



**REVIEW BY FORT BEND COUNTY  
COMMISSIONERS COURT**

**Fort Bend County  
Engineering Department**  
301 Jackson Suite 401  
Richmond, Texas 77469  
281.633.7500  
[Permits@fortbendcountytx.gov](mailto:Permits@fortbendcountytx.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](http://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 \_\_\_\_\_, seconded by Commissioner \_\_\_\_\_, 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:   
County Engineer

Presented to Commissioners Court and approved.

Date Recorded \_\_\_\_\_ Comm. Court No. \_\_\_\_\_

Clerk of Commissioners Court

By: \_\_\_\_\_  
Drainage District Engineer/Manager

By: \_\_\_\_\_  
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@fortbendcountytx.gov](mailto:Permits@fortbendcountytx.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):**

\_\_\_\_\_  
Drainage District Approval

\_\_\_\_\_  
Date

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

  
\_\_\_\_\_  
Permit Administrator

10/29/2018  
\_\_\_\_\_  
Date

FULSHEAR MUNICIPAL UTILITY DISTRICT NO. 1

PERFORMANCE BOND

SECTION 00605

Bond [REDACTED]

PERFORMANCE BOND

STATE OF TEXAS

Contract Date October 15, 2018

COUNTY OF Fort Bend

Date Bond Executed May 11, 2018

PRINCIPAL James Construction Group, LLC

SURETY Continental Casualty Company

OWNER FULSHEAR MUNICIPAL UTILITY DISTRICT NO. 1

PENAL SUM OF BOND (In words and figures) One Million Seven Hundred Sixty Five Thousand Two Hundred Forty Two and Seventeen Cents (\$1,765,242.17), being 100 percent of the Contract Price.

CONTRACT for BRIDGE CONSTRUCTION FOR FULSHEAR TRACE WITHIN FULBROOK ON FULSHEAR CREEK located in Fulshear Municipal Utility District No. 1, FORT BEND County, Texas (the "Contract").

KNOW ALL PERSONS BY THESE PRESENTS, that we, Principal and Surety above named, are held and firmly bound unto Owner, its successors and assigns, in the penal sum of the amount stated above, for the payment of which sum well and truly to be made, we bind ourselves and our respective heirs, executors, administrators, officers, directors, shareholders, partners, successors, and assigns, jointly and severally, firmly by these presents.

WHEREAS, Principal entered into that certain Contract with Owner, dated the same date as this bond, which Contract is expressly incorporated herein for all purposes.

NOW, THEREFORE, THE CONDITIONS OF THIS OBLIGATION IS SUCH, that if Principal well and truly performs the work in accordance with the plans, specifications and any other contract documents, during the original term of the Contract and any extensions thereof that may be granted by Owner, with or without notice to Surety, and during the life of any guaranty or warranty required under the Contract, then this obligation is void; otherwise it is to remain in full force and effect. Should the Principal fail to faithfully and strictly perform the work as required by the Contract in all its terms, the Surety will be liable for all damages, losses, expenses and liabilities that the Owner may suffer in consequence thereof.

This bond is given in compliance with the provisions of Chapter 2253 of the Texas Government Code, as amended, which is incorporated herein by this reference. However, all of the express provisions contained herein and in the Contract are applicable whether or not within the scope of said statute.

Surety hereby agrees, for value received, that no change, extension of time, alteration or addition to the terms of the Contract or to work performed under the Contract, or to the plans, specifications or drawings accompanying the Contract, will in any way affect its obligations on this bond and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract or to the work to be performed thereunder.

The bound parties have executed this instrument pursuant to authority of their respective governing body, to be effective on the same date of the Contract.

James Construction Group, LLC  
 PRINCIPAL  
 By [Signature]  
 Name Michael D. Killgore  
 Title President  
 Address 18484 E. Petroleum Drive  
 Baton Rouge, LA 70809

ATTEST  
 By [Signature]  
 Name Stephanie McGraw  
 Title Contracts Administrator  
 (SEAL)

Continental Casualty Company  
 SURETY  
 By [Signature]  
 Name Karen Rhodes  
 Title Attorney-in-Fact

ATTEST  
 By [Signature]  
 Name Debbie L. Welsh  
 Title Senior Account Executive

(SEAL)

Physical Address:  
 Continental Casualty Company - Attn: Surety Dept.  
 333 S. Wabash Avenue  
 Chicago, IL 60604  
 Mailing Address:  
 same as above  
 Telephone: 877-672-6115

Local Recording Agent Personal Identification Number:

Marc W. Boots, #918527 / NPN #1576934

McGriff, Seibels & Williams of Texas, Inc. 818 Town & Country Blvd., Suite 500 Houston, TX 77024

**Surety must attach its original Power of Attorney to this bond.**

CERTIFICATE AS TO CORPORATE PRINCIPAL

I, \_\_\_\_\_, certify that I am the secretary of the corporation named as Principal in the Bond; that \_\_\_\_\_, who signed the bond on behalf of Principal, was then \_\_\_\_\_ of the corporation; that I know his or her signature, and his or her signature is genuine; and that the Bond was duly signed for and on behalf of the corporation by authority of its governing body.

\_\_\_\_\_ (Corporate Seal)

Revised June, 2012

POWER OF ATTORNEY APPOINTING INDIVIDUAL ATTORNEY-IN-FACT

Know All Men By These Presents, That Continental Casualty Company, an Illinois insurance company, National Fire Insurance Company of Hartford, an Illinois insurance company, and American Casualty Company of Reading, Pennsylvania, a Pennsylvania insurance company (herein called "the CNA Companies"), are duly organized and existing insurance companies having their principal offices in the City of Chicago, and State of Illinois, and that they do by virtue of the signatures and seals herein affixed hereby make, constitute and appoint

Michael Brophy Mc Gowan, Susan J Mc Gowan, Donna J Frowd, Debbie L Welsh, Jon Richard Sullivan, Karen Rhodes, Individually

of Novato, CA, their true and lawful Attorney(s)-in-Fact with full power and authority hereby conferred to sign, seal and execute for and on their behalf bonds, undertakings and other obligatory instruments of similar nature

- In Unlimited Amounts -

and to bind them thereby as fully and to the same extent as if such instruments were signed by a duly authorized officer of their insurance companies and all the acts of said Attorney, pursuant to the authority hereby given is hereby ratified and confirmed.

This Power of Attorney is made and executed pursuant to and by authority of the By-Law and Resolutions, printed on the reverse hereof, duly adopted, as indicated, by the Boards of Directors of the insurance companies.

In Witness Whereof, the CNA Companies have caused these presents to be signed by their Vice President and their corporate seals to be hereto affixed on this 20th day of February, 2018.

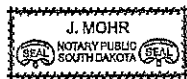


Continental Casualty Company
National Fire Insurance Company of Hartford
American Casualty Company of Reading, Pennsylvania

Paul T. Bruflat
Vice President

State of South Dakota, County of Minnehaha, ss:

On this 20th day of February, 2018, before me personally came Paul T. Bruflat to me known, who, being by me duly sworn, did depose and say: that he resides in the City of Sioux Falls, State of South Dakota; that he is a Vice President of Continental Casualty Company, an Illinois insurance company, National Fire Insurance Company of Hartford, an Illinois insurance company, and American Casualty Company of Reading, Pennsylvania, a Pennsylvania insurance company described in and which executed the above instrument; that he knows the seals of said insurance companies; that the seals affixed to the said instrument are such corporate seals; that they were so affixed pursuant to authority given by the Boards of Directors of said insurance companies and that he signed his name thereto pursuant to like authority, and acknowledges same to be the act and deed of said insurance companies.



My Commission Expires June 23, 2021

J. Mohr
Notary Public

CERTIFICATE

I, D. Johnson, Assistant Secretary of Continental Casualty Company, an Illinois insurance company, National Fire Insurance Company of Hartford, an Illinois insurance company, and American Casualty Company of Reading, Pennsylvania, a Pennsylvania insurance company do hereby certify that the Power of Attorney herein above set forth is still in force, and further certify that the By-Law and Resolution of the Board of Directors of the insurance companies printed on the reverse hereof is still in force. In testimony whereof I have hereunto subscribed my name and affixed the seal of the said insurance companies this 11th day of May, 2018.



Continental Casualty Company
National Fire Insurance Company of Hartford
American Casualty Company of Reading, Pennsylvania

D. Johnson
Assistant Secretary

Form F6853-4/2012

Go to www.cnasurety.com > Owner / Obligee Services > Validate Bond Coverage, if you want to verify bond authenticity.

## Authorizing By-Laws and Resolutions

ADOPTED BY THE BOARD OF DIRECTORS OF CONTINENTAL CASUALTY COMPANY:

This Power of Attorney is made and executed pursuant to and by authority of the following resolution duly adopted by the Board of Directors of the Company at a meeting held on May 12, 1995:

“RESOLVED: That any Senior or Group Vice President may authorize an officer to sign specific documents, agreements and instruments on behalf of the Company provided that the name of such authorized officer and a description of the documents, agreements or instruments that such officer may sign will be provided in writing by the Senior or Group Vice President to the Secretary of the Company prior to such execution becoming effective.”

This Power of Attorney is signed by Paul T. Brufat, Vice President, who has been authorized pursuant to the above resolution to execute power of attorneys on behalf of Continental Casualty Company.

This Power of Attorney is signed and sealed by facsimile under and by the authority of the following Resolution adopted by the Board of Directors of the Company by unanimous written consent dated the 25<sup>th</sup> day of April, 2012:

“Whereas, the bylaws of the Company or specific resolution of the Board of Directors has authorized various officers (the “Authorized Officers”) to execute various policies, bonds, undertakings and other obligatory instruments of like nature; and

Whereas, from time to time, the signature of the Authorized Officers, in addition to being provided in original, hard copy format, may be provided via facsimile or otherwise in an electronic format (collectively, “Electronic Signatures”); Now therefore be it resolved: that the Electronic Signature of any Authorized Officer shall be valid and binding on the Company.”

ADOPTED BY THE BOARD OF DIRECTORS OF NATIONAL FIRE INSURANCE COMPANY OF HARTFORD:

This Power of Attorney is made and executed pursuant to and by authority of the following resolution duly adopted by the Board of Directors of the Company by unanimous written consent dated May 10, 1995:

“RESOLVED: That any Senior or Group Vice President may authorize an officer to sign specific documents, agreements and instruments on behalf of the Company provided that the name of such authorized officer and a description of the documents, agreements or instruments that such officer may sign will be provided in writing by the Senior or Group Vice President to the Secretary of the Company prior to such execution becoming effective.”

This Power of Attorney is signed by Paul T. Brufat, Vice President, who has been authorized pursuant to the above resolution to execute power of attorneys on behalf of National fire Insurance Company of Hartford.

This Power of Attorney is signed and sealed by facsimile under and by the authority of the following Resolution adopted by the Board of Directors of the Company by unanimous written consent dated the 25<sup>th</sup> day of April, 2012:

“Whereas, the bylaws of the Company or specific resolution of the Board of Directors has authorized various officers (the “Authorized Officers”) to execute various policies, bonds, undertakings and other obligatory instruments of like nature; and

Whereas, from time to time, the signature of the Authorized Officers, in addition to being provided in original, hard copy format, may be provided via facsimile or otherwise in an electronic format (collectively, “Electronic Signatures”); Now therefore be it resolved: that the Electronic Signature of any Authorized Officer shall be valid and binding on the Company.”

ADOPTED BY THE BOARD OF DIRECTORS OF AMERICAN CASUALTY COMPANY OF READING, PENNSYLVANIA:

This Power of Attorney is made and executed pursuant to and by authority of the following resolution duly adopted by the Board of Directors of the Company by unanimous written consent dated May 10, 1995:

“RESOLVED: That any Senior or Group Vice President may authorize an officer to sign specific documents, agreements and instruments on behalf of the Company provided that the name of such authorized officer and a description of the documents, agreements or instruments that such officer may sign will be provided in writing by the Senior or Group Vice President to the Secretary of the Company prior to such execution becoming effective.”

This Power of Attorney is signed by Paul T. Brufat, Vice President, who has been authorized pursuant to the above resolution to execute power of attorneys on behalf of American Casualty Company of Reading, Pennsylvania.

This Power of Attorney is signed and sealed by facsimile under and by the authority of the following Resolution adopted by the Board of Directors of the Company by unanimous written consent dated the 25<sup>th</sup> day of April, 2012:

“Whereas, the bylaws of the Company or specific resolution of the Board of Directors has authorized various officers (the “Authorized Officers”) to execute various policies, bonds, undertakings and other obligatory instruments of like nature; and

Whereas, from time to time, the signature of the Authorized Officers, in addition to being provided in original, hard copy format, may be provided via facsimile or otherwise in an electronic format (collectively, “Electronic Signatures”); Now therefore be it resolved: that the Electronic Signature of any Authorized Officer shall be valid and binding on the Company.”

# Document A310™ – 2010

Conforms with The American Institute of Architects AIA Document 310

## Bid Bond

### CONTRACTOR:

(Name, legal status and address)  
James Construction Group, LLC  
18484 E. Petroleum Drive  
Baton Rouge, LA 70809

### SURETY:

(Name, legal status and principal place of business)  
Continental Casualty Company  
333 S. Wabash Ave.  
Chicago, IL 60604

### OWNER:

(Name, legal status and address)  
Fulshear Municipal Utility District No. 1  
c/o Costello, Inc.  
2107 City West Blvd., 3rd Floor  
Houston, TX 77042

Mailing Address for Notices  
Continental Casualty Company  
Attn: Surety Dept.  
333 S. Wabash Ave.  
Chicago, IL 60604

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

**BOND AMOUNT:** Ten Percent (10%) of Bid Amount ---

### PROJECT:

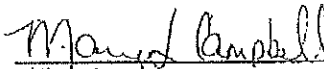
(Name, location or address, and Project number, if any)  
Bridge Construction for Fulshear Trace  
Within Fulbrook on Fulshear Creek  
#2014-121-W21  
Fort Bend County, TX

The Contractor and Surety are bound to the Owner in the amount set forth above, for the payment of which the Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, as provided herein. The conditions of this Bond are such that if the Owner accepts the bid of the Contractor within the time specified in the bid documents, or within such time period as may be agreed to by the Owner and Contractor, and the Contractor either (1) enters into a contract with the Owner in accordance with the terms of such bid, and gives such bond or bonds as may be specified in the bidding or Contract Documents, with a surety admitted in the jurisdiction of the Project and otherwise acceptable to the Owner, for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof; or (2) pays to the Owner the difference, not to exceed the amount of this Bond, between the amount specified in said bid and such larger amount for which the Owner may in good faith contract with another party to perform the work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect. The Surety hereby waives any notice of an agreement between the Owner and Contractor to extend the time in which the Owner may accept the bid. Waiver of notice by the Surety shall not apply to any extension exceeding sixty (60) days in the aggregate beyond the time for acceptance of bids specified in the bid documents, and the Owner and Contractor shall obtain the Surety's consent for an extension beyond sixty (60) days.

If this Bond is issued in connection with a subcontractor's bid to a Contractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

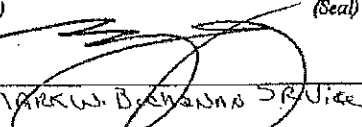
When this Bond has been furnished to comply with a statutory or other legal requirement in the location of the Project, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

Signed and sealed this 1st day of May, 2018

  
\_\_\_\_\_  
(Witness)

  
\_\_\_\_\_  
(Witness) Karen Rhodes

James Construction Group, LLC  
(Principal) \_\_\_\_\_ (Seal)

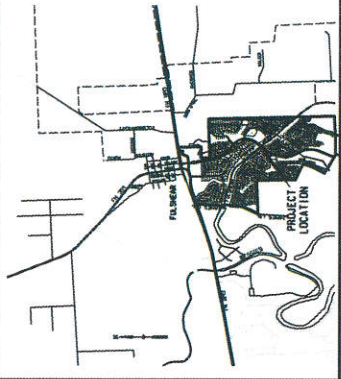
(Title)  SR Vice President

Continental Casualty Company  
(Surety) \_\_\_\_\_

  
(Title) Debbie L. Welsh, Attorney-In-Fact  
Licensed Texas Non-Resident Agent #1759479 (aka Deborah Lynn Welsh)

# 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



VICINITY MAP  
N.T.S.

MAP REF: F.B.C. KEY MAP PG. 622-BLK. M & R

### INDEX OF DRAWINGS

#### SHEET NO. & DESCRIPTION

1. COVER SHEET
2. CONSTRUCTION NOTES
3. STRUCTURAL DRAWINGS
4. BRIDGE LAYOUT
5. ADJUSTMENT PLAN & ELEVATION
6. ADJUSTMENT DETAILS
7. INTERIOR BEET PLAN & ELEVATION
8. FRAMING PLAN
9. FRAMING DETAILS
10. BEAR DETAILS
11. BEAR DETAILS
12. PRECAST CONCRETE NON-STANDARD JOISTS
13. PRECAST CONCRETE JOIST DETAILS
14. PRECAST CONCRETE JOIST DETAILS
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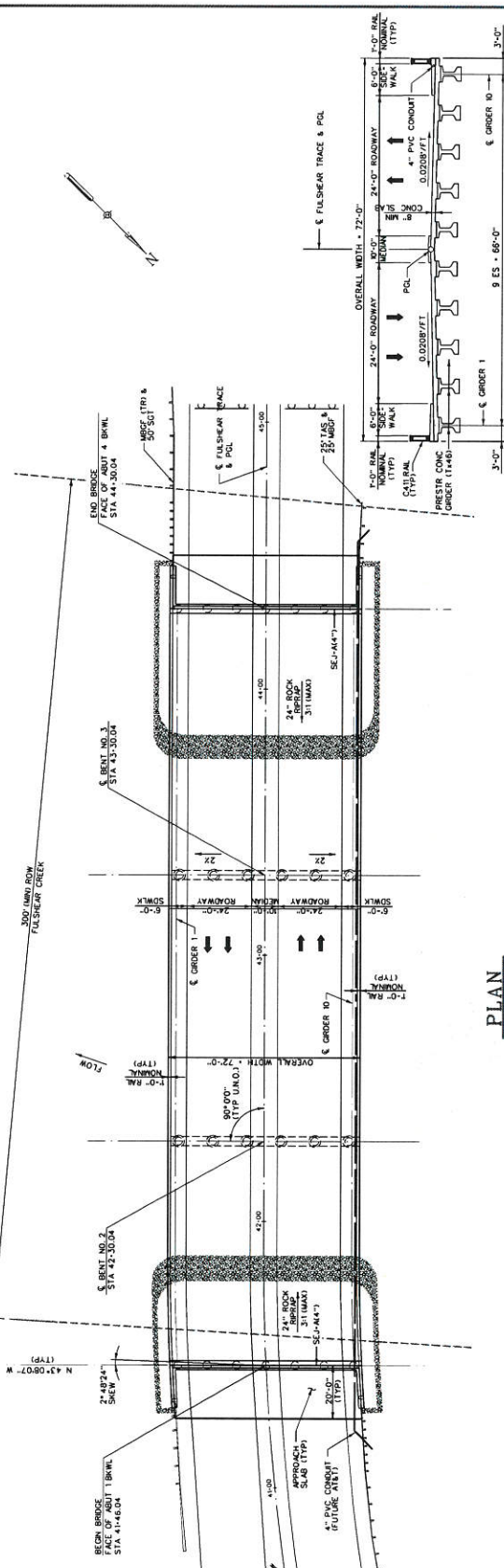
Engineering and Surveying  
2107 CityWest Blvd., 3rd Floor  
Houston, Texas, 77042  
(713)783-7788 / (713)783-3580, Fax  
TBPE FIRM REG. No. 280  
TBPLS FIRM REG. No. 100486  
JOB NO. 2014-181-782 MARCH 2018



NOTES:  
ALL REFERENCES TO THE NORTHWEST CORNER OR A CORNER OF AN  
ACRES TRACT OF LAND RECORDED IN CHAIN'S FILE NUMBER 877048 OF  
THE OFFICIAL RECORDS OF FORT BEND COUNTY, TEXAS



**CURVE DATA**  
 P.I. STA 39+47.56  
 $\Delta = 32^{\circ}41'55.56"$  (RT)  
 $L = 479.22'$   
 $R = 840.00'$   
 $D = 6^{\circ}49'15.35"$



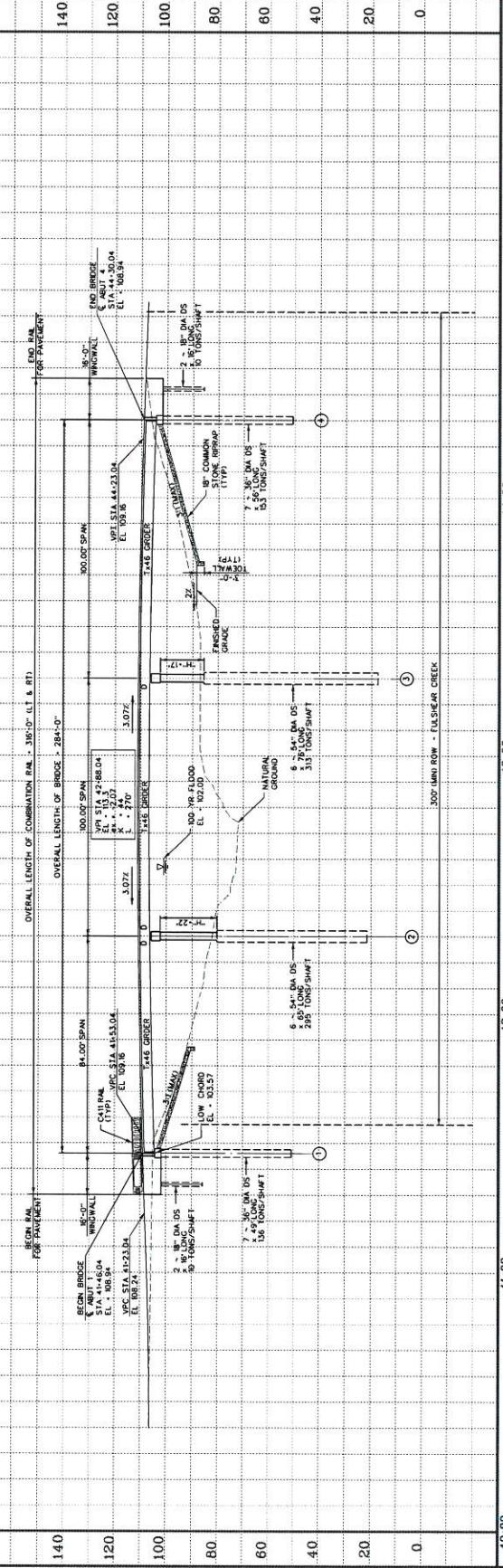
**PLAN**  
**FULSHEAR TRACE BRIDGE (100'R.O.W.)**

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

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

SCALE: 1" = 8'-0"

- DESIGNED IN ACCORDANCE WITH SPECIFICATIONS AND DETAILS HL-93 LOADING.
- THE "H" VALUES SHOWN ARE ESTIMATED COLUMN HEIGHTS. CONTRACTOR SHALL OBTAIN A PERMIT FROM THE PORT BEND COUNTY ENGINEERING DEPARTMENT (2800 S33-7500, PORT BEND COUNTY, TEXAS) PRIOR TO ANY WORK WITHIN RIGHT-OF-WAY.
- SEE US FOR DETAILS SHEET FOR CONDUIT DETAILS AND NOTES.



DESIGNED BY:	DESIGNED BY:	DESIGNED BY:	DESIGNED BY:
DRAWN BY:	DRAWN BY:	DRAWN BY:	DRAWN BY:
CHECKED BY:	CHECKED BY:	CHECKED BY:	CHECKED BY:
SURVEY CHECKED BY:	SURVEY CHECKED BY:	SURVEY CHECKED BY:	SURVEY CHECKED BY:
DATE BY:	DATE BY:	DATE BY:	DATE BY:
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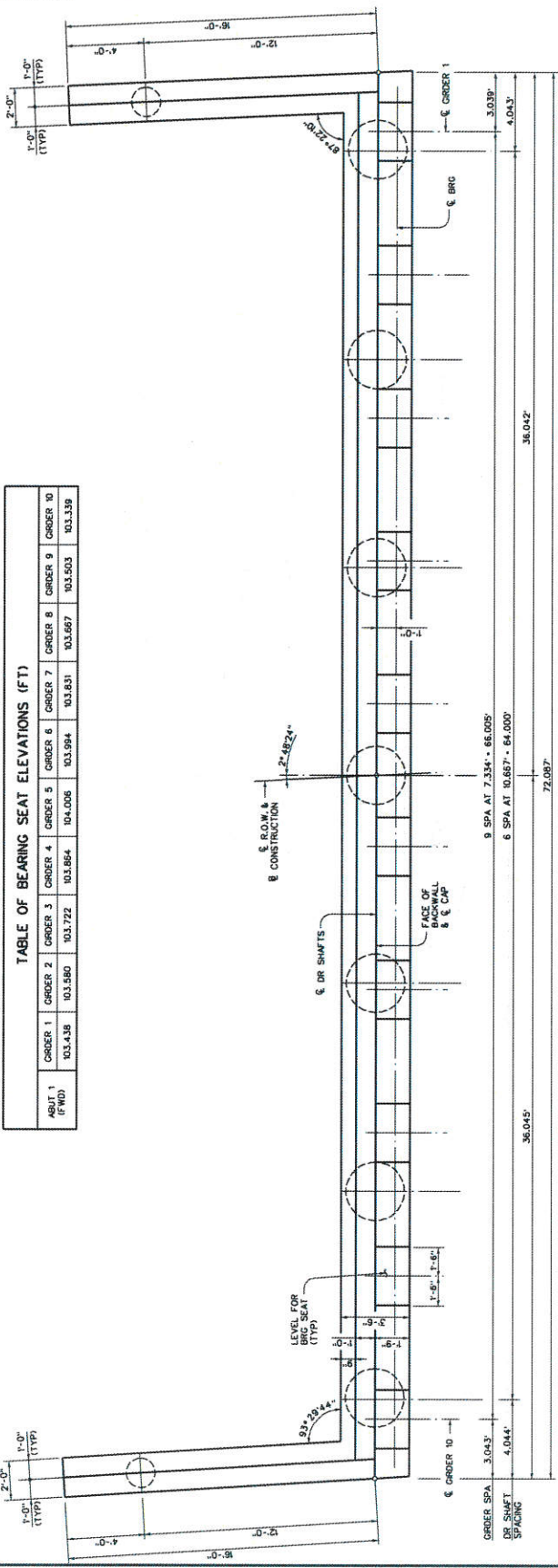
**Costello**

Engineering and Surveying  
 2107 CityWest Blvd., 3rd Floor  
 (713)783-7788 / (713)783-3580 Fax  
 TBPFS FIRM REG. No. 280  
 TBPFS FIRM REG. No. 100486

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

**TABLE OF BEARING SEAT ELEVATIONS (FT)**

ORDER 1	ORDER 2	ORDER 3	ORDER 4	ORDER 5	ORDER 6	ORDER 7	ORDER 8	ORDER 9	ORDER 10
103.438	103.580	103.722	103.864	104.006	103.994	103.831	103.667	103.503	103.339

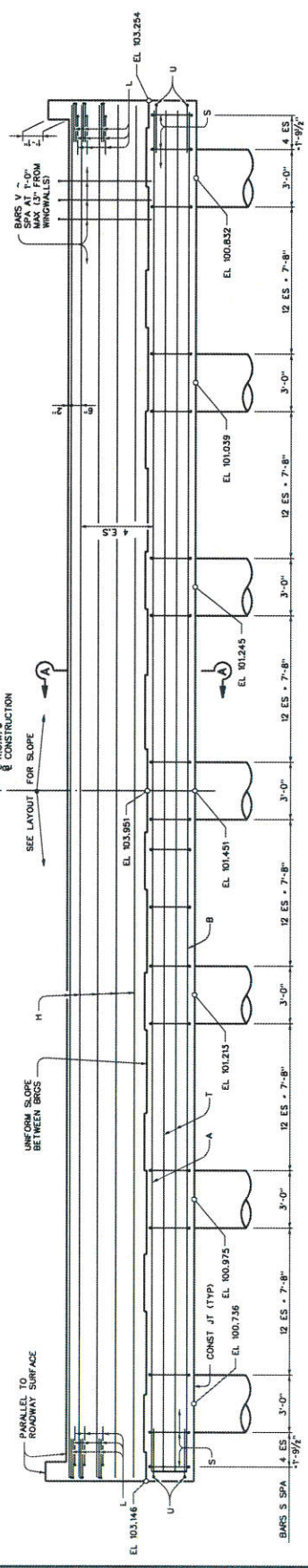


**TABLE OF FOUNDATION LOADS**

SPAN LENGTH	ALL ORDER TYPES
FT	TONS/SHAFT
B4	136

**PLAN**

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



**ELEVATION**

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

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

SHEET 4  
OF 43 SHEETS  
JOB NO. B14181-V1



**FULSHEAR TRACE**  
**ABUTMENT 1**

Engineering and Surveying  
2107 CityWest Blvd., 3rd Floor  
Dallas, Texas 75201  
(713)763-7788 (713)763-3980 Fax  
TBPE FIRM REG. No. 280  
TBPLS FIRM REG. No. 100486



DESIGNED BY: \_\_\_\_\_  
DESIGN CHECKED BY: \_\_\_\_\_  
DRAWN BY: \_\_\_\_\_  
CODE CHECKED BY: \_\_\_\_\_  
SURVEY CHECKED BY: \_\_\_\_\_  
SCALE BY: \_\_\_\_\_  
SCALE REVISIONS BY: \_\_\_\_\_

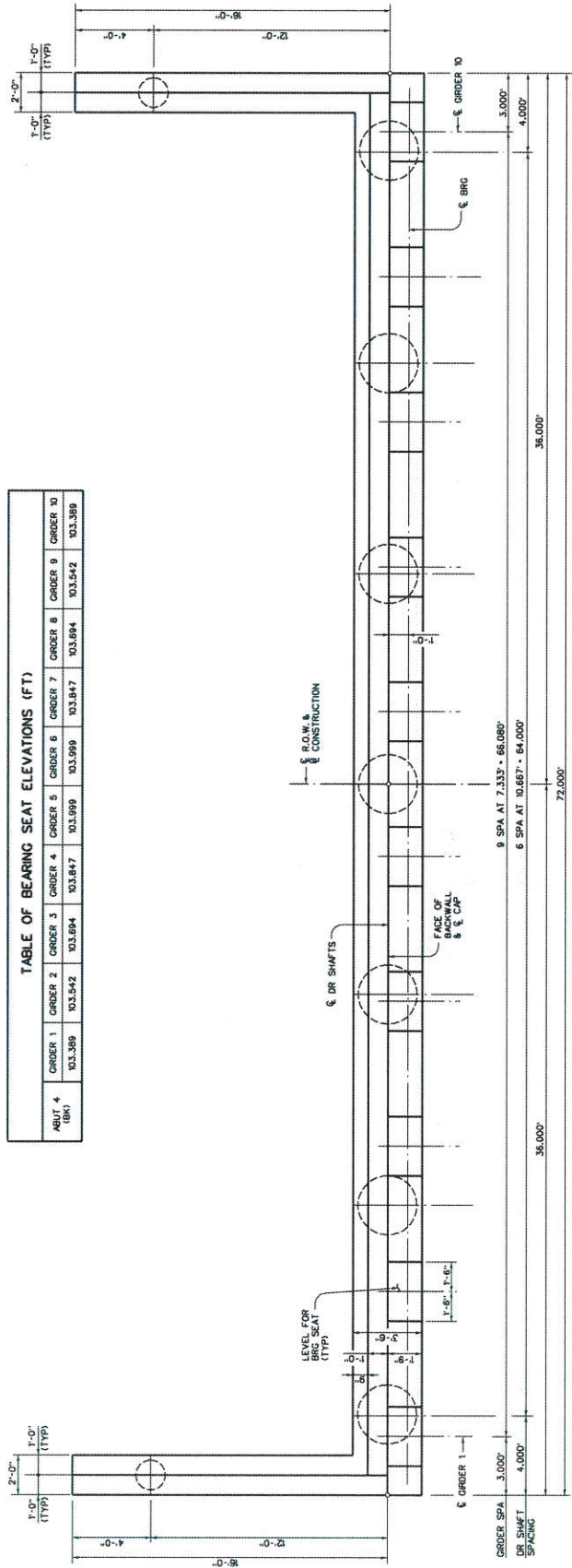
NO.	REVISION	DATE	BY

**TABLE OF FOUNDATION LOADS**

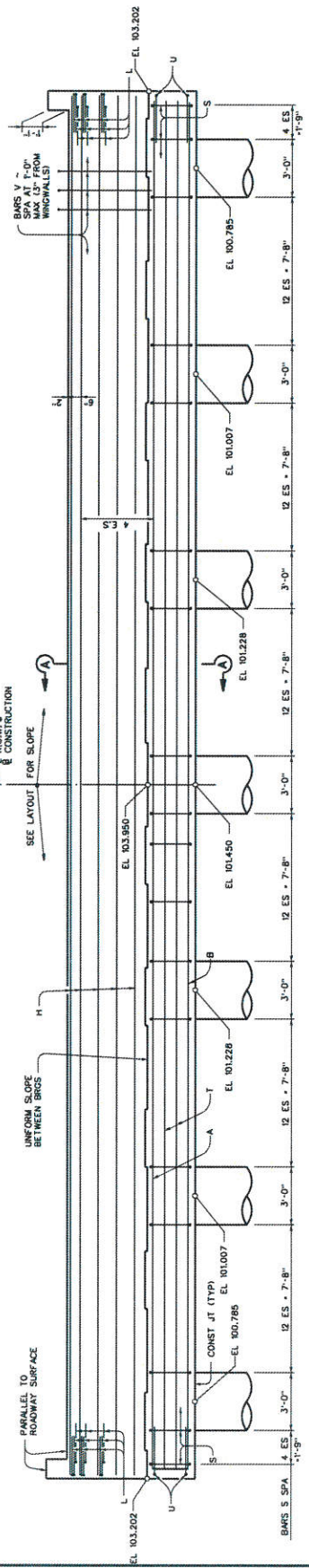
SPAN LENGTH	ALL ORDER TYPES
FT	TONS/SHAFT
100	153

**TABLE OF BEARING SEAT ELEVATIONS (FT)**

ORDER 1	ORDER 2	ORDER 3	ORDER 4	ORDER 5	ORDER 6	ORDER 7	ORDER 8	ORDER 9	ORDER 10
103.389	103.542	103.894	103.847	103.890	103.890	103.847	103.894	103.542	103.389



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



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

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



**FULSHEAR TRACE**  
**ABUTMENT 4**

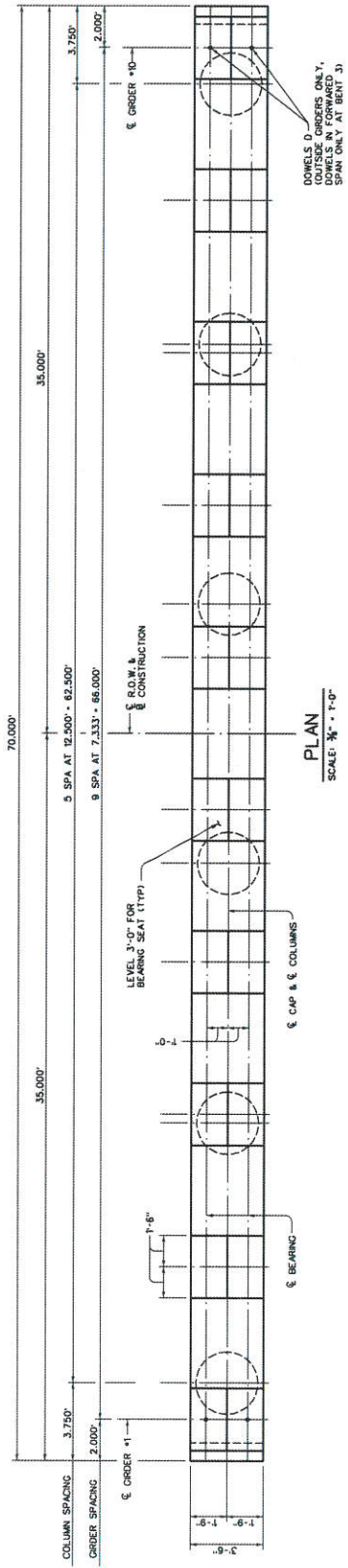
Engineering and Surveying  
2107 CityWest Blvd., 3rd Floor  
(731)763-7788 / (731)763-3860 Fax  
TBPE FIRM REG. No. 280  
TBPLS FIRM REG. No. 100486



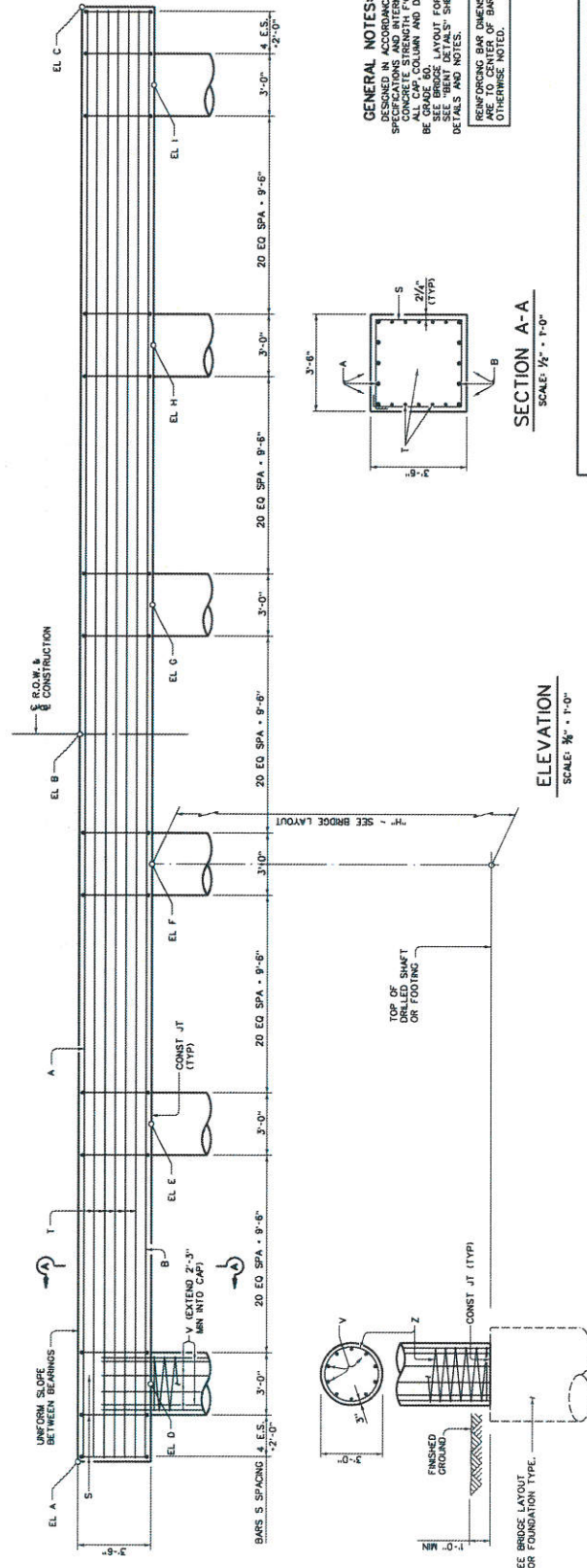
DESIGNED BY: \_\_\_\_\_  
DESIGN CHECKED BY: \_\_\_\_\_  
DRAWN BY: \_\_\_\_\_  
CHECKED BY: \_\_\_\_\_  
SURVEY CHECKED BY: \_\_\_\_\_  
SCALE BY: \_\_\_\_\_ DATE: \_\_\_\_\_

NO.	REVISION	DATE	BY

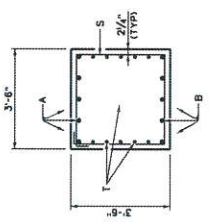




PLAN  
SCALE: 1/8" = 1'-0"



ELEVATION  
SCALE: 1/2" = 1'-0"



SECTION A-A  
SCALE: 1/2" = 1'-0"

**GENERAL NOTES:**  
DESIGNED IN ACCORDANCE WITH 7TH EDITION TO AASHTO LRFD BRIDGE SPECIFICATIONS AND AASHTO PCI DESIGNER'S GUIDE FOR BRIDGE CONSTRUCTION.  
ALL CAP, COLUMN AND DRILLED SHAFT REINFORCING MUST BE CHAIRS.  
SEE "BENT DETAILS" SHEET FOR ALL FOUNDATION DETAILS AND NOTES.  
REINFORCING BAR DIMENSIONS SHOWN ARE NET LENGTHS OF BAR UNLESS OTHERWISE NOTED.

ELEVATION	BENT 2	BENT 3
EL A	105.083	105.268
EL B	105.811	105.998
EL C	105.083	105.268
EL D	101.661	101.846
EL E	101.921	102.106
EL F	102.811	102.366
EL G	102.181	102.106
EL H	101.921	102.106
EL I	101.661	101.846

BENT	ORDER 1	ORDER 2	ORDER 3	ORDER 4	ORDER 5	ORDER 6	ORDER 7	ORDER 8	ORDER 9	ORDER 10
BENT 1 (B1)	105.250	105.403	105.555	105.708	105.860	105.960	105.707	105.555	105.402	105.250
BENT 2 (FWD)	105.276	105.429	105.582	105.734	105.887	105.734	105.582	105.429	105.276	
BENT 3 (FWD)	105.455	105.607	105.760	105.912	106.065	105.912	105.760	105.607	105.455	
	105.435	105.588	105.741	105.893	106.046	105.893	105.741	105.588	105.435	

TABLE OF BEARING SEAT ELEVATIONS (FT)



FULSHEAR TRACE  
INTERIOR BENTS 2 AND 3

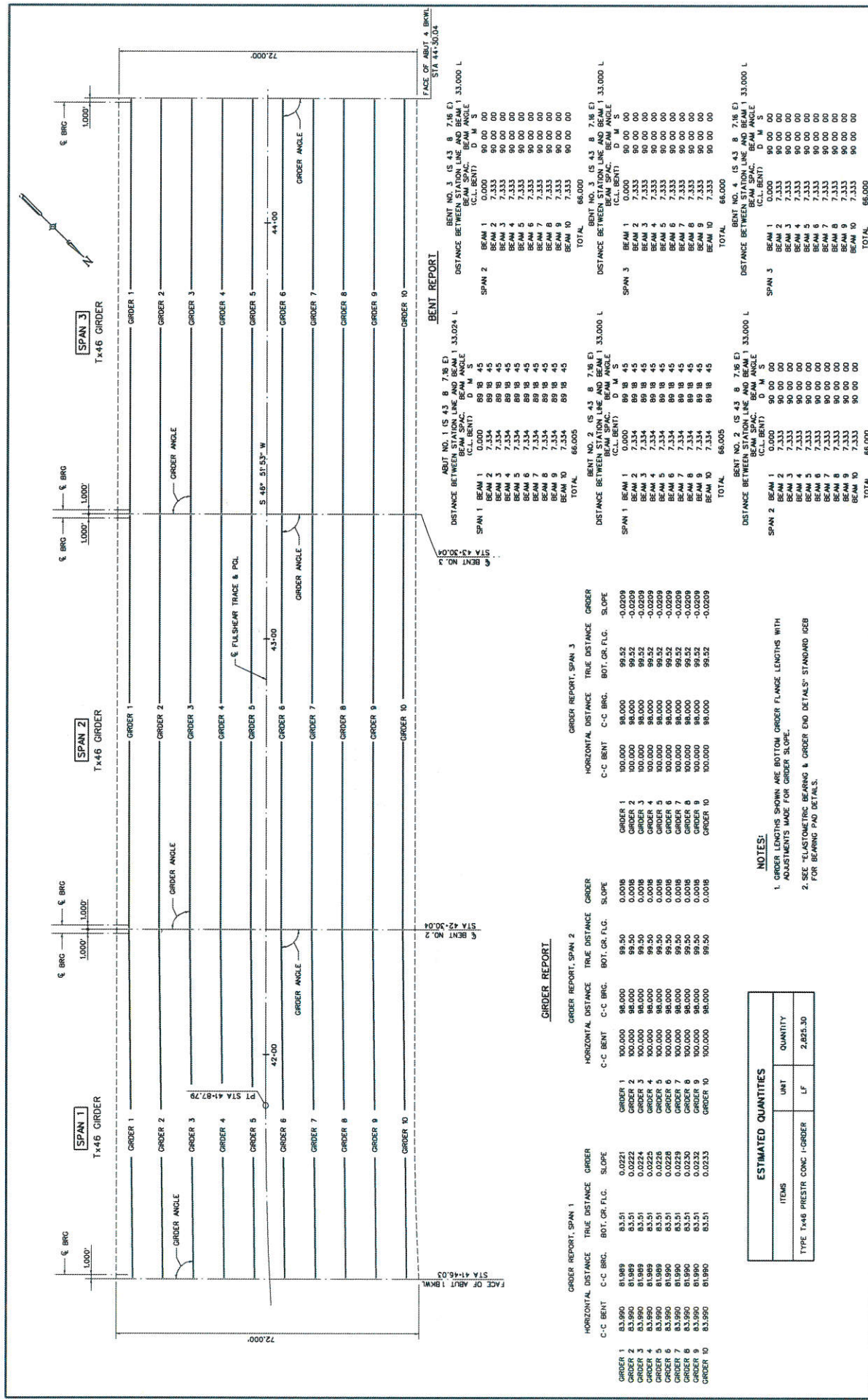
Engineering and Surveying  
2107 CityWest Blvd., 3rd Floor  
Houston, Texas 77042  
(713) 778-1100  
TBP&S FIRM REG. NO. 280  
TBP&S FIRM REG. NO. 100486



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

NO.	REVISION	DATE	BY





**BENT REPORT**

ABUT. NO. 1 (S 43 B 7.16 E) DISTANCE BETWEEN STATION LINE AND BEAM 1 33.024 L

BEAM SPAC.	BEAM ANGLE	(C.L. BENT)	D	M	S
BEAM 1	0.000	89 18 45	0.000	90 00 00	0.000
BEAM 2	7.334	89 18 45	7.333	90 00 00	7.333
BEAM 3	7.334	89 18 45	7.333	90 00 00	7.333
BEAM 4	7.334	89 18 45	7.333	90 00 00	7.333
BEAM 5	7.334	89 18 45	7.333	90 00 00	7.333
BEAM 6	7.334	89 18 45	7.333	90 00 00	7.333
BEAM 7	7.334	89 18 45	7.333	90 00 00	7.333
BEAM 8	7.334	89 18 45	7.333	90 00 00	7.333
BEAM 9	7.334	89 18 45	7.333	90 00 00	7.333
BEAM 10	7.334	89 18 45	7.333	90 00 00	7.333
TOTAL	66.005		66.000		66.000

FACE OF ABUT. 4 BKWL STA 44+30.04

**BENT REPORT**

ABUT. NO. 2 (S 43 B 7.16 E) DISTANCE BETWEEN STATION LINE AND BEAM 1 33.000 L

BEAM SPAC.	BEAM ANGLE	(C.L. BENT)	D	M	S
BEAM 1	0.000	89 18 45	0.000	90 00 00	0.000
BEAM 2	7.334	89 18 45	7.333	90 00 00	7.333
BEAM 3	7.334	89 18 45	7.333	90 00 00	7.333
BEAM 4	7.334	89 18 45	7.333	90 00 00	7.333
BEAM 5	7.334	89 18 45	7.333	90 00 00	7.333
BEAM 6	7.334	89 18 45	7.333	90 00 00	7.333
BEAM 7	7.334	89 18 45	7.333	90 00 00	7.333
BEAM 8	7.334	89 18 45	7.333	90 00 00	7.333
BEAM 9	7.334	89 18 45	7.333	90 00 00	7.333
BEAM 10	7.334	89 18 45	7.333	90 00 00	7.333
TOTAL	66.005		66.000		66.000

FACE OF ABUT. 4 BKWL STA 44+30.04

**BENT REPORT**

ABUT. NO. 3 (S 43 B 7.16 E) DISTANCE BETWEEN STATION LINE AND BEAM 1 33.000 L

BEAM SPAC.	BEAM ANGLE	(C.L. BENT)	D	M	S
BEAM 1	0.000	89 18 45	0.000	90 00 00	0.000
BEAM 2	7.334	89 18 45	7.333	90 00 00	7.333
BEAM 3	7.334	89 18 45	7.333	90 00 00	7.333
BEAM 4	7.334	89 18 45	7.333	90 00 00	7.333
BEAM 5	7.334	89 18 45	7.333	90 00 00	7.333
BEAM 6	7.334	89 18 45	7.333	90 00 00	7.333
BEAM 7	7.334	89 18 45	7.333	90 00 00	7.333
BEAM 8	7.334	89 18 45	7.333	90 00 00	7.333
BEAM 9	7.334	89 18 45	7.333	90 00 00	7.333
BEAM 10	7.334	89 18 45	7.333	90 00 00	7.333
TOTAL	66.005		66.000		66.000

FACE OF ABUT. 4 BKWL STA 44+30.04

**ORDER REPORT, SPAN 1**

ORDER	HORIZONTAL DISTANCE	TRUE DISTANCE	SLOPE
ORDER 1	83.51	83.51	0.0221
ORDER 2	83.51	83.51	0.0224
ORDER 3	83.51	83.51	0.0225
ORDER 4	83.51	83.51	0.0228
ORDER 5	83.51	83.51	0.0229
ORDER 6	83.51	83.51	0.0229
ORDER 7	83.51	83.51	0.0230
ORDER 8	83.51	83.51	0.0232
ORDER 9	83.51	83.51	0.0233
ORDER 10	83.51	83.51	0.0233

**ORDER REPORT, SPAN 2**

ORDER	HORIZONTAL DISTANCE	TRUE DISTANCE	SLOPE
ORDER 1	98.000	98.000	0.0018
ORDER 2	98.000	98.000	0.0018
ORDER 3	98.000	98.000	0.0018
ORDER 4	98.000	98.000	0.0018
ORDER 5	98.000	98.000	0.0018
ORDER 6	98.000	98.000	0.0018
ORDER 7	98.000	98.000	0.0018
ORDER 8	98.000	98.000	0.0018
ORDER 9	98.000	98.000	0.0018
ORDER 10	98.000	98.000	0.0018

**ORDER REPORT, SPAN 3**

ORDER	HORIZONTAL DISTANCE	TRUE DISTANCE	SLOPE
ORDER 1	98.000	98.000	-0.0209
ORDER 2	98.000	98.000	-0.0209
ORDER 3	98.000	98.000	-0.0209
ORDER 4	98.000	98.000	-0.0209
ORDER 5	98.000	98.000	-0.0209
ORDER 6	98.000	98.000	-0.0209
ORDER 7	98.000	98.000	-0.0209
ORDER 8	98.000	98.000	-0.0209
ORDER 9	98.000	98.000	-0.0209
ORDER 10	98.000	98.000	-0.0209

**ESTIMATED QUANTITIES**

ITEMS	UNIT	QUANTITY
TYPE T4x6 PRESTR CONC I-GIRDER	LF	2,825.30

- NOTES:**
- ORDER LENGTHS SHOWN ARE BOTTOM ORDER FLANGE LENGTHS WITH ADJUSTMENTS MADE FOR GIRDER SLOPE.
  - SEE ELASTOMERIC BEARING & GIRDER END DETAILS STANDARD IGEB FOR BEARING PAD DETAILS.

DESIGNED BY: \_\_\_\_\_

CHECKED BY: \_\_\_\_\_

DRAWN BY: \_\_\_\_\_

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

REVISIONS BY: \_\_\_\_\_

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

**Costello**

Engineering and Surveying  
2100 North Loop West  
Houston, Texas 77042  
(713)783-7788 (713)783-3580 Fax  
TBPB FIRM REG. NO. 280  
TBPB'S FIRM REG. NO. 100486

**FULSHEAR TRACE**

**FRAMING PLAN**

SHEET **9**

OF **43**

SHEETS

JOB NO. 2018121-PEI





STRUCTURE	DESIGNED GIRDERS				STRAIGHT STRAND PATTERN				DEPRESSED STRAND PATTERN		CONCRETE		OPTIONAL DESIGN				NON-STANDARD STRAND PATTERNS					
	SEPAR. NO.	GIRDER NO.	GIRDER TYPE	NO. STRAND PATTERN	PRESTRESSING STRANDS		TOTAL NO.	SIZE	STRENGTH	DIST. FROM TOP BOTTOM	NO. DEBOUNDED STRANDS	NO. TOTAL STRANDS	RELEASE STRANDS	NUMBER OF STRANDS	DESIGN LOAD TENSILE STRAIN (STEP 2) (SERVILE II) (FSR) (ksi)	DESIGN LOAD TENSILE STRAIN (STEP 1) (SERVILE III) (FSR) (ksi)	DESIGNED NUMBER ULTIMATE STRENGTH (FSR) (ksi)	DESIGNED NUMBER ULTIMATE STRENGTH (FSR) (ksi)	LIVE LOAD DISTRIBUTION FACTOR	PATTERN	STRAIGHT ARRANGEMENT AT % OF GIRDER	
					NO. STRANDS	STRENGTH (ksi)																NO. STRANDS
FULSHEAR TRACE BRIDGE	1	1-3	T-46	28	0.6	270	13.89	13.89		2	42.5	42.5	4.700	5.800	-3.052	4877	0.633	0.767				
	1	4-7	T-46	26	0.6	270	13.76	13.76	2.5	2	42.5	42.5	4.300	5.200	-2.931	4873	0.633	0.767				
	262	1-3	T-46	42	0.6	270	13.38	13.38	4.5	4	0	0	5.300	6.500	-4.442	6545	0.694	0.767				
	263	4-7	T-46	38	0.6	270	13.02	13.02	2.5	4	0	0	5.400	6.500	-4.807	6254	0.804	0.767				

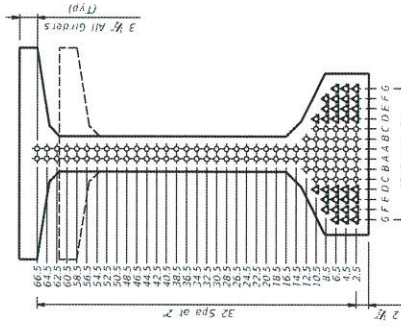
DISCLAIMER: The use of this software is governed by the Texas Engineering Practice Act. No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the completion of this standard or other format or for increases or decreases in design stresses resulting from its use.

**DESIGN NOTES:**  
 1. When TO-END (in) equals TO-E (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):  
 Compression = 0.65 f<sub>ci</sub>  
 Tension = 0.24 √f<sub>ci</sub>  
 Optional designs must likewise conform:  
 3. Portion of full HL93.

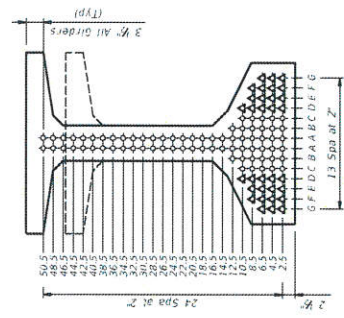
**FABRICATION NOTES:**  
 Provide Class H concrete.  
 Provide Grade 60 reinforcing steel bars.  
 Use low relaxation strands, each prestressed to 75 percent of f<sub>pu</sub>.  
 Strand debonding must comply with Item 424.4.2.2.4. Full-length debonded strands are only permitted in positions marked Δ. Double wrap full-length debonded strands in outer most position of each strand.  
 When shown on this sheet, the fabricator has the option of furnishing either the designed girder or an approved optional design. All optional design submissions must be signed, sealed and dated by a Professional Engineer registered in the State of Texas.

**DEBOUNDED STRAND DESIGNS:**  
 Locate strands for the designed girder as low as possible on the deck and as far apart as possible.  
 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 "x" and outer most positions.  
 2) Place strands in each "y" and outer most positions.  
 3) Space strands as evenly as possible across the entire width.  
 Do not debond strands in position "0". Distribute debonded strands symmetrically about the vertical centerline. Increase lengths working outward, with debonding staggered in each row.

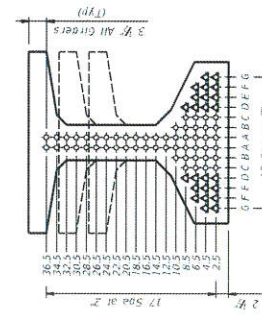
**DEPRESSED STRAND DESIGNS:**  
 Locate strands for the designed girder as low as possible on the 2<sup>nd</sup> grid system unless a non-standard strand pattern is indicated. Fill row "2.5", then row "4.5", then row "6.5", etc., beginning each row in the "x" position and working outward until the required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



TYPE T x62 & T x70



TYPE T x46 & T x54



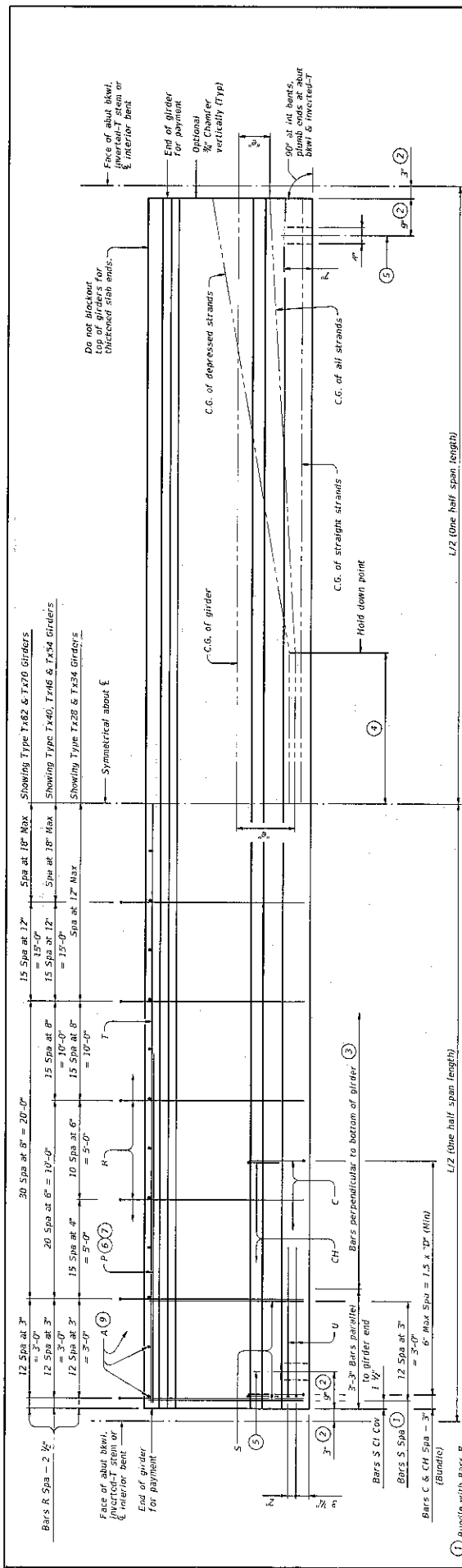
TYPE T x28, T x34 & T x40

**Costello**  
 Costello Bridge Division  
 Texas Department of Transportation  
 PRESTRESSED CONCRETE  
 T-GIRDER DESIGNS  
 (NON-STANDARD SPANS)

HL93 LOADING

IGND

REV	BY	DATE	DESCRIPTION
1	WJL	11/17/06	ISSUED FOR BIDDING
2	WJL	11/17/06	REVISED
3	WJL	11/17/06	REVISED
4	WJL	11/17/06	REVISED



### GIRDER DIMENSIONS AND SECTION PROPERTIES

Girder Type	"D" (in.)	"B" (in.)	"T" (in.)	"W" (in.)	"W" (in.)	"W" (in.)	"W" (in.)	Area (sq. in.)	"I" (in. <sup>4</sup> )	"I" (in. <sup>4</sup> )	Weight (lb/ft)
TX28	28	6	15.02	12.98	585	52,772	40,559	630			630
TX34	34	12	18.49	15.51	627	88,355	40,731	675			675
TX40	40	18	21.90	18.10	659	134,980	40,902	720			720
TX46	46	22	25.30	20.70	761	195,089	46,278	819			819
TX54	54	30	30.49	23.51	817	299,740	46,707	880			880
TX62	62	37 1/2	33.72	26.28	910	463,072	57,351	980			980
TX70	70	45 1/2	38.09	31.91	966	628,747	57,573	1,040			1,040

**GENERAL NOTES:**  
 Designed according to AASHTO LRFD Bridge Design Specifications.  
 Provide Class II concrete.  
 Provide Grade 60 reinforcing steel.  
 All bars shall be lap spliced in accordance with ASTM A1064 unless otherwise noted.  
 It is permissible for bars or strands to come in contact with each other in the concrete provided they are spaced with 1" clearances.  
 Reinforcing bar dimensions shown are outside of bar.

**HL93 LOADING** SHEET 1 OF 2

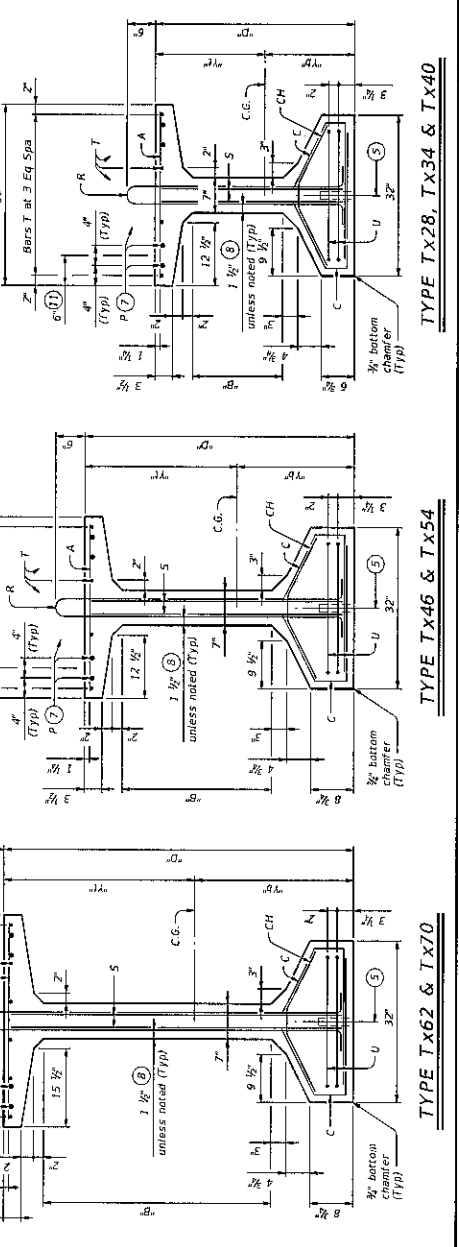
**Texas Department of Transportation**  
**PRESTRESSED CONCRETE**  
**I-GIRDER DETAILS**

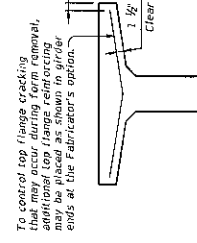
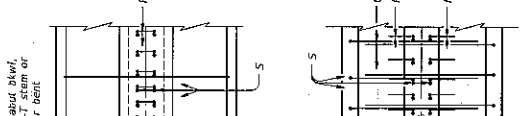
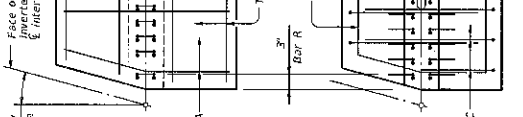
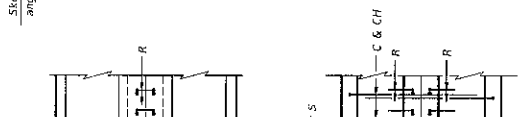
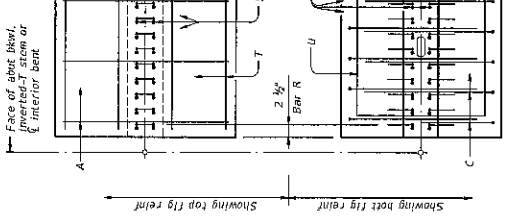
**IGD**

File No.	Project No.	Sheet No.	Scale
IGD			

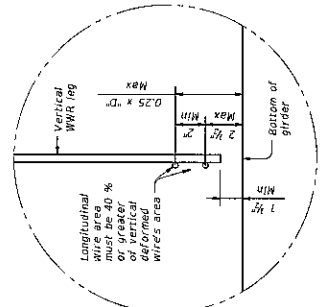
### GIRDER ELEVATION

- Bundle with Bars R.
- Measured along  $\epsilon$  Girder at interior bents; perpendicular to abutment skirt or inverted-T stem.
- The average of the top and bottom spacing of Bars R cannot exceed the required spacing.
- L/20, but not less than 5'-0" (4'-4").
- 6" or 1 1/2" Vertical Slotted Holes at towered girder end and 1/2" or 3/4" at base. Anchor holes may be tapered (4 3/4" x 1 3/4") at base. If holes are formed with sheet metal, forms may be left in place.
- Bars P (#6 x 15'-0") required in TX62 and TX70 girders. At the fabricator's option bars larger than #6 may be used. When L is less than 50 ft, Bars P are to be the same length as Bars T.
- Bars P (#6 x 15'-0") are only required in TX28, TX34, TX40, TX46, and TX54 girders when  $\epsilon$  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.
- 1 1/2" Clear Cover to Bars S.
- 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 forms for "Deck Forming Notes".
- Based on 155 pcf total weight of concrete and reinforcing steel.
- Smooth trowel finish on the side overhang of exterior girder.





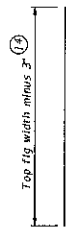
**OPTIONAL TOP FLANGE REINFORCING DETAIL**



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

**PLAN OF GIRDER ENDS**

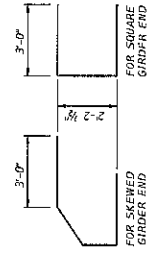
- (12) Reinforcing patterns shown are provided as guides to fabricate reinforcement placement in skewed ends of girders. Slight changes to girder end as cover requirements permit, which may prevent them to be bundled with Bars R.
- (13) Bars may be cut or bent at skewed end as required.
- (14) Increase 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 increased to meet the same strength requirements. Yield strength over 60 ksi, yield strength of WWR is limited to 75 ksi.



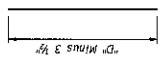
**BARS A (#3)**



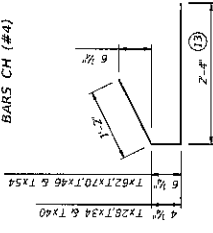
**BARS T (#4)**



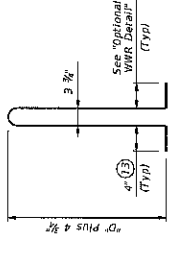
**BARS U (#5)**



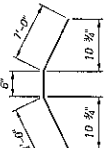
**BARS S (#6)**



**BARS C (#4)**



**BARS R (#4)**



**BARS CH (#4)**

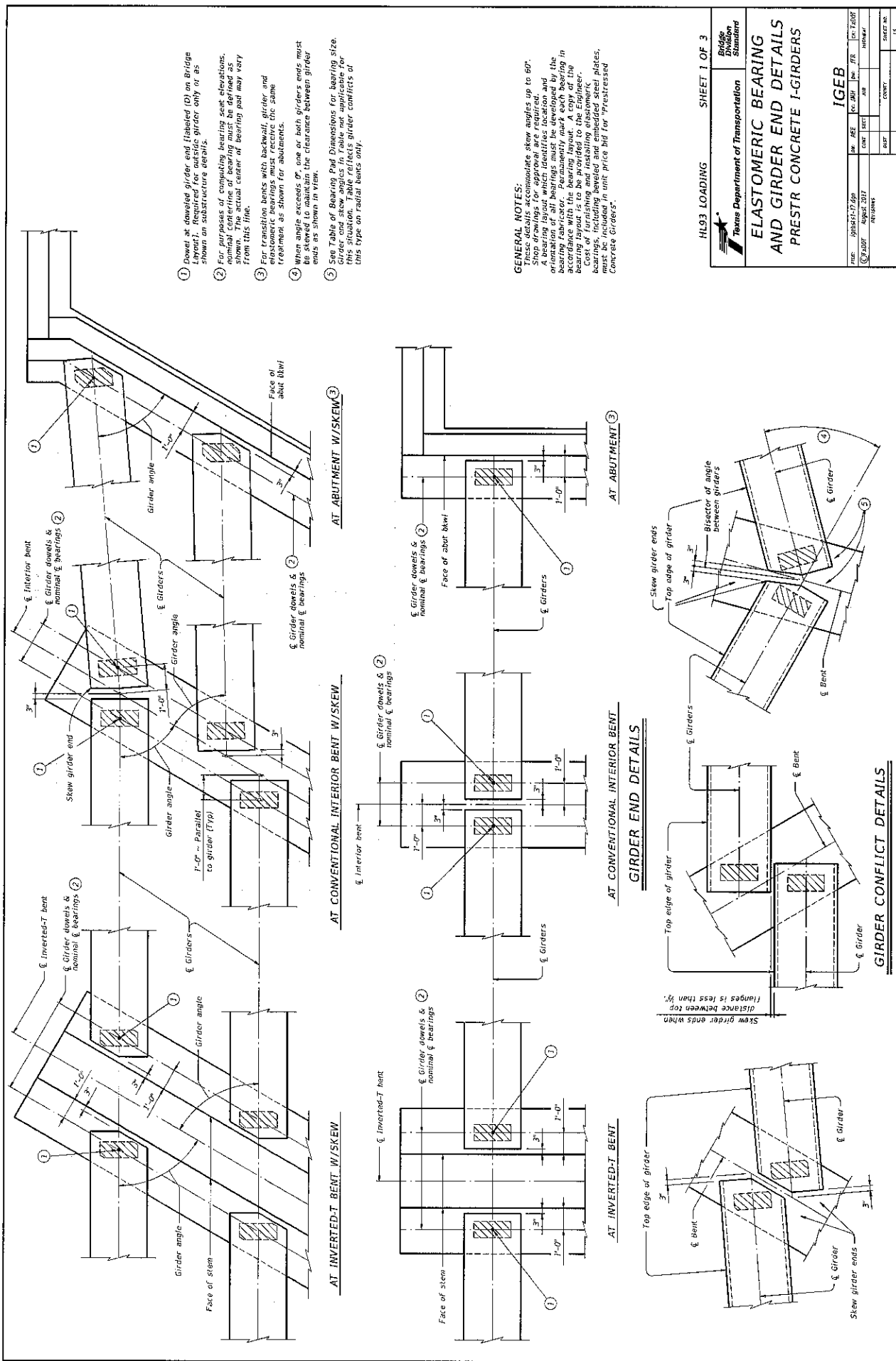
SHEET 2 OF 2

**Texas Department of Transportation**

**PRESTRESSED CONCRETE I-GIRDER DETAILS**

DATE: 08/26/17	DESIGNER: JRM	CHECKER: JRM	DATE: 08/26/17	SCALE: AS SHOWN	PROJECT: I-37	SECTION: 100+00	CONTRACT: 1-100	CONTRACT NO.: 1-100	CONTRACT DATE: 10/1/16	CONTRACT NO.: 1-100	CONTRACT DATE: 10/1/16
IGD											
COUNTY: TARRANT											
SHEET NO. 14											

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HL03 LOADING SHEET 1 OF 3

Texas Department of Transportation  
 Bridge Building Standard

**ELASTOMERIC BEARING AND GIRDER END DETAILS**  
 PRESTR. CONCRETE I-GIRDERS

IGEB

REV.	DATE	BY	CHKD.	APP.	DATE
01	08/21/17	MM	RS	MM	17
02	08/21/17	MM	RS	MM	17
03	08/21/17	MM	RS	MM	17

PROJECT NO. \_\_\_\_\_ COUNTY \_\_\_\_\_ SHEET NO. 15

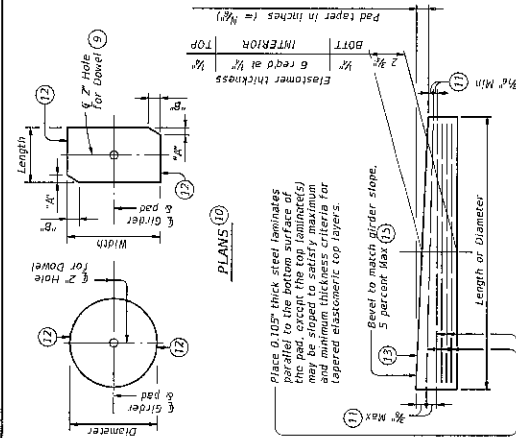
**TABLE OF MINIMUM SUBSTRUCTURE DIMENSIONS (1)**

Girder Type	Abutments	Int Beams	Int Beams	Int Beams
	Face of Blvd to Face of Cap	Overlaid Cap Width	Cap Width	Cap Width
T-62 thru T-654	1'-0"	2'-0"	2'-0"	2'-10 1/2"
T-62 & T-670	2'-0"	4'-0"	4'-0"	2'-1 1/2"

**TABLE OF BEARING PAD DIMENSIONS**

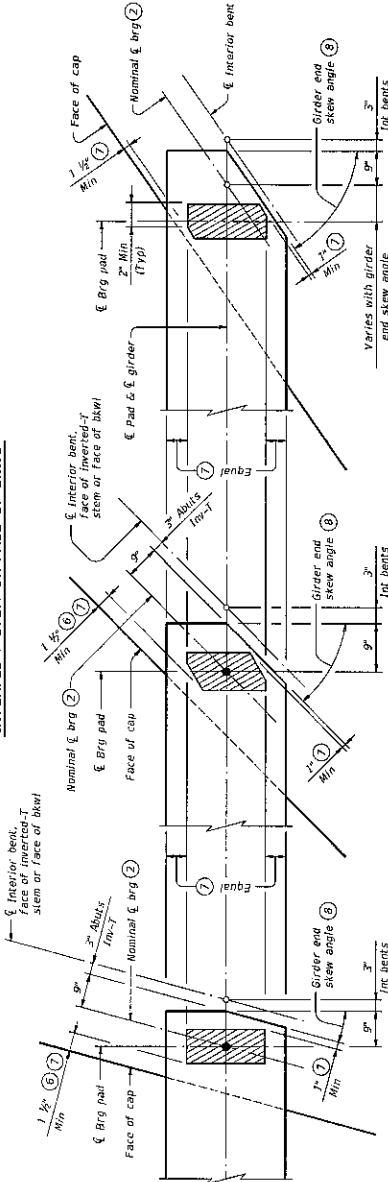
Bent Type	Girder Type	Bearing Type (1)	Clearance Above Slope (2)	Pad Size Lgth x Wdh (3)	Pad Size Dimensions (4)
ABUTMENT, INVERTED-T, TRANSITION BEATS	T-28, T-34, T-40, T-46 & T-54	G-1-W	0" thru 21"	6" x 21"	1" x 21"
		G-2-W	21" thru 30"	6" x 21"	1 1/2" x 21"
		G-3-W	30" thru 45"	9" x 21"	4 1/2" x 21"
		G-4-W	45" thru 60"	15" Dia	---
BACKWARDS	T-62 & T-670	G-5-W	0" thru 21"	9" x 21"	---
		G-6-W	21" thru 30"	9" x 21"	1 1/2" x 21"
		G-7-W	30" thru 45"	10" x 21"	4 1/2" x 21"
		G-8-W	45" thru 60"	10" x 21"	7 1/2" x 21"
CONVENTIONAL BEATS	T-62, T-34, T-40, T-46 & T-54	G-1-W	0" thru 60"	6" x 21"	---
		G-5-W	0" thru 18"	9" x 21"	---
		G-2-W	18" thru 30"	6" x 21"	1 1/2" x 21"
		G-9-W	30" thru 45"	6" x 21"	3" x 21"
CONVENTIONAL INTERIOR BEATS	T-62 & T-670	G-10-W	45" thru 60"	9" x 21"	6" x 21"
		G-5-W	0" thru 18"	9" x 21"	---
		G-6-W	18" thru 30"	9" x 21"	1 1/2" x 21"
		G-11-W	30" thru 45"	9" x 21"	1 1/2" x 21"
ENDS (CONFLICTS)	T-62 & T-670	G-12-W	45" thru 60"	9" x 21"	3" x 21"
		G-12-W	45" thru 60"	9" x 21"	3" x 21"
		G-12-W	45" thru 60"	9" x 21"	3" x 21"
		G-12-W	45" thru 60"	9" x 21"	3" x 21"

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



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

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



**SKEWED GIRDER ENDS AT CONVENTIONAL INTERIOR BEATS (16)**  
(NO GIRDER DOWELS)

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

**BEARING PAD PLACEMENT DIAGRAMS**

**TEXAS DEPARTMENT OF TRANSPORTATION**  
Bridge Division  
Standard

**ELASTOMERIC BEARING AND GIRDER END DETAILS**  
PRESTR. CONCRETE I-GIRDERS

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

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FIG. 133  
REVISED 10/17/04  
REVISED 2012  
REVISED

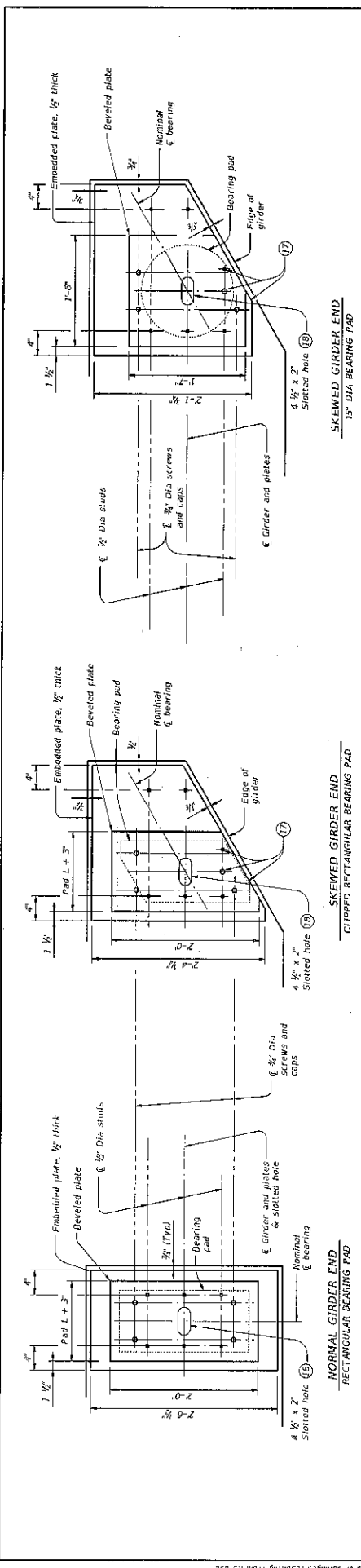
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SHEET NO. \_\_\_\_\_ OF \_\_\_\_\_

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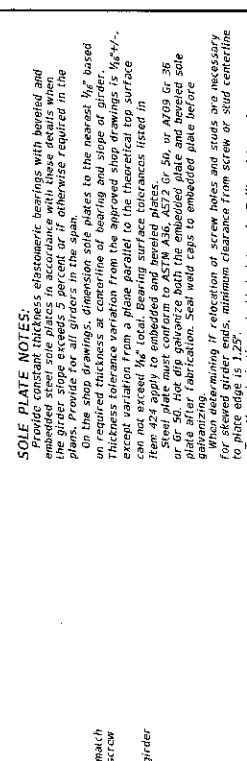
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HL93 LOADING SHEET 2 OF 3

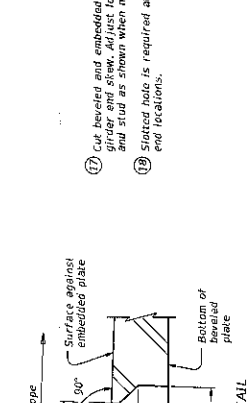


**NORMAL GIRDER END RECTANGULAR BEARING PAD**  
**SKewed GIRDER END CLIPPED RECTANGULAR BEARING PAD**

**PLAN VIEW OF SOLE PLATE DETAILS**



**BEVELED PLATE DETAILS**



**GIRDER DETAILS**

**SOLE PLATE NOTES:**  
 Provide constant thickness elastomeric bearings with beveled and embedded steel sole plates in accordance with these details when used on skewed girders. Provide details otherwise required in the plans. Provide for all girders in the span.  
 On the shop drawings, dimension sole plates to the nearest 1/8" based on required thickness at centerline of bearing and slope of girder. Thickness tolerance variation from the approved shop drawings is 1/8" except variation from a plate parallel to the theoretical top surface of the girder shall be as shown in the connection 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. 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 edge of sole plate shall be 1/2".  
 Tap threads in the embedded plate only. Drill and tap prior to galvanizing.  
 1/2" Dia screws must be electroplated, socket flat head countersunk cap screws conforming to ASTM F835. Electroplating must conform to the requirements of ASTM F835. Screws must be minimum 3/4" long and minimum embedment into the embedded plate shall be 1/2".  
 Galvanized steel caps (16 ga with a nominal 3" inside diameter and deep enough to accommodate the screws, but not less than 1/2" deep or deeper than 1" on sole plate) shall be attached to the sole plate. In-situ screw heads must not protrude below the bottom of the beveled plate.

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**HL93 LOADING SHEET 3 OF 3**

**Texas Department of Transportation**  
 Bridge Division Standard

**ELASTOMERIC BEARING AND GIRDER END DETAILS**  
 PRESTR. CONCRETE I-GIRDERS

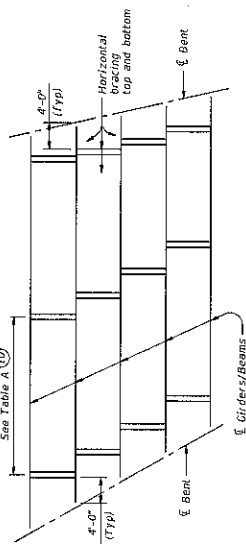
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08/20/2011	08/28/2011	08/28/2011	08/28/2011	08/28/2011
PROJECT NO.:	SECTION:	DATE:	BY:	APP'D:



TABLE A

OPTION 1-RIGID BRACING (STEEL STRAP)		OPTION 2-FLEXIBLE BRACING (NO. 5 OVER PCP)	
Girder or Beam Type	Slab Overhang less than 4'-0" (1)	Girder or Beam Type	Slab Overhang less than 4'-0" (1)
	Maximum Bracing Spacing		Maximum Bracing Spacing
T-X2B	1/2 points	T-X2B	1/2 points
T-X34	1/2 points	T-X34	1/2 points
T-X40	1/2 points	T-X40	1/2 points
T-X48	1/2 points	T-X48	1/2 points
T-X54	1/2 points	T-X54	1/2 points
T-X62	1/2 points	T-X62	1/2 points
T-X70	1/2 points	T-X70	1/2 points
A	1/2 points	A	2.0 ft
B	1/2 points	B	3.0 ft
C	1/2 points	C	4.5 ft
IV	1/2 points	IV	2.0 ft
VI	1/2 points	VI	4.0 ft

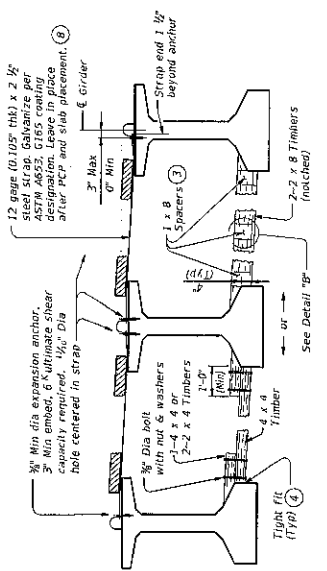
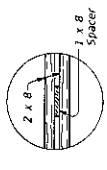


SLAB PLACEMENT BRACING

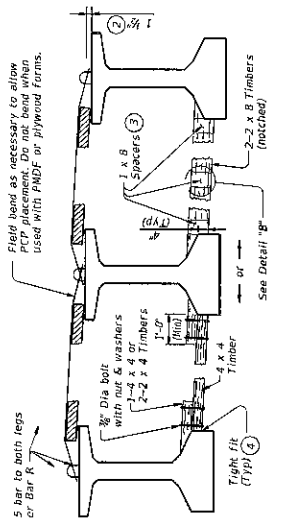
- 7) Place and weld #5 bars as shown during erection. If finished deck with prestressed panels, bars can be temporarily removed, one at a time, during panel erection. Re-install bar prior to additional panel erection. Bars can rest on panels and be bent down and welded to girder bars R.
- 8) Clear distance between spacers must not exceed 3". Nail together with 16d nails.
- 9) Use wedges as necessary to obtain tight fit. Nail wedges to timbers.
- 10) Pressure treated landscape timbers can not be used.
- 11) Prior to installing, field band strap to lay flush on both girders' top flange and slope between flange lips.
- 12) Bracing spacing (1/2 and 1/4 points) measured between first and last typical brace location.
- 13) Measure slab overhang from centerline of girder or beam. When slab overhangs, 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 shall submit proposals for such conditions to the Engineer for approval. Systems equal to or better than those shown may be used provided details of such systems are submitted to and approved by the Engineer. The Contractor shall be responsible for the adequacy of the bracing and the safety of the structure. The Contractor shall be responsible for the safety of the structure. All turn-buckles, come-alongs, anchors and other connections must be capable of developing the full strength of the cable. Spacers shall be used to maintain the spacing between the furnish anchor bolts and nuts in accordance with Item 449, "Anchor Bolts".



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

TEXAS Department of Transportation  
 Bridge Division  
 Standard

**MINIMUM ERECTION AND BRACING REQUIREMENTS  
 PRESTRESSED CONCRETE  
 I-GIRDERS AND I-BEAMS**

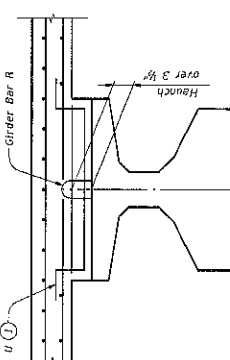
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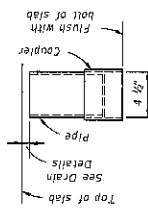
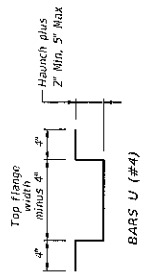
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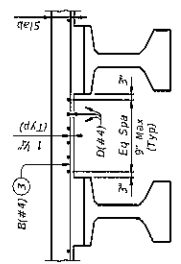
SHEET NO. 15



**HAUNCH REINFORCING DETAIL**

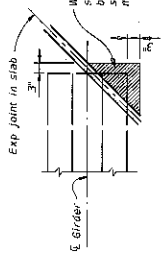


**C-I-P DRAIN DETAIL**



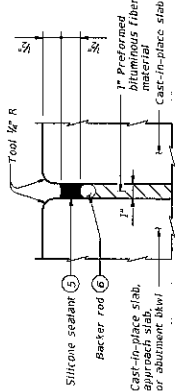
**TYPICAL PART TRANSVERSE SLAB SECTION WITHOUT PCP**

Top reinforcing steel not shown for clarity.

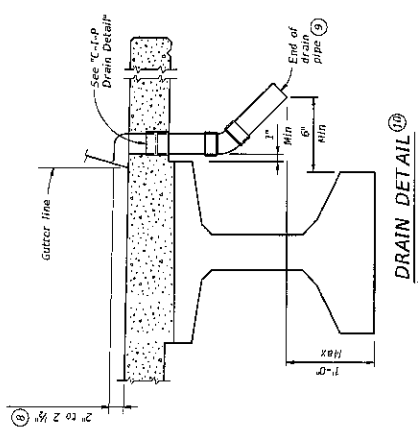


Where flanges project under slab of adjacent span, provide a minimum of 1/2" clearance of girder and bottom of adjacent slab. Material of same compressible material may be used as a filler.

**TREATMENT AT GIRDER END FOR SKEWED SPANS**



**TYPE A JOINT DETAIL**



**DRAIN DETAIL**

**GENERAL NOTES:**  
 Designed according to AASHTO LRFD Bridge Design Specifications.  
 All items (reinforcing steel, drains, joint sealant, etc.) shall be of a quality and are subsidiary to other bid items.

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

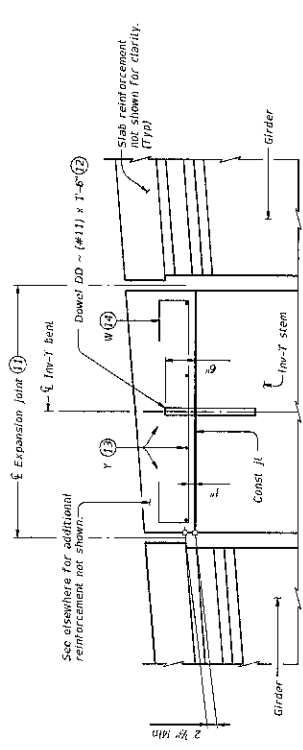
**DECK FORMWORK NOTES:**  
 Formwork shall be designed to safely withstand load of 3,000 lbs. applied to and along the axis of a cut road 45 degrees from vertical, regardless of higher loads permitted by hanger manufacturers. Do not place a hanger less than 12" from girder end. Space hangers accordingly.

- 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 #4 spaced at 9" Max with 2" end cover. Overhang option. Contractor's may end alternating bars #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 = 1'-7"
- 5) Class 7 silicone sealant that conforms to DMS-6310. Install when ambient temperature is between 35°F and 85°F and rising. Engineer to determine allowable bars for sealant application.
- 6) 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. Band 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 built-up curb. Degrease outside of exposed PVC, apply acrylic water base primer, and apply sealant to all joints. All drains shall be installed in accordance with the details and 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.

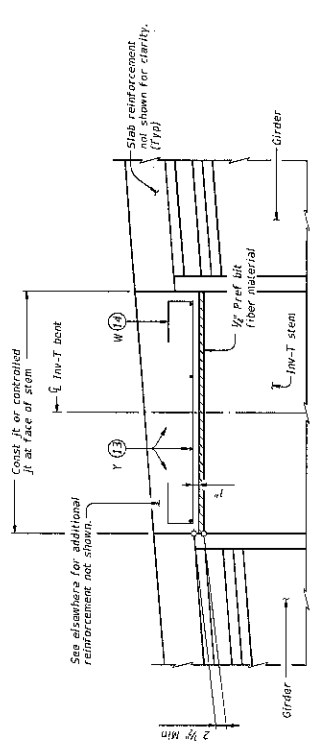
Texas Department of Transportation  
 Bridge Standard  
 MISCELLANEOUS  
 SLAB DETAILS  
 PRESTR. CONCRETE I-GIRDERS

IGMS

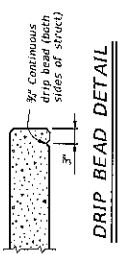
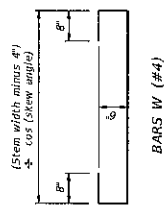
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Contract	SPRINTS 17106	Contract No.	17106	Project No.	17106
Division	BRIDGES	Division	BRIDGES	Division	BRIDGES
County		County		County	
Sheet No.	29	Sheet No.	29	Sheet No.	29



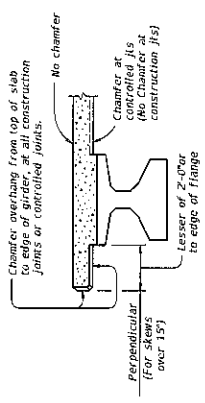
**SHOWING EXPANSION JOINTS**



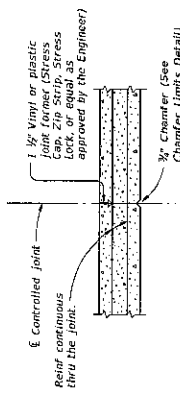
**SHOWING CONST. JTS OR CONTROLLED JTS. REINFORCEMENT OVER INV-T BEAMS**



**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 beams for quantity and location.
- 13 Splice 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 meet requirements. Place parallel to longitudinal slab reinforcement.
- 15 See Span details for type of joint and joint locations.

SHEET 2 OF 2

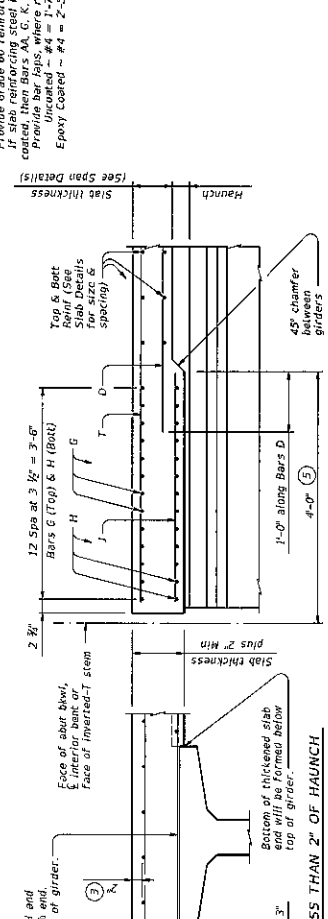
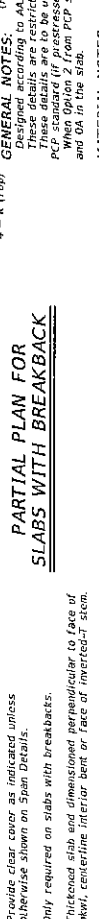
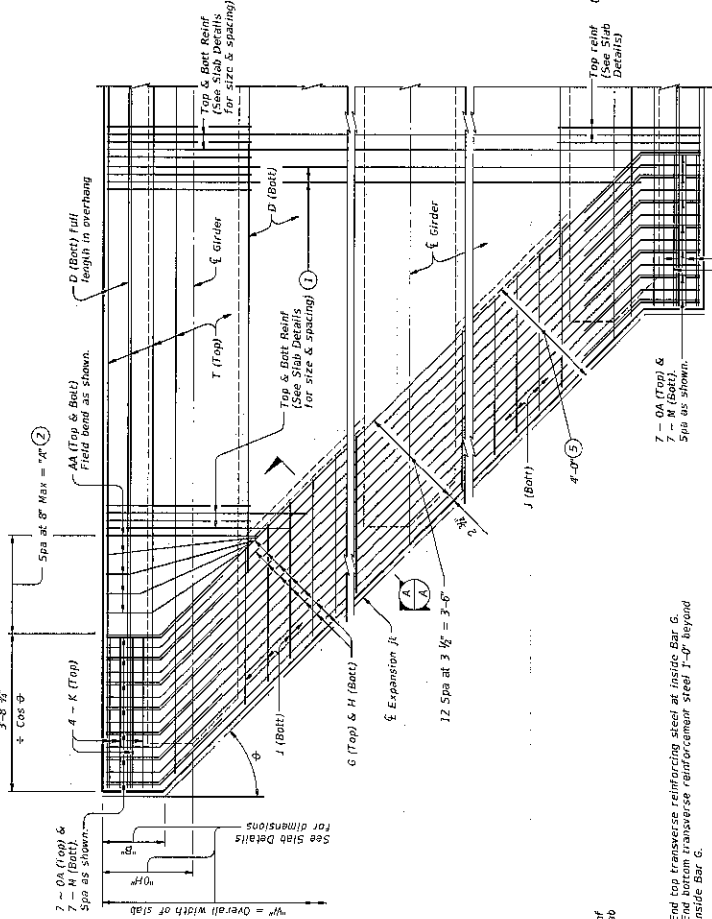
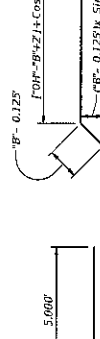
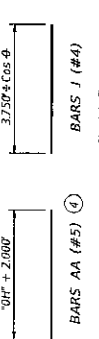
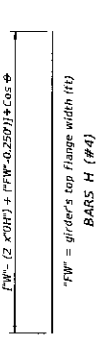
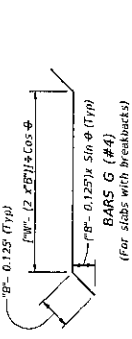
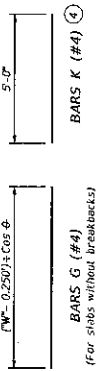
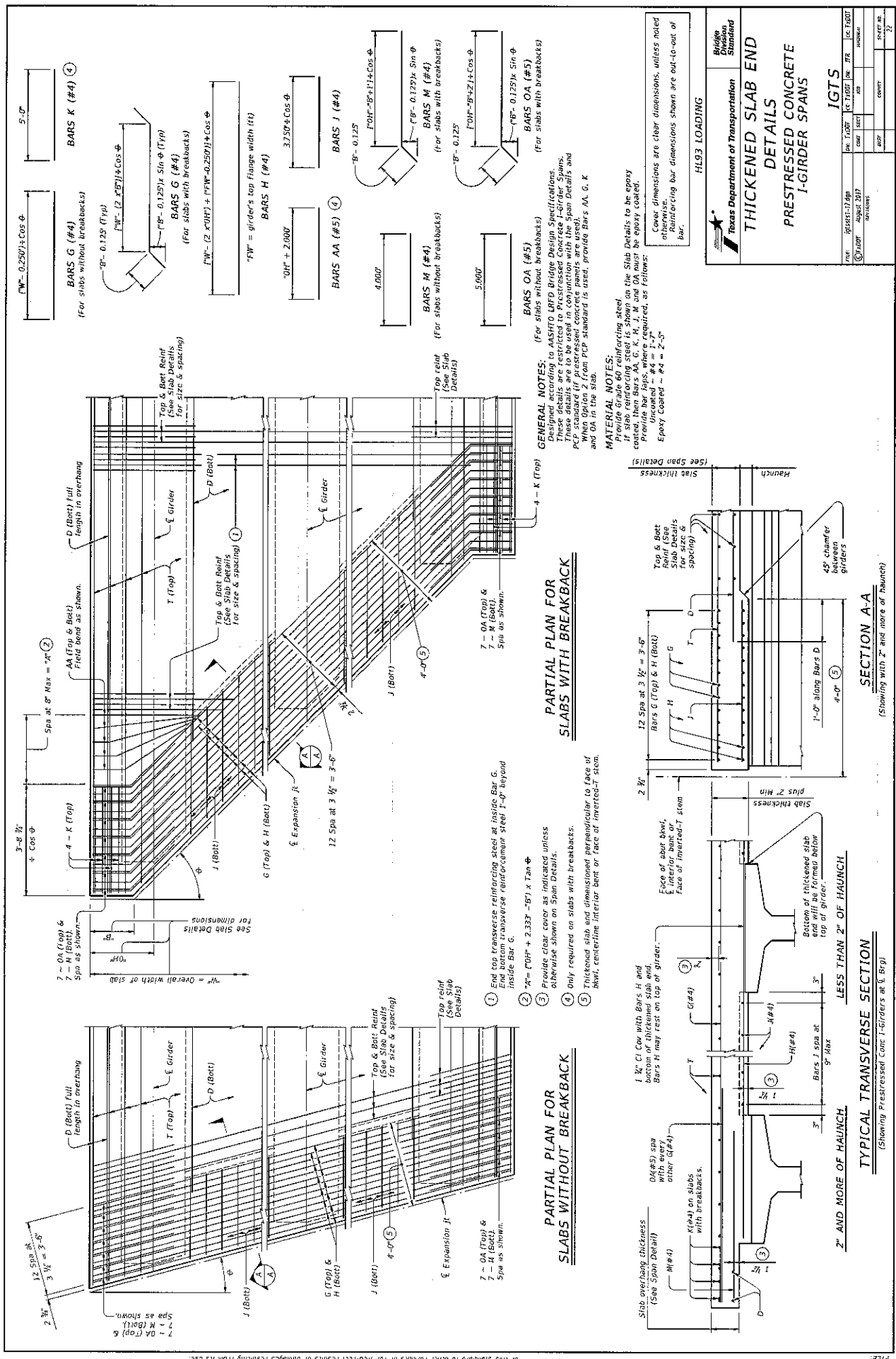


Bridge Standard

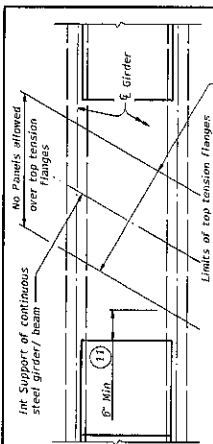
**MISCELLANEOUS SLAB DETAILS PRESTR. CONCRETE I-GIRDERS**

IGMS

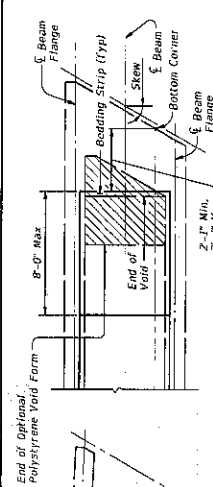
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COUNTY								SHEET NO.	21



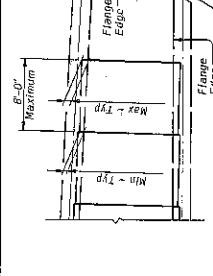




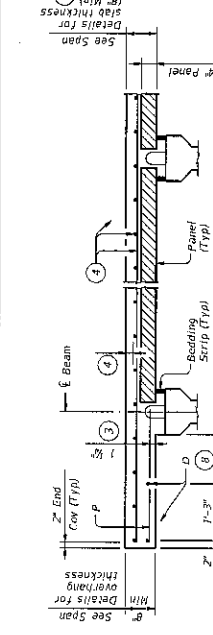
AT INT. SUPPORTS OF CONTINUOUS STEEL GIRDERS



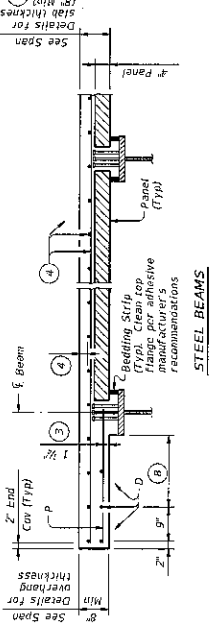
OVER CONC. U-BEAMS



AT FLARED BEAMS OR GIRDERS



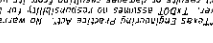
NORMAL OVERHANG WITH PRESTR. CONC. U-BEAMS



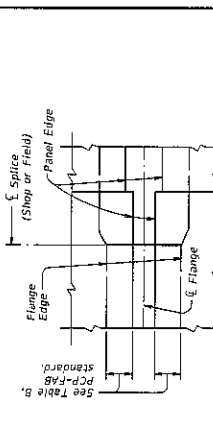
SLOPED OVERHANG WITH PRESTR. CONC. U-BEAMS



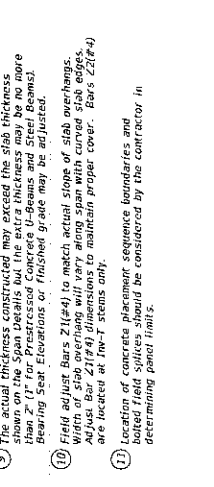
PRESTRESSED CONCRETE X-BEAMS



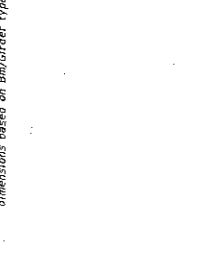
PRESTRESSED CONCRETE I-GIRDERS



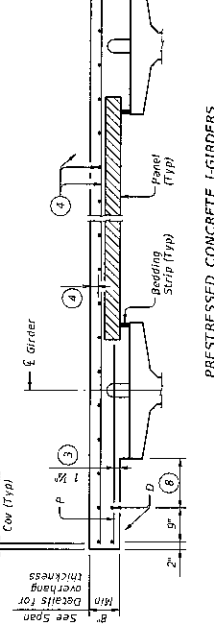
PLAN AT SPLICE



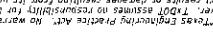
ELEVATION AT SPLICE



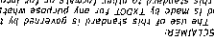
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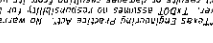
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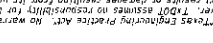
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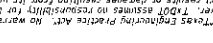
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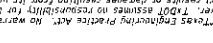
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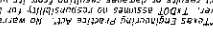
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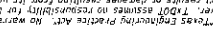
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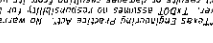
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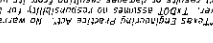
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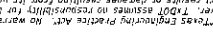
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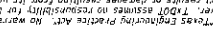
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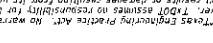
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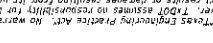
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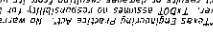
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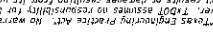
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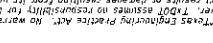
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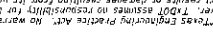
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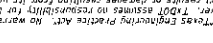
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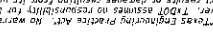
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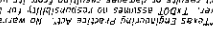
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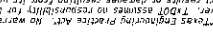
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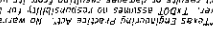
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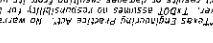
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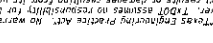
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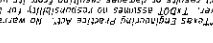
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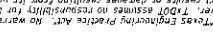
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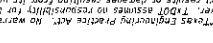
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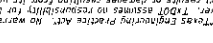
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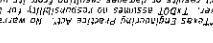
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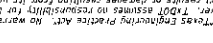
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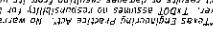
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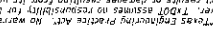
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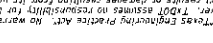
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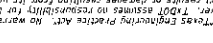
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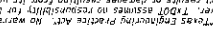
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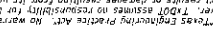
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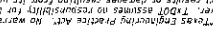
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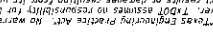
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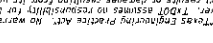
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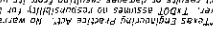
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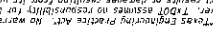
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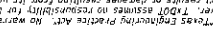
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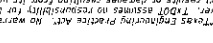
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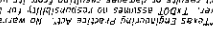
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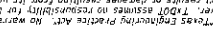
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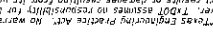
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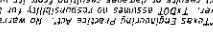
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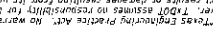
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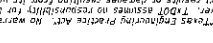
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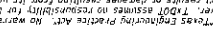
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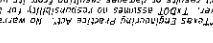
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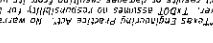
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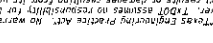
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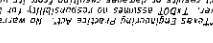
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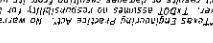
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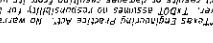
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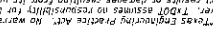
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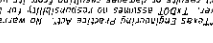
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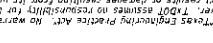
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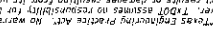
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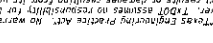
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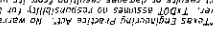
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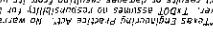
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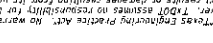
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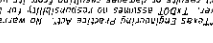
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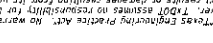
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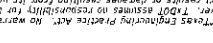
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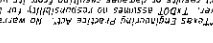
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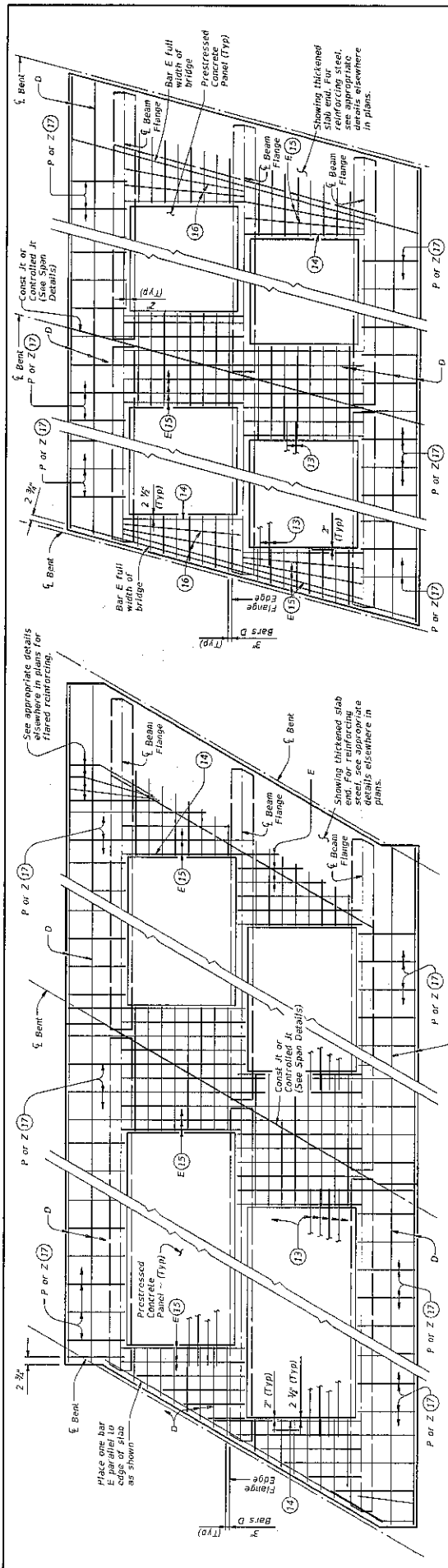


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PRESTRESSED CONCRETE U-BEAMS





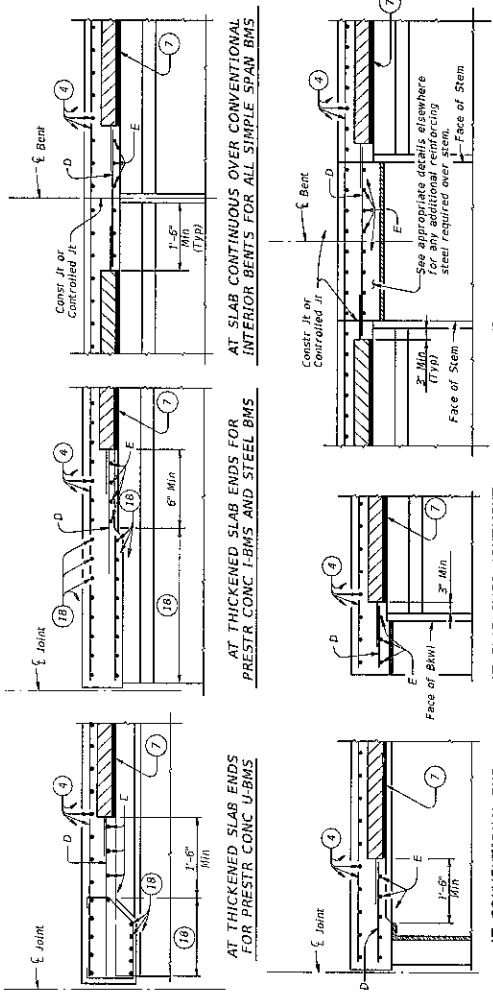
AT ALL SPAN ENDS UNLESS NOTED OTHERWISE

AT THICKENED END SLABS

OPTION 1 ~ PLAN OF SLABS WITH NORMAL REINFORCEMENT

OPTION 1 ~ PLAN OF SLABS WITH SKEWED REINFORCEMENT

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OPTION 1 ~ ELEVATIONS AT BEAM ENDS

TABLE OF REINFORCING STEEL (12)

BAR	SIZE	Max (ft.)
D	#4	9
E	#4	3
F	#4	18
Z	#4	18

- 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 Bent adjacent leading strips together with adhesive. Cut v-notches approx 1/2" deep. in the top of the leading 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 F(#4). Bars Z(#4) are required for slope overhangs with U-bents.
- 19 See appropriate thickened slab end details for reinforcing and limits of thickened slab end.

HLS3 LOADING SHEET 3 OF 4

Texas Department of Transportation  
 Bridge Division  
 Standard

PRESTRESSED  
 CONCRETE PANELS  
 DECK DETAILS

PCP

REV: 10/2014 (Rev. 1/2007) (Rev. 5/11)

DATE: 02/07/2015

PROJECT: 1501

CONTRACT: 154242-01

SHEET NO. 25





**DESIGN NOTES:**  
 F 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 construction loads shall be limited to 18 ksi in the web of steel. Allowable stress for weld metal must be 12,400 psi. Maximum deflection under the weight of forms, reinforcement and concrete shall not exceed the following:

1/180 of the form design span, but not more than 0.36" for design spans of 10' or less.

1/240 of the form design span, but not more than 0.15" for design spans greater than 10'.

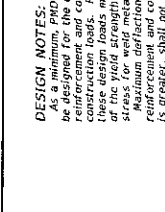
The form design span must not be less than the distance between the centerlines of measured parallel to the form flanges, minus Z.

**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 flanges. Form sheets must be supported by a length of one inch at each end. Form supports must be placed in direct contact with beam flanges. 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 the heads facing down. Only welds or bolts must be used to support vertical loads.

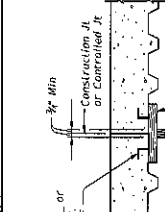
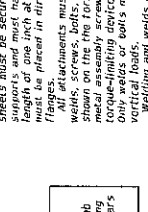
Welding and welds must be in accordance with the specifications of the American Institute of Steel Construction, Inc. All welds must be made by a qualified welder in accordance with Item 446. In metal, where the galvanized coating has been damaged, must be thoroughly cleaned and repaired in accordance with Item 445, "Galvanizing".

Flutes must line up uniformly across the entire width of the structure where main reinforcement is placed. Construction joints will not be permitted unless shown on the plans. The location of construction joints shall be indicated 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 shown on the forming plans to prevent damage to the forms, yet provide proper vibration to prevent voids or honeycomb construction joints.

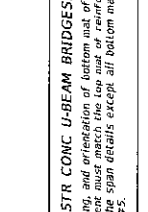


Note: In spans where PMDF forms are used, timber forms must be used at construction joints. Support edge of metal form and to provide anchorage of metal form to slab concrete where joined to wood forms.

**SECTION THRU CONSTRUCTION JOINT**

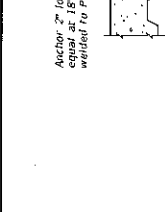


**TYP LONGITUDINAL SLAB SECTION**

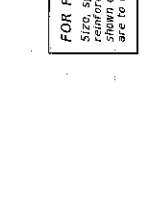


- 1 Slab thickness minus 3/8" if corrugations match reinforcing bars.
- 2 Welding of form supports to tension flanges will not be permitted. Other methods of providing wind hold down shall be used. At least one layer of sheet metal must be provided between the flange and the weld joint.
- 3 The direction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

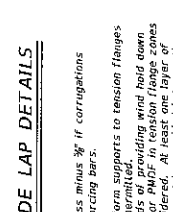
**GENERAL NOTES:**  
 Steel for Permanent Metal Deck Forms (PMDF) and support angles shall be A36 Structural Steel (Specification for Structural Steel) with a minimum yield strength of 33 ksi. Minimum thickness of PMDF is 20 gauge and that of support angles and protective angles is 12 gauge. All steel shall be galvanized to the Engineer. These plans must show all necessary details of sheets, closures, fasteners, supports, connectors, special 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 approved by the Engineer. The Department reserves the right to require modifications to the plans. The Contractor is responsible for the adequacy of these 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.



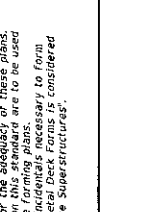
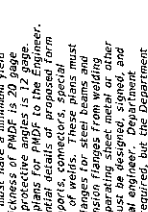
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**U-BEAMS WITH WELD ANCHORS**



**TYPICAL TRANSVERSE SECTIONS**



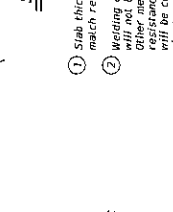
**TYPES OF END CLOSURES**



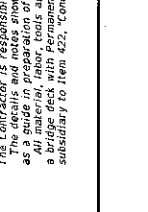
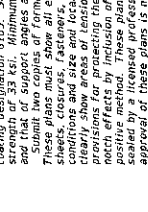
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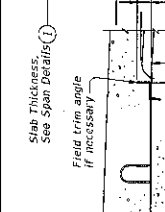
**U-BEAMS WITH WELD ANCHORS**



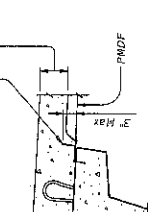
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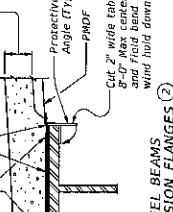
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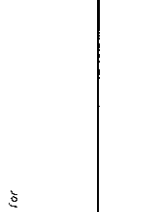
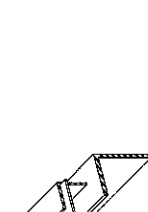
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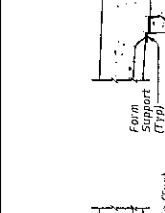
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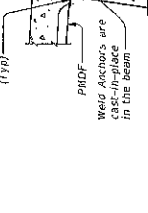
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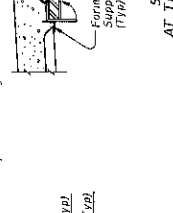
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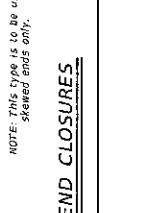
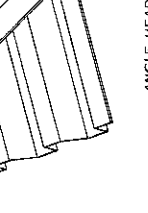
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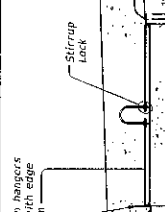
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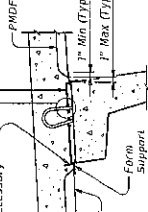
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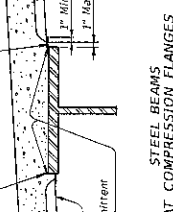
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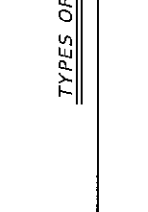
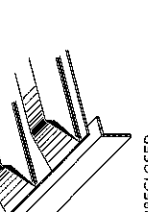
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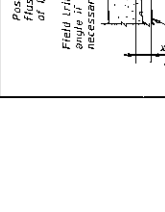
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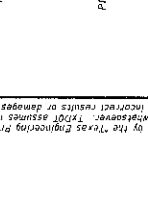
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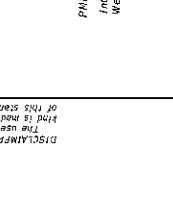
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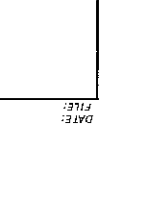
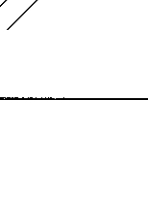
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**U-BEAMS WITH WELD ANCHORS**



**TYPICAL TRANSVERSE SECTIONS**



**TYPES OF END CLOSURES**

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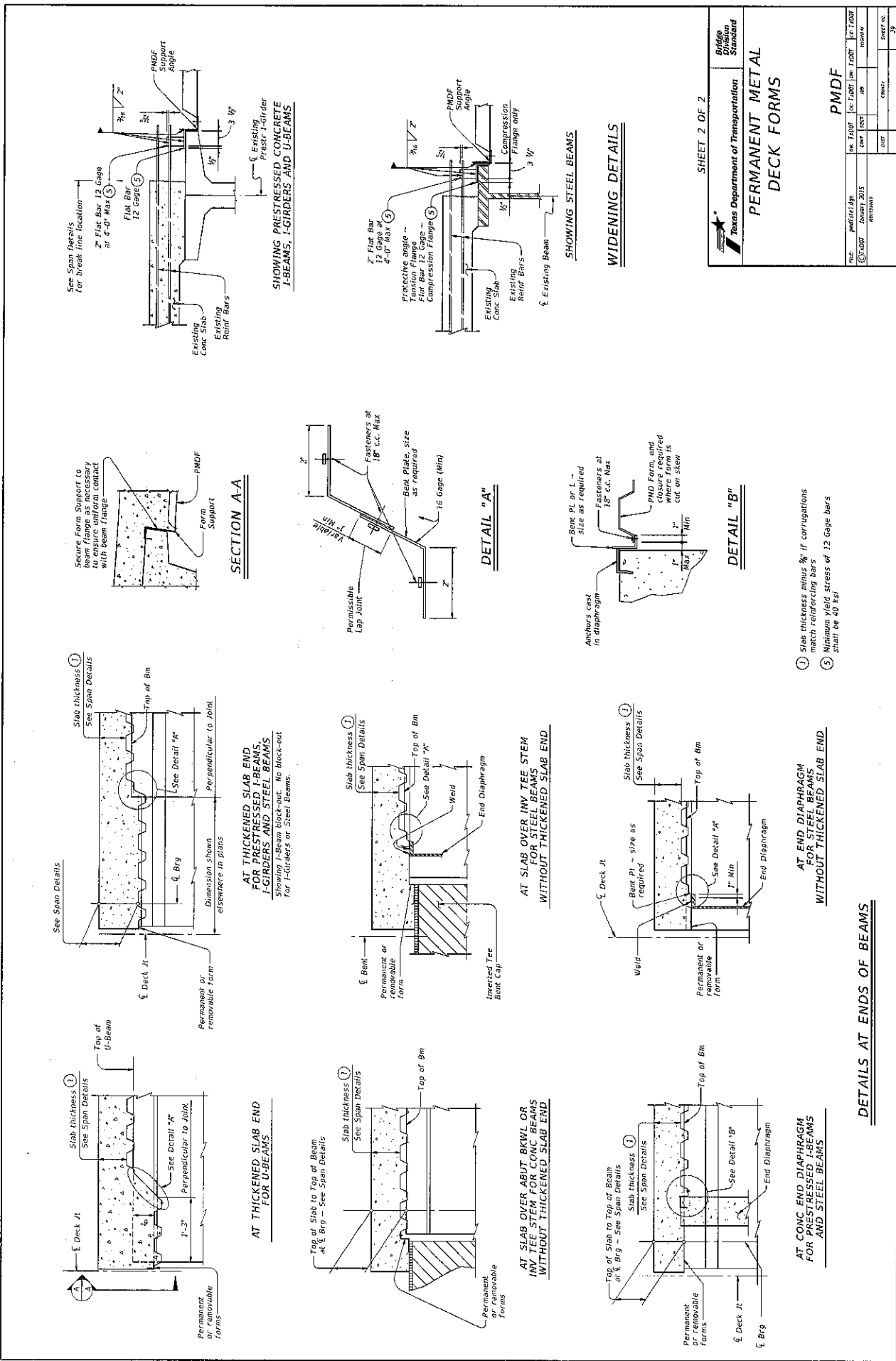
**BRIDGE DIVISION**

**PERMANENT METAL DECK FORMS**

**PMDF**

SHEET 1 OF 2

REV	DATE	BY	CHKD	APP'D	DESCRIPTION
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2	12/07/07	TRC	TRC	TRC	12/07/07
3	12/07/07	TRC	TRC	TRC	12/07/07
4	12/07/07	TRC	TRC	TRC	12/07/07
5	12/07/07	TRC	TRC	TRC	12/07/07
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7	12/07/07	TRC	TRC	TRC	12/07/07
8	12/07/07	TRC	TRC	TRC	12/07/07
9	12/07/07	TRC	TRC	TRC	12/07/07
10	12/07/07	TRC	TRC	TRC	12/07/07



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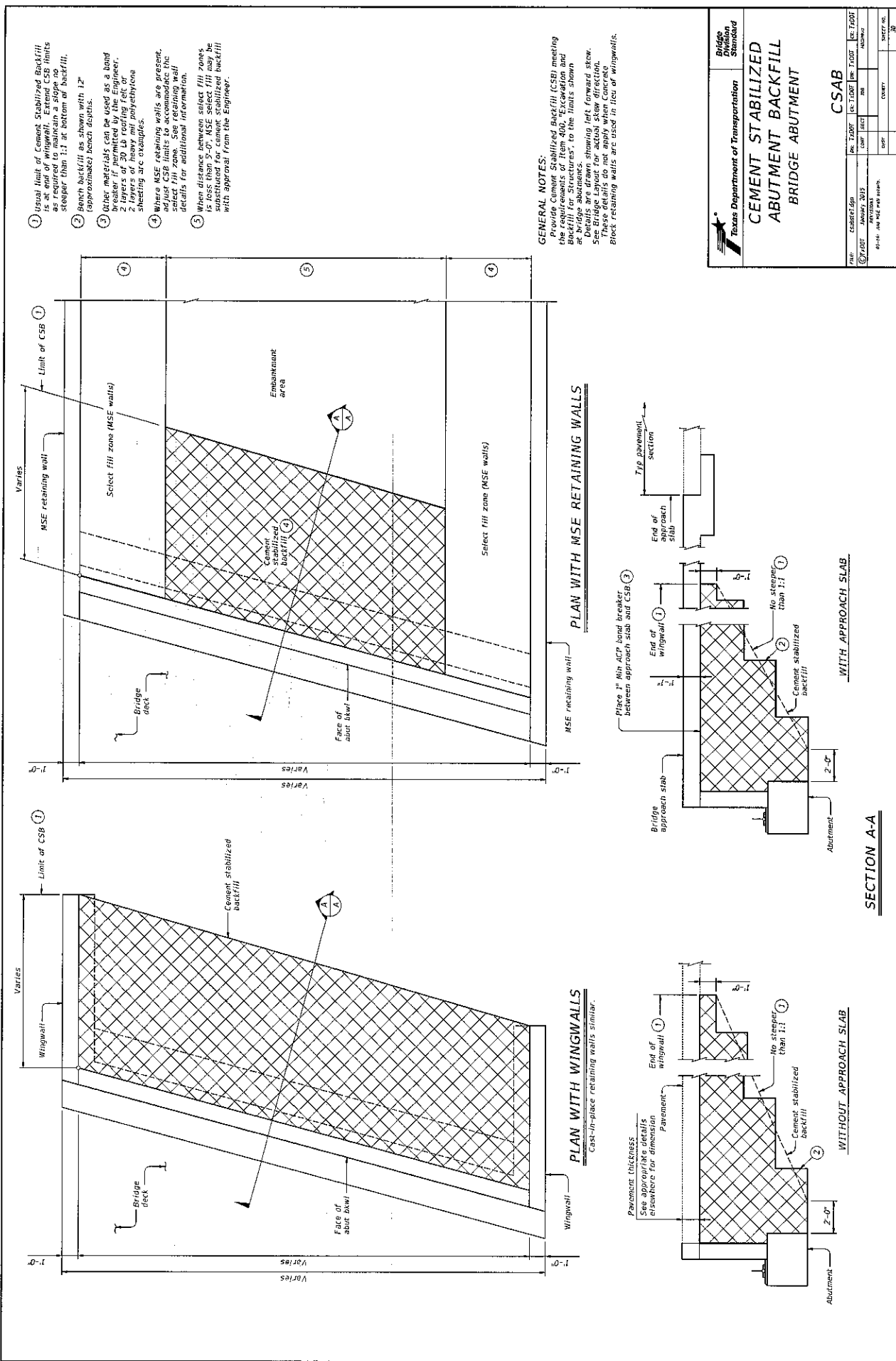
Texas Department of Transportation		Bridge Division Standard	
<b>PERMANENT METAL DECK FORMS</b>			
REV:	DATE:	BY:	CHK:
01/10/07	January 2015	revisions	
PROJECT NO.:		CONTRACT NO.:	SHEET NO. 23

SHEET 2 OF 2

PMDF

DETAILS AT ENDS OF BEAMS

- ① Slab thickness minus 3/8" if corrugations match reinforcing bars
- ② Minimum yield stress of 12 Gage bars shall be 40 KSI



- 1 Usual limit of Cement Stabilized Backfill is at end of wingwall. Extend CSB limits 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.
- 4 Layers of heavy mat polyethylene sheeting are examples.
- 5 Where MSE retaining walls are present, adjust CSB limits to accommodate the select fill zone. See retaining wall details for additional information.
- 6 When distance between select fill zones is less than 2'-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 in the details.  
 Details are drawn showing left forward skew. See Bridge Layout for actual skew direction. These details do not apply when concrete block retaining walls are used in lieu of wingwalls.

**Texas Department of Transportation**  
**Bridge Standard**

**CEMENT STABILIZED ABUTMENT BACKFILL BRIDGE ABUTMENT**

**CSAB**

DATE	PROJECT NO.	REV. NO.	REV. DATE	REV. DESCRIPTION
01/2007	4433003	0001	01/2007	ISSUE FOR CONSTRUCTION
		0002	01/2007	REVISED
		0003	01/2007	REVISED
		0004	01/2007	REVISED
		0005	01/2007	REVISED
		0006	01/2007	REVISED
		0007	01/2007	REVISED
		0008	01/2007	REVISED
		0009	01/2007	REVISED
		0010	01/2007	REVISED

DATE: FILE:  
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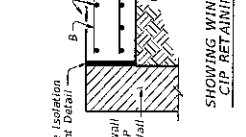
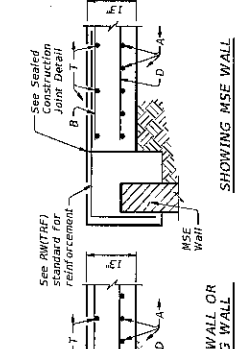
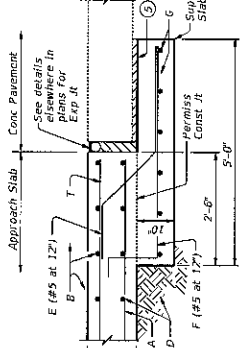
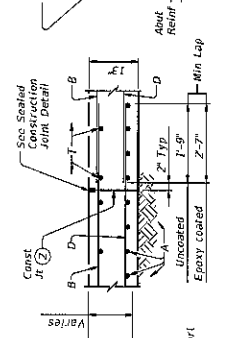
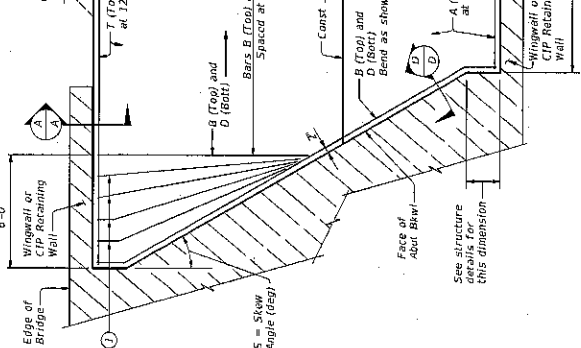
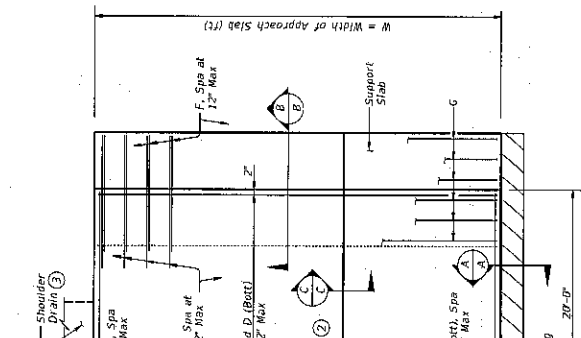
**APPROXIMATE QUANTITIES**

Reinf steel weight = 8.5 lbs/SF of Approach Slab  
 = 18.4 lbs/LF of Support Slab  
 Vol of Abrs Slab Conc (CY) = 1.052W + T + 0.022W Tan S  
 (Includes Support Slab)  
 W = Width of Approach Slab (ft)  
 T = Conc Pavement Thickness (in)  
 S = Skew Angle (deg)

**BAR TABLE**

BAR SIZE	#1	#2	#3	#4	#5	#6	#7
A	#3	#3	#3	#3	#3	#3	#3
B	#3	#3	#3	#3	#3	#3	#3
C	#3	#3	#3	#3	#3	#3	#3
D	#3	#3	#3	#3	#3	#3	#3
E	#3	#3	#3	#3	#3	#3	#3
F	#3	#3	#3	#3	#3	#3	#3
G	#3	#3	#3	#3	#3	#3	#3
T	#3	#3	#3	#3	#3	#3	#3

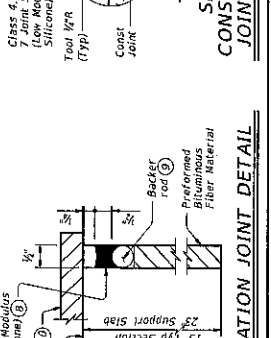
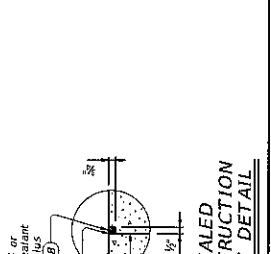
- Place Bars B and D in this region (1'-6" Max Spa, 3" Min Spa). Minimum lapped bar length = 2'-6". Bend bars as necessary.
- Provide longitudinal construction joints that align with longitudinal construction joints in the bridge deck. Other longitudinal construction joints must receive approval of the 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 of concrete pavement to match existing pavement conditions. Smooth and trowel finish. On top of support slab with 60" or more of heavy coat of powdered graphite. Press down one layer of 30% roofing felt.
- Multiple place fix 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.
- Reinforcing bar shall be 25% larger than joint opening and shall be compatible with the slab.
- 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.



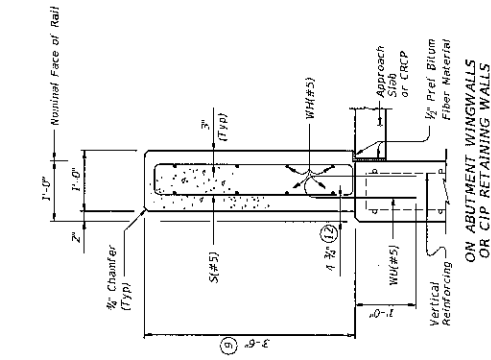
**GENERAL NOTES:**  
 Provide Class 50 concrete with a minimum compressive strength of 4,000 psi.  
 Provide Grade 60 reinforcing steel.  
 Provide a minimum distance of 100 feet prior to the approach slab, unless otherwise indicated on the plans.  
 Compact and finish the subgrade or foundation for the approach slab and grades shown on the plans.  
 Cure for 4 days using water or membrane curing per Item 432.  
 Backer rod and preformed bituminous fiber material are subsidiary to approach slab concrete.  
 Provide a 1" bondbreaker (asphaltic concrete pavement or asphalt shrouded base) between the approach slab and the support slab.  
 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 APPROACH SLAB**  
**CONCRETE PAVEMENT**  
**BAS-C**

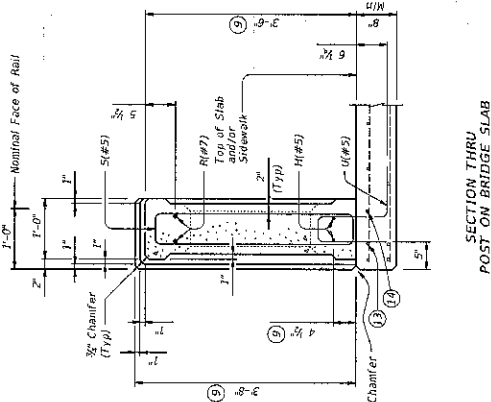
NO. 1000	REV. 10/07	REV. 10/07	REV. 10/07
DATE	ISSUED	REVISED	REVISED
NO. 1000	REV. 10/07	REV. 10/07	REV. 10/07
DATE	ISSUED	REVISED	REVISED



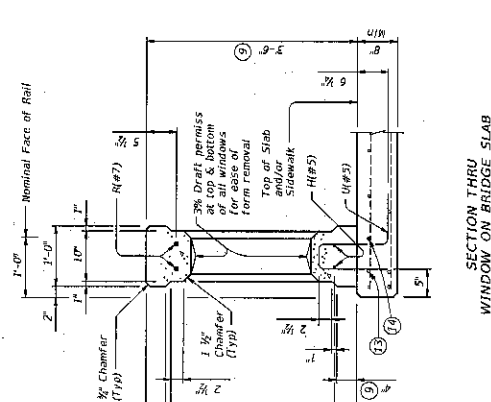




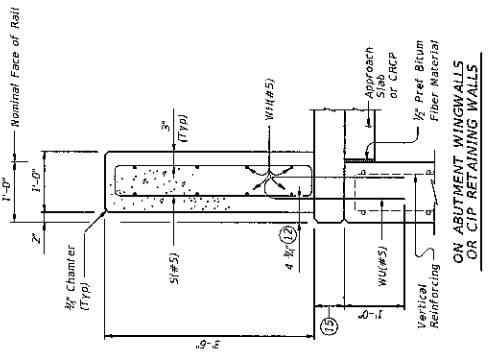
SECTION THRU POST ON BRIDGE SLAB (Showing Pilaster)



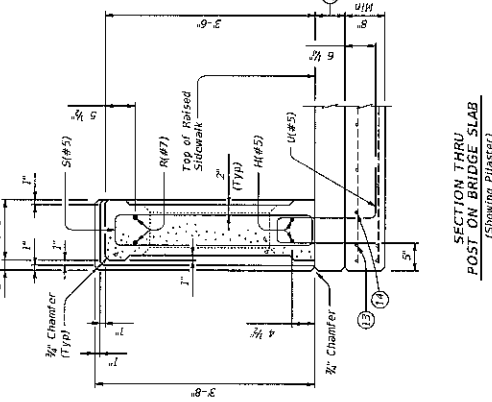
SECTION THRU RAIL WITHOUT RAISED SIDEWALK



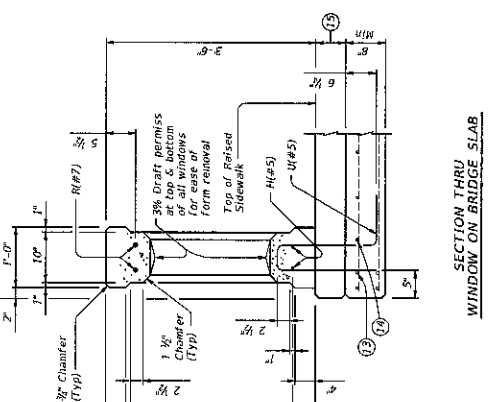
SECTION THRU WINDOW ON BRIDGE SLAB



SECTION THRU RAIL WITH RAISED SIDEWALK

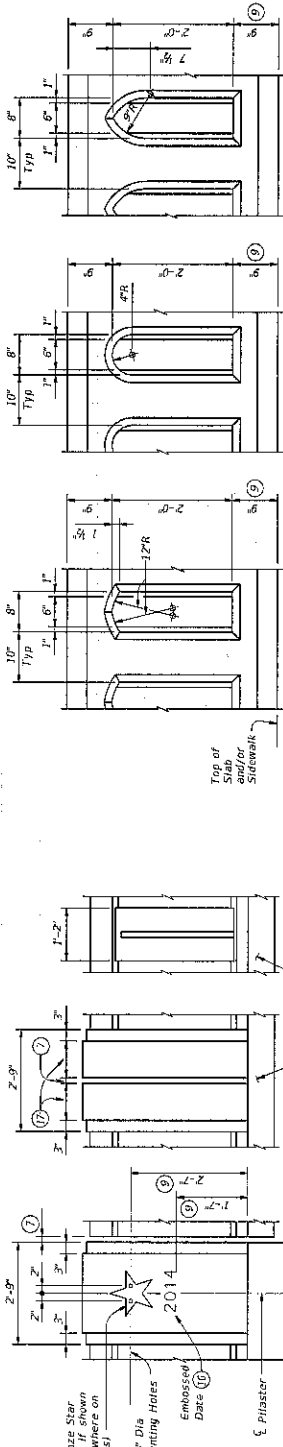


SECTION THRU WINDOW ON BRIDGE SLAB (Showing Pilaster)



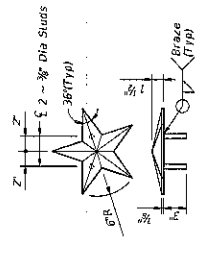
SECTION THRU WINDOW ON BRIDGE SLAB (Showing Pilaster)

- ① Increase 2" for structures with overlay.
- ② 5/8" when vertical reinforcing has closer clear cover over horizontal reinforcing in abutment, wingwalls or retaining walls on traffic side of wall.
- ③ As an aid in supporting reinforcement, additional longitudinal bars may be used in the slab with the reinforcement bars. These bars must be furnished at the Contractor's expense.
- ④ Top longitudinal slab bar may be adjusted laterally 2" plus or minus to fit reinforcing.
- ⑤ Raised Sidewalk

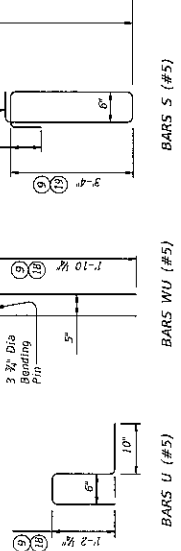


**ABUTMENT**  
**BENT**  
**SPAN**  
**EXTERIOR PILASTER ELEVATIONS**  
(Showing without raised sidewalk)

**TYPE A**  
**TYPE B**  
**TYPE C**  
**WINDOW TYPES**



**BRONZE STAR DETAIL**  
Two known manufacturers are:  
1. Kamin Castings  
2. Southwell Company  
San Antonio, Texas



**CONSTRUCTION NOTES:**  
Attach Bronze Star with a Type III Class C epoxy. Clamp star until epoxy achieves set. Remove any visible epoxy "squeeze out" from under star.  
Bronze Stars, pilasters, parapet must be plumb unless otherwise approved.  
Apply a one rub finish to all railing surfaces unless otherwise shown elsewhere on the plans.

**MATERIAL NOTES:**  
Provide Class "C" concrete for railing. Provide Class "C" (HPC) concrete if shown elsewhere in the plans.  
Provide Class "C" concrete for pilasters.  
Epoxy coat all rail reinforcement if slab bars are epoxy coated.  
Bronze Star must be cast of architectural bronze having a minimum thickness of 1/2".  
Epoxy coating composition: Copper 85 %, Tin 3 %, Total 3 %, Zinc 3 %.  
Provide bar laps, where required, as follows:  
Uncoated - #5 = 1'-0"  
Epoxy coated - #5 = 2'-0"  
Uncoated - #7 = 2'-0"  
Epoxy coated - #7 = 4'-0"

**GENERAL NOTES:**  
This rail was evaluated based on the results of previous crash tests and approved for a NCHRP Report 350 LL-2 rating. This rail is only approved for low speed use, speeds of 30 mph or less.  
Do not use this railing on bridges with expansion joints providing more than 5" movement.  
Rail anchorage details shown on this standard may require modification for use on bridges with expansion joints. See drawings elsewhere in plans for these modifications.  
Shop drawings will not be required for this rail.  
See Bridge Layout or other plan sheets for the following: number of windows, window type, inclusion of bronze stars, inclusion of construction year with abutment and bent, erection drawings showing span number, span location, number of windows between pilasters and spacing to first window (see Note 6) to the Engineer for approval.  
Height of railing with no overlay increase and no pilasters is 350 plf.

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

- 7) Provide rail joints at ends of all spans the same width as Slab joint opening, except that Rail Joints over construction joints shall be staggered from Slab joints.
- 8) Slab joint openings 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 weight and does not absorb moisture. If forming material is not left in place, plug the bottom 6" with slab joint sealing compound to prevent drainage and staining.
- 9) Increase 2" for structures with overlay.
- 10) Construction year (use if shown elsewhere on plans). 3" High Plasticoid Bar Typeface with 1/2" recess. Placed at one Abutment only or as directed by the Engineer.
- 11) Dimensions must be the same on each side of joint.
- 12) For raised sidewalks, add sidewalk height to total bar height. Use sidewalk height at rail's location.
- 13) Reduce by 2" or field bend over Preformed Bituminous Fiber Material to gain cover.
- 14) Bronze Star dimensions of the final product can be slightly smaller due to shrinkage after casting.

SHEET 3 OF 3

**Texas Department of Transportation**

**COMBINATION RAIL**  
**TEXAS CLASSIC**

**TYPE C411**

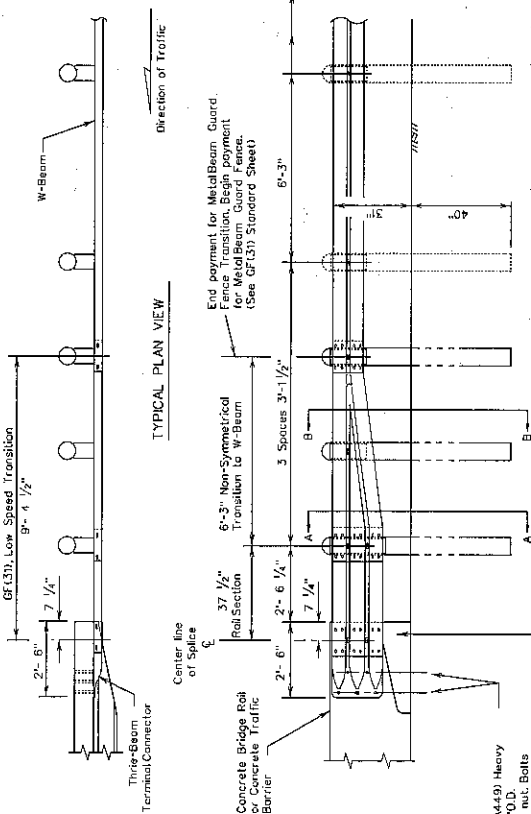
DATE: 06/07/2014	REV: 1.000	REV: 1.000	REV: 1.000
DESIGNED BY: J. D. ...	CHECKED BY: J. D. ...	APPROVED BY: J. D. ...	DATE: 06/07/2014
PROJECT NO. 12345678		SHEET NO. 34	





**GENERAL NOTES**

1. The type of post (round wood post, rectangular wood post, or steel post) and the exact position of the transition shall be as directed by the Engineer.
2. Reinforcement shall meet the requirements of Item 540, "Metal Beam Guard Fence" except as modified in the plans.
3. Button head "best" bolts (ASTM A307) shall be of sufficient length to extend through the nut, washer, and the nut and washer. The nut and washer shall be of the type specified in Item 401, "Bolts and Washers" (ASTM A307) or 402, "Bolts and Washers" (ASTM A563).
4. Fillets (bolts, nuts, and washers) shall be galvanized in accordance with Item 445, "Galvanizing." Fillets shall be subsidiary to the bit 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 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-720, "Composite Material Posts and Blocks," shall be used. The manufacturer of the composite material post and/or block of similar dimensions. The Construction Division, TxDOT, maintains a Material Producer List (MPL) for producers of materials conforming to DMS-720. Only producers on the MPL can furnish composite material posts and/or blocks.
9. Refer to GF(31) standard sheet for additional details.



TYPICAL PLAN VIEW

TYPICAL ELEVATION VIEW

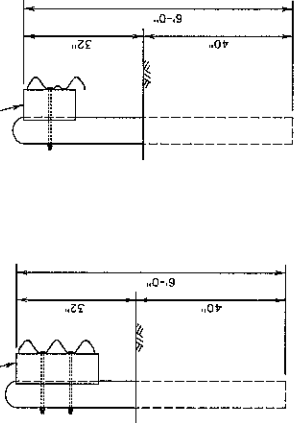
5 - 5/8" Dia. ASTM A325 or A449 Heavy Hex Head Bolts, with two 1 1/4" O.D. washers under each head and nut. Bolts shall be of sufficient length to extend through the full thickness of the rail, concrete barrier, and install with both heads on traffic face.

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

**TERMINAL CONNECTION NOTE**  
To ensure a stable connection, (1) Rectangular Block (6" x 8" x 22" Nom.) shall be installed at the recessed nuts of the Terminal Connection splice.

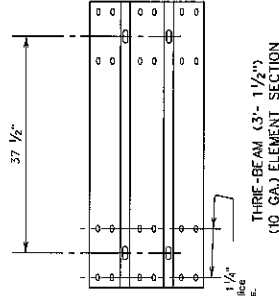
This post location shall be in the center of the Block (6" x 8" x 22" Nom.).

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

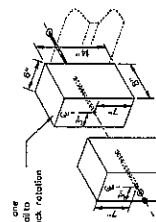


SECTION A-A

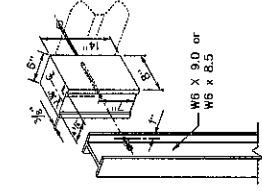
SECTION B-B



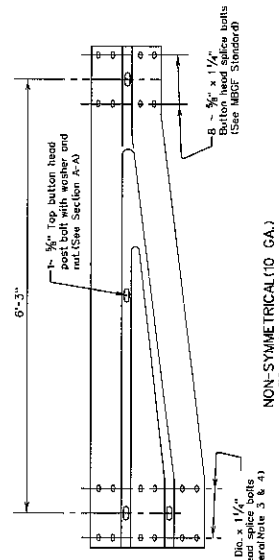
THRE-BEAM (3'-1 1/2') (10 GA.) ELEMENT SECTION



WOOD BLOCK TO RECTANGULAR WOOD POST (Showing Standard Block)



STEEL POST & BLOCK (Showing Standard Block)



NON-SYMMETRICAL (10 GA.) TRANSITION SECTION

Texas Department of Transportation  
Design Division Standard

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

**GF(31) TL2-11**

DATE	REVISED	BY	FOR
01/20/01	01/20/01	2011	2011
PROJECT	NO.	SECTION	SHEET NO.
			57

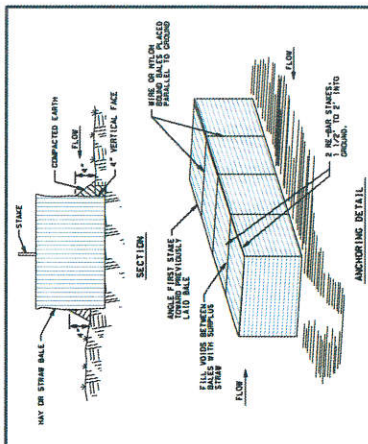










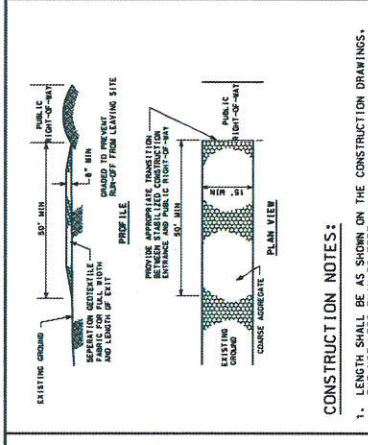


**GENERAL NOTES:**

- BALES SHALL BE PLACED IN A ROW WITH ENDS TIGHTLY ABUTTING THE ADJACENT BALES. - FILL THE VOIDS BETWEEN BALES WITH SURPLUS STRAW. PLACE BALES WITH BINDING PARALLEL TO GROUND SURFACE.
- WHERE POSSIBLE EACH BALE SHALL BE EMBEDDED IN THE SOIL A MINIMUM OF 4 INCHES.
- BALES SHALL BE SECURELY ANCHORED IN PLACE BY 3/8 INCH REBAR STAKES DRIVEN THROUGH THE BALES. THE FIRST STAKE IN EACH BALE SHALL BE ANGLED TOWARDS THE PREVIOUS BALE TO FORCE THE BALES TOGETHER.
- BALES SHALL BE BOUND BY EITHER WIRE OR NYLON ROPE TIED ACROSS THE GAP.
- MAINTENANCE WILL BE PERFORMED AS NEEDED.

**STRAW BALE FENCE**

□ □ □  
SYMBOL

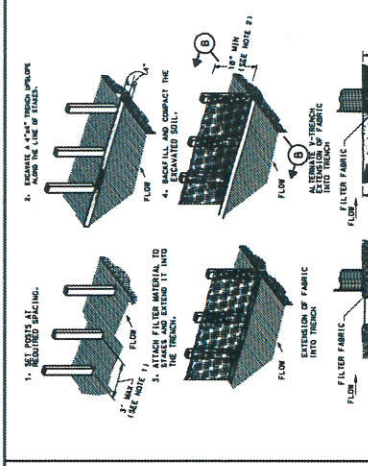


**CONSTRUCTION NOTES:**

- LENGTH SHALL BE AS SHOWN ON THE CONSTRUCTION DRAWINGS, BUT NOT LESS THAN 50 FEET.
- THICKNESS SHALL BE NOT LESS THAN 8 INCHES.
- WIDTH SHALL BE NOT LESS THAN FULL WIDTH OF ALL POINTS OF INGRESS OR EGRESS.
- STABILIZATION FOR OTHER AREAS SHALL HAVE THE SAME AGGREGATE THICKNESS AND WIDTH REQUIREMENTS AS THIS.
- STABILIZED CONSTRUCTION EXIT, UNLESS OTHERWISE SHOWN ON THE CONSTRUCTION DRAWINGS, SHALL BE CONSTRUCTED TO ACCOMMODATE A TRUCK WASHING AREA. AN OUTLET SEDIMENT TRAP MUST BE PROVIDED FOR THE TRUCK WASHING AREA.
- SEE SECTION 02133 - STABILIZED CONSTRUCTION EXIT.
- STABILIZED CONSTRUCTION EXIT SHALL BE MAINTAINED FREE OF SEDIMENT FOR THE DURATION OF THE PROJECT.

**STABILIZED CONSTRUCTION EXIT**

□ □ □  
SYMBOL

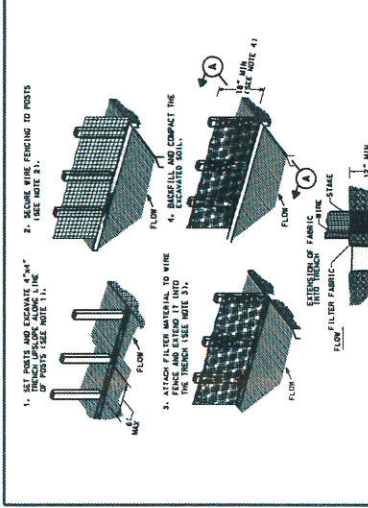


**CONSTRUCTION NOTES:**

- 2 INCH THICK BY 2 INCH WOODEN STAKES TO BE SET AT 6 FEET APART AND EMBEDDED A MIN OF 12 INCHES. IF PREASSEMBLED FENCE WITH SUPPORT METTING IS USED, SPACING OF POST MAY BE INCREASED TO 8 FEET MAX.
- ATTACH FILTER FABRIC TO WOODEN STAKES. - FILTER FABRIC SHALL HAVE A MIN HEIGHT OF 18 INCHES AND MAX HEIGHT OF 24 INCHES ABOVE NATURAL GROUND.
- WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHOULD BE OVERLAPPED 12 INCHES AT THE POSTS, AND FOLDED.
- SEE SECTION 02131 - NONWOVEN GEOTEXTILE FILTER FABRIC.

**FILTER FABRIC FENCE**

□ □ □  
SYMBOL

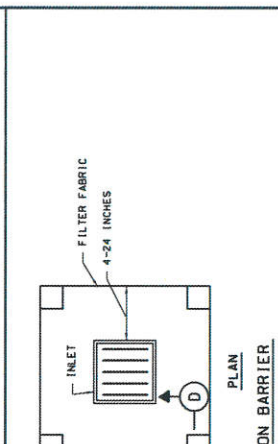


**CONSTRUCTION NOTES:**

- SET 2 INCH BY 2 INCH WOODEN STAKES SPACED A MAX OF 6 FEET APART AND EMBEDDED A MIN OF 12 INCHES.
- WOVEN WIRE FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH STAPLES.
- FILTER CLOTH TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24 INCHES AT TOP AND MIDSECTION.
- MINIMUM HEIGHT OF FILTER SHOULD BE 18 INCHES AND A MAXIMUM OF 24 INCHES ABOVE NATURAL GROUND.
- WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVERLAPPED 12 INCHES AT THE POSTS, AND FOLDED.
- SEE SECTION 02135 - REINFORCED FILTER FABRIC BARRIER.

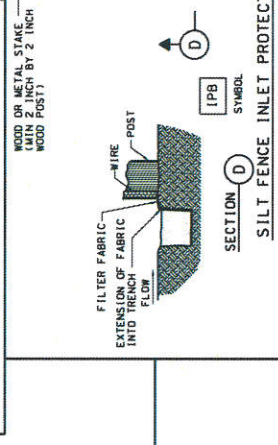
**REINFORCED FILTER FABRIC BARRIER**

□ □ □  
SYMBOL



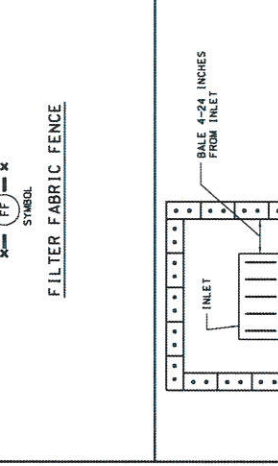
**CONSTRUCTION NOTE:**

- SEE CONSTRUCTION NOTES FOR IPB.



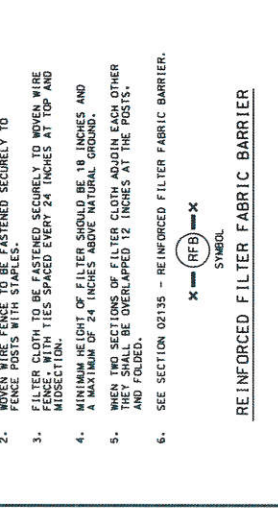
**CONSTRUCTION NOTE:**

- SEE CONSTRUCTION NOTES FOR IPB.



**CONSTRUCTION NOTE:**

- SEE CONSTRUCTION NOTES FOR IPB.



**CONSTRUCTION NOTE:**

- SEE CONSTRUCTION NOTES FOR IPB.

DESIGNED BY: _____			<b>43</b> SHEETS
DRAWN BY: _____			
CHECKED BY: _____			
DATE: _____			
BY: _____			
REVISION		<b>FULSHEAR TRACE</b> <b>POLLUTION PREVENTION DETAILS</b>	
Engineering and Surveying 2107 CityWest Blvd., 3rd Floor (713) 763-7788, (713) 763-3660, Fax TBPE FIRM REG. No. 280 TBPLS FIRM REG. No. 100486			
DESIGNED BY: _____			
DRAWN BY: _____			
CHECKED BY: _____			
DATE: _____			
BY: _____			



## 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.