	10	#5	56'-6"	589	
U	2	#5	9'-8"	20	
V	40	#9	38'-9"	5,270	
Z	4	#4	1,154'-7"	3,085	
Reinforcing Steel				Lb	13,975
Class "C" Concrete (Cap)				CY	26.4
Class "C" Concrete (Col)				CY	37.7

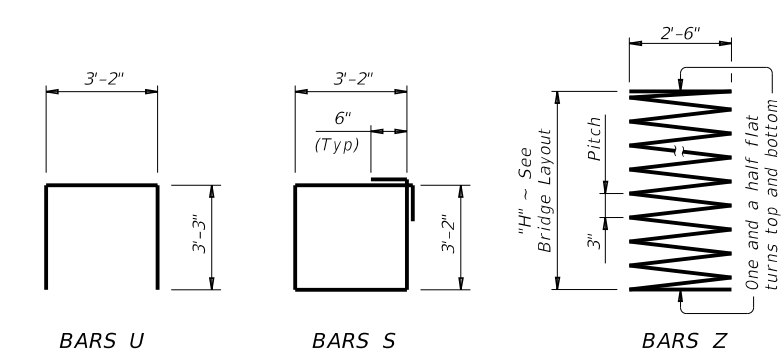
FOUNDATION LOADS ④				
Span Average	Drilled Shaft Loads	Pile Load (Tons/Pile)		
		3 Pile Ftg	4 Pile Ftg	5 Pile Ftg
Ft	Tons/Shaft			
40	110	40	31	25
45	118	43	33	27
50	126	45	35	28
55	134	48	37	30
60	142	51	39	32
65	149	53	40	33
70	157	56	42	35
75	165	58	44	36
80	172	61	46	38
85	180	63	48	39
90	187	66	50	41
95	195	68	52	42
100	203	71	54	44
105	210	73	56	45
110	218	76	58	47
115	225	78	59	48
120	233	81	61	50

GENERAL NOTES:
 Designed according to AASHTO LRFD Bridge Design Specifications.
 See Bridge Layout for foundation type, size and length.
 See Common Foundation Details (FD) standard sheet for all foundation details and notes.
 See Shear Key (IGSK) standard sheet for all shear key details and notes, if applicable.
 Bent selected must be based on the average span length rounded up to the next 5 ft increment.
 Details are drawn showing right forward skew. See Bridge Layout for actual skew direction.
 These bent details may be used with standard SIG-40-45 only.

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

MATERIAL NOTES:
 Provide Class C concrete (f'c = 3,600 psi).
 Provide Class C (HPC) concrete if shown elsewhere in the plans.
 Provide Grade 60 reinforcing steel.
 Galvanize dowel bars D.

HL93 LOADING



- Quantities shown are based on an "H" value of 36'. For each linear foot variation in "H" value, make the following adjustments:
 Bars V length, 1'-0"
 Bars Z length, 31'-5"
 Reinforcing steel, 220 Lb
 Class "C" conc (col), 1.05 CY
- This standard may not be used for "H" heights exceeding 36'. In areas of very soft soil or where scour is anticipated, allowable "H" heights must be evaluated by the Engineer prior to the use of this standard.
- Omit Dowels D at end of multi-span units. Adjust reinforcing steel total accordingly.
- Foundation Loads based on "H" = 36'.
- Measured parallel to top of cap cross-slope.

		Bridge Division Standard	
INTERIOR BENTS TYPE TX28 THRU TX54 PRESTR CONC I-GIRDERS 40' ROADWAY 45° SKEW			
BIG-40-45			
FILE: big48sts-17.dgn	DN: TAR	CK: SDB	DW: JTR
CTxDOT August 2017	CONT SECT	JOB	HIGHWAY
REVISIONS	0484 01	025	FM 707
DIST	COUNTY	SHEET NO.	
ABL	JONES	100	

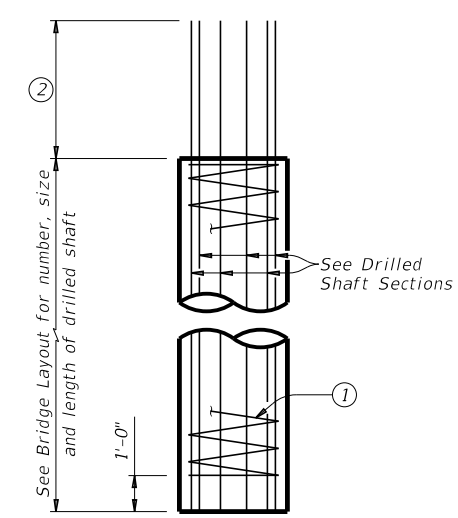
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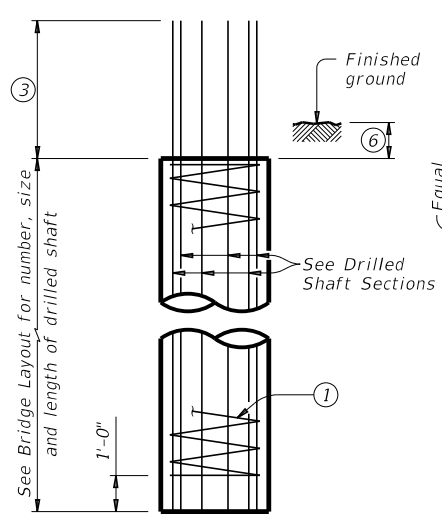
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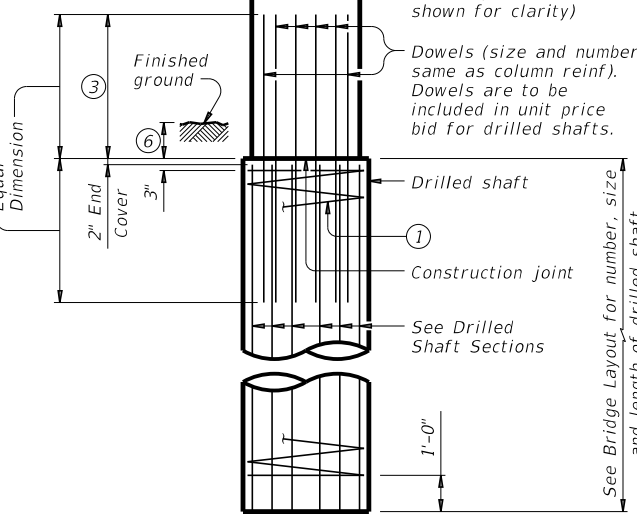
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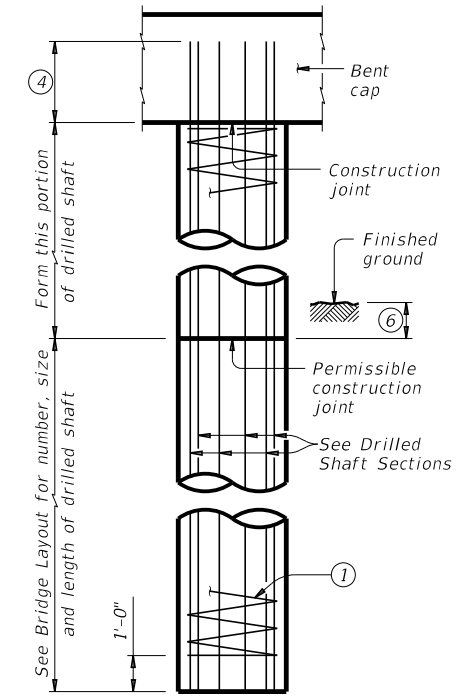
ABUTMENTS, WINGWALLS AND MULTI-DRILLED SHAFT FOOTINGS



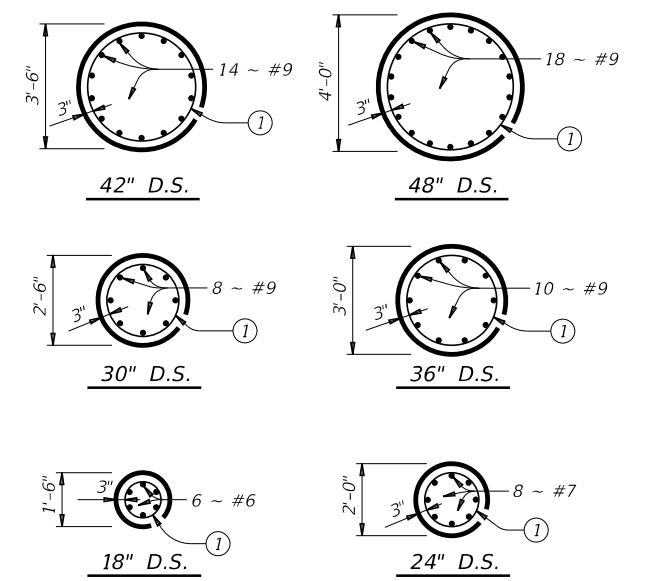
INTERIOR BENTS DRILLED SHAFT DIA EQUAL TO COLUMN DIA



INTERIOR BENTS DRILLED SHAFT DIA GREATER THAN COLUMN DIA



OPTIONAL INTERIOR BENT DRILLED SHAFT DETAIL 5

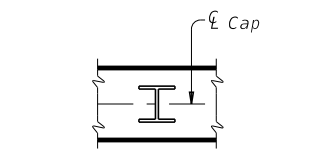


DRILLED SHAFT SECTIONS

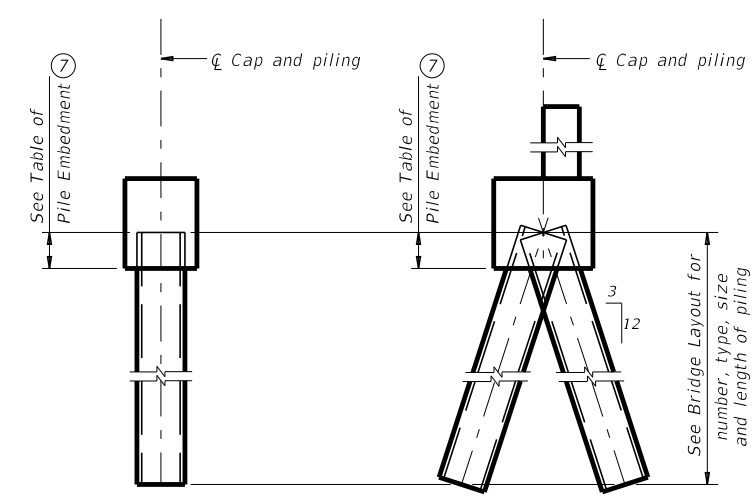
DRILLED SHAFT DETAILS

TABLE OF PILE EMBEDMENT	
Pile Type	Embedment Depth (Ft)
16" Sq Concrete 18" Sq Concrete HP14 Steel HP16 Steel	1'-0"
20" Sq Concrete 24" Sq Concrete HP18 Steel	1'-6"

See Prestressed Concrete Piling (CP) standard for additional details on concrete pile embedment.

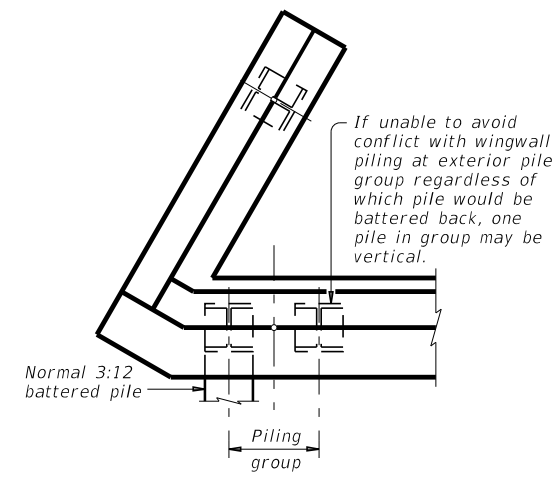


ORIENTATION OF STEEL H-PIILING



VERTICAL PILE BATTERED PILE

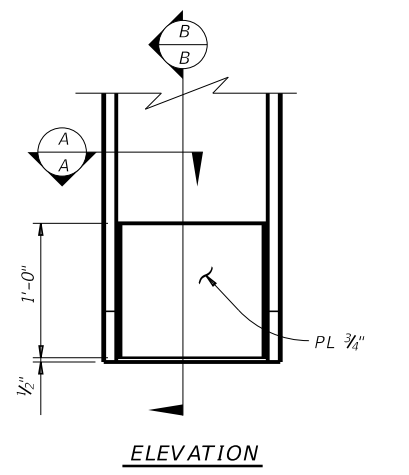
PIILING DETAILS (Concrete or steel H)



DETAIL "A"

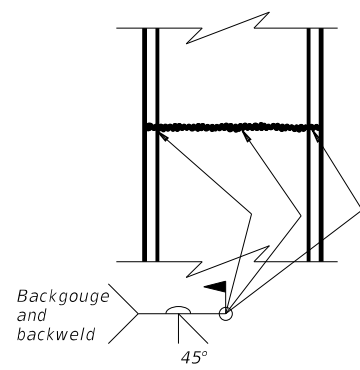
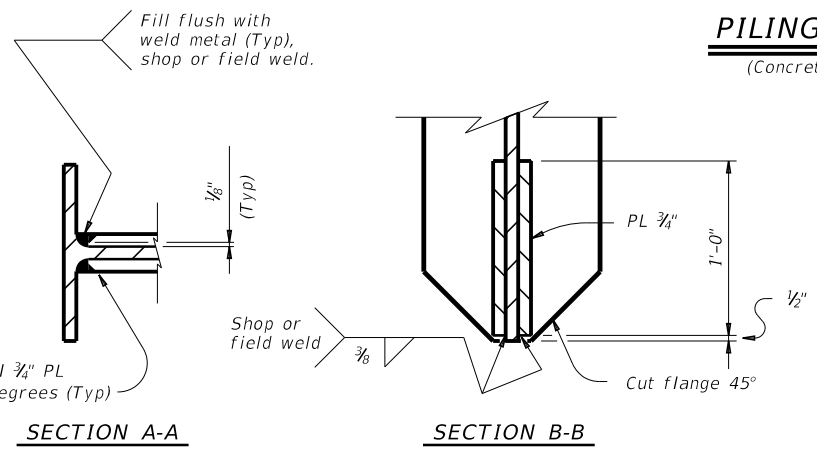
(Showing plan view of a 30° skewed abutment)

- 1 #3 spiral at 6" pitch (one and a half flat turns top and bottom).
- 2 Min extension into supported element:
#6 Bars = 1'-11"
#7 Bars = 2'-0"
#9 Bars = 2'-3"
- 3 Min lap with column reinf:
#7 Bars = 2'-11"
#9 Bars = 3'-9"
#11 Bars = 4'-8"
- 4 Min extension into supported element:
#6 Bars = 1'-11"
#7 Bars = 2'-3"
#9 Bars = 2'-9"
- 5 Drilled shafts may extend to the bottom of bent caps for "H" heights of 6 ft and less (as shown on the Bridge Layout), if approved. This option can only be used when the drilled shaft diameter equals the column diameter. Obtain approval of the forming method above the ground line prior to construction. No adjustments in payment will be made if this option is used.
- 6 1'-0" Min, unless shown otherwise on plans.
- 7 Or as shown on plans.



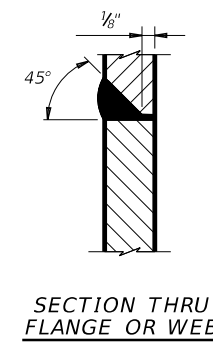
STEEL H-PILE TIP REINFORCEMENT

See Item 407 "Steel Piling" to determine when tip reinforcement is required and for options to the details shown.



STEEL H-PILE SPLICE DETAIL

Use when required.



SHEET 1 OF 2

Texas Department of Transportation Bridge Division Standard

COMMON FOUNDATION DETAILS

FD

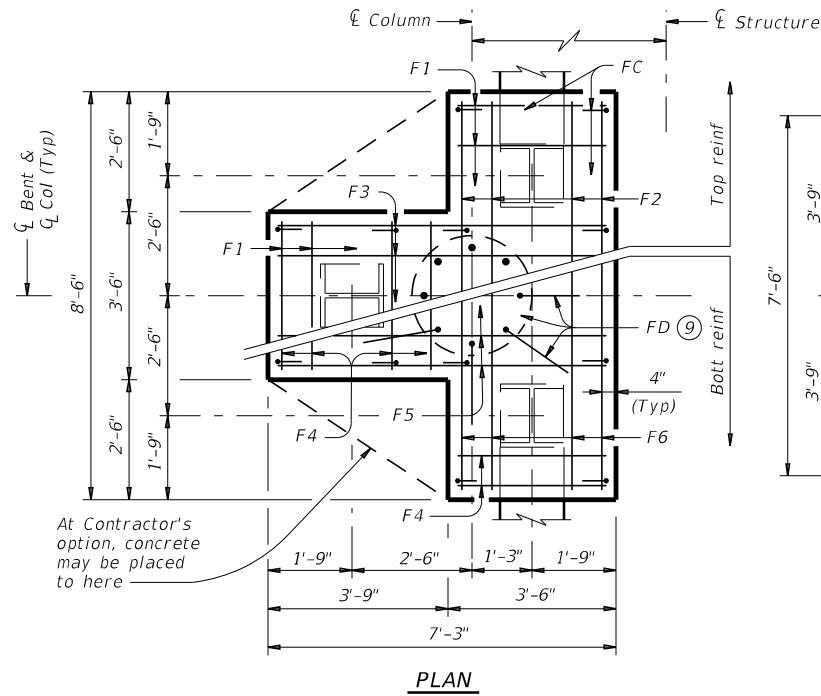
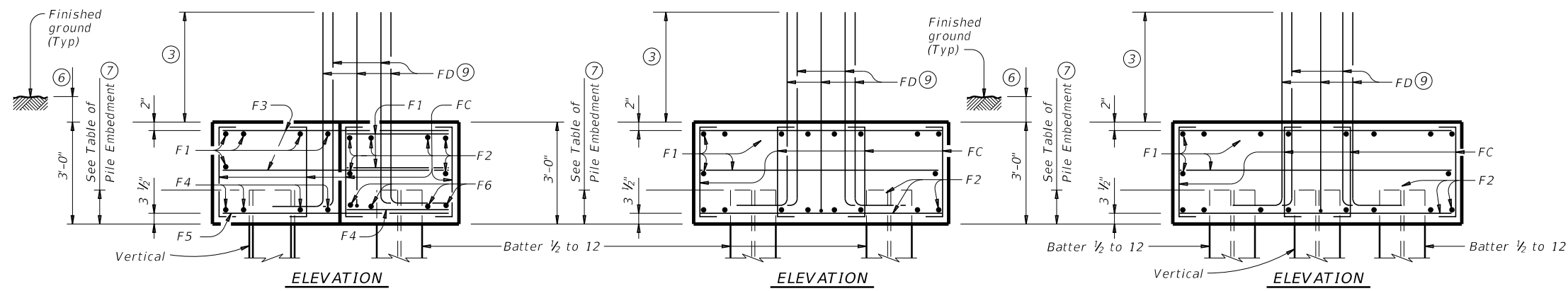
FILE: fdstd01-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0484	01	025	FM 707
01-20: Added #11 bars to the FD bars.	DIST	COUNTY	SHEET NO.	
	ABL	JONES	101	

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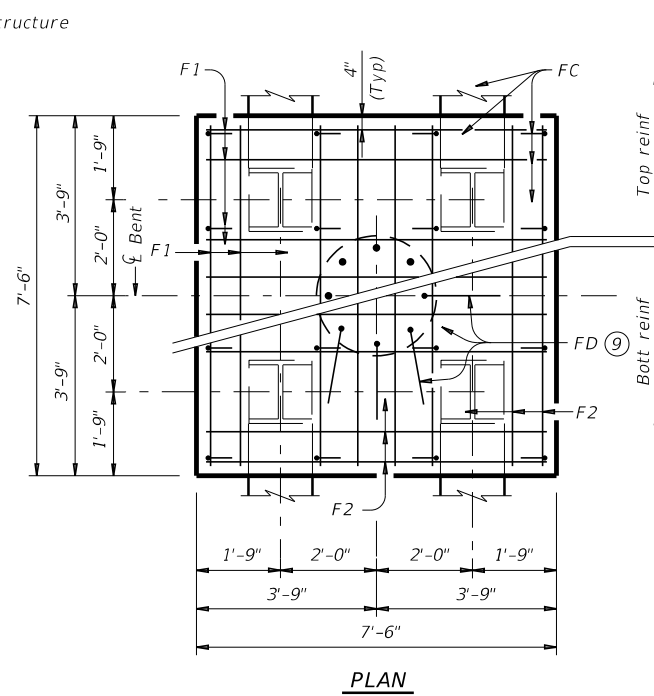
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TABLE OF FOOTING QUANTITIES FOR 30" COLUMNS

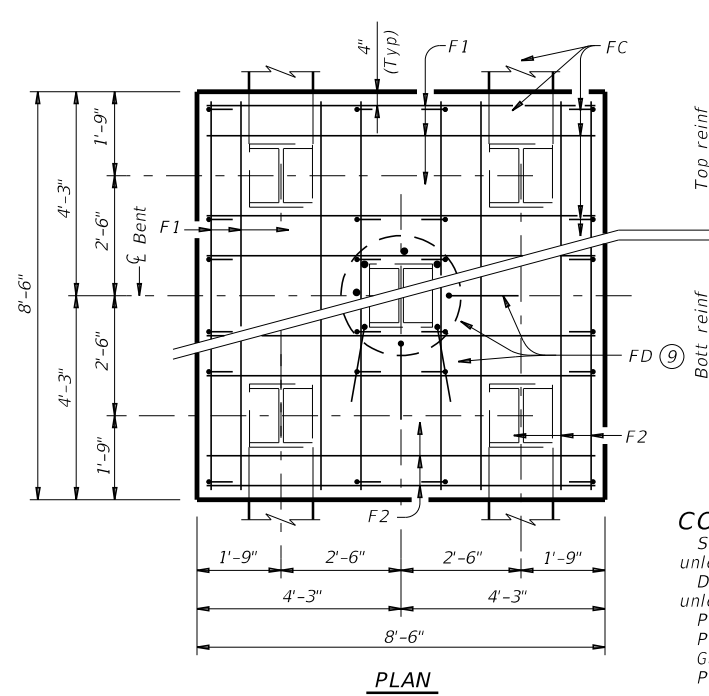
ONE 3 PILE FOOTING					
Bar	No.	Size	Length	Weight	
F1	11	#4	3'- 2"	23	
F2	6	#4	8'- 2"	33	
F3	6	#4	6'- 11"	28	
F4	8	#9	3'- 2"	86	
F5	4	#9	6'- 11"	94	
F6	4	#9	8'- 2"	111	
FC	12	#4	3'- 6"	28	
FD ^⑩	8	#9	8'- 1"	220	
Reinforcing Steel				Lb	623
Class "C" Concrete				CY	4.8
ONE 4 PILE FOOTING					
Bar	No.	Size	Length	Weight	
F1	20	#4	7'- 2"	96	
F2	16	#8	7'- 2"	306	
FC	16	#4	3'- 6"	37	
FD ^⑩	8	#9	8'- 1"	220	
Reinforcing Steel				Lb	659
Class "C" Concrete				CY	6.3
ONE 5 PILE FOOTING					
Bar	No.	Size	Length	Weight	
F1	20	#4	8'- 2"	109	
F2	16	#9	8'- 2"	444	
FC	24	#4	3'- 6"	56	
FD ^⑩	8	#9	8'- 1"	220	
Reinforcing Steel				Lb	829
Class "C" Concrete				CY	8.0



THREE PILE FOOTING^⑧
 For 36" Dia and smaller columns.



FOUR PILE FOOTING^⑧
 For 42" Dia and smaller columns.



FIVE PILE FOOTING^⑧
 For 42" Dia and smaller columns.

CONSTRUCTION NOTES:

- See Bridge Layout for foundation type required. Use these foundation details unless shown otherwise.
- Drive piling under abutment wingwalls to a minimum resistance of 10 Tons/Pile unless shown otherwise.
- Provide Class C Concrete ($f'_c = 3,600$ psi), unless shown otherwise.
- Provide Grade 60 reinforcing steel.
- Galvanize reinforcing if shown elsewhere in the plans.
- Provide bar laps for drilled shaft reinforcing, where required, as follows:
 Uncoated or galvanized (#6) ~ 2'-6"
 Uncoated or galvanized (#7) ~ 2'-11"
 Uncoated or galvanized (#9) ~ 3'-9"

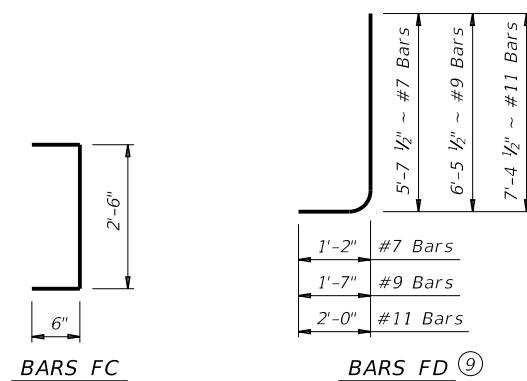
GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

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

DESIGNER NOTES:

- Do not use the drilled shaft details shown on this standard for retaining wall, noise wall, barrier, or sign foundations without structural evaluation.
- Do not use the footings shown on this standard in direct contact with salt water or exposed to salt water spray.
- Maximum allowable pile loads for the footings shown are:
 72 Tons/Pile with 24" Dia Columns
 80 Tons/Pile with 30" Dia Columns
 100 Tons/Pile with 36" Dia Columns
 120 Tons/Pile with 42" Dia Columns



- ③ Min lap with column reinforcing:
 #7 Bars = 2'-11"
 #9 Bars = 3'-9"
 #11 Bars = 4'-8"
- ⑥ 1'-0" Min, unless shown otherwise on plans.
- ⑦ Or as shown on plans.
- ⑧ See Bridge Layout for type, size and length of piling.
- ⑨ Number and size of FD bars must match column reinforcing. Tie FD bars to the top of the bottom reinforcing mat.
- ⑩ Adjust FD quantity, size and weight as needed to match column reinforcing.

SHEET 2 OF 2



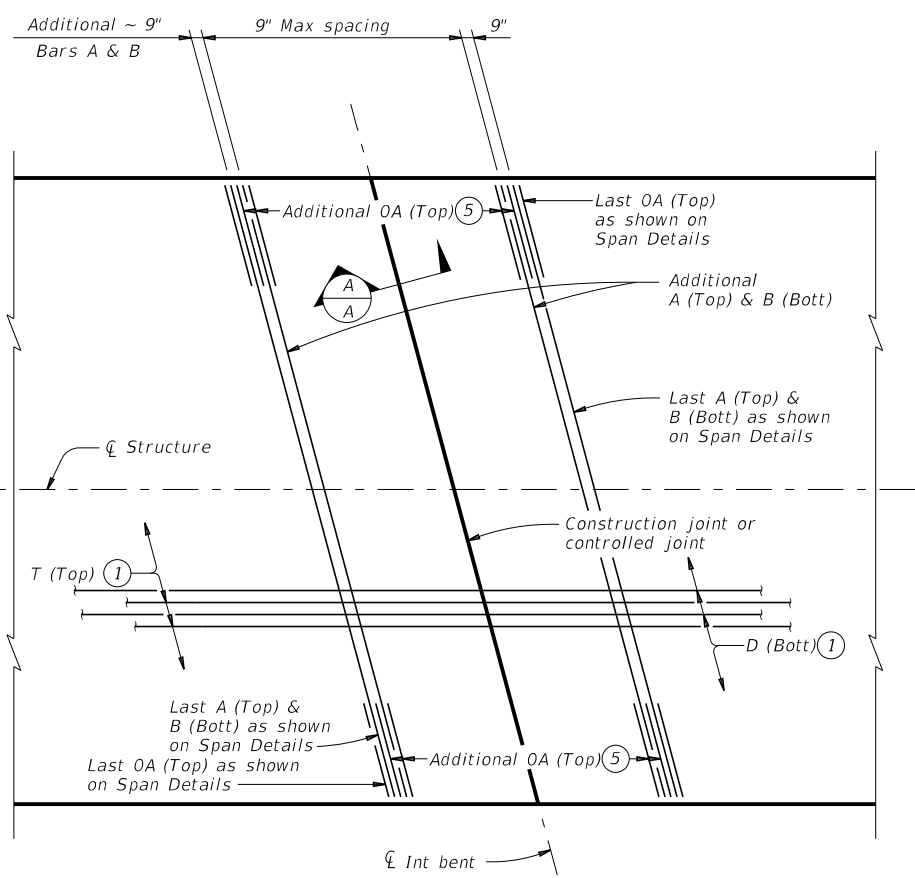
COMMON FOUNDATION DETAILS

FD

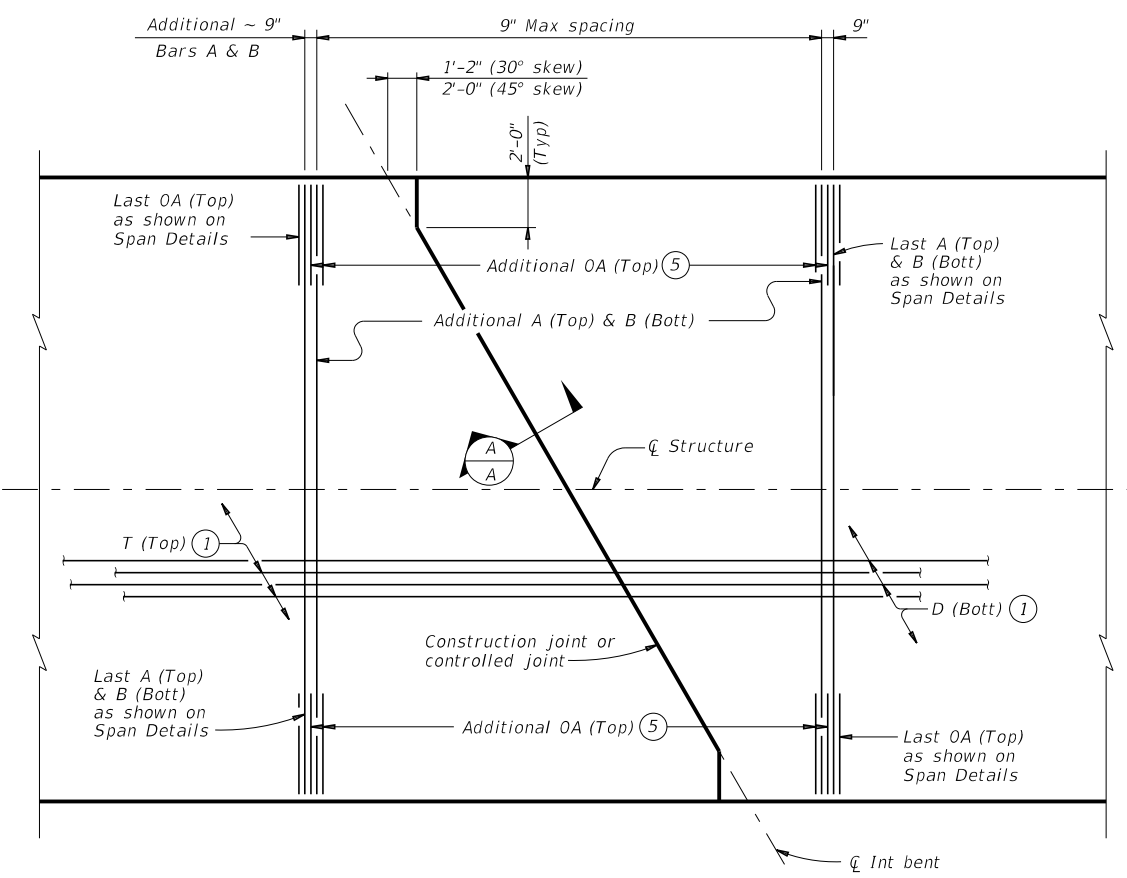
FILE: fdstd01-20.dgn	DN: TxDOT	CK: TxDOT	OW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0484	01	025	FM 707
01-20: Added #11 bars to the FD bars.	DIST	COUNTY	SHEET NO.	
	ABL	JONES	102	

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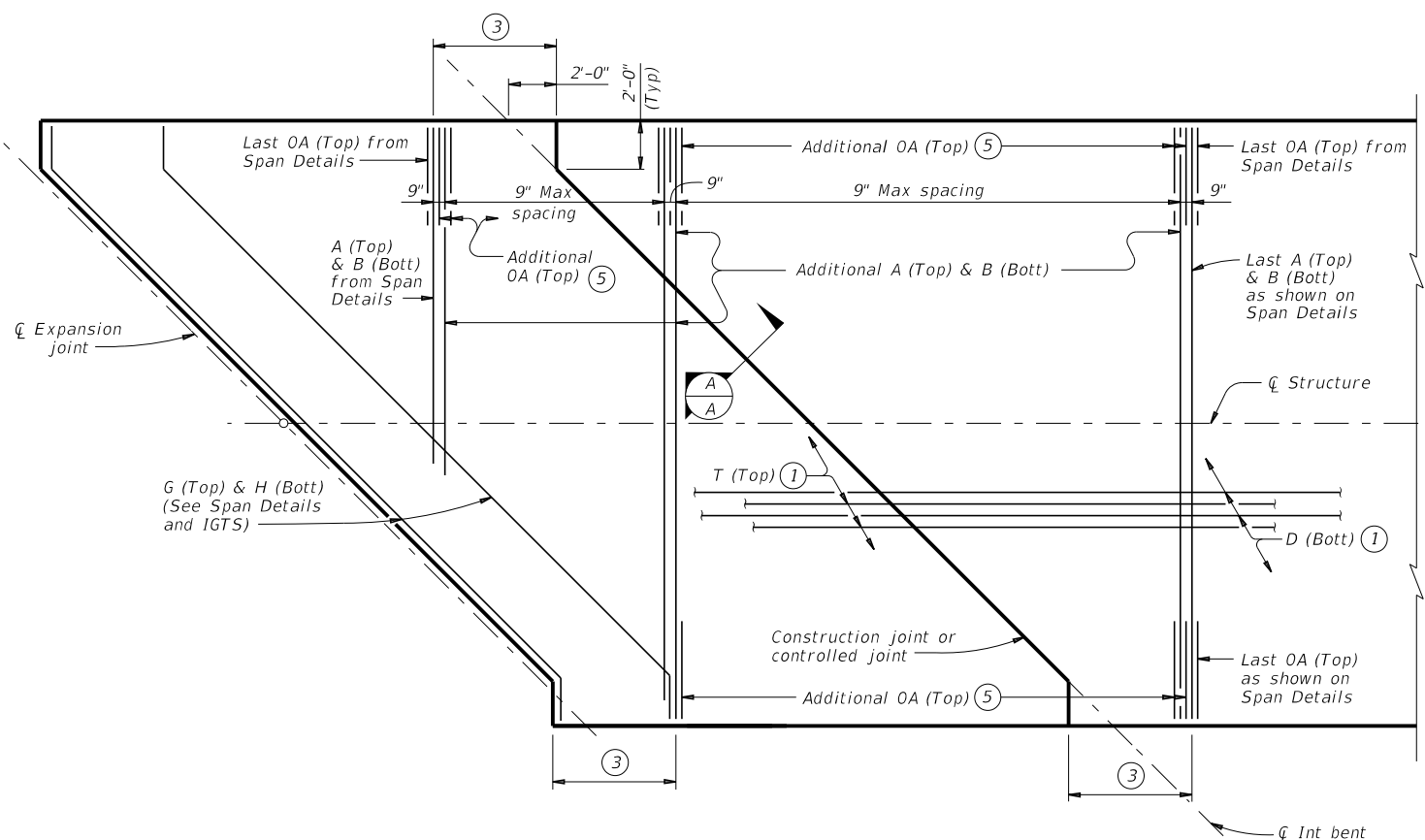
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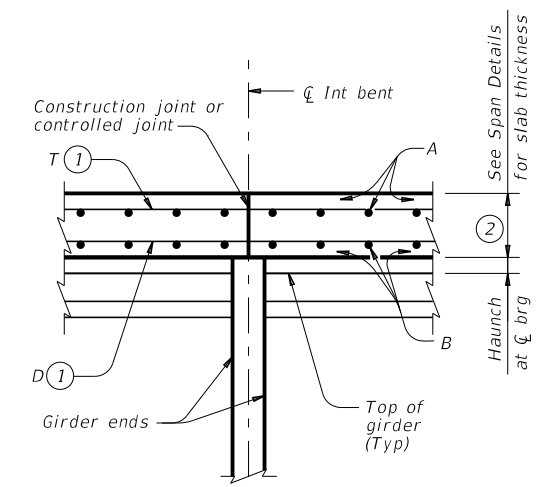
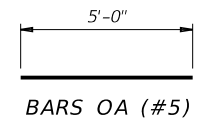
PLAN FOR 0° OR 15° SKEW
 (Showing 15° skew)



PLAN FOR 30° OR 45° SKEW
 (Showing 30° skew)



PLAN FOR 45° SKEW
 (Showing short span condition.)



SECTION A-A
 Bars OA (Top) not shown for clarity.

- ① Top and bottom mats must be continuous through joint.
- ② Maintain a constant slab thickness over the bent.
- ③ 5'-4" as shown on Span Details.
- ④ Use these details when no full slab width bars A and B are shown on Span Details.
- ⑤ Bars OA (Top) at 9" Max spacing between Bars A (Top).
- ⑥ Values in table assume a temperature change of 70° F after erection when calculating thermal movement in one direction (not total).

TABLE OF ⑥ ALLOWABLE UNIT LENGTH	
Max Rdwy Grade, Percent	Unit Length Factor
0.00	4.1
1.00	3.9
2.00	3.7
3.00	3.5
4.00	3.3
5.00	3.1

Unit length must not exceed the length of the shortest end span times the Unit Length Factor shown in table or 400', whichever is less.

BAR TABLE	
BAR	SIZE
A	#4
B	#4
D	#4
T	#4
OA	#5

The details shown on this sheet are applicable for two and three span units comprised of the same girder type. Units may be comprised of different span lengths. See "Table of Allowable Unit Length".

GENERAL NOTES:
 Designed according to AASHTO LRFD Bridge Design Specifications.
 This standard is drawn showing right forward skew. See Bridge Layout for actual skew direction.

CONSTRUCTION NOTES:
 Where multi-span units are indicated on the Bridge Layout, the thickened slab end details and reinforcement shown on IGTS standard (Bars AA, G, H, J, K, and M) and on the Span Details will be omitted where slabs are continuous over interior bents. At these locations, the slab details and reinforcement will be as shown on this sheet or on PCP standard (if using this option).
 Thickened slab end reinforcement and details still apply at expansion joint locations (ends of units).
 See Span Details for remainder of slab reinforcement and details.

MATERIAL NOTES:
 Provide Grade 60 reinforcing steel.
 Provide Class "S" concrete (f'c = 4,000 psi).
 Provide Class "S" (HPC) if shown elsewhere on the plans.
 Provide bar laps, where required, as follows:
 Uncoated ~ #4 = 1'-7"
 Epoxy Coated ~ #4 = 2'-5"

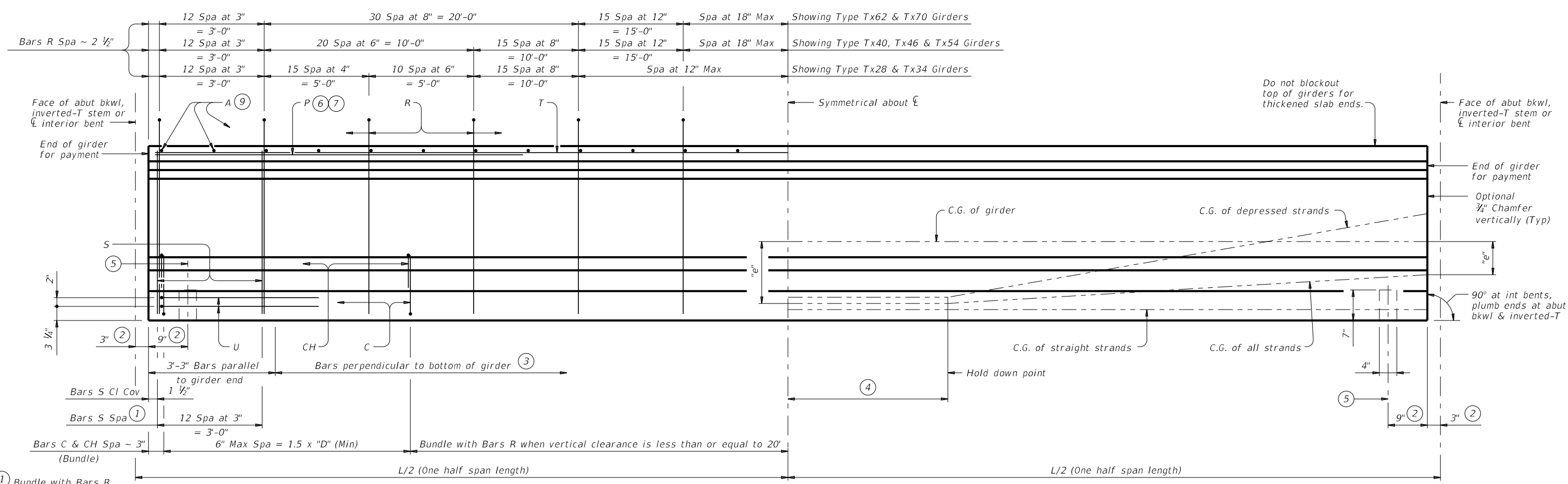
The details shown on this sheet are applicable for use only with the Prestressed Concrete I-Girder Standard Designs shown on standards IGSD-24, IGSD-28, IGSD-30, IGSD-32, IGSD-38, IGSD-40 and IGSD-44.

HL93 LOADING

Texas Department of Transportation		Bridge Division Standard
CONTINUOUS SLAB DETAILS		
PRESTR CONC I-GIRDER SPANS		
IGCS		
FILE: igcs1sts-19.dgn	DN: JMH	CK: TxDOT
① TxDOT August 2017	CONT SECT	JOB HIGHWAY
REVISIONS	0484 01	025 FM 707
10-19: Added bubble note 6.	DIST COUNTY	SHEET NO.
	ABL JONES	103

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DATE: 11/11/2021 5:09:47 PM
 FILE: c:\bms\br\idgformar-pw\ar-on.tg\inter\dms0510369-BR-01-IGD-01.dgn



- ① Bundle with Bars R.
- ② Measured along ϵ Girder at interior bents; perpendicular to abutment bkwl or inverted-T stem.
- ③ The average of the top and bottom spacing of Bars R cannot exceed the required spacing.
- ④ L/20, but not less than 5'-0" (-0,+2).

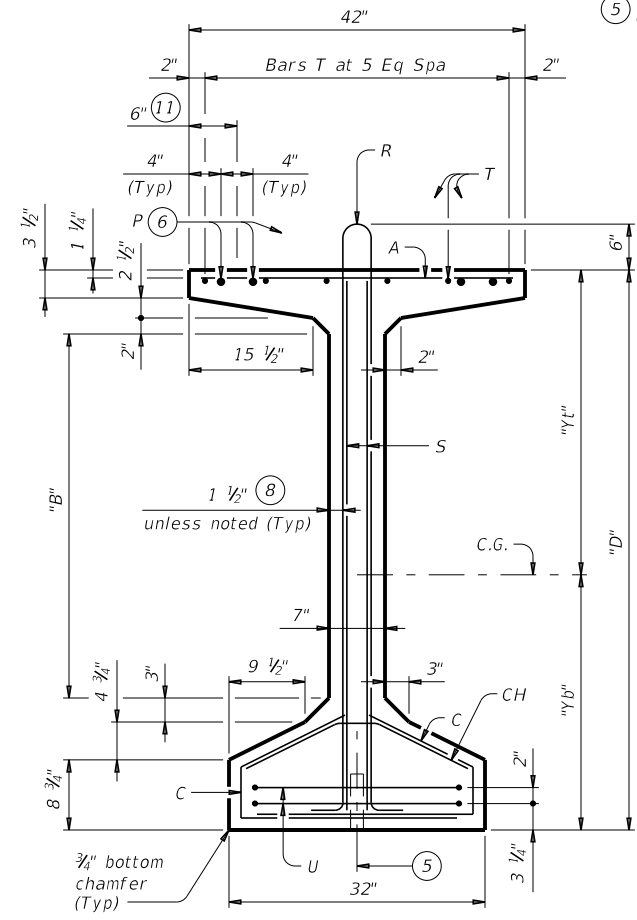
GIRDER ELEVATION

- ⑥ Bars P (#6 x 15'-0") required in Tx62 and Tx70 girders. At the fabricator's option bars larger than #6 may be used. When L is less than 50 ft, Bars P are to be the same length as Bars T.
- ⑦ Bars P (#6 x 15'-0") are only required in Tx28, Tx34, Tx40, Tx46, and Tx54 girders when "e" at girder ends exceeds 0.25 x "D". At the fabricator's option bars larger than #6 may be used. When L is less than 50 ft, Bars P are to be the same length as Bars T.
- ⑧ 1 3/8" Clear Cover to Bars S.
- ⑨ Space Bars A at 6" Max for girders requiring overhang bracket hangers. Space at 12" Max for all other girders. Tie to Bars R as necessary. See standard IGMS for "Deck Forming Notes".
- ⑩ Based on 155 pcf total weight of concrete and reinforcing steel.
- ⑪ Smooth trowel finish on the slab overhang side of exterior girder.

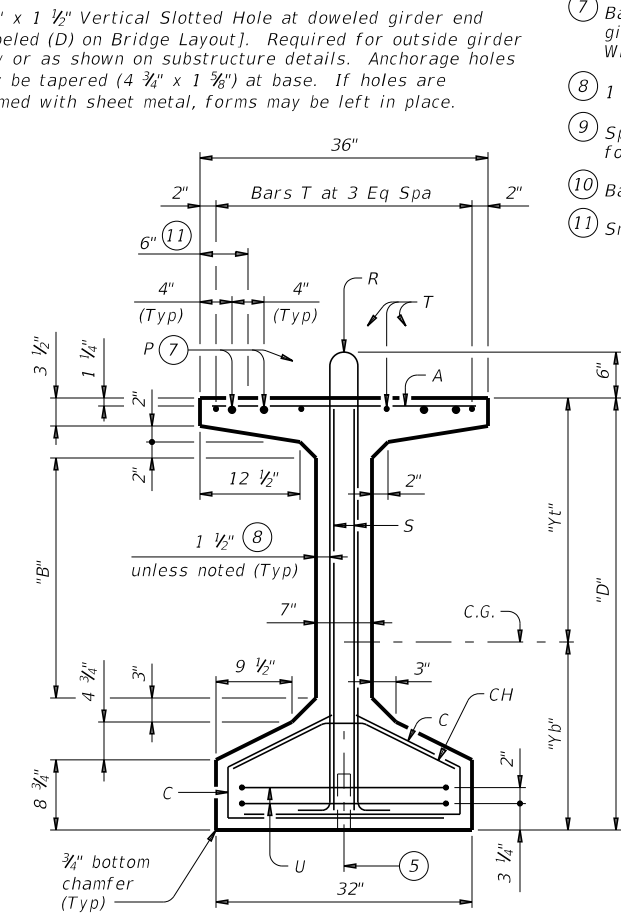
GIRDER DIMENSIONS AND SECTION PROPERTIES								
Girder Type	"D"	"B"	"Yt"	"Yb"	Area	"Ix"	"Iy"	Weight (10)
	(in.)	(in.)	(in.)	(in.)	(in. ²)	(in. ⁴)	(in. ⁴)	(plf)
Tx28	28	6	15.02	12.98	585	52,772	40,559	630
Tx34	34	12	18.49	15.51	627	88,355	40,731	675
Tx40	40	18	21.90	18.10	669	134,990	40,902	720
Tx46	46	22	25.90	20.10	761	198,089	46,478	819
Tx54	54	30	30.49	23.51	817	299,740	46,707	880
Tx62	62	37 1/2"	33.72	28.28	910	463,072	57,351	980
Tx70	70	45 1/2"	38.09	31.91	966	628,747	57,579	1,040

GENERAL NOTES:
 Designed according to AASHTO LRFD Bridge Design Specifications. Provide Class H concrete. Provide Grade 60 reinforcing steel. An equal area of deformed Welded Wire Reinforcement (WWR) (ASTM A1064) may be substituted for Bars A, C, R or T unless otherwise noted. It is permissible for bars or strands to come in contact with materials used in forming anchor holes.

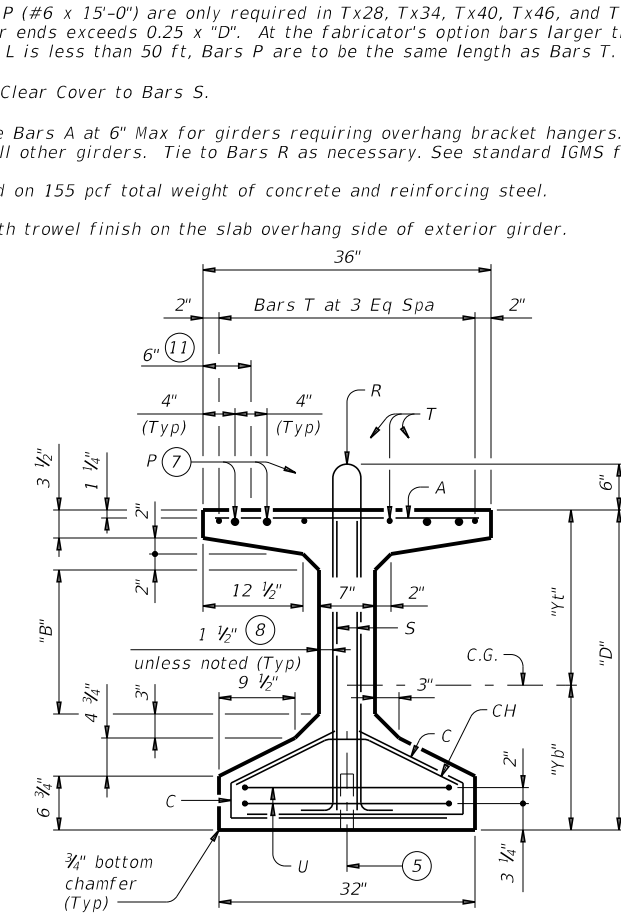
Cover dimensions are clear dimensions, unless noted otherwise. Reinforcing bar dimensions shown are out-to-out of bar.



TYPE Tx62 & Tx70



TYPE Tx46 & Tx54



TYPE Tx28, Tx34 & Tx40



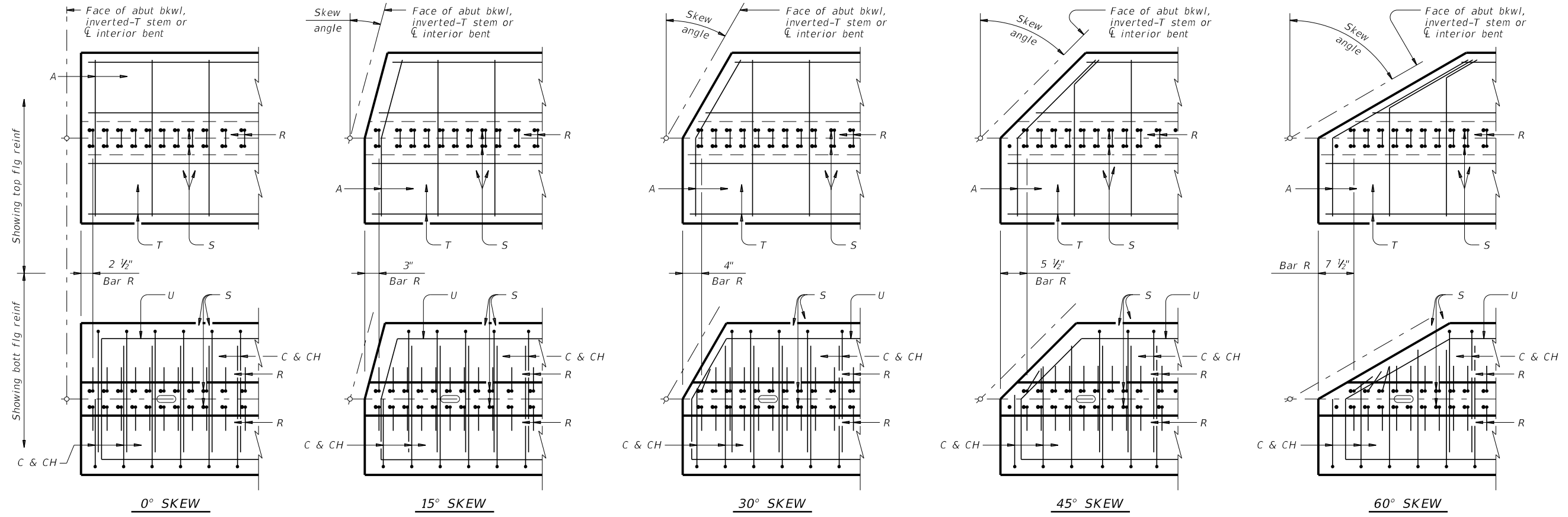
PRESTRESSED CONCRETE I-GIRDER DETAILS

IGD

FILE: igdstds1-19.dgn	DN: TxDOT	CK: JMH	DW: JTR	CK: TAR
©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0484	01	025	FM 707
10-19: Added Bars C and CH full length for VC <= 20'	DIST	COUNTY	SHEET NO.	
	ABL	JONES	104	

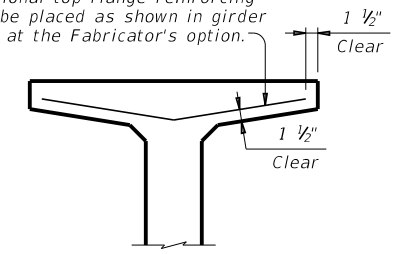
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DATE: 11/11/2021 5:09:50 PM
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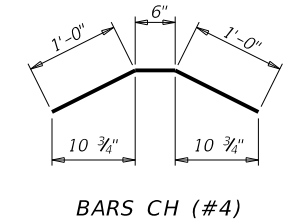


PLAN OF GIRDER ENDS (12)

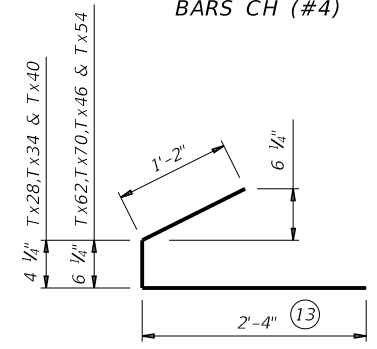
To control top flange cracking that may occur during form removal, additional top flange reinforcing may be placed as shown in girder ends at the Fabricator's option.



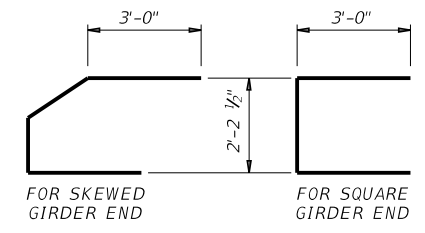
OPTIONAL TOP FLANGE REINFORCING DETAIL



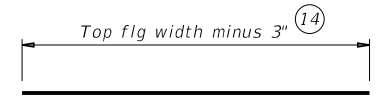
BARS CH (#4)



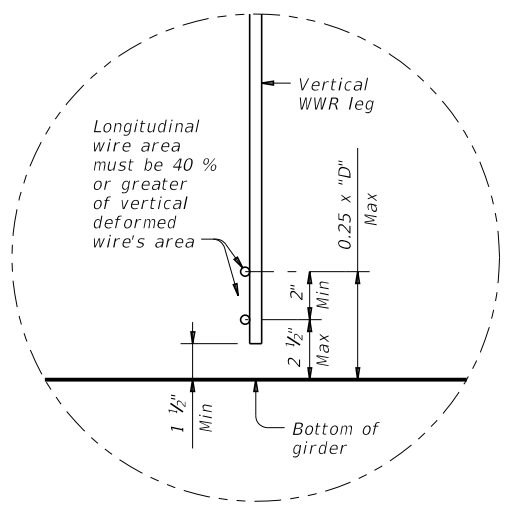
BARS C (#4)



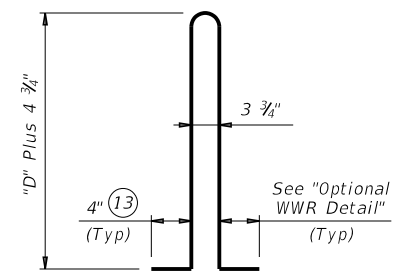
BARS U (#5)



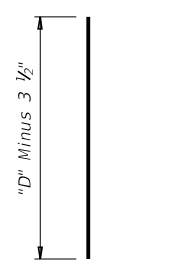
BARS A (#3)



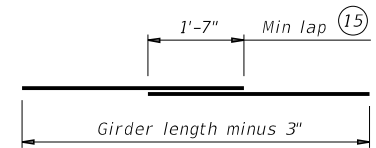
OPTIONAL WELDED WIRE REINFORCEMENT (WWR) DETAIL



BARS R (#4) (16)



BARS S (#6)



BARS T (#4)

- (12) Reinforcing patterns shown are provided as guides to determine reinforcement placement in skewed ends. Place Bars S as close to girder end as cover requirements permit, which may prevent them to be bundled with Bars R.
- (13) Bars may be cut or bent at skewed end as required.
- (14) Increase as necessary for bars at skewed end.
- (15) No portion of bar less than 10 ft.
- (16) For Welded Wire Reinforcement (WWR) option, area of Bars R may be reduced in proportion to the increase in reinforcement yield strength over 60 ksi. Yield strength of WWR is limited to 75 ksi.



PRESTRESSED CONCRETE I-GIRDER DETAILS

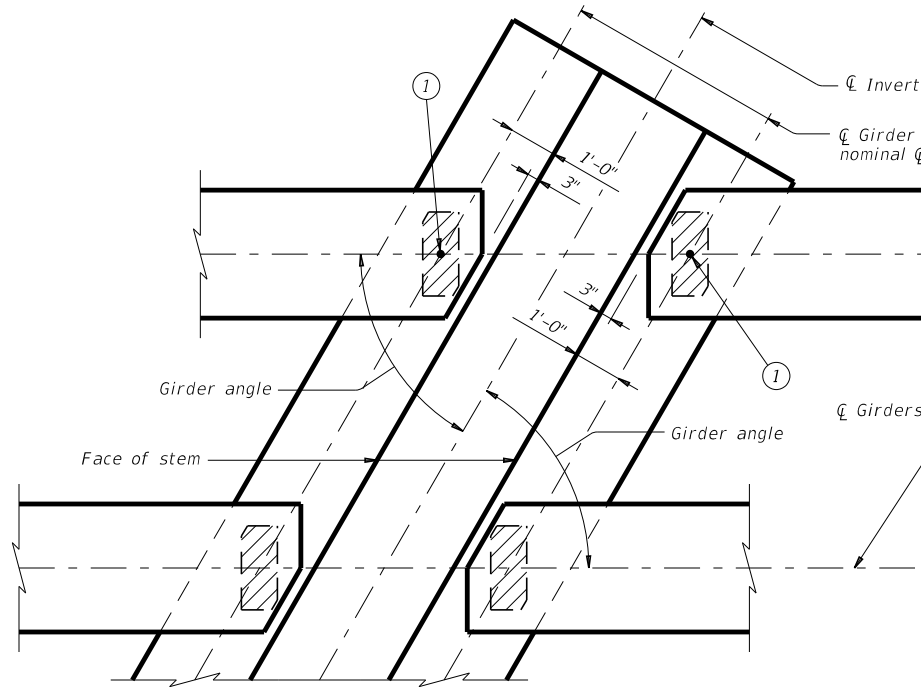
IGD

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©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0484	01	025	FM 707
10-19: Added Bars C and CH full length for VC <= 20'	DIST	COUNTY	SHEET NO.	
ABL	JONES		105	

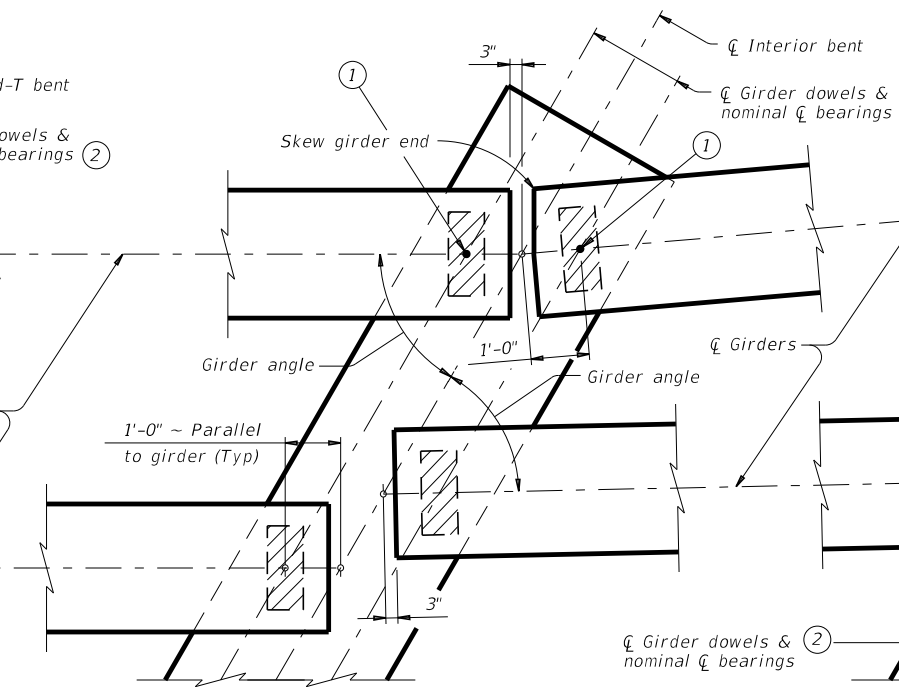
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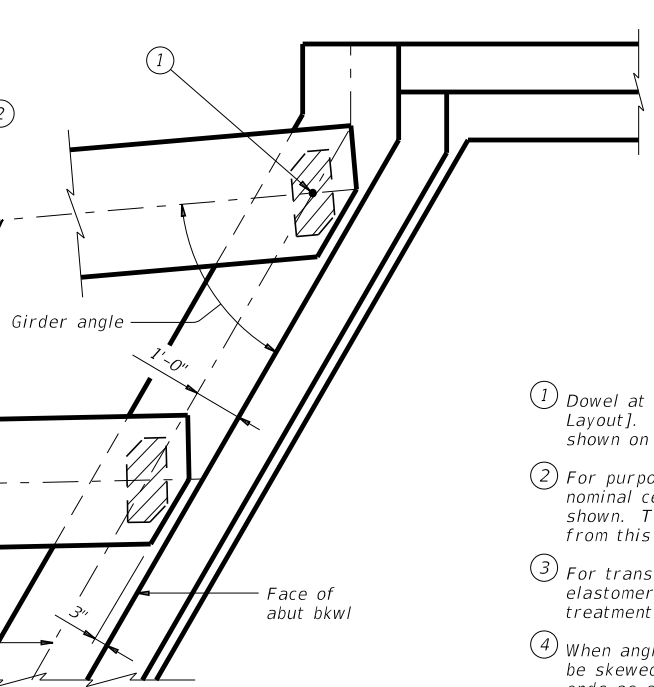
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AT INVERTED-T BENT W/SKEW

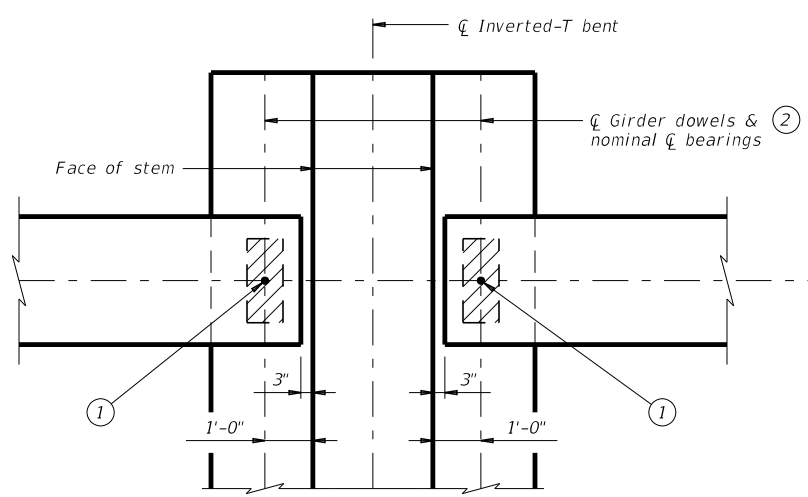


AT CONVENTIONAL INTERIOR BENT W/SKEW

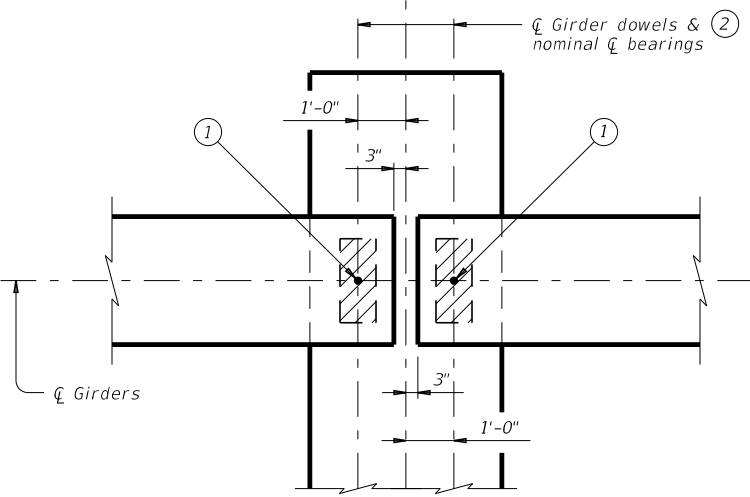


AT ABUTMENT W/SKEW

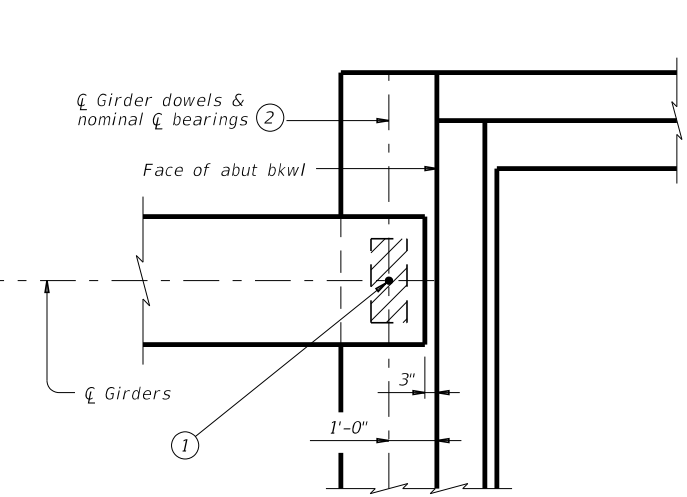
- ① Dowel at doweled girder end [labeled (D) on Bridge Layout]. Required for outside girder only or as shown on substructure details.
- ② For purposes of computing bearing seat elevations, nominal centerline of bearing must be defined as shown. The actual center of bearing pad may vary from this line.
- ③ For transition bents with backwall, girder and elastomeric bearings must receive the same treatment as shown for abutments.
- ④ When angle exceeds 0°, one or both girder ends must be skewed to maintain the clearance between girder ends as shown in view.
- ⑤ See Table of Bearing Pad Dimensions for bearing size. Girder end skew angles in Table not applicable for this situation. Table reflects girder conflicts of this type on radial bents only.



AT INVERTED-T BENT



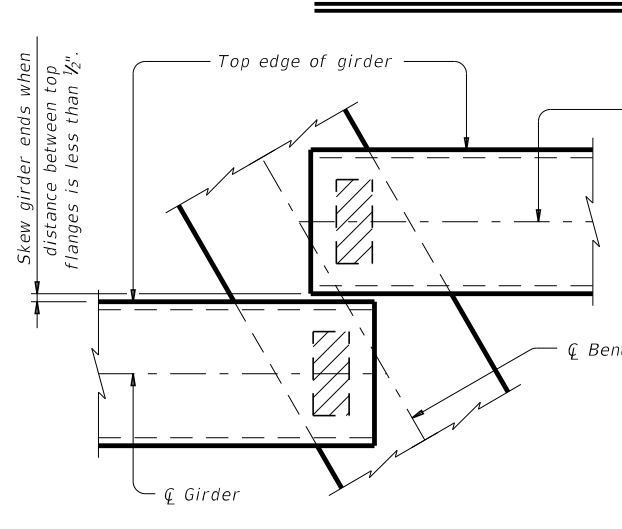
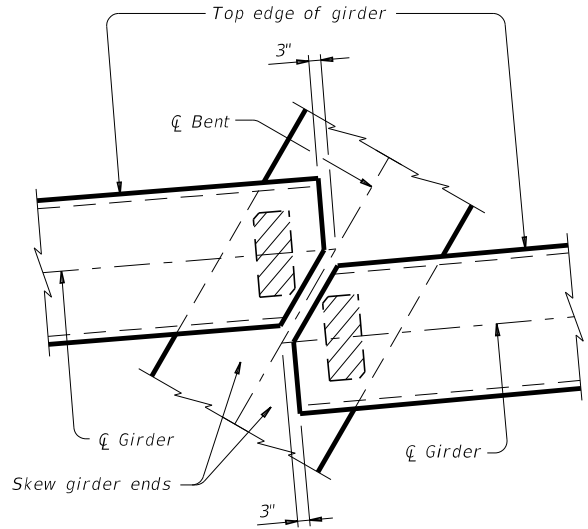
AT CONVENTIONAL INTERIOR BENT



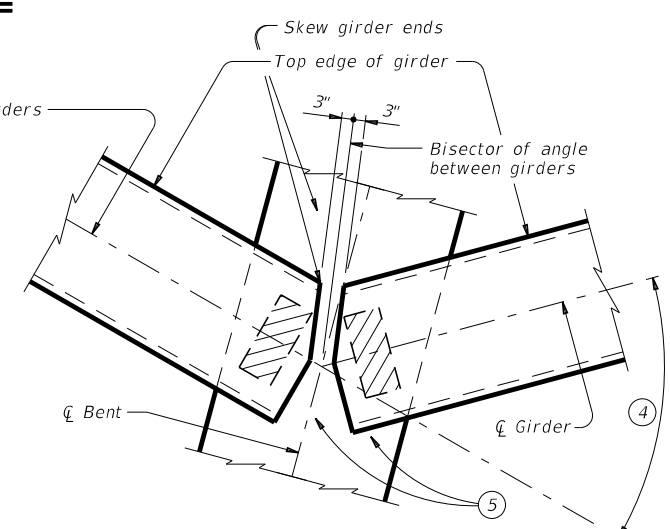
AT ABUTMENT

GENERAL NOTES:
 These details accommodate skew angles up to 60°. Shop drawings for approval are required.
 A bearing layout which identifies location and orientation of all bearings must be developed by the bearing fabricator. Permanently mark each bearing in accordance with the bearing layout. A copy of the bearing layout is to be provided to the Engineer.
 Cost of furnishing and installing elastomeric bearings, including beveled and embedded steel plates, must be included in unit price bid for "Prestressed Concrete Girders".

GIRDER END DETAILS



GIRDER CONFLICT DETAILS



ELASTOMERIC BEARING AND GIRDER END DETAILS PRESTR CONCRETE I-GIRDERS

IGEB

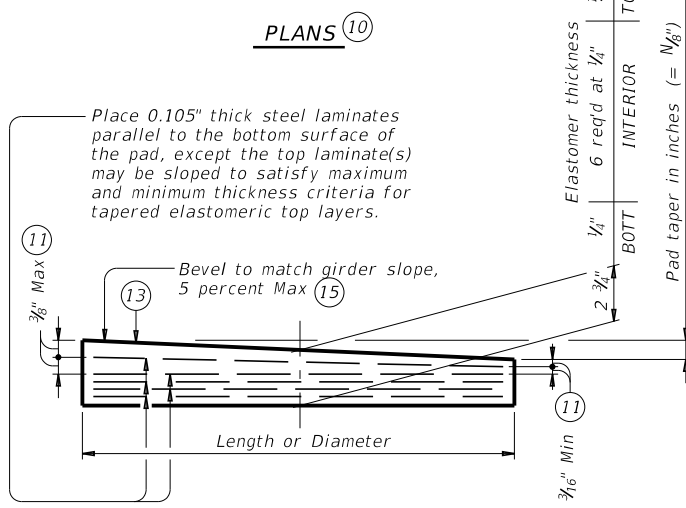
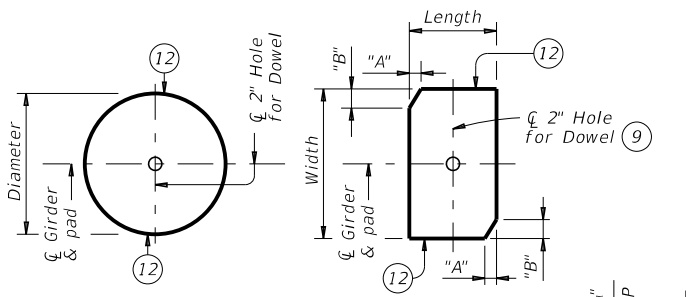
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©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0484	01	025	FM 707
	DIST	COUNTY	SHEET NO.	
	ABL	JONES	106	

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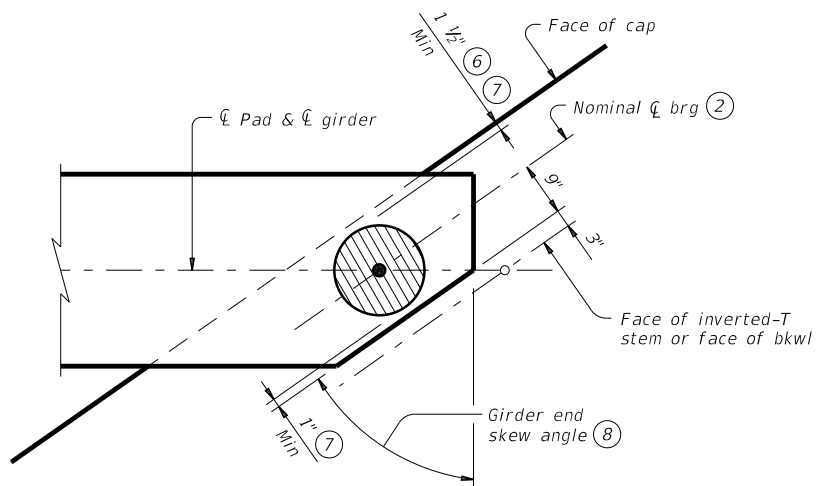
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Girder Type	Abutments	Int Bents	Inv-T Bents
	Face of Bkwl to Face of Cap	Overall Cap Width	Corbel Width
Tx28 thru Tx54	1'-9"	3'-6"	1'-10 1/2"
Tx62 & Tx70	2'-0"	4'-0"	2'-1 1/2"

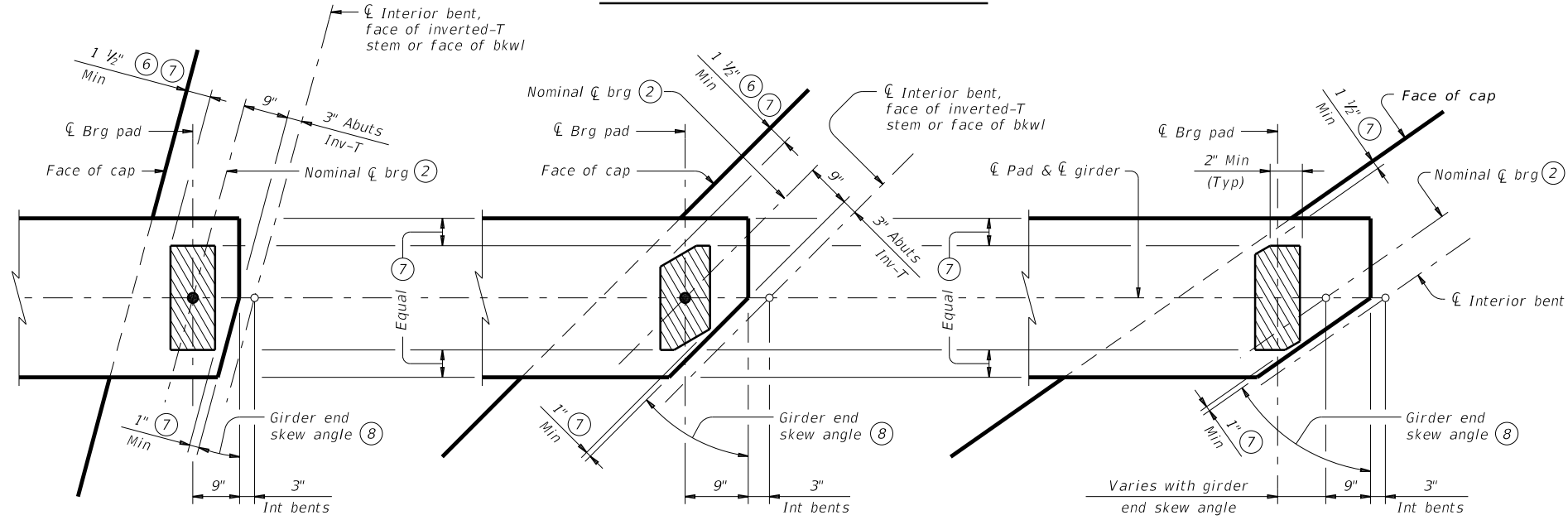
Bent Type	Girder Type	Bearing Type (13)	Girder End Skew Angle Range	Pad Size Lgth x Wdth	Pad Clip Dimensions	
					"A"	"B"
ABUTMENTS, INVERTED-T AND TRANSITION BENTS WITH BACKWALLS	Tx28, Tx34, Tx40, Tx46 & Tx54	G-1-"N"	0° thru 21°	8" x 21"	---	---
		G-2-"N"	21°+ thru 30°	8" x 21"	1 1/2"	2 1/2"
		G-3-"N"	30°+ thru 45°	9" x 21"	4 1/2"	4 1/2"
		G-4-"N"	45°+ thru 60°	15" Dia	---	---
	Tx62 & Tx70	G-5-"N"	0° thru 21°	9" x 21"	---	---
		G-6-"N"	21°+ thru 30°	9" x 21"	1 1/2"	2 1/2"
		G-7-"N"	30°+ thru 45°	10" x 21"	4 1/2"	4 1/2"
		G-8-"N"	45°+ thru 60°	10" x 21"	7 1/4"	4 1/4"
CONVENTIONAL INTERIOR BENTS	Tx28, Tx34, Tx40, Tx46 & Tx54	---	---	---	---	---
	Tx62 & Tx70	G-5-"N"	0° thru 60°	9" x 21"	---	---
CONVENTIONAL INTERIOR BENTS WITH SKEWED GIRDER ENDS (GIRDER CONFLICTS) (16)	Tx28, Tx34, Tx40, Tx46 & Tx54	G-1-"N"	0° thru 18°	8" x 21"	---	---
		G-2-"N"	18°+ thru 30°	8" x 21"	1 1/2"	2 1/2"
		G-9-"N"	30°+ thru 45°	8" x 21"	3"	3"
		G-10-"N"	45°+ thru 60°	9" x 21"	6"	3 1/2"
	Tx62 & Tx70	G-5-"N"	0° thru 18°	9" x 21"	---	---
		G-5-"N"	18°+ thru 30°	9" x 21"	---	---
		G-11-"N"	30°+ thru 45°	9" x 21"	1 1/2"	1 1/2"
		G-12-"N"	45°+ thru 60°	9" x 21"	3"	1 3/4"



LAMINATED ELASTOMERIC BEARING PAD
(50 DUROMETER)



ROUND BEARINGS FOR SKEWED GIRDER ENDS AT FACE OF INVERTED-T STEM OR FACE OF BKWL



SKEWED GIRDER ENDS AT INT BENTS, FACE OF INVERTED-T STEM OR FACE OF BKWL

SKEWED GIRDER ENDS AT CONVENTIONAL INTERIOR BENTS (NO GIRDER DOWELS)

BEARING PAD PLACEMENT DIAGRAMS

- (2) For purposes of computing bearing seat elevations, nominal centerline of bearing must be defined as shown. The actual center of bearing pad may vary from this line.
- (6) 3" for inverted-T.
- (7) Place centerline pad as near nominal centerline bearing as possible between limits shown.
- (8) Girder end skew angle is equal to 90° minus the girder angle except at some conflicting girders.
- (9) Provide 2" dia hole only at locations required. See Substructure details for location.
- (10) See Table of Bearing Pad Dimensions for dimensions.
- (11) Maximum and minimum layer thicknesses shown are for elastomer only, on tapered layers.
- (12) Locate Permanent Mark here.
- (13) Indicate BEARING TYPE on all pads. For tapered pads, locate BEARING TYPE on the high side. The Fabricator must include the value of "N" (amount of taper in 1/8" increments) in this mark.
 Examples: N=0, (for 0° taper)
 N=1, (for 1/8" taper)
 N=2, (for 1/4" taper)
 (etc.)
 Fabricated pad top surface slope must not vary from plan girder slope by more than (0.0625" / IN) / IN.
- (14) Substructure dimensions must satisfy the minimums provided to accommodate the elastomeric bearings shown on this standard.
- (15) See sheet 3 of 3 for beveled plate use when slopes exceed 5 percent.
- (16) If girder end is skewed for a girder conflict at an interior bent and a beveled sole plate is required, use bearing type for abutments at this location. Location of bearing centerline is to be set as for abutments in this case.

HL93 LOADING SHEET 2 OF 3

Texas Department of Transportation
 Bridge Division Standard

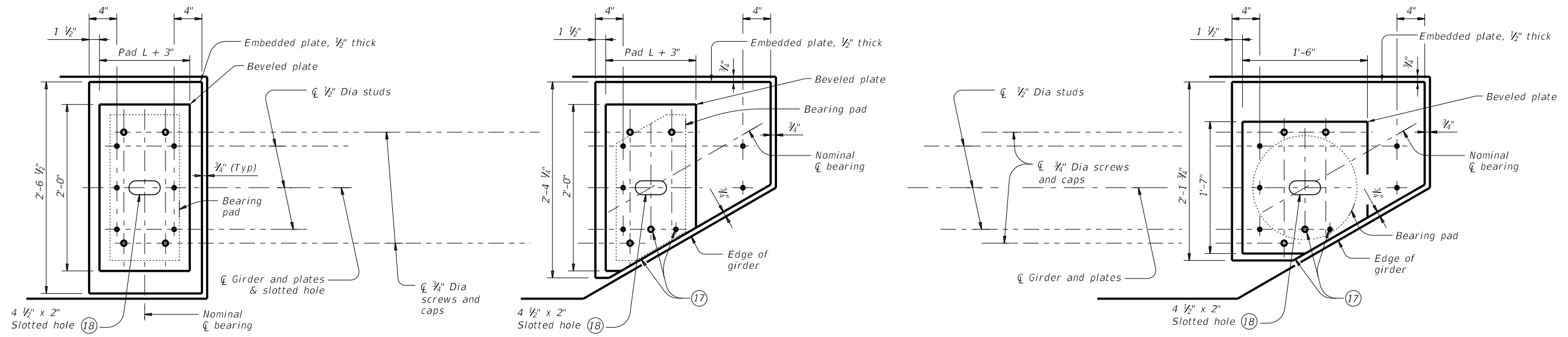
ELASTOMERIC BEARING AND GIRDER END DETAILS PRESTR CONCRETE I-GIRDERS

IGEB

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©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0484	01	025	FM 707
	DIST	COUNTY	SHEET NO.	
	ABL	JONES	107	

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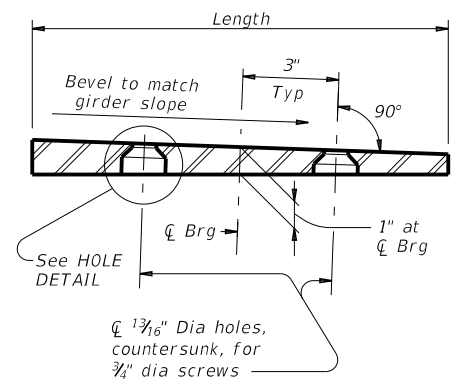


NORMAL GIRDER END
 RECTANGULAR BEARING PAD

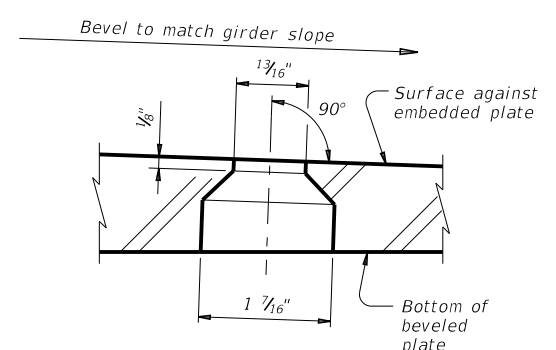
SKewed GIRDER END
 CLIPPED RECTANGULAR BEARING PAD

SKewed GIRDER END
 15" DIA BEARING PAD

PLAN VIEW OF SOLE PLATE DETAILS



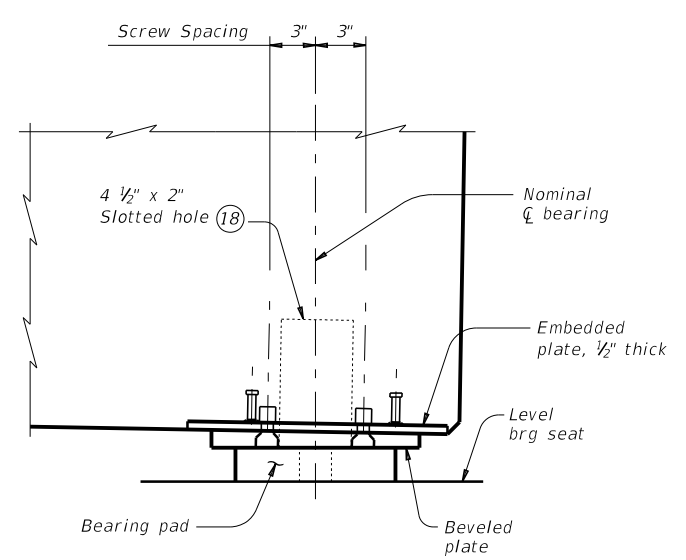
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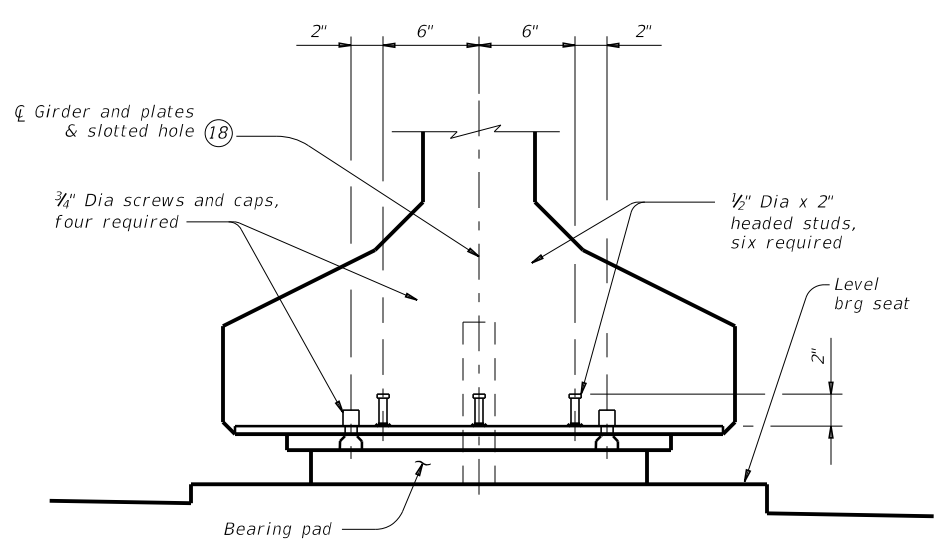
HOLE DETAIL

- (17) Cut beveled and embedded plates to match girder end skew. Adjust location of screw and stud as shown when necessary.
- (18) Slotted hole is required at doweled girder end locations.

BEVELED PLATE DETAILS



SIDE ELEVATION



END ELEVATION
 Showing normal girder end.

GIRDER DETAILS

SOLE PLATE NOTES:

Provide constant thickness elastomeric bearings with beveled and embedded steel sole plates in accordance with these details when the girder slope exceeds 5 percent or if otherwise required in the plans. Provide for all girders in the span.

On the shop drawings, dimension sole plates to the nearest 1/16" based on required thickness at centerline of bearing and slope of girder. Thickness tolerance variation from the approved shop drawings is 1/16" +/-, except variation from a plane parallel to the theoretical top surface can not exceed 1/16" total. Bearing surface tolerances listed in Item 424 apply to embedded and beveled plates.

Steel plate must conform to ASTM A36, A572 Gr 50, or A709 Gr 36 or Gr 50. Hot dip galvanize both the embedded plate and beveled sole plate after fabrication. Seal weld caps to embedded plate before galvanizing.

When determining if relocation of screw holes and studs are necessary for skewed girder ends, minimum clearance from screw or stud centerline to plate edge is 1.25".

Tap threads in the embedded plate only. Drill and tap prior to galvanizing.

3/4" Dia screws must be electroplated, socket flat head countersunk cap screws conforming to ASTM F835. Electroplating must conform to ASTM B633, SC 2, Type I. Provide screws long enough to maintain a 3/4" minimum embedment into the embedded plate and galvanized cap. Provide galvanized steel caps (16 ga Min) with a nominal 1" inside diameter and deep enough to accommodate the screws, but not less than 1/2" deep or deeper than 1".

Install beveled sole plates prior to shipping girders. Installed screw heads must not protrude below the bottom of the beveled plate.



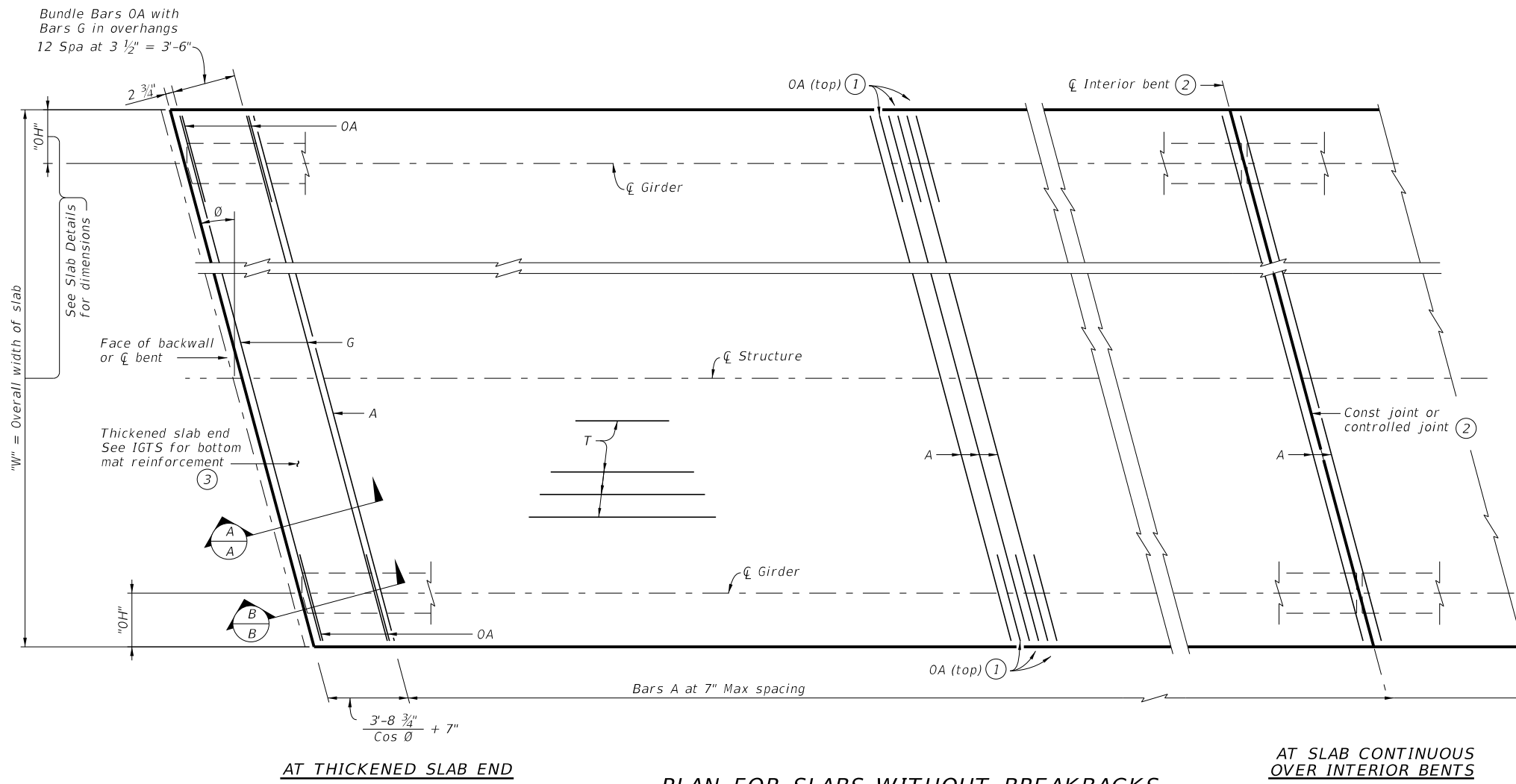
ELASTOMERIC BEARING AND GIRDER END DETAILS
PRESTR CONCRETE I-GIRDERS

IGEB

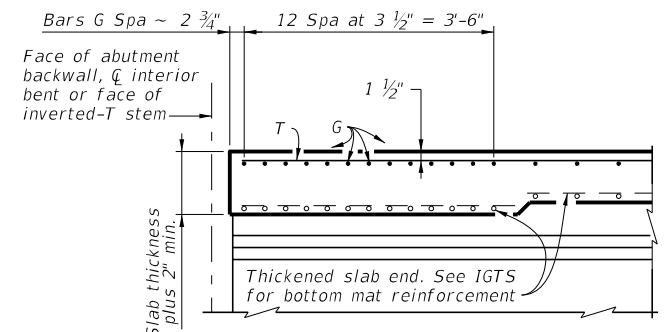
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©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0484	01	025	FM 707
	DIST	COUNTY	SHEET NO.	
	ABL	JONES	108	

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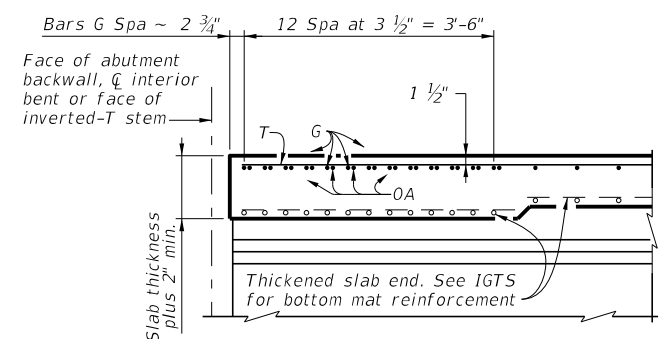
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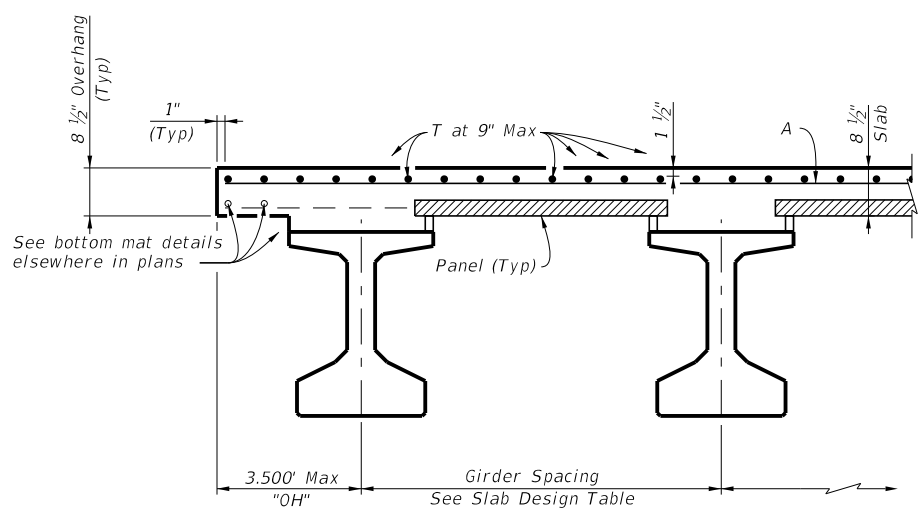
PLAN FOR SLABS WITHOUT BREAKBACKS
 Showing top mat reinforcement only.



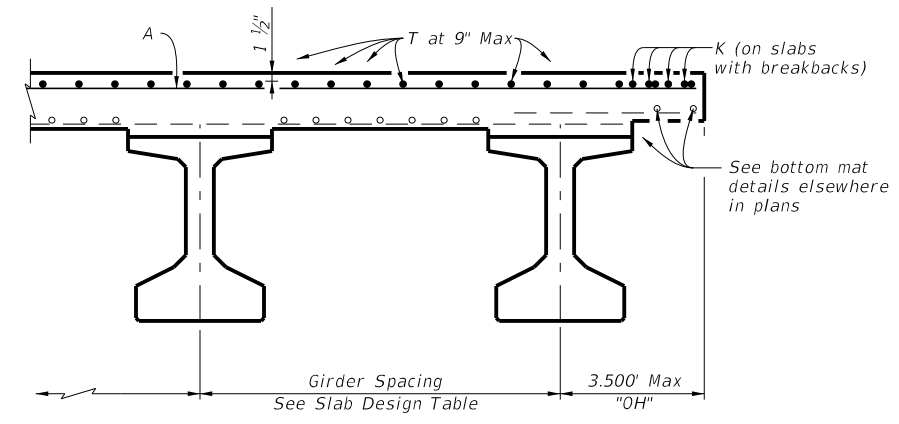
SECTION A-A
 Showing Thickened Slab End with PCP Option 1. Option 2 similar.



SECTION B-B
 Showing Thickened Slab End with PCP Option 1. Option 2 similar.



PARTIAL TYPICAL TRANSVERSE SECTION



SECTION OF THICKENED SLAB END
 Showing PCP Option 1. Option 2 similar.

- ① Place Bars OA midway between Bars A at overhang.
- ② Bars are continuous through joint.
- ③ Thickened slab end dimensioned perpendicular to face of bkwl, centerline interior bent or face of inverted-T stem.

HL93 LOADING SHEET 1 OF 2

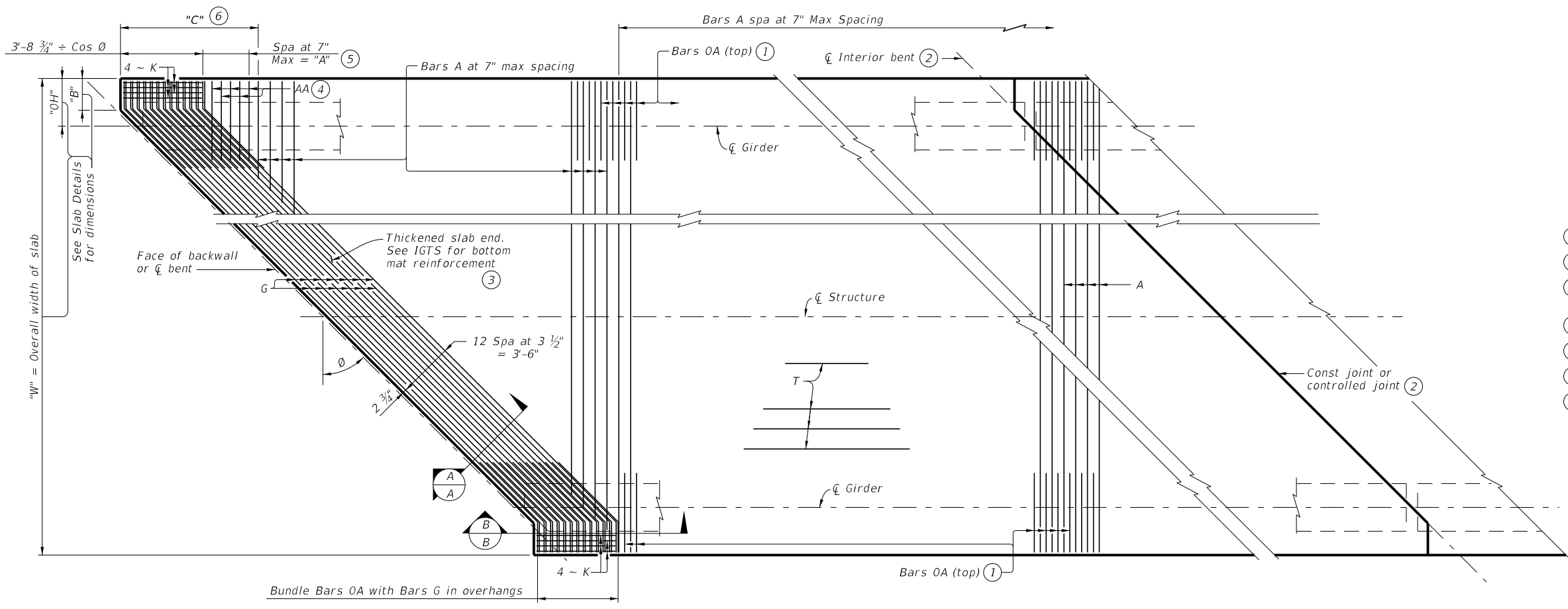
Texas Department of Transportation Bridge Division Standard

GFRP SLAB TOP MAT REINFORCEMENT
PRESTRESSED CONC I-GIRDER SPANS

IGFRP

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REVISIONS	0484	01	025	FM 707
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DIST	COUNTY		SHEET NO.	
ABL	JONES		109	

BAR TABLE	
BAR	SIZE
A	#5
AA	#5
G	#5
K	#5
OA	#5
T	#5



- ① Place Bars OA midway between Bars A at overhang.
- ② Bars are continuous through joint.
- ③ Thickened slab end dimensioned perpendicular to face of bkwl, centerline interior bent or face of inverted-T stem.
- ④ Tie Bars AA to bottom of Bars G in this location.
- ⑤ $A = ("OH" + 2.333' - "B") \times \tan \theta$
- ⑥ $C = \frac{3.729'}{\cos \theta} + "A" + \text{Bar A spacing}$
- ⑦ Only required on slabs with breakbacks.

AT THICKENED SLAB END

PLAN FOR SLABS WITH BREAKBACKS

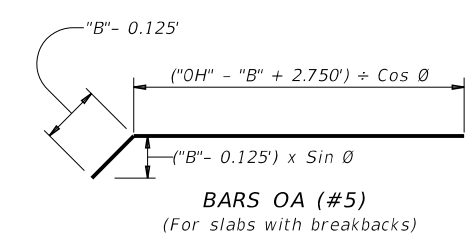
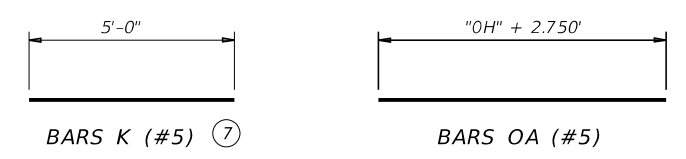
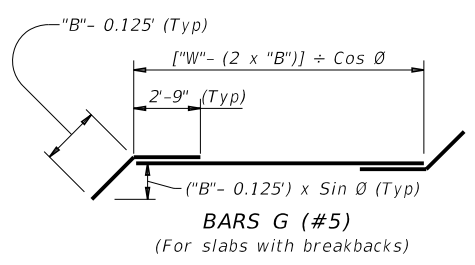
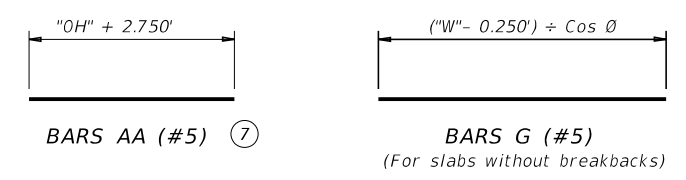
Showing top mat reinforcement only.

AT SLAB CONTINUOUS OVER INTERIOR BENTS

GENERAL NOTES:
 Designed according to AASHTO LRFD Bridge Design Specifications and AASHTO LRFD Bridge Design Guide Specifications for GFRP-Reinforced Concrete, 2nd Edition. These details are restricted to Prestressed Concrete I-Girder spans with an 8 1/2" slab and up to a 10'-0" girder spacing.
 These details are to be used in conjunction with the Span Details and PCP Standard (if prestressed concrete panels are used).
 This standard provides Glass Fiber Reinforced Polymer (GFRP) reinforcement details for the top mat of slab reinforcement. The bottom mat reinforcement and other slab details are as shown elsewhere in the plans.
 The Contractor has the option to provide GFRP reinforcement, in accordance with the details shown, when epoxy-coated steel bars are specified for the deck slab. The Contractor may provide an alternate GFRP slab design with calculations signed and sealed by a Professional Engineer.

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

MATERIAL NOTES:
 Provide GFRP bars, conforming to ASTM D7957/7957M, except provide a minimum modulus of elasticity of 7,500 ksi.
 Provide Grade 60 steel bars for all bottom mat reinforcement as shown elsewhere in plans.
 Provide bar laps, where required, as follows:
 #5 GFRP bar = 2'-9"



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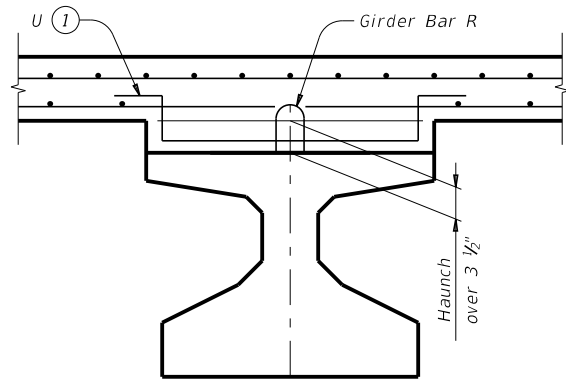
**GFRP SLAB TOP MAT REINFORCEMENT
 PRESTRESSED CONC I-GIRDER SPANS**

IGFRP

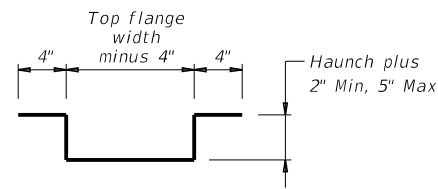
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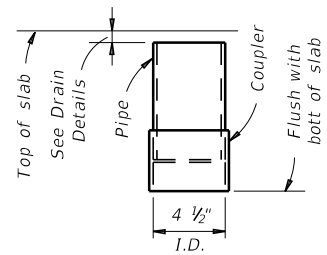
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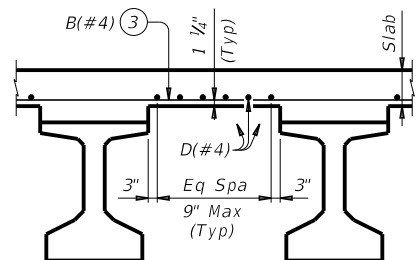
HAUNCH REINFORCING DETAIL



BARS U (#4)

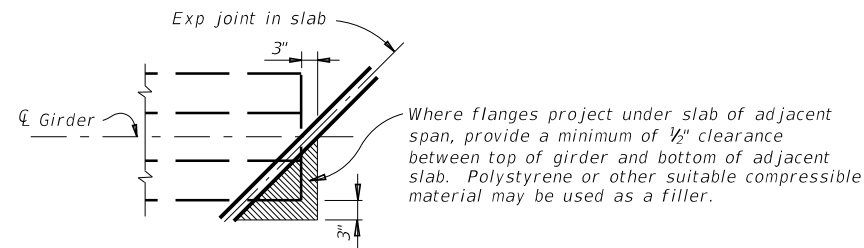


C-I-P DRAIN DETAIL

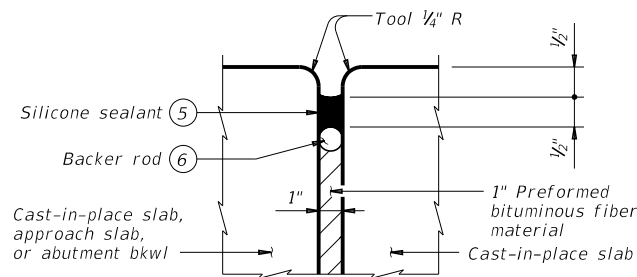


TYPICAL PART TRANSVERSE SLAB SECTION WITHOUT PCP

Top reinforcing steel not shown for clarity.

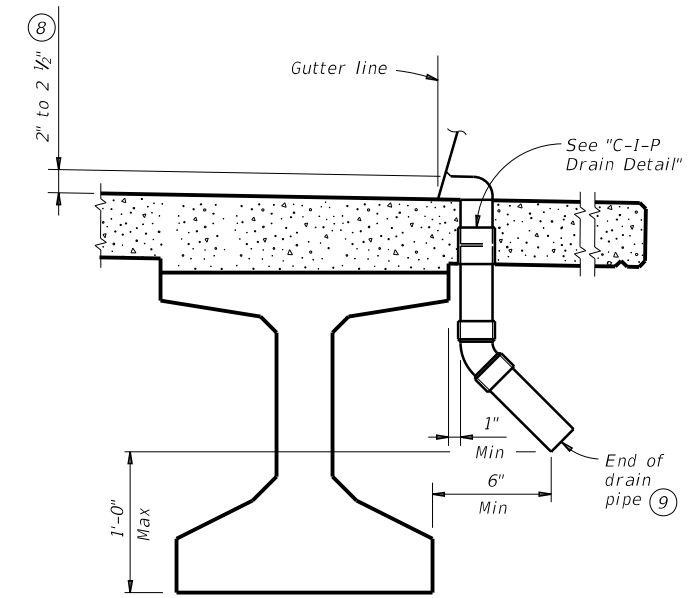


TREATMENT AT GIRDER END FOR SKEWED SPANS



TYPE A JOINT DETAIL

- ① Space Bars U with girder Bars R in all areas where measured haunch exceeds 3 1/2".
- ② Roughen outside of PVC with coarse rasp or equal to ensure bond with cast-in-place concrete.
- ③ Bars B(#4) spaced at 9" Max with 2" end cover. Overhang option, Contractor's may end alternating bars B(#4) at centerline outside girder.
- ④ Provide Grade 60 reinforcing steel. Provide bar laps, where required, as follows:
 Uncoated ~ #4 = 1'-7"
 Epoxy coated ~ #4 = 2'-5"
- ⑤ Class 7 silicone sealant that conforms to DMS-6310. Install when ambient temperature is between 55°F and 85°F and rising. Engineer to determine allowable hours for sealant application.
- ⑥ 1 1/4" backer rod must be compatible with joint sealant. Use of multiple pieces to create a backer rod cross section is not permitted. Top of backer rod must be convex as shown.
- ⑦ The maximum distance between Type A expansion joints is 100'. See Bridge Layout for location of joints.
- ⑧ Drain entrance formed in rail or sidewalk.
- ⑨ Water may not be discharged onto girders.
- ⑩ All drain pipe and fittings to be 4" diameter (Sch 40) PVC. See Item 481 "Pipe for Drains" for pipe, connections and solvent welding. Bend reinforcing steel to clear PVC 1". Drain length and location is as directed by the Engineer. Drains are not permitted over roadways or railroads, or within 10'-0" of bent caps. Degrease outside of exposed PVC, apply acrylic water base primer, then coat with same surface finishing material as used for outside girder face. Variations of the above designs, as required for the type of rail used and its location on the structure, may be installed with the approval and direction of the Engineer.



DRAIN DETAIL

GENERAL NOTES:
 Designed according to AASHTO LRFD Bridge Design Specifications.
 Payment for Type A joint will be as per Item 454, "Bridge Expansion Joints."
 All other items (reinforcing steel, drains, etc.) shown on this sheet are subsidiary to other bid items.

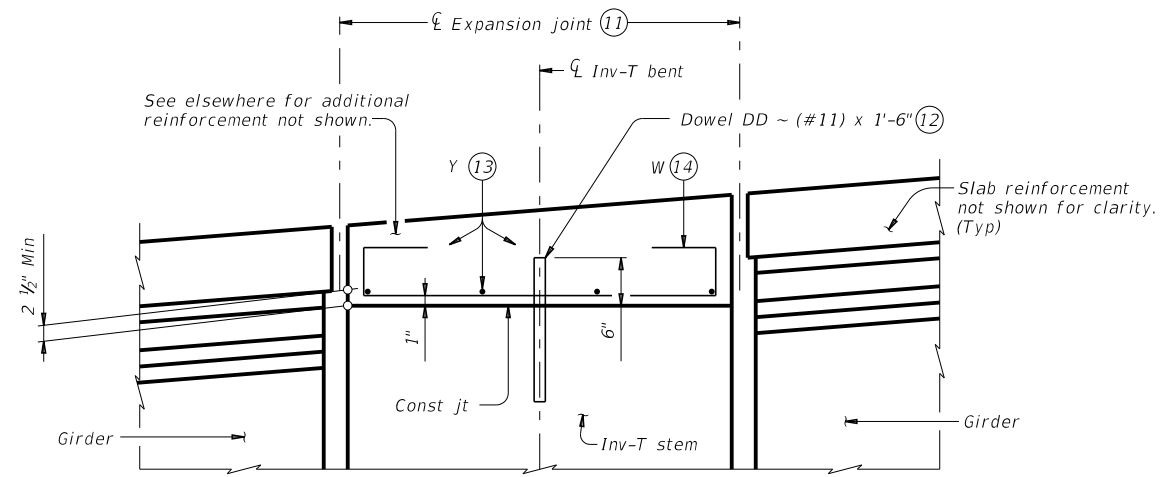
Cover dimensions are clear dimensions, unless noted otherwise.
 Reinforcing bar dimensions shown are out-to-out of bar.

DECK FORMWORK NOTES:
 Overhang bracket hangers are limited to a safe working load of 3,600 lbs, applied to and along the axis of a coil rod at 45 degrees from vertical, regardless of higher loads permitted by hanger manufacturers. Do not place a hanger less than 12" from girder end. Space hangers accordingly.

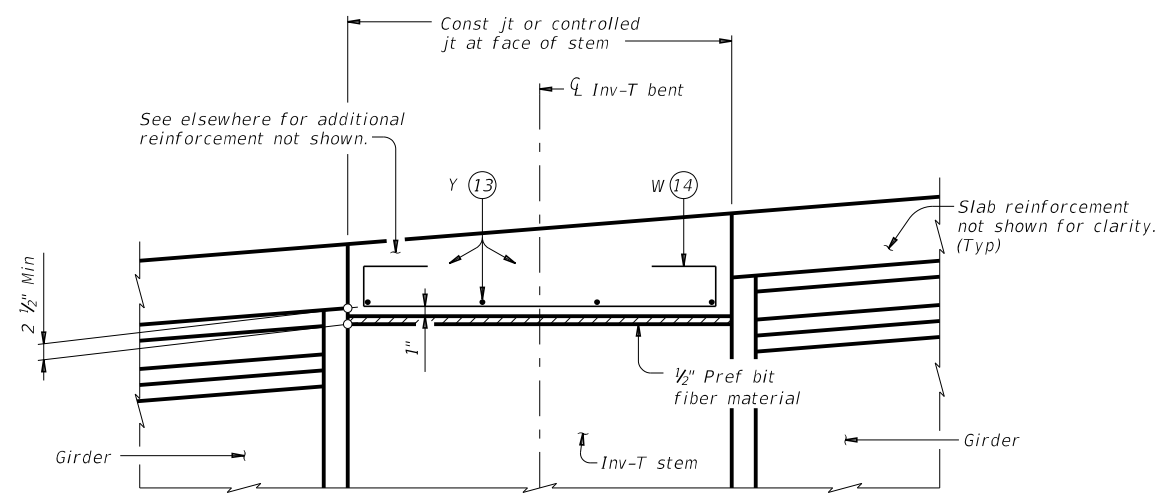
		Bridge Division Standard	
MISCELLANEOUS SLAB DETAILS PRESTR CONCRETE I-GIRDERS			
IGMS			
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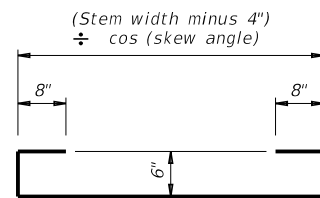
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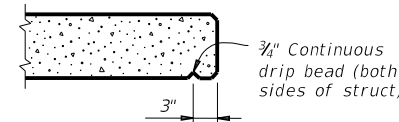
SHOWING EXPANSION JOINTS



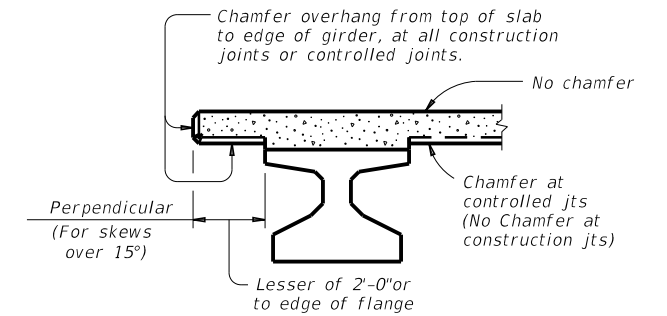
**SHOWING CONST JTS OR CONTROLLED JTS
 REINFORCEMENT OVER INV-T BENTS**



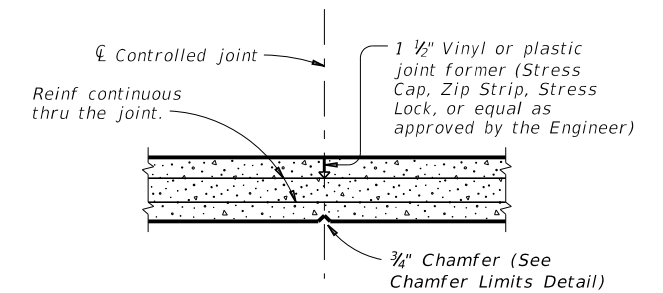
BARS W (#4)



DRIP BEAD DETAIL



CHAMFER LIMITS DETAIL (15)



CONTROLLED JOINT DETAIL

(Saw-cutting is not allowed)

- (11) See Layout for joint type.
- (12) Dowels DD (#11) spaced at 5 Ft Max. See Inv-T bents for quantity and location.
- (13) Space Bars Y (#4) at 12" Max. Use 2" end cover. Number of Bars Y must satisfy spacing limit. Place parallel to bent.
- (14) Space Bars W at 12" Max (3" from end of cap). Tilt if necessary to maintain cover requirements. Place parallel to longitudinal slab reinforcement.
- (15) See Span details for type of joint and joint locations.

SHEET 2 OF 2



**MISCELLANEOUS
 SLAB DETAILS
 PRESTR CONCRETE I-GIRDERS**

IGMS

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 Alex.Massara
 alex.massara@dot.state.tx.us
 alex.massara@dot.state.tx.us

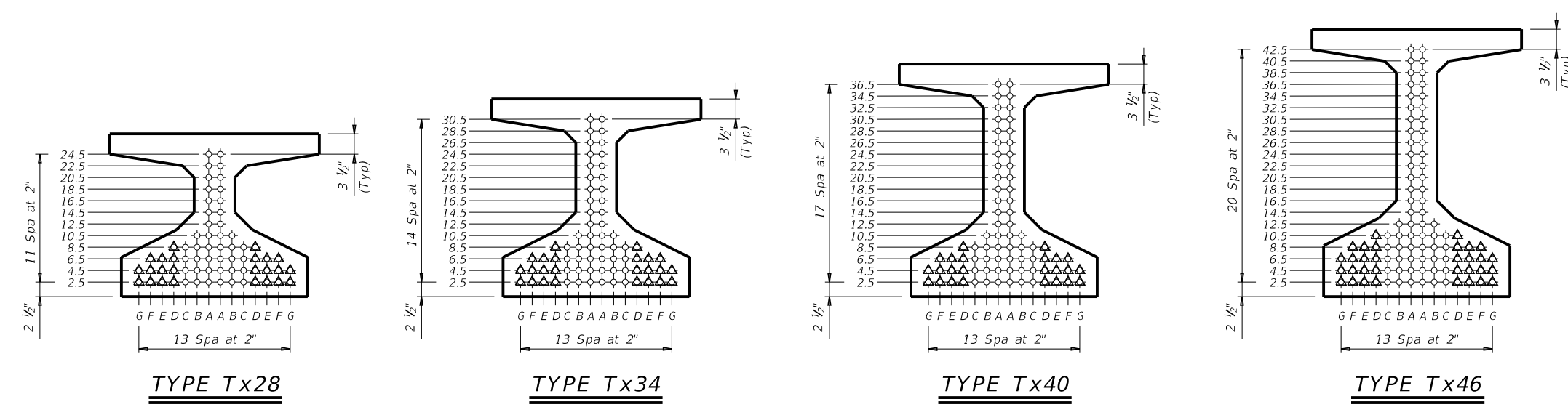
STRUCTURE	DESIGNED GIRDERS									DEPRESSED STRAND PATTERN	CONCRETE		OPTIONAL DESIGN				LOAD RATING				
	SPAN NO.	GIRDER NO.	GIRDER TYPE	PRESTRESSING STRANDS					NO.		TO END (in)	RELEASE STRGTH (ksi)	MINIMUM 28 DAY COMP STRGTH (ksi)	DESIGN LOAD COMP STRESS (TOP ϵ) (SERVICE I) Fct(ksi)	DESIGN LOAD TENSILE STRESS (BOTTL ϵ) (SERVICE III) Fcb(ksi)	REQUIRED MINIMUM ULTIMATE MOMENT CAPACITY (STRENGTH I) (kip-ft)	LIVE LOAD DISTRIBUTION FACTOR		STRENGTH I		SERVICE III
				NON-STD STRAND PATTERN	TOTAL NO.	SIZE (in)	STRGTH f_{pu} (ksi)	"e" ϵ (in)									"e" END (in)	Moment	Shear	Inv	Opr
Type Tx28 Girders 40' Roadway 8.5" Slab	40	ALL	Tx28		12	0.6	270	10.48	10.48	2	10.5	4.700	5.000	1.171	-1.656	1590	0.830	1.040	1.54	2.00	1.85
	45	ALL	Tx28		14	0.6	270	10.48	9.34			4.000	5.200	1.483	-2.021	1684	0.800	1.050	1.53	1.98	1.63
	50	ALL	Tx28		16	0.6	270	10.23	9.23	4	8.5	4.000	5.600	1.807	-2.427	1973	0.780	1.050	1.44	1.87	1.38
	55	ALL	Tx28		18	0.6	270	10.04	7.81	4	14.5	4.000	6.200	2.190	-2.882	2297	0.760	1.060	1.37	1.77	1.15
	60	ALL	Tx28		22	0.6	270	9.75	6.48	4	22.5	4.400	6.800	2.597	-3.355	2625	0.740	1.060	1.35	1.90	1.13
65	ALL	Tx28		26	0.6	270	9.56	6.48	4	24.5	5.200	7.200	3.049	-3.865	2965	0.720	1.070	1.20	1.77	1.09	
Type Tx34 Girders 40' Roadway 8.5" Slab	40	ALL	Tx34		12	0.6	270	13.01	13.01	2	8.5	4.000	5.000	0.920	-1.270	1937	0.860	1.020	1.82	2.36	2.43
	45	ALL	Tx34		14	0.6	270	13.01	12.15	2	6.5	4.000	5.000	1.161	-1.547	2121	0.830	1.030	1.81	2.35	2.20
	50	ALL	Tx34		14	0.6	270	13.01	12.44	2	6.5	4.000	5.000	1.425	-1.865	2073	0.810	1.030	1.46	1.89	1.64
	55	ALL	Tx34		16	0.6	270	12.76	11.76	4	8.5	4.000	5.000	1.724	-2.213	2383	0.790	1.040	1.42	1.84	1.41
	60	ALL	Tx34		16	0.6	270	12.76	11.76	4	8.5	4.500	5.800	2.033	-2.567	2721	0.770	1.040	1.38	1.79	1.24
	65	ALL	Tx34		20	0.6	270	12.41	9.61	4	18.5	4.000	5.800	2.373	-2.945	3069	0.750	1.050	1.17	1.74	1.08
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	75	ALL	Tx34		28	0.6	270	12.01	8.58	4	28.5	5.200	6.500	3.138	-3.781	3824	0.720	1.050	1.49	1.99	1.11
80	ALL	Tx34		32	0.6	270	11.64	8.26	6	24.5	5.800	7.000	3.567	-4.245	4236	0.710	1.060	1.22	1.79	1.05	
Type Tx40 Girders 40' Roadway 8.5" Slab	40	ALL	Tx40		12	0.6	270	15.60	15.60			4.000	5.000	0.757	-1.027	1998	0.890	1.010	2.08	2.70	2.97
	45	ALL	Tx40		14	0.6	270	15.60	15.60			4.700	5.000	0.953	-1.249	2363	0.860	1.010	2.08	2.69	2.72
	50	ALL	Tx40		14	0.6	270	15.60	15.60			4.500	5.000	1.175	-1.505	2555	0.830	1.020	1.70	2.21	2.12
	55	ALL	Tx40		16	0.6	270	15.35	14.35	4	8.5	4.000	5.000	1.408	-1.776	2685	0.810	1.020	1.66	2.15	1.89
	60	ALL	Tx40		16	0.6	270	15.35	14.35	4	8.5	4.000	5.000	1.672	-2.070	2798	0.790	1.030	1.39	1.81	1.46
	65	ALL	Tx40		18	0.6	270	15.16	13.82	4	10.5	4.000	5.000	1.942	-2.368	3153	0.770	1.030	1.38	1.79	1.31
	70	ALL	Tx40		20	0.6	270	15.00	13.40	4	12.5	4.000	5.000	2.249	-2.705	3554	0.760	1.030	1.35	1.75	1.14
	75	ALL	Tx40		24	0.6	270	14.77	9.77	4	34.5	4.100	5.600	2.574	-3.046	3937	0.740	1.040	1.12	1.73	1.02
	80	ALL	Tx40		26	0.6	270	14.68	9.76	4	36.5	4.400	5.800	2.900	-3.399	4348	0.730	1.040	1.20	1.88	1.05
	85	ALL	Tx40		30	0.6	270	14.40	10.00	6	28.5	5.100	6.100	3.268	-3.787	4786	0.720	1.040	1.26	1.99	1.04
90	ALL	Tx40		34	0.6	270	14.07	9.48	6	32.5	5.600	6.300	3.628	-4.168	5218	0.710	1.040	1.52	1.85	1.16	
Type Tx46 Girders 40' Roadway 8.5" Slab	40	ALL	Tx46		12	0.6	270	17.60	17.60			4.000	5.000	0.663	-0.816	2075	0.920	0.990	2.31	3.00	3.55
	45	ALL	Tx46		12	0.6	270	17.60	17.60			4.000	5.000	0.832	-0.994	2458	0.890	1.000	1.92	2.49	2.84
	50	ALL	Tx46		14	0.6	270	17.60	17.60			4.200	5.000	1.026	-1.204	2931	0.870	1.000	1.88	2.44	2.56
	55	ALL	Tx46		16	0.6	270	17.35	16.35	4	8.5	4.000	5.000	1.236	-1.421	3272	0.840	1.010	1.86	2.41	2.33
	60	ALL	Tx46		16	0.6	270	17.35	16.35	4	8.5	4.000	5.000	1.466	-1.657	3218	0.820	1.010	1.56	2.03	1.85
	65	ALL	Tx46		16	0.6	270	17.35	16.35	4	8.5	4.500	5.500	1.702	-1.897	3301	0.800	1.010	1.56	2.02	1.69
	70	ALL	Tx46		18	0.6	270	17.16	15.83	4	10.5	4.000	5.000	1.969	-2.168	3722	0.790	1.020	1.32	1.71	1.31
	75	ALL	Tx46		20	0.6	270	17.00	15.40	4	12.5	4.000	5.000	2.251	-2.442	4127	0.770	1.020	1.06	1.46	1.00
	80	ALL	Tx46		22	0.6	270	16.88	15.06	4	14.5	4.000	5.000	2.537	-2.727	4561	0.760	1.020	1.19	1.69	1.05
	85	ALL	Tx46		26	0.6	270	16.68	12.07	4	34.5	4.000	5.300	2.856	-3.039	5023	0.750	1.020	1.31	1.86	1.07
	90	ALL	Tx46		30	0.6	270	16.40	9.20	6	42.5	4.100	5.500	3.190	-3.351	5458	0.730	1.030	1.38	2.02	1.06
	95	ALL	Tx46		34	0.6	270	16.07	9.72	6	42.5	4.700	5.700	3.520	-3.670	5924	0.720	1.030	1.47	2.12	1.09
100	ALL	Tx46		38	0.6	270	15.81	10.45	6	40.5	5.400	6.100	3.862	-4.000	6400	0.710	1.030	1.48	2.19	1.10	
105	ALL	Tx46		42	0.6	270	15.60	10.46	6	42.5	5.900	6.800	4.249	-4.363	6911	0.700	1.030	1.50	1.75	1.08	

- ① Based on the following allowable stresses (ksi):
 Compression = 0.65 f'ci
 Tension = 0.24 $\sqrt{f'ci}$
 Optional designs must likewise conform.
- ② Portion of full HL93.

DESIGN NOTES:
 Designed according to AASHTO LRFD Bridge Design Specifications. Load rated using Load and Resistance Factor Rating according to AASHTO Manual for Bridge Evaluation.
 Optional designs for girders 120 feet or longer must have a calculated residual camber equal to or greater than that of the designed girder.
 Prestress losses for the designed girders have been calculated for a relative humidity of 60 percent. Optional designs must likewise conform.

FABRICATION NOTES:
 Provide Class H concrete.
 Provide Grade 60 reinforcing steel bars.
 Use low relaxation strands, each pretensioned to 75 percent of fpu.
 Strand debonding must comply with Item 424.4.2.2.4. Full-length debonded strands are only permitted in positions marked Δ . Double wrap full-length debonded strands in outer most position of each row.
 When shown on this sheet, the Fabricator has the option of furnishing either the designed girder or an approved optional design. All optional design submittals must be signed, sealed and dated by a Professional Engineer registered in the State of Texas.
 Seal cracks in girder ends exceeding 0.005" in width as directed by the Engineer. The fabricator is permitted to decrease the spacing of Bars R and S by providing additional bars to help limit crack width provided the decreased spacing results in no less than 1" clear between bars. The fabricator must take an approved corrective action if cracks greater than 0.005" form on a repetitive basis.

DEPRESSED STRAND DESIGNS:
 Locate strands for the designed girder as low as possible on the 2" grid system unless a non-standard strand pattern is indicated. Fill row "2.5", then row "4.5", then row "6.5", etc., beginning each row in the "A" position and working outward until the required number of strands is reached. All strands in the "A" position must be depressed, maintaining the 2" spacing so that, at the girder ends, the upper two strands are in the position shown in the table.



HL93 LOADING SHEET 1 OF 2

Texas Department of Transportation
 Bridge Division Standard

PRESTRESSED CONCRETE I-GIRDER STANDARD DESIGNS
 40' ROADWAY

IGSD-40

FILE: ig07stds-21.dgn	DN: EFC	CK: AJF	DW: EFC	CK: TAR
©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0484	01	025	FM 707
10-19: Redesigned girders. 1-21: Added load rating.	DIST	COUNTY	SHEET NO.	
	ABL	JONES	113	

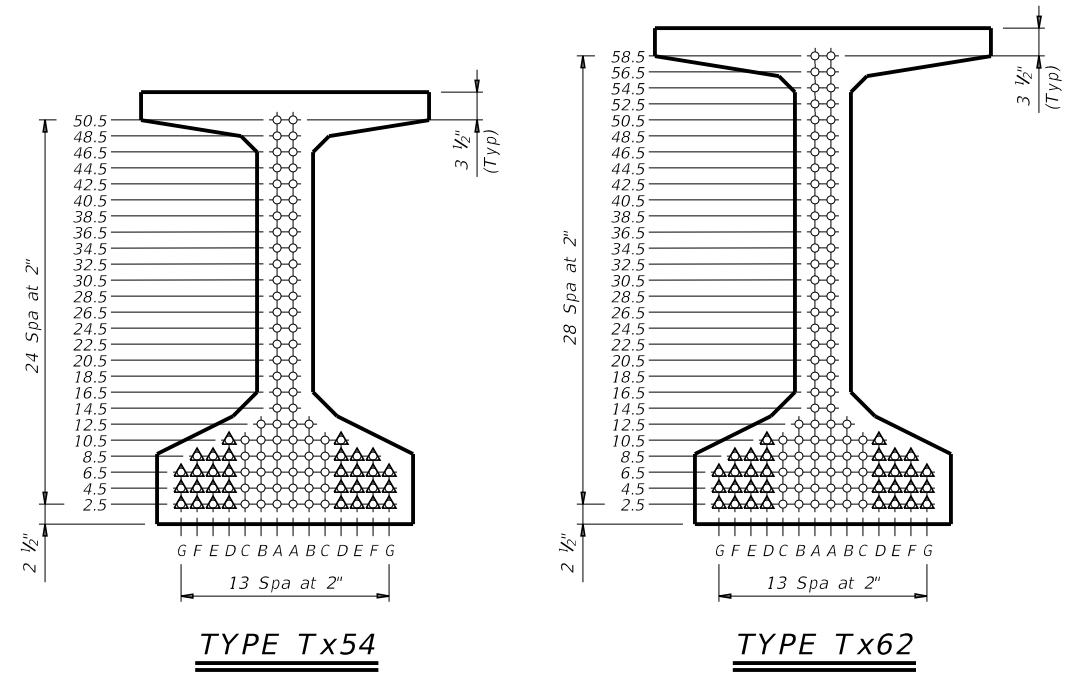
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Alex.Massara
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STRUCTURE	DESIGNED GIRDERS									DEPRESSED STRAND PATTERN		CONCRETE		OPTIONAL DESIGN					LOAD RATING		
	SPAN NO.	GIRDER NO.	GIRDER TYPE	PRESTRESSING STRANDS					NO.					TO END (in)	RELEASE STRGTH (1) f'ci (ksi)	MINIMUM 28 DAY COMP STRGTH f'c (ksi)	DESIGN LOAD COMP STRESS (TOP ϵ) (SERVICE I) Fct(ksi)	DESIGN LOAD TENSILE STRESS (BOTTL ϵ) (SERVICE III) fcb(ksi)	REQUIRED MINIMUM ULTIMATE MOMENT CAPACITY (STRENGTH I) (kip-ft)	LIVE LOAD DISTRIBUTION FACTOR (2)	
				NON-STD STRAND PATTERN	TOTAL NO.	SIZE (in)	STRGTH fpu (ksi)	"e" ϵ (in)		"e" END (in)	Moment	Shear	Inv							Opr	Inv
Type Tx54 Girders 40' Roadway 8.5" Slab	40	ALL	Tx54		10	0.6	270	21.01	21.01			4.000	5.000	0.554	-0.670	2161	0.960	0.980	2.11	2.74	3.61
	45	ALL	Tx54		12	0.6	270	21.01	21.01			4.000	5.000	0.688	-0.808	2537	0.920	0.990	2.21	2.86	3.46
	50	ALL	Tx54		14	0.6	270	21.01	21.01			4.000	5.000	0.847	-0.978	3027	0.900	0.990	2.17	2.81	3.14
	55	ALL	Tx54		14	0.6	270	21.01	21.01			4.000	5.000	1.018	-1.154	3506	0.870	0.990	1.82	2.36	2.56
	60	ALL	Tx54		16	0.6	270	20.76	20.26	4	6.5	4.000	5.000	1.206	-1.346	3925	0.850	1.000	1.82	2.36	2.36
	65	ALL	Tx54		16	0.6	270	20.76	20.26	4	6.5	4.000	5.000	1.408	-1.548	3872	0.830	1.000	1.55	2.01	1.92
	70	ALL	Tx54		18	0.6	270	20.56	19.23	4	10.5	4.000	5.000	1.614	-1.751	4103	0.810	1.000	1.57	2.04	1.79
	75	ALL	Tx54		18	0.6	270	20.56	19.67	4	8.5	4.000	5.000	1.847	-1.981	4272	0.800	1.000	1.34	1.74	1.43
	80	ALL	Tx54		20	0.6	270	20.41	18.81	4	12.5	4.000	5.000	2.091	-2.214	4703	0.780	1.010	1.36	1.76	1.32
	85	ALL	Tx54		20	0.6	270	20.41	18.81	4	12.5	4.000	5.000	2.353	-2.466	5180	0.770	1.010	1.17	1.52	1.02
	90	ALL	Tx54		24	0.6	270	20.17	17.84	4	18.5	4.000	5.000	2.612	-2.717	5655	0.760	1.010	1.35	1.76	1.09
	95	ALL	Tx54		28	0.6	270	20.01	14.29	4	44.5	4.000	5.000	2.902	-2.991	6161	0.750	1.010	1.50	1.94	1.11
	100	ALL	Tx54		32	0.6	270	19.63	11.38	6	50.5	4.100	5.000	3.184	-3.260	6658	0.740	1.020	1.55	2.08	1.12
	105	ALL	Tx54		34	0.6	270	19.48	13.48	6	40.5	4.700	5.400	3.500	-3.555	7191	0.730	1.020	1.46	2.03	1.01
110	ALL	Tx54		38	0.6	270	19.22	12.27	6	50.5	5.000	5.700	3.831	-3.862	7738	0.720	1.020	1.53	2.13	1.05	
115	ALL	Tx54		42	0.6	270	19.01	12.72	6	50.5	5.600	6.400	4.147	-4.157	8268	0.710	1.020	1.39	1.87	1.08	
120	ALL	Tx54		46	0.6	270	18.66	11.36	8	50.5	5.800	6.800	4.504	-4.484	8840	0.700	1.020	1.34	1.76	1.03	
Type Tx62 Girders 40' Roadway 8.5" Slab	60	ALL	Tx62		16	0.6	270	25.53	25.53			4.000	5.000	0.948	-1.129	4196	0.880	0.990	2.04	2.65	2.83
	65	ALL	Tx62		16	0.6	270	25.53	25.53			4.000	5.000	1.106	-1.298	4607	0.860	0.990	1.75	2.27	2.35
	70	ALL	Tx62		18	0.6	270	25.33	25.33			4.000	5.000	1.274	-1.476	4887	0.840	0.990	1.77	2.29	2.21
	75	ALL	Tx62		18	0.6	270	25.33	25.33			4.000	5.000	1.443	-1.653	4843	0.820	0.990	1.55	2.00	1.85
	80	ALL	Tx62		20	0.6	270	25.18	24.38	4	8.5	4.000	5.000	1.634	-1.854	5110	0.810	1.000	1.55	2.01	1.72
	85	ALL	Tx62		20	0.6	270	25.18	24.38	4	8.5	4.000	5.000	1.834	-2.057	5382	0.790	1.000	1.36	1.77	1.41
	90	ALL	Tx62		22	0.6	270	25.05	23.60	4	12.5	4.000	5.000	2.048	-2.277	5897	0.780	1.000	1.37	1.78	1.31
	95	ALL	Tx62		24	0.6	270	24.94	23.94	4	10.5	4.900	5.000	2.273	-2.506	6428	0.770	1.000	1.19	1.55	1.03
	100	ALL	Tx62		28	0.6	270	24.78	22.49	4	20.5	4.500	5.100	2.491	-2.730	6948	0.760	1.000	1.38	1.78	1.12
	105	ALL	Tx62		32	0.6	270	24.40	15.40	6	54.5	4.000	5.000	2.736	-2.977	7508	0.750	1.010	1.20	1.77	1.01
	110	ALL	Tx62		34	0.6	270	24.25	15.42	6	56.5	4.200	5.000	2.970	-3.214	8051	0.740	1.010	1.65	2.18	1.31
	115	ALL	Tx62		36	0.6	270	24.11	15.78	6	56.5	4.500	5.200	3.236	-3.479	8638	0.730	1.010	1.58	2.12	1.22
	120	ALL	Tx62		38	0.6	270	23.99	17.67	6	46.5	5.000	5.900	3.513	-3.752	9241	0.720	1.010	1.55	2.07	1.12
	125	ALL	Tx62		42	0.6	270	23.78	16.35	6	58.5	5.300	6.200	3.770	-4.009	9815	0.710	1.010	1.58	2.13	1.35
130	ALL	Tx62		46	0.6	270	23.43	15.78	8	52.5	5.700	6.600	4.073	-4.315	10512	0.710	1.010	1.51	1.88	1.21	

NON-STANDARD STRAND PATTERNS	
PATTERN	STRAND ARRANGEMENT AT ϵ OF GIRDER

- (1) Based on the following allowable stresses (ksi):
 Compression = 0.65 f'ci
 Tension = 0.24 $\sqrt{f'ci}$
 Optional designs must likewise conform.
- (2) Portion of full HL93.



HL93 LOADING SHEET 2 OF 2

Texas Department of Transportation
 Bridge Division Standard

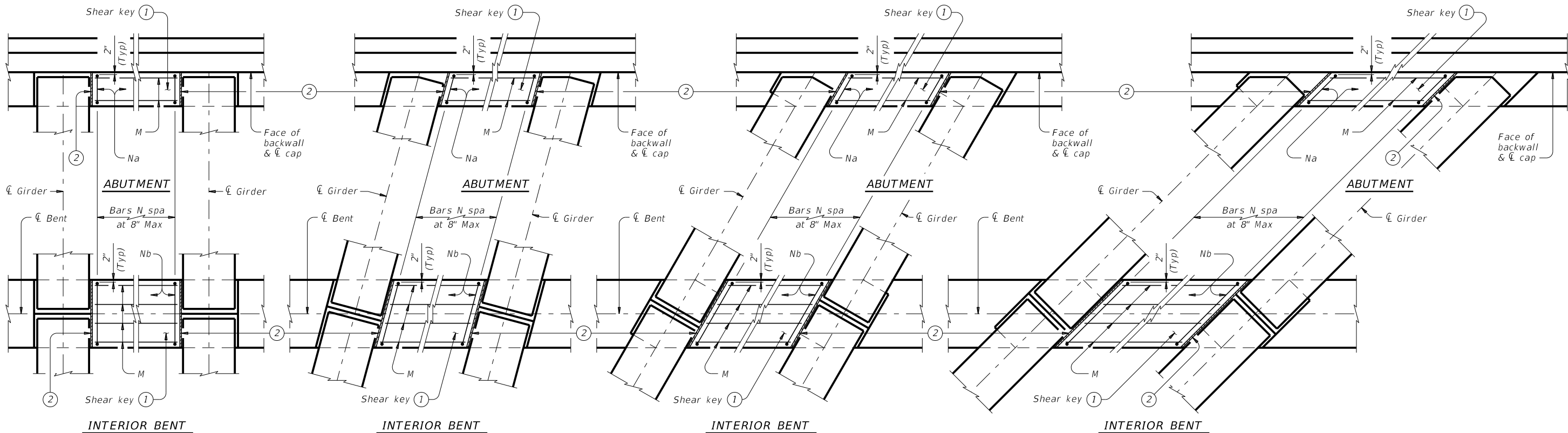
PRESTRESSED CONCRETE I-GIRDER STANDARD DESIGNS
 40' ROADWAY

IGSD-40

FILE: ig07stds-21.dgn	DN: EFC	CK: AJF	DW: EFC	CK: TAR
©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0484	01	025	FM 707
10-19: Redesigned girders. 1-21: Added load rating.	DIST	COUNTY	SHEET NO.	
	ABL	JONES	114	

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PARTIAL PLANS WITH NO SKEW

Showing shear keys on 3'-6" wide caps. 4'-0" caps similar.

PARTIAL PLANS WITH 15° SKEW

Showing shear keys on 3'-6" wide caps. 4'-0" caps similar.

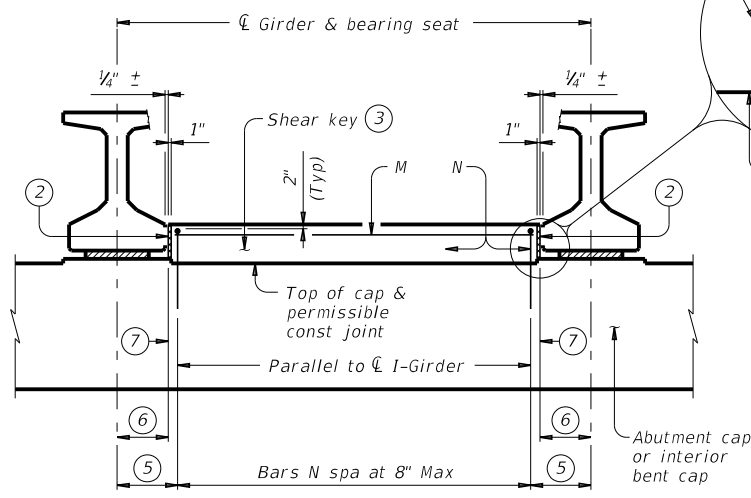
PARTIAL PLANS WITH 30° SKEW

Showing shear keys on 3'-6" wide caps. 4'-0" caps similar.

PARTIAL PLANS WITH 45° SKEW

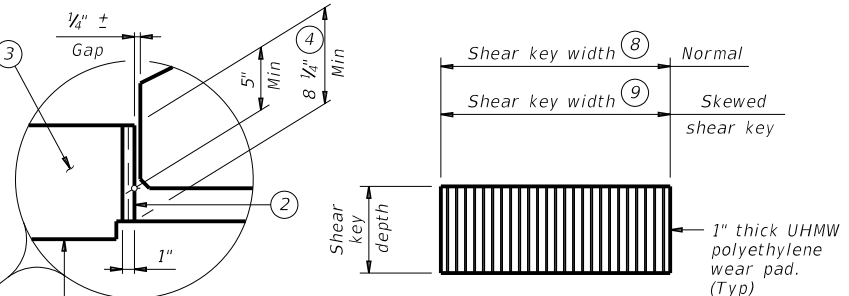
Showing shear keys on 3'-6" wide caps. 4'-0" caps similar.

- ① Place shear keys on the upstream side of structure between outside girder and next adjacent girder, unless shown otherwise on plans.
- ② UHMW polyethylene wear pad. (Typ)
- ③ Leave a 1/4" gap plus or minus between girder and face of wear pad. Cast wear pad with shear key, smooth side facing girder. Care must be taken to keep concrete from flowing under girder. Slope top of shear keys in accordance with Item 420.4.9, "Treatment and Finishing of Horizontal Surfaces."
- ④ Measure at higher bearing seat elevation forward or back. Dimension based on typical bearing pad and bearing seat. Increase as necessary to maintain 5" overlap.
- ⑤ With No Skew = 1'-8 1/4", measured along centerline cap. With Skew = 1'-8 1/4" * Cos Skew, measured along centerline cap.
- ⑥ With No Skew = 1'-4 1/4", measured along centerline cap. With Skew = 1'-4 1/4" * Cos Skew, measured along centerline cap.
- ⑦ Face of UHMW polyethylene wear pad. Smooth side of pad facing girder.
- ⑧ Abutments = 1/2 Cap width. Interior bents = Cap width.
- ⑨ Abutments = 1/2 Cap width * Cos Skew. Interior bents = Cap width * Cos Skew.

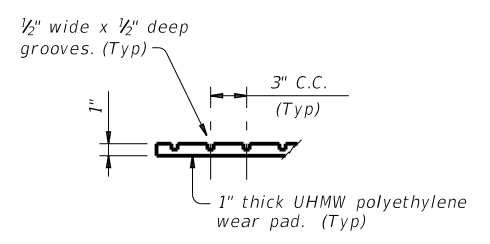


PARTIAL ELEVATION OF ABUTMENT OR INTERIOR BENT CAP

Showing shear key with girder Type Tx46. Other I-Girder types similar.

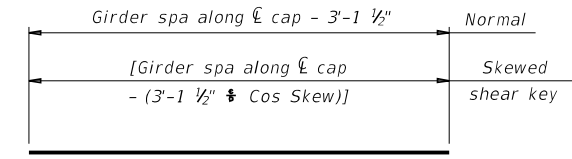


ELEVATION

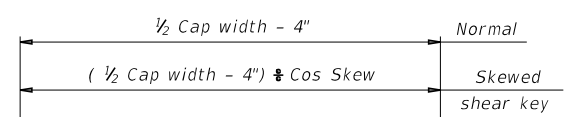


PART SECTION

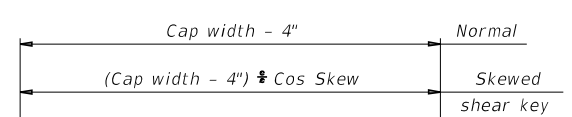
ULTRA HIGH MOLECULAR WEIGHT (UHMW) POLYETHYLENE WEAR PAD DETAILS



BARS M (#5)



BARS Na (#5) (For abutments)



BARS Nb (#5) (For interior bents)

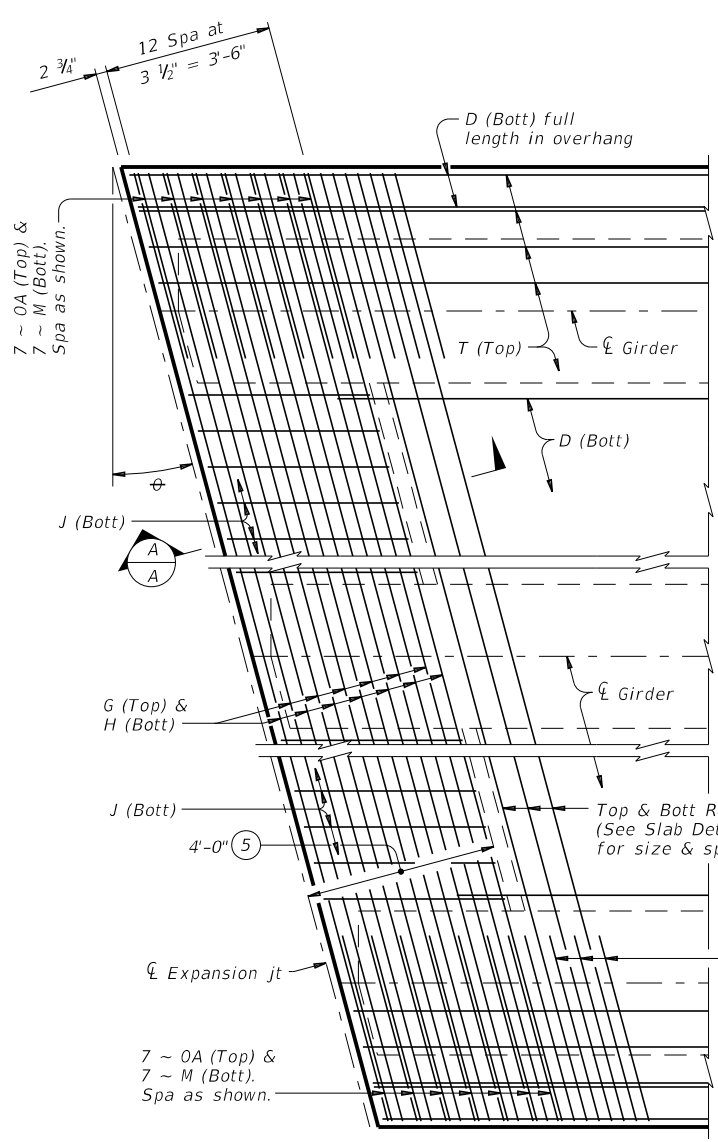
CONSTRUCTION NOTES:
 Provide Class "C" concrete (f'c = 3,600 psi). Provide Class "C" (HPC) if shown elsewhere on the plans.
 Provide Grade 60 reinforcing steel.
 Provide epoxy coated reinforcing steel for shear key if abutment or interior bent reinforcing steel is epoxy coated.
 Provide Ultra High Molecular Weight (UHMW) polyethylene wear pads in accordance with ASTM D6712.

GENERAL NOTES:
 Designed according to AASHTO LRFD Bridge Design Specifications. Details showing skew are drawn showing right forward skew. See Bridge Layout for actual skew direction.
 These details are limited to bridges skewed 45 degrees and less. This standard is only applicable for I-Girders.
 Modify details for bearing conditions, and girder spacing not shown on this standard. Details do not account for sole plate or pedestal bearing seat.
 Include shear key concrete in abutment or bent concrete for payment.
 UHMW polyethylene wear pads are subsidiary to Class "C" concrete.
 Cover dimensions are clear dimensions, unless noted otherwise. Reinforcing bar dimensions shown are out-to-out of bar.

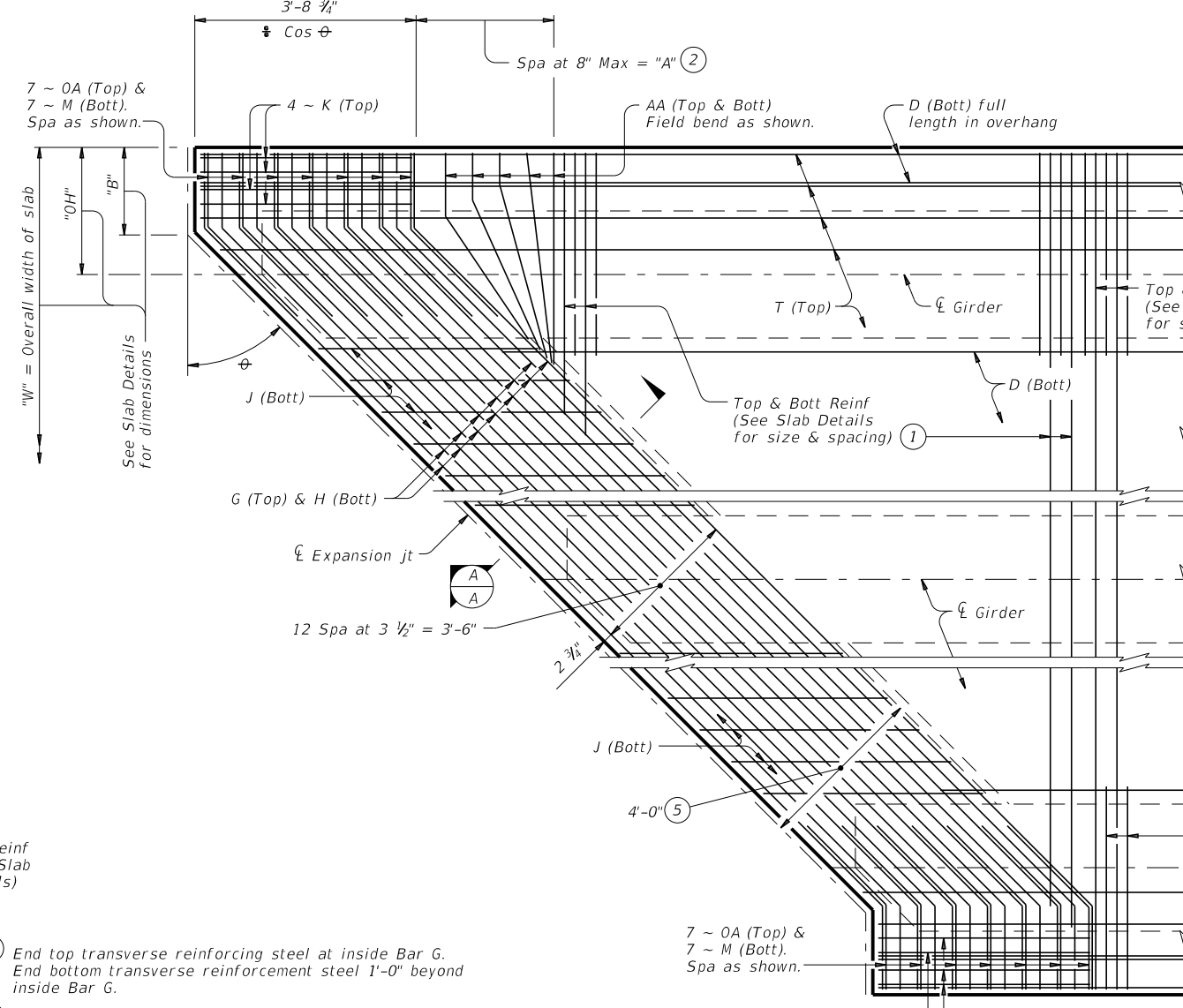
		Bridge Division Standard	
SHEAR KEY DETAILS PRESTR CONCRETE I-GIRDERS			
IGSK			
FILE: igskstds-17.dgn	DN: TxDOT	CK: TxDOT	DW: JTR
REVISIONS	CONT	SECT	JOB
0484	01	025	FM 707
DIST	COUNTY	SHEET NO.	
ABL	JONES	115	

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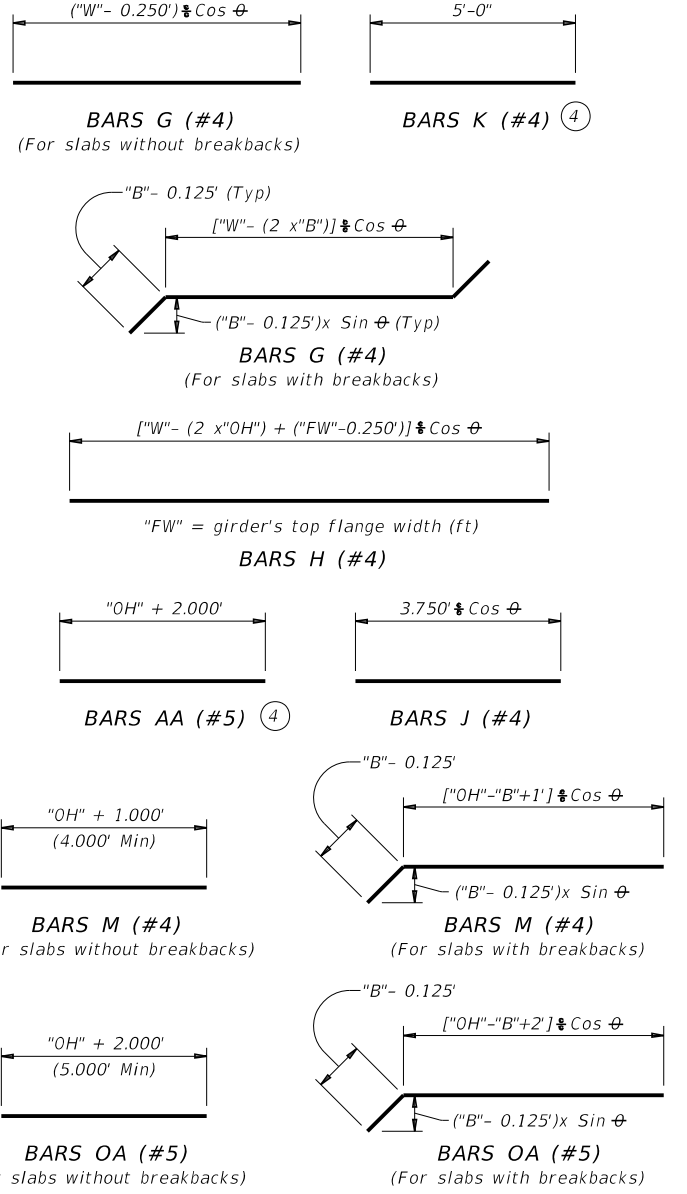
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PARTIAL PLAN FOR SLABS WITHOUT BREAKBACK



PARTIAL PLAN FOR SLABS WITH BREAKBACK

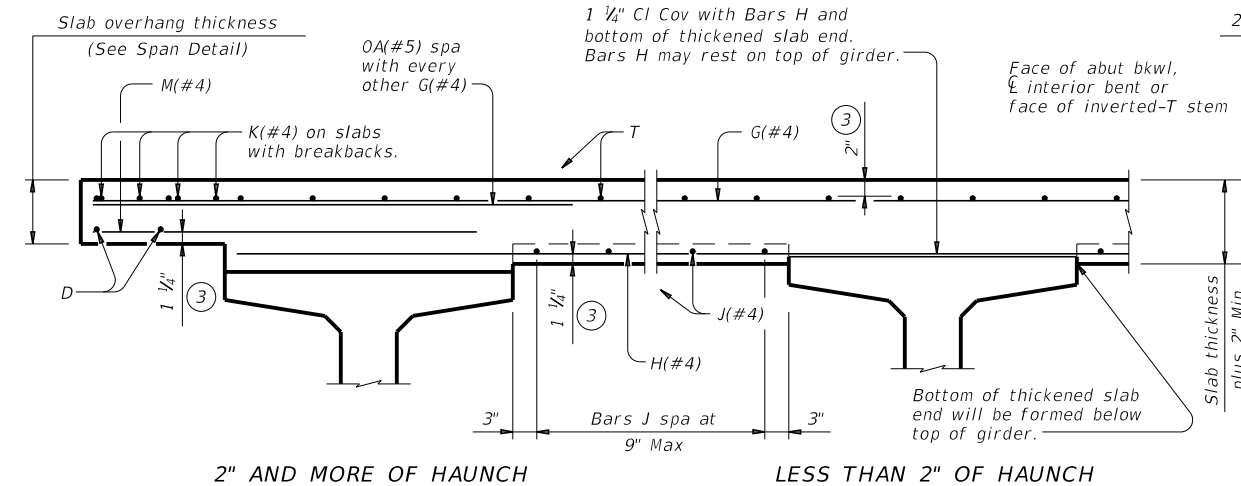


- ① End top transverse reinforcing steel at inside Bar G. End bottom transverse reinforcement steel 1'-0" beyond inside Bar G.
- ② "A" = ("OH" + 2.333 "B") x Tan ϕ
- ③ Provide clear cover as indicated unless otherwise shown on Span Details.
- ④ Only required on slabs with breakbacks.
- ⑤ Thickened slab end dimensioned perpendicular to face of bkwl, centerline interior bent or face of inverted-T stem.

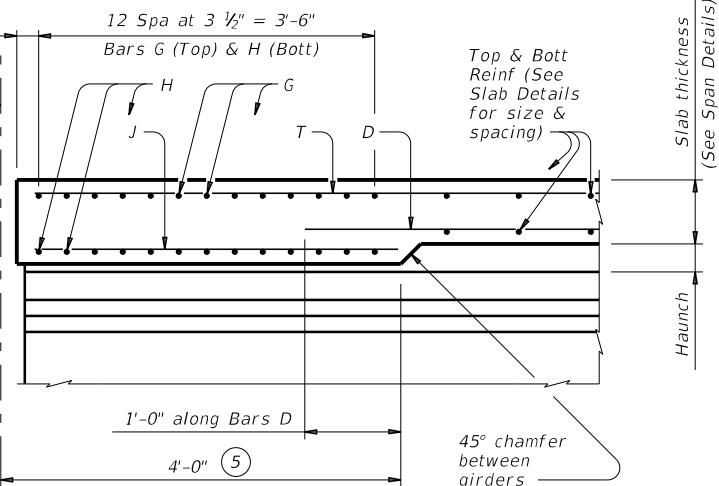
GENERAL NOTES:
 Designed according to AASHTO LRFD Bridge Design Specifications. These details are restricted to Prestressed Concrete I-Girder Spans. These details are to be used in conjunction with the Span Details and PCP standard (if prestressed concrete panels are used). When Option 2 from PCP standard is used, provide Bars AA, G, K and OA in the slab.

MATERIAL NOTES:
 Provide Grade 60 reinforcing steel. If slab reinforcing steel is shown on the Slab Details to be epoxy coated, then Bars AA, G, K, H, J, M and OA must be epoxy coated. Provide bar laps, where required, as follows:
 Uncoated ~ #4 = 1'-7"
 Epoxy Coated ~ #4 = 2'-5"

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



TYPICAL TRANSVERSE SECTION
 (Showing Prestressed Conc I-Girders at \perp Brg)

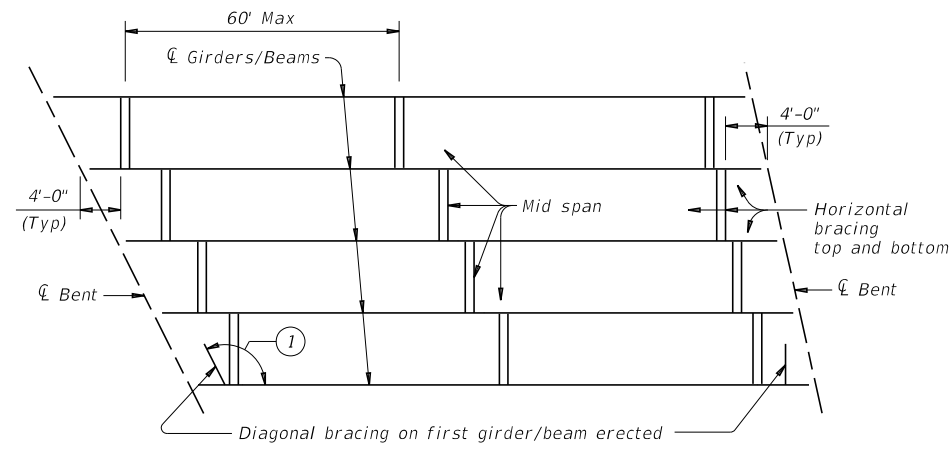


SECTION A-A
 (Showing with 2" and more of haunch)

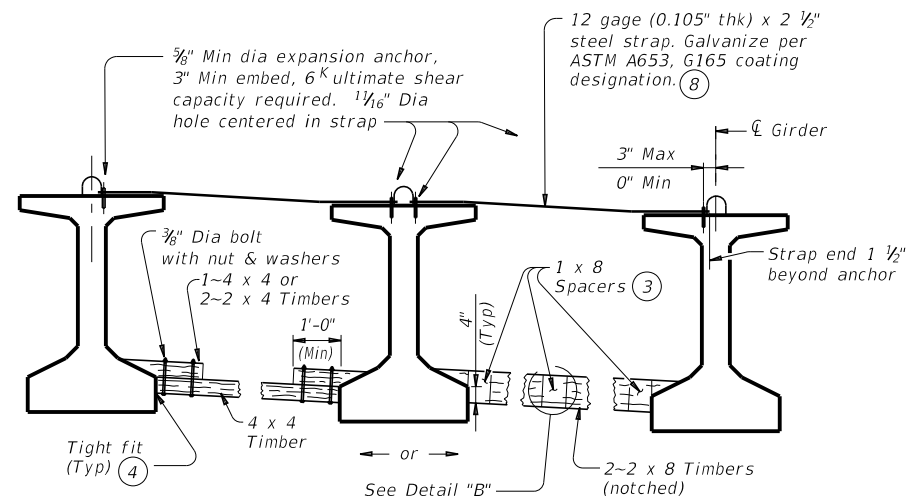
HL93 LOADING		Bridge Division Standard	
THICKENED SLAB END DETAILS			
PRESTRESSED CONCRETE I-GIRDER SPANS			
IGTS			
FILE: igtss1-17.dgn	DN: TxDOT	CK: TxDOT	DW: JTR
©TxDOT August 2017	CONT	SECT	JOB
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	DIST	COUNTY	HIGHWAY
	ABL	JONES	FM 707
			SHEET NO.
			116

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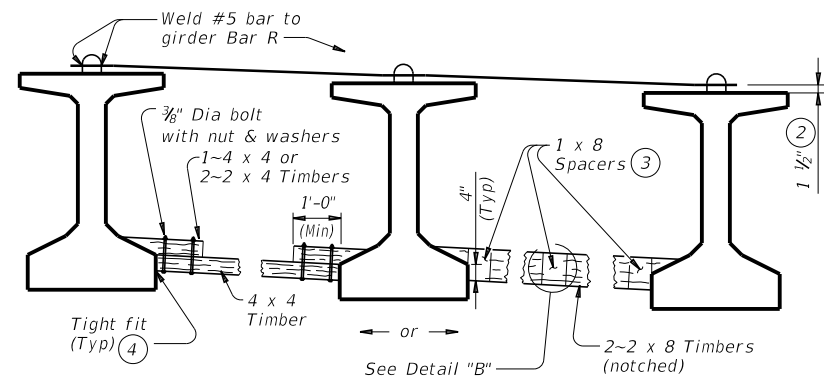


ERECTOR BRACING



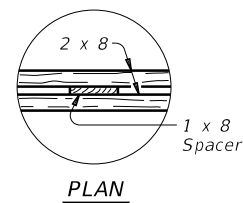
FOR ERECTOR BRACING, OPTION 1

(This option is not allowed when slab is formed with PMDF or plywood.)

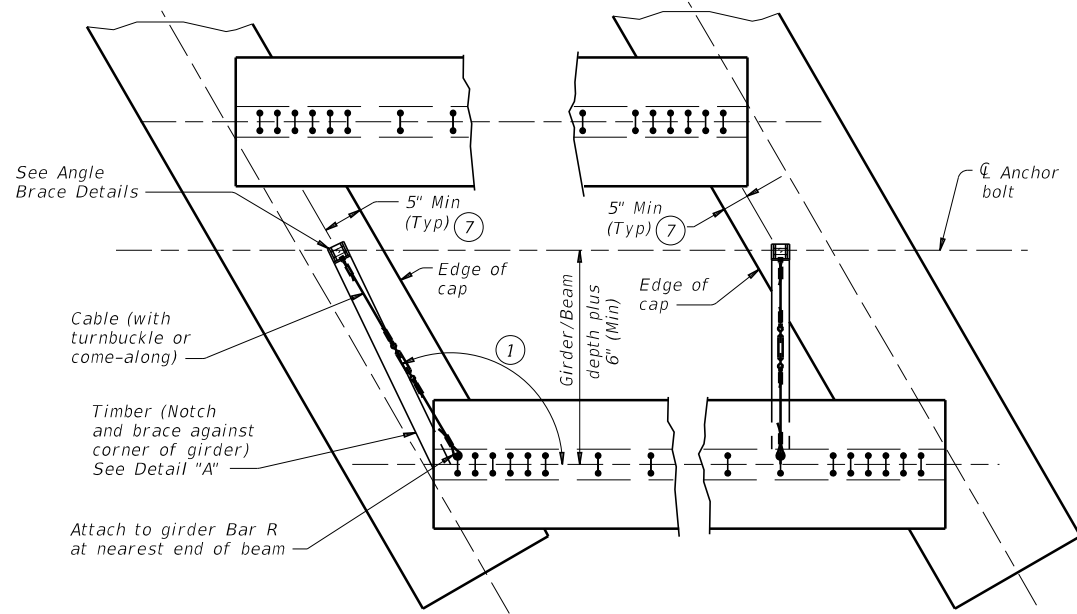


FOR ERECTOR BRACING, OPTION 2

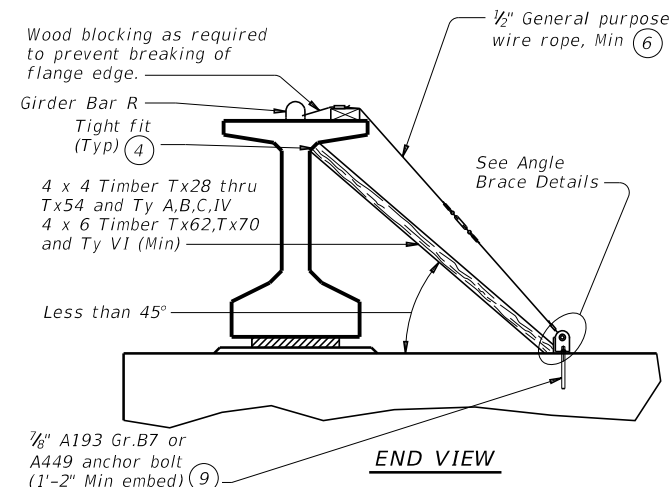
HORIZONTAL BRACING DETAILS



DETAIL "B"



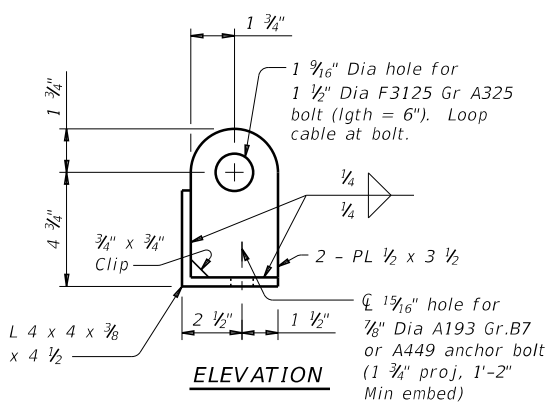
PLAN



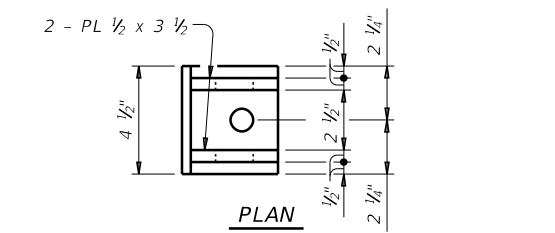
END VIEW

DIAGONAL BRACING DETAILS

(To be used on both ends of the first girder/beam erected in the span in each phase.)



ELEVATION



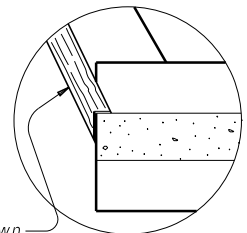
PLAN

ANGLE BRACE DETAILS

HAULING & ERECTION:
 The Contractor's attention is directed to the possible lateral instability of prestressed concrete girders and beams over 130' long, especially during hauling and erection. The use of the following methods to improve stability is encouraged: Locate lifting devices at the maximum practical distance from girder ends; use external lateral stiffening devices during hauling and erection; lift with vertical lines using two machines; and take care in handling to minimize inertial and impact forces.

ERECTOR BRACING:
 Erection bracing details shown are considered the minimum for fulfilling the bracing requirements of Item 425. Required erection bracing must be placed immediately after erection of each girder and remain in place until additional bracing as required for slab placement is in place. This standard is needed in all cases to meet requirements for Slab Placement Bracing.

PHASED CONSTRUCTION:
 Place erection and slab placement bracing for all girders in a phase as shown in these details. For phases after first, also place erection and slab placement bracing between outer girder of completed phase and adjacent girder of current phase. When the phase construction joint is between girders, top bracing can be omitted.



DETAIL "A"

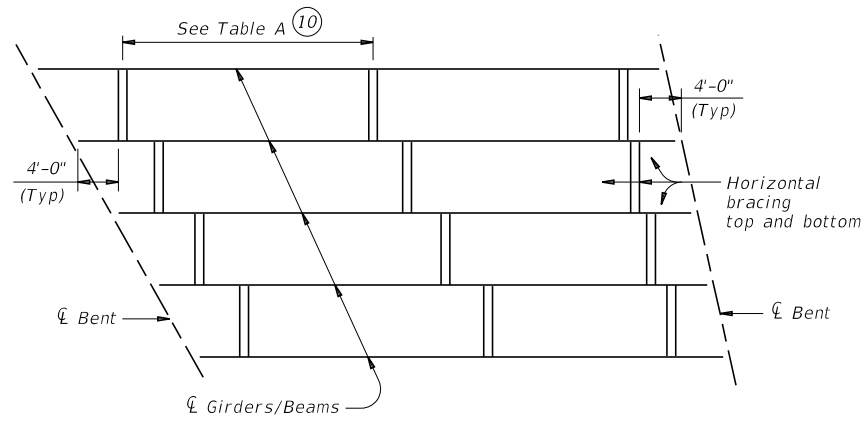
- 1 If angle shown exceeds 120 degrees, move diagonal brace to other side of girder/beam and place square to girder/beam. This may prevent exterior girder from being erected first.
- 2 Place and weld #5 bars as shown during erection. If forming deck with prestressed panels, bars can be temporarily removed, one at a time, during panel erection. Re-install bar prior to additional panel erection. Bars can rest on panels and be bent down and welded to girder Bars R (See Sheet 2 of 2).
- 3 Clear distance between spacers must not exceed 3'. Nail together with 16d nails.
- 4 Use wedges as necessary to obtain tight fit. Nail wedges to timbers.
- 5 Pressure treated landscape timbers can not be used.
- 6 All hardware used with cable must be able to develop a minimum 25 kips breaking strength. Use thimbles at all loops in cable. Install cable clamps with saddles bearing against the live end and U-bolts bearing against the dead end.
- 7 It is acceptable to tie anchor bolts to cap reinforcement.
- 8 Prior to installing, field bend strap to lay flush on both girders' top flange and slope between flange tips.
- 9 Anchor bolt may be drilled and epoxied in place. Provide 25k minimum pullout. Core drill hole.

SHEET 1 OF 2

		Bridge Division Standard	
MINIMUM ERECTOR AND BRACING REQUIREMENTS PRESTRESSED CONCRETE I-GIRDERS AND I-BEAMS			
MEBR(C)			
FILE: mebcsts1-17.dgn	DN: TxDOT	CK: TxDOT	OW: TxDOT
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REVISIONS	0484	01	025
	DIST	COUNTY	SHEET NO.
	ABL	JONES	117

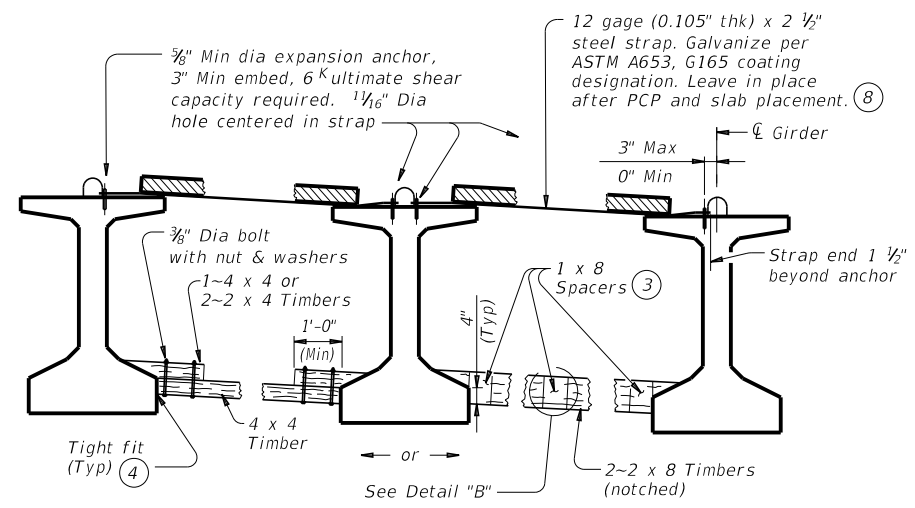
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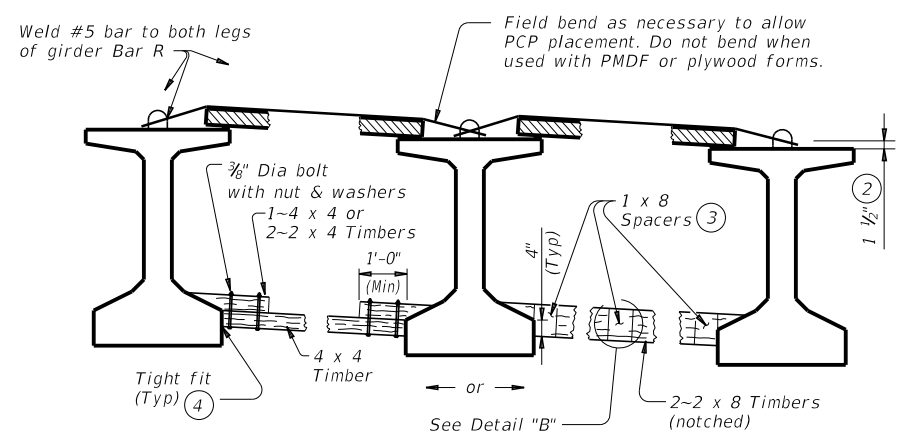
SLAB PLACEMENT BRACING

TABLE A				
Girder or Beam Type	OPTION 1-RIGID BRACING (STEEL STRAP)		OPTION 2-FLEXIBLE BRACING (NO. 5 OVER PCP)	
	Maximum Bracing Spacing		Maximum Bracing Spacing	
	Slab Overhang less than 4'-0" (11)	Slab Overhang 4'-0" and greater (11)	Slab Overhang less than 4'-0" (11)	Slab Overhang 4'-0" and greater (11)
Tx28	1/4 points	1/4 points	Tx28	1/4 points
Tx34	1/4 points	1/4 points	Tx34	1/4 points
Tx40	1/4 points	1/8 points	Tx40	1/4 points
Tx46	1/4 points	1/8 points	Tx46	1/4 points
Tx54	1/4 points	1/8 points	Tx54	1/4 points
Tx62	1/4 points	1/8 points	Tx62	1/4 points
Tx70	1/4 points	1/8 points	Tx70	1/4 points
A	1/8 points	1/8 points	A	2.0 ft
B	1/8 points	1/8 points	B	3.0 ft
C	1/8 points	1/8 points	C	4.5 ft
IV	1/4 points	1/8 points	IV	1/4 points
VI	1/4 points	1/8 points	VI	1/4 points



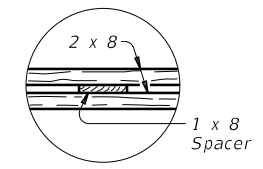
FOR SLAB PLACEMENT BRACING, OPTION 1 - RIGID

(Showing slab formed with PCP. This option is not allowed when slab is formed with PMDF or plywood.)



FOR SLAB PLACEMENT BRACING, OPTION 2 - FLEXIBLE

(Showing slab formed with PCP.)



**PLAN
DETAIL "B"**

HORIZONTAL BRACING DETAILS (5)

- 2 Place and weld #5 bars as shown during erection. If forming deck with prestressed panels, bars can be temporarily removed, one at a time, during panel erection. Re-install bar prior to additional panel erection. Bars can rest on panels and be bent down and welded to girder Bars R.
- 3 Clear distance between spacers must not exceed 3'. Nail together with 16d nails.
- 4 Use wedges as necessary to obtain tight fit. Nail wedges to timbers.
- 5 Pressure treated landscape timbers can not be used.
- 8 Prior to installing, field bend strap to lay flush on both girders' top flange and slope between flange tips.
- 10 Bracing spacing (1/4 and 1/8 points) measured between first and last typical brace location.
- 11 Measure slab overhang from centerline of girder or beam. When overhang varies in span, determine bracing spacing based on largest overhang.

SLAB PLACEMENT BRACING:
 The details for slab placement bracing are considered minimum for fulfilling the requirements of Specification Items 422 and 425. Required slab placement bracing must remain in place until slab concrete has attained a compressive strength of 3000 psi.

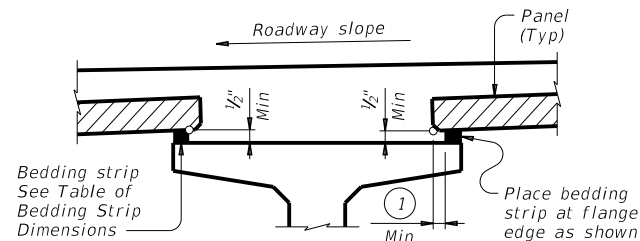
GENERAL NOTES:
 Bracing details for spans longer than 150' are not provided. The Contractor must submit proposed bracing details for such conditions to the Engineer for approval prior to erection. Systems equal to or better than those shown may be used provided details of such systems are submitted to and approved by the Engineer prior to erection. Use of these systems or details does not relieve the Contractor of the responsibility for the adequacy of the bracing and the safety of the structure. Removal of bracing for short periods of time to align girders and beams is permissible. All turn-buckles, come-alongs, anchors and other connections must be capable of developing the full strength of the cable shown. Furnish anchor bolts and nuts in accordance with Item 449, "Anchor Bolts".

		Bridge Division Standard	
MINIMUM ERECTION AND BRACING REQUIREMENTS PRESTRESSED CONCRETE I-GIRDERS AND I-BEAMS			
MEBR(C)			
FILE: mebcsts1-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT
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	DIST	COUNTY	SHEET NO.
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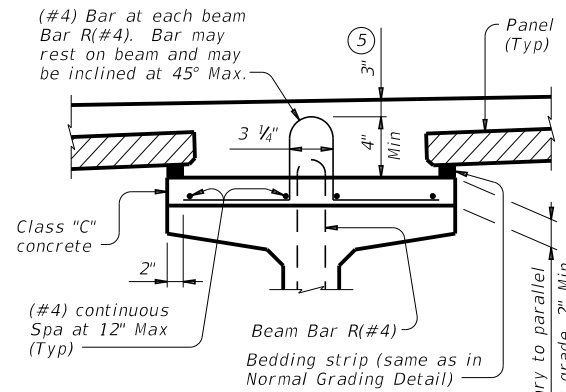
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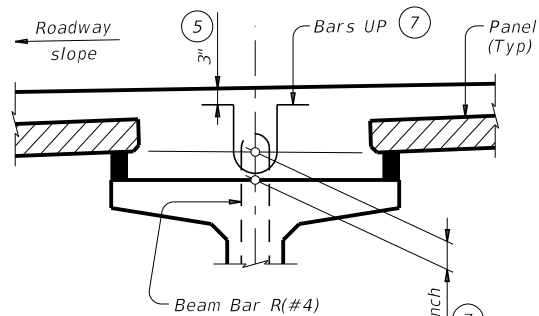
NORMAL GRADING DETAIL ③

Showing prestressed concrete I-girders. (Other beam types similar)



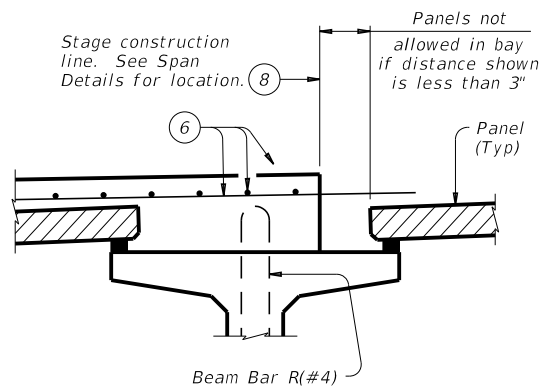
SPECIAL GRADING DETAIL FOR CONCRETE BEAMS

Showing prestressed concrete I-girders. (Other beam types similar)



HAUNCH REINFORCING DETAIL

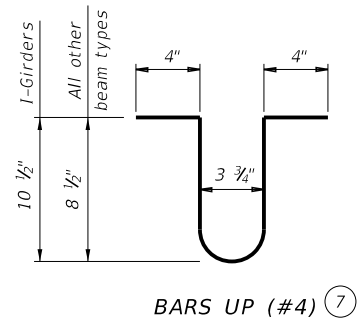
Showing prestressed concrete I-girders. (Other beam types similar)



PRESTR CONC I-GIRDERS

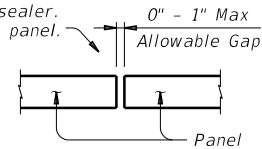
WIDTH	HEIGHT ④	
	Min	Max
1" (Min)	1/2"	2"
1 1/4"	1/2"	2 1/2"
1 1/2"	1/2"	3"
1 3/4"	1/2"	3 1/2"
2"	1/2"	4"
2 1/4"	1/2"	4 1/2" ②
2 1/2"	1/2"	5" ②
2 3/4"	1/2"	5 1/2" ②
3" (Max)	1/2"	6" ②

- ① 2" Min for I-girders, 1 1/2" Min for all other beam types.
- ② Allowed for I-girders, not allowed on other beam types.
- ③ To reduce the quantity of cast-in-place concrete, bedding strip thickness may be increased in 1/4" increments. Bedding strips must be comprised of one layer. Bond bedding strips to the beams with an adhesive compatible with bedding strips. Bedding strips over 2.5" high may need to be bonded to panels. The same thickness strip must be used under any one panel edge and the maximum change in thickness between adjacent panels is 1/4". Alternatively, bedding strips may be cut to grade. Panels may be supported by an alternate method, using a commercial product, if approved by the Engineer of Bridge Design, Bridge Division. If bedding strips exceed 6" high for I-Girders, 4" high for all other beam types, use Special Grading Detail for Concrete Beams or submit an alternate method to the Bridge Division for approval.
- ④ Height must not exceed twice the width.
- ⑤ Provide clear cover as indicated unless otherwise shown on Span Details.
- ⑥ See Span Details and Thickened Slab End Details for top slab reinforcement and clear cover. Transverse top slab reinforcement may rest on top of prestressed concrete panels if necessary to maintain clear cover.
- ⑦ Space Bars UP(#4) with Beam Bars R(#4) in all areas where measured haunch exceeds 3 1/2" with I-girders, and 3" for all other beam types. Epoxy coating for Bars UP is not required.
- ⑧ Do not locate construction joints on top of a panel.
- ⑨ Butt adjacent bedding strips together with adhesive. Cut v-notches, approx 1/4" deep, in the top of the bedding strips at 8' o.c..



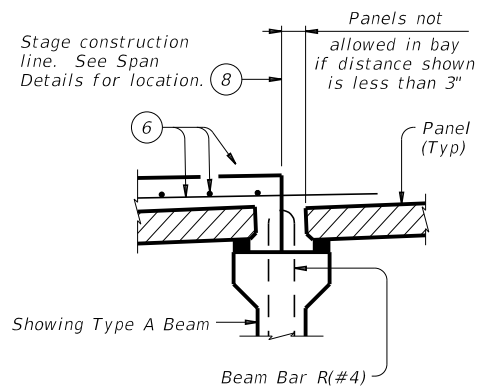
BARS UP (#4) ⑦

Seal joint between panels when gap exceeds 1/4" with polyurethane sealant or expanding foam sealer. Make seal flush with top of panel.

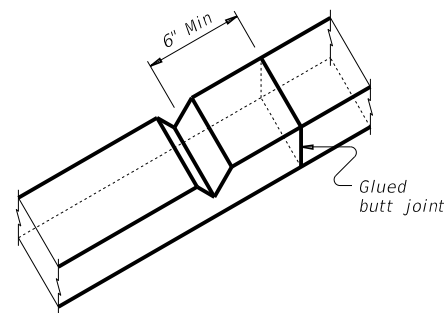


PANEL JOINTS

(Panel reinforcing not shown for clarity. The gap cannot be considered as a panel fabrication tolerance. Adjust panel placement to minimize joint openings.)



PRESTR CONC I-BEAMS



BEDDING STRIP DETAIL ⑨

STAGE CONSTRUCTION LIMITATIONS

(Other beam types similar)

CONSTRUCTION NOTES:
 Erected panels must bear uniformly on bedding strips of extruded polystyrene placed along top flange edges. Placing panels to minimize joint openings is recommended. If additional blocking is needed, special grading details for supporting the panels and extra reinforcing between beam and slab will be considered subsidiary to deck construction. Bars U, shown on PCP-FAB, may be bent over or cut off if necessary. Care must be taken to ensure proper cleaning of construction debris and consolidation of concrete material under the edges of the panels. Bedding strips must be placed at beam flange edges so that adequate space is provided for the mortar to flow a minimum of 1 1/2" under the panels as the slab concrete is placed. To allow the proper amount of mortar to flow between beam and panel, the minimum vertical opening must be at least 1/2". Roadway cross-slope reduces the opening available for entry of the mortar. Bedding strips varying in thickness across the beam are therefore required. For clear span between U-beams less than or equal to 18", see Permissible Slab Forming Detail on Miscellaneous Slab Detail sheets, UBMS.

MATERIAL NOTES:
 Provide Grade 60 reinforcing steel in the cast-in-place slab. See Table of Reinforcing Steel for size and spacing of reinforcement. If the top and bottom layer of reinforcing steel is shown on the Span Details to be epoxy coated, then the D, E, P, & Z bars must be epoxy coated. Provide bar Laps, where required, as follows:
 Uncoated ~ #4 = 1'-7"
 Epoxy Coated ~ #4 = 2'-5"

GENERAL NOTES:
 Designed according to AASHTO LRFD Bridge Design Specifications. Panel placement may follow either Option 1 or Option 2 except Option 1 must be used if the skew exceeds 45 degrees. Use of Prestressed Concrete Panels is not permitted for horizontally curved steel plate or tub girders. See Span Details for other possible restrictions on their use. These details are to be used in conjunction with the Span Details, PCP-FAB and other applicable standard drawings. When panel support (bedding strips) deviates from what is shown herein, provide details signed and sealed by a professional Engineer. Any additional reinforcing or concrete required on this standard is considered subsidiary to the bid item "Reinforced Concrete Slab".

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

HL93 LOADING SHEET 1 OF 4

Texas Department of Transportation Bridge Division Standard

PRESTRESSED CONCRETE PANELS DECK DETAILS

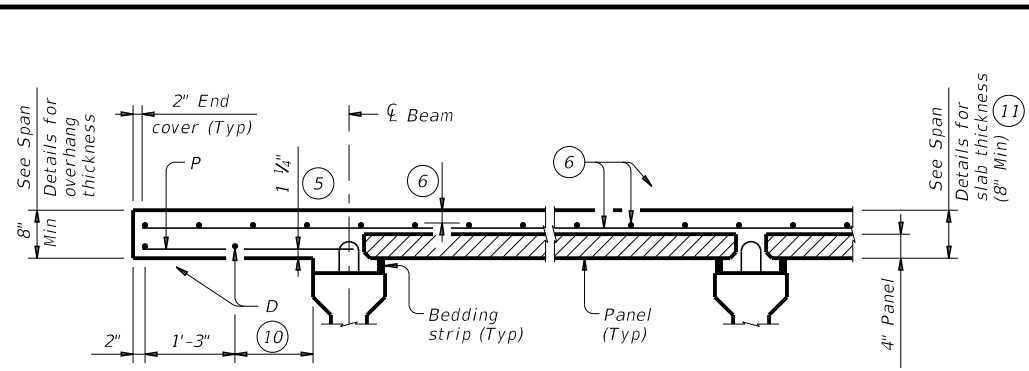
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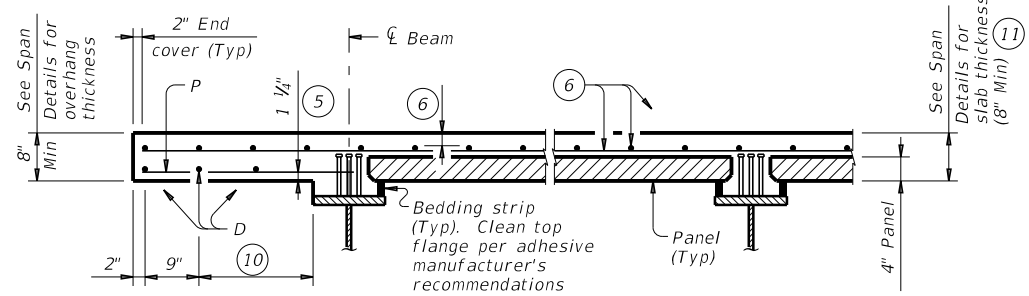
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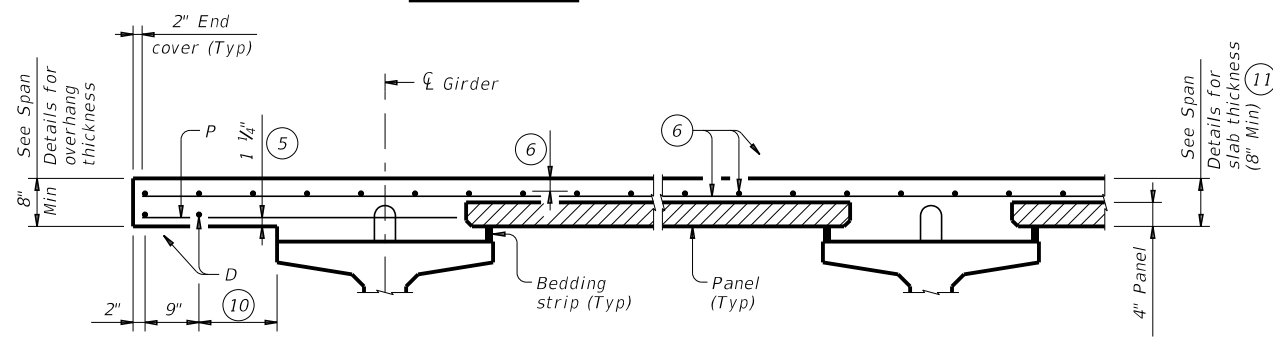
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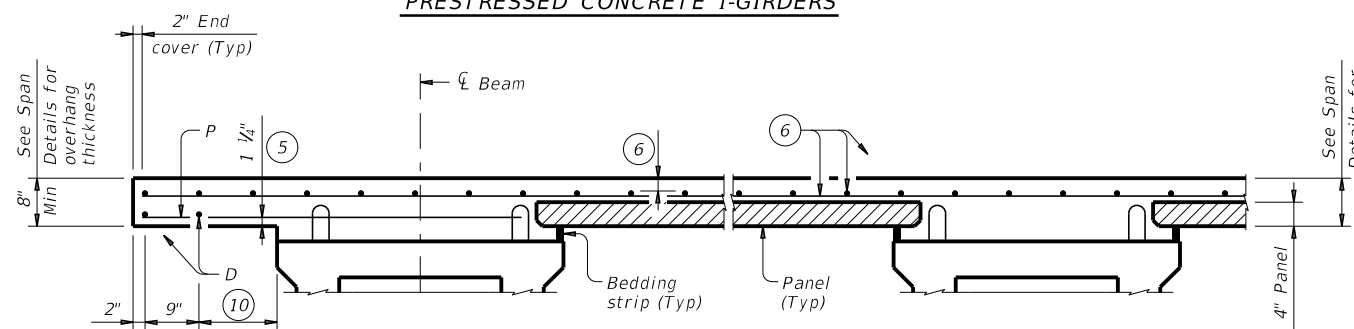
PRESTRESSED CONCRETE I-BEAMS



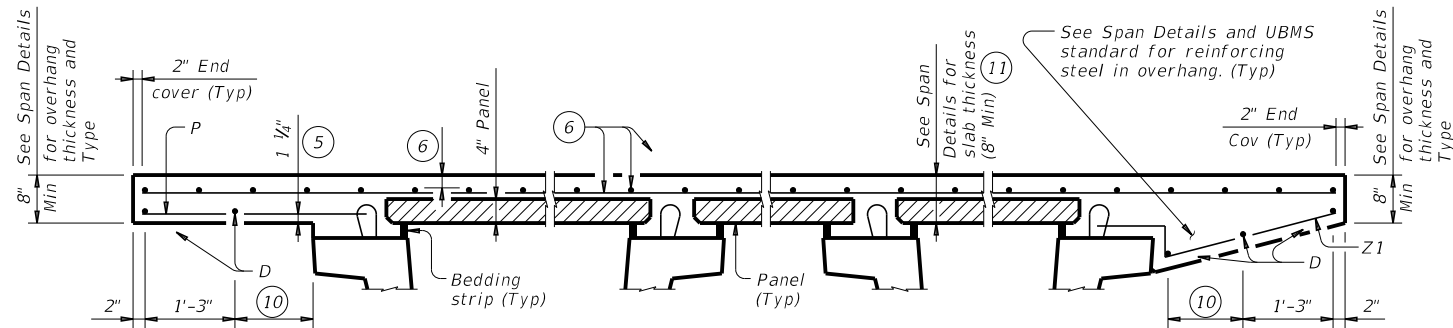
STEEL BEAMS



PRESTRESSED CONCRETE I-GIRDERS



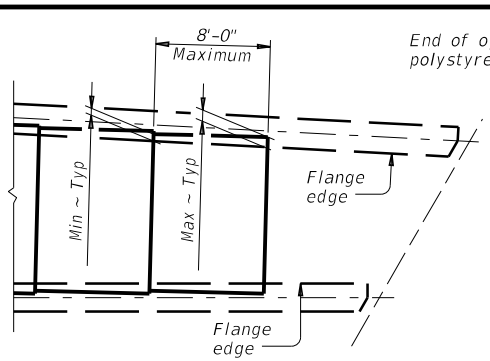
PRESTRESSED CONCRETE X-BEAMS



NORMAL OVERHANG WITH PRESTR CONC U-BEAMS

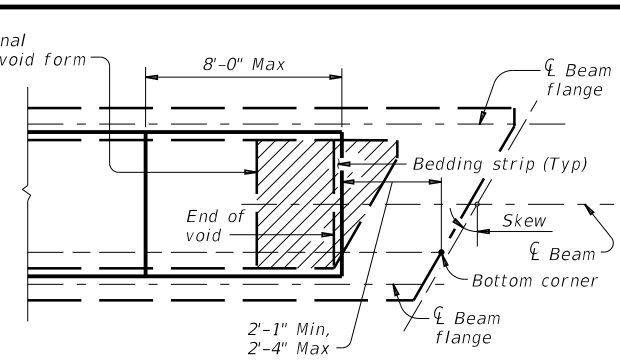
TYPICAL PART TRANSVERSE SECTIONS

SLOPED OVERHANG WITH PRESTR CONC U-BEAMS



AT FLARED BEAMS OR GIRDERS

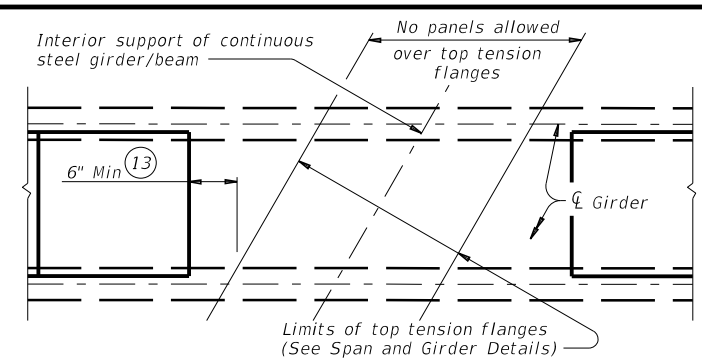
See PCP-FAB standard for Min and Max dimensions based on beam/girder type.



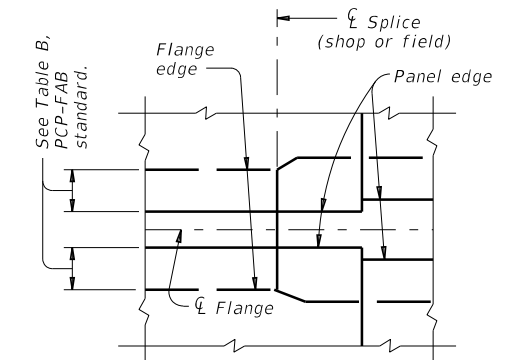
OVER CONC U-BEAMS

PART PLANS OF PANEL PLACEMENT

- 5 Provide clear cover as indicated unless otherwise shown on Span Details.
- 6 See Span Details and Thickened Slab End Details for top slab reinforcement and clear cover. Transverse top slab reinforcement may rest on top of prestressed concrete panels if necessary to maintain clear cover.
- 9 Butt adjacent bedding strips together with adhesive. Cut v-notches, approx 1/4" deep, in the top of the bedding strips at 8' o.c..
- 10 Equally space additional bar if more than 1'-3" Max.
- 11 The actual thickness constructed may exceed the slab thickness shown on the Span Details but the extra thickness may be no more than 2" (1" for prestressed concrete U-beams and steel beams). Bearing seat elevations or finished grade may be adjusted.
- 12 Field adjust Bars Z1(#4) to match actual slope of slab overhangs. Width of slab overhang will vary along span with curved slab edges. Adjust Bar Z1(#4) dimensions to maintain proper cover. Bars Z2(#4) are located at Inverted-Tee stems only.
- 13 Location of concrete placement sequence boundaries and bolted field splices should be considered by the contractor in determining panel limits.



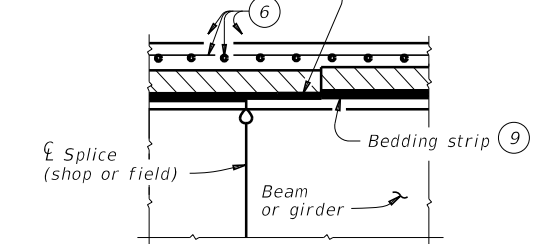
AT INT SUPPORTS OF CONTINUOUS STEEL GIRDERS



PLAN AT SPLICE

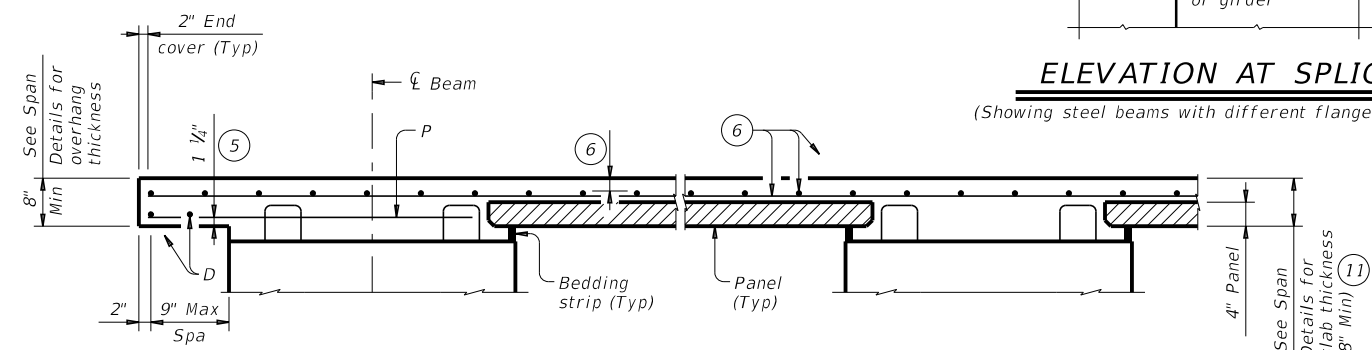
(Showing steel beams with flange width transition)

Cut bedding strip to adjust for difference in flange thickness.



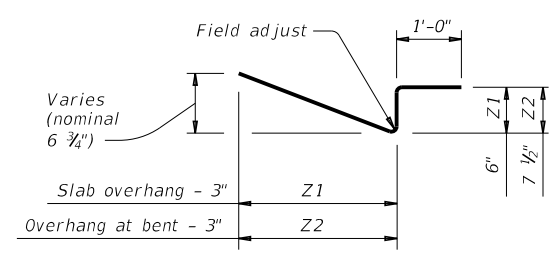
ELEVATION AT SPLICE

(Showing steel beams with different flange thickness)



PRESTRESSED CONCRETE SPREAD SLAB BEAMS

Bars P over exterior beams are still required when no overhang is used. In this case, only one Bar D, 2" from slab edge, is required.



BARS Z (#4) (12)

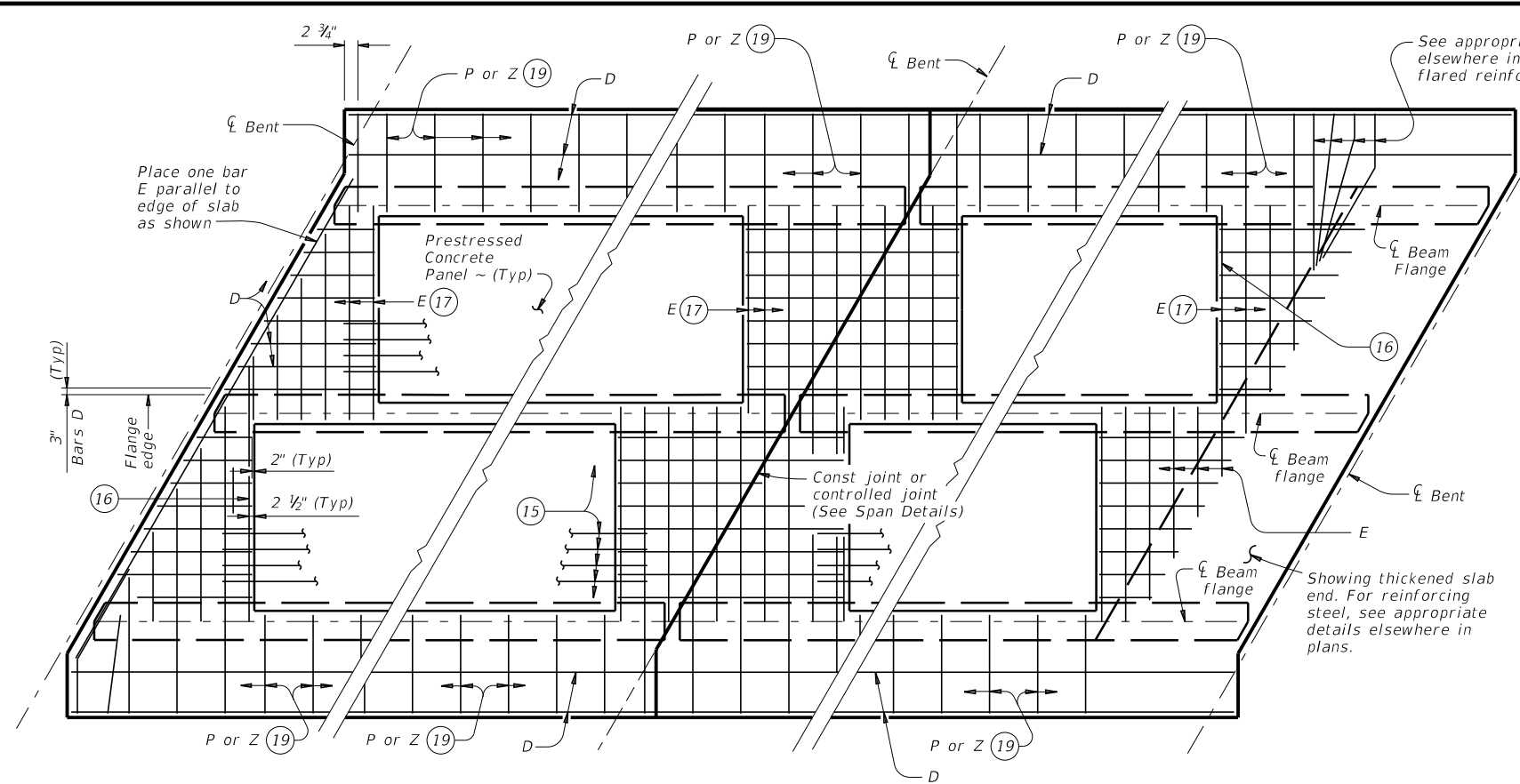
PRESTRESSED CONCRETE PANELS DECK DETAILS

PCP

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	ABL	JONES		120

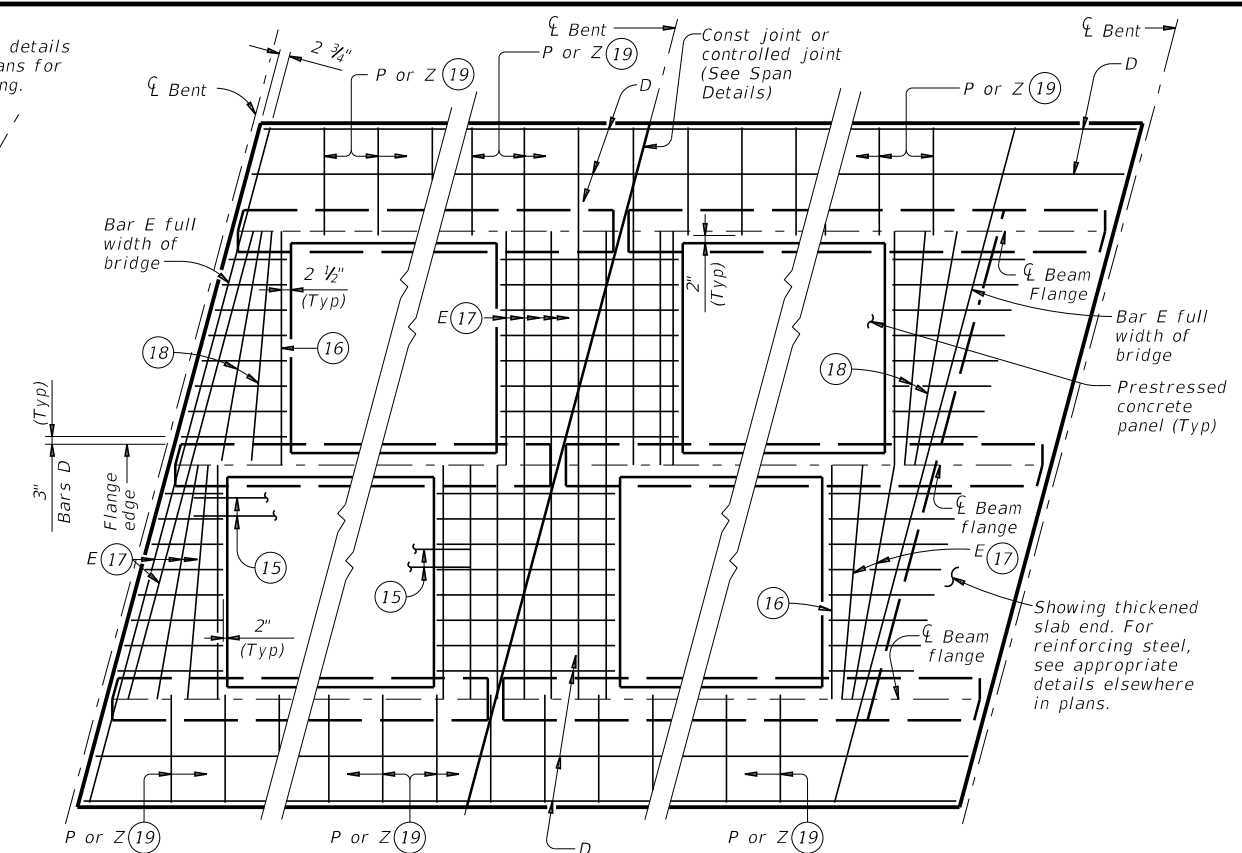
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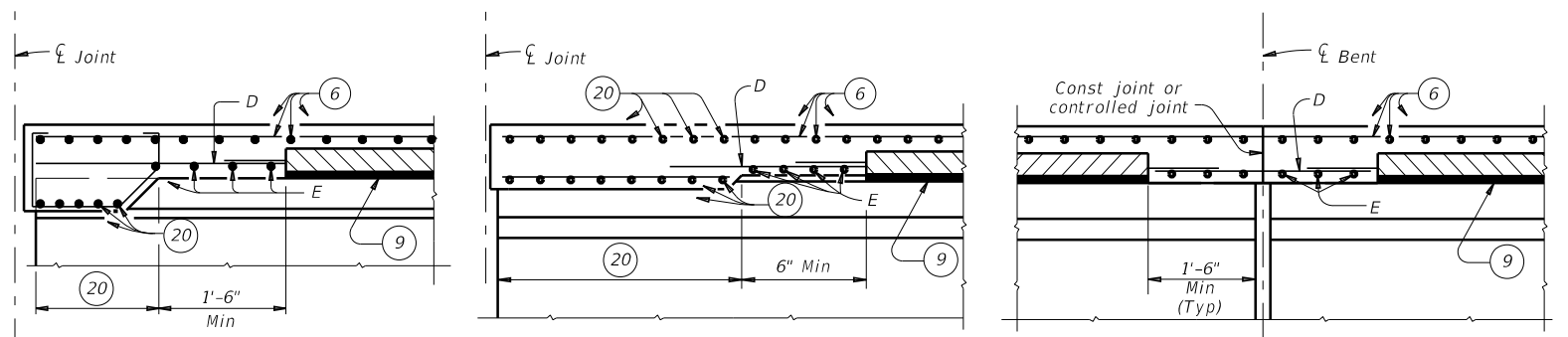
AT ALL SPAN ENDS UNLESS NOTED OTHERWISE
 AT INTERIOR BENTS
 AT THICKENED END SLABS

OPTION 1 ~ PLAN OF SLABS WITH NORMAL REINFORCEMENT

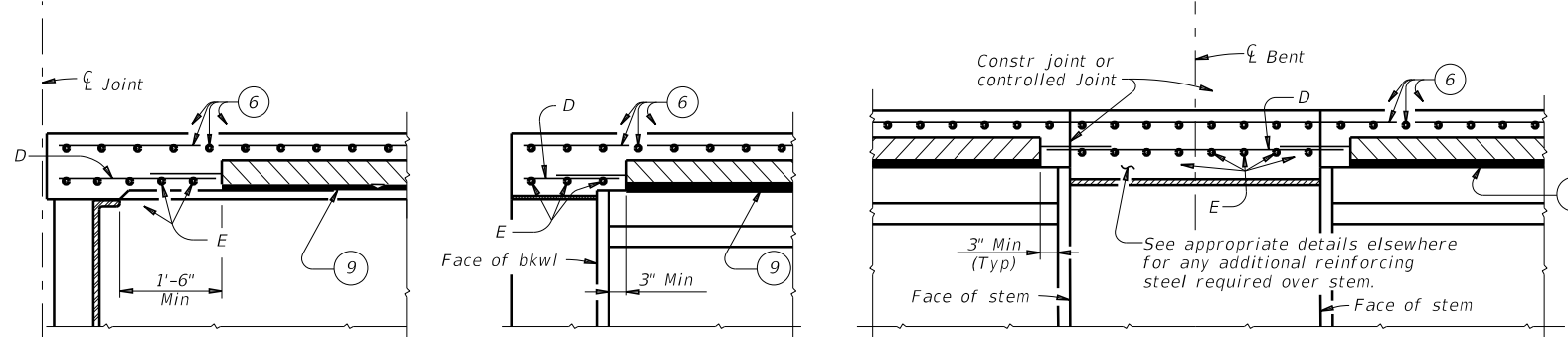


AT ALL SPAN ENDS UNLESS NOTED OTHERWISE
 AT INTERIOR BENTS
 AT THICKENED END SLABS

OPTION 1 ~ PLAN OF SLABS WITH SKEWED REINFORCEMENT



AT THICKENED SLAB ENDS FOR PRESTR CONC U-BMS
 AT THICKENED SLAB ENDS FOR PRESTR CONC I-BMS AND STEEL BMS
 AT SLAB CONTINUOUS OVER CONVENTIONAL INTERIOR BENTS FOR ALL SIMPLE SPAN BMS



AT CONVENTIONAL END DIAPHRAGMS FOR STEEL BMS
 AT SLAB OVER ABUTMENT BACKWALL FOR ALL BMS
 AT SLAB CONTINUOUS OVER INVERTED-T BENTS FOR ALL BMS

OPTION 1 ~ ELEVATIONS AT BEAM ENDS

- 6 See Span Details and Thickened Slab End Details for top slab reinforcement and clear cover. Transverse top slab reinforcement may rest on top of prestressed concrete panels if necessary to maintain clear cover.
- 9 Butt adjacent bedding strips together with adhesive. Cut v-notches, approx 1/4" deep, in the top of the bedding strips at 8" o.c.
- 14 Max Spacing as listed unless otherwise shown.
- 15 At connection with cast-in-place slab, extend longitudinal panel reinforcement. See PCP-FAB for details.
- 16 Maintain one Bar E(#4) parallel to panel ends (Typ).
- 17 Bars E(#4) not continuous over beam flanges must overlap beam flange 6" Min.
- 18 Add flared Bars E(#4) (Min Spa = 6", Max Spa = 12") as required at panel ends.
- 19 Where possible, Bars E(#4) may be extended into overhangs to replace Bars P(#4). Bars Z(#4) are required for sloped overhangs with U-Beams.
- 20 See appropriate thickened slab end details for reinforcing and limits of thickened slab end.

TABLE OF REINFORCING STEEL (14)		
BAR	SIZE	Max Spa (in.)
D	#4	9
E	#4	9
P	#4	18
UP	#4	~
Z	#4	18

Texas Department of Transportation
 Bridge Division Standard

PRESTRESSED CONCRETE PANELS DECK DETAILS

PCP

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0484	01	025	FM 707	
DIST	COUNTY	SHEET NO.		
ABL	JONES	121		

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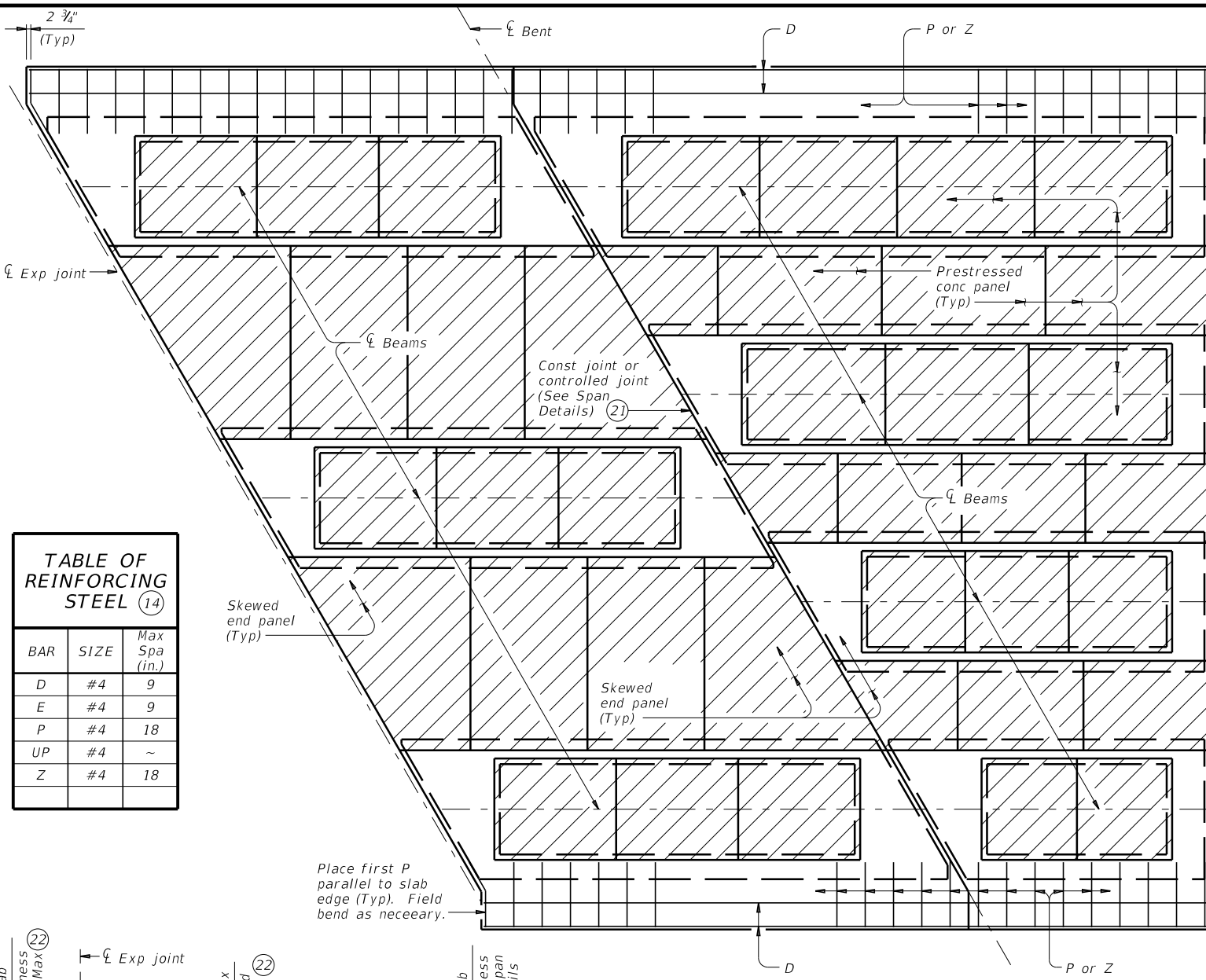
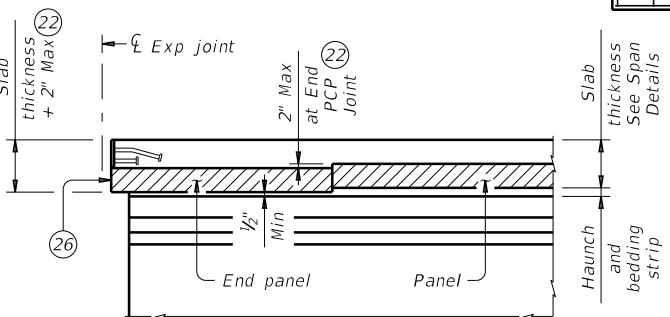
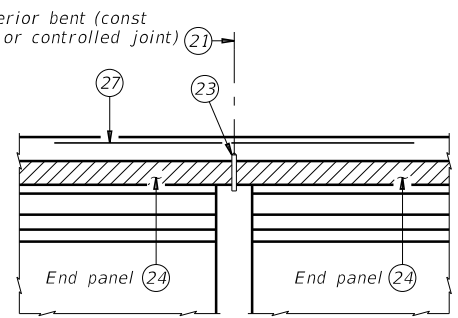


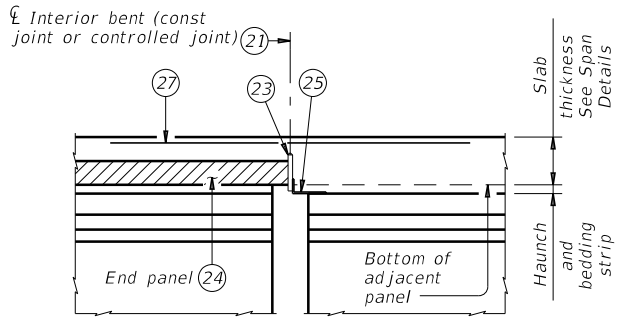
TABLE OF REINFORCING STEEL (14)		
BAR	SIZE	Max Spa (in.)
D	#4	9
E	#4	9
P	#4	18
UP	#4	~
Z	#4	18



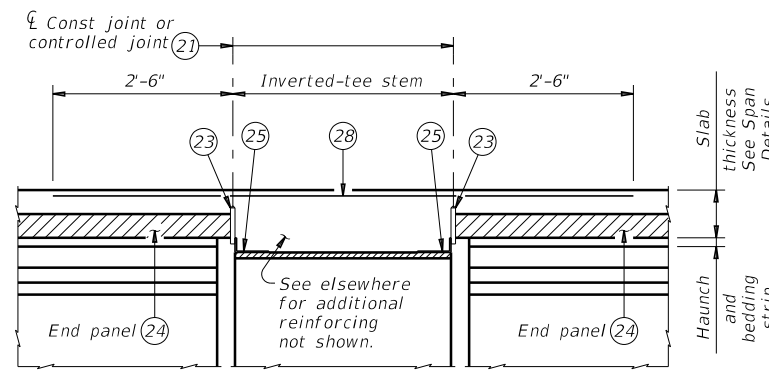
JOINTS (BETWEEN BEAMS/GIRDERS OR AT INV-T STEM)
 For SEJ-A, SEJ-S(0), AJ, and Type A expansion joints only.



CONVENTIONAL INTERIOR BENT
 Panel against panel between beams/girders.



CONVENTIONAL INTERIOR BENT
 Panel against beam/girder end in adjacent span.



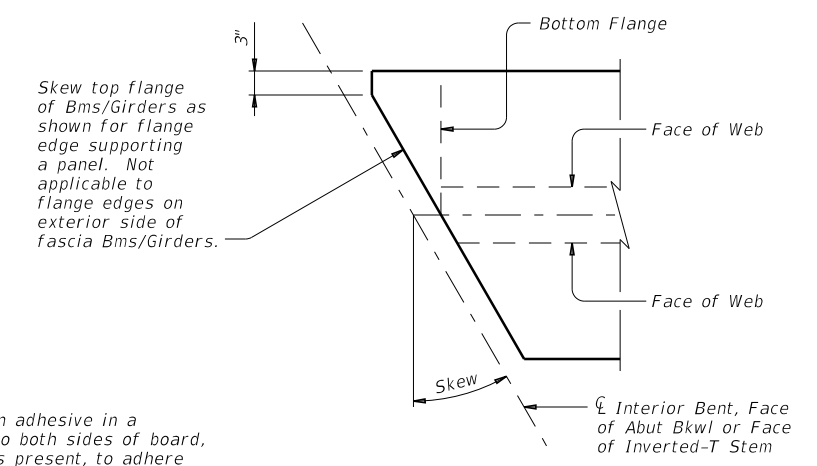
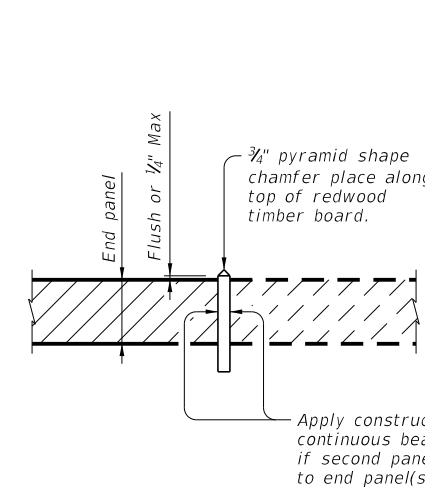
INVERTED-T BENT
 Panels against inverted-tee stem

OPTION 2 ~ ELEVATIONS AT BEAM ENDS (6)

ELEVATION EXAMPLE OF END PANEL AND TIMBER BOARD (23)

See "Option 2 ~ Elevation At Beam Ends".

- (6) See Span Details and Thickened Slab End Details for top slab reinforcement and clear cover. Transverse top slab reinforcement may rest on top of prestressed concrete panels if necessary to maintain clear cover.
- (14) Max Spacing as listed unless otherwise shown.
- (21) 1 1/2" Vinyl or plastic joint former at controlled joints (Stress Cap, Zip Strip, Stress Lock, or equal as approved by the Engineer.)
- (22) End panel may be set up to 2" lower to accommodate expansion joint hardware, provided bedding strip is not less than 1/2" thick.
- (23) 3/4" thick redwood timber board, leave in place. Redwood timber board placed flush with top of panel or within 1/4" Max above panel. Place 3/4" pyramid shape chamfer along top of timber board. See "Elevation Example of End Panel and Timber Board". Place straight, within 1/4" of centerline of bent or face of inverted-tee, across bridge width and end board at exterior flange edge of fascia beams/girders. Do not extend into overhang.
- (24) Place panel within 1/2" of 3/4" thick board.
- (25) Permanent galvanized steel sheet form. Removable formwork is acceptable.
- (26) Place end panel within 1/2" of expansion joint opening. End panel cannot encroach on required expansion joint opening.
- (27) Place additional (#4) bar 5'-0" in length between every slab bars T. Center (#4) bar on Joint.
- (28) Place additional (#4) bar continuous 2'-6" beyond each side of Inverted-T Stem between every slab bars T.



OPTION 2 ~ SHOWING MODIFICATION TO BEAM/GIRDER TOP FLANGE FOR SKEWS OVER 5°

Showing I-Bm/I-Girder, U-Bms and Steel Bms similar.

SPECIAL OPTION 2 CONSTRUCTION NOTES:

When Option 2 is chosen bottom mat of thickened end slab reinforcing is not required. Use the same top mat as shown on the Thickened Slab End Details sheet.
 Placing panels adjacent to expansion joints and bent centerlines prior to completing interior panel placement is recommended. Saw cutting panels to fit is acceptable when approved by the Engineer. Minimum distance from a saw cut edge to a panel strand is 1 1/2".
 Do not extend the longitudinal panel reinforcement into the cast-in-place slab.
 Top flanges of beams and girders on skewed bridges must be modified as shown on this drawing. The Contractor is responsible for coordinating this modification with the beam fabricator prior to submitting shop drawings for approval.
 Fabricator may optionally skew the whole end. When electing to skew whole end, girder end details and bearing type at conventional interior bent must be changed to use condition at abutment. Fabricator must coordinate change in bearing type, bearing centerline location, and dowel location with Engineer and Contractor. Show appropriate changes on girder and bearing shop drawings.
 Bending of anchor studs of expansion joints shown on standards AJ, SEJ-A and SEJ-S(0) is permissible if necessary to clear top of end panels. The Contractor is responsible for coordinating modifications with the joint fabricator. Submit shop drawings for approval when modifications to expansion joint hardware are made.
 Bedding strips under skewed end panels must conform to the requirements of Item 422 except their minimum compressive strength must be 60 psi.
 Provide Bars AA, G, K and OA from standard IGTS in the slab.

HL93 LOADING SHEET 4 OF 4

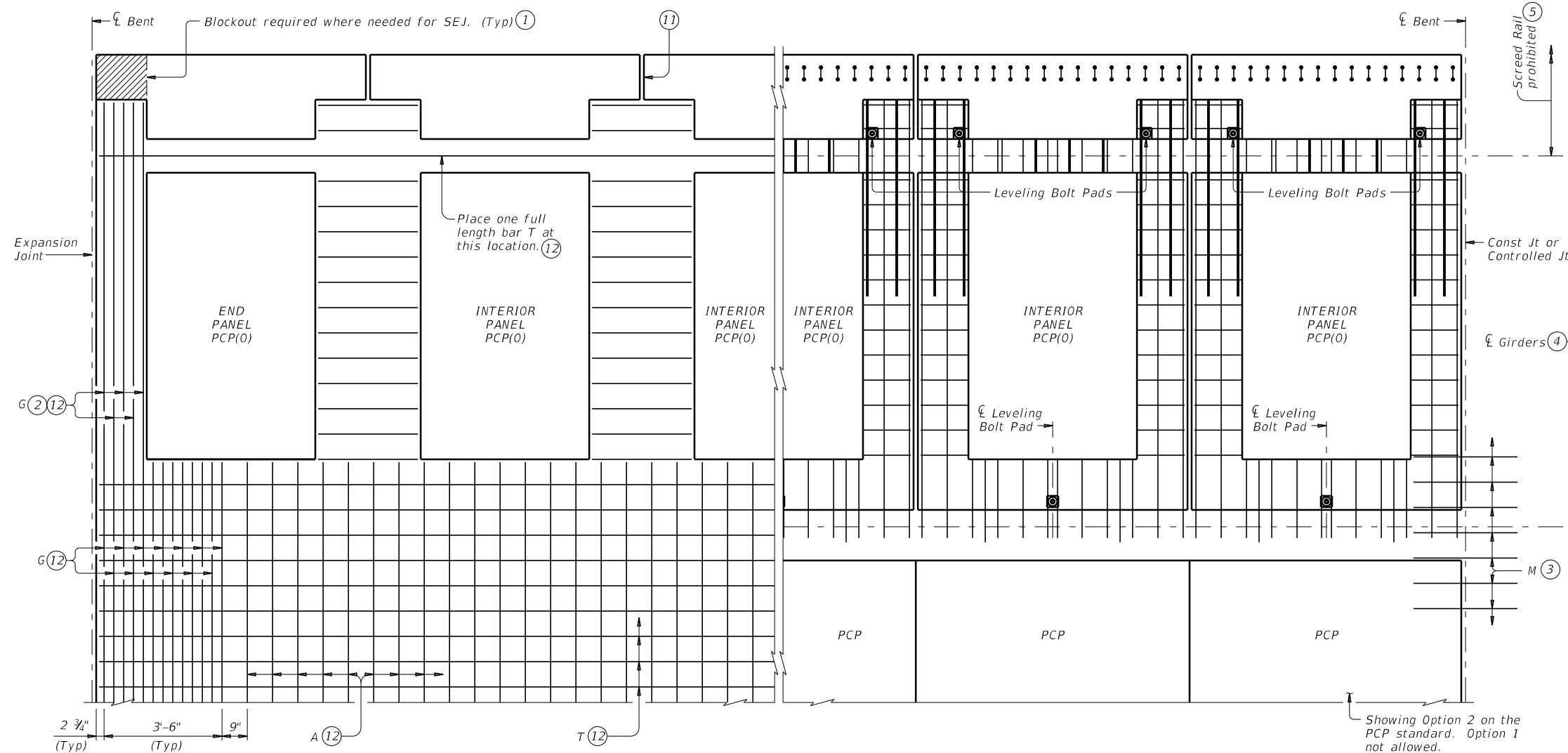
Texas Department of Transportation
 Bridge Division Standard

PRESTRESSED CONCRETE PANELS DECK DETAILS

PCP

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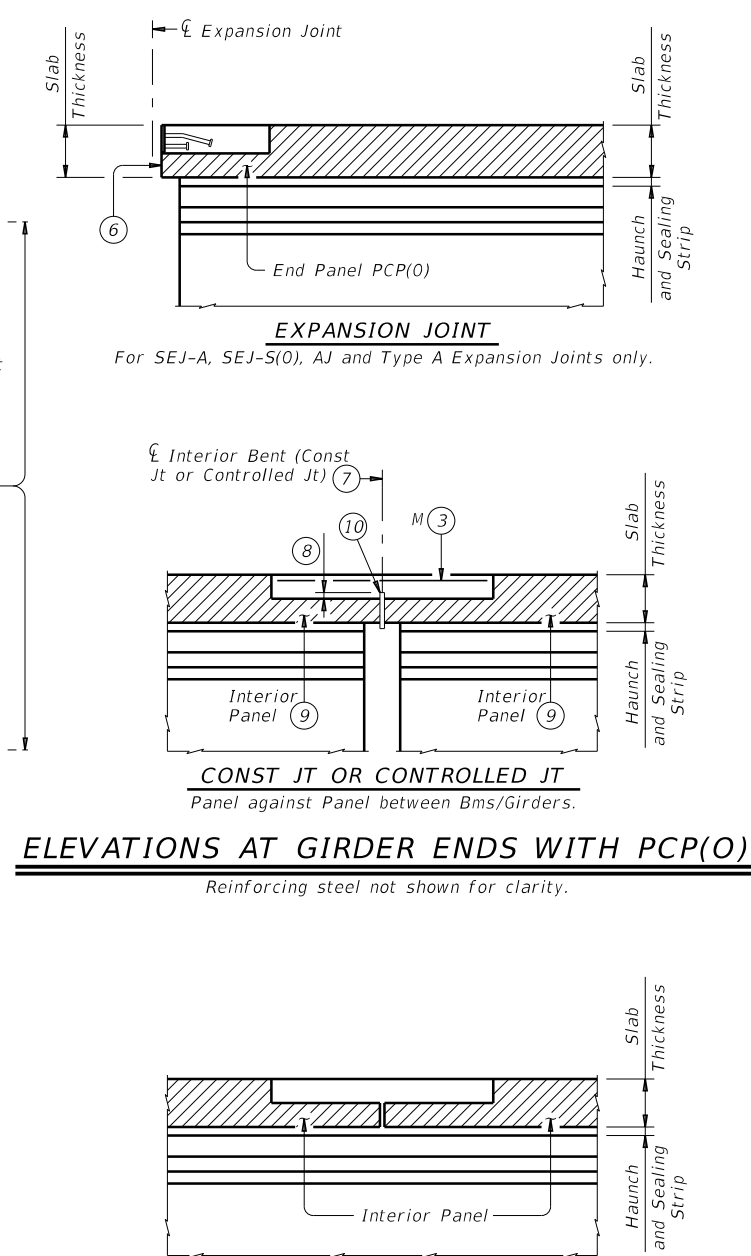
SHOWING FIELD PLACEMENT OF TOP REINFORCING STEEL

SHOWING PCP(O) EXPOSED REINFORCING STEEL

PANEL LAYOUT

PCP(O) shown with gaps between panels for clarity. The gap cannot be considered as a panel fabrication tolerance.

- ① 1'-4" x 1'-6" x 4 1/2" blockout to accommodate SEJ that require an upturn. Contractor to communicate with fabricator the location and type of SEJ to be utilized.
- ② When blockout is required, extend bars G into blockout.
- ③ Place additional bars M 2'-11" in length on top of bars A and between every bar T. Center bars M at center of bent. Located at bents with construction joints or controlled joints only. Bars M may replace additional (#4) bars 5'-0" in length as shown on PCP standard in Option 2 ~ Elevations At Beam Ends. Option 1 not allowed.
- ④ It is recommended to profile every 4 ft by surveying each girder under PCP(O) for proper grading of panels.
- ⑤ Screed rail used to set grade for paving machine is not allowed past exterior girder as shown.
- ⑥ Place end panel PCP(O) within 1/2" of expansion joint opening. Do not encroach on required expansion joint opening.
- ⑦ Top Plastic Joint Former at Controlled Joints (Stress Cap, Zip Strip, Stress Lock, etc.) is not required with these Details.
- ⑧ 0" Min, 3/4" Max, support as necessary.
- ⑨ Place panel within 1/2" of 3/4" thick board.
- ⑩ 3/4" thick wood/timber board, leave in place. Place straight, within 1/4" of Centerline of Bent, across bridge width and end board at exterior flange edge of fascia girders. Do not extend into overhang.
- ⑪ Seal top of panel only, with a Class 4 sealant prior to rail construction. Typical between panels. Do not seal at Expansion Joints.
- ⑫ 1 1/2" End Cover. (Typ)



ELEVATIONS AT GIRDER ENDS WITH PCP(O)

Reinforcing steel not shown for clarity.

ELEVATION BETWEEN PCP(O)

The gap cannot be considered as a panel fabrication tolerance. Reinforcing steel not shown for clarity.

HL93 LOADING SHEET 1 OF 2

Texas Department of Transportation Bridge Division

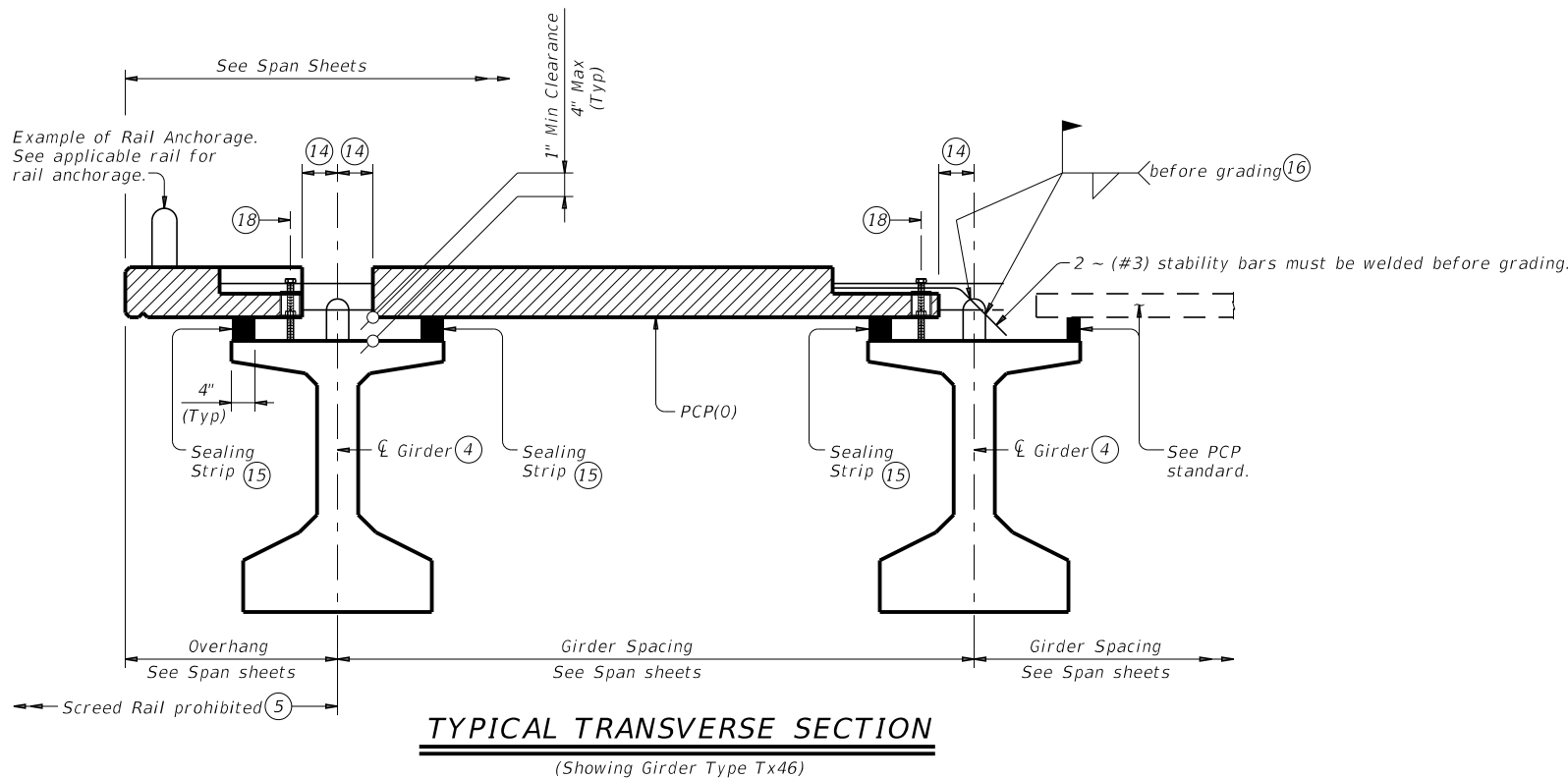
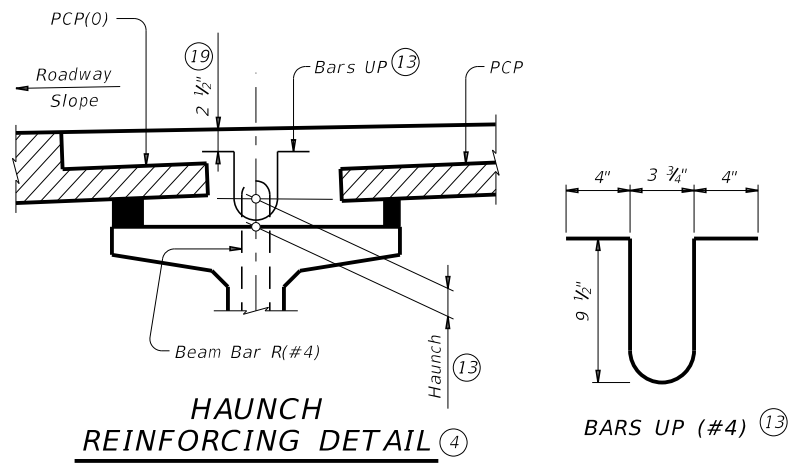
PRECAST CONCRETE PANELS FOR OVERHANGS

PCP(O)

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©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0484	01	025	FM 707
	DIST	COUNTY	SHEET NO.	
	ABL	JONES	123	

BAR TABLE		
BAR	SIZE	MAX SPA (IN)
A (12/17)	#4	9"
G (12/17)	#4	3 1/2"
M	#4	9"
T (12/17)	#4	9"

- ④ It is recommended to profile every 4 ft by surveying each girder under PCP(0) for proper grading of panels.
- ⑤ Screed rail used to set grade for paving machine is not allowed past exterior girder as shown.
- ⑫ 1 1/2" End Cover on bars. (Typ)
- ⑬ Space bars UP(#4) with girder bars R(#4) in all areas where measured haunch exceeds 3 1/2" with Prestressed Concrete I-Girders. Epoxy coating for Bars UP is not required.
- ⑭ 6" plus or minus.
- ⑮ Place sealing strip at flange edge as shown. Butt adjacent sealing strips longitudinally together with adhesive. Use pencil vibrators with concrete placement over girder and between sealing strips to avoid rupturing sealing strips. Cut sealing strips 2" higher than anticipated haunch thickness and compress to grade.
- ⑯ (#3) Panel bars F must be field bent and welded to the R bars in girder. Two bars F per panel.
- ⑰ Field placed bars that are allowed to be lapped. Reinforcing steel that protrudes from panels are not considered bars to be lapped. See "Material Notes" for applicable bar laps.
- ⑱ Leveling Bolt Pad. 1" Dia Coil Rod or 1" Dia Coil Bolt shown, are furnished by the contractor. After grading each PCP(0) panel with the 1" Dia coil rods or coil bolts, secure each panel in its final resting position (plastic shims, welding, etc) and remove all 1" Dia coil rods or coil bolts for the cast-in-place concrete. Coil rods/bolts may be left in place at contractor's option. If coil rods/bolts are left in place, coil rods/bolts must have at least 2 1/2" of cover to top of finish grade. Grading bolts are inadequate to carry all conceivable screed/construction loads. Panel support method must be calculated, location identified, and placed on shop drawings. Method chosen to support panels must be adequate for all construction loads. Panel support method must be placed/constructed after final grading and before screed rail placement.
- ⑲ Unless shown otherwise on Span Details.



CONSTRUCTION NOTES:

Placing panels adjacent to expansion joints and bent centerlines prior to completing interior panel placement is recommended. Ensure proper cleaning of construction debris and consolidation of concrete mortar under the edges of the panels. Place sealing strips at girder flange edges so that adequate space is provided for the mortar to flow a minimum of 8" transversely under the panels as the slab concrete is placed. Panel placement with Option 1 on the PCP standard is not allowed. It is recommended to profile every 4 ft by surveying each girder under PCP(0) for proper grading of panels. To allow the proper amount of mortar to flow between girder and panel, maintain a minimum vertical opening of 1". Roadway cross-slope reduces the opening available for entry of the mortar. Sealing strips vary in thickness along girder are therefore required. Seal the top panel with a Class 4 sealant as shown in the Panel Layout.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel in cast-in-place slab. See Table of Reinforcing Steel for size and spacing of reinforcement. If the reinforcing steel is shown on the Span Details to be epoxy coated, then epoxy coat bars A, G, M, & T. Provide bar laps, where required, as follows:
 Uncoated ~ #4 = 1'-7"
 Epoxy Coated ~ #4 = 2'-5"
 Provide sealing strips comprised of one layer low density polyurethane (1.0 Lbs density) foam sealing strips or equivalent. Oversize the height of sealing strips by 2". Bond sealing strips to the girder with 3M Scotch® 4693 or equivalent adhesive compatible with sealing strips.

GENERAL NOTES:

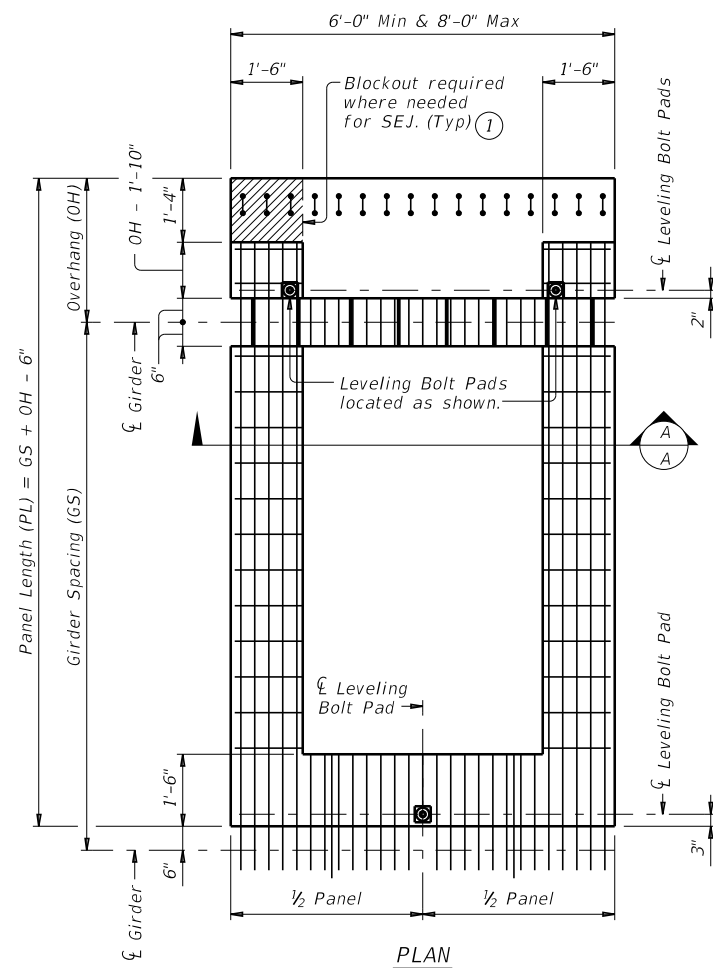
Designed according to AASHTO LRFD Specifications. These details can be used as an option to construct the deck overhang when noted on the Span details and in conjunction with the PCP(0)-FAB, PCP and applicable Standard sheets. These details are only applicable for Prestr Conc I-Girders. Any additional reinforcement or concrete required on these details is subsidiary to the bid Item "Reinforced Concrete Slab".

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

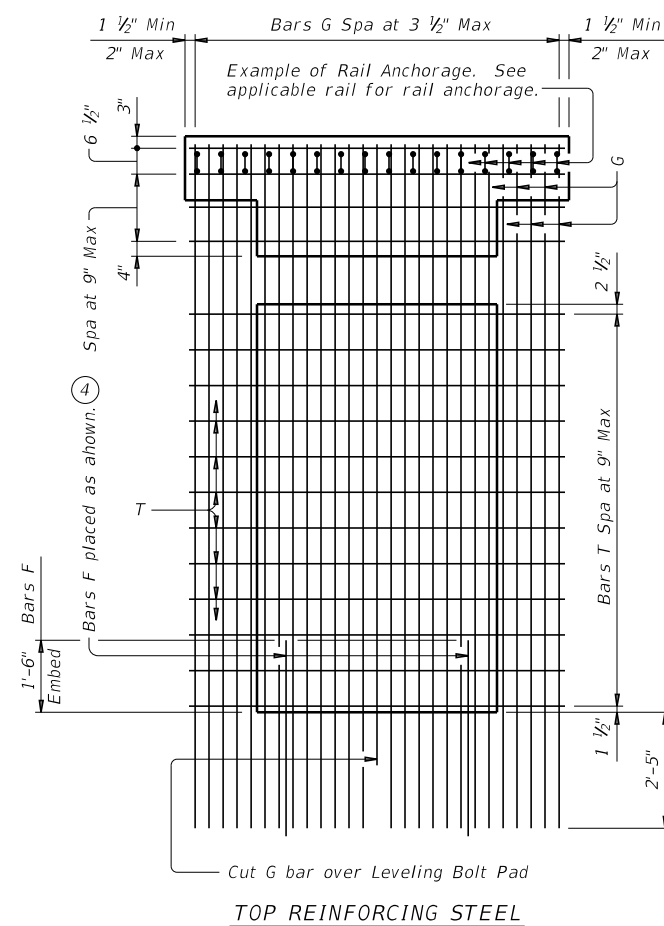
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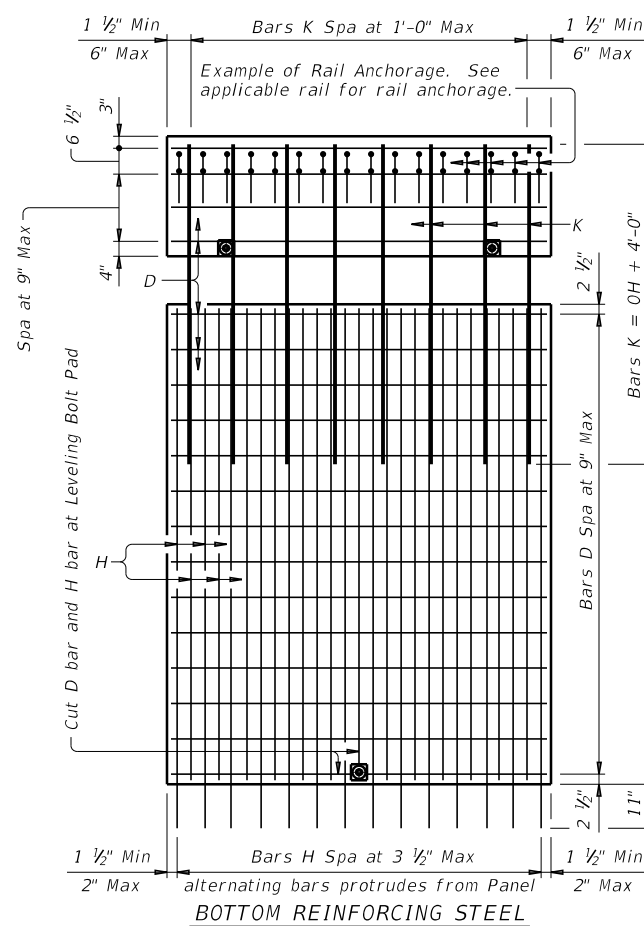


PLAN

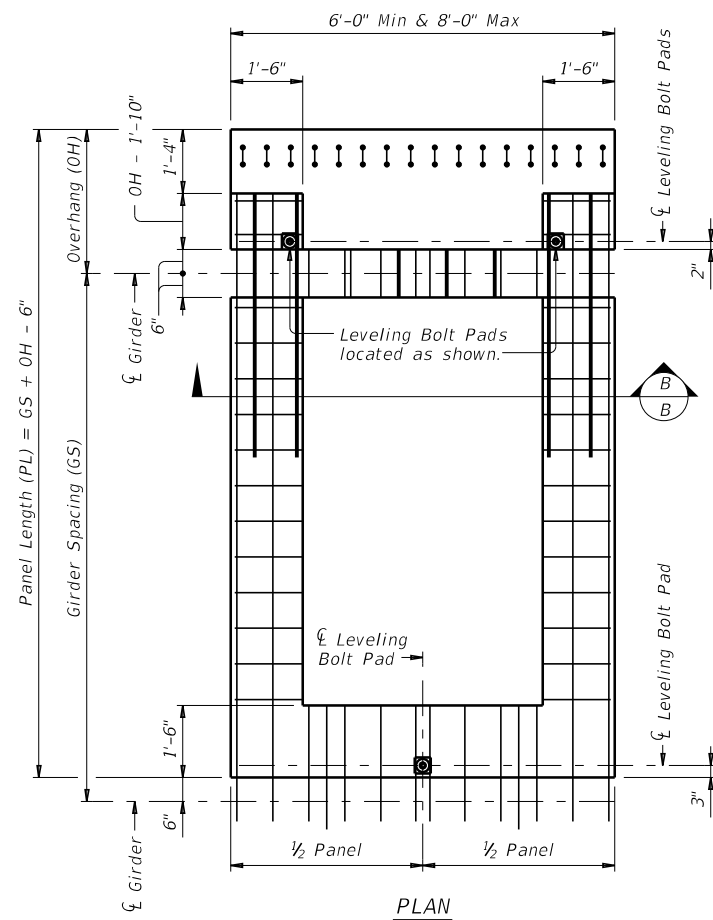


TOP REINFORCING STEEL

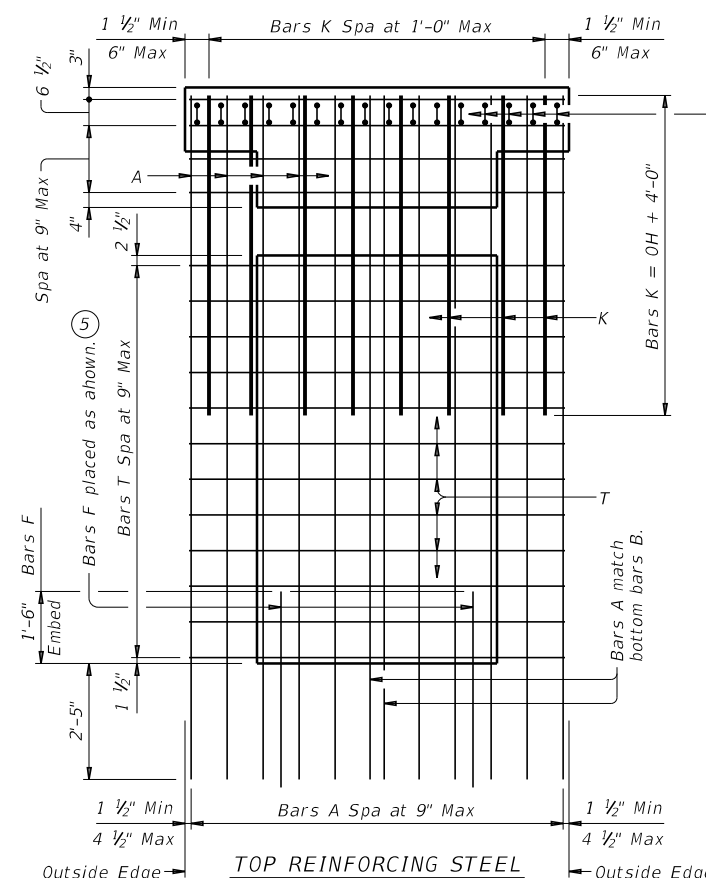
END PANEL



BOTTOM REINFORCING STEEL

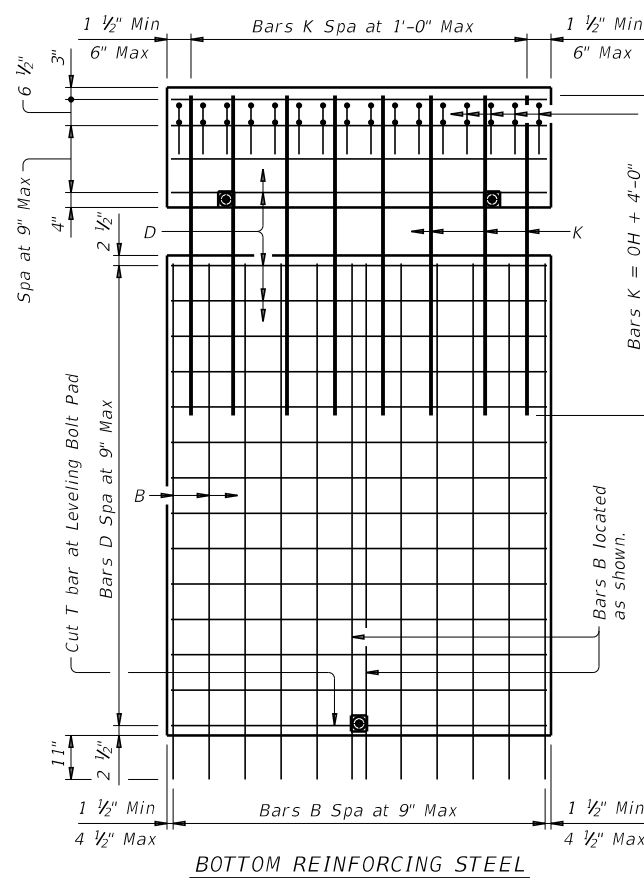


PLAN



TOP REINFORCING STEEL

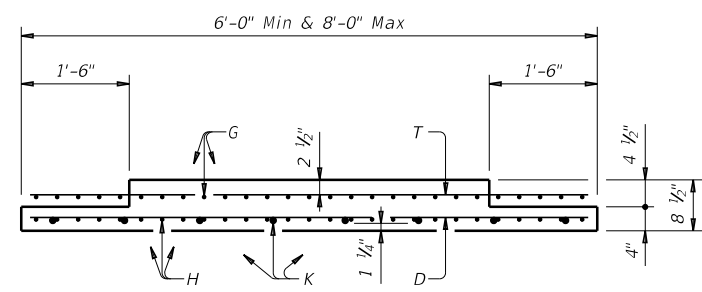
INTERIOR PANEL



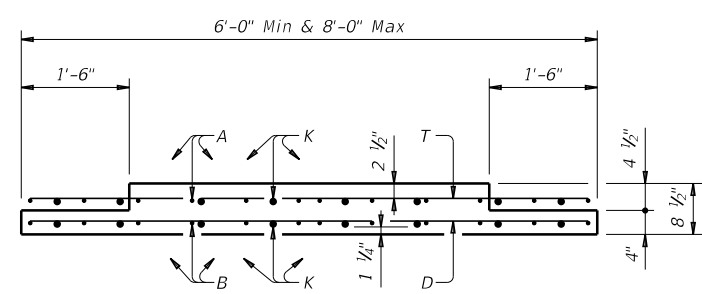
BOTTOM REINFORCING STEEL

BAR TABLE	
BAR	SIZE
A (2)	#4
B (2)	#4
D (2, 3)	#4
F (3)	#3
G (2)	#4
H (2)	#4
K (2, 3)	#8
T (2, 3)	#4

- ① 1'-4" x 1'-6" x 4 1/2" blockout to accommodate SEJ that require an upturn. Contractor to communicate with fabricator the location and type of SEJ to be utilized.
- ② 1 1/2" End Cover on bars. (Typ)
- ③ Bars that are not allowed to have lap splices.
- ④ Place F bars under bars T and against bars G.
- ⑤ Place F bars under bars T and between bars A.



SECTION A-A



SECTION B-B

Example of Rail Anchorage. See applicable rail for rail anchorage.

Example of Rail Anchorage. See applicable rail for rail anchorage.

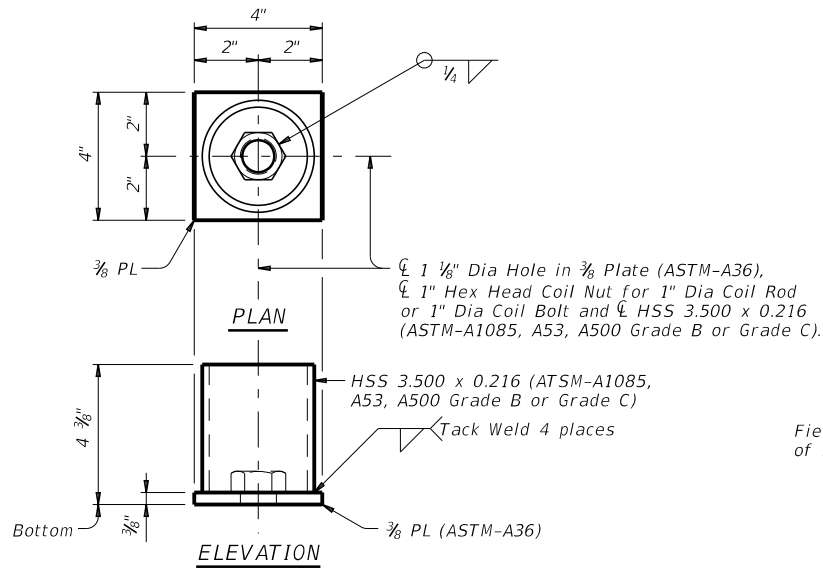
HL93 LOADING SHEET 1 OF 2

Texas Department of Transportation Bridge Division

**PRECAST CONCRETE
PANELS FOR OVERHANGS
FABRICATION DETAILS**

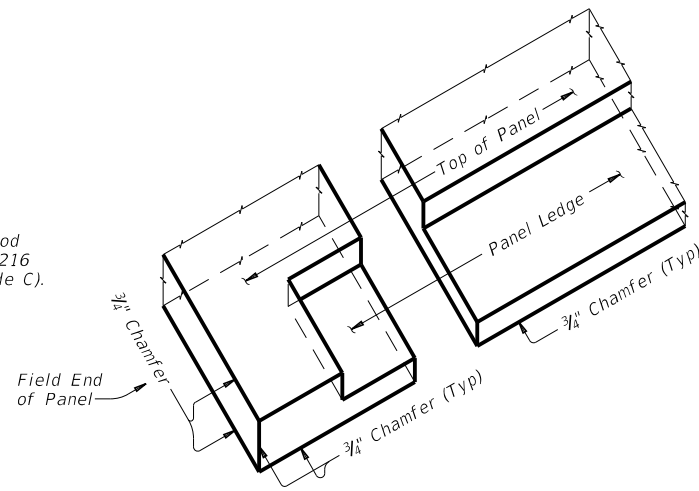
PCP(O)-FAB

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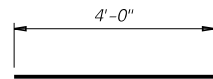
LEVELING BOLT PAD DETAILS

Galvanize if epoxy coated reinforcing steel is used in slab. Do not oil this assembly.

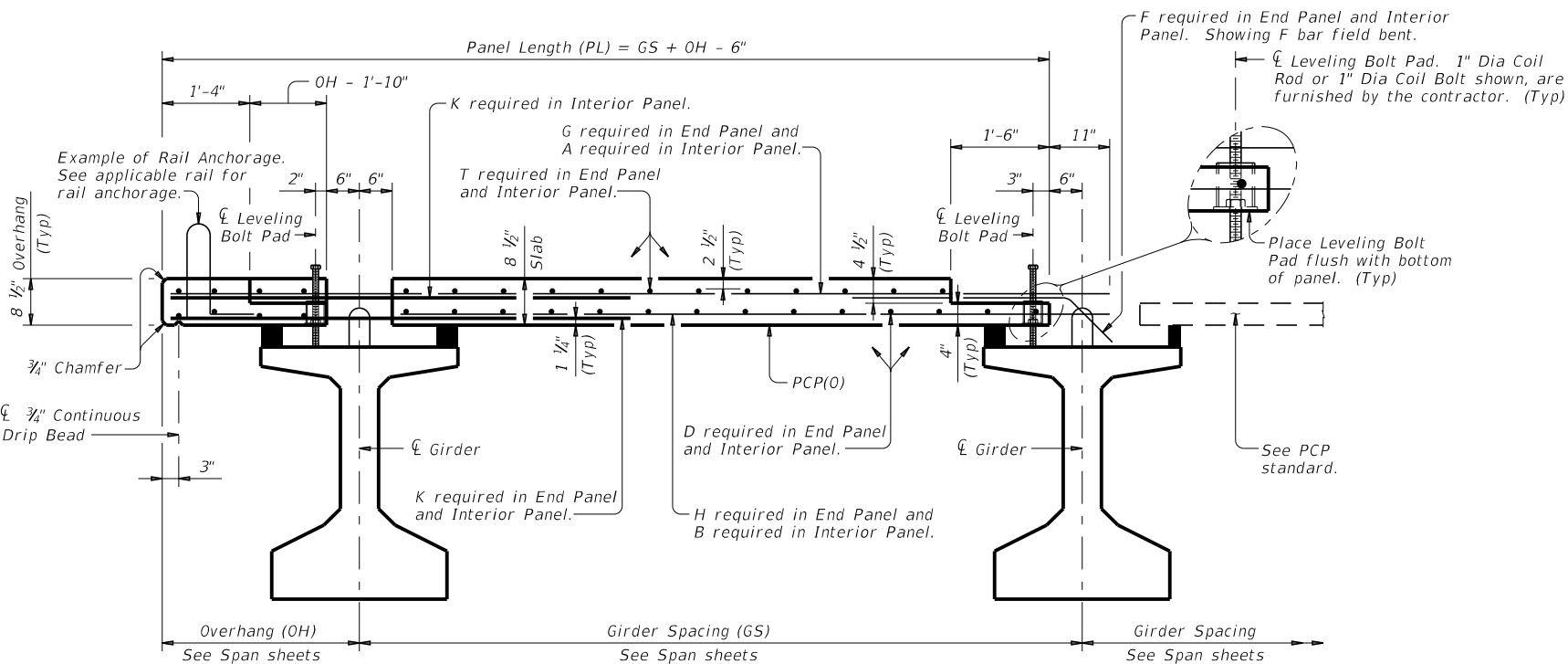


ISOMETRIC VIEW AT CORNER OF PANEL

Showing Typical Chamfers on Panel. Drip Bead and reinforcing steel not shown for clarity.



BARS F



TYPICAL TRANSVERSE SECTION

(Showing Girder Type Tx46)

CONSTRUCTION/FABRICATION NOTES:

- Remove laitance from top panel surface.
- Finish top surface area of panel with a broom finish.
- Finish top ledge of panel to a roughness between a No. 6 and No. 9 concrete surface profile, inclusive, as specified by the International Concrete Repair Institute (ICRI).
- Provide 3/4" concrete chamfers as shown on these details.
- Do not lap splice bars D, F, K & T. Bars A, B, G & H, may be spliced with only one lap splice allowed on each bar.
- Panels must be fabricated by a fabricator meeting the requirements of DMS 7300 for Multi-Project Nonstressed Member Fabrication Plant.

MATERIAL NOTES:

- Provide Class H concrete ($f'c=4000$ psi) in panels. Provide Class H (HPC) concrete for panels if required elsewhere in plans. Maximum large aggregate size is 1".
- Provide material as shown on this standard for the Leveling Bolt Pad.
- Provide Grade 60 conventional reinforcing steel.
- Provide epoxy coated reinforcement for bars A, B, D, G, H, K & T if slab reinforcement is epoxy coated.
- An equal area and spacing of deformed Welded Wire Reinforcement (WWR) ASTM-A1064 may be substituted for bars A, B, D, G, H & T, unless otherwise noted. Bars F and K can not be replaced with WWR.
- Galvanize leveling bolt pad assembly if epoxy-coated reinforcing steel is used in slab.

GENERAL NOTES:

- Designed according to AASHTO LRFD Specifications.
- These details are only applicable for Prestr Conc I-Girders.
- Any additional reinforcement, lifting devices or epoxy coated reinforcement required on these details are subsidiary to the bid Item "Reinforced Concrete Slab".
- See railing details for rail anchorage in panel overhang.
- A panel layout which identifies location of each panel must be developed by the fabricator. Permanently mark each panel in accordance with the panel layout. A copy of the layout is to be provided to the Engineer.
- Submit stable lifting methods and devices to the Engineer for approval.
- Shop drawings for the fabrication of panels will require the Engineer's approval.

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

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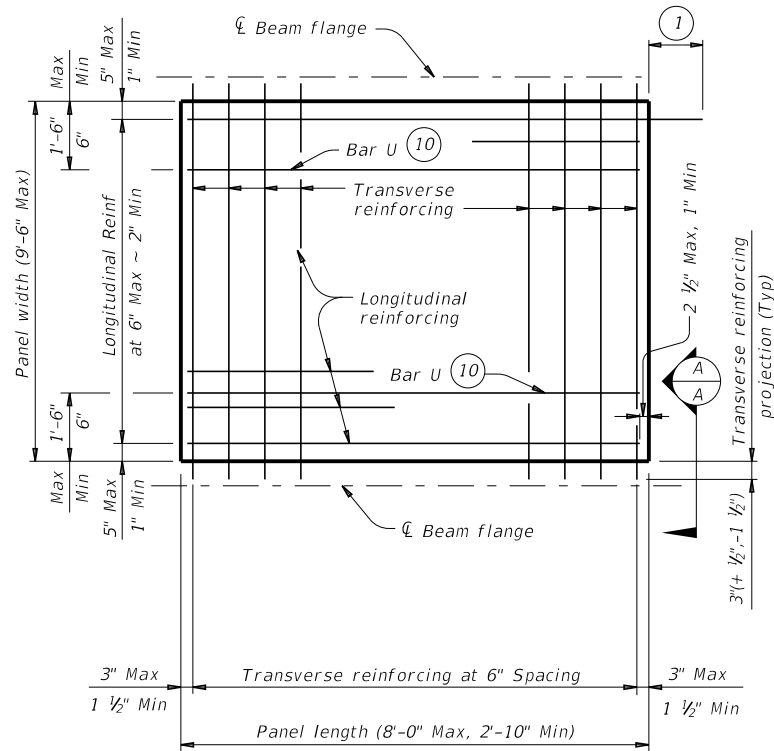
PRECAST CONCRETE PANELS FOR OVERHANGS FABRICATION DETAILS

PCP(O)-FAB

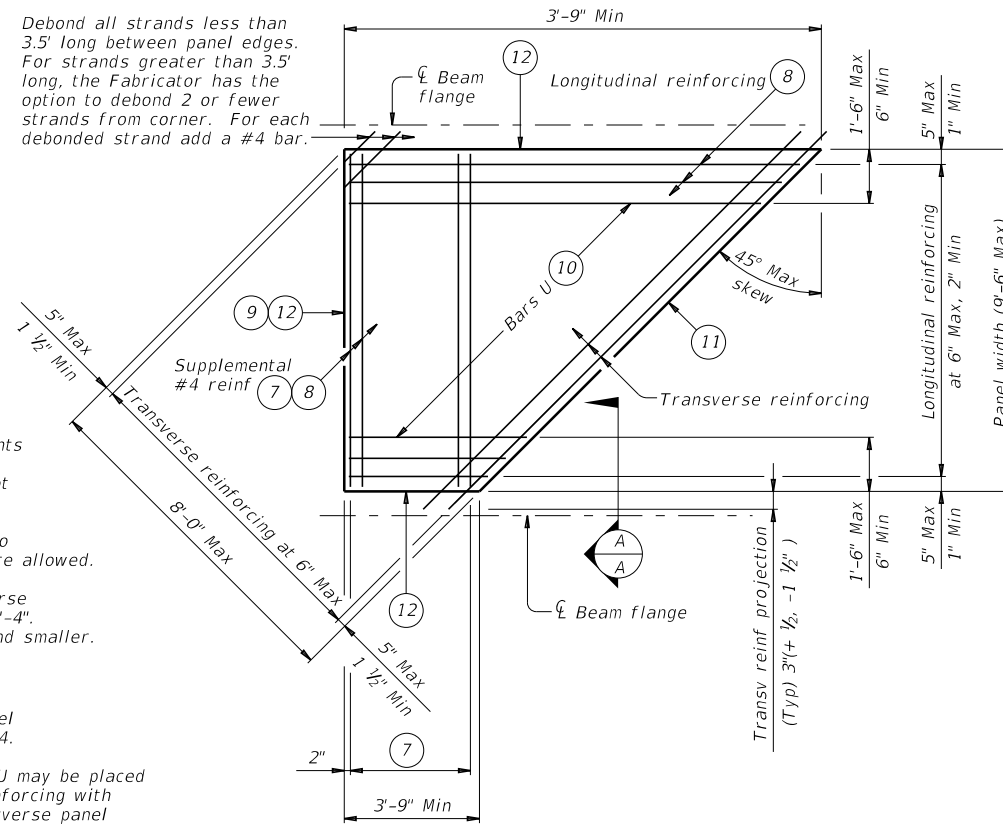
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TYPICAL NON-SKEWED PANEL PLAN



TYPICAL SKEWED END PANEL PLAN

(Only to be used with details shown elsewhere in the plans.)

- 1 At connection with cast-in-place slab, extend longitudinal panel reinforcement 1'-0" (+2", -0") past panel end. Alternatively, provide (#3) x 2'-0" dowels at 6" Max Spacing and extend dowels 1'-0" past panel end.
- 2 Four loops required per panel.
- 3 Four loops required per panel. 3/8" or 1/2" strands may be used.
- 4 Normal dimensions must be used on spans with parallel beams. Maximum and Minimum dimensions apply only to spans with flared beams.
- 5 See Normal Grading Detail on PCP standard for lap requirements and bedding strip dimensions. Some laps shown in tables cannot utilize all bedding strip widths.
- 6 One Splice allowed per panel. No more than two sheets of WWR are allowed.
- 7 Provide (#4) bars under transverse reinforcing, 10 Spaces at 4" = 3'-4". Omit for 5 degree (1:12) skew and smaller.
- 8 End Cover 2 1/2" Max, 1" Min.
- 9 Recess strands on indicated panel edge in accordance with Item 424.
- 10 At the fabricator's option, Bars U may be placed parallel to transverse panel reinforcing with horizontal legs in plane of transverse panel reinforcing.
- 11 Use length of indicated panel edge as panel width for purpose of determining type of transverse reinforcing.
- 12 Timber form work permissible this edge.

TABLE A (4) (5)				TABLE B (4) (5)			
Beam Type	Normal (In.)	Min (In.)	Max (In.)	Top Flange Width	Normal (In.)	Min (In.)	Max (In.)
A	3	2 1/2	3 1/2	11" to 12"	2 3/4	2 1/2	2 3/4
B	3	2 1/2	3 1/2	Over 12" to 15"	3 1/4	3	3 1/4
C	4	3	4 1/2	Over 15" to 18"	4	3	4 3/4
IV	6	4	7 1/2	Over 18"	5	3 1/2	6 1/4
VI	6 1/2	4 1/2	8 1/2				
U40 - 54	5 1/2	5 1/2	7				
Tx28-70	6	5	7 1/2				
XB20 - 40	4	3	4 1/2				
XSB12 - 15	4	3	4 1/2				

GENERAL NOTES:

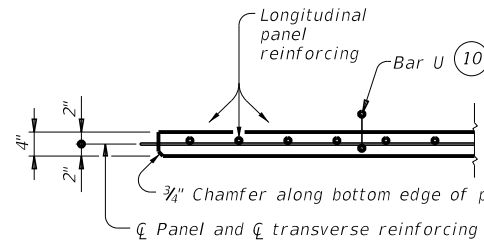
Provide Class H concrete for panels. Release strength $f'c=3,500$ psi. Minimum 28 day strength $f'c=5,000$ psi.
 Provide 3/4" chamfer along bottom edge of panel on beam side. Do not use epoxy-coated reinforcing steel bar or strand in panels. Remove laitance from top panel surface. Finish top of panel to a roughness between a No. 6 and No. 9 concrete surface profile, inclusive, as specified by the International Concrete Repair Institute (ICRI).
 Shop drawings for the fabrication of panels will not require the Engineer's approval if fabrication is in accordance with the details shown on this standard.
 A panel layout which identifies location of each panel must be developed by the Fabricator. Permanently mark each panel in accordance with the panel layout. A copy of the layout is to be provided to the Engineer.

TRANSVERSE PANEL REINFORCEMENT:

For panel widths over 5', use 3/8" or 1/2" Dia (270k) prestressing strands with a tension of 14.4 kips per strand.
 For panel widths over 3'-6" up to and including 5', use 3/8" or 1/2" Dia (270k) prestressing strands with a tension of 14.4 kip per strand. Optionally, (#4) Grade 60 reinforcing bars may be used in lieu of prestressed strands.
 For panel widths up to 3'-6", use (#4) Grade 60 reinforcing bars (prestressed strands alone are not allowed).
 Place transverse panel reinforcement at panel centroid and space at 6" Max.

LONGITUDINAL PANEL REINFORCEMENT:

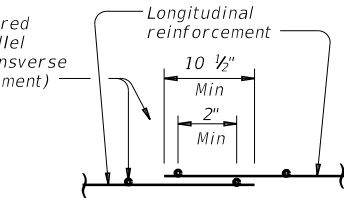
Any of the following options may be used for longitudinal panel reinforcement:
 1. (#3) Grade 60 reinforcing steel at 6" Max Spacing. No splices allowed.
 2. 3/8" Dia prestressing strands at 4 1/2" Max Spacing (unstressed). No splices allowed.
 3. 1/2" Dia prestressing strands at 6" Max Spacing (unstressed). No splices allowed.
 4. Deformed Welded Wire Reinforcement (WWR) (ASTM A1064) providing 0.22 sq in per foot of panel width. Wires larger than D11 not permitted. Provide transverse wires to ensure proper handling of reinforcing. One splice per panel is allowed. See WWR Splice Detail.
 No combination of longitudinal reinforcement options in a panel is allowed. Place longitudinal panel reinforcement above or below transverse panel reinforcement. Must be placed above transverse panel reinforcement for skewed end panels with supplemental (#4) reinforcement.



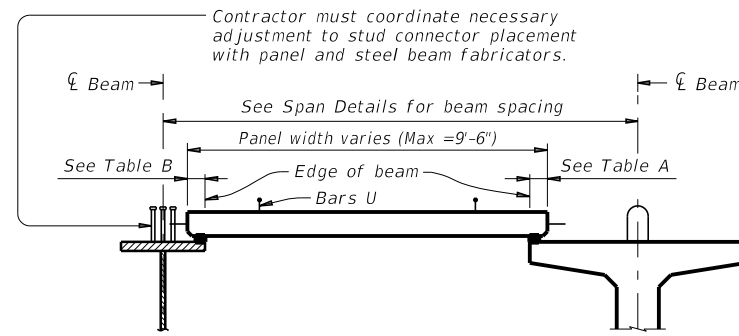
SECTION A-A

(Not showing supplemental #4 bars for skewed end panels.)

No splice required for wires parallel to strands (transverse panel reinforcement)

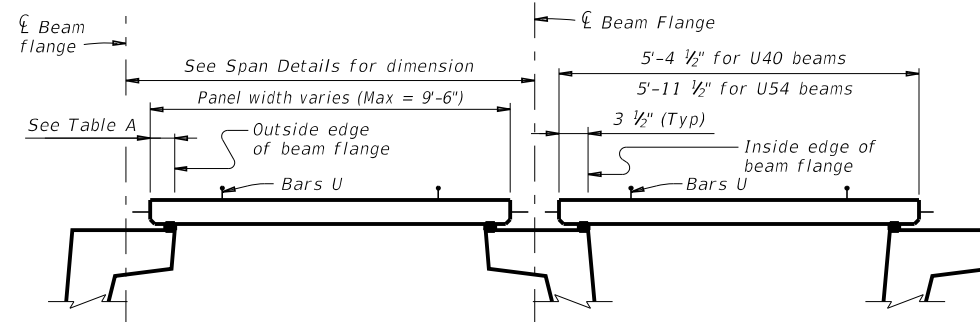


WELDED WIRE REINFORCEMENT (WWR) SPLICE DETAIL



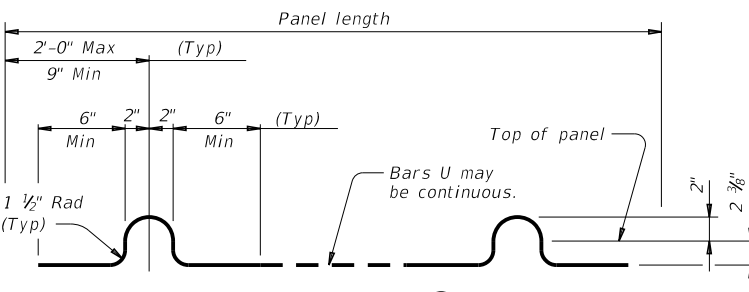
STEEL BEAMS

PRESTRESSED CONCRETE BEAMS OR GIRDERS
 Typ unless noted otherwise

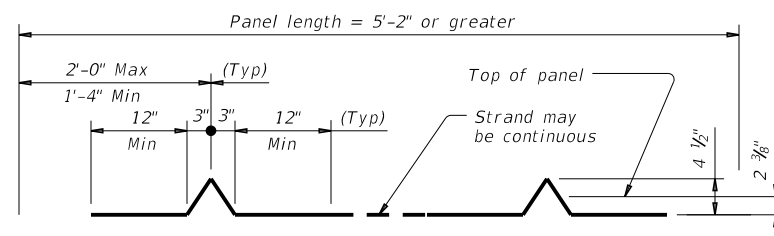


PRESTRESSED CONCRETE U-BEAMS

TYPICAL SECTIONS FOR DETERMINING PANEL WIDTH



BARS U (#3)



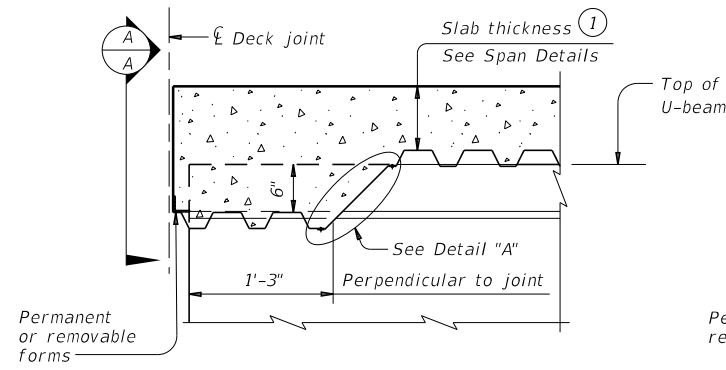
OPTIONAL STRAND FOR BARS U

HL93 LOADING

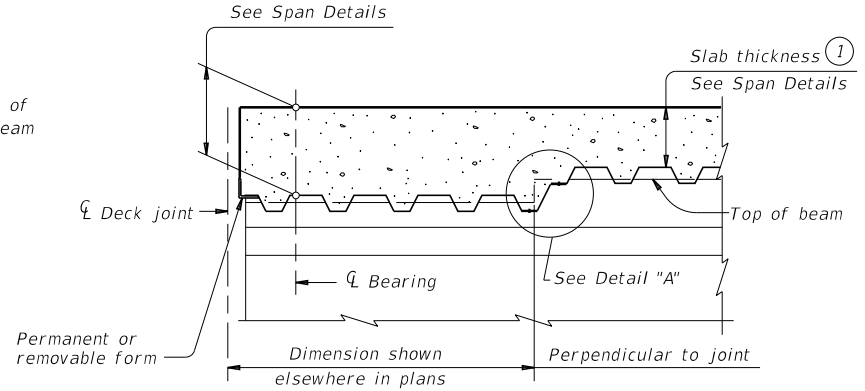
		Bridge Division Standard	
PRESTRESSED CONCRETE PANEL FABRICATION DETAILS			
PCP-FAB			
FILE: pcpstd2-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR
©TxDOT April 2019	CONT 0484	SECT 01	JOB 025
REVISIONS			FM 707
	DIST ABL	COUNTY JONES	SHEET NO. 127

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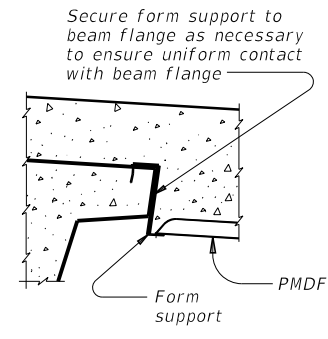
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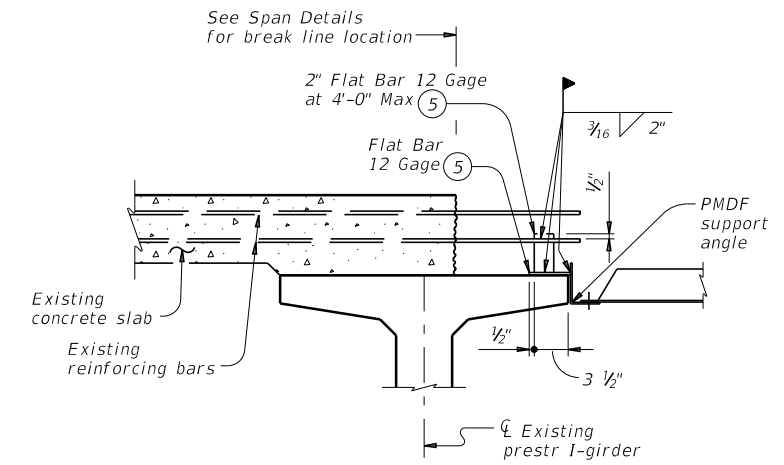
AT THICKENED SLAB END FOR U-BEAMS



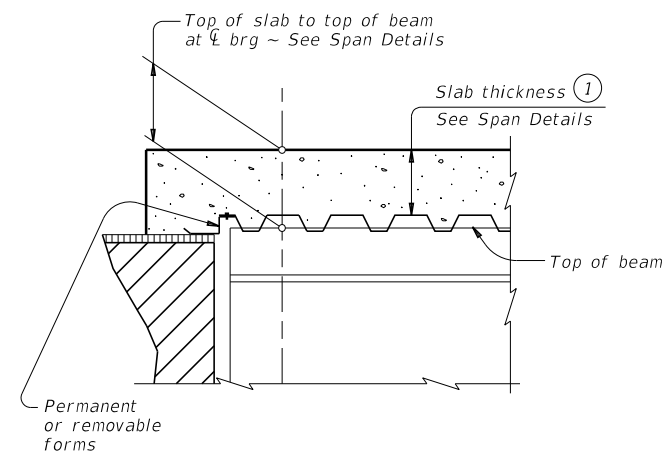
AT THICKENED SLAB END FOR PRESTRESSED I-BEAMS, I-GIRDERS AND STEEL BEAMS
 Showing I-beam block-out. No block-out for I-girders or steel beams.



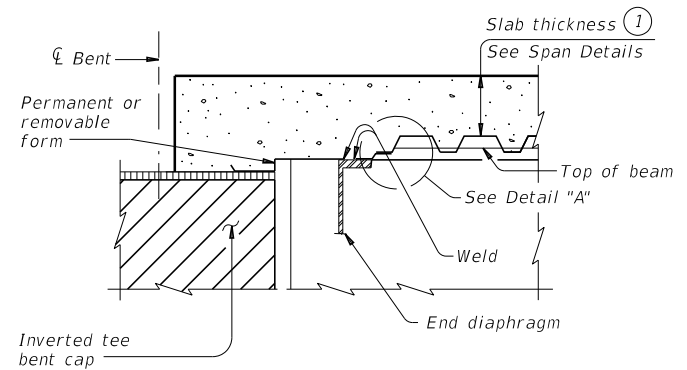
SECTION A-A



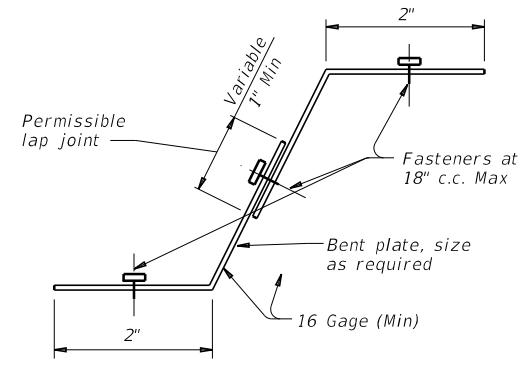
SHOWING PRESTRESSED CONCRETE I-BEAMS, I-GIRDERS AND U-BEAMS



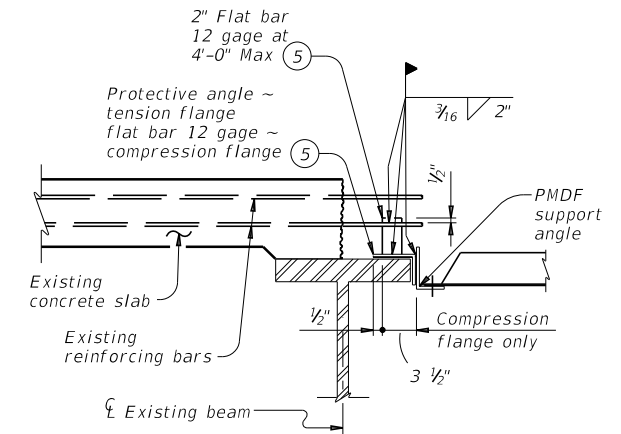
AT SLAB OVER ABUT BKWL OR INV TEE STEM FOR CONC BEAMS WITHOUT THICKENED SLAB END



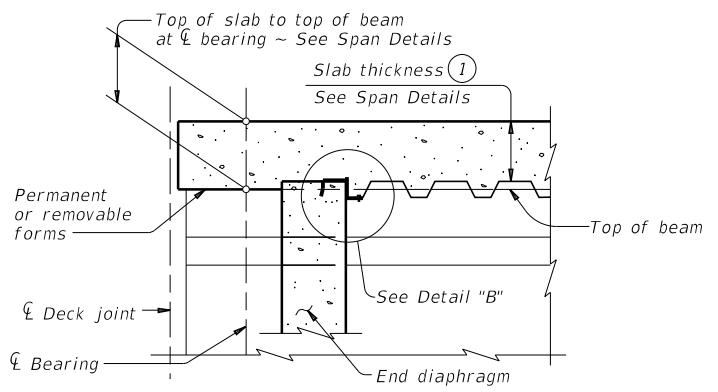
AT SLAB OVER INV TEE STEM FOR STEEL BEAMS WITHOUT THICKENED SLAB END



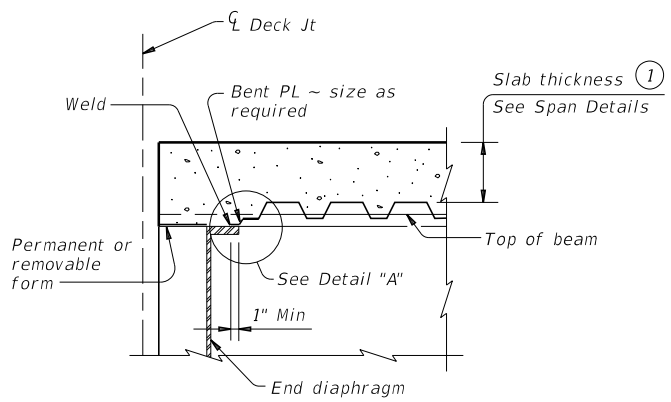
DETAIL "A"



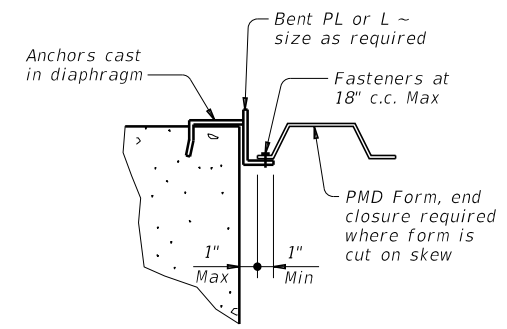
SHOWING STEEL BEAMS



AT CONC END DIAPHRAGM FOR PRESTRESSED I-BEAMS AND STEEL BEAMS



AT END DIAPHRAGM FOR STEEL BEAMS WITHOUT THICKENED SLAB END



DETAIL "B"

WIDENING DETAILS

DETAILS AT ENDS OF BEAMS

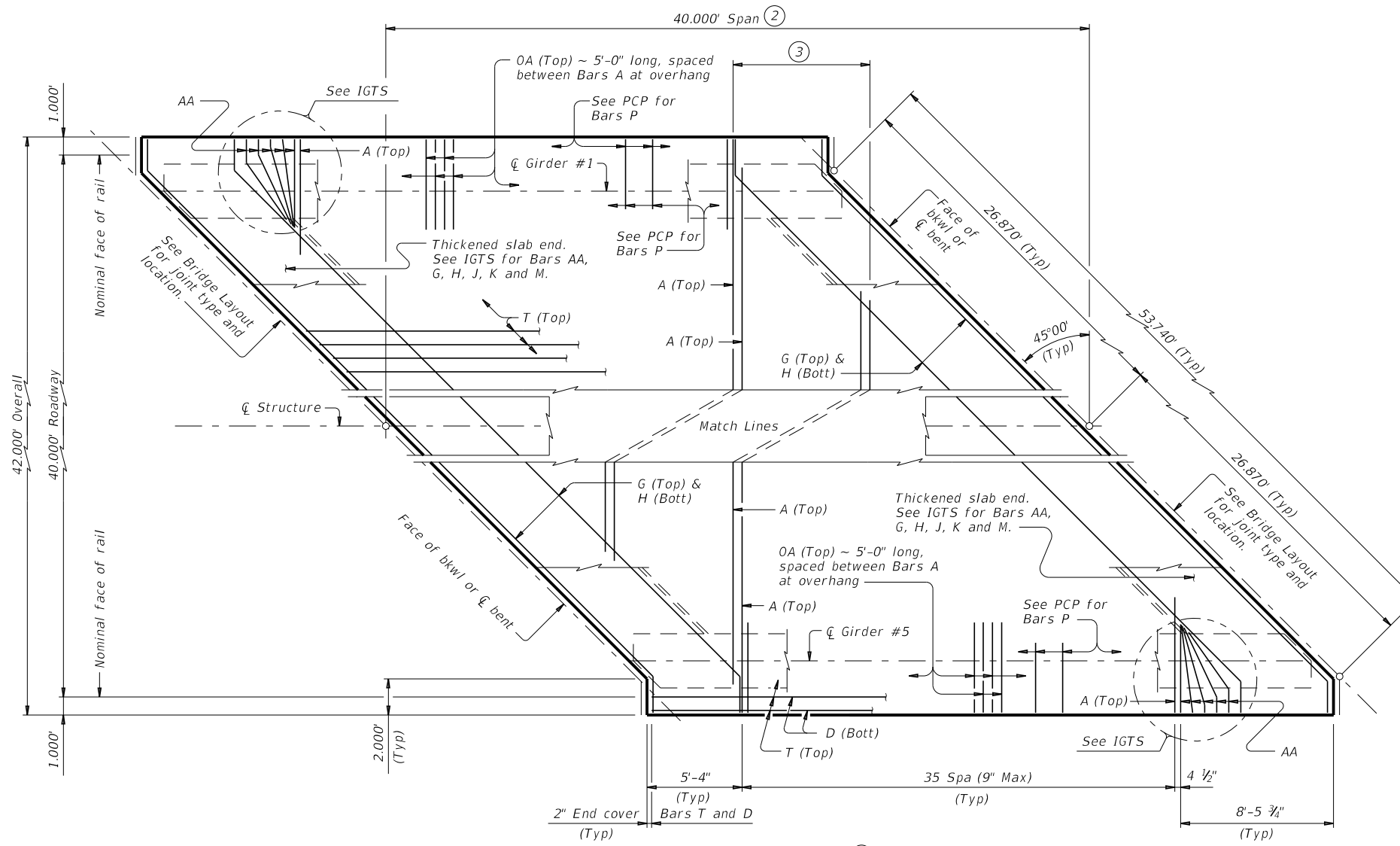
- (1) Slab thickness minus 5/16" if corrugations match reinforcing bars
- (5) Minimum yield stress of 12 gage bars shall be 40 ksi

SHEET 2 OF 2

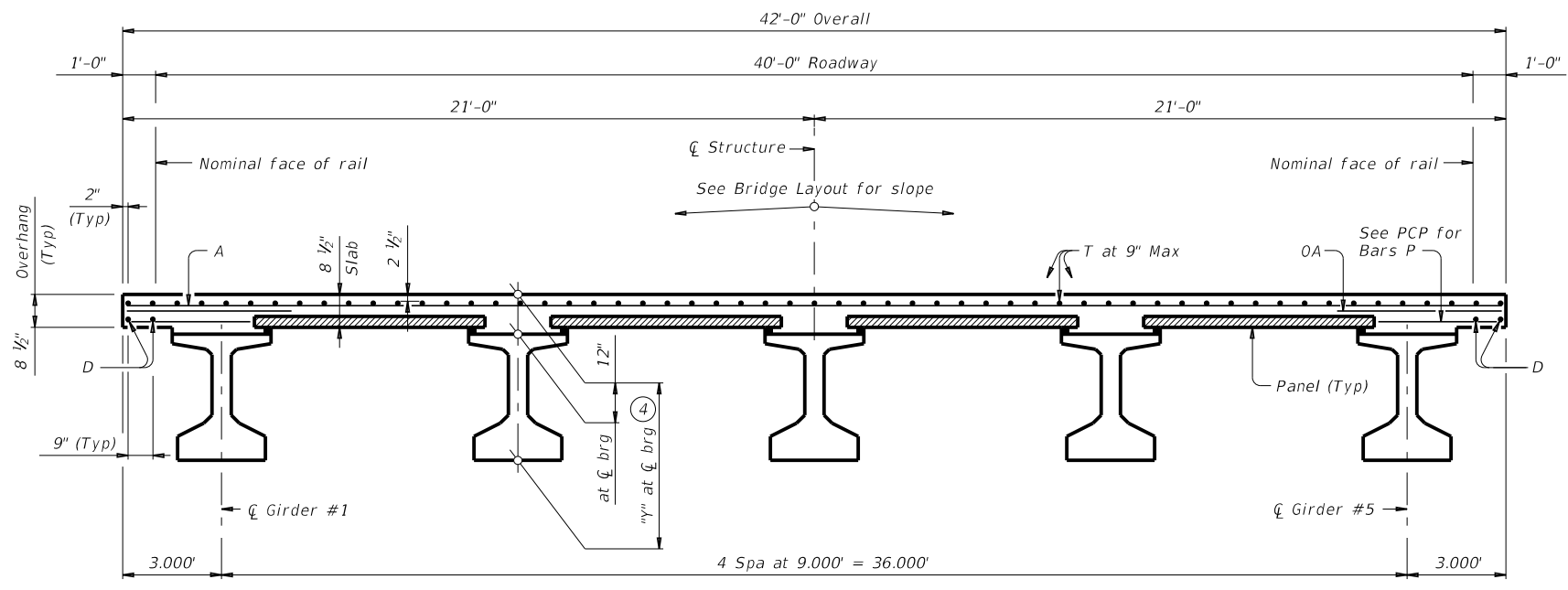
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PERMANENT METAL DECK FORMS			
PMDF			
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©TxDOT April 2019	CONT	SECT	JOB
REVISIONS	0484	01	025 FM 707
02-20: Modified box note by adding steel beams/girders and subsidiary.	DIST	COUNTY	SHEET NO.
	ABL	JONES	129

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PLAN ~ 40' SPAN (1)



TYPICAL TRANSVERSE SECTION
 (Showing girder type Tx46)

TABLE OF SECTION DEPTHS	
GIRDER TYPE	"y" AT CL BRG (4)
	Ft/In
Tx28	3'-4"
Tx34	3'-10"
Tx40	4'-4"
Tx46	4'-10"
Tx54	5'-6"

BAR TABLE	
BAR	SIZE
A	#4
AA	#5
D	#4
G	#4
H	#4
J	#4
K	#4
M	#4
OA	#5
P	#4
T	#4

- ① If multi-span units (with slab continuous over interior bents) are indicated on the Bridge Layout, see standard IGCS for adjustment to slab reinforcement and quantities.
- ② Span lengths for prestressed concrete I-Girder type:
 Type Tx28 for spans lengths 40.000' thru 65.000'.
 Type Tx34 for spans lengths 40.000' thru 80.000'.
 Type Tx40 for spans lengths 40.000' thru 90.000'.
 Type Tx46 for spans lengths 40.000' thru 105.000'.
 Type Tx54 for spans lengths 40.000' thru 120.000'.
 See appropriate "Plan Detail" for span length.
- ③ Bars A (Top) at 9" Max Spacing.
- ④ "y" value shown is based on theoretical girder camber, dead load deflection from an 8 1/2" concrete slab, a constant roadway grade, and using precast panels (PCP). The Contractor will adjust this value as necessary for any roadway vertical curve and/or if the precast overhang panel (PCP(0)) option is used.

HL93 LOADING SHEET 1 OF 3



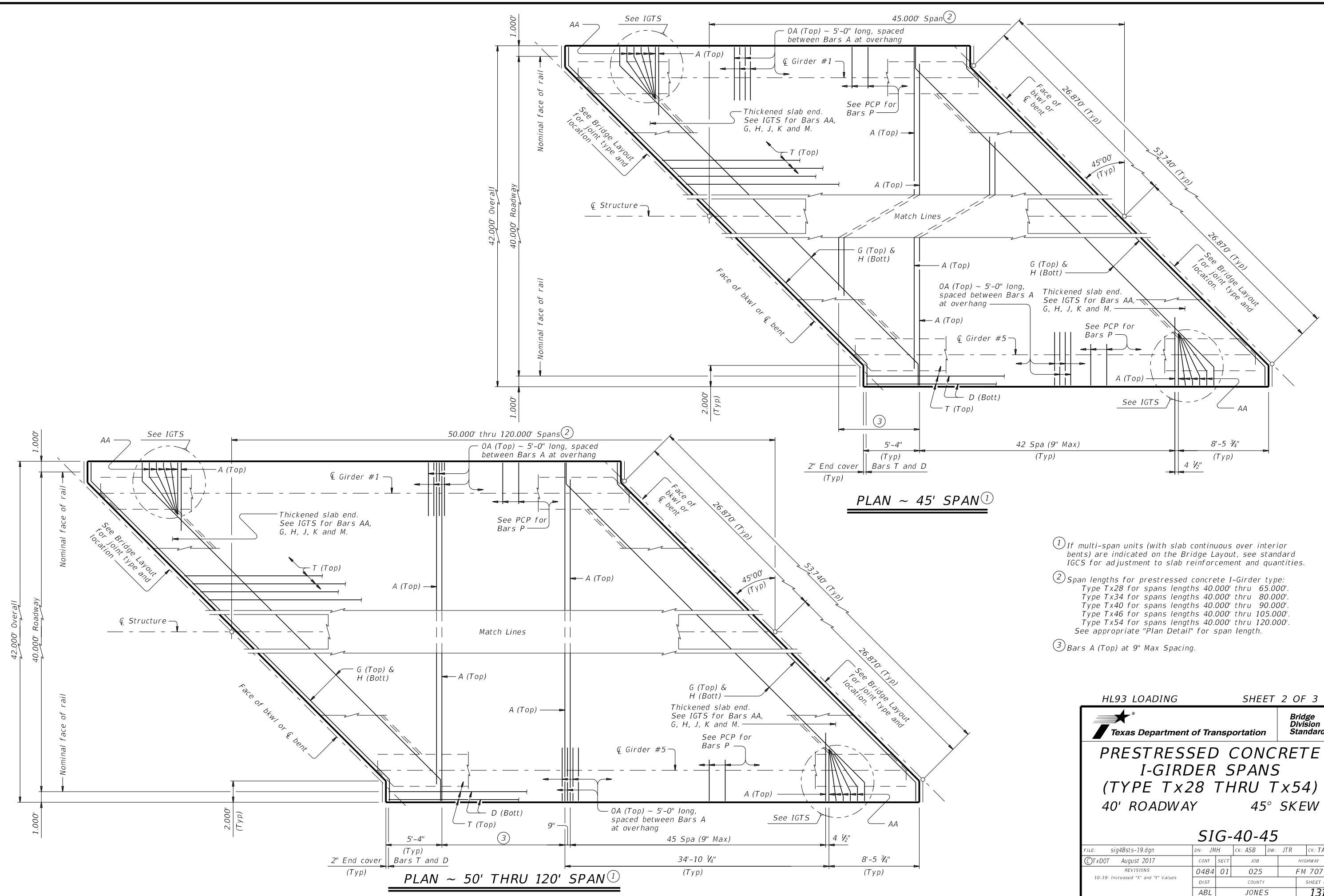
PRESTRESSED CONCRETE I-GIRDER SPANS (TYPE Tx28 THRU Tx54) 40' ROADWAY 45° SKEW

SIG-40-45

FILE: sig48sts-19.dgn	DN: JMH	CK: ASB	DW: JTR	CK: TAR
©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0484	01	025	FM 707
10-19: Increased "X" and "Y" Values	DIST	COUNTY	SHEET NO.	
	ABL	JONES	130	

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- ① If multi-span units (with slab continuous over interior bents) are indicated on the Bridge Layout, see standard IGCS for adjustment to slab reinforcement and quantities.
- ② Span lengths for prestressed concrete I-Girder type:
 Type Tx28 for spans lengths 40,000' thru 65,000'.
 Type Tx34 for spans lengths 40,000' thru 80,000'.
 Type Tx40 for spans lengths 40,000' thru 90,000'.
 Type Tx46 for spans lengths 40,000' thru 105,000'.
 Type Tx54 for spans lengths 40,000' thru 120,000'.
 See appropriate "Plan Detail" for span length.
- ③ Bars A (Top) at 9" Max Spacing.

HL93 LOADING SHEET 2 OF 3

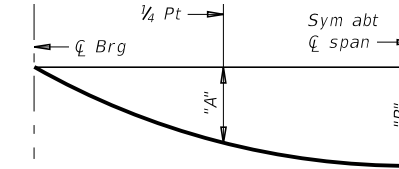
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PRESTRESSED CONCRETE I-GIRDER SPANS (TYPE Tx28 THRU Tx54) 40' ROADWAY 45° SKEW			
SIG-40-45			
FILE: sig48sts-19.dgn	DN: JMH	CK: ASB	DW: JTR
©TxDOT August 2017	CONT	SECT	JOB
REVISIONS	0484	01	025
10-19: Increased "X" and "Y" Values		DIST	COUNTY
		ABL	JONES
		SHEET NO. 131	

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TABLE OF DEAD LOAD DEFLECTIONS

TYPE Tx28 GIRDERS			TYPE Tx34 GIRDERS			TYPE Tx40 GIRDERS			TYPE Tx46 GIRDERS			TYPE Tx54 GIRDERS		
SPAN LENGTH	"A"	"B"	SPAN LENGTH	"A"	"B"	SPAN LENGTH	"A"	"B"	SPAN LENGTH	"A"	"B"	SPAN LENGTH	"A"	"B"
Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft
40	0.010	0.014	40	0.006	0.008	40	0.004	0.006	40	0.003	0.004	40	0.001	0.002
45	0.016	0.023	45	0.010	0.014	45	0.006	0.009	45	0.004	0.006	45	0.003	0.004
50	0.026	0.036	50	0.016	0.022	50	0.010	0.014	50	0.007	0.010	50	0.004	0.006
55	0.038	0.054	55	0.023	0.032	55	0.015	0.021	55	0.010	0.014	55	0.006	0.009
60	0.055	0.077	60	0.033	0.046	60	0.021	0.030	60	0.014	0.020	60	0.010	0.014
65	0.076	0.107	65	0.046	0.064	65	0.030	0.042	65	0.021	0.029	65	0.014	0.019
			70	0.062	0.087	70	0.041	0.057	70	0.028	0.039	70	0.019	0.026
			75	0.082	0.115	75	0.053	0.075	75	0.036	0.051	75	0.024	0.034
			80	0.107	0.150	80	0.070	0.098	80	0.048	0.067	80	0.031	0.044
						85	0.090	0.126	85	0.061	0.086	85	0.041	0.057
						90	0.113	0.159	90	0.078	0.109	90	0.051	0.072
									95	0.096	0.135	95	0.063	0.089
									100	0.119	0.167	100	0.078	0.110
									105	0.145	0.204	105	0.096	0.135
									110			110	0.116	0.163
									115			115	0.139	0.195
									120			120	0.165	0.232



DEAD LOAD DEFLECTION DIAGRAM

Calculated deflections shown are due to the concrete slab on interior girders only ($E_c = 5000$ ksi). Adjust values as required for exterior girders and if optional slab forming is used. These values may require field verification.

TABLE OF ESTIMATED QUANTITIES

SPAN LENGTH	REINF CONCRETE SLAB	Prestressed Concrete Girders			TOTAL REINF STEEL ⑥
		ABUT TO INT BT ⑤	INT BT TO INT BT ⑤	ABUT TO ABUT ⑤	
Ft	SF	LF	LF	LF	Lb
40	1,680	196.98	197.50	196.46	3,864
45	1,890	221.98	222.50	221.46	4,347
50	2,100	246.98	247.50	246.46	4,830
55	2,310	271.98	272.50	271.46	5,313
60	2,520	296.98	297.50	296.46	5,796
65	2,730	321.98	322.50	321.46	6,279
70	2,940	346.98	347.50	346.46	6,762
75	3,150	371.98	372.50	371.46	7,245
80	3,360	396.98	397.50	396.46	7,728
85	3,570	421.98	422.50	421.46	8,211
90	3,780	446.98	447.50	446.46	8,694
95	3,990	471.98	472.50	471.46	9,177
100	4,200	496.98	497.50	496.46	9,660
105	4,410	521.98	522.50	521.46	10,143
110	4,620	546.98	547.50	546.46	10,626
115	4,830	571.98	572.50	571.46	11,109
120	5,040	596.98	597.50	596.46	11,592

- ⑤ Fabricator will adjust lengths for girder slopes as required.
- ⑥ Reinforcing steel weight is calculated using an approximate factor of 2.3 lbs/SF.

GENERAL NOTES:
 Designed according to AASHTO LRFD Bridge Design Specifications.
 Multi-span units, with slab continuous over interior bents, may be formed with the details shown on this sheet and standard IGCS.
 See IGTS standard for Thickened Slab End details and quantity adjustments.
 See PCP and PCP-FAB for panel details not shown.
 See PCP(O) and PCP(O)-FAB for precast overhang panel details if this option is used.
 See IGMS standard for miscellaneous details.
 See applicable rail details for rail anchorage in slab.
 See PMDF standard for details and quantity adjustments if this option is used.
 This standard is drawn showing right forward skew. See Bridge Layout for actual skew direction.
 This standard does not support the use of transition bents.

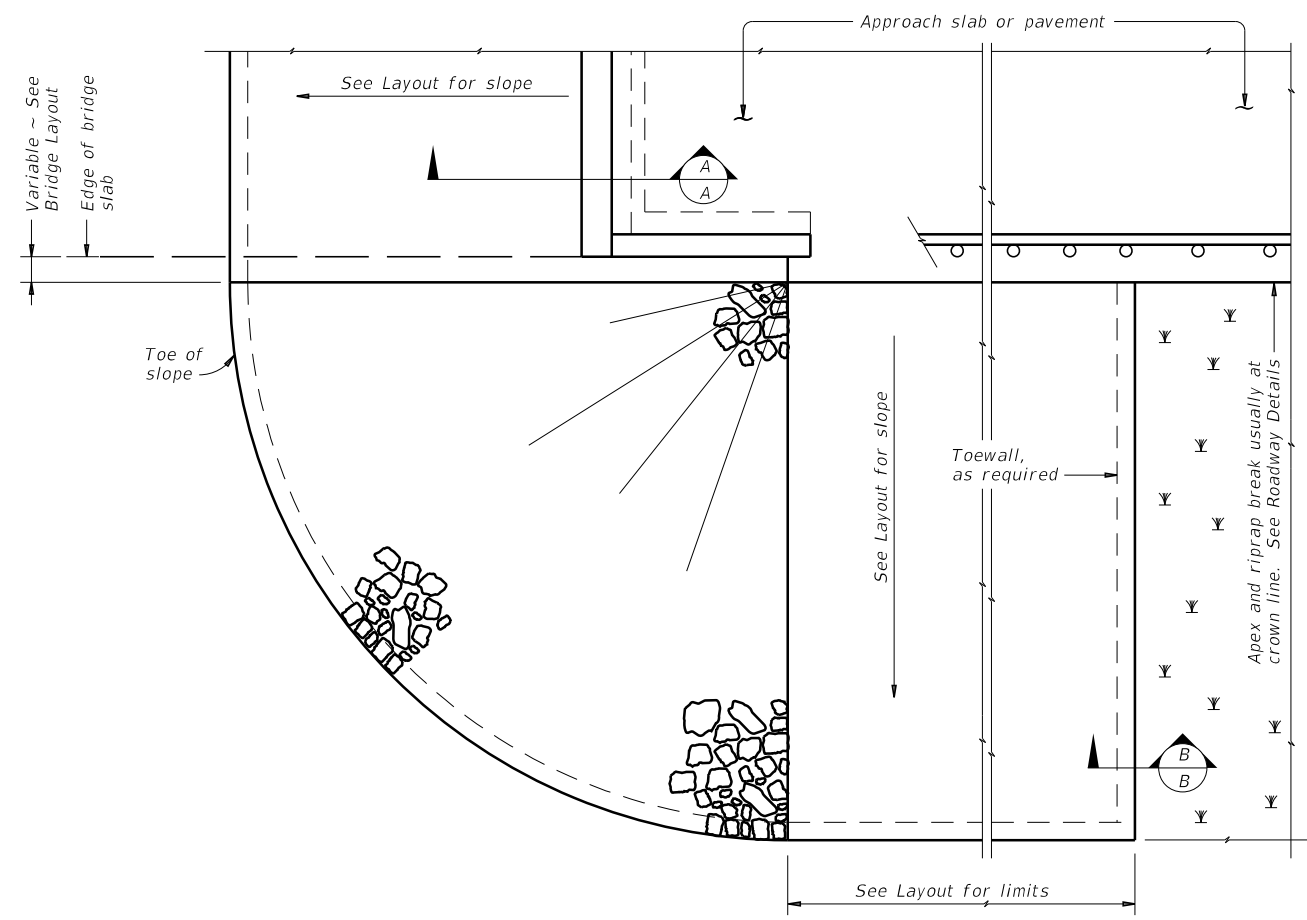
Cover dimensions are clear dimensions, unless noted otherwise.

MATERIAL NOTES:
 Provide Class S concrete ($f'_c = 4,000$ psi).
 Provide Class S (HPC) concrete if shown elsewhere in the plans.
 Provide Grade 60 reinforcing steel.
 Provide bar laps, where required, as follows:
 Uncoated ~ #4 = 1'-7"
 Epoxy coated ~ #4 = 2'-5"
 Deformed Welded Wire Reinforcement (WWR) (ASTM A1064) of equal size and spacing may be substituted for Bars A, AA, D, OA, P or T unless noted otherwise.

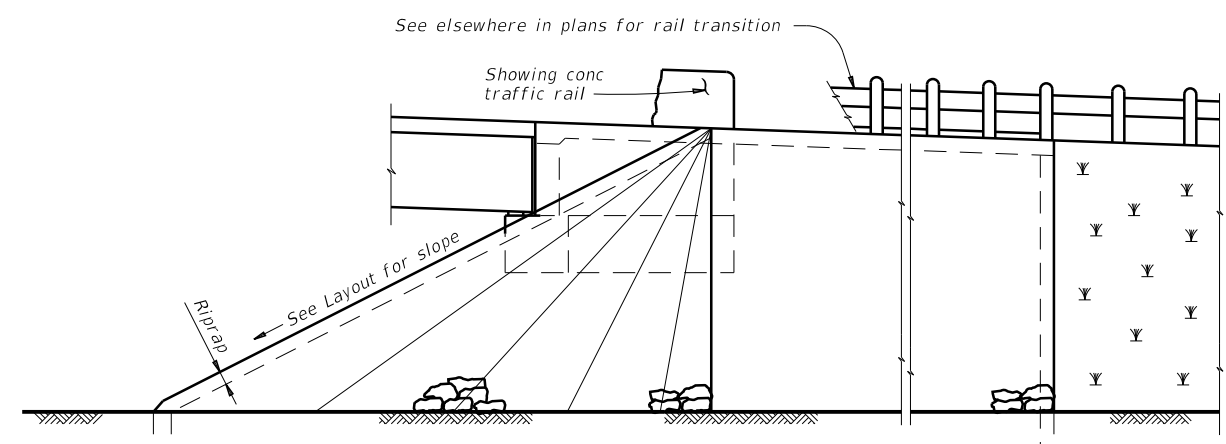
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PRESTRESSED CONCRETE I-GIRDER SPANS (TYPE Tx28 THRU Tx54) 40' ROADWAY 45° SKEW			
SIG-40-45			
FILE: sig48sts-19.dgn	DN: JMH	CK: ASB	DW: JTR
©TxDOT August 2017	CONT	SECT	JOB
REVISIONS	0484	01	025
10-19: Increased "X" and "Y" Values	DIST	COUNTY	SHEET NO.
	ABL	JONES	132

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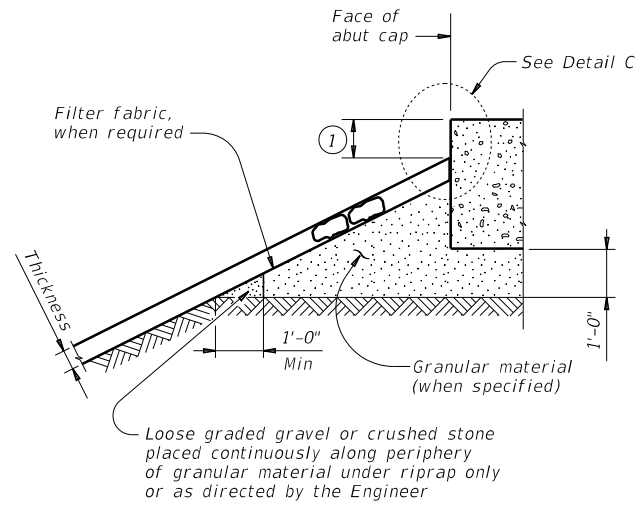
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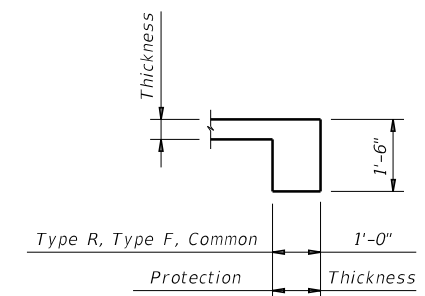
PLAN



ELEVATION

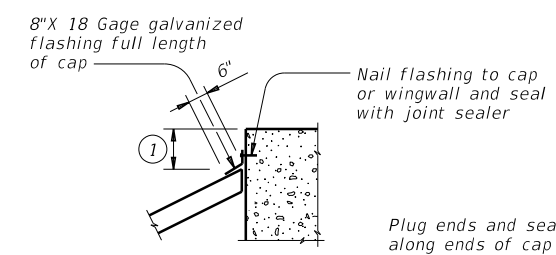


SECTION A-A AT CAP

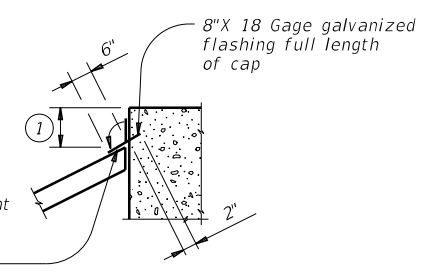


SECTION B-B

Provide toewall when shoulder drain is located adjacent to limits of stone riprap. Omit toewall when thickness of protection riprap is greater than 18".



CAP OPTION A



CAP OPTION B

DETAIL C

① Top of cap to top of riprap dimension varies as directed by the Engineer. Provide 9" Min for beam/slab type bridges and 1'-6" for slab span, box beam, or slab beam bridges.

GENERAL NOTES:
 Refer to Item 432, "Riprap" for stone size and gradation, and construction details. See Layout for limits and thickness of riprap specified.
 See elsewhere in plans for locations and details of shoulder drains.

SHEET 1 OF 2

		Bridge Division Standard	
<h1>STONE RIPRAP</h1>			
<h2>SRR</h2>			
FILE: srrstd1-19.dgn	DN: AES	CK: JGD	DW: BWH
©TxDOT April 2019	CONT SECT	JOB	HIGHWAY
REVISIONS	0484 01	025	FM 707
DIST	COUNTY	SHEET NO.	
ABL	JONES	133	

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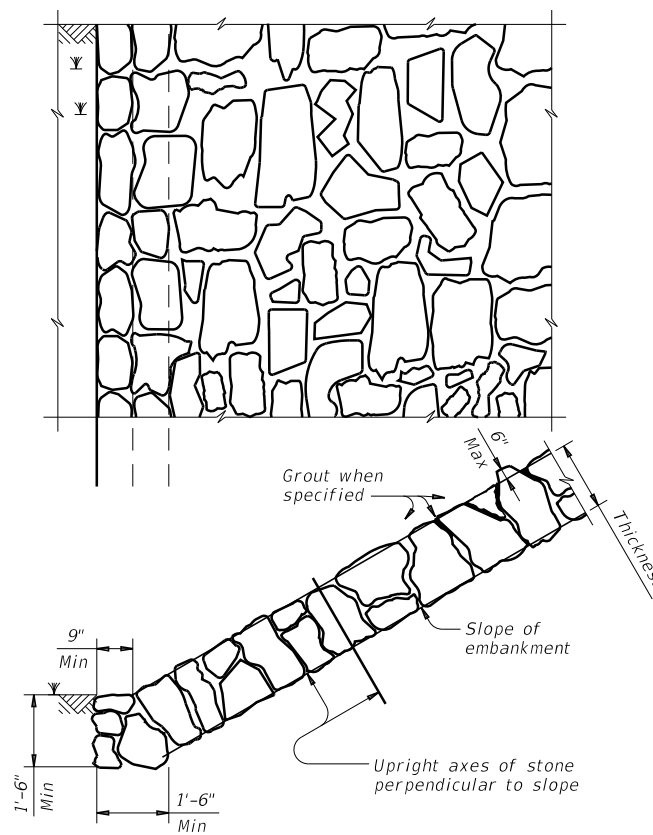


FIGURE 1 ~ TYPE R STONE RIPRAP
dry or grouted

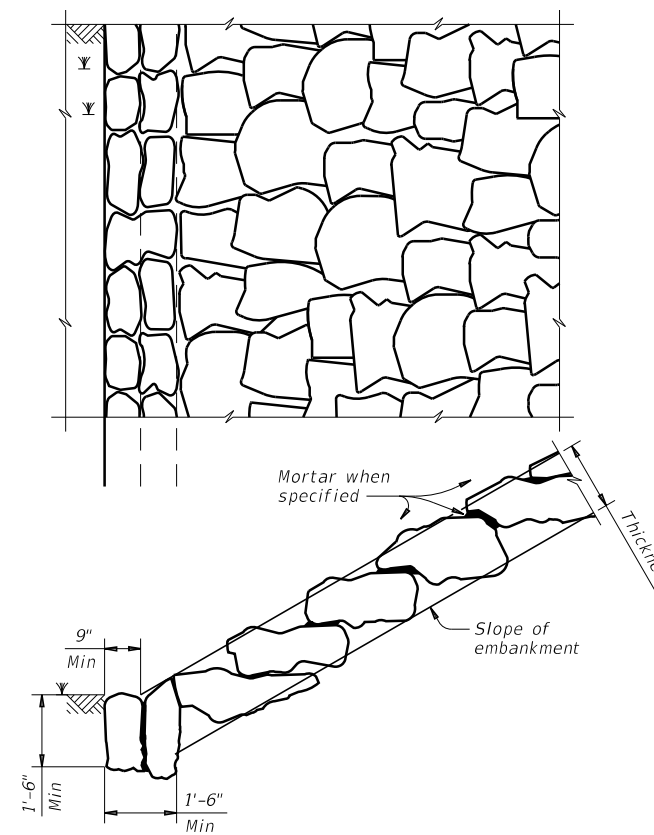


FIGURE 2 ~ TYPE F STONE RIPRAP
dry or mortared

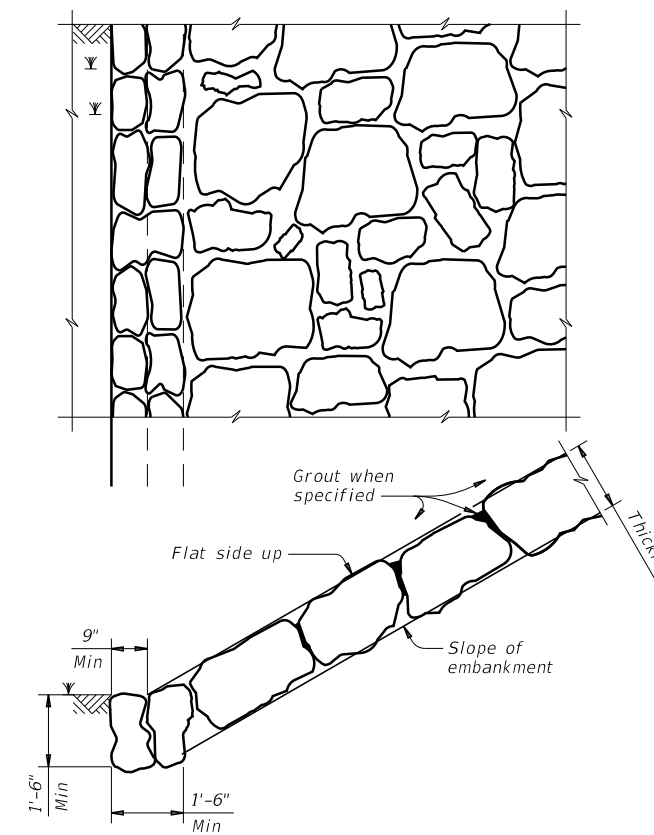


FIGURE 3 ~ TYPE F STONE RIPRAP
grouted

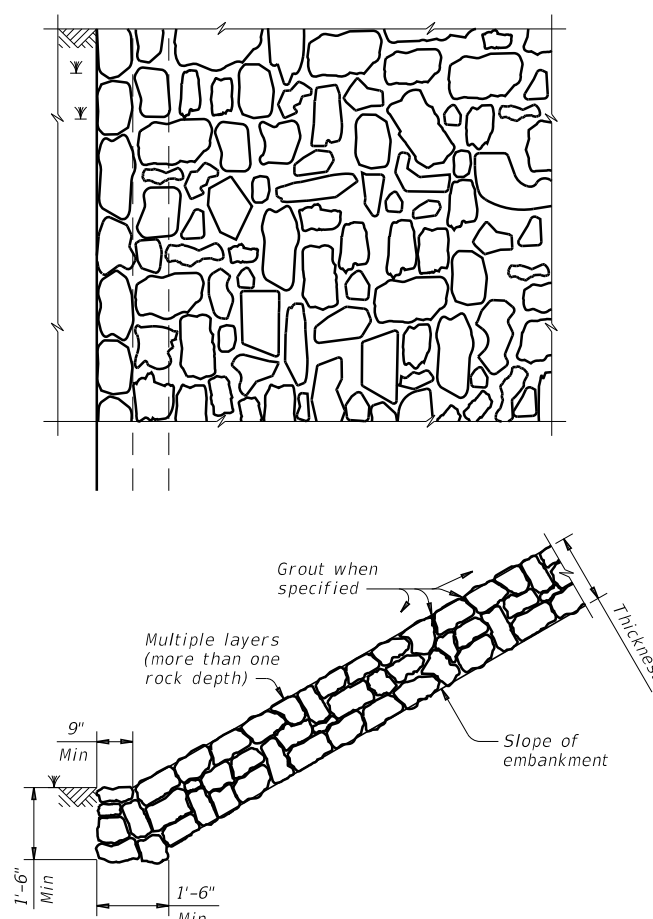


FIGURE 4 ~ COMMON STONE RIPRAP
dry or grouted

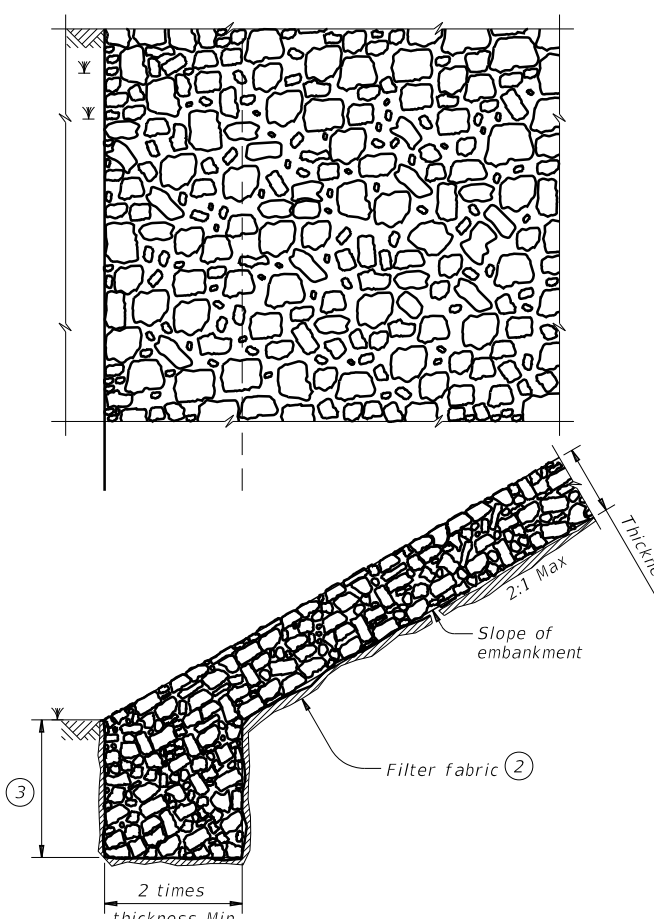
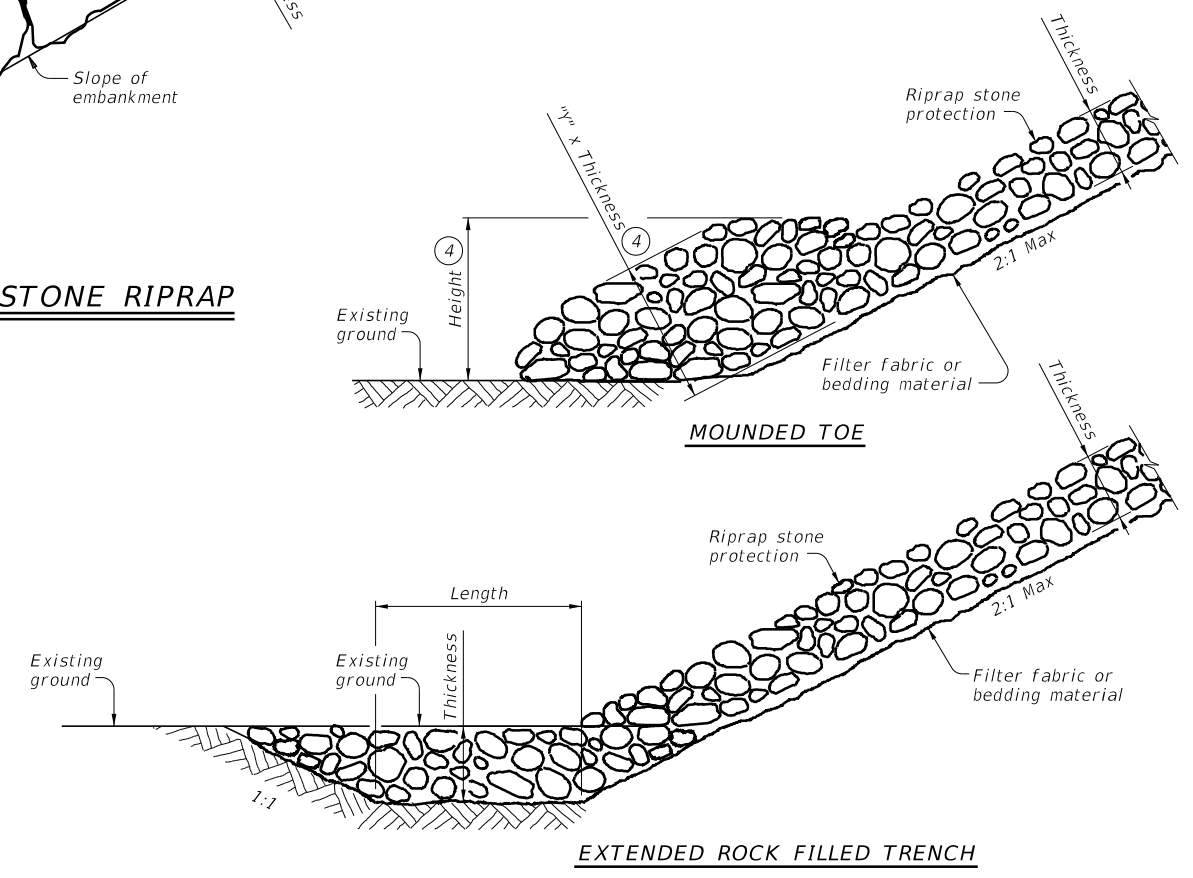


FIGURE 5 ~ PROTECTION STONE RIPRAP

- 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.



PROTECTION STONE RIPRAP TOE OPTIONS

SHEET 2 OF 2

Texas Department of Transportation
Bridge Division Standard

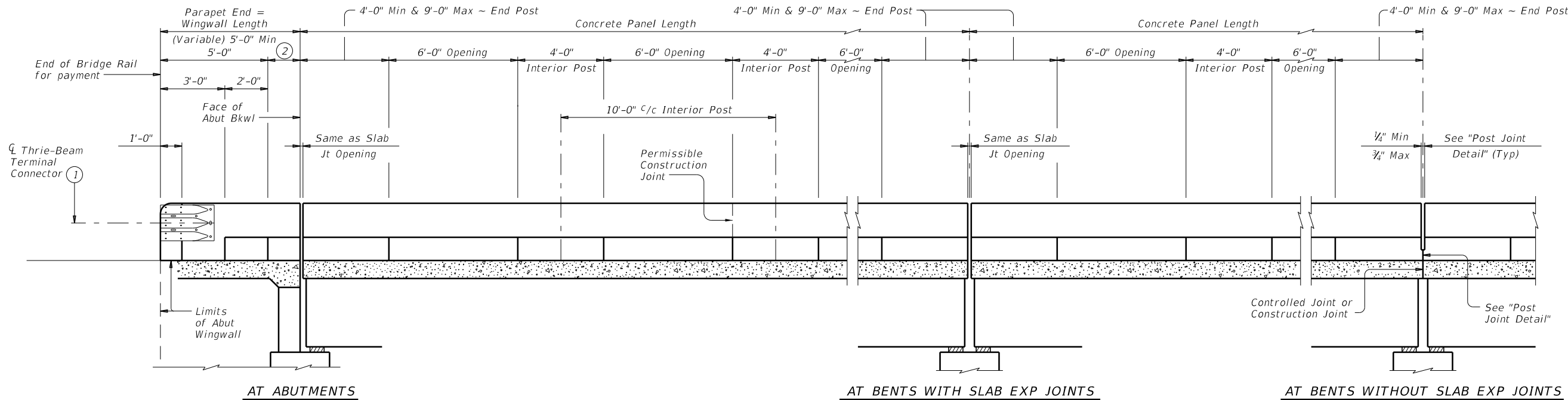
STONE RIPRAP

SRR

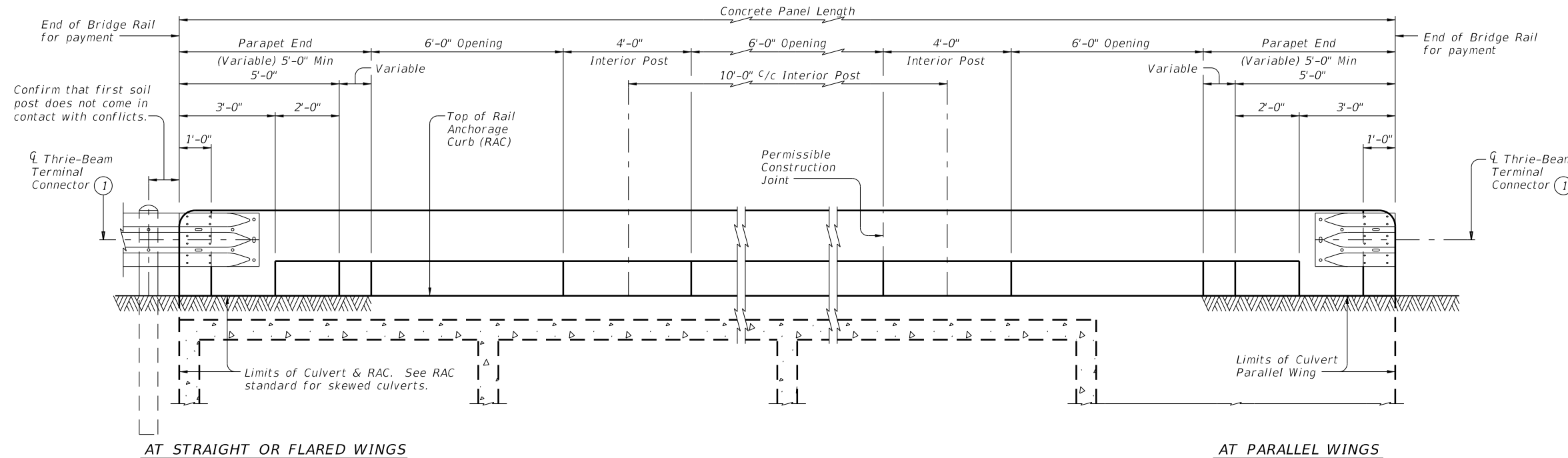
FILE: srrside1-19.dgn	DN: AES	CK: JGD	DW: BWH	CK: AES
©TxDOT April 2019	CONT SECT	JOB	HIGHWAY	
REVISIONS	0484 01	025	FM 707	
	DIST	COUNTY	SHEET NO.	
	ABL	JONES	134	

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: 11/11/2021 5:13:09 PM
 FILE: c:\bms\br\edge\form\mer-pw\adon\fa\inter\dms05103\0369-BR-01-1223-01.dgn



ROADWAY ELEVATION OF RAIL ON BRIDGE



ROADWAY ELEVATION OF RAIL ON BOX CULVERTS

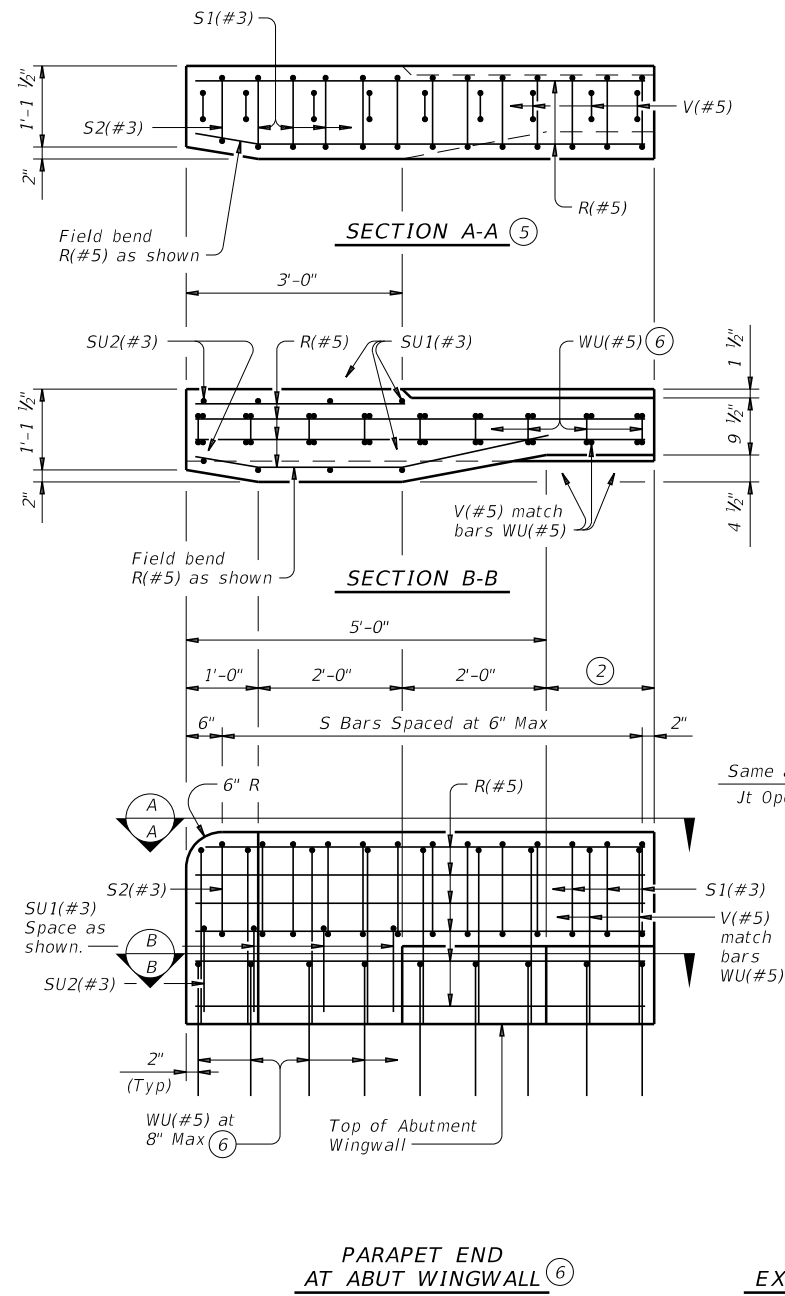
Showing 0° skew culvert. Skewed culverts similar. See RAC standard for details not shown. Vertical joints in concrete rail are not required, unless shown elsewhere.

- ① Terminal Connectors and associated hardware are to be paid for under the Item "Metal Beam Guard Fence". Attach Metal Beam Guard Fence Transitions to the bridge rail and extend along the embankment unless otherwise shown in the plans.
- ② Wingwall Length minus 5'-0" (Varies)

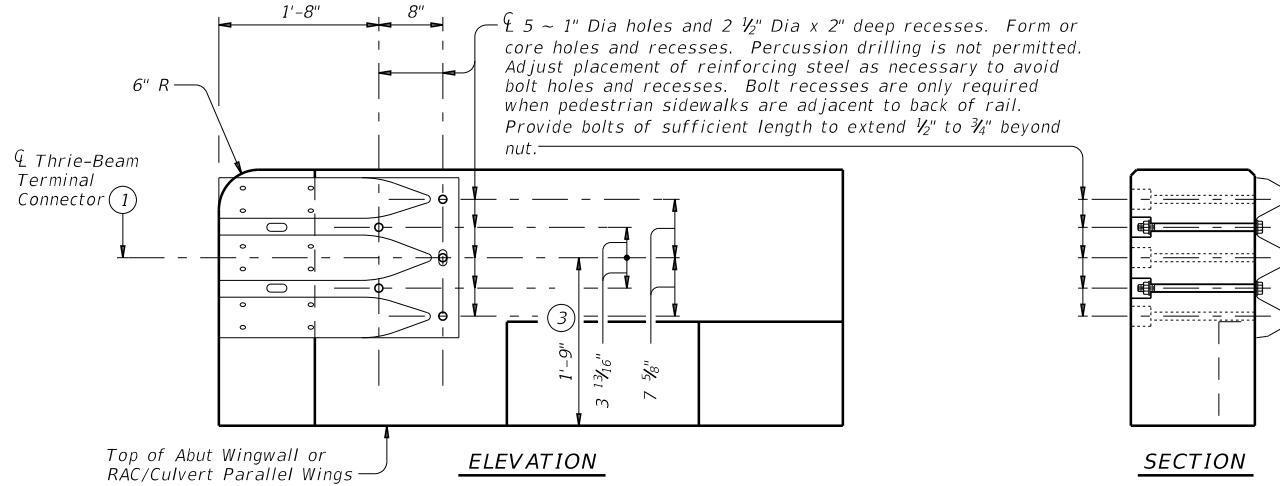
		Bridge Division Standard	
<h2>TRAFFIC RAIL</h2>			
<h3>TYPE T223</h3>			
FILE: r1std005-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR
©TxDOT September 2019	CONT	SECT	JOB
REVISIONS	0484	01	025
	DIST	COUNTY	SHEET NO.
	ABL	JONES	135

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.

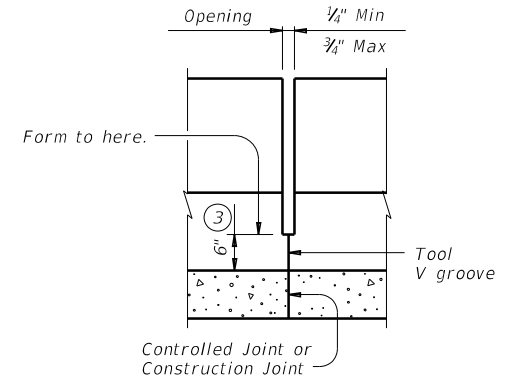
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PARAPET END AT ABUT WINGWALL ⑥

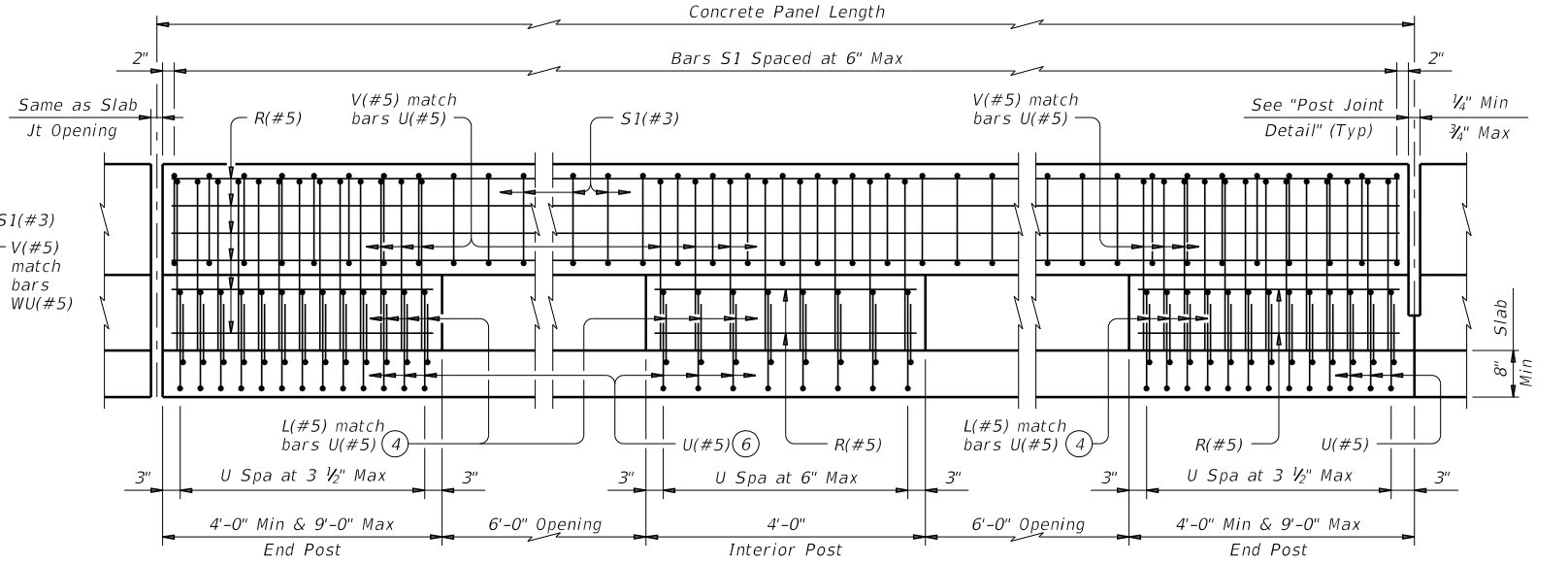


TERMINAL CONNECTION DETAILS



POST JOINT DETAIL

Provide at all interior bents without slab expansion joints.



ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT

Showing rail on slab. Rail on box culvert similar.

- ① Terminal Connectors and associated hardware are to be paid for under the Item "Metal Beam Guard Fence". Attach Metal Beam Guard Fence Transitions to the bridge rail and extend along the embankment unless otherwise shown in the plans.
- ② Wingwall Length minus 5'-0" (Varies)
- ③ Increase 2" for structures with overlay.
- ④ Bars L(#5) are part of rail reinforcing and are included in unit price bid for railing. Space with Bars U. Bars L match slab bar cover. Bars L may be bundled with top slab reinforcing if spacing is equivalent.
- ⑤ Bars SU1(#3), SU2(#3) and WU(#5) not shown for clarity.
- ⑥ Substitute Bars U(#5) for Bars WU(#5) when parapet end is located on anchorage curb over culvert top slab. Use Bars WU(#5) in culvert parallel wings.



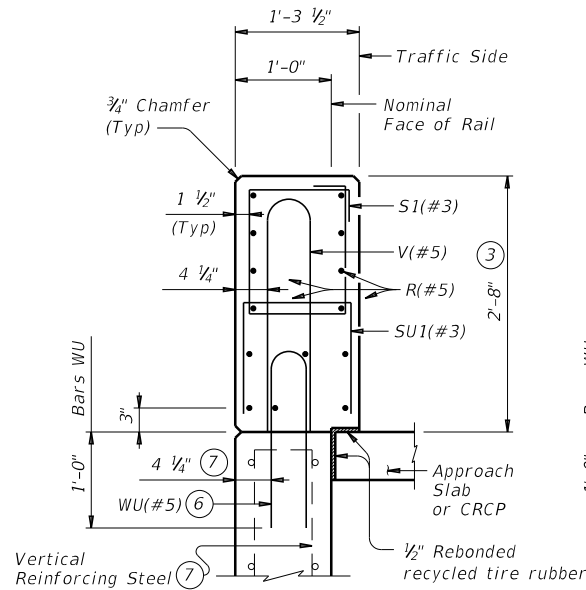
TRAFFIC RAIL

TYPE T223

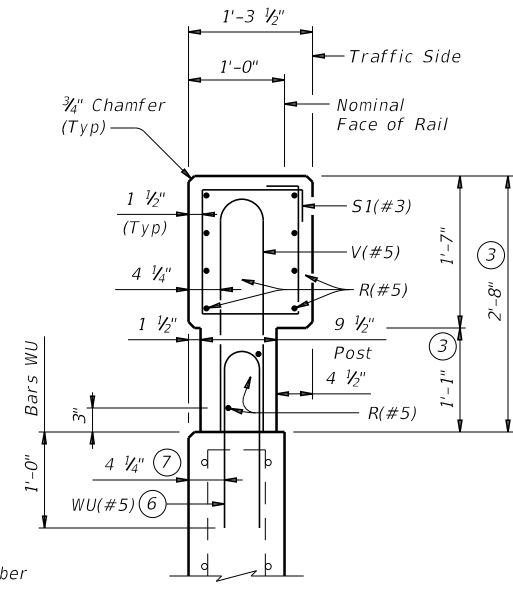
FILE: r\std005-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: AES
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0484	01	025	FM 707
	DIST	COUNTY	SHEET NO.	
	ABL	JONES	136	

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.

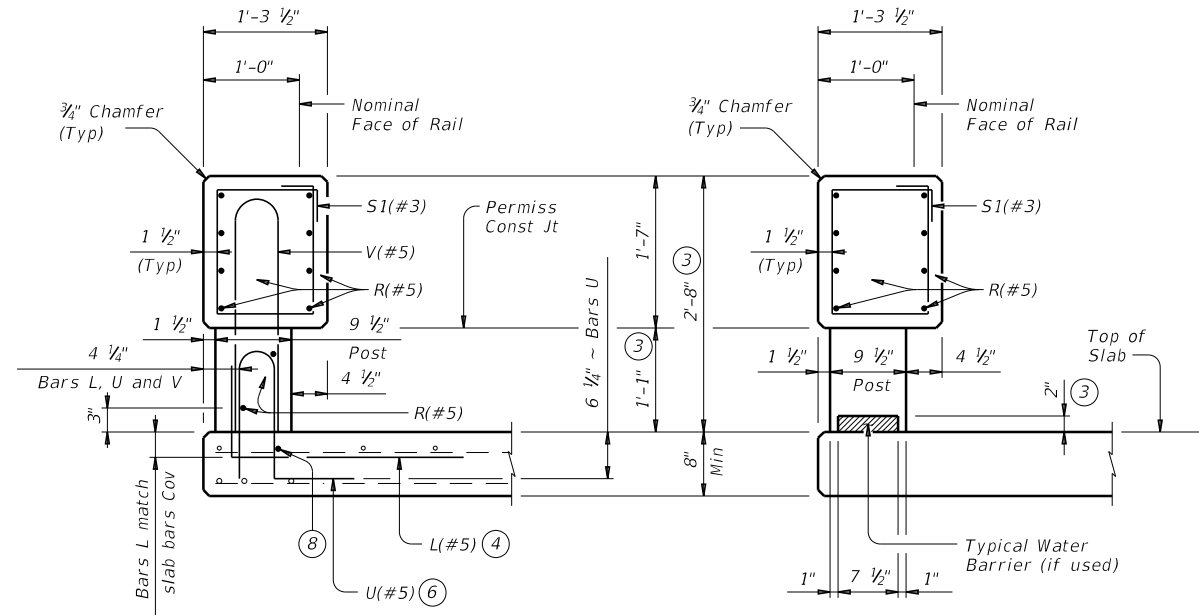
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**SECTION C-C
ON ABUTMENT WINGWALLS
OR CIP RETAINING WALLS**

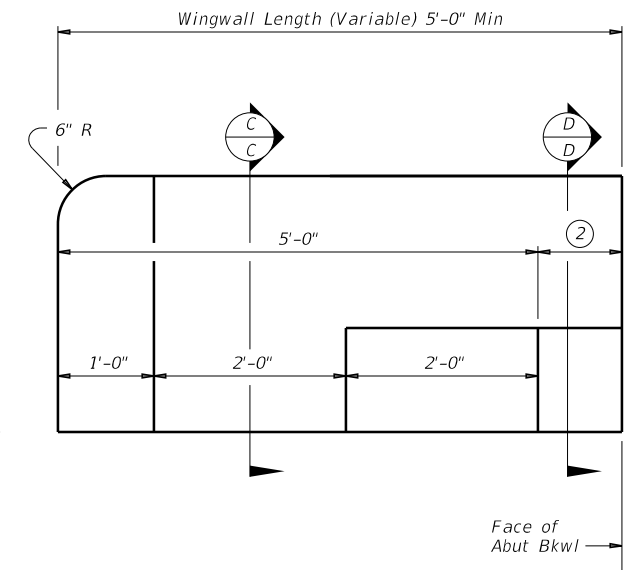


**SECTION D-D
ON ABUTMENT WINGWALLS
OR CIP RETAINING WALLS**



**AT POST
ON BRIDGE SLAB**

**AT OPENING
ON BRIDGE SLAB**



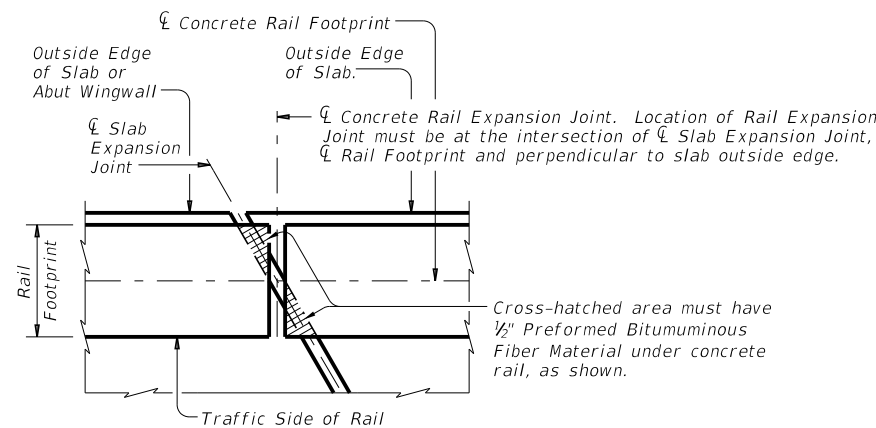
**ELEVATION AT
ABUTMENT WINGWALL**

Box culvert parallel wings or rail anchorage curb similar.

SECTIONS THRU RAIL

Sections on box culverts similar.

- ② Wingwall Length minus 5'-0" (Varies)
- ③ Increase 2" for structures with overlay.
- ④ Bars L(#5) are part of rail reinforcing and are included in unit price bid for railing. Space with Bars U. Bars L match slab bar cover. Bars L may be bundled with top slab reinforcing if spacing is equivalent.
- ⑥ Substitute Bars U(#5) for Bars WU(#5) when parapet end is located on anchorage curb over culvert top slab. Use Bars WU(#5) in culvert parallel wings.
- ⑦ When vertical reinforcing has closer clear cover over horizontal reinforcing in abutment wingwalls on traffic side of wall, move the horizontal wingwall/retaining wall reinforcing to the inside of Bars WU where bars conflict.
- ⑧ Top longitudinal slab bar may be adjusted laterally 3" plus or minus to tie reinforcing.
- ⑨ At the Contractor's option, Bars V may be replaced by extending Bars U to 2'-5 1/4" above the roadway surface without overlay.



PLAN OF RAIL AT EXPANSION JOINTS

Example showing Slab Expansion Joints without breakbacks.

CONSTRUCTION NOTES:

Face of rail and parapet must be vertical transversely unless otherwise shown in the plans or approved by the Engineer.
 Provide water barriers at openings draining onto undercrossing roadways and sidewalks. They may be cast-in-place or precast in convenient lengths and bonded to the bridge deck with an approved epoxy cement.
 Chamfer all exposed corners.

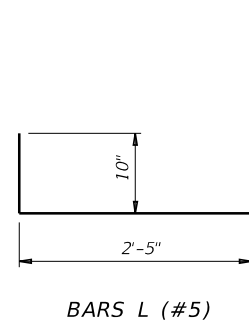
MATERIAL NOTES:

Provide Class "C" concrete. Provide Class "C" (HPC) if required elsewhere.
 Provide Grade 60 reinforcing steel.
 Epoxy coat or galvanize all reinforcing steel if slab bars are epoxy coated or galvanized.
 Deformed Welded Wire Reinforcing (WWR) (ASTM A1064) of equal size and spacing may be substituted for Bars U, V, and WU unless noted otherwise. Provide the same laps as required for reinforcing bars.
 Provide bar laps, where required, as follows:
 Uncoated or galvanized ~ #5 = 2'-0"
 Epoxy coated ~ #5 = 3'-0"

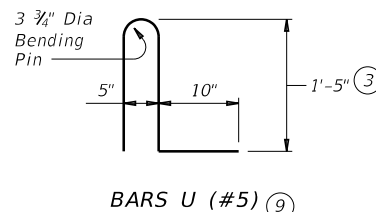
GENERAL NOTES:

This rail has been evaluated by full-scale crash test to meet MASH TL-3 criteria. This rail can be used for speeds of 50 mph and greater when a TL-3 rated guard fence transition is used. When a TL-2 rated guard fence transition is used, this rail can only be used for speeds of 45 mph and less.
 Do not use this railing on bridges with expansion joints providing more than 5" movement.
 Rail anchorage details shown on this standard may require modification for select structure types. See appropriate details elsewhere in plans for these modifications.
 Shop drawings are not required for this rail.
 Average weight of railing with no overlay is 358 plf.

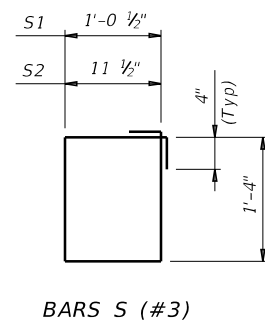
Cover dimensions are clear dimensions, unless noted otherwise. Reinforcing bar dimensions shown are out-to-out of bar.



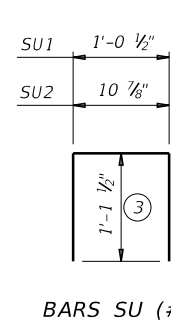
BARS L (#5)



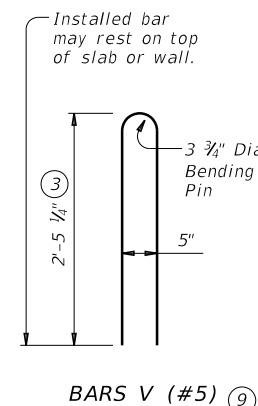
BARS U (#5) ⑨



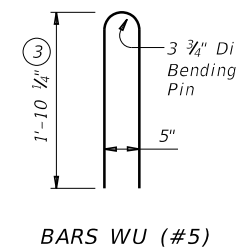
BARS S (#3)



BARS SU (#3)



BARS V (#5) ⑨



BARS WU (#5)

SHEET 3 OF 3

		Bridge Division Standard	
<h1>TRAFFIC RAIL</h1>			
<h2>TYPE T223</h2>			
FILE: r1std005-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR
©TxDOT September 2019	CONT	SECT	JOB
REVISIONS	0484	01	025
	DIST	COUNTY	SHEET NO.
	ABL	JONES	137

SUMMARY OF SMALL SIGNS					SMA RD SGN ASSM TY XXXXX (X) XX (X-XXXX)					BRIDGE MOUNT CLEARANCE SIGNS	
PLAN SHEET NO.	SIGN NO.	SIGN DESIGNATION	SIGN CONTENT	SIGN DIMENSIONS (See above Note)	ALUMINUM TYPE A	ALUMINUM TYPE G	Post Type	Anchor Type	Mounting Designation	TY N = Type N TY S = Type S	
							FRP = Fiberglass TWT = Thin-wall 10BWG = 10 BWG S80 = Sched 80	Posts (1 or 2)	UA = Univer-Conc UB = Univer-Bolt SA = Slip-Conc SB = Slip-Bolt WS = Wedge Steel WP = Wedge Plastic		P = Prefab. "Plain" T = Prefab. "T" U = Prefab. "U"
1 OF 4	1	M1-6F	<FM SHIELD> FARM ROAD (ROUTE #)	24 x 24	X		10BWG	1	SA	P	
		M6-4	<ARROW - DUAL LEFT & RIGHT>	21 x 15	X						
	2	W1-7T	<BI-DIRECTIONAL LRG ARRW w/ CHEVRONS>	96 x 36	X		10BWG	1	SA	T	
	3	M1-6F	<FM SHIELD> FARM ROAD (ROUTE #)	24 x 24	X		10BWG	1	SA	P	
		M6-1R	<ARROW - HORIZ. STRGHT RIGHT>	21 x 15	X						
	4	M1-6F	<FM SHIELD> FARM ROAD (ROUTE #)	24 x 24	X		10BWG	1	SA	U	
	M6-1R	<ARROW - HORIZ. STRGHT RIGHT>	21 x 15	X							
	D1-1	(DESTINATION - 1 LINE)	54 x 18	X							
	M6-1R	<ARROW - HORIZ. STRGHT RIGHT>	21 x 15	X							
	R1-1	STOP	36 x 36	X		10BWG	1	SA	P		
	M3-3	SOUTH <AUXILIARY SIGN>	24 x 12	X		10BWG	1	SA	P		
2 OF 4	1	W8-13aT	BRIDGE MAY ICE IN COLD WEATHER	36 x 36	X		10BWG	1	SA	P	
	2*	M2-1	JCT <AUXILIARY SIGN>	21 x 15	X		10BWG	1	SA	P	
		M1-6F	<FM SHIELD> FARM ROAD (ROUTE #)	24 x 24	X						
	3*	I-3	(RIVER NAME) RIVER	48 x 30	X		10BWG	1	SA	T	
3 OF 4	1*	I-3	(RIVER NAME) RIVER	48 x 30	X		10BWG	1	SA	T	
4 OF 4	1	W8-13aT	BRIDGE MAY ICE IN COLD WEATHER	36 x 36	X		10BWG	1	SA	P	

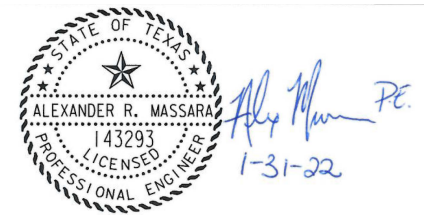
* NOTE: ALL SIGNS LISTED IN SUMMARY ARE EXISTING SIGNS. AN ASTERISK INDICATES AN EXISTING SIGN WHICH WILL NEED TO BE NEWLY INSTALLED DUE TO CONSTRUCTION ACTIVITIES.

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

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website:
<http://www.txdot.gov/>

NOTE:

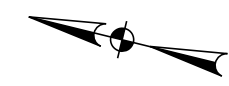
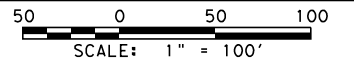
1. Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.
2. For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS) Standard Sheet.
3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD (GEN).



FM 707
SUMMARY OF
SMALL SIGNS

SHEET 1 OF 1

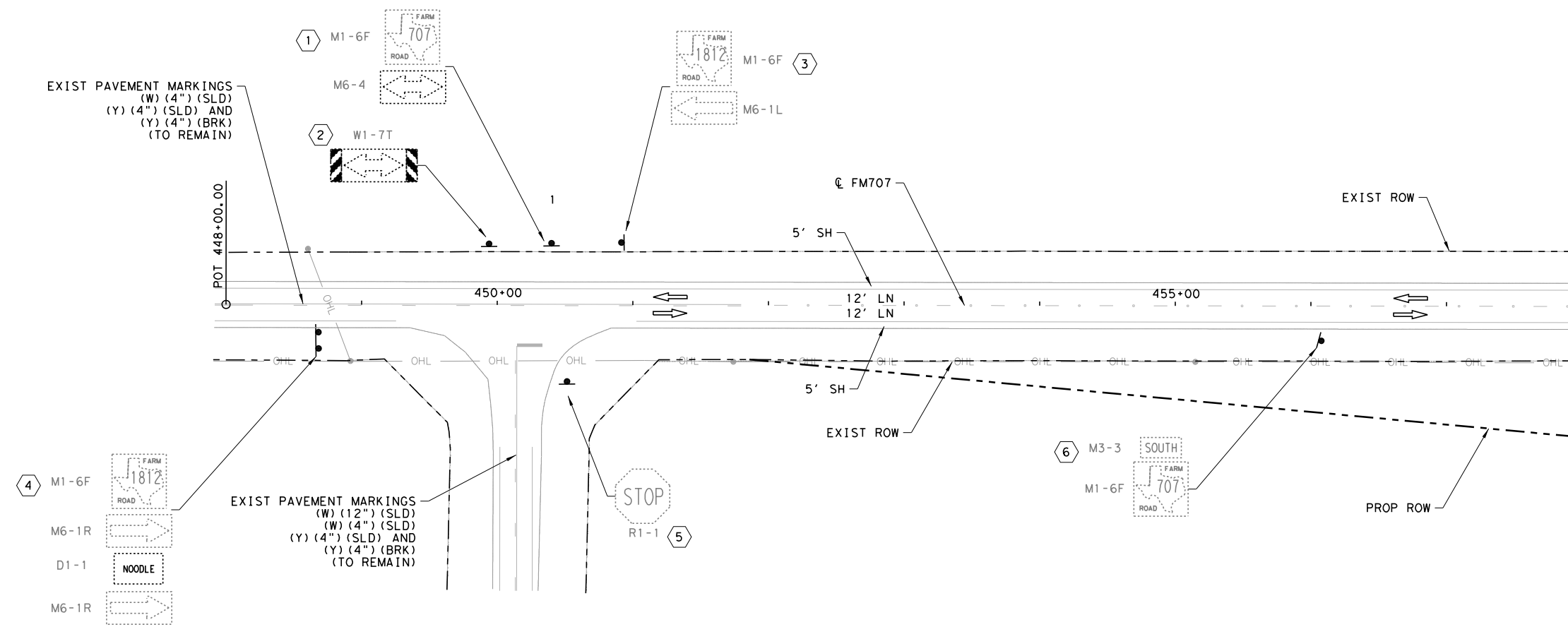
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DW:	CG	CK:	AT	DIST:	ABL	COUNTY:	JONES	SHEET NO.:	138		



LEGEND

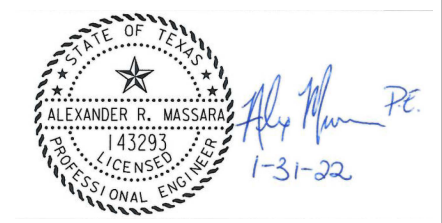
- (W) PAV MRK (W) (4") (SLD)
- (X) PAV MRK (Y) (4") (SLD)
- (Y) PAV MRK (Y) (4") (BRK)
- (Z) REFL PAV MRK TY II-A-A
- # SOSS REFERENCE NUMBER
- EXISTING SIGN STRUCTURE
- DIRECTION OF TRAVEL
- (D-SW)SZ 1(BRF)GF2(BI)
- (D-SW)SZ 1(BRF)CTB(BI)
- EXIST SIGN TO REMAIN
- EXIST SIGN DISPLACED BY CONSTRUCTION ACTIVITIES (TO BE REPLACED)

MATCH LINE @ FM707 STA 458+00



NOTES:

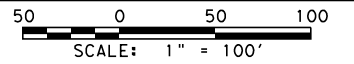
1. ALL SIGNS DISPLACED BY CONSTRUCTION ACTIVITIES SHALL BE REPLACED ACCORDING TO TMUCTD WITH A NEW SIGN AND SIGN ASSEMBLY.
2. SEE SUMMARY OF SMALL SIGNS FOR MORE INFORMATION.



**FM 707
SIGNING AND
PAVEMENT MARKING
PLAN**

SCALE: 1" = 100' SHEET 1 OF 4

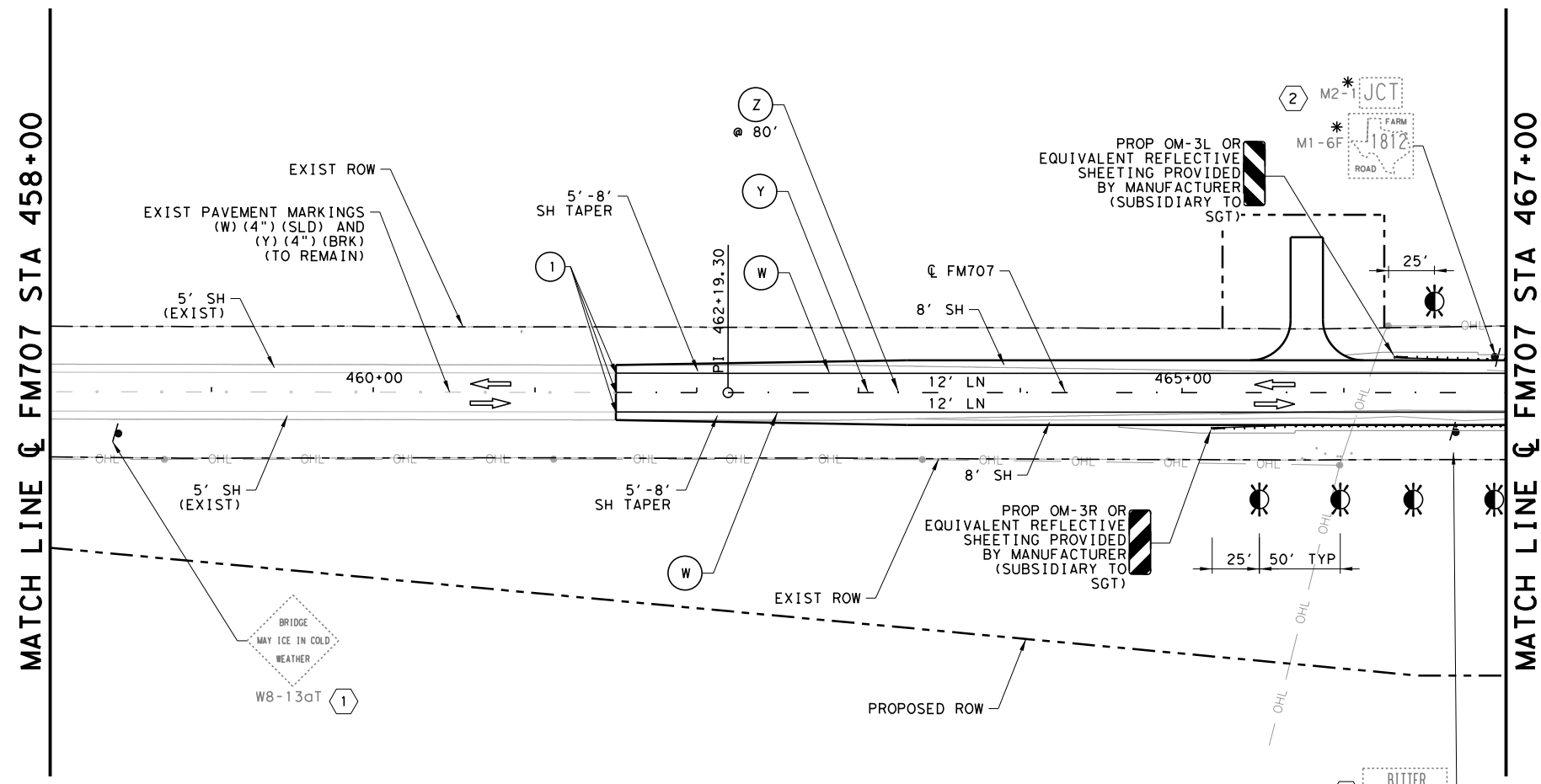
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AM	JK	0484	01	025	FM 707
DW:	CK:	DIST	COUNTY		SHEET NO.
AM	AT	ABL	JONES		139



LEGEND

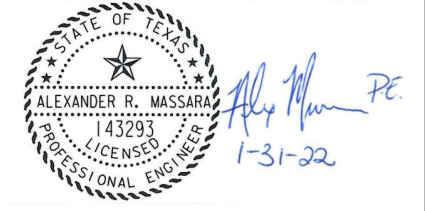
- (W) PAV MRK (W) (4") (SLD)
- (X) PAV MRK (Y) (4") (SLD)
- (Y) PAV MRK (Y) (4") (BRK)
- (Z) REFL PAV MRK TY II-A-A
- # SOSS REFERENCE NUMBER
- EXISTING SIGN STRUCTURE
- DIRECTION OF TRAVEL
- (D-SW)SZ 1(BRF)GF2(BI)
- (D-SW)SZ 1(BRF)CTB(BI)
- EXIST SIGN TO REMAIN
- EXIST SIGN DISPLACED BY CONSTRUCTION ACTIVITIES (TO BE REPLACED)

1 BEGIN (Y), (Z), (W)x2
FM707
STA 461+50.00



NOTES:

1. ALL SIGNS DISPLACED BY CONSTRUCTION ACTIVITIES SHALL BE REPLACED ACCORDING TO TMUCTD WITH A NEW SIGN AND SIGN ASSEMBLY.
2. SEE SUMMARY OF SMALL SIGNS FOR MORE INFORMATION.



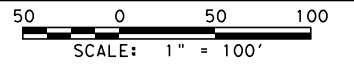
BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPB REGISTRATION NO. 264



**FM 707
SIGNING AND
PAVEMENT MARKING
PLAN**

SCALE: 1" = 100' SHEET 2 OF 4

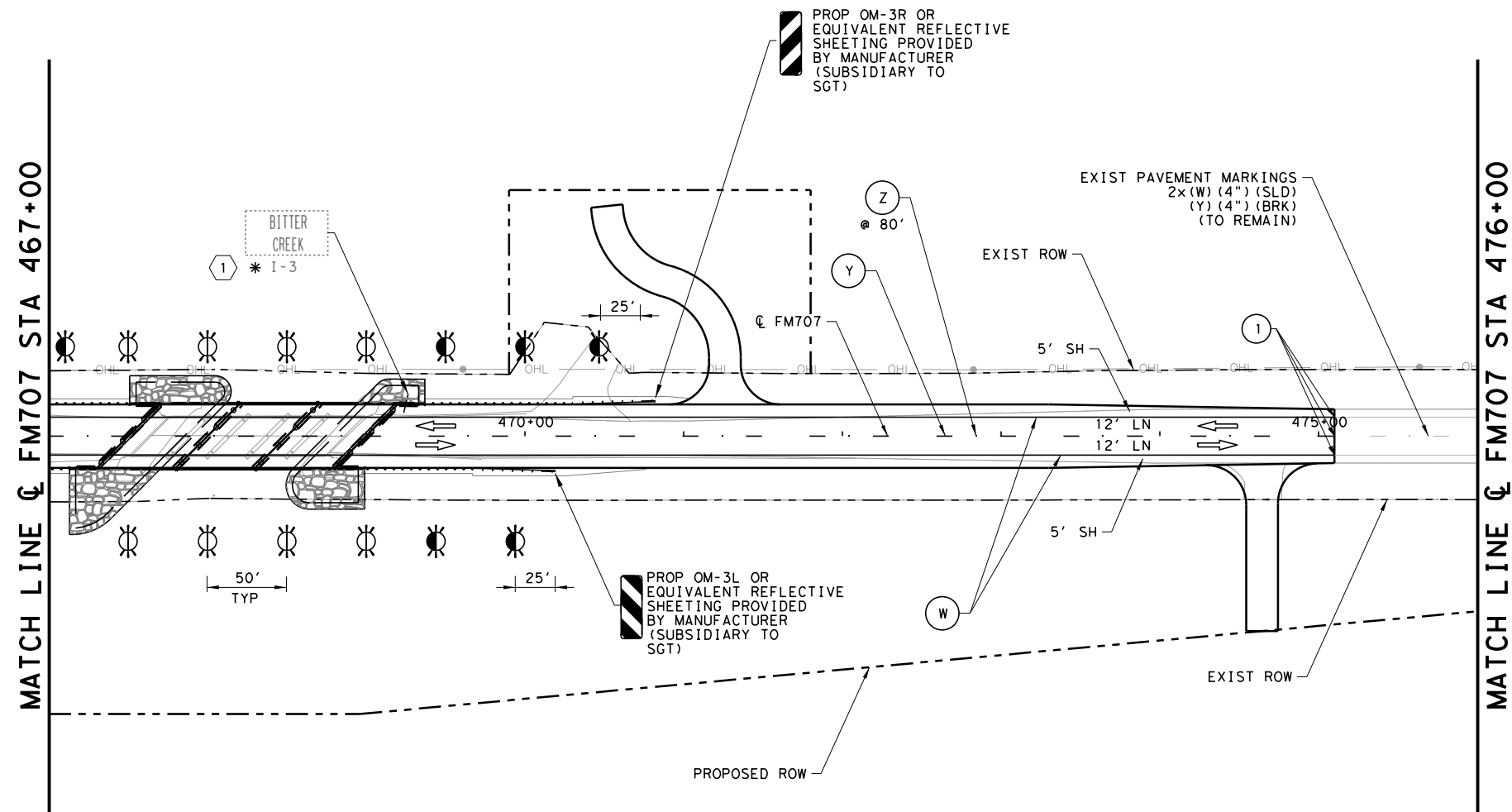
DS:	CK:	CONT	SECT	JOB	HIGHWAY
AM	JK	0484	01	025	FM 707
DW:	CK:	DIST	COUNTY		SHEET NO.
AM	AT	ABL	JONES		140



LEGEND

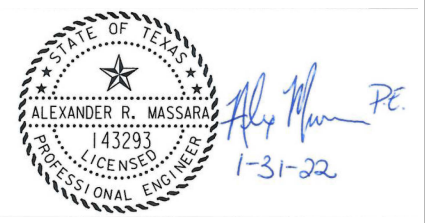
- (W) PAV MRK (W) (4") (SLD)
- (X) PAV MRK (Y) (4") (SLD)
- (Y) PAV MRK (Y) (4") (BRK)
- (Z) REFL PAV MRK TY II-A-A
- # SOSS REFERENCE NUMBER
- EXISTING SIGN STRUCTURE
- DIRECTION OF TRAVEL
- (D-SW)SZ 1(BRF)GF2(BI)
- (D-SW)SZ 1(BRF)CTB(BI)
- EXIST SIGN TO REMAIN
- EXIST SIGN DISPLACED BY CONSTRUCTION ACTIVITIES (TO BE REPLACED)

1 END (W) x2, (Y), (Z)
 FM707
 STA 475+10.00
 MATCH EXIST
 PAVEMENT MARKINGS



NOTES:

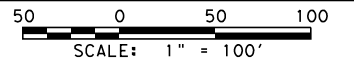
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2. SEE SUMMARY OF SMALL SIGNS FOR MORE INFORMATION.












**FM 707
 SIGNING AND
 PAVEMENT MARKING
 PLAN**



SCALE: 1" = 100' SHEET 3 OF 4

DS:	CK:	CONT	SECT	JOB	HIGHWAY
AM	JK	0484	01	025	FM 707
DW:	CK:	DIST	COUNTY		SHEET NO.
AM	AT	ABL	JONES		141

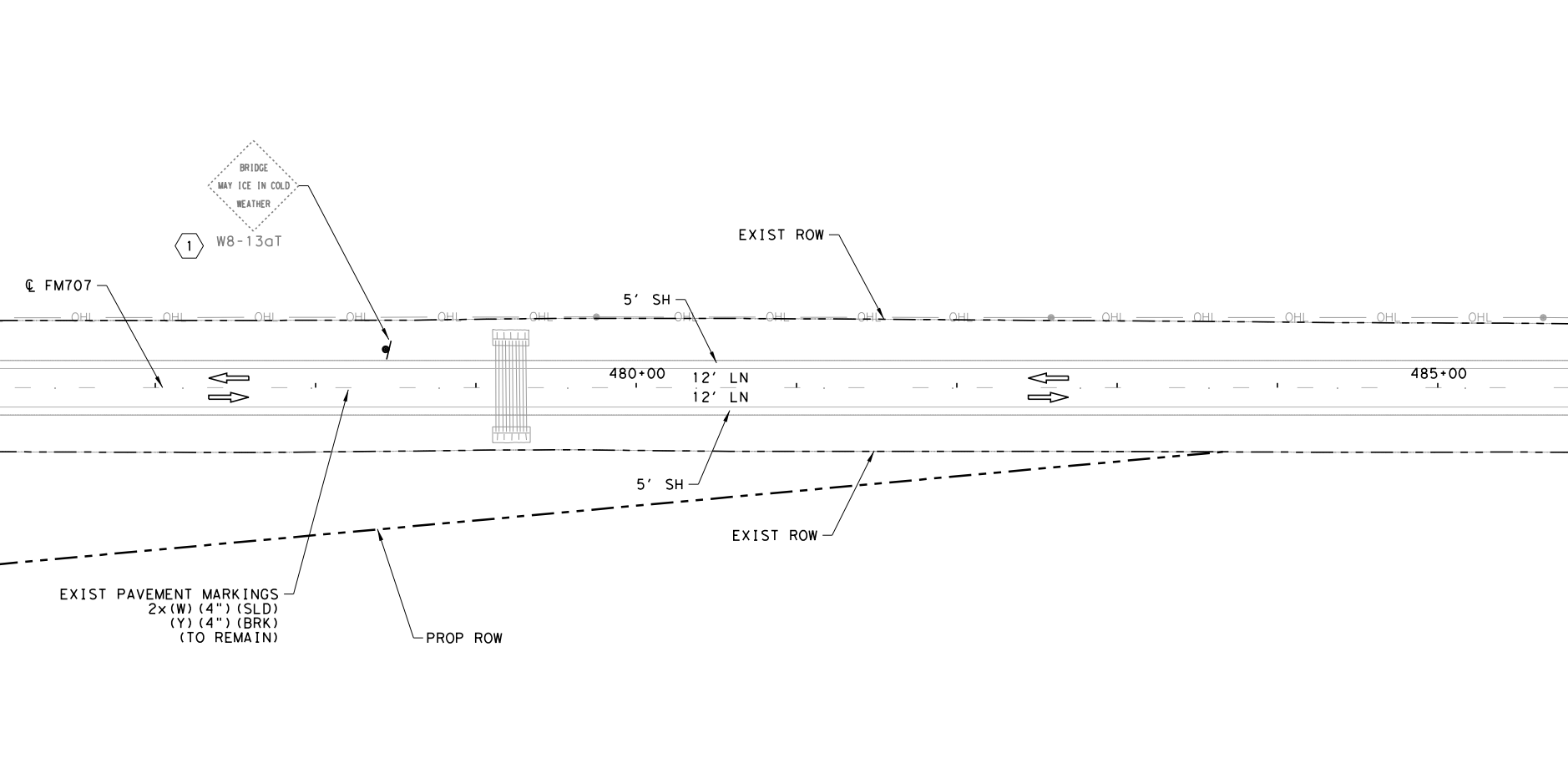


LEGEND

-  PAV MRK (W) (4") (SLD)
-  PAV MRK (Y) (4") (SLD)
-  PAV MRK (Y) (4") (BRK)
-  REFL PAV MRK TY II-A-A
-  SOSS REFERENCE NUMBER
-  EXISTING SIGN STRUCTURE
-  DIRECTION OF TRAVEL
-  (D-SW)SZ 1(BRF)GF2(BI)
-  (D-SW)SZ 1(BRF)CTB(BI)

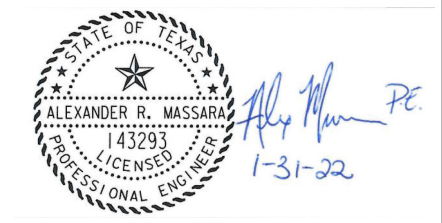
-  EXIST SIGN TO REMAIN
-  EXIST SIGN DISPLACED BY CONSTRUCTION ACTIVITIES (TO BE REPLACED)

MATCH LINE @ FM707 STA 476+00



NOTES:

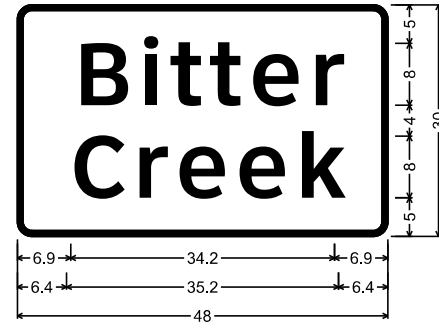
1. ALL SIGNS DISPLACED BY CONSTRUCTION ACTIVITIES SHALL BE REPLACED ACCORDING TO TMUCTD WITH A NEW SIGN AND SIGN ASSEMBLY.
2. SEE SUMMARY OF SMALL SIGNS FOR MORE INFORMATION.



**FM 707
SIGNING AND
PAVEMENT MARKING
PLAN**

SCALE: 1" = 100' SHEET 4 OF 4

DS:	CK:	CONT	SECT	JOB	HIGHWAY
AM	JK	0484	01	025	FM 707
DW:	CK:	DIST	COUNTY		SHEET NO.
AM	AT	ABL	JONES		142



I-3;
 1.9" Radius, 0.8" Border, White on, Green;
 "Bitter", ClearviewHwy-5-W-R;
 "Creek", ClearviewHwy-5-W-R;

NOTES:
 1. ALL DIMENSIONS SHOWN ARE IN INCHES.



BRIDGEFARMER & ASSOCIATES, INC.
 CONSULTING ENGINEERS
 TBPE REGISTRATION NO. 264

Texas Department of Transportation
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FM 707
SMALL SPECIAL SIGN
DETAILS

SHEET 1 OF 1

DS:	AM	CK:	DH	CONT:	0484	SECT:	01	JOB:	025	HIGHWAY:	FM 707
DW:	AM	CK:	AT	DIST:	ABL	COUNTY:	JONES	SHEET NO.:	143		

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 File: \\msbfr1\agefarmer-pw\alex.massara\br1\agefarmer.com.dms05113\0369-dm1-20.dgn

REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS				DELINEATORS				D & OM DESCRIPTIVE CODES	
DEVICE	SIZE 1	SIZE 2	SIZE 3	SIZE 4	SINGLE		DOUBLE		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 BRFL = 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
						SHEETING: Yellow, White or Red Type B or C reflective sheeting		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 (fix). 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.				POST TYPE	WC	YFLX, WFLX	WC	YFLX, WFLX
					MOUNT TYPE	GND	GND, SRF	GND	GND, SRF

OBJECT MARKERS								D & OM DESCRIPTIVE CODES	
DEVICE	Type 1 (OM-1)	Type 2 (OM-2)			Type 3 (OM-3)			Type 4 (OM-4)	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 units (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
		OM-1	OM-2X	OM-2Y	OM-2Z	OM-3L	OM-3R	OM-3C	
SHEETING	Yellow-Type B _{FL} or C _{FL} Sheeting	Yellow - Type B or C Sheeting			Alternating acrylic black and retroreflective 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)			CHEVRONS				ONE DIRECTION LARGE ARROW		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.	
DEVICE	GF1	GF2	CTB	 W1-8				 W1-6		
	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.		SIZE (W x L)	18" x 24" (Conventional)	24" x 30" (Conventional Oversize)	30" x 36" (Expressway)	36" x 48" (Freeway)	SIZE (W x L)	48" x 24" (Conventional)	60" x 30" (Expressway & Freeway)
			MOUNTING HEIGHT	4'-0" or 7'-0"		7'-0" Only		MOUNTING HEIGHT	7'-0"	
			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).						
SHEETING	Yellow, White, Red									
NOTE	1. Reflective sheeting shall have a minimum dimension of 3 inches and minimum surface area of 9 square inches.									

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER MATERIAL DESCRIPTION

D & OM(1)-20

FILE: dom1-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TXDOT August 2004	CONT	SECT	JOB	HIGHWAY
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10-09 3-15	DIST	COUNTY	SHEET NO.	
4-10 7-20	ABL	JONES	144	

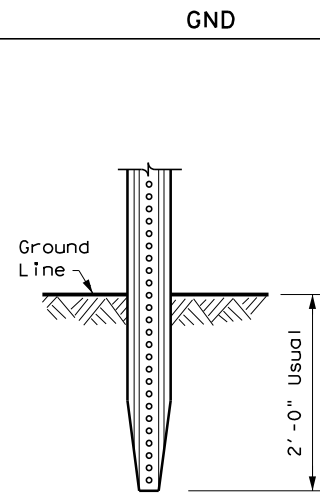
20A

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POST TYPE AND SUPPORT FOUNDATION DETAILS

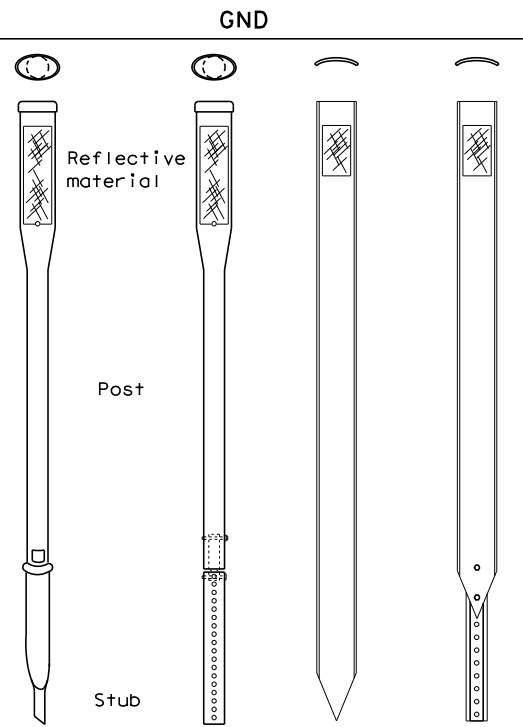
WING CHANNEL (WC)



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)



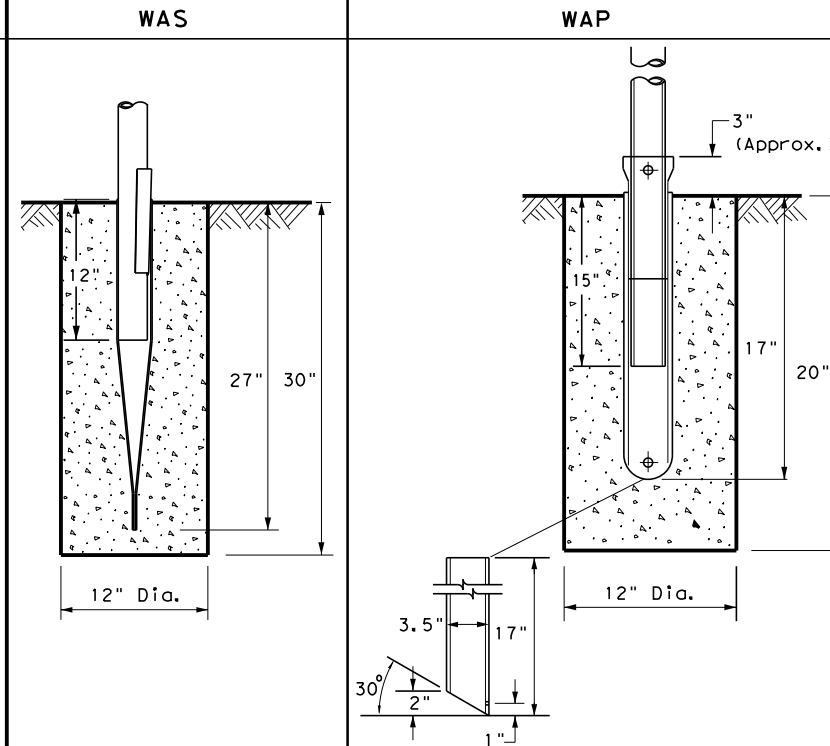
EMBEDDED

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



STEEL

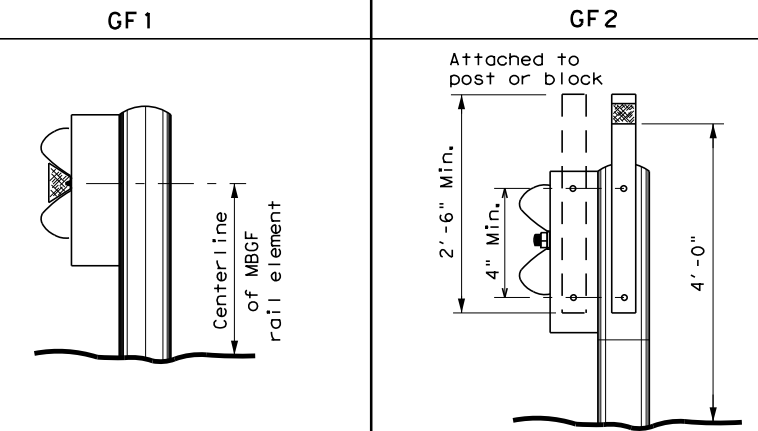
PLASTIC

NOTE

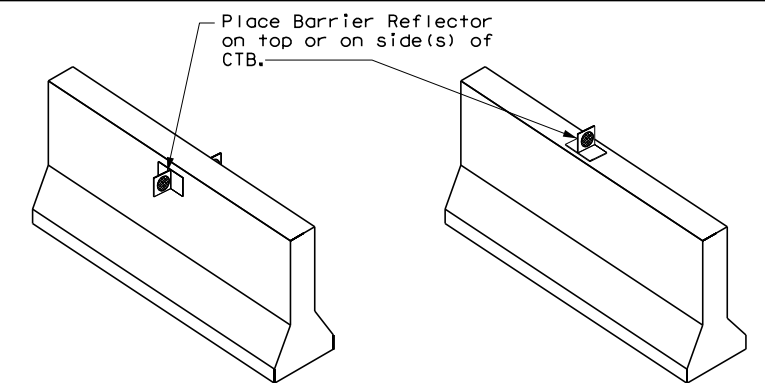
1. Install per manufacturer's recommendations.

TYPE OF BARRIER MOUNTS

GUARD FENCE ATTACHMENT



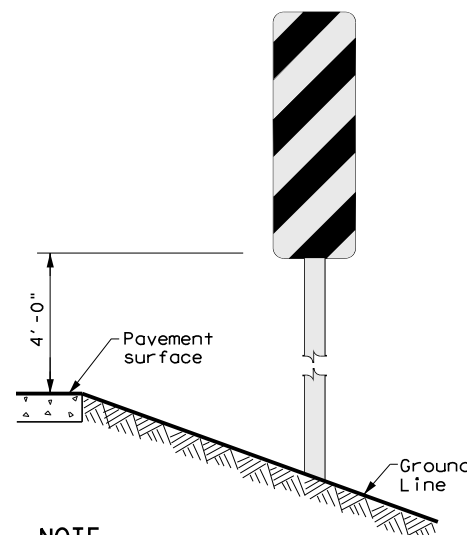
CONCRETE TRAFFIC BARRIER (CTB)



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.

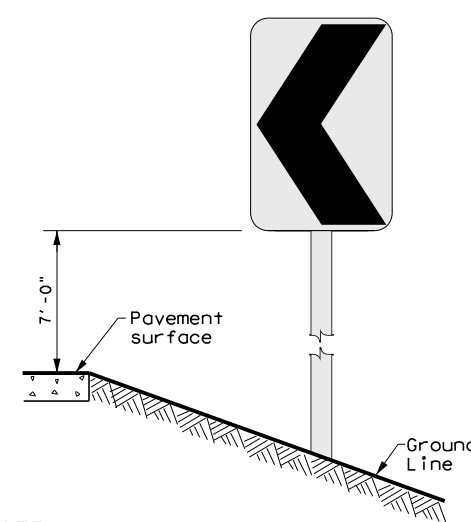
TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS



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)

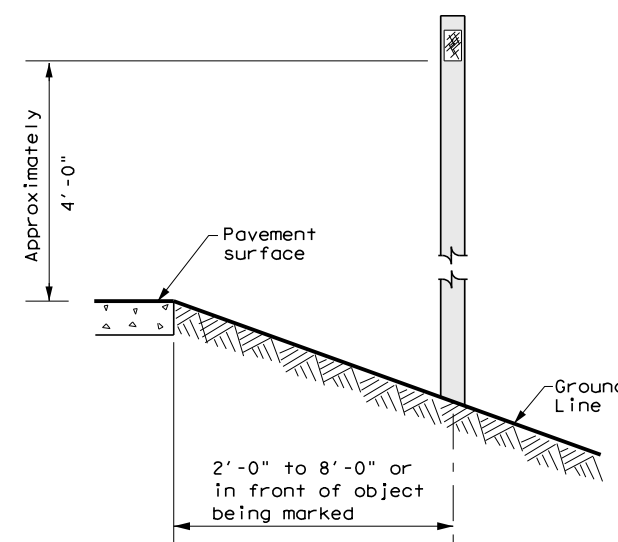
CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN



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.



DELINEATOR & OBJECT MARKER INSTALLATION

D & OM(2)-20

FILE: dom2-20.dgn	DW: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
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10-09 3-15	DIST	COUNTY	SHEET NO.	
4-10 7-20	ABL	JONES	145	

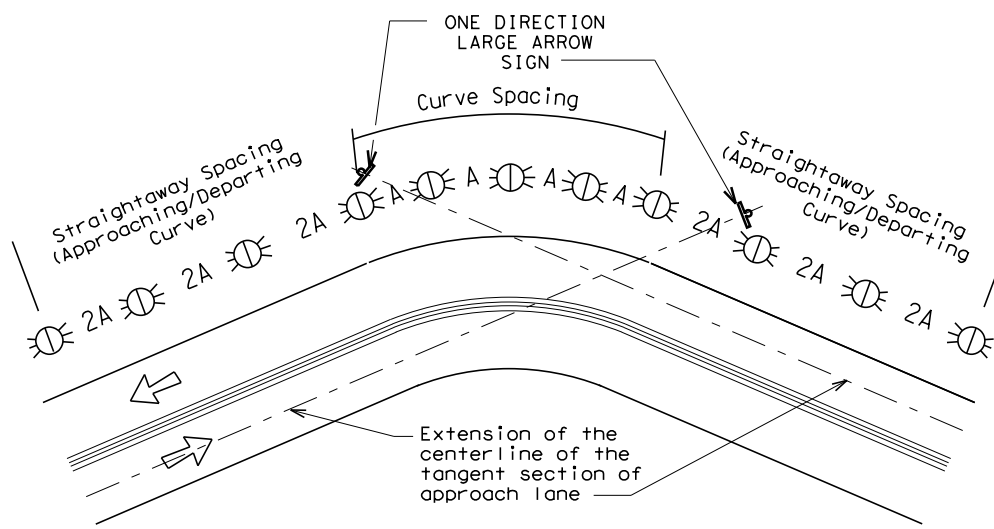
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 Alex.Massara

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

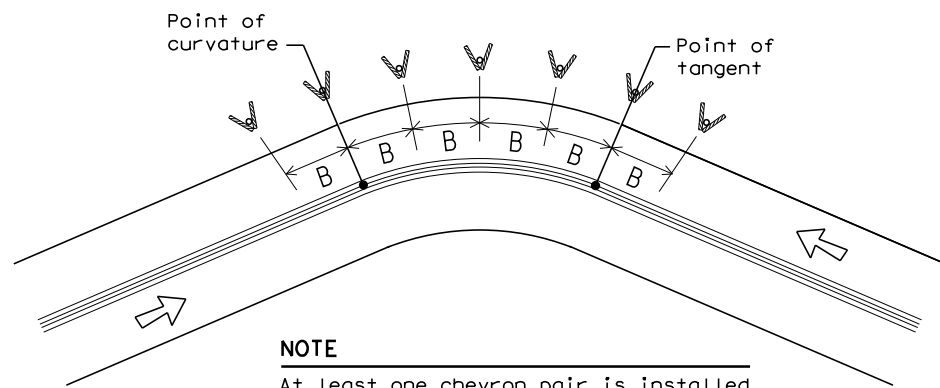
SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES



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

- 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.
- Barrier reflectors may be used to replace required delineators.
- Single red delineators may be mounted on the back side of delineator posts for wrong way driver applications

LEGEND

	Bi-directional Delineator
	Delineator
	Sign



DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

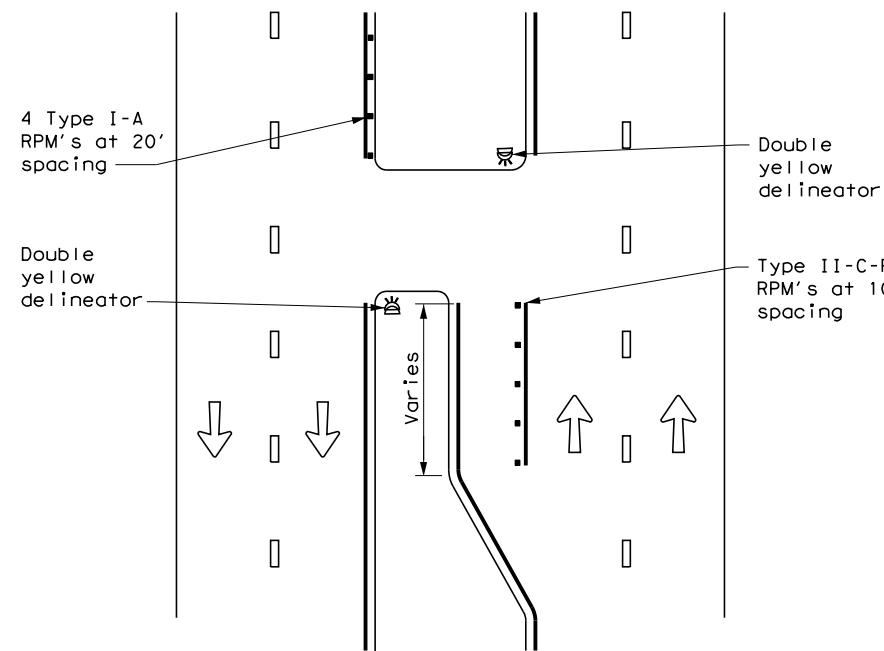
D & OM(3) -20

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© TXDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0484	01	025	FM 707
3-15 8-15	DIST	COUNTY	SHEET NO.	
8-15 7-20	ABL	JONES	146	

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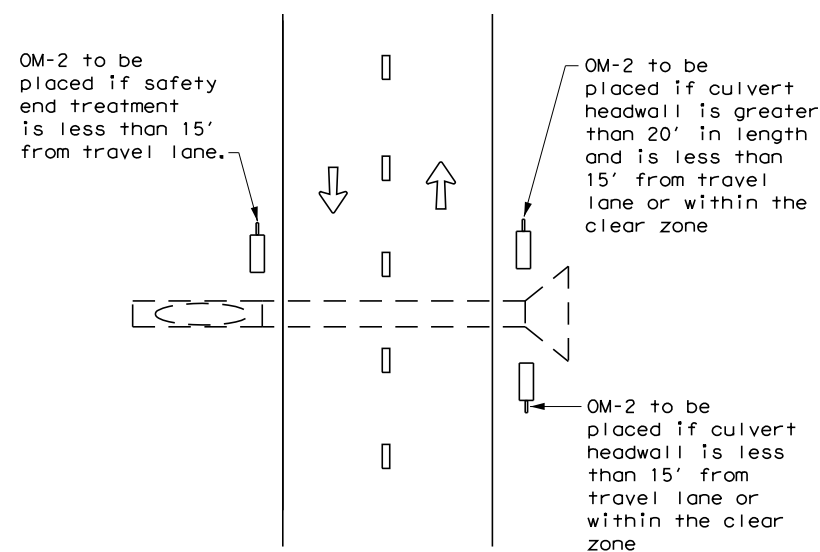
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 Alex.Massara

CROSSOVERS



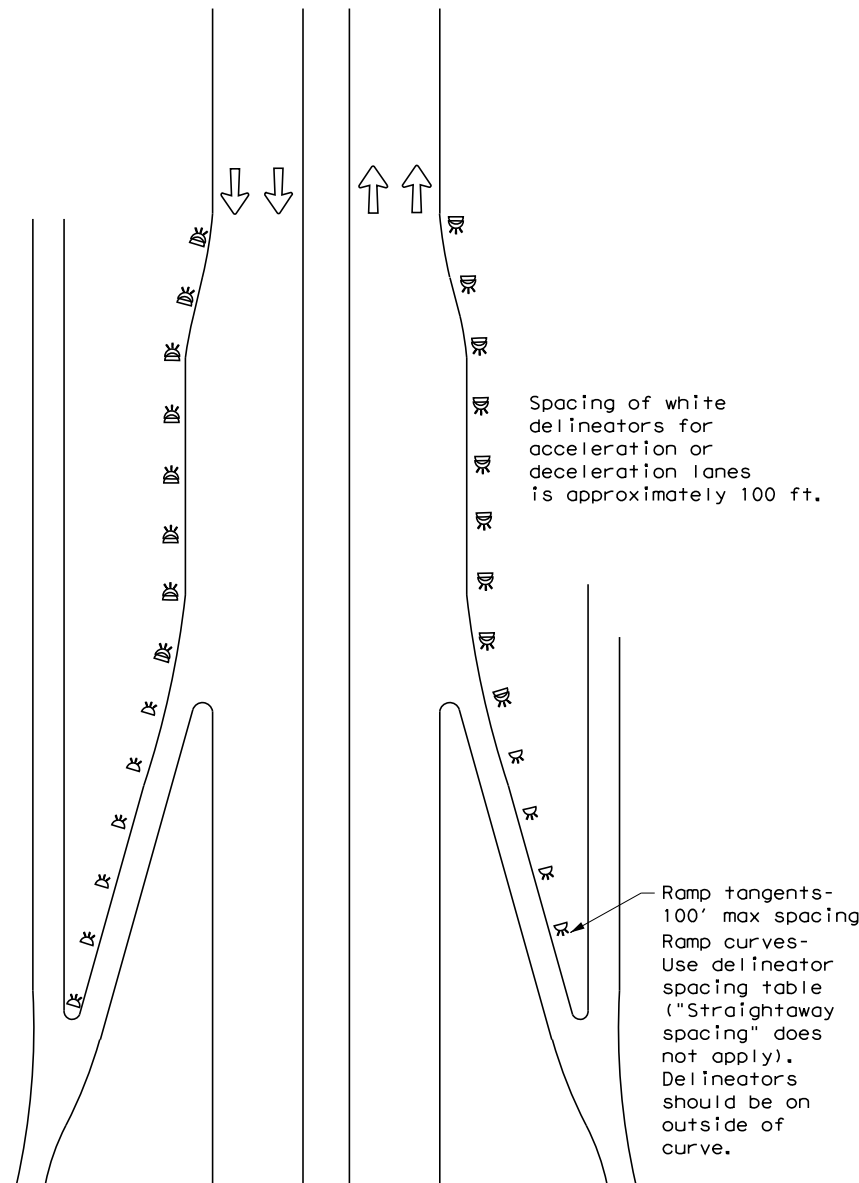
DETAIL 1

FOR CULVERTS WITHOUT MBGF



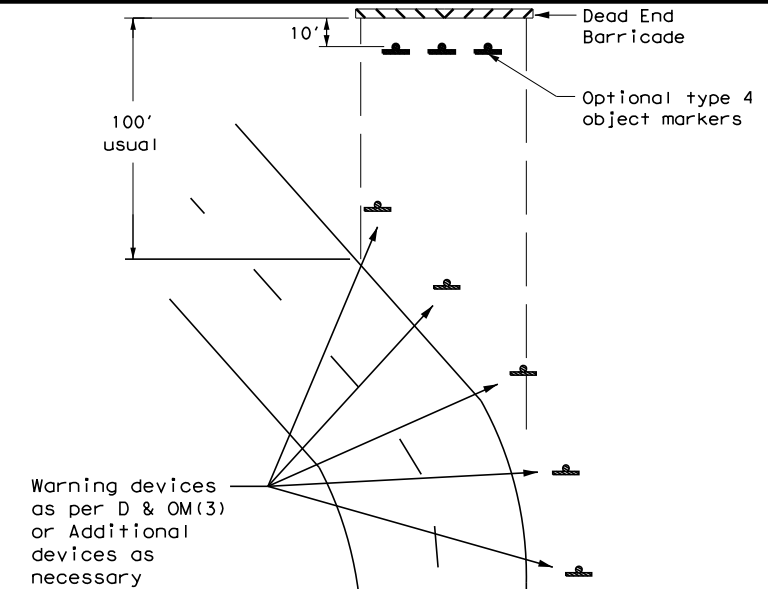
DETAIL 2

FREEWAY DELINEATION FOR RAMPS AND ACCELERATION/DECELERATION LANES



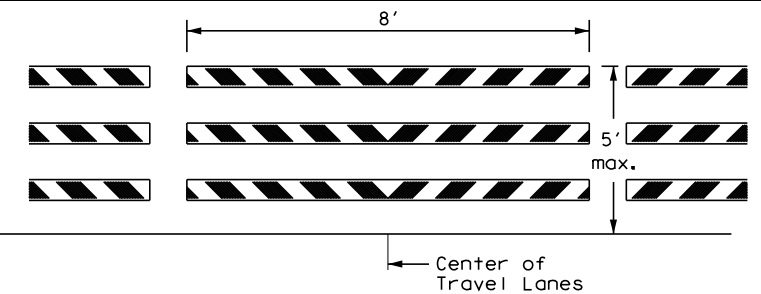
DETAIL 3

TYPICAL APPLICATION OF DEAD END BARRICADE



DETAIL 4

TYPICAL DEAD END BARRICADE INSTALLATION



NOTES

- Barricade striping shall be red and white reflective sheeting for all permanent road closures.
- Barricade striping is red and white sloping toward the center of the roadway.
- 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

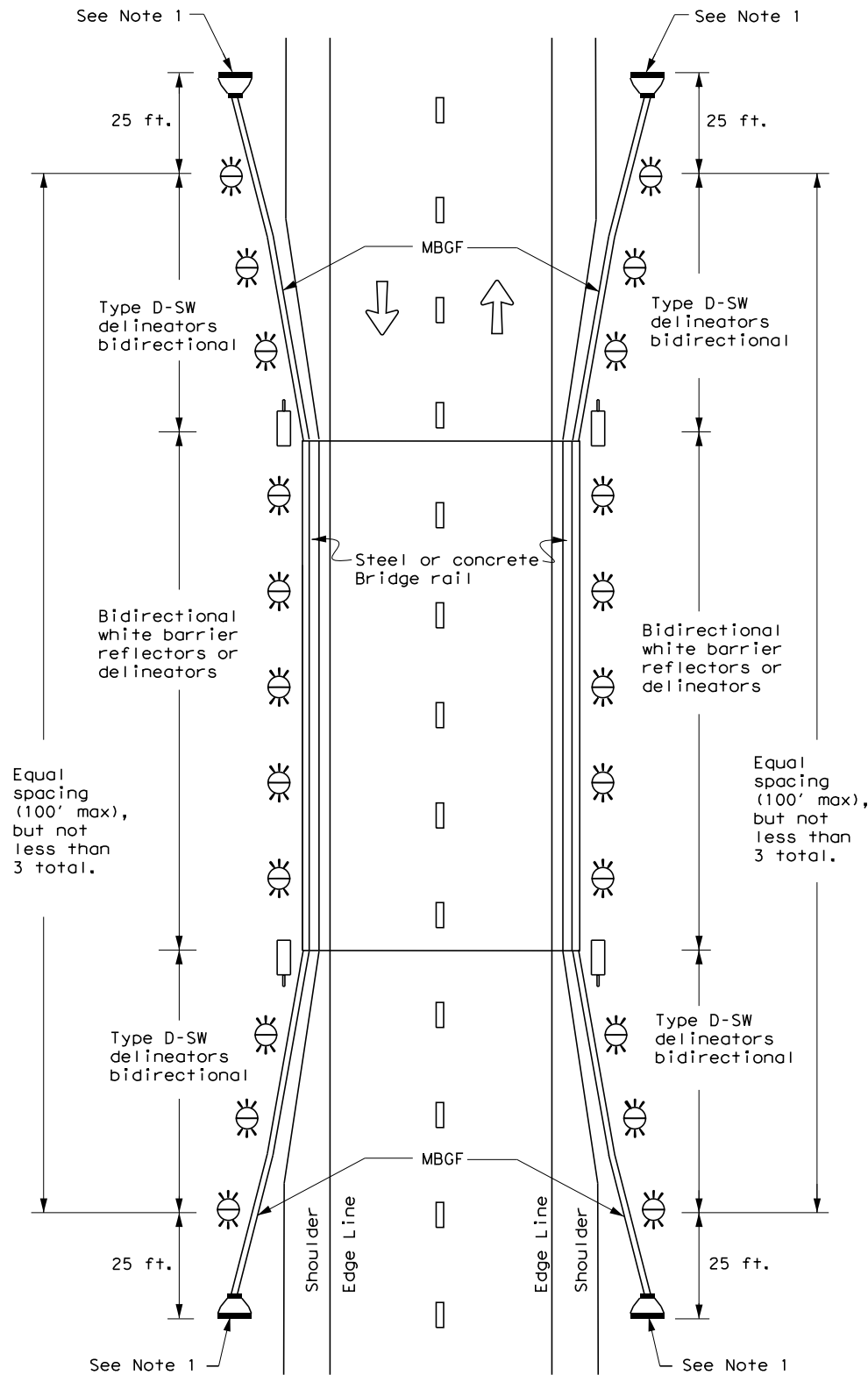


DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(4) -20

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3-15	DIST	COUNTY	SHEET NO.	
7-20	ABL	JONES	147	

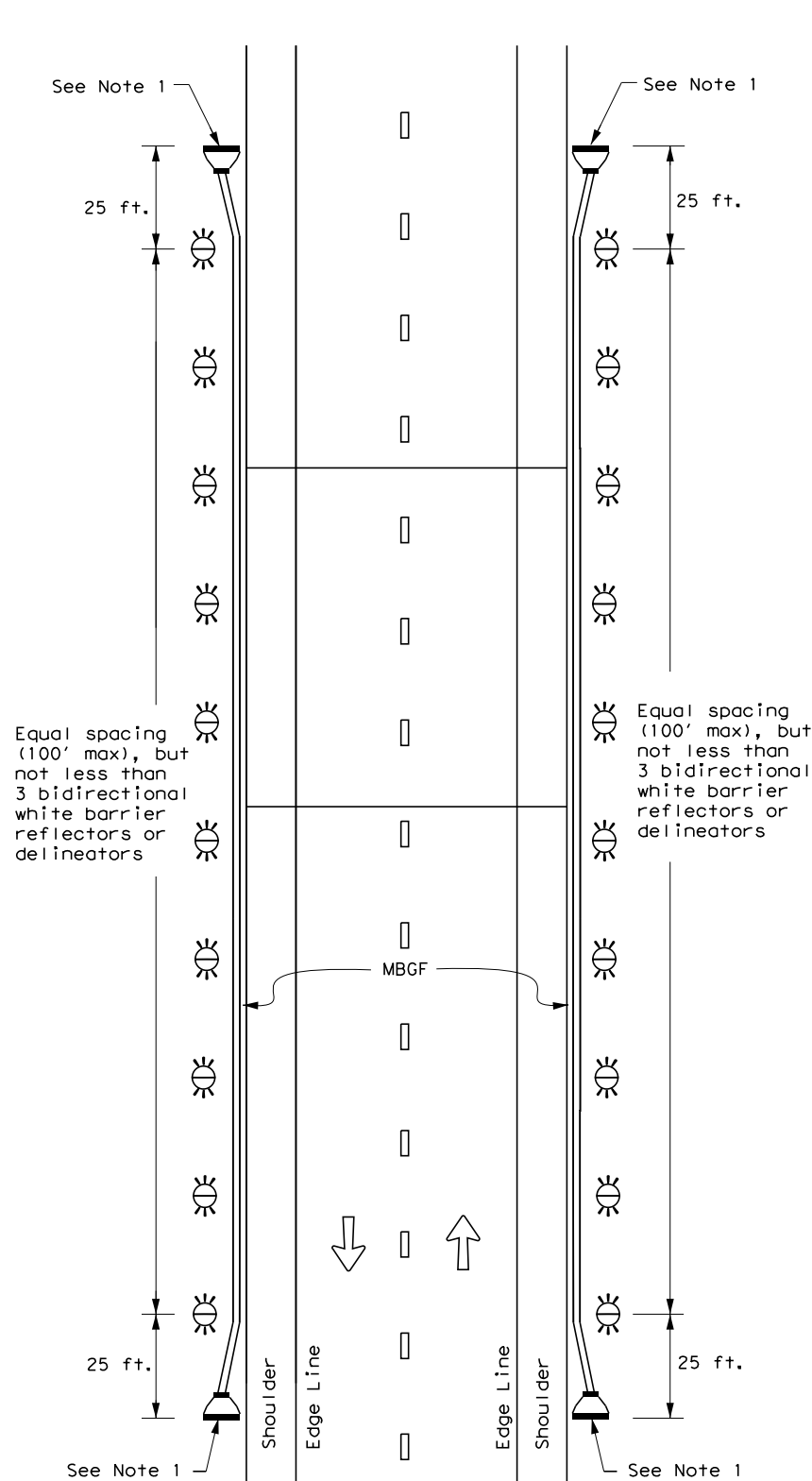
**TWO-WAY, TWO LANE ROADWAY
WITH REDUCED WIDTH APPROACH RAIL**



NOTE:

1. Terminal ends require reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end.

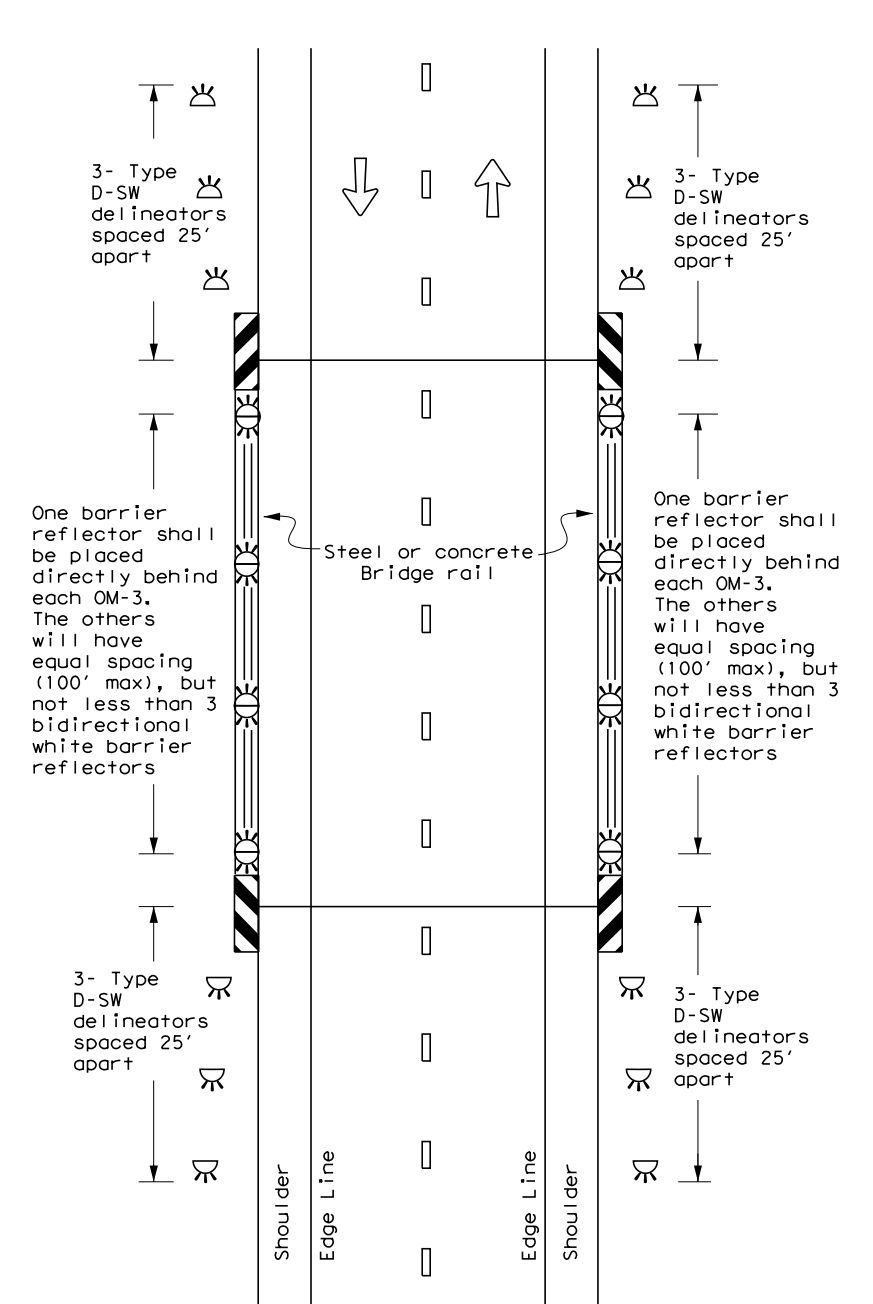
**TWO-WAY, TWO LANE ROADWAY
WITH METAL BEAM GUARD FENCE (MBGF)**



NOTE:

1. Terminal ends require reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end.

**TWO-WAY, TWO LANE ROADWAY
BRIDGE WITH NO APPROACH RAIL**



LEGEND

	Bidirectional Delineator
	Delineator
	OM-3
	OM-2
	Terminal End
	Traffic Flow



**DELINEATOR &
OBJECT MARKER
PLACEMENT DETAILS**

D & OM(5) - 20

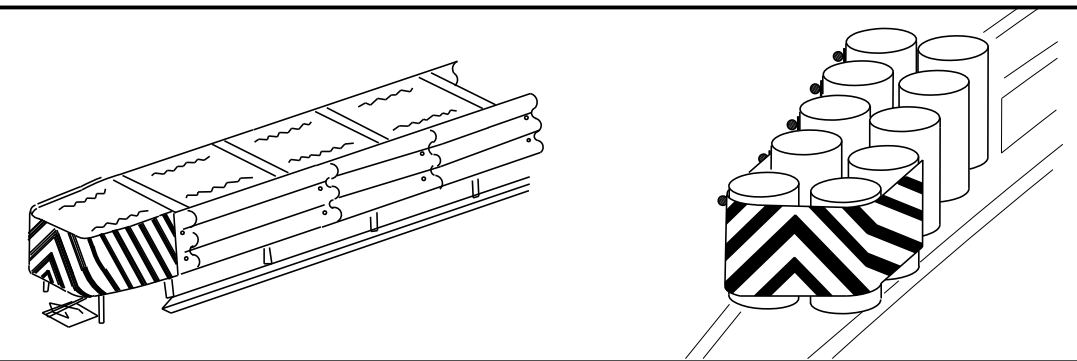
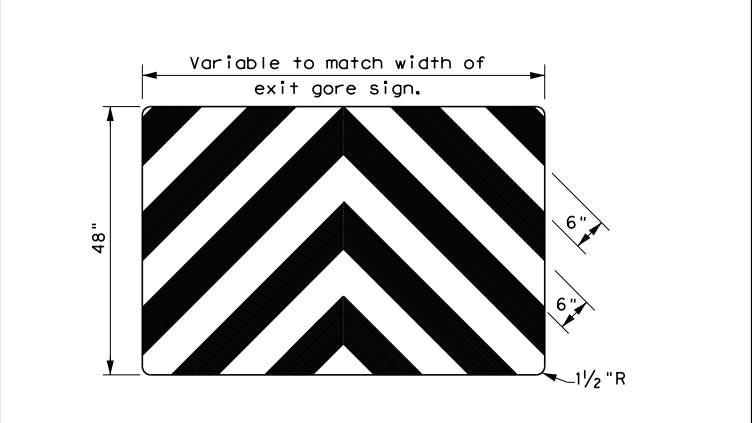
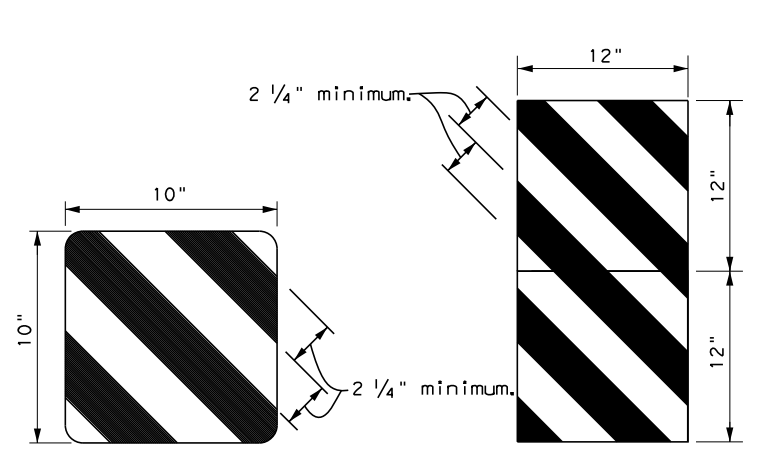
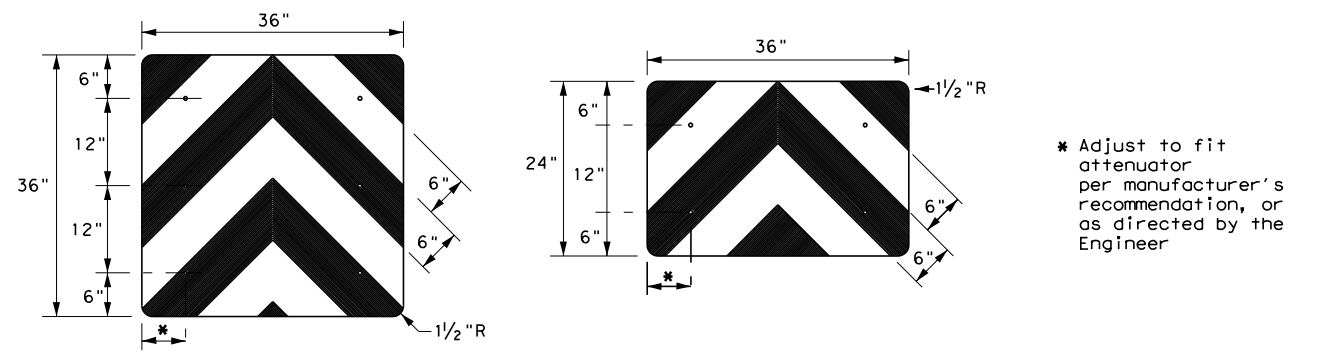
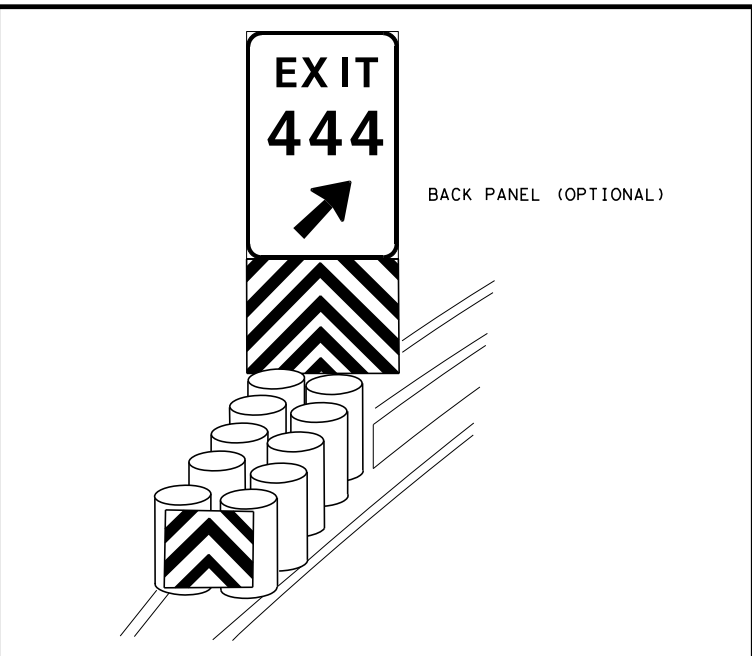
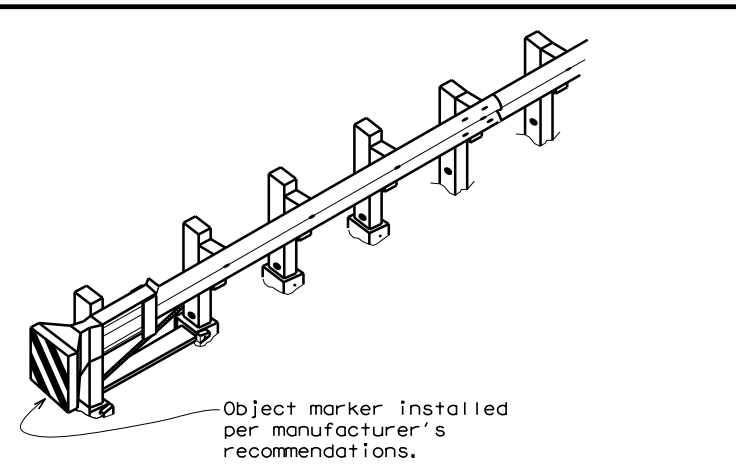
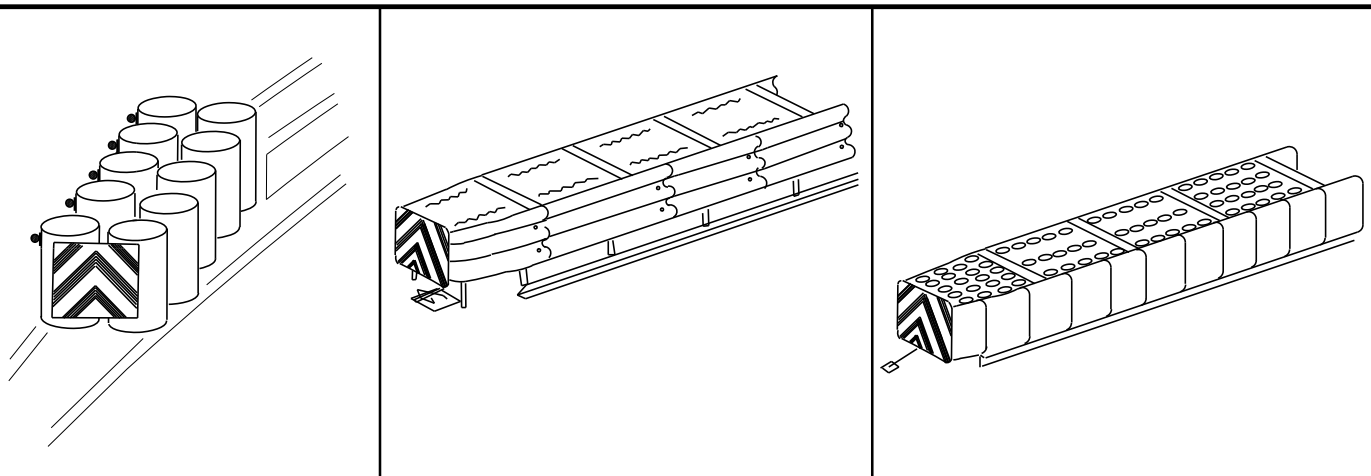
FILE: dom5-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT August 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	0484	01	025	FM 707
7-20	DIST	COUNTY	SHEET NO.	
	ABL	JONES	148	

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 alex.massara@texas.gov alex.massara@texas.gov



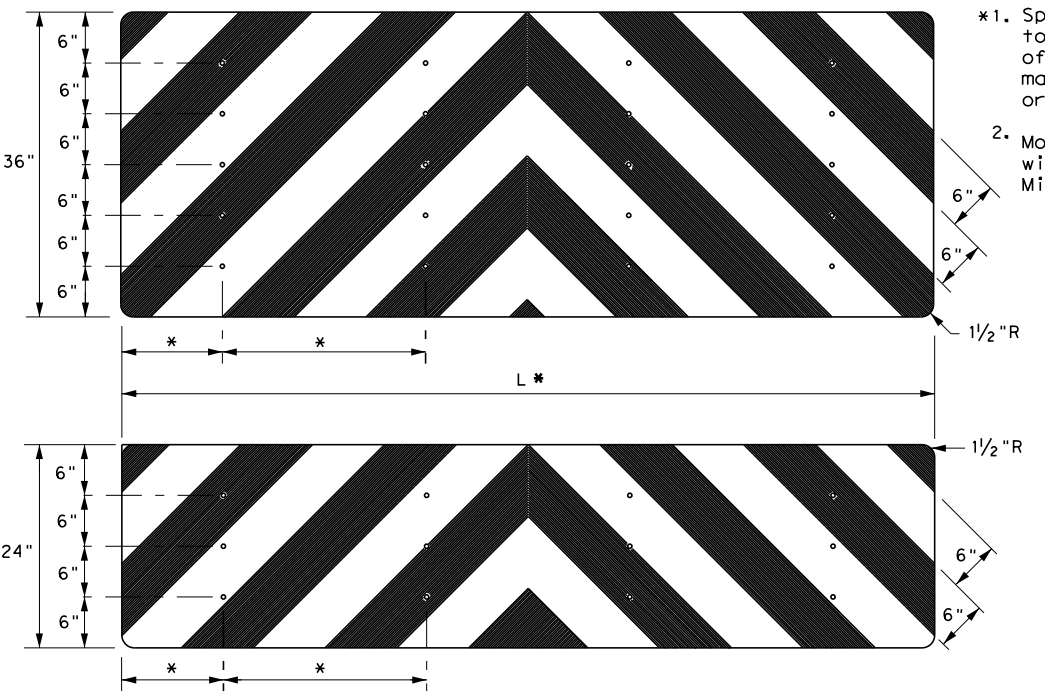
OBJECT MARKERS SMALLER THAN 3 FT²

NOTES

- 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.
- 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.
- 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 1/4".
- 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.
- Object Marker at nose of attenuator is subsidiary to the attenuator.
- See D & OM (1-4) for required barrier reflectors.

NOTES

- Spacing should be adjusted to attach through centerline of drum, per attenuator manufacturer's recommendation, or as directed by the Engineer.
- Mounting should be flush with top of attenuator. Minimum size 96" x 24".

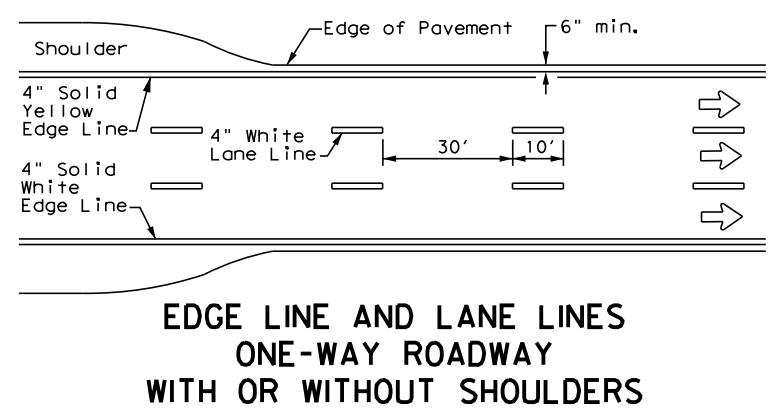


DELINEATOR & OBJECT MARKER FOR VEHICLE IMPACT ATTENUATORS D & OM(VIA) -20			
FILE: domvia20.dgn	DW: TxDOT	CK: TxDOT	DN: TxDOT
© TxDOT December 1989	CONT	SECT	JOB
REVISIONS		0484 01	025 FM 707
4-92 8-04	DIST	COUNTY	SHEET NO.
8-95 3-15	ABL	JONES	149
4-98 7-20			
20G			

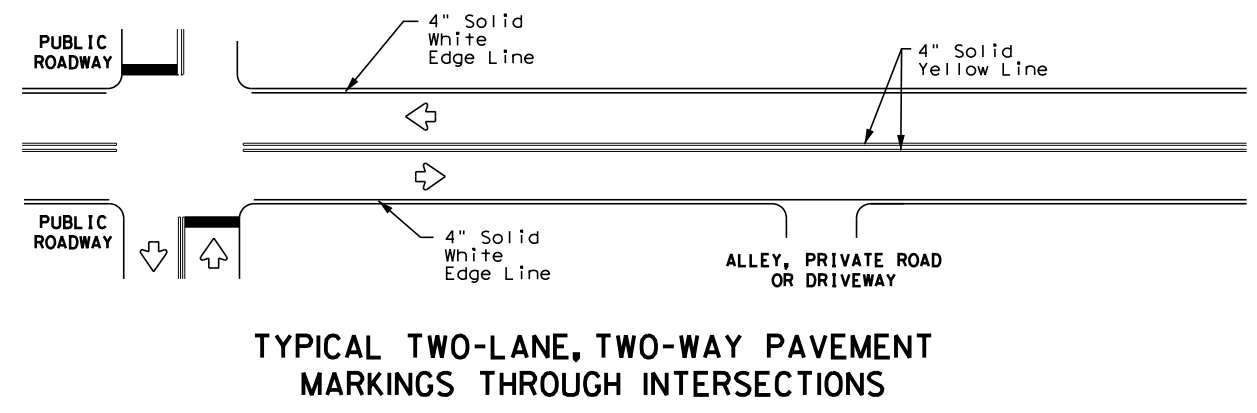
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 Alex.Massara
 alex.massara@brt.farmer.com

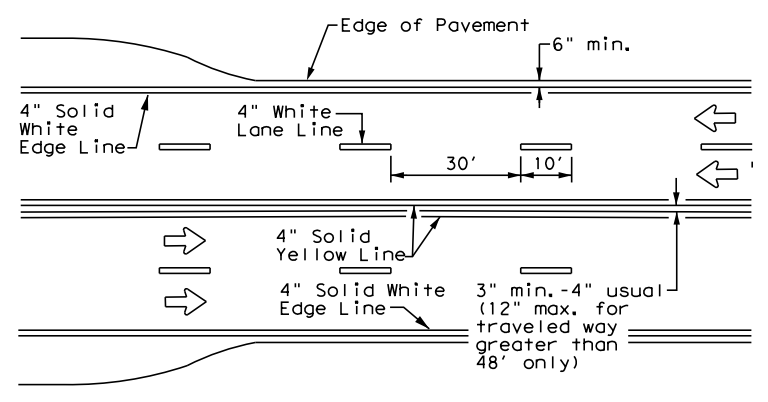
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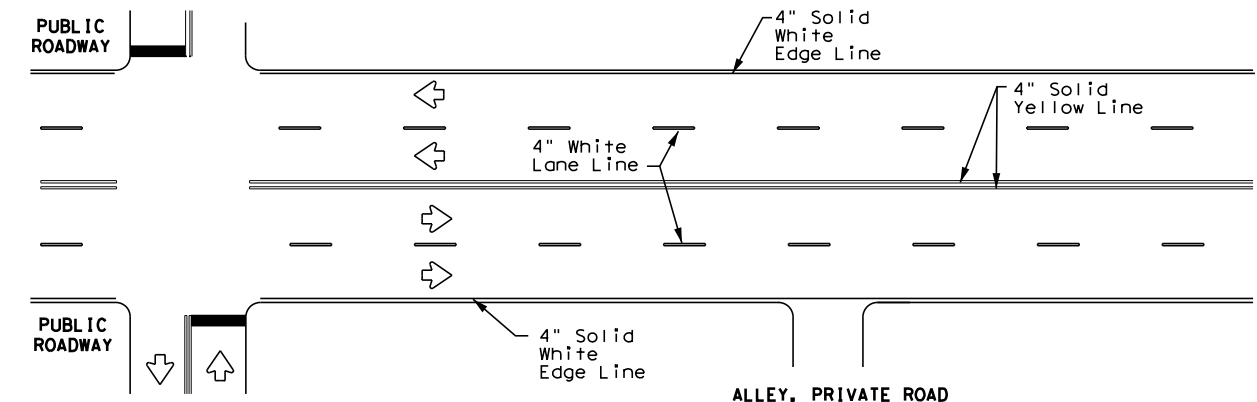
**EDGE LINE AND LANE LINES
 ONE-WAY ROADWAY
 WITH OR WITHOUT SHOULDERS**



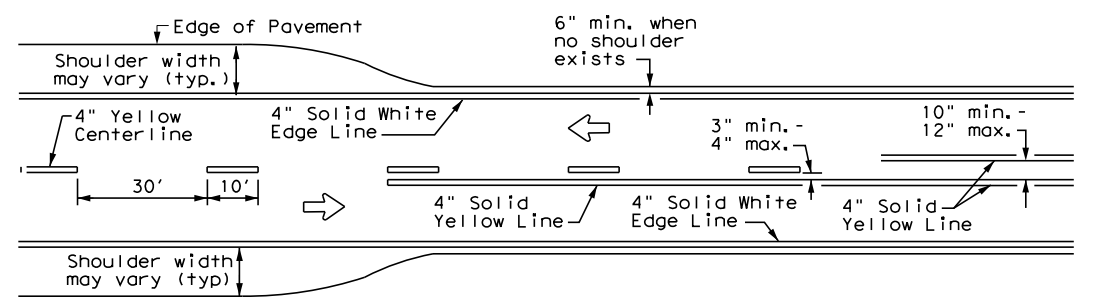
**TYPICAL TWO-LANE, TWO-WAY PAVEMENT
 MARKINGS THROUGH INTERSECTIONS**



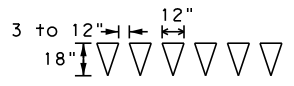
**CENTERLINE AND LANE LINES
 FOUR LANE TWO-WAY ROADWAY
 WITH OR WITHOUT SHOULDERS**



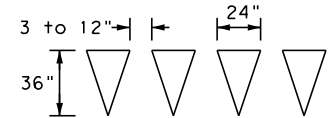
**TYPICAL MULTI-LANE, TWO-WAY PAVEMENT
 MARKINGS THROUGH INTERSECTIONS**



**TWO LANE TWO-WAY ROADWAY
 WITH OR WITHOUT SHOULDERS**

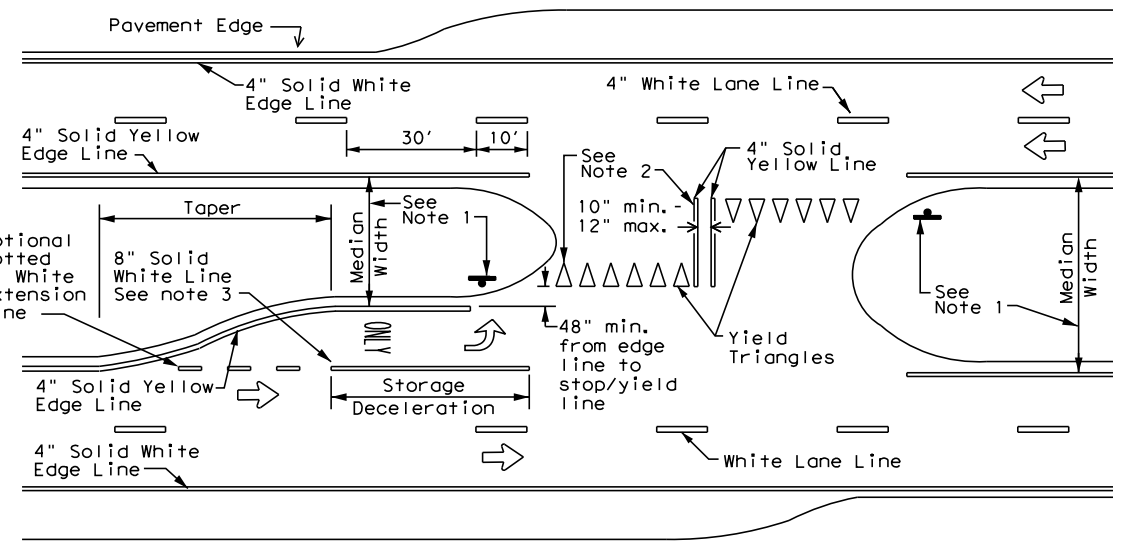


For posted speed on road being marked equal to or less than 40 MPH.



For posted speed on road being marked equal to or greater than 45 MPH.

YIELD LINES



FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

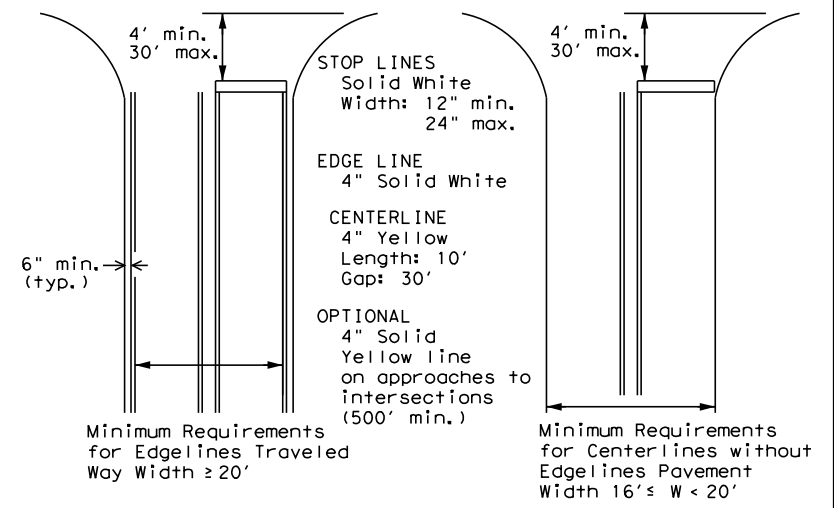
- Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections. Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling width to determine if signs are required. Yield signs are the typical intersection control. Stop signs are optional as determined by the Engineer.
- 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 triangles shall only be used with yield signs.
- 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

- Edgeline striping shall be as shown in the plans or as directed by the Engineer. The edgeline should not be placed 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.
- 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



**TYPICAL STANDARD
 PAVEMENT MARKINGS**

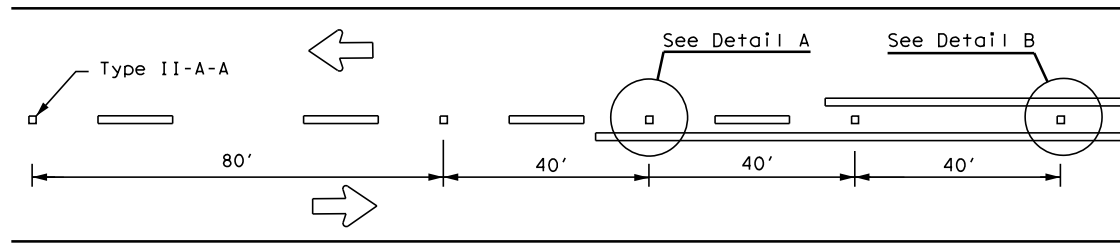
PM(1)-20

FILE: pm1-20.dgn	DN:	CK:	DW:	CK:
© TxDOT November 1978	CONT	SECT	JOB	HIGHWAY
8-95 3-03 REVISIONS	0484	01	025	FM 707
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8-00 6-20	ABL	JONES		150

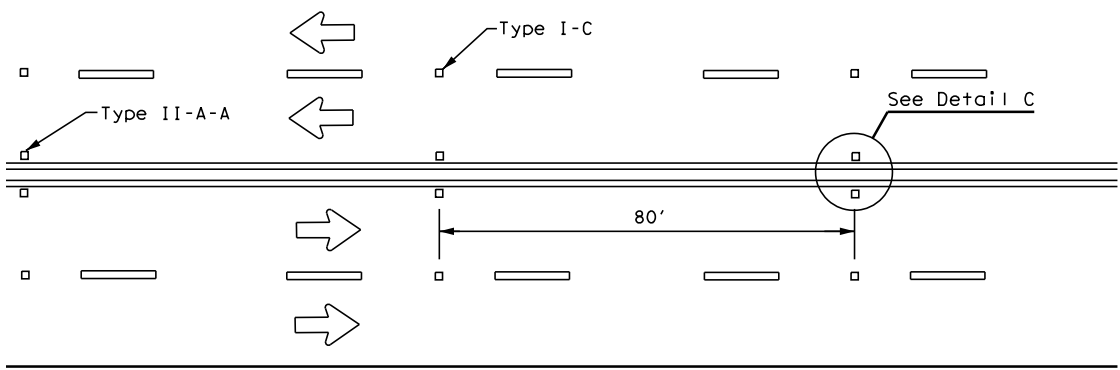
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE

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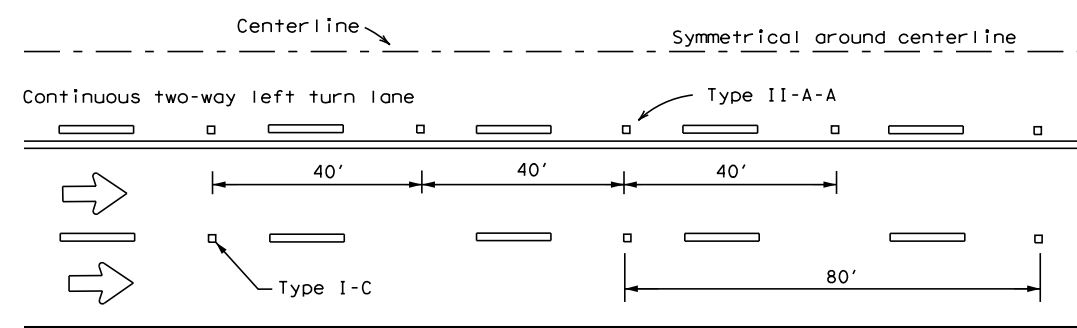
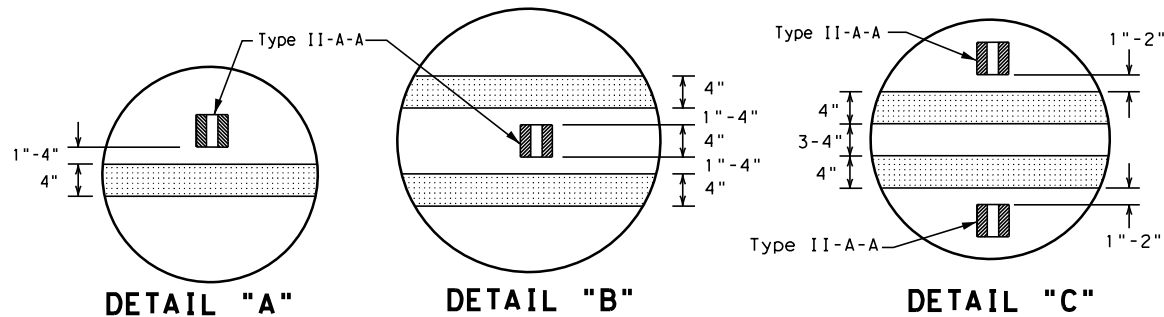
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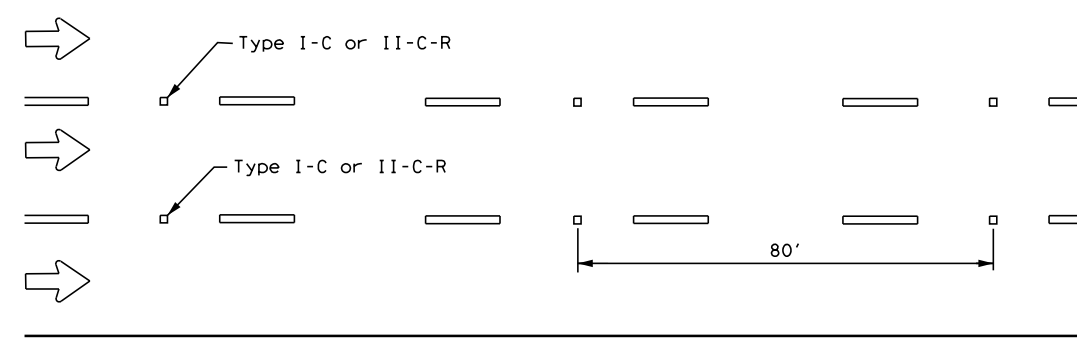
CENTERLINE FOR ALL TWO LANE ROADWAYS



**CENTERLINE & LANE LINES
FOR FOUR LANE TWO-WAY HIGHWAYS**



CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE

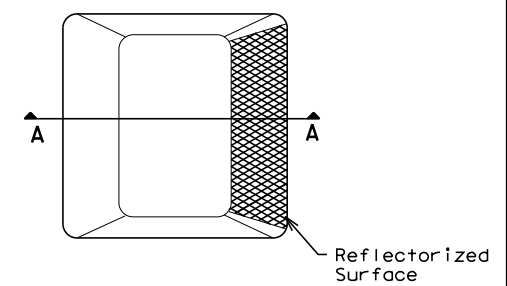


LANE LINES FOR ONE-WAY ROADWAY (NON-FREWAY FACILITIES)

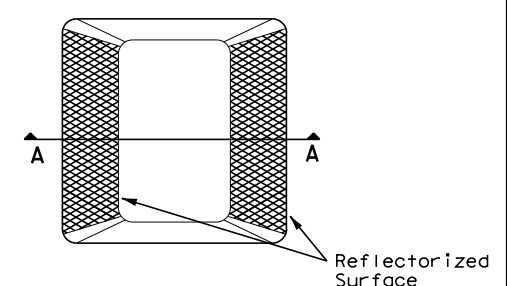
Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.

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

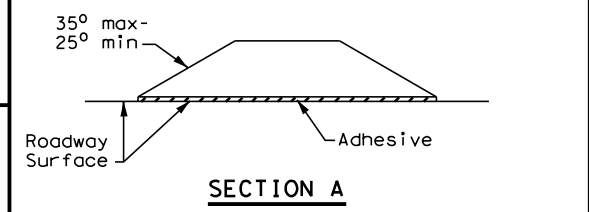
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)



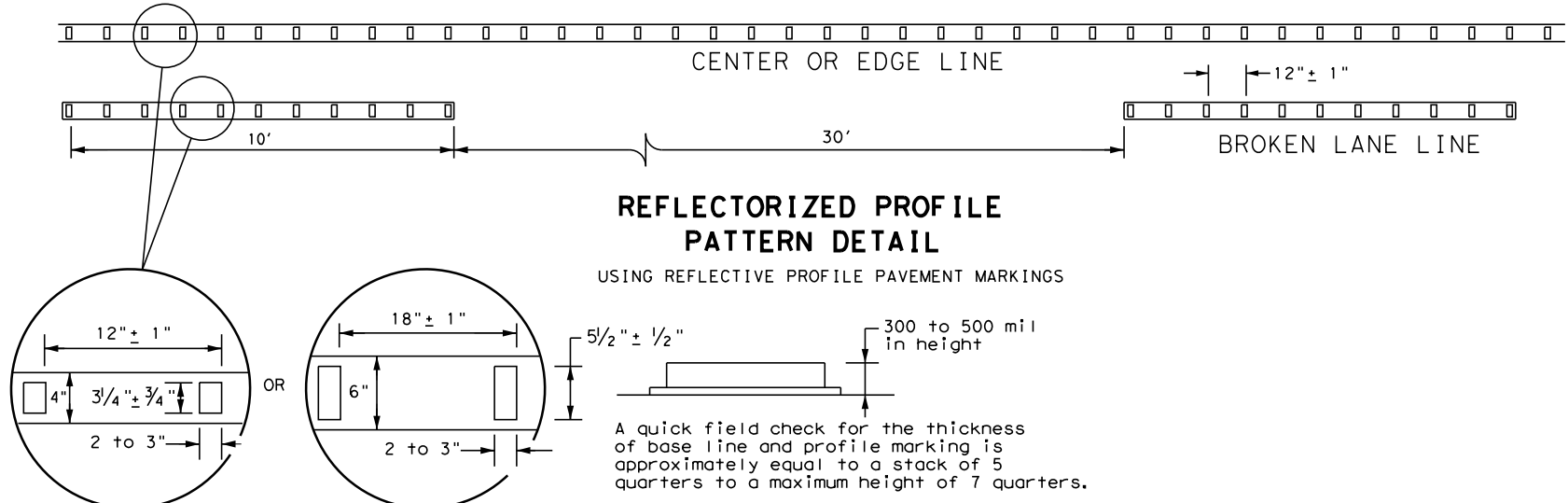
Type II (Top View)



RAISED PAVEMENT MARKERS

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.



NOTE
 Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.



POSITION GUIDANCE USING RAISED MARKERS REFLECTORIZED PROFILE MARKINGS PM(2) - 20

FILE: pm2-20.dgn	DN:	CK:	DW:	CK:
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4-92 2-10 REVISIONS	0484	01	025	FM 707
5-00 2-12	DIST	COUNTY	SHEET NO.	
8-00 6-20	ABL	JONES	151	

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SIGN SUPPORT DESCRIPTIVE CODES

(Descriptive Codes correspond to project estimate and quantities sheets)

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

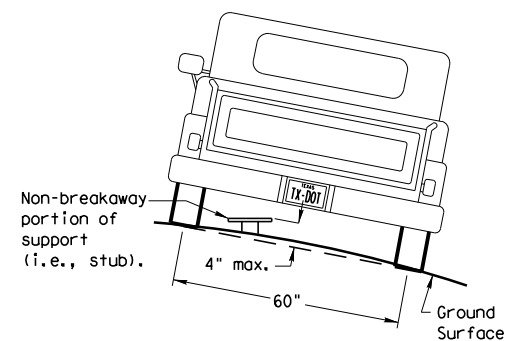
Post Type
 FRP = Fiberglass Reinforced Plastic Pipe (see SMD(FRP))
 TWT = Thin-Walled Tubing (see SMD(TWT))
 10BWG = 10 BWG Tubing (see SMD(SLIP-1) to (SLIP-3))
 S80 = Schedule 80 Pipe (see SMD(SLIP-1) to (SLIP-3))

Number of Posts (1 or 2)

Anchor Type
 UA = Universal Anchor - Concreted (see SMD(FRP) and (TWT))
 UB = Universal Anchor - Bolted down (see SMD(FRP) and (TWT))
 WS = Wedge Anchor Steel - (see SMD(TWT))
 WP = Wedge Anchor Plastic (see SMD(TWT))
 SA = Slipbase - Concreted (see SMD(SLIP-1) to (SLIP-3))
 SB = Slipbase - Bolted Down (see SMD(SLIP-1) to (SLIP-3))

Sign Mounting Designation
 P = Prefab. "Plain" (see SMD(SLIP-1) to (SLIP-3), (TWT), (FRP))
 T = Prefab. "T" (see SMD(SLIP-1) to (SLIP-3), (TWT))
 U = Prefab. "U" (see SMD(SLIP-1) to (SLIP-3))
 IF REQUIRED
 1EXT or 2EXT = Number of Extensions (see SMD(SLIP-1) to (SLIP-3), (TWT))
 BM = Extruded Wind Beam (see SMD(SLIP-1) to (SLIP-3))
 WC = 1.12 #/ft Wing Channel (see SMD(SLIP-1) to (SLIP-3))
 EXAL = Extruded Aluminum Sign Panels (see SMD(SLIP-3))

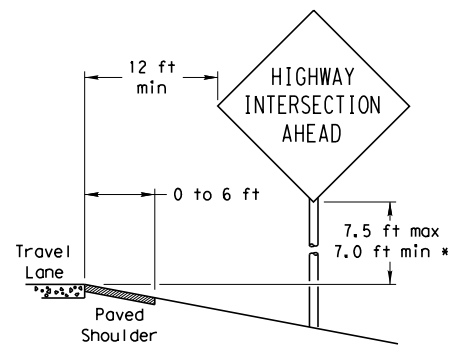
REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



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).

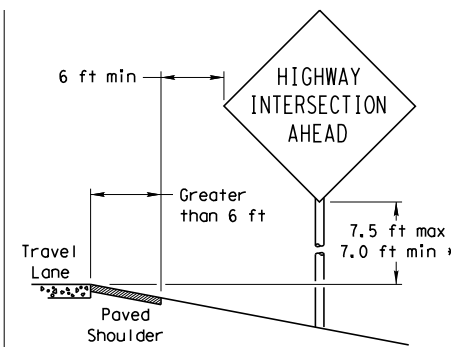
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

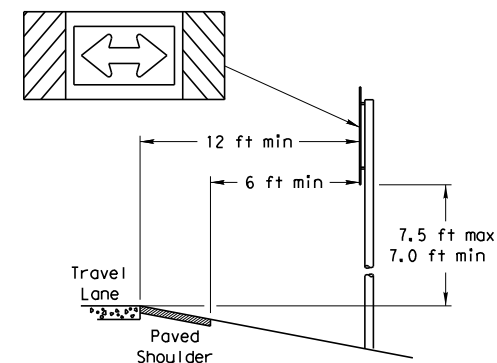
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



GREATER THAN 6 FT. WIDE

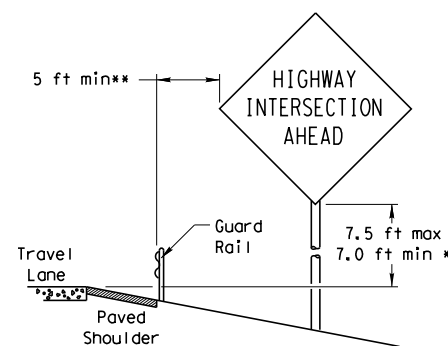
When the shoulder is greater than 6 ft in width, the sign must be placed at least 6 ft. from the edge of the shoulder.

T-INTERSECTION



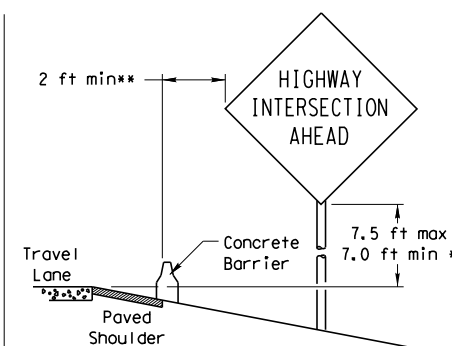
When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.

BEHIND BARRIER



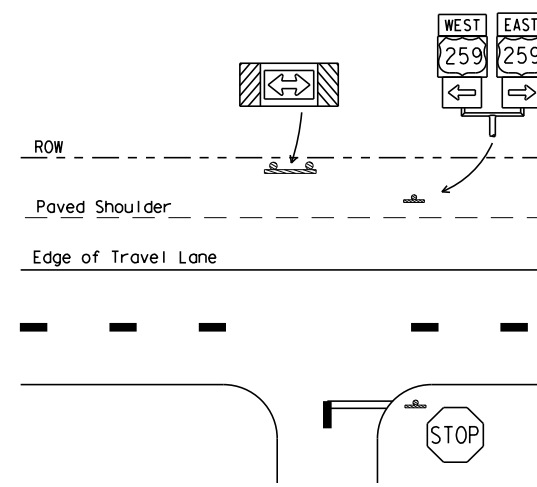
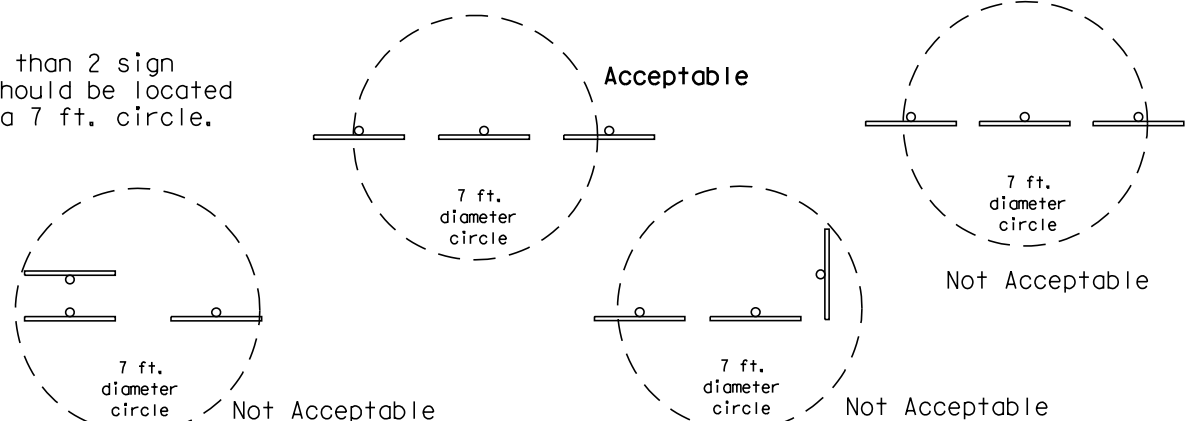
BEHIND GUARDRAIL

**Sign clearance based on distance required for proper guard rail or concrete barrier performance.



BEHIND CONCRETE BARRIER

No more than 2 sign posts should be located within a 7 ft. circle.



* Signs shall be mounted using the following condition that results in the greatest sign elevation:

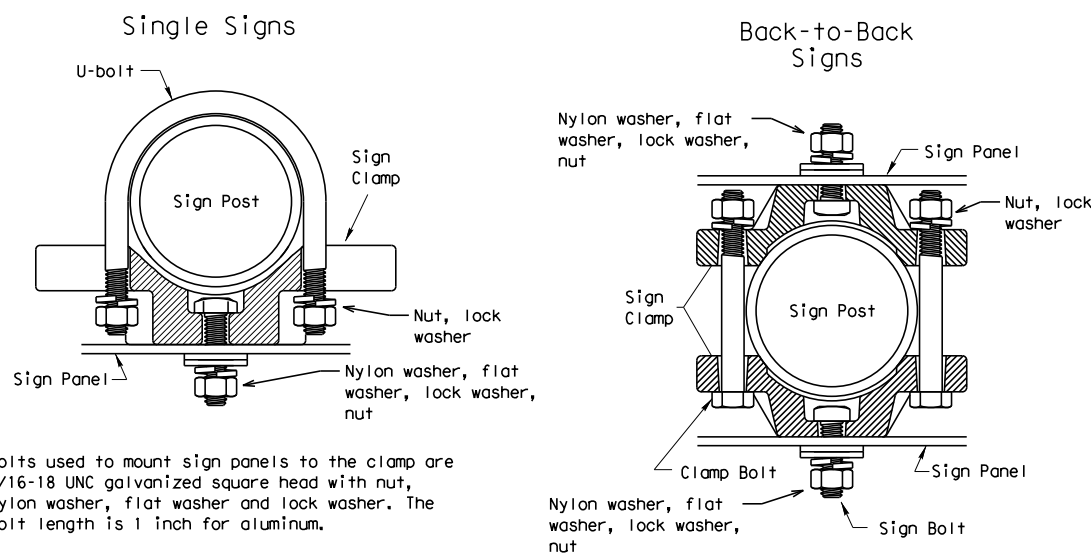
- (1) a minimum of 7 to a maximum of 7.5 feet above the edge of the travel lane or
- (2) a minimum of 7 to a maximum of 7.5 feet above the grade at the base of the support when sign is installed on the backslope.

The maximum values may be increased when directed by the Engineer.

See the Traffic Operations Division website for detailed drawings of sign clamps, Triangular Slipbase System components and Wedge Anchor System components.

The website address is:
<http://www.txdot.gov/publications/traffic.htm>

TYPICAL SIGN ATTACHMENT DETAIL



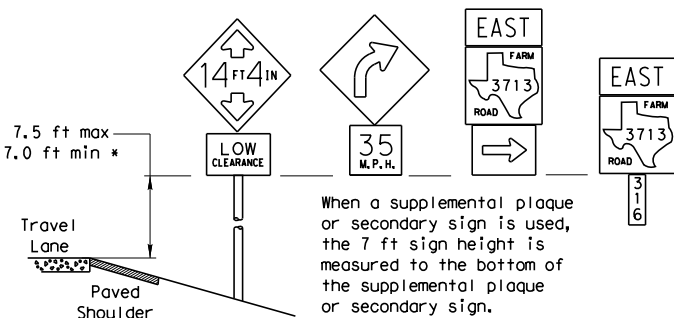
Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

When two sign clamps are used to mount signs back-to-back, use a 5/16-18 UNC galvanized hex head per ASTM A307 with nut and helical-spring lock washer. The approximate bolt lengths for various post sizes and sign clamp types are given in the table at right. The bolt length may need to be adjusted depending upon field conditions.

Sign clamps may be either the specific size clamp or the universal clamp.

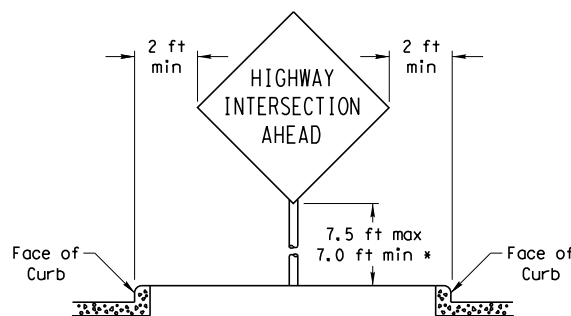
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES

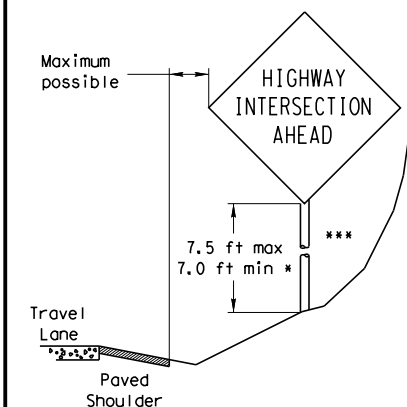


When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

CURB & GUTTER OR RAISED ISLAND



RESTRICTED RIGHT-OF-WAY (When 6 ft min. is not possible.)



Right-of-way restrictions may be created by rocks, water, vegetation, forest, buildings, a narrow island, or other factors.

In situations where a lateral restriction prevents the minimum horizontal clearance from the edge of the travel lane, signs should be placed as far from the travel lane as practical.

*** Post may be shorter if protected by guardrail or if Engineer determines the post could not be hit due to extreme slope.

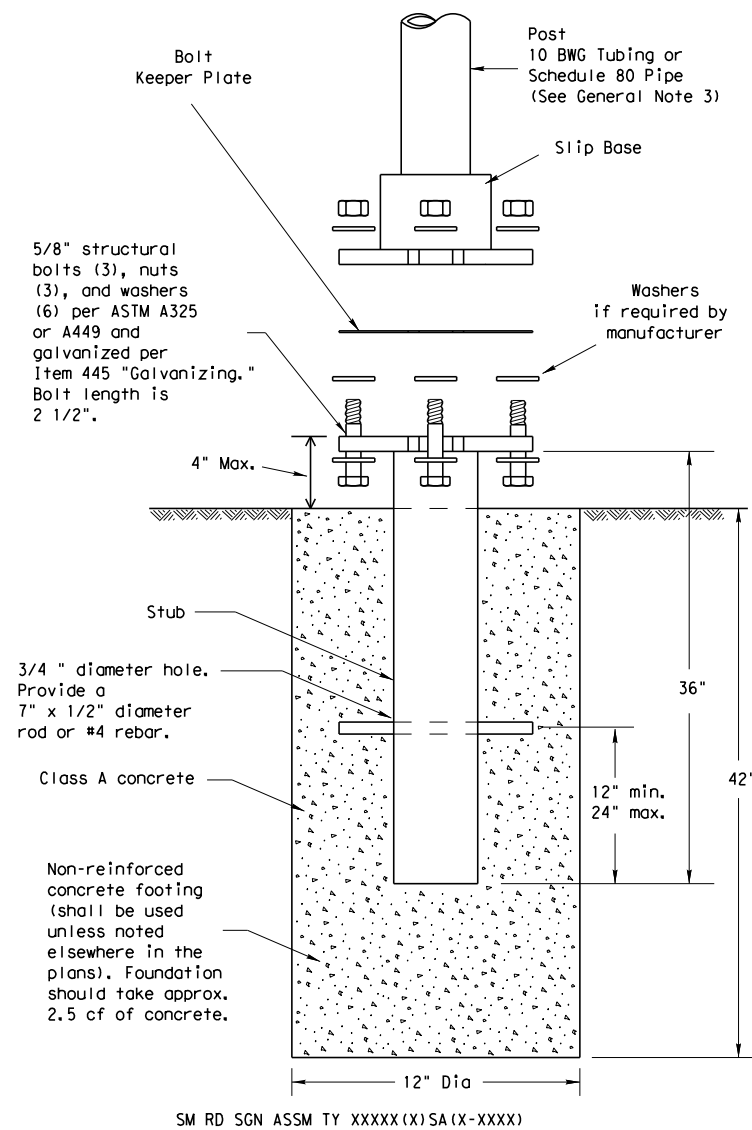


SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

SMD (GEN) - 08

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9-08	REVISIONS	CONT	SECT	JOB
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		DIST	COUNTY	PROJECT
		ABL	JONES	FM 707
				SHEET NO.
				152

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:

- 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.
- 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
- 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>
- Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.

ASSEMBLY PROCEDURE

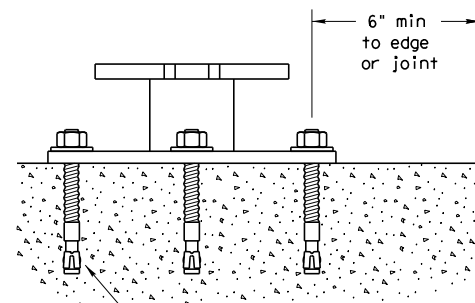
Foundation

- 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.
- 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.
- 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.
- Plumb the stub. Allow a minimum of 4 days to set, unless otherwise directed by the Engineer.
- The triangular slipbase system is multidirectional and is designed to release when struck from any direction.

Support

- 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.
- 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



5/8" diameter Concrete Anchor - 8 places (embed a minimum of 5 1/2" and torque to min. of 50 ft-lbs). Anchor may be expansion or adhesive type.

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, "Epoxyes 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.

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Texas Department of Transportation
 Traffic Operations Division

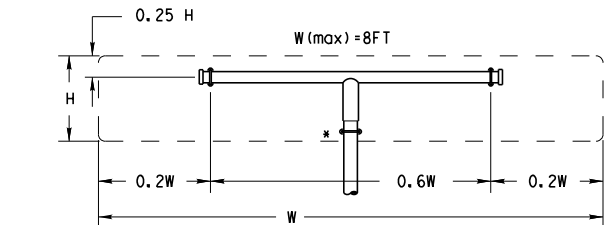
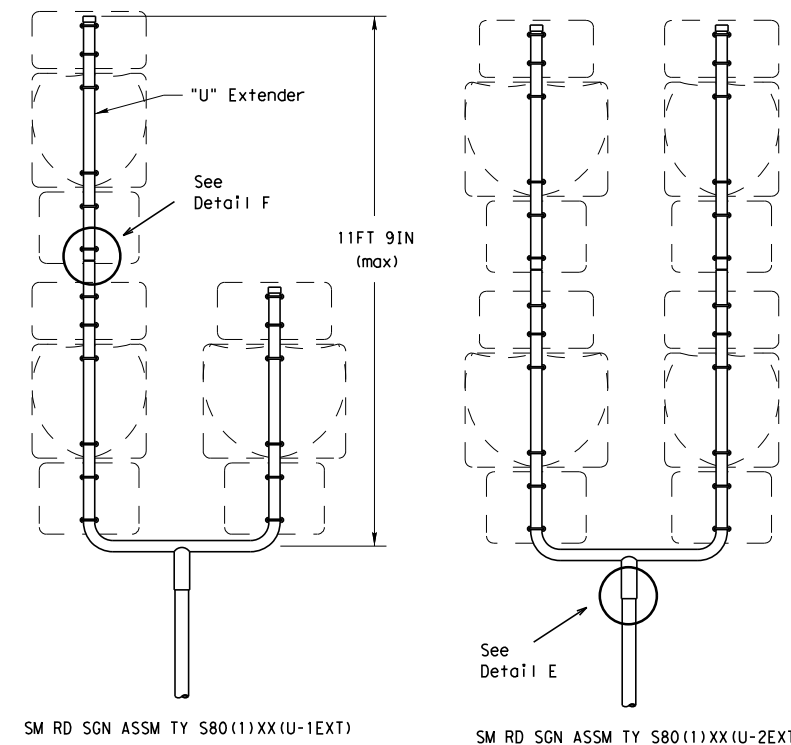
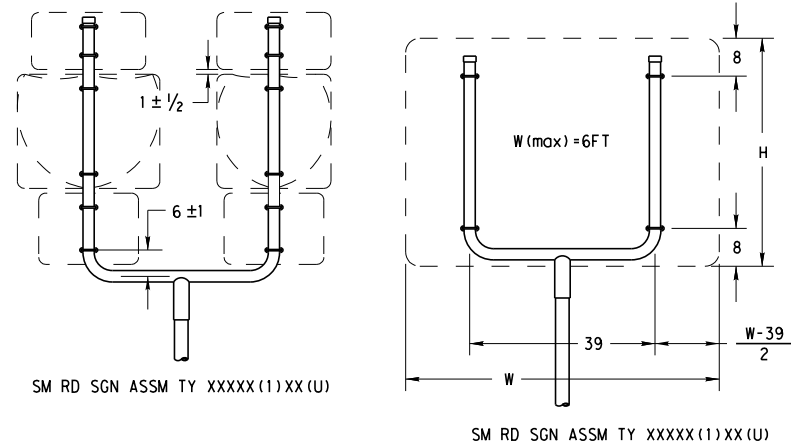
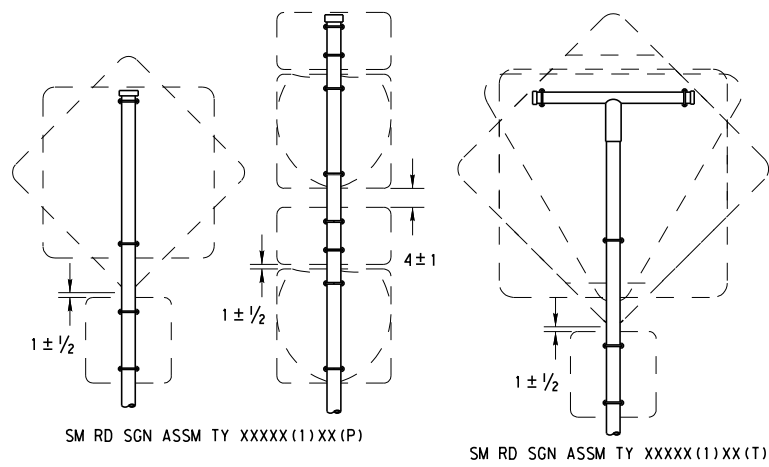
SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-1)-08

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		0484	01	025	FM 707
		DIST	COUNTY		SHEET NO.
		ABL	JONES		153

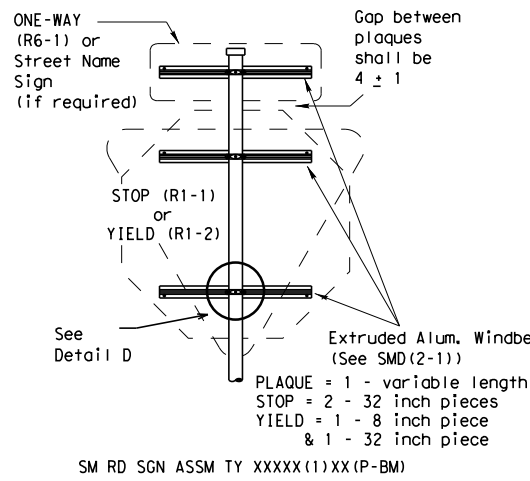
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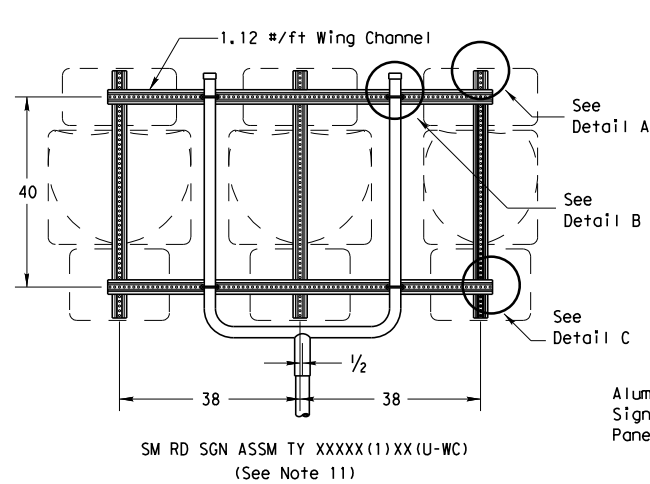


All dimensions are in english unless detailed otherwise.

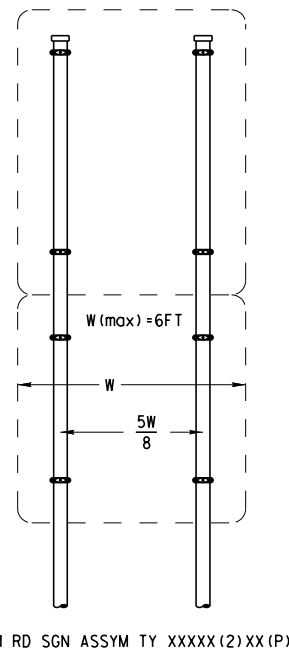
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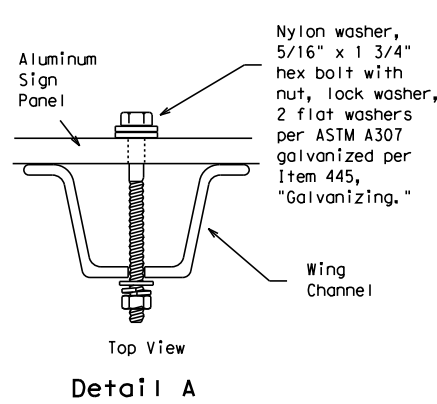
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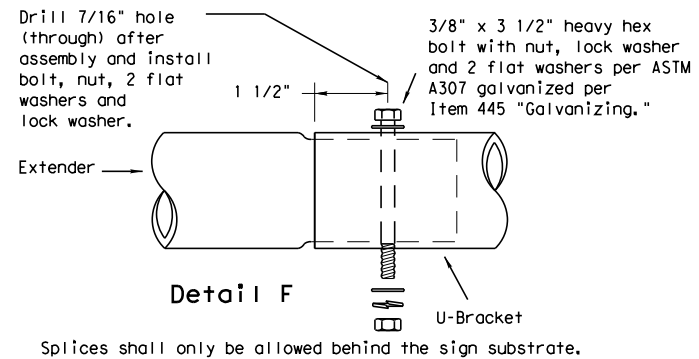
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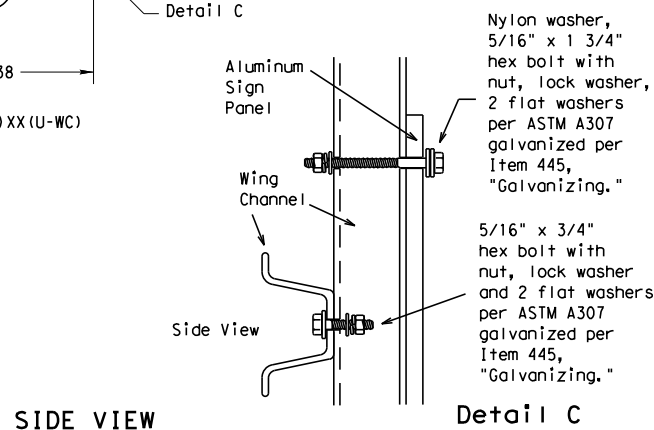
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Detail A

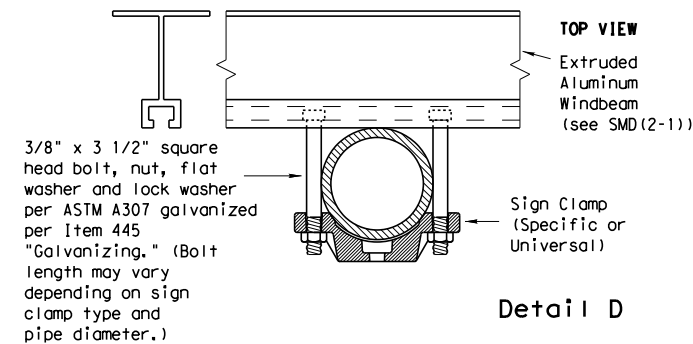


Detail F



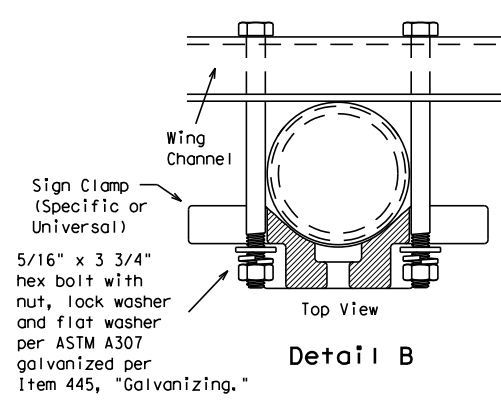
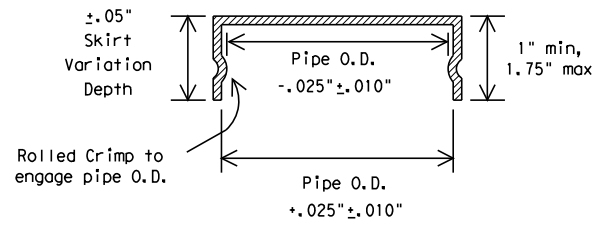
SIDE VIEW

Detail C

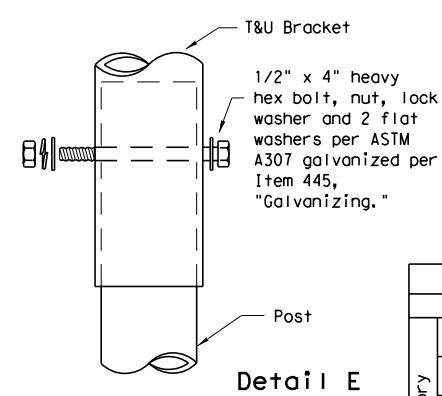


Detail D

FRICION CAP DETAIL



Detail B



Detail E

GENERAL NOTES:

1. SIGN SUPPORT # OF POSTS MAX. SIGN AREA

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)	
Warning	48x60-inch signs	TY S80(1)XX(T)	
	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)	

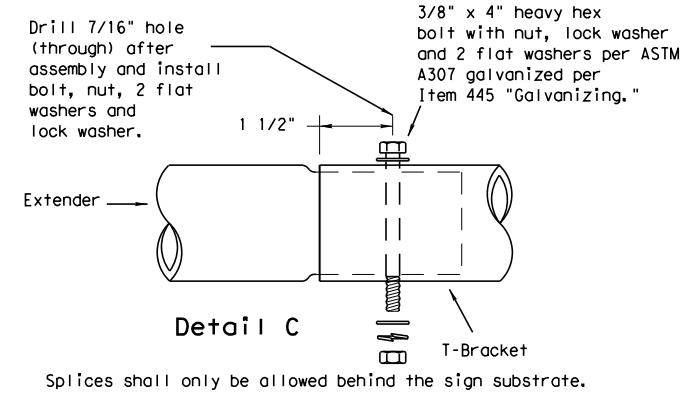
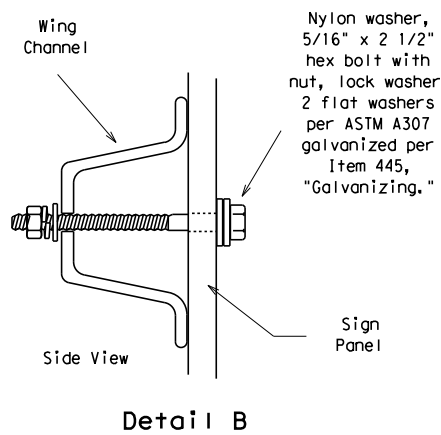
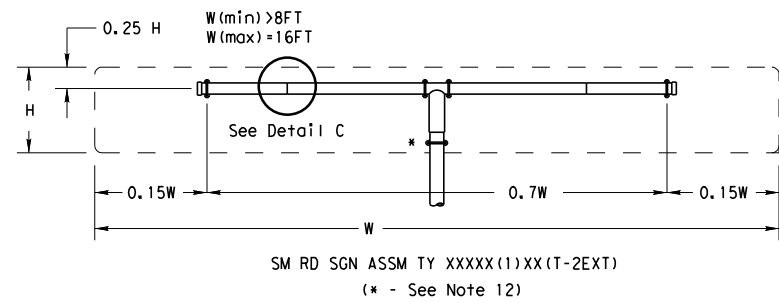
Texas Department of Transportation
 Traffic Operations Division

SIGN MOUNTING DETAILS
 SMALL ROADSIDE SIGNS
 TRIANGULAR SLIPBASE SYSTEM
 SMD(SLIP-2)-08

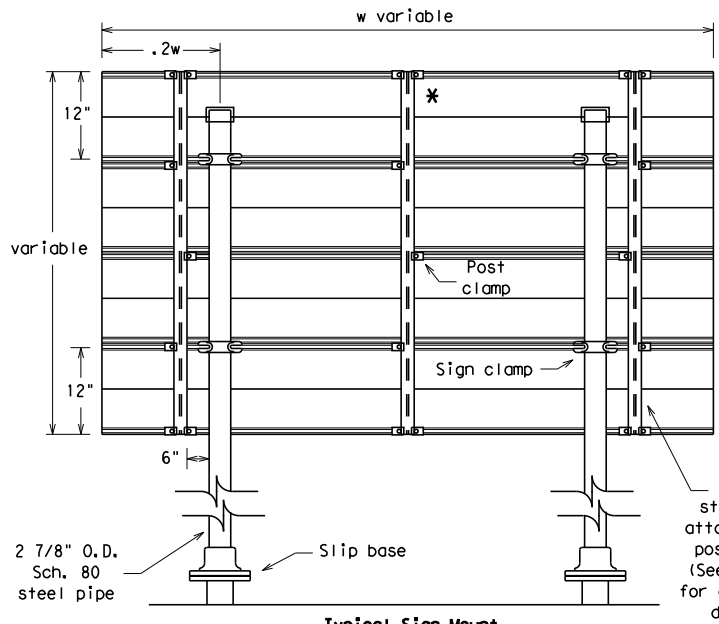
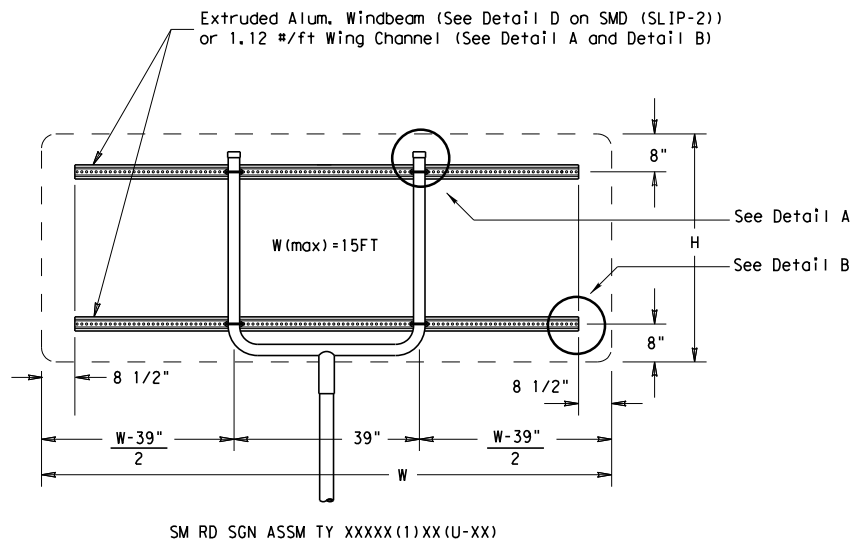
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9-08	REVISONS	CONT	SECT	JOB
		0484	01	025
		DIST	COUNTY	HIGHWAY
		ABL	JONES	FM 707
				SHEET NO.
				154

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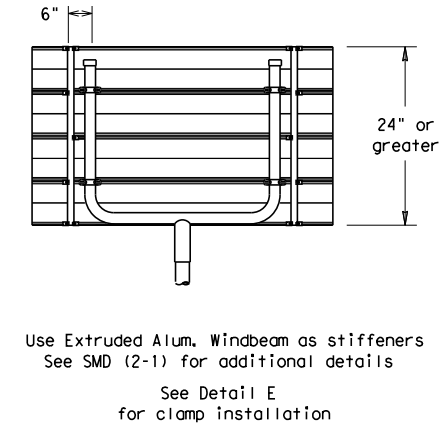
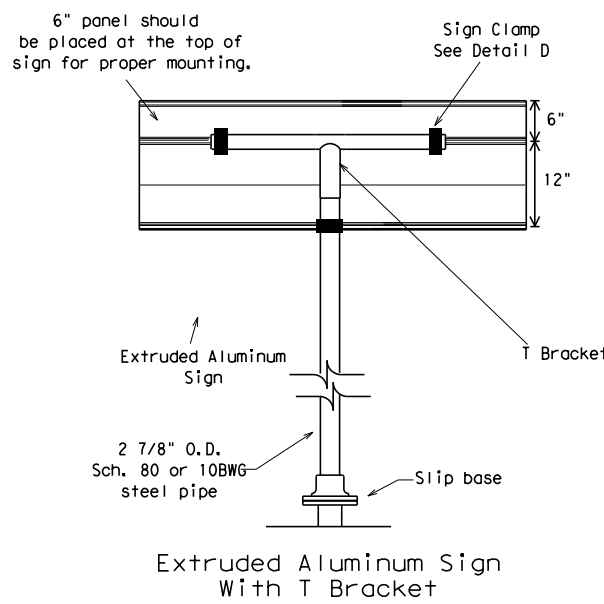
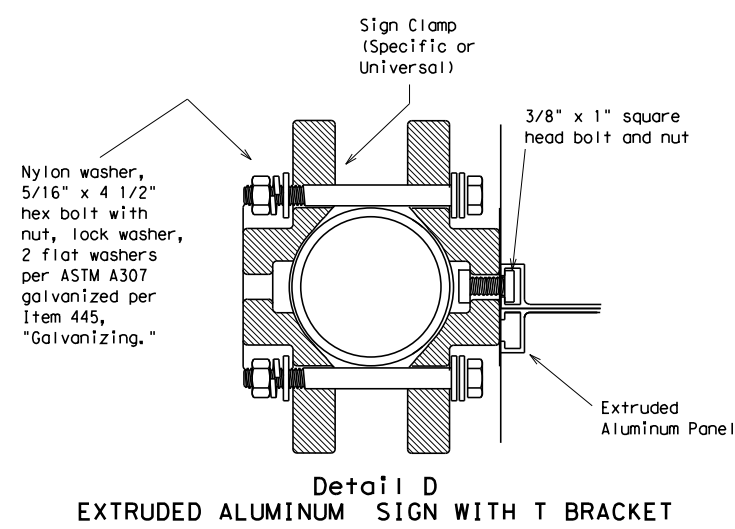
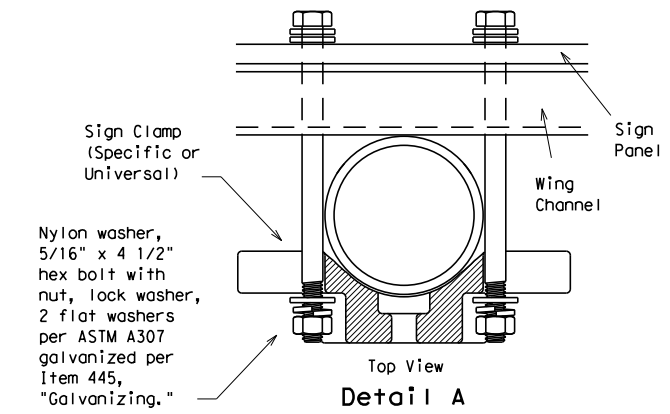
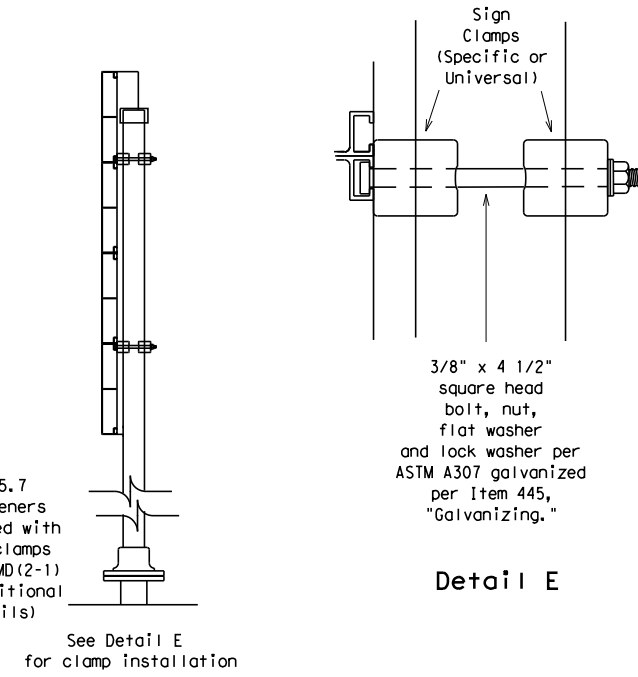
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Splices shall only be allowed behind the sign substrate.



* Additional stiffener placed at approximate center of signs when sign width is greater than 10'.



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 |
- 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.
- Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
- 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.
- Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
- 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.
- 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.
- Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
- 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."
- Sign blanks shall be the sizes and shapes shown on the plans.
- 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.
- 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)
Warning	48x60-inch signs	TY S80(1)XX(T)
	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

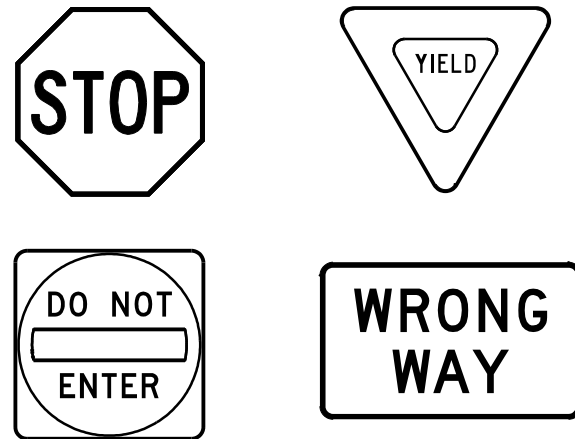
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9-08	REVISIONS	CONT	SECT	JOB	HIGHWAY
		0484	01	025	FM 707
		DIST	COUNTY		SHEET NO.
		ABL	JONES		155

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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

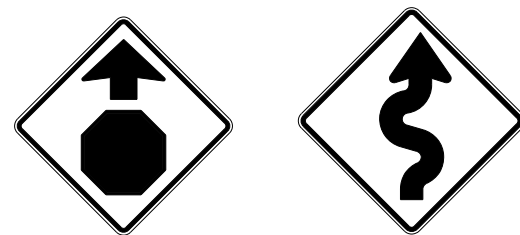
- Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).
- Sign legend shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets (B, C, D, E, Emod or F).
- 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.
- Black legend and borders shall be applied by screening process or cut-out acrylic non-reflective black film to background sheeting, or combination thereof.
- 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.
- 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.
- Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.
- 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

		Traffic Operations Division Standard	
<h2>TYPICAL SIGN REQUIREMENTS</h2>			
<h3>TSR (4) - 13</h3>			
FILE:	tsr4-13.dgn	DN:	TxDOT
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12-03	7-13	CONT	SECT
9-08		0484	01
		JOB	HIGHWAY
		025	FM 707
		DIST	COUNTY
		ABL	JONES
		SHEET NO.	157

SITE DESCRIPTION

PROJECT LIMITS:
THE PROJECT LIMITS SHOWN ON THE TITLE SHEET AND LIMITS OF TXDOT RIGHT OF WAY SHALL ALSO BE THE LIMITS OF COVERAGE OF THE SW3P.

PROJECT LOCATION MAPS: TITLE SHEET

DRAINAGE PATTERNS: DRAINAGE AREA MAPS
<OR POSSIBLY SW3P SITE PLAN>

APPROX. SLOPES ANTICIPATED AFTER MAJOR GRADING AND AREAS OF SOIL DISTURBANCE: TYPICAL SECTIONS

MAJOR CONTROLS AND LOCATIONS OF STABILIZATION PRACTICES: SW3P SITE PLAN

PROJECT SPECIFIC LOCATIONS: TO BE SPECIFIED BY PROJECT FIELD OFFICE AND LOCATED IN THE PROJECT SW3P FILE.

SURFACE WATERS AND DISCHARGE LOCATIONS:
DRAINAGE AND CULVERT LAYOUT SHEETS

TYPICAL AREAS WHICH WILL NOT BE DISTURBED: SW3P SITE PLAN

ENDANGERED SPECIES, DESIGNATED CRITICAL HABITAT AND HISTORIC PROPERTY: EPIC SHEET

ESTIMATED START DATES AND DURATION OF ACTIVITIES IN THE INTENDED SCHEDULE/SEQUENCE OF EARTH-DISTURBING ACTIVITIES: CONTRACT TIME ESTIMATE

NATURE OF ACTIVITY:
BRIDGE REPLACEMENT AND RECONSTRUCTION OF APPROACHES

MAJOR SOIL DISTURBING ACTIVITIES:
SOIL DISTURBING ACTIVITIES WILL INCLUDE ROW PREPARATION, GRADING, EXCAVATION, EMBANKMENT, CHANNEL AND STRUCTURAL EXCAVATION AND PLACING TOPSOIL.

TOTAL PROJECT AREA:
11.11 ACRES

TOTAL AREA TO BE DISTURBED (AT EACH SITE):
9.60 ACRES

WEIGHTED RUNOFF COEFFICIENT BEFORE CONSTRUCTION:
0.70

WEIGHTED RUNOFF COEFFICIENT AFTER CONSTRUCTION:
0.70

EXISTING CONDITION OF SOIL & VEGETATIVE COVER:
GOOD

% OF EXISTING VEGETATIVE COVER:
70%

NAME OF RECEIVING WATERS:
CLEAR FORK BRAZOS RIVER, I232, UNIMPAIRED

EROSION AND SEDIMENT CONTROLS

USE "T" OR "P" IN THE BLANKS BELOW IF APPLICABLE (T= TEMPORARY, P= PERMANENT)

SOIL STABILIZATION PRACTICES:

<u> </u> P, T	BUFFER ZONES	<u> </u> P	PERMANENT PLANTING, SODDING, OR SEEDING
<u> </u> T	MULCHING	<u> </u> P, T	PRESERVATION OF NATURAL RESOURCES
<u> </u> T	TEMPORARY SEEDING	<u> </u> T	SOIL RETENTION BLANKET
<u> </u> T	OTHER	<u> </u> T	OTHER

OTHER:
DISTURBED AREAS ON WHICH CONSTRUCTION ACTIVITY HAS CEASED (TEMPORARILY OR PERMANENTLY) SHALL BE STABILIZED WITHIN 14 DAYS UNLESS ACTIVITIES ARE SCHEDULED TO RESUME WITHIN 14 DAYS.

FOR CONSTRUCTION PROJECTS, THIS DISTRICT OF THE TEXAS DEPARTMENT OF TRANSPORTATION USES SITEMANAGER, A COMPUTER BASED CONSTRUCTION RECORD-KEEPING SYSTEM, AS PART OF RECORD FOR PROJECT WORK INCLUDING ENVIRONMENTAL RELATED ACTIVITIES. DOCUMENTATION DESCRIBING MAJOR GRADING ACTIVITIES, TEMPORARY OR PERMANENT CESSATION OF CONSTRUCTION AND STABILIZATION MEASURE IS PART OF THIS SYSTEM AND IS INCORPORATED BY REFERENCE INTO THIS SW3P.

STRUCTURAL PRACTICES:

<u> </u>	CHANNEL LINERS	<u> </u>	DIVERSION DIKE AND SWALE COMBINATIONS
<u> </u>	CURBS AND GUTTERS	<u> </u>	DIVERSION, INTERCEPTOR, OR PERIMETER DIKES
<u> </u>	HAY BALES	<u> </u>	DIVERSION, INTERCEPTOR, OR PERIMETER SWALES
<u> </u>	PAVED FLUMES	<u> </u>	ROCK BEDDING AT CONSTRUCTION EXIT
<u> </u>	PIPE SLOPE DRAINS	<u> </u>	STONE OUTLET STRUCTURES
<u> </u>	STORM SEWERS	<u> </u>	STORM INLET SEDIMENT TRAP
<u> </u>	SEDIMENT BASINS	<u> </u> X	TEMPORARY EROSION CONTROL LOGS (BIOLOGS)
<u> </u>	SEDIMENT TRAPS	<u> </u> X	TIMBER MATTING AT CONSTRUCTION EXIT
<u> </u> X	SILT FENCES	<u> </u>	VEGETATIVE FILTER STRIPS
<u> </u> X	ROCK FILTER DAMS	<u> </u>	VELOCITY CONTROL DEVICES
<u> </u> X	EROSION CONTROL LOGS	<u> </u> X	LINED CONCRETE WASHOUT

OFFSITE VEHICLE TRACKING CONTROLS:

<u> </u> X	HAUL ROADS DAMPENED FOR DUST CONTROL
<u> </u> X	EXCESS DIRT ON ROAD REMOVED DAILY
<u> </u> X	LOADED HAUL TRUCKS TO BE COVERED WITH TARPAULIN
<u> </u> X	STABILIZED CONSTRUCTION ENTRANCE
<u> </u>	OTHER

NARRATIVE - SEQUENCE OF CONSTRUCTION (STORM WATER MANAGEMENT) ACTIVITIES:

- THE ORDER OF ACTIVITIES WILL BE AS FOLLOWS:
1. PLACE EROSION CONTROL ITEMS, AS APPROVED BY THE ENGINEER, PRIOR TO ANY WORK WHICH DISTURBS EXISTING SOIL.
 2. DURING TOPSOIL SALVAGING AND GRADING OPERATIONS, USE DUE CARE IN MINIMIZE DISTURBANCE OF SOIL OUTSIDE REQUIRED LIMITS.
 3. PLACE TOPSOIL AND BONDED FIBER MATRIX SEEDING AS SOON AS PRACTICAL AFTER ASPHALT STABILIZED FLEXIBLE BASE IS PLACED. REDRESS TOP SOIL AT PAVEMENT EDGES AS NEEDED.
 4. THE CONTRACTOR SHALL BE A RESPONSIBLE PARTY IN IDENTIFYING, PREVENTING AND MAINTAINING APPROPRIATE EROSION AND SILATION CONTROL MEASURES.
 5. GAIN APPROVAL FROM ENGINEER BEFORE REMOVAL OF EROSION CONTROL ITEMS. RESEED AND REDRESS ANY AREA DISTURBED DURING REMOVAL OPERATION.

STORM WATER MANAGEMENT:
NA

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.

INSPECTION:

AN INSPECTION WILL BE PERFORMED BY A TXDOT INSPECTOR EVERY 7 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:

ALL WASTE MATERIALS WILL BE COLLECTED AND STORED IN A SECURELY LIDDED METAL DUMPSTER. THE DUMPSTER WILL MEET ALL STATE AND LOCAL CITY SOLID WASTE MANAGEMENT REGULATIONS. ALL TRASH AND CONSTRUCTION DEBRIS FROM THE SITE WILL BE DEPOSITED IN THE DUMPSTER. THE DUMPSTER WILL BE EMPTIED AS NECESSARY OR AS REQUIRED BY LOCAL REGULATION AND THE TRASH WILL BE HAULED TO A PERMITTED LANDFILL. NO CONSTRUCTION WASTE MATERIAL WILL BE BURIED ON SITE. CONSTRUCTION DEBRIS AND LITTER SHOULD BE PICKED UP ON A DAILY BASIS UNLESS OTHERWISE DIRECTED BY THE ENGINEER. WASTE AND DIRT PILES SHOULD BE REMOVED ON A WEEKLY BASIS.

HAZARDOUS WASTE (INCLUDING SPILL REPORTING):

NO LONG TERM WATER QUALITY IMPACTS ARE EXPECTED AS A RESULT OF THE PROPOSED PROJECT. SEE THE NEXT PLAN SHEET FOR A LIST OF POTENTIAL POLLUTANTS. IN THE EVENT OF A MAJOR SPILL, NOTIFY THE TXDOT ENGINEER IMMEDIATELY. ALL PERSONNEL WILL BE INSTRUCTED IN THE PROCEDURES FOR SPILL HANDLING AND DISPOSING OF ANY HAZARDOUS MATERIALS THEY WILL BE USING. ALL SPILLS, INCLUDING THOSE OF LESS THAN 25 GALLONS SHALL BE CLEANED IMMEDIATELY AND ANY CONTAMINATED SOIL SHALL BE IMMEDIATELY REMOVED FROM THE SITE AND BE DISPOSED OF PROPERLY. DESIGNATED AREAS SHALL BE DETERMINED BY THE AREA ENGINEER FOR SPOILS DISPOSAL AND MATERIAL STORAGE. THESE AREAS SHALL BE PROTECTED FROM RUN-ON AND RUN-OFF. MATERIALS RESULTING FROM THE DESTRUCTION OF EXISTING ROADS AND BEING REMOVED AND/OR DISPOSED OF BY THE CONTRACTOR WILL BE DONE SO IN ACCORDANCE WITH ALL FEDERAL, STATE, AND LOCAL LAWS, ORDINANCES AND REGULATIONS AND WITH THE APPROVAL OF THE PROJECT ENGINEER. ANY CHANGES TO AMBIENT WATER QUALITY DURING CONSTRUCTION OF THE PROPOSED PROJECT SHALL BE PROHIBITED AND MAY RESULT IN ADDITIONAL WATER QUALITY CONTROL MEASURES, WHICH SHALL BE MITIGATED AS SOON AS POSSIBLE AND SHALL BE REPORTED TO THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ) WITHIN 24 HOURS OF BECOMING AWARE OF IMPACTS.

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.

REMARKS:

CONSTRUCTION STAGING AREAS AND VEHICLE MAINTENANCE AREAS SHALL BE CONSTRUCTED BY THE CONTRACTOR IN A MANNER TO MINIMIZE THE RUNOFF OF POLLUTANTS. 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 PART OF THE FINISHED WORK. 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 STREAMBED.



Aaron Demaray Tainter
11/8/2021



NO SCALE SHEET 1 OF 2

TxDOT STORM WATER POLLUTION PREVENTION PLAN (SW3P)

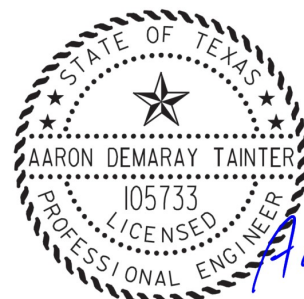
FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 707
STATE	COUNTY		SHEET NO.
TEXAS	JONES		158
DISTRICT	CONTROL	SECTION	
ABL	0484	01	

c:\bms\br idgefarmer-pw\alex.massar\br idgefarmer.com\dms05115\001*SW3P.dgn 11/8/2021 12:51:35 PM

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11/1/2021 5:14:19 PM

LIST OF POTENTIAL POLLUTANTS

POTENTIAL POLLUTANT	RELATED SOURCE	CONTROLS
CEMENTATEOUS MATERIAL AND CEMENTATEOUS AGGREGATES (BROKEN CONCRETE)	REMOVAL OF CONCRETE RIPRAP, CULVERT COMPONENTS, BRIDGE COMPONENTS, ETC.	THIS CONSTRUCTION WASTE SHALL BE PROPERLY DISPOSED OF IN ACCORDANCE WITH STATE AND LOCAL REGULATIONS. WHEN STORED ON SITE PRIOR TO DISPOSAL, IT SHALL BE CONTAINED SO AS TO ENSURE THAT IT CANNOT ENTER SURFACE RUNOFF.
MILLED ASPHALTIC CEMENT PAVEMENT (MILLINGS)	OBLITERATION OF ABANDONED ROAD AND PLANING OF ASPHALT	THIS CONSTRUCTION WASTE SHALL BE PROPERLY DISPOSED OF IN ACCORDANCE WITH STATE AND LOCAL REGULATIONS. WHEN STORED ON SITE PRIOR TO DISPOSAL, IT SHALL BE CONTAINED SO AS TO ENSURE THAT IT CANNOT ENTER SURFACE RUNOFF.
VIRGIN ASPHALTIC MATERIAL INCLUSIVE OF PRIME OILS, PRECOAT AGGREGATES, AND HOT MIX BITUMINOUS MIXTURES	APPLICATIONS OF PRIME COATS, SEAL COAT, AND PAVING OPERATIONS	THIS MATERIAL SHALL BE APPLIED AT APPROPRIATE RATES FOR CONSTRUCTION PURPOSES WHICH WILL PRECLUDE THESE MATERIALS FROM ENTERING RUNOFF. IN THE EVENT OF ANY UNINTENDED DISCHARGE, CONTROLS TO CONTAIN RUNOFF WILL BE IMMEDIATELY PLACED AND TCEQ WILL BE IMMEDIATELY NOTIFIED.
CONCRETE, REBAR, WIRE, WIRE FABRIC LUMBER, NAILS, STYROFOAM BLOCK, FIBERBOARD, CURING COMPOUND AND LINSEED OIL	CONSTRUCTION OF CONCRETE BRIDGE COMPONENTS SUCH AS DRILLED SHAFTS, CULVERTS, ABUTMENTS, BENTS, REINFORCED CONCRETE SLABS, RAIL, INLET, CONCRETE TRAFFIC BARRIERS, CURB AND GUTTER, RIPRAP AND SIGN FOUNDATIONS	THIS CONSTRUCTION WASTE SHALL BE PROPERLY DISPOSED OF IN ACCORDANCE WITH STATE AND LOCAL REGULATIONS. WHEN STORED ON SITE PRIOR TO DISPOSAL, IT SHALL BE CONTAINED SO AS TO ENSURE THAT IT CANNOT ENTER SURFACE RUNOFF. ANY TEMPORARY FILLS MUST BE REMOVED IN THEIR ENTIRETY AND THE AFFECTED AREAS RETURNED TO THEIR PREEXISTING CONDITION/ELEVATION.
MASONRY CONCRETE BLOCK, GEOGRID FABRIC, CARDBOARD, AND PLASTIC RAP	CONSTRUCTION OF MODULAR RETAINING WALL SYSTEMS	THIS CONSTRUCTION WASTE SHALL BE PROPERLY DISPOSED OF IN ACCORDANCE WITH STATE AND LOCAL REGULATIONS. WHEN STORED ON SITE PRIOR TO DISPOSAL, IT SHALL BE CONTAINED SO AS TO ENSURE THAT IT CANNOT ENTER SURFACE RUNOFF.
WOOD POSTS, STEEL POSTS, BARRELS, CONES, SIGN BOARDS (ALUMINUM AND PLYBOARD), FASTENERS, NUTS, BOLTS, AND WASHERS	PLACEMENT AND/OR REMOVAL OF BARRICADES, SIGNS AND TRAFFIC CONTROL DEVICES	THIS CONSTRUCTION WASTE SHALL BE PROPERLY DISPOSED OF IN ACCORDANCE WITH STATE AND LOCAL REGULATIONS. WHEN STORED ON SITE PRIOR TO DISPOSAL, IT SHALL BE CONTAINED SO AS TO ENSURE THAT IT CANNOT ENTER SURFACE RUNOFF.
WOOD POST, STEEL POST, STEEL FASTENERS, NUTS, BOLTS, AND WASHERS	CONSTRUCTION OF METAL BEAM GUARD FENCE	THIS CONSTRUCTION WASTE SHALL BE PROPERLY DISPOSED OF IN ACCORDANCE WITH STATE AND LOCAL REGULATIONS. WHEN STORED ON SITE PRIOR TO DISPOSAL, IT SHALL BE CONTAINED SO AS TO ENSURE THAT IT CANNOT ENTER SURFACE RUNOFF.
STRUCTURAL STEEL I-BEAM, SIGN BOARDS, AND CONCRETE FOUNDATIONS	REMOVAL OF ROADSIDE SIGN ASSEMBLIES LARGE AND SMALL	THIS CONSTRUCTION WASTE SHALL BE PROPERLY DISPOSED OF IN ACCORDANCE WITH STATE AND LOCAL REGULATIONS. WHEN STORED ON SITE PRIOR TO DISPOSAL, IT SHALL BE CONTAINED SO AS TO ENSURE THAT IT CANNOT ENTER SURFACE RUNOFF.
THERMOPLASTIC PAINT, GLASS BEADS, REFLECTIVE TABS, AND RAISED REFLECTIVE PAVEMENT MARKERS	APPLICATION OF PAVEMENT MARKINGS/MARKERS	THIS CONSTRUCTION WASTE SHALL BE PROPERLY DISPOSED OF IN ACCORDANCE WITH STATE AND LOCAL REGULATIONS. WHEN STORED ON SITE PRIOR TO DISPOSAL, IT SHALL BE CONTAINED SO AS TO ENSURE THAT IT CANNOT ENTER SURFACE RUNOFF.
PETROLEUM PRODUCTS (SMALL QUANTITIES INTRODUCED BY CONTRACTOR)	EQUIPMENT FAILURE, MAINTENANCE AND REPAIR	ALL EQUIPMENT AND VEHICLE MAINTENANCE SHALL BE PERFORMED IN A DESIGNATED AREA WITH APPROPRIATE MEASURES FOR CONTAINMENT AND PROPER DISPOSAL OF ALL WASTE MATERIALS INCLUDING HYDRAULIC OIL AND OTHER LIQUIDS IN ACCORDANCE STATE AND LOCAL WASTE MANAGEMENT REGULATIONS. ALL MATERIAL STORED PRIOR TO DISPOSAL SHALL BE CONTAINED IN A CONTAINER WITH A SECURE COVER MEETING ALL STATE AND LOCAL WASTE MANAGEMENT REGULATIONS.
ELIGIBLE NON-STORM WATER DISCHARGES INCLUDING BUT NOT LIMITED TO NON-POTABLE WATER AND NON-STORM WATER DISCHARGE	MOISTURE APPLICATIONS FOR DUST CONTROL, DENSITY, VEGETATION WATERING, NON-DETERGENT VEHICLE WASHING, AND AIR CONDITIONING CONDENSATE	THIS MATERIAL SHALL BE APPLIED AT APPROPRIATE RATES FOR CONSTRUCTION PURPOSES WHICH WILL PRECLUDE THESE MATERIALS FROM ENTERING RUNOFF. IN THE EVENT OF ANY UNINTENDED DISCHARGE, CONTROLS TO CONTAIN RUNOFF WILL BE IMMEDIATELY PLACED AND THE NON-POTABLE WATER WILL BE RECOVERED AND PROPERLY STORED FOR REUSE.
SURVEY STAKE, FLAGGING TAPE AND PAINT	SURVEY STAKING, ALIGNMENT ESTABLISHMENT	THIS CONSTRUCTION WASTE SHALL BE PROPERLY DISPOSED OF IN ACCORDANCE WITH STATE AND LOCAL REGULATIONS. WHEN STORED ON SITE PRIOR TO DISPOSAL, IT SHALL BE CONTAINED SO AS TO ENSURE THAT IT CANNOT ENTER SURFACE RUNOFF.
WASTEWATER	WASHOUT AND CLEANOUT OF STUCCO, PAINT, FORM RELEASE OILS, CURING COMPOUNDS AND OTHER CONSTRUCTION MATERIALS	THIS CONSTRUCTION WASTE SHALL BE PROPERLY DISPOSED OF IN ACCORDANCE WITH STATE AND LOCAL REGULATIONS. WHEN STORED ON SITE PRIOR TO DISPOSAL, IT SHALL BE CONTAINED SO AS TO ENSURE THAT IT CANNOT ENTER SURFACE RUNOFF.
SOAPS AND SOLVENTS	VEHICLE AND EQUIPMENT WASHING	THIS CONSTRUCTION WASTE SHALL BE PROPERLY DISPOSED OF IN ACCORDANCE WITH STATE AND LOCAL REGULATIONS. WHEN STORED ON SITE PRIOR TO DISPOSAL, IT SHALL BE CONTAINED SO AS TO ENSURE THAT IT CANNOT ENTER SURFACE RUNOFF.
UNSUITABLE FILL MATERIAL	EXCAVATION - ROADWAY, SPECIAL AND EROSION CONTROL	THIS CONSTRUCTION WASTE SHALL BE PROPERLY DISPOSED OF IN ACCORDANCE WITH STATE AND LOCAL REGULATIONS. WHEN STORED ON SITE PRIOR TO DISPOSAL, IT SHALL BE CONTAINED SO AS TO ENSURE THAT IT CANNOT ENTER SURFACE RUNOFF.



Aaron Demaray Tainter
11/2/2021

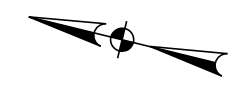
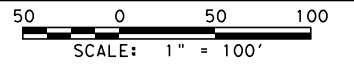


NO SCALE SHEET 2 OF 2

TxDOT STORM WATER POLLUTION PREVENTION PLAN (SW3P)

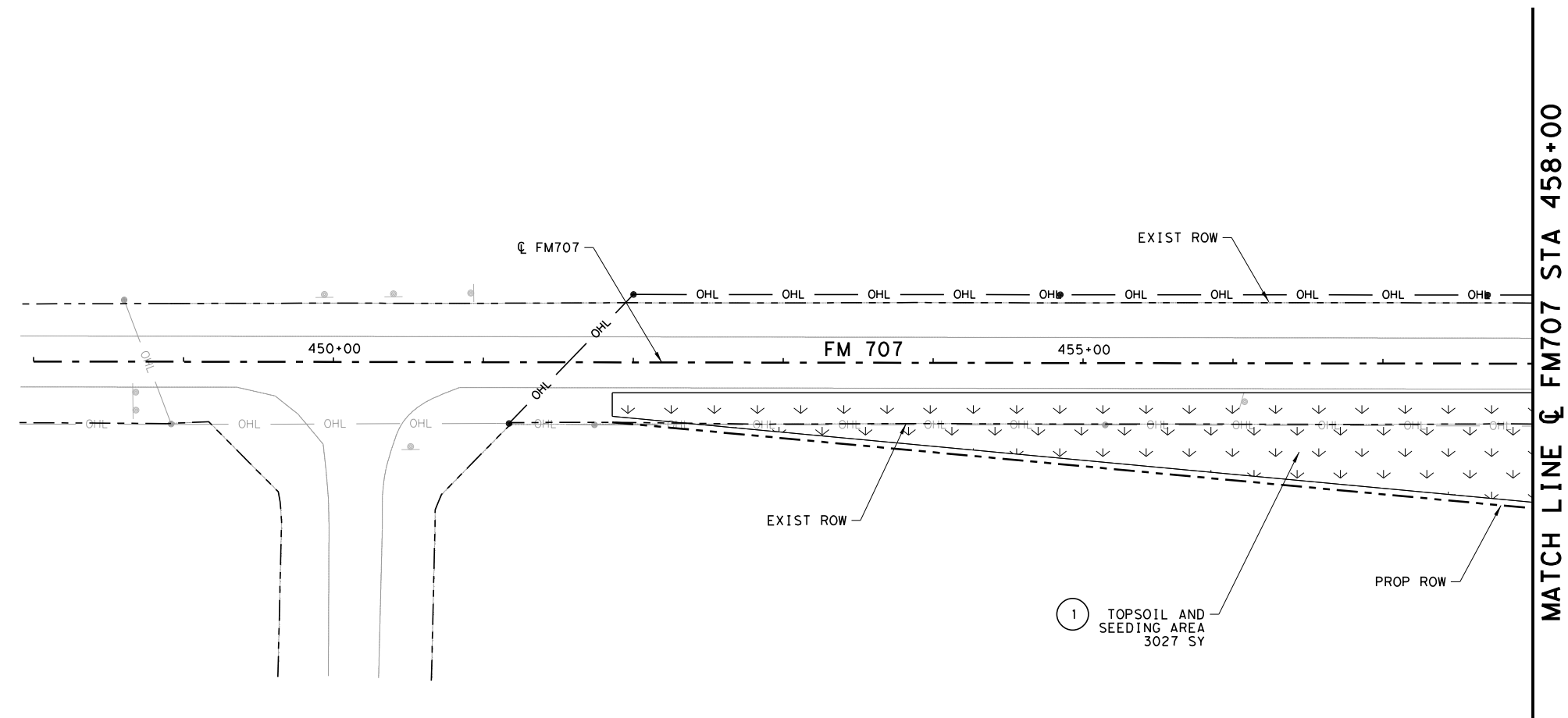
REV. DATE: 02/27/2014

FHWA DIVISION	PROJECT NO.	HIGHWAY NO.	
6	SEE TITLE SHEET	FM 707	
STATE	COUNTY	SHEET NO.	
TEXAS	JONES	159	
DISTRICT	CONTROL	SECTION	JOB
ABL	0484	01	025



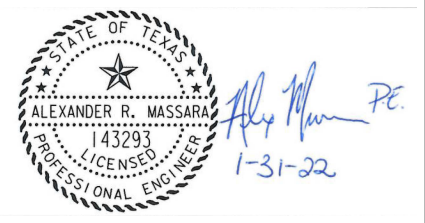
LEGEND

- SF— TEMPORARY SEDIMENT CONTROL FENCE (SCF)
- CL-SS○ EROSION CONTROL LOG ON SLOPES (CL-SS)
- CL-D○ EROSION CONTROL LOG IN DITCHES (CL-D)
- RFD2○ ROCK FILTER DAM (TYP 2) (RFD2)
- ▤ CONSTRUCTION EXIT
- ▨ SEEDING AREA
- ▩ SOIL RETENTION BLANKET (SRB)
- D— DITCH



NOTES:

1. LOCATIONS OF EROSION CONTROL DEVICES, INCLUDING CONSTRUCTION ENTRANCES, CONSTRUCTION EXITS, AND CONCRETE WASHOUTS, ARE APPROXIMATIONS. ACTUAL LOCATIONS TO BE DETERMINED IN THE FIELD BY THE ENGINEER.
2. EROSION CONTROL DEVICES SHALL BE INSTALLED PRIOR TO THE START OF ANY CONSTRUCTION ACTIVITY AND SHALL REMAIN IN PLACE UNTIL CONSTRUCTION IS COMPLETE.
3. EROSION CONTROL DEVICE INSTALLATION, MAINTENANCE, AND REMOVAL SHALL BE IN ACCORDANCE WITH TXDOT STANDARDS FOR EROSION CONTROL.
4. SEE DAILY WORK REPORTS FOR INITIAL STABILIZATION TIME FRAMES.
5. TOPSOIL TO BE STOCKPILED IN WINDROWS ALONG ROW. AFTER REMOVAL OF TEMP DETOUR REPLACE DISTURBED TOPSOIL PER ITEM 160 6001. THIS SHEET IS PROVIDED AS PART OF THE SW3P PERMIT AND WILL BE USED BY DEPARTMENT PERSONNEL DURING CONSTRUCTION ACTIVITIES TO DOCUMENT THE INSTALLATION AND MAINTENANCE OF ANY BMP'S USED ON THIS PROJECT.



NO.	TYPE	BMP		DATE	
		UNIT	QNTY	PLACED	REMOVED
1	SEED	SY	3027		



**FM 707
SW3P
SITE PLAN**

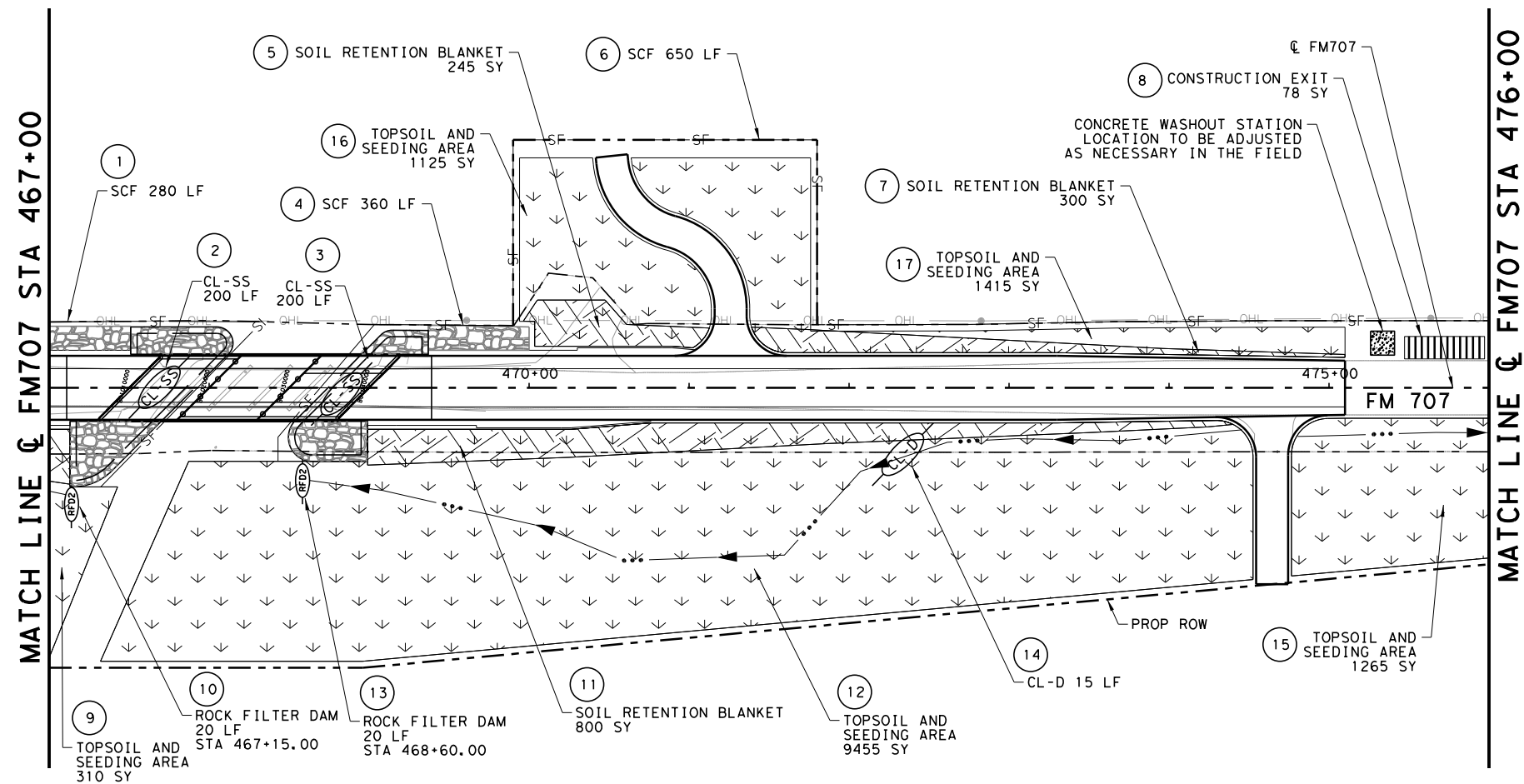
SCALE: 1" = 100' SHEET 1 OF 4

DS:	AM	CK:	DH	0484	01	025	FM 707
DW:	CG	CK:	AT	ABL	JONES		SHEET NO. 161



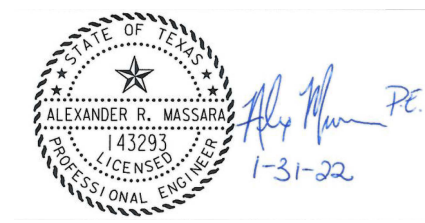
LEGEND

- SF— TEMPORARY SEDIMENT CONTROL FENCE (SCF)
- (CL-SS)— EROSION CONTROL LOG ON SLOPES (CL-SS)
- (CL-D)— EROSION CONTROL LOG IN DITCHES (CL-D)
- (RFD2)— ROCK FILTER DAM (TYP 2) (RFD2)
- [Hatched Box] CONSTRUCTION EXIT
- [Dotted Box] SEEDING AREA
- [Cross-hatched Box] SOIL RETENTION BLANKET (SRB)
- DITCH



NOTES:

1. LOCATIONS OF EROSION CONTROL DEVICES, INCLUDING CONSTRUCTION ENTRANCES, CONSTRUCTION EXITS, AND CONCRETE WASHOUTS, ARE APPROXIMATIONS. ACTUAL LOCATIONS TO BE DETERMINED IN THE FIELD BY THE ENGINEER.
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NO.	TYPE	BMP		DATE	
		UNIT	QNTY	PLACED	REMOVED
1	SCF	LF	280		
2	CL-SS	LF	200		
3	CL-SS	LF	200		
4	SCF	LF	360		
5	SRB	SY	245		
6	SCF	LF	650		
7	SRB	SY	300		
8	CONSTRUCTION EXIT	SY	78		
9	SEED	SY	310		

NO.	TYPE	BMP		DATE	
		UNIT	QNTY	PLACED	REMOVED
10	RFD2	LF	20		
11	SRB	SY	800		
12	SEED	SY	9455		
13	RFD2	LF	20		
14	CL-D	LF	15		
15	SEED	SY	1265		
16	SEED	SY	1125		
17	SEED	SY	1415		

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPB REGISTRATION NO. 264

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**FM 707
SW3P
SITE PLAN**

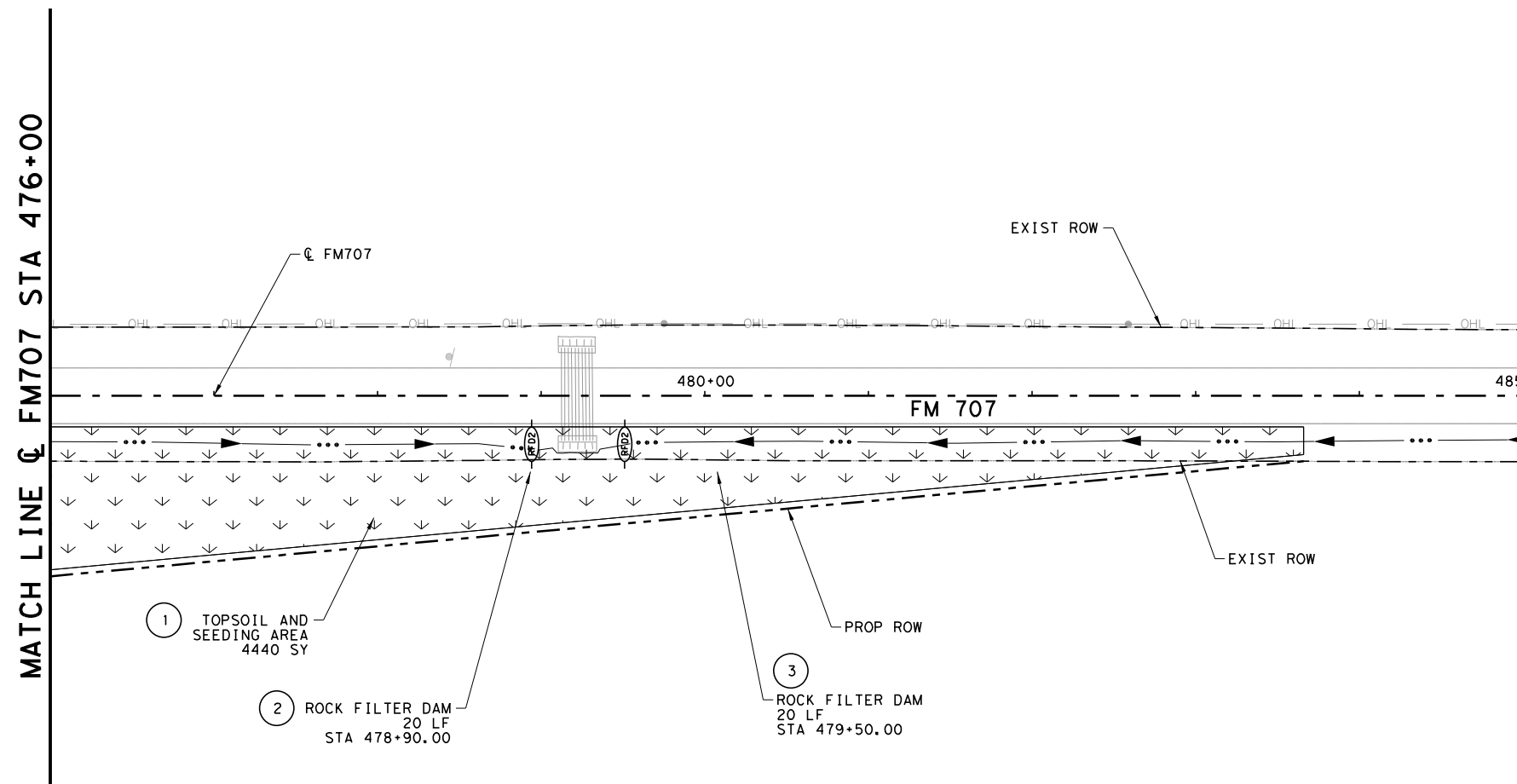
SCALE: 1" = 100' SHEET 3 OF 4

DS:	CG	CK:	DH	0484	01	025	FM 707
DW:	CG	CK:	AT	ABL	JONES		163



LEGEND

- SF— TEMPORARY SEDIMENT CONTROL FENCE (SCF)
- (CL-SS)— EROSION CONTROL LOG ON SLOPES (CL-SS)
- (CL-D)— EROSION CONTROL LOG IN DITCHES (CL-D)
- (RFD2)— ROCK FILTER DAM (TYP 2) (RFD2)
- [Vertical lines symbol] CONSTRUCTION EXIT
- [Dotted pattern symbol] SEEDING AREA
- [Cross-hatch pattern symbol] SOIL RETENTION BLANKET (SRB)
- ...— DITCH



NOTES:

1. LOCATIONS OF EROSION CONTROL DEVICES, INCLUDING CONSTRUCTION ENTRANCES, CONSTRUCTION EXITS, AND CONCRETE WASHOUTS, ARE APPROXIMATIONS. ACTUAL LOCATIONS TO BE DETERMINED IN THE FIELD BY THE ENGINEER.
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3. EROSION CONTROL DEVICE INSTALLATION, MAINTENANCE, AND REMOVAL SHALL BE IN ACCORDANCE WITH TXDOT STANDARDS FOR EROSION CONTROL.
4. SEE DAILY WORK REPORTS FOR INITIAL STABILIZATION TIME FRAMES.
5. TOPSOIL TO BE STOCKPILED IN WINDROWS ALONG ROW. AFTER REMOVAL OF TEMP DETOUR REPLACE DISTURBED TOPSOIL PER ITEM 160 6001.
6. THIS SHEET IS PROVIDED AS PART OF THE SW3P PERMIT AND WILL BE USED BY DEPARTMENT PERSONNEL DURING CONSTRUCTION ACTIVITIES TO DOCUMENT THE INSTALLATION AND MAINTENANCE OF ANY BMP'S USED ON THIS PROJECT.



NO.	TYPE	BMP		DATE	
		UNIT	QNTY	PLACED	REMOVED
1	SEED	SY	4440		
2	RFD2	LF	20		
3	RFD2	LF	20		

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

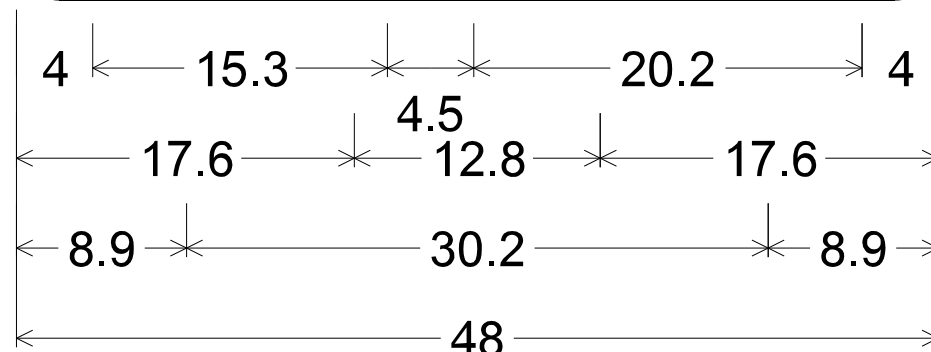
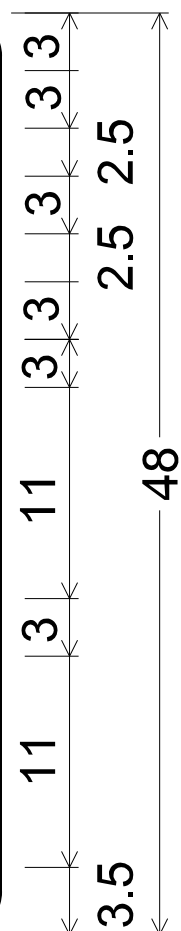
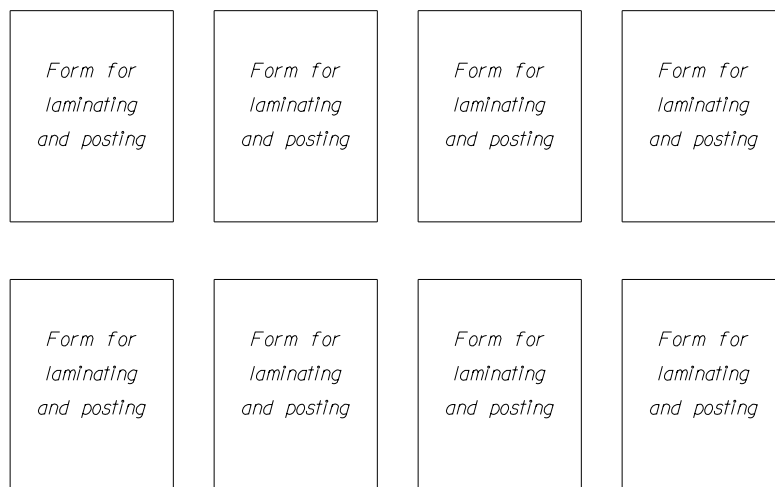
Texas Department of Transportation
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**FM 707
SW3P
SITE PLAN**

SCALE: 1" = 100' SHEET 4 OF 4

DS:	CG	CK:	DH	0484	01	025	FM 707
DW:	CG	CK:	AT	ABL	JONES		164

Tx DOT PROJECT SW3P INFORMATION



2.3" Radius, 0.9" Border, White on Blue;
 [TxDOT PROJECT] E Mod;
 [SW3P] E Mod;
 [INFORMATION] E Mod;

NOTE:

The Forms needed for laminating and posting to the SW3P Notification Board will be provided by the Engineer. The total number of forms may vary. Notification Boards are to be constructed from Plywood, 1/2 or 5/8-inch thick, in accordance with TxDOT Departmental Material Specification (DMS)-7100. 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 sign will be placed at a location within the right-of-way but outside the clear zone as directed by the Engineer. This work will not be paid for directly, but will be considered subsidiary to other items.



Aaron Demaray Tainter
 11/2/2021

**SW3P NOTIFICATION
BOARD DETAIL**

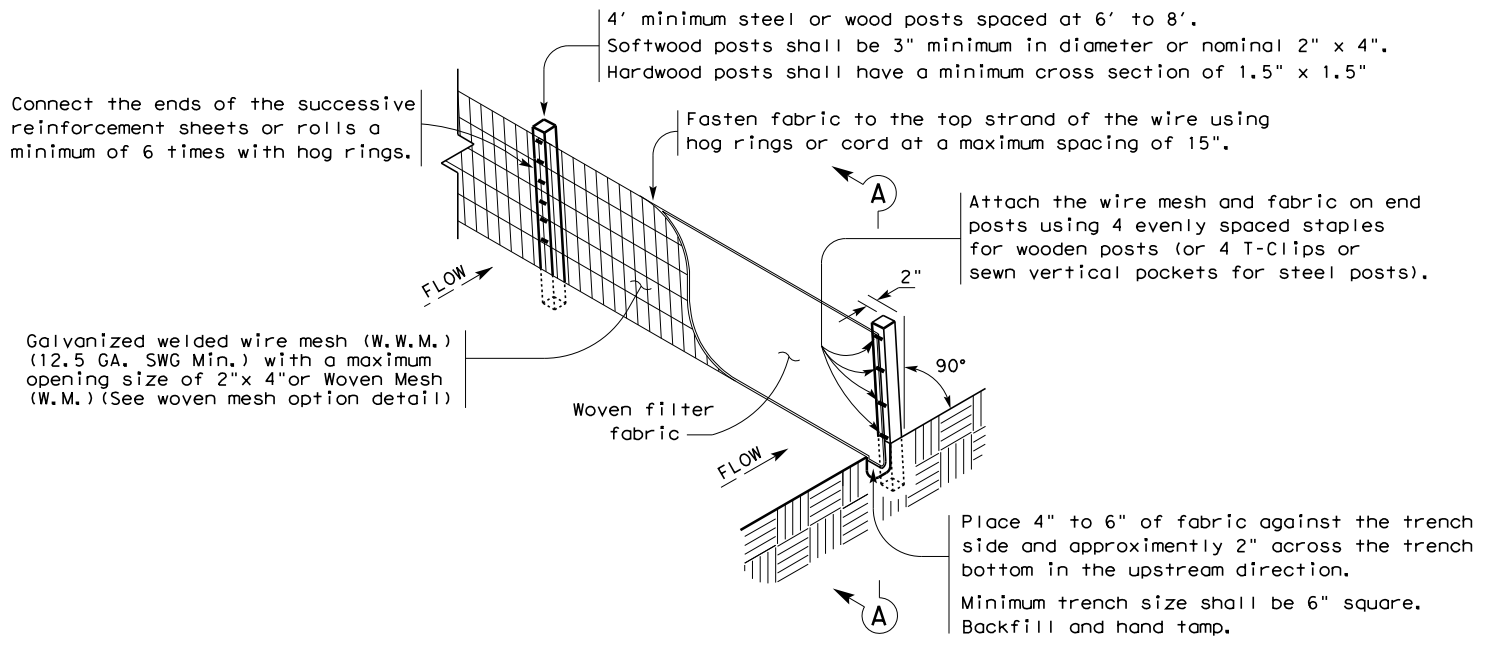


NO SCALE SHEET 1 OF 1

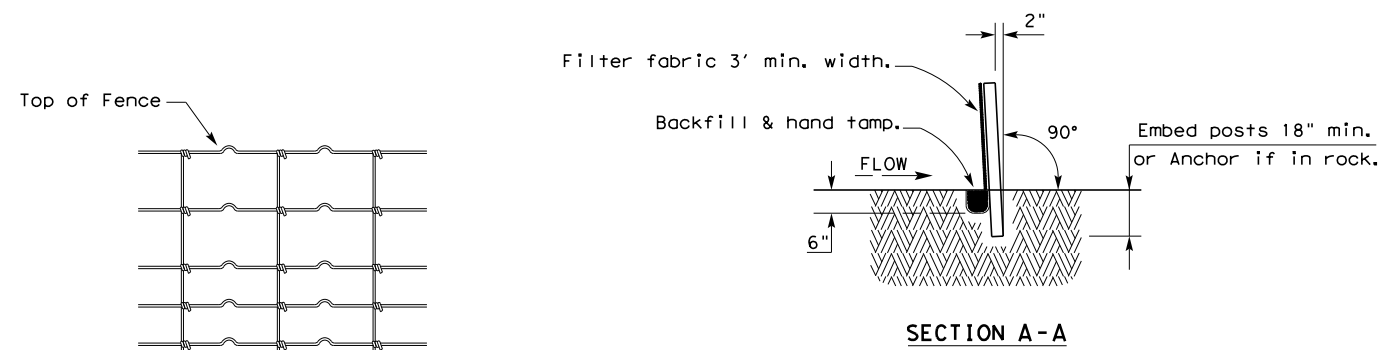
FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 707
STATE	COUNTY		SHEET NO.
TEXAS	JONES		173
DISTRICT	CONTROL	SECTION	
ABL	0484	01	025

DISCLAIMER: 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. The use of this standard is assumed to be the responsibility of the user. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 1/28/2016
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TEMPORARY SEDIMENT CONTROL FENCE



HINGE JOINT KNOT WOVEN MESH (OPTION) DETAIL

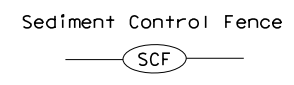
Galvanized hinge joint knot woven mesh (12.5 GA. SWG Min.) requires a minimum of five horizontal wires spaced at a maximum of 12 inches apart and all vertical wires spaced at a maximum of 12 inches apart.

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.

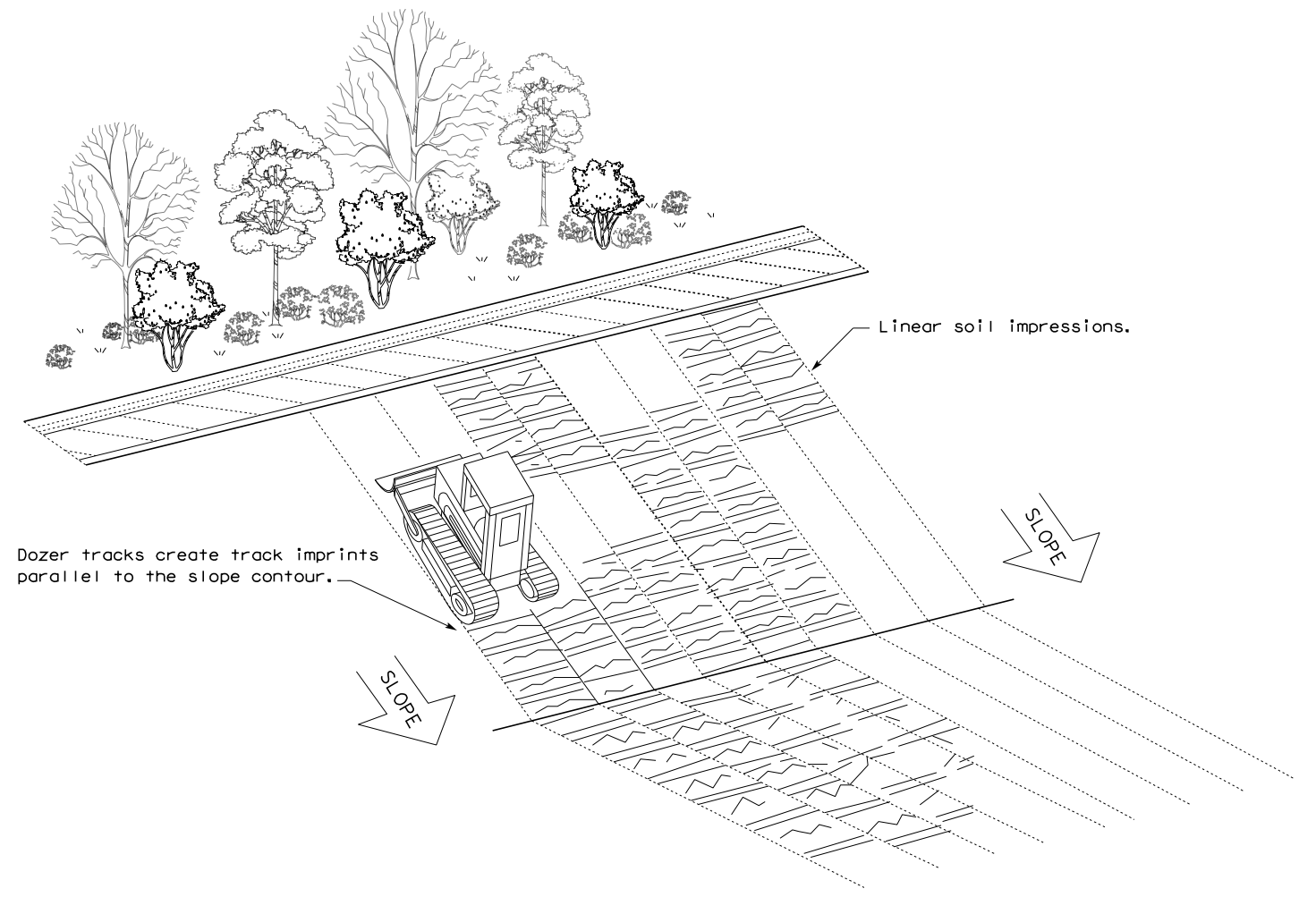
Sediment control fence should be sized to filter a maximum flow through rate of 100 GPM/FT². Sediment control fence is not recommended to control erosion from a drainage area larger than 2 acres.

LEGEND



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 continuous linear track impressions where the minimum 12" length impressions are perpendicular to the slope or direction of water flow.

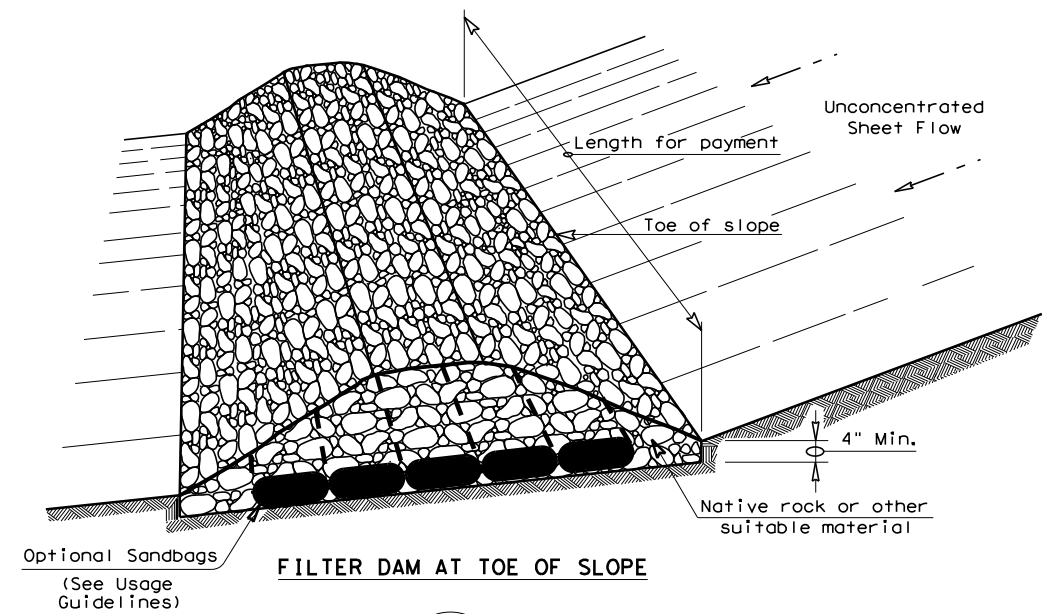


VERTICAL TRACKING

				Design Division Standard	
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES FENCE & VERTICAL TRACKING					
EC(1) - 16					
FILE: ec116	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS	
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0484	01	025	FM 707	
	DIST	COUNTY		SHEET NO.	
	ABL	JONES		174	

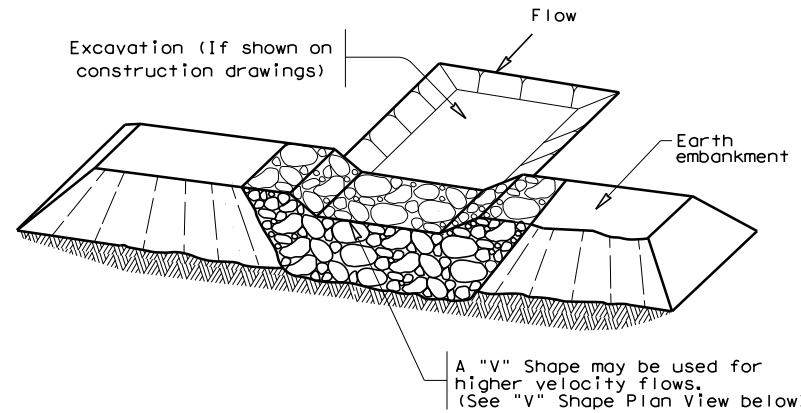
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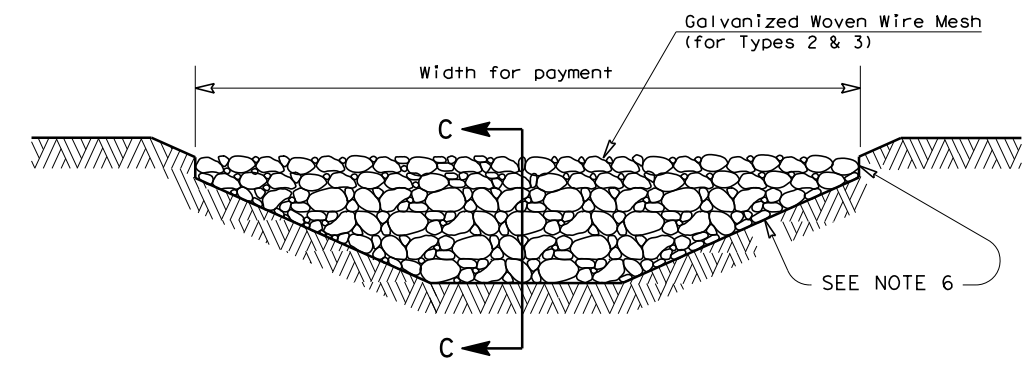
FILTER DAM AT TOE OF SLOPE

(RFD1)



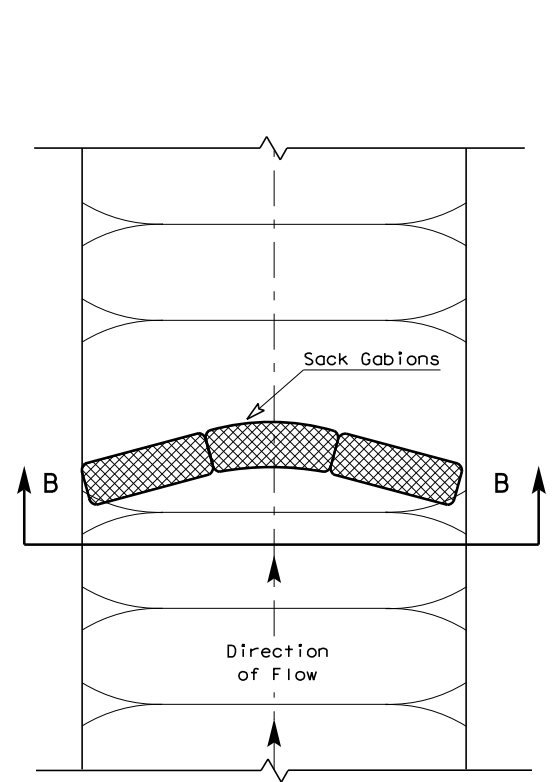
FILTER DAM AT SEDIMENT TRAP

(RFD1) OR (RFD2)

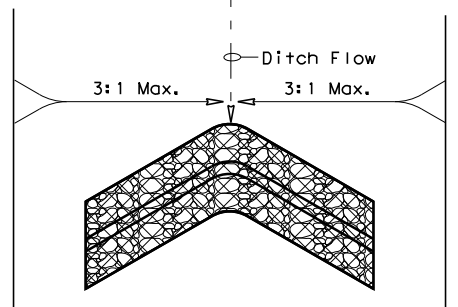


FILTER DAM AT CHANNEL SECTIONS

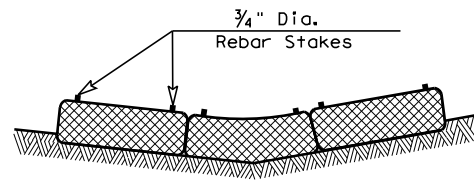
(RFD1) OR (RFD2) OR (RFD3)



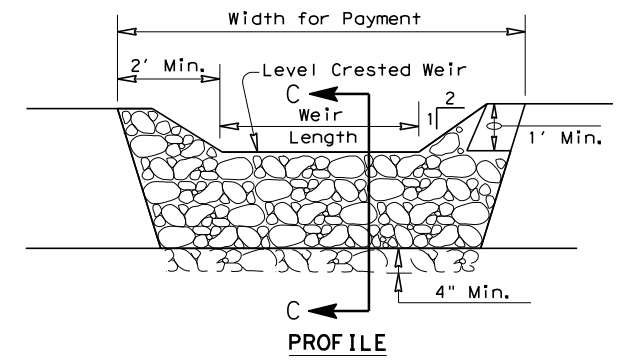
PLAN VIEW



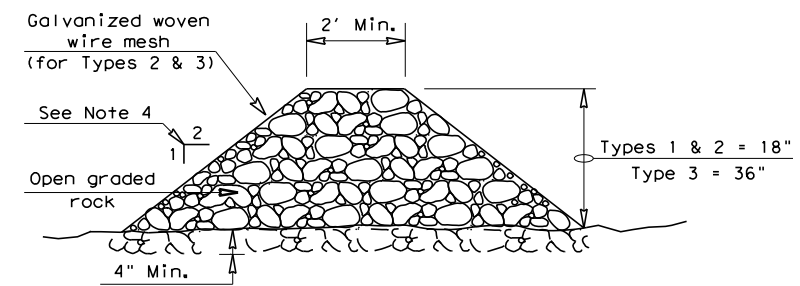
"V" SHAPE PLAN VIEW



SECTION B-B



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/FT² 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 (approximately 8 Ft/Sec or more) in which aggregate wash out may occur. Sandbags may be used at the embedded foundation (4" deep min.) for better filtering efficiency of low flows if called for on the plans or directed by the Engineer.

Type 2 (18" high with wire mesh) (3" to 6" aggregate): Type 2 may be used in ditches and at dike or swale outlets.

Type 3 (36" high with wire mesh) (4" to 8" aggregate): Type 3 may be used in stream flow and should be secured to the stream bed.

Type 4 (Sack gabions) (3" to 6" aggregate): Type 4 May be used in ditches and smaller channels to form an erosion control dam.

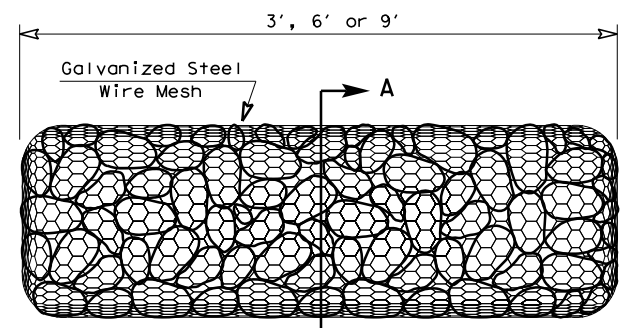
Type 5: Provide rock filter dams as shown on plans.

GENERAL NOTES

1. If shown on the plans or directed by the Engineer, filter dams should be placed near the toe of slopes where erosion is anticipated, upstream and/or downstream at drainage structures, and in roadway ditches and channels to collect sediment.
2. Materials (aggregate, wire mesh, sandbags, etc.) shall be as indicated by the specification for "Rock Filter Dams for Erosion and Sedimentation Control".
3. The rock filter dam dimensions shall be as indicated on the SW3P plans.
4. Side slopes should be 2:1 or flatter. Dams within the safety zone shall have sideslopes of 6:1 or flatter.
5. Maintain a minimum of 1' between top of rock filter dam weir and top of embankment for filter dams at sediment traps.
6. Filter dams should be embedded a minimum of 4" into existing ground.
7. The sediment trap for ponding of sediment laden runoff shall be of the dimensions shown on the plans.
8. Rock filter dam types 2 & 3 shall be secured with 20 gauge galvanized woven wire mesh with 1" diameter hexagonal openings. The aggregate shall be placed on the mesh to the height & slopes specified. The mesh shall be folded at the upstream side over the aggregate and tightly secured to itself on the downstream side using wire ties or hog rings. For in stream use, the mesh should be secured or staked to the stream bed prior to aggregate placement.
9. Sack Gabions should be staked down with 3/4" dia. rebar stakes, and have a double-twisted hexagonal weave with a nominal mesh opening of 2 1/2" x 3 1/4".
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.

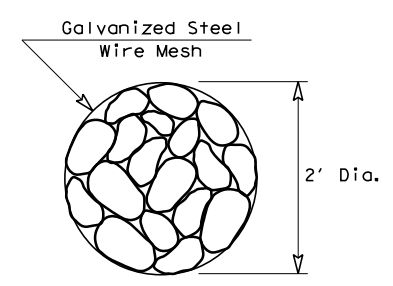
PLAN SHEET LEGEND

- Type 1 Rock Filter Dam (RFD1)
- Type 2 Rock Filter Dam (RFD2)
- Type 3 Rock Filter Dam (RFD3)
- Type 4 Rock Filter Dam (RFD4)



TYPE 4 (SACK GABIONS)

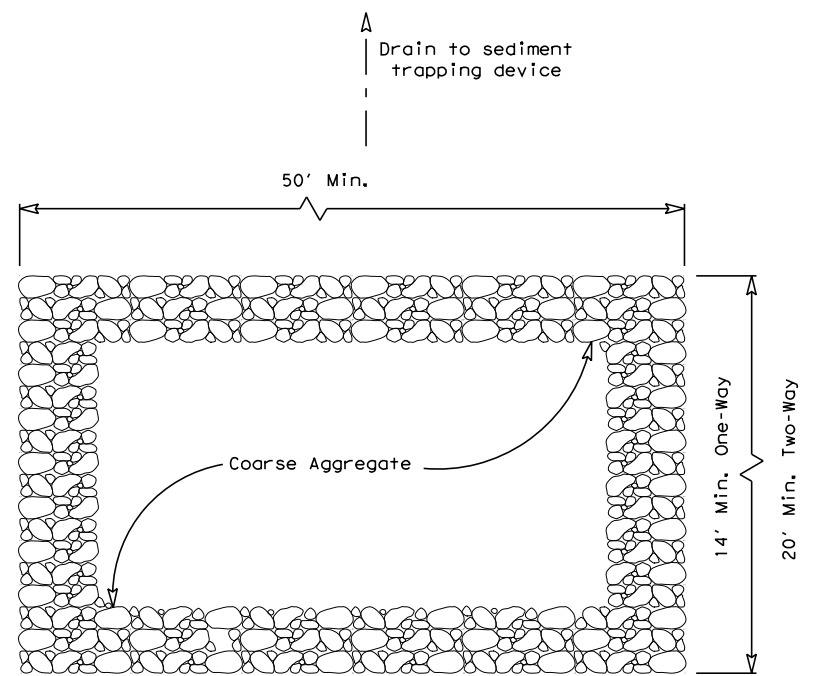
(RFD4)



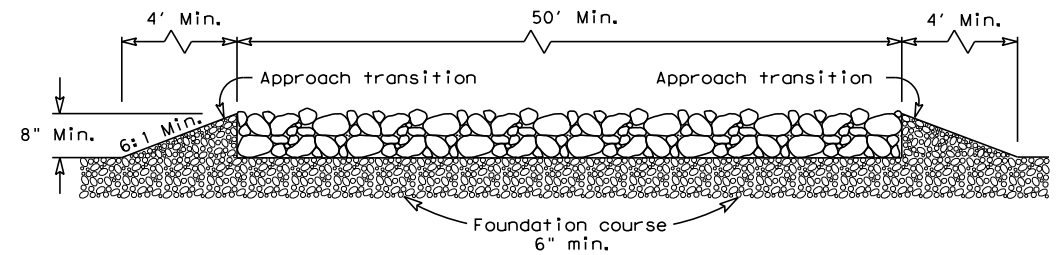
SECTION A-A

		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
© TxDOT: JULY 2016	CONT	SECT	JOB
REVISIONS	0484	01	025
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PLAN VIEW

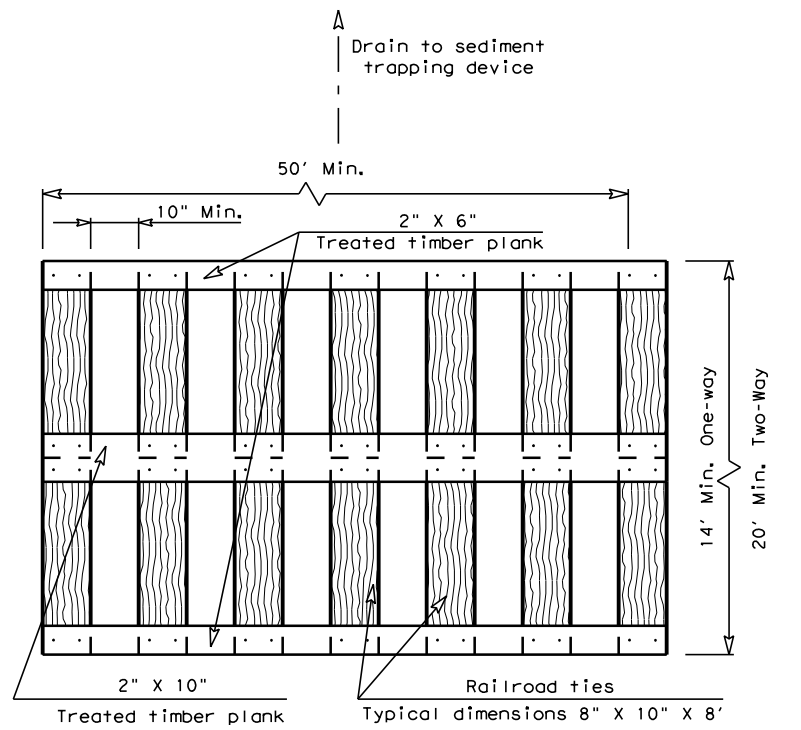


ELEVATION VIEW

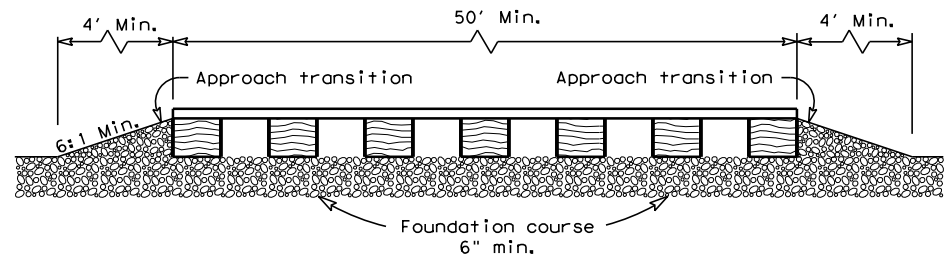
CONSTRUCTION EXIT (TYPE 1)
ROCK CONSTRUCTION (LONG TERM)

GENERAL NOTES (TYPE 1)

- The length of the type 1 construction exit shall be as indicated on the plans, but not less than 50'.
- The coarse aggregate should be open graded with a size of 4" to 8".
- The approach transitions should be no steeper than 6:1 and constructed as directed by the Engineer.
- The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other materials approved by the Engineer.
- The construction exit shall be graded to allow drainage to a sediment trapping device.
- The guidelines shown hereon are suggestions only and may be modified by the Engineer.
- Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.



PLAN VIEW

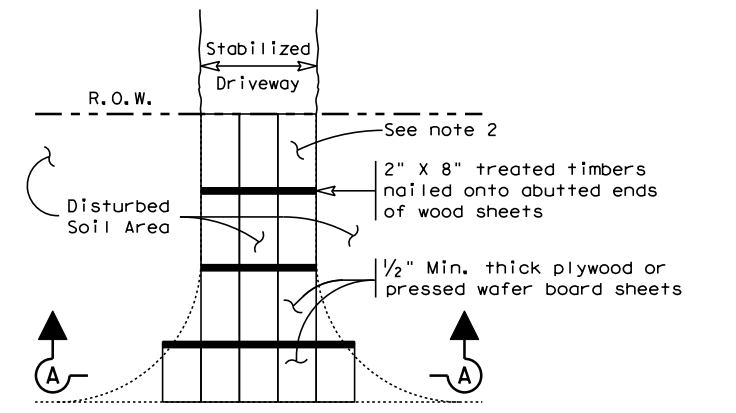


ELEVATION VIEW

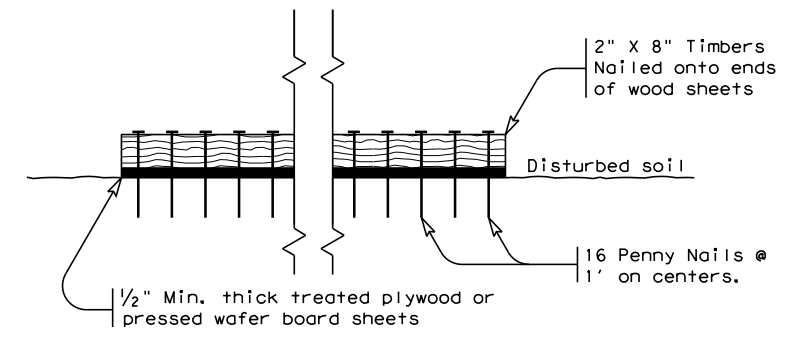
CONSTRUCTION EXIT (TYPE 2)
TIMBER CONSTRUCTION (LONG TERM)

GENERAL NOTES (TYPE 2)

- The length of the type 2 construction exit shall be as indicated on the plans, but not less than 50'.
- The treated timber planks shall be attached to the railroad ties with 1/2" x 6" min. lag bolts. Other fasteners may be used as approved by the Engineer.
- The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
- The approach transitions shall be no steeper than 6:1 and constructed as directed by the Engineer.
- The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other material as approved by the Engineer.
- The construction exit should be graded to allow drainage to a sediment trapping device.
- The guidelines shown hereon are suggestions only and may be modified by the Engineer.
- Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.



PLAN VIEW



SECTION A-A
CONSTRUCTION EXIT (TYPE 3)
SHORT TERM

GENERAL NOTES (TYPE 3)

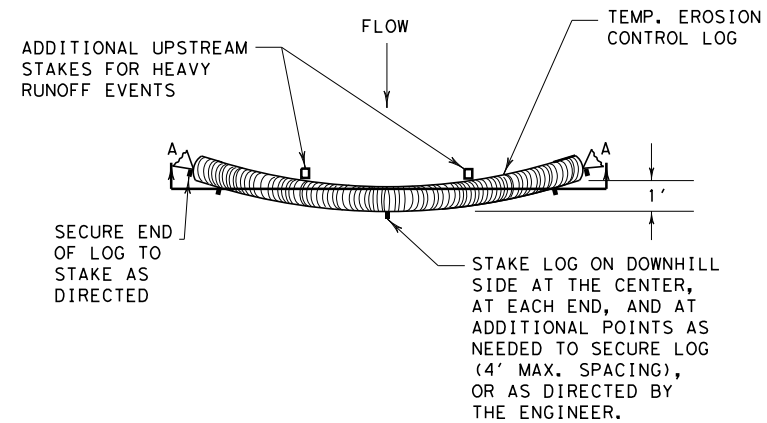
- The length of the type 3 construction exit shall be as shown on the plans, or as directed by the Engineer.
- The type 3 construction exit may be constructed from open graded crushed stone with a size of two to four inches spread a min. of 4" thick to the limits shown on the plans.
- The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
- The guidelines shown hereon are suggestions only and may be modified by the Engineer.



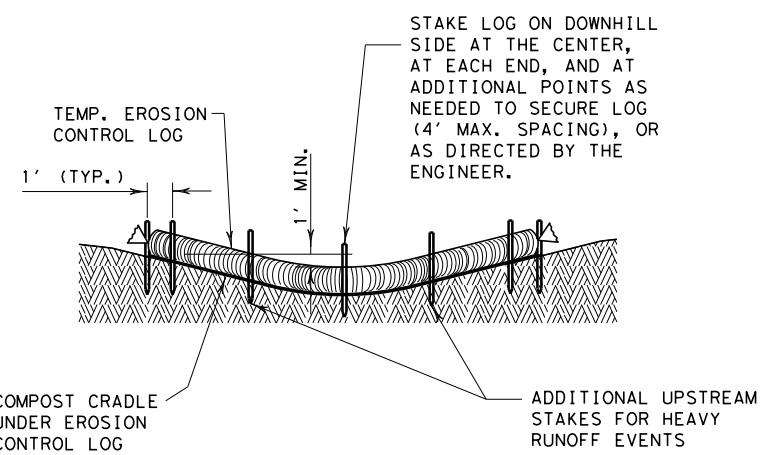
**TEMPORARY EROSION,
 SEDIMENT AND WATER
 POLLUTION CONTROL MEASURES
 CONSTRUCTION EXITS
 EC(3)-16**

FILE: ec316	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
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	ABL	JONES	176	

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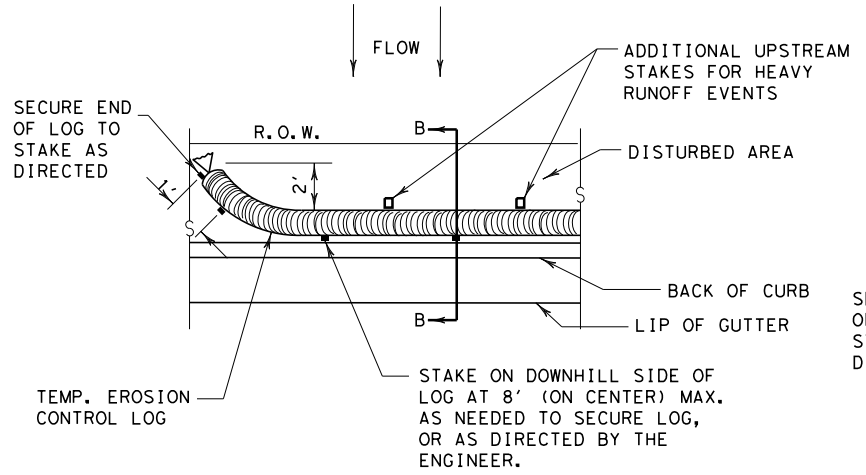
PLAN VIEW



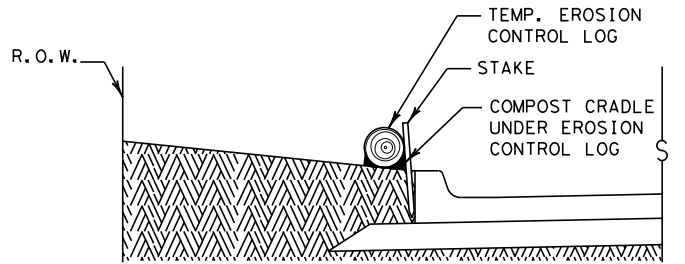
SECTION A-A

EROSION CONTROL LOG DAM

CL-D



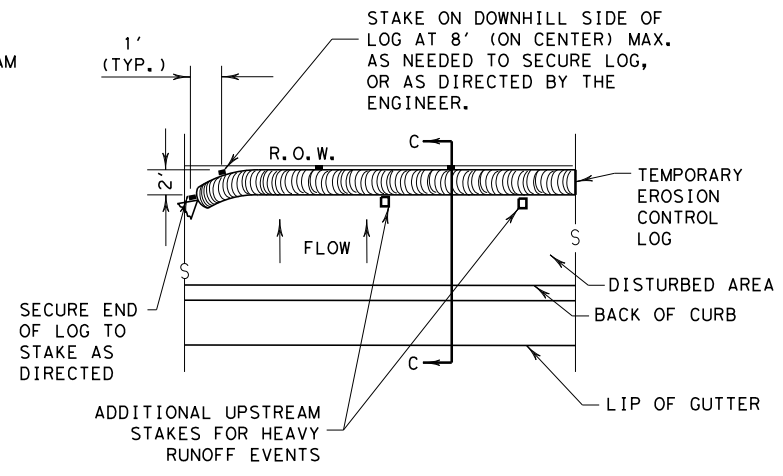
PLAN VIEW



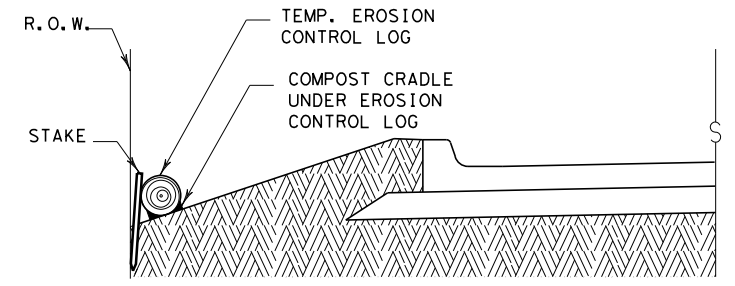
SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

CL-BOC



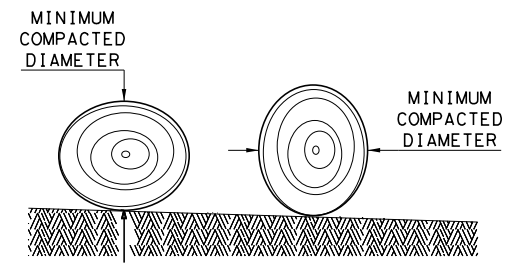
PLAN VIEW



SECTION C-C

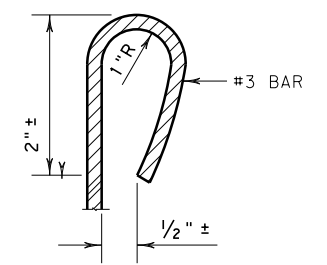
EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

CL-ROW



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS

- 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



REBAR STAKE DETAIL

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.

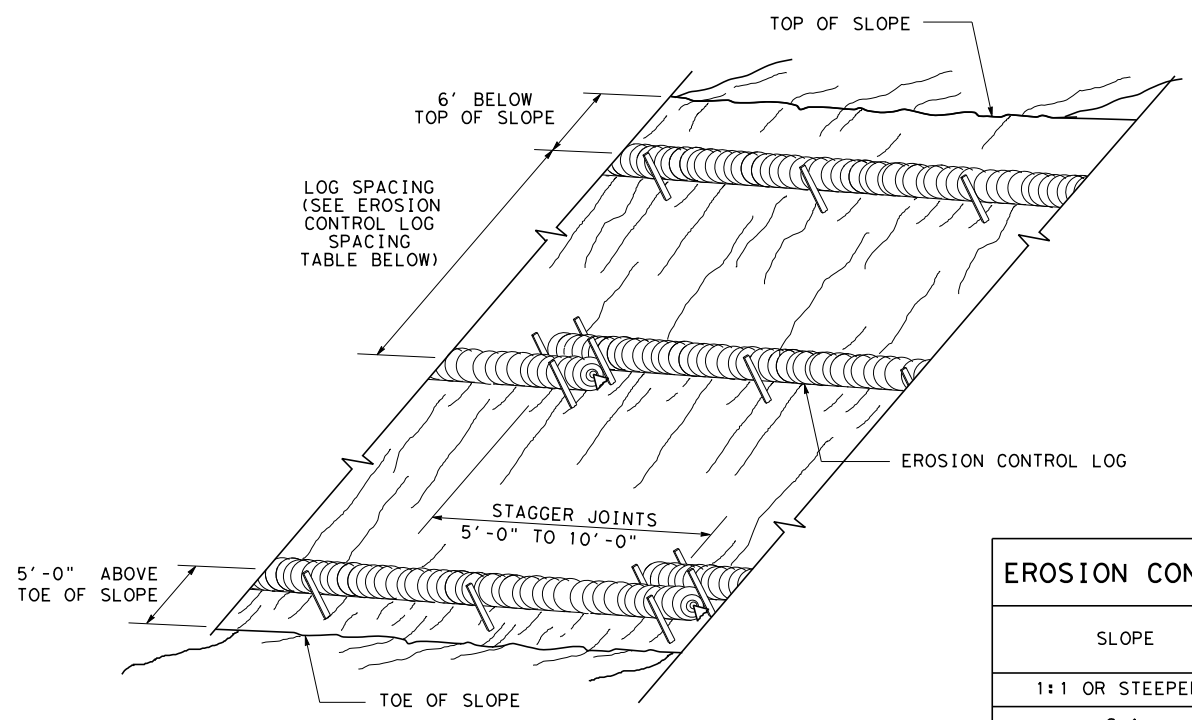
GENERAL NOTES:

1. EROSION CONTROL LOGS SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'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.

SHEET 1 OF 3

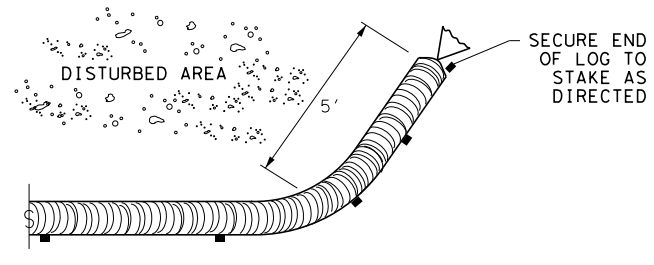
		Design Division Standard	
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES EROSION CONTROL LOG EC (9) - 16			
FILE: ec916	DN: TxDOT	CK: KM	DW: LS/PT
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**EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING**

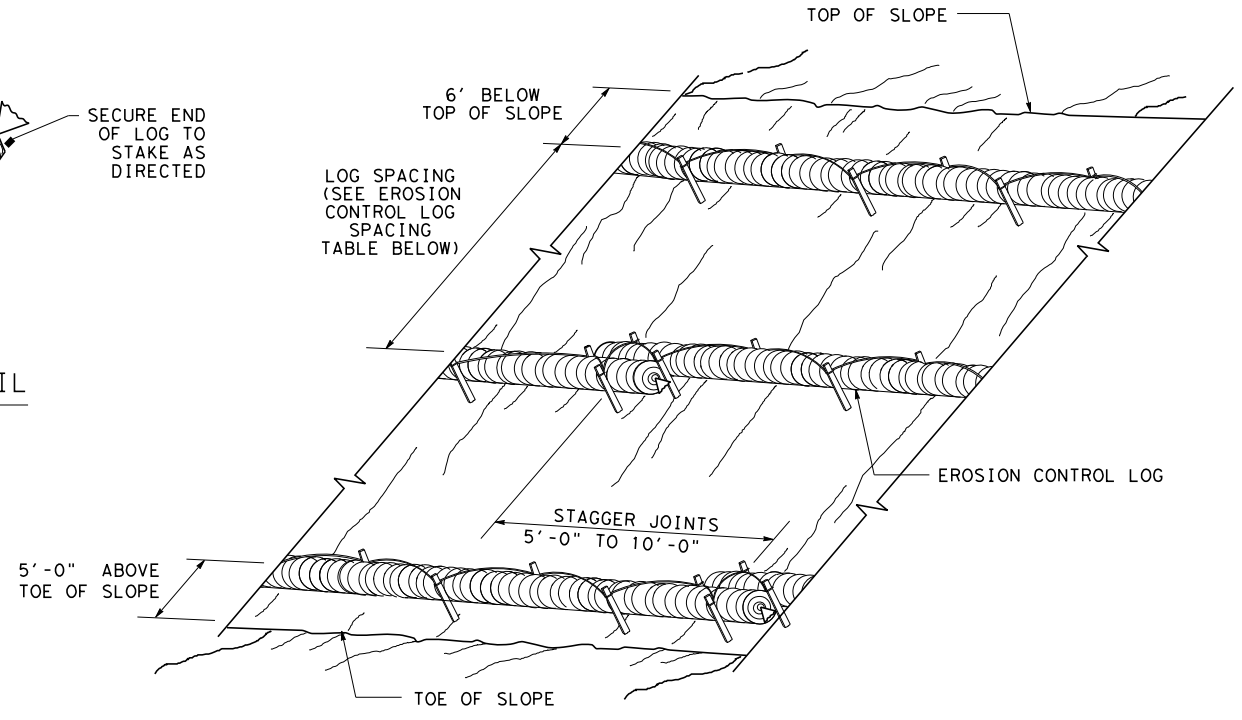
CL-SST



END SECTION RAP DETAIL

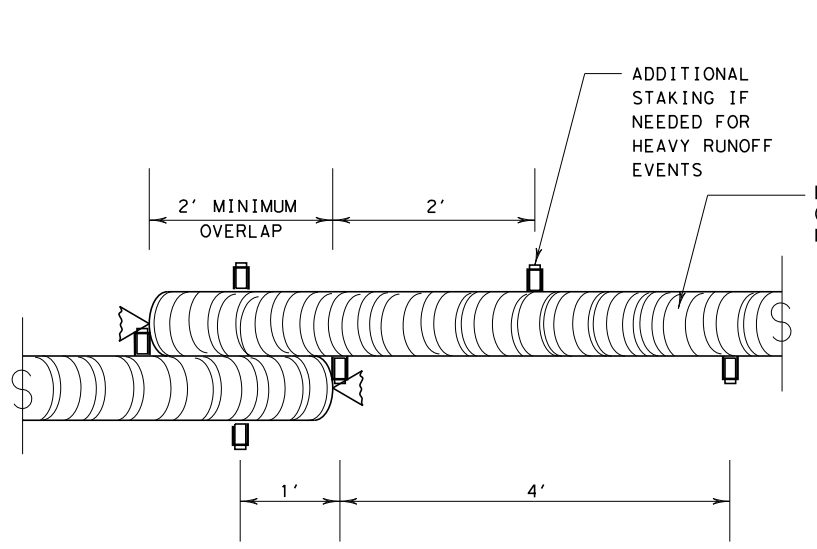
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5'	10'	15'	20'
2:1	10'	20'	30'	40'
3:1	15'	30'	45'	60'
4:1 OR FLATTER	20'	40'	60'	80'

* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
 SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;
 HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART



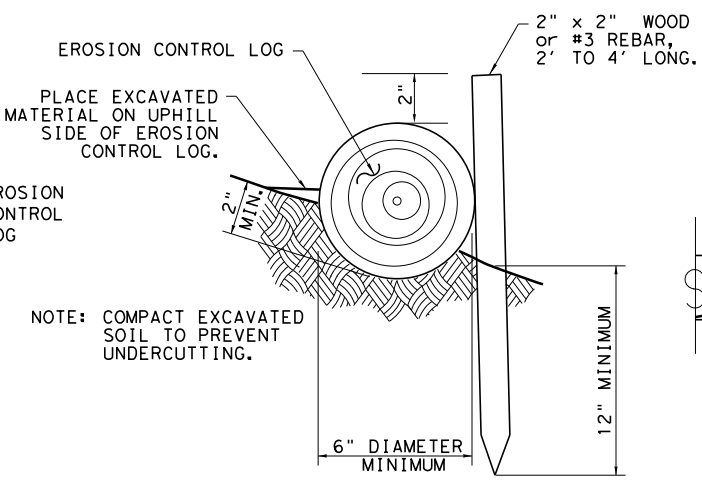
**EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING**

CL-SSL

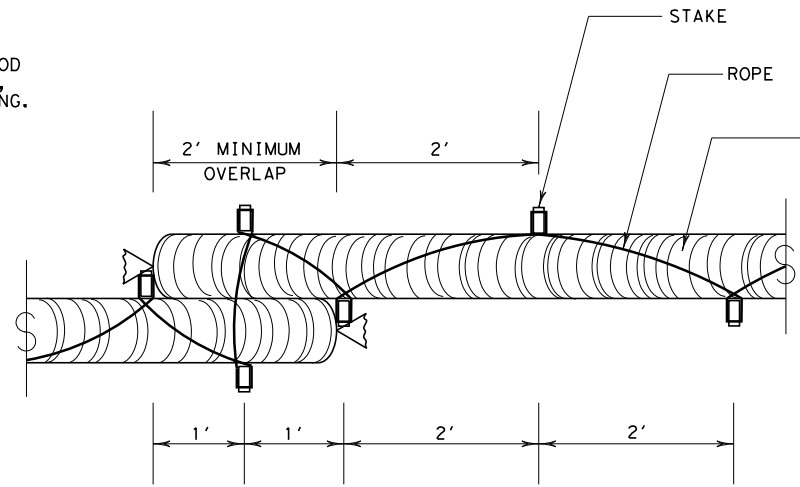


STAKE AND TRENCHING ANCHORING DETAIL

CL-SST

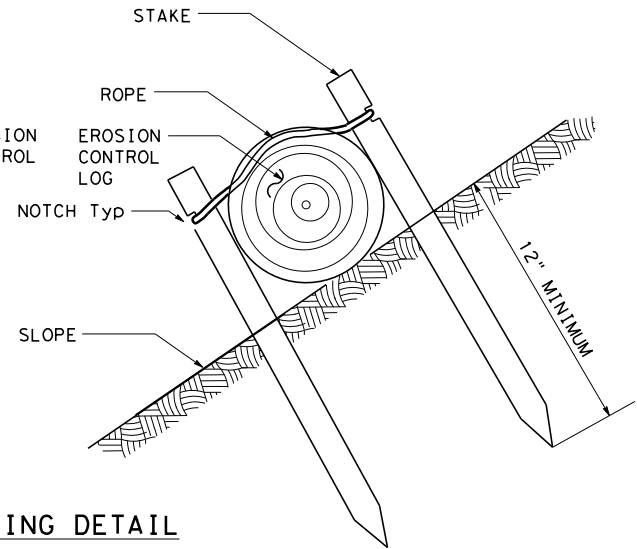


NOTE: COMPACT EXCAVATED SOIL TO PREVENT UNDERCUTTING.



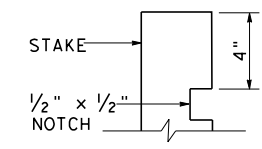
STAKE AND LASHING ANCHORING DETAIL

CL-SSL



LOG DIAMETER	DEPTH
6"	2"
8"	3"
12"	4"
18"	5"

TRENCH DEPTH TABLE



STAKE NOTCH DETAIL

SHEET 2 OF 3

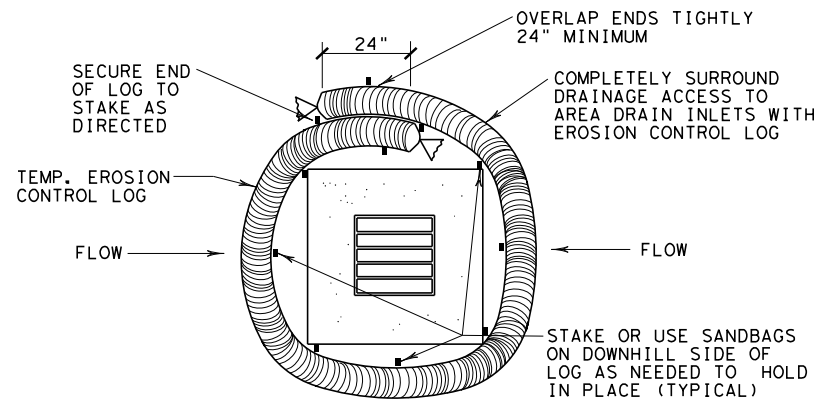
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TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES EROSION CONTROL LOG EC (9) - 16			
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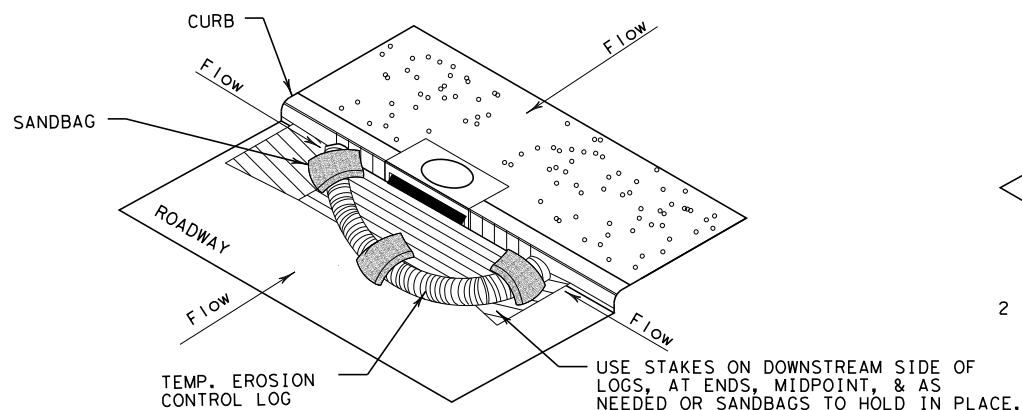
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Alex.Massara



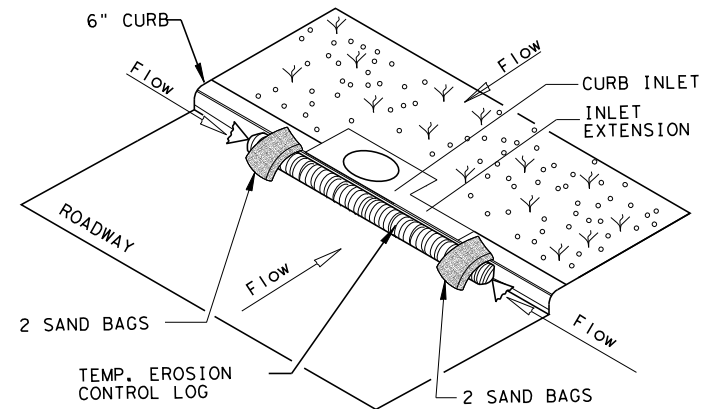
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

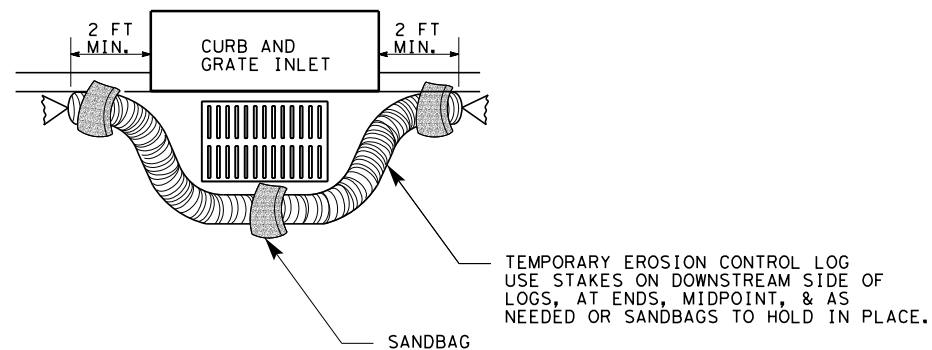
CL-CI



EROSION CONTROL LOG AT CURB INLET

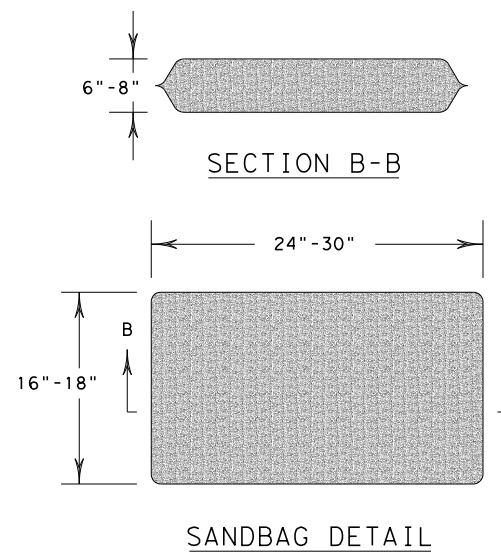
CL-CI

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



SHEET 3 OF 3



**TEMPORARY EROSION,
SEDIMENT AND WATER
POLLUTION CONTROL MEASURES
EROSION CONTROL LOG
EC (9) - 16**

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	ABL	JONES	179	