



**REVIEW BY FORT BEND COUNTY  
COMMISSIONERS COURT**

**Fort Bend County  
Engineering Department**  
301 Jackson Suite 401  
Richmond, Texas 77469  
281.633.7500  
Permits@fortbendcountytexas.gov

☒ Right of Way Permit  
☐ Commercial Driveway Permit

Permit No: 2018-23957

**Applicant:** James Construction Group, LLC

**Job Location Site:** Fulshear Trace Bridge, Fulshear, TX 77441

**Bond No:**                      **Date of Bond:** 5/11/2018 **Amount:** \$1,765,242.17

The above applicant came to make use of certain Fort Bend County property subject to, "The Order Regulating the Laying, Construction, Maintenance, and Repair of Buried Cables, Conduits, and Pole Lines, In, Under, Across or Along Roads, Streets, Highways, and Drainage Ditches in Fort Bend County, Texas, Under the Jurisdiction of the Commissioners Court of Fort Bend County, Texas," as passed by the Commissioners Court of Fort Bend County, Texas, of the Minutes of the Commissioners Court of Fort Bend County, Texas, to the extent that such order is not inconsistent with Chapter 181, Vernon's Texas Statutes and Codes Annotated.

**Notes:**

1. Evidence of review by the Commissioners Court must be kept on the job site and failure to do so constitutes grounds for job shutdown.
2. Written notices are required:
  - a. 48 hours in advance of construction start up, and
  - b. When construction is completed and ready for final inspection, submit notification to Permit Administrator thru MyGovernmentOnline.org portal.
3. This permit expires one (1) year from date of permit if construction has not commenced.
4. This permit applies to work performed within right-of-ways owned and maintained by Fort Bend County only, and it is the responsibility of the applicant to acquire all other necessary permits.

On this 6th day of November, 2018, Upon Motion of Commissioner Meyers, seconded by Commissioner Patterson, duly put and carried, it is ORDERED, ADJUDGED AND DECREED that said notice of said above purpose is hereby acknowledged by the Commissioners Court of Fort Bend County, Texas, and that said notice be placed on record according to the regulation order thereof.

**Signature**

By:

Sean Eglinton  
County Engineer

Presented to Commissioners Court and approved.

Date Recorded 11-13-2018 Comm. Court No. 125

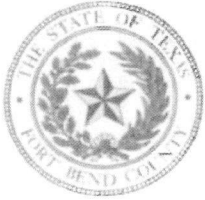
By:

Mark Vogler  
Drainage District Engineer/Manager

Clerk of Commissioners Court

By:

Ronda Willis  
Deputy



**PERMIT APPLICATION REVIEW FORM FOR  
CABLE, CONDUIT, AND POLE LINE ACTIVITY  
IN FORT BEND COUNTY**

**Fort Bend County  
Engineering Department**  
301 Jackson Suite 401  
Richmond, Texas 77469  
281.633.7500  
Permits@fortbendcountytexas.gov

- ☒ Right of Way Permit  
☐ Commercial Driveway Permit

Permit No: 2018-23957

The following "Notice of Proposed Cable, Conduit, and/or Pole Line activity in Fort Bend County" and accompanying attachments have been reviewed and the notice conforms to appropriate regulations set by Commissioner's Court of Fort Bend County, Texas.

**(1) COMPLETE APPLICATION FORM:**

- ☒ a. Name of road, street, and/or drainage ditch affected.  
☒ b. Vicinity map showing course of directions  
☒ c. Plans and specifications

**(2) BOND:**

- ☐ County Attorney, approval when applicable.
- ☐ Perpetual bond currently posted. Bond No: \_\_\_\_\_ Amount: \_\_\_\_\_
- ☒ Performance bond submitted. Bond No: [REDACTED] Amount: \$1,765,242.17
- ☐ Cashier's Check Check No: \_\_\_\_\_ Amount: \_\_\_\_\_

**(3) DRAINAGE DISTRICT APPROVAL (WHEN APPLICABLE):**

Mark Wagner  
Drainage District Approval

11/1/18  
Date

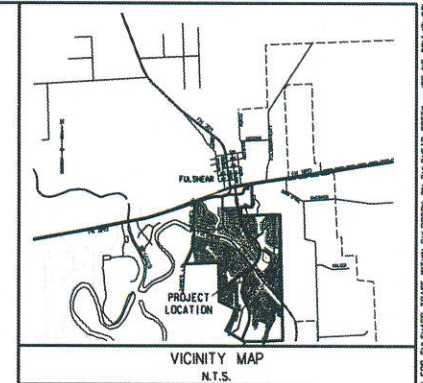
**We have reviewed this project and agree it meets minimum requirements.**

[Signature]  
Permit Administrator

10/29/2018  
Date

# CONSTRUCTION PLANS FOR BRIDGE CONSTRUCTION

## FOR FULSHEAR TRACE WITHIN FULBROOK ON FULSHEAR CREEK LOCATED IN FULSHEAR M.U.D. No. 1 CITY OF FULSHEAR FORT BEND COUNTY, TEXAS



MAP REF: F.B.C. KEY MAP PG. 522-BLK. M & R

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30. CEMENT STABILIZED ABUTMENT BACKFILL
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32. CURB RAIL W/WINDOWS (TYPE C411) (1 OF 2)
33. CURB RAIL W/WINDOWS (TYPE C411) (2 OF 2)
34. CURB RAIL W/WINDOWS (TYPE C411) (3 OF 2)
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- DETAILS AND MISCELLANEOUS SHEETS
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43. POLLUTION PREVENTION DETAILS



Engineering and Surveying  
2107 CityWest Blvd., 3rd Floor  
Houston, Texas 77042  
(713)783-7788 (713)783-3580, Fax  
TBPE FIRM REG. No. 280  
TBPLS FIRM REG. No. 100486

JOB NO. 2014-121-W21 MARCH, 2015



Know what's below.  
Call before you dig.



NOTES:  
ALL BEARINGS REFERENCED TO THE NORTHWEST CORNER OF A CALL 248.57  
ACRE TRACT OF LAND RECORDED IN CLERK'S FILE NUMBER 9770482 OF  
THE OFFICIAL RECORDS OF FORT BEND COUNTY, TEXAS

SHEET NO. 1 OF 43 SHEETS

FULSHEAR CREEK M.U.D. No. 1



1. WATER LINES, WASTEWATER COLLECTION SYSTEM, DRAINAGE COLLECTION SYSTEM AND PAVING IMPROVEMENTS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE CITY OF FULSHEAM SUBDIVISION DRAINAGE CONSTRUCTION STANDARDS" AS CURRENTLY AMENDED.
2. THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGE TO EXISTING UTILITIES AND ADJUTIVE UTILITY LINES INCLUDING, BUT NOT LIMITED TO WATER LINES, WASTEWATER COLLECTION SYSTEMS AND SEWER LINES, DURING CONSTRUCTION.
3. CONTRACTOR SHALL NOTIFY THE CITY OF FULSHEAM ENGINEER MR. DAVID LEYENDECKER, BY TELEPHONE NO. 201-391-0153 48 HOURS BEFORE STARTING CONSTRUCTION OF THIS PROJECT.
4. CONTRACTOR TO OBTAIN ALL PERMITS REQUIRED FOR CONSTRUCTION.
5. THE OWNER WILL PROVIDE CONSTRUCTION AND CONSTRUCTION STARTING THROUGHOUT THE PROJECT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CONTRACTOR SHALL GIVE ENGINEER THREE (3) BUSINESS DAYS NOTICE FOR CONSTRUCTION STARTING. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LIGHT (48) HOURS NOTICE IN ADVANCE OF BEGINNING OF CONSTRUCTION.
6. ALL UNSATISFACTORY AND/OR WASTE MATERIALS INCLUDING VEGETATION, ROOTS, STUMPS, AND WEEDS SHALL BE REMOVED BY THE CONTRACTOR. THE CONTRACTOR, INCLUDE COST OF THIS WORK, INCLUDING MAINT. IN OTHER ITEMS OF THIS PROJECT. ALL TREES ARE NOT INDICATED ON THE CONSTRUCTION PLANS SHALL BE REMOVED. THE CONTRACTOR SHALL BE RESPONSIBLE TO VISIT THE SITE AND DETERMINE THE EXTENT OF TREE REMOVAL REQUIRED.
7. CONTRACTOR SHALL MAINTAIN ADEQUATE DRAINAGE AT ALL TIMES DURING CONSTRUCTION OF THIS PROJECT.
8. CONTRACTOR SHALL VERIFY LOCATION OF EXISTING UTILITIES PRIOR TO CONSTRUCTION OF PROPOSED FACILITIES. THE CONTRACTOR SHALL NOTIFY UTILITIES 48 HOURS PRIOR TO COMMENCEMENT OF CONSTRUCTION. CONTACT THE CITY OF FULSHEAM, B11.
9. CONTRACTOR SHALL CONFINE ALL WORK EFFORTS WITHIN THE DESIGNATED AREA UNLESS SPECIFICALLY AUTHORIZED BY THE OWNER. EXTREME CARE SHOULD BE EXERCISED NEAR ADJACENT PROPERTY TO PROTECT ANY EXISTING TREES, FENCES, LANDSCAPING AND OTHER EXISTING AND ADJUTIVE UTILITIES.
10. ALL EXISTING LANDSCAPING, SIDEWALKS, FENCES, UTILITIES AND OTHER EXISTING FACILITIES DAMAGED DURING CONSTRUCTION WILL BE REPLACED OR REPAIRED TO THEIR ORIGINAL CONDITION BY THE CONTRACTOR AT HIS EXPENSE.
11. ALL CONSTRUCTION WHICH HINDERS TRAFFIC OR REQUIRES TRAFFIC DIVERSION SHALL BE IN ACCORDANCE WITH THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
12. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PURCHASING ANY WATER NEEDED FOR CONSTRUCTION OR TESTING. THE PURCHASE OF WATER FOR CONSTRUCTION OR TESTING SHALL BE CONSIDERED INCIDENTAL TO THE VARIOUS OTHER ITEMS OF WORK.
13. NO WORK SHALL BE COMPLETED TO THE SATISFACTION OF THE CITY OF FULSHEAM ENGINEER AND THE CITY OF FULSHEAM ENGINEER.
14. MAINTAIN A MINIMUM OF 8' CLEARANCE BETWEEN ALL UTILITIES.
15. ALIGNMENT, CENTERLINE, CURVE DATA, AND STATIONING FOR ALL STREETS AND BACK LOT EASEMENTS TO BE VERIFIED BY CONTRACTOR FROM APPROVED SUBDIVISION PLAT.
16. UPON PROJECT COMPLETION AND PRIOR TO FINAL RELEASE OF RETAINAGE, CONTRACTOR SHALL COMPLY WITH THE REQUIREMENTS OF "PROJECT'S RECORD DOCUMENTS" OF THE CITY OF FULSHEAM WHICH RELATE TO THE RESPECTIVE CONTRACTOR AND SEPARATE PAVT.
17. DELIVERY TRUCKS AND TRAILERS SHALL BE LOADED WITH A WEIGHT STABILIZED SAND, ETC.) SHALL BE MAINTAINED BY THE CONTRACTOR UPON REQUEST, BE MADE AVAILABLE FOR REVIEW BY THE ENGINEER.
18. PRIOR TO FINAL RELEASE OF RETAINAGE, THE CONTRACTOR SHALL PROVIDE A NOTARIZED CERTIFICATION THAT ALL MATERIALS INSTALLED IN THE PROJECT ARE COMPLETE IN PLACE IN ACCORDANCE WITH APPROVED PLANS.
19. ALL FILL AREAS SHALL BE PROOF ROLLED AND BE PLACED IN MAXIMUM 8-INCH LIPS AND COMPACTED TO A MINIMUM 95% OF STANDARD PROCTOR
20. CONTRACTOR SHALL BE RESPONSIBLE FOR THE COST OF THE

[illegible][illegible]

Engineering and Surveying  
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(713)783-7788 (713)783-3580, Fax  
TBPE FIRM REG. No. 280  
TBPLS FIRM REG. No. 100486

FULSHEAR TRACE

### CONSTRUCTION NOTES



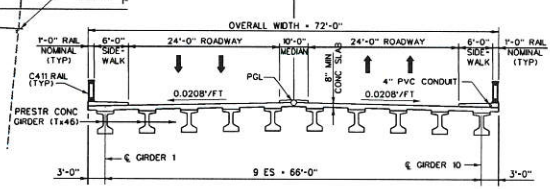
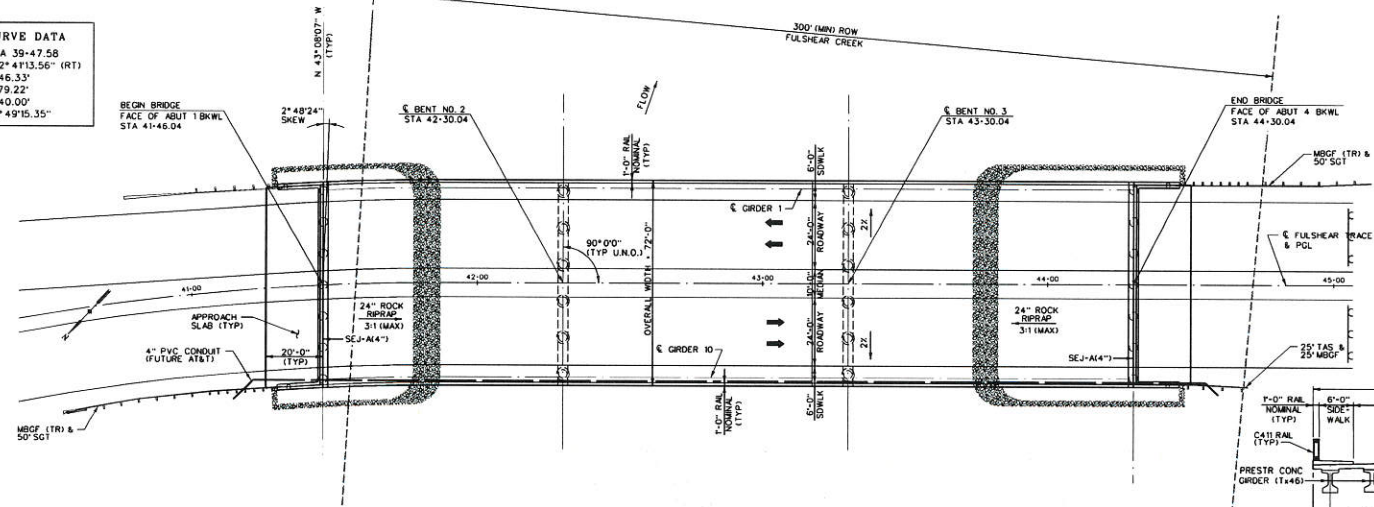
SHEET 2

OF 43 SHEETS

JOB NO. 2014121-V21



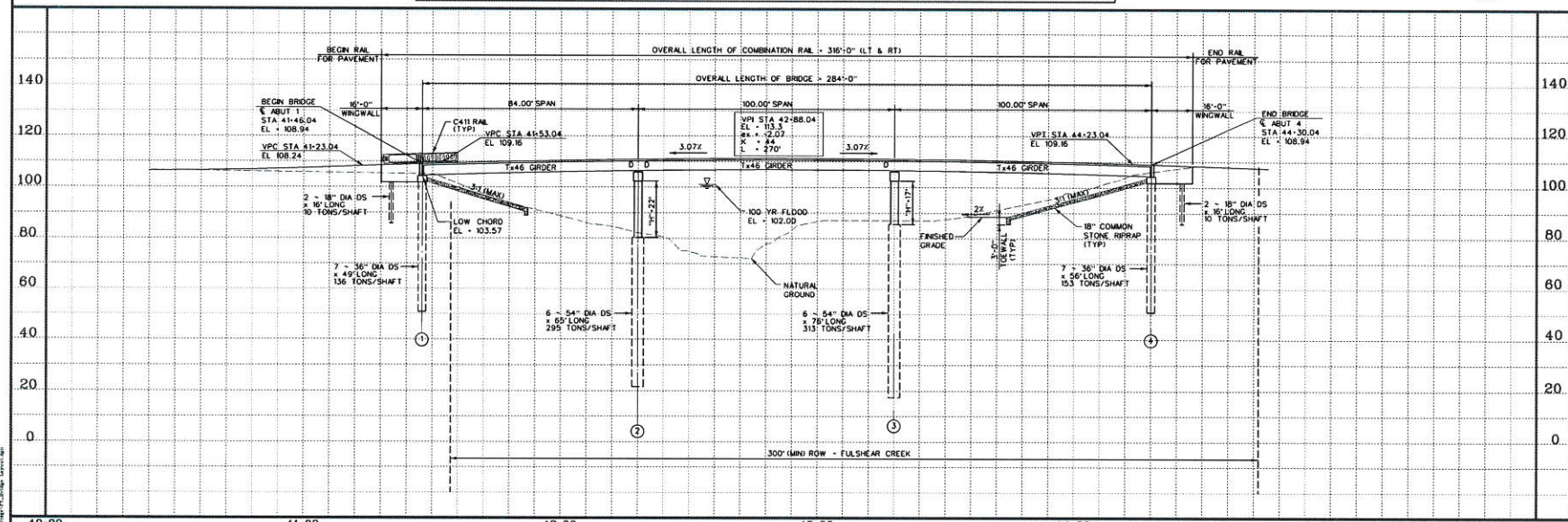
**CURVE DATA**  
P.I. STA 39+47.58  
Δ = 32° 41'13.56" (RT)  
T = 246.33'  
L = 479.22'  
R = 840.00'  
D = 6° 49'15.35"



**PLAN**  
**FULSHEAR TRACE BRIDGE (100'R.O.W.)**

CONTRACTOR TO FIELD VERIFY LOCATION AND ELEVATION OF EXISTING UTILITIES PRIOR TO STARTING CONSTRUCTION

**TYPICAL SECTION**  
N.T.S.



- HL-93 LOADING  
SCALE: 1" = 8' VERT.
1. DESIGNED IN ACCORDANCE WITH 7TH EDITION AASHTO LRFD SPECIFICATIONS AND INTERMS HL-93 LOADING.
  2. THE "H" VALUES SHOWN ARE ESTIMATED COLUMN HEIGHTS. CONTRACTOR IS RESPONSIBLE TO ADJUST BASED ON FIELD CONDITIONS.
  3. CONTRACTOR SHALL OBTAIN A PERMIT FROM THE FORT BEND COUNTY ENGINEERING DEPARTMENT, (281) 633-7500, PRIOR TO ANY WORK WITHIN THE FULSHEAR CREEK RIGHT-OF-WAY.
  4. SEE "SLAB DETAILS" SHEET FOR CONDUIT DETAILS AND NOTES.

NO.	REVISION	DATE	BY

DESIGNED BY: \_\_\_\_\_  
DESIGN CHECKED BY: \_\_\_\_\_  
DRAWN BY: \_\_\_\_\_  
CADD CHECKED BY: \_\_\_\_\_  
SURVEY CHECKED BY: \_\_\_\_\_  
QA/QC BY: \_\_\_\_\_ DATE: \_\_\_\_\_  
QA/QC REVISIONS BY: \_\_\_\_\_

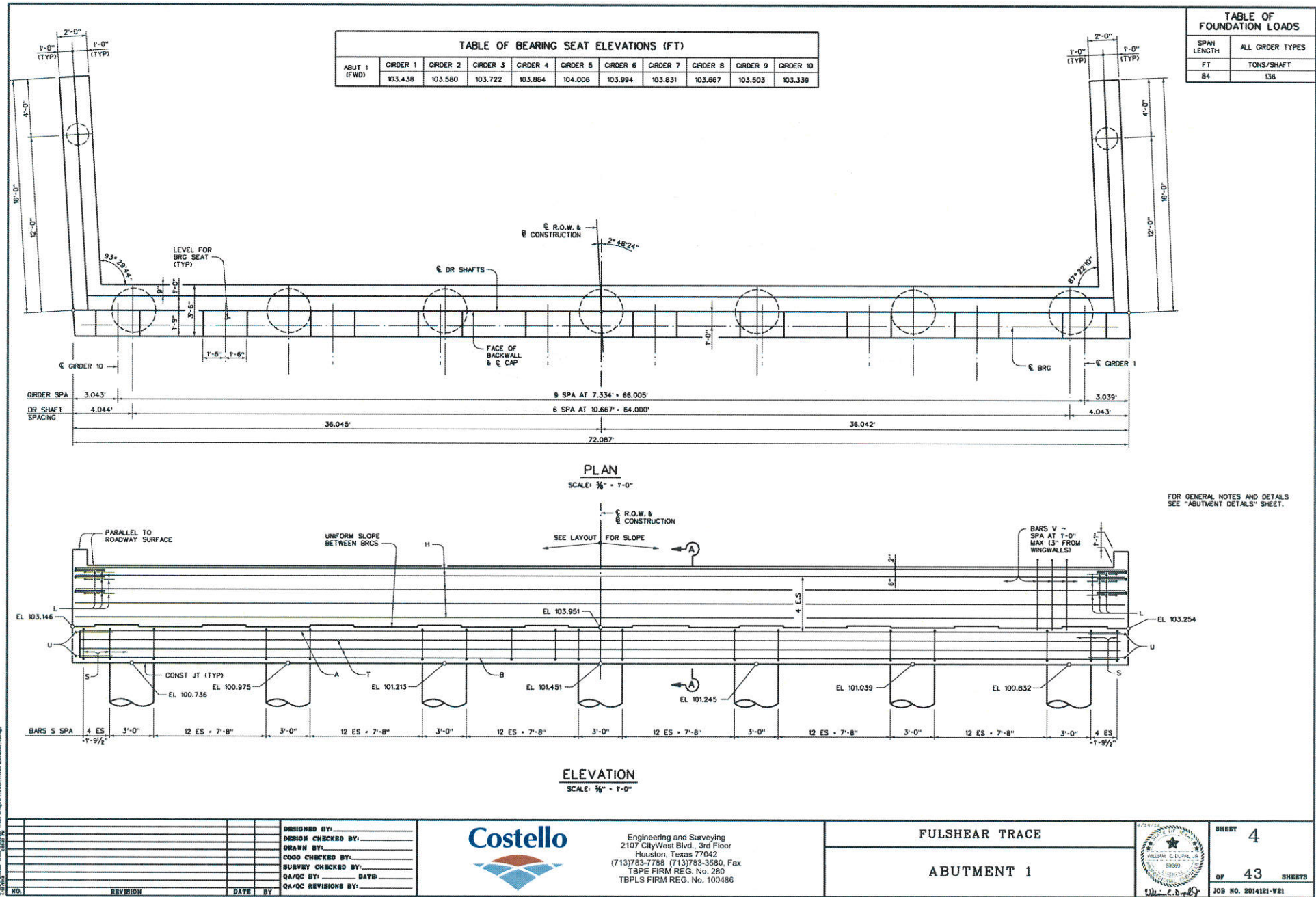


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**FULSHEAR TRACE**  
**BRIDGE LAYOUT**



SHEET **3**  
OF **43** SHEETS  
JOB NO. 2014121-W21





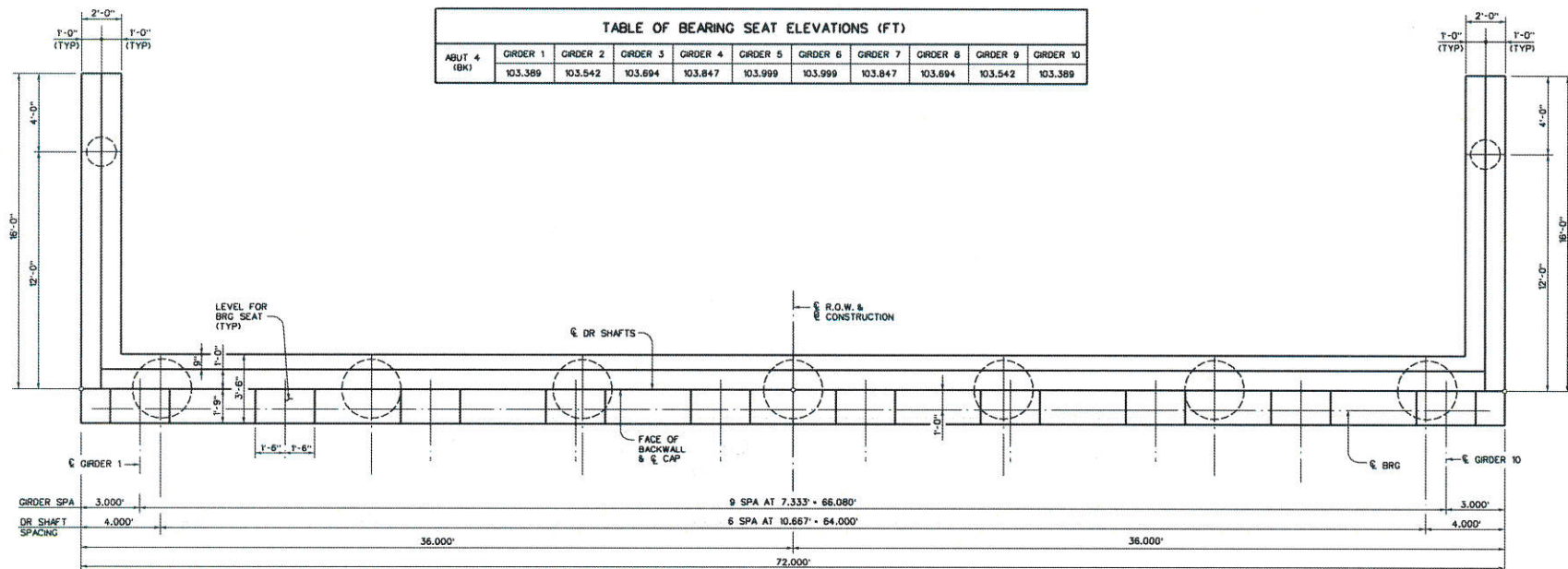
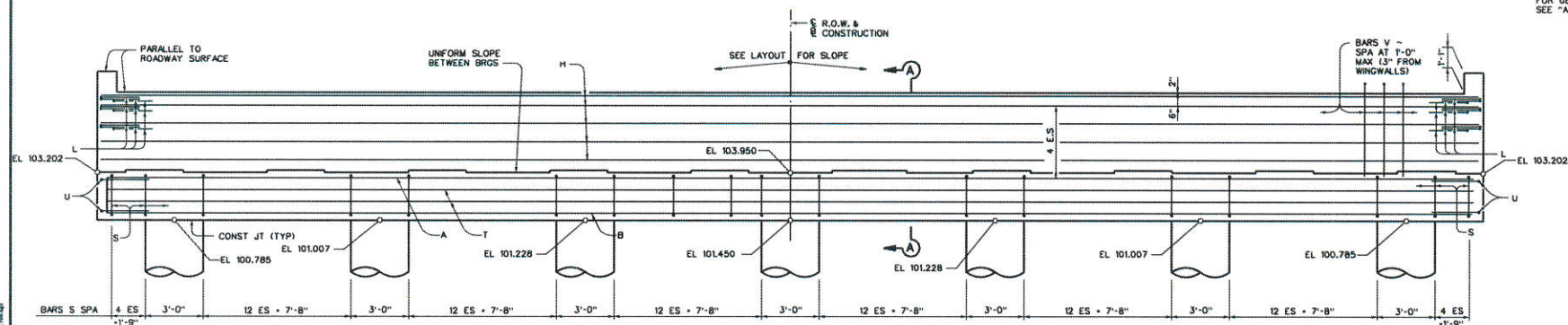


TABLE OF BEARING SEAT ELEVATIONS (FT)										
ABUT 4 (BK)	GIRDER 1	GIRDER 2	GIRDER 3	GIRDER 4	GIRDER 5	GIRDER 6	GIRDER 7	GIRDER 8	GIRDER 9	GIRDER 10
	103.389	103.542	103.694	103.847	103.999	103.999	103.847	103.694	103.542	103.389

TABLE OF FOUNDATION LOADS	
SPAN LENGTH	ALL GIRDER TYPES
FT	TONS/SHAFT
100	153

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



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

FOR GENERAL NOTES AND DETAILS  
SEE "ABUTMENT DETAILS" SHEET.

DESIGNED BY:	
DESIGN CHECKED BY:	
DRAWN BY:	
CHECKED BY:	
SURVEY CHECKED BY:	
QA/QC BY:	DATE:
QA/QC REVISIONS BY:	



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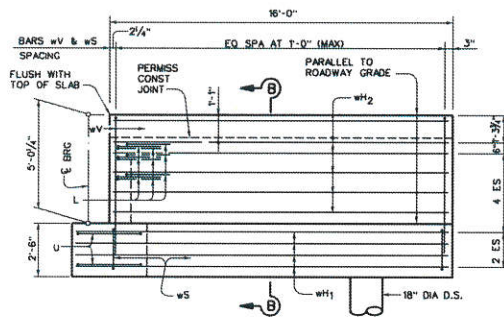
FULSHEAR TRACE

ABUTMENT 4

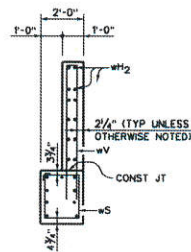


SHEET	5
OF	43 SHEETS
JOB NO.	2014121-021

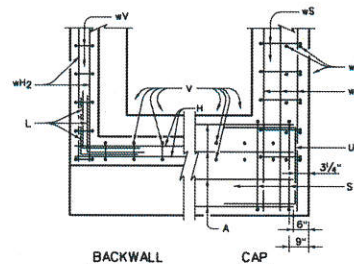




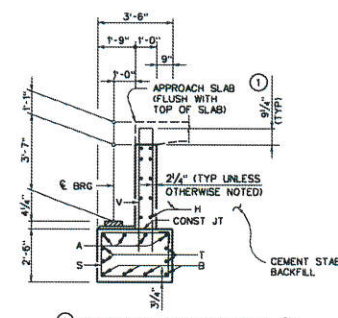
WINGWALL ELEVATION  
SCALE: 3/8" = 1'-0"



SECTION B-B  
SCALE: 3/8" = 1'-0"



CORNER DETAILS  
SCALE: 3/8" = 1'-0"

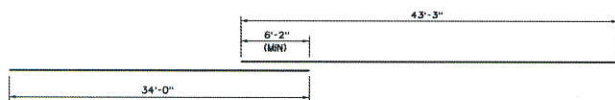


SECTION A-A  
SCALE: 3/8" = 1'-0"

TABLES OF ESTIMATED QUANTITIES (PER ABUTMENT)

BAR	NO.	SIZE	LENGTH	WEIGHT
Δ A	4	#10	77'-3"	1,330
⊕ B	4	#10	75'-10"	1,305
⊙ H	10	#6	73'-11"	1,110
⊙ T	4	#6	73'-3"	440
L	18	#6	4'-0"	108
S	88	#5	11'-4"	1,040
U	4	#6	8'-0"	48
V	71	#5	12'-7"	932
wH1	18	#6	17'-5"	471
wH2	24	#6	15'-8"	565
wS	34	#4	7'-8"	174
wV	34	#5	12'-10"	455
REINFORCING STEEL *				LB 7,978
CLASS "C" CONCRETE				CY 45.1

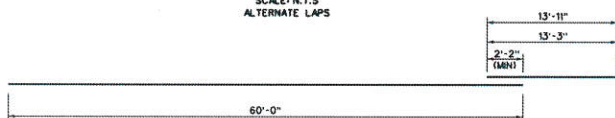
Δ INCLUDES ONE 6'-2" LAP SPLICE  
⊕ INCLUDES ONE 4'-9" LAP SPLICE  
⊙ INCLUDES ONE 2'-2" LAP SPLICE  
\* FOR CONTRACTOR'S INFORMATION ONLY.



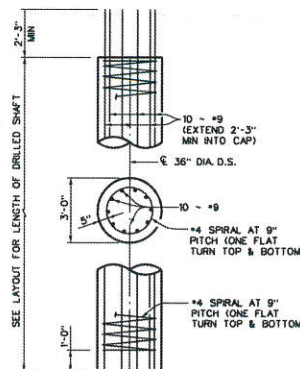
SPLICE DETAILS FOR BARS A  
SCALE: N.T.S.  
ALTERNATE LAPS



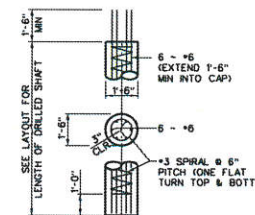
SPLICE DETAILS FOR BARS B  
SCALE: N.T.S.  
ALTERNATE LAPS



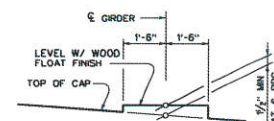
SPLICE DETAILS FOR BARS H & T  
SCALE: N.T.S.  
ALTERNATE LAPS



ABUT 36" DRILLED SHAFT DETAIL  
SCALE: 3/8" = 1'-0"



ABUT 18" DRILLED SHAFT DETAIL  
SCALE: 3/8" = 1'-0"

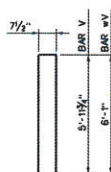


BEARING SEAT DETAIL

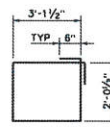
(BEARING SURFACE MUST BE CLEAN AND FREE OF ALL LOOSE MATERIAL BEFORE PLACING BEARING PAD.)  
N.T.S.

GENERAL NOTES:  
DESIGNED IN ACCORDANCE WITH 7TH EDITION TO AASHTO LRFD SPECIFICATIONS AND INTERMS (H-93 LOADING).  
CONCRETE STRENGTH  $f'_c = 3,600$  PSI.  
ALL CAP AND WALL REINFORCING MUST BE GRADE 60.  
SEE BRIDGE LAYOUT FOR HEADER SLOPE AND FOUNDATION TYPE, SIZE AND LENGTH.  
SEE CONCRETE RIPRAP STANDARD SHEET, CORR. FOR RIPRAP ATTACHMENT DETAILS, IF APPLICABLE.  
SEE APPLICABLE RAIL DETAILS FOR RAIL ANCHORAGE IN WINGWALLS.

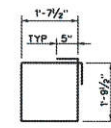
REINFORCING BAR DIMENSIONS SHOWN ARE TO CENTER OF BAR UNLESS OTHERWISE NOTED.



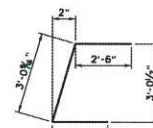
BARS V & wV



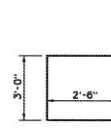
BARS S



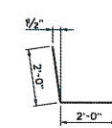
BARS wS



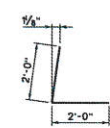
BARS U  
(FOR ABUT 1)



BARS U  
(FOR ABUT 4)



BARS L  
(FOR ABUT 1)



BARS L  
(FOR ABUT 4)

HLAS LOADING

DESIGNED BY:	
DESIGN CHECKED BY:	
DRAWN BY:	
CHECKED BY:	
SURVEY CHECKED BY:	
QA/QC BY:	
DATE:	
REVISION:	



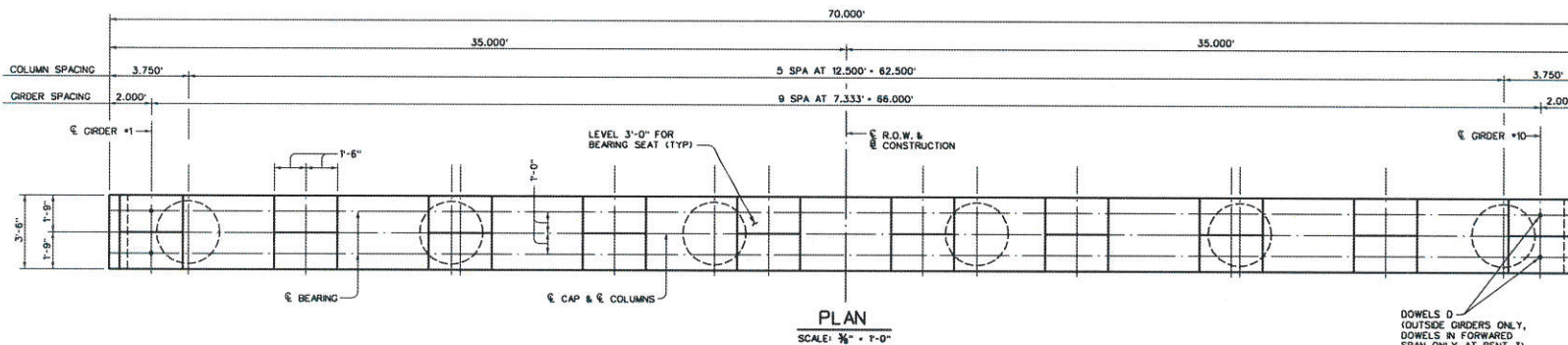
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FULSHEAR TRACE

ABUTMENT DETAILS



SHEET	6
OF	43
SHEETS	
JOB NO.	2014121-W21



BENT STATION	
BENT NO.	STATION
2	42+30.04
3	43+30.04

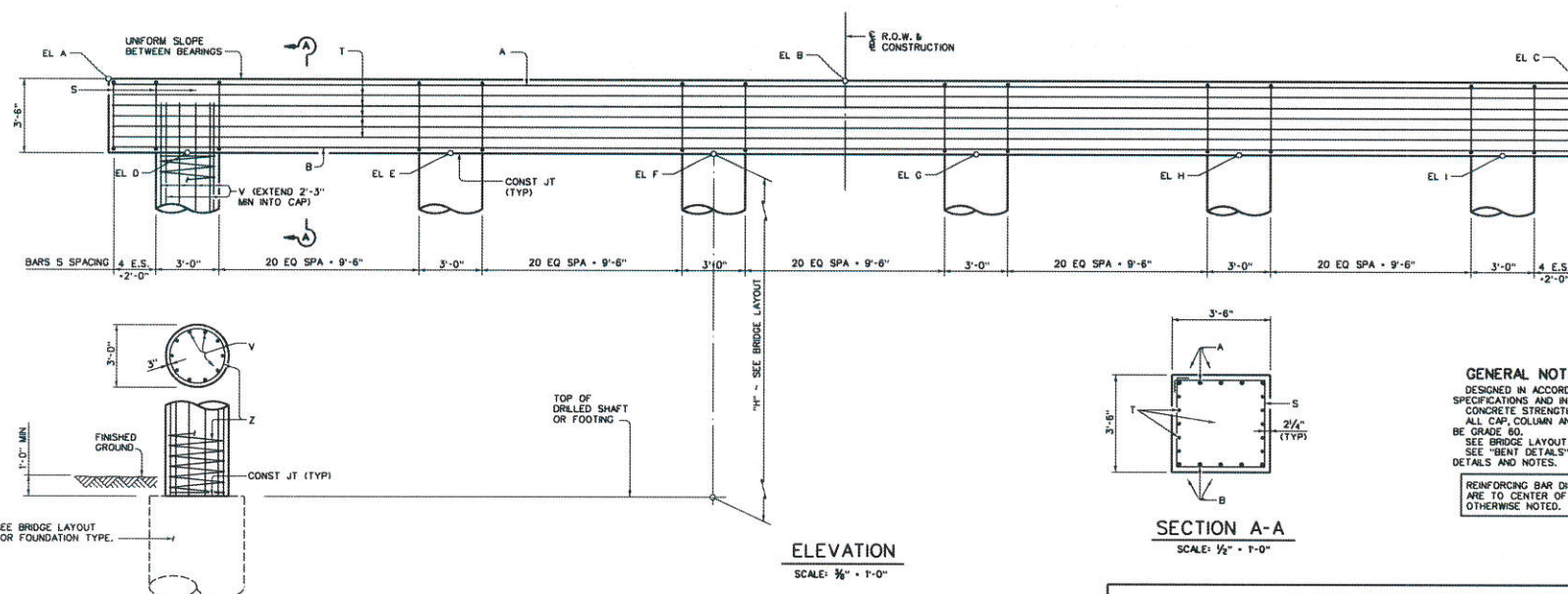


TABLE OF ELEVATIONS		
ELEVATION	BENT 2	BENT 3
EL A	105.083	105.268
EL B	105.811	105.996
EL C	105.083	105.268
EL D	101.661	101.846
EL E	101.921	102.106
EL F	102.181	102.366
EL G	102.181	102.366
EL H	101.921	102.106
EL I	101.661	101.846

**GENERAL NOTES:**  
 DESIGNED IN ACCORDANCE WITH 7TH EDITION TO AASHTO LRFD SPECIFICATIONS AND INTERMS (HL-93 LOADING).  
 CONCRETE STRENGTH  $f'_c = 3,600$  PSI.  
 ALL CAP, COLUMN AND DRILLED SHAFT REINFORCING MUST BE GRADE 60.  
 SEE BRIDGE LAYOUT FOR FOUNDATION TYPE, SIZE AND LENGTH.  
 SEE "BENT DETAILS" SHEET FOR ALL FOUNDATION DETAILS AND NOTES.

REINFORCING BAR DIMENSIONS SHOWN ARE TO CENTER OF BAR UNLESS OTHERWISE NOTED.

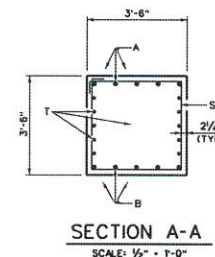


TABLE OF BEARING SEAT ELEVATIONS (FT)										
BENT	GRIDER 1	GRIDER 2	GRIDER 3	GRIDER 4	GRIDER 5	GRIDER 6	GRIDER 7	GRIDER 8	GRIDER 9	GRIDER 10
BENT 2 (BK)	105.250	105.403	105.555	105.708	105.860	105.860	105.707	105.555	105.402	105.250
BENT 2 (FWD)	105.276	105.429	105.582	105.734	105.887	105.887	105.734	105.582	105.429	105.276
BENT 3 (BK)	105.455	105.607	105.760	105.912	106.065	106.065	105.912	105.760	105.607	105.455
BENT 3 (FWD)	105.435	105.588	105.741	105.893	106.046	106.046	105.893	105.741	105.588	105.435

FULSHEAR TRACE

INTERIOR BENTS 2 AND 3



SHEET 7  
 OF 43 SHEETS  
 JOB NO. 2014121-021

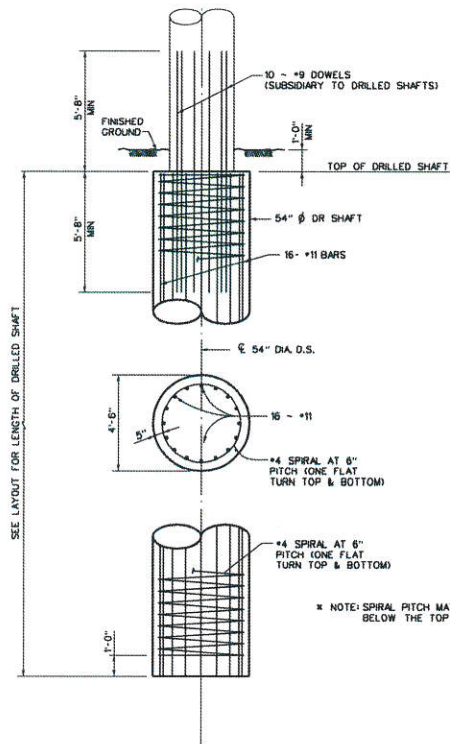


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 DESIGN CHECKED BY: \_\_\_\_\_  
 DRAWN BY: \_\_\_\_\_  
 CODE CHECKED BY: \_\_\_\_\_  
 SURVEY CHECKED BY: \_\_\_\_\_  
 QA/QC BY: \_\_\_\_\_ DATE: \_\_\_\_\_  
 QA/QC REVISIONS BY: \_\_\_\_\_

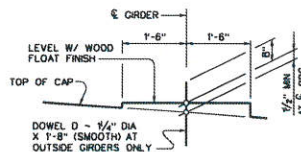
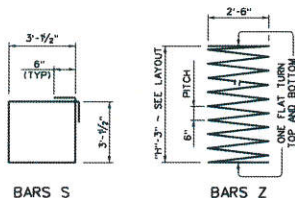
NO.	REVISION	DATE	BY





INTERIOR BENT DRILLED SHAFT DETAIL

SCALE: 3/8" = 1'-0"



BEARING SEAT DETAIL

(BEARING SURFACE MUST BE CLEAN AND FREE OF ALL LOOSE MATERIAL BEFORE PLACING BEARING PAD.)  
N.T.S.

TABLE OF ESTIMATED QUANTITIES BENT 2

BAR	NO.	SIZE	LENGTH	WEIGHT
Δ A	5	#11	76'-6"	2,032
Φ B	5	#11	75'-0"	1,992
Θ T	10	#5	71'-10"	749
D	4	1 1/4" D	1'-8"	28
S	115	#5	13'-6"	1,619
V	60	#9	24'-3"	4,947
Z	6	#3	358'-1"	809
REINFORCING STEEL * LB 12,176				
CLASS "C" CONCRETE (CAP) CY 32.2				
CLASS "C" CONCRETE (COL) CY 34.6				

TABLE OF ESTIMATED QUANTITIES BENT 3

BAR	NO.	SIZE	LENGTH	WEIGHT
Δ A	5	#11	76'-6"	2,032
Φ B	5	#11	75'-0"	1,992
Θ T	10	#5	71'-10"	749
D	2	1 1/4" D	1'-8"	14
S	115	#5	13'-6"	1,619
V	60	#9	19'-3"	3,927
Z	6	#3	279'-5"	630
REINFORCING STEEL * LB 10,963				
CLASS "C" CONCRETE (CAP) CY 32.2				
CLASS "C" CONCRETE (COL) CY 26.7				

TABLE OF FOUNDATION LOADS

BENT	DRILLED SHAFT LOAD
No.	TONS/SHAFT
2	295
3	313

FOR GENERAL NOTES, SEE INTERIOR BENTS SHEET.

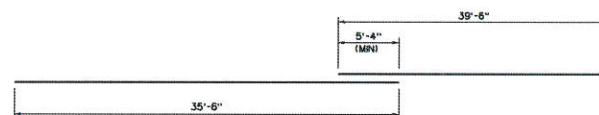
① QUANTITIES SHOWN ARE BASED ON "H" VALUE SHOWN ON BRIDGE LAYOUT. FOR EACH LINEAR FOOT VARIATION IN "H" VALUE, MAKE THE FOLLOWING ADJUSTMENTS:  
BARS V LENGTH, H ± 1'  
BARS Z LENGTH, ± 15'-9"  
REINFORCING STEEL, ± 40 LBS PER COLUMN  
CLASS "C" CONC (COL), 0.26 CY PER COLUMN

Δ INCLUDES ONE 6'-10" LAP SPICE  
Φ INCLUDES ONE 5'-4" LAP SPICE  
Θ INCLUDES ONE 2'-2" LAP SPICE  
\* FOR CONTRACTOR'S INFORMATION ONLY.



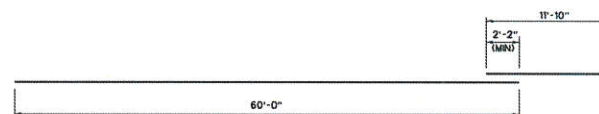
SPLICE DETAILS FOR BARS A

SCALE: N.T.S.  
ALTERNATE LAPS



SPLICE DETAILS FOR BARS B

SCALE: N.T.S.  
ALTERNATE LAPS



SPLICE DETAILS FOR BARS T

SCALE: N.T.S.  
ALTERNATE LAPS

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NO.	REVISION	DATE	BY

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DESIGN CHECKED BY:  
DRAWN BY:  
COORD CHECKED BY:  
SURVEY CHECKED BY:  
QA/QC BY: DATE:  
QA/QC REVISIONS BY:



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FULSHEAR TRACE

BENT DETAILS



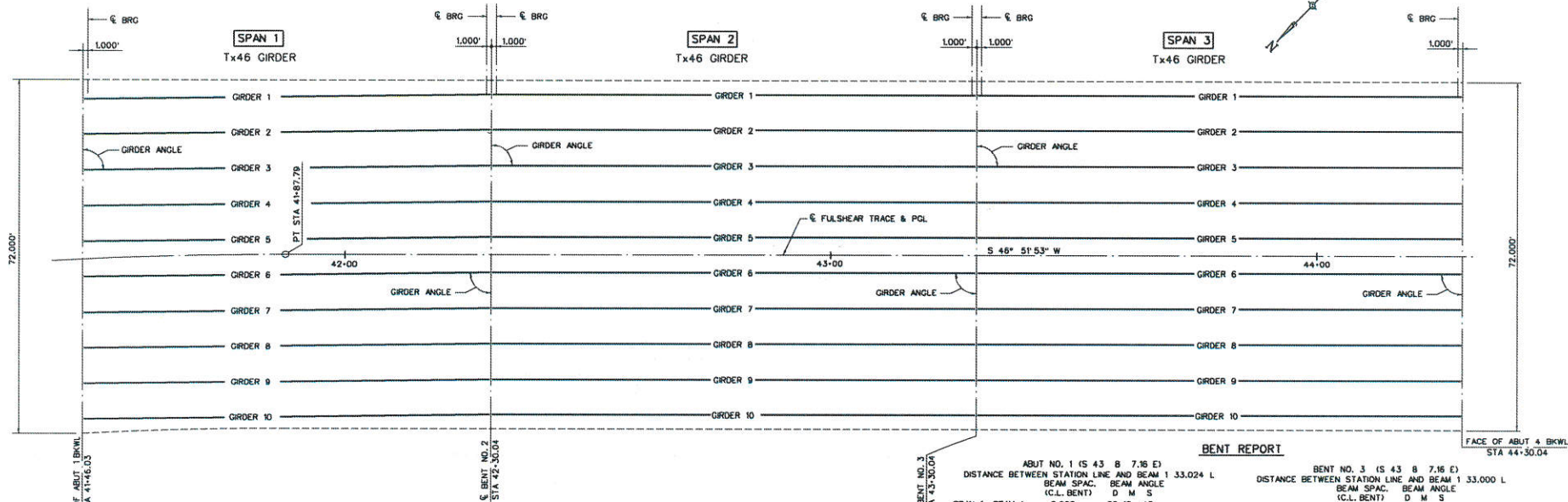
HLOS LOADING

SHEET 8

OF 43 SHEETS

JOB NO. 2014121-F21





#### GIRDER REPORT

##### GIRDER REPORT, SPAN 1

	HORIZONTAL DISTANCE	TRUE DISTANCE	GIRDER
	C-C BENT	C-C BRG.	BOT. GR. FLG.
			SLOPE
GIRDER 1	83.990	81.989	83.51
GIRDER 2	83.990	81.989	83.51
GIRDER 3	83.990	81.989	83.51
GIRDER 4	83.990	81.989	83.51
GIRDER 5	83.990	81.989	83.51
GIRDER 6	83.990	81.990	83.51
GIRDER 7	83.990	81.990	83.51
GIRDER 8	83.990	81.990	83.51
GIRDER 9	83.990	81.990	83.51
GIRDER 10	83.990	81.990	83.51

##### GIRDER REPORT, SPAN 2

	HORIZONTAL DISTANCE	TRUE DISTANCE	GIRDER
	C-C BENT	C-C BRG.	BOT. GR. FLG.
			SLOPE
GIRDER 1	100.000	98.000	99.50
GIRDER 2	100.000	98.000	99.50
GIRDER 3	100.000	98.000	99.50
GIRDER 4	100.000	98.000	99.50
GIRDER 5	100.000	98.000	99.50
GIRDER 6	100.000	98.000	99.50
GIRDER 7	100.000	98.000	99.50
GIRDER 8	100.000	98.000	99.50
GIRDER 9	100.000	98.000	99.50
GIRDER 10	100.000	98.000	99.50

##### GIRDER REPORT, SPAN 3

	HORIZONTAL DISTANCE	TRUE DISTANCE	GIRDER
	C-C BENT	C-C BRG.	BOT. GR. FLG.
			SLOPE
GIRDER 1	100.000	98.000	99.52
GIRDER 2	100.000	98.000	99.52
GIRDER 3	100.000	98.000	99.52
GIRDER 4	100.000	98.000	99.52
GIRDER 5	100.000	98.000	99.52
GIRDER 6	100.000	98.000	99.52
GIRDER 7	100.000	98.000	99.52
GIRDER 8	100.000	98.000	99.52
GIRDER 9	100.000	98.000	99.52
GIRDER 10	100.000	98.000	99.52

#### ESTIMATED QUANTITIES

ITEMS	UNIT	QUANTITY
TYPE Tx46 PRESTR CONC I-GIRDER	LF	2,825.30

#### NOTES:

- GIRDER LENGTHS SHOWN ARE BOTTOM GIRDER FLANGE LENGTHS WITH ADJUSTMENTS MADE FOR GIRDER SLOPE.
- SEE "ELASTOMETRIC BEARING & GIRDER END DETAILS" STANDARD ICEB FOR BEARING PAD DETAILS.

#### BENT REPORT

ABUT. NO. 1 (S 43° 8' 7.16" E)			
DISTANCE BETWEEN STATION LINE AND BEAM 1 33.024 L			
BEAM SPAC.	BEAM ANGLE	D	M S
(C.L. BENT)	(C.L. BENT)		
SPAN 1 BEAM 1	0.000	89	18 45
BEAM 2	7.334	89	18 45
BEAM 3	7.334	89	18 45
BEAM 4	7.334	89	18 45
BEAM 5	7.334	89	18 45
BEAM 6	7.334	89	18 45
BEAM 7	7.334	89	18 45
BEAM 8	7.334	89	18 45
BEAM 9	7.334	89	18 45
BEAM 10	7.334	89	18 45
TOTAL	66.005		

BENT NO. 2 (S 43° 8' 7.16" E)			
DISTANCE BETWEEN STATION LINE AND BEAM 1 33.000 L			
BEAM SPAC.	BEAM ANGLE	D	M S
(C.L. BENT)	(C.L. BENT)		
SPAN 1 BEAM 1	0.000	89	18 45
BEAM 2	7.334	89	18 45
BEAM 3	7.334	89	18 45
BEAM 4	7.334	89	18 45
BEAM 5	7.334	89	18 45
BEAM 6	7.334	89	18 45
BEAM 7	7.334	89	18 45
BEAM 8	7.334	89	18 45
BEAM 9	7.334	89	18 45
BEAM 10	7.334	89	18 45
TOTAL	66.005		

BENT NO. 3 (S 43° 8' 7.16" E)			
DISTANCE BETWEEN STATION LINE AND BEAM 1 33.000 L			
BEAM SPAC.	BEAM ANGLE	D	M S
(C.L. BENT)	(C.L. BENT)		
SPAN 2 BEAM 1	0.000	90	00 00
BEAM 2	7.333	90	00 00
BEAM 3	7.333	90	00 00
BEAM 4	7.333	90	00 00
BEAM 5	7.333	90	00 00
BEAM 6	7.333	90	00 00
BEAM 7	7.333	90	00 00
BEAM 8	7.333	90	00 00
BEAM 9	7.333	90	00 00
BEAM 10	7.333	90	00 00
TOTAL	66.000		

BENT NO. 3 (S 43° 8' 7.16" E)			
DISTANCE BETWEEN STATION LINE AND BEAM 1 33.000 L			
BEAM SPAC.	BEAM ANGLE	D	M S
(C.L. BENT)	(C.L. BENT)		
SPAN 2 BEAM 1	0.000	90	00 00
BEAM 2	7.333	90	00 00
BEAM 3	7.333	90	00 00
BEAM 4	7.333	90	00 00
BEAM 5	7.333	90	00 00
BEAM 6	7.333	90	00 00
BEAM 7	7.333	90	00 00
BEAM 8	7.333	90	00 00
BEAM 9	7.333	90	00 00
BEAM 10	7.333	90	00 00
TOTAL	66.000		

BENT NO. 3 (S 43° 8' 7.16" E)			
DISTANCE BETWEEN STATION LINE AND BEAM 1 33.000 L			
BEAM SPAC.	BEAM ANGLE	D	M S
(C.L. BENT)	(C.L. BENT)		
SPAN 3 BEAM 1	0.000	90	00 00
BEAM 2	7.333	90	00 00
BEAM 3	7.333	90	00 00
BEAM 4	7.333	90	00 00
BEAM 5	7.333	90	00 00
BEAM 6	7.333	90	00 00
BEAM 7	7.333	90	00 00
BEAM 8	7.333	90	00 00
BEAM 9	7.333	90	00 00
BEAM 10	7.333	90	00 00
TOTAL	66.000		

BENT NO. 3 (S 43° 8' 7.16" E)			
DISTANCE BETWEEN STATION LINE AND BEAM 1 33.000 L			
BEAM SPAC.	BEAM ANGLE	D	M S
(C.L. BENT)	(C.L. BENT)		
SPAN 3 BEAM 1	0.000	90	00 00
BEAM 2	7.333	90	00 00
BEAM 3	7.333	90	00 00
BEAM 4	7.333	90	00 00
BEAM 5	7.333	90	00 00
BEAM 6	7.333	90	00 00
BEAM 7	7.333	90	00 00
BEAM 8	7.333	90	00 00
BEAM 9	7.333	90	00 00
BEAM 10	7.333	90	00 00
TOTAL	66.000		

FULSHEAR TRACE

FRAMING PLAN



SHEET 9

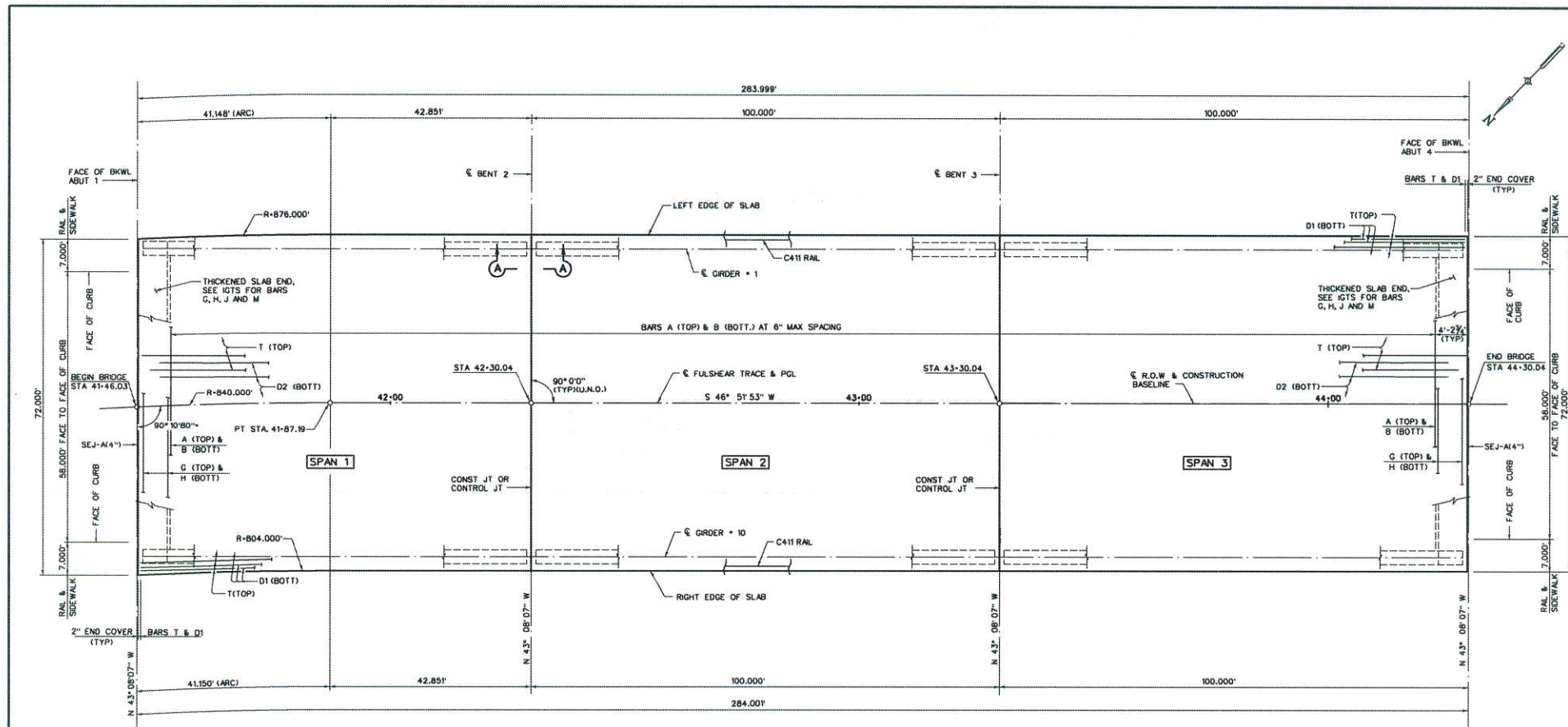
OF 43 SHEETS

JOB NO. 2014121-W21



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DESIGN CHECKED BY: \_\_\_\_\_  
DRAWN BY: \_\_\_\_\_  
GOOD CHECKED BY: \_\_\_\_\_  
SUBVY CHECKED BY: \_\_\_\_\_  
QA/QC BY: \_\_\_\_\_ DATE: \_\_\_\_\_  
QA/QC REVISIONS BY: \_\_\_\_\_



# PRESTRESSED I-GIRDER UNIT

SCALE: 1" = 10'-0"

NOTES:  
FOR GENERAL NOTES SEE "SLAB DETAILS" SHEET.  
\* MEASURED RADIAL TO CURVE.

P:\Projects\2014\121-721\Drawings\10-SLAB PLAN.dwg

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FULSHEAR TRACE

SLAB PLAN



SHEET	10
OF	43 SHEETS
JOB NO.	2014121-721







DATE: \_\_\_\_\_  
FILE: \_\_\_\_\_

STRUCTURE	DESIGNED GIRDERS								STRAIGHT STRAND PATTERN										DEPRESSED STRAND ① PATTERN			CONCRETE		OPTIONAL DESIGN				
	SPAN NO.	GIRDER NO.	GIRDER TYPE	PRESTRESSING STRANDS					TOT NO. DEB	DEBOINED STRANDS PER ROW							NO.	T <sub>U</sub> END (in)	T <sub>O</sub> (in)	RELEASE STRENGTH ② (ksi)	MINIMUM JOINT COMP. STRENGTH P <sub>c</sub> (ksi)	DESIGN LOAD TOP STRESS (TOP C) (SERVICE I)	DESIGN TENSILE STRESS (BOT C) (SERVICE III)	REQUIRED MINIMUM ULTIMATE CAPACITY (STRENGTH II) (WIP-III)	LIVE LOAD DISTRIBUTION FACTOR ③			
				TOTAL NO.	SIZE (in)	STRENGTH (ksi)	"e" IN	"d" END (in)		DIST FROM BOTTOM (in)	NO. OF STRANDS	NUMBER OF STRANDS DEBOINED TO (E) (FROM BOT)																
												TOTAL	DE-BONDED	3	6	9									12	15		
FULSHEAR TRACÉ BRIDGE	1	1-3 B-10	T+48	28	0.6	270	13.89	13.89										2	42.5	42.5	4700	5600	2.860	-3.052	4877	0.633	0.767	
	1	4-7	T+46	28	0.6	270	13.76	13.76										2	42.5	42.5	4300	5200	2.817	-2.931	4673	0.633	0.767	
	26.3	1-3 B-10	T+46	42	0.6	270	13.89	13.38	6	2.5 4.5	14 14	4 2	0 2	0 0	2 0	0 0	2 0	2	42.5	42.5	5900	6500	4.074	-4.242	6545	0.604	0.767	
	26.3	4-7	T+46	38	0.6	270	13.92	13.49	4	2.5	14	4	0	2	0	2	0	2	42.5	42.5	5400	6500	4.016	-4.067	6254	0.604	0.767	

[illegible]

① When TO END (in) equals TO  $\bar{C}$  (in), place these straight strands at the defined TO values. Fill the lower rows with the remainder of the total number of strands in accordance with the Debonded Strand Designs notes.

② Based on the following allowable stresses (ksi):

$$\text{Compression} = 0.65 f'_{ci}$$

$$Tension = 0.24 \sqrt{f'cI}$$

Optional designs must likewise conform

③ *Portion of full HL93.*

DESIGN NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

Optional designs for girders 120 feet or longer must have a calculated residual camber equal to or greater than that of the designed girder.

Prestress losses for the designed girders have been calculated for a relative humidity of 70 percent. Optional designs must likewise conform.

FABRICATION NOTES:

**CONSTRUCTION NOTES:**  
Provide Class H concrete.

Provide Grade 60 reinforcing steel bars.

Use low relaxation strands, each pretensioned to 75 percent of  $f_{pu}$ .

Strand debonding must comply with Item 424.4.2.2.4. Full-length debonded strands are only permitted in positions marked  $\Delta$ . Double wrap full-length debonded strands in outer most position of each

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

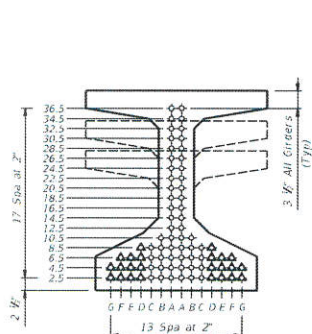
### DEBONDED STRAND DESIGNS:

Locate strands for the designed girder as low as possible on the 2" grid system unless a non-standard strand pattern is indicated. Fill row "2.5", then row "4.5", then row "6.5", etc. Place strands within a row as follows:

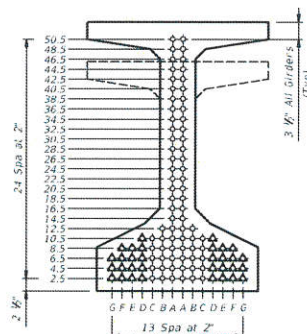
- 1) Locate a strand in each "A" and outer most positions.
  - 2) Place strand symmetrically about vertical centerline of girder.
  - 3) Space strands as equally as possible across the entire width.
- Do not debond strands in position "G". Distribute debonded strands symmetrically about the vertical centerline. Increase debonded lengths working outward, with debonding staggered in each row.

DEPRESSED STRAND DESIGNS:

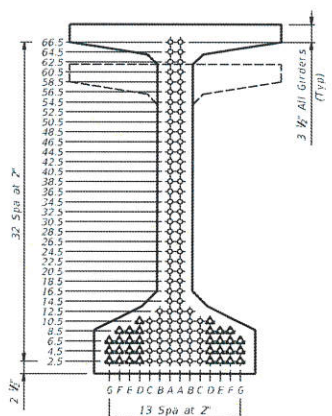
Locate strands for the designed girder as low as possible on the 2" grid system unless a non-standard strand pattern is indicated. Fill row "2.5", then row "4.5", then row "6.5", etc., beginning each row in the "A" position and working outward until the required number of strands is reached. All strands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



TYPE Tx28, Tx34 & Tx40



TYPE Tx46 & Tx54



TYPE Tx62 & Tx70



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### HL93 LOADING



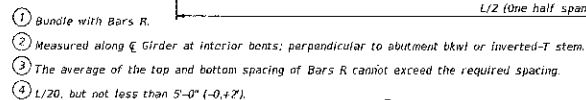
Texas Department of Transportation

**Bridge  
Division  
Standard**

## PRESTRESSED CONCRETE I-GIRDER DESIGNS (NON-STANDARD SPANS)

## IGND

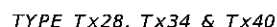
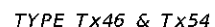
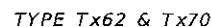
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	DESC	CORRECT		SHEET NO
				12

DATE:  
FILE:

- (6) Bars P (#6 x 15'-0") required in TxD6 and TxD70 girders. At the fabricator's option bars larger than #6 may be used. When L is less than 50 ft, Bars P are to be the same length as Bars S.
- (7) Bars P (#6 x 15'-0") are only required in TxD28, TxD31, TxD40, TxD46, and TxD54 girders when "e" at girder ends exceeds 0.25 x "D". At the fabricator's option bars larger than #6 may be used. When L is less than 50 ft, Bars P are to be the same length as Bars T.
- (8) 1 3/8" Clear Cover to Bars S.
- (9) Space Bars A at 6" Max for girders requiring overhang bracket hangers. Space at 12" Max for all other girders. Tie to Bars R as necessary. See standard IGMS for "Deck Forming Notes".
- (10) Based on 155 pcf total weight of concrete and reinforcing steel.
- (11) Smooth trowel finish on the slab overhang side of exterior girder.

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

**GENERAL NOTES:**  
Designed according to AASHTO LRFD Bridge Design Specifications.  
Provide Class H concrete.  
Provide Grade 60 reinforcing steel.  
An equal area of deformed welded wire reinforcement (WWR) (ASTM A1064) may be substituted for Bars A, C, R or T unless otherwise noted.  
It is permissible for bars or strands to come in contact with materials used in forming anchor holes.  
Cover dimensions are clear dimensions, unless noted otherwise. Reinforcing bar dimensions shown are out-to-out of bar.



*SHEET 1 OF 2*

Bridge  
Division  
Standard

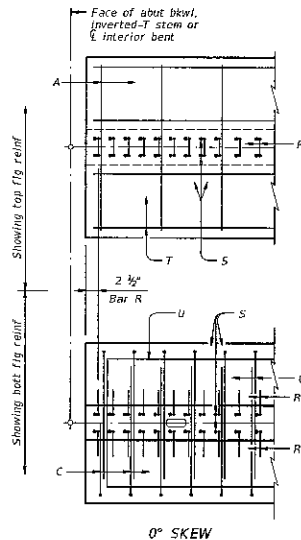
## PRESTRESSED CONCRETE I-GIRDER DETAILS

IGD

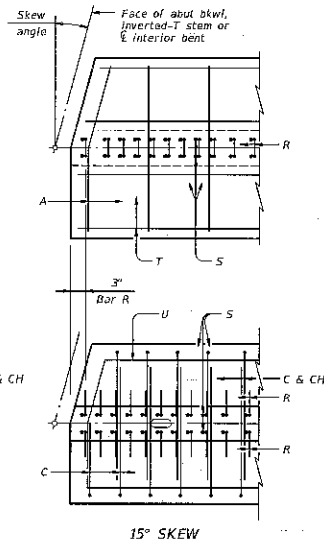
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					13

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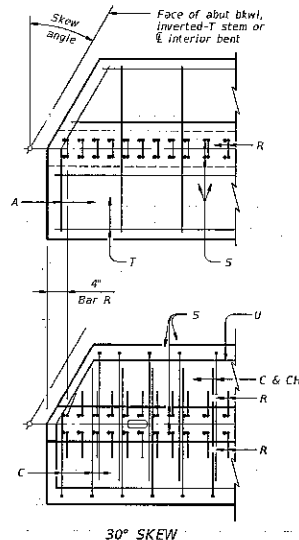
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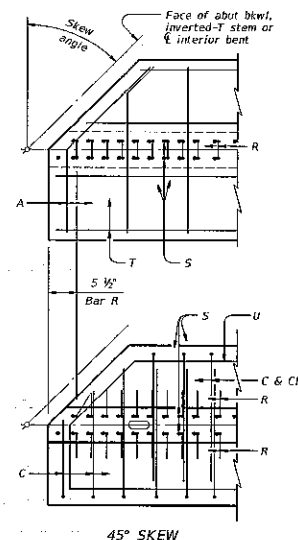
0° SKEW



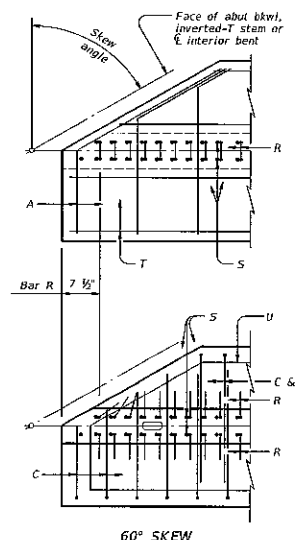
15° SKEW



30° SKEW



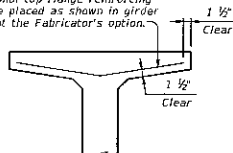
45° SKEW



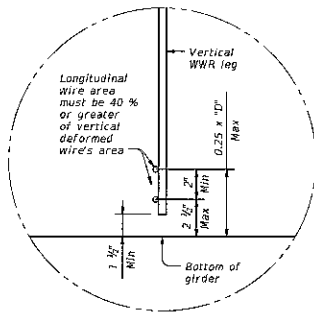
60° SKEW

# PLAN OF GIRDER ENDS (12)

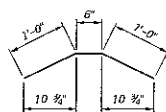
To control top flange cracking that may occur during form removal, additional top flange reinforcing may be placed as shown in girder ends at the Fabricator's option.



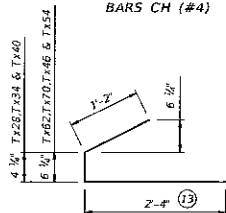
OPTIONAL TOP FLANGE REINFORCING DETAIL



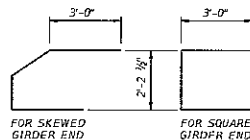
OPTIONAL WELDED WIRE REINFORCEMENT (WWR) DETAIL



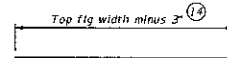
BARS CH (#4)



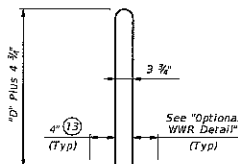
BARS C (#4)



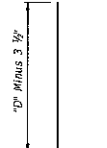
BARS U (#5)



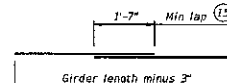
BARS A (#3)



BARS R (#4) (16)



BARS S (#6)



BARS T (#4)

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

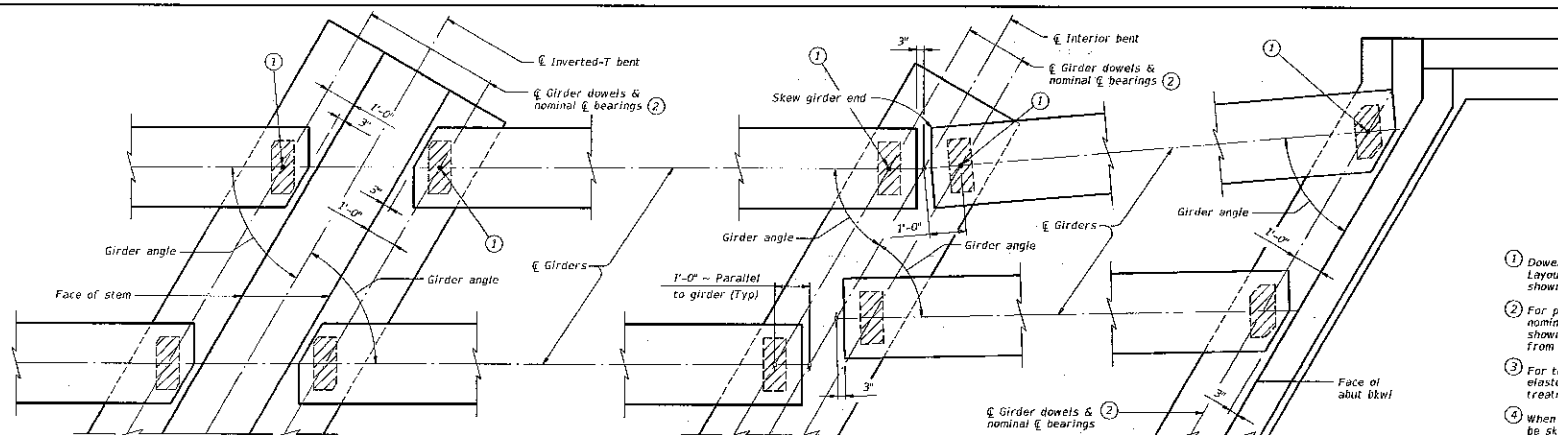
HL93 LOADING SHEET 2 OF 2

Texas Department of Transportation		Bridge Division Standard	
PRESTRESSED CONCRETE I-GIRDER DETAILS			
IGD			
File: Igsdstd-17.dgn	Dr: TADOT	Ce: JAH	Dw: JFA
August 2013	Cont: SECT	Job: PRESTRESS	
REVISIONS		County:	Sheet no: 14



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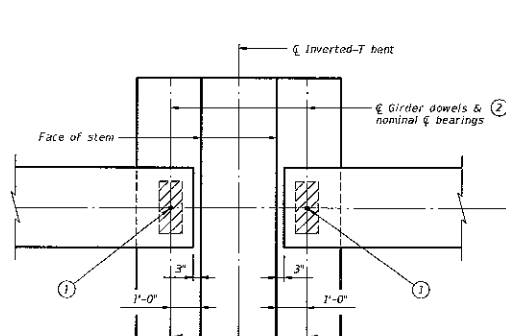
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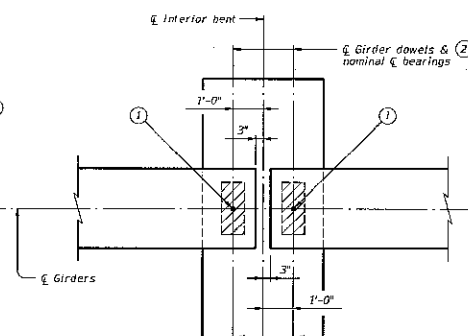
AT INVERTED-T BENT W/SKEW

AT CONVENTIONAL INTERIOR BENT W/SKEW

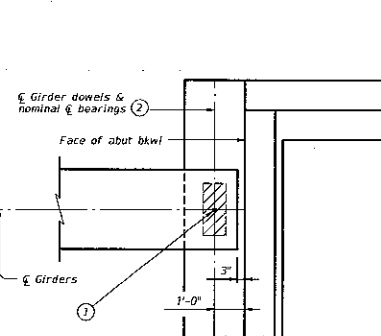
AT ABUTMENT W/SKEW<sup>3</sup>



AT INVERTED-T BENT



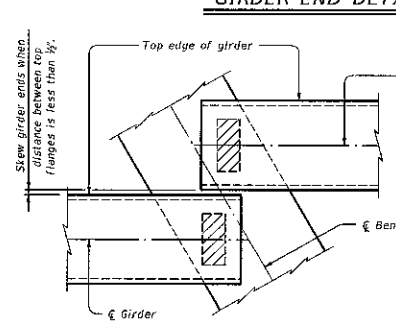
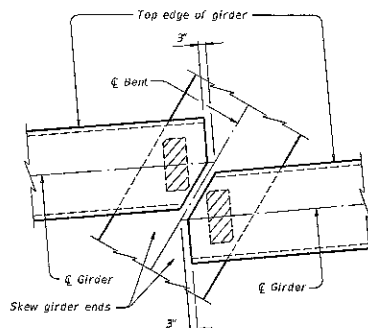
AT CONVENTIONAL INTERIOR BENT



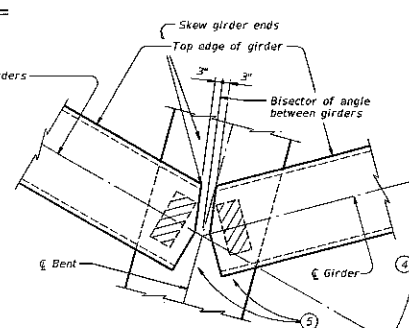
AT ABUTMENT<sup>3</sup>

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

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



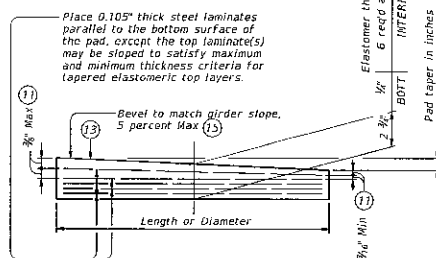
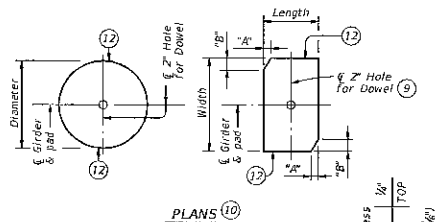
GIRDER CONFLICT DETAILS



HL93 LOADING SHEET 1 OF 3

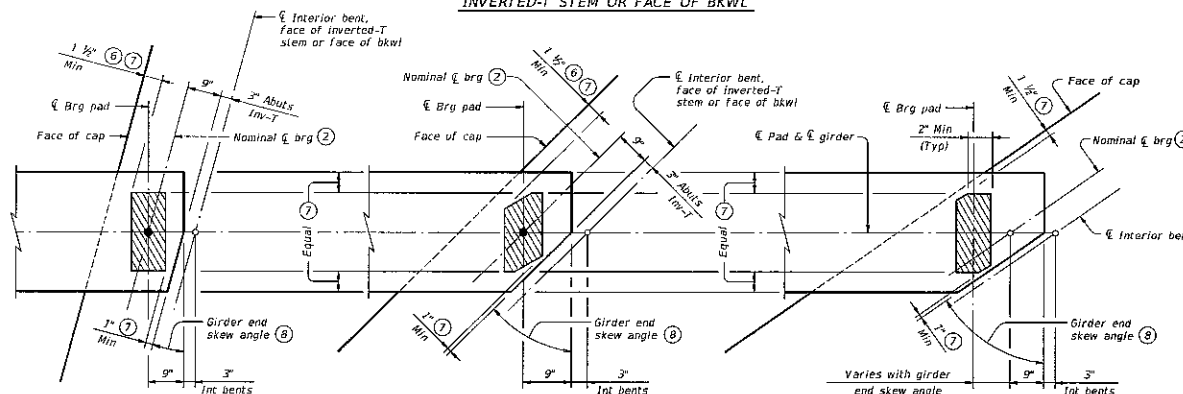
Texas Department of Transportation		Bridge Division Standards	
<b>ELASTOMERIC BEARING AND GIRDER END DETAILS PRESTR CONCRETE I-GIRDERS</b>			
<b>IGEB</b>			
FILE: Igebrst-17.dgn	DATE: AUG 2017	REV: 1	BY: JTR
PROJECT: AUGUST 2017	SECTION: AUG	INCHES: 1/4"	INCHES: 1/4"
REVISIONS		COUNTRY	SHEET NO. 15

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**LAMINATED ELASTOMERIC BEARING PAD**  
(50 DUROMETER)

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



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

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

**BEARING PAD PLACEMENT DIAGRAMS**

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

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

- (2) For purposes of computing bearing seat elevations, nominal centerline of bearing must be defined as shown. The actual center of bearing pad may vary from this line.
- (6) 3" for inverted-T.
- (7) Place centerline pad as near nominal centerline bearing as possible between limits shown.
- (8) Girder end skew angle is equal to 90° minus the girder angle except at some conflicting girders.
- (9) Provide 2" dia hole only at locations required. See Substructure details for location.
- (10) See Table of Bearing Pad Dimensions for dimensions.
- (11) Maximum and minimum layer thicknesses shown are for elastomer only, on tapered layers.
- (12) Locate Permanent Mark here.
- (13) Indicate BEARING TYPE on all pads. For tapered pads, locate BEARING TYPE on the high side. The Fabricator must include the value of "N" (amount of taper in 1/8" increments) in this mark.  
Examples: N=0, (for 0° taper)  
N=1, (for 1/8" taper)  
N=2, (for 1/4" taper)  
(etc.)  
Fabricated pad top surface slope must not vary from plan girder slope by more than (0.0025" / 1N/1N).
- (14) Substructure dimensions must satisfy the minimums provided to accommodate the elastomeric bearings shown on this standard.
- (15) See sheet 3 of 3 for beveled plate use when slopes exceed 5 percent.
- (16) If girder end is skewed for a girder conflict at an interior bent and a beveled sole plate is required, use bearing type for abutments at this location. Location of bearing centerline is to be set as for abutments in this case.

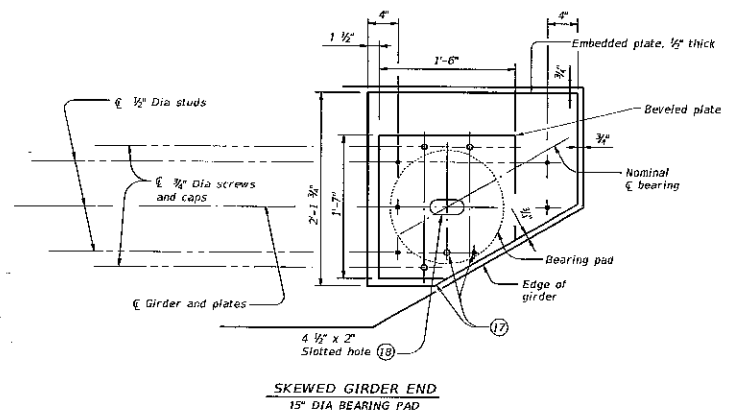
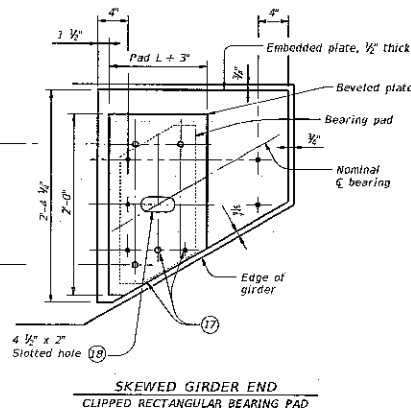
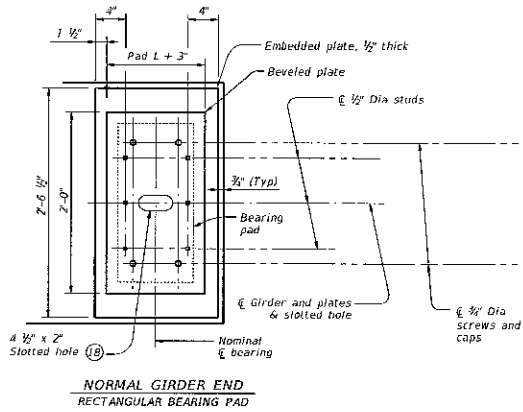
HL93 LOADING

SHEET 2 OF 3

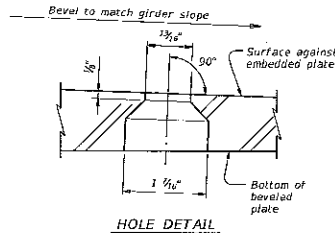
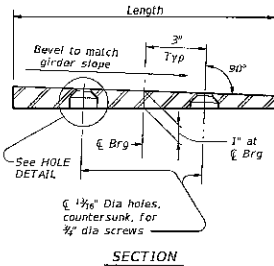
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<b>IGEB</b>			
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Project: [blank] County: [blank]		Sheet No. 18	

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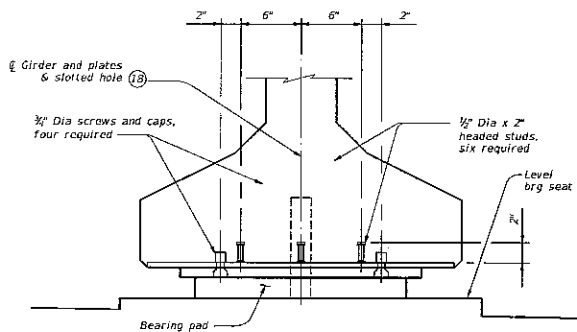
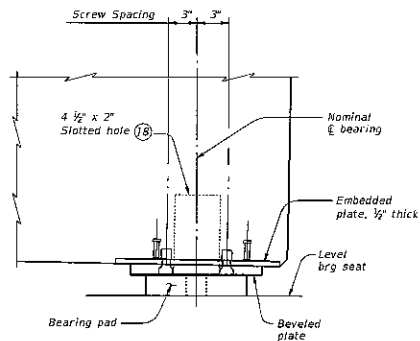


### PLAN VIEW OF SOLE PLATE DETAILS



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

### BEVELED PLATE DETAILS



### GIRDER DETAILS

Showing normal girder end.

### SOLE PLATE NOTES:

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

On the shop drawings, dimension sole plates to the nearest 1/8 inch based on required thickness at centerline of bearing and slope of girder. Thickness tolerance variation from the approved shop drawings is 1/16 inch +/-, except variation from a plane parallel to the theoretical top surface can not exceed 1/8 inch total. Bearing surface tolerances listed in item 424 apply to embedded and beveled plates.

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

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


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

1/2 inch Dia screws must be electroplated, socket flat head countersunk cap screws conforming to ASTM F335. Electroplating must conform to ASTM B633, SC 2, Type 1. Provide screws long enough to maintain a 3/4 inch minimum embedment into the embedded plate and galvanized cap. Provide galvanized steel caps (16 ga Min) with a nominal 1 inch inside diameter and deep enough to accommodate the screws, but not less than 1/2 inch deep or deeper than 1 inch.

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

HL93 LOADING

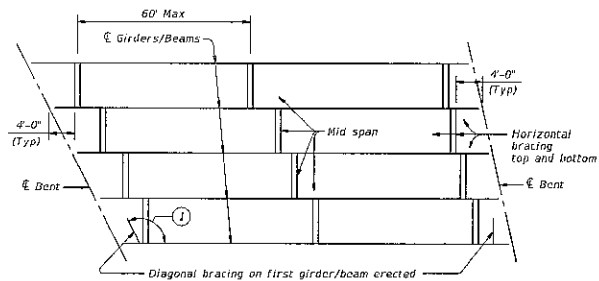
SHEET 3 OF 3

 Texas Department of Transportation				Bridge Division Standard	
<b>ELASTOMERIC BEARING AND GIRDER END DETAILS</b>					
<b>PRESTR CONCRETE I-GIRDERS</b>					
<b>IGEB</b>					
file: igeb01-17.dgn		DR: AEE	CHK: JMH	DN: JTR	CD: 17A001
17A001 August 2017		CONF: SECT	DES: JES	HOLDING	
REVISING:		DIST:	COUNTY:	SHEET NO. 17	

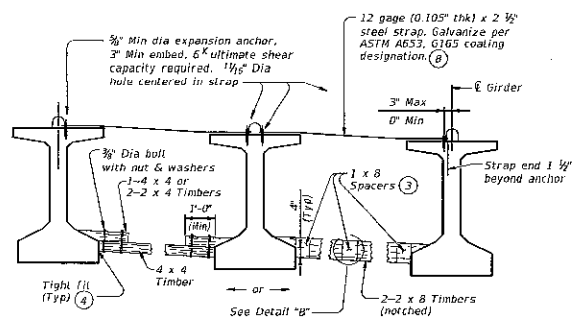


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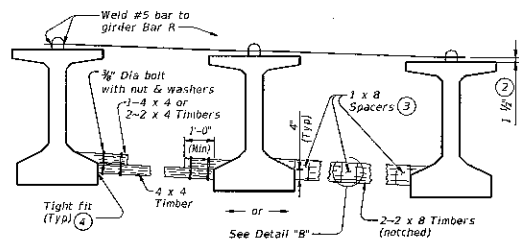


### ERECTION BRACING



### FOR ERECTION BRACING, OPTION 1

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

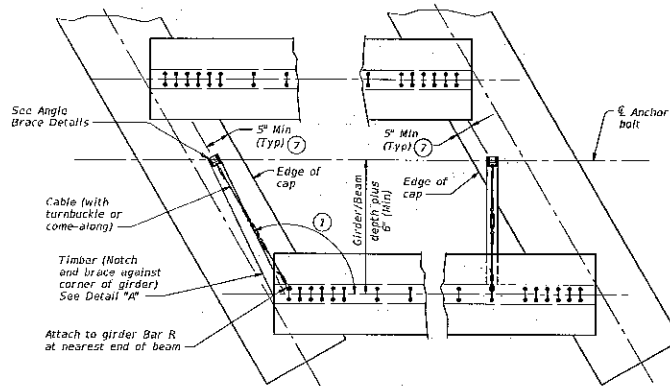


### FOR ERECTION BRACING, OPTION 2

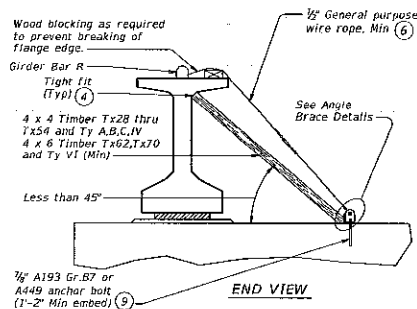
### HORIZONTAL BRACING DETAILS



### DETAIL "B"



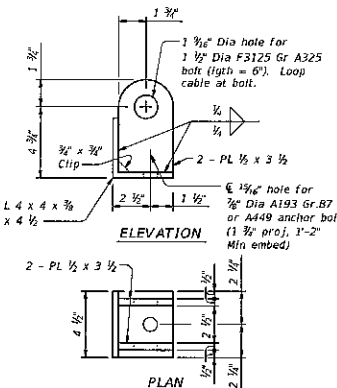
### PLAN



### END VIEW

### DIAGONAL BRACING DETAILS

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



### PLAN

### ANGLE BRACE DETAILS

### HAULING & ERECTION:

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

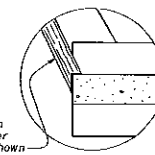
### ERECTION BRACING:

Erection bracing details shown are considered the minimum for fulfilling the bracing requirements of Item 425.

Required erection bracing must be placed immediately after erection of each girder and remain in place until additional bracing as required for slab placement is in place. This standard is needed in all cases to meet requirements for Slab Placement Bracing.


### PHASED CONSTRUCTION:

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



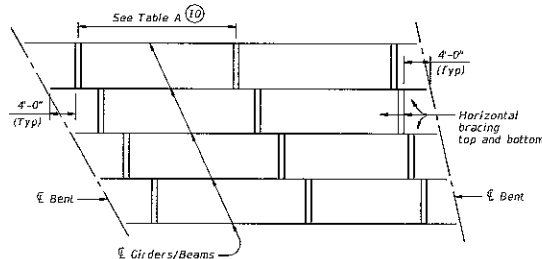
1. If angle shown exceeds 120 degrees, move diagonal brace to other side of girder/beam and place square to girder/beam. This may prevent exterior girder from being erected first.
2. Place and weld #5 bars as shown during erection. If forming deck with prestressed panels, bars can be temporarily removed,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

SHEET 1 OF 2

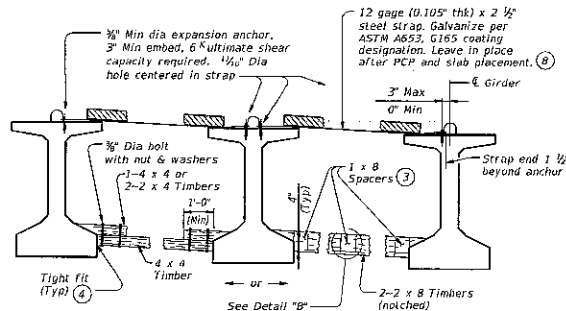
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MINIMUM ERECTION AND BRACING REQUIREMENTS PRESTRESSED CONCRETE I-GIRDERS AND I-BEAMS					
MEBR(C)					
FILE: mebr(c)-17.dgn	DATE: TXDOT	DATE: TXDOT	DATE: TXDOT	DATE: TXDOT	DATE: TXDOT
TXDOT August 2017	CONF	SECT	JOB	TOWN/HA	
REVISIONS					
	LAST	COUNTY		SHEET NO.	
				18	

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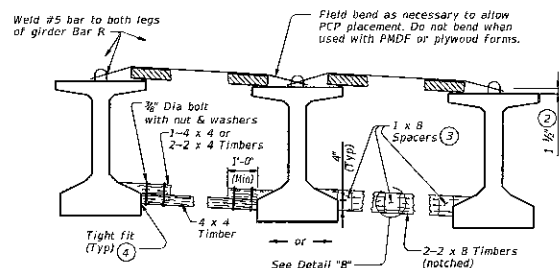
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**SLAB PLACEMENT BRACING**



**FOR SLAB PLACEMENT BRACING, OPTION 1 - RIGID**  
(Showing slab formed with PCP. This option is not allowed when slab is formed with PMDF or plywood.)



**FOR SLAB PLACEMENT BRACING, OPTION 2 - FLEXIBLE**  
(Showing slab formed with PCP.)

**HORIZONTAL BRACING DETAILS (5)**

TABLE A		
OPTION 1-RIGID BRACING (STEEL STRAP)		
Girder or Beam Type	Maximum Bracing Spacing	
	Slab Overhang less than 4'-0" (1)	Slab Overhang 4'-0" and greater (1)
Tx28	1/4 points	1/4 points
Tx34	1/4 points	1/4 points
Tx40	1/4 points	1/4 points
Tx46	1/4 points	1/4 points
Tx54	1/4 points	1/4 points
Tx62	1/4 points	1/4 points
Tx70	1/4 points	1/4 points
A	1/4 points	1/4 points
B	1/4 points	1/4 points
C	1/4 points	1/4 points
IV	1/4 points	1/4 points
VI	1/4 points	1/4 points

OPTION 2-FLEXIBLE BRACING (NO. 5 OVER PCP)		
Girder or Beam Type	Maximum Bracing Spacing	
	Slab Overhang less than 4'-0" (1)	Slab Overhang 4'-0" and greater (1)
Tx28	1/4 points	1/4 points
Tx34	1/4 points	1/4 points
Tx40	1/4 points	1/4 points
Tx46	1/4 points	1/4 points
Tx54	1/4 points	1/4 points
Tx62	1/4 points	1/4 points
Tx70	1/4 points	1/4 points
A	2.0 ft	1.5 ft
B	3.0 ft	2.0 ft
C	4.5 ft	2.0 ft
IV	1/4 points	4.0 ft
VI	1/4 points	4.0 ft

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

#### SLAB PLACEMENT BRACING:

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

#### GENERAL NOTES:

Bracing details for spans longer than 150' are not provided. The Contractor must submit proposed bracing details for such conditions to the Engineer for approval prior to erection. Systems equal to or better than those shown may be used provided details of such systems are submitted to and approved by the Engineer prior to erection. Use of these systems or details does not relieve the Contractor of the responsibility for the adequacy of the bracing and the safety of the structure.

Removal of bracing for short periods of time to align girders and beams is permissible.

All turn-buckles, come-alongs, anchors and other connections must be capable of developing the full strength of the cable shown.

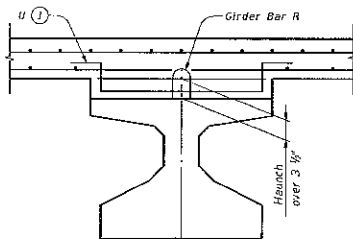
Furnish anchor bolts and nuts in accordance with Item 449, "Anchor Bolts".

SHEET 2 OF 2

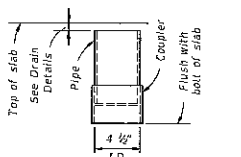
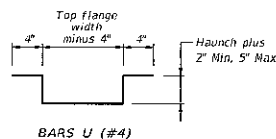
Texas Department of Transportation		Bridge Division Standard	
<b>MINIMUM ERECTION AND BRACING REQUIREMENTS</b>			
<b>PRESTRESSED CONCRETE I-GIRDERS AND I-BEAMS</b>			
<b>MEBR(C)</b>			
FILE: MEBR(C)-17.dgn	DR: TADOT	CHK: TADOT	IN: TADOT
DATE: August 2017	DRP: MCB	NO: MCB	MEBR(C)
REVISED:	DATE:	COUNTY:	SHEET NO. 19



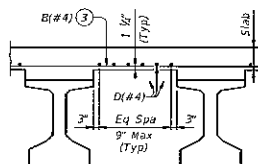
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**HAUNCH REINFORCING DETAIL**

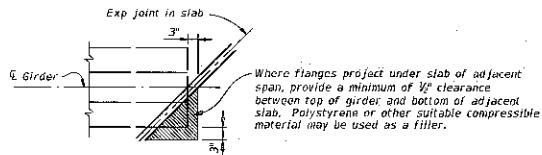


**C-I-P DRAIN DETAIL**

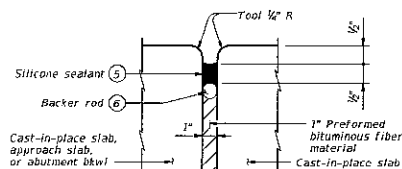


**TYPICAL PART TRANSVERSE SLAB SECTION WITHOUT PCP**

Top reinforcing steel not shown for clarity.

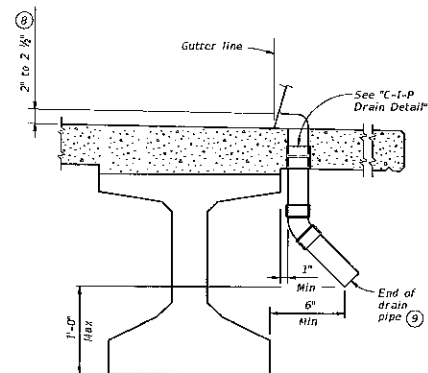


**TREATMENT AT GIRDER END FOR SKEWED SPANS**



**TYPE A JOINT DETAIL**

- ① Space Bars U with girder Bars R in all areas where measured haunch exceeds 3 1/2".
- ② Roughen outside of PVC with coarse rasp or equal to ensure bond with cast-in-place concrete.
- ③ Bars B(#4) spaced at 9" Max with 2" end cover. Overhang option. Contractor's may end alternating bars R(#4) at centerline outside girder.
- ④ Provide Grade 60 reinforcing steel. Provide bar laps, where required, as follows:  
Uncoated - #4 = 1'-7"  
Epoxy coated - #4 = 2'-5"
- ⑤ Class 7 silicone sealant that conforms to DNS-6210. Install when ambient temperature is between 35°F and 85°F and rising. Engineer to determine allowable hours for sealant application.
- ⑥ 1 1/2" backer rod must be compatible with joint sealant. Use of multiple pieces to create a backer rod cross section is not permitted. Top of backer rod must be convex as shown.
- ⑦ The maximum distance between Type A expansion joints is 100'. See Bridge Layout for location of joints. Type A joints are subsidiary to Item 422, "Concrete Superstructures".
- ⑧ Drain entrance formed in rail or sidewalk.
- ⑨ Water may not be discharged onto girders.
- ⑩ All drain pipe and fittings to be 4" diameter (Sch 40) PVC. See Item 481 "Pipe for Drains" for pipe, connections and solvent welding. Bend reinforcing steel to clear PVC 1". Drain length and location is as directed by the Engineer. Drains are not permitted over roadways or railways, or within 10'-0" of bent caps. Degrease outside of exposed PVC, apply acrylic water base primer, then coat with same surface finishing material as used for outside girder face. Variations of the above designs, as required for the type of rail used and its location on the structure, may be installed with the approval and direction of the Engineer.



**DRAIN DETAIL**

**GENERAL NOTES:**  
Designed according to AASHTO LRFD Bridge Design Specifications.  
All items (reinforcing steel, drains, joint formers, etc.) shown on this sheet are subsidiary to other bid items.

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

**DECK FORMWORK NOTES:**  
Overhang bracket hangers are limited to a safe working load of 3,500 lbs. applied to and along the axis of a cut rod at 45 degrees from vertical, regardless of higher loads permitted by hanger manufacturers. Do not place a hanger less than 12" from girder end. Space hangers accordingly.

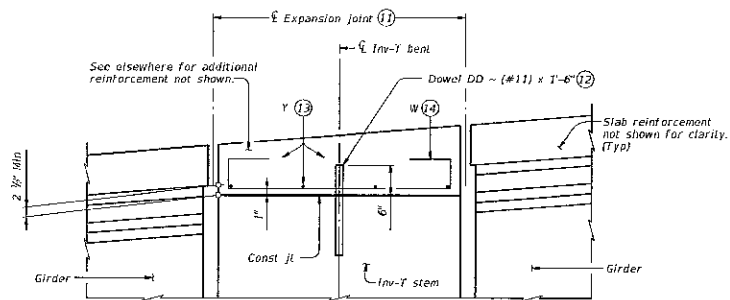
SHEET 1 OF 2

		Bridge Division Standard	
<b>MISCELLANEOUS SLAB DETAILS</b> <b>PRESTR CONCRETE I-GIRDERS</b>			
<b>IGMS</b>			
FILE: IGMS17-09 C:\TxDOT\August 2017 REVIEWS	DR: JED CHK: JED DES: JED	CR: TxDOT PW: JER JWS HOSKINS	CR: TxDOT PW: JER JWS HOSKINS
COUNTY:		SHEET NO.: 20	

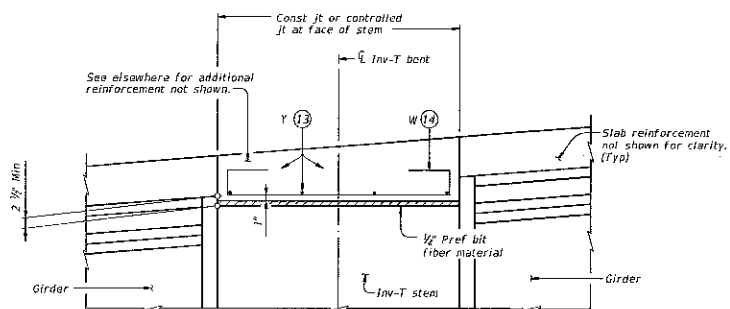
DATE: FILE:

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DATE:  
FILE:

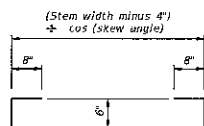


**SHOWING EXPANSION JOINTS**

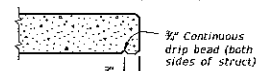


**SHOWING CONST JTS OR CONTROLLED JTS**

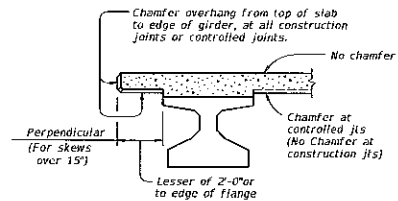
**REINFORCEMENT OVER INV-T BENTS**



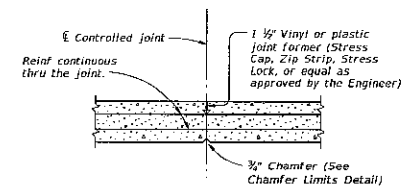
**BARS W (#4)**



**DRIP BEAD DETAIL**



**CHAMFER LIMITS DETAIL (15)**



**CONTROLLED JOINT DETAIL**

(Saw-cutting is not allowed)

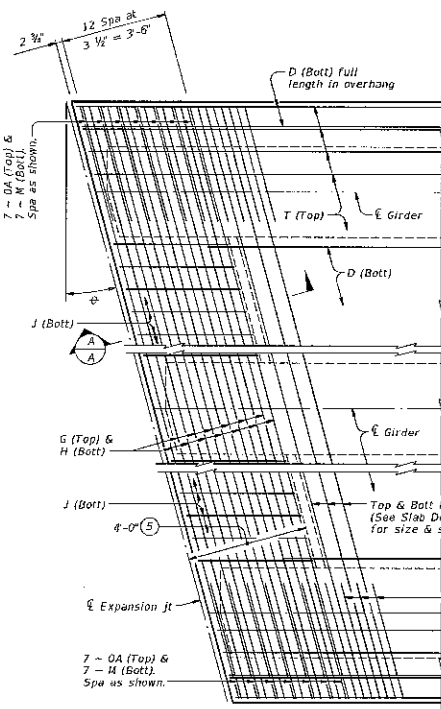
- (11) See Layout for joint type.
- (12) Dowels DD (#11) spaced at 5 Ft Max. See Inv-T bents for quantity and location.
- (13) Space Bars Y (#4) at 12" Max. Use 2" end cover. Number of Bars Y must satisfy spacing limit. Place parallel to bent.
- (14) Space Bars W at 12" Max (3" from end of cap). Tilt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

SHEET 2 OF 2

		Bridge Division Standard	
<b>MISCELLANEOUS SLAB DETAILS PRESTR CONCRETE I-GIRDERS</b>			
<b>IGMS</b>			
PREP: Igms-174ggs AUGUST 2017 REVISIONS	DES: TxDOT CON: SECT AUT:	CH: TxDOT DES: JTA APPROV:	SHEET NO. 21

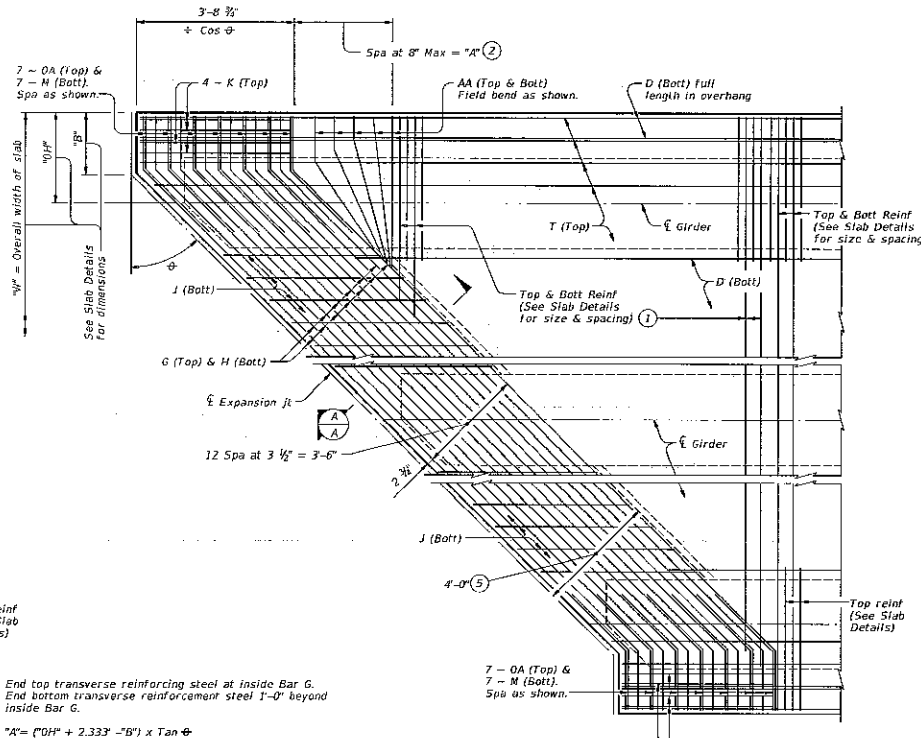


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**PARTIAL PLAN FOR  
SLABS WITHOUT BREAKBACK**

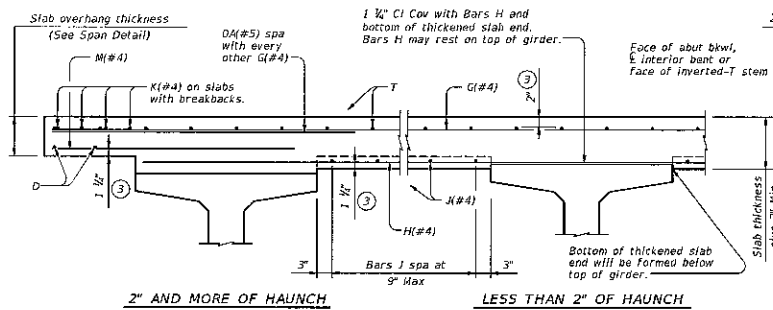
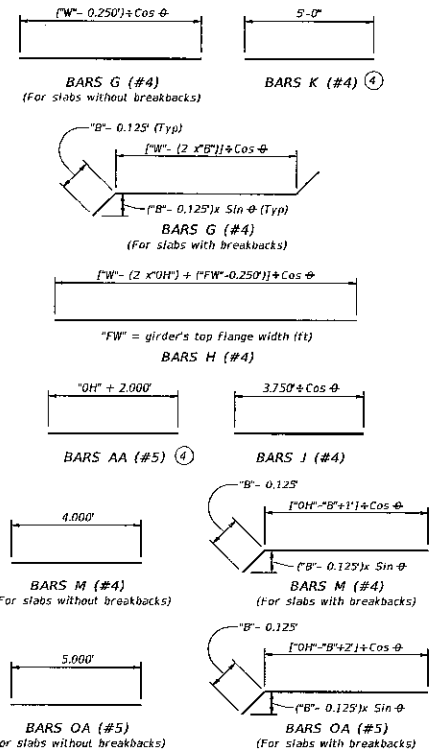
- ① End top transverse reinforcing steel at inside Bar G. End bottom transverse reinforcing steel 1'-0" beyond inside Bar G.
- ②  $A' = ("OH" + 2.33' - "B") \times \tan \phi$
- ③ Provide clear cover as indicated unless otherwise shown on Span Details.
- ④ Only required on slabs with breakbacks.
- ⑤ Thickened slab end dimensioned perpendicular to face of bkw, centerline interior bent or face of inverted-T stem.



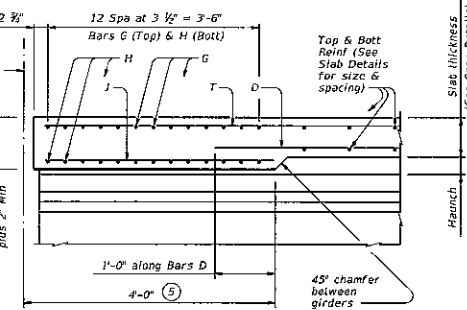
**PARTIAL PLAN FOR  
SLABS WITH BREAKBACK**

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

**MATERIAL NOTES:**  
Provide Grade 60 reinforcing steel.  
If slab reinforcing steel is shown on the Slab Details to be epoxy coated, then Bars AA, G, K, M, J, M and OA must be epoxy coated.  
Provide bar laps, where required, as follows:  
Uncoated - #4 = 1'-0"  
Epoxy Coated - #4 = 2'-5"



**TYPICAL TRANSVERSE SECTION**  
(Showing Prestressed Conc I-Girders at 1/2 Brg)

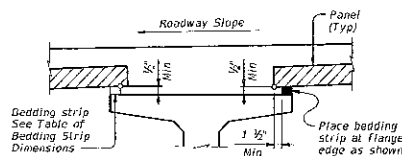


**SECTION A-A**  
(Showing with 2" and more of haunch)

HL93 LOADING			
Texas Department of Transportation			
Bridge Division Standard			
<b>THICKENED SLAB END DETAILS PRESTRESSED CONCRETE I-GIRDER SPANS</b>			
<b>IGTS</b>			
FILE: JG181517-12.dgn	DATE: 08/01/2017	BY: TADOT	CHK: TADOT
PROJECT: 12-0000	SECTION: 12-0000	DATE: 08/01/2017	BY: TADOT
COUNTY: 12-0000		SHEET NO.: 12	

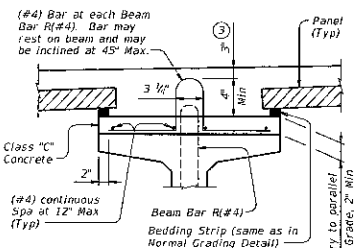
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DATE: FILE:



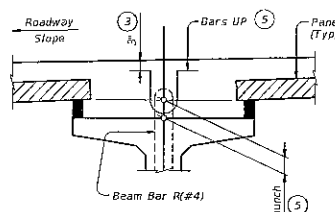
### NORMAL GRADING DETAIL ①

Showing Prestressed Concrete I-Girders.  
(Other Beam Types Similar)



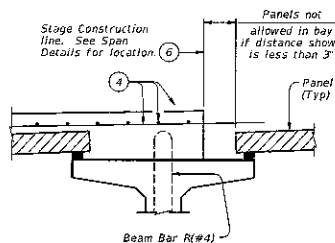
### SPECIAL GRADING DETAIL FOR CONCRETE BEAMS

Showing Prestressed Concrete I-Girders.  
(Other Beam Types Similar)



### HAUNCH REINFORCING DETAIL

Showing Prestressed Concrete I-Girders.  
(Other Beam Types Similar)



### PRESTR CONC I-GIRDERS

### STAGE CONSTRUCTION LIMITATIONS

(Other Beam Types Similar)

TABLE OF BEDDING STRIP DIMENSIONS		
WIDTH	HEIGHT (2)	
	Min	Max
1" (Min)	1/2"	2"
1 1/2"	1/2"	2 1/2"
1 3/4"	1/2"	3"
2" (Max)	1/2"	3 1/2"

① To reduce the quantity of cast-in-place concrete, bedding strip thickness may be increased in 1/2" increments. Bedding strips must be comprised of one layer. Bond bedding strips to the beams with an adhesive compatible with bedding strips. Bedding strips over 2 1/2" high may need to be bonded to panels. The same thickness strip must be used under any one panel edge and the maximum change in thickness between adjacent panels is 1/4". Alternatively, bedding strips may be cut to grade. Panels may be supported by an alternate method, using a commercial product, if approved by the Engineer of Bridge Design, Bridge Division. If bedding strips exceed 4" high, use Special Grading Detail for Concrete Beams or submit an alternate method to the Bridge Division for approval.

② Height must not exceed twice the width.

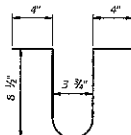
③ Provide clear cover as indicated unless otherwise shown on Span Details.

④ See Span Details and Thickened Slab End Details for top slab reinforcement and clear cover. Transverse top slab reinforcement may rest on top of prestressed concrete panels if necessary to maintain clear cover.

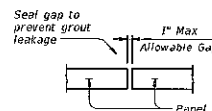
⑤ Space Bars UP (#4) with Beam Bars R (#4) in all areas where measured haunch exceeds 3" or 3 1/2" with Prestressed Concrete I-Girders. Epoxy coating for Bars UP is not required.

⑥ Do not locate construction joints on top of a panel.

⑦ Butt adjacent bedding strips together with adhesive. Cut v-notches, approx 1/4" deep, in the top of the bedding strips at 8" o.c.

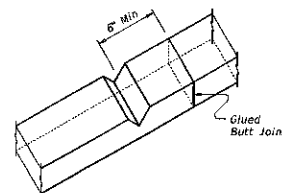


### BARS UP (#4) ⑤



### TYPICAL SECTION AT PANEL JOINT

(Panel reinforcing not shown for clarity.)  
The gap cannot be considered as a panel fabrication tolerance.



### BEDDING STRIP DETAIL ⑦

### CONSTRUCTION NOTES:

Erected panels must bear uniformly on bedding strips of extruded polystyrene placed along top flange edges. If additional blocking is needed, special grading details for supporting the panels and extra reinforcing between beam and slab will be considered subsidiary to deck construction.

Bars U, shown on PCP-FAB, may be bent over or cut off if necessary.

Cure must be taken to ensure proper cleaning of construction debris and consolidation of concrete mortar under the edges of the panels. Bedding strips must be placed at beam flange edges so that adequate space is provided for the mortar to flow a minimum of 1 1/2" under the panels as the slab concrete is placed.

To allow the proper amount of mortar to flow between beam and panel, the minimum vertical opening must be at least 1/2". Roadway cross-slope reduces the opening available for entry of the mortar. Bedding strips varying in thickness across the beam are therefore required.

For clear span between U-beams less than or equal to 18", see Permissible Slab Forming Detail on Miscellaneous Slab Detail sheets, UBMS.

### MATERIAL NOTES:

Provide Grade 60 reinforcing steel in the cast-in-place slab. See Table of Reinforcing Steel for size and spacing of reinforcement.

If the top and bottom layer of reinforcing steel is shown on the Span Details to be epoxy coated, then the D, E, P, & Z bars must be epoxy coated.

Provide Bar Laps, where required, as follows:

Uncoated - #4 = 1'-5"  
Epoxy Coated - #4 = 2'-3"

### GENERAL NOTES:

Designed according to AASHTO LRFD Specifications. Panel placement may follow either Option 1 or Option 2 except Option 1 must be used if the skew exceeds 45 degrees.

Use of Prestressed Concrete Panels is not permitted for horizontally curved steel plate or tub girders. See Span Details for other possible restrictions on their use.

These details are to be used in conjunction with the Span Details, PCP-FAB and other applicable Standard drawings.

Any additional reinforcement or concrete required on this standard is considered subsidiary to the bid item "Reinforced Concrete Slab".

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

HL93 LOADING

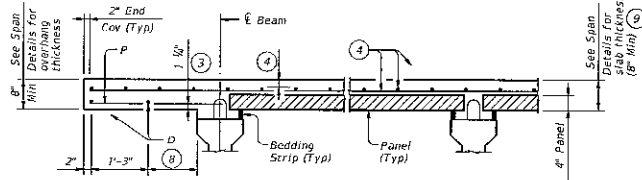
SHEET 1 OF 4

Texas Department of Transportation		Bridge Division Standard	
PRESTRESSED CONCRETE PANELS DECK DETAILS			
PCP			
FILE: pcpstd01.dgn	DATE: 1/15/2015	BY: TADW	CHK: JTR
PROJECT: 00000000	CONTRACT: 00000000	SHEET: 000	REVISION: 000
COUNTY: 00000000		SHEET NO. 23	

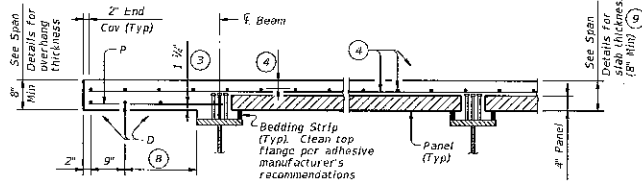


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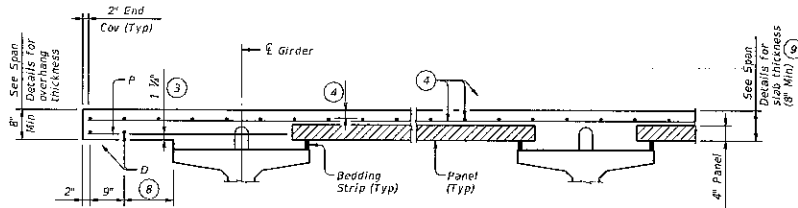
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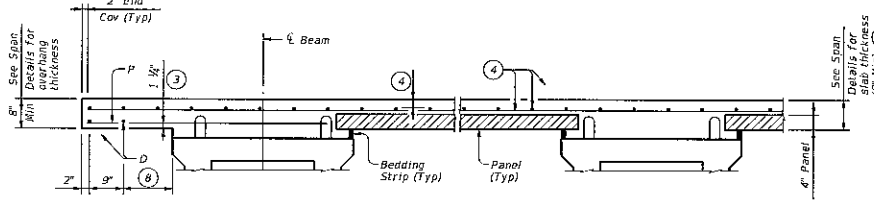
**PRESTRESSED CONCRETE I-BEAMS**



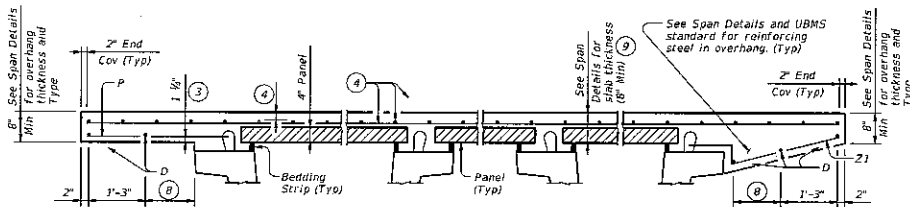
**STEEL BEAMS**



**PRESTRESSED CONCRETE I-GIRDERS**



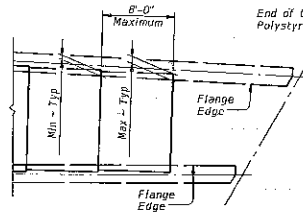
**PRESTRESSED CONCRETE X-BEAMS**



**NORMAL OVERHANG WITH PRESTR CONC U-BEAMS**

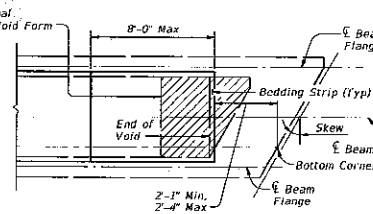
**TYPICAL PART TRANSVERSE SECTIONS**

**SLOPED OVERHANG WITH PRESTR CONC U-BEAMS**



**AT FLARED BEAMS OR GIRDERS**

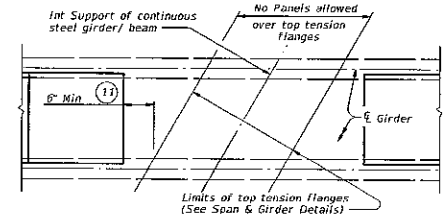
See PCP-FAB standard for Min and Max dimensions based on Bm/Girder type.



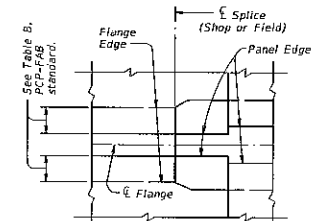
**OVER CONC U-BEAMS**

**PART PLANS OF PANEL PLACEMENT**

- 3 Provide clear cover as indicated unless otherwise shown on Span Details.
- 4 See Span Details and Thickened Slab End Details for top slab reinforcement and clear cover. Transverse top slab reinforcement may rest on top of prestressed concrete panels if necessary to maintain clear cover.
- 7 Butt adjacent bedding strips together with adhesive. Cut v-notches, approx 1/4" deep, in the top of the bedding strips at 8' o.c..
- 8 Equally space additional bar if more than 1'-3" Max.
- 9 The actual thickness constructed may exceed the slab thickness shown on the Span Details but the extra thickness may be no more than 2" (1" for Prestressed Concrete U-Beams and Steel Beams). Bearing Seat Elevations or finished grade may be adjusted.
- 10 Field adjust Bars Z1(#4) to match actual slope of slab overhangs. Width of slab overhang will vary along span with curved slab edges. Adjust Bar Z1(#4) dimensions to maintain proper cover. Bars Z2(#4) are located at Inv-T stems only.
- 11 Location of concrete placement sequence boundaries and bolted field splices should be considered by the contractor in determining panel limits.

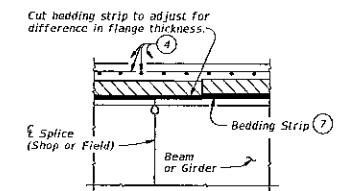


**AT INT SUPPORTS OF CONTINUOUS STEEL GIRDERS**



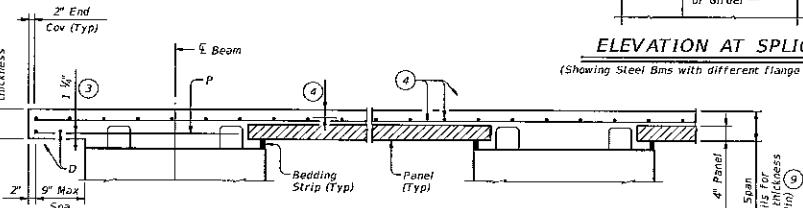
**PLAN AT SPLICE**

(Showing Steel Bms with flange width transition)



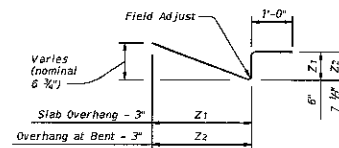
**ELEVATION AT SPLICE**

(Showing Steel Bms with different flange thickness)



**PRESTRESSED CONCRETE SPREAD SLAB BEAMS**

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



**BARS Z (#4) 10**

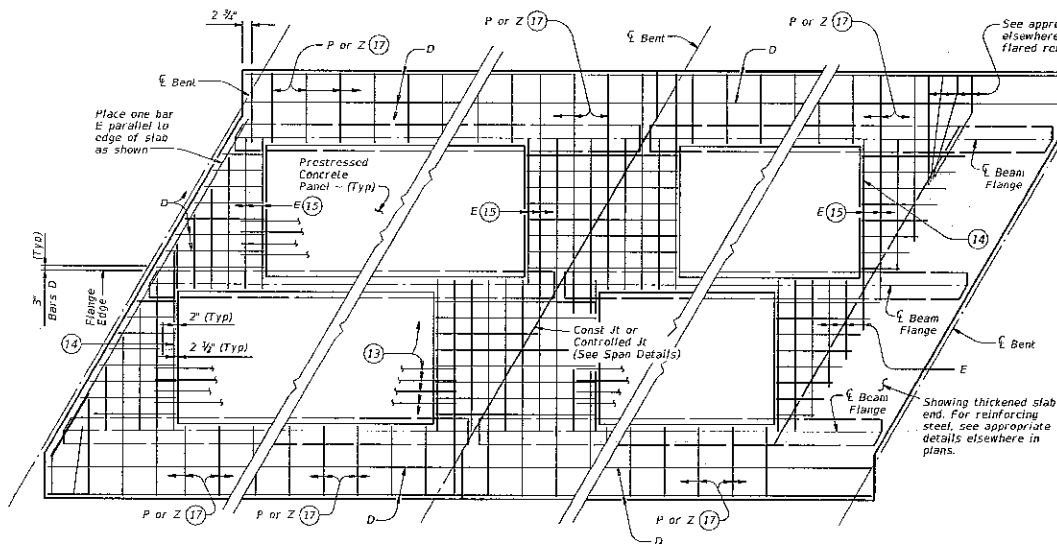
HL93 LOADING

SHEET 2 OF 4

Texas Department of Transportation		Bridge Division Standard	
<b>PRESTRESSED CONCRETE PANELS DECK DETAILS</b>			
<b>PCP</b>			
FILE: PCP0101.001	REV: 12/00	CH: 12/00	DATE: JVA
12/00	12/00	12/00	12/00
REV: 12/00	REV: 12/00	REV: 12/00	REV: 12/00
DATE	COUNTY	SHEET NO.	
		24	

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DATE: FILE:

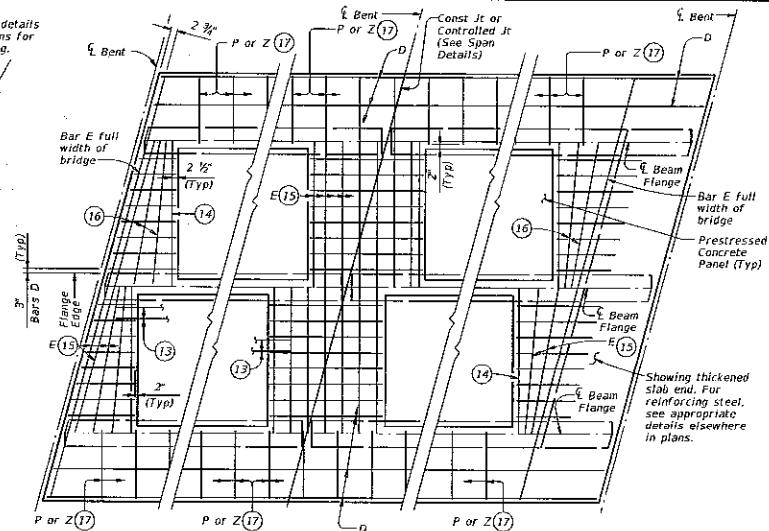


AT ALL SPAN ENDS UNLESS NOTED OTHERWISE

AT INTERIOR BENTS

AT THICKENED END SLABS

OPTION 1 - PLAN OF SLABS WITH NORMAL REINFORCEMENT

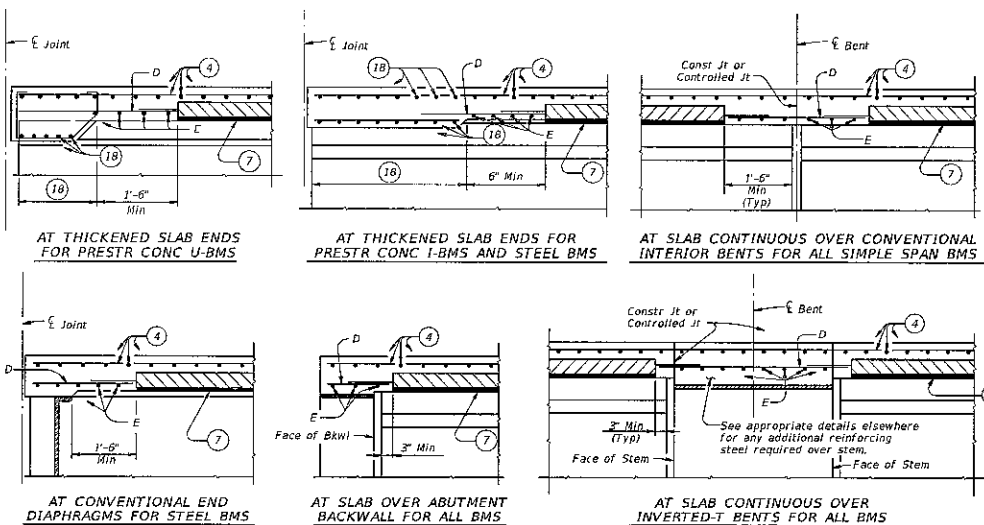


AT ALL SPAN ENDS UNLESS NOTED OTHERWISE

AT INTERIOR BENTS

AT THICKENED END SLABS

OPTION 1 - PLAN OF SLABS WITH SKEWED REINFORCEMENT



OPTION 1 - ELEVATIONS AT BEAM ENDS

- 4 See Span Details and Thickened Slab End Details for top slab reinforcement and clear cover. Transverse top slab reinforcement may rest on top of prestressed concrete panels if necessary to maintain clear cover.
- 7 Butt adjacent bedding strips together with adhesive. Cut v-notches, approx 1/2" deep, in the top of the bedding strips at 8' o.c.
- 12 Max Spacing as listed unless otherwise shown.
- 13 At connection with cast-in-place slab, extend longitudinal panel reinforcement. See PCP-FAB for details.
- 14 Maintain one Bar E(#4) parallel to panel ends (Typ).
- 15 Bars E(#4) not continuous over beam flanges must overlap beam flange 6" Min.
- 16 Add flared Bars E(#4) (Min Spa = 6", Max Spa = 12") as required at panel ends.
- 17 Where possible, Bars E(#4) may be extended into overhangs to replace Bars P(#4). Bars Z(#4) are required for sloped overhangs with U-Beams.
- 18 See appropriate thickened slab end details for reinforcing and limits of thickened slab end.

TABLE OF REINFORCING STEEL (12)		
BAR	SIZE	Max Spa (in.)
D	#4	9
E	#4	9
P	#4	18
UP	#4	~
Z	#4	18

HL93 LOADING

SHEET 3 OF 4

Texas Department of Transportation		Bridge Division Standard	
<b>PRESTRESSED CONCRETE PANELS DECK DETAILS</b>			
<b>PCP</b>			
FILE: pcpsdet.dgn	DATE: 1/20/07	BY: JTR	CHK: JSH
© 2007 January 2005	CDW	SEC	100
REVISED	DATE	COUNTY	SHEET NO. 25

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DATE: FILE:

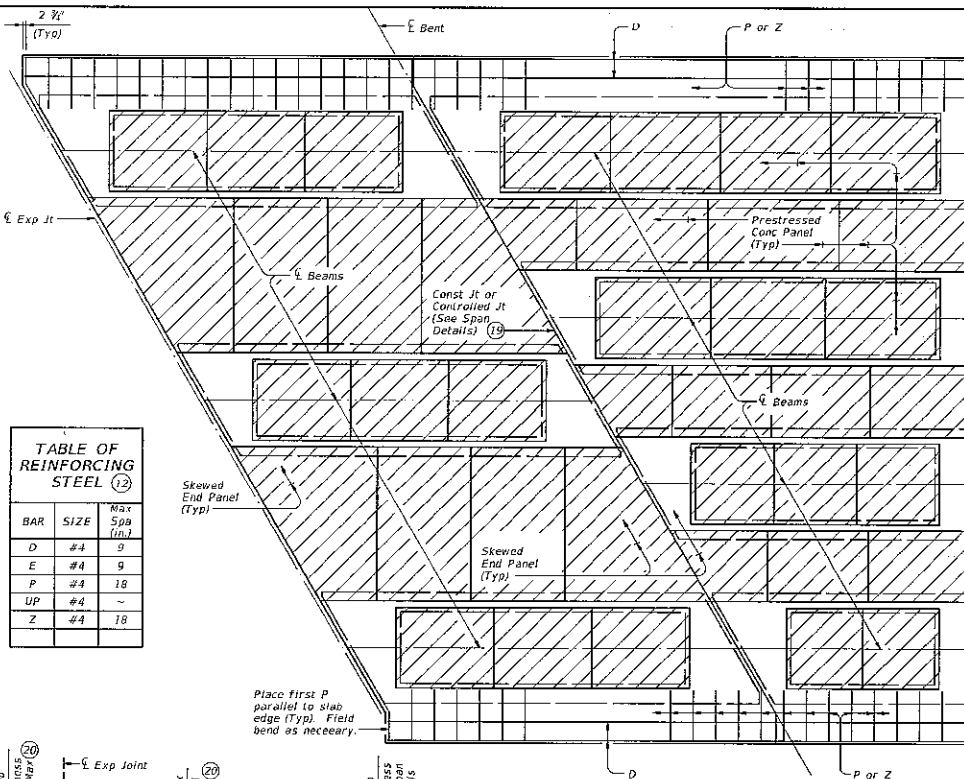
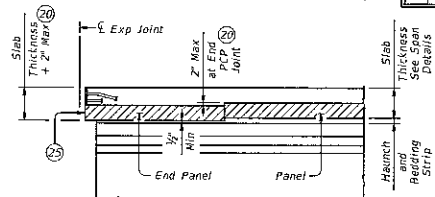
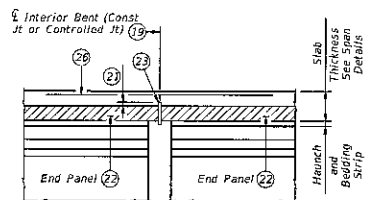


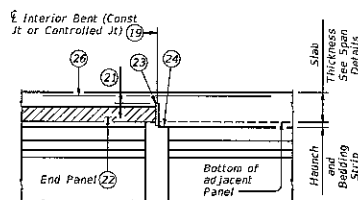
TABLE OF REINFORCING STEEL (12)		
BAR	SIZE	Max Spa (in.)
D	#4	9
E	#4	9
P	#4	18
UP	#4	~
Z	#4	18



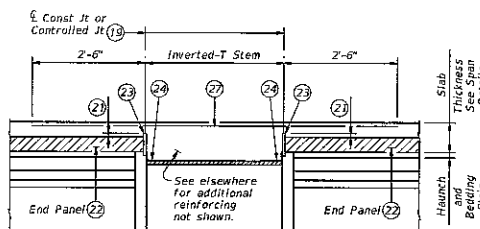
JOINTS (BETWEEN BEAMS/GIRDERS OR AT INV-T STEM)  
For SEI-A, SEI-S(O), AJ and Type A Expansion Joints only.



CONVENTIONAL INTERIOR BENT  
Panel against Panel between Bns/Girders.

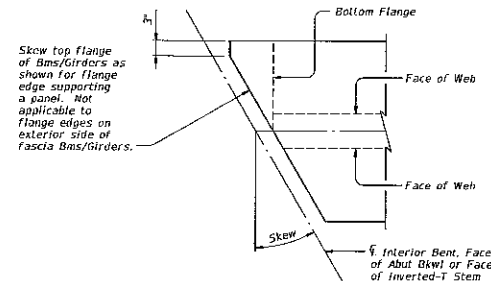


CONVENTIONAL INTERIOR BENT  
Panel against Bm/Girder End in Adjacent Span.



INVERTED-T BENT  
Panels against Inverted-T Stem

OPTION 2 ~ ELEVATIONS AT BEAM ENDS (4)



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

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

- (4) See Span Details and Thickened Slab End Details for top slab reinforcement and clear cover. Transverse top slab reinforcement may rest on top of prestressed concrete panels if necessary to maintain clear cover.
- (12) Max Spacing as listed unless otherwise shown.
- (19) Top Plastic Joint Former at Controlled Joints (Stress Cap, Zip Strip, Stress Lock, etc.) is not required with these Details.
- (20) End panel may be set up to 2" lower to accommodate expansion joint hardware, provided bedding strip is not less than 1/2" thick.
- (21) 1" Min. 1 1/2" Max, support as necessary.
- (22) Place panel within 1/2" of 3/8" thick board.
- (23) 3/8" thick timber board, leave in place. Place straight, within 1/2" of Centerline of Bent or Face of Inv-T, across bridge width and end board at exterior flange edge of fascia beams/girders. Do not extend into overhang.
- (24) Permanent galvanized steel sheet form. Removable formwork is acceptable.
- (25) Place and panel within 1/2" of expansion joint opening. End panel cannot encroach on required expansion joint opening.
- (26) Place additional (#4) bar, 5'-0" in length between every slab bars T. Center (#4) bar on joint.
- (27) Place additional (#4) bar continuous Z-6" beyond each side of Inverted-T Stem between every slab bars T.

**SPECIAL OPTION 2 CONSTRUCTION NOTES:**  
Placing panels adjacent to expansion joints and bent centerlines prior to completing interior panel placement is recommended. Saw cutting panels to fit is acceptable when approved by the Engineer. Minimum distance from a saw cut edge to a panel strand is 1 1/2". Do not extend the longitudinal panel reinforcement into the cast-in-place slab.  
Top flanges of beams and girders on skewed bridges must be modified as shown on this drawing. The Contractor is responsible for coordinating this modification with the beam fabricator prior to submitting shop drawings for approval.  
Fabricator may optionally skew the whole end. When electing to skew whole end, girder end details and bearing type at conventional interior bent must be changed to use condition at abutment. Fabricator must coordinate change in bearing type, bearing centerline location, and dowel location with Engineer and Contractor. Show appropriate changes on girder and bearing shop drawings.  
Bending of anchor studs of expansion joints shown on standards AJ, SEI-A and SEI-S(O) is permissible if necessary to clear top of end panels. The Contractor is responsible for coordinating modifications with the joint fabricator. Submit shop drawings for approval when modifications to expansion joint hardware are made.  
Bedding strips under skewed end panels must conform to the requirements of Item 425 except their minimum compressive strength must be 60 psi.  
Provide Bars AA, G, K and OA from standard IGTS(MOD) in the slab.

HL93 LOADING

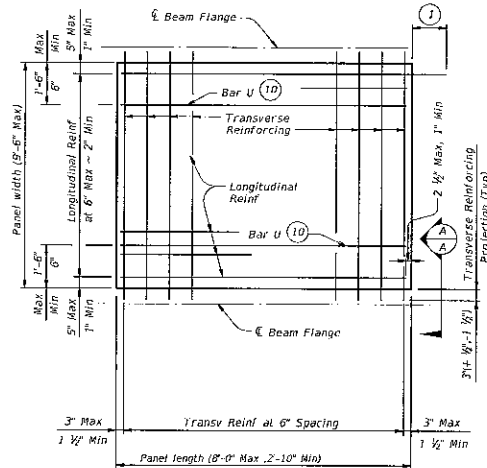
SHEET 4 OF 4

Texas Department of Transportation		Bridge Division Standard	
<b>PRESTRESSED CONCRETE PANELS DECK DETAILS</b>			
<b>PCP</b>			
PREP: prestdel@gn	CHK: TxDOT	CHK: TxDOT	CHK: JTR
DATE: JANUARY 2015	REV: 001	REV: 001	REV: 001
PROJECT: COUNTY: SHEET NO: 26		PROJECT: COUNTY: SHEET NO: 26	

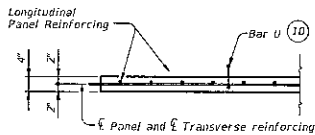


DISCLAIMER: This standard is governed by the Texas Engineering Practice Act. No warranty of any kind is made by TxDOT for the use of this standard in other contexts or for incorrect results or damages resulting from its use.

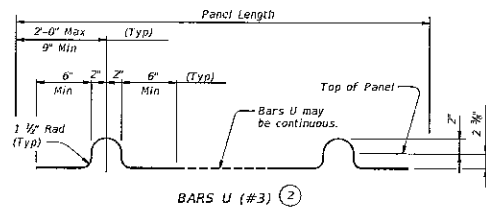
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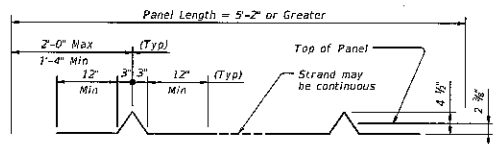
**TYPICAL NON-SKEWED PANEL PLAN**



**SECTION A-A**  
(Not Showing supplemental #4 bars for Skewed End Panels.)



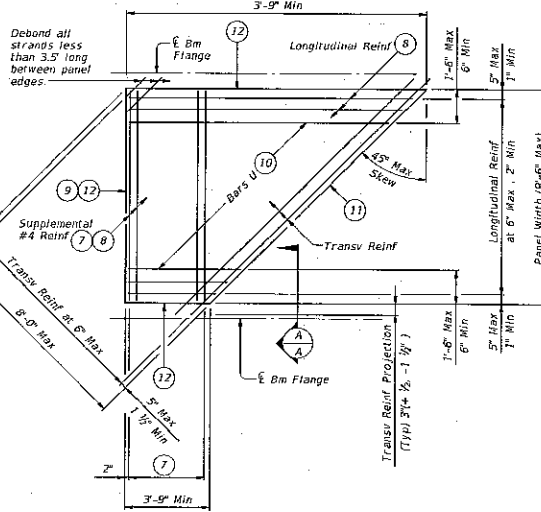
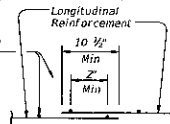
**BARS U (#3)**



**OPTIONAL STRAND FOR BARS U**

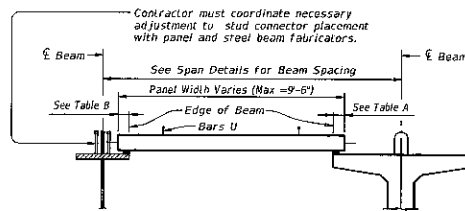
- 1 At connection with cast-in-place slab, extend longitudinal panel reinforcement 1'-0" (+2'-0") past panel end. Alternatively, provide (#3) x 2'-0" dowels at 6" Max Spacing and extend dowels 1'-0" past panel end.
- 2 Four loops required per panel.
- 3 Four loops required per panel. 3/8" or 1/2" strands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

**WELDED WIRE REINFORCEMENT (WWR) SPlice DETAIL**



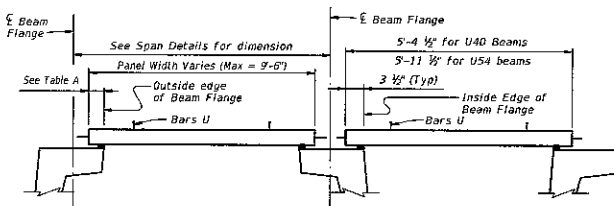
**TYPICAL SKEWED END PANEL PLAN**

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



**STEEL BEAMS**

**PRESTRESSED CONCRETE BEAMS OR GIRDERS**  
Typ unless noted otherwise



**PRESTRESSED CONCRETE U-BEAMS**

**TYPICAL SECTIONS FOR DETERMINING PANEL WIDTH**

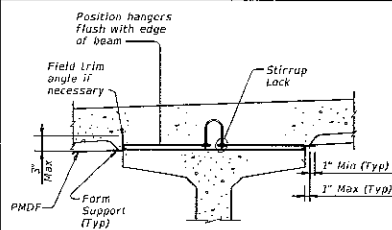
TABLE A (4) (5)					TABLE B (4) (5)				
Beam Type	Normal (in.)	Min (in.)	Max (in.)		Top Flange Width	Normal (in.)	Min (in.)	Max (in.)	
A	3	2 1/2	3 1/2		11" to 12"	2 3/4	2 1/2	2 3/4	
B	3	2 1/2	3 1/2		Over 12" to 15"	3 1/4	3	3 1/4	
C	4	3	4 1/2		Over 15" to 18"	4	3	4 1/2	
IV	6	4	7 1/2		Over 18"	5	3 1/2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

- GENERAL NOTES:**
- Provide Class H concrete for panels. Release strength  $f_{ci}$  = 3500 psi. Minimum 28 day strength  $f_{cr}$  = 5000 psi.
  - Do not use epoxy-coated reinforcing steel bar or strand in panels.
  - Remove laitance from top panel surface.
  - Finish top of panel to a roughness between a No.6 and No.9 concrete surface profile, inclusive, as specified by the International Concrete Repair Institute (ICRI).
  - Shop drawings for the fabrication of panels will not require the Engineer's approval if fabrication is in accordance with the details shown on this standard.
  - A panel layout which identifies location of each panel must be developed by the Fabricator. Permanently mark each panel in accordance with the panel layout. A copy of the layout is to be provided to the Engineer.
- TRANSVERSE PANEL REINFORCEMENT:**
- For panel widths over 5', use 3/8" or 1/2" Dia (270k) prestressing strands with a tension of 14.4 kips per strand.
  - For panel widths over 3'-6" up to and including 5', use 3/8" or 1/2" Dia (270k) prestressing strands with a tension of 14.4 kip per strand. Optionally, #4 Grade 60 reinforcing bars may be used in lieu of prestressed strands.
  - For panel widths up to 3'-6", use #4 Grade 60 reinforcing bars (prestressed strands alone are not allowed).
  - Place transverse panel reinforcement at panel centroid and space at 6" Max.
- LONGITUDINAL PANEL REINFORCEMENT:**
- Any of the following options may be used for longitudinal panel reinforcement:
  - 1. (#3) Grade 60 reinforcing steel at 6" Max Spacing. No splices allowed.
  - 2. 3/8" Dia prestressing strands at 4 1/2" Max Spacing (unstressed). No splices allowed.
  - 3. 1/2" Dia prestressing strands at 6" Max Spacing (unstressed). No splices allowed.
  - 4. Deformed Welded Wire Reinforcement (WWR) (ASTM A1064) providing 0.22 sq in per foot of panel width. Wires larger than D11 not permitted. Provide transverse wires to ensure proper handling of reinforcing. One splice per panel is allowed. See WWR Splice Detail.
  - No combination of longitudinal reinforcement options in a panel is allowed.
  - Place longitudinal panel reinforcement above or below transverse panel reinforcement. Must be placed above transverse panel reinforcement for skewed and panels with supplemental #4 reinforcement.

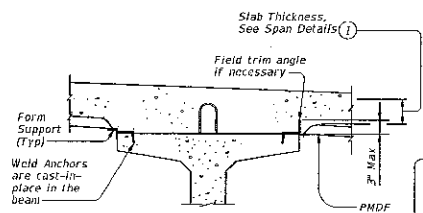
		<b>HL93 LOADING</b>		<b>Bridge Division Standard</b>
<b>PRESTRESSED CONCRETE PANEL FABRICATION DETAILS</b>				
<b>PCP-FAB</b>				
FILE: WSP262-00 DATE: JANUARY 2015 REVISION:	DRAWN: JTB CHECK: JTB DESIGNED:	DATE: JANUARY 2015 DRAWN: JTB CHECK: JTB DESIGNED:	COUNTY:	SHEET NO. 27

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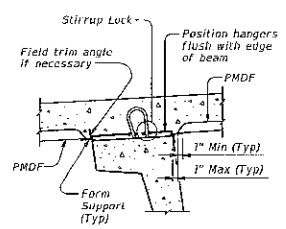
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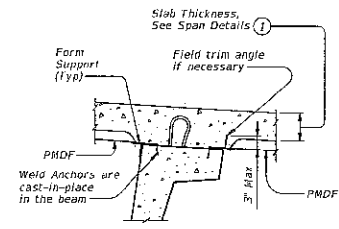
PRESTR CONC I-BEAMS AND I-GIRDERS WITH STIRRUP LOCKS



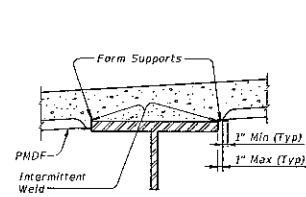
PRESTR CONC I-BEAMS AND I-GIRDERS WITH WELD ANCHORS



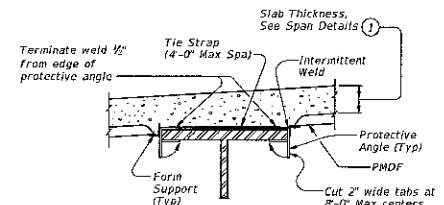
U-BEAMS WITH STIRRUP LOCKS



U-BEAMS WITH WELD ANCHORS

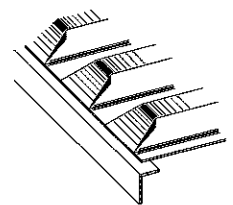


STEEL BEAMS AT COMPRESSION FLANGES

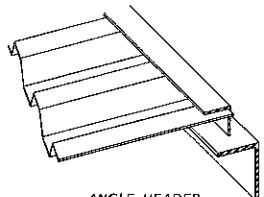


STEEL BEAMS AT TENSION FLANGES

TYPICAL TRANSVERSE SECTIONS



PRECLOSED

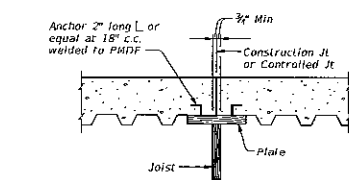
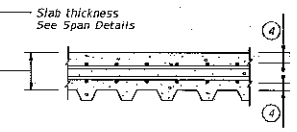


ANGLE HEADER

NOTE: This type is to be used for skewed ends only.

TYPES OF END CLOSURES

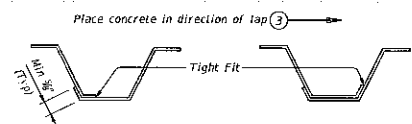
TYP LONGITUDINAL SLAB SECTION



Note: In spans where PMD forms are used, timber forms must be used at construction joints. Adequate provision must be made to support edge of metal form and to provide anchorage of metal form to slab concrete where joined to wood forms.

SECTION THRU CONSTRUCTION JOINT

FOR PRESTR CONC U-BEAM BRIDGES: Size, spacing, and orientation of bottom mat of slab reinforcement must match the top mat of reinforcing shown on the span details except all bottom mat bars are to be #5.



SIDE LAP DETAILS

1. Slab thickness minus 3/8" if corrugations match reinforcing bars.
2. Welding of form supports to tension flanges will not be permitted. Other methods of providing wind hold down resistance for PMDF in tension flange zones will be considered. At least one layer of sheet metal must be provided between the flange and the weld joint.
3. The direction of concrete placement will be such that the upper layer of the form overlap is loaded first.
4. See Span details for cover requirements.

GENERAL NOTES:

Steel for Permanent Metal Deck Forms (PMDF) and support angles shall conform to ASTM A653, Structural Steel (SS), with coating designation G165. Steel must have a minimum yield strength of 53 ksi. Minimum thickness of PMDF is 20 gage and that of support angles and protective angles is 12 gage. Submit two copies of forming plans for PMDF to the Engineer. These plans must show all essential details of proposed form sheets, closures, fasteners, supports, connectors, special conditions and size and location of welds. These plans must clearly show areas of tension flanges for steel beams and provisions for protecting the tension flanges from welding notch effects by inclusion of separating sheet metal or other positive method. These plans must be designed, signed, and sealed by a licensed professional engineer. Department approval of these plans is not required, but the Department reserves the right to require modifications to the plans. The Contractor is responsible for the adequacy of these plans. The details and notes shown on this standard are to be used as a guide in preparation of the forming plans. All material, labor, tools and incidentals necessary to form a bridge deck with Permanent Metal Deck Forms is considered subsidiary to Item 422, "Concrete Superstructures".

**DESIGN NOTES:**  
As a minimum, PMDF and support angles must be designed for the dead load of the form, reinforcement and concrete plus 50 psf for construction loads. Flexural stresses due to these design loads must not exceed 75 percent of the yield strength of the steel. Allowable stress for weld metal must be 12,400 psi. Maximum deflection under the weight of forms, reinforcement and concrete or 120 psi, whichever is greater, shall not exceed the following:

- 1/180 of the form design span, but not more than 0.50", for design spans of 10' or less.
- 1/240 of the form design span, but not more than 0.75", for design spans greater than 10'.

The form design span must not be less than the clear distance between beam flanges, measured parallel to the form flutes, minus 2".

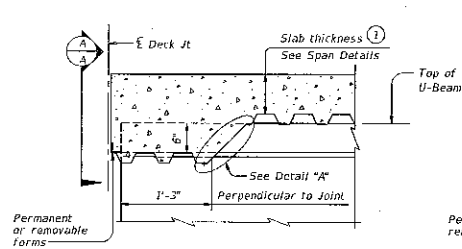
CONSTRUCTION NOTES:

Form sheets must not be permitted to rest directly on the top of beam flanges. Form sheets must be securely fastened to form supports and must have a minimum bearing length of one inch at each end. Form supports must be placed in direct contact with beam flanges. All attachments must be made by permissible welds, screws, bolts, clips or other means shown on the forming plans. All sheet metal assembly screws must be installed with torque-limiting devices to prevent stripping. Only welds or bolts must be used to support vertical loads. Welding and welds must be in accordance with the provisions of Item 448, "Structural Field Welding", pertaining to fillet welds. All welds must be made by a qualified welder in accordance with Item 448. All permanently exposed form metal, where the galvanized coating has been damaged, must be thoroughly cleaned and repaired in accordance with Item 445, "Galvanizing". Minor heat discoloration in areas of welds need not be touched up. Flutes must line up uniformly across the entire width of the structure where main reinforcing steel is located in the flute. Construction joints will not be permitted unless shown on the plans. The location of and forming details for any construction joint used must be shown on the forming plans. Forms below a construction joint must be removed after curing of the slab. A sequence for uniform vibration of concrete must be approved by the Engineer prior to concrete placement. Attention must be given to prevent damage to the forms, yet provide proper vibration to prevent voids or honeycomb in the flutes and at headers and/or construction joints.

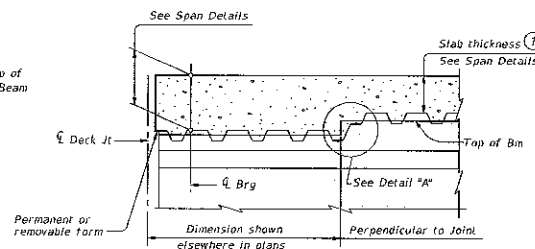
		Bridge Division Standard	
<b>PERMANENT METAL DECK FORMS</b>			
<b>PMDF</b>			
Title: pmdfrel.dgn Date: January 2015 Revision:	DW: TxDOT CWS: BCTY DES:	CK: TxDOT APP:	Date: TxDOT PROJECT NO:
28		28	

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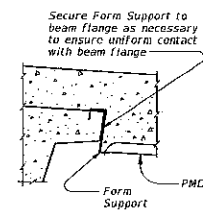
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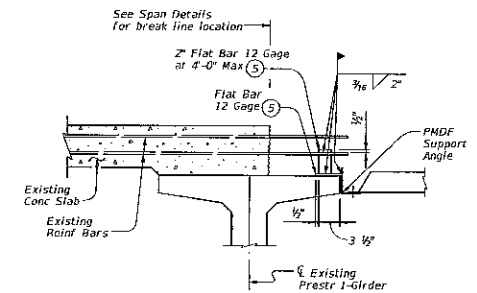
AT THICKENED SLAB END FOR U-BEAMS



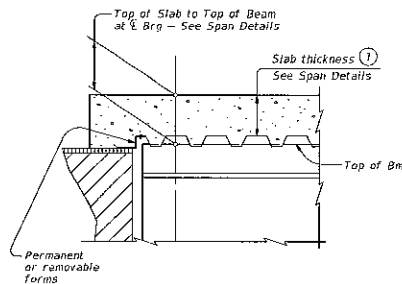
AT THICKENED SLAB END FOR PRESTRESSED I-BEAMS, I-GIRDERS AND STEEL BEAMS  
Showing I-Beam block-out. No block-out for I-Girders or Steel Beams.



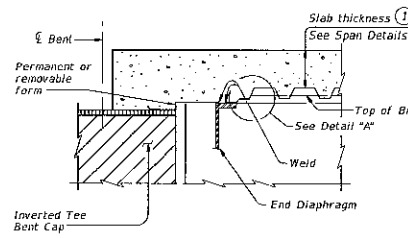
SECTION A-A



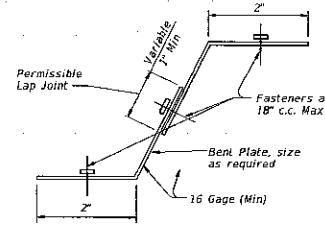
SHOWING PRESTRESSED CONCRETE I-BEAMS, I-GIRDERS AND U-BEAMS



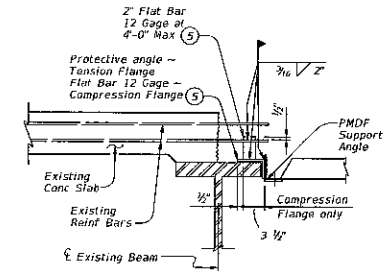
AT SLAB OVER ABUT BKWL OR INV TEE STEM FOR CONC BEAMS WITHOUT THICKENED SLAB END



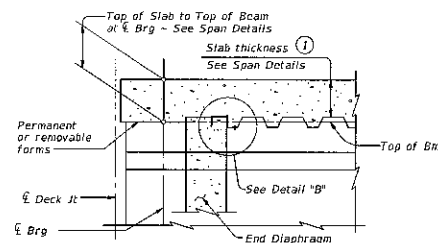
AT SLAB OVER INV TEE STEM FOR STEEL BEAMS WITHOUT THICKENED SLAB END



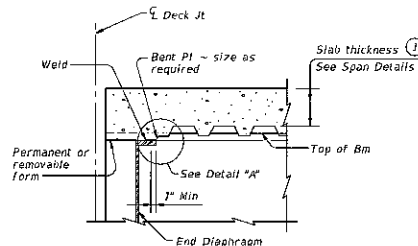
DETAIL "A"



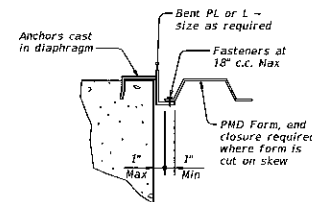
SHOWING STEEL BEAMS



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



AT END DIAPHRAGM FOR STEEL BEAMS WITHOUT THICKENED SLAB END



DETAIL "B"

WIDENING DETAILS

DETAILS AT ENDS OF BEAMS

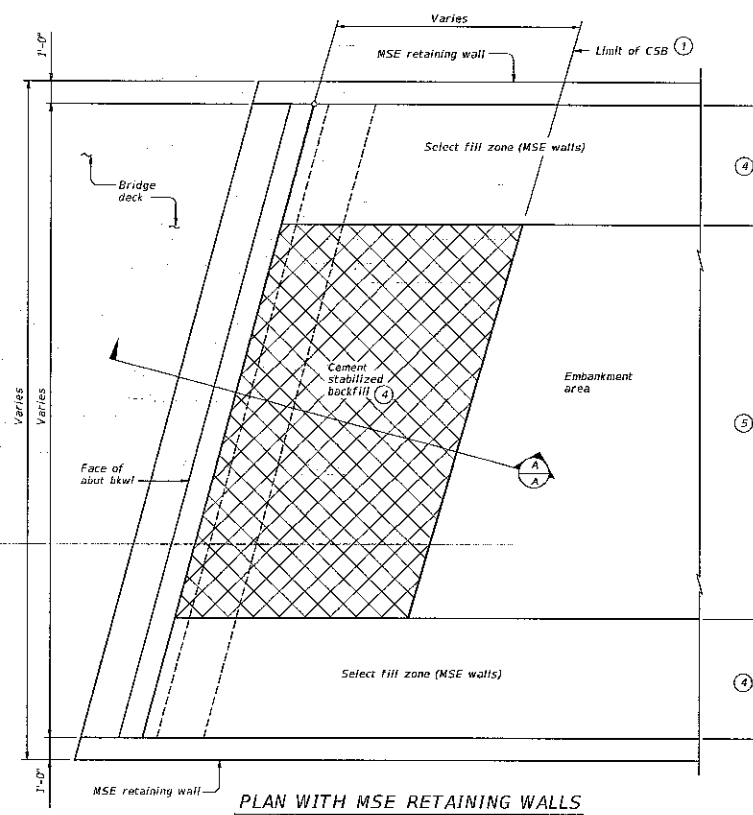
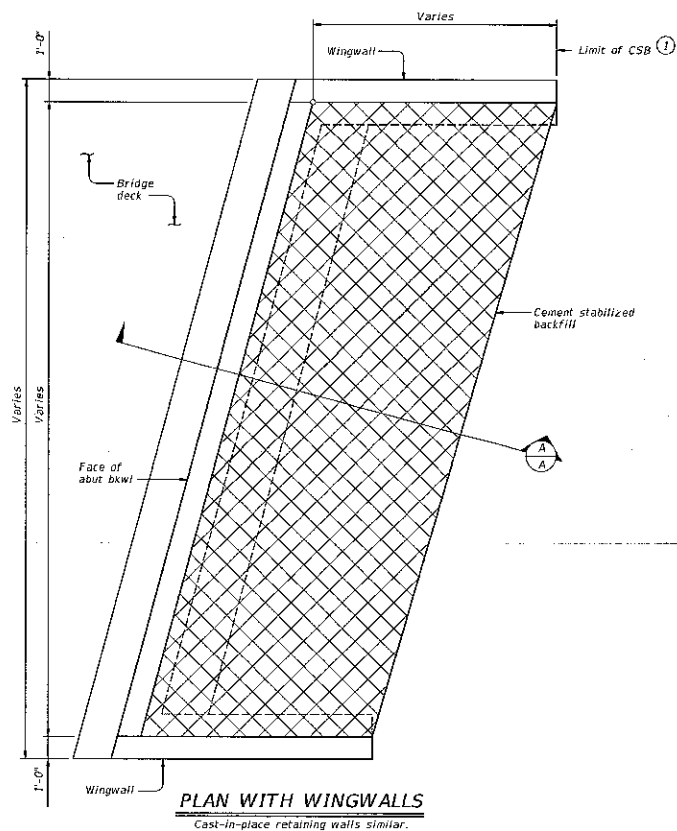
- (1) Slab thickness minus 3/8" if corrugations match reinforcing bars  
(5) Minimum yield stress of 12 Gauge bars shall be 40 ksi

SHEET 2 OF 2

Texas Department of Transportation		Bridge Division Standard	
PERMANENT METAL DECK FORMS			
PMDF			
FILE: pmdate1.dgn	DATE: TXDOT January 2015	REV: TXDOT	REV: TXDOT
CONTRACT	SHEET	POSTER	POSTER
DIST	COUNTY	SHEET NO.	
		29	

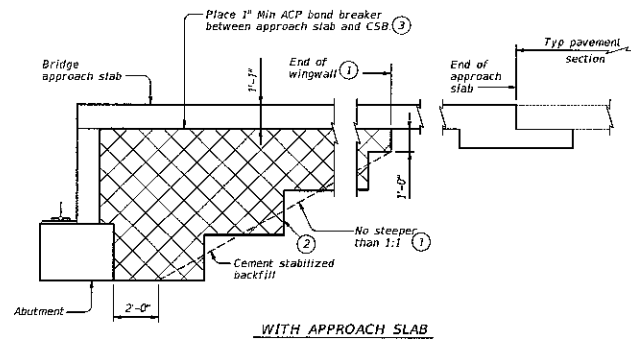
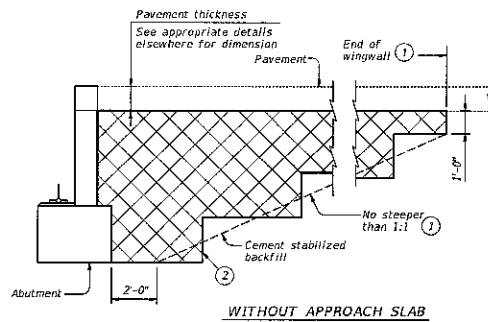
DISCLAIMER: This standard is governed by the Texas Engineering Practice Act. No warranty of any kind is made by TxDOT for the use of this standard for any purpose other than that for which it was developed or for incorrect results or damages resulting from its use.

DATE: FILE:



- 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 Other materials can be used as a bond breaker if permitted by the Engineer. 2 layers of 30 lb roofing felt or 2 layers of heavy mil polyethylene sheeting are examples.
- ④ Where MSE retaining walls are present, adjust CSB limits to accommodate the select fill zone. See retaining wall details for additional information.
- ⑤ 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.

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



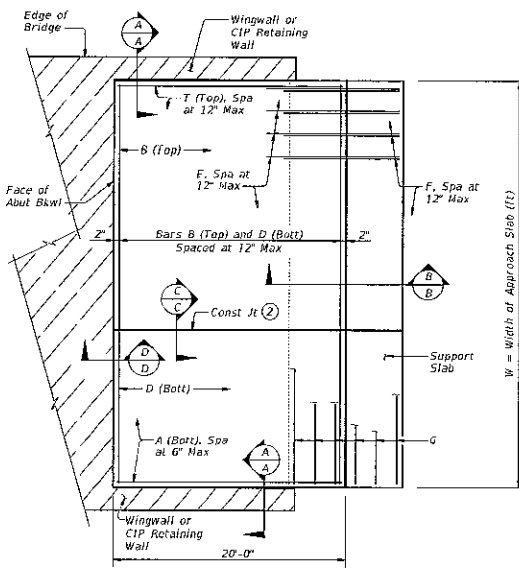
**SECTION A-A**

Texas Department of Transportation		Bridge Division Standard	
<b>CEMENT STABILIZED ABUTMENT BACKFILL BRIDGE ABUTMENT</b>			
<b>CSAB</b>			
FILE: CSAB01.dgn	DN: TxDOT	EX: TxDOT	REV: TxDOT
① TxDOT January 2013	COMP: SECT	REV: 001	REVISIONS
01-101 AND MSE WALL DETAILS		COUNTY	SHEET NO.
			30

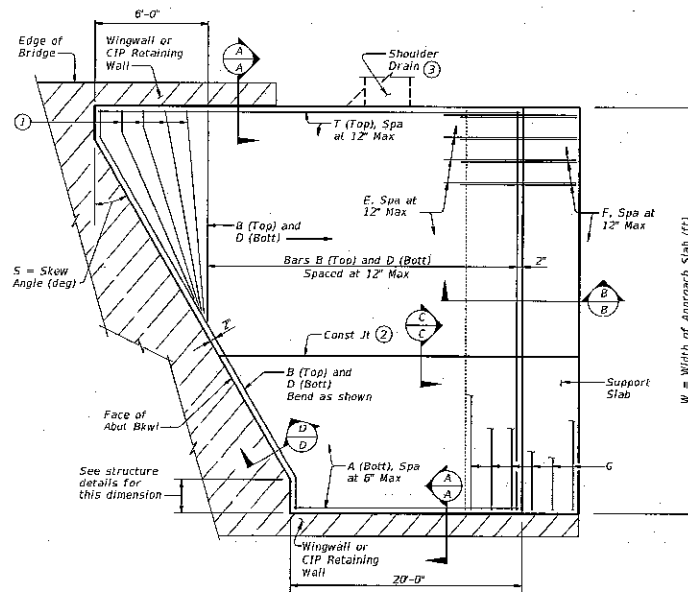


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DWG: FILE:



**PLAN**  
(Showing Non-Skewed Approach Slab)



**PLAN**  
(Showing Skewed Approach Slab)

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

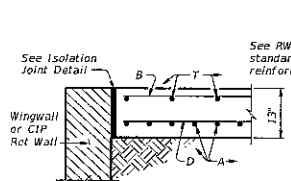
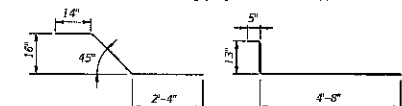
#### APPROXIMATE QUANTITIES <sup>(4)</sup>

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

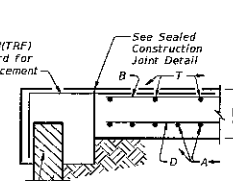
Vol of Appr Slab Conc (CY) =  $1.052W - 0.093W \times T + 0.02W \times \tan S$   
(Includes Support Slab)

W = Width of Approach Slab (ft)  
T = Conc Pavement Thickness (in)  
S = Skew Angle (deg)

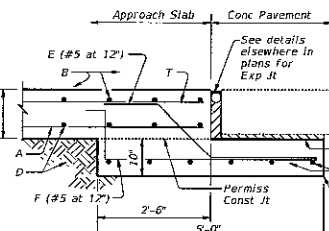
- Flare Bars B and D in this region (1'-6" Max Spa, 3" Min Spa). Minimum flared bar length = 2'-6". Bend bars as necessary.
- Provide longitudinal construction joints that align with longitudinal construction joints in the bridge slab with bridges built in stages. Other longitudinal construction joints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



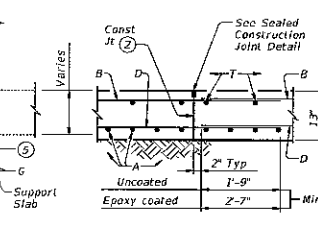
**SECTION A-A**  
SHOWING WINGWALL OR CIP RETAINING WALL



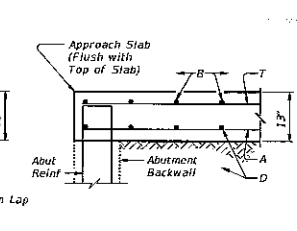
**SECTION A-A**  
SHOWING MSE WALL



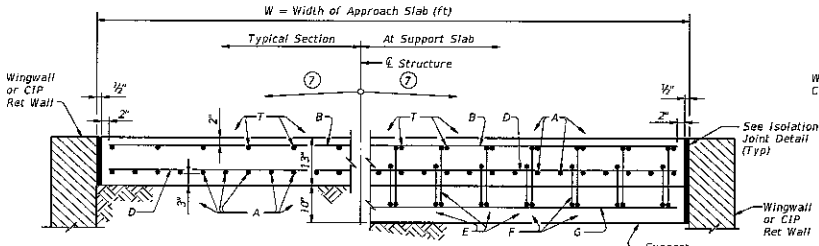
**SECTION B-B**



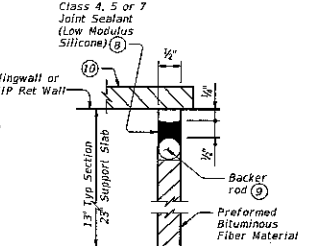
**SECTION C-C**



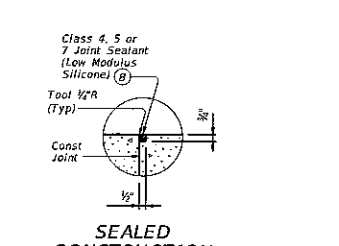
**SECTION D-D**



**TRANSVERSE SECTION**



**ISOLATION JOINT DETAIL**



**SEALED CONSTRUCTION JOINT DETAIL**

**GENERAL NOTES:**

Construct approach slab in accordance with Item 422.

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

Provide Grade 60 reinforcing steel.

Construct the subgrade or subbase 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.

Sealant, backer rod and preformed bituminous fiber material are subsidiary to approach slab concrete.

Provide a 1" bondbreaker (asphaltic concrete pavement or asphalt stabilized base) between the approach slab and cement stabilized backfill or cement treated base. Other bondbreakers may be used if approved by the Engineer.

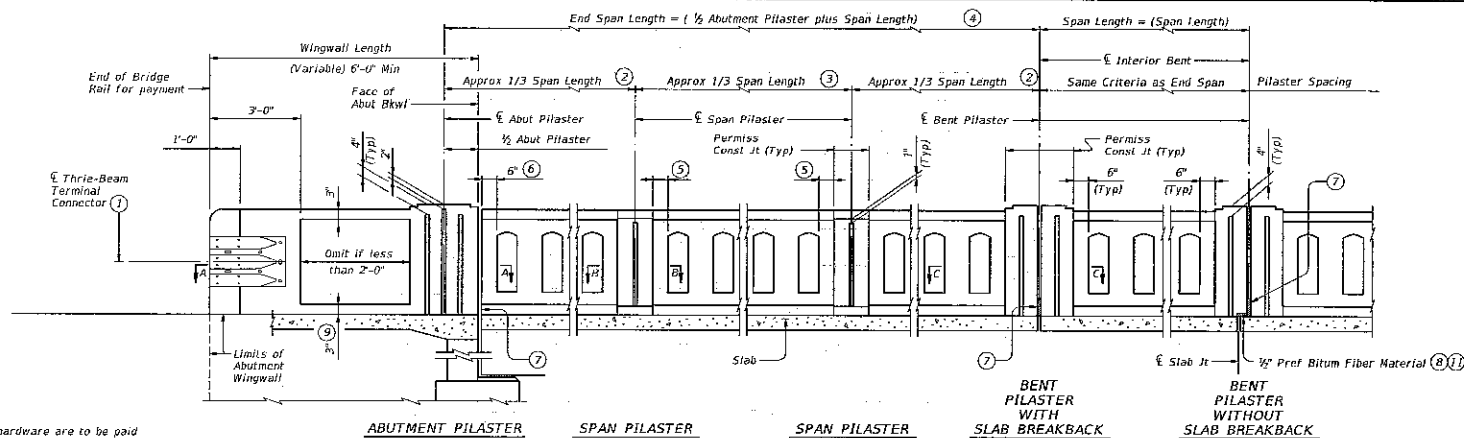
Cover dimensions are clear dimensions, unless noted otherwise.

Reinforcing bar dimensions shown are out-to-out of bar.

Texas Department of Transportation		Bridge Division Standard	
<b>BRIDGE APPROACH SLAB CONCRETE PAVEMENT</b>			
<b>BAS-C</b>			
Rev.	Description	Rev.	Description
1	1/2007	1	1/2007
2	1/2015	2	1/2015
3	1/2015	3	1/2015
4	1/2015	4	1/2015
5	1/2015	5	1/2015
6	1/2015	6	1/2015
7	1/2015	7	1/2015
8	1/2015	8	1/2015
9	1/2015	9	1/2015
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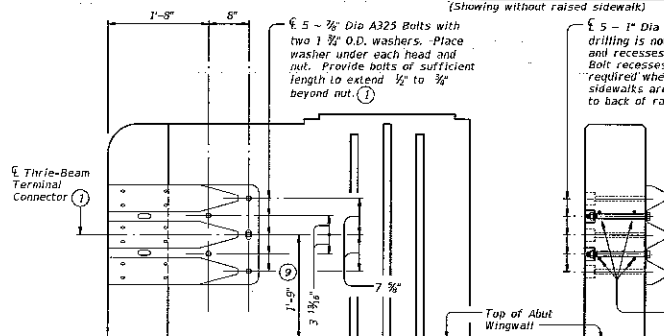
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- ① Terminal Connectors and associated hardware are to be paid for under the item "Metal Beam Guard Fence". Attach Metal Beam Guard Fence Transitions to the bridge rail and extend along the embankment unless otherwise shown in the plans.
- ② Number of windows in exterior bays are equal.
- ③ Number of windows in interior bays are not less than the amount in exterior bays (Note 2).
- ④ Space Span Pilasters at 1/3 span length (Approx) when spans are 100 ft and less, as shown. Space Span Pilasters at 1/5 span length (Approx) for spans greater than 100 ft.
- ⑤ Dimension is the same for all posts adjacent to Span Pilasters in a span. Dimension may vary from span to span, Min = 3", Max = 7 1/2".
- ⑥ Min = 6", Max = 1'-3".
- ⑦ Provide rail joints at ends of all spans the same width as Slab joint opening, except that Rail Joints over construction joints must be 1/2" Min to 3/4" Max in width. Joints must be open if slab joint opening is not sealed. Joints over construction joints and over sealed deck joints must be plugged. Forming material used in joints may be left in place if it is light in color and compressible, such as the following materials: polystyrene, molded cork granules, sponge rubber sheet, etc. If forming material is not left in place, plug the bottom 6" with slab joint sealing compound to prevent drainage and staining.
- ⑧ Place Preformed Bituminous Fiber Material between slab and rail when rail extends over expansion joint. Shift Bars U as necessary.
- ⑨ Increase 2" for structures with overlay.
- ⑩ Place 4 additional Bars WH(#5) 3'-8" in length inside Bars S(#5) and centered 2'-0" from end of rail when Terminal Connections are required. Field bend as needed.
- ⑪ Shift U Bars from region below 1/2" Preformed Bituminous Fiber Material at joints.



### ROADWAY ELEVATION OF RAIL

(Showing without raised sidewalk)

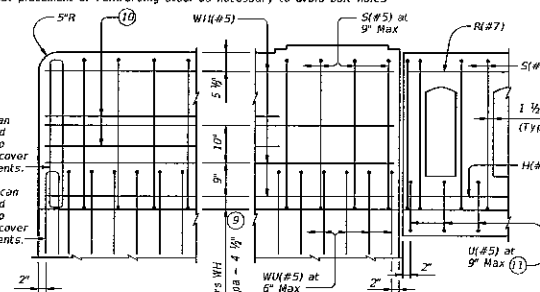


ELEVATION

SECTION

### TERMINAL CONNECTION DETAILS

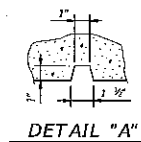
(Showing parapet with Pilaster on 6'-0" Wingwall)



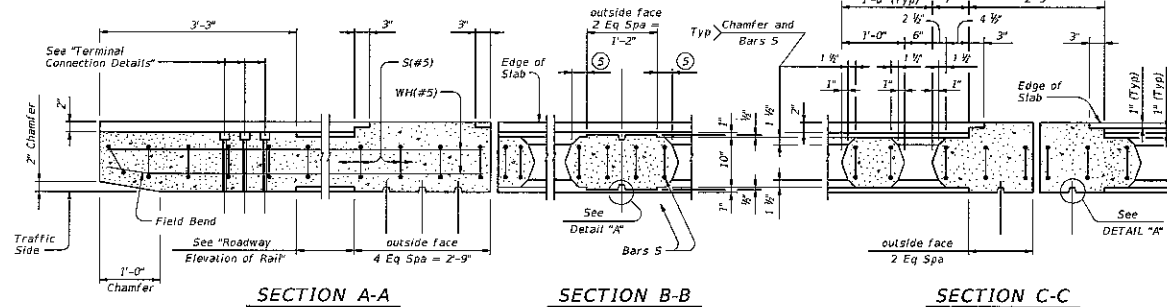
### ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT

(Showing without raised sidewalk)

The use of this railing is restricted to speeds of 45 mph or less.



DETAIL "A"



SECTION A-A

SECTION B-B

SECTION C-C

SHEET 1 OF 3



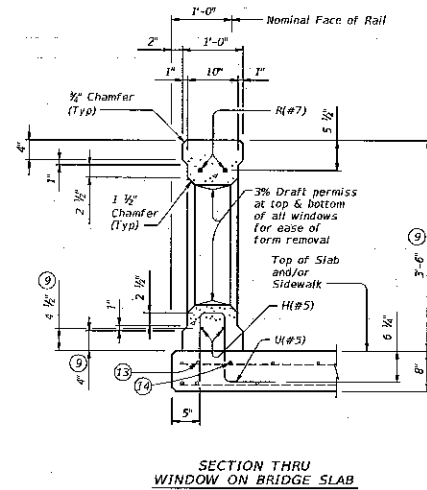
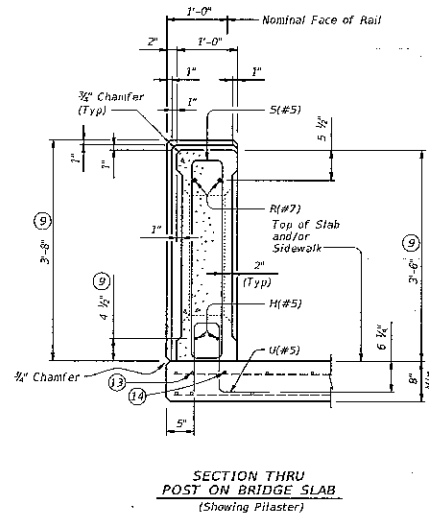
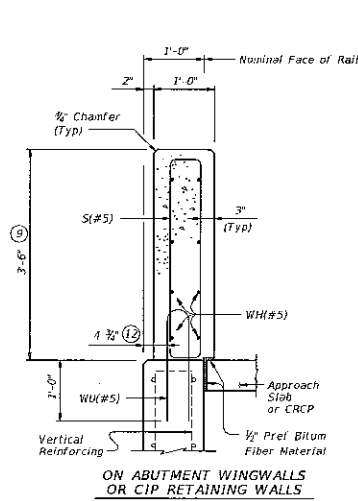
## COMBINATION RAIL TEXAS CLASSIC

### TYPE C411

FILE: H&M021291	REV: F400T	CR: T400T	SP: T400T	SR: T400T
DATE: July 2014	CON: 100%	ISS: 100%	REV: 100%	REV: 100%
DESIGN: 100%	CHECK: 100%	APPROVE: 100%	DATE: 100%	DATE: 100%
DIST: 100%	COUNTY: 100%	SHEET NO: 22		

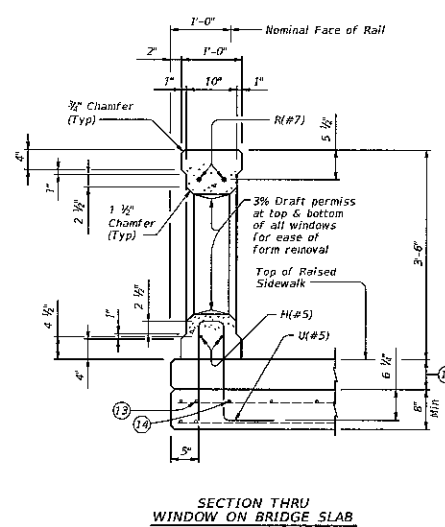
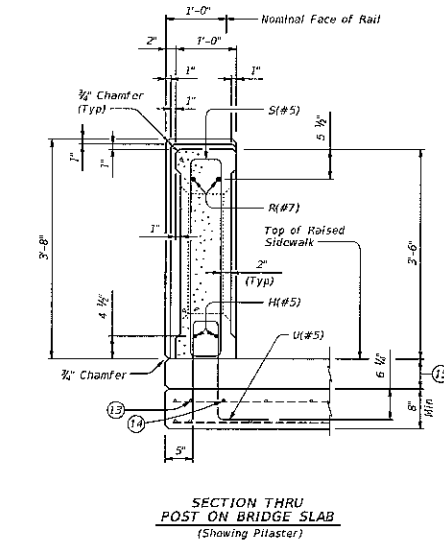
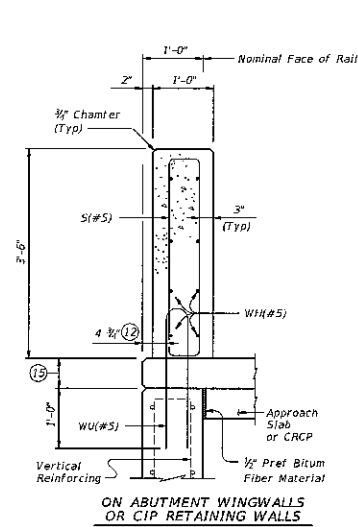
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### SECTIONS THRU RAIL WITHOUT RAISED SIDEWALK


- ⑨ Increase 2" for structures with overlay.
- ⑫ 5 1/2" when vertical reinforcing has closer clear cover over horizontal reinforcing in abutment wingwalls or retaining walls on traffic side of wall.
- ⑬ As an aid in supporting reinforcement, additional longitudinal bars may be used in the slab with the approval of the Engineer. Such bars must be furnished at the Contractor's expense.
- ⑭ Top longitudinal slab bar may be adjusted laterally 3" plus or minus to tie reinforcing.
- ⑮ Raised Sidewalk



### SECTIONS THRU RAIL WITH RAISED SIDEWALK

SHEET 2 OF 3		Bridge Division Standard	
COMBINATION RAIL TEXAS CLASSIC			
TYPE C411			
FIG.:	ctb3021.dgn	DN: TxDOT	CK: TxDOT
REV:	July 2014	CHG: SECT	JOB: HIGHWAY
REV:		CHG:	COUNTY:
			SHEET NO. 33

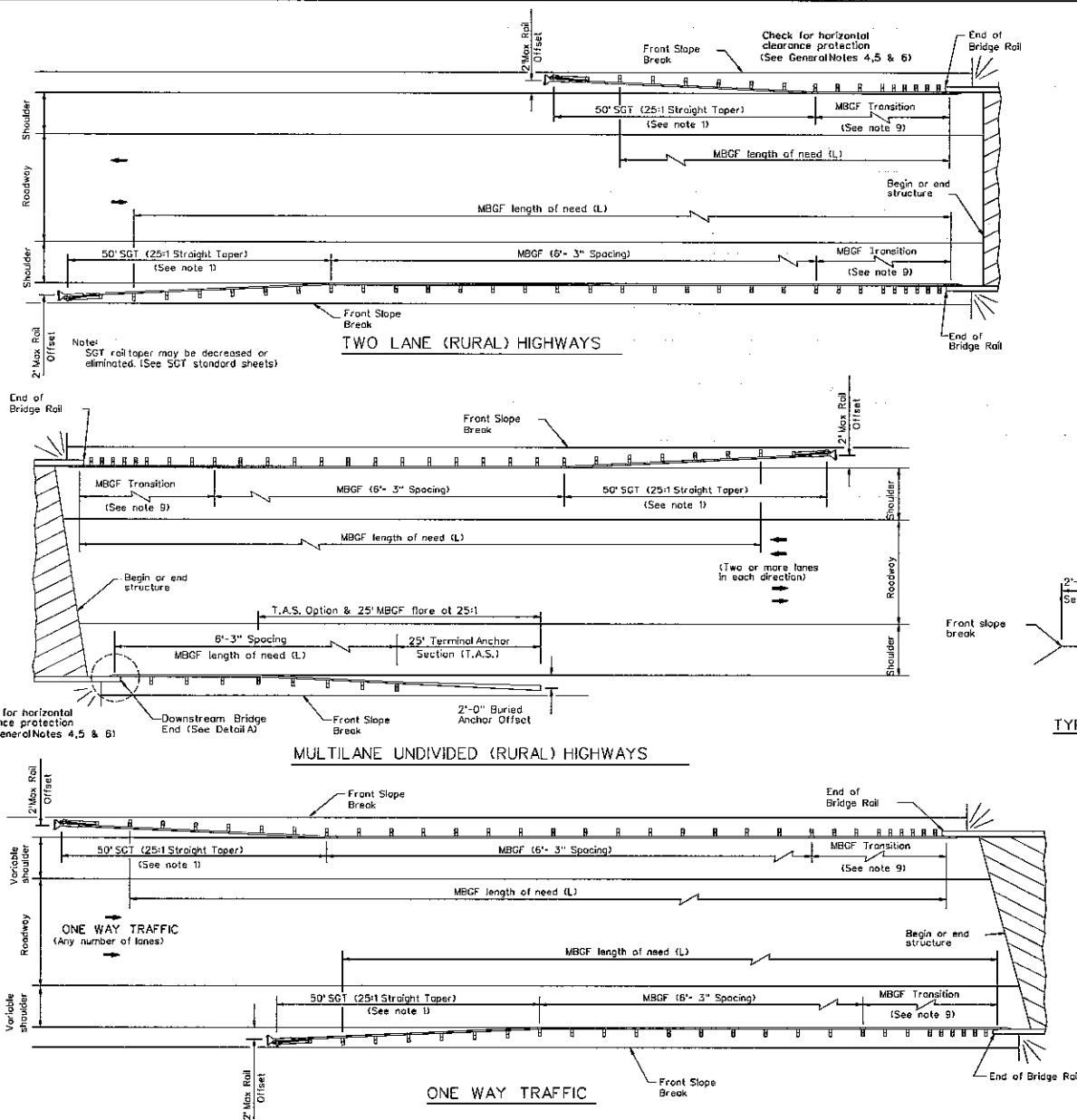
DATE: \_\_\_\_\_  
FILE: \_\_\_\_\_

SHEET 3 OF 3																									
 <p><b>Texas Department of Transportation</b></p>	<b>Bridge Division Standard</b>																								
<h1 style="margin: 0;">COMBINATION RAIL</h1> <h1 style="margin: 0;">TEXAS CLASSIC</h1>																									
<h2 style="margin: 0;">TYPE C411</h2>																									
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;">DATE:</td> <td style="width: 35%;">RIS00021.dgn</td> <td style="width: 10%;">DWG: T-100T</td> <td style="width: 10%;">CR: T-100T</td> <td style="width: 10%;">DR: T-100T</td> <td style="width: 10%;">CC: T-10</td> </tr> <tr> <td>PROJECT:</td> <td>July 2014</td> <td>CWRT: SECT</td> <td>ASD</td> <td colspan="2">FIDUCIAL</td> </tr> <tr> <td>REVISIONS:</td> <td></td> <td>SHEET:</td> <td>COUNTRY:</td> <td colspan="2">SHEET NO.</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td colspan="2" style="text-align: center;">34</td> </tr> </table>		DATE:	RIS00021.dgn	DWG: T-100T	CR: T-100T	DR: T-100T	CC: T-10	PROJECT:	July 2014	CWRT: SECT	ASD	FIDUCIAL		REVISIONS:		SHEET:	COUNTRY:	SHEET NO.						34	
DATE:	RIS00021.dgn	DWG: T-100T	CR: T-100T	DR: T-100T	CC: T-10																				
PROJECT:	July 2014	CWRT: SECT	ASD	FIDUCIAL																					
REVISIONS:		SHEET:	COUNTRY:	SHEET NO.																					
				34																					



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DATE: FILE:



# GENERAL NOTES

- For more detail: See MBGF, SGT, and MBGF Transition standard sheets.
- Quantities of metal beam guard fence (MBGF) at individual bridge ends are shown elsewhere in plans.
- Use average daily traffic (ADT) for the current year to determine MBGF length of need in accordance with the Roadway Design Manual unless otherwise specified. Where significant traffic volume growth is anticipated on low volume (0-750 ADT) highways, use length determinations for the lower volume category.
- MBGF may not be required to shield departure end of bridge unless other obstacles within the horizontal clearance limits or opposing traffic indicate a MBGF consideration.
- Terminal anchor sections (TAS) are only for downstream end anchorage use, outside the horizontal clearance area of opposing traffic.
- Direct connection of MBGF (at 6'-3" post spacing without transition) to concrete rail are only for downstream rail connections outside the horizontal clearance area of opposing traffic. (See Detail A)
- The crown shall be widened to accommodate MBGF. Typically the "front slope" break should be 2'-0" from the back of the MBGF post. This applies to new construction on new alignment or where existing roadway cross section is to be widened to increase roadway width. This does not apply to rehabilitation work where existing roadway crown width is to be retained. (See Typical Cross Section at MBGF).
- For restrictive bridge widths: The MBGF should be properly transitioned from the existing bridge rail to the adjoining MBGF. (See MBGF Transition Standards). Metal beam guard fence at these bridge locations shall be flared at the rate of 25:1 or flatter, and be of the length necessary to locate the terminus at the 2 ft. maximum offset from the shoulder edge. (See Typical Cross Section at MBGF).
- Transition length and post spacing will vary depending on the transition type. Transition type will be shown elsewhere in the plans.

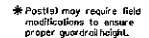
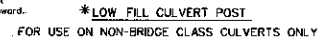
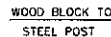
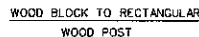
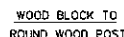
## TYPICAL CROSS SECTION AT MBGF

## DETAIL A

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

		Design Division Standard	
BRIDGE END DETAILS (28" Metal Beam Guard Fence Applications to Rigid Rails)			
BED(28)-11			
FILE: bed2811.dgn © TxDOT December 2001 REVISED	DW: T.Y.OOT CONT: SECT JOB:	DW: BD JOB:	DW: VP JOB:
EST:	COUNTY:	SHEET NO.: 35	

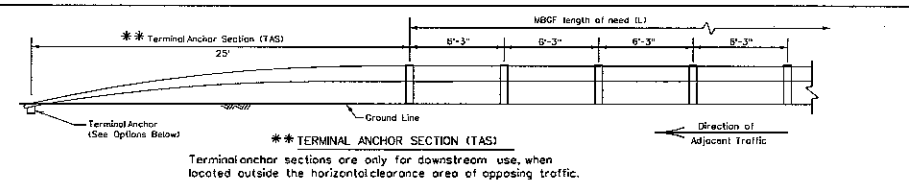
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FILE: \_\_\_\_\_



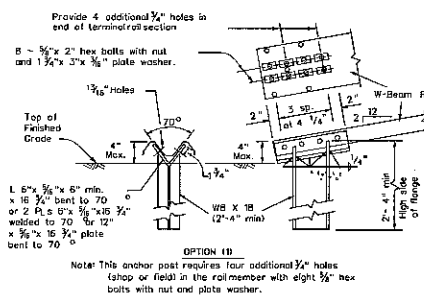
FOR USE ON NON-BRIDGE CLASS CULVERTS ONLY

- 

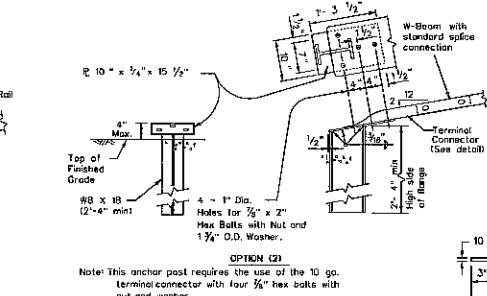
**BUTTON HEAD BOLT**  
Post and Splice Bolts



Terminal anchor sections are only for downstream use, when located outside the horizontal clearance area of opposing traffic.



**OPTION (1)**  
Note: This anchor post requires four additional  $\frac{3}{4}$ " holes (shop or field) in the rail member with eight  $\frac{3}{8}$ " hex bolts with nut and plate washer.



Note: This anchor post requires the use of the 10 ga. terminal connector with four  $\frac{3}{8}$ " hex bolts with nut and washer.

**TERMINAL ANCHOR POST OPTIONS**  
(See General Note 1D)

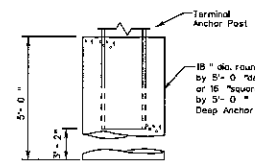
## Notes

Either concrete anchor may be used with either post option above.

No construction joint is allowed in the concrete anchor.

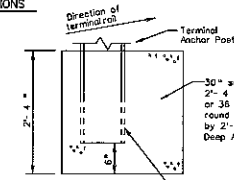
Terminal rail may be bolted to post and in twist position prior to placing concrete anchor.

If concrete anchor is precast, the area should be compacted as directed by the Engineer, when placed in the field.



**TERMINAL CONCRETE ANCHOR OPTIONS**  
(See General Note 11)

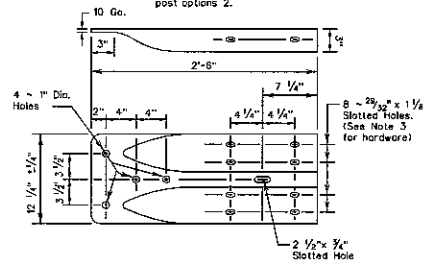
(See General Note 11)



Place face of post  
approx. on C of anchor

### TERMINAL CONNECTOR

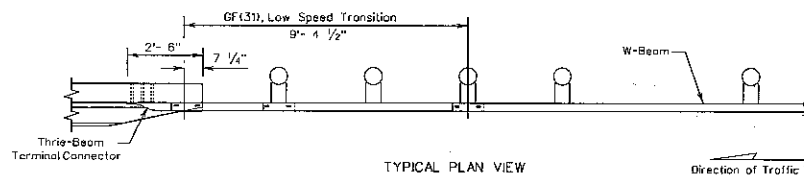
For connection hardware to concrete rails, see the MBGF transition standards.



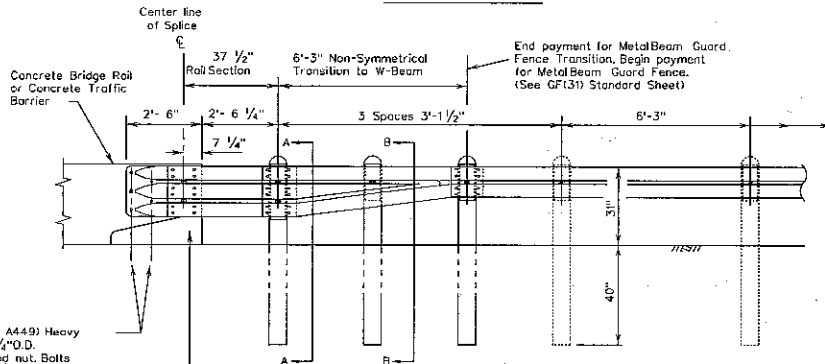
Note: Terminal Connector to be used with terminal anchors.

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DATE: FILE:



TYPICAL PLAN VIEW



TYPICAL ELEVATION VIEW

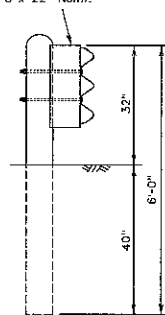
5 - 7/8" Dia. (ASTM A325 or A449) Heavy Hex Head Bolts, with two 1 3/4" O.D. washers under each head and nut. Bolts shall be of sufficient length to extend through the full thickness of the rail, washer, and nut. Install with bolt heads on traffic face.

Chamfer required on concrete rails that extend beyond the face of the guardrail transition.

**TERMINAL CONNECTION NOTE**

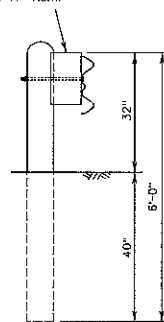
To ensure a stable connection, (12) Rectangular Washers (FWR03) are required under the recessed nuts at the Terminal Connection splice.

This post location requires a Three-Beam Block (6" x 8" x 22" Nom).

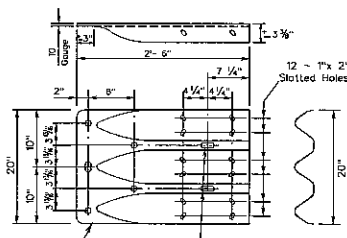


SECTION A-A

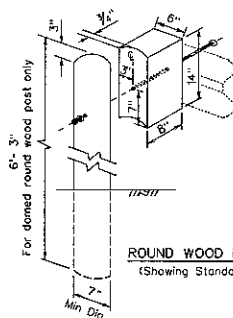
Standard Block (6" x 8" x 14" Nom)



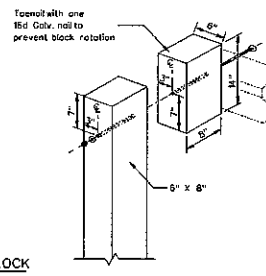
SECTION B-B



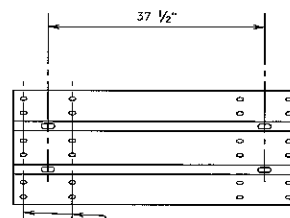
THREE-BEAM TERMINAL CONNECTION  
(See Terminal Connection Note)



ROUND WOOD POST & BLOCK  
(Showing Standard Block)

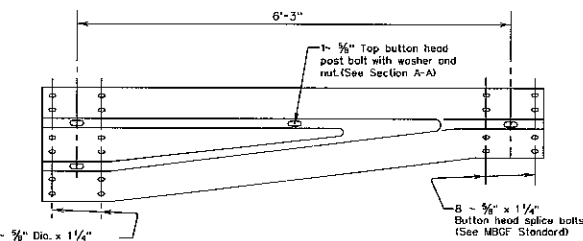


WOOD BLOCK TO RECTANGULAR WOOD POST

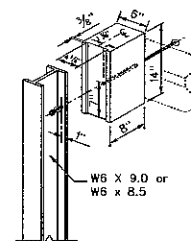


THREE-BEAM (3'-1 1/2")  
(10 GA.) ELEMENT SECTION

12 - 3/8" Dia. x 1 1/4" Button head splice bolts (See General Note 3 & 4)



NON-SYMMETRICAL (10 GA.)  
TRANSITION SECTION



STEEL POST & BLOCK  
(Showing Standard Block)

**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 transitions shall be as shown in the plans or as directed by the Engineer.
2. Rollment shall meet the requirements of Item 540, "Metal Beam Guard Fence" except as modified in the plans.
3. Button head "post" bolts (ASTM A307) shall be of sufficient length to extend through the full thickness of the nut and Type A 1 3/4" O.D. washer and not more than 1" beyond it. Button head "splice" bolts (ASTM A307) are 3/8" x 1 1/4" with 3/8" double recessed nuts (ASTM A563).
4. Fittings (bolts, nuts, and washers) shall be galvanized in accordance with Item 445, "Galvanizing." Fittings shall be subsidiary to the bid item requiring construction of the transition.
5. Crown will be widened to accommodate transitions.
6. If solid rock is encountered. See the GF(31) standard sheet for the proper installation guidance.
7. Posts shall not be set in concrete, of any depth.
8. Unless otherwise shown in the plans, a composite material post and/or block that meets the requirements of DMS-7210, "Composite Material Posts and Blocks for Metal Beam Guard Fence", may be substituted for posts and/or 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 can furnish composite material posts and/or blocks.
9. Refer to GF(31) standard sheet for additional details.

Texas Department of Transportation  
Design Division Standard

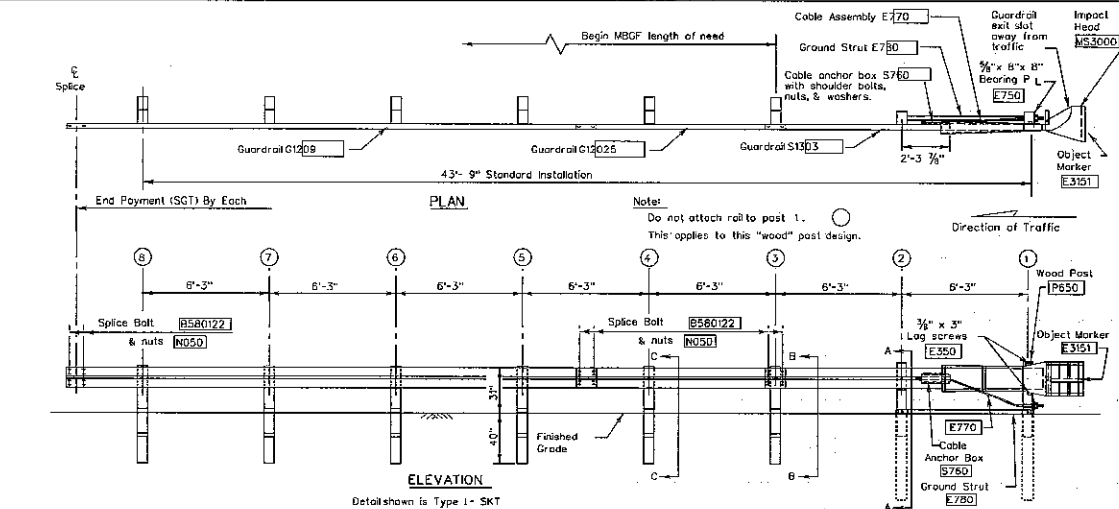
**METAL BEAM GUARD FENCE  
TRANSITION (TL-2)  
(Low Speed Transition)**

GF(31)TL2-11

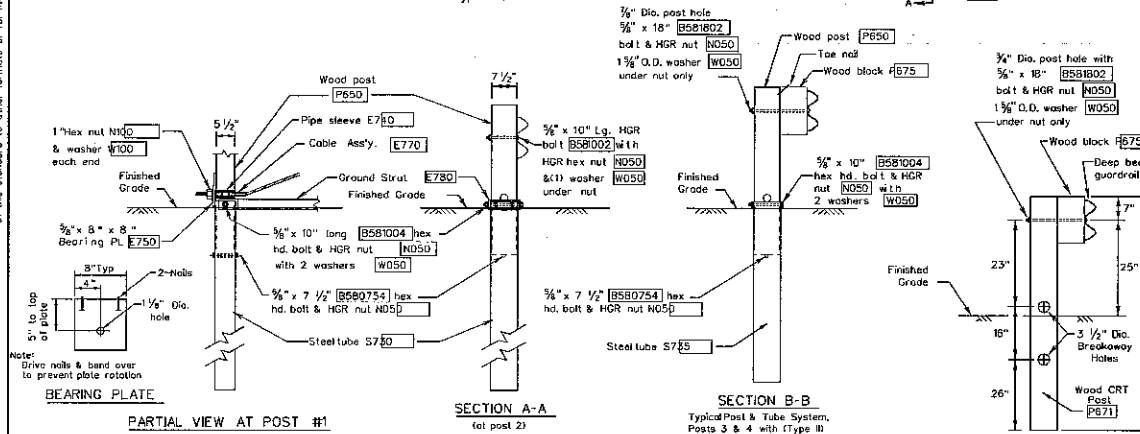
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DESIGN: TxDOT	REVISION: 2011	DATE: 01/01/01	BY: AM	CHK: BD
DATE: 01/01/01	COUNTY: [ ]	SHEET NO. 37		

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DATE: FILE:



Detail shown is Type I - SKT



Note: Drive nails & band over to prevent plate rotation

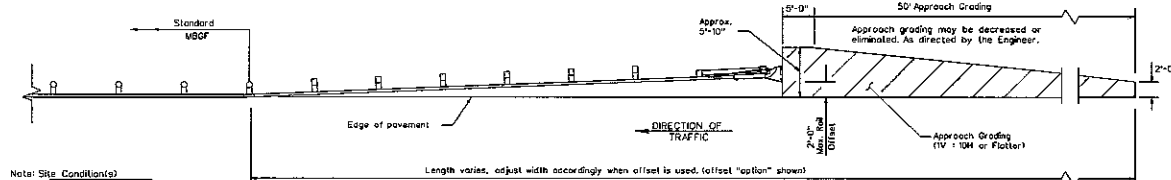
BEARING PLATE

PARTIAL VIEW AT POST #1

SECTION A-A  
(at post 2)

SECTION B-B  
Typical Post & Tube System,  
Posts 3 & 4 with (Type II)  
& Posts 3 Thru 8 with (Type III)

SECTION C-C  
Typ. at Posts 3 Thru 8 with (Type I)



Note: Site Conditions

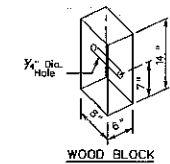
Site conditions may exist where grading is required for the proper installation of metal guardrail end treatments.

APPROACH GRADING AT GUARDRAIL END TREATMENTS

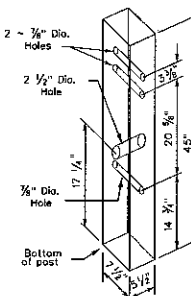
# GENERAL NOTES

- For additional information contact Interstate Steel Inc. (432) 263-3725
- The Type of SGT unit will be specified elsewhere in the plans. The numbers in the circles indicate post position. The Type of SGT unit chosen is a maintenance consideration and does not affect the systems performance.
 

Post & Tube Options	Post Only
Type I Posts 1 thru 2	Posts 3 thru 8
Type II Posts 1 thru 4	Posts 5 thru 8
Type III Posts 1 thru 8	None
- SGT's placed within the "minimum" 150 ft. radius, shall be installed straight. Standard rail elements may be installed within the radius, without special fabrication.
- All bolts, nuts cable assemblies, cable anchors, steel tubes & bearing plates shall be galvanized.
- A flare rate of 25:1 may be used over the first 50 ft. of the system to prevent the terminal head from encroaching the shoulder. The flare may be decreased or eliminated for specific installations, if directed by the Engineer.
- The steel tubes shall not protrude more than 4 inches above ground. Site grading may be necessary to meet this requirement.
- The steel tubes may be driven with an approved driving head. They shall not be driven with the wood post in the tube. If the steel tubes are placed in drilled holes, the backfill material must be satisfactorily compacted to prevent tube settlement.
- If solid rock is encountered. See the Manufacturer's installation manual for the proper installation guidance.
- The breakaway cable assembly must be taut. A locking device, (vice grips or channellock pliers) should be used to prevent the cable from twisting when tightening the nuts.
- The wood blocks shall be "toe nailed" to the rectangular wood posts to prevent them from turning when the wood shrinks. The bearing plate on the front post shall also be "toe nailed" to prevent rotation.
- For curb installations, the soil tubes and posts shall be installed at the proper ground elevation behind the curb. The posts will then require field drilling new holes to accommodate the rail to post connection bolt to maintain the proper height of the rail above the gutter pan. The excess post length above the rail will be removed if directed by the Engineer.
- An object marker shall be installed on the front of the impact head as detailed on D80M(VIA).



WOOD BLOCK



All measurements should be taken from bottom of posts.

## UNIVERSAL WOOD POST

POST & TUBE OPTIONS	
Type I post 1 thru 2	<input type="radio"/>
Type II post 1 thru 4	<input type="radio"/>
Type III post 1 thru 8	<input type="radio"/>

POST & TUBE OPTIONS		BILL OF MATERIAL	
Item #	Type	DESCRIPTION	Quantity
S1303	1	Guardrail (12 Ga.) 12" x 6" SKT	1
G12025	1	Guardrail (12 Ga.) 9" x 4 1/2"	1
G1209	1	Guardrail (12 Ga.) 25" x 0"	1
S730	2	Steel Tube - 6" x 8" x 72" x 1/4" min. or 3/8"	2
S735	0	Steel Tube - 6" x 8" x 54" x 1/4" min. or 3/8"	0
P650	2	Wood Posts - 5 1/2" x 7 1/2" x 45"	2
P671	6	Wood CRT Posts - 6" x 8" x 72"	6
P675	6	Wood Block - 6" x 8" x 14"	6
E740	1	Pipe Sleeve - 2 Std. Pipe x 5 1/2"	1
E750	1	Bearing Plate - 3/8" x 8"	1
S760	1	Cable Anchor Box	1
E770	1	Cable Assembly	1
E780	1	Ground Strut	1
MS3000	1	Impact Head	1
HARDWARE			
B580754	2	3/4" x 7 1/2" Hex Hd. Bolt	2
B58004	2	3/4" x 10" Hex Hd. Bolt (Top of Tubes)	2
W050	11	3/4" Washers	11
B58002	1	3/4" x 10" HGR Post Bolt (Post 2)	1
B58002	16	3/4" x 1 1/4" HGR Splice Bolt	16
B58002	5	3/4" x 18" HGR Post Bolt (Posts 3 thru 8)	5
N050	35	3/4" HGR Nut (24-Spl. Varies-Posts, 2-Strut)	35
E350	2	3/4" x 3" Lag Screw	2
N100	2	1" Hex Nut (Anchor Cable)	2
W100	2	1" Washer (Anchor Cable)	2
SB12A	8	Cable Anchor Box Shoulder Bolts	8
N012A	8	1/2" Structural Nut	8
W012A	8	1/2" Structural Washer	8
E3151	1	Object Marker - (18" x 18")	1

Texas Department of Transportation Design Division Standard

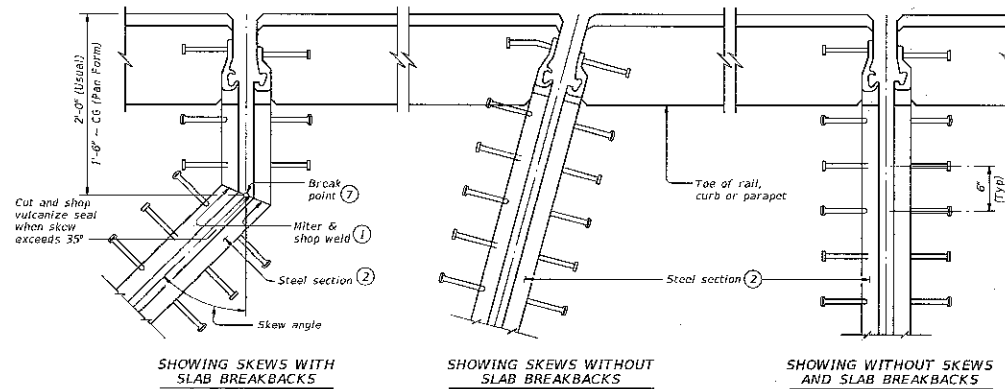
## SINGLE GUARDRAIL TERMINAL (SKT-31) (WOOD POST) SGT(8)31-17

FILE: SGT(8)31-17	REV: 1.00	REV: 1.00	REV: 1.00	REV: 1.00
DATE: December 2011	DATE: 12/11	DATE: 12/11	DATE: 12/11	DATE: 12/11
REVISED	REVISED	REVISED	REVISED	REVISED
BY: [Signature]	BY: [Signature]	BY: [Signature]	BY: [Signature]	BY: [Signature]
COUNTY	COUNTY	COUNTY	COUNTY	COUNTY
SHEET NO.	SHEET NO.	SHEET NO.	SHEET NO.	SHEET NO.
38	38	38	38	38



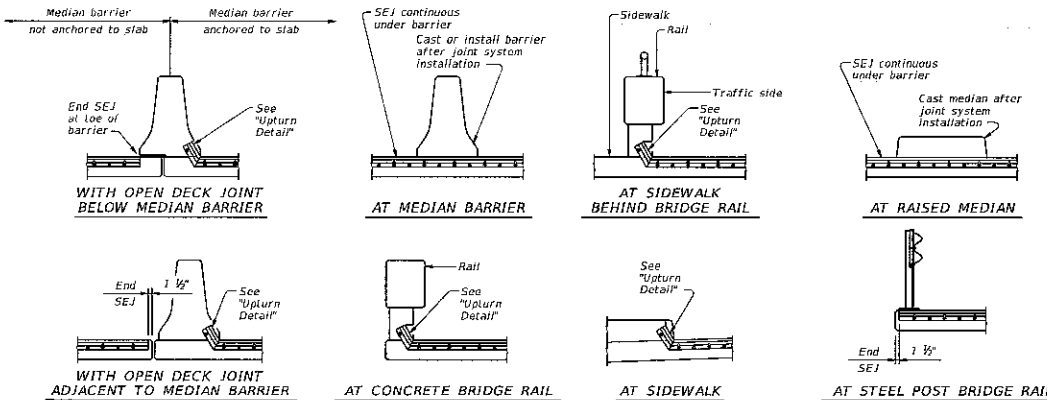
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DATE: FILE:



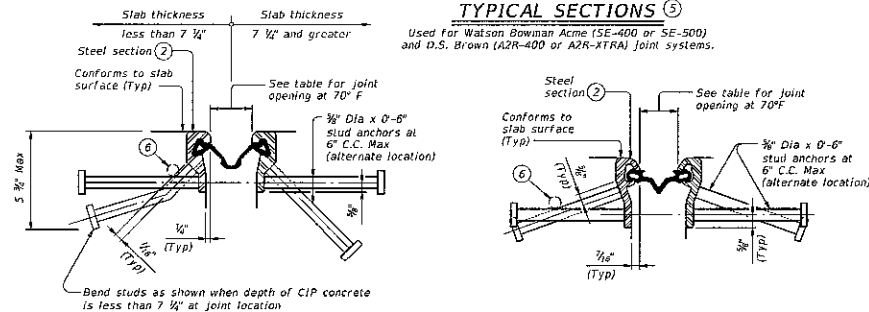
### PLANS OF END CONDITIONS

Used for Watson Bowman Acme (SE-400 or SE-500) and D.S. Brown (A2R-400 or A2R-XTRA) joint systems.



### TYPICAL SECTIONS

Used for Watson Bowman Acme (SE-400 or SE-500) and D.S. Brown (A2R-400 or A2R-XTRA) joint systems.



SECTION THRU WATSON BOWMAN ACME (SE-400 OR SE-500) JOINTS

SECTION THRU D.S. BROWN (A2R-400 OR A2R-XTRA) JOINTS

### TABLE OF SEALED EXPANSION JOINT INFORMATION

MANUFACTURER	STEEL SECTION ②	STRIP SEAL			
		4" JOINT		5" JOINT	
		Seal Type	Joint Opening ③	Seal Type	Joint Opening ③
D.S. Brown	Type SSCM2	A2R-400	1 3/4"	A2R-XTRA	2"
Watson Bowman Acme	Type R	SE-400	1 3/4"	SE-500	2"
Watson Bowman Acme	As Shown	SPS-400	2"	N/A	N/A
R.J. Watson	As Shown	SF-400	2 1/2"	N/A	N/A

### REDUCED LONGITUDINAL MOVEMENT RANGE

SKEW (deg)	JOINT SIZE	
	4"	5"
0	4.0"	5.0"
15	4.0"	5.0"
30	3.5"	4.3"
45	2.8"	3.5"

### DESIGN NOTES:

Joints installed on a skew have reduced ability to accommodate longitudinal movement. Use table values to determine the correct joint size for skewed installations.  
For other skews over 25 degrees, calculate reduced movement range by multiplying joint size by cosine (skew).

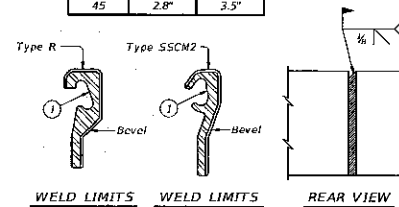
### FABRICATION NOTES:

Temporarily stop assemble corresponding sections of Sealed Expansion Joints, check for fit, and match mark for shipment. Secure corresponding sections together for shipment with shipping angle. Do not use erection bolts. The seal must be continuous and included in the price bid for Sealed Expansion Joint.  
Ship steel sections in convenient lengths of 10'-0" Min and 24'-0" Max unless necessary for staged construction or widening. 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.  
Bolt weld all shop and field splices and grind smooth areas in contact with seal. Make all necessary field splice joint preparations in the shop.  
Point portions of steel sections not in contact with concrete with the primer specified for System II paint.  
Shop drawings for the fabrication of Sealed Expansion Joints will not require the Engineer's approval if fabrication is in accordance with the details shown on this standard.

### CONSTRUCTION NOTES:

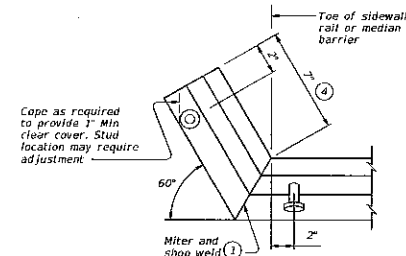
Secure the Sealed Expansion Joint in position and place to the proper grade and alignment by welding braces to adjacent reinforcing steel, to prestressed beam stirrups, or to anchors cast in concrete diaphragms. Include cost of temporary bracing in the price bid for Sealed Expansion Joint.  
Remove shipping angle immediately after each joint half is secured in place. Grind smooth, and touch up with organic zinc-rich paint.  
Clean and prepare seal cavity for seal installation as per the Manufacturer's installation procedures.

**GENERAL NOTES:**  
Provide Sealed Expansion Joints in the size and at locations shown on the plans.  
Minimum slab and overhang thickness required for the use of SEJ-A is 6 1/2".



### FIELD SPLICE DETAIL

Used for Watson Bowman Acme (SE-400 or SE-500) and D.S. Brown (A2R-400 or A2R-XTRA) joint systems.



### UPTURN DETAIL

Used for Watson Bowman Acme (SE-400 or SE-500) and D.S. Brown (A2R-400 or A2R-XTRA) joint systems.

- Remove all burrs which will be in contact with seal prior to making splice.
- Shape of steel section shown is typical. Variations in sections must be approved by the Engineer.
- These openings are also the recommended minimum installation openings.
- Reduce for sidewalk or parapet heights less than 6".
- Other conditions affecting the joint profile should be noted elsewhere.
- Move transverse bars that are in conflict with SEJ studs, in either the bridge slab or approach slab, to rest at the junction of the studs.
- See span details for location of break point.

SHEET 1 OF 2

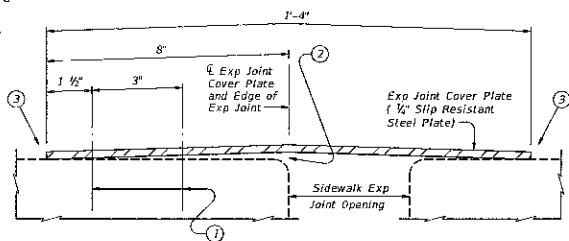
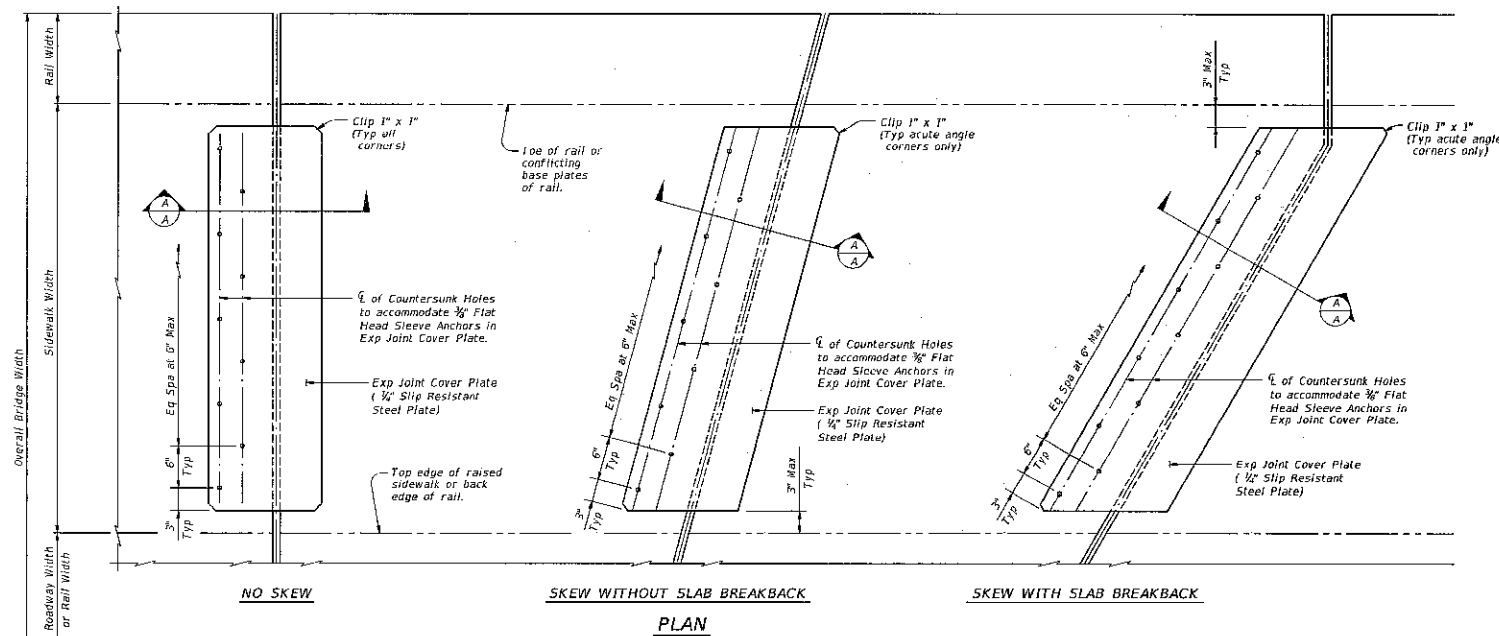
Texas Department of Transportation		Bridge Division Standard	
SEALED EXPANSION JOINT TYPE A WITHOUT OVERLAY			
SEJ-A			
FILE: S2JstA1.020	DN: TxDOT	EX: TxDOT	OR: JTR
REVISED: January 2015	CONF: SEJ	ADD:	APPROVAL:
61-16: Addition of 5/16" seal type (SEJ-A) to SEJ-A.		COUNTY:	SHEET NO. 39

DATE: \_\_\_\_\_  
FILE: \_\_\_\_\_

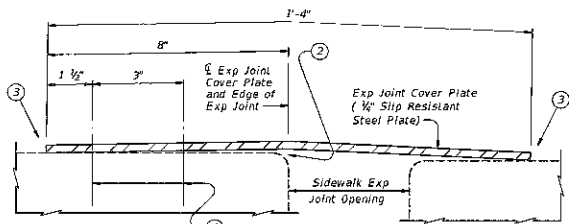
FILE: sejasel.dgn	DR: TxDOT	CR: TxDOT	DR: JTR	CR: DR
TxDOT January 2015	CONF	SECT	JOB	HIGHWAY
REVISIONS				
01-16: Archival of strip road type Simulation in a new plan near SR01 north end.	DATE	COUNTY	SHEET OF	
			40	

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DATE: FILE:

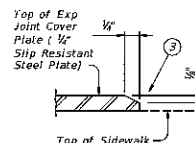


SHOWING LEVEL EXP JOINT



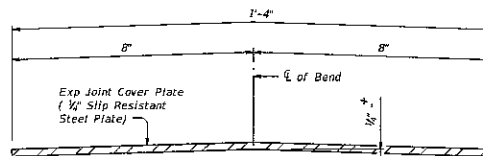
SHOWING UNLEVEL EXP JOINT  
(Install Sleeve Anchors on high side of Exp Joint)

# SECTION A-A



EXP JOINT COVER  
PLATE BEVEL DETAIL

Bevel all plate edges as shown.



BENDING DIAGRAM OF  
EXP JOINT COVER PLATE

1.  $\frac{1}{4} \times 2 \frac{1}{2}$  Min, Flat Head Sleeve Anchors, Stainless Steel, Countersink Flat Head Sleeve Anchors in  $\frac{1}{4}$  Slip Resistant Steel Plate.
2. It is not necessary to remove plate crown provided the plate is firmly secured to the sidewalk.
3. Transverse edges must be in contact with sidewalk surface after installation.

APPROVED SLIP RESISTANT PLATE	
Product	Manufacturer Website
Mebac® #3, Steel	<a href="http://www.harscoikg.com">www.harscoikg.com</a>
Algrip™, Steel	<a href="http://www.algrip.com">www.algrip.com</a>
SlipNOT® Grade 2, Steel	<a href="http://www.slipnot.com">www.slipnot.com</a>

## FABRICATION NOTES:

Shop drawings for the fabrication of Sidewalk Expansion Joint Cover Plate will not require the Engineer's approval if fabrication is in accordance with the details shown on this standard.

A Bridge Sidewalk Expansion Joint Cover Plate Layout which identifies location side of sleeve anchors and orientation of all cover plate sections must be developed by the fabricator. Mark each steel section in accordance with the Bridge Sidewalk Expansion Joint Cover Plate Layout. A copy of the Bridge Sidewalk Expansion Joint Cover Plate Layout is to be provided to the Engineer.

Sidewalk expansion joint cover plates must be hot-dipped galvanized  $\frac{1}{4}$  slip resistant steel plate. Checker plate or diamond plate is not allowed nor are slip resistant tapes, films and non-metallic coatings.

Minimum required yield strength of steel plate is 36 ksi.

Hot-dip galvanize slip resistant steel plate after fabrication in accordance with Item 445, "Galvanizing".

Provide stainless steel flat head sleeve anchors meeting the requirements of ASTM F 593, Group 1, Alloy 304. Countersink holes in slip-resistant plate for sleeve anchors. Drill holes in sidewalk as per sleeve anchor manufacturer's recommendations. Install sleeve anchors flush with, or slightly recessed below, top surface of sidewalk expansion joint cover plate.

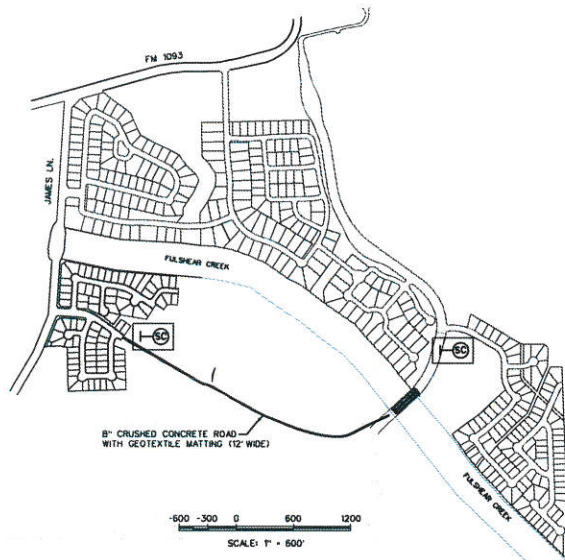
## GENERAL NOTES:

Sidewalk expansion joint cover plates can only accommodate up to a 2" maximum expansion joint. Details provided are applicable to concrete walkway surfaces only.

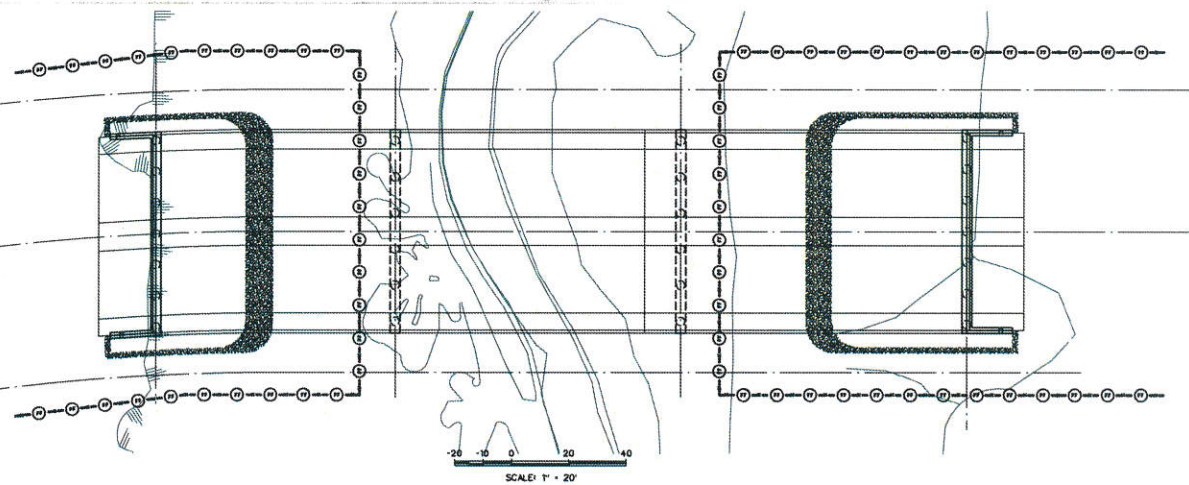
Payment for sidewalk expansion joint cover plates must be by the pound of "Structural Steel (Misc Non-Bridge)" as per Item 442, "Metal for Structures".

Estimated weight of one sidewalk expansion joint cover plate is 14 plf.

		Bridge Division Standard	
<b>BRIDGE SIDEWALK EXPANSION JOINT COVER PLATE (ALL SKEWS)</b>			
<b>BS-EJCP</b>			
FILE: BS-EJCP.dgn	DATE: 1/20/01	BY: TxDOT	CHK: TxDOT
1/20/01	JANUARY 2001	DATE: 1/20/01	CHK: TxDOT
REVISIONS		DATE	CHECKED BY
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CONSTRUCTION EXIT &  
CRUSHED CONCRETE ROAD LOCATION



### PLAN

						DESIGNED BY: _____
						DESIGN CHECKED BY: _____
						DRAWN BY: _____
						CODE CHECKED BY: _____
						SUBVY CHECKED BY: _____
						QA/QC BY: _____ DAYB
						QA/QC REVISIONS BY: _____
NO.		REVISION		DATE	BY	



Engineering and Surveying  
2107 CityWest Blvd., 3rd Floor  
Houston, Texas 77042  
(713)783-7788 (713)783-3580, Fax  
TBPE FIRM REG. No. 280  
TBPLS FIRM REG. No. 100486

FULSHEAR TRACE

FULSHEAR TRACE BRIDGE  
POLLUTION PREVENTION PLAN



SHEET 42  
OF 43 SHEETS  
JOB NO. 2014121-W21



SHEET 43  
OF 43 SHEETS  
JOB NO. 2014121-VZ1



## DRAINAGE DISTRICT

Fort Bend County, Texas

April 18, 2018

Mr. Camarron Jackson, P.E.  
Costello Engineering  
2107 City West Blvd., 3<sup>rd</sup> Floor  
Houston, TX 77042  
Phone: (713) 783-7788

Re: Bridge Construction for Fulshear Trace within Fulbrook on Fulshear Creek

Dear Mr. Jackson:

The Fort Bend County Drainage District staff has received the above referenced construction plans for review and comment. The proposed improvements are fully located within Fulshear MUD No. 1 and the city limits of the City of Fulshear; therefore the FBCDD review is limited to proposed interaction with our right-of-way along Fulshear Creek.

The attached no objection letter from the Fulshear MUD No. 1 engineer includes acknowledgment that Fulshear MUD No. 1 currently has primary maintenance responsibility for the Fulshear Creek right-of-way at the proposed bridge location.

Sheet 3 of the construction plans specifically notes that the contractor shall obtain a permit from the Fort Bend County Engineering Department prior to any work within the Fulshear Creek right-of-way. The design engineer has provided assurance that access easements will be recorded in the near future to establish access points between the new road and the Fulshear Creek right-of-way at all four corners of the proposed bridge.

Contingent upon the aforementioned permit and access easements being secured, and approval by the City of Fulshear engineer, the Fort Bend County Drainage District interposes no objection to the "Bridge Construction for Fulshear Trace within Fulbrook on Fulshear Creek" construction plans.

Please let me know if you have any questions or need anything further.

Sincerely,

Jeffrey T. Janacek, P.E., C.F.M.  
First Assistant to the Chief Engineer  
Fort Bend County Drainage District

cc: Ms. Maggie Dalton – Fort Bend County Engineering Dept.