FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
6	BR 2021 (063)		CR 347
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	SAT	WILSON	1
CONTROL	SECTION	JOB	
0915	14	047	

SEE INDEX OF SHEETS ON SHEET 2

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

FEDERAL AID PROJECT

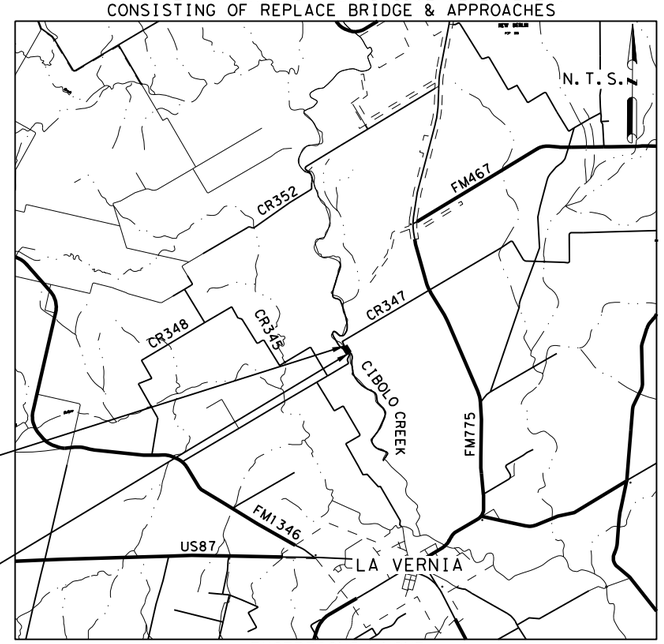
WILSON COUNTY
CR 347

FUNCTIONAL CLASSIFICATION= LOCAL ROAD
DESIGN SPEED= N/A MEETS OR IMPROVE EXISTING CONDITIONS
AREA OF DISTURBED SOIL= 0.28 ACRES
ADT: (2022)= 200
ADT: (2042)= 300

PROJECT NO.: BR 2021 (063)
CSJ: 0915-14-047
COUNTY: WILSON
LIMITS: CR 347 @ CIBOLO CREEK
ROADWAY LENGTH: 300 FT = 0.057 MI.
BRIDGE LENGTH: 45 FT = 0.008 MI.

TOTAL LENGTH: 345 FT = 0.065 MI.

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



END PROJECT
END CSJ: 0915-14-047
STA 12+95.00

BEGIN PROJECT
BEGIN CSJ: 0915-14-047
STA 9+50.00

EXCEPTIONS: NONE
EQUATIONS: NONE
RR X-ING'S: NONE

FINAL PLANS

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

FINAL PLANS STATEMENT:

THE CONSTRUCTION WORK WAS PERFORMED
IN ACCORDANCE WITH THE PLANS.

P.E. _____
AREA ENGINEER DATE

TEXAS DEPARTMENT OF TRANSPORTATION

Texas Department of Transportation

COUNTY: WILSON PROJECT NO. BR 2021 (063)
HWY. NO. CR 347 LETTING DATE:
DATE ACCEPTED:

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)

RECOMMENDED FOR LETTING 4/27/2021
DocuSigned by: Lizette Colvert, P.E.
DESIGN SUPPORT DIRECTOR

RECOMMENDED FOR LETTING 4/27/2021
DocuSigned by: Gregg Granato, P.E.
DESIGN ENGINEER

RECOMMENDED FOR LETTING 4/27/2021
DocuSigned by: Clayton Ripps, P.E.
DIRECTOR OF TRANSPORTATION PLANNING AND DEVELOPMENT

APPROVED FOR LETTING 4/27/2021
DocuSigned by: Gina Gallegos, P.E.
DISTRICT ENGINEER

I. GENERAL

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1	TITLE SHEET
2	INDEX OF SHEETS
3	PROJECT LAYOUT
4	EXISTING TYPICAL SECTION
5	PROPOSED TYPICAL SECTIONS
6, 6A -- 6D	GENERAL NOTES
7 -- 7A	ESTIMATE AND QUANTITY
8 -- 9	SUMMARY OF QUANTITIES
10 -- 11	SUMMARY OF SMALL SIGNS

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13	TRAFFIC CONTROL PLAN (ADVANCE WARNING LAYOUT)
14	TRAFFIC CONTROL PLAN (DETOUR ROUTE)

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29	HORIZONTAL AND VERTICAL CONTROL
30	HORIZONTAL ALIGNMENT DATA
31	REMOVAL LAYOUT
32	CUT AND FILL IN FLOODPLAIN
33	PLAN AND PROFILE
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46	*SGT(15)31-20
47	*TRF
47A	*TREE PROTECTION (SAT DIST STND)
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58	ESTIMATED QUANTITES
59	BRIDGE GEOMETRY
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EROSION CONTROL STANDARDS

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STATE OF TEXAS — TREY NEAL — 106194 — LICENSED PROFESSIONAL ENGINEER

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

______________, P.E. 4/29/2021

TREY A. NEAL, P.E.

STATE OF TEXAS — RYAN C. LAURENT — 131995 — LICENSED PROFESSIONAL ENGINEER

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

______________, P.E. 4/29/2021

RYAN C. LAURENT, P.E.

Kimley»Horn F-928

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CR 347 @ CIBOLO CREEK

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0915	14	047	

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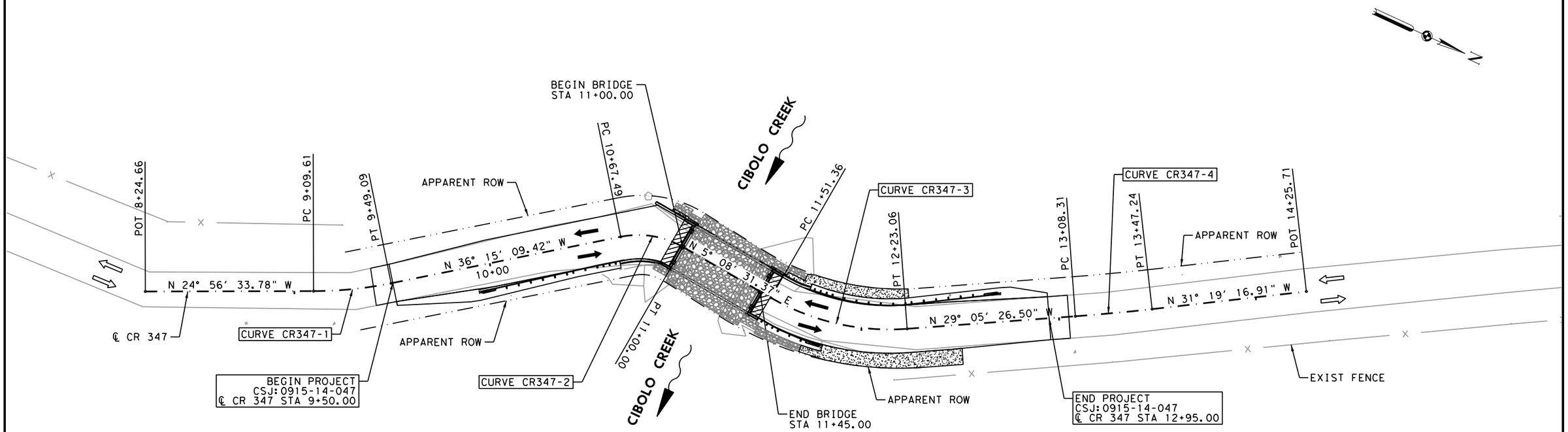

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4/7/2021

STATE OF TEXAS
JORDAN S. KIEWIT
131234
LICENSED
PROFESSIONAL ENGINEER

0' 25' 50' HORZ

SCALE

Kimley»Horn F-928

Texas Department of Transportation

CR 347 @ CIBOLO CREEK

PROJECT LAYOUT

SHEET 1 OF 1

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	BR 2021 (063)	CR 347

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TEXAS	SAT	WILSON	3
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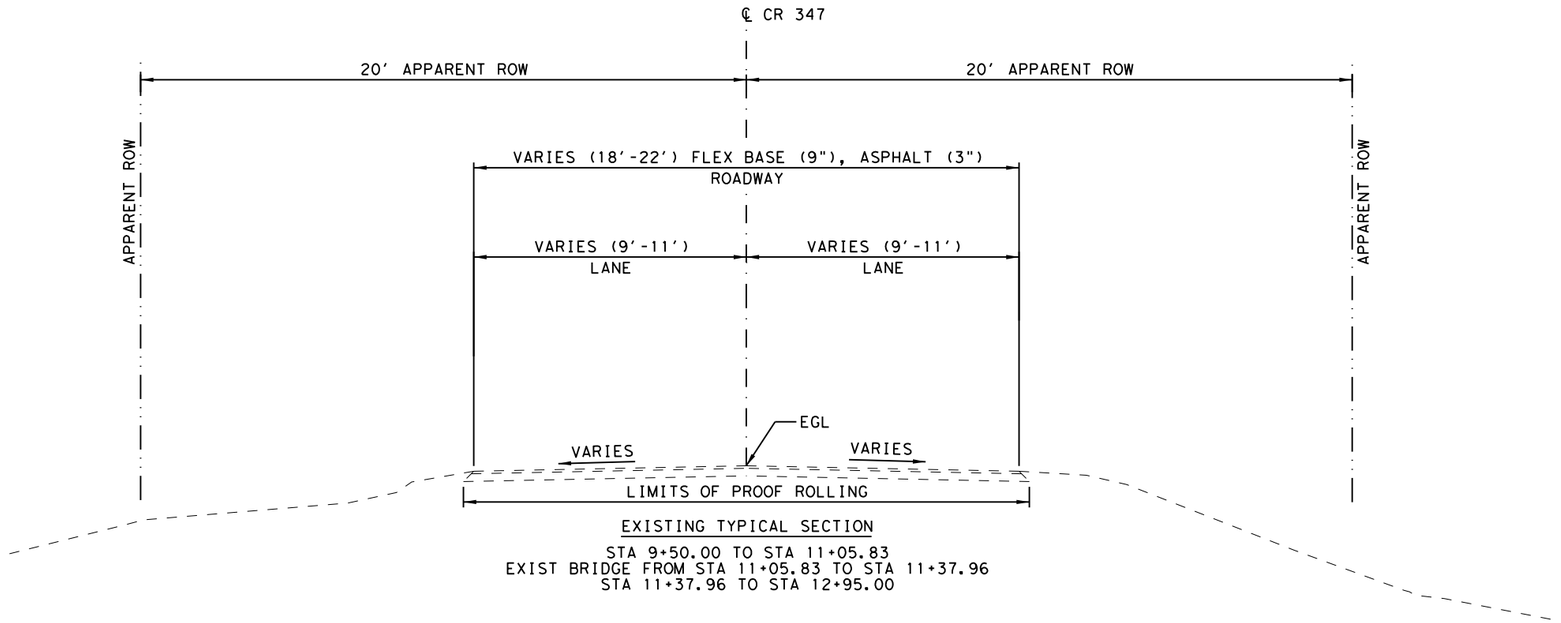

EXISTING TYPICAL SECTION

STA 9+50.00 TO STA 11+05.83
EXIST BRIDGE FROM STA 11+05.83 TO STA 11+37.96
STA 11+37.96 TO STA 12+95.00

NOTES:

1. PROOF ROLL EXISTING ROAD BED TO REMAIN AFTER REMOVING STABILIZED BASE AND ASPHALT PAVEMENT.

4/21/2021

STATE OF TEXAS
JORDAN S. KIEWIT
131234
LICENSED
PROFESSIONAL ENGINEER

0' 2.5' 5' HORZ

Kimley»Horn F-928

Texas Department of Transportation

CR 347 @ CIBOLO CREEK

EXISTING TYPICAL SECTION

SHEET 1 OF 1

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
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TEXAS	SAT	WILSON	4
CONT.	SECT.	JOB	
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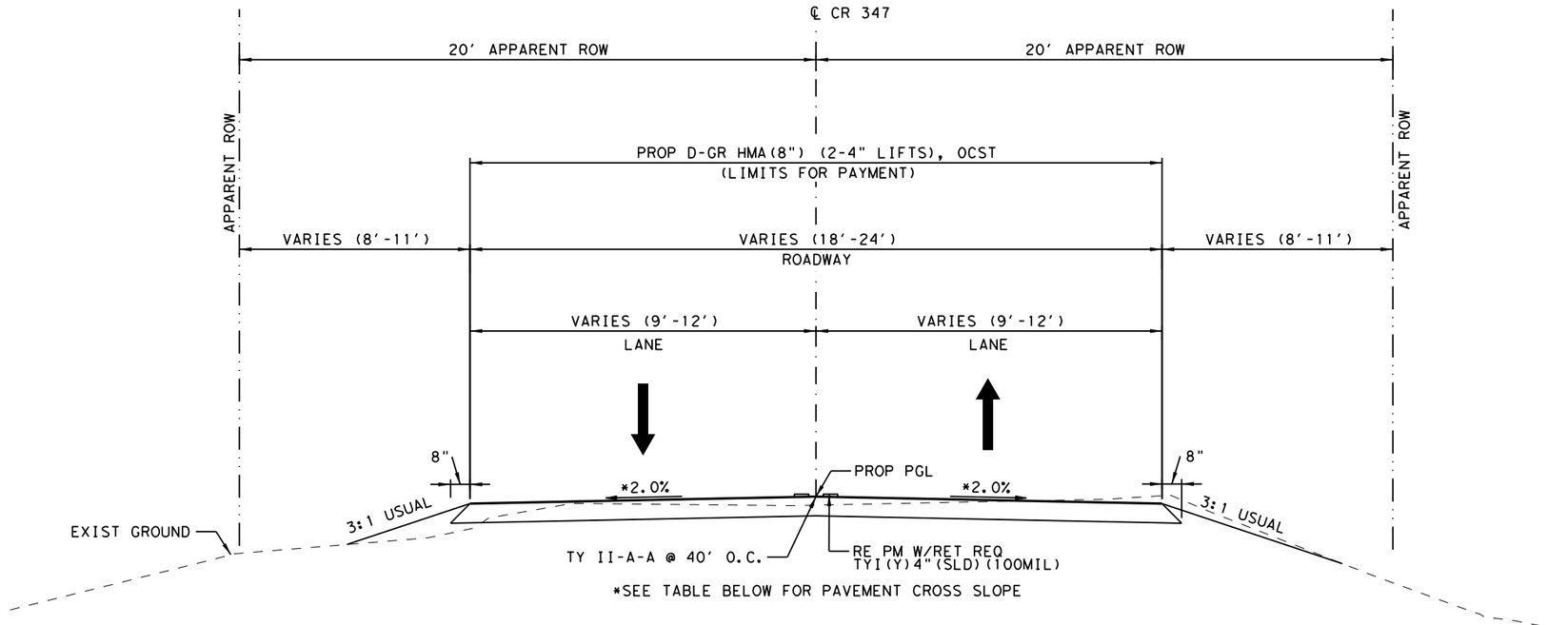
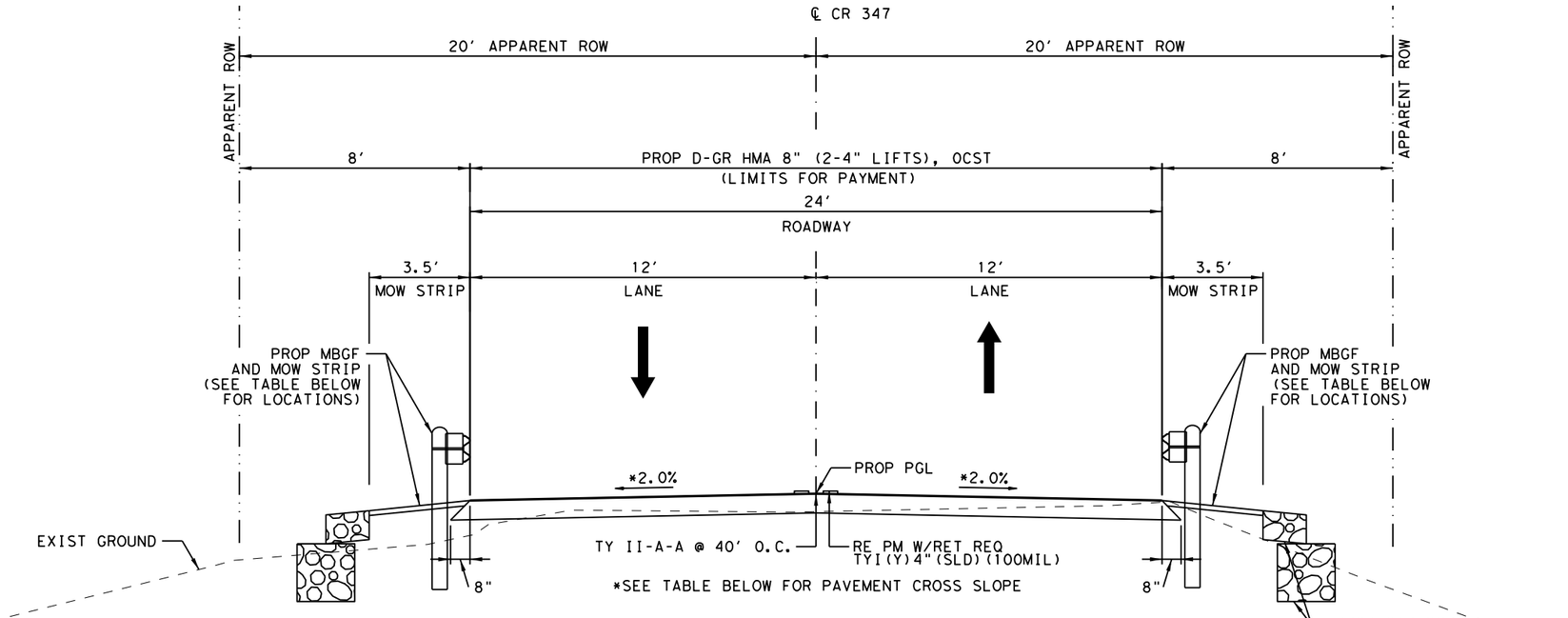


*SEE TABLE BELOW FOR PAVEMENT CROSS SLOPE

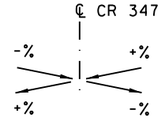
PROPOSED TYPICAL SECTION
STA 9+50.00 TO 10+00.00
STA 12+45.00 TO 12+95.00



*SEE TABLE BELOW FOR PAVEMENT CROSS SLOPE

PROPOSED TYPICAL SECTION
STA 10+00.00 TO 11+00.00
PROP BRIDGE FROM STA 11+00.00 TO 11+45.00
STA 11+45.00 TO 12+45.00

SUPER ELEVATONS		
STA	LT SLOPE	RT SLOPE
9+50.00	MATCH EXIST	MATCH EXIST
9+80.00	-2.00%	-2.00%
11+51.00	-2.00%	-2.00%
12+15.00	2.00%	-2.00%
12+95.00	MATCH EXIST	MATCH EXIST



PROPOSED MBGF LOCATIONS	
BEGIN STA	END STA
9+91 RT	10+65 RT
11+51 RT	11+83 RT
11+71 LT	12+50 LT

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4/21/2021

STATE OF TEXAS
JORDAN S. KIEWIT
131234
LICENSED
PROFESSIONAL ENGINEER

0' 2.5' 5' HORZ

Kimley»Horn F-928

Texas Department of Transportation

CR 347 @ CIBOLO CREEK

PROPOSED TYPICAL SECTIONS

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FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
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**********GENERAL NOTES**********
2014 Specification Book

========== **Basis of Estimate** ==========

Item	Description	Depth	Rate	Area	Quant-Unit
3076 6003	D-GR HMA TY-B PG64-22(EXEMPT)	(8")	110lb/sy-in	656 sy	289 ton

========== **Surface Treatment Data** ==========

Item	Description	Rate	Area	Quant-Unit
316 6222	(One Course)AGGR (TY-PB GR-3 SAC-B)	1cy/105sy	703 sy	7 cy
316 6436	(One Course)ASPH(AC-15P OR AC-10-2TR)	0.3gal/sy	703 sy	211 gal
3076 6066	TACK COAT	0.1gal/sy	132 sy	14 gal

--General--
To better fit field conditions, the cross sections may be varied when approved.

Any materials removed and not reused and determined to be salvageable shall be stored within the project limits at an approved location or delivered undamaged to the storage yard as directed. Properly dispose unsalvageable materials in accordance with local, state, and federal regulations. Deface traffic signs so that they will not reappear in public as signs.

Any sign panels that are adjusted or removed and replaced, shall be done the same workday unless otherwise approved. This work shall be considered subsidiary to Item 502.

Hurricane Evacuation:
Hurricane Season is from June 1 thru November 30. As the closest metropolitan city inland from the Texas Coast, the City of San Antonio is a major shelter destination during mandatory hurricane evacuations. As such, planned work zone lane or road closures may be restricted and/or suspended during mandatory hurricane evacuation operations. The District will coordinate these restrictions at a minimum H-120 from any projected impact to the Texas Coast.

No time charges will be made if the Engineer determines that work on the project was impacted by the hurricane.

The Engineer may order changes in the Traffic Control Plan to accommodate evacuation traffic, and may suspend the work, all or in part, to ensure timely completion of this work. All work to implement changes in the Traffic Control Plan will be paid through existing bid prices or through Item 9.5, Force Account. However, the Department will not entertain any request for delay

damages, loss of efficiency that may be attributed to the restriction or suspension of road or lane closures, or to changes in the Traffic Control Plan.

Contractor questions on this project are to be addressed to the following individual(s):
Will Lockett, P.E., Area Engineer Will.Lockett@txdot.gov
Carlos Arcila, P.E., Assistant Area Engineer Carlos.Arcila@txdot.gov

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

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

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.

--Item 5--
Prior to letting, bidders may obtain a free computer diskette or a computerized transfer of files (from the Engineer's office) that contains the earthwork information. If copies of the cross-sections in addition to, or instead of, the CD are requested, they will be available at the Engineer's office for borrowing by copying companies at the bidder's expense.

Prevention of Migratory Bird Nesting:
It is anticipated that migratory birds, a protected group of species, may try to nest on bridges, culverts, vegetation, or gravel substrate, at any time of the year. The preferred nesting season for migratory birds is from February 15 through October 1. When practicable, schedule construction operations outside of the preferred nesting season. Otherwise, nests containing migratory birds must be avoided and no work will be performed in the nesting areas until the young birds have fledged.

Structures:
Bridge and culvert construction operations cannot begin until swallow nesting prevention is implemented, until after October 1 if it's determined that swallow nesting is actively occurring, or until it's determined swallow nests have been abandoned. If the State installed nesting deterrent on the bridges and culverts, maintain the existing nesting deterrent to prevent swallow nesting until October 1 or completion of the bridge and culvert work, whichever occurs earlier. If new nests are built and occupied after the beginning of the work, do not perform work that can interfere with or discourage swallows from returning to their nests. Prevention of swallow nesting can be performed by one of the following methods:

1. By February 15 begin the removal of any existing mud nests and all other mud placed by swallows for the construction of nests on any portion of the bridge and culverts. The Engineer will inspect the bridges and culverts for nest building activity. If swallows begin nest building, scrape or wash down all nest sites. Perform these activities daily unless the Engineer determines the need to do this work more frequently. Remove nests and mud through October 1 or until bridge and culvert construction operations are completed.

2. By February 15 place a nesting deterrent (which prevents access to the bridge and culvert by swallows) on the entire bridge (except deck and railing) and culverts.

No extension of time or compensation payment will be granted for a delay or suspension of work caused by nesting swallows. This work is subsidiary to the various bid items.

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 7--
The total disturbed areas within the project is anticipated at less than one (1) acre. Due to this type of construction, the project qualifies for exclusion under the Construction General Permit (CGP) issued by the Texas Commission on Environmental Quality (TCEQ). However; should the sum of the Engineer's anticipated disturbances and the Contractor's (On ROW and off ROW) PSL's equal or exceed the one (1) acre threshold; both TxDOT and the Contractor have project responsibilities under the CGP that reverts to non-exclusion status. Obtain approval for all non-depicted areas of disturbance that increases the initial soil and vegetation disturbed area estimates before work starts at these locations.

Notify the Engineer of the disturbed acreage within one (1) mile of the project limits. Obtain authorization from the TCEQ for Contractor PSL's for construction support activities on or off ROW.

No significant traffic generators events identified.

--Item 8--
Working days will be computed and charged in accordance with Article 8.3.1.4.:Standard Workweek.

Create and maintain a Bar Chart schedule.

--Item 100--
Begin clearing operations after trees and other areas of vegetation to be protected have been identified and approved. Install fencing around features to be protected as shown in the plans or directed. Coordinate all right of way clearing operations with the SW3P.

Trim and remove brush and trees within the stations noted in the plans and as needed for construction operations. Unless shown otherwise in the plans or a designated non-mow area, perform trimming or removal for areas to the ROW limits. Trim or remove to provide minimum of 5 ft. of horizontal clearance and 7 ft. of vertical clearance for the following: sidewalks, paths, guard fence, rails, signs, object markers, and structures. Trim to provide a minimum of 12 ft. vertical clearance under all trees. This work is subsidiary.

Obtain approval for proposed method of tree and brush trimming and removal. Vertical flailing equipment is not allowed. Treat damaged or cut branches, roots and/or stumps of all oak trees with a commercial tree wound dressing. Disinfect all pruning tools with a solution of 70% alcohol before moving from one tree to another. Unless otherwise approved remove all resulting vegetative debris from the ROW within 24 hours. The Engineer can stop all construction operations if the dressing, cut and removal requirements are not followed.

--Item 110--
Where excavation extends beyond a right of way fence, remove and replace the fence to a comparable condition. This work shall be considered subsidiary to the bid item.

--Item 132--
At no time shall the retaining wall backfill material exceed the adjacent embankment operation by more than one embankment lift. At no time will the embankment adjacent to the retaining wall backfill exceed the wall backfill by any elevation.

--Item 164--
Drill seeding of permanent grasses requires the use of approved grass seeding equipment capable of properly storing and metering the release of small seeds (such as Bermuda grass) separately from fluffy type seeds (such as bluestems). Equipment manufactured for planting grain crops is acceptable for planting temporary cool season seeds, but not for planting the permanent seed mix.

If performing a permanent seeding in an area with established temporary grass cover and mowing is performed instead of tilling, seed and fertilizer may be distributed simultaneously during "Broadcast Seeding" operations, provided each component is applied at the specified rate.

--Item 166--
Use a fertilizer with an analysis of 13-13-13 (50% of the total N must be sulfur coated urea) to apply 60 lbs of actual N per acre. This requires 460 lbs of 13-13-13 per acre or .095 lbs per SY of area.

--Item 168--
Apply vegetative watering as needed to supplement natural rainfall during the vegetation establishment period. Plan quantity of irrigation water is based on the application of a total of 1.3 gal of water each week for each sq. yd. of area that is sodded or seeded. Establishment time is estimated to be 12 weeks for both sod and permanent seed mixes. Temporary seeding will require less time for establishment. Provide a schedule and coordinate watering cycles and rates per cycle with the Engineer. Obtain approval if the quantity of water to be applied is expected to exceed the plan quantity. Adjust the amount of water applied with each cycle and the number of cycles each wk. according to actual site conditions. Drought or other conditions, as determined by the Engineer, may require the application of supplemental irrigation during hours other than normal working hours.

--Item 247--
There is no minimum PI requirement for this project.

--Item 316--
When using latex asphalt, avoid drifting of asphalt onto traffic and adjacent properties.

Asphalt season will be year around, but meet sections 316.4.4.1 through 4.4.3.

Ensure that the asphalt for precoating the aggregate and the asphalt used for the surface treatment will not result in a reaction that may adversely affect the bonding of the aggregate and asphalt during the surface treatment operation.

Do not add bag house fines in the production of precoated material.

--Item 420--
Mass concrete will be measured in place.

Restrict large aggregate size to ¾" maximum for class "C" concrete used in aesthetic details requiring form liners.

Pier and Bent Concrete will be paid for as "Plans Quantity".

--Item 422--
For construction of approach slabs, longitudinal joints shall be placed on lane lines. Joints may be either a saw-cut crack control joint or a construction joint. Saw cut joints shall terminate 1'-0" before reaching the edge of the slab, must be saw cut as soon as possible after placement of concrete, and will be cut within 12 hours of concrete placement. Once sawing begins, it should be a continuous operation and should only be stopped if raveling occurs. Saw cut will be to a depth of 1.5" and filled with approved joint sealant.

The bridge approach slab will be poured simultaneously with the bridge deck.

--Item 432--
In areas where guard fence posts are to be placed in riprap, the riprap shall have an 18 inch +/- blocked out area (round or square). After the posts are installed, the blocked out area shall be topped off with 4 inches of low strength grout/mortar consisting of about 1 sack of cement per cubic yard of mix.

Match the slope of the Riprap (Mow Strip) to the slope of the adjacent roadway.

--Item 496--
The Contractor will submit a demolition plan for all structures to be replaced and/or removed in accordance with Item 496.

Provide for the safety and health of employees and abide by all OSHA Standards and Regulations. All costs incurred for proper management, shall be subsidiary to this Item.

Water to be temporarily diverted for the construction of CR 347 over Cibolo Creek. Diversion of water will not be paid for directly but will be considered subsidiary to Item 496.

Demolition of existing bridge to be performed in such a way that debris/material is not allowed to fall in, and impact the waters of Cibolo Creek.

--Item 500--
"Materials on Hand" payments will not be considered in determining percentages for mobilization payments.

--Item 502--
Place standard markings no later than 14 days after surface treatment operations are completed.

When advanced warning flashing arrow panels and/or changeable message sign is specified, have one standby unit in good condition at the job site. Standby time shall be considered subsidiary to the bid item.

After written notification, the time frame is provided on the Form 599 to provide properly maintained signs and barricades before considered in non-compliance. Failure to make corrections as noted may result in payment for this item being withheld.

Moving an existing sign to a temporary location is subsidiary to this Item. Installations with permanent supports at permanent locations will be paid for under the applicable bid item (s).

Notify the Engineer in writing 10 business days in advance of any temporary or permanent lane, ramp, connector, etc. closures/detours, restrictions to lane widths, alterations to vertical

clearances, or modifications to radii. Any other modifications to the roadway that may adversely affect the mobility of oversized/overweight trucks also require 10 business days advance written notice to the Engineer. Unless shown in the TCP, no lane, ramp, connector, etc. closures are allowed during special events. At least one lane has to remain open at all times. Lane closures will not be allowed if this reporting requirement is not met.

Avoid placing stockpiles within the roadway's horizontal clear zone. If a stockpile is placed within the clear zone, address in accordance with the TMUTCD.

Do not place barricades, signs, or any other traffic control devices where they interfere with sight distance at driveways or side streets.

In addition to providing a Contractor's Responsible Person and a phone number for emergency contact, have an employee available to respond on the project for emergencies and for taking corrective measures within 2 hours or within a reasonable time frame as specified by the Engineer.

If Nighttime work is required and work is not behind positive barrier then full TY 3 reflective gear is required to be worn by all workers, hard hat halos are required to be worn by the flaggers at flagging stations, TY III barricades are required to be spaced at 500 ft, and a mandatory night work meeting is required.

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.

--Item 506--
An Inspector will perform a regularly scheduled SWP3 inspection every 7 calendar days.

Failure to address items noted on the SW3P inspection report within two report cycles may result in the Department stopping all construction operations, exclusive of time charges, or withholding that month's estimate until the SW3P deficiencies are corrected unless the Engineer determines that the area is too wet to correct SW3P deficiencies.

Failure to correctly maintain daily monitoring reports and submitting to TxDOT on a daily/weekly basis may result in the monthly estimate being withheld.

--Item 540--
MBGF posts shall be round with domed tops, and not painted. If 10 or less timber posts are needed, they may be purchased locally and will be accepted by visual inspection.

Guard fence posts placed in proposed and/or existing areas of riprap, sidewalks or other concrete shall have an 18 inch +/- (square or round) block out in the concrete. After the posts are installed, the blocked out area shall be topped off with 4 inches of low strength grout/mortar consisting of about 1 sack of cement per cubic yard of mix.

When connecting a Thrie-Beam to a concrete wingwall, bridge rail, CTB, etc., drill the holes for bolt placement using rotary or core type equipment. Use a core type drill when reinforcing steel is encountered. Do not use percussion or impact drilling. Repair damage to the concrete and spalls exceeding ½" from the edge of the hole.

--Item 542--
Salvage all undamaged/acceptable radius guardrail and deliver to the TxDOT maintenance section yard.

--Item 644--
The wedge anchor system shown on State Standard Sheet SMD (TWT) is not allowed.

The set screw type for Triangular Slipbase Systems is not allowed. Use the following products for the Triangular Slipbase System.

Triangular Slip Base Systems
(For use with 10 BWG and Schedule 80 Round Posts)

Southern Plains Fabrication	SPF Triangular Slipbase Housing	Info@SouthernPlainsFabrication.com http://SouthernPlainsFabrication.com (806) 241-0060
Structural and Steel Products	Triangular Slipbase Breakaway Support	CustServ@s-steel.com http://s-steelcom (800) 782-5804

--Item 666--
Use TY II material (vs. an acrylic or epoxy) as the sealer for the TY I markings, place the TY II a minimum of 14 calendar days (to provide adequate curing) before placing the TY I markings.

Failure to provide the retroreflectometer testing data within the time specified in the specifications will result in non-payment of the bid item.

--Item 672--
Place all adhesive material directly from the heated dispenser to the pavement. Do not use portable or non-heated containers. Use adhesive of sufficient thickness so that when the marker is pressed into the adhesive, 1/8" or more adhesive will remain under 100% of the marker. The adhesive should extend not less than 1/2" but not more than 1 1/2" beyond the perimeter of the marker.

--Item 4171--
Install bridge identification numbers shown below for each of the following listed bridges in accordance to the special specification and San Antonio District Standard. Install the bridge identification number on two locations as shown on the plans, or as directed. For bridges in a two-way condition, install the bridge identification number on each outside beam on the upstream side of traffic. For bridges in a one-way condition, install the bridge identification number on each side, opposite corners on each outside beam. For culverts less than 5 ft. in height, install the bridge identification number on the headwall on upstream and downstream location. For culverts greater than 5 ft. in height, install the bridge identification number inside the first barrel on the upstream side of traffic and inside the last barrel on the opposite corner in the direction of traffic.

CR 347 Bridge at Cibolo Creek – NBI # 15-247-AA03-84-002

QUANTITY SHEET

CONTROLLING PROJECT ID 0915-14-047 **DISTRICT** San Antonio **COUNTY** Wilson
HIGHWAY CR 347

						TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB		**0915-14-047**			
		PROJECT ID		**A00131351**			
		COUNTY		**Wilson**			
		HIGHWAY		**CR 347**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	100-6002	PREPARING ROW	STA	3.450		3.450	
	100-6007	PREP ROW (TREE)(GREATER THAN 24" DIA)	EA	1.000		1.000	
	104-6009	REMOVING CONC (RIPRAP)	SY	155.000		155.000	
	105-6014	REMOVING STAB BASE & ASPH PAV (7"-12")	SY	759.000		759.000	
	110-6001	EXCAVATION (ROADWAY)	CY	125.000		125.000	
	132-6003	EMBANKMENT (FINAL)(ORD COMP)(TY B)	CY	5.000		5.000	
	164-6021	CELL FBR MLCH SEED(PERM)(RURAL)(SANDY)	SY	146.000		146.000	
	164-6029	CELL FBR MLCH SEED(TEMP)(WARM)	SY	73.000		73.000	
	164-6031	CELL FBR MLCH SEED(TEMP)(COOL)	SY	73.000		73.000	
	168-6001	VEGETATIVE WATERING	MG	4.600		4.600	
	169-6002	SOIL RETENTION BLANKETS (CL 1) (TY B)	SY	146.000		146.000	
	216-6001	PROOF ROLLING	HR	2.000		2.000	
	316-6222	AGGR(TY-PB GR-3 SAC-B)	CY	7.000		7.000	
	316-6436	ASPH (AC-15P OR AC-10-2TR)	GAL	211.000		211.000	
	400-6005	CEM STABIL BKFL	CY	34.000		34.000	
	402-6001	TRENCH EXCAVATION PROTECTION	LF	102.000		102.000	
	403-6001	TEMPORARY SPL SHORING	SF	820.000		820.000	
	416-6002	DRILL SHAFT (24 IN)	LF	183.000		183.000	
	420-6013	CL C CONC (ABUT)	CY	18.400		18.400	
	420-6066	CL C CONC (RAIL FOUNDATION)	CY	7.500		7.500	
	422-6007	REINF CONC SLAB (SLAB BEAM)	SF	1,170.000		1,170.000	
	422-6015	APPROACH SLAB	CY	39.000		39.000	
	425-6012	PRESTR CONC SLAB BEAM (5SB15)	LF	222.500		222.500	
	432-6001	RIPRAP (CONC)(4 IN)	CY	11.200		11.200	
	432-6045	RIPRAP (MOW STRIP)(4 IN)	CY	13.500		13.500	
	450-6006	RAIL (TY T223)	LF	167.000		167.000	
	454-6004	ARMOR JOINT (SEALED)	LF	50.400		50.400	
	459-6001	GABIONS (GALV)	CY	232.700		232.700	
	459-6007	GABION MATTRESSES (GALV)(12 IN)	SY	111.600		111.600	
	496-6009	REMOV STR (BRIDGE 0 - 99 FT LENGTH)	EA	1.000		1.000	
	500-6001	MOBILIZATION	LS	100.00%		100.00%	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	8.000		8.000	
	506-6020	CONSTRUCTION EXITS (INSTALL) (TY 1)	SY	225.000		225.000	
	506-6024	CONSTRUCTION EXITS (REMOVE)	SY	225.000		225.000	
	506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	137.000		137.000	
	506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	137.000		137.000	
	540-6001	MTL W-BEAM GD FEN (TIM POST)	LF	25.000		25.000	

QUANTITY SHEET

CONTROLLING PROJECT ID 0915-14-047 **DISTRICT** San Antonio **COUNTY** Wilson
HIGHWAY CR 347

		CONTROL SECTION JOB		**0915-14-047**		TOTAL EST.	TOTAL FINAL
		PROJECT ID		**A00131351**			
		COUNTY		**Wilson**			
		HIGHWAY		**CR 347**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	540-6014	SHORT RADIUS	LF	37.500		37.500	
	540-6016	DOWNSTREAM ANCHOR TERMINAL SECTION	EA	1.000		1.000	
	540-6021	MTL THRIE-BEAM GD FEN (TIM POST)	EA	3.000		3.000	
	542-6001	REMOVE METAL BEAM GUARD FENCE	LF	189.000		189.000	
	544-6001	GUARDRAIL END TREATMENT (INSTALL)	EA	2.000		2.000	
	644-6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	3.000		3.000	
	644-6023	IN SM RD SN SUP&AM TYFRP(1)UA(P)	EA	2.000		2.000	
	644-6076	REMOVE SM RD SN SUP&AM	EA	2.000		2.000	
	658-6014	INSTL DEL ASSM (D-SW)SZ (BRF)CTB (BI)	EA	6.000		6.000	
	658-6062	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2(BI)	EA	8.000		8.000	
	658-6094	INSTL DEL ASSM (D-DW)SZ 1(WFLX)SRF	EA	5.000		5.000	
	666-6042	REFL PAV MRK TY I (W)12"(SLD)(100MIL)	LF	31.000		31.000	
	666-6224	PAVEMENT SEALER 4"	LF	732.000		732.000	
	666-6228	PAVEMENT SEALER 12"	LF	31.000		31.000	
	666-6303	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	LF	42.000		42.000	
	666-6315	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF	690.000		690.000	
	672-6009	REFL PAV MRKR TY II-A-A	EA	9.000		9.000	
	678-6001	PAV SURF PREP FOR MRK (4")	LF	732.000		732.000	
	678-6006	PAV SURF PREP FOR MRK (12")	LF	31.000		31.000	
	3076-6003	D-GR HMA TY-B PG64-22 (EXEMPT)	TON	289.000		289.000	
	3076-6066	TACK COAT	GAL	14.000		14.000	
	4171-6001	INSTALL BRIDGE IDENTIFICATION NUMBERS	EA	2.000		2.000	
	6001-6002	PORTABLE CHANGEABLE MESSAGE SIGN	EA	2.000		2.000	
	08	EROSION CONTROL MAINTENANCE (NON-PART)	LS	1.000		1.000	
		SAFETY CONTINGENCY (NON-PART)	LS	1.000		1.000	

TCP SUMMARY

SPEC ITEM #	6001 6002
ITEM DESCRIPTION	PORTABLE CHANGEABLE MESSAGE SIGN
UNITS	EA
TCP	2
TOTAL	2

REMOVAL SUMMARY

SPEC ITEM #	0100 6007	0104 6009	0105 6014	0496 6009	0542 6001
ITEM DESCRIPTION	PREP ROW (TREE) (GREATER THAN 24" DIA)	REMOVING CONC (RIPRAP)	REMOVING STAB BASE & ASPH PAV (7"-12")	REMOV STR (BRIDGE 0-99 FT LENGTH)	REMOVE METAL BEAM GUARD FENCE
UNITS	EA	SY	SY	EA	LF
REMOVAL	1	155	759	1	189
TOTAL	1	155	759	1	189

EARTHWORK SUMMARY

LOCATION (STATION TO STATION)	0110 6001 EXCAVATION (ROADWAY)	0132 6003 EMBANKMENT (FINAL) (ORD COMP) (TY B)
UNITS	CY	CY
9+50 TO 10+00	0	0
10+00 TO 10+50	0	0
10+50 TO 11+00	33	2.5
BRIDGE		
11+45 TO 11+95	39	2.5
11+95 TO 12+45	53	0
TOTAL	125	5

NOTES:

1. TEMPORARY DIVERSION OF WATER FOR REMOVAL OF EXISTING STRUCTURE AND CONSTRUCTION OF GABIONS AND BRIDGE ELEMENTS WILL NOT BE PAID FOR DIRECTLY BUT WILL BE CONSIDERED SUBSIDIARY TO ITEM 496.

ROADWAY SUMMARY

SPEC ITEM #	0100 6002	0420 6066	0432 6001	0432 6045	0450 6006	0540 6001	0540 6014	0540 6016	0540 6021	0544 6001
ITEM DESCRIPTION	PREPARING ROW *	CL C CONC (RAIL FOUNDATION)	RIPRAP (CONC) (4IN)	RIPRAP (MOW STRIP) (4 IN)	RAIL (TY T223)	MTL W-BEAM GD FEN (TIM POST)	SHORT RADIUS	DOWNSTREAM ANCHOR TERMINAL SECTION	MTL THRIE-BEAM GD FEN (TIM POST)	GUARDRAIL END TREATMENT (INSTALL)
UNITS	STA	CY	CY	CY	LF	LF	LF	EA	EA	EA
9+50 TO 11+00	1.50	5.2	0.2	5.9	37	12.5			1	1
BRIDGE	0.45									
11+45 TO 12+95	1.50	2.3	11	7.6	16	12.5	37.5	1	2	1
TOTAL	3.45	7.5	11.2	13.5	53	25.0	37.5	1	3	2

* REMOVAL OF CONCRETE DEBRIS/RUBBLE IS CONSIDERED SUBSIDIARY TO ITEM 100 PREP ROW

PAVEMENT SUMMARY

LOCATION	SURFACE AREA		** OCST		**	**
		0216 6001 PROOF ROLLING	0316 6222 AGGR (TY-PB GR-3 SAC-B)	0316 6436 ASPH (AC-15P OR AC-10-2TR)	3076 6003 D-GR HMA TY-B PG64-22 (EXEMPT)	3076 6066 TACK COAT
			1 CY / 105 SY	0.30 GAL / SY	110 LB / SY/IN	0.10 GAL / SY
	SY	HR	SY	SY	SY	SY
TRANSITION	22		22	22		
9+50 TO 11+00	315	1	315	315	315	63
BRIDGE						
11+45 TO 12+95	341	1	341	341	341	69
TRANSITION	25		25	25		
TOTAL	703	2	703	703	656	132

**REFER TO BASIS OF ESTIMATE FOR BID ITEM QUANTITIES

Kimley»Horn F-928

Texas Department of Transportation

CR 347 @ CIBOLO CREEK

SUMMARY OF QUANTITIES

SHEET 1 OF 2

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	BR 2021 (063)	CR 347

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	WILSON	8
CONT.	SECT.	JOB	
0915	14	047	

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GABION SUMMARY

LOCATION	0402 6001 TRENCH EXCAVATION PROTECTION	0403 6001 TEMPORARY SPL SHORING	0459 6001 GABIONS (GALV)	0459 6007 GABION MATTRESSES (GALV) (12 IN)
UNITS	LF	SF	CY	SY
SLOPE PROTECTION "1"			4.6	0.5
ABUTMENT AND WINGWALLS 1	51	350	101.5	6.5
ABUTMENT AND WINGWALLS 2	51	350	106.4	6.6
SLOPE PROTECTION "2"			5.4	0.5
SLOPE PROTECTION "3"		120	14.8	
CHANNEL PROTECTION				97.5
TOTAL	102.0	820	232.7	111.6

BRIDGE

SPEC ITEM #	0400 6005	0416 6002	0420 6013	0422 6007	0422 6015	0425 6012	0450 6006	0454 6004	4171 6001
ITEM DESCRIPTION	CEM STABIL BKFL	DRILL SHAFT (24 IN)	CL C CONC (ABUT)	REINF CONC SLAB (SLAB BEAM)	APPROACH SLAB	PRESTR CONC SLAB BEAM (5SB15)	RAIL (TY T223)	ARMOR JOINT (SEALED)	STENCILING PERMANENT STRUCTURE NUMBERS
BRIDGE COMPONENT	CY	LF	CY	SF	CY		LF	LF	EA
2 - ABUTMENTS	34	183	18.4		39		114.0	50.4	
1 - 45.00' PRESTR CONC SLAB BEAM UNIT				1,170		222.50			
									2
TOTAL	34	183	18.4	1,170	39	222.50	114.0	50.4	2

SIGNING AND PAVEMENT MARKING SUMMARY

SPEC ITEM #	0644 6001	0644 6023	0644 6076	0658 6014	0658 6062	0658 6094	0666 6042	0666 6224	0666 6228	0666 6303	0666 6315	0672 6009	0678 6001	0678 6006
ITEM DESCRIPTION	IN SM RD SN SUP&AM TY 10BWG(1) SA(P)	IN SM RD SN SUP&AM TYFRP(1) UA(P)	REMOVE SM RD SN SUP&AM	INSTL DEL ASSM (D-SW)SZ (BR)CTB (BI)	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2 (BI)	INSTL DEL ASSM (D-DW)SZ 1(WFLX)SRF	REFL PAV MRK TY I (W) 12" (SLD) (100MIL)	PAVEMENT SEALER 4"	PAVEMENT SEALER 12"	RE PM W/ RET REQ TY I (W) 4" (SLD) (100MIL)	RE PM W/ RET REQ TY I (Y) 4" (SLD) (100MIL)	REFL PAV MRKR TY II-A-A	PAV SURF PREP FOR MRK (4")	PAV SURF PREP FOR MRK (12")
UNITS	EA	EA	EA	EA	EA	EA	LF	LF	LF	LF	LF	EA	LF	LF
SIGNING AND PAVEMENT MARKINGS														
	3	2	2	6	8	5	31	732	31	42	690	9	732	31
TOTAL	3	2	2	6	8	5	31	732	31	42	690	9	732	31

SW3P SUMMARY

SPEC ITEM #	0164 6021	0164 6029	0164 6031	0166 6002	0168 6001	0169 6002	0506 6020	0506 6024	0506 6038	0506 6039
ITEM DESCRIPTION	CELL FBR MLCH SEED (PERM) (RURAL) (SANDY)	CELL FBR MLCH SEED (TEMP) (WARM)	CELL FBR MLCH SEED (TEMP) (COOL)	FERTILIZER *	VEGETATIVE WATERING	SOIL RETENTION BLANKETS (CL 1)(TY B)	CONSTRUCTION EXITS (INSTALL) (TY 1)	CONSTRUCTION EXITS (REMOVE)	TEMP SDMT CONT FENCE (INSTALL)	TEMP SDMT CONT FENCE (REMOVE)
UNITS	SY	SY	SY	TON	MG	SY	SY	SY	LF	LF
SW3P	146	73	73	0.1	4.6	146	225	225	137	137
TOTAL	146	73	73	0.1	4.6	146	225	225	137	137

* FOR CONTRACTOR'S INFORMATION ONLY

NOTES:

1. TEMPORARY DIVERSION OF WATER FOR REMOVAL OF EXISTING STRUCTURE AND CONSTRUCTION OF GABIONS AND BRIDGE ELEMENTS WILL NOT BE PAID FOR DIRECTLY BUT WILL BE CONSIDERED SUBSIDIARY TO ITEM 496.

Kimley»Horn F-928

Texas Department of Transportation

CR 347 @ CIBOLO CREEK

SUMMARY OF QUANTITIES

SHEET 2 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	BR 2021 (063)	CR 347

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	WILSON	9
CONT.	SECT.	JOB	
0915	14	047	

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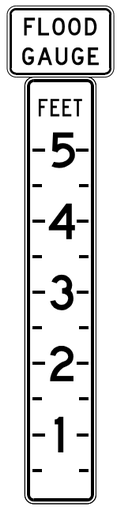
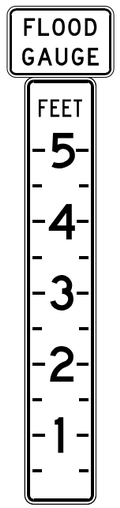
SUMMARY OF SMALL SIGNS

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX) POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE TY N TY S
78	1	W8-19aTP W8-19		18" X 12" 12" X 72"			FRP	1	UA	P		
78	2	W8-19aTP W8-19		18" X 12" 12" X 72"			FRP	1	UA	P		
78	3	R19-5T		24" X 30"			10BWG	1	SA	P		

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

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).

DATE:
FILE:

Texas Department of Transportation — Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

SHEET 1 OF 2

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	14	047	CR 347
4-16 8-16	DIST	COUNTY		SHEET NO.
	SAT	WILSON		10

SUMMARY OF SMALL SIGNS

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

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE TY N TY S
78	4	W1-3R W13-1P		30" X 30" 18" X 18"	X		10BWG	1	SA	P		
78	5	W1-3R W13-1P		30" X 30" 18" X 18"	X		10BWG	1	SA	P		

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

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NOTE:

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).

DATE:
FILE:

Texas Department of Transportation — Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS SHEET 2 OF 2

FILE:	sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT	May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS		0915	14	047	CR 347
4-16		DIST	COUNTY		SHEET NO.
8-16		SAT	WILSON		11

18

DETOUR, BARRICADES, WARNING SIGNS, SEQUENCE OF WORK, ETC.

THE CONTRACTOR'S ATTENTION IS DIRECTED TO THE REQUIREMENTS OF ITEM 7, "LEGAL RELATIONS AND RESPONSIBILITIES", OF THE STANDARD SPECIFICATIONS. IN ADDITION TO THESE LEGAL REQUIREMENTS, THE FOLLOWING PROVISIONS SHALL ALSO GOVERN ON THIS CONTRACT:

GENERAL

1. TRAFFIC MUST BE HANDLED THROUGHOUT THE PROJECT DURING CONSTRUCTION. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING A SAFE AND COMFORTABLE PASSAGE FOR VEHICULAR AND PEDESTRIAN TRAFFIC WITH MINIMAL INCONVENIENCE TO THE PUBLIC AS SHOWN IN THE PLANS OR AS DIRECTED/APPROVED BY THE ENGINEER.

2. THE CONTRACTOR MAY PROPOSE/RECOMMEND MODIFICATION TO THE SEQUENCE OF WORK FOR CONSIDERATION BY THE ENGINEER. ANY MAJOR RECOMMENDATION MODIFICATION BY THE CONTRACTOR SHALL INCLUDE ANY CHANGES TO THE VARIOUS BID ITEMS, IMPACT TO TRAFFIC, EFFECT OF OVERALL PROJECT IN TIME AND COST, ETC. IF THIS PROPOSAL IS IMPLEMENTED, THE CONTRACTOR WILL BE RESPONSIBLE FOR DEVELOPING DETAILED PLAN SHEETS TO BE SEALED BY A LICENSED PROFESSIONAL ENGINEER FOR INCLUSION WITH THE CHANGE ORDER, THE CONTRACTOR CANNOT PROCEED WITH ANY CONSTRUCTION OPERATIONS BASED ON A REVISED PHASE/SEQUENCE UNTIL WRITTEN APPROVAL IS OBTAINED FROM THE ENGINEER. IF AT ANY TIME DURING CONSTRUCTION THE CONTRACTOR'S PROPOSED PLAN OF OPERATION FOR HANDLING TRAFFIC DOES NOT PROVIDE FOR SAFE AND COMFORTABLE MOVEMENT, THE CONTRACTOR WILL IMMEDIATELY CHANGE THEIR OPERATION TO CORRECT THE UNSATISFACTORY CONDITION.

3. DO NOT STORE ANY CONSTRUCTION MATERIAL OR EQUIPMENT AT ANY LOCATION THAT WILL CONSTITUTE A HAZARD AND WILL ENDANGER TRAFFIC.

4. THE CONTRACTOR WILL PROVIDE ADVANCE NOTIFICATION TO THE ENGINEER OF IMPENDING/UPCOMING LANE CLOSURES. SEE GENERAL NOTES OR NOTIFICATION REQUIREMENTS.

5. ACCESS TO ADJOINING PROPERTY MUST BE MAINTAINED AT ALL TIMES.

6. TEMPORARY DRAINAGE IS THE RESPONSIBILITY OF THE CONTRACTOR.

7. THE CONTRACTOR SHALL INSTALL AND MAINTAIN AN ADEQUATE NUMBER OF BARRICADES, WARNING AND DIRECTIONAL SIGNS TO DELINEATE TRAFFIC FOR ANY DETOURS OR CLOSURES. THE CONTRACTOR MAY, WITH THE APPROVAL AND/OR DIRECTED BY THE ENGINEER BE REQUIRED TO VARY THE NUMBER AND LOCATIONS OF SIGNS AND BARRICADES FROM THAT INDICATED ON THE PLANS.

8. REMOVAL AND DISPOSAL OF EXISTING ABANDONED UTILITIES (EITHER PREVIOUSLY ABANDONED OR ABANDONED DURING THIS PROJECT) REQUIRED TO SUPPORT THIS PROJECT'S CONSTRUCTION SHALL BE PERFORMED UNDER THE OVERALL PREPARE RIGHT-OF-WAY (ITEM 100).

9. ALL SEQUENCE OF WORK ON THIS PROJECT SHALL BE COORDINATED TO COINCIDE WITH ANY PROJECTS WITHIN OR ADJACENT TO THIS PROJECT.

10. COVER PERMANENT SIGNS IF NOT USED. THIS IS SUBSIDIARY TO ITEM 502.

11. NOTIFY AND INCLUDE COPIES OF THE DETOUR MAP AND APPROXIMATE CONSTRUCTION SCHEDULE TO THE LOCAL FIRE DEPARTMENT, EMERGENCY MEDICAL SERVICES, SHERIFF, DEPARTMENT OF PUBLIC SERVICES, AND THE SCHOOL DISTRICT SO ROUTES CAN BE ADJUSTED AS NEEDED.

SEQUENCE OF CONSTRUCTION

THIS PROJECT WILL BE CONSTRUCTED IN ONE PHASE. A BRIEF DESCRIPTION OF THIS PHASE IS AS FOLLOWS:

1. PLACE DETOUR SIGNS AND BARRICADES UTILIZING BC(10)-14 AND TCP PLANS.
2. PLACE SWP3 DEVICES.
3. PLACE PROTECTIVE MEASURES TO PROTECT THE WATERS OF CIBOLO CREEK FROM MATERIAL/ DEBRIS ASSOCIATED WITH THE DEMOLITION OF THE EXISTING BRIDGE.
4. REMOVE EXISTING STRUCTURE AND PAVEMENT.
5. TEMPORARILY DIVERT WATER FOR DRILLED SHAFT CONSTRUCTION.
6. CONSTRUCT DRILLED SHAFTS.
7. CONSTRUCT ABUTMENT CONCRETE.
8. CONSTRUCT GABION BLOCKS AT ABUTMENT FACES.
9. CONSTRUCT PRESTRESSED SLAB BEAMS.
10. CONSTRUCT REINFORCED CONCRETE SLAB AND BRIDGE APPROACH SLAB.
11. CONSTRUCT T223 BRIDGE RAIL.
12. PERFORM ROADWAY EXCAVATION & EMBANKMENT.
13. CONSTRUCT GABION BLOCKS AT WINGWALLS AND SLOPE STABILIZATION.
14. CONSTRUCT TRF & T223 RAIL.
15. CONSTRUCT MBGF AND ELEMENTS.
16. CONSTRUCT 8" OF HMA.
17. PLACE FIRST COURSE AND CURE.
18. INSTALL PERMANENT SIGNING AND STRIPING.
19. REMOVE SW3P DEVICES.
20. PERFORM FINAL CLEANUP.
21. REMOVE DETOUR SIGNS AND BARRICADES.

HAULING EQUIPMENT

1. THE USE OF RUBBER-TIRED EQUIPMENT WILL BE REQUIRED FOR MOVING DIRT OR OTHER MATERIALS ALONG OR ACROSS PAVEMENT SURFACES. WHERE THE CONTRACTOR DESIRES TO MOVE ANY EQUIPMENT NOT LICENSED FOR OPERATION ON PUBLIC HIGHWAYS, ON OR ACROSS PAVEMENT, THEY SHALL PROTECT THE PAVEMENT FROM DAMAGE AS DIRECTED/APPROVED BY THE ENGINEER.

2. THROUGHOUT THE CONSTRUCTION OPERATIONS, THE CONTRACTOR WILL BE REQUIRED TO CONDUCT THEIR HAULING OPERATIONS IN A MANNER SUCH THAT VEHICLES WILL NOT HAUL OVER PREVIOUSLY RECOMPACTED SUBGRADE OR COMPACTED BASE MATERIAL, EXCEPT IN SHORT SECTIONS FOR DUMPING MANIPULATIONS.

FINAL CLEAN UP

1. UPON COMPLETION OF THE WORK AND BEFORE FINAL ACCEPTANCE AND FINAL PAYMENT IS MADE, THE CONTRACTOR SHALL CLEAR AND REMOVE FROM THE SITE ALL SURPLUS AND DISCARDED MATERIALS AND DEBRIS OF EVERY KIND AND LEAVE THE ENTIRE PROJECT IN A SMOOTH NEAT AND SIGHTLY CONDITION.

PAYMENT

1. ALL BARRICADES, SIGNS, AND FLAGGERS SHALL BE SUBSIDIARY TO ITEM 502, "BARRICADES, SIGNS AND TRAFFIC HANDLING." ALL EROSION AND SEDIMENT CONTROL DEVICES WILL BE PAID UNDER ITEM 506, "TEMPORARY EROSION, SEDIMENTATION AND ENVIRONMENTAL CONTROLS." ALL OTHER WORK AND MATERIALS SHALL BE SUBSIDIARY TO THE VARIOUS BID ITEMS UNLESS OTHERWISE INDICATED IN THE PLANS.

SAFETY

1. THE CONTRACTOR SHALL PROVIDE, CONSTRUCT AND MAINTAIN BARRICADES AND SIGNS IN ACCORDANCE WITH STATE STANDARDS BC(1)-14 THRU BC(12)-14. ANY SIGNS REQUIRED THAT ARE NOT DETAILED IN THE STANDARD SHEETS SHALL BE IN CONFORMANCE WITH THE "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" AND THE "STANDARD HIGHWAY SIGN DESIGNS FOR TEXAS."

2. BARRICADES AND WARNING SIGNS SHALL BE PLACED AS INDICATED ON THE PLANS. THIS SHALL BE CONSIDERED THE MINIMUM REQUIRED TO PROVIDE FOR THE SAFETY OF TRAFFIC DURING CONSTRUCTION. THE CONTRACTOR SHALL PROVIDE AND MAINTAIN OTHER SUCH BARRICADES AND SIGNS DEEMED NECESSARY BY THE ENGINEER OR AS DIRECTED BY FIELD CONDITIONS, TO PROVIDE FOR THE PASSAGE OF TRAFFIC IN SAFETY AT ALL TIMES.

3. THE CONTRACTOR SHALL PROVIDE AND MAINTAIN FLAGGERS AS DIRECTED/APPROVED BY THE ENGINEER, AT SUCH POINTS AND FOR SUCH PERIODS OF TIME AS MAY BE REQUIRED, TO PROVIDE FOR THE SAFETY OF THE TRAVELING PUBLIC AND THE CONTRACTOR'S PERSONNEL.

4. THE CONTRACTOR SHALL KEEP THE ROADWAY CLEAN AND FREE OF DIRT AND OTHER MATERIALS DURING HAULING OPERATIONS. IF THE CONTRACTOR DOES NOT MAINTAIN A CLEAN ROADWAY, THEY SHALL CEASE ALL CONSTRUCTION OPERATIONS, WHEN DIRECTED BY THE ENGINEER, TO CLEAN THE ROADWAY TO THE SATISFACTION OF THE ENGINEER.

4/7/2021

STATE OF TEXAS
JORDAN S. KIEWIT
131234
LICENSED
PROFESSIONAL ENGINEER

Kimley»Horn F-928

Texas Department of Transportation

CR 347 @ CIBOLO CREEK

TCP GENERAL NOTES AND NARRATIVE

SHEET 1 OF 1

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	BR 2021 (063)	CR 347

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	WILSON	12
CONT.	SECT.	JOB	
0915	14	047	

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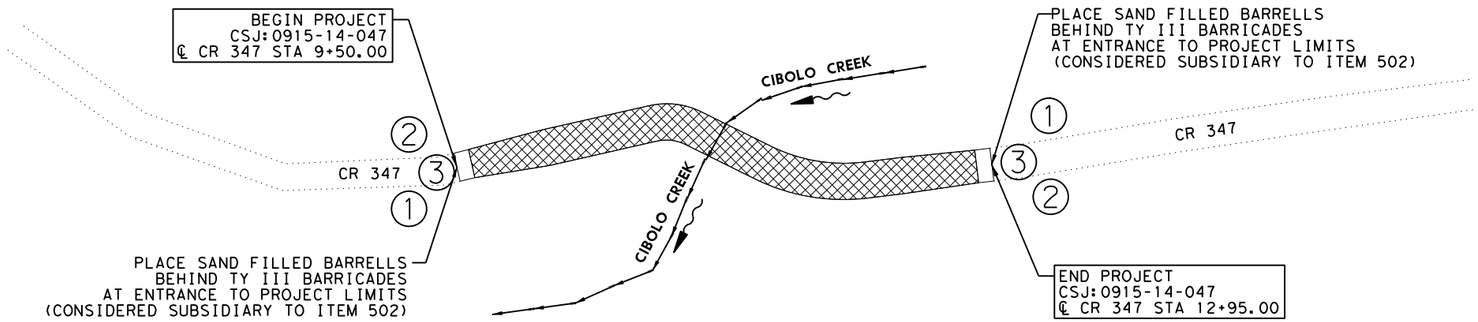
SCHEDULE OF TRAFFIC CONTROL DEVICES

LOCATION	R20-3T	G20-10T	G20-9TP R20-5T R20-5aTP	R2-1	CW20-3C	CW20-3B	G20-5T G20-6T	R11-2	TY III	G20-2bT	G20-2a	CW20-2D	R11-3a	R11-2 M4-10L	MR-12T M4-9L	MR-12T M4-9R	MR-12T M4-9S	R11-3a
1	X	X	X	X	X	X												
2										X	X							
3							X	X	X									
4												X	X	X	X	X	X	X



ROAD CLOSURE DETAIL

NTS

ADVANCE WARNING SIGNS LEGEND:

(1) TO BE USED AT THE BEGINNING OF THE PROJECT AND ENTERING SIDE STREETS.

(2) TO BE USED AT THE END OF THE PROJECT LIMITS AND EXITING SIDE STREETS.

(3) TO BE USED AT THE BEGINNING OF THE PROJECT LIMITS. BARRICADES TO BE PLACED BEFORE BEGINNING CONSTRUCTION OPERATIONS AND SHALL REMAIN FOR THE DURATION OF THE PROJECT.

(4) TO BE USED ALONG THE LENGTH OF THE PROJECT PER THE DETOUR LAYOUT.

NOTES:

1. COUNTY ROAD 347 FROM FARM ROAD 1346 TO FARM ROAD 775 WILL BE CLOSED TO THE THROUGH TRAFFIC DURING CONSTRUCTION.
2. LOCATIONS SHOWN FOR SIGNING ARE APPROXIMATE AND FOR VISUAL AID. EXACT LOCATIONS AND SIGN SPACING ARE TO BE ACCORDING TO TEXAS MUTCD, BARRICADE & TCP STANDARDS, OR AS DIRECTED. TYPE 3 BARRICADES TO BE PLACED IN A LOCATION THAT IS SATISFACTORY TO THE ENGINEER. ALLOW EGRESS AND INGRESS FOR LOCAL PROPERTY OWNERS AT ALL TIMES.
3. ALL TRAFFIC CONTROL SETUP AND DEVICES ARE TO BE IN ACCORDANCE WITH THE LATEST VERSION OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TEXAS MUTCD) & TXDOT STANDARDS.
4. ANY SIGNS LISTED ON THIS SHEET AND ANY ADDITIONAL SIGNS REQUIRED ARE TO BE SUPPLIED BY THE CONTRACTOR AND CONSIDERED SUBSIDIARY TO ITEM 502. ANY ADDITIONAL SIGNS REQUESTED BY THE ENGINEER WILL BE IN ACCORDANCE WITH THE "BC" STANDARD SHEETS, THE "TCP" STANDARD SHEETS AND/OR THE TEXAS MUTCD.
5. BARRICADES ARE NOT TO BE USED AS A SIGN SUPPORT. SUPPORT FOR SIGNS SHALL BE TEMPORARY, FIXED OR PORTABLE SIGN SUPPORTS, AS DIRECTED BY THE ENGINEER OR IN ACCORDANCE WITH THE "BC" STANDARD SHEETS AND THE TEXAS MUTCD.
6. ALL CONSTRUCTION TRAFFIC IS TO BE REGULATED SO AS TO CAUSE A MINIMUM OF INCONVENIENCE TO THE TRAVELING PUBLIC. AT TIMES WHEN IT IS NECESSARY FOR CONSTRUCTION EQUIPMENT OR TRUCKS TO STOP, UNLOAD, OR CROSS ROADWAYS UNDER TRAFFIC, WARNING SIGNS AND FLAGGERS SHALL BE PROVIDED AS NECESSARY TO ADEQUATELY PROTECT THE TRAVELING PUBLIC.
7. BARRICADES AND WARNING SIGNS ON THE SHEET ARE THE MINIMUM CONSTRUCTION ZONE SIGNING. ADDITIONAL BARRICADES, WARNING SIGNS, ARROW PANELS, CONES, ETC. REQUIRED IN ACCORDANCE WITH CURRENT "BC" STANDARDS AND THE TEXAS MUTCD MAY BE REQUIRED IN AREAS OF ACTUAL CONSTRUCTION.

4/8/2021

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STATE OF TEXAS

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Texas Department of Transportation

CR 347 @ CIBOLO CREEK

TRAFFIC CONTROL PLAN
(ADVANCE WARNING LAYOUT)

SHEET 1 OF 1

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	BR 2021 (063)	CR 347

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	WILSON	13
CONT.	SECT.	JOB	
0915	14	047	

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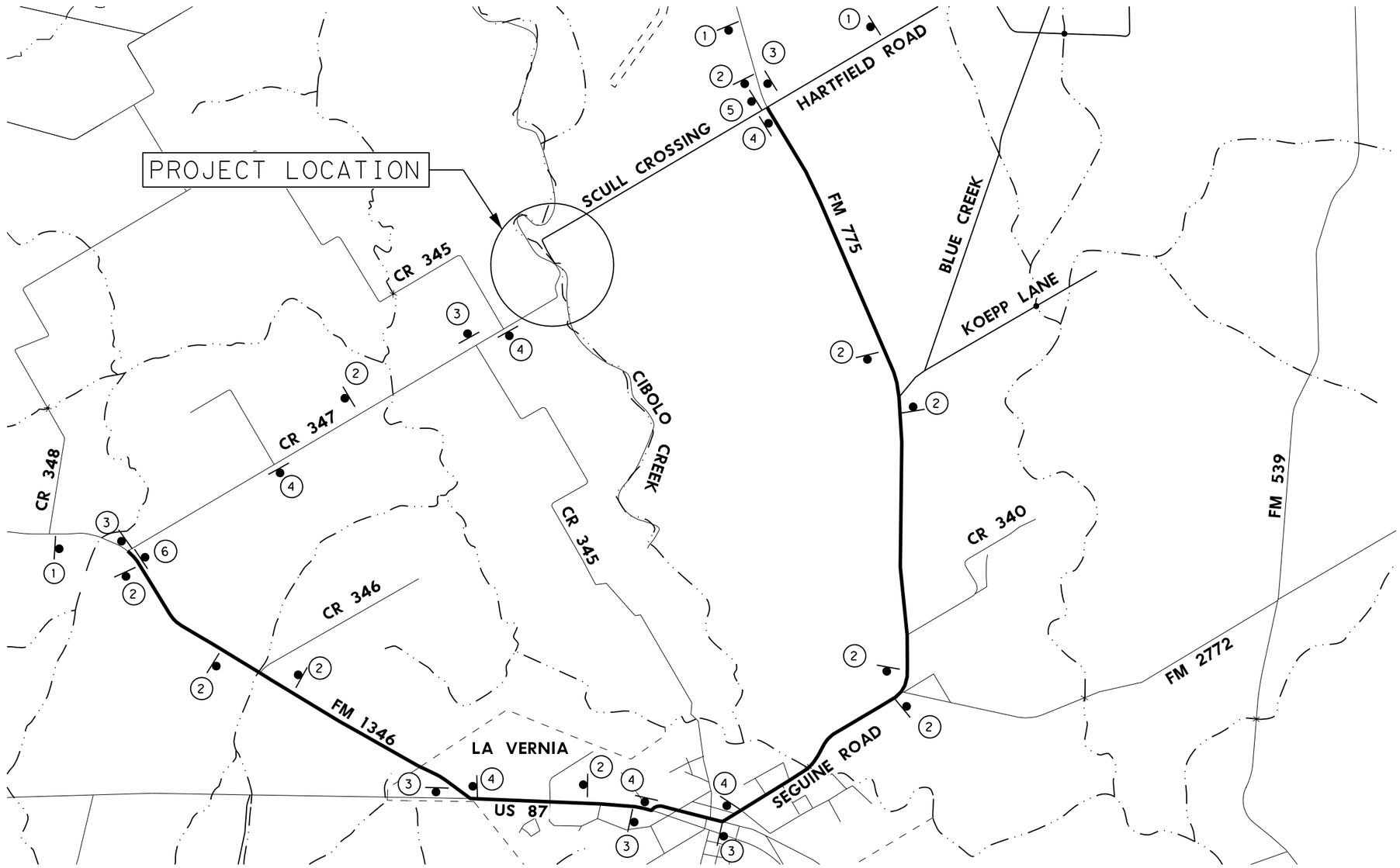

N

LEGEND

- DETOUR ROUTE
- CONSTRUCTION SIGN
- EXISTING ROADS
- STREAMS

NOTES:

1. COUNTY ROAD 347 FROM FARM ROAD 1346 TO FARM ROAD 775 WILL BE CLOSED TO THROUGH TRAFFIC DURING CONSTRUCTION.
2. LOCATIONS SHOWN FOR SIGNING ARE APPROXIMATE AND FOR VISUAL AID. EXACT LOCATIONS AND SIGN SPACING ARE TO BE ACCORDING TO TXMUTCD, BARRICADE & TCP STANDARDS, OR AS DIRECTED. TYPE 3 BARRICADES TO BE PLACED IN A LOCATION THAT IS SATISFACTORY TO THE ENGINEER. ALLOW EGRESS AND INGRESS FOR LOCAL PROPERTY OWNERS AT ALL TIMES.
3. THE ENGINEER MAY REQUEST ADDITIONAL SIGNS, WHICH WILL BE SUBSIDIARY TO PERTINENT BID ITEMS.

STATE OF TEXAS
JORDAN S. KIEWIT
131234
LICENSED
PROFESSIONAL ENGINEER

4/7/2021

0' 1500' 3000'

SCALE

DETOUR AHEAD	CW20-20 48" X 48"	1
CR 347 / DETOUR ⇧	M4-12T 30" X 12" / M4-9S 30" X 24"	2
CR 347 / DETOUR ⇦	M4-12T 30" X 12" / M4-9L 30" X 24"	3
CR 347 / DETOUR ⇨	M4-12T 30" X 12" / M4-9R 30" X 24"	4
ROAD CLOSED 14 MILES AHEAD LOCAL TRAFFIC ONLY	R11-3a 60" X 30"	5
ROAD CLOSED 26 MILES AHEAD LOCAL TRAFFIC ONLY	R11-3a 60" X 30"	6

Kimley»Horn F-928

Texas Department of Transportation

CR 347 @ CIBOLO CREEK

TRAFFIC CONTROL PLAN
(DETOUR ROUTE)

SHEET 1 OF 1

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	BR 2021 (063)	CR 347

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	WILSON	14
CONT.	SECT.	JOB	
0915	14	047	

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

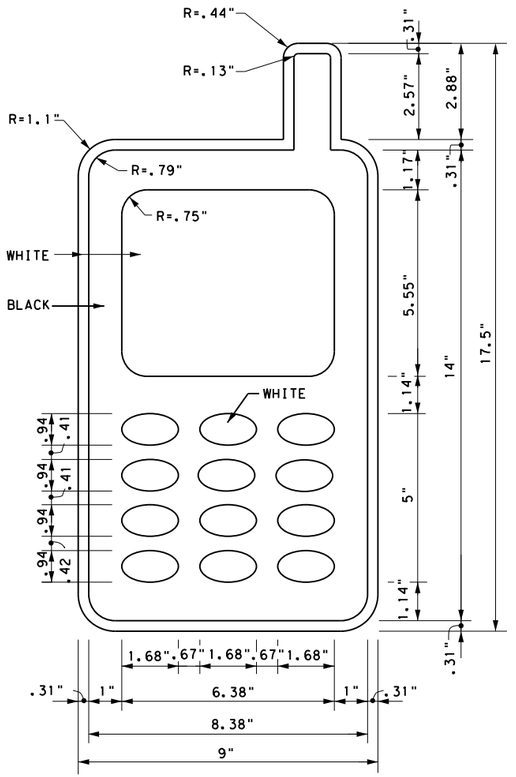
11. Except for devices required by Note 10, traffic control devices should be in place only while work is actually in progress or a definite need exists.

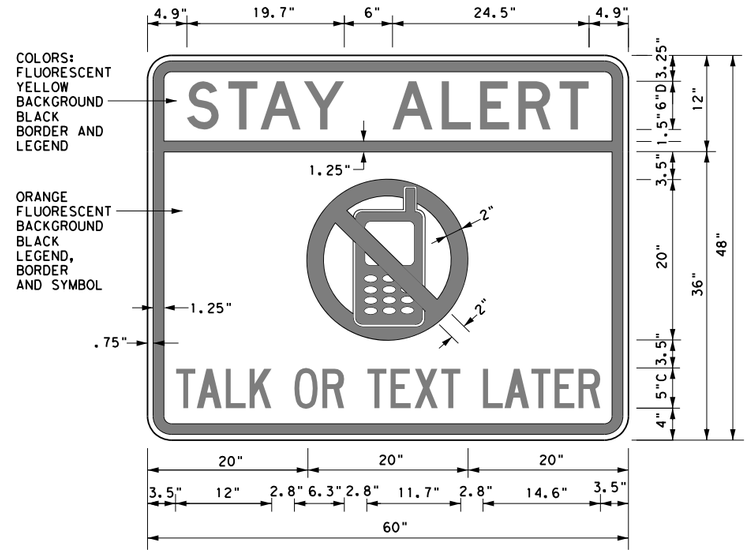
12. The Engineer has the final decision on the location of all traffic control devices.

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

WORKER SAFETY APPAREL NOTES:

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





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

SIGN DETAIL (G20-10T)

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

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

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

Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	14	047	CR 347
4-03 5-10 8-14	DIST	COUNTY		SHEET NO.
9-07 7-13	SAT	WILSON		15

DATE: 2/4/2021 7:43:16 AM
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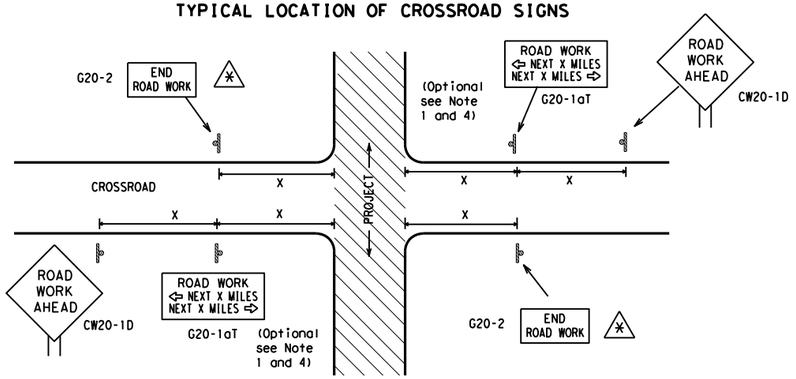
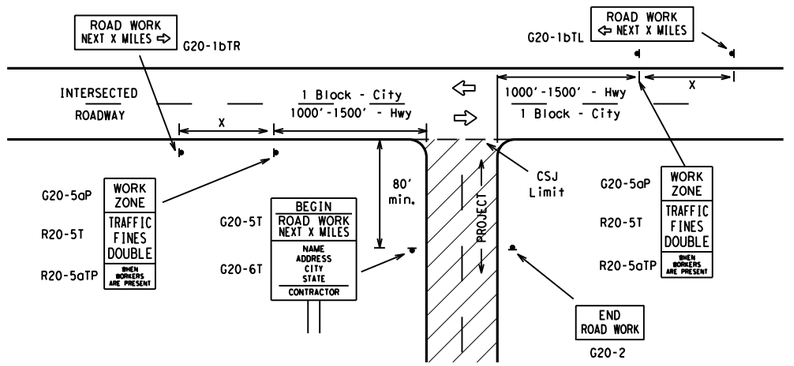
TYPICAL LOCATION OF CROSSROAD SIGNS



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

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

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

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

SIZE

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

SPACING

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

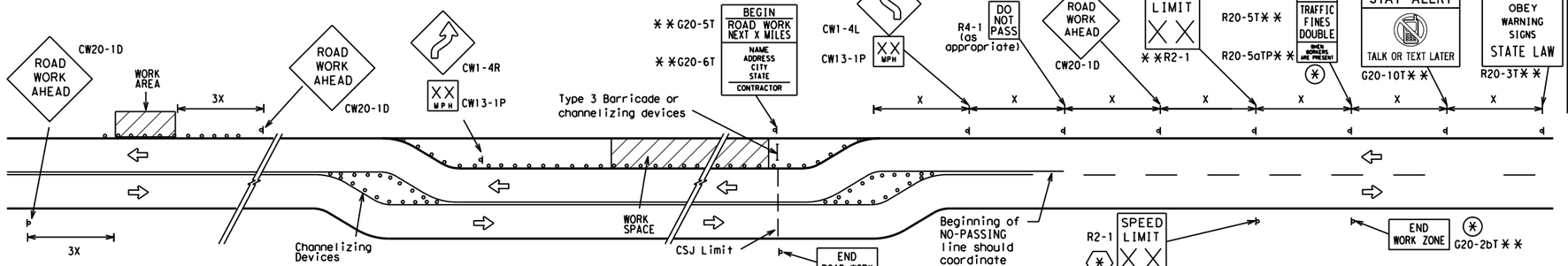
✱ For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

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

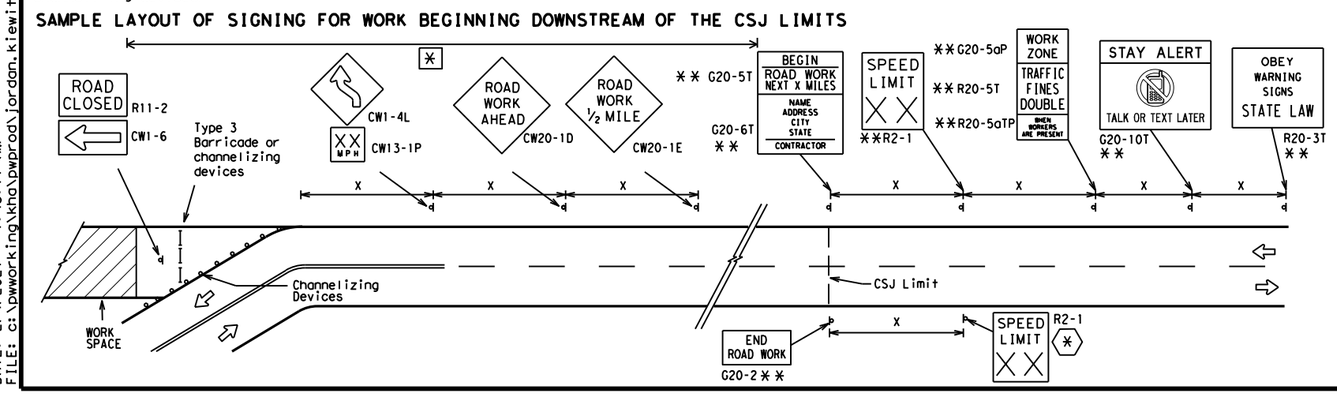
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



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

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS

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



NOTES

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

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

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

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

(✱) Contractor will install a regulatory speed limit sign at the end of the work zone.

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

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-14

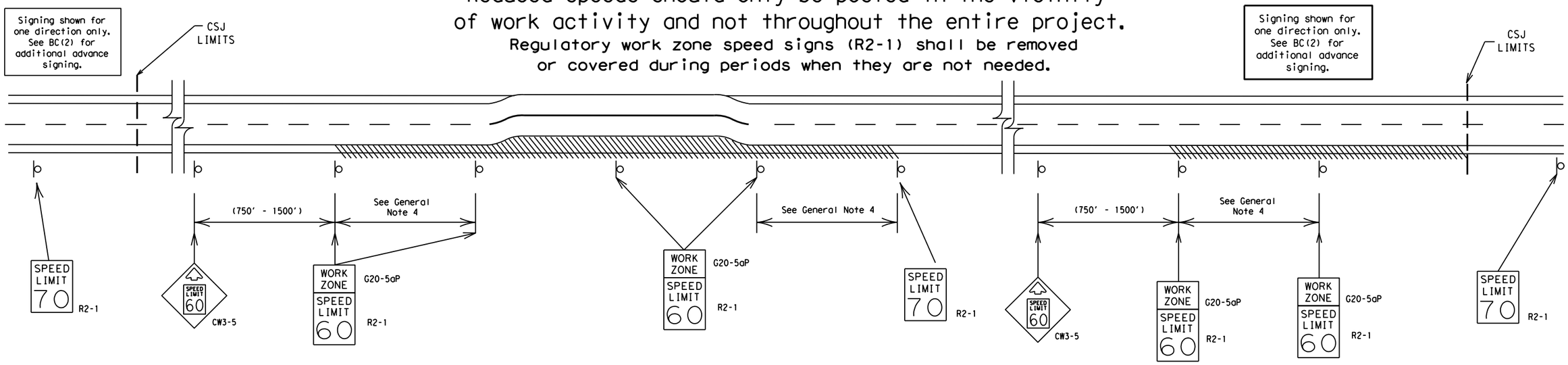
FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	14	047	CR 347
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13	SAT	WILSON		16

TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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

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



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

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

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SHEET 3 OF 12

Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-14

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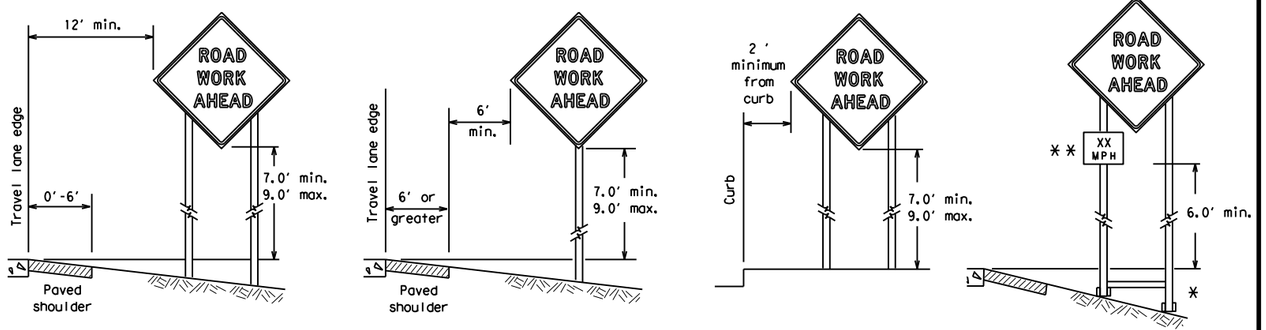
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 9-07 8-14 7-13	0915	14	047	CR 347
	DIST	COUNTY		SHEET NO.
	SAT	WILSON		17

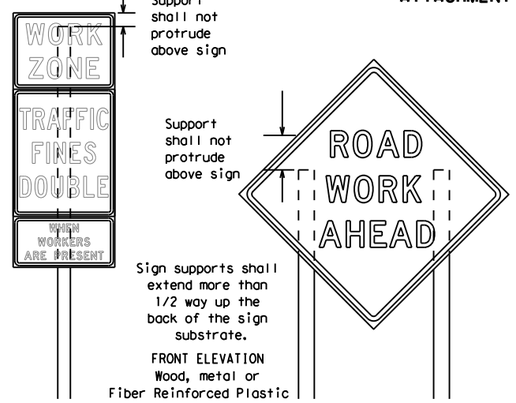
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS



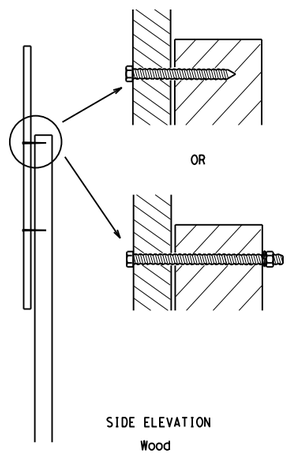
* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

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

ATTACHMENT FOR SIGN SUPPORTS



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

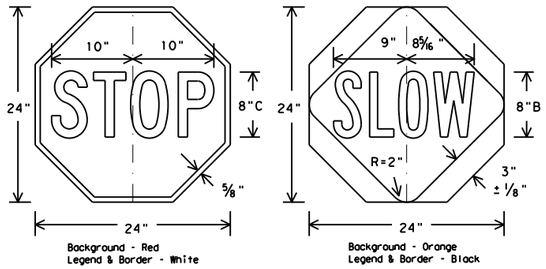


Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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

STOP/SLOW PADDLES

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



CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-14

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7-13	SAT	WILSON		18

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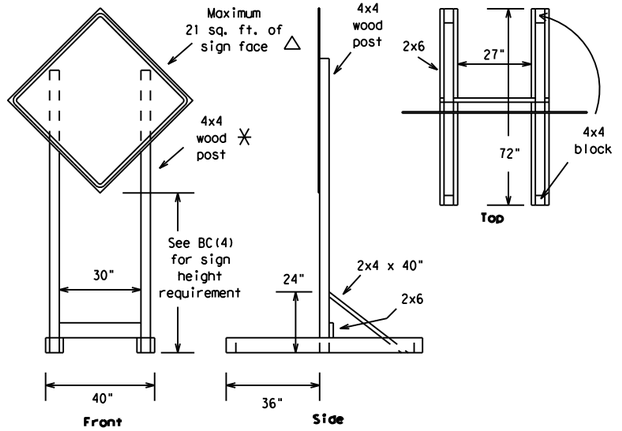
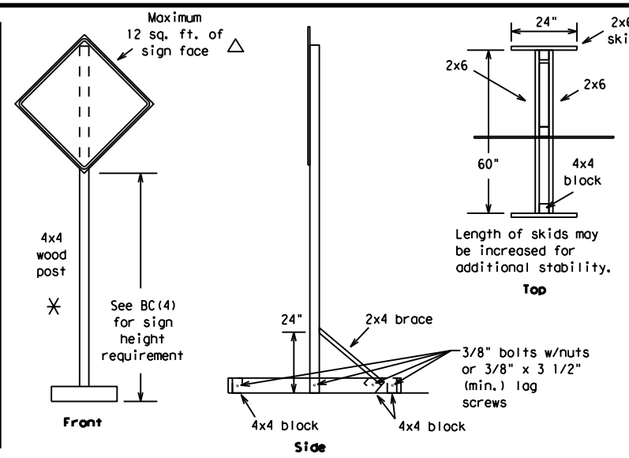
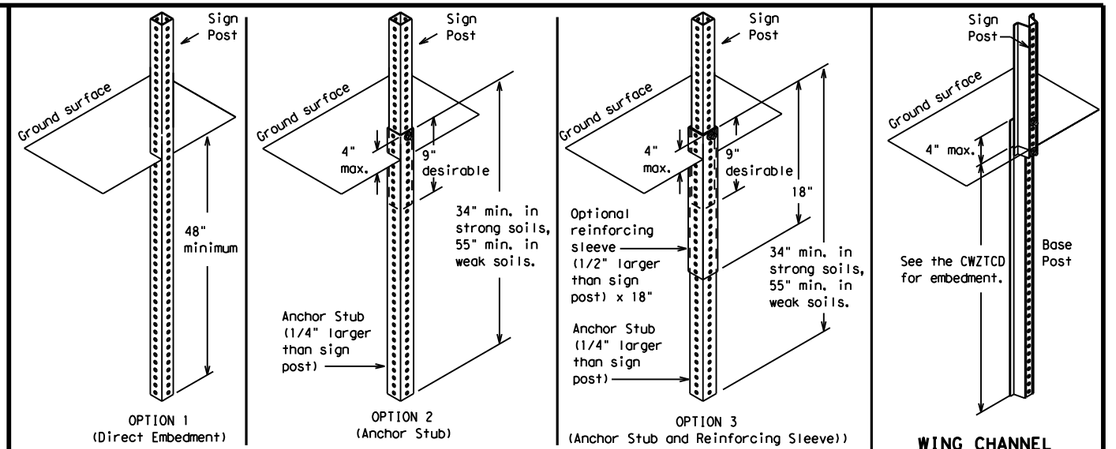




SKID MOUNTED WOOD SIGN SUPPORTS

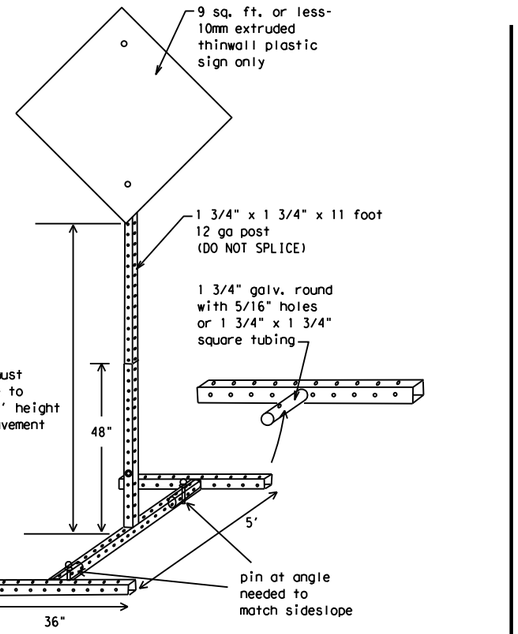
LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS □

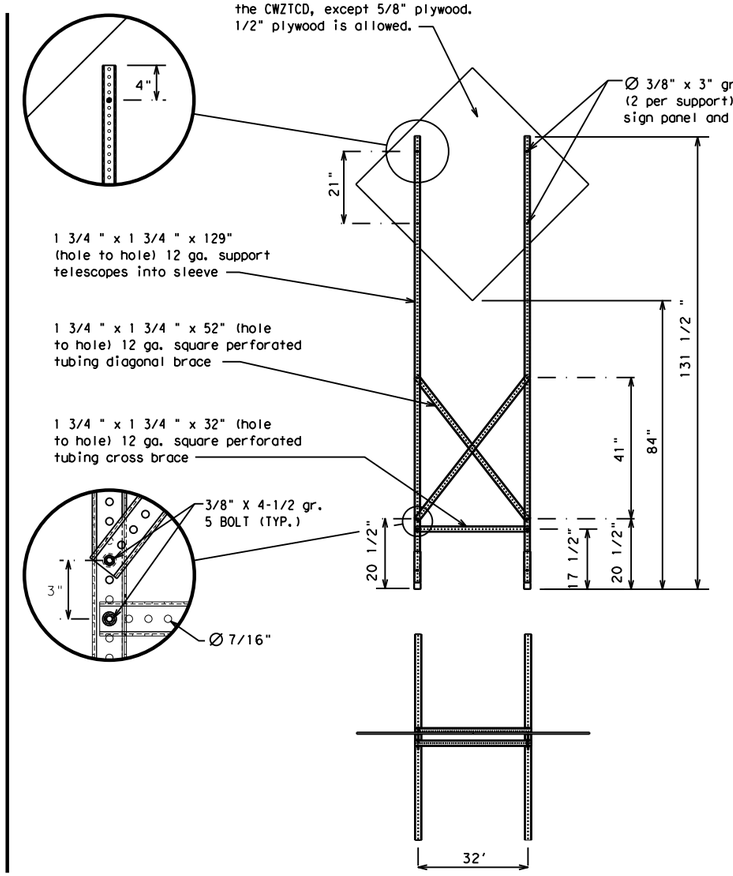


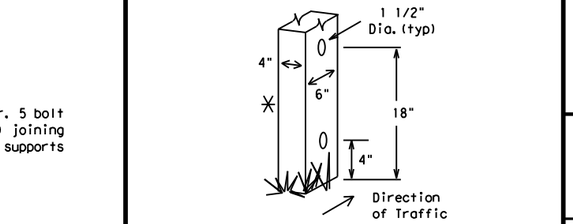
PERFORATED SQUARE METAL TUBING

GROUND MOUNTED SIGN SUPPORTS

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

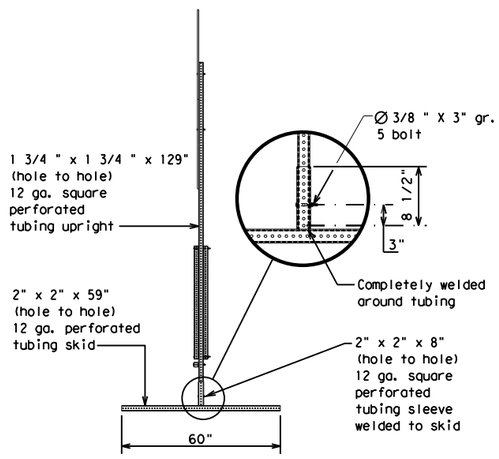






Nominal Post Size	Number of Posts	Maximum Sq. feet of Sign Face	Minimum Soil Embedment	Drilled Hole(s) Required
4 x 4	1	12	36"	NO
4 x 4	2	21	36"	NO
4 x 6	1	21	36"	YES
4 x 6	2	36	36"	YES

WOOD POST SYSTEM FOR GROUND MOUNTED SIGN SUPPORTS



WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

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

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

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

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

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Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-14

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7-13	SAT	WILSON		19

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SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

PORTABLE CHANGEABLE MESSAGE SIGNS

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

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

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

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

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

Other Condition List

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

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

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

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

Location List

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

Warning List

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

** Advance Notice List

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

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

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

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

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

FULL MATRIX PCMS SIGNS

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

Texas Department of Transportation

Traffic Operations Division Standard

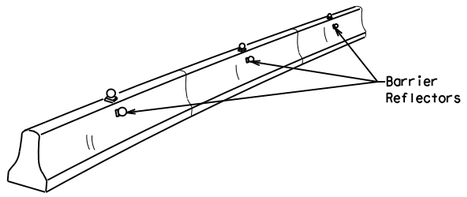
BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	14	047	CR 347
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13	SAT	WILSON		20

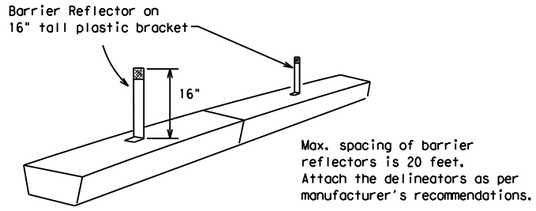
100

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

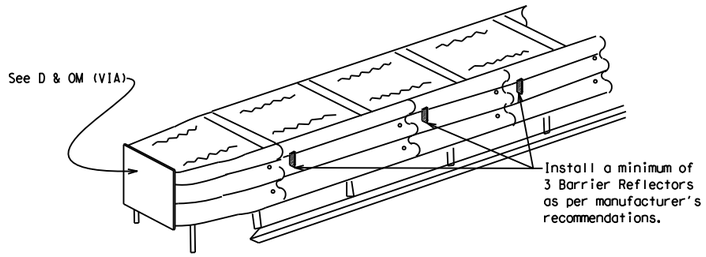


CONCRETE TRAFFIC BARRIER (CTB)

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



LOW PROFILE CONCRETE BARRIER (LPCB)

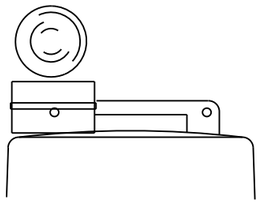


DELINEATION OF END TREATMENTS

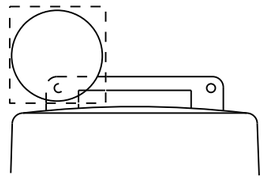
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



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



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

WARNING LIGHTS

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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

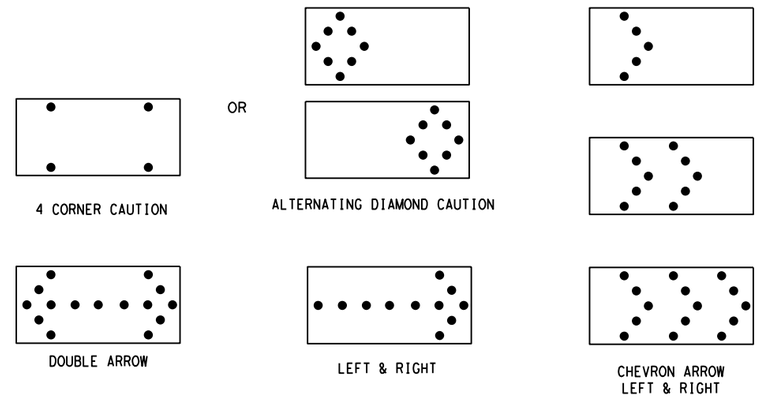
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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

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

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

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

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



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

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

ATTENTION

Flashing Arrow Boards shall be equipped with automatic dimming devices.

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

1. Truck-mounted attenuators (TMA) used on TxDOT facilities must meet the requirements outlined in the National Cooperative Highway Research Report No. 350 (NCHRP 350) or the Manual for Assessing Safety Hardware (MASH).
2. Refer to the CWZTCD for the requirements of Level 2 or Level 3 TMAs.
3. Refer to the CWZTCD for a list of approved TMAs.
4. TMAs are required on freeways unless otherwise noted in the plans.
5. A TMA should be used anytime that it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the work performance.
6. The only reason a TMA should not be required is when a work area is spread down the roadway and the work crew is an extended distance from the TMA.

Texas Department of Transportation

Traffic Operations Division Standard

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

BC(7)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
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7-13	SAT	WILSON		21

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GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

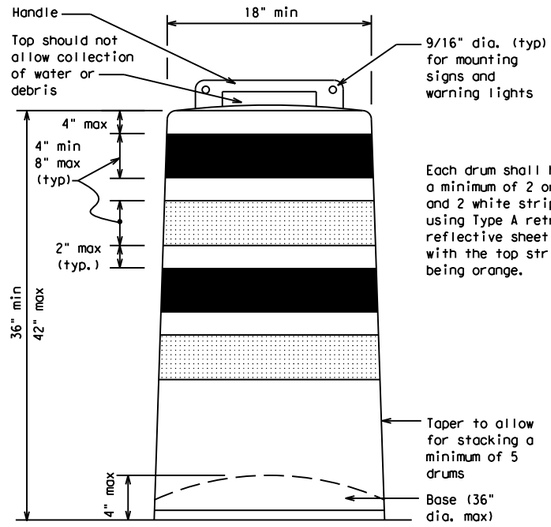
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

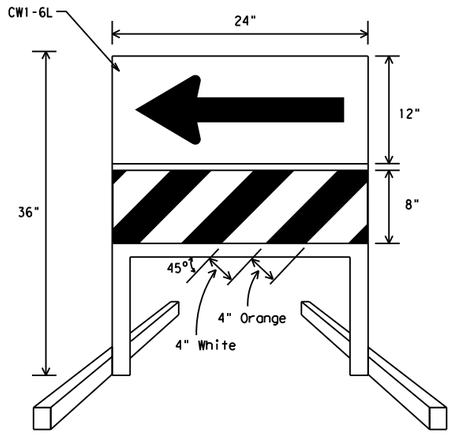
RETROREFLECTIVE SHEETING

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

BALLAST

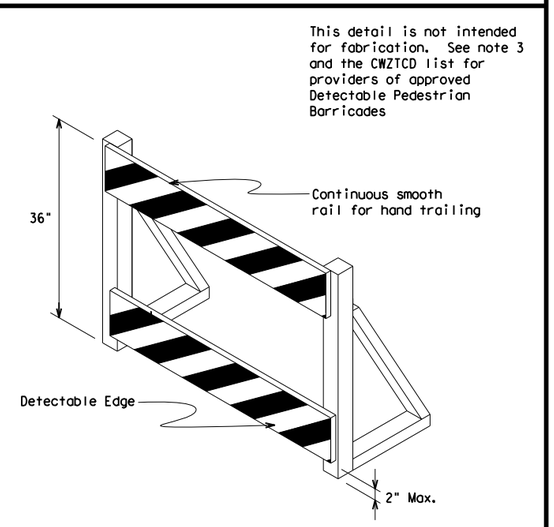
1. Unballasted bases shall be large enough to hold up to 50 lbs. of sand. This base, when filled with the ballast material, should weigh between 35 lbs (minimum) and 50 lbs (maximum). The ballast may be sand in one to three sandbags separate from the base, sand in a sand-filled plastic base, or other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





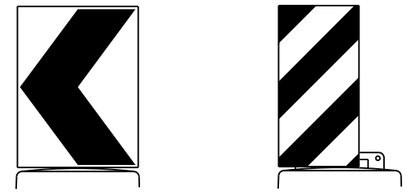
DIRECTION INDICATOR BARRICADE

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



DETECTABLE PEDESTRIAN BARRICADES

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



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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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4-03 7-13	DIST	COUNTY		SHEET NO.
9-07 8-14	SAT	WILSON		22

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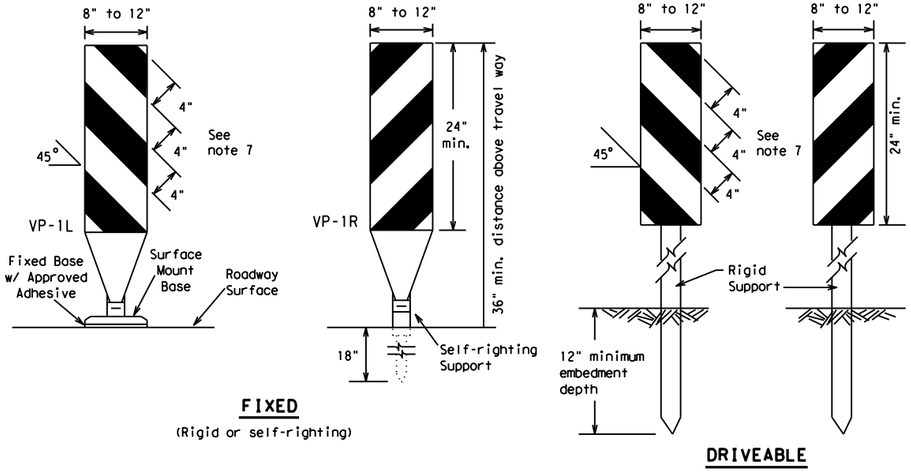
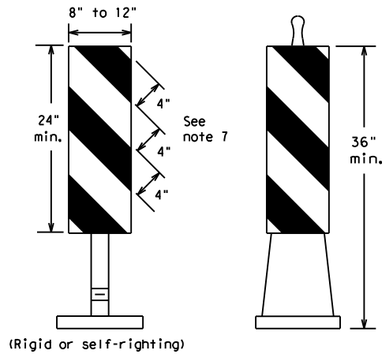


FIXED
(Rigid or self-righting)

DRIVEABLE

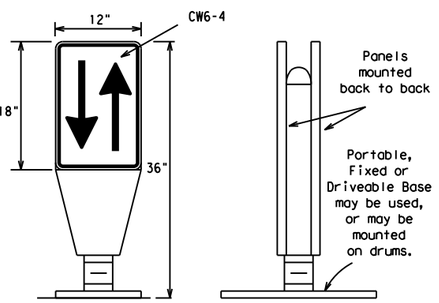


(Rigid or self-righting)

PORTABLE

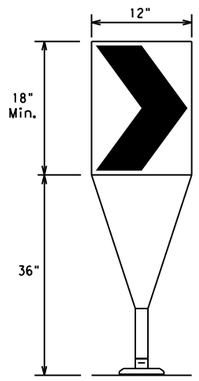
VERTICAL PANELS (VPs)

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



OPPOSING TRAFFIC LANE DIVIDERS (OTLD)

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



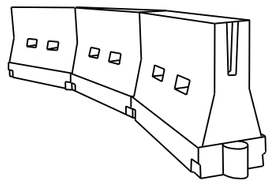
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

CHEVRONS

GENERAL NOTES

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



LONGITUDINAL CHANNELIZING DEVICES (LCD)

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

WATER BALLASTED SYSTEMS USED AS BARRIERS

1. Water ballasted systems used as barriers shall not be used solely to channelize road users, but also to protect the work space per the appropriate NCHRP 350 crashworthiness requirements based on roadway speed and barrier application.
2. Water ballasted systems used to channelize vehicular traffic shall be supplemented with retroreflective delineation or channelizing devices to improve daytime/nighttime visibility. They may also be supplemented with pavement markings.
3. Water ballasted systems used as barriers shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
4. Water ballasted systems used as barriers should not be used for a merging taper except in low speed (less than 45 MPH) urban areas. When used on a taper in a low speed urban area, the taper shall be delineated and the taper length should be designed to optimize road user operations considering the available geometric conditions.
5. When water ballasted systems used as barriers have blunt ends exposed to traffic, they should be attenuated as per manufacturer recommendations or flared to a point outside the clear zone.

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

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

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

SHEET 9 OF 12

Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-14

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© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	14	047	CR 347
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7-13	SAT	WILSON		23

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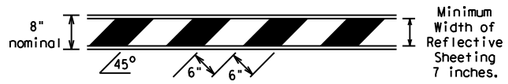
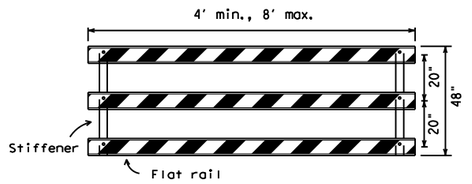
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



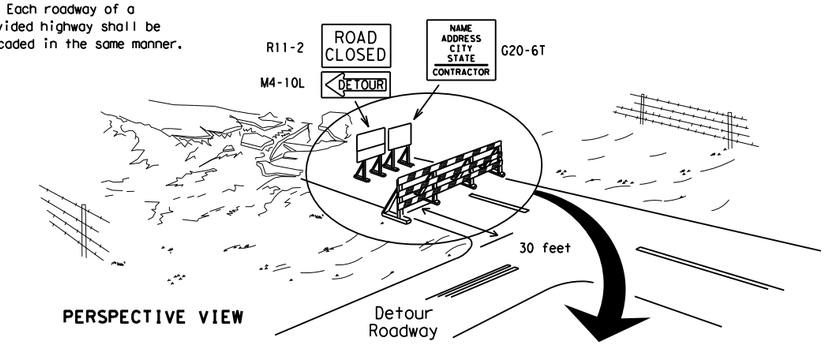
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

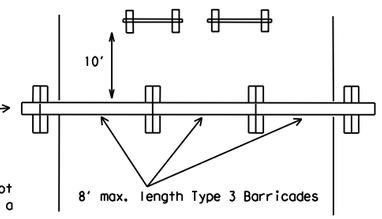
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

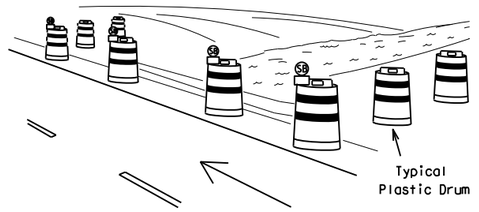
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

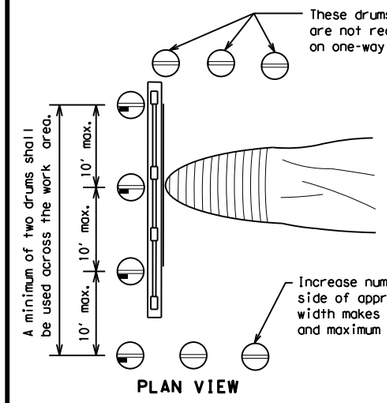
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

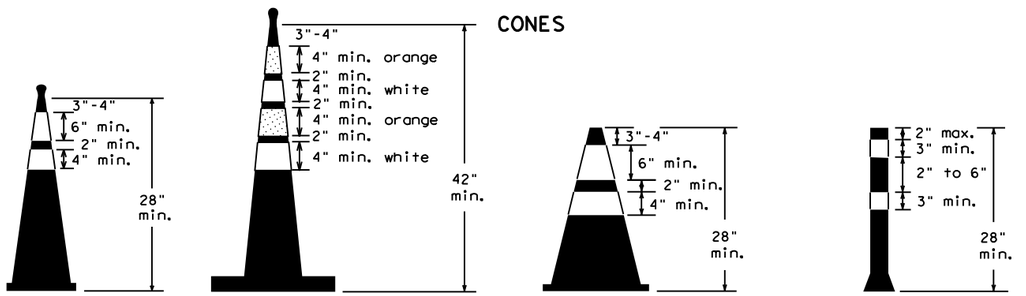
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



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

PLAN VIEW

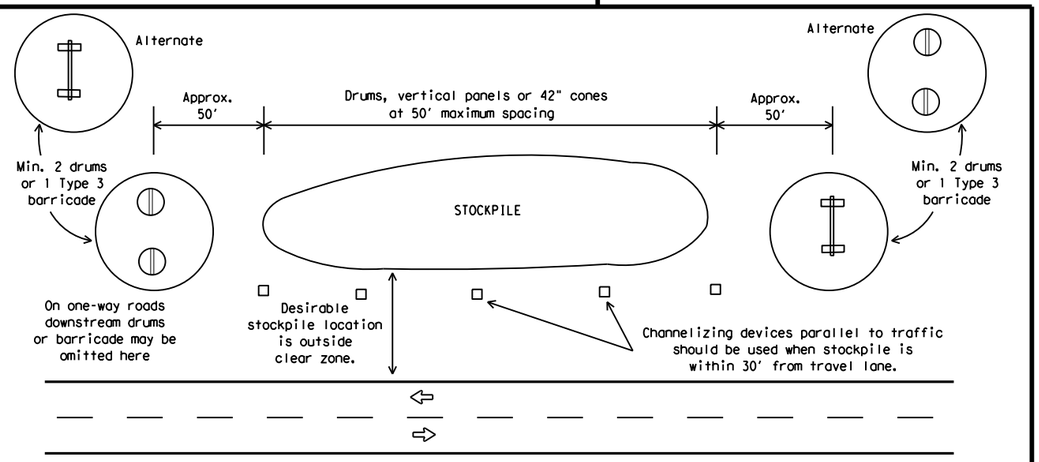
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



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

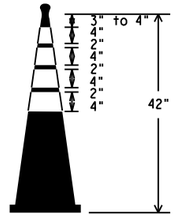
42" 2-piece cones shall have a minimum weight of 30 lbs. including base.

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

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



EDGELINE CHANNELIZER

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

Texas Department of Transportation — Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-14

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REVISIONS 9-07 8-14 7-13	0915	14	047	CR 347
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	SAT	WILSON		24

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WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

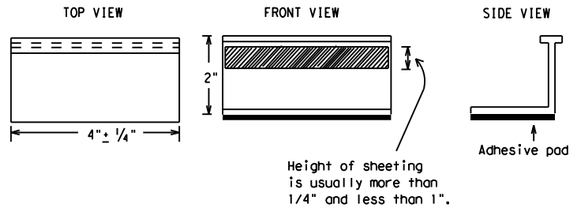
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-14

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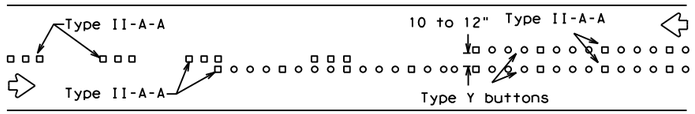
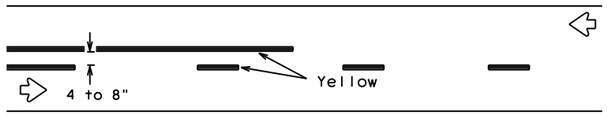
PAVEMENT MARKING PATTERNS

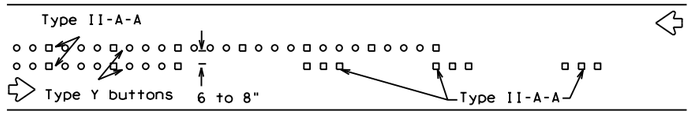
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



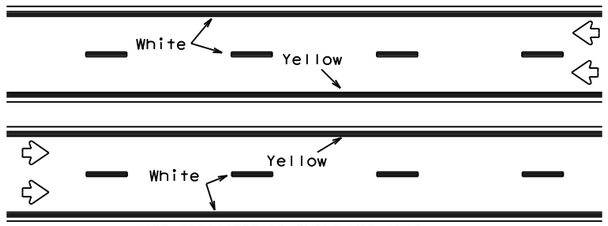
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



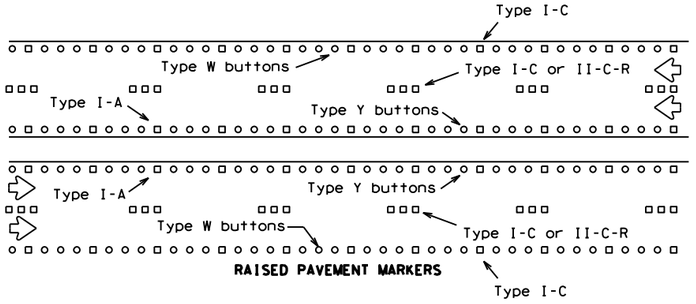
RAISED PAVEMENT MARKERS - PATTERN B

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

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



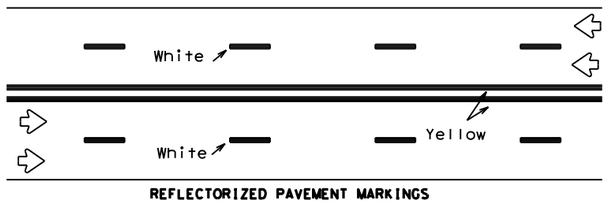
REFLECTORIZED PAVEMENT MARKINGS



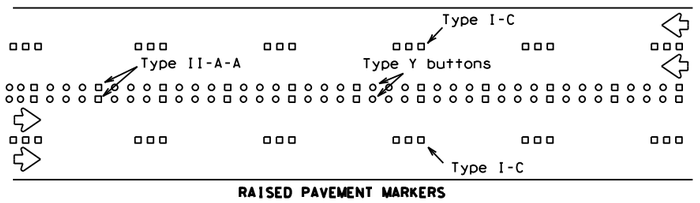
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



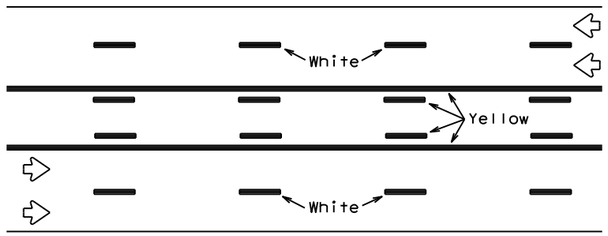
REFLECTORIZED PAVEMENT MARKINGS



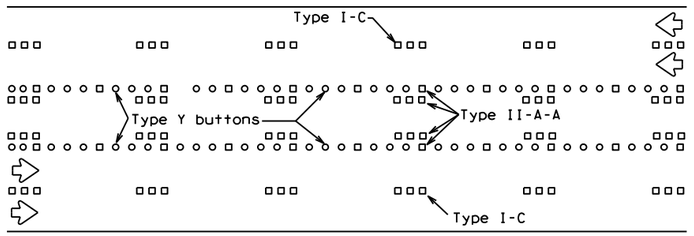
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

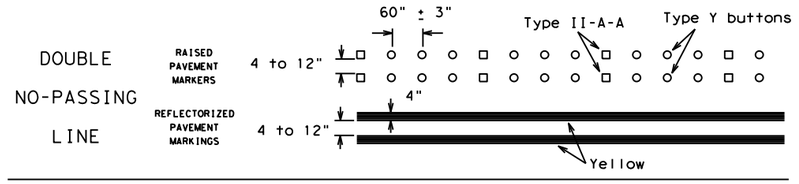
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

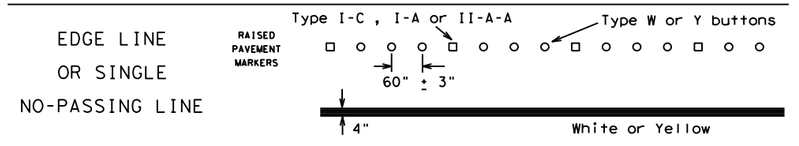
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

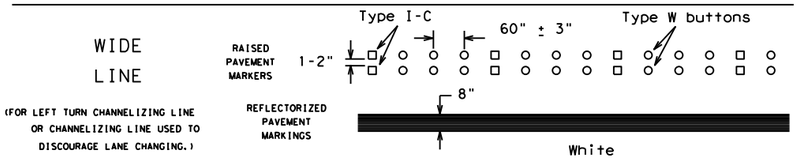


EDGE LINE OR SINGLE NO-PASSING LINE



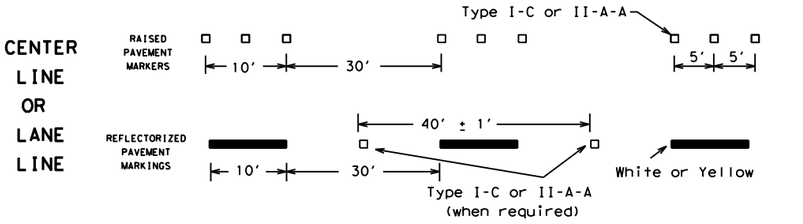
WIDE LINE

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

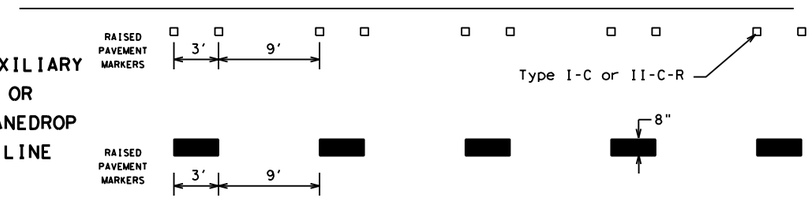


BROKEN LINES

CENTER LINE OR LANE LINE

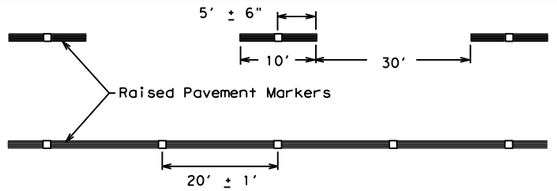


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



Centerline only - not to be used on edge lines

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

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	14	047	CR 347
1-97 9-07	DIST	COUNTY		SHEET NO.
2-98 7-13	SAT	WILSON		26
11-02 8-14				

106

DATE: 2/4/2021 7:43:22 AM
FILE: c:\pwworking\kha\pwprod\jordan.kiewit.vdms99925\bc-14.dgn

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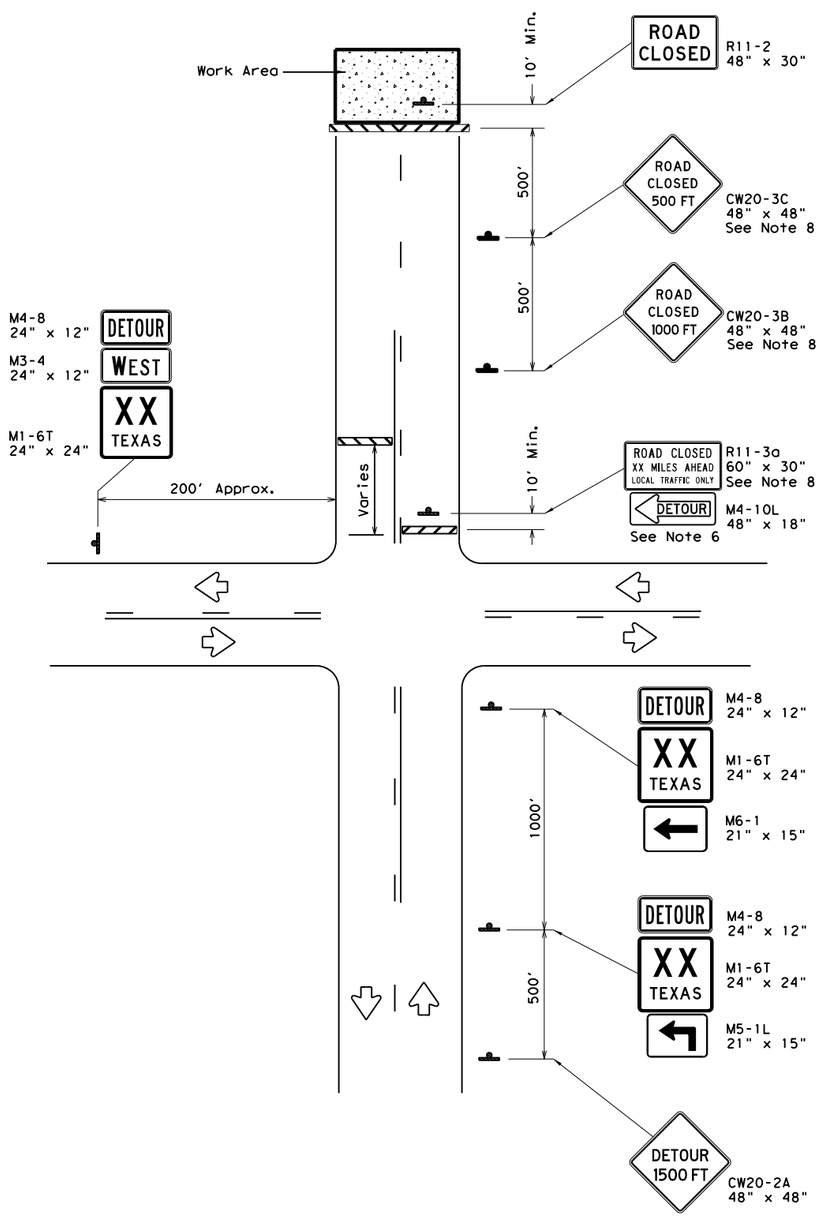
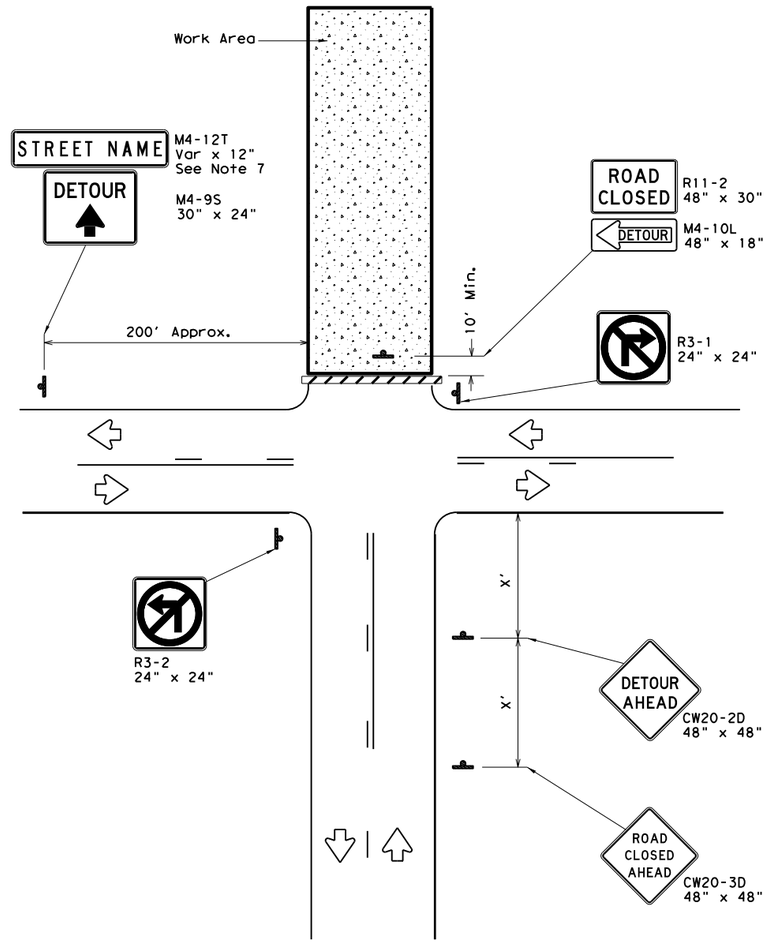


ROAD CLOSURE BEYOND THE INTERSECTION

Signing for a Numbered Route with an Off-Site Detour



ROAD CLOSURE AT THE INTERSECTION

Signing for an Un-numbered Route with an Off-Site Detour

LEGEND	
	Type 3 Barricade
	Sign

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

* Conventional Roads Only

GENERAL NOTES

1. This sheet is intended to provide details for temporary work zone road closures. For permanent road closure details see the D&OM standards.
2. Barricades used shall meet the requirements shown on Barricade and Construction Standard BC(10) and listed on the Compliant Work Zone Traffic Control Devices list (CWZTCD).
3. Stockpiled materials shall not be placed on the traffic side of barricades.
4. Barricades at the road closure should extend from pavement edge to pavement edge.
5. Detour signing shown is intended to illustrate the type of signing that is appropriate for numbered routes or un-numbered routes as labeled. It does not indicate the full extent of detour signing required. Detour routes should be signed as shown elsewhere in the plans.
6. If the road is open for a significant distance beyond the intersection or there are significant origin/destination points beyond the intersection, the signs and barricades at this location should be located at the edge of the traveled way.
7. The Street Name (M4-12T) sign is to be placed above the DETOUR (M4-9S) sign.
8. For urban areas where there is a shorter distance between the intersection and the actual closure location, the ROAD CLOSED XX MILES AHEAD (R11-3a) sign may be replaced with a ROAD CLOSED TO THRU TRAFFIC (R11-4) sign. If adequate space does not exist between the intersection and the closure a single ROAD CLOSED AHEAD (CW20-3D) sign spaced as per the table above may replace the ROAD CLOSED 1000 FT (CW20-3B) and ROAD CLOSED 500 FT (CW20-3C) signs.
9. Signs and barricades shown shall be subsidiary to Item 502. Locations where these details will be required shall be as shown elsewhere in the plans.

Texas Department of Transportation

Traffic Operations Division Standard

WORK ZONE ROAD CLOSURE DETAILS

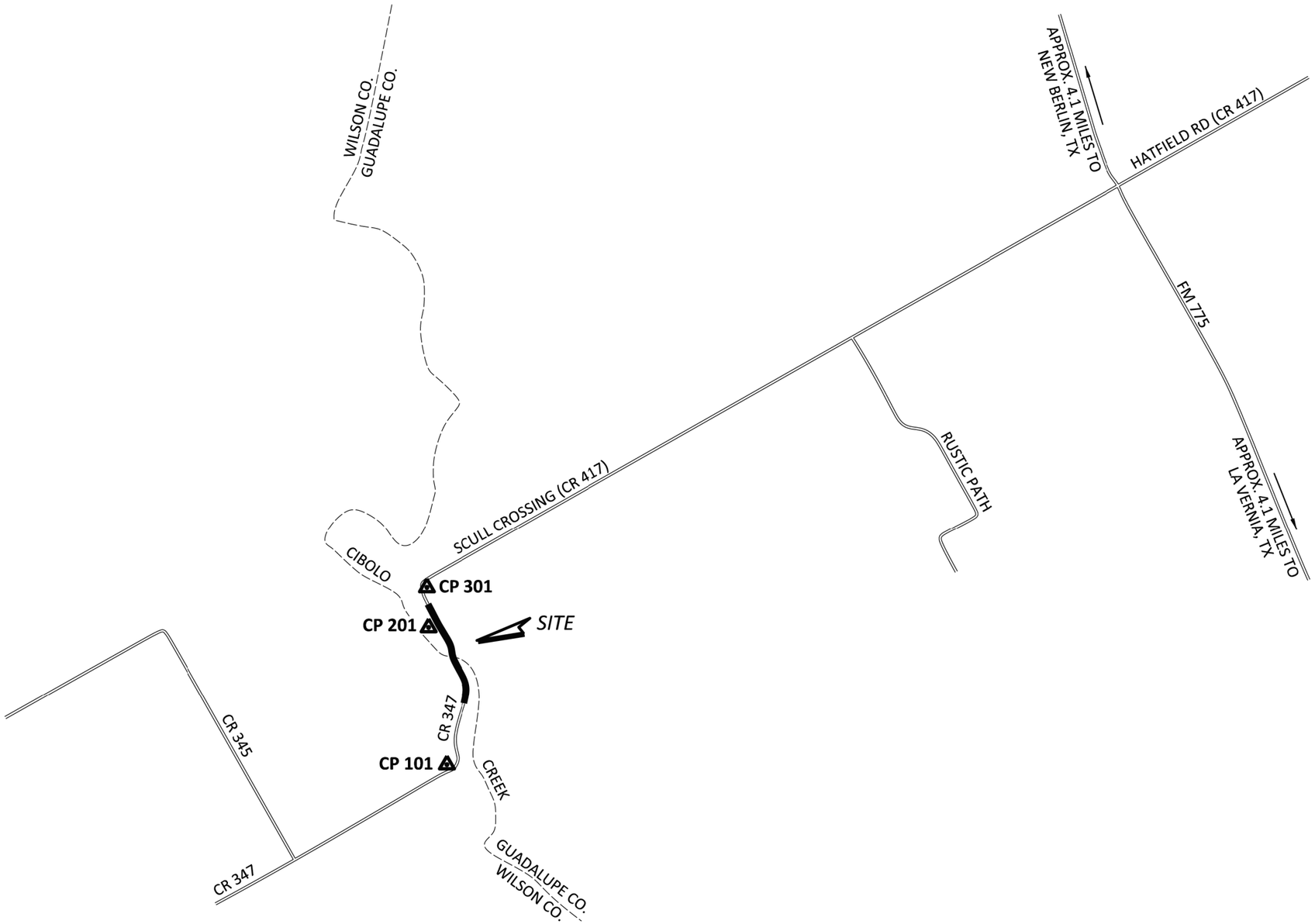
WZ(RCD)-13

FILE: wzrcd-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 1995	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	14	047	CR 347
1-97 4-98 7-13	DIST	COUNTY		SHEET NO.
2-98 3-03	SAT	WILSON		27

CONTROL POINT	SURFACE COORDINATES		GRID COORDINATES		LATITUDE	LONGITUDE	ELEVATION	DESCRIPTION
	Northing	Easting	Northing	Easting				
101	13,693,155.99	2,246,684.19	13,691,376.11	2,246,329.14	29°23'33.8746"	98°07'38.1864"	497.46'	5/8" IRON ROD WITH TXDOT ALUMINUM DISK
201	13,694,337.35	2,246,553.28	13,692,557.32	2,246,261.27	29°23'45.5789"	98°07'39.5664"	477.31'	5/8" IRON ROD WITH TXDOT ALUMINUM DISK
301	13,694,635.86	2,246,489.83	13,692,855.79	2,246,197.83	29°23'48.5387"	98°07'40.2588"	499.37'	5/8" IRON ROD WITH TXDOT ALUMINUM DISK

NORTH

NOT TO SCALE



NOTES:

HORIZONTAL DATUM:

BEARINGS ARE BASED ON NAD83 (2011), TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE (4204). COORDINATES AND DISTANCES ARE IN U.S. SURVEY FEET. COORDINATE VALUES ARE SURFACE VALUES DERIVED BY A GRID TO SURFACE ADJUSTMENT FACTOR OF 1.00013.

HORIZONTAL CONTROL COORDINATE VALUES WERE OBTAINED BY GPS/GNSS OBSERVATIONS UTILIZING TXDOT RTN VRS SYSTEM NAD83 ITRF 2014 (EPOCH 2010) TO THE FOLLOWING CONTINUOUSLY OPERATING REFERENCE STATIONS (CORS):

CORS ID: TXSE
SITE NAME: SEGUIN COR ARP

CORS ID: GVEC
SITE NAME: GUADALUPE VALLEY ELECTRIC COOP

VERTICAL DATUM:

ELEVATIONS ARE REFERENCED TO NORTH AMERICAN VERTICAL DATUM 1988 (NAVD88), GEOID MODEL 12B (CONUS) AND WERE ESTABLISHED THROUGH DIFFERENTIAL DIGITAL LEVELING METHODS AND GPS STATION AVERAGING.

DATE ESTABLISHED: 07/14/2020

STATE OF TEXAS
REGISTERED
VICTOR MENDEZ, JR.
6056
PROFESSIONAL
LAND SURVEYOR

09/15/2020
VICTOR MENDEZ, JR., R.P.L.S. NO. 6056

DATE	BY	REV	REVISION

POZNECKI CAMARILLO
5835 CALLAGHAN RD. SUITE 200
SAN ANTONIO, TEXAS, 78228
(210) 349-3273 (PH)
TBPE FIRM REGISTRATION #F-483 / TBPLS FIRM REGISTRATION #100423-00
(210) 349-4395 (FAX) http://www.pozcam.com/

CR 347

HORIZONTAL AND VERTICAL CONTROL INDEX MAP

DSN	DV	FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
CHK	VM		BR 2021(063)		28
DRN	RC	STATE	DIST.	COUNTY	
CHK	CR	TEXAS	14	WILSON/GUADALUPE	
		CONT.	SECT.	JOB	HIGHWAY NO.
		0915	14	047	CR 347

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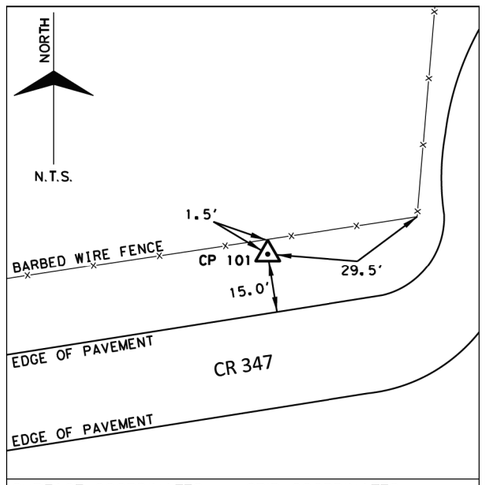
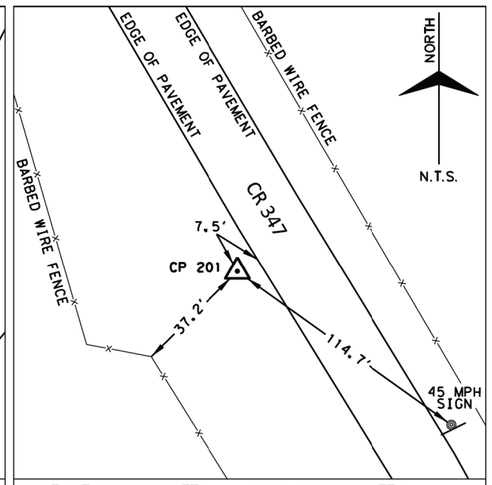
CP 101



SURFACE COORDINATES		GRID COORDINATES	
NORTHING:	13,693,155.99	NORTHING:	13,691,376.11
EASTING:	2,246,684.19	EASTING:	2,246,392.14
ELEVATION:	497.46'	ELEVATION:	497.46'

DESCRIPTION – 5/8" IRON ROD WITH TXDOT ALUMINUM DISK SET APPROXIMATELY 1,515' NORTHEAST OF THE INTERSECTION OF CR 347 AND CR 345 ON THE NORTHWEST SIDE OF CR 347.

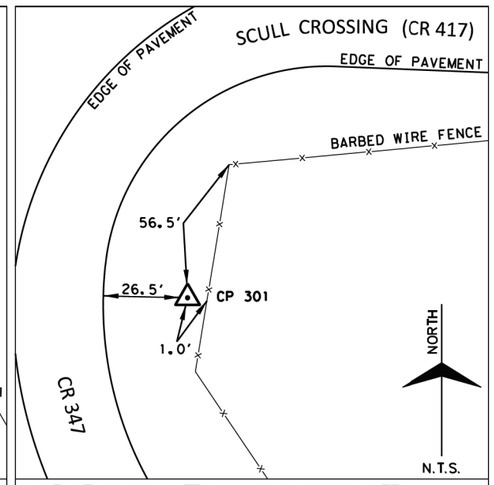
CP 201



SURFACE COORDINATES		GRID COORDINATES	
NORTHING:	13,694,337.35	NORTHING:	13,692,557.32
EASTING:	2,246,553.28	EASTING:	2,246,261.27
ELEVATION:	477.31'	ELEVATION:	477.31'

DESCRIPTION – 5/8" IRON ROD WITH TXDOT ALUMINUM DISK SET APPROXIMATELY 2,810' NORTHEAST OF THE INTERSECTION OF CR 347 AND CR 345 ON THE SOUTHWEST SIDE OF CR 347.

CP 301



SURFACE COORDINATES		GRID COORDINATES	
NORTHING:	13,694,635.86	NORTHING:	13,692,855.79
EASTING:	2,246,489.83	EASTING:	2,246,197.83
ELEVATION:	499.37'	ELEVATION:	499.37'

DESCRIPTION – 5/8" IRON ROD WITH TXDOT ALUMINUM DISK SET APPROXIMATELY 3,145' NORTHEAST OF THE INTERSECTION OF CR 347 AND CR 345 ON THE EAST SIDE OF CR 347.

NOTES:

HORIZONTAL DATUM:

BEARINGS ARE BASED ON NAD83 (2011), TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE (4204). COORDINATES AND DISTANCES ARE IN U.S. SURVEY FEET. COORDINATE VALUES ARE SURFACE VALUES DERIVED BY A GRID TO SURFACE ADJUSTMENT FACTOR OF 1.00013.

HORIZONTAL CONTROL COORDINATE VALUES WERE OBTAINED BY GPS/GNSS OBSERVATIONS UTILIZING TXDOT RTN VRS SYSTEM NAD83 ITRF 2014 (EPOCH 2010) TO THE FOLLOWING CONTINUOUSLY OPERATING REFERENCE STATIONS (CORS):

CORS ID: TXSE
SITE NAME: SEGUIN COR ARP

CORS ID: GVEC
SITE NAME: GUADALUPE VALLEY ELECTRIC COOP

VERTICAL DATUM:

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DATE ESTABLISHED: 07/14/2020

STATE OF TEXAS
REGISTERED
VICTOR MENDEZ, JR.
6056
PROFESSIONAL
LAND SURVEYOR

09/15/2020
VICTOR MENDEZ, JR., R.P.L.S. NO. 6056

DATE	BY	REV	REVISION

POZNECKI CAMARILLO
5835 CALLAGHAN RD. SUITE 200
SAN ANTONIO, TEXAS, 78228
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TBPE FIRM REGISTRATION #F-483 / TBPLS FIRM REGISTRATION #100423-00
(210) 349-4395 (FAX) http://www.pozcam.com/

CR 347

HORIZONTAL AND VERTICAL CONTROL

DSN	DV	FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
CHK	VM		BR 2021(063)		29
DRN	RC	STATE	DIST.	COUNTY	
		TEXAS	14	WILSON/GUADALUPE	
CHK	CR	CONT.	SECT.	JOB	HIGHWAY NO.
		0915	14	047	CR 347

Beginning chain CR347 description

Point CR3471 N 13,693,824.4200 E 2,246,810.1670 Sta 8+24.66

Course from CR3471 to PC CR347-1 N 24° 56′ 33.78" W Dist 84.9572

Curve Data

Curve CR347-

P.I. Station	9+29.42	N	13,693,919.4100	E	2,246,765.9880
Delta =	11° 18′ 35.64" (LT)				
Degree =	28° 38′ 52.40"				
Tangent =	19.8038				
Length =	39.4790				
Radius =	200.0000				
External =	0.9781				
Long Chord =	39.4149				
Mid. Ord. =	0.9733				
P.C. Station	9+09.61	N	13,693,901.4533	E	2,246,774.3395
P.T. Station	9+49.09	N	13,693,935.3802	E	2,246,754.2771
C.C.		N	13,693,817.1109	E	2,246,592.9935
Back = N	24° 56′ 33.78" W				
Ahead = N	36° 15′ 09.42" W				
Chord Bear = N	30° 35′ 51.60" W				

Course from PT CR347-1 to PC CR347-2 N 36° 15′ 09.42" W Dist 118.3950

Curve Data

Curve CR347-2

P.I. Station	10+84.49	N	13,694,044.5664	E	2,246,674.2107
Delta =	41° 23′ 40.79" (RT)				
Degree =	127° 19′ 26.24"				
Tangent =	17.0017				
Length =	32.5113				
Radius =	45.0000				
External =	3.1047				
Long Chord =	31.8088				
Mid. Ord. =	2.9043				
P.C. Station	10+67.49	N	13,694,030.8560	E	2,246,684.2646
P.T. Station	11+00.00	N	13,694,061.4997	E	2,246,675.7345
C.C.		N	13,694,057.4666	E	2,246,720.5534
Back = N	36° 15′ 09.42" W				
Ahead = N	5° 08′ 31.37" E				
Chord Bear = N	15° 33′ 19.02" W				

Course from PT CR347-2 to PC CR347-3 N 5° 08′ 31.37" E Dist 51.3598

Curve Data

Curve CR347-3

P.I. Station	11+88.31	N	13,694,149.4584	E	2,246,683.6497
Delta =	34° 13′ 57.87" (LT)				
Degree =	47° 44′ 47.34"				
Tangent =	36.9544				
Length =	71.6969				
Radius =	120.0000				
External =	5.5612				
Long Chord =	70.6352				
Mid. Ord. =	5.3149				
P.C. Station	11+51.36	N	13,694,112.6528	E	2,246,680.3376
P.T. Station	12+23.06	N	13,694,181.7510	E	2,246,665.6827
C.C.		N	13,694,123.4078	E	2,246,560.8206
Back = N	5° 08′ 31.37" E				
Ahead = N	29° 05′ 26.50" W				
Chord Bear = N	11° 58′ 27.56" W				

Course from PT CR347-3 to PC CR347-4 N 29° 05′ 26.50" W Dist 85.2531

Curve Data

Curve CR347-4

P.I. Station	13+27.78	N	13,694,273.2623	E	2,246,614.7676
Delta =	2° 13′ 50.42" (LT)				
Degree =	5° 43′ 46.48"				
Tangent =	19.4687				
Length =	38.9326				
Radius =	1,000.0000				
External =	0.1895				
Long Chord =	38.9301				
Mid. Ord. =	0.1895				
P.C. Station	13+08.31	N	13,694,256.2495	E	2,246,624.2332
P.T. Station	13+47.24	N	13,694,289.8938	E	2,246,604.6470
C.C.		N	13,693,770.0561	E	2,245,750.3820
Back = N	29° 05′ 26.50" W				
Ahead = N	31° 19′ 16.91" W				
Chord Bear = N	30° 12′ 21.70" W				

Course from PT CR347-4 to CR34714 N 31° 19′ 16.91" W Dist 78.4668

Point CR34714 N 13,694,356.9253 E 2,246,563.8570 Sta 14+25.71

Ending chain CR347 description

4/7/2021

JORDAN S. KIEWIT 131234 LICENSED PROFESSIONAL ENGINEER STATE OF TEXAS

Kimley»Horn F-928

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CR 347 @ CIBOLO CREEK

HORIZONTAL ALIGNMENT DATA

SHEET 1 OF 1

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	BR 2021 (063)	CR 347

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	WILSON	30
CONT.	SECT.	JOB	
0915	14	047	

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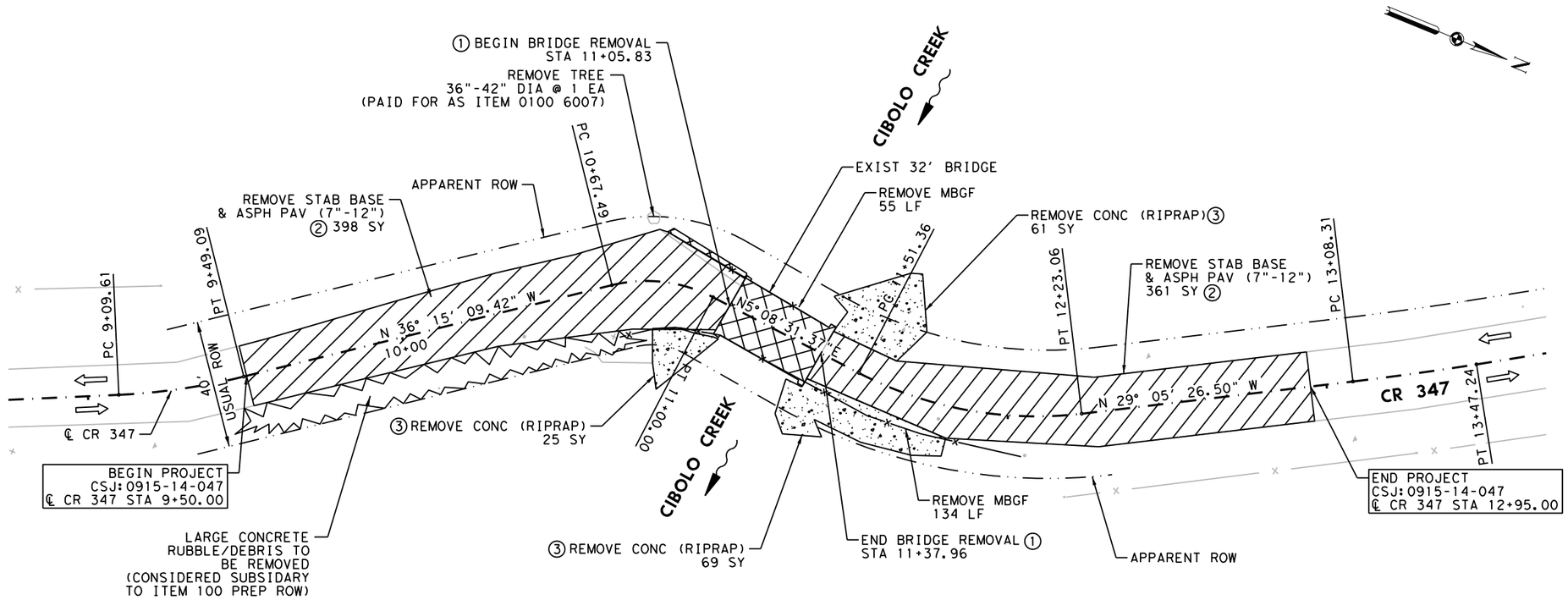
ITEM CODE	DESCRIPTION	UNIT	QTY
0100 6007	PREP ROW (TREE)(GREATER THAN 24" DIA)	EA	1
0104 6009	REMOVING CONC (RIPRAP)	SY	155
0105 6014	REMOVING STAB BASE & ASPH PAV (7"-12")	SY	759
0496 6009	REMOV STR (BRIDGE 0 - 99 FT LENGTH)	EA	1
0542 6001	REMOVE METAL BEAM GUARD FENCE	LF	189



LEGEND

① REMOV STR (BRIDGE 0-99 FT LENGTH)

② REMOVING STAB BASE & ASPH PAV (7"-12")

③ REMOVING CONC (RIPRAP)

NOTES:

1. CONTRACTOR TO DEMOLISH THE EXISTING BRIDGE IN SUCH A MANNER THAT WILL NOT ALLOW MATERIALS/DEBRIS FROM DEMOLITION TO FALL IN AND IMPACT THE WATERS OF CIBOLO CREEK. THIS WORK WILL NOT BE PAID FOR DIRECTLY BUT WILL BE CONSIDERED SUBSIDIARY TO PERTINENT ITEMS.
2. CONTRACTOR SHALL PROVIDE A DEMOLITION PLAN TO ENGINEER FOR APPROVAL PRIOR TO REMOVING THE EXISTING STRUCTURE AND CONCRETE RIPRAP.
3. TREE AND BRUSH REMOVAL SHALL BE SUBSIDIARY TO PREP ROW UNLESS NOTED OTHERWISE.

STATE OF TEXAS
JORDAN S. KIEWIT
131234
LICENSED
PROFESSIONAL ENGINEER

4/7/2021

0' 20' 40' HORZ
SCALE

Kimley»Horn F-928

Texas Department of Transportation

CR 347 @ CIBOLO CREEK

REMOVAL LAYOUT

SHEET 1 OF 1

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	BR 2021 (063)	CR 347

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	WILSON	31
CONT.	SECT.	JOB	
0915	14	047	

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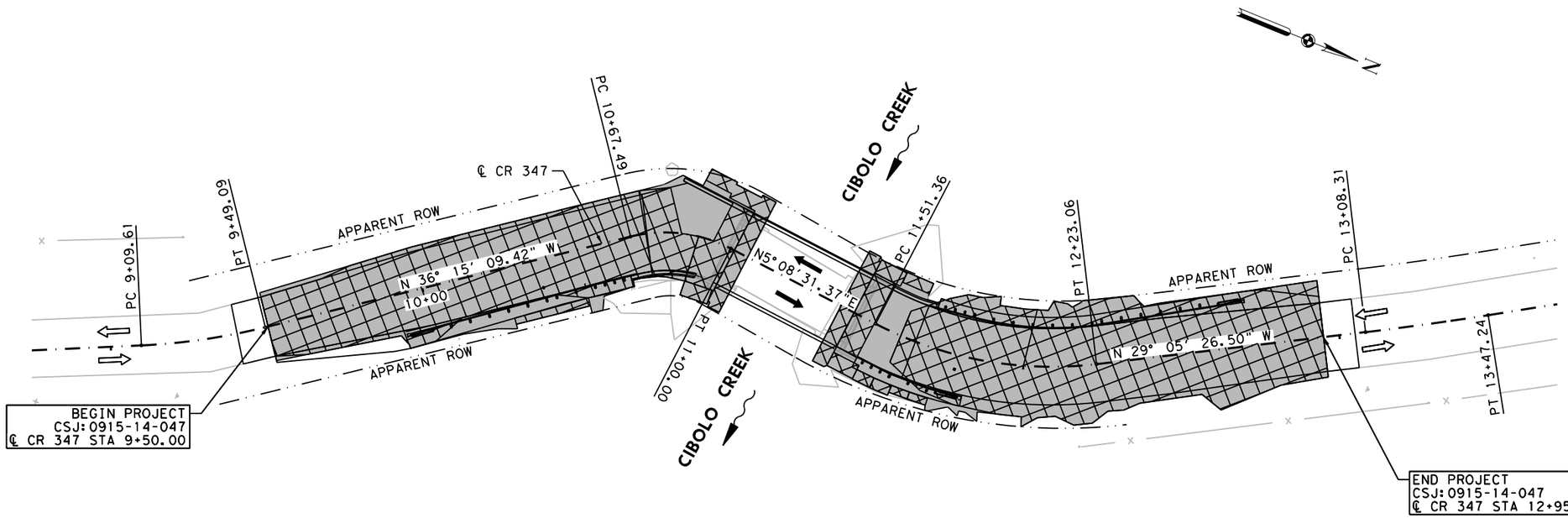
ITEM CODE	DESCRIPTION	UNIT	QTY
0110 6001	EXCAVATION (ROADWAY)	CY	125
0132 6003	EMBANKMENT (FINAL)(ORD COMP)(TY B)	CY	5



LEGEND

CUT

FILL

NOTES:

1. 100 YR FLOOD PLAIN ELEVATION 500.77'.

4/7/2021

STATE OF TEXAS
JORDAN S. KIEWIT
131234
LICENSED
PROFESSIONAL ENGINEER

0' 20' 40'
SCALE: 1"= 40'

Kimley»Horn F-928

Texas Department of Transportation

CR 347 @ CIBOLO CREEK

CUT AND FILL IN FLOODPLAIN

SHEET 1 OF 1

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	BR 2021 (063)	CR 347

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	WILSON	32
CONT.	SECT.	JOB	
0915	14	047	

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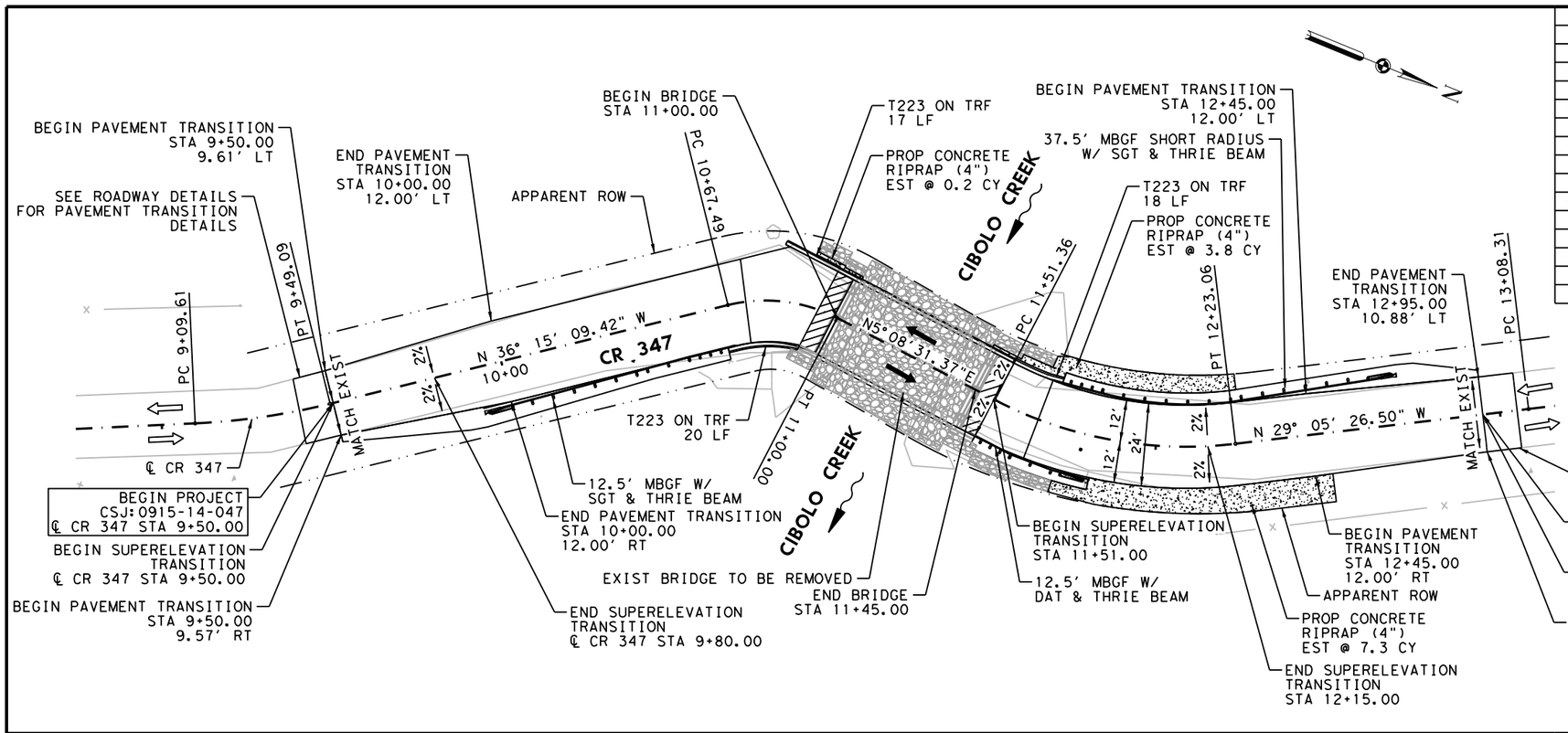


ITEM CODE	DESCRIPTION		UNIT	QTY
0100 6002	PREPARING ROW		STA	3.45
0216 6001	PROOF ROLLING		HR	2
0316 6222	AGGR(TY-PB GR-3 SAC-B)	**	SY	703
0316 6436	ASPH (AC-15P OR AC-10-2TR)	**	SY	703
0420 6066	CL C CONC (RAIL FOUNDATION)		CY	7.5
0432 6001	RIPRAP (CONC)(4 IN)		CY	11.2
0432 6045	RIPRAP (MOW STRIP)(4 IN)		CY	13.5
0450 6006	RAIL (TY T223)		LF	53
0540 6001	MTL W-BEAM GD FEN (TIM POST)		LF	25
0540 6014	SHORT RADIUS		LF	37.5
0540 6016	DOWNSTREAM ANCHOR TERMINAL SECTION		EA	1
0540 6021	MTL THRIE-BEAM GD FEN (TIM POST)		EA	3
0544 6001	GUARDRAIL END TREATMENT (INSTALL)		EA	2
3076 6003	D-GR HMA TY-B PG64-22 (EXEMPT)	**	SY	656
3076 6066	TACK COAT	**	SY	132

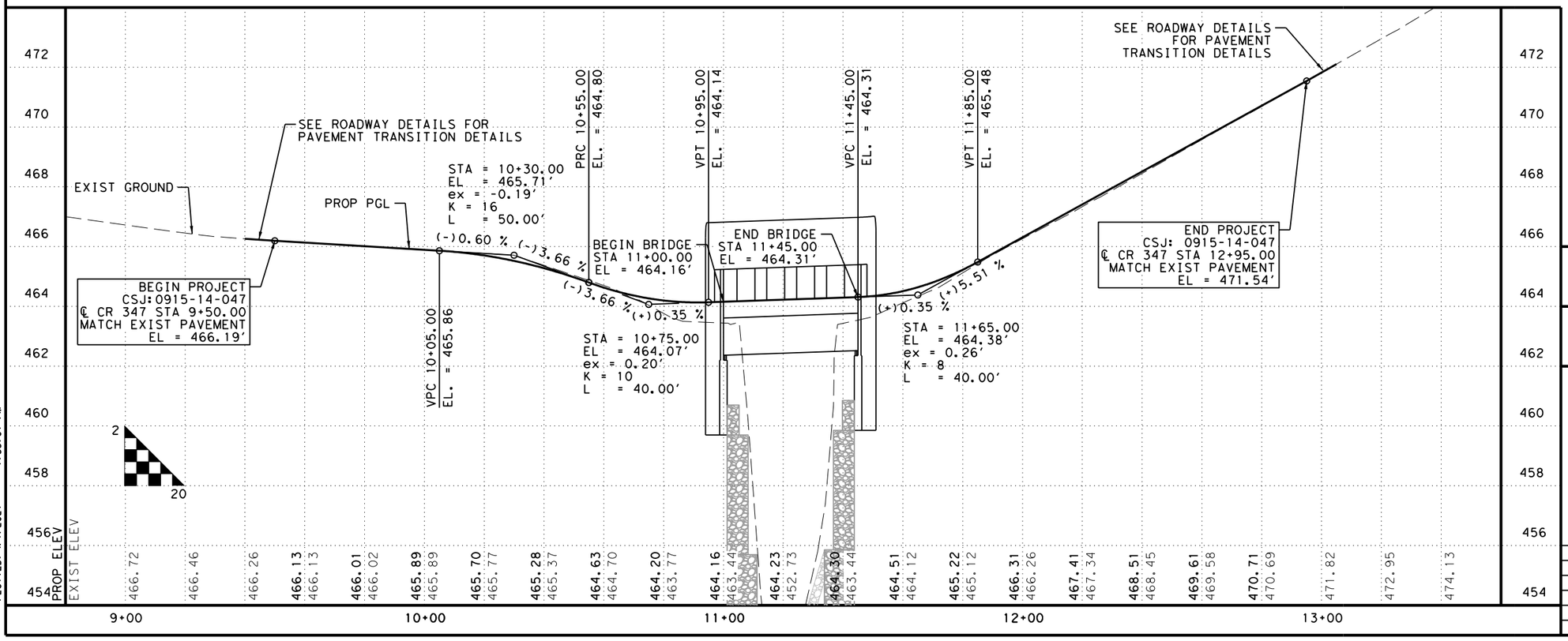
**REFER TO BASIS OF ESTIMATE FOR BID ITEM QUANTITIES

LEGEND

- PROP DIRECTION OF TRAFFIC FLOW
- EXIST DIRECTION OF TRAFFIC FLOW
- FLOW ARROW
- PROP GABION / GABION MATTRESSES

NOTES:

1. REFER TO HORIZONTAL DATA SHEET FOR HORIZONTAL ALIGNMENT DATA.
2. REFER TO HORIZONTAL & VERTICAL CONTROL SHEET FOR BENCHMARK INFORMATION.
3. REFER TO BRIDGE LAYOUT FOR BRIDGE DETAILS.
4. REFER TO GABION DETAILS SHEET FOR GABION DETAILS.



4/7/2021

STATE OF TEXAS
JORDAN S. KIEWIT
131234
LICENSED
PROFESSIONAL ENGINEER

0' 20' 40' HORZ
0' 2' 4' VERT
SCALE

Kimley»Horn F-928

Texas Department of Transportation

CR 347 @ CIBOLO CREEK

PLAN AND PROFILE

SHEET 1 OF 1

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	BR 2021 (063)	CR 347

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	WILSON	33
CONT.	SECT.	JOB	
0915	14	047	

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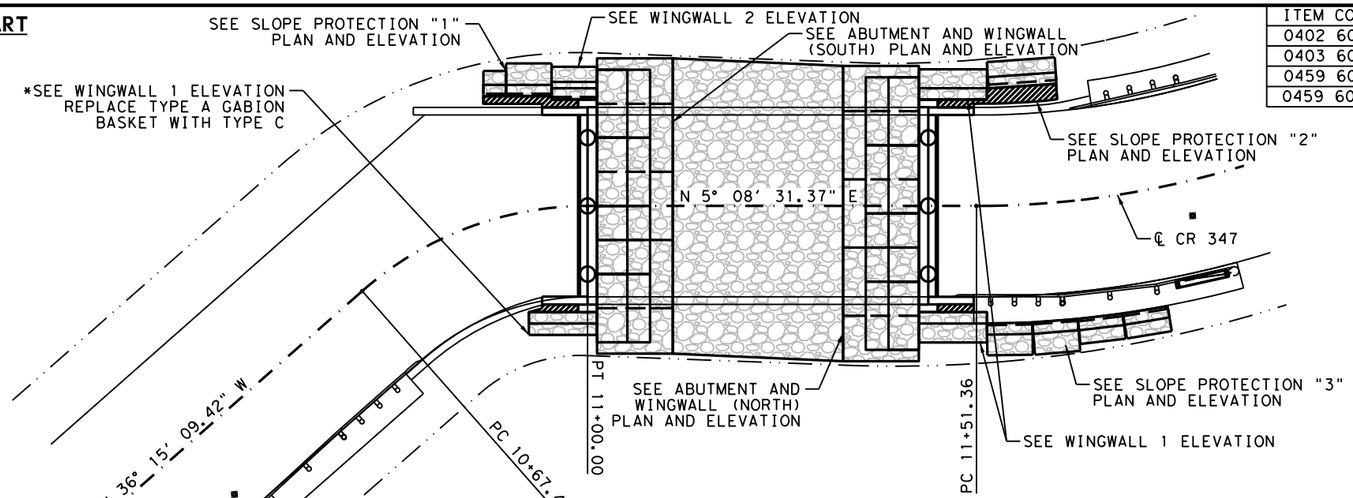
TYPICAL GABION BASKET SIZE CHART

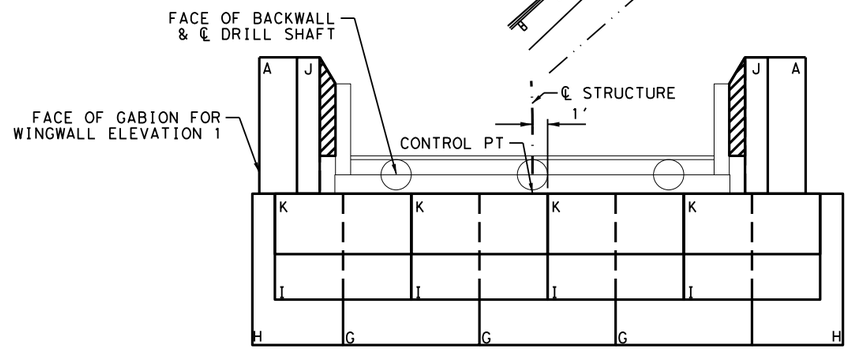
TYPE-(LENGTH X WIDTH X HEIGHT)

A: GABION-(9'X4'X4')
B: GABION-(6'X4'X4')
C: GABION-(9'X3'X3')
D: GABION-(6'X3'X3')
E: GABION-(3'X3'X3')
F: GABION-(6'X2'X2')
G: GABION-(9'X10'X4')
H: GABION-(6'X10'X4')
I: GABION-(9'X7'X4')
J: MATTRESS-(9'X1.5'X1')
K: MATTRESS-(9'X4'X1')
L: MATTRESS-(6'X1.5'X1')

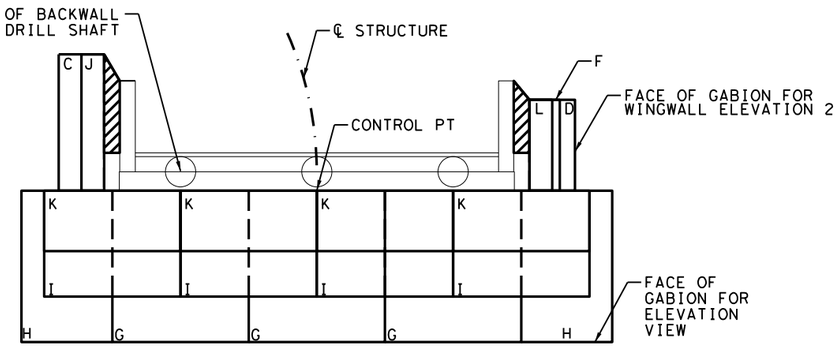


GABION LAYOUT

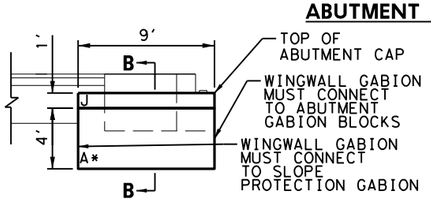
ITEM CODE	DESCRIPTION	UNIT	QTY
0402 6001	TRENCH EXCAVATION PROTECTION	LF	102
0403 6001	TEMPORARY SPL SHORING	SF	820
0459 6001	GABIONS (GALV)	CY	232.7
0459 6007	GABION MATTRESSES (GALV)(12 IN)	SY	111.6



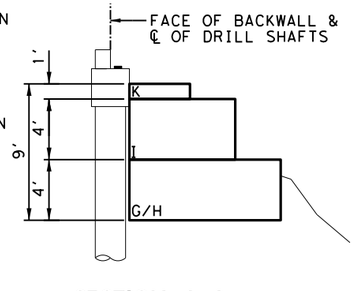
ABUTMENT AND WINGWALL (NORTH) PLAN
N.T.S



ABUTMENT AND WINGWALL (SOUTH) PLAN
N.T.S



WINGWALL 1 ELEV.
N.T.S



SECTION A-A
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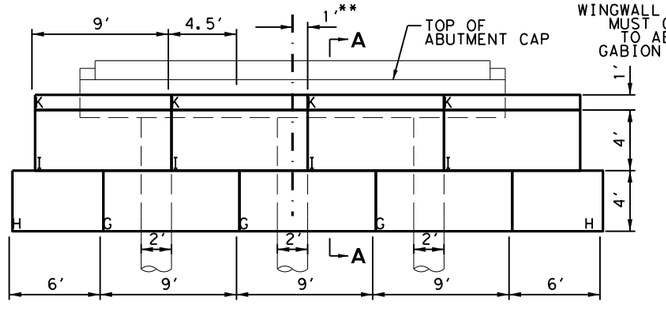
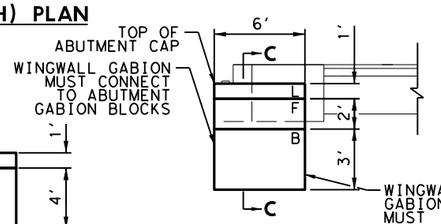
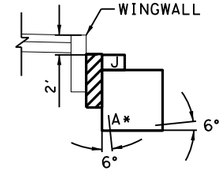


ABUTMENT ELEVATION
N.T.S
** 1' FOR SOUTHERN ABUTMENT
0' FOR NORTHERN ABUTMENT



WINGWALL 2 ELEV.
N.T.S



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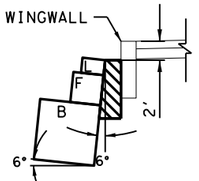
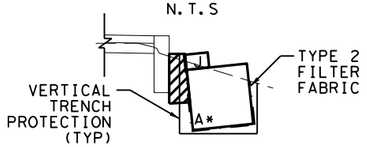
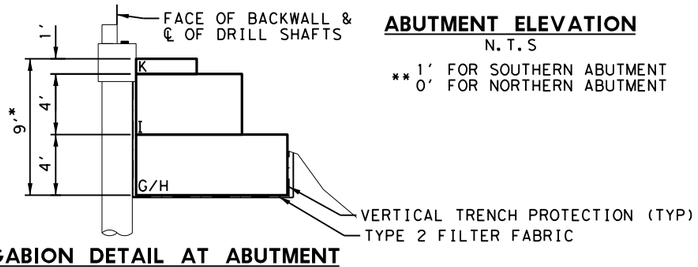


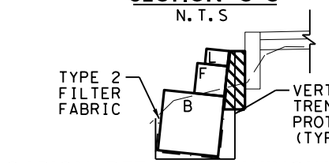
SECTION C-C
N.T.S



GABION DETAIL AT WINGWALL 1
N.T.S



GABION DETAIL AT ABUTMENT
N.T.S
*LIMITS OF PAYMENT FOR TEMPORARY SPECIAL SHORING



GABION DETAIL AT WINGWALL 2
N.T.S

LEGEND

TY DS BACKFILL

FOR CONTRACTOR'S INFORMATION ONLY
TY DS BACKFILL TOTAL QUANTITY:
(ESTIMATED AT 15 CY)

NOTES:

1. FOUNDATION BEDDING MATERIAL SHOULD HAVE A 6° SLOPE TOWARD THE STRUCTURE TO ALLOW THE GABION BASKETS TO REST FIRMLY AGAINST THE STRUCTURE.
2. ALL WORK WILL BE PERFORMED IN ACCORDANCE WITH ITEM 459 "GABIONS AND GABION MATTRESSES". ALL GABION BASKETS WILL BE GALVANIZED. USE TYPE 2 FILTER FABRIC WHERE GABION BASKETS ARE IN CONTACT WITH THE SOIL. ANY VOIDS BETWEEN THE GABION BASKETS AND THE SOIL WILL BE FILLED WITH TYPE "DS" BACKFILL AS SPECIFIED IN ITEM 423. FILTER FABRIC AND TYPE "DS" BACKFILL WILL BE CONSIDERED SUBSIDIARY TO ITEM 459 "GABIONS AND GABION MATTRESSES".
3. CONTRACTOR TO CONNECT ALL ADJOINING GABION OR GABION MATTRESS UNITS.
4. TEMPORARY DIVERSION OF WATER FOR REMOVAL OF EXISTING STRUCTURE AND CONSTRUCTION OF GABIONS AND BRIDGE ELEMENTS WILL NOT BE PAID FOR DIRECTLY BUT WILL BE CONSIDERED SUBSIDIARY TO ITEM 496.

STATE OF TEXAS
JORDAN S. KIEWIT
131234
LICENSED
PROFESSIONAL ENGINEER

4/8/2021

0' 10' 20' HORZ
SCALE

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Texas Department of Transportation

CR 347 @ CIBOLO CREEK

GABION DETAILS

SHEET 1 OF 2

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	BR 2021 (063)	CR 347

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	WILSON	34
CONT.	SECT.	JOB	
0915	14	047	

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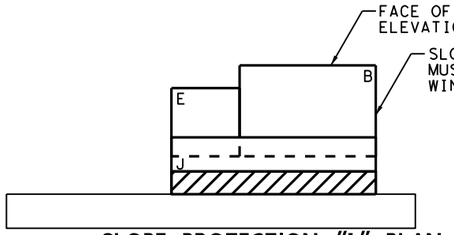
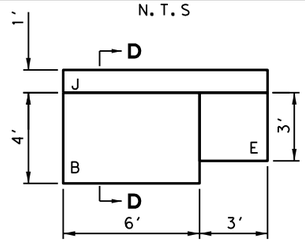
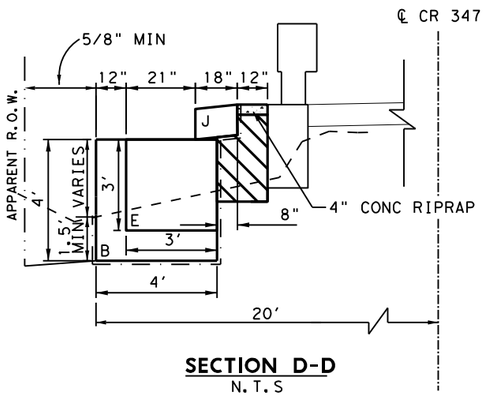


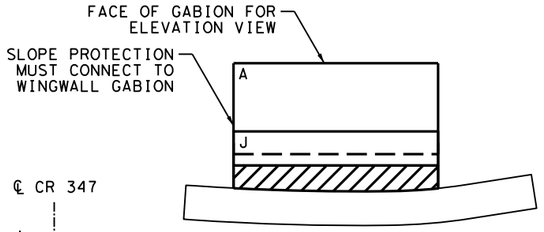
SLOPE PROTECTION "1" PLAN
N.T.S



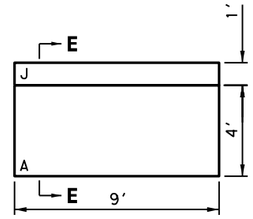
SLOPE PROTECTION "1" ELEVATION
N.T.S



SECTION D-D
N.T.S



SLOPE PROTECTION "2" PLAN
N.T.S



SLOPE PROTECTION "2" ELEVATION
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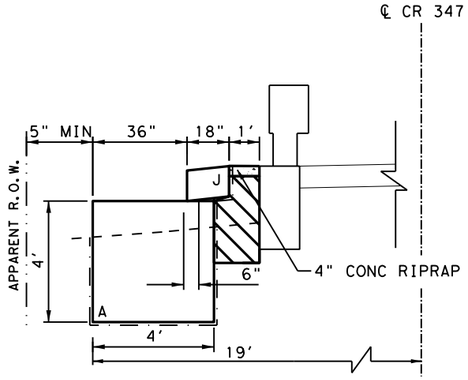
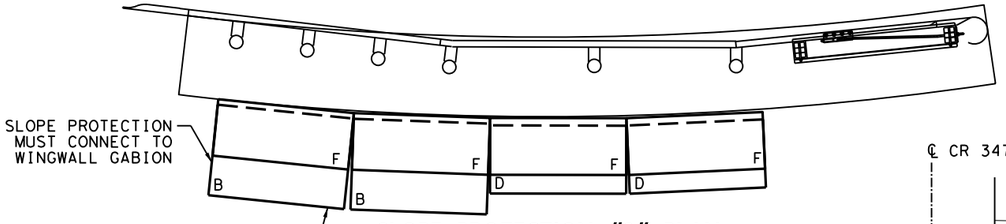
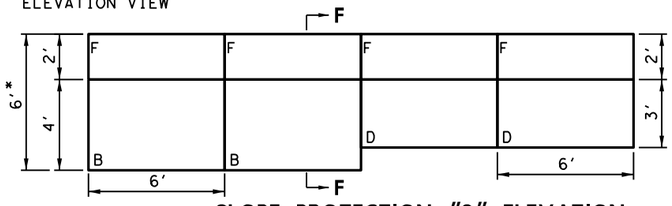


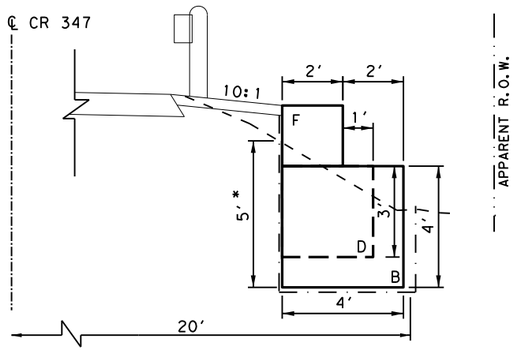
SECTION E-E
N.T.S



SLOPE PROTECTION "3" PLAN
N.T.S



SLOPE PROTECTION "3" ELEVATION
N.T.S
* LIMITS OF PAYMENT FOR TEMPORARY SPECIAL SHORING



SECTION F-F
N.T.S

TYPICAL GABION BASKET SIZE CHART

TYPE-(LENGTH X WIDTH X HEIGHT)

A: GABION-(9'X4'X4')
B: GABION-(6'X4'X4')
C: GABION-(9'X3'X3')
D: GABION-(6'X3'X3')
E: GABION-(3'X3'X3')
F: GABION-(6'X2'X2')
G: GABION-(9'X10'X4')
H: GABION-(6'X10'X4')
I: GABION-(9'X7'X4')
J: MATTRESS-(9'X1.5'X1')
K: MATTRESS-(9'X4'X1')
L: MATTRESS-(6'X1.5'X1')

LEGEND

TY DS BACKFILL

FOR CONTRACTOR'S INFORMATION ONLY
TY DS BACKFILL TOTAL QUANTITY:
(ESTIMATED AT 15 CY)

NOTES:

1. FOUNDATION BEDDING MATERIAL SHOULD HAVE A 6° SLOPE TOWARD THE STRUCTURE TO ALLOW THE GABION BASKETS TO REST FIRMLY AGAINST THE STRUCTURE.
2. ALL WORK WILL BE PERFORMED IN ACCORDANCE WITH ITEM 459 "GABIONS AND GABION MATTRESSES". ALL GABION BASKETS WILL BE GALVANIZED. USE TYPE 2 FILTER FABRIC WHERE GABION BASKETS ARE IN CONTACT WITH THE SOIL. ANY VOIDS BETWEEN THE GABION BASKETS AND THE SOIL WILL BE FILLED WITH TYPE "DS" BACKFILL AS SPECIFIED IN ITEM 423. FILTER FABRIC AND TYPE "DS" BACKFILL WILL BE CONSIDERED SUBSIDIARY TO ITEM 459 "GABIONS AND GABION MATTRESSES".
3. CONSTRUCTION GABION TOE NEAR DRILLED SHAFTS AFTER DRILLED SHAFTS HAVE BEEN PLACED BUT PRIOR TO CONSTRUCTION OF ABUTMENT CAP. FINALIZE GABIONS PRIOR TO SLAB PLACEMENT.
4. GABION CONSTRUCTION SHALL UTILIZE TRENCH EXCAVATION PROTECTION WITH VERTICAL SIDES, PAID IN ACCORDANCE WITH ITEM 402 - TRENCH EXCAVATION PROTECTION.
5. CONTRACTOR TO CONNECT ALL ADJOINING GABION OR GABION MATTRESS UNITS.
6. TEMPORARY DIVERSION OF WATER FOR REMOVAL OF EXISTING STRUCTURE AND CONSTRUCTION OF GABIONS AND BRIDGE ELEMENTS WILL NOT BE PAID FOR DIRECTLY BUT WILL BE CONSIDERED SUBSIDIARY TO ITEM 496.

4/8/2021

STATE OF TEXAS
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Texas Department of Transportation

CR 347 @ CIBOLO CREEK

GABION DETAILS

SHEET 2 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	BR 2021 (063)	CR 347

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	WILSON	35
CONT.	SECT.	JOB	
0915	14	047	

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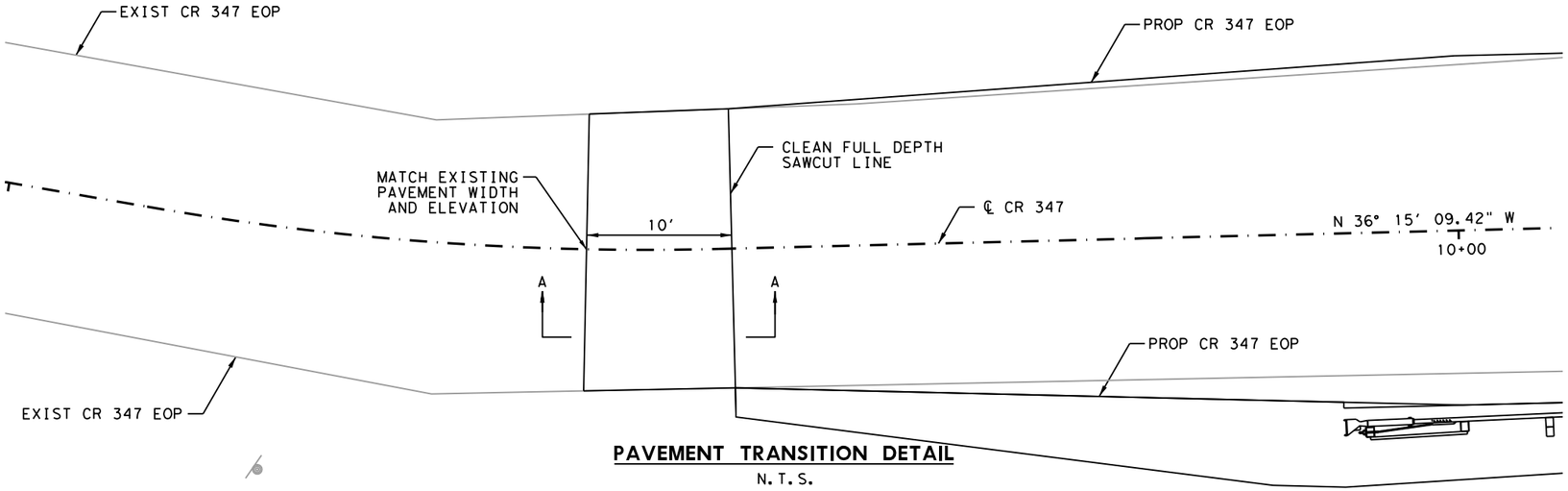
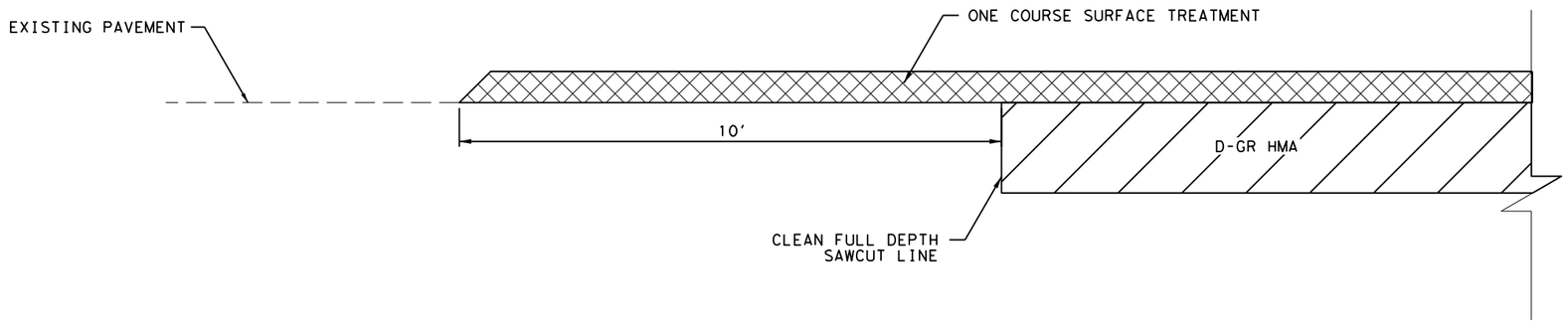


PAVEMENT TRANSITION DETAIL

N.T.S.



SECTION A-A

N.T.S.

NOTES:

1. CONTRACTOR SHALL ADJUST GRADING AS NECESSARY TO ENSURE SMOOTH TRANSITION FROM PROPOSED PAVEMENT TO EXISTING PAVEMENT ACROSS SAWCUT JOINT.

4/7/2021

STATE OF TEXAS
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CR 347 @ CIBOLO CREEK

ROADWAY DETAILS
(PAVEMENT TRANSITION DETAIL)

SHEET 1 OF 1

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	BR 2021 (063)	CR 347

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	WILSON	36
CONT.	SECT.	JOB	
0915	14	047	

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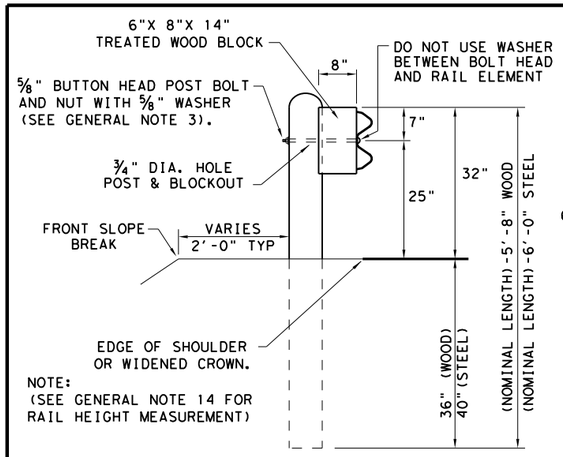
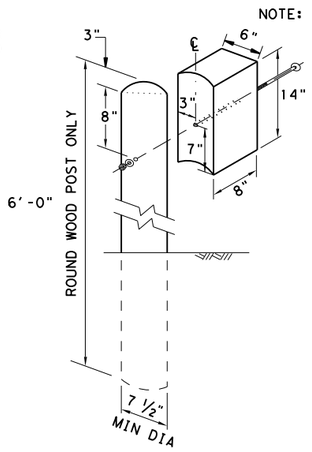
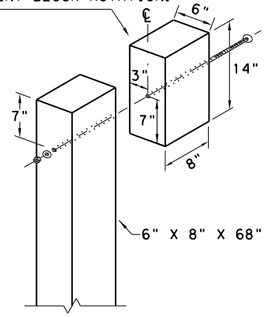


TYPICAL POST PLACEMENT

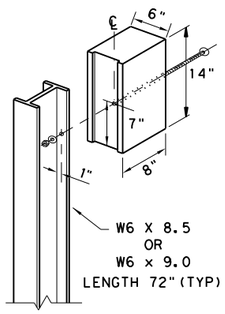


WOOD BLOCK TO ROUND WOOD POST

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

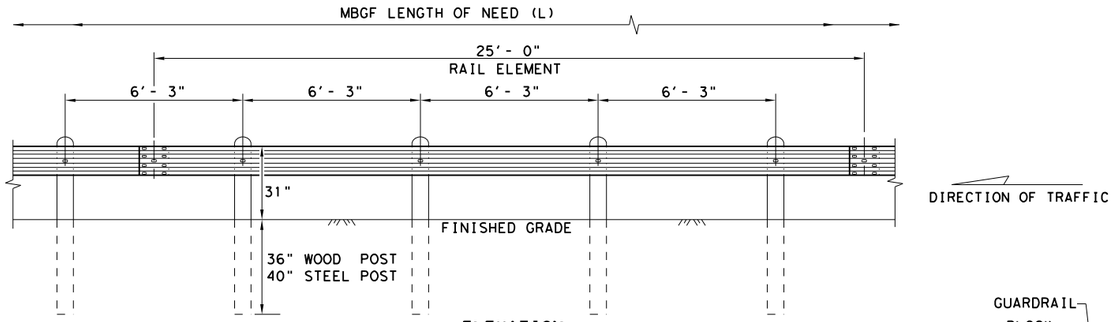


WOOD BLOCK TO RECTANGULAR WOOD POST



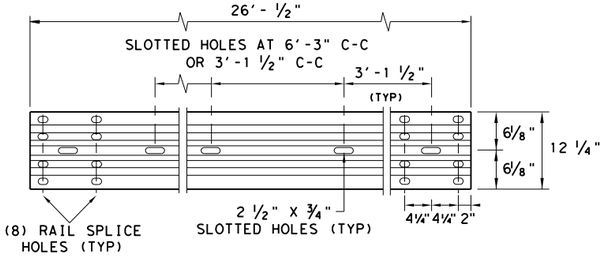
ROUTED WOOD BLOCK TO I-BEAM STEEL POST

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



ELEVATION
MID-SPAN RAIL SPLICE

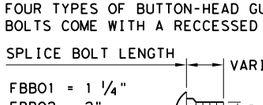
SHOWING A 25'- 0" SECTION OF W-BEAM RAIL. (SEE GENERAL NOTE 2)



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

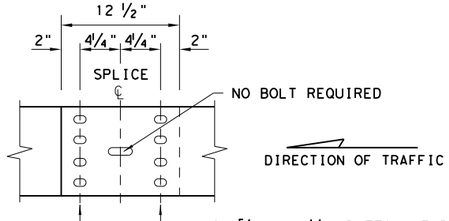
NOTES: SEE GENERAL NOTE 2 FOR ALLOWABLE RAIL TYPES.
SEE RAIL SPLICE DETAIL FOR REQUIRED HARDWARE.

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



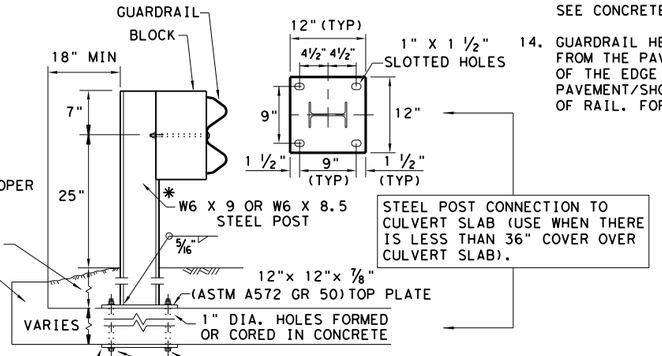
BUTTON HEAD BOLT

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



MID-SPAN RAIL SPLICE DETAIL

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



LOW FILL CULVERT POST

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

NOTE: TWO INSTALLATION OPTIONS.

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

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

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

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

GENERAL NOTES

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

Texas Department of Transportation — Design Division Standard

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

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	SAT	WILSON		37

DATE: 2/4/2021
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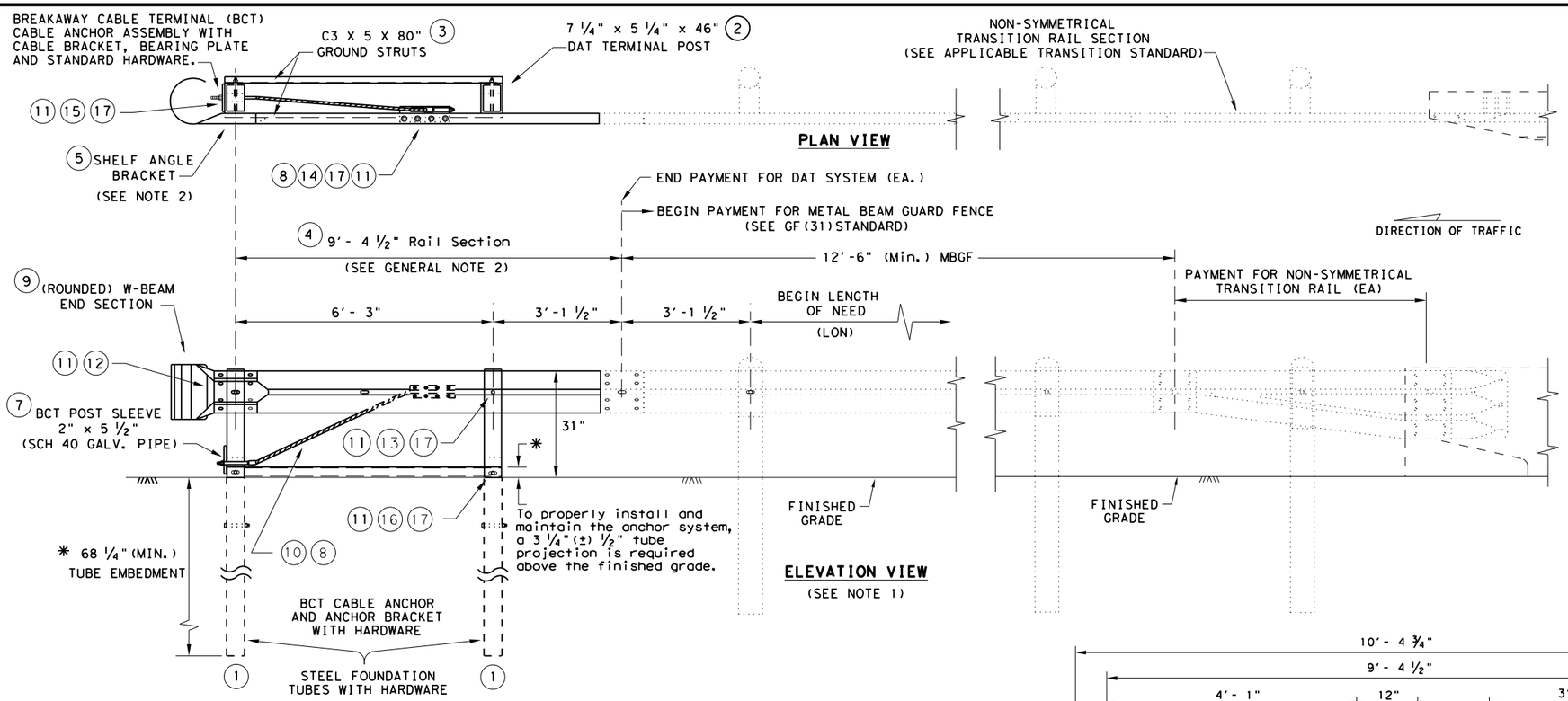


DOWNSTREAM ANCHOR TERMINAL (DAT)

NOTE: ONLY FOR DOWNSTREAM USE, WHEN LOCATED OUTSIDE THE HORIZONTAL CLEARANCE AREA OF OPPOSING TRAFFIC.

GENERAL NOTES

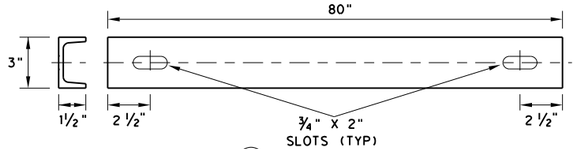
1. THE DETAIL SHOWN IS THE MINIMUM LENGTH OF NEED (LON) FOR A DOWNSTREAM ANCHOR TERMINAL (DAT) CONNECTED TO A CONCRETE RAIL.
2. THE RAIL SECTION AT THE END POST IS SUPPORTED BY THE SHELF ANGLE BRACKET. THE RAIL ELEMENT IS NOT ATTACHED TO THE END POST.
3. THE FOUNDATION TUBES SHALL NOT PROJECT MORE THAN 3 3/4" ABOVE THE FINISHED GRADE.
4. ALL HARDWARE FOR DAT SHALL BE ASTM A307 UNLESS OTHERWISE SHOWN.
5. REFER TO GF(31) SHEET FOR TERMINAL CONNECTION DETAILS.

MOW STRIP INSTALLATION

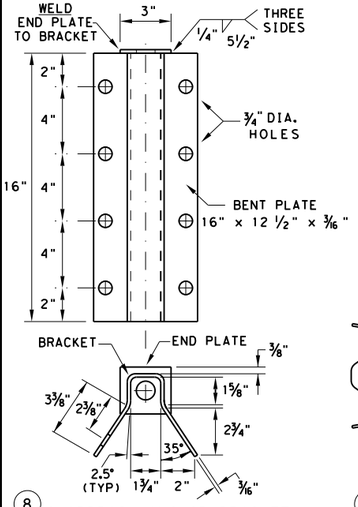
IF A MOW STRIP IS REQUIRED WITH THE DAT INSTALLATION THE LEAVE-OUT AREA AROUND THE STEEL FOUNDATION TUBES AND THE TWO CHANNEL STRUTS MAY BE OMITTED. THIS WILL REQUIRE A FULL POUR AT THE FOUNDATION TUBES.

#	(DAT) PARTS LIST	QTY
(1)	STEEL FOUNDATION TUBE	2
(2)	DAT TERMINAL POST	2
(3)	CHANNEL STRUT	2
(4)	TERMINAL RAIL ELEMENT	1
(5)	SHELF ANGLE BRACKET	1
(6)	BCT BEARING PLATE	1
(7)	BCT POST SLEEVE	1
(8)	GUARDRAIL ANCHOR BRACKET	1
(9)	(ROUNDED) W-BEAM END SECTION	1
(10)	BCT CABLE ANCHOR	1
(11)	RECESSED NUT, GUARDRAIL	20
(12)	1 1/4" BUTTON HEAD BOLT	4
(13)	10" BUTTON HEAD BOLT	2
(14)	5/8" X 2" HEX HEAD BOLT	8
(15)	5/8" X 8" HEX HEAD BOLT	4
(16)	5/8" X 10" HEX HEAD BOLT	2
(17)	5/8" FLAT WASHER	18

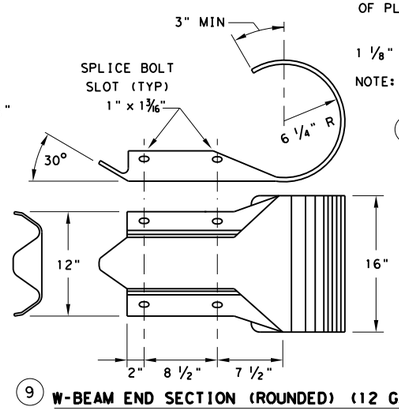
(4) TERMINAL RAIL ELEMENT FOR DAT



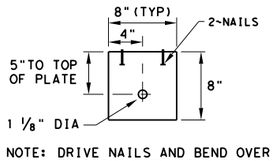
(3) CHANNEL STRUT
C3 X 5 X 80", GRADE A36



(8) GUARDRAIL ANCHOR BRACKET

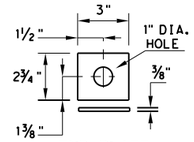


(9) W-BEAM END SECTION (ROUNDED) (12 GA.)

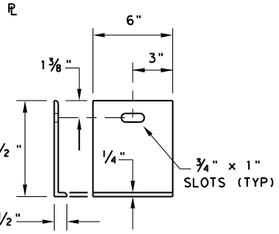


NOTE: DRIVE NAILS AND BEND OVER TO PREVENT PLATE ROTATION

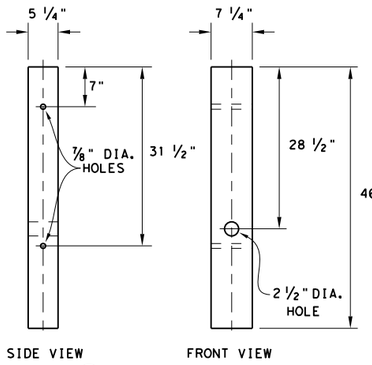
(6) BEARING PLATE
8"x 8"x 5/8" R



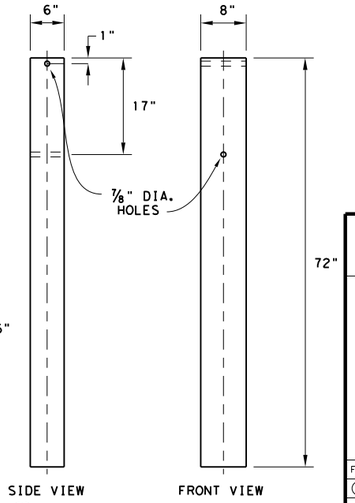
END PLATE



(5) SHELF ANGLE BRACKET



(2) TERMINAL POST
7 1/4"x 5 1/4"x 46" WOOD POST



(1) STEEL FOUNDATION TUBE
6"x 8"x 1/8" x 72" STEEL TUBE

Texas Department of Transportation — Design Division Standard

METAL BEAM GUARD FENCE
(DOWNSTREAM ANCHOR TERMINAL)
TL-3 MASH COMPLIANT

GF(31)DAT-19

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	SAT	WILSON		38

DATE: 2/4/2021
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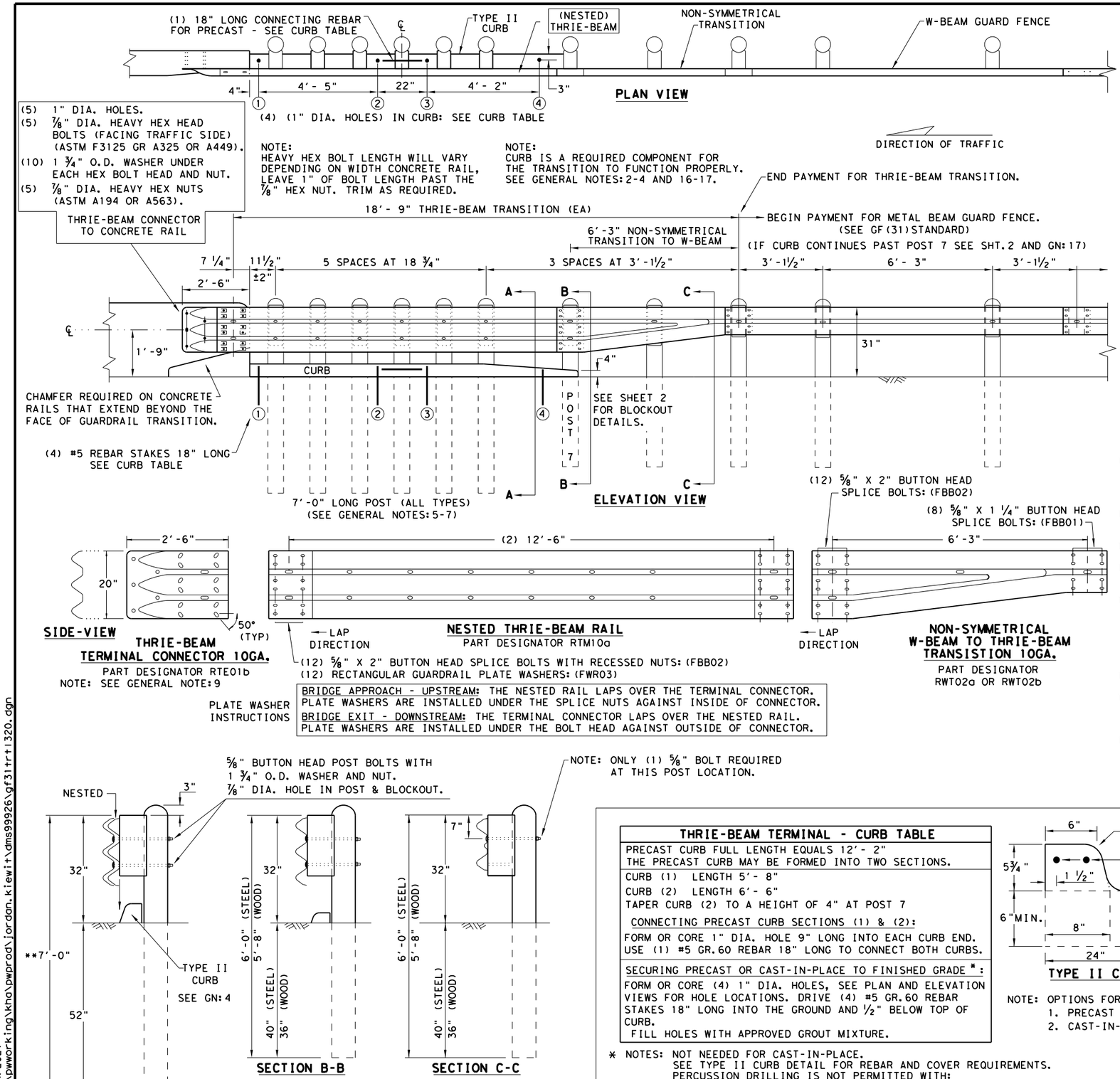


GENERAL NOTES

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

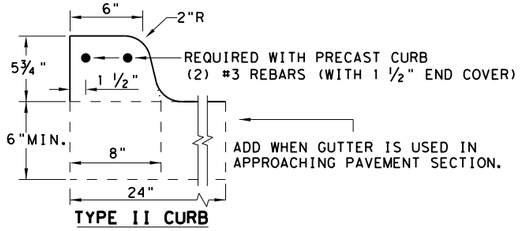
THRIE-BEAM TERMINAL - CURB TABLE

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

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

CONNECTING PRECAST CURB SECTIONS (1) & (2):
FORM OR CORE 1" DIA. HOLE 9" LONG INTO EACH CURB END. USE (1) #5 GR.60 REBAR 18" LONG TO CONNECT BOTH CURBS.

SECURING PRECAST OR CAST-IN-PLACE TO FINISHED GRADE *:
FORM OR CORE (4) 1" DIA. HOLES, SEE PLAN AND ELEVATION VIEWS FOR HOLE LOCATIONS. DRIVE (4) #5 GR.60 REBAR STAKES 18" LONG INTO THE GROUND AND 1/2" BELOW TOP OF CURB.
FILL HOLES WITH APPROVED GROUT MIXTURE.



TYPE II CURB

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

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

TYPE II CURB DETAILS

HIGH-SPEED TRANSITION

Texas Department of Transportation — Design Division Standard

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

GF(31)TR TL3-20

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	SAT	WILSON		39

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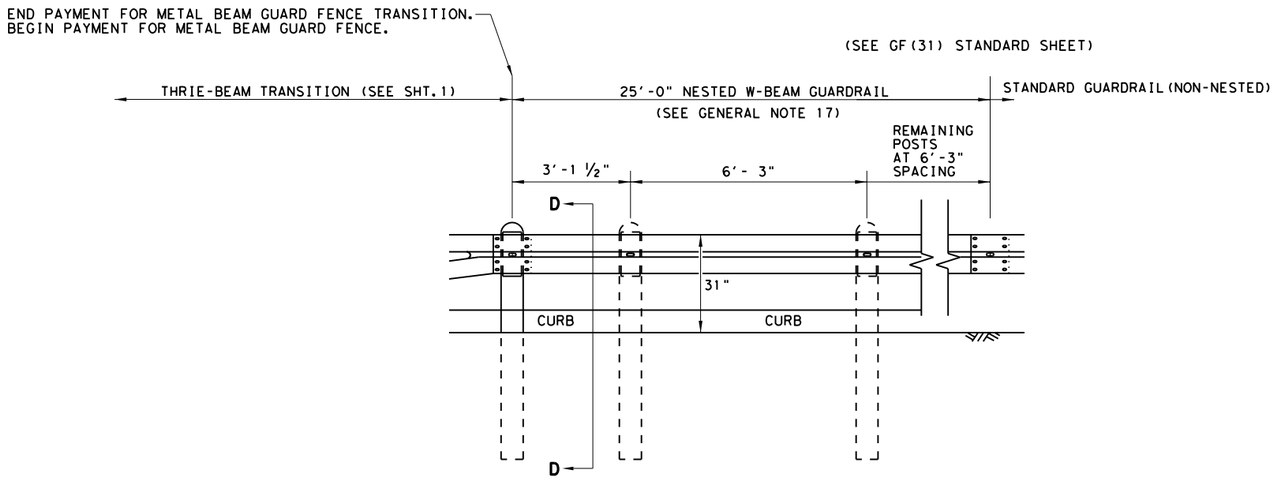
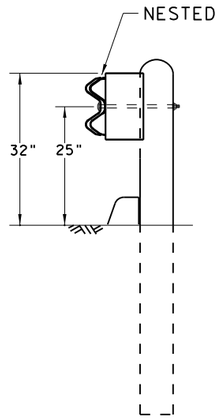
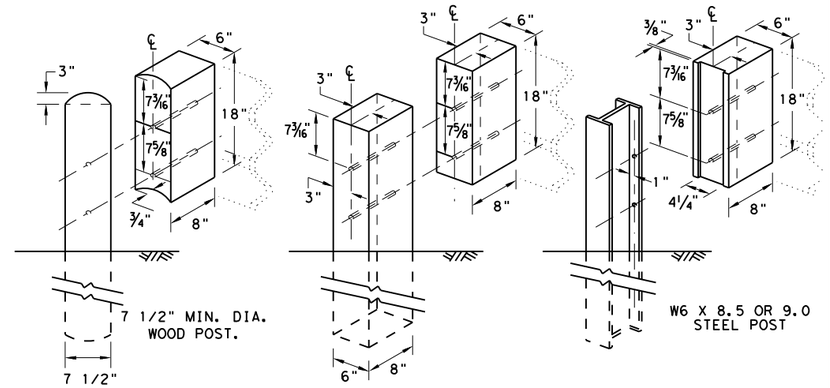
REQUIRED ALTERNATIVE FOR CONTINUOUS CURB EXTENDING PAST POST 7 (SEE SHT. 1 GENERAL NOTE 17)



ELEVATION VIEW



SECTION D-D



THRIE BEAM TRANSITION BLOCKOUT DETAILS

HIGH-SPEED TRANSITION

SHEET 2 OF 2

Texas Department of Transportation — Design Division Standard

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

GF(31)TR TL3-20

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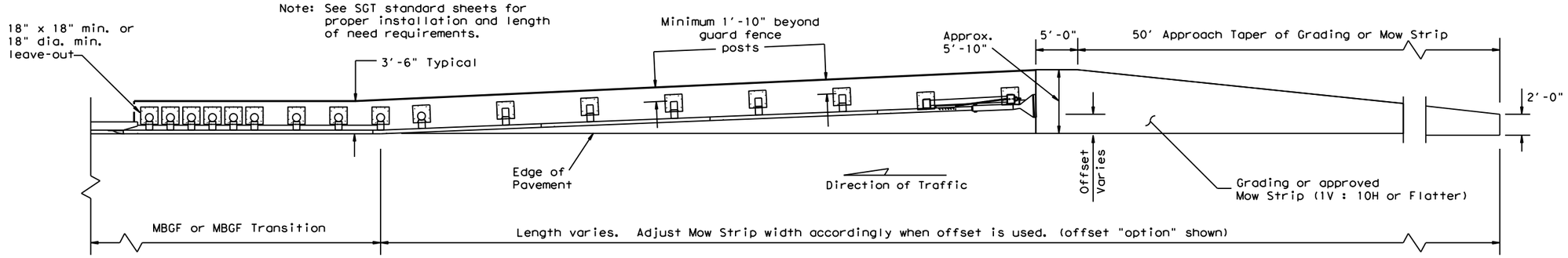
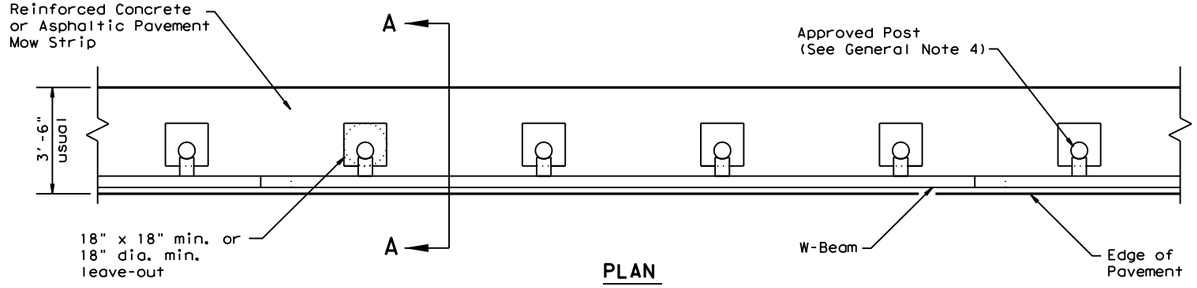
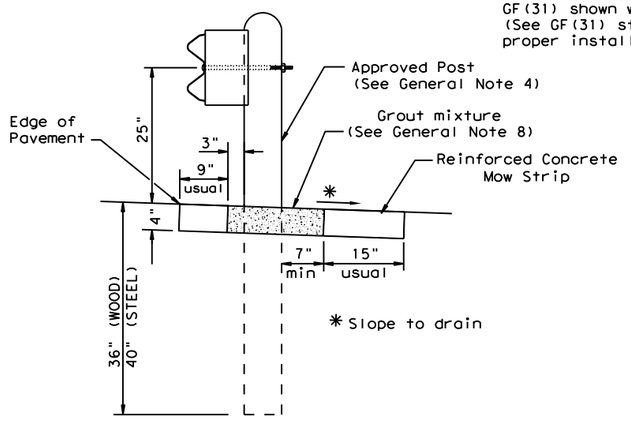


GRADING AND MOW STRIP AT GUARDRAIL END TREATMENTS



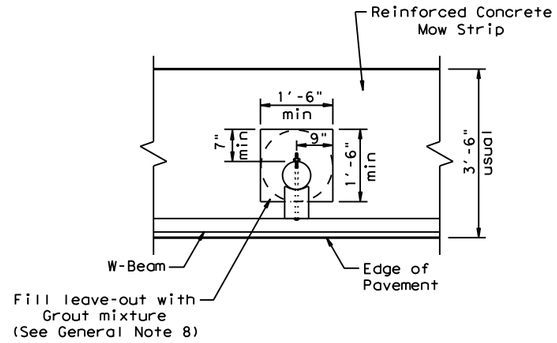
PLAN

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



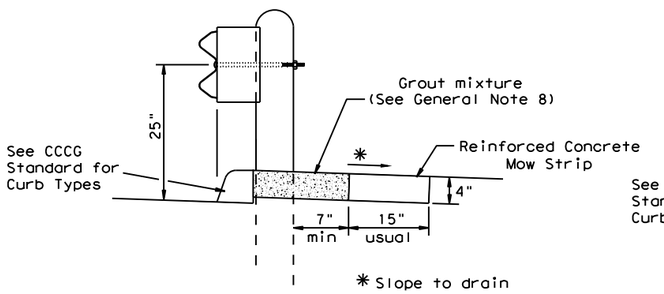
SECTION A-A

Typical



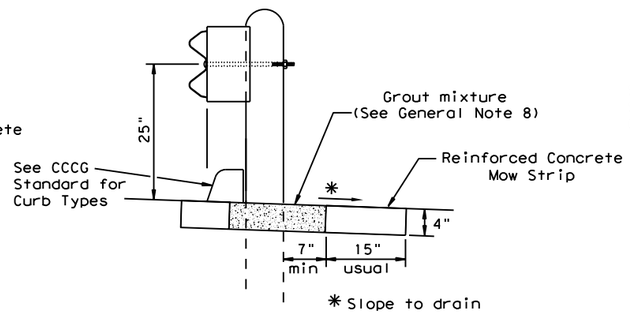
MOW STRIP DETAIL

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



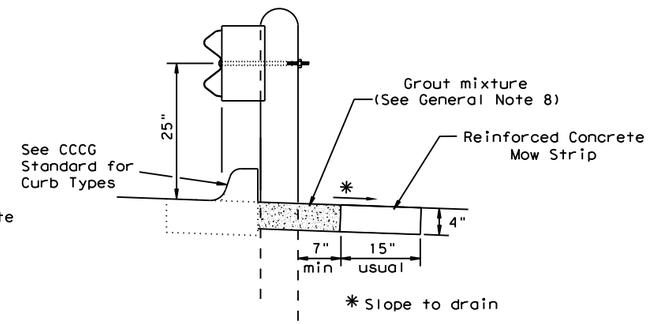
CURB OPTION (1)

This option will increase the post embedment throughout the system.



CURB OPTION (2)

Curb shown on top of mow strip



CURB OPTION (3)

Note: Site Condition(s)

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

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

GENERAL NOTES

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

Texas Department of Transportation

Design Division Standard

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

GF(31)MS-19

FILE: gf31ms19.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	14	047	CR 347
	DIST	COUNTY		SHEET NO.
	SAT	WILSON		41

DATE: 2/4/2021 7:45:23 AM
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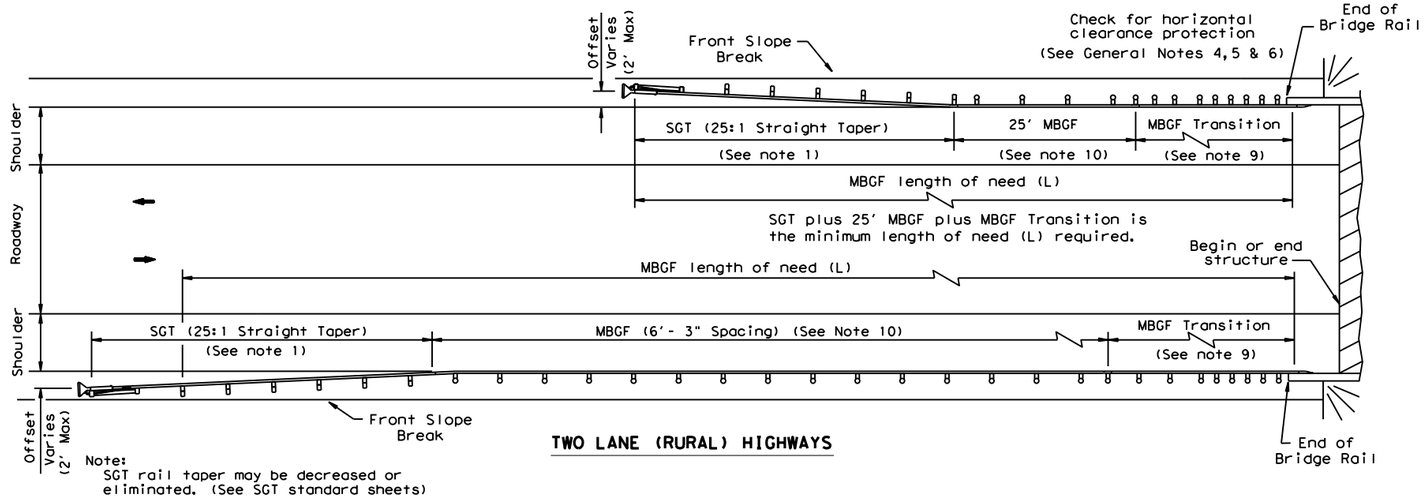
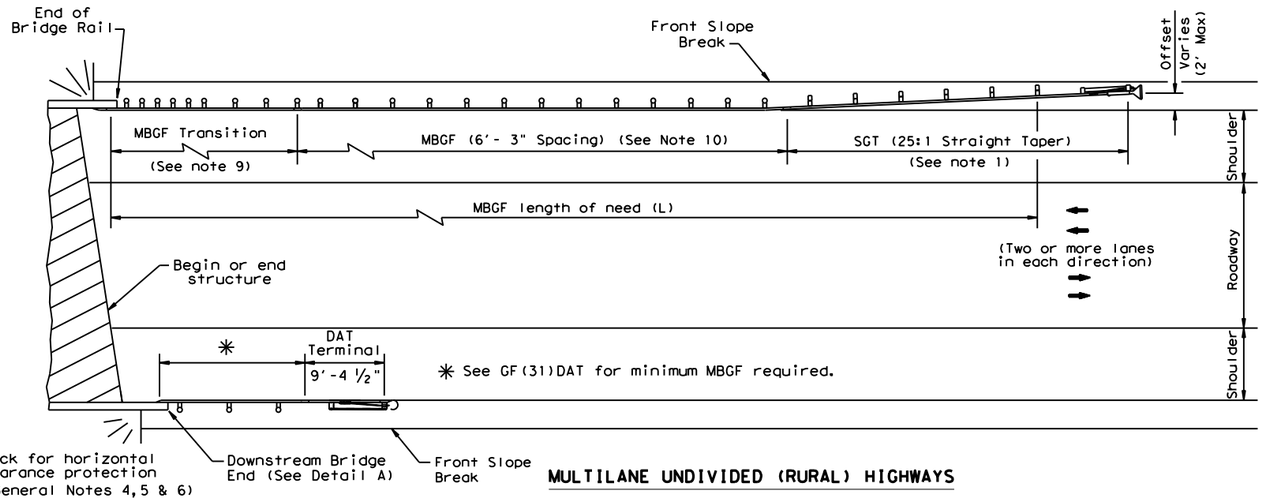
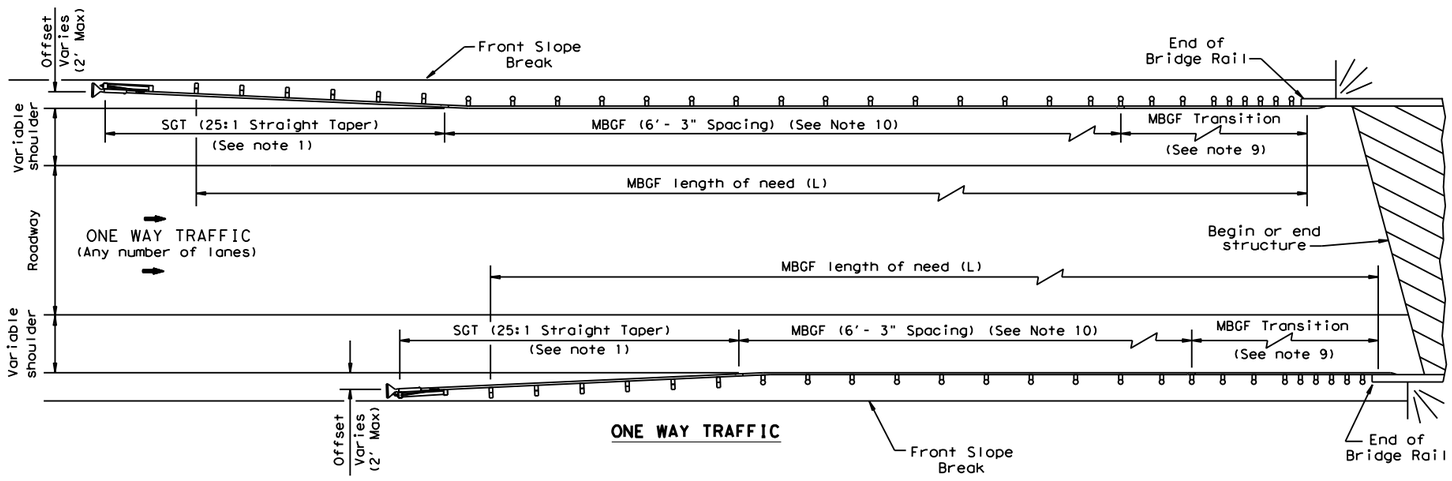


TWO LANE (RURAL) HIGHWAYS

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



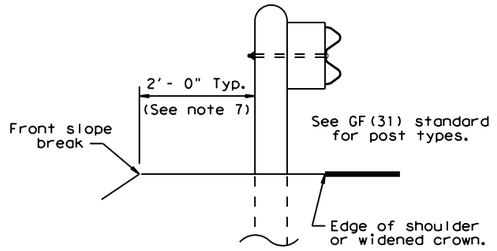
MULTILANE UNDIVIDED (RURAL) HIGHWAYS



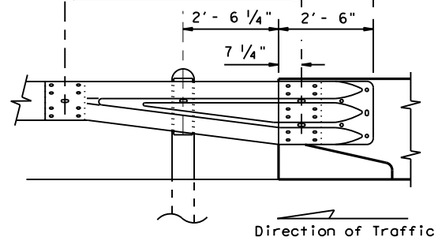
ONE WAY TRAFFIC

GENERAL NOTES

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



TYPICAL CROSS SECTION AT MBGF



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

DETAIL A

Showing Downstream Rail Attachment

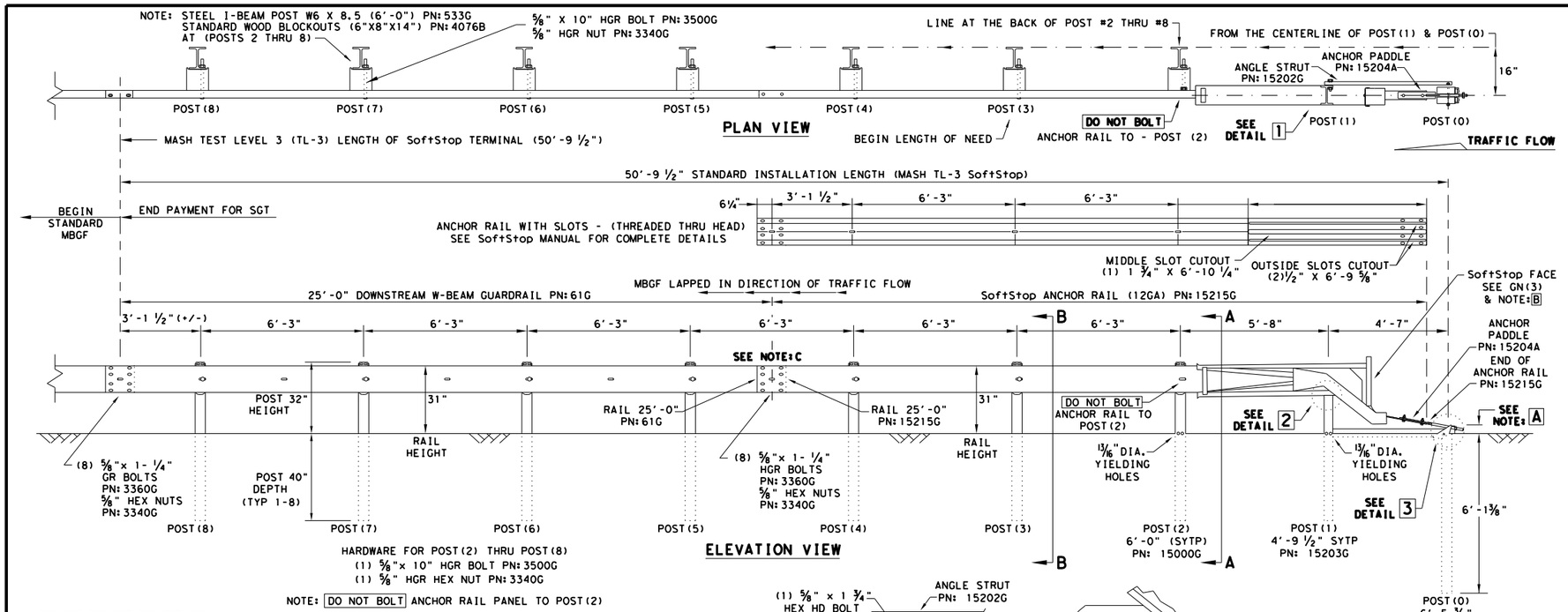
Texas Department of Transportation — Design Division Standard

BRIDGE END DETAILS

(METAL BEAM GUARD FENCE APPLICATIONS TO RIGID RAILS)

BED-14

FILE: bed14.dgn	DN: TxDOT	CK: AM	DW: BD/VP	CK: CGL
© TxDOT: December 2011	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	14	047	CR 347
REVISED APRIL 2014 SEE (MEMO 0414)	DIST	COUNTY		SHEET NO.
	SAT	WILSON		42



GENERAL NOTES

1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: TRINITY HIGHWAY AT 1(888)323-6374. 2525 N. STEMMONS FREEWAY, DALLAS, TX 75207
2. FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO THE; SoftStop END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY MANUAL. PN: 620237B
3. APPLY HIGH INTENSITY REFLECTIVE SHEETING, "OBJECT MARKER" ON THE FRONT FACE OF THE DEVICE PER MANUFACTURER'S RECOMMENDATIONS. OBJECT MARKER SHALL CONFORM TO THE STANDARDS REQUIRED IN TEXAS MUTCD.
4. FOR POST (LEAVE-OUT) INSTALLATION AND GUIDANCE SEE TXDOT'S LATEST ROADWAY MOW STRIP STANDARD.
5. HARDWARE (BOLTS, NUTS, & WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
6. A COMPOSITE MATERIAL BLOCKOUT 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.
7. IF SOLID ROCK IS ENCOUNTERED SEE THE MANUFACTURER'S INSTALLATION MANUAL AND REFER TO THE LATEST ROADWAY MBGF STANDARD FOR INSTALLATION GUIDANCE.
8. POSTS SHALL NOT BE SET IN CONCRETE.
9. IT IS ACCEPTABLE TO INSTALL THE SoftStop IMPACT HEAD PARALLEL TO THE GRADE LINE OR WITH AN UPWARD TILT.
10. DO NOT ATTACH THE SoftStop SYSTEM DIRECTLY TO A RIGID BARRIER.
11. UNDER NO CIRCUMSTANCES SHALL THE GUARDRAIL WITHIN THE SoftStop SYSTEM BE CURVED.
12. A FLARE RATE OF UP TO 25:1 MAY BE USED TO PREVENT THE TERMINAL HEAD FROM ENCROACHING ON THE SHOULDER. THE FLARE MAY BE DECREASED OR ELIMINATED FOR SPECIFIC INSTALLATIONS, IF DIRECTED BY THE ENGINEER.

NOTE: A	THE INSTALLATION HEIGHT OF FULLY ASSEMBLED ANCHOR POST WILL VARY FROM 3-3/4" MIN. TO 4" MAX. ABOVE FINISHED GRADE.
NOTE: B	PART PN: 5852B RIGHT-SIDE (HIGH INTENSITY REFLECTIVE SHEETING) PART PN: 5851B LEFT-SIDE (HIGH INTENSITY REFLECTIVE SHEETING)
NOTE: C	W-BEAM SPLICE LOCATED BETWEEN LINE POST(4) AND LINE POST(5) GUARDRAIL PANEL 25'-0" PN: 61G ANCHOR RAIL 25'-0" PN: 15215G LAP GUARDRAIL IN DIRECTION OF TRAFFIC FLOW.

PART	QTY	MAIN SYSTEM COMPONENTS
620237B	1	PRODUCT DESCRIPTION ASSEMBLY MANUAL (LATEST REV.)
15208A	1	SoftStop HEAD (SEE MANUAL FOR RIGHT-LEFT APPROACH)
15215G	1	SoftStop ANCHOR RAIL (12GA) WITH CUTOUT SLOTS
61G	1	SoftStop DOWNSTREAM W-BEAM RAIL (12GA) (25'- 0")
15205A	1	POST #0 - ANCHOR POST (6'- 5 3/8")
15203G	1	POST #1 - (SYTP) (4'- 9 1/2")
15000G	1	POST #2 - (SYTP) (6'- 0")
533G	6	POST #3 THRU #8 - I-BEAM (W6 x 8.5) (6'- 0")
4076B	7	BLOCKOUT - WOOD (ROUTED) (6" x 8" x 14")
6777B	7	BLOCKOUT - COMPOSITE (4" x 7 1/2" x 14")
15204A	1	ANCHOR PADDLE
15207G	1	ANCHOR KEEPER PLATE (24 GA)
15206G	1	ANCHOR PLATE WASHER (1/2" THICK)
15201G	2	ANCHOR POST ANGLE (10" LONG)
15202G	1	ANGLE STRUT
		HARDWARE
4902G	1	1" ROUND WASHER F436
3908G	1	1" HEAVY HEX NUT A563 GR.DH
3717G	2	3/4" x 2 1/2" HEX BOLT A325
3701G	4	3/4" ROUND WASHER F436
3704G	2	3/4" HEAVY HEX NUT A563 GR.DH
3360G	16	5/8" x 1 1/4" W-BEAM RAIL SPLICE BOLTS HGR
3340G	25	5/8" W-BEAM RAIL SPLICE NUTS HGR
3500G	7	5/8" x 10" HGR POST BOLT A307
3391G	1	5/8" x 1 3/4" HEX HD BOLT A325
4489G	1	5/8" x 9" HEX HD BOLT A325
4372G	4	5/8" WASHER F436
105285G	2	5/8" x 2 1/2" HEX HD BOLT GR-5
105286G	1	5/8" x 1 1/2" HEX HD BOLT GR-5
3240G	6	5/8" ROUND WASHER (WIDE)
3245G	3	5/8" HEX NUT A563 GR.DH
5852B	1	HIGH INTENSITY REFLECTIVE SHEETING - SEE NOTE:B

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

Texas Department of Transportation

Design Division Standard

TRINITY HIGHWAY
SOFTSTOP END TERMINAL
MASH - TL-3
SGT(10S)31-16

FILE: sgt10s3116		DN: TxDOT		CK: KM	DW: VP		CK: MB/VP
©TxDOT: JULY 2016		CONT	SECT	JOB		HIGHWAY	
REVISIONS		0915	14	047		CR 347	
		DIST	COUNTY				SHEET NO.
		SAT	WILSON				43

DATE:
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DATE: 2/4/2021
FILE: c:\pwworking\kha\pwprod\jordan.kiewit.dms99926\sgt11s3118.dgn

(SEE GN NOTE 15)
STANDARD 31" MBGF

ITEM (6)
INNER SIDE SLIDER
(ISS) PANEL FOR RAIL 3

FIELD-SIDE
(RAIL 3)

NOTE:
RECESSED HEX NUTS FACING
TRAFFIC-SIDE **SEE DETAIL (C)**

REFERENCE LINE USED TO INSTALL
LINE POST(9) THRU POST(2)

POST 1 OFFSET DISTANCE MEASURED
7-⅝" FROM REFERENCE LINE

ITEM (10)
CABLE ASSEMBLY

ITEM (2)
GROUNDSTRUT

NO BLOCKOUT
AT (POST 1)

POST 9 | POST 8 | POST 7 | POST 6 | POST 5 | POST 4 | POST 3 | POST 2

RAIL 4 | RAIL 3 | RAIL 2 | RAIL 1

CABLES

NOTES:
1. ITEM (12) COMPOSITE BLOCKOUTS INSTALLED AT LINE POST(9) THRU LINE POST(2).
2. DO NOT INSTALL A BLOCKOUT AT LINE POST(1).

ITEM (5)
TRAFFIC SIDE SLIDER
(TSS) PANEL FOR RAIL 2

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

PLAN VIEW

MBGF RAIL 2 | MBGF RAIL 1

INSTALL GUARD FENCE RECESSED HEX NUTS ON TRAFFIC-SIDE

DETAIL (C)

TRAFFIC FLOW

END PAYMENT (SGT) BY EACH

DO NOT BOLT
RAIL TO POST 6

BEGIN LENGTH OF NEED

INSTALLATION LENGTH 55'- ½"

49'-8 ⅝"

6'-3" | 6'-3" | 6'-3" | 6'- ¾" | 6'-3" | 6'-3" | 6'-3" | 37 ½" | 5'-3 ⅞"

ITEM (25)
MAX-TENSION HEAD
SEE DETAIL (A)

RAIL HEIGHT 31"

ARROWS

DETAIL (D)

HEAD HEIGHT

DETAIL (B)

32-¼"

ITEM (13) RAIL 4 | ITEM (13) RAIL 3 | ITEM (13) RAIL 2 | ITEM (13) RAIL 1

CABLES

FINISHED GRADE

ITEM (10)
CABLE ASSEMBLY

ITEM (2)
GROUNDSTRUT

68-⅛"

POST 9 | POST 8 | POST 7 | POST 6 | POST 5 | POST 4 | POST 3 | POST 2 | POST 1

ITEM (4)
I-BEAM
W6 X 9

NO BLOCKOUT
AT (POST 1)

SOIL
ANCHOR POST
ITEM (1)

(8) X-LITE LINE POST - ITEM (11)

ELEVATION VIEW

A

A

TSS PANEL
GALVANIZED
ITEM (5)

RSS PLATE
GALVANIZED
ITEM (8)

INSTALL THE TSS AND RSS
WITH THE ARROWS POINTING
TOWARDS THE MAX-HEAD

TSS PANEL AND RSS PLATE

DETAIL (D)

HEAD HEIGHT 32-¼"

TOP OF POST

31-⅞"

FINISHED GRADE

40-⅛"

68-⅛" ANCHOR POST DEPTH

ITEM (1) ANCHOR

ITEM (11)
LINE POSTS
2 THRU 9
(NOTE: ITEM (4) POST 1 (NOT SHOWN), TO BE INSTALLED AT SAME DEPTH AS LINE POSTS.)

SOIL ANCHOR, POST 1 & LINE POST 2 THRU 9

SECTION VIEW A-A

NOTE:
USE THE MASH APPROVED
X-TENSION CABLE ASSEMBLY.

7 ⅝"

2 ⅛"

UPPER CABLE
(BACK SIDE)

LOWER CABLE
(TRAFFIC SIDE)

DETAIL (B)

CABLE
FRICTION PLATE
HEAD UNIT
ITEM (9)

NOTE:
INSTALL ⅝" RECESSED HEX
NUTS ON TRAFFIC SIDE.

ITEM (24)
ITEM (21)
ITEM (20) 8X
ITEM (17) 8X

ITEM (23)
6X
3 SCREWS
EACH SIDE

ITEM (22)
BRACKET
SHIPPED FLAT

(RAIL 1)

ITEM (3)

ITEM (16)
4X

* ITEM (25)
HIGH INTENSITY
REFLECTIVE SHEETING

NOTE: DELINEATION MARKER IN ACCORDANCE WITH TEXAS MUTCD.

SPLICE FOR IMPACT-HEAD
TO GUARD FENCE (RAIL1)

DETAIL (A)

GENERAL NOTES

1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: LINDSAY TRANSPORTATION SOLUTIONS (LTS) - BARRIER SYSTEMS, INC. AT (707) 374-6800
2. FOR INSTALLATION, REPAIR, & MAINTENANCE REFER TO THE; MAX-TENSION INSTALLATION INSTRUCTION MANUAL. P/N MANMAX REV D (ECN 3516).
3. APPLY HIGH INTENSITY REFLECTIVE SHEETING, "OBJECT MARKER" ON THE FRONT FACE OF THE DEVICE PER MANUFACTURE'S RECOMMENDATIONS. OBJECT MARKER SHALL CONFORM TO THE STANDARDS REQUIRED IN TEXAS MUTCD.
4. FOR POST (LEAVE-OUT) INSTALLATION AND GUIDANCE SEE TXDOT'S LATEST ROADWAY MOW STRIP STANDARD.
5. ALL STEEL COMPONENTS ARE GALVANIZED PER ASTM A123 OR EQUIVALENT UNLESS OTHERWISE STATED.
6. SYSTEM SHOWN USING STEEL WIDE FLANGE POST WITH COMPOSITE BLOCKOUTS.
7. 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.
8. REFER TO INSTALLATION MANUAL FOR SPECIFIC PANEL LAPPING GUIDANCE.
9. IF SOLID ROCK IS ENCOUNTERED SEE THE MANUFACTURER'S INSTALLATION MANUAL FOR INSTALLATION GUIDANCE.
10. POSTS SHALL NOT BE SET IN CONCRETE.
11. 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.
12. MAX-TENSION SYSTEM SHALL NEVER BE INSTALLED WITHIN A CURVED SECTION OF GUARDRAIL.
13. IF A DELINEATION MARKER IS REQUIRED, MARKER SHALL BE IN ACCORDANCE WITH TEXAS MUTCD.
14. THE SYSTEM IS SHOWN WITH 12'-6" MBGF PANELS, 25'-0" MBGF PANELS ARE ALSO ALLOWED.
15. A MINIMUM OF 12'-6" OF 12GA. MBGF IS REQUIRED IMMEDIATELY DOWNSTREAM OF THE MAX-TENSION SYSTEM.

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	⅝" X 7" THREAD BOLT HH (GR.5)GEOMET	1
16	BSI-2001885	¾" X 3" ALL-THREAD BOLT HH (GR.5)GEOMET	4
17	4001115	⅝" X 1 ¼" GUARD FENCE BOLTS (GR.2)MGAL	48
18	2001840	⅝" X 10" GUARD FENCE BOLTS MGAL	8
19	2001636	⅝" WASHER F436 STRUCTURAL MGAL	2
20	4001116	⅝" RECESSED GUARD FENCE NUT (GR.2)MGAL	59
21	BSI-2001888	⅝" X 2" ALL THREAD BOLT (GR.5)GEOMET	1
22	BSI-1701063-00	DELINEATION MOUNTING (BRACKET)	1
23	BSI-2001887	¼" X ¾" SCREW SD HH 410SS	7
24	4002051	GUARDRAIL WASHER RECT AASHTO FWR03	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

* TO BE PROVIDED BY DISTRIBUTOR OR CONTRACTOR.

** ALTERNATIVE ITEMS NOT SHOWN.
ITEM(26) 8" WOOD-BLOCKOUTS
ITEM(27) 25'GUARD FENCE PANELS

APPROX 5'-10" | 5'-0" | 50' APPROACH GRADING

STANDARD MBGF

EDGE OF PAVEMENT

NOTE: ADJUST WIDTH ACCORDINGLY WHEN OFFSET IS USED. (OFFSET "OPTION" SHOWN)

2'-0" MAX. RAIL OFFSET

APPROACH GRADING
(1V:10H OR FLATTER)
SEE PRODUCT ASSEMBLY MANUAL FOR ADDITIONAL GUIDANCE.

2'-0"

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

APPROACH GRADING AT GUARDRAIL END TREATMENTS

TRAFFIC FLOW

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

FILE: sgt11s3118.dgn	DN: TxDOT	CK: KM	DW: TxDOT	CK: CL
© TxDOT: FEBRUARY 2018	CONT	SECT	JOB	HIGHWAY
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	DIST	COUNTY		SHEET NO.
	SAT	WILSON		44

DATE: 2/4/2021
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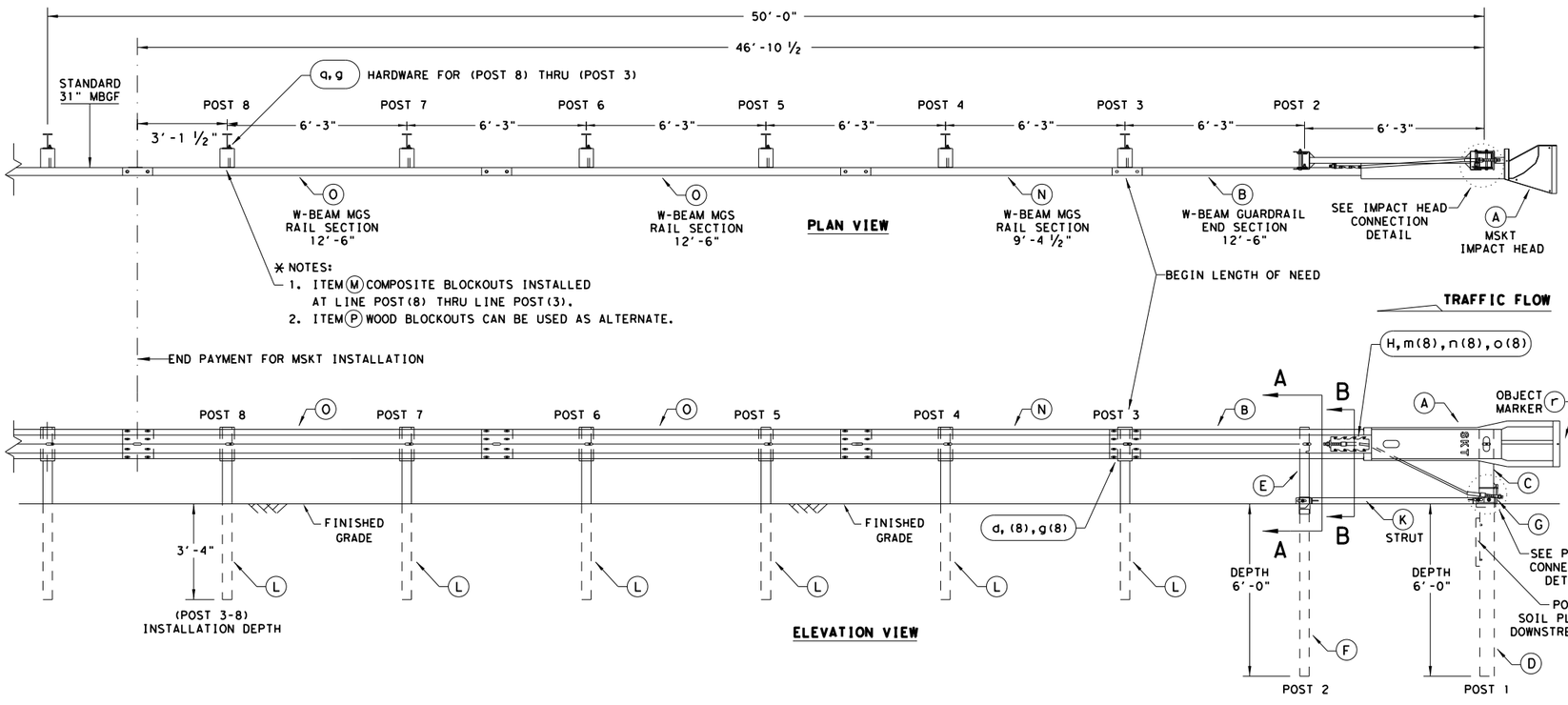
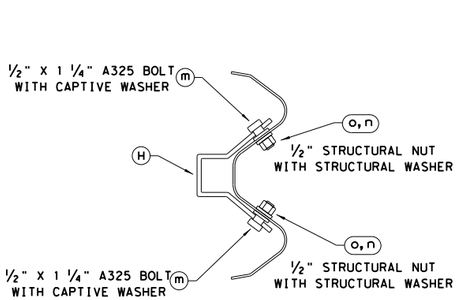
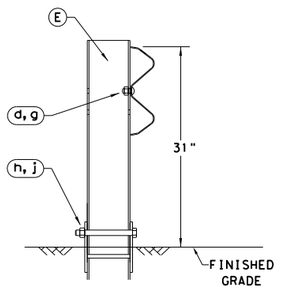


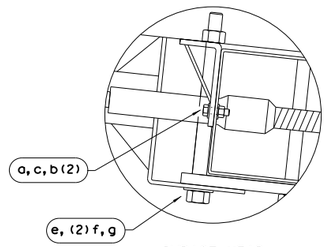
NOTE: SEE (GENERAL NOTE 14) FOR DRIVING CAP INFORMATION.



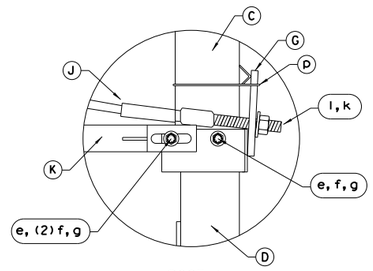
SECTION B-B
ANCHOR BRACKET



POST 2
SECTION A-A



IMPACT HEAD
CONNECTION DETAIL



POST 1
CONNECTION DETAIL

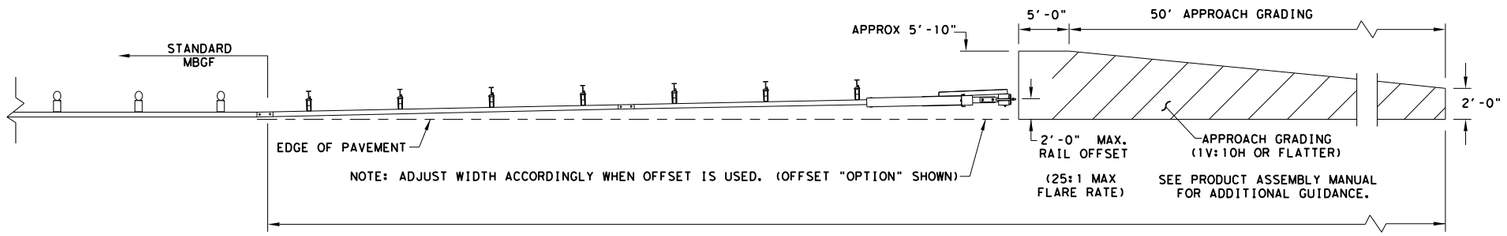
GENERAL NOTES

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

ITEM	QTY	MAIN SYSTEM COMPONENTS	ITEM NUMBERS
A	1	MSKT IMPACT HEAD	MS3000
B	1	W-BEAM GUARDRAIL END SECTION, 12 Ga.	SF1303
C	1	POST 1 - TOP (6" X 6" X ⅛" TUBE)	MTPHP1A
D	1	POST 1 - BOTTOM (6' W6X15)	MTPHP1B
E	1	POST 2 - ASSEMBLY TOP	UHP2A
F	1	POST 2 - ASSEMBLY BOTTOM (6' W6X9)	HP2B
G	1	BEARING PLATE	E750
H	1	CABLE ANCHOR BOX	S760
J	1	BCT CABLE ANCHOR ASSEMBLY	E770
K	1	GROUND STRUT	MS785
L	6	W6x9 OR W6x8.5 STEEL POST	P621
M	6	COMPOSITE BLOCKOUTS	CBSP-14
N	1	W-BEAM MGS RAIL SECTION (9'-4 ½")	G12025
O	2	W-BEAM MGS RAIL SECTION (12'-6")	G1203A
P	6	WOOD BLOCKOUT 6" X 8" X 14"	P675
Q	1	W-BEAM MGS RAIL SECTION (25'-0")	G1209
		SMALL HARDWARE	
a	2	⅝" x 1" HEX BOLT (GRD 5)	B5160104A
b	4	⅝" WASHER	W0516
c	2	⅝" HEX NUT	N0516
d	25	⅝" Dia. x 1 ¼" SPLICE BOLT (POST 2)	B580122
e	2	⅝" Dia. x 9" HEX BOLT (GRD A449)	B580904A
f	3	⅝" WASHER	W050
g	33	⅝" Dia. H.G.R NUT	N050
h	1	¾" Dia. x 8 ½" HEX BOLT (GRD A449)	B340854A
j	1	¾" Dia. HEX NUT	N030
k	2	1 ANCHOR CABLE HEX NUT	N100
l	2	1 ANCHOR CABLE WASHER	W100
m	8	½" x 1 ¼" A325 BOLT WITH CAPTIVE WASHER	SB12A
n	8	½" STRUCTURAL NUTS	N012A
o	8	1 1/16" O.D. x 9/16" I.D. STRUCTURAL WASHERS	W012A
p	1	BEARING PLATE RETAINER TIE	CT-100ST
q	6	⅝" x 10" H.G.R. BOLT	B581002
r	1	OBJECT MARKER 18" X 18"	E3151

SEE NOTES: *

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



NOTE: ADJUST WIDTH ACCORDINGLY WHEN OFFSET IS USED. (OFFSET "OPTION" SHOWN)

APPROACH GRADING AT GUARDRAIL END TREATMENTS

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

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

Texas Department of Transportation

Design Division Standard

SINGLE GUARDRAIL TERMINAL
MSKT-MASH-TL-3
SGT(12S)31-18

FILE: sgt12s3118.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CL	
© TxDOT: APRIL 2018	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0915	14	047	CR 347	
	DIST	COUNTY		SHEET NO.	
	SAT	WILSON		45	

DATE: 2/4/2021
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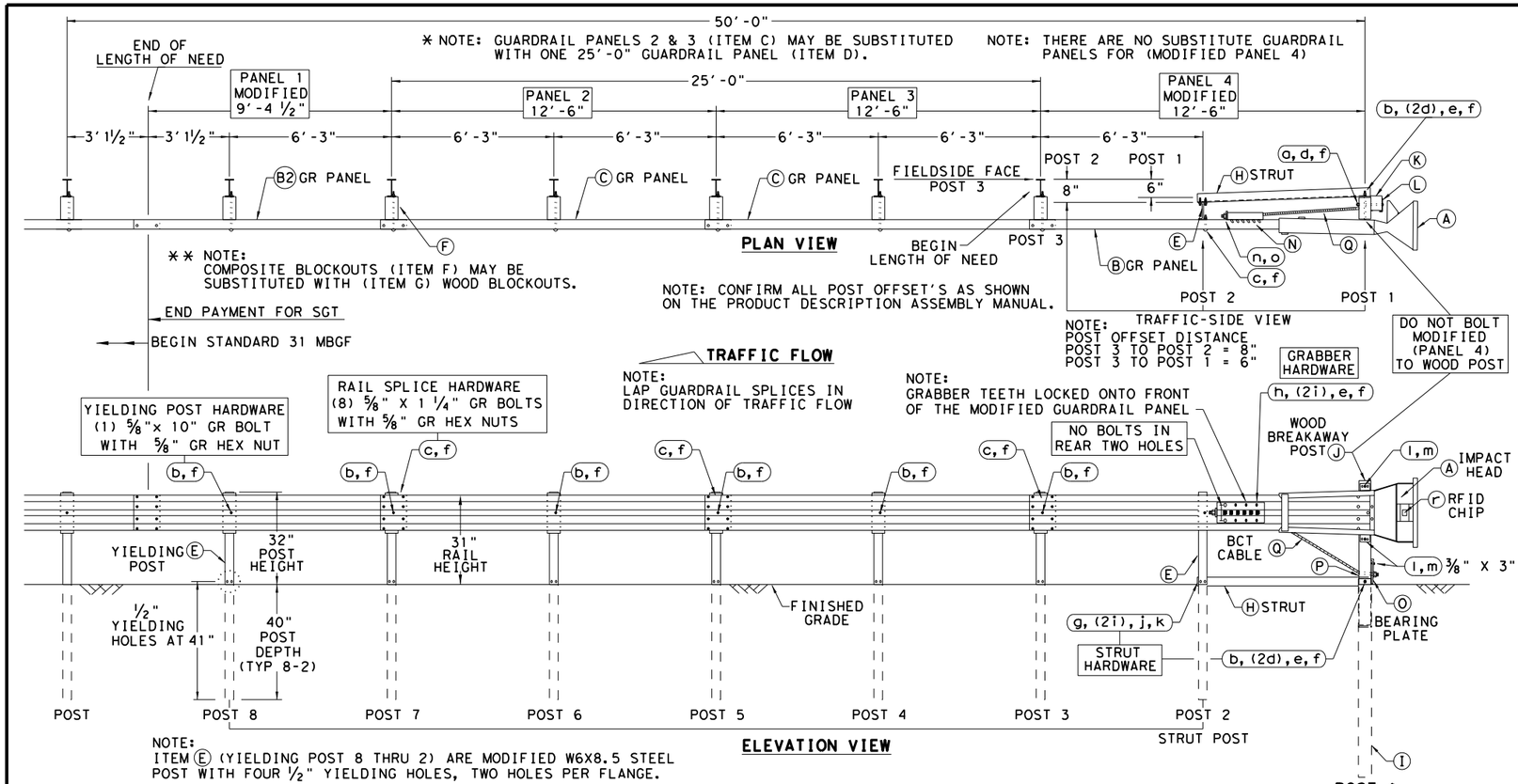
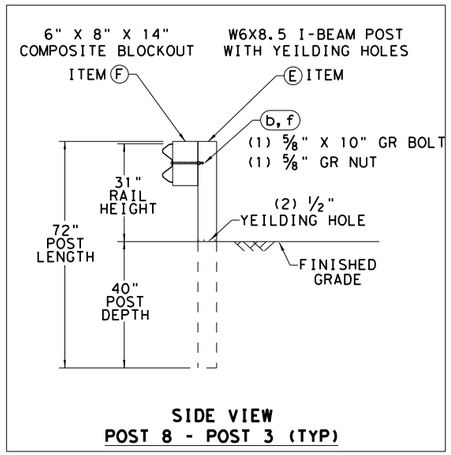


GENERAL NOTES

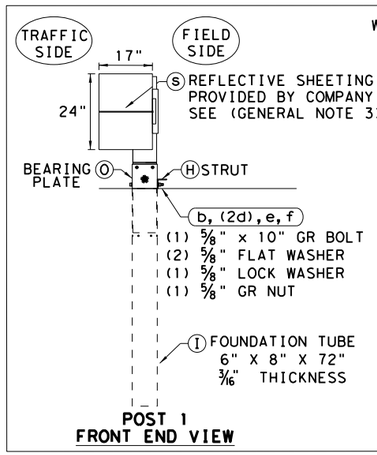
1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: SPIG INDUSTRY, INC. AT 1(267) 644-9510. 14675 INDUSTRIAL PARK RD; BRISTOL, VA 24202
2. FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO THE MANUFACTURER'S; SGET END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY MANUAL.
3. MANUFACTURER WILL APPLY HIGH INTENSITY REFLECTIVE SHEETING, "OBJECT MARKER" TO THE FACE PLATE OF THE DEVICE PER MANUFACTURER'S RECOMMENDATIONS. THE OBJECT MARKER SHALL CONFORM TO THE STANDARDS REQUIRED IN TEXAS MUTCD.
4. THE NOMINAL HEIGHT OF THE GUARDRAIL BEAM IS 31 INCHES WITH A TOLERANCE OF +/- ONE INCH.
5. FOR POST (LEAVE-OUT) INSTALLATION AND GUIDANCE SEE TXDOT'S LATEST ROADWAY MOW STRIP STANDARD.
6. (POST 2 THROUGH POST 8) ARE MODIFIED STEEL-YIELDING POSTS WITH YIELDING HOLES AT GROUND LEVEL. THERE ARE NO SUBSTITUTE POSTS.
7. POSTS SHALL NOT BE SET IN CONCRETE.
8. IF SOLID ROCK IS ENCOUNTERED FOR ANY OF THE POSTS IN THE SYSTEM, CONTACT THE MANUFACTURER FOR SPECIFIC INSTALLATION GUIDANCE.
9. HARDWARE (BOLTS, NUTS, & WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445,"GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
10. A COMPOSITE MATERIAL BLOCKOUT THAT MEETS DMS-7210 REQUIREMENTS MAY BE SUBSTITUTED FOR AN APPROVED WOOD BLOCKOUT. SEE CONSTRUCTION DIVISION MATERIAL PRODUCER LIST (MPL) FOR CERTIFIED PRODUCERS.
11. THE ENTIRE SYSTEM MUST BE INSTALLED IN A STRAIGHT LINE WITHOUT ANY CURVE. HOWEVER, THE SYSTEM CAN BE OFFSET BY TWO FEET AS SHOWN ON THE APPROACH GRADING DETAIL TO HELP OFF-SET THE IMPACT HEAD FROM SHOULDER OF THE ROAD.

ITEM	QTY	MAIN SYSTEM COMPONENTS	ITEM #
A	1	SGET IMPACT HEAD	SIH1A
B	1	MODIFIED GUARDRAIL PANEL 12'-6" 12GA	126SPZGP
B2	1	MODIFIED GUARDRAIL PANEL 9'-4 1/2" 12GA	GP94
C	2	STANDARD GUARDRAIL PANEL 12'-6" 12GA	GP126
D *	1	STANDARD GUARDRAIL PANEL 25'-0" 12GA	GP25
E	7	MODIFIED YIELDING I-BEAM POST W6x8.5	YP6MOD
F	6	COMPOSITE BLOCKOUT 6" X 8" X 14"	CBO8
G **	6	WOOD BLOCKOUT 6" X 8" X 14"	WBO8
H	1	STRUT 3" X 3" X 80" x 1/4" A36 ANGLE	STR80
I	1	FOUNDATION TUBE 6" X 8" X 72" x 3/16"	FNDT6
J	1	WOOD BREAKAWAY POST 5 1/2" x 7 1/2" x 50"	WBRK50
K	1	WOOD STRIKE BLOCK	WSBLK14
L	1	STRIKE PLATE 1/4" A36 BENT PLATE	SPLT8
M	1	REINFORCEMENT PLATE 12 GA. GR55	REPLT17
N	1	GUARDRAIL GRABBER 2 1/2" X 2 1/2" X 16 1/2"	GGR17
O	1	BEARING PLATE 8" X 8 5/8" X 5/8" A36	BPLT8
P	1	PIPE SLEEVE 4 1/4" X 2 3/8" O.D. (2 1/8" I.D.)	PSLV4
Q	1	BCT CABLE 3/4" X 81" LENGTH	CBL81
		SMALL HARDWARE	
a	1	5/8" X 12" GUARDRAIL BOLT 307A HDG	12GRBLT
b	7	5/8" X 10" GUARDRAIL BOLT 307A HDG	10GRBLT
c	33	5/8" X 1 1/4" GR SPLICE BOLTS 307A HDG	1GRBLT
d	3	5/8" FLAT WASHER F436 A325 HDG	58FW436
e	1	5/8" LOCK WASHER HDG	58LW
f	39	5/8" GUARDRAIL HEX NUT HDG	58HN563
g	2	1/2" X 2" STRUT BOLT A325 HDG	2BLT
h	6	1/2" X 1 1/4" PLATE BOLT A325 HDG	125BLT
i	16	1/2" FLAT WASHER F436 A325 HDG	12FWF436
j	8	1/2" LOCK WASHER HDG	12LW
k	8	1/2" HEX NUT A563 HDG	12HN563
l	4	3/8" X 3" HEX LAG SCREW GR5 HDG	38LS
m	4	3/8" FLAT WASHER F436 A325 HDG	38FW844
n	2	1" FLAT WASHER F436 A325 HDG	1FWF436
o	2	1" HEX NUT A563DH HDG	1HN563
p	1	18" TO 24" LONG ZIP TIE RATED 175-200LB	ZPT18
q	1	1 1/2" X 4" SCH-40 PVC PIPE	PSPCR4
r	1	RFID CHIP RATED MIL-STD-810F	RFID810F
s	1	IMPACT HEAD REFLECTIVE SHEETING	RS30M

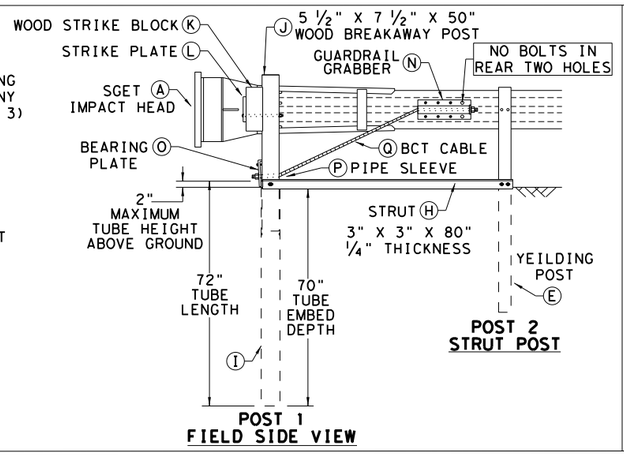
ALTERNATIVE ITEMS
NOTE: SEE PLAN VIEW



SIDE VIEW
POST 8 - POST 3 (TYP)

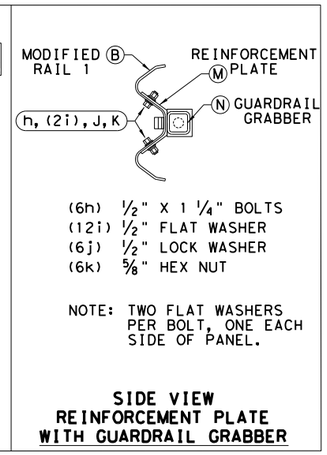


POST 1
FRONT END VIEW

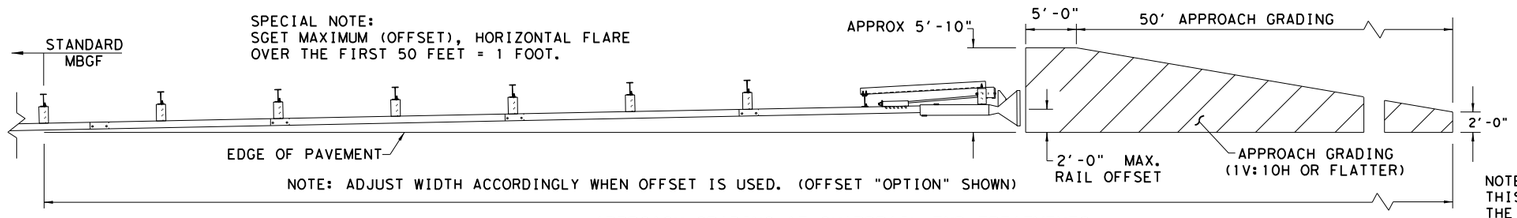


POST 1
FIELD SIDE VIEW

POST 2
STRUT POST



SIDE VIEW
REINFORCEMENT PLATE
WITH GUARDRAIL GRABBER



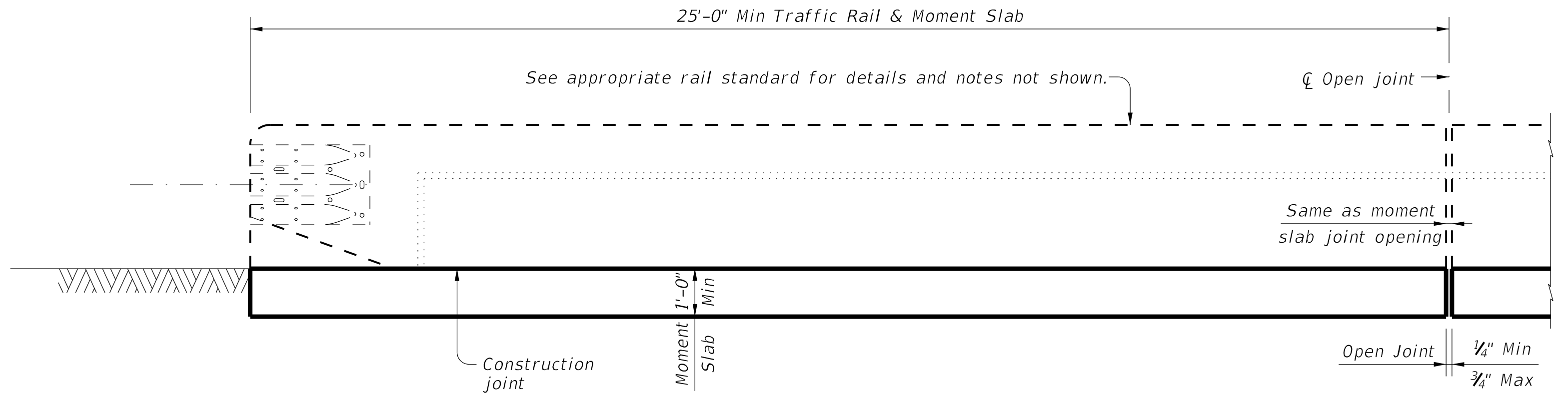
APPROACH GRADING AT GUARDRAIL END TREATMENTS

NOTE:
THIS STANDARD IS A BASIC REPRESENTATION OF THE SGET TERMINAL SYSTEM AND IS NOT INTENDED TO REPLACE THE MANUFACTURER'S ASSEMBLY MANUAL.

Texas Department of Transportation
Design Division Standard

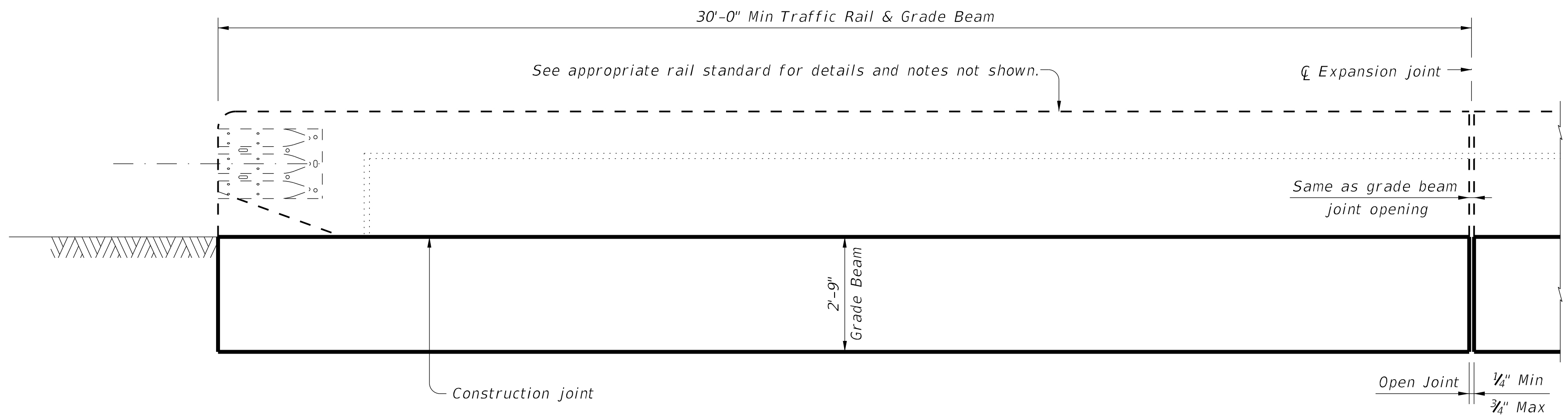
SPIG INDUSTRY, LLC
SINGLE GUARDRAIL TERMINAL
SGET - TL-3 - MASH
SGT(15)31-20

FILE: sgt153120.dgn	DN: TxDOT	CK: KM	DW: VP	CK: VP
©TxDOT: APRIL 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	14	047	CR 347
	DIST	COUNTY		SHEET NO.
	SAT	WILSON		46



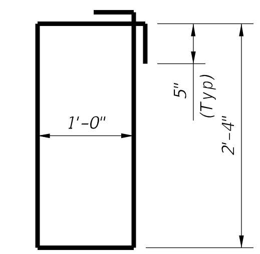
ROADWAY ELEVATION OF TRAFFIC RAIL ON MOMENT SLAB (TRF-MS)

(Showing SSTR rail other rails are similar. Reinforcing not shown for clarity.)

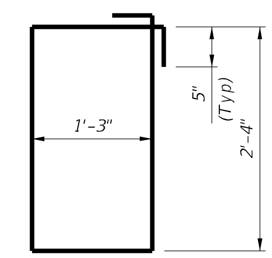


ROADWAY ELEVATION OF TRAFFIC RAIL ON GRADE BEAM (TRF-GB)

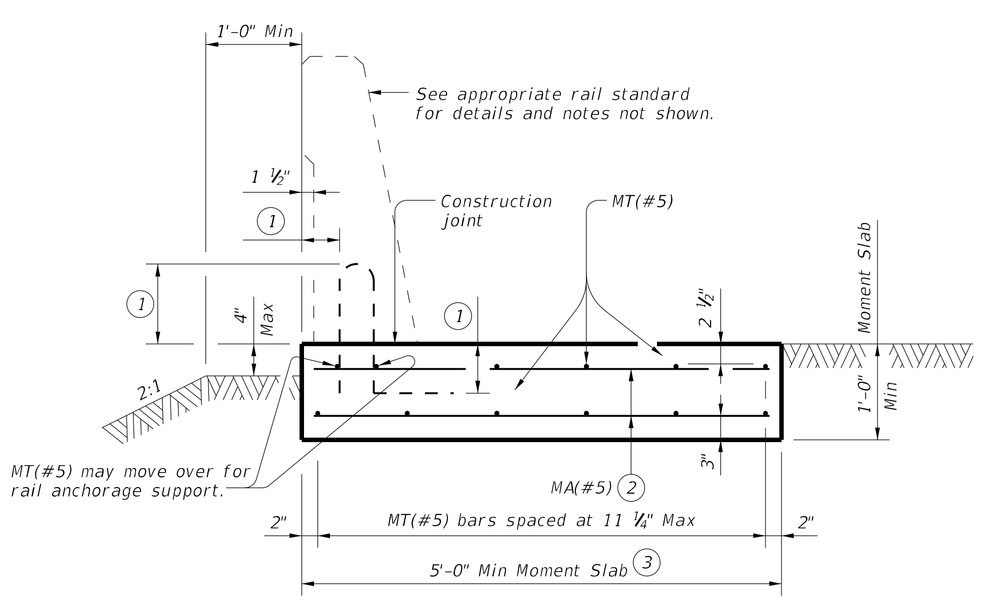
(Showing SSTR rail other rails are similar. Reinforcing not shown for clarity.)



BARS S1(#4)

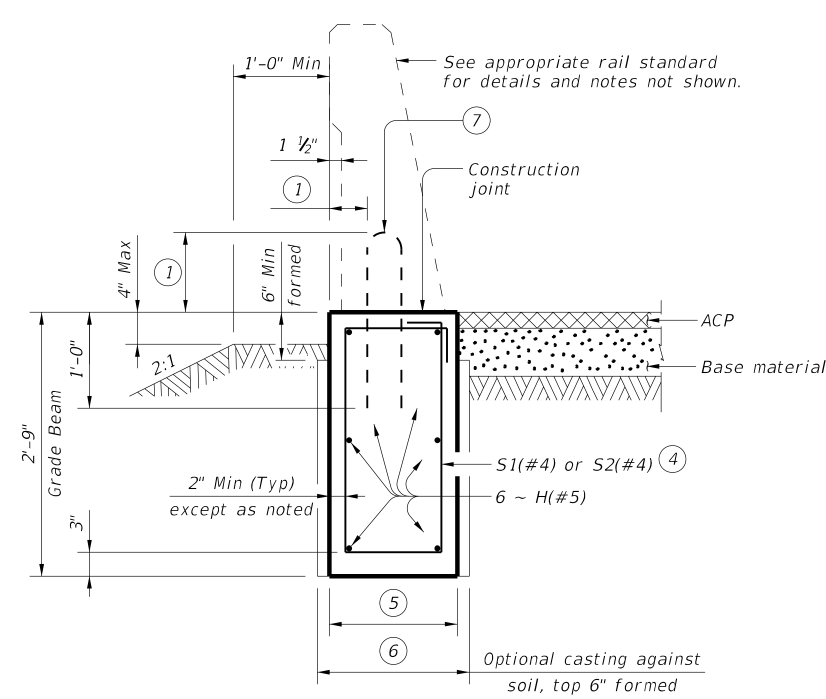


BARS S2(#4)



SECTION OF TRAFFIC RAIL ON MOMENT SLAB (TRF-MS)

(Showing SSTR rail other rails are similar.)



SECTION OF TRAFFIC RAIL ON GRADE BEAM (TRF-GB)

(Showing SSTR rail other rails are similar.)

1. See applicable bridge rail standard.
2. MA(#5) space longitudinally along moment slab at 12" Max. (Spaced 2 ½" longitudinally from outside edge of moment slab).
3. Approximate moment slab concrete = 0.19 CY/LF and reinforcement = 22.4 LB/LF.
4. S1(#4) or S2(#4) spaced longitudinally along grade beam at 8" Max. (Spaced 2 ½" longitudinally from outside edge of grade beam).
5. Use bar S1(#4) with 1'-4" grade beam width and bridge rail types: All rails except for T224, C412, T66, C66, T80HT and T80SS. Approximate grade beam concrete = 0.14 CY/LF and reinforcement = 13.8 LB/LF.

   Use bar S2(#4) with 1'-7" grade beam width and bridge rail types: T66 and C66. Approximate grade beam concrete = 0.16 CY/LF and reinforcement = 14.2 LB/LF.
6. 1'-6" for bridge rail types: All rails except for T224, C412, T66, C66, T80HT and T80SS.

   1'-9" bridge rail types: T66 and C66.
7. Modify reinforcing on standard bridge rail anchorage if necessary by extending rail anchorage 12" Min, vertically into traffic rail

CONSTRUCTION NOTES:

Align moment slab (TRF-MS) or grade beam (TRF-GB) open joints with rail open joints maintaining no less than minimum rail length. Provide moment slab (TRF-MS) or grade beam (TRF-GB) with open joints at no greater than 100' spacing unless otherwise shown on the plans or approved by the Engineer.

MATERIAL NOTES:

Provide Class "C" concrete. Provide Class "C" (HPC) if required elsewhere.
Provide Grade 60 reinforcing steel.
Epoxy coat or galvanize all reinforcing steel if required elsewhere.
Deformed Welded Wire Reinforcement (WWR) (ASTM A1064) of equal size and spacing may be substituted for bars S1(#4), S2(#4) and H(#5) unless noted otherwise. Provide the same laps as required for reinforcing bars.
Provide bar laps, where required, as follows:
Uncoated or galvanized ~ #5 = 2'-4"
Epoxy coated ~ #5 = 3'-6"

GENERAL NOTES:

Use of these details will result in a moment slab (TRF-MS) or grade beam (TRF-GB) foundation that is acceptable for traffic rails which are MASH TL-2, TL-3, or TL-4 compliant.
See elsewhere in the plans for selected options between moment slab (TRF-MS) and/or grade beam (TRF-GB).
The foundation design resistance is based on the current AASHTO bridge railing requirements with the assumption of fair to good soil support conditions. Poor soil conditions will require suitably deeper and/or wider foundations.
See appropriate rail standard for details and notes not shown.
This detail is intended for use as a guide to unusual railing anchorage situations but may be included in the plans, modified as necessary to apply to specific installations required on the project.
Payment for moment slab (TRF-MS) and/or grade beam (TRF-GB) will be by Class "C" concrete or Class "C" (HPC) concrete for rail foundations.
The associated bridge railing will be paid for by the linear foot which includes the concrete and reinforcement.
Excavation will be subsidiary to other Items.

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

Texas Department of Transportation | Bridge Division Standard

TRAFFIC RAIL FOUNDATIONS FOR MASH TL-2, TL-3 & TL-4 BRIDGE RAILS

TRF

FILE: rlstd027-20.dgn	DN: TxDOT	CK: TAR	DW: JTR	CK: TAR
©TxDOT September 2019	CONT 0915	SECT 14	JOB 047	HIGHWAY CR 347
REVISIONS 07-20: Added moment slab with rail foundation lengths.	DIST SAT		COUNTY WILSON	SHEET NO. 47

DATE: 7:45:56 AM
FILE: ...\pwprod\jordan.kiewit\dms99926\rlstd027-20.dgn

GENERAL NOTES FOR TREE PROTECTION

1. PROTECT AND INSURE THE CONTINUED GOOD HEALTH OF EXISTING TREES IDENTIFIED ON THE PLANS OR DIRECTED BY THE ENGINEER. PRESERVE ALL EXISTING VEGETATION WITHIN THE PREFERRED ROOT PROTECTION ZONE.

2. SECURE THE SERVICES OF A TREE CARE SPECIALIST TO PERFORM OR OVERSEE ANY OPERATION INVOLVING LIMB PRUNING, ROOT PRUNING, CHEMICAL APPLICATION, OR ASSESSMENT OF THE CONDITION OF TREES OR EFFECTS OF CONSTRUCTION ON TREES DESIGNATED FOR PROTECTION.

3. WITHIN THE PREFERRED ROOT PROTECTION ZONE, NONE OF THE FOLLOWING ACTIVITIES ARE ALLOWED:

PARKING OF ANY VEHICLES; ERECTION OF ANY SHED OR STRUCTURE; STORAGE OF ANY EQUIPMENT OR MATERIALS; USE BY PEOPLE FOR ANY REASON; DUMPING OF ANY LITTER, WASTE MATERIALS, OR LIQUIDS; IMPOUNDMENT OF WATER; ADDITION OF FILL-SOIL; EXCAVATION, BORING, OR TRENCHING OF ANY TYPE

DEFINITIONS

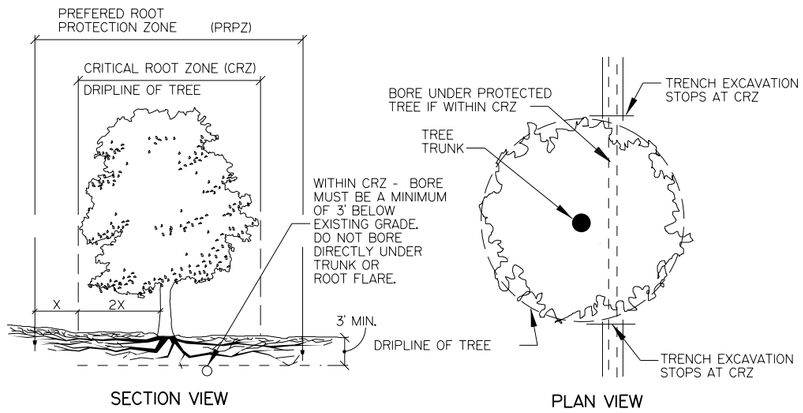
1. DRIPLINE - THE LINE ON THE GROUND DIRECTLY BELOW THE OUTER TIPS OR ENDS OF THE TREE LIMBS.

2. CRITICAL ROOT ZONE (CRZ) - THE GROUND AREA EXTENDING OUT FROM THE TREE TRUNK TO THE DRIPLINE.

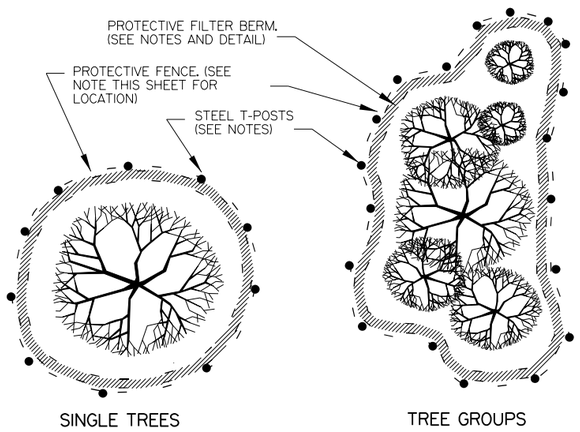
3. PREFERRED ROOT PROTECTION ZONE (PRPZ) - THE GROUND AREA EXTENDING OUT FROM THE TREE TRUNK A DISTANCE EQUAL TO ONE AND ONE HALF OF THE DISTANCE FROM THE TRUNK TO THE DRIPLINE.

4. TREE CARE SPECIALIST - CERTIFIED ARBORIST OR PROFESSIONAL URBAN FORESTER.

5. O.C. - ON CENTER



TRENCHING PAST TREES



PLAN VIEW OF FENCING LAYOUT

CONSTRUCTION METHODS

1. PRIOR TO THE START OF CONSTRUCTION, MARK ALL TREES OR OTHER FEATURES INDICATED ON THE PLANS TO BE PROTECTED WITH YELLOW FLAGGING FOR APPROVAL BY THE ENGINEER.

2. PRIOR TO CONSTRUCTION, PRUNE PROTECTED TREES AS FOLLOWS:
   A. REMOVE ANY DISEASED OR DEAD LIMBS AND CORRECT ANY PREVIOUS IMPROPER PRUNING
   B. REMOVE LIMBS FOR NECESSARY EQUIPMENT ACCESS (AS APPROVED BY THE ENGINEER).
   C. REMOVE LIMBS THAT WILL BE WITHIN TWENTY FEET (20) VERTICAL CLEARANCE OF VEHICLE TRAVEL LANES.
   D. REMOVE LIMBS THAT WILL BE WITHIN TEN FEET (10) VERTICAL CLEARANCE OF PEDESTRIAN AREAS.

3. PERFORM PRUNING USING ONLY TOOLS SPECIFICALLY DESIGNED FOR THE JOB AND IN ACCORDANCE WITH ANSI A300 PRUNING STANDARD. PRUNED MATERIAL BECOMES THE PROPERTY OF THE CONTRACTOR AND WILL BE DISPOSED OF OFF-SITE.

4. ERECT PROTECTIVE FENCING AT ALL TREES, GROUPS OF TREES, OR OTHER FEATURES AS SHOWN ON THE PLANS, OR DESIGNATED BY THE ENGINEER, OR OTHERWISE INDICATED FOR PROTECTION.

5. ERECT PROTECTIVE FENCING FOR TREES AT THE EDGE OF THE PRPZ. PLACE FENCING IN OTHER LOCATIONS ONLY WITH THE APPROVAL OF THE ENGINEER. THE FENCE MATERIAL SHALL BE CHAIN-LINK FENCE.
   A. CHAIN-LINK FENCING SHALL BE SIX-FOOT (6) IN HEIGHT AND SUPPORTED BY EIGHT-FOOT (8) STEEL T-POSTS SPACED SIX FEET (6) O.C., DRIVEN A MINIMUM OF 20" INTO EXISTING GRADE.
   B. THE FENCING SHALL BE CONTINUOUS BETWEEN POSTS AND SHALL BE FIRMLY ATTACHED TO THE POSTS WITH A MINIMUM OF 4 WIRE TIES.

6. PREPARE SIGNS WITH THE FOLLOWNG WORDING, AND INSTALL AT A MINIMUM OF 50' ON CENTER ALONG THE PROTECTIVE FENCING:
   PROTECTED AREA
   DO NOT ENTER
   THIS FENCE MAY NOT BE REMOVED OR MODIFIED WITHOUT THE PERMISSION OF THE ENGINEER
   CONTACT (PHONE NUMBER)

7. IF IT BECOMES NECESSARY TO LOCATE THE PROTECTIVE FENCING WITHIN SIX FEET (6) OF THE TRUNK OF A TREE, SECURE WOOD PLANKING TO THE TRUNK. THE PLANKING SHALL BE NOMINAL 2X4 DIMENSION LUMBER SECURED WITH A ROPE, BAND, OR STRAP OF SUFFICIENT DURABILITY TO REMAIIN IN PLACE FOR THE DURATION OF THE PROJECT. INSTALL PLANKS TO A HEIGHT OF TEN FEET (10) OR TO THE LOWEST MAJOR BRANCHES WHICHEVER IS LOWEST. DO NOT USE NAILS, SCREWS, OR ANY OTHER DAMAGING ATTACHMENTS UNDER ANY CIRCUMSTANCES.

8. ERECT A FILTER BERM COMPOSED OF WOOD CHIPS TO THE DIMENSIONS AND LOCATION SHOWN IN THE DETAILS. USE WOOD CHIPS LESS THAN OR EQUAL TO 5 IN. IN LENGTH WITH 95% PSSING A 2-IN. SCREEN AND LESS THAN 30% PASSING A 1-IN. SCREEN.

9. IMMEDIATELY REMOVE ANY CONCRETE, LIME OR OTHER CHEMICALS ACCIDENTALLY SPILLED WITHIN THE PROTECTED ROOT ZONE. IMMEDIATELY TREAT FOR ACCIDENTAL DAMAGE TO ANY TREE AS DIRECTED BY THE ENGINEER. SECURE THE SERVICES OF A TREE CARE SPECIALIST TO ASSESS AND/OR TREAT FOR THE DAMAGE.

10. MAINTAIN ALL TREE PROTECTION MATERIALS THROUGHOUT ENTIRE LENGTH OF PROJECT. REPAIR ANY DAMAGED TREE PROTECTION MATERIALS IMMEDIATELY AT THE CONTRACTOR'S EXPENSE. ADDITIONAL COMPOST OR MULCH MATERIALS MAY BE REQUIRED.

11. NO TRENCHING, EXCAVATING, FILLING, OR COMPACTION IS ALLOWED WITHIN THE CRITICAL ROOT ZONE EXCEPT AS SPECIFICALLY IDENTIFIED IN THE PLANS OR APPROVED BY THE ENGINEER.

12. IF ROOT REMOVAL OR EXCAVATION IS UNAVOIDABLE WITHIN THE PREFERRED ROOT PROTECTION ZONE, HAND-DIG TO EXPOSE MAJOR TREE ROOTS OF ONE-INCH (1") DIAMETER OR GREATER. ONCE EXPOSED, PRUNE ROOTS WITH SHARP, CLEAN TOOLS DESIGNED FOR THAT PURPOSE. BACKFILL EXPOSED ROOT ENDS AS SOON AS POSSIBLE OR COVERED WITH SIX INCHES (6") SHREDDED HARDWOOD MULCH WITHIN THE SAME DAY OF EXCAVATION.

13. PRUNE ANY ROOTS EXPOSED BY CONSTRUCTION FLUSH WITH THE SOIL. BACKFILL ROOT AREAS WITH GOOD QUALITY TOPSOIL AS SOON AS POSSIBLE. IF EXPOSED ROOTS ARE NOT TO BE BACKFILLED WITHIN TWO DAYS, COVER THEM WITH A MINIMUM OF SIX INCHES (6") OF SHREDDED HARDWOOD MULCH.

14. SHOULD ACCESS ACROSS THE CRITICAL ROOT ZONE BE NECESSARY, OPEN ONLY THAT PORTION NEEDED FOR ACCESS AND THE COMPLETION OF THE TASK. INSTALL SIX INCHES (6") OF SHREDDED HARDWOOD BARK IN ACCESS AREAS BEFORE ANY WHEELED OR TRACKED VEHICES ENTER THE CRITICAL ROOT ZONE. REPLACE PROTECTIVE FENCING TO ITS ORIGINAL POSITIONS AS SOON AS POSSIBLE AFTER THE CONSTRUCTION TASK IS COMPLETED AND REMOVE THE BARK MULCH LAYER AND STOCKPILE OUTSIDE THE CRITICAL ROOT ZONE.

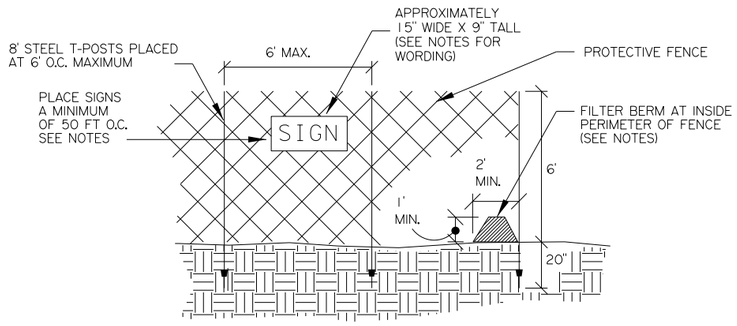
15. FOR PROPOSED UNDERGROUND UTILITIES SHOWN ELSEWHERE IN THE PLANS THAT CROSS THE CRITICAL ROOT ZONE, BORE AT A MINIMUM OF THREE FEET (3') BELOW EXISTING GRADE. TRENCH FOR BORE SHALL NOT INTRUDE INTO CRITICAL ROOT ZONE.

POST CONSTRUCTION

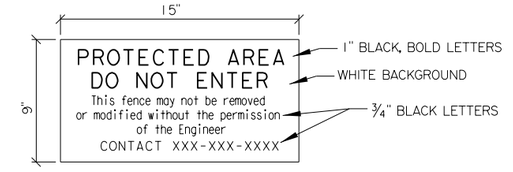
1. UPON THE COMPLETION OF CONSTRUCTION ACTIVITIES, CONDUCT A FINAL ASSESSMENT BY A TREE CARE SPECIALIST TO DETERMINE THE HEALTH AND CONDITION OF THE TREES. THE SPECIALIST SHOULD PROVIDE RECOMMENDATIONS FOR THE FOLLOWING INSPECTION ITEMS FOR NEEDED POST-CONSTRUCTION MEASURES:
   A. DAMAGE TO ANY PART OF THE TREE
   B. CHANGES IN SOILS STRUCTURE SUCH AS COMPACTION, FILLS, EROSION, OR LOSS OF ORGANIC MATTER

IMPLEMENT THE RECOMMENDATIONS MADE BY THE TREE CARE SPECIALIST AS DIRECTED. AT A MINIMUM, PERFORM THE FOLLOWING:
   A. REMOVE TREES THAT MAY HAVE DIED DURING CONSTRUCTION
   B. REMOVE ANY FILL SOIL FROM ROOT ZONES
   C. REPAIR AREAS DAMAGED DURING CONSTRUCTION

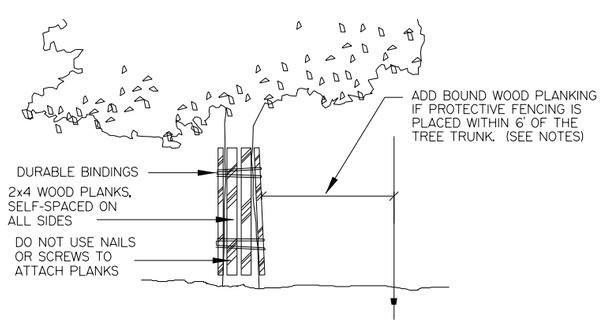
2. AFTER ALL CONSTRUCTION ACTIVITIES HAVE CEASED, REMOVE ALL TREE PROTECTION MATERIALS FROM THE PROJECT SITE. MULCH MAY BE SPREAD OVER THE SITE IN A TWO-INCH THICK MAXIMUM LAYER.



PROTECTIVE FENCE AND SIGN PLACEMENT



SIGNAGE FOR PROTECTED AREAS



WOOD PLANKING INSTALLATION

THIS WORK AND ALL ASSOCIATED MATERIALS WILL NOT BE PAID FOR DIRECTLY, BUT WILL BE SUBSIDIARY TO ITEM 100 - PREPARING RIGHT OF WAY.

NOT TO SCALE

Texas Department of Transportation
San Antonio District

TREE PROTECTION

San Antonio District Standard

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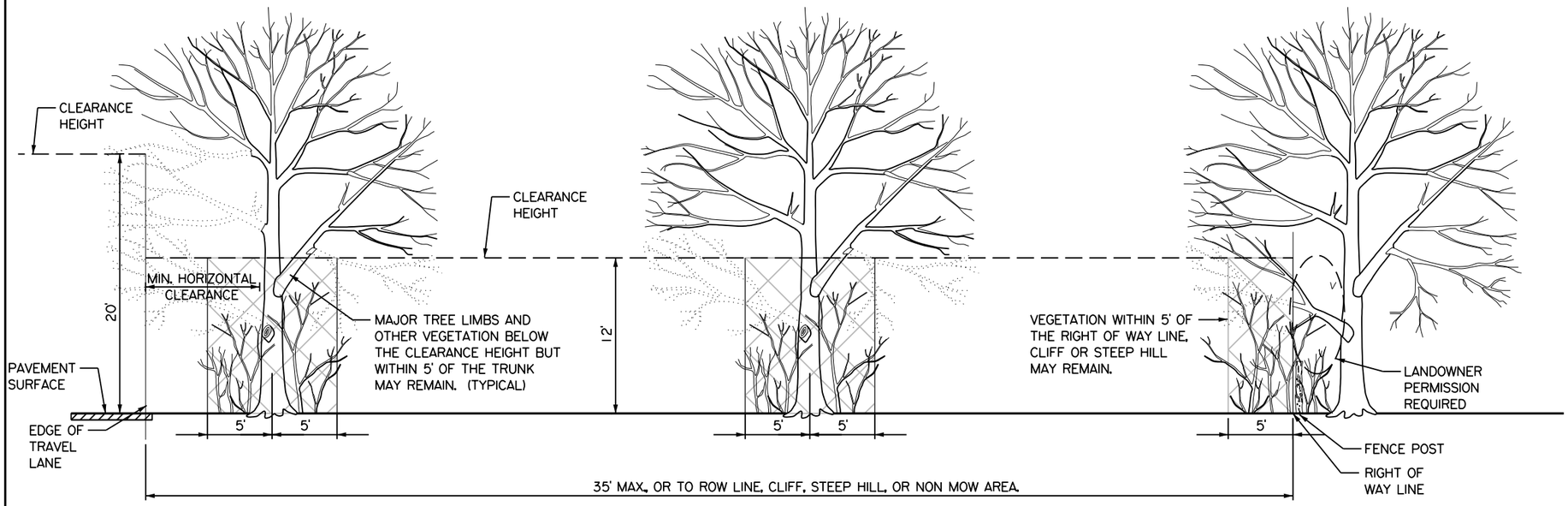
ORIGINAL DRAWING DATE: 12-18-18	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT			SHEET
REVISIONS	SAT	6	BR 2021(063)			47A
	COUNTY		CONTROL	SECTION	JOB	HIGHWAY
	WILSON		0915	14	047	CR 347

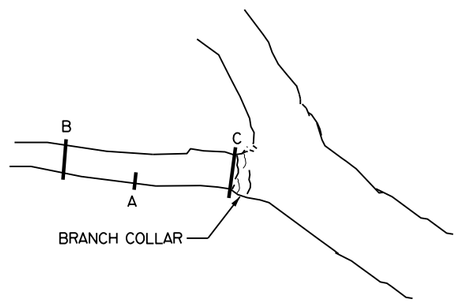


TREE PRUNING

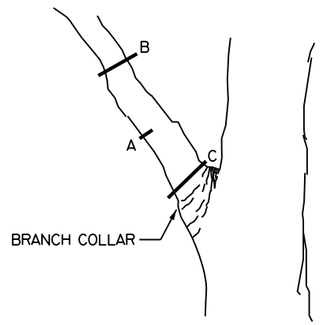
A - STEP 1
CUT 1/3 WAY THROUGH BOTTOM OF LIMB 8-12" ABOVE MAIN STEM OR TRUNK

B - STEP 2
REMOVE LIMB 4-6" BEYOND THE FIRST CUT

C - STEP 3
REMOVE STUB WITH A SMOOTH CUT JUST BEYOND THE BRANCH COLLAR OF THE REMOVED LIMB.



TREE LIMB



MAIN BRANCH

PRUNING CUTS - LIMBS 2" IN DIAMETER AND GREATER

TREE REMOVAL:

REMOVE ALL DEAD WOODY VEGETATION WITHIN THE ROW. CUT STUMPS FLUSH WITH THE GROUND.

TREE PRUNING:

THE OBJECTIVE OF TREE PRUNING IS FOR CROWN RAISING TO ALLOW CLEARANCE FOR MAINTENANCE VEHICLES.

WITH THE EXCEPTION OF WORK WITHIN OR ALONG A CHANNEL OR UNLESS OTHERWISE SHOWN ON THE PLANS, LIMIT WIDTH OF WORK TO 35' FROM THE EDGE OF THE TRAVEL LANE, OR TO ROW LINE, CLIFF, STEEP HILL, OR NON-MOW AREA, WHICHEVER IS LESS. THE ENGINEER WILL DEFINE CLIFFS, STEEP HILLS AND NON-MOW AREAS BASED ON FIELD CONDITIONS. THE ENGINEER MAY DEFINE AREAS TO RESTRICT OR INCREASE TREE PRUNING.

IF ANY TREES IN THE ROW ARE MARKED IN ANY WAY, VERIFY THE MEANING OF THE MARKINGS BEFORE BEGINNING PRUNING OPERATIONS.

WHEN PRUNING OAK TREES, DISINFECT TOOLS BEFORE MOVING FROM ONE TREE TO ANOTHER. USE 70% METHYL ALCOHOL, CHLORINE SOLUTION, OR OTHER APPROVED MATERIAL AS A DISINFECTANT.

TREAT ALL WOUNDS AND CUTS ON ALL OAK SPECIES WITH A COMMERCIAL TREE WOUND DRESSING WITHIN 20 MINUTES OF CREATING THE WOUND.

FLAILING EQUIPMENT IS NOT ALLOWED FOR THIS WORK.

REPAIR DAMAGE TO A PRIVATE FENCE OR OTHER PRIVATE PROPERTY AT CONTRACTOR EXPENSE.

PERFORM TREE PRUNING WITHIN ROW LIMITS. IF POSSIBLE, OBTAIN LANDOWNER PERMISSION AND MAKE PROPER PRUNING CUTS NECESSARY TO MAINTAIN THE HEALTH OF THE TREE.

CUT LIMBS AT A MAJOR FORK IN THE BRANCH OR, IF THE ENTIRE BRANCH IS ENCROACHING INTO THE AREA TO BE CLEARED, REMOVE THE BRANCH AT THE TRUNK.

DO NOT LEAVE A STUB BEYOND THE BRANCH COLLAR OR CUT THROUGH THE BRANCH COLLAR WHEN MAKING PRUNING CUTS. THE BRANCH COLLAR IS GENERALLY VISIBLE, BUT IF IT IS NOT, MAKE THE FINAL CUT APPROXIMATELY 1/2" FROM THE PARENT BRANCH OR TRUNK, PERPENDICULAR TO THE BRANCH OR LIMB BEING REMOVED.

THIS WORK AND ALL ASSOCIATED MATERIALS WILL NOT BE PAID FOR DIRECTLY, BUT WILL BE SUBSIDIARY TO ITEM 100 - PREPARING RIGHT OF WAY.

NOT TO SCALE

San Antonio District

TREE PRUNING AND REMOVAL

San Antonio District Standard

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ORIGINAL DRAWING DATE: 12-18-18	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT #			SHEET
REVISIONS	SAT	6	BR 2021(063)			47B
	COUNTY		CONTROL	SECTION	JOB	HIGHWAY
	WILSON		0915	14	047	CR 347

4/7/2021

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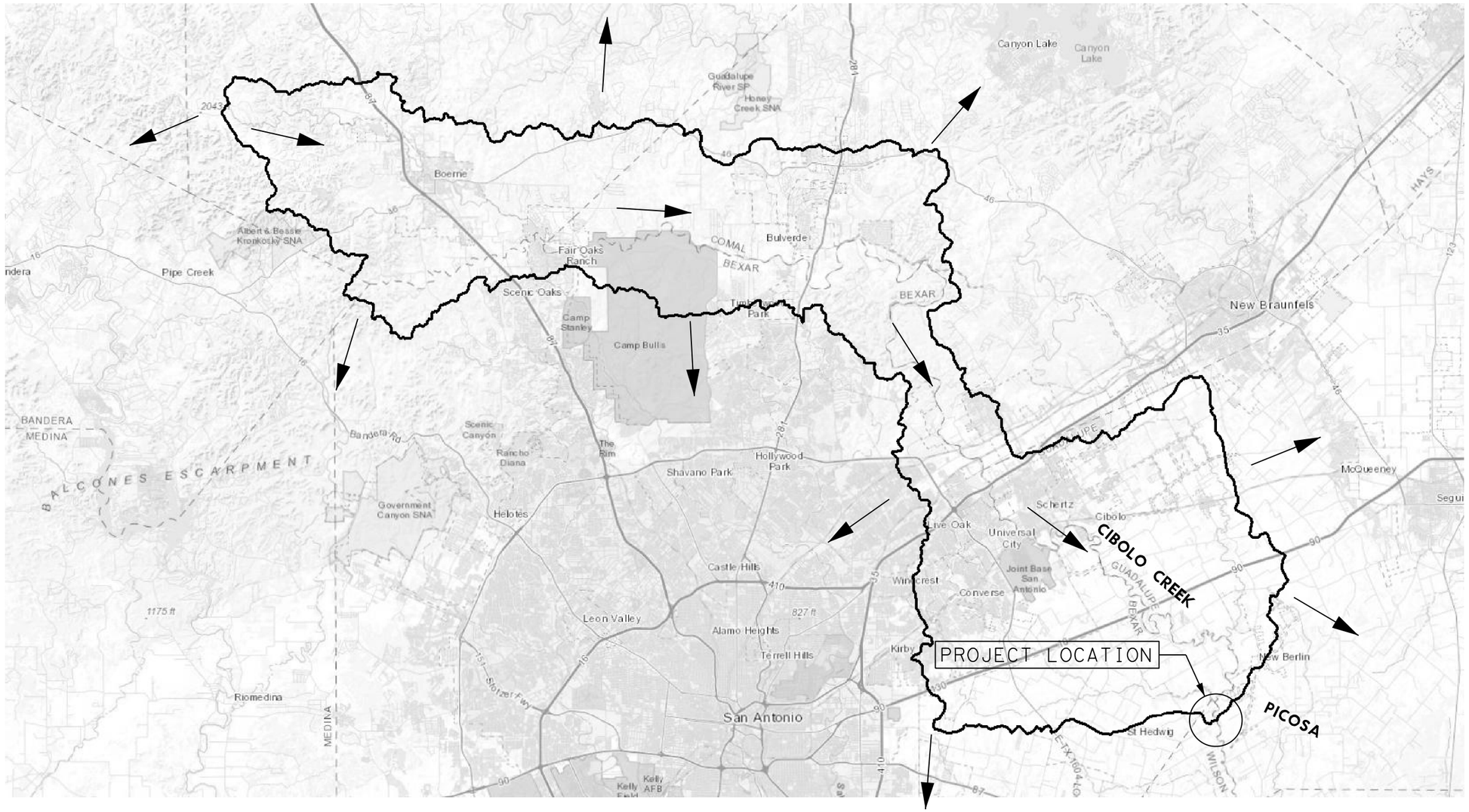

RUNOFF CALCULATIONS FROM SARA				
CROSSING	DRAINAGE AREA (SQ MI)	10-YR (CFS)	50-YR (CFS)	100-YR (CFS)
CR 347 AT CIBOLO	475	39261	58513	64798

NOTES:

1. DRAINAGE AREAS, DATA TABLES, AND CALCULATIONS TAKEN FROM THE SAN ANTONIO RIVER AUTHORITY (SARA) HYDROLOGY TECHNICAL SUPPORT DATA NOTEBOOK (HTSDN) PREPARED FOR WILSON COUNTY DFIRM MAP MODERNIZATION PROJECT IN JULY 2007.
2. DRAINAGE BASIN AREA VERIFIED USING USGS QUADRANGLE MAPS DATED 2020.
3. THE CR 347 CROSSING OF CIBOLO CREEK IS LOCATED IN A FEMA DESIGNATED ZONE AE FLOOD AREA IN WILSON COUNTY ON MAP NUMBER 48493C0025C, EFFECTIVE NOVEMBER 26, 2010. THE EXISTING HYDRAULIC MODELS FOR CIBOLO CREEK IN WILSON COUNTY ARE WERE OBTAINED FROM SAN ANTONIO RIVER AUTHORITY.
4. NO RUNOFF VALUES WERE CALCULATED AT CR 347 IN THE FIS.

4/7/2021

STATE OF TEXAS
AUSTIN S. HELTON
124922
LICENSED
PROFESSIONAL ENGINEER

Kimley»Horn F-928

Texas Department of Transportation

CR 347 @ CIBOLO CREEK

DRAINAGE AREA MAP

SHEET 1 OF 1

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	BR 2021 (063)	CR 347

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	WILSON	48
CONT.	SECT.	JOB	
0915	14	047	

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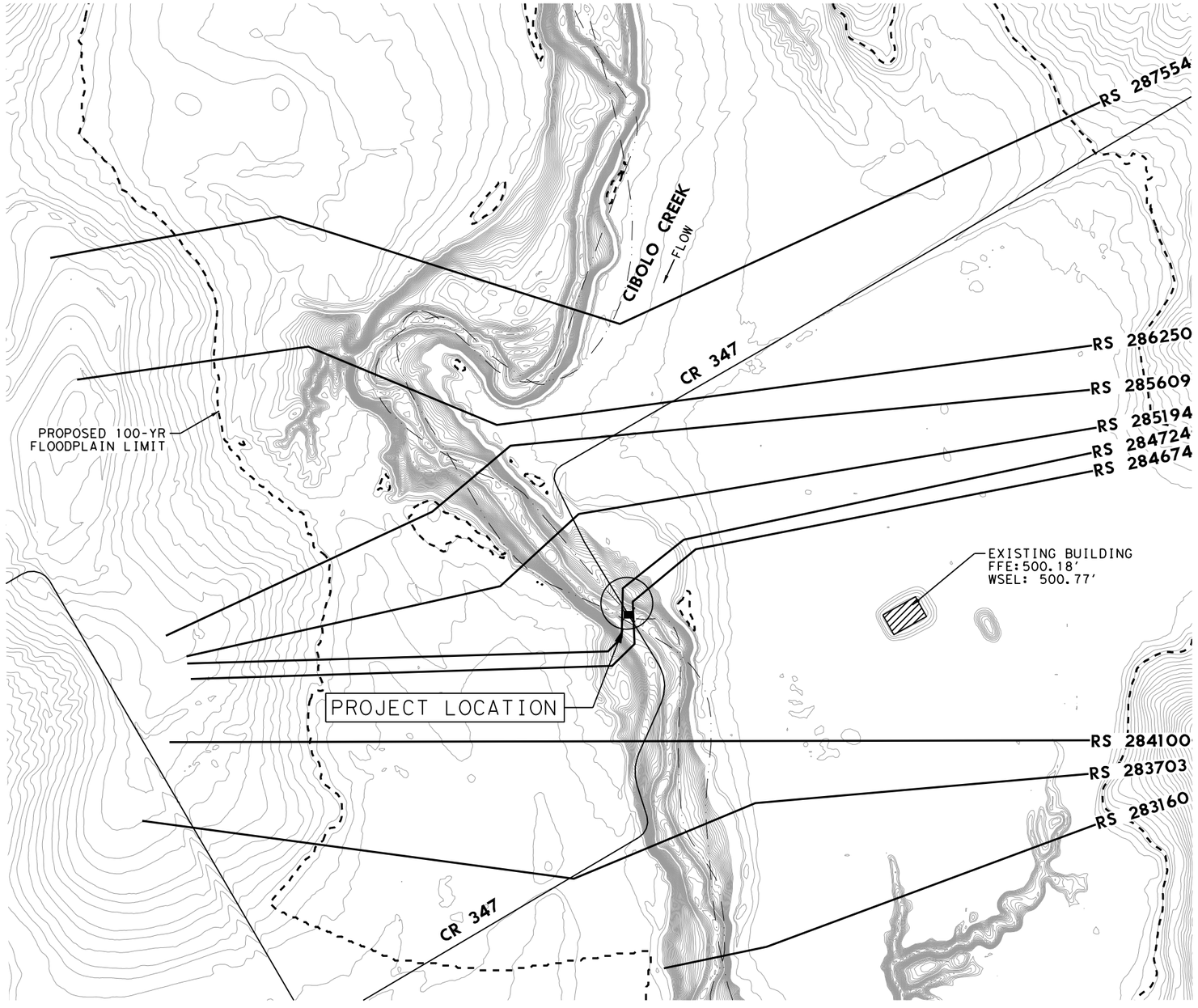

NOTES:

1. SEE NOTES ON DRAINAGE AREA MAP FOR PEAK FLOW CALCULATIONS.
2. HYDRAULICS ANALYZED USING HEC-RAS VERSION 5.0.7 WITH STEADY FLOW ANALYSIS.
3. THE CR 347 CROSSING OF CIBOLO CREEK IS LOCATED IN A FEMA DESIGNATED ZONE AE FLOOD AREA IN WILSON COUNTY ON MAP NUMBER 48493C0025C, EFFECTIVE NOVEMBER 26, 2010. THE EXISTING HYDRAULIC MODELS FOR CIBOLO CREEK IN WILSON COUNTY WERE OBTAINED FROM SAN ANTONIO RIVER AUTHORITY.
4. MULTIPLE PLANS AND GEOMETRY FILES WERE INCLUDED IN THE MODEL RECEIVED FROM THE SAN ANTONIO RIVER AUTHORITY. THE PLAN LABELED "CIBOLO_CREEK_MAINSTEM" WAS USED AS THE EXISTING EFFECTIVE MODEL AND ALL OTHER PLANS REMAINED AS RECIEVED. CROSS SECTION DATA IS BASED ON THE EFFECTIVE MODEL RECEIVED AND WERE SUPPLEMENTED WITH SURVEY AND LIDAR DATA RECEIVED FROM TEXAS NATURAL RESOURCES INFORMATION SYSTEM (TNRIS).
5. A CORRECTED EFFECTIVE MODEL WAS CREATED FROM THE EXISTING EFFECTIVE MODEL. CORRECTIONS INCLUDED BRIDGE PARAMETERS, FLOW CHANGE LOCATION ADDITION, CROSS SECTION MODIFICATION WITH SURVEYED TERRAIN AND INEFFECTIVE FLOW AREA ADDITIONS.
6. THE TXDOT HYDRAULIC MANUAL SETS CRITERIA OF OFF-SYSTEM BRIDGES AS "SAME OR SLIGHTLY BETTER THAN EXISTING". THE PROPOSED BRIDGE MEETS THIS REQUIREMENT.
7. THE EXIST PASSING DESIGN EVENT DISCHARGE IS SET SO THAT THE WATER PASSES UNDER THE BRIDGE IN EXISTING CONDITIONS.
8 THE PROPOSED PASSING DESIGN EVENT DISCHARGE IS SET SO THAT THE WATER PASSES UNDER THE BRIDGE IN PROPOSED CONDITIONS.
8. DOWNSTREAM BOUNDARY CONDITION WAS SET TO KNOWN WSEL (460.24) FOR 100 YR PROFILE AND SET TO NORMAL DEPTH (SL = 0.0006 FT/FT) FOR DESIGN EVENT PROFILE.
9. COORDINATION WITH THE LOCAL FLOODPLAIN ADMINISTRATOR IN WILSON COUNTY HAS BEEN INITIATED AND ALL PLANS HAVE BEEN PROVIDED FOR THEIR REVIEW ON 10/16/20.

N

SCALE = NTS

4/7/2021

STATE OF TEXAS
AUSTIN S. HELTON
124922
LICENSED
PROFESSIONAL ENGINEER

SUMMARY - PROPOSED VS EXISTING CAPACITY		
	EXISTING	PROPOSED
STRUCTURE TYPE	BRIDGE	BRIDGE
ROADWAY OVERTOP ELEV (FT)	463.39	464.13
LOW CHORD ELEVATION (FT)	461.39	462.13
Q(EX PASSING) (CFS)	472	472
WSEL (FT)	461.38	461.39
Q(PR PASSING) (CFS)	613	613
WSEL (FT)	462.25	462.09
Q(100) (CFS)	64798	64798
WSEL (FT)	500.77	500.77

Kimley»Horn F-928

Texas Department of Transportation

CR 347 @ CIBOLO CREEK

HYDRAULIC DATA

SHEET 1 OF 5

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	BR 2021 (063)	CR 347

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	WILSON	49
CONT.	SECT.	JOB	
0915	14	047	

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HEC-RAS CROSS SECTION SUMMARY - EXISTING VS PROPOSED

HEC-RAS Locations: User Defined

River	Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
					(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Cibolo Creek	1	289052 LETTERED XS M	1% AC	EFF_EX_CORR	90782.00	458.60	503.51		503.94	0.001636	8.21	22631.14	3259.66	0.23
Cibolo Creek	1	289052 LETTERED XS M	1% AC	EFF_PR_CORR	90782.00	458.60	503.51		503.95	0.001635	8.21	22638.20	3260.37	0.23
Cibolo Creek	1	289052 LETTERED XS M	EX PASS	EFF_EX_CORR	319.00	458.60	465.36		465.40	0.001062	1.44	221.08	64.77	0.14
Cibolo Creek	1	289052 LETTERED XS M	EX PASS	EFF_PR_CORR	319.00	458.60	465.36		465.39	0.001068	1.45	220.62	64.70	0.14
Cibolo Creek	1	289052 LETTERED XS M	PR PASS	EFF_EX_CORR	418.00	458.60	466.07		466.11	0.001043	1.56	268.58	69.11	0.14
Cibolo Creek	1	289052 LETTERED XS M	PR PASS	EFF_PR_CORR	418.00	458.60	466.05		466.09	0.001058	1.56	267.29	69.03	0.14
Cibolo Creek	1	288669	1% AC	EFF_EX_CORR	90782.00	458.25	503.00		503.42	0.001378	7.70	23324.28	3457.18	0.22
Cibolo Creek	1	288669	1% AC	EFF_PR_CORR	90782.00	458.25	503.00		503.42	0.001377	7.70	23333.25	3457.77	0.22
Cibolo Creek	1	288669	EX PASS	EFF_EX_CORR	319.00	458.25	464.93		464.97	0.001166	1.51	211.94	62.34	0.14
Cibolo Creek	1	288669	EX PASS	EFF_PR_CORR	319.00	458.25	464.92		464.96	0.001176	1.51	211.31	62.27	0.14
Cibolo Creek	1	288669	PR PASS	EFF_EX_CORR	418.00	458.25	465.65		465.69	0.001149	1.62	258.12	67.20	0.15
Cibolo Creek	1	288669	PR PASS	EFF_PR_CORR	418.00	458.25	465.62		465.66	0.001171	1.63	256.38	67.03	0.15
Cibolo Creek	1	288002	1% AC	EFF_EX_CORR	90782.00	457.65	501.99		502.47	0.001939	7.93	18793.18	3825.18	0.23
Cibolo Creek	1	288002	1% AC	EFF_PR_CORR	90782.00	457.65	501.99		502.48	0.001936	7.93	18809.87	3826.52	0.23
Cibolo Creek	1	288002	EX PASS	EFF_EX_CORR	319.00	457.65	463.91		463.96	0.002056	1.70	187.88	58.30	0.17
Cibolo Creek	1	288002	EX PASS	EFF_PR_CORR	319.00	457.65	463.89		463.93	0.002104	1.71	186.38	58.15	0.17
Cibolo Creek	1	288002	PR PASS	EFF_EX_CORR	418.00	457.65	464.67		464.72	0.001894	1.79	233.53	62.83	0.16
Cibolo Creek	1	288002	PR PASS	EFF_PR_CORR	418.00	457.65	464.61		464.66	0.001972	1.82	230.25	62.52	0.17
Cibolo Creek	1	287554	1% AC	EFF_EX_CORR	90782.00	457.24	501.85		502.12	0.000349	6.44	28525.13	3914.93	0.18
Cibolo Creek	1	287554	1% AC	EFF_PR_CORR	90782.00	457.24	501.85		502.12	0.000349	6.44	28542.33	3915.79	0.18
Cibolo Creek	1	287554	EX PASS	EFF_EX_CORR	319.00	457.24	463.49		463.53	0.000541	1.66	191.78	58.30	0.16
Cibolo Creek	1	287554	EX PASS	EFF_PR_CORR	319.00	457.24	463.45		463.49	0.000560	1.68	189.48	58.08	0.16
Cibolo Creek	1	287554	PR PASS	EFF_EX_CORR	418.00	457.24	464.28		464.33	0.000487	1.74	239.83	62.73	0.16
Cibolo Creek	1	287554	PR PASS	EFF_PR_CORR	418.00	457.24	464.21		464.26	0.000514	1.78	235.34	62.33	0.16
Cibolo Creek	1	286250 LETTERED XS L	1% AC	EFF_EX_CORR	64798.00	456.06	501.60		501.80	0.000213	5.27	29551.75	3919.99	0.15
Cibolo Creek	1	286250 LETTERED XS L	1% AC	EFF_PR_CORR	64798.00	456.06	501.60		501.81	0.000213	5.27	29569.22	3920.23	0.15
Cibolo Creek	1	286250 LETTERED XS L	EX PASS	EFF_EX_CORR	483.00	456.06	462.68		462.74	0.000643	2.00	241.95	62.79	0.18
Cibolo Creek	1	286250 LETTERED XS L	EX PASS	EFF_PR_CORR	483.00	456.06	462.60		462.66	0.000685	2.04	236.76	62.40	0.18
Cibolo Creek	1	286250 LETTERED XS L	PR PASS	EFF_EX_CORR	633.00	456.06	463.52		463.59	0.000625	2.14	296.08	67.68	0.18
Cibolo Creek	1	286250 LETTERED XS L	PR PASS	EFF_PR_CORR	633.00	456.06	463.39		463.47	0.000674	2.20	287.63	66.67	0.19
Cibolo Creek	1	285609	1% AC	EFF_EX_CORR	64798.00	455.48	501.30		501.62	0.000598	5.79	20095.72	3523.56	0.17
Cibolo Creek	1	285609	1% AC	EFF_PR_CORR	64798.00	455.48	501.31		501.62	0.000597	5.78	20113.89	3524.37	0.17
Cibolo Creek	1	285609	EX PASS	EFF_EX_CORR	483.00	455.48	462.27		462.32	0.000670	1.77	272.86	65.66	0.15
Cibolo Creek	1	285609	EX PASS	EFF_PR_CORR	483.00	455.48	462.16		462.21	0.000728	1.82	265.36	65.15	0.16
Cibolo Creek	1	285609	PR PASS	EFF_EX_CORR	633.00	455.48	463.11		463.17	0.000673	1.92	330.32	71.27	0.16
Cibolo Creek	1	285609	PR PASS	EFF_PR_CORR	633.00	455.48	462.95		463.01	0.000743	1.99	318.73	70.16	0.16
Cibolo Creek	1	285194 CR 347 - XS04	1% AC	EFF_EX_CORR	64798.00	454.95	500.83		501.36	0.000702	7.64	17837.04	3462.59	0.22
Cibolo Creek	1	285194 CR 347 - XS04	1% AC	EFF_PR_CORR	64798.00	454.95	500.84		501.36	0.000700	7.64	17860.19	3463.63	0.22
Cibolo Creek	1	285194 CR 347 - XS04	EX PASS	EFF_EX_CORR	483.00	454.95	462.04		462.09	0.000459	1.75	275.66	66.90	0.15
Cibolo Creek	1	285194 CR 347 - XS04	EX PASS	EFF_PR_CORR	483.00	454.95	461.91		461.96	0.000506	1.81	266.55	66.27	0.16
Cibolo Creek	1	285194 CR 347 - XS04	PR PASS	EFF_EX_CORR	633.00	454.95	462.89		462.94	0.000443	1.90	333.18	69.36	0.15
Cibolo Creek	1	285194 CR 347 - XS04	PR PASS	EFF_PR_CORR	633.00	454.95	462.70		462.76	0.000501	1.98	319.99	68.83	0.16
Cibolo Creek	1	284724 CR 347 - XS3	1% AC	EFF_EX_CORR	64798.00	453.81	500.77	479.82	500.97	0.000617	4.61	22687.08	3734.96	0.13
Cibolo Creek	1	284724 CR 347 - XS3	1% AC	EFF_PR_CORR	64798.00	453.81	500.77	479.74	500.98	0.000613	4.61	22728.27	3735.87	0.13
Cibolo Creek	1	284724 CR 347 - XS3	EX PASS	EFF_EX_CORR	483.00	453.81	461.46	457.29	461.56	0.005249	2.57	187.71	62.25	0.26
Cibolo Creek	1	284724 CR 347 - XS3	EX PASS	EFF_PR_CORR	483.00	453.81	461.45	457.27	461.53	0.002027	2.20	219.98	62.20	0.18
Cibolo Creek	1	284724 CR 347 - XS3	PR PASS	EFF_EX_CORR	633.00	453.81	462.36	457.80	462.46	0.004089	2.57	246.16	67.65	0.24
Cibolo Creek	1	284724 CR 347 - XS3	PR PASS	EFF_PR_CORR	633.00	453.81	462.18	457.83	462.28	0.002777	2.50	253.41	66.72	0.20
Cibolo Creek	1	284704			Bridge									
Cibolo Creek	1	284674 CR 347 - XS02	1% AC	EFF_EX_CORR	64798.00	451.46	500.70		500.89	0.000585	4.58	24271.68	3850.59	0.13
Cibolo Creek	1	284674 CR 347 - XS02	1% AC	EFF_PR_CORR	64798.00	451.46	500.70		500.89	0.000584	4.58	24284.29	3850.58	0.13
Cibolo Creek	1	284674 CR 347 - XS02	EX PASS	EFF_EX_CORR	483.00	451.46	461.34	455.05	461.40	0.000757	1.87	258.53	83.60	0.12
Cibolo Creek	1	284674 CR 347 - XS02	EX PASS	EFF_PR_CORR	483.00	451.46	461.36		461.39	0.000622	1.54	314.25	83.76	0.10
Cibolo Creek	1	284674 CR 347 - XS02	PR PASS	EFF_EX_CORR	633.00	451.46	462.12		462.18	0.002453	1.96	323.11	91.51	0.18
Cibolo Creek	1	284674 CR 347 - XS02	PR PASS	EFF_PR_CORR	633.00	451.46	462.07		462.12	0.000774	1.83	346.25	90.89	0.12
Cibolo Creek	1	284100 CR 347 - XS01	1% AC	EFF_EX_CORR	64798.00	453.19	500.62		500.84	0.000725	5.26	21920.96	3346.54	0.15
Cibolo Creek	1	284100 CR 347 - XS01	1% AC	EFF_PR_CORR	64798.00	453.19	500.62		500.84	0.000725	5.26	21920.96	3346.54	0.15
Cibolo Creek	1	284100 CR 347 - XS01	EX PASS	EFF_EX_CORR	483.00	453.19	461.26		461.33	0.002785	2.03	237.46	68.99	0.19
Cibolo Creek	1	284100 CR 347 - XS01	EX PASS	EFF_PR_CORR	483.00	453.19	461.26		461.33	0.002785	2.03	237.46	68.99	0.19
Cibolo Creek	1	284100 CR 347 - XS01	PR PASS	EFF_EX_CORR	633.00	453.19	461.97		462.05	0.002731	2.20	287.85	73.25	0.20
Cibolo Creek	1	284100 CR 347 - XS01	PR PASS	EFF_PR_CORR	633.00	453.19	461.97		462.05	0.002731	2.20	287.85	73.25	0.20

NOTES:

1. REFER TO HYDRAULIC DATA SHEET 1 FOR CALCULATION NOTES.

4/7/2021

STATE OF TEXAS
AUSTIN S. HELTON
124922
LICENSED
PROFESSIONAL ENGINEER

Kimley»Horn F-928

Texas Department of Transportation

CR 347 @ CIBOLO CREEK

HYDRAULIC DATA

SHEET 2 OF 5

FED.RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	BR 2021 (063)	CR 347

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	WILSON	50
CONT.	SECT.	JOB	
0915	14	047	

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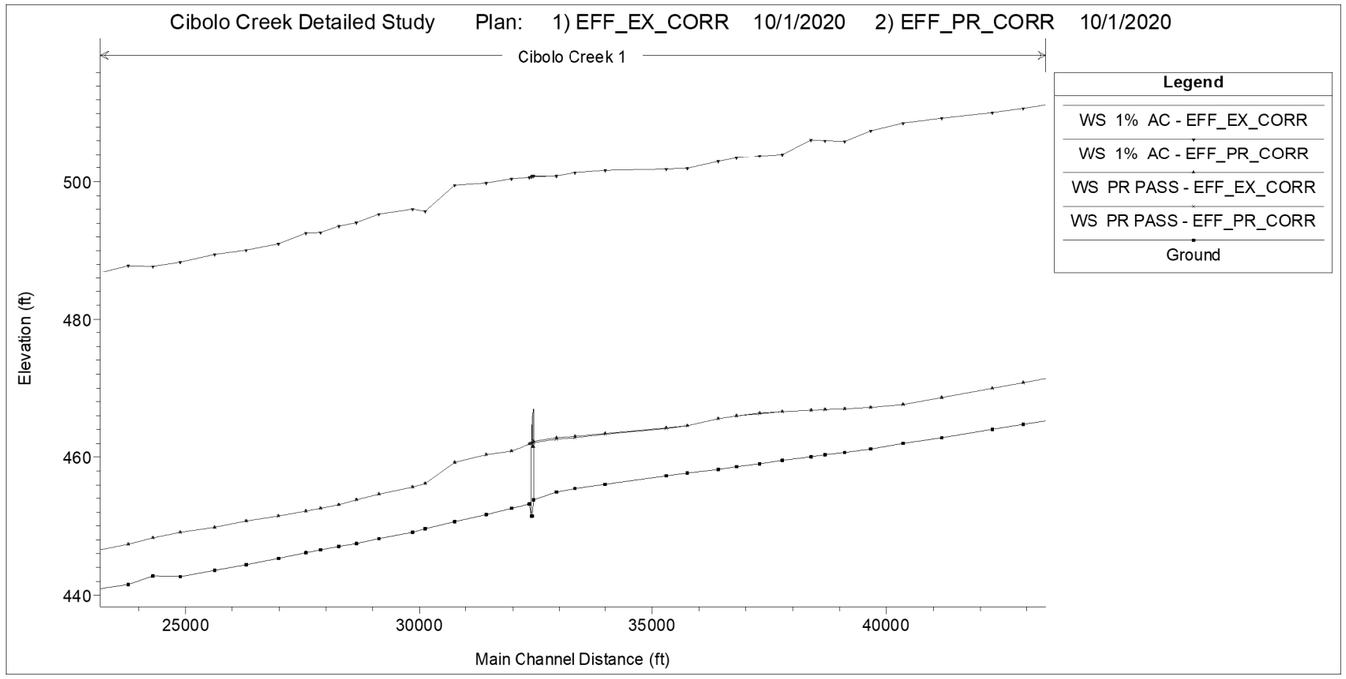
NOTES:

1. REFER TO HYDRAULIC DATA SHEET 1 FOR CALCULATION NOTES.

HEC-RAS WATER SURFACE PROFILES - EXISTING VS PROPOSED



RATING TABLE EX VS PROP WSEL		
	AT UPSTREAM ROW	
EVENT	EXIST WSEL FT	PRO WSEL FT
EX PASSING	461.38	461.39
PR PASSING	462.25	462.09
10-YR	490.97	491.05
50-YR	499.59	499.63
100-YR	500.77	500.77

4/7/2021

STATE OF TEXAS
AUSTIN S. HELTON
124922
LICENSED
PROFESSIONAL ENGINEER

Kimley»Horn F-928

Texas Department of Transportation

CR 347 @ CIBOLO CREEK

HYDRAULIC DATA

SHEET 3 OF 5

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	BR 2021 (063)	CR 347

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	WILSON	51
CONT.	SECT.	JOB	
0915	14	047	

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NOTES:

1. REFER TO HYDRAULIC DATA SHEET 1 FOR CALCULATION NOTES.

BRIDGE HYDRAULIC SUMMARY - EXISTING

Plan: EFF_EX_CORR Cibolo Creek 1 RS: 284704 Profile: 1% AC

E.G. US. (ft)	500.97	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	500.77	E.G. Elev (ft)	500.94	500.92
Q Total (cfs)	64798.00	W.S. Elev (ft)	500.78	500.77
Q Bridge (cfs)	127.74	Crit W.S. (ft)	481.19	480.61
Q Weir (cfs)		Max Chl Dpth (ft)	46.97	49.31
Weir Sta Lft (ft)		Vel Total (ft/s)	2.89	2.70
Weir Sta Rgt (ft)		Flow Area (sq ft)	22418.81	23966.34
Weir Submerg		Froude # Chl	0.08	0.08
Weir Max Depth (ft)		Specif Force (cu ft)	188173.20	197420.70
Min El Weir Flow (ft)	464.43	Hydr Depth (ft)	6.00	6.21
Min El Prs (ft)	461.48	W.P. Total (ft)	3836.96	3963.52
Delta EG (ft)	0.08	Conv. Total (cfs)	2279115.0	2285387.0
Delta WS (ft)	0.07	Top Width (ft)	3736.26	3857.46
BR Open Area (sq ft)	169.11	Frctn Loss (ft)	0.02	0.01
BR Open Vel (ft/s)	0.76	C & E Loss (ft)	0.01	0.01
BR Sluice Coef		Shear Total (lb/sq ft)	0.29	0.30
BR Sel Method	Energy only	Power Total (lb/ft s)	0.85	0.82

Plan: EFF_EX_CORR Cibolo Creek 1 RS: 284704 Profile: EX PASS

E.G. US. (ft)	461.49	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	461.38	E.G. Elev (ft)	461.45	461.38
Q Total (cfs)	472.00	W.S. Elev (ft)	461.32	461.29
Q Bridge (cfs)	472.00	Crit W.S. (ft)	457.19	455.15
Q Weir (cfs)		Max Chl Dpth (ft)	7.51	9.83
Weir Sta Lft (ft)		Vel Total (ft/s)	2.86	2.33
Weir Sta Rgt (ft)		Flow Area (sq ft)	165.28	202.75
Weir Submerg		Froude # Chl	0.21	0.16
Weir Max Depth (ft)		Specif Force (cu ft)	561.07	852.30
Min El Weir Flow (ft)	464.43	Hydr Depth (ft)	5.55	6.83
Min El Prs (ft)	461.48	W.P. Total (ft)	36.23	40.72
Delta EG (ft)	0.15	Conv. Total (cfs)	7946.8	10335.1
Delta WS (ft)	0.10	Top Width (ft)	29.77	29.71
BR Open Area (sq ft)	169.11	Frctn Loss (ft)	0.05	0.02
BR Open Vel (ft/s)	2.86	C & E Loss (ft)	0.02	0.02
BR Sluice Coef	0.27	Shear Total (lb/sq ft)	1.00	0.65
BR Sel Method	Energy only	Power Total (lb/ft s)	2.87	1.51

BRIDGE HYDRAULIC SUMMARY - PROPOSED

Plan: EFF_PR_CORR Cibolo Creek 1 RS: 284704 Profile: 1% AC

E.G. US. (ft)	500.98	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	500.77	E.G. Elev (ft)	500.95	500.92
Q Total (cfs)	64798.00	W.S. Elev (ft)	500.79	500.78
Q Bridge (cfs)	186.21	Crit W.S. (ft)	482.31	481.09
Q Weir (cfs)		Max Chl Dpth (ft)	46.98	49.32
Weir Sta Lft (ft)		Vel Total (ft/s)	2.92	2.71
Weir Sta Rgt (ft)		Flow Area (sq ft)	22174.70	23873.00
Weir Submerg		Froude # Chl	0.08	0.08
Weir Max Depth (ft)		Specif Force (cu ft)	179192.10	194157.30
Min El Weir Flow (ft)	466.99	Hydr Depth (ft)	5.93	6.19
Min El Prs (ft)	462.52	W.P. Total (ft)	3858.89	3986.82
Delta EG (ft)	0.08	Conv. Total (cfs)	2177020.0	2223477.0
Delta WS (ft)	0.07	Top Width (ft)	3737.97	3857.86
BR Open Area (sq ft)	231.60	Frctn Loss (ft)	0.02	0.01
BR Open Vel (ft/s)	0.80	C & E Loss (ft)	0.01	0.01
BR Sluice Coef		Shear Total (lb/sq ft)	0.32	0.32
BR Sel Method	Energy only	Power Total (lb/ft s)	0.93	0.86

Plan: EFF_PR_CORR Cibolo Creek 1 RS: 284704 Profile: PR PASS

E.G. US. (ft)	462.19	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	462.09	E.G. Elev (ft)	462.16	462.07
Q Total (cfs)	613.00	W.S. Elev (ft)	462.04	461.98
Q Bridge (cfs)	613.00	Crit W.S. (ft)	457.87	455.67
Q Weir (cfs)		Max Chl Dpth (ft)	8.23	10.52
Weir Sta Lft (ft)		Vel Total (ft/s)	2.80	2.31
Weir Sta Rgt (ft)		Flow Area (sq ft)	218.98	265.75
Weir Submerg		Froude # Chl	0.22	0.17
Weir Max Depth (ft)		Specif Force (cu ft)	747.04	1105.64
Min El Weir Flow (ft)	466.99	Hydr Depth (ft)	4.87	5.91
Min El Prs (ft)	462.52	W.P. Total (ft)	51.10	55.76
Delta EG (ft)	0.16	Conv. Total (cfs)	10099.3	13157.8
Delta WS (ft)	0.11	Top Width (ft)	45.04	45.09
BR Open Area (sq ft)	231.60	Frctn Loss (ft)	0.07	0.02
BR Open Vel (ft/s)	2.80	C & E Loss (ft)	0.02	0.02
BR Sluice Coef		Shear Total (lb/sq ft)	0.99	0.65
BR Sel Method	Energy only	Power Total (lb/ft s)	2.76	1.49

4/7/2021

STATE OF TEXAS
AUSTIN S. HELTON
124922
LICENSED
PROFESSIONAL ENGINEER

Kimley»Horn F-928

Texas Department of Transportation

CR 347 @ CIBOLO CREEK

HYDRAULIC DATA

SHEET 4 OF 5

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	BR 2021 (063)	CR 347

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	WILSON	52
CONT.	SECT.	JOB	
0915	14	047	

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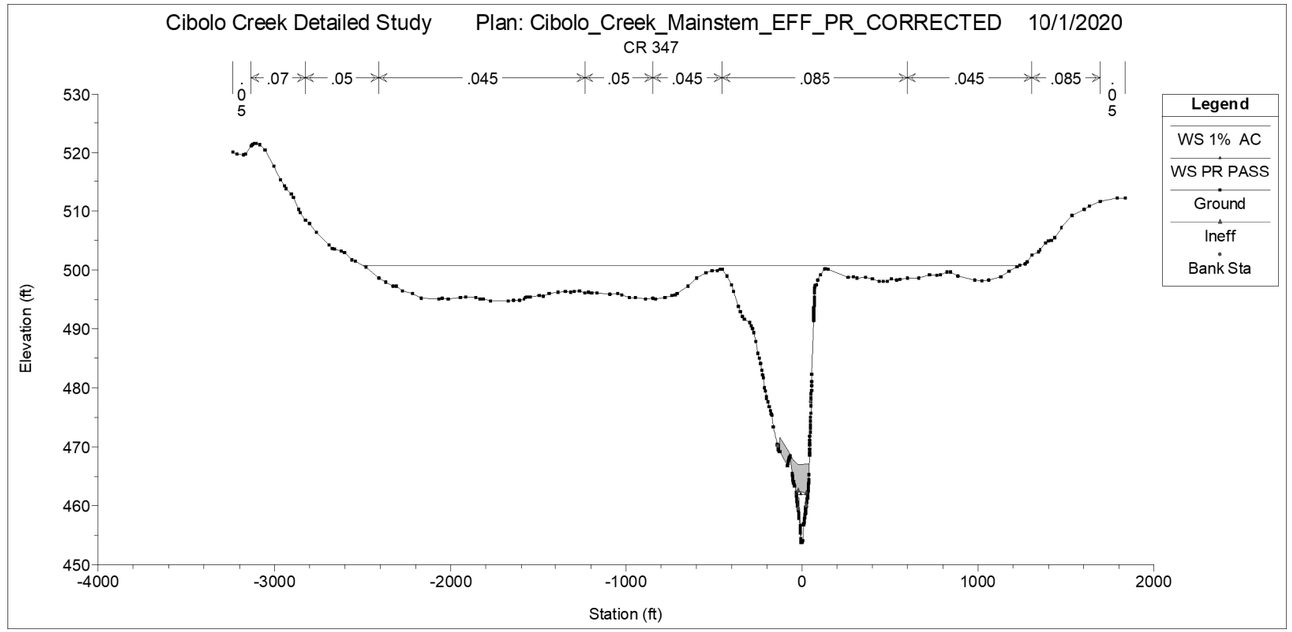
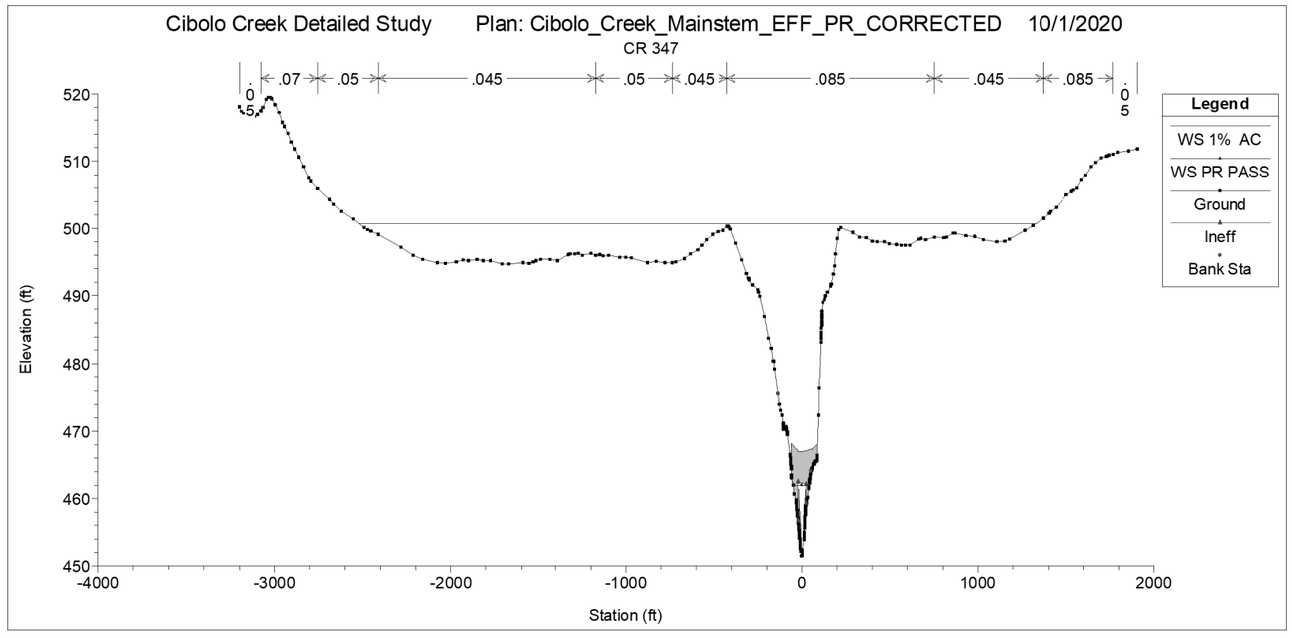
BRIDGE SECTION - PROPOSED UPSTREAM



BRIDGE SECTION - PROPOSED DOWNSTREAM



NOTES:

1. REFER TO HYDRAULIC DATA SHEET 1 FOR CALCULATION NOTES.

4/7/2021

STATE OF TEXAS
AUSTIN S. HELTON
124922
LICENSED
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Texas Department of Transportation

CR 347 @ CIBOLO CREEK

HYDRAULIC DATA

SHEET 5 OF 5

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	BR 2021 (063)	CR 347

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	WILSON	53
CONT.	SECT.	JOB	
0915	14	047	

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LIVE-BED CONTRACTION SCOUR ANALYSIS										
LOCATION	FREQ (yrs)	y_1 (ft)	y_0 (ft)	K_1	Q_1 (cfs)	Q_2 (cfs)	W_1 (ft)	W_2 (ft)	y_2 (ft)	y_s (ft)
CHANNEL	PR PASS	4.55	4.87	0.69	613.00	613.00	68.48	36.00	7.09	2.22

PR-PASS TOTAL SCOUR CALCULATIONS- CIBOLO CREEK

CONTRACTION SCOUR RESULTS

FREQ	AVG DEPTH
(yrs)	(ft)
PR-PASS	2.22

LIVE BED CONTRACTION SCOUR ANALYSIS

$$\frac{y_2}{y_1} = \left(\frac{Q_2}{Q_1}\right)^{\S} * \left(\frac{W_1}{W_2}\right)^{0.69}$$

$y_s = y_2 - y_0$

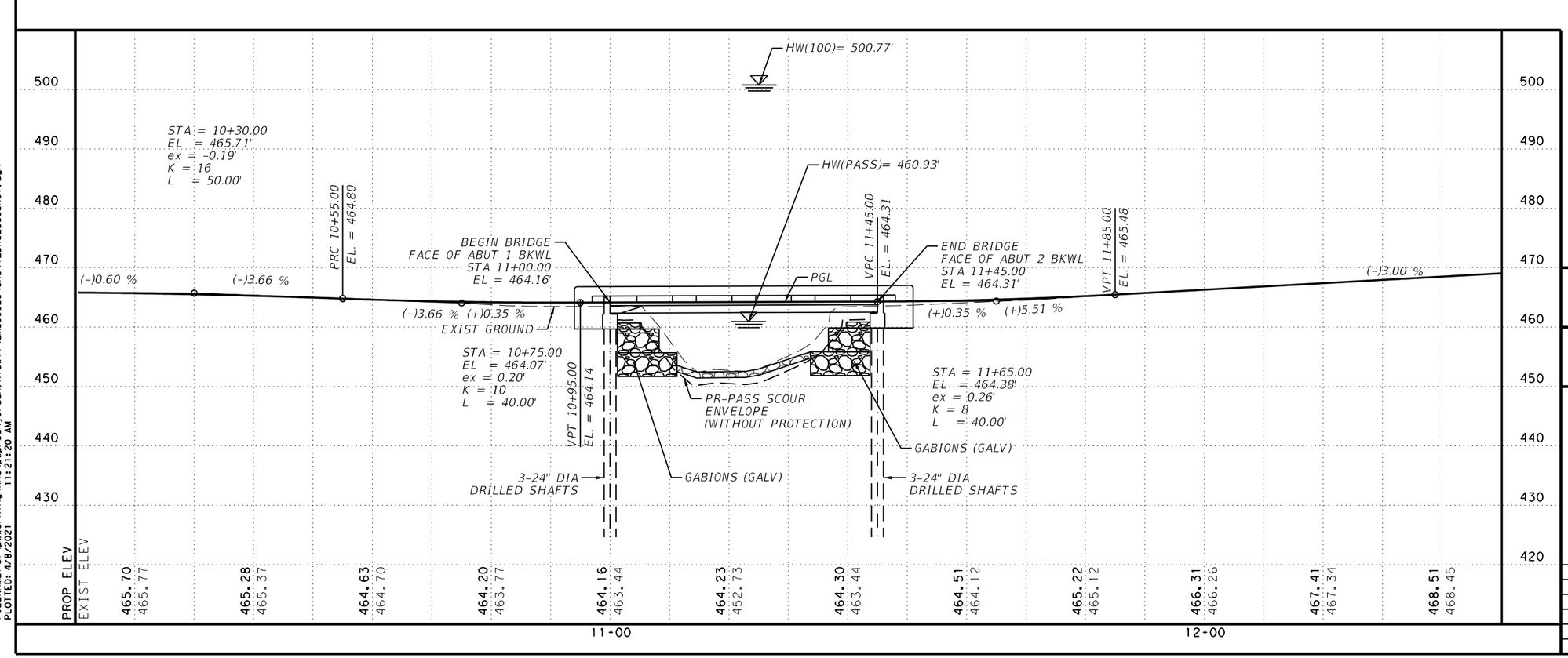
WHERE:
y_1= Average depth in the upstream main channel (ft)
y_2= Average depth in the contracted section (ft)
y_0= Existing depth in the contracted section before scour (ft)
Q_1= Flow in the upstream channel transporting sediments (cfs)
Q_2= Flow in the contracted channel (cfs)
W_1= Bottom width of the upstream main channel that is transporting bed material (ft)
W_2= Bottom width of the main channel in the contracted section less pier widths (ft)
K_1= Exponent determined from table below
y_s= Average contraction scour depth (ft)

V_*/T	k_1	MODE OF BED MATERIAL TRANSPORT
<0.5	0.59	MOSTLY CONTACT BED MATERIAL DISCHARGE
0.5 TO 2.0	0.64	SOME SUSPENDED BED MATERIAL DISCHARGE
>2.0	0.69	MOSTLY SUSPENDED BED MATERIAL DISCHAGE

V*= Shear velocity in the upstream section (ft/s)
V*= Fall velocity of bed material based on the D50 (ft/s)

NOTES:

1. SCOUR ANALYSIS WAS PERFORMED IN THE FHWA HYDRAULIC TOOLBOX VERSION 5.0.
2. SCOUR COMPUTATIONS WERE PERFORMED FOR THE PR-PASS AND 100-YR FLOWS. THE PR-PASS FREQUENCY IS THE SCOUR DESIGN FREQUENCY.



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4/8/2021

STATE OF TEXAS
AUSTIN S. HELTON
124922
LICENSED
PROFESSIONAL ENGINEER

0' 10' 20'
SCALE

Kimley»Horn F-928

Texas Department of Transportation

CR 347 @ CIBOLO CREEK

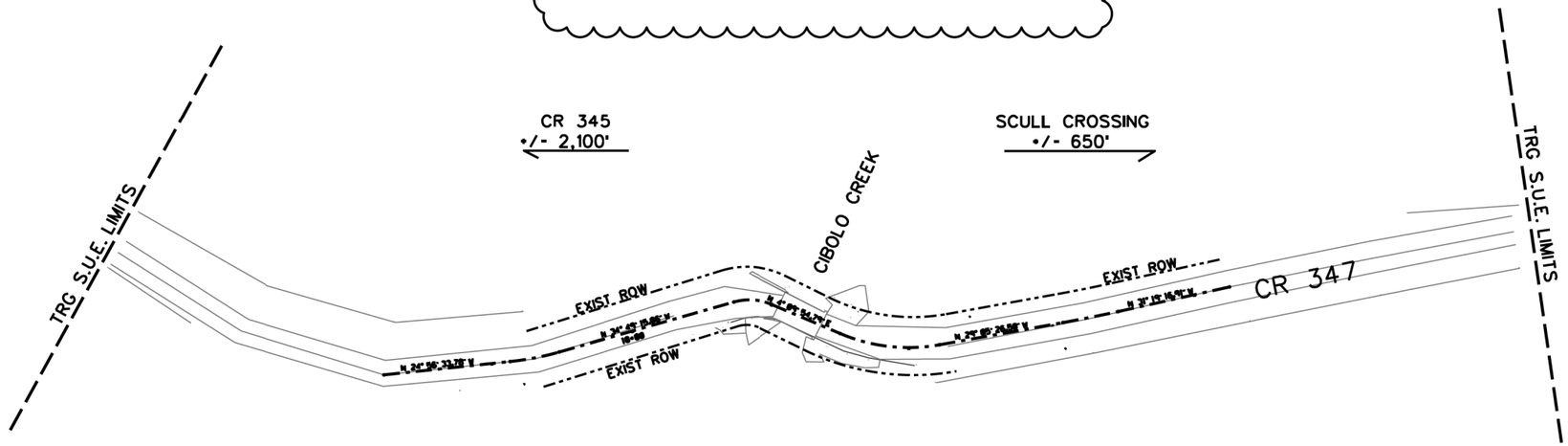
SCOUR ANALYSIS

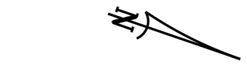
SHEET 1 OF 1

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	BR 2021 (063)	CR 347

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	WILSON	54
CONT.	SECT.	JOB	
0915	14	047	

NO UTILITIES LOCATED WITHIN
S.U.E. LIMITS





GRAPHIC SCALE IN FEET

EXISTING UTILITY CONTACT INFORMATION

GUADALUPE VALLEY ELECTRIC CO-OP

PAUL STOCK
1-830-386-4424
PSTOCK@GVEC.ORG

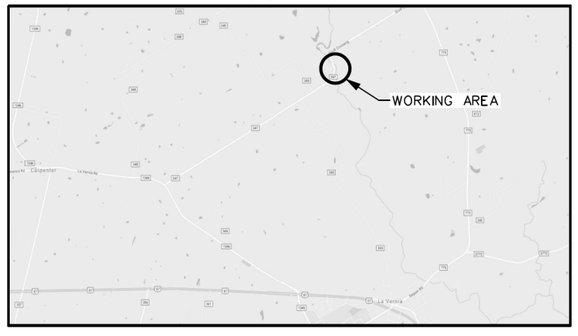
AT&T

PHILLIP AUSTIN
210-283-1839
PA1657@ATT.COM

EAST CENTRAL SPECIAL UTILITY DISTRICT

ALBERT STRZELCZYK
210-649-2383
EASTCENTRALWATER@SBCGLOBAL.NET

DETAIL VIEW



The Rios Group, Inc.
TBPE Firm # F-14595

01-29-2021

LEGEND OF UTILITY TYPES

ABANDONED UTILITY
PROPOSED UTILITY
UNKNOWN UTILITY

COMMUNICATIONS
FRONTIER (TELE) — QL "B" — C1
FRONTIER (TELE) — QL "C"/QL "D" — C1

POTABLE WATER
PICOSA CREEK WSC — QL "B" — W1
PICOSA CREEK WSC — QL "C" — W1
PICOSA CREEK WSC — QL "D" — W1

OVERHEAD UTILITY — QL "D" — OH
OH1 - KARNES ELECTRIC CO-OP (ELEC)
OH2- FRONTIER (TELE)

LEGEND OF UTILITY SYMBOLS

END CAP
QUALITY LEVEL CHANGE
TEST HOLE
UTILITY CONTINUATION
FIBER HANDHOLE
TELEPHONE CABINET
TELEPHONE HANDHOLE (VAULT)
TELEPHONE MANHOLE
TELEPHONE PEDESTAL
TELEPHONE POLE
TELEPHONE POLE W/RISER
ELECTRIC POLE (POWER)
ELECTRIC POLE W/RISER
FIRE HYDRANT
WATER MANHOLE
WATER METER
WATER VALVE
WATER VAULT

REV	DATE	BY	DESCRIPTION

THE RIOS GROUP
SUBSURFACE UTILITY ENGINEERING
UTILITY COORDINATION
1740 Universal City Blvd., Ste 200
Universal City, TX 78148

CR 347 AT CIBOLO CREEK

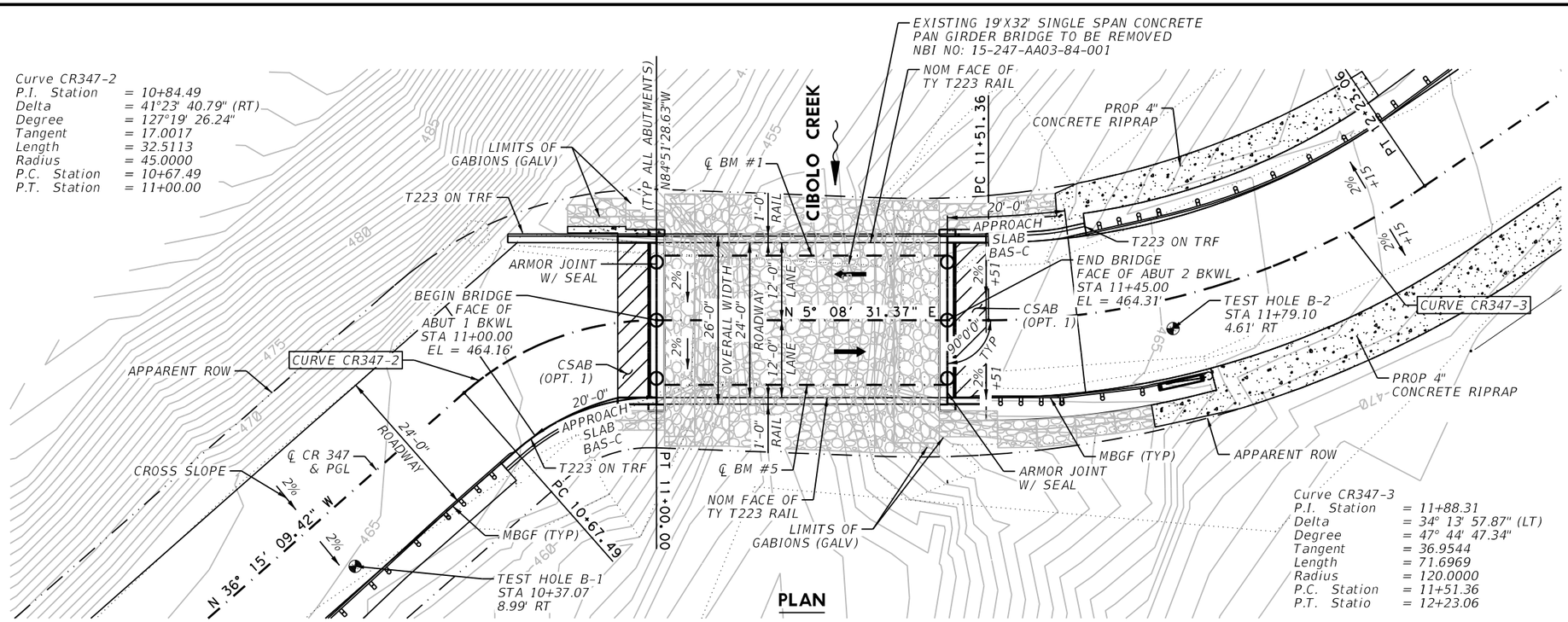
S.U.E. PLAN SHEET

DESIGNED BY: D.W.	CHECKED BY: T.I.	DATE: 01-29-2021
APPROVED BY:	CHECKED BY:	DATE:

TRG PROJECT NUMBER	SUE SHEET NO.	DATE
KHA1921.04	1 OF 1	01-29-2021

CSJ NUMBER	PLAN SHEET NO.
0915-14-047	55

STATE	DISTRICT	COUNTY
TX	SAT	WILSON

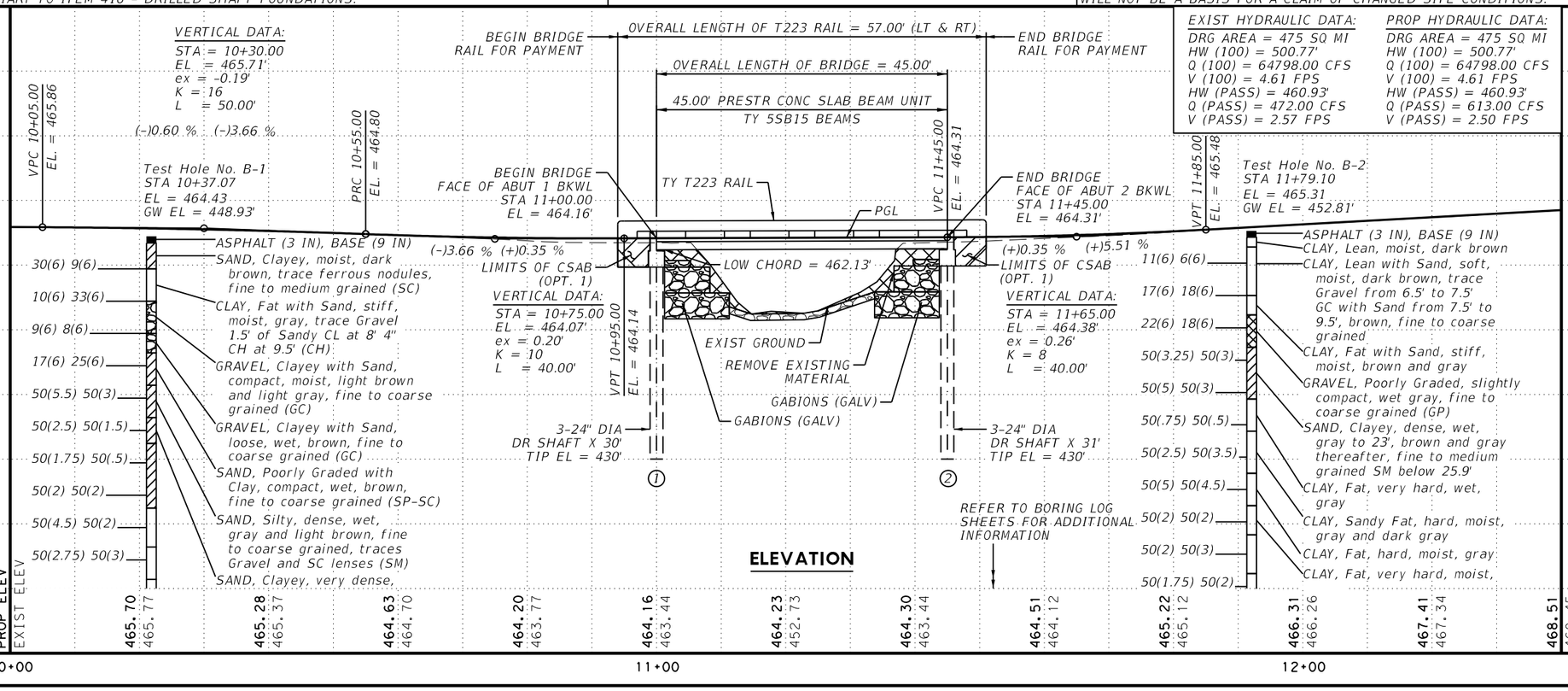


GENERAL NOTES:

1. BRIDGE DESIGNED FOR HL93 LOADING PER AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 8TH EDITION (2017), AND INTERIM REVISIONS THERETO.
2. CONTRACTOR TO FIELD VERIFY LOCATIONS OF ALL STRUCTURES AND UTILITIES PRIOR TO ORDERING MATERIALS AND NOTIFY ENGINEER IN WRITING OF ANY CONFLICTS OR DISCREPANCIES.
3. SEE BRIDGE TYPICAL SHEET FOR ADDTIONAL INFORMATION.
4. SEE BORING LOG SHEETS FOR DRILLING LOG INFORMATION.
5. EXISTING BRIDGE SUPERSTRUCTURE AND SUBSTRUCTURE TO BE REMOVED TO 2' BELOW FINISHED GRADE.
6. SEE GABION DETAILS SHEETS FOR MORE INFORMATION.

THE CONTRACTOR'S ATTENTION IS DRAWN TO THE WATER BEARING SAND MATERIAL SHOWN IN THE BORING LOGS. THE USE OF 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.

THE CONTRACTOR IS CAUTIONED THAT THE GROUNDWATER LEVEL 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.



EXIST HYDRAULIC DATA:
DRG AREA = 475 SQ MI
HW (100) = 500.77'
Q (100) = 64798.00 CFS
V (100) = 4.61 FPS
HW (PASS) = 460.93'
Q (PASS) = 472.00 CFS
V (PASS) = 2.57 FPS

PROP HYDRAULIC DATA:
DRG AREA = 475 SQ MI
HW (100) = 500.77'
Q (100) = 64798.00 CFS
V (100) = 4.61 FPS
HW (PASS) = 460.93'
Q (PASS) = 613.00 CFS
V (PASS) = 2.50 FPS

DESIGN SPEED: MOIEC(MEET OR IMPROVE EXISTING CONDITIONS)
FUNCTIONAL CLASS: LOCAL
EXIST ADT: 200 (2022)
PROP ADT: 300 (2042)
TERRAIN: ROLLING
EXIST NBI : 15-247-AA03-84-001
PROP NBI : 15-247-AA03-84-002

4/8/2021

STATE OF TEXAS
RYAN C. LAURENT
131995
LICENSED
PROFESSIONAL ENGINEER

0' 10' 20' HORZ
0' 10' 20' VERT
SCALE

Kimley»Horn F-928

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CR 347 @ CIBOLO CREEK

BRIDGE LAYOUT

SHEET 1 OF 2

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	BR 2021 (063)	CR 347

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	WILSON	56
CONT.	SECT.	JOB	
0915	14	047	

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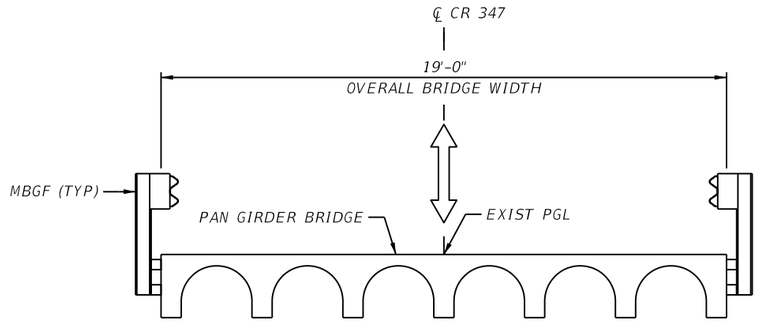
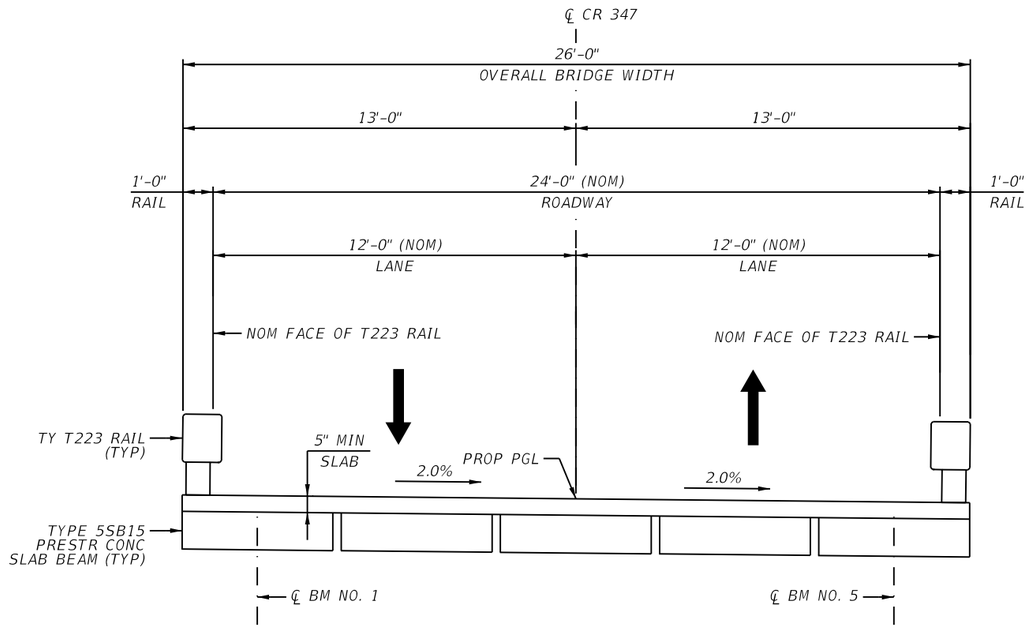


EXISTING TYPICAL SECTION



PROPOSED TYPICAL SECTION
SCALE: 1"=5'

PROP ELEV
EXIST ELEV

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4/7/2021

STATE OF TEXAS
RYAN C. LAURENT
131995
LICENSED
PROFESSIONAL ENGINEER

Kimley»Horn F-928

Texas Department of Transportation

CR 347 @ CIBOLO CREEK

BRIDGE LAYOUT

SHEET 2 OF 2

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	BR 2021 (063)	CR 347

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	WILSON	57
CONT.	SECT.	JOB	
0915	14	047	

SPEC ITEM #	0400 6005	0416 6002	0420 6013	0422 6007	0422 6015	0425 6012	0450 6006	0454 6004	4171 6001
ITEM DESCRIPTION	CEM STABIL BKFL	DRILL SHAFT (24 IN)	CL C CONC (ABUT)	REINF CONC SLAB (SLAB BEAM)	APPROACH SLAB	PRESTR CONC SLAB BEAM (5SB15)	RAIL (TY T223)	ARMOR JOINT (SEALED)	STENCILING PERMANENT STRUCTURE NUMBERS
BRIDGE COMPONENT	CY	LF	CY	SF	CY		LF	LF	EA
2 - ABUTMENTS	34	183	18.4		39		114.0	50.4	
1 - 45.00' PRESTR CONC SLAB BEAM UNIT				1,170		222.50			
									2
TOTAL	34	183	18.4	1,170	39	222.50	114.0	50.4	2

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Texas Department of Transportation

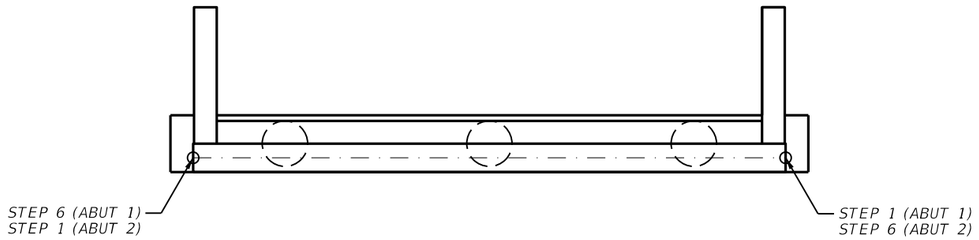
CR 347 @ CIBOLO CREEK

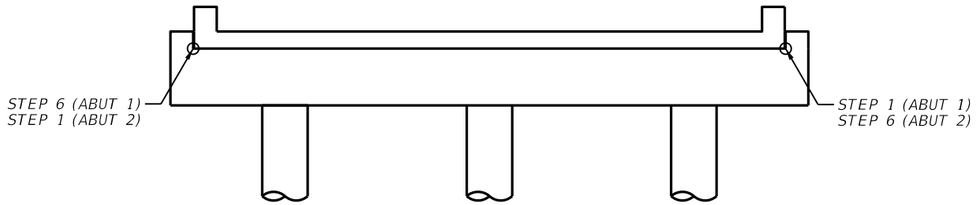
ESTIMATED QUANTITIES

SHEET 1 OF 1

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	BR 2021 (063)	CR 347

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	WILSON	58
CONT.	SECT.	JOB	
0915	14	047	





CONTROL ELEVATIONS					
	TOP OF CAP		TOP OF DRILLED SHAFTS*		
	STEP 1	STEP 6	DS 1	DS 2	DS 3
ABUT 1	462.462'	461.942'	459.862'	459.702'	459.542'
ABUT 2	462.612'	462.092'	460.012'	459.852'	459.692'

* ELEVATIONS AT ℄ OF DRILLED SHAFT

GENERAL NOTES:

1. REFER TO TXDOT STANDARDS APSB-24 AND SPSB-24 FOR DETAILS NOT SHOWN.

BEAM REPORT AT CENTER OF BOX, SPAN 1

	HORIZONTAL DISTANCE C-C BENT	C-C BRG.	TRUE DISTANCE BOT. BM. FLG.	BEAM SLOPE	BEAM BEARING
BOX 1	45.0000	43.5833	44.5003	0.00344	N 5 8 31.16 E
BOX 2	45.0000	43.5833	44.5003	0.00344	N 5 8 31.16 E
BOX 3	45.0000	43.5833	44.5003	0.00344	N 5 8 31.16 E
BOX 4	45.0000	43.5833	44.5003	0.00344	N 5 8 31.16 E
BOX 5	45.0000	43.5833	44.5003	0.00344	N 5 8 31.16 E

4/7/2021

STATE OF TEXAS
RYAN C. LAURENT
131995
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BENT REPORT

BENT NO. 1 (N 84 51 28.84 W)

DISTANCE BETWEEN STATION LINE AND STEP LINE 1, 13.0000 L

BOX		STEP SPAC. (CL BENT)	BEAM ANGLE D M S CL BENT	DIST CL BENT TO CL BRNG PERP TO CL BEAM	DIST CL BENT TO CL BRNG ALONG CL BENT	DIST CL BENT TO END OF BM PERP TO CL BEAM	DIST CL BENT TO END OF BM ALONG
STEP 1		0.0000	90 0 0.00	0.7083	0.7083	0.2500	0.2500
BOX 1	LEFT CENTER RIGHT	5.1172	90 0 0.00	0.7083	0.7083	0.2500	0.2500
BOX 2	LEFT CENTER RIGHT						
STEP 3		5.2552	90 0 0.00	0.7083	0.7083	0.2500	0.2500
BOX 3	LEFT CENTER RIGHT						
STEP 4		5.2552	90 0 0.00	0.7083	0.7083	0.2500	0.2500
BOX 4	LEFT CENTER RIGHT						
		5.2552	90 0 0.00	0.7083	0.7083	0.2500	0.2500
BOX 5	LEFT CENTER RIGHT						
STEP 6		5.1172	90 0 0.00	0.7083	0.7083	0.2500	0.2500
	TOTAL	26.0000					

BENT REPORT

BENT NO. 2 (N 84 51 28.84 W)

DISTANCE BETWEEN STATION LINE AND STEP LINE 1, 13.0000 L

BOX		STEP SPAC. (CL BENT)	BEAM ANGLE D M S CL BENT	DIST CL BENT TO CL BRNG PERP TO CL BEAM	DIST CL BENT TO CL BRNG ALONG CL BENT	DIST CL BENT TO END OF BM PERP TO CL BEAM	DIST CL BENT TO END OF BM ALONG
STEP 1		0.0000	90 0 0.00	0.7083	0.7083	0.2500	0.2500
BOX 1	LEFT CENTER RIGHT	5.1172	90 0 0.00	0.7083	0.7083	0.2500	0.2500
BOX 2	LEFT CENTER RIGHT						
STEP 3		5.2552	90 0 0.00	0.7083	0.7083	0.2500	0.2500
BOX 3	LEFT CENTER RIGHT						
STEP 4		5.2552	90 0 0.00	0.7083	0.7083	0.2500	0.2500
BOX 4	LEFT CENTER RIGHT						
		5.2552	90 0 0.00	0.7083	0.7083	0.2500	0.2500
BOX 5	LEFT CENTER RIGHT						
STEP 6		5.1172	90 0 0.00	0.7083	0.7083	0.2500	0.2500
	TOTAL	26.0000					

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Texas Department of Transportation

CR 347 @ CIBOLO CREEK

BRIDGE GEOMETRY

SHEET 1 OF 1

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	BR 2021 (063)	CR 347

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	WILSON	59
CONT.	SECT.	JOB	
0915	14	047	

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DRILLING LOG

WinCore
Version 3.3

County	Wilson	Hole	B-1	District	San Antonio
Highway	CR 347	Structure	Bridge	Date	07/27/20
CSJ	0915-14-047	Station	10+37.07	Grnd. Elev.	464.43 ft
		Offset	8.99' RT	GW Elev.	448.93 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test: Lateral Press. (psi)	Triaxial Test: Deviator Stress (psi)	Properties: MC	LL	PI	Wet Den. (pcf)	Additional Remarks
463.7			ASPHALT (0.5''), BASE (2.5'')							
			SAND, Clayey with Gravel, moist, dark brown, fine to coarse grained, trace ferrous nodules, trace asphalt fragments to 2.5' (SC)			6				SSS@1', N=7, -#200=20.1%
						9	35	18		PTS@3', PP=2.75, -#200=34.9%
459.4	5	30 (6) 9 (6)				11	41	24		SSS@5', N=13, -#200=38.2%
			CLAY, Sandy Lean, stiff, moist, gray; GC with Sand layer to 6.3' (CL)			17				SSS@6.3', N=11
						19	39	22		PTS@8', PP=4.0, -#200=67.4% Sulfate Content<100 ppm
454.4	10	10 (6) 33 (6)								
			GRAVEL, Clayey with Sand, compact, moist, light brown, fine to coarse grained (GC)			7				SSS@11.5', N=41, -#200=13.8%
451.4			GRAVEL, Clayey with Sand, loose, wet, brown, fine to coarse grained (GC)							
	15	9 (6) 8 (6)				20				SSS@16.5', N=10
445.4			SAND, Poorly Graded with Clay and Gravel, compact, wet, brown, fine to coarse grained (SP-SC)							
	20	17 (6) 25 (6)				14				SSS@21.4', N=18, -#200=8.8%
440.4			SAND, Silty, dense, wet, gray and light brown, fine to coarse grained, traces Gravel and SC lenses (SM)							
	25	50 (5.5) 50 (3)				22				SSS@26', N=52
435.4			SAND, Clayey, very dense, wet, dark gray, fine grained (SC)							
	30	50 (2.5) 50 (1.5)				24				SSS@30.5', N=76, -#200=18.9%
430.4			CLAY, Fat, very hard, moist, dark gray (CH)							
	35	50 (1.75) 50 (0.5)				24	52	32		SSS@35.3', N=27, 50/5.5 -#200=88.8%
	40	50 (2) 50 (2)								

Remarks: Drill Rig: CME 55 with 170-pound TxDOT Automatic Hammer; SSS: Split Spoon Sample; PTS: Push Tube Sample; PP: Pocket Penetrometer Reading (tsf); Drilling Method: CFA to 15' then Mud Rotary; Lat. 29.395094, Long. -98.127175

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: Phillip Stein **Logger:** Pearl Saya-Ang **Organization:** Corsair Consulting LLC

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DRILLING LOG

WinCore
Version 3.3

County	Wilson	Hole	B-1	District	San Antonio
Highway	CR 347	Structure	Bridge	Date	07/27/20
CSJ	0915-14-047	Station	10+37.07	Grnd. Elev.	464.43 ft
		Offset	8.99' RT	GW Elev.	448.93 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test: Lateral Press. (psi)	Triaxial Test: Deviator Stress (psi)	Properties: MC	LL	PI	Wet Den. (pcf)	Additional Remarks
						23				SSS@40.5', N=49
422.4			CLAY, Fat, very hard, moist, dark gray (CH)							
			SAND, Clayey, dense, wet, gray, fine grained (SC)							
	45	50 (4.5) 50 (2)				22	40	22		SSS@45.7', N=39, -#200=32.8%
416.9			CLAY, Fat, hard, moist, dark gray (CH)							
	50	50 (2.75) 50 (3)				20				SSS@50.7', N=41
411.4			CLAY, Fat, very hard, moist, dark gray (CH)							
	55	50 (1.5) 50 (1.75)				22				SSS@55.4', N=58
407.4			CLAY, Sandy Lean, very hard, moist, gray, few SC lenses (CL)							
	60	50 (2.5) 50 (1.25)				37				SSS@60.4', N=37, 50/3
402.9			CLAY, Fat, very hard, moist, dark gray, trace SM lenses (CH)							
	65	50 (1.5) 50 (1)				22				SSS@65.3', N=53
394.1	70	50 (1) 50 (1)								Boring Terminated at 70.3'
	75									
	80									

Remarks: Drill Rig: CME 55 with 170-pound TxDOT Automatic Hammer; SSS: Split Spoon Sample; PTS: Push Tube Sample; PP: Pocket Penetrometer Reading (tsf); Drilling Method: CFA to 15' then Mud Rotary; Lat. 29.395094, Long. -98.127175

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Driller: Phillip Stein **Logger:** Pearl Saya-Ang **Organization:** Corsair Consulting LLC

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STATE OF TEXAS
YANFENG LI
98358
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01/28/21

95% PLANS

CORSAIR CONSULTING LLC
F-14217

Texas Department of Transportation

CR 347 @ CIBOLO CREEK

BORING LOGS

SHEET 1 OF 2

FEDRD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	BR 2021 (063)	CR 347

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAN ANTONIO	WILSON	60
CONT.	SECT.	JOB	
0915	14	047	

DRILLING LOG

WinCore
Version 3.3

County	Guadalupe	Hole	B-2	District	San Antonio
Highway	CR 347	Structure	Bridge	Date	07/28/20
CSJ	0915-14-047	Station	11+79.10	Grnd. Elev.	465.31 ft
		Offset	4.61' RT	GW Elev.	452.81 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test: Lateral Press. (psi)	Triaxial Test: Deviator Stress (psi)	Properties: MC	LL	PI	Wet Den. (pcf)	Additional Remarks
464.6			ASPHALT (1.25"), BASE (3.25")			18	46	27		SSS@1', N=12, -#200=79.6%
			CLAY, Lean with Sand, soft, moist, dark brown; GC with Sand to 1'; GC with Sand below 7.5' (CL)	0	40.5	17	48	29	117	PTS@2.5', PP=3.5, -#200=81.7% Sulfate Contents=720 ppm
	5	11 (6) 6 (6)		0	38.2	14			127	PTS@4.5', PP=3.5
						18				PTS@6.5', PP=2.5
						8				SSS@7.5', N=33, -#200=19.1%
455.8	10	17 (6) 18 (6)	CLAY, Fat with Sand, stiff, moist, brown and gray (CH)			20				SSS@11.5', N=10
452.3			GRAVEL, Poorly Graded, compact, wet, gray, fine to coarse grained (GP)							
	15	22 (6) 18 (6)				9				SSS@16.4', N=12
446.3			SAND, Silty, dense, wet, gray, fine grained; CH layer below 26.5' (SM)							
	20	50 (3.25) 50 (3)				26				SSS@20.7', N=51, -#200=19.0%
	25	50 (5) 50 (3)				31				SSS@25.9', N=46
436.3			CLAY, Fat, very hard, wet, gray (CH)							
	30	50 (0.75) 50 (0.5)				39				SSS@30.3', N=50/5.75
433.3			CLAY, Sandy Fat, hard, moist, dark gray (CH)							
	35	50 (2.5) 50 (3.5)				20				SSS@35.7', N=38
427.3			CLAY, Fat, hard, moist, gray (CH)							
	40	50 (5) 50 (4.5)								

Remarks: Drill Rig: CME 55 with 170-pound TxDOT Automatic Hammer; SSS: Split Spoon Sample; PTS: Push Tube Sample; PP: Pocket Penetrometer Reading (tsf); Drilling Method: CFA to 10' then Mud Rotary; Lat. 29.395449, Long. -98.127250

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: Phillip Stein **Logger:** Pearl Saya-Ang **Organization:** Corsair Consulting LLC

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DRILLING LOG

WinCore
Version 3.3

County	Guadalupe	Hole	B-2	District	San Antonio
Highway	CR 347	Structure	Bridge	Date	07/28/20
CSJ	0915-14-047	Station	11+79.10	Grnd. Elev.	465.31 ft
		Offset	4.61' RT	GW Elev.	452.81 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test: Lateral Press. (psi)	Triaxial Test: Deviator Stress (psi)	Properties: MC	LL	PI	Wet Den. (pcf)	Additional Remarks
			CLAY, Fat, hard, moist, gray (CH)			24				SSS@41', N=43
422.8			CLAY, Fat, very hard, moist, gray (CH)							
	45	50 (2) 50 (2)				19				SSS@45.5', N=59
418.3			CLAY, Fat, hard, moist, gray (CH)							
	50	50 (2) 50 (3)				21				SSS@50.7', N=59
412.8			CLAY, Fat, very hard, moist, gray (CH)							
	55	50 (1.75) 50 (2)				22				SSS@55.5', N=50
408.3			SAND, Clayey, very dense, wet, light gray, fine grained (SC)							
	60	50 (2) 50 (1)				14	29	14		SSS@60.5', N=50/5 -#200=46.7%
	65	50 (0.75) 50 (0.5)				15				SSS@65.3', N=30, 41, 50/5
394.9	70	50 (1) 50 (2)								Boring Terminated at 70.4'
	75									
	80									

Remarks: Drill Rig: CME 55 with 170-pound TxDOT Automatic Hammer; SSS: Split Spoon Sample; PTS: Push Tube Sample; PP: Pocket Penetrometer Reading (tsf); Drilling Method: CFA to 10' then Mud Rotary; Lat. 29.395449, Long. -98.127250

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: Phillip Stein **Logger:** Pearl Saya-Ang **Organization:** Corsair Consulting LLC

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STATE OF TEXAS
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01/28/21

95% PLANS

CORSAIR CONSULTING LLC
F-14217

Texas Department of Transportation

CR 347 @ CIBOLO CREEK

BORING LOGS

SHEET 2 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	BR 2021 (063)	CR 347

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAN ANTONIO	WILSON	
CONT.	SECT.	JOB	61
0915	14	047	

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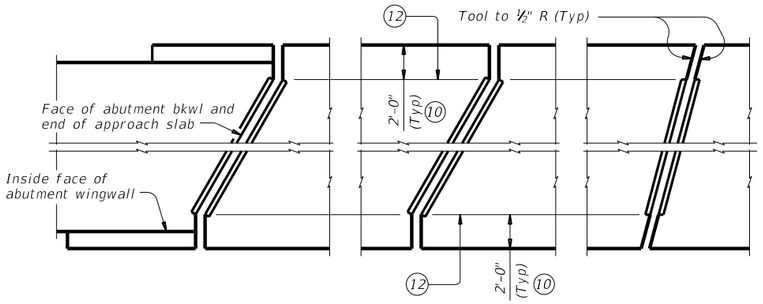
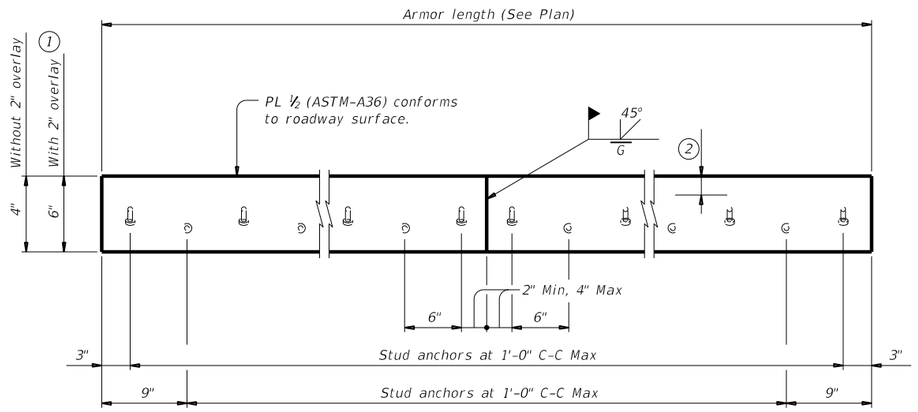


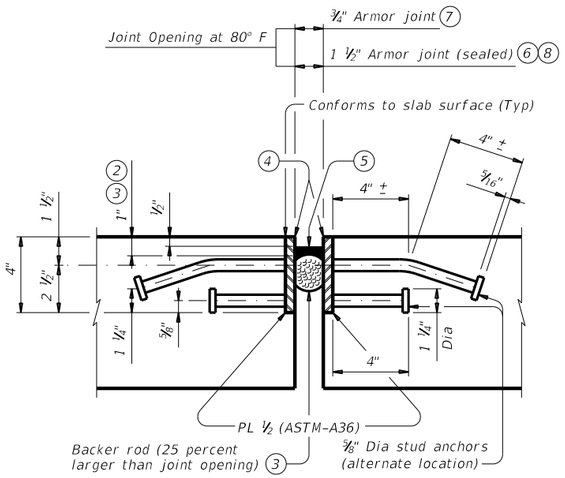
JOINTS AT ABUTMENTS | SKEWS OVER 15° | SKEWS THRU 15°

PLANS OF ARMOR PLATES

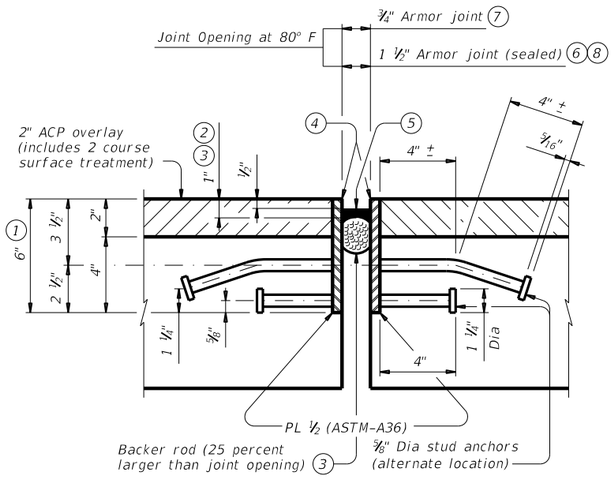


ELEVATION OF BASIC ARMOR PLATE

1. Adjust 6" plate height for overlay thicknesses other than the 2" shown. Adjust weight by 1.70 plf for each ½" variation in thickness.
2. Do not paint top 1 ½" of plate if using sealed armor joint.
3. Set top of backer rod 1" below top of armor plate. Backer rod must be compatible with joint sealant. Use of multiple pieces to create a backer rod cross section is not permitted. Top of backer rod must be convex as shown.
4. Blast clean entire contact area between sealant and plate (SSPC-SP10) before installing sealant. Light brush blast and thoroughly clean all dust and debris from concrete surfaces in contact with joint sealant before application of silicone seal.
5. Use Class 7 joint sealant that conforms to DMS-6310.
6. Place sealant while ambient temperature is between 55°F and 80°F and is rising.
7. Armor joint does not include joint sealant or backer rod.
8. Armor joint (sealed) includes Class 7 joint sealant and backer rod.
9. Form vertical leg of seal as per the Manufacturer's recommendations. Use Class 4 joint sealant if Class 7 cannot be installed correctly. Install according to Manufacturer's recommendations.
10. Unless shown otherwise, terminate armor plate at slab break point if break is more than 2'-0" from slab edge.
11. See "Plans of Armor Plates".
12. At Fabricator's option, armor plate may extend up to 6" beyond this point for skews through 15°.
13. Align shipping angle perpendicular to joint.



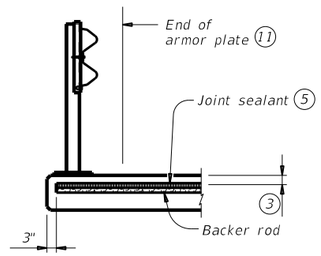
SHOWN WITHOUT 2" OVERLAY AT JOINT LOCATION



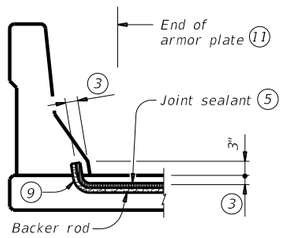
SHOWN WITH 2" OVERLAY AT JOINT LOCATION 1

ARMOR JOINT SECTIONS

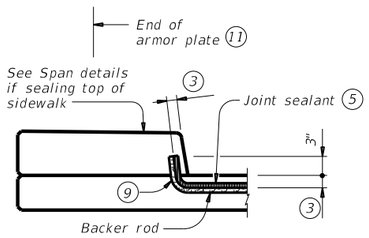
Showing Armor Joint (Sealed)



AT STEEL POST BRIDGE RAIL



AT CONCRETE BRIDGE RAIL



AT SIDEWALK

JOINT SEALANT TERMINATION DETAILS

Armor joint (sealed) only. Armor plate is not shown for clarity.

FABRICATION NOTES:

Match mark corresponding plate sections and secure together for shipment with shipping angle. Do not use erection bolts.

Ship armor joints in convenient lengths of 10'-0" Min and 24'-0" Max unless necessary for stage construction or widenings. One shop splice is permitted in each shipping length provided no piece is less than 2'-0" long and sufficient studs are added to limit the stud to shop splice distance to 2" Min and 4" Max.

Weld studs in accordance with AWS D1.1.

Use groove welds for all shop and field butt splices. Grind smooth areas in contact with seal. Make all necessary field splice joint preparations in the shop.

Paint the entire steel section, except as stated in Note 2, with System II or IV primer in accordance with Item 446 "Field Cleaning and Painting Steel." Provide paints in accordance with Item 446.2. Prepare steel and apply paint in accordance with Items 446.4.7.3 and 446.4.7.4.

Shop drawings for the fabrication of armor joints will not require the Engineer's approval if fabrication is in accordance with the details shown on this standard.

CONSTRUCTION NOTES:

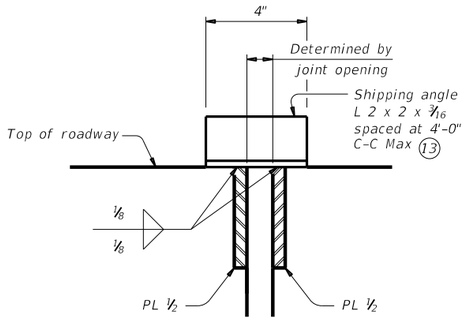
Secure armor joints in position and place to proper grade and alignment by welding braces to adjacent reinforcing steel, to prestressed beam stirrups, or to anchors cast in concrete diaphragms. Include cost of temporary bracing in the price bid for Armor Joint.

Remove shipping angle immediately after each joint half is secured in place. Grind smooth, and touch up with organic zinc-rich paint.

GENERAL NOTES:

Provide armor joints at locations shown on the plans. Provide the seal when "Armor Joint (Sealed)" is noted on the plans. These joint details accommodate a joint movement range of 1 ⅜" (½" opening movement and ⅜" closure movement).

Payment for armor joint, with or without seal, is based on length of armor plate.



SHOWN WITHOUT 2" OVERLAY AT JOINT LOCATION
With overlay similar

SHIPPING ANGLE

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

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

Texas Department of Transportation

Bridge Division Standard

ARMOR JOINT DETAILS

AJ

FILE: ajstde01-19.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	14	047	CR 347
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	SAT	WILSON		62

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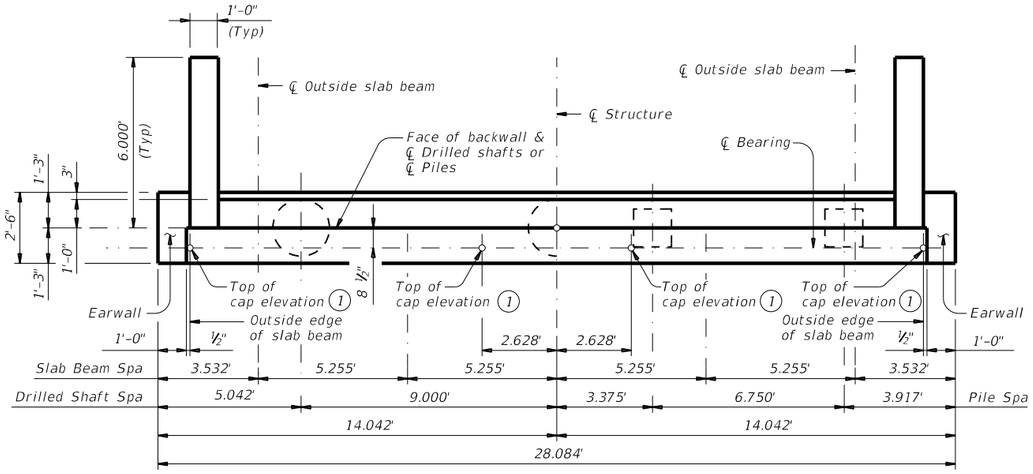
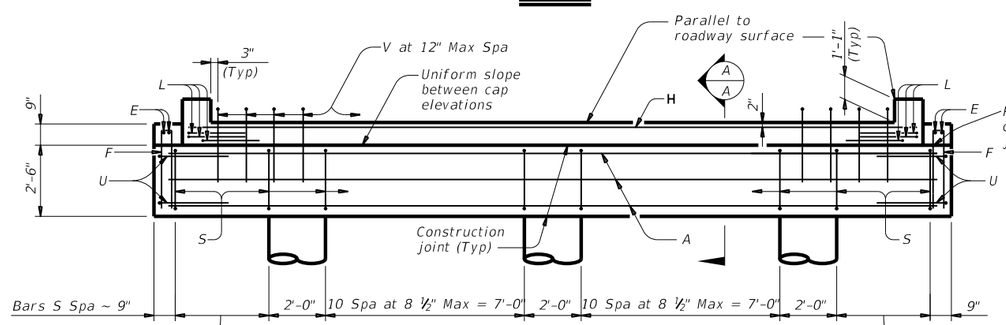
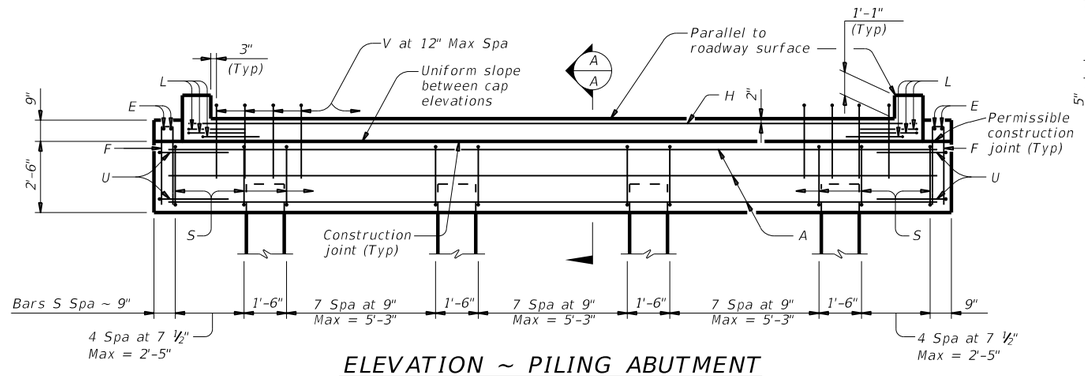


SHOWING DRILLED SHAFTS — SHOWING PILES

PLAN

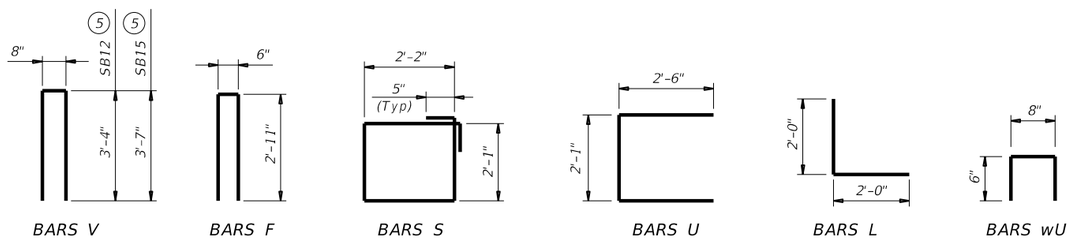


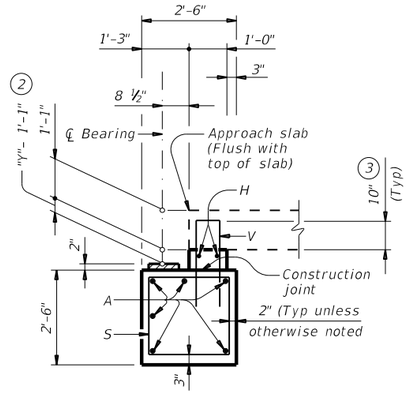
ELEVATION ~ DRILLED SHAFT ABUTMENT



ELEVATION ~ PILING ABUTMENT

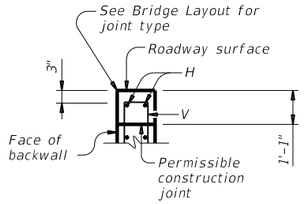
Note: For piles larger than 16", adjust Bars S spacing as required to avoid piles.





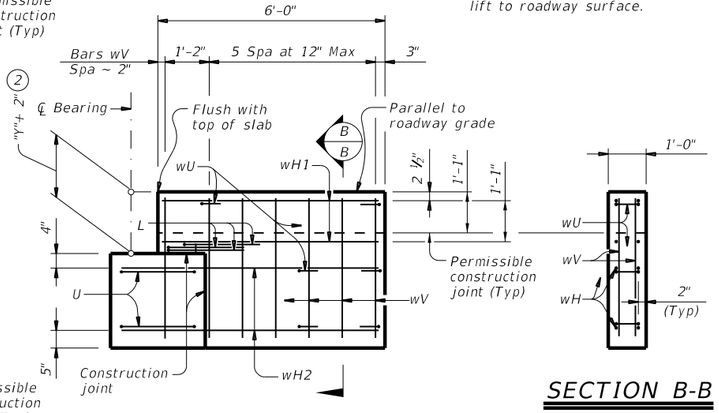
SECTION A-A (4)

(With approach slab)
Note: At Contractor's option, backwall may be cast with approach slab.



BACKWALL DETAIL (4)

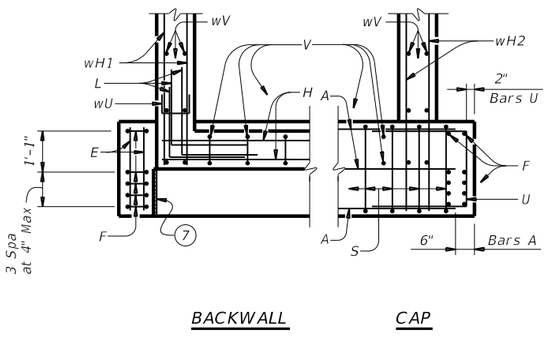
(Without approach slab)
Note: At Contractor's option, backwall may be cast in one lift to roadway surface.



WINGWALL ELEVATION

(Earwall not shown for clarity.)

SECTION B-B



BACKWALL — CAP

CORNER DETAILS

FOUNDATION LOADS

Span Length	Drilled Shaft Loads		Vertical Pile Loads	
Ft	Tons/DS		Tons/Pile	
	5SB12	5SB15	5SB12	5SB15
25	39	41	29	31
30	43	46	33	34
35	48	51	36	38
40	52	55	39	41
45		59		44
50		63		47

TABLE OF ESTIMATED QUANTITIES (6)

Bar	No.	Size	Length (5)		Weight (5)	
			5SB12	5SB15	5SB12	5SB15
A	6	#11	27'-1"	27'-1"	863	863
E	4	#4	2'-2"	2'-2"	6	6
F	10	#4	6'-4"	6'-4"	43	43
H	2	#5	25'-8"	25'-8"	54	54
L	6	#6	4'-0"	4'-0"	36	36
S	34	#4	9'-4"	9'-4"	212	212
U	4	#6	7'-1"	7'-1"	43	43
V	25	#5	7'-4"	7'-10"	191	204
wH1	8	#6	5'-8"	5'-8"	68	68
wH2	8	#6	6'-11"	6'-11"	83	83
wU	12	#4	1'-8"	1'-8"	14	14
wV	28	#5	3'-10"	4'-1"	112	119
Reinforcing Steel			Lb		1,725	1,745
Cl "C" Conc (Abut)			CY		8.8	9.2

(1) Top of cap elevations are based on section depths shown on Span Details.

(2) See Span Details for "Y".

(3) Increase as required to maintain 3" from finished grade.

(4) See Bridge Layout to determine if approach slab is present.

(5) See Bridge Layout for beam type used in the superstructure.

(6) Quantities shown are for one abutment only (with approach slab). Without approach slab, add 1.0 CY Class "C" concrete and 54 Lb reinforcing steel for 2 additional Bars H.

(7) ½" preformed bituminous fiber material between slab beam and earwall. Bond to earwall with an approved adhesive. Cast inside face of earwall perpendicular to cap. (Typ)

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

Designed for a normal embankment header slope of 3:1 and a maximum span length of 50 feet.

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.

These abutment details may be used with standard SPSB-24 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.

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

ABUTMENTS

PRESTR CONCRETE SLAB BEAM

24' ROADWAY

APSB-24

FILE: psbste09-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2017	CONT	SECT	JOB	HIGHWAY
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	SAT	WILSON		63

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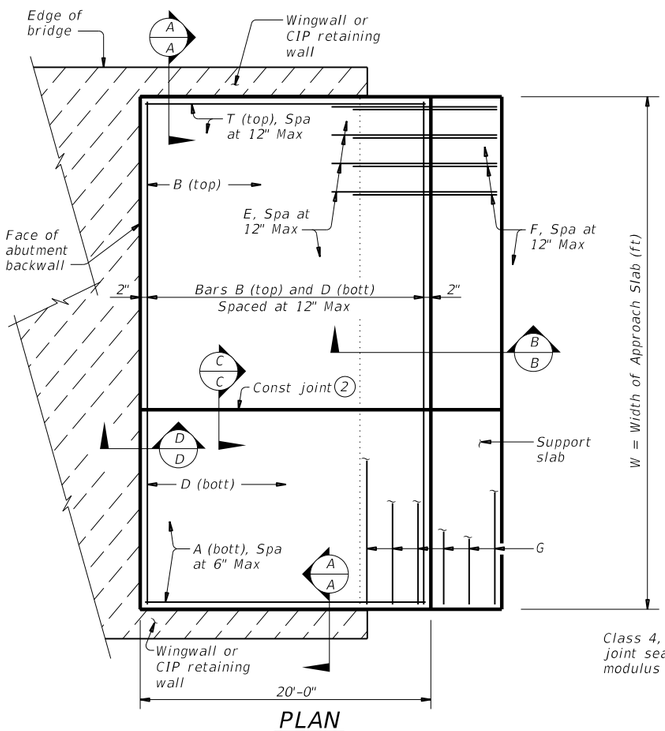
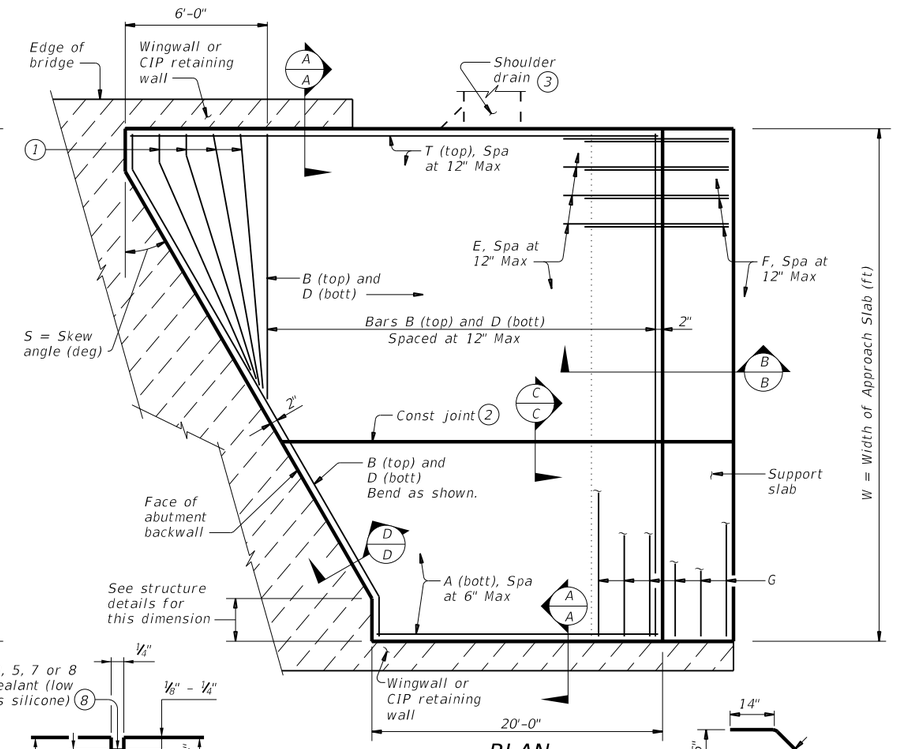


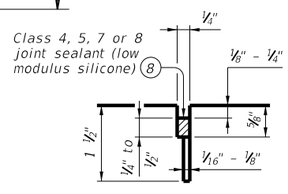
PLAN

(Showing non-skewed approach slab.)

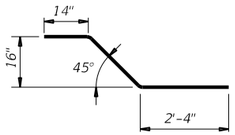


PLAN

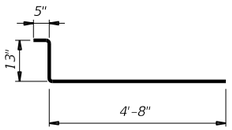
(Showing skewed approach slab.)



LONGITUDINAL SAW CUT JOINT DETAIL



BARS E (#5)



BARS F (#5)

BAR TABLE	
BAR	SIZE
A	#8
B	#5
D	#5
E	#5
F	#5
G	#5
T	#5

APPROXIMATE QUANTITIES (4)

Reinf steel weight = 8.5 Lbs/SF of Approach Slab
= 18.4 Lbs/LF of Support Slab

Vol of Appr Slab Conc (CY) = 1.057W – 0.008W x T + 0.02W² Tan S
(Includes Support Slab)

W = Width of Approach Slab (ft)

T = Conc Pavement Thickness (in)

S = Skew Angle (deg)

(1) Flare Bars B and D in this region (1'-6" Max Spa, 3" Min Spa). Minimum flared bar length = 2'-6". Bend bars as necessary.

(2) Provide longitudinal construction joints that align with longitudinal construction joints in the bridge slab with bridges built in stages. Other longitudinal construction joints must receive approval of the Engineer.

(3) See details elsewhere in plans for shoulder drain location and details.

(4) For Contractor's information only. Quantities shown are for one approach slab only.

(5) On portion of support slab that supports the concrete pavement, adjust top surface elevation, if required, to accommodate concrete pavement thickness. Smooth trowel finish. Oil top of support slab with 60 grade oil and apply heavy coat of powdered graphite. Press down one layer of 30# roofing felt.

(6) Multiple piece tie bars are acceptable at longitudinal construction joints provided minimum laps shown are achieved.

(7) See details elsewhere in plans for required cross-slope.

(8) Place in accordance with Item 438.

(9) Provide backer rod that is 25% larger than joint opening and compatible with the sealant.

(10) If bridge rail is present at the wingwall or CIP retaining wall, place ½" rebonded recycled tire rubber between concrete railing and top of approach slab as shown when concrete railing projects over the approach slab.

GENERAL NOTES:

Construct approach slab in accordance with Item 422.

Provide Class "S" concrete with a minimum compressive strength of 4,000 psi.

Provide Grade 60 reinforcing steel.

Provide longitudinal joints as shown on the Longitudinal Saw Cut Joint Detail at lane lines and shoulders when width between longitudinal construction joints or edges of approach slab exceeds 16 feet. Saw cut joints within 24 hours of concrete placement to a depth of 1 ½" and seal in accordance with Item 438. Alternately, provide a controlled joint consisting of 1 ½" vinyl or plastic joint former (Stress Cap, Zip Strip, Stress Lock, or equal as approved by the Engineer.)

Provide rebonded recycled tire rubber joint filler that meets the requirements of DMS-6310, "Joint Sealants and Fillers."

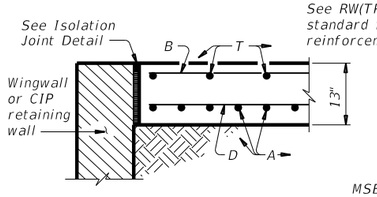
Construct the subgrade or subbase away from the bridge for a minimum distance of 100 feet prior to the approach slab, unless otherwise indicated on the plans.

Compact and finish the subgrade or foundation for the approach slab to the typical cross-section and to the lines and grades shown on the plans.

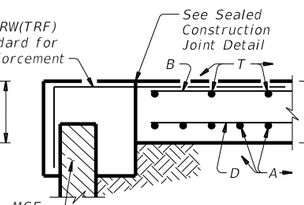
Cure for 4 days using water or membrane curing per Item 422.

All details shown herein are subsidiary to bridge approach slab.

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

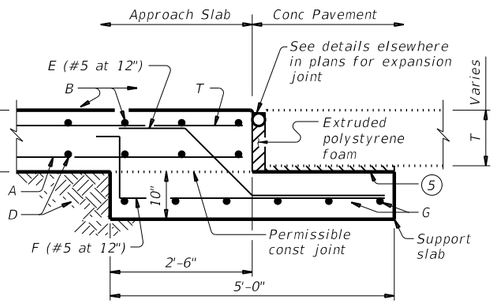


SHOWING WINGWALL OR CIP RETAINING WALL

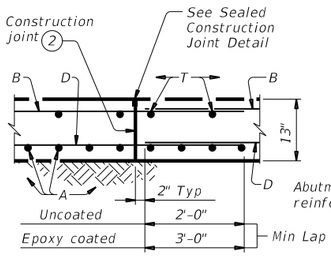


SHOWING MSE WALL

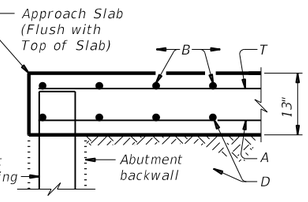
SECTION A-A



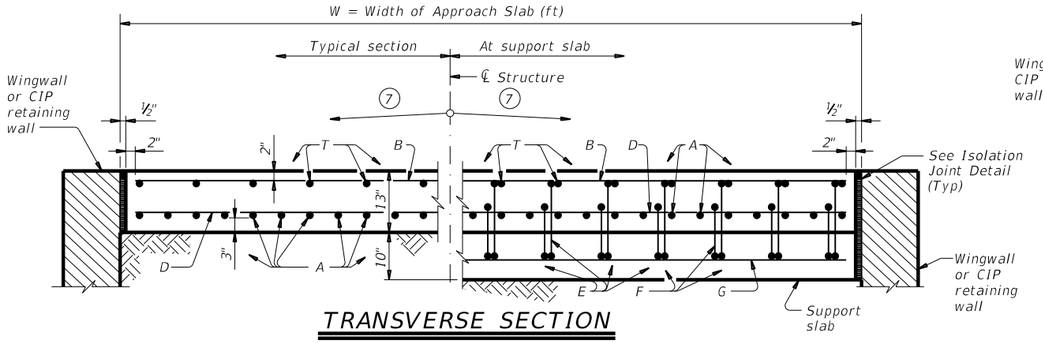
SECTION B-B



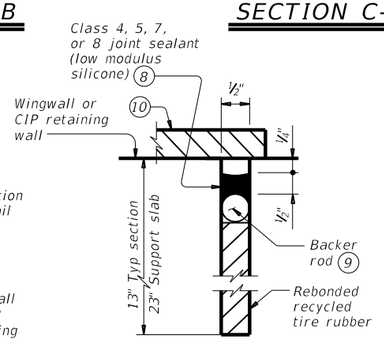
SECTION C-C (6)



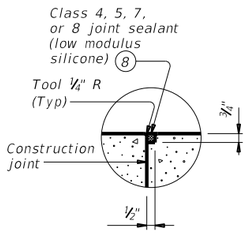
SECTION D-D



TRANSVERSE SECTION



ISOLATION JOINT DETAIL



SEALED CONSTRUCTION JOINT DETAIL

Texas Department of Transportation

Bridge Division Standard

BRIDGE APPROACH SLAB

CONCRETE PAVEMENT

BAS-C

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©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	14	047	CR 347
02-20: Removed stress relieving pad.	DIST	COUNTY		SHEET NO.
	SAT	WILSON		64

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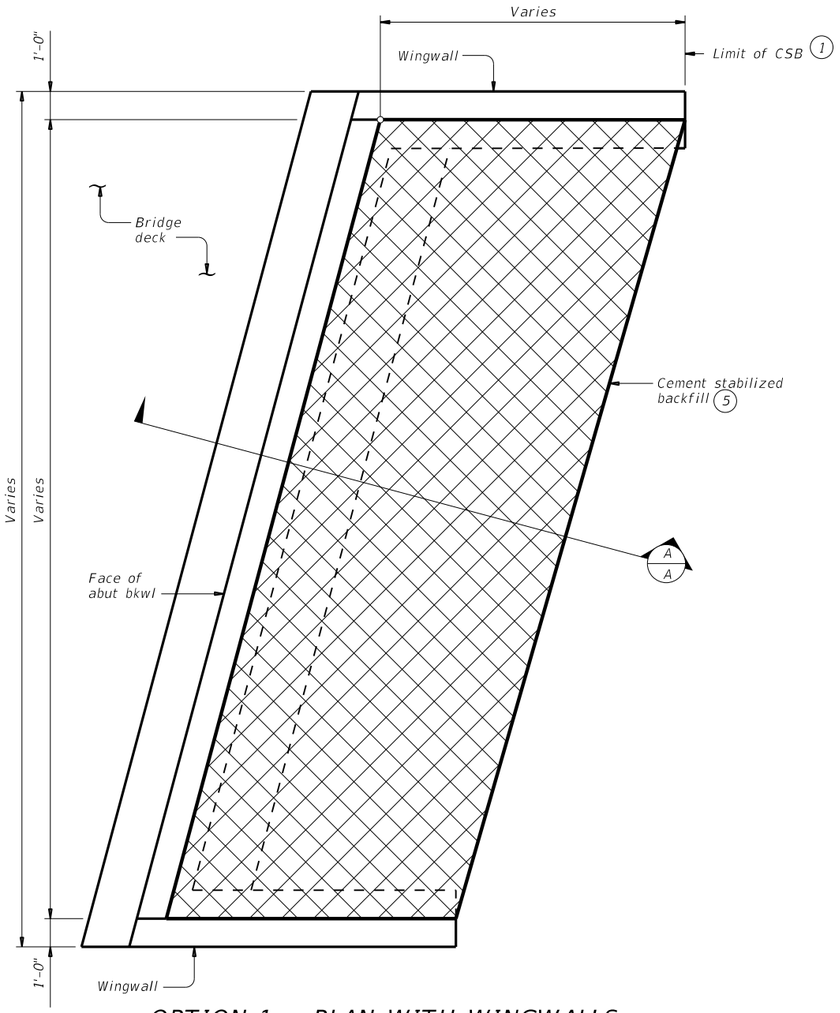
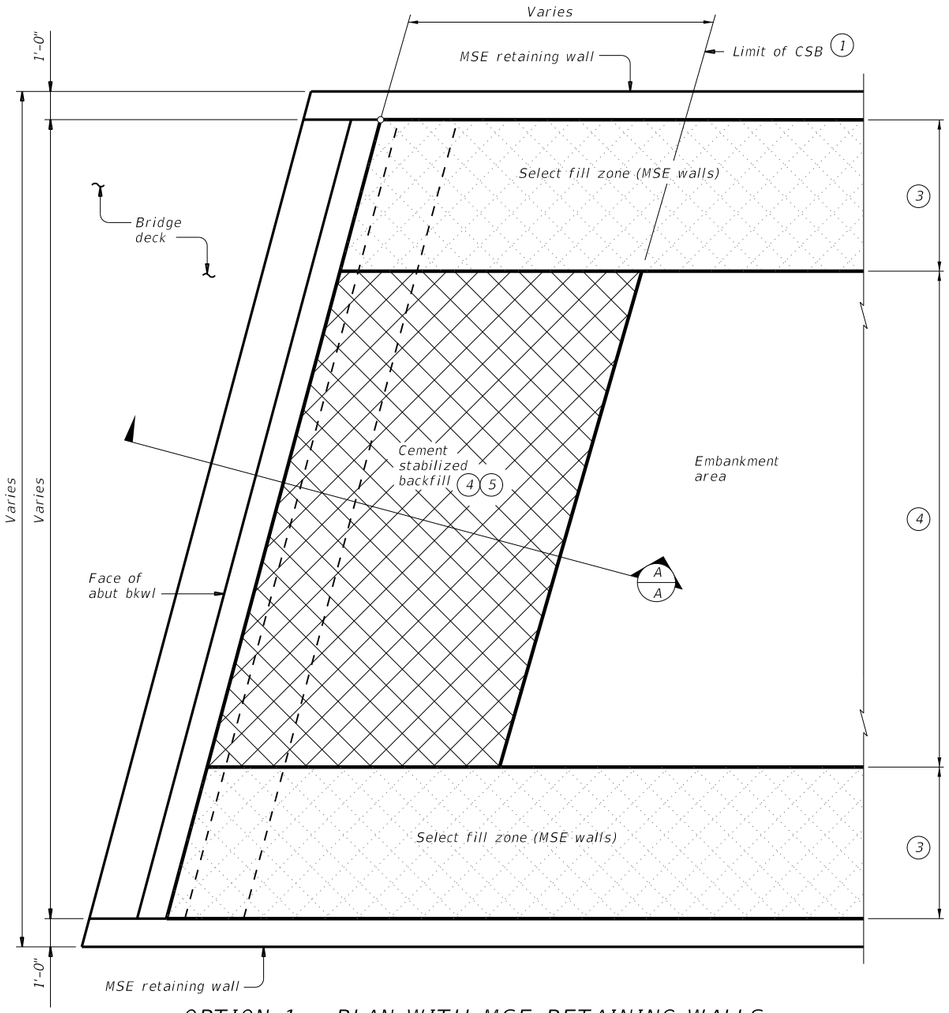
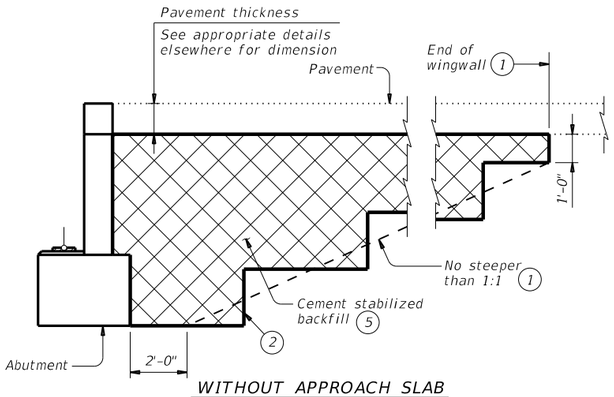


OPTION 1 ~ PLAN WITH WINGWALLS

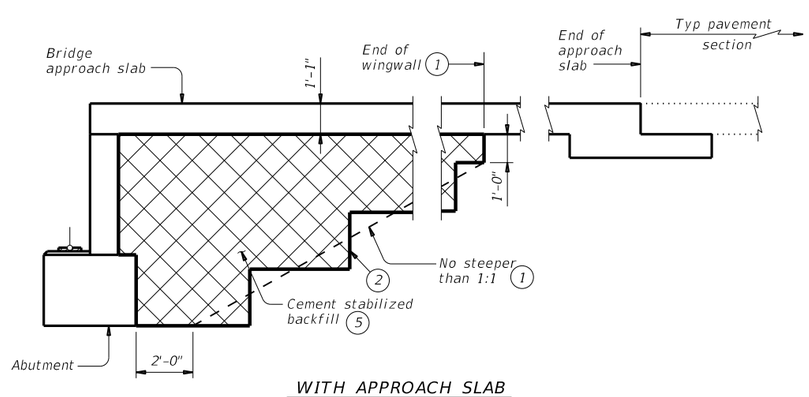
Cast-in-place retaining walls similar.



OPTION 1 ~ PLAN WITH MSE RETAINING WALLS



WITHOUT APPROACH SLAB



WITH APPROACH SLAB

(Showing BAS-C, BAS-A similar.)

SECTION A-A

(1) Usual limit of Cement Stabilized Backfill is at end of wingwall. Extend CSB limits as required to maintain a slope no steeper than 1:1 at bottom of backfill.

(2) Bench backfill as shown with 12" (approximate) bench depths.

(3) Where MSE retaining walls are present, adjust CSB limits to accommodate the select fill zone. See retaining wall details for additional information.

(4) When distance between select fill zones is less than 5'-0", MSE select fill may be substituted for cement stabilized backfill with approval from the Engineer.

(5) If shown in the plans flowable backfill can be used as a substitute for cement stabilized backfill with the following constraints:
a). If flowable backfill is to be placed over MSE backfill then a filter fabric will be placed over the MSE backfill prior to placement of the flowable fill; and
b). Place flowable fill in lifts not exceeding 2 feet in height, place each successive lift when the previous lift has stiffened/hardened (i.e. has lost its flowability).

GENERAL NOTES:

See the Bridge Layout for selected Option. Option 2 is intended for new construction requiring high plasticity embankment fill with a plasticity index (PI) greater than 30 or pavement built in poor native soil. Poor soils are defined as high plasticity clays or expansive clays. Option 1 is intended for construction only requiring PI controlled embankment fill or excavation in competent soils/rocks in order to construct the abutment.

Provide Cement Stabilized Backfill (CSB) meeting the requirements of Item 400, "Excavation and Backfill for Structures", to the limits shown at bridge abutments.

If required elsewhere in the plans, provide Flowable Backfill meeting the requirements of Item 401, "Flowable Backfill", to the limits shown at bridge abutments.

Details are drawn showing left forward skew. See Bridge Layout for actual skew direction.

These details do not apply when Concrete Block retaining walls are used in lieu of wingwalls.

Texas Department of Transportation

Bridge Division Standard

CEMENT STABILIZED ABUTMENT BACKFILL

BRIDGE ABUTMENT

CSAB

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©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
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	SAT	WILSON		65

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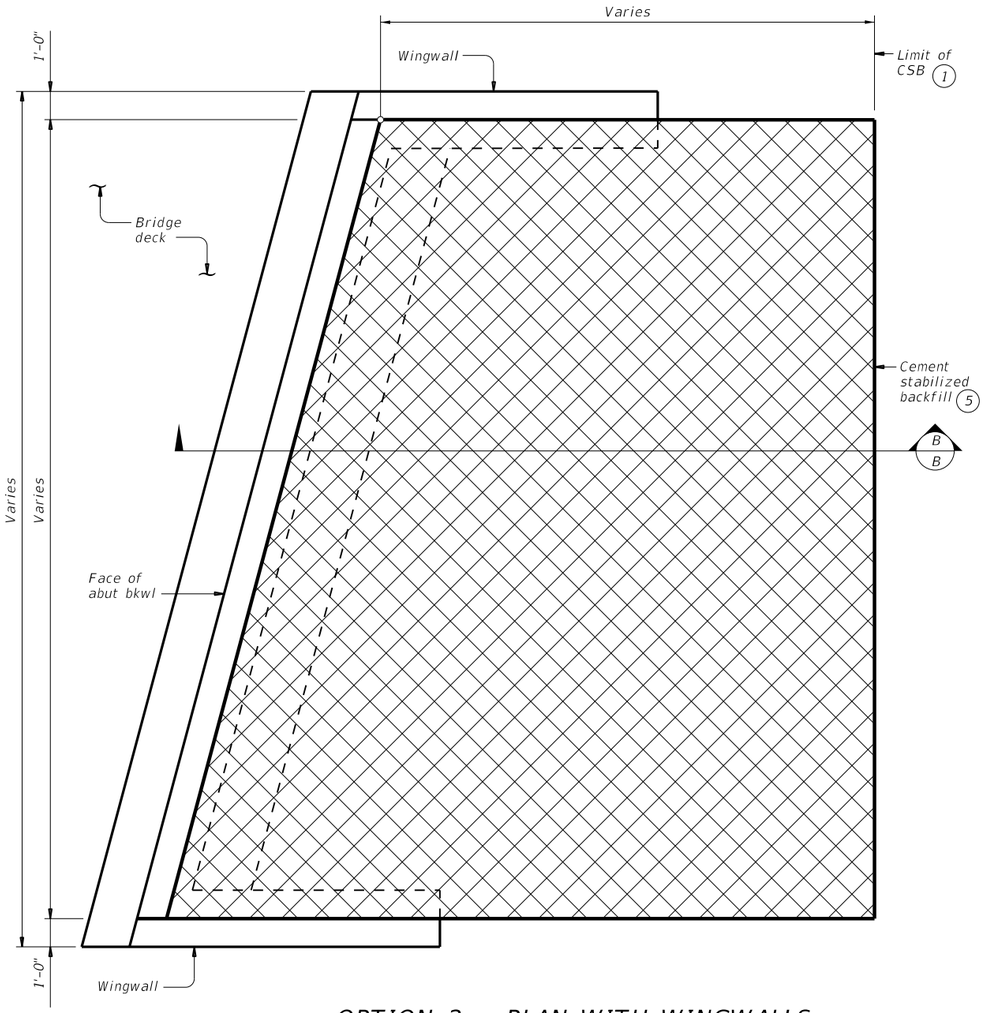
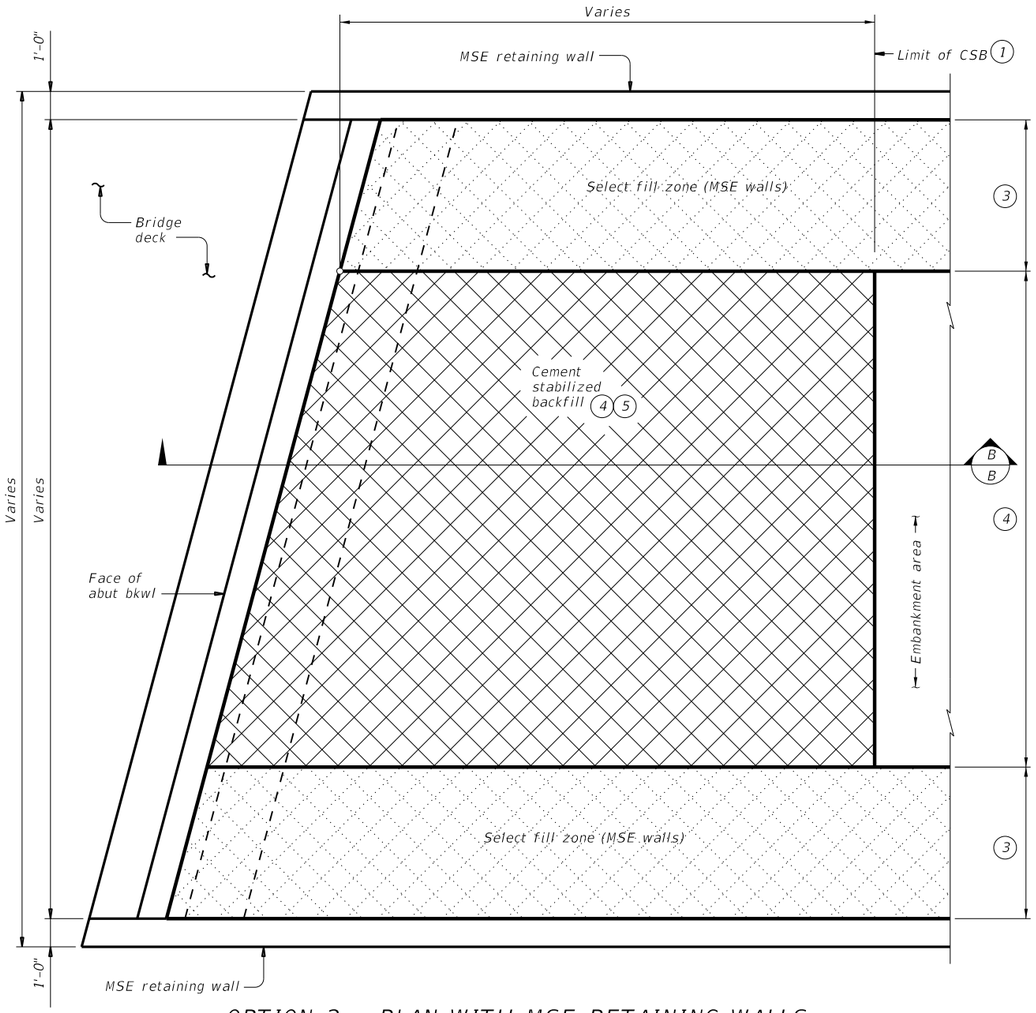


OPTION 2 ~ PLAN WITH WINGWALLS

Cast-in-place retaining walls similar.



OPTION 2 ~ PLAN WITH MSE RETAINING WALLS

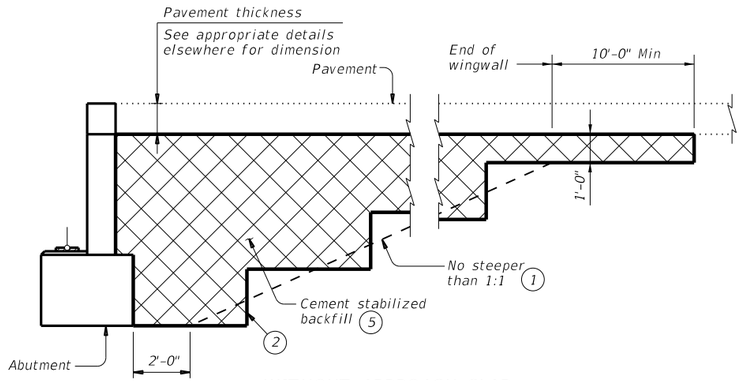
(1) Usual limit of Cement Stabilized Backfill is at end of wingwall. Extend CSB limits as required to maintain a slope no steeper than 1:1 at bottom of backfill.

(2) Bench backfill as shown with 12" (approximate) bench depths.

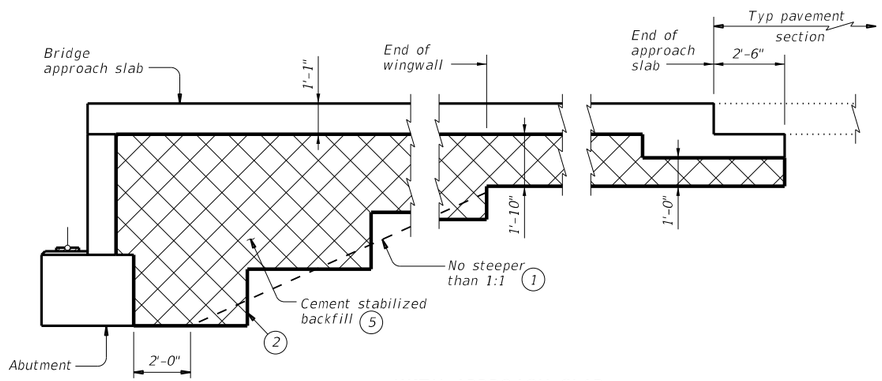
(3) Where MSE retaining walls are present, adjust CSB limits to accommodate the select fill zone. See retaining wall details for additional information.

(4) When distance between select fill zones is less than 5'-0", MSE select fill may be substituted for cement stabilized backfill with approval from the Engineer.

(5) If shown in the plans flowable backfill can be used as a substitute for cement stabilized backfill with the following constraints:
a). If flowable backfill is to be placed over MSE backfill then a filter fabric will be placed over the MSE backfill prior to placement of the flowable fill; and
b). Place flowable fill in lifts not exceeding 2 feet in height, place each successive lift when the previous lift has stiffened/hardened (i.e. has lost its flowability).



WITHOUT APPROACH SLAB



WITH APPROACH SLAB
(Showing BAS-C, BAS-A similar.)

SECTION B-B

SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

CEMENT STABILIZED ABUTMENT BACKFILL

BRIDGE ABUTMENT

CSAB

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©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
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02-20: Added Option 2.	DIST	COUNTY		SHEET NO.
	SAT	WILSON		66

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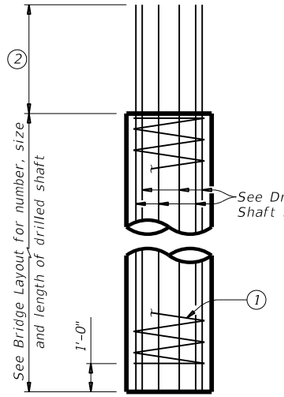
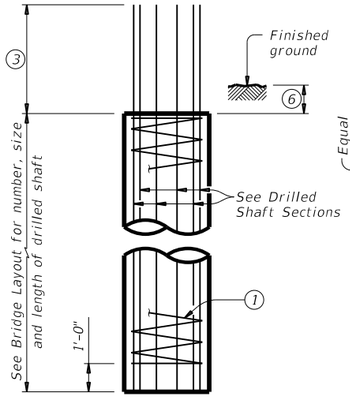
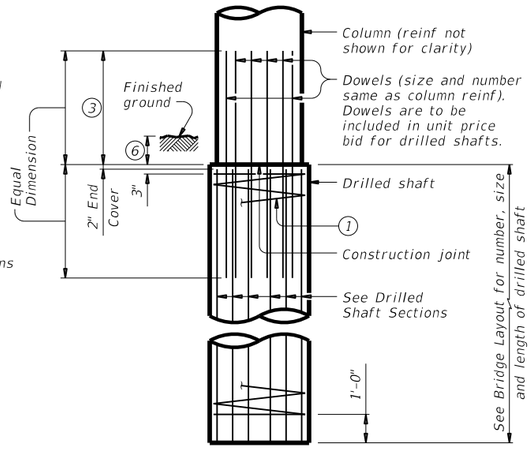


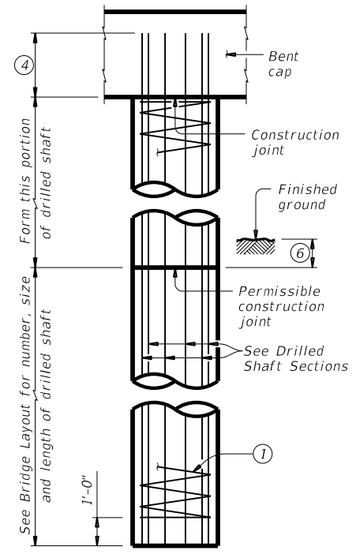
ABUTMENTS, WINGWALLS AND MULTI-DRILLED SHAFT FOOTINGS



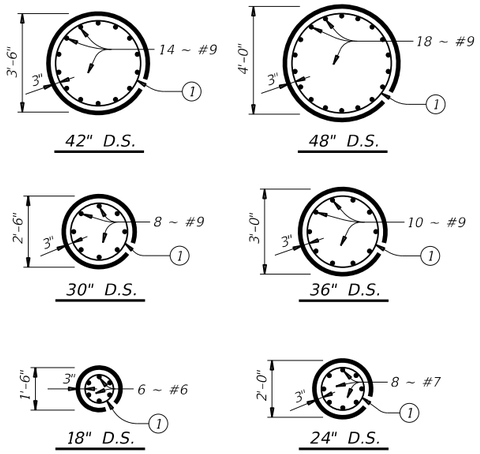
INTERIOR BENTS DRILLED SHAFT DIA EQUAL TO COLUMN DIA



INTERIOR BENTS DRILLED SHAFT DIA GREATER THAN COLUMN DIA



OPTIONAL INTERIOR BENT DRILLED SHAFT DETAIL (5)

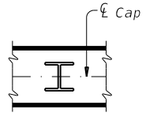


DRILLED SHAFT SECTIONS

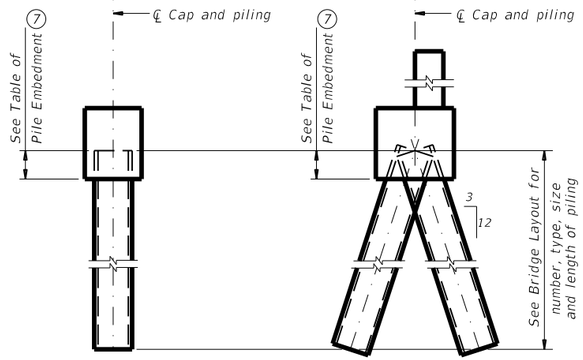
DRILLED SHAFT DETAILS

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"

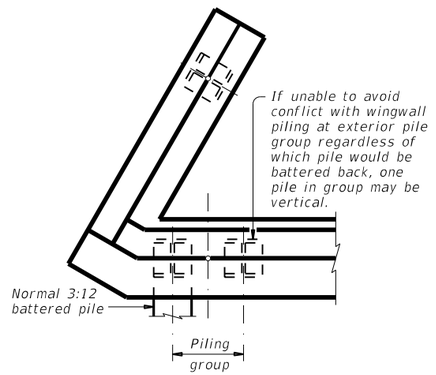
See Prestressed Concrete Piling (CP) standard for additional details on concrete pile embedment.



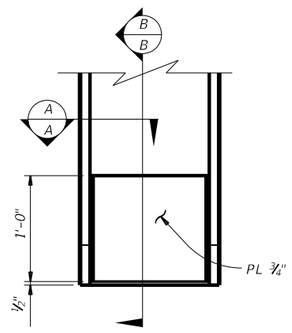
ORIENTATION OF STEEL H-PILING

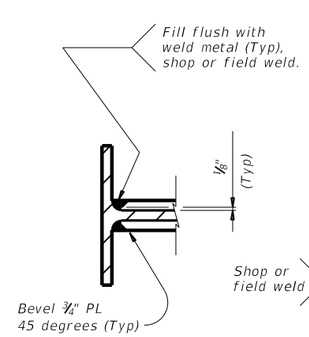


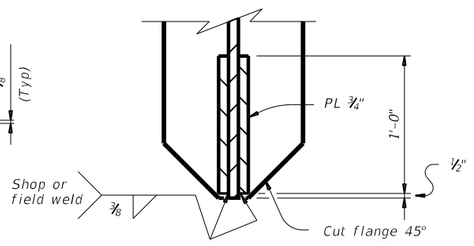
PILING DETAILS
(Concrete or steel H)



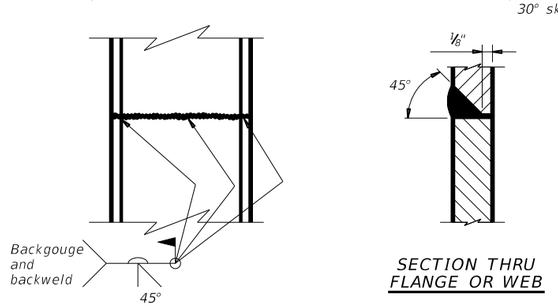
DETAIL "A"
(Showing plan view of a 30° skewed abutment)







STEEL H-PILE TIP REINFORCEMENT
See Item 407 "Steel Piling" to determine when tip reinforcement is required and for options to the details shown.



SECTION THRU FLANGE OR WEB

STEEL H-PILE SPLICE DETAIL
Use when required.

(1) #3 spiral at 6" pitch (one and a half flat turns top and bottom).

(2) Min extension into supported element:
#6 Bars = 1'-11"
#7 Bars = 2'-0"
#9 Bars = 2'-3"

(3) Min lap with column reinf:
#7 Bars = 2'-11"
#9 Bars = 3'-9"
#11 Bars = 4'-8"

(4) Min extension into supported element:
#6 Bars = 1'-11"
#7 Bars = 2'-3"
#9 Bars = 2'-9"

(5) Drilled shafts may extend to the bottom of bent caps for "H" heights of 6 ft and less (as shown on the Bridge Layout), if approved. This option can only be used when the drilled shaft diameter equals the column diameter. Obtain approval of the forming method above the ground line prior to construction. No adjustments in payment will be made if this option is used.

(6) 1'-0" Min, unless shown otherwise on plans.

(7) Or as shown on plans.

Texas Department of Transportation

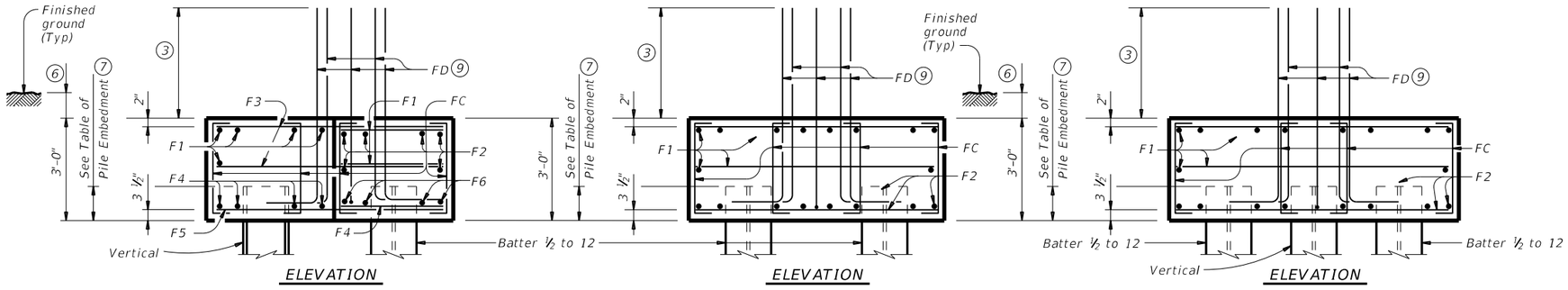
Bridge Division Standard

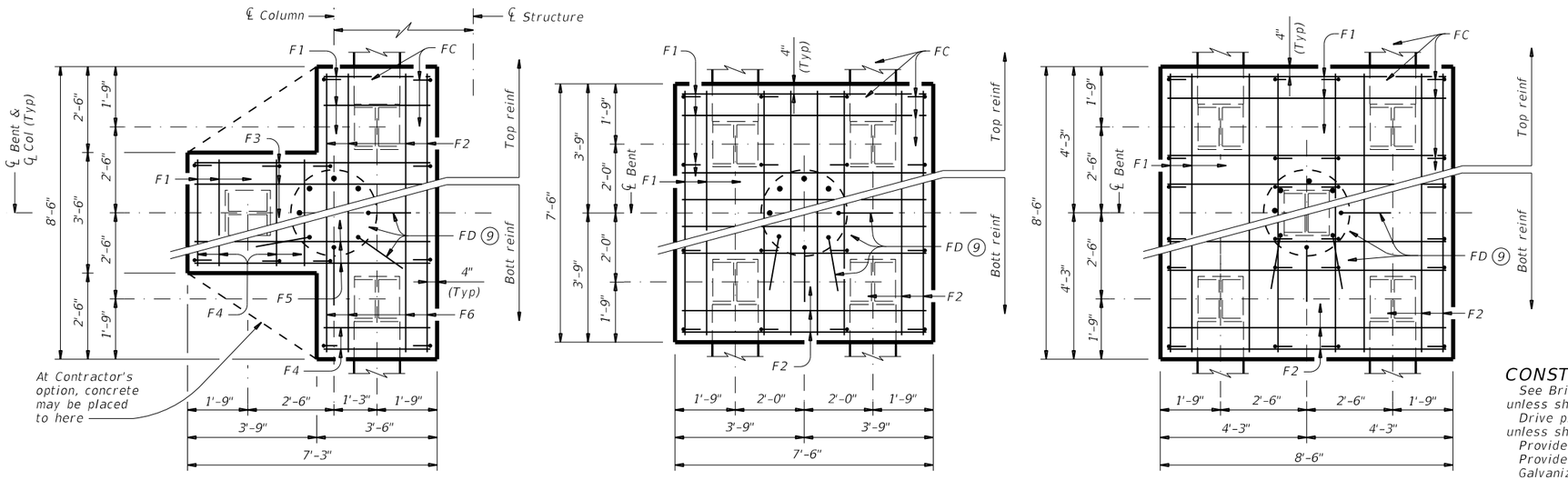
COMMON FOUNDATION DETAILS

FD

FILE: fdstde01-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	14	047	CR 347
01-20: Added #11 bars to the FD bars.	DIST	COUNTY		SHEET NO.
	SAT	WILSON		67

DATE: 2/4/2021 7:49:10 AM
FILE: c:\pwworking\kho\pwprod\jordan.kiewit\dms99930\fdstde01-20.dgn





THREE PILE FOOTING (8)

For 36" Dia and smaller columns.

FOUR PILE FOOTING (8)

For 42" Dia and smaller columns.

FIVE PILE FOOTING (8)

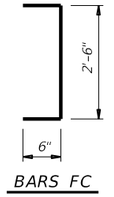
For 42" Dia and smaller columns.

TABLE OF FOOTING QUANTITIES FOR 30" COLUMNS

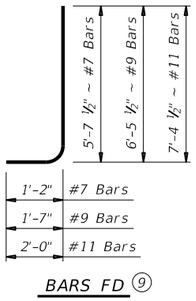
ONE 3 PILE FOOTING				
Bar	No.	Size	Length	Weight
F1	11	#4	3'- 2"	23
F2	6	#4	8'- 2"	33
F3	6	#4	6'- 11"	28
F4	8	#9	3'- 2"	86
F5	4	#9	6'- 11"	94
F6	4	#9	8'- 2"	111
FC	12	#4	3'- 6"	28
FD (10)	8	#9	8'- 1"	220
Reinforcing Steel			Lb	623
Class "C" Concrete			CY	4.8

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



BARS FC



BARS FD (9)

(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.

CONSTRUCTION NOTES:

See Bridge Layout for foundation type required. Use these foundation details unless shown otherwise.

Drive piling under abutment wingwalls to a minimum resistance of 10 Tons/Pile unless shown otherwise.

Provide Class C Concrete (f'c = 3,600 psi), unless shown otherwise.

Provide Grade 60 reinforcing steel.

Galvanize reinforcing if shown elsewhere in the plans.

Provide bar laps for drilled shaft reinforcing, where required, as follows:

Uncoated or galvanized (#6) ~ 2'-6"
Uncoated or galvanized (#7) ~ 2'-11"
Uncoated or galvanized (#9) ~ 3'-9"

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

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

DESIGNER NOTES:

Do not use the drilled shaft details shown on this standard for retaining wall, noise wall, barrier, or sign foundations without structural evaluation.

Do not use the footings shown on this standard in direct contact with salt water or exposed to salt water spray.

Maximum allowable pile loads for the footings shown are:

72 Tons/Pile with 24" Dia Columns
80 Tons/Pile with 30" Dia Columns
100 Tons/Pile with 36" Dia Columns
120 Tons/Pile with 42" Dia Columns

Texas Department of Transportation

Bridge Division Standard

COMMON FOUNDATION DETAILS

FD

FILE: fdstde01-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	14	047	CR 347
01-20: Added #11 bars to the FD bars.	DIST	COUNTY		SHEET NO.
	SAT	WILSON		68

DATE: 2/4/2021 7:49:13 AM
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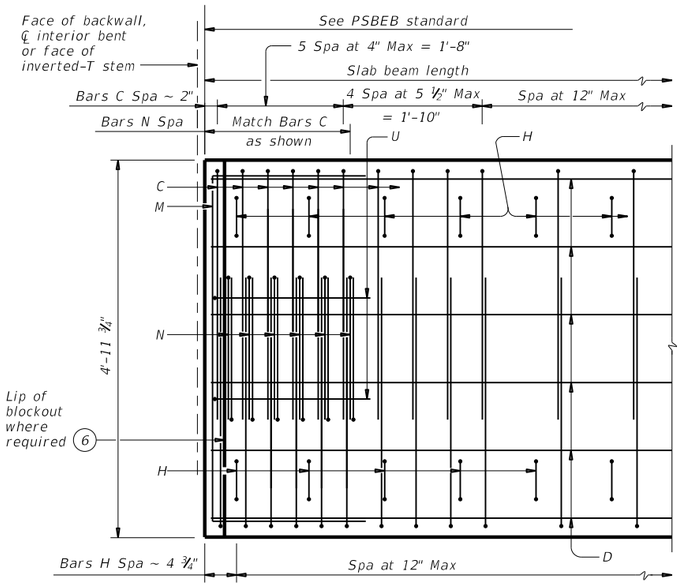
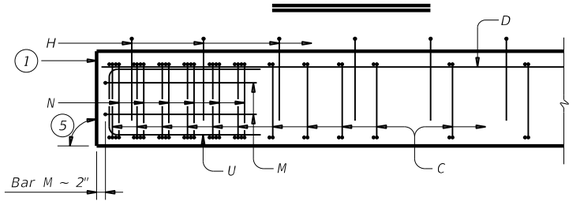
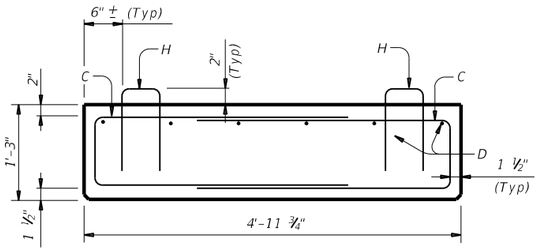


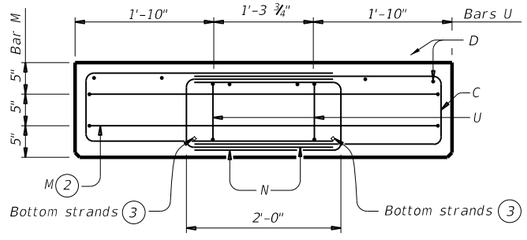
PART PLAN



ELEVATION

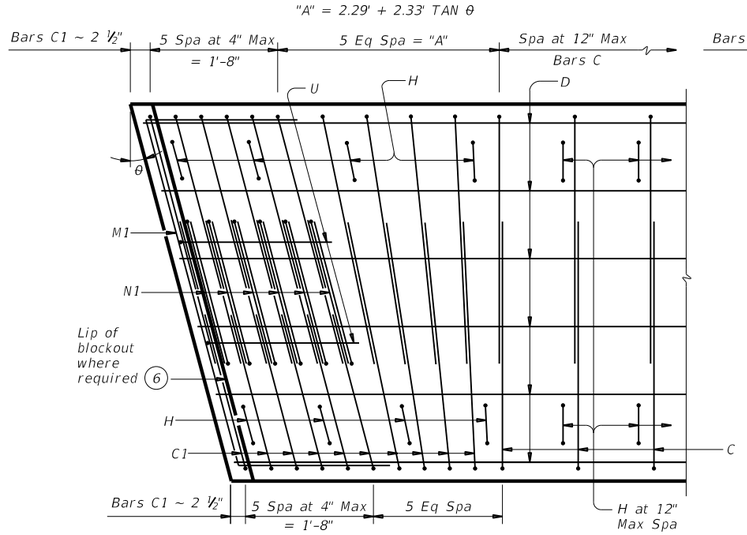


SECTION



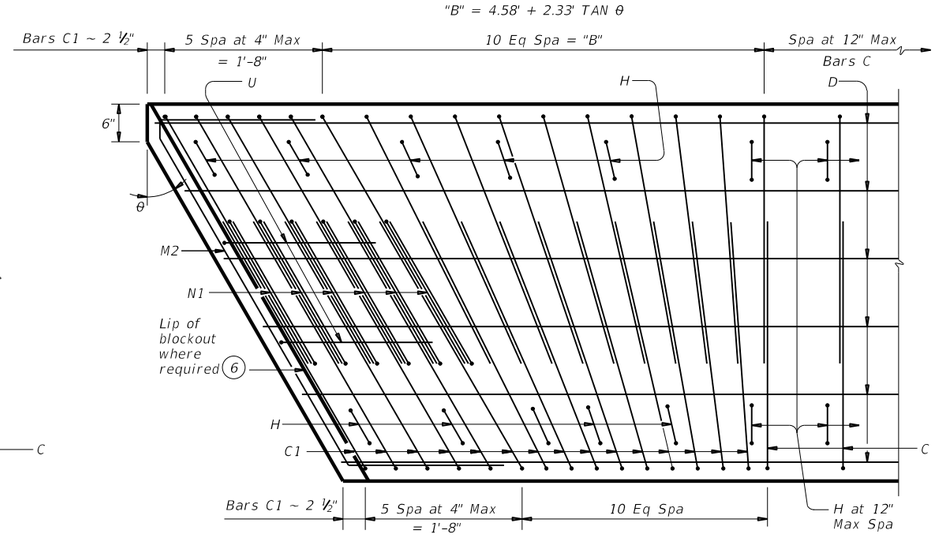
END MAT REINFORCING

Bars H not shown for clarity.



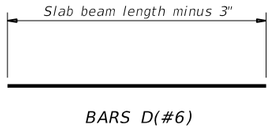
PART SKEW PLAN

(Showing θ over 0° to 15° skew)

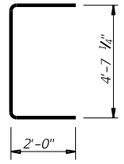


PART SKEW PLAN

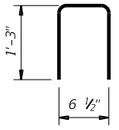
(Showing θ over 15° to 30° skew)



BARS D(#6)



BARS M(#4)



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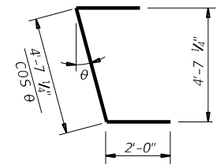
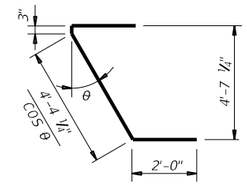
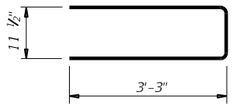


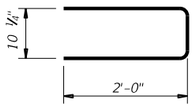
BARS M1(#4)



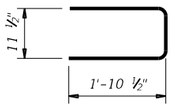
BARS M2(#4)



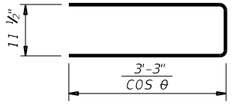
BARS C(#4)



BARS U(#5)



BARS N(#4)



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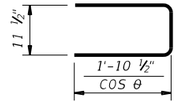
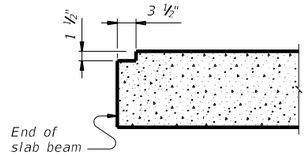


BARS N1(#4)



ELEVATION OF BLOCKOUT (6)

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.
Provide Class H concrete. Provide Class H (HPC) if shown elsewhere in the plans.
Provide Grade 60 reinforcing steel.
An equal area of welded wire reinforcement (WWR) (ASTM 1064) may be substituted for bars C and D if approved by the Engineer.
These details can be used for any skew angle up to a maximum of 30 degrees.
Chamfer all exposed corners ¾" or round to a ¾" radius.
Details are drawn showing right forward skew. See Bridge Layout for actual direction.

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

BEAM PROPERTIES		
Area	in^2	896.2
Y top	in	7.50
Y bott	in	7.50
I	in^4	16,805
Weight (4)	lb/ft	934

(1) See End Mat Reinforcing detail.
(2) Adjust bars M vertically to avoid strands.
(3) See sheet PSBND or PSBSD for strand locations.
(4) Assumes 150 pcf weight density of concrete.
(5) 90° at conventional interior bents. End of beam must be vertical at abutment backwall and inverted-T stem.
(6) Blockout required at armor joint (AJ) and sealed expansion joint (SEJ) locations to accommodate joint anchorage.

HL93 LOADING

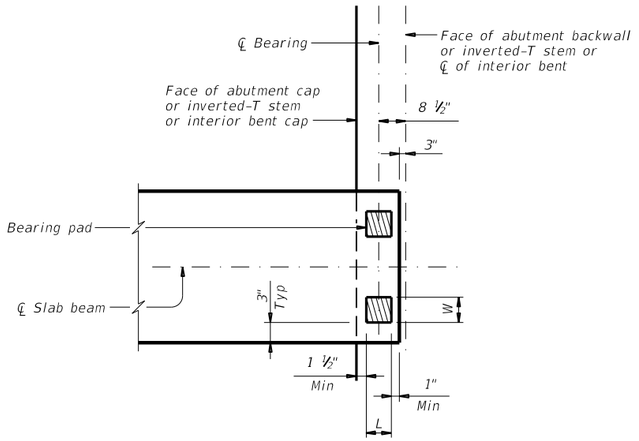
Texas Department of Transportation
Bridge Division Standard

PRESTRESSED CONCRETE SLAB BEAM DETAILS

(TYPE 5SB15)

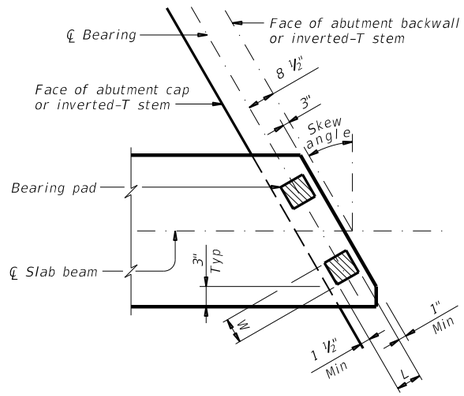
PSB-5SB15

FILE: psbsts04-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	14	047	CR 347
	DIST	COUNTY		SHEET NO.
	SAT	WILSON		69



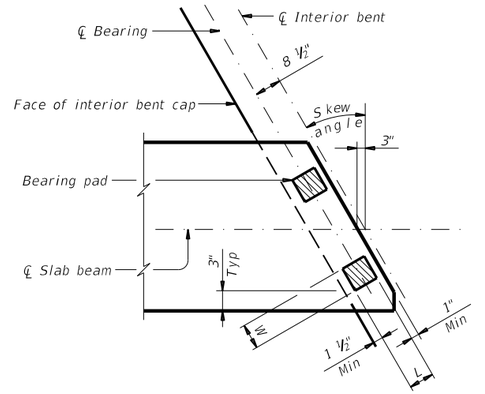
TWO-PAD DETAIL PLAN

(At abutment or inverted-T cap or at interior bent)



TWO-PAD DETAIL SKEW PLAN

(At abutment or inverted-T cap)



TWO-PAD DETAIL SKEW PLAN

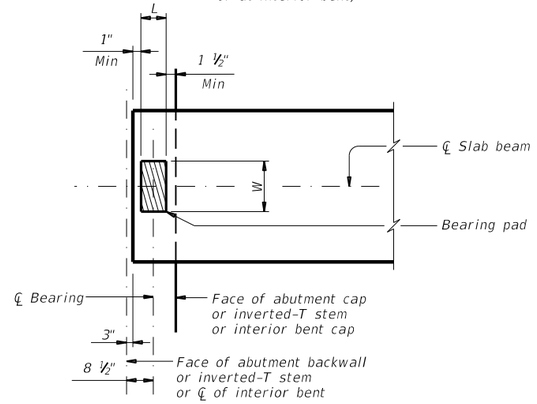
(At interior bent)

TABLE OF BEARING PAD DIMENSIONS (ALL PRESTR CONC SLAB BM TYPES)

One-Pad (Ty SB1-"N") (2)			Two-Pad (Ty SB2-"N") (2)		
W	L	T	W	L	T
14"	7"	2"	7"	7"	2"

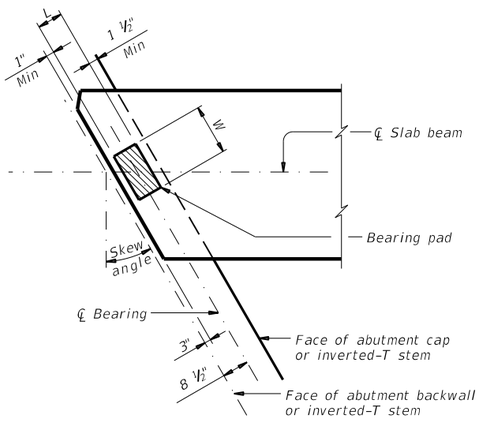
Pad sizes shown are applicable for the following conditions:

(1) All one, two and three span units where the minimum span length is not less than 25' and the maximum span is not more than 50'.
(2) Skews less than or equal to 30°.



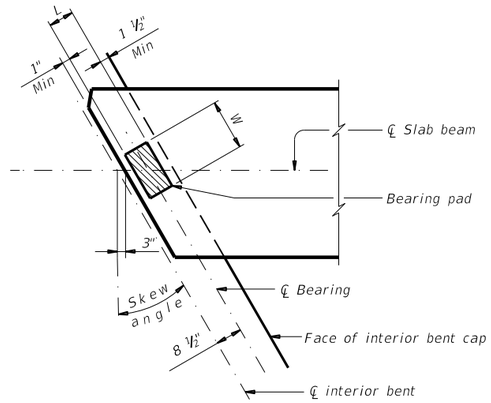
ONE-PAD DETAIL PLAN

(At abutment or inverted-T cap or at interior bent)



ONE-PAD DETAIL SKEW PLAN

(At abutment or inverted-T cap)

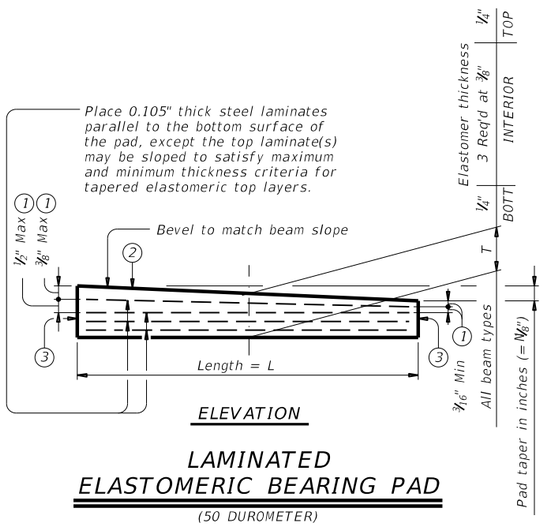


ONE-PAD DETAIL SKEW PLAN

(At interior bent)

ELASTOMERIC BEARING PAD PLACEMENT AND BEAM END DIAGRAMS

Place one bearing pad at forward station beam end.
Place two bearing pads at back station beam end.



ELEVATION

LAMINATED ELASTOMERIC BEARING PAD

(50 DUROMETER)

(1) Maximum and minimum layer thicknesses shown are for elastomer only, on tapered layers.

(2) Indicate BEARING TYPE on all pads. For tapered pads, locate BEARING TYPE on the high side. The Fabricator must include the value of "N" (amount of taper in ⅛" increments) in this mark.
Examples: N=0, (for 0" taper)
N=1, (for ⅛" taper)
N=2, (for ¼" taper)
(etc.)
Fabricated pad top surface slope must not vary from plan beam slope by more than $\left(\frac{0.0625"}{Length}\right)$ IN/IN.

(3) Locate permanent mark here.

GENERAL NOTES:

These details accommodate skew angles up to 30°.

Shop drawings for approval are required.

A bearing layout which identifies location and orientation of all bearings must be developed by the bearing fabricator. Permanently mark each bearing in accordance with the bearing layout. A copy of the bearing layout is to be provided to the Engineer.

Cost of furnishing and installing elastomeric bearings must be included in unit price bid for "Prestressed Concrete Slab Beams".

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

ELASTOMERIC BEARING AND BEAM END DETAILS

PRESTR CONCRETE SLAB BEAM

PSBEB

FILE: psbste06-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	14	047	CR 347
	DIST	COUNTY		SHEET NO.
	SAT	WILSON		70

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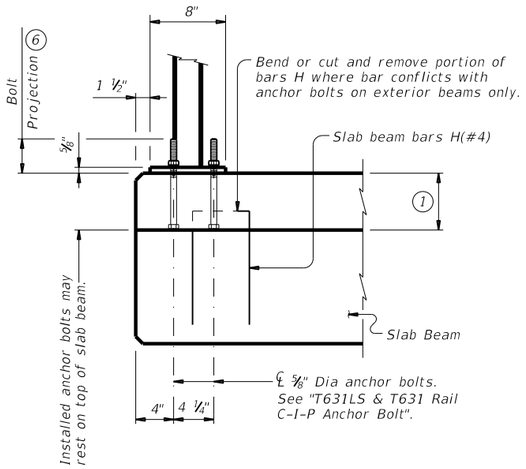
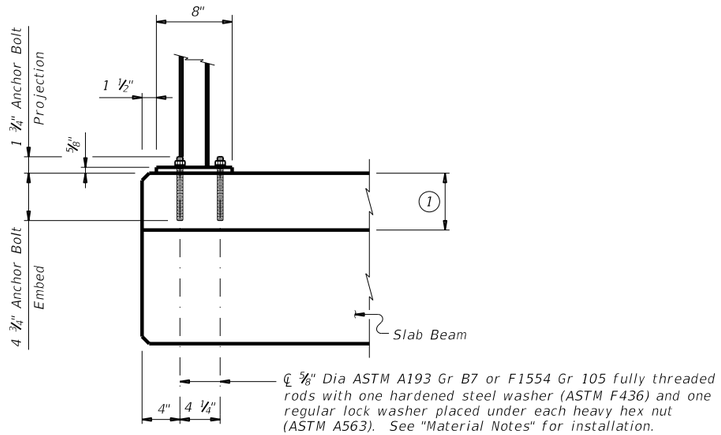


CAST-IN-PLACE ANCHORAGE OPTION



ADHESIVE ANCHORAGE OPTION

T631LS & T631 RAIL ANCHORAGE PLACEMENT 2 7

PART SPAN ELEVATION

SECTION

TYPICAL CONCRETE RAIL ANCHORAGE

(Showing typical concrete rail anchorage)

T631LS & T631 RAIL C-I-P ANCHOR BOLT

PLAN OF CONCRETE RAILS AT EXPANSION JOINTS

1. Cast-in-place slab thickness varies due to beam camber (5" minimum).
2. Replace cast-in-place anchor bolts shown on T631LS and T631 Rail standard with an adhesive anchor system or cast-in-place anchor bolts shown on this sheet.
3. Bar length shown on rail standard, minus 1 ¼". Adjust bar length for a raised sidewalk.
4. See rail standard for projection from finished grade or top of sidewalk.
5. Place additional (#5) longitudinal bar.
6. Excess bolt length has been provided to accommodate a variable slab thickness due to beam camber. If slab thickness on span details exceed 7", bolt length must be increased accordingly. After posts have been set and bolts tightened, bolt projection above nuts of more than ½" must be cut off and painted with two coats of zinc-rich paint conforming to the Item 445 "Galvanizing".
7. Distance from end of top outside edge of slab to center of first bolt group can not be less than 9", except: 15° Skew: 1'-0" (acute corner only)
   30° Skew: 1'-3" (acute corner only)
8. Location of rail expansion joint must be at the intersection of ℄ slab expansion joint, ℄ rail footprint and perpendicular to slab outside edge.
9. Cross-hatched area must have ½" preformed bituminous fiber material under concrete rail, as shown.

CONSTRUCTION NOTES:

Rail anchorage bars may be field bent as required to clear rail reinforcing or provide minimum cover shown on standard rail detail sheets.

Test adhesive anchors in accordance with Item 450.3.3, "Tests". Test 3 anchors per 100 anchors installed. Perform corrective measures to provide adequate capacity if any of the tests do not meet the required test load. Repair damage from testing as directed.

MATERIAL NOTES:

Galvanize all steel components of steel rail system.

Provide Grade 60 reinforcing steel.

Cast-in-place anchorage system for T631LS and T631 Rail must be ⅝" Dia heavy hex head anchor bolts (ASTM F3125 Gr 325 or A449) with one hardened steel washer (ASTM F436) and one regular lock washer placed under heavy hex nut. Nuts must conform to ASTM A563 requirements. Embed anchor bolts 4 ½" minimum.

Adhesive anchors for T631LS and T631 Rail must be ⅝" Dia ASTM A193 Gr B7 or F1554 Gr 105 fully threaded rods with one hardened steel washer (ASTM F436) and one regular lock washer placed under each heavy hex nut. Nuts must conform to ASTM A563 requirements. Embed fully threaded rod into slab and/or abutment wingwall using a Type III, Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment depth is 4 ¾". Anchor adhesive chosen must be able to achieve a nominal bond strength in tension of a single anchor, Na, of 8 kips (edge distance must be accounted for). Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing."

Epoxy coat or galvanize reinforcing steel shown on this standard if rail reinforcement is epoxy coated or galvanized.

GENERAL NOTES:

Designed in accordance with AASHTO LRFD Bridge Design Specifications.

This standard is for use with structures with a 5" minimum cast-in-place concrete slab.

This standard may require modification for interior rails. This standard does not apply to median barriers.

This standard does not provide details for Type T221P, T224, T80HT, T80SS, C412, PR11, PR22 and PR3 rails on slab beam bridges.

See rail standards for approved speed restrictions, notes and details not shown.

Cover dimensions are clear dimensions, unless noted otherwise.

Texas Department of Transportation

Bridge Division Standard

RAIL ANCHORAGE DETAILS

PRESTR CONCRETE SLAB BEAMS

PSBRA

FILE: psbste07-18.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT January 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	14	047	CR 347
03-18: Updated adhesive anchor notes.	DIST	COUNTY		SHEET NO.
	SAT	WILSON		71

STRUCTURE	DESIGNED BEAMS (STRAIGHT STRANDS)																		OPTIONAL DESIGN					LOAD RATING		
				PRESTRESSING STRANDS							DEBONDED STRANDS PER ROW							CONCRETE								
	SPAN LENGTH	BEAM NO.	BEAM TYPE	NON-STD STRAND PATTERN	TOTAL NO.	SIZE	STRGTH	"e" ℄	"e" END	TOT NO. DEB	DIST FROM BOTTOM	NO. OF STRANDS		NUMBER OF STRANDS DEBONDED TO (ft from end)					RELEASE STRGTH (1)	MINIMUM 28 DAY COMP STRGTH	DESIGN LOAD COMP STRESS (TOP ℄) (SERVICE I)	DESIGN LOAD TENSILE STRESS (BOTT ℄) (SERVICE III)	REQUIRED MINIMUM ULTIMATE MOMENT CAPACITY (STRENGTH I)	LIVE LOAD DISTRIBUTION FACTOR (2)		STRENGTH I	SERVICE III
	(ft)					(in)	fpu (ksi)	(in)	(in)		(in)	TOTAL	DE-BONDED	3	6	9	12	15	f'ci (ksi)	f'c (ksi)	fct (ksi)	fcb (ksi)	(kip-ft)	Moment	Shear	Inv	Inv
24' ROADWAY SB12 BEAM	25	ALL	5SB12		8	0.6	270	3.50	3.50	0	2.5	8	0	0	0	0	0	0	4.000	5.000	0.914	-1.217	448	0.450	0.450	1.40	1.82	1.71
	30	ALL	5SB12		10	0.6	270	3.50	3.50	0	2.5	10	0	0	0	0	0	0	4.000	5.000	1.292	-1.685	530	0.450	0.450	1.25	1.62	1.29
	35	ALL	5SB12		14	0.6	270	3.50	3.50	0	2.5	14	0	0	0	0	0	0	4.000	5.000	1.730	-2.219	675	0.450	0.450	1.33	1.73	1.23
	40	ALL	5SB12		18	0.6	270	3.50	3.50	0	2.5	18	0	0	0	0	0	0	4.000	5.000	2.218	-2.796	820	0.440	0.440	1.34	1.74	1.12
24' ROADWAY SB15 BEAM	25	ALL	5SB15		8	0.6	270	5.00	5.00	0	2.5	8	0	0	0	0	0	0	4.000	5.000	0.725	-0.897	551	0.450	0.450	1.77	2.29	2.41
	30	ALL	5SB15		8	0.6	270	5.00	5.00	0	2.5	8	0	0	0	0	0	0	4.000	5.000	1.020	-1.244	574	0.450	0.450	1.23	1.59	1.45
	35	ALL	5SB15		10	0.6	270	5.00	5.00	0	2.5	10	0	0	0	0	0	0	4.000	5.000	1.361	-1.640	708	0.450	0.450	1.15	1.49	1.14
	40	ALL	5SB15		14	0.6	270	5.00	5.00	0	2.5	14	0	0	0	0	0	0	4.000	5.000	1.739	-2.068	864	0.440	0.440	1.32	1.71	1.19
	45	ALL	5SB15		18	0.6	270	5.00	5.00	2	2.5	18	2	2	0	0	0	0	4.000	5.000	2.179	-2.574	1054	0.440	0.440	1.34	1.73	1.08
	50	ALL	5SB15		24	0.6	270	5.00	5.00	8	2.5	24	8	4	4	0	0	0	4.000	5.000	2.680	-3.153	1276	0.440	0.440	1.33	1.72	1.11
28' ROADWAY SB12 BEAM	25	ALL	5SB12		8	0.6	270	3.50	3.50	0	2.5	8	0	0	0	0	0	0	4.000	5.000	0.903	-1.184	444	0.430	0.430	1.47	1.91	1.80
	30	ALL	5SB12		10	0.6	270	3.50	3.50	0	2.5	10	0	0	0	0	0	0	4.000	5.000	1.276	-1.639	508	0.430	0.430	1.32	1.71	1.37
	35	ALL	5SB12		12	0.6	270	3.50	3.50	0	2.5	12	0	0	0	0	0	0	4.000	5.000	1.708	-2.159	647	0.430	0.430	1.18	1.53	1.02
	40	ALL	5SB12		18	0.6	270	3.50	3.50	0	2.5	18	0	0	0	0	0	0	4.000	5.000	2.200	-2.744	799	0.430	0.430	1.37	1.78	1.17
28' ROADWAY SB15 BEAM	25	ALL	5SB15		8	0.6	270	5.00	5.00	0	2.5	8	0	0	0	0	0	0	4.000	5.000	0.716	-0.874	529	0.430	0.430	1.85	2.40	2.53
	30	ALL	5SB15		8	0.6	270	5.00	5.00	0	2.5	8	0	0	0	0	0	0	4.000	5.000	1.007	-1.212	570	0.430	0.430	1.29	1.67	1.53
	35	ALL	5SB15		10	0.6	270	5.00	5.00	0	2.5	10	0	0	0	0	0	0	4.000	5.000	1.343	-1.598	680	0.430	0.430	1.21	1.57	1.22
	40	ALL	5SB15		14	0.6	270	5.00	5.00	0	2.5	14	0	0	0	0	0	0	4.000	5.000	1.725	-2.032	842	0.430	0.430	1.36	1.76	1.24
	45	ALL	5SB15		18	0.6	270	5.00	5.00	2	2.5	18	2	2	0	0	0	0	4.000	5.000	2.149	-2.508	1013	0.420	0.420	1.41	1.82	1.16
	50	ALL	5SB15		22	0.6	270	5.00	5.00	6	2.5	22	6	4	2	0	0	0	4.000	5.000	2.643	-3.073	1227	0.420	0.420	1.33	1.72	1.01
30' ROADWAY SB12 BEAM	25	ALL	4SB12		6	0.6	270	3.50	3.50	0	2.5	6	0	0	0	0	0	0	4.000	5.000	0.904	-1.187	341	0.340	0.340	1.38	1.79	1.67
	30	ALL	4SB12		8	0.6	270	3.50	3.50	0	2.5	8	0	0	0	0	0	0	4.000	5.000	1.277	-1.646	407	0.340	0.340	1.32	1.71	1.37
	35	ALL	4SB12		10	0.6	270	3.50	3.50	0	2.5	10	0	0	0	0	0	0	4.000	5.000	1.711	-2.169	518	0.340	0.340	1.24	1.60	1.08
	40	ALL	4SB12		14	0.6	270	3.50	3.50	0	2.5	14	0	0	0	0	0	0	4.000	5.000	2.205	-2.758	640	0.340	0.340	1.34	1.73	1.11
30' ROADWAY SB15 BEAM	25	ALL	4SB15		6	0.6	270	5.00	5.00	0	2.5	6	0	0	0	0	0	0	4.000	5.000	0.723	-0.888	431	0.350	0.350	1.69	2.19	2.32
	30	ALL	4SB15		6	0.6	270	5.00	5.00	0	2.5	6	0	0	0	0	0	0	4.000	5.000	1.017	-1.231	438	0.350	0.350	1.16	1.50	1.37
	35	ALL	4SB15		8	0.6	270	5.00	5.00	0	2.5	8	0	0	0	0	0	0	4.000	5.000	1.346	-1.605	545	0.340	0.340	1.21	1.57	1.21
	40	ALL	4SB15		12	0.6	270	5.00	5.00	0	2.5	12	0	0	0	0	0	0	4.000	5.000	1.729	-2.043	675	0.340	0.340	1.47	1.91	1.38
	45	ALL	4SB15		14	0.6	270	5.00	5.00	2	2.5	14	2	2	0	0	0	0	4.000	5.000	2.166	-2.542	823	0.340	0.340	1.33	1.73	1.06
	50	ALL	4SB15		18	0.6	270	5.00	5.00	4	2.5	18	4	2	2	0	0	0	4.000	5.000	2.665	-3.115	998	0.340	0.340	1.32	1.71	1.02

(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 AASTHO Manual for Bridge Evaluation.

Prestress losses for the designed beams have been calculated for a relative humidity of 60 percent. Optional designs must likewise conform.

FABRICATION NOTES:

Provide Class H concrete.

Provide Grade 60 reinforcing steel.

Use low relaxation strands, each pretensioned to 75 percent of fpu.

Full-length debonded strands are not permitted in positions "A" and "B".

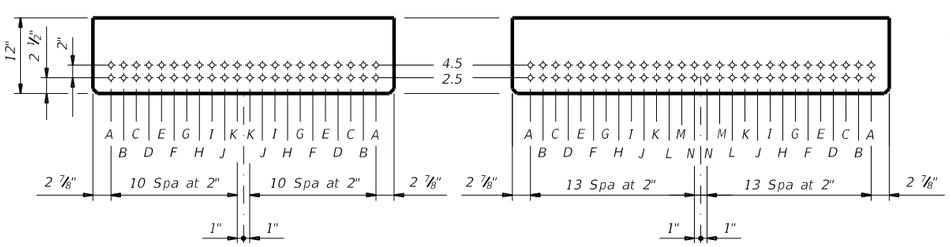
Strand debonding must comply with Item 424.4.2.2.2.4.

When shown on this sheet, the Fabricator has the option of furnishing either the designed beam or an approved optional beam design. All optional design submittals and shop drawings must be signed, sealed and dated by a Professional Engineer registered in the State of Texas.

Locate strands for the designed beam as low as possible on the 2" grid system unless a non-standard strand pattern is indicated. Fill row "2.5", then row "4.5". Place strands within a row as follows:

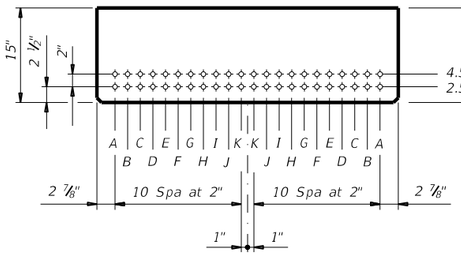
1) Locate a strand in each "A" position.
2) Place strand symmetrically about vertical centerline of beam.
3) Space strands as equally as possible across the entire width.

Do not debond strands in position "A". Distribute debonded strands symmetrically about the vertical centerline. Increase debonded lengths working outward, with debonding staggered in each row.

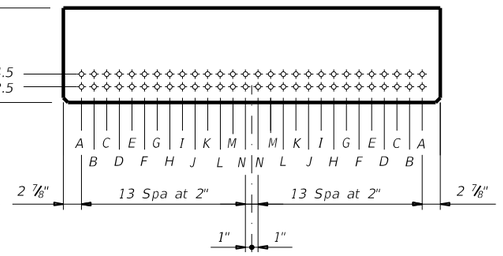


TxDOT 4SB12 SLAB BEAM

TxDOT 5SB12 SLAB BEAM



TxDOT 4SB15 SLAB BEAM



TxDOT 5SB15 SLAB BEAM

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

PRESTRESSED CONCRETE SLAB BEAM STD DESIGNS

(TY SB12 OR SB15)

24', 28' & 30' ROADWAY

PSBSD

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©TxDOT January 2017	CONT	SECT	JOB	HIGHWAY
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	DIST	COUNTY		SHEET NO.
	SAT	WILSON		72

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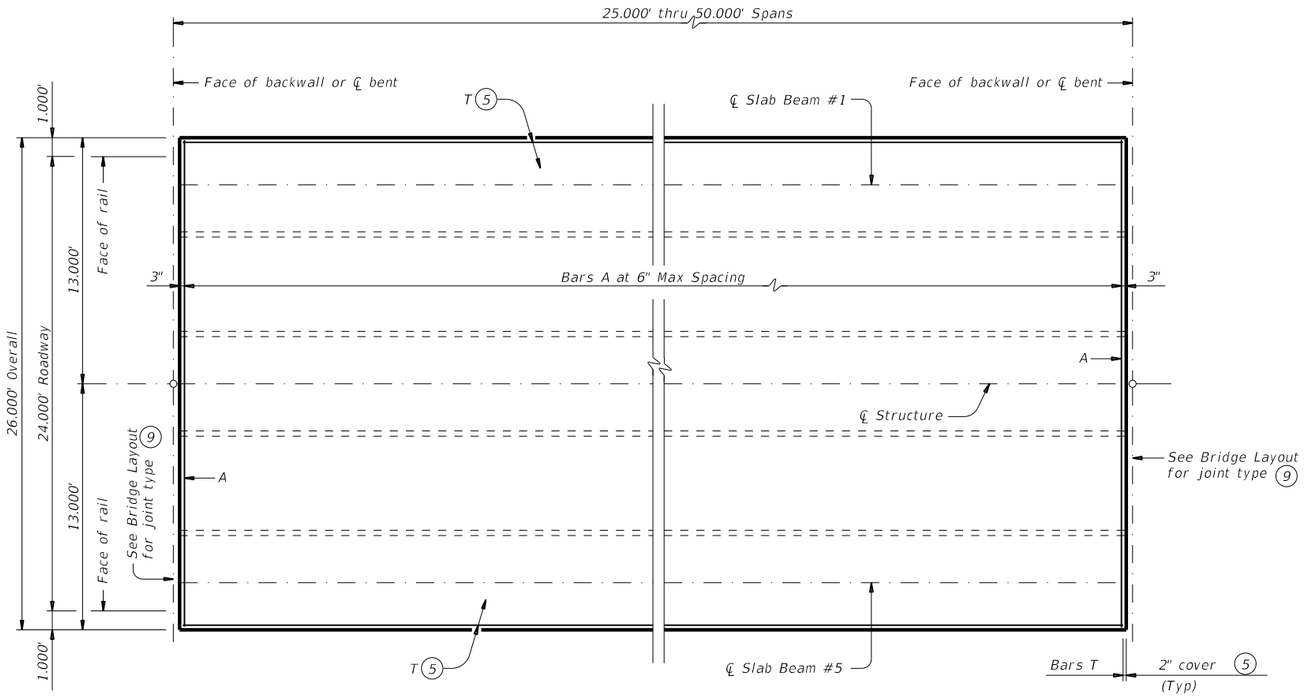
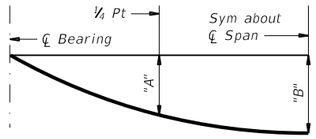


PLAN

TABLE OF VARIABLE VALUES

Span Length	Beam Type	Dead Load Deflection		Section (3) Depths	
		"A"	"B"	"X"	"Y"
Ft	(1)	Ft	Ft	In	Ft/In
25	5SB12	0.004	0.005	5 ¼"	1'-5 ¼"
30	5SB12	0.008	0.011	5 ½"	1'-5 ½"
35	5SB12	0.015	0.021	6"	1'-6"
40	5SB12	0.026	0.036	6 ½"	1'-6 ½"
25	5SB15	0.002	0.003	5 ¼"	1'-8 ¼"
30	5SB15	0.004	0.006	5 ½"	1'-8 ½"
35	5SB15	0.008	0.011	5 ½"	1'-8 ½"
40	5SB15	0.013	0.019	5 ¾"	1'-8 ¾"
45	5SB15	0.022	0.030	6 ½"	1'-9 ½"
50	5SB15	0.034	0.047	7"	1'-10"



DEAD LOAD DEFLECTION DIAGRAM

NOTE: Deflections shown are due to concrete slab only (E_c = 5,000 ksi). Calculated deflections shown are theoretical and actual dimensions may vary. Adjust based on field verification.

TABLE OF ESTIMATED QUANTITIES

SPAN LENGTH	REINF CONCRETE SLAB (SLAB BEAM)	PRESTR CONC SLAB BEAM (5SB12 OR 5SB15) (1)			TOTAL (2) REINF STEEL
		ABUT TO INT BT	INT BT TO INT BT	ABUT TO ABUT	
Ft	SF	LF (4)	LF (4)	LF (4)	Lb
25	650	122.50	122.50	122.50	1,820
30	780	147.50	147.50	147.50	2,180
35	910	172.50	172.50	172.50	2,550
40	1,040	197.50	197.50	197.50	2,910
45	1,170	222.50	222.50	222.50	3,280
50	1,300	247.50	247.50	247.50	3,640

(1) See Bridge Layout for beam type used in the superstructure. These standards do not provide for the use of both SB12 and SB15 beams within the same structure.

(2) Reinforcing steel weight is calculated using an approximate factor of 2.8 Lbs/SF.

(3) Based on theoretical beam camber, dead load deflections of 5" cast-in-place concrete slab and a constant grade. The Contractor will adjust these values for any vertical curve.

(4) Fabricator will adjust beam lengths for beam slopes as required.

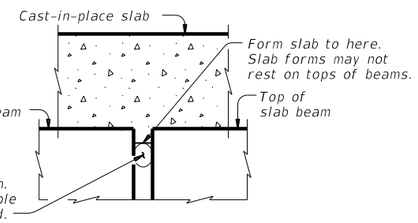
(5) Where slab is continuous over Interior Bents, Bars T are continuous through Joint. See "Continuous Slab Detail".

(6) This standard does not provide for changes in roadway cross-slopes within the structure.

(7) 1 ¼" 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.

(8) 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.

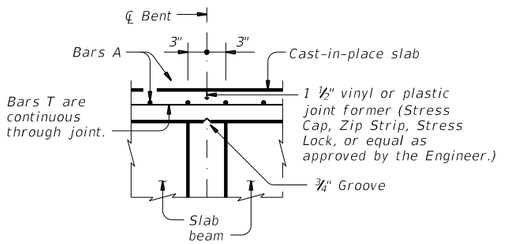
(9) See Bridge Layout for expansion joint locations. If using Type A expansion joints, the maximum distance between joints is 100 feet. Type A joints are subsidiary to Item 422, "Concrete Superstructures".



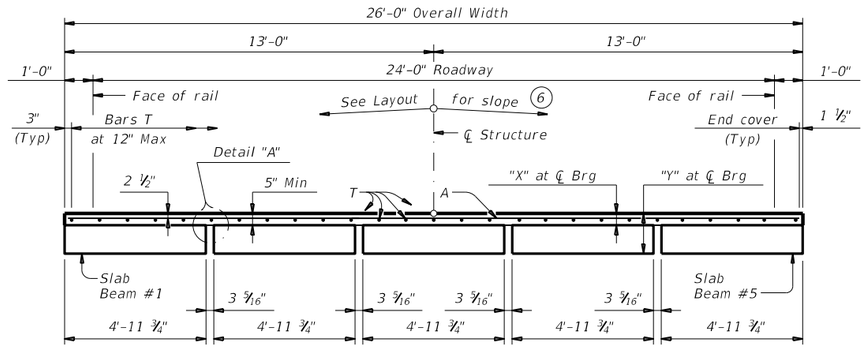
DETAIL "A"

BAR TABLE

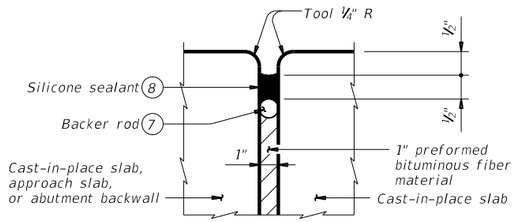
BAR	SIZE
A	#5
T	#4



CONTINUOUS SLAB DETAIL



TYPICAL TRANSVERSE SECTION



TYPE A JOINT DETAIL (9)

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.
Two- or three-span units, with slab continuous over interior bents, may be formed with the details shown on this sheet.
See applicable rail details for rail anchorage in slab.
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"
~ #5 = 2'-0"
Epoxy coated ~ #4 = 2'-5"
~ #5 = 3'-0"

Deformed welded wire reinforcement (WWR) (ASTM A1064) of equal size and spacing may be substituted for Bars A or T unless noted otherwise.

HL93 LOADING

Texas Department of Transportation

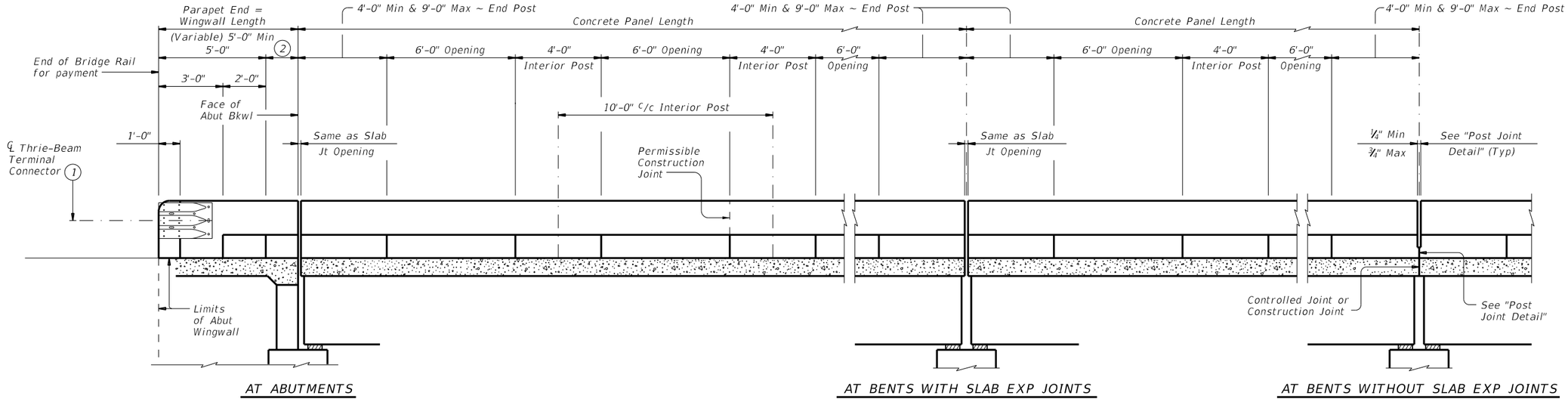
Bridge Division Standard

PRESTRESSED CONCRETE SLAB BEAM SPANS (TY SB12 OR SB15)

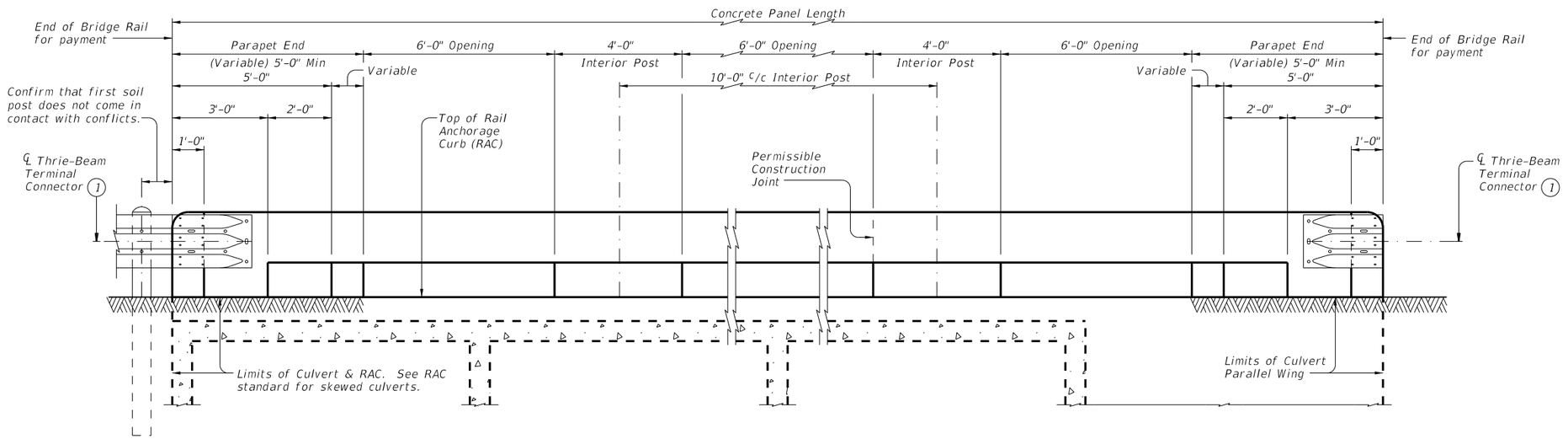
24' ROADWAY

SPSB-24

FILE: psbste30-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	14	047	CR 347
	DIST	COUNTY		SHEET NO.
	SAT	WILSON		73



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)

DATE: 2/4/2021 7:49:37 AM
FILE: c:\pwworking\khd\pwprod\jordan.kiewit\dms99930\rlstd005-19.dgn

SHEET 1 OF 3

Texas Department of Transportation

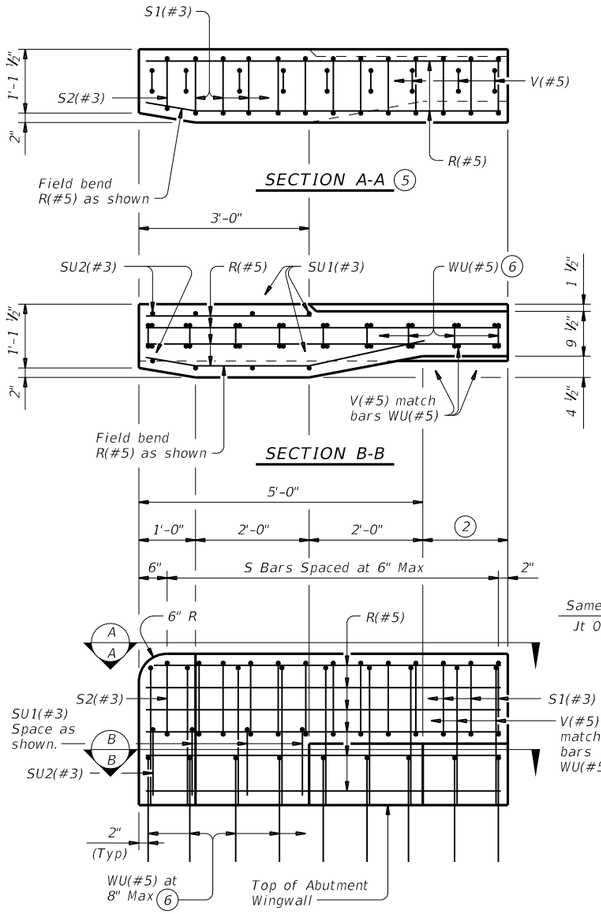
Bridge Division Standard

TRAFFIC RAIL

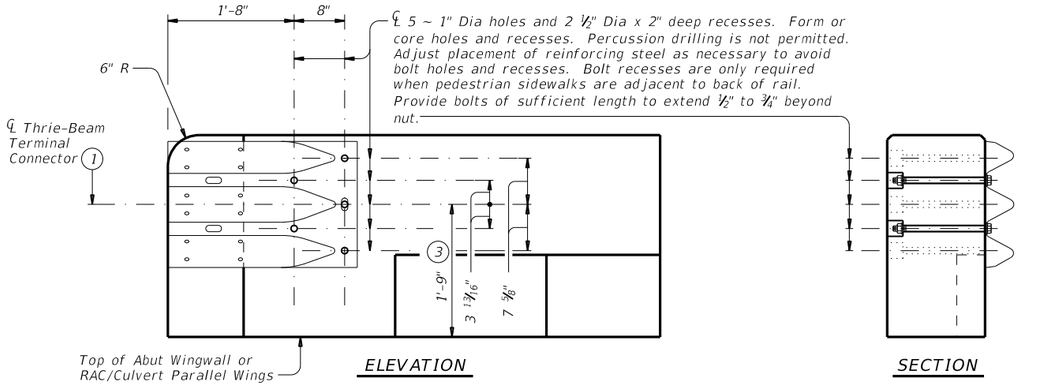
TYPE T223

FILE: rlstd005-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: AES
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	14	047	CR 347
	DIST	COUNTY		SHEET NO.
	SAT	WILSON		74

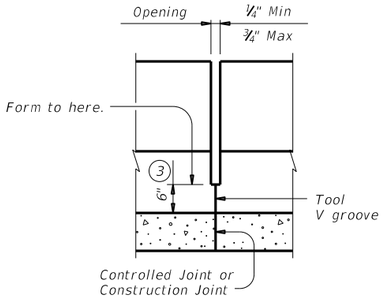
DATE: 2/4/2021 7:49:37 AM
FILE: c:\pwworking\khd\pwprod\jordan.kiewit.tdms99930\r1std005-19.dgn



PARAPET END AT ABUT WINGWALL (6)

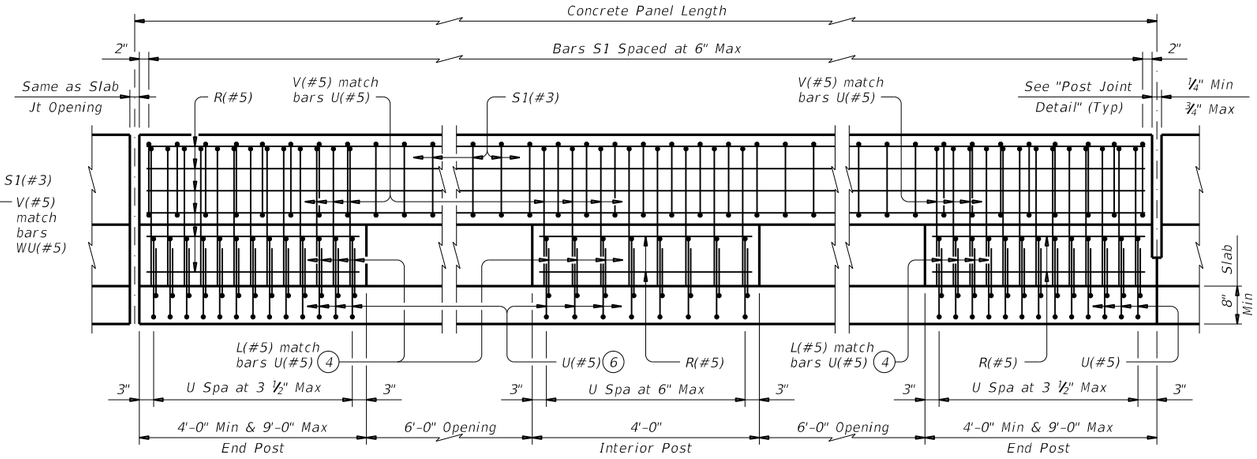


TERMINAL CONNECTION DETAILS



POST JOINT DETAIL

Provide at all interior bents without slab expansion joints.



AT SLAB EXPANSION JOINTS

AT 4' INTERIOR POST

AT 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 achorage curb over culvert top slab. Use Bars WU(#5) in culvert parallel wings.

Texas Department of Transportation

Bridge Division Standard

TRAFFIC RAIL

TYPE T223

FILE: r1std005-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: AES
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	14	047	CR 347
	DIST	COUNTY		SHEET NO.
	SAT	WILSON		75

DATE: 2/4/2021 7:49:38 AM
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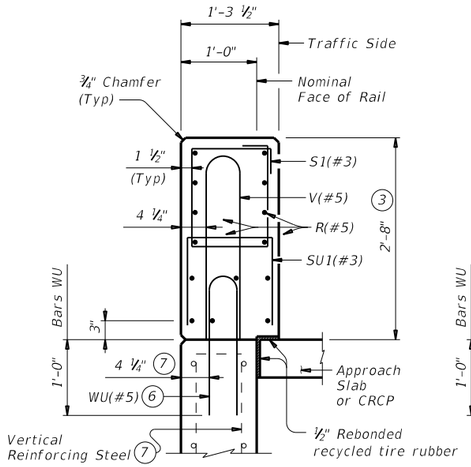
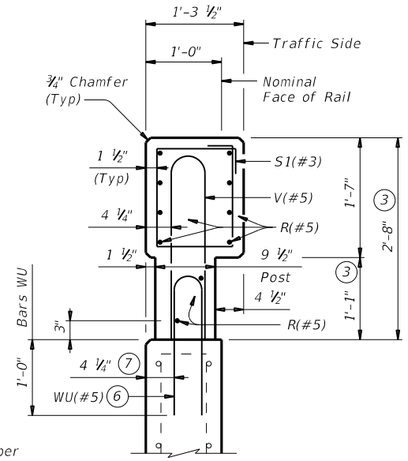
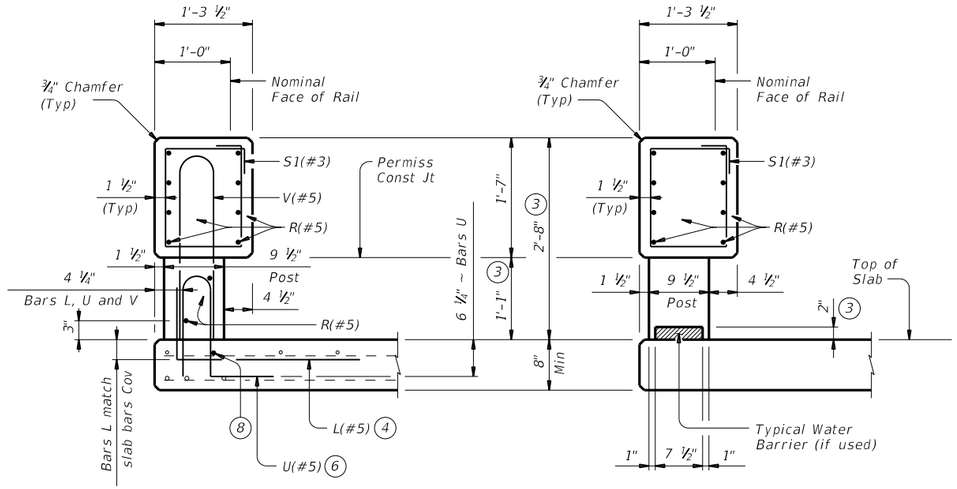


SECTION C-C
ON ABUTMENT WINGWALLS
OR CIP RETAINING WALLS



SECTION D-D
ON ABUTMENT WINGWALLS
OR CIP RETAINING WALLS

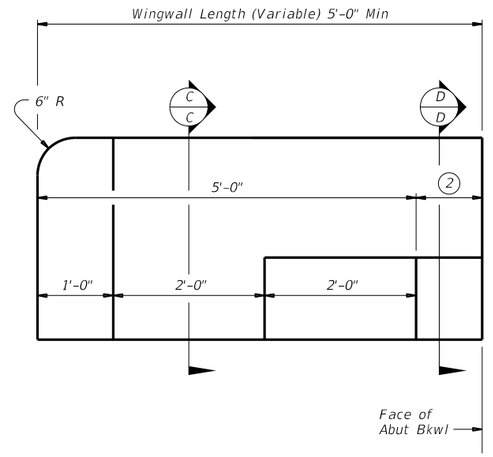


AT POST
ON BRIDGE SLAB

AT OPENING
ON BRIDGE SLAB

SECTIONS THRU RAIL

Sections on box culverts similar.



ELEVATION AT ABUTMENT WINGWALL

Box culvert parallel wings or rail anchorage curb similar.

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.

(2) Wingwall Length minus 5'-0" (Varies)

(3) Increase 2" for structures with overlay.

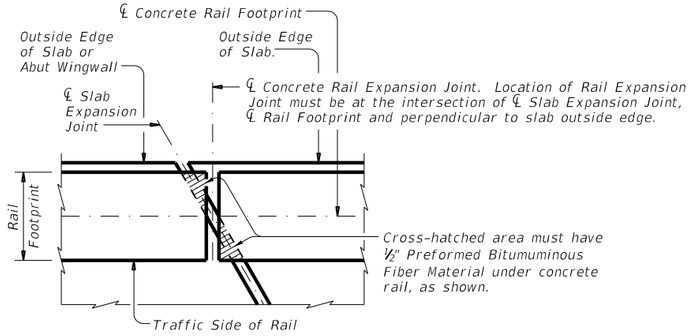
(4) Bars L(#5) are part of rail reinforcing and are included in unit price bid for railing. Space with Bars U. Bars L match slab bar cover. Bars L may be bundled with top slab reinforcing if spacing is equivalent.

(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.

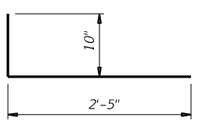
(8) Top longitudinal slab bar may be adjusted laterally 3" plus or minus to tie reinforcing.

(9) At the Contractor's option, Bars V may be replaced by extending Bars U to 2'-5 ¼" above the roadway surface without overlay.

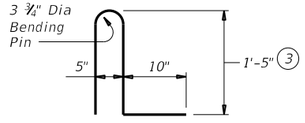


PLAN OF RAIL AT EXPANSION JOINTS

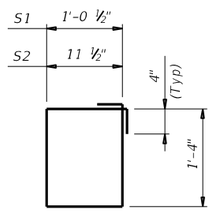
Example showing Slab Expansion Joints without breakbacks.



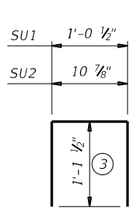
BARS L (#5)



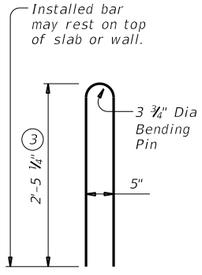
BARS U (#5) (9)



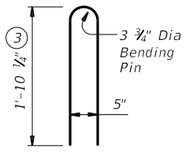
BARS S (#3)



BARS SU (#3)



BARS V (#5) (9)



BARS WU (#5)

SHEET 3 OF 3

Texas Department of Transportation

Bridge Division Standard

TRAFFIC RAIL

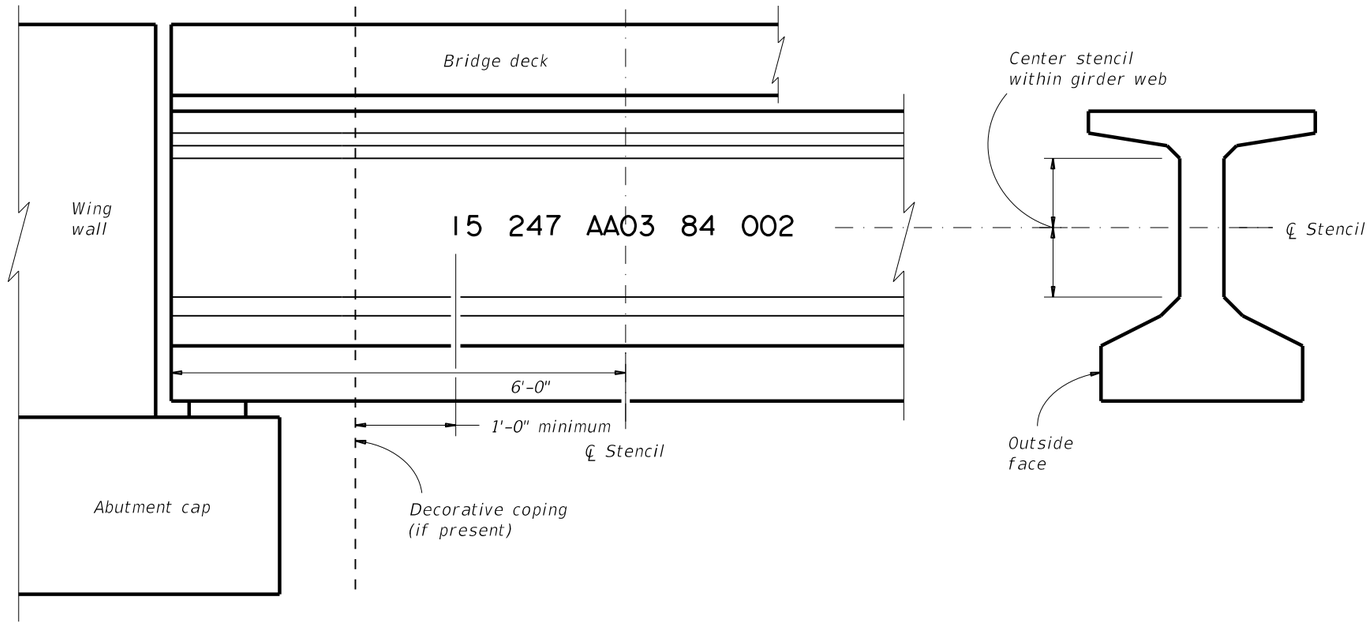
TYPE T223

FILE: rlstd005-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: AES
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	14	047	CR 347
	DIST	COUNTY		SHEET NO.
	SAT	WILSON		76

15 247 AA03 84 002

San Antonio District designation	County designation	Control number	Section nunber	Structure number

PAINTED STRUCTURE NUMBER DETAIL



TYPICAL BRIDGE CORNER (ELEVATION)

SAN ANTONIO DISTRICT COUNTY DESIGNATIONS

Atascosa 007
Bandera 010
Bexar 015
Comal 046
Frio 083
Guadalupe 095
Kendall 131
Kerr 133
McMullen 162
Medina 163
Uvalde 232
Wilson 247

GENERAL NOTES:
Apply stucture number in accordance with Special Specification for Stenciling Permanent Structure Numbers.

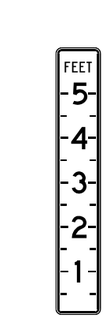
SAN ANTONIO DISTRICT STANDARD

Texas Department of Transportation
San Antonio District (Structural Design)
Prepared by and for the use of TxDOT

BRIDGE NBI NUMBER STENCIL

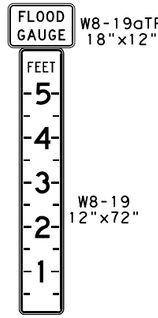
DN: BCL	CK: XXX	FILENAME: 000000000 SA District Stencil.dgn		
DW: SRF	CK: XXX	ORIGINAL DRAWING DATE: August 2019		
DIST	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		COUNTY
SAT	6			WILSON
CONTROL	SECTION	JOB	SHEET NO.	ROUTE
0915	14	047	77	CR 347

REVISIONS:



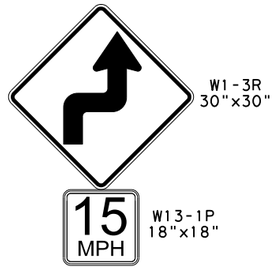
① TO BE REMOVED

② TO BE REMOVED



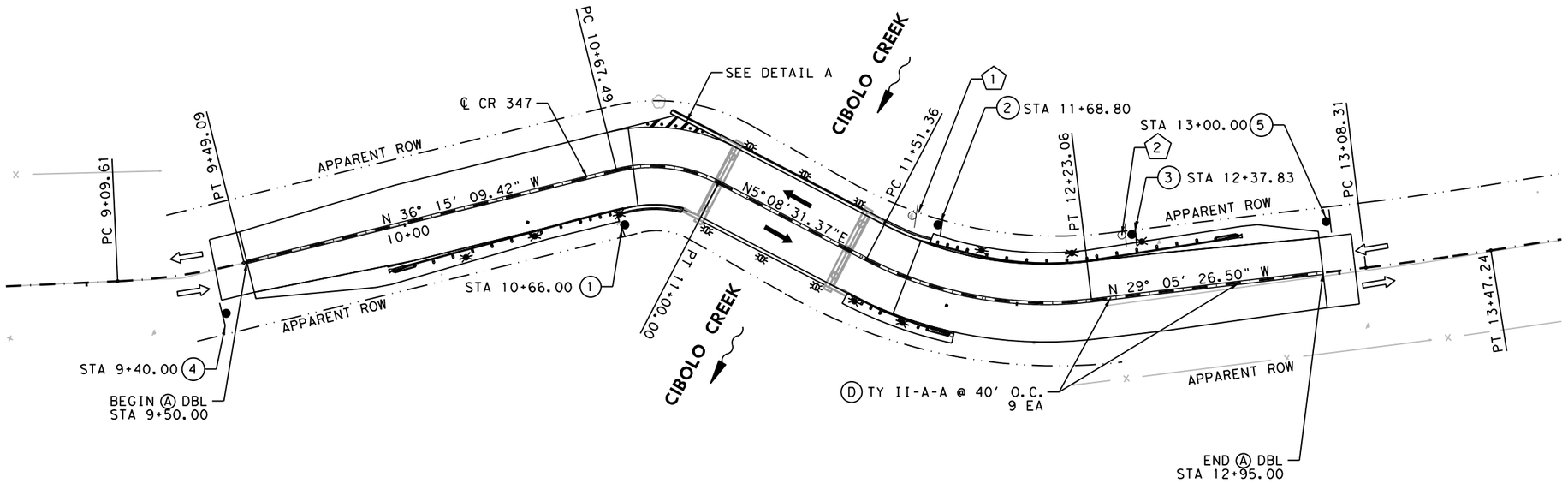
①②

③



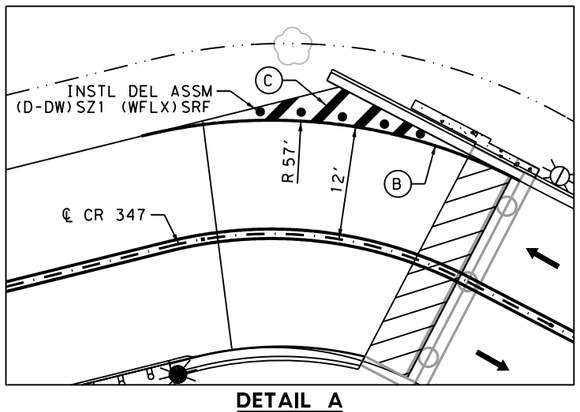
④ ⑤

ITEM CODE	DESCRIPTION	UNIT	QTY
0644 6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	3
0644 6023	IN SM RD SN SUP&AM TYFRP(1)UA(P)	EA	2
0644 6076	REMOVE SM RD SN SUP&AM	EA	2
0658 6014	INSTL DEL ASSM (D-SW)SZ (BR)CTB (BI)	EA	6
0658 6062	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2(BI)	EA	8
0658 6094	INSTL DEL ASSM (D-DW)SZ 1(WFLX)SRF	EA	5
0666 6042	REFL PAV MRK TY I (W)12"(SLD)(100MIL)	LF	31
0666 6224	PAVEMENT SEALER 4"	LF	732
0666 6228	PAVEMENT SEALER 12"	LF	31
0666 6303	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	LF	42
0666 6315	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF	690
0672 6009	REFL PAV MRKR TY II-A-A	EA	9
0678 6001	PAV SURF PREP FOR MRK (4")	LF	732
0678 6006	PAV SURF PREP FOR MRK (12")	LF	31



LEGEND

- # EXIST SIGN TO BE REMOVED
- # PROPOSED SIGN
- Ⓐ REFL PAV MRK TY I (Y) 4" (SLD)(100MIL)
- Ⓑ REFL PAV MRK TY I (W) 4" (SLD)(100MIL)
- Ⓒ REFL PAV MRK TY I (W) 12" (SLD)(100MIL)
- Ⓓ REFL PAV MRKR TY II-A-A
- INSTL DEL ASSM (D-SW)SZ1 (BRF)CTB BI
- INSTL DEL ASSM (D-SW)SZ1 (BRF)GF2 BI
- INSTL DEL ASSM (D-DW)SZ1 (WFLX)SRF
- PROP DIRECTION OF TRAFFIC
- EXIST DIRECTION OF TRAFFIC



DETAIL A

NOTES:

1. SEE TXDOT STD D&OM FOR ADDITIONAL INFORMATION ON DELINEATOR PLACEMENT.
2. GF2 BARRIER REFLECTORS TO BE INSTALLED ALONG MBGF.
3. CTB REFLECTORS TO BE INSTALLED ALONG BRIDGE RAILS.

4/21/2021

STATE OF TEXAS
JORDAN S. KIEWIT
131234
LICENSED
PROFESSIONAL ENGINEER

0' 20' 40'
SCALE: 1"= 40'

Kimley»Horn F-928

Texas Department of Transportation

CR 347 @ CIBOLO CREEK

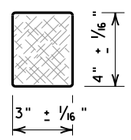
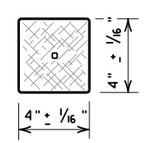
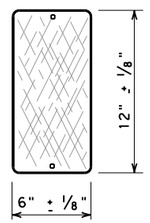
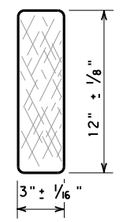
SIGNING AND PAVEMENT MARKING LAYOUT

SHEET OF

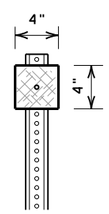
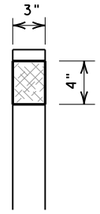
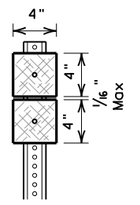
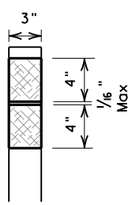
FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
6	BR 2021 (063)		CR 347
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	WILSON	78
CONT.	SECT.	JOB	
0915	14	047	

FILENAME: c:\pwworking\khotpwprod\jordan.kiewit\dms99931\CR347_SPMD_01.dgn
PLOTTED: 4/21/2021 12:09:46 PM

REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS

	SIZE 1	SIZE 2	SIZE 3	SIZE 4
DEVICE				
SHEETING	Yellow, White or Red Type B or C reflective sheeting			
NOTE	1. Size 1 and 4 - Direct applied reflective sheeting for use on flexible post (flx). 2. Size 2 and 3 - For use on wing channel (wc) post only. Use approved metal, plastic or fiberglass backplate with 17/64" mounting holes.			

DELINEATORS

	SINGLE		DOUBLE	
DEVICE				
	1-Size 2 reflector unit	1-Size 1 reflector unit	2-Size 2 reflector units	2-Size 1 reflector units
SHEETING	Yellow, White or Red Type B or C Reflective Sheeting			
POST TYPE	WC	YFLX, WFLX	WC	YFLX, WFLX
MOUNT TYPE	GND	GND, SRF	GND	GND, SRF

D & OM DESCRIPTIVE CODES

INSTL DEL ASSM (D-XX)SZ X (XXXX)XXX(XX)

NUMBER OF REFLECTORS
S = Single
D = Double

COLOR OF REFLECTORS
W = White
Y = Yellow
R = Red

REFLECTOR UNIT SIZE
1 or 2

TYPE OF POST OR DELINEATOR
WC = Wing Channel Post
YFLX = Yellow Flexible Post
WFLX = White Flexible Post
BRF = Barrier Reflector

TYPE OF MOUNT
GND = Embedded (drivable or set in concrete)
CTB = Concrete Barrier Mount
GF1 or GF2 = Guard Fence Attachment
SRF = Surface Mount

DIRECTION
If Required
BI = Bi-Directional
BR = Bi-Directional with red on back

INSTL OM ASSM (OM-XX) (XXXX)XXX(XX)

TYPE OF OBJECT MARKER
1, 2, 3, or 4

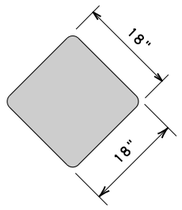
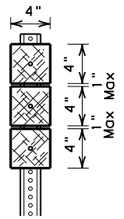
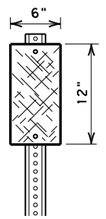
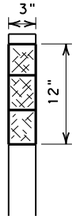
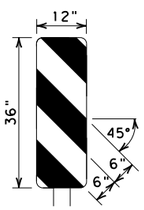
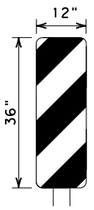
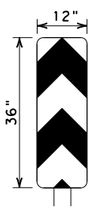
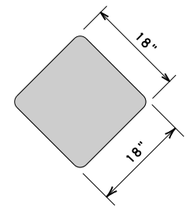
NUMBER OF REFLECTORS OR DIRECTION
X = 3-Size 2 reflector units (Type 2 only)
Y = 1-Size 3 reflector unit (Type 2 only)
Z = 3-Size 1 or 1-Size 4 reflector unit(s)(Type 2 only)
L = Left Side (Type 3 Object Marker only)
R = Right Side (Type 3 Object Marker only)
C = Center (Type 3 Object Marker only)

TYPE OF POST
WC = Wing Channel Post
WFLX = White Flexible Post
TWT = Thin Walled Tubing

TYPE OF MOUNT
GND = Embedded (drivable)
SRF = Surface Mount
WAS = Wedge Anchor Steel
WAP = Wedge Anchor Plastic

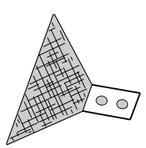
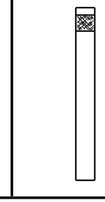
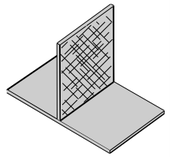
DIRECTION
If Required
BI = Bi-Directional

OBJECT MARKERS

	Type 1 (OM-1)	Type 2 (OM-2)			Type 3 (OM-3)			Type 4 (OM-4)
	OM-1	OM-2X	OM-2Y	OM-2Z	OM-3L	OM-3R	OM-3C	OM-4
DEVICE								
		3-Size 2 reflector units	1-Size 3 reflector unit	3-Size 1 reflector units or 1-Size 4 reflector unit				
SHEETING	Yellow-Type B_{FL} or C_{FL} Sheeting	Yellow - Type B or C Sheeting			Alternating acrylic black and retroflective yellow - Type B_{FL} or C_{FL} Sheeting			Red -Type B_{FL} or C_{FL} Sheeting
POST TYPE	TWT	WC	WC	WFLX	TWT			TWT
MOUNT TYPE	WAS, WAP	GND	GND	GND, SRF	WAS, WAP			WAS, WAP

DEPARTMENTAL MATERIAL SPECIFICATIONS	
FLEXIBLE DELINEATOR & OBJECT MARKER POSTS (EMBEDDED & SURFACE MOUNT TYPES)	DMS-4400
SIGN FACE MATERIALS	DMS-8300
DELINEATORS, OBJECT MARKERS AND BARRIER REFLECTORS	DMS-8600

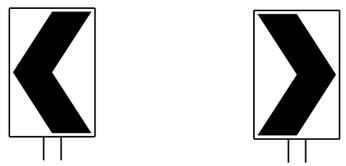
BARRIER REFLECTORS (BRF)

	GF1	GF2	CTB
DEVICE			

1. Barrier reflectors shall meet the requirements of DMS 8600.
2. Approved Barrier Reflectors are listed on the "Barrier Reflectors" Material Producer List at: www.txdot.gov.

SHEETING	Yellow, White, Red
NOTE	1. Reflective sheeting shall have a minimum dimension of 3 inches and minimum surface area of 9 square inches.

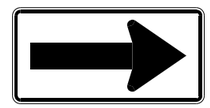
CHEVRONS

DEVICE:  W1-8

SIZE (W x L)	18"x 24" (Conventional)	24"x 30" (Conventional Oversize)	30"x 36" (Expressway)	36" x 48" (Freeway)
MOUNTING HEIGHT	4'-0" or 7'-0"		7'-0" Only	

NOTE
1. CHEVRON (W1-8) signs and ONE DIRECTION LARGE ARROW (W1-6) Signs shall be installed per Sign Mounting Details (SMD) Standard Sheets and paid under Item 644 (Small Roadside Sign Assemblies).
2. When there is a need to increase conspicuity, the Texas version of the ONE DIRECTION LARGE ARROW sign (W1-9T) may be used instead of the ONE DIRECTION LARGE ARROW (W1-6).

ONE DIRECTION LARGE ARROW

DEVICE:  W1-6

SIZE (W x L)	48" x 24" (Conventional)	60" x 30" (Expressway & Freeway)
MOUNTING HEIGHT	7'-0"	

NOTE:

Delineator and object marker substrates and sign substrates shall be 0.080" Aluminum sign blank to conform to ASTM B-209 Alloy 6061-T6 or approved alternative.

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DELINEATOR & OBJECT MARKER MATERIAL DESCRIPTION

D & OM(1)-20

FILE: dom1-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
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REVISIONS	0915	14	047	CR 347
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	SAT	WILSON		79

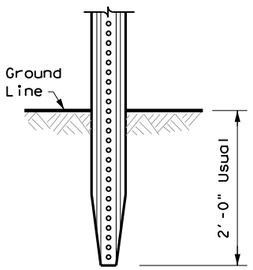
20A

DATE: 2/4/2021 7:49:49 AM
FILE: c:\pwworking\kho\pwprod\jordan.kiewit\dms9931\dom1-20.dgn

POST TYPE AND SUPPORT FOUNDATION DETAILS

WING CHANNEL (WC)

GND

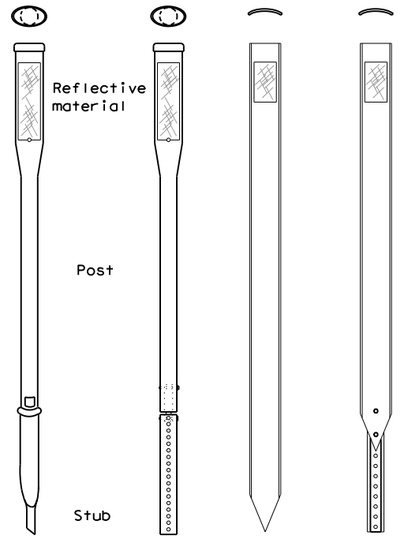


NOTES

1. Embedded Wing Channel (WC) post option may be used for Type 2 Object Markers and Delineators only.
2. 1.12 lbs/ft steel per ASTM A 1011 SS Gr. 50, or ASTM A499.

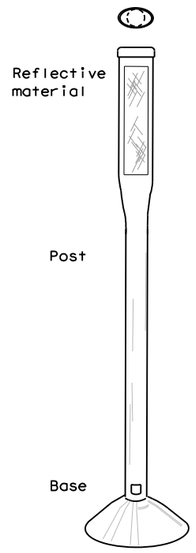
FLEXIBLE POSTS (YFLX, WFLX)

GND



EMBEDDED

SRF



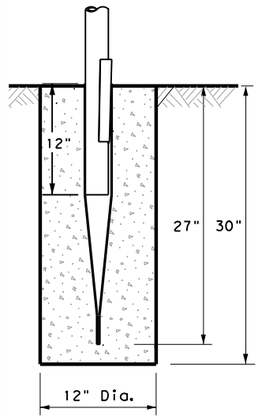
SURFACE MOUNT

NOTES

1. See "Flexible Delineator and Object Marker Posts" Material Producer List for approved devices.
2. Install per manufacturer's recommendations.
3. Post length may vary to meet field conditions.
4. When using yellow delineators with flexible posts to separate opposing direction of travel, such as centerline or median use, the flexible posts shall be yellow.

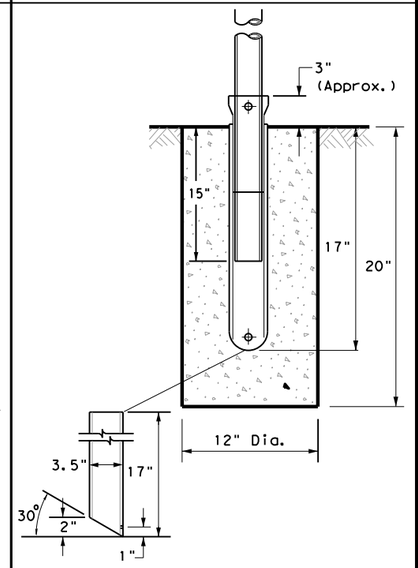
WEDGE ANCHOR SYSTEMS

WAS



STEEL

WAP



PLASTIC

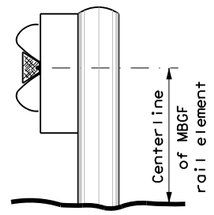
NOTE

1. Install per manufacturer's recommendations.

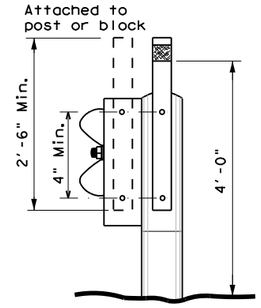
TYPE OF BARRIER MOUNTS

GUARD FENCE ATTACHMENT

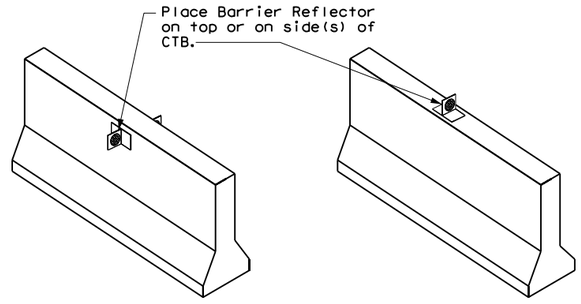
GF1



GF2



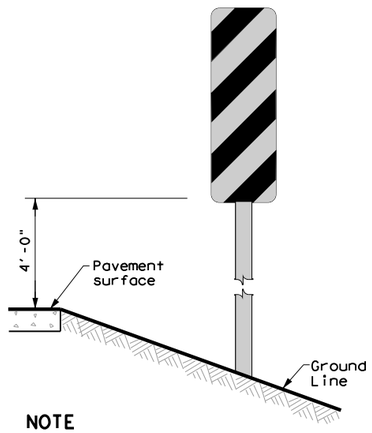
CONCRETE TRAFFIC BARRIER (CTB)



GENERAL NOTES

1. Place delineators on a section of roadway at a consistent distance from the edge of pavement.
2. Where a restriction prevents consistent placement from the pavement edge, place the affected object markers in line with the innermost edge of the obstruction.
3. When Type 2 object markers and delineators are more than 8'-0" from the edge of the pavement, it may not be possible to maintain a height of approximately 4'-0". If this is the case, place the object marker or delineator as close to the desired height as possible.
4. Install all delineators, object markers and barrier reflectors in accordance with the manufacturer's recommendation.
5. Barrier reflectors should be installed a minimum of 18 inches above the edge of the pavement surface.
6. Diagonal stripes on Type 3 object markers shall slope down toward the intended travel lane.

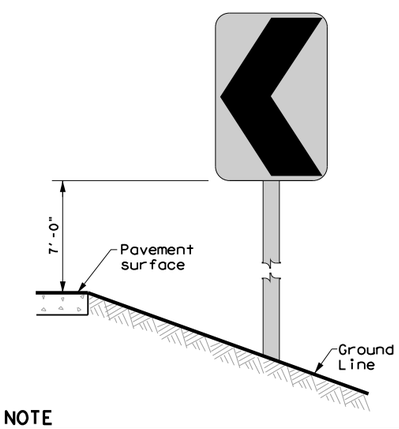
TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS



NOTE

Mounting at 4 feet to the bottom of the chevron is permitted for chevrons that will not exceed a height of 6'-6" to the top of the chevron (sizes 24" x 30" and smaller)

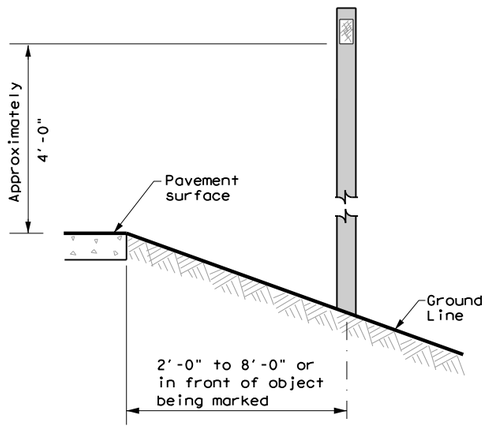
CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN



NOTE

Chevrons 30" x 36" and larger shall be mounted at a height of 7' to the bottom of the chevron. Chevron sign and ONE DIRECTION LARGE ARROW sign (W1-9T) shall be installed per SMD standard sheets and paid under item 644.

DELINEATORS AND TYPE 2 OBJECT MARKERS



See general notes 1, 2 and 3.

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DELINEATOR & OBJECT MARKER INSTALLATION

D & OM(2)-20

FILE: dom2-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
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REVISIONS	0915	14	047	CR 347
10-09 3-15	DIST	COUNTY		SHEET NO.
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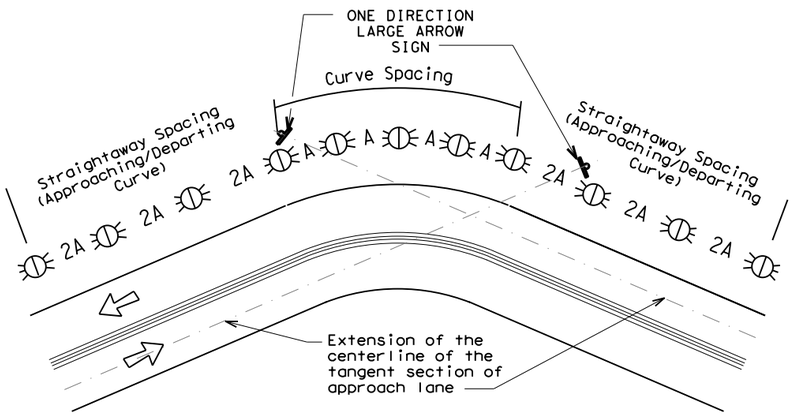
20B

MINIMUM WARNING DEVICES AT CURVES WITH ADVISORY SPEEDS

Amount by which Advisory Speed is less than Posted Speed	Curve Advisory Speed	
	Turn (30 MPH or less)	Curve (35 MPH or more)
5 MPH & 10 MPH	• RPMs	• RPMs
15 MPH & 20 MPH	• RPMs and One Direction Large Arrow sign	• RPMs and Chevrons; or • RPMs and One Direction Large Arrow sign where geometric conditions or roadside obstacles prevent the installation of chevrons.
25 MPH & more	• RPMs and Chevrons; or • RPMs and One Direction Large Arrow sign where geometric conditions or roadside obstacles prevent the installation of chevrons	• RPMs and Chevrons

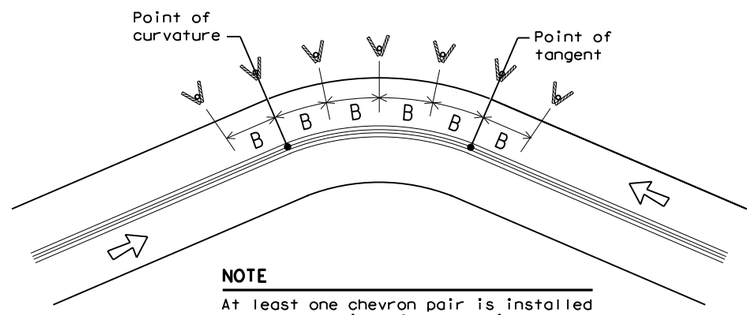
SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES



NOTE

ONE DIRECTION LARGE ARROW (W1-6) sign should be located at approximately and perpendicular to the extension of the centerline of the tangent section of approach lane.

SUGGESTED SPACING FOR CHEVRONS ON HORIZONTAL CURVES



NOTE

At least one chevron pair is installed beyond the point of tangent in tangent section.

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS KNOWN

Degree of Curve	FEET			
	Radius of Curve	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
		A	2A	B
1	5730	225	450	—
2	2865	160	320	—
3	1910	130	260	200
4	1433	110	220	160
5	1146	100	200	160
6	955	90	180	160
7	819	85	170	160
8	716	75	150	160
9	637	75	150	120
10	573	70	140	120
11	521	65	130	120
12	478	60	120	120
13	441	60	120	120
14	409	55	110	80
15	382	55	110	80
16	358	55	110	80
19	302	50	100	80
23	249	40	80	80
29	198	35	70	40
38	151	30	60	40
57	101	20	40	40

Curve delineator approach and departure spacing should include 3 delineators spaced at 2A. This spacing should be used during design preparation or when the degree of curve is known.

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS NOT KNOWN

Advisory Speed (MPH)	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
	A	2xA	B
65	130	260	200
60	110	220	160
55	100	200	160
50	85	170	160
45	75	150	120
40	70	140	120
35	60	120	120
30	55	110	80
25	50	100	80
20	40	80	80
15	35	70	40

If the degree of curve is not known, delineator spacing may be determined based on the Advisory Speed of the curve. Use the delineator curve spacing for each Advisory Speed (MPH).

DELINEATOR AND OBJECT MARKER APPLICATION AND SPACING

CONDITION	REQUIRED TREATMENT	MINIMUM SPACING
Frwy./Exp. Tangent	RPMs	See PM-series and FPM-series standard sheets
Frwy./Exp. Curve	Single delineators on right side	See delineator spacing table
Frwy/Exp.Ramp	Single delineators on at least one side of ramp (should be on outside of curves) (see Detail 3 on D&OM(4))	100 feet on ramp tangents Use delineator spacing table for ramp curves ("straightway spacing" does not apply to ramp curves)
Acceleration/Deceleration Lane	Double delineators (see Detail 3 on D&OM(4))	100 feet (See Detail 3 on D & OM (4))
Truck Escape Ramp	Single red delineators on both sides	50 feet
Bridge Rail (steel or concrete)and Metal Beam Guard Fence	Bi-Directional Delineators when undivided with one lane each direction Single Delineators when multiple lanes each direction	Equal spacing (100'max) but not less than 3 delineators
Concrete Traffic Barrier (CTB) or Steel Traffic Barrier	Barrier reflectors matching the color of the edge line	Equal spacing 100' max
Cable Barrier	Reflectors matching the color of the edge line	Every 5th cable barrier post (up to 100'max)
Guard Rail Terminus/Impact Head	Divided highway - Object marker on approach end Undivided 2-lane highways - Object marker on approach and departure end	Requires reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end See D & OM (5) and D & OM (6)
Bridges with no Approach Rail	Type 3 Object Marker (OM-3) at end of rail and 3 single delineators approaching rail	See D & OM(5)
Reduced Width Approaches to Bridge Rail	Type 2 and Type 3 Object Markers (OM-3) and 3 single delineators approaching bridge	Requires reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end See D & OM (5)
Culverts without MBGF	Type 2 Object Markers	See Detail 2 on D & OM(4)
Crossovers	Double yellow delineators and RPMs	See Detail 1 on D & OM (4)
Pavement Narrowing (lane merge) on Freeways/Expressway	Single delineators adjacent to affected lane for full length of transition	100 feet

NOTES

1. Unless indicated otherwise, the delineator or barrier reflector color shall conform to the color of the pavement edge line on the side of the road where the delineators or barrier reflectors are placed.
2. Barrier reflectors may be used to replace required delineators.
3. Single red delineators may be mounted on the back side of delineator posts for wrong way driver applications

LEGEND

	Bi-directional Delineator
	Delineator
	Sign

Texas Department of Transportation

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DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(3)-20

FILE: dom3-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
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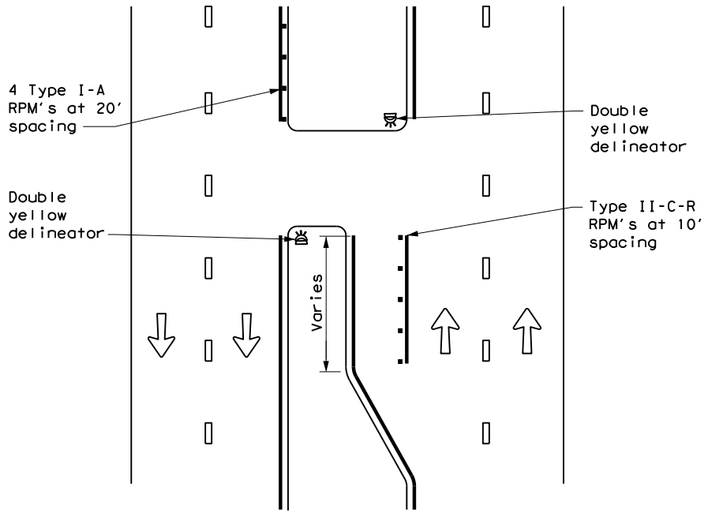
REVISIONS	0915	14	047	CR 347
3-15 8-15	DIST	COUNTY		SHEET NO.
8-15 7-20	SAT	WILSON		81

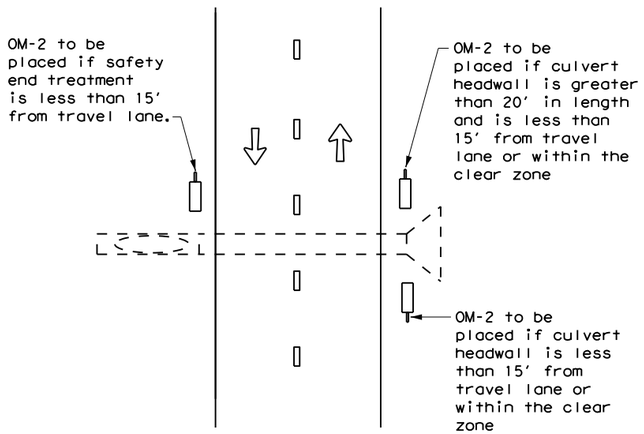
20C

CROSSOVERS



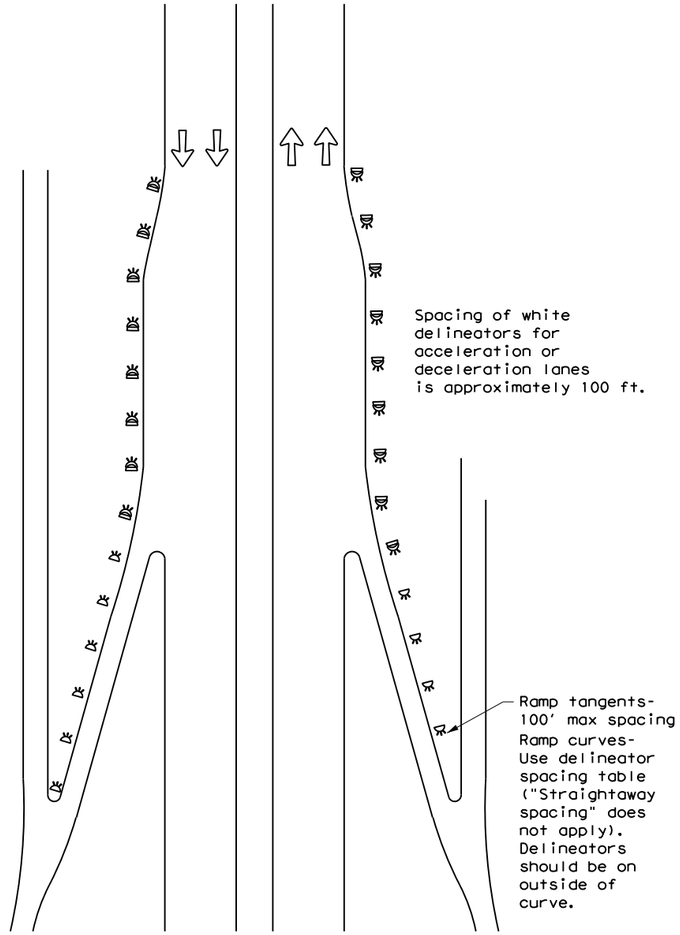
DETAIL 1

FOR CULVERTS WITHOUT MBGF



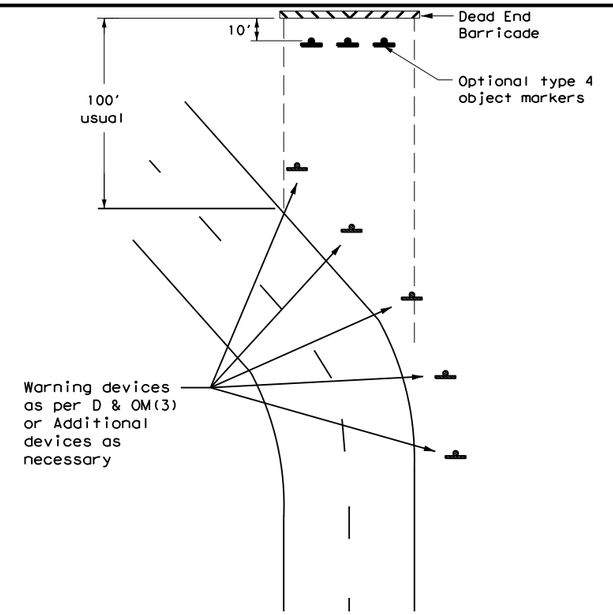
DETAIL 2

FREEWAY DELINEATION FOR RAMPS AND ACCELERATION/DECELERATION LANES



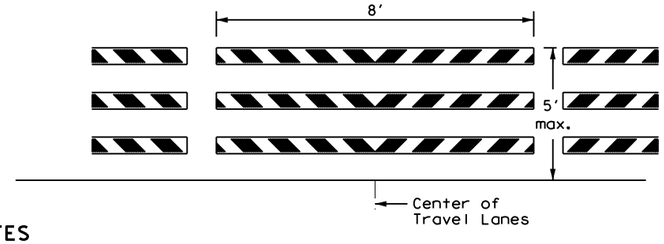
DETAIL 3

TYPICAL APPLICATION OF DEAD END BARRICADE



DETAIL 4

TYPICAL DEAD END BARRICADE INSTALLATION



NOTES

1. Barricade striping shall be red and white reflective sheeting for all permanent road closures.
2. Barricade striping is red and white sloping toward the center of the roadway.
3. Type 3 Barricade Supports should be anchored to soil or pavement as described in compliant Work Zone Traffic Control Devices List, section D.2.f and D.2.g.

DETAIL 5

LEGEND	
	Bidirectional Delineator
	Delineator
	OM-3
	Barricade
	Sign
	OM-2
	Double Delineator

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DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(4)-20

FILE: dom4-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
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3-15	DIST	COUNTY		SHEET NO.
7-20	SAT	WILSON		82

20D

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DATE: 2/4/2021 7:50:09 AM
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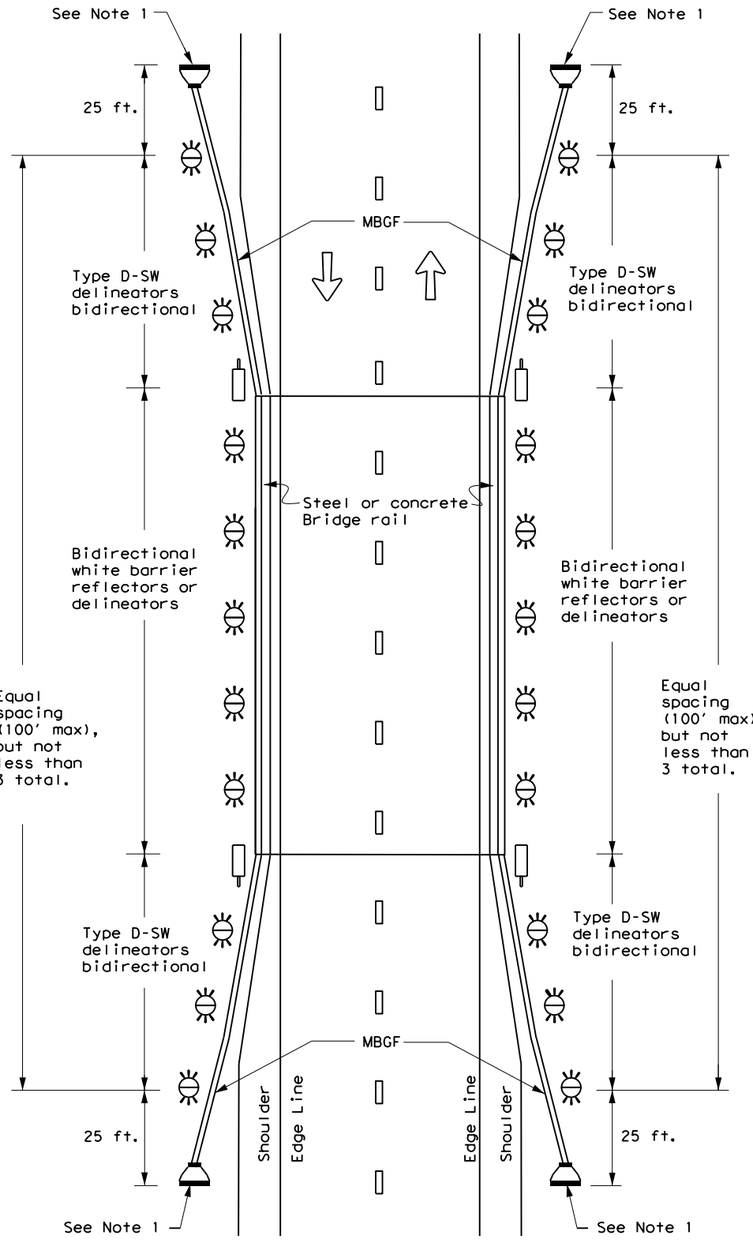
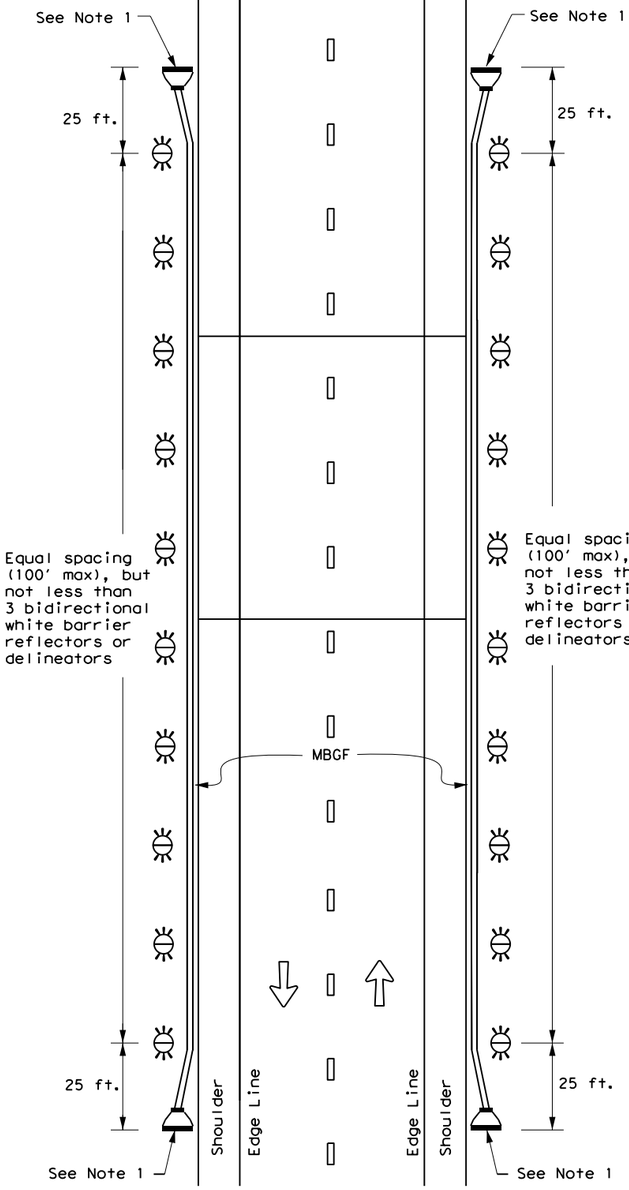
TWO-WAY, TWO LANE ROADWAY WITH REDUCED WIDTH APPROACH RAIL



NOTE:

1. Terminal ends require reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end.

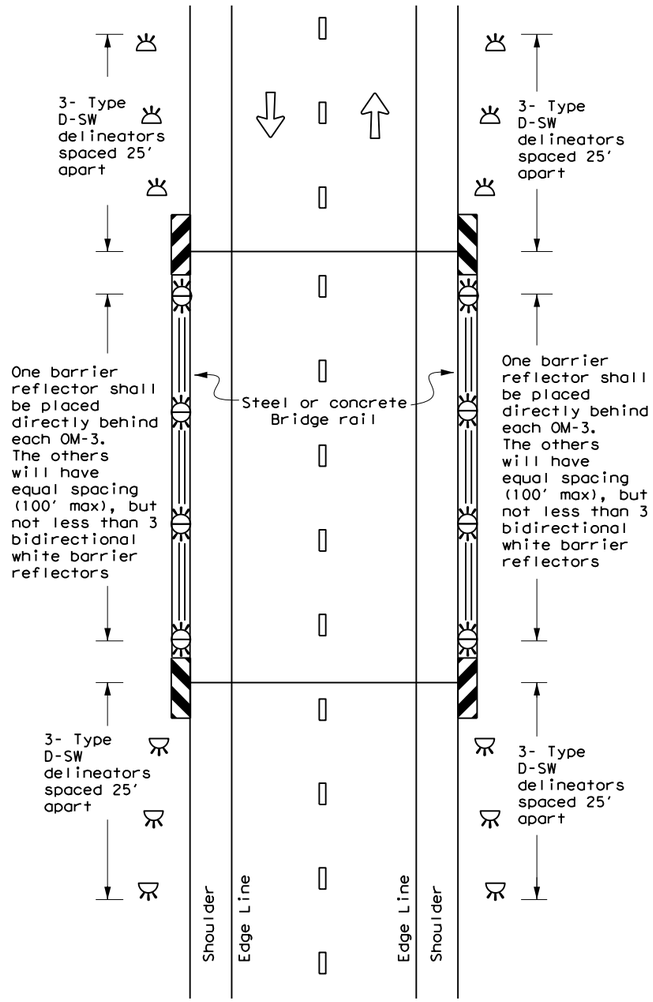
TWO-WAY, TWO LANE ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



NOTE:

1. Terminal ends require reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end.

TWO-WAY, TWO LANE ROADWAY BRIDGE WITH NO APPROACH RAIL



LEGEND

	Bidirectional Delineator
	Delineator
	OM-3
	OM-2
	Terminal End
	Traffic Flow

Texas Department of Transportation

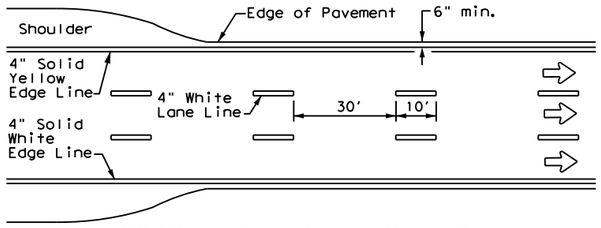
Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

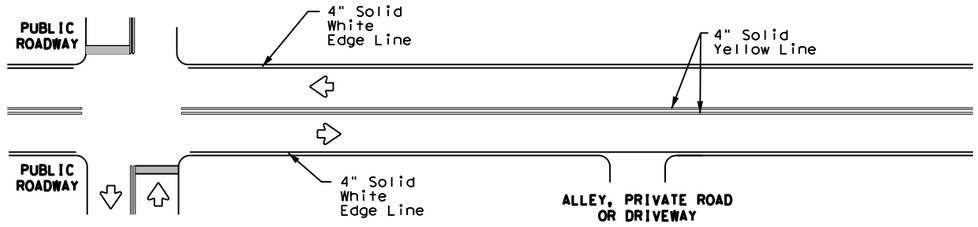
D & OM(5)-20

FILE: dom5-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT August 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	14	047	CR 347
7-20	DIST	COUNTY		SHEET NO.
	SAT	WILSON		83

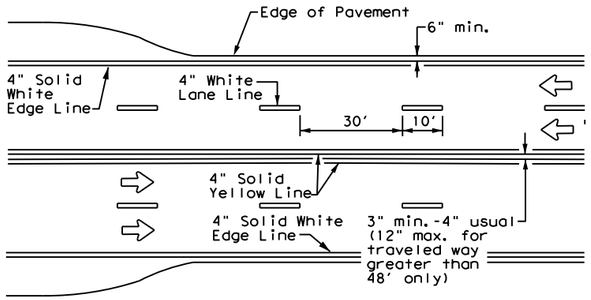
20E



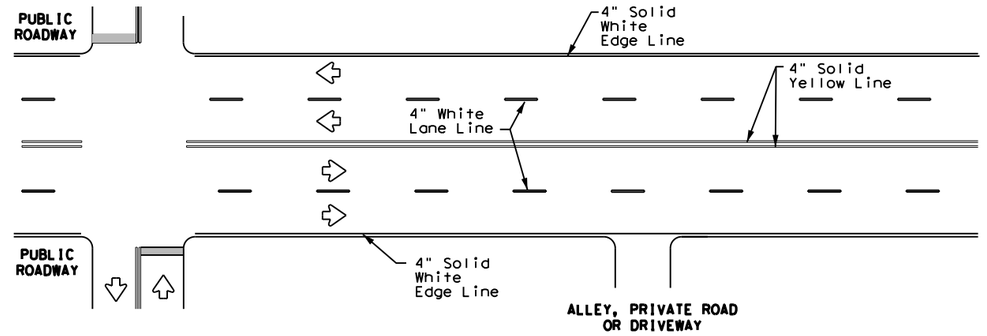
EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS



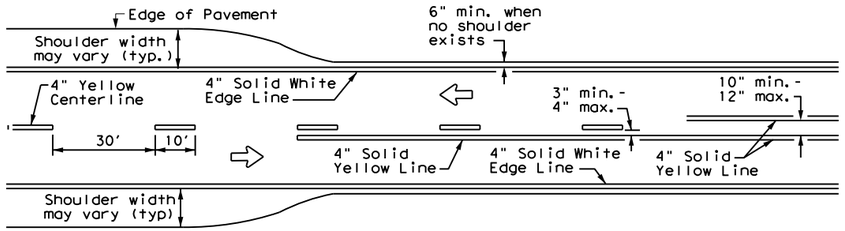
TYPICAL TWO-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS



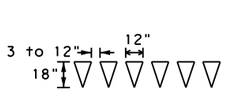
CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



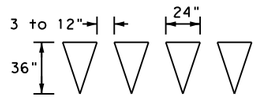
TYPICAL MULTI-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS



TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS

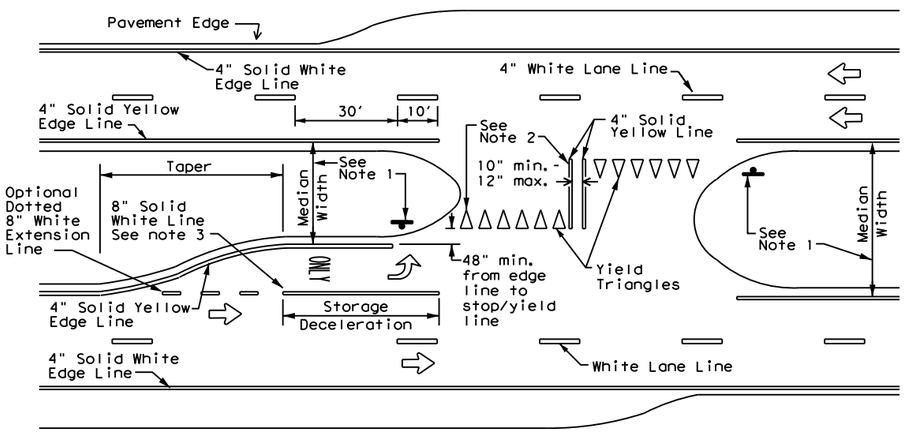


For posted speed on road being marked equal to or less than 40 MPH.



For posted speed on road being marked equal to or greater than 45 MPH.

YIELD LINES



FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

1. Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections. Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling width to determine if signs are required. Yield signs are the typical intersection control. Stop signs are optional as determined by the Engineer.

2. Install median striping (double yellow centerlines and stop bars/yield triangles) when a 50' or greater median centerline can be placed. Stop bars shall only be used with stop signs. Yield traingles shall only be used with yield signs.

3. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

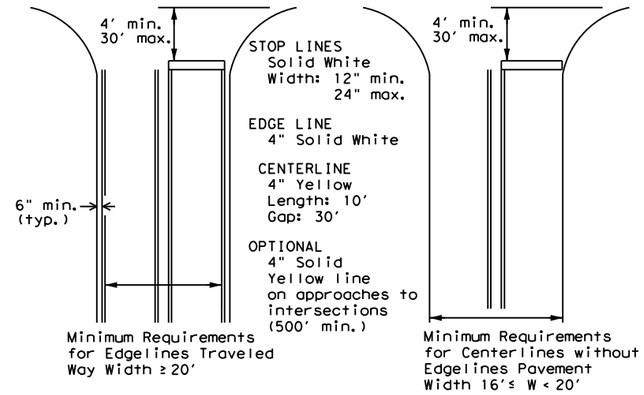
GENERAL NOTES

1. Edgeline striping shall be as shown in the plans or as directed by the Engineer. The edgeline should not be placed less less than 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edgelines are not required in curb and gutter sections of roadways.

2. The traveled way includes only that portion of the roadway used for vehicular travel. It does not include the parking lanes, sidewalks, berms and shoulders. The traveled ways shall be measured from the inside of edgeline to the inside of edgeline of a two lane roadway.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



GUIDE FOR PLACEMENT OF STOP LINES, EDGE LINE & CENTERLINE

Based on Traveled Way and Pavement Widths for Undivided Highways

Texas Department of Transportation

Traffic Safety Division Standard

TYPICAL STANDARD PAVEMENT MARKINGS

PM(1)-20

FILE: pm1-20.dgn	DN:	CK:	DW:	CK:
© TxDOT November 1978	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03	0915	14	047	CR 347
5-00 2-12	DIST	COUNTY		SHEET NO.
8-00 6-20	SAT	WILSON		84

22A

DATE: 2/4/2021 7:50:13 AM
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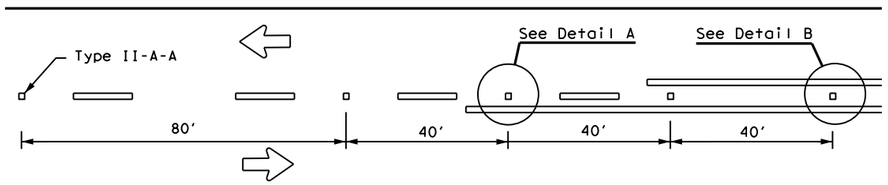
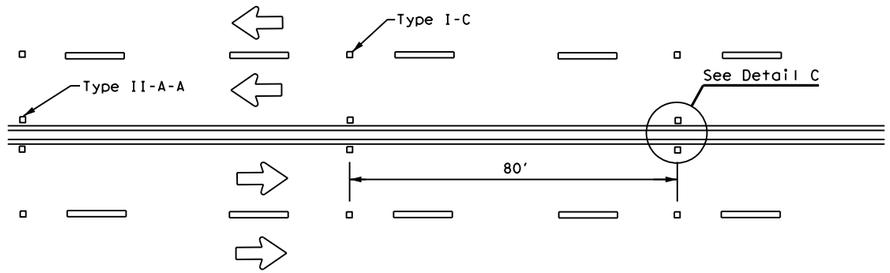
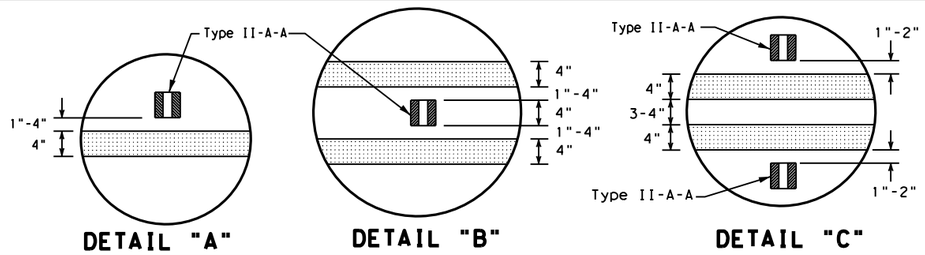
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE



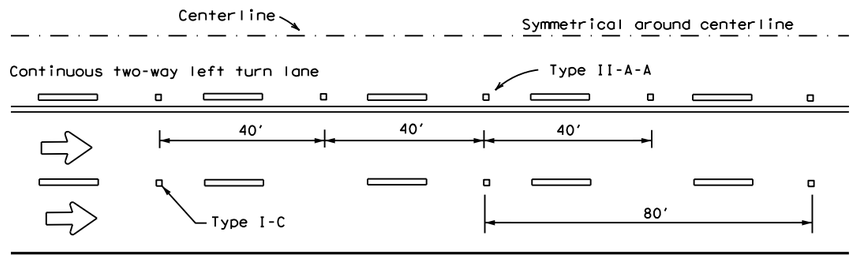
CENTERLINE FOR ALL TWO LANE ROADWAYS



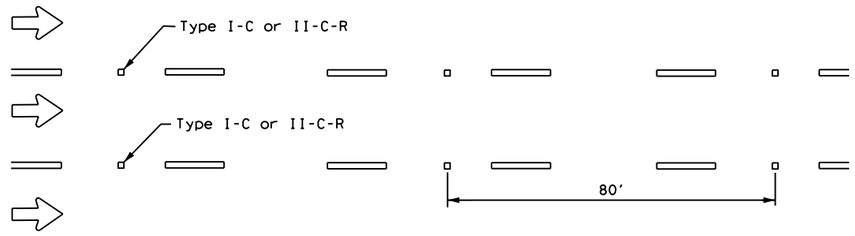
CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY HIGHWAYS



DETAIL "A" **DETAIL "B"** **DETAIL "C"**



CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE

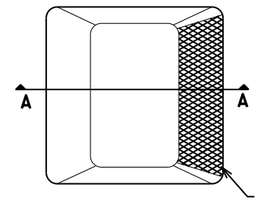


LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

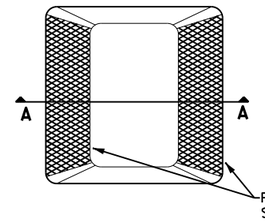
Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

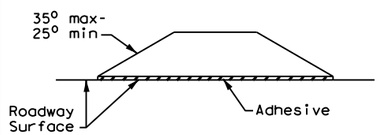
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)

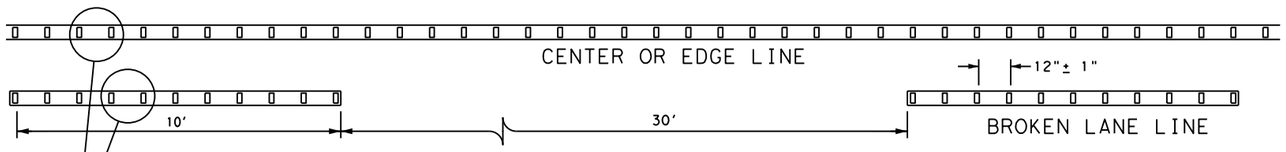


Type II (Top View)



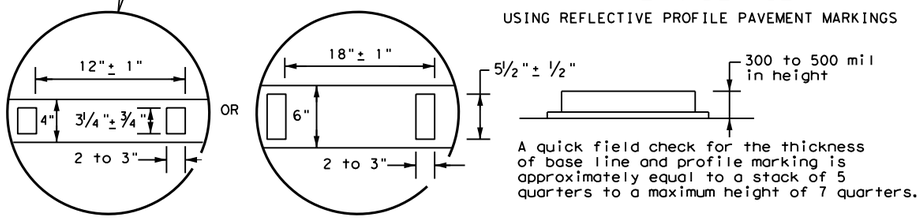
SECTION A

RAISED PAVEMENT MARKERS



REFLECTORIZED PROFILE PATTERN DETAIL

USING REFLECTIVE PROFILE PAVEMENT MARKINGS



4" EDGE LINE, CENTER LINE OR LANE LINE

OPTIONAL 6" EDGE LINE, CENTER LINE OR LANE LINE

A quick field check for the thickness of base line and profile marking is approximately equal to a stack of 5 quarters to a maximum height of 7 quarters.

NOTE

Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

GENERAL NOTES

1. All raised pavement markers placed in broken lines shall be placed in line with and midway between the stripes.
2. On concrete pavements the raised pavement markers should be placed to one side of the longitudinal joints.

Texas Department of Transportation

Traffic Safety Division Standard

POSITION GUIDANCE USING RAISED MARKERS RELECTORIZED PROFILE MARKINGS PM(2)-20

FILE: pm2-20.dgn	DN:	CK:	DW:	CK:
©TxDOT April 1977	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-92 2-10	0915	14	047	CR 347
5-00 2-12	DIST	COUNTY		SHEET NO.
8-00 6-20	SAT	WILSON		85

22B

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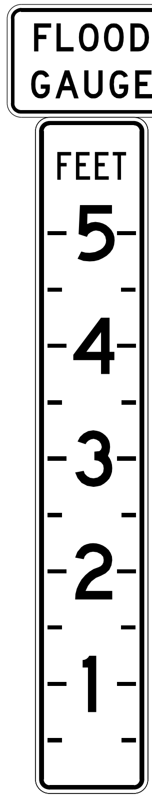
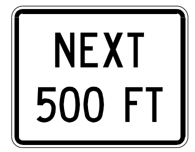


W8-19aTP
18x12

W8-19
12x72

W8-18
36x36

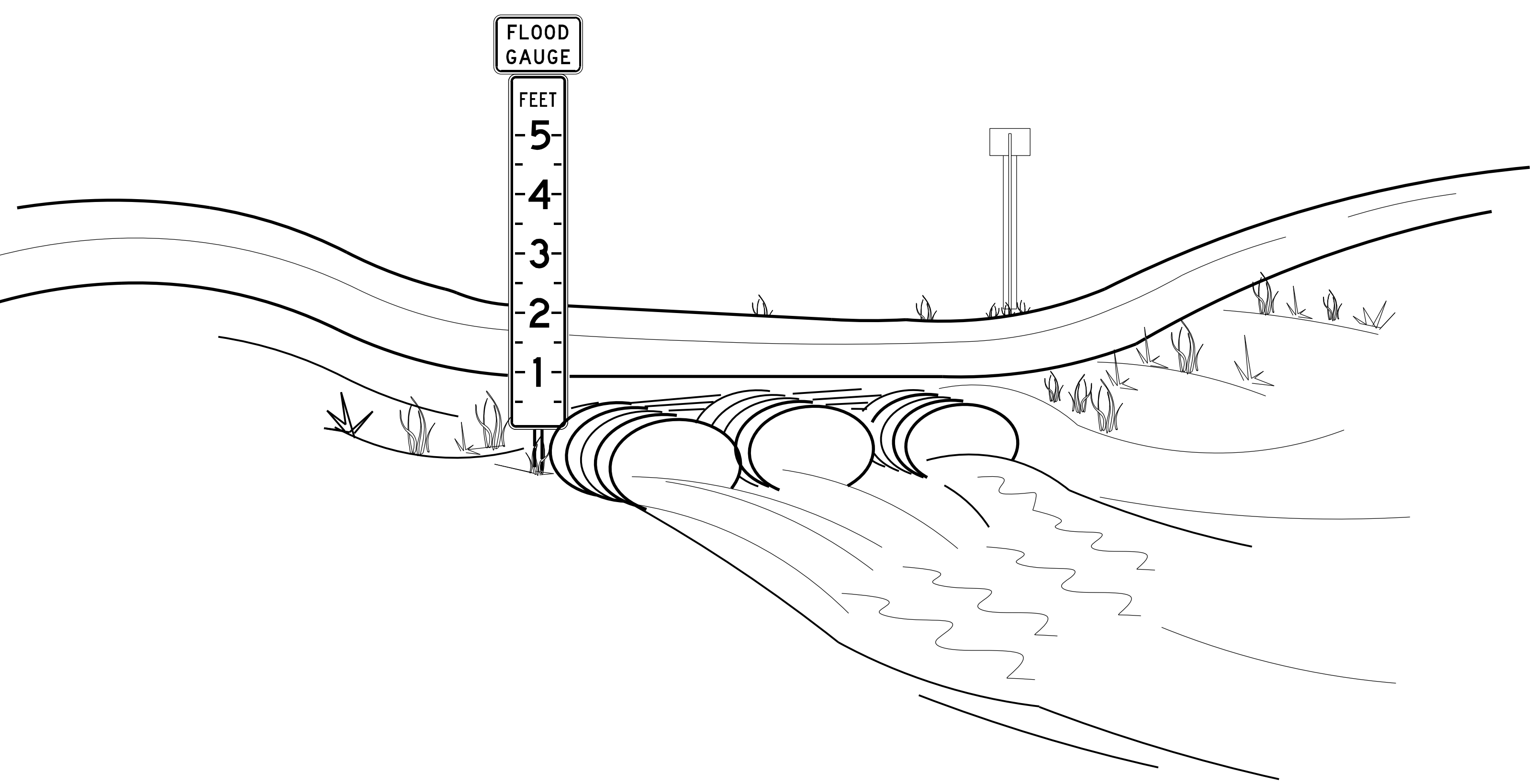


W16-4P
18x12

DEPARTMENTAL MATERIAL SPECIFICATIONS	
ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300

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

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	FLUORESCENT YELLOW	TYPE B_{FL} & C_{FL} SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM



GENERAL NOTES

1. Each flood gauge assembly shall consist of the FLOOD GAUGE sign (W8-19aTP) and DEPTH MARKER (W8-19). Two assemblies should be erected, one along each approach, at the low water crossing location on the right side of the roadway.

2. The flood gauge assembly should be of sufficient height to register depth of water to a minimum of five (5) Feet above the lowest travel lane pavement surface. Actual height of depth marker required for each location is shown elsewhere in the plans, but should not be in excess of ten (10) feet.

3. The flood gauge assembly should be located not more than ten (10) feet from the pavement edge. Consideration should be given to placement with regard to the following factors:

   a) Accurate register of depth of water over roadway.

   b) Daytime and nighttime visibility of the flood gauge assembly along roadway approaches.

   c) Outside the main flow of water during both normal and flood conditions.

4. In areas where flood conditions would likely obscure the flood gauge assembly, a second pair of gauges, one on each approach, registering depths greater than shown on the first flood gauge assembly, is recommended.

5. The Engineer will approve all flood gauge assembly locations before installation.

6. The alphabets and lateral spacing between letters and numerals shall conform with the Texas "Manual on Uniform Traffic Control Devices for Streets and Highways", latest edition, and any approved changes thereto. Lateral Spacing of text shall provide a balanced appearance. All materials shall conform to Department Specifications.

7. FLOOD GAUGE signs and depth marker shall be mounted in accordance with Standard SMD (series). The recommended mounting is three (3) inch fiberglass reinforced pipe (FRP) pipe as shown on Standard SMD(GEN) and SMD(FRP). ROAD MAY FLOOD sign (W8-18) along the approach roadway may be required in areas where rainfall causes frequent roadway flooding.

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.
http://www.txdot.gov/

DATE: 7:50:27 AM
FILE: ...jordan.kiewit\dms9993\fga-15.dgn

Texas Department of Transportation
Traffic Operations Division Standard

FLOOD GAUGE ASSEMBLY

FGA-15

FILE: fga-15.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT January 1997	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	14	047	CR 347
3-15	DIST		COUNTY	SHEET NO.
	SAT		WILSON	86

SIGN SUPPORT DESCRIPTIVE CODES

(Descriptive Codes correspond to project estimate and quantities sheets)

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

Post Type

FRP = Fiberglass Reinforced Plastic Pipe (see SMD(FRP))
TWT = Thin-Walled Tubing (see SMD(TWT))
10BWG = 10 BWG Tubing (see SMD(SLIP-1) to (SLIP-3))
S80 = Schedule 80 Pipe (see SMD(SLIP-1) to (SLIP-3))

Number of Posts (1 or 2)

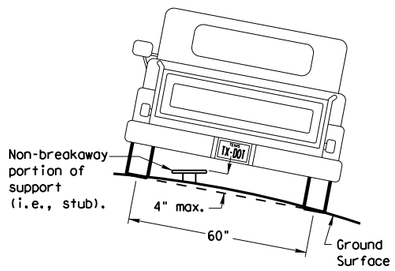
Anchor Type

UA = Universal Anchor - Concreted (see SMD(FRP) and (TWT))
UB = Universal Anchor - Bolted down (see SMD(FRP) and (TWT))
WS = Wedge Anchor Steel - (see SMD(TWT))
WP = Wedge Anchor Plastic (see SMD(TWT))
SA = Slipbase - Concreted (see SMD(SLIP-1) to (SLIP-3))
SB = Slipbase - Bolted Down (see SMD(SLIP-1) to (SLIP-3))

Sign Mounting Designation

P = Prefab. "Plain" (see SMD(SLIP-1) to (SLIP-3), (TWT), (FRP))
T = Prefab. "T" (see SMD(SLIP-1) to (SLIP-3), (TWT))
U = Prefab. "U" (see SMD(SLIP-1) to (SLIP-3))
IF REQUIRED
1EXT or 2EXT = Number of Extensions (see SMD(SLIP-1) to (SLIP-3), (TWT))
BM = Extruded Wind Beam (see SMD(SLIP-1) to (SLIP-3))
WC = 1.12 #/ft Wing Channel (see SMD(SLIP-1) to (SLIP-3))
EXAL = Extruded Aluminum Sign Panels (see SMD(SLIP-1) to (SLIP-3))

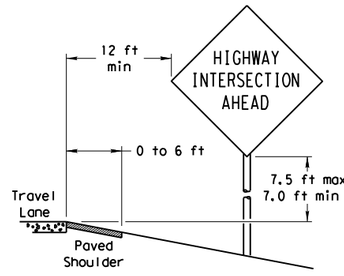
REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



To avoid vehicle undercarriage snagging, any substantial remains of a breakaway support, when it is broken away, should not project more than 4 inches above a 60-inch chord (i.e., typical space between wheel paths).

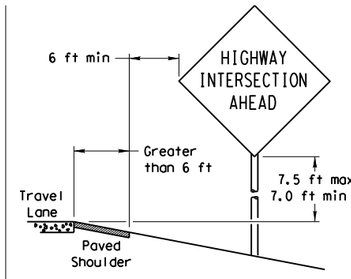
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

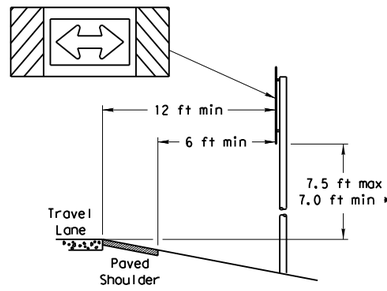
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



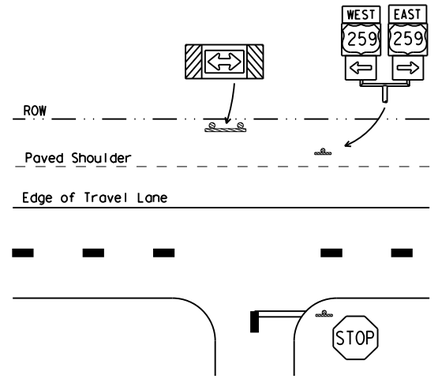
GREATER THAN 6 FT. WIDE

When the shoulder is greater than 6 ft in width, the sign must be placed at least 6 ft. from the edge of the shoulder.

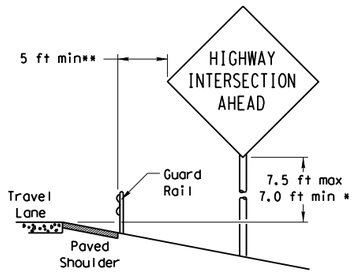
T-INTERSECTION



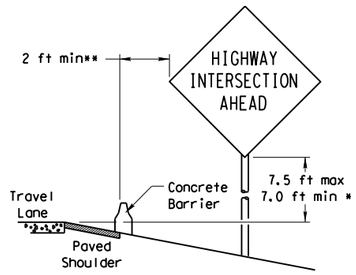
When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.



BEHIND BARRIER



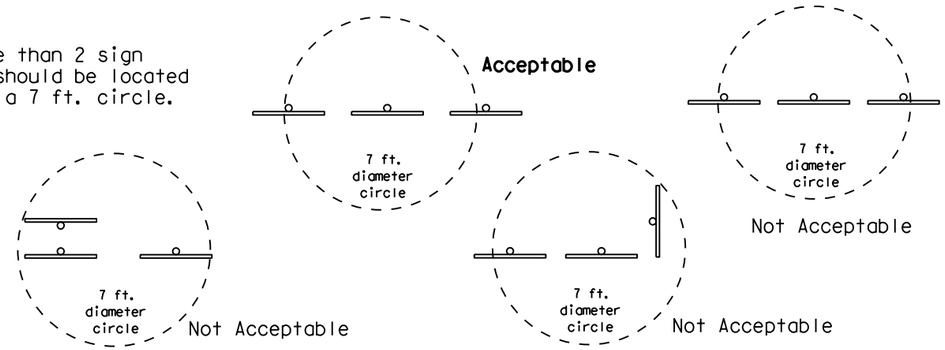
BEHIND GUARDRAIL



BEHIND CONCRETE BARRIER

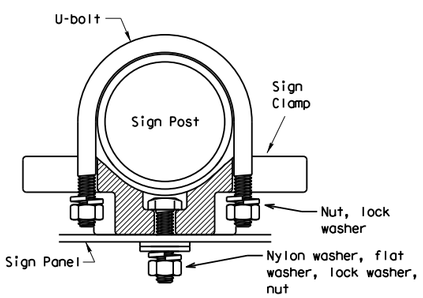
****Sign clearance based on distance required for proper guard rail or concrete barrier performance.**

No more than 2 sign posts should be located within a 7 ft. circle.



TYPICAL SIGN ATTACHMENT DETAIL

Single Signs

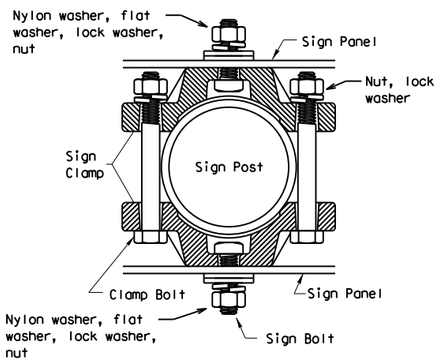


Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

When two sign clamps are used to mount signs back-to-back, use a 5/16-18 UNC galvanized hex head per ASTM A307 with nut and helical-spring lock washer. The approximate bolt lengths for various post sizes and sign clamp types are given in the table at right. The bolt length may need to be adjusted depending upon field conditions.

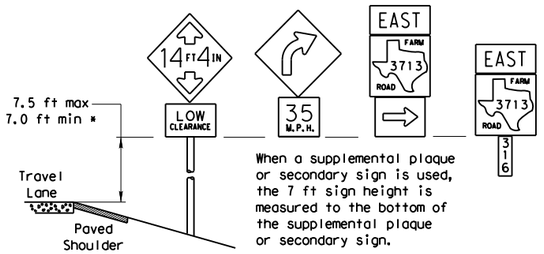
Sign clamps may be either the specific size clamp or the universal clamp.

Back-to-Back Signs



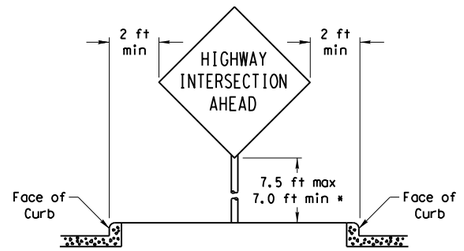
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



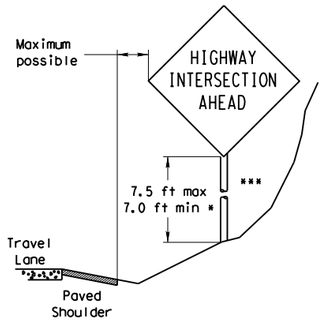
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

CURB & GUTTER OR RAISED ISLAND



RESTRICTED RIGHT-OF-WAY

(When 6 ft min. is not possible.)



Right-of-way restrictions may be created by rocks, water, vegetation, forest, buildings, a narrow island, or other factors.

In situations where a lateral restriction prevents the minimum horizontal clearance from the edge of the travel lane, signs should be placed as far from the travel lane as practical.

*** Post may be shorter if protected by guardrail or if Engineer determines the post could not be hit due to extreme slope.

* Signs shall be mounted using the following condition that results in the greatest sign elevation:

(1) a minimum of 7 to a maximum of 7.5 feet above the edge of the travel lane or

(2) a minimum of 7 to a maximum of 7.5 feet above the grade at the base of the support when sign is installed on the backslope.

The maximum values may be increased when directed by the Engineer.

See the Traffic Operations Division website for detailed drawings of sign clamps, Triangular Slipbase System components and Wedge Anchor System components.

The website address is:
http://www.txdot.gov/publications/traffic.htm

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

SMD(GEN)-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS 9-08

CONT	SECT	JOB	HIGHWAY
0915	14	047	CR 347
DIST	COUNTY		SHEET NO.
SAT	WILSON		87

DATE: 2/4/2021 7:50:32 AM
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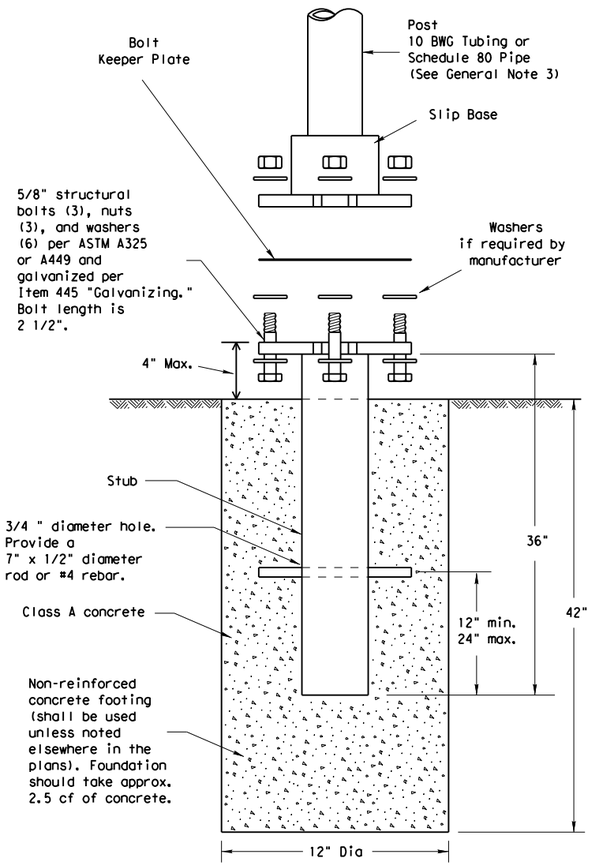
TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS



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

NOTE

There are various devices approved for the Triangular Slipbase System. Please reference the Material Producer List for approved slip base systems. http://www.txdot.gov/business/producer_list.htm The devices shall be installed per manufacturers' recommendations. Installation procedures shall be provided to the Engineer by Contractor.

GENERAL NOTES:

1. Slip base shall be permanently marked to indicate manufacturer. Method, design, and location of marking are subject to approval of the TxDOT Traffic Standards Engineer.
2. Material used as post with this system shall conform to the following specifications:
   10 BWG Tubing (2.875" outside diameter)
   - 0.134" nominal wall thickness
   - Seamless or electric-resistance welded steel tubing or pipe
   - Steel shall be HSLAS Gr 55 per ASTM A1011 or ASTM A1008
   - Other steels may be used if they meet the following:
     - 55,000 PSI minimum yield strength
     - 70,000 PSI minimum tensile strength
     - 20% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of 0.122" to 0.138"
   - Outside diameter (uncoated) shall be within the range of 2.867" to 2.883"
   - Galvanization per ASTM A123 or ASTM A653 G210. For precoated steel tubing (ASTM A653), recoat tube outside diameter weld seam by metallizing with zinc wire per ASTM B833.

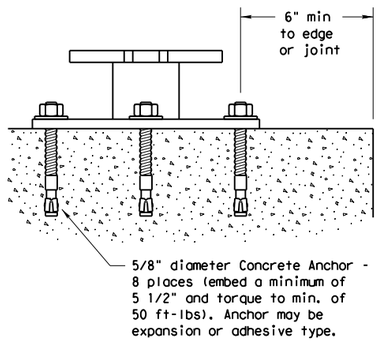
   Schedule 80 Pipe (2.875" outside diameter)
   - 0.276" nominal wall thickness
   - Steel tubing per ASTM A500 Gr C
   - Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the following:
     - 46,000 PSI minimum yield strength
     - 62,000 PSI minimum tensile strength
     - 21% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of 0.248" to 0.304"
   - Outside diameter (uncoated) shall be within the range of 2.855" to 2.895"
   - Galvanization per ASTM A123
3. See the Traffic Operations Division website for detailed drawings of sign clamps and Texas Universal Triangular Slipbase System components. The website address is: http://www.txdot.gov/publications/traffic.htm
4. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.

ASSEMBLY PROCEDURE

Foundation
1. Prepare 12-inch diameter by 42-inch deep hole. If solid rock is encountered, the depth of the foundation may be reduced such that it is embedded a minimum of 18 inches into the solid rock.
2. The Engineer may permit batches of concrete less than 2 cubic yards to be mixed with a portable, motor-driven concrete mixer. For small placements less than 0.5 cubic yards, hand mixing in a suitable container may be allowed by Engineer. Concrete shall be Class A.
3. Push the pipe end of the slip base stub into the center of the concrete. Rotate the stub back and forth while pushing it down into the concrete to assure good contact between the concrete and stub. Continue to work the stub into the concrete until it is between 2 to 4 inches above the ground.
4. Plumb the stub. Allow a minimum of 4 days to set, unless otherwise directed by the Engineer.
5. The triangular slipbase system is multidirectional and is designed to release when struck from any direction.

Support
1. Cut support so that the bottom of the sign will be 7 to 7.5 feet above the edge of the travelway (i.e., edge of the closest lane) when slip plate is below the edge of pavement or 7 to 7.5 feet above slip plate when the slip plate is above the edge of the travelway. The cut shall be plumb and straight.
2. Attach sign to support using connections shown. When multiple signs are installed on the same support, ensure the minimum clearance between each sign is maintained. See SMD(SLIP-2) for clearances based on sign types.

CONCRETE ANCHOR



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

Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. Heavy hex nut per ASTM A563, and hardened washer per ASTM F436. The stud bolt shall have a minimum yield and ultimate tensile strength of 50 and 75 KSI, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Adhesive type anchors shall have stud bolts installed with Type III epoxy per DMS-6100, "Epoxies and Adhesives." Adhesive anchors may be loaded after adequate epoxy cure time per the manufacturer's recommendations. Top of bolt shall extend at least flush with top of the nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 5 1/2" minimum embedment, shall have a minimum allowable tension and shear of 3900 and 3100 psi, respectively.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-1)-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS
9-08

CONT	SECT	JOB	HIGHWAY
0915	14	047	CR 347

DIST	COUNTY	SHEET NO.
SAT	WILSON	88

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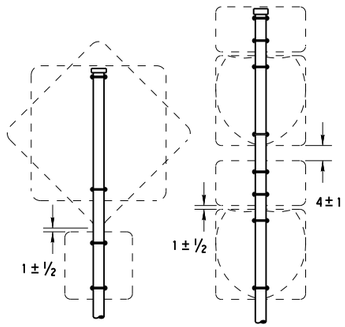
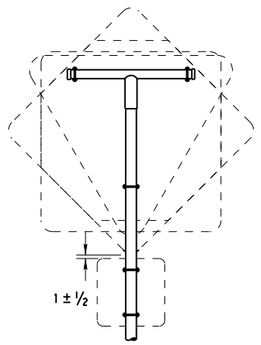


SM RD SGN ASSM TY XXXXX(1)XX(P)



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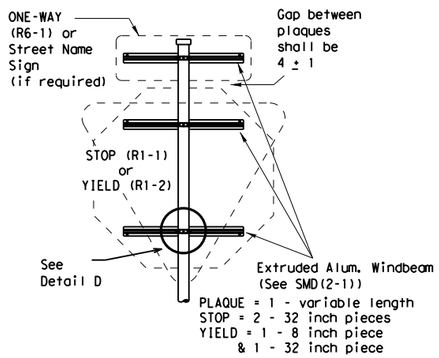
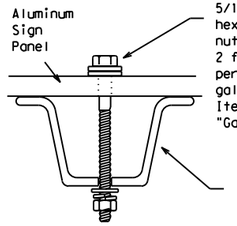
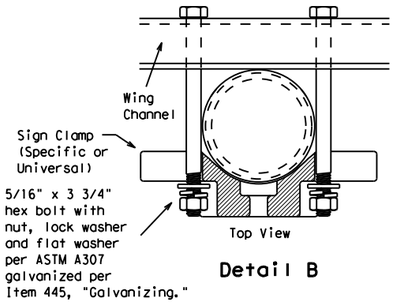


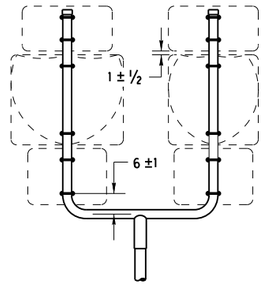
SM RD SGN ASSM TY XXXXX(1)XX(P-BM)



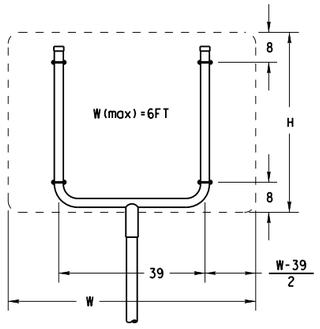
Detail A



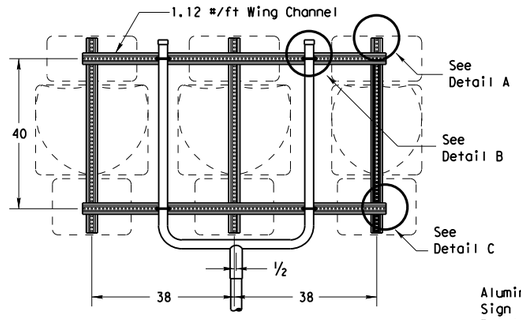
Detail B



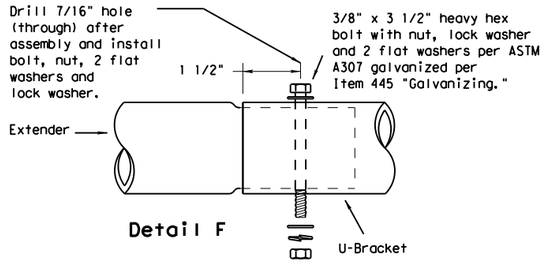
SM RD SGN ASSM TY XXXXX(1)XX(U)



SM RD SGN ASSM TY XXXXX(1)XX(U)

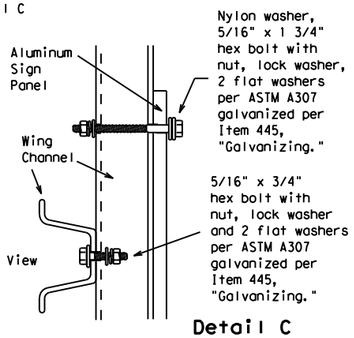


SM RD SGN ASSM TY XXXXX(1)XX(U-WC)
(See Note 11)

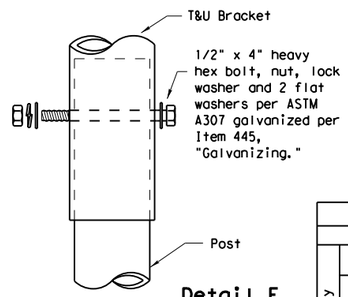


Detail F

Splices shall only be allowed behind the sign substrate.



Detail C



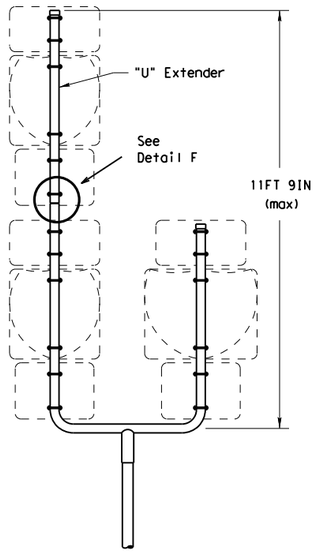
Detail E

GENERAL NOTES:

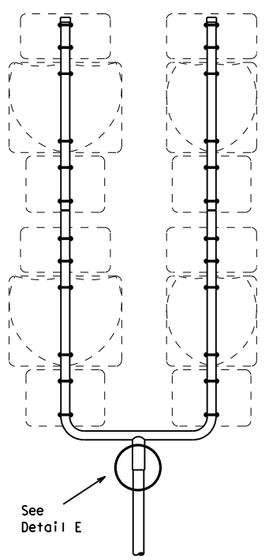
1.

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

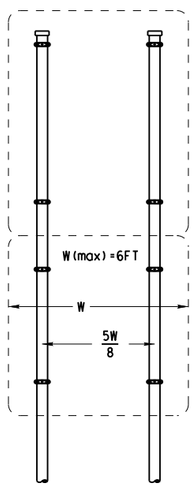
2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Additional route markers may be added vertically, provided the total sign area does not exceed the maximum allowable amount per Note 1.
11. Additional sign clamp required on the "T-bracket" post for 24 inch height signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.
13. Sign blanks shall be the sizes and shapes shown on the plans.



SM RD SGN ASSM TY S80(1)XX(U-1EXT)

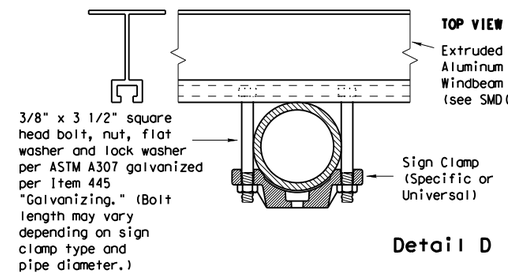


SM RD SGN ASSM TY S80(1)XX(U-2EXT)

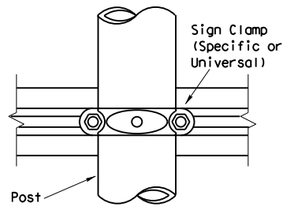


SM RD SGN ASSYM TY XXXXX(2)XX(P)

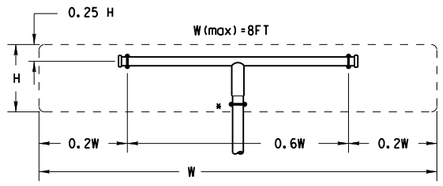
SIDE VIEW



Detail D



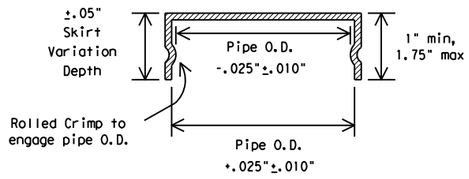
REQUIRED SUPPORT		
	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)



All dimensions are in english unless detailed otherwise.

SM RD SGN ASSM TY XXXXX(1)XX(T)
(* - See Note 12)

FRICTION CAP DETAIL



Friction caps may be manufactured from hot rolled or cold rolled steel sheets. The minimum sheet metal thickness shall be 24 gauge for all cap sizes.

The rim edges shall be reasonably straight and smooth. Caps shall be sized and formed in such a manner as to produce a drive-on friction fit and have no tendency to rock when seated on the pipe. The depth shall be sufficient to give positive protection against entrance of rainwater. They shall be free of sharp creases or indentations and show no evidence of metal fracture.

Caps shall have an electrodeposited coating of zinc in accordance with the requirements of ASTM B633 Class FE/ZN 8.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-2)-08

DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT

9-08 REVISIONS

CONT	SECT	JOB	HIGHWAY
0915	14	047	CR 347

DIST	COUNTY	SHEET NO.
SAT	WILSON	89

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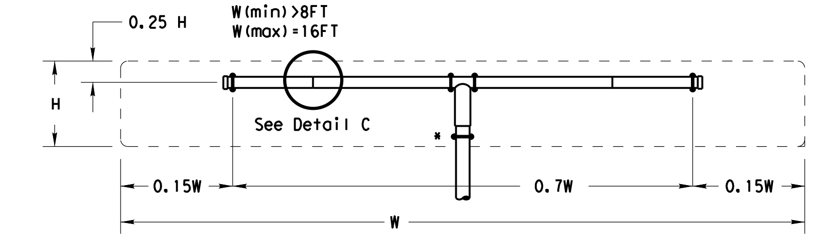
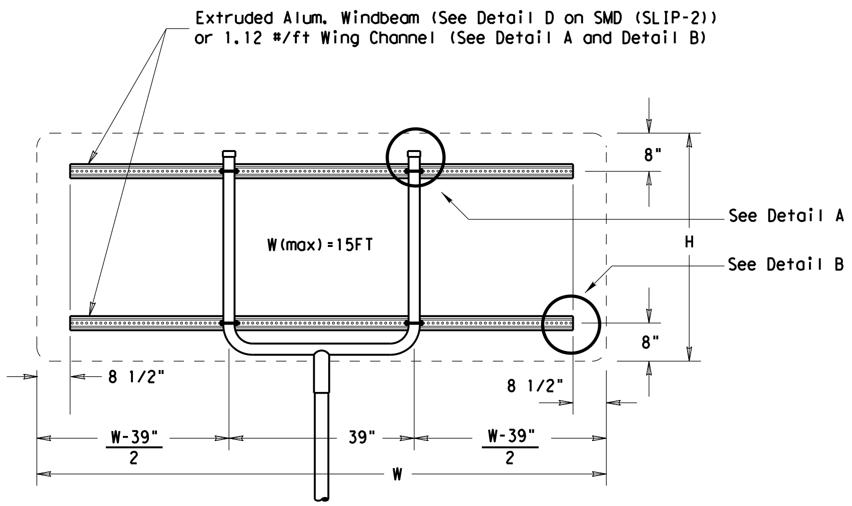
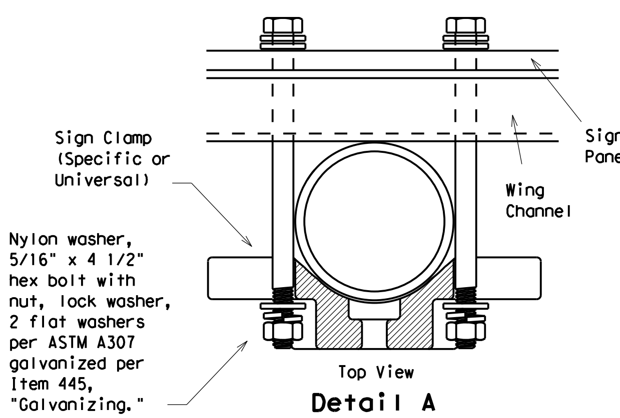


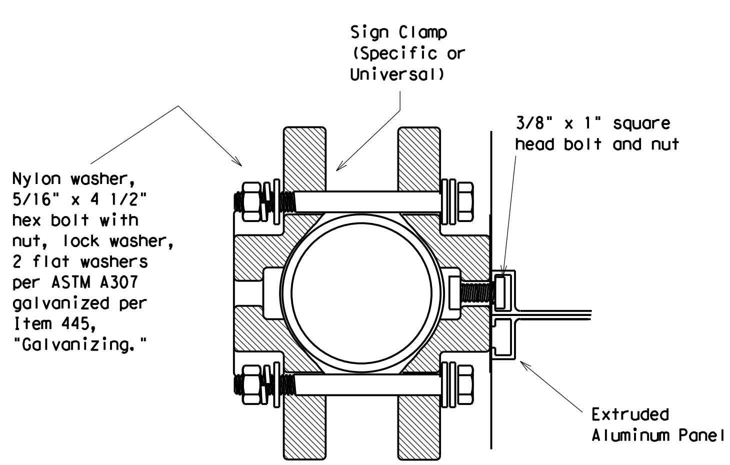
SM RD SGN ASSM TY XXXXX(1)XX(T-2EXT)
(* - See Note 12)



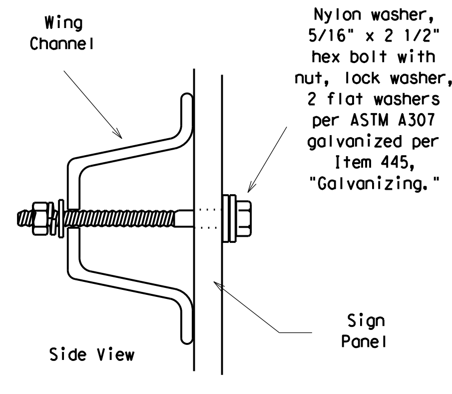
SM RD SGN ASSM TY XXXXX(1)XX(U-XX)



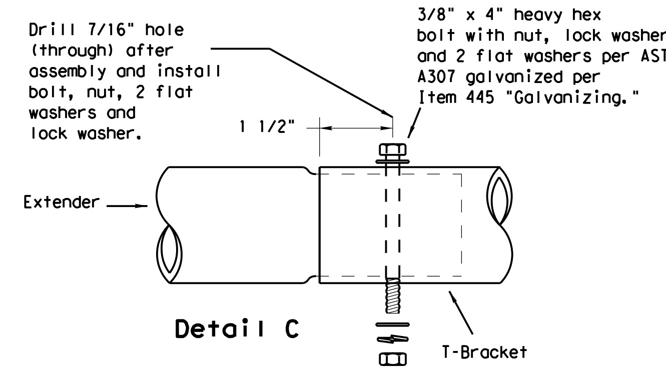
Detail A



Detail D
EXTRUDED ALUMINUM SIGN WITH T BRACKET

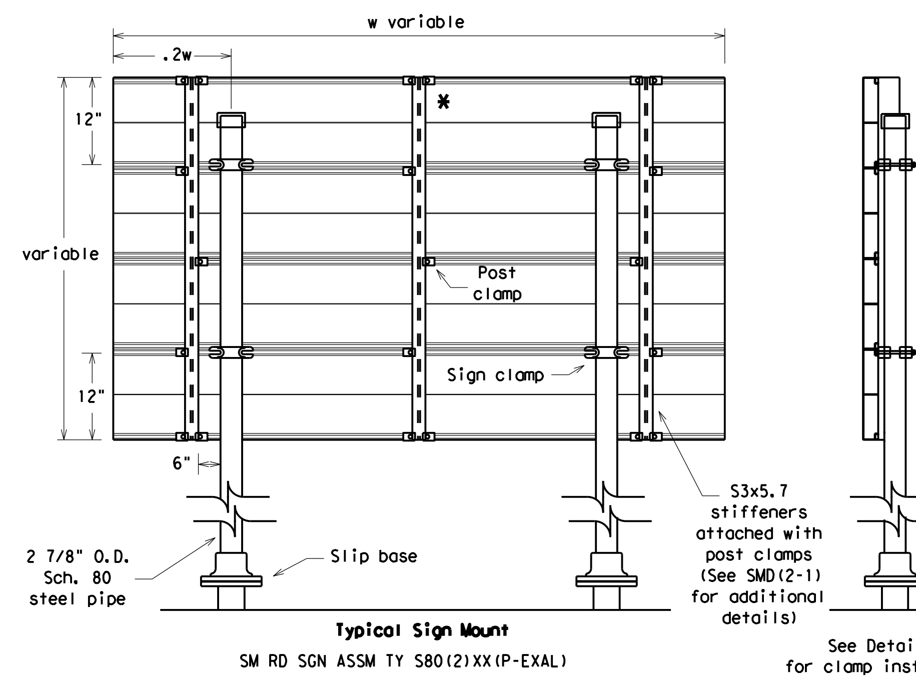


Detail B



Detail C

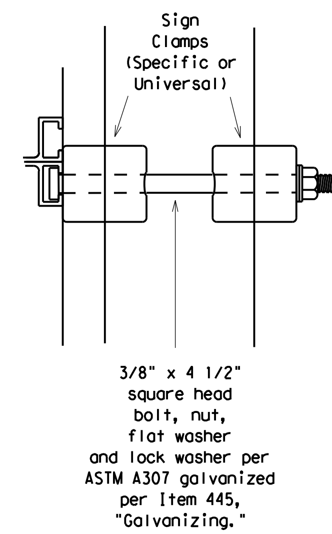
Splices shall only be allowed behind the sign substrate.



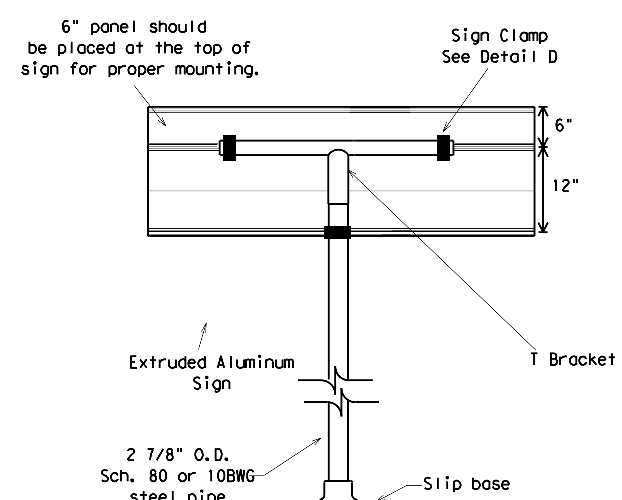
Typical Sign Mount

SM RD SGN ASSM TY S80(2)XX(P-EXAL)

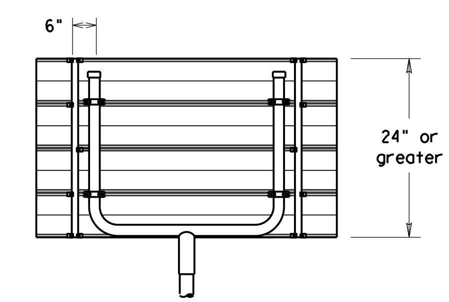
* Additional stiffener placed at approximate center of signs when sign width is greater than 10'.



Detail E



Extruded Aluminum Sign
With T Bracket



Use Extruded Alum. Windbeam as stiffeners
See SMD (2-1) for additional details
See Detail E
for clamp installation

GENERAL NOTES:

1.

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Sign blanks shall be the sizes and shapes shown on the plans.
11. Additional sign clamp required on the "T-bracket" post for 24 inch high signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.

REQUIRED SUPPORT

	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
Regulatory	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
Regulatory	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
Regulatory	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
Regulatory	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
Warning	48x60-inch signs	TY S80(1)XX(T)
Warning	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
Warning	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
Warning	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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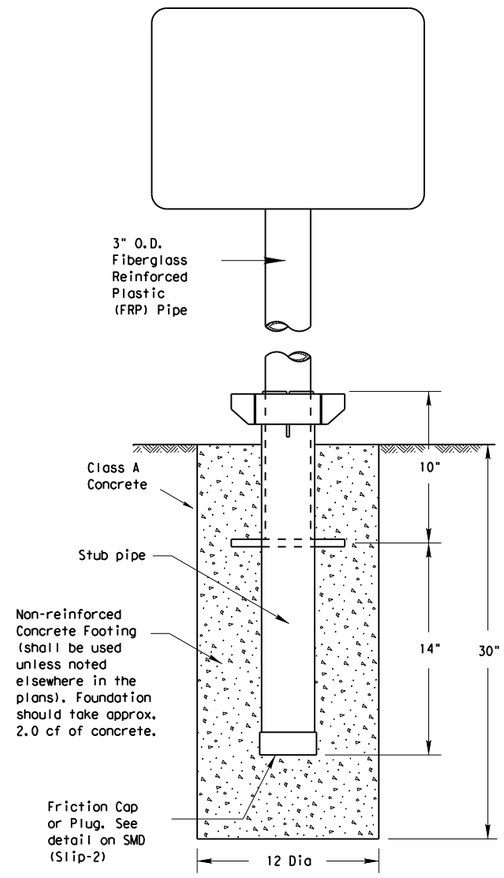
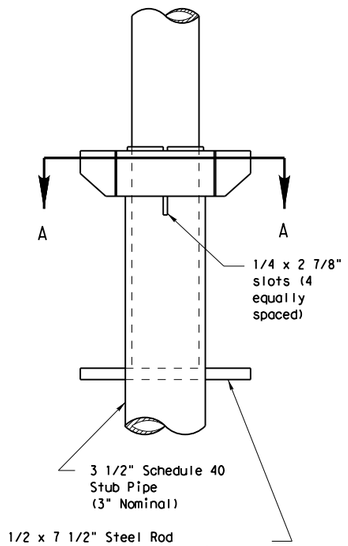
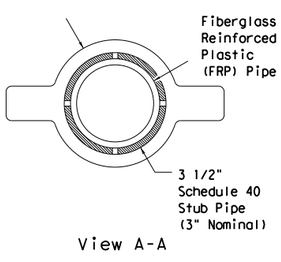
REVISIONS	CONT	SECT	JOB	HIGHWAY
9-08	0915	14	047	CR 347
	DIST		COUNTY	SHEET NO.
	SAT		WILSON	90

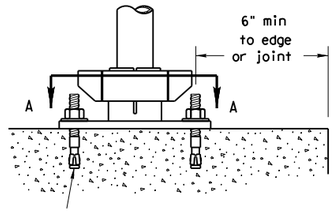
Universal Anchor System with Fiberglass Reinforced Plastic (FRP) Post





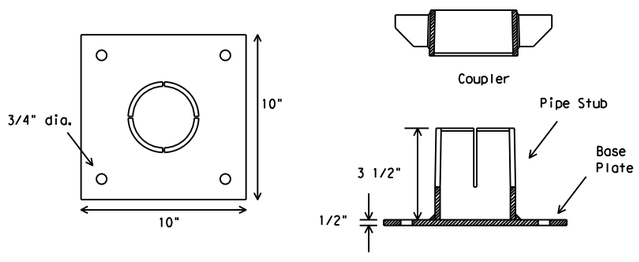


SM RD SGN ASSM TY FRP(X)UA(P)



Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. A heavy hex nut per ASTM A563 and hardened washer per ASTM F436. The stud bolt shall have minimum yield and ultimate tensile strengths of 50 and 75 ksi, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Top of bolt shall extend at least flush with top of nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 3 3/8" minimum embedment, shall have a minimum allowable tension and shear of 2450 and 1525 psi, respectively. Adhesive type anchors shall have stud bolts installed with Type III epoxy per DMS-6100, "Epoxies and Adhesives." Adhesive anchors may be loaded after adequate epoxy cure time per the manufacturer's recommendations.

BOLT-DOWN DETAILS



SM RD SGN ASSM TY FRP(X)UB(P)

GENERAL NOTES:

1. FRP sign supports for a single type sign support may be used for signs up to and including 16 square feet. Dual post installation may be used for signs up to and including 32 square feet.
2. All nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing."
3. See the Traffic Operations Division website for detailed drawings of sign clamps. The website address is: http://www.txdot.gov/publications/traffic.htm

FRP POST REQUIREMENTS

1. Materials shall conform to the requirements of Departmental Material Specification DMS-4410 and will be furnished in a yellow or gray color as specified elsewhere in the plans.
2. Thickness of FRP sign support is 0.125" + 0.031", - 0.0".
3. FRP sign supports are prequalified by the Traffic Operations Division. Prequalification procedures are obtained by writing:
   Texas Department of Transportation
   Traffic Operations Division
   125 East 11th Street
   Austin, Texas 78701-2483

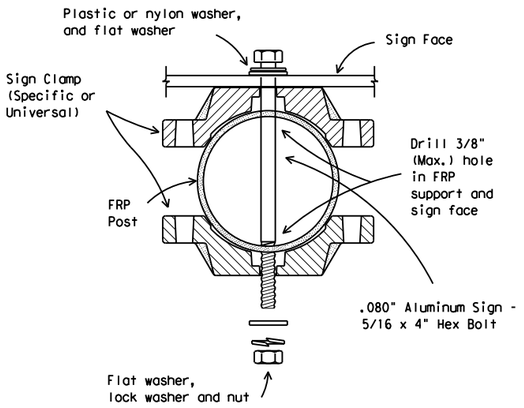
UNIVERSAL ANCHOR SYSTEM INSTALLATION PROCEDURES

1. Dig foundation hole. Where solid rock is encountered at ground level, the foundation shall be a minimum depth of 18". When solid rock is encountered below ground level, the foundation shall extend in the solid rock a minimum depth of 18" or provide a minimum foundation depth of 30". If solid rock is encountered, the socket/stub may be reduced in length as required to a minimum length of 18". Any material removed from the socket/stub shall be from the bottom and the clearance requirements given on SMD(GEN) must be followed. The inner surfaces of the socket/stub must remain free of concrete or other debris.
2. The Engineer may permit batches of concrete less than 2 cubic yards to be mixed with a portable, motor driven concrete mixer. For small placements less than 0.5 cubic yards, hand mixing in a suitable container may be allowed by Engineer. Concrete shall be Class A.
3. Insert base post in foundation hole to depths shown and fill hole with concrete. Cut base post from bottom and ensure a minimum of 18" embedment if installed in solid rock.
4. Level and plumb the base post with coupler using a torpedo level and let concrete set a minimum of 4 days, unless otherwise directed by Engineer. Bottom of base post slots shall be above the concrete footing.
5. Attach sign to FRP post.
6. Insert sign post into base post. Lower until the post comes to rest on the steel rod.
7. Use hammer to ensure the coupler is firmly seated. Top of coupler should be level with top of base post in most instances.
8. Check sign to ensure there is no twist. If loose, increase the tightening of coupler.

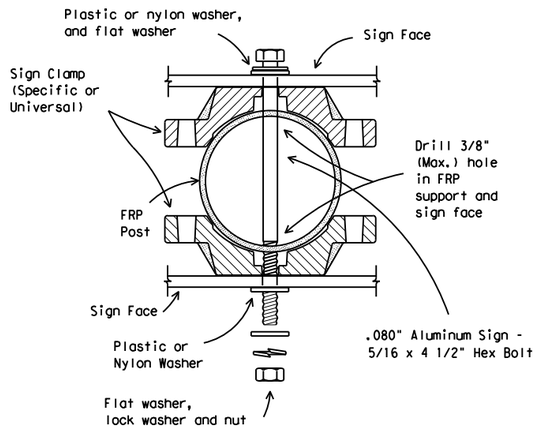
BOLT DOWN SIGN SUPPORT

1. Position base plate with coupler on existing concrete.
2. Drill holes into concrete and insert the 5/8" diameter bolts with wedge anchors, and tighten nuts.
3. Attach sign to FRP post.
4. Insert bottom of sign post into pipe stub.
5. Use hammer to ensure the coupler is firmly seated. Top of coupler should be level with top of base post in most instances.
6. Check sign to ensure there is no twist. If loose, increase the tightening of coupler.

Typical Sign Mounting Detail for FRP Support with Single Sign



Typical Sign Mounting Detail for FRP Support with Back-to-Back Signs



Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS UNIVERSAL ANCHOR SYSTEM WITH FRP POST

SMD(FRP)-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS
9-08

CONT	SECT	JOB	HIGHWAY
0915	14	047	CR 347

DIST	COUNTY	SHEET NO.
SAT	WILSON	91

26F

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Note To Designer:
1. Do not alter Sheet Design or Font style, size or weight - match text attributes.
2. If additional space is needed for a numbered section, fence and adjust sections up or down as needed for proportioning and readability but do not relocate from it's relative position.

A. GENERAL SITE DATA

1. PROJECT LIMITS: *CR 347 @ CIBOLO CREEK*

2. PROJECT SITE MAPS:

- *Project Latitude* 29°23'43" *Project Longitude* -98°7'38"
- *Project Location Map: Shown on Title Sheet*
- *Drainage Patterns: Shown on Drainage Area Maps (Sheet 40)*
- *Approx. Slopes Anticipated After Major Gradings and Areas of Soil Disturbance: Shown on Typical Sections (Sheets 4 - 5)*
- *Major Controls and Locations of Stabilization Practices: Shown on SW3P Sheets (Sheet 75)*
- *Project Specific Locations: Off-site waste, borrow, or storage areas are not part of this SW3P.*
- *Surface Waters and Discharge Locations: Shown on Bridge Layout Sheets (Sheets 48 - 49)*

3. PROJECT DESCRIPTION: *REPLACE BRIDGE AND APPROACHES*

Non-Joint Bid Utilities are not part of this SW3P.

4. FOR MAJOR SOIL DISTURBING ACTIVITIES SEQUENCE OF EVENTS:

1. *Install controls down-slope of work area and initiate inspection and maintenance activities.*
2. *Begin phased construction with interim stabilization practices. Adjust erosion and sedimentation controls during construction to meet requirements and changing conditions and as directed/approved by the Engineer.*
3. *Major soil disturbing activities may include but are not limited to: right-of-way preparation, cut and/or fill to improve roadway profile, final grading and placement of topsoil and the following (if marked):*

- [X] *Placement of road base*
- [ ] *Exstensive ditch grading*
- [X] *Upgrading or replacing culverts or bridges*
- [ ] *Temporary detour road(s)*
- [ ] *Other:* _____

5. EXISTING AND PROPOSED CONDITIONS:

Description of existing vegetative cover: Uniform Grass
Percentage of existing vegetative cover: 41.9%
Existing vegetative cover: (mark one)
- [X] *Thick or uniformly established*
- [ ] *Thin and Patchy*
- [ ] *None or minimal cover*

Description of soils: (Provide classification and description of soils)
Site Acreage: 0.34 *Acreage disturbed: 0.28*
Site runoff coefficient (pre-construction): *Site runoff coefficient (post-construction):*

6. RECEIVING WATERS: *(Mark all that apply)*

- [X] *A classified stream does not pass through project.*
- [ ] *A classified stream passes through project. Name* _____ *Segment Number* _____

Name of receiving waters that will receive discharges from disturbed areas of the project: CIBOLO CREEK

Site is in a Municipal Separate Storm Sewer System (MS4).
MS4 Operator (name): _____

B. BEST MANAGEMENT PRACTICES

General timing or sequence for implementation of BMPs shall be as required and/or as directed/approved by the Engineer to provide adequate controls. BMPs shown on plan sheets are to be considered "proposed" unless/until install date is shown. BMPs are to reduce sediments from road construction activities.

1. SOIL STABILIZATION PRACTICES: (Select T = Temporary or P = Permanent, as applicable)

- [T/P] SEEDING
- [T/P] MULCHING (Hay or Straw)
- [ ] BUFFER ZONES
- [ ] PLANTING
- [ ] COMPOST/MULCH FILTER BERM
- [ ] SODDING
- [ ] PRESERVATION OF NATURAL RESOURCES
- [P] FLEXIBLE CHANNEL LINER
- [ ] RIGID CHANNEL LINER
- [T/P] SOIL RETENTION BLANKET
- [ ] COMPOST MANUFACTURED TOPSOIL
- [ ] OTHER: (Specify Practice)

2. STRUCTURAL PRACTICES: (Select T = Temporary or P = Permanent, as applicable)

- [T] SILT FENCES
- [ ] HAY BALES
- [ ] ROCK FILTER DAMS
- [ ] DIVERSION, INTERCEPTOR, OR PERIMETER DIKES
- [ ] DIVERSION, INTERCEPTOR, OR PERIMETER SWALES
- [ ] DIVERSION DIKE AND SWALE COMBINATIONS
- [ ] PIPE SLOPE DRAINS
- [ ] PAVED FLUMES
- [T] ROCK BEDDING AT CONSTRUCTION EXIT
- [ ] TIMBER MATTING AT CONSTRUCTION EXIT
- [ ] CHANNEL LINERS
- [ ] SEDIMENT TRAPS
- [ ] SEDIMENT BASINS
- [ ] STORM INLET SEDIMENT TRAP
- [ ] STONE OUTLET STRUCTURES
- [ ] CURBS AND GUTTERS
- [ ] STORM SEWERS
- [ ] VELOCITY CONTROL DEVICES
- [ ] OTHER:

3. STORM WATER MANAGEMENT:

The proposed facility was designed in consideration of hydraulic design standards to convey stormwater in a manner that is protective of public safety and property. The control of erosion from the facility is inherent to the design. Additional factors affecting post-construction stormwater at the project location include: (mark all that apply)

- [X] *Existing or new vegetation provides natural filtration.*
- [ ] *The design includes provisions for permanent erosion controls provided by strategically placed pervious and impervious surfaces.*
- [ ] *Project includes permanent sedimentation controls (other than grass).*
- [X] *Velocities do not require dissipation devices.*
- [ ] *Velocity-dissipation devices included in the design.*
- [ ] *Other :* _____

4. NON-STORM WATER DISCHARGES:

Off-site discharges are prohibited except as follows:

1. *Discharges from fire fighting activities and/or fire hydrant flushings.*
2. *Vehicle, external building, and pavement wash water where detergents and soaps are not used and where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed).*
3. *Plain water used to control dust.*
4. *Plain water originating from potable water sources.*
5. *Uncontaminated groundwater, spring water or accumulated stormwater.*
6. *Foundation or footing drains where flows are not contaminated with process materials such as solvents.*
7. *Other:* _____

Concrete truck wash water discharges on the site should be prohibited or minimized. If allowed by the Engineer, they must be managed in a manner so as not to contaminate surface water. They must not be located in areas of concentrated flow. Concrete truck wash-out locations must be shown on the SW3P Layout and included in the inspections.

Hazardous material spill/leak shall be prevented or minimized. At a minimum, this includes asphalt products, fuels, oils, lubricants, solvents, paints, acids, concrete curing compounds and chemical additives for soil stabilization. BMPs shall be implemented to the storage areas of these products. All spills must be cleaned and disposed properly and reported to the Engineer. Report any release at or above the reportable quantity during a 24 hour period to the National Response Center at 1-800-424-8802.

C. OTHER REQUIREMENTS & PRACTICES

1. MAINTENANCE:

All erosion and sediment controls shall be maintained in good working order. If a repair is necessary, it shall be performed before the next anticipated storm event but no later than 7 calendar days after the surrounding exposed ground has dried sufficiently to prevent further damage from equipment. If maintenance prior to the next anticipated storm event is impracticable, maintenance must be scheduled and accomplished as soon as practicable. Disturbed areas on which construction activities have ceased, temporarily or permanently, shall be stabilized within 14 calendar days unless they are scheduled to and do resume within 21 calendar days. The areas adjacent to creeks and drainageways shall have priority followed by protecting storm sewer inlets.

2. INSPECTION:

For areas of the construction site that have not been finally stabilized, areas used for storage of materials, structural control measures, and locations where vehicles enter or exit the site, personnel provided by the permittee and familiar with the SW3P must inspect disturbed areas at least once every seven (7) calendar days. An Inspection and Maintenance Report shall be prepared for each inspection and the controls shall be revised on the SW3P within seven (7) calendar days following the inspection.

3. WASTE MATERIALS:

All non-hazardous municipal waste materials such as litter, rubbish, trash and garbage located on or originating from the project shall be collected and stored in a securely lidded metal dumpster, provided by the Contractor. The dumpster shall be emptied as necessary or as required by local regulation and the trash shall be hauled to a permitted disposal facility. The burying of non-hazardous municipal waste on the project shall not be permitted. Construction material waste sites, stockpiles and haul roads shall be constructed to minimize and control the amount of sediment that may enter receiving waters. Construction material waste sites shall not be located in any wetland, water body or stream bed. Construction staging areas and vehicle maintenance areas shall be constructed in a manner to minimize the runoff of pollutants.

4. OFFSITE VEHICLE TRACKING:

Off-site vehicle tracking of sediments and the generation of dust must be minimized. Excess sediments on road shall be removed on a regular basis as directed/approved by the Engineer.

5. OTHER:

See the EPIC sheet for additional environmental information.

Kimley»Horn F-928

 Texas Department of Transportation

4/7/2021

STATE OF TEXAS
JORDAN S. KIEWIT
131234
LICENSED PROFESSIONAL ENGINEER

JORDAN S. KIEWIT , P.E. 4/7/2021
Signature of Registrant & Date

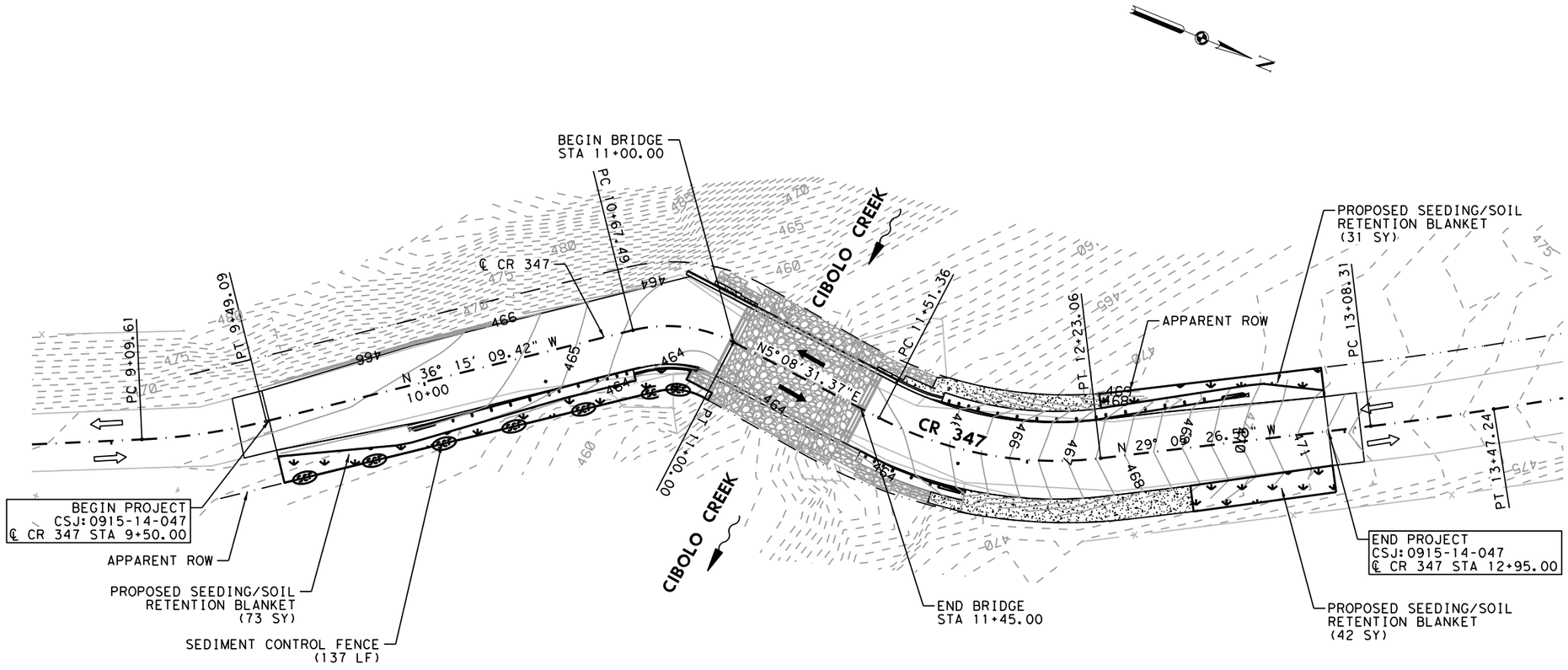
REVISION DATE: 10/12

STORM WATER POLLUTION PREVENTION PLAN (SW3P)

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
6	BR 2021 (062)		CR 347
STATE	DISTRICT	COUNTY	
TEXAS	SAT	WILSON	
CONTROL	SECTION	JOB	SHEET NO.
0915	14	047	92

ITEM CODE	DESCRIPTION	UNIT	QTY
0164 6021	CELL FBR MLCH SEED(PERM)(RURAL)(SANDY)	SY	146
0164 6029	CELL FBR MLCH SEED(TEMP)(WARM)	SY	73
0164 6031	CELL FBR MLCH SEED(TEMP)(COOL)	SY	73
0166 6002	FERTILIZER *	TON	0.1
0168 6001	VEGETATIVE WATERING	MG	4.6
0169 6002	SOIL RETENTION BLANKETS (CL 1) (TY B)	SY	146
0506 6020	CONSTRUCTION EXITS (INSTALL) (TY 1)	SY	225
0506 6024	CONSTRUCTION EXITS (REMOVE)	SY	225
0506 6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	137
0506 6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	137

* FOR CONTRACTORS INFORMATION ONLY



LEGEND

- TEMPORARY SEDIMENT CONTROL FENCE
- SEEDING/SOIL RETENTION BLANKET
- EROSION CONTROL LOG
- EXIST CONTOUR
- PROP CONTOUR

4/7/2021

JORDAN S. KIEWIT
131234
LICENSED
PROFESSIONAL ENGINEER
STATE OF TEXAS

0' 20' 40'
SCALE: 1"= 40'

Kimley»Horn F-928

Texas Department of Transportation

CR 347 @ CIBOLO CREEK

SW3P LAYOUT

SHEET 1 OF 1

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	BR 2021 (063)	CR 347

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	WILSON	93
CONT.	SECT.	JOB	
0915	14	047	

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I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

Texas Pollutant Discharge Elimination System (TPDES) TXR 150000: Stormwater Discharge Permit or Construction General Permit (CGP) required for projects with 1 or more acres distrubed soil. Projects with any disturbed soil must protect for erosion and sedimentation in accordance with Item 506.

☒ No Action Required ☐ Required Action

Action No.

1. Prevent stormwater pollution by controlling erosion and sedimentation in accordance with TPDES Permit TXR 150000.
2. Comply with the Storm Water Pollution Prevention Plan (SW3P) and revise when necessary to control pollution or required by the Engineer.
3. Post Construction Site Notice (CSN) with SW3P information on or near the site, accessible to the public and Texas Commission on Environmental Quality (TCEQ), Environmental Protection Agency (EPA) or other inspectors.
4. When Contractor project specific locations (PSL's) increase disturbed soil area to 5 acres or more, Contractor shall submit Notice of Intent (NOI) to TCEQ and the Engineer.
5. NOI required: ☐Yes ☒No

Note: If amount of soil disturbance changes, permit requirements may change.

II. WORK IN OR NEAR STREAMS, WATERBODIES AND WETLANDS CLEAN WATER ACT SECTIONS 401 AND 404

US Army Corps of Engineers (USACE) Permit required for filling, dredging, excavating or other work in any potential USACE jurisdictional water, such as, rivers, creeks, streams, or wetlands.

The Contractor shall adhere to all of the terms and conditions associated with the following permit(s):

☐ No Permit Required
☒ Nationwide Permit (NWP) 14 - Pre-construction Notice (PCN) not Required
☐ Nationwide Permit 14 - PCN Required
☐ Individual 404 Permit Required
☐ Other Nationwide Permit Required: NWP# _____

Required Actions: List waters of the US permit applies to, location in project and check Best Management Practices (BMPs) planned to control erosion, sedimentation and post-project total suspended solids (TSS).

1. CIBOLO CREEK - NWP #14 with no PCN
2.
3.
4.

401 Best Management Practices: (Not applicable if no USACE permit)

Erosion	Sedimentation	Post-Construction TSS
☒ Temporary Vegetation	☒ Silt Fence	☐ Vegetative Filter Strips
☐ Blankets/Matting	☐ Rock Berm	☐ Retention/Irrigation Systems
☐ Mulch	☐ Triangular Filter Dike	☐ Extended Detention Basin
☐ Sodding	☐ Sand Bag Berm	☐ Constructed Wetlands
☐ Interceptor Swale	☐ Straw Bale Dike	☐ Wet Basin
☐ Diversion Dike	☐ Brush Berms	☐ Erosion Control Compost
☐ Erosion Control Compost	☐ Erosion Control Compost	☐ Mulch Filter Berm and Socks
☐ Mulch Filter Berm and Socks	☐ Mulch Filter Berm and Socks	☐ Compost Filter Berm and Socks
☐ Compost Filter Berm and Socks	☐ Compost Filter Berm and Socks	☒ Vegetation Lined Ditches
	☐ Stone Outlet Sediment Traps	☐ Sand Filter Systems
	☐ Sediment Basins	☐ Sedimentation Chambers
		☐ Grassy Swales

III. CULTURAL RESOURCES

Refer to TxDOT Standard Specifications in the event historical issues or archeological artifacts are found during construction. Upon discovery of archeological artifacts (bones, burnt rock, flint, pottery, etc.) cease work in the immediate area and contact the Engineer immediately.

☒ No Action Required ☐ Required Action

Action No.

1.
2.
3.
4.

IV. VEGETATION RESOURCES

Preserve native vegetation to the extent practical. Contractor must adhere to Construction Specification Requirements Specs 162,164, 192, 193, 506, 730, 751, 752 in order to comply with requirements for invasive species, beneficial landscaping, and tree/brush removal commitments.

☒ No Action Required ☐ Required Action

Action No.

1.
2.
3.
4.

V. FEDERAL LISTED, PROPOSED THREATENED, ENDANGERED SPECIES, CRITICAL HABITAT, STATE LISTED SPECIES, CANDIDATE SPECIES AND MIGRATORY BIRDS.

☐ No Action Required ☒ Required Action

Action No.

1. MIGRATORY BIRD NESTS: Schedule construction activities as needed to meet the following requirements:

   A. Do not remove or destroy any active migratory bird nests (nests containing eggs and/or flightless birds) at any time of year. If there are any active nests, they shall not be removed until the nests become inactive.

   B. On/in structures, if there are any active nests, they shall not be removed until all nests become inactive. After inactive nests are removed and/or before nest activity begins, deterrent materials may be applied to the structures to prevent future nest building.

2. See Item 5 in General Notes.
3. Skunk BMP- The contractor shall avoid harming or harassing the Eastern Spotted Skunk if encountered.
4. Mussel BMP- A mussel survey and relocation will be conducted before construction activities take place in the water, if determined necessary by the 2021 Mussel Work Plan between TxDOT and TPWD.

If any of the listed species are observed, cease work in the immediate area, do not disturb species or habitat and contact the Engineer immediately. The work may not remove active nests from bridges and other structures during nesting season of the birds associated with the nests. If caves or sinkholes are discovered, cease work in the immediated area, and contact the Engineer immediately.

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

General (applies to all projects):

Comply with the Hazard Communication Act (the Act) for personnel who will be working with hazardous materials by conducting safety meetings prior to beginning construction and making workers aware of potential hazards in the workplace. Ensure that all workers are provided with personal protective equipment appropriate for any hazardous materials used.

Obtain and keep on-site Material Safety Data Sheets (MSDS) for all hazardous products used on the project, which may include, but are not limited to the following categories: Paints, acids, solvents, asphalt products, chemical additives, fuels and concrete curing compounds or additives. Provide protected storage, off bare ground and covered, for products which may be hazardous. Maintain product labelling as required by the Act.

Maintain an adequate supply of on-site spill response materials, as indicated in the MSDS. In the event of a spill, take actions to mitigate the spill as indicated in the MSDS, in accordance with safe work practices, and contact the District Spill Coordinator immediately. The Contractor shall be responsible for the proper containment and cleanup of all product spills.

Contact the Engineer if any of the follwing are detected:
* Dead or distressed vegetation (not identified as normal)
* Trash piles, drums, canister, barrels, etc.
* Undesirable smells or odors
* Evidence of leaching or seepage of substances

Hazardous Materials or Contamination Issues Specific to this Project:

☒ No Action Required ☐ Required Action

Action No.

1.
2.
3.

Does the project involve the demolition of a span bridge?
☒ Yes ☐ No (No further action required)

If "Yes", a pre- demolition notification must be submitted to the Texas Department of State Health Services. The contractor shall contact TxDOT's Project Engineer 25 calendar days prior to the demolition of the bridges(s) on the project to assist with the notification.

VII. OTHER ENVIRONMENTAL ISSUES

(includes regional issues such as Edwards Aquifer District, etc.)

☒ No Action Required ☐ Required Action

Action No.

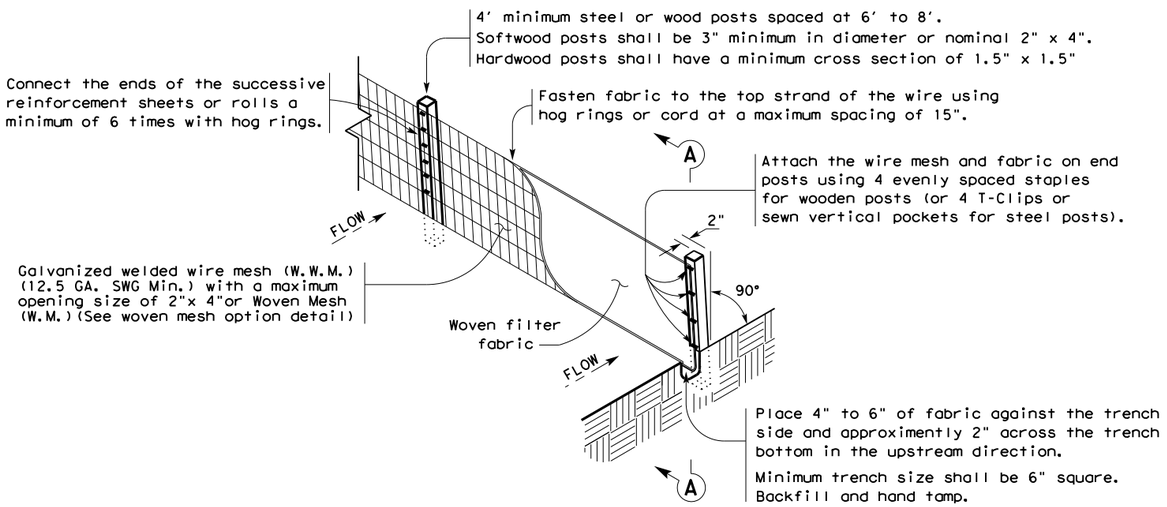
1.
2.
3.

Texas Department of Transportation
San Antonio District Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

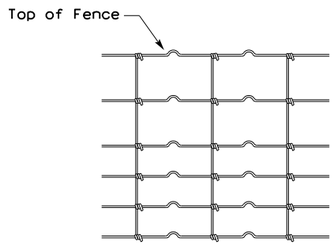
EPIC

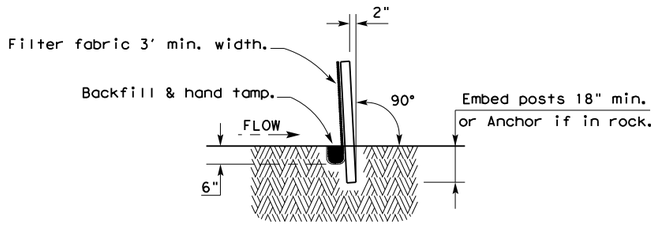
FILE: epic_2015-10-09_SAT.dgn	DN: TxDOT	CK: TxDOT	DW: BW	CK: GAG
©TxDOT OCTOBER 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	14	047	CR 347
	DIST	COUNTY		SHEET NO.
	SAT	WILSON		94



TEMPORARY SEDIMENT CONTROL FENCE

SCF





SECTION A-A

HINGE JOINT KNOT WOVEN MESH (OPTION) DETAIL

Galvanized hinge joint knot woven mesh (12.5 GA.SWG Min.) requires a minimum of five horizontal wires spaced at a maximum of 12 inches apart and all vertical wires spaced at a maximum of 12 inches apart.

SEDIMENT CONTROL FENCE USAGE GUIDELINES

A sediment control fence may be constructed near the downstream perimeter of a disturbed area along a contour to intercept sediment from overland runoff. A 2 year storm frequency may be used to calculate the flow rate to be filtered.

Sediment control fence should be sized to filter a maximum flow through rate of 100 GPM/FT^2. Sediment control fence is not recommended to control erosion from a drainage area larger than 2 acres.

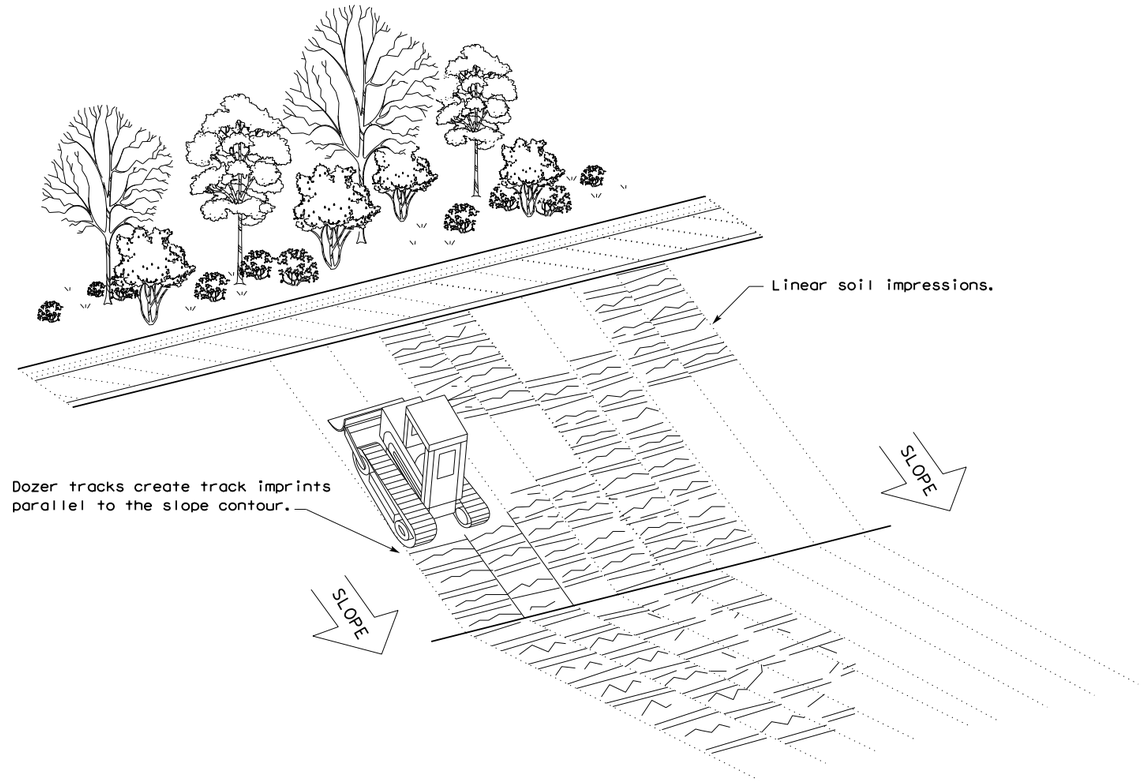
LEGEND

Sediment Control Fence

SCF

GENERAL NOTES

1. Vertical tracking is required on projects where soil distributing activities have occurred unless otherwise approved.
2. Perform vertical tracking on slopes to temporarily stabilize soil.
3. Provide equipment with a track undercarriage capable of producing linear soil impressions measuring a minimum of 12" in length by 2" to 4" in width by 1/2" to 2" in depth.
4. Do not exceed 12" between track impressions.
5. Install continous linear track impressions where the minimum 12" length impressions are perpendicular to the slope or direction of water flow.



VERTICAL TRACKING

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

FENCE & VERTICAL TRACKING

EC(1)-16

FILE: ec116	DN: TxDOT		CK: KM		DW: VP	DN/CK: LS
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