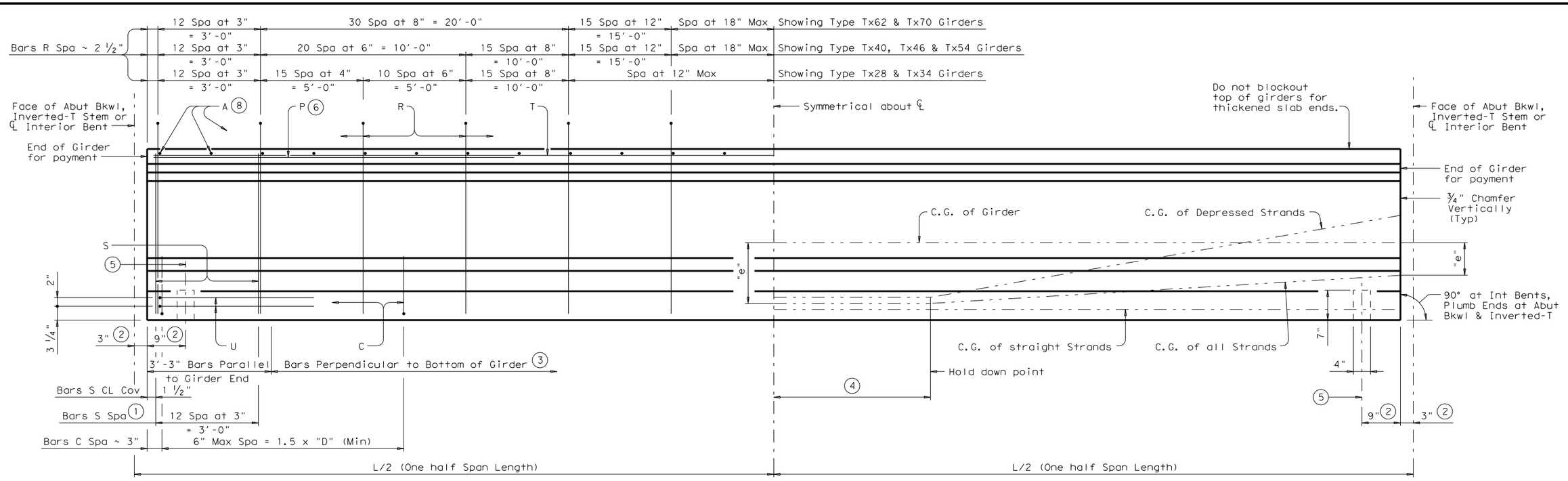
PATH:

LEVELS DISPLAYED

1



GIRDER ELEVATION

(1) Bundle with Bars R.

(2) Measured along ℄ Girder at Interior Bents; perpendicular to Abutment Bkwl or Inverted-T Stem.

(3) The average of the top and bottom spacing of Bars R cannot exceed the required spacing.

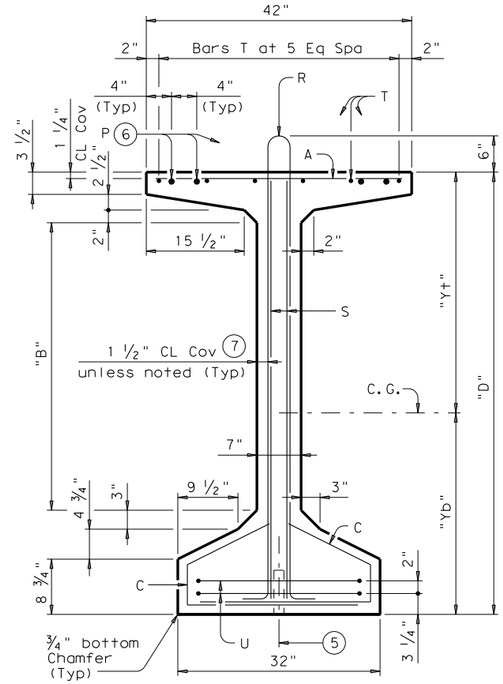
(4) L/20, but not less than 5'-0" (-0, +2').

(5) ℄ 4" x 1 ½" Vertical Slotted Hole at doweled girder end [labeled (D) on Bridge Layout]. Required for outside girder only or as shown on substructure details. Anchorage holes may be tapered (4 ¾" x 1 ⅝") at base. If holes are formed with sheet metal, forms may be left in place.

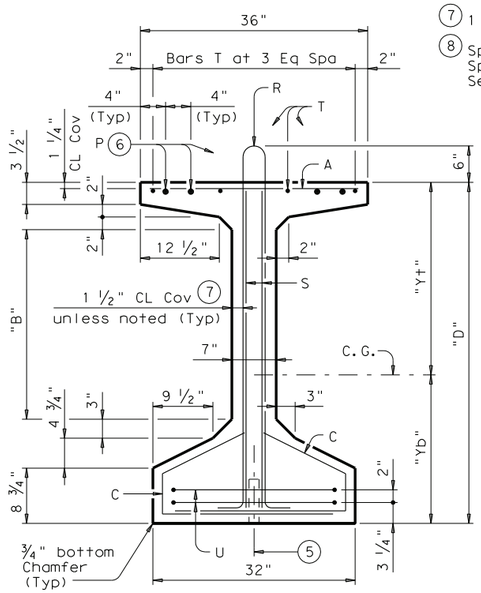
(6) Bars P (#6 x 15'-0") are only required when "e" at girder ends exceeds 0.25 x "D". At the fabricator's option bars larger than #6 may be used. When L is less than 50 ft, Bars P are to be the same length as Bars T.

(7) 1 ⅜" Clear Cover to Bars S.

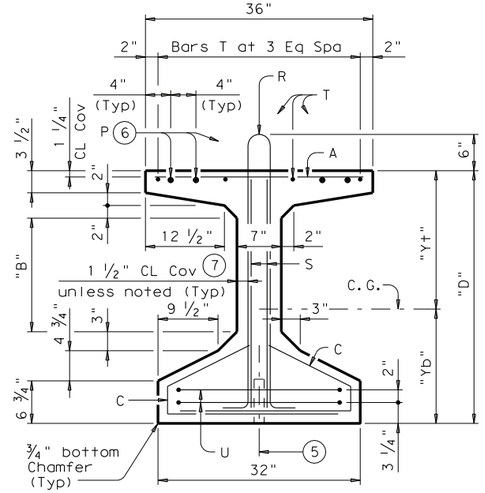
(8) Space Bars A at 6" Max for girders requiring overhang bracket hangers. Space at 12" Max for all other girders. Tie to Bars R as necessary. See standard IGMS for "Deck Forming Notes".



TYPE Tx62 & Tx70



TYPE Tx46 & Tx54



TYPE Tx28, Tx34 & Tx40

GIRDER DIMENSIONS AND SECTION PROPERTIES

Girder Type	"D" (in.)	"B" (in.)	"Yt" (in.)	"Yb" (in.)	Area (in.²)	"Ix" (in.⁴)	"Iy" (in.⁴)	Weight (plf)
Tx28	28	6	15.02	12.98	585	52,772	40,559	610
Tx34	34	12	18.49	15.51	627	88,355	40,731	653
Tx40	40	18	21.90	18.10	669	134,990	40,902	697
Tx46	46	22	25.90	20.10	761	198,089	46,478	793
Tx54	54	30	30.49	23.51	817	299,740	46,707	851
Tx62	62	37 ½"	33.72	28.28	910	463,072	57,351	948
Tx70	70	45 ½"	38.09	31.91	966	628,747	57,579	1,006

GENERAL NOTES:

Designed in accordance with AASHTO LRFD Specifications.

All concrete must be Class H. Provide Class H(HPC) if shown elsewhere in plans.

All reinforcing bars must be Grade 60.

An equal area of deformed Welded Wire Reinforcement (WWR) (ASTM A497) may be substituted for Bars A, C, R or T unless otherwise noted.

It is permissible for bars or strands to come in contact with materials used in forming anchor holes.

HL93 LOADING

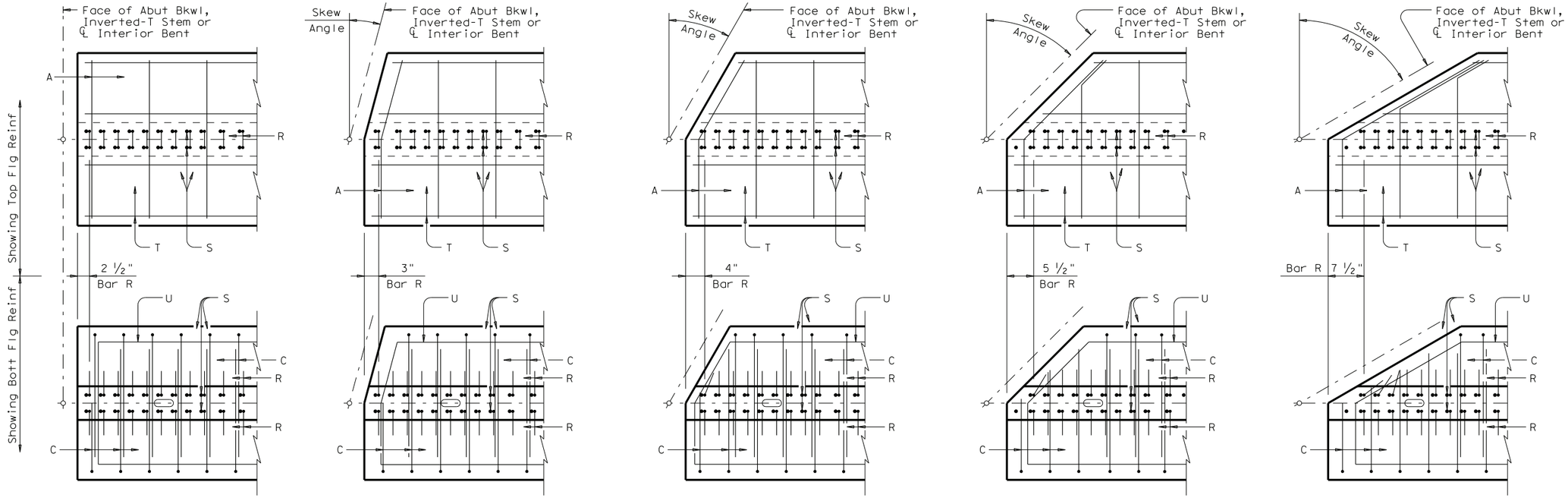
SHEET 1 OF 2

Texas Department of Transportation
Bridge Division

PRESTRESSED CONCRETE I-GIRDER DETAILS

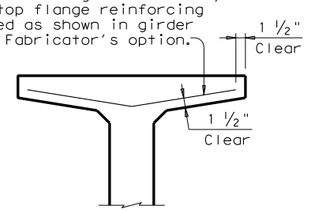
IGD

FILE: igdstde1.dgn	DN: TxDOT	CK: JMH	DW: JTR	CK: JMH	
©TxDOT June 2007	DISTRICT	FEDERAL AID PROJECT			SHEET
REVISIONS 02/09 General Notes. 12/10 Optional Top Flange Reinforcing.					
	COUNTY		CONTROL	SECT	JOB	HIGHWAY

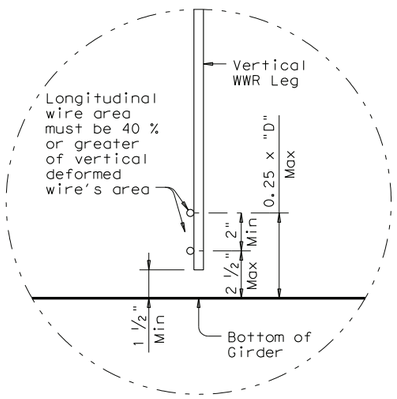


PLAN OF GIRDER ENDS (9)

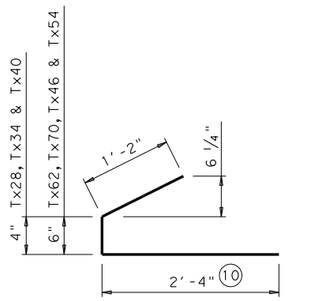
To control top flange cracking that may occur during form removal, additional top flange reinforcing may be placed as shown in girder ends at the Fabricator's option.



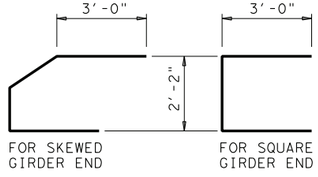
OPTIONAL TOP FLANGE REINFORCING DETAIL



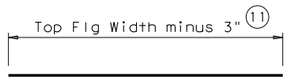
OPTIONAL WELDED WIRE REINFORCEMENT (WWR) DETAIL



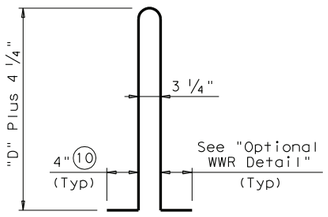
BARS C (#4)



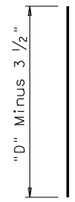
BARS U (#5)



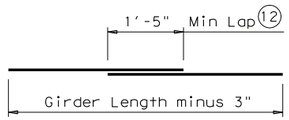
BARS A (#3)



BARS R (#4) (13)



BARS S (#6)



BARS T (#4)

(9) Reinforcing patterns shown are provided as guides to determine reinforcement placement in skewed ends. Place Bars S as close to girder end as cover requirements permit, which may prevent them to be bundled with Bars R.

(10) Bars may be cut or bent at skewed end as required.

(11) Increase as necessary for bars at skewed end.

(12) No portion of bar less than 10 ft.

(13) For Welded Wire Reinforcement (WWR) option, area of Bars R may be reduced in proportion to the increase in reinforcement yield strength over 60 ksi. Yield strength of WWR is limited to 75 ksi.

HL93 LOADING SHEET 2 OF 2

Texas Department of Transportation
Bridge Division

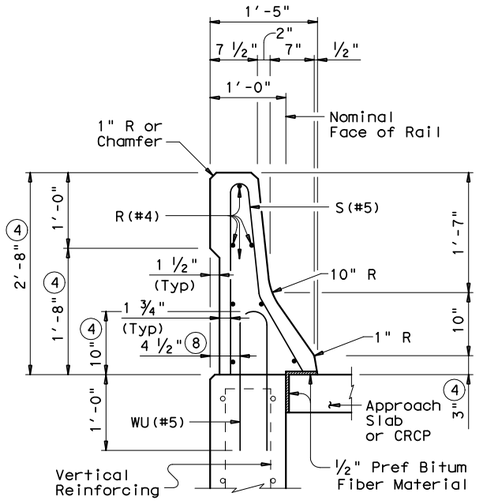
PRESTRESSED CONCRETE I-GIRDER DETAILS

IGD

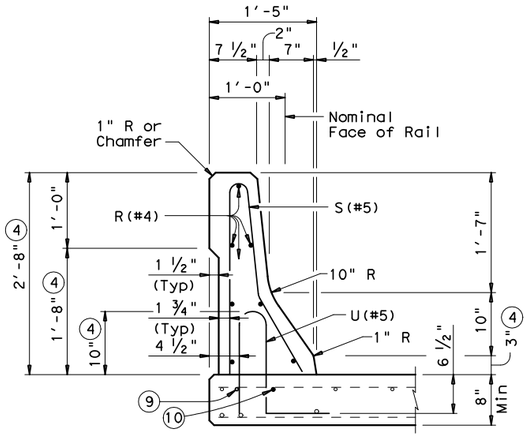
FILE: igdstde1.dgn	DN: TxDOT	CK: JMH	DW: JTR	CK: JMH
© TxDOT June 2007	DISTRICT	FEDERAL AID PROJECT		SHEET
REVISIONS 02/09 General Notes. 12/10 Optional Top Flange Reinforcing.		COUNTY	CONTROL SECT JOB	HIGHWAY

LEVELS DISPLAYED
PATH:

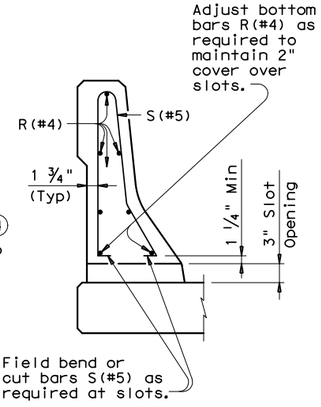
LEVELS DISPLAYED | ACC:



ON ABUTMENT WINGWALLS OR CIP RETAINING WALLS

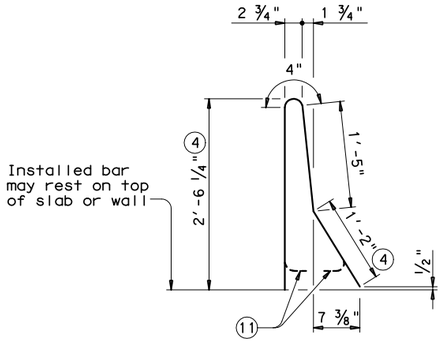


ON BRIDGE SLAB

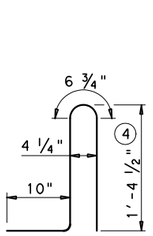


ON BRIDGE SLAB AT SIDE SLOT DRAIN

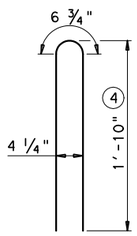
SECTIONS THRU RAIL



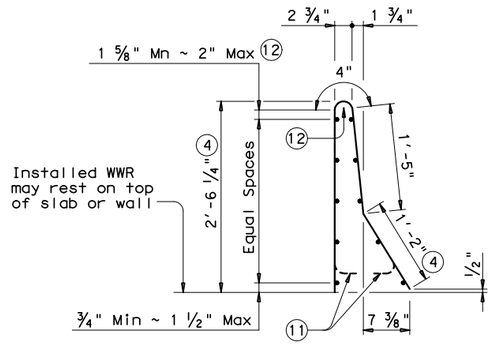
BARS S (#5)



BARS U (#5)

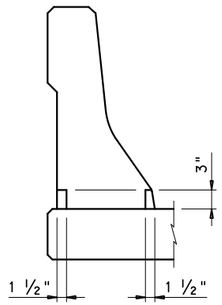


BARS WU (#5)

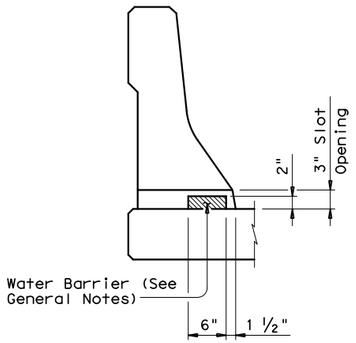


OPTIONAL WELDED WIRE REINFORCEMENT (WWR)

DESCRIPTION	LONGITUDINAL WIRES	VERTICAL WIRES
Minimum (Cumulative Total) Wire Area	0.933 Sq In.	0.248 Sq In. per Ft
	No. of Wires	Spacing
Minimum	6	4"
Maximum	11	12"
Maximum Wire Size Differential	The smaller wire shall have an area of 40% or more of the larger wire.	



CAST-IN-PLACE WATER BARRIER



PRECAST WATER BARRIER

OPTIONAL WATER BARRIERS

(4) Increase 2" for structures with Overlay.

(8) 5 1/2" when vertical reinforcing has closer clear cover over horizontal reinforcing in abutment wingwalls or retaining walls on traffic side of wall.

(9) As an aid in supporting reinforcement, additional longitudinal bars may be used in the slab with the approval of the Engineer. Such bars shall be furnished at the Contractors expense.

(10) Top longitudinal slab bar may be adjusted laterally 3" ± to tie reinforcing.

(11) Bend or cut as required to clear drain slots.

(12) No longitudinal wires may be within upper bend.

GENERAL NOTES:

This rail has been evaluated and approved to be of equal strength to railings with like geometry, which have been crash tested to meet NCHRP Report 350 TL-4 criteria. This rail can be used for design 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 design speeds of 45 mph and less.

Rail anchorage details shown on this standard may require modification for select structure types. See appropriate details elsewhere in plans for these modifications.

All steel components except reinforcing shall be galvanized unless otherwise shown in plans.

All concrete shall be Class "C".

All reinforcing steel shall be Grade 60.

Shop drawings will not be required for this rail.

This railing may be constructed with slip-forms when approved by the Engineer, with equipment approved by the Engineer. Sensor control for both line and grade must be provided. Tack welding to provide bracing for slip-form operations is acceptable. Welding can be performed at a minimum spacing of 3 ft between the cage and the anchorage. It is permissible to weld to U, WU and S bars at any location on the cage. If increased bracing is needed, additional anchorage devices must be added and welding must be performed in the upper two thirds of the cage.

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

Deformed welded wire reinforcement (WWR) may be used as an option to conventional reinforcement and shall be made in accordance with ASTM A497 (Deformed Wire). Combinations of Reinforcing Steel and WWR or configurations of WWR other than shown will be permitted when the conditions in the table are satisfied and the dimension from end of section to first welded vertical wire does not exceed 3".

Water barriers shall be provided at openings draining onto undercrossing roadways and sidewalks. They may be cast in place or precast in convenient length and bonded to the bridge deck with an approved epoxy cement.

Epoxy coat bars U and WU if slab bars are epoxy coated.

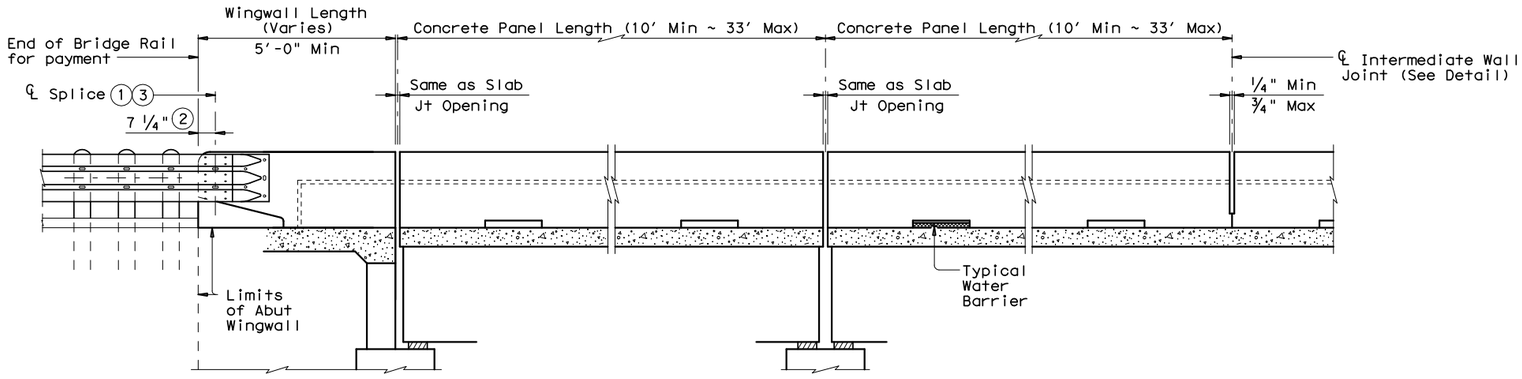
Average weight of railing with no overlay is 313 plf.

Texas Department of Transportation
Bridge Division

TRAFFIC RAIL

SHEET 2 OF 2 **TYPE T502**

FILE: rlstde17.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
© TxDOT February 2003	DISTRICT	FEDERAL AID PROJECT		SHEET
REVISIONS	DALLAS	(SEE TITLE SHEET)		
4-05: Added TL-2 Terminal Connection, minor corrections & modified Notes.	COUNTY		CONTROL	SECT	JOB	HIGHWAY
	ELLIS		0172	08	050	US 287

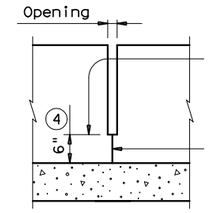


AT ABUTMENT BENTS
Showing TL-3 Transition

AT SLAB EXP JOINTS

AT INTERMEDIATE WALL JOINTS

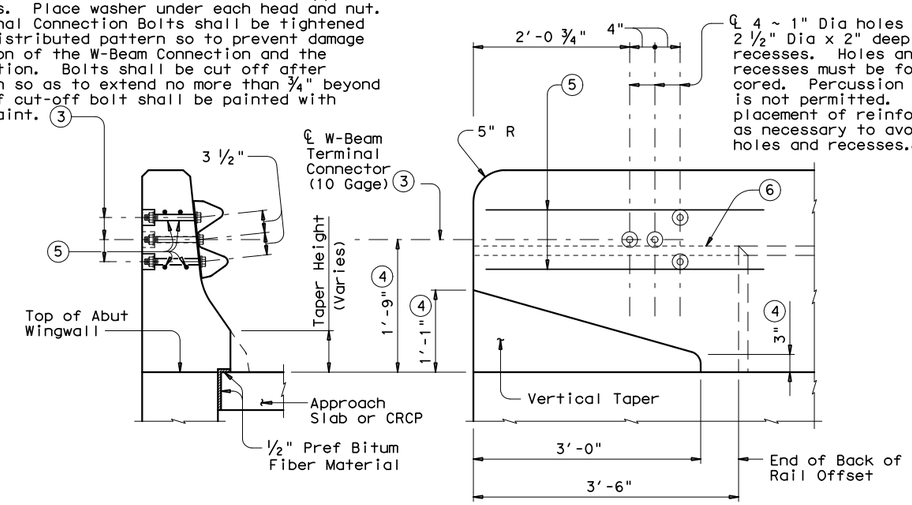
ROADWAY ELEVATION OF RAIL



INTERMEDIATE WALL JOINT DETAIL

Note: Provide intermediate wall joints over all slab construction joints, over interior supports on continuous units, and at equal intervals in between as necessary to maintain a 33' maximum length of unbroken wall.

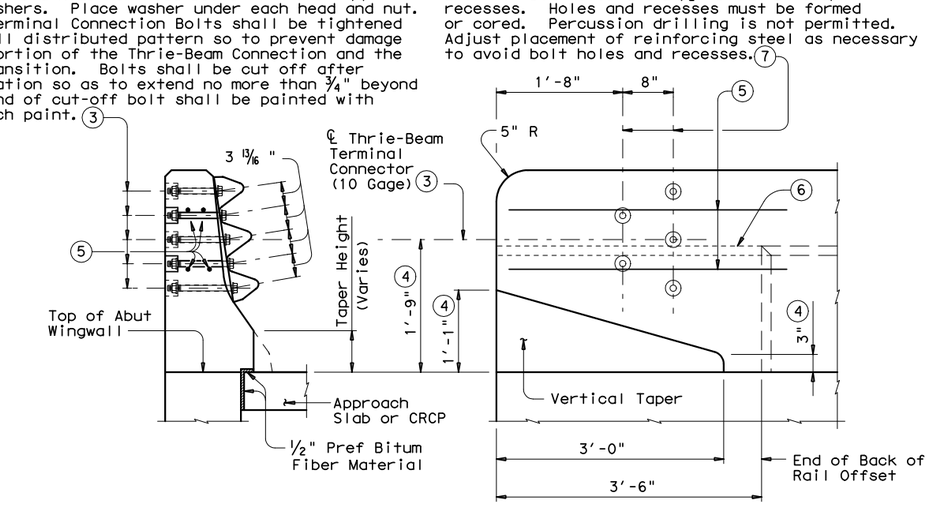
℄ 4 ~ 7/8" Dia A325 Hex Head Bolts with two 1 3/4" O.D. washers. Place washer under each head and nut. The 4 Terminal Connection Bolts shall be tightened in a well distributed pattern so to prevent damage or distortion of the W-Beam Connection and the MBGF Transition. Bolts shall be cut off after installation so as to extend no more than 3/4" beyond nut. End of cut-off bolt shall be painted with Zinc-rich paint. (3)



SECTION ELEVATION

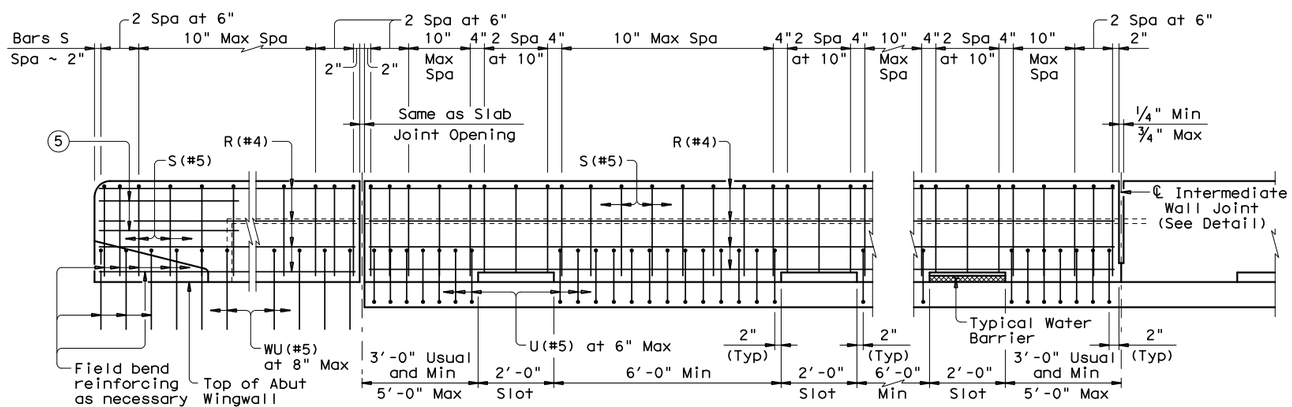
TL-2 TERMINAL CONNECTION DETAILS

℄ 5 ~ 7/8" Dia A325 Hex Head Bolts with two 1 3/4" O.D. washers. Place washer under each head and nut. The 5 Terminal Connection Bolts shall be tightened in a well distributed pattern so to prevent damage or distortion of the Thrie-Beam Connection and the MBGF Transition. Bolts shall be cut off after installation so as to extend no more than 3/4" beyond nut. End of cut-off bolt shall be painted with Zinc-rich paint. (3)



SECTION ELEVATION

TL-3 TERMINAL CONNECTION DETAILS



ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT

(1) Metal Beam Guard Fence Transitions must be attached to the bridge rail and extended along the embankment unless otherwise shown in the plans.

(2) Showing TL-3 Splice location, TL-2 Splice location is 1'-0".

(3) Terminal Connectors and associated hardware are to be paid for under the Item "Metal Beam Guard Fence".

(4) Increase 2" for structures with Overlay.

(5) 4 additional Bars R(#4) 3'-8" in length shall be placed inside Bars S(#5) and centered 2'-0" from end of rail when Terminal Connections are required.

(6) Back of rail offset may, with Engineer's approval be continued to the end of the railing.

(7) Bolt recesses are only required when pedestrian sidewalks are adjacent to back of rail.

Sheet 90 of 94 Sheets

Texas Department of Transportation
Bridge Division

TRAFFIC RAIL

SHEET 1 OF 2 **TYPE T502**

FILE: ristdel7.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
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REVISIONS 4-05: Added TL-2 Terminal Connection, minor corrections & modified Notes.	DALLAS	(SEE TITLE SHEET)		
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	ELLIS	0172	08	050	US 287

LEVELS DISPLAYED ACC: 1