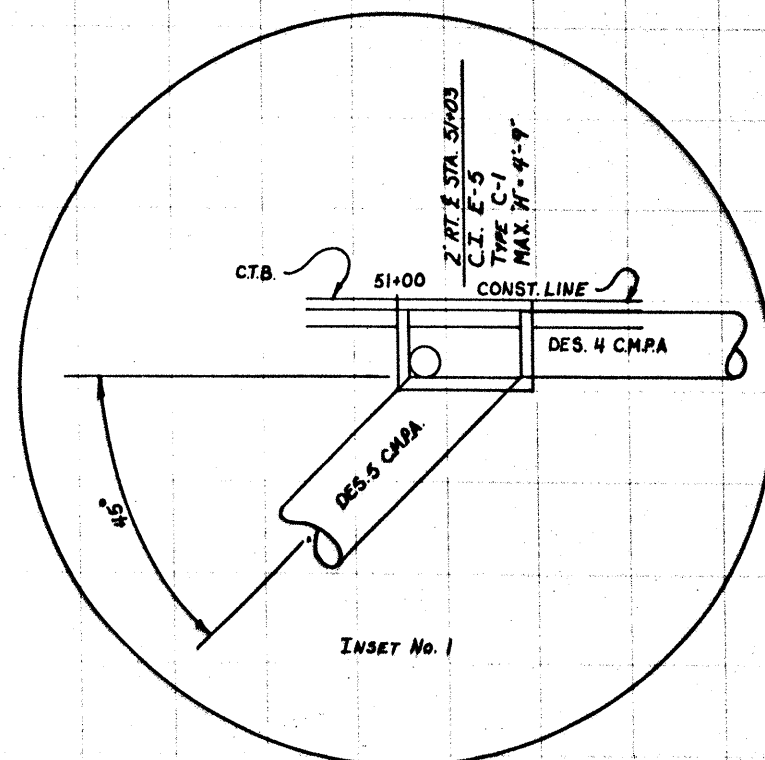
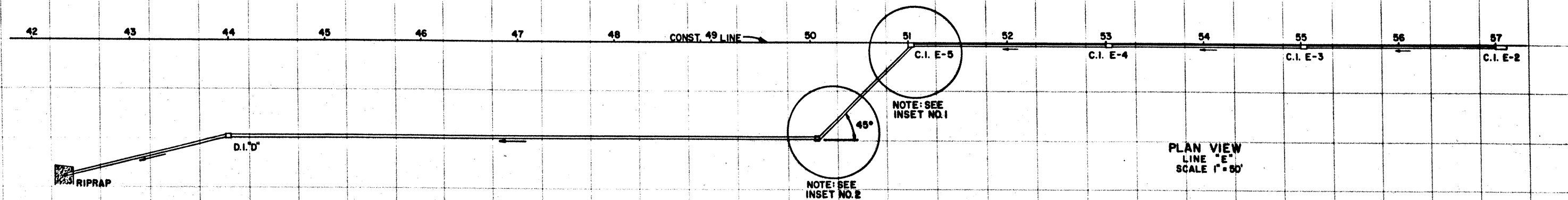


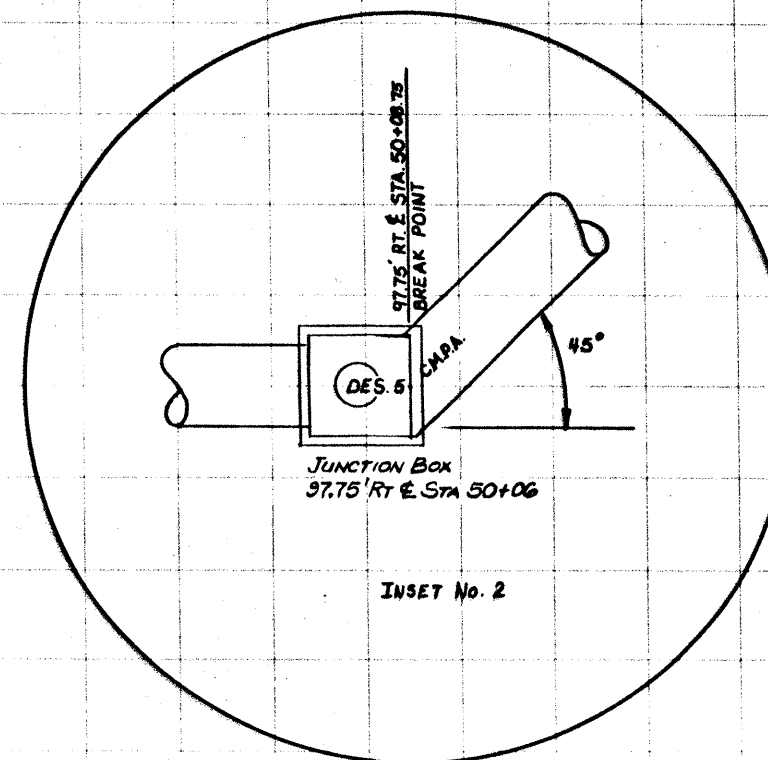
174

*Bullis P. Hunt* 7/26/82

# CULVERT CROSS SECTIONS

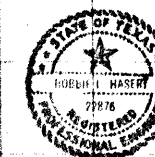


LINE "E"



LINE "E"

175

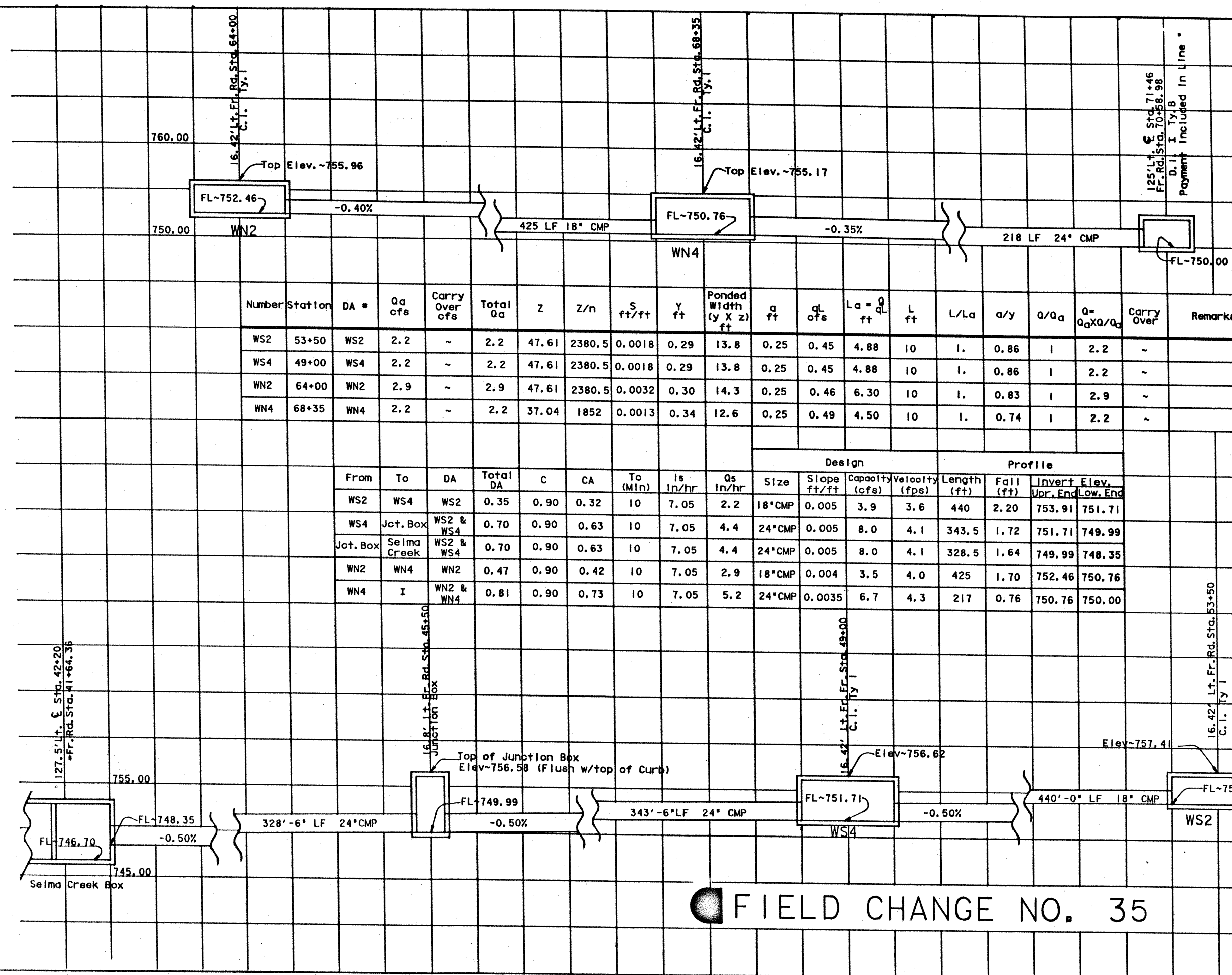


Robert L. Haseg 7/26/82  
Date

# CULVERT DETAIL SHEET

SHEET 6 OF 16			
FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJECT NO.	SHEET NO.
6	TEXAS	IR 35-2 (152) 173	175
COUNTY	GUADALUPE	SECTION	16
15	Guadalupe, Etc.	16	6 29th IH 35





**ESTIMATED QUANTITIES**

Item	Unit	Plan	Final
CMP (Gal. Stl. 18in)	LF	425	
CMP (Gal. Stl. 24in)	LF	217	
Inlet (Comp.) (Ty.) (Curb)	Ea	2	
* Str. Exoav. (Culv. Small)	CY	350	
* For Contr. Info. Only			



The seal appearing on this document was authorized by David C. Kopp, P.E. 63747, on 8/26, 1991.

**ESTIMATED QUANTITIES**

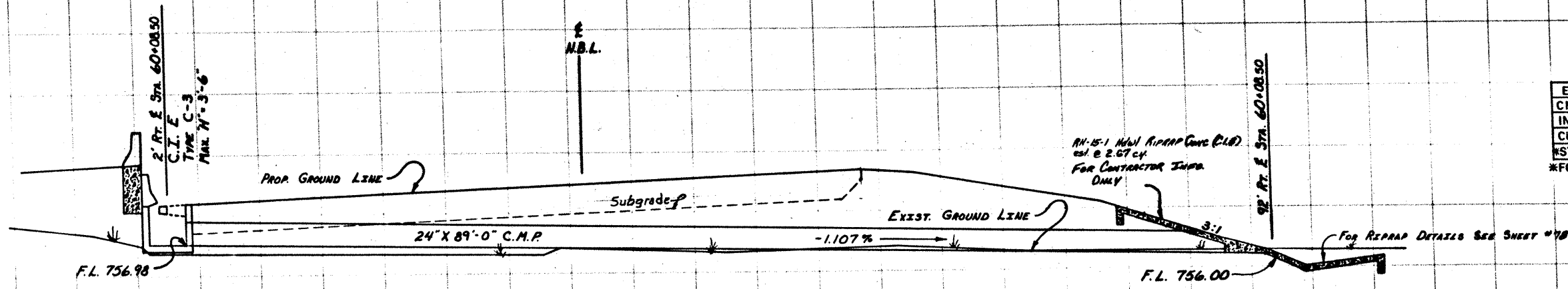
Item	Unit	Plan	Final
CMP (Gal. Stl. 18in)	LF	440	
CMP (Gal. Stl. 24in)	LF	672	
Inlet (Comp.) (Ty.) (Curb)	Ea	2	
Manh (Comp.) (Jot. Box)	Ea	1	
* Str. Exoav. (Culv. Small)	CY	880	
* For Contr. Info. Only			

175A

FIELD CHANGE NO. 35

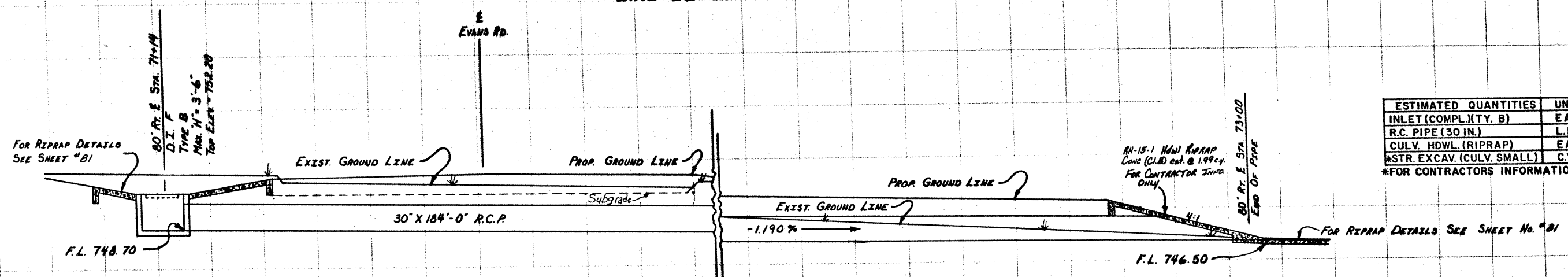
DES. NO.	STATE	FEDERAL PROJECT NO.	SHEET NO.
0	TEXAS	TP 35-2 (157) 175	175A
STATE DIST. NO.	COUNTY	CONTRACT NO.	DATE
15	GUADALUPE	16	6 29 84

765  
760  
755  
  
755  
750  
745  
  
745  
740  
735



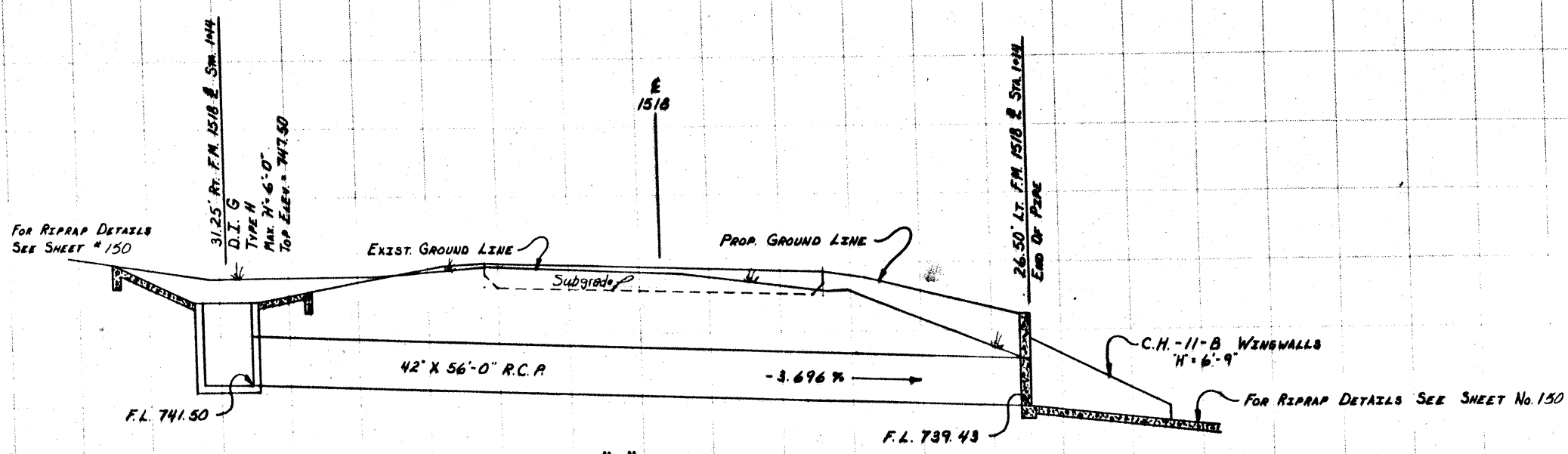
ESTIMATED QUANTITIES	UNIT	PLAN	FINAL
CMP (GAL. STL. 24 IN.)	L.F.	89.0	
INLET (COMPL.) (CURB) (15 FT.)	E.A.	1	
CULV. HDWL. (RIPRAP)	E.A.	1	
*STR. EXCAV. (CULV. SMALL)	C.Y.	4	

\*FOR CONTRACTORS INFORMATION ONLY



ESTIMATED QUANTITIES	UNIT	PLAN	FINAL
INLET (COMPL.) (TY. B)	E.A.	1	
R.C. PIPE (30 IN.)	L.F.	184.0	
CULV. HDWL. (RIPRAP)	E.A.	1	
*STR. EXCAV. (CULV. SMALL)	C.Y.	133	

\*FOR CONTRACTORS INFORMATION ONLY



ESTIMATED QUANTITIES	UNIT	PLAN	FINAL
R.C. PIPE (42 IN.)	L.F.	56.0	
INLET (COMPL.) (TY. H)	E.A.	1	
CULV. HDWL. (CH-11B) (60 IN.)	E.A.	1	
TRENCH EXCAVATION PROTECTION	L.F.	60.5	
*STR. EXCAV. (CULV. SMALL)	C.Y.	63	

\*FOR CONTRACTORS INFORMATION ONLY

174

Bobbie L. Hasset 7/26/82



# CULVERT CROSS SECTIONS

ESTIMATED QUANTITIES	UNIT	PLAN	FINAL
CMP (GAL. STL.) (18 IN.)	L.F.	9.0	
INLET (COMPL.) (CURB) (15 FT)	EA.	1	
STR. EXCAV. (CULV. SMALL)	C.Y.	1	

\*FOR CONTRACTORS INFORMATION ONLY

ESTIMATED QUANTITIES	UNIT	PLAN	FINAL
R.C. PIPE (36 IN.)	L.F.	103.92	
INLET (COMPL.) (TY. B)	EA.	1	
CULV. HDWL. (RIPRAP)	EA.	1	
STR. EXCAV. (CULV. SMALL)	C.Y.	83	

\*FOR CONTRACTORS INFORMATION ONLY

ESTIMATED QUANTITIES	UNIT	PLAN	FINAL
R.C. PIPE (30 IN.)	L.F.	240.17	
INLET (COMPL.) (TY. C)	EA.	1	
CULV. HDWL. (RIPRAP)	EA.	1	
STR. EXCAV. (CULV. SMALL)	C.Y.	301	
TRENCH EXCAVATION PROTECTION	L.F.	190.0	

\*FOR CONTRACTORS INFORMATION ONLY

FOR RIPRAP DETAILS SEE SHEET No. 81



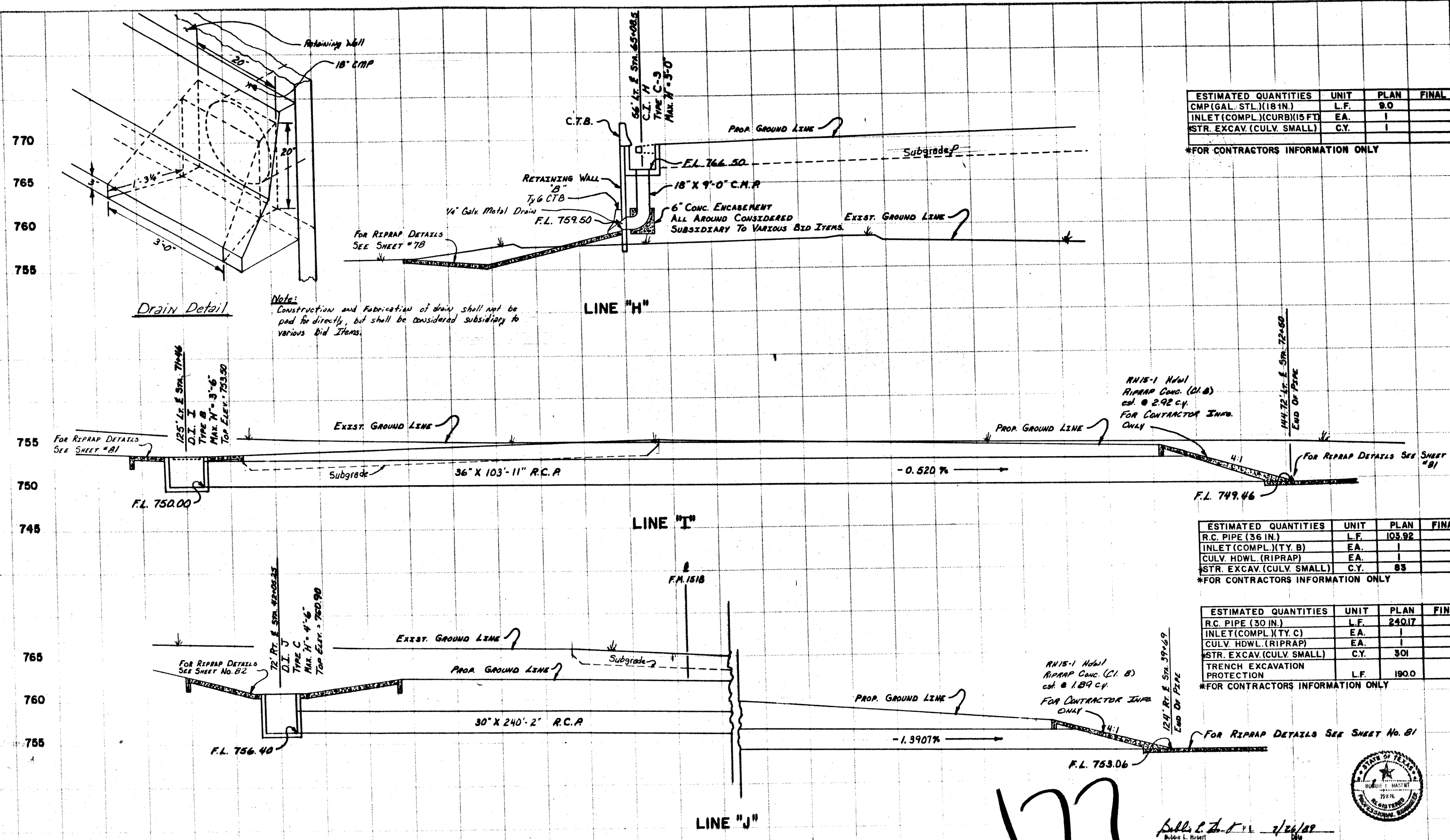
Bubbe L. Hastert 2/26/82

SHEET 8 OF 16

IR35-2 (157) 173

15. Guadalupe Etc. 16. 6. P. E. I. H. 35

# CULVERT CROSS SECTIONS



Drain Detail

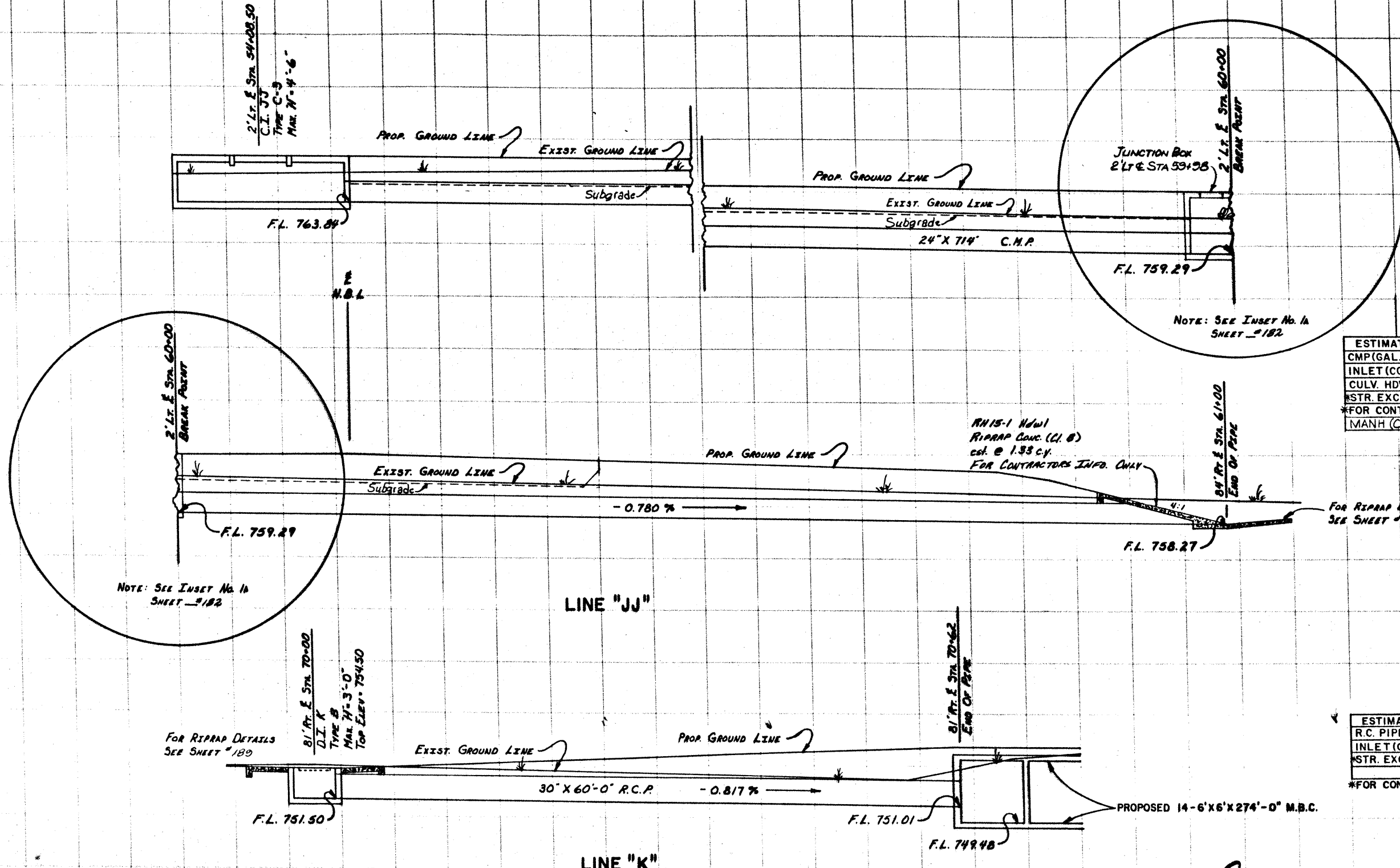
Note: Construction and Fabrication of drain shall not be paid for directly, but shall be considered subsidiary to various bid items.

LINE "H"

LINE "I"

LINE "J"

770  
765  
760  
765  
760  
755  
755  
750  
745



ESTIMATED QUANTITIES	UNIT	PLAN	FINAL
CMP (GAL. STL. 24 IN.)	L.F.	714.0	
INLET (COMPL.) (CURB) (15 FT.)	E.A.	1	
CULV. HDWL. (RIPRAP)	E.A.	1	
STR. EXCAV. (CULV. SMALL)	C.Y.	95	
*FOR CONTRACTORS INFORMATION ONLY			
MANH (COMPL.) (JCT. BOX)	E.A.	1	

ESTIMATED QUANTITIES	UNIT	PLAN	FINAL
R.C. PIPE (30 IN.)	L.F.	60.0	
INLET (COMPL.) (TY. B)	E.A.	1	
STR. EXCAV. (CULV. SMALL)	C.Y.	26	
*FOR CONTRACTORS INFORMATION ONLY			

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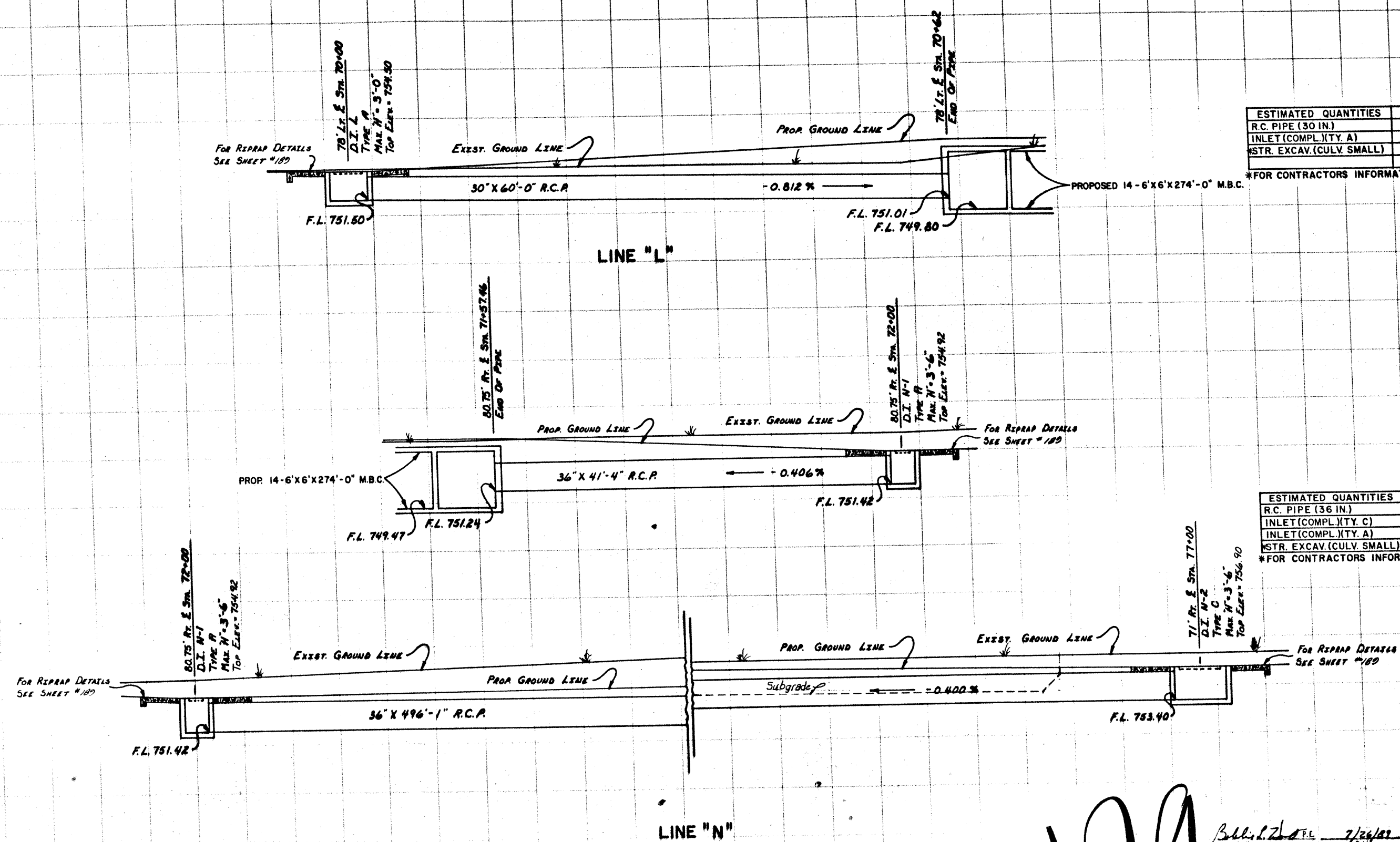
Bill P. Z... P.E. 2/24/02  
Bobbie L. Huerst



# CULVERT CROSS SECTIONS



755  
750  
745  
  
755  
750  
745  
  
760  
755  
745



ESTIMATED QUANTITIES	UNIT	PLAN	FINAL
R.C. PIPE (30 IN.)	L.F.	60.0	
INLET (COMPL.) (TY. A)	E.A.	1	
STR. EXCAV. (CULV. SMALL)	C.Y.	35	

\*FOR CONTRACTORS INFORMATION ONLY

ESTIMATED QUANTITIES	UNIT	PLAN	FINAL
R.C. PIPE (36 IN.)	L.F.	537.42	
INLET (COMPL.) (TY. C)	E.A.	1	
INLET (COMPL.) (TY. A)	E.A.	1	
STR. EXCAV. (CULV. SMALL)	C.Y.	200	

\*FOR CONTRACTORS INFORMATION ONLY

179

Bill L. Z...  
Bobbie L. Haver  
7/26/89  
Date



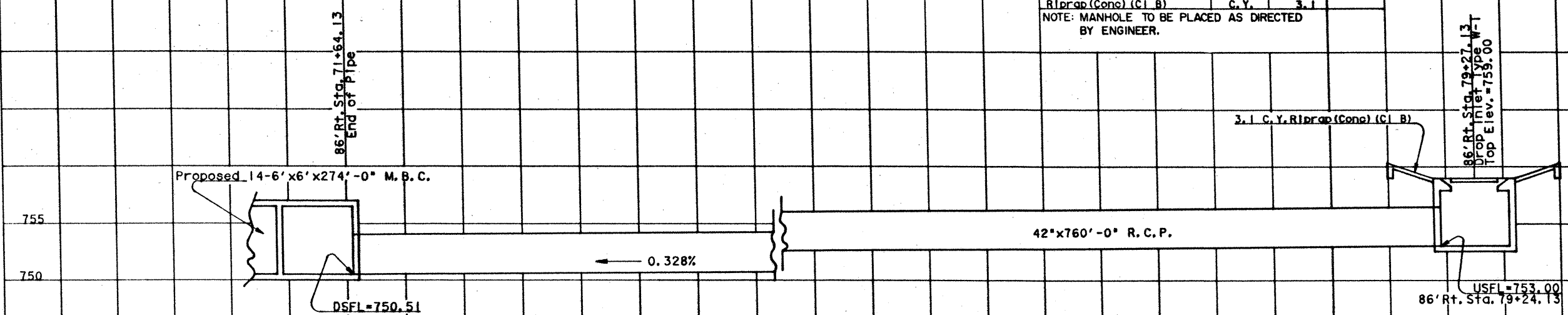
# CULVERT CROSS SECTIONS



Drainage Area "00"&"Q" (Above R.W. "E") feed this Structure					
Design Freq.	"C"	T/C	iso	"A"	Q <sub>10</sub>
50 yrs	0.65	17 min	8.15	10.8	57 cfs

ESTIMATED QUNTITIES	UNIT	PLAN	FINAL
R.C. Pipe (42 in)	L.F.	760.0	
Inlet (Comp) (Ty W-1)	Ea.	1	
Manh (Comp) (Jet Box)	Ea.	1	
Riprap (Cone) (CI B)	C.Y.	3.1	

NOTE: MANHOLE TO BE PLACED AS DIRECTED BY ENGINEER.



LINE "NN"

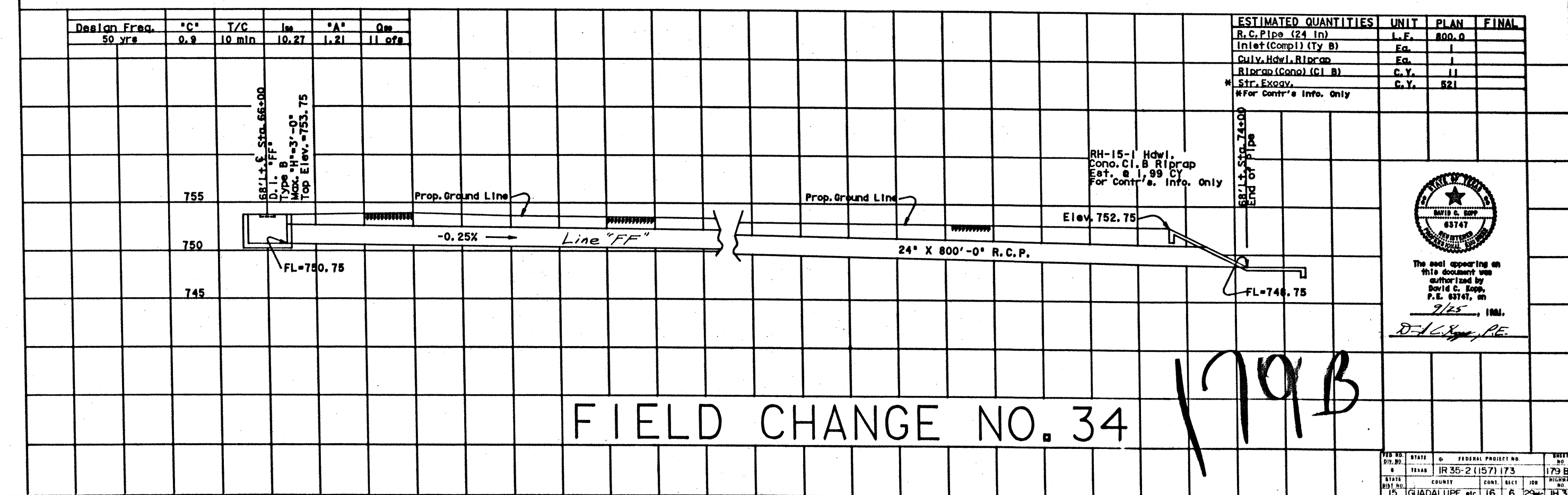
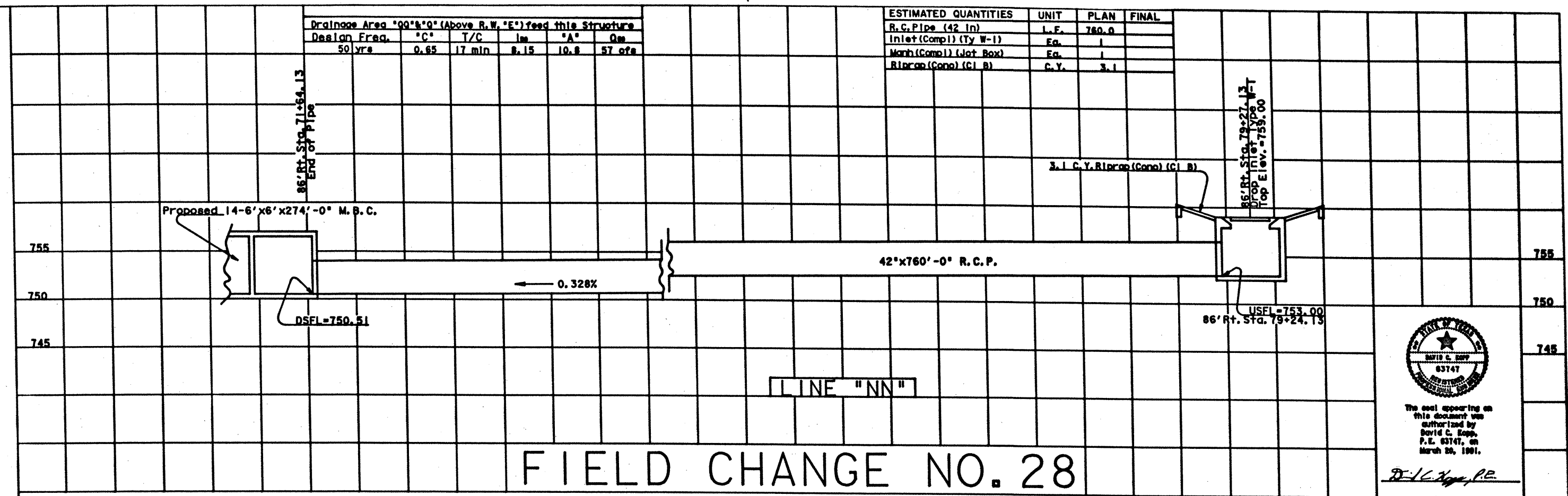
FIELD CHANGE NO. 28



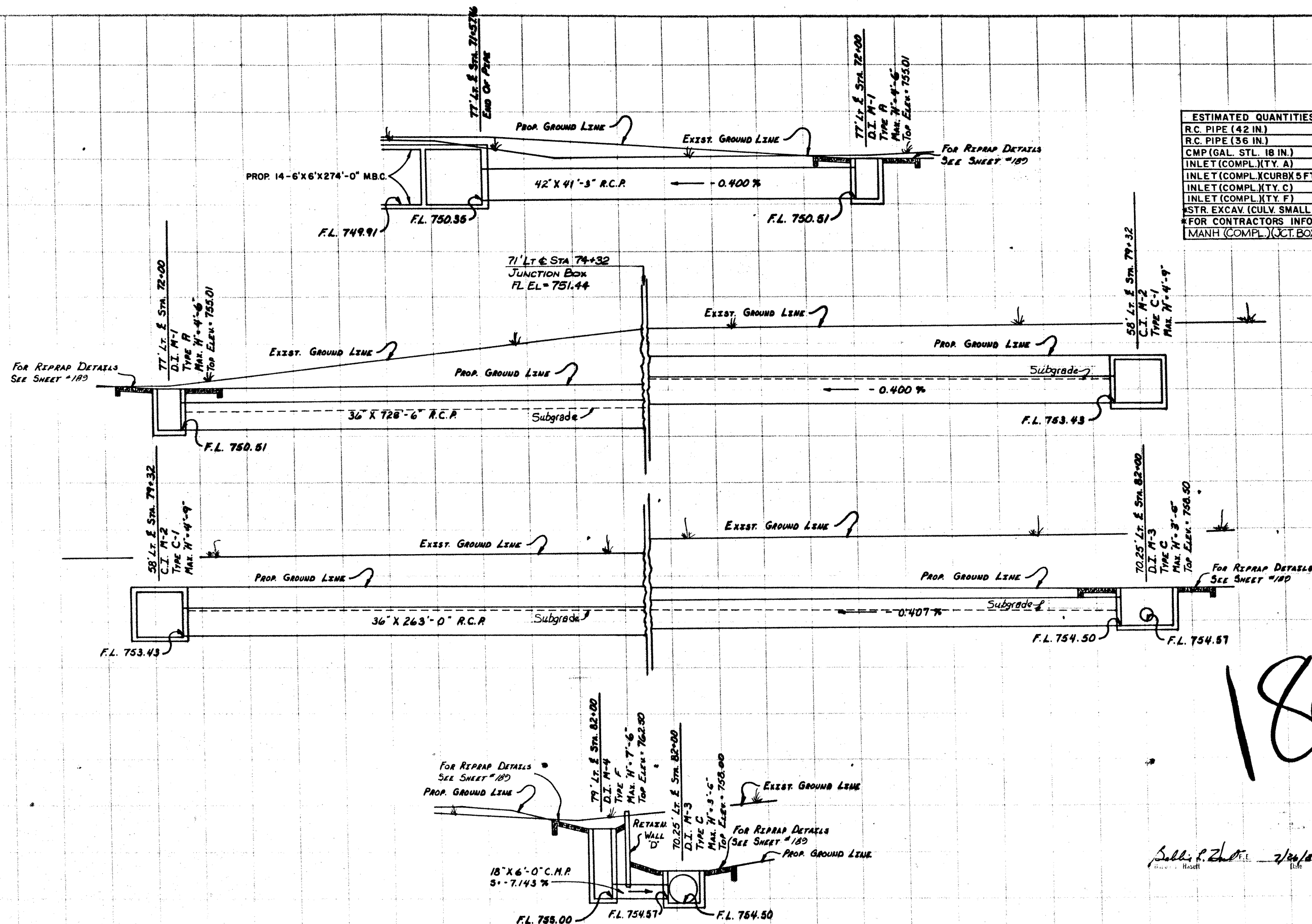
The seal appearing on this document was authorized by David C. Kopp, P.E. 63747, on March 22, 1981.  
D.C. Kopp, P.E.

179A

FED. RD. DIST. NO.	STATE	FEDERAL PROJECT NO.	SHEET NO.
4	TEXAS	IR 35-2 (157) 173	179 A
STATE DIST. NO.	COUNTY	COUNT. SECT.	JOB HIGHWAY NO.
15	GUADALUPE, ETC	16 6	29thc IH 35



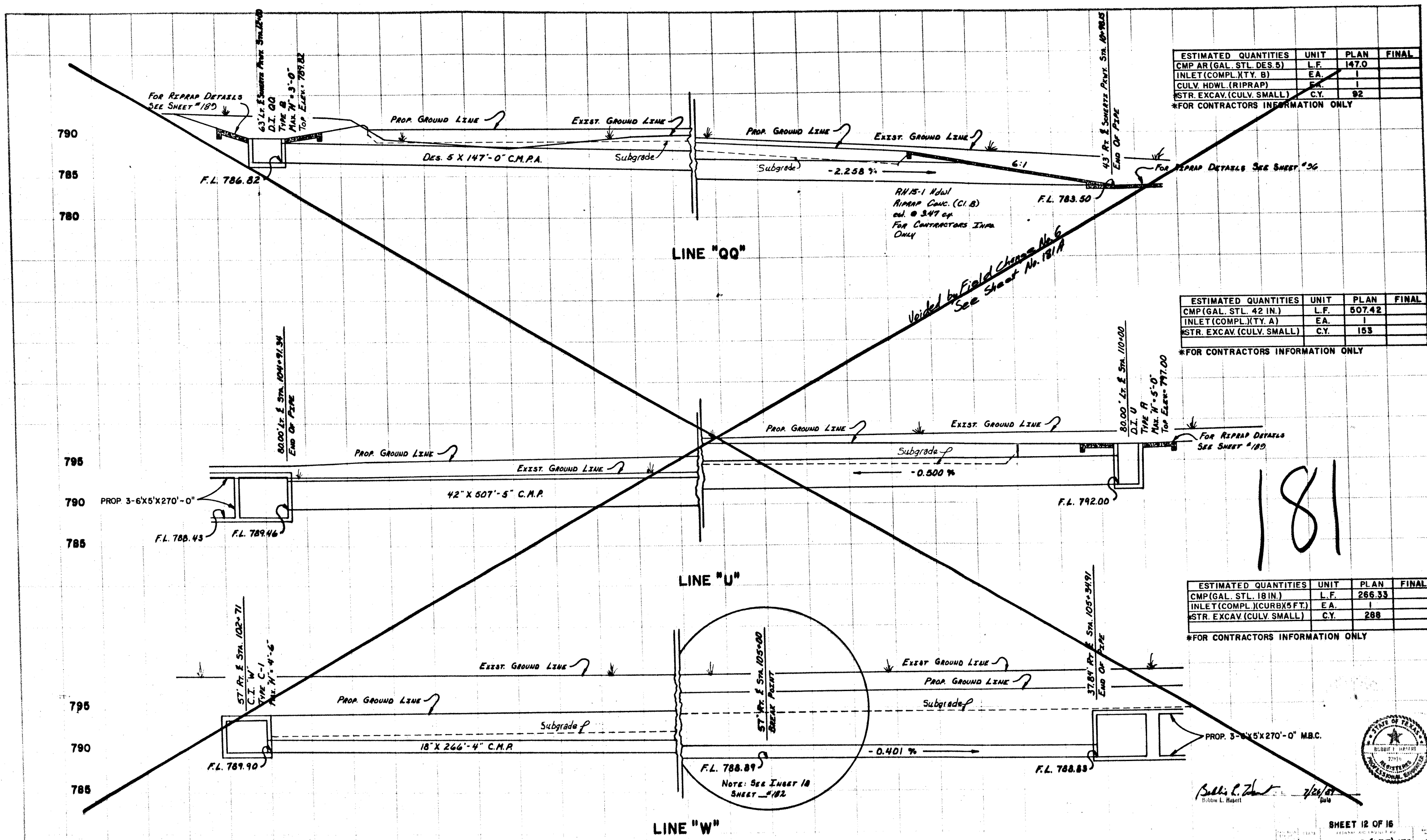
755  
750  
745  
760  
755  
750  
760  
755  
750  
760  
755  
750  
760  
755  
750



ESTIMATED QUANTITIES	UNIT	PLAN	FINAL
R.C. PIPE (42 IN.)	L.F.	41.25	
R.C. PIPE (36 IN.)	L.F.	991.2	
CMP (GAL. STL. 18 IN.)	L.F.	60	
INLET (COMPL.) (TY. A)	EA.	1	
INLET (COMPL.) (CURB 5 FT.)	EA.	1	
INLET (COMPL.) (TY. C)	EA.	1	
INLET (COMPL.) (TY. F)	EA.	1	
STR. EXCAV. (CULV. SMALL)	C.Y.	310	
*FOR CONTRACTORS INFORMATION ONLY			
MANH (COMPL.) (JCT. BOX)	EA.	1	

LINE "M"

# CULVERT CROSS SECTIONS



ESTIMATED QUANTITIES	UNIT	PLAN	FINAL
CMP AR (GAL. STL. DES. 5)	L.F.	147.0	
INLET (COMPL. XTY. B)	E.A.	1	
CULV. HDWL. (RIPRAP)	E.A.	1	
STR. EXCAV. (CULV. SMALL)	C.Y.	92	

\*FOR CONTRACTORS INFORMATION ONLY

ESTIMATED QUANTITIES	UNIT	PLAN	FINAL
CMP (GAL. STL. 42 IN.)	L.F.	507.42	
INLET (COMPL. XTY. A)	E.A.	1	
STR. EXCAV. (CULV. SMALL)	C.Y.	153	

\*FOR CONTRACTORS INFORMATION ONLY

ESTIMATED QUANTITIES	UNIT	PLAN	FINAL
CMP (GAL. STL. 18 IN.)	L.F.	266.33	
INLET (COMPL. CURB 5 FT.)	E.A.	1	
STR. EXCAV. (CULV. SMALL)	C.Y.	288	

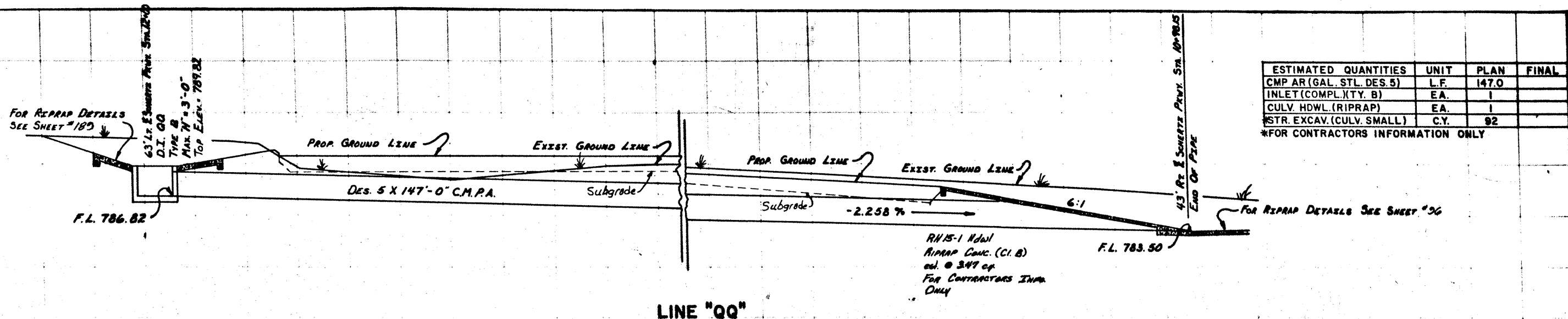
\*FOR CONTRACTORS INFORMATION ONLY

181



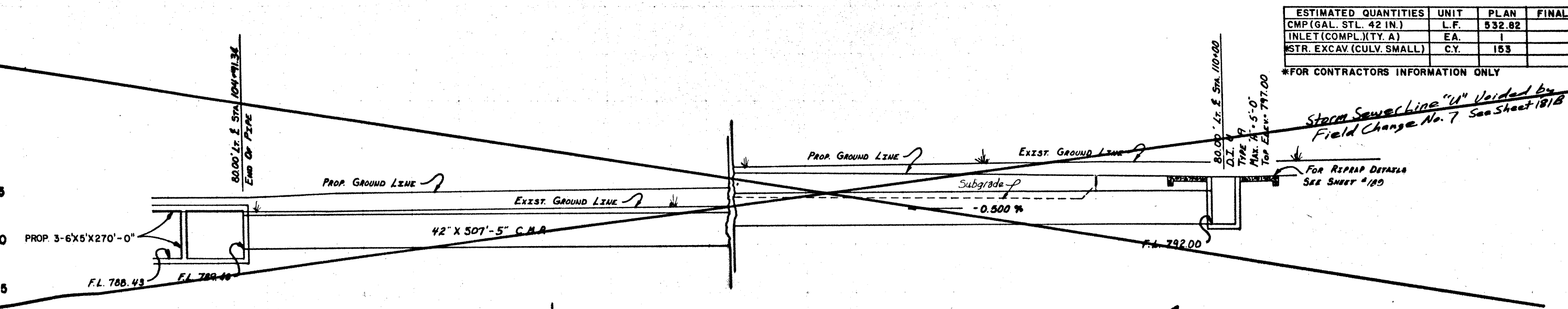
Robert L. Hupert 7/26/01  
 Robert L. Hupert Date

# CULVERT CROSS SECTIONS



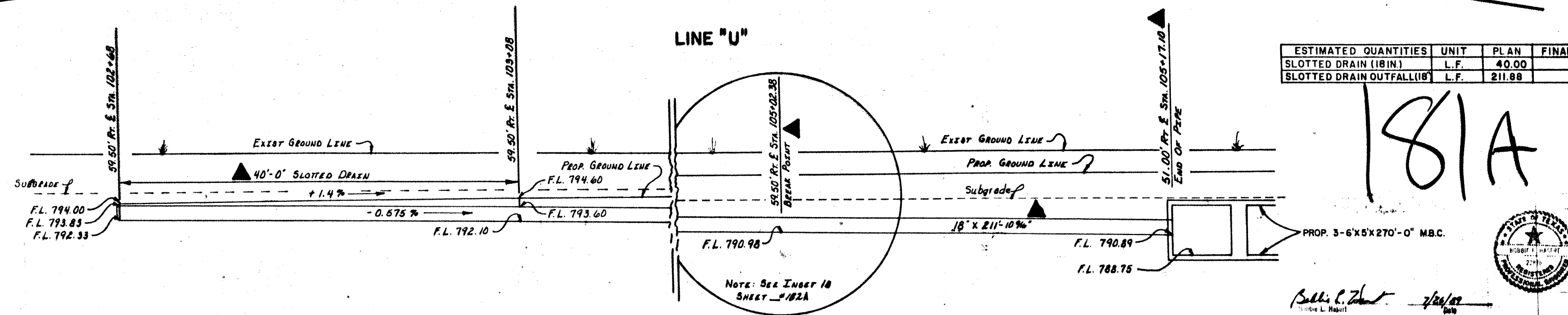
ESTIMATED QUANTITIES	UNIT	PLAN	FINAL
CMP AR (GAL. STL. DES. 5)	L.F.	147.0	
INLET (COMPL. (TY. B)	EA.	1	
CULV. HDWL. (RIPRAP)	EA.	1	
STR. EXCAV. (CULV. SMALL)	C.Y.	92	

\*FOR CONTRACTORS INFORMATION ONLY



ESTIMATED QUANTITIES	UNIT	PLAN	FINAL
CMP (GAL. STL. 42 IN.)	L.F.	532.82	
INLET (COMPL. (TY. A)	EA.	1	
STR. EXCAV. (CULV. SMALL)	C.Y.	153	

\*FOR CONTRACTORS INFORMATION ONLY



ESTIMATED QUANTITIES	UNIT	PLAN	FINAL
SLOTTED DRAIN (18 IN.)	L.F.	40.00	
SLOTTED DRAIN OUTFALL (18")	L.F.	211.88	

181A

▲ FIELD CHANGE NO. 6  
CULVERT CROSS SECTIONS

Ballis C. Z... 7/26/07



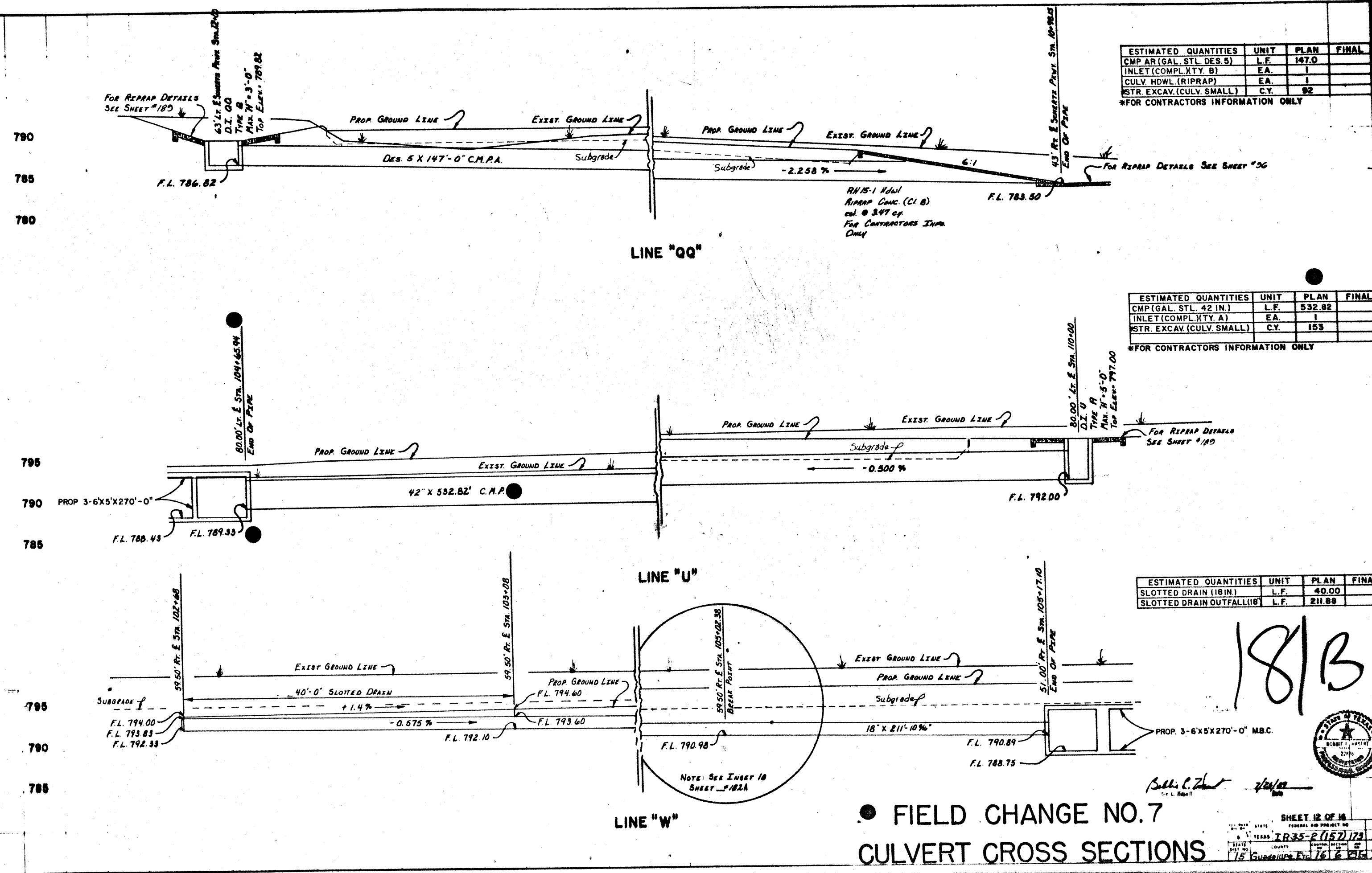
ESTIMATED QUANTITIES	UNIT	PLAN	FINAL
CMP AR (GAL. STL. DES. 5)	L.F.	147.0	
INLET (COMPL. XTY. B)	EA.	1	
CULV. HDWL. (RIPRAP)	EA.	1	
STR. EXCAV. (CULV. SMALL)	C.Y.	92	

\*FOR CONTRACTORS INFORMATION ONLY

ESTIMATED QUANTITIES	UNIT	PLAN	FINAL
CMP (GAL. STL. 42 IN.)	L.F.	532.82	
INLET (COMPL. XTY. A)	EA.	1	
STR. EXCAV. (CULV. SMALL)	C.Y.	153	

\*FOR CONTRACTORS INFORMATION ONLY

ESTIMATED QUANTITIES	UNIT	PLAN	FINAL
SLOTTED DRAIN (18 IN.)	L.F.	40.00	
SLOTTED DRAIN OUTFALL (18")	L.F.	211.88	



● FIELD CHANGE NO. 7

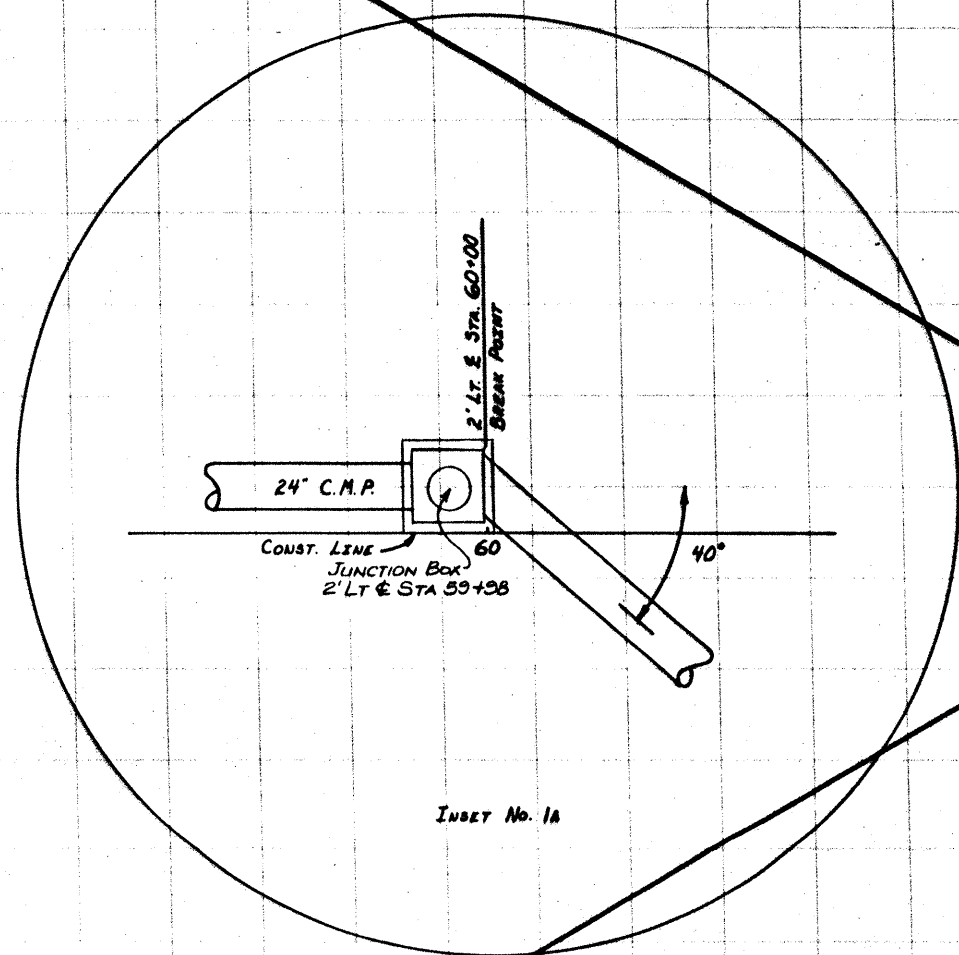
CULVERT CROSS SECTIONS

181B

Robert L. Z... 7/24/02

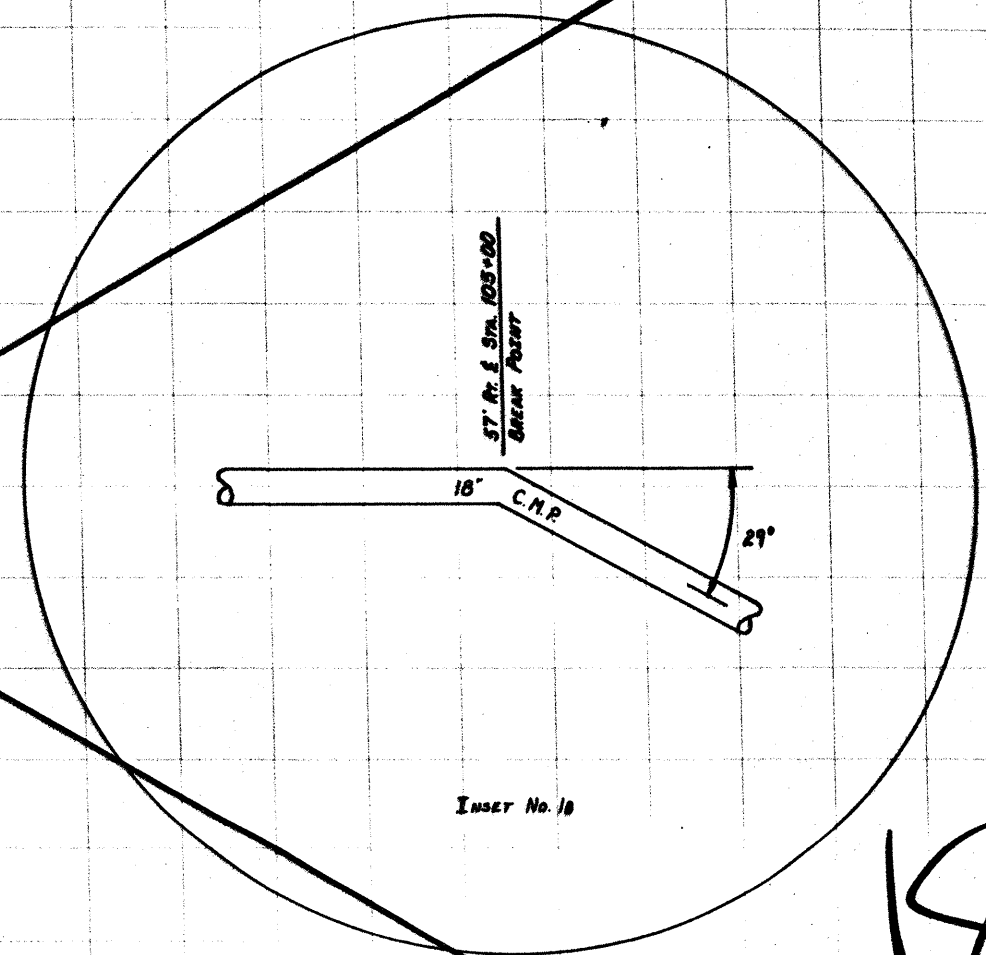


Voided by Field Change No. 6  
See Sheet No. 1820



INSET No. 1A

LINE "JJ"



INSET No. 1B

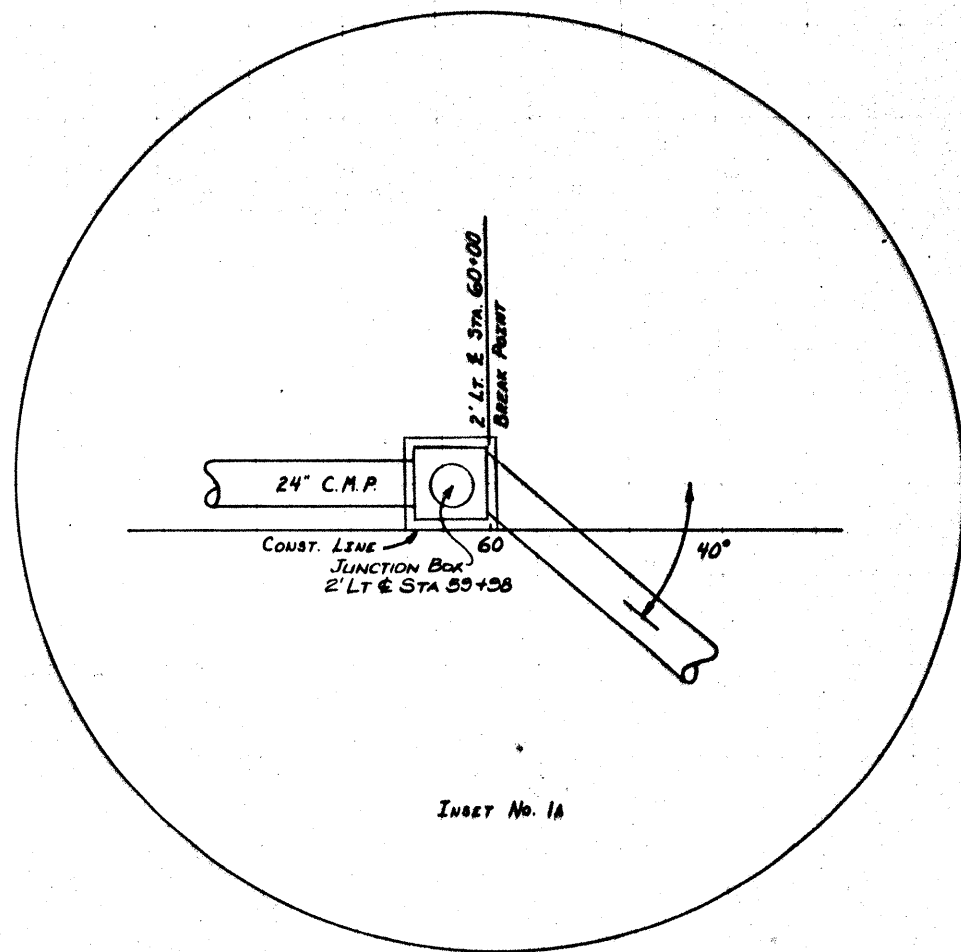
LINE "W"

182



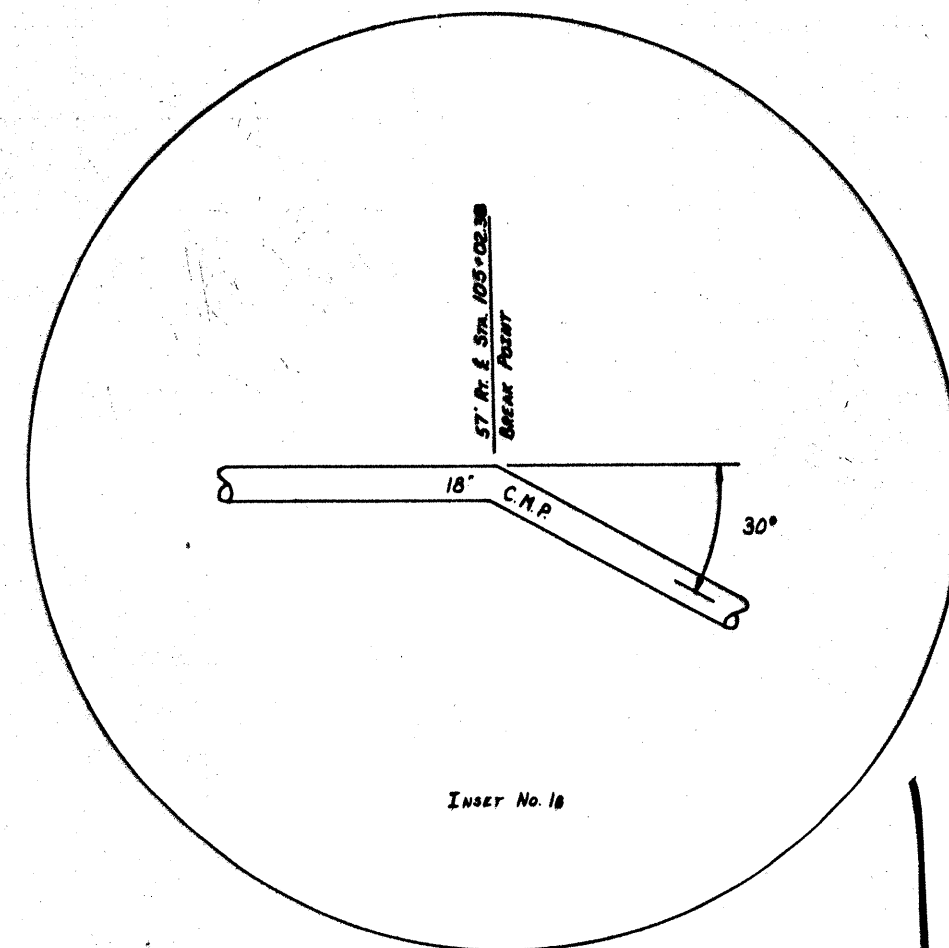
Robert L. Hasty 7/27/82

# CULVERT DETAIL SHEET



INSET No. 1A

LINE "JJ"



INSET No. 1B

LINE "W"

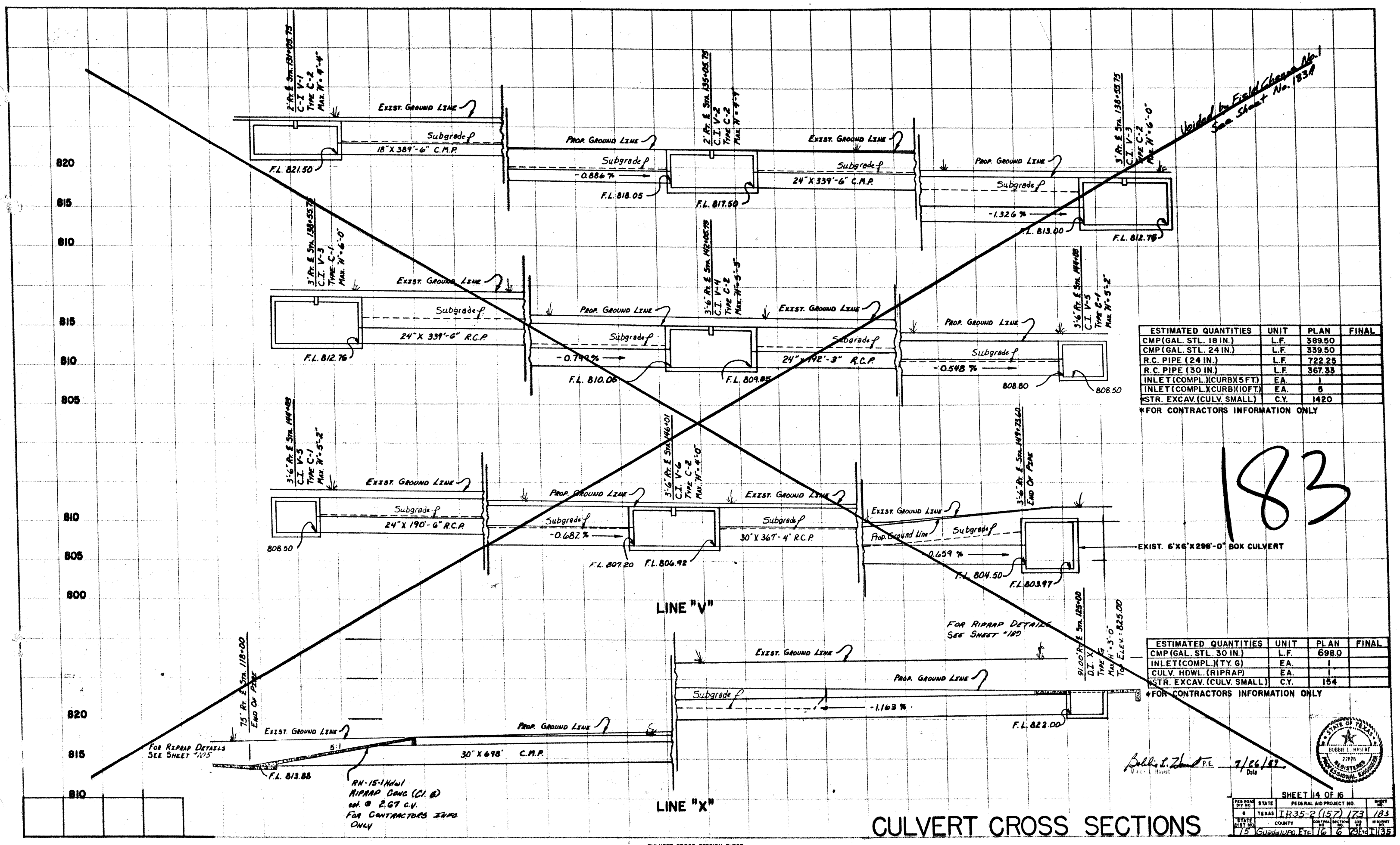
*Billie L. Hunt* 7/24/09



# FIELD CHANGE NO. 6 CULVERT DETAIL SHEET

SHEET 13 OF 16			
FEDERAL AID PROJECT NO.	IR35-2 (152) 173	182A	
STATE	TEXAS	COUNTY	EL PASO
DISTRICT	15	SECTION	16
BRIDGE NO.	6	DATE	7/24/09





ESTIMATED QUANTITIES	UNIT	PLAN	FINAL
CMP (GAL. STL. 18 IN.)	L.F.	389.50	
CMP (GAL. STL. 24 IN.)	L.F.	339.50	
R.C. PIPE (24 IN.)	L.F.	722.25	
R.C. PIPE (30 IN.)	L.F.	367.33	
INLET (COMPL. CURB) (5 FT.)	EA.	1	
INLET (COMPL. CURB) (10 FT.)	EA.	6	
STR. EXCAV. (CULV. SMALL)	C.Y.	1420	

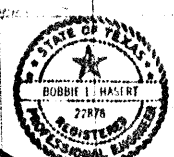
\*FOR CONTRACTORS INFORMATION ONLY

ESTIMATED QUANTITIES	UNIT	PLAN	FINAL
CMP (GAL. STL. 30 IN.)	L.F.	698.0	
INLET (COMPL. TY. G)	EA.	1	
CULV. HDWL. (RIPRAP)	EA.	1	
STR. EXCAV. (CULV. SMALL)	C.Y.	154	

\*FOR CONTRACTORS INFORMATION ONLY

183

Ball's P. 7/26/87  
Date

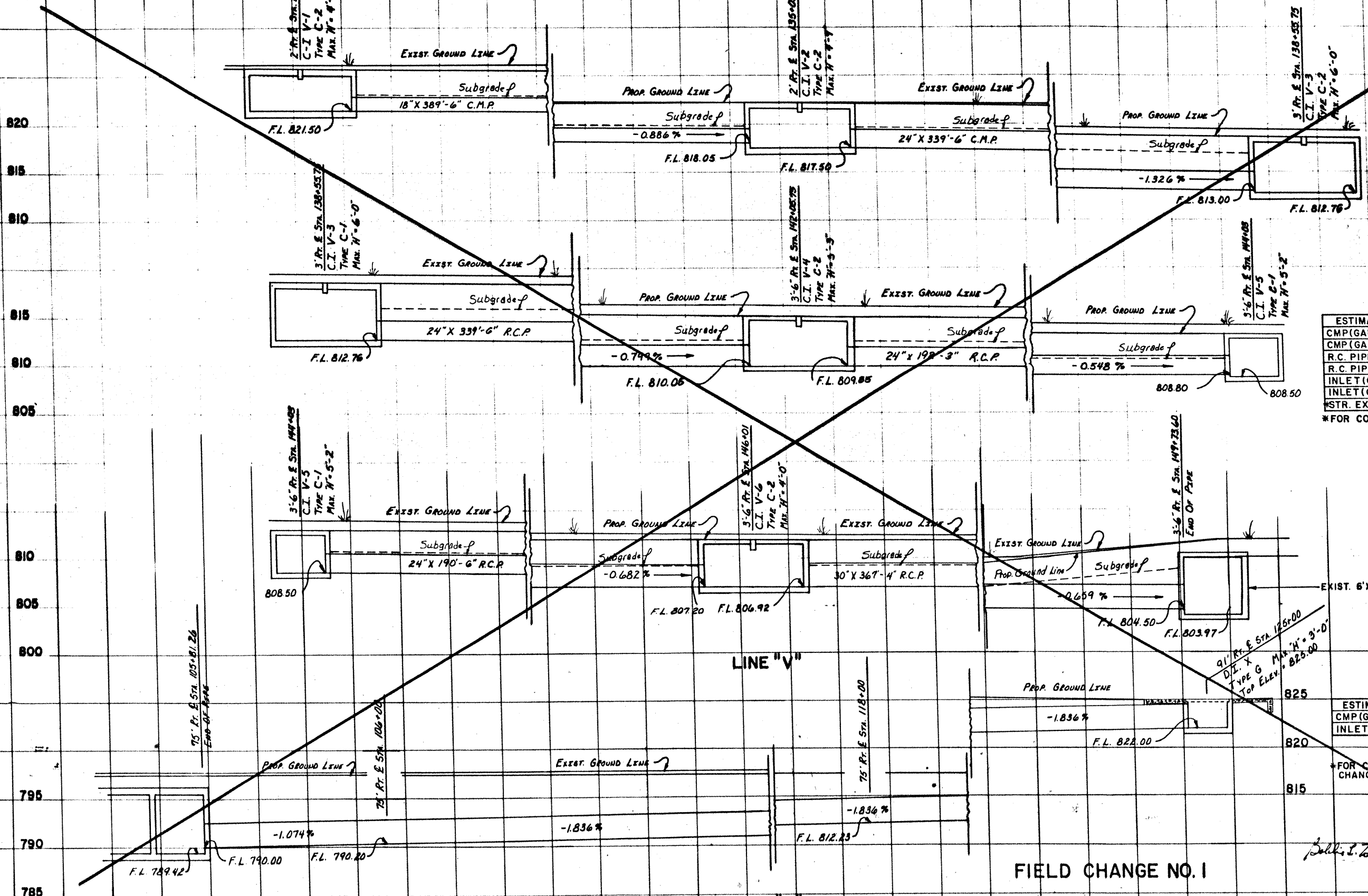


SHEET 14 OF 16			
FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJECT NO.	SHEET NO.
15	TEXAS	TR35-2 (157) 173	183
COUNTY	DISTRICT	SECTION	DATE
15	GURDHUPT	16	6 29 1987

# CULVERT CROSS SECTIONS



United by Field Change No. 7  
See Sheet 183B



ESTIMATED QUANTITIES	UNIT	PLAN	FINAL
CMP (GAL. STL. 18 IN.)	L.F.	389.50	
CMP (GAL. STL. 24 IN.)	L.F.	339.50	
R.C. PIPE (24 IN.)	L.F.	722.25	
R.C. PIPE (30 IN.)	L.F.	367.33	
INLET (COMPL. XCURB) (5 FT.)	EA.	1	
INLET (COMPL. XCURB) (10 FT.)	EA.	5	
STR. EXCAV. (CULV. SMALL)	C.Y.	1420	

\*FOR CONTRACTORS INFORMATION ONLY

183A

ESTIMATED QUANTITIES	UNIT	PLAN	FINAL
CMP (GAL. STL. 30 IN.)	L.F.	1917.0	
INLET (COMPL. XTY. G)	EA.	1	

\*FOR CONTRACTORS INFORMATION ONLY  
CHANGED BY FIELD CHANGE NO. 1

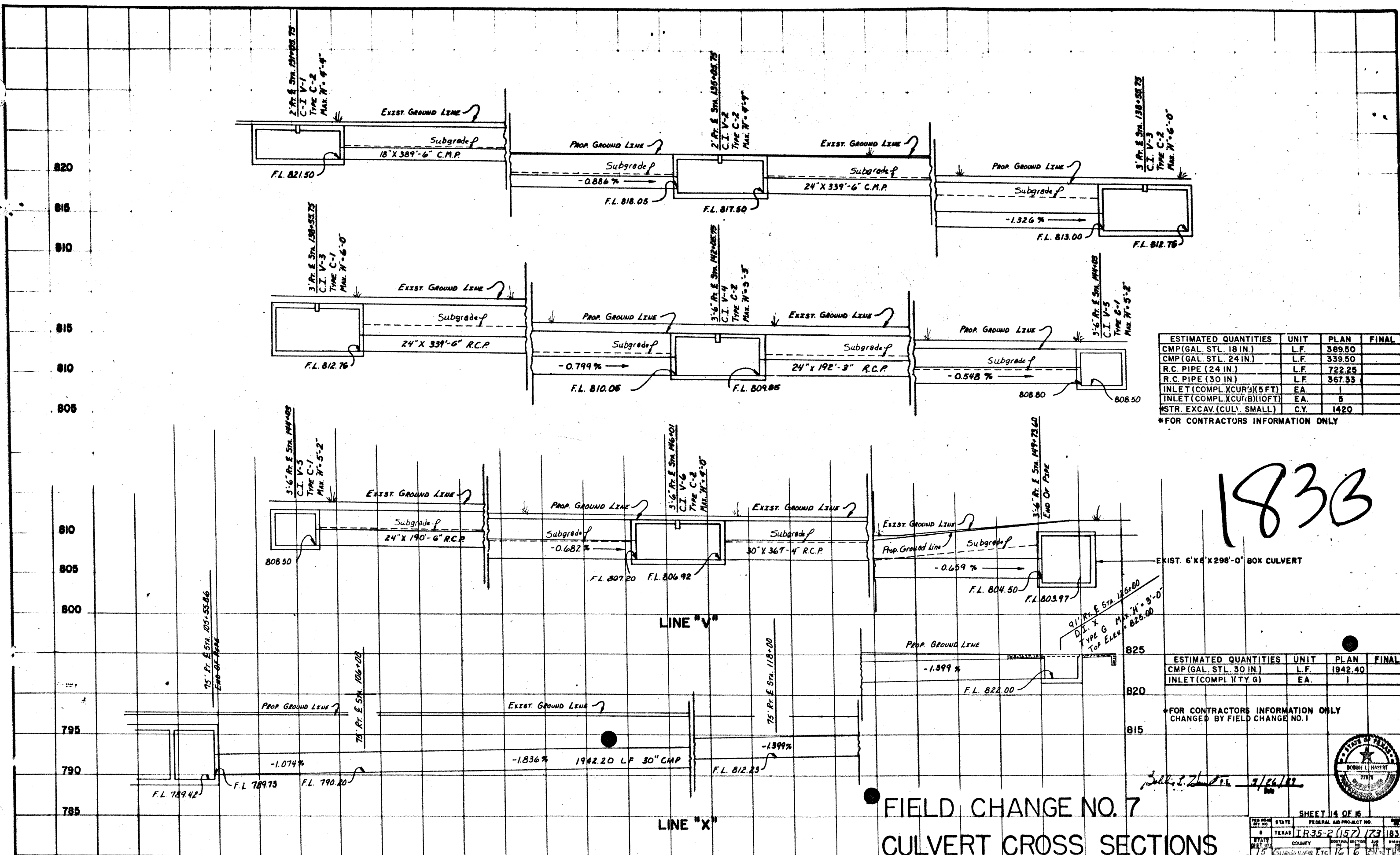
FIELD CHANGE NO. 1

CULVERT CROSS SECTIONS



SHEET 14 OF 16

FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJECT NO.	SHEET
15	TEXAS	1R35-2 (157) 173	183A
COUNTY	SECTION	POST MILE	STATION
15	16	16	25



ESTIMATED QUANTITIES	UNIT	PLAN	FINAL
CMP (GAL. STL. 18 IN.)	L.F.	389.50	
CMP (GAL. STL. 24 IN.)	L.F.	339.50	
R.C. PIPE (24 IN.)	L.F.	722.25	
R.C. PIPE (30 IN.)	L.F.	367.33	
INLET (COMPL. XCUR'G) (5 FT.)	EA.	1	
INLET (COMPL. XCUR'G) (10 FT.)	EA.	5	
STR. EXCAV. (CULV. SMALL)	C.Y.	1420	

\*FOR CONTRACTORS INFORMATION ONLY

1833

ESTIMATED QUANTITIES	UNIT	PLAN	FINAL
CMP (GAL. STL. 30 IN.)	L.F.	1942.40	
INLET (COMPL. XTY. G)	EA.	1	

\*FOR CONTRACTORS INFORMATION ONLY  
CHANGED BY FIELD CHANGE NO. 1

# FIELD CHANGE NO. 7 CULVERT CROSS SECTIONS

STATE OF TEXAS  
COUNTY OF DALLAS  
CITY OF DALLAS

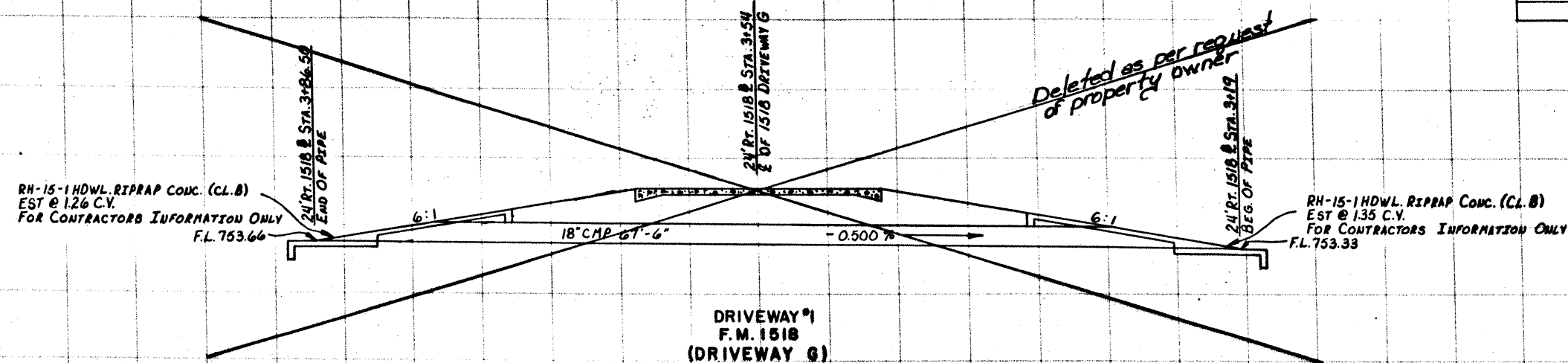
SHEET 14 OF 16

PROJECT NO. 1835-2 (157) 73 1838

DATE 7/26/87

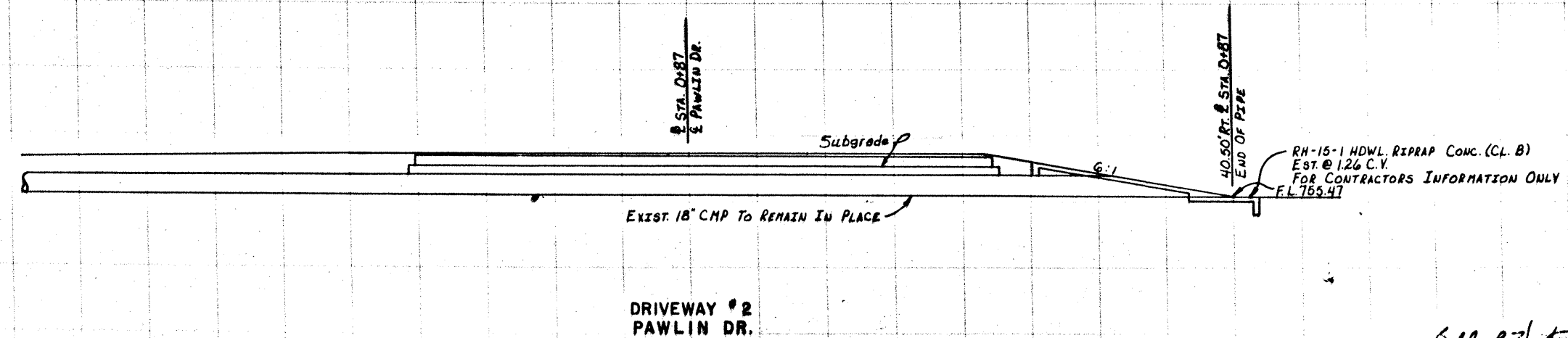
ESTIMATED QUANTITIES	UNIT	PLAN	FINAL
CMP (6AL. STL. 18)	L.F.	67.5	
CULV. HDWL.	EA.	2	

760  
755  
750



ESTIMATED QUANTITIES	UNIT	PLAN	FINAL
CULV. HDWL. (RIPRAP)	EA.	1	

760  
755



184



Robert I. Mastri 2/26/00

# CULVERT CROSS SECTIONS

*Voided by Field Change No. 7  
See Sheet 184B*

184A

ESTIMATED QUANTITIES	UNIT	PLAN	FINAL
CMP (GAL. STL. 18 IN.)	L.F.	141.4	
INLET (COMPL. CURB) (5 FT.)	E.A.	1	
STR. EXCAV. (CULV. SMALL)	CY.	110	

\*FOR CONTRACTORS INFORMATION ONLY



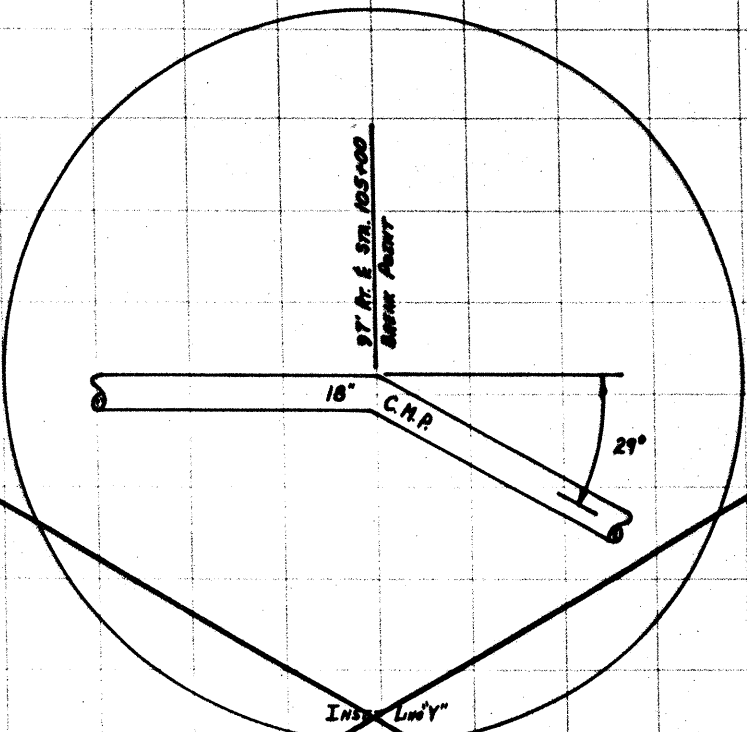
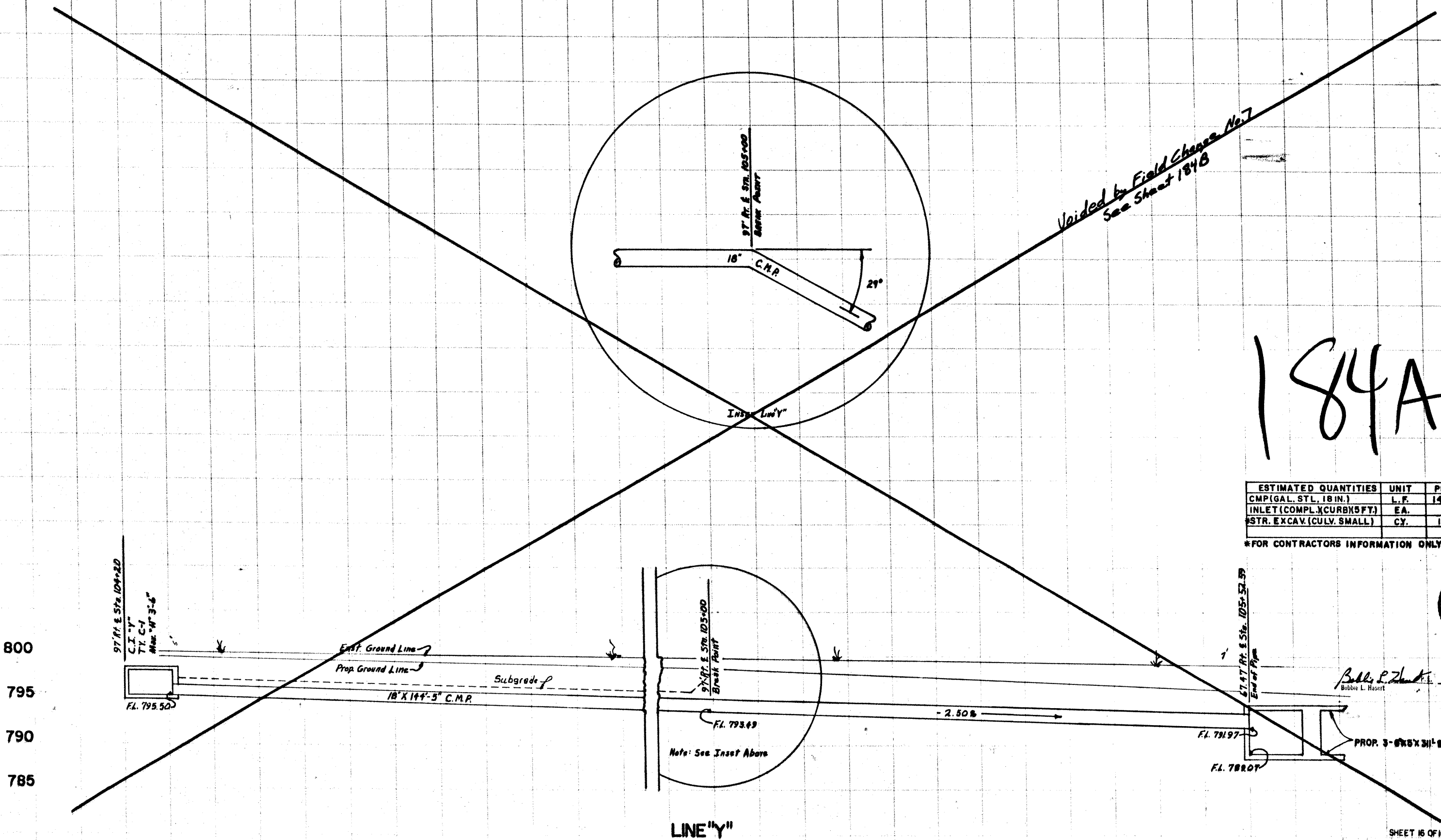
*Bobbie L. Hasset*  
Bobbie L. Hasset  
2/26/00  
Date

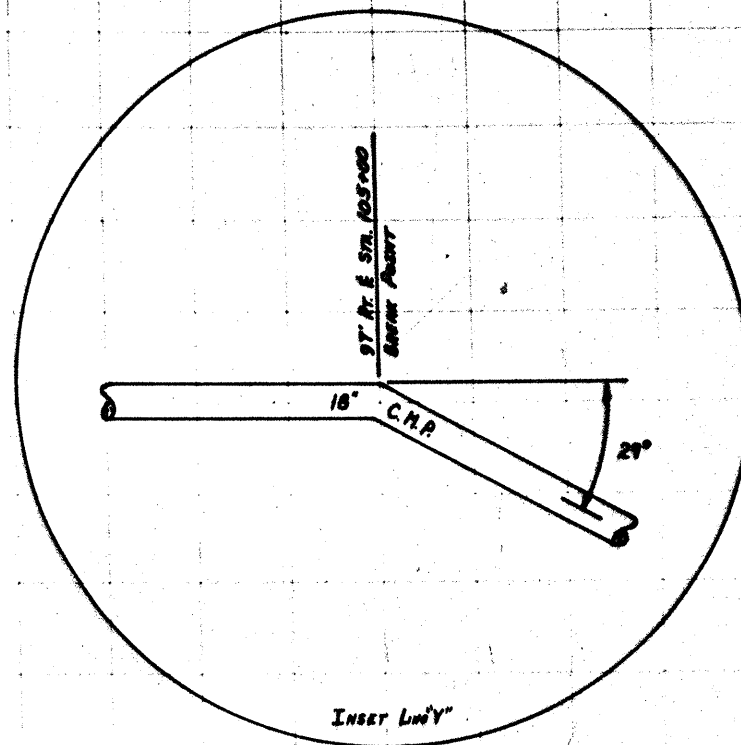
PROP. 3'-0" X 3'-0" 1/4"

SHEET 16 OF 16

PROJECT: IR 35-2 (157) 173  
15 Guadalupe, Etc. 16 6 22 IN. 35

CULVERT CROSS SECTIONS





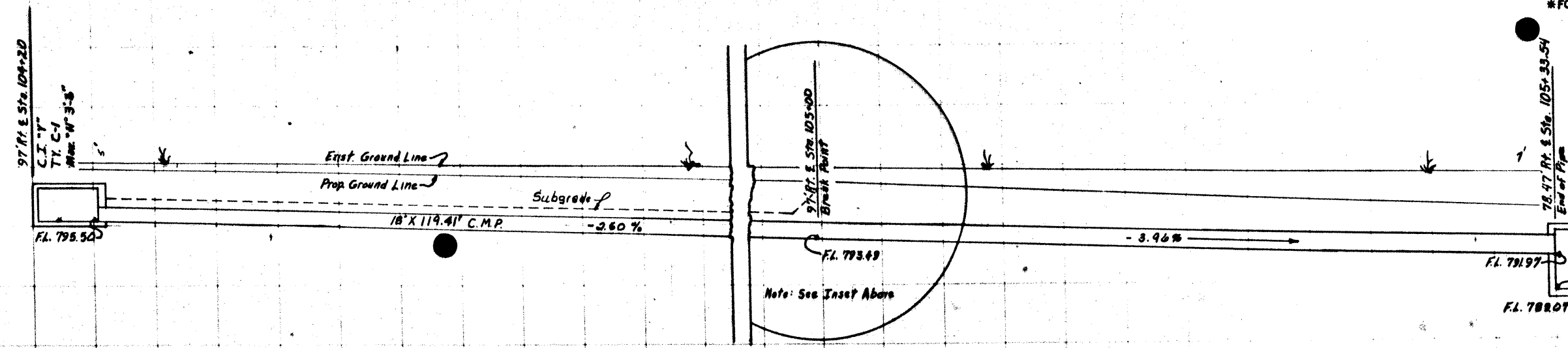
184B

ESTIMATED QUANTITIES	UNIT	PLAN	FINAL
CMP (GAL. STL. 18 IN.)	L.F.	119.41	
INLET (COMPL. CURB) (5 FT.)	EA.	1	
STR. EXCAV. (CULV. SMALL)	CY.	110	

\*FOR CONTRACTORS INFORMATION ONLY



Bobbie L. Hassell 7/26/00



800  
795  
790  
785

LINE "Y"

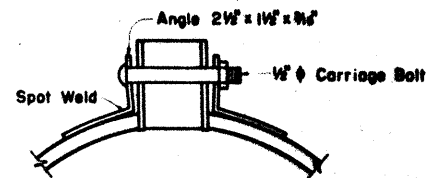
FIELD CHANGE NO. 7

CULVERT CROSS SECTIONS

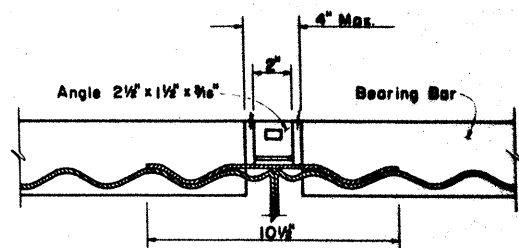
SHEET 16 OF 16		DATE	7/26/00
STATE	TEXAS	FEDERAL AID PROJECT NO.	184B
COUNTY	COMAL	SECTION	173
DIST NO.	173	SECTION NO.	16

CULVERT CROSS SECTION SHEET

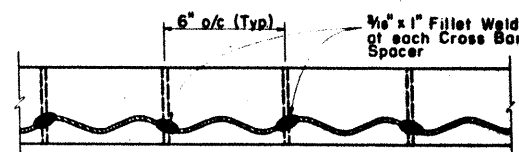




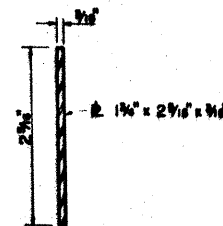
JOINT SECTION



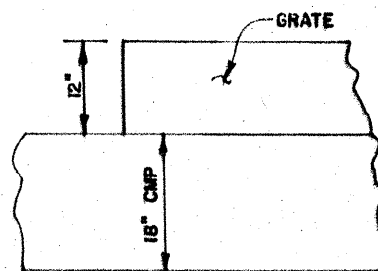
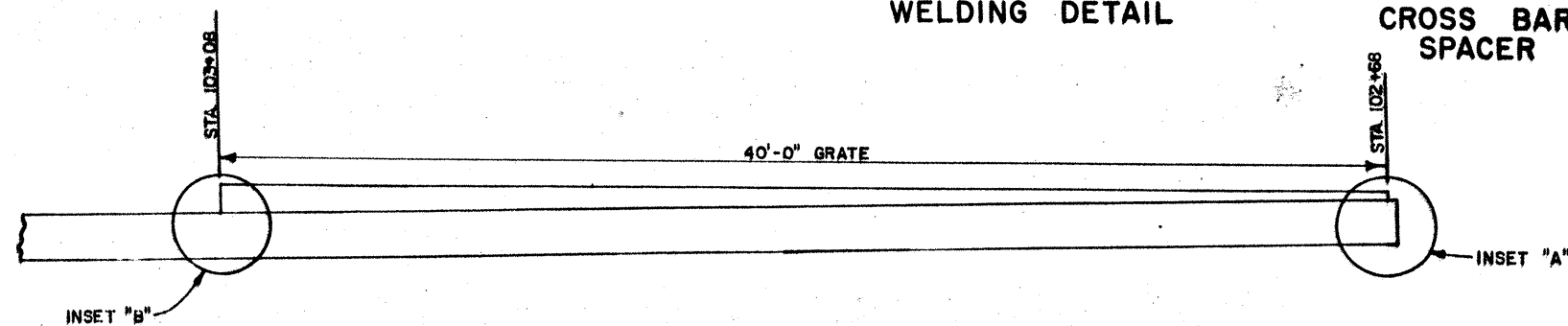
JOINT ELEVATION



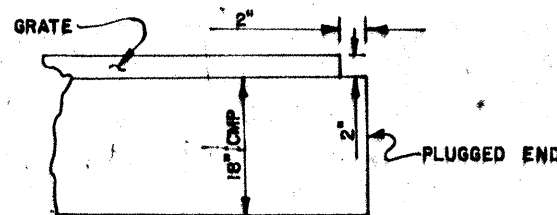
WELDING DETAIL



CROSS BAR SPACER



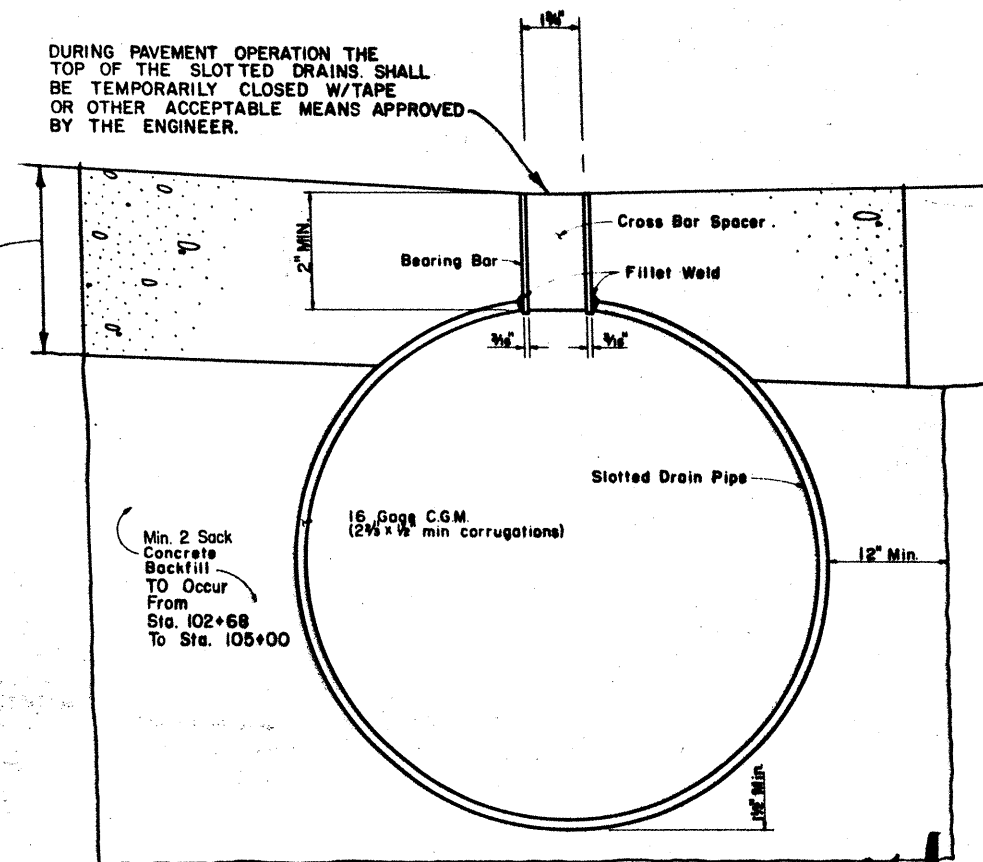
INSET "B"



INSET "A"

FIELD CHANGE NO. 6

DURING PAVEMENT OPERATION THE TOP OF THE SLOTTED DRAINS SHALL BE TEMPORARILY CLOSED W/TAPE OR OTHER ACCEPTABLE MEANS APPROVED BY THE ENGINEER.



TYPICAL SECTION

184c

GENERAL NOTES:

Grate assemblies shall conform to the provisions of ASTM Designation: A-36, and shall be galvanized in accordance with ASTM Designation: A-123.

All welded locations shall be painted with a good quality asphalt base aluminum paint. All welding shall be in accordance with Item 448, Structural Welding.

The Corrugated Galvanized Pipe shall be in accordance with Item 460, Corrugated Galvanized Pipe.

Trenches for slotted drains and outfall pipe shall be backfilled with 1 1/2" minimum (or as shown otherwise) low strength concrete (minimum 2 sk. cement/cy) as directed by the Engineer.

Outfall Connection slip joint shall be backed with a suitable compressible material to retain grout in place during curing.

Slotted Drain shall be furnished in 20 ft. lengths wherever practical to minimize the number of joints required.

The Contractor may furnish either of the designs as shown.



STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

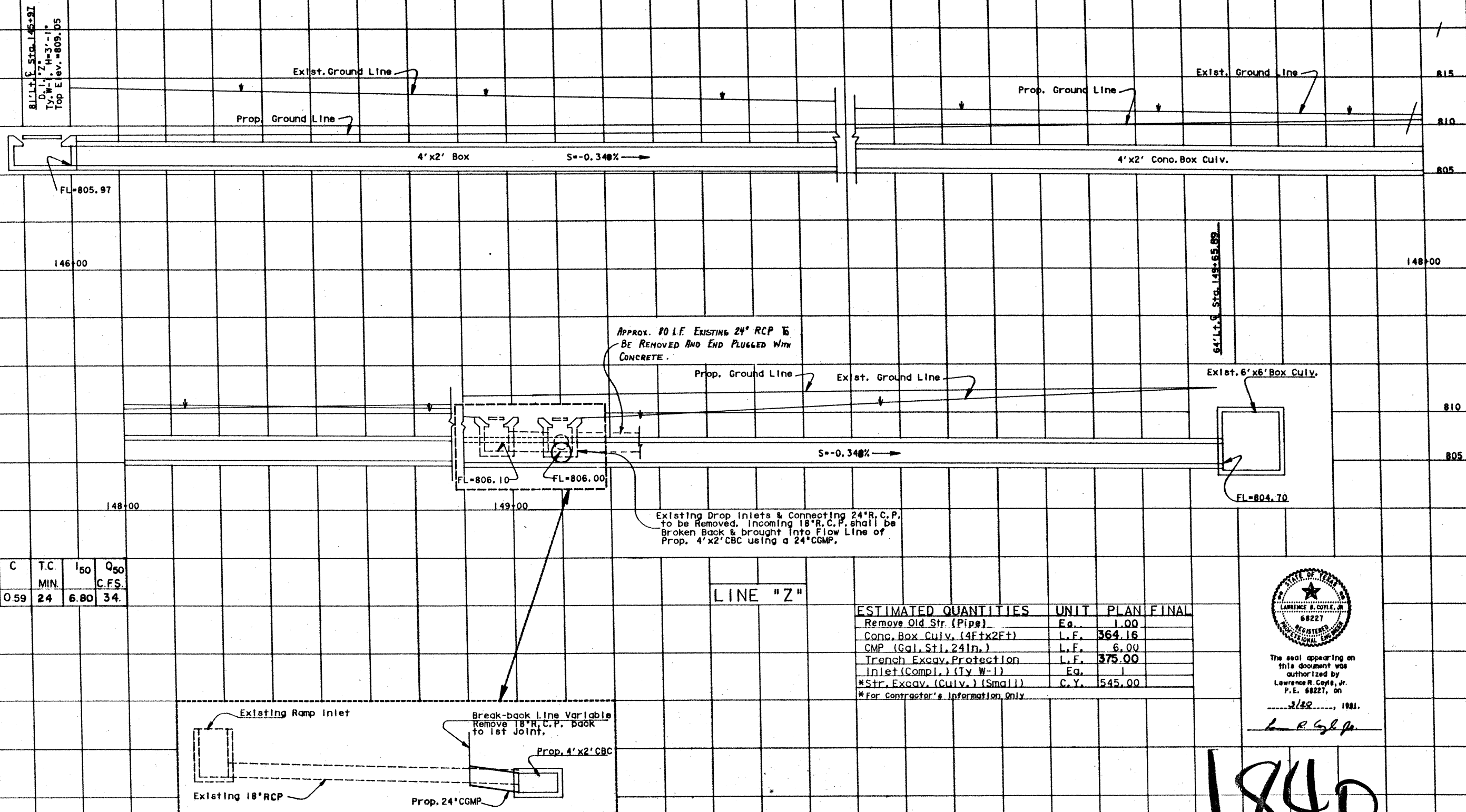
SLOTTED DRAIN

SD (MOD)

ORIGINAL DRAWING DATE	JUNE 1982	STATE	DESIGN	FEDERAL AID PROJECT	0	0000
BY		15	6	1.H.35-2 (157)173	184C	
CH						
DW						
CR						

ORIGINAL

D.A.	AREA	C	T.C.	150	Q50
	AC.		MIN.		C.F.S.
Z	8.45	0.59	24	6.80	34.



LINE "Z"

ESTIMATED QUANTITIES	UNIT	PLAN	FINAL
Remove Old Str. (Pipe)	Eg.	1.00	
Conc. Box Culv. (4'x2'x24')	L.F.	364.16	
CMP (Gal. Stl. 24in.)	L.F.	6.00	
Trench Excav. Protection	L.F.	375.00	
Inlet (Comp.) (Ty. W-1)	Eg.	1	
*Str. Excav. (Culv.) (Small)	C.Y.	545.00	
*For Contractor's Information Only			



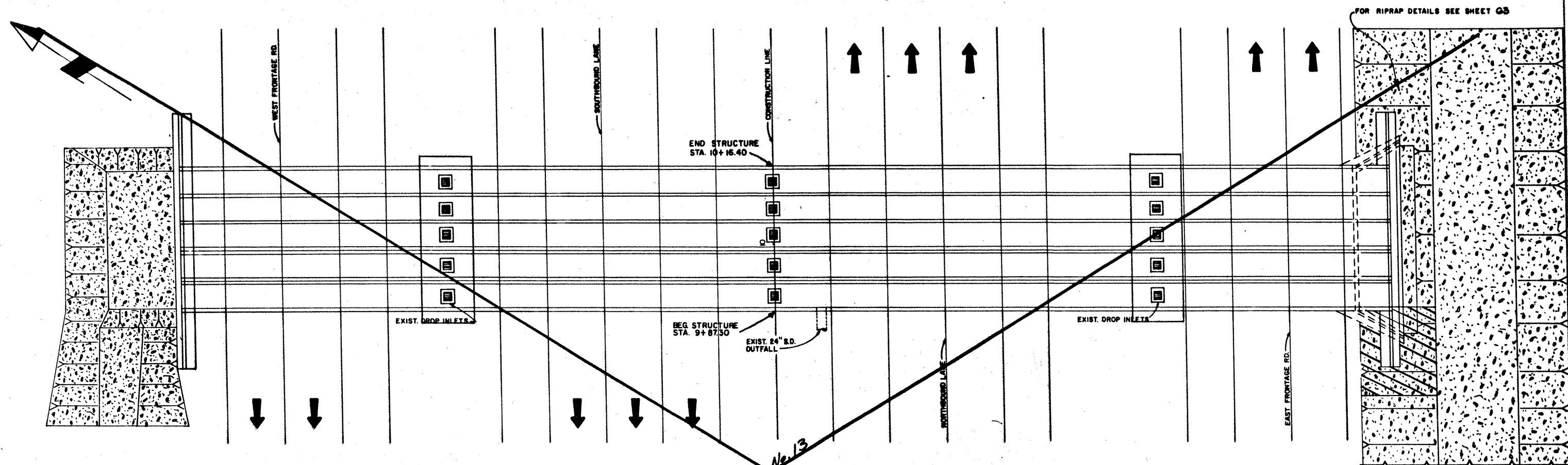
The seal appearing on this document was authorized by Lawrence R. Coyle, Jr., P.E. 68227, on 3/22, 1981.

L.R. Coyle, Jr.

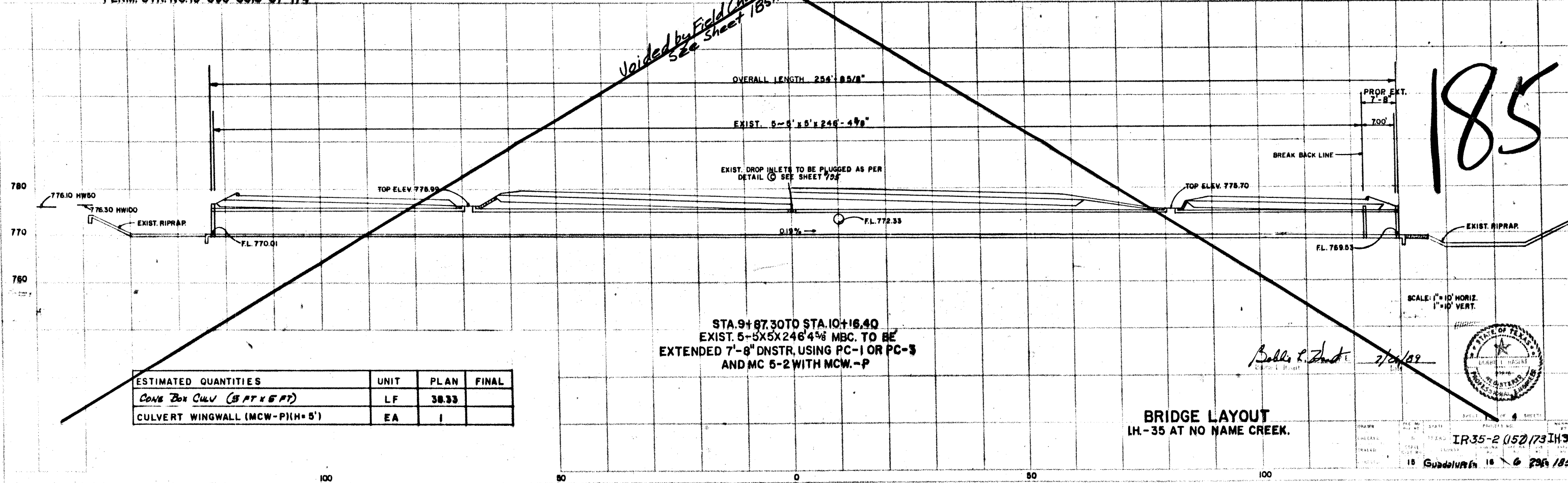
184D

FIELD CHANGE NO. 39

REV. NO.	STATE	FEDERAL PROJECT NO.	SHEET NO.
15	TXAS	IR 35-2(157)173	184D
	COUNTY	COUNT. SECT.	JOB
15	GUADALUPE	16 6	2904 1H35



PERM. STR. NO. 15-095-0016-07-174

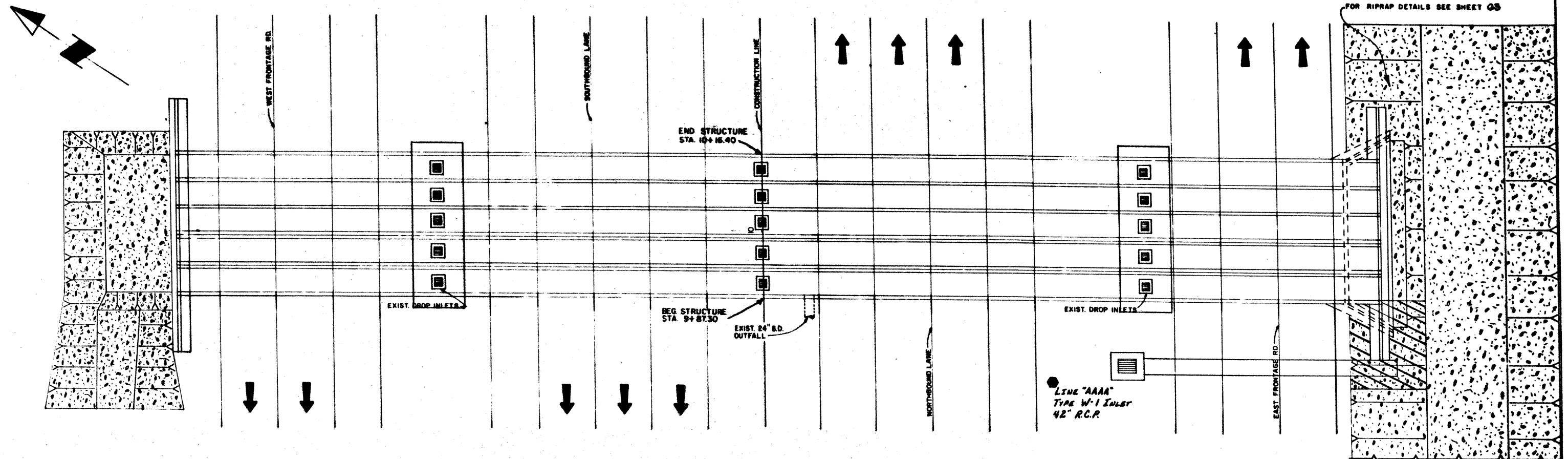


ESTIMATED QUANTITIES	UNIT	PLAN	FINAL
CONC BOX CULV (5 FT X 5 FT)	LF	30.33	
CULVERT WINGWALL (MCW-P)(H=5')	EA	1	

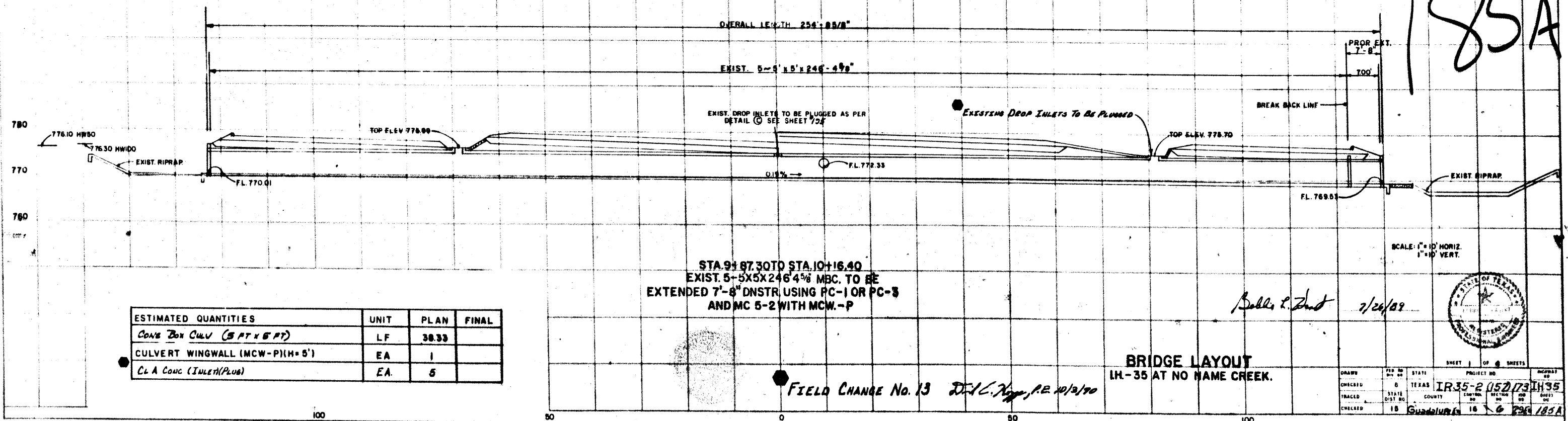
STA. 9+87.30 TO STA. 10+16.40  
EXIST. 5'-5" x 5' x 24" 4 5/8" MBC. TO BE  
EXTENDED 7'-8" DNSTR. USING PC-1 OR PC-3  
AND MC 5-2 WITH MCW.-P

BRIDGE LAYOUT  
IH-35 AT NO NAME CREEK.

IR-35-2 (152)/73 IH-35  
15 Guadalupe 16 6 296/185



PERM. STR. NO. 15-095-0016-07-174





ESTIMATED QUANTITIES	UNIT	PLAN	FINAL
CONC BOX CULV (6'x6')	L.F.	46.67	
CONC. BOX CULV. (10'x6')	L.F.	1741.44	
CULV. WINGWALL (MCW-P) (H=6'-0")	EA.	2	
DROP INLET (TYPE E)	EA.	3	

EXIST. RIPRAP

PROP. STRUCTURE

3 TYPE E DROP INLETS 75' LT. &  
PROPOSED BETWEEN FRONTAGE  
ROAD AND MAINLANES.

BEG. STRUCTURE  
STA. 40+92.28

END STRUCTURE  
STA. 42+20.63

EXIST. DRAINS IN SIDE OF BOX CULVERT  
TO BE REPAIRED AS PER DETAIL A ON SHEET 195

RIPRAP

RIPRAP

SCALE: 1"=20' HOR.  
1"=20' VERT.

PERM. STR. NO. 15-015-0016-07-023

OVERALL LENGTH 251'-3" (AVERAGE LENGTH)

PROP. 7-10'x6'x130'-0"

PROP. 7-10'x6'x121'-3" (AVG. LENGTH)

PROP. 6'-0"  
EXTENSION  
6'-0"

EXIST. 7-6'x6'x124'-0"

EXIST. 7-6'x6'x127'-4"

W. FRONT.  
ROAD

SBL

CONST.  
LINE

NBL

EXIT RAMP

PROP. EXTENSION  
VAR. BREAK BACK  
LINE

BREAK BACK LINE

3 TYPE E DROP INLETS 75' LT. &  
PROPOSED BETWEEN FRONTAGE  
ROAD AND MAINLANES.

757.19 HW100  
755.66 HW50

U.S.F.L. 746.71 EXIST. F.L. 746.69

-0.37%

D.S. F.L. 746.75

STA. 40+92.28 TO STA. 42+20.63  
EXIST. 7-6'x6'x251'-3" MC6-1 TO BE EXTENDED TO  
7-6'x6'x251'-3" (AVG) USING MC6-1, AND LENGTHENED WITH  
7-10'x6'x251'-3" (AVG) USING PC-1, PC-3, MC10-1 OR PC-7 & MCW-P

BRIDGE LAYOUT  
I.H.35 AT SELMA CREEK



*Bobbie L. Hasert* 7/24/09  
Bobbie L. Hasert

SCALE: 1"=10' HOR.  
1"=10' VERT.

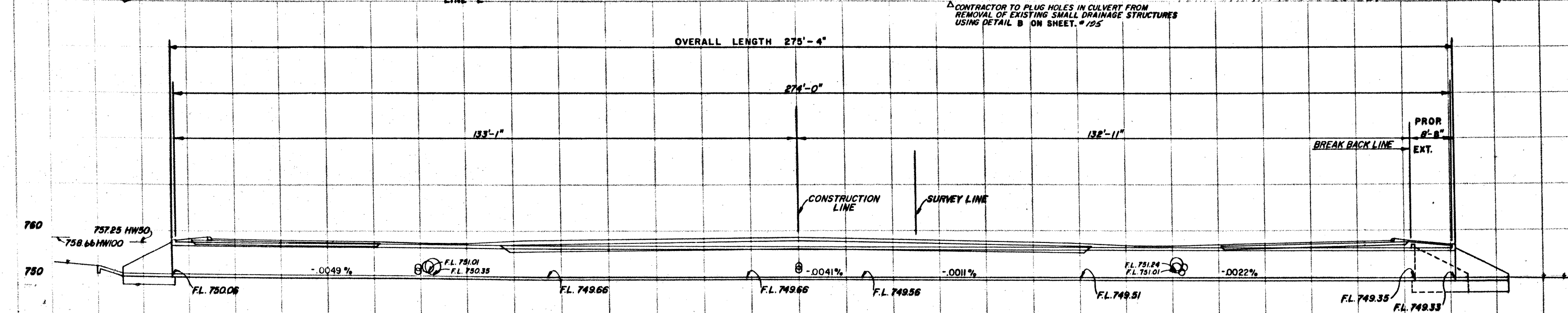
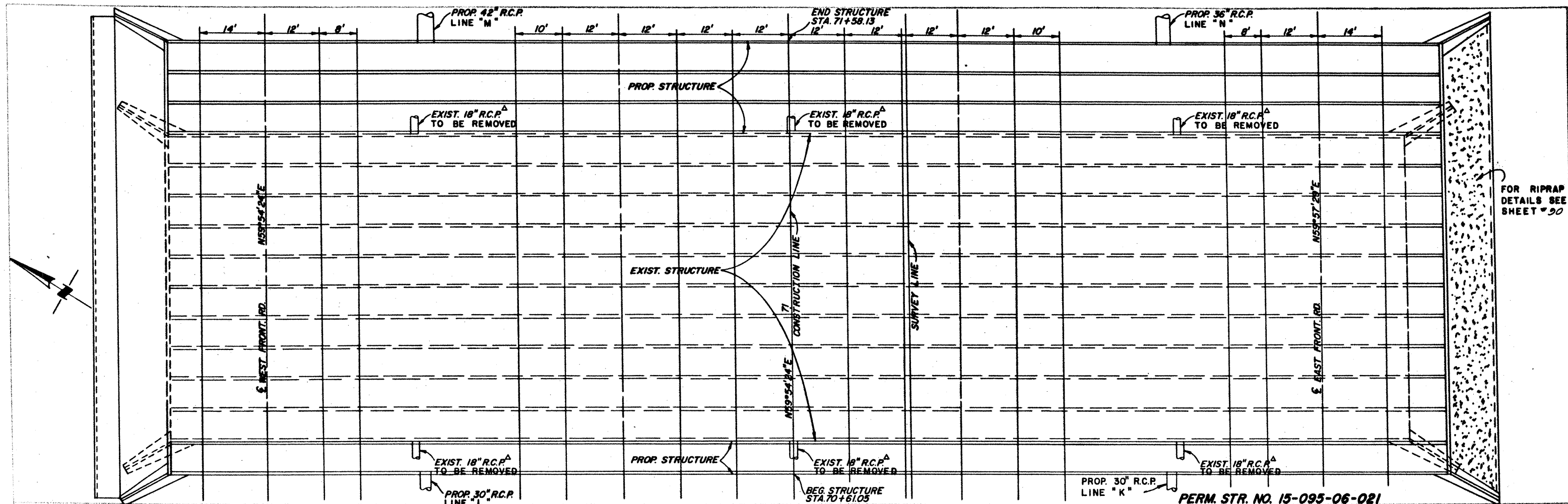
Rev. 10-27-89

SHEET 2 OF 4 SHEETS

PROJECT NO. IR35-2(152)173 I.H.35

15 E. 10th St. 16 G. 19th St. 106





ESTIMATED QUANTITIES	UNIT	PLAN	FINAL
CONC BOX CULV (6' x 6')	L.F.	1188.0	
CULVERT WINGWALL (MCW-FI) (H=6')	EA.	2.0	

STA. 70+61.05 TO STA. 71+58.13  
 EXIST. 10-6'X6'X266'-0" MC6-(SPL) & MCW-FI  
 TO BE LENGTHENED & EXTENDED  
 TO 14-6'X6'X275'-4" CULV.  
 USING MC6-1, PC-1, PC-3, PC-7 & MCW-FI

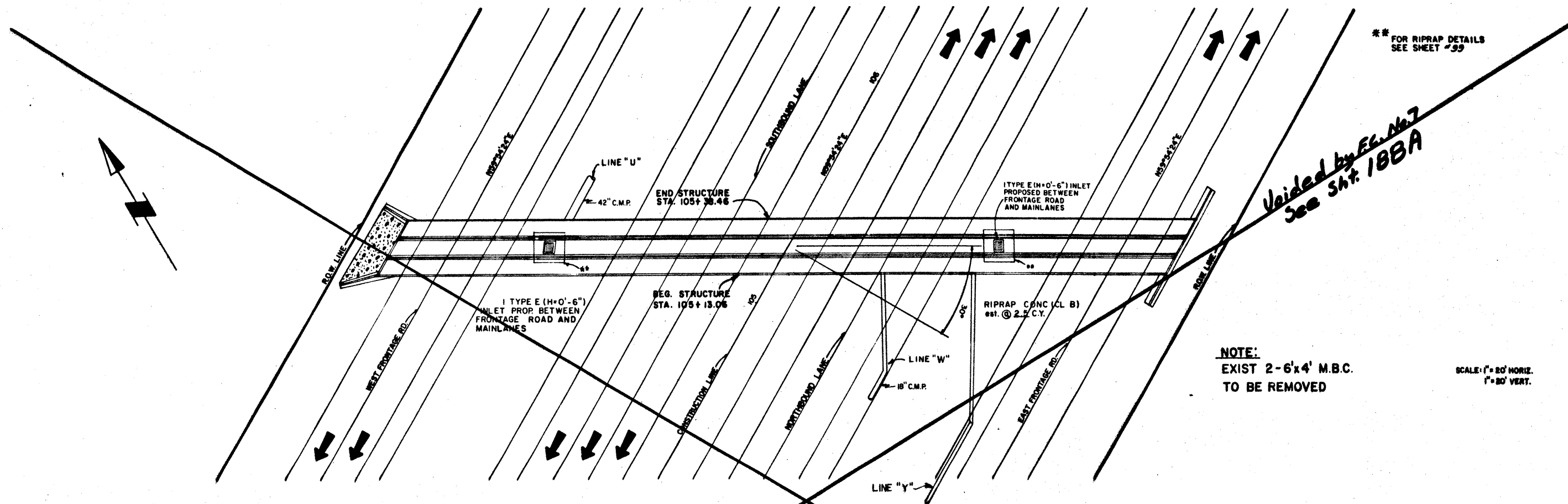
*Bellevue P. Hunt* 7/26/89

187

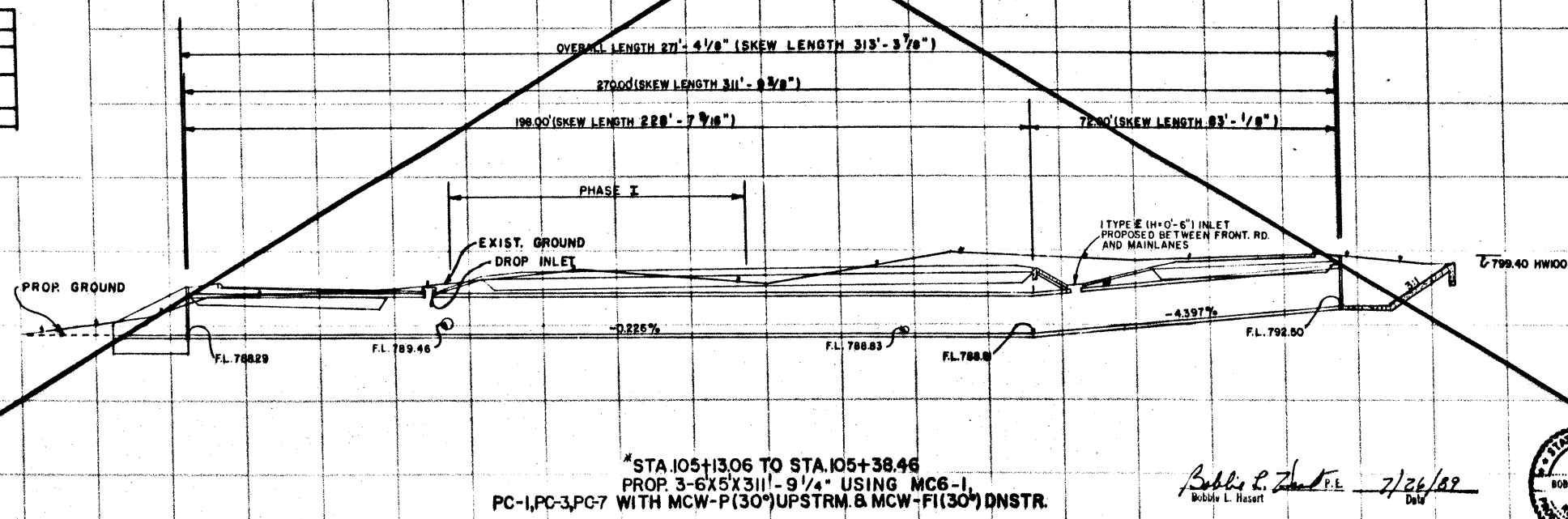
SCALE 1"=10' HOR.  
 1"=10' VER.

BRIDGE LAYOUT  
 I.H. 35 AT BRANCH OF DIETZ CREEK.

IR35-2 (157) 173 I.H. 35  
 15 Guadalupe Ave. 18 6 236 187



ESTIMATED QUANTITIES	UNIT	PLAN	FINAL
CONC BOX CULV. (6'x5')	L.F.	935.34	
CULVERT WINGWALL (MCW-P) (3C dec.) (H=5')	EA.	1	
CULVERT WINGWALL (MCW-FI) (3C dec.) (H=5')	EA.	1	
DROP INLET (TY E)	EA.	2	



\* Note:  
This Structure to be Precast Boxes.

Robert L. Hasset P.E. 7/26/82  
Date

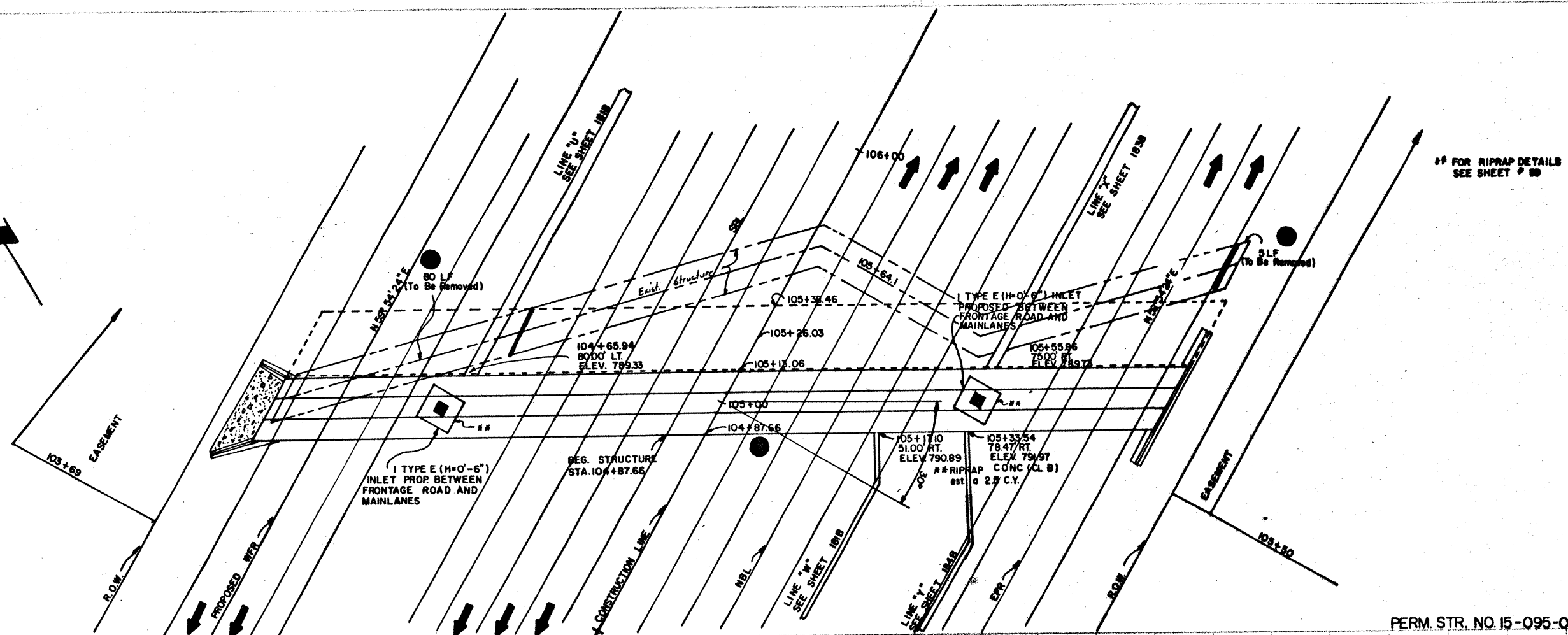
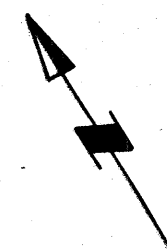


BRIDGE LAYOUT  
I.H. - 33 AT BRANCH OF DIETZ CREEK

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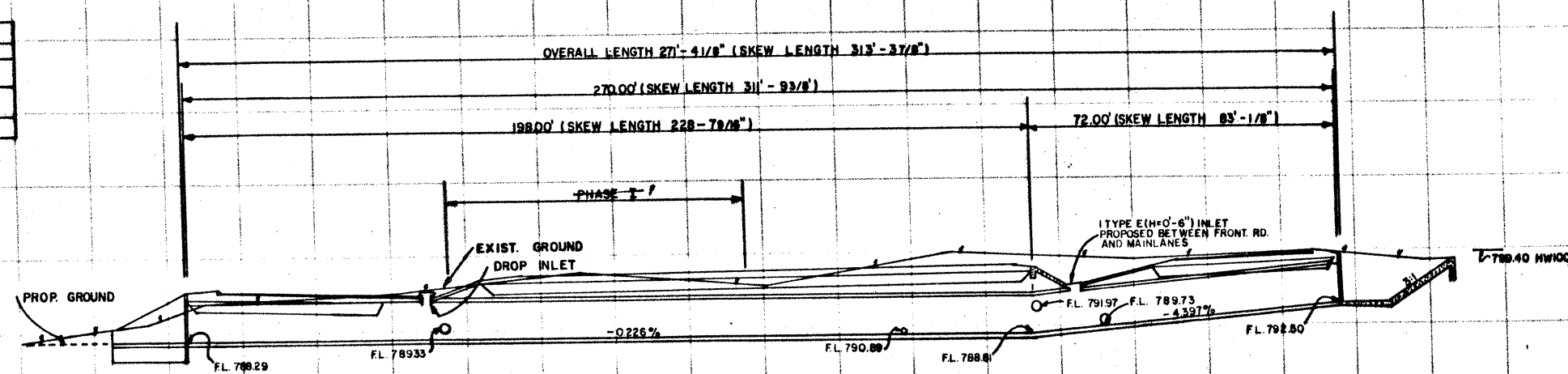
SCALE: 1" = 20' HORIZ. 1" = 10' VERT.

DESIGNED BY	STATE	PROJECT NO.	DATE
CHECKED BY	IR35-2 (152) 173	11-88	
APPROVED BY	15	6	29th 188



PERM. STR. NO. 15-095-0016-06-191

ESTIMATED QUANTITIES	UNIT	PLAN	FINAL
CONC BOX CULV. (6' x 5')	L.F.	935.34	
CULVERT WINGWALL (MCW-P) (30 de) (H=5')	EA.	1	
CULVERT WINGWALL (MCW-F) (30 de) (H=5')	EA.	1	
DROP INLET (TY E)	EA.	2	



188A

\* STA. 104+87.66 TO STA. 105+13.06  
PROP. 3'-6" X 5' X 31 1/4" USING MC6-1  
PC-1, PC-3, PC-7 WITH MCW-P (30°) UPSTRM & MCW-F (30°) DNSTR.  
\* Note: This structure to be Precast Bases.

\* Eliminate under this Field Change

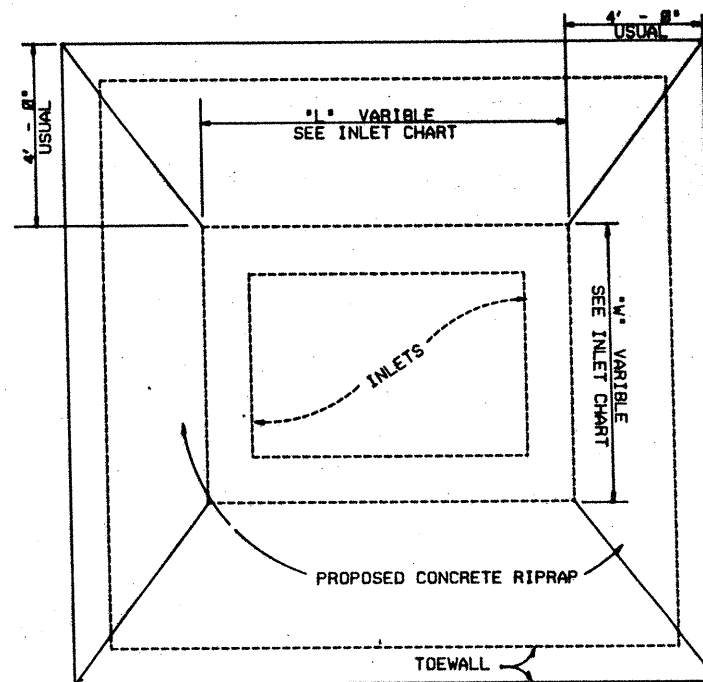


SCALE: 1"=20' HORIZ.  
1"=10' VERT.

● FIELD CHANGE NO. 7

BRIDGE LAYOUT  
I.H. 35 at BRANCH OF  
DIETZ CREEK

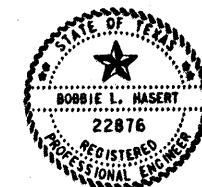
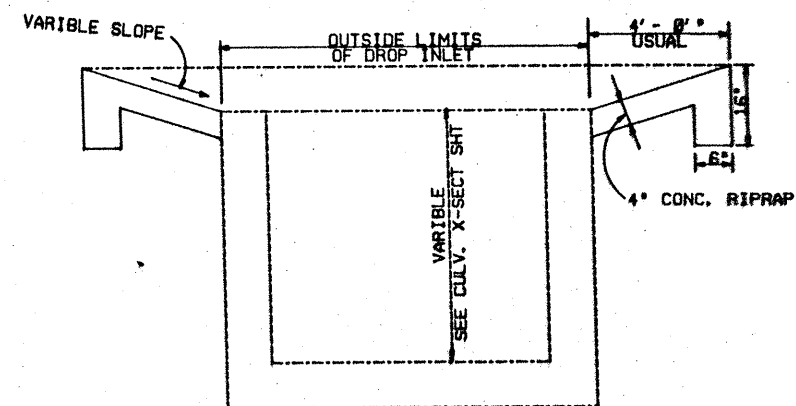
PROJECT NO.	IR 35-2(157)173	DATE	11/30
SHEET NO.	15	TOTAL SHEETS	29
DESIGNED BY	GUADALUPE et al.	CHECKED BY	29th/188A



CONCRETE RIPRAP QUANTITIES  
FOR VARIOUS TYPES OF INLETS

TYPE INLET	*L* OUTSIDE dim.	*W* OUTSIDE DIM.	*QUANT. C. Y.
TYPE "A"	3'-6"	4'-6"	2.43
TYPE "B"	5'-0"	4'-6"	2.64
TYPE "C"	6'-6"	4'-6"	2.84
TYPE "D"	3'-6"	3'-6"	2.30
TYPE "E"	5'-0"	3'-6"	2.18
TYPE "F"	3'-6"	3'-6"	2.30
TYPE "G"	5'-0"	3'-6"	2.50
TYPE "H"	8'-6"	4'-6"	3.11

• FOR CONTRACTOR'S INFORMATION



The seal appearing on  
this document was  
authorized by  
Bobbie L. Hasert,  
P.E., 22876, on  
7/26, 1987

*Bobbie L. Hasert, P.E.*

189

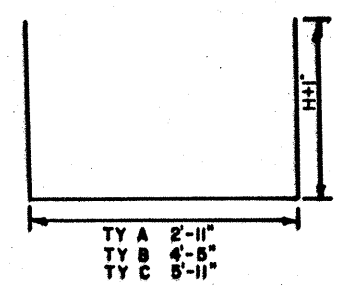
RIPRAP BASIN FOR DROP INLETS

FED. RD. DIST. NO.	STATE	FEDERAL PROJECT NO.	SHEET NO.
15	TEXAS	IR 35-2 (157173)	189
COUNTY	CONTRACT	SECTION	JOB
Guadalupe Etc.	16	6	390 TH35

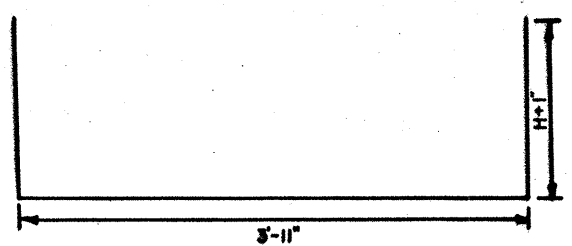
ESTIMATED QUANTITIES<sup>Δ</sup>

TYPE A															TYPE B										TYPE C															
H=3'-0"						H=3'-6"					H=4'-6"					H=5'-0"					H=3'-0"					H=3'-6"					H=3'-6"					H=4'-6"				
BAR	NO.	SIZE	SPAC	LTH	WGT	NO.	SIZE	SPAC	LTH	WGT	NO.	SIZE	SPAC	LTH	WGT	NO.	SIZE	SPAC	LTH	WGT	NO.	SIZE	SPAC	LTH	WGT	NO.	SIZE	SPAC	LTH	WGT	NO.	SIZE	SPAC	LTH	WGT	NO.	SIZE	SPAC	LTH	WGT
R	5	4	9"	10'-1"	34	5	4	9"	11'-1"	37	5	4	9"	13'-1"	44	5	4	9"	14'-1"	47	7	4	9"	10'-1"	47	7	4	9"	11'-1"	52	9	4	9"	11'-1"	67	9	4	9"	13'-1"	79
S	5	4	8"	9'-1"	30	5	4	8"	10'-1"	34	5	4	8"	12'-1"	40	5	4	8"	13'-1"	44	5	4	8"	10'-7"	35	5	4	8"	11'-7"	39	5	4	8"	13'-1"	44	5	4	8"	15'-1"	50
U	10	4	8"	8'-2"	55	12	4	8"	8'-2"	65	14	4	8"	8'-2"	76	16	4	8"	8'-2"	87	10	4	8"	9'-8"	65	12	4	8"	9'-8"	77	12	4	8"	11'-2"	90	14	4	8"	11'-2"	104
REINF STEEL (LBS)					119					136					160					178					147					168					201					233
CLASS A CONC (CY)					1.06					1.19					1.45					1.58					1.34					1.50					1.82					2.19
GRATE					1					1					1					1					2					2					3					3

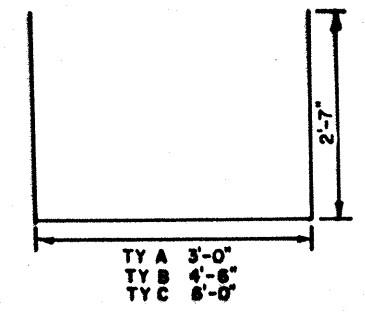
Δ FOR CONTRACTOR INFORMATION ONLY  
Δ QUANTITIES ARE NOT DECREASED FOR PIPE INSTALLATIONS



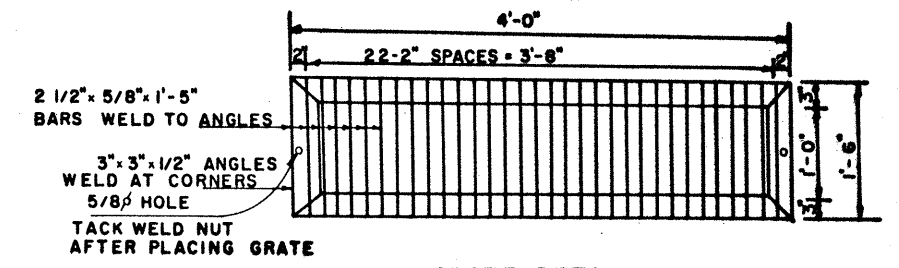
BARS S



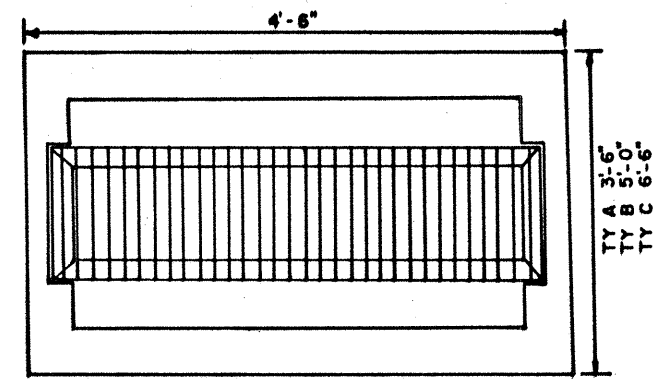
BARS R



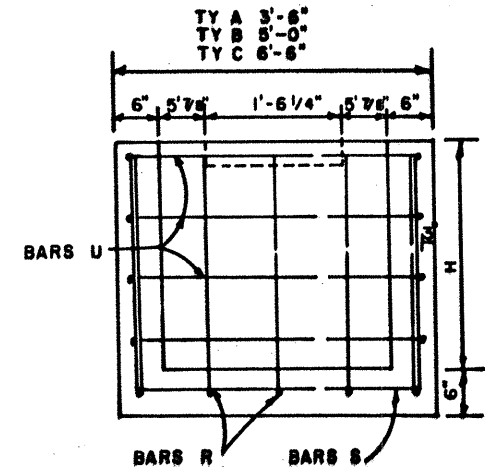
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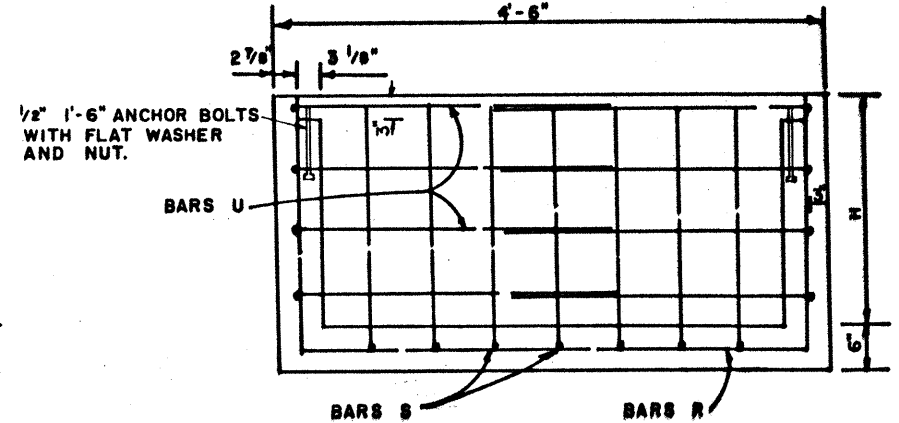
GRATE DETAIL



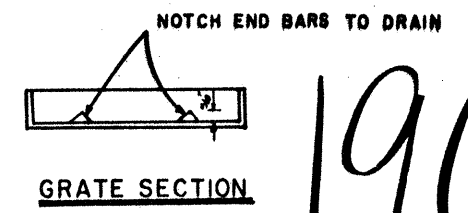
PLAN VIEW



SIDE VIEW



END VIEW



GRATE SECTION

GENERAL NOTES  
ALL DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTERS OF BARS  
BEND REINFORCING STEEL TO CLEAR PIPE OPENINGS  
ALL CONCRETE SHALL BE CL "A"  
ALL EXPOSED CORNERS SHALL BE CHAMFERED 3/4"

DROP INLET DETAILS  
TYPE A, TYPE B, & TYPE C

Bob L. Haveri 7/26/02

FIG. NO.	STATE	FEDERAL PROJECT NO.	SHEET NO.
15	GA	IR35-2 (152) 173	190
DATE	COUNTY	CON. SECT.	JOB - HIGHWAY
7/26/02	Guadalupe, Etc.	16	6 23K TH35



# ESTIMATED QUANTITIES <sup>Δ</sup>

TYPE D						TYPE E									
H=0'-6"						H=0'-6"					H=1'-0"				
BAR	NO.	SIZE	SPAC	LTH	WGT	NO.	SIZE	SPAC	LTH	WGT	NO.	SIZE	SPAC	LTH	WGT
M	2	4	8"	7'-0"	9	2	4	8"	8'-6"	16	4	4	8"	8'-6"	28
N	24	4	8"	1'-8"	27	24	4	8"	1'-8"	28					35
Δ REINFORCING STEEL LBS					36										
Δ CLASS A CONCRETE C.Y.					0.14										
Δ GRATE					1										

Δ FOR CONTRACTOR INFORMATION ONLY

Δ QUANTITIES ARE NOT DECREASED FOR PIPE INSTALLATIONS

## GENERAL NOTES

ALL DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTERS OF BARS

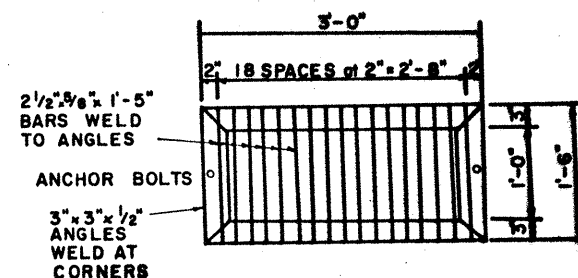
REINFORCING STEEL IN TOP SLAB OF CULVERT TO BE FIELD CUT AND BENT TO SUPPORT INLET STEEL

ALL CONCRETE SHALL BE CL "A"

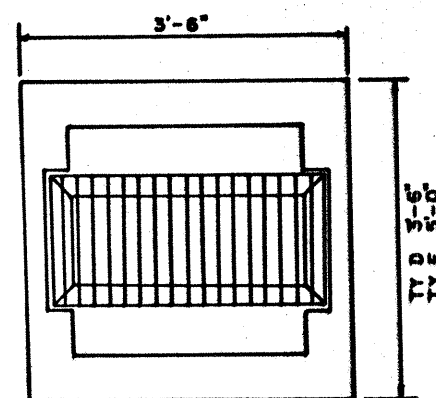
ALL EXPOSED CORNERS SHALL BE CHAMFERED 3/4"



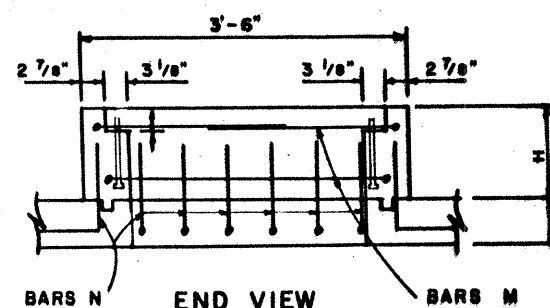
GRATE SECTION



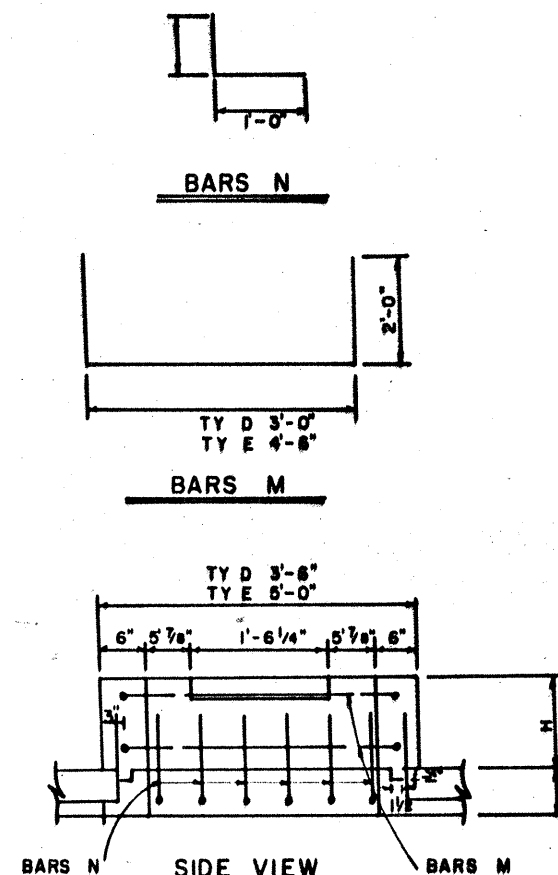
GRATE DETAIL



PLAN VIEW



END VIEW



SIDE VIEW

# ESTIMATED QUANTITIES <sup>Δ</sup>

TYPE F										TYPE G					
H=3'-0"					H=7'-6"					H=3'-0"					
BAR	NO.	SIZE	SPAC	LTH	WGT	NO.	SIZE	SPAC	LTH	WGT	NO.	SIZE	SPAC	LTH	WGT
R	5	4	9"	9'-1"	30	5	4	9"	18'-1"	60	7	4	9"	9'-1"	43
S	5	4	8"	9'-1"	30	5	4	8"	18'-1"	60	5	4	8"	10'-7"	35
U	10	4	8"	7'-2"	48	24	4	8"	7'-2"	115	10	4	8"	8'-8"	58
Δ REINFORCING STEEL LBS					109										
Δ CLASS A CONCRETE C.Y.					0.89										
Δ GRATE					1										

Δ FOR CONTRACTOR INFORMATION ONLY

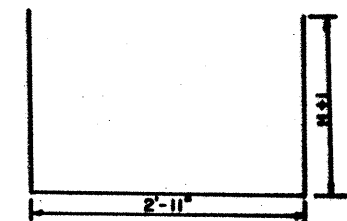
Δ QUANTITIES ARE NOT DECREASED FOR PIPE INSTALLATION

## GENERAL NOTES

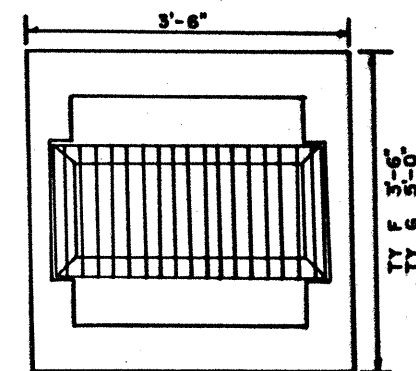
ALL DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTERS OF BARS

ALL CONCRETE SHALL BE CL "A"

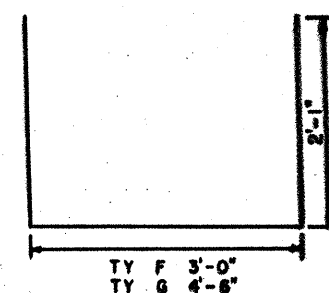
ALL EXPOSED CORNERS SHALL BE CHAMFERED 3/4"



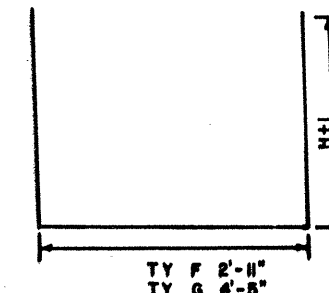
BARS R



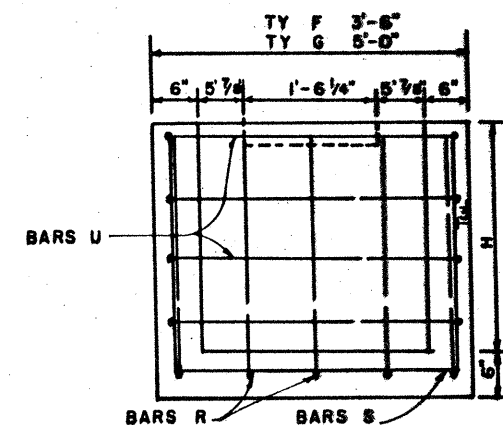
PLAN VIEW



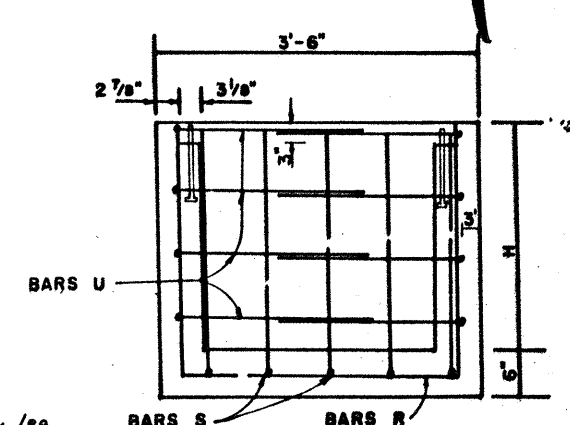
SIDE VIEW



SIDE VIEW



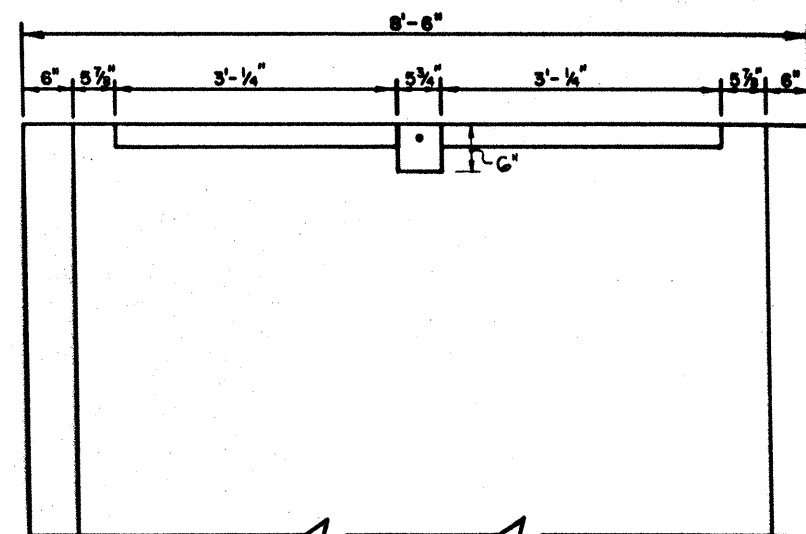
END VIEW



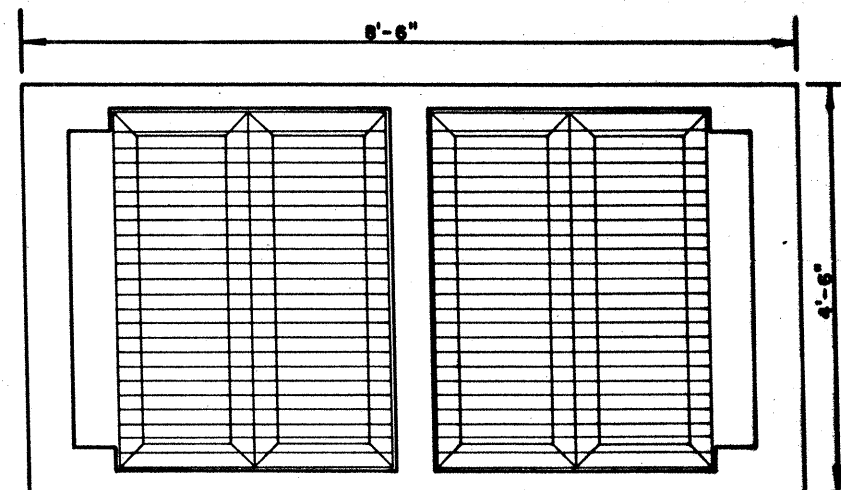
END VIEW

DROP INLET DETAILS  
TYPE D, TYPE E, TYPE F, TYPE G

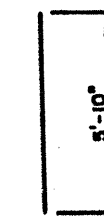
TYPE NO.	STATE	FEDERAL PROJECT NO.	SHEET NO.
IR 35-2 (157)	TEXAS	173	191
COUNTY	CONE	RECT	JOB
15 Guadalupe Etc	16	6	291-TH35



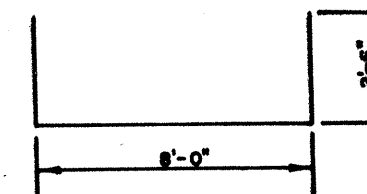
SIDE VIEW



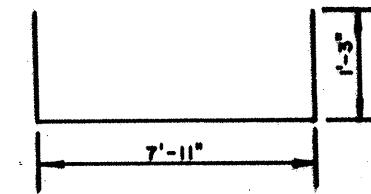
PLAN VIEW



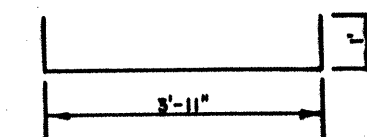
BARS T



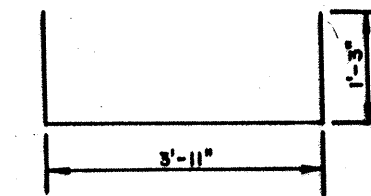
BARS U



BARS S



BARS V



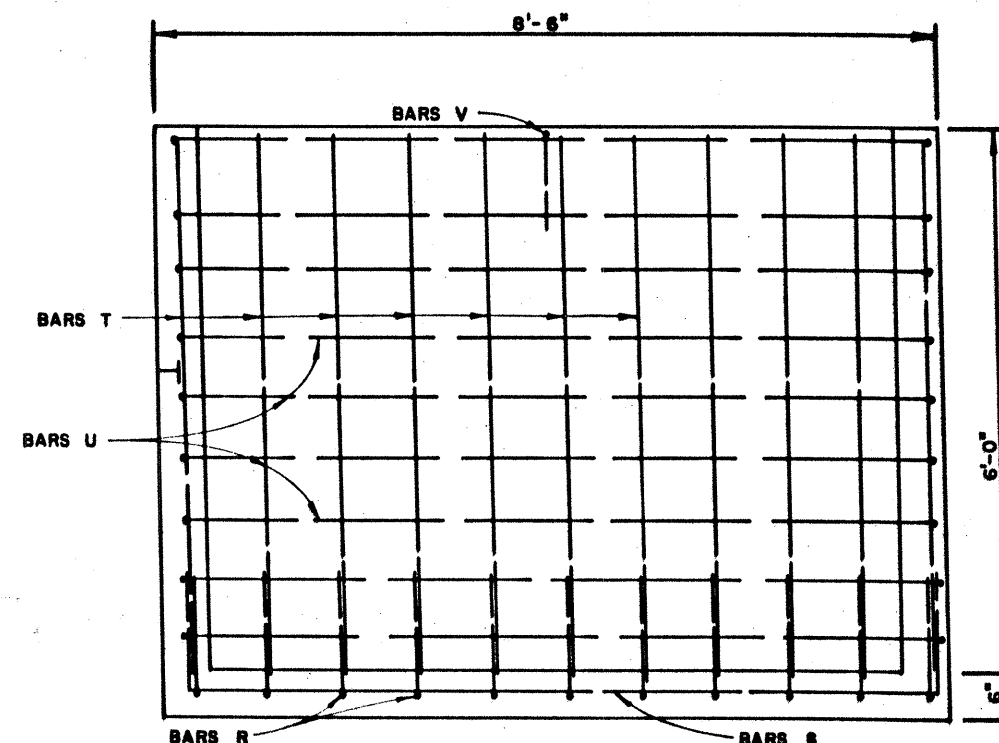
BARS R

# ESTIMATED QUANTITIES

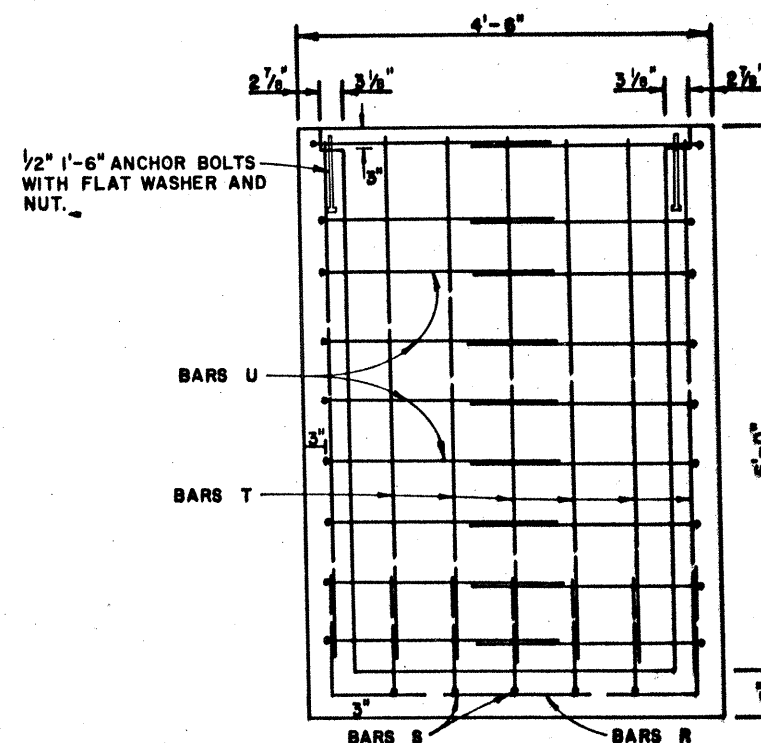
## TYPE H "H" = 6'-0"

BAR	NO.	SIZE	SPACE	LENGTH	WEIGHT
R	12	4	8"	6'-5"	51.44
S	7	4	8"	10'-5"	48.71
T	34	4	8"	5'-10"	132.48
U	18	4	8"	13'-0"	156.31
V	1	4	-	5'-11"	3.95
△ REINFORCING STEEL LBS.					392.89
△ CLASS A CONCRETE CY.					3.35
△ GRATE					4

△ FOR CONTRACTOR INFORMATION ONLY  
△ QUANTITIES ARE NOT DECREASED FOR PIPE INSTALLATIONS



SIDE VIEW



END VIEW

## GENERAL NOTES

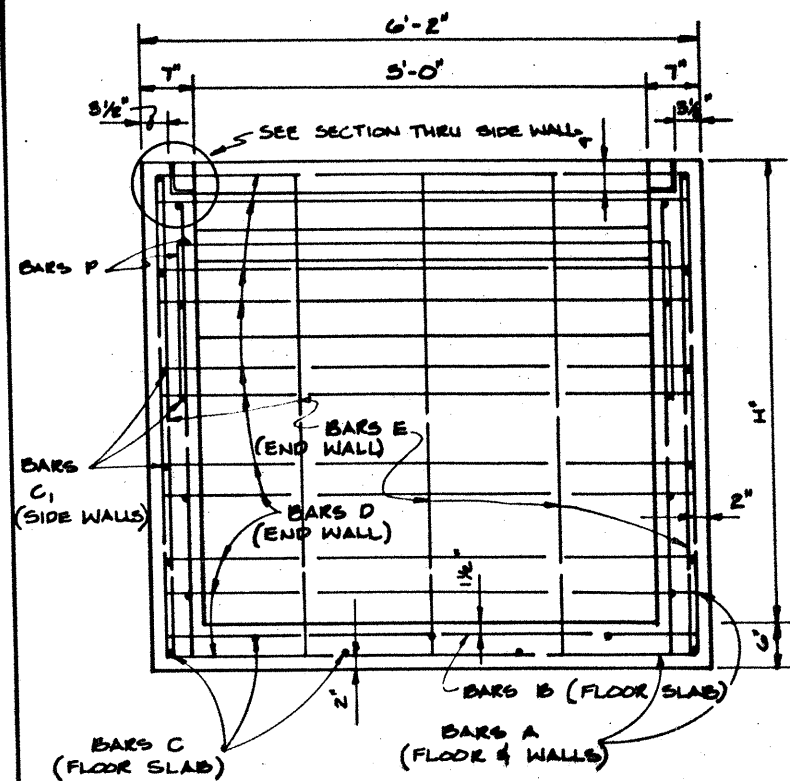
ALL DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTERS OF BARS  
FOR GRATE DETAILS REFER TO SHEET "130"  
ALL CONCRETE SHALL BE CLASS "A"  
ALL EXPOSED CORNERS SHALL BE CHAMFERED 3/4"  
USE TYPE GRATE AS DETAILED ON SHEET "130"

DROP INLET DETAILS  
TYPE "H"

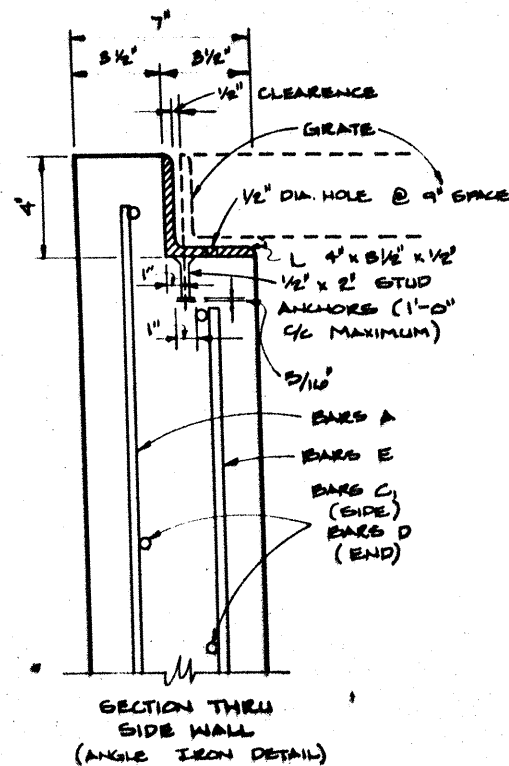


Bill P. Z... 2/26/02  
Bobbie L. Masart Date

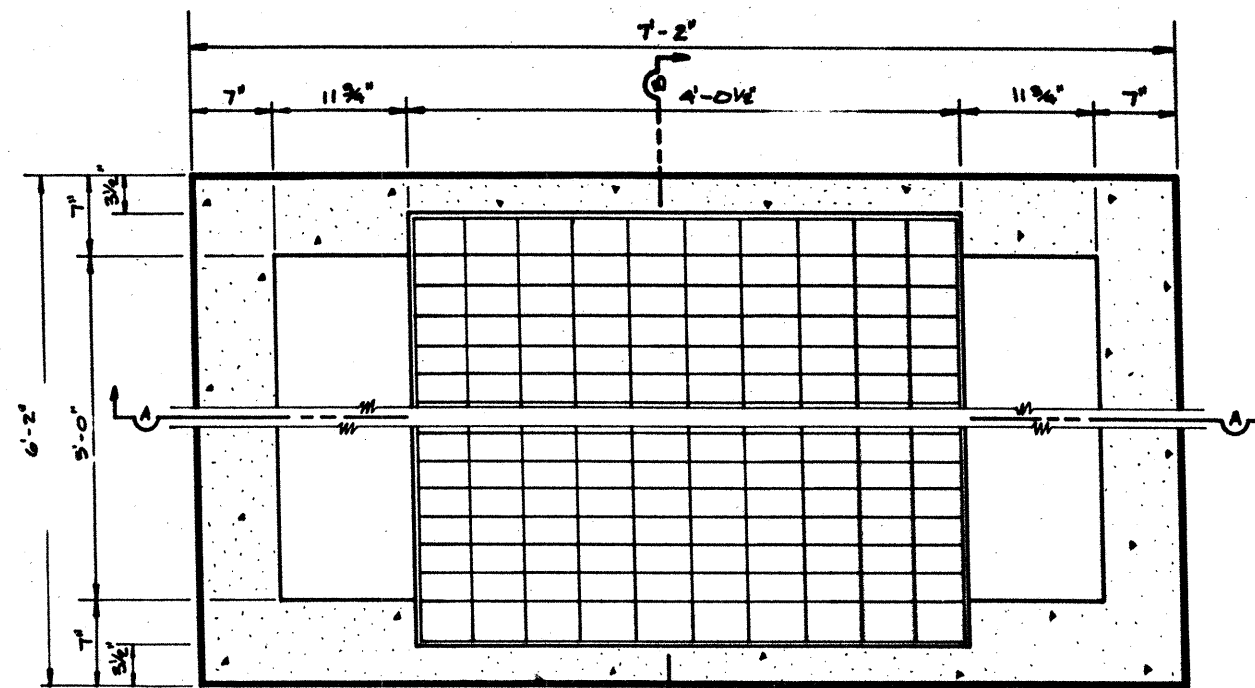
FED. RD. DIST. NO.	STATE	FEDERAL PROJECT NO.	SHEET NO.
4	TEXAS	TR35-2 (157) 173	192
STATE DIST. NO.	COUNTY	CONTRACT NO.	JOB NO.
15	Guadalupe	16	6 296 TH35



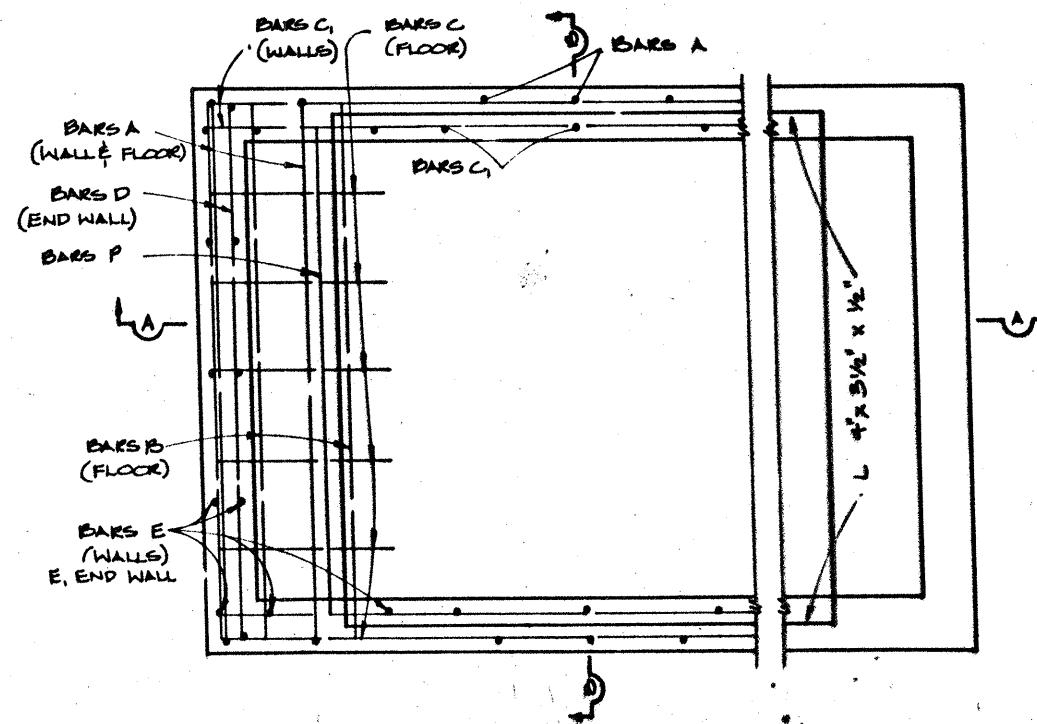
SECTION B-B



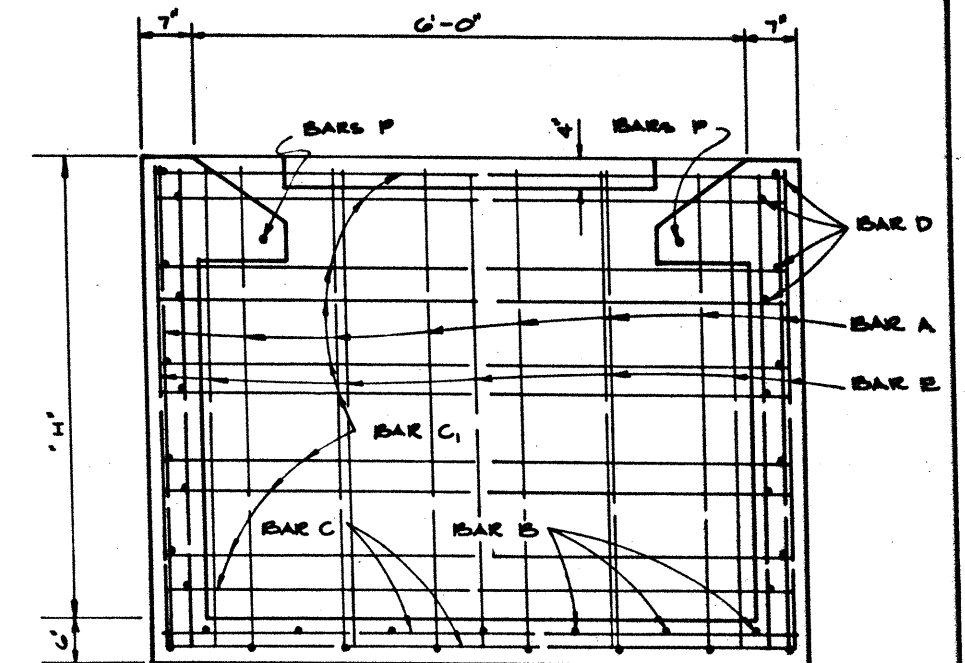
SECTION THRU SIDE WALL  
(ANGLE IRON DETAIL)



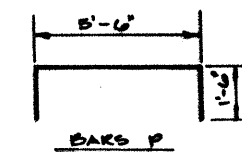
PLAN VIEW W/GRATE



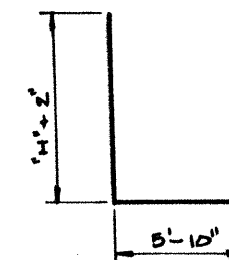
PLAN VIEW



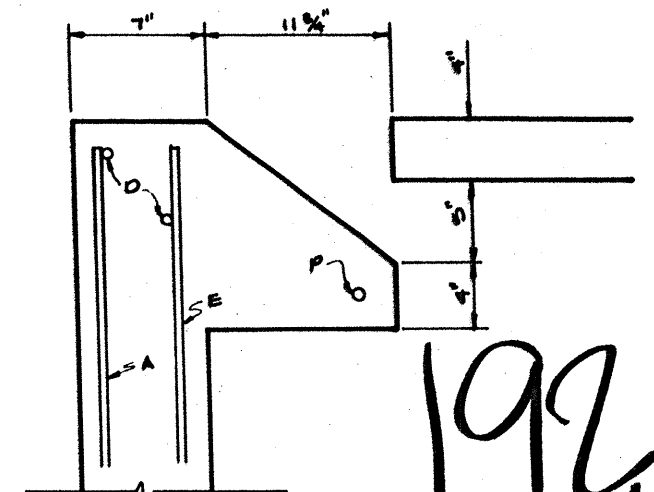
SECTION A-A



BARS P



BARS A



END WALL DETAIL

192A

GENERAL NOTES:

1. QUANTITIES SHOWN HERE ON ARE FOR CONTRACTORS INFORMATION ONLY.
2. ALL CONCRETE SHALL BE CLASS "A" COARSE AGGREGATE GRADE 4 MAY BE USED.
3. DIMENSION RELATING TO REINFORCING STEEL ARE TO CENTER OF BARS.
4. REINFORCING STEEL IN THE AREA OF THE BLOCKOUTS SHALL BE FIELD BENT OR CUT AS DIRECTED BY THE ENGINEER TO PROVIDE A TIE TO THE PROPOSED CONNECTION.
5. THE CONTRACTOR SHALL PROVIDE AN ADEQUATE MEANS TO LIFT AND PLACE THE INLETS SUBJECT TO THE APPROVAL OF THE ENGINEER.
6. ALL EXPOSED CORNERS SHALL BE CHAMFERED 3/4".

BILL OF REINFORCING STEEL  
(BASED ON "H" = 6'-6")

INLET TYPE	BARS A					BARS B					BARS C					BARS C <sub>1</sub>					BARS D					BARS E					BARS E <sub>1</sub>					BARS P				
	NO.	SIZE	SPAC.	LEN.	WT.	NO.	SIZE	SPAC.	LEN.	WT.	NO.	SIZE	SPAC.	LEN.	WT.	NO.	SIZE	SPAC.	LEN.	WT.	NO.	SIZE	SPAC.	LEN.	WT.	NO.	SIZE	SPAC.	LEN.	WT.	NO.	SIZE	SPAC.	LEN.	WT.	NO.	SIZE	SPAC.	LEN.	WT.
W	8	#4	12"±	14'-8"	102	7	#4	12"	5'-10"	27	7	#4	11 3/8"	6'-10"	82	24	#4	1'-0"	6'-10"	110	90	#4	18"±	5'-10"	117	14	#4	17"±	6'-8"	62	10	#4	17"±	6'-8"	45	2	#4	SHOWN	8'-6"	11

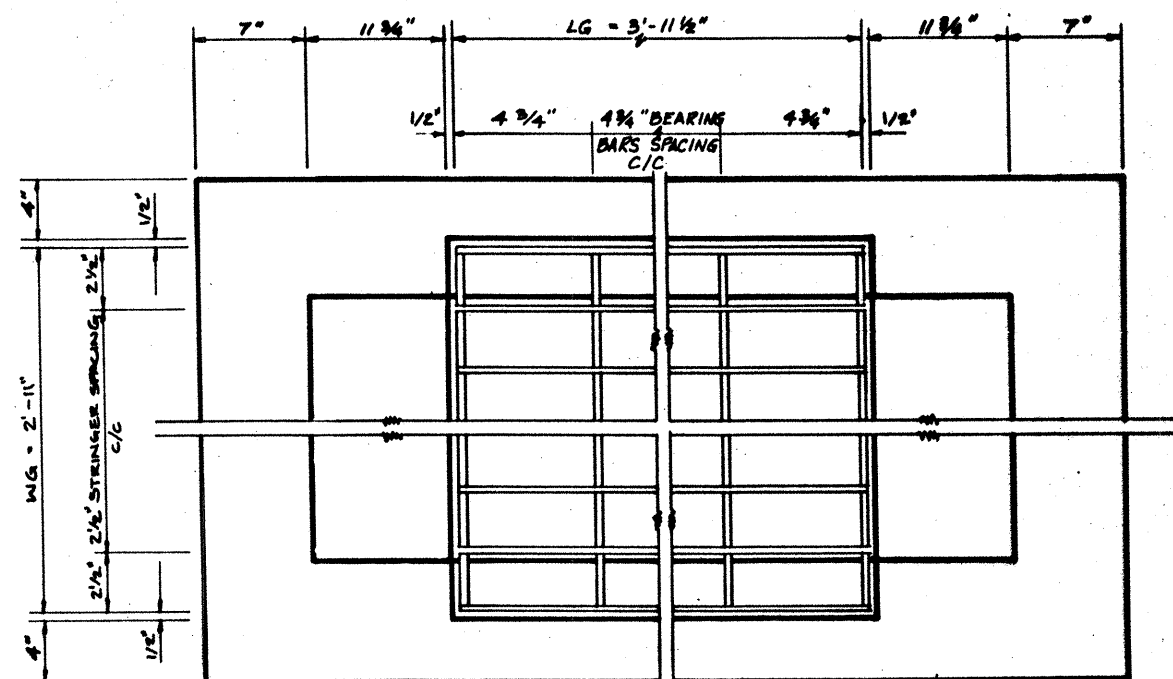
ESTIMATED QUANTITIES (BASED ON "H" = 6'-6")				
INLET TYPE W				
TOTAL WT. REINF. STL.	TCY CONCRETE	CL. A	S. STRUCT. STL.	# GRATES
506	4.46		96	1

\*FOR CONTRACTORS INFORMATION ONLY

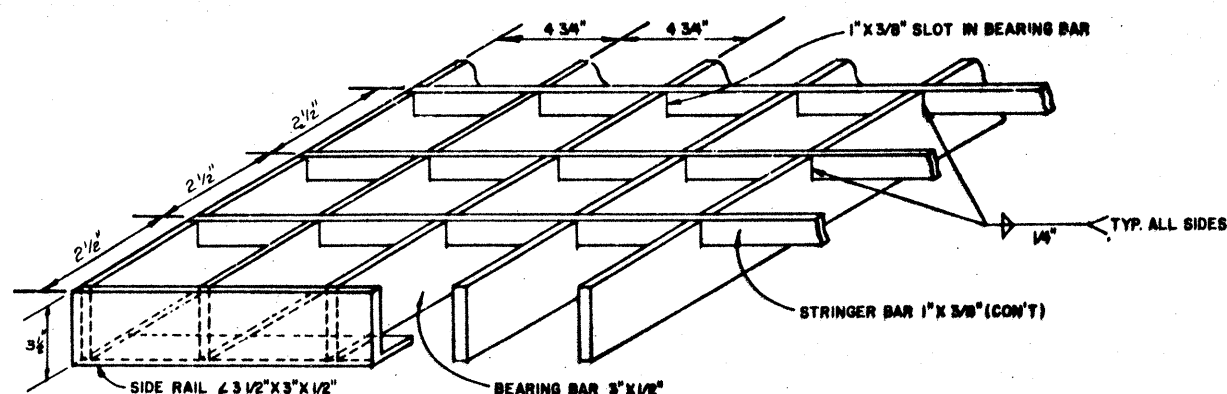
TYPE W-1 INLET DETAILS

FIELD CHANGE No. 13

DATE	STATE	FEDERAL PROJECT NO.	REVISION
1971	TEXAS	IR 35-2(157)173	192A
DATE	COUNTY	CONT. NO.	REVISION
15	GUADALUPE, ETC.	16	6 290014.33



GRATE PLAN VIEW

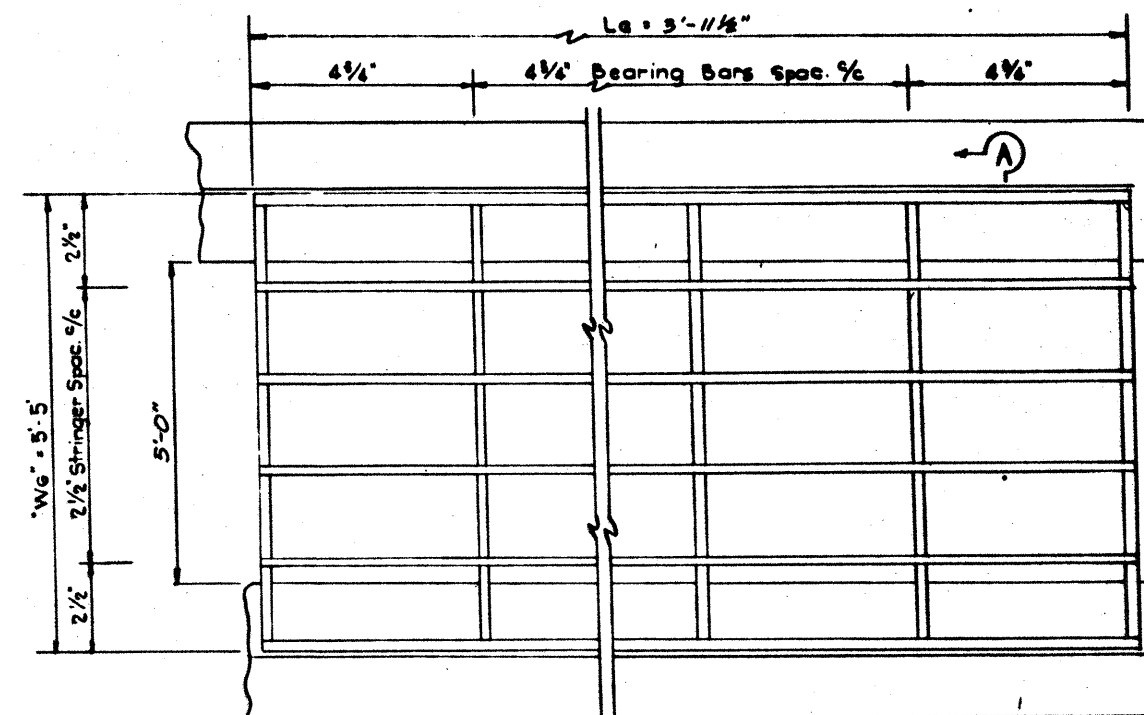


GRATE CORE

BILL OF MATERIALS FOR ONE TRAFFIC GRATE											
GRATE DIM.		SIDE-RAIL		BEARING BAR		STRINGER BAR		TOTAL			
OUT TO OUT		2 3/4" X 3" X 1/2"		3" X 1/2"		1" X 3/8"		WEIGHT			
Lg	Wg	NO.	LTH.	WT.	NO.	LTH.	WT.	NO.	LTH.	WT.	LBS.
5'-11 1/2"	2'-11"	2	3'-11 1/2"	61	16	2'-10"	231	13	8'-11 1/2"	66	378

GRATE TYPE 3

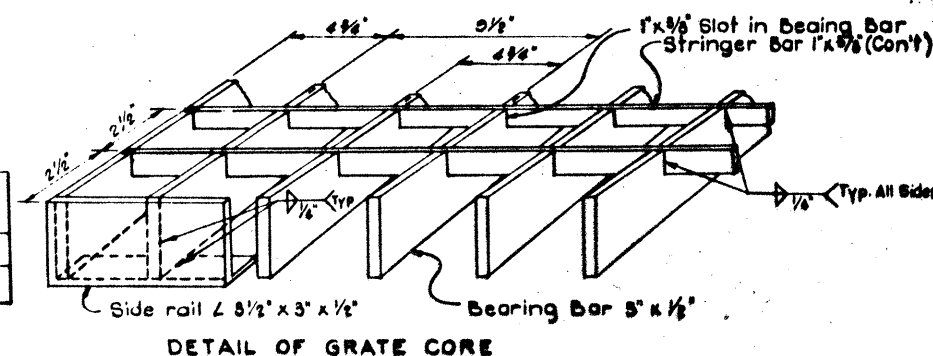
FIELD CHANGE No. 13



GRATE PLAN VIEW

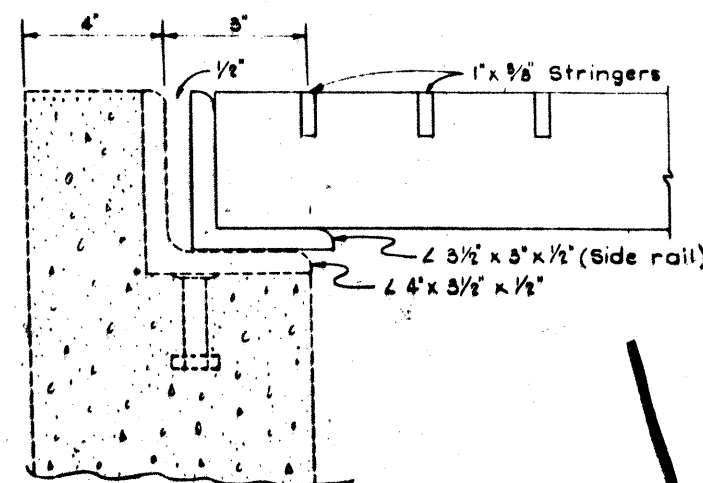
GENERAL NOTES:  
Estimated quantities shown hereon are for Contractors information only.

GRATE DIMEN.		SIDERAIL		BEAR BAR		STRINGER		TOTAL WEIGHT			
Out to Out		2 3/4" x 3" x 1/2"		3" x 1/2"		Bar 1" x 3/8"					
Lg	Wg	No.	Lgth	Wt.	No.	Lgth	Wt.	No.	Lgth	Wt.	Lbs.
5'-11 1/2"	5'-5"	2	5'-11 1/2"	81	16	5'-4"	435	27	5'-11 1/2"	137	653



NOTE:

The Contractor may substitute a commercial grate in lieu of this type of design. The commercial grate shall be capable of supporting a 10,000 pound wheel load. The commercial grate shall provide a minimum opening of 50 square inches per square foot of grate and have a minimum opening of 3 square inches per individual grate opening. No individual grate opening shall be more than 2 1/4 inches by 4 1/4 inches. The commercial grate shall be approved by the Engineer.

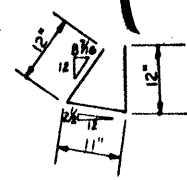
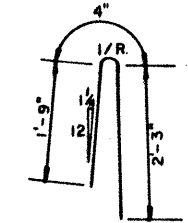
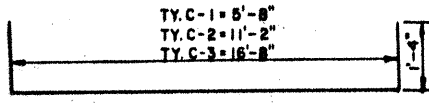
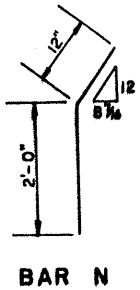
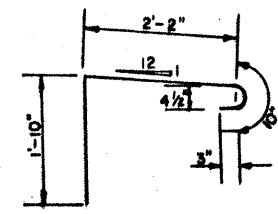
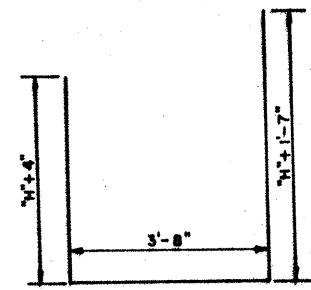
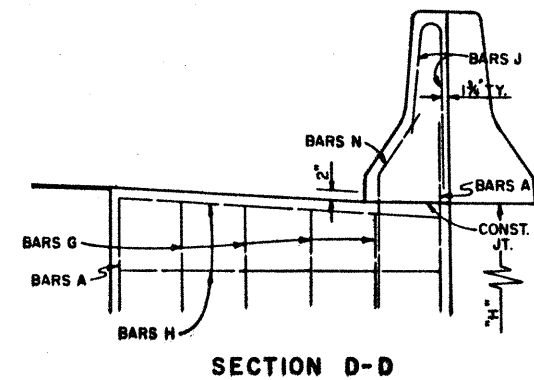
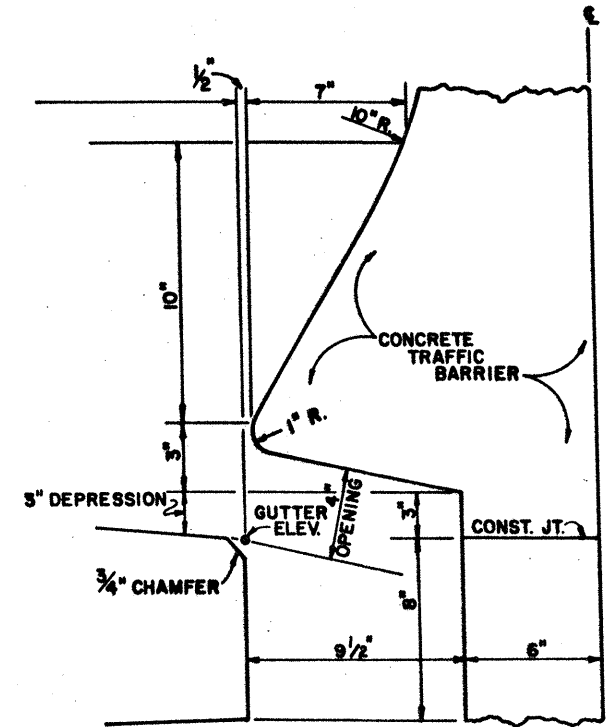
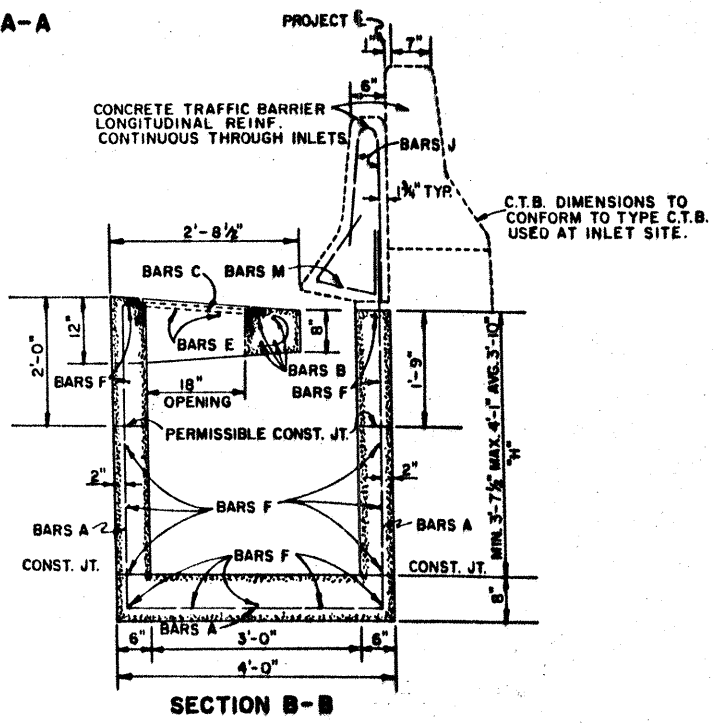
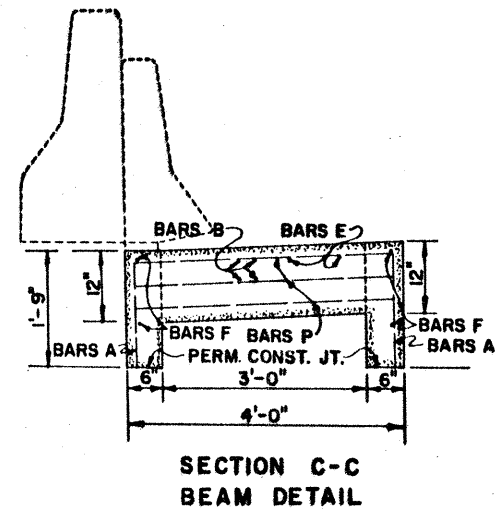
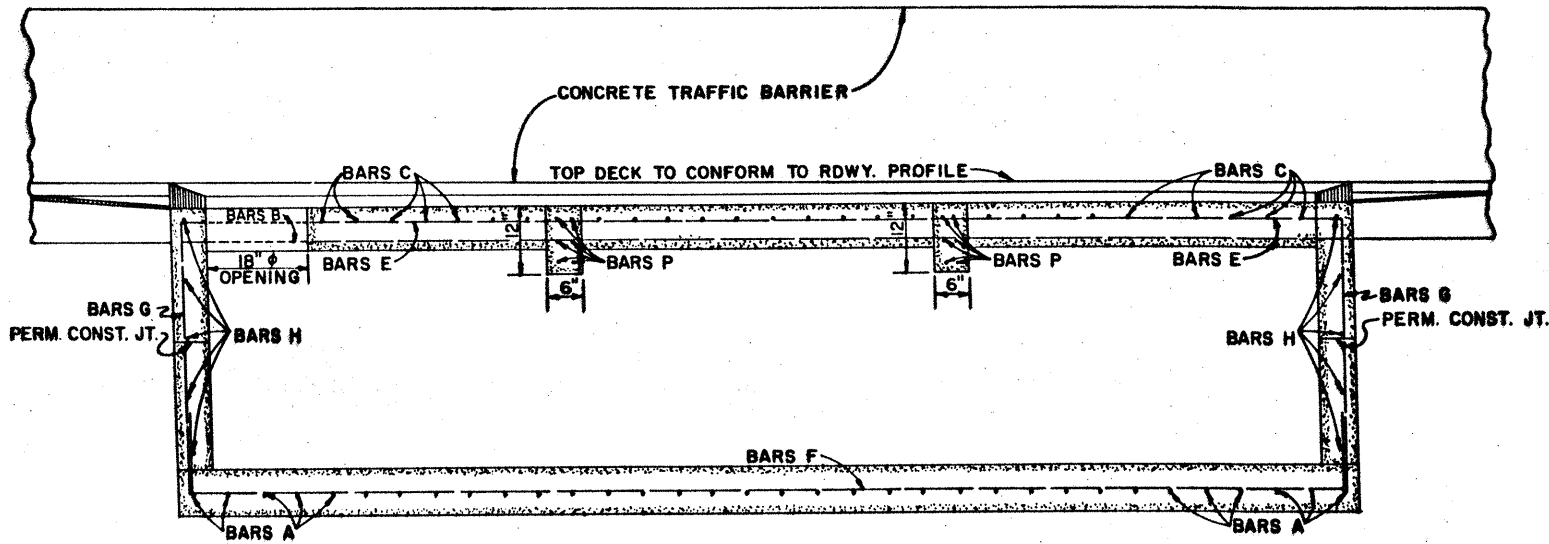
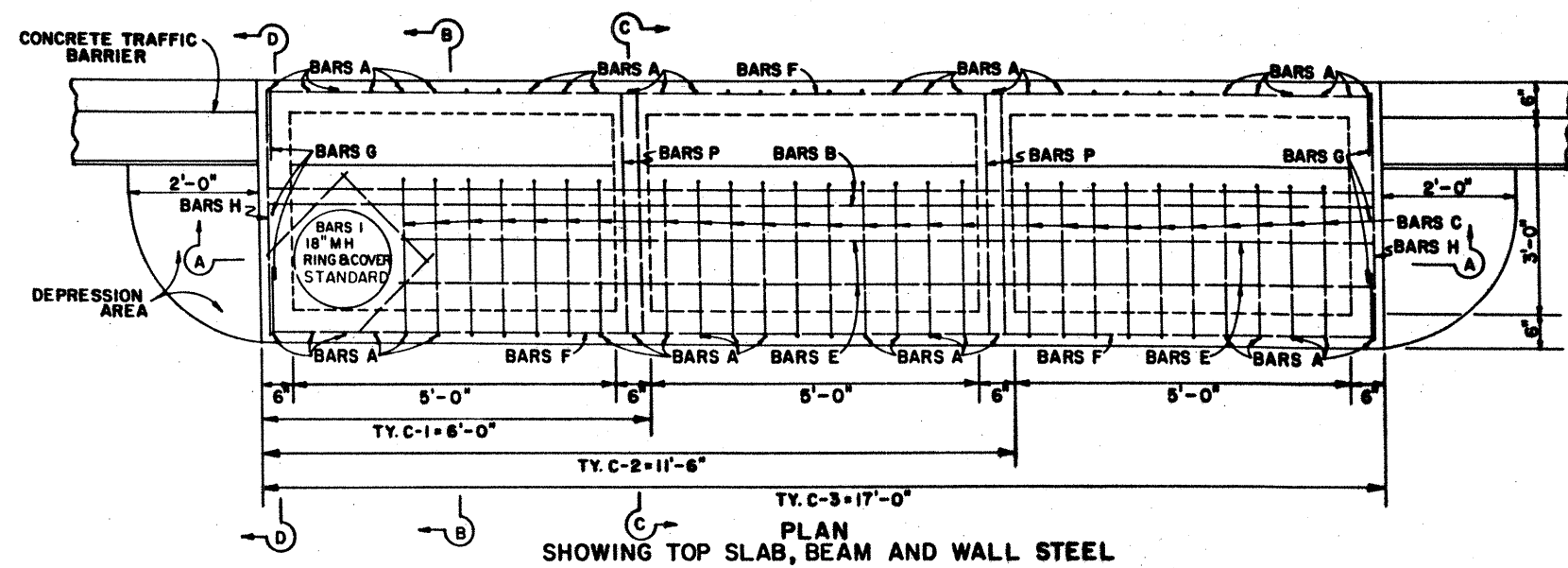


SECTION AA

TYPE 4 GRATE DETAILS

STATE	FEDERAL PROJECT NO.	DATE
15 GUADALUPE, ETC.	16 4	1928





BILL OF REINFORCING STEEL						
ESTIMATED QUANTITIES - TYPE C-1 INLET						
BAR	NO.	SIZE	SPACE	LENGTH	WEIGHT	
A	12	4	6"	13'-3"	106	
B	4	5	3"	4'-8"	19	
C	7	5	6"	4'-10"	35	
E	2	4	8"	2'-9"	4	
F	17	4	11"	4'-8"	53	
G	6	4	11"	4'-2"	17	
H	10	4	11"	3'-8"	25	
I	3	4	-	1'-10"	4	
J	12	4	6"	4'-4"	35	
M	10	4	6"	2'-11"	20	
N	2	4	-	3'-0"	4	
P	-	5	-	-	-	
TOTAL - REINF. STEEL - LBS.					322	
TOTAL - CLASS "A" CONC. - C.Y.					2.20	

ESTIMATED QUANTITIES - TYPE C-2 INLET						
BAR	NO.	SIZE	SPACE	LENGTH	WEIGHT	
A	23	4	6"	13'-3"	204	
B	4	5	3"	11'-2"	47	
C	17	5	6"	4'-10"	86	
E	2	4	8"	9'-3"	12	
F	17	4	11"	13'-10"	157	
G	6	4	11"	4'-2"	17	
H	10	4	11"	3'-8"	24	
I	3	4	-	1'-10"	4	
J	23	4	6"	4'-4"	67	
M	21	4	6"	2'-11"	41	
N	2	4	-	3'-0"	4	
P	6	5	-	3'-8"	23	
TOTAL - REINF. STEEL - LBS.					686	
TOTAL - CLASS "A" CONC. - C.Y.					3.95	

ESTIMATED QUANTITIES - TYPE C-3 INLET						
BAR	NO.	SIZE	SPACE	LENGTH	WEIGHT	
A	35	4	6"	13'-3"	310	
B	4	5	3"	16'-8"	70	
C	26	5	6"	4'-10"	131	
E	2	4	8"	14'-5"	19	
F	17	4	11"	13'-10"	157	
G	6	4	11"	4'-2"	17	
H	10	4	11"	3'-8"	25	
I	3	4	-	1'-10"	4	
J	34	4	6"	4'-4"	98	
M	32	4	6"	2'-11"	62	
N	2	4	-	3'-0"	4	
P	12	4	-	3'-8"	29	
TOTAL - REINF. STEEL - LBS.					926	
TOTAL - CLASS "A" CONC. - C.Y.					5.69	

Δ FOR CONTRACTORS INFORMATION ONLY  
USING H = 3'-10"

# GENERAL NOTES

DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTER OF BARS

ALL EXPOSED CORNERS TO BE CHAMFERED 3/4"

TYPE C-1, C-2, C-3  
INLET DETAILS

FED. NO.	STATE	FEDERAL PROJECT NO.	SHEET NO.
15	TEXAS	IR35-2 (152) 173	123
STATE	COUNTY	CONTRACT	SECTION
15	GUADALUPE	16	6



# BILL OF REINFORCING STEEL

LOWER UNIT 20' X 5'-0" (TY. IV)					
BAR SHAPE	NO.	SIZE	SPAC.	LENGTH	
A	22	#4	12"	VARIES	
B	21	#4	12"	5'-10"	
B1	VARIES	#4	12"	5'-10"	
E1	36	#4	18"	VARIES	
E2	8	#4	18"	VARIES	
F1	VARIES	#4	2'-0"	20'-0"	
F2	11	#4	2'-0"	20'-0"	
G	4	#4	6"	5'-10"	
H	13	#4	6"	2'-4"	

LOWER UNIT 20' X 3'-8" (TY. III)					
BAR SHAPE	NO.	SIZE	SPAC.	LENGTH	
A	22	#4	12"	VARIES	
B	21	#4	12"	4'-6"	
B1	VARIES	#4	12"	4'-6"	
E1	34	#4	18"	VARIES	
E2	6	#4	18"	VARIES	
F1	VARIES	#4	12"	20'-0"	
F2	9	#4	12"	20'-0"	
G	4	#4	6"	4'-6"	
H	10	#4	6"	2'-4"	

LOWER UNIT 10' X 5'-0" (TY. II)					
BAR SHAPE	NO.	SIZE	SPAC.	LENGTH	
A	2	#4	12"	VARIES	
B	11	#4	12"	5'-10"	
B1	VARIES	#4	12"	5'-10"	
E1	22	#4	18"	VARIES	
E2	8	#4	18"	VARIES	
F1	VARIES	#4	12"	10'-10"	
F2	11	#4	12"	10'-10"	

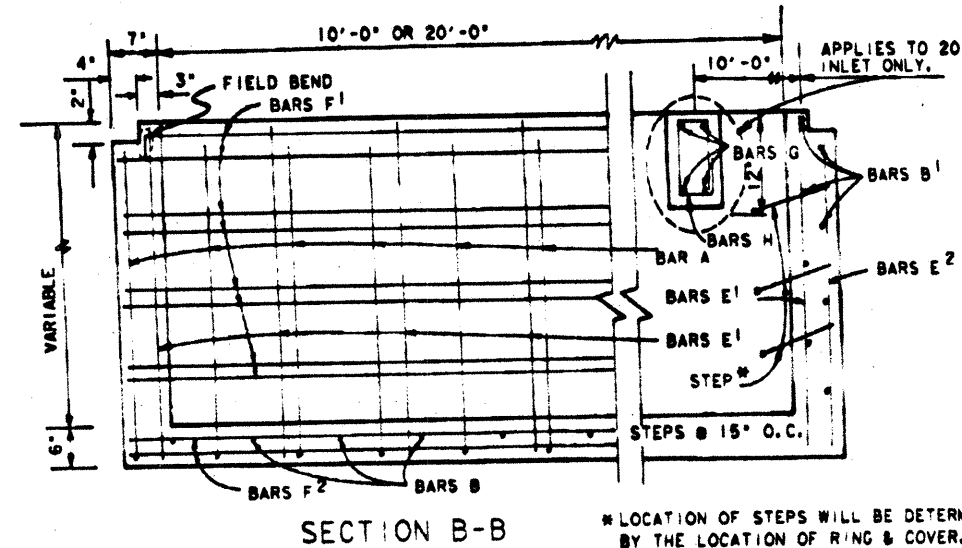
LOWER UNIT 10' X 3'-8" (TY. I)					
BAR SHAPE	NO.	SIZE	SPAC.	LENGTH	
A	12	#4	12"	VARIES	
B	11	#4	12"	4'-6"	
B1	VARIES	#4	12"	4'-6"	
E1	20	#4	18"	VARIES	
E2	6	#4	18"	VARIES	
F1	VARIES	#4	12"	10'-10"	
F2	9	#4	12"	10'-10"	

TY. II = TY. III & TY. IV BOLTED TOGETHER

TYPE VIII = 2-TY. IV INLETS BOLTED TOGETHER

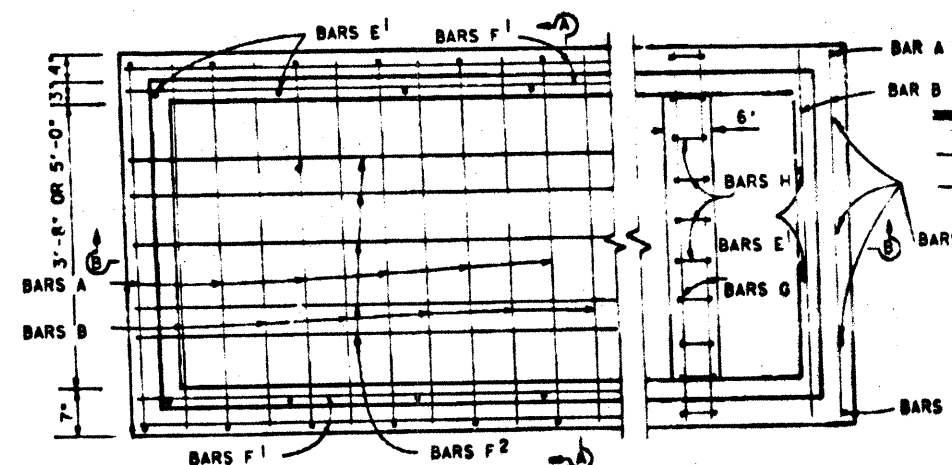
TY. V = TY. I & TY. III BOLTED TOGETHER

TYPE VII = 2-TY. III INLETS BOLTED TOGETHER

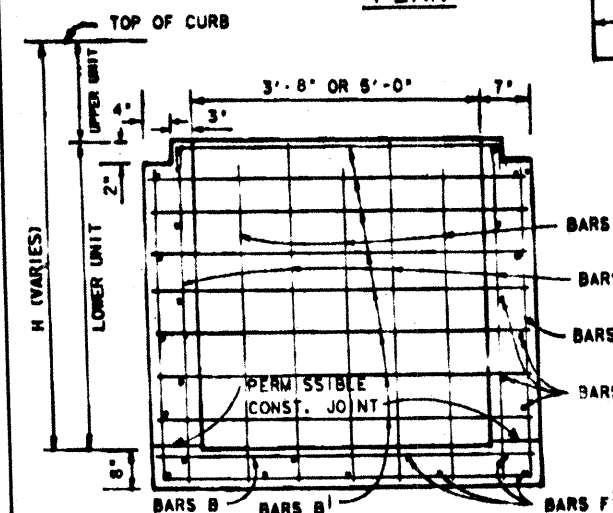


SECTION B-B

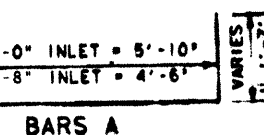
\* LOCATION OF STEPS WILL BE DETERMINED BY THE LOCATION OF RING & COVER.



PLAN



SECTION A-A



BAR A

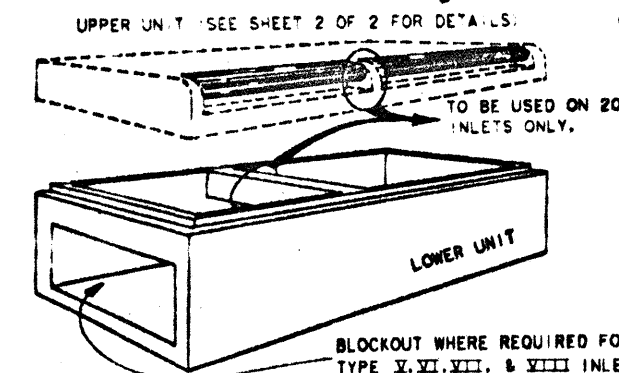
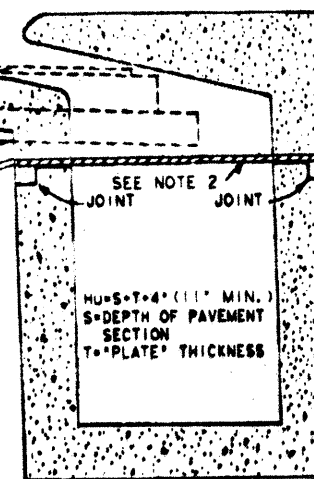
## GENERAL NOTES:

ALL CONCRETE SHALL BE CLASS 'A'.  
ALL DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTER OF BARS.  
QUANTITIES SHOWN ARE FOR CONTRACTORS INFORMATION ONLY.  
BOLTS, NUTS, WASHERS AND PLATES ARE TO BE GALVANIZED.  
BOLTS, NUTS, WASHERS, PLATES AND GASKETS SHALL BE SUBSIDIARY TO INLETS.  
THE CONTRACTOR SHALL PROVIDE AN ADEQUATE MEANS TO LIFT AND PLACE THE INLETS, SUBJECT TO APPROVAL OF THE ENGINEER, WHEN USING PRECAST UNITS.  
ALL BARS INTERCEPTING BLOCKOUT LOCATIONS SHALL BE FIELD CUT.  
WHEN CROSSING OR PARALLELING ANY EXISTING UTILITIES, IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO PROTECT AND MAINTAIN THESE UTILITY LINES.  
ALL LOWER UNITS SHALL RECEIVE INVERT MORTAR SHAPING AS DIRECTED BY THE ENGINEER.  
NORMAL SIZE FOR PIPE BLOCKOUTS IN INLET BOXES SHALL NOT EXCEED 3' BEYOND THE OUTER SHELL OF THE RC PIPE, TAKING INTO ACCOUNT THE SKEW WIDTHS OF THE PIPE AS NECESSARY.  
COMMERCIALY AVAILABLE STEPS (AS APPROVED BY THE ENGINEER) SHALL BE PROVIDED AND INSTALLED IN ALL INLETS WHERE THE 'H' EXCEEDS 4'-0".  
CONSTRUCTION JOINT SHOWN AT FLOWLINE MAY BE RAISED A MAXIMUM OF 8" AT THE OPTION OF THE CONTRACTOR. ADJUST LENGTH OF VERTICAL STEEL AS REQUIRED.

## NOTES FOR PHASE CONSTRUCTION:

1. THE CURB INLET SHALL BE CONSTRUCTED (SLAB & WALLS) TO A DEPTH 'HU' BELOW THE INLET GUTTER LINE ELEVATION.
2. CAP THE INLET WITH A STEEL PLATE (MATERIAL TO BE APPROVED BY THE ENGINEER) AND CONSTRUCT THE PROP. RDWY. OVER THE PLATE.
3. AFTER THE RDWY. IS COMPLETED AND AFTER THE CURB IS PLACED (UP TO THE PROP. CONCRETE DEPRESSION) BUT PRIOR TO THE FINAL ACP MAT, SAW CUT THE PAV. NEEDED FOR INLET COMPLETION, REMOVE THE PLATE AND PROCEED WITH THE UPPER PORTION OF THE CURB INLET (GUTTER DEPRESSION, WALL AND DECK).

## PHASE CONSTRUCTION COVER PLATE DETAIL



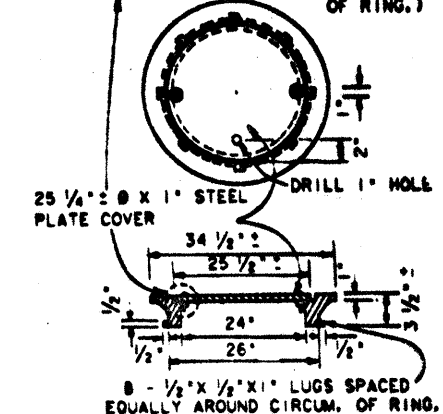
## FIELD CHANGE NO. 35

## CURB INLET LOWER UNIT

APR' 91

UPPER UNIT & LOWER UNIT TO BE JOINED USING A NON-SHRINK-AGE CONCRETE GROUT.

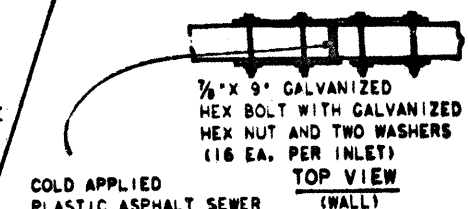
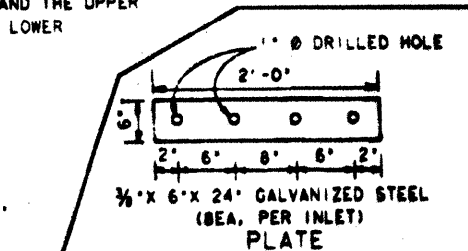
1/2" x 1/4" COUNTER SUNK HOLE 1/2" x 1/4" SO. HD. BOLT WITH SO. NUT. (2 EA. REQUIRED) (NUT TO BE WELDED TO INNER SURFACE OF RING.)



## JOINT DETAIL

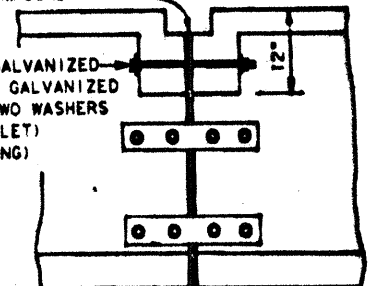
WHEN USING PRECAST UPPER UNIT, THIS SPACE IS PROVIDED FOR THE SPECIFIC PURPOSE OF MAKING MINOR HORIZONTAL AND VERTICAL ADJUSTMENTS AS MAY BE NEEDED TO ACCOMMODATE A FIT BETWEEN THE UPPER AND LOWER UNIT THAT ALLOWS FOR A MATCHING LINE AND GRADE BETWEEN THE ROADWAY CURB AND THE UPPER UNIT OF THE INLET. ADJUST HEIGHT OF LOWER UNIT BY 1".

## RING & COVER DETAIL



COLD APPLIED PLASTIC ASPHALT SEWER JOINT COMPOUND

1/2" x 1'-3/2" GALVANIZED HEX BOLT WITH GALVANIZED HEX NUT AND TWO WASHERS (3 EA. PER INLET) (1'-2" SPACING)



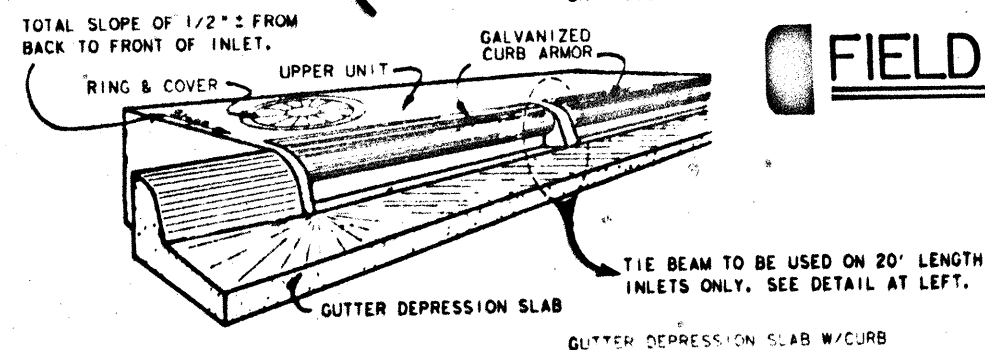
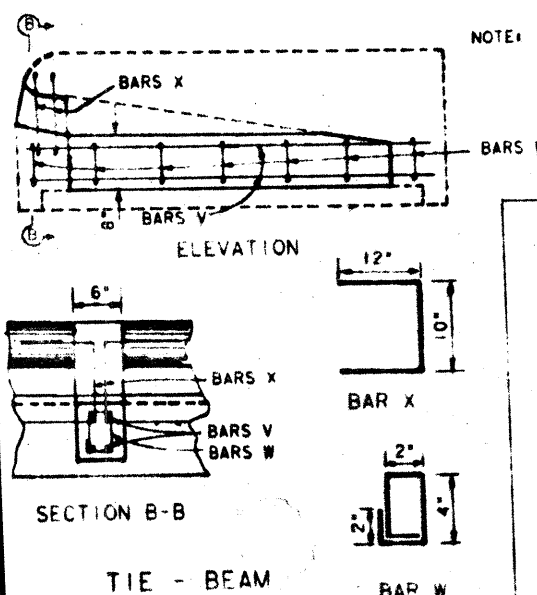
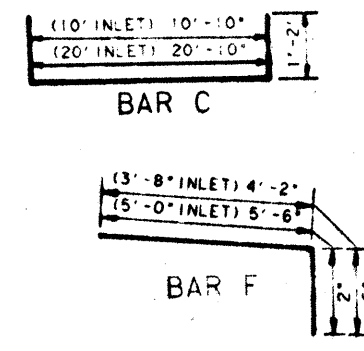
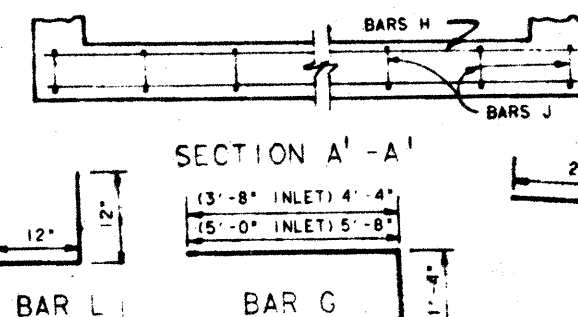
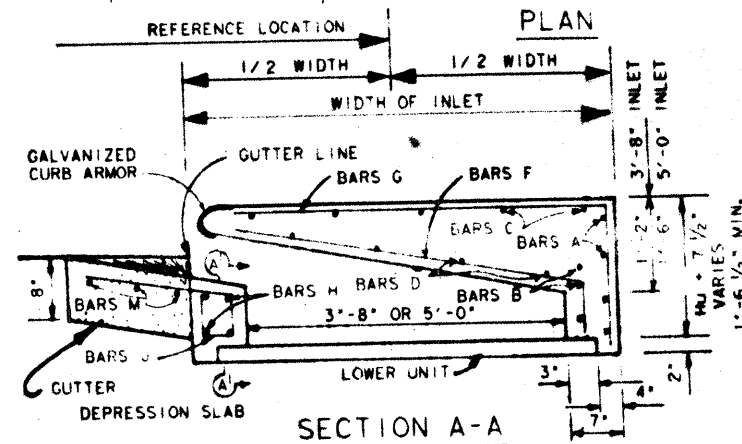
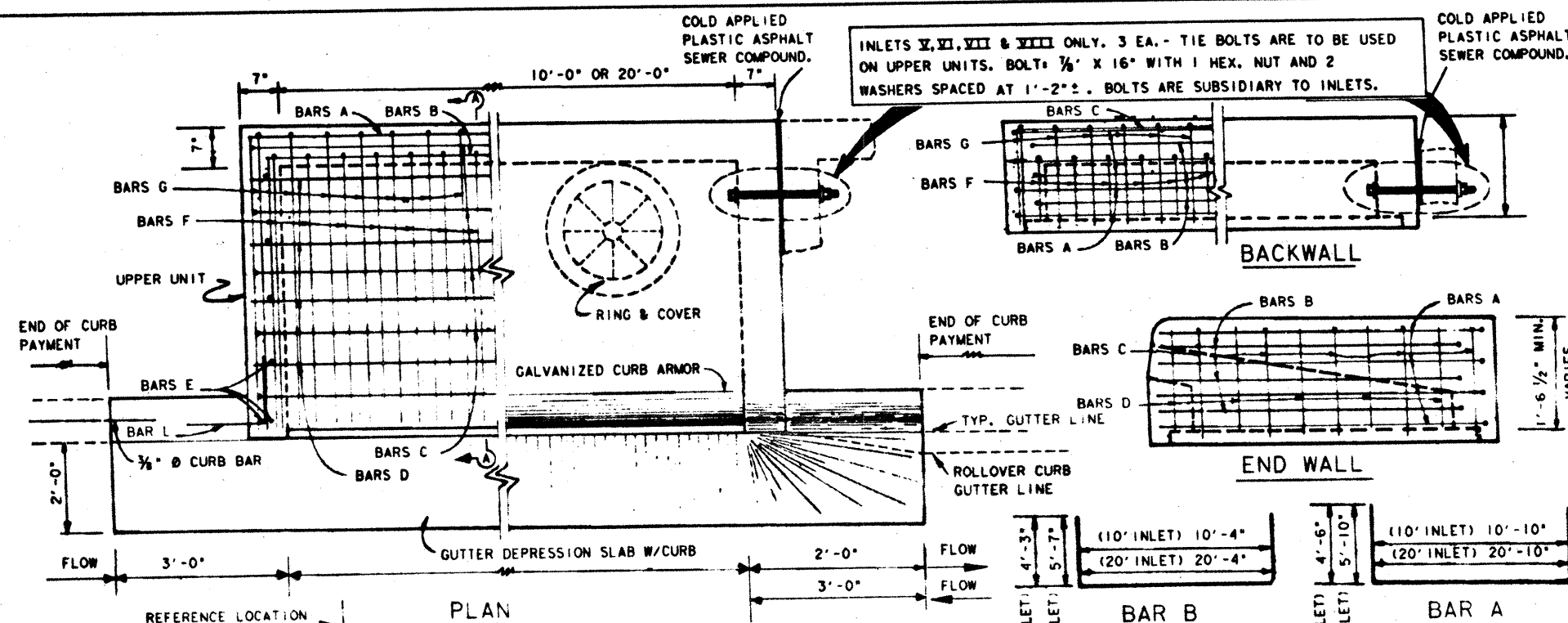
## SIDE VIEW

NOTE: TO BE USED ON TYPE V, VI, VII, & VIII INLETS ONLY. BOLTS, NUTS, WASHERS, PLATES AND GASKETS TO BE SUBSIDIARY TO PRE-CAST INLETS.

## INLET BOLTING DETAILS












SHEET 1 OF 2












FED. NO.	FED. AID PROJECT NO.	SHEET NO.
6	IP 35-2 (157) 123	193A
STATE	DIST. NO.	COUNTY
TEXAS	15	Guadalupe, etc.
CON.	SECT.	JOB
16	6	290A ZH 35

BILLS OF REINFORCING STEEL (FOR HU = 11")

UPPER UNIT 20' X 5' (TY. IV)						
BAR	SHAPE	NO.	SIZE	SPAC	LENGTH	WEIGHT
A		4	#4	5"	32'-6"	87
B		3	#4	5"	31'-6"	63
C		7	#4	11"	23'-2"	108
D		11	#4	6"	20'-10"	153
E		16	#4	11"	1'-2"	13
F		41	#6	6"	5'-8"	349
G		42	#6	6"	7'-0"	442
H		4	#4	—	20'-10"	56
J		22	#4	12"	3'-6"	51
L		4	#4	—	2'-0"	5
M		3	#4	10"	24'-8"	49
V		4	#4	—	5'-10"	16
W		10	#4	8" ±	1'-4"	9
X		4	#4	—	2'-10"	8
TOTAL WEIGHT						LBS. 1409

UPPER UNIT 20' X 3'-8" (TY. III)						
BAR	SHAPE	NO.	SIZE	SPAC	LENGTH	WEIGHT
A		4	#4	5"	29'-10"	80
B		3	#4	5"	28'-10"	58
C		5	#4	11"	23'-2"	77
D		7	#4	6"	20'-10"	97
E		12	#4	11"	1'-2"	9
F		41	#6	6"	4'-8"	287
G		42	#6	6"	5'-8"	357
H		4	#4	—	20'-10"	56
J		22	#4	12"	3'-6"	51
L		4	#4	—	2'-0"	5
M		3	#4	10"	24'-8"	49
V		4	#4	—	4'-8"	12
W		7	#4	8" ±	1'-4"	6
X		4	#4	—	2'-10"	8
TOTAL WEIGHT						LBS. 1152

UPPER UNIT 10 X 5 (TY. II)						
BAR	SHAPE	NO.	SIZE	SPAC.	LENGTH	WEIGHT
A		4	#4	5"	21'-6"	60
B		3	#4	5"	21'-6"	43
C		7	#4	11"	13'-2"	62
D		11	#4	6"	10'-10"	80
E		16	#4	11"	1'-2"	13
F		21	#6	6"	5'-8"	179
G		22	#6	6"	7'-0"	231
H		4	#4	—	10'-10"	29
J		12	#4	12"	3'-6"	51
L		4	#4	—	2'-0"	5
M		3	#4	10"	14'-8"	29
TOTAL WEIGHT						LBS. 782

UPPER UNIT 10' X 3'-8" (TY. I)						
BAR	SHAPE	NO.	SIZE	SPAC.	LENGTH	WEIGHT
A		4	#4	5"	19'-10"	53
B		3	#4	5"	18'-10"	38
C		5	#4	11"	13'-2"	44
D		7	#4	6"	10'-10"	51
E		12	#4	11"	1'-2"	9
F		21	#6	6"	4'-8"	147
G		22	#6	6"	5'-8"	187
H		4	#4	—	10'-10"	29
J		12	#4	12"	3'-6"	51
L		4	#4	—	2'-0"	5
M		3	#4	10"	14'-8"	29
TOTAL WEIGHT						LBS. 643

TY VI - TY II & TY IV BOLTED TOGETHER

TY VIII - TY IV & TY IV BOLTED TOGETHER

TY V = TY I & TY III BOLTED TOGETHER

TY VII = TY III & TY III BOLTED TOGETHER

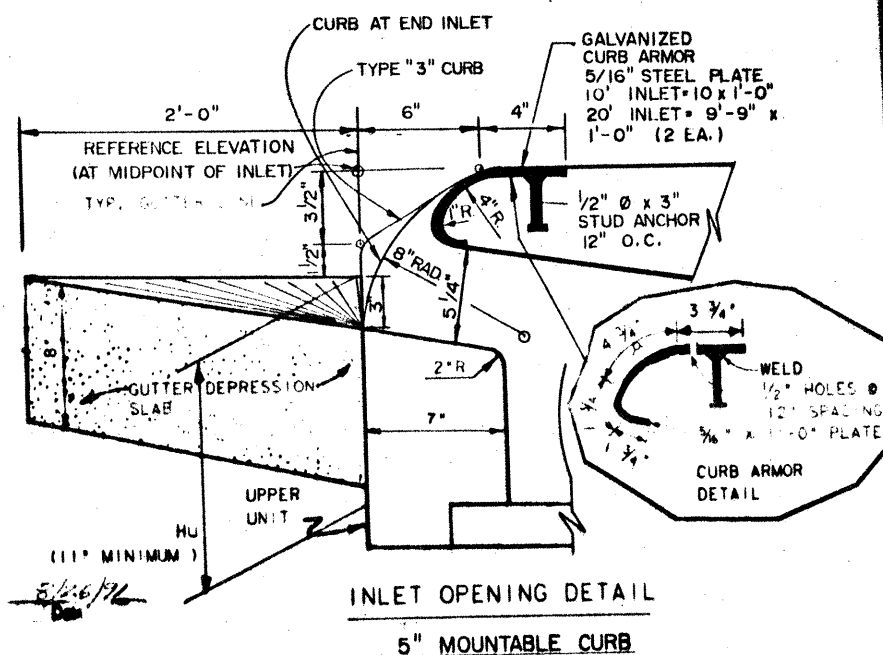
CONCRETE QUANTITIES	
GUTTER DEPRESSION SLAB	C.Y.
20' NLE <sup>7</sup>	1.0
10' INLET	0.6

CONCRETE QUANTITIES	
UPPER UNIT (ONLY)	C.Y.
20' X 5'-0"	3.6
20' X 3'-8"	3.6
10' X 5'-0"	2.0
10' X 3'-8"	1.8

CURB ARMOR		LBS
10' INLET 1 @ 10'-0" x 1'-0" x 5/8"		130
20' INLET 2 @ 9'-9" x 1'-0" x 5/8"		254

GENERAL NOTES:

ALL BARS INTERCEPTING MANHOLE RING & COVER SHALL BE FIELD CUT,  
ALL CONCRETE SHALL BE CLASS "A".  
ALL DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTER OF BARS,  
ALL EXPOSED CORNERS SHALL BE CHAMFERED  $\frac{1}{4}$ ".  
RING & COVER LOCATION WILL BE AS DIRECTED BY THE ENGINEER.  
BOLTS, NUTS & WASHERS SHALL BE GALVANIZED.  
QUANTITIES SHOWN ARE FOR CONTRACTORS INFORMATION ONLY.  
GUTTER DEPRESSION SLAB IS TO RECEIVE A WOOD FLOAT CONCRETE FINISH.  
SEE "JOINT DETAIL" ON SHEET 1 OF 2 FOR FIT BETWEEN UPPER AND LOWER UNITS,  
FACE OF INLET TO CONFORM TO FACE OF CURB LINE.  
PAYMENT WILL BE MADE AT THE UNIT PRICE BID FOR EACH TYPE INLET  
INCLUDED IN THE CONTRACT FOR THE DIFFERENT INLET LENGTHS WHICH  
SHALL BE FULL COMPENSATION FOR EACH "M" SHOWN IN THE PLANS.  
PAYMENT FOR CONC., STEEL RING & COVER AND THE STEPS SHALL BE INCLUDED IN  
UNIT COST OF ITEM 470 BY EACH "MANHOLES & INLETS".

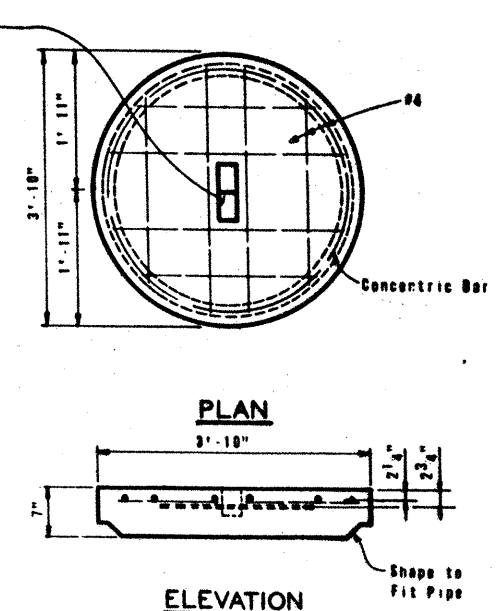
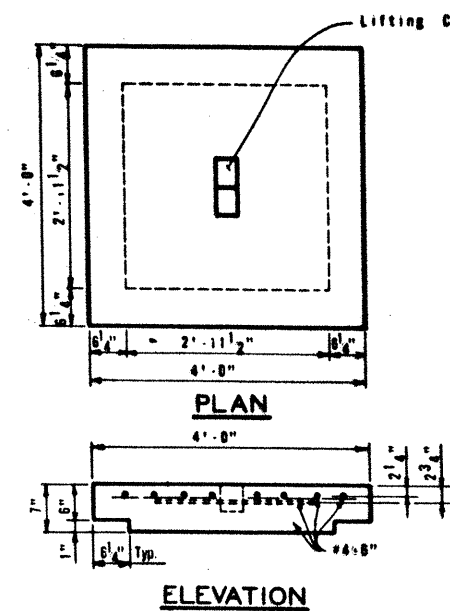
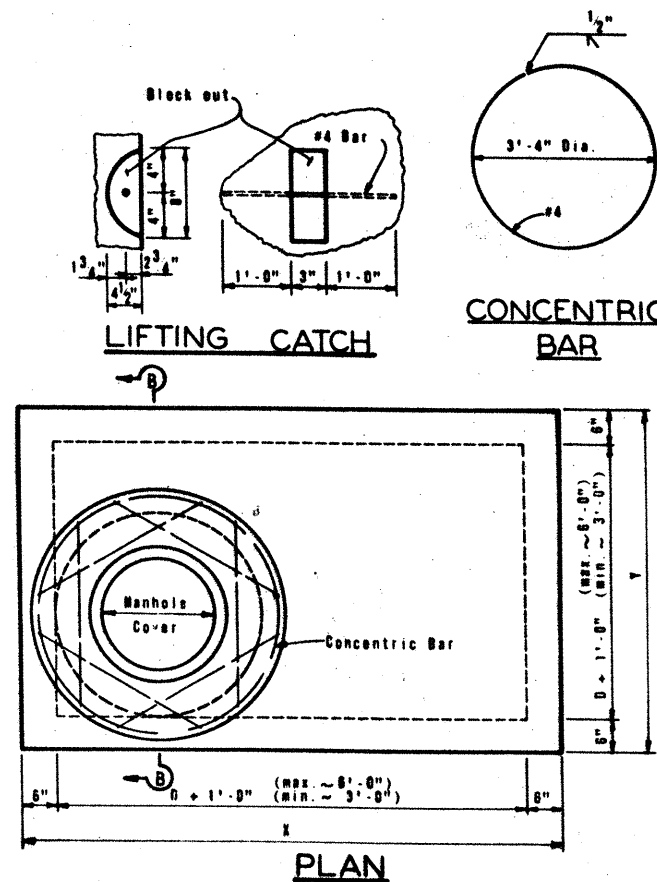
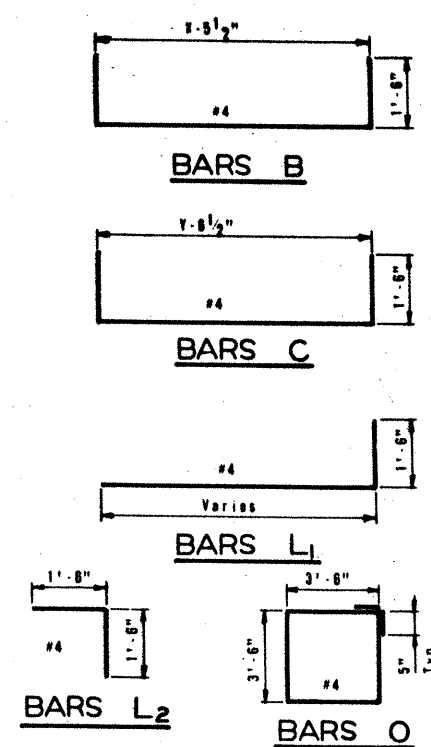
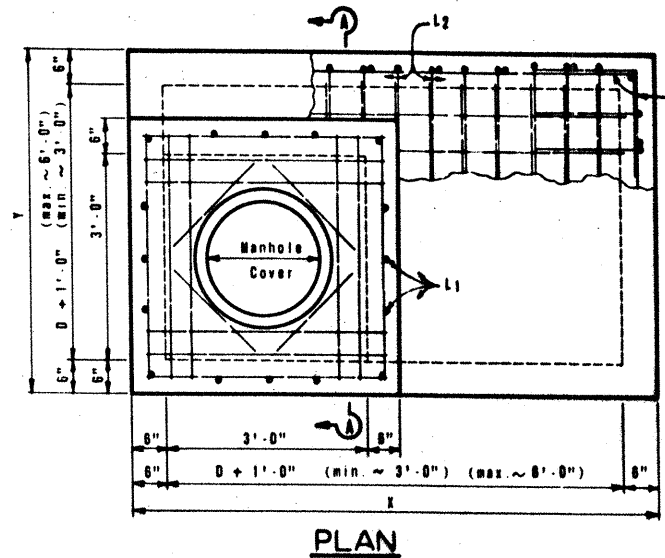


**FIELD CHANGE NO. 35**  
**CURB INLET**  
**UPPER UNIT**

**SHEET 2 OF 2**

FED. NO. DIV. NO.	FEDERAL AID PROJECT NO.			SHEET NO.
6	IR 35-2 (157) 173			1936
STATE	STATE DIST. NO.	COUNTY		
TEXAS	15	Guadalupe, Etc.		
CONT.	SECT.	JOB	HIGHWAY NO.	
16	6	29ct	I.H. 35	

Note: Riser, either cast-in-place or concrete pipe, may be located in any corner.



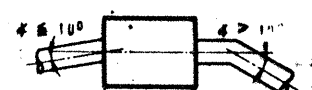
CAST-IN-PLACE RISER COVER  
CONCRETE PIPE RISER COVER  
OPTIONAL PRECAST CONCRETE LIFT-OFF COVERS

194

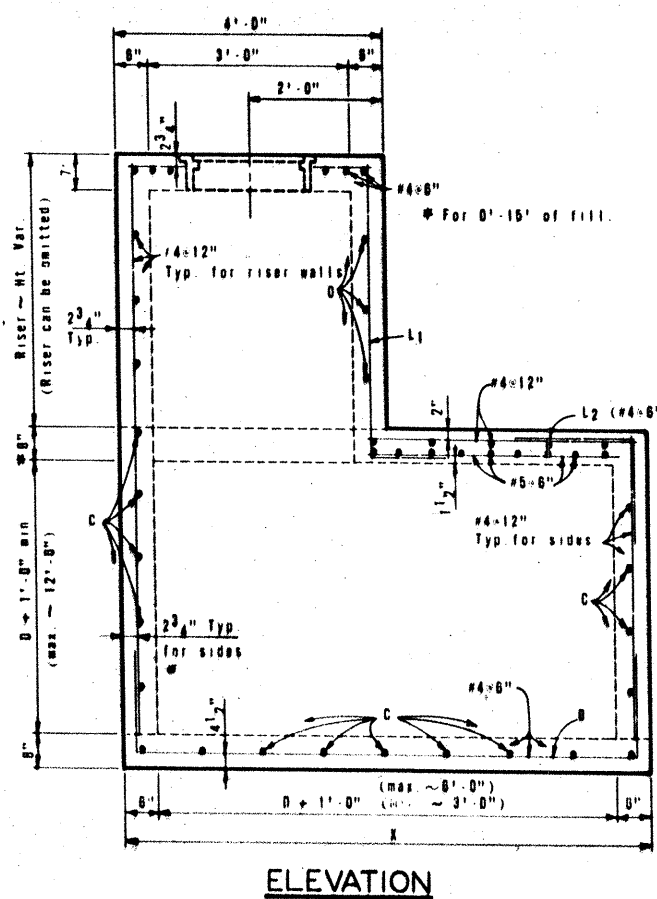
#### GENERAL NOTES

Unless otherwise shown in the plans, payment will be made for each Manhole and Riser. Exposed edges shall be reinforced 3/4". A 1/4" x 1/4" x 1/4" bearing plate of a reinforced precast concrete cover will be acceptable for precast construction. Shop drawings will not be required. The contractor shall have the approval of the Engineer before making any changes to the design. In areas of conflict between reinforcing steel, block-outs, pipes, anchor bolts or other reinforcing steel, the reinforcement shall be bent or adjusted to clear as directed by the Engineer. The riser may be constructed of reinforced concrete as shown or of Reinforced Concrete Pipe, Class III, in accordance with ASTM Designation C-76. If pipe is used, joints shall conform to the item "Reinforced Concrete Pipe Joints". Precast Concrete Lift Off Cover may be substituted for "Ring and Cover".

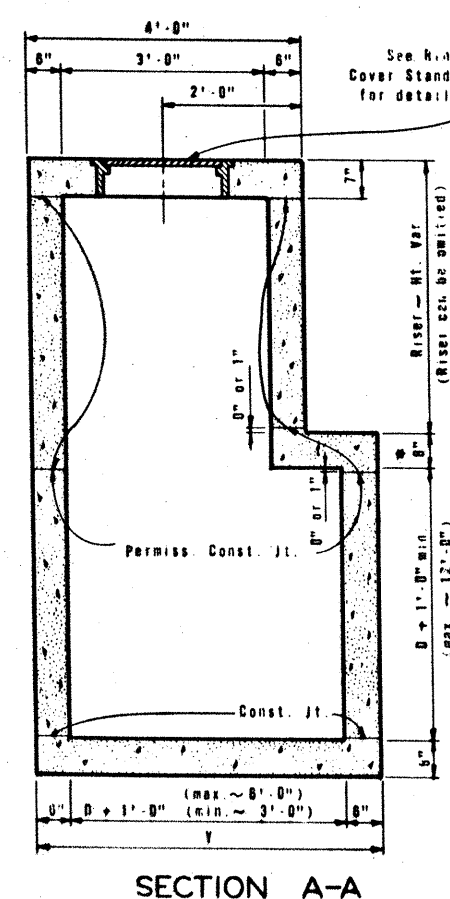
Connecting pipes should enter within 1' of or at inlet wall. If necessary, pipe above or curved approach alignment should be used to stay within this limit.



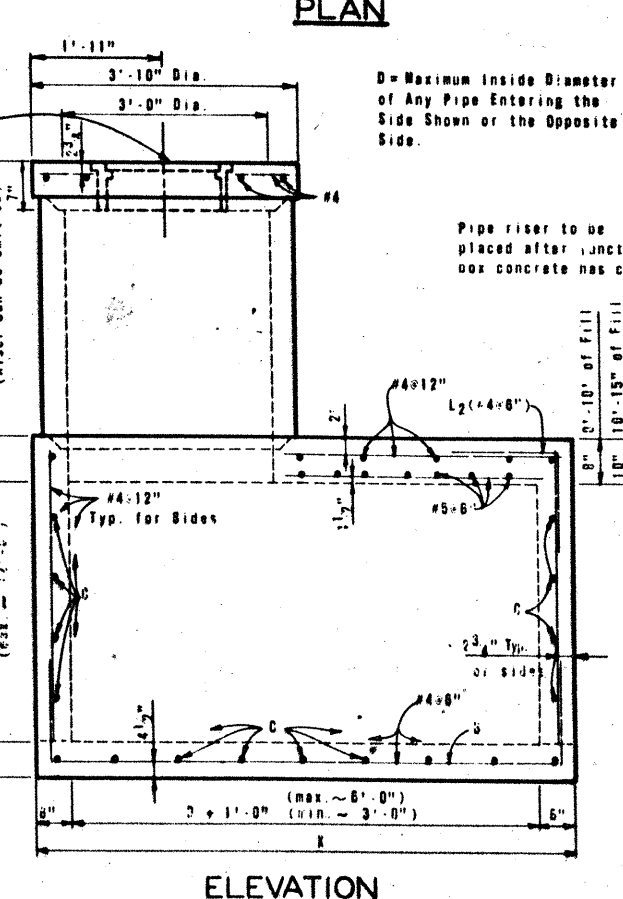
Pipes may enter any or all walls. The maximum size of pipe that can be accommodated is 60". More than one pipe may enter a side, subject to the maximum box dimensions shown. The clear distance between adjacent pipes should be 8" minimum.



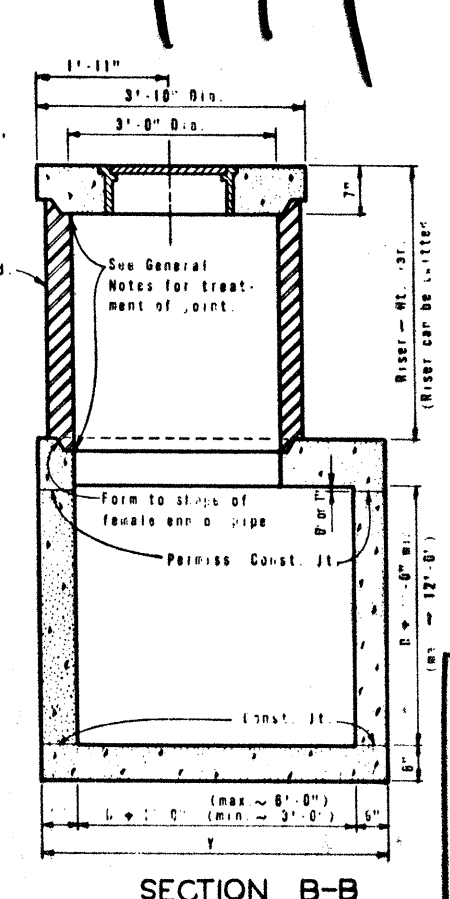
MANHOLE WITH CAST-IN-PLACE RISER



SECTION A-A



OPTIONAL MANHOLE WITH PIPE RISER



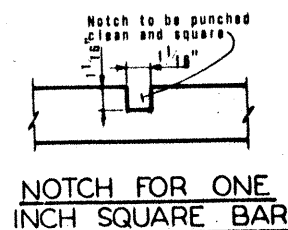
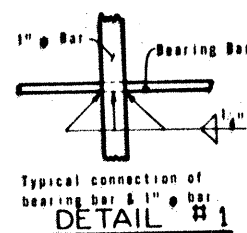
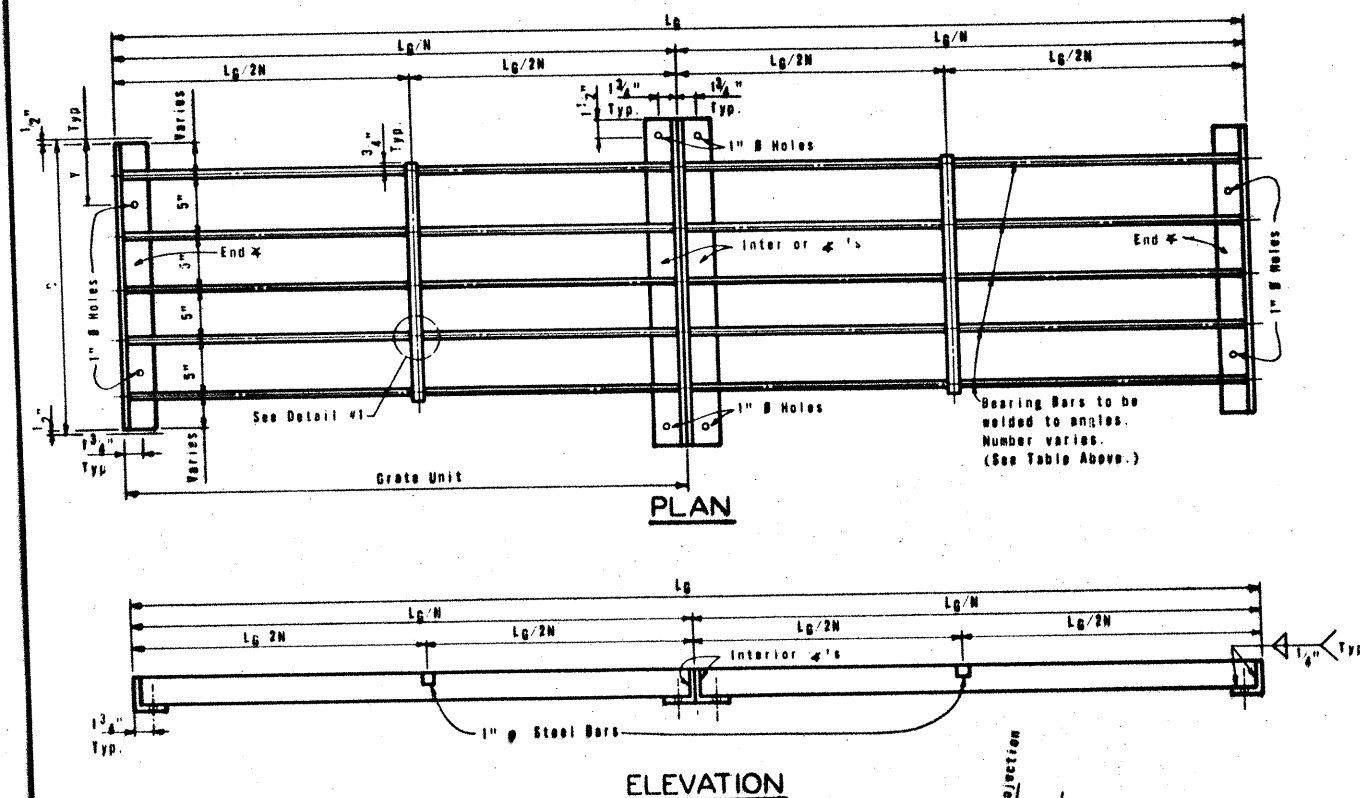
SECTION B-B

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION			
MANHOLE TYPE M			
(JUNCTION BOX WITH ACCESS)			
MH-M			
ORIGINAL DRAWING DATE DEC 1977	STATE	FEDERAL AID PROJECT	SHEET
DN - ADC	15	6	1R35-2(152)/73
CR - THD	Rev 8-86 Gen Notes	COUNTY	CONTRACT
SW - MGR			
CH - THD			

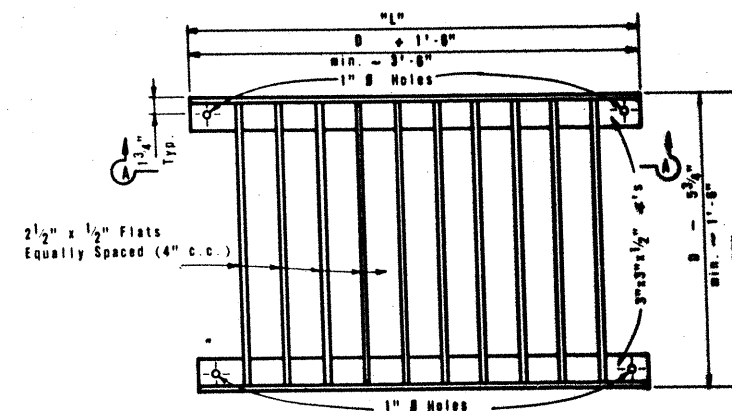
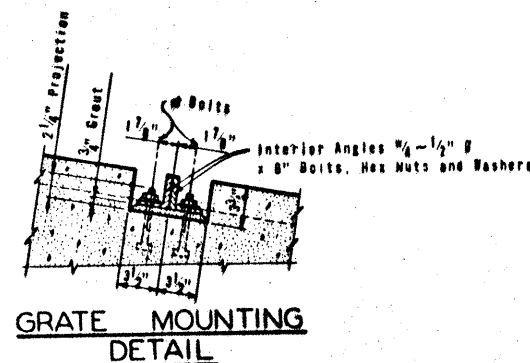


GRATE QUANTITIES FOR SLOPING INLET																				
SLOPE	Y	DIAM OF PIPE = D	TOTAL																	
			BEARING BARS @ 5" C.C.				INTERIOR ANGLES				END ANGLES				1" BARS				TOTAL WEIGHT LBS.	
			NO	SIZE	LG/N	WT.	NO	SIZE	LGTH	WT.	NO	SIZE	LGTH	WT.	NO	LGTH	WT.			
6:1	4 1/2"	18"	2	2	8	2 1/2" x 1/2"	6'-5 3/4"	220	2	3" x 3" x 1/2"	2'-0 1/2"	38	2	3" x 3" x 1/2"	1'-5"	27	2	1'-4 1/2"	9	285
6:1	5"	24"	2	2	10	2 1/2" x 1/2"	8'-1 3/4"	345	2	3" x 3" x 1/2"	2'-6 1/2"	43	2	3" x 3" x 1/2"	1'-11"	38	2	1'-8 1/2"	12	441
6:1	5 1/2"	30"	3	3	18	2 1/2" x 1/2"	8'-6 1/4"	480	4	3" x 3" x 1/2"	3'-0 1/2"	114	2	3" x 3" x 1/2"	2'-5"	45	3	2'-2 1/2"	23	680
6:1	6"	36"	3	3	21	2 1/2" x 1/2"	7'-7 1/4"	678	4	3" x 3" x 1/2"	3'-0 1/2"	133	2	3" x 3" x 1/2"	2'-11"	53	3	2'-7 1/2"	27	882
6:1	6 1/2"	42"	3	3	24	2 1/2" x 1/2"	8'-8 5/8"	888	4	3" x 3" x 1/2"	4'-0 1/2"	152	2	3" x 3" x 1/2"	3'-5"	64	3	3'-0 1/2"	31	1,138
6:1	4 1/2"	48"	4	4	40	2 1/2" x 1/2"	7'-4 1/4"	1,248	6	3" x 3" x 1/2"	4'-8 1/2"	258	2	3" x 3" x 1/2"	3'-11"	74	4	3'-10 1/2"	53	1,632

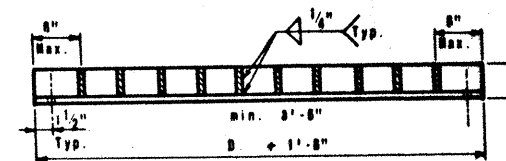
N = Number of grate units.  
For pipe diameters of 21", 27", and 33" use grates for pipe diameters of 24", 30" and 36", respectively.



GRATE DETAILS  
FOR SLOPING INLET  
TYPE S

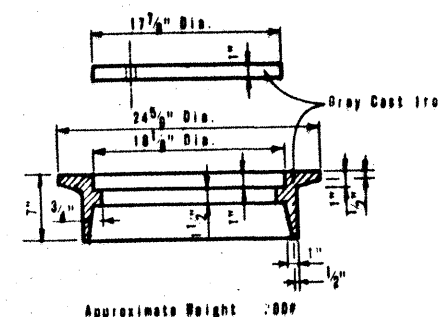
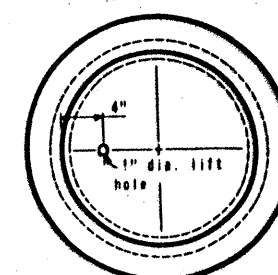


PLAN



SECTION A-A

GRATE DETAILS  
FOR HORIZONTAL INLET  
TYPE H



RING AND COVER  
DETAILS  
TYPE C

GENERAL NOTES  
Structural Steel for grates shall conform to the requirements of  
ASTM Designation A-36 or AISI Designation #1010 - #1020.

Rings and covers of slightly different dimensions but approximately  
the same weight may be substituted if approved by the Engineer.

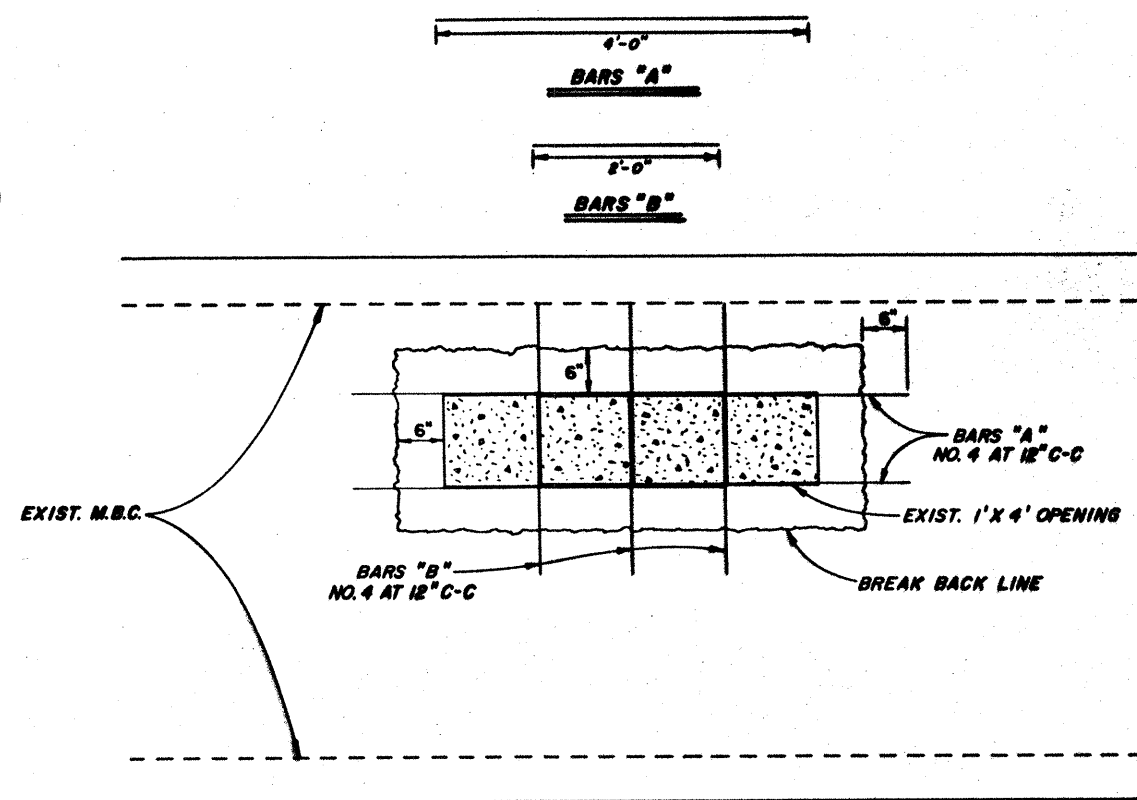


STATE DEPARTMENT OF HIGHWAYS  
AND PUBLIC TRANSPORTATION  
GRATE (TYPE S),  
GRATE (TYPE H),  
RING & COVER (TYPE C)  
ILG-S ILG-H RC-C

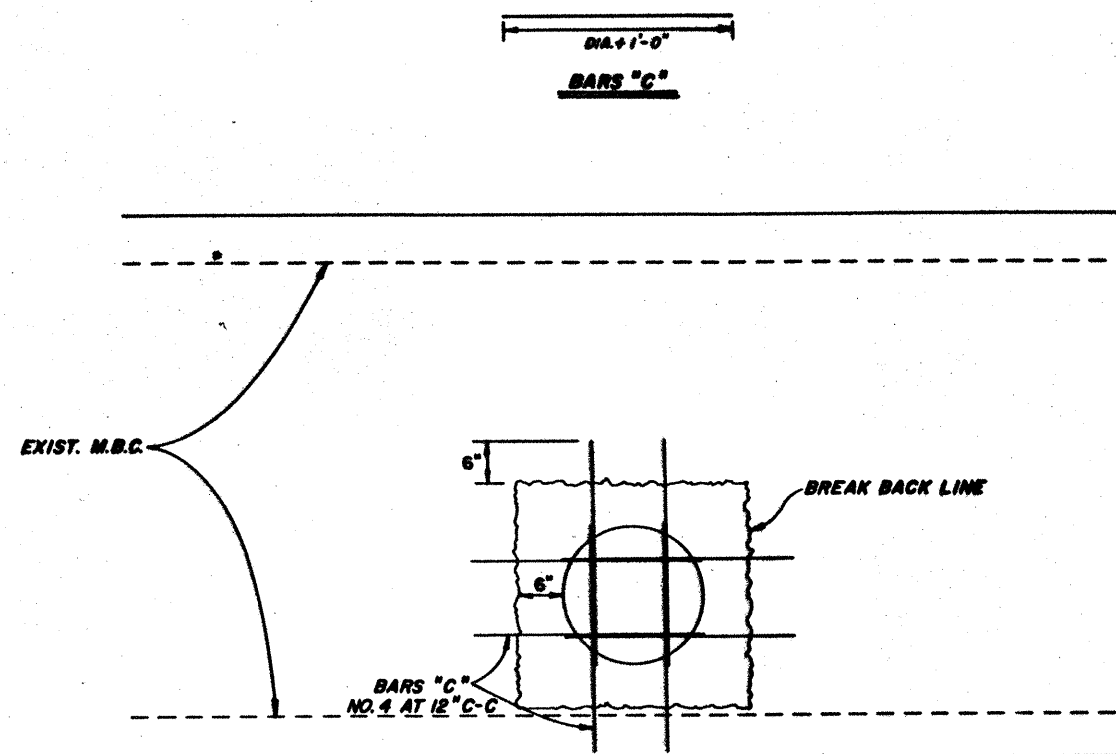
ORIGINAL DRAWING DATE DEC. 1977		STATE	FEDERAL	FEDERAL AID PROJECT	SHEET
DM: ADC	REVISIONS	18	6	24 35-2 (187) 113	192A
CP: THD		COUNTY	CONTRACT	SECTION	FOOTING
DP: MGB					
CH: THD					

194A

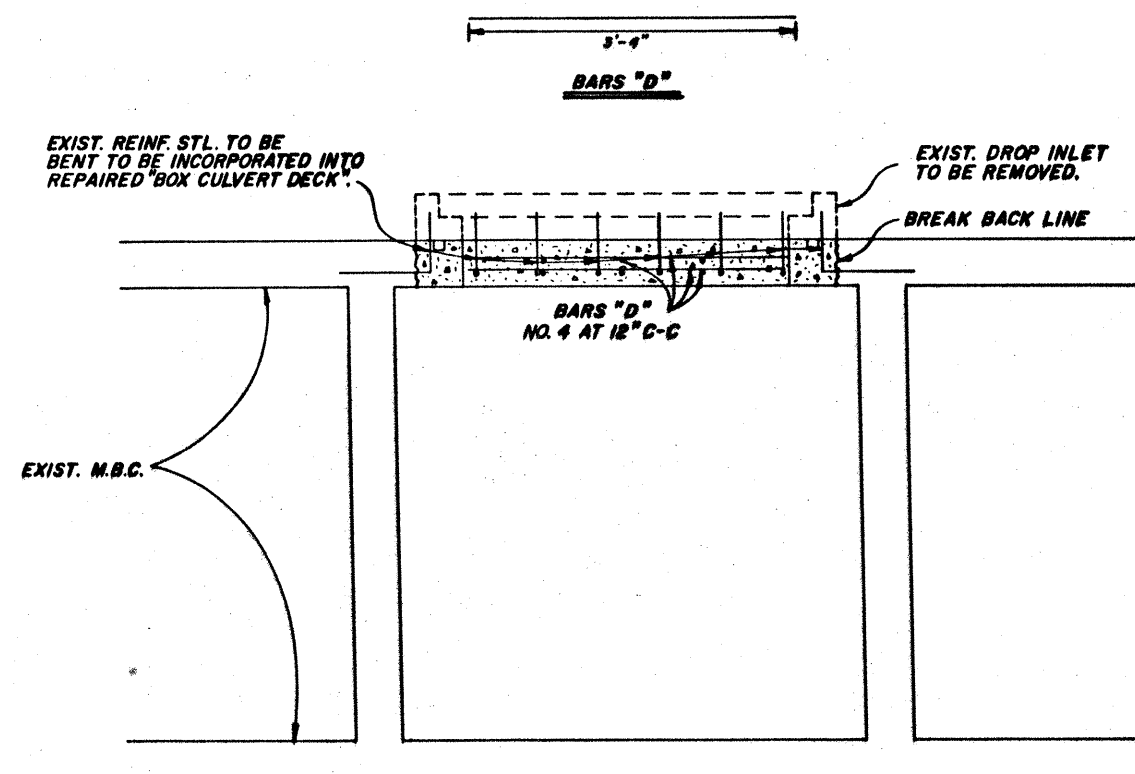
④



⑤



③



GENERAL NOTES

ALL STEEL, CONCRETE AND REPAIR WORK CONSIDERED SUBSIDIARY TO THE ITEM "EXT. CONC. STR."  
 ALL CONCRETE FOR REPAIR WORK SHALL BE CLASS "A"  
 ALL STEEL FOR REPAIR WORK SHALL BE GRADE 40  
 IN DETAILS A & B REINFORCING STEEL TO BE DOWELED AND GROUTED AT 6" DEPTH AS DIRECTED BY THE ENGINEER  
 FACE OF BREAK BACK LINE TO BE CLEARED OF ALL LOOSE CONCRETE. CONCRETE TO BE REMOVED FROM EXPOSED REINFORCING STEEL.  
 CONCRETE SURFACES AT THE BREAK BACK LINE MAY REQUIRE A MORTAR COATING AS DIRECTED BY THE ENGINEER.

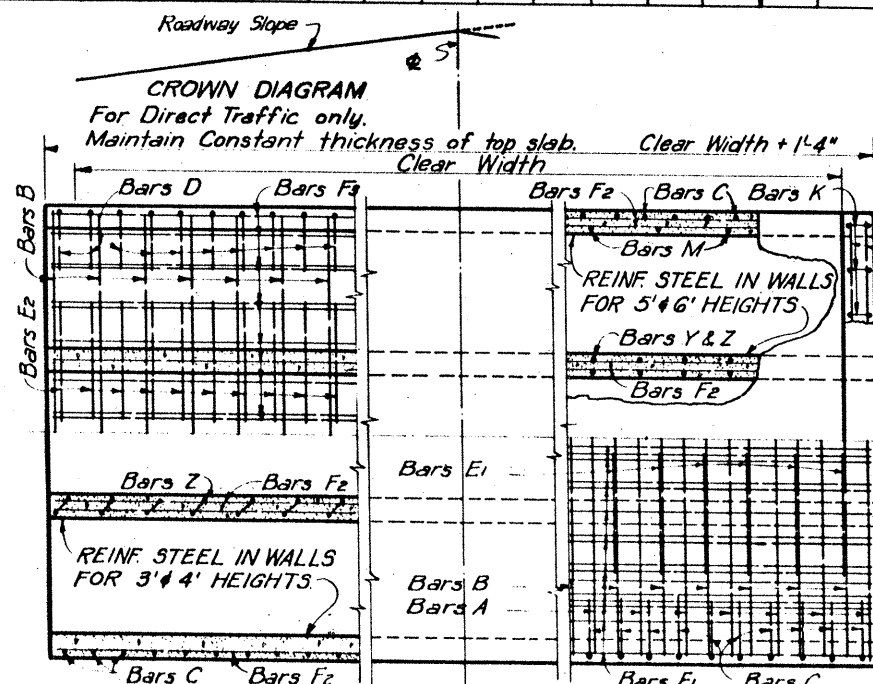
195

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MISCELLANEOUS BOX CULVERT REPAIR DETAILS

STATE	FEDERAL PROJECT NO.	STATE	FEDERAL PROJECT NO.
15	IR35-2(152)123	15	IR35-2(152)123
COUNTY	CONTRACT	COUNTY	CONTRACT
Guadalupe, Etc.	16	Guadalupe, Etc.	16



[illegible]

**BOTTOM SLAB** **TOP SLAB**  
NOTE: TOP & BOTTOM SLAB REINFORCING STEEL SIMILAR  
FOR CULVERT SIZES SHOWN ON THIS SHEET.

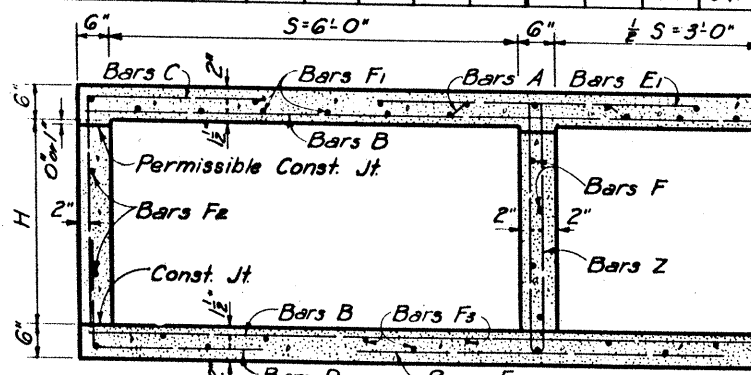


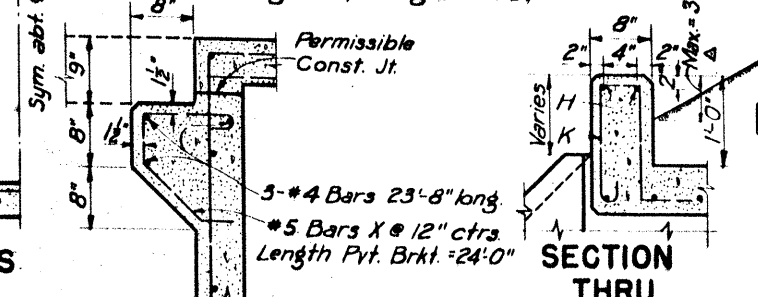
Diagram illustrating the reinforcement layout for a slab, showing various bars and dimensions:

- Top horizontal dimension:  $3' - 6' - 0''$
- Top horizontal segments:  $7''$ ,  $7''$ , and  $5' - 3' - 0''$
- Left vertical dimension:  $6''$
- Left vertical segments:  $0' - 2' - 2''$  and  $2''$
- Right vertical segments:  $2''$  and  $2''$
- Bottom horizontal dimension:  $6''$
- Bottom horizontal segments:  $1' - 2''$  and  $1' - 2''$
- Reinforcement bars labeled: Bars C, Bars F1, Bars A, Bars E1, Bars B, Bars F2, Bars M, Bars Z, Bars Y, Bars B, Bars F3.
- Notes: "Permissible Const. Jt." and "Const. Jt."

**BARS A**

BARREL QUANTITIES FOR 44' CLEAR WIDTH						
CULVERT SIZE	NO. OF SPANS	LENGTH OF STRUCT.	*BARREL QUANT.		QUANT. P.L.F. BBL	
			CONC.	STEEL	CONC.	STEEL
S	H		Cu. Yd.	Lb.	Cu. Yd.	Lb.
6'x3'	2	13'-6"	30.90	4521	0.667	97.30
	3	20'-0"	44.64	6635	0.963	143.99
	4	26'-6"	58.38	8862	1.259	190.69
	5	33'-0"	72.17	11,037	1.556	237.38
	6	39'-6"	85.91	13,205	1.852	284.07
6'x4'	2	13'-6"	33.40	4793	0.722	103.31
	3	20'-0"	48.00	7089	1.037	152.68
	4	26'-6"	62.60	9377	1.352	202.04
	5	33'-0"	77.20	11,674	1.667	251.40
	6	39'-6"	91.76	13,965	1.981	300.78
6'x5'	2	13'-9"	38.44	5620	0.833	121.43
	3	20'-4"	54.72	8128	1.185	175.44
	4	26'-11"	71.01	10629	1.537	229.47
	5	33'-6"	87.29	13139	1.889	283.49
	6	40'-1"	103.57	15647	2.241	337.48
6'x6'	2	13'-9"	41.39	5813	0.898	125.66
	3	20'-4"	58.67	8382	1.272	181.01
	4	26'-11"	75.90	10946	1.645	236.37
	5	33'-6"	93.18	13097	2.019	291.73
	6	40'-1"	110.42	16086	2.392	347.06

\* These quantities do not include toe walls, wings or paving bracket



SECTION  
THRU  
CURB

**GENERAL NOTES:**

The bottom edge of the top slab shall be chamfered 3 inches at the entrance. Reinforcing bars shall be adjusted to provide a minimum of 1 1/2 inches clear cover. Headwall heights will be reduced, if necessary, to provide a maximum of 3 inches projection above the roadway slope. No increase or decrease will be made in plan quantities of concrete or reinforcing steel for this work.

Construction joints shown at the flow line may be raised a maximum of 6 inches at the Contractor's option. Bars M may be cut off or raised, bars C and D may be reversed (D on top) and bars Y and Z may be reversed (Y on top).

All reinforcing steel shall be Grade 60.

PVT. BRKT. QUANT.

2 PVT. BRKTS.	
24'-0" Long	
CONC.	STEEL
CU. YDS.	LBS.
1.19	264

TEXAS HIGHWAY DEPARTMENT  
**MULTIPLE BOX CULVERTS**  
 SIZES 6'x3', 6'x4', 6'x5' & 6'x6'  
 DIRECT TRAFFIC TO 4'-0" FILL

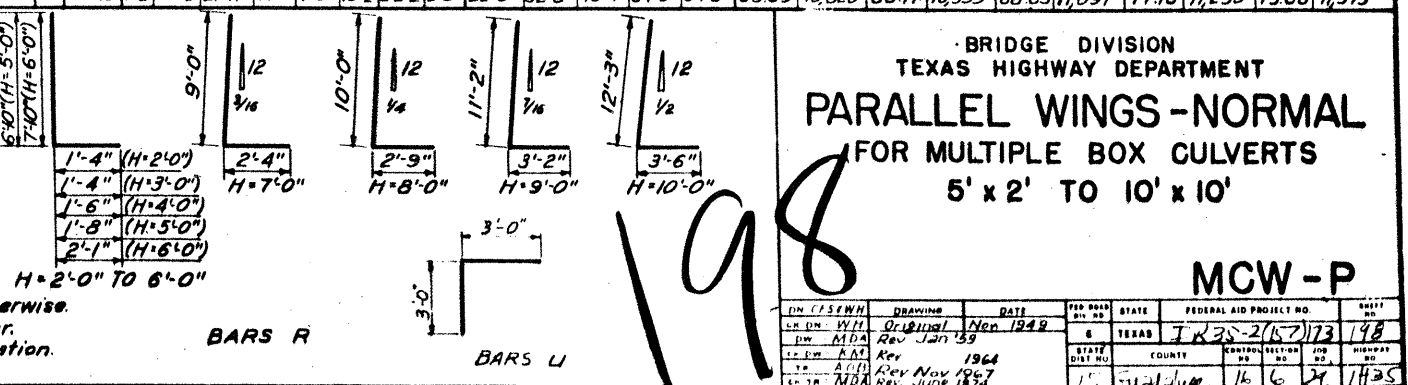
MC 6-1

Rev. 7-84		Rev. 8-85		Rev. 8-87 (Gen Note)		MC 6-1	
DRAWING		DATE		PER ROAD		STATE	
CR DM RMM		Original JAN 1958		STATE		FEDERAL AID PROJECT NO.	
DW KM		Rev Jan 1958		6 TEXAS		1R35-2(57) 173	
CR DM MDA		Rev Nov 1964		STATE		COUNTY	
TN CWW		Rev Nov 1967		DIST NO		CONTROL SECTION	
CR TM RM		Rev May 1977		15		16	

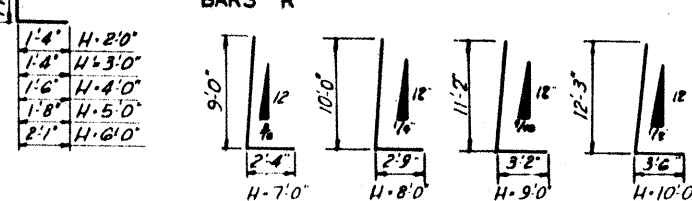




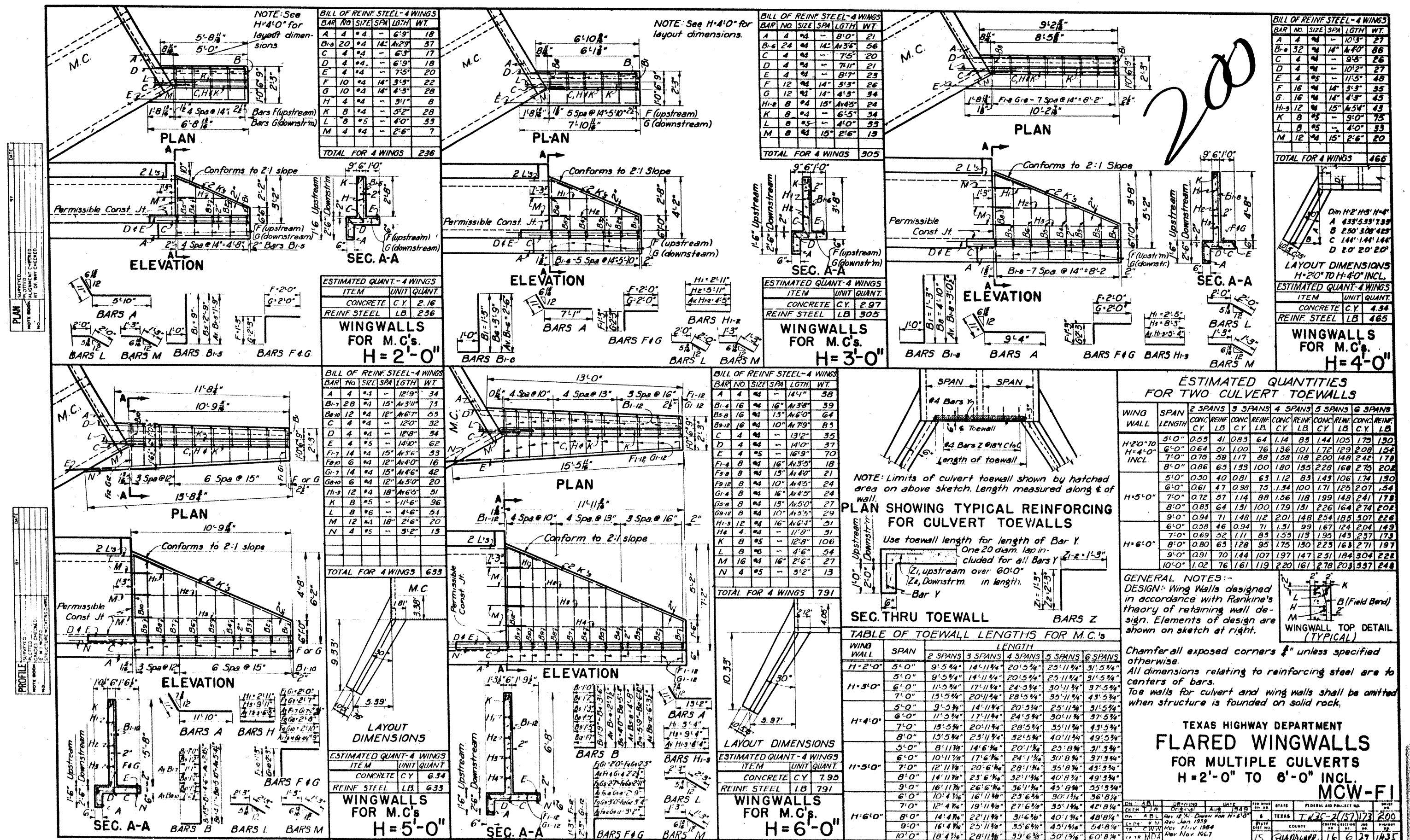


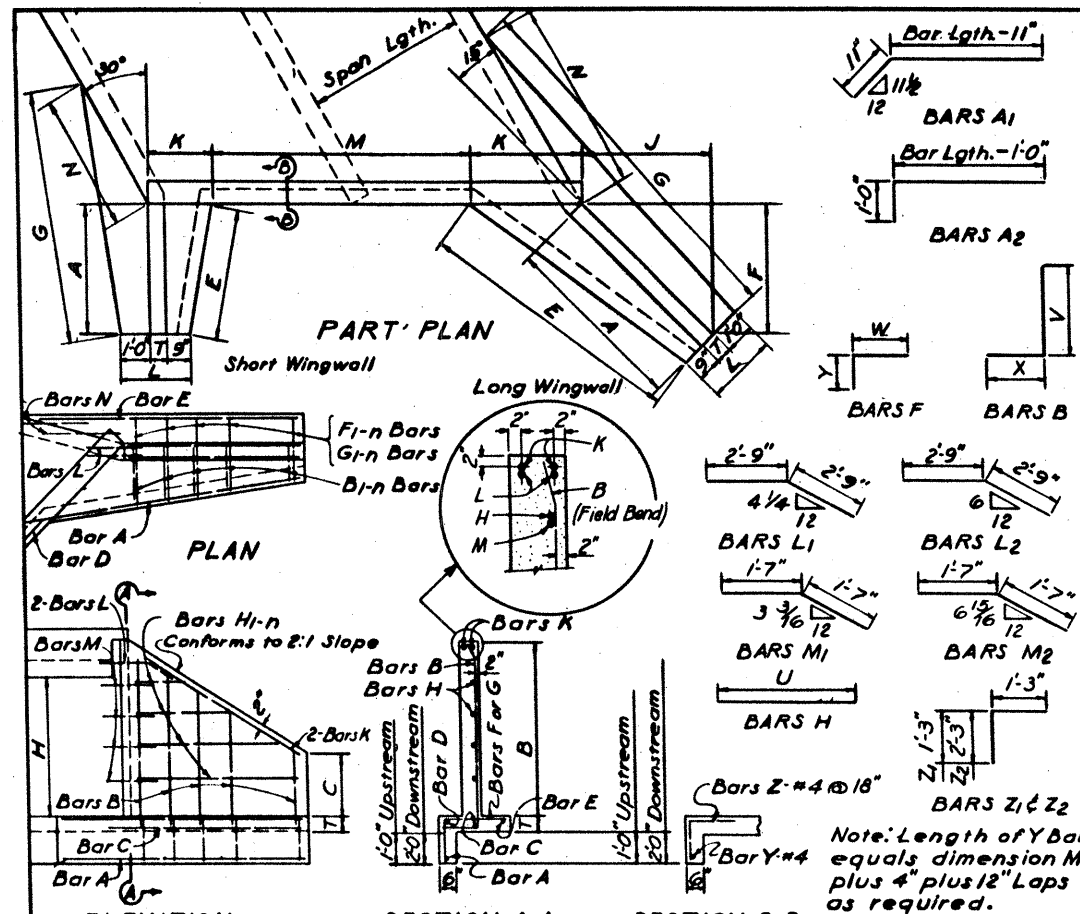












QUANTITIES FOR TWO M.B.C. TOEWALLS											
H	SPAN LGTH	2 SPANS	3 SPANS	4 SPANS	5 SPANS	6 SPANS	H	SPAN LGTH	2 SPANS	3 SPANS	4 SPANS
2'	5'-0"	0.63	46	0.98	71	1.33	2'	5'-0"	10.38	16.72	22.19
3'	5'-0"	0.63	46	0.98	71	1.33	3'	5'-0"	10.38	16.72	22.19
4'	5'-0"	0.63	46	0.98	71	1.33	4'	5'-0"	10.38	16.72	22.19
5'	5'-0"	0.63	46	0.98	71	1.33	5'	5'-0"	10.38	16.72	22.19
6'	5'-0"	0.63	46	0.98	71	1.33	6'	5'-0"	10.38	16.72	22.19
7'	5'-0"	0.63	46	0.98	71	1.33	7'	5'-0"	10.38	16.72	22.19
8'	5'-0"	0.63	46	0.98	71	1.33	8'	5'-0"	10.38	16.72	22.19
9'	5'-0"	0.63	46	0.98	71	1.33	9'	5'-0"	10.38	16.72	22.19
10'	5'-0"	0.63	46	0.98	71	1.33	10'	5'-0"	10.38	16.72	22.19

TABLE OF DIMENSIONS FOR WINGWALLS											
H	A	B	C	D	E	F	G	H	I	J	K
2'	4'-4"	3'-2"	1'-0"	4'-4"	3'-2"	1'-0"	4'-4"	2'	4'-4"	3'-2"	1'-0"
3'	4'-4"	3'-2"	1'-0"	4'-4"	3'-2"	1'-0"	4'-4"	3'	4'-4"	3'-2"	1'-0"
4'	4'-4"	3'-2"	1'-0"	4'-4"	3'-2"	1'-0"	4'-4"	4'	4'-4"	3'-2"	1'-0"
5'	4'-4"	3'-2"	1'-0"	4'-4"	3'-2"	1'-0"	4'-4"	5'	4'-4"	3'-2"	1'-0"
6'	4'-4"	3'-2"	1'-0"	4'-4"	3'-2"	1'-0"	4'-4"	6'	4'-4"	3'-2"	1'-0"
7'	4'-4"	3'-2"	1'-0"	4'-4"	3'-2"	1'-0"	4'-4"	7'	4'-4"	3'-2"	1'-0"
8'	4'-4"	3'-2"	1'-0"	4'-4"	3'-2"	1'-0"	4'-4"	8'	4'-4"	3'-2"	1'-0"
9'	4'-4"	3'-2"	1'-0"	4'-4"	3'-2"	1'-0"	4'-4"	9'	4'-4"	3'-2"	1'-0"
10'	4'-4"	3'-2"	1'-0"	4'-4"	3'-2"	1'-0"	4'-4"	10'	4'-4"	3'-2"	1'-0"

BAR DIMENSIONS - LONG WINGWALLS											
H	BAR	DIMENSIONS	BAR	DIMENSIONS	BAR	DIMENSIONS	BAR	DIMENSIONS	BAR	DIMENSIONS	BAR
2'	B1	1'-3"	B5	3'-3"	B9	5'-3"	B13	7'-3"	B17	9'-3"	B21
3'	B1	1'-3"	B5	3'-3"	B9	5'-3"	B13	7'-3"	B17	9'-3"	B21
4'	B1	1'-3"	B5	3'-3"	B9	5'-3"	B13	7'-3"	B17	9'-3"	B21
5'	B1	1'-3"	B5	3'-3"	B9	5'-3"	B13	7'-3"	B17	9'-3"	B21
6'	B1	1'-3"	B5	3'-3"	B9	5'-3"	B13	7'-3"	B17	9'-3"	B21
7'	B1	1'-3"	B5	3'-3"	B9	5'-3"	B13	7'-3"	B17	9'-3"	B21
8'	B1	1'-3"	B5	3'-3"	B9	5'-3"	B13	7'-3"	B17	9'-3"	B21
9'	B1	1'-3"	B5	3'-3"	B9	5'-3"	B13	7'-3"	B17	9'-3"	B21
10'	B1	1'-3"	B5	3'-3"	B9	5'-3"	B13	7'-3"	B17	9'-3"	B21

BILLS OF REINFORCING STEEL FOR H=2'-0"											
Bar	No.	Size	Length	Weight	Bar	No.	Size	Length	Weight	Bar	No.
A1	2	4	17'-0"	11	B1	10	4	17'-0"	22	C1	2
A2	2	4	17'-0"	11	B2	10	4	17'-0"	22	C2	2
A3	2	4	17'-0"	11	B3	10	4	17'-0"	22	C3	2
A4	2	4	17'-0"	11	B4	10	4	17'-0"	22	C4	2
A5	2	4	17'-0"	11	B5	10	4	17'-0"	22	C5	2
A6	2	4	17'-0"	11	B6	10	4	17'-0"	22	C6	2
A7	2	4	17'-0"	11	B7	10	4	17'-0"	22	C7	2
A8	2	4	17'-0"	11	B8	10	4	17'-0"	22	C8	2
A9	2	4	17'-0"	11	B9	10	4	17'-0"	22	C9	2
A10	2	4	17'-0"	11	B10	10	4	17'-0"	22	C10	2

BILLS OF REINFORCING STEEL FOR H=3'-0"											
Bar	No.	Size	Length	Weight	Bar	No.	Size	Length	Weight	Bar	No.
A1	2	4	17'-0"	11	B1	10	4	17'-0"	22	C1	2
A2	2	4	17'-0"	11	B2	10	4	17'-0"	22	C2	2
A3	2	4	17'-0"	11	B3	10	4	17'-0"	22	C3	2
A4	2	4	17'-0"	11	B4	10	4	17'-0"	22	C4	2
A5	2	4	17'-0"	11	B5	10	4	17'-0"	22	C5	2
A6	2	4	17'-0"	11	B6	10	4	17'-0"	22	C6	2
A7	2	4	17'-0"	11	B7	10	4	17'-0"	22	C7	2
A8	2	4	17'-0"	11	B8	10	4	17'-0"	22	C8	2
A9	2	4	17'-0"	11	B9	10	4	17'-0"	22	C9	2
A10	2	4	17'-0"	11	B10	10	4	17'-0"	22	C10	2

BILLS OF REINFORCING STEEL FOR H=4'-0"											
Bar	No.	Size	Length	Weight	Bar	No.	Size	Length	Weight	Bar	No.
A1	2	4	17'-0"	11	B1	10	4	17'-0"	22	C1	2
A2	2	4	17'-0"	11	B2	10	4	17'-0"	22	C2	2
A3	2	4	17'-0"	11	B3	10	4	17'-0"	22	C3	2
A4	2	4	17'-0"	11	B4	10	4	17'-0"	22	C4	2
A5	2	4	17'-0"	11	B5	10	4	17'-0"	22	C5	2
A6	2	4	17'-0"	11	B6	10	4	17'-0"	22	C6	2
A7	2	4	17'-0"	11	B7	10	4	17'-0"	22	C7	2
A8	2	4	17'-0"	11	B8	10	4	17'-0"	22	C8	2
A9	2	4	17'-0"	11	B9	10	4	17'-0"	22	C9	2
A10	2	4	17'-0"	11	B10	10	4	17'-0"	22	C10	2

BILLS OF REINFORCING STEEL FOR H=5'-0"											
Bar	No.	Size	Length	Weight	Bar	No.	Size	Length	Weight	Bar	No.
A1	2	4	17'-0"	11	B1	10	4	17'-0"	22	C1	2
A2	2	4	17'-0"	11	B2	10	4	17'-0"	22	C2	2
A3	2	4	17'-0"	11	B3	10	4	17'-0"	22	C3	2
A4	2	4	17'-0"	11	B4	10	4	17'-0"	22	C4	2
A5	2	4	17'-0"	11	B5	10	4	17'-0"	22	C5	2
A6	2	4	17'-0"	11	B6	10	4	17'-0"	22	C6	2
A7	2	4	17'-0"	11	B7	10	4	17'-0"	22	C7	2
A8	2	4	17'-0"	11	B8	10	4	17'-0"	22	C8	2
A9	2	4	17'-0"	11	B9	10	4	17'-0"	22	C9	2
A10	2	4	17'-0"	11	B10	10	4	17'-0"	22	C10	2

BILLS OF REINFORCING STEEL FOR H=6'-0"											
Bar	No.	Size	Length	Weight	Bar	No.	Size	Length	Weight	Bar	No.
A1	2	4	17'-0"	11	B1	10	4	17'-0"	22	C1	2
A2	2	4	17'-0"	11	B2	10	4	17'-0"	22	C2	2
A3	2	4	17'-0"	11	B3	10	4	17'-0"	22	C3	2
A4	2	4	17'-0"	11	B4	10	4	17'-0"	22	C4	2
A5	2	4	17'-0"	11	B5	10	4	17'-0"	22	C5	2
A6	2	4	17'-0"	11	B6	10	4	17'-0"	22	C6	2
A7	2	4	17'-0"	11	B7	10	4	17'-0"	22	C7	2
A8	2	4	17'-0"	11	B8	10	4	17'-0"	22	C8	2
A9	2	4	17'-0"	11	B9	10	4	17'-0"	22	C9	2
A10	2	4	17'-0"	11	B10	10	4	17'-0"	22	C10	2

**GENERAL NOTES:**  
DESIGN: Wingwall designed in accordance with Rankine's theory of retaining wall design.

Chamfer exposed corners  $\frac{1}{4}$  unless specified otherwise.

All dimensions relating to reinforcing steel are to centers of bars.

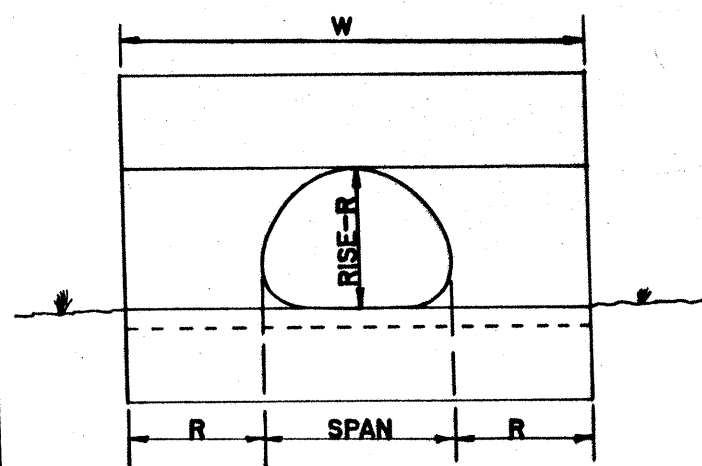
The toe walls for wingwalls and culverts shall be omitted when structure is founded on solid rock.

BRIDGE DIVISION  
TEXAS HIGHWAY DEPARTMENT  
**FLARED WINGWALLS**  
FOR 30° SKEWED MULTIPLE BOX CULVERTS  
H=2'-0" TO 7'-0" INCLUSIVE  
**MCW-FI-30°**

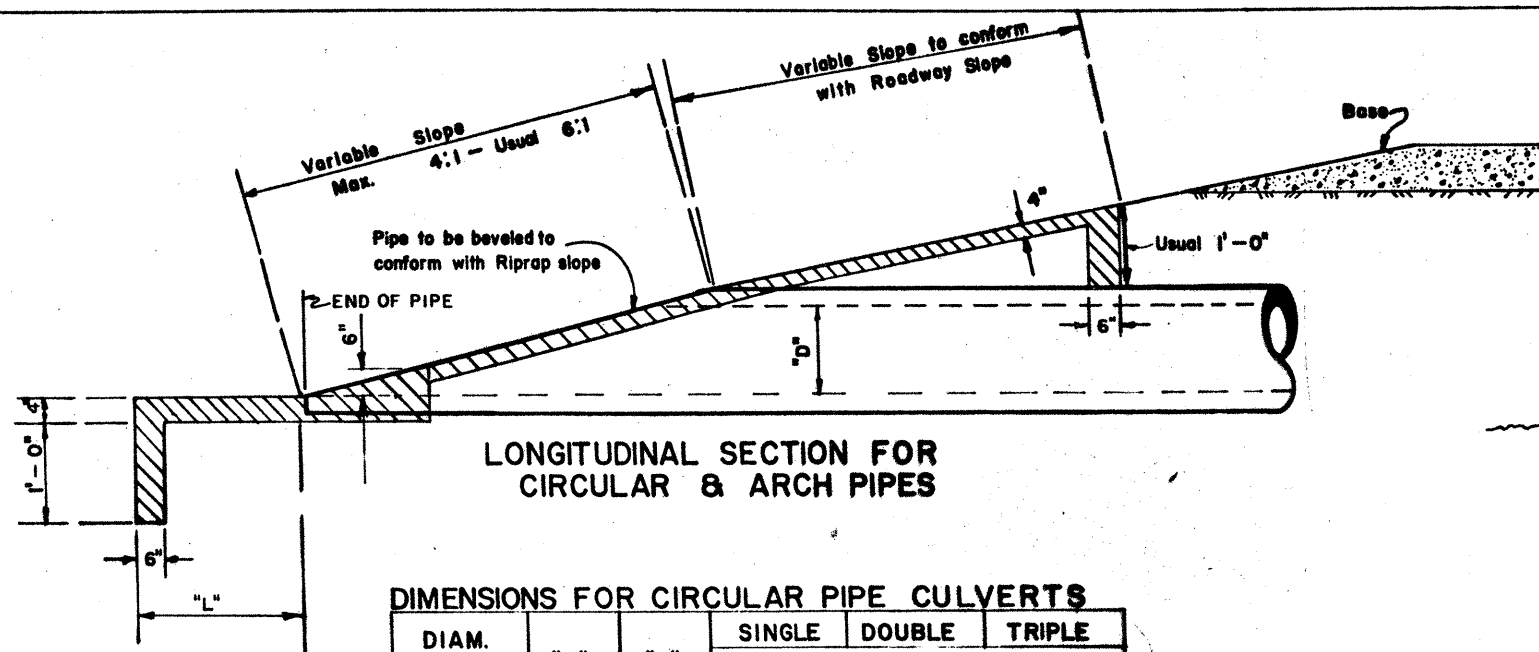
DATE	DRAWING	DATE	REV.	BY	CHK.	APP.	DATE	REV.	BY	CHK.	APP.
11-21-56	02/20/57	11-21-56	1	J.M.G.	H.M.H.	02/20/57	1	J.M.G.	H.M.H.	02/20/57	1
11-21-56	02/20/57	11-21-56	1	J.M.G.	H.M.H.	02/20/57	1	J.M.G.	H.M.H.	02/20/57	1
11-21-56	02/20/57	11-21-56	1	J.M.G.	H.M.H.	02/20/57	1	J.M.G.	H.M.H.	02/20/57	1
11-21-56	02/20/57	11-21-56	1	J.M.G.	H.M.H.	02/20/57	1	J.M.G.	H.M.H.	02/20/57	1





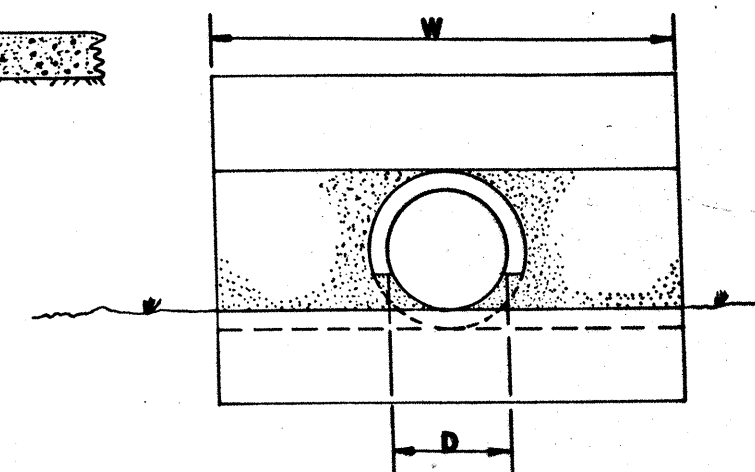


SINGLE C.G.M. PIPE ARCH CULVERT

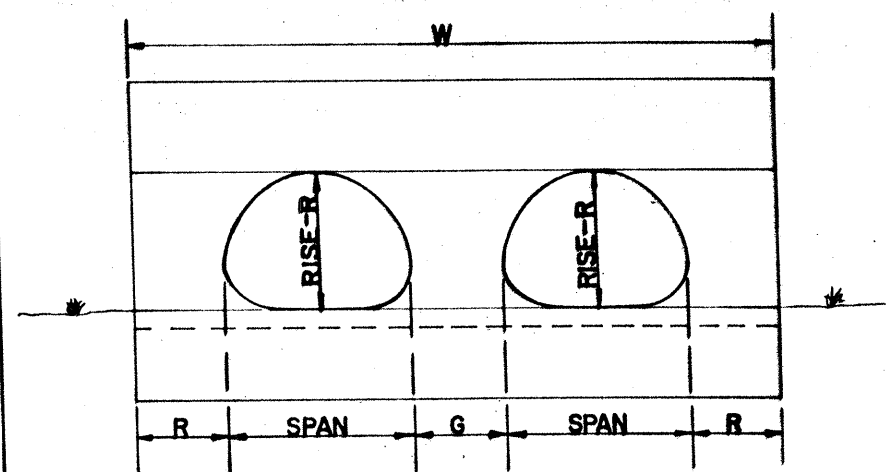


DIMENSIONS FOR CIRCULAR PIPE CULVERTS

DIAM. OF PIPE	"L"	"G"	"W"		
			SINGLE	DOUBLE	TRIPLE
18"	2'-0"	1'-2"	4'-6"	7'-2"	9'-10"
21"	2'-6"	1'-3 1/2"	5'-3"	8'-4"	11'-4"
24"	3'-0"	1'-5"	6'-0"	9'-5"	12'-10"
30"	4'-0"	1'-8"	7'-6"	11'-8"	15'-10"
36"	5'-0"	1'-11"	9'-0"	13'-11"	18'-10"
42"	6'-0"	2'-2"	10'-6"	16'-2"	21'-10"
48"	7'-0"	2'-5"	12'-0"	18'-5"	24'-10"
54"	8'-0"	2'-10"	13'-6"	20'-10"	28'-2"
60"	9'-0"	3'-0"	15'-0"	23'-0"	31'-0"



SINGLE CIRCULAR PIPE CULVERT

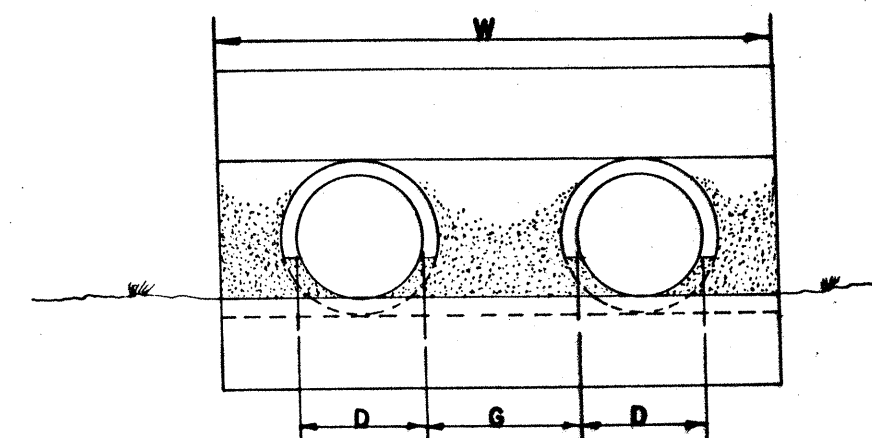


MULTIPLE C.G.M. PIPE ARCH CULVERT

DIMENSIONS FOR C.G.M. PIPE ARCH CULVERTS

DESIGN SIZE	APPROX. ARCH DIM.		"L"	"G"	"W"			
	Span	Rise			SINGLE	DOUBLE	TRIPLE	QUADRUPLE
1	17"	13"	2'-0"	1'-0"	3'-7"	6'-0"	8'-5"	10'-10"
2	21"	15"	2'-0"	1'-2"	4'-3"	7'-2"	10'-1"	13'-0"
3	28"	20"	3'-0"	1'-5"	5'-8"	9'-5"	13'-2"	16'-11"
4	35"	24"	4'-0"	1'-8"	6'-11"	11'-6"	16'-1"	20'-8"
5	42"	29"	5'-0"	1'-11"	8'-4"	13'-9"	19'-2"	24'-7"
6	49"	33"	6'-0"	2'-2"	9'-7"	15'-0"	22'-1"	28'-4"
7	57"	38"	7'-0"	2'-5"	11'-1"	18'-3"	25'-5"	32'-7"
8	64"	43"	8'-0"	2'-10"	12'-5"	20'-8"	28'-10"	37'-0"
9	71"	47"	9'-0"	3'-0"	13'-9"	22'-8"	31'-7"	40'-6"

NOTE:  
For Riprap Quantities  
See Culvert Layout Sheet

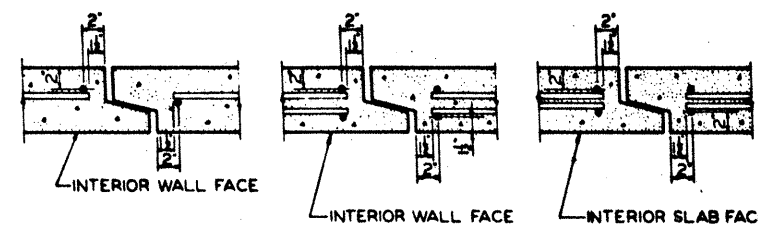


MULTIPLE CIRCULAR PIPE CULVERT

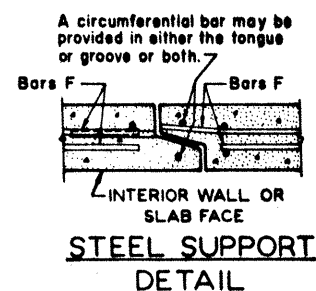
RIPRAP HEADWALLS FOR PIPE CULVERTS  
RH-15-1

203

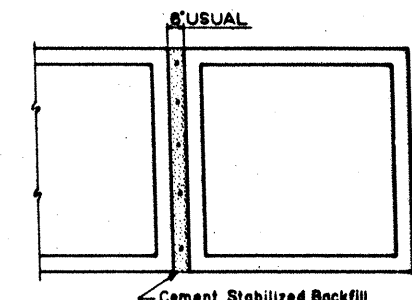
CULV SIZE		TYPE SECT.	DIMEN- SIONS		MAX. FILL	TOTAL QUANTITIES FOR L=8'		QUANTITIES PLF OF BARREL		BILL OF REINFORCING STEEL FOR L=8'																				LIFT. WEIGHT L=8'						
						CONC		REINF		BARS A TOP SLAB				BARS B BOTTOM SLAB				BARS C				#4 BARS D @18"± C TO C			# 4 BARS F @ 18" MAX. LENGTH L= 7"											
						CY	LBS	CY	LBS	NO	SIZE	SPA	LG	WT	NO	SIZE	SPA	LG	WT	NO	SIZE	SPA	LG	WT	NO	LG	WT	F <sub>1</sub>	SPA			F <sub>2</sub>	SPA	F <sub>3</sub>	SPA	TOTAL
3	2	1	6"	6"	14"	1.778	193	2222	24.13	9	#4	12"	3'-6"	21							12	#4	8 1/2"	13'-6"	108			3	14"	8	14"	2	15"	13	64	7,330
3	3	1	6"	6"	14"	2.074	230	2592	28.88	9	#4	11 1/2"	3'-6"	21							13	#4	7 1/2"	15'-6"	135			3	14"	8	14"	4	14"	15	74	8,560
	2	1	6"	6"	12"	2.074	295	2592	36.88	8	#5	14"	4'-6"	38							11	#5	9"	15'-6"	178			4	18"	10	18"	2	15"	16	79	8,600
4	3	1	6"	6"	12"	2.370	346	2963	43.75	8	#5	12"	4'-6"	38							12	#5	8"	17'-6"	219			4	18"	10	18"	4	14"	18	89	9,840
	4	1	6"	6"	12"	2.667	395	3333	49.38	9	#5	12"	4'-6"	42							13	#5	7 1/2"	19'-6"	264			4	18"	10	18"	4	18"	18	89	11,070
5	2	2	6"	6"	8"	2.370	385	2963	48.25	10	#5	10"	5'-6"	57	11	#5	9"	5'-6"	63	9	#5	11"	17'-8"	166			8	17"	10	17"	2	15"	20	99	9,860	
	3	2	6"	6"	8"	2.667	426	3333	53.25	11	#5	9"	5'-6"	63	12	#5	8 1/2"	5'-6"	69	9	#5	12"	19'-8"	185			8	17"	10	17"	4	14"	22	109	11,100	
	4	2	6"	6"	8"	2.963	444	3704	57.00	11	#5	8 1/2"	5'-6"	63	12	#5	7 1/2"	5'-6"	69	9	#5	12"	21'-8"	203			8	17"	10	17"	4	18"	22	109	12,310	
6	5	3	6"	6"	8"	3.556	548	4445	68.50	11	#5	9"	5'-8"	65	12	#5	8"	5'-8"	71	8	#5	13"	24'-0"	200	12	5'-6"	44	10	17"	12	17"	12	18"	34	168	14,780
	3	2	6"	6"	8"	2.963	568	3704	71.00	14	#5	7"	6'-6"	95	14	#5	7"	6'-6"	95	11	#5	9"	21'-8"	249			10	15"	12	15"	4	14"	26	129	12,390	
	4	2	6"	6"	8"	3.259	605	4074	75.63	15	#5	6 1/2"	6'-6"	102	15	#5	6 1/2"	6'-6"	102	11	#5	9 1/2"	23'-8"	272			10	15"	12	15"	4	18"	26	129	13,620	
7	5	3	6"	6"	8"	3.852	684	4815	85.50	14	#5	7"	6'-8"	97	15	#5	6 1/2"	6'-8"	104	10	#5	10"	26'-0"	271	12	5'-6"	44	10	16"	12	16"	12	18"	34	168	16,070
	6	3	6"	6"	8"	4.198	746	5248	93.25	15	#5	6 1/2"	6'-8"	102	16	#5	6"	6'-8"	111	10	#5	10"	28'-0"	292	12	6'-6"	52	10	16"	12	16"	16	16"	38	189	17,520
	3	2	6 1/2"	6"	6"	3.457	746	4321	93.25	11	#6	9"	7'-6"	124	12	#6	8"	7'-6"	135	10	#6	10"	23'-10"	358			10	18"	12	18"	4	14"	26	129	14,520	
8	4	2	6 1/2"	6"	6"	3.753	778	4691	97.25	12	#6	8"	7'-6"	135	13	#6	7 1/2"	7'-6"	146	9	#6	11"	25'-10"	349			12	18"	14	18"	4	18"	30	148	15,740	
	5	3	6 1/2"	7"	6"	4.350	879	5438	109.88	11	#6	9"	7'-8"	127	12	#6	8"	7'-8"	138	9	#6	11 1/2"	28'-2"	381	12	5'-6"	44	12	17"	14	17"	12	18"	38	189	18,220
	6	3	6 1/2"	7"	6"	4.695	956	5869	119.50	12	#6	8 1/2"	7'-8"	138	13	#6	8 1/2"	7'-8"	150	9	#6	12"	30'-2"	408	12	6'-6"	52	12	17"	14	17"	16	16"	42	208	19,670
9	7	3	6 1/2"	7"	6"	5.041	1011	6301	126.38	12	#6	8 1/2"	7'-8"	138	13	#6	7 1/2"	7'-8"	150	9	#6	11 1/2"	32'-2"	435	12	7'-6"	60	12	17"	14	17"	20	15"	46	228	21,110
	4	2	6 1/2"	6"	6"	4.074	979	5093	122.38	15	#6	6 1/2"	8'-6"	192	14	#6	7"	8'-6"	179	11	#6	9"	27'-10"	460			12	17"	14	17"	4	18"	30	148	17,180	
	5	3	6 1/2"	7"	6"	4.671	1050	5838	131.25	14	#6	7"	8'-8"	182	14	#6	7"	8'-8"	182	10	#6	10"	30'-2"	453	12	5'-6"	44	12	17"	14	17"	12	18"	38	189	19,640
10	6	3	6 1/2"	7"	6"	5.017	1107	6271	138.38	14	#6	7"	8'-8"	182	14	#6	7"	8'-8"	182	10	#6	10"	32'-2"	483	12	6'-6"	52	12	17"	14	17"	16	16"	42	208	21,080
	7	3	6 1/2"	7"	6"	5.362	1178	6703	147.25	14	#6	7"	8'-8"	182	15	#6	6 1/2"	8'-8"	195	10	#6	10"	34'-2"	513	12	7'-6"	60	12	17"	14	17"	20	15"	46	228	22,530
	8	3	6 1/2"	8"	6"	6.157	1202	7696	150.25	13	#6	7 1/2"	8'-10"	172	14	#6	7"	8'-10"	186	10	#6	10 1/2"	36'-6"	548	12	8'-6"	68	12	18"	14	18"	20	18"	46	228	25,770
11	5	3	7"	7"	6"	5.242	1222	6553	152.75	15	#6	6 1/2"	9'-8"	218	15	#6	6 1/2"	9'-8"	218	11	#6	9"	32'-4"	534	12	5'-6"	44	14	17"	16	17"	12	18"	42	208	22,070
	6	3	7"	7"	6"	5.588	1297	6985	162.13	16	#6	6"	9'-8"	232	15	#6	6 1/2"	9'-8"	218	11	#6	9"	34'-4"	567	12	6'-6"	52	14	17"	16	17"	16	16"	46	228	23,530
	7	3	7"	7"	6"	5.934	1372	7417	171.50	16	#6	6"	9'-8"	232	16	#6	6"	9'-8"	232	11	#6	9"	36'-4"	600	12	7'-6"	60	14	17"	16	17"	20	15"	50	248	24,980
12	8	3	7"	8"	6"	6.733	1399	8416	174.88	15	#6	6 1/2"	9'-10"	222	15	#6	6 1/2"	9'-10"	222	11	#6	9 1/2"	38'-8"	639	12	8'-6"	68	14	17"	16	17"	20	18"	50	248	28,230
	9	3	7"	8"	6"	7.128	1460	8909	182.50	15	#6	6 1/2"	9'-10"	222	15	#6	6 1/2"	9'-10"	222	11	#6	9"	40'-8"	672	12	9'-6"	76	14	17"	16	17"	24	17"	54	268	29,880
	5	3	7"	7"	6"	5.588	1470	6985	183.75	17	#6	5 1/2"	10'-8"	272	16	#6	6"	10'-8"	256	13	#6	7 1/2"	34'-4"	670	12	5'-6"	44	16	16"	18	16"	12	18"	46	228	23,650
13	6	3	7"	7"	6"	5.934	1537	7417	192.13	17	#6	5 1/2"	10'-8"	272	16	#6	6"	10'-8"	256	13	#6	7 1/2"	36'-4"	709	12	6'-6"	52	16	16"	18	16"	16	16"	50	248	25,090
	7	3	7"	7"	6"	6.279	1604	7849	200.50	17	#6	5 1/2"	10'-8"	272	17	#6	5 1/2"	10'-8"	256	13	#6	7 1/2"	38'-4"	748	12	7'-6"	60	16	16"	18	16"	20	15"	54	268	26,540
	8	3	7"	8"	6"	7.078	1623	8848	202.88	17	#6	5 1/2"	10'-10"	277	17	#6	5 1/2"	10'-10"	277	12	#6	8"	40'-8"	733	12	8'-6"	68	16	16"	18	16"	20	18"	54	268	29,790
14	9	3	7"	8"	6"	7.473	1686	9342	210.75	17	#6	5 1/2"	10'-10"	277	17	#6	5 1/2"	10'-10"	277	12	#6	8"	42'-8"	769	12	9'-6"	76	16	16"	18	16"	24	17"	58	287	31,430
	10	3	7"	8"	6"	7.868	1817	9835	227.13	17	#6	5 1/2"	10'-10"	277	17	#6	5 1/2"	10'-10"	277	13	#6	7 1/2"	44'-8"	872	12	10'-6"	84	16	16"	18	16"	28	16"	62	307	33,120



**SINGLE MAT PLACEMENT** **DOUBLE MAT PLACEMENT**



NOTE: As many Bars F as necessary may be extended to end of box to support steel during manufacture. Bars may be slightly bent to clear slope on groove lip as shown in detail. Alternatively the steel may be supported by bar extensions welded to Bars F.

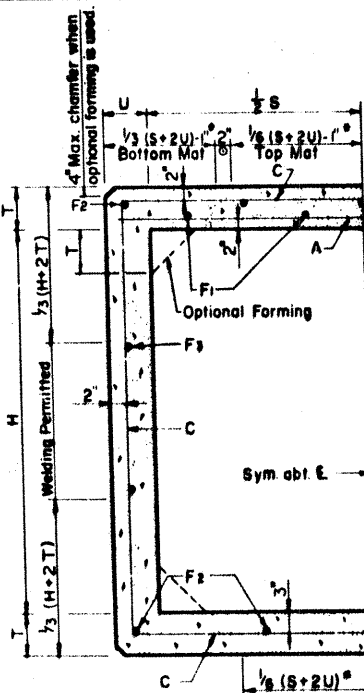


**MULTIPLE UNIT PLACEMENT**

**GENERAL NOTES:**  
Cement Stabilized Backfill shall be considered subsidiary to the unit price bid for Concrete Box.

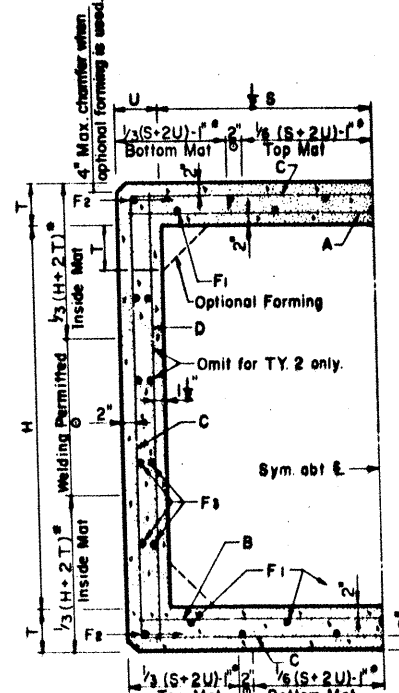
All welding to be done by qualified welder.

Additional splices in reinforcing steel not shown hereon, must be submitted to the Bridge Division for approval prior to fabrication.  
Grade 60 Bars or Wire Fabric may be used in place of Grade 40 Steel by supplying 82% of the area of steel per linear foot shown in the Tables for Bars A, B, C and D.  
Longitudinal steel shall have at least as much area as Bars F and shall be spaced at 18" c.c. maximum.  
These designs are adequate for HS 20 live loading and any fill depth from 2'-0" to the maximum shown in the tables.  
In lieu of furnishing the designs shown on this detail the contractor may use designs from either Std. PC-3, PC-7 or ASTM C-789, Table 1. In either case, the substituted design must equal or exceed the maximum fill height for the maximum fill height for the same sized box in the table in this detail. For boxes reinforced with wire fabric the minimum cover shall be three times the wire diameter but not less than one inch. Placing of reinforcement shall otherwise conform to specification "Reinforcing Steel."



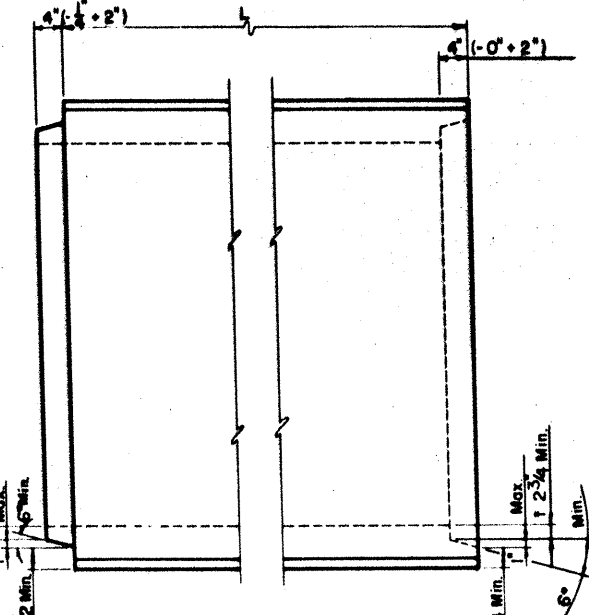
**HALF SECTION TYPE 1**

\*Permissible lack welding on mats shown.  
○Permissible lack welding both mats.

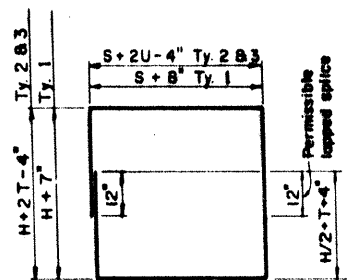


**HALF SECTION TYPES 2 & 3**

† These dimensions shall be sufficiently different to allow a 1/4" (± 1/16") nominal space between the sloping faces.



**SIDE AND TOP VIEW**  
NOTE: Tongue and groove dimensional controls shown are intended to allow either a 4" long 1" slope joint, a 6" long 6" slope joint or any joint configuration within these limits. Dimensions shown as minimums shall be maintained around the perimeter of the box.

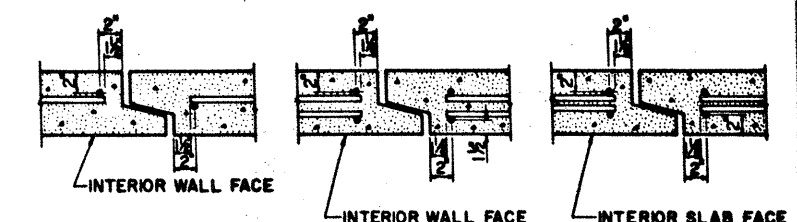


**BARS C**

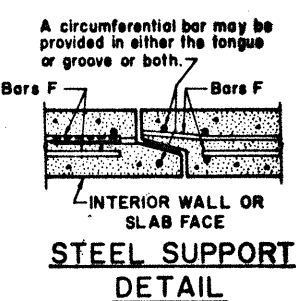
TEXAS HIGHWAY DEPARTMENT BRIDGE DIVISION			
PRECAST CONCRETE BOX CULVERTS			
PC-1			
ORIGINAL DRAWING DATE MARCH 1983	STATE	FEDERAL AID PROJECT	SHEET
DN-ADC	REV. 1-86 (Gen. Notes)	15	204
DN-CCY	REV. 8-86 (Gen. Notes)	16	205
DN-FDS			
DN-CCY			



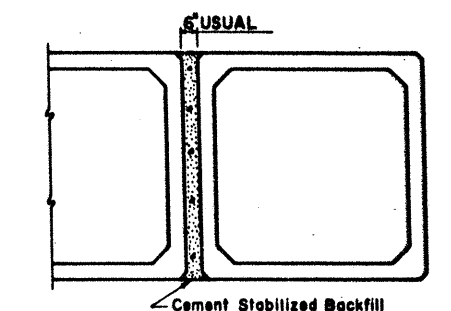
CULV. SIZE	TYPE SECT.	DIMEN- SIONS	MAX. FILL	TOTAL QUANTITIES FOR L=8'		QUANTITIES P.L.F. OF BARREL		BILL OF REINFORCING STEEL FOR L=8'																		LIFT. WEIGHT L=8' LBS.										
				CONC.	REINF.	CONC.	REINF.	BARS A TOP SLAB			BARS B BOTTOM SLAB			BARS C			#4 BARS D 18"± C. TO C.			# 4 BARS F 18" MAX. LENGTH L=7"																
								NO.	SIZE	SPA.	LG.	WT.	NO.	SIZE	SPA.	LG.	WT.	NO.	SIZE	SPA.	LG.	WT.	NO.	LG.	WT.		F <sub>1</sub>	SPA.	F <sub>2</sub>	SPA.	TOTAL	WT.				
S	H	T	U		C.Y.	LBS.	C.Y.	LBS.	NO.	SIZE	SPA.	LG.	WT.	NO.	SIZE	SPA.	LG.	WT.	NO.	SIZE	SPA.	LG.	WT.	NO.	LG.	WT.	F <sub>1</sub>	SPA.	F <sub>2</sub>	SPA.	TOTAL	WT.				
3	2	1	4"	4"	16'	1.185	204	1481	25.50																							4,940				
	3	1	4"	4"	16'	1.383	253	1728	31.63																							5,780				
	2	1	5"	5"	16'	1.790	322	2238	40.25																							7,470				
4	3	1	5"	5"	16'	2.037	398	2546	49.75																							8,520				
	4	1	5"	5"	16'	2.284	493	2855	61.63																							9,590				
	2	2	6"	6"	8'	2.518	385	3148	48.13	10	#5	10"	5'-6"	57	11	#5	9 1/2"	5'-6"	63	9	#5	11"	17'-8"	166			8	17"	10	17"	2	15"	20	99	10,460	
5	3	2	6"	6"	8'	2.815	426	3519	53.25	11	#5	9 1/2"	5'-6"	63	12	#5	8 1/2"	5'-6"	69	9	#5	12"	19'-8"	185			8	17"	10	17"	4	14"	22	109	11,700	
	4	2	6"	6"	8'	3.111	422	3889	52.75	11	#5	9"	5'-6"	63	12	#5	8"	5'-6"	69	8	#5	13"	21'-8"	181			8	17"	10	17"	4	18"	22	109	12,890	
	5	3	6"	6"	8'	3.407	533	4259	66.63	12	#5	8 1/2"	5'-6"	69	13	#5	7 1/2"	5'-6"	75	8	#5	14"	23'-8"	197	12	5'-6"	44	8	17"	10	17"	12	17"	30	148	14,170
6	3	2	7"	7"	8'	3.714	498	4643	62.25	11	#5	9"	6'-8"	76	12	#5	8 1/2"	6'-8"	83	9	#5	11"	22'-4"	210			10	16"	12	16"	4	15"	26	129	15,390	
	4	2	7"	7"	8'	4.060	523	5075	65.38	12	#5	8 1/2"	6'-8"	83	12	#5	8"	6'-8"	83	9	#5	12"	24'-4"	228			10	16"	12	16"	4	18"	26	129	16,800	
	5	3	7"	7"	8'	4.405	605	5506	75.63	12	#5	8"	6'-8"	83	13	#5	7 1/2"	6'-8"	90	8	#5	13"	26'-4"	220	12	5'-6"	44	10	16"	12	16"	12	17"	34	168	18,260
7	6	3	7"	7"	8'	4.751	656	5939	82.00	12	#5	8"	6'-8"	83	14	#5	7"	6'-8"	97	8	#5	13"	28'-4"	236	12	6'-6"	52	10	16"	12	16"	16	16"	38	188	19,690
	3	2	8"	8"	6'	4.742	605	5928	75.63	12	#5	8 1/2"	7'-10"	98	12	#5	8 1/2"	7'-10"	98	10	#5	10"	25'-0"	261			12	16"	14	16"	4	15"	30	148	19,620	
	4	2	8"	8"	6'	5.138	616	6423	77.00	12	#5	8"	7'-10"	98	13	#5	7 1/2"	7'-10"	106	9	#5	11"	27'-0"	253			12	16"	14	16"	6	15"	32	159	21,230	
8	5	3	8"	8"	6'	5.533	716	6916	89.50	12	#5	8"	7'-10"	98	14	#5	7"	7'-10"	114	9	#5	11"	29'-0"	272	12	5'-6"	44	12	16"	14	16"	12	18"	38	188	22,900
	6	3	8"	8"	6'	5.928	771	7410	96.38	13	#5	7 1/2"	7'-10"	106	14	#5	7"	7'-10"	114	9	#5	12"	31'-0"	291	12	6'-6"	52	12	16"	14	16"	16	17"	42	208	24,540
	7	3	8"	8"	6'	6.323	827	7904	103.38	13	#5	7 1/2"	7'-10"	106	15	#5	6 1/2"	7'-10"	123	9	#5	12"	33'-0"	310	12	7'-6"	60	12	16"	14	16"	20	16"	46	228	26,180
9	4	2	8"	8"	6'	5.533	798	6916	99.75	15	#5	6 1/2"	8'-10"	138	15	#5	6 1/2"	8'-10"	138	12	#5	8 1/2"	29'-0"	363			12	18"	14	18"	6	15"	32	159	22,960	
	5	3	8"	8"	6'	5.928	873	7410	109.13	15	#5	6 1/2"	8'-10"	138	16	#5	6"	8'-10"	147	11	#5	9"	31'-0"	356	12	5'-6"	44	12	18"	14	18"	12	18"	38	188	24,610
	6	3	8"	8"	6'	6.323	933	7904	116.63	16	#5	6"	8'-10"	147	16	#5	5 1/2"	8'-10"	147	11	#5	9 1/2"	33'-0"	379	12	6'-6"	52	12	18"	14	18"	16	17"	42	208	26,250
10	7	3	8"	8"	6'	6.719	994	8399	124.25	16	#5	6"	8'-10"	147	17	#5	5 1/2"	8'-10"	157	11	#5	9 1/2"	35'-0"	402	12	7'-6"	60	12	18"	14	18"	20	16"	46	228	27,900
	8	3	8"	8"	6'	7.114	1025	8893	128.13	16	#5	6"	8'-10"	147	17	#5	5 1/2"	8'-10"	157	11	#5	9 1/2"	37'-0"	425	12	8'-6"	68	12	18"	14	18"	20	18"	46	228	29,520
	5	3	9"	9"	6'	7.222	996	9028	124.50	15	#5	6 1/2"	10'-0"	156	16	#5	6"	10'-0"	167	12	#5	8"	33'-8"	421	12	5'-6"	44	14	18"	16	18"	12	18"	42	208	29,940
11	6	3	9"	9"	6'	7.665	1070	9581	133.75	16	#5	6"	10'-0"	167	17	#5	5 1/2"	10'-0"	177	12	#5	8 1/2"	35'-8"	446	12	6'-6"	52	14	18"	16	18"	16	17"	46	228	31,780
	7	3	9"	9"	6'	8.111	1123	1014	140.38	16	#5	6"	10'-0"	167	17	#5	5 1/2"	10'-0"	177	12	#5	8 1/2"	37'-8"	471	12	7'-6"	60	14	18"	16	18"	20	16"	50	248	33,620
	8	3	9"	9"	6'	8.555	1187	1069	148.38	12	#6	8 1/2"	10'-0"	180	13	#6	7 1/2"	10'-0"	195	12	#5	8 1/2"	39'-8"	496	12	8'-6"	68	14	18"	16	18"	20	18"	50	248	35,470
12	9	3	9"	9"	6'	8.999	1256	1125	157.00	12	#6	8 1/2"	10'-0"	180	14	#6	7"	10'-0"	210	12	#5	8 1/2"	41'-8"	522	12	9'-6"	76	14	18"	16	18"	24	17"	54	268	37,310
	5	3	10"	10"	6'	8.640	1223	1080	152.88	11	#6	9"	11'-2"	184	12	#6	8"	11'-2"	201	10	#6	10 1/2"	36'-4"	546	12	5'-6"	44	16	17"	18	17"	16	15"	50	248	35,840
	6	3	10"	10"	6'	9.133	1220	1142	152.50	12	#6	8 1/2"	11'-2"	201	12	#6	8"	11'-2"	201	9	#6	11"	38'-4"	518	12	6'-6"	52	16	17"	18	17"	16	18"	50	248	37,830
13	7	3	10"	10"	6'	9.627	1292	1203	161.50	12	#6	8"	11'-2"	201	13	#6	7 1/2"	11'-2"	218	9	#6	11 1/2"	40'-4"	545	12	7'-6"	60	16	17"	18	17"	20	17"	54	268	39,880
	8	3	10"	10"	6'	10.120	1363	1265	170.38	12	#6	8"	11'-2"	201	14	#6	7"	11'-2"	235	9	#6	11 1/2"	42'-4"	572	12	8'-6"	68	16	17"	18	17"	24	18"	58	287	41,930
	9	3	10"	10"	6'	10.614	1398	1327	174.75	12	#6	8"	11'-2"	201	14	#6	7"	11'-2"	235	9	#6	11 1/2"	44'-4"	599	12	9'-6"	76	16	17"	18	17"	24	18"	58	287	43,950
14	10	3	10"	10"	6'	11.108	1470	1389	183.75	12	#6	8"	11'-2"	201	15	#6	6 1/2"	11'-2"	252	9	#6	11 1/2"	46'-4"	626	12	10'-6"	84	16	17"	18	17"	28	17"	62	307	46,000



**SINGLE MAT PLACEMENT**  
**DOUBLE MAT PLACEMENT**



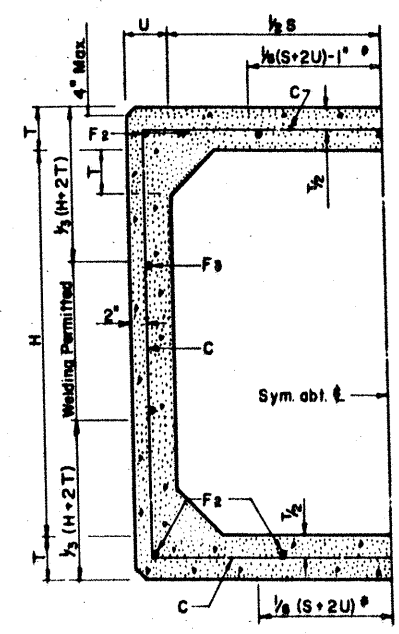
**STEEL SUPPORT DETAIL**



**MULTIPLE UNIT PLACEMENT**

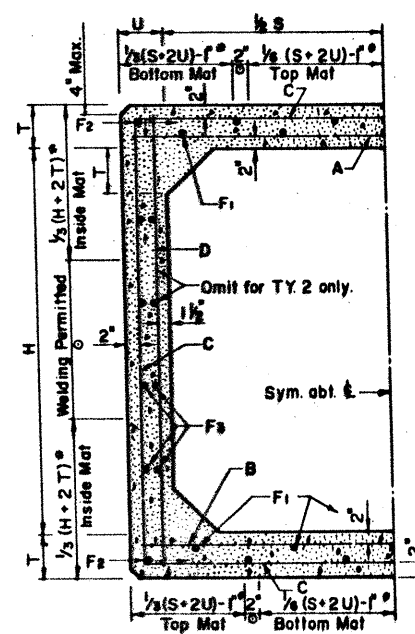
**GENERAL NOTES:**  
Cement Stabilized Backfill shall be considered subsidiary to the unit price bid for Concrete Box.

All welding to be done by qualified welder.  
Additional splices in reinforcing steel not shown hereon, must be submitted to the Bridge Division for approval prior to fabrication.  
Grade 60 Bars or Wire Fabric may be used in place of Grade 40 Steel by supplying 82% of the area of steel per linear foot shown in the Tables for Bars A, B, C and D.  
Longitudinal steel shall have at least as much area as Bars F and shall be spaced at 18" c.c. maximum.  
These designs are adequate for HS 20 live loading and any fill depth from 2'-0" to the maximum shown in the tables.  
In lieu of furnishing the designs shown on this detail the contractor may use designs from either Std. PC-1, PC-7 or ASTM C 789, Table 1. In either case, the substituted design must equal or exceed the maximum fill height for the same sized box in the table on this detail. For boxes reinforced with wire fabric the minimum cover shall be three times the wire diameter but not less than one inch. Placing of reinforcement shall otherwise conform to specification "Reinforcing Steel."

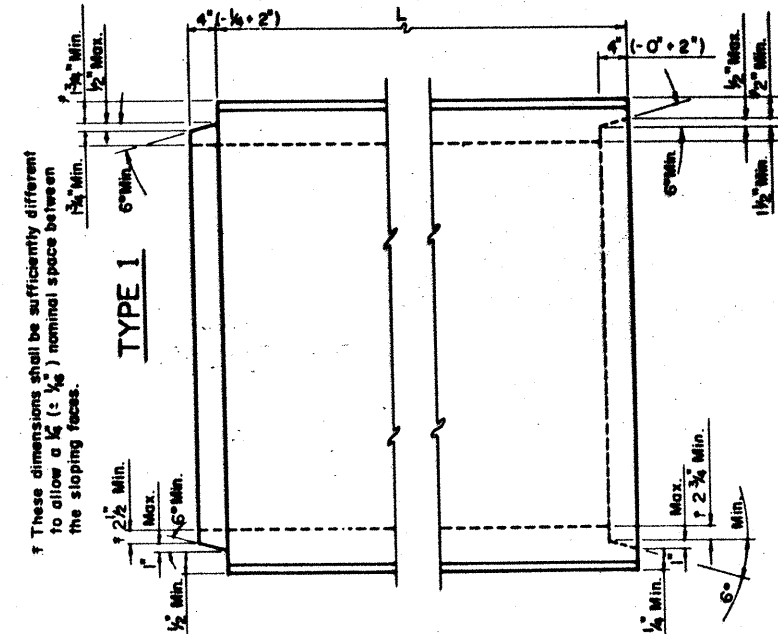


**HALF SECTION TYPE 1**

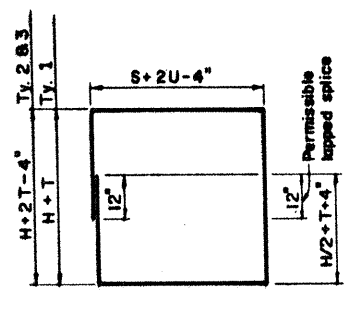
\*Permissible tack welding on mats shown.  
©Permissible tack welding both mats.



**HALF SECTION TYPES 2 & 3**



**SIDE AND TOP VIEW**  
NOTE: Tongue and groove dimensional controls shown are intended to allow either a 4" long 1" slope joint, a 6" long 6" slope joint or any joint configuration within these limits. Dimensions shown as minimums shall be maintained around the perimeter of the box.



**BARS C**

**205**

**TEXAS HIGHWAY DEPARTMENT  
BRIDGE DIVISION  
PRECAST CONCRETE  
BOX CULVERTS**

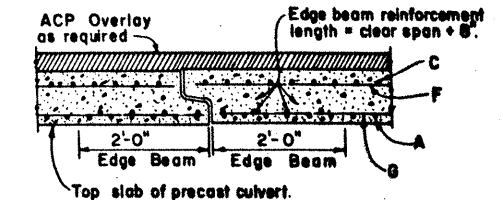
**PC-3**

ORIGINAL	DATE	REVISION	BY	DATE	REVISION	BY	DATE	REVISION	BY
15	5	15	5	15	5	15	5	15	5

CULVERT SIZE ft.		DIMENSIONS in.			TYPE SECT.	REINFORCING STEEL												EDGE BEAM REINF.	LIFT WT. L = 12'	MAX FILL ft.			
						BARS A		BARS B		BARS C		BARS D		BARS F		BARS G†					BARS M		BARS N
S	H	T <sub>r</sub>	T <sub>b</sub>	U	SIZE	SPA	SIZE	SPA	SIZE	SPA	SIZE	SPA	SIZE	SPA	SIZE	SPA	SIZE	SPA	SIZE	NO.	TONS		
3	1	6	6	6	1	#5	6"	#5	12"	#4	18"	#4	15"	#4	18"	#4	6"	#4	18"	#5	3	2.7	15'
	1.5	"	"	"	1	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	3.2	"
	2	"	"	"	2	"	"	"	"	"	15"	"	"	"	"	"	"	18"	#4	18"	"	2.7	"
	3	"	"	"	2	"	"	"	"	"	"	"	"	"	"	"	"	15"	"	15"	"	3.2	"
4	1	6	6	6	1	#5	5"	#5	10"	#4	18"	#4	15"	#4	18"	#4	6"	#4	18"	#5	4	3.2	12'
	2	"	"	"	1	"	"	"	"	"	"	12"	"	"	"	"	"	15"	"	"	"	4.1	"
	3	"	"	"	1	"	"	"	"	"	"	#5	9"	"	"	"	"	"	"	"	"	5.0	"
	4	"	"	"	1	"	"	"	"	"	"	7"	"	"	"	"	"	12"	"	"	"	5.9	"
5	1	6½	6	6	1	#5	4"	#5	8"	#4	18"	#4	15"	#4	18"	#4	6"	#4	18"	#5	5	3.5	10'
	2	"	"	"	1	"	"	"	"	"	"	12"	"	"	"	"	"	15"	"	"	"	4.4	"
	3	"	"	"	1	"	"	"	"	"	"	#5	9"	"	"	"	"	"	"	"	"	5.3	"
	4	"	"	"	1	"	"	"	"	"	"	7"	"	"	"	"	"	12"	"	"	"	6.2	"
	5	"	"	"	2	"	"	"	"	"	"	9"	#4	9"	"	"	"	15"	#4	15"	"	5.1	"
6	1	7	6½	6	1	#5	4"	#5	8"	#4	18"	#4	15"	#4	18"	#4	6"	#4	18"	#5	5	4.2	8'
	2	"	"	"	1	"	"	"	"	"	"	12"	"	"	"	"	"	15"	"	"	"	5.1	"
	3	"	"	"	1	"	"	"	"	"	"	#5	9"	"	"	"	"	"	"	"	"	6.0	"
	4	"	"	"	1	"	"	"	"	"	"	7"	"	"	"	"	"	12"	"	"	"	6.9	"
	5	"	"	"	2	"	"	"	"	"	"	9"	#4	9"	"	"	"	15"	#4	15"	"	5.9	"
7	1	7½	7	6	1	#5	4"	#5	6"	#4	18"	#4	15"	#4	18"	#4	6"	#4	18"	#5	5	5.0	8'
	2	"	"	"	1	"	"	"	"	"	"	12"	"	"	"	"	"	15"	"	"	"	5.9	"
	3	"	"	"	1	"	"	"	"	"	"	#5	9"	"	"	"	"	"	"	"	"	6.8	"
	4	"	"	"	1	"	"	"	"	"	"	7"	"	"	"	"	"	12"	"	"	"	7.7	"
	5	"	"	"	2	"	"	"	"	"	"	9"	#4	9"	"	"	"	15"	#4	15"	"	6.7	"
	6	"	"	"	2	"	"	"	"	"	#5	10"	#5	9"	"	"	"	"	"	"	"	7.1	"
	7	"	"	"	2	"	"	"	"	"	8"	6"	"	"	"	"	"	12"	"	12"	"	7.6	"
8	1	8	7½	6	1	#6	5"	#6	8"	#4	18"	#4	15"	#4	18"	#4	6"	#4	18"	#6	4	5.9	8'
	2	"	"	"	1	"	"	"	"	"	"	12"	"	"	"	"	"	15"	"	"	"	6.8	"
	3	"	"	"	1	"	"	"	"	"	"	#5	9"	"	"	"	"	12"	"	"	"	7.7	"
	4	"	"	"	1	"	"	"	"	"	"	7"	"	"	"	"	"	12"	"	"	"	8.6	"
	5	"	"	"	2	"	"	"	"	"	"	9"	#4	9"	"	"	"	15"	#4	15"	"	7.6	"
	6	"	"	"	2	"	"	"	"	"	#5	10"	#5	9"	"	"	"	"	"	"	"	8.0	"
	7	"	"	"	2	"	"	"	"	"	"	6"	"	"	"	"	"	12"	"	12"	"	8.5	"
	8	"	"	"	2	"	"	"	"	"	"	8"	5"	"	"	"	"	"	"	"	"	8.9	"
9	1	8	7½	6	1	#6	4"	#6	6"	#4	18"	#4	15"	#4	18"	#5	6"	#4	18"	#6	4	6.4	8'
	2	"	"	"	1	"	"	"	"	"	"	12"	"	"	"	"	"	15"	"	"	"	7.3	"
	3	"	"	"	1	"	"	"	"	"	"	#5	9"	"	"	"	"	"	"	"	"	8.2	"
	4	"	"	"	1	"	"	"	"	"	"	7"	"	"	"	"	"	12"	"	"	"	9.1	"
	5	"	"	"	2	"	"	"	"	"	"	9"	#4	9"	"	"	"	15"	#4	15"	"	8.2	"
	6	"	"	"	2	"	"	"	"	"	#5	10"	#5	9"	"	"	"	"	"	"	"	8.6	"
	7	"	"	"	2	"	"	"	"	"	8"	6"	"	"	"	"	"	12"	"	12"	"	9.0	"
	8	"	"	"	2	"	"	"	"	"	"	7"	5"	"	"	"	"	"	"	"	"	9.5	"
10	1	8½	8	6	1	#6	4"	#6	5"	#4	18"	#4	15"	#4	18"	#5	6"	#4	18"	#6	4	7.4	8'
	2	"	"	"	1	"	"	"	"	"	"	"	12"	"	"	"	"	15"	"	"	"	8.3	"
	3	"	"	"	1	"	"	"	"	"	"	#5	9"	"	"	"	"	"	"	"	"	9.2	"
	4	"	"	"	1	"	"	"	"	"	"	7"	"	"	"	"	"	12"	"	"	"	10.1	"
	5	"	"	"	2	"	"	"	"	"	"	9"	#4	9"	"	"	"	15"	#4	15"	"	9.2	"
	6	"	"	"	2	"	"	"	"	"	#5	10"	#5	9"	"	"	"	"	"	"	"	9.6	"
	7	"	"	"	2	"	"	"	"	"	8"	6"	"	"	"	"	"	12"	"	12"	"	10.0	"
	8	"	"	"	2	"	"	"	"	"	"	7"	5"	"	"	"	"	"	"	"	"	10.5	"

⊙ Lift weight is the maximum piece weight of the top and bottom sections.  
 † If the fill height is greater than 2'-0", the size and spacing of Bars G may be reduced to that of Bars F.

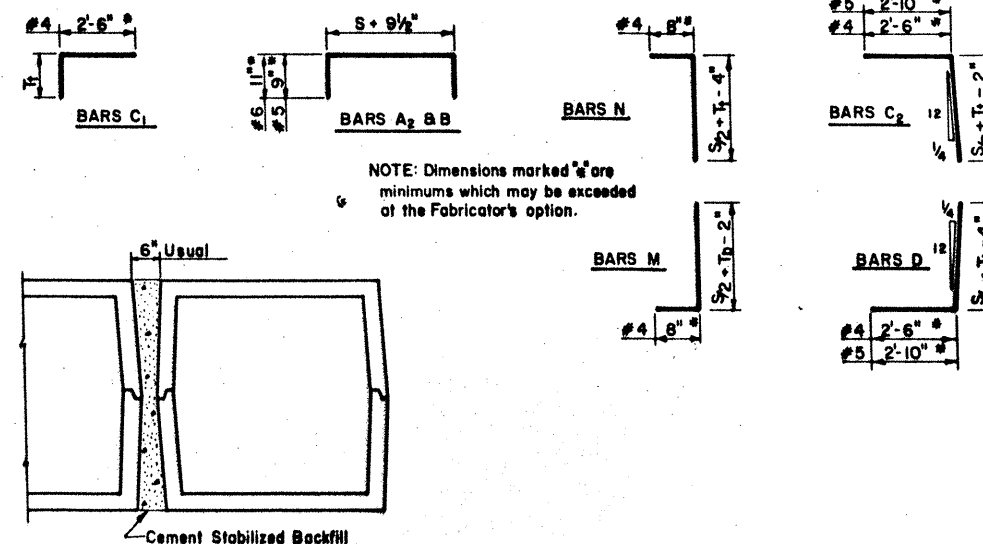
NOTE: Edge beam reinforcement may be combined with Bars A in a single layer, or placed in a separate layer as shown below. Bars shall be bundled as necessary to maintain required clear distances between bars.



#### EDGE BEAM

#### GENERAL NOTES:

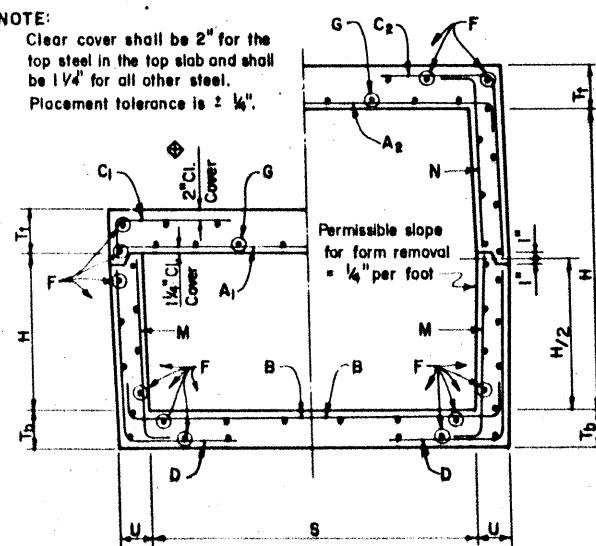
Design conforms to 1977 AASHTO Standard Specifications for Highway Bridges (Interim revisions included thru 1982) for HS 20 direct traffic loading and maximum fill height shown in the table. Precast culverts constructed according to this design shall conform to Item 462 "Concrete Box Culverts".  
 The Contractor may furnish designs shown on this sheet in lieu of other precast culvert designs of the same nominal size, provided the maximum fill does not exceed that shown in the table.  
 Reinforcing steel: Grade 60 deformed bars. Concrete,  $f'_c = 4000$  psi.  
 Joint Protection: Where fill measured from the top of the precast box culvert to the roadway surface is less than 2'-0", joints shall be protected by strengthening the top slab with an Edge Beam at each free edge.  
 Edge Beams shall be subsidiary to the unit price bid for Concrete Box.



#### MULTIPLE UNIT PLACEMENT

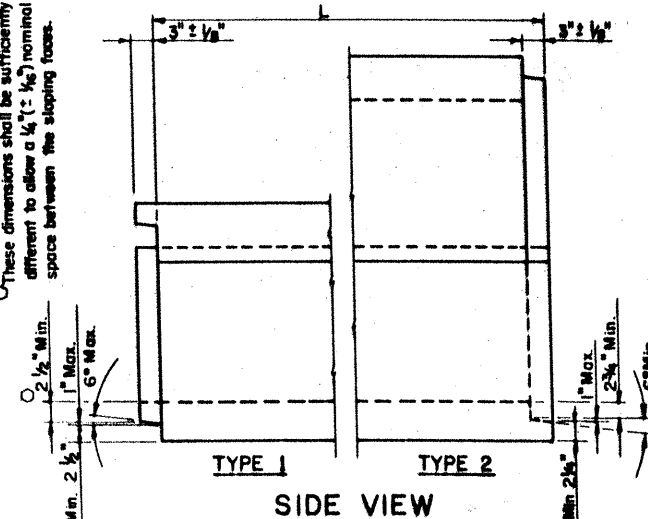
#### NOTE:

Clear cover shall be 2" for the top steel in the top slab and shall be 1 1/4" for all other steel. Placement tolerance is ± 1/4".

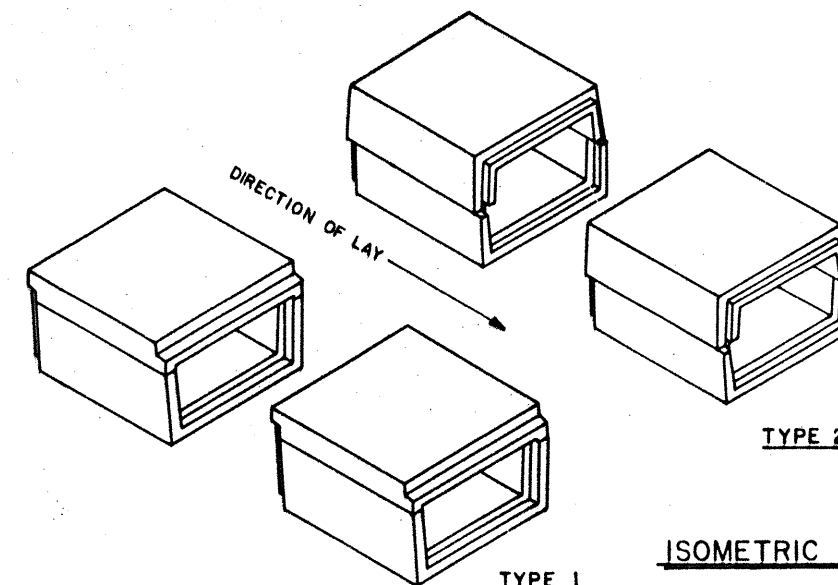


TYPE 1 TYPE 2  
TYPICAL BOX HALF SECTIONS

These dimensions shall be sufficiently different to allow a 1/4" (1/8" nominal) space between the sloping faces.



NOTE: Tongue and groove dimensional controls are intended to allow either a 3" long 1" slope joint, a 5" long 6" slope joint or any joint configuration within these limits. Dimensions shown as minimums shall be maintained around the box and along the horizontal joint.



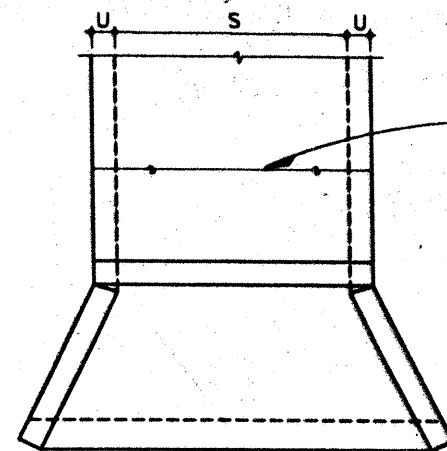
ISOMETRIC VIEW

Tack Welding: No tack welding of reinforcing bars will be permitted except within 6 inches of an end. Bars F are exempt from this restriction, and may be tack welded anywhere along their length.  
 Multiple Unit Placement: Cement Stabilized Backfill shall be considered subsidiary to the unit price bid for Concrete Box.  
 Form Removal and Handling Procedures: Precast pieces may be removed from the forms as soon as they have attained sufficient strength to allow handling without cracking. Damaged or cracked pieces shall be subject to rejection.  
 Marking: In addition to the marking requirements of Item 462, each piece shall bear the following markings:  
 Top and Bottom pieces without edge beams: TXPC7  
 Top pieces with edge beams: TXPC7 EB  
 Joint Seals: Horizontal and transverse joints shall be sealed in accordance with the Specifications.

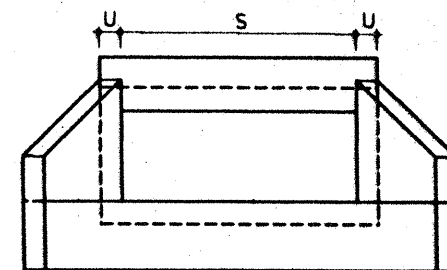
STATE DEPARTMENT OF HIGHWAYS  
AND PUBLIC TRANSPORTATION  
**PRECAST CONCRETE  
BOX CULVERTS**

PC-7

ORIGINAL DRAWING DATE	MARCH 1983	STATE	MISSISSIPPI	FEDERAL AID PROJECT	0	REVISION	
BY	LEH	DATE	15	BY	LEH	DATE	15
CH	EDS	DATE	15	CH	EDS	DATE	15
APPROVED		DATE		APPROVED		DATE	



PLAN



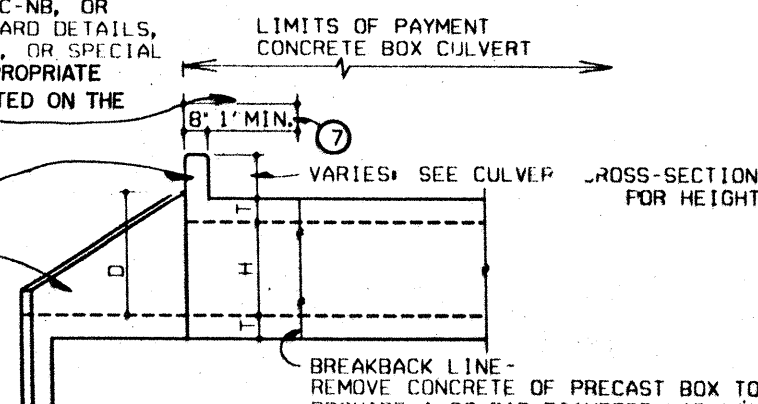
ELEVATION

④⑤

THIS SECTION OF CONCRETE BOX CULVERT SHALL BE CAST IN PLACE - QUANTITIES AND PLACEMENT OF REINFORCING STEEL SHALL CONFORM TO THE SC-NA, SC-NB, OR SC-NC BOX CULVERT STANDARD DETAILS, RELATED SKEWED STANDARD, OR SPECIAL DESIGN STANDARD. THE APPROPRIATE STANDARD SHALL BE AS LISTED ON THE CULVERT CROSS-SECTION.

COST OF CURB IS INCLUDED IN THE LENGTH OF THE BOX.

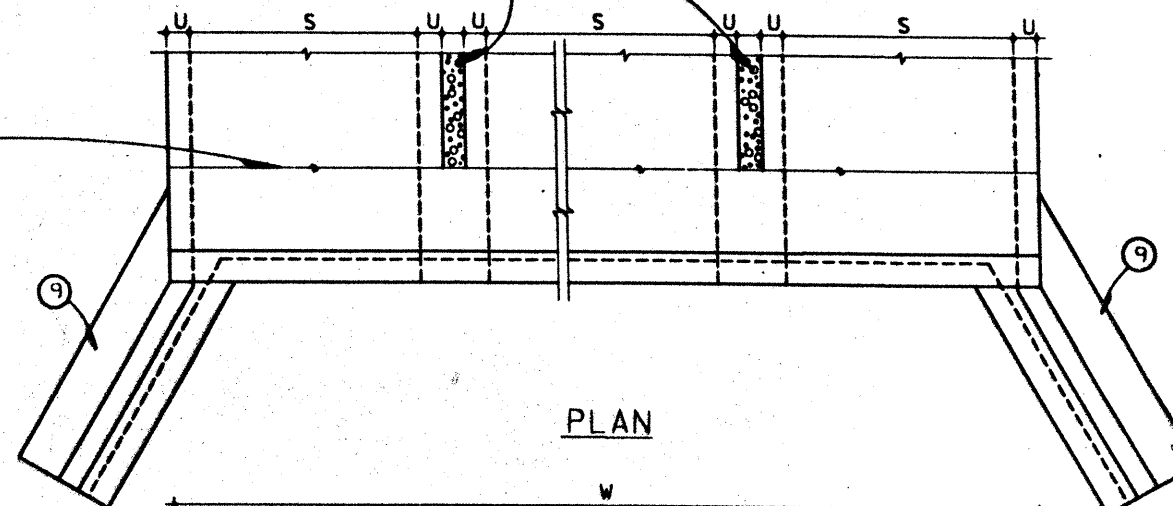
⑧ FWN OR RELATED SKEWED WINGWALL



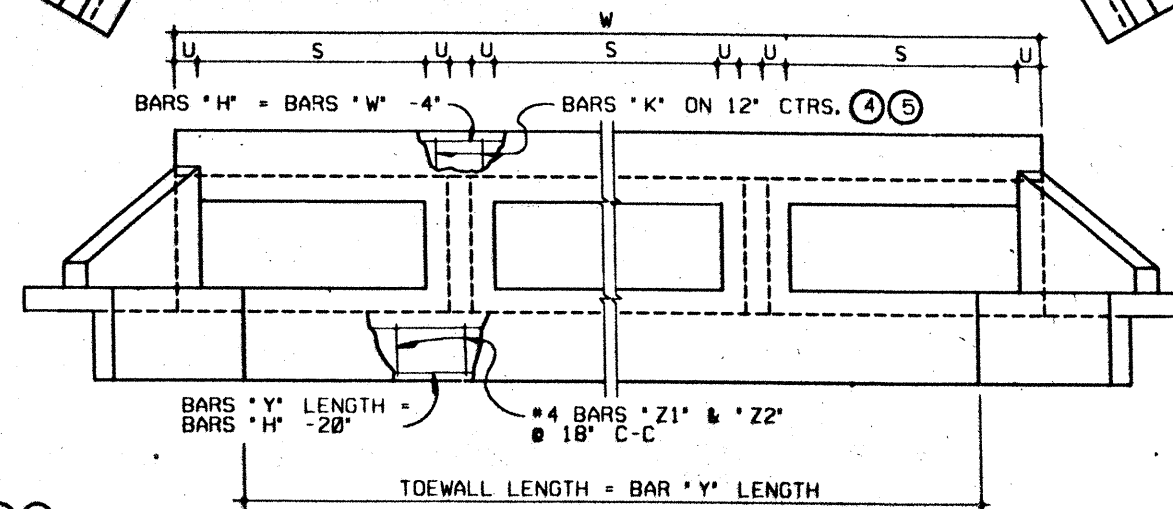
ELEVATION

DETAIL OF FWN CONNECTION TO PRECAST CONCRETE BOX CULVERT

CEMENT STABILIZED BACKFILL



PLAN

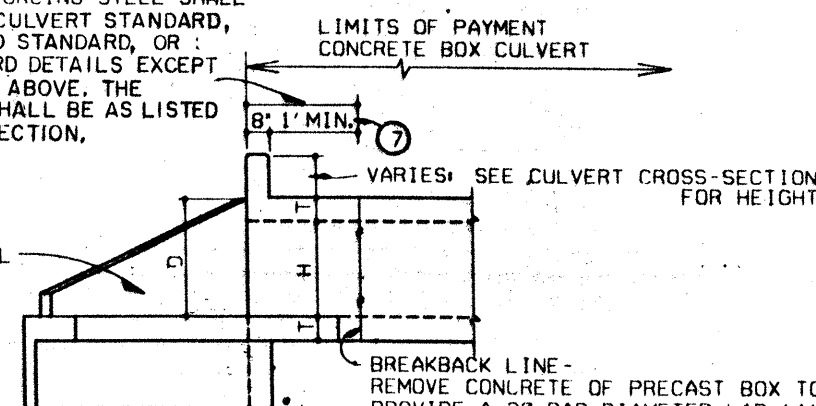


ELEVATION

④⑤

THIS SECTION OF CONCRETE BOX CULVERT SHALL BE CAST IN PLACE - QUANTITIES AND PLACEMENT OF REINFORCING STEEL SHALL CONFORM TO THE MC BOX CULVERT STANDARD, DETAILS, RELATED SKEWED STANDARD, OR SPECIAL DESIGN STANDARD DETAILS EXCEPT BARS "H", "K", "Y", AND "Z", ABOVE. THE APPROPRIATE STANDARD SHALL BE AS LISTED ON THE CULVERT CROSS-SECTION.

⑧ MCW-F1, MCW-F2, OR RELATED SKEWED WINGWALL



ELEVATION

DETAIL OF WINGWALL CONNECTION TO PRECAST CONCRETE BOX CULVERTS

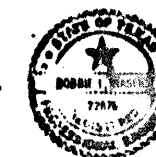
# GENERAL NOTES:

- THESE DETAILS SHOW THE ADAPTATION OF FLARED WINGWALLS (NORMAL OR SKEWED) TO A PRECAST CONCRETE BOX CULVERT. SEE APPROPRIATE WINGWALL STANDARD FOR DETAILS AND DIMENSIONS NOT SHOWN HEREON.
- WINGWALL, TOEWALL, AND APRON QUANTITIES TO BE PAID FOR AS SHOWN ON MCW-F1, MCW-F2, FWN STANDARD OR RELATED SKEWED STANDARD, MODIFIED, OR SPECIAL DESIGN STANDARD.
- ALL CAST-IN-PLACE CONCRETE SHALL CONFORM TO THE REQUIREMENTS OF ITEM 462 'CONCRETE BOX CULVERTS'.
- OMIT BARS \*K\* FOR CURB HEIGHTS OF 4' OR LESS. PLACE BARS \*H\* AS SHOWN ON THE APPROPRIATE STANDARD.
- TO DETERMINE THE LENGTH OF BARS \*H\* AND \*X\* ON A SKEWED BOX DETERMINE THE LENGTH ON A NORMAL STRUCTURE AND MULTIPLY BY THE FOLLOWING FACTORS: 1.04 FOR 15°, 1.15 FOR 30°, 1.41 FOR 45°.
- IN LIEU OF BREAKING EACH THE PRECAST BOX AS SHOWN, THE END SECTION MAY BE CAST TO THE BREAKBACK LINE WITH THE END STEEL EXPOSED.
- THIS DIMENSION MAY BE REDUCED TO ZERO IF THE CURB, WINGWALL, AND TOEWALL STEEL IS CAST INTO THE BOX DURING FABRICATION, OR AN APPROVED NUMBER OF DOWELS ARE PROVIDED AS DIRECTED BY THE ENGINEER.
- DETAILS ARE SHOWN FOR A NORMAL MULTIPLE BOX CULVERT, BUT ARE ALSO APPLICABLE TO SKEWED CONDITIONS.
- WINGWALL STEEL WHICH EXTENDS MORE THAN 1'-8" INTO THE CULVERT BARREL MAY BE FIELD BENT INTO THE CAST-IN-PLACE PORTION OF THE CULVERT BARREL.
- THE CONTRACTOR MAY PRESENT ALTERNATE WING CONNECTION DETAILS AND END TREATMENT PROCEDURES TO THE ENGINEER FOR CONSIDERATION.
- THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER FOR APPROVAL DETAILS SHOWING PLACEMENT LAYOUT AND END TREATMENT PROCEDURE FOR ALL MULTIPLE SKEWED STRUCTURES.
- DETAILS SIMILAR FOR SAFETY END TREATMENT TYPE 1.

## WINGWALL CONNECTION TO PRECAST CONCRETE BOX CULVERT

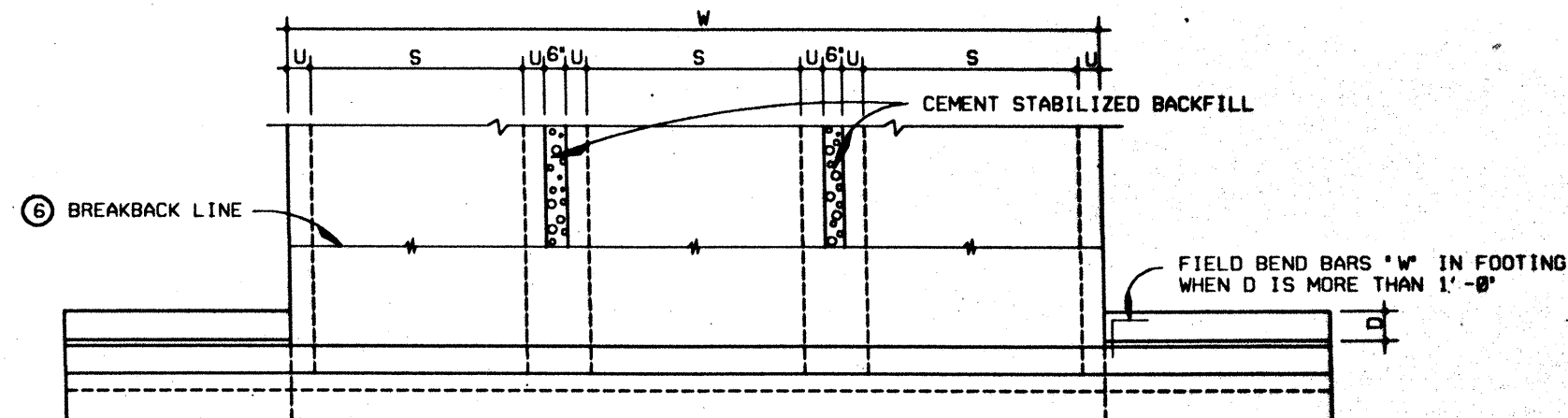
NO SCALE

*Bobbie L. Hazzert* 7/26/89  
Date

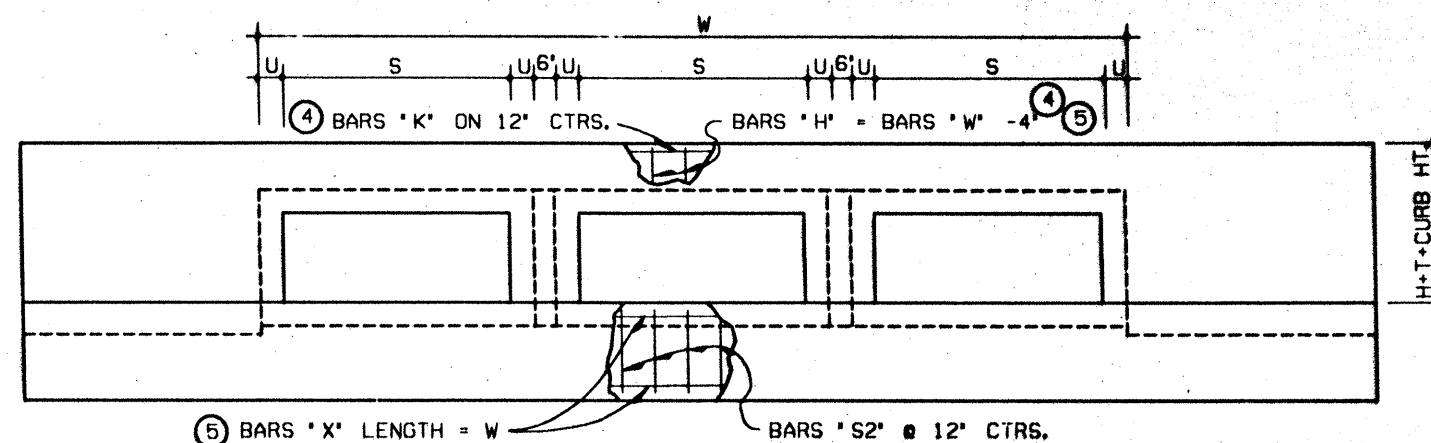


REV.	DATE	BY	CHKD.	PROJECT NO.	SHEET
1				IR 35-2(157) 173	206
15	7/26/89	Bobbie L. Hazzert			291X IN 35





PLAN



ELEVATION

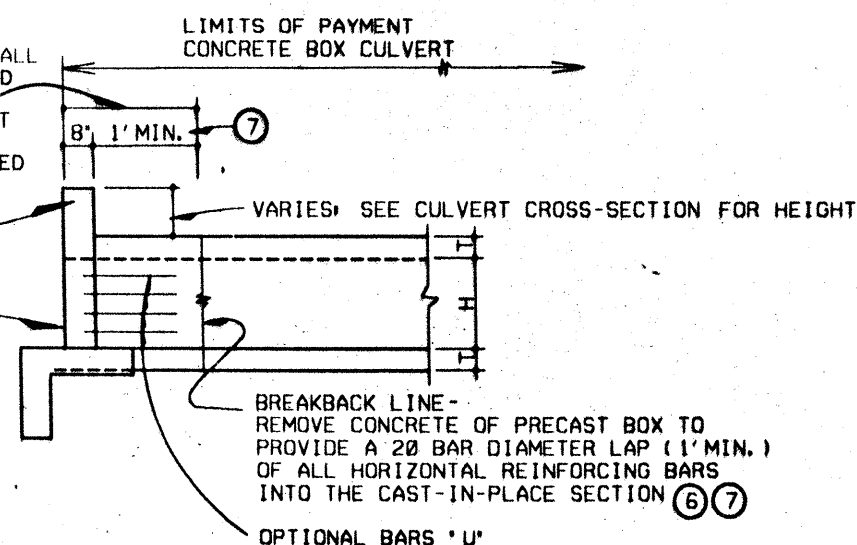
④ ⑤

THIS SECTION OF CONCRETE BOX CULVERT SHALL BE CAST IN PLACE - QUANTITIES AND PLACEMENT OF REINFORCING STEEL SHALL CONFORM TO THE MC BOX CULVERT STANDARD DETAILS, RELATED SKEWED STANDARD, OR SPECIAL DESIGN STANDARD DETAILS EXCEPT BARS "H", "K", "Y", AND "Z" ABOVE. THE APPROPRIATE STANDARD SHALL BE AS LISTED ON THE CULVERT CROSS-SECTIONS.

COST OF CURB IS INCLUDED IN THE LENGTH OF THE BOX

MCW - P 15'  
MCW - P 30'  
MCW - P 45'

⑧

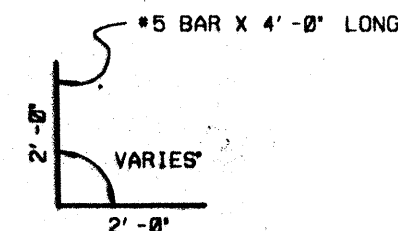


ELEVATION

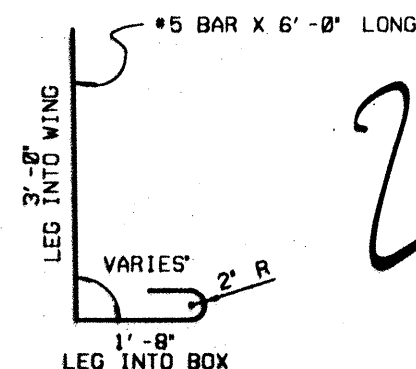
*Bill P. Z...* 7/26/89



BARS \*U\* MAY BE USED AS SHOWN ON THE REQUIRED PARALLEL WINGWALL STANDARD OR EITHER OPTION 1 OR 2 SHOWN BELOW MAY BE SUBSTITUTED.



BARS \*U\* OPTION 1  
USE 150% OF THE NUMBER SHOWN ON THE PARALLEL WINGWALL STANDARD



BARS \*U\* OPTION 2  
USE 150% OF THE NUMBER SHOWN ON THE PARALLEL WINGWALL STANDARD

GENERAL NOTES:

- ① THESE DETAILS SHOW THE ADAPTATION OF PARALLEL WINGWALLS (NORMAL OR SKEWED) TO A PRECAST CONCRETE BOX CULVERT. SEE APPROPRIATE WINGWALL STANDARD FOR DETAILS AND DIMENSIONS NOT SHOWN HEREON.
- ② WINGWALL, TOEWALL, AND APRON QUANTITIES TO BE PAID FOR AS SHOWN ON MCW-F1, MCW-F2, FWN STANDARD OR RELATED SKEWED STANDARD, MODIFIED, OR SPECIAL DESIGN STANDARD.
- ③ ALL CAST-IN-PLACE CONCRETE SHALL CONFORM TO THE REQUIREMENTS OF ITEM 462 'CONCRETE BOX CULVERTS'.
- ④ OMIT BARS \*K\* FOR CURB HEIGHTS OF 4' OR LESS. PLACE BARS \*H\* AS SHOWN ON THE APPROPRIATE STANDARD.
- ⑤ TO DETERMINE THE LENGTH OF BARS \*H\* AND \*X\* ON A SKEWED BOX DETERMINE THE LENGTH ON A NORMAL STRUCTURE AND MULTIPLY BY THE FOLLOWING FACTORS: 1.04 FOR 15°, 1.15 FOR 30°, 1.41 FOR 45°.
- ⑥ IN LIEU OF BREAKING BACK THE PRECAST BOX AS SHOWN, THE END SECTION MAY BE CAST TO THE BREAKBACK LINE WITH THE END STEEL EXPOSED.
- ⑦ THIS DIMENSION MAY BE REDUCED TO ZERO IF THE CURB, WINGWALL, AND TOEWALL STEEL IS CAST INTO THE BOX DURING FABRICATION, OR AN APPROVED NUMBER OF DOWELS ARE PROVIDED AS DIRECTED BY THE ENGINEER.
- ⑧ DETAILS ARE SHOWN FOR A NORMAL MULTIPLE BOX CULVERT, BUT ARE ALSO APPLICABLE TO SKEWED CONDITIONS.
- ⑨ WINGWALL STEEL WHICH EXTENDS MORE THAN 1'-8" INTO THE CULVERT BARREL MAY BE FIELD BENT INTO THE CAST-IN-PLACE PORTION OF THE CULVERT BARREL.
- ⑩ THE CONTRACTOR MAY PRESENT ALTERNATE WING CONNECTION DETAILS AND END TREATMENT PROCEDURES TO THE ENGINEER FOR CONSIDERATION.
- ⑪ THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER FOR APPROVAL DETAILS SHOWING PLACEMENT LAYOUT AND END TREATMENT PROCEDURE FOR ALL MULTIPLE SKEWED STRUCTURES.

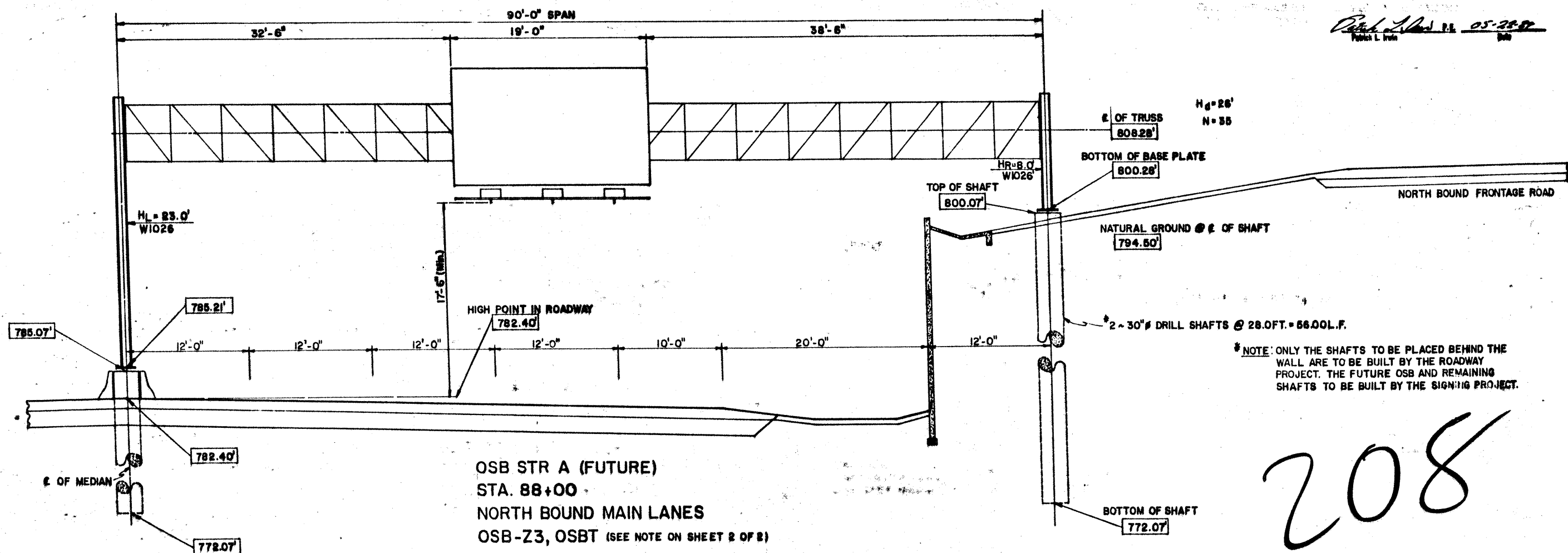
WINGWALL CONNECTION  
TO  
PRECAST CONCRETE  
BOX CULVERT

NO SCALE

FED. DIST.	STATE	PROJECT NO.	SHEET
15	TEXAS	TP 35-2 (151) 173	207
DIST.	COUNTY	CONTRACT	SECTION
15	Gauley Pk. ETC.	116	16



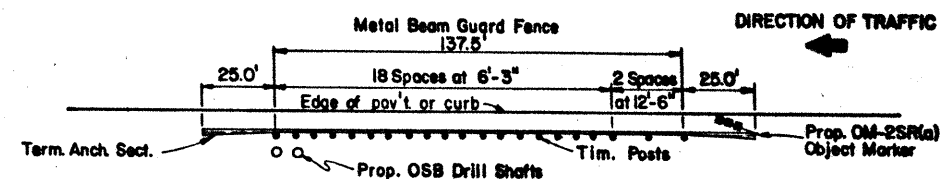
05-28-02  
Public L. Iron



OSB LAYOUT

SHEET 1 OF 2			
NO. 35	STATE	FEDERAL PROJECT NO.	NO.
35	TEXAS	TR-35-2(157)173	208
STATE DIST. NO.	COUNTY	CONT. DIST.	NO.
15	Guadalupe, Etc.	16	16



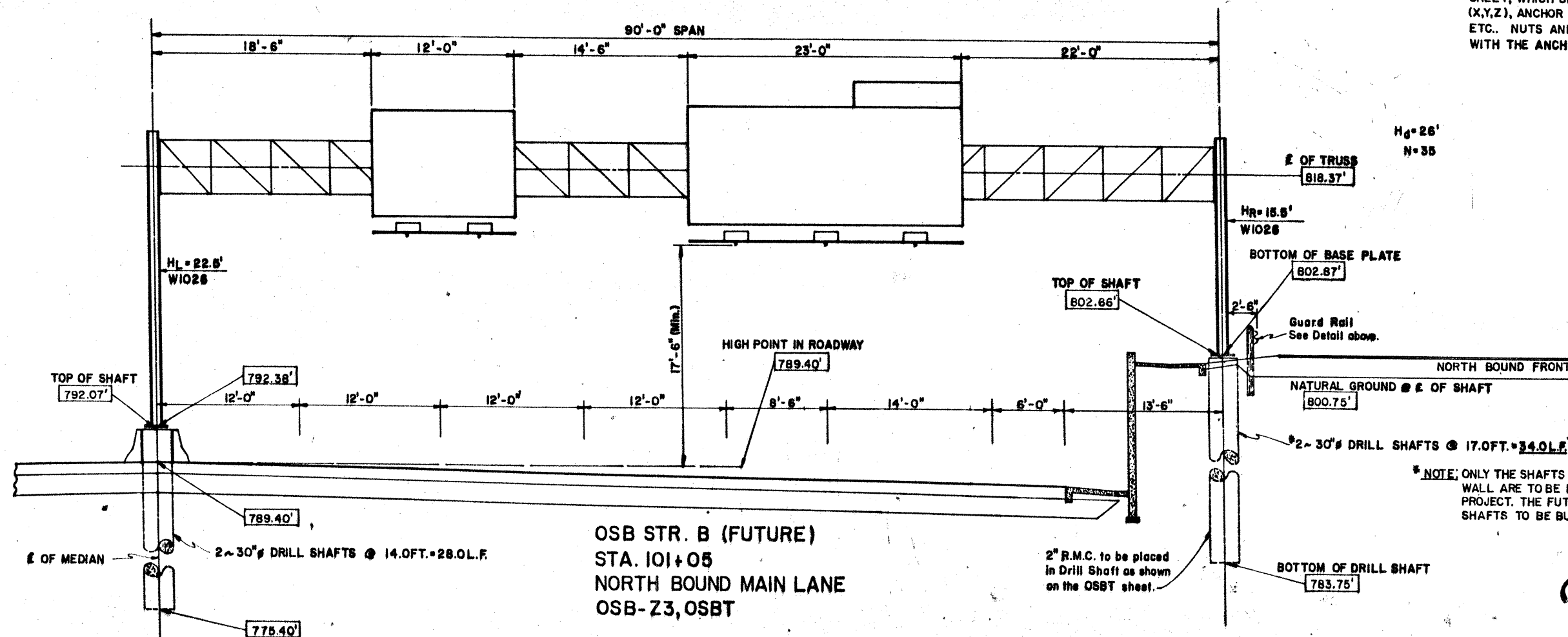


**METAL BEAM GUARD FENCE (12 GA)  
DETAIL**

NOTE: (STR. A & STR. B)  
SHOWN IS THE ELEVATION OF THE FUTURE OSB  
SHOWING THE TWO 30" DRILL SHAFTS TO BE  
BUILT BY THE ROADWAY PROJECT. DETAILS FOR  
THE TWO DRILL SHAFTS ARE SHOWN ON THE OSBT  
SHEET, WHICH SHOWS THE ANCHOR BOLT PATTERN  
(X,Y,Z), ANCHOR BOLT SIZE, AND FOUNDATION DATA,  
ETC.. NUTS AND WASHERS ARE TO BE INCLUDED  
WITH THE ANCHOR BOLTS.



*Robert L. Lipe* P.E. 05-23 P.  
Felix L. Lipe



\* NOTE: ONLY THE SHAFTS TO BE PLACED BEHIND THE  
WALL ARE TO BE BUILT BY THE ROADWAY  
PROJECT. THE FUTURE OSB AND REMAINING  
SHAFTS TO BE BUILT BY THE SIGNING PROJECT.

209

OSB. LAYOUT

SHEET 2 OF 2									
PROJ. NO.	STATE	FEDERAL PROJECT NO.	DIST. NO.	CONTRACT NO.	SECTION	JOB NO.	REVISION NO.	DATE	BY
15	TEXAS	IR35-2(157)23	205						
15	GUARDRAILS, ETC.	16	6	295	TH35				



Normally, the maximum spacing for tower bracing is the same as column spacing; however, this spacing may be increased as follows:

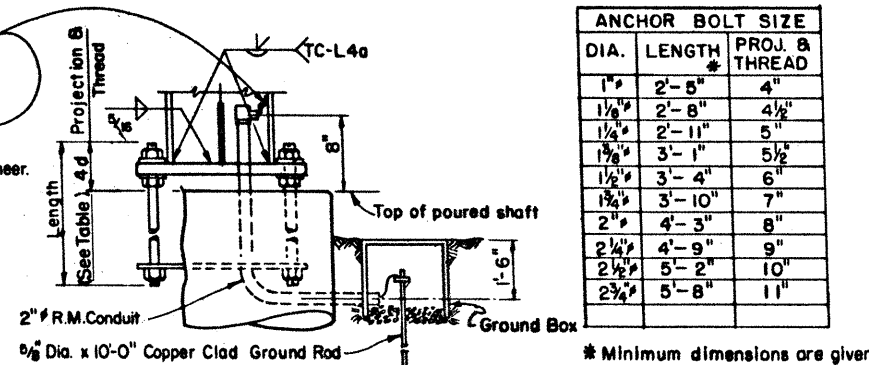
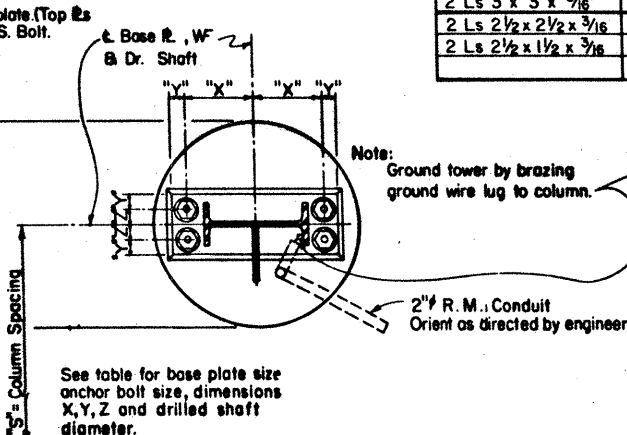
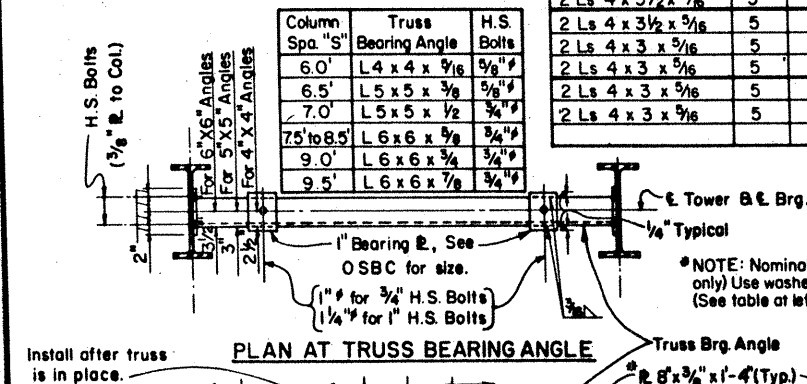
Determine required size column and spacing to satisfy height for the wind zone and truss span being used.  $\text{Height} = \frac{HL + HR}{2}$

Note the number of times this size column is shown for larger heights for the same span and wind zone.

Spacing of bracing may be increased one foot for each time height is shown, except the increase shall not exceed five feet.

[illegible]

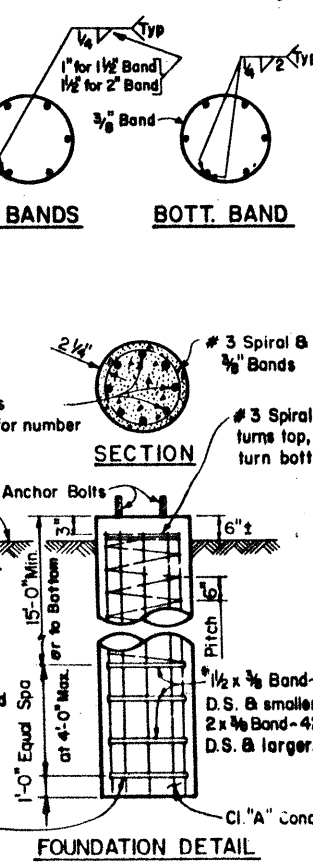
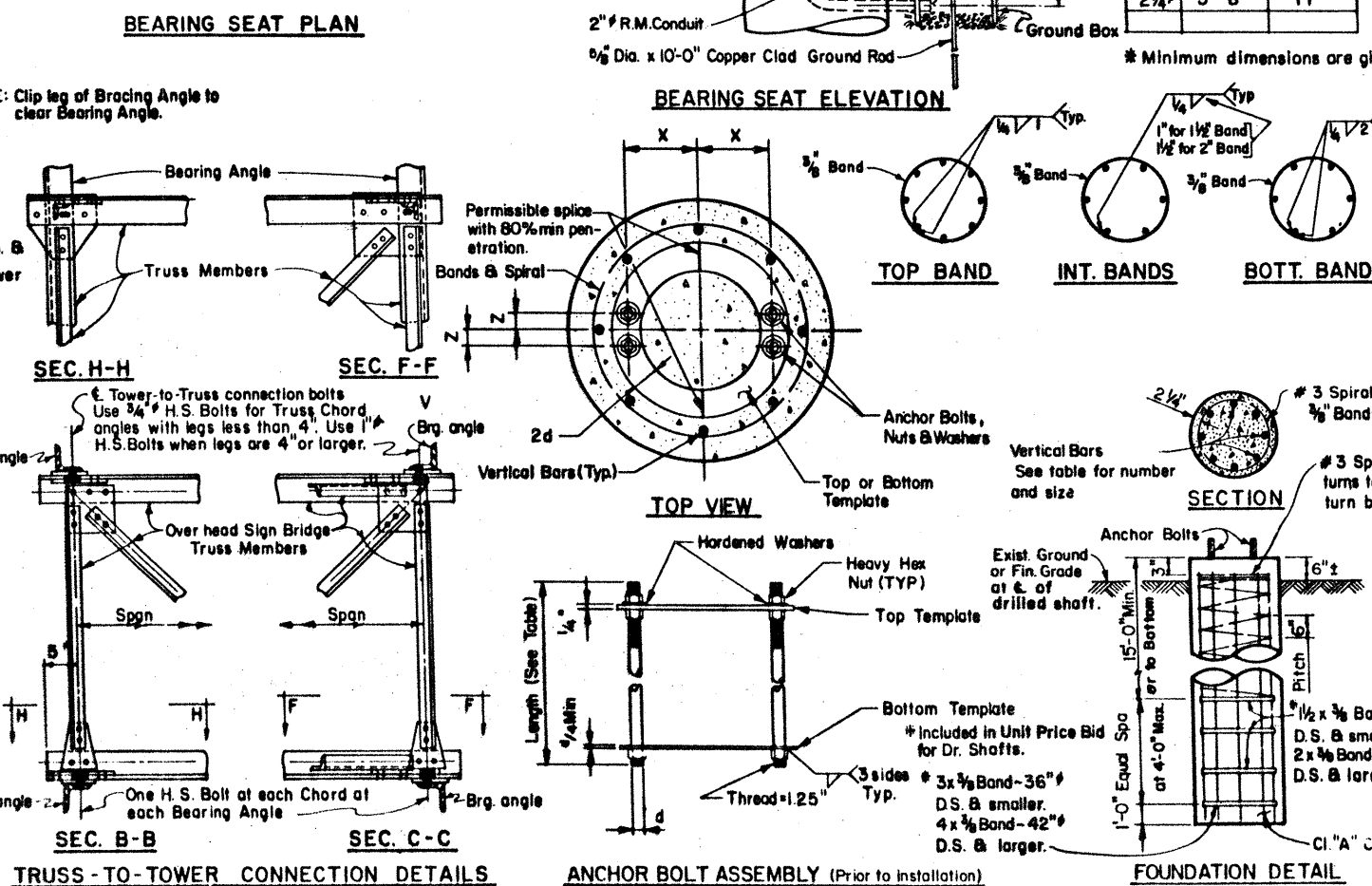
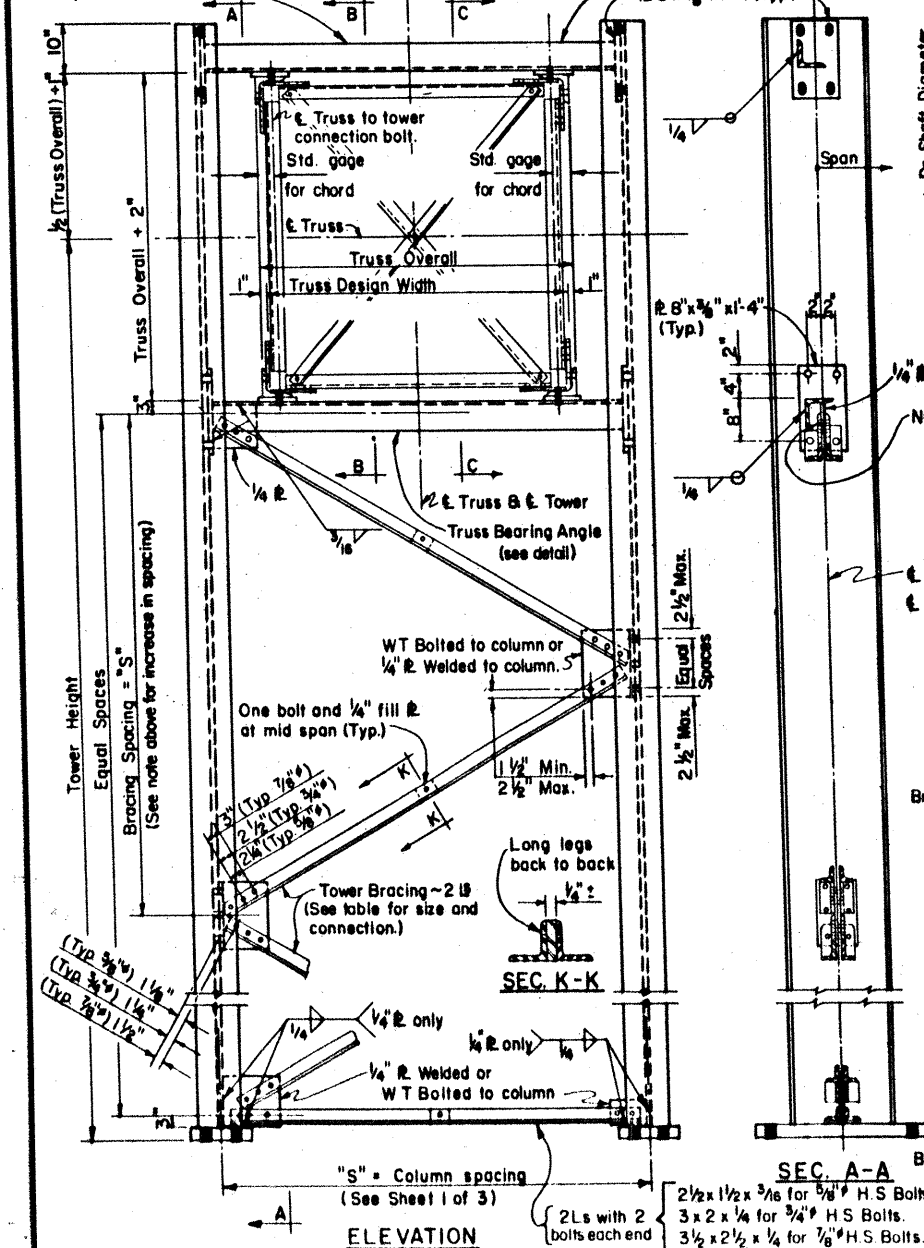
"X"	"Y"	"Z"	BASE PLATE SIZE	ANCHOR BOLT SIZE	FOUNDATION DATA	COLUMN SIZE
15¼	5	4	18" x 3¼" x 3'-4½"	2½" x 5'-8"	48" Shaft with 18" #11	W24117
15½	5	4	18" x 3½" x 3'-4½"	2½" x 5'-8"	48" Shaft with 18" #11	W24104
15½	5	4	18" x 3" x 3'-4½"	2½" x 5'-8"	48" Shaft with 18" #11	W2494
15	4½	3¾	16½" x 3" x 3'-3"	2½" x 5'-2"	48" Shaft with 14" #11	W2484
14¾	4½	3¾	16½" x 2¾" x 3'-2½"	2½" x 5'-2"	48" Shaft with 14" #11	W2476
14¾	4½	3¾	16½" x 2½" x 3'-2½"	2½" x 5'-2"	48" Shaft with 14" #11	W2468
13½	4½	3¾	16½" x 2¾" x 3'-0"	2½" x 5'-2"	42" Shaft with 12" #11	W2168
13½	4½	3¾	16½" x 2½" x 3'-0"	2½" x 5'-2"	42" Shaft with 12" #11	W2162
13	4	3½	15" x 2½" x 2'-10"	2¼" x 4'-9"	42" Shaft with 10" #11	W2157
11¾	4	3½	15" x 2½" x 2'-7½"	2¼" x 4'-9"	42" Shaft with 10" #11	W1855
11½	4	3½	15" x 2½" x 2'-7"	2¼" x 4'-9"	42" Shaft with 10" #11	W1850
11½	3½	3	13" x 2½" x 2'-6"	2" x 4'-3"	42" Shaft with 8" #10	W1846
10½	3½	3	13" x 2½" x 2'-4"	2" x 4'-3"	36" Shaft with 8" #10	W1640
10¼	3	2¾	11½" x 2½" x 2'-2½"	1¾" x 3'-10"	36" Shaft with 8" #9	W1636
9½	3	2¾	11½" x 2½" x 2'-1"	1¾" x 3'-10"	36" Shaft with 8" #9	W1434
9¼	3	2¾	11½" x 2" x 2'-0½"	1¾" x 3'-10"	36" Shaft with 8" #9	W1430
8	2¾	2½	9¾" x 1¾" x 1'-9½"	1½" x 3'-10"	30" Shaft with 8" #8	W1226
7	2½	2	9" x 1¾" x 1'-7"	1½" x 3'-1"	30" Shaft with 8" #8	W1026
6¾	2½	1⅞	8¼" x 1½" x 1'-6"	1½" x 2'-11"	30" Shaft with 8" #8	W1022
6¾	2	1⅞	7¼" x 1½" x 1'-5½"	1½" x 2'-8"	24" Shaft with 8" #7	W1017
6½	1¾	1½	6½" x 1½" x 1'-4½"	1" x 2'-5"	24" Shaft with 8" #7	W1015



ANCHOR BOLT SIZE		
DIA.	LENGTH #	PROJ. & THREAD
1" #	2'-5"	4"
1 1/8" #	2'-8"	4 1/2"
1 1/4" #	2'-11"	5"
1 3/8" #	3'-1"	5 1/2"
1 1/2" #	3'-4"	6"
1 3/4" #	3'-10"	7"
2" #	4'-3"	8"
2 1/4" #	4'-9"	9"
2 1/2" #	5'-2"	10"
2 3/4" #	5'-8"	11"

ANCHOR BOLT DIA. d	WASHER DIMENSIONS				HOLE IN BASE PLATE
	OUTSIDE DIAMETER	HOLE DIAMETER	THICKNESS		
			MIN.	MAX.	
1 1/2" or less	2d	d + 1/8"	0.136"	0.177"	d + 1/8"
1 3/4"	2d - 1/8"	d + 1/8"	0.178"	0.280"	d + 1/8"
2"	2d - 1/4"	d + 1/8"	0.178"	0.280"	d + 1/8"
Over 2"	2d - 1/2"	d + 1/8"	0.240"	0.340"	d + 1/8"

**GENERAL NOTES:**  
Design conforms to Standard Specification for Structural Supports for Highway Signs, Luminaires and Traffic Signals for Design Heights up to 50'.  
For size and spacing of columns see sheet 1 of 3.  
At contractor's option lower bracing connections may be high strength bolted or welded. If welded connections are used, length of connection shall be taken from the table shown on sheet 3 of 3.  
All connection bolts shall conform to ASTM A325 or A449. Washers shall conform to ASTM F436 - 76B. Bolts, nuts and washers shall be galvanized.  
All structural steel shall conform to ASTM A-36 except where noted. HS 50 shall conform to ASTM A441, ASTM A572 or ASTM A588. Structural steel shall be galvanized after fabrication.



YP Nuts for Anchor Bolts shall be heavy hex and shall conform to ASTM A194 Gr. 2H. Anchor bolts shall conform to ASTM A193-B7 or A687. Galvanize anchor bolt projection plus 6 Threads for anchor bolts and nuts shall be BUN threads.


Anchor bolts shall be rigidly held in position during concrete placement by using steel templates at the top and bottom. The bottom template and anchor plate assembly shall remain in place and shall not be damaged during concrete placement. The top template shall be removed after concrete has set.

Exposed nuts and washers shall be galvanized in accordance with the Specifications. Embedded nuts and top and bottom templates need not be galvanized.

Concrete shall be Class "A".

Unless shown otherwise, welded steel bands may be replaced with spirals as noted on the foundation detail.

All vertical reinforcing shall be carried to the bottom of the Drilled Shaft.



# STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

## OVERHEAD SIGN BRIDGE TOWER DETAILS

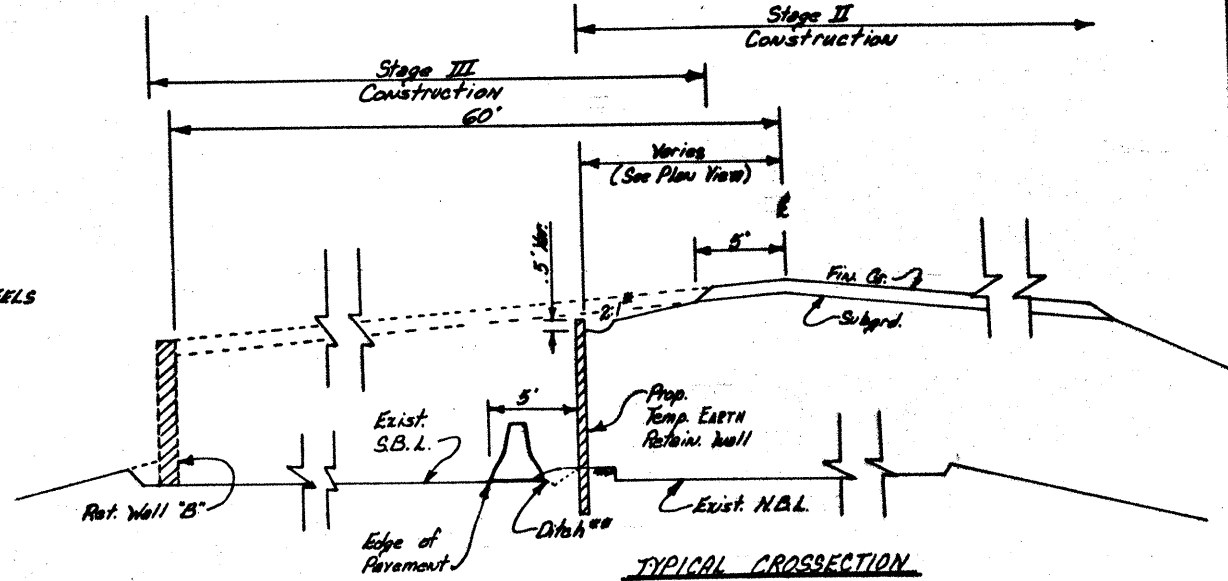
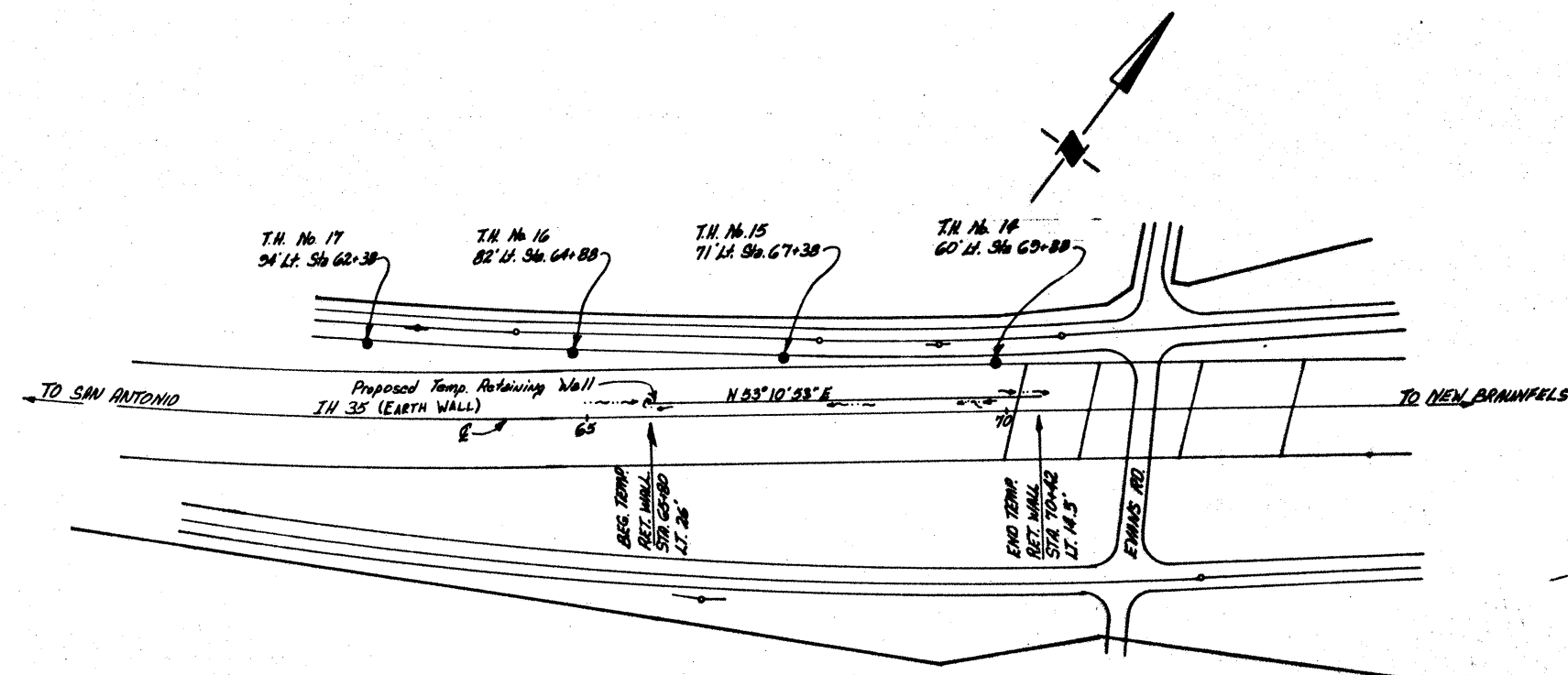
### OSBT

**SHEET 2 OF 3**

ORIGINAL DRAWING DATE <b>7-83</b>	STATE DISTRICT	FEDERAL DESIGN	FEDERAL AID PROJECT
<b>REVISIONS</b>	<b>15</b>	<b>6</b>	<b>IR 35-2 (157) 173</b>
DN - LEH			<b>COUNTY</b>
CR - CWC			<b>DISTRICT SECTION AND</b>
DN - EDS			<b>16 6 29.11</b>
CR - LEH			<b>GUADALUPE ETC.</b>



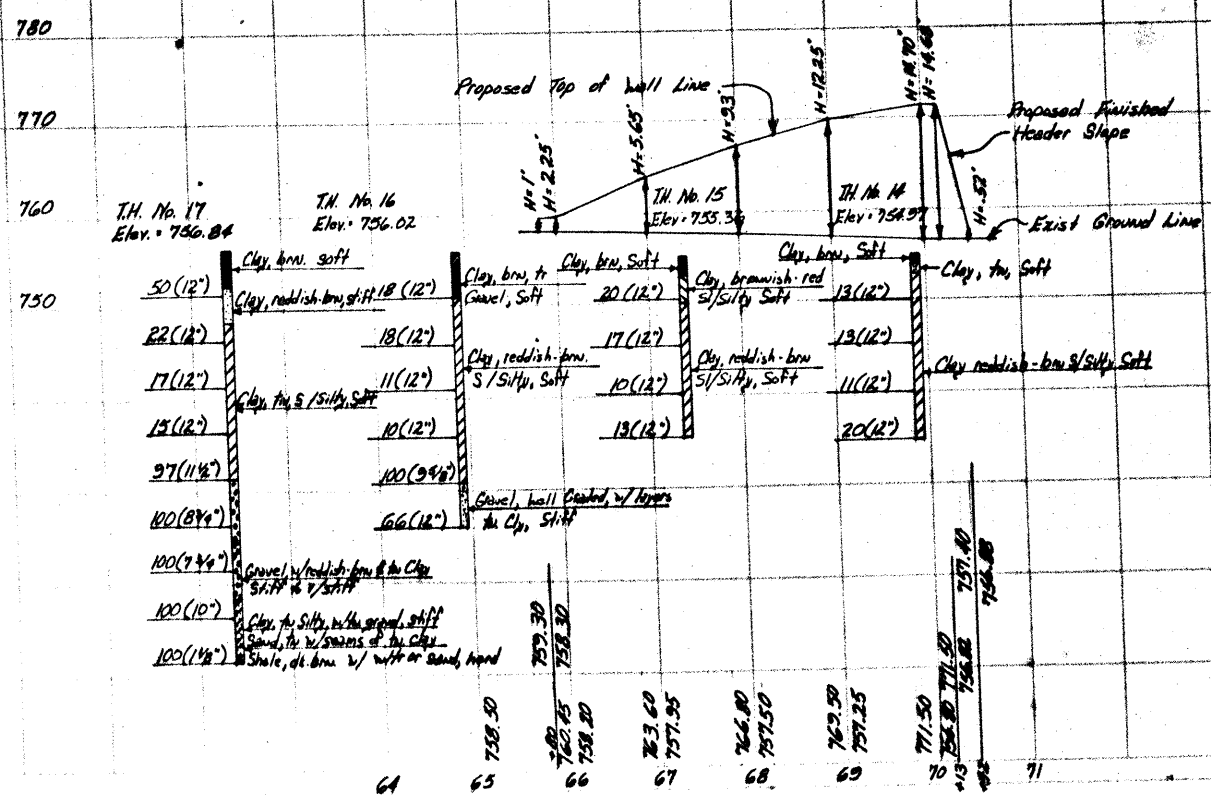
Salv. P. J. 7/26/89  
Bobbie L. Hester



- TYPICAL CROSSSECTION**
- \* Contractor to Cover Slope with Fabric to Insure Slope Stability and Erosion Control.
  - \*\* Contractor to Insure Proper Drainage.
- Note:**  
Exist. Curb to be removed before the placement of the PCTB.

ESTIMATED QUANTITIES		
ITEM	QUANT.	UNIT
Temp. Earth Walls	4011	S.F.

212



# TEMPORARY RETAINING WALL LAYOUT

STA. 65+80 TO STA. 70+42

SCALE 1" = 100' HOR.  
1" = 10' VER.

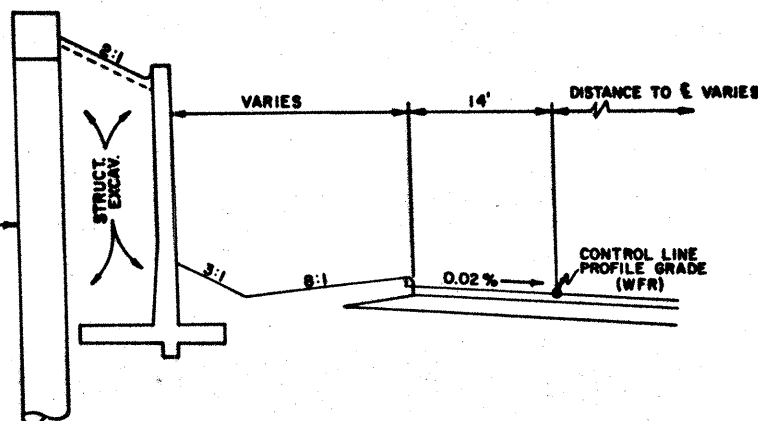
DRAWN	CHECKED	DATE	SCALE	PROJECT NO.	SHEET NO.
15	15	15	15	15	15



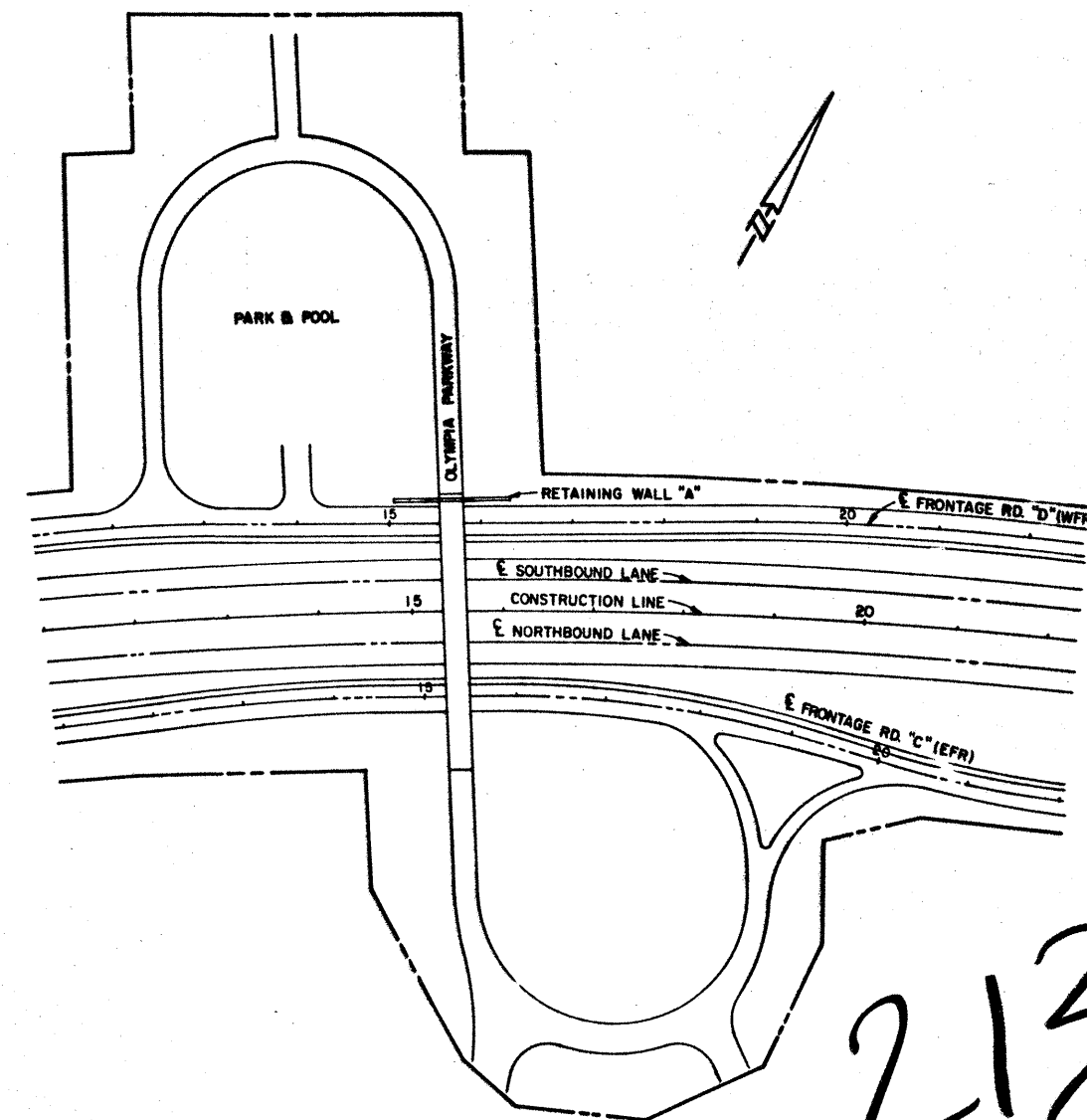
PANEL	MIN. "H"	MAX. "H"	AVG. "H"	DES.	LENGTH
1	3.89'	14'	8.94'	LC-12-32*	32'-0"
2 & 3	SEE SOIL NAILED WALL DETAILS				
4	3.09'	14'	8.55'	LC-12-32*	32'-0"

\*See Special Panel Details.

EXISTING 3-30" Ø  
DRILLED SHAFTS  
BOTTOM ELEV. = 723.6 ±



**SECTION**



213

RET. WALL "A" STA. 10+03 =  
125.00' LT. & STA. 14+86.94

T.H. NO. 11A  
118.00' LT. & STA. 14+89  
ELEV. 772.37

RET. WALL "A" &

EXIST. RIPRAP

N59°50'54"E

PROP. W.F.R.

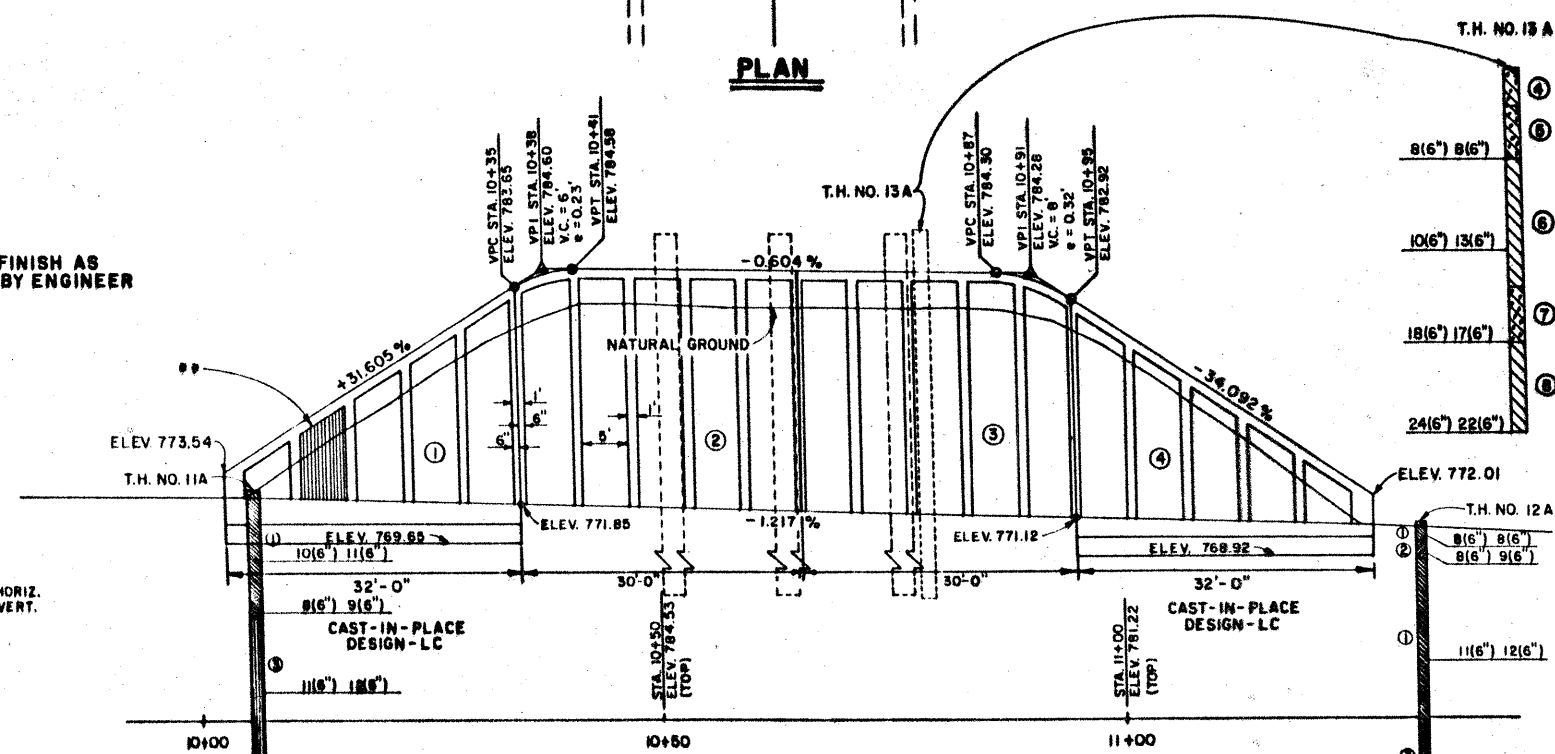
**PLAN**

RET. WALL "A" STA. 11+27 =  
126.06' LT. & STA. 16+08.27

T.H. NO. 12A  
123.00' LT. & STA. 16+15  
ELEV. 770.64

\*\*STRIATED FINISH AS  
APPROVED BY ENGINEER

SCALE: 1" = 10' HORIZ.  
1" = 5' VERT.



**ELEVATION**

DATA FOR TEST HOLES 11a, 12a, & 13a  
SEE PLAN VIEW FOR CORRECT LOCATION

1. CLAY, BROWN, SOFT
2. CLAY, IN WITH GRAVEL, SOFT
3. CLAY, LIGHT BROWN, SOFT
4. CLAY, CALICHE, CRUSHED LIMESTONE, TAN, SOFT
5. CLAY, TAN, ORANGE, W/MEDIUM GRAVEL, SOFT
6. CLAY, GRAY, W/TRACE OF TAN, SOFT
7. CLAY, GRAY, BLACK, W/FINE GRAVEL, SOFT
8. CLAY, DARK, BROWN, VERY STIFF

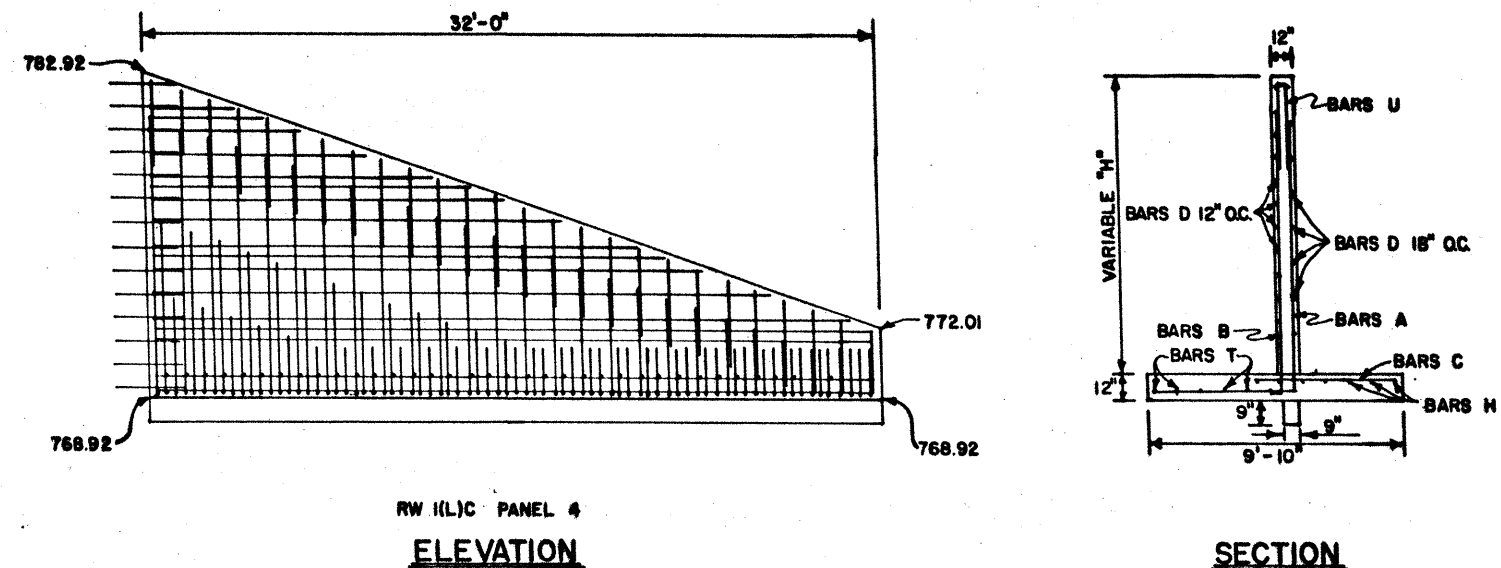
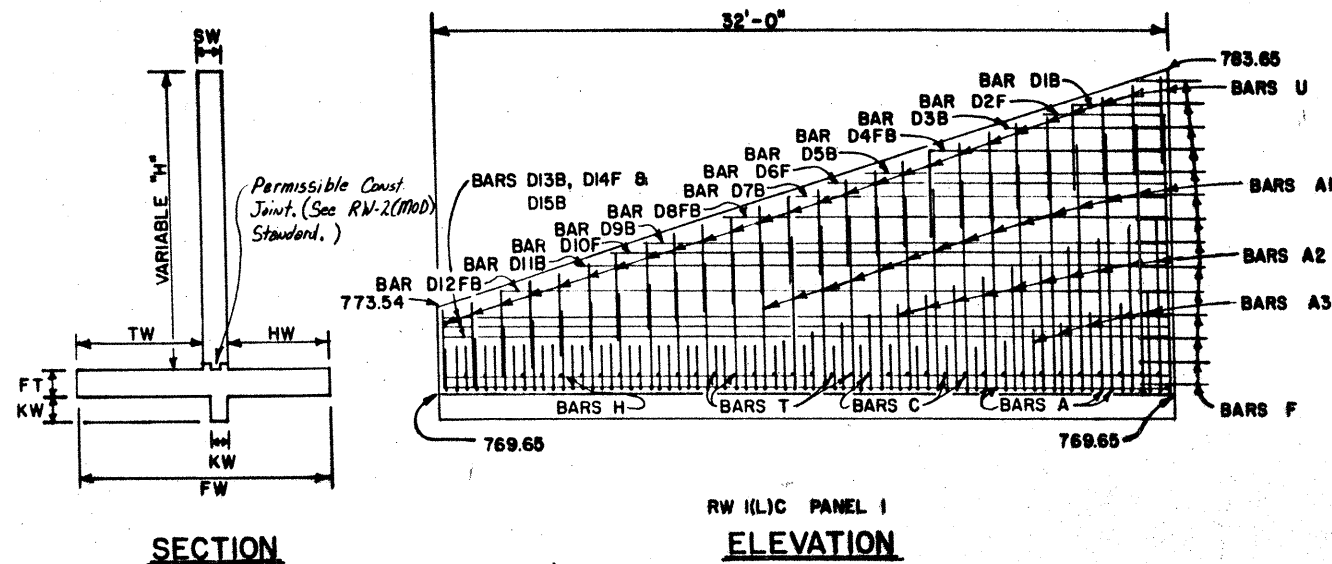
ESTIMATED QUANTITIES		
ITEM	QUANT.	UNIT.
RETAINING WALL (SPL. FIN.)	496	S.F.
RETAINING WALL (FASCIA) (SPL. FIN.)	848	S.F.
SOIL NAIL ANCHORS	1800	L.F.
SOIL NAIL TEST ANCHOR	2	EA.

## RETAINING WALL "A" LAYOUT

REVISED TOP ELEV. PROFILE  
1-20-89



PROJ. NO.	STATE	FEDERAL PROJECT NO.	SHEET NO.
15	TEXAS	IR 35-2 (157) 173	2/3
DATE	COUNTY	CONTRACT NO.	JOB NO.
15	Garland Co., Tex.	16	6 2944 JH-34



**PANEL 1**

BAR NO	SIZE	SPACING	LENGTH	WEIGHT
A1	26	1.043	15"	7'-11" AVG. 192
A2	25	1.502	15"	4'-11" AVG. 185
A3	25	2.044	15"	3'-5" AVG. 175
B	26	1.043	15"	7'-11" AVG. 192
C	38	2.670	10"	5'-5" 550
D1B	1	1.043		3'-8" 4
D2F	1	1.043		5'-2" 5
D3B	1	1.043		6'-9" 7
D4FB	2	1.043		9'-11" 21
D5B	1	1.043		13'-0" 14
D6F	1	1.043		14'-8" 15
D7B	1	1.043		16'-3" 17
D8FB	2	1.043		19'-5" 41
D9B	1	1.043		22'-7" 24
D10F	1	1.043		24'-0" 25
D11B	1	1.043		25'-9" 27
D12FB	2	1.043		28'-11" 60
D13B	1	1.043		31'-8" 33
D14F	1	1.043		31'-8" 33
D15B	1	1.043		31'-8" 33
F	14	2.670	12"	3'-0" 112
H	7	1.043	12"	31'-8" 231
T	7	1.043	12"	31'-8" 231
U	26	1.043	15"	8'-4" 226
<b>TOTAL</b>				<b>2453</b>

**PANEL 4**

BAR NO	SIZE	SPACING	LENGTH	WEIGHT
A1	26	1.043	15"	7'-11" AVG. 192
A2	25	1.502	15"	4'-11" AVG. 185
A3	25	2.044	15"	3'-5" AVG. 175
B	26	1.043	15"	7'-11" AVG. 192
C	38	2.670	10"	5'-5" 550
D1B	1	1.043		3'-4" 3
D2F	1	1.043		4'-10" 3
D3B	1	1.043		6'-3" 7
D4FB	2	1.043		9'-0" 19
D5B	1	1.043		12'-0" 13
D6F	1	1.043		15'-7" 14
D7B	1	1.043		18'-0" 16
D8FB	2	1.043		22'-0" 38
D9B	1	1.043		20'-11" 22
D10F	1	1.043		22'-5" 23
D11B	1	1.043		23'-10" 25
D12FB	2	1.043		26'-10" 56
D13B	1	1.043		31'-8" 33
D14F	1	1.043		31'-8" 33
D15B	1	1.043		31'-8" 33
F	14	2.670	12"	3'-0" 112
H	7	1.043	12"	31'-8" 231
T	7	1.043	12"	31'-8" 231
U	26	1.043	15"	8'-4" 226
<b>TOTAL</b>				<b>2434</b>

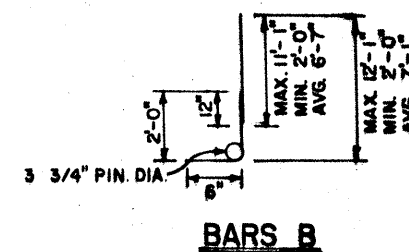
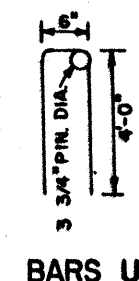
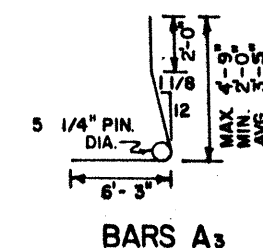
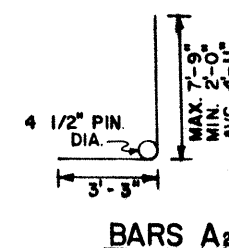
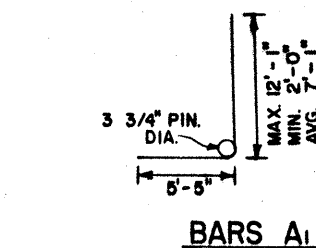
**BARS D SECTION A**

3'-8"
5'-2"
6'-9"
9'-11"
13'-0"
14'-8"
16'-3"
19'-5"
22'-7"
24'-0"
25'-9"
28'-11"
31'-8"
31'-8"
31'-8"

BARS D1B
BARS D2F
BARS D3B
BARS D4FB
BARS D5B
BARS D6F
BARS D7B
BARS D8FB
BARS D9B
BARS D10F
BARS D11B
BARS D12FB
BARS D13B
BARS D14F
BARS D15B

**BARS D SECTION B**

3'-4"
4'-10"
6'-3"
9'-0"
12'-0"
13'-7"
15'-1"
18'-0"
20'-11"
22'-5"
23'-10"
26'-10"
31'-8"
31'-8"
31'-8"



214

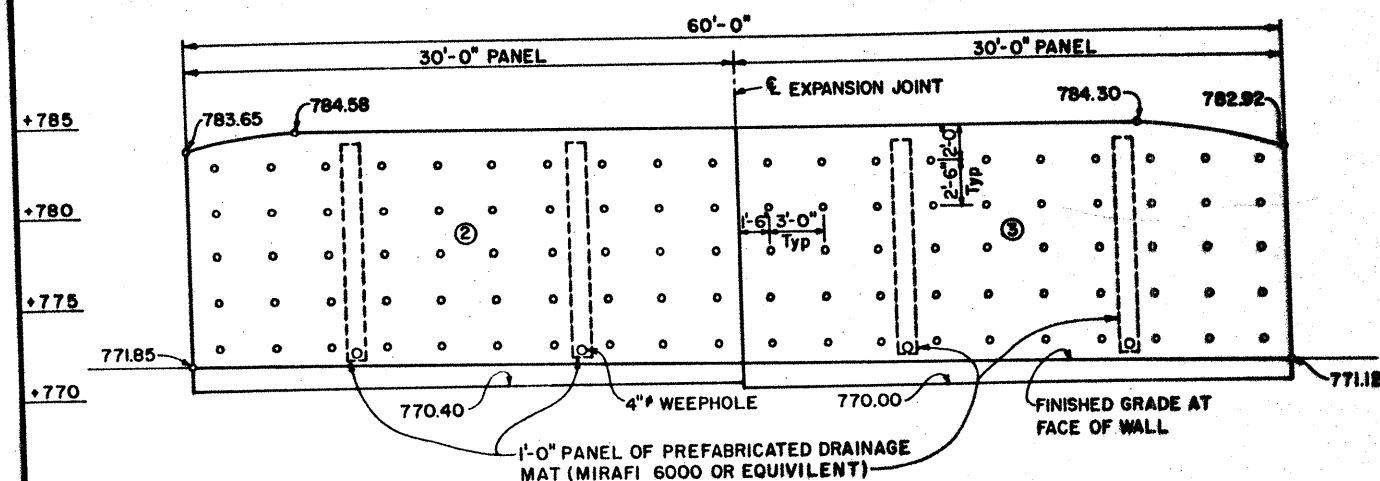
SCALE: 1" = 4'



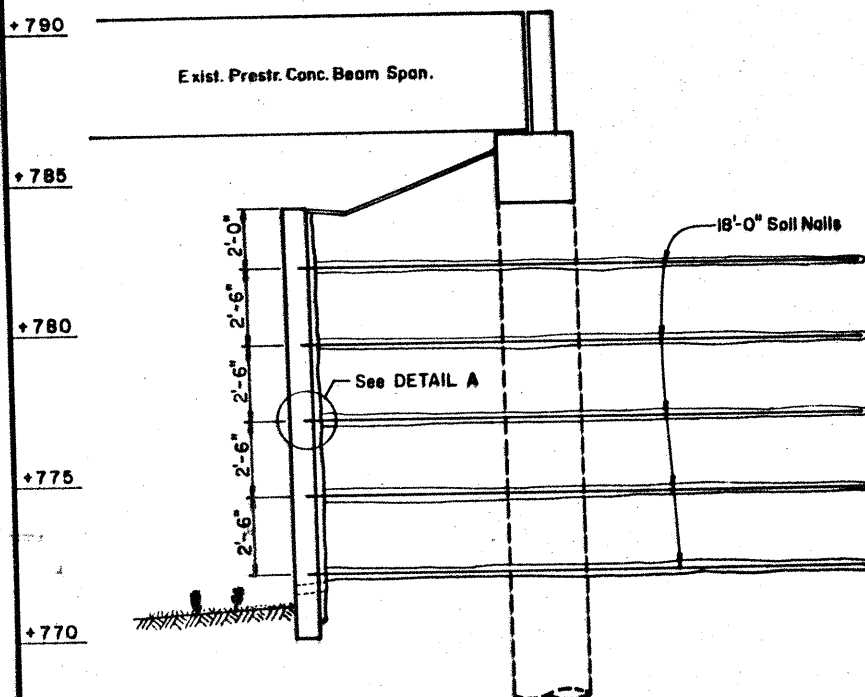
Sub. L. Z. 2/24/02

RETAINING WALL "A"  
RW 1(L)C  
DESIGN HEIGHT = 12'

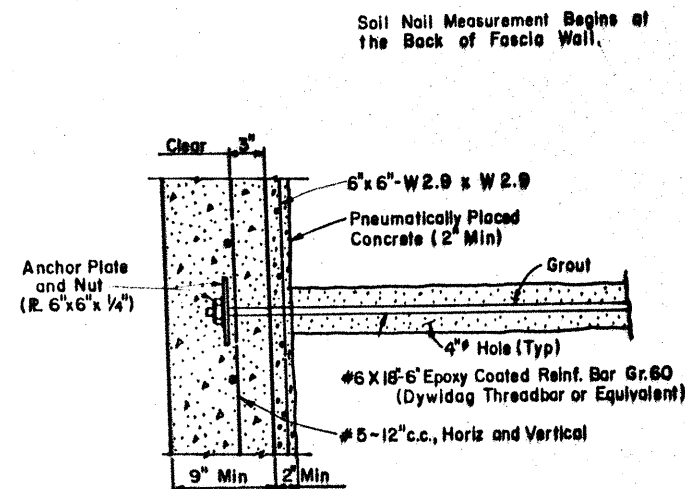
FED. NO.	STATE	FEDERAL PROJECT NO.	SHEET NO.
6	TEXAS	IR35-2(157)173	24
STATE DIST. NO.	COUNTY	CONTRACT NO.	SECTION NO.
15	Guadalupe	16	6



SOIL NAIL PANEL ELEVATIONS



SECTION THRU WALL



DETAIL A

# CONSTRUCTION SEQUENCE:

The slope in front of the soil nail retaining wall panels shall be removed in lifts. The depth of each lift shall be limited to the amount necessary to install a single horizontal row of Soil Nails. At no time shall more than 5' of unnailed vertical face be exposed.

Upon completion of each horizontal row of nails, a minimum of 2" of pneumatically placed concrete shall be applied to the cut face. The concrete shall be reinforced with a single layer of Welded Wire Reinforcing Fabric, 6" x 6" - W2.9 X W2.9

When all rows of nails have been placed, the permanent Concrete Fascia Wall shall be completed.

## GENERAL NOTES:

All concrete shall be Class "C".

All reinforcing steel shall be Grade 60.

Chamfer all exposed corners.

Two Soil Nail Test Anchors 18' in length will be required on this project. Test Nails shall develop a minimum of 11 kips.

Pneumatically placed concrete shall comply with requirements of the Item "Pneumatically Placed Concrete" (Type III), except that it will not be paid for directly.

Drainage system shall consist of 1' Panels of Prefabricated Drainage Mats meeting the requirements of the Special Specification "Prefabricated Soil Drainage Mats".

Pneumatically placed concrete shall be removed in the area of the drains, and Drainage Mats placed against the soil. The drainage system will not be paid for directly but will be considered subsidiary to the Item "Retaining Walls".

The price bid per square foot of Retaining Wall shall include all concrete, reinforcing steel, pneumatically placed concrete, expansion joint material, waterstops, drainage material, and any other materials necessary to complete the wall.

Drilled Shafts under the existing structure may interfere with the installation of soil nails. The Contractor shall probe for and locate the drilled shafts. Soil Nails may be moved a maximum of 1' horizontally and angled up to 10° to facilitate installation.

215



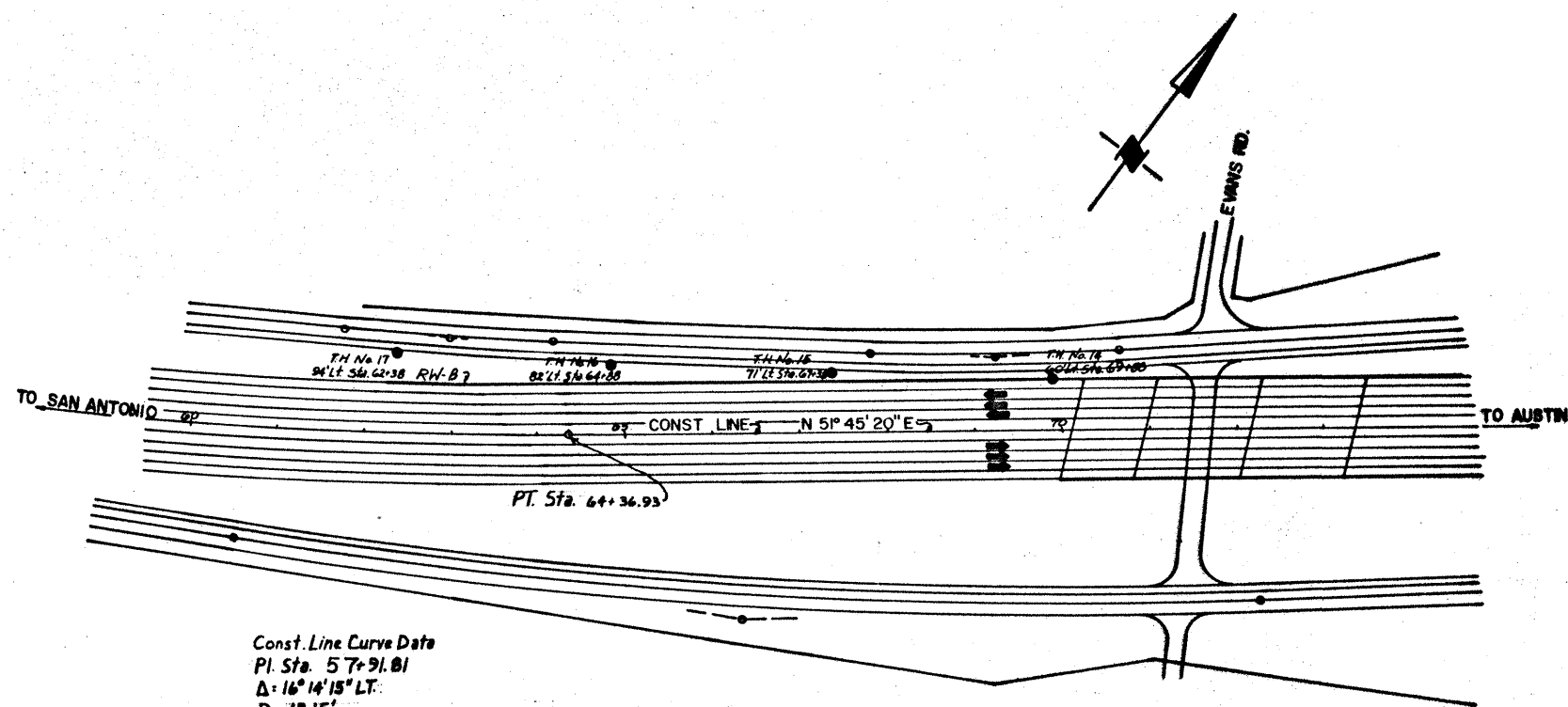
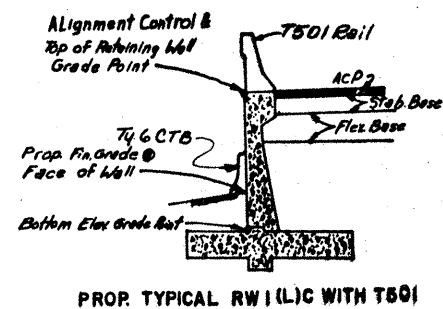
STATE DEPARTMENT OF HIGHWAYS  
AND PUBLIC TRANSPORTATION

## SOIL NAILED WALL DETAILS

ORIGINAL DRAWING DATE	MAY 1989	STATE	DESIGN	REVISION	FEDERAL AID PROJECT	NO.	SHEET
BY	MPM	15	6	7R 35-2 (157) 173	215		
CH	GHO						
DR	EDS						
CD	MPM						

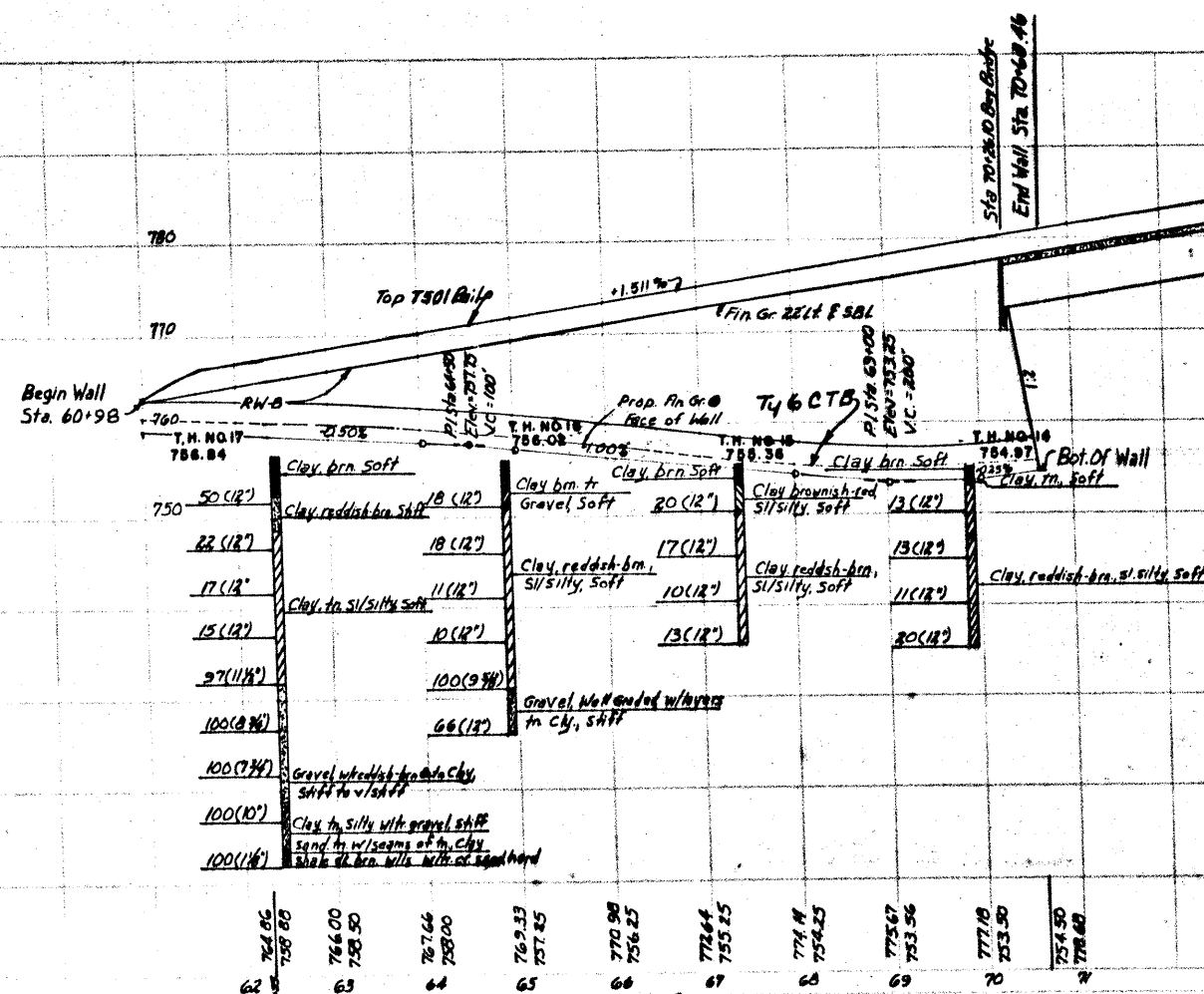


Bobby L. Nasrett 7/26/89  
Bobby L. Nasrett



Const. Line Curve Data  
PI Sta. 57+91.01  
 $\Delta = 16^\circ 14' 15''$  LT.  
D =  $1^\circ 15'$   
T = 653.00'  
L = 1298.99'  
R = +583.64'

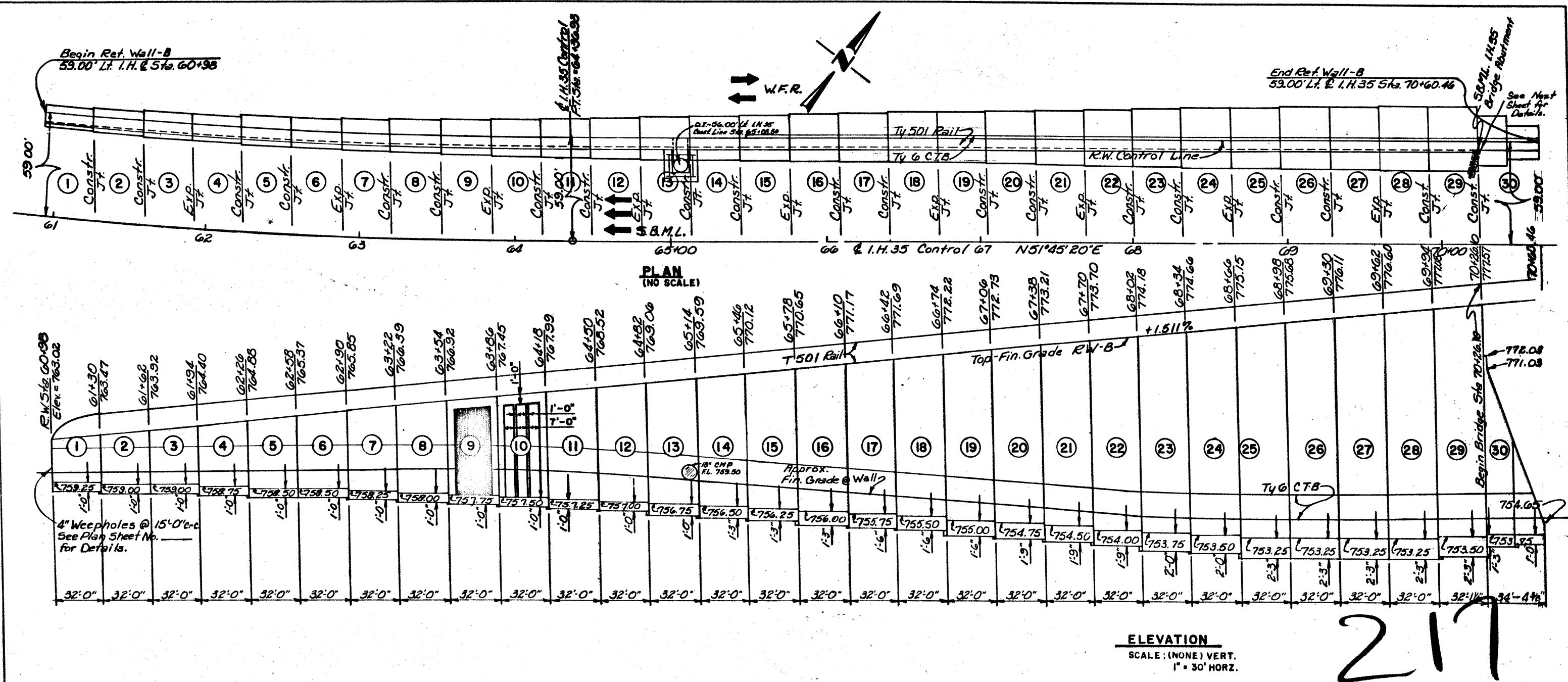
LAYOUT  
RETAINING WALL BETWEEN  
STA. 60+98 AND STA. 70+60.46  
FROM SELMA CROSSOVER TO FM. 3009,  
I.H. 35 CONTROL 18-7-B4  
BEXAR CO. SCALE: 1" = 100' HOR.  
1" = 10' VERT.



216

IR 35-2(157)/73 IH35  
15 GUNNERS, STC 16 6 BDFM 216





Panel	RWB-1	RWB-2	RWB-3	RWB-4	RWB-5	RWB-6	RWB-7	RWB-8	RWB-9	RWB-10	RWB-11	RWB-12	RWB-13	RWB-14	RWB-15	RWB-16	RWB-17	RWB-18	RWB-19	RWB-20	RWB-21	RWB-22	RWB-23	RWB-24	RWB-25	RWB-26	RWB-27	RWB-28	RWB-29	RWB-30
Design	LC-4-32	LC-5-32	LC-6-32	LC-6-32	LC-7-32	LC-7-32	LC-8-32	LC-9-32	LC-10-32	LC-11-32	LC-12-32	LC-13-32	LC-14-32	LC-14-32	LC-15-32	LC-16-32	LC-17-32	LC-18-32	LC-19-32	LC-20-32	LC-21-32	LC-22-32	LC-23-32	LC-23-32	LC-23-32	LC-24-32	LC-24-32	LC-24-32	LC-24-32	LC-24-32
CRCC Panel	11.54	13.26	13.81	13.57	17.12	17.70	19.39	21.21	23.02	23.95	25.68	27.39	29.21	34.89	35.89	38.14	44.70	47.37	50.33	51.44	59.05	62.47	65.92	73.43	77.15	77.99	78.79	86.97	87.67	26.04
Reinf. Steel	1218	1483	1403	1658	1760	1760	2130	2460	2668	2668	3381	3787	4235	4943	4943	5338	5690	6069	6969	6969	7644	8088	9238	9652	9900	9900	9900	10,478	10,478	3,268
Str. Ext.	10.67	10.67	10.67	10.67	10.67	10.67	10.67	10.67	10.67	10.67	10.67	10.67	10.67	10.67	10.67	10.67	10.67	10.67	10.67	10.67	10.67	10.67	10.67	10.67	10.67	10.67	10.67	10.67	10.67	11.45
T501 Rail	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Gravel Backfill	2.37	2.84	3.91	4.98	6.16	7.35	8.53	9.72	10.90	12.56	13.99	15.88	18.25	20.99	22.52	24.89	27.02	29.16	31.53	33.90	35.79	38.16	40.06	41.48	43.09	44.09	45.51	46.22	47.41	19.56
Reinf. Steel	187.84	150.24	165.12	188.48	212.00	227.52	251.84	276.96	301.92	327.04	352.16	377.28	402.40	427.36	452.32	477.12	501.76	526.56	559.20	583.04	606.56	638.08	661.44	684.96	709.28	724.64	739.36	754.88	762.40	320.93
Ty 6 CBT	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	34.36

\* For Contractors Information Only.

Totals		
Cl/C Conc.	C.Y.	1255.09
Reinf. Steel	Lbs.	169,174
Str. Ext.	C.Y.	1215.81
Water Prod.	SY.	320.91
T501 Rail	LF	928.1
Gravel Backfill	C.Y.	708.22
Panel Area	S.F.	13,500.00
Ty 6 CBT	LF	962.46

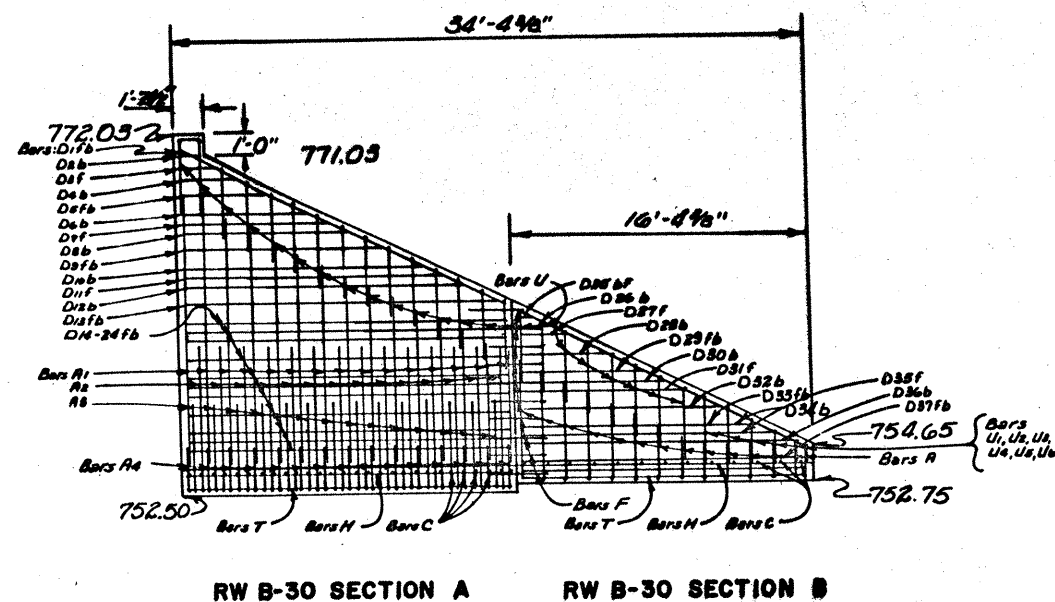
Robert L. Zant Jr. 7/26/02



**RETAINING WALL "B"**  
FROM 59.00' LT. & I.H. 35 STA.  
60+98.00 TO 59.00' LT. & I.H. 35  
STA. 70+60.46

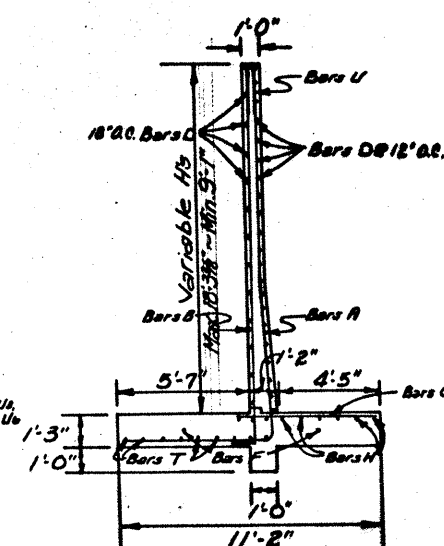
SHEET 1 OF 2

STATE	FEDERAL PROJECT NO.	SHEET NO.
TEXAS	IR35-2 (157) 173	217
COUNTY	CONTRACT	SECTION
15	Guadalupe Etc	16 6 296

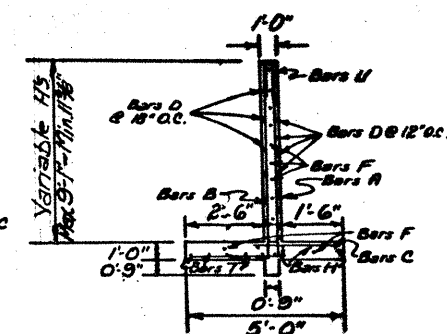
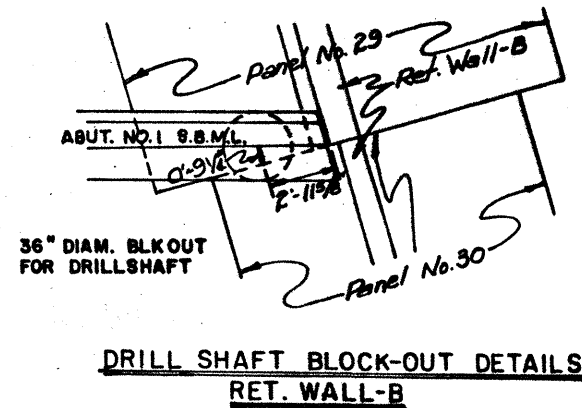


RW B-30 SECTION A RW B-30 SECTION B

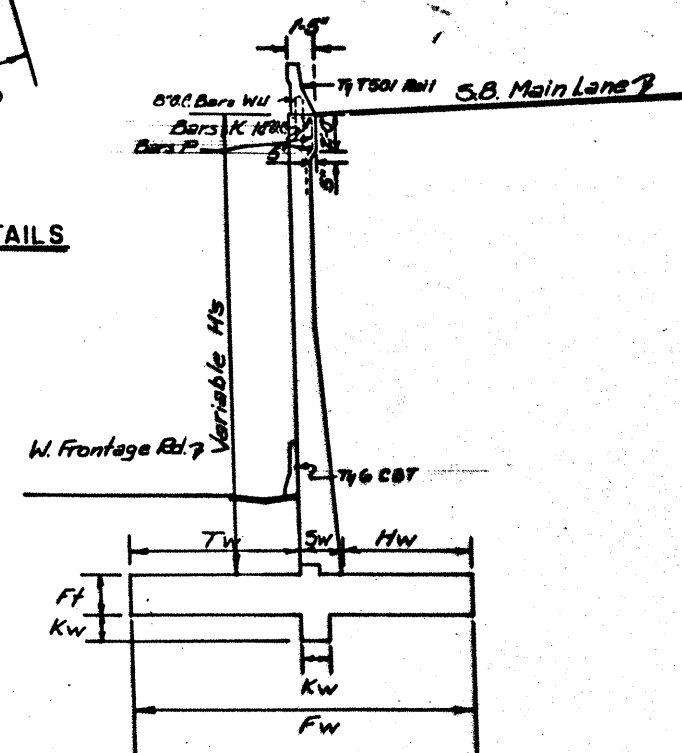
ELEVATION



SECTION A



SECTION B



RW B-1 TO RW B-29  
TYPICAL SECTION

BARS D

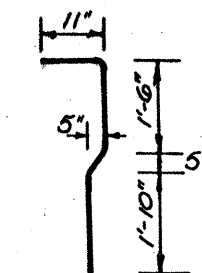
Bar No.	Size	Length	Weight
A1	15 #5	12'-4 1/2\" Avg.	194
A2	14 #6	11'-2\"	235
A3	14 #7	10'-11\"	312
A4	15 #8	8'-5\"	357
B	15 #5	17'-10 1/2\" Avg.	280
C	22 #5	6'-1\"	455
D1	2 #5	19'-7\"	41
D2	1 #5	1'-3\"	1
D3	1 #5	2'-0\"	2
D4	1 #5	3'-1\"	3
D5	2 #5	5'-0\"	10
D6	1 #5	7'-0\"	7
D7	1 #5	8'-0\"	8
D8	1 #5	9'-0\"	9
D9	2 #5	11'-0\"	22
D10	1 #5	13'-0\"	14
D11	1 #5	14'-0\"	15
D12	2 #5	17'-0\"	35
D13	1 #5	17'-6\"	35
D14	13 #5	17'-6\"	237
D15	10 #5	17'-6\"	80
D16	7 #5	17'-6\"	110
D17	15 #5	17'-6\"	128
D18	15 #5	8'-4\"	130
Total			2,678

SECTION A

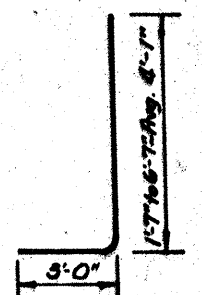
Bar No.	Size	Length	Weight
D1fb	19'-7\"		
D2fb	1'-3\"		
D3fb	2'-0\"		
D4fb	3'-1\"		
D5fb	5'-0\"		
D6fb	7'-0\"		
D7fb	8'-0\"		
D8fb	9'-0\"		
D9fb	11'-0\"		
D10fb	13'-0\"		
D11fb	14'-0\"		
D12fb	15'-0\"		
D13fb	17'-0\"		
D14fb	17'-6\"		
D15fb	17'-6\"		
D16fb	17'-6\"		
D17fb	17'-6\"		
D18fb	17'-6\"		
D19fb	17'-6\"		
D20fb	17'-6\"		
D21fb	17'-6\"		
D22fb	17'-6\"		
D23fb	17'-6\"		
D24fb	17'-6\"		
D25fb	17'-6\"		
D26fb	17'-6\"		
D27fb	17'-6\"		
D28fb	17'-6\"		
D29fb	17'-6\"		
D30fb	17'-6\"		
D31fb	17'-6\"		
D32fb	17'-6\"		
D33fb	17'-6\"		
D34fb	17'-6\"		
D35fb	17'-6\"		
D36fb	17'-6\"		
D37fb	17'-6\"		

Bar No.	Size	Length	Weight
A	14 #5	4'-1\" Avg.	60
B	14 #5	8'-0\" Avg.	179
C	14 #4	3'-0\"	25
D25	2 #5	17'-8\"	37
D26	1 #5	1'-1\"	1
D27	1 #5	2'-2\"	2
D28	1 #5	3'-2\"	4
D29	2 #5	5'-2\"	11
D30	1 #5	7'-2\"	7
D31	1 #5	8'-2\"	8
D32	1 #5	9'-2\"	10
D33	2 #5	11'-2\"	23
D34	1 #5	13'-2\"	14
D35	1 #5	14'-2\"	15
D36	1 #5	15'-2\"	16
D37	2 #5	15'-10\"	33
H	3 #5	15'-10 1/2\"	50
I	3 #5	15'-10 1/2\"	50
L	8 #5	8'-4\"	70
L1	1 #5	7'-8\"	8
L2	1 #5	6'-6\"	7
L3	1 #5	5'-4\"	6
L4	1 #5	4'-0\"	4
L5	1 #5	2'-10\"	3
L6	1 #5	1'-8\"	2
Total			590

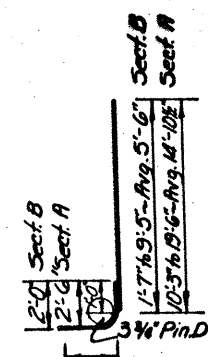
SECTION B



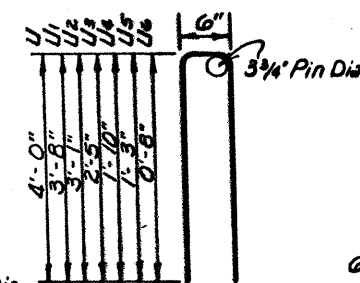
BARS K



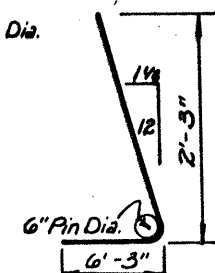
BARS A



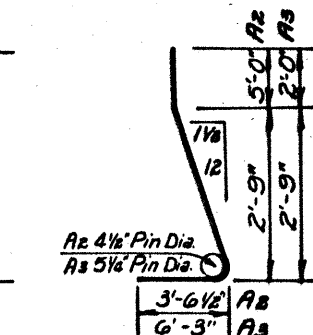
BARS B



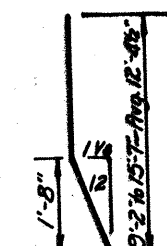
BARS U



BARS A4



BARS A2 & 3



BARS A1

RETAINING WALL RW-B-30  
SPL. PANEL DETAILS

SHEET 2 OF 2



Robert L. Mabry 7/26/82

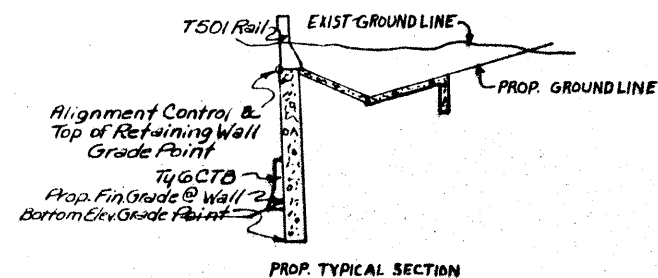
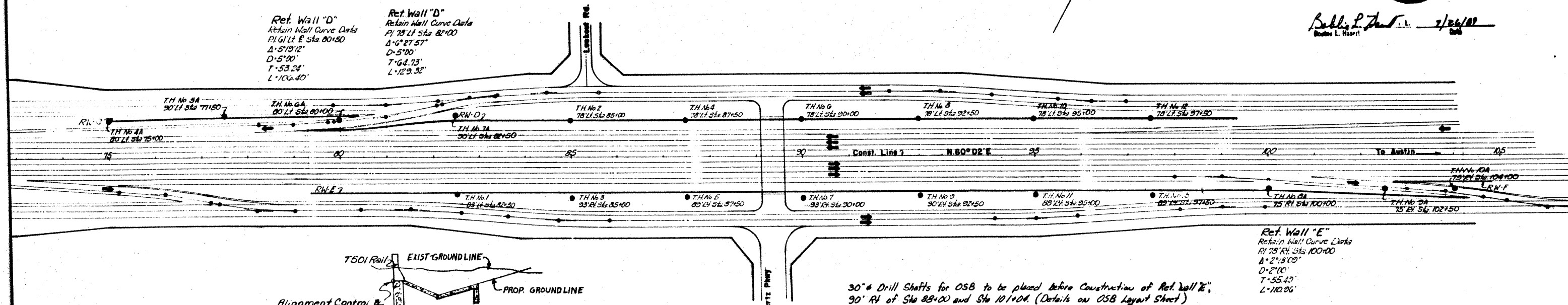
STATE	FEDERAL PROJECT NO.	NO.
TEXAS	TR35-2 (157) 173	218
COUNTY	CONTRACT	SECTION
15 Guadalupe	Etc 16	6 29th TH35



Robert L. Hurst 2/26/82

Ret. Wall "D"  
Retain Wall Curve Data  
PI 61.14 Sta 80+50  
 $\Delta = 51.91^\circ$   
 $D = 5.00'$   
 $T = 53.24'$   
 $L = 100.40'$

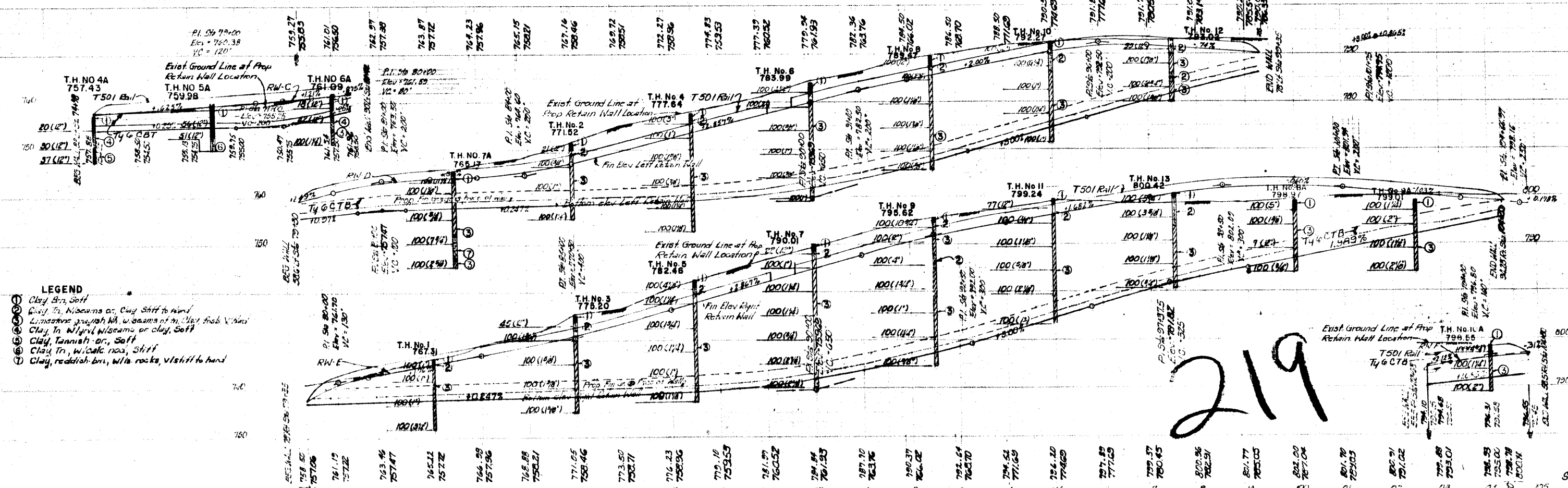
Ret. Wall "D"  
Retain Wall Curve Data  
PI 78.14 Sta 82+00  
 $\Delta = 6^\circ 27.57'$   
 $D = 5.00'$   
 $T = 64.73'$   
 $L = 129.32'$



Ret. Wall "E"  
Retain Wall Curve Data  
PI 78.14 Sta 100+00  
 $\Delta = 2^\circ 3.03'$   
 $D = 2.00'$   
 $T = 55.49'$   
 $L = 110.96'$

30" Drill Shafts for OSB to be placed before Construction of Ret. Wall "E",  
90' Rt of Sta 83+00 and Sta 101+04. (Details on OSB Layout Sheet)

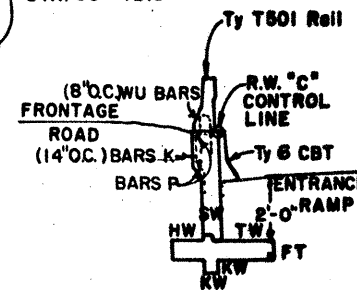
**LAYOUT**  
RETAINING WALLS BETWEEN  
STA. 75+00 AND STA. 104+80  
FROM SELMA CROSSOVER TO F.M. 3009  
I.H. 35 CONTROL 16-6-29  
GUADALUPE CO. SCALE: 1"=100' HOR.  
1"=10' VERT.



- LEGEND**
- 1 Clay, Brn. Soft
  - 2 Clay, In. Nibsams or Clay Shift to hand
  - 3 Limestone grayish bl. w. seams of m. Clay fresh & hard
  - 4 Clay, In. Nibsams or clay, Soft
  - 5 Clay, Tannish or, Soft
  - 6 Clay, In. w/ calc. nod. Shift
  - 7 Clay, reddish-brn. w/ calc. nod. Shift

BEGIN RW "C"  
83.00' LT. I.H. 35 CONST. LINE  
STA. 74+98.0

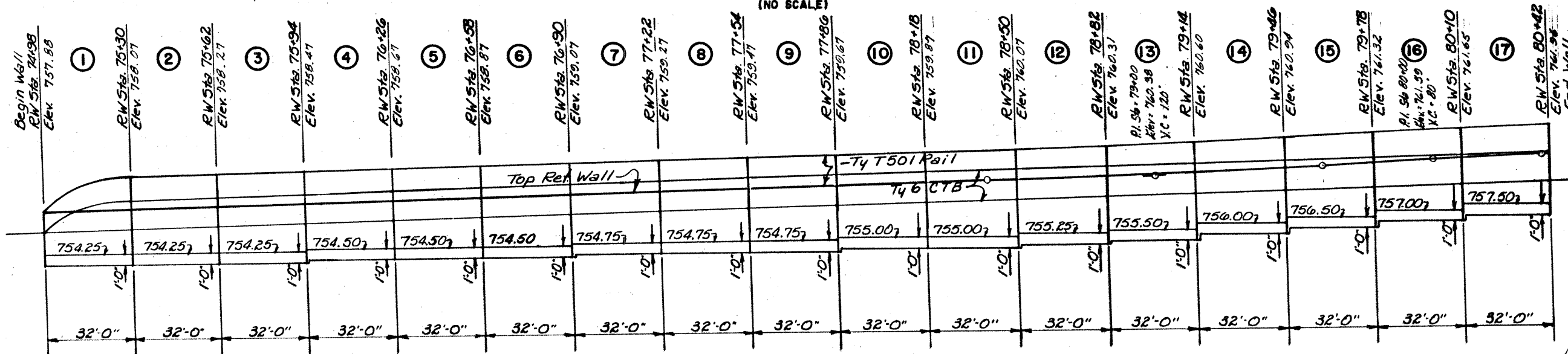
END RW "C"  
90.00' LT. I.H. 35 CONST. LINE  
STA. 80+42.0



RET. WALL "C"  
TYPICAL SECTION

Const. I.H. 35  $\nearrow$  N60°02'E

PLAN  
(NO SCALE)



ELEVATION  
SCALE: 1" = 20' HORIZ.  
1" = 5' VERT.

Panel	RWC-1	RWC-2	RWC-3	RWC-4	RWC-5	RWC-6	RWC-7	RWC-8	RWC-9	RWC-10	RWC-11	RWC-12	RWC-13	RWC-14	RWC-15	RWC-16	RWC-17	Totals
Design	LC-4-32	LC-4-32	LC-5-32	LC-5-32	LC-5-32	LC-5-32	LC-5-32	LC-5-32	LC-5-32	LC-5-32	LC-5-32	LC-5-32	LC-5-32	LC-5-32	LC-5-32	LC-5-32	LC-5-32	
C/C Conc. Cu.Yd.	10.16	10.39	11.52	11.46	11.69	11.93	11.87	12.11	12.35	12.29	12.52	12.49	12.51	12.29	12.12	11.95	11.74	201.33
Reinf. Steel Lbs.	1278	1218	1483	1483	1483	1483	1483	1483	1483	1483	1483	1483	1483	1483	1483	1483	1483	24,681
Str. Excav. Cu.Yd.																		376.68
Waterproof Sp.Yd.	10.67	10.67	10.67	10.67	10.67	10.67	10.67	10.67	10.67	10.67	10.67	10.67	10.67	10.67	10.67	10.67	10.67	181.39
Ty T501 Rail L.F.	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	544
Gravel Backfill Cu.Yd.					0.59	1.09	0.97	1.39	1.92	1.80	2.28	2.16	2.04	1.33	0.62			16.19
Panel Area Sp.Ft.	119.20	125.44	131.84	130.24	136.64	143.04	141.44	147.84	154.24	152.64	159.04	158.08	158.56	152.64	148.16	143.68	137.92	2440.64
T 6 CBT L.F.	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	544

\* For Contractors Information Only

## RETAINING WALL RWC

FROM STA. 74+98 - 83.0' Lt. I.H. 35 Const. Line  
TO STA. 80+42 - 90.0' Lt. I.H. 35 Const. Line

PROJECT NO.	STATE	FEDERAL PROJECT NO.	SHEET NO.
IR-35-2(152)173	TEXAS		220
COUNTY	CONTRACT	SECTION	WORK
15 Guadalupe Etc	16	6	295



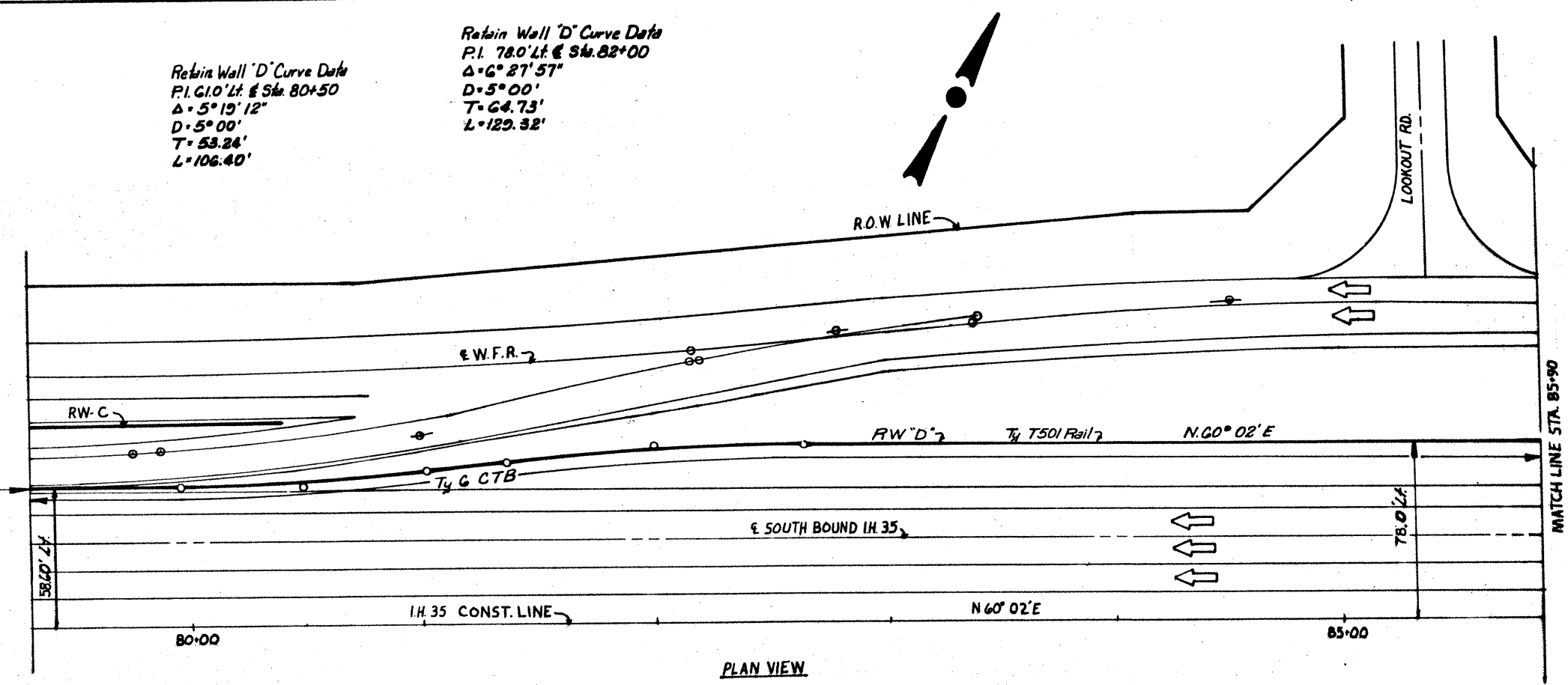


Bill P. Hasty 7/24/82  
Robert L. Hasty

Retain Wall 'D' Curve Data  
P.I. 61.0' Lt. & Sta. 80+50  
Δ = 5° 15' 12"  
D = 5° 00'  
T = 53.24'  
L = 106.40'

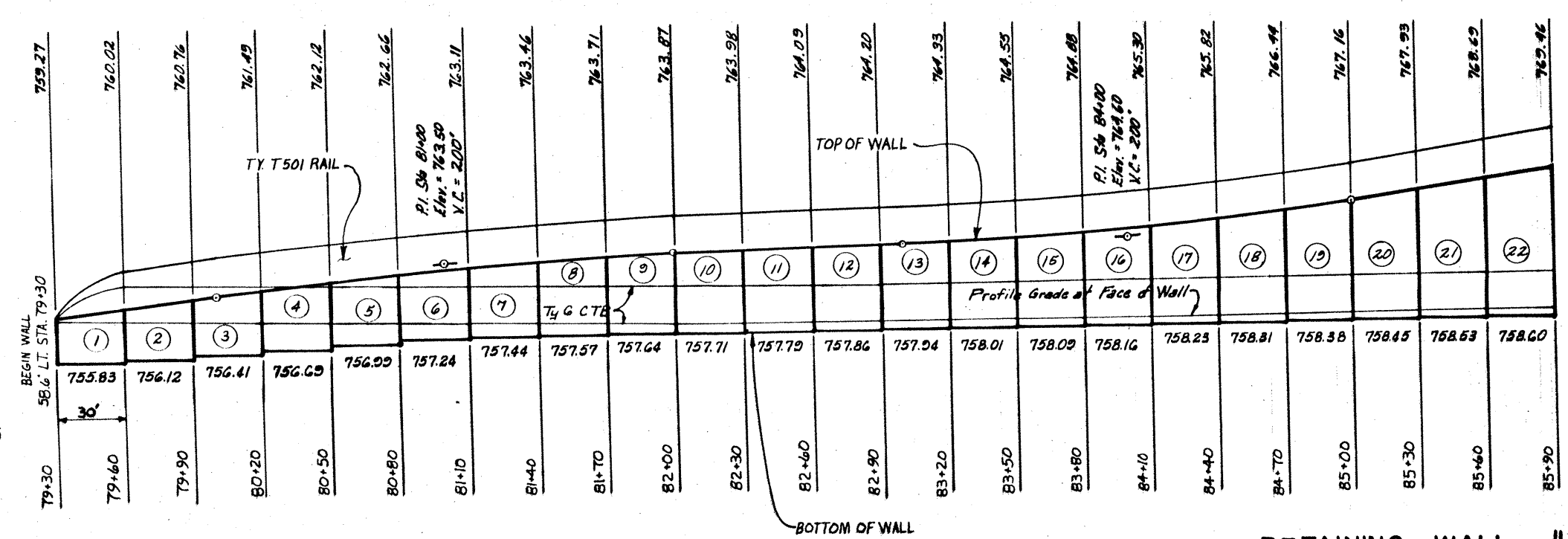
Retain Wall 'D' Curve Data  
P.I. 78.0' Lt. & Sta. 82+00  
Δ = 6° 27' 57"  
D = 5° 00'  
T = 64.73'  
L = 129.32'

Begin Ret. Wall 'D'  
Sta. 79+30.0'  
58.60' Lt. I.H. 35  
& Sta. 79+30.0



PLAN VIEW  
Scale: 1" = 30'

NOTE: FOR T.Y. T501  
RAIL END SECTION DETAILS  
SEE SHEET 244.

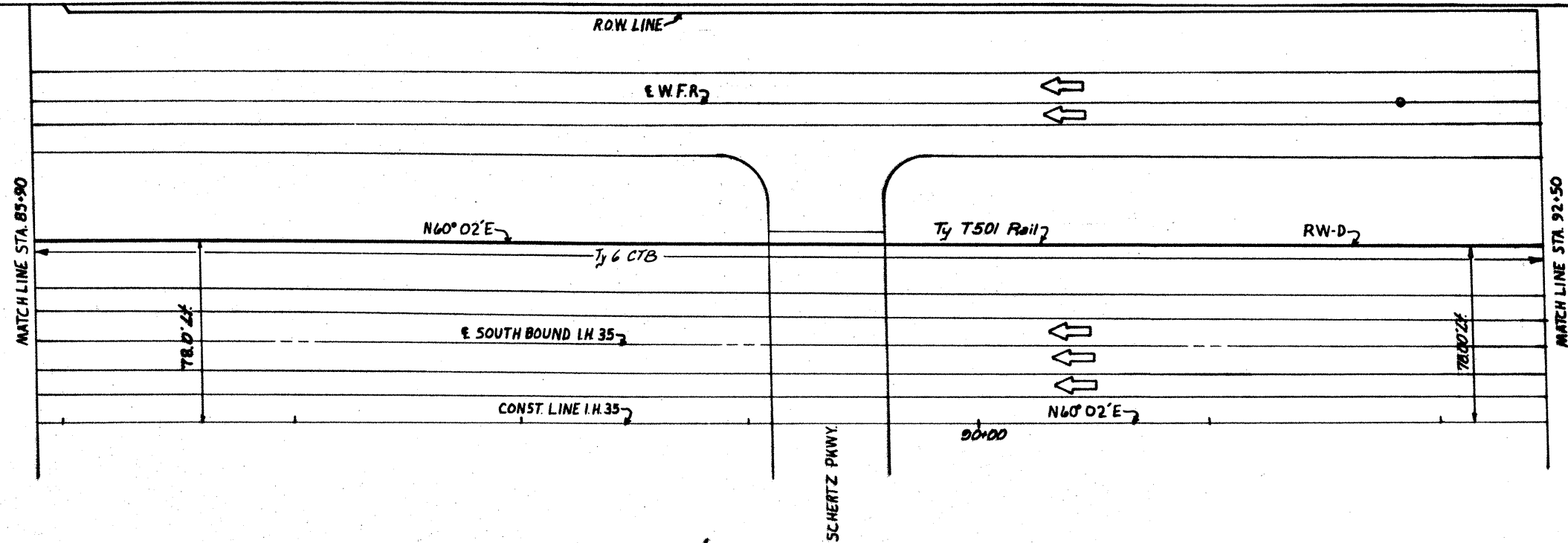


ELEVATION VIEW  
Scale: 1" = 30' Vert.  
1" = 5' Horiz.

RETAINING WALL "D"  
FROM 58.60' LT. & I.H. 35 STA.  
79+30.00 TO 78.00' LT. & I.H. 35  
STA. 99+35.00

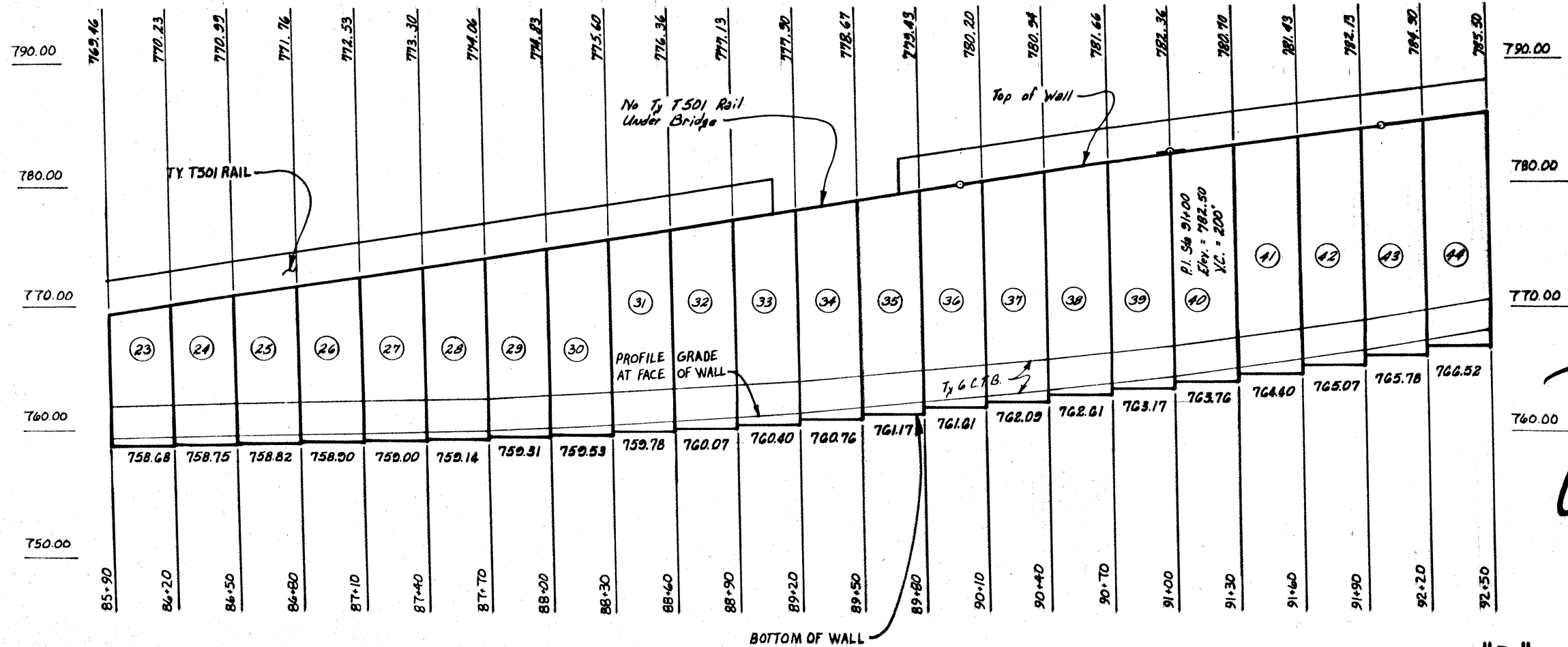
DES. NO.	STATE	FEDERAL PROJECT NO.	SHEET NO.
017-80	TEXAS	IR35-2(157)173	221
STATE DIST. NO.	COUNTY	CONTRACT NO.	SECTION NO.
15	Guadalupe, Etc.	16	6 295 I.H. 35

221



B.L. Hasert 7/26/02  
Bobbie L. Hasert

PLAN VIEW  
Scale: 1" = 30'

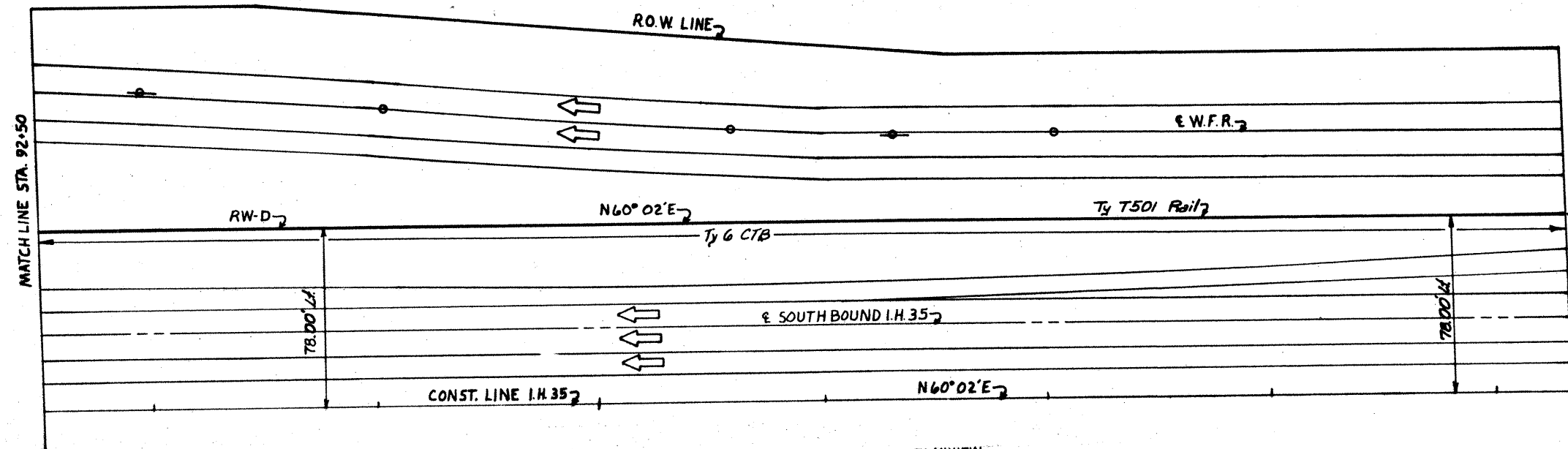


ELEVATION VIEW  
Scale: 1" = 30' Horiz.  
1" = 5' Vert.

RETAINING WALL "D"  
FROM 58.60' LT. E I.H. 35 STA.  
79+30.00 TO 78.00' LT. E I.H. 35  
STA. 99+35.00

STATE	FEDERAL PROJECT NO.	SHEET NO.
TX	IR35-2(152)73	222
STATE DIST. NO.	COUNTY	CONTRACT NO.
15	Guadalupe	16 G 295

222

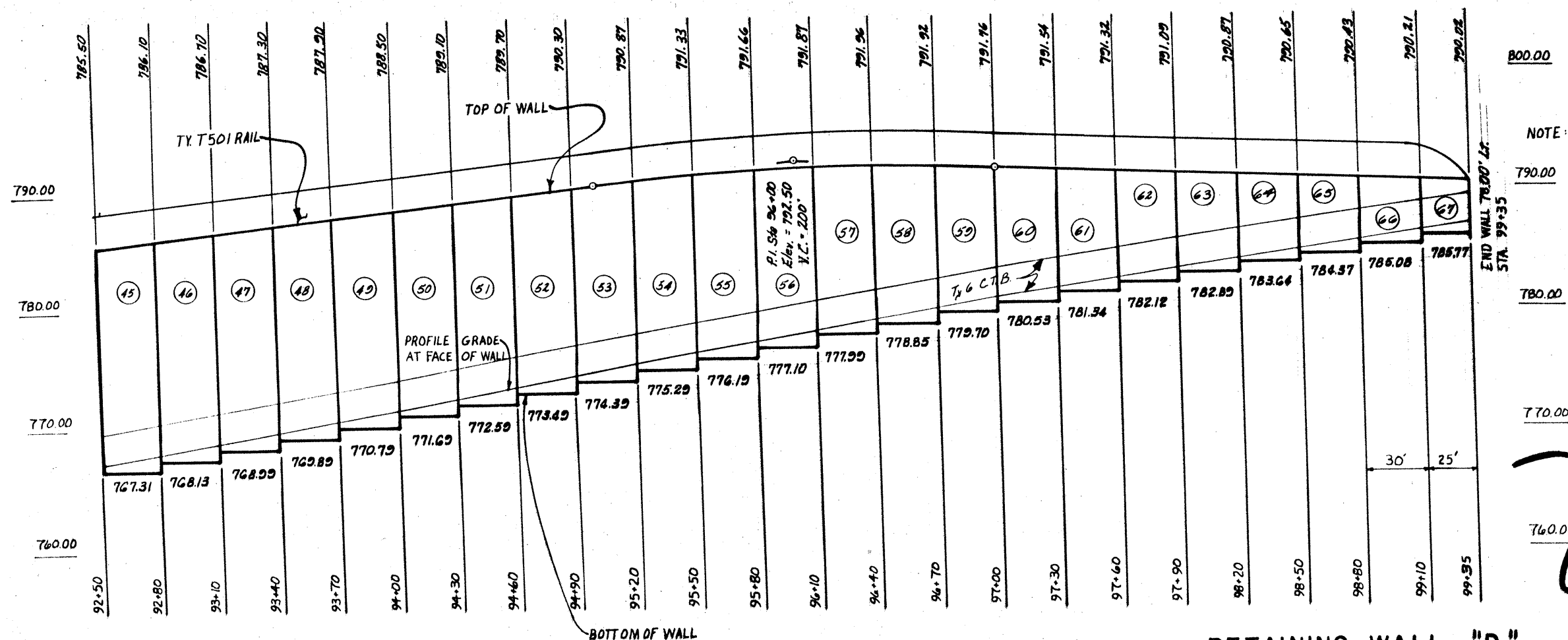


PLANVIEW  
Scale: 1" = 30'

End Retain. Wall "D"  
Sta. 99+35.0  
+78.00' LT. I.H. 35  
E. Sta. 99+35.0



Bobbie L. Hasert 7/26/02



NOTE: FOR TY T501 RAIL END SECTION DETAILS SEE SHEET 223.

770.00

760.00

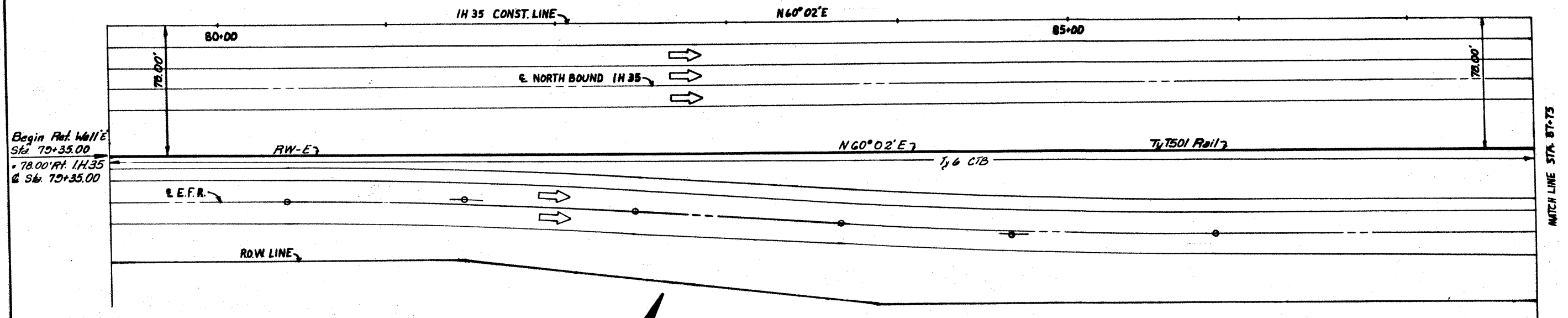
RETAINING WALL "D"

FROM 58.60' LT. & I.H. 35 STA.  
79+30.00 TO 78.00' LT. & I.H. 35  
STA. 99+35.00

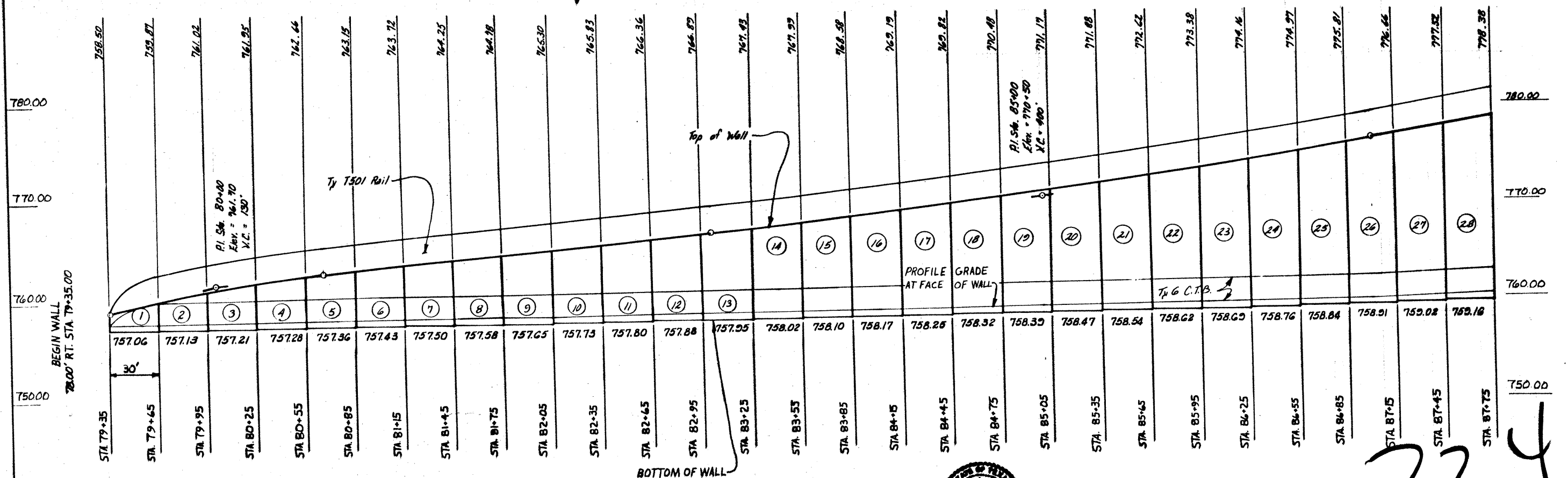
ELEVATION VIEW  
Scale: 1" = 30' Horiz.  
1" = 5' Vert.

STATE	FEDERAL PROJECT NO.	SHEET NO.
TEXAS	IR35-2 (157) 73	223
COUNTY	CONTRACT	JOB
IS GUADALUPE	ETC 16	6 29th I.H. 35

223



PLAN VIEW  
Scale 1" = 30'



NOTE: FOR TY T501 RAIL END SECTION DETAILS SEE SHEET 343.

ELEVATION VIEW

Scale: 1" = 30' Horiz.  
1" = 5' Vert.



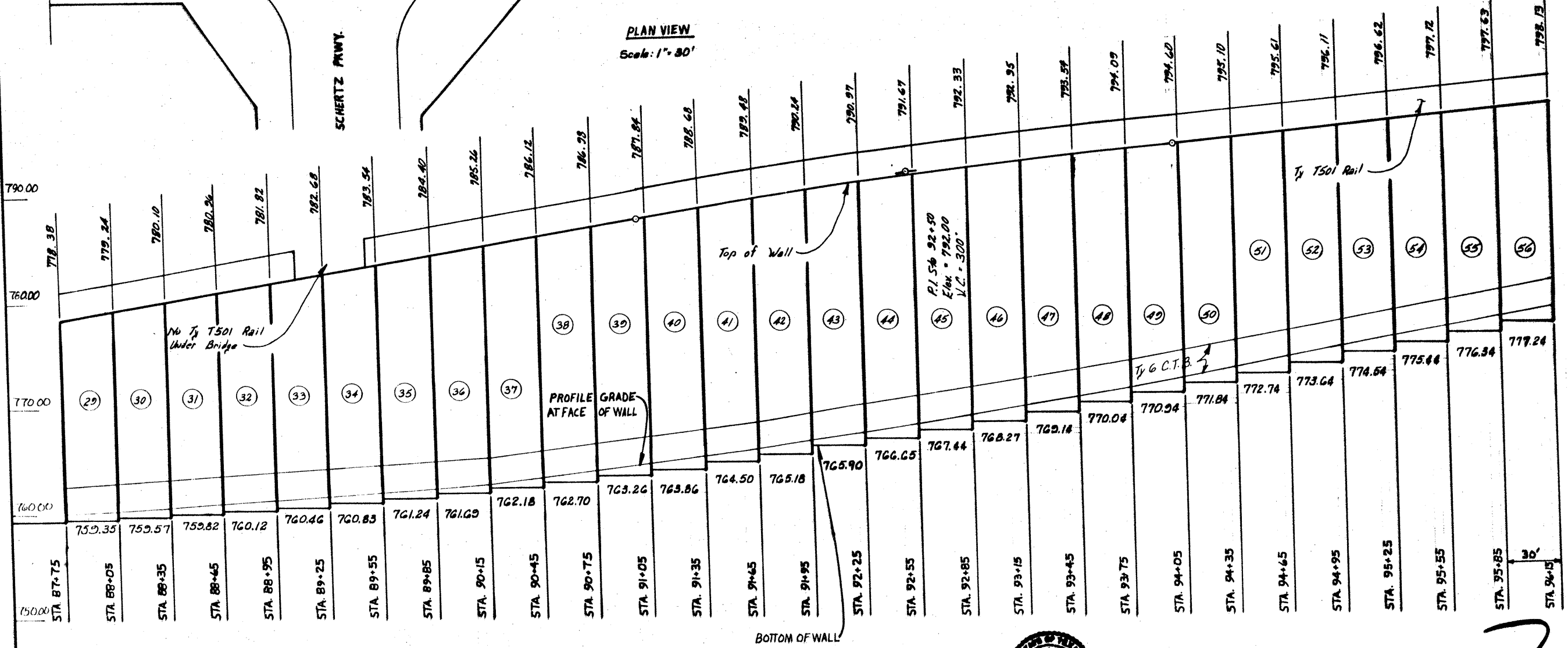
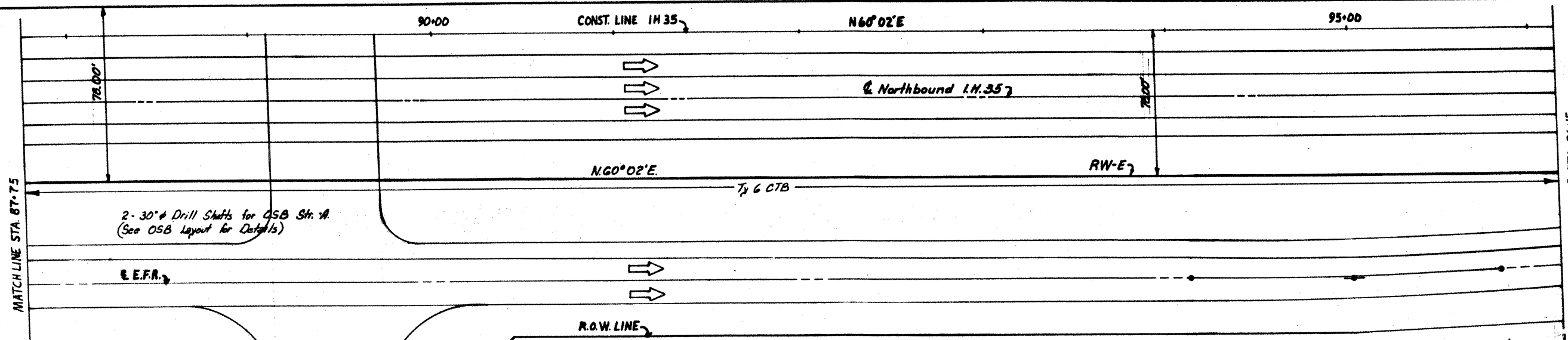
Bobbie L. Hester 7/26/02

RETAINING WALL "E"  
FROM 78.00' RT. & I.H. 35 STA.  
79 + 35.00 TO 94.28' RT. & I.H. 35  
STA. 104 + 20.00

FED. RD. DIST. NO.	STATE	FEDERAL PROJECT NO.	SHEET NO.
15	TEXAS	IR35-2(157)173	224
STATE DIST. NO.	COUNTY	CONT. SECT. JOB NO.	ROUTE NO.
15	Garland Co.	16	6

224



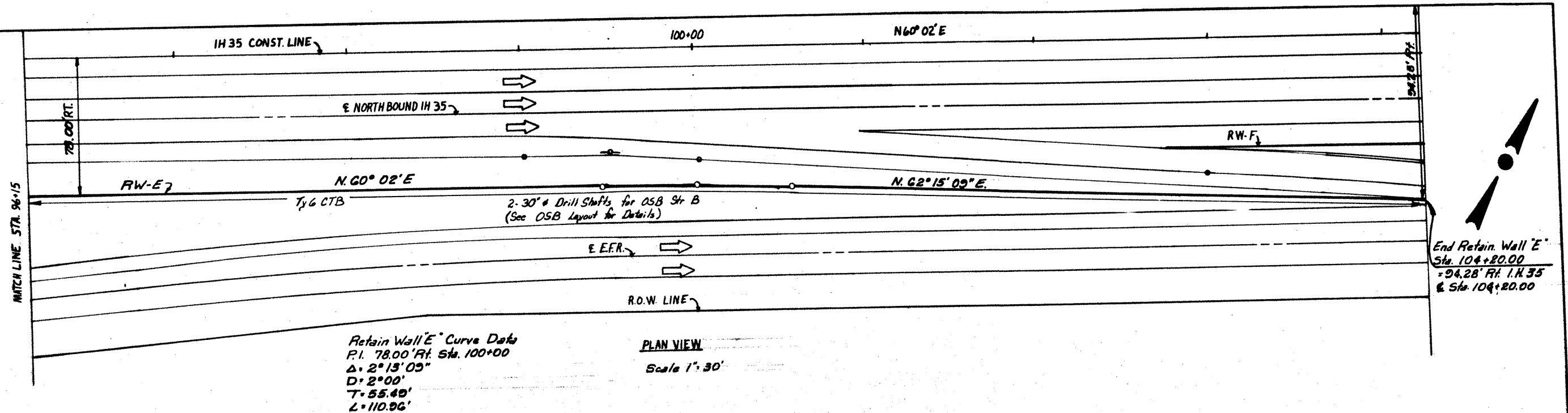


Bobbie L. Haslett  
7/26/82

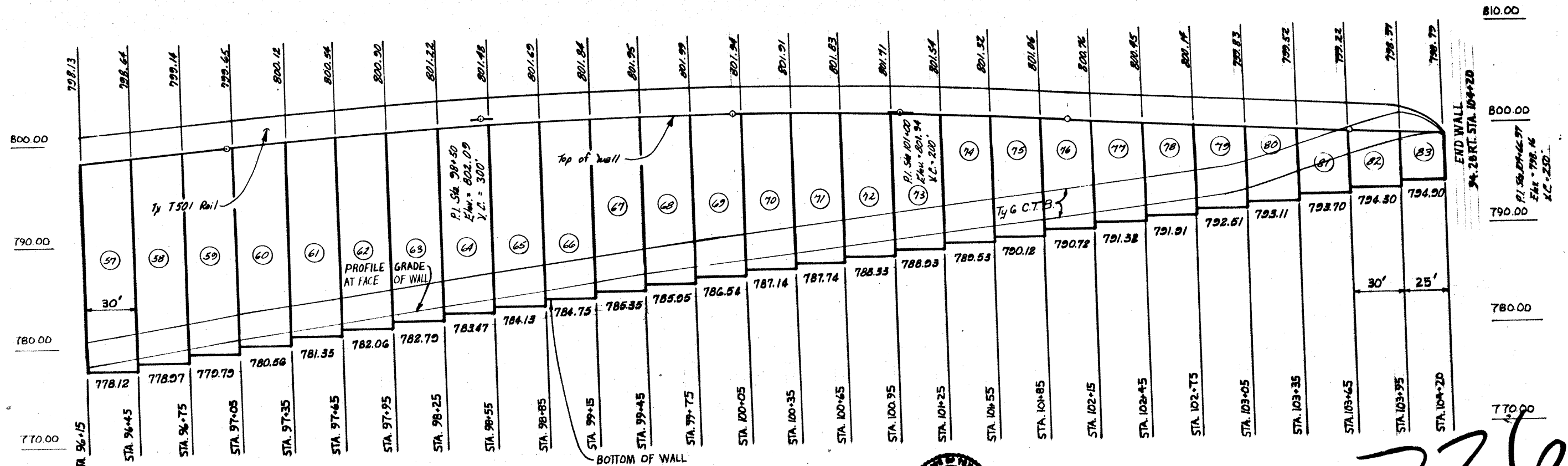
RETAINING WALL "E"  
FROM 78.00' RT. & I.H. 35 STA.  
79+35.00 TO 94.28' RT. & I.H. 35  
STA. 104+20.00

PROJECT NO.	STATE	FEDERAL PROJECT NO.	SHEET NO.
15	TEXAS	IR35-2(152)173	225
COUNTY	CONTRACT	SECTION	NO.
15	16	6	225

225



NOTE: FOR TY T501 RAILEND  
 SECTIONS DETAILS SEE  
 SHEET 249



**ELEVATION VIEW**

Scale: 1" = 30' Horiz.  
 1" = 5' Vert.



*Dallas L. Hester* 7/26/89  
 Dallas L. Hester

**RETAINING WALL "E"**  
 FROM 78.00' RT. & I.H. 35 STA.  
 79+35.00 TO 94.28' RT. C I.H. 35  
 STA. 104+20.00

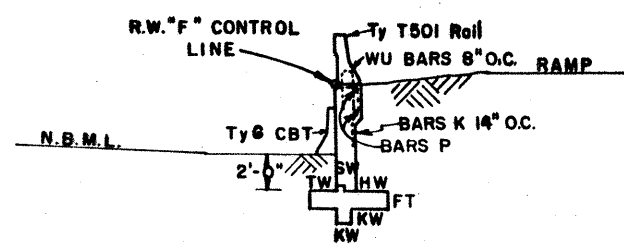
FED. RD. DIST. NO.	STATE	FEDERAL PROJECT NO.	SHEET NO.
15	TEXAS	TR35-2(157)173	226
COUNTY	CONTRACT NO.	SECTION NO.	JOB NO.
15	Guadalupe Etc.	16	6 296 TH35

WALL TABULATION SHEET

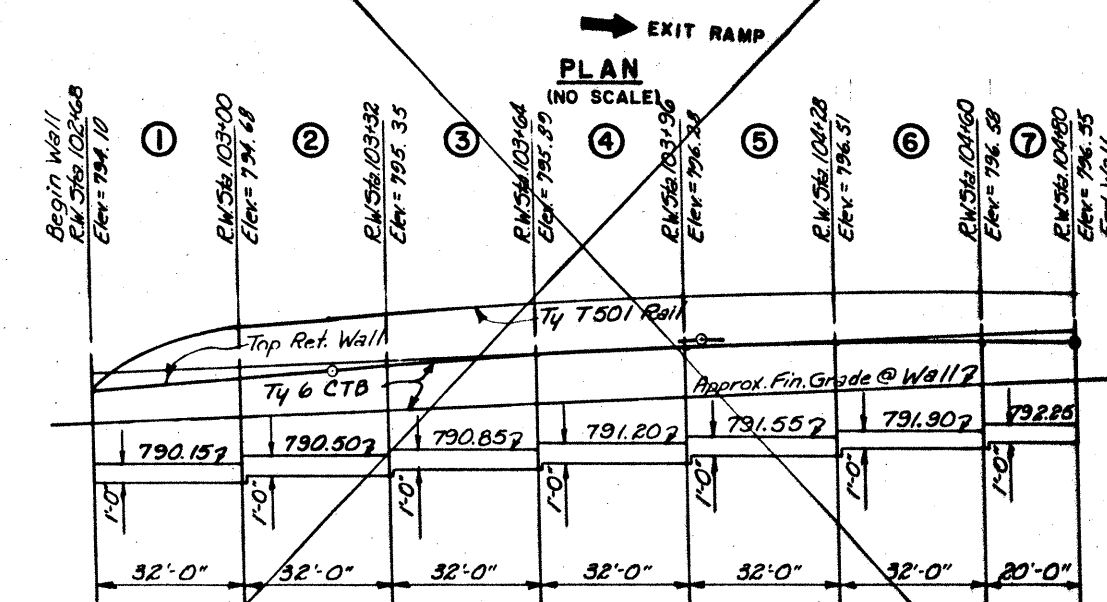
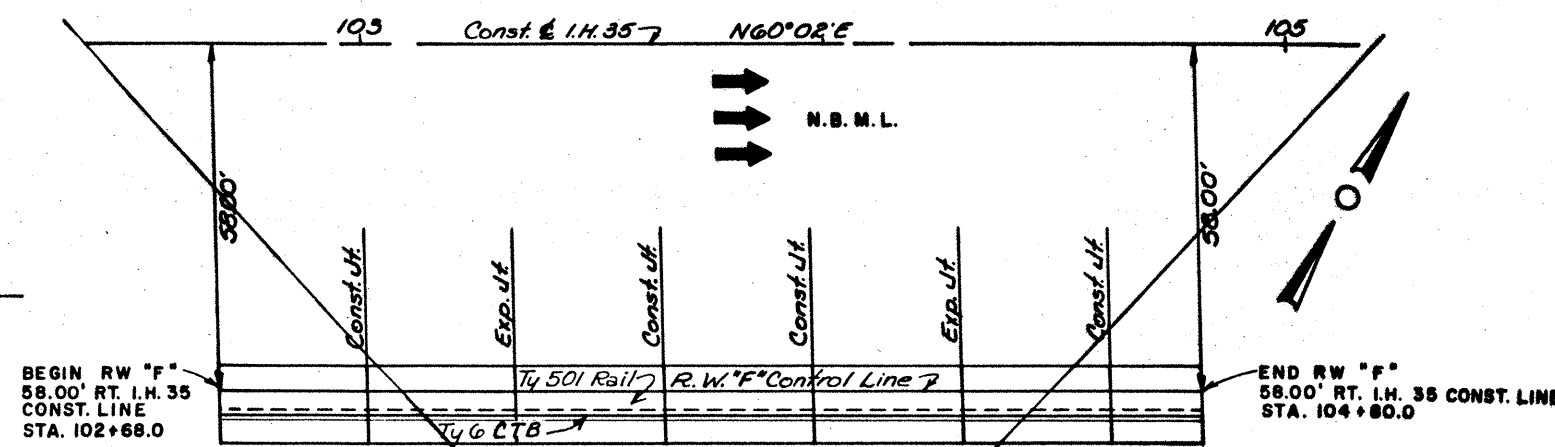
panel no.	Joint station	top of panel elev	bott of panel elev	panel length	av panel ht ~ ft	panel area-sf	no. rock nails	length of nails	total length l.f.
RETAINING WALL "D" Beg 58.6' Lt. 79+30 End 78' Lt. 99+35									
1	79+30	759.27	755.83	30	3.82	114.6	6	6	36
2	79+60	760.02	756.12		4.27	128.1			
3	79+90	760.76	756.41		4.72	141.6			
4	80+20	761.49	756.69		5.12	153.6			
5	80+50	762.12	756.99		5.40	162.0	6		36
6	80+80	762.66	757.24		5.65	169.5	12		72
7	81+10	763.11	757.44		5.85	175.5			
8	81+40	763.46	757.57		6.02	180.6			
9	81+70	763.71	757.64		6.15	184.5			
10	82+00	763.87	757.71		6.22	186.6			
11	82+30	763.98	757.79		6.25	187.5			
12	82+60	764.00	757.86		6.29	188.7			
13	82+90	764.20	757.94		6.33	189.9			
14	83+20	764.33	758.01		6.43	192.9			
15	83+50	764.55	758.09		6.63	198.9			
16	83+80	764.88	758.16		6.93	207.9			
17	84+10	765.30	758.23		7.33	219.9			
18	84+40	765.82	758.31		7.82	234.6			
19	84+70	766.44	758.38		8.42	252.6			
20	85+00	767.16	758.45		9.10	273.0			
21	85+30	767.93	758.53		9.78	293.4			
22	85+60	768.69	758.60		10.48	314.4	12	6	72
23	85+90	769.46	758.68		11.17	335.1	18	9	162
24	86+20	770.23	758.75		11.86	355.8			
25	86+50	770.99	758.82		12.56	376.8			
26	86+80	771.76	758.90		13.25	397.5			
27	87+10	772.53	759.00		13.92	417.6			
28	87+40	773.30	759.14		14.54	436.2			
29	87+70	774.06	759.31		15.14	454.2	18	9	162
30	88+00	774.83	759.53		15.69	470.7	24	12	288
31	88+30	775.60	759.78		16.20	486.0			
32	88+60	776.36	760.07		16.68	500.4			
33	88+90	777.13	760.40		17.12	513.6			
34	89+20	777.90	760.76		17.53	525.9			
35	89+50	778.67	761.17		17.88	536.4			
36	89+80	779.43	761.61		18.21	546.3			
37	90+10	780.20	762.09		18.48	554.4			
38	90+40	780.94	762.61		18.69	560.7			
39	90+70	781.66	763.17		18.84	565.2			
40	91+00	782.36	763.76		17.77	533.1			
41	91+30	780.70	764.40		16.67	500.1			
42	91+60	781.43	765.07		16.71	501.3			
43	91+90	782.13	765.78		17.74	532.2			
44	92+20	784.90	766.52		18.68	560.4			
45	92+50	785.53	767.31		18.49	554.7			
46	92+80	786.10	768.13		18.27	548.1			
47	93+10	786.70	768.99		18.01	540.3			
48	93+40	787.30	769.89		17.71	531.3			
49	93+70	787.90	770.79		17.41	522.3			
50	94+00	788.50	771.69		17.11	513.3			
51	94+30	789.10	772.59		16.81	504.3			
52	94+60	789.70	773.49		16.51	495.3			
53	94+90	790.30	774.39		16.20	486.0			
54	95+20	790.87	775.29		15.81	474.3	24	12	288
55	95+50	791.33	776.19		15.31	459.3	18	9	162
56	95+80	791.66	777.10		14.67	440.1			
57	96+10	791.87	777.99		13.93	417.9			
58	96+40	791.96	778.85		13.09	392.7			
59	96+70	791.92	779.70		12.14	364.2			
60	97+00	791.76	780.53		11.12	333.6			
61	97+30	791.54	781.34		10.09	302.7	12		72
62	97+60	791.32	782.12		9.09	272.7			
63	97+90	791.09	782.89		8.09	242.7			
64	98+20	790.87	783.64		7.12	213.6			
65	98+50	790.65	784.37		6.17	185.1	12		72
66	98+80	790.43	785.08	30	5.24	157.2	6	6	36
67	99+10	790.21	785.77	25	4.35	108.75	5	6	30
67 END WALL	99+35	791.02	786.33						
Totals For Retaining Wall "D"						24,070.65			11,136

panel no.	Joint station	top of panel elev	bott of panel elev	panel length	av panel ht ~ ft	panel area-sf	no. rock nails	length of nails	total length l.f.
RETAINING WALL "E" Beg 78' Rt. 79+35 End 94.28' Rt. 104+20									
1	79+35	758.50	757.06	30	2.13	63.9	6	6	36
2	79+65	759.87	757.13		3.32	99.6			
3	79+95	761.02	757.21		4.28	128.4			
4	80+25	761.95	757.28		5.03	150.9	6		36
5	80+55	762.66	757.36		5.55	166.5	12		72
6	80+85	763.16	757.43		6.01	180.3			
7	81+15	763.72	757.50		6.49	194.7			
8	81+45	764.25	757.58		6.94	208.2			
9	81+75	764.78	757.65		7.39	221.7			
10	82+05	765.30	757.73		7.84	235.2			
11	82+35	765.83	757.80		8.30	249.0			
12	82+65	766.36	757.88		8.75	262.5			
13	82+95	766.89	757.95		9.21	276.3			
14	83+25	767.43	758.02		9.69	290.7			
15	83+55	767.99	758.10		10.19	305.7	12	6	72
16	83+85	768.58	758.17		10.72	321.6	18	9	162
17	84+15	769.19	758.25		11.26	337.8			
18	84+45	769.82	758.32		11.83	354.9			
19	84+75	770.48	758.39		12.44	373.2			
20	85+05	771.17	758.47		13.06	391.8			
21	85+35	771.88	758.54		13.71	411.3			
22	85+65	772.62	758.62		14.38	431.4			
23	85+95	773.38	758.69		15.08	452.4	18	9	162
24	86+25	774.16	758.76		15.81	474.3	24	12	288
25	86+55	774.97	758.84		16.55	496.5			
26	86+85	775.81	758.91		17.33	519.9			
27	87+15	776.66	759.02		18.07	542.1			
28	87+45	777.52	759.16		18.79	563.7			
29	87+75	778.38	759.35		19.46	583.8			
30	88+05	779.24	759.57		20.10	603.0	24	12	288
31	88+35	780.10	759.82		20.71	621.3	30	15	450
32	88+65	780.96	760.12		21.27	638.1			
33	88+95	781.82	760.46		21.79	653.7			
34	89+25	782.68	760.83		22.28	668.4			
35	89+55	783.54	761.24		22.73	681.9			
36	89+85	784.40	761.69		23.14	694.2			
37	90+15	785.26	762.18		23.51	675.3			
38	90+45	786.12	762.70		23.85	715.5			
39	90+75	786.98	763.26		24.15	724.5			
40	91+05	787.84	763.86		24.40	732.0			
41	91+35	788.64	764.50		24.58	737.4			
42	91+65	789.48	765.18		24.68	740.4			
43	91+95	790.24	765.90		24.71	741.3			
44	92+25	790.97	766.65		24.67	740.1			
45	92+55	791.67	767.44		24.58	736.8			
46	92+85	792.33	768.27		24.37	731.1			
47	93+15	792.95	769.14		24.11	723.3			
48	93+45	793.54	770.04		23.78	713.4			
49	93+75	794.09	770.94		23.41	702.3			
50	94+05	794.60	771.84		23.01	690.3			
51	94+35	795.10	772.74		22.62	678.6			
52	94+65	795.61	773.64		22.22	666.6			
53	94+95	796.11	774.54		21.83	654.9			
54	95+25	796.62	775.44		21.43	642.9			
55	95+55	797.12	776.34		21.04	631.2			
56	95+85	797.63	777.24		20.64	619.2	30	15	450
57	96+15	798.13	778.12		20.27	608.1	24	12	288
58	96+45	798.64	778.97		19.92	597.6			
59	96+75	799.14	779.79		19.61	588.3			
60	97+05	799.65	780.58		19.33	579.9			
61	97+35	800.12	781.35		18.98	569.4			
62	97+65	800.54	782.06		18.66	559.8			
63	97+95	800.90	782.79		18.27	548.1			
64	98+25	801.22	783.47	30	17.88	536.4	24	12	288

panel no.	Joint station	top of panel elev	bott of panel elev	panel length	av panel ht ~ ft	panel area-sf	no. rock nails	length of nails	total length l.f.	
RETAINING WALL "E" CONT'D										
65	98+55	801.48	784.13	30	17.46	523.8	24	12	288	
66	98+85	801.69	784.75		17.02	510.6				
67	99+15	801.84	785.35		16.55	496.5				
68	99+45	801.95	785.95		16.02	480.6				
69	99+75	801.99	786.54		15.43	462.9	24	12	288	
70	100+05	801.94	787.14		14.79	443.7	18	9	162	
71	100+35	801.91	787.74		14.13	423.9				
72	100+65	801.83	788.33	Z	13.44	403.2				
73	100+95	801.71	788.93			12.70	381.0			
74	101+25	801.54	789.53			11.90	357.0			
75	101+55	801.32	790.12		11.07	332.1	18	9	162	
76	101+85	801.06	790.72		10.19	305.7	12	6	72	
77	102+15	800.76	791.32		9.29	278.7				
78	102+45	800.45	791.91		8.39	251.7				
79	102+75	800.14	792.51		7.48	224.40				
80	103+05	799.83	793.11		6.57	197.1				
81	103+35	799.52	793.70		5.67	170.1	12		72	
82	103+65	799.22	794.30	30	4.80	144.0	6	3	36	
83	103+95	798.97	794.90	25	3.98	99.5	6	6	36	
END WALL	104+20	798.79	795.40							
Totals For Retaining Wall "E"						38,890.10			21,168	



**RET. WALL "F"**  
**TYPICAL SECTION**



**ELEVATION**  
SCALE: 1" = 20' HORIZ.  
1" = 5' VERT.

Panel	RWF-1	RWF-2	RWF-3	RWF-4	RWF-5	RWF-6	RWF-7	Totals
Design	HC-5-32	HC-5-32	HC-5-32	HC-5-32	HC-5-32	HC-5-32	HC-5-20	
Cl'c Conc.	Cu.Yd.	10.18	10.51	10.81	10.25	10.90	6.42	70.43
Reinf. Steel	Lbs	1416	1416	1416	1416	1416	894	9390
Str. Excav	Cu.Yd.							123.67
Waterproof	Sq.Yd.	10.67	10.67	10.67	10.67	10.67	6.67	70.69
Ty T501 Rail	L.F	32	32	32	32	32	20	212
Gravel Bl Fill	Cu.Yd.	1.75	1.75	1.73	1.73	1.71	0.96	11.34
Panel Area	Sq.Ft	135.68	144.64	152.64	156.48	155.20	86.40	979.74
Ty 6 CBT	L.F	32	32	32	32	32	20	212

\* For Contractors Information Only.

Voided by F.C. #6  
AR 5/29/90

227



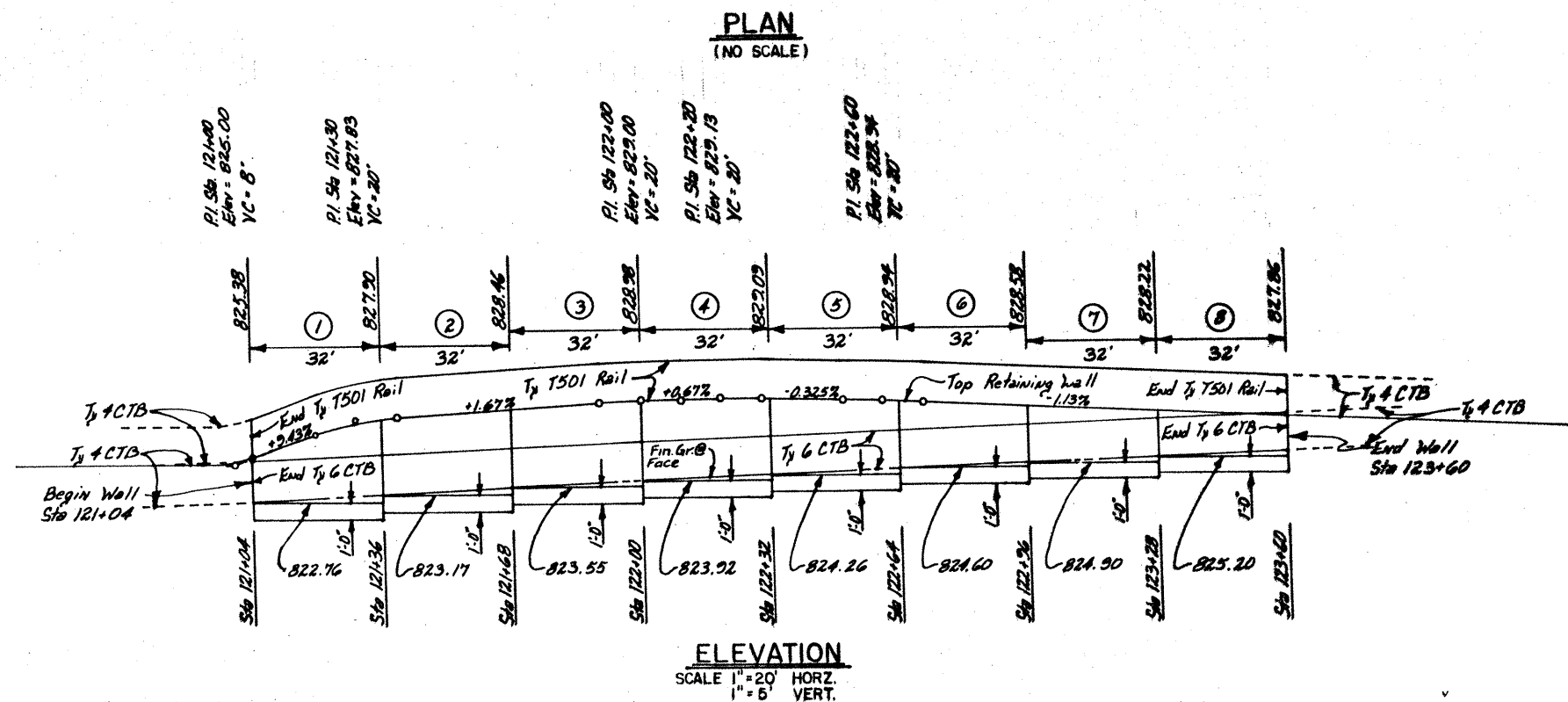
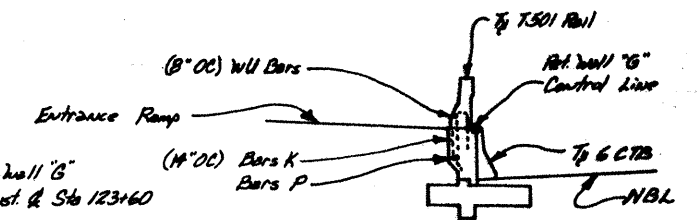
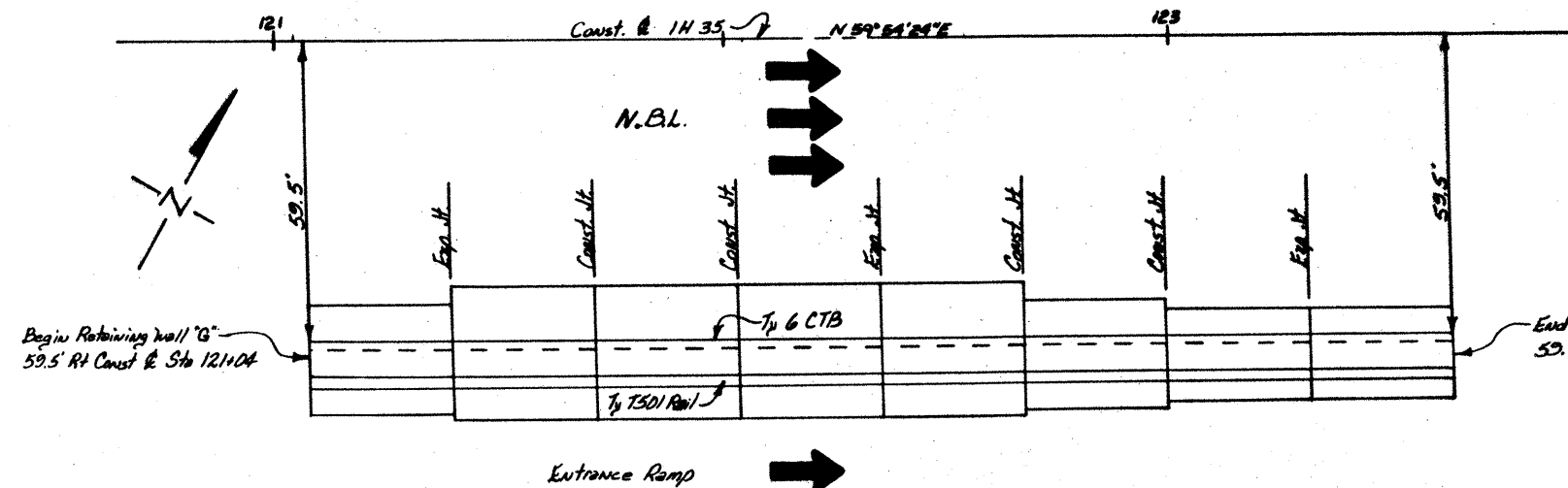
Robert L. Hazzett 7/26/92  
L. Hazzett

**RETAINING WALL RWE**

FROM STA. 102+68 - 58.0' RT. I.H. 35 Const. Line  
TO STA. 104+80 - 58.0' RT. I.H. 35 Const. Line

FED. RD. DIST. NO.	STATE	FEDERAL PROJECT NO.	SHEET NO.
6	NEW JERSEY	TR35-2(152)173	227
DATE	COUNTY	CONTRACT	JOB
15	GUARDIAN, ETC.	16	6 295 TH35





Panel		1	2	3	4	5	6	7	8	Totals	
Design		HC-4-32	HC-5-32	HC-5-32	HC-5-32	HC-5-32	HC-4-32	HC-3-32	HC-3-32		
Cl' C Conc	CY	9.01	11.09	11.28	11.21	10.79	9.34	7.97	7.18	77.87	*
Reinf. Steel	Lbs.	1,155	1,416	1,416	1,416	1,416	1,155	923	923	9,820	*
Str. Excav	CY										*
Waterproof	SY	10.67	10.67	10.67	10.67	10.67	10.67	10.67	10.67	85.36	*
Ty 1501 Rail	LF	32	32	32	32	32	32	32	32	256	*
Gravel Backfill	CY	2.09	4.76	5.14	5.03	4.17	2.75	1.10	—	25.13	*
Panel Area	SF	124.16	160.32	165.44	163.68	152.16	133.12	112.00	90.88	1,101.76	
Ty 6 CBT	LF	32	32	32	32	32	32	32	32	256	

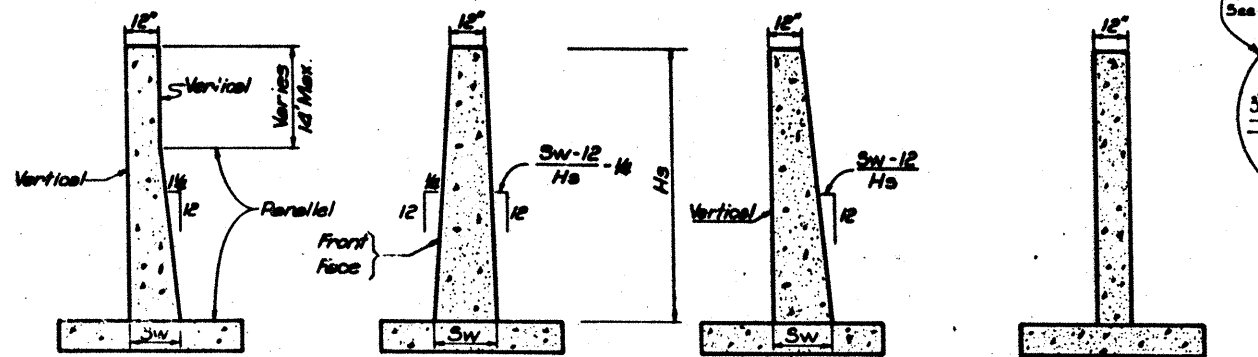
\* For Contractors Information Only

## RETAINING WALL "G"

FROM STA. 121+04 - 59.5' RT 1H 35 CONST LINE  
TO STA. 123+60 - 59.5' RT 1H 35 CONST LINE

STATE	FED. PROJECT NO.	SHEET NO.
TEXAS	1R35-2(157)173	227A
COUNTY	CONTRACT	DATE
Guadalupe Co.	16	6/29/83





AS DETAILED  
ALL HEIGHTS  
(Basis for Payment)

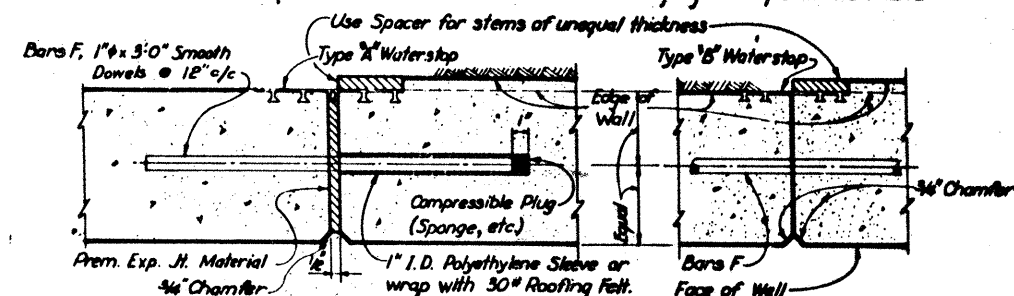
BOTH FRONT & BACK  
FACES SLOPING  
Other slopes may be used on either  
front or back face of wall.

FRONT FACE VERTICAL  
BACK FACE SLOPED  
(For  $H > 14'$ )

BOTH FACES VERTICAL  
(As detailed for  $H > 14'$ )

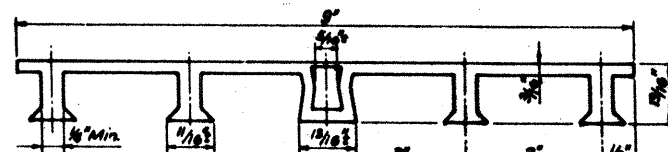
### ALTERNATE STEM SLOPE DETAILS

Walls with slopes other than those shown may be used after approval by the Engineer. Sw shall not be less than shown in the design. No payment will be made for excess concrete due to changing of slope of wall face.



EXPANSION JOINT

CONSTRUCTION JOINT

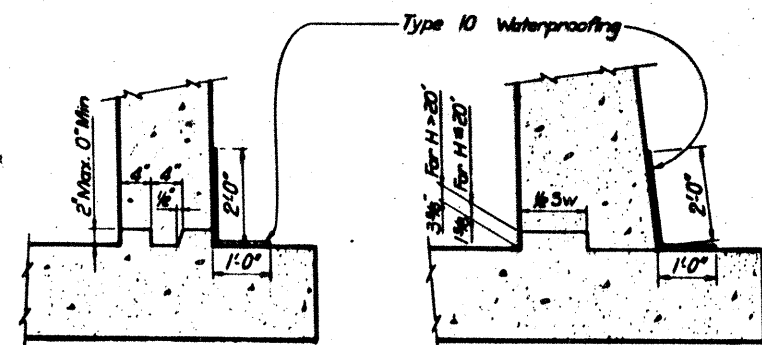


PVC WATERSTOP TYPE 'A'



PVC WATERSTOP TYPE 'B'

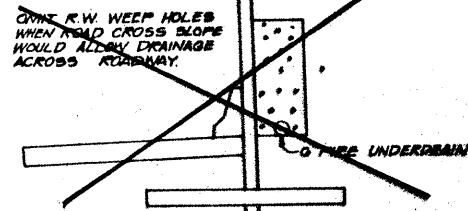
Note: Dimensions & shapes  
may vary slightly depending  
on manufacturer.



H ≤ 14'

H > 14'

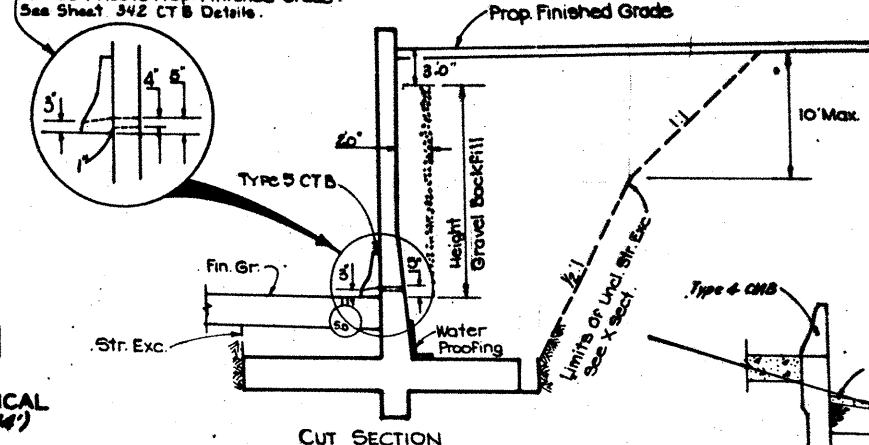
### JOINT AND WATERSTOP DETAILS



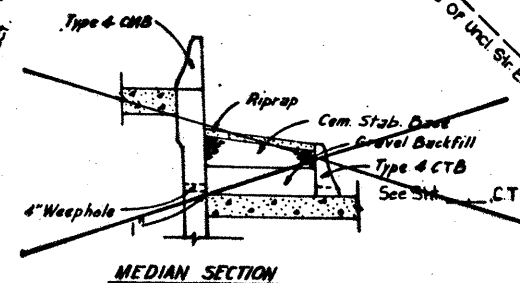
CUT or FILL  
SECTION w/  
6" PIPE UNDERDRAIN

NOTE: Bars Z are to be fabricated  
on RW-4 sheet. Omit bars  
Z when difference in top of  
footing elevations is less  
than 0'-0".

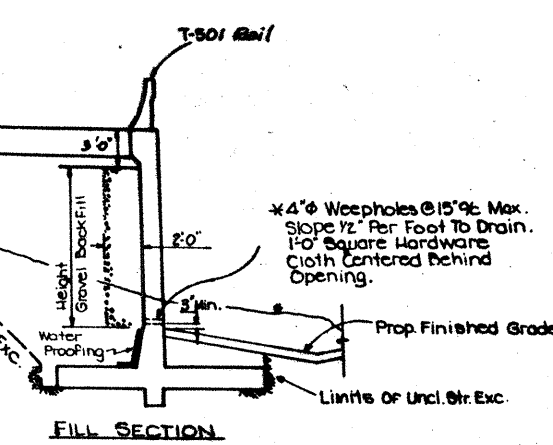
4" Weep Holes In Retaining Wall With A  
8" X 5" Opening In Type 5 CTB. 4" Weep Holes  
Placed 1" Above Prop. Finished Grade.  
See Sheet 342 CTB Details.



CUT SECTION



MEDIAN SECTION



FILL SECTION

### GENERAL NOTES:

Walls are designed to provide a minimum factor of safety against sliding of 1.5. The undisturbed or compacted soil depth in front of walls, from bottom of Key up shall not be less than  $K_w + F_r + 1'-0"$ . The angle of internal friction ( $\phi$ ) of this soil must be greater than  $20^\circ$ .

The bearing capacity of the soil must be equal to or greater than the wall footing pressure.

Retaining Walls with heights up to 15'-0" are detailed to be placed on grades up thru 10% with footing level, with no changes in reinforcing steel. Steeper grades can be accommodated by shortening Bars A1 & B and increasing length of legs of Bars U by the same amount. No change in Quantities will be involved. Walls over 15'-0" in height can be placed on steeper grades with no revisions.

Retaining Walls may be placed on Horizontal Curves by adjusting lengths of footing Bars T & H. Minor revisions of Concrete Quantities may be required when maximum footing pressure walls are used.

Designed in accordance with A.A.S.H.O. 1973 Standard Specifications.

All concrete to be Class C.  
Reinforcing bar laps and splices conform to Research Report 113-3

Cost of furnishing and installing expansion joint material and waterstops shall be included in price bid for Retaining Wall or Retaining Wall (SPL Fin).



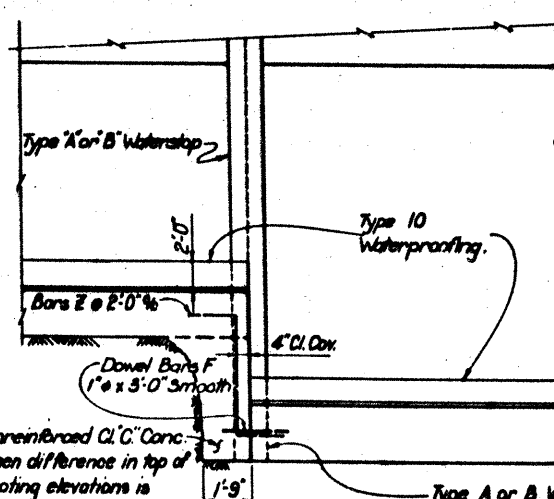
Robbie L. Massey, P.E. 7/26/82

TEXAS HIGHWAY DEPARTMENT  
BRIDGE DIVISION

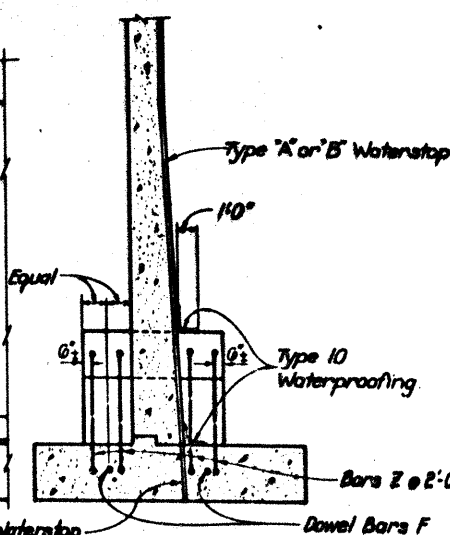
## RETAINING WALLS MISCELLANEOUS DETAILS

RW-2 (MOD)

Unreinforced C.I.C. Conc. when difference in top of footing elevations is less than 0'-0". Omit when Dowel Bars F can be placed between adjacent footings with 4" min cover top and bottom.



PART ELEVATION



PART SECTION

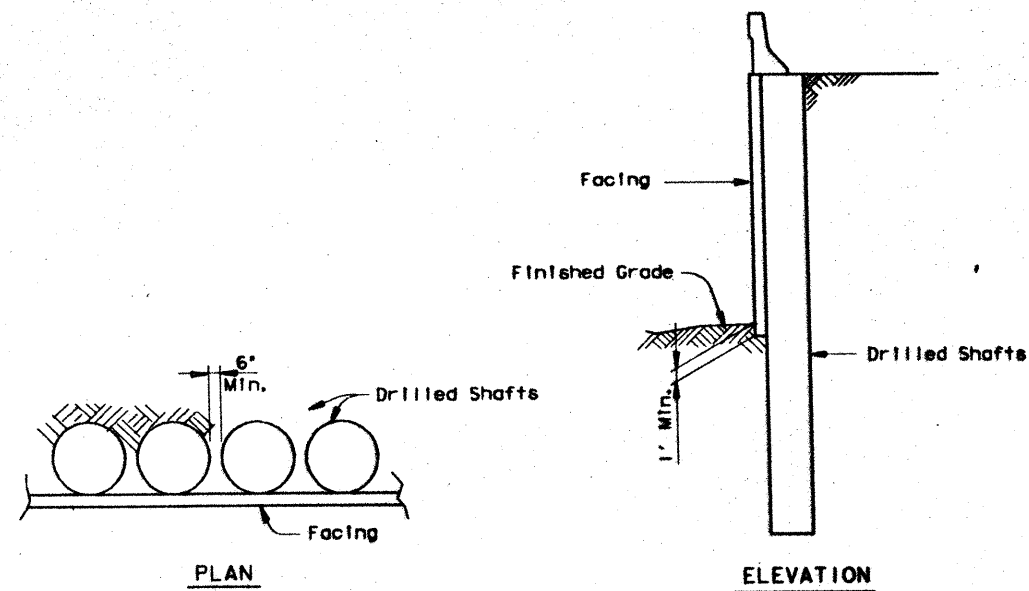
### SHOWING WATERSTOP @ FOOTING JOINT

ORIGINAL DRAWING DATE	DATE	BY	CHKD	APPROVED	PROJECT	SHEET
MAR 1975		CWC	DAB		IR35-2(157)73	229
		AS			Guadalupe Etc	16 6 29/11/85

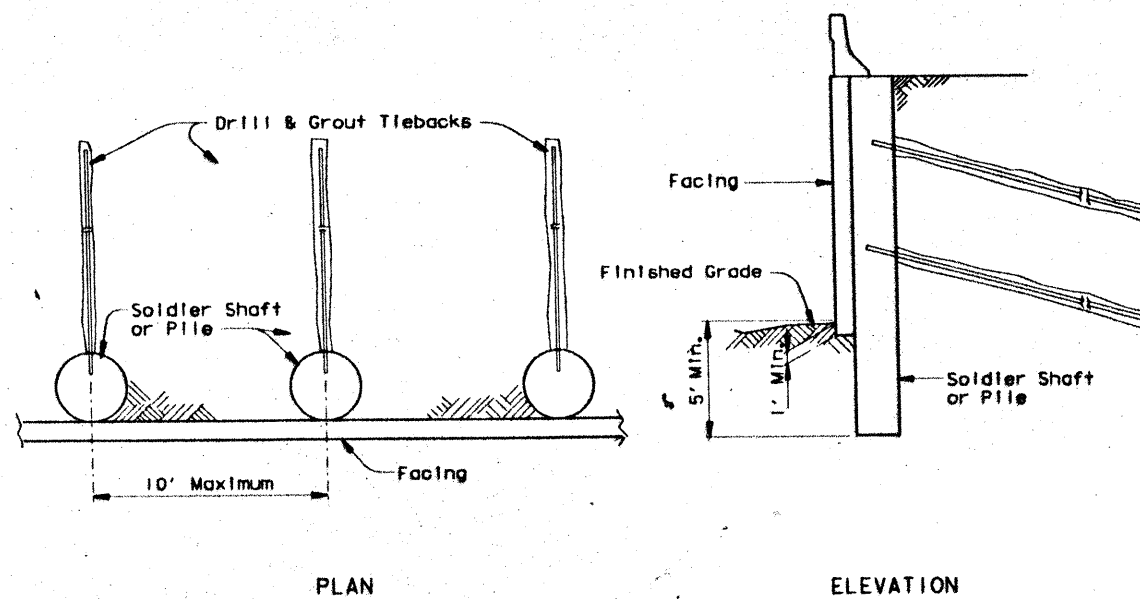




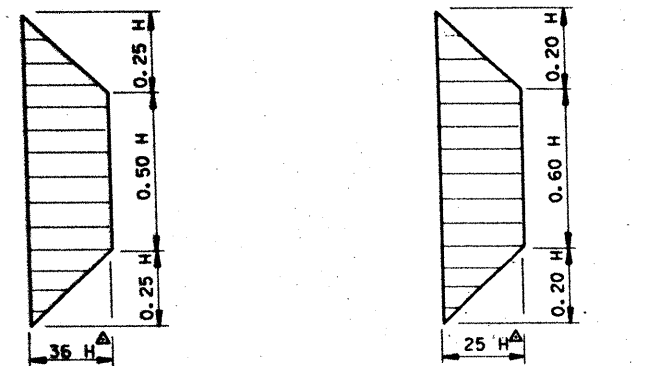




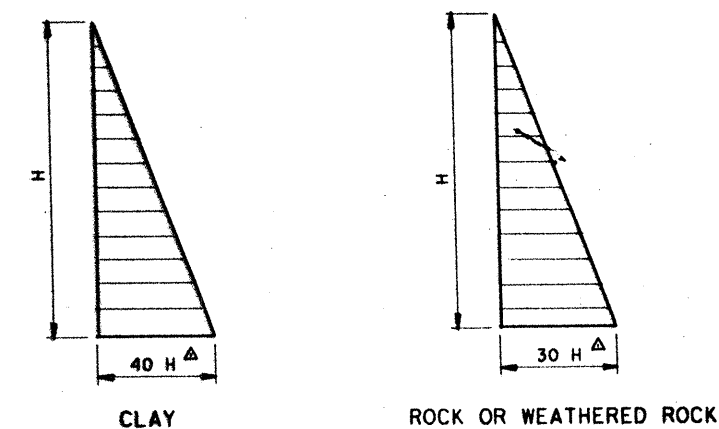
CANTILEVERED DRILLED SHAFT WALL



PRESTRESSED GROUND ANCHOR WALL



CLAY ROCK OR WEATHERED ROCK  
PRESTRESSED GROUND ANCHOR WALL



CLAY ROCK OR WEATHERED ROCK  
CANTILEVERED DRILLED SHAFT

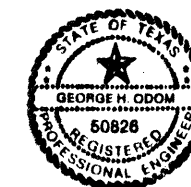
### DESIGN PARAMETERS

NOTE:  $H^{\Delta} = H$  (Height of Wall) +  $H_{ec}$  (Equivalent Surcharge Depth)

### GENERAL NOTES:

- Required safety factors:
- Factor of safety against sliding 1.5 min.
- Factor of safety against overturning 2.0 min.

The minimum design penetration of soldier shafts shall be increased when storm sewers or other installations are placed directly in front of retaining walls.



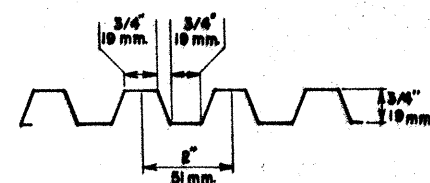
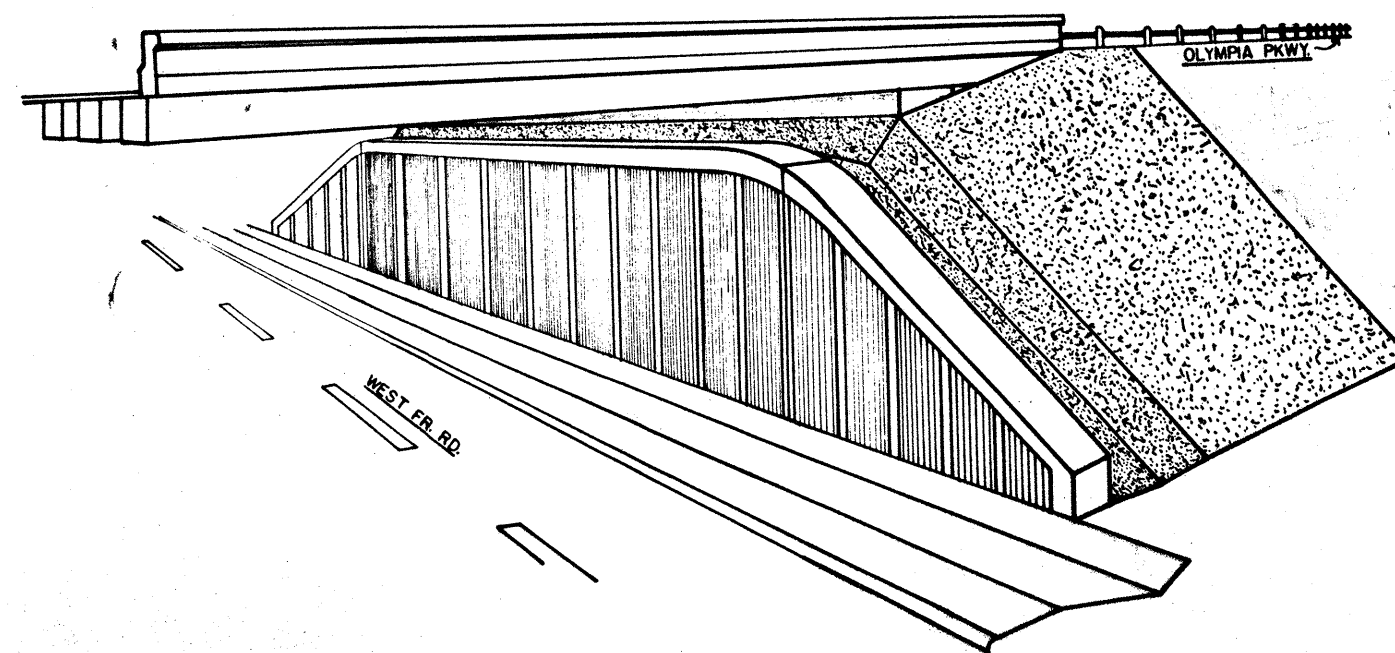
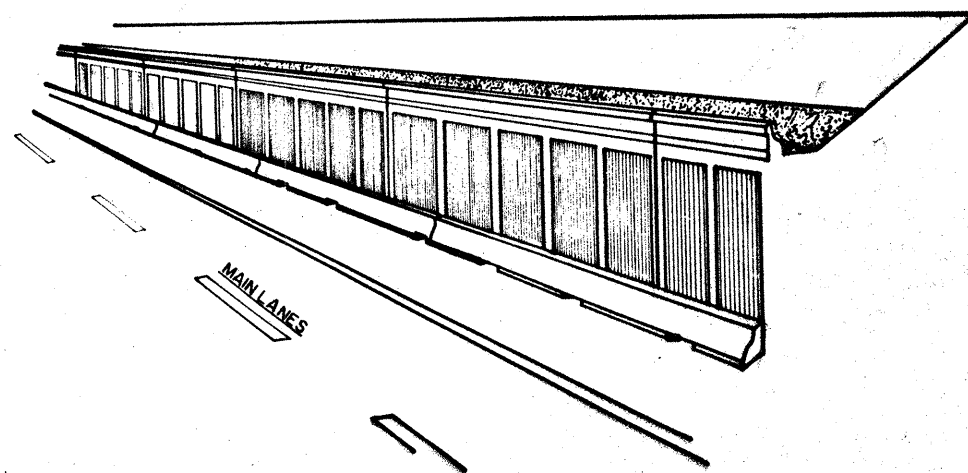
*G. Odom*  
9/21/89

## STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION OPTIONAL DESIGNED RETAINING WALL

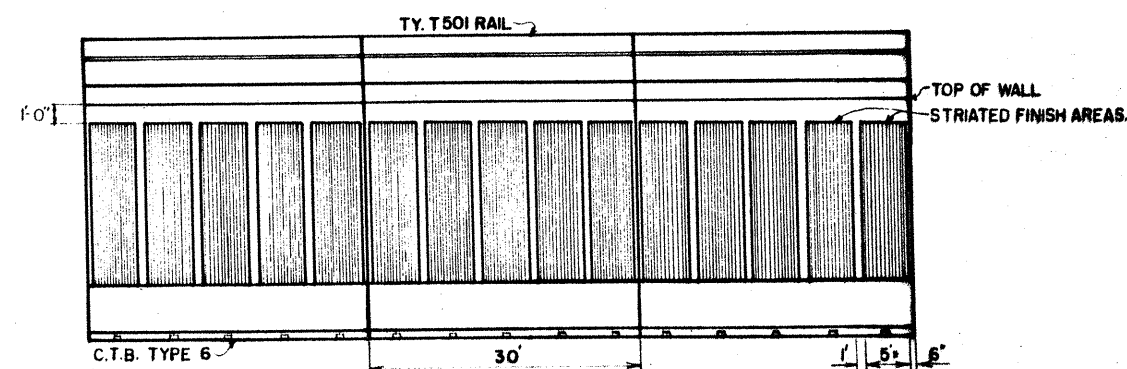
D4511 2FA3113551151999HHL01.DGN	PREPARED BY AND FOR USE OF TEXAS SOCIETY			
DATE: AUG 1989	STATE DISTRICT: 15	FEDERAL REGION: 6	FEDERAL AID PROJECT: 16	SHEET: 29
ENGR: GHO	COUNTY: BEXAR	SECTION: 16	JOBS: 6	HIGHWAY: 29
CHK: MPM				
SW: RNP				
DR: GHO				



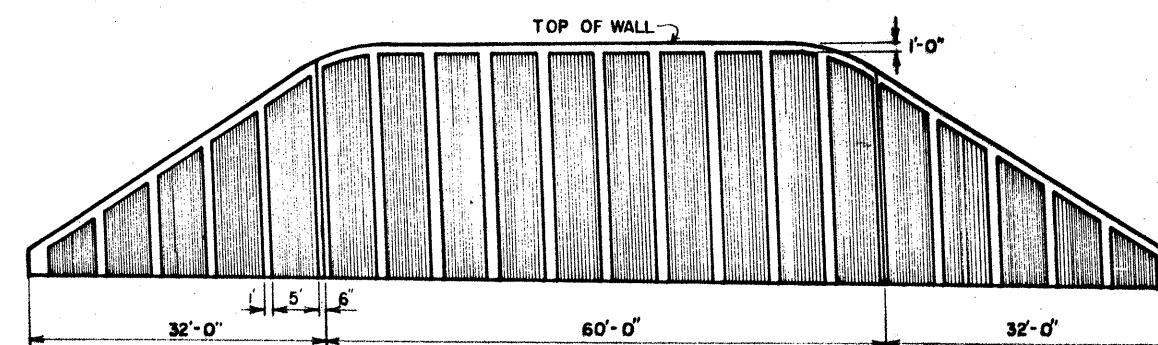




BURKE COMPANY PATTERN NUMBER 304 or EQUAL  
STRIATED PATTERN FORM



FOR RET. WALLS C & F. STRIATED PANEL WIDTH = 7'  
RETAINING WALLS D, E, B, C, F



RETAINING WALL 'A'

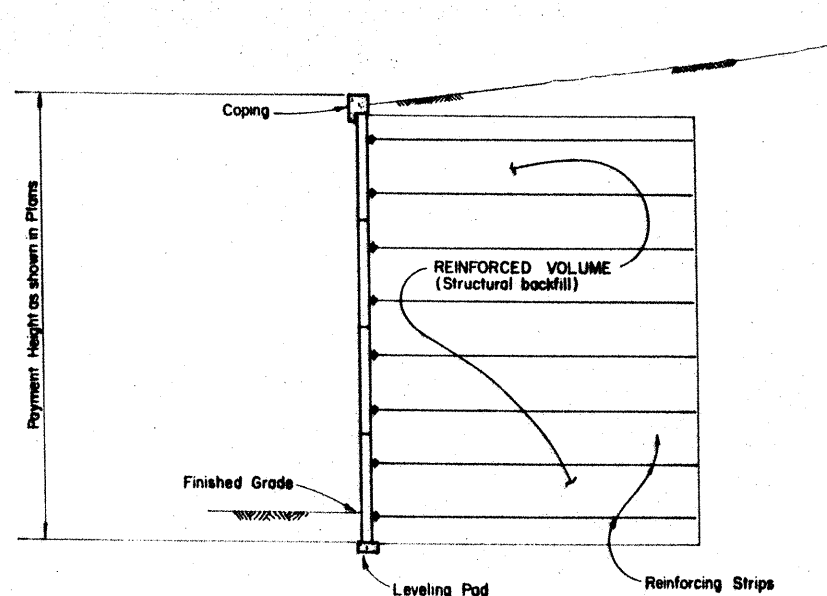
RETAINING WALLS WILL RECEIVE CLASS B FINISH

RETAINING WALL  
FINISH DETAILS

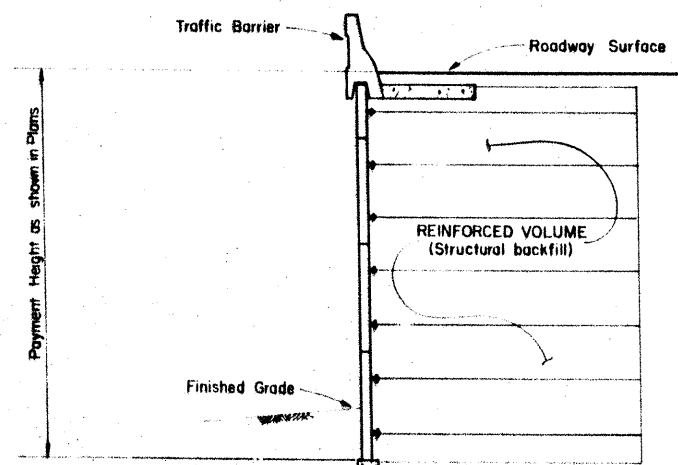


*Robbie L. Haselet* 7/26/82  
Robbie L. Haselet

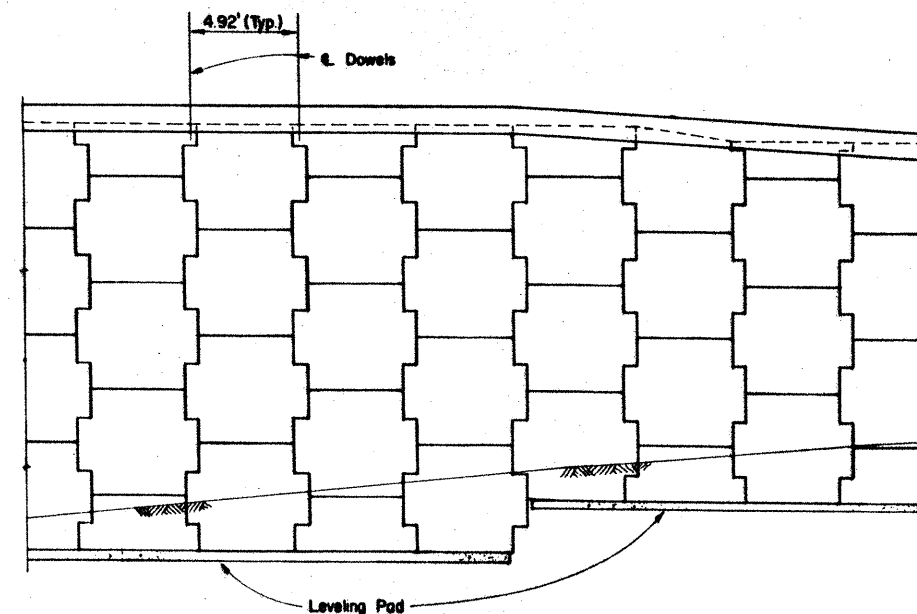
PROJ. NO.	STATE	FEDERAL PROJECT NO.	SHEET NO.
15	TEXAS	IR35-P (157) 173	232
15	COUNTY	CON. SECT. 106	16
15	15	6	232



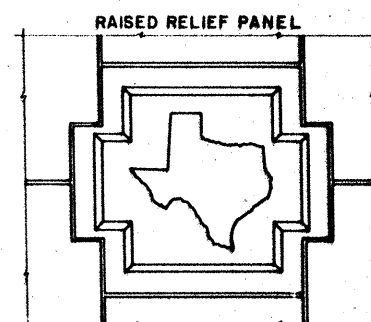
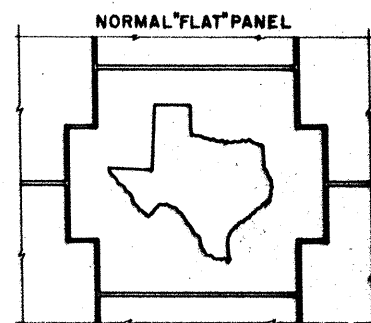
TYPICAL SECTION



TYPICAL SECTION (Showing roadway on wall)



ELEVATION



MAP OF TEXAS EMBLEM

Map of Texas emblem shall be formed into a wall panel next to each bridge abutment. The exact location of each emblem shall be approved by the Engineer. The cost of forming the emblems will not be paid for directly, but shall be considered incidental to the item "Retaining Wall."

The map of Texas shall be inset a minimum of 3/4" into the face of the panel, and shall receive a smooth finish. The inset area shall be finished with a contrasting color as approved by the Engineer.

#### DESIGN PARAMETERS

Structure shall be based on the following design parameters:

Random Backfill: unit weight = 125 PCF  
 $\phi = 30^\circ$  C = 0 PSF  
 $K_a = .333$

Select Backfill: unit weight = 125 PCF  
 $\phi = 34^\circ$  C = 0 PSF  
 $K_a = .28$   $K_c = .44$

Stress in steel and concrete shall be in accordance with A.A.S.H.T.O. 1983 and current Interim Specifications.

The minimum length of Reinforcing Strips shall be 8.0'.

#### EXTERNAL STABILITY CRITERIA

Factor of safety in sliding along the base of the structure shall be greater than or equal to 1.5.

Factor of safety in overturning shall be greater than or equal to 2.0.

Allowable bearing pressure shall not exceed 1/2 the ultimate bearing capacity of the foundation.

#### INTERNAL STABILITY CRITERIA

The coefficient of earth pressure,  $K$ , shall vary linearly from .44 at the top of the structure to .28 at a depth of 20 feet. Below 20 feet,  $K$  shall equal .28.

The factor of safety against pullout of the strips shall be greater than or equal to 1.5 at all levels of reinforcement. The embedded length used in calculations shall be the length beyond the appropriate failure surface. The Rankine failure surface will be used as the failure plane unless another failure plane can be properly justified. Pullout resistance shall be determined from actual test data evaluated at 3/4 inch strain.



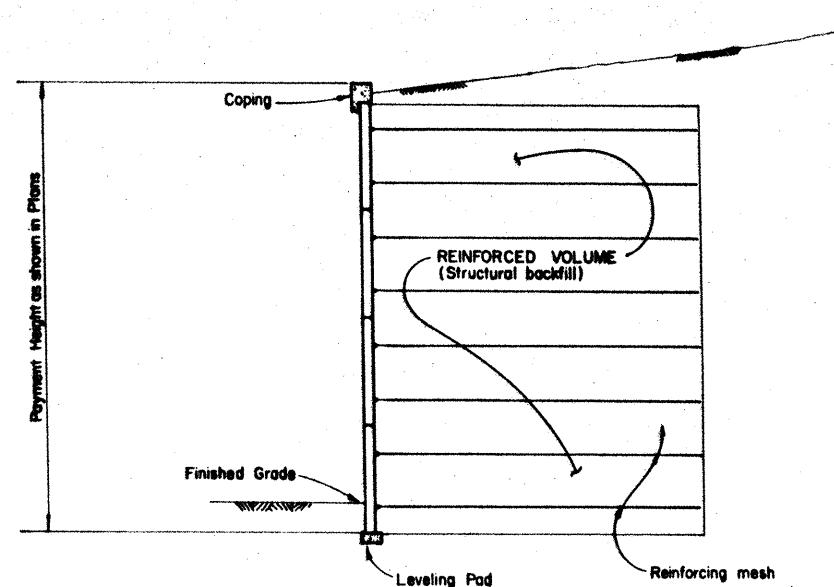
STATE DEPARTMENT OF HIGHWAYS  
AND PUBLIC TRANSPORTATION

## REINFORCED EARTH RETAINING WALL

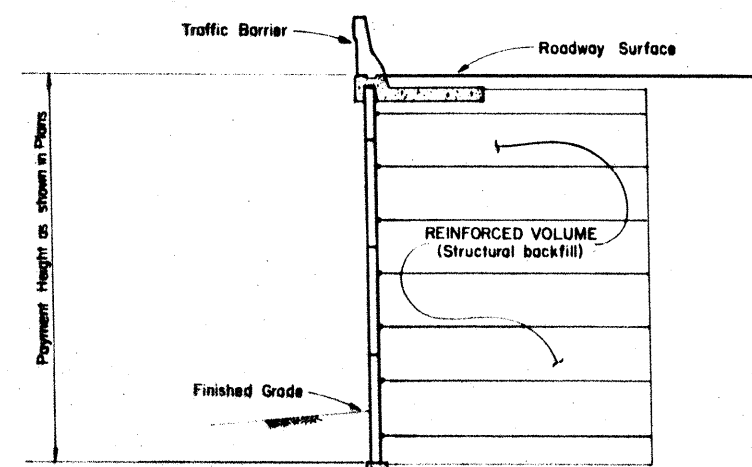
232A

ORIGINAL DRAWING DATE	JUNE 1985	STATE FEDERAL	DESIGN	FEDERAL AID PROJECT	0	SHEET
REVISIONS		15	6	ER 35-2(152)73	232A	
BY	11 H/ (Add Texas Emblem)	COUNTY				
DW - MPM		GUADALUPE	16	6	24	1/85
CR - HCH						

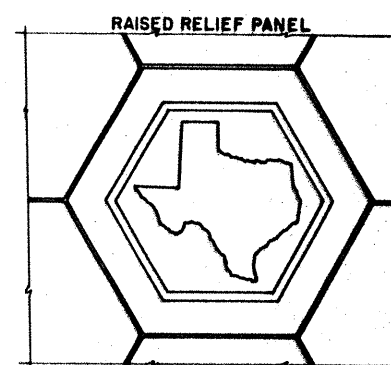
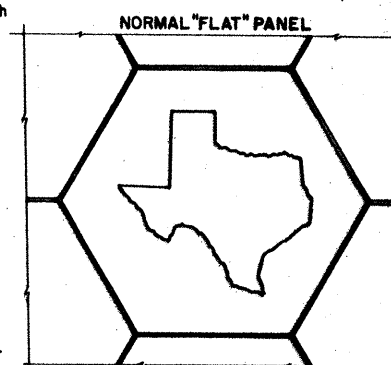




TYPICAL SECTION



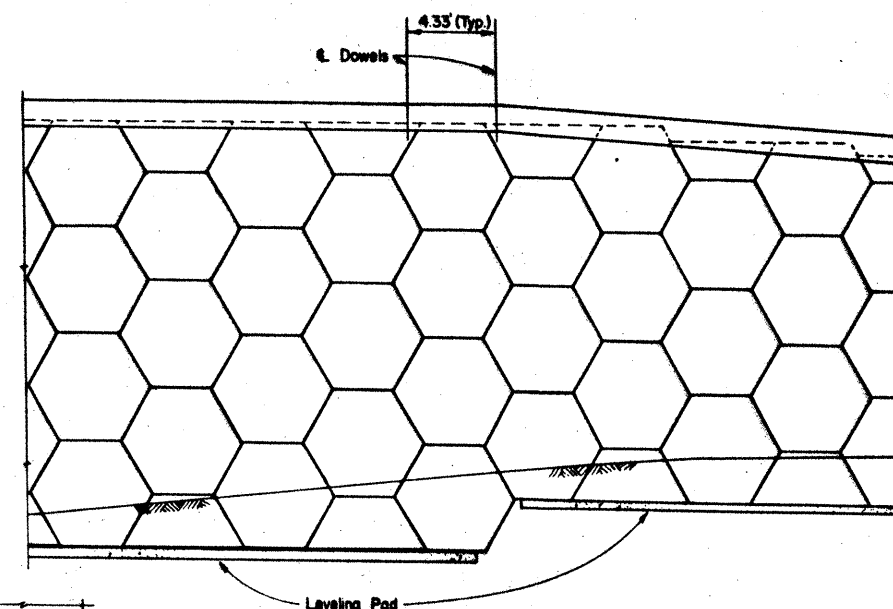
TYPICAL SECTION (Showing roadway on wall)



MAP OF TEXAS EMBLEM

Map of Texas emblem shall be formed into a wall panel next to each bridge abutment. The exact location of each emblem shall be approved by the Engineer. The cost of forming emblems will not be paid for directly, but shall be considered incidental to the Item "Retaining Wall."

The map of Texas shall be inset a minimum of  $\frac{1}{8}$ " into the face of panel, and shall receive a smooth finish. The inset area shall be finished with a contrasting color as approved by the Engineer.



ELEVATION

#### DESIGN PARAMETERS

Structure shall be based on the following design parameters:

Random Backfill: unit weight = 125 PCF  
 $\phi = 30^\circ$  C = 0 PSF  
 $K_a = .333$

Select Backfill: unit weight = 125 PCF  
 $\phi = 34^\circ$  C = 0 PSF  
 $K_a = .28$   $K_c = .44$

Stress in steel and concrete shall be in accordance with AASHTO 1983 and current Interim Specifications.

The minimum length of Reinforcing mesh shall be 80'.

#### EXTERNAL STABILITY CRITERIA

Factor of safety in sliding along the base of the structure shall be greater than or equal to 1.5.

Factor of safety in overturning shall be greater than or equal to 2.0.

Allowable bearing pressure shall not exceed 1/2 the ultimate bearing capacity of the foundation.

#### INTERNAL STABILITY CRITERIA

The coefficient of earth pressure, K, shall vary linearly from .44 at the top of the structure to .28 at a depth of 20 feet. Below 20 feet, K shall equal .28.

The factor of safety against pullout of the mesh shall be greater than or equal to 1.5 at all levels of reinforcement. The embedded length used in calculations shall be the length beyond the appropriate failure surface. The Rankine failure surface will be used as the failure plane unless another failure plane can be properly justified. Pullout resistance shall be determined from actual test data evaluated at 3/4 inch strain.



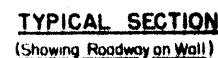
STATE DEPARTMENT OF HIGHWAYS  
AND PUBLIC TRANSPORTATION

RETAINED EARTH  
RETAINING WALL

232B

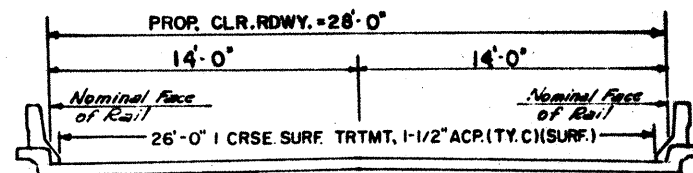
ORIGINAL DRAWING DATE	REVISIONS	STATE	FEDERAL AID PROJECT	SHEET
JUNE 1985	1. 87(Add Texas Emblem)	15	6	1430-2/57/73 1428
BY -	CD -	COUNTY	DISTRICT	JOB
MPM				
HLR				





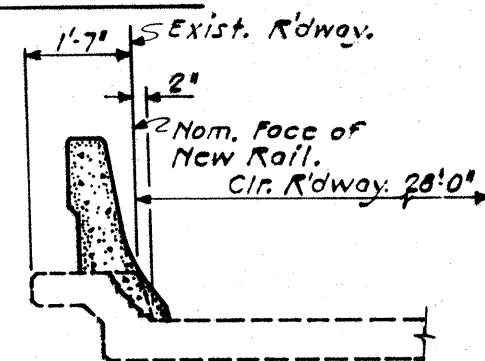
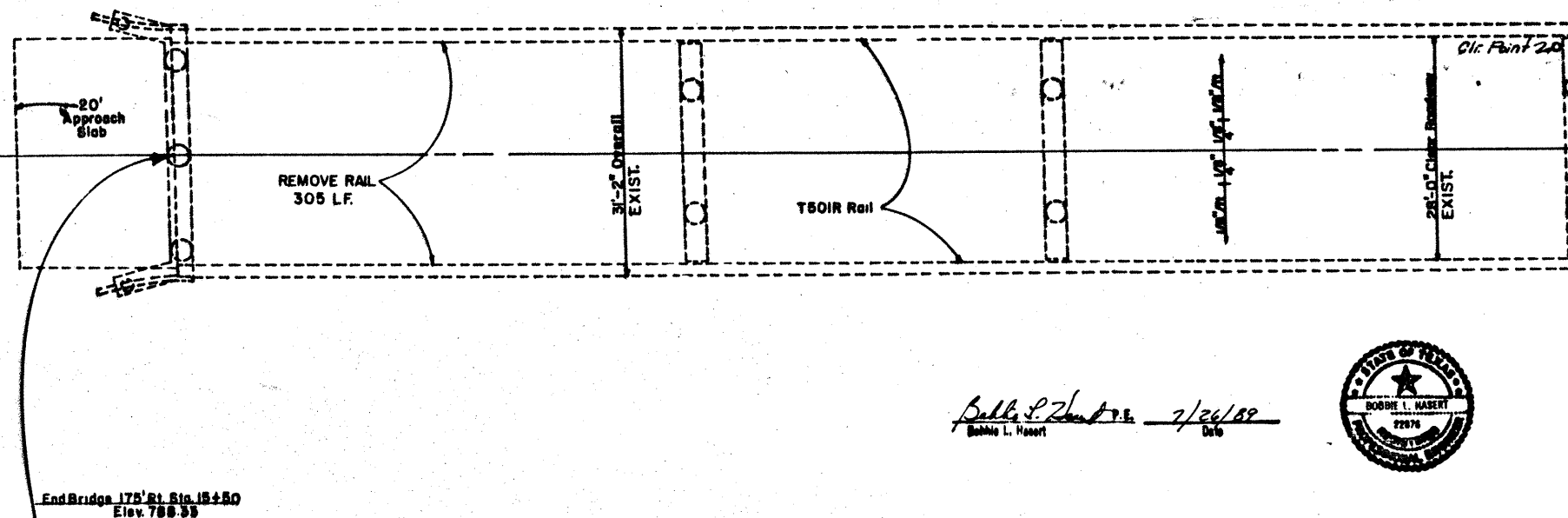
The map of Texas shall be inset a minimum of  $\frac{3}{4}$ " into the face of the panel, and shall receive a smooth finish. The inset area shall be finished in a contrasting color as approved by the Engineer.

DATE-PLACE, ORIGIN, DATE		STATE		FEDERAL AND PRODUCT		SHEET	
MARCH 1986		STATE		FEDERAL AND PRODUCT		SHEET	
DEVELOPER		15 6		IR 35-201723		2320	
COUNTRY		GUADALUPE		16 6 29		1435	



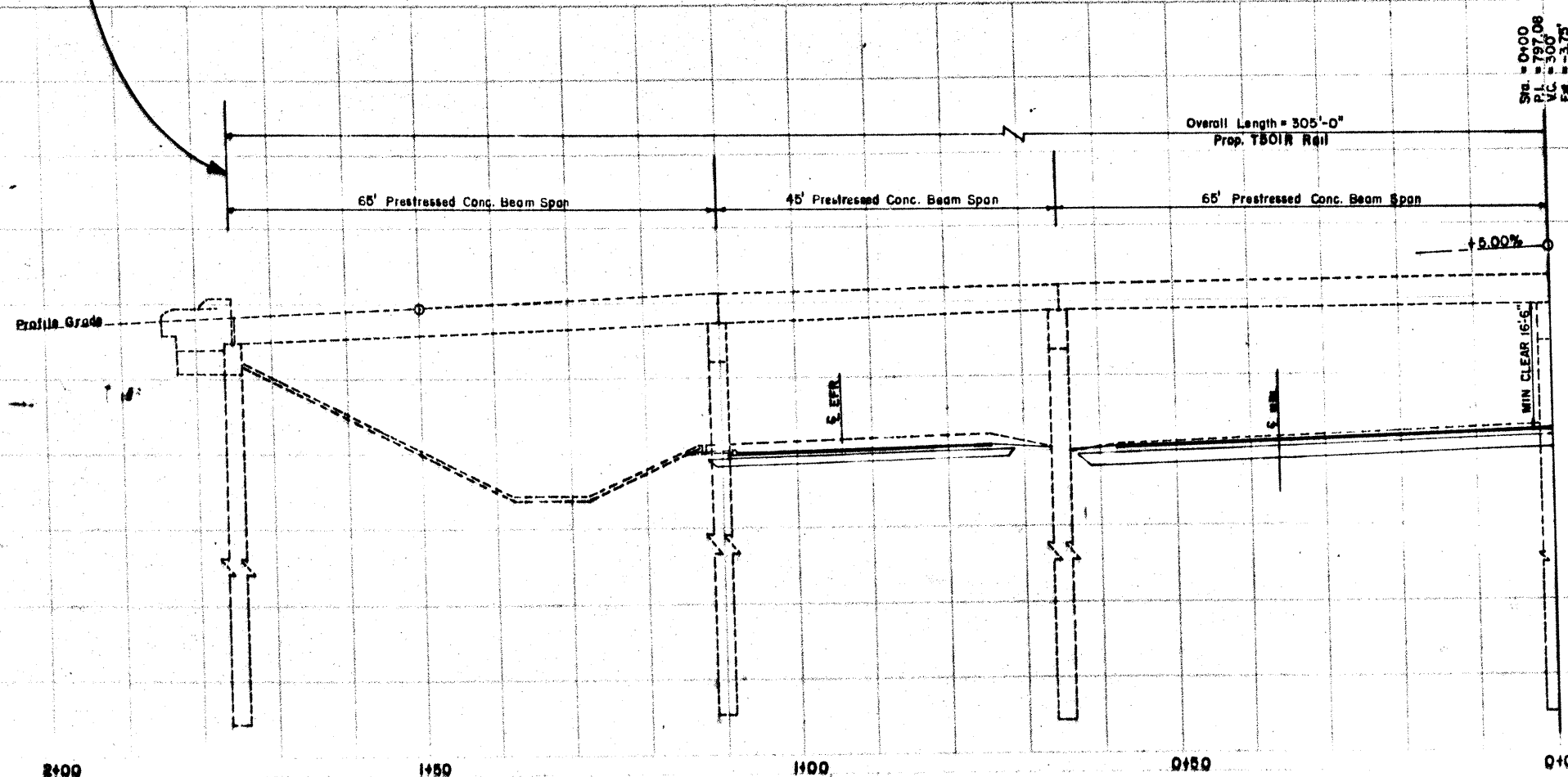
TYPICAL SECTION PROP. TRAFFIC RAIL TYPE T501R

ITEM	QUANTITIES
REMOVE RAIL	610' L.F.
RAIL (TY. T501R)	610' L.F.
CL. A OR B FINISH FOR EXIST. CONC.	3347.68 SY



PROPOSED RETROFIT RAIL

PERMANENT STR. NO.  
15-015-0016-07-096



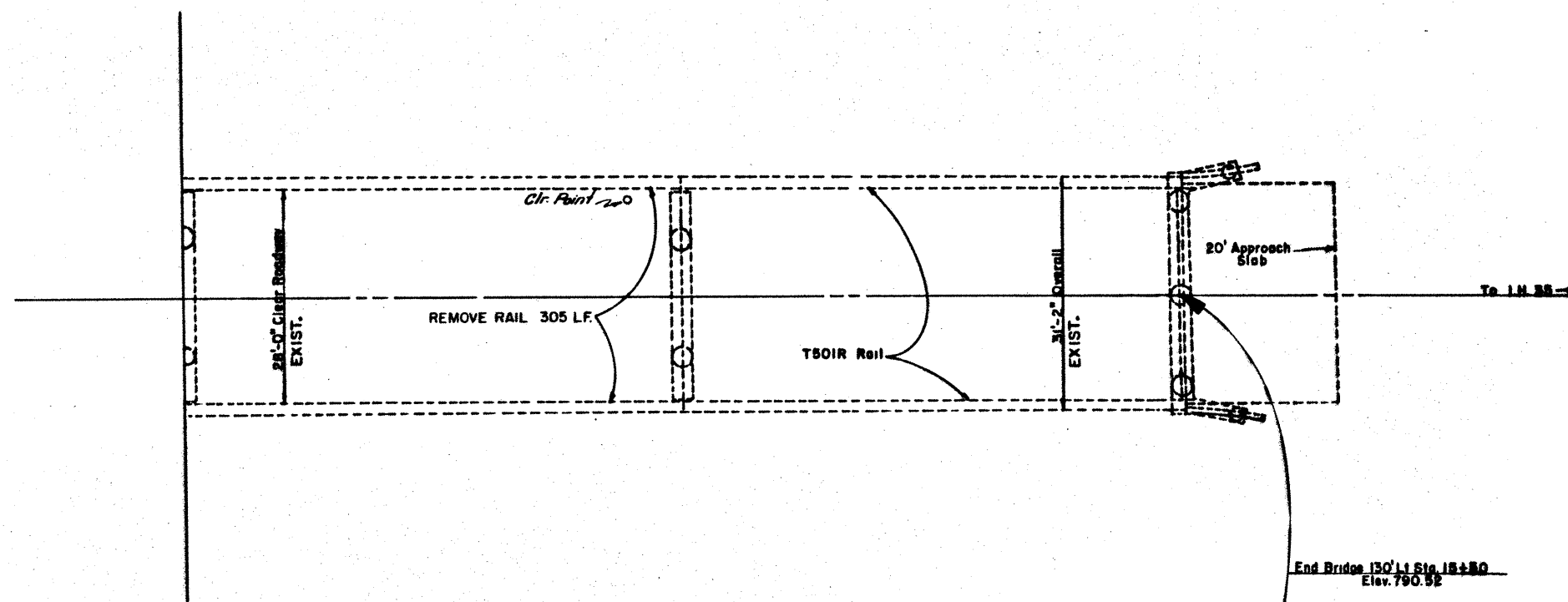
233

BRIDGE LAYOUT  
I.H. 35 UNDERPASS AT OLYMPIA PARKWAY  
SCALE 1"=10' Horiz. & Vert.

IR35-2(157)1/3/1435

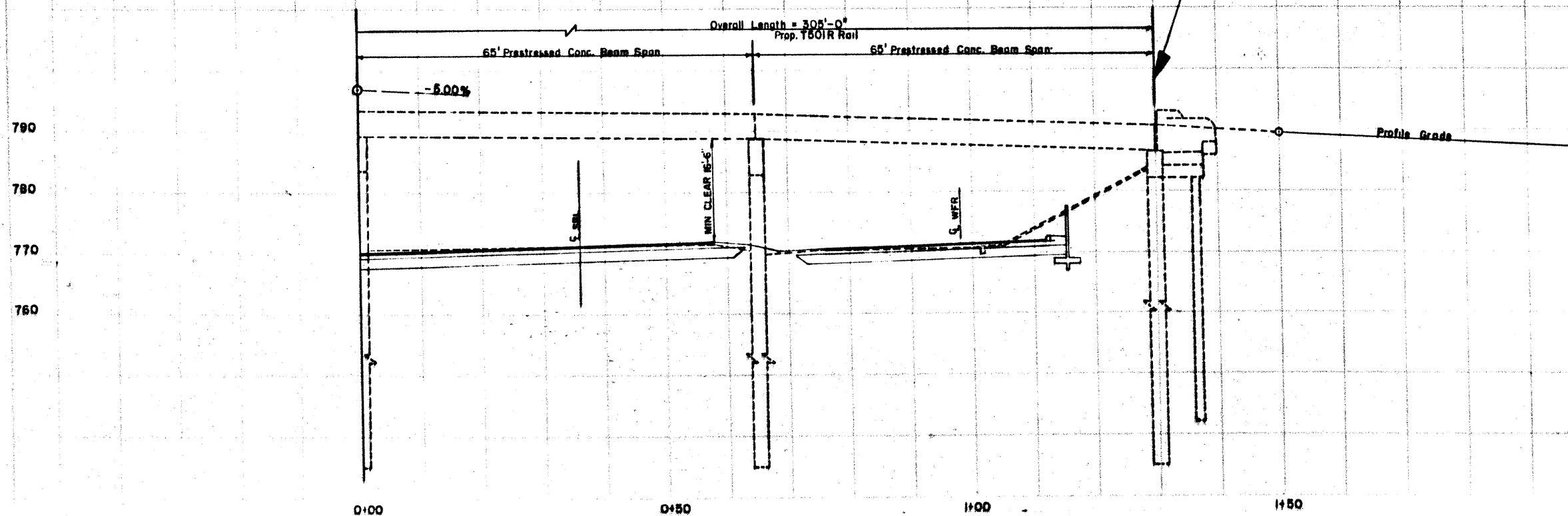
15 Gaudin/10/15/16 6 296 233

REV. 01-15-88 PROP. CL. RDWY. = 26'-0"



Bobbie L. Hasert 7/24/02

PI Sta = 0+00  
Elev = 797.08  
V.C. = 300'  
Ext. = -3.78'



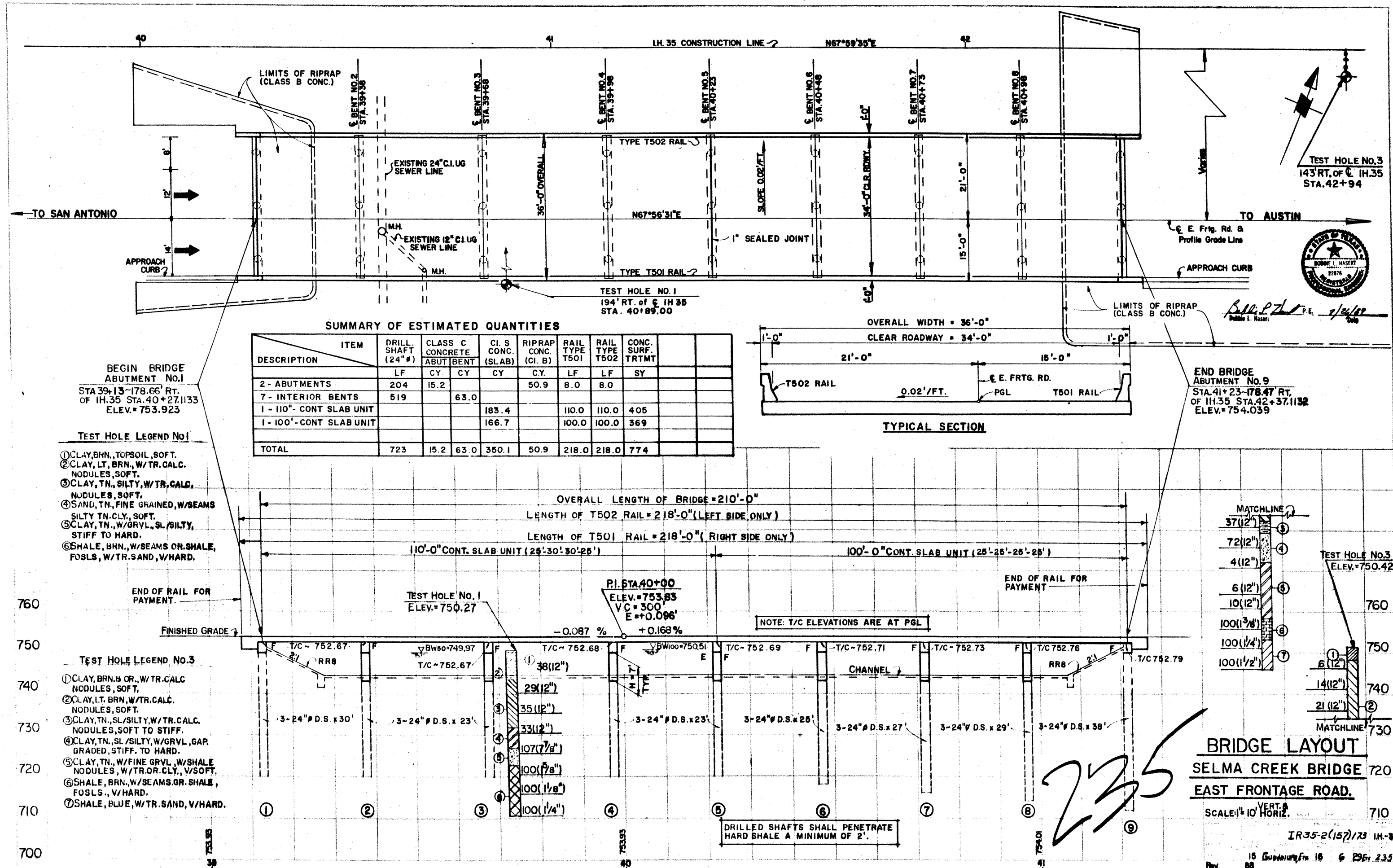
234

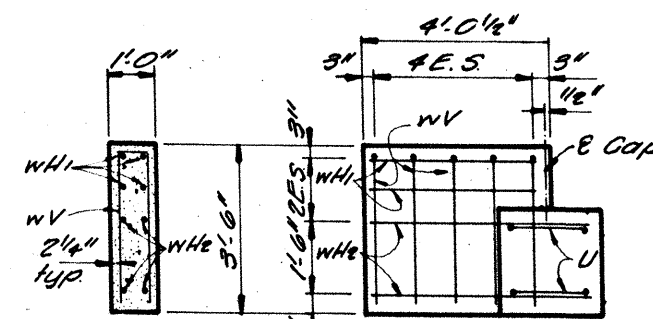
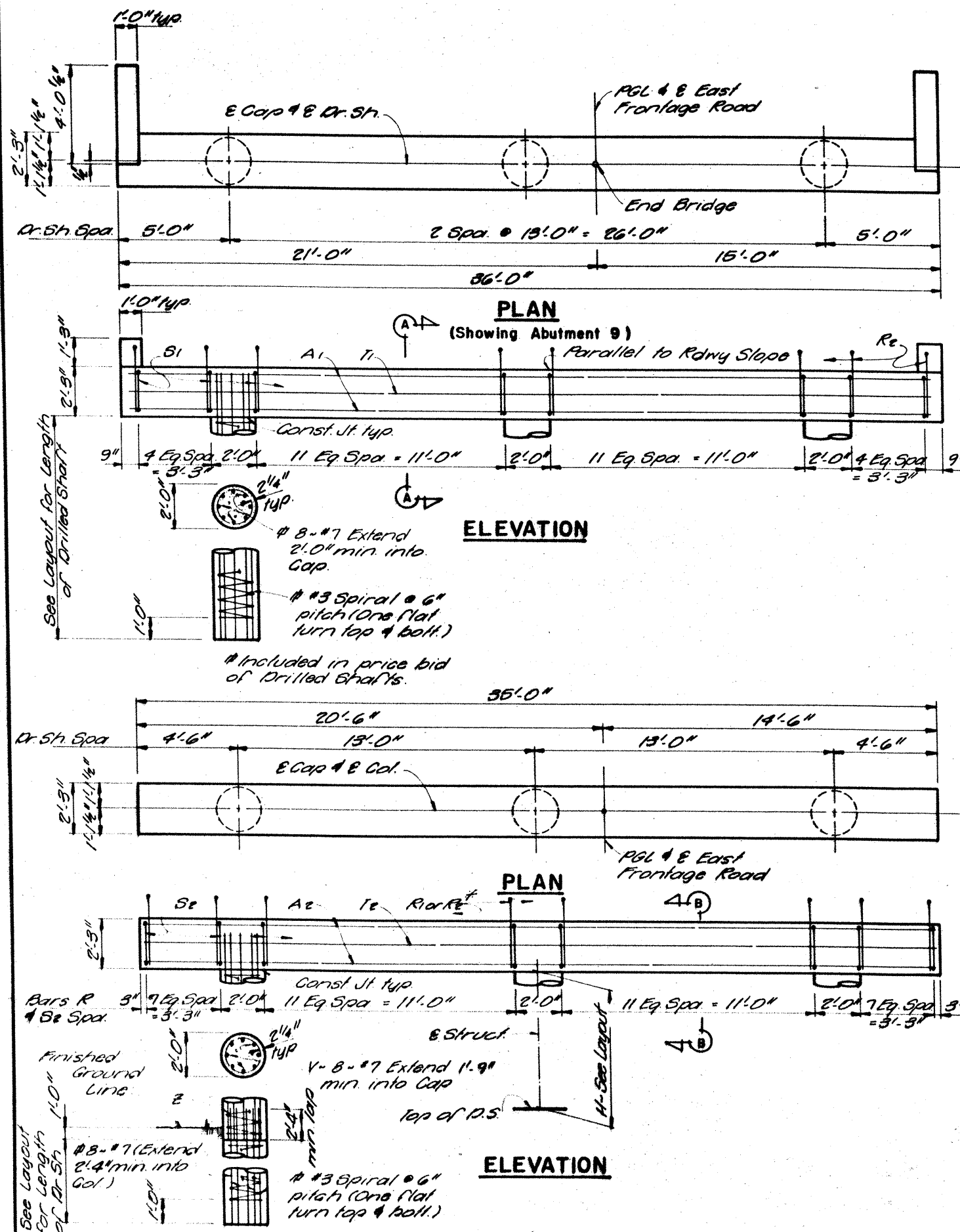
BRIDGE LAYOUT  
I.H. 35 UNDERPASS AT OLYMPIA PARKWAY  
SCALE 1" = 10' Horiz. & Vert.

IR35-2 (157) 123 I.H. 35

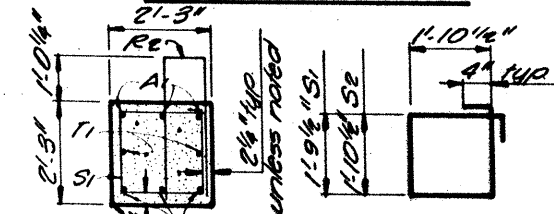
15 Goodwin, En 16 6 29 En 234  
REV. 01-15-88 PROP. CL. RDWY = 28'-0"







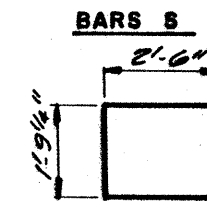
SECTION ELEVATION  
WINGWALL DETAILS



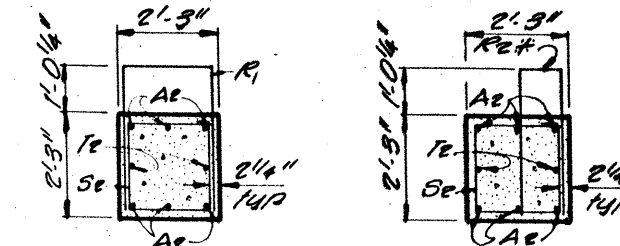
**SECTION A-A**



**BARS** w



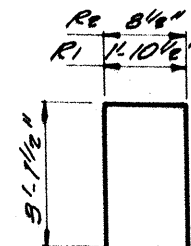
BARS U



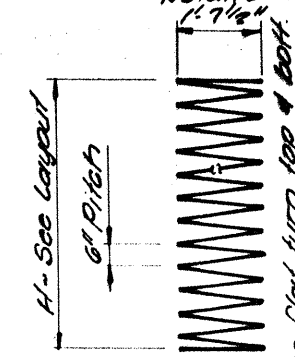
FIX. BENTS: 2-4 & 6-8

**EXP. BENT: 6**

**SECTION B-B**



BARS R



**BARS Z**

TABLE OF ESTIMATED QUANTITIES FOR ONE ABUT. ONLY				
Bar	No.	Size	Length	Weight
A <sub>1</sub>	6	#8	35'-0"	361
S <sub>1</sub>	34	#4	8'-0"	182
I <sub>1</sub>	2	#4	35'-0"	47
U	4	#6	6'-9"	40
W <sub>H</sub> I	8	#6	3'-8"	44
W <sub>H</sub> E	8	#6	4'-9"	57
W <sub>V</sub>	10	#5	6'-9"	70
Re	34	#4	7'-0"	159
Reinforcing Steel #			LB	1160
Class C Concrete			CY	7.6

[illegible]

TABLE OF ▲ VARIABLE QUANTITIES						TOTAL ▲ ESTIMATED QUANTITIES	
H.	C/C Conc.	Bars V 24-#7		Bars E 3-#3		Raint. Sl #	C.C. Conc.
Ft.	C.Y.	Lg/H.	Wt.	Lg/H.	Wt.	L.B.	C.Y.
5'	1.7	6'-9"	331	6'1"	69	1487	8.3
6'	2.1	7'-9"	380	72"	81	1498	8.7
7'	2.4	8'-9"	429	82"	92	1558	9.0
8'	2.8	9'-9"	478	92"	104	1619	9.4
9'	3.1	10'-9"	527	102"	115	1679	9.7

\* For Contractor's information only.  
 \* Quantities shown for one bent only.  
 \* Substitute 40 Bars  $R_{e(14)} \times 7.0"$  for Bars  $R_1$  @ Bent 5. Deduct 31 lbs. from total estimated quantity of Reinf. Steel @ Bent 5 only.

GENERAL NOTES:  
Designed in accordance with A.A.S.H.T.O.  
1983 Standard and Interim Specifications.  
All Int. Bnt. Cap steel shall be grade 60.  
b Calculated Drilled Shaft Load =  
Abutment = 401 kN  
Interior Bent = 751 kN

HS20 LOADING

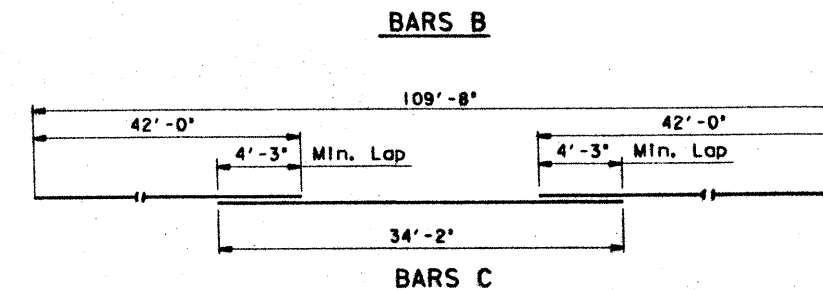
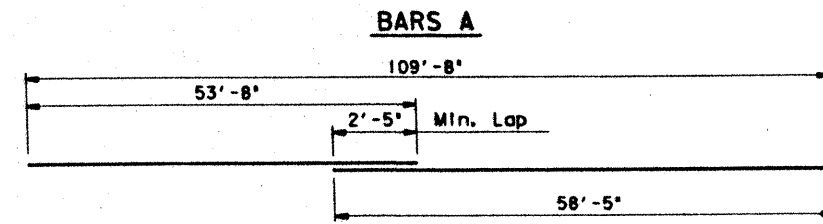
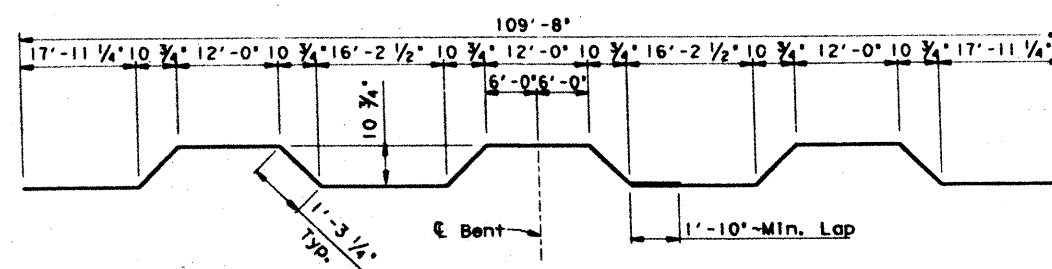
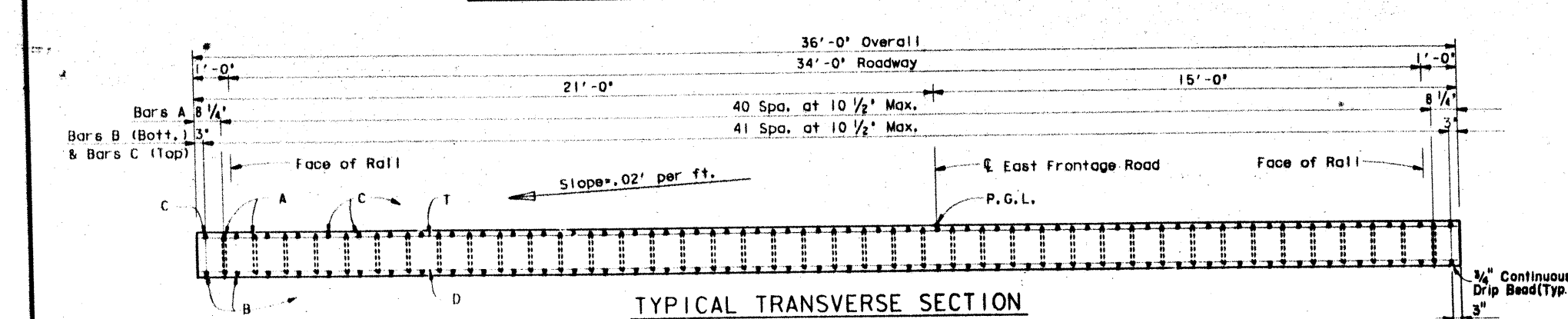
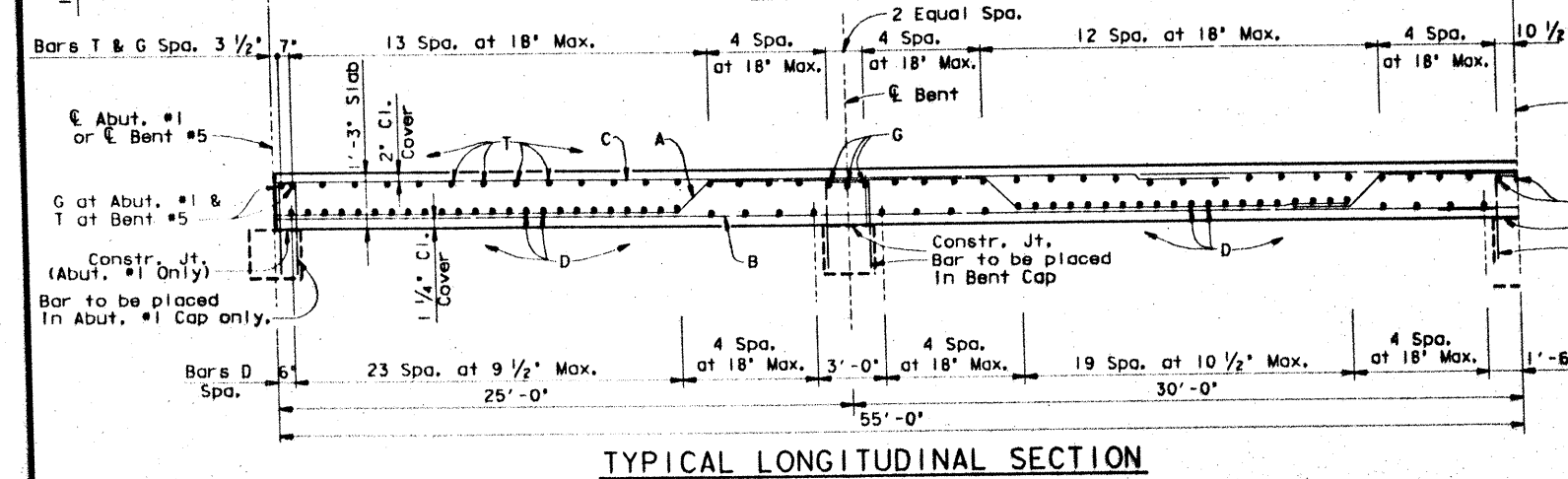
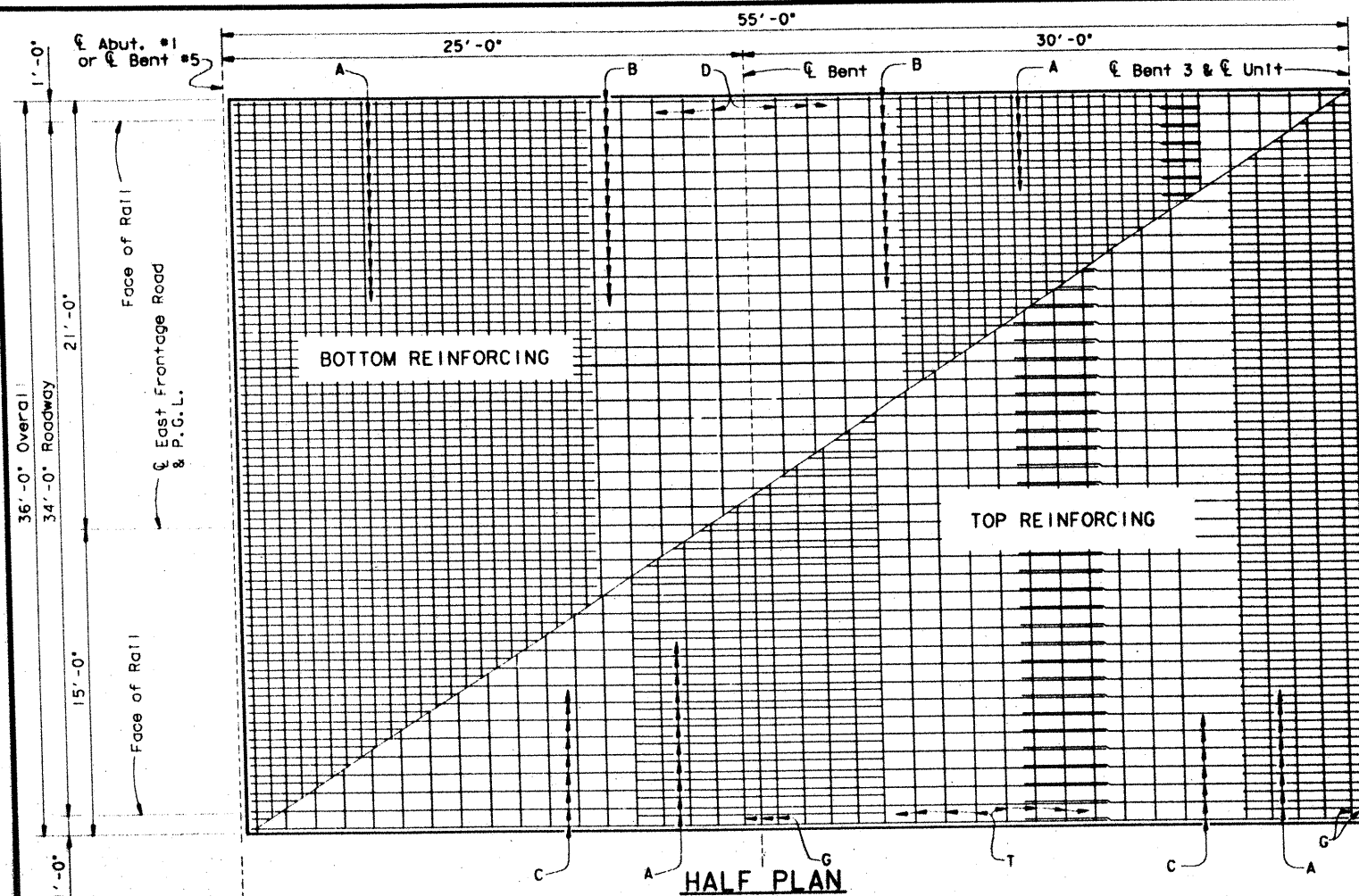


**STATE DEPARTMENT OF HIGHWAYS  
AND PUBLIC TRANSPORTATION**

# ABUTMENTS AND INTERIOR BENTS

**SELMA CREEK BRIDGE  
EAST FRONTAGE ROAD**

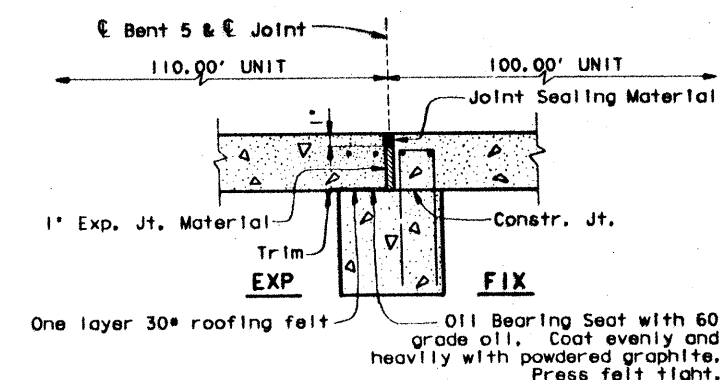
OFFICIAL DRAWING DATE <b>AUGUST 1988</b>		STATE DISTRICT	FEDERAL AND PROJECT	SHEET
DN -	REVISONS	<b>15</b>	<b>6</b>	<b>IR35-2(157)73</b>
CA -		COURTY		
DN -		COURTY	SECTION	JOB
CA -		<b>Guadalupe, Etc</b>		
				<b>16 6 235-1435</b>



# TABLE OF ESTIMATED QUANTITIES

Bar	No.	Size	Length	Weight
A	41	# 8	113'-9"	12452
B	42	# 8	112'-1"	12569
C	42	# 9	118'-2"	16875
D	112	# 5	35'-8"	4167
G	11	# 9	35'-8"	1334
T	72	# 4	35'-8"	1716
Reinforcing Steel				Lb # 49113
C1. S Concrete (Slab)				CY 183.4

\* For contractor's information only.



GENERAL NOTES:

Designed in accordance with A.A.S.H.T.O. 1983 Standard and Interim Specifications.

Minimum rate of concrete placement shall be 40 C.Y. per hour.

HS 20 LOADING

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

110.00' CONTINUOUS SLAB UNIT (SPANS 1-4)

SELMA CREEK BRIDGE

EAST FRONTAGE ROAD

045200A-171A2-1355116339885501.DGN

DESIGNED BY AND FOR USE OF TEXAS SOUTH

DATE: AUGUST, 1988

REVISIONS

15

16

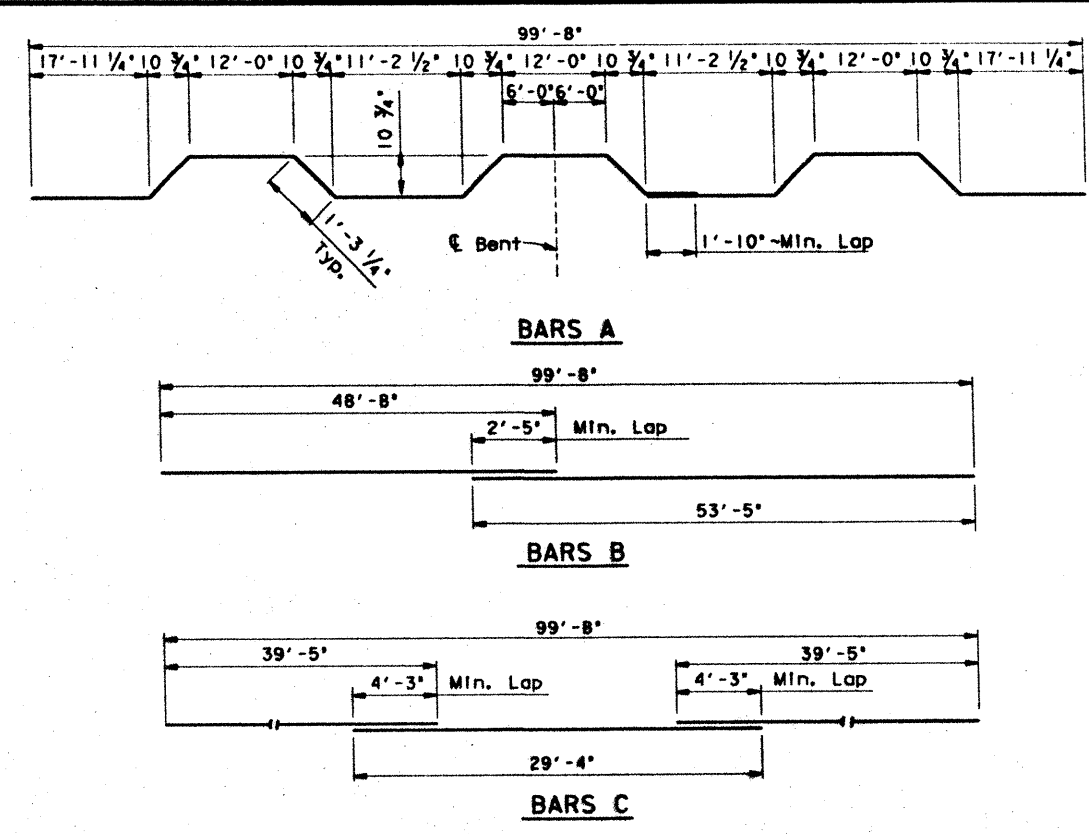
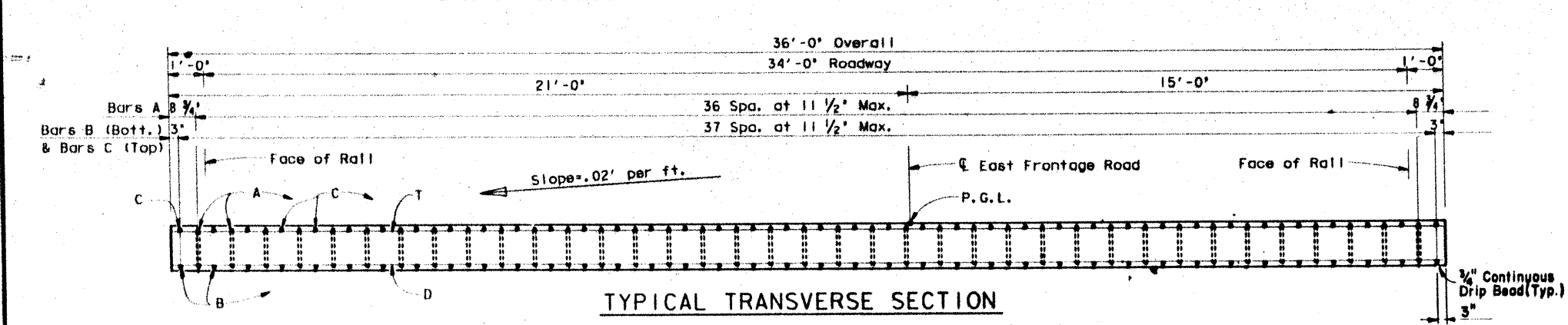
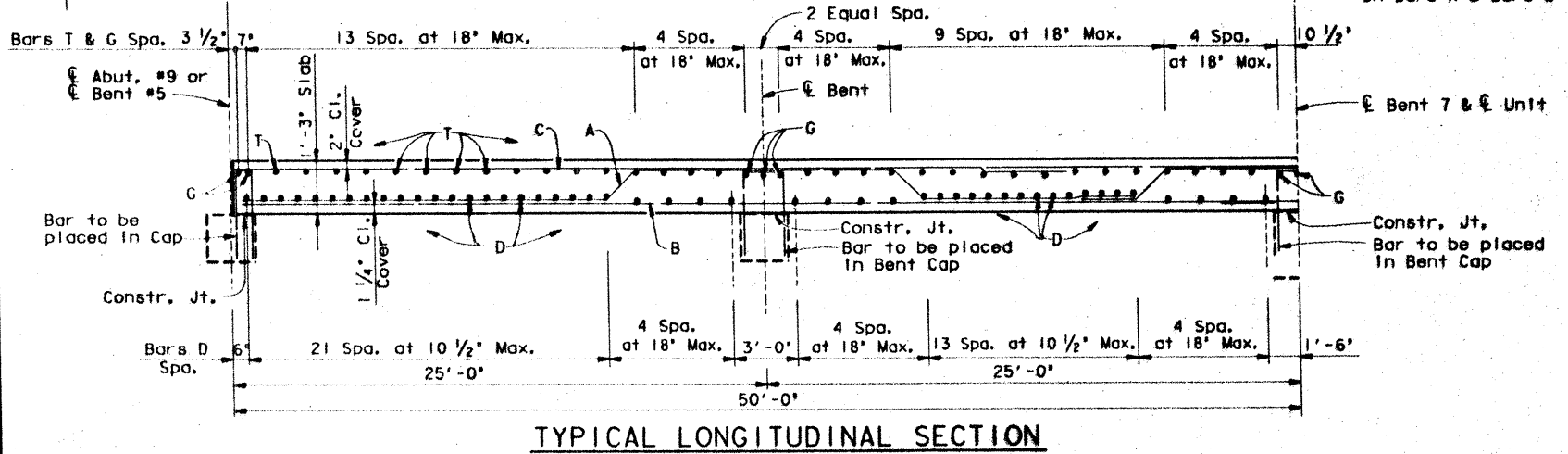
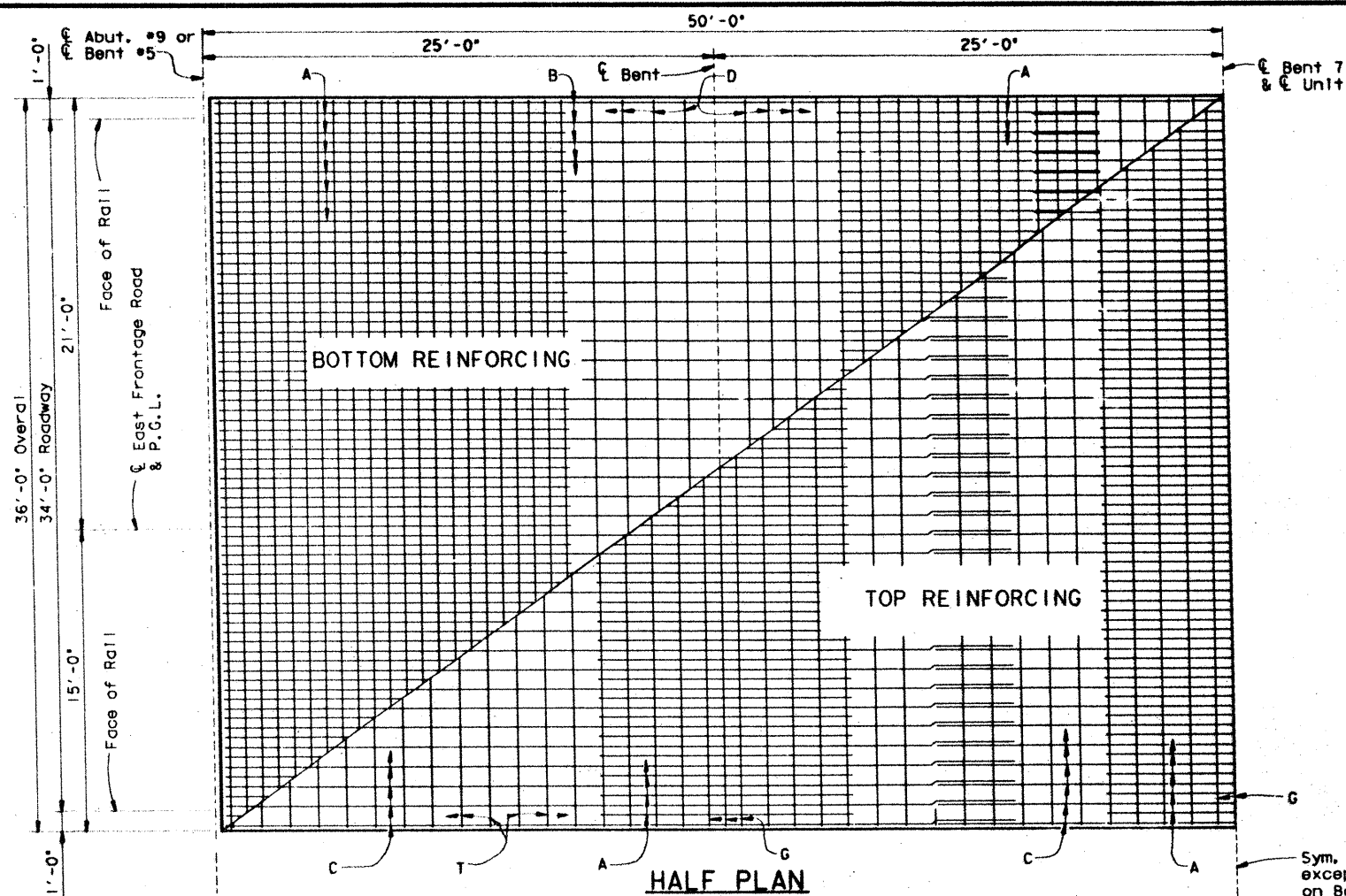
IR35-R(157) 173

237

16 6 29

237





Bar	No.	Size	Length	Weight
A	37	# 8	103'- 9"	10249
B	38	# 8	102'- 1"	10357
C	38	# 9	108'- 2"	13976
D	96	# 5	35'- 8"	3572
G	13	# 9	35'- 8"	1577
T	64	# 4	35'- 8"	1525
Reinforcing Steel				Lb # 41256
Cl. S Concrete (Slab)				CY 166.7

\* For contractor's information only.

**GENERAL NOTES:**  
 Designed in accordance with A.A.S.H.T.O. 1983 Standard and Interim Specifications.  
 Minimum rate of concrete placement shall be 40 C.Y. per hour.

238

HS 20 LOADING

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

**100.00' CONTINUOUS SLAB UNIT**

(SPANS 5-8)

SELMA CREEK BRIDGE

EAST FRONTAGE ROAD

D45200A1-2FA2-13551-161398BC502.DGN

PREPARED BY AND FOR USE OF TEXAS SDHP

DATE: SEPT, 1988

PROJECT: IR35-2(157)173

SHEET: 238

CONTRACT: 0016

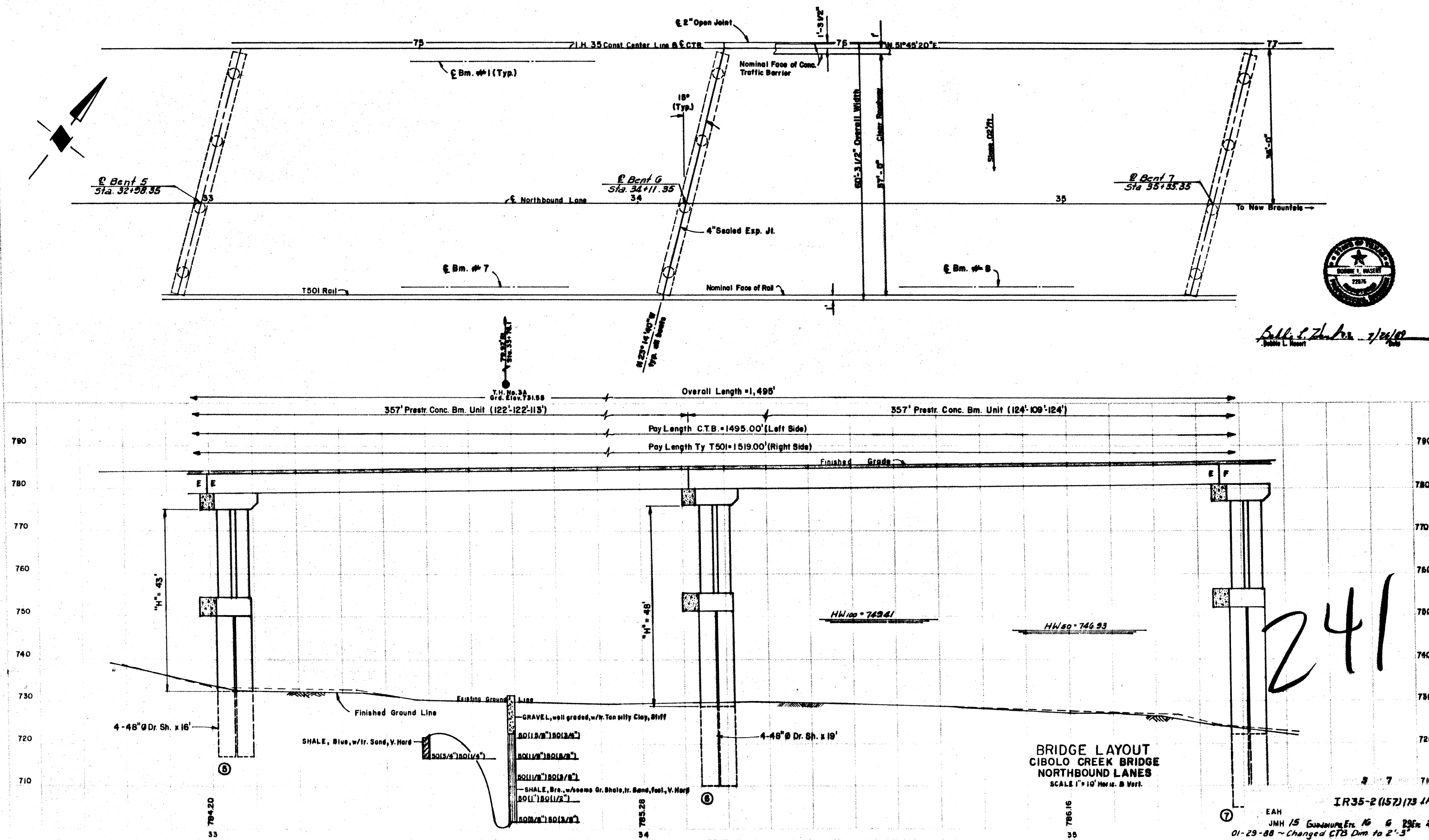
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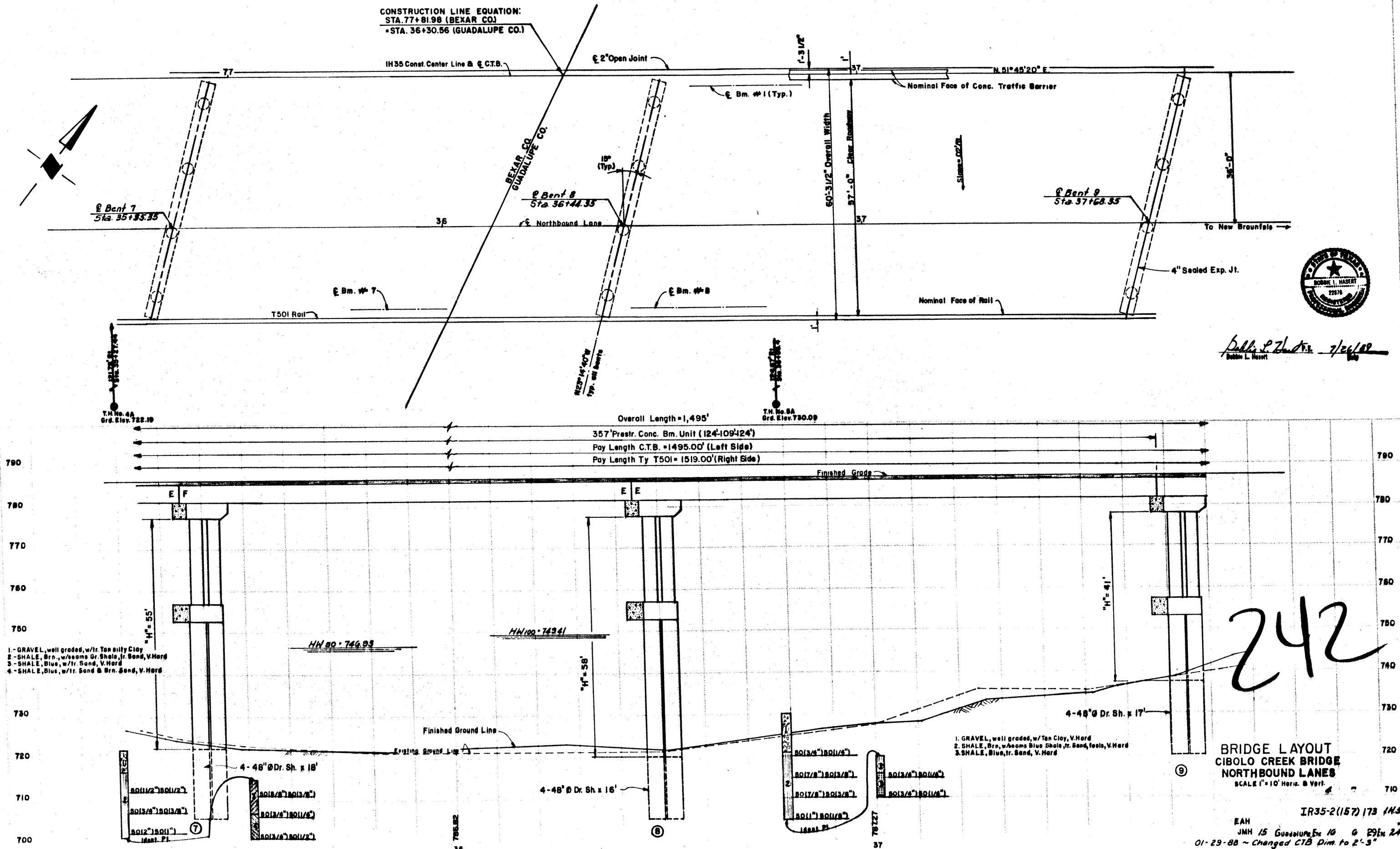
GUADALUPE, ETC.









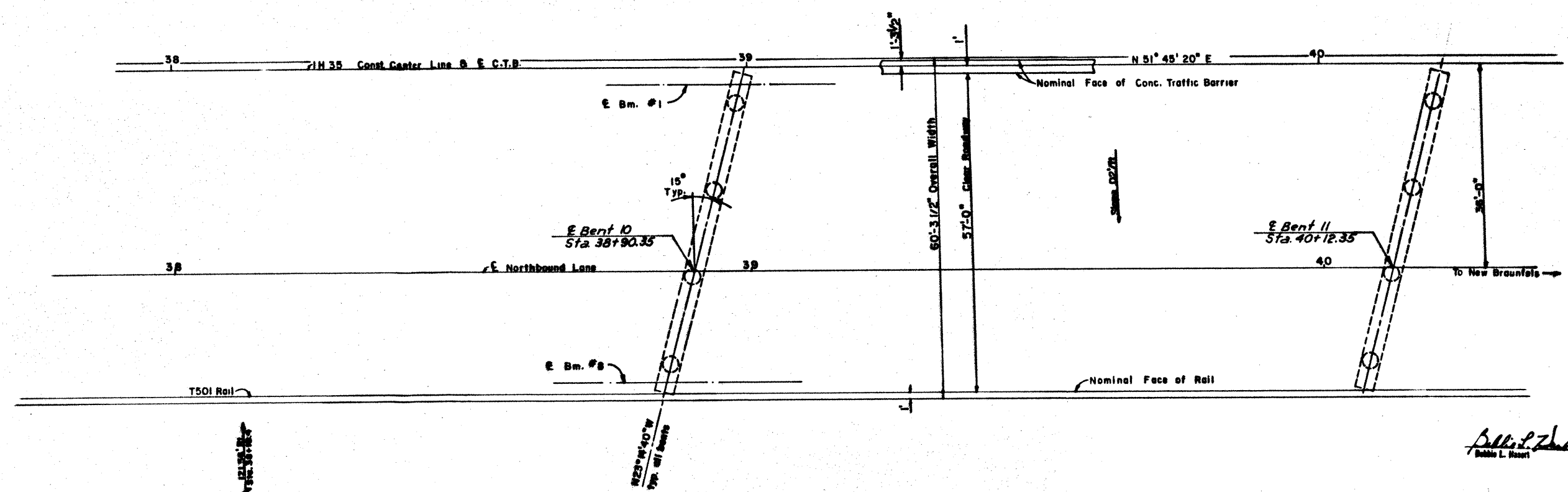
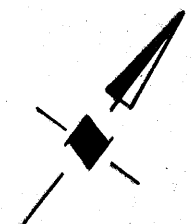


Bob L. Hackett 7/26/89  
 Bobbie L. Hackett

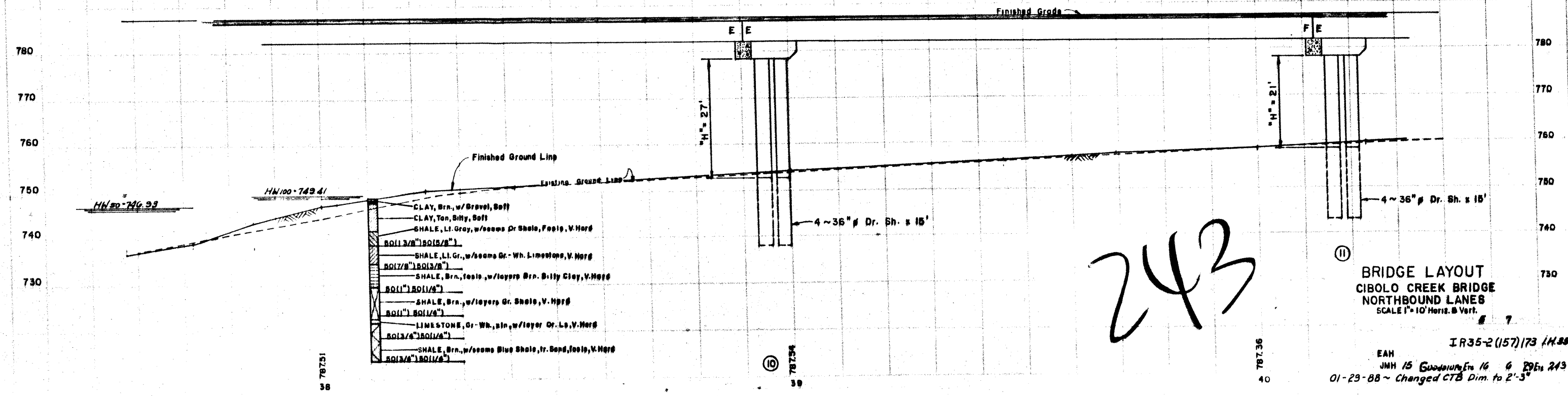
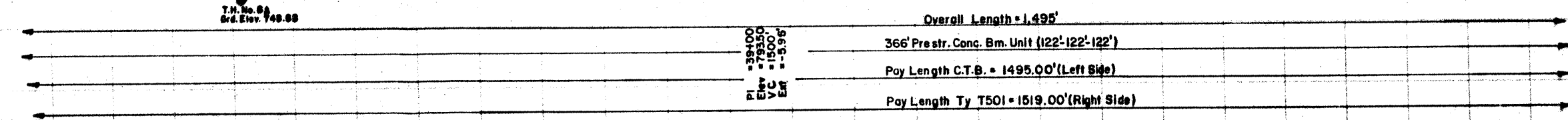
**BRIDGE LAYOUT**  
**CIBOLO CREEK BRIDGE**  
**NORTHBOUND LANES**  
 SCALE 1" = 10' Horiz. & Vert.

IR35-2(157) 173 1A38  
 EAH  
 JMH 15 Guadalupe Co. 10 0 29in 242  
 01-23-88 ~ Changed CTB Dim. to 2'-3"





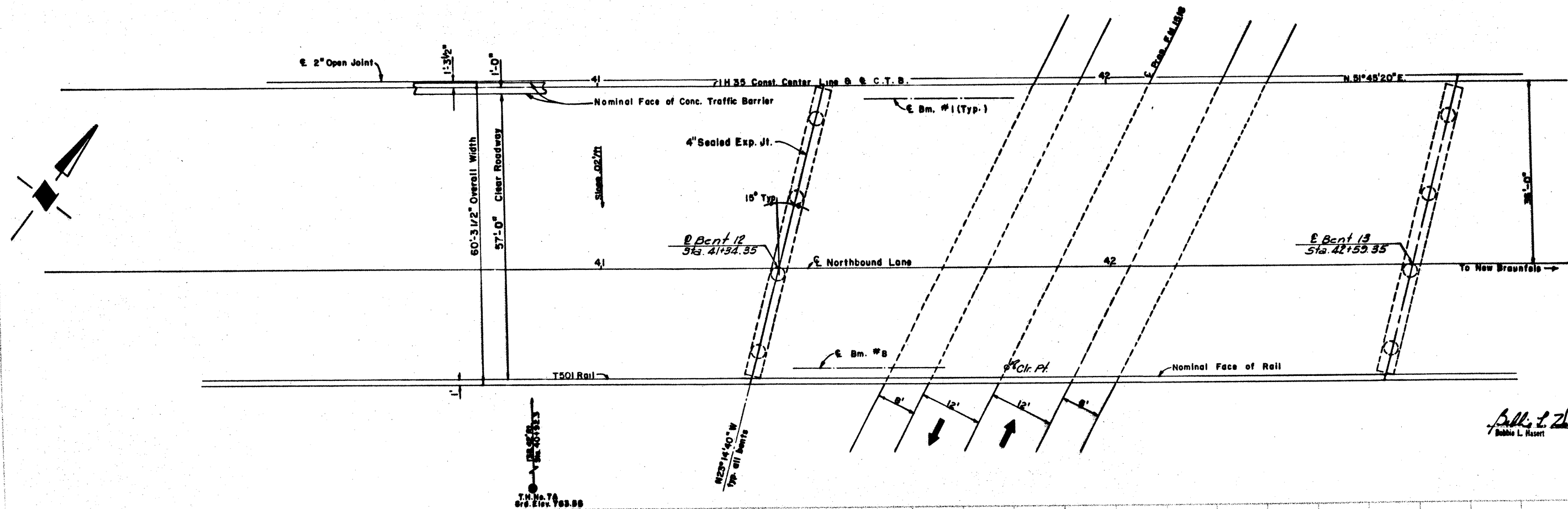
*Bob L. Haselet* 7/26/87  
Bobbie L. Haselet



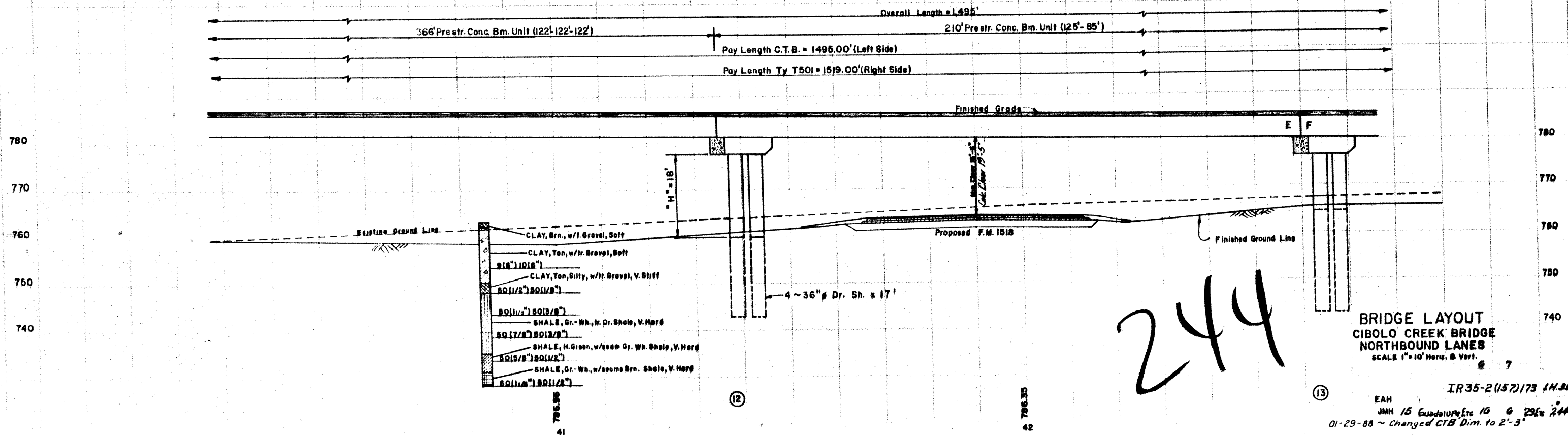
243

BRIDGE LAYOUT  
CIBOLO CREEK BRIDGE  
NORTHBOUND LANES  
SCALE 1" = 10' Horiz. & Vert.

IR 35-2 (157) 173 (H. 85)  
EAM  
JMH 15 Guadalupe 16 6 29 E 243  
01-29-88 ~ Changed CTB Dim. to 2'-3"



*Bobbie L. Nasert* 7/26/89  
Bobbie L. Nasert

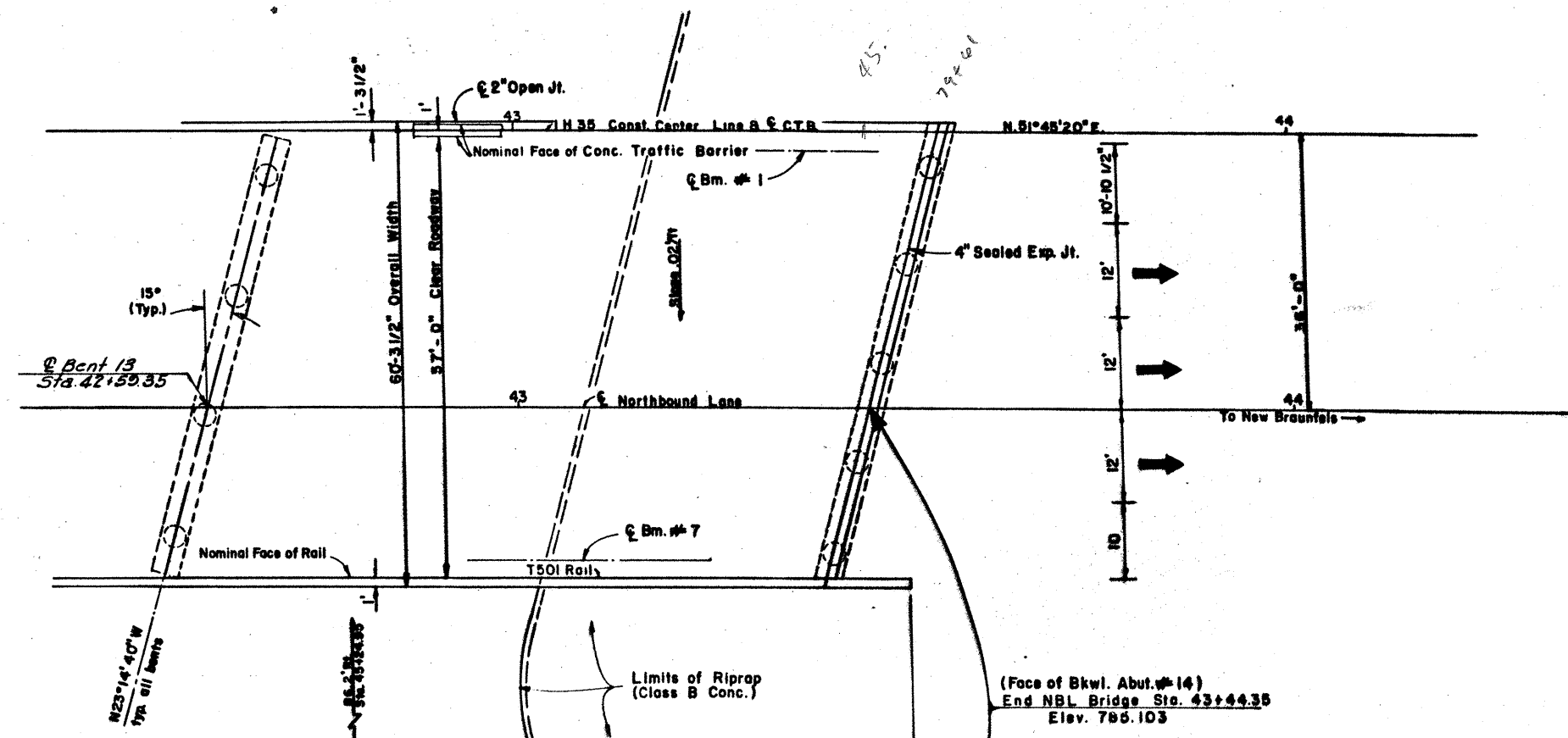
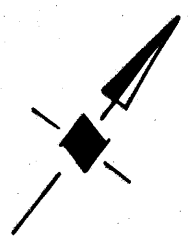


244

BRIDGE LAYOUT  
CIBOLO CREEK BRIDGE  
NORTHBOUND LANES  
SCALE 1" = 10' Horiz. & Vert.

IR35-2(157)73 14.35  
EAH  
JMH 15 Guadalupe 10 6 29 244  
01-29-88 ~ Changed CTB Dim. to 2'-3"

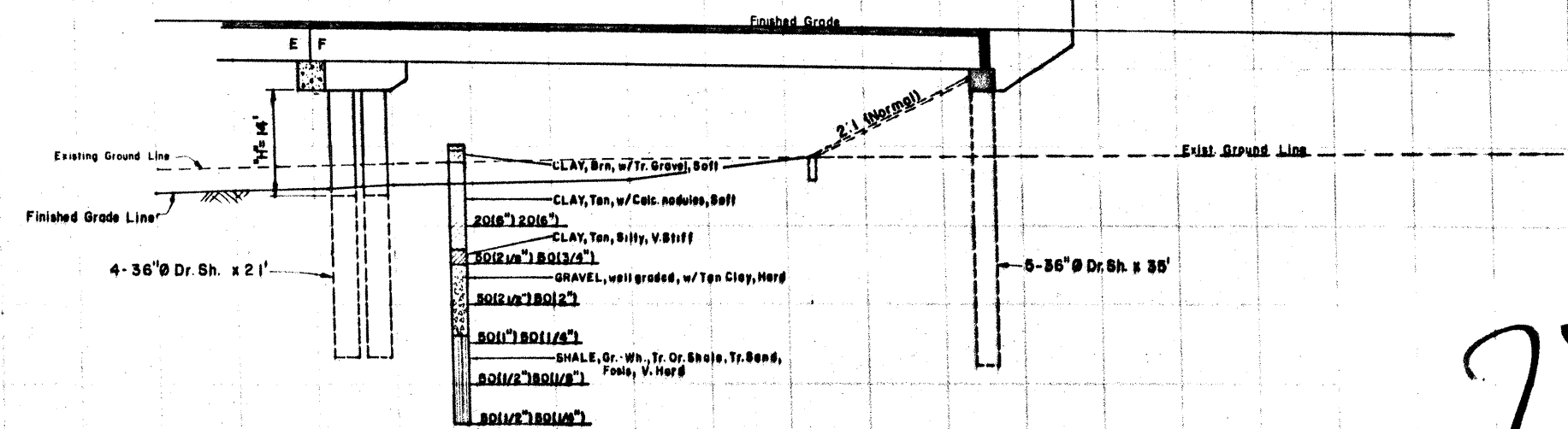
418



*Robert L. Maceri*  
 Robert L. Maceri  
 7/24/02

Overall Length = 1495'  
 210' Prestr. Conc. Bm. Unit (125' - 85')  
 Pay Length C.T.B. = 1495.00' (Left side)  
 Pay Length Ty T501 = 1519.00' (Right side)

End C.T.B. (Lt.)  
 for payment  
 End Ty T501 (Rt.)  
 for payment



790  
780  
770  
760  
750  
740

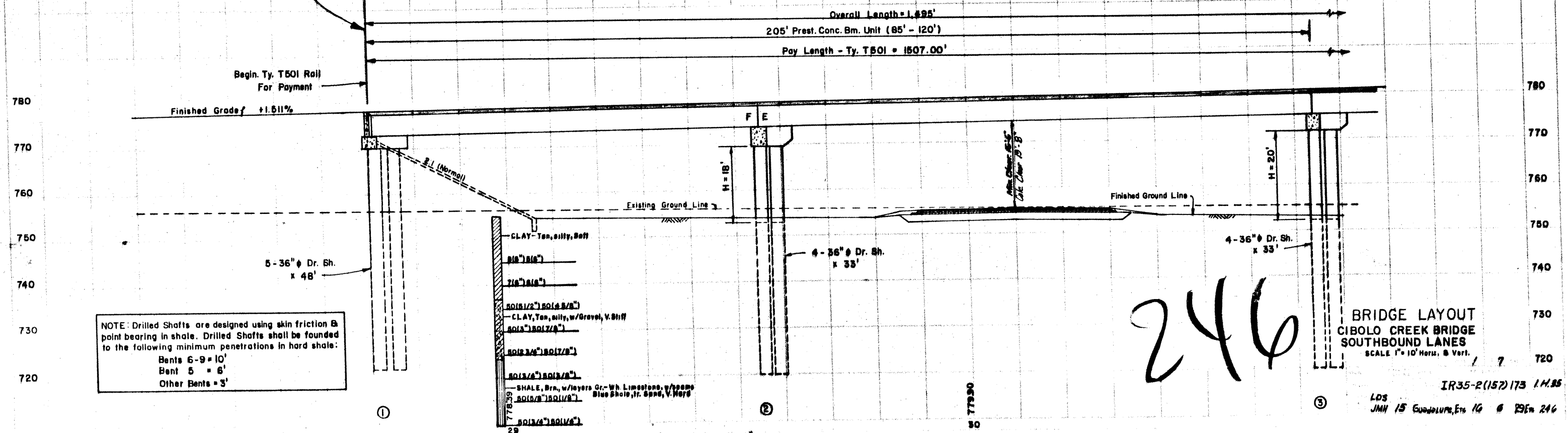
790  
780  
770  
760  
750  
740

245

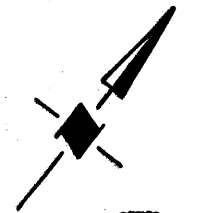
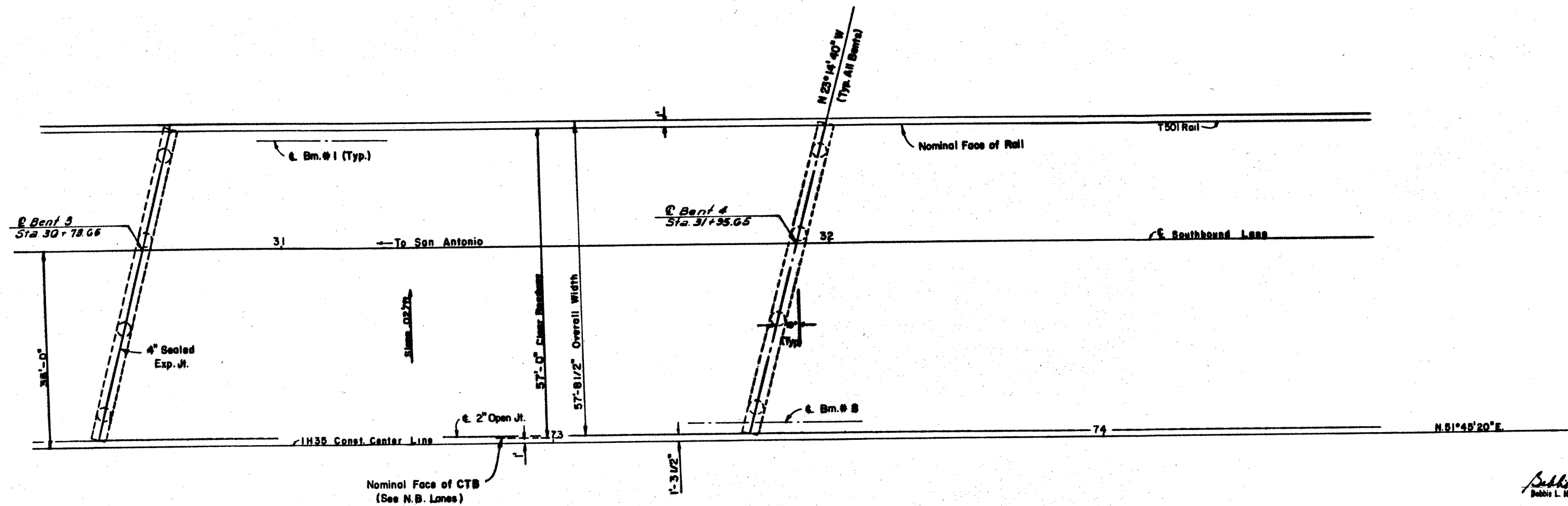
BRIDGE LAYOUT  
 CIBOLO CREEK BRIDGE  
 NORTHBOUND LANES  
 SCALE 1" = 10' Horiz. & Vert.

IR35-2(157)73 14.85  
 EAH  
 JMH 15 6/24/02  
 01-29-88 ~ Changed C.T.B. Dim. to 2'-3"  
 02-12-88 ~ Changed Lt Shldr. Dim.

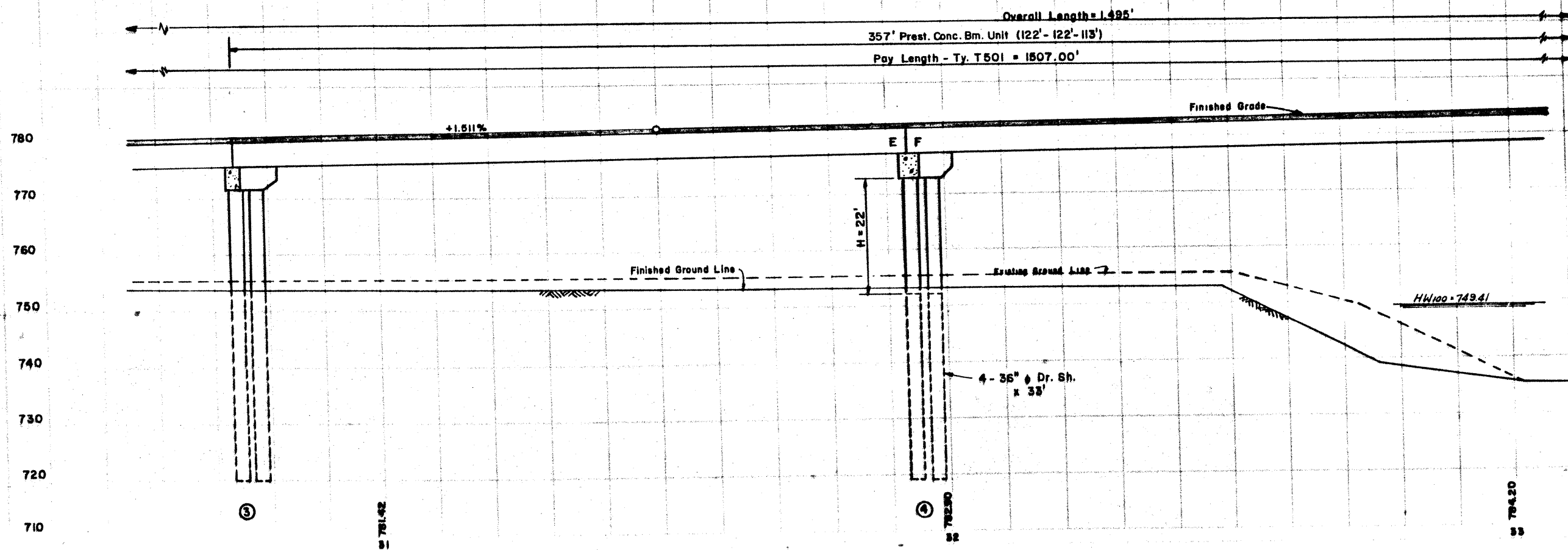








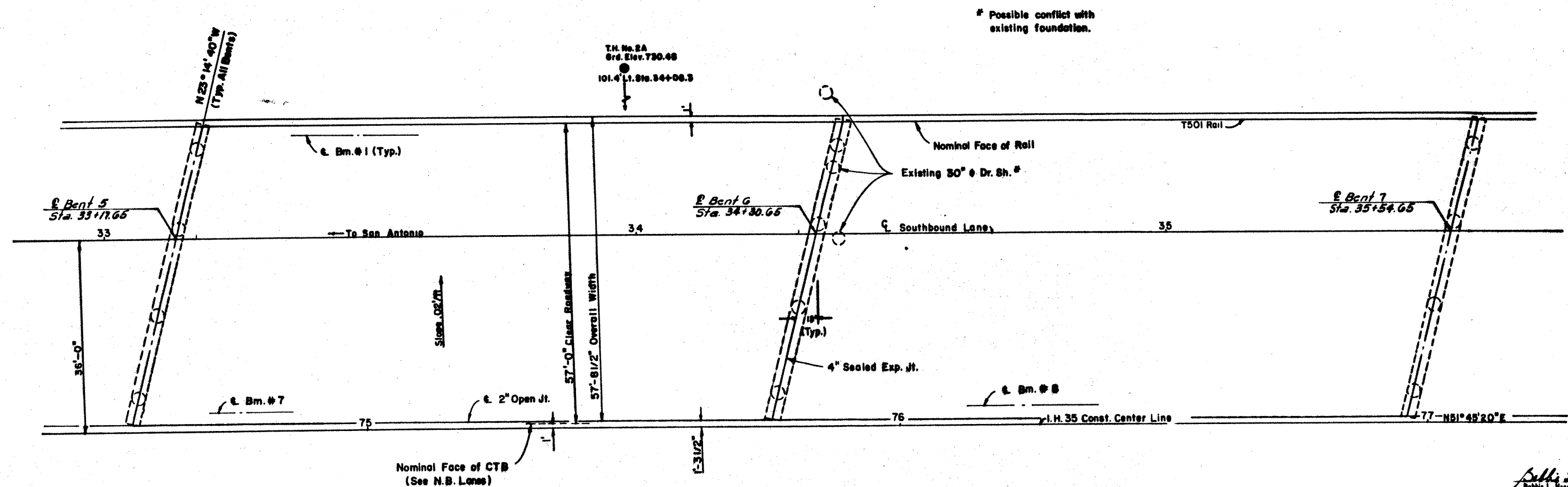
*Bobbie L. Hasty* P.E. 2/26/09  
Bobbie L. Hasty



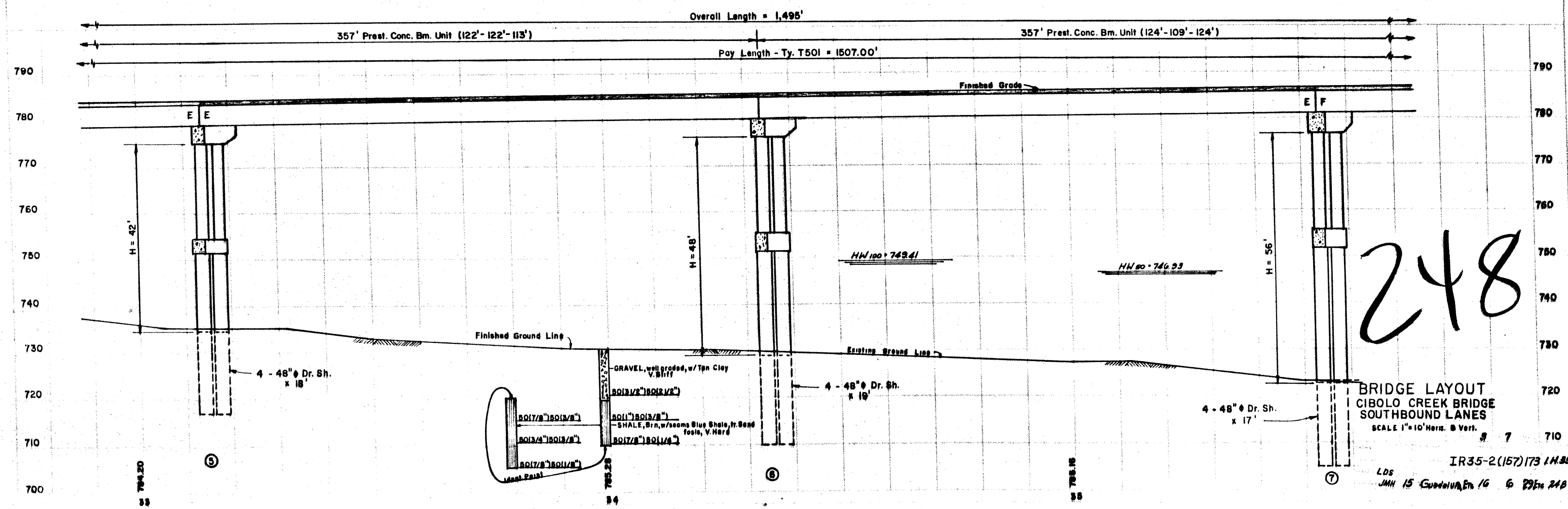
247

BRIDGE LAYOUT  
CIBOLO CREEK BRIDGE  
SOUTHBOUND LANES  
SCALE 1" = 10' Horiz. & Vert.

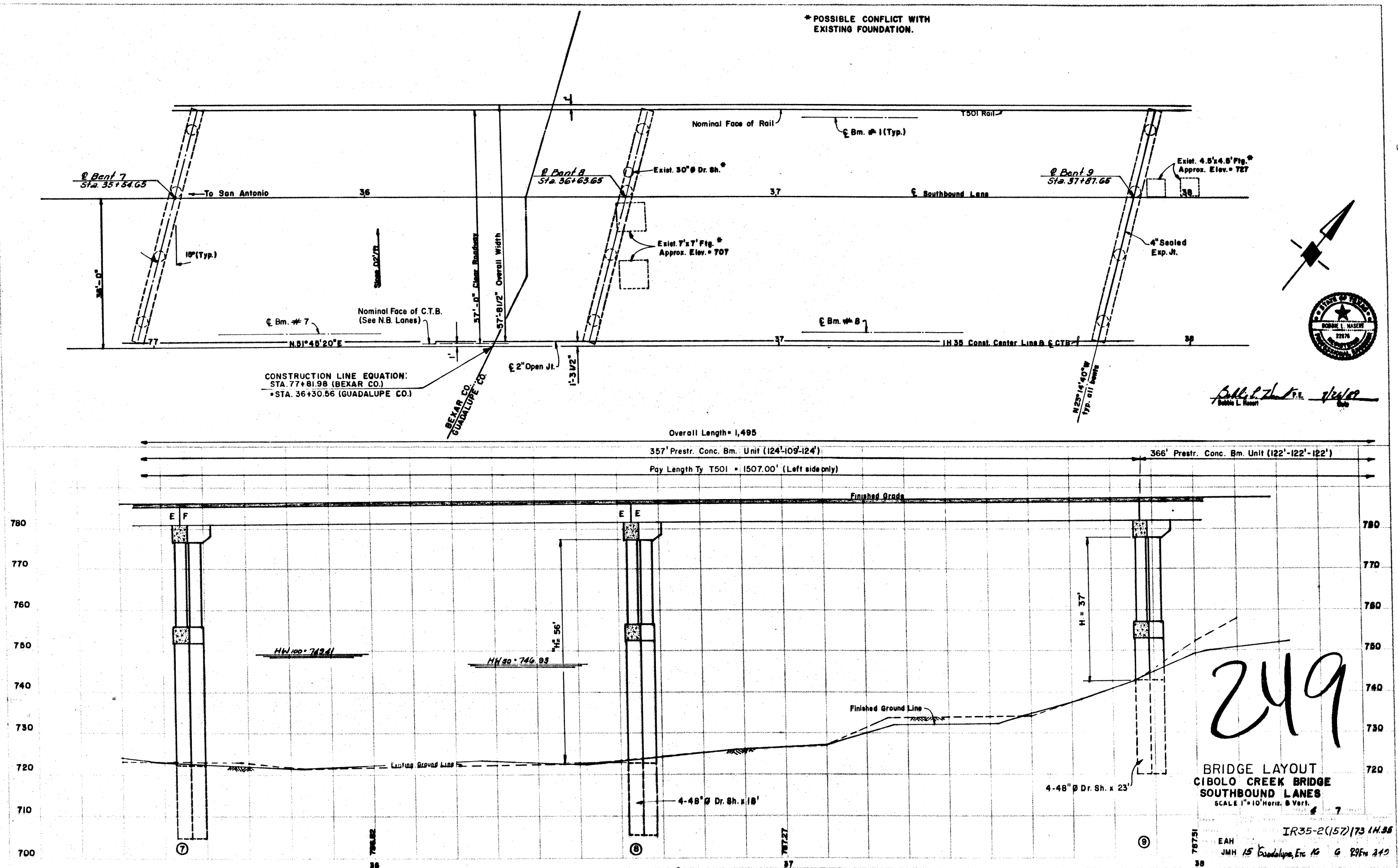
IR35-2(157)173 1A.95  
LOS  
JMH 15 Guadalupe, Etc. 1/6 G 296% 247

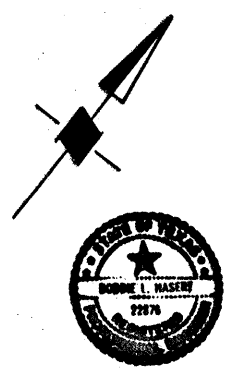
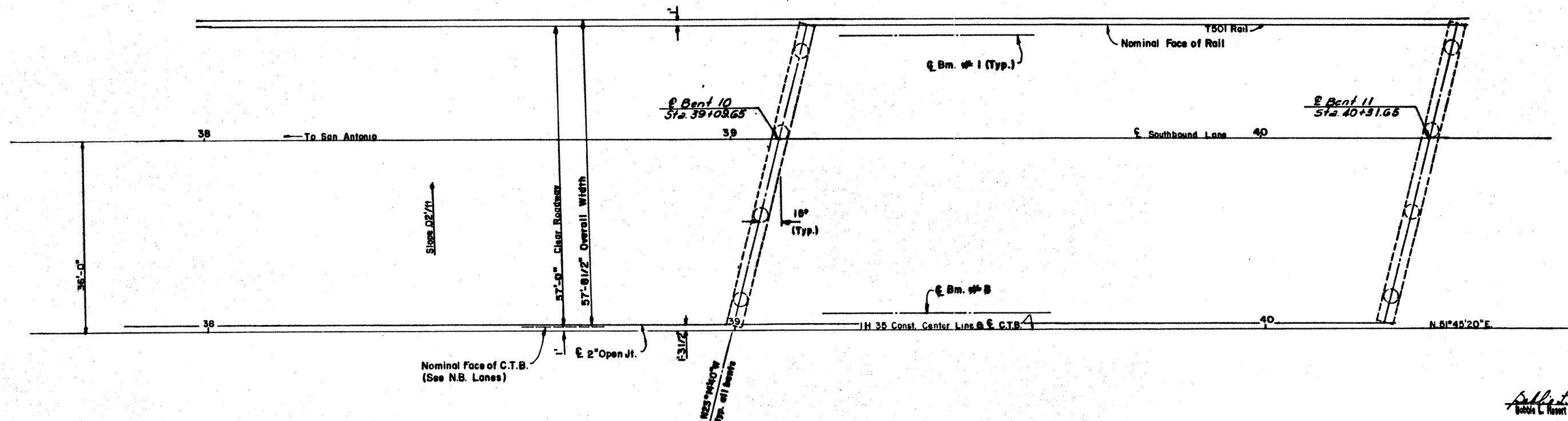


Sub. P. 2. 7/26/82  
 Robert L. Hester

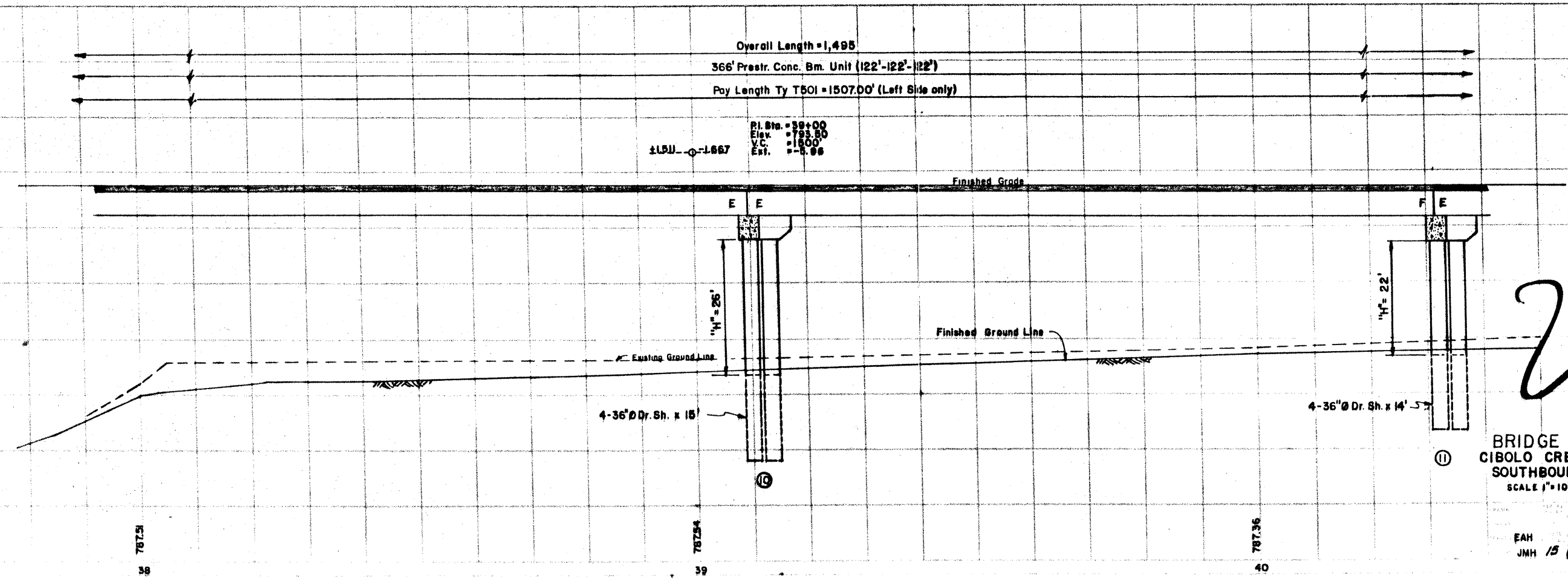


BRIDGE LAYOUT  
 CIBOLO CREEK BRIDGE  
 SOUTHBOUND LANES  
 SCALE 1" = 10' Horiz. 8" Vert.  
 IR35-2(157)173 1A.86  
 LHS  
 JMH 15 Guadalupe 16 6 29th 248





*Bob L. Hansen* 7/24/82  
Bobbie L. Hansen



250

BRIDGE LAYOUT  
CIBOLO CREEK BRIDGE  
SOUTHBOUND LANES

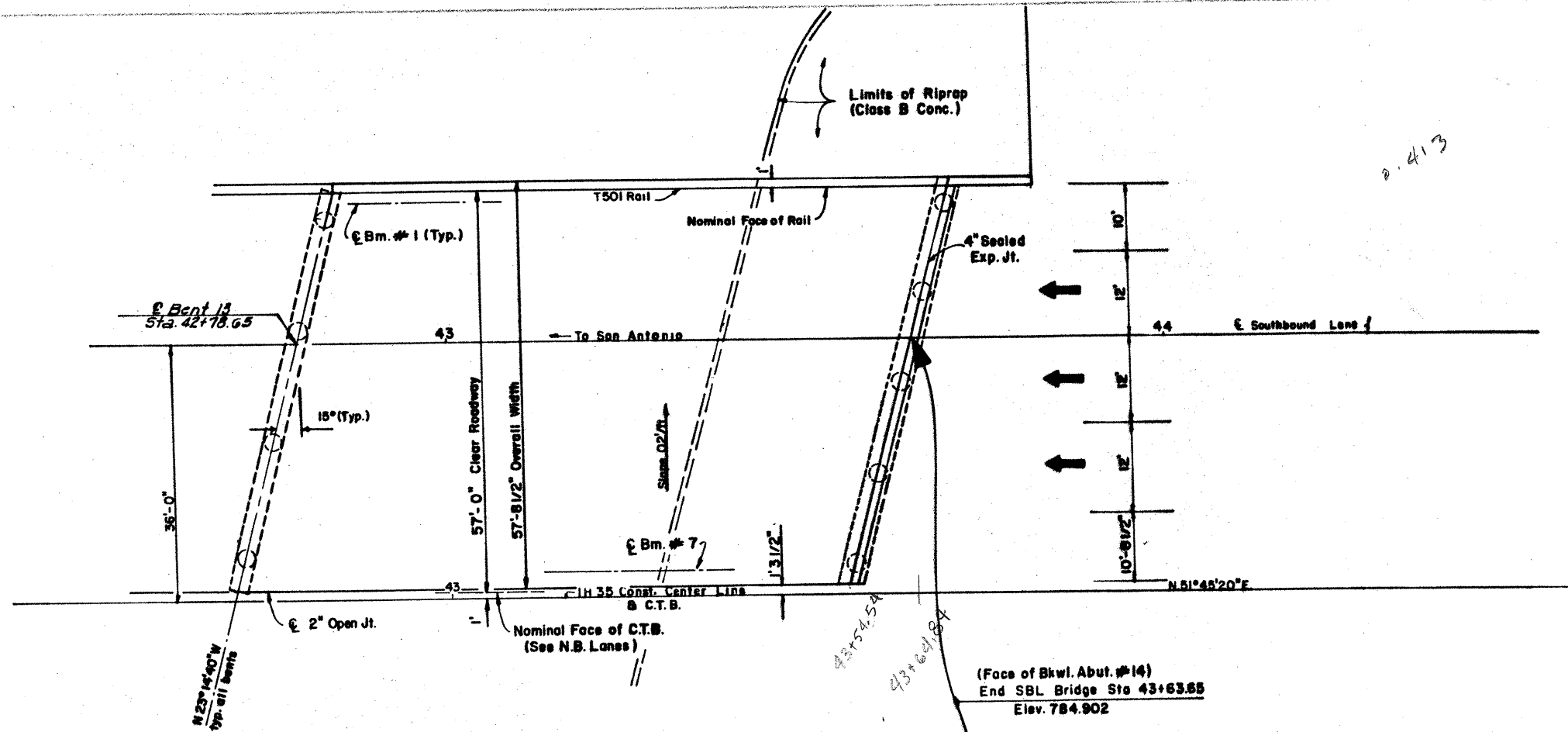
SCALE 1" = 10' Horiz. 1" = 10' Vert.

IR35-2(157)73 1A.85

EAH  
JMH 15 6 296 250

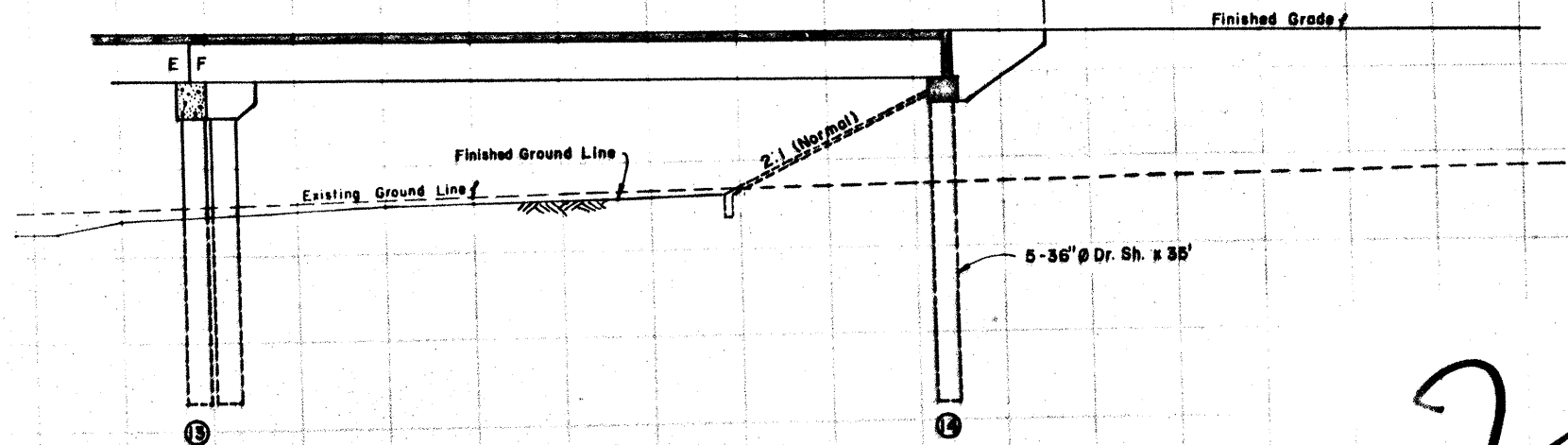






Bob L. Mason 2/26/87

Overall Length = 1495  
 210' Prestr. Conc. Bm. Unit - (125' - 85')  
 Pay Length Ty. T501 = 1507.00' (Left Side only)  
 End of Ty T501 for payment.



BRIDGE LAYOUT  
 CIBOLO CREEK BRIDGE  
 SOUTHBOUND LANES  
 SCALE 1" = 10' Horiz. & Vert.

IR35-2(157)173 IN 85

EAH  
 JMH 15 Guadalupe 10 6 295m 252

252

## SUMMARY OF ESTIMATED QUANTITIES

ITEM  DESCRIPTION	Drilled Shaft		Class C Concrete		Reinforced Concrete Slab	Prestressed Concrete Beam Type IV	Concrete Surface Treatment	Riprap (Conc.) (C.I.B)		Rolling	Concrete Traffic Barrier						Sealed Expansion Joint (4')
	36"	48"	Abut.	Bent													
	L.F.	L.F.	C.Y.	C.Y.													
2-Abutments	415		67.4					99.1		L.F.	L.F.						L.F.
12-Interior Bents	668	344		924.2						24.0							
1-205.00' Prestr. Conc. Bm. Unit					12343	1550.20	1286			205.0	205.0						59
1-357.00' Prestr. Conc. Bm. Unit					21494	2735.57	2239			357.0	357.0						59
1-357.00' Prestr. Conc. Bm. Unit					21495	2739.41	2239			357.0	357.0						59
1-366.00' Prestr. Conc. Bm. Unit					22035	2920.08	2296			366.0	366.0						59
1-210.00' Prestr. Conc. Bm. Unit					12644	1590.05	1317			210.0	210.0						118
Bridge Lighting Details																	
TOTAL	1083	344	67.4	924.2	90011	11535.31	9377	99.1		1519.0	1495.0						354

# BEARING SEAT ELEVATIONS

		BEAM 1	BEAM 2	BEAM 3	BEAM 4	BEAM 5	BEAM 6	BEAM 7	BEAM 8
BENT	1 (FWD)	773.0144	772.8020	772.5894	772.3770	772.1648	771.9521	771.7397	
BENT	2 (BK) (FWD)	774.2766 774.2563	774.0645 774.0742	773.8518 773.8923	773.6394 773.7102	773.4272 773.5281	773.2146 773.3462	773.0022 773.1641	772.9819
BENT	3 (BK) (FWD)	776.0479 776.0278	775.8660 775.8457	775.6838 775.6638	775.5017 775.4817	775.3198 775.2996	775.1377 775.1177	774.9556 774.9355	774.7734 774.7534
BENT	4 (BK) (FWD)	777.8787 777.9199	777.6980 777.7395	777.5173 777.5586	777.3364 777.3779	777.1555 777.1973	776.9746 777.0164	776.7935 776.8352	776.6123 776.6541
BENT	5 (BK) (FWD)	779.4961 779.4709	779.3208 779.2664	779.1453 779.0618	778.9697 778.8569	778.7939 778.6521	778.6182 778.4470	778.4424 778.2419	778.2664
BENT	6 (BK) (FWD)	780.6101 780.6858	780.4111 780.5154	780.2119 780.3447	780.0127 780.1741	779.8135 780.0034	779.6140 779.8325	779.4143 779.6616	779.4907
BENT	7 (BK) (FWD)	781.7170 781.6848	781.5518 781.4922	781.3865 781.2993	781.2212 781.1064	781.0557 780.9133	780.8901 780.7202	780.7244 780.5269	780.5586
BENT	8 (BK) (FWD)	782.2876 782.3357	782.1003 782.1753	781.9128 782.0146	781.7253 781.8540	781.5378 781.6934	781.3501 781.5325	781.1621 781.3716	781.2107
BENT	9 (BK) (FWD)	782.6782 782.6602	782.5232 782.5051	782.3679 782.3499	782.2124 782.1946	782.0571 782.0391	781.9014 781.8835	781.7458 781.7280	781.5907 781.5727
BENT	10 (BK) (FWD)	782.7659 782.7646	782.6160 782.6150	782.4658 782.4648	782.3157 782.3147	782.1655 782.1646	782.0151 782.0144	781.8647 781.8640	781.7144 781.7136
BENT	11 (BK) (FWD)	782.5171 782.5122	782.3723 782.3677	782.2275 782.2229	782.0828 782.0781	781.9377 781.9331	781.7927 781.7881	781.6475 781.6431	781.5027 781.4977
BENT	12 (BK) (FWD)	781.9111 781.9446	781.7717 781.8052	781.6321 781.6658	781.4924 781.5261	781.3528 781.3865	781.2129 781.2466	781.0730 781.1067	780.9337 780.9666
BENT	13 (BK) (FWD)	781.0481 781.0566	780.9138 780.9001	780.7798 780.7437	780.6455 780.5872	780.5110 780.4304	780.3767 780.2734	780.2422 780.1165	780.1077
BENT	14 (BK)	780.2646	780.1123	779.9600	779.8076	779.6550	779.5024	779.3496	

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HS 20 LOADING



STATE DEPARTMENT OF HIGHWAYS  
AND PUBLIC TRANSPORTATION

# ESTIMATED QUANTITIES AND HEARING SEAT ELEVATIONS

CIBOLO CREEK BRIDGE  
NORTHBOUND LANES

D4541 Z1 A21 135511615906TAR01.D5N		PREPARED BY AND FOR USE OF TEXAS SHEET	
DRAWING SHEET DATE: SEPTEMBER, 1988		TERRAIN AND PROJECT	
REVISIONS		SHEET	
DR. P. C. W.	15	6	IR35-2101173 253
DR. J. R.			
DR. C. B.			
QUANTITY		CONTROLS, SECTION AND HIGHWAY	
GRAVEL, ETC.		16	6 2321H 35

SUMMARY OF ESTIMATED QUANTITIES


ITEM DESCRIPTION	Drilled Shaft		Class C Concrete		Reinforced Concrete Slab	Prestressed Concrete Beam Type IV	Concrete Surface Treatment	Riprap (Conc.) (C.I.B)		Railing		Sealed Expansion Joint (4')				
	36" #	48" #	Abut.	Bent												
	L.F.	L.F.	C.Y.	C.Y.						Type T501 L.F.		L.F.				
2-Abutments	415		62.1					61.0		12.0						
12-Interior Bents	656	380		914.9												
1-205.00' Prestr. Conc. Bm. Unit					11813	1550.20	1286			205.0		59				
1-357.00' Prestr. Conc. Bm. Unit					20572	2735.57	2239			357.0		59				
1-357.00' Prestr. Conc. Bm. Unit					20571	2739.41	2239			357.0		59				
1-366.00' Prestr. Conc. Bm. Unit					21090	2920.08	2296			366.0		59				
1-210.00' Prestr. Conc. Bm. Unit					12101	1590.05	1317			210.0		118				
Bridge Lighting Details																
TOTAL	1071	380	62.1	914.9	86147	11535.31	9377	61.0		1507.0		354				

BEARING SEAT ELEVATIONS

		BEAM 1	BEAM 2	BEAM 3	BEAM 4	BEAM 5	BEAM 6	BEAM 7	BEAM 8
BENT 1 (FWD)		772.1934	772.3342	772.4751	772.6160	772.7568	772.8979	773.0388	
BENT 2 (BK)		773.4558	773.5967	773.7375	773.8784	774.0193	774.1604	774.3013	
BENT 2 (FWD)		773.4355	773.5562	773.6770	773.7976	773.9185	774.0393	774.1599	774.2810
BENT 3 (BK)		775.2271	775.3477	775.4685	775.5894	775.7102	775.8308	775.9517	776.0725
BENT 3 (FWD)		775.2070	775.3276	775.4485	775.5691	775.6899	775.8108	775.9314	776.0525
BENT 4 (BK)		777.0435	777.1663	777.2891	777.4119	777.5344	777.6570	777.7795	777.9019
BENT 4 (FWD)		777.0842	777.2073	777.3301	777.4529	777.5754	777.6982	777.8206	777.9431
BENT 5 (BK)		778.6199	778.7480	778.8762	779.0042	779.1321	779.2598	779.3875	779.5151
BENT 5 (FWD)		778.5945	778.7439	778.8933	779.0427	779.1919	779.3411	779.4900	
BENT 6 (BK)		779.6960	779.8511	780.0063	780.1611	780.3159	780.4707	780.6252	
BENT 6 (FWD)		779.7715	779.9045	780.0374	780.1702	780.3030	780.4358	780.5684	780.7009
BENT 7 (BK)		780.7615	780.8997	781.0381	781.1760	781.3142	781.4521	781.5901	781.7278
BENT 7 (FWD)		780.7288	780.8901	781.0515	781.2129	781.3738	781.5349	781.6958	
BENT 8 (BK)		781.2957	781.4624	781.6292	781.7957	781.9622	782.1287	782.2949	
BENT 8 (FWD)		781.3433	781.4863	781.6292	781.7722	781.9150	782.0576	782.2002	782.3428
BENT 9 (BK)		781.6448	781.7930	781.9414	782.0896	782.2375	782.3855	782.5334	782.6814
BENT 9 (FWD)		781.6262	781.7744	781.9229	782.0710	782.2192	782.3672	782.5151	782.6631
BENT 10 (BK)		781.6914	781.8450	781.9985	782.1519	782.3052	782.4585	782.6116	782.7646
BENT 10 (FWD)		781.6899	781.8435	781.9971	782.1504	782.3040	782.4573	782.6104	782.7634
BENT 11 (BK)		781.4016	781.5605	781.7192	781.8779	782.0364	782.1951	782.3533	782.5117
BENT 11 (FWD)		781.3965	781.5554	781.7141	781.8728	782.0315	782.1899	782.3486	782.5068
BENT 12 (BK)		780.7551	780.9192	781.0830	781.2471	781.4106	781.5745	781.7380	781.9016
BENT 12 (FWD)		780.7878	780.9519	781.1160	781.2800	781.4438	781.6077	781.7715	781.9348
BENT 13 (BK)		779.8499	780.0193	780.1887	780.3579	780.5271	780.6963	780.8652	781.0342
BENT 13 (FWD)		779.8579	780.0557	780.2534	780.4509	780.6482	780.8455	781.0427	
BENT 14 (BK)		779.0381	779.2400	779.4419	779.6433	779.8450	780.0464	780.2478	

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HS 20 LOADING



STATE DEPARTMENT OF HIGHWAYS  
AND PUBLIC TRANSPORTATION

ESTIMATED QUANTITIES  
AND  
BEARING SEAT ELEVATIONS

CIBOLO CREEK BRIDGE  
SOUTHBOUND LANES

045121A21355116139051AB01.DGN

DATE: 09/01/88

BY: CLEW

CHK: JKH

APP: JKH

SEPTEMBER, 1988

REVISIONS

15

6

IR35-2(157) 173

254

PREPARED BY AND FOR USE OF TEXAS SDHP

FILE NO. AND PROJECT

16

6

254

1H 35

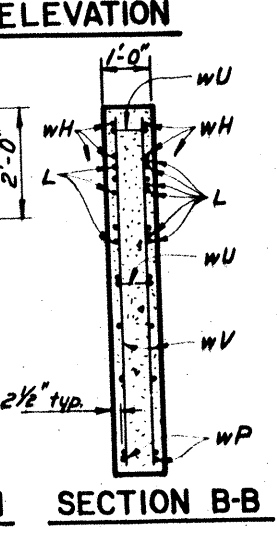
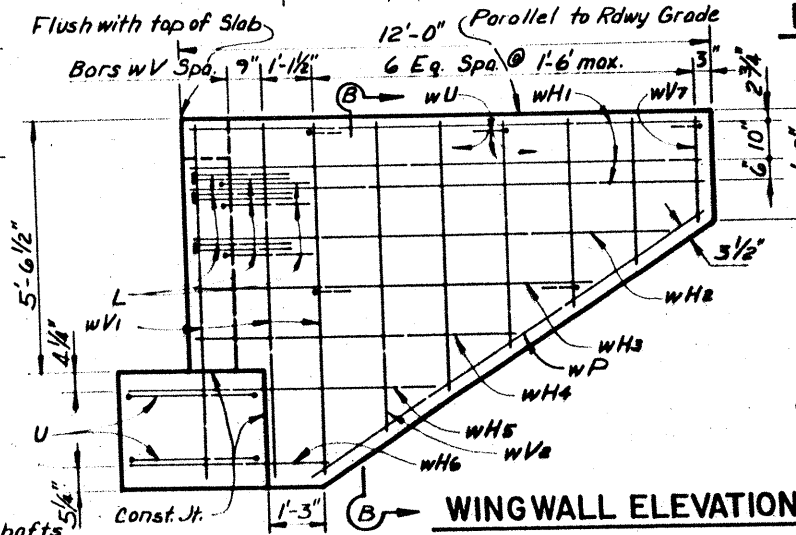
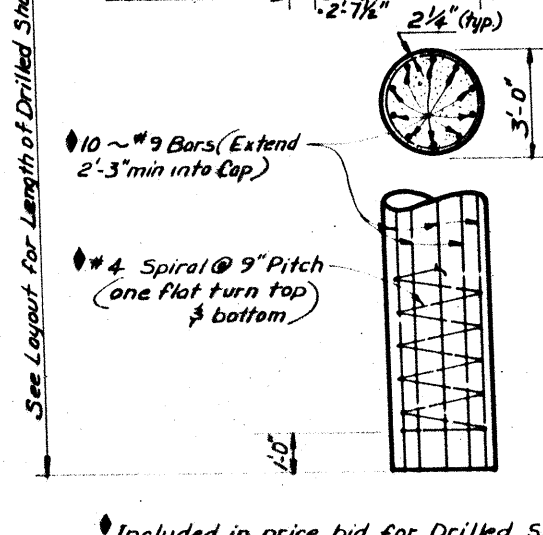
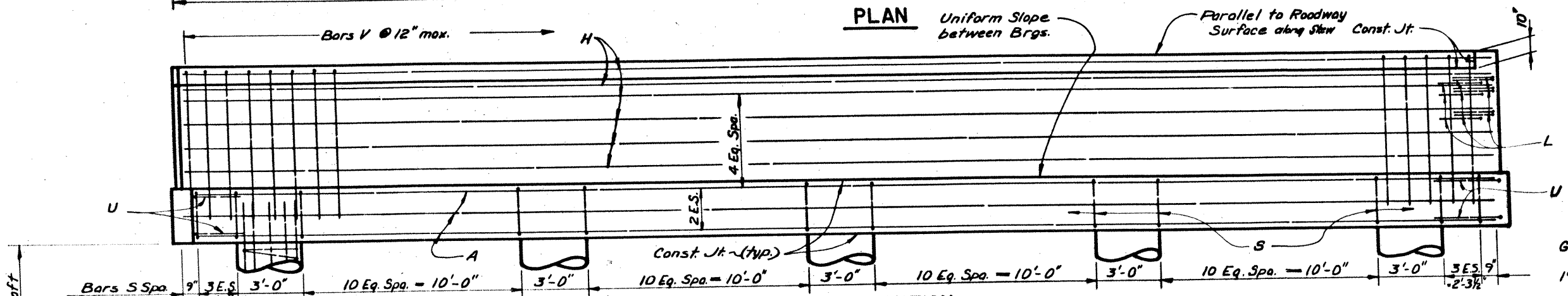
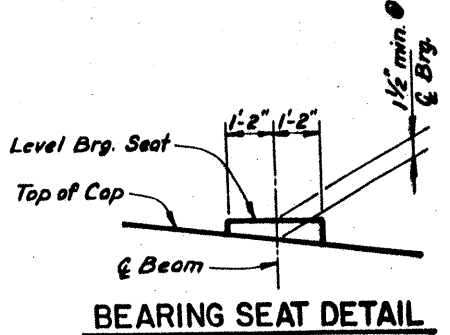
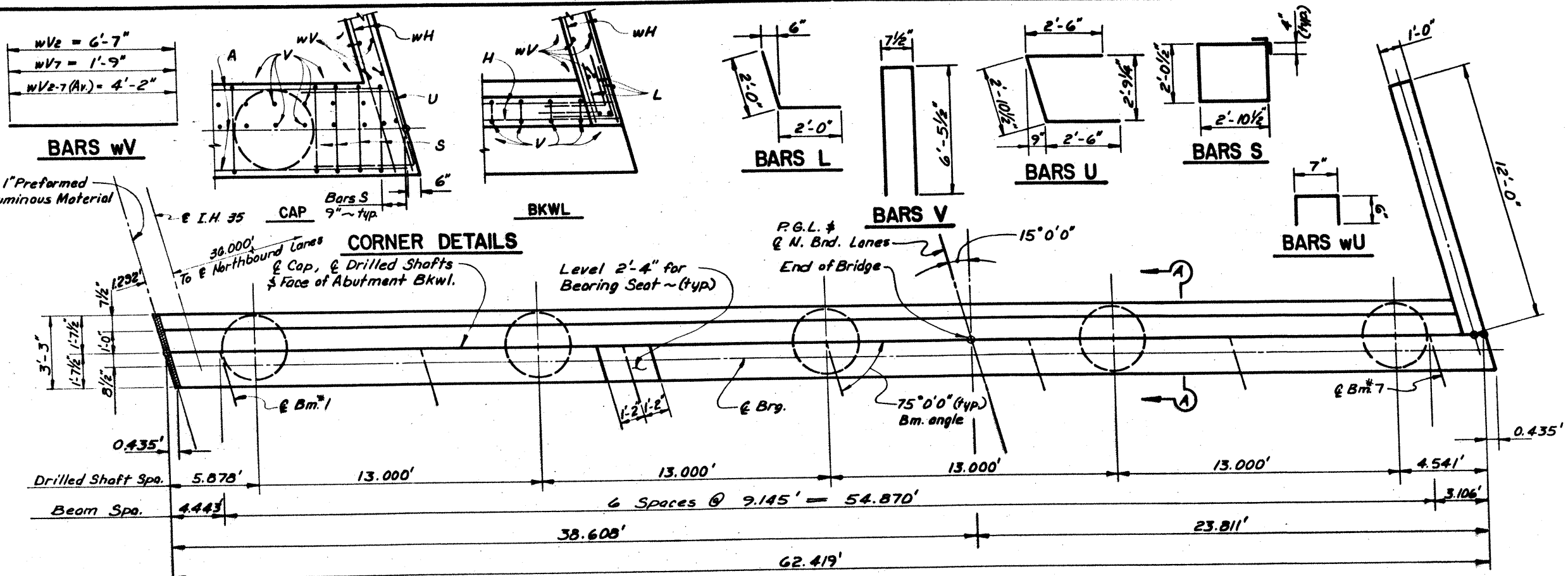




TABLE OF ESTIMATED QUANTITIES

Bar	No.	Size	Length	Weight
A	6	#11	68'-5"	2181
H	12	#5	63'-1"	790
L	9	#6	4'-0"	54
S	52	#4	10'-6"	365
U	4	#6	7'-11"	48
V	62	#5	13'-7"	878
WH1	6	#6	11'-8"	105
WH2	2	#6	10'-3"	31
WH3	2	#6	8'-8"	26
WH4	2	#6	7'-0"	21
WH5	2	#6	7'-0"	21
WH6	2	#6	4'-5"	13
WV1	6	#5	7'-8"	48
WV2-7 (AV)	12	#5	4'-2"	52
WU	5	#4	1'-7"	5
WP	2	#6	11'-0"	33
Reinforcing Steel + LB				4671
Class "C" Concrete			C.Y.	33.6

+ For contractors information only  
 \*Includes 1 ~ 6'-8" min. lap  
 ■Includes 1 ~ 1'-0" min. lap



GENERAL NOTES:  
 Designed in accordance with A.A.S.H.T.O.  
 1983 Standard & Interim Specifications  
 Calculated Drilled Shaft Load = 33 T/sh.

HS 20 LOADING  
 STATE DEPARTMENT OF HIGHWAYS  
 AND PUBLIC TRANSPORTATION

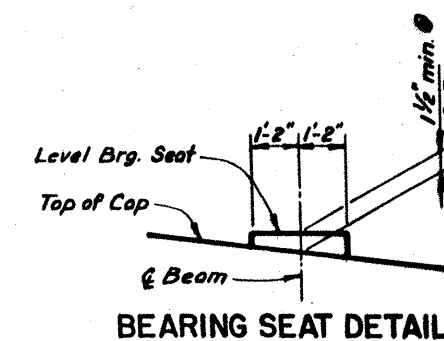
ABUTMENT  
 NO. 14  
 CIBOLO CREEK BRIDGE  
 NORTHBOUND LANES

DATE	AUGUST, 1980	STATE	TEXAS	FEDERAL PROJECT	15 G TR35-2(157) 173	SHEET	256
BY	CEW	DESIGNED	PLR	CONTRACT	GUADALUPE, ETC. DDIG 06	INCHES	256 1/4-35
CHECKED	AFM	APPROVED	JMH				

TABLE OF ESTIMATED QUANTITIES

Bar	No.	Size	Length	Weight
A	6	#11	57'-10"	1844
H	12	#5	57'-10"	724
S	48	#4	10'-6"	337
U	4	#6	7'-11"	48
V	59	#5	13'-7"	836
Reinforcing Steel +				LB 3789
Class "C" Concrete				C.Y. 29.6

+ For contractors information only



BEARING SEAT DETAIL

GENERAL NOTES:  
Designed in accordance with A.A.S.H.T.O.  
1983 Standard & Interim Specifications  
Calculated Drilled Shaft Load = 32 T/Sha.

HS 20 LOADING

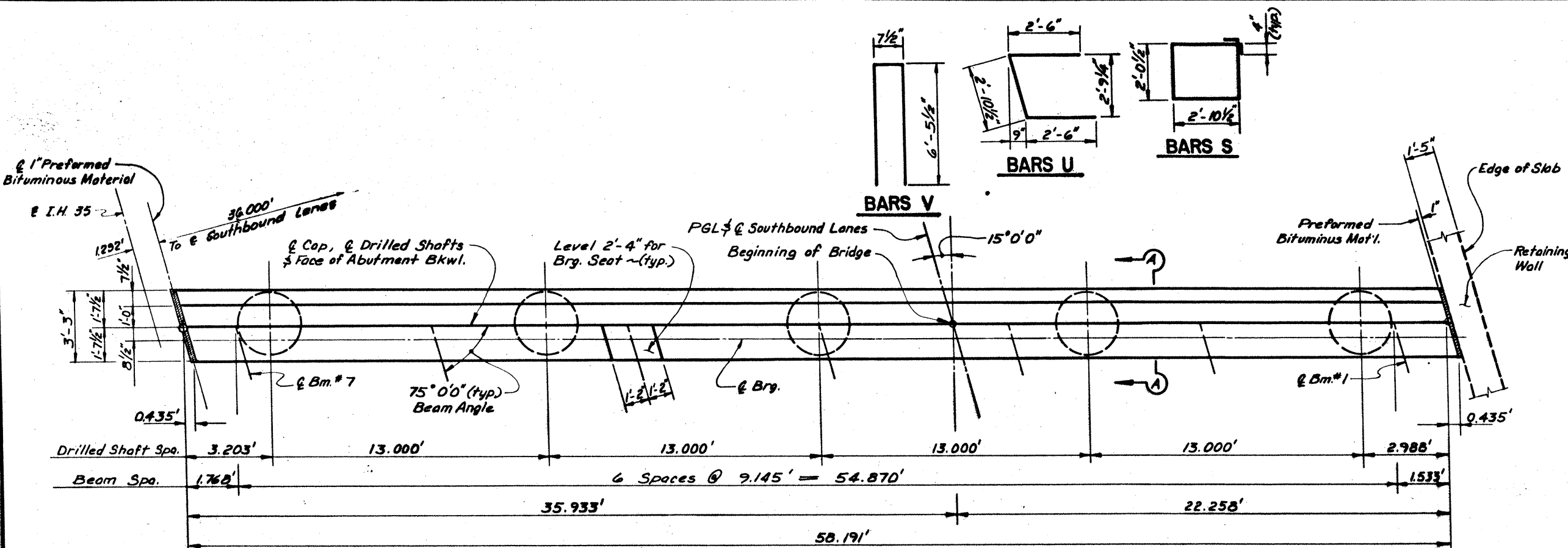


STATE DEPARTMENT OF HIGHWAYS  
AND PUBLIC TRANSPORTATION

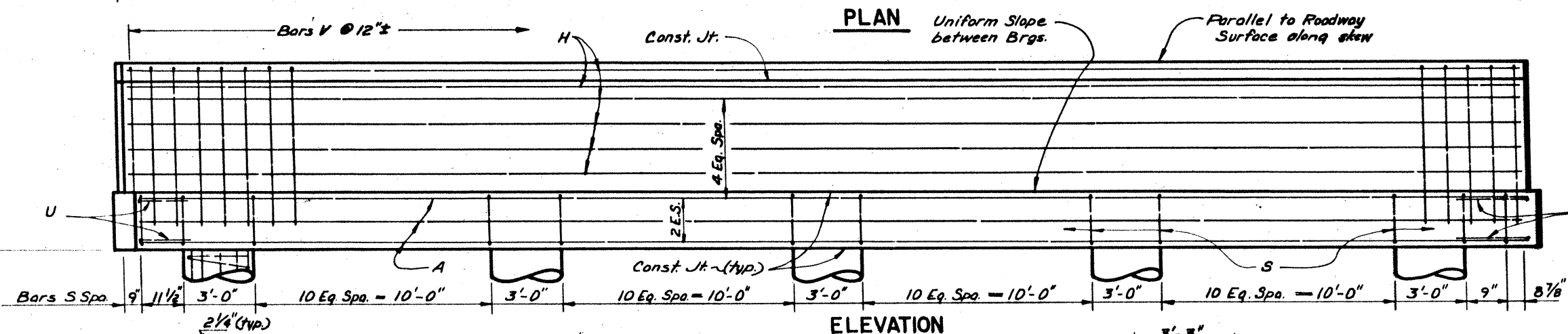
# ABUTMENT NO. 1

CIBOLO CREEK BRIDGE  
SOUTHBOUND LANES

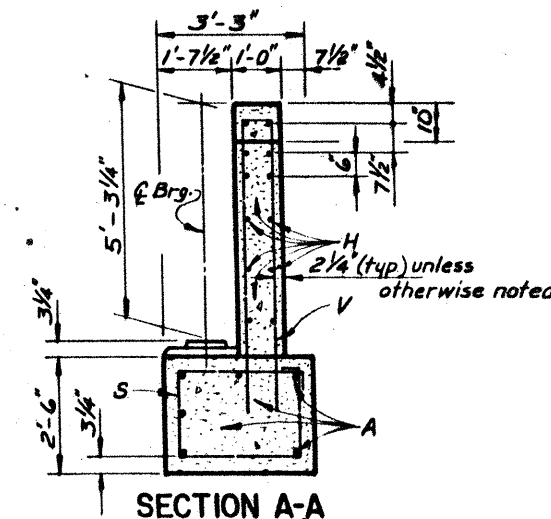
DESIGNED BY	DATE	PROJECT NO.	SHEET NO.
CEW	AUGUST, 1988	15 G 1R35-2(157)173	251
PLR			
AFM			
PLR			



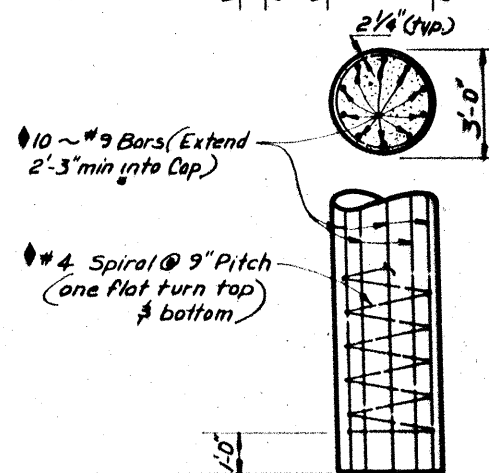
PLAN



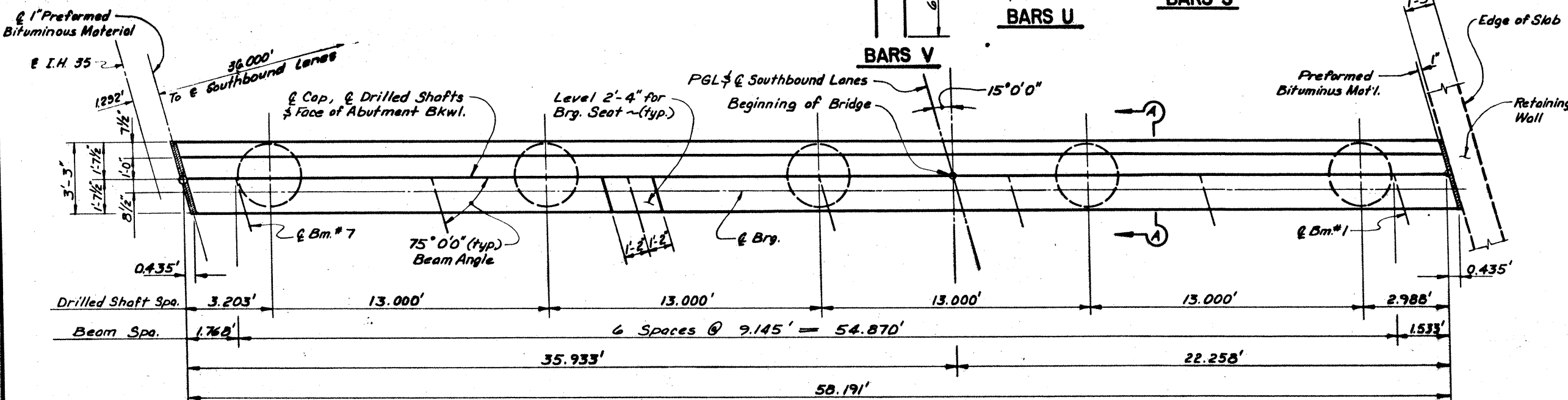
ELEVATION



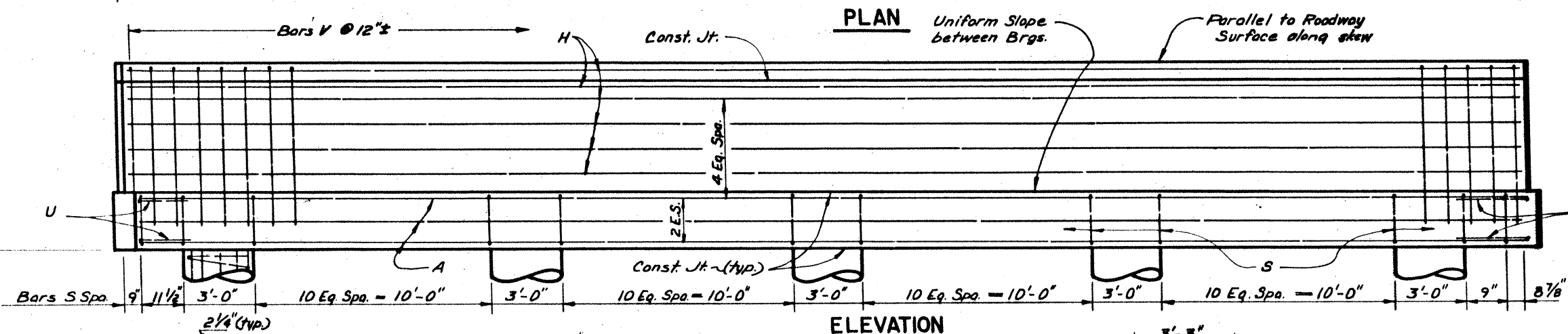
SECTION A-A



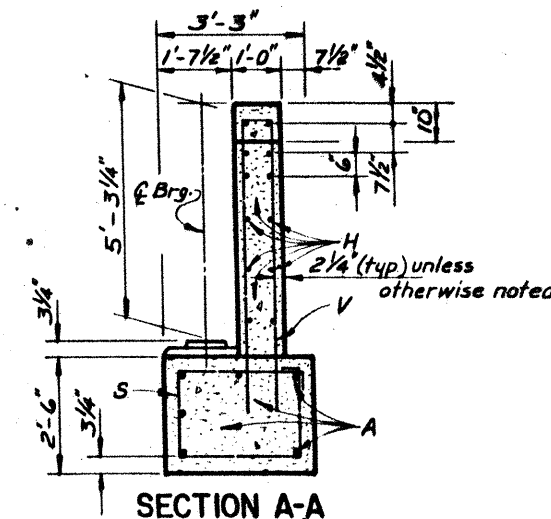
Included in price bid for Drilled Shaft



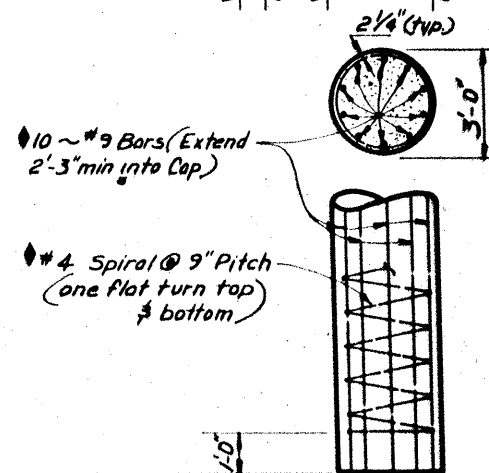
PLAN



ELEVATION



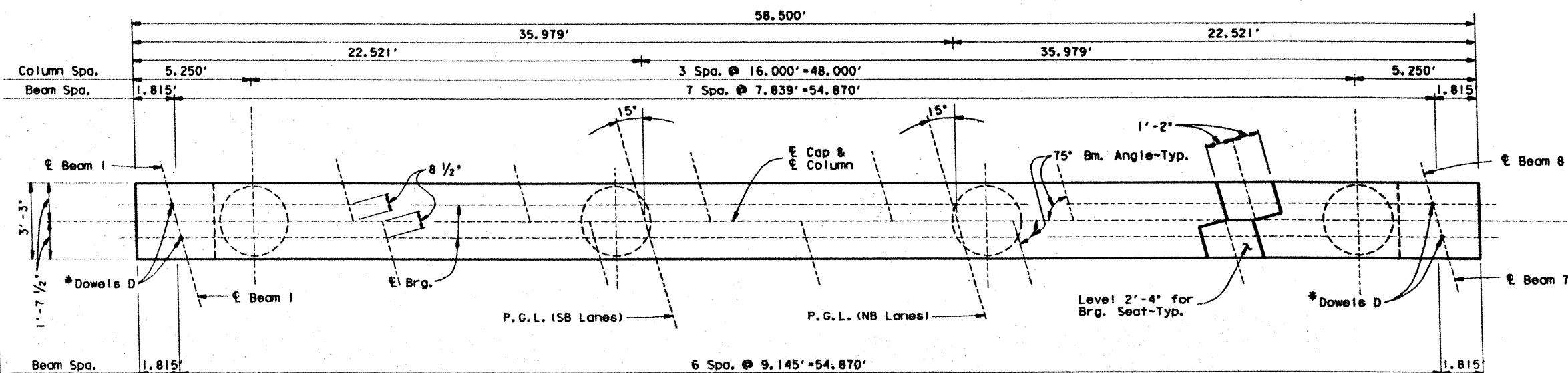
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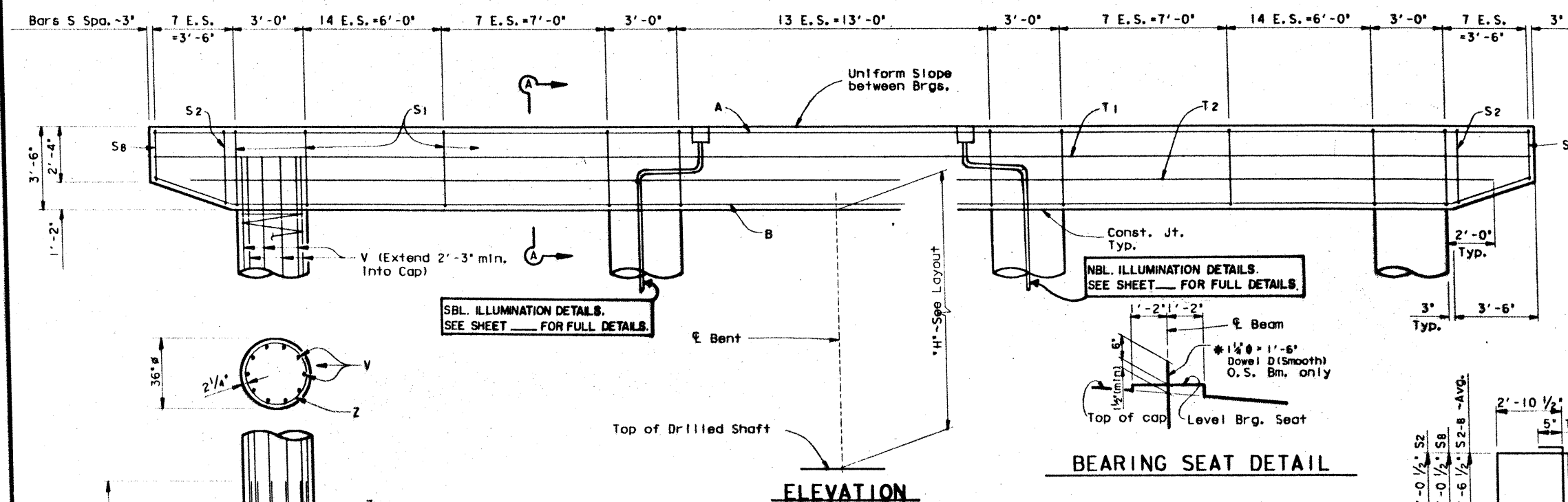
Included in price bid for Drilled Shaft



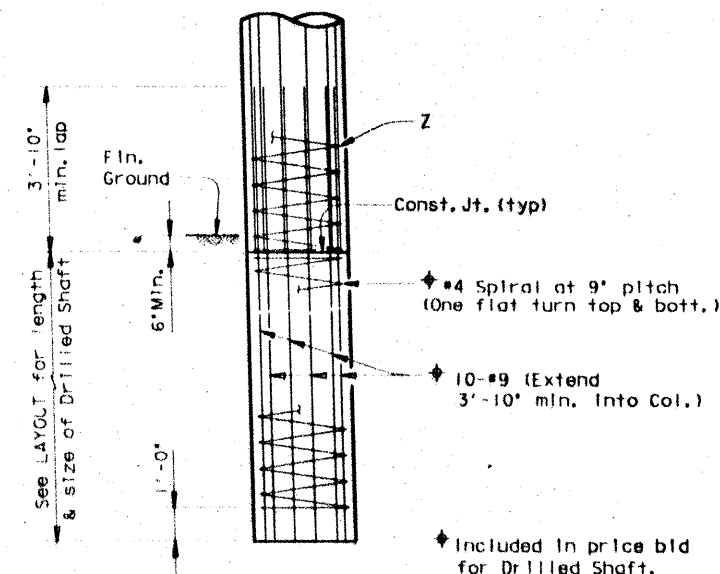




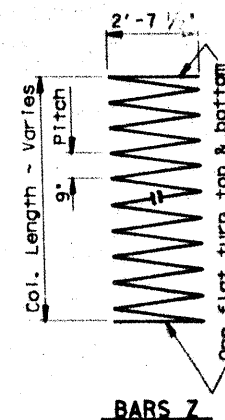
**PLAN**  
(Bent No. 2 shown)



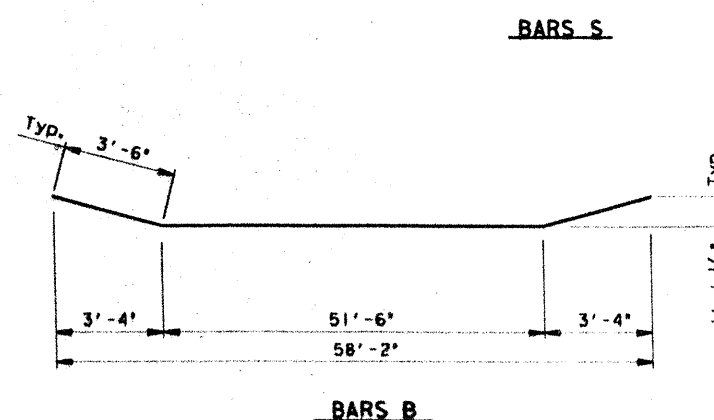
BEARING SEAT DETAIL



**SECTION A-A**



BARS 2



**BARS B**

† TABLE OF  
CONSTANT QUANTITIES

BAR	NO	SIZE	LENGTH	WEIGHT
A	5	#11	58'- 2"	1545
B	4	#11	58'- 6"	1243
D	4	1 1/4"	1'- 6"	25
S1	60	# 5	12'-10"	803
S2-8	14	# 5	11'- 8" Av	170
T1	2	# 5	58'- 2"	121
T2	2	# 5	55'- 0"	115

Reinforcing Steel	#	LB	4022
Class C Conc.		CY	24.4

TABLE OF VARIABLE QUANTITIES						TOTAL EST. QUANTITIES	
H	CL. 'C' CONC.	BARS V 40 ~ * 9		BARS Z 4 ~ * 4		REINF. STEEL #	CL. 'C' CONC.
FT.	C. Y.	LGTH.	WT.	LGTH.	WT.	LB.	C. Y.
9	9.4	11'-3"	1530	116'	310	5862	33.8
10	10.5	12'-3"	1666	127'	339	6027	34.9
11	11.5	13'-3"	1802	138'	369	6193	35.9
12	12.6	14'-3"	1938	149'	398	6358	37.0
13	13.6	15'-3"	2074	160'	428	6524	38.0
14	14.7	16'-3"	2210	171'	457	6689	39.1
15	15.7	17'-3"	2346	182'	486	6854	40.1
16	16.8	18'-3"	2482	193'	516	7020	41.2
17	17.8	19'-3"	2618	204'	545	7185	42.2
18	18.8	20'-3"	2754	215'	574	7350	43.2
19	19.9	21'-3"	2890	226'	604	7516	44.3

\* For contractor's information only.  
† Quantities shown are for one bent only.

**GENERAL NOTES:**

Designed according to A.A.S.H.T.O. 1983 Standard  
and current Interim Specifications.

Calculated Foundation Load:

225 <sup>Tons</sup>/Drilled Shaft (Bent Nos. 2 & 13 NB Lanes)

215 <sup>Tons</sup>/Drilled Shaft (Bent Nos. 2 & 13 SB Lanes)

All cap steel shall be Grade 60.

HS 20 LOADING



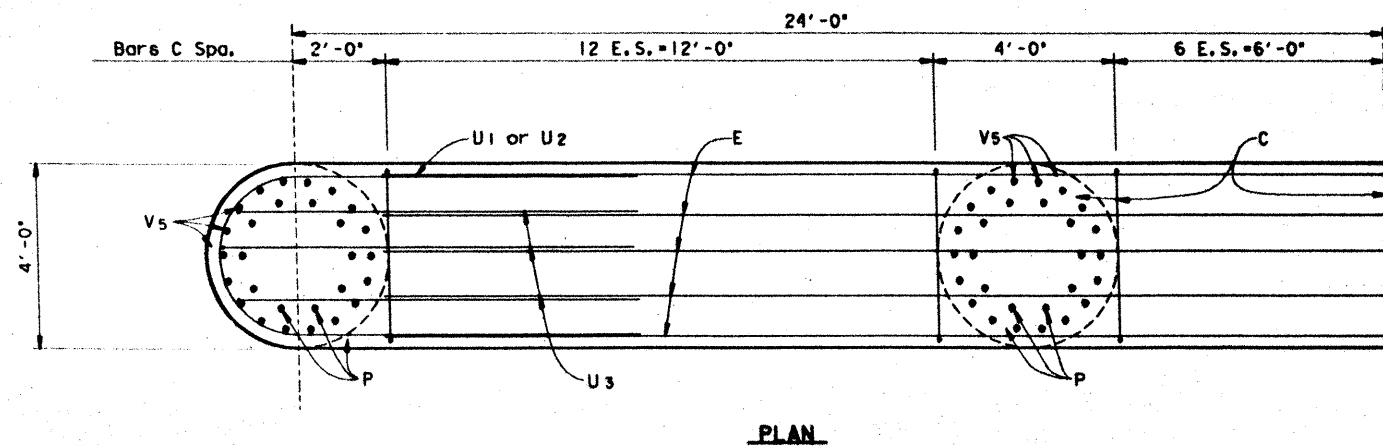
INTERIOR BENT  
NO. 2 OR 13

CIBOLO CREEK BRIDGE  
NORTHBOUND & SOUTHBOUND LANES

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APR 21 1988		CLASS. PAGE NO.	FILE NO. AND PROJECT
REVISIONS		15	6
DATE	BY	IR35-2(157)173 260	
DATE	BY	ISSUE	CONTROL SECTION
DATE	BY	16	6 296
DATE	BY	CIVILIAN, ETC.	

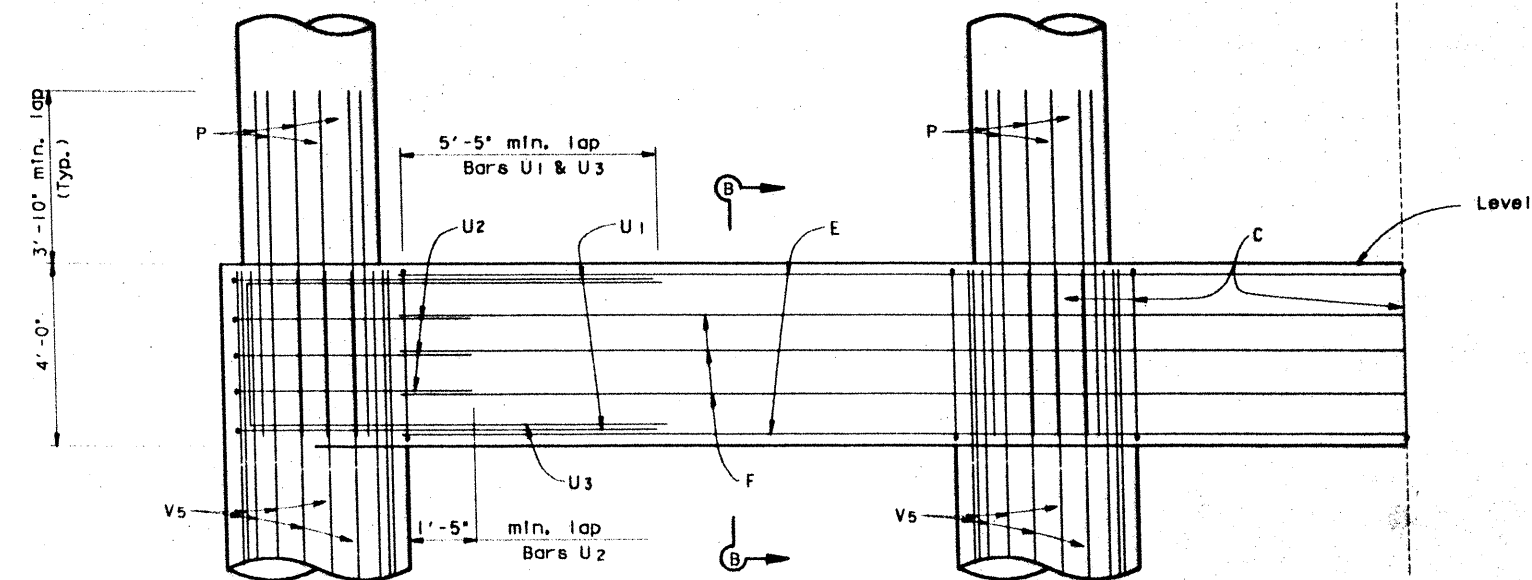






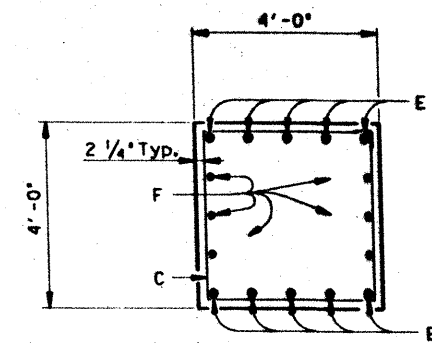
PLAN

Reinforcing symmetrical about C Bent

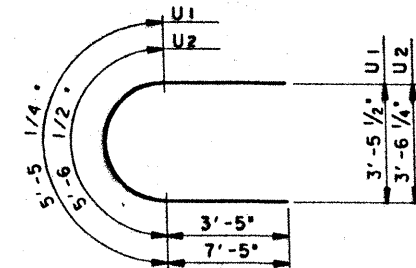


ELEVATION

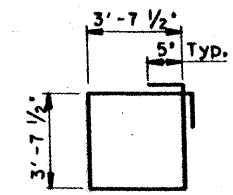
TIE BEAM DETAILS



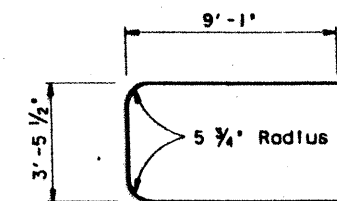
SECTION B-B



BARS U1 or U2



BARS C



BARS U3

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GENERAL NOTES:  
 Designed according to A.A.S.H.T.O. 1983 Standard  
 and current Interim Specifications.  
 Calculated Foundation Load:  
 286 Tons/Drilled Shaft (Bent Nos. 6-8 SB Lanes)  
 273 Tons/Drilled Shaft (Bent Nos. 5 SB Lanes)  
 291 Tons/Drilled Shaft (Bent Nos. 5 & 6 NB Lanes)  
 297 Tons/Drilled Shaft (Bent Nos. 7 & 8 NB Lanes)  
 All cap steel shall be Grade 60.  
 HS 20 LOADING Sheet 2 of 2



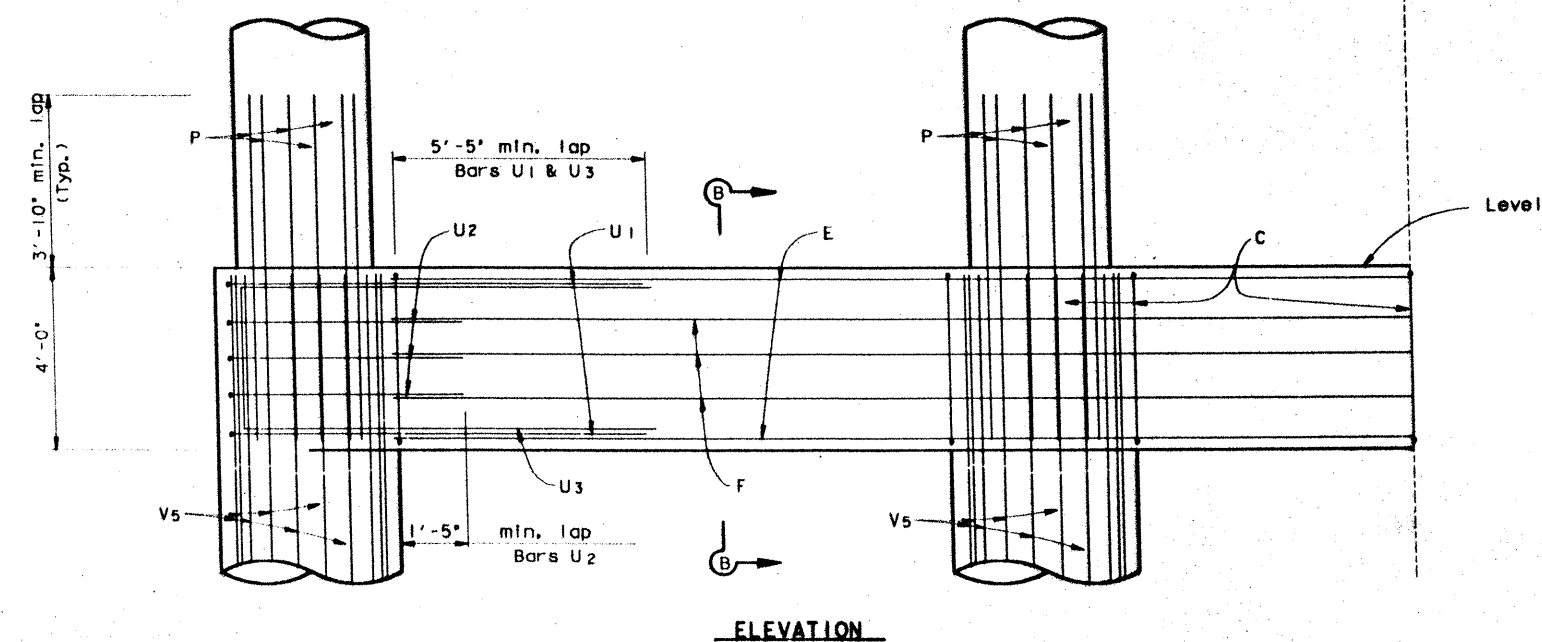
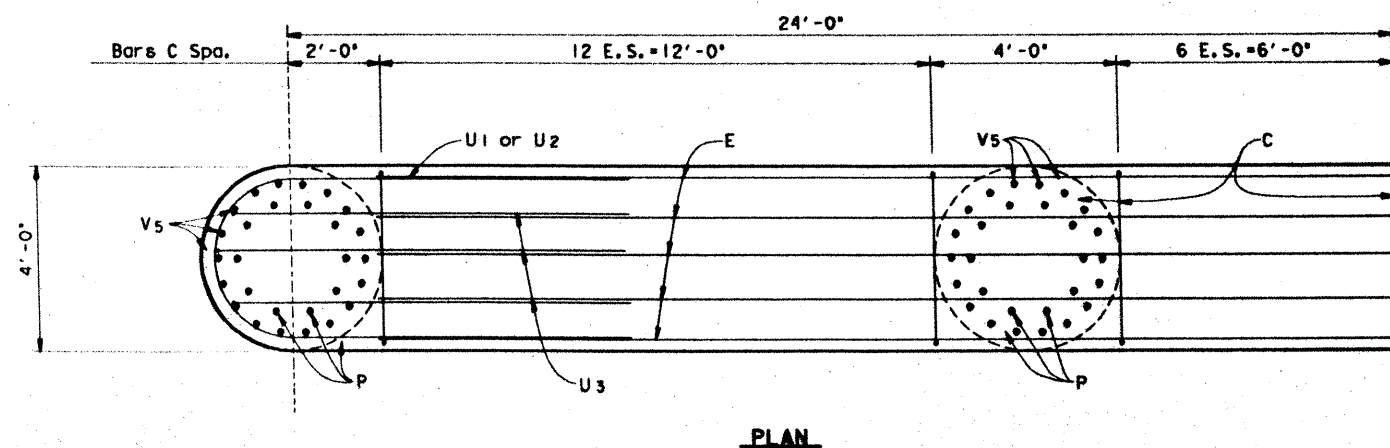
STATE DEPARTMENT OF HIGHWAYS  
 AND PUBLIC TRANSPORTATION  
**INTERIOR BENT  
 NOS. 5-8**

CIBOLO CREEK BRIDGE  
 NORTHBOUND & SOUTHBOUND LANES

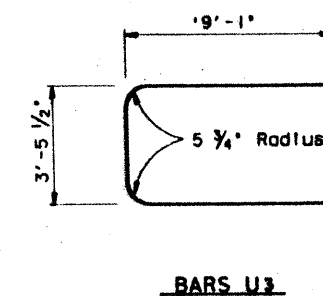
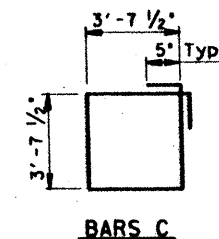
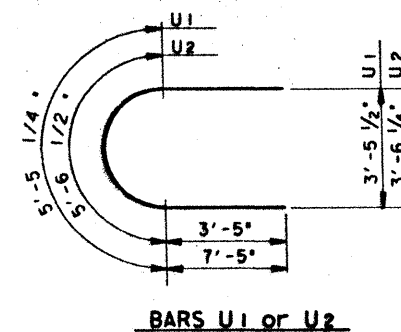
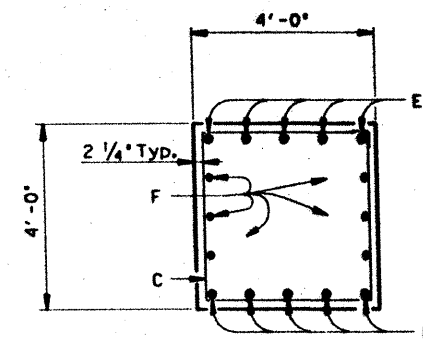
DESIGNED BY: A2135510313906-INT04.DGN	DATE: SEPTEMBER 1988	SCALE: 1/4" = 1'-0"	PROJECT: 1R35-2(152)/73	SHEET: 168
CHECKED BY: PIR	APPROVED BY: NHJ	DATE: 10/1/88	PROJECT: 1R35-2(152)/73	SHEET: 168
CIBOLO CREEK BRIDGE		DATE: 10/1/88	PROJECT: 1R35-2(152)/73	SHEET: 168







**TIE BEAM DETAILS**



GENERAL NOTES:  
 Designed according to A.A.S.H.T.O. 1983 Standard  
 and current Interim Specifications.  
 Calculated Foundation Load:  
 297 Tons/Drilled Shaft (NB)  
 281 Tons/Drilled Shaft (SB)  
 All cap steel shall be Grade 60.

HS 20 LOADING Sheet 2 of 2

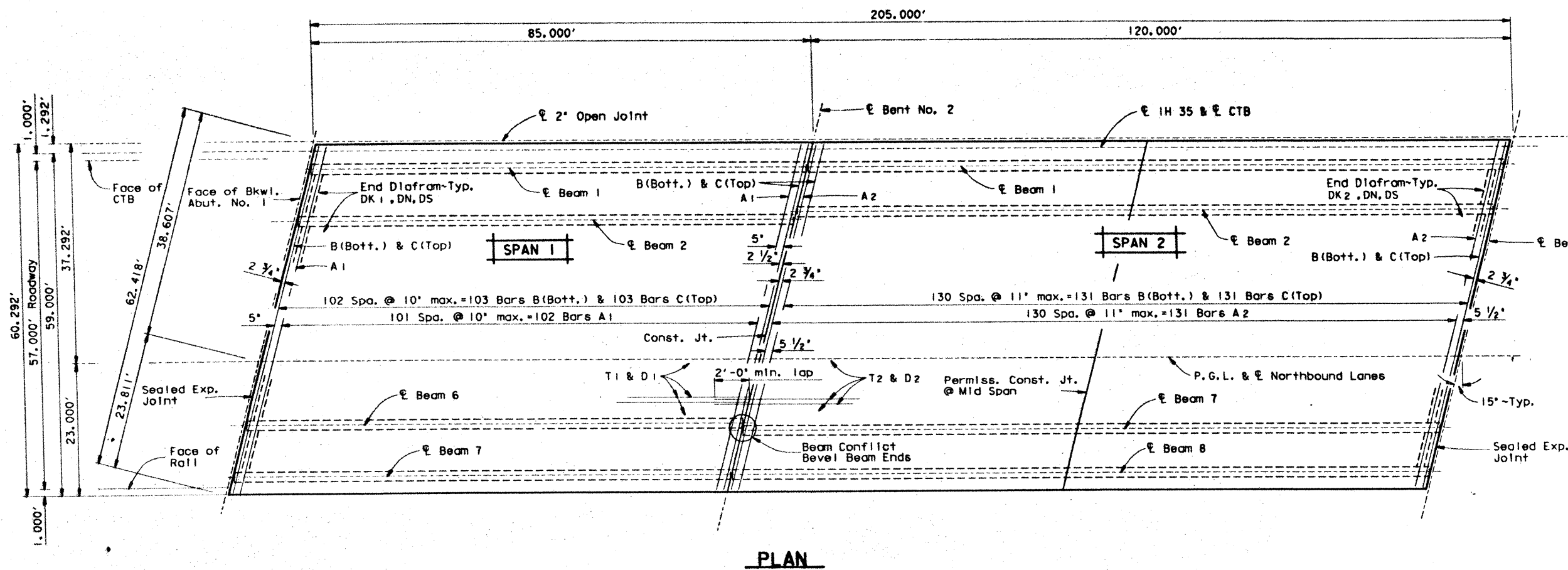


STATE DEPARTMENT OF HIGHWAYS  
 AND PUBLIC TRANSPORTATION  
**INTERIOR BENT  
 NO. 9**

CIBOLO CREEK BRIDGE  
 NORTHBOUND & SOUTHBOUND LANES

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DATE: SEPTEMBER 1988	REVISIONS:
BY: C.E.H.	15
CHK: P.L.R.	16
APP: M.H.	17
18	19

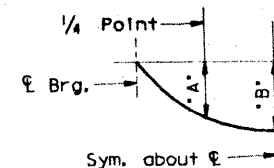




PLAN

Span No.	Beam No.	Horiz. Dist. $\ell$ - $\ell$ Bent	# Beam Length
1	All	85.000'	84.68'
2	All	120.000'	119.68'

# Beam lengths shown are bottom flange lengths with adjustment made for beam slope.



Span No.	Beam No.	*A*	*B*
1	All	0.043'	0.060'
2	All	0.139'	0.195'

DEAD LOAD DEFLECTION DIAGRAM

Deflections shown are due to cast-in-place concrete only ( $E=5 \times 10^6$  p.s.i.)

TABLE OF ESTIMATED QUANTITIES

BAR	NO	SIZE	LENGTH	WEIGHT
A 1	102	#5	* 65'-2"	6933
A 2	131	#5	* 65'-1"	8892
B	234	#4	* 63'-3"	9887
C	234	#5	* 63'-6"	15498
D 1	61	#5	* 86'-3"	5487
D 2	63	#5	* 124'-8"	8192
T 1	57	#4	* 86'-0"	3275
T 2	65	#4	* 124'-2"	5391
DK 1	24	#5	7'-1"	177
DK 2	28	#5	5'-9"	168
DN	2	#8	55'-11"	299
DS	90	#4	5'-4"	320

Reinforcing Steel	#	LB	64519
Prestr. Conc. Bms. (Ty. IV)	LF	1550.20	

Span No.	Reinf. Conc. Slab ~ S.F.	Class S Conc. ~ C.Y. #	Diaf.	Slab
1	5118	2.1	123.9	
2	7225	2.1	165.8	
Total	12343		293.9	

\* For contractor's information only.  
 \* Includes 1'-1'-2" min. lap.  
 \* Includes 1'-1'-5" min. lap.  
 \* Includes 2'-1'-2" min. laps.  
 \* Includes 2'-1'-5" min. laps.

GENERAL NOTES:

Designed in accordance with A.A.S.H.T.O., 1983 Standard and Interim Specifications.  
 Design  $f_c=1200$  p.s.i.

HS 20 LOADING Sheet 1 of 2

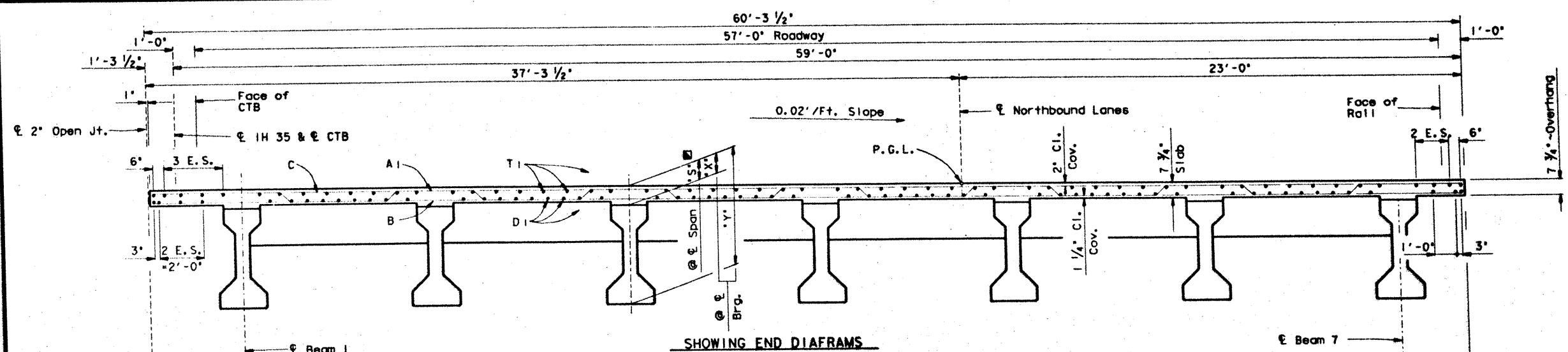
STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION  
**205.00' PRESTR. CONC. BEAM UNIT**  
 (SPANS 1 & 2)

CIBOLO CREEK BRIDGE  
 NORTHBOUND LANES

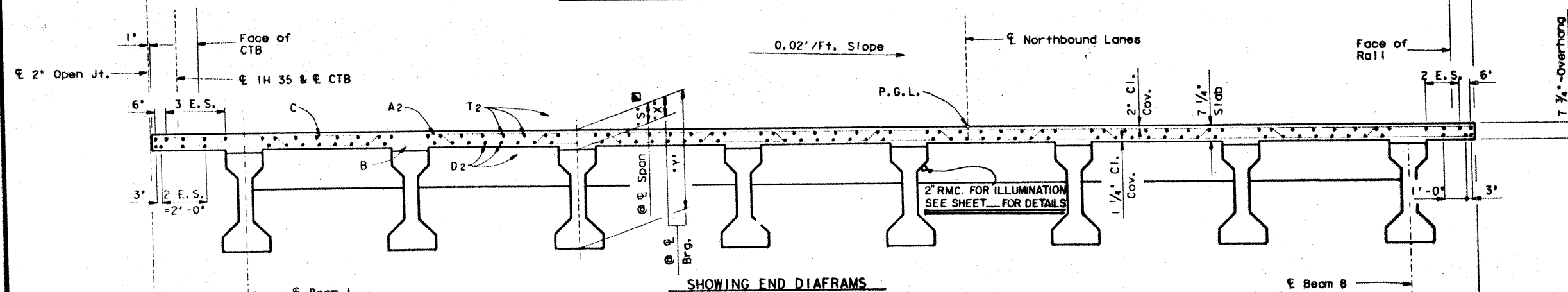
0451-21-A21(355103)3906P1001.DGN	PREPARED BY AND FOR USE OF TEXAS HIGHWAY DEPARTMENT
AUGUST, 1988	DATE
IR35-2(157)73 245	PROJECT
COUNTY	SECTION
DATE	BY

265





TYPICAL TRANSVERSE SECTION-SPAN 1



TYPICAL TRANSVERSE SECTION-SPAN 2

Span No.	Beam No.	*X* @ E Brg.	*Y* @ E Brg.	*S* @ E Span
1	All	9 1/4"	5'-3 1/4"	8 1/8"
2	All	9 1/2"	5'-3 1/2"	7 1/2"

\*Theoretical value, for information only.

HS 20 LOADING Sheet 2 of 2



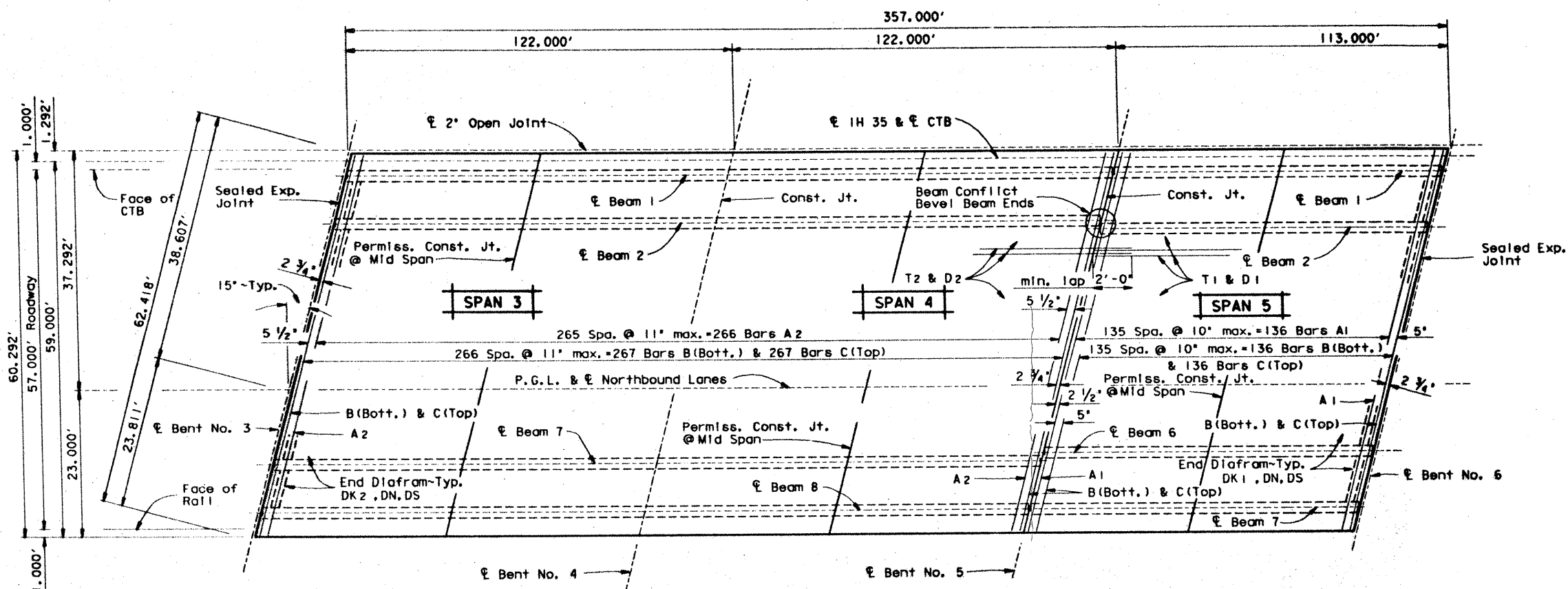
STATE DEPARTMENT OF HIGHWAYS  
AND PUBLIC TRANSPORTATION  
205.00' PRESTR. CONC.  
BEAM UNIT  
(SPANS 1 & 2)

CIBOLO CREEK BRIDGE  
NORTHBOUND LANES

D451121A2135510313906PPB04.DGN PREPARED BY AND FOR USE OF TEXAS SH&PT  
DATE: AUGUST, 1988  
DRAWN: JLB  
CHECKED: JLB  
APPROVED: JLB  
PROJECT: IR35-2(157)173  
SHEET: 246  
DATE: 10/1/88  
BY: JLB  
FOR: CIBOLO CREEK BRIDGE, ETC.

*266*

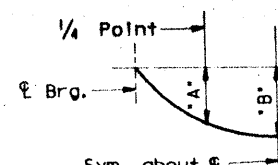




**PLAN**

Span No.	Beam No.	Horiz. Dist. $\ell$ - $\ell$ Bent	# Beam Length
3 & 4	All	122,000'	121.68'
5	All	113,000'	112.67'

# Beam lengths shown are bottom flange lengths with adjustment made for beam slope.



**DEAD LOAD DEFLECTION DIAGRAM**

Deflections shown are due to cast-in-place concrete only ( $E=5 \times 10^6$  p.s.i.)

Span No.	Beam No.	*A*	*B*
3 & 4	All	0.149'	0.209'
5	All	0.136'	0.191'

**TABLE OF ESTIMATED QUANTITIES**

BAR	NO	SIZE	LENGTH	WEIGHT
A1	136	#5	* 65'-2"	9244
A2	266	#5	* 65'-1"	18056
B	403	#4	* 63'-3"	17027
C	403	#5	* 63'-6"	26691
D1	61	#5	* 114'-3"	7269
D2	63	#5	* 251'-6"	16526
T1	57	#4	* 114'-0"	4341
T2	65	#4	* 250'-6"	10877
DK1	24	#5	7'-1"	177
DK2	28	#5	5'-9"	168
DN	2	#8	55'-11"	299
DS	90	#4	5'-4"	320

Reinforcing Steel	#	LB	110995
Prestr. Conc. Bms. (Ty. IV)	LF		2735.57

Span No.	Reinf. Conc. Slab ~ S.F.	Class S Conc. ~ C.Y. #	Slab
3	7345	2.1	169.6
4	7345	2.1	169.2
5	6804	2.1	165.8
Total	21494		508.8

\* For contractor's information only.  
 \* Includes 1'-1'-2' min. lap.  
 \* Includes 1'-1'-5' min. lap.  
 \* Includes 4'-1'-2' min. laps.  
 \* Includes 4'-1'-5' min. laps.

**GENERAL NOTES:**

Designed in accordance with A.A.S.H.T.O. 1983 Standard and Interim Specifications.  
 Design  $f_c=1200$  p.s.i.

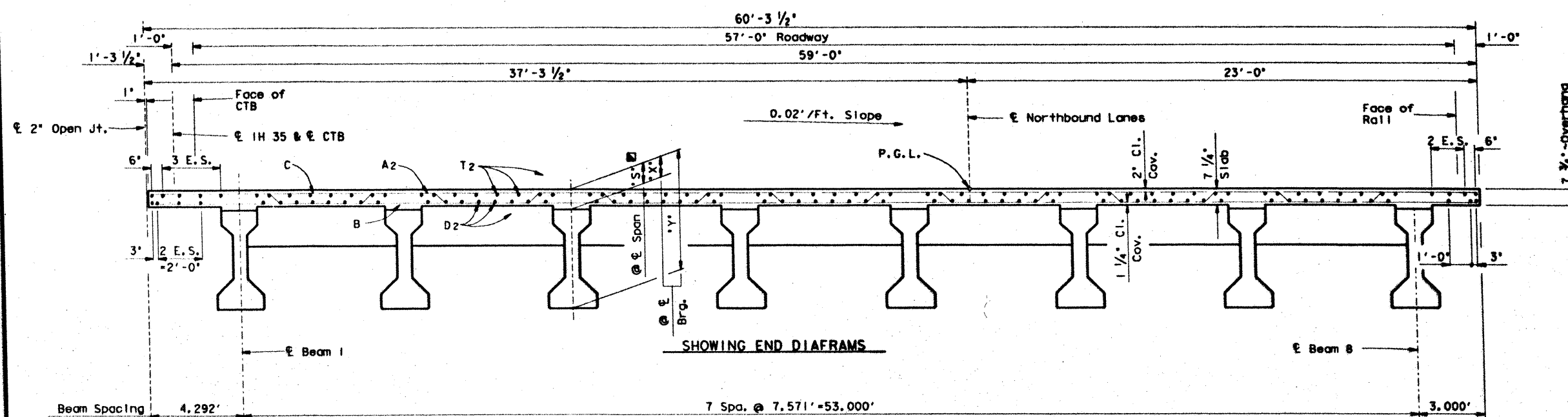
HS 20 LOADING Sheet 1 of 2

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION  
**357.00' PRESTR. CONC. BEAM UNIT**  
 (SPANS 3-5)

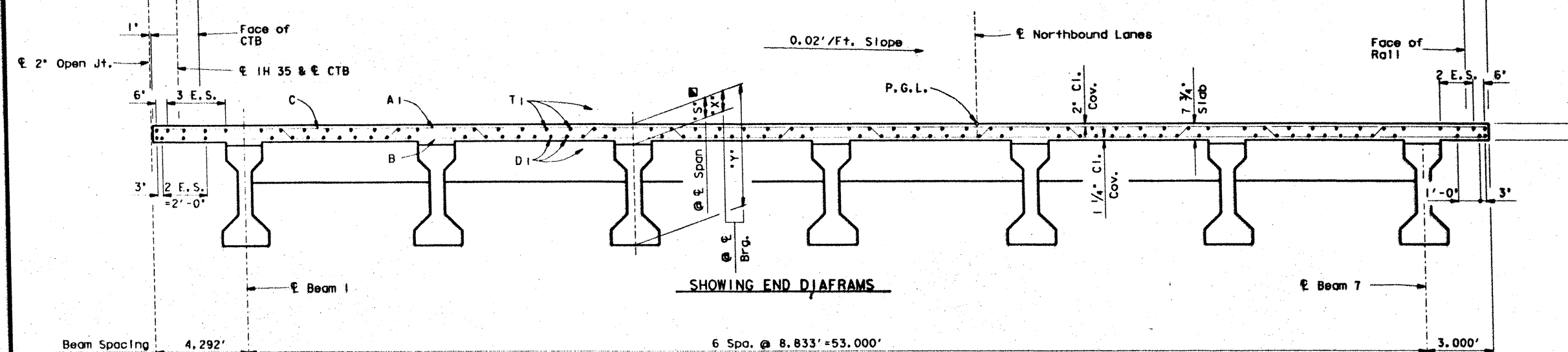
**CIBOLO CREEK BRIDGE NORTHBOUND LANES**

DESIGNED BY	DATE	APPROVED BY	DATE
DR. L. E. R.	SEPT., 1988	DR. L. E. R.	SEPT., 1988
DR. M. J. J.		DR. M. J. J.	
DR. J. K.		DR. J. K.	

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**TYPICAL TRANSVERSE SECTION-SPANS 3 & 4**



**TYPICAL TRANSVERSE SECTION-SPAN 5**

Span No.	Beam No.	*X' @ E Brg.	*Y' @ E Brg.	*S' @ E Span
3	All	9 3/4'	5'-3 3/4"	7 1/2'
4	All	9 1/2'	5'-3 1/2"	7 5/8'
5	All	10'	5'-4"	8 1/8'

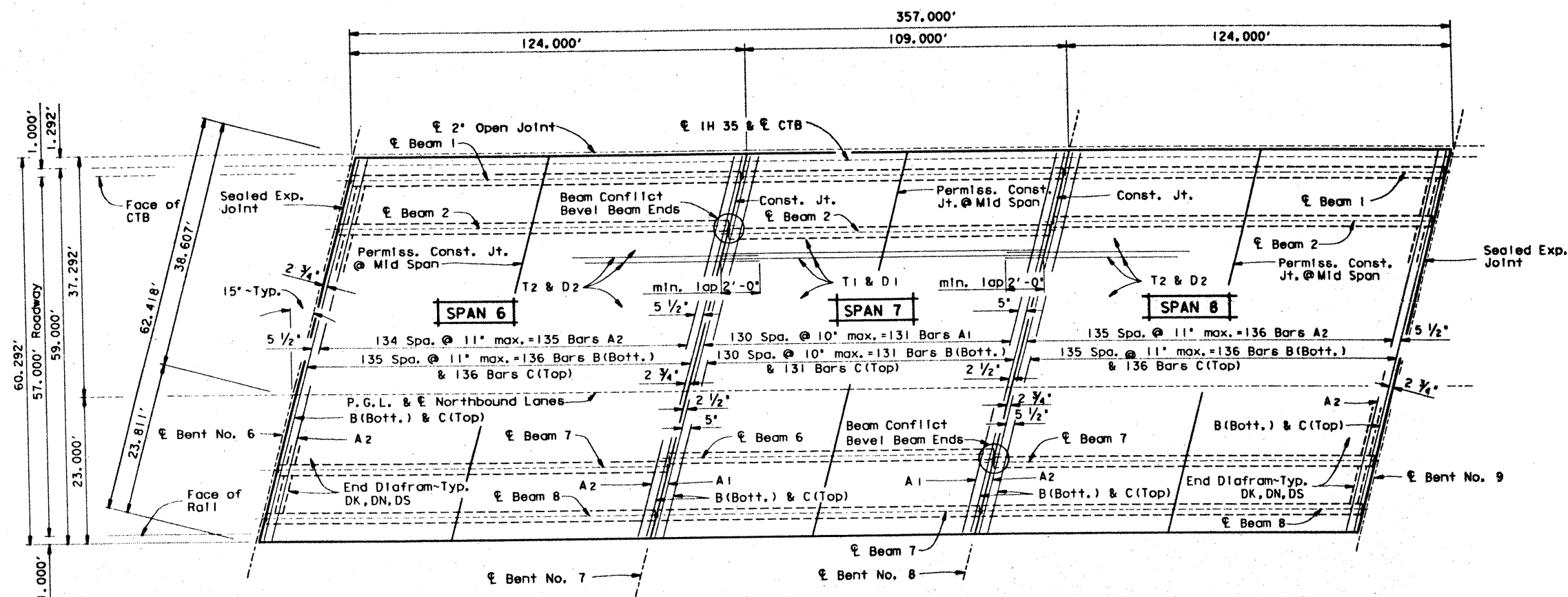
\*Theoretical value, for information only.

HS 20 LOADING Sheet 2 of 2

STATE DEPARTMENT OF HIGHWAYS  
AND PUBLIC TRANSPORTATION  
**357.00' PRESTR. CONC.  
BEAM UNIT**  
(SPANS 3-5)  
**CIBOLO CREEK BRIDGE  
NORTHBOUND LANES**

D4541 ZEA2135511613906P007.DGN  
DESIGNED BY: J. W. H. DATE: SEPT., 1988  
CHECKED BY: J. W. H. DATE: SEPT., 1988  
APPROVED BY: J. W. H. DATE: SEPT., 1988  
STATE: TEXAS COUNTY: BEXAR  
PROJECT: 1R35-2(157)173  
SHEET: 16 OF 35

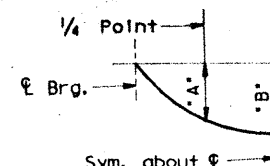
268



PLAN

Span No.	Beam No.	Horiz. Dist. $\phi$ - $\phi$ Bent	Beam Length
6 & 8	All	124.000'	123.67
7	All	109.000'	108.67

Beam lengths shown are bottom flange lengths with adjustment made for beam slope.



DEAD LOAD DEFLECTION DIAGRAM

Deflections shown are due to cast-in-place concrete only ( $E = 5 \times 10^6$  p.s.i.)

Span No.	Beam No.	'A'	'B'
6 & 8	All	0.159'	0.223'
7	All	0.118'	0.165'

TABLE OF ESTIMATED QUANTITIES

BAR	NO	SIZE	LENGTH	WEIGHT
A1	131	#5	* 65'-2"	8904
A2	271	#5	* 65'-1"	18395
B	403	#4	* 63'-3"	17027
C	403	#5	* 63'-6"	26691
D1	61	#5	* 110'-5"	7025
D2	126	#5	* 128'-8"	16909
T1	57	#4	* 110'-2"	4195
T2	130	#4	* 128'-2"	11130
DK	56	#5	5'-9"	336
DN	2	#8	55'-11"	299
DS	84	#4	5'-4"	299

Reinforcing Steel	#	LB	111210
Prestr. Conc. Bms. (Ty. IV)	LF		2739.41

Span No.	Reinf. Conc. Slab ~ S.F.	Class S Conc. ~ C.Y.	#
6	7466	2.1	171.5
7	6563		159.6
8	7466	2.1	171.5
Total	21495		506.8

\* For contractor's information only.  
 + Includes 1'-1'-2' min. lap.  
 \* Includes 1'-1'-5' min. lap.  
 \* Includes 2'-1'-2' min. laps.  
 \* Includes 2'-1'-5' min. laps.

GENERAL NOTES:

Designed in accordance with A.A.S.H.T.O., 1983 Standard and Interim Specifications.  
 Design  $f_c = 1200$  p.s.i.

HS 20 LOADING Sheet 1 of 2



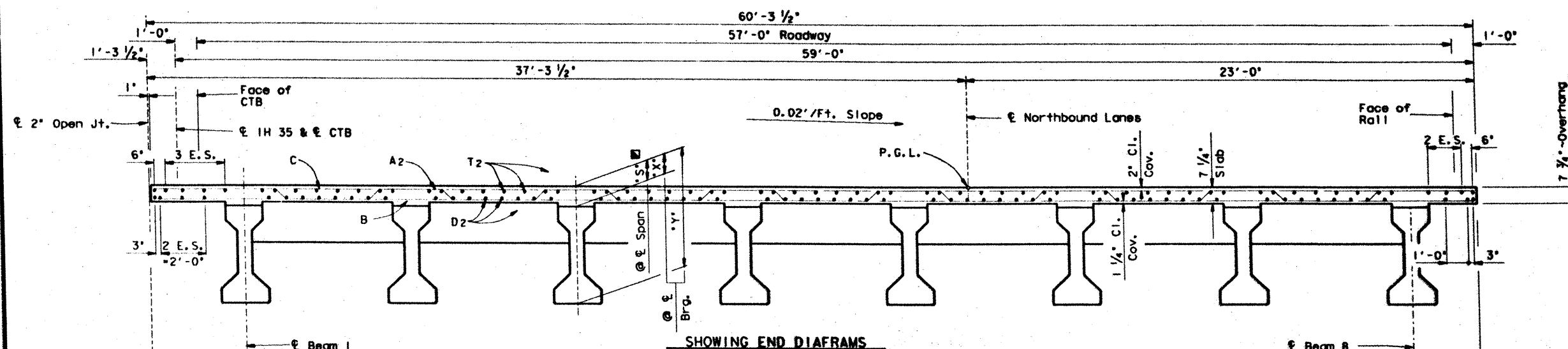
STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION  
 357.00' PRESTR. CONC. BEAM UNIT (SPANS 6-8)

CIBOLO CREEK BRIDGE NORTHBOUND LANES

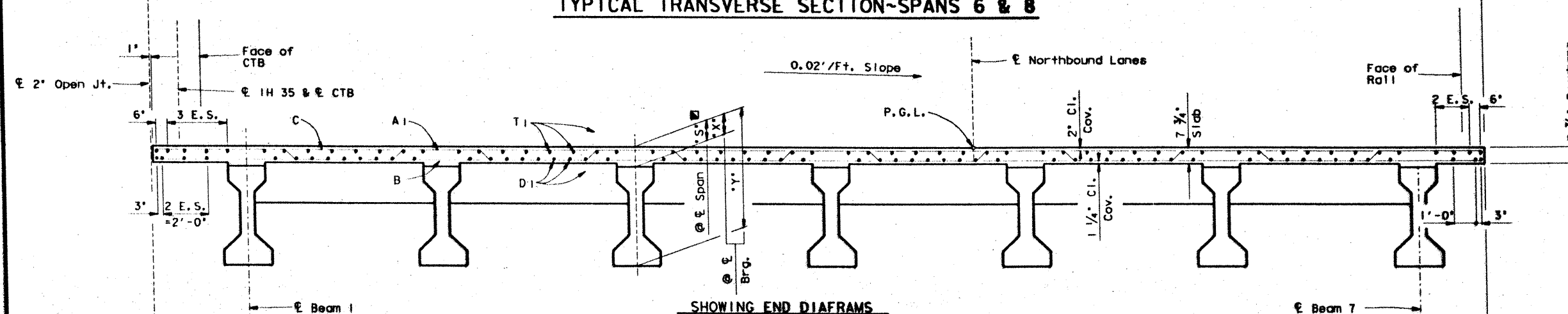
DESIGNED BY: A2135611631906PUBH.DGN	PREPARED BY: AND FOR USE OF TEXAS SDHP
DATE: SEPT. 1988	REVISIONS:
BY: C.E.H.	15
BY: P.H.	6
BY: M.W. & J.K.	3
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TYPICAL TRANSVERSE SECTION-SPANS 6 & 8



TYPICAL TRANSVERSE SECTION-SPAN 7

Span No.	Beam No.	*X* @ E Brg.	*Y* @ E Brg.	*S* @ E Span
6	All	9 1/4"	5'-3 1/4"	7 1/2'
7	All	9 3/4"	5'-3 3/4"	8 1/8'
8	All	9 1/4"	5'-3 1/4"	7 1/2'

\*Theoretical value, for information only.

HS 20 LOADING

Sheet 2 of 2



STATE DEPARTMENT OF HIGHWAYS  
AND PUBLIC TRANSPORTATION

357.00' PRESTR. CONC.  
BEAM UNIT  
(SPANS 6-8)

CIBOLO CREEK BRIDGE  
NORTHBOUND LANES

D451-ZFA2113551-613906P009.DGN		PREPARED BY AND FOR USE OF TEXAS SDH&PT	
ORIGINAL DATE: SEPT., 1988	REVISIONS	DATE: 15	BY: 6
CALC. BY: CEM	DESIGN: 15	DATE: 15	BY: 6
CHECKED BY: MJB & JR	DESIGN: 15	DATE: 15	BY: 6
CALC. BY: CEM	DESIGN: 15	DATE: 15	BY: 6

IR35-2(152)73 870

6 2982 1H 35



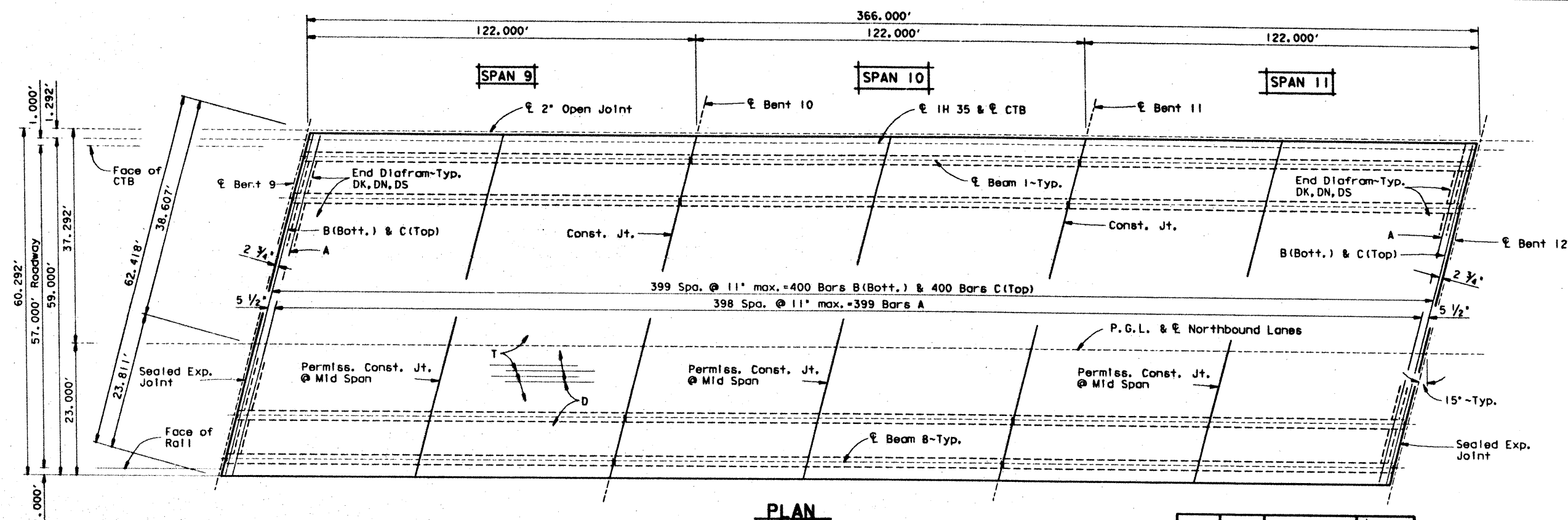
TABLE OF  
ESTIMATED QUANTITIES

BAR	NO	SIZE	LENGTH	WEIGHT
A	399	#5	* 65' - 1'	27083
B	400	#4	* 63' - 3'	16900
C	400	#5	* 63' - 6'	26492
D	63	#5	* 374' - 2'	24586
T	65	#4	* 372' - 8'	16181
DK	56	#5	5' - 9'	336
DN	2	#8	55' - 11'	299
DS	84	#4	5' - 4'	299

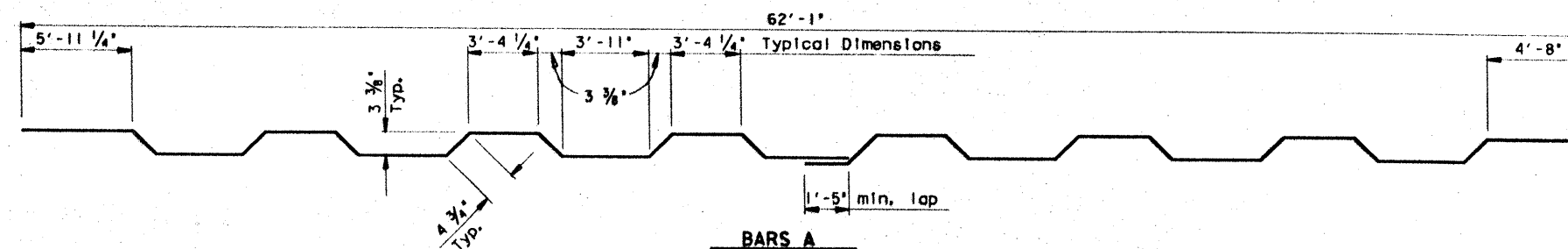
Reinforcing Steel	#	LB	112176
Prestr. Conc. Bms. (Ty. IV)	LF		2920.08

Span	Reinf. Conc. Slab ~ S.F.	Class S Conc. ~ C.Y. #	Slab
9	7345	2.1	168.8
10	7345	-0-	168.8
11	7345	2.1	168.8
Total	22035		510.6

\* For contractor's information only.  
 \* Includes 1'-1'-2' min. lap.  
 \* Includes 1'-1'-5' min. lap.  
 \* Includes 6'-1'-2' min. laps.  
 \* Includes 6'-1'-5' min. laps.



PLAN



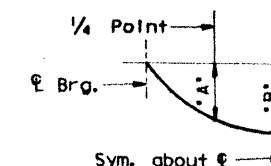
BARS A

Span No.	Beam No.	Horiz. Dist. @ Bent	# Beam Length
9-11	All	122,000'	121.67

# Beam lengths shown are bottom flange lengths with adjustment made for beam slope.

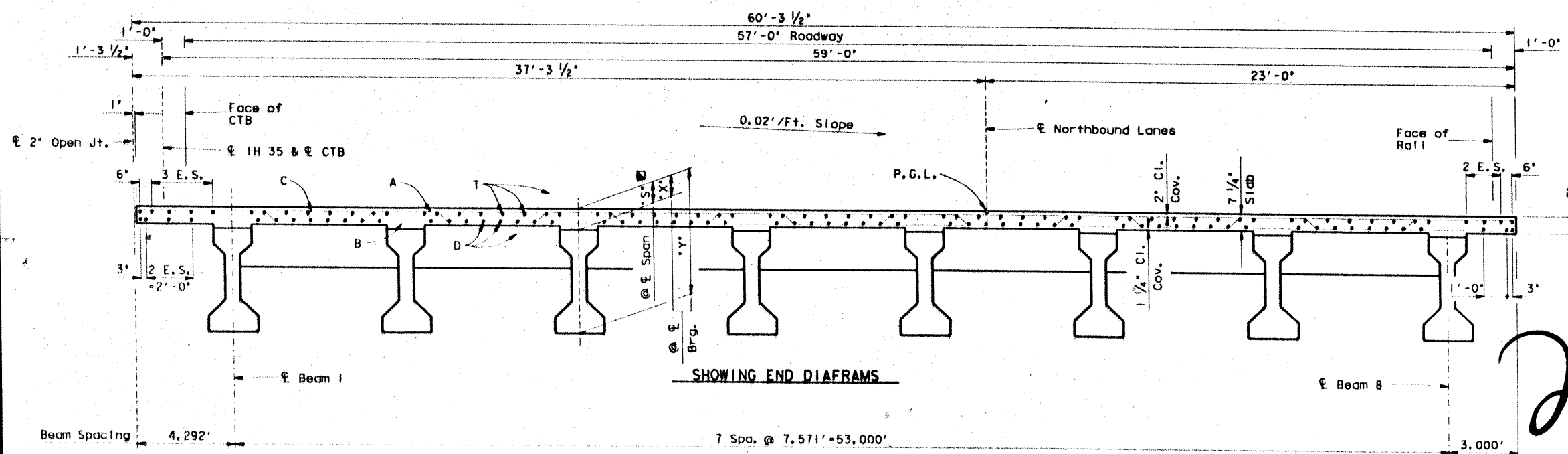
Span No.	Beam No.	*X' @ Bent	*Y' @ Bent	*S' @ Span
9-11	All	9 1/2'	5'-3 1/2'	7 5/8'

\* Theoretical value, for information only.



DEAD LOAD DEFLECTION DIAGRAM

Deflections shown are due to cast-in-place concrete only (E=5 x 10<sup>6</sup> p.s.i.)



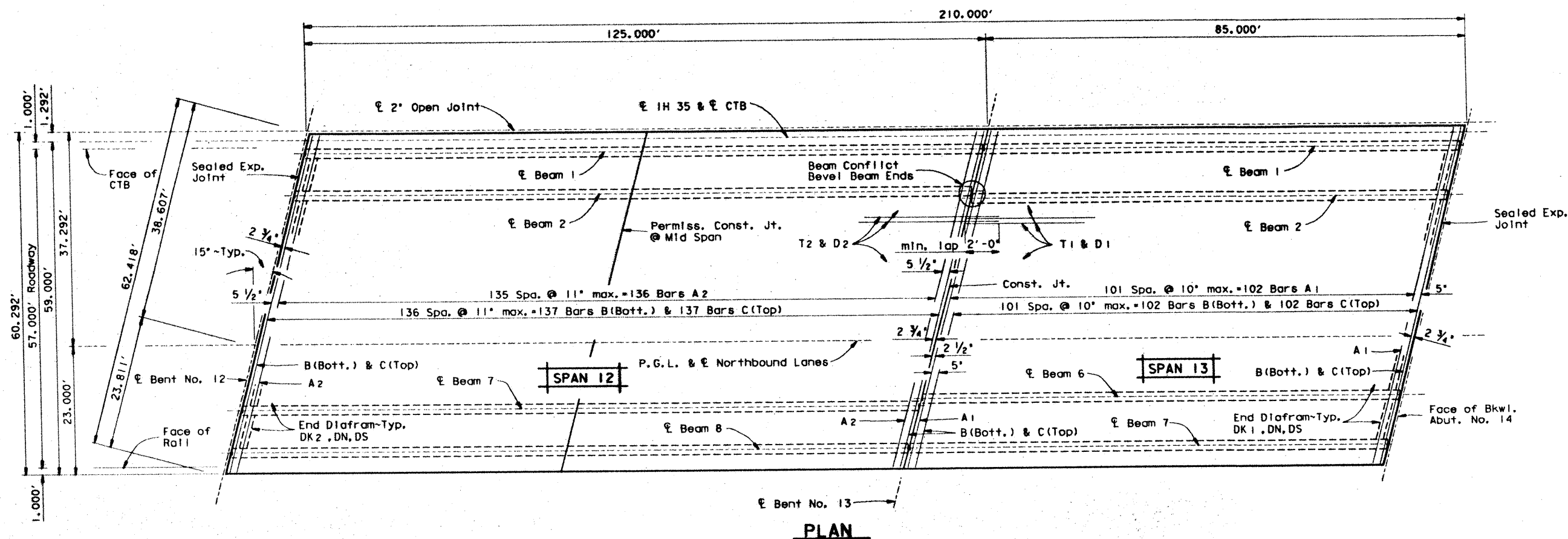
TYPICAL TRANSVERSE SECTION

GENERAL NOTES:  
 Designed in accordance with A.A.S.H.T.O. 1983 Standard and Interim Specifications.  
 Design fc=1200 p.s.i.

HS 20 LOADING

STATE DEPARTMENT OF HIGHWAYS  
 AND PUBLIC TRANSPORTATION  
**36.00' PRESTR. CONC. BEAM UNIT**  
 (SPANS 9-11)  
**CIBOLO CREEK BRIDGE**  
**NORTHBOUND LANES**

DESIGNED BY: J. A. Z. 135511613906/2002.DGN	DATE: AUGUST, 1988	PREPARED BY: AND FOR USE OF TEXAS HIGHWAY DEPARTMENT	PROJECT: 15-6	SHEET: 27/
DR. C. E. W.	DR. P. L. R.	DR. M. W. J. K.	CONTRACT: 1R35-2(152)173	DATE: 8/27/88
BY: J. B.	BY: J. B.	BY: J. B.	CONTRACT: 1R35-2(152)173	DATE: 8/27/88



Span No.	Beam No.	Horiz. Dist. $\ell$ - $\ell$ Bent	# Beam Length
12	All	125.000'	124.67'
13	All	85.000'	84.67'

# Beam lengths shown are bottom flange lengths with adjustment made for beam slope.

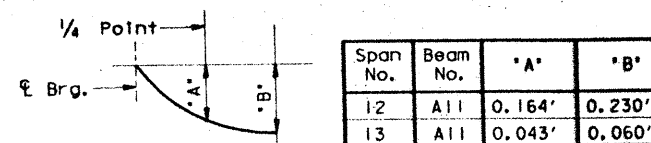


TABLE OF ESTIMATED QUANTITIES

BAR	NO	SIZE	LENGTH	WEIGHT
A1	102	#5	* 65'-2"	6933
A2	136	#5	* 65'-1"	9231
B	239	#4	* 63'-3"	10098
C	239	#5	* 63'-6"	15829
D1	61	#5	* 86'-3"	5487
D2	63	#5	* 129'-8"	8520
T1	57	#4	* 86'-0"	3275
T2	65	#4	* 129'-2"	5609
DK1	24	#5	7'-1"	177
DK2	28	#5	5'-9"	168
DN	2	#8	55'-11"	299
DS	90	#4	5'-4"	320

Reinforcing Steel # LB 65946  
 Prestr. Conc. Bms. (Ty. IV) LF 1590.05

Span No.	Reinf. Conc. Slab - S.F.	Class S Conc. - C.Y. #	Slab
12	7526	2.1	172.7
13	5118	2.1	123.9
Total	12644		300.8

\* For contractor's information only.  
 # Includes 1'-1'-2" min. lap.  
 \* Includes 1'-1'-5" min. lap.  
 # Includes 2'-1'-2" min. laps.  
 # Includes 2'-1'-5" min. laps.

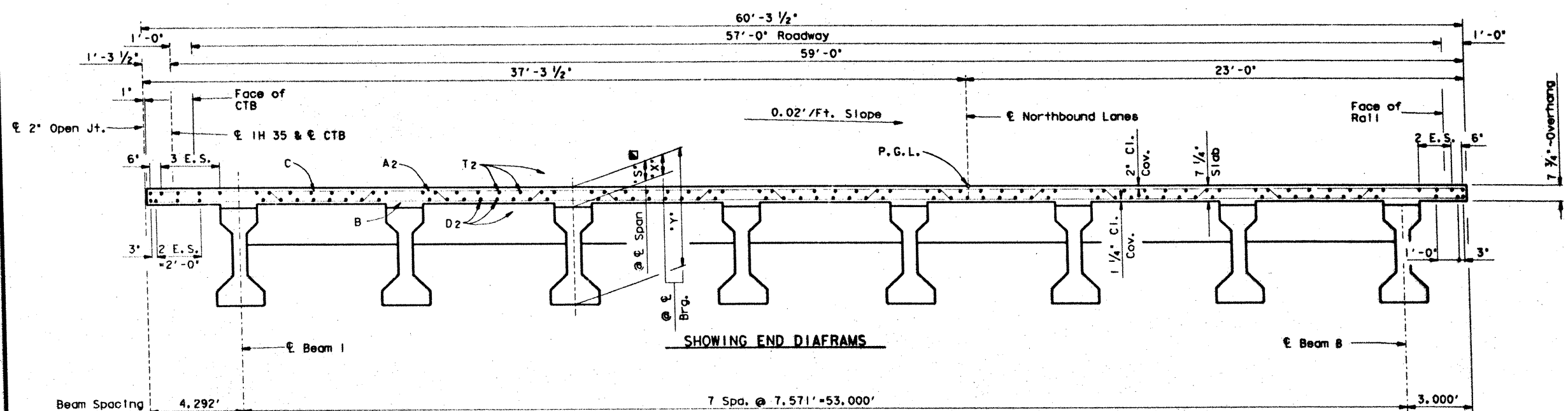
GENERAL NOTES:  
 Designed in accordance with A.A.S.H.T.O. 1983 Standard and Interim Specifications.  
 Design  $f_c=1200$  p.s.i.

HS 20 LOADING Sheet 1 of 2

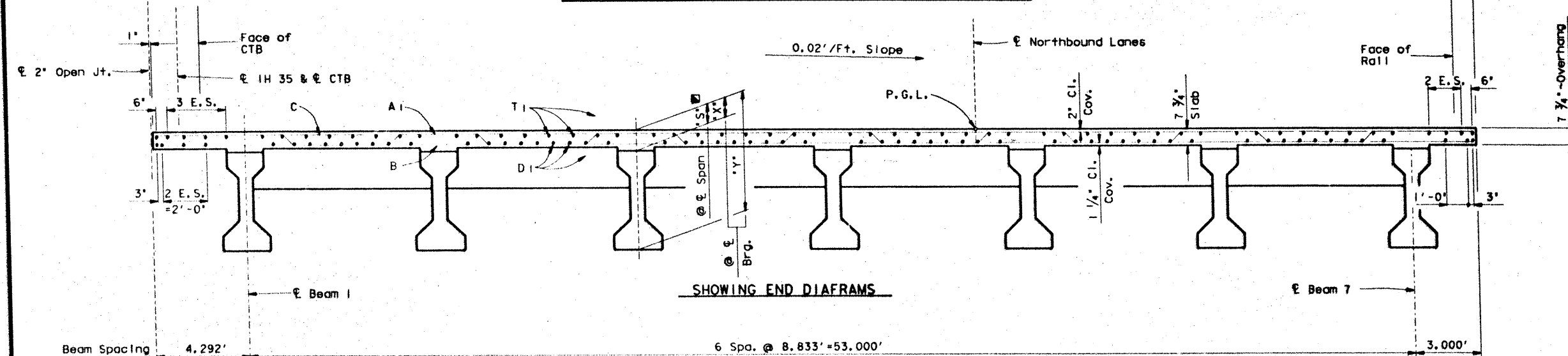
STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION  
 210.00' PRESTR. CONC. BEAM UNIT  
 (SPANS 12 & 13)

CIBOLO CREEK BRIDGE  
 NORTHBOUND LANES

DESIGNED BY: A2113551033906PPH03, DUN	PREPARED BY: AND FOR USE OF TEXAS SDH&PT
AUGUST, 1988	DATE: 8/1/88
BY: [Signature]	BY: [Signature]
PROJECT: IR 35-2(157)173	SHEET: 272
QUANTITY: 239	REMARKS: [Blank]
DATE: 8/1/88	DATE: 8/1/88



TYPICAL TRANSVERSE SECTION-SPAN 12



TYPICAL TRANSVERSE SECTION-SPAN 13

Span No.	Beam No.	*X* @ E Brg.	*Y* @ E Brg.	*S* @ E Span
12	All	9 1/2"	5'-3 1/2"	7 3/8"
13	All	9 1/4"	5'-3 1/4"	8 3/8"

\*Theoretical value, for information only.

HS 20 LOADING Sheet 2 of 2

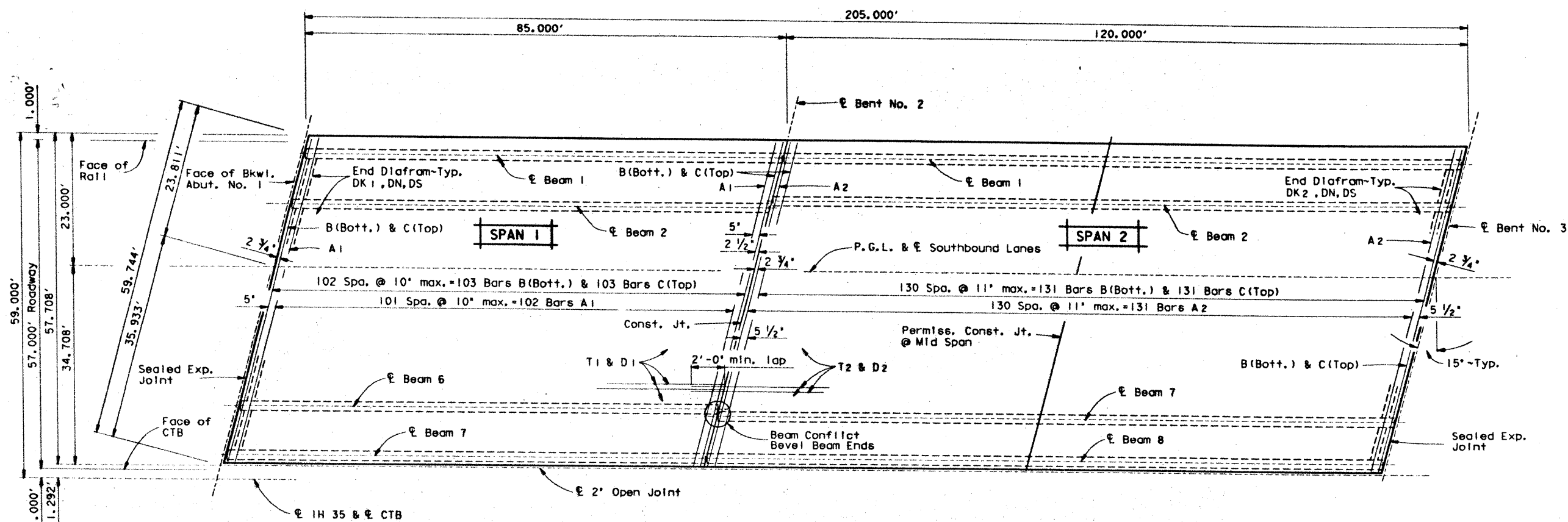


STATE DEPARTMENT OF HIGHWAYS  
AND PUBLIC TRANSPORTATION  
210.00' PRESTR. CONC.  
BEAM UNIT  
(SPANS 12 & 13)

CIBOLO CREEK BRIDGE  
NORTHBOUND LANES

DATE: 12/12/82 (355103) 3906PHOS. 11/81  
DESIGNED BY: J. W. B. 11/81  
CHECKED BY: J. W. B. 11/81  
APPROVED BY: J. W. B. 11/81  
REVISIONS: 1. 11/81  
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PLAN

Span No.	Beam No.	Horiz. Dist. $\ell$ - $\ell$ Bent	# Beam Length
1	A11	85,000'	84.68'
2	A11	120,000'	119.68'

# Beam lengths shown are bottom flange lengths with adjustment made for beam slope.

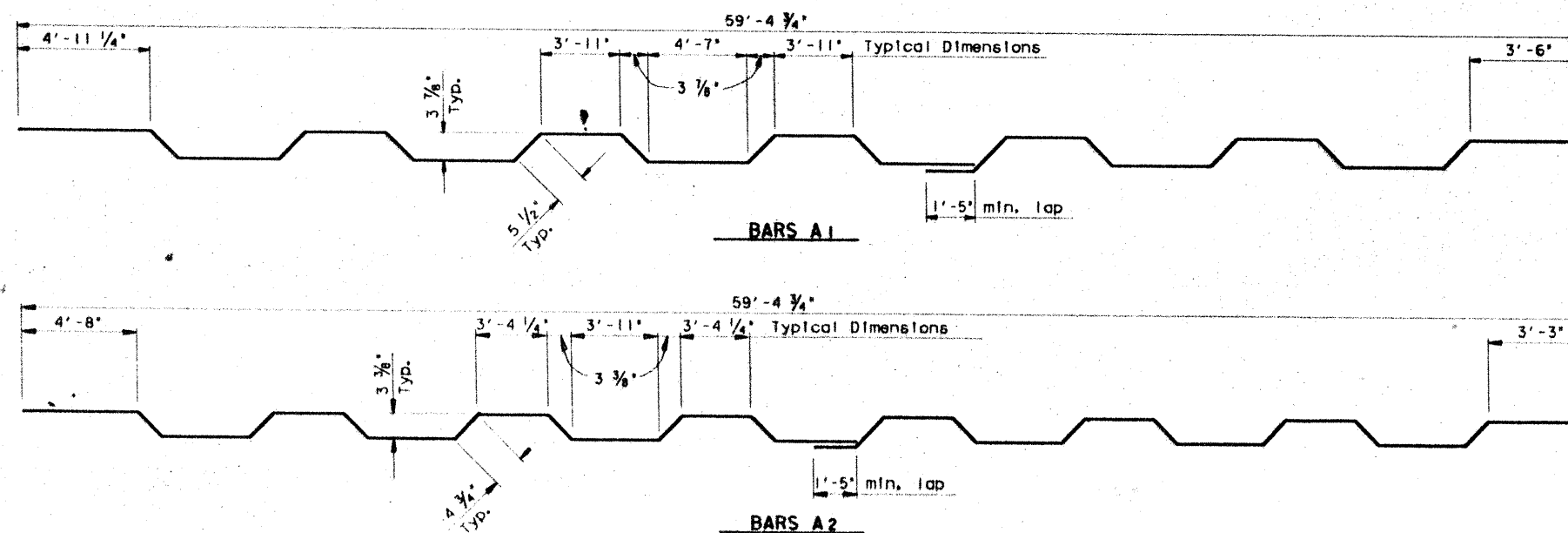
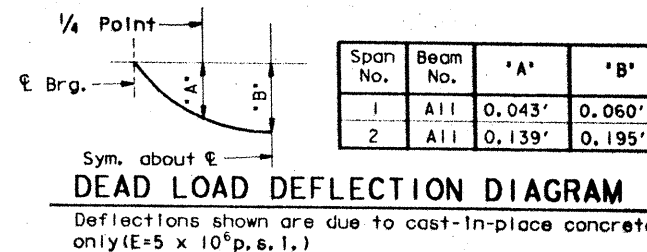


TABLE OF ESTIMATED QUANTITIES

BAR	NO	SIZE	LENGTH	WEIGHT
A1	102	#5	* 62'-5"	6641
A2	131	#5	* 62'-5"	8529
B	234	#4	59'-5"	9288
C	234	#5	59'-5"	14502
D1	58	#5	* 86'-3"	5218
D2	60	#5	* 124'-8"	7802
T1	54	#4	* 86'-0"	3102
T2	62	#4	* 124'-2"	5143
DK1	24	#5	7'-1"	177
DK2	28	#5	5'-9"	168
DN	2	#8	55'-11"	299
DS	90	#4	5'-4"	320

Reinforcing Steel	#	LB	61189
Prestr. Conc. Bms. (Ty. IV)	LF	1550.20	

Span No.	Reinf. Conc. Slab - S.F.	Class S Conc. - C.Y. #	Slab
1	4898	2.1	118.7
2	6915	2.1	158.8
Total	11813		281.7

\* For contractor's information only.  
 † Includes 1'-1'-2' min. lap.  
 \* Includes 1'-1'-5' min. lap.  
 ‡ Includes 2'-1'-2' min. laps.  
 ‡ Includes 2'-1'-5' min. laps.

GENERAL NOTES:

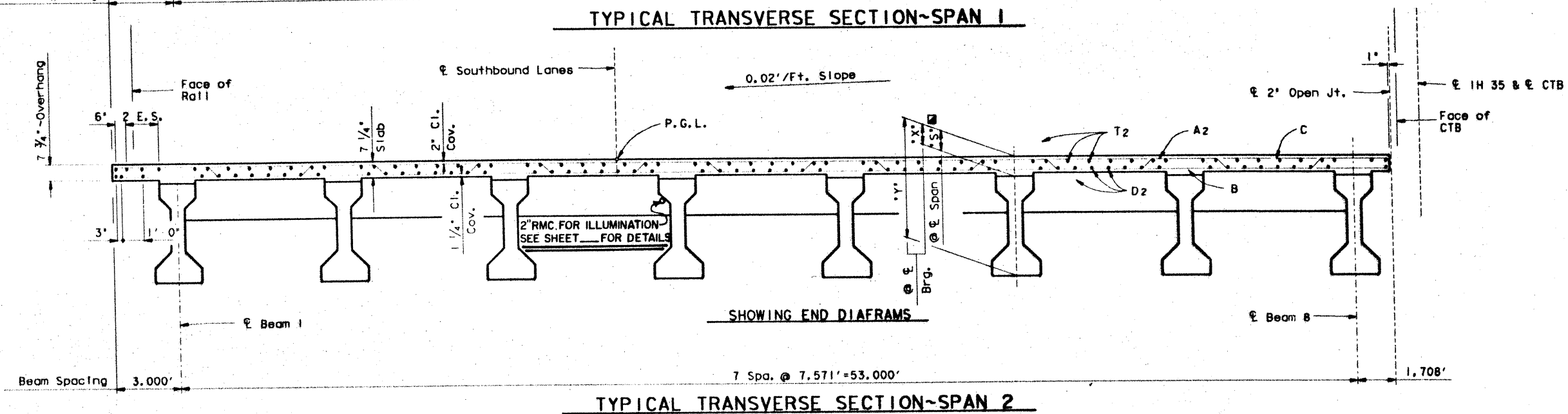
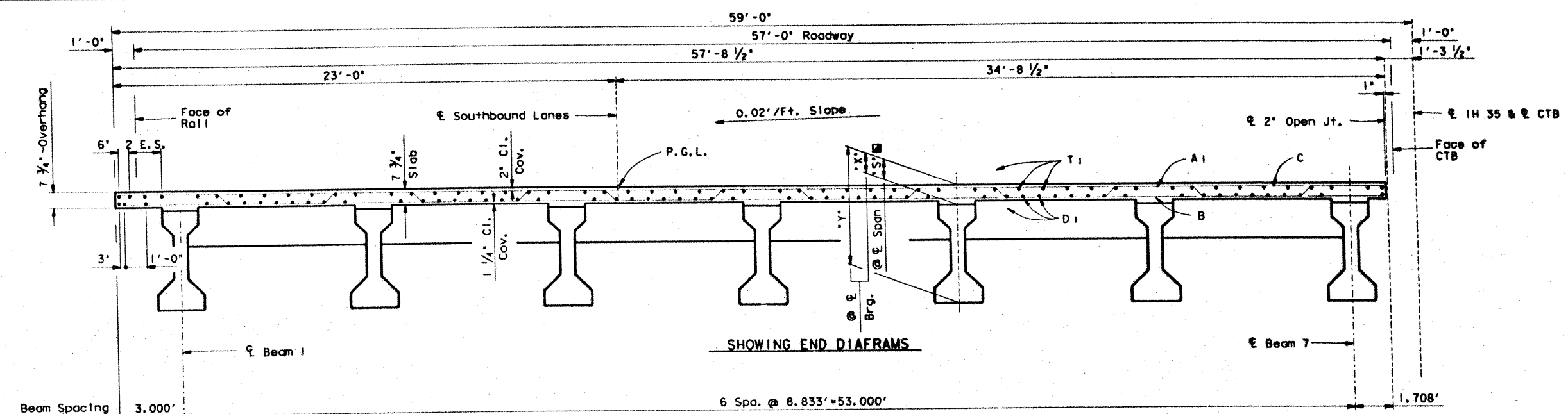
Designed in accordance with A.A.S.H.T.O. 1983 Standard and Interim Specifications.  
 Design  $f_c=1200$  p.s.i.

HS 20 LOADING Sheet 1 of 2

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION  
**205.00' PRESTR. CONC. BEAM UNIT**  
 (SPANS 1 & 2)  
**CIBOLO CREEK BRIDGE SOUTHBOUND LANES**

D454-21 A21 3551013905PFB01.DGN	PREPARED BY AND FOR USE OF TEXAS SDHP
DATE: AUGUST 1, 1988	DATE: AUGUST 1, 1988
BY: [Signature]	BY: [Signature]
CHECKED: [Signature]	CHECKED: [Signature]
APPROVED: [Signature]	APPROVED: [Signature]
PROJECT: IR35-2(152) 173	PROJECT: IR35-2(152) 173
DATE: 10/1/88	DATE: 10/1/88
BY: [Signature]	BY: [Signature]
CHECKED: [Signature]	CHECKED: [Signature]
APPROVED: [Signature]	APPROVED: [Signature]





Span No.	Beam No.	$\cdot X^*$ o f Brg.	$\cdot Y^*$ o f Brg.	$\cdot S^*$ o f Span
1	All	9 $\frac{1}{4}$ "	5' - 3 $\frac{1}{4}$ "	8 $\frac{1}{8}$ "
2	All	9 $\frac{1}{2}$ "	5' - 3 $\frac{1}{2}$ "	7 $\frac{1}{2}$ "

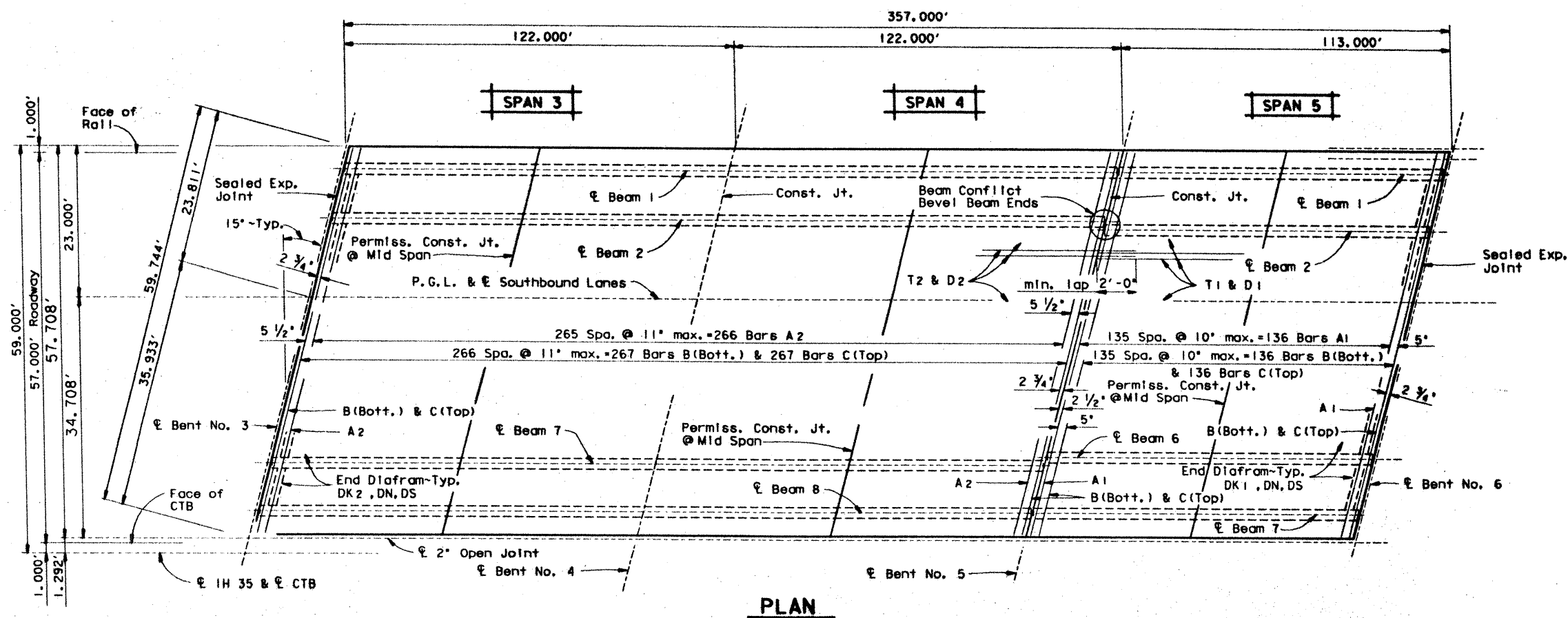
HS 20 LOADING Sheet 2 of 2

STATE DEPARTMENT OF HIGHWAYS  
AND PUBLIC TRANSPORTATION

205.00' PRESTR. CONC.  
BEAM UNIT  
(SPANS 1 & 2)

CIBOLO CREEK BRIDGE  
SOUTHBOUND LANES

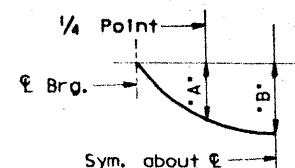
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PLAN

Span No.	Beam No.	Horiz. Dist. $\phi$ - $\phi$ Bent	# Beam Length
3 & 4	A11	122,000'	121.68'
5	A11	113,000'	112.67'

# Beam lengths shown are bottom flange lengths with adjustment made for beam slope.



DEAD LOAD DEFLECTION DIAGRAM

Deflections shown are due to cast-in-place concrete only ( $E=5 \times 10^6$  p.s.i.)

Span No.	Beam No.	*A*	*B*
3 & 4	A11	0.149'	0.209'
5	A11	0.136'	0.191'

TABLE OF ESTIMATED QUANTITIES

BAR	NO	SIZE	LENGTH	WEIGHT
A1	136	#5	* 62'-5"	8854
A2	266	#5	* 62'-5"	17318
B	403	#4	59'-5"	15966
C	403	#5	59'-5"	24976
D1	58	#5	* 114'-3"	6911
D2	60	#5	* 251'-6"	15739
T1	54	#4	* 114'-0"	4112
T2	62	#4	* 250'-6"	10375
DK1	24	#5	7'-1"	177
DK2	28	#5	5'-9"	168
DN	2	#8	55'-11"	299
DS	90	#4	5'-4"	320

Reinforcing Steel	#	LB	105245
Prestr. Conc. Bms. (Ty. IV)	LF		2735.57

Span No.	Reinf. Conc. Slab ~ S.F.	Class S Conc. ~ C.Y. #	Slab
3	7030	2.1	162.1
4	7030		161.7
5	6512	2.1	158.8
Total	20572		486.8

\* For contractor's information only.  
 # Includes 1'-1'-2" min. lap.  
 \* Includes 1'-1'-5" min. lap.  
 # Includes 4'-1'-2" min. laps.  
 # Includes 4'-1'-5" min. laps.

GENERAL NOTES:

Designed in accordance with A.A.S.H.T.O. 1983 Standard and Interim Specifications.  
 Design  $f_c=1200$  p.s.i.

HS 20 LOADING Sheet 1 of 2

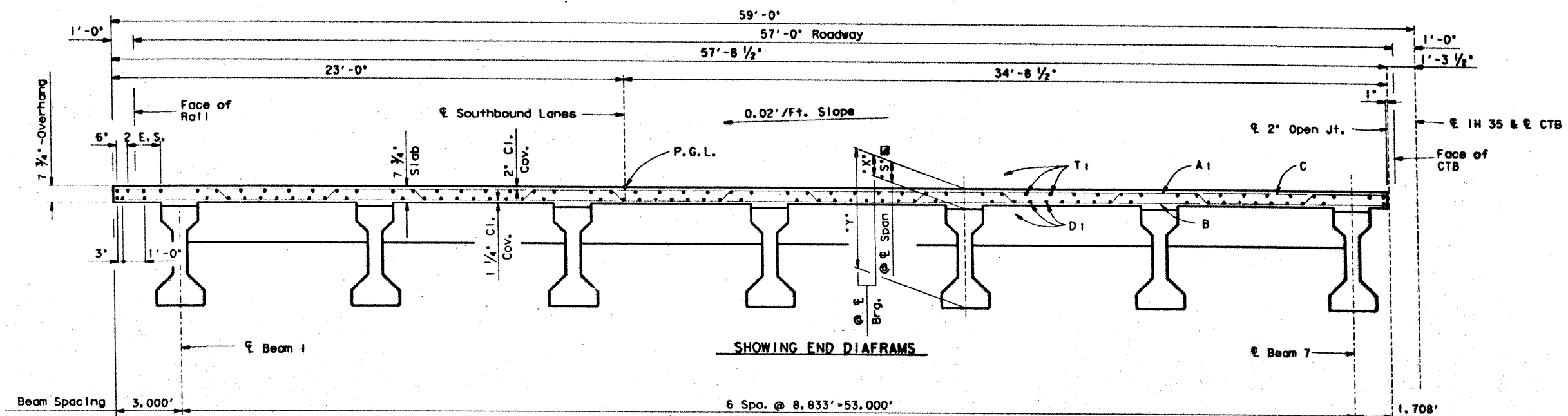


STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION  
 357.00' PRESTR. CONC. BEAM UNIT (SPANS 3-5)

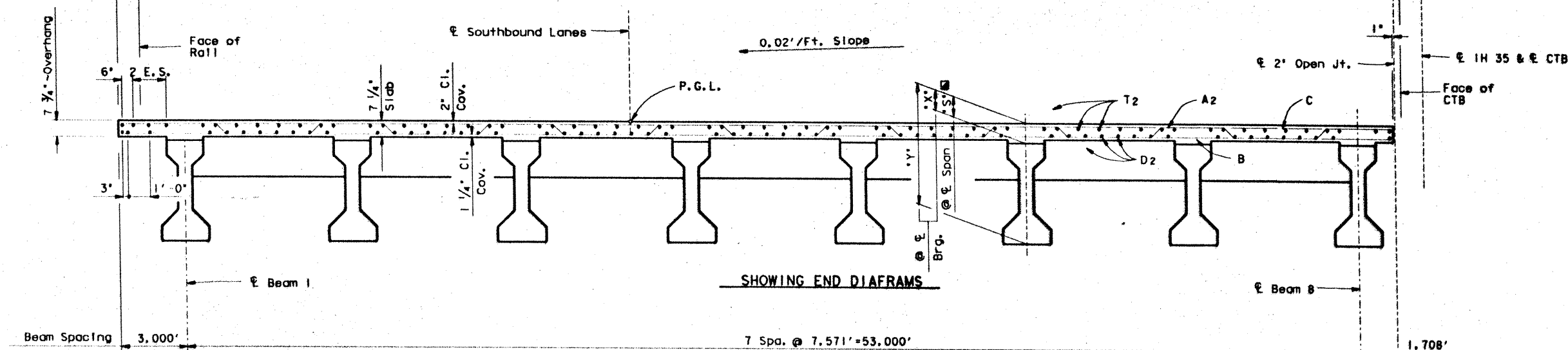
CIBOLO CREEK BRIDGE SOUTHBOUND LANES

0451121A2135511613905PH06.DGN	PREPARED BY AND FOR USE OF TEXAS SDHP1
DATE: 08/11/88	DATE: 08/11/88
BY: EJP	BY: EJP
CHECKED: PER	CHECKED: PER
IN: MW & JK	IN: MW & JK
16	16
6	6
29	29
11	11
35	35

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TYPICAL TRANSVERSE SECTION-SPAN 5



TYPICAL TRANSVERSE SECTION-SPANS 3 & 4

Span No.	Beam No.	*X* @ Brq.	*Y* @ Brq.	*S* @ Span
3	All	9 3/4"	5'-3 3/4"	7 1/2"
4	All	9 1/2"	5'-3 1/2"	7 3/4"
5	All	10"	5'-4"	8 1/4"

\*Theoretical value, for information only.

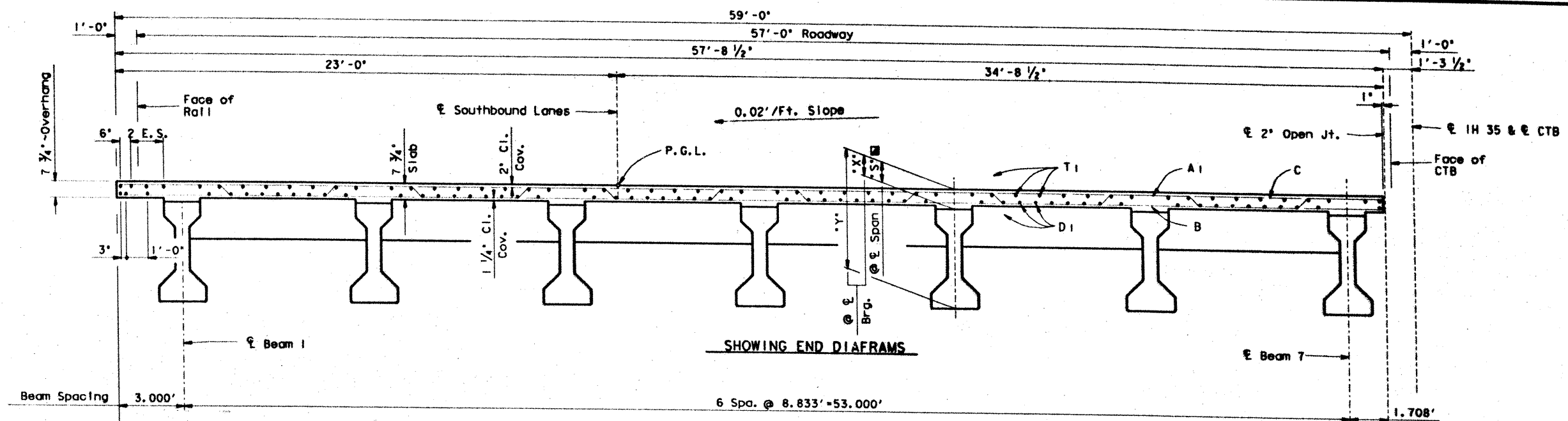
HS 20 LOADING Sheet 2 of 2

STATE DEPARTMENT OF HIGHWAYS  
AND PUBLIC TRANSPORTATION  
357.00' PRESTR. CONC.  
BEAM UNIT  
(SPANS 3-5)  
CIBOLO CREEK BRIDGE  
SOUTHBOUND LANES

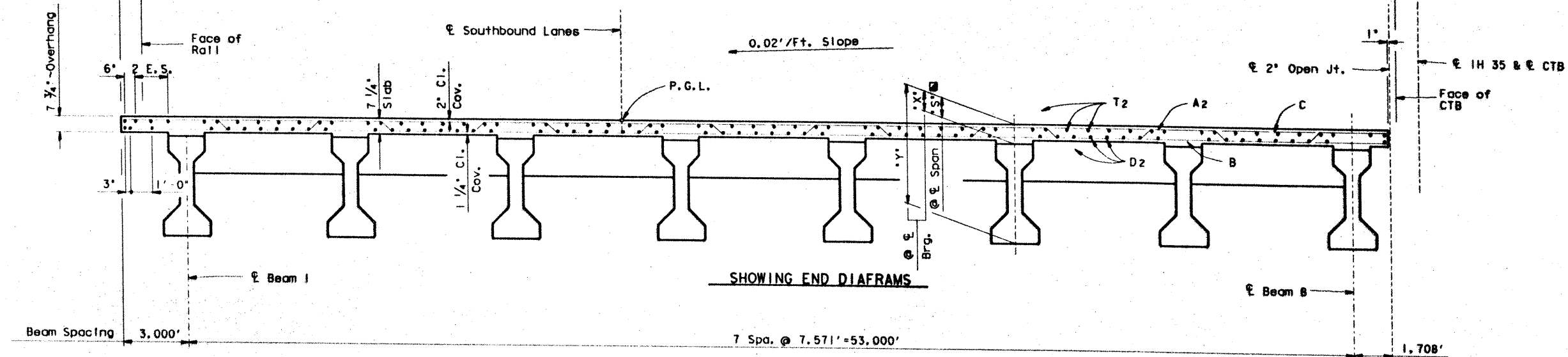
D4511 Z1A21135511633905PPB07.DGN	DATE: 10/1/88	DESIGNED BY: J. L. B.	CHECKED BY: J. L. B.	APPROVED BY: J. L. B.
DATE: 10/1/88	DESIGNED BY: J. L. B.	CHECKED BY: J. L. B.	APPROVED BY: J. L. B.	DATE: 10/1/88
DATE: 10/1/88	DESIGNED BY: J. L. B.	CHECKED BY: J. L. B.	APPROVED BY: J. L. B.	DATE: 10/1/88
DATE: 10/1/88	DESIGNED BY: J. L. B.	CHECKED BY: J. L. B.	APPROVED BY: J. L. B.	DATE: 10/1/88







TYPICAL TRANSVERSE SECTION~SPAN 7



TYPICAL TRANSVERSE SECTION~SPANS 6 & 8

Span No.	Beam No.	*X* @ 1/4" Brg.	*Y* @ 1/4" Brg.	*S* @ 1/4" Span
6	All	9 1/4"	5'-3 1/4"	7 1/2"
7	All	9 3/4"	5'-3 3/4"	8 1/8"
8	All	9 1/4"	5'-3 1/4"	7 1/2"

\*Theoretical value, for information only.

HS 20 LOADING Sheet 2 of 2

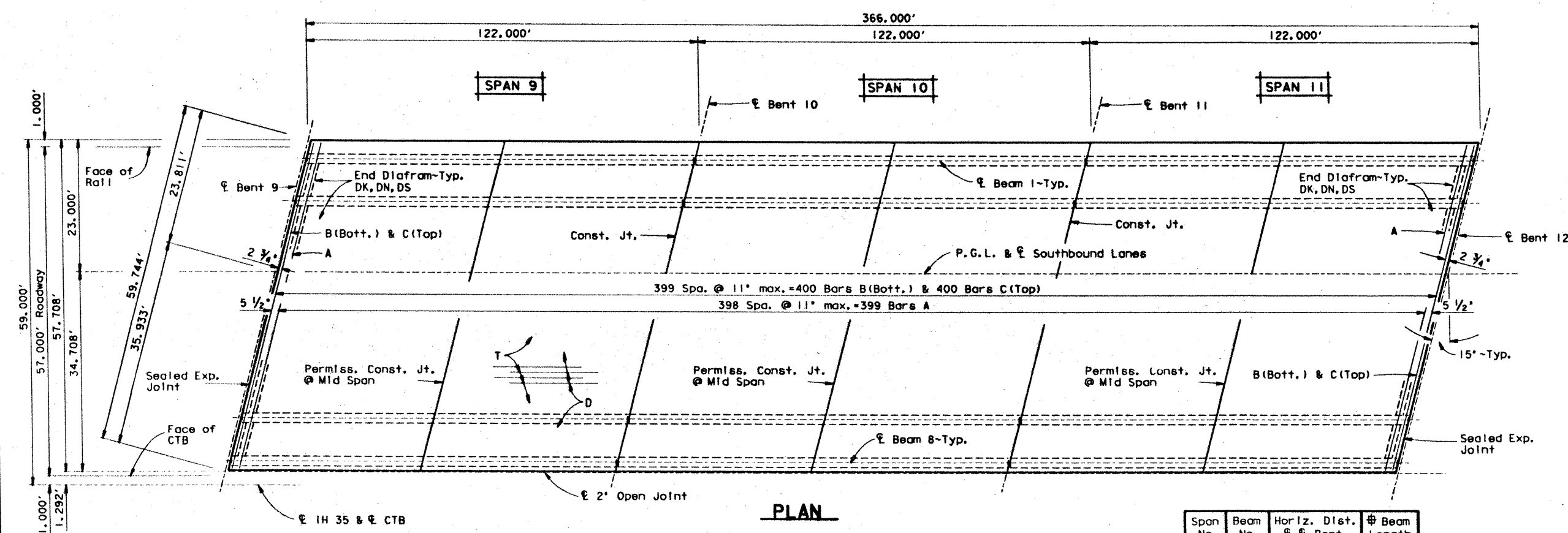
STATE DEPARTMENT OF HIGHWAYS  
AND PUBLIC TRANSPORTATION

357.00' PRESTR. CONC.  
BEAM UNIT  
(SPANS 6-8)

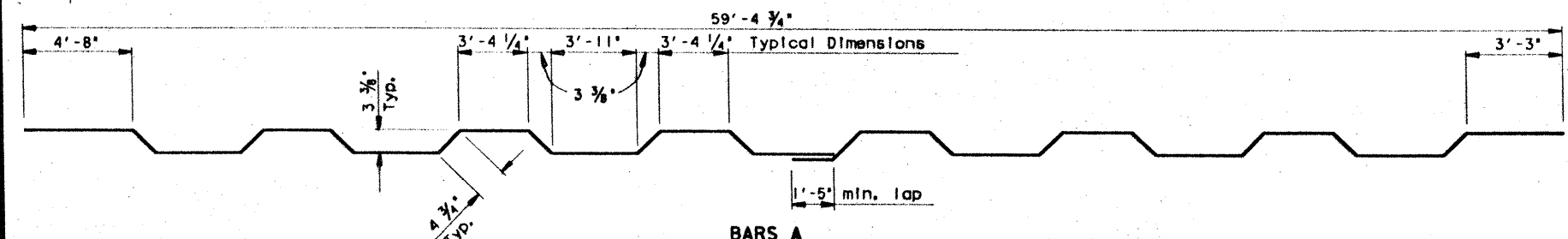
CIBOLO CREEK BRIDGE  
SOUTHBOUND LANES

D45111A2\*135511613905PPE09, DGN  
ORIGINAL DRAWING DATE: SEPT., 1988  
REVISED: 15

PREPARED BY AND FOR USE OF TEXAS SOUTH  
COUNTY: 6  
SECTION: 173  
JOB: 272  
SHEET: 16  
DATE: 1988



PLAN



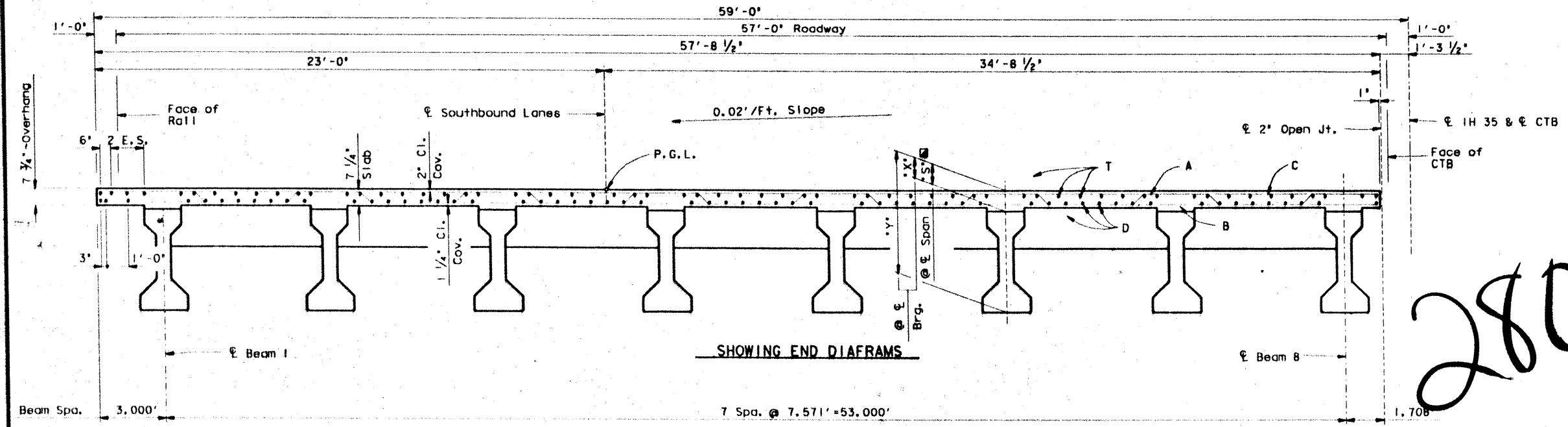
BARS A

Span No.	Beam No.	Horiz. Dist. @ Bent	# Beam Length
9-11	All	122,000'	121.67

# Beam lengths shown are bottom flange lengths with adjustment made for beam slope.

Span No.	Beam No.	*X' @ Bent	*Y' @ Bent	*S' @ Span
9-11	All	9 1/2"	5'-3 1/2"	7 5/8"

\*Theoretical value, for information only.



TYPICAL TRANSVERSE SECTION

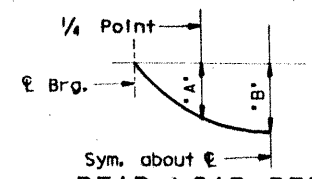
TABLE OF ESTIMATED QUANTITIES

BAR	NO	SIZE	LENGTH	WEIGHT
A	399	#5	* 62'-5"	25977
B	400	#4	59'-5"	15877
C	400	#5	59'-5"	24790
D	60	#5	374'-2"	23416
T	62	#4	372'-6"	15427
DK	56	#5	5'-9"	336
DN	2	#8	55'-11"	299
DS	84	#4	5'-4"	299

Reinforcing Steel	#	LB	106421
Prestr. Conc. Bms. (Ty. IV)	LF		2920.08

Span	Reinf. Conc. Slab ~ S.F.	Class S Conc. ~ C.Y. #	Slab
9	7030	2.1	162.8
10	7030	-0-	162.8
11	7030	2.1	162.8
Total	21090		492.6

\* For contractor's information only.  
 \* Includes 1'-1'-5" min. lap.  
 \* Includes 6'-1'-2" min. laps.  
 \* Includes 6'-1'-5" min. laps.



DEAD LOAD DEFLECTION DIAGRAM

Deflections shown are due to cast-in-place concrete only (E=5 x 10<sup>6</sup> p.s.i.)

GENERAL NOTES:  
 Designed in accordance with A.A.S.H.T.O. 1983 Standard and Interim Specifications.  
 Design fc=1200 p.s.i.

HS 20 LOADING

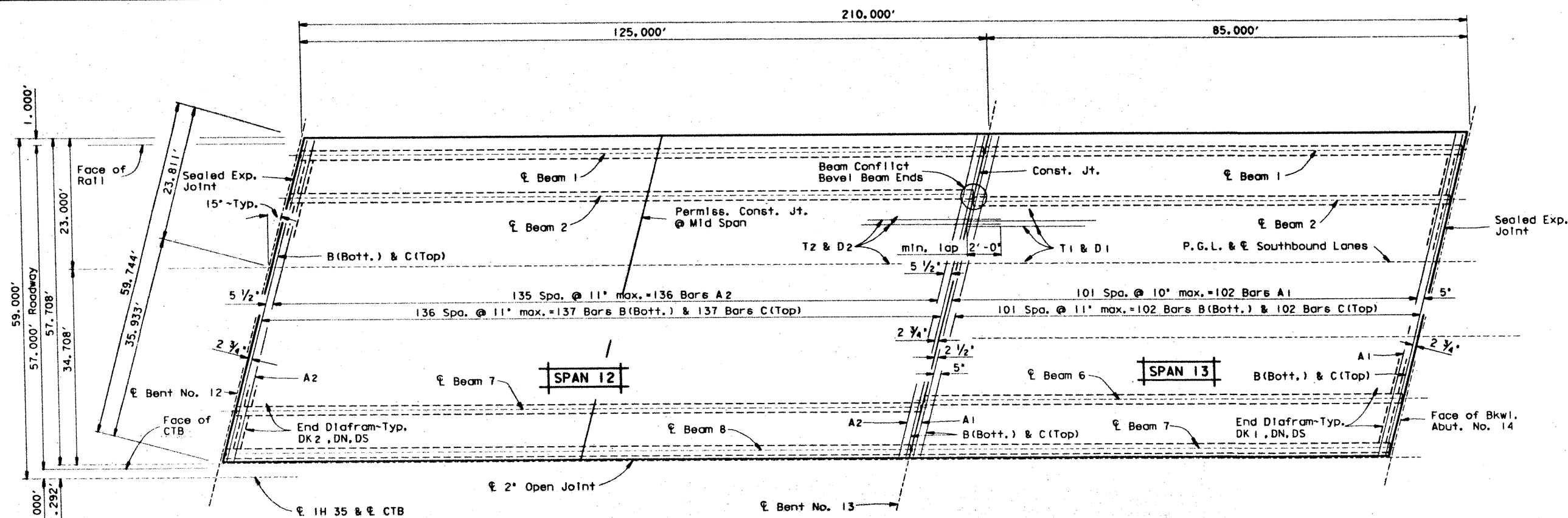
STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

366.00' PRESTR. CONC. BEAM UNIT (SPANS 9-11)

CIBOLO CREEK BRIDGE SOUTHBOUND LANES

280

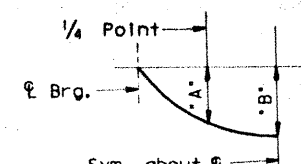
IR35-2(152)173 280



**PLAN**

Span No.	Beam No.	Horiz. Dist. $\phi$ - $\phi$ Bent	# Beam Length
12	A11	125,000'	124.67'
13	A11	85,000'	84.67'

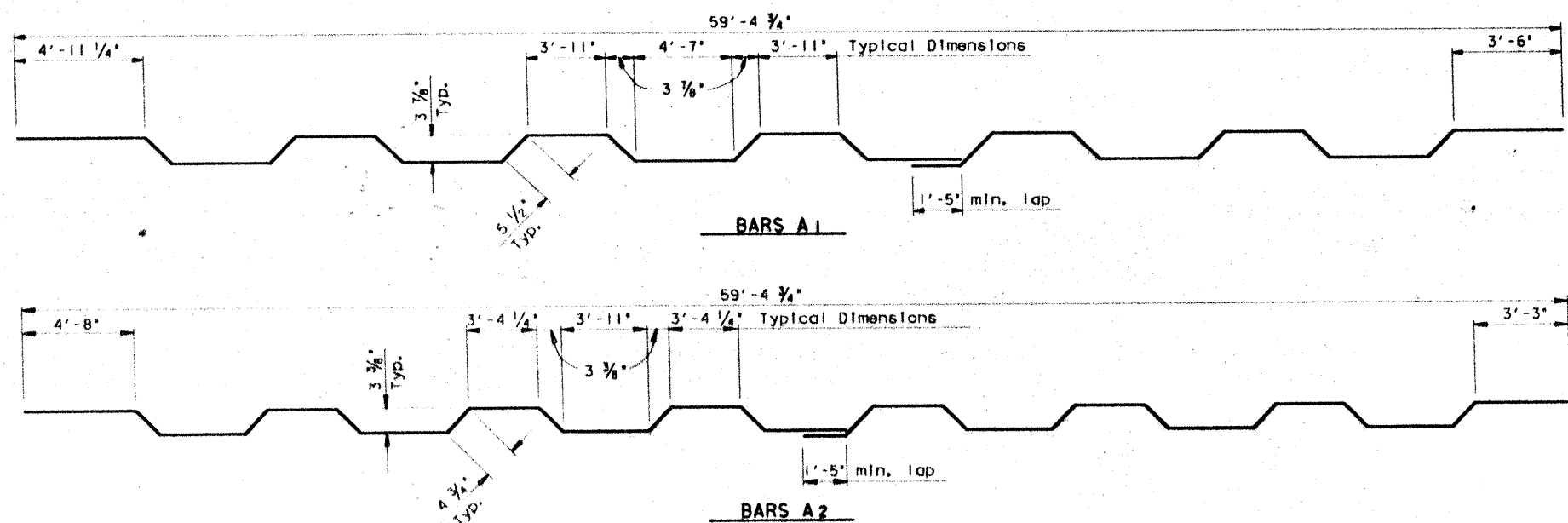
# Beam lengths shown are bottom flange lengths with adjustment made for beam slope.



**DEAD LOAD DEFLECTION DIAGRAM**

Deflections shown are due to cast-in-place concrete only ( $E=5 \times 10^6$  p.s.i.)

Span No.	Beam No.	'A'	'B'
12	A11	0.164'	0.230'
13	A11	0.043'	0.060'



**TABLE OF ESTIMATED QUANTITIES**

BAR	NO	SIZE	LENGTH	WEIGHT
A1	102	#5	* 62'-5"	6641
A2	136	#5	* 62'-5"	8854
B	239	#4	59'-5"	9487
C	239	#5	59'-5"	14812
D1	58	#5	* 86'-3"	5218
D2	60	#5	* 129'-8"	8115
T1	54	#4	* 86'-0"	3102
T2	62	#4	* 129'-2"	5350
DK1	24	#5	7'-1"	177
DK2	28	#5	5'-9"	168
DN	2	#8	55'-11"	299
DS	90	#4	5'-4"	320


Reinforcing Steel	#	LB	62543
Prestr. Conc. Bms. (Ty. IV)	LF	1590.05	

Span No.	Reinf. Conc. Slab - S.F.	Class S Conc. - C.Y. #	Slab
12	7203	2.1	165.5
13	4898	2.1	118.7
Total	12101		284.2

\* For contractor's information only.  
 # Includes 1'-1'-2' min. lap.  
 \* Includes 1'-1'-5' min. lap.  
 # Includes 2'-1'-2' min. laps.  
 # Includes 2'-1'-5' min. laps.

**GENERAL NOTES:**  
 Designed in accordance with A.A.S.H.T.O. 1983 Standard and Interim Specifications.  
 Design  $f_c=1200$  p.s.i.

HS 20 LOADING Sheet 1 of 2



STATE DEPARTMENT OF HIGHWAYS  
AND PUBLIC TRANSPORTATION

**210.00' PRESTR. CONC.  
BEAM UNIT**  
(SPANS 12 & 13)

**CIBOLO CREEK BRIDGE  
SOUTHBOUND LANES**

DATE: 12/1/82

BY: [Signature]

CHECKED: [Signature]

APPROVED: [Signature]

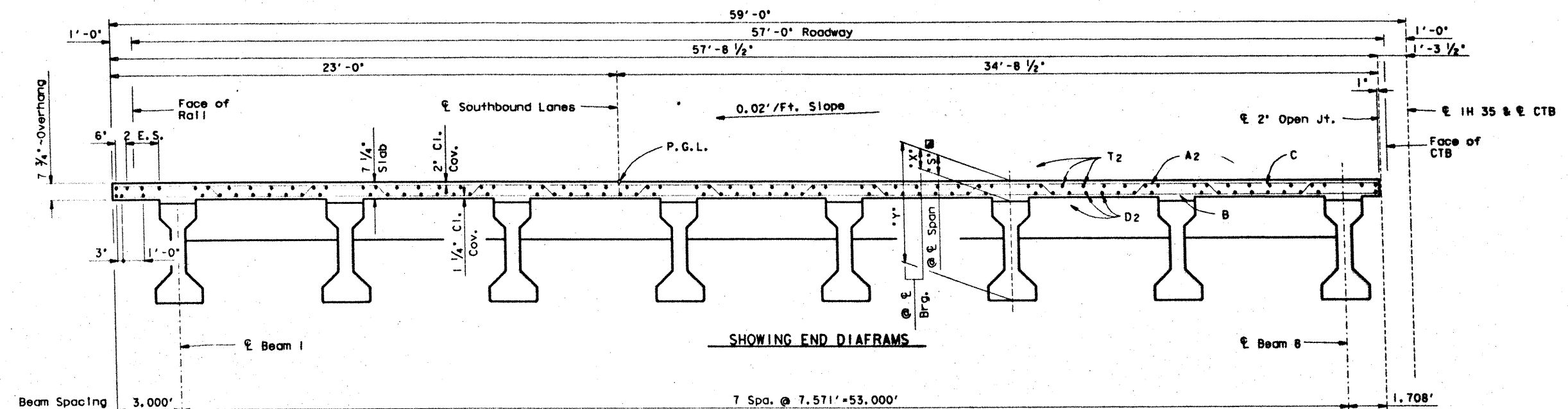
PROJECT: 1R35-2(152)173 281

CONTRACT: 1R35-2(152)173

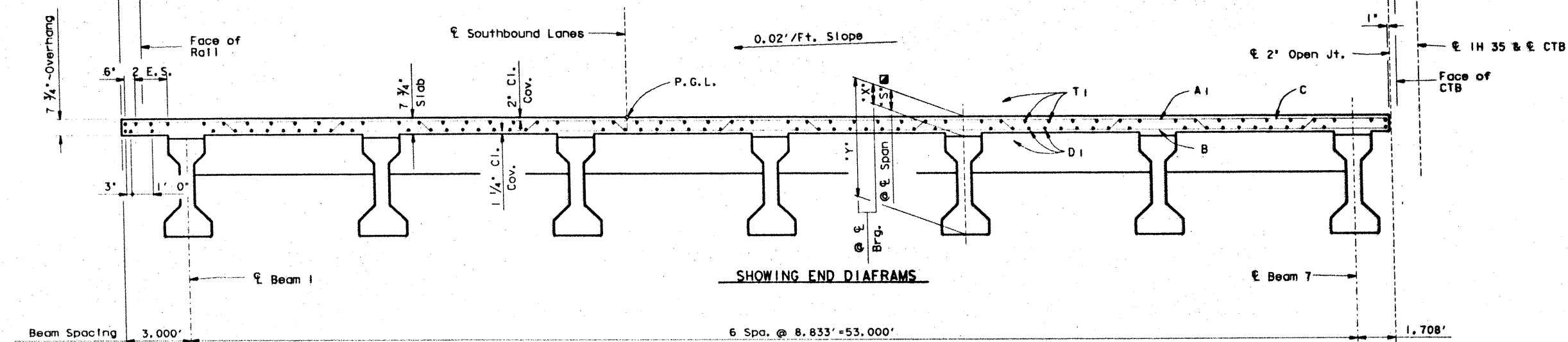
SECTION: 281

DATE: 12/1/82

281



TYPICAL TRANSVERSE SECTION-SPAN 12



TYPICAL TRANSVERSE SECTION-SPAN 13

Span No.	Beam No.	*X* @ Brg.	*Y* @ Brg.	*S* @ Span
12	All	9 1/2"	5'-3 1/2"	7 5/8"
13	All	9 1/4"	5'-3 1/4"	8 3/8"

\*Theoretical value, for information only.

HS 20 LOADING

Sheet 2 of 2

STATE DEPARTMENT OF HIGHWAYS  
AND PUBLIC TRANSPORTATION

210.00' PRESTR. CONC.  
BEAM UNIT

(SPANS 12 & 13)

CIBOLO CREEK BRIDGE  
SOUTHBOUND LANES

0451121A2135510313905PBD5.DWG

DATE: AUGUST, 1988

PREPARED BY AND FOR USE OF TEXAS SDH&T

DATE: 15

PROJECT: IR 35-2 (157)173

SHEET: 282

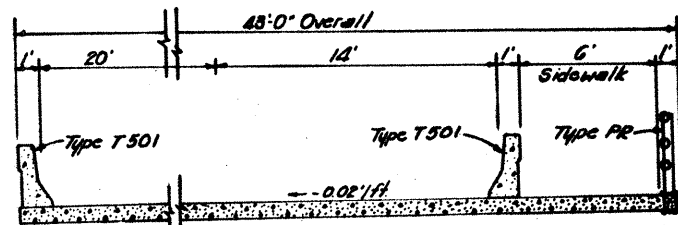
COUNTY: TARRANT

CONTRACT: 16

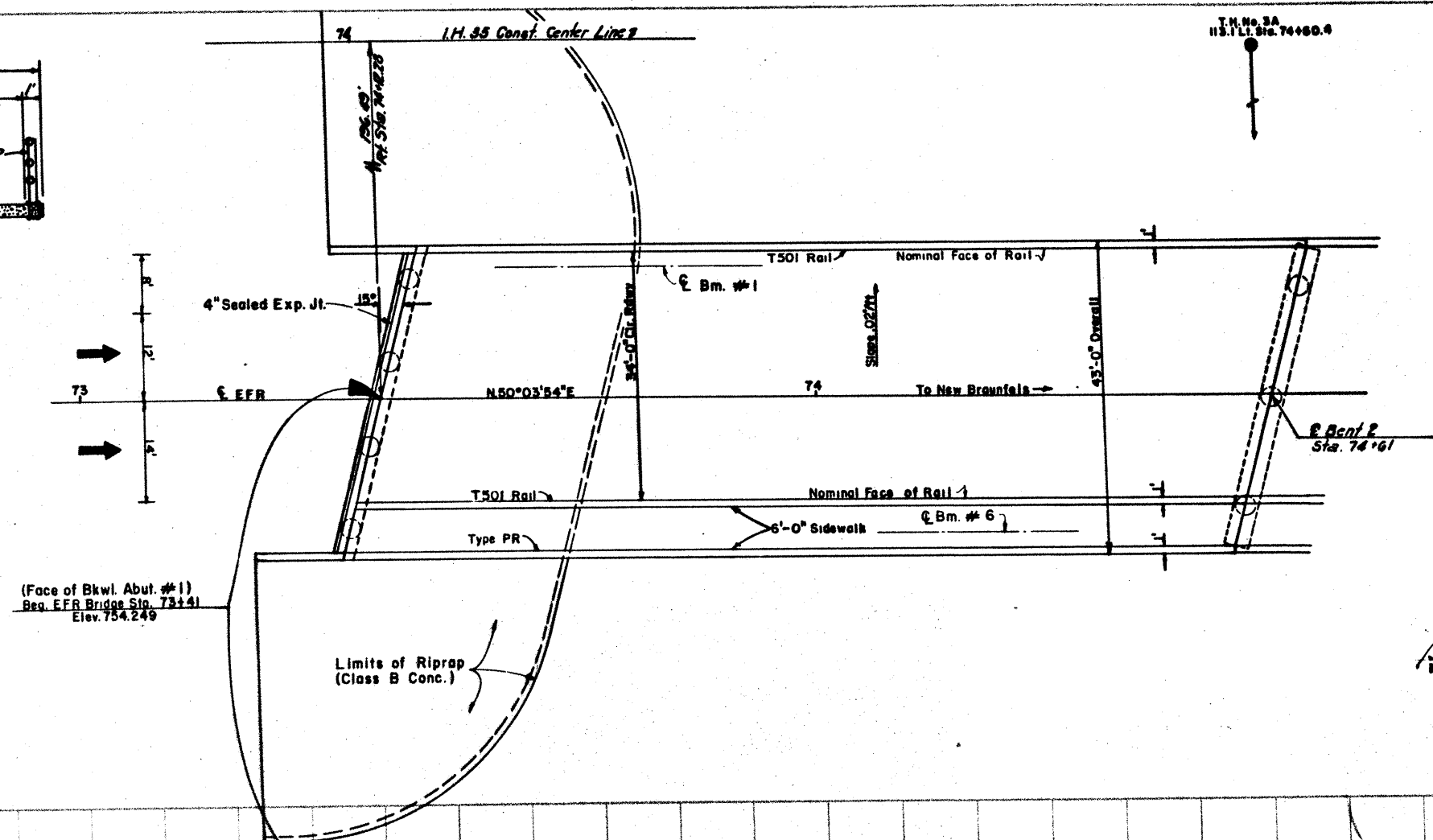
SECTION: 16

DATE: 1988



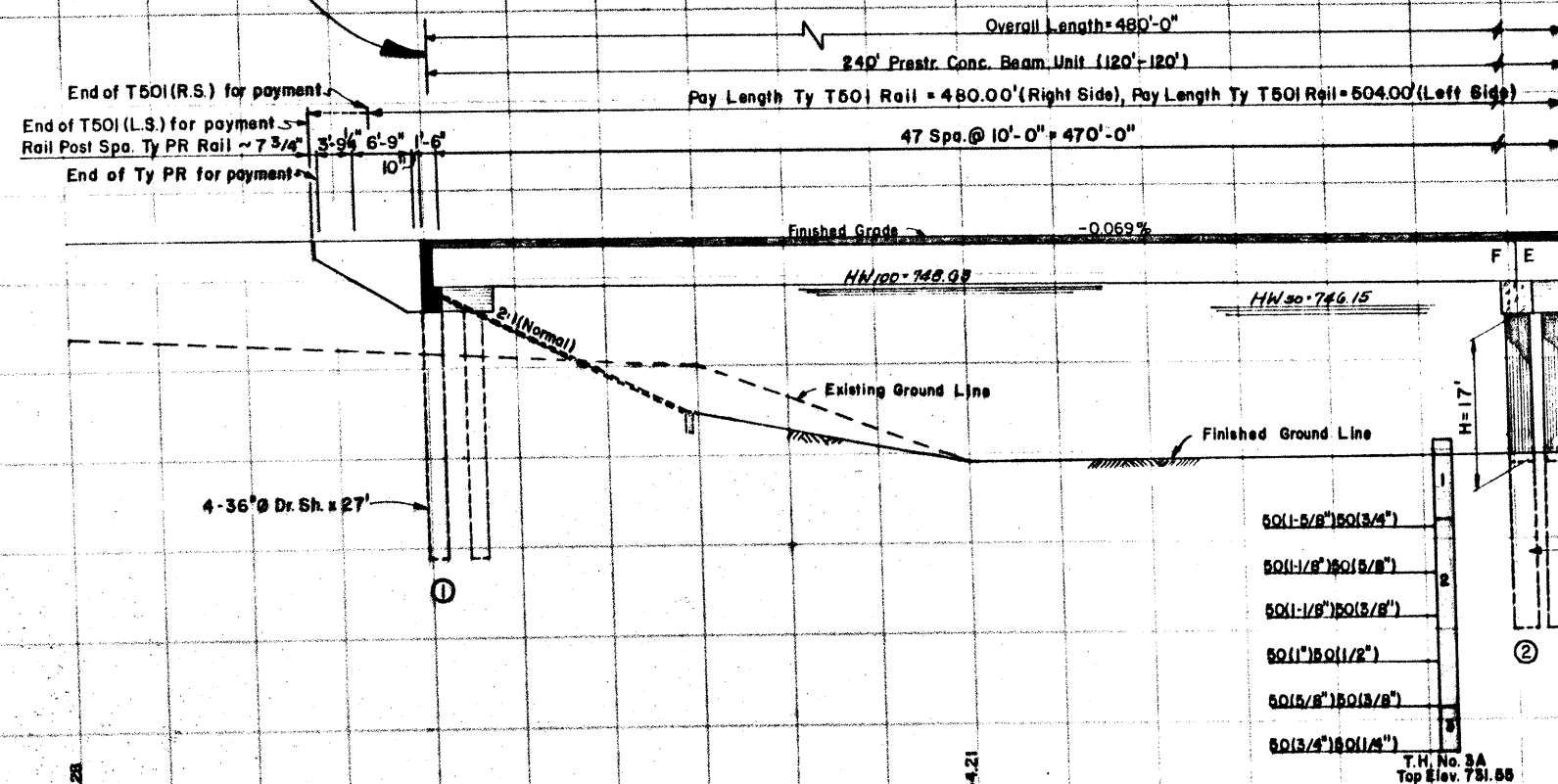


TYPICAL SECTION E.F.R. BRIDGE



Robbie L. Hazert P.E. 7/26/09  
Robbie L. Hazert

Note: Drilled shafts are designed using skin friction & point bearing in shale. Drilled shafts shall be founded a minimum of one diameter into hard shale.



283

BRIDGE LAYOUT  
CIBOLO CREEK BRIDGE  
EAST FRONTAGE ROAD  
SCALE 1" = 10' Horiz. & Vert.

IR35-2 (152) 173 1H.35

EAH  
B/B 15 Boulevard, Etc. 16 6 29th 203  
01-29-88 ~ Changed to T501 Rail

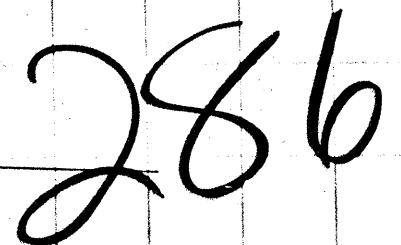
- T.H. No. 3A
1. GRAVEL, well graded, w/tr. Tan silty Clay, Stiff
  2. SHALE, Brn., w/seams Gr. Shale, tr. Sand, Foss., V. Hard
  3. SHALE, Blue, w/tr. Sand, V. Hard







Bobbie L. Masert P.E. 7/24/89  
Bobbie L. Masert Date



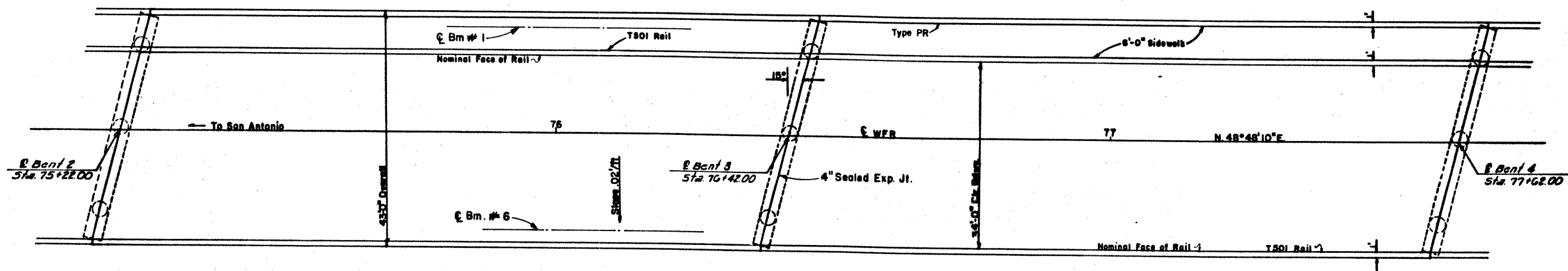
**Note: Drilled shafts are designed using skin friction & point bearing in shale. Drilled shafts shall be founded a minimum of one diameter into hard shale.**

BRIDGE LAYOUT  
CIBOLO CREEK BRIDGE  
WEST FRONTAGE ROAD  
SCALE 1" = 10' Horiz. & Vert.

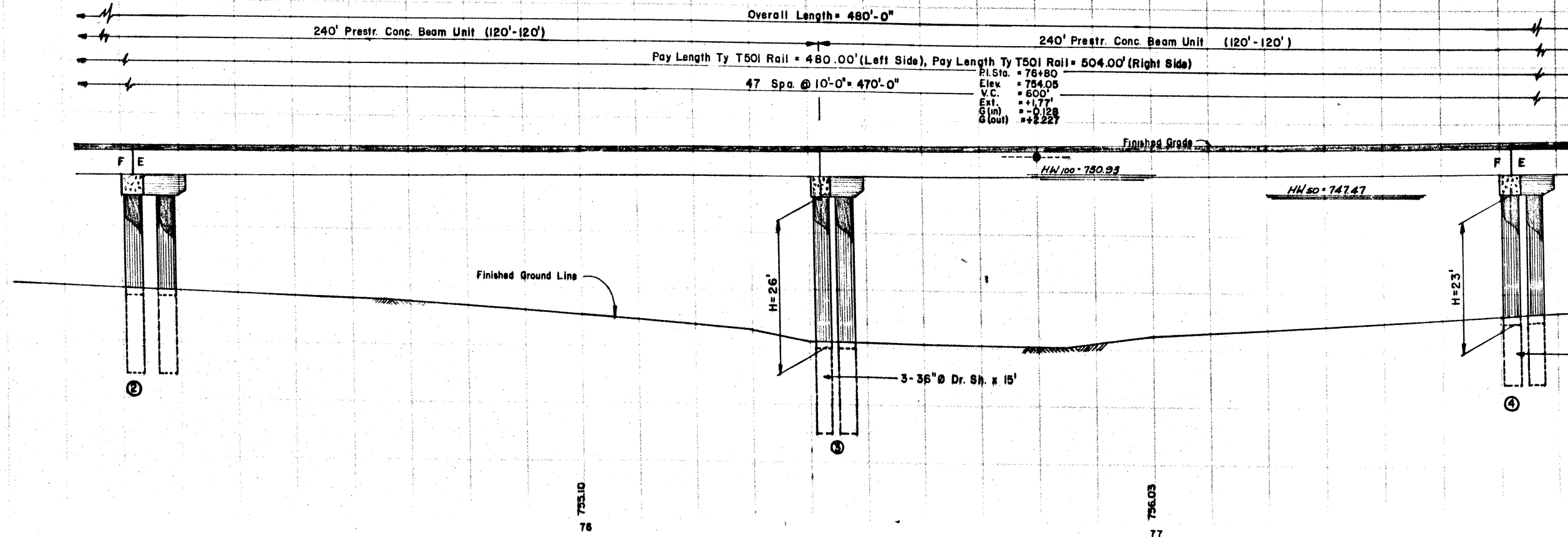
IR35-2(157)73 1H.35

EAH  
B/B 15 Guadelupe Etc 16 6 29 Etc 286  
01-29-88 ~ changed to T501 Rail





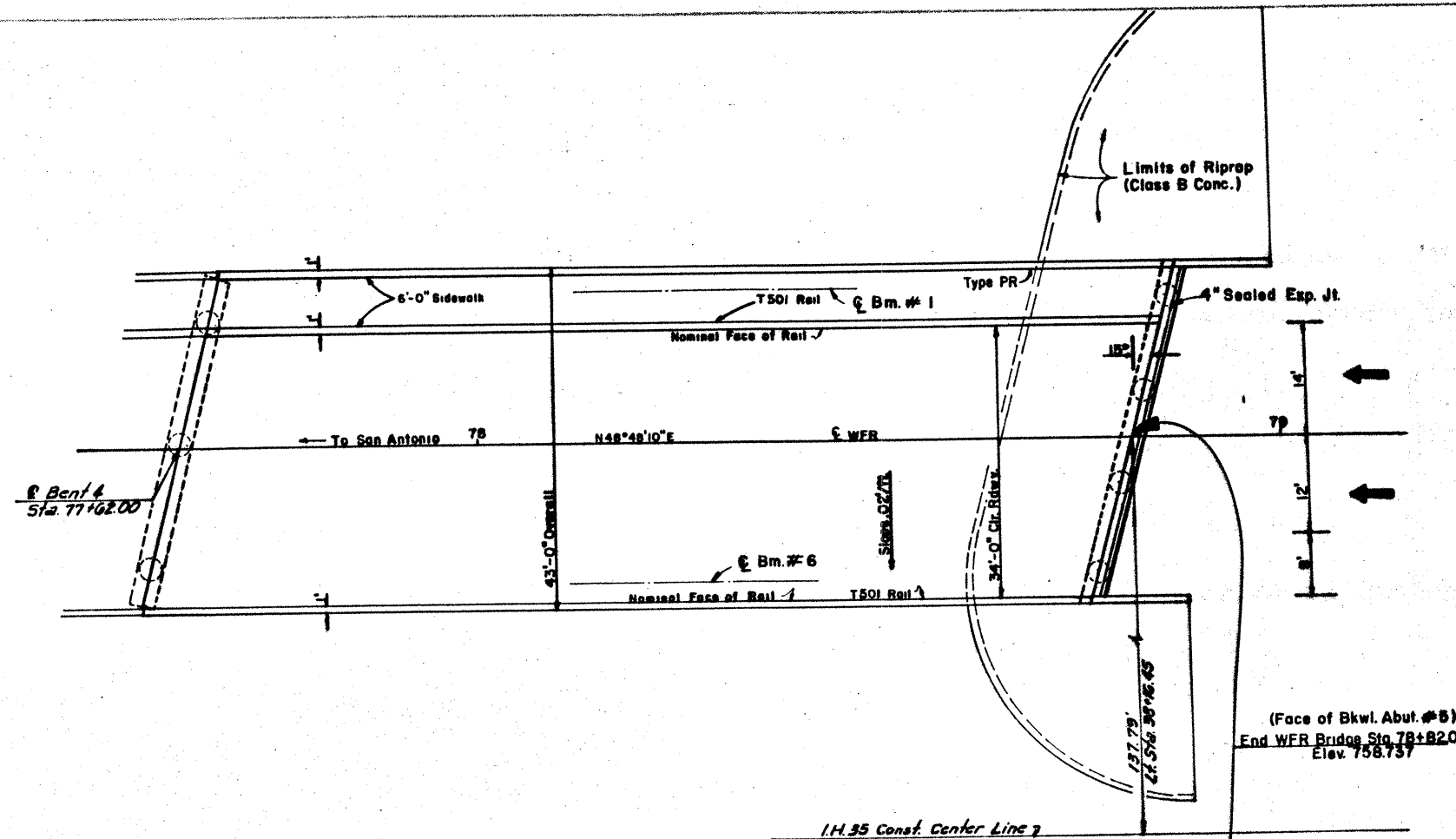
*Robert L. Hooten* P.E. 7/26/82  
 Robert L. Hooten



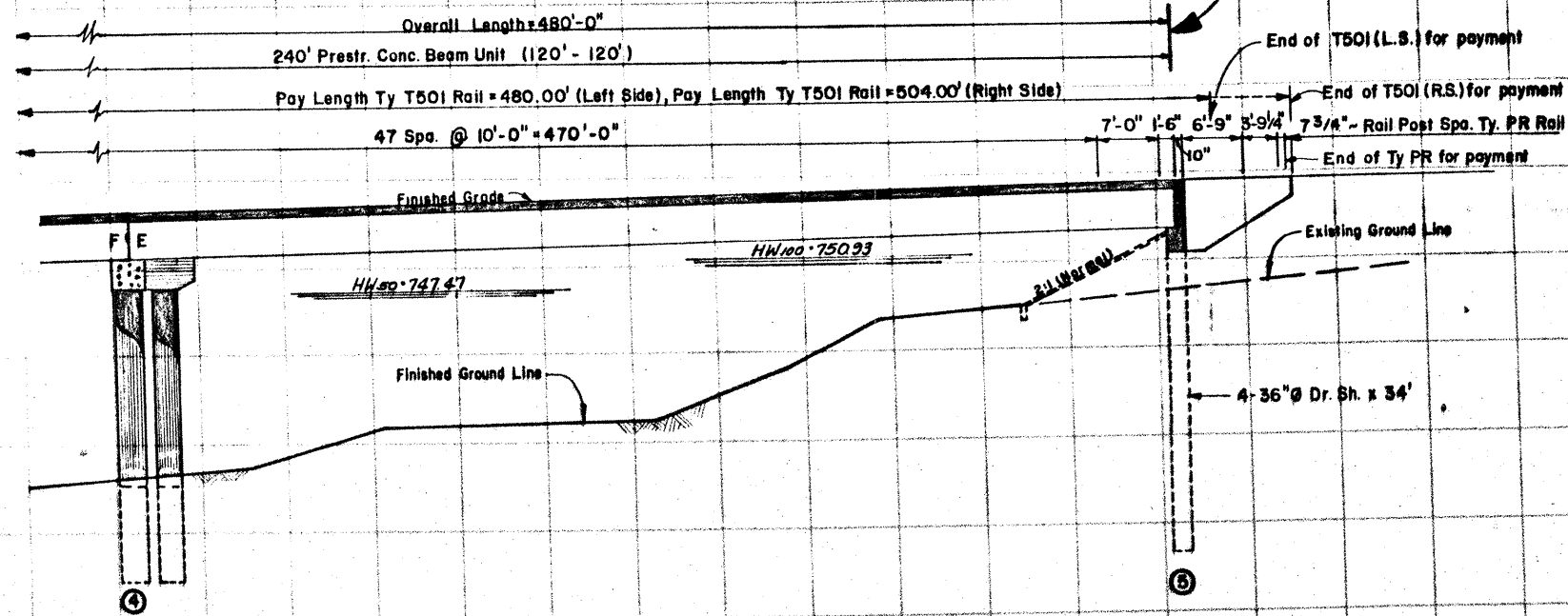
287

BRIDGE LAYOUT  
 CIBOLO CREEK BRIDGE  
 WEST FRONTAGE ROAD  
 SCALE 1"=10' Horiz. & Vert.

IR35-2(152)173 1H35  
 EAH  
 BUB 15 Guadalupe Etc 16 6 Dec 287  
 01-29-88-Changed to T501 Rail



Robbie L. Mason 7/26/02



288

BRIDGE LAYOUT  
CIBOLO CREEK BRIDGE  
WEST FRONTAGE ROAD

SCALE 1" = 10' Horiz. 8" Vert.

IR35-2(152)173 14.85

EAH  
B/B 15 Guadalupe Exp 16 6 Pgs 288  
01-29-88-changed to T501 Rail

## SUMMARY OF ESTIMATED QUANTITIES

ITEM  DESCRIPTION	Drilled Shaft	Class C Concrete		Reinforced Concrete Slab	Prestressed Concrete Beam	Concrete Surface Treatment	R/Prap (Conc.) (C.I.B)	Railing		Sealed Expansion Joint (4')							
	36"	Abut.	Bent		Type IV			Type T501	Type PR								
	L.F.	C.Y.	C.Y.	S.F.	L.F.	S.Y.	C.Y.	L.F.	L.F.	L.F.							
2-Abutments	228	54.6					90.9	24.0	22.7								
3-Interior Bents	141		106.5														
2-240.00' Prestr. Conc. Bm. Units				20640	2872.08	2142		960.0	480.0	105							
TOTAL	369	54.6	106.5	20640	2872.08	2142	90.9	984.0	502.7	105							

## BEARING SEAT ELEVATIONS

		BEAM 1	BEAM 2	BEAM 3	BEAM 4	BEAM 5	BEAM 6
BENT	1 (FWD)	748.4492	748.5986	748.7480	748.8975	749.0469	749.1960
BENT	2 (BK)	748.3669	748.5164	748.6658	748.8152	748.9646	749.1140
	(FWD)	748.3242	748.4736	748.6230	748.7725	748.9219	749.0713
BENT	3 (BK)	748.3721	748.5146	748.6575	748.8005	748.9436	749.0869
	(FWD)	748.3345	748.4768	748.6194	748.7622	748.9053	749.0486
BENT	4 (BK)	748.9946	749.1265	749.2583	749.3901	749.5222	749.6548
	(FWD)	749.0066	749.1379	749.2698	749.4016	749.5337	749.6658
BENT	5 (BK)	750.3228	750.4434	750.5642	750.6853	750.8064	750.9280

289

HS 20 LOADING

STATE DEPARTMENT OF HIGHWAYS  
AND PUBLIC TRANSPORTATION

# ESTIMATED QUANTITIES AND BEARING SEAT ELEVATIONS

CIBOLO CREEK BRIDGE  
EAST FRONTAGE ROAD

D45E ZI AZE 13550313904TAROT, DGN						PREPARED BY AND FOR USE OF TEXAS SDHP/T					
SEPTEMBER, 1988						STATISTICAL SECTION		FEDERAL AND PROSECUT.		ORIGIN	
REVISIONS						15		6		IR35-2(157) 173 189	
DRAWN BY C.W.						COUNTY					
CHECKED BY T.M.						GUADALUPE, ETC		16		6 296 TH 35	
APPROVED BY W.B.J.											
DATE 10/1/88											

## SUMMARY OF ESTIMATED QUANTITIES

DESCRIPTION	ITEM	Drilled Shaft	Class C Concrete		Reinforced Concrete Slab	Prestressed Concrete Beam	Concrete Surface Treatment	Riprap (Conc.) (C.I.B)	Rolling		Sealed Expansion Joint (4")						
		36" #	Abut.	Bent		Type IV			Type T501	Type PR							
		L.F.	C.Y.	C.Y.	S.F.	L.F.	S.Y.	C.Y.	L.F.	L.F.	L.F.						
2-Abutments		256	54.6					62.8	24.0	22.7							
3-Interior Bents		120		104.8													
2-240.00' Prestr. Conc. Bm. Units					20640	2872.14	2142		960.0	480.0	105						
TOTAL		376	54.6	104.8	20640	2872.14	2142	62.8	984.0	502.7	105						

## BEARING SEAT ELEVATIONS

		BEAM 1	BEAM 2	BEAM 3	BEAM 4	BEAM 5	BEAM 6
BENT	1 (FWD)	749.2725	749.1250	748.9775	748.8303	748.6833	748.5364
BENT	2 (BK)	749.5261	749.3694	749.2126	749.0562	748.8999	748.7439
	(FWD)	749.5325	749.3757	749.2187	749.0623	748.9058	748.7495
BENT	3 (BK)	750.3445	750.1785	750.0125	749.8467	749.6809	749.5154
	(FWD)	750.3577	750.1914	750.0251	749.8594	749.6936	749.5281
BENT	4 (BK)	751.7280	751.5527	751.3774	751.2021	751.0271	750.8523
	(FWD)	751.7478	751.5723	751.3967	751.2214	751.0464	750.8716
BENT	5 (BK)	753.6763	753.4915	753.3069	753.1223	752.9382	752.7539

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HS 20 LOADING

STATE DEPARTMENT OF HIGHWAYS  
AND PUBLIC TRANSPORTATION

# ESTIMATED QUANTITIES AND BEARING SEAT ELEVATIONS

CIBOLO CREEK BRIDGE  
WEST FRONTAGE ROAD

WEST VIRGINIA

046101ZFAZ\*13551031330041AB02.DGN  
SEPTEMBER, 1988

PHOTOGRAPHED BY AND FOR USE OF TEXAS SOHMP

REVISIONS

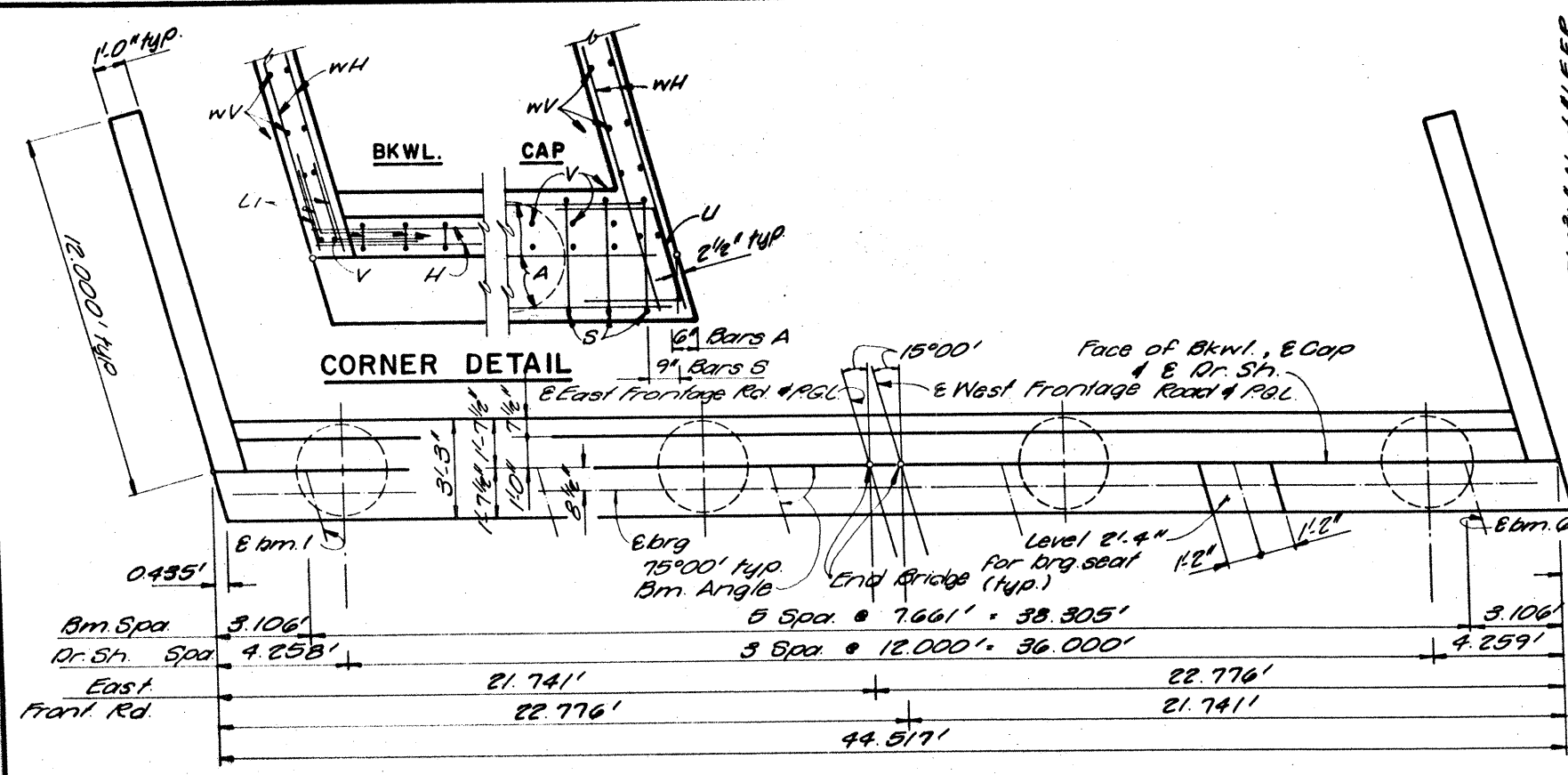
IR35-2(57)73 290

GUARDIAN, ETC

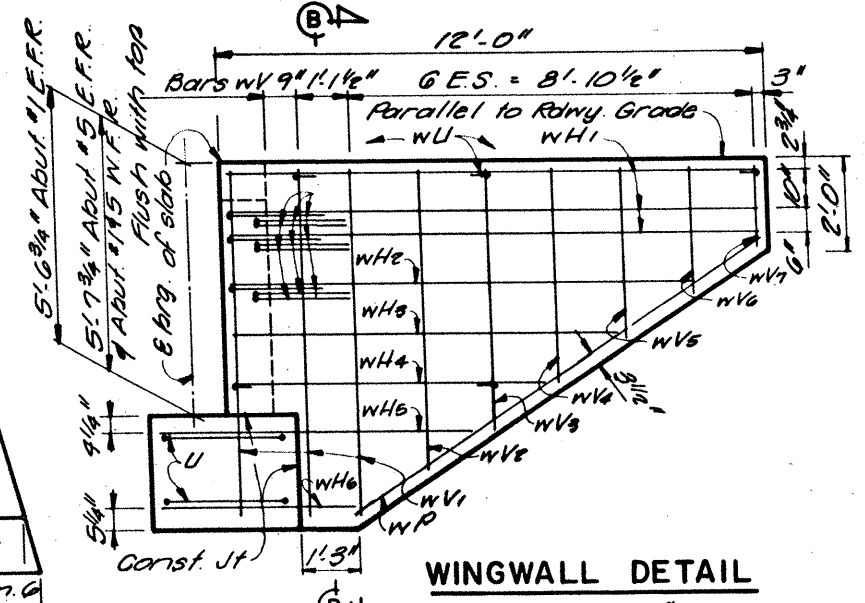
16 6 290 11 35



TABLE OF ESTIMATED QUANTITIES				
Bar	No.	Size	Length	Weight
A	6	#11	43.6'	1387
H	12	#5	44.2'	553
LI	9	#6	4.0'	54
LE	9	#6	4.0'	54
S	30	#4	10.0'	252
U	4	#6	7.11'	48
V	43	#5	13.9'	617
WH1	12	#6	11.8'	210
WH2	4	#6	10.3'	62
WH3	4	#6	8.7'	52
WH4	4	#6	7.0'	42
WH5	4	#6	6.11'	42
WH6	4	#6	4.4'	26
WU	10	#4	11.7'	11
WV1	12	#5	7.9'	97
WV2	24	#5	4.44'	108
WP	4	#6	11.0'	60
Reinforcing Steel #			183681	
Class C Concrete cu			27.3	

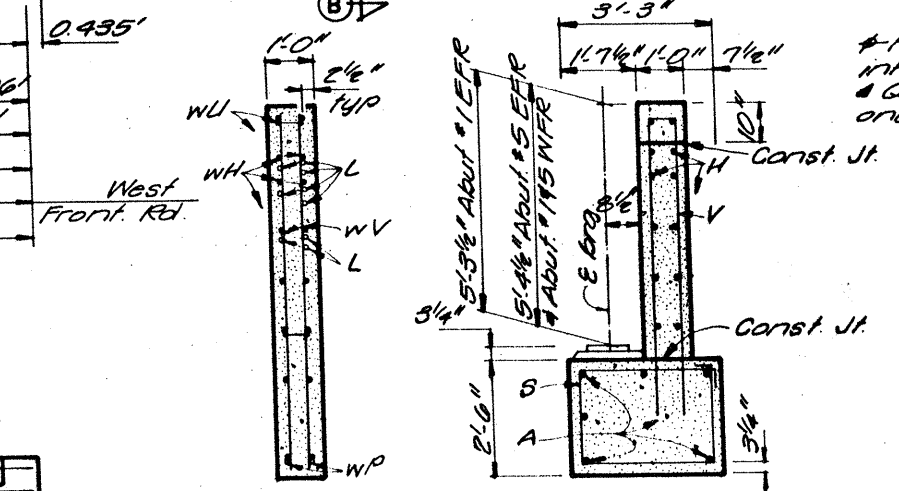


**PLAN**  
(Showing Abut. #5 WFR & EFR)



**WINGWALL DETAIL**

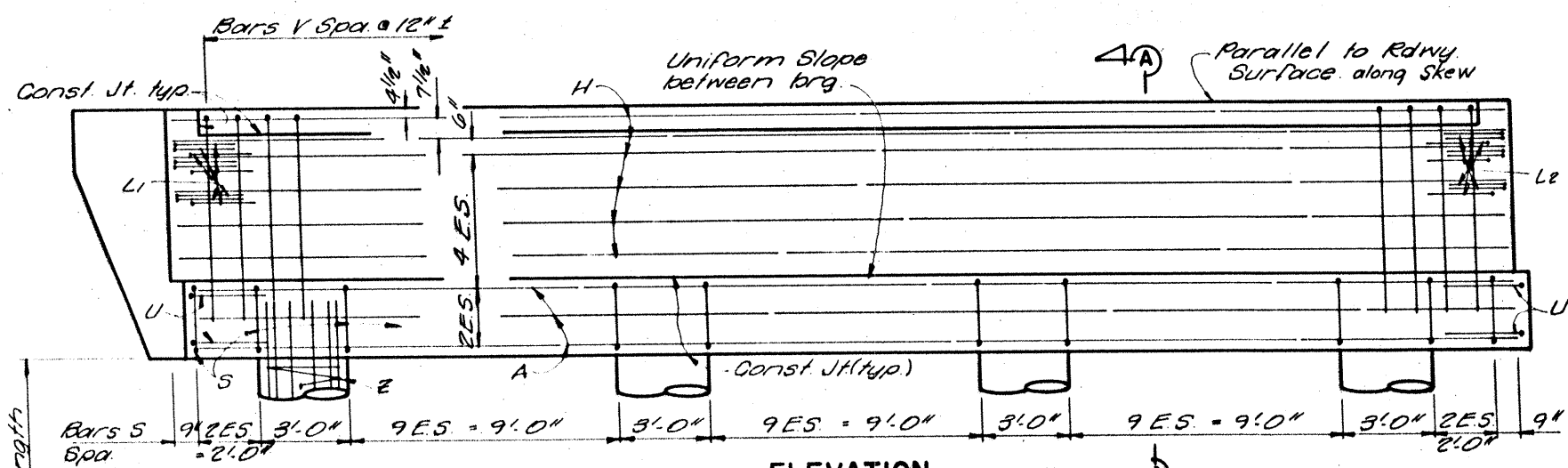
\* For Contractor's information only.  
\* Quantities shown are for one abutment only.



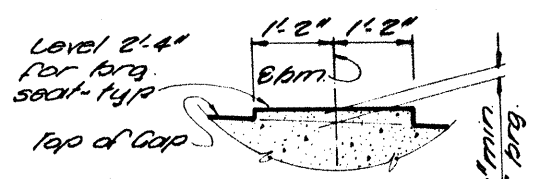
**SECTION B-B**

**SECTION A-A**

291



**ELEVATION**



**BEARING SEAT DETAIL**

**GENERAL NOTES:**  
Designed in accordance with A.A.S.H.T.O. 1983 Standard and Interim Specifications.  
Calculated Dr. Sh. Load = 109 T/SF.

H.S. 20 LOADING

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

**ABUTMENT NO. 1 or 5**

**CIBOLO CREEK BRIDGE EAST or WEST FRONTAGE ROAD**

ORIGINAL DRAWING DATE	AUGUST 1988	REVISIONS	15	6	1R35-2(152)73	291
DESIGNED BY	CA	QIA	15	6	1R35-2(152)73	291
CHECKED BY	CA	QIA	15	6	1R35-2(152)73	291
APPROVED BY	CA	QIA	15	6	1R35-2(152)73	291

See Layout Sheet for Length of Drilled Shafts

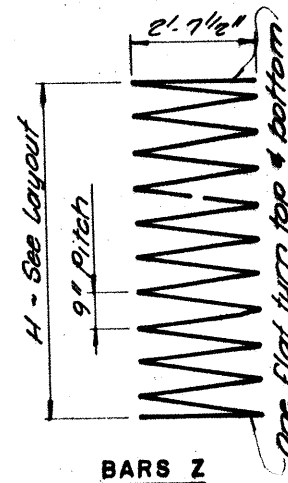
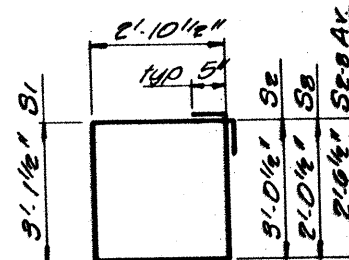
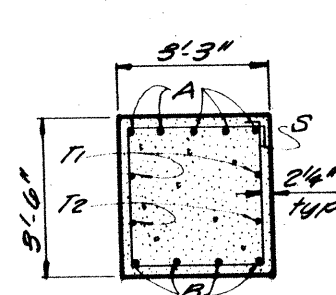
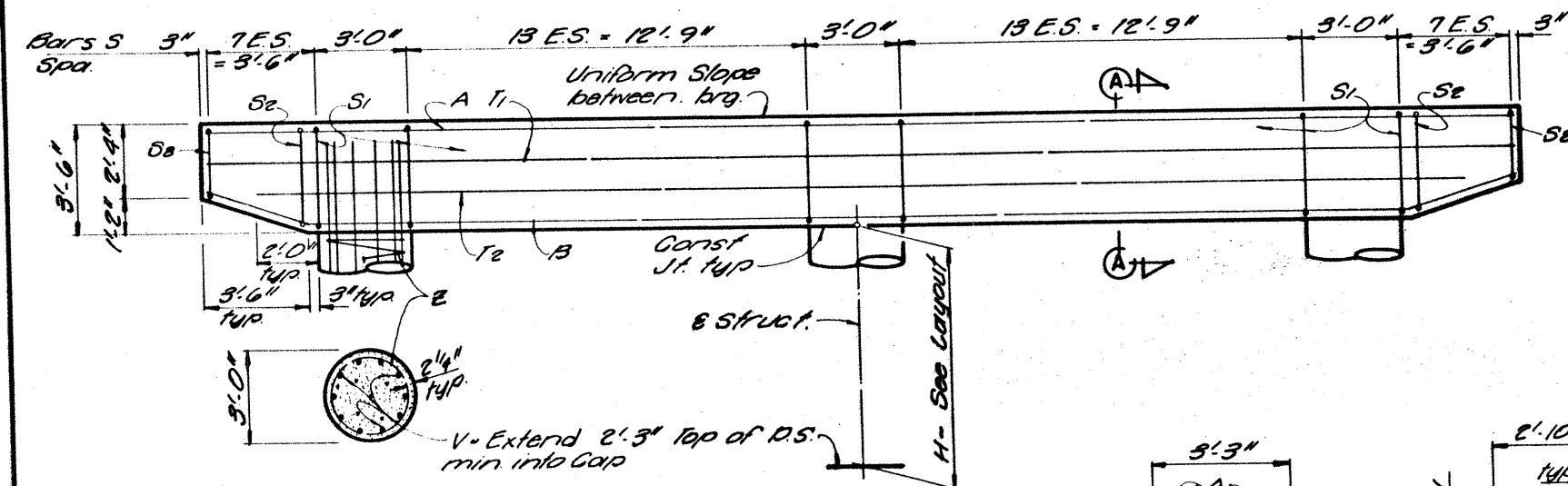
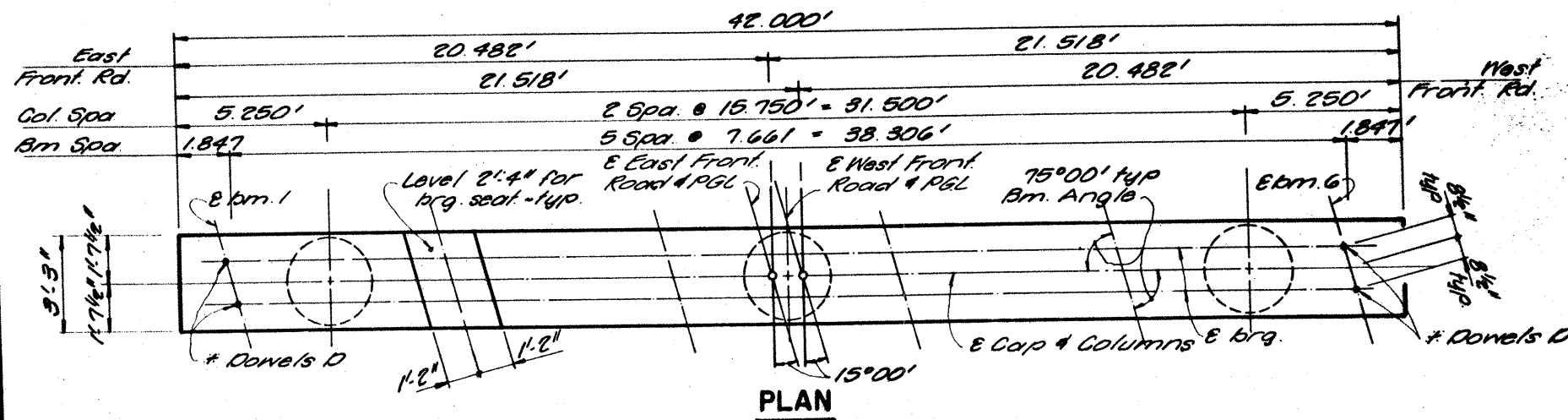


TABLE OF CONSTANT QUANTITIES

Bar	No	Size	Length	Weight
A	5	#11	41.8'	1107
B	4	#11	42.0'	893
D	4	#14	11.6'	85
S1	30	#5	12.10'	401
S2	14	#5	11.84'	169
T1	2	#5	41.8'	87
T2	2	#5	38.6'	80
Reinforcing Steel #11				2762
Class C Concrete				174

TABLE OF VARIABLE QUANTITIES

H	C/C Conc	Bars V 30" x 9"	Bars Z 3" x 4"
FT	C.Y.	Lqth WT	Lqth WT
15'	11.8	1743	1760
16'	12.6	1833	1862
17'	13.4	1933	1964
18'	14.1	2033	2066
19'	14.9	2133	2168
20'	15.7	2233	2270
21'	16.5	2333	2372
22'	17.3	2433	2474
23'	18.1	2533	2576
24'	18.8	2633	2678
25'	19.6	2733	2780
26'	20.4	2833	2882
27'	21.2	2933	2984
28'	22.0	3033	3086
29'	22.8	3133	3188
30'	23.6	3233	3290
31'	24.3	3333	3392

\*For Contractor's information only.  
 + Deduct 25 lbs. Bars D for bent 3.  
 # Quantities shown are for one bent only.

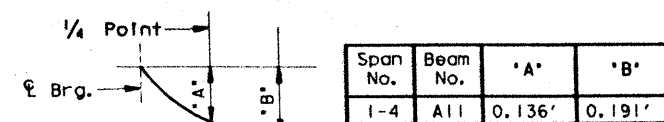
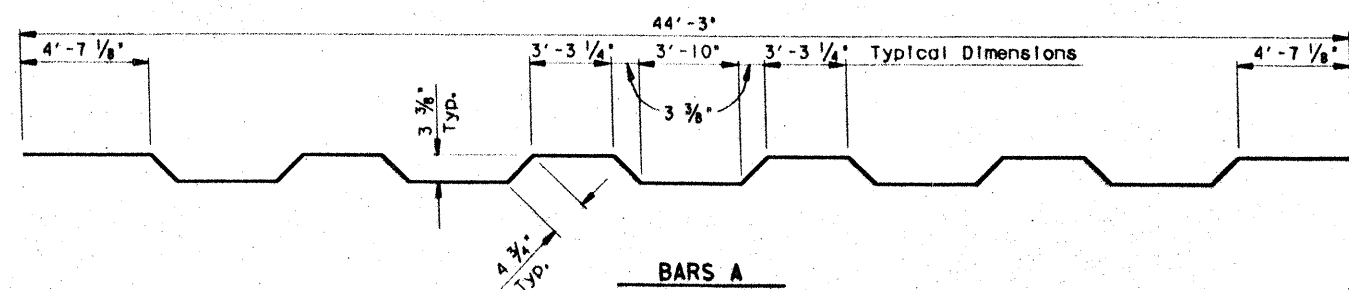
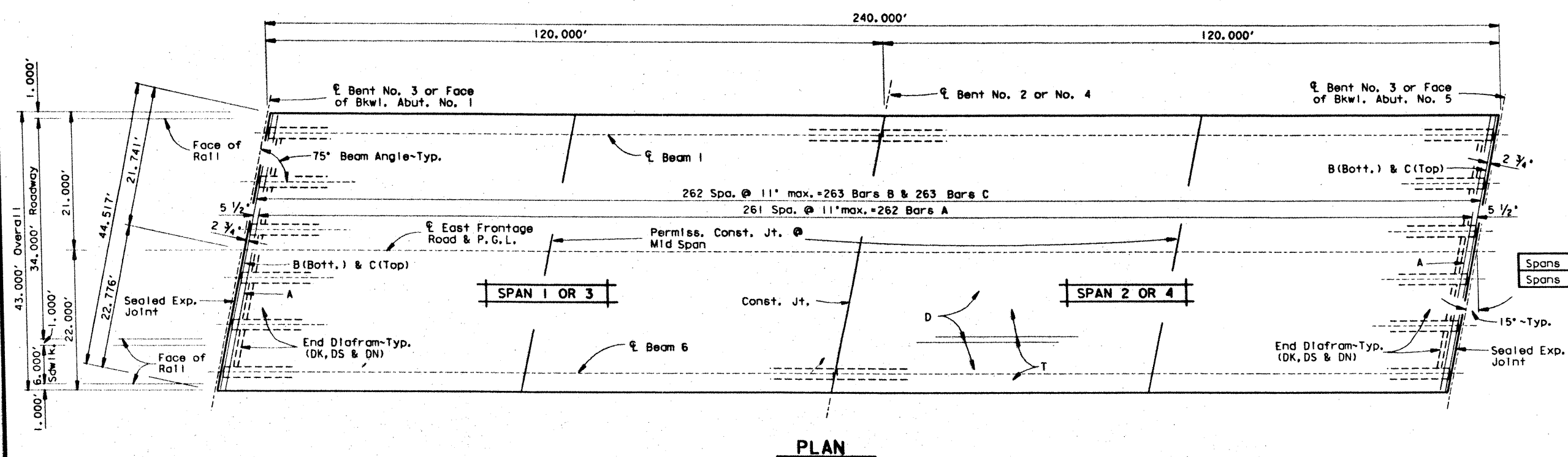
GENERAL NOTES:  
 Designed in accordance with A.A.S.H.T.O.  
 1983 Standard and Interim Specifications.  
 All cap steel shall be Grade 60.  
 Calculated Dr. Sh. Load (East or West Frontage Road):  
 Bent 2 = 262 kips  
 Bent 3 = 268 kips  
 Bent 4 = 265 kips  
 H.S. 20 LOADING

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

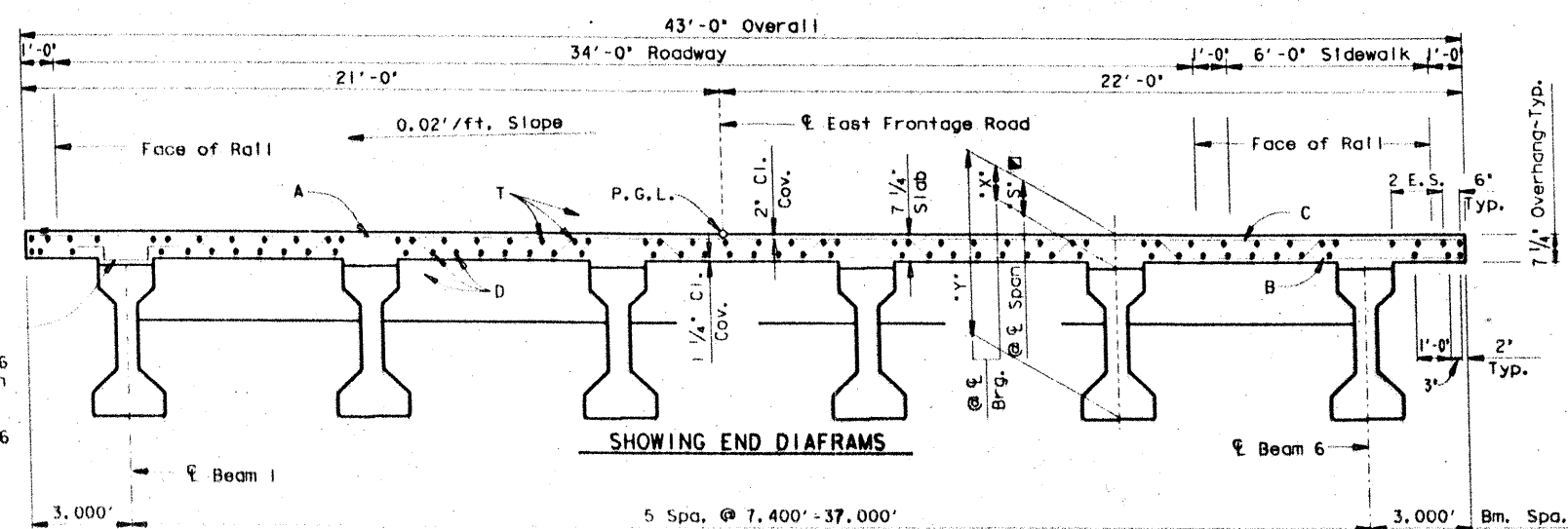
INTERIOR BENTS NOS. 2-4

CIBOLO CREEK BRIDGE EAST or WEST FRONTAGE ROAD

ORIGINAL DRAWING DATE	AUGUST 1988	STATE PROJECT NO.	15	FEDERAL AID PROJECT	1	SHEET	202
BY	CEM	DESIGNED BY	15	CONTRACT SECTION	10	DATE	10/2/88
IN	DM	CHECKED BY	15	CONTRACT SECTION	10	DATE	10/2/88
IN	DM	APPROVED BY	15	CONTRACT SECTION	10	DATE	10/2/88

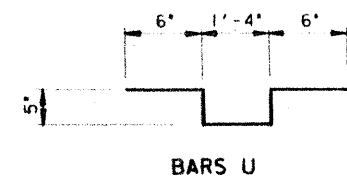


Span No.	Beam No.	'A'	'B'
1-4	All	0.136'	0.191'



Span No.	Beam No.	*X* • • Brg.	*Y* • • Brg.	*S* • • Span
1	All	9 1/2"	5' - 3 1/2"	7 1/2"
2	All	10"	5' - 4"	7 3/8"
3 or 4	All	10 1/2"	5' - 4 1/2"	7 1/2"

■ Theoretical value, for information only.



### ▲ TABLE OF ESTIMATED QUANTITIES

BAR	NO	SIZE	LENGTH	WEIGHT
A	262	#5	45' - 5'	12412
B	263	#4	44' - 3'	7774
C	263	#5	44' - 3'	12138
D	46	#5	* 245' - 4'	11771
T	48	#4	* 244' - 4'	7834
DK	40	#5	5' - 7'	233
DN	2	#8	38' - 4'	205
DS	60	#4	5' - 4'	214
U	120	#4	3' - 2'	254
U	480	#4	3' - 2'	1015

SPANS 1 & 2			
Reinforcing Steel		#	LB 5283
Prestr. Conc. Bms. (Ty. IV)		LF	1436.0
Span No.	Reinf. Conc. Slab ~ S.F.	Class S Conc. ~ C.Y.	
		Diaf.	Slab
1	5160	1.5	118.2
2	5160	1.5	118.9
Total	10320	240.1	

SPANS 3 & 4			
Reinforcing Steel		#	LB
Prestr. Conc. Bms. (Ty. IV)		LF	1436.
Span No.	Reinf. Conc. Slab ~ S.F.	Class S Conc. ~ C.Y.	
		Diaf.	Slab
3	5160	1.5	119.5
4	5160	1.5	119.5
Total	10320	242.0	

- \* For contractor's information only.
- \* Includes 4~1'-2' min. laps.
- \* Includes 4~1'-5' min. laps.
- \* Quantities shown are for one unit only.

GENERAL NOTES:

Designed in accordance with A.A.S.H.T.O. 1983  
Standard and Interim Specifications.  
Design for 1200 p.s.i.

HS 20 LOADING

STATE DEPARTMENT OF HIGHWAYS  
AND PUBLIC TRANSPORTATION

240.00' PRESTR. CONC.  
BEAM UNIT

CIBOLO CREEK BRIDGE  
EAST FRONTAGE ROAD

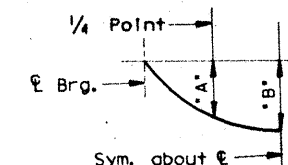
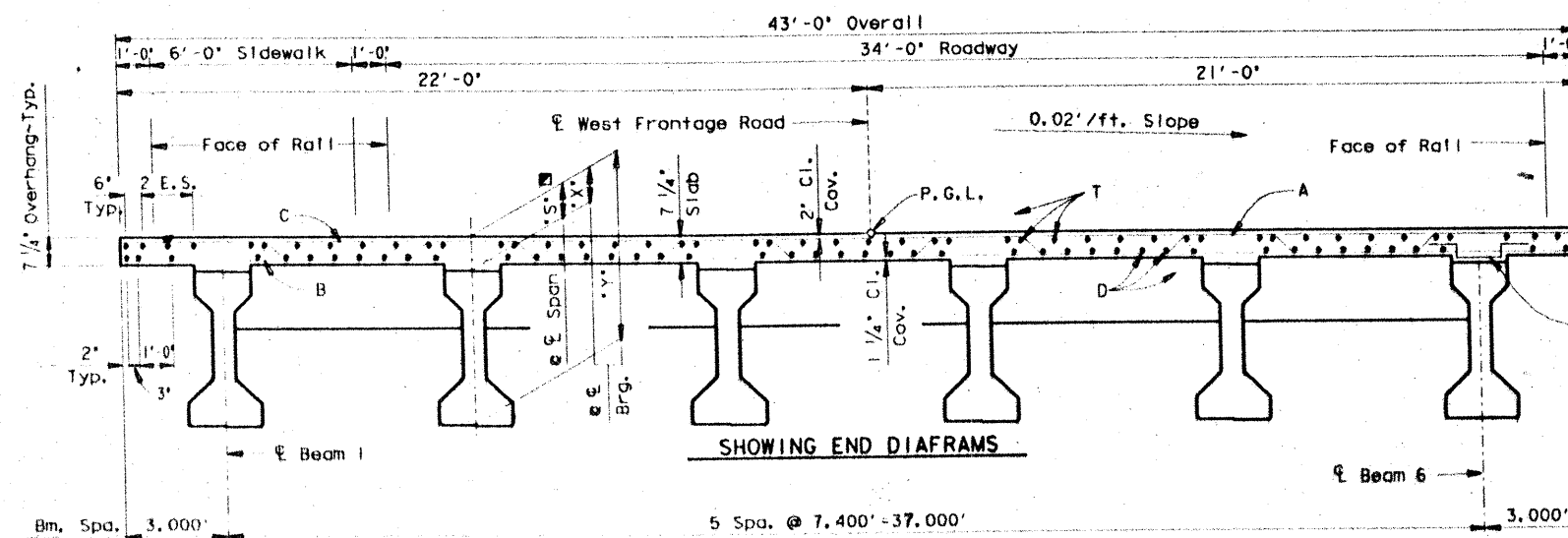
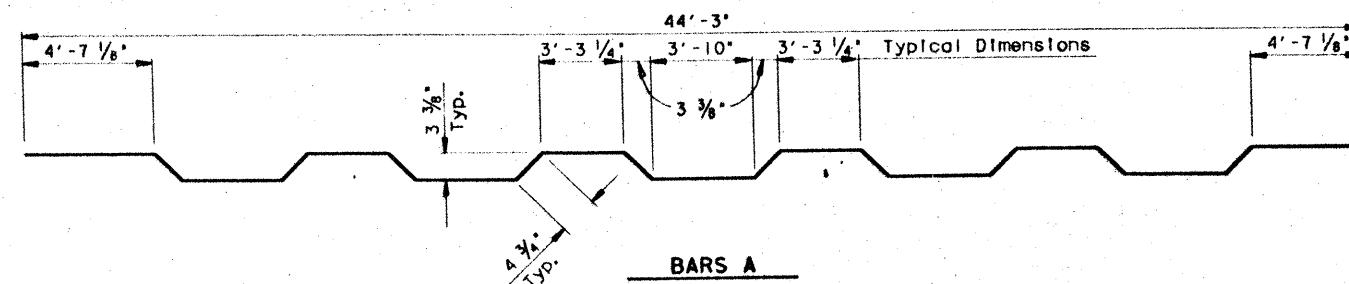
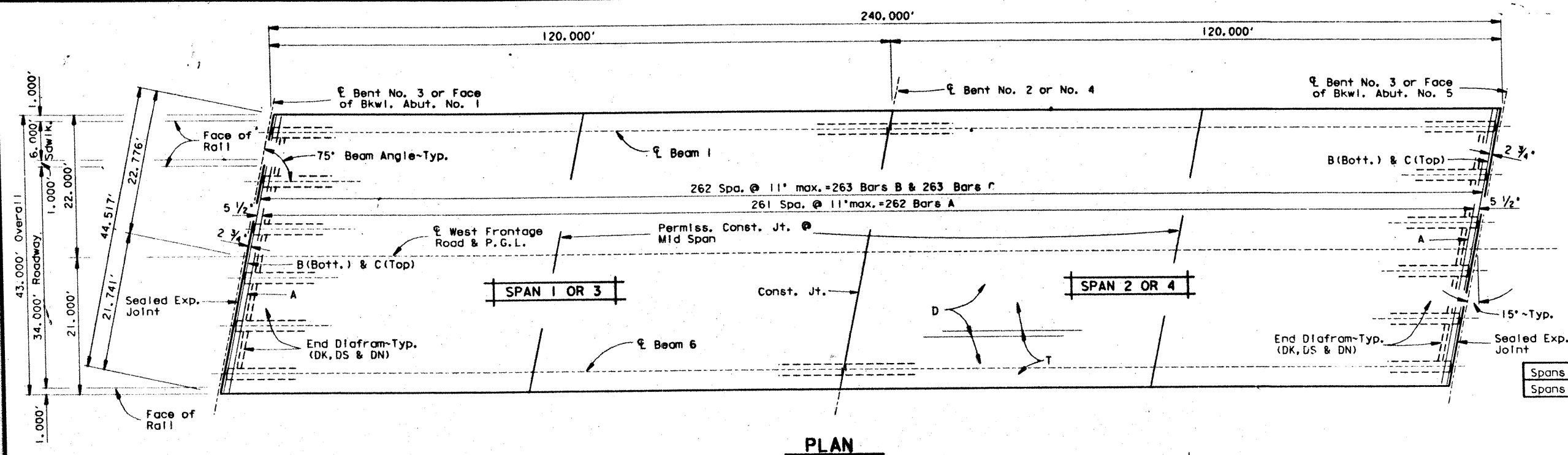
0451771 (1355102) 3904PBB02, DUN  
ORIGINAL CARD DATE: MARCH 1968  
REVISIONS

PREPARED BY AND FOR USE OF TEXAS SON&P  
FACILITY NUMBER: 16 6  
INTERNAL PRODUCT: 1  
SHEET: 1

IR35-2(152)173 22

COUNTY: 16 6  
SECTION: 29  
TOWNSHIP: 3

COMMUNITY, ETC



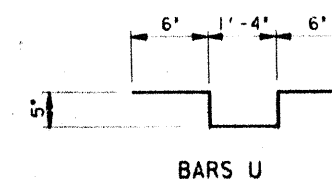
Span No.	Beam No.	'A'	'B'
1-4	All	0.136'	0.191

Span No.	Beam No.	Horiz. Dist. $\angle$ - $\angle$ Bent	# Beam Length
1-3	All	120.00'	119.67
4	All	120.00'	119.68

# Beam lengths shown are bottom flange lengths with adjustment made for beam slope.

Span No.	Beam No.	'X' e-e Brg.	'Y' e-e Brg.	<input checked="" type="checkbox"/> 'S' e-e Spo
1-4	All	10 1/2'	5'-4 1/2'	7 5/8'

■ Theoretical value, for information only.



### ▲ TABLE OF ESTIMATED QUANTITIES

BAR	NO	SIZE	LENGTH	WEIGHT
A	262	#5	45' - 5"	12412
B	263	#4	44' - 3"	7774
C	263	#5	44' - 3"	12138
D	46	#5	* 245' - 4"	11771
T	48	#4	* 244' - 4"	7834
U	480	#4	3' - 2"	1015
DK	40	#5	5' - 7"	233
DN	2	#8	38' - 4"	205
DS	60	#4	5' - 4"	214

	Reinforcing Steel	‡	LB	53596
Spans 1 & 2	Prestr. Conc. Bms. (Ty. IV)		LF	1436.04
Spans 3 & 4	Prestr. Conc. Bms. (Ty. IV)		LF	1436.10

Span No.	ReInf. Conc. Slab ~ S.F.	Class S Conc. ~ C.Y. #	
		Diaf.	Slab
1 or 3	5160	1.5	119.5
2 or 4	5160	1.5	119.5
Total	10320	242.0	

\* For contractor's Information only.  
 † Includes 4'-1'-2' min. laps.  
 \* Includes 4'-1'-5' min. laps.  
 ▲ Quantities shown are for one unit only.

GENERAL NOTES:

Designed in accordance with A.A.S.H.T.O. 1983  
Standard and Interim Specifications.  
Design for 1200 p.s.i.

HS 20 LOADING

STATE DEPARTMENT OF HIGHWAYS  
AND PUBLIC TRANSPORTATION  
240.00' PRESTR. CONC.  
BEAM UNIT

CIBOLO CREEK BRIDGE  
WEST FRONTAGE ROAD

[illegible]





SUMMARY OF ESTIMATED QUANTITIES


ITEM DESCRIPTION	Drilled Shaft		Class C Concrete		Reinf. Concrete Slab	Prestr. Concrete Beam (Type C)	Riprap (Conc.) (Cl. B)	Rolling Type C4 (Mod.)	Sealed Exp. Joint (4")	Concrete Surface Treatment						
	18" #	30" #	Abut.	Bent												
	LF	LF	CY	CY	SF	LF	CY	LF	LF	SY						
2-Abutments	62	357	94.4					56.0								
1-Interior Bent		55		40.5												
1-170' Prestr. Conc. Bm. Unit					15640	2201.68		340.0	162.0	1735						
TOTAL	62	412	94.4	40.5	15640	2201.68		396.0	162.0	1735						

BEARING SEAT ELEVATIONS

		BEAM 1	BEAM 2	BEAM 3	BEAM 4	BEAM 5	BEAM 6	BEAM 7	BEAM 8	BEAM 9	BEAM 10	BEAM 11	BEAM 12	BEAM 13
BENT 1 (FWD)		780.0361	780.1794	780.3230	780.4663	780.6096	780.7529	780.8962	780.7529	780.6096	780.4663	780.3230	780.1794	780.0361
BENT 2 (BK)		782.0647	782.2080	782.3513	782.4946	782.6379	782.7812	782.9246	782.7812	782.6379	782.4946	782.3513	782.2080	782.0647
	(FWD)	782.0903	782.2336	782.3770	782.5203	782.6636	782.8069	782.9502	782.8069	782.6636	782.5203	782.3770	782.2336	782.0903
BENT 3 (BK)		783.0708	783.2141	783.3574	783.5007	783.6440	783.7874	783.9307	783.7874	783.6440	783.5007	783.3574	783.2141	783.0708

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HS 20 LOADING



STATE DEPARTMENT OF HIGHWAYS  
AND PUBLIC TRANSPORTATION

ESTIMATED QUANTITIES  
AND  
BEARING SEAT ELEVATIONS.  
SCHERTZ PARKWAY UNDERPASS

D45200A+1ZFAZ1355116139081A01.DGN

ORIGINAL DRAWING DATE: AUGUST, 1988

PREPARED BY AND FOR USE OF TEXAS SDHP

DATE: 11/1/88

BY: JMH

BY: NKL

BY: JKL

BY: JKL

PROJECT: IR35-2 (152)/73

SECTION: 296

QUANTITY: 296

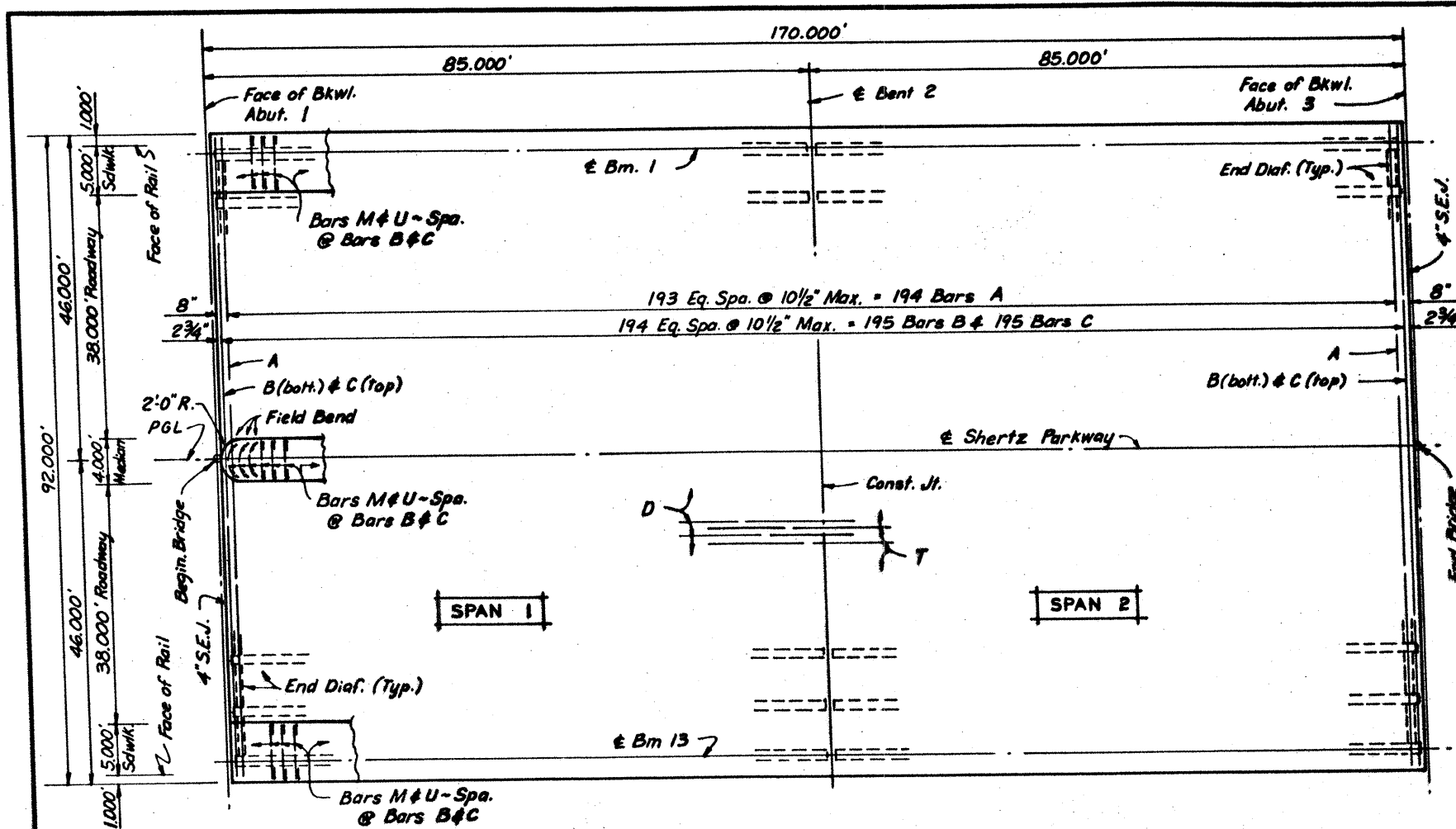
DATE: 11/1/88







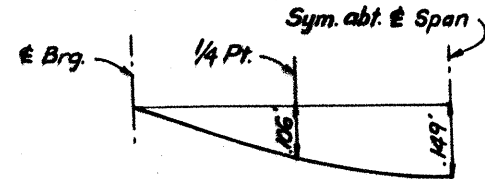




PLAN

SPAN NO.	BEAM NO.	HORZ. DIST. $\pm$ BENT	BEAM LENGTH
1	All	85.000'	84.69'
2	All	85.000'	84.67'

▲ Beam lengths shown are bottom flange lengths with adjustments made for bm. slope.



DEAD LOAD DEFLECTION DIAGRAM

Deflections shown are due to cast-in-place concrete only ( $E = 5 \times 10^6$  p.s.i.)

TABLE OF ESTIMATED QUANTITIES

Bar	No.	Size	Length	Weight
A	194	#5	96'-2"	19,459
B	195	#4	92'-11"	12,104
C	195	#5	93'-2"	18,949
D	102	#5	172'-6"	18,352
Me	390	#4	5'-7"	1,454
T	114	#4	172'-0"	13,098
U2	390	#5	1'-11"	781
U3	390	#5	2'-1"	846
DK	96	#5	5'-8"	568
DN	2	#8	86'-11"	464
DS1	144	#4	4'-10"	465
Reinforcing Steel			#	Lb. 86,540
Prestr. Conc. Bms. (Ty. C)			L.F.	2201.68
Span No.	Reinf. Conc. Slab - S.F.	# Class S Conc. - C.Y.		
		Diag.	Slab	
1	7820	3.0	212.7	
2	7820	3.0	212.7	
Total	15,640		431.4	

\* For Contractors information only.  
 ♦ Includes 2 ~ 1'5" min. laps.  
 # Includes 2 ~ 1'2" min. laps.  
 ■ Includes 1 ~ 1'5" min. lap.  
 \* Includes 1 ~ 1'2" min. lap.

GENERAL NOTES  
 Designed in accordance with A.A.S.H.T.O. 1983 Standard and Interim Specifications.  
 Design  $f_c = 1200$  p.s.i.

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HS 20 LOADING Sheet 1 of 2

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

170.00' PRESTR. CONC. BEAM UNIT (85'-85')

SCHERTZ PARKWAY UNDERPASS

OFFICIAL DRAWING DATE: AUG. 1988

DESIGNER: JMH

CHECKER: NKF

IN CHARGE: LDS

STATE: 16

FEDERAL AID PROJECT: 16

FEDERAL AID SECTION: 6

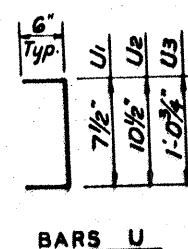
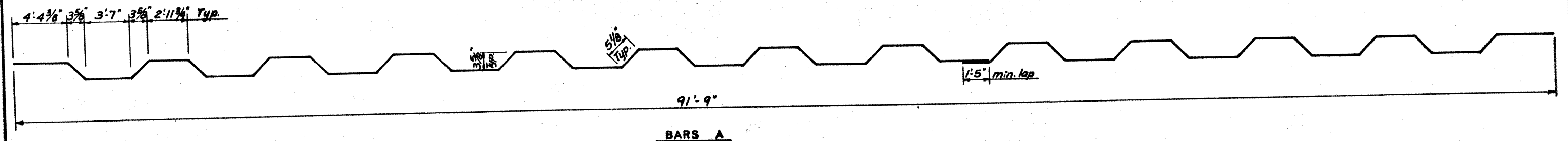
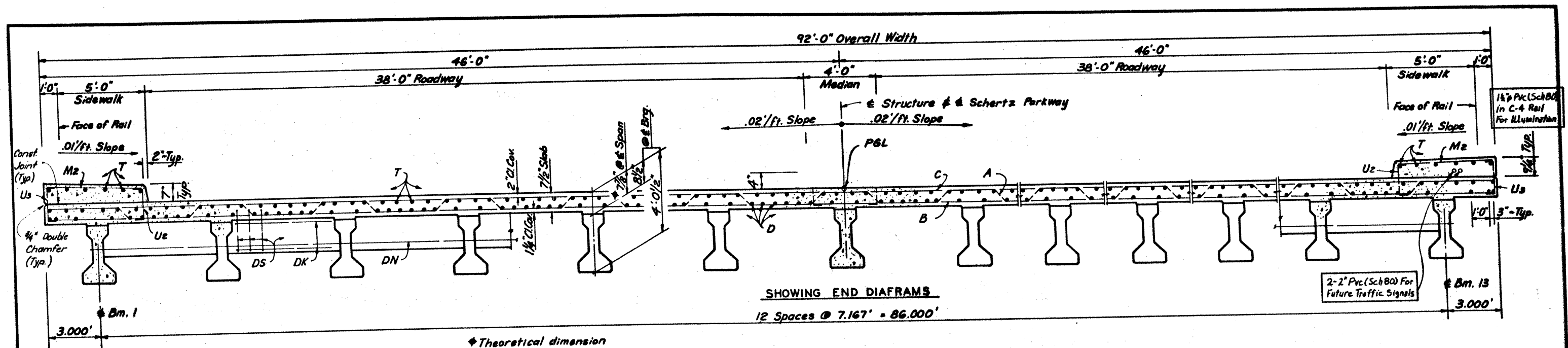
COUNTY: Guadalupe, ETC

CONTRACT NO.: 16

SECTION: 6

JOB: 299

SHEET: 113



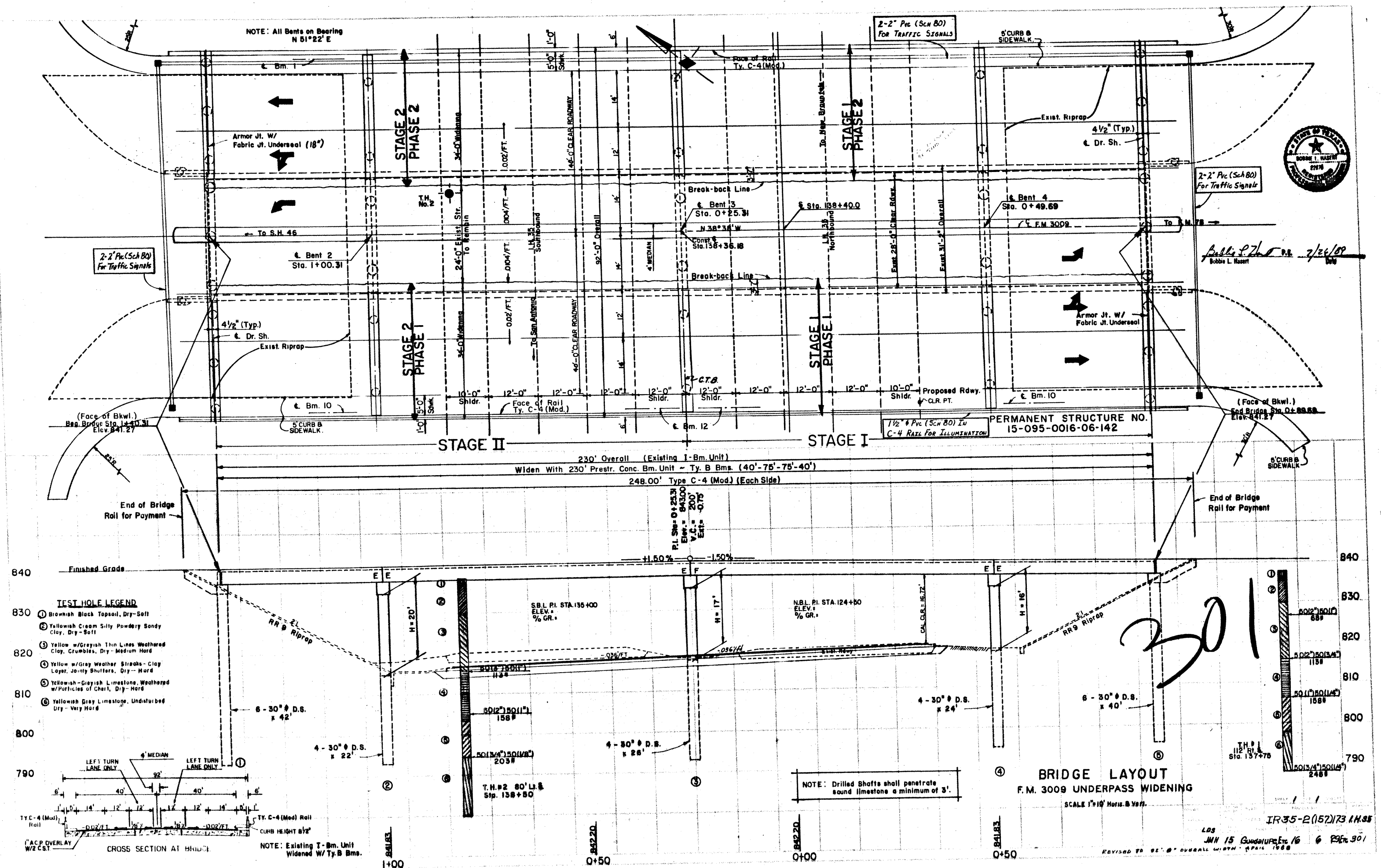
300

HS 20 LOADING *Sheet 2 of 2*

170.00' PRESTR. CONC.  
BEAM UNIT  
(85'-85')

SCHERTZ PARKWAY UNDERPASS

ORIGINAL DRAWING DATE <b>AUG. 1988</b>		STATE DISTRICT	FEDERAL DISTRICT	FEDERAL AID PROJECT	SHEET
DWG. <b>BY</b>		<b>15</b>	<b>6</b>	<b>TR35-2(157)73</b>	<b>300</b>
CHN. <b>JMK</b>		COUNTY		CONTRACT	JOB
C.B. <b>JMK</b>		<b>Guadalupe, ETC</b>		<b>15</b>	<b>6 295-JN35</b>



SUMMARY OF ESTIMATED QUANTITIES

ITEM DESCRIPTION	Drilled Shafts	Cl. C Conc. For Ext. Str.	Class C Concrete	Reinf. Conc. Slab for Ext. Str.	Prestr. Concrete Beam Type B	Riprap (Conc.) (Cl. B)	Structural Steel (Armor Jt.)	Rolling Type C4 (Mod.)	* Fabric Joint Underseal	Cl A OR B FINISH FOR EXIST CONC	CLEAN AND PAINT EXIST. STR.						
	30"ø	Abut.	Bent														
	LF	CY	CY	SF	LF	CY	LB	LF	LF	SY	LS						
2-Abutments	492	54.6					1340	36.0									
3-Interior Bents	288		92.5														
1-230' Prestr. Conc. Bm. Unit				15640	2585.48		1340	460.0	161								
TOTAL	780	54.6	92.5	15640	2585.48		2680	496.0	161	130	1						


\*For Contractor's Information Only

BEARING SEAT ELEVATIONS

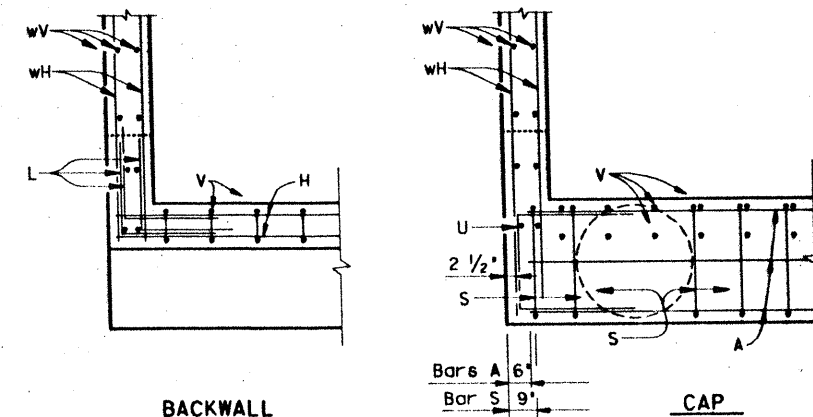
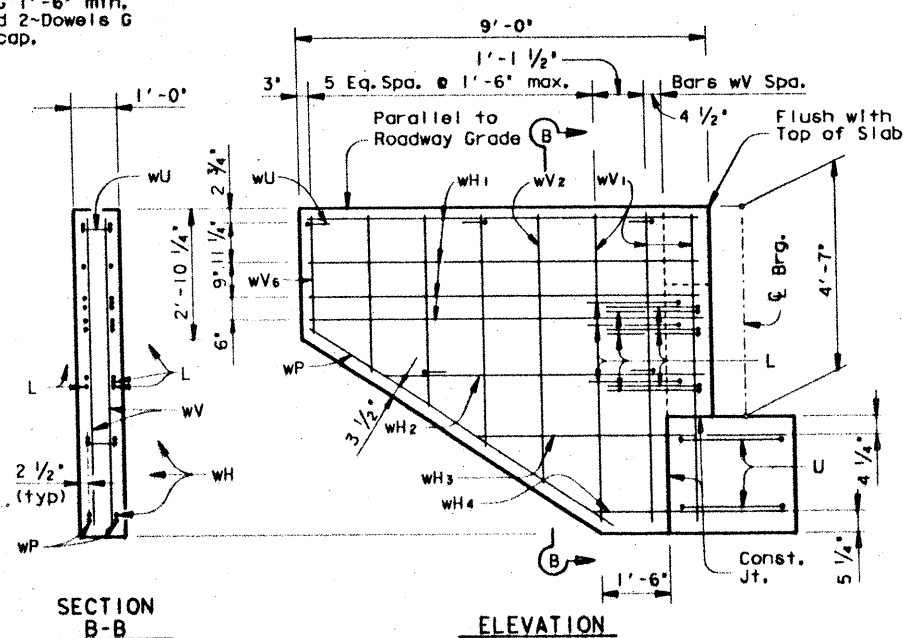
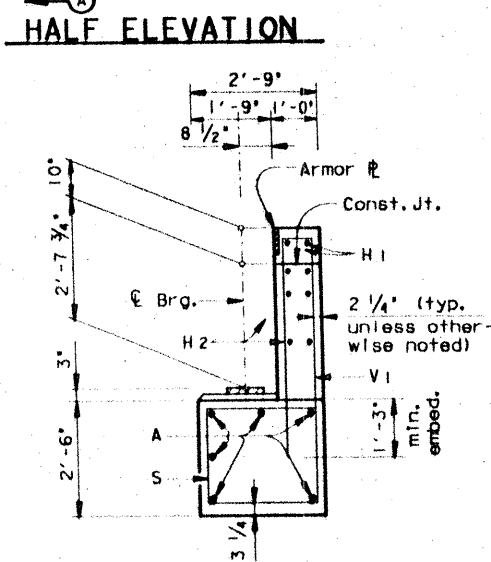
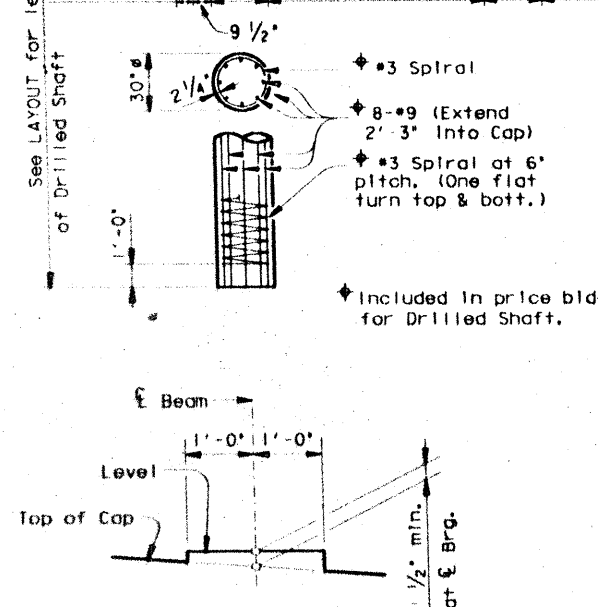
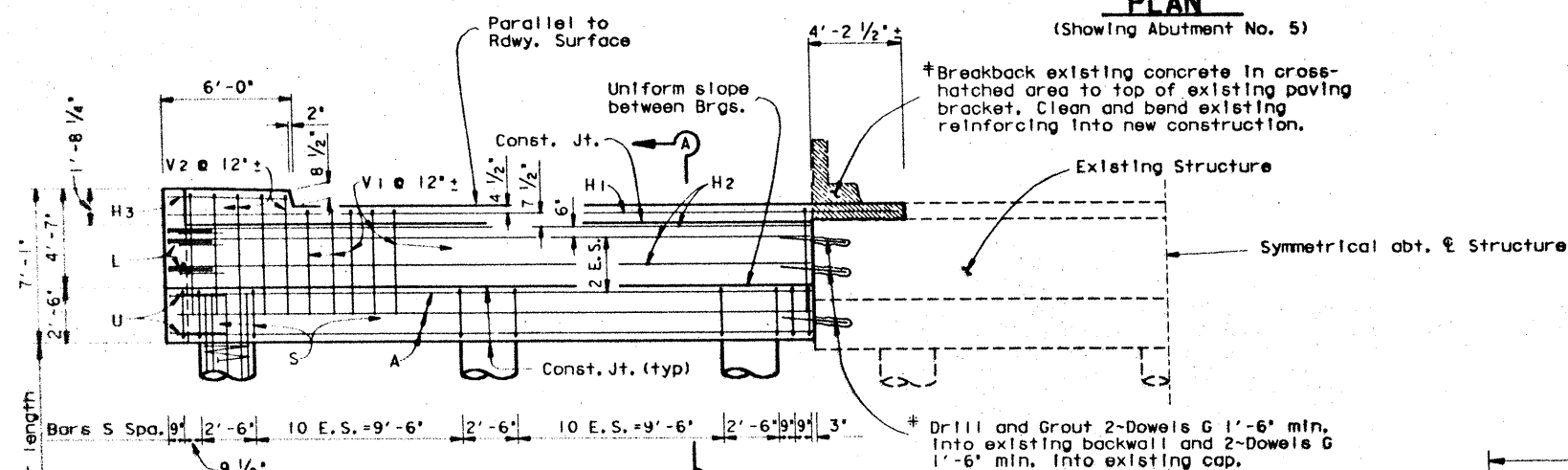
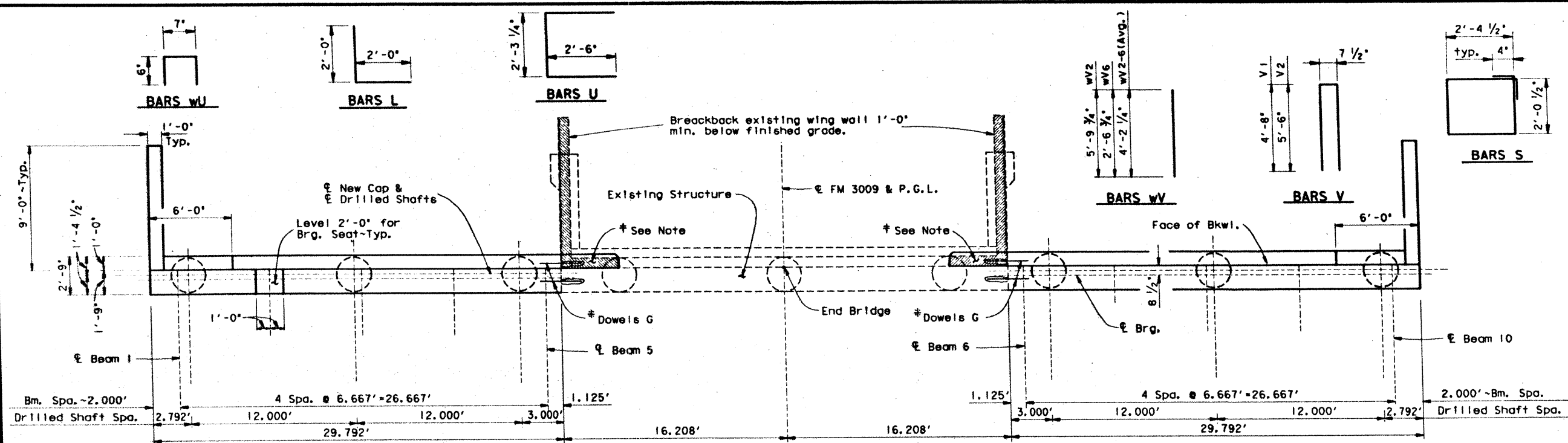
		BEAM 1	BEAM 2	BEAM 3	BEAM 4	BEAM 5	BEAM 6	BEAM 7	BEAM 8	BEAM 9	BEAM 10	BEAM 11	BEAM 12
BENT 1 (FWD)		836.9165	837.0500	837.1833	837.3167	837.4500	837.4500	837.3167	837.1833	837.0498	836.9165		
BENT 2 (BK)		837.4929	837.6262	837.7595	837.8928	838.0261	838.0261	837.8928	837.7595	837.6262	837.4927		
BENT 2 (FWD)		837.4463	837.5530	837.6597	837.7664	837.8730	837.9795	837.9797	837.8730	837.7664	837.6597	837.5530	837.4463
BENT 3 (BK)		837.8601	837.9668	838.0735	838.1802	838.2869	838.3936	838.3936	838.2869	838.1802	838.0735	837.9668	837.8601
BENT 3 (FWD)		837.8601	837.9668	838.0735	838.1802	838.2869	838.3936	838.3936	838.2869	838.1802	838.0735	837.9668	837.8601
BENT 4 (BK)		837.4463	837.5530	837.6597	837.7664	837.8730	837.9795	837.9797	837.8730	837.7664	837.6597	837.5530	837.4463
BENT 4 (FWD)		837.4929	837.6262	837.7595	837.8928	838.0261	838.0261	837.8928	837.7595	837.6262	837.4927		
BENT 5 (BK)		836.9165	837.0500	837.1833	837.3167	837.4500	837.4500	837.3167	837.1833	837.0498	836.9165		

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HS 20 LOADING

		STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION	
ESTIMATED QUANTITIES AND BEARING SEAT ELEVATIONS FM 3009 UNDERPASS WIDENING			
D45200A11 ZFA24E355116139071AB01, DON		PREPARED BY AND FOR USE OF TEXAS SDH&PT	
ORIGINAL DATE: AUGUST, 1988		REVISIONS	
BY: CEW	15	6	IR35-2 (157) 173 302
CHK: JMH			
APP: JK			
EX: JMH			
COUNTY: GUADALUPE, ETC		SHEET: 29 OF 1135	





### TABLE OF ESTIMATED QUANTITIES

BAR	NO	SIZE	LENGTH	WEIGHT
A	12	#11	29'- 2"	1860
G	8	#9	3'- 0"	82
H1	4	#5	33'- 8"	140
H2	12	#5	29'- 6"	369
H3	4	#5	5'- 7"	23
L	18	#6	4'- 0"	108
S	54	#4	9'- 6"	342
U	4	#6	7'- 3"	40
V1	48	#5	10'- 0"	50
V2	10	#5	11'- 8"	122
WH1	16	#6	8'- 8"	208
WH2	4	#6	6'- 11"	4
WH3	4	#6	6'- 9"	4
WH4	4	#6	4'- 1"	2
WP	4	#6	7'- 10"	4
WU	10	#4	1'- 7"	1
WV1	12	#5	6'- 8"	8
WV2-6	20	#5	4'- 2" Av	8

Reinforcing Steel *	LB	4136
Class C Conc. for Ext. Str.	CY	27.3
Struct. Steel (Arm. Jt.)	LB	▲ 670

\* For contractor's information only.  
▲ Quantity shown is for one half  
of one complete Armor Joint.

GENERAL NOTES:

Designed in accordance with A.A.S.H.T.O. 1983 Standard and Interim Specifications.

See sheet 2 of "230.00' PRESTR. CONC. BM. UNIT" for Armor Joint details not shown.

Calculated Drilled Shaft Load=48 Tons/Shaft.

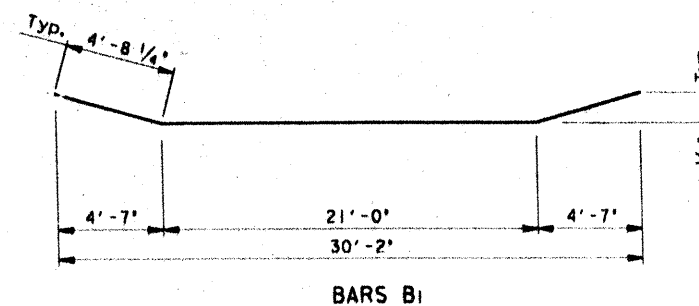
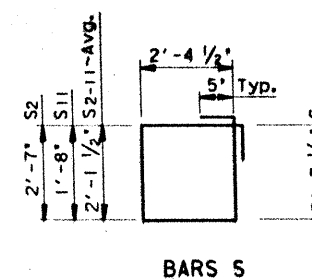
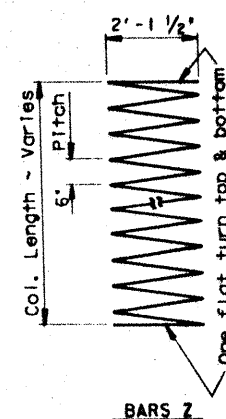
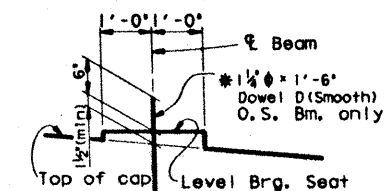
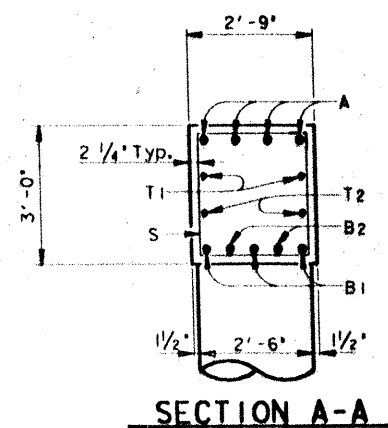
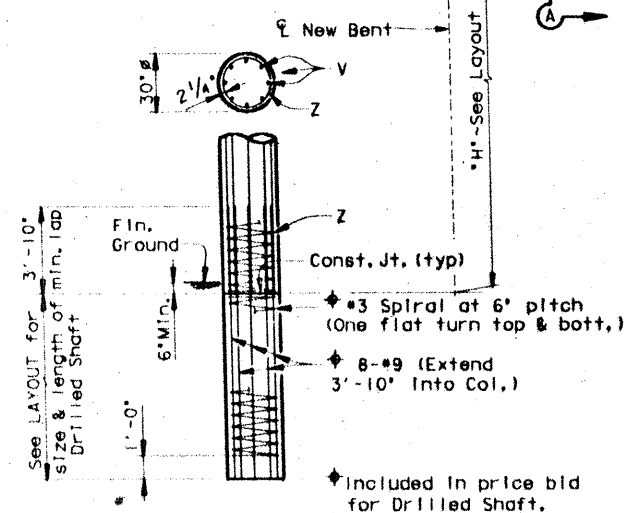
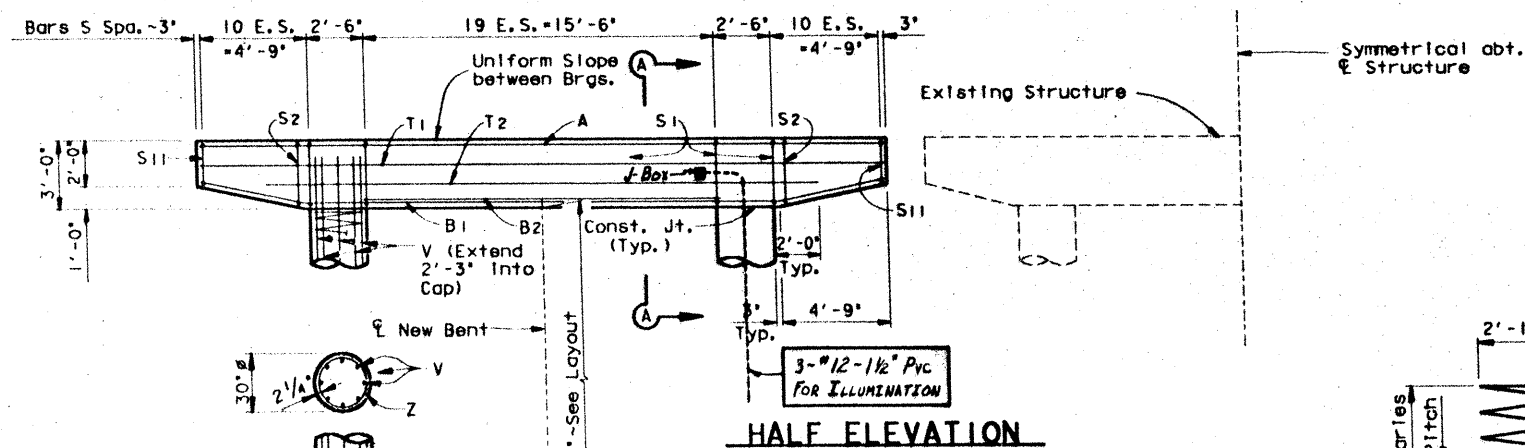
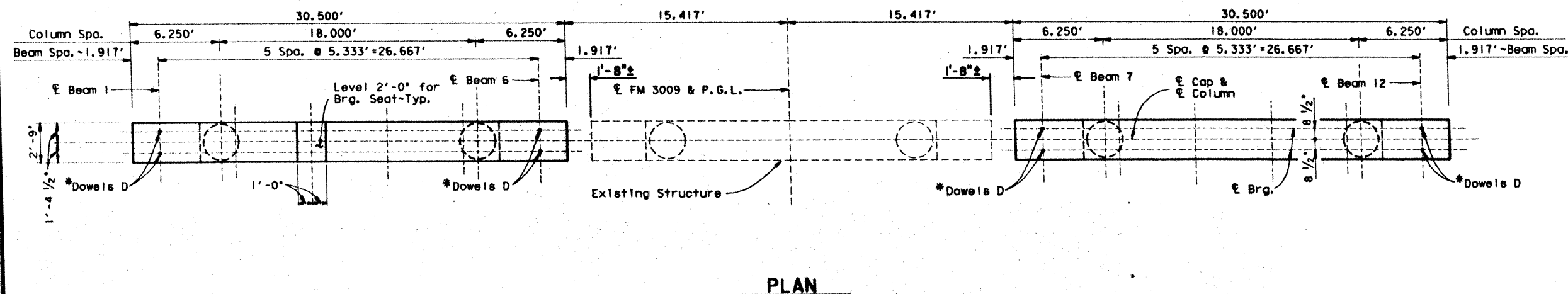
HS 20 LOADING

STATE DEPARTMENT OF HIGHWAYS  
AND PUBLIC TRANSPORTATION

FM 3009 UNDERPASS WIDENING

DASIS # 1A2135510313907A01.DGN		PREPARED BY AND FOR USE OF TEXAS SONHP			
ORIGINAL DUE DATE		START DATE	FIELD NO.	FEDERAL PROJECT	SHEET
AUGUST, 1988		15	6	IR35-2(57)173	302
REVISURE		COUNTY	CONTRACT	SECTION	303
SOL. CEM		COUNTY ETC	16	6	TH 3
COL. M.H.					
PRO. M.H.					





## TABLE OF CONSTANT QUANTITIES

[illegible]

TABLE OF VARIABLE QUANTITIES						TOTAL EST. QUANTITIES	
H	CL.'C' CONC.	BARS V 32 ~ • 9		BARS Z 4 ~ • 3		REINF. STEEL #	CL.'C' CONC.
FT.	C. Y.	LGTH.	WT.	LGTH.	WT.	LB.	C. Y.
15	10.9	17' - 3"	1877	214'	322	5965	28.
16	11.6	18' - 3"	1986	228'	343	6095	29.
17	12.4	19' - 3"	2094	241'	362	6222	30.
18	13.1	20' - 3"	2203	254'	382	6351	31.
19	13.8	21' - 3"	2312	268'	403	6481	31.

‡ For contractor's information only.

GENERAL NOTES:

Designed according to A.A.S.H.T.O. 1983 Standard  
and current Interim Specifications.  
Calculated Foundation Load = 180 Tons/Drilled Shaft  
All cap steel shall be Grade 60.

HS 20 LOADING



STATE DEPARTMENT OF HIGHWAYS  
AND PUBLIC TRANSPORTATION

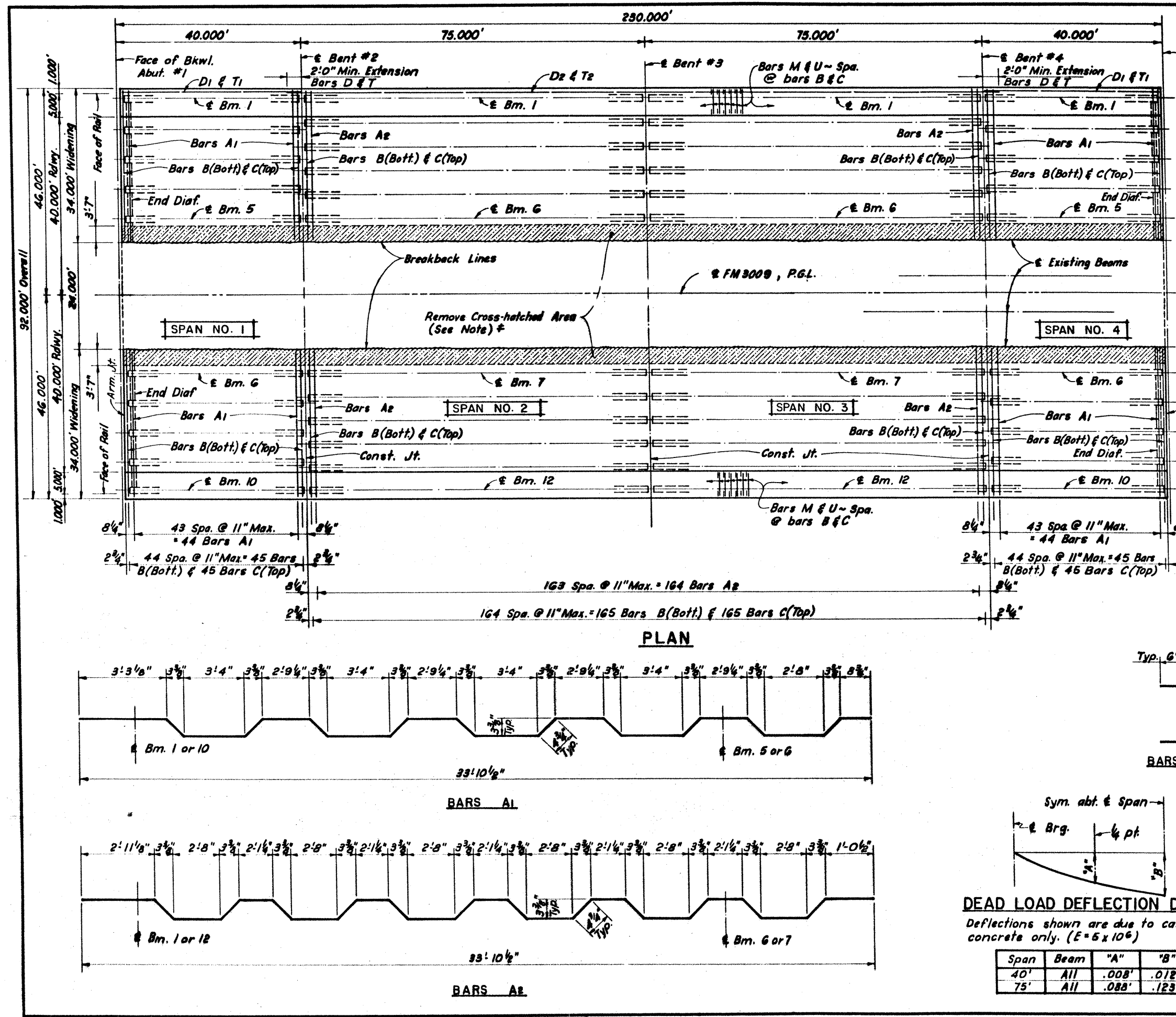
FM 3009 UNDERPASS WIDENING

045-71A2(135510)3907IN02,DGN  
ORIGINAL DRAINING DATE AUGUST, 1988

PREPARED BY AND FOR USE OF TEXAS SDHP

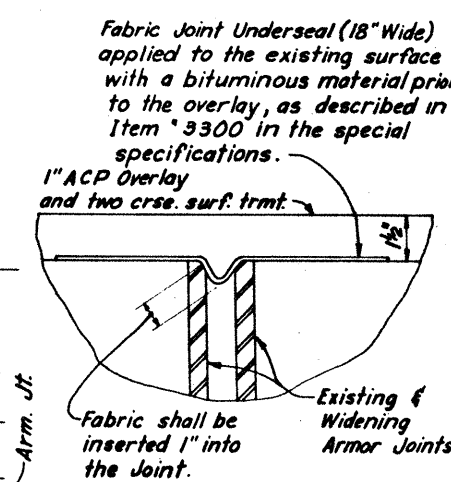
SHEET NO.	FEDERAL PROJECT NO.	FEDERAL AID PROJECT	SHEET
15	IR35-2(157)73	30	

COUNTY GRADUATE ETC 16 0 29E IN 3



**TABLE OF ESTIMATED QUANTITIES**

Bar	No.	Size	Length	Weight
A1	176	#5	35'0"	6,425
A2	328	#5	35'3"	12,059
B	510	#4	33'10"	11,525
C	510	#5	33'10"	17,995
D1	152	#5	39'3"	6,289
D2	90	#5	35'6"	14,722
M	510	#4	5'7"	1,901
T1	152	#4	39'8"	4,028
T2	90	#4	35'6"	9,399
T3	12	#4	23'2"	1,869
U1	510	#5	2'0"	1,064
U2	510	#5	2'2"	1,154
DK1	64	#5	5'3"	350
DK2	16	#5	4'6"	75
DS	116	#4	4'10"	374
DN	4	#8	32'11"	352
Reinforcing Steel				LB. # 82,581
Prestr. Conc. Bms. (Ty. B)				L.F. 2585.48
Str. Stl. (Arm. Jt.)				LB. # 1340
Slab	Reinf. Conc. Slab for Ext. Str. ~ S.F.	C.S. Conc. for Ext. Str. ~ S.F.	Slab Dia. F.	Slab
1	2720	2.2	75.5	
2	5100	-	142.6	
3	5100	-	142.6	
4	2720	2.2	75.5	
Total	15640		440.6	



**GENERAL NOTES:**

Designed in accordance with A.A.S.H.T.O. 1983 Standard & Interim Specifications.

Design  $f_c = 1200$  p.s.i.

The use of Optional Diagrams shall be disallowed.

**HS 20 LOADING**

**STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION**

**230.00' PRESTR. CONC. BEAM UNIT (40'-75'-75'-40')**

**FM 3009 UNDERPASS WIDENING**

**306**

**Sheet 1 of 2**

**DATE: AUG. 1988**

**DESIGNER: JMH**

**CHECKER: BJB**

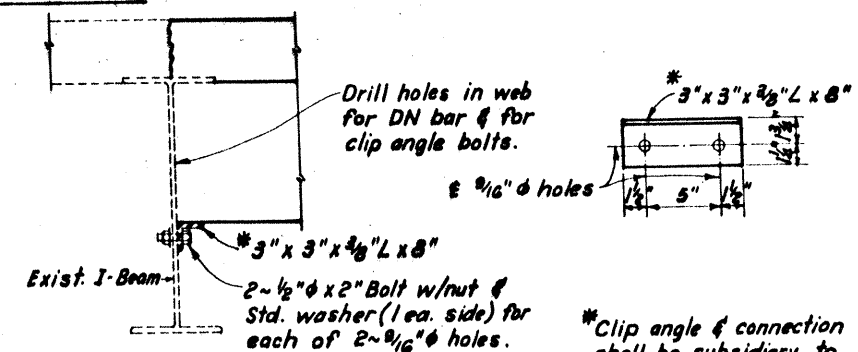
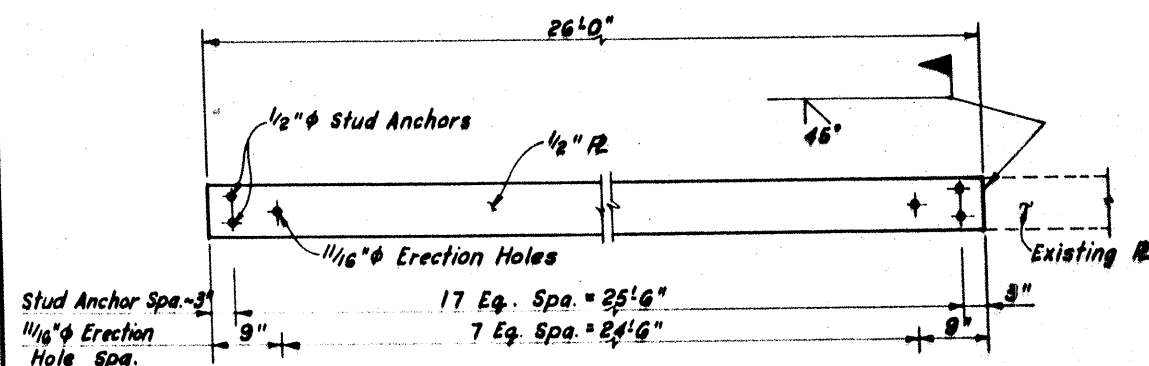
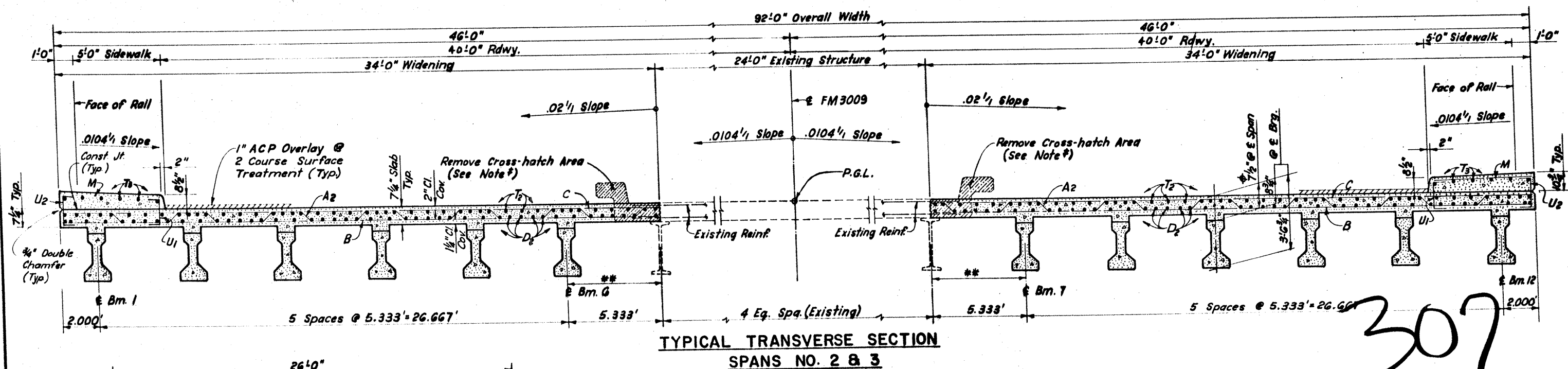
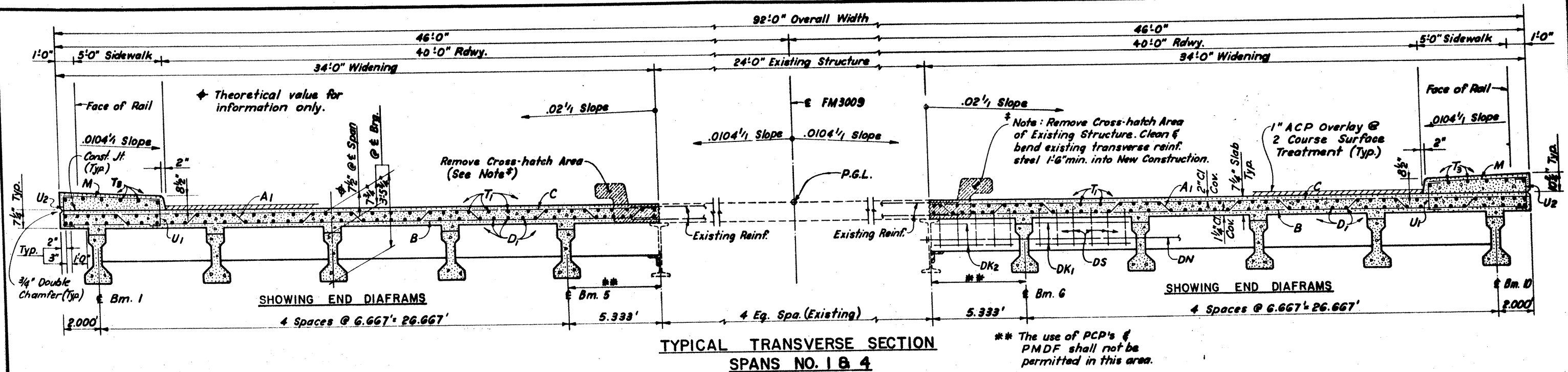
**APPROVER: JMH**

**PROJECT: GUADALUPE, ETC**

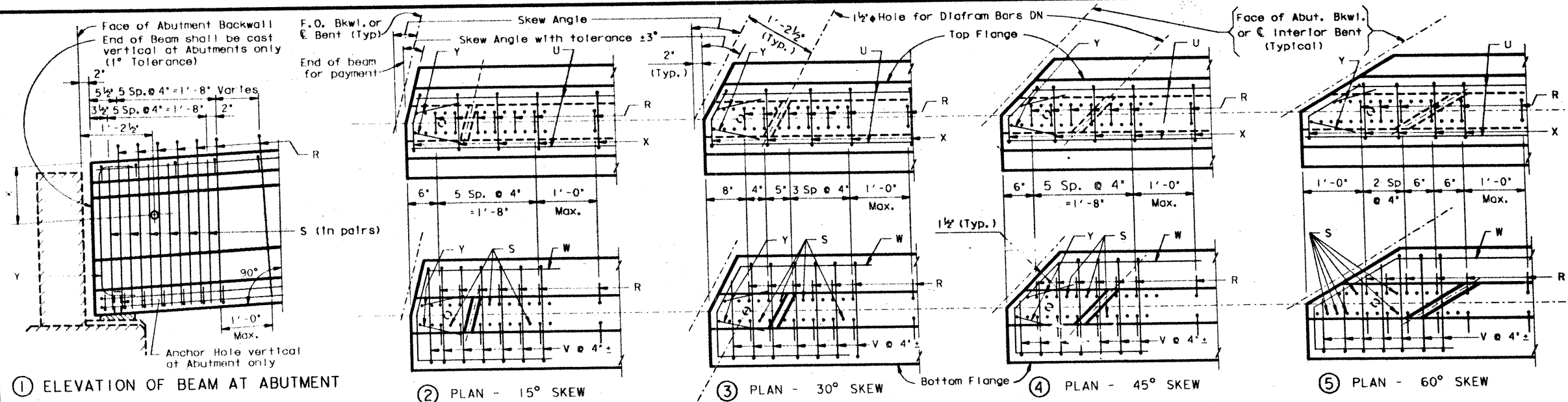
**SECTION: 16 G**

**POSTMILE: 11.35**





HS 200 *LOADING* *Sheet 2 of 2*

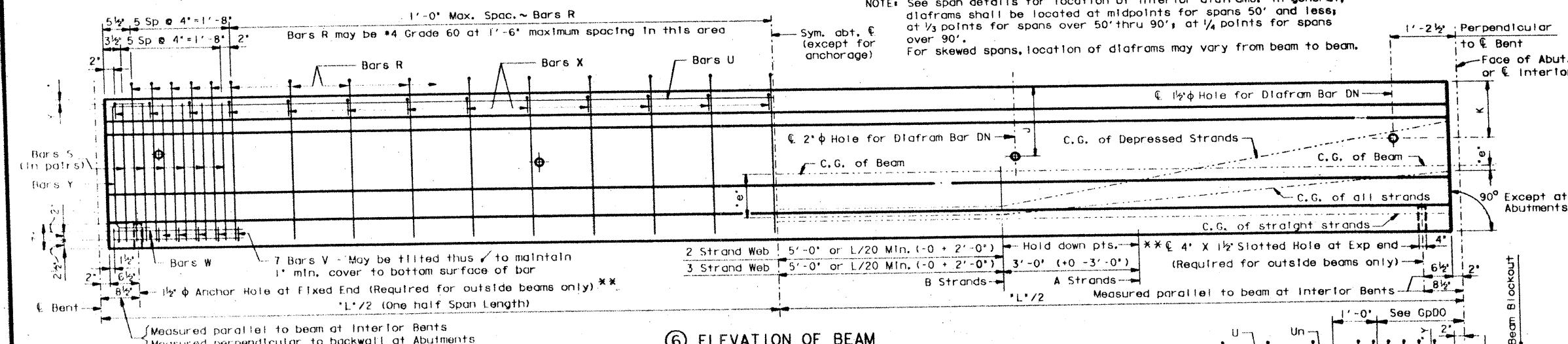


NOTE: Reinforcing patterns shown above are to be used as guides in determining the reinforcement for the actual beam type and the skew angle used. In general, the distance between consecutive Bars R and/or S shall be 2'. This spacing may be varied in order to avoid diaphragm holes, however, a minimum cross sectional area equivalent to that of Bars R and S in square beam end shall be provided.

### DETAILS OF SKEWED BEAM ENDS

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

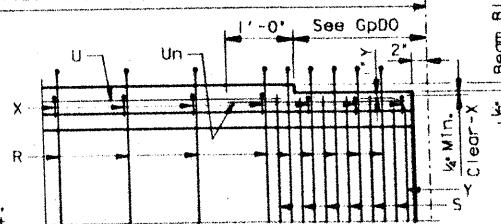
NOTE: See span details for location of interior diaphragms. In general, diaphragms shall be located at midpoints for spans 50' and less; at 1/3 points for spans over 50' thru 90'; at 1/4 points for spans over 90'. For skewed spans, location of diaphragms may vary from beam to beam.



### 6 ELEVATION OF BEAM

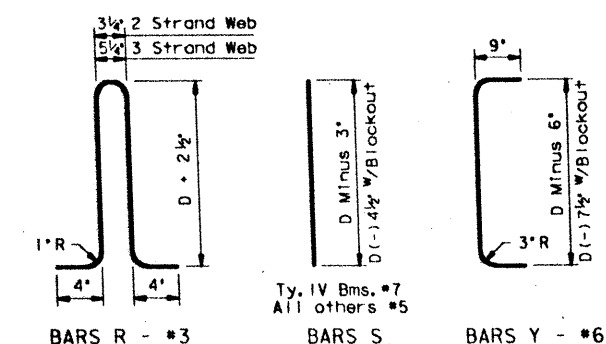
† If Prestressed Concrete Panels are used.

NOTE: Anchor holes may be tapered (4 1/4" x 1 1/2" Exp End) (1 1/2" Fixed End) at base. If holes are formed with sheet metal, forms may be left in place. Holes at fixed end may extend full depth of beam. Plug top or fill with asphalt mastic. At the option of the fabricator, inside beams may be furnished with anchor holes.

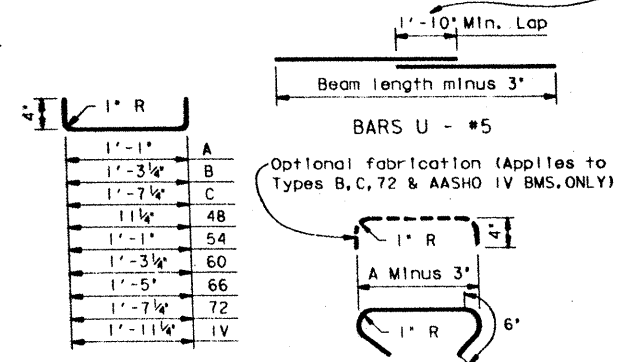


BEAM DIMENSIONS AND SECTION PROPERTIES																
BEAM TYPE	A IN.	B IN.	C IN.	D IN.	E IN.	F IN.	G IN.	H IN.	J IN.	K IN.	W IN.	Y <sub>T</sub> IN.	Y <sub>B</sub> IN.	AREA IN. <sup>2</sup>	I IN. <sup>4</sup>	WT/LF LB.
A	12	16	5	28	5	11	3	4	13	15	6	15.39	12.61	275.4	22,658	287
B	12	18	6	34	5 1/2	14	2 1/2	5 1/2	17	15	6 1/2	19.07	14.93	360.3	43,177	375
C	14	22	7	40	7 1/2	16	3 1/2	6	21	15	7	22.91	17.09	494.9	82,602	516
54	16	16	8	54	5	32	5	4	35	15	6	28.47	25.53	493.4	164,022	514
72	22	22	11	72	7 1/2	40 1/2	7 1/2	5 1/2	47	15	7	38.27	33.73	863.4	532,060	899
IV	20	26	8	54	9	23	6	8	33	18	8	29.25	24.75	788.4	260,403	821

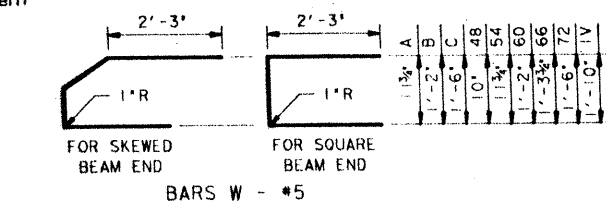
† Tolerance for Dimensions J & K = (+ 1/2", - 1") (Same tolerance to be applied to all holes for a given Diaphragm Bar DN)



Splices permitted (40' Min. C-C Splices) No portion of bar less than 10'



NOTE: Width tolerance for Bars V = ± 1/4"



NOTE: All reinforcing bars for beams shall be ASTM Grade 60 steel.

### GENERAL NOTES:

Designed in accordance with current A.A.S.H.T.O. specifications.

All concrete shall be Class H.

Bottom corners of all beam flanges and outside corners of exterior beam ends shall be chamfered 1/4" or rounded to a 3/4" Radius.

The use of diaphragm holes for lifting purposes will not be permitted.

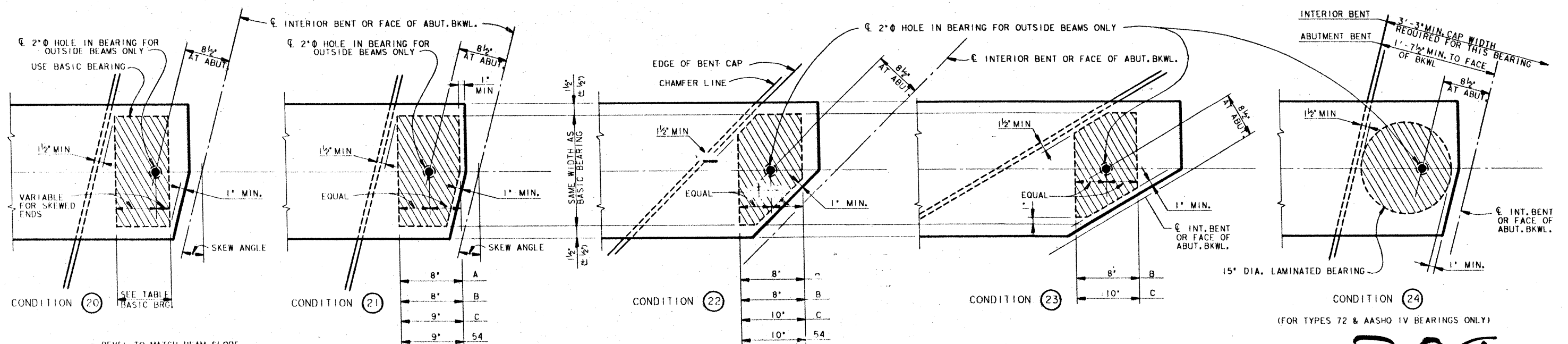
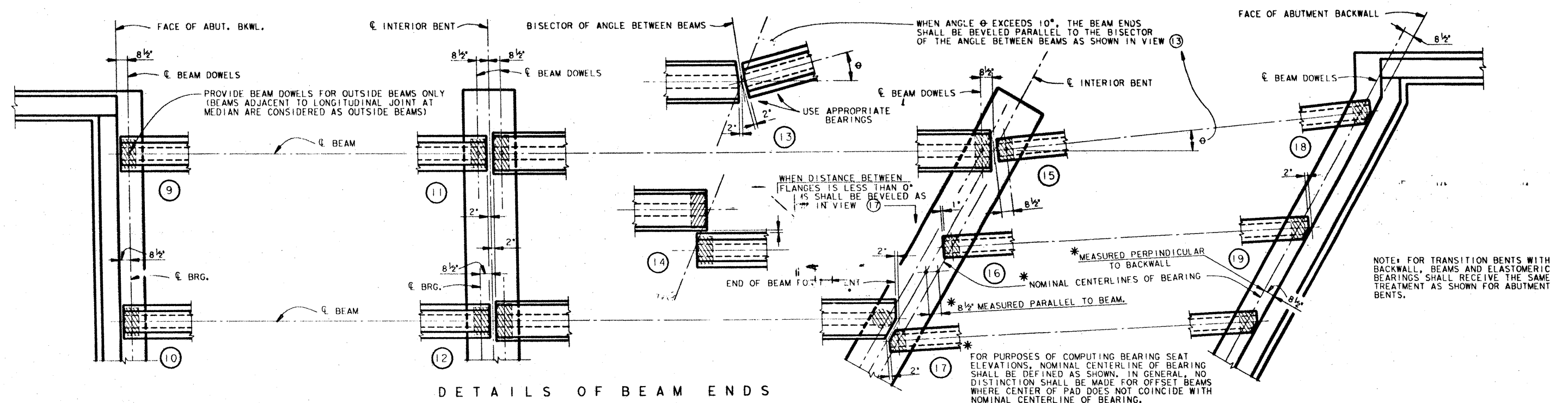
308

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

PRESTRESSED CONCRETE BEAMS BEAM DETAILS

GpA-2

DATE: 12/21/61 (255116)39060001, DON	PREPARED BY: AND FOR USE OF TEXAS HIGHWAY DEPARTMENT	REVISIONS:	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
--------------------------------------	--	------------	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	-----



NOTE: BASIC BEARINGS ARE TO BE USED FOR SQUARE BEAM ENDS AND FOR MODERATELY SKEWED BEAM ENDS AS COVERED IN CONDITION 20. HOLES IN BEARINGS FOR SQUARE BEAMS SHALL BE CENTERED IN PAD.

### DETAILS OF ELASTOMERIC BEARINGS

BASIC BEARINGS			
BM. TYPE	SIZE, THICKNESS	1" &	DESCRIPTION
A	8" X 14"	X 1 1/2"	PLAIN
B	8" X 16"	X 3/4"	PLAIN
C	9" X 19"	X 1"	PLAIN
5-4	9" X 14"	X 1 1/2"	LAMINATED
7-2	9" X 20"	X 1 1/2"	LAMINATED
1V	9" X 22"	X 1 1/2"	LAMINATED
B 1	8" X 16"	X 1 1/2"	LAMINATED
B 2	8" X 16"	X 1"	PLAIN
1V 1	9" X 22"	X 2 1/4"	LAMINATED

B-1 At Abutments 1 & 5-1M3009 Underpass Widening  
 B-2 At Bent 2 Bk. & Bent 4 Fwd. -1M3009 Underpass Widening  
 IV-1 At Bent 3 Fwd., Bent 6 Both, Bent 9 Both, and Bent 12 Bk.  
 for Cibola Creek Southbound & Northbound Lanes

BEARINGS FOR BEVELED BEAM ENDS					
BM. TYPE	CONDITION 20	CONDITION 21	CONDITION 22	CONDITION 23	CONDITION 24
A	0° THRU 20°	20° THRU 30°	OVER 30°	N/A	N/A
B	0° THRU 15°	15° THRU 30°	30° THRU 55°	OVER 55°	N/A
C	0° THRU 10°	10° THRU 20°	20° THRU 50°	OVER 50°	N/A
54	0° THRU 10°	10° THRU 25°	OVER 25°	N/A	N/A
72	0° THRU 10°	N/A	N/A	N/A	OVER 10°
IV	0° THRU 8°	N/A	N/A	N/A	OVER 8°
B-1	0° THRU 15°	N/A	N/A	N/A	N/A
B-2	0° THRU 15°	N/A	N/A	N/A	N/A
IV-1	0° THRU 15°	N/A	N/A	N/A	OVER 8°

GENERAL NOTES:  
 BEAMS SHALL BE SEATED ON ELASTOMERIC BEARINGS OF THE DIMENSIONS SHOWN.  
 BEARINGS SHALL BE FURNISHED WITH THEIR THICKNESS VARYING IN ONE DIRECTION DEPENDING ON THE SLOPE OF THE ERECTED BEAM.  
 CONSTANT THICKNESS BEARINGS MAY BE USED FOR MODERATE BEAM SLOPES IF THE VARIATION IS WITHIN THE ALLOWABLE DIMENSIONAL TOLERANCES GIVEN IN THE SPECIFICATIONS.  
 COST OF FURNISHING AND INSTALLING ELASTOMERIC BEARINGS SHALL BE INCLUDED IN UNIT PRICE BID FOR "PRESTRESSED CONCRETE BEAMS".

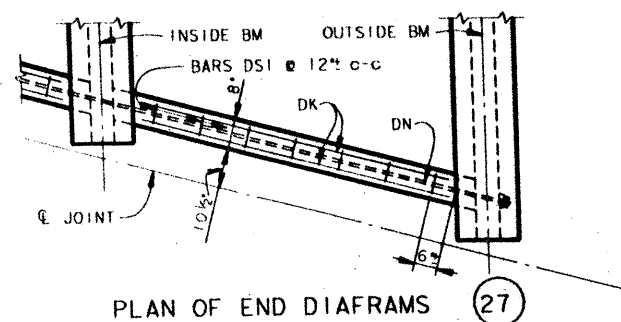
309

STATE DEPARTMENT OF HIGHWAYS  
 AND PUBLIC TRANSPORTATION

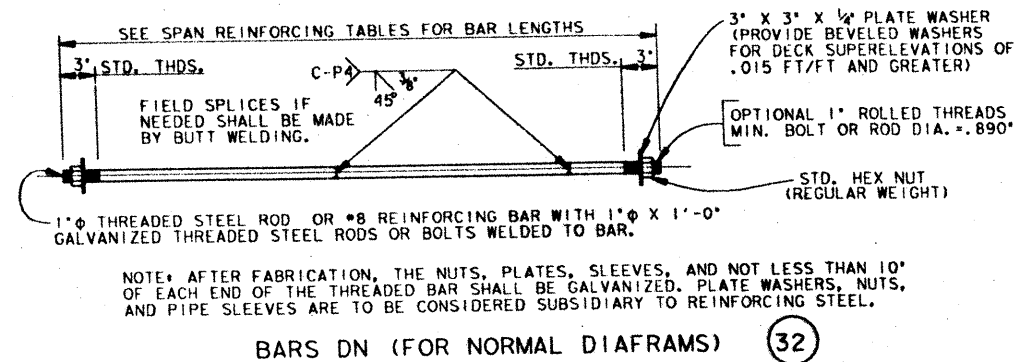
**PRESTRESSED  
 CONCRETE BEAMS  
 BEAM ENDS & BEARINGS  
 Gp B-2 (MOD)**

D45117FA2135511633906M002.DGN		PREPARED BY AND FOR USE OF TEXAS SDHPMT	
DATE: JUNE 1987	DESIGN: 15	SECTION: 6	SHEET: 309
REVISED: 06-88		IR35-2(15 2/73 309	
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APPROVED: [blank]		DATE: 06/29/87	

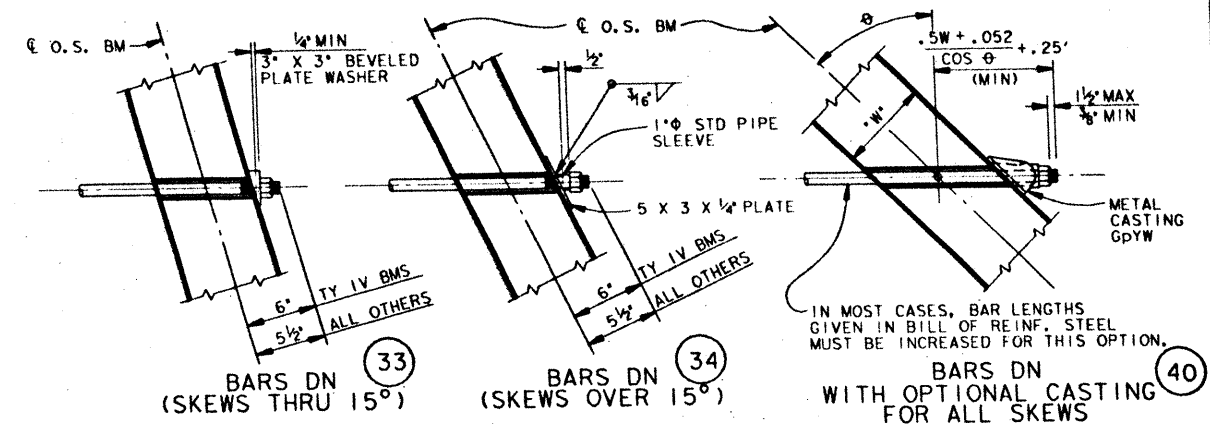




PLAN OF END DIAFRAMS (27)



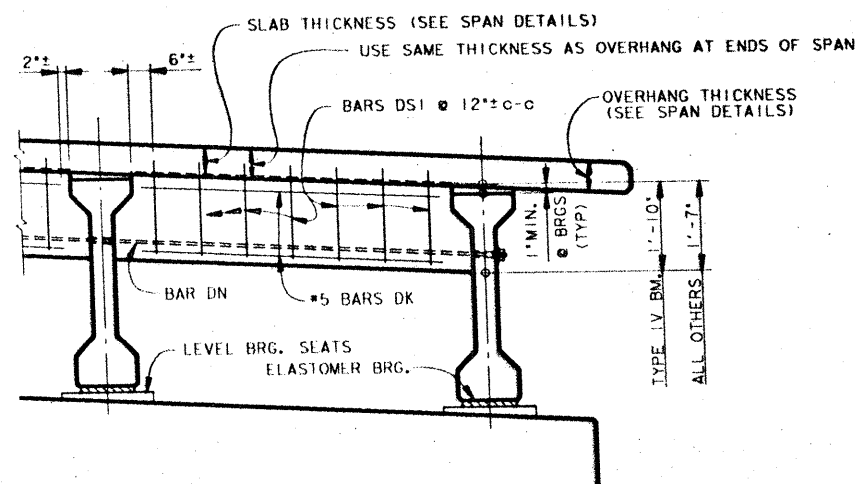
BARS DN (FOR NORMAL DIAFRAMS) (32)



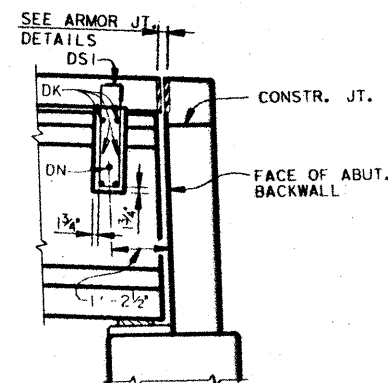
BARS DN (SKEWS THRU 15°) (33)

BARS DN (SKEWS OVER 15°) (34)

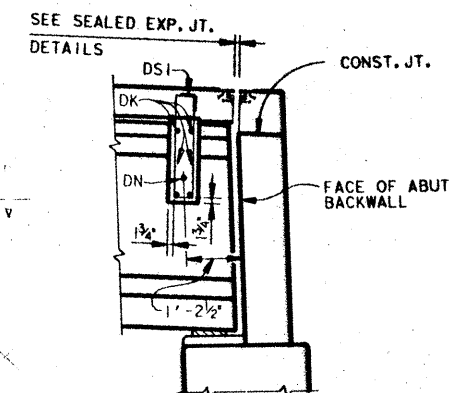
BARS DN WITH OPTIONAL CASTING FOR ALL SKEWS (40)



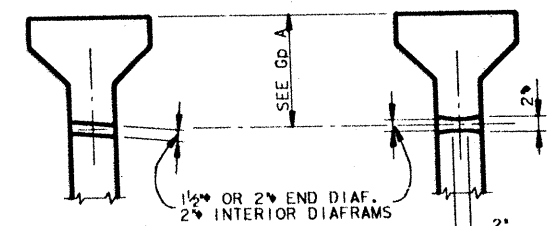
ELEVATION - END DIAFRAMS (28)



SEC. THRU. STRUCTURE AT ABUTMENT

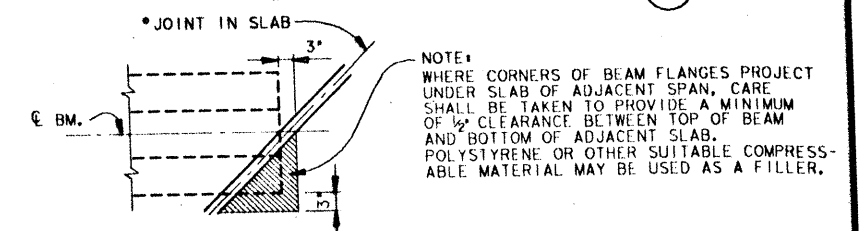


SEC. THRU. STRUCTURE AT ABUTMENT (WITH SEALED EXP. JT.)



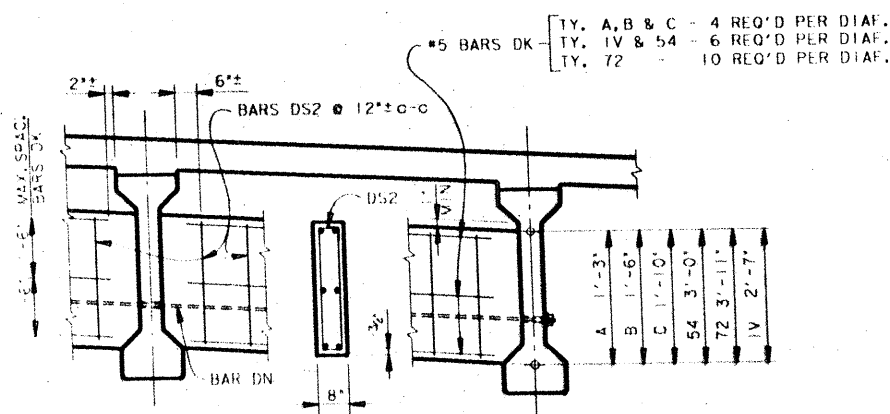
FORM HOLES PARALLEL TO ROADWAY SLOPE IF SUPERELEVATION IS GREATER THAN .03 FT/FT FOR 1/2" HOLES OR .06 FT/FT FOR 2" HOLES.

DIAFRAM HOLE LOCATIONS (35)

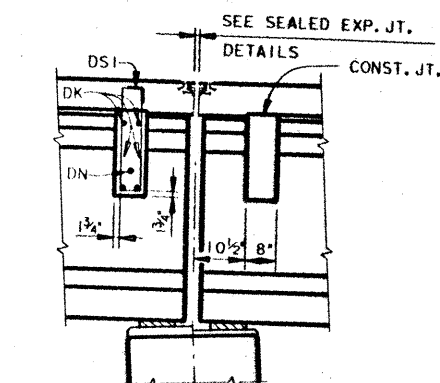


TREATMENT OF BM. END FOR SKEWED SPANS (39)

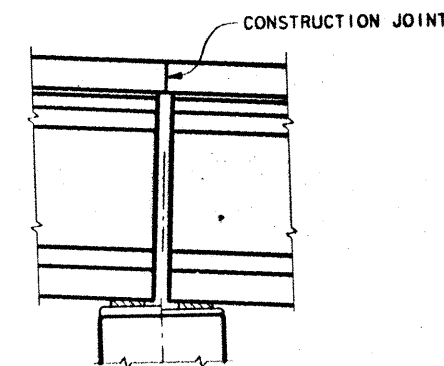
GENERAL NOTES:  
DESIGNED IN ACCORDANCE WITH CURRENT A.A.S.H.T.O. SPECIFICATIONS.  
ALL CAST-IN-PLACE CONCRETE SHALL BE CLASS S UNLESS OTHERWISE SHOWN ON SPAN DETAILS.  
NO CONCRETE SHALL BE PLACED IN THE BRIDGE SLAB UNTIL THE DIAFRAMS ARE IN PLACE. THE DIAFRAM CONCRETE HAS REACHED A MINIMUM FLEXURAL STRENGTH OF 300 P.S.I., AND THE NUTS OF BARS DN HAVE SUBSEQUENTLY BEEN FIRMLY TIGHTENED.



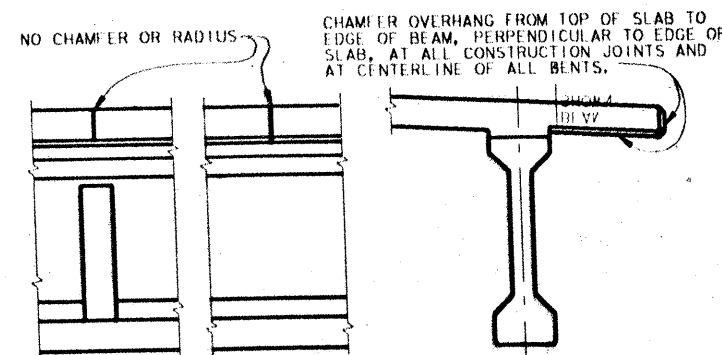
ELEVATION - INTERIOR DIAFRAMS (30)



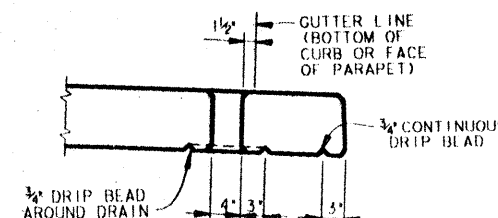
SEC. THRU. END DIAFRAMS (WITH SEALED EXP. JT.)



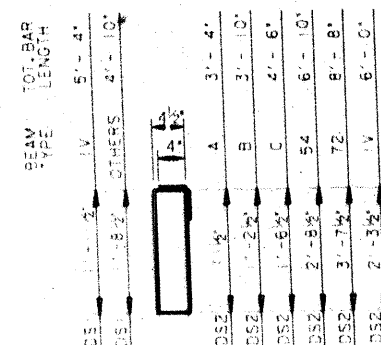
SEC. THRU. INT. BENT



CONSTRUCTION JOINT DETAIL (38)  
TO BE LOCATED AS SHOWN ON THE SPAN DETAILS.



DRAIN DETAILS (37)



#4 BARS DSI & DS2

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

PRESTRESSED CONCRETE BEAM SPAN DETAILS

CONSTRUCTION DETAILS

Gp C (MOD)

DESIGNED BY: ZFAZ161390AM0003, DGN  
APPROVED BY: HJD  
DATE: 11/11/1971  
SHEET: 310

PREPARED BY AND FOR USE OF TEXAS HIGHWAY DEPARTMENT  
PROJECT: 15  
SECTION: 15  
JOB: 15  
DATE: 11/11/1971



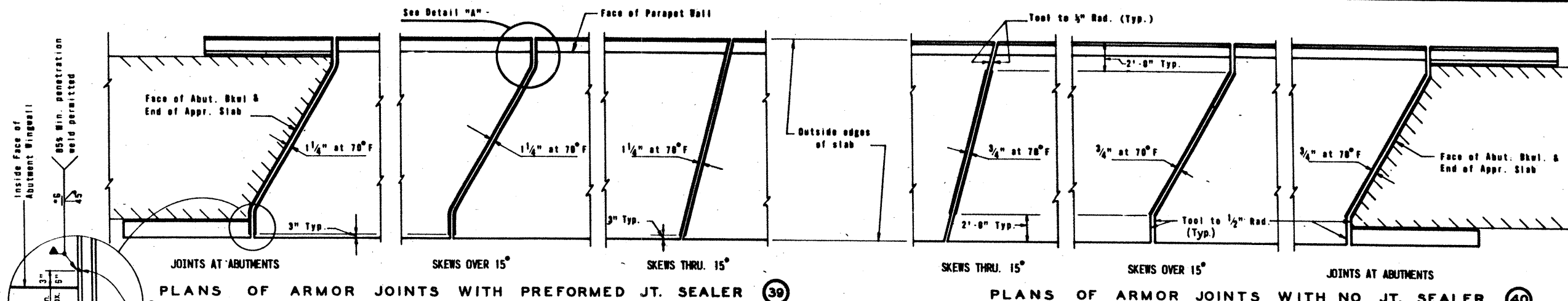
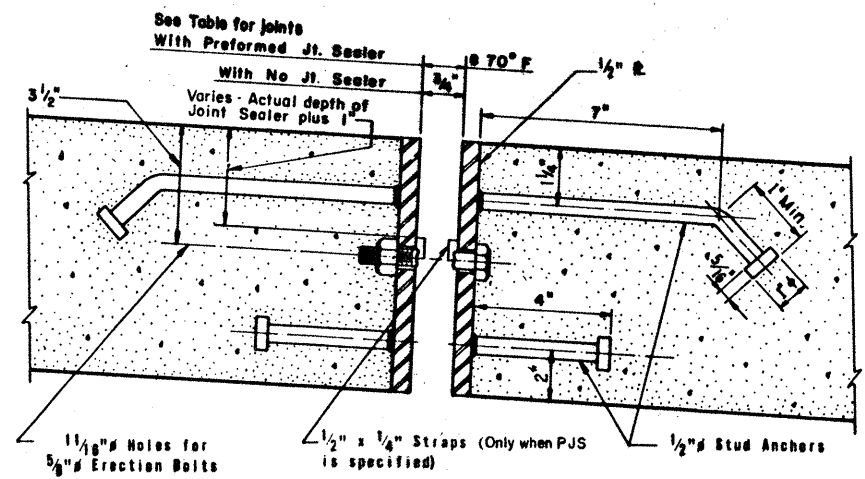
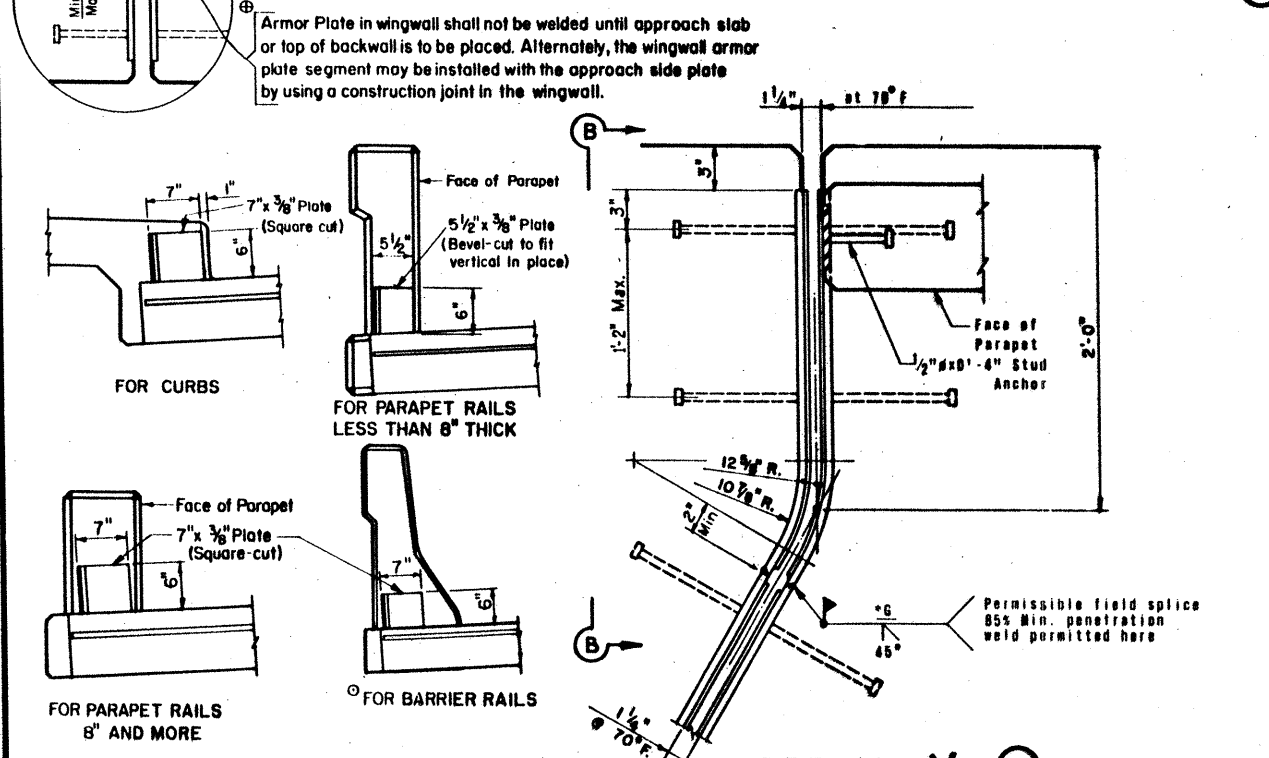


PLATE DEPTH "t"	WT. LB.	P.L.F. LB.
6 1/4"	22.32	23.17
6 1/2"	23.18	24.03
6 3/4"	24.03	24.88
7"	24.88	25.72
7 1/4"	25.73	26.58
7 1/2"	26.58	27.43
7 3/4"	27.43	28.28
8"	28.28	29.13
8 1/4"	29.13	29.98

▲ Plate Depth "t" = Thickness of Slab Overhang (See Span Details)

▲ Weights of Armor Joints with preformed joint sealer. Additional weight of two parapet armor plates with straps = 10 lb.



SECTION THRU ARMOR JOINT (44)

Armor joint openings given above are for simple prestressed beam spans and shall be used unless otherwise shown on span details or elsewhere in the plans

Joint Opening	PJS Size
1 1/4"	2"
1 1/2"	2 1/2"
1 3/4"	3"
2"	3 1/2"
2 1/2"	4"

RDY. WIDTH	PLATE DEPTH "t"	SQUARE		15° SKEW		30° SKEW		45° SKEW	
		LB.	▲ LB.	LB.	▲ LB.	LB.	▲ LB.	LB.	▲ LB.
26'-0"	6 3/4"	584	691	604	715	674	785	825	941
34'-0"	7 1/2"	857	980	887	1015	989	1117	1211	1364
40'-0"	7 1/2"	1016	1144	1052	1186	1173	1307	1437	1579
42'-0"	7 1/2"	1069	1199	1107	1242	1234	1370	1512	1656
44'-0"	7 1/2"	1088	1217	1127	1259	1257	1391	1539	1683
48'-0"	7 1/2"	1228	1364	1272	1413	1418	1560	1737	1883

**GENERAL NOTES:**

Armor joints shall be provided at all locations shown on plans. Provision for preformed joint sealer shall be made when thus indicated on bridge layout: "Armor Joint (PJS)" or otherwise noted in plans.

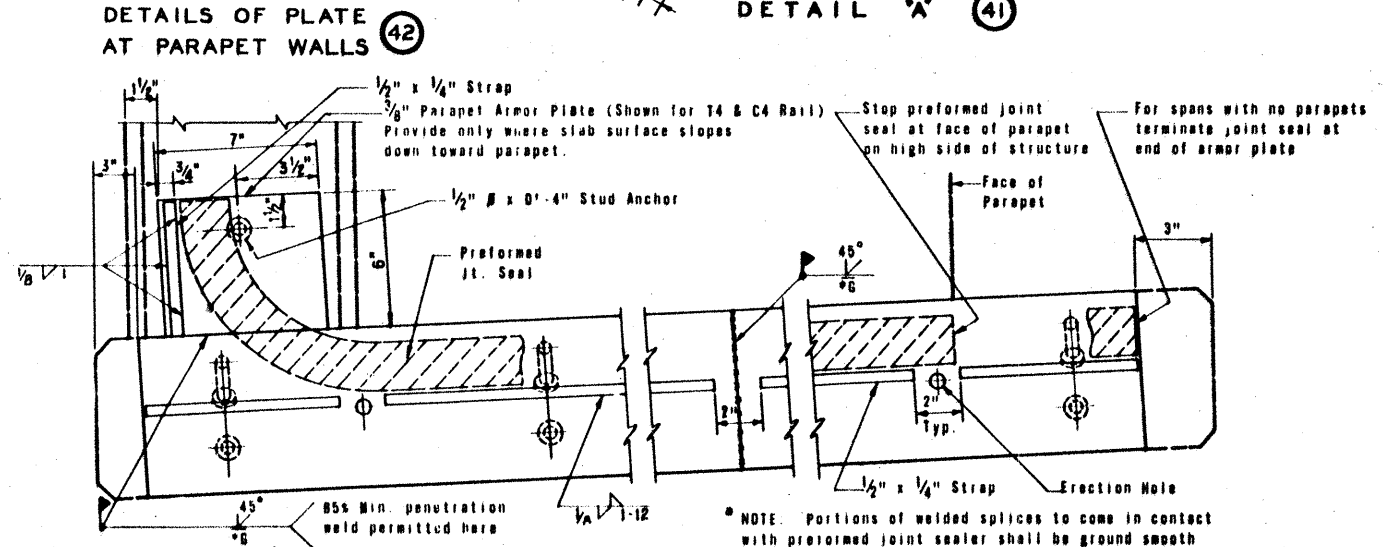
Stud Anchors shall be electric arc and-welded to the plates with complete fusion.

Erection holes shall be punched to line up in final position of armor joint.

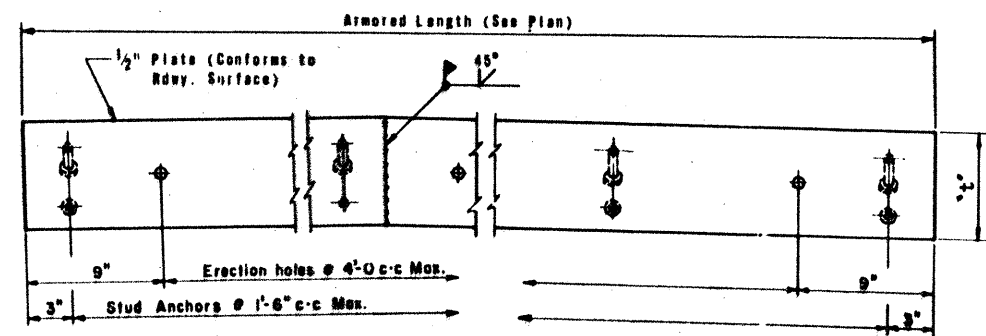
Armor plates shall be shipped in convenient lengths (20'-0" Max.) (10'-0" Min. except as shown otherwise on Detail "A"). Corresponding plate sections shall be match marked and bolted together for shipment.

Field splices shall be made by butt welding.

Erection bolts shall be cut off flush with armor plates or straps promptly after the concrete in the latter of the two placements has taken initial set.



(43) VIEW B-B (SHOWING INSTALLATION OF ARMOR & IN PARAPET FOR PREFORMED JOINT SEALER)



ELEVATION OF BASIC ARMOR PLATE (45)

311

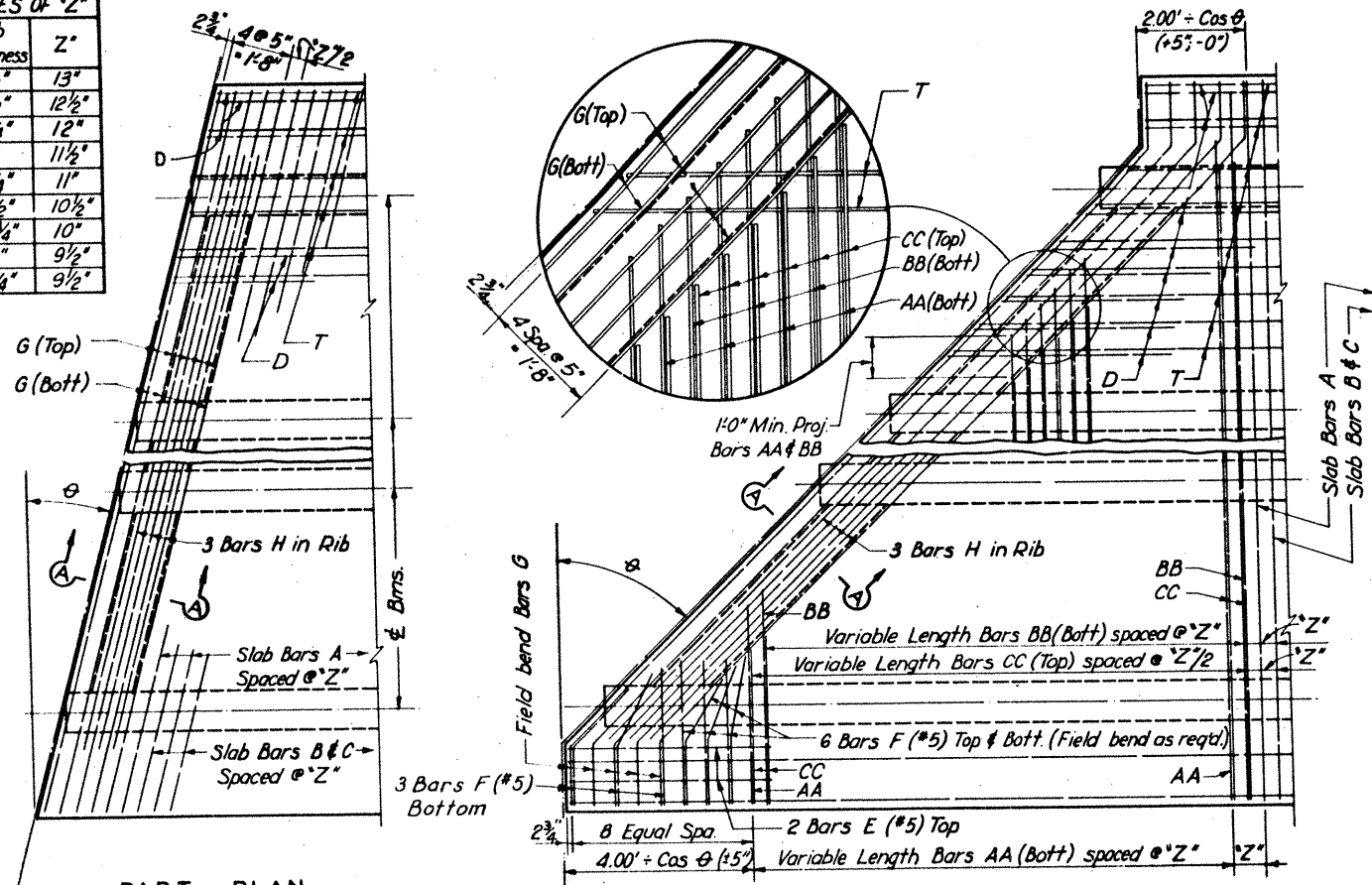
TEXAS HIGHWAY DEPARTMENT  
BRIDGE DIVISION

ARMOR JOINT DETAILS

Gp D

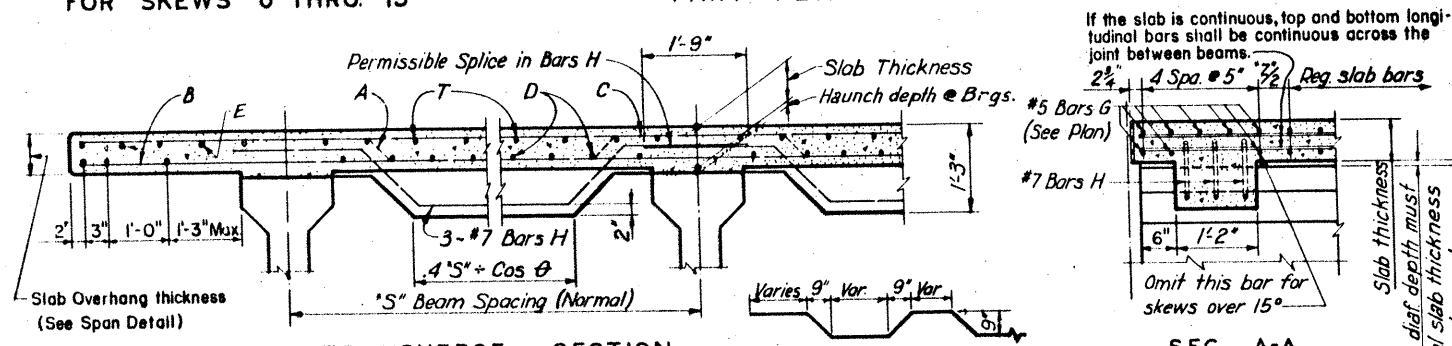
ORIGINAL DRAWING DATE April 1971	STATE PROJECT 15	FEDERAL PROJECT IR35-2(152)123	SHEET 311
REVISIONS CR - THD Rev. 7-73 CR - THD Rev. 2-74 CR - THD Rev. 6-85	REVISED BY CR - THD Rev. 7-73 CR - THD Rev. 2-74 CR - THD Rev. 6-85	COUNTY GUADALUPE	SHEET 311

Slab Thickness	Z"
6 1/2"	13"
6 3/4"	12 1/2"
7"	12"
7 1/4"	11 1/2"
7 1/2"	11"
7 3/4"	10 1/2"
8"	10"
8 1/4"	9 1/2"



PART PLAN FOR SKEWS 0° THRU. 15°

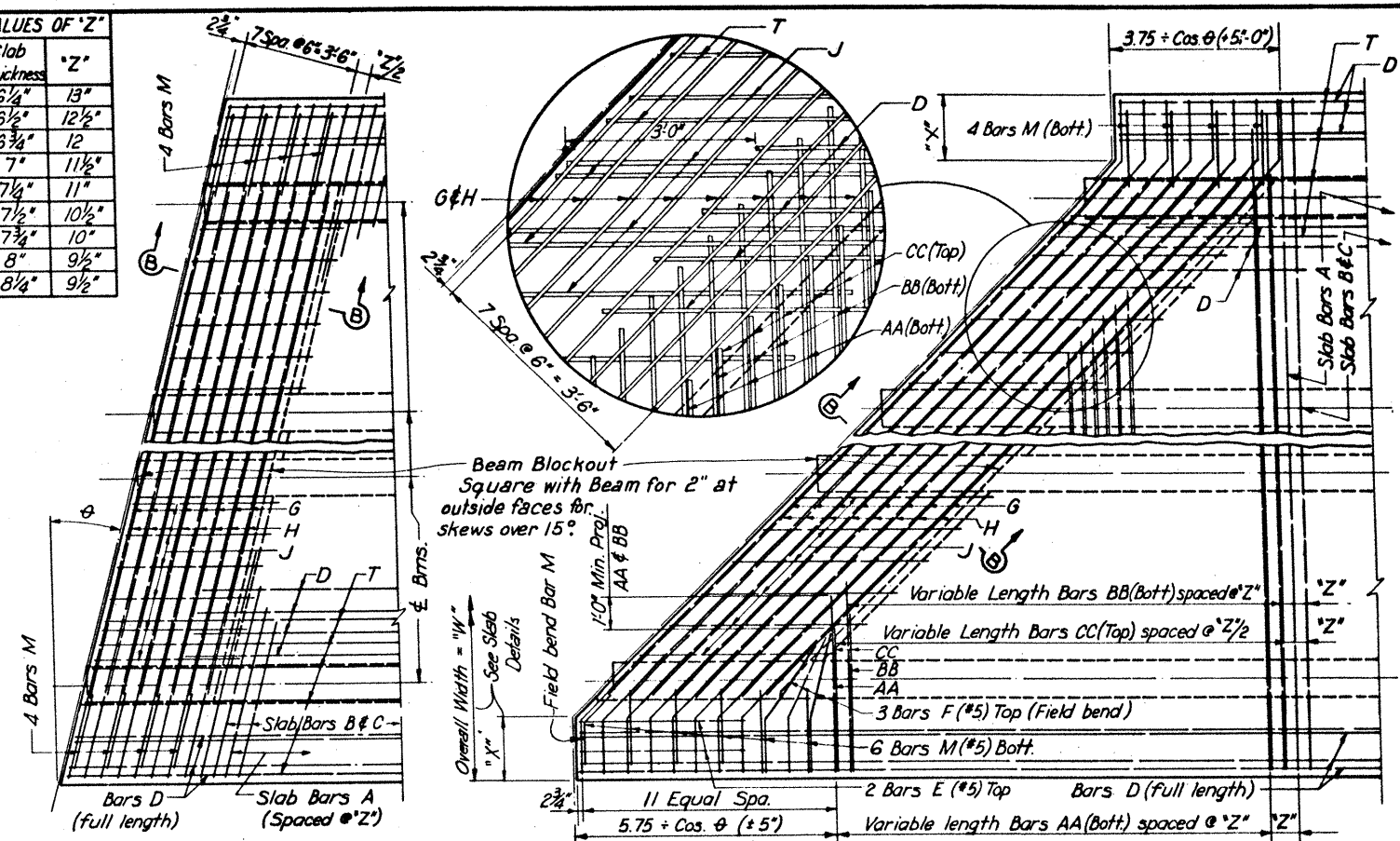
PART PLAN FOR SKEWS OVER 15°



TRANSVERSE SECTION END DIAGRAM OPTION NO. 1

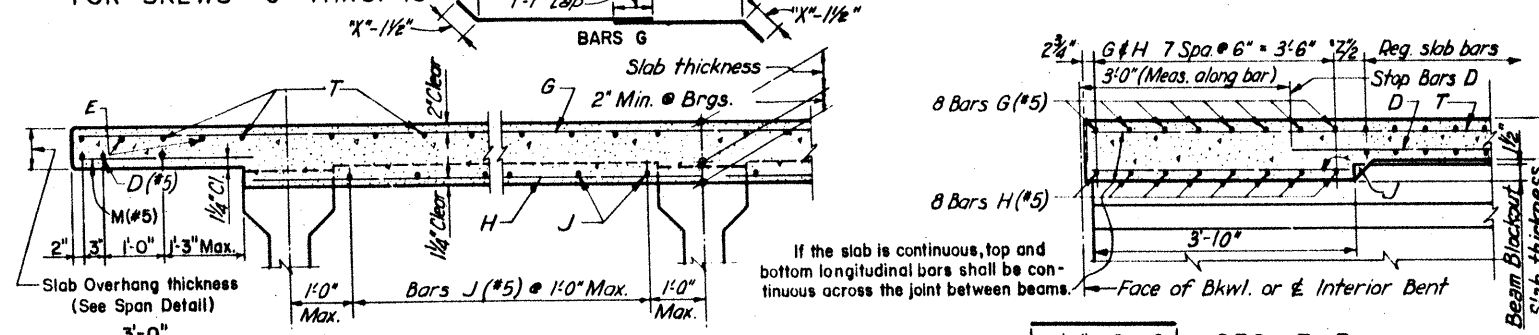
SEC. A-A

Slab Thickness	Z"
6 1/2"	13"
6 3/4"	12 1/2"
7"	12"
7 1/4"	11 1/2"
7 1/2"	11"
7 3/4"	10 1/2"
8"	10"
8 1/4"	9 1/2"



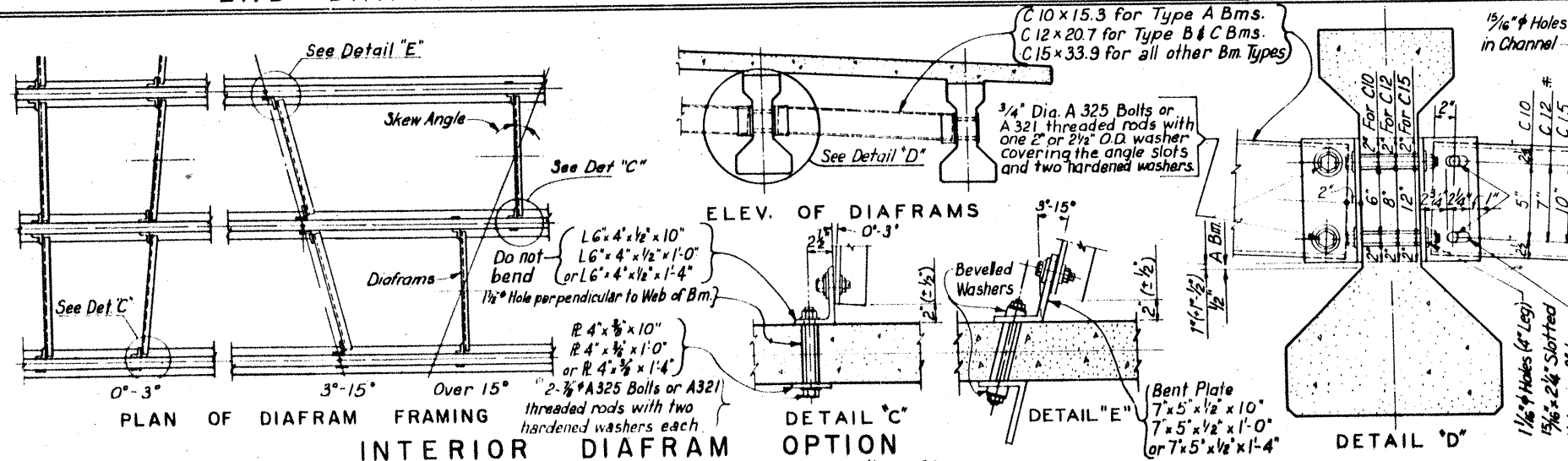
PART PLAN FOR SKEWS 0° THRU. 15°

PART PLAN FOR SKEWS OVER 15°



TRANSVERSE SECTION END DIAGRAM OPTION NO. 2

SEC. B-B



PLAN OF DIAFRAM FRAMING

INTERIOR DIAFRAM OPTION

ELEV. OF DIAFRAMS

DETAIL 'C' OPTION

DETAIL 'D'

**GENERAL NOTES:**  
 Diagram options hereon may be used in lieu of the diagrams show on Gp C.  
 Unless otherwise shown or noted hereon, all span details remain unchanged.  
 Contractor shall notify prestressed beam and steel fabricators as to which one he intends to use. Options selected shall be incorporated in shop drawings.  
 All parts of steel diaphragms shall be galvanized after fabrication. After erection, all scratched or otherwise damaged galvanized parts shall be repaired in accordance with Item 450.5.  
 Prestressed Beam Modifications: For Interior Diagram Option, holes in beam shall be 1 1/2" For End Diagram Options, holes in ends of beam shall be eliminated. For End Diagram Options the upper 1 1/2" of the top flange of the beam shall be blocked out to provide the required concrete depth over the beam.  
 Payment for any diaphragm option used shall be included in the price bid for Reinforced Concrete Slab.

312

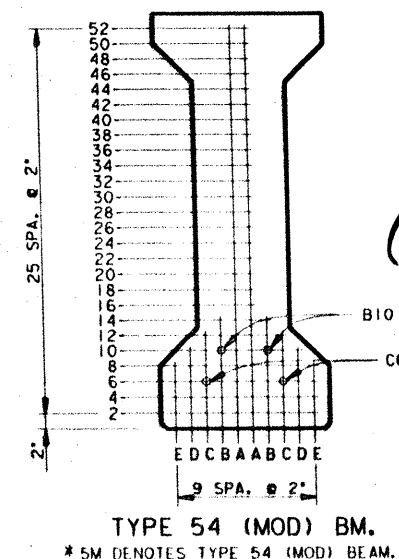
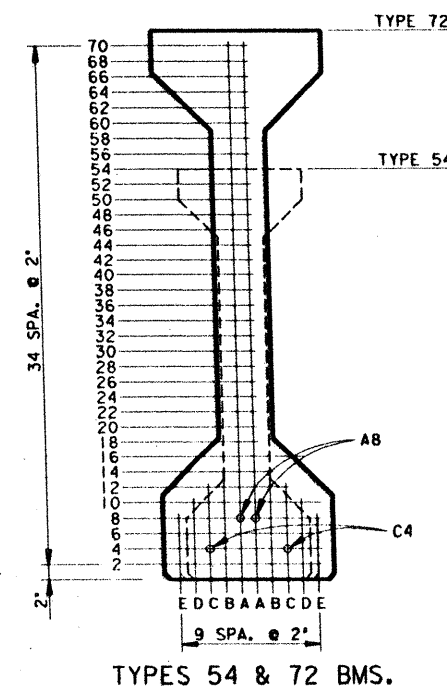
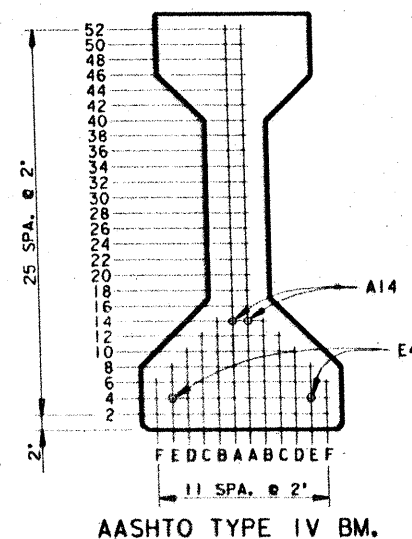
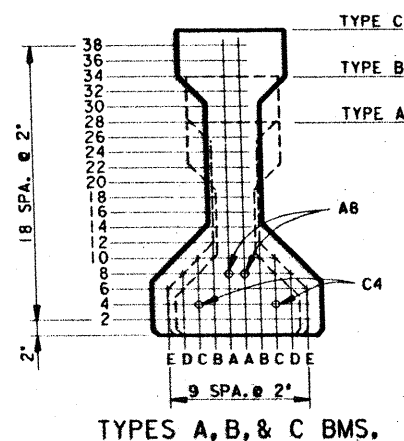
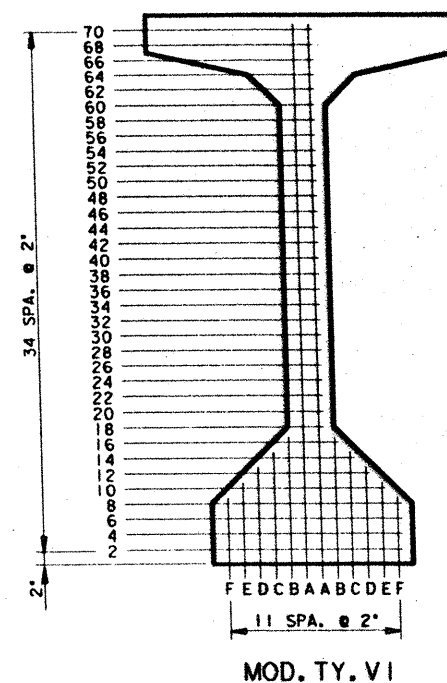
STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION  
**DIAFRAM OPTIONS FOR PRESTRESSED BEAM SPANS**  
 Gp DO

ORIGINAL DRAWING DATE	DEC. 1980	STATE PROJECT	15	FEDERAL AID PROJECT	IR35-2(157)173	SHEET	3/2
REVISED DATE	Rev. 1-82 LEC	REVISED DATE	Rev. 11-84	REVISED DATE	Rev. 11-82	REVISED DATE	Rev. 11-85
BY	RHS	BY	RHS	BY	RHS	BY	RHS
CHECKED	Rev. 10-85 (Remove blockout L 1001)	CHECKED	Rev. 10-83 (Channel Gage)	CHECKED	Rev. 10-83 (Channel Gage)	CHECKED	Rev. 10-83 (Channel Gage)



DESIGNED BEAMS (DEPRESSED STRANDS)													OPTIONAL DESIGN				
STRUCTURE	SPAN	BEAM NO.	* BEAM TYPE	NON-STD. STRAND PATTERN	PRESTRESSING STRANDS								CONCRETE		DN. LOAD COMP. STRESS (TOP F)	DN. LOAD TENSILE STRESS (BOT. F)	REQUIRED MINIMUM ULTIMATE MOMENT CAPACITY
					TOTAL				DEPRESSED				RELEASE STRGTH.	MINIMUM 28 DAY COMP. STRGTH.			
					NO.	SIZE	STRGTH.	*e* in.	*e* END in.	NO.	TO						
CIBOLO CREEK BRIDGE N. B. & S. B. LANES	18.13 7 28.5 3, 4, 6 & 8-11 12	ALL	IV		28	1/2	270K	21.32	16.18	6	A-30	4000	5000	2251	-2607	4684	
		ALL	IV		50	1/2	270K	19.47	11.07	10	A-52	5453	6439	3644	-4031	6878	
		ALL	IV		54	1/2	270K	19.12	11.34	10	A-52	5949	7038	3908	-4295	7274	
		ALL	IV		58	1/2	270K	18.68	10.41	12	A-52	6156	7947	4286	-4536	7385	
		ALL	IV		60	1/2	270K	18.48	10.48	12	A-52	6384	8117	4353	-4602	7479	
CIBOLO CREEK BRIDGE EAST & WEST FRONTAGE RD.	1-4	ALL	IV		52	1/2	270K	19.29	11.21	10	A-52	5732	7236	3993	-4242	6931	
SCHERTZ PARKWAY UNDERPASS	ALL	ALL	C		36	1/2	270K	12.42	7.09	8	A-32	5880	6687	3823	-4102	3673	
FM3009 UNDERPASS WIDENING	18.4 28.3	ALL	B		8	1/2	270K	12.93	10.43	2	A-12	4000	5000	1113	-1597	1031	
		ALL	B		26	1/2	270K	10.47	6.16	8	A-22	6044	6044	3482	-4183	2344	
				</													

# DESIGNS BASED ON LOW RELAXATION STRANDS



## NON-STANDARD STRAND PATTERNS

PATTERN	STRAND ARRANGEMENT AT E OF BEAM

## GENERAL NOTES:

Designed in accordance with current A.A.S.H.T.O. Specifications.

All concrete shall be Class H.

When shown on this sheet, the Fabricator has the option of furnishing either the designed depressed strand beam or an approved optional beam design using stress relieved or low relaxation strands. Optional designs for beams 120 foot or longer shall have a calculated residual camber equal to or greater than that of the designed beam.

Prestress losses for the designed beams have been calculated according to the current A.A.S.H.T.O. Standard and Interim Specifications for a relative humidity of 65 %. Optional designs shall likewise conform.

Certain beams with depressed strands are subject to cracking in the end of the beam. When such cracks occur, all subsequent beams of the same type and strand pattern shall have strands wrapped in the following manner:

1. Alternate rows of depressed strands shall be wrapped for 2 feet from each end of the beam.
2. One half of the straight strands, as nearly as possible, shall be wrapped for 4 feet from each end of the beam.
3. The wrapping pattern shall be symmetrical about the vertical axis of the beam for both depressed and straight strands.
4. Strands shall be wrapped so that the centers of gravity of the depressed strands and the straight strands will remain within 1 inch of their original location.
5. Strands shall be tightly wrapped with plastic tubing. Both ends and the seam of the tube shall be sealed with waterproof tape.
6. Revised shop drawings will not be required.

For depressed strand designed beams, strands shall be located as low as possible on the 2' grid system shown hereon unless a non-standard strand pattern is indicated. Fill row "2", then row "4", then row "6", etc., beginning each row in the "A" position and working outward until the required number of strands is reached. All strands in the "A" position shall be depressed, maintaining the 2' spacing so that the upper two strands are in the position shown in the table at the beam ends.

Initial pretension for 1/2" 270 K strands = 28.9 K for stress relieved strands or 31.0 K for low relaxation strands. Design shown based on initial pretension of 31.0 K.



STATE DEPARTMENT OF HIGHWAYS  
AND PUBLIC TRANSPORTATION

PRESTRESSED  
CONCRETE BEAMS

(NON-STANDARD SPANS)

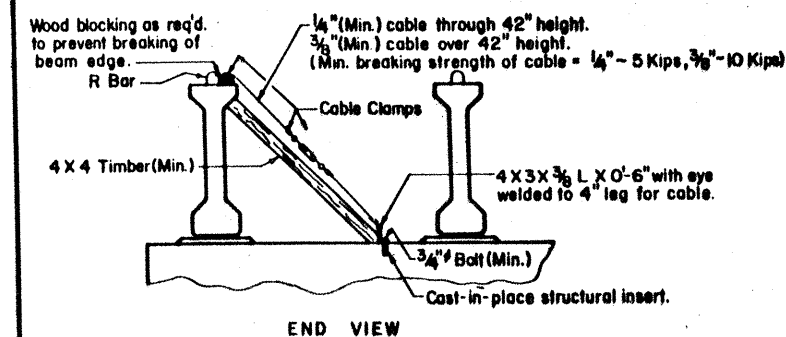
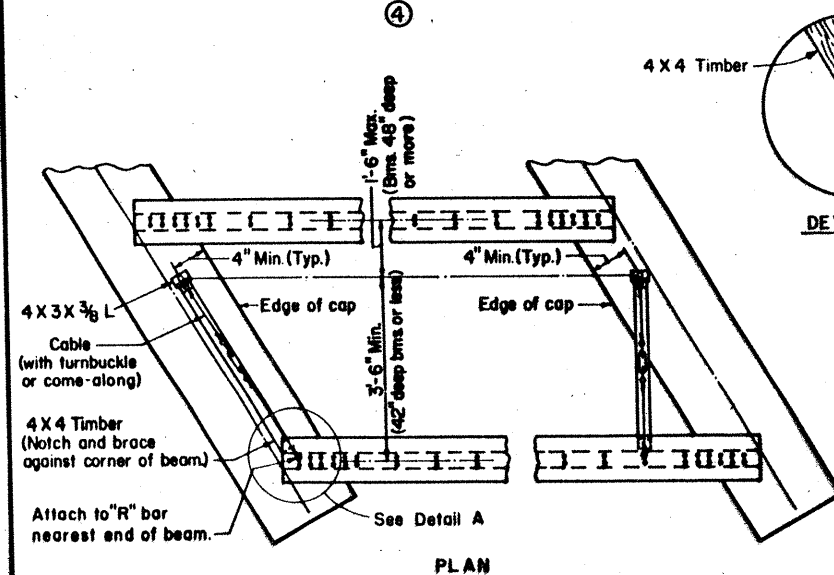
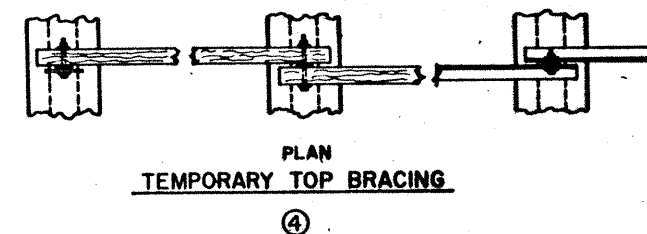
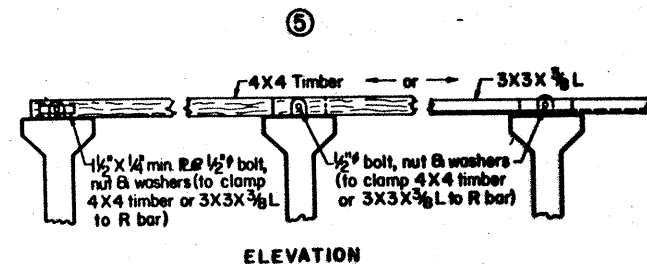
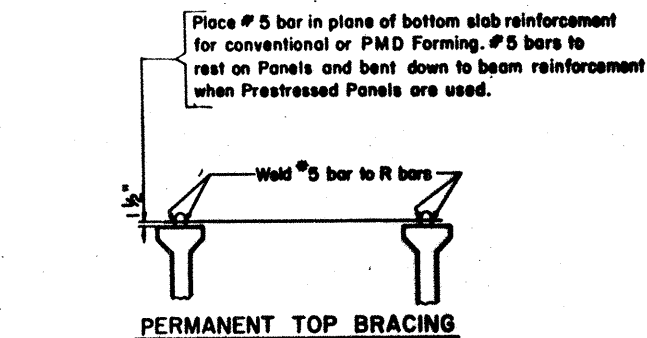
Gp-NS-LR

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REVISION: 2	DATE: 7/2/73	BY: JLM	REVISION: 2	DATE: 7/2/73
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REVISION: 4	DATE: 7/2/73	BY: JLM	REVISION: 4	DATE: 7/2/73
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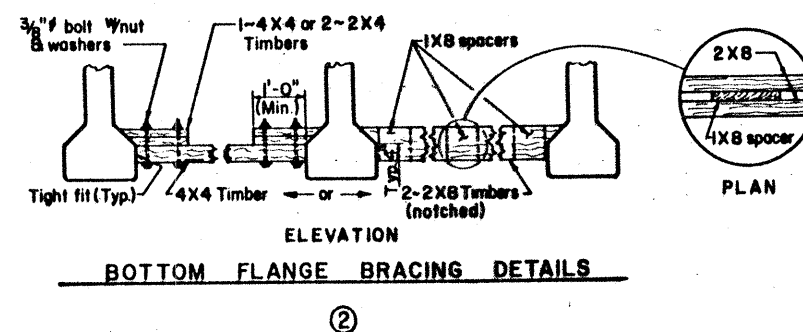
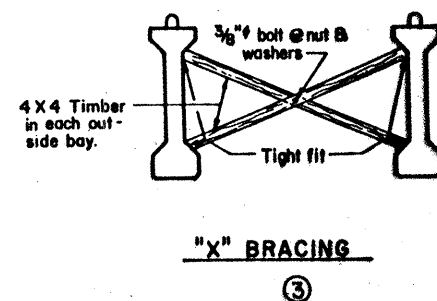
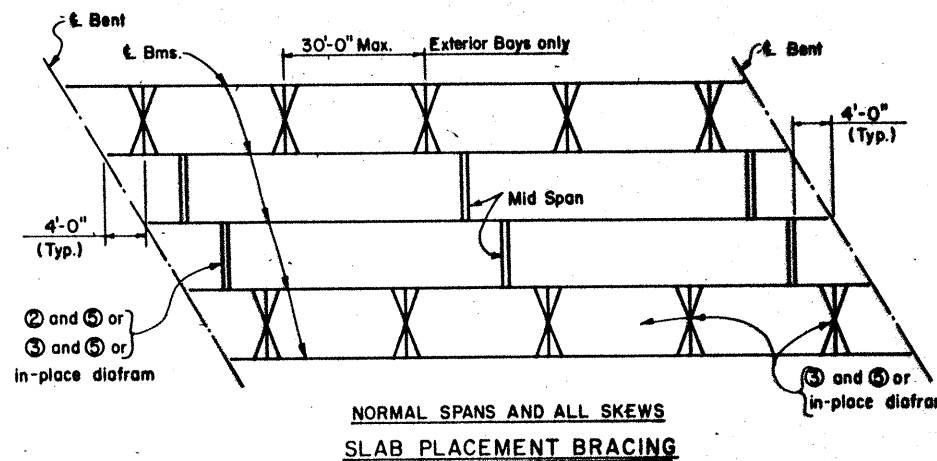
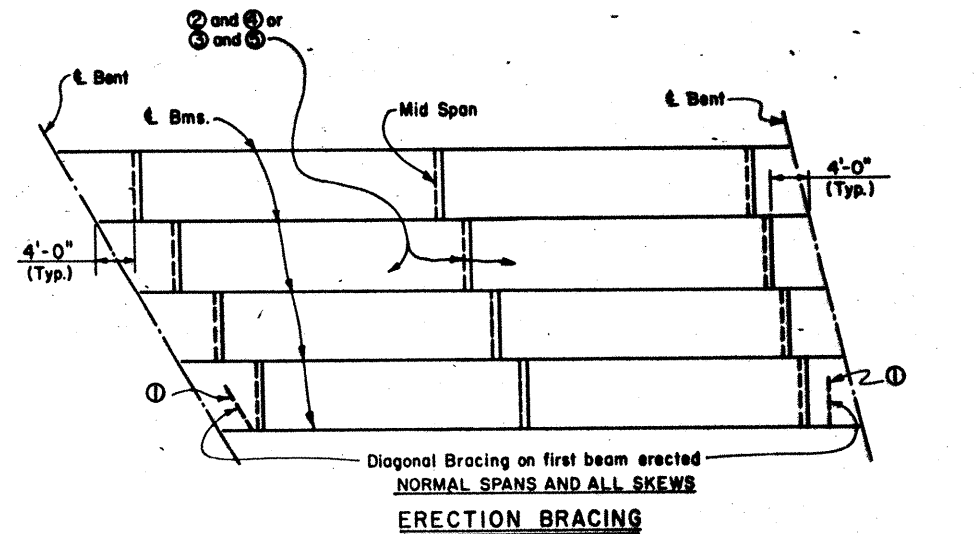


ORIGINAL DRAWING DATE		MARCH 1983		STATE DISTRICT		FEDERAL AID PROJECT		Q		EMBT	
ON		REVISIONS		15		6		IR35-2(157)173		3/4	
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		Rev 1: 6 (H&L and Sp)									
DW - DRG		Rev 11: B7-5				COUNTY		CONTROL		MILE	
		Rev 10: B6									
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**DIAGONAL BRACING DETAILS**  
(To be used on both ends of the first beam erected in the span.)



- Indicates Diagonal Bracing ①
- Indicates Bottom Bracing ② with Temporary Top Bracing ④ or "X" Bracing ③ with Permanent Top Bracing ⑤.
- Indicates Permanent Top Bracing ⑤
- Indicates Bottom Bracing ② or "X" Bracing ③, either one with Permanent Top Bracing ⑤ or an in-place diaphragm only.
- Indicates "X" Bracing ③ & Permanent Top Bracing ⑤ or an in-place diaphragm only.

# **GENERAL NOTES:** **ERECTION BRACING:**

Erection bracing details are considered minimum for fulfilling the requirements of Specification Item 425 (Article 425.5), and Special Provisions thereto, for bracing Types A, B, C, III, IV and V prestressed concrete beams erected in the span over a traveled way or railroad, and in those spans generally parallel to a traveled way or railroad and within a distance equal to the difference in elevation between the top of cap upon which the beams are being erected and the traveled way, or 30 feet, whichever is greater.

Required erection bracing shall be placed immediately after erection of each beam and remain in place until diaphragm bars DN are tightened or additional bracing as required for slab placement is in place.

## **SLAB PLACEMENT BRACING:**

The details for slab placement bracing are considered minimum for fulfilling the requirements of Specification Item 420, Article 420.9 (4) and special provisions thereto.

Required slab placement bracing shall remain in place until the slab concrete has attained a flexural strength of 500 p.s.i.

## **GENERAL:**

Bracing details for closely spaced beams (as on ramps or railroad structures) are not included herein. The Contractor shall submit his proposed bracing details for such conditions to the Engineer for approval prior to erection.

Systems equal to or better than those shown may be used provided details of such systems are submitted to and approved by the Engineer prior to erection.

Use of these systems and/or details does not relieve the Contractor of the responsibility for the adequacy of the bracing and the safety of the structure.

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

Bottom flange bracing at beam ends may be omitted when all beams are fixed with dowel bars or when erection is on steel caps or floor beams containing bearing seats which restrict lateral movement.

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

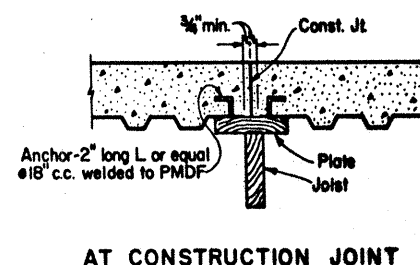
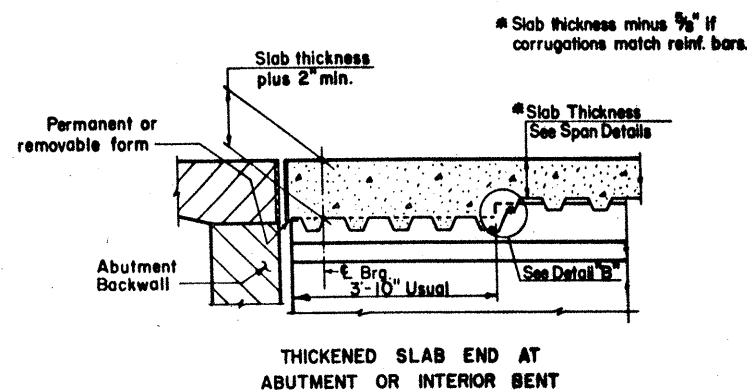
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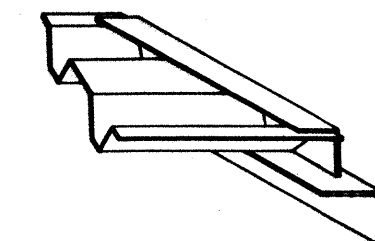
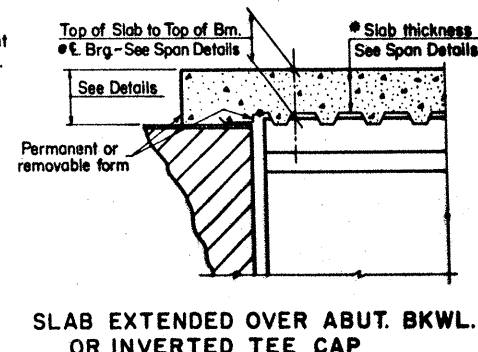
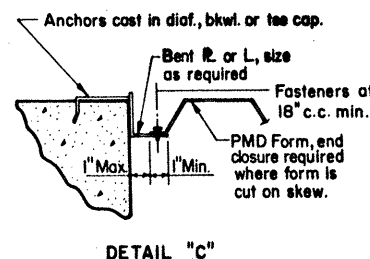
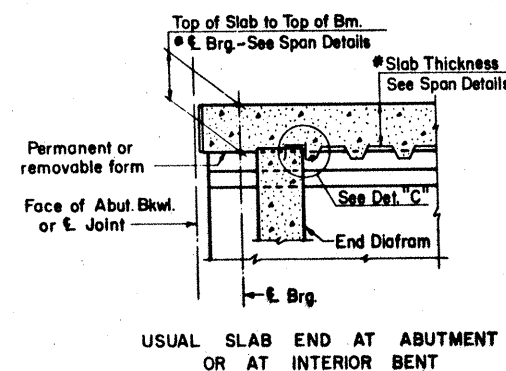
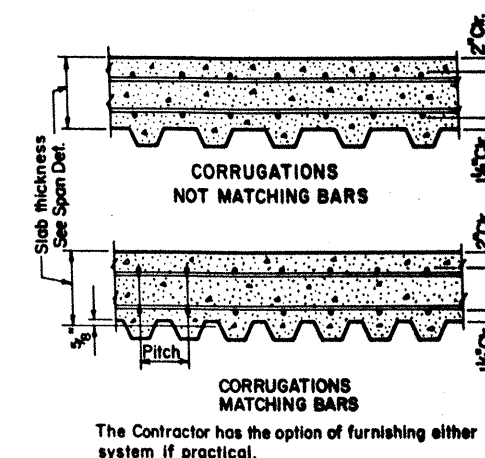
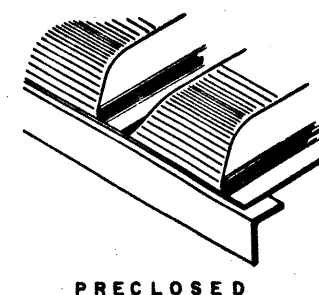
## STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION **PRESTRESSED CONCRETE BEAMS** TYPES A, B, C, III, IV & V MINIMUM ERECTION AND BRACING REQUIREMENTS

**PCB-MEBR (1)**

ORIGINAL DRAWING DATE	DEC 1980	STATE	FEDERAL	FEDERAL AID PROJECT	0	SHEET
DN - THD	REVISIONS	15	6	IR35-2(157)73	315	
CA - THD				COUNTY	CONTROL SECTION	JOB
DW - EDS				GUADALUPE, ETC	0016	06 23E 14-35
CR - THD						



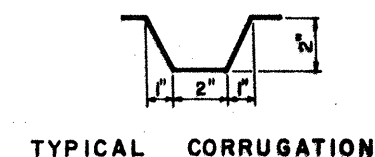
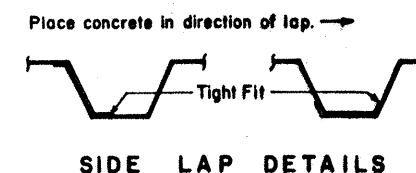
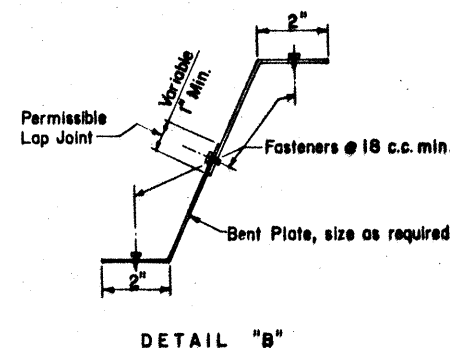
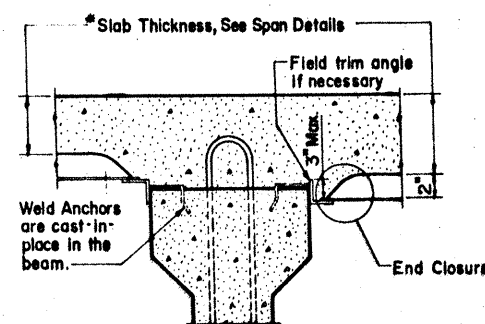
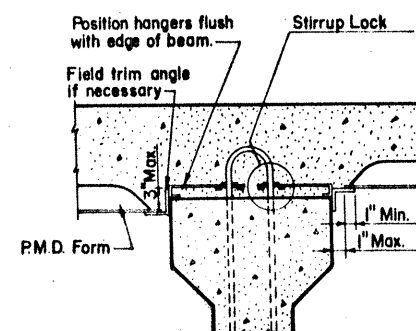
Note: In spans where PMD forms are used, timber forms shall be used at construction joints. Adequate provision shall be made to support edge of metal form and to provide anchorage of metal form to slab concrete where joined to wood forms.



Note: This type to be used for skewed ends only.

TYPES OF END CLOSURES

# DETAILS AT BEAM ENDS



## APPROXIMATE QUANTITIES FOR ONE SQUARE FOOT OF SLAB (for Contractor's information only)

Slab Thickness inches	Reinf Steel Lb / SF	Class S Concrete CY / SF
7.25	4.81	0.0255
7.50	4.93	0.0262
7.75	5.06	0.0270
8.00	5.27	0.0278
8.25	5.67	0.0285

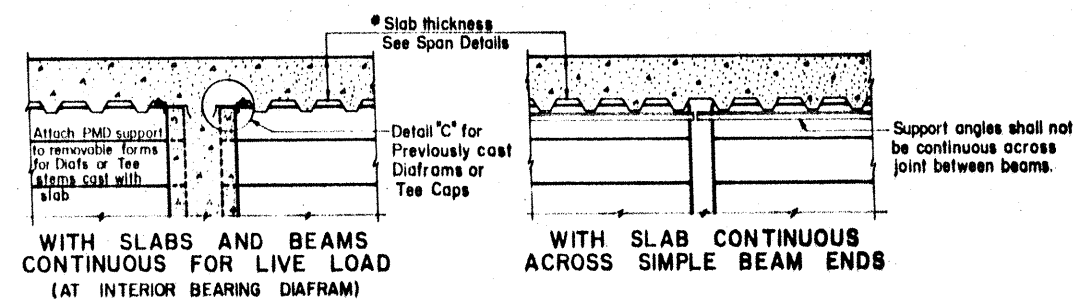
These approximate quantities are for a typical square foot of cast-in-place slab over the average PMDF with corrugations not matching bars. Truss bars are assumed in the slab. The quantities do not include an allowance for slab overhangs, thickened ends or diaframs, or possible haunch over beams.

GENERAL NOTES:  
Permanent Metal Deck Forms (P.M.D. Forms) shall be designed for the dead load of form, reinforcement and concrete plus 50 pounds per square foot for construction loads. The following allowable stresses shall be used in the design:

ASTM A446, Grade	Yield (psi)	Allowable Stress (psi)
A	33,000	23,900
B	37,000	26,800
C	40,000	29,000
D	50,000	36,000
E	80,000	36,000
Weld Metal		12,400

Maximum deflection under the weight of forms, reinforcement and concrete, or a minimum of 120 pounds per square foot shall not exceed 1/50 of the form span or 1/2 inch whichever is less. The design span for forms shall be clear distance between beam flanges measured parallel to the form flutes minus 2 inches. The minimum thickness of the form shall be 22 gage and that of the support angles shall be 14 gage. All forms shall be securely fastened to supports. This Standard shall be used as a guide in the preparation of shop detail drawings.

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WITH SLAB CONTINUOUS ACROSS SIMPLE BEAM ENDS

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

PERMANENT METAL DECK FORMS (CONCRETE)

PMDF (C)

ORIGINAL DRAWING DATE: MARCH 1986

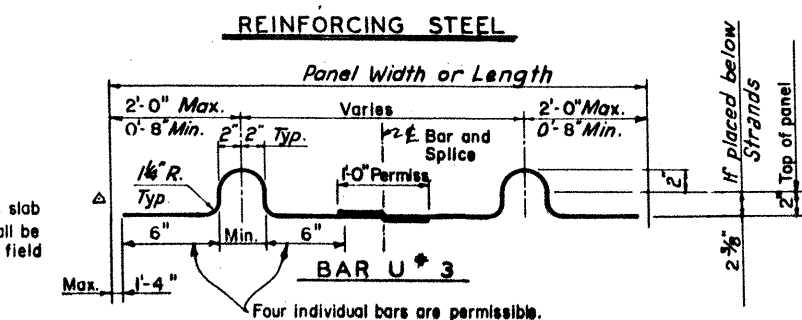
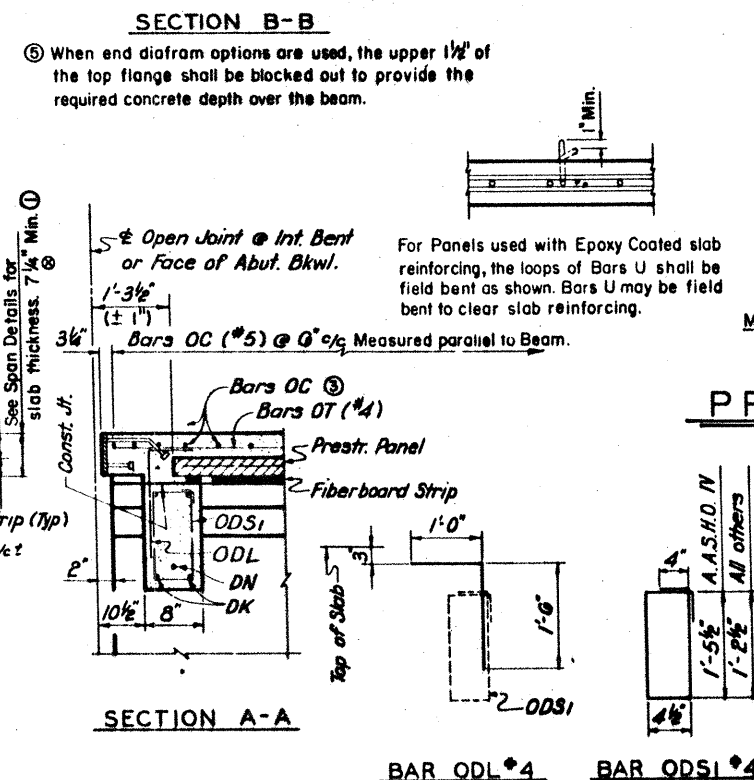
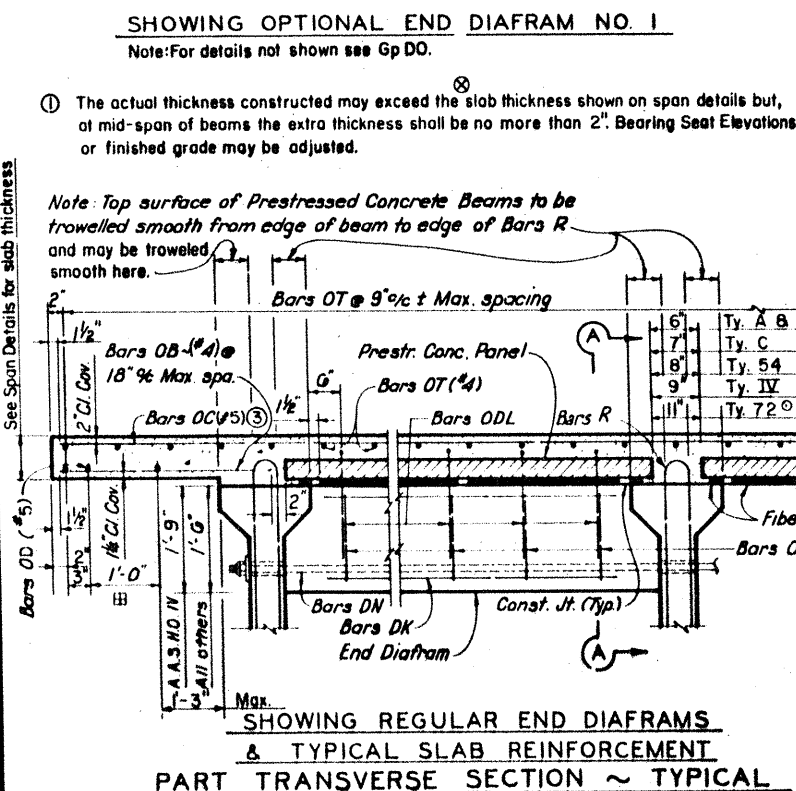
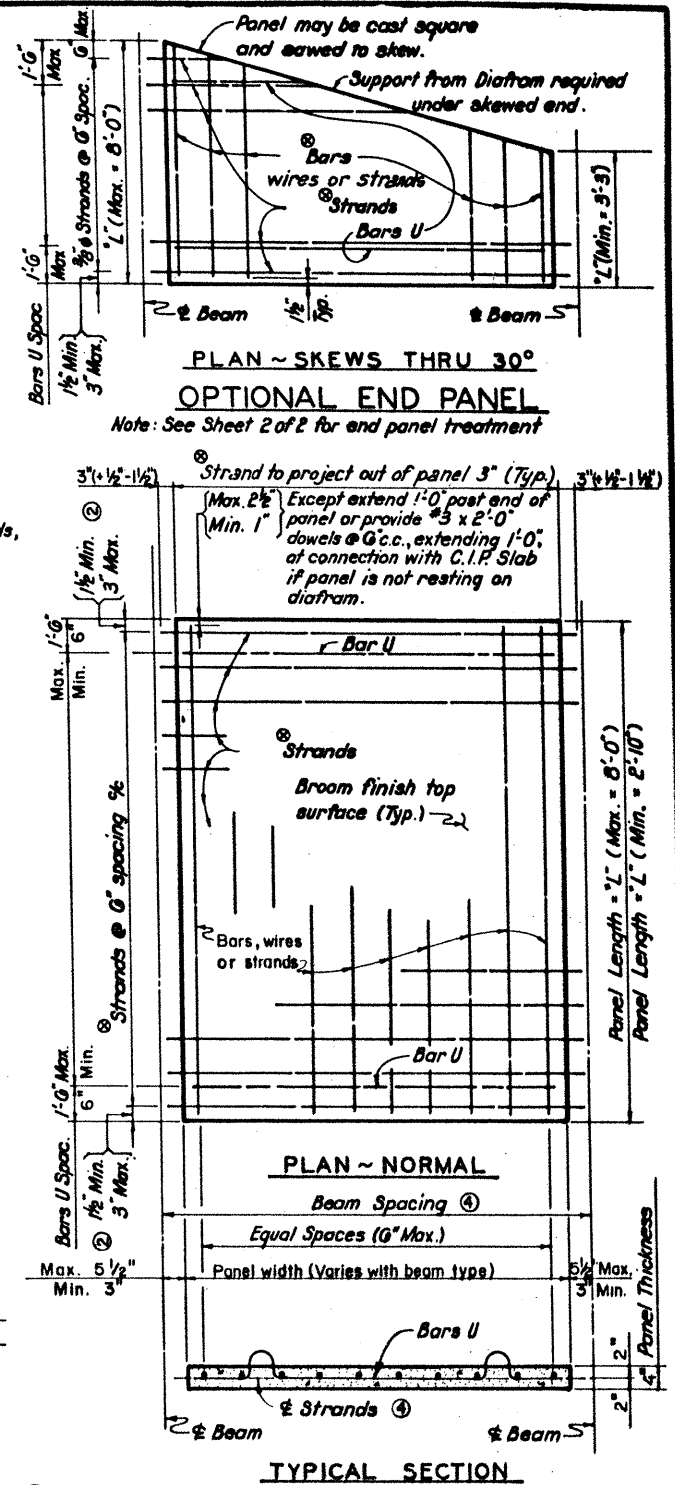
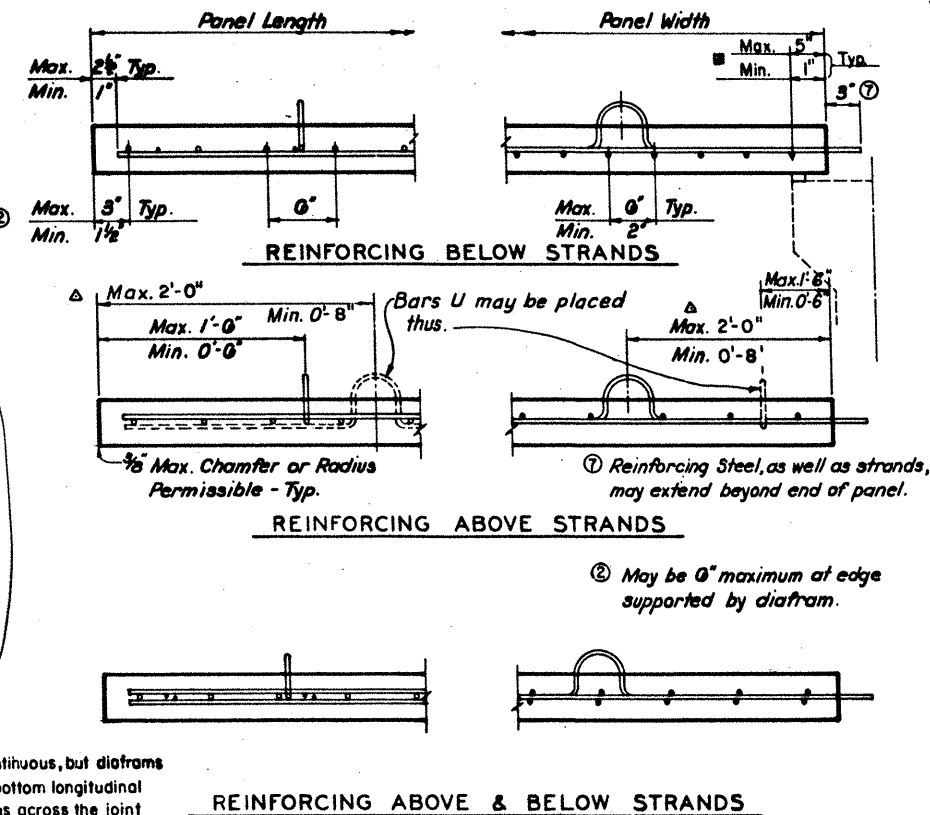
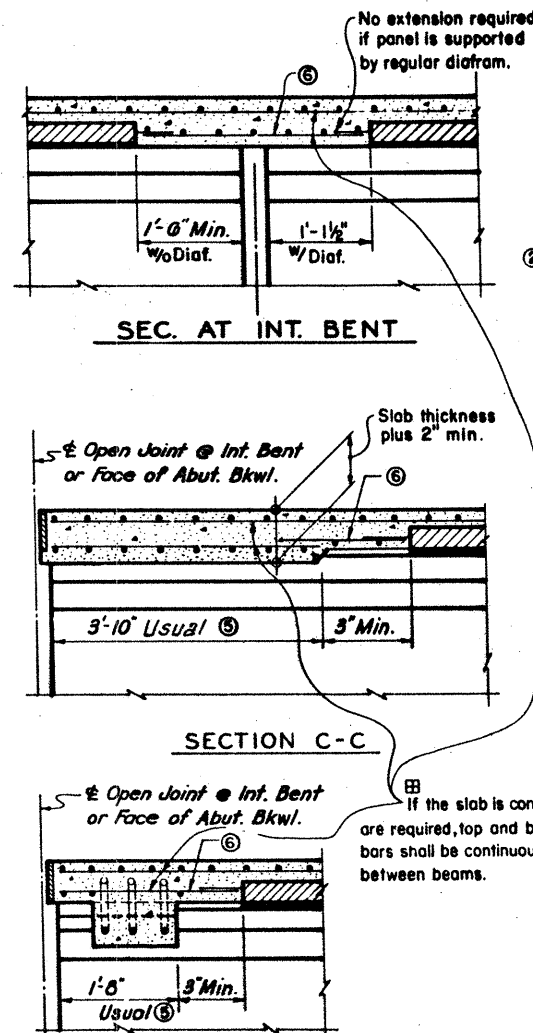
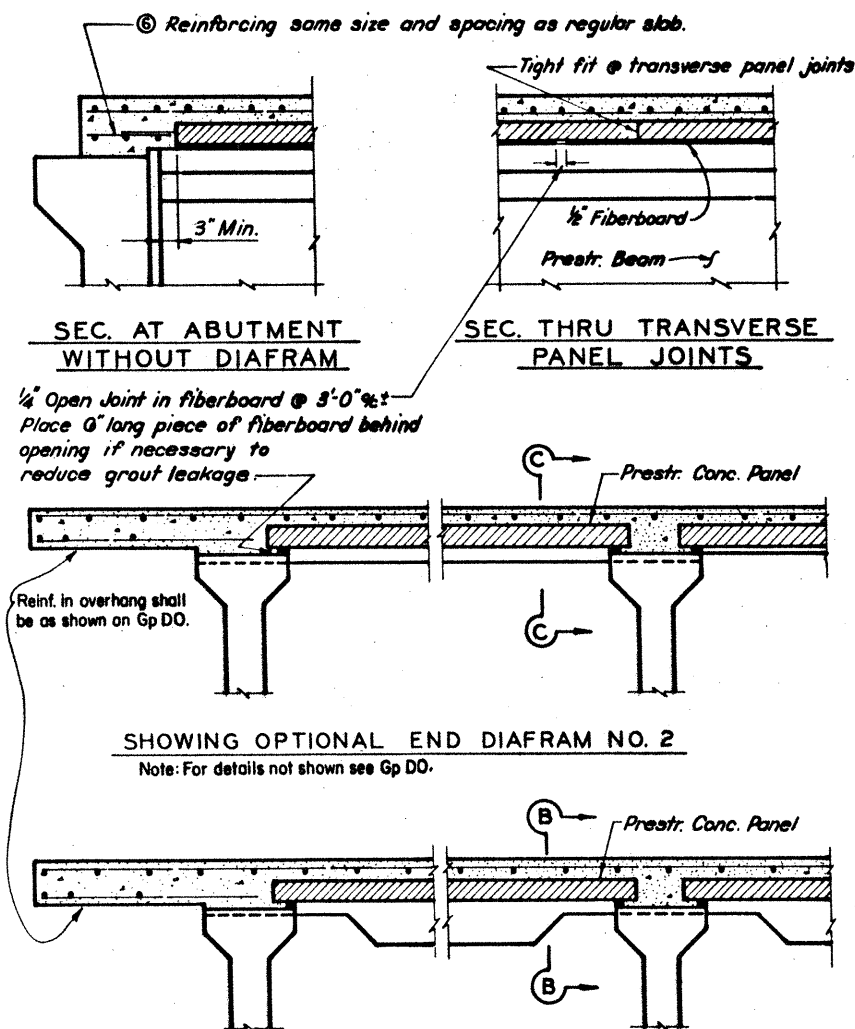
STATE: DISTRICT: FEDERAL AND PROJECT: 4

15 6 TR35-21157173 3/6

Rev II B6 (Added sq ft quant's)

Rev 5-B7

COUNTY: GUADALUPE, ETC 0016 06 295 JH 35



## PRESTRESSED PANEL DETAILS

Notes:

- ③ Bars OC in C.I.P. slab shall be Gr 60.
- ④ Reinforcing steel Gr 60 #4 at 6"  $\phi$  may be substituted for strands in panels where beam spacings are narrower than 5'-0"

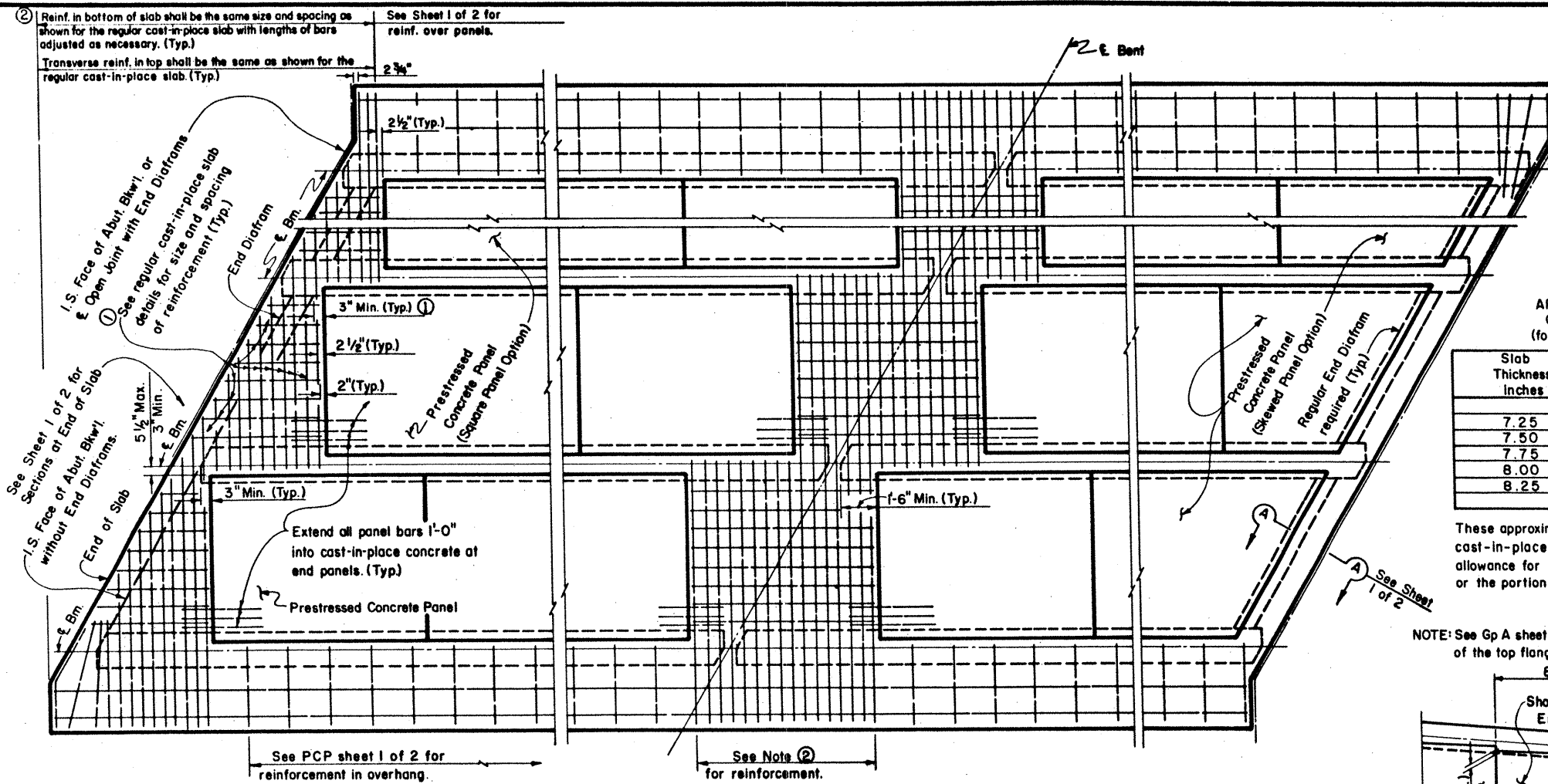
TEXAS HIGHWAY DEPARTMENT  
BRIDGE DIVISION

**PRESTRESSED CONCRETE  
PANELS**

## OPTIONAL DECK DETAILS

PCP

Rev 3-87	ORIGINAL DRAWING DATE	DEC. 1980	STATE	FEDERAL	FEDERAL AID PROJECT	0	DWST
Rev 9-85	NO. R/R	REVISIONS	15	6	IR35-2(152)73		3/7
Rev 6-85	CR-MCP	Rev. 11-81 Bors U					
Rev 10-84	DW-AS	Rev. 12-81					
Rev 8-84	CR-MCP	Rev. 6-85					
Rev 8-84	DW-AS	Rev. 2-82					
Rev 8-84	CR-MCP	Rev. 11-82					
			COUNTY	CONTRACT	DEL. NO.	POST	WAYWAY
			GUADALUPE ETC	0016	06	908	11-35

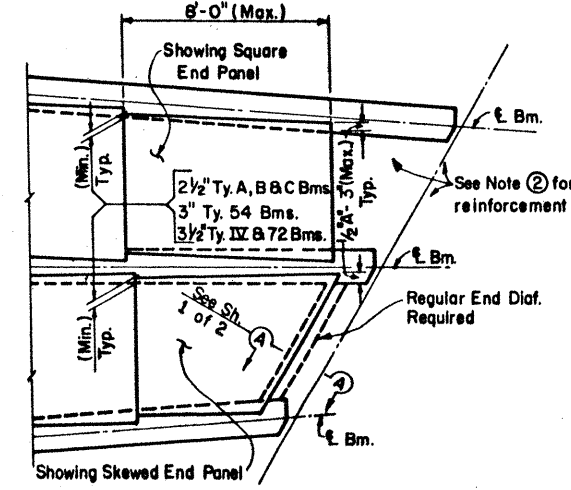


APPROXIMATE QUANTITIES FOR ONE SQUARE FOOT OF SLAB (for Contractor's information only)

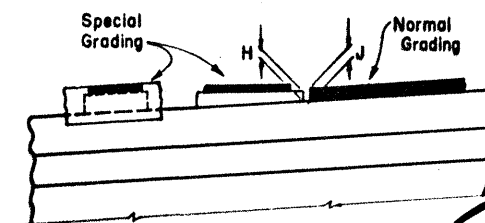
Slab Thickness Inches	Reinf Steel Lb/SF	Class S Concrete CY/SF
7.25	2.98	0.0100
7.50	2.98	0.0108
7.75	2.98	0.0116
8.00	2.98	0.0123
8.25	2.98	0.0131

These approximate quantities are for a typical square foot of cast-in-place slab over the PCP. They do not include an allowance for slab overhangs, thickened ends or diaphragms, or the portion between panels over the beams.

NOTE: See Gp A sheet for dimension "A" which is the width of the top flange of the prestressed beam.



**FLARED BEAM SPANS PART PLAN**



At grading method changes along the beam, the special grading "H" dimension may be reduced to 1 3/4" and the normal grading "J" dimension may be increased to 2". Some cross-slope conditions may require further H and J adjustments as directed by the Engineer.

**GENERAL NOTES:**  
 Designed for HS 20 Loading in accordance with A.A.S.H.T.O. 1977 Standard and Interim Specifications.  
 All concrete for panels to be Class H. Release strength  $f'_{ci} = 4000$  p.s.i. Minimum 28 day strength  $f'_c = 5000$  p.s.i.  
 Prestressing strands to be  $7/16"$  (270) with an initial tension of 16.1 kips per strand. Larger strands may be used with the same spacing and initial tension.  
 Suitable holes or anchorage devices for lifting panels may be cast in the panels provided they are shown on the shop plans and approved by the Engineer. Panel lengths shall be determined by the contractor and shown on the shop plans.  
 Erected panels shall bear uniformly on blocking strips of fiberboard placed along the outer edge of each beam and on the edge of end diaphragms. A 1/4" gap shall be left at 3'-0" intervals to permit escape of trapped air in the cast-in-place concrete. If additional blocking is needed, special grading details for supporting the panels and extra reinforcing between beam and slab will be required. The cost of this additional blocking will be considered subsidiary to deck construction.  
 Care must be taken to ensure proper cleaning of construction debris and consolidation of concrete mortar under the edges of the panels. It is also important that the fiberboard strips be placed at the edges of beams so that adequate space is provided for the mortar to flow a minimum of 1 1/2" under the panel as the slab concrete is placed. Roadway cross-slope reduces the opening required for proper entry of the mortar on the high side. Fiberboard blocking strips varying in thickness across the beam are therefore required. Tests have shown that careful vibration of deck concrete will allow the proper amount of mortar to flow through a 1/2" opening; however, a minimum opening of 1/4" is desirable.  
 Standard detail Gp-C shall apply except as modified.

**FIBERBOARD DIMENSIONS**

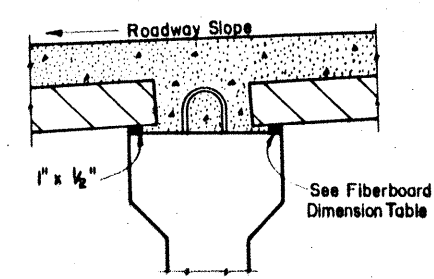
MAX. ROADWAY SLOPE				BEAM
.08'/ft.	.06'/ft.	.04'/ft.	.02'/ft.	
1" x 1"	1" x 1"	1" x 1"	1" x 1/2"	A, B, C
1 1/2" x 1 1/2"	1" x 1"	1" x 1"	1" x 1/2"	54
1 1/2" x 1 1/2"	1 1/2" x 1 1/2"	1" x 1"	1" x 1/2"	IX, 72

- ③ Concrete blocks used for special grading shall be any convenient plan dimension with a minimum of 2 in. by 4 in. and a maximum of 4 in. by 8 in. Heights may be from 1.125 to 5.5 inches.
- ④ Concrete blocks from 1.125 in. high to 2.0 in. high may be used without the additional R bar extensions or longitudinal No. 4 bars.
- ⑤ For blocks up to 3.5 in. high, use 1 in. by 4 in. 20 gage galvanized sheet metal angle and for blocks 3.5 to 5.5 in. high, use 1 in. x 6 in. 16 gage galvanized sheet metal angle. Tie sheet metal thru holes in angle at 12 inch centers with 14 gage minimum galvanized wire. Sheet metal angles are to be overlapped at splices and left in place. Vent holes 0.375 inches in diameter are to be placed in angles within the upper 1 inch, spaced at 36 in. centers.

**END OF SLAB SQUARE PANEL OPTION AND SKEWS OVER 30°**

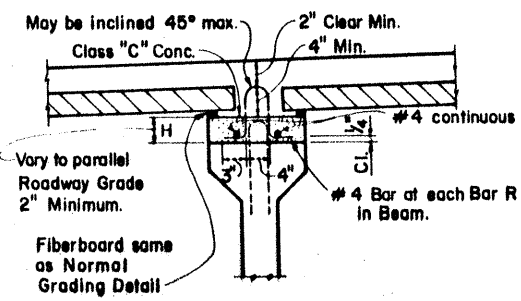
Note: Square panel option shall be used with end diaphragm options or other thickened slab end details, or when end diaphragms are omitted, or skewed greater than 30°.

- ① For end diaphragm options, regular slab reinforcing is as shown on Gp D0 and the minimum distance applies to the back edge of the deepest part of the diaphragm or other thickened slab edge.



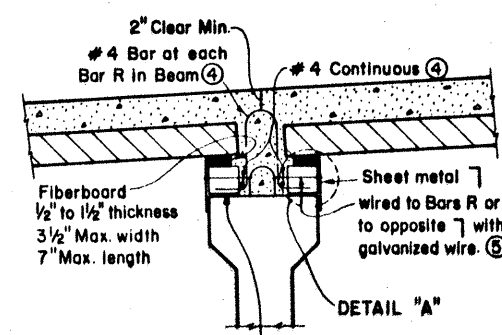
**NORMAL GRADING DETAIL**

Minimum fiberboard dimensions shall be as shown. Thicker strips may be used on one or both sides of the beam to reduce cast-in-place concrete thickness, within tolerances. The thicker strips shall be 1" x 3/4", 1" x 1", 1 1/2" x 1/4" or 1 1/2" x 1 1/2". No more than 1 1/2" total may be used. The same thickness strip shall be used under any one panel edge and the maximum change in thickness between adjacent panels shall be 1/4".



**SPECIAL GRADING DETAILS**

For use where the distance between top of beam and finished grade can not be achieved within tolerances on cast-in-place slab thickness and thickness of fiber board strips. An alternate method may be used provided it is approved by the Engineer.



**DETAIL "A"**

Place concrete blocks (4"x8" Max.) at 1/4 pts. of panel edges (± 2" along beam). For panels 4 ft. and less the blocks may be at panel corners and common to two panels. Blocks not to be used with Types A and B beams.

SHEET 2 OF 2

**STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION**

**PRESTRESSED CONCRETE PANELS**

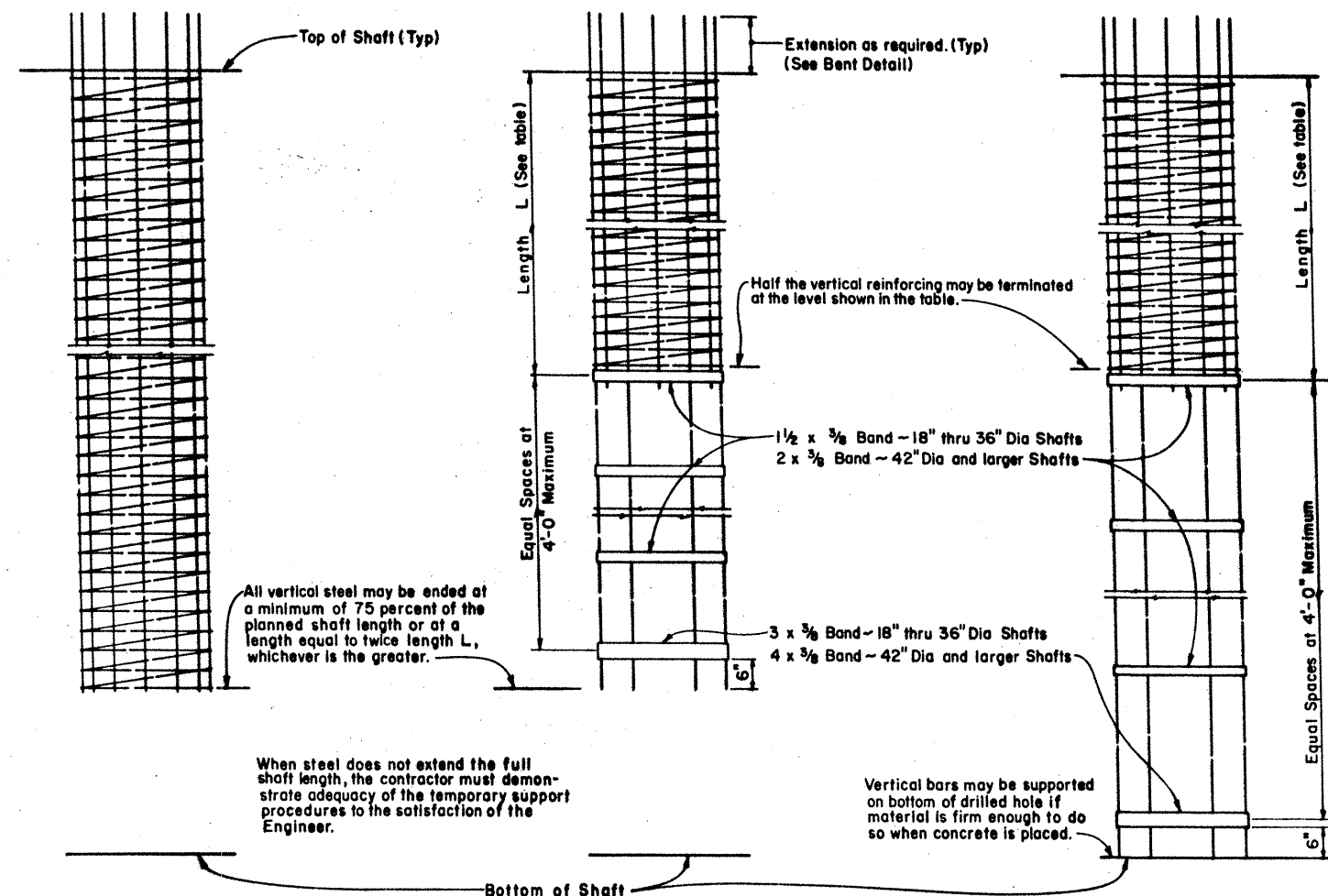
**OPTIONAL DECK DETAILS**

PREPARED BY AND FOR THE USE OF THE S.D.H. & P.T. **PCP**

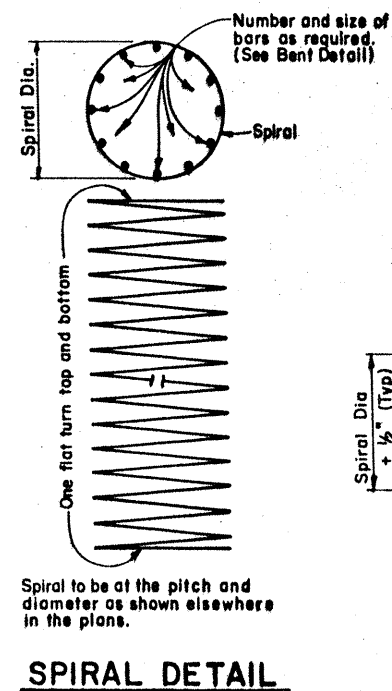
ORIGINAL DRAWING DATE DEC 1980	STATE PROJECT 15	FEDERAL PROJECT 6	FEDERAL AID PROJECT 0	SHEET 318
REVISED BY	REVISED DATE	REVISED BY	REVISED DATE	
CR-MBP	Rev 11-81	Rev 8-83		
CR-EDS	Rev 12-81	Rev 8-84		
CR-JJP	Rev 10-82	Rev 10-84		

COUNTY GUADALUPE PROJECT 06 29-ED-1H-35

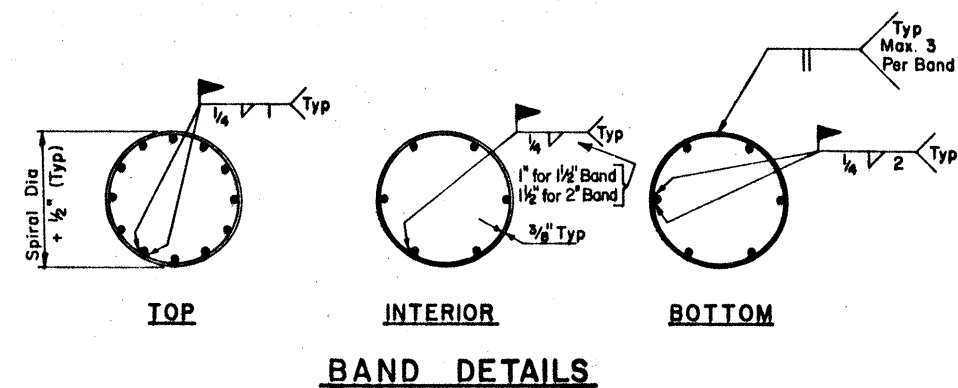




### ELEVATIONS



### SPIRAL DETAIL



### BAND DETAILS

LENGTH L		
Drilled Shaft diameter (inches)	Length L (feet)	The length L is measured from top of shaft, natural ground, or finished ground, whichever results in the longer length of full reinforcement.
18 and 24	24	
30 and 36	30	
42 and larger	10 shaft diameters	

### GENERAL NOTES:

At the Contractor's option, any or all drilled shafts may be constructed using these details in lieu of the drilled shaft details shown elsewhere in the plans.

These details shall not be applied to single column bents supported by a single shaft, or to overhead sign bridge towers supported by a single shaft, or to high mast illumination pole foundations. Drilled shafts in or immediately adjacent to stream channels and any others specifically noted elsewhere in the plans shall have full reinforcement and be excluded from application of these details.

All welded bands and reinforcing steel, including that projecting the required amount from the top of the shaft, shall not be paid for directly but shall be subsidiary to the bid items, Drilled Shaft Foundations or Slurry Displacement Drilled Shafts.

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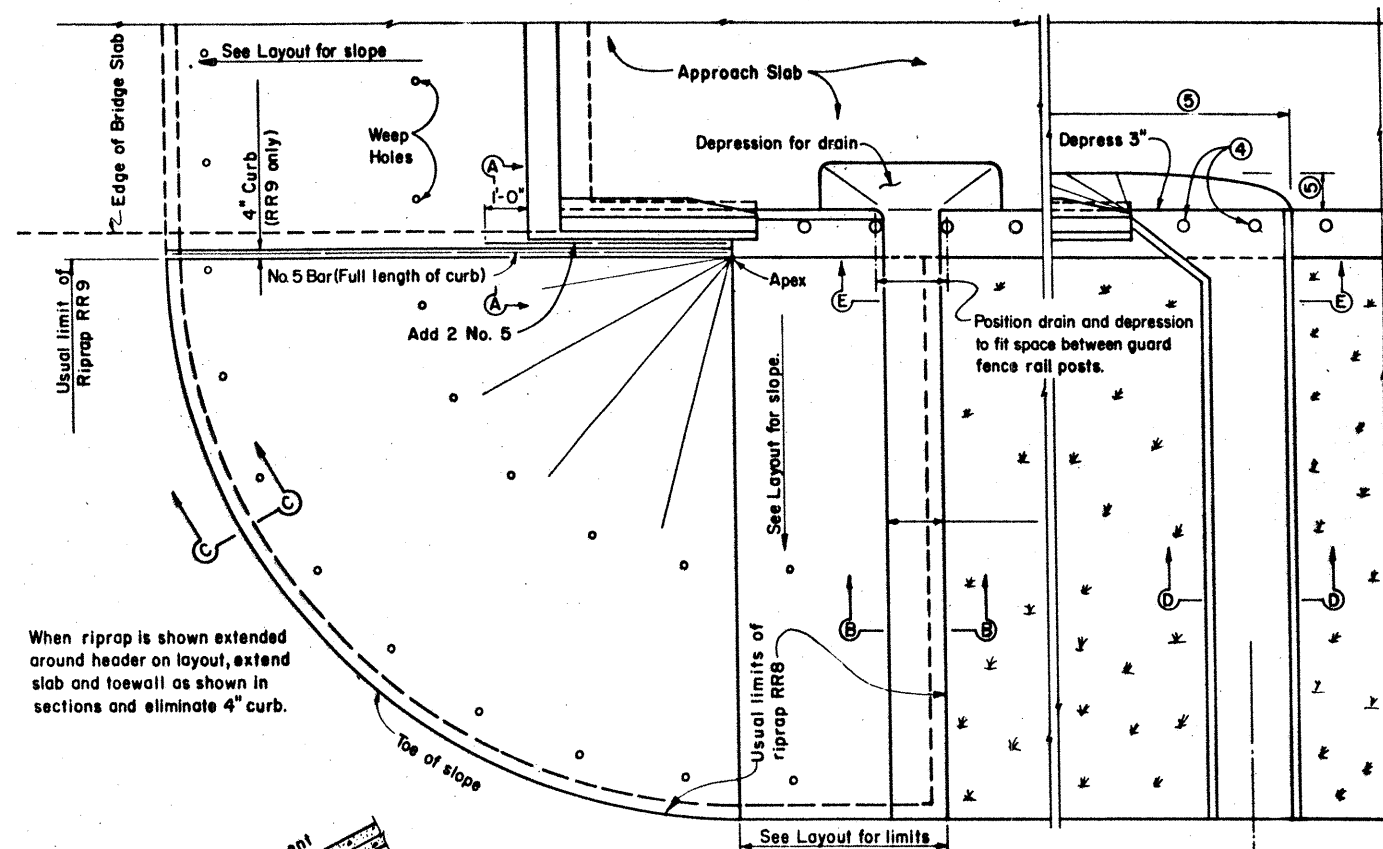
STATE DEPARTMENT OF HIGHWAYS  
AND PUBLIC TRANSPORTATION

## OPTIONAL DRILLED SHAFT REINFORCING

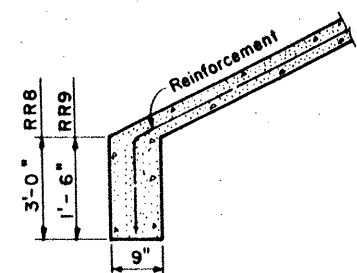
ODSR

ORIGINAL DRAWING DATE	FEB 1987	STATE	PROJECT	SECTION	DATE
BY	THD	15	6	TR-35-2(157)123	312
BY	GHO				
BY	EDS				
BY	JJP				

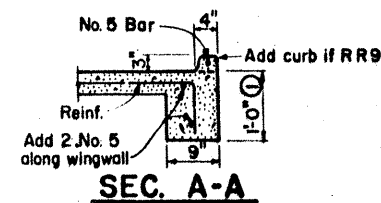




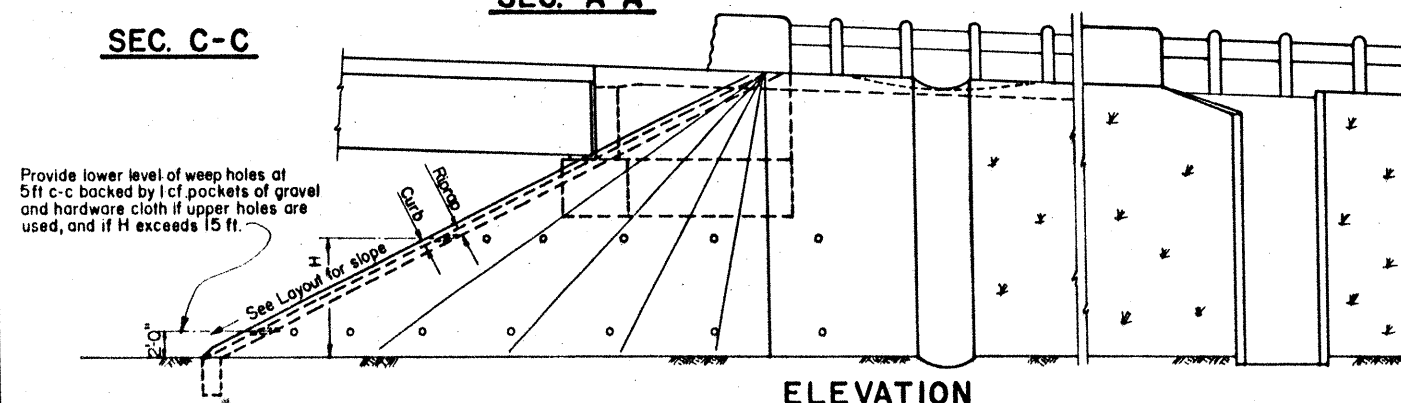
PLAN



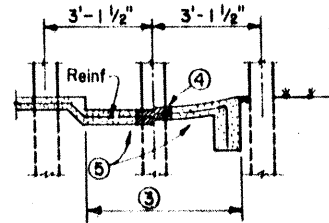
SEC. C-C



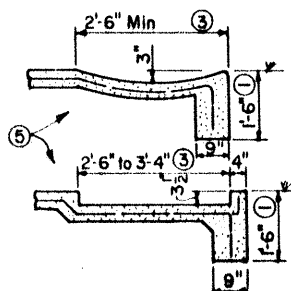
SEC. A-A



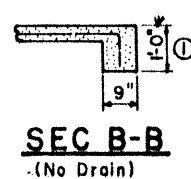
ELEVATION



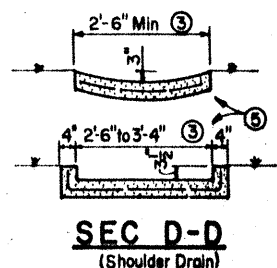
SEC. E-E



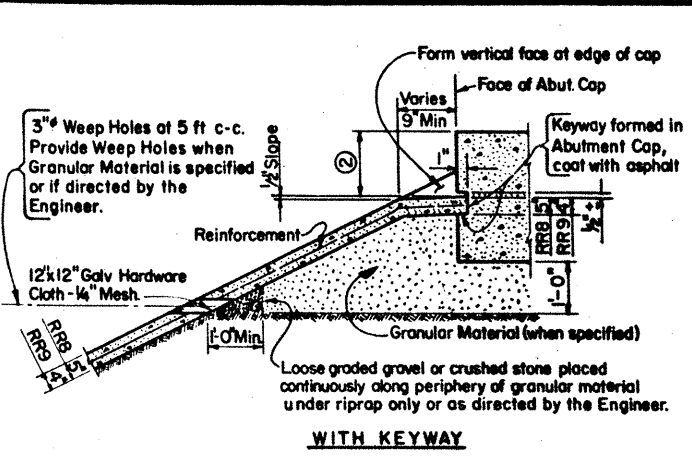
SEC. B-B  
(With Drain)



SEC. B-B  
(No Drain)



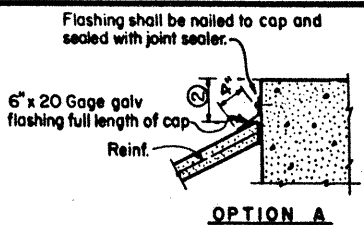
SEC. D-D  
(Shoulder Drain)



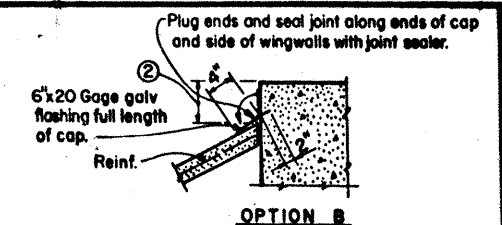
WITH KEYWAY

The sealing option of the joint between the face of cap and riprap shall be as designated by the Engineer. Options A or C may be used at wingwalls in all cases.

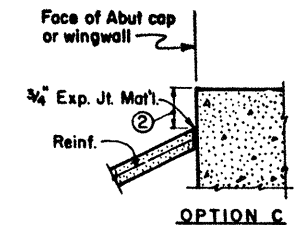
**SECTIONS THRU RIPRAP AT CAP**



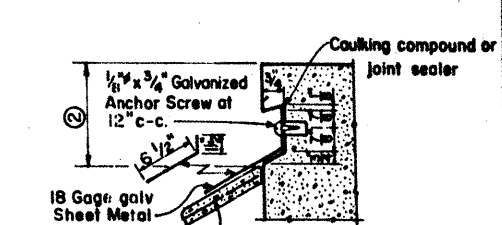
OPTION A



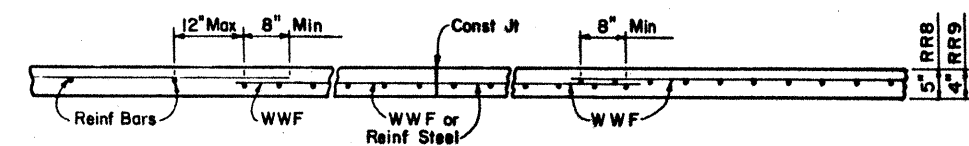
OPTION B



OPTION C



OPTION D



Reinforcing bars shall be No. 3 at 18 in. spac c-c. Welded wire fabric shall be 6 x 6 - W2.9 x W2.9. Combinations of WWF and reinforcing bars may be used if both are permitted. Lap splices shall be a minimum of 8 inches, measured from the transverse wire of WWF.

SECTION THRU REINFORCING AND CONST JOINT

- 1 Wall extension may be reduced or modified if approved by the Engineer.
- 2 Dimension varies as directed by the Engineer. Should be 9" Min for stringer type bridges and 1'-6" for slab type bridges.
- 3 Wider or other drain configurations shall be used if shown elsewhere in plans or if directed by the Engineer.
- 4 A 12 in. diameter leave out should be provided in the riprap at the guard fence location. Backfill with 4 in. of ACP if directed by the Engineer.
- 5 Limits and configuration of drains and depressions shall be as shown elsewhere in plans or as directed by the Engineer.

**GENERAL NOTES:**

Concrete shall be Class B unless noted elsewhere in plans.

Reinforcing other than that shown may be used by substituting reinforcement of equal or greater unit cross-sectional area. The maximum reinforcement spacing shall be 18 inches.

Construction joints or grooved joints extending the full slant slope height shall be at intervals of approximately 20 feet unless otherwise directed by the Engineer.

Porus Concrete Filter Blanket and Gravel Backfill shall be placed if shown elsewhere in the plans or if directed by the Engineer.

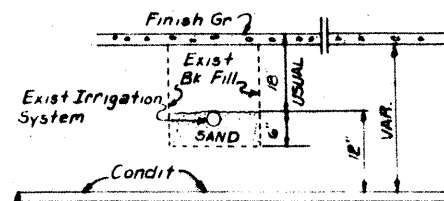
Hardware cloth, loose graded stone behind weep holes, flashing, or other sealing material shall not be paid for directly but shall be subsidiary to the bid item, Riprap.

Unless specified elsewhere in the plans to be only reinforcing bars, the riprap reinforcing may be composed of reinforcing bars, welded wire fabric, or any suitable combination of both types.

RR8 is to be used on stream crossings.  
RR9 is to be used on other embankments.

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STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION	
CONCRETE RIPRAP FOR EMBANKMENT SLOPES UNDER BRIDGE ENDS RR8 & RR9	
ORIGINAL DRAWING DATE: FEB 1987	DATE: 15 6 1987
BY: JJP	BY: JJP
BY: THD	BY: THD
BY: EDS	BY: EDS
BY: JJP	BY: JJP
PROJECT: 15 6 TR35-20(52)123 320	
COUNTY: GUADALUPE ETC 0016 06 23 11.35	

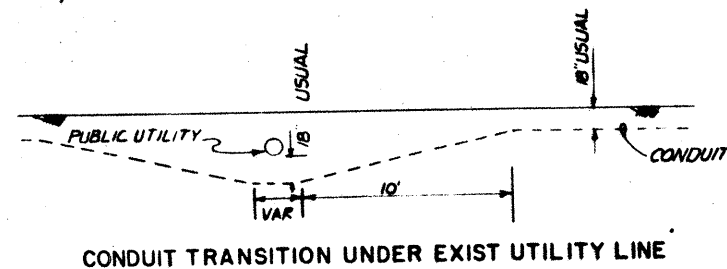


### NOTES

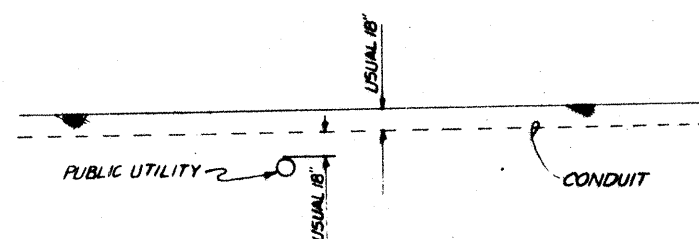
THE LOCATION OF UTILITIES & IRRIGATION EITHER UNDERGROUND OR OVERHEAD SHOWN WITHIN THE RIGHT OF WAY ARE APPROXIMATE AND SHALL BE VERIFIED BY THE CONTRACTOR BEFORE BEGINNING CONSTRUCTION OPERATIONS.

ADDITIONAL CONDUIT REQUIRED TO CLEAR IRRIGATION OR PUBLIC UTILITIES WILL NOT BE INCLUDED IN PAYMENT, BUT SHALL BE CONSIDERED SUBSIDIARY TO THE VARIOUS ILLUMINATION ITEMS.

TYPICAL CONDUIT AT PUBLIC UTILITIES AND EXIST. IRRIGATION SYSTEMS

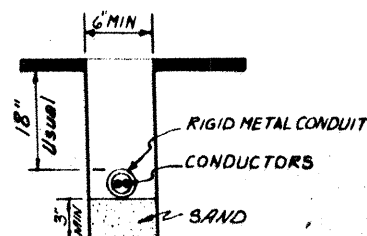


CONDUIT TRANSITION UNDER EXIST UTILITY LINE



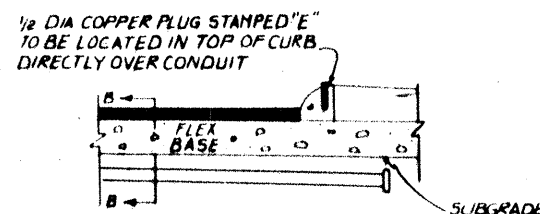
CONDUIT ACROSS EXIST. UTILITY LINE

TYPICAL CONDUIT AT PUBLIC UTILITIES

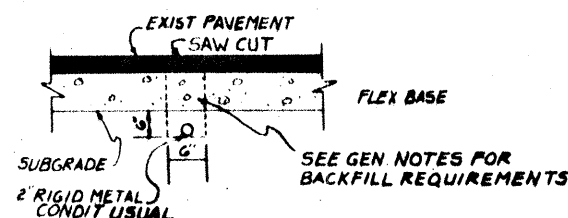
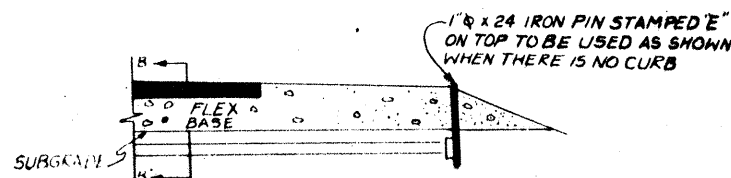


NOTE: TRENCHES AFTER PLACEMENT OF THE SAND BED THE CONDUIT TRENCH SHALL BE BACKFILLED WITH MATERIAL EXCAVATED FROM THE TRENCH AND COMPACTED TO THE APPROXIMATE DENSITY OF THE ADJACENT MATERIALS. ALL CONDUIT PLACED FOR USE ON THIS PROJECT SHALL HAVE CONDUIT BUSHINGS AT EACH END.

TRENCH DETAILS (TRENCHES PARALLEL TO ROADWAY)

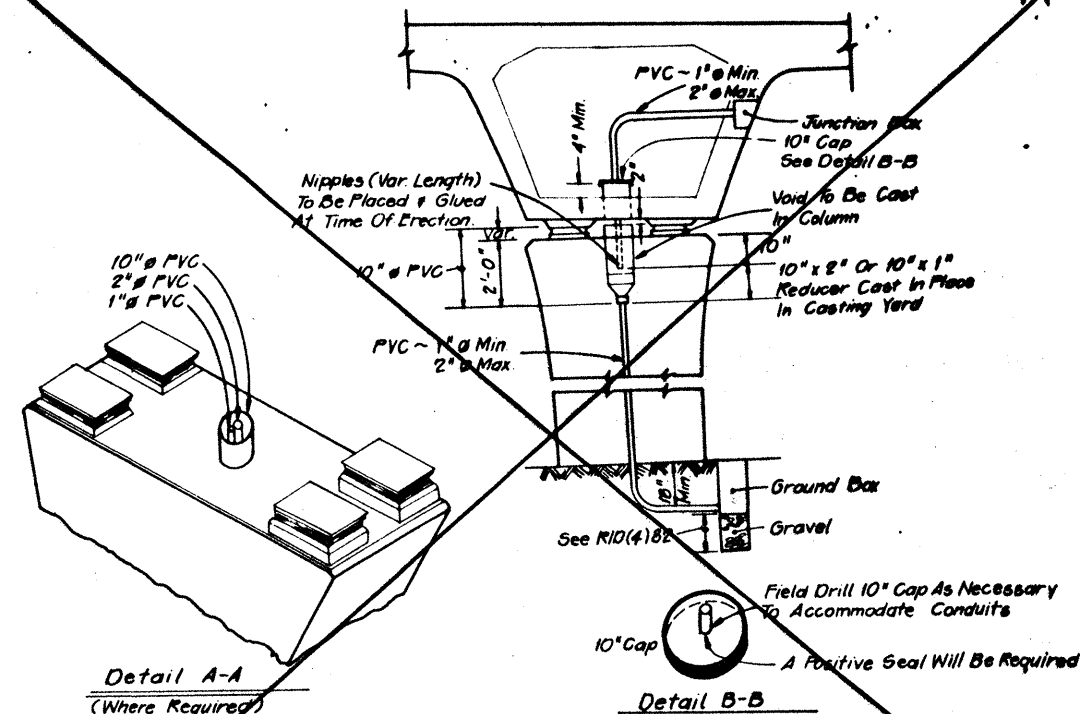
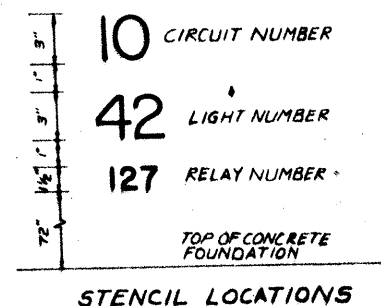
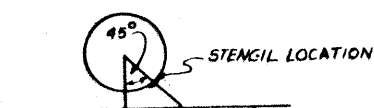


SEE GEN NOTES FOR GROUND BOX REQUIREMENTS

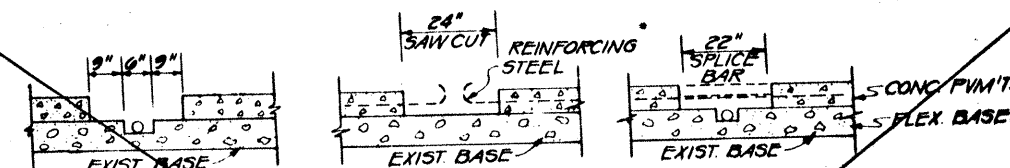


SECTION D-D

TRENCH AND MARKER DETAILS (RIGID METAL CONDUIT UNDER ROADWAY)



Note: It Shall Be The Responsibility Of The Contractor To Seal The Void Around The Conduit "Watertight". The Contractor Shall Furnish The Method Of Sealing To The Engineer For Approval. Where 1" & 2" PVC Conduits Are To Be Placed In The Same Column The Conduits Shall Be Bound Together With Tape. All Work Labor And Materials Necessary To Run Conduit From Spine To Column As Indicated Hereon Shall Be Considered Subsidiary To The Various Illumination Items.



TRENCH DETAILS RIGID METAL CONDUIT IN EXISTING CONCRETE PAVEMENT MARKERS SHALL BE AS INDICATED ON THIS SHEET

- NOTES:
- 1) PRIOR TO THE REMOVAL OF EXISTING CONCRETE PAVEMENT, THE CONCRETE SHALL BE CUT A MINIMUM OF ONE (1) INCH IN DEPTH.
  - 2) AFTER REMOVAL OF THE PAVEMENT, THE STEEL BARS SHALL BE CUT ON ALTERNATE SIDES AND BE BENT NO MORE THAN IS NECESSARY TO ACCOMMODATE THE TRENCHING OPERATION AND PLACEMENT OF THE CONDUIT.
  - 3) AFTER CONDUIT HAS BEEN PLACED IN ITS FINAL POSITION THE STEEL SHALL BE PLACED BACK TO ITS ORIGINAL POSITION AND A 22" SPLICE BAR SHALL BE ATTACHED TO THE STEEL.
  - 4) THE CONTRACTOR SHALL USE MAGNESIUM PHOSPHATE CONCRETE (M.P.C.), MANUFACTURED BY PRODUCTS INC. MACEDONIA, OHIO OR EQUAL. IF THE EXISTING PAVEMENT HAS ACP OVERLAY THE MCP SHALL BE PLACED TO WITHIN TWO INCHES OF FINISHED GRADE AND THE FINAL TWO INCHES SHALL BE AS PER GEN. NOTES ITEM 400 & 618.
  - 5) UNLESS OTHERWISE NOTED ON THE PLANS PROPOSED CONDUIT THAT CROSSES CITY STREETS, FRONTAGE ROADS ETC. MAY BE BORED IN ACCORDANCE WITH THE ITEM "CONDUIT (RM) (2 IN) (PUSHED OR BORED)." SEE SHEET \_\_\_\_ FOR PAYMENT.



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ROADWAY ILLUMINATION DETAILS

Bill G. Davis P.E. 7/27/84

FED. RD. DIST. NO.	STATE	FEDERAL PROJECT NO.	SHEET NO.
6	TEXAS	IR35-2(152)173	321
COUNTY	CONTRACT	SECTION	DATE
15	GUADALUPE ETC.	16	6/28/84

GENERAL NOTES:

I. SCOPE

Details herein apply to roadway lighting installations bid under the following Specification items: Roadway Illumination Assemblies, Relocate Roadway Illumination Assemblies, Roadway Illumination Assembly Foundations, Conduit, Electrical Conductor, Duct Cable, Ground Box, Circuit Protector Assembly, Service Poles, Transformer Stations and Special Specifications relating to lighting and electrical items. All work, materials and services not shown on plans which may be necessary for complete and proper construction shall be performed, furnished and installed by the Contractor. Faulty fabrication or poor workmanship in any material, equipment and installation will be considered justification for rejection. Materials and Installation shall comply with the applicable provisions of the National Electrical Code and National Electrical Manufacturers Association standards. Where manufacturer's provide warranties or guarantees as a customary trade practice, Contractor shall furnish to the State such warranties or guarantees.

II. MATERIALS

A. General

All materials shall be new and unused. Alternate material equal to or better than those specified may be substituted with the approval of the Engineer.

B. Roadway Illumination Assembly

- Structural Support Design for Mast-Arm Mounted Luminaires.** Lighting standards shall be designed in accordance with the latest issue of the AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals." All poles to be installed in counties abutting the coast shall be designed for 90 mph wind loads. Poles in all other counties shall be designed for 80 mph wind loads. An additional 1.3 gust factor shall be applied to the wind loads. For transformer base poles, fabricator shall include transformer base and connecting hardware in design calculations and shop drawing submittals. Manufacturer's shop drawings shall include the ASTM designations for all material to be used. See paragraph II D for additional requirements for the transformer base.
- Slip Joint Poles.** Poles may be fabricated in two sections and field-assembled by the lap-joint method. The two sections shall telescope together with a lap length of not less than 1-1/2 times the shaft diameter at the lap joint. The longitudinal seam weld within 13 inches of the slip joint shall be a full penetration weld.
- Mast Arm Attachments.** All poles and attachments shall be structurally designed to support two 12-foot mast arms and luminaires. Poles shall be supplied with mast arm combinations as shown in the plans. All mast arms shall be designed for a 55-pound luminaire having an effective projected area of 1.4 square feet.
- Minor Damage Repair.** The finished pole shall have a smooth, uniform finish free of pits, blisters, or other defects. Scratched, chipped, or damaged areas on galvanized poles and mast arms shall be thoroughly cleaned by wire brushing. The cleaned area shall be painted with two coats of zinc dust-zinc oxide paint conforming to the requirements of Federal Specifications TT-P-641b, or repaired by the application of repair compounds meeting Federal Specification 0-693 (stick only) in accordance with the manufacturer's recommendations.
- Pole Bonding Means.** All shoe base poles, including poles on concrete traffic barriers, shall have a grounding lug with 1/2-13 NC female threads inside the pole near the hand hole, minimum of 3 full threads.
- Hand Holes.** All shoe base poles shall have hand holes with reinforcing frames and covers. The openings on all poles shall be approximately 4 inches x 6-1/2 inches located approximately 10 inches from the bottom of the pole and except for poles mounted on concrete traffic barrier, shall be placed 90 degrees to mast arm unless otherwise noted on plans. See paragraph III.B.4 for CTB mounted poles.
- CTB Poles.** Poles installed on concrete traffic barrier shall also meet the requirements of CTB details.
- J-Hooks.** All mast arm type poles shall be equipped with a J-hook inside the pole, near the top for supporting vertical conductors.
- Base Plate Bolt Circle.** Bolt circle for poles except CTB-mounted poles less than 40 feet MH shall be 13 inches. For MH 40 feet or greater, bolt circle shall be 15 inches. For poles placed on existing bridge brackets or existing foundations bolt circle shall be coordinated with anchor bolts in place.

10. Steel Poles.

- a. Steel poles shall be fabricated in accordance with the item "Steel Structures." Longitudinal seam welds for pole sections shall have 60% minimum penetration. All welding shall be in accordance with Departmental Construction Bulletin C-5. Two-section poles jointed by circumferential welds will not be permitted.

- b. Pole components shall be constructed using the following materials:

Shaft: ASTM A-572 Grade 50 or ASTM A-595 Grade A (50 KSI min. yield) or ASTM A-36M50, in accordance with Item 4146. Galvanized in accordance with ASTM A-123.

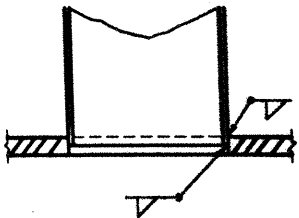
Base Plate: ASTM A-27 Grade 65-35 or ASTM A-36 - galvanized in accordance with ASTM A-123.

Mast Arm Connector: ASTM A-27 Grade 65-35 - galvanized in accordance with ASTM A-153 Class A.

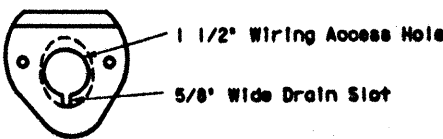
Mast Arms: Steel Pipe ASTM A-53 Grade A or B or ASTM A-501 or A-513 TY 1 with minimum 30 KSI yield and 20% elongation in 2 inches, galvanized in accordance with ASTM A-123.

Pole Caps: Pole cap shall be zinc die-cast, aluminum, or galvanized metal, secured by three stainless steel or galvanized screws.

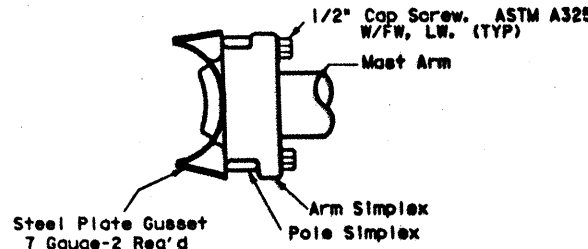
Pole Hardware: All bolts except mast arm connection bolts shall be stainless steel or standard steel galvanized ASTM A-153 Class C or D, or B-695 Class 40. Mast arm connection bolts shall be ASTM A-325, ASTM A-321 or ASTM A-193 Grade B-7, galvanized as above. Nuts and washers shall be compatible with the bolts and shall be stainless steel or steel, galvanized as above. Lock washers shall be provided on all bolted connections.



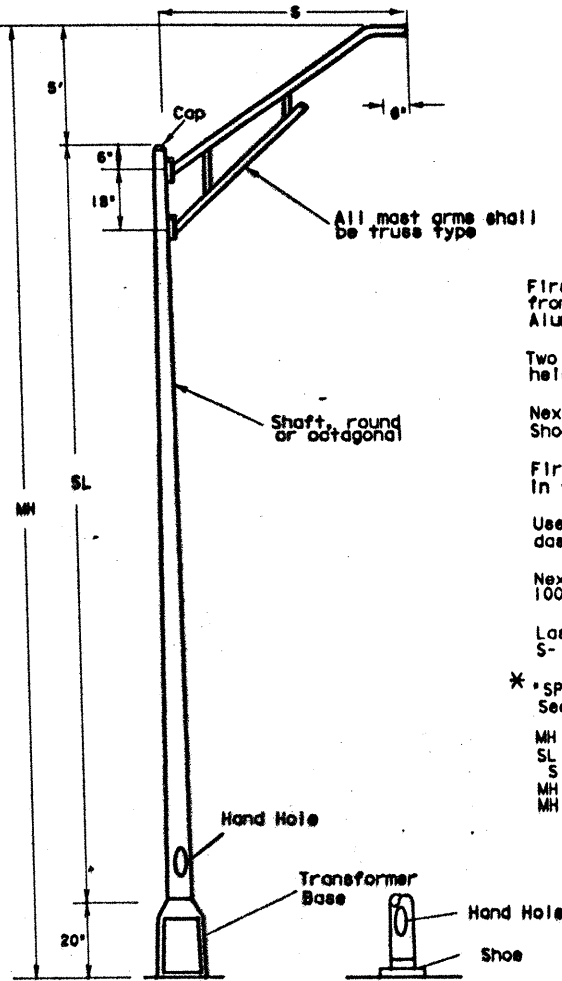
SECTION  
POLE SHAFT TO BASE PLATE



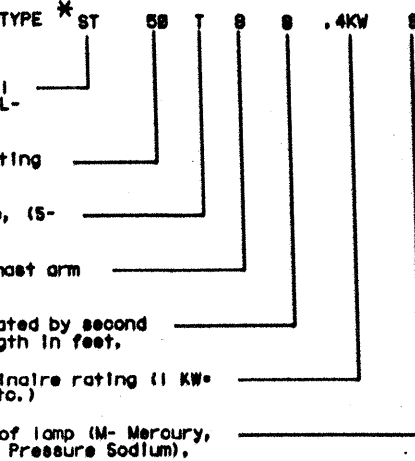
MAST ARM CONNECTOR



MAST ARM TO POLE SHAFT CONNECTION



EXPLANATION OF ROADWAY  
ILLUMINATION ASSEMBLY  
DESIGNATIONS



\* SP denotes special (ovalized) steel pole for installing on CTB. See standard sheet CTBI (4).

MH = Mounting Height  
SL = Shaft Length  
S = Spread (Mast arm length)  
MH = SL + 5' + 20' (T-Base)  
MH = SL + 5' (Shoe Base)

322

ROADWAY ILLUMINATION ASSEMBLY

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION	
ROADWAY ILLUMINATION DETAILS	
RID (1)-88	
DRW. NO.	DATE
1-88	3-88
REV. NO.	DATE
1-88	3-88
STATE	FED. AID PROJECT NO.
TEXAS	1R 35-2(157)175
COUNTY	CONT. SECT. JOB
15	GUARD, ETC. 16 6 29
SHEET NO. 322	
HIGHWAY NO. 1N 35	



## 11. Aluminum Poles.

### a. Pole components shall be constructed using the following materials:

Shaft: ASTM B-221 or B-241 Alloy 6063-T6, ASTM B-209 Alloy 5086-H34, ASTM B-221 Alloy 6005-T5.

Base Flange: ASTM B-26 Alloy 356.0-T6 or ASTM B-108 Alloy A356.0-T6.

Mast Arm Fittings: ASTM B-209 Alloy 6061-T6 or ASTM B-221 Alloy 6005-T5.

Mast Arms: ASTM B-241 Alloy 6061-T6 or Alloy 6063-T6.

Pole Cap: ASTM B-209 Alloy 5086-H32 or ASTM B-108 or B-26 Alloy 356.0-T6.

Bolts: Stainless Steel AISI 300. Bolts threading into aluminum threads shall be treated with anti-seize compound, Never-Seize Compound, Permatex 133K or equal.

### 12. Installation of High Strength Bolts. The tightening of nuts on high strength bolts shall be in accordance with the item "Structural Bolting."

### C. Foundations

- Concrete and reinforcing steel for foundations will be included for payment under item "Roadway Illumination Assembly Foundations" only. Top 6 inches of foundation shall be formed and struck level.
- Anchor bolts for all poles except CTB-mounted poles shall be steel, ASTM A-36M55. Anchor bolts for CTB-mounted poles shall be steel, ASTM A-325 or A-321 threaded rod. Nuts for CTB anchor bolts shall be ASTM A-563 Grade D heavy hex, galvanized. The top 8 inches of all anchor bolts shall be galvanized per ASTM A-153. Anchor bolts in foundations shall be 1 1/4 in. x 48 in. and shall have top end threaded not less than 5 inches and furnished with galvanized hex nuts, flat and lock washers. The lower end of the bolt shall be bent at a right angle or threaded and furnished with nut and washer. When bolts with rolled threads are furnished, bolt body need not be full size. See CTB details for anchor bolts in CTB. Anchor bolts and nuts shall have Class 2A and 2B fit. Nuts shall be tapped or chased after galvanizing.
- Alternate material equal to or better than material specified may be substituted with the approval of the Engineer. Concrete shall be Class A or C in accordance with item "Concrete for Structures". Reinforcing steel shall meet the requirements of the item "Reinforcing Steel".
- The bolt circle in foundations for transformer base poles with a mounting height (MH) less than 40 feet shall be 14 inches. The bolt circle for shoe base poles less than 40 feet MH shall be 13 inches. For poles with MH 40 feet or greater, bolt circle in foundations shall be 17-1/4 inches in diameter if a transformer base is used and 15 inches if a shoe base mounting is used.
- A minimum of two conduits shall be installed in each foundation. See lighting layout sheets for locations of foundations with more than 2 conduits. Any unused conduits in foundations shall be capped on both ends.

### D. Transformer Base

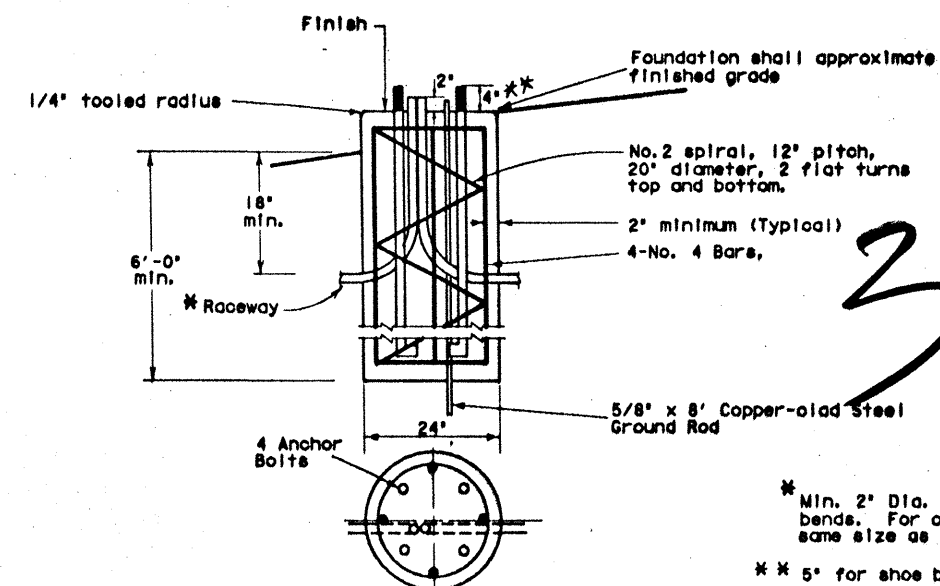
- Transformer base shall be cast from aluminum, ASTM B-108 or B-26 Alloy 356.0-T6, and shall be furnished with four washers or lugs as recommended by the manufacturer. Base for poles less than 40 feet MH shall have a bottom bolt circle to accommodate a 14 inch anchor bolt circle. Top bolt circle shall be 13 inches. Bases for poles with MH 40 feet or greater shall have a bottom bolt circle to accommodate a 17-1/4 inch anchor bolt circle, top bolt circle shall be 14 inches to 15 inches.
- Transformer base shall be approximately 20 inches high and shall have a door approximately 13 inches X 8 inches X 9-1/4 inches. Screw or bolts for attachment of door to base shall be stainless steel. Four machine bolts with four nuts, eight flat washers and four lock washers, galvanized ASTM A-153 Class C or D, or B-695 Class 40, shall be provided with each transformer base for connecting the pole. Bolts shall be ASTM A325 or approved equal. Nuts shall be ASTM A-563 Grade DH, galvanized. A 1/2-13 NC female threaded grounding lug shall be provided inside the transformer base. Leveling nuts shall not be used under transformer bases.
- Transformer bases shall meet the breakaway requirements of the AASTHO "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals," 1975 edition, and shall have been tested by FHWA-approved methods.
- Transformer bases shall have been tested to meet or exceed the full plastic moment capacity of the pole designed.
- Certification of the plastic moment load test and FHWA breakaway requirement test shall be submitted with shop drawings. Shop drawings shall show transformer base model number and logo.
- Aluminum transformer bases shall be stamped, initialed or by other approved permanent means, marked to show fabricator's name or logo and model number. Such information shall be placed in a readily seen location, inside or outside the base, but shall not be placed on the door. ~~Transformer base door shall be hinged.~~
- ~~Transformer base door shall be hinged.~~

### E. All Luminaires

- The luminaire housing shall be cast or drawn from a non-ferrous alloy and shall be free of cracks and excessive porosity. All nuts, screws, clips, washers and attaching hardware shall be made of stainless steel or steel electro-zinc-plated, minimum thickness 0.0002 inch with olive green drab or yellow chromate conversion coating, or other approved conversion coatings except that brackets may be made from pre-galvanized steel. All threaded surfaces used in the housing shall be lubricated with a silicone grease.
- The slipfitter shall securely clamp the luminaire to the mast arm. A positive means of vertical adjustment shall be provided. The refractor shall be crystal-clear pressed glass. The optic assembly shall be provided with resilient gaskets and so constructed that a positive seal against weather and other contaminants will be maintained. The luminaire shall be designed to permit ready removal of the refractor from the luminaire but shall provide a positive means of preventing an unintentional separation. The latch shall provide a positive means of maintaining closure of the luminaire. The socket shall be rigidly attached to a high grade porcelain base which shall extend and enclose the metal shell. A locking means shall be incorporated in the shell of the socket to positively resist the removal of the lamp. Reflectors shall be aluminum and shall not be painted.
- Mast-arm mounted luminaires, except underpass luminaires, shall be provided with a leveling device which is clearly visible from the ground. Unless otherwise directed by the Engineer, mast-arm mounted luminaires will be tested and installed in the level position.
- Underpass luminaires shall be fused internally. Fuses shall be 5 amp time-delay type.

## II. B. 13. Fabrication Tolerances

Part	Dimension	Tolerance
Pole Assembly	Shaft length	± 1 in.
	I.D. of outside piece of slip fitting pieces	+1/8 in., -1/16 in.
	O.D. of inside piece of slip fitting pieces	+1/32 in., -1/8 in.
	Shaft diameter: other	+ 3/16 in.
	Out of "round"	1/4 in.
	Straightness of shaft	± 1/4 in. in 10 ft.
	Twist in shaft	4° in 50 ft.
	Perpendicular to baseplate	1/8 in. in 24 in.
Arm Assembly	Pole centered on baseplate	± 1/4 in.
	Location of Attachments	± 1/4 in.
	Arm Length	± 3 in.
	Arm Rise	± 1 3/4 in. in 10 ft.
	Arm Diameter	± 3/16 in.
	Overall length or width	± 1/4 in.
	Thickness	+1/4 in., -1/16 in.
	Deviation from flat	1/8 in. in 12 in.
Anchor Bolt	Spacing between holes	± 3/32 in.
	Anchor bolt hole size	± 1/16 in.
	Length	+ 1 in., -1/4 in.
Miscellaneous	Threaded length	+ 1 1/2 in., -1/8 in.
	Galvanized length (if required)	+ 8 in., -1/4 in.
	Bolt hole spacing	± 1/16 in.
	Strut location in truss arms	± 1 1/2 in.



TYPE B FOUNDATION

TYPE A FOUNDATION

Same except without reinforcing steel

MOD: REMOVED HINGED DOOR

		STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION	
		ROADWAY ILLUMINATION DETAILS	
RID (2)-88(MOD)			
DRAWING NO. 1-88 DATE 3-88 REVISIONS 3-88	FED. NO. 6 STATE TEXAS COUNTY 15 LOCALITY GUAD., ETC.	FEDERAL AID PROJECT NO. 1R 35-2 (157) 173 CONT. 16 SECT. 6 JOB 29 HIGHWAY 1H 85	SHEET NO. 523

## 1. Photometrics

- The uniformity factor "F" shall be not less than 7.0 when calculated from the equation:

$$F = \frac{L (1 \text{ Min.})}{1 \text{ Max.}}$$

**W0601**

F = the uniformity factor

L = 200

1 Min. = minimum measured intensity within the rectangle

1 Max. = maximum measured intensity within the rectangle

- The uniformity factor "F" shall be not less than 7.0 when calculated from the equations:

$$F = \frac{L (1 \text{ Min.})}{1 \text{ Max.}}$$

Where:

$F$  = the uniformity factor

**L = 250**

1 Min. = minimum measured intensity within the rectangle

1 Max. = maximum measured intensity within the rectangle

- ## 2. Ballista

- |                            |                       |
|----------------------------|-----------------------|
| Nominal Lamp Rating, Watts | Maximum Wattage Input |
| 150                        | 220                   |
| 250                        | 400                   |
| 400                        | 552                   |

- | Nominal Lamp Watts | Minimum Lamp Watts | Maximum Lamp Watts |
|--------------------|--------------------|--------------------|
| 150                | 110                | 180                |
| 250                | 175                | 370                |
| 400                | 280                | 475                |

- g. The electronic starting aid shall provide a starting pulse with an amplitude of 2500 volts minimum, 4000 volts maximum. The pulse width shall be a minimum of 0.8 microseconds at 2250 volts. The pulse shall occur when the open-circuit voltage is equal to or greater than 90 percent of peak open-circuit voltage. Pulse repetition rate shall be a minimum of one per cycle and pulse current shall be a minimum of 0.18 amperes. Electronic starting aids for mast-arm mounted poles shall be replaceable without the use of tools.

- g. Ballasts shall permanently and clearly indicate the following: lamp type, catalog number, voltage rating, connection diagram, and manufacturer. Capacitors in all luminaires shall be non-PCB type.

### 3. Lamps

- a. All lamps shall be new and shall have been manufactured no earlier than six months prior to the date the project is awarded.
- b. High pressure sodium vapor lamps in the wattage range of 200 to 400 watts inclusive shall have a lamp voltage not greater than 108 volts when tested after thirty minutes' burn-in. 150 watt lamps shall be rated for 55 volts.

#### 4. Testing

- a. Ballasts and luminaires will be tested using a lamp furnished for the same project.
- b. Luminaires, ballasts, and lamps will be sampled and tested in accordance with the SDHPT Materials and Test Division's Manual of Testing Procedures.

- G. Wood Poles. For projects requiring more than 10 transformer and/or service poles, poles shall be creosote-treated to eight pounds per cubic foot-retention in accordance with the item "Timber Preservative and Treatment." For projects requiring ten or fewer poles, treatment shall be as stated above and Contractor may purchase poles locally if source and treatment are documented. All poles shall meet the requirements of ANSI 05.1-1972.

#### H. Electrical Conductors

1. All conductors shall be of annealed copper meeting the requirements of ASTM B-3 or B-33 and the NEC.
2. Insulated conductors shall be NEC Type XHHW or Type USE(XLP). Conductors in circuits containing two or more insulated conductors shall be color-coded at each accessible point (i.e., ground boxes, pole bases, junction boxes). Color-coding will be required on pre-conduitized duct cable containing two or more insulated conductors. Color-coding of electrical conductors may be made using colored tape. Tape marker shall consist of half-lap layer of tape covering a six inch length of jacket. Tape markers shall be placed on all insulated conductors needing coding at all pole bases, ground boxes, junction boxes, service assembly enclosures and luminaires.
3. Insulated conductors shall be marked in accordance with Article 310 of the NEC, and shall meet the requirements of Underwriters Laboratories' Standards.
4. Neutral conductors shall be insulated and shall be white or black with white tape marking. White shall not be used for any other conductor. Grounding conductors shall be bare or if insulated shall have green jacket. Green shall not be used for any other conductor.
5. Bonding conductors No. 8 and smaller, tied to ground rods, shall be solid.

### 1. Conduit and Fittings

1. Conduit must be UL-approved for the intended use shown on plan sheets. Aluminum conduit will not be permitted, unless allowed by plan note.
2. Fittings for steel conduit shall be steel or malleable iron, threaded or threadless, rain-tight. Die cast, set screw, indenter or push-on (sooks) fittings will not be permitted.
3. Insulated grounding bushings shall be used on all metallic conduit entries into boxes or enclosures without bossed hubs and in ground boxes.
4. Expansion joints for metallic conduit shall be provided with a grounding strap. Expansion joints for metal conduit shall be Appleton UNYL 50 Series, OZ AX Series or equal.

## 11. J. Ground Boxes

1. Ground Boxes shall meet the following requirements.

- d. Boxes shall be manufactured from Reinforced Polymer Concrete (RPM) composed of borosilicate glass fiber, a catalyzed polyester resin and an aggregate.

- b. Minimum inside dimensions (WxLxH) shall be as follows:  
Type A shall be 12 inches x 23 inches x 11 inches.  
Type B shall be 12 inches x 23 inches x 22 inches.  
Type C shall be 16 inches x 29 inches x 11 inches.  
Type D shall be 16 inches x 29 inches x 22 inches.

- c. Bottom edge of box or extension shall be footed (2-1/2 inch flange).

- d. Ground boxes and covers shall be designed for heavy duty loading (15,000 lb load over 10 inches x 10 inches area). Ground boxes and covers shall have been tested to meet required loading. Contractor shall submit certification of such tests.

- e. All ground boxes and covers shall be permanently marked with manufacturer's name or logo and manufacturer's model number.


- f. Ground box covers shall be steel, hot dipped galvanized, and shall have "ELECTRIC" imprint. Covers shall be bolted down. A grounding lug with 1/2-13 NC female threads shall be placed on the underside of the cover. Cover shall be bonded to grounded conductor with 3 foot jumper, Blackburn TTC4 or Burndy KC22B2 connector and split bolt connector.

2. Where indicated on plans, ground box will be encased in concrete apron as detailed.

3. A minimum gravel fill of 9 inches shall be placed under each ground box.

4. The Contractor may cut the necessary conduit holes in box extensions only. Holes must be 18 inches or more below the cover.

5. The Contractor shall make brochure submittal (four copies) on ground boxes.

		STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION			
		ROADWAY ILLUMINATION DETAILS RID (3)-88			
CORR. CR. COR. CR.	DRAINING ORIGINAL REVISED REVISED REVISED	DATE 1-88 3-88 4-89	FED. NO. DIST. NO. STATE DATE	FEDERAL AID PROJECT NO. 6 TEXAS 1R 35-2 (157) 173	SHEET NO. 32
			COUNTY 15 GUAD. ETC.	CONT. 16	SECT. 6
				JOB 29	HIGHWAY NO. 15

## II. K. Junction Boxes

1. Junction boxes shall be cast iron or steel, hot-dipped galvanized, or cast aluminum (surface-mounted only) unless otherwise noted on plans.
2. Surface-mounted junction boxes for conduit 1-1/4 inches and larger shall be Crouse Hinds Type WAB, OZ Type YS, or Adalot Type 3R, with mounting lugs, minimum size 6 inches x 6 inches x 4 inches, or approved equal. For conduit 1 inch or smaller, surface-mounted boxes may be 4-1/2 inches round and approximately 3 inches deep, Crouse Hinds Type GRFX, Appleton Type JBDX, three-gang FD, or approved equal.
3. Flush-mounted junction boxes installed in concrete structures shall be Crouse Hinds, OZ, or approved equal similar to boxes described above but for flush mounting.

## III. CONSTRUCTION METHODS

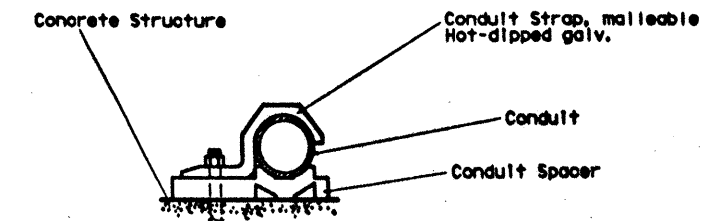
- A. General
1. The location of poles, conductors, conduits, junction boxes, transformer stations and service poles are diagrammatic only and may be shifted by the Engineer to accommodate local conditions.
  2. Erection and/or removal of poles and luminaires located near any overhead electrical lines shall be accomplished using established industry and utility safety practices. The Contractor shall consult with the appropriate utility company prior to beginning such work.

### B. Roadway Illumination Assemblies

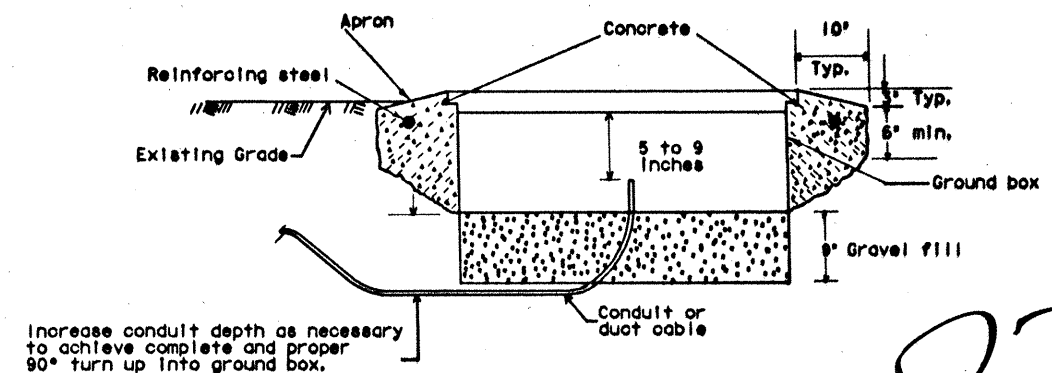
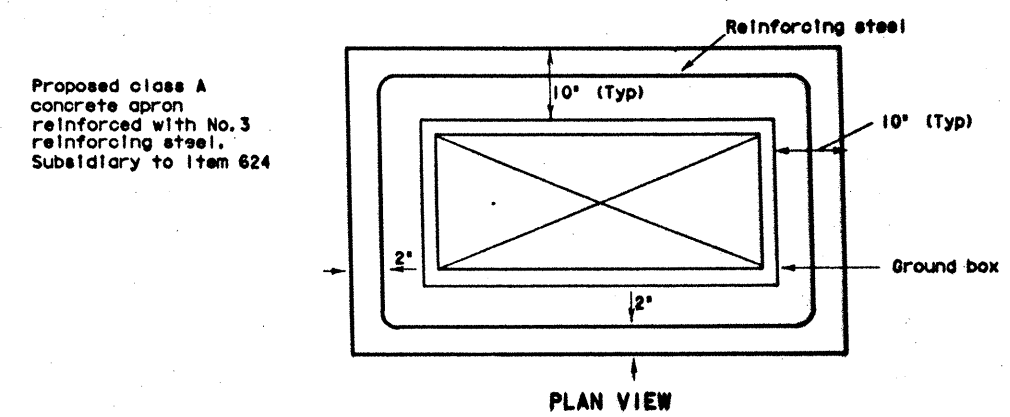
1. Roadway Illumination Assembly poles shall be erected plumb and true. Top of foundation shall be struck level and shims used to plumb pole, except that for shoe base poles only leveling nuts may be used. Leveling nuts shall not be used under transformer bases. Grout will not be placed between base flange and the foundation.
2. In each pole, continuous color-coded stranded No. 12 AWG copper Type XHHW or other approved XLP conductors shall be connected to the line side of each ballast. Color coding shall be accomplished as described in paragraph II.H.
3. A fused connector assembly or fuse-holder as specified shall be connected in each hot wire on the line side of each ballast. Luminaires on poles will be fused using quick-disconnect fuse-holders as shown in details. Fuses shall be 5 ampere time-delay type.
4. For median-mounted poles placed on concrete median barrier, all hand holes shall be on same side of the median.
5. Acorn nuts will not be allowed for attaching pole to transformer base or foundation. Nut covers will not be allowed.

### C. Conduit

1. Continuous runs of conduit in excess of 150 feet attached to structures shall have expansion joints at mid-span or 150-foot intervals and at structure expansion joints or as shown in plans.
2. Conduit hangers or straps shall be spaced at maximum intervals of 5 feet. Hangers shall be Unistrut Series J1200, Globe Series 450, or equal, unless otherwise indicated in the plans. Conduit spacers shall be used on Rigid Metal conduit placed on vertical surface of concrete structures (see conduit detail).
3. Conduit hangers shall not be attached directly to prestressed concrete girders except as shown in the plans and approved by the Engineer.
4. Conduit placement beneath existing paved surfaces shall be accomplished by jacking or boring in accordance with the pertinent provisions of Article 476.3 "Construction" of the Item "Jacking, Boring or Tunneling Pipe," unless otherwise noted on plans. Jacking, boring, or tunneling will not be paid for directly but will be subsidiary to the Item "Conduit." Duct cable shall be extended through the conduit in one continuous length or conductors shall be encased in a continuous length of conduit where passing under an existing roadway. Direct burial of conductor will not be allowed.
5. For all conduit placed by trenching, trenching and backfilling shall be in accordance with the Item, "Excavation and Backfill for Sewers," except for measurement and payment. Trenching depth shall provide a minimum of 18 inch cover over conduit, unless noted otherwise on the plans.
6. With approval of the Engineer conduit placed under new roadways may be trenched in subgrade and backfilled with excavated material. When approved by the Engineer, conduit may be trenched in sub-base but must be backfilled with cement-stabilized base. Conduit placed after base or surfacing operation has begun must be jacked or bored. Conduit placed under existing roadways, driveways or sidewalks shall be placed as directed by the Engineer or as shown on plans.
7. Open ends of all conduit and raceways shall be fitted with temporary caps or plugs to prevent entry of dirt, debris and rodents during construction.
8. Conduit entry into junction boxes shall be made weathertight using threaded fittings or hubs, or with sealing locknuts inside and out.
9. The ends of all metallic conduit terminating in a ground box, junction box, enclosure, or light pole base carrying individual conductors shall be fitted with insulated grounding bushings. A bonding jumper shall be installed from bushings to nearest ground rod, grounding lug, or grounded conductor. At service poles, bonding jumper shall be AWG Size no. 6. All other jumpers shall be minimum size AWG No. 8. Metallic conduit run underground and not exposed or accessible at any point need not be grounded.
10. Conduits shall be sealed with heat shrink boots or tubes, with sealant, or shall be sealed by other methods approved by Engineer. Sealing shall be done after completion of the pull test described in paragraph III.D.3.



**CONDUIT DETAIL**  
(Attachment to vertical surfaces)  
(See para. III.C.2)



**SECTION**  
**APRON FOR GROUND BOXES**  
(Where required by plan note)



STATE DEPARTMENT OF HIGHWAYS  
AND PUBLIC TRANSPORTATION

## ROADWAY ILLUMINATION DETAILS RID (4)-88

DRAWING	DATE	FED. NO.	STATE	FEDERAL AID PROJECT NO.	SHEET NO.
DR. 1	ORIGINAL	1-88	6 TEXAS	1P 35-2(157) 173	325
CR. 1	REVISED	3-88			
DP. 1	REVISED	4-89			
CA. 1	REVISED				
			15	GUAD., ETC.	16 6 24 11/85

11. All conduit entering ground boxes and pole bases and used to carry individual conductors shall be furnished with bell end fittings or bushings. Metallic conduit shall be fitted with grounding strap and bonding jumper. Jumper shall be tied to nearest ground rod or grounding conductor.
12. Where called for on plans, the conduit shall be placed on a 3-inch sand cushion and backfilled with material excavated from the trench and compacted to the approximate density of the adjacent materials.
13. Conduits entering ground boxes shall be placed so that the conduit ends shall be not less than 5 inches nor more than 9 inches from the box cover (see ground box detail).

#### D. Electrical Conductor

1. A non-metallic pull rope shall be used in pulling conductor in non-metallic conduit.
2. After installation and prior to connecting ends, each continuous run of insulated conductor shall have a minimum D.C. insulation resistance of one megohm when tested at 1000 volts D.C. All or part of conductor system may be tested at the Engineer's option. Conductors exhibiting an insulation resistance of less than one megohm shall be replaced by the Contractor at his own expense.
3. After conductor is placed in conduit, a pull test will be made on conductors. Any length of conductor that cannot be pulled easily will be replaced by the Contractor at his expense.
4. Conductors shall be supported by a J-hook in top of illumination poles.
5. A minimum length of 3 feet of conductor shall be left in ground boxes and pole bases for making up connections.

#### E. Duct Cable

1. Duct cable shall be placed by the open trench method, except where otherwise noted, at a depth of 18 inches unless otherwise indicated. Bends in duct cable shall be made in the manner recommended by the manufacturer. Minimum bending radii shall be as follows:

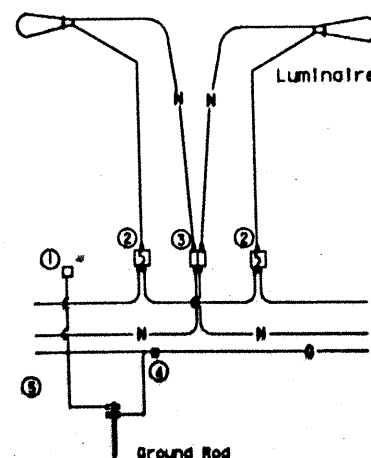
1-inch duct : 15 inches R.  
1-1/4 inch duct : 18 inches R.  
1-1/2 inch duct : 20 inches R.

Handling of duct cable reels and installation of duct shall be as recommended by the manufacturer. Duct entering ground boxes shall be placed so that the duct ends shall be not less than 5 inches nor more than 9 inches from the box cover.

2. All ducts entering ground boxes shall be securely lashed together in vertical position. After duct cable has been installed, a pull test will be made on conductors. If conductors cannot be easily pulled, Contractor shall replace or otherwise adjust installation to free up the conductors. Duct cable ends shall be sealed with approved compound after pull test is completed.
3. Where noted on plans duct cable shall be placed on a 2-inch sand cushion and backfilled with a minimum 6 inches of sand.

#### F. Bonding and Grounding

1. The Contractor shall insure that all exposed metal containing electrical conductors is bonded and grounded, using ground rods, grounding bushings, locknuts, and other fittings as necessary.
2. Metallic conduit, lighting poles, and luminaires on bridge structures shall be grounded. Each structure shall have at least one 5/8-inch x 8 foot copper-clad ground rod driven in the ground and a No. 8 AWG copper bonding jumper shall be installed from the ground rod to the grounding conductor of the lighting circuit.
3. The bonding jumper shall be bare or, if insulated, shall be green. Ground rods, connectors, and bonding jumpers will not be paid for separately, but will be subsidiary to the various bid items.

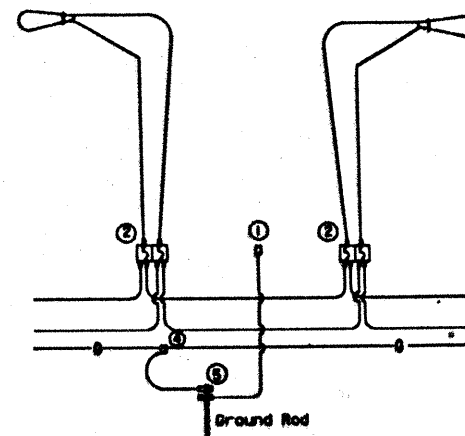


THREE WIRE CIRCUIT-OUTSIDE GROUNDED  
LUMINAIRES SERVED AT 480V

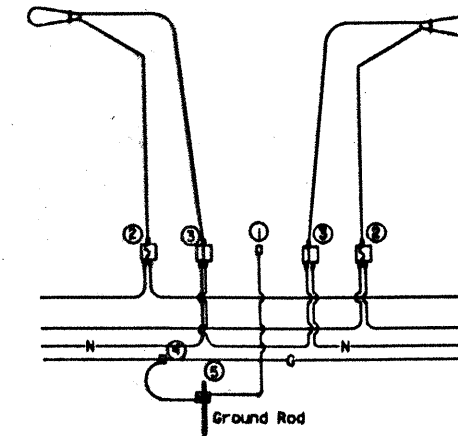
#### NOTES:

- ① Pole Bonding Connector-Blackburn #TTC3 or Weaver #TGC3 or equal.
- ② Fused Connector-Homac, Busman HEB, HEX, or equal.
- ③ Un-fused Connector-Homac, Busman HEB, HEX, or equal.
- ④ Split Bolt Connector.
- ⑤ Ground Rod Clamp - 2 Required - Blackburn GG58H Burndy GKP635 or equal.
- ⑥ All fuses shall be time-delay types, 3 Amp (Littlefuse FLO, Busman FNO or equal)

\*For Transformer Base Poles. On Shoe Base Poles, omit un-fused connector for neutral conductor.



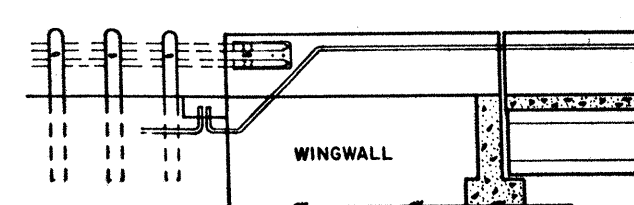
FOR THREE-WIRE CIRCUIT-CENTER GROUNDED  
LUMINAIRES SERVED AT 480V



FOUR-WIRE CIRCUIT-CENTER GROUNDED  
LUMINAIRES SERVED AT 240V

#### G. Connectors and Splices

1. Splices, in locations permitted by the Engineer, shall be made with approved compression sleeves or split bolt connectors insulated with heavy-wall heat shrink tubing containing factory-applied sealant or approved waterproof mechanical splice kit (Homac 'Flood Seal'). Heat shrink sleeves shall lap conductor insulation a minimum of 2 inches on both sides of the splice. If split bolt connectors are used, connectors shall be covered with two half-lap layers of rubber tape before insulation is applied.
2. For this project wire nuts will not be used.



#### NOTES

A ground rod shall be installed and attached to the equipment grounding conductor in all ground boxes containing conduit that extends above the ground.

Ground rod clamp to be Blackburn GG 5/8H, Weaver W5/8 or equal.

All conduit entering the ground box shall be of the size and type indicated in the plans and be equipped with bushings and locknuts.

The conduit leaving the ground box and entering the wingwall shall be 1" Ø PVC unless otherwise noted in the plans.

#### CONDUIT ENTRY TO BRIDGE STRUCTURE DETAIL

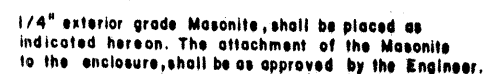
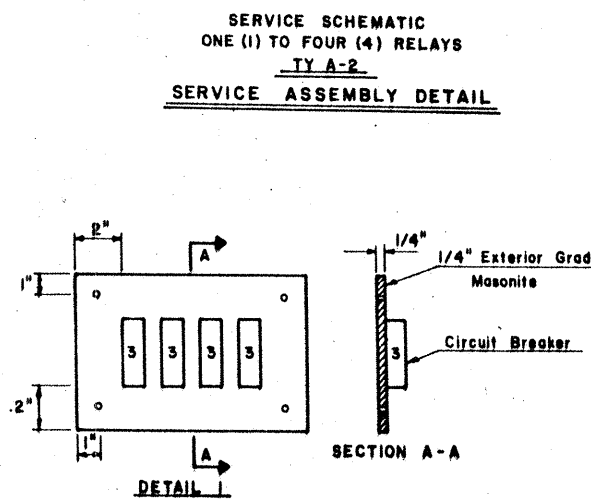
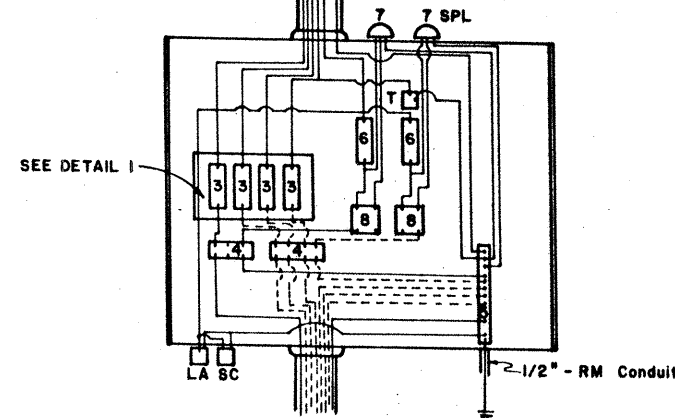
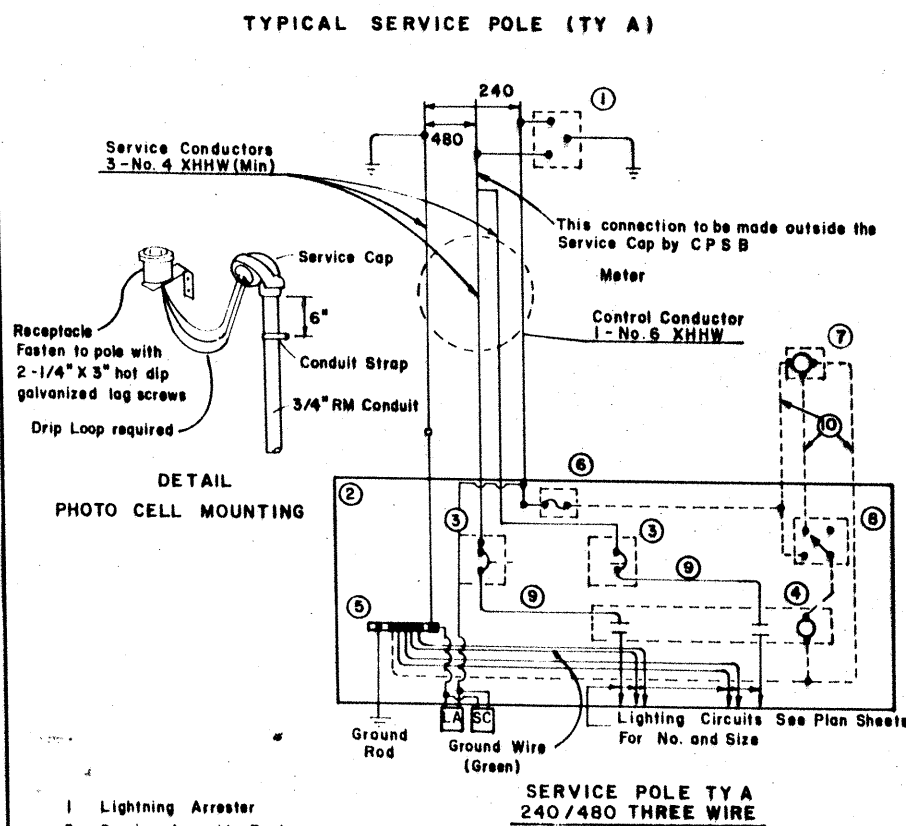
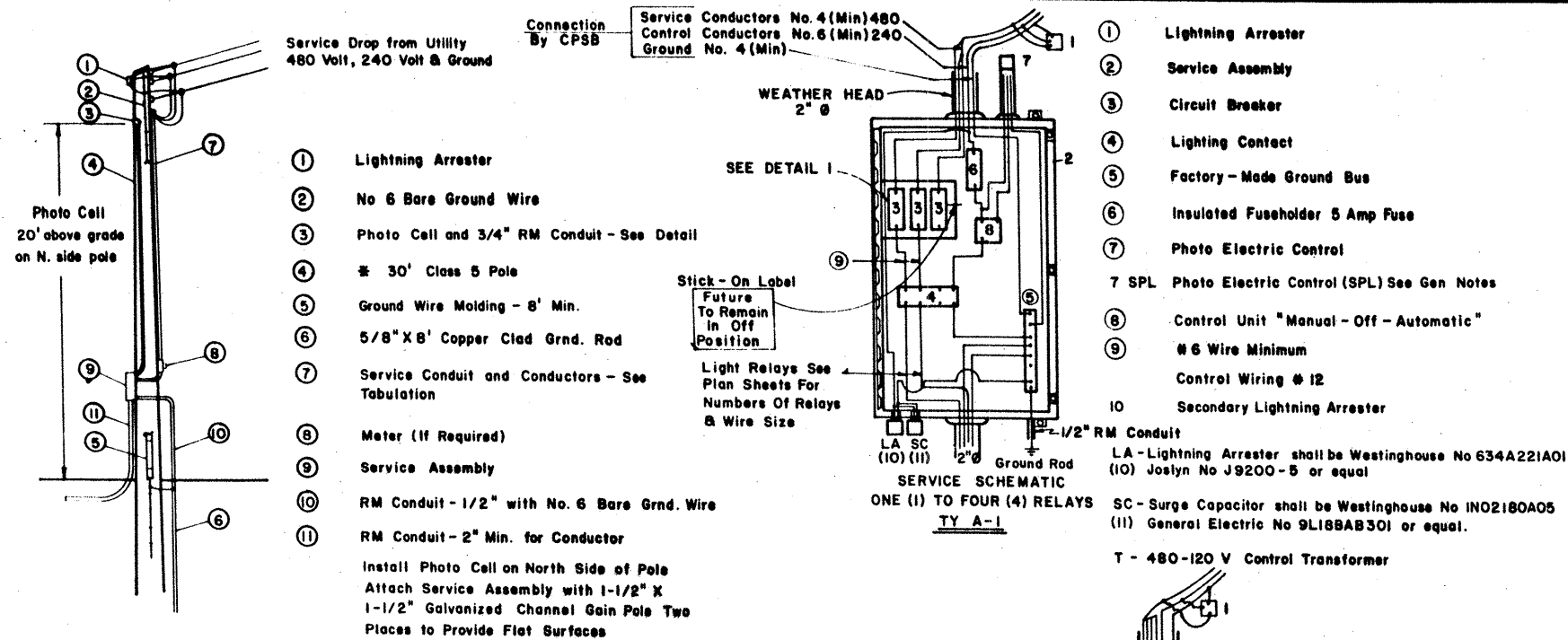


*Robert B. Brown* P.E. 7/26/89  
Gilbert G. G-13 Date

MODIFICATIONS  
CHANGED NOTE 12.  
MODIFIED DETAIL FOR CONDUIT  
ENTRY TO BRIDGE STRUCTURE.  
CHANGED NOTE G-2.

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION		ROADWAY ILLUMINATION DETAILS RID (5)-88 (MOD.)	
DATE	1-88	STATE	TEXAS
FEDERAL AID PROJECT NO.	IR35-2(152)133	COUNTY	16
SECTION	6	REVISION	15
BY	CH	DATE	7/26/89





- 1 Lightning Arrestor  
2 Service Assembly Enclosure  
3 Circuit Breaker  
4 Lighting Contactor  
5 Factory-made Ground Bus  
6 Insulated Fuseholder, 5 Amp Fuse  
7 Photo - Electric Control  
8 Control Unit "Manual-Off-Automatic"  
9 Power Conductors - Same as Lighting Circuits (but a min. of No. 6)  
10 Control Conductors (No. 12 XHHW) -----  
LA Lighting Arrestor  
SC Surge Capacitor

**GENERAL NOTES :**

### SERVICE POLE AND CIRCUIT PROTECTOR ASSEMBLY

1. Service Assembly Enclosure. NEMA 3 enclosure consisting of NEMA 12 enclosure with drip shield and conversion hardware, constructed of 14-gauge steel, with piano hinge and resilient gasket. Door held with clamps with provisions for padlocking. Equipment-mounting panel 12-gauge steel, primed and painted white. Enclosure shall be galvanized outside and primed and painted white inside.
2. Lighting Contactor shall be Square D-No. 8903, Allen/Bradley Bulletin No. 702L or equal, Electrically held, of type designed to control tungsten, mercury vapor and other lighting loads, rated for 480 volt load, number of poles and ampere rating to meet circuit requirements, with silver alloy double break contacts. Ampere rating shall be a minimum of 1.25 times circuit load or as shown elsewhere. Lighting contactor to be 240-Volt control.
3. Control Unit. Standard duty 3-position (Auto-Manual-Off) control station in NEMA 1 enclosure.
4. Photo-Cell Control. Dry-type hermetically sealed cadmium sulfide cell, expulsion arrester and electro-mechanical relay, mounted in weatherproof plastic housing having twist-lock base. Turn-on range of 0.5 to 5 footcandles, factory-set at 1 ± 1/2 footcandle. Turn-off 2 footcandles higher than turn-on. Voltage 100 to 285. Control circuit to be fused with enclosed in-line fuseholder and 5 ampere fuse.
5. Lightning Arrester. Valve-type, 0-650 volt with bracket for pole mounting. General Electric NO. 9L15ECB001 or equal.
6. Circuit Breakers and Fuses, shall conform to current NEMA and UL standards. Circuit breakers shall be rated 480 Volts for 240/480 Volt or 480 Volt circuit and 240 Volt for 240 Volt circuit. Fuses shall be rated 600 volts for any 480 Volt circuit and 250 Volts for 240 Volt circuit. Renewable link fuses will not be permitted. Each circuit breaker shall serve only one lighting circuit.
7. Metering. Where metering is required utility company will provide the meter base. Contractor shall install the base.
8. Voltage, shall be 480 Volts phase to ground for lighting circuits and 240 Volts phase to ground for control circuits unless otherwise noted.
9. Service Pole, shall constitute a complete and independent point of service for the various circuits.
10. Circuit Breakers shall be of the single pole type servicing only one (1) relay. If a two pole circuit breaker is used in lieu of a single pole circuit breaker it shall serve only one (1) relay.
11. The Contractors particular attention is called to the fact that all work done, and materials used must be in accordance with standards of the C.P.S.B. or as directed by the Engineer. Inspection of such work by C.P.S.B. at the request of the Engineer will in no sense make the city of San Antonio a party to the contract.
12. The Contractor shall set the service pole and service assembly including all necessary conduit and wiring up to and including the weatherhead. The City Public Service Co. of San Antonio, will install the Transformer Pole, the Transformer, and connect the service lines to the service pole previously installed by the Contractor. All cost incurred by the Contractor for obtaining the necessary power supply from CPS will be included in the unit price bid under the item "Service Pole".

## SERVICE POLES

[illegible]

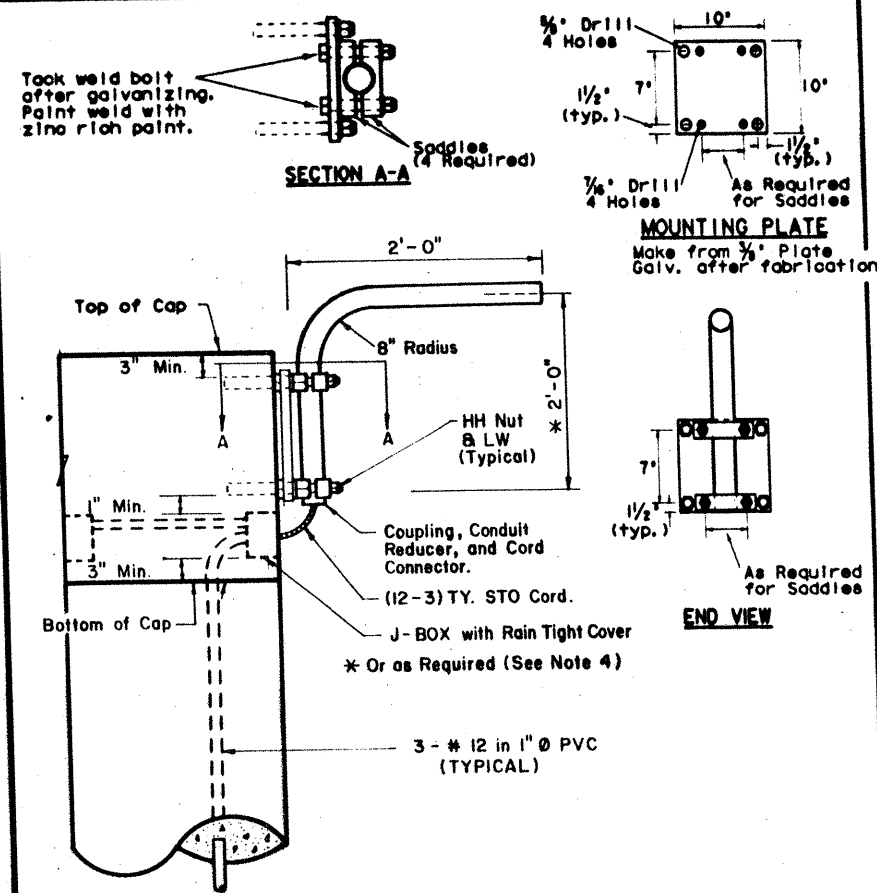
*Bilbert A. Gavia* P.E. 7/26/89  
Gilbert G. Gavia Date

STATE DEPARTMENT OF HIGHWAYS  
AND PUBLIC TRANSPORTATION

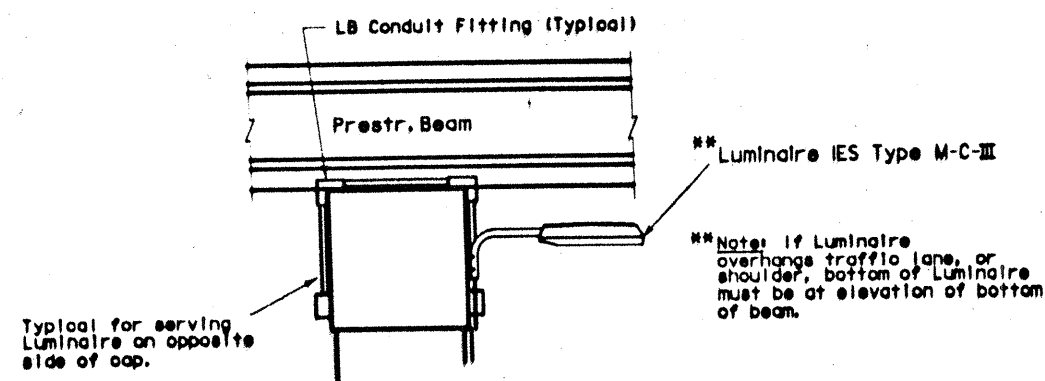
## ROADWAY ILLUMINATION DETAILS

RID (6) - 88 (MOD)

PER NO WY. NO	STATE	FEDERAL PROJECT NO.	SHEET NO.
0	TEXAS	IR35-2(157)173	327
STAGE DIST. NO.	COUNTY	CONT.	SECTION
15	Guadalupe Etc	16	6
		295	IR35

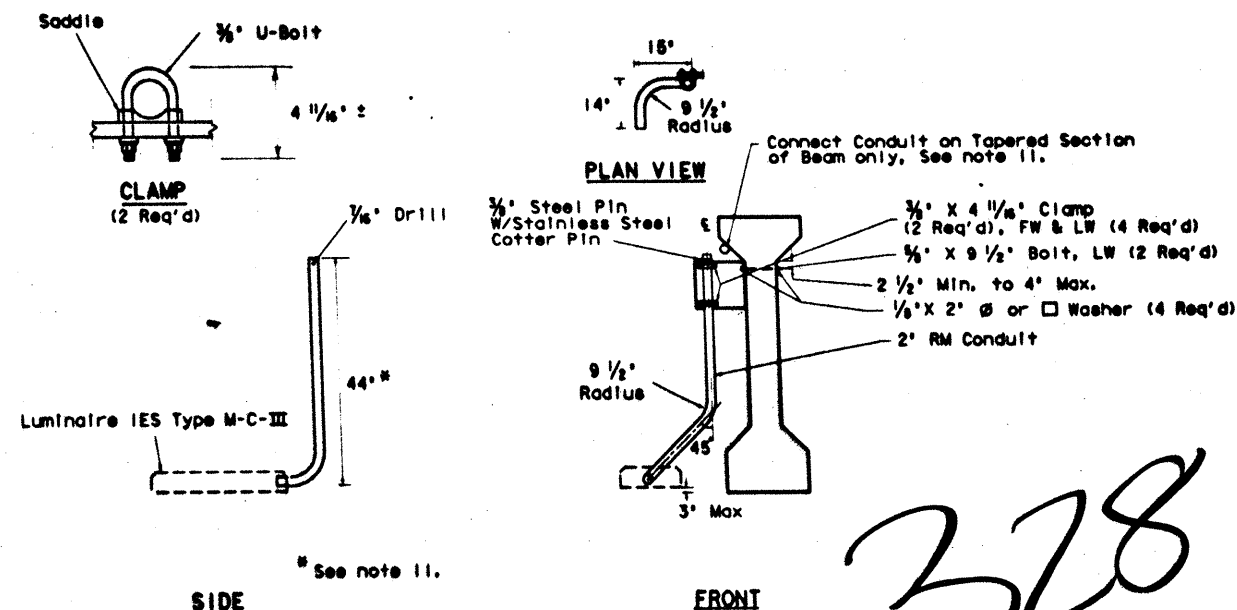


UNDERPASS LIGHTING ARM TYPE 1



U/P (SPL-CO) (KW) S (TYPE 1)

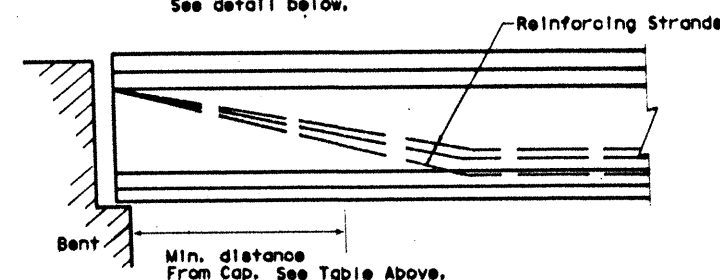
- NOTES:**
- ALL LUMINAIRES**
- Luminaire locations, conduit and conductor sizes and routing are typical and diagrammatic only. See project layout sheets for specific details.
  - A ground rod shall be installed and attached to the equipment grounding conductor in all ground boxes containing conduit that extends above ground. All RMC in these boxes shall have grounding bushings and shall be properly bonded.
  - Adjust conduit in saddles to place fixture height and orientation as required. See fixture orientation detail and layout sheet. Where traffic is likely to pass under luminaires, place luminaires so that bottom of luminaire is above bottom of beam, maximum of 3 inches.
  - All bolts, nuts and washers shall be galvanized.
  - Fabrication of brackets will not be paid for directly but shall be subsidiary to item 610, Rwy Illum Assemblies.
- TYPE 1**
- Type 1 arm shaft - 1-1/2" rigid metal conduit (1.90" O.D., .145" wall).
  - Anchor bolts for Type 1 luminaire shall be 3/8 in. bolt or stud expansion anchors with min. pull out of 3000 lb pull out each, with 4 in. min. embedment. Provide lock washers.
  - Attach conduit to plate with 4 saddles, 4-3/8" bolts, HHN & LW.
- TYPE 2**
- Reduce conduit length for Type C concrete beams. Field cutting and threading will be permitted.
  - Connecting conduit may be strapped to tapered section only of precast beams as shown. Anchor as approved by the Engineer. Maximum anchor depth is 1 inch.
  - Indiscriminate drilling into precast concrete beams may result in reduced beam strength. Drilling location shall be only as directed by Engineer. See location of underpass lighting mounting bracket detail.
  - The locations given in the table are such that reinforcing strands will not be damaged.



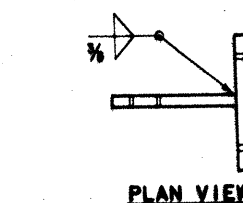
UNDERPASS LIGHTING ARM TYPE 2

Bridge Span Length	Minimum Distance From Bent Cap to Fixture Mounting Arm
<50'	10'
50'-70'	15'
70'-90'	20'
>90'	25'

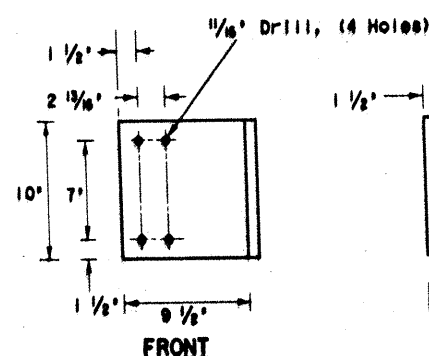
See detail below.



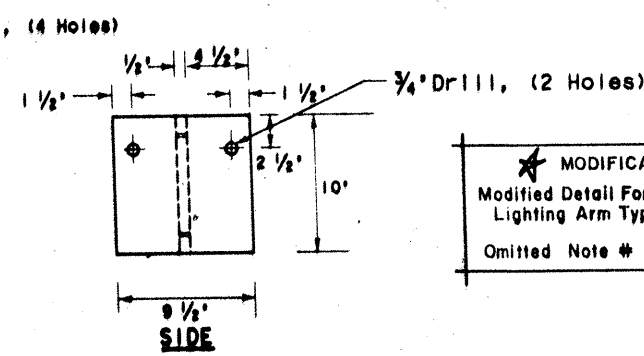
LOCATION OF UNDERPASS LIGHT MOUNTING BRACKET



PLAN VIEW



FRONT



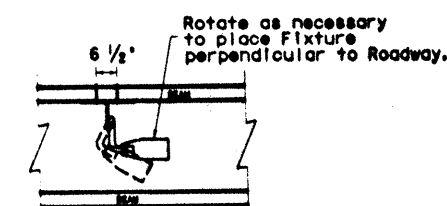
SIDE

BRACKET DETAIL

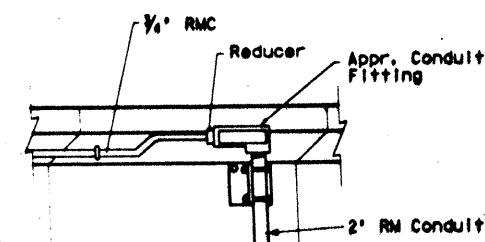
Make From 1/2" Plate (ASTM A-36)  
Galv. after fabrication

U/P (SPL-CO) (KW) (TYPE 2)

U/P LUMINAIRE DETAILS



FIXTURE ORIENTATION

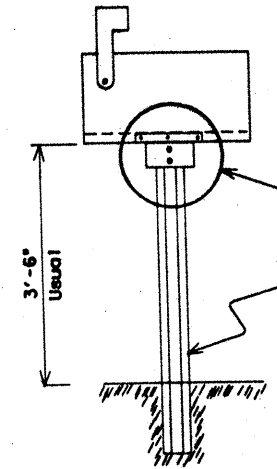
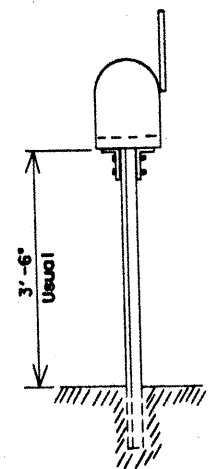


CONDUIT CONNECTION (TYPICAL)



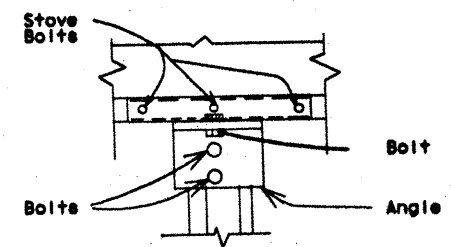
Richard P. Davis P.E. 7/26/09

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION	
ROADWAY ILLUMINATION DETAIL	
RID (7)-88 (MOD) *	
DATE: 1-88	STATE: TEXAS
DATE: 3-88	PROJECT: TR35-2(157)173
DATE: 6-88	PROJECT: 328
DATE: 15	PROJECT: 15



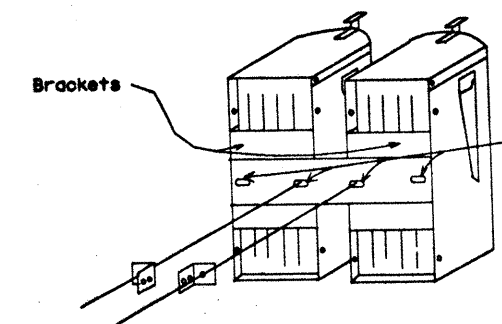
See Detail A for single mailbox  
See Detail B for double mailbox  
  
Approved mailbox support  
(For Types, see MB-89 sheet 2 of 3)

SINGLE AND DOUBLE MAILBOX MOUNT



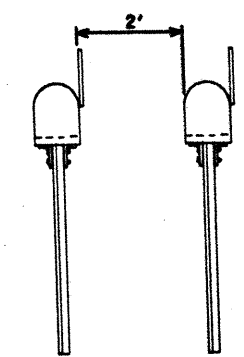
For bolt sizes see notes for Standard Mailbox Attachment Details

DETAIL A  
SINGLE MAILBOX MOUNT

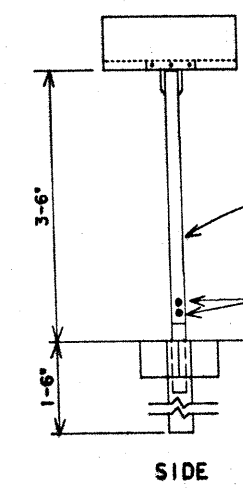
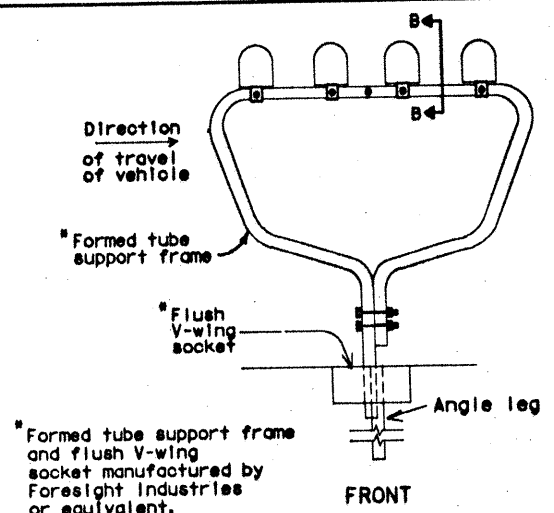


Adapter Plate to Bracket Attachment,  
4 - 3/8" dia. x 1/2" bolt, each bolt has a lock washer and nut

DETAIL B  
DOUBLE MAILBOX MOUNT  
(Not permitted for No. 2 Mailboxes)

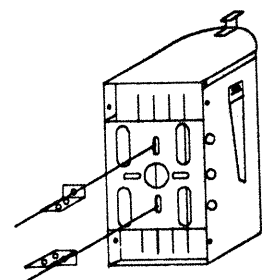
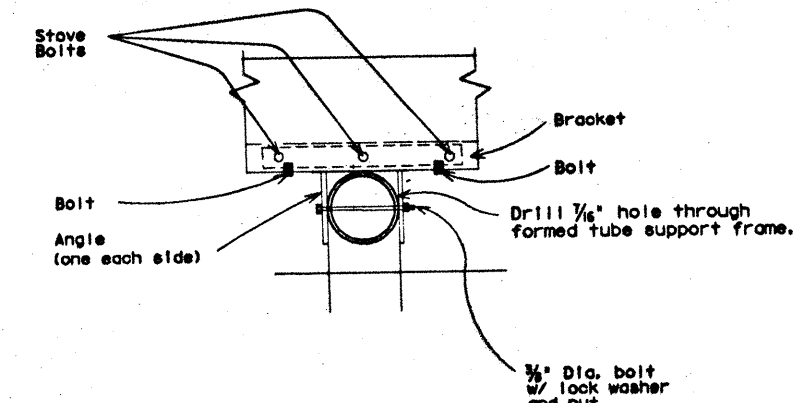


TWO SINGLE MAILBOX INSTALLATIONS  
2' Clear Distance between installations

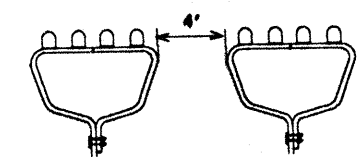


\*Formed tube support frame and flush V-wing socket manufactured by Foresight Industries or equivalent.

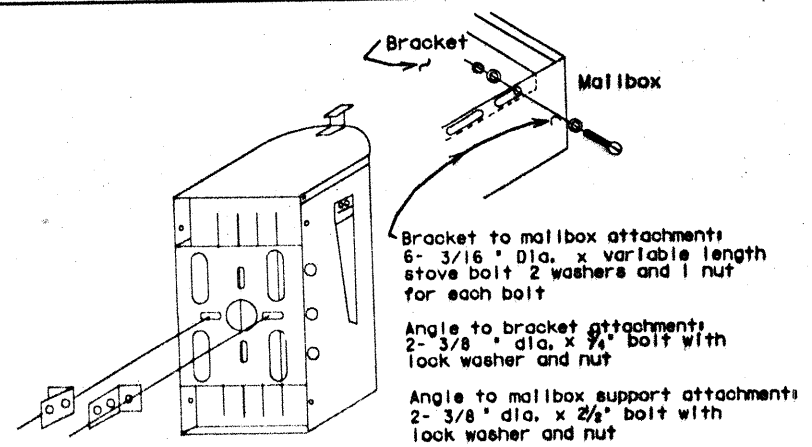
MULTIPLE MAILBOX MOUNT



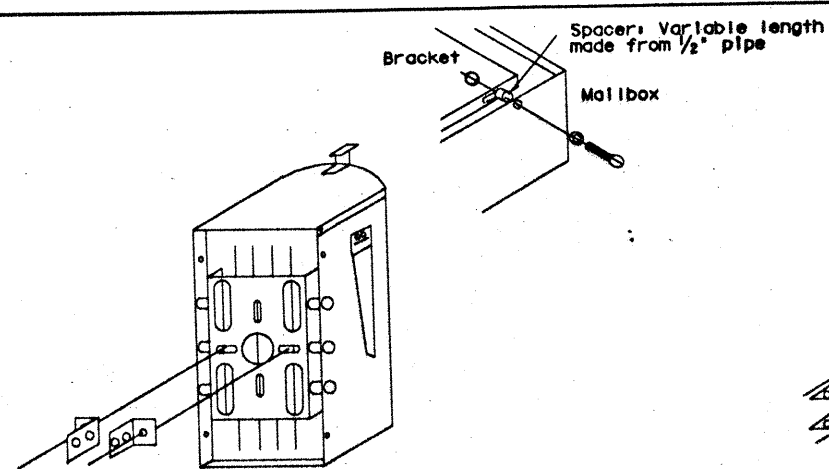
ANGLE TO BRACKET ATTACHMENT FOR MULTIPLE MAILBOX MOUNT



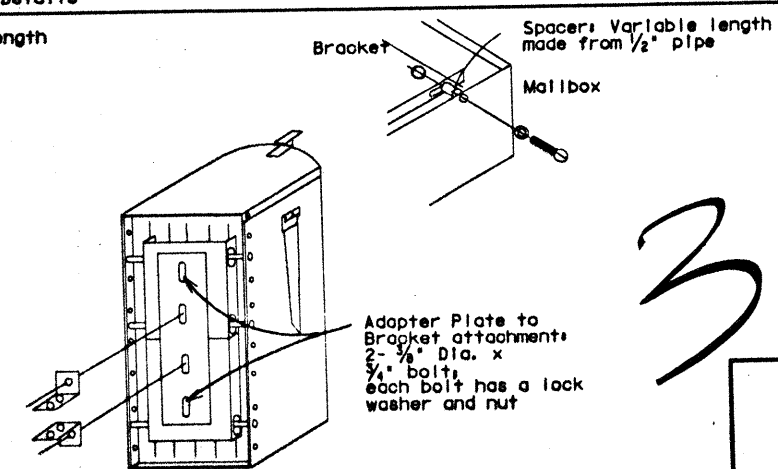
TWO OR MORE MULTIPLE MAILBOX INSTALLATIONS  
4' Clear Distance between installations.



SIZE NO. 1 MAILBOX



SIZE NO. 1 1/2 MAILBOX  
See notes for Size No. 1 Mailbox



SIZE NO. 2 MAILBOX  
See notes for Size No. 1 Mailbox

STANDARD MAILBOX ATTACHMENT DETAILS

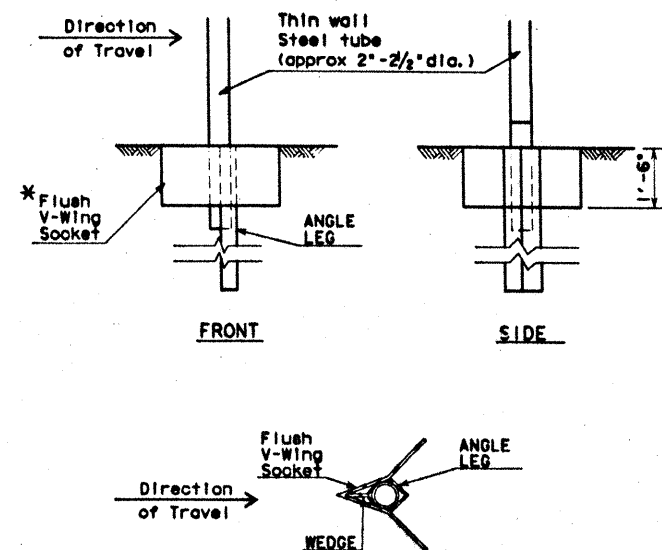
For General Notes See sheet 2 of 3.  
  
See MB-89 sheet 3 of 3 for Adapter Plate, Angle, and Bracket Hardware Details.  
Bracket may be installed with edges down.

329

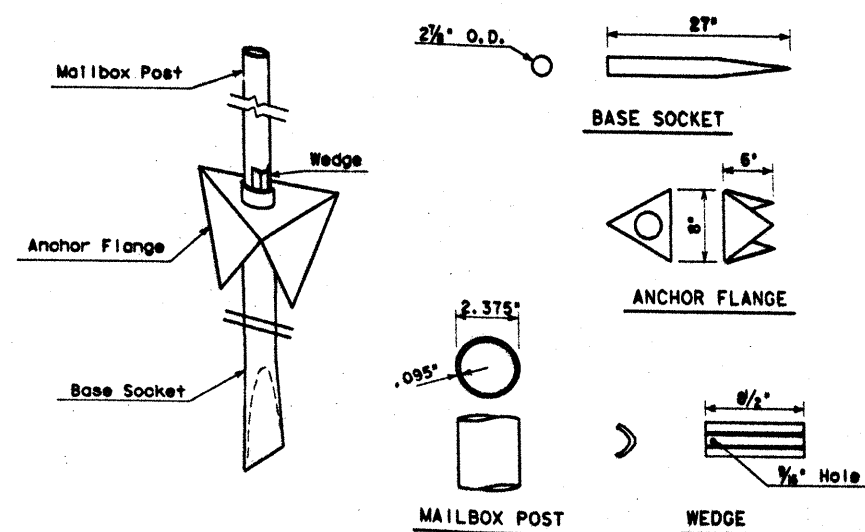
STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

MAILBOX MOUNTING DETAILS  
MB-89

Sheet 1 of 3	
DATE	STATE
6	TEXAS
PROJECT NO.	12 BE-2 (107) 177
DESIGNED BY	15
CHECKED BY	16
APPROVED BY	17



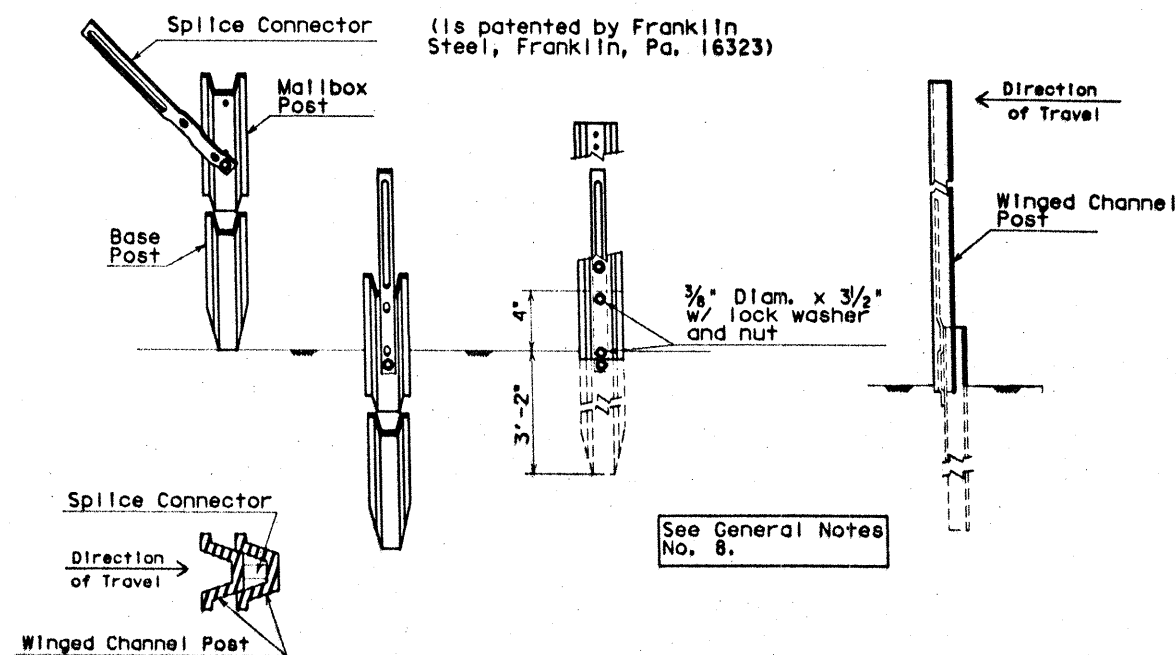
**TYPE 1 SUPPORT/FOUNDATION**  
THIN WALL STEEL TUBE w/ V-LOC ANCHORAGE



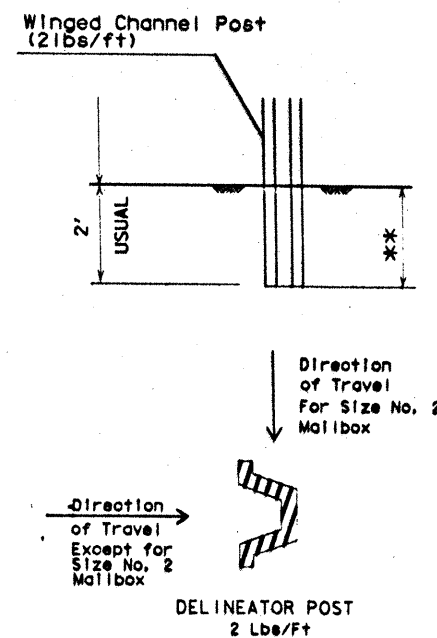
**TYPE 2 SUPPORT/FOUNDATION**  
THIN WALL STEEL TUBE w/ANCHOR FLANGE

**NOTES FOR TYPE 2 SUPPORT/FOUNDATION**

1. The Base Socket is formed from 2-7/8" O.D. x 12 gauge galvanized pipe.
2. The Anchor Flange is formed from 12 Ga. galvanized steel made to ASTM A-525. Only needed for soft soils as determined by the Engineer.
3. The Wedge is formed from 11 Ga. galvanized steel made to ASTM A-525.
4. The Mailbox Post is 2.375" O.D. x 0.095" thin wall steel tubing.
5. Steel Support Foundation unit shall be made from new material and shall be corrosion resistant. The unit shall be galvanized in accordance with ASTM designation A-123, A-525, G-90 or better. In addition, steel members of the support that are in direct contact with earth must be galvanized to ASTM Designation G-90 and coated with one mil of clear approved coating, or galvanized in accordance with ASTM Designation A-123.



**TYPE 3 SUPPORT/FOUNDATION**  
DELINEATOR POST w/ SPLICE CONNECTOR



**TYPE 4 SUPPORT/FOUNDATION**  
DELINEATOR POST

**GENERAL NOTES**

1. Bolts, nuts, screws, washers and other miscellaneous hardware shall be galvanized in accordance to ASTM Designation: A-153, Class C or D, or B-454, Class 40.
2. Foundation and post must be driven plumb. Recommended procedure is to drive post or foundation about 10-12 inches, stop and check for straightness, front to back, side to side. Make adjustments, continue to drive an additional 10-12 inches, repeat check, make final adjustments, complete installation.
3. The 2 lbs./ft. winged channel posts for the Type 4 support shall conform to the requirements of departmental materials specification D-9-7130.
4. Hardware for mounting mailboxes to support/foundation furnished by Foresight Industries or equivalent may be used when approved by the Engineer.
5. Where more than two mailboxes are to be mounted at one location a multiple mailbox mount shall be used.
6. The formed tube support frame for the multiple mailbox mount and the Type 1 mailbox support system are patented and manufactured by Foresight Products Inc.
7. Any support or foundation on these standards may be used for mounting single or double mailboxes, except for the restriction shown in note No. 8.
8. The Type 3 support foundation cannot be used with No. 2 size mailbox unless a tested mounting hardware is approved by the Engineer.

329A



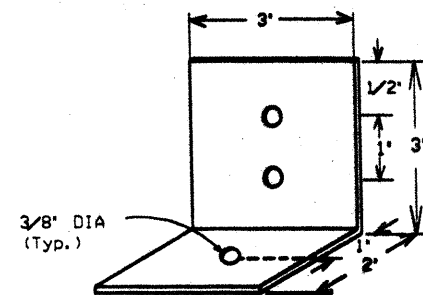
STATE DEPARTMENT OF HIGHWAYS  
AND PUBLIC TRANSPORTATION

MAILBOX SUPPORT/  
FOUNDATION DETAILS

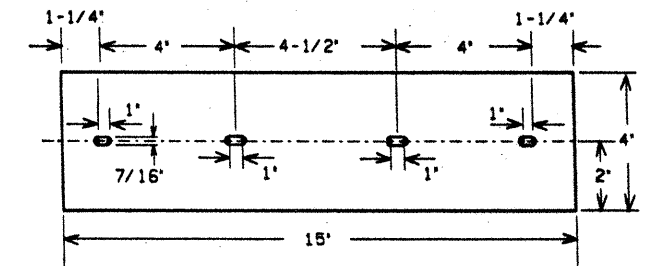
MB-89 Sheet 2 of 3

STATE	FEDERAL AID PROJECT NO.	SHEET NO.
TEXAS	16 243 (H7) 123	329A
COUNTY	CONTRACT	DATE
15	16 243 (H7) 123	6-21-89



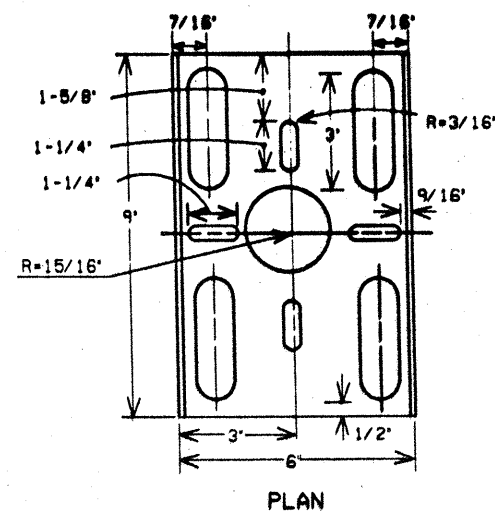


ANGLE

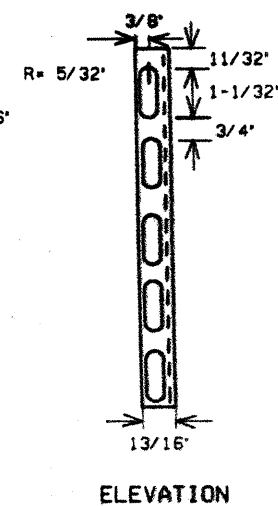


HOLES SHALL HAVE A DIAMETER OF 7/16"

ADAPTER PLATE



BRACKET



Hardware for mounting mailboxes to support/foundation furnished by Foresight Industries or equivalent may be used when approved by the Engineer.

The bracket is to be constructed of 14 gage galvanized steel sheet. The angle is to be constructed of 14 gage galvanized steel sheet. The adapter plate is to be constructed of 12 gage steel sheet. The angle and the adapter plate may be galvanized before or after fabrication in accordance with ASTM A568. The angle must be formed into the 90 degree bend without damage to the galvanizing coating. The base metal of the angle and the adapter plate must have sufficient ductility to be bent flat upon itself without breaking. Items with wet storage stains (white rust) will not be accepted.

329B



STATE DEPARTMENT OF HIGHWAYS  
AND PUBLIC TRANSPORTATION

STANDARD MAILBOX HARDWARE

MB-89

Sheet 3 of 3

DATE	STATE	FEDERAL AID PROJECT NO.	SHEET
12/15	TEXAS	22 36-2 (167) 177	229B
12/15	COUNTY	CONTRACT NO.	177

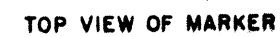
THE REQUIREMENTS FOR THE ABSOLUTE VOLUME MIX DESIGN AND THE WEIGHING OF THE INGREDIENTS FOR THE CONCRETE IN ALL MARKERS WILL BE WAIVED. MIXING OF CONCRETE MAY BE ACCOMPLISHED IN ANY MANNER SATISFACTORY TO THE ENGINEER.

THE WORK PERFORMED AND MATERIALS FURNISHED IN CONSTRUCTING RIGHT-OF-WAY MARKERS MEASURED AS PROVIDED IN ITEM 538 OF THE STANDARD SPECIFICATIONS SHALL BE PAID FOR AT CONTRACT UNIT PRICE BID FOR "RIGHT-OF-WAY MARKERS (TYPE I), " OR "RIGHT-OF-WAY MARKERS (TYPE II)."



*Type 1 Right-of-Way Markers shall be precast concrete, and shall be installed at designated points to the depth, lines, and grades established by the Engineer*

*In case the material to be excavated consists of rock or hard clay, this Marker may be shortened 12" if so directed by the Engineer*

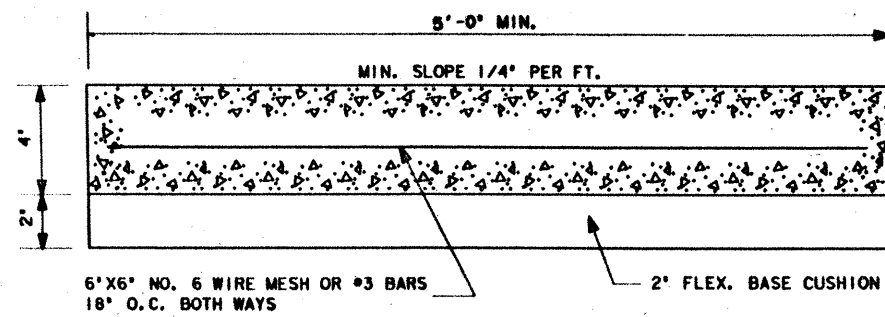


TYPE II RIGHT-OF-WAY MARKERS SHALL BE POURED IN PLACE CONCRETE, AND BRONZE DISKS SHALL BE SET TO CORRECT LINE AND GRADE AS DIRECTED BY THE ENGINEER.

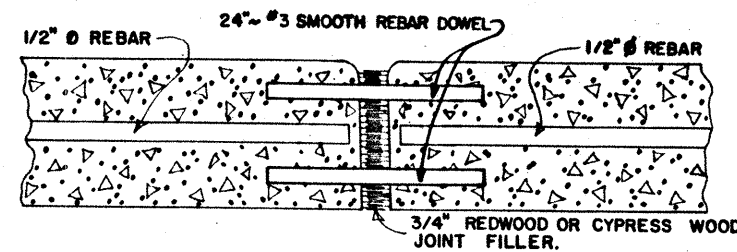
BRONZE DISKS SHALL BE OF ARCHITECTURAL BRONZE HAVING THE FOLLOWING COMPOSITION: COPPER 85%, TIN 5%, LEAD 5%, ZINC 5%. EXCAVATION FOR MARKERS SHALL BE MADE TO NEAT LINES EXCEPT FOR THE TOP 6" OF THE MARKER WHICH SHALL BE FORMED WITH REMOVABLE FORMS OF SHEET METAL OR OTHER SUITABLE MATERIAL. THE TOP PART OF THE MARKER AROUND THE BRONZE DISK SHALL RECEIVE A STEEL TROWEL FINISH.

AFTER THE CONCRETE HAS TAKEN ITS FINAL SET, THE ENGINEER WILL STENCIL REQUIRED SURVEY DATA AND, WITH CHISEL OR CENTER PUNCH, CUT CROSS MARKING EXACT LOCATION OF RIGHT-OF-WAY LINE IN THE BRONZE DISK.

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION		RIGHT-OF-WAY MARKERS		M-83A	
DN	DRAWING	DATE	PER NO	STATE	FEDERAL PROJECT NO
CR DN	ORIGINAL		QIV NO	TEXAS	22 86-2 (157) 173
DN	REVISED	11-21-83	0		
CR DN	REVISED		QIV NO	COUNTY	COUNTY
YB			16	Garland	14
CR YB					6 23 24-35

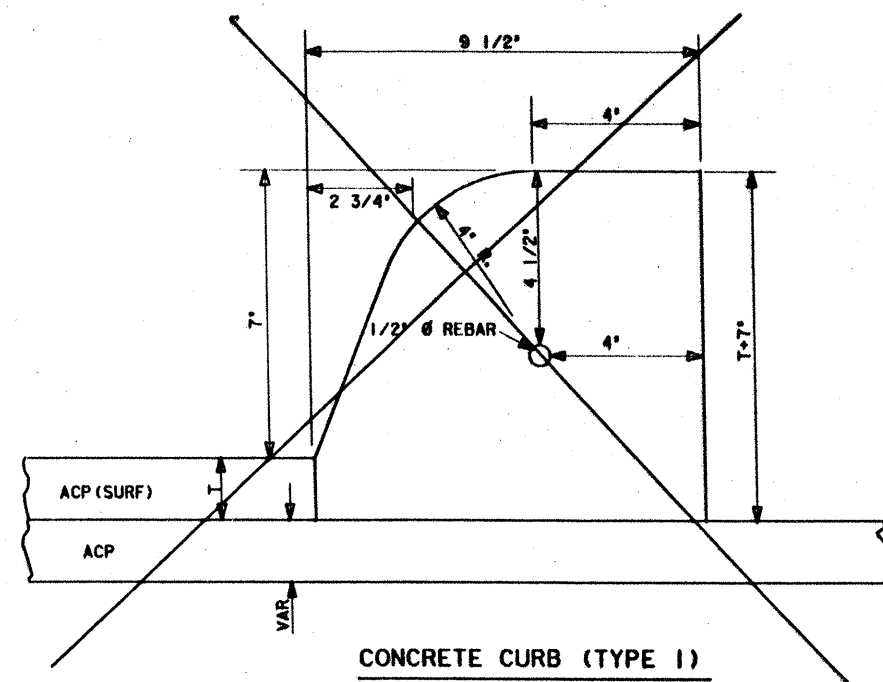
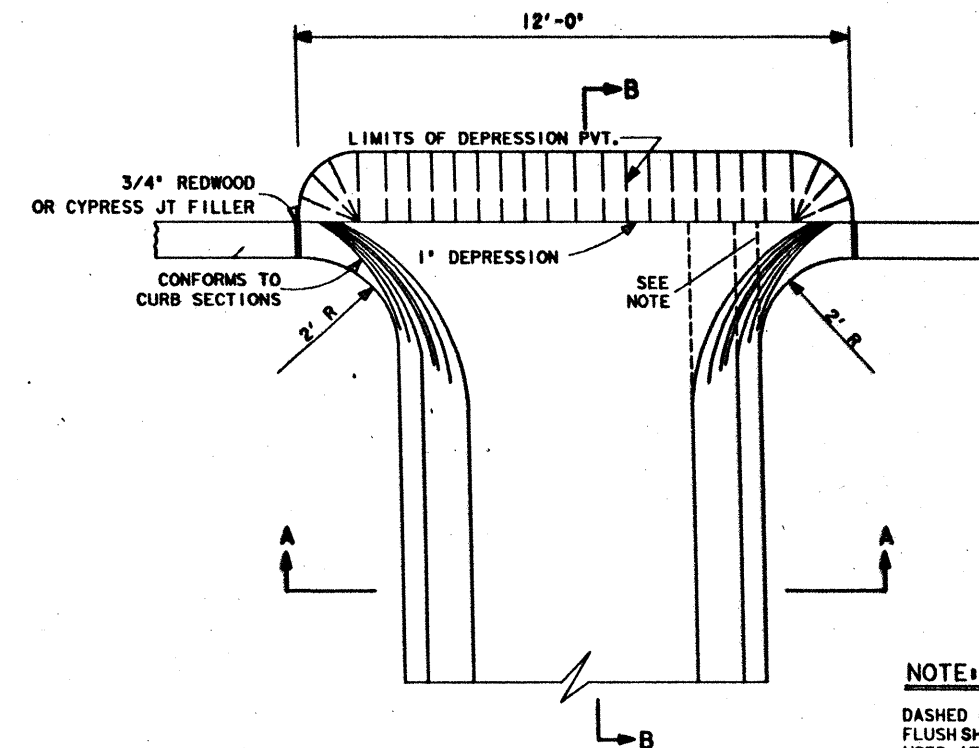


TYPICAL SIDEWALK DETAIL

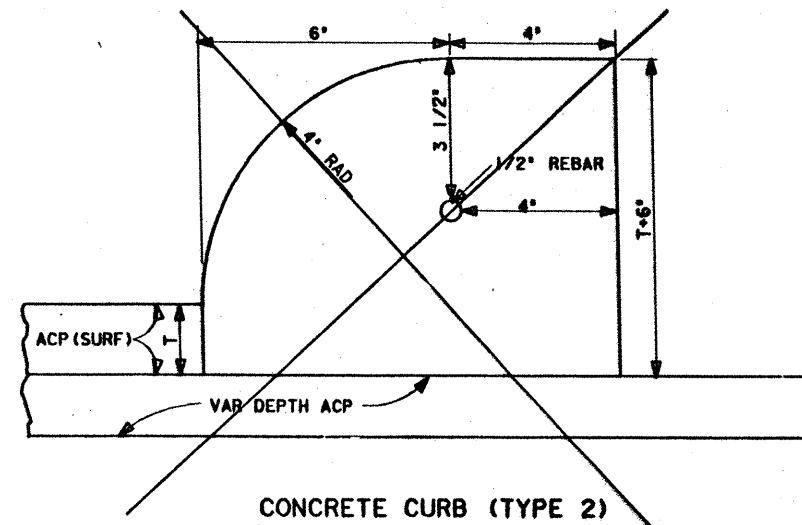


NOTE: EXPANSION JOINTS TO BE PLACED AT INTERVALS OF APPROX. 200', AT THE BEGINNING AND END OF CURVES AND AT DRIVEWAYS. CURB WILL BE SCORED APPROX. EVERY 10', WITH BRUSH FINISH.

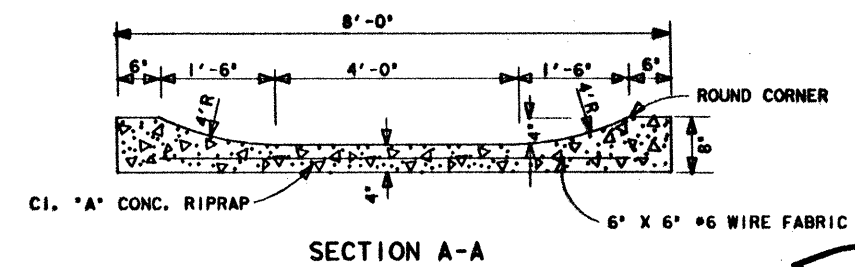
TYPICAL EXPANSION JOINT DETAIL



CONCRETE CURB (TYPE 1)

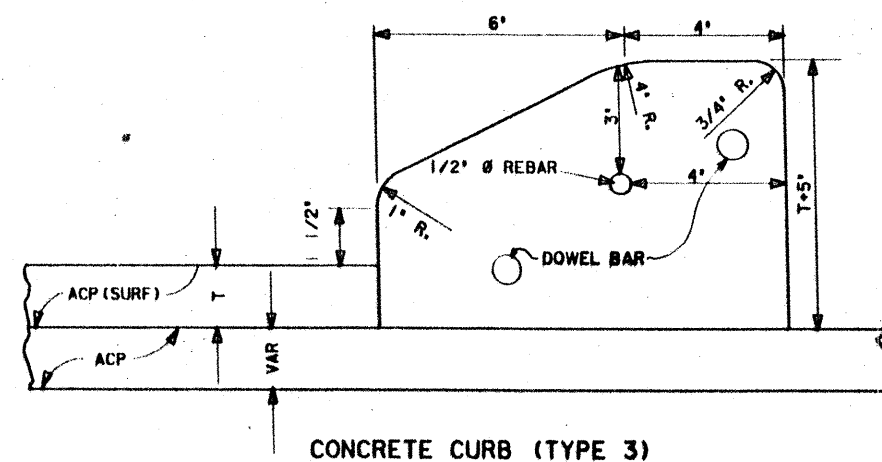


CONCRETE CURB (TYPE 2)

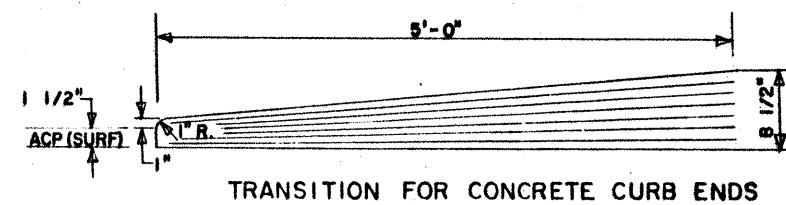


SECTION A-A

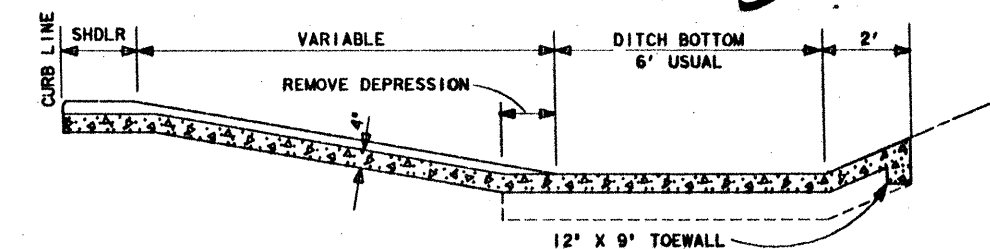
331



CONCRETE CURB (TYPE 3)



TRANSITION FOR CONCRETE CURB ENDS



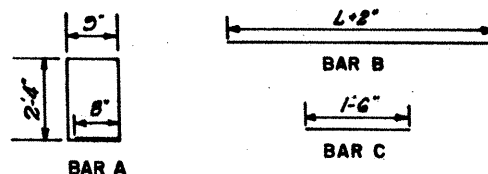
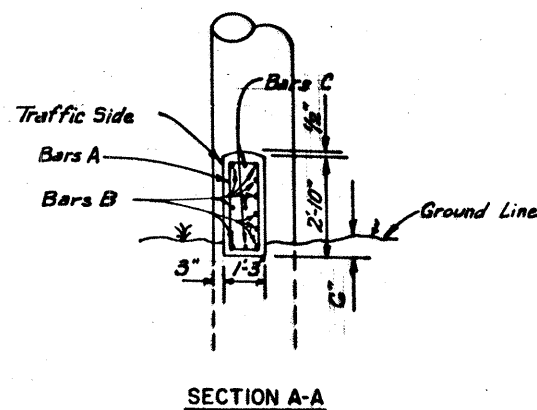
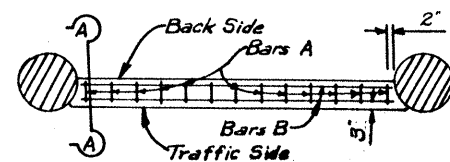
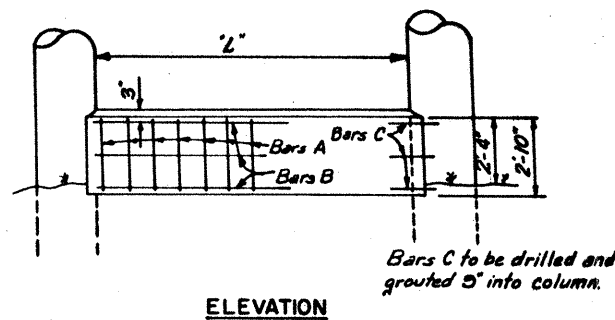
SECTION B-B

Each Curb Slot est @ 2 cy  
Riprap Conc (C1 A)

Salby L. Hunt  
7/26/07



CURB & SIDEWALK DETAIL



BILL OF REINFORCING STEEL					
L=10'-8"					
BAR	NO.	SIZE	SPAC.	LEN.	WT.
A	11	4	12"	6'-10"	60
B	*9	6	5 1/2"	10'-10"	146
C	6	6	7"	1'-6"	14

BILL OF REINFORCING STEEL					
L=13'-6"					
BAR	NO.	SIZE	SPAC.	LEN.	WT.
A	14	4	12"	6'-10"	64
B	*9	6	5 1/2"	13'-8"	185
C	6	6	7"	1'-6"	14

BILL OF REINFORCING STEEL					
L=15'-6"					
BAR	NO.	SIZE	SPAC.	LEN.	WT.
A	16	4	12"	6'-10"	73
B	*9	6	5 1/2"	15'-8"	212
C	6	6	7"	1'-6"	14

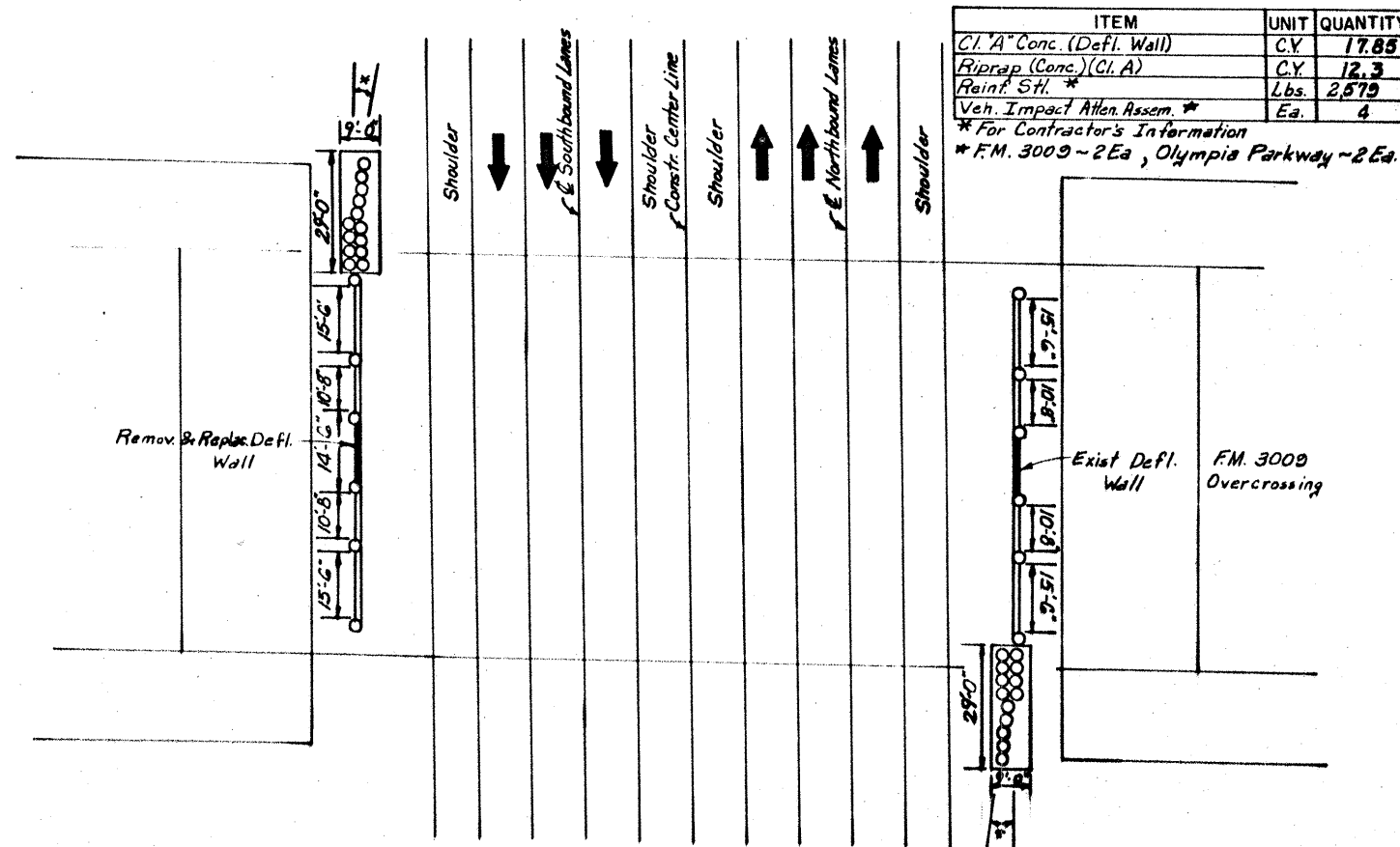
BILL OF REINFORCING STEEL					
L=14'-6"					
BAR	NO.	SIZE	SPAC.	LEN.	WT.
A	15	4	12"	6'-10"	68
B	*9	6	5 1/2"	14'-8"	198
C	6	6	7"	1'-6"	14

\* G in back side - 3 in Traffic side.  
 @ To be used at Olympia Parkway

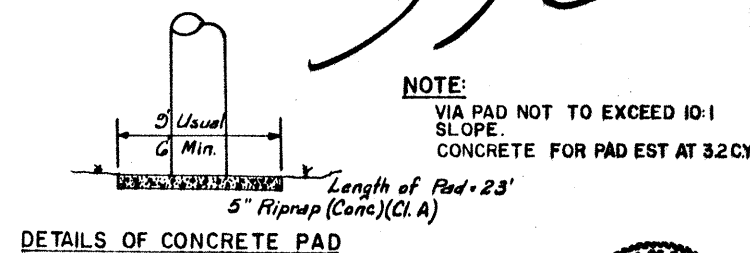
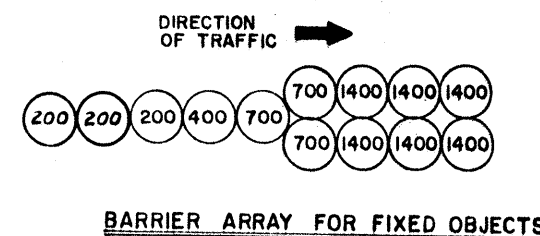
QUANTITY EACH WALL			
"L"	"W"	CONC. C.Y.	STL. LB.
10'-8"	1'-3"	1.44	210
13'-6"	1'-3"	1.82	263
14'-6"	1'-3"	1.95	280
15'-6"	1'-3"	2.08	299

#### GENERAL NOTES

All concrete shall be class "A"  
 Chamfer exposed corners 3/4"  
 All dimensions relating to reinforcing steel are to centers of bars.  
 Concrete surface finish shall be Grade 1.



\* Angle to be determined in field.



#### VEHICULAR DEFLECTION WALL

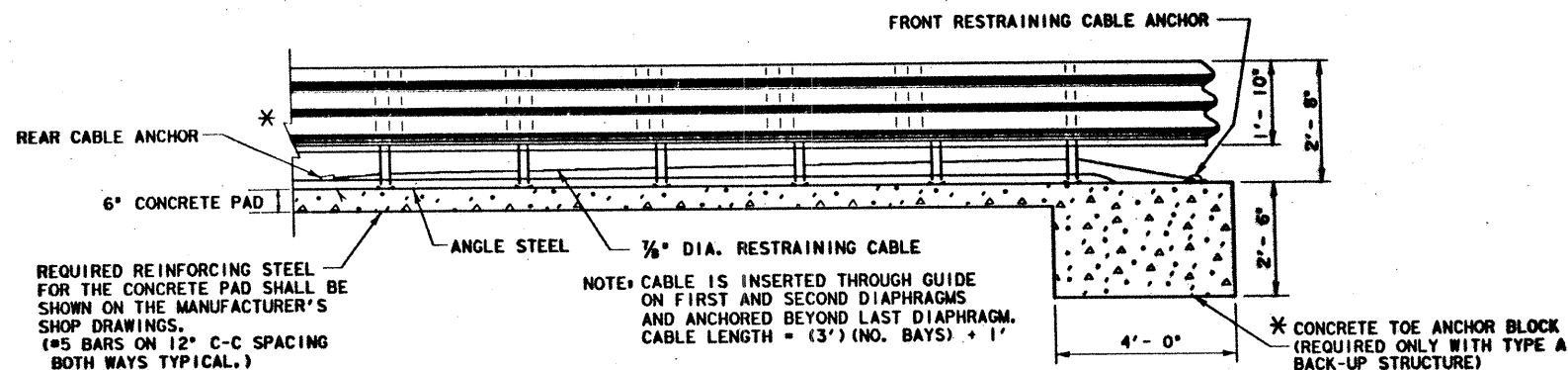
(BETWEEN BRIDGE COLUMNS)

VDW(BC)

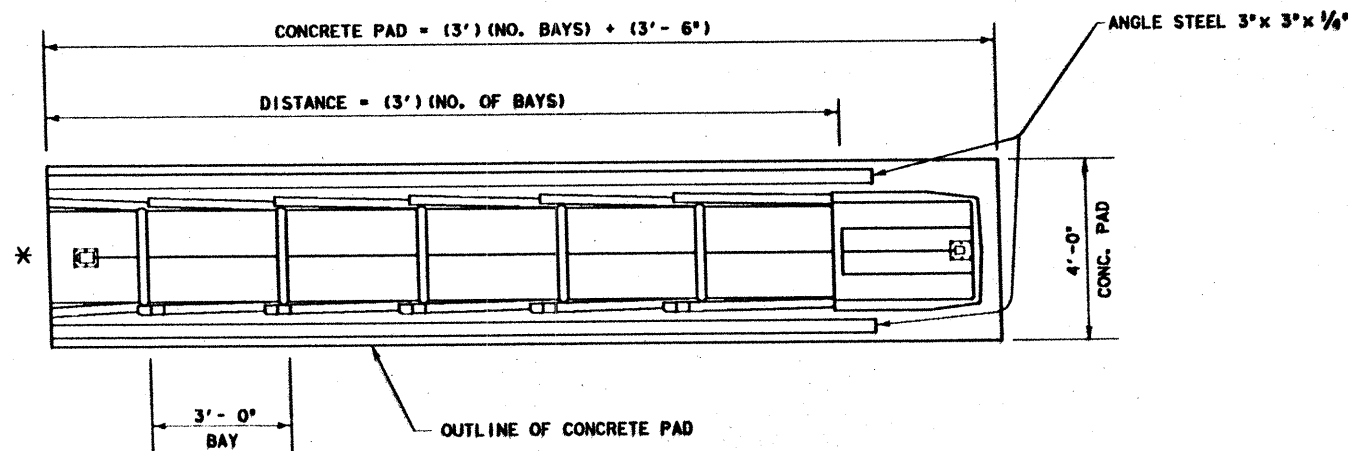
ITEM NO.	STATE	FEDERAL PROJECT NO.	SHEET NO.
15	TEXAS	IR-35-2(157)173	332
15	GUADALUPE, ETC.	16	6 297c IH35



EACH FRONT AND REAR ANCHOR TO BE SECURED TO CONCRETE PAD USING SIX  $\frac{3}{4}$ " DIA. x 6  $\frac{1}{4}$ " CONC. ANCHOR BOLTS,  $\frac{3}{4}$ " HEX HEAD NUTS AND  $\frac{3}{4}$ " FLAT WASHERS



ELEVATION



PLAN

\* SEE NOTE FOR BACK-UP STRUCTURE INFORMATION

# STRUCTURAL INFORMATION

**TYPE A** TENSION STRUT: CONSISTS OF DIAGONAL STRUTS, CONNECTIONS, AND ACCESSORIES, AS DETAILED BY THE MANUFACTURER, LOCATED AT REAR OF G.R.E.A.T. UNIT. WHEN USED, A 4' x 4' x 2'-6" CONCRETE TOE ANCHOR BLOCK SHALL BE PROVIDED BENEATH THE FRONT PORTION OF THE CONCRETE PAD EXCEPT WHERE THE G.R.E.A.T. UNIT IS TO BE PLACED ON CONTINUOUSLY REINFORCED CONCRETE PAVEMENT.

**TYPE B** CAST-IN-PLACE CONCRETE WALL BACKUP: WHEN A TYPE B BACKUP IS SPECIFIED, THE BACKUP WALL SHALL BE DETAILED ELSEWHERE IN THE PLANS. IF CAST-IN-PLACE STRUCTURES SUCH AS CONCRETE TRAFFIC BARRIER, BRIDGE PARAPETS, COLUMNS, OR SPECIAL WALLS ARE USED AS BACKUP STRUCTURES, THEN INTERMEDIATE WALLS AS DETAILED ELSEWHERE IN THE PLANS SHALL BE PROVIDED BETWEEN THESE STRUCTURES AND THE G.R.E.A.T. UNIT. THE INTERMEDIATE WALLS SHALL BE EQUAL IN HEIGHT AND WIDTH TO THAT OF THE G.R.E.A.T. UNIT. THE INTERMEDIATE WALLS SHALL BE REINFORCED WITH A STEEL CAGE. PRECAST CONCRETE MEDIAN BARRIER SHALL NOT BE USED AS A BACKUP STRUCTURE FOR THE G.R.E.A.T. UNIT.

**TYPE C** WIDE FLANGE BACK-UP: CONSISTS OF TWO 6WF25 x 6'-2" STEEL POSTS ERECTED VERTICALLY AT REAR OF G.R.E.A.T. UNIT. POSTS ARE SET IN A CAST-IN-PLACE, REINFORCED FOUNDATION WHICH IS 4'-0" x 2'-0" x 3'-0", WITH THE 3'-0" DEPTH MEASURED FROM THE TOP OF CONCRETE PAD. DETAILS FOR CONNECTIONS AND ACCESSORIES FOR THE WIDE FLANGE BACK-UP PROVIDED BY THE MANUFACTURER.

**TYPE CZ** CONSTRUCTION ZONE BACK-UP: CONSISTS OF A STEEL BASE AND BACK-UP AS INTEGRAL PARTS OF THE G.R.E.A.T. UNIT. ANCHORAGE PROVIDED BY ANCHOR BOLTS WHERE THE UNIT IS PLACED ON CONCRETE OR BY DRIVEN, STEEL ANGLE ANCHOR PINS FOR PLACEMENT ON OTHER THAN CONCRETE. THE TYPE CZ UNIT IS ONLY AVAILABLE IN 2' OR 2.5' WIDTHS WITH 3 OR 6 BAYS.

**NOTES:** TYPE OF BACK-UP STRUCTURE FOR EACH LOCATION SPECIFIED ELSEWHERE IN THE PLANS.

DETAILS OF COMPONENTS TO THE GUARD RAIL ENERGY ABSORBING TERMINAL WILL BE SHOWN ON SHOP DRAWINGS FURNISHED TO THE ENGINEER BY THE MANUFACTURER.

DESIGN SPEED (MPH)	NO. OF BAYS <sup>①</sup>
40 OR LESS	3
45	4
50	5
55	6
60	8
65	10

<sup>①</sup> BASED ON MAXIMUM DECELERATION FORCE OF 6 G's

IF TYPE CZ UNIT IS USED, REFER TO STRUCTURAL INFORMATION FOR WIDTHS AND NUMBER OF BAYS.

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STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

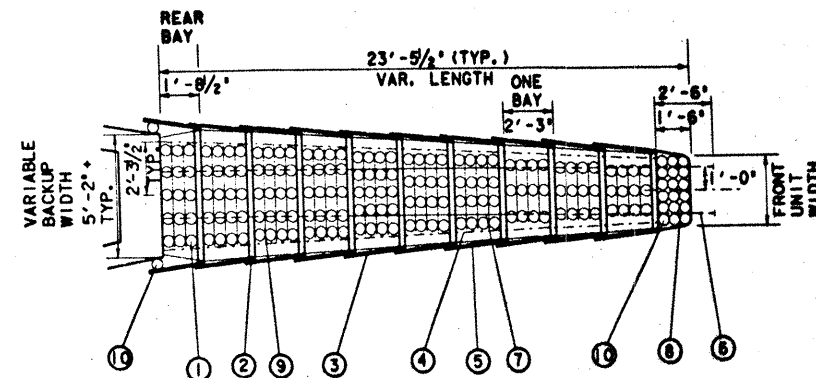
GUARD RAIL ENERGY ABSORBING TERMINAL

GREAT-89

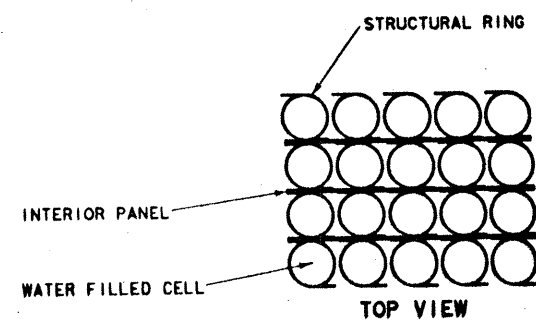
REVISIONS	FED. NO. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	SHEET NO.
	6	TEXAS	12 26-2 (167) 173	684
		COUNTY	CONF. SECT. JOB	BRIDGE NO.

A-91

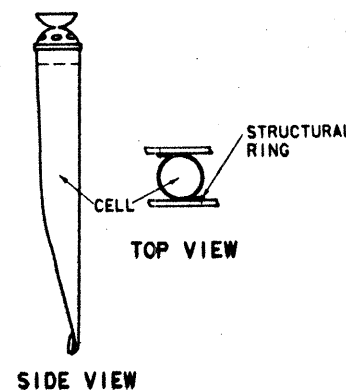
NOTE: LENGTH VARIED AS DICTATED BY DESIGN SPEED AND AVAILABLE SPACE; SEE TABLE FOR LISTING OF LENGTHS FOR STANDARD INSTALLATIONS.



TYPICAL CELL SANDWICH INSTALLATION (WATER FILLED CELLS)



TYPICAL BAY ASSEMBLY



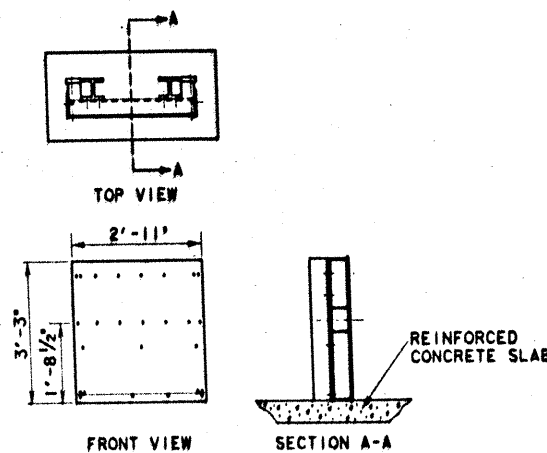
TYPICAL CELL

KEY

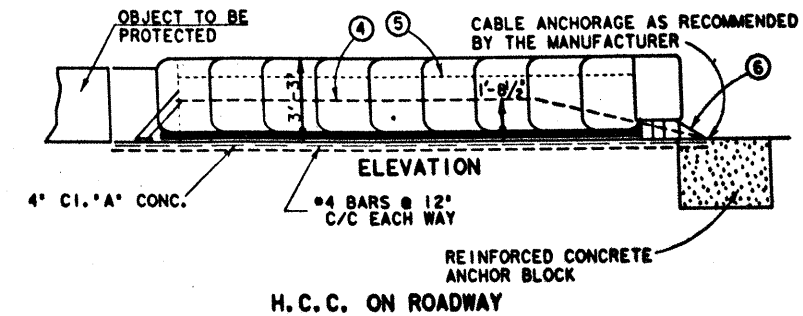
- ① WATER FILLED CELLS
- ② DIAPHRAGMS
- ③ FENDER PANELS
- ④ RESTRAINING CABLES
- ⑤ PULL-OUT CABLES
- ⑥ SECONDARY CABLES
- ⑦ SLIDE STRAPS
- ⑧ FLEXIBLE NOSE COVER
- ⑨ INTERIOR PANELS
- ⑩ STANDARD VINYL CELLS

SYSTEM TYPE	LENGTH *	NO. OF BAYS	MAXIMUM DESIGN SPEED	AVERAGE 'G' FORCES **
HYDRAULIC CRASH CUSHION	12'-2 1/2'	5	40 MPH	5.8
	16'-8 1/2'	7	45 MPH	5.4
	18'-11 1/2'	8	50 MPH	5.9
	23'-5 1/2'	10	55 MPH	5.7
	27'-11 1/2'	12	60 MPH	5.7

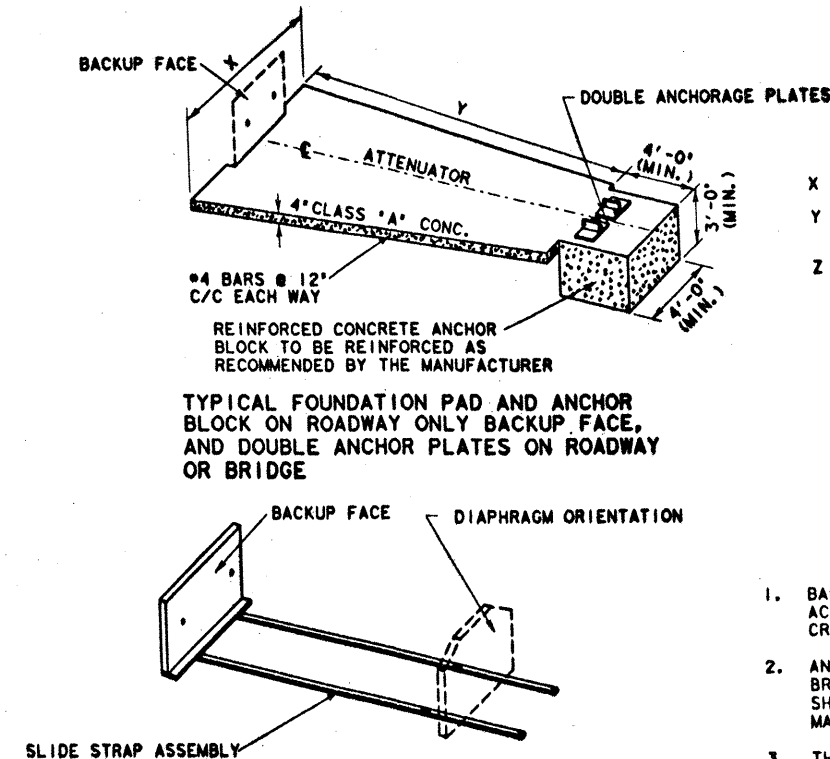
\* TOTAL LENGTH OF UNIT AS MEASURED FROM FRONT FACE OF BACKUP TO FORWARD EDGE OF FRONT CELLS.  
 \*\* AVERAGED OVER ENTIRE HCC SYSTEM LENGTH; 50 MILLISECOND PEAK 'G' FORCES EXCEED THESE VALUES.



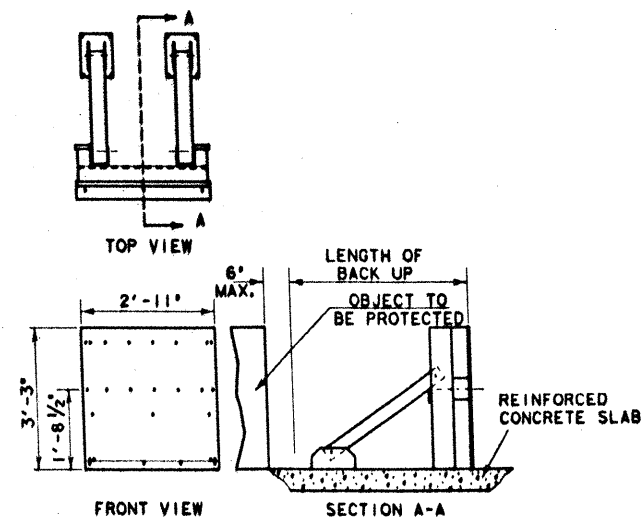
TYPICAL WIDE FLANGE BACKUP ASSEMBLY ON ROADWAY OR BRIDGE



TYPICAL FOUNDATION PAD AND ANCHOR BLOCK ON ROADWAY ONLY BACKUP FACE, AND DOUBLE ANCHOR PLATES ON ROADWAY OR BRIDGE



TYPICAL SLIDE STRAP ASSEMBLY



TYPICAL DIAGONAL BRACED BACKUP ASSEMBLY ON ROADWAY OR BRIDGE

X = SLAB WIDTH = REAR UNIT WIDTH + 12 IN.  
 Y = SLAB LENGTH = (NUMBER OF BAYS x 2'-3') + LENGTH OF BACKUP ASSEMBLY  
 Z = SLAB WIDTH = FRONT UNIT WIDTH + 12 IN.

GENERAL NOTES

- BACKUP WIDTH SHOULD BE 3'-0", 5'-2" OR 7'-6" TO ACCOMMODATE STANDARD ASSEMBLIES FOR HYDRAULIC CRASH CUSHIONS. BACKUP WALL HEIGHT IS USUAL 3'-3".
- ANCHOR BLOCKS, SLIDE STRAP ASSEMBLY AND DIAGONALLY BRACED BACKUP ASSEMBLY MAY VARY FROM THE DETAILS SHOWN HEREON AS DESIGNED AND RECOMMENDED BY THE MANUFACTURER SUPPLYING THIS PRODUCT.
- THE BID ITEM, 'HYDRAULIC CRASH CUSHION', (BRIDGE STRUCTURE) OR (RDWY), INCLUDES ALL FEATURES SHOWN HEREON INCLUDING BACKUP ASSEMBLY, SLIDE STRAP ASSEMBLY, HARDWARE FOR CONNECTING TO FOUNDATION PAD OR BRIDGE DECK, AND FOR CUSHIONS LOCATED ON ROADWAY, THE FOUNDATION PAD AND ANCHOR BLOCK.
- THE TYPE OF BACKUP ASSEMBLY (DIAGONAL BRACE OR WIDE FLANGE) WILL BE PROVIDED AS SPECIFIED ELSEWHERE IN THE PLANS.
- WHEN LOCATED ON BRIDGE DECK ALL BOLTS FOR THE DOUBLE ANCHORAGE PLATE AND BACKUP ASSEMBLY SHALL BE LOCATED AND PLACED PRIOR TO POURING THE DECK.



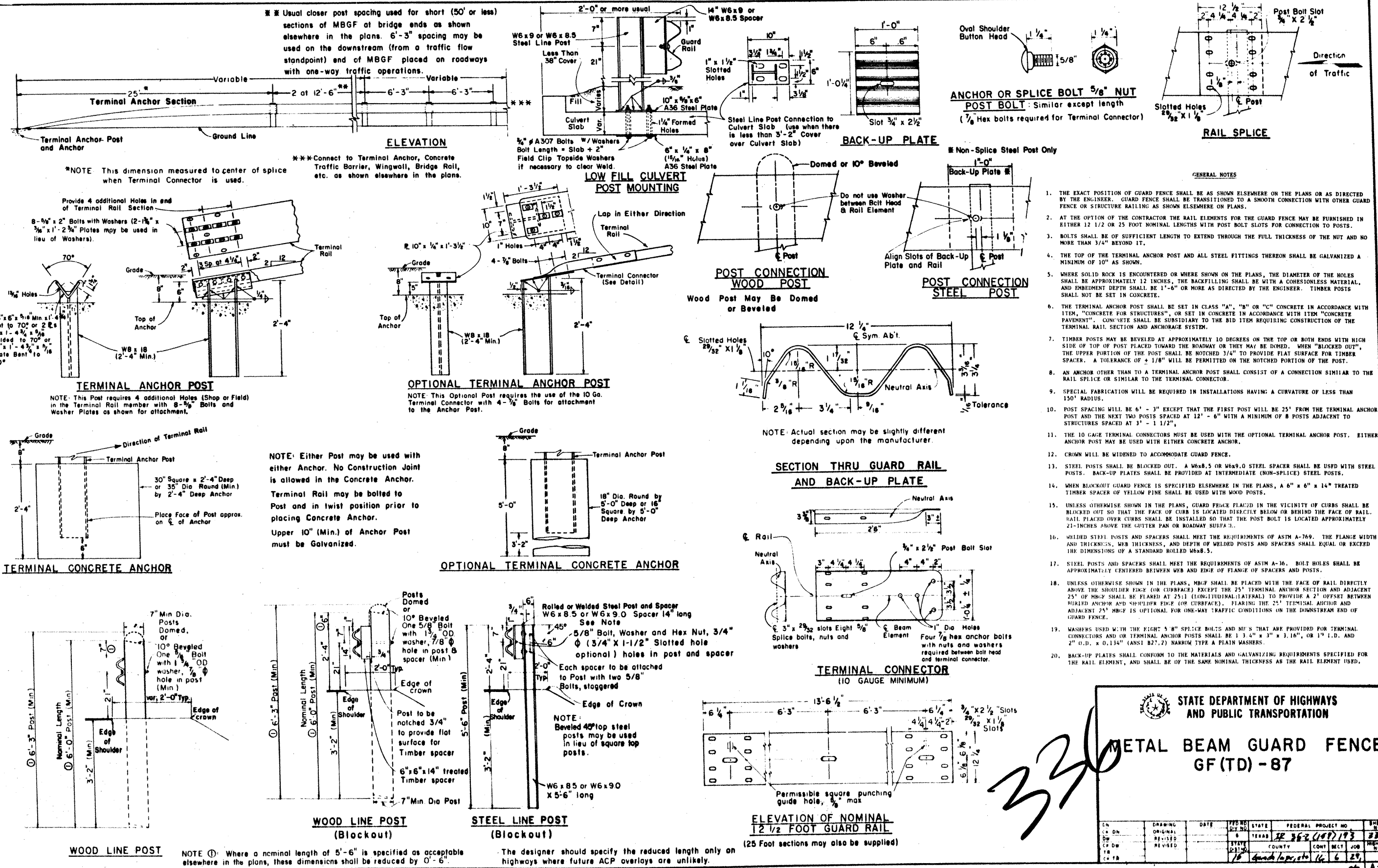
STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

HYDRAULIC CRASH CUSHION (HCC) (FREE STANDING)

HCC - 88

REV. 15-01-88	DES. NO. 6	STATE TEXAS	FEDERAL AID PROJECT NO. 99-2 (197) 173	SHEET NO. 555
	DATE 12-11-88	COUNTY	CONTRACT NO. 6	JOB NO. 29
			DESIGNED BY G. B. L. H. C. 16	CHECKED BY J. H. B. 16

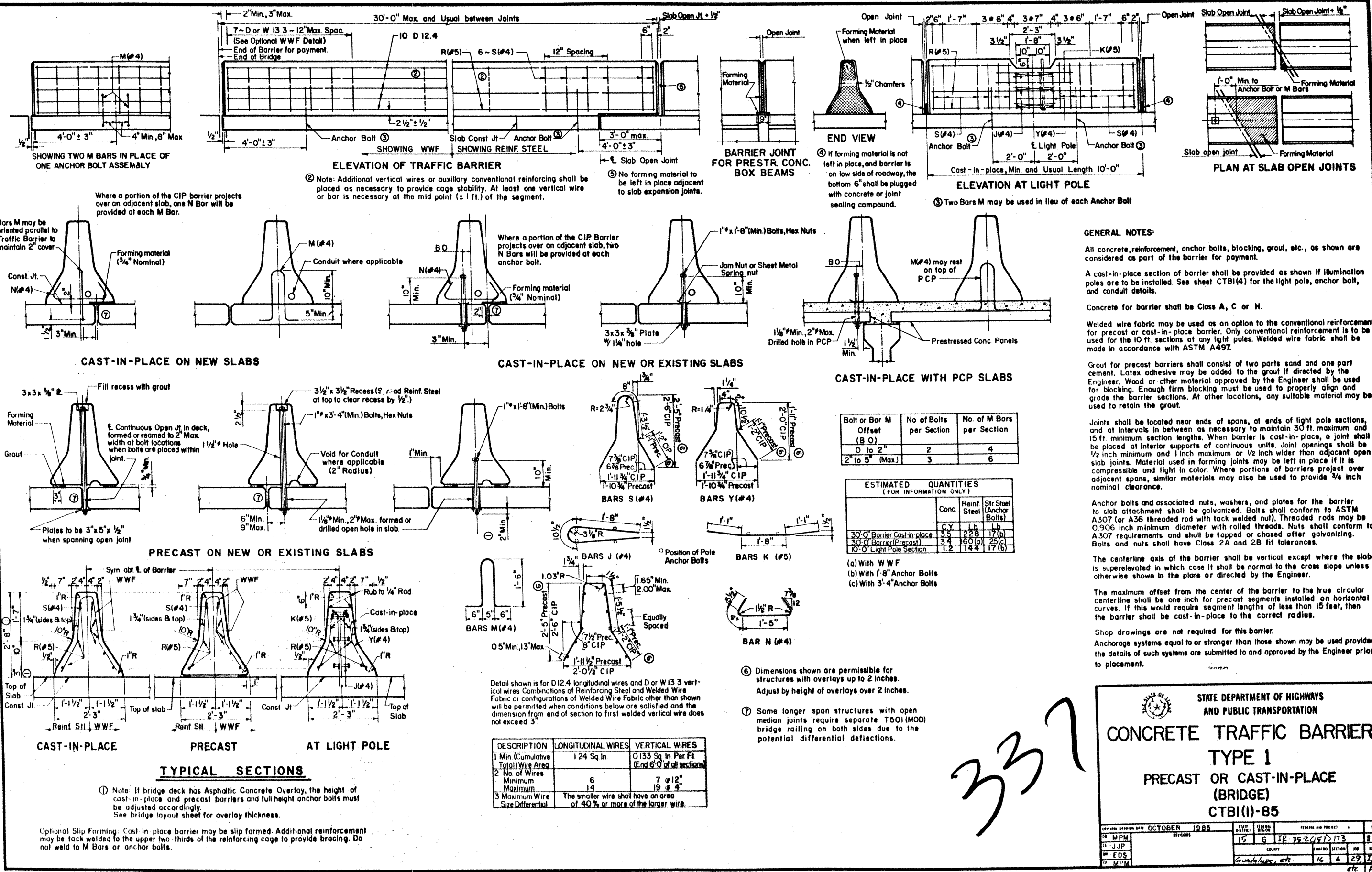




STATE DEPARTMENT OF HIGHWAYS  
AND PUBLIC TRANSPORTATION

**METAL BEAM GUARD FENCE**  
**GF (TD) - 87**

CN	DRAWING	DATE	FIG NO	STATE	FEDERAL PROJECT NO	SHEET NO
CDN	ORIGINAL		DIV NO			
DW	REVISED		6	TEXAS	12 262 (167) 193	286
CDW	REVISED		STATE	COUNTY	CONT	ECT
TR			2310			
CD TR			16	Grand Jpr, etc	16	6 29
						HIGHWAY NO



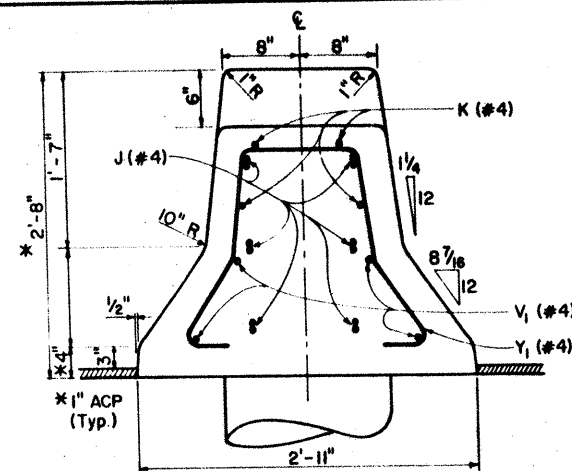
337

STATE DEPARTMENT OF HIGHWAYS  
AND PUBLIC TRANSPORTATION

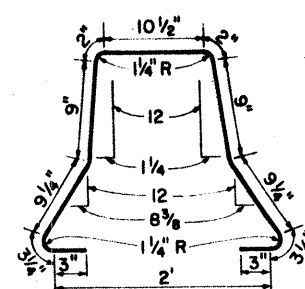
**CONCRETE TRAFFIC BARRIER**  
**TYPE 1**  
**PRECAST OR CAST-IN-PLACE**  
**(BRIDGE)**  
**CTBI(1)-85**

DATE: OCTOBER 1985	STATE: 15	SECTION: 6	FEDERAL AID PROJECT: 1R-35-2(57)173	SHEET: 337
BY: JJP	COUNTY: Gumbel, etc.	SECTION: 16	DATE: 29	BY: A-52

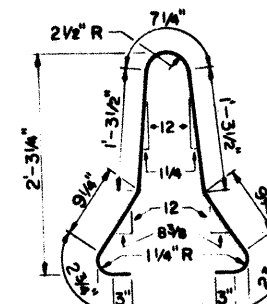




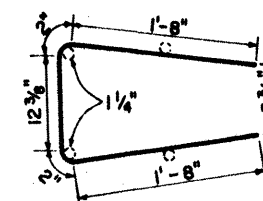
SECTION AT LIGHT POLE



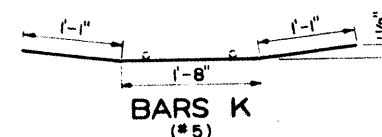
BARS Y1 (#4)



BARS S1 (#4)



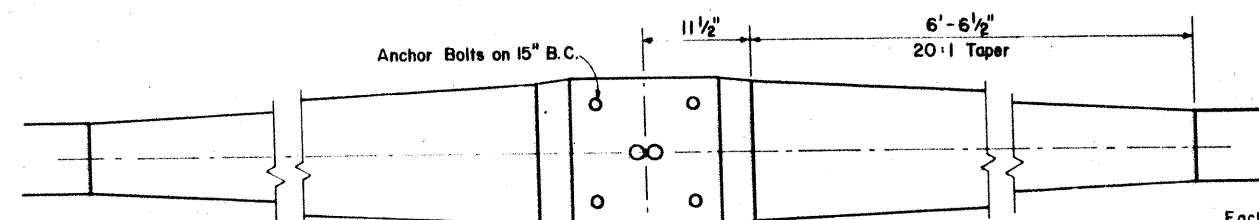
BARS J (#4)



BARS K (#5)

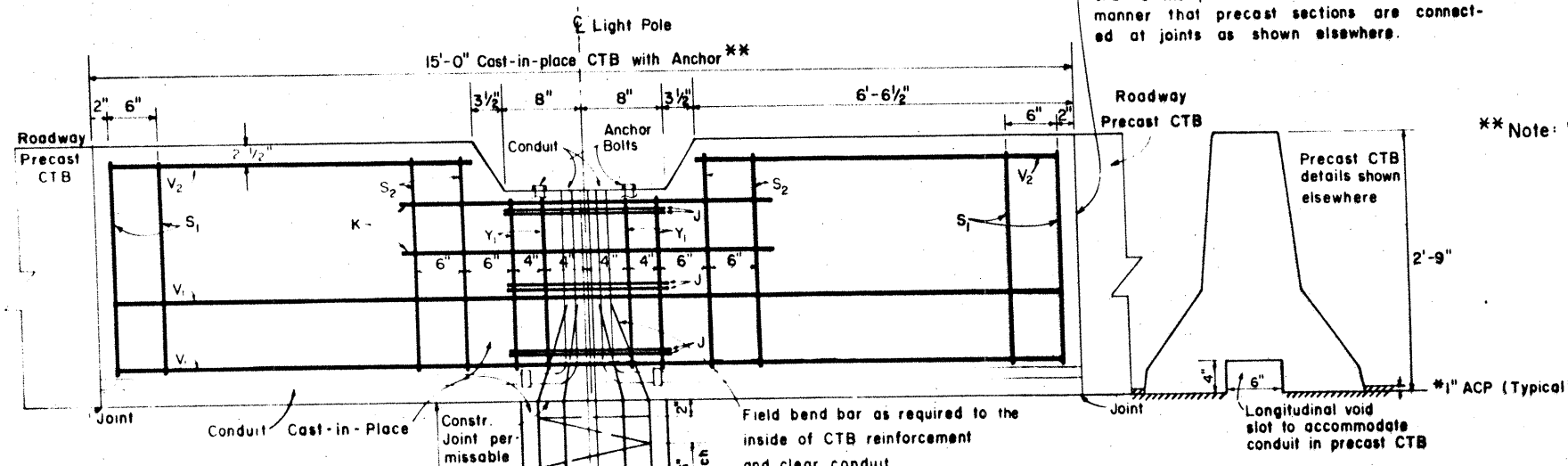
Schedule of Reinforcement for  
Each 15' Cast-in-place  
Section of Light Poles (Excl. Anchor)

BAR	SIZE	QUANTITY	LENGTH
Y1	#4	4	see details hereon
S1	#4	4	
S2	#4	4	
J	#4	6	
K	#5	4	
V1	#5	4	14'-11"
V2	#5	4	6'-4 1/2"



PLAN VIEW

Each end of cast-in-place section shall be formed to mate with the type of roadway precast concrete traffic barrier. The cast-in-place section shall be connected at each end to the precast sections in the same manner that precast sections are connected at joints as shown elsewhere.



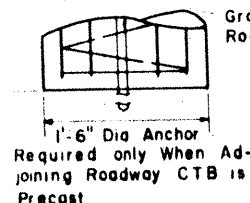
SECTION THRU RDWY.  
PRECAST CONCRETE TRAFFIC BARRIER (PCTB)

\*\* Note: Where roadway CTB is cast-in-place, 1'-6" diameter anchor is not required under barrier at light pole locations, and barrier shall be continuous (without open joint). Reinforcement of the CTB shall be as detailed hereon.

Where roadway CTB is precast, 15' cast-in-place section with 1'-6" diameter anchor shall be provided as detailed hereon.

Note: Optional location for ground rod is through CTB and alongside, rather than through, 18" diameter anchor.

4'-0" Usual

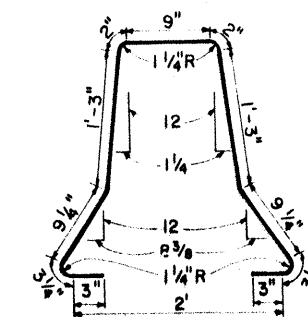


SECTION A-A

No. 2 Spiral Hooping, one flat turn top and bottom.  
6 #6 ATSM A-615 (Gr. 40)

ELEVATION OF TREATMENT AT LIGHT POLE

ROADWAY PRECAST CTB



BARS S2 (#4)

# GENERAL NOTES

- ALL CONCRETE FOR CONCRETE TRAFFIC BARRIER (CTB), INCLUDING ANCHOR WHERE REQUIRED, SHALL BE CLASS A, C OR H.
- DETAILS FOR BRIDGE CTB AT LIGHT POLES SHOWN ON SHEET CTBI (1).
- DRIED SHAFT ANCHORS WHEN REQUIRED SHALL NOT BE PAID FOR DIRECTLY BUT WILL BE CONSIDERED SUBSIDIARY TO THE UNIT PRICE 50 FOR CTB.
- PROVIDE 4-1/4" x 2-3" ANCHOR BOLTS, ASTM A 325 WITH TOP THREADED NOT LESS THAN 6" AND THE THREADED END GALVANIZED NOT LESS THAN 8" AND FURNISHED WITH GALVANIZED HEX NUTS, FLAT AND LOCK WASHERS. THE LOWER END OF THE BOLT SHALL BE BENT AT A RIGHT ANGLE OR THREADED AND FURNISHED WITH NUT AND WASHER. ANCHOR BOLTS AND GROUND RODS WILL NOT BE PAID FOR DIRECTLY BUT SHALL BE SUBSIDIARY TO THE ITEM "CONCRETE TRAFFIC BARRIER".
- PLACE GROUT UNDER POLE BASE PLATE AFTER POLE IS SET. GROUT SHALL BE ONE PART SAND AND TWO PARTS CEMENT AND SUFFICIENT WATER FOR PLASTICITY.
- ANCHOR BOLT AND CONDUIT PROJECTION SHALL BE 5 INCHES. LEVELING NUTS SHALL BE PROVIDED.



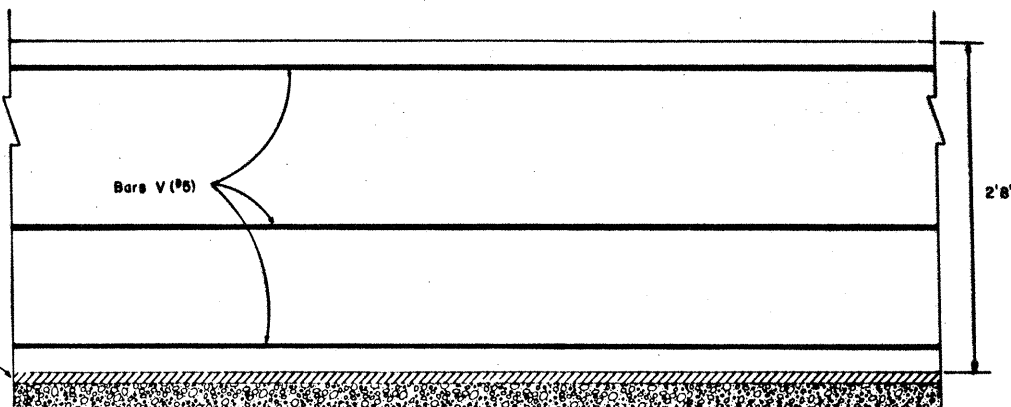
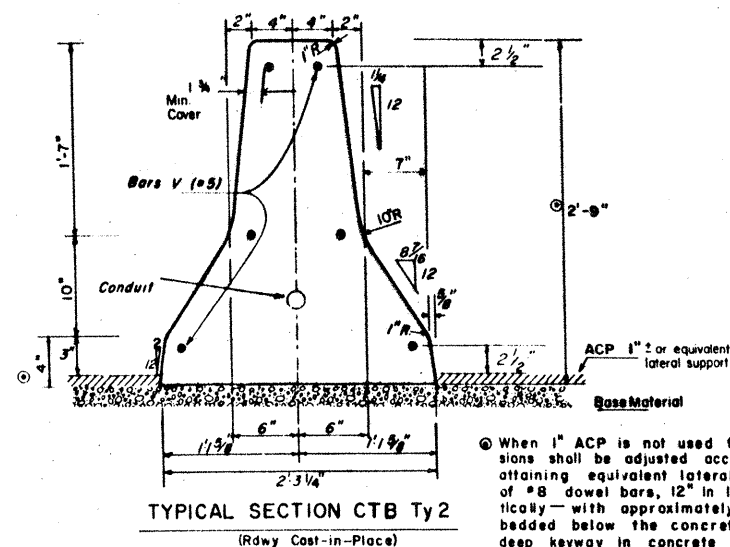
Billie A. Brown P.E. 7/26/89  
Date

MOD. WIDEN CTB FOR 15"x15" POLE BASE PLATE.

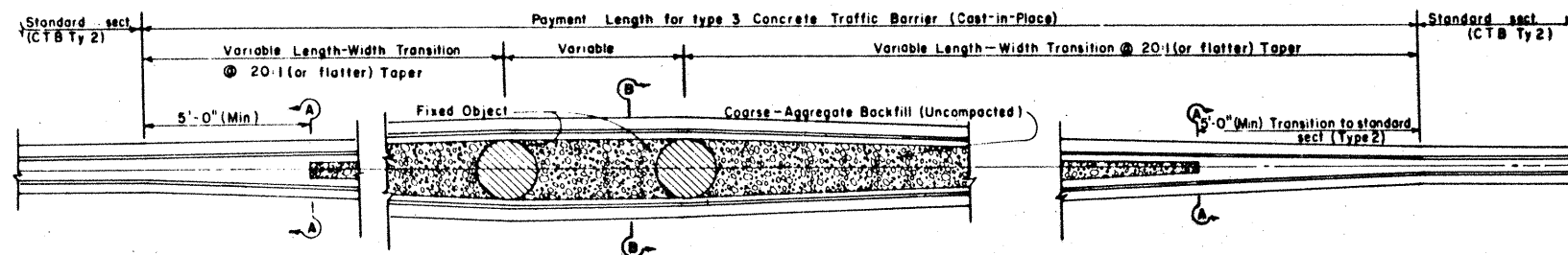
STATE DEPARTMENT OF HIGHWAYS  
AND PUBLIC TRANSPORTATION  
**CONCRETE TRAFFIC BARRIER  
TYPE 2**  
ROADWAY CTB  
AT LIGHT POLES  
CTBI(3)-85MOD

DATE	BY	STATE	FEDERAL PROJECT NO.	SHEET NO.
1-17-85	6	TEXAS	TR-35-2(157) 173	338
DATE	BY	STATE	COUNTY	COM. DIST.
15	GURRARD	FR	16	6

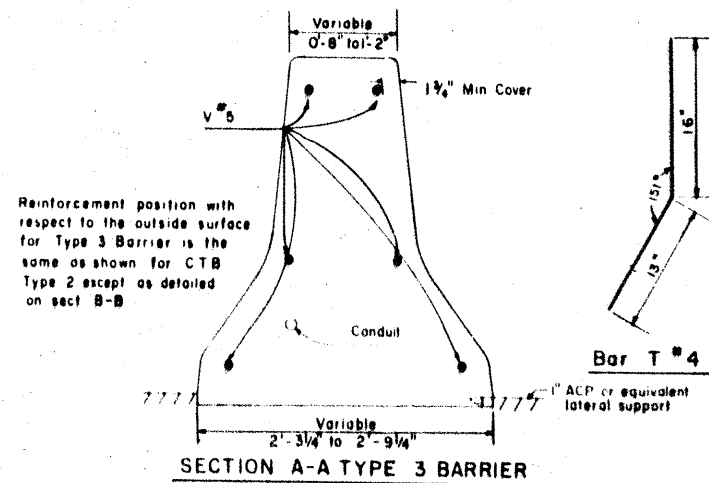
Rev. 7-28-83  
Concrete for Barrier shall be Class A, C or H.



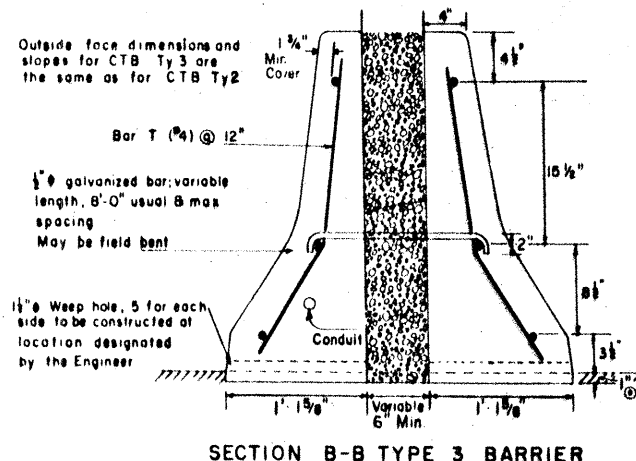
ELEVATION OF RDWY BARRIER CTB TY2



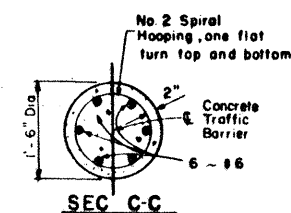
PLAN TYPE 3 BARRIER



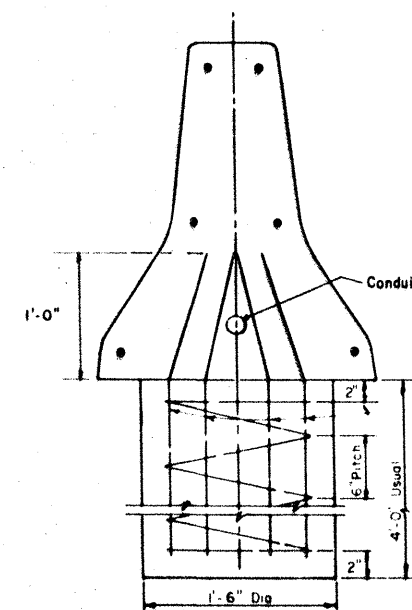
SECTION A-A TYPE 3 BARRIER



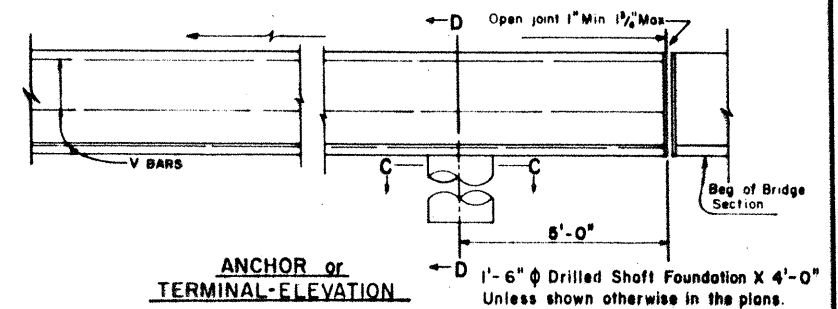
SECTION B-B TYPE 3 BARRIER



SEC C-C



ANCHOR DETAIL - SECTION D-D



ANCHOR or  
TERMINAL-ELEVATION

# GENERAL NOTES

AXIS OF TRAFFIC BARRIER SHALL BE VERTICAL, EXCEPT WHERE ROADWAY IS SUPERELEVATED, THEN AXIS SHALL BE NORMAL TO ROADWAY SURFACE.  
ALL STEEL FITTINGS SHALL BE GALVANIZED AFTER FABRICATION.  
UNLESS OTHERWISE SHOWN IN THE PLANS THE CONTRACTOR HAS THE OPTION OF PLACING EITHER PRECAST OR CAST-IN-PLACE CONCRETE TRAFFIC BARRIER.

## CTB TY 2&3

BID PRICE PER LINEAR FOOT OF CTB TY 2&3, INCLUDING TERMINAL AND ANCHOR SECTIONS, SHALL INCLUDE ALL OF THE CONCRETE, REINFORCEMENT, DRILLED SHAFT FOUNDATIONS AND AGGREGATE BACKFILL.

ALL CONCRETE FOR CTB TY 2&3, INCLUDING DRILLED SHAFT FOUNDATION, SHALL BE CLASS A, C OR H.

LONGITUDINAL AND VERTICAL BARS FOR ROADWAY BARRIER SHALL CONFORM TO ASTM A-615 (GRADE 40).

AT CONSTRUCTION JOINTS FOR THE ROADWAY BARRIER, THE LONGITUDINAL BARS SHALL EXTEND BEYOND THE JOINT SO THAT BAR SPLICES WILL BE A MINIMUM OF TWO FEET FROM THE CONSTRUCTION JOINT.

BAR SPLICES FOR ROADWAY BARRIER SHALL BE A MINIMUM OF 24 TIMES THE NOMINAL DIAMETER OF THE BAR.

ANY METHOD DEvised BY THE CONTRACTOR AND APPROVED BY THE ENGINEER THAT WILL ASSURE THE LONGITUDINAL ROADWAY STEEL FOR CTB TY 2&3 WILL BE POSITIONED  $\pm \frac{1}{2}$ -INCH AS DIMENSIONED WILL BE SATISFACTORY.

CONDUIT TO BE PROVIDED ONLY WHEN CALLED FOR ELSEWHERE IN THE PLANS. POSITION OF CONDUIT MAY BE ADJUSTED TO FACILITATE CONSTRUCTION SUBJECT TO APPROVAL OF THE ENGINEER.

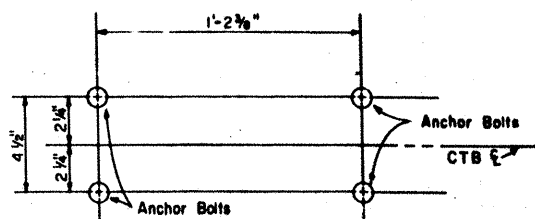
SEE SHEET CTB(4) FOR LIGHTING, ANCHOR BOLT, AND CONDUIT DETAILS. SEE CTB(3)-81 FOR DESIGN DETAILS OF BARRIER WITH ILLUMINATION.

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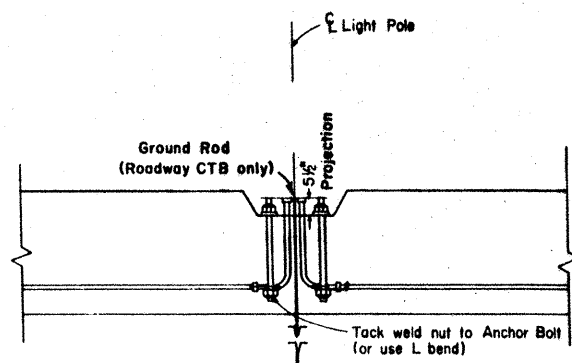
STATE DEPARTMENT OF HIGHWAYS  
AND PUBLIC TRANSPORTATION  
**CONCRETE TRAFFIC BARRIER**  
**TYPE 2 & 3**  
**ROADWAY CTB**  
**CAST-IN-PLACE**  
**CTB(2)-81**

REV	DATE	BY	CHKD	APP'D	REASON
1	10/1/83	W. J. H. /	W. J. H. /	W. J. H. /	ORIGINAL
2	10/1/83	W. J. H. /	W. J. H. /	W. J. H. /	REVISED
3	10/1/83	W. J. H. /	W. J. H. /	W. J. H. /	REVISED
4	10/1/83	W. J. H. /	W. J. H. /	W. J. H. /	REVISED
5	10/1/83	W. J. H. /	W. J. H. /	W. J. H. /	REVISED

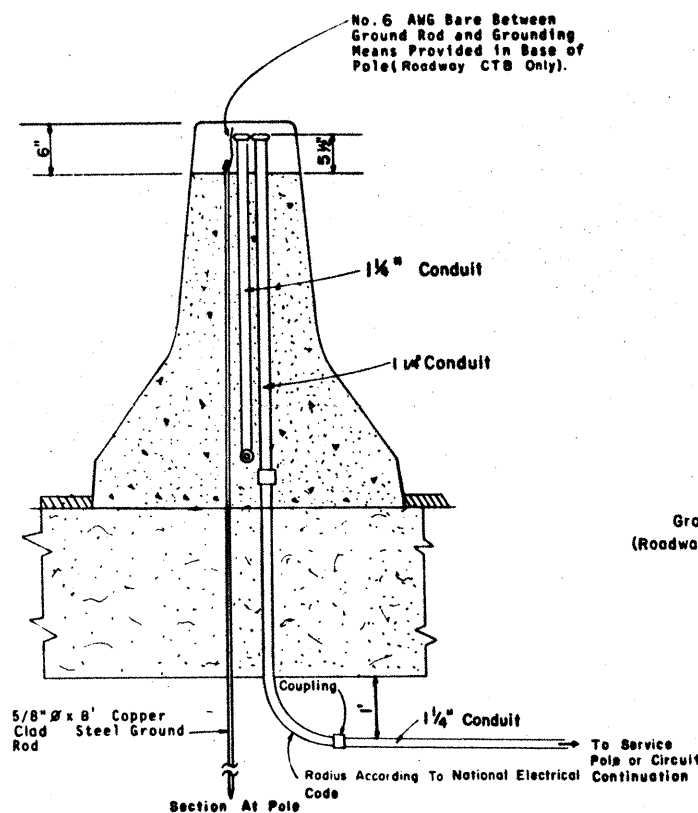
Rev 7-28-83  
Concrete for Barrier shall be Class A, C or H



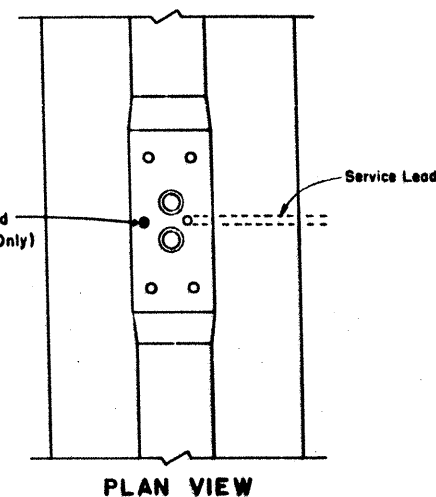
TOP VIEW (ALL CTB TYPES)  
ANCHOR BOLT PATTERN



DETAILS AT LIGHT POLE ON BRIDGES AND ROADWAY  
(CAST-IN-PLACE)

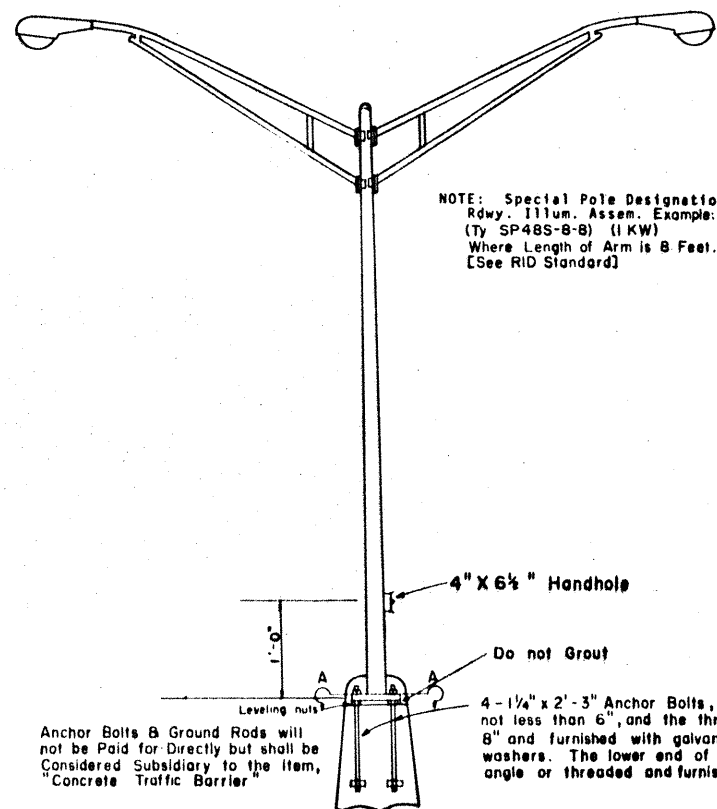


SERVICE LEAD AND GROUND  
DETAIL (ROADWAY CTB\*) \* CAST-IN-PLACE AND PRECAST

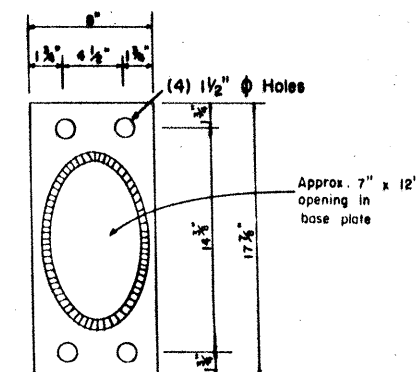


# GENERAL NOTES

1. POLES ON BRIDGE BARRIER SHALL BE GROUNDED USING A GROUND ROD NEAR THE WING WALL AND GROUNDING CONDUCTOR TO EACH POLE.
2. WHERE ROADWAY SECTIONS ARE PRECAST, LIGHT POLES SHALL BE PLACED ON CAST-IN-PLACE SECTIONS AS SHOWN ON SHEET CTB1(3).
3. STEEL REINFORCEMENT OF CTB NEAR LIGHT POLES IS SHOWN ELSEWHERE.



NOTE: Special Pole Designation  
Rdwy. Illum. Assem. Example:  
(Ty SP48S-8-8) (1 KW)  
Where Length of Arm is 8 Feet.  
[See RID Standard]



Section A-A

[Shape of pole may be Elliptical  
or Polygonal]

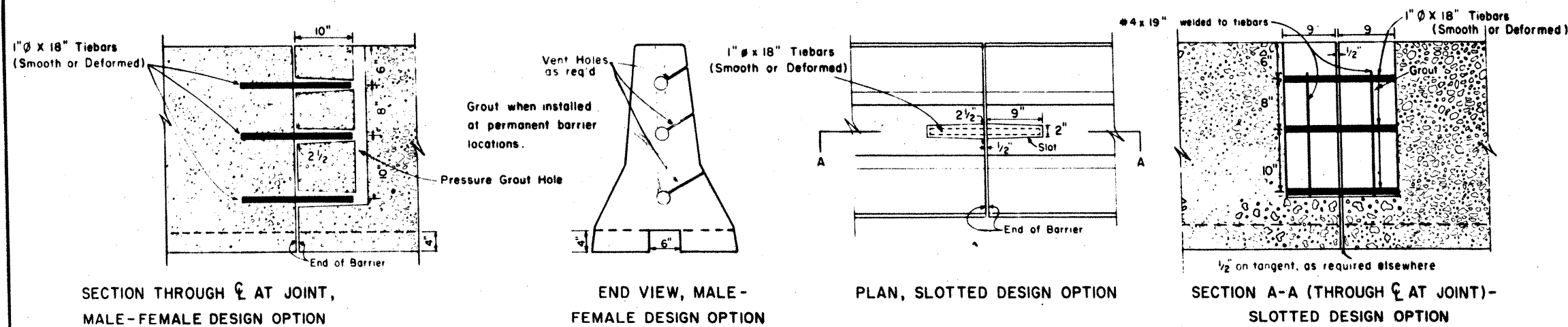
340



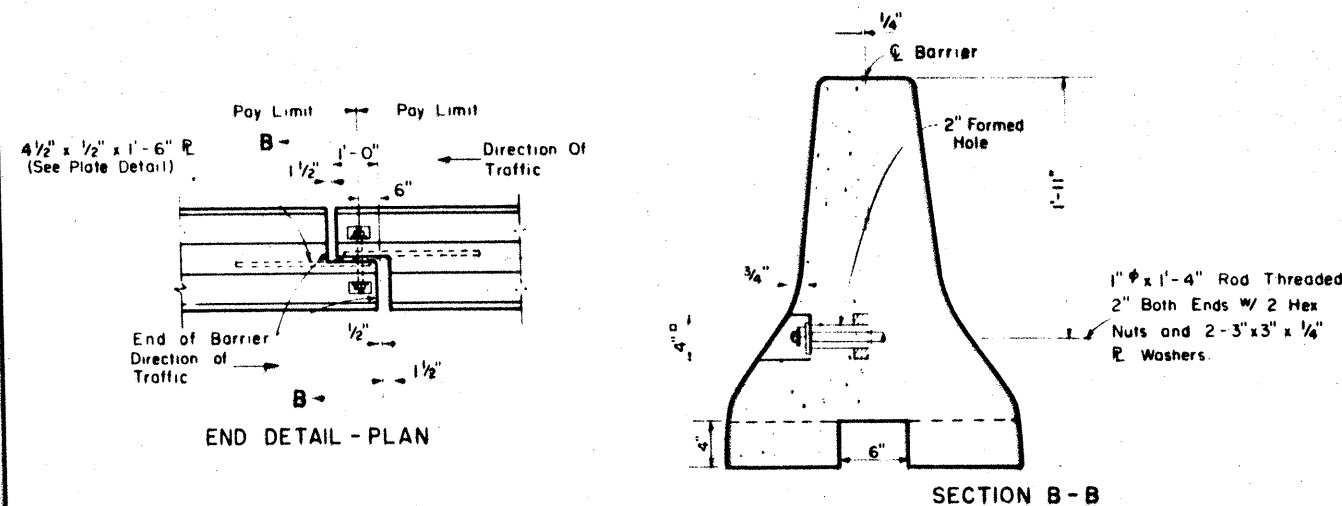
STATE DEPARTMENT OF HIGHWAYS  
AND PUBLIC TRANSPORTATION  
**CONCRETE  
TRAFFIC BARRIER**  
BRIDGE AND ROADWAY WITH ILLUMINATION,  
POLE, CONDUIT, AND ANCHOR BOLT DETAILS

CTB1(4)-88

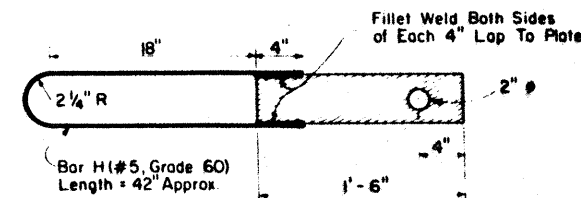
DW	DRAWING	DATE	PROJ NO	STATE	FEDERAL PROJECT NO	SHEET NO.
CH	DN	1941	15	TEXAS	JR 35-2 (157) 173	340
CH	DW	DATE	PROJ NO	STATE	FEDERAL PROJECT NO	SHEET NO.
CH	DN	1941	15	TEXAS	JR 35-2 (157) 173	340



### JOINT TYPE A

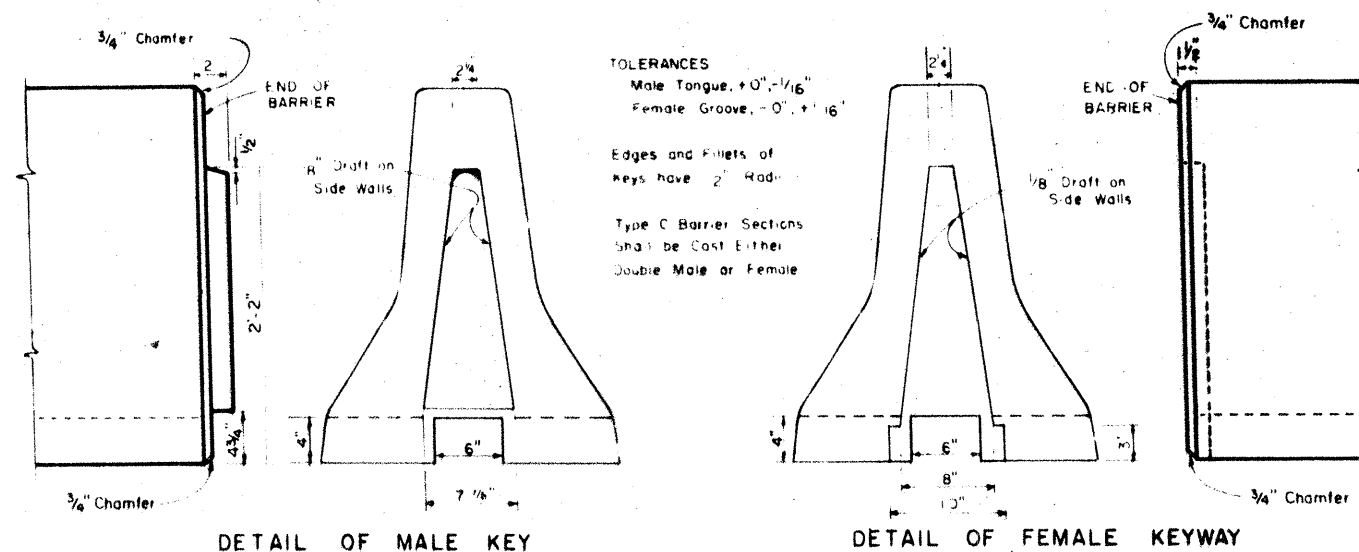


### JOINT TYPE B



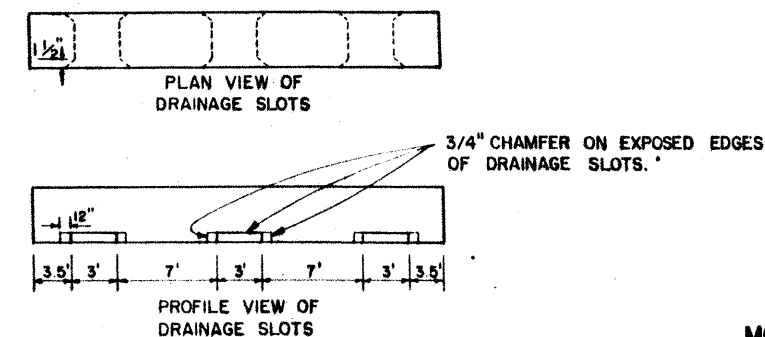
NOTE: Plates Conform to ASTM A36 Steel

PLATE DETAIL



### JOINT TYPE C\*

JOINT DETAILS



\* THE CONTRACTOR IS ADVISED THAT THE KEYWAY CONNECTION FOR PRECAST CONCRETE TRAFFIC BARRIER JOINT TYPE C IS PATENTED BY EASI-SET INDUSTRIES, MIDLAND, VIRGINIA, 22728. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO PROVIDE FOR USE OF THE CONNECTION BY AGREEMENT WITH THE PATENTEE AND SAVE HARMLESS THE STATE FROM ANY AND ALL CLAIMS FOR INFRINGEMENT IN ACCORDANCE WITH ARTICLE 7.3 OF ITEM 7, "LEGAL RELATIONS AND RESPONSIBILITIES TO THE PUBLIC."

### GENERAL NOTES

- WHERE ILLUMINATION IS TO BE PLACED ON CONCRETE TRAFFIC BARRIER, A 10' CAST-IN-PLACE SECTION SHALL BE PROVIDED AT EACH LIGHT POLE LOCATION AS SHOWN ON SHEET CTB(3). POLE, ANCHOR BOLT, AND OTHER ILLUMINATION DETAILS ARE SHOWN ON SHEET CTB(4).
- CONCRETE SHALL BE CLASS A, C OR H. CONCRETE SHALL RECEIVE AN ORDINARY SURFACE FINISH AS DESCRIBED IN THE ITEM "CONCRETE STRUCTURES."
- REGARDLESS OF THE METHOD OF HANDLING, BARRIER SECTION LIFTING POINTS SHALL BE 64 FEET FROM THE ENDS OF THE BARRIER. LIFTING DEVICES AND ATTACHMENTS TO BARRIER SECTIONS SHALL BE AS APPROVED BY THE ENGINEER.
- FOR JOINT TYPE A BARRIER THAT IS INSTALLED IN A TEMPORARY LOCATION, TIE BARS SHOULD BE PLACED IN THE SLOT WHEN THE SLOT DESIGN OPTION IS USED OR, FOR THE MALE-FEMALE DESIGN OPTION, THE MALE-FEMALE CONNECTIONS SHOULD BE MATED. NEITHER OF THE OPTIONAL JOINT TYPES SHOULD BE GROUTED FOR TEMPORARY LOCATIONS OF BARRIER.
- WHEN INSTALLED IN A PERMANENT ROADWAY LOCATION, END CONNECTIONS OF THE JOINT TYPE A BARRIER SHALL BE GROUTED WITH A MIXTURE OF TWO PART SAND AND ONE PART CEMENT WITH ENOUGH WATER TO MAKE THE MIXTURE PLASTIC. GROUTING SHALL BE DONE IN A MANNER THAT WILL ASSURE A SMOOTH SURFACE AT THE JOINT.
- SURFACE FINISHING AND GROUTING (WHERE REQUIRED) SHALL BE CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS INVOLVED.
- ALL STEEL FITTINGS FOR TYPE B BARRIER SHALL BE GALVANIZED AFTER FABRICATION.
- BARRIER LENGTH SHALL BE 30 FEET (+/- 4 INCHES) UNLESS SPECIFIED OTHERWISE ELSEWHERE IN THE PLANS.
- FORMS SHALL BE CONSTRUCTED OF STEEL. EDGES OF BARRIER SHALL BE ROUNDED OR CHAMFERED AS SHOWN ON SHEET PCTB(2).
- THE CONTRACTOR HAS THE OPTION OF PLACING PRECAST (JOINT TYPES A, B, OR C) OR CAST-IN-PLACE TYPE 2 CONCRETE TRAFFIC BARRIER AS SHOWN ON SHEET CTB(2)-81 UNLESS OTHERWISE SHOWN IN THE PLANS.
- WHEN SERVING TO CHANNELIZE TRAFFIC IN NIGHTTIME SITUATIONS, THE BARRIER SHOULD BE LIGHT IN COLOR AND SHALL BE SUPPLEMENTED BY THE USE OF STANDARD DELINEATION OR CHANNELIZATION MARKINGS OR DEVICES SUCH AS DELINEATORS OR VERTICAL PANELS.



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Robert A. Davis P.E. 7/26/89  
Robert G. Davis

MODIFIED TO ADD DRAINAGE SLOTS.



STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

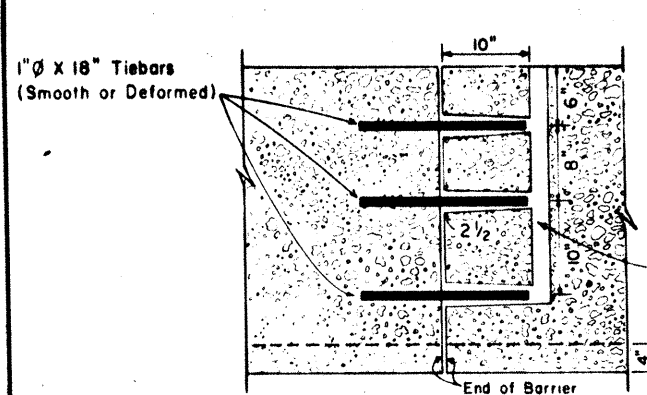
PRECAST CONCRETE TRAFFIC BARRIER TYPE 2

PCTB(1)-83 (MOD.)

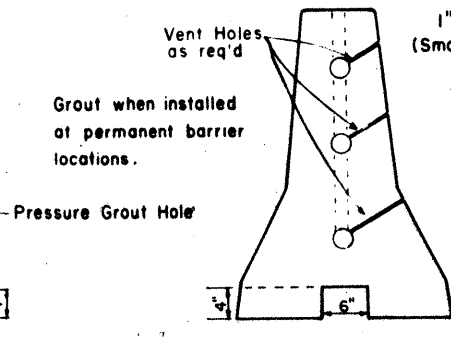
NO.	DATE	BY	STATE	FEDERAL PROJECT NO.	REVISION
1	7/26/89	RD	TEXAS	IR35-2(157) 175	341
2					
3					
4					
5					
6					
7					
8					
9					
10					

Rev. B-31-85  
Rev. 7-28-83  
Concrete for Barrier shall be Class A, C or H

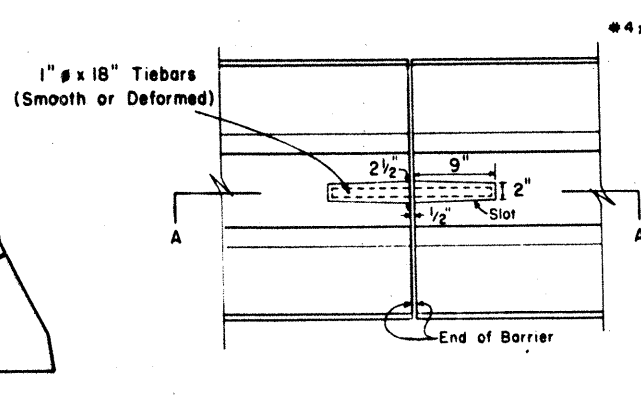




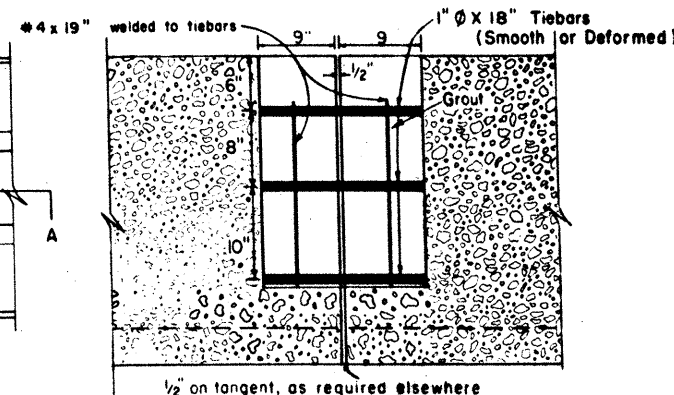
SECTION THROUGH C AT JOINT,  
MALE-FEMALE DESIGN OPTION



END VIEW, MALE-FEMALE  
DESIGN OPTION



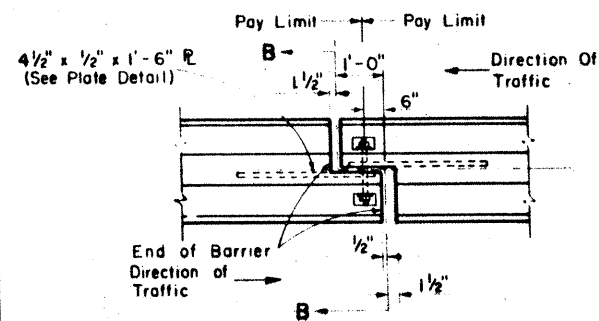
PLAN, SLOTTED DESIGN OPTION



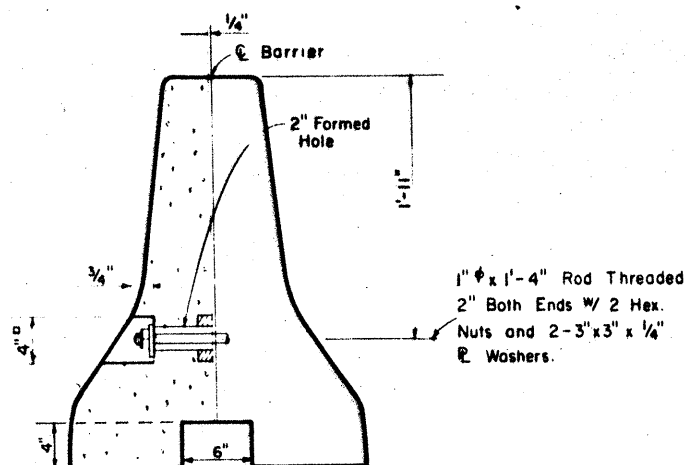
SECTION A-A (THROUGH C AT JOINT)-  
SLOTTED DESIGN OPTION

#### GENERAL NOTES

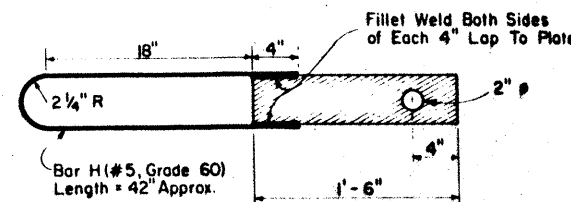
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- REGARDLESS OF THE METHOD OF HANDLING, BARRIER SECTION LIFTING POINTS SHALL BE 64 FEET FROM THE ENDS OF THE BARRIER. LIFTING DEVICES AND ATTACHMENTS TO BARRIER SECTIONS SHALL BE AS APPROVED BY THE ENGINEER.
- FOR JOINT TYPE A BARRIER THAT IS INSTALLED IN A TEMPORARY LOCATION, TIE BARS SHOULD BE PLACED IN THE SLOT WHEN THE SLOT DESIGN OPTION IS USED OR, FOR THE MALE-FEMALE DESIGN OPTION, THE MALE-FEMALE CONNECTIONS SHOULD BE MATED. NEITHER OF THE OPTIONAL JOINT TYPES SHOULD BE GROUTED FOR TEMPORARY LOCATIONS OF BARRIER.
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- SURFACE FINISHING AND GROUTING (WHERE REQUIRED) SHALL BE CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS INVOLVED.
- ALL STEEL FITTINGS FOR TYPE B BARRIER SHALL BE GALVANIZED AFTER FABRICATION.
- BARRIER LENGTH SHALL BE 30 FEET (+/- 4 INCHES) UNLESS SPECIFIED OTHERWISE ELSEWHERE IN THE PLANS.
- FORMS SHALL BE CONSTRUCTED OF STEEL. EDGES OF BARRIER SHALL BE ROUNDED OR CHAMFERED AS SHOWN ON SHEET PCTB(2).
- THE CONTRACTOR HAS THE OPTION OF PLACING PRECAST (JOINT TYPES A, B, OR C) OR CAST-IN-PLACE TYPE 2 CONCRETE TRAFFIC BARRIER AS SHOWN ON SHEET CTB(2)-81 UNLESS OTHERWISE SHOWN IN THE PLANS.
- WHEN SERVING TO CHANNELIZE TRAFFIC IN NIGHTTIME SITUATIONS, THE BARRIER SHOULD BE LIGHT IN COLOR AND SHALL BE SUPPLEMENTED BY THE USE OF STANDARD DELINEATION OR CHANNELIZATION MARKINGS OR DEVICES SUCH AS DELINEATORS OR VERTICAL PANELS.



END DETAIL - PLAN



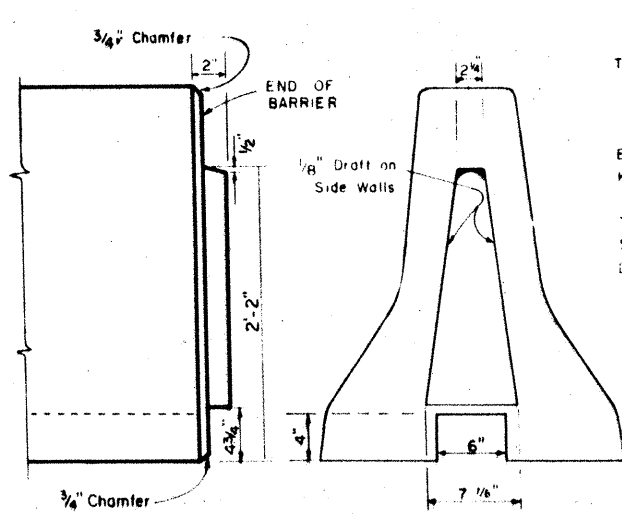
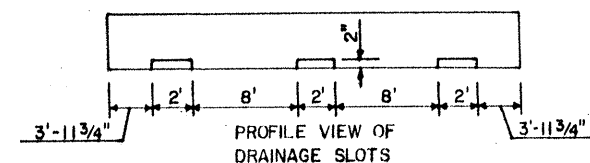
SECTION B-B



NOTE: Plates Conform to  
ASTM A36 Steel

PLATE DETAIL

#### JOINT TYPE B

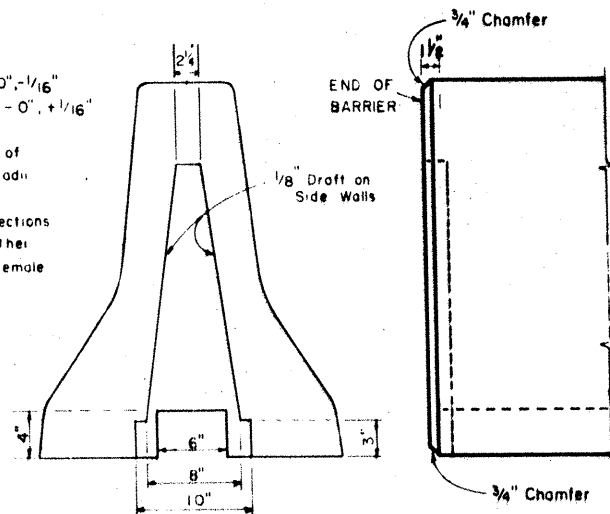


DETAIL OF MALE KEY

TOLERANCES:  
Male Tongue, +0", -1/16"  
Female Groove, -0", +1/16"

Edges and Fillets of  
Keys have 1/2" Radii

Type C Barrier Sections  
Shall be Cast Either  
Double Male or Female



DETAIL OF FEMALE KEYWAY

#### JOINT TYPE C\*

#### JOINT DETAILS

\* THE CONTRACTOR IS ADVISED THAT THE KEYWAY CONNECTION FOR PRECAST CONCRETE TRAFFIC BARRIER JOINT TYPE C IS PATENTED BY EAST-SET INDUSTRIES, MIDLAND, VIRGINIA, 22728. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO PROVIDE FOR USE OF THE CONNECTION BY AGREEMENT WITH THE PATENTEE AND SAVE HARMLESS THE STATE FROM ANY AND ALL CLAIMS FOR INFRINGEMENT IN ACCORDANCE WITH ARTICLE 7.3 OF ITEM 7, "LEGAL RELATIONS AND RESPONSIBILITIES TO THE PUBLIC."

34/A

#### FIELD CHANGE NO. 2



STATE DEPARTMENT OF HIGHWAYS  
AND PUBLIC TRANSPORTATION

PRECAST  
CONCRETE TRAFFIC BARRIER  
TYPE 2

PCTB(1) - 83 MOD

REV	DATE	DESCRIPTION	BY	CHKD	DATE	PROJECT NO.	SHEET NO.
1	10/15/83	ORIGINAL	W. H. H.	W. H. H.	10/15/83	IR 35-2 (187) 73	34/A
2	10/15/83	REVISED	W. H. H.	W. H. H.	10/15/83	IR 35-2 (187) 73	34/A
3	10/15/83	REVISED	W. H. H.	W. H. H.	10/15/83	IR 35-2 (187) 73	34/A

Rev 7-28-83  
Concrete for Barrier shall be Class A, C or H

Min. inside Bending Radius = Four Vertical Wire Diameters

Min. Four Vertical Wire Diameters

Conc. Traffic Barrier

Equally Spaced (Typ.)

0.5" min.  
1.5" max.

Vertical Welded Wires D or W 13.3, approx. length 65" Four at 12" C-C required at each end of precast conc. traffic barriers. \*

Longitudinal Wires 10D12.4 \*

Vertical steel member nearest end of barrier may be welded wire or tied bar.

4" max. 12" 12" 12"

2" min.

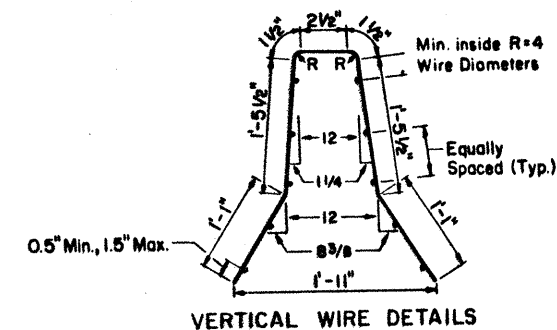
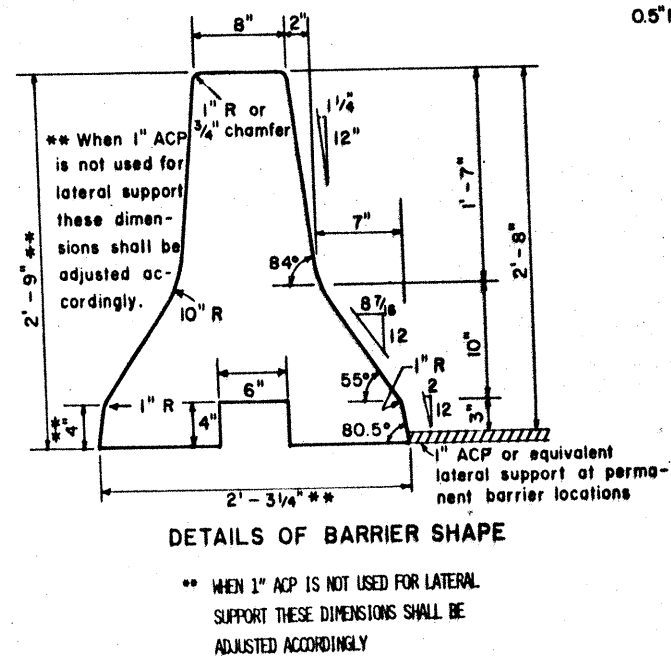
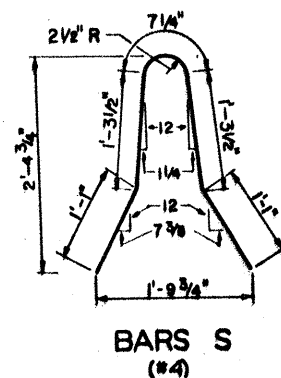
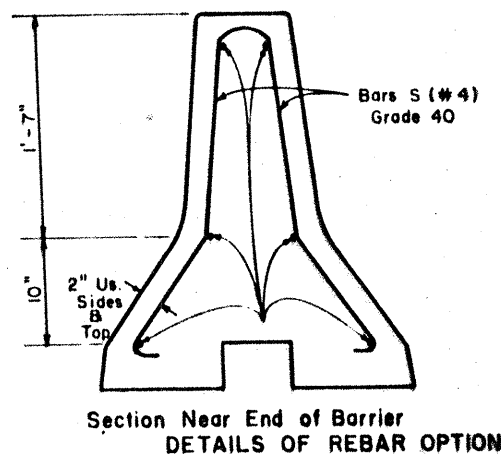
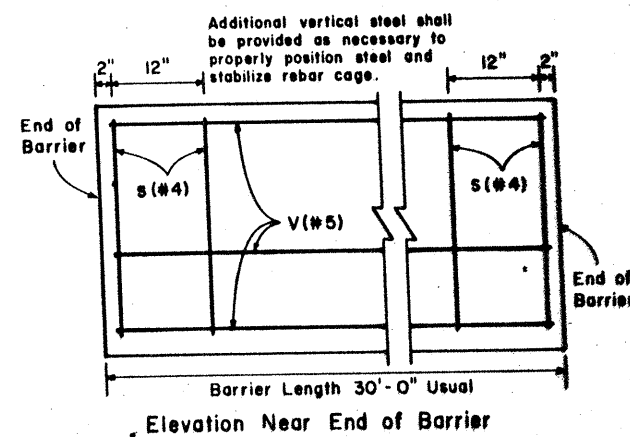
\* Note: Detail shown is for D12.4 longitudinal wires and D or W 13.3 vertical wires. Other size and spacing combinations meeting the tabulated conditions may be used.

Sufficient welded wire or auxiliary tied bar shall be placed vertically at locations as necessary to provide for cage stability. Minimally one additional vertical steel reinforcement shall be provided at each end of the barrier.

End View

Sufficient welded wire or auxiliary tied bar shall be placed vertically at locations as necessary to provide for cage stability. Minimally one additional vertical steel reinforcement shall be located at the midpoint (21') of the barrier length.

DESCRIPTION	LONGITUDINAL WIRES	VERTICAL WIRES
1. WIRE TYPE	DEFORMED	SMOOTH OR DEFORMED
2. MINIMUM (CUMULATIVE TOTAL) WIRE AREA	1.24 SQ. IN.	0.133 SQ. IN. PER FT. (REQ'D ONLY IN END 3'-4" OF PRECAST SECTIONS)
3. NO. OF WIRES MINIMUM MAXIMUM	6 14	4 @ 12" CC EA. PRECAST END 12 @ 4" CC EA. PRECAST END
4. BENDING RADIUS	N/A	MINIMUM RADIUS = TWO VERTICAL WIRE DIAMETERS
5. WIRE PLACEMENT A. TOP WIRES	NOT LESS THAN 4 NOR MORE THAN 5 VERTICAL WIRE DIAMETERS FROM THE UPPER BENDS IN THE VERTICAL WIRES	N/A
B. BOTTOM WIRES	4" PLUS OR MINUS 1/2" FROM BOTTOM OF BAR- RIER	N/A
C. OTHER WIRES	UNIFORMLY AND SYMME- TRICALLY SPACED ALONG FACES OF BARRIER	MINIMUM SPACING 4" MAXIMUM SPACING 12"
6. MAXIMUM WIRE SIZE DIFFERENTIAL	THE SMALLER WIRE SHALL HAVE AN AREA OF 40% OR MORE OF THE LARGER WIRE.	




1. WHERE USED, REBAR REINFORCEMENT SHALL CONFORM TO ASTM A-615 (GRADE 40).
2. BARRIER LENGTH SHALL BE 30 FEET (+/- 4 INCHES) UNLESS OTHERWISE SPECIFIED IN THE PLANS.

341B

FIELD CHANGE NO. 2

# APPROXIMATE P.L.F. QUANTITIES		
CONCRETE	CY.	0.112
REBAR	LB.	6.62
WELDED WIRE FABRIC	LB.	4.82

# FOR CONTRACTOR'S INFORMATION ONLY  
WEIGHT OF ONE 30' UNIT = APPROXIMATELY 7 TONS

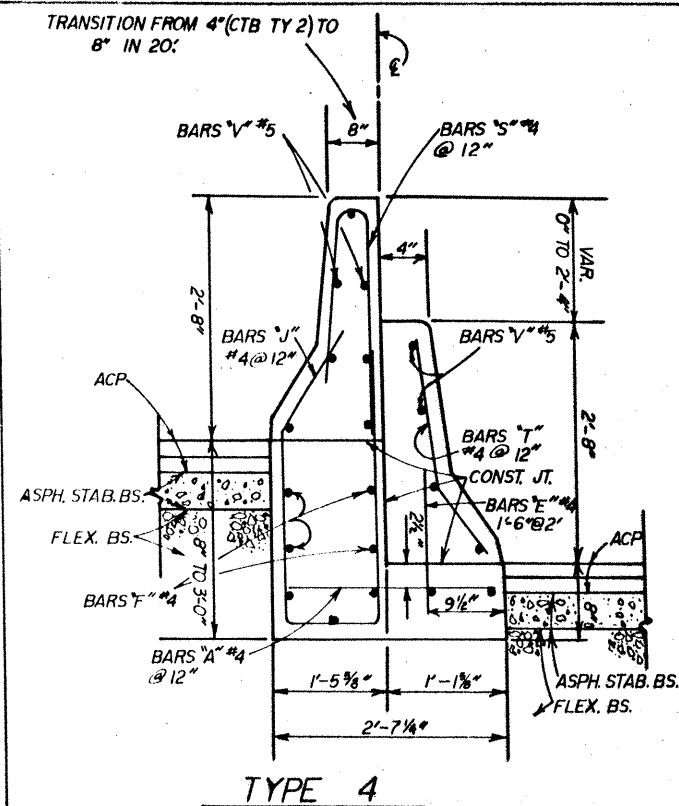


STATE DEPARTMENT OF HIGHWAYS  
AND PUBLIC TRANSPORTATION

**PRECAST  
CONCRETE TRAFFIC BARRIER  
TYPE 2**

**PCTB (2)-85**

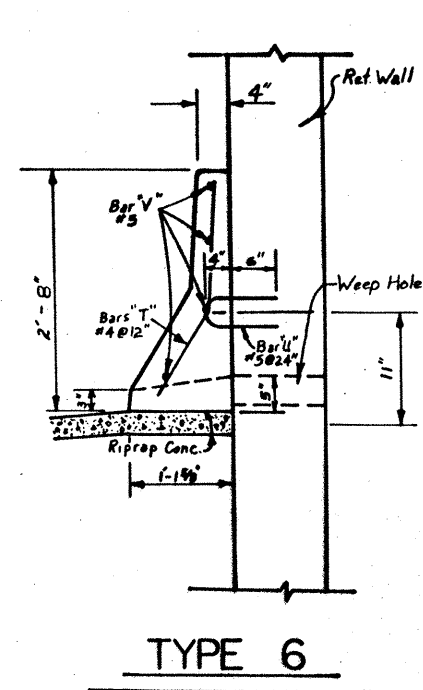
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CR DN	ORIGINAL		DIS NO	TEXAS	IR 35-24157-173	3418
DW	REVISED		8	COUNTY		THURSDAY
CR DW	REVISED		DATE		CONTRACT	NO
FR			15	GUADALUPE, ETC	2016 06 029	TH 35



### GENERAL NOTES

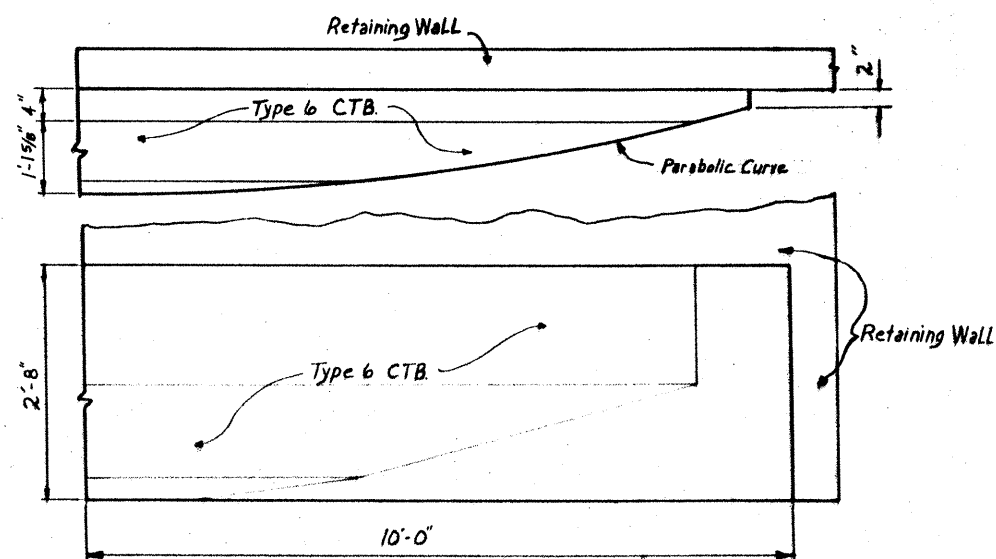
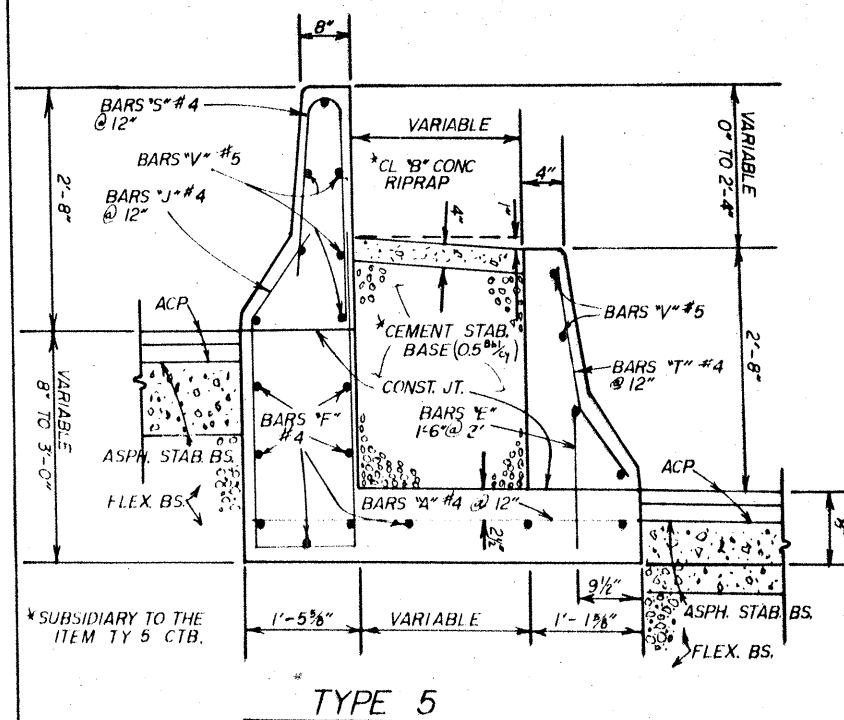
FOR OTHER DETAILS AND  
INFORMATION SEE CTB  
STANDARD SHEETS.

*In areas requiring the attachment of illumination poles to CTB Ty 4 or Ty 5, the pole shall be attached to the high side. Details for CTB modifications shall be done as per CTB(3)-85 & CTB(4)-88. Bar "S" shall be adjusted accordingly and take the place of Bar "Y<sub>1</sub>" in CTB(3)-85.*



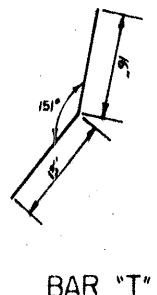
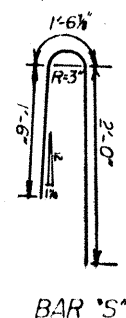
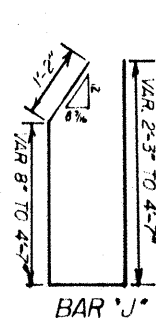
At Retaining Wall striated surface areas, the face of the wall must be sealed with a grout along the top of the CTB as directed by the Engineer. Payment for this is considered subsidiary to the particular retaining wall item.

Bar 4 may be drilled and grouted into retaining wall or it may be pre-cast into retaining wall as directed by the Engineer.



Begin Trans of CTB Ty. 6 At Retaining Walls.

Note: Payment Will Be made As Per Item CTB Ty.6.



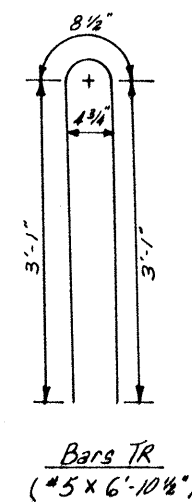
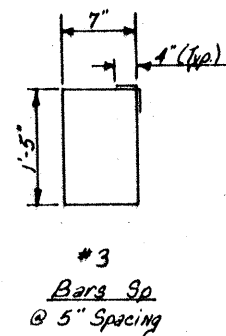
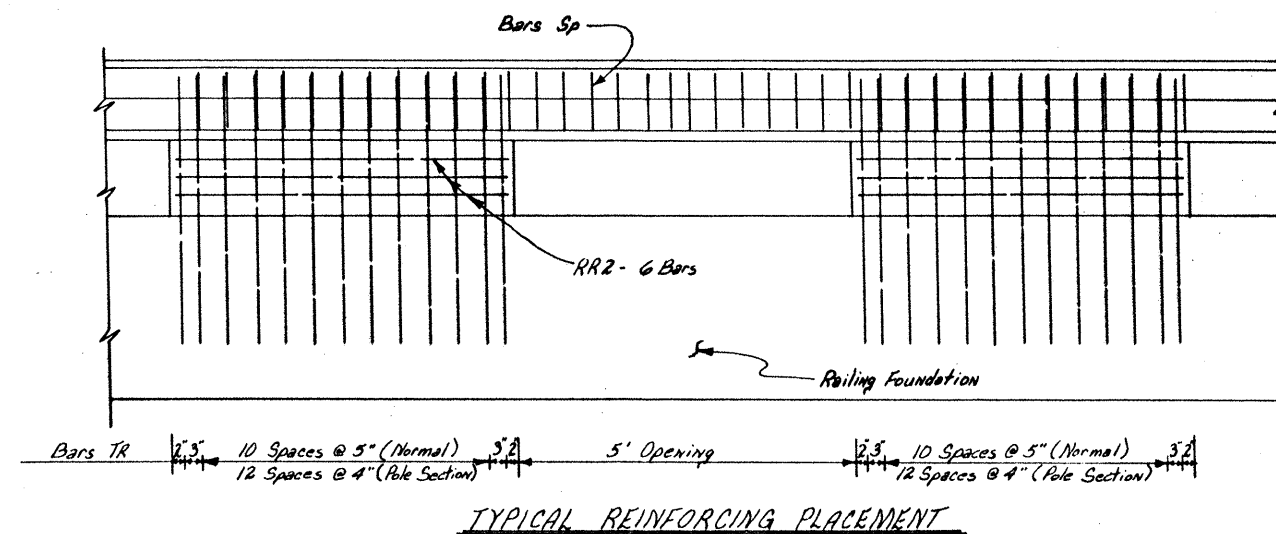
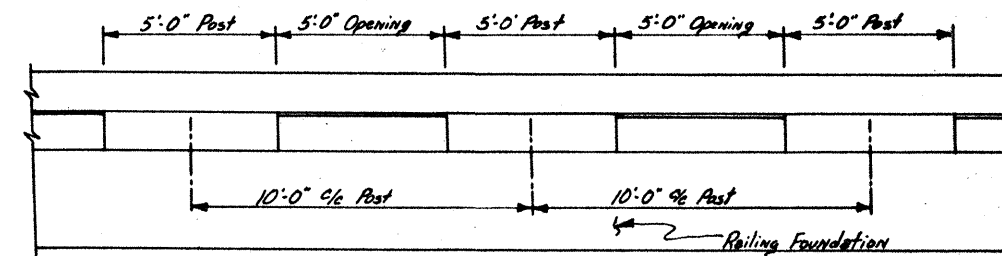
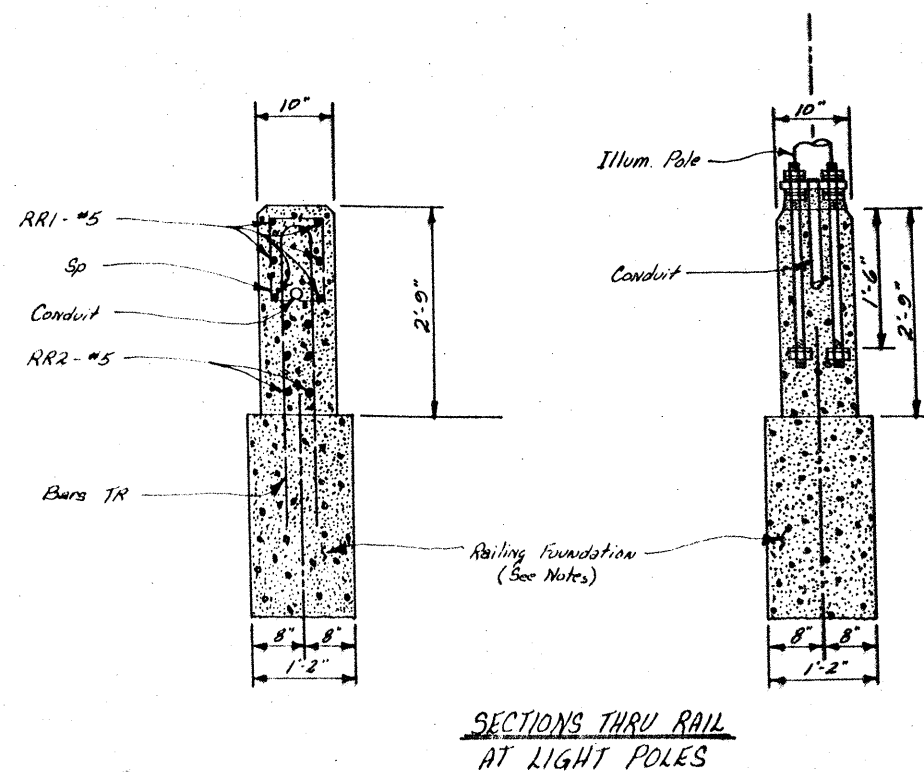
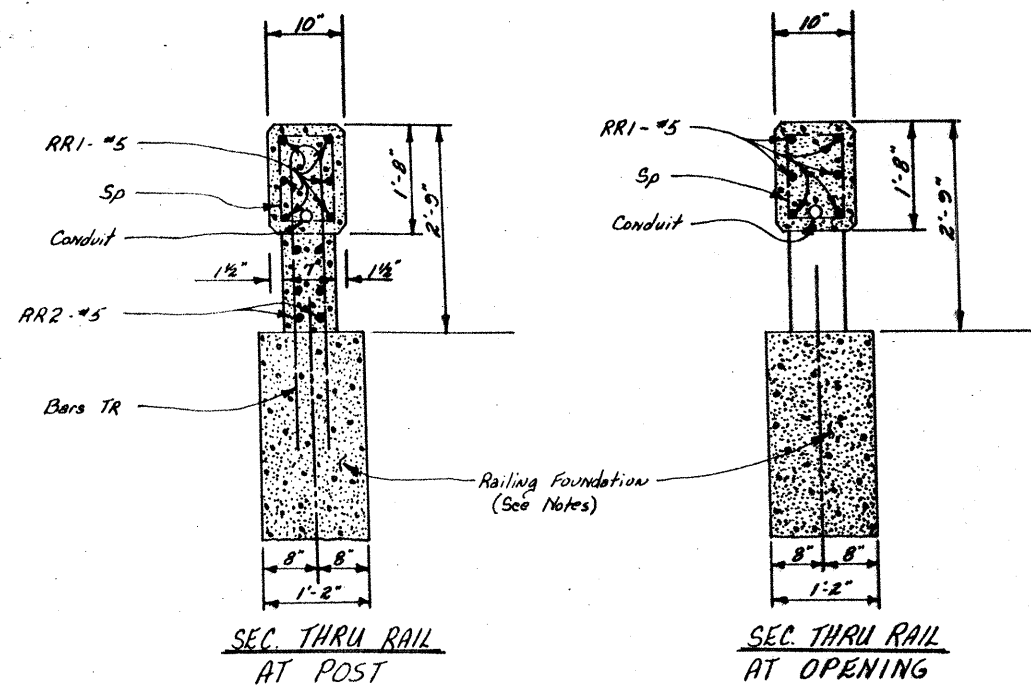
CTB DETAILS

342

Bellis L. Zant 7/26/89  
Juddie L. Zant Date



FED NO DIV NO 6	STATE TEXAS	FEDERAL PROJECT NO IR 35-2 (157) 173	SHEET NO 342
STATE DIST NO 15	COUNTY Guadalupe Etc	COST 16	SHEET NO 6
		16	6



**GENERAL NOTES:**  
 All Concrete Shall Be Class C. Chamfer all Exposed Corners.  
 Dimensions Relating To Reinforcing Steel Are To Centers Of Bars.  
 All Reinforcing Steel Shall Be Grade 60.  
 Railing Shall Be As Shown in Placement Detail. Openings Shall Have End Faces Perpendicular To Adjacent Roadway Grade.  
 Shop Drawings Will Not Be Required for this Rail.  
 Field Bend Standard Horizontal Bars To Clear Anchor Bolts at Light Pole.  
 Where The Light Pole Section is Used, Spacing of The TR Bars Will Change From 5" to 4" Spacing as Shown On "Typical Reinforcing Placement".  
 For Railing Foundation Dimensions and Reinforcing Steel Placement, See Standard "TRF".  
 Railing Foundations Shall Be Centered On The Railing as Shown at Left.  
 For Contractors Information Only, 0.074 CY Estimated Add'l Conc. C/C Required Per Light Installation.  
 A smooth transition length of 20', as directed by the Engineer, shall be required from the CTB to CTB SPECIAL.

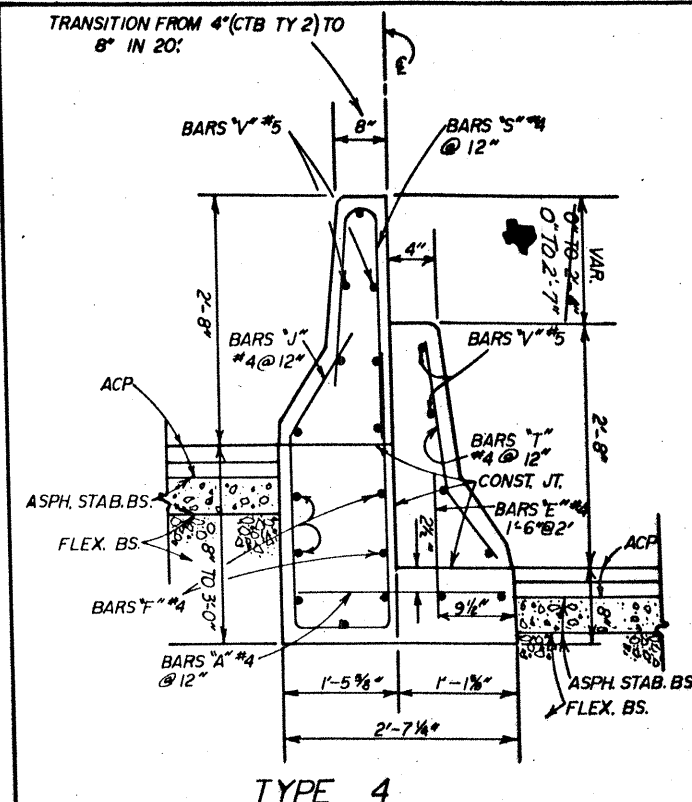
Rolls 2.26.11. 2/1/89  
 Date



**CTB DETAILS**  
 (CTB SPECIAL)

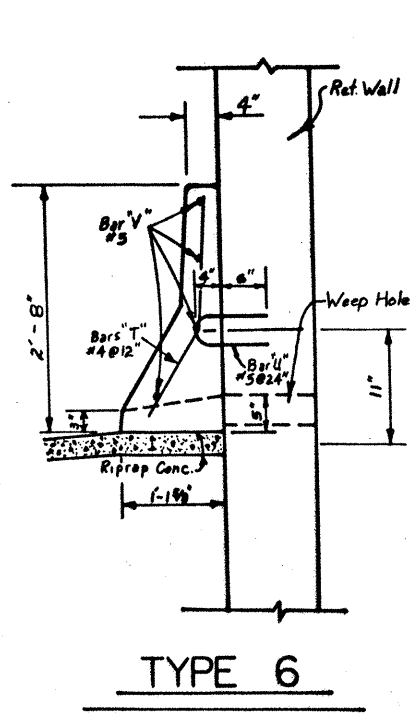
FED. RD. DIST. NO.	STATE	FEDERAL PROJECT NO.	SHEET NO.
15	TEXAS	IR 35-2(157) 173	342 A
COUNTY	CONTRACT NO.	DATE	BY
Guadalupe, etc.	16	6	29/8





**GENERAL NOTES**  
 FOR OTHER DETAILS AND INFORMATION SEE CTB STANDARD SHEETS.

In areas requiring the attachment of illumination poles to CTB Ty 4 or Ty 5, the pole shall be attached to the high side. Details for CTB modifications shall be done as per CTB(3)85 & CTB(4)88. Bar "S" shall be adjusted accordingly and take the place of Bar "Y" in CTB(3)85.



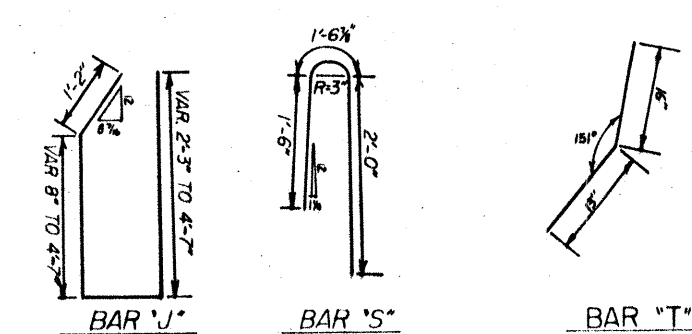
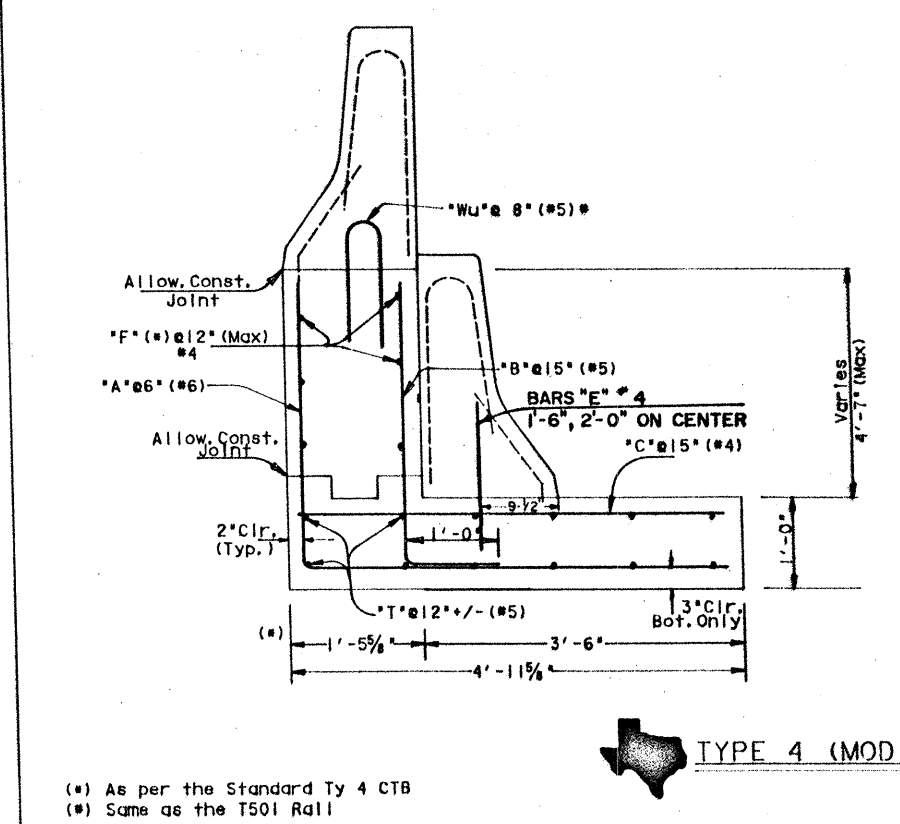
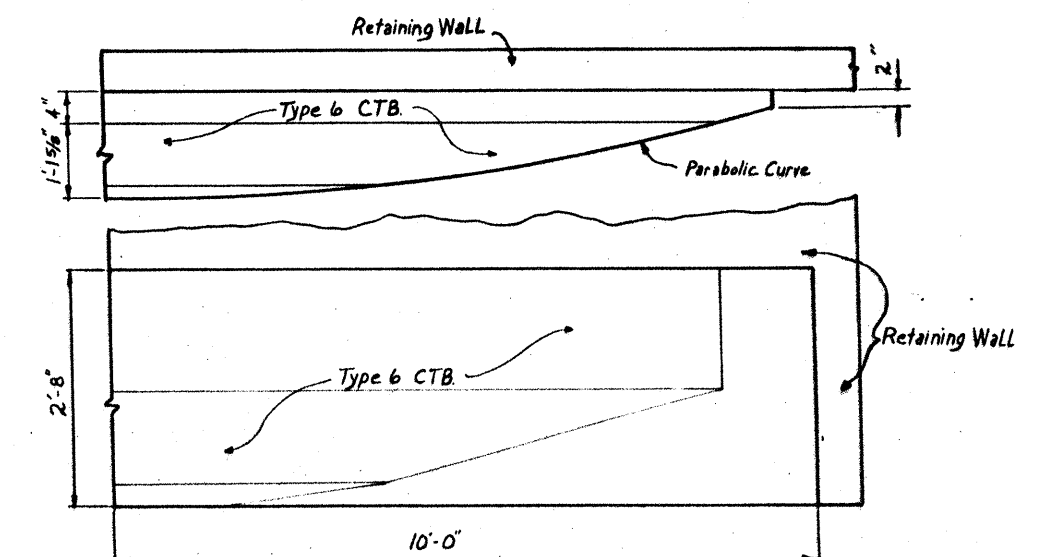
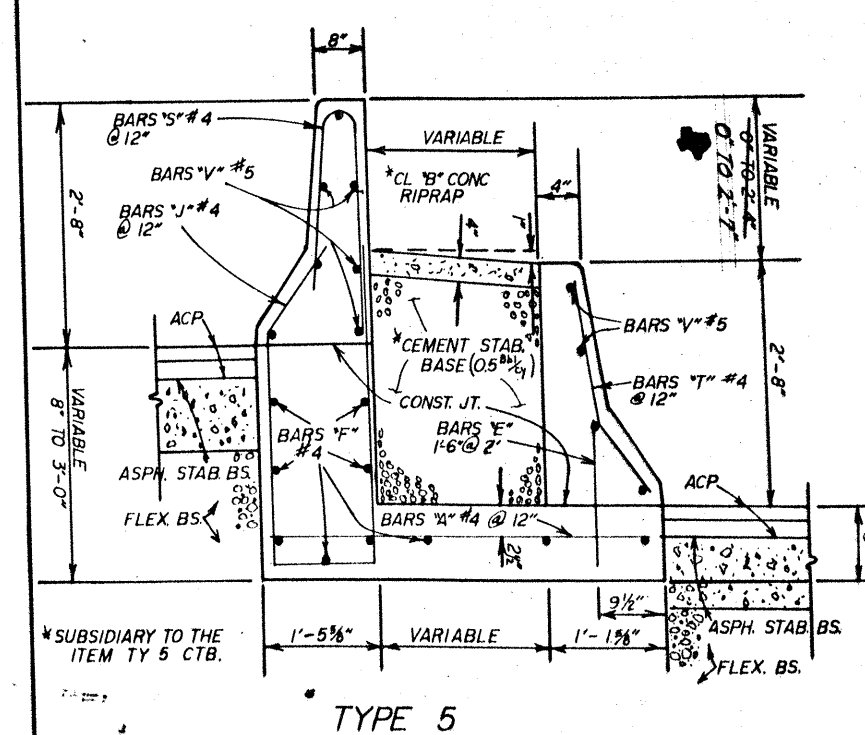
At Retaining Wall striated surface areas, the face of the wall must be sealed with a grout along the top of the CTB as directed by the Engineer. Payment for this is considered subsidiary to the particular retaining wall item.

Bar U may be drilled and grouted into retaining wall or it may be pre-cast into retaining wall as directed by the Engineer.

Seal of the State of Texas  
 DAVID C. KOPP  
 63747  
 REGISTERED PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by David C. Kopp, P.E. 63747, on 8/6/1991.

D.C. Kopp, P.E.



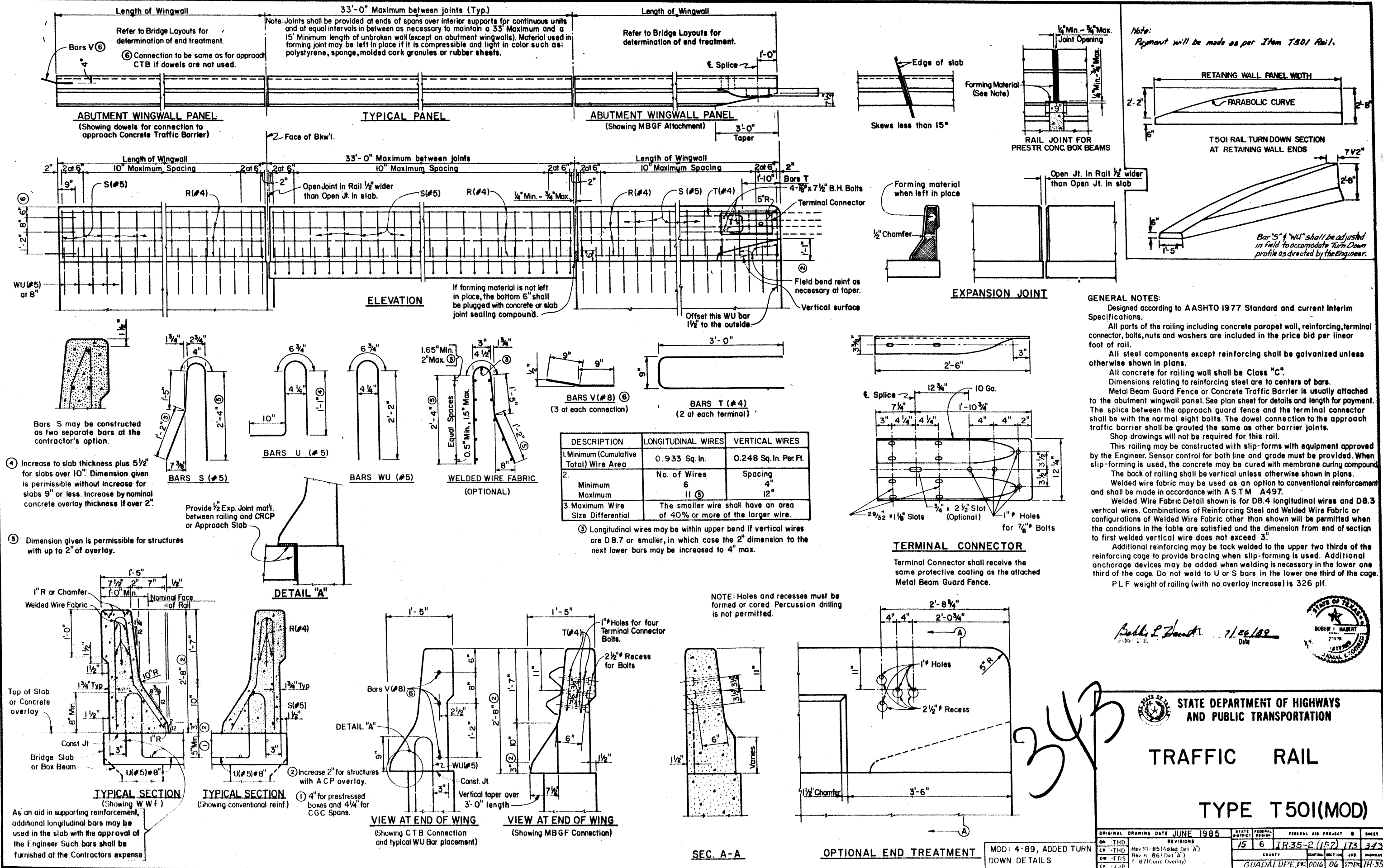
Begin Trans of CTB Ty 6 At Retaining Walls.  
 Note: Payment Will Be Made As Per Item CTB Ty 6.

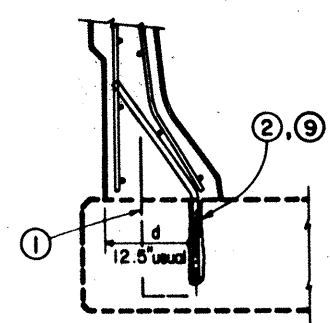
CTB DETAILS

FIELD CHANGE NO. 33

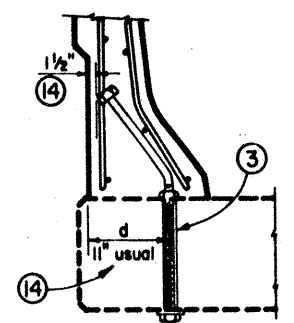
342B

PROJECT NO.	STATE	FEDERAL PROJECT NO.	SHEET NO.
15	TEXAS	IR 35-2 (157) 173	342B
DIST NO.	COUNTY	CONTRACT NO.	PROJECT NO.
15	Guadalupe	16	6 2954 IH35

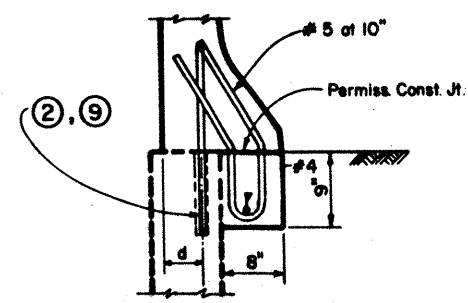
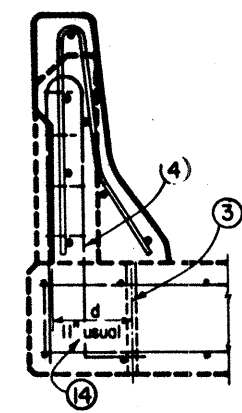




SLABS OVER 12" THICK



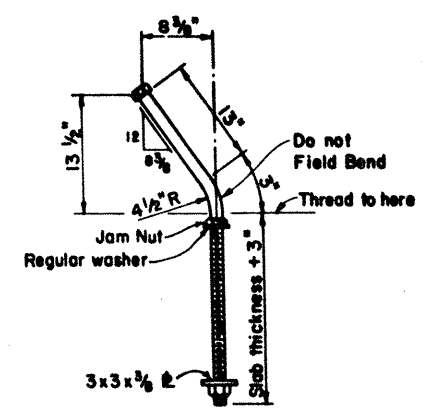
SLABS OVER 6 1/2" THICK



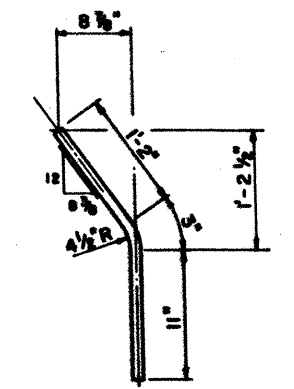
**TABLE S**

d Inches	Maximum Spacing (Inches)	
	Dowels (2) No. 6 Gr. 60	Anchor Bolts (3) & (4) 1" A193 B7
5	8.2	25.6
7	11.8	36.9
10	17.4	54.0
12	21.1	65.3

Other spacings may be interpolated

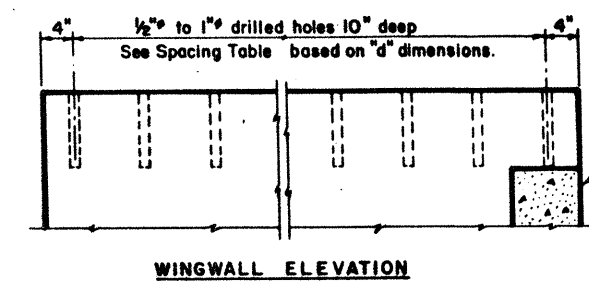
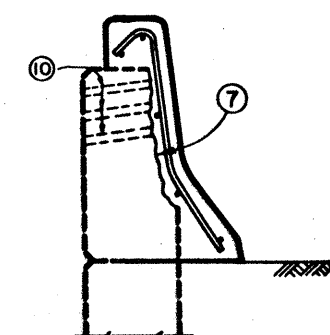
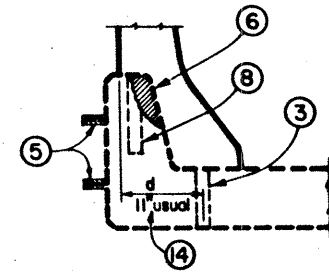
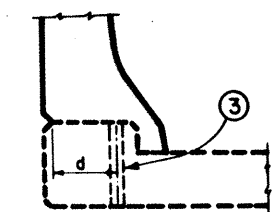
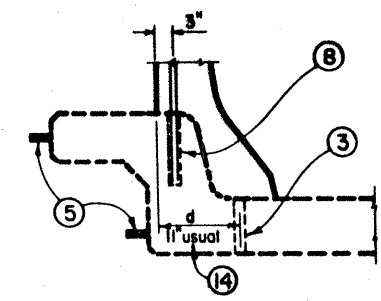


1" ANCHOR BOLT (3)  
(A193 B7)

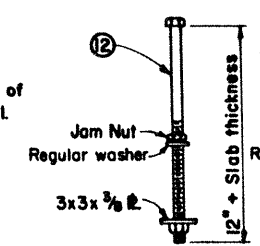


NO. 6 DOWEL (2)  
(Gr. 60)

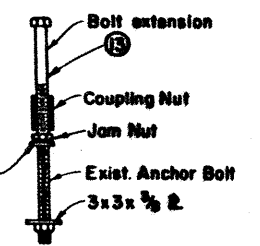
Use straight dowel at wingwall or turn in line with wingwall.



WINGWALL ELEVATION



3/8" ANCHOR BOLT (12, 13)  
(A321, A325 or A193 B7)



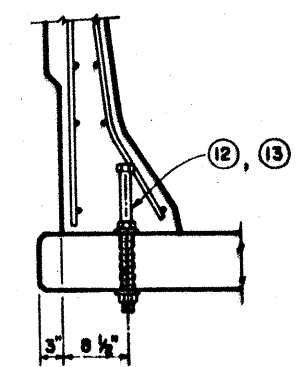
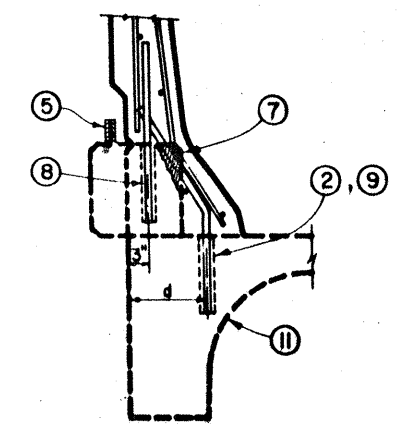
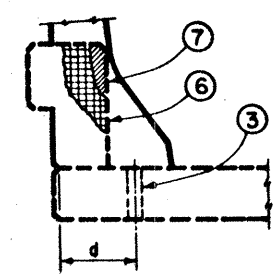
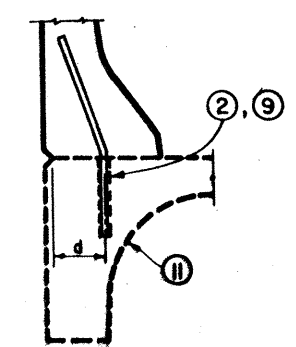
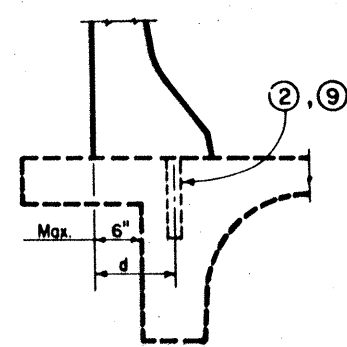
**GENERAL NOTES:**

Designed in accordance with AASHTO 1977 Standard and Interim Specifications. Pullout tests have been performed on the epoxied No. 6 dowel anchorage system which have demonstrated that over 60 ksi can be developed in the dowel. See Traffic Rail Type T501R standard for details not shown herein.

Not all possible combinations of existing railing, curbs, parapets, etc. have been shown on this sheet. Other combinations and reinforcement arrangements are permissible if they meet the same strength requirements as indicated on this sheet.

Additional reinforcing may be tack welded to the upper two thirds of the reinforcing cage to provide bracing when slip forming is used. Additional dowels or anchorages may be added when welding is necessary in the lower one third of the cage. Do not weld to the anchor bolts or required dowels.

**TYPICAL WINGWALL T501R RETROFIT DETAILS**



Existing T 1 Rail only.

**TYPICAL T501R RETROFIT DETAILS**

- On the bridge deck, remove existing rail posts, leaving at least 12 inches of the four No. 5 front face reinforcing bars intact which must be incorporated into the new rail. The existing four post bars may be considered to be equivalent to 1.5 of the No. 6 dowels.
- No. 6 dowels are to be epoxy grouted into the existing bridge slab as shown at a spacing not to exceed that given in Table S.  
  
The holes for the dowels shall be 10 inches deep which are 0.875 to 1.0 inch in diameter. The holes shall be clean and dry. Compressed air, if used to clean the holes, shall have no oil in suspension. The holes may be drilled with impact, rotary, or percussion type drilling equipment.  
  
The dowels shall be set into the holes with epoxy binder which conforms to the requirements of SDHPT Epoxy type VIII (formerly B-102). They shall not be disturbed for a minimum of 72 hours in which the air temperature is more than 40 degrees Fahrenheit. Temperatures below 40 degrees shall not be considered as part of the epoxy curing time.
- Drill 1.125 to 1.25 inch diameter holes through the existing bridge deck at a spacing not to exceed that given in Table S.  
  
The holes through the bridge deck must be drilled with rotary or coring type equipment. Percussion or impact drilling shall not be used. Spoils in the bottom of the slab exceeding 0.5 inch from the edge of the holes shall be patched.  
  
The bolts, nuts, and bottom plate washers shall be galvanized. Bolts and nuts shall have Class 2A and 2B fit tolerances. The nuts shall be topped after galvanizing.
- On the bridge deck, remove existing rail posts, leaving at least 12 inches of the four No. 5 front face reinforcing bars intact, which must be incorporated into the new rail. The existing four post bars may be considered to be equivalent to 0.35 anchor bolts.
- Remove existing rail, cut and grind anchor bolts flush, and paint ends with two coats of zinc dust-zinc rich oxide paint as described under Item 450.
- Notch the existing curb at the bolt locations to provide 0.5 in. minimum clearance behind the bolts.
- Break back upper face of existing parapet to provide 0.5 inch minimum clearance behind the S and R bars.
- No. 6 dowels must be epoxy grouted into the existing curb or parapet as shown at a spacing not to exceed 5 feet, using the same procedures as described for note (2).
- An approved resin type binder in capsules may be used for the No. 6 dowels in lieu of the epoxy binder. Depth of holes and installation shall be in accordance with manufacturer's recommendations such that the full pullout strength of the dowel may be obtained.
- Drill holes through existing wingwall for terminal anchorage bolts.
- Patch if spall occurs while drilling.
- Remove old Anchor Bolts and replace with 7/8" Bolts in the two existing interior holes. Also add one of these bolts at the midpoint between old posts. Drill holes 1" in diameter for the additional bolt using procedure described for Note (3). Secure bolts with a Jam Nut and washer. Galvanize Nut, washers and lower 12" of bolt (Min.). Existing bottom plates may be used at old post locations in place of the 3x3x 3/8" plates.
- At existing posts, two interior bolts may optionally be left in place with an additional length of bolt joined by a rod coupling nut. Rod Coupling Nut shall be grade 5 or better with a proof load capacity at least equivalent to A325 Nuts. Do not galvanize. Class 2B thread fit tolerance. The two exterior bolts may be used for the bolt extensions. In either case, the length of bolt and head protruding from slab shall be approximately 1 1/2" to insure adequate development length and cover over the bolt head. Bolts may be slightly field bent to maintain cover.
- If d dimension is less than the usual 11 inches, use reduced spacing as given in Table S and turn bolt as required to maintain 1 1/2" cover to back of rail.

This sheet is intended to be used as a guide for retrofitting existing structures with the T501 type of railing. Details with appropriate notes taken from this guide should be prepared for the specific application.

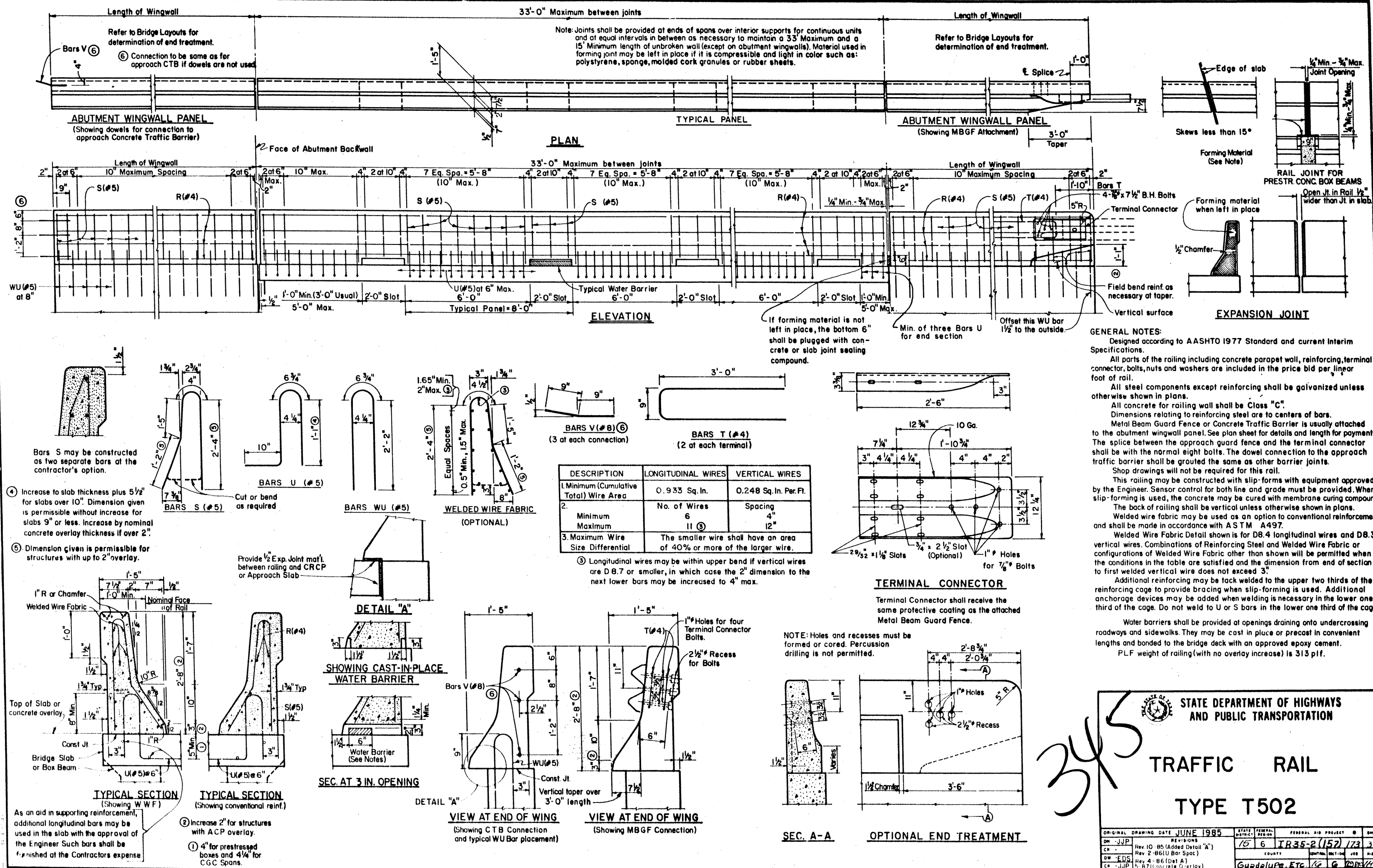
344

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

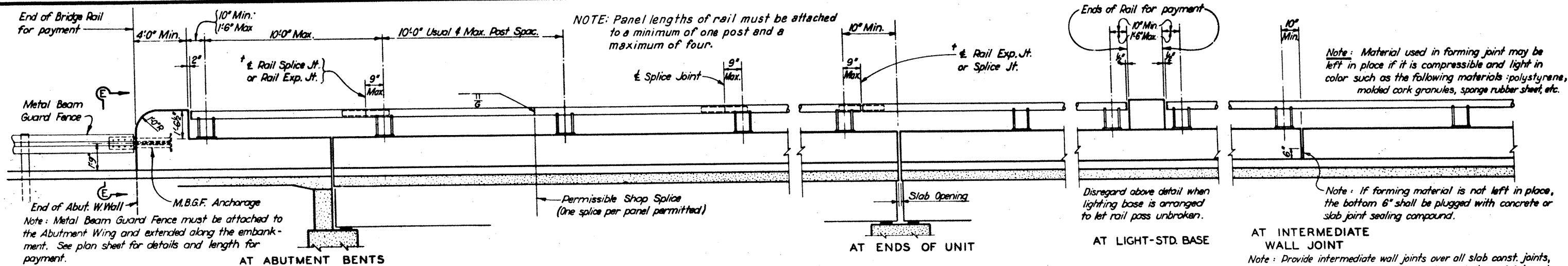
**RETROFIT TRAFFIC RAIL DETAILS**

T 501 R

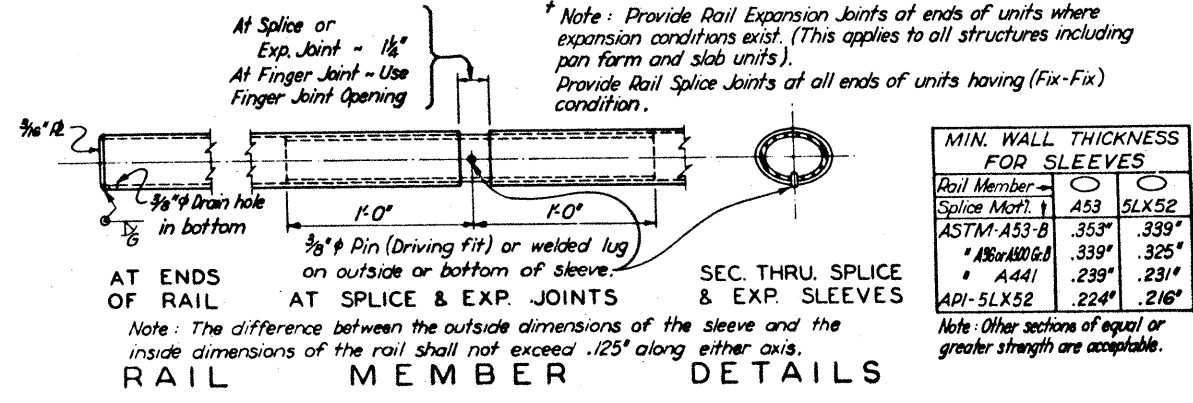
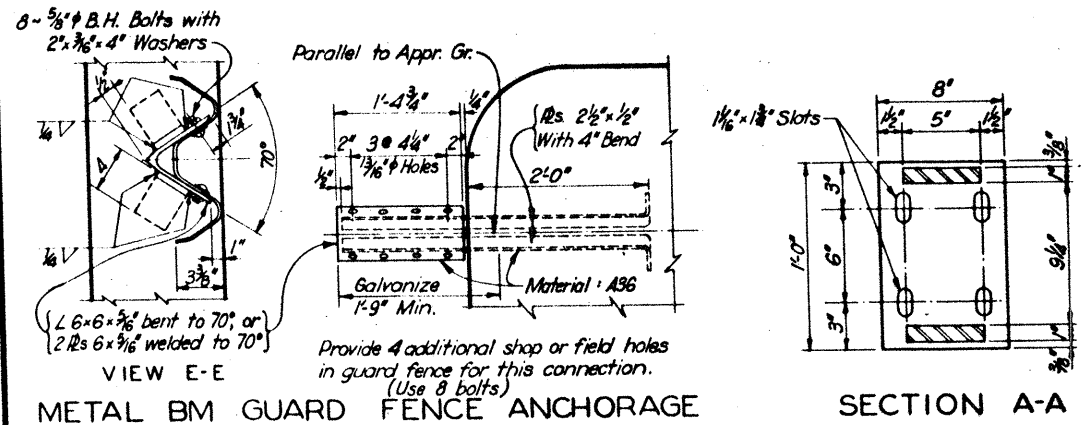
ORIGINAL DRAWING DATE	JUNE 1985	STATE	DESIGN	FEDERAL AID PROJECT	0	SHEET
BY	JNP	REVISIONS	15	6	TR35-2 (152) 173	344
CH						
DATE	EDS					
CH						







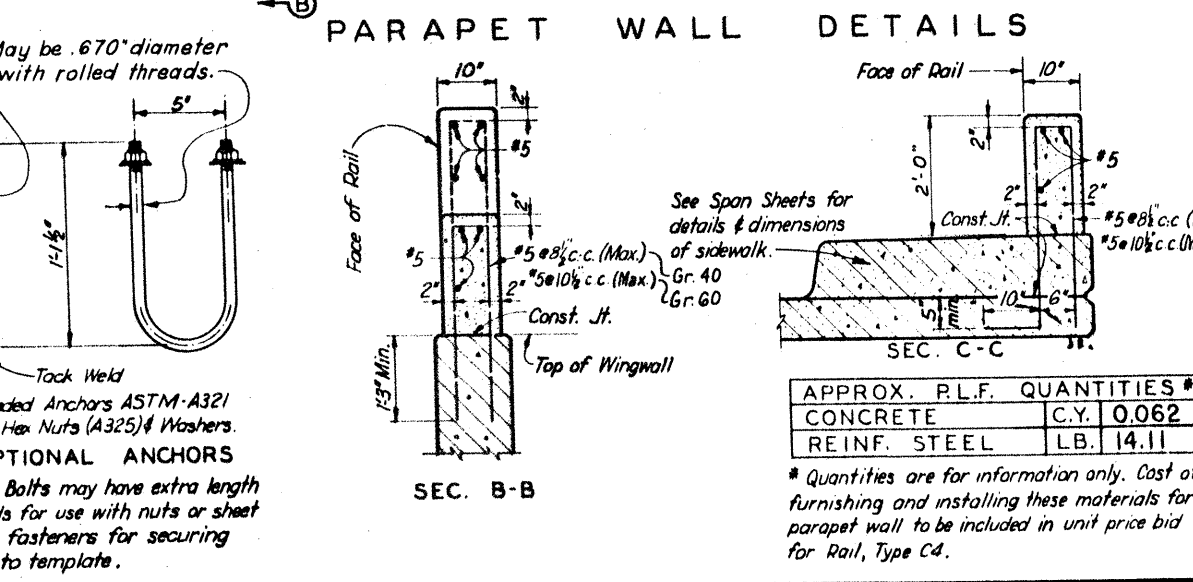
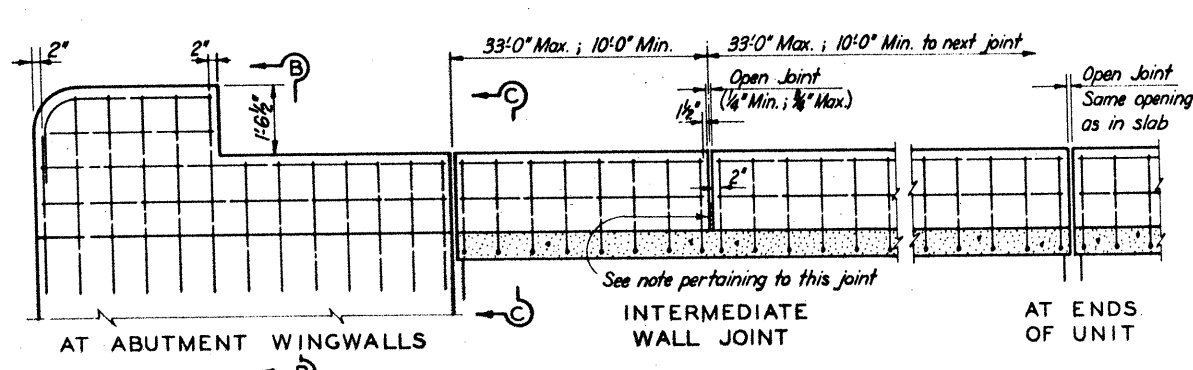
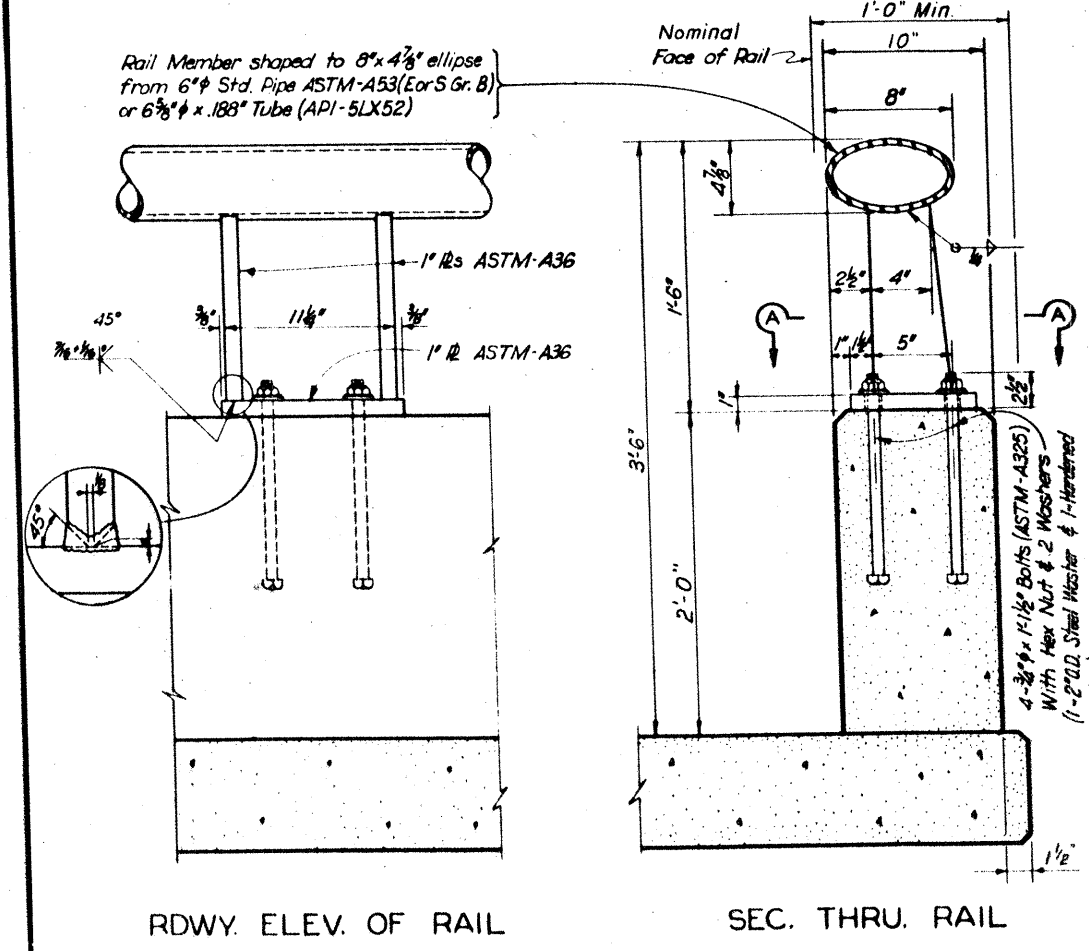
# ROADWAY ELEVATION OF RAIL



RAILS ON HORIZONTAL CURVES		
Rad. to face of rail	Max. Chord Lgth.	Fabrication
Over 1910'	20'-0"	Furnish in straight rail panels
Over 950' - 1910'	10'-0"	Bevel weld or bend chord sections of rail member & sleeves or fabricate to the reqd. rad.
Over 300' - 950'	10'-0"	Fabricate to the required radius
Thru. 300'	0	

Shop drawings will not be required.

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GENERAL NOTES:

Designed according to A.A.S.H.T.O. 1977 Standard and current Interim Specifications.

All open ends of rail shall be capped.

The face of concrete railing shall be vertical unless otherwise shown in plans. Rail posts shall be perpendicular to top of concrete. Grout may be used under base plates if necessary.

Nuts shall conform to A563 requirements and shall be tapped after galvanizing. Bolts and nuts shall have Class 2A and 2B fit tolerances.

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

For railing not requiring shop drawings, erection drawings showing panel lengths, rail post spacing and anchor bolt setting shall be submitted to the Resident Engineer for approval. If railing requires shop and erection drawings, these drawings shall be submitted to the Bridge Engineer for approval.

Shop drawings may be submitted as 11"x18" prints provided they are clearly legible.

Unit bid price for Rail Type C4 includes:

Concrete Parapet Wall and Wing Terminal Wall, Metal Railing, Posts, Connectors, Anchor Bolts and M.B.G.F. Anchorage.

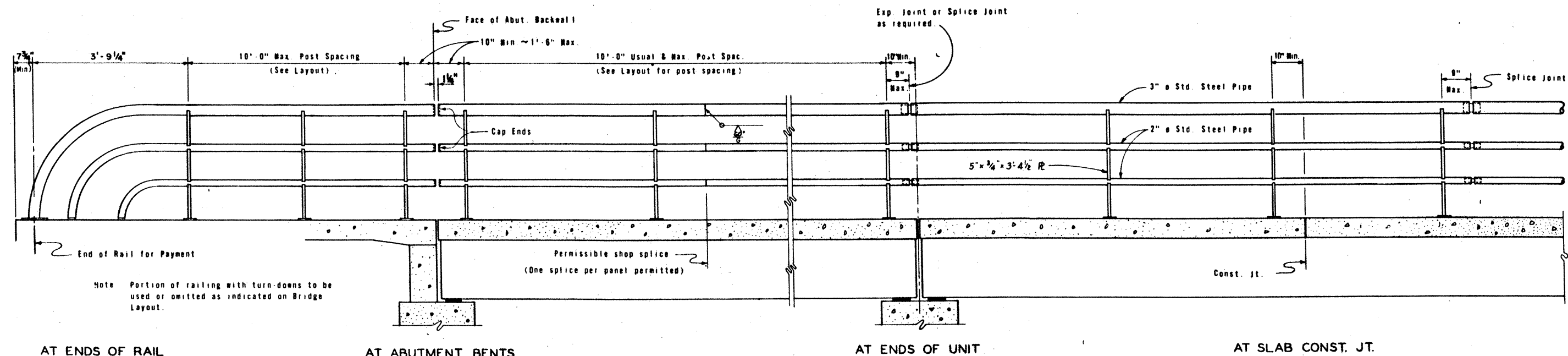
Concrete for parapet wall shall be Class C. Chamfer all exposed corners 3/4" unless otherwise shown.

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

COMBINATION RAIL TYPE C4 (MOD.)

(STEEL)

ORIGINAL DRAWING DATE	DEC 1980	STATE	FEDERAL AID PROJECT	SHEET
DR - JJP	REVISIONS	15	6	IR 35-2 (157) 123 346
CR - RLR	Rev 4 - B4 (Gen Notes)			
DR - RNS	Rev 9 - B4 (Sidewalk) Eliminated Aluminum option			
CR - JJP		GUADALUPE	ET-0016	06 79 PM 1H-35



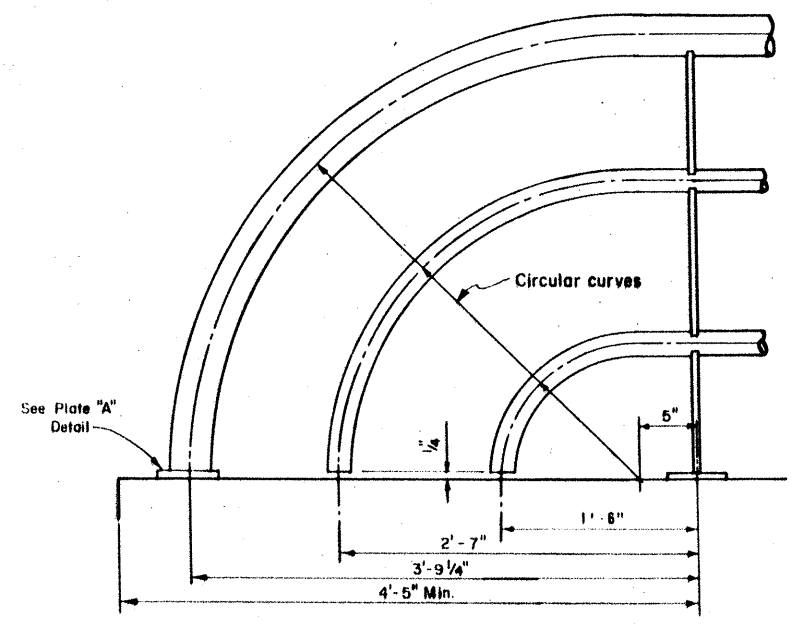
AT ENDS OF RAIL

AT ABUTMENT BENTS

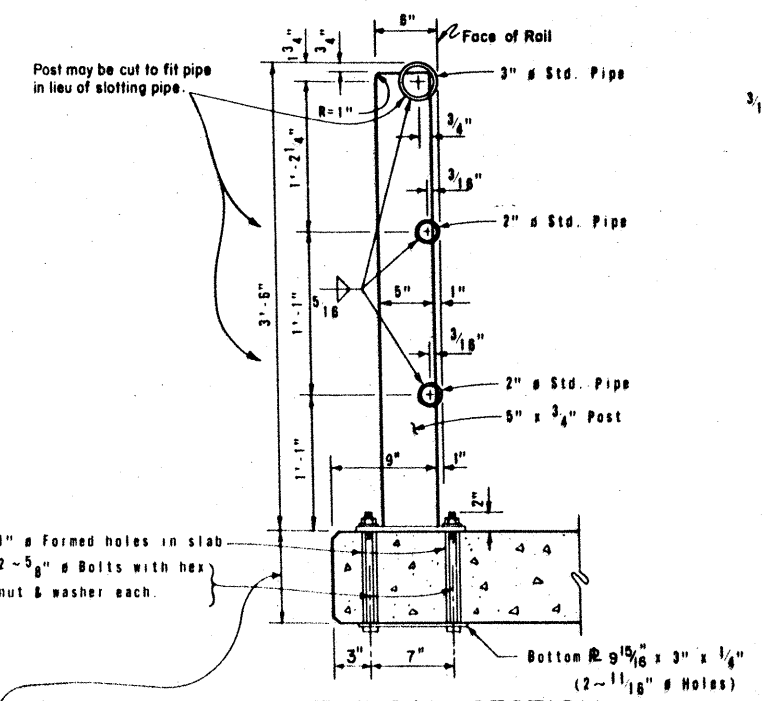
AT ENDS OF UNIT

AT SLAB CONST. JT.

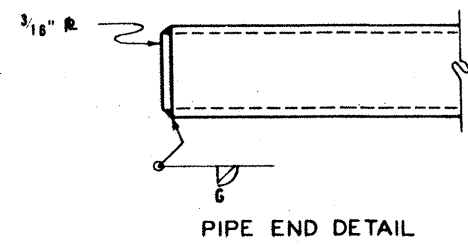
### ROADWAY ELEVATION OF RAIL



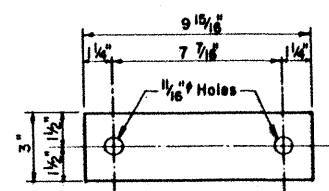
DETAIL OF RAIL ENDS



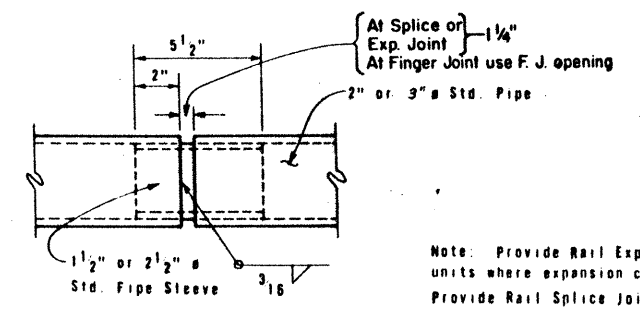
TYPICAL SECTION



PIPE END DETAIL



DETAIL OF BOTTOM PLATE



SPLICE JT. & EXP. JT.

Note: Provide Rail Expansion Joints at ends of units where expansion conditions exist. Provide Rail Splice Joints at all ends of units having (Fix-Fix) condition.

**GENERAL NOTES:**  
 Designed according to AASHTO 1977 Standard and current Interim Specifications. Pipe for railing shall be Std. Pipe (ASTM A-53) (E or S Grade A or B). Anchor bolts, nuts, washers and bottom plates to be included in unit price bid for railing.  
 Panel lengths of railing shall be attached to a minimum of three posts except at abutment wingwalls.  
 All steel components to be galvanized unless otherwise shown in plans. Anchor bolts and nuts to be ASTM A307.  
 The face of railing shall be vertical. Rail posts shall be perpendicular to adjacent roadway grade. Grout may be used under base plates if necessary.  
 Shop drawings to be submitted to the Bridge Engineer for approval will be required only for rails on horizontal curves in which case the rail members shall be fabricated to the required radius for radii of 600' or less. For rails not requiring shop drawings, erection drawings showing panel lengths, splice locations, rail post spacing and anchor bolt setting shall be submitted to the Resident Engineer for approval. Shop drawings may be submitted as 11" X 18" prints provided they are clearly legible.  
 Exposed edges of handrail and handrail posts shall be rounded or chamfered to approximately 1/8" by grinding.

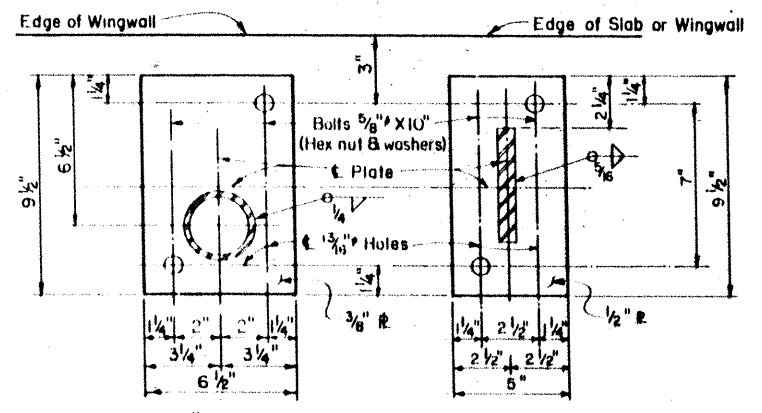
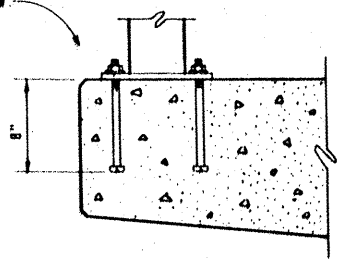


PLATE "A" DETAIL

BASE PLATE DETAIL

Where overhang thickness is greater than 8" or when underside is sloping, use anchorage shown below.



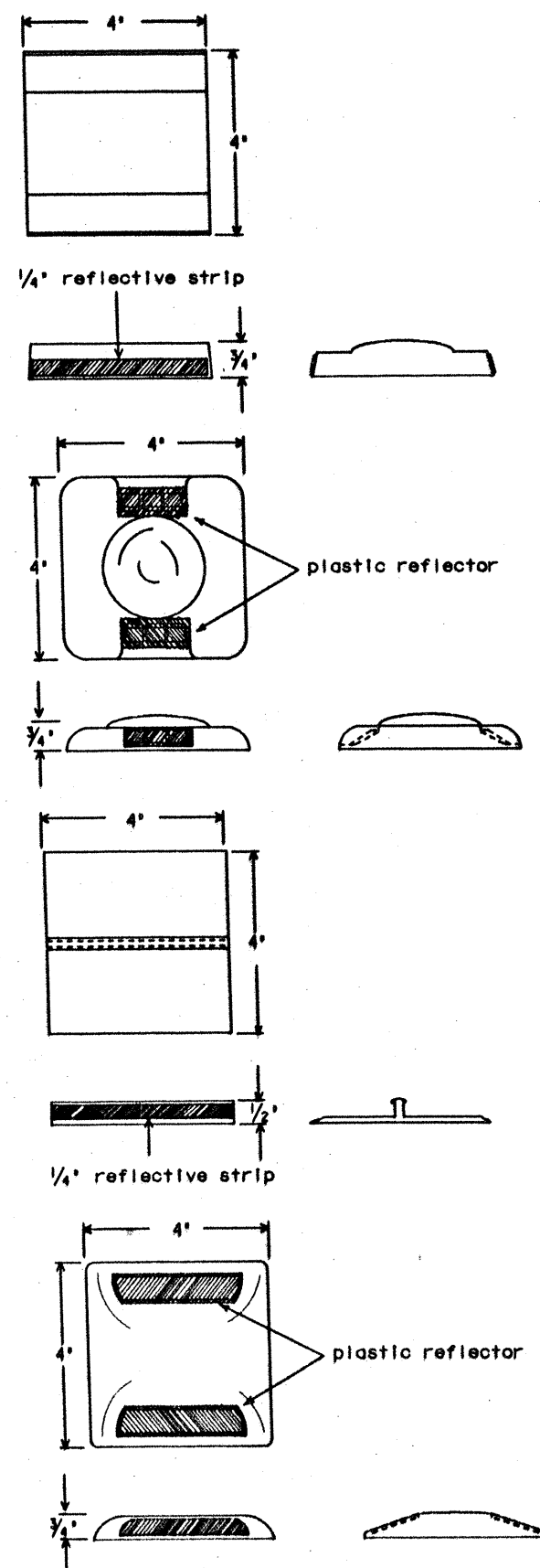
SPECIAL BOLT ANCHORAGE DETAIL

347

		STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION	
		PEDESTRIAN RAILING	
TYPE PR		(STEEL)	
ORIGINAL DRAWING DATE	DEC. 1980	STATE	FEDERAL AID PROJECT
REVISIONS		15	6
CR - F.H.S.	Rev. 2-84 (Gen. Rules)	IR 35-2 (157) 73 347	
DW - J.M.K.	Rev. 2-85	COUNTY	GUADALUPE
CR - D.H.	Rev. 6-85	SECTION	0016
		JOB	06
		DATE	11-35

# WORK ZONE PAVEMENT MARKINGS

## Raised Markers



## NOTES FOR WORK ZONE PAVEMENT MARKINGS

### GENERAL

- 1) Dimensions indicated on this sheet are typical and approximate. Variations in size and height may occur between markers or devices made by manufacturers, by as much as 1/4 inch, unless otherwise noted.
- 2) This sheet is to be used in conjunction with Standard Sheet TCP(5-2).
- 3) Raised markers and temporary flexible-reflective roadway marker tabs will require normal maintenance replacement when used on roadways with an ADT per lane of up to 7500 vehicles with no more than 10% truck mix. When roadways exceed these values additional maintenance replacement of devices should be planned, or permanent individual unit pavement markings used, as detailed on sheets IPM(1), IPM(2), PM(0), PM(1), PM(2), PM(3) or as detailed elsewhere in the plans.

### RAISED MARKERS

#### General

- 1) Raised Markers detailed on this sheet will be designated Type AA (two amber reflective surfaces with yellow body), Type A (one amber reflective surface with yellow body) or Type C (one silver reflective surface with white body). Color used shall be in accordance with the TMUTCD.

#### Sampling & Testing

- 1) Pavement Markings detailed on this sheet are to be inspected and accepted by the Project Engineer or his designated representative. Sampling and testing is not normally required.

### ABBREVIATED PAVEMENT MARKINGS

#### General

- 1) Temporary flexible-reflective roadway marker tabs detailed on this sheet will be designated Type Y-2 (two amber reflective surfaces with yellow body), Type Y (one amber reflective surface with yellow body), and Type W (one silver reflective surface with white body).

#### Material

- 1) Temporary flexible-reflective roadway marker tabs shall meet requirements of Department Material Specification D-9-8242.
- 2) The body of the temporary flexible-reflective roadway marker tabs shall consist of a base and vertical wall made of polyurethane, polyester elastomer or other material approved by the Materials and Tests Division.
- 3) The reflective material shall be protected with an easily removable heat resistant transparent cover capable of withstanding and protecting the reflective material from the application of 400 degree F asphalt. Stapling or clipping devices used to retain the protective cover shall not protrude through the reflective material.

#### Sampling & Testing

- 1) Temporary flexible-reflective roadway marker tabs for seal coat projects detailed on this sheet are to be inspected and accepted by the Project Engineer or his designated representative. Sampling and testing is not normally required, however at the option of the Engineer, either 'A' or 'B' below may be imposed to assure quality before placement on the roadway.
  - A) Select five (5) or more temporary flexible-reflective roadway marker tabs at random from each lot or shipment and submit to the Materials and Tests Division to determine specification compliance.
  - B) Select five (5) temporary flexible-reflective roadway marker tabs and submit to the following test. Affix five (5) tabs at two (2) foot intervals on an asphaltic pavement in a straight line. Using a medium size sedan, run over the markers with front and rear wheels at a speed of 35 to 40 miles per hour, four times in each direction. No more than one (1) out of five reflective surfaces shall be lost or displaced as a result of this test.

#### Maintenance

- 1) When dry, the temporary flexible-reflective roadway marker tabs shall be visible for a minimum distance of 200 feet during normal daylight hours and when illuminated by automobile low-beam head light at night, unless sight distance is restricted by roadway geometrics.
- 2) No two consecutive tabs nor four tabs per 1000 feet of line shall be missing or fail to meet the visual performance requirements of note 1.
- 3) The Contractor will be responsible for maintaining the abbreviated pavement markings, when they are used, until the standard pavement markings are in place. When the Contractor is responsible for placement of the standard pavement markings, no segment of roadway shall remain without standard pavement markings for a period greater than two (2) weeks unless weather conditions prohibit that placement. The standard pavement markings shall be placed as soon as weather permits.
- 4) After 72 hours following the seal-coat operation, provided the standard pavement markings have not been placed, any temporary flexible-reflective roadway marker tabs not meeting the visibility requirements stated in note 1, shall be replaced as directed by the Engineer.

### REMOVABLE - PREFABRICATED PAVEMENT MARKINGS

#### Sampling & Testing

- 1) Removable - Prefabricated Pavement Markings shall be a material of manufacture and product code or designation shown on the list of approved materials covered by the Department Materials Specification D-9-8241. The list of approved materials will be maintained by the Equipment and Procurement Division (File D-4).

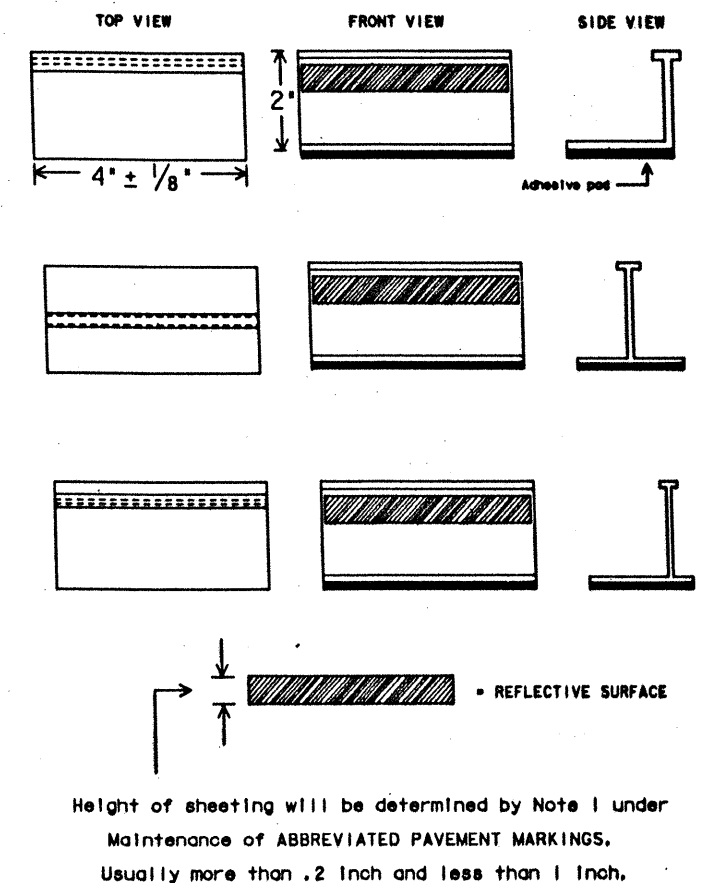
### CONSTRUCTION GRADE - PREFABRICATED PAVEMENT MARKINGS (FOIL BACK)

#### Sampling & Testing

- 1) Construction Grade - Prefabricated Pavement Markings shall be a material of manufacture and product code or designation shown on the list of approved material covered by the Specification SDHPT - 550-74-01. The list of approved materials will be maintained by the Equipment and Procurement Division (File D-4).

# WORK ZONE PAVEMENT MARKINGS

## Temporary Flexible-Reflective Roadway Marker Tabs for Seal Coat Projects



348

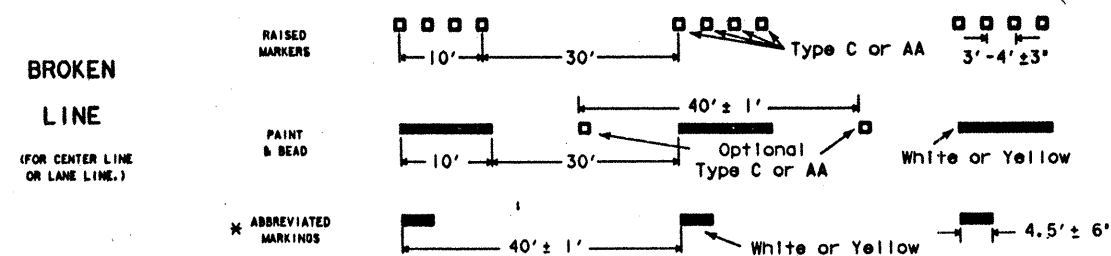
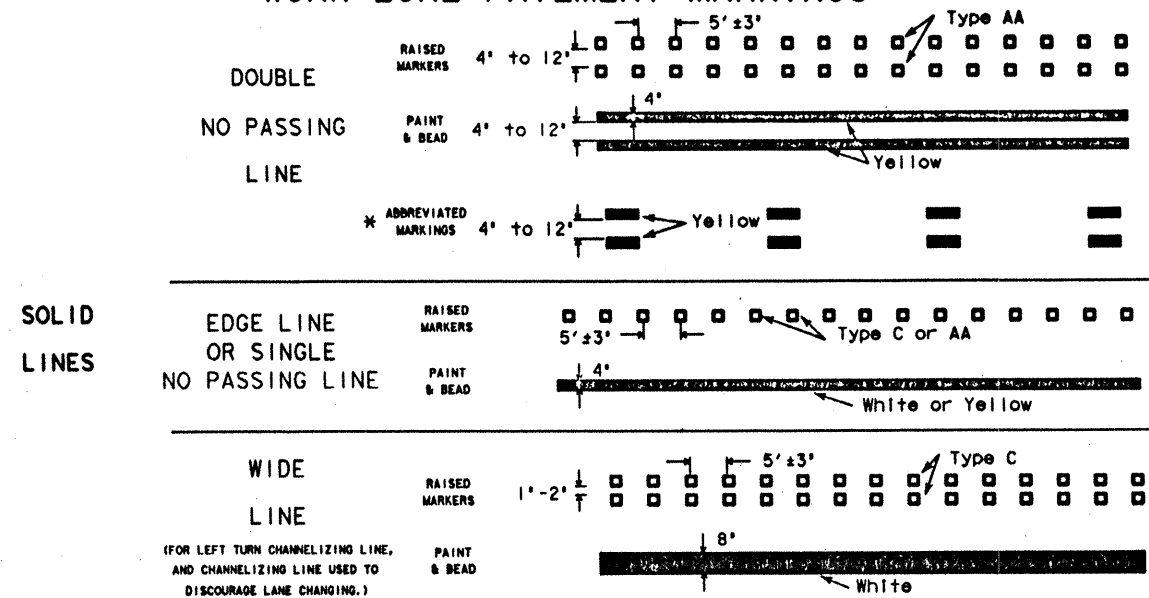
STATE DEPARTMENT OF HIGHWAYS  
AND PUBLIC TRANSPORTATION

Work Zone  
Pavement Markings

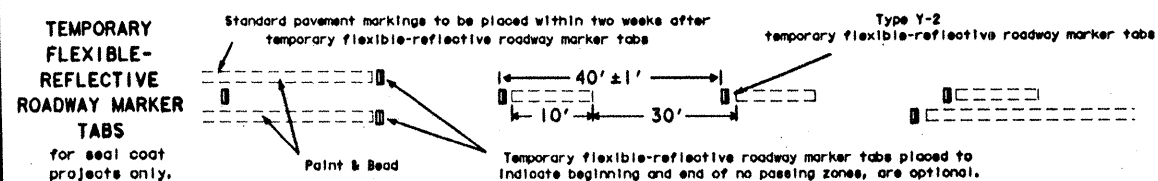
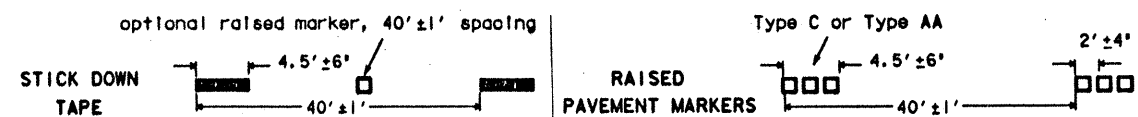
TCP (5-1)

DATE	DW	REV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.
CHECKED	LR	6	TEXAS	1A 35-2(157)173	1H 35
TRACED	STATE DIST. NO.	COUNTY	CONTRACT NO.	SECTION NO.	AD NO.
CHECKED	15	Guadalupe, Etc.	16	6	29

## WORK ZONE PAVEMENT MARKINGS



### ABBREVIATED PAVEMENT MARKING DETAILS



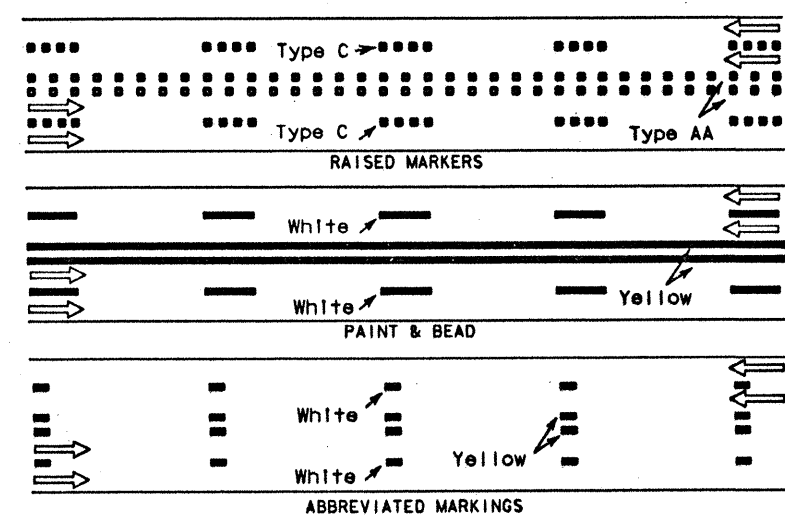
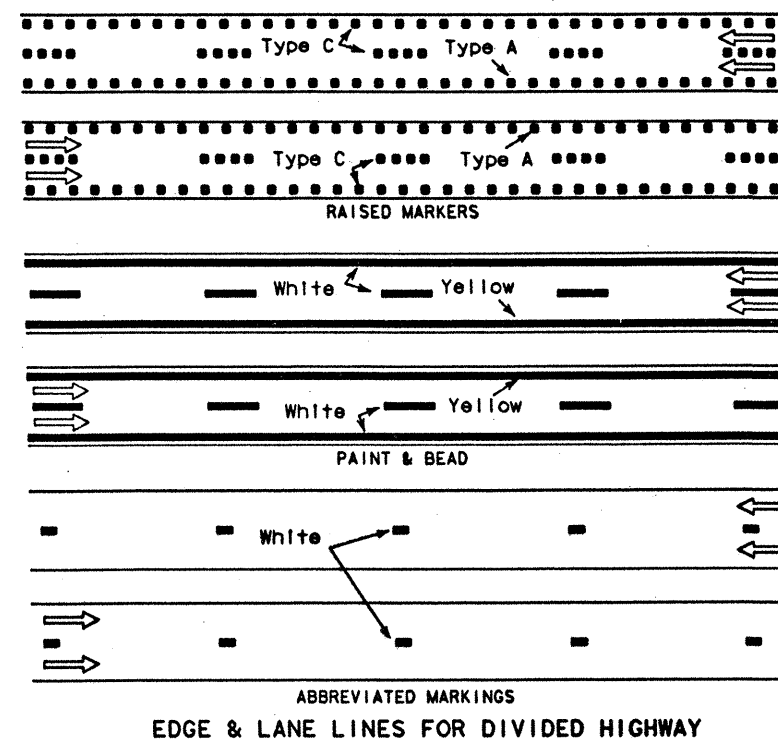
## NOTES FOR STANDARD WORK ZONE MARKINGS

- 1) Standard Work Zone Pavement Markings may be of paint and beads, raised markers or combination of paint and raised markers; thermo plastic paint and beads may be used in lieu of paint and beads unless otherwise specified elsewhere in the plans. Abbreviated marking patterns are not to be used for standard pavement markings.
- 2) Raised markers detailed on TCP(5-1) are to be placed according to the patterns on this sheet. Standard, permanent, raised markers as detailed on sheets IPM(1) and IPM(2) shall be placed according to patterns on sheets IPM(1), IPM(2), PM(0), PM(1), PM(2) or PM(3).
- 3) For additional details on Work Zone pavement markings see sheet TCP (5-1).
- 4) Spacing for pavement markings on this sheet are maximum spacings and may be reduced to fit field conditions.
- 5) Adhesive used for work zone raised pavement markings shall be Bituminous material hot applied, or Butyl Rubber/pad.
- 6) When Channelizing line is used to discourage lane changing, edge lines should not be used unless placed next to a barrier wall.

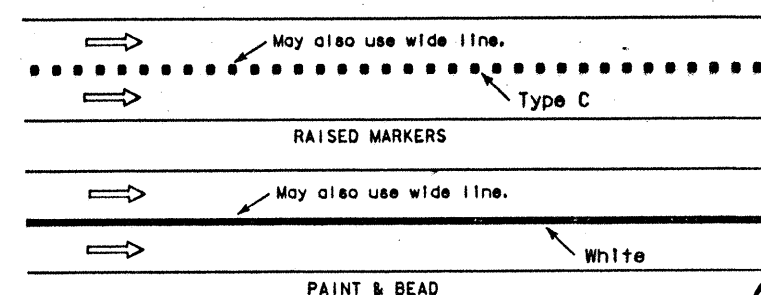
### NOTES FOR ABBREVIATED PAVEMENT MARKINGS

- 1) Abbreviated pavement marking materials may be stick down tape, raised markers or paint and beads unless otherwise specified elsewhere in the plans.
- 2) Abbreviated pavement markings for seal coat projects shall use temporary flexible-reflective roadway marker tabs. Temporary flexible-reflective roadway marker tabs are to be installed to provide true alignment for striping crews as directed by the Engineer.
- 3) Temporary flexible-reflective roadway marker tabs for seal coat projects should be applied to the pavement no more than two days before the seal coat is applied. After the seal coat is rolled and swept the cover over the reflective strip shall be removed.
- 4) Abbreviated pavement markings shall not be used to simulate edge lines.

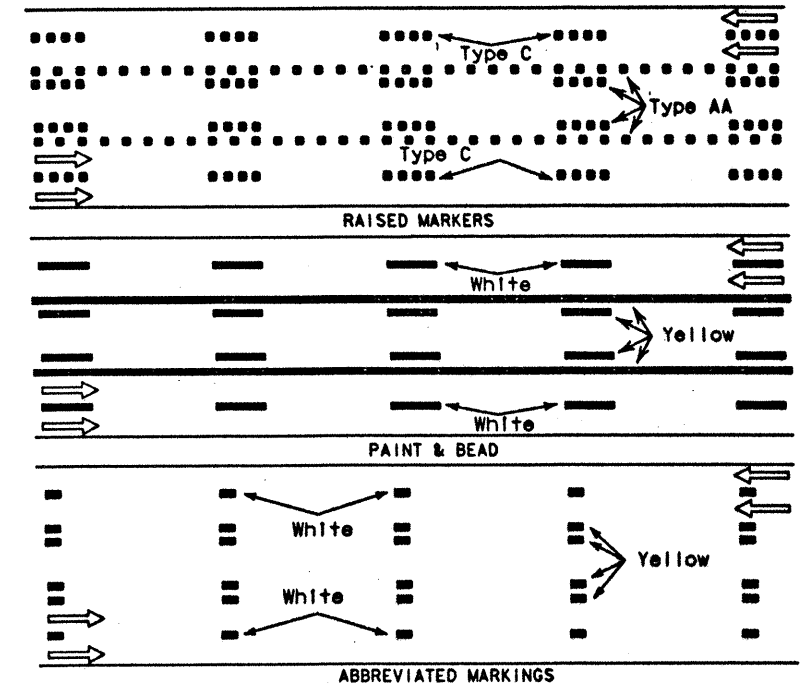
## PAVEMENT MARKING PATTERNS



### LANE & CENTER LINES FOR MULTI-LANE UNDIVIDED HIGHWAYS

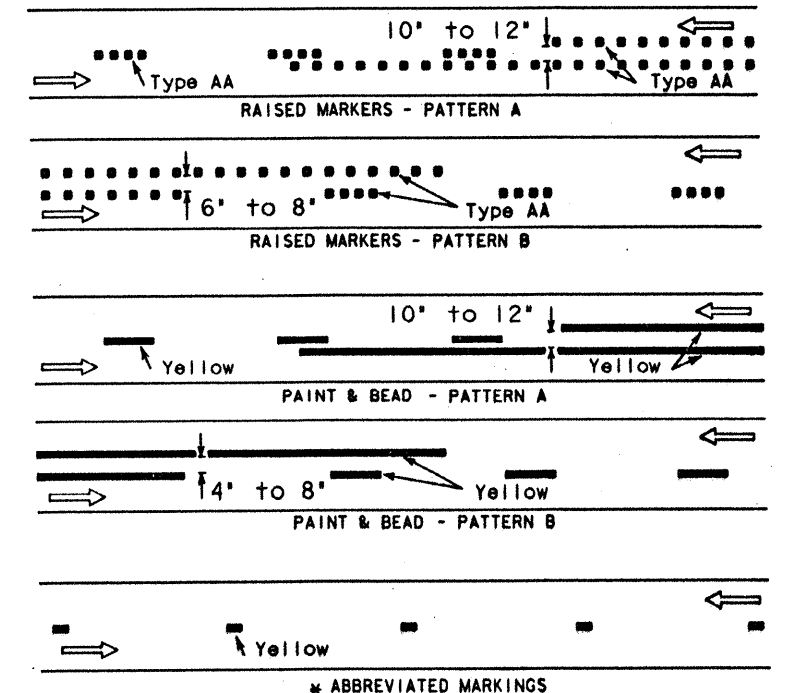


## CHANNELIZING LINE TO DISCOURAGE LANE CHANGING



### PAVEMENT MARKINGS FOR TWO-WAY LEFT-TURN LANE

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



### \* ABBREVIATED MARKINGS

### NOTE

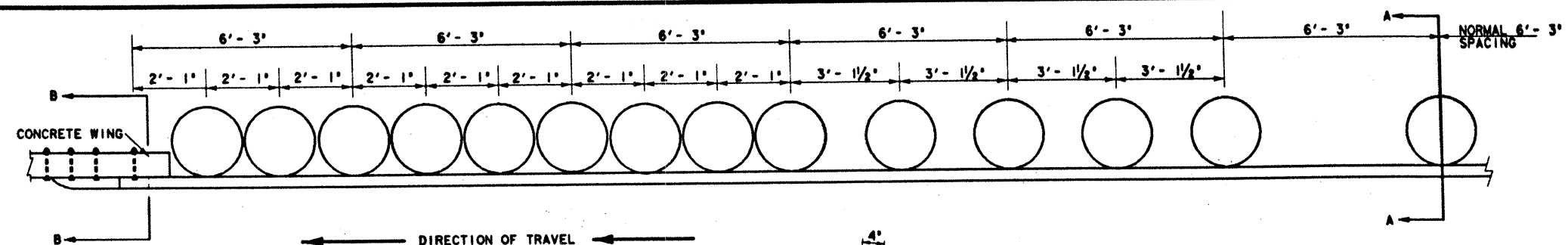
- 1) Spacing between markers shall be uniform with no more than a 10% variation in spacing.
- 2) Pattern A is the Department Standard. Pattern B may be used if approved by the Engineer.
- \* 3) When abbreviated markings are used in areas of no passing zones, signs in accordance with the Texas MUTCD shall be used to indicate the limits of the no passing zones.

STATE DEPARTMENT OF HIGHWAYS  
AND PUBLIC TRANSPORTATION

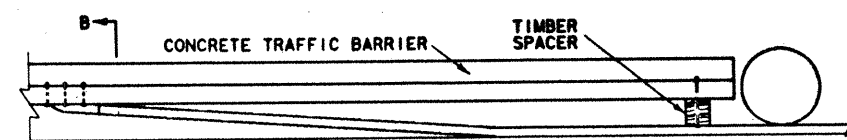
WORK ZONE  
PAVEMENT MARKINGS  
MOD TCP (5-2)

ORIGINAL DRAWING DATE: 5-88		STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET	
DN. -- DN	REVISIONS 1-89	13	6	IR 35-2(50)173	349	
CL. -- LR		COUNTY		CONTROL SECTION	JOB HIGHWAY	
DN. --		Gundlupre		16	6. 29	TH 85
CL. --						

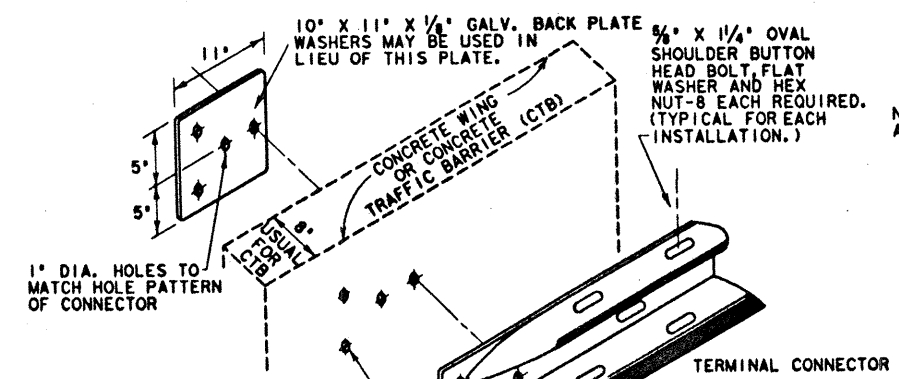




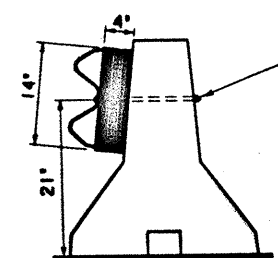
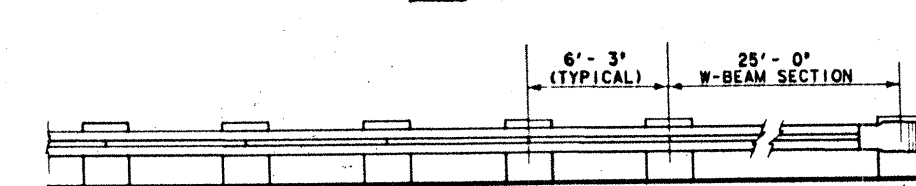
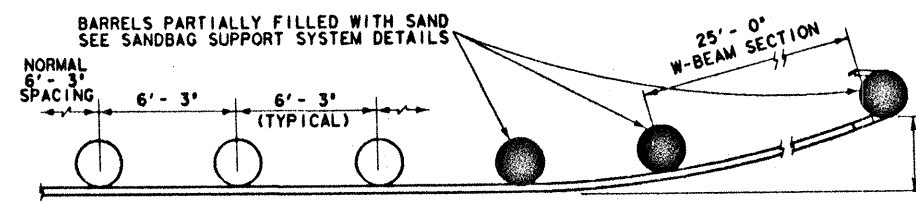
**PLAN VIEW**  
**ATTACHMENT TO BRIDGE RAIL**  
**OR CONCRETE TRAFFIC BARRIER**



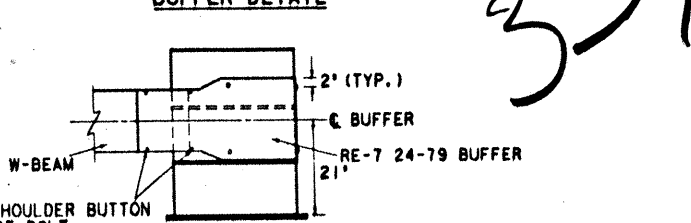
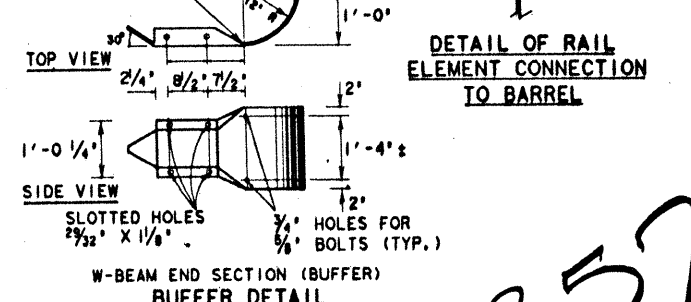
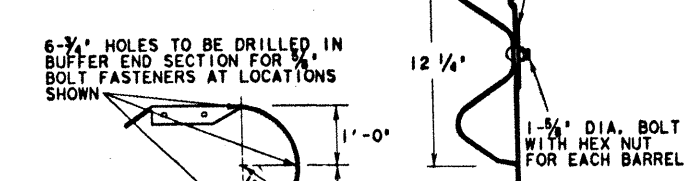
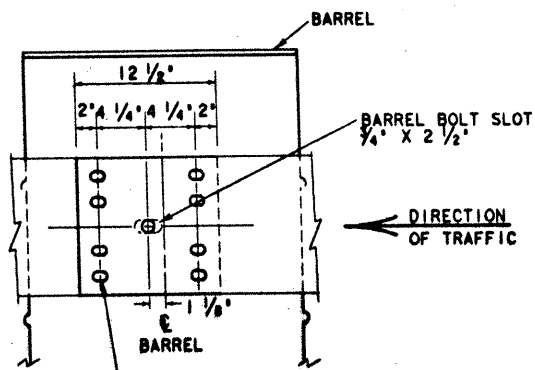
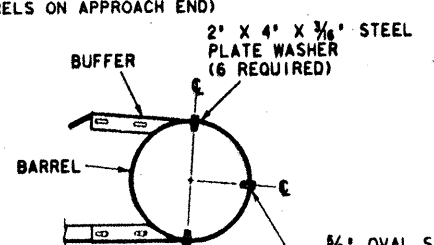
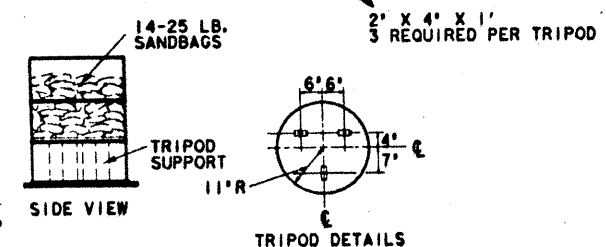
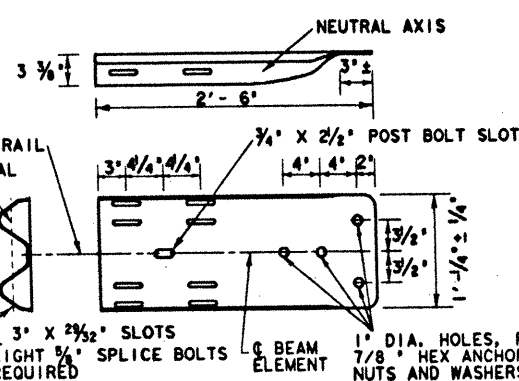
WHEN ATTACHING RAIL ELEMENTS TO TRAFFIC BARRIER, A 4' X 6" X 14' TREATED TIMBER SPACER SHALL BE REQUIRED AND THE RAIL ELEMENT SHALL BE EXTENDED AN ADDITIONAL 12'- 6" BEYOND THE BLOCKOUT.



ATTACHMENT TO BRIDGE RAIL  
OR CONCRETE TRAFFIC BARRIER  
SECTION B-B

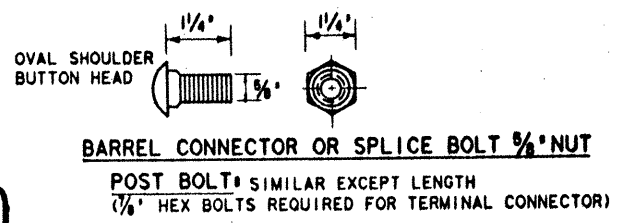
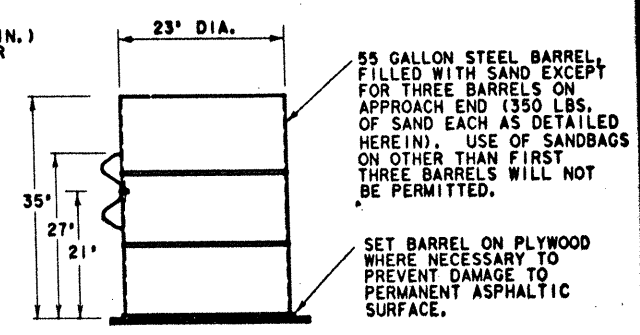


ONE 3/8" BOLT AND NUT WITH  
1-1/4" O.D. WASHER, 1/2" &  
HOLE IN SPACER AND CONCRETE  
TRAFFIC BARRIER. BOLT LENGTH  
SHALL BE SUFFICIENT TO EXTEND  
THROUGH THE FULL THICKNESS OF  
THE NUT AND NO MORE THAN  
3/4" BEYOND IT.



NOTE: 6-  $\frac{3}{4}$ " DIAMETER HOLES TO BE DRILLED IN BARRELS. LOCATE HOLES BY FITTING BUFFER AROUND BARREL AND MARKING BARREL TO ENSURE PROPER FIT.

- ### GENERAL NOTES
1. RAIL ELEMENT MAY BE EITHER 12.5 OR 25 FOOT LENGTHS, EXCEPT A 25 FOOT LENGTH IS REQUIRED ON THE APPROACH TERMINAL, AND EITHER 10 OR 12 GAUGE.
  2. MINIMUM LENGTH OF PLACEMENT EQUALS 100 FEET EXCEPT WHERE BOTH ENDS ARE CONNECTED TO A POSITIVE BARRIER (BRIDGE RAIL, CTB, ETC.) MINIMUM LENGTH OF PLACEMENT EQUALS 75 FEET WHERE ONE END IS CONNECTED TO A POSITIVE BARRIER.
  3. WHEN THE ROADWAY SURFACE IS ASPHALT, PLYWOOD SHALL BE PLACED UNDER THE BARRELS TO PREVENT DAMAGE TO THE PERMANENT ASPHALTIC PAVEMENT.
  4. LOCATION OF BARREL MOUNTED GUARD FENCE IS SHOWN ELSEWHERE IN THE PLANS.
  5. RAIL ELEMENT SPLICES SHALL BE LAPPED IN THE DIRECTION OF TRAFFIC.
  6. RAIL SPLICES SHALL BE CONNECTED WITH THE NORMAL EIGHT 1 1/4" LONG OVAL SHOULDER BUTTON HEAD BOLTS WHICH ARE 3/4" IN DIAMETER.
  7. BARREL SPACING SHALL BE 6'-3". EXCEPT CLOSER SPACING SHALL BE USED AS SHOWN TO TRANSITION INTO A CONNECTION WITH A BRIDGE RAIL, CONCRETE TRAFFIC BARRIER, OR SIMILAR FIXED OBJECT. WHEN USED AS A TRANSITION SPACING OF BARRELS SHOULD BE (FROM FRONT BARREL) ONE SPACE AT 28', 3 SPACES AT 6'-3", 4 SPACES AT 3'-1/2" AND 8 SPACES AT 2'-1".
  8. DRAINAGE HOLES SHALL BE DRILLED IN THE BOTTOM OF THE BARRELS TO ALLOW FOR DRAINAGE OF WATER.
  9. APPROACH END OF THE TEMPORARY BARRIER SHALL BE FLARED AWAY FROM THE ROADWAY AND SHALL BE TREATED AS SHOWN.
  10. IF THE BARRIER IS USED AS A CHANNELIZING DEVICE IN NIGHTTIME SITUATIONS, IT SHALL BE SUPPLEMENTED BY DELINEATION OR CHANNELIZATION MARKINGS OR DEVICES. REFLECTORIZED MARKINGS ON DRUMS AS DETAILED ON THE BC STANDARD SHEETS, OR VERTICAL PANELS, OR DELINEATORS SHALL BE USED TO PROVIDE SUPPLEMENTAL DELINEATION.



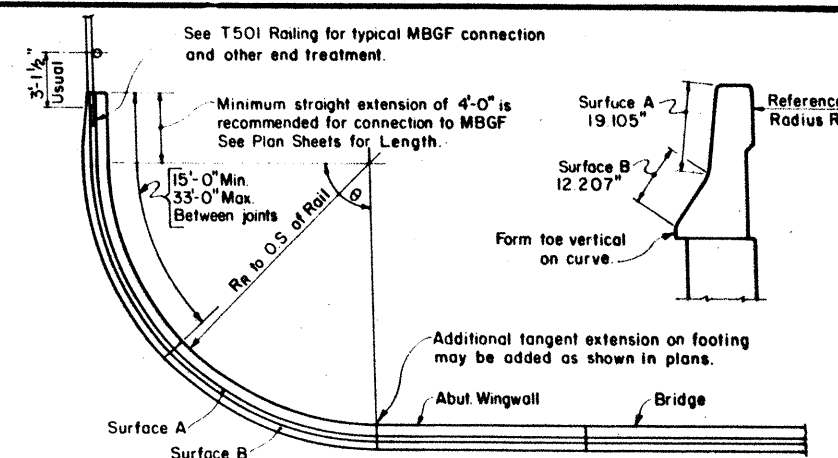
TEMPORARY BARRIER  
BARREL-MOUNTED GUARD FENCE

TB (BMGF)-88

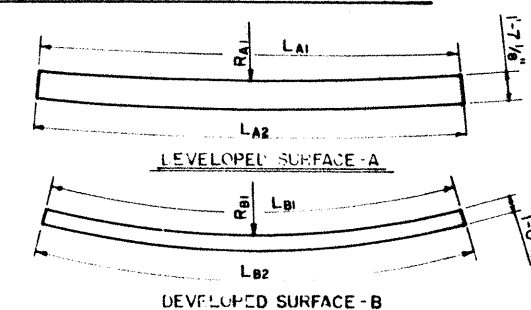
REV. 8-1-64	FED. RD. DIST. NO.	STATE	FEDERAL AID PROJECT NO.				SHEET NO.
	6	TEXAS	RR 35-2 (157) 173				357
	STATE DIST. NO.	COUNTY	CONT.	SECT.	JOB	H. SHAW NO.	
	15	Garza	16	6	29	JH35	

[illegible]
$$\begin{array}{ll} R_{A1} = 9.552 R_R + 5.97 & R_{B1} = 1.744 R_R + 1.38 \\ L_{A1} = 1.571 R_R + 0.98 & L_{B1} = 1.571 R_R + 1.24 \\ L_{A2} = 1.571 R_R + 1.24 & L_{B2} = 1.571 R_R + 2.16 \end{array}$$

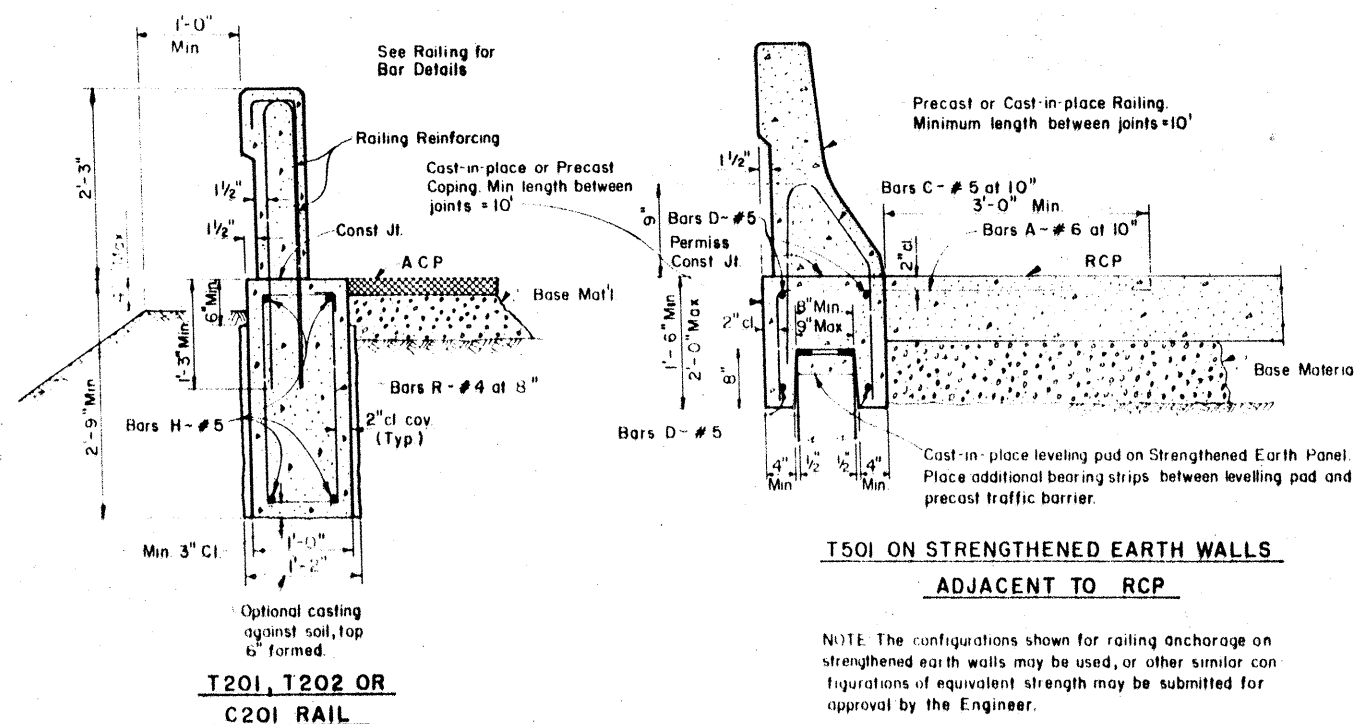
**DESIGN NOTE:** The curved end treatment at bridge ends should only be used in areas where traffic speed is 40 mph or less.



CURVED T 501 RAILING AT BRIDGE ENDS



Excavation will be considered subsidiary to other items



Technical drawing of a bridge railing cross-section. The drawing includes the following labels and dimensions:

- Precast or Cast-in-place Railing.** Minimum length between joints = 10'
- # 5 at 8"** (Reinforcement bar spacing)
- 3"** (Dimension)
- 1 1/2"** (Dimension)
- Permiss. Const. Jt.** (Permissible Construction Joint)
- Precast or Cast-in-place Coping.** Minimum length between joints = 10'
- # 5 at 8"** (Reinforcement bar spacing)
- # 5** (Reinforcement bar)
- # 5 at 10"** (Reinforcement bar spacing)
- Cast-in-place Footing**
- 2'-6" Min** (Overall height dimension)
- Varies** (Dimension)
- 2" cl** (Clearance dimension)
- 10" Min.** (Width dimension)
- Min. 2'** (Footing depth dimension)

T501 ON DOUBLEWAL WALLS

NOTE: The configurations shown for railing on Doublewall walls may be used, or other similar configurations of equivalent strength may be submitted for approval by the Engineer.

NOTE: The above footings for T501, T201, or T202 Railing have approx. 10 C.Y. per L.F. of Concrete and 1077lbs. per L.F. of reinforcement.

358

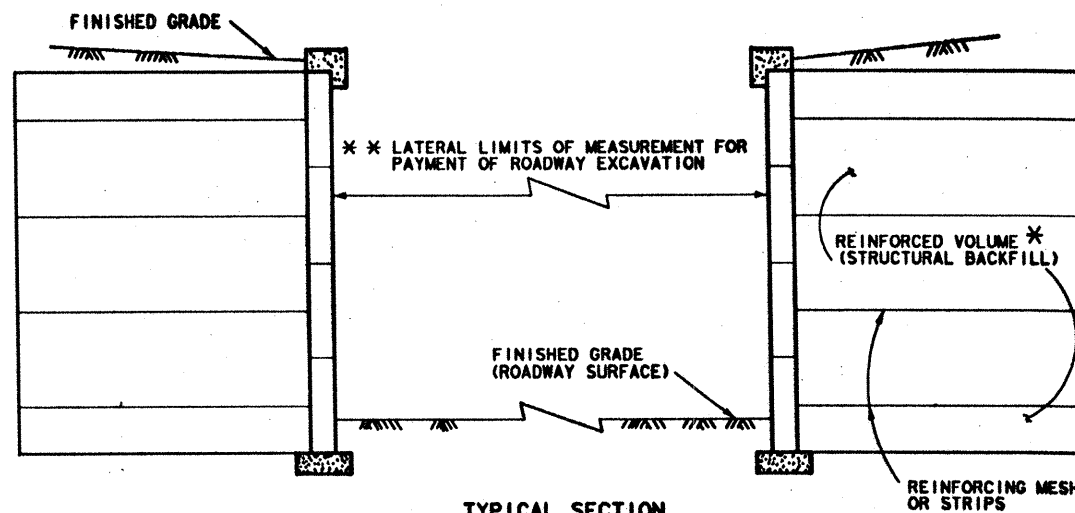
STATE DEPARTMENT OF HIGHWAYS  
AND PUBLIC TRANSPORTATION

BRIDGE TRAFFIC  
RAILING FOUNDATIONS

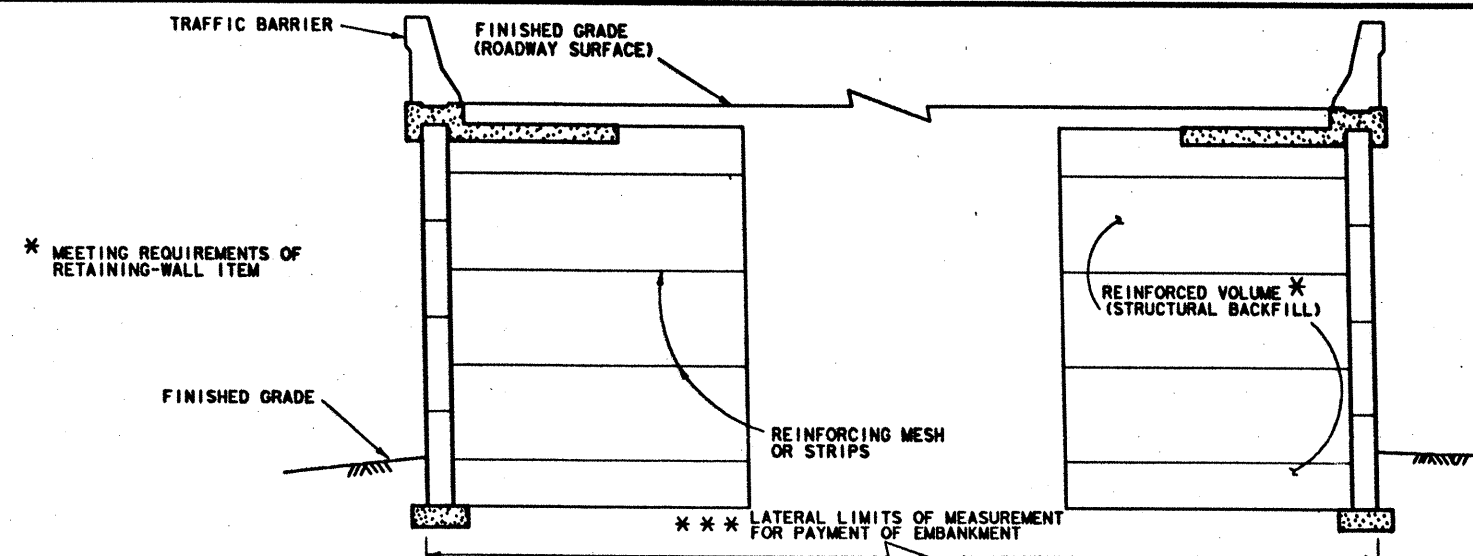
TREF

ORIGINAL DRAWING DATE <b>JUNE 1985</b>		STATE DURHAM	FEDERAL RIS-000	FEDERAL AID PROJECT #	QUEST
ON - <b>JIP</b>		REVISIONS			
CR - <b>JIP</b>	May 8 85 12 PM Added note see 1 HB (see Notes) in instrument 1031	15	6	JR35-2157173	382
DW - <b>JIP</b>		EQUITY		CONTROL	ACT: 04
CR - <b>JIP</b>		EQUITY		110	6 29 143

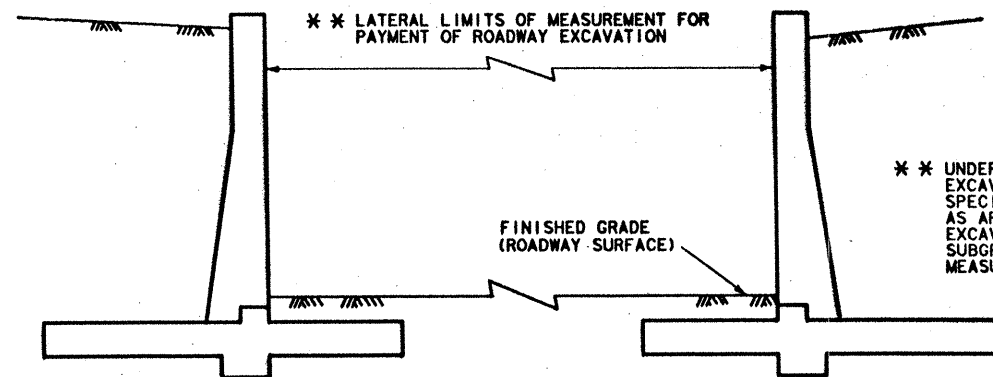
et



**TYPICAL SECTION**  
# ROADWAY EXCAVATION BETWEEN RETAINED EARTH OR REINFORCED EARTH RETAINING WALLS



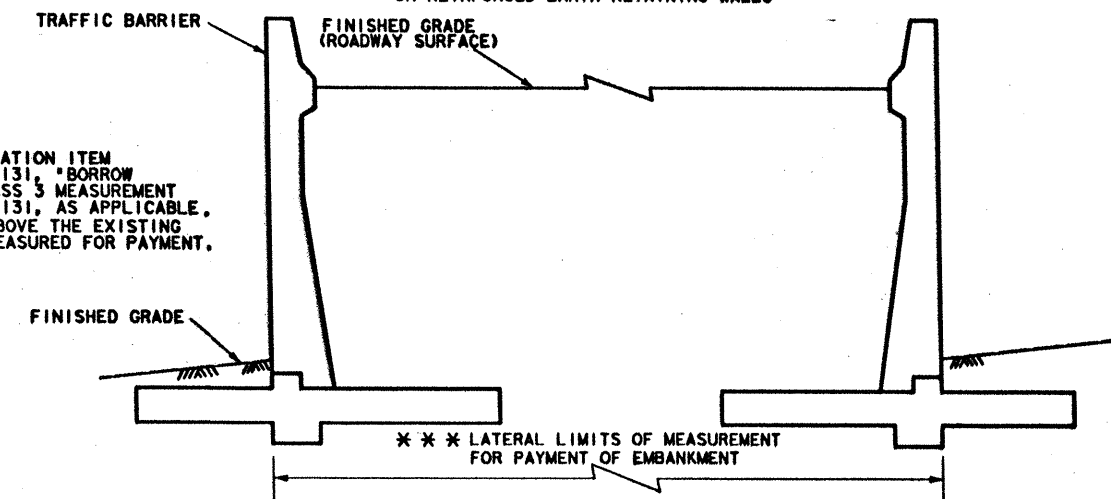
**TYPICAL SECTION**  
# EMBANKMENT BETWEEN RETAINED EARTH OR REINFORCED EARTH RETAINING WALLS



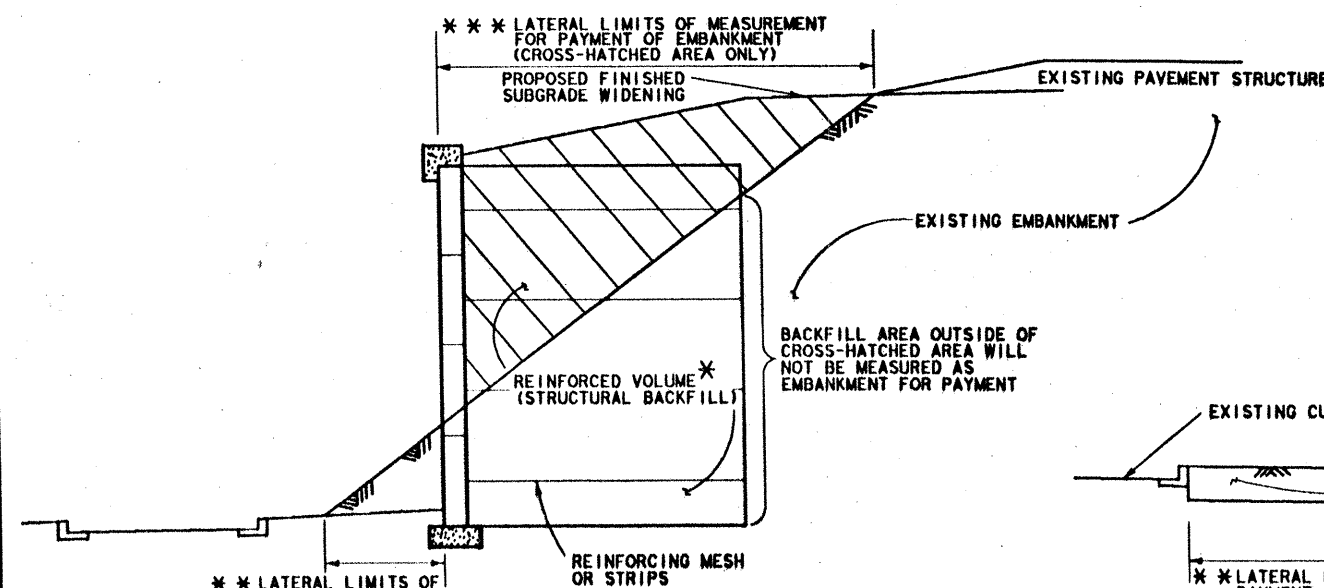
**TYPICAL SECTION**  
ROADWAY EXCAVATION BETWEEN CONVENTIONAL RETAINING WALLS

\*\*\* UNDER SPECIAL SPECIFICATION ITEM "EMBANKMENT", OR ITEM 131, "BORROW (DELIVERED)", WHEN CLASS 3 MEASUREMENT IS SPECIFIED FOR ITEM 131, AS APPLICABLE, ONLY THE EMBANKMENT ABOVE THE EXISTING GROUND LINE WILL BE MEASURED FOR PAYMENT.

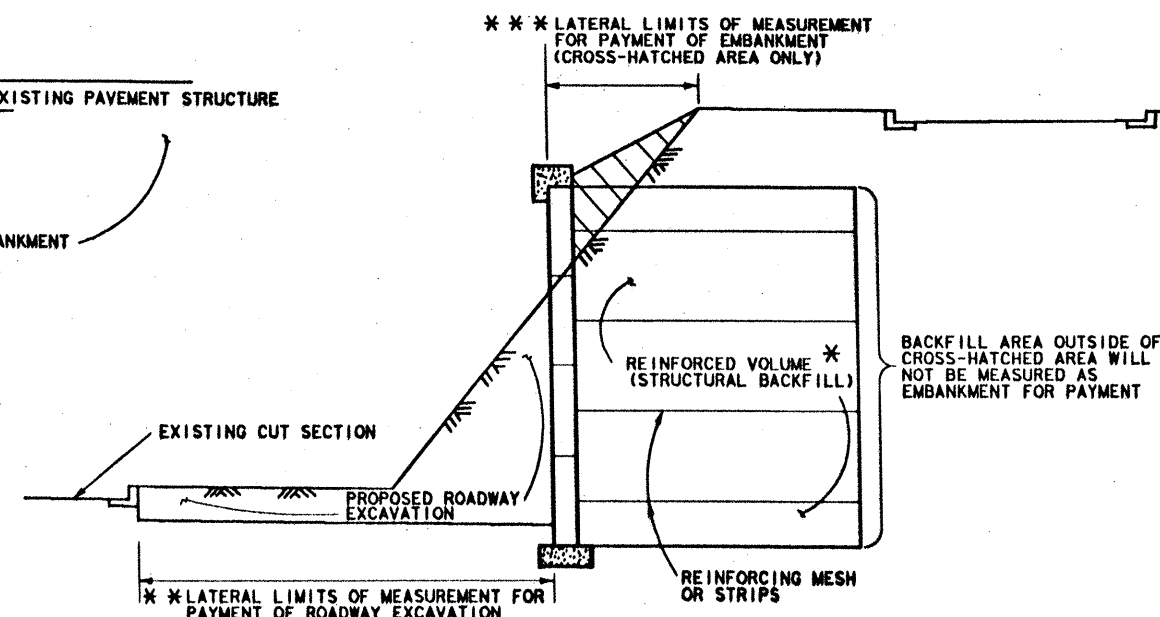
# EARTHWORK MEASUREMENT WITH OTHER DESIGNS OF RETAINING WALLS WILL BE MADE TO THE OUTSIDE FINISHED FACE IN THE SAME MANNER.



**TYPICAL SECTION**  
EMBANKMENT BETWEEN CONVENTIONAL RETAINING WALLS



**TYPICAL SECTION**  
# WIDENING EMBANKMENT WITH RETAINED EARTH OR REINFORCED EARTH RETAINING WALLS



**TYPICAL SECTION**  
# WIDENING CUT SECTION WITH RETAINED EARTH OR REINFORCED EARTH RETAINING WALLS

359



STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

# EARTHWORK MEASUREMENT AT RETAINING WALLS

EMRW - 88

REVISIONS	FED. RD. DIST. NO.	STATE	FEDERAL AID PROJECT NO.	SHEET NO.
	6	TEXAS	IR 35-2(157) 173	359
		COUNTY	CONT. SECT. JOB	ROADWAY NO.
	15	Guadalupe	16	6 29

etc. | A-12

SHOP PLAN FILE

# 6764

COUNTY: GUADALUPE

PROJECT: IR 35-2 (157) 173

CONTROL: 0016-06-029

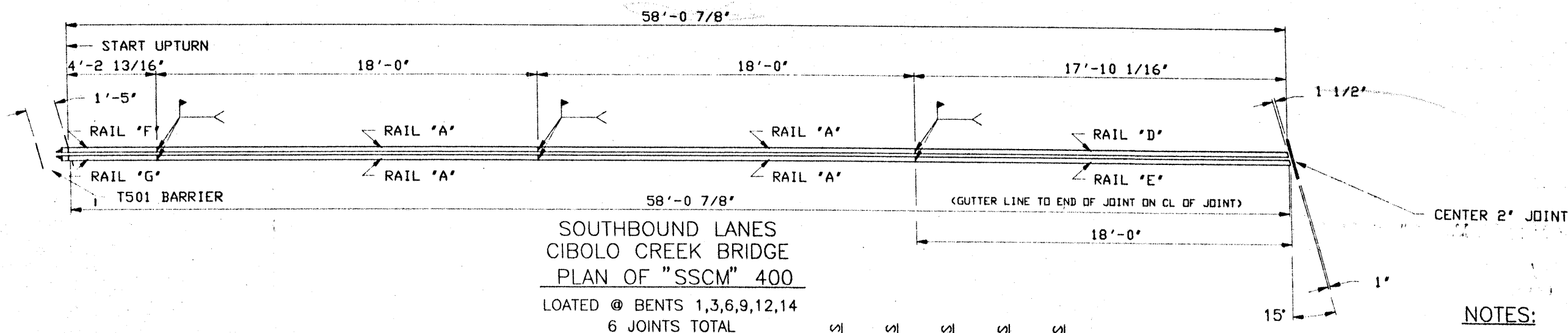
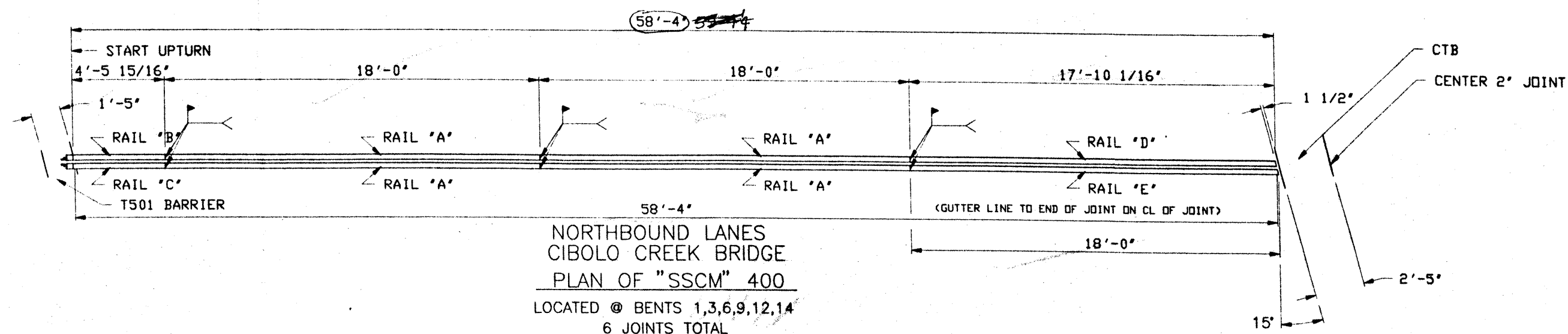
HIGHWAY: IH 35

STRUCTURE: FM 3009 U'PASS, CIBOLO CR. BR.  
NB & SB, EAST & WEST FRNTG. RD. & SCHERTZ PRNT.

SHEETS: S.E.I. (SHT. 1-5) & A.I. (SHT. E1 & 1)







# NOTES:

IF ANCHOR STUDS INTERFERE  
WITH ERECTION HOLES, RE-  
LOCATE STUDS.

FOR UPTURN DETAIL  
SEE SHEET NO. 5

STATE DEPARTMENT OF HIGHWAY  
AND PUBLIC TRANSPORTATION  
APPROVED  
JUN 13 1990  
APPROVAL OF THIS DRAWING DOES NOT  
RELIEVE THE CONTRACTOR OF THE  
RESPONSIBILITY FOR THE CORRECTNESS  
OF DETAIL

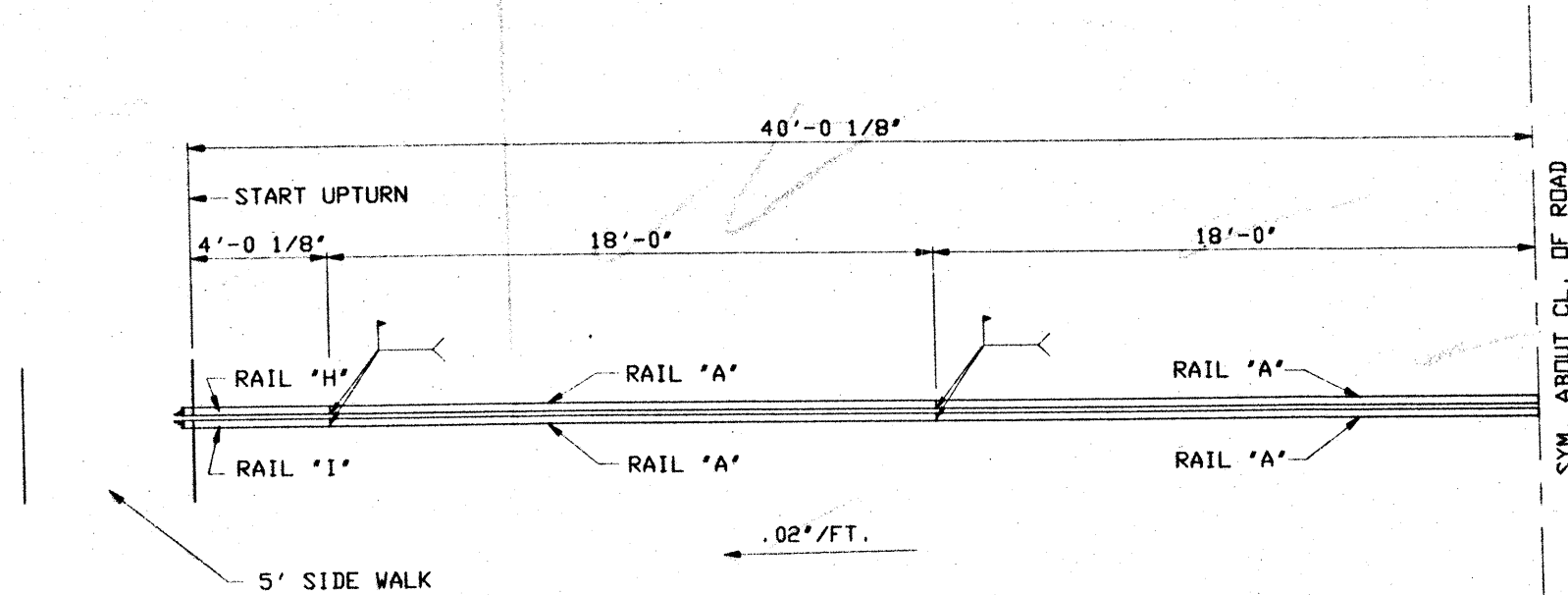
EXPANSION JOINTS FABRICATED BY:  
DELTEX STEEL FABRICATING COMPANY  
CUT 'N' SHOOT, TEXAS 77303  
OR THE D.S. BROWN CO.  
NORTH BALTIMORE, OHIO 45872

D.S. BROWN 90-2116 SHEET 1 OF 5

ITEM NO.	PART NO.	DESCRIPTION	LENGTH		MATERIAL	FINISH	REMARKS	NBL	SBL	EFR	WFR	U PASS	TOTAL
			FEET	INCHES									
1	SSCX-50-P-588	"SSCM" FRAME RAIL	18	0	A588	PAINT		24	24			16	64
2	SSCX-50-U-588	"SSCM" FRAME RAIL	4	8 1/8	A588	PAINT	UPTURN CUT RH	6					6
3	SSCX-50-U-588	"SSCM" FRAME RAIL	4	8 1/8	A588	PAINT	UPTURN CUT LH	6					6
4	SSCX-50-P-588	"SSCM" FRAME RAIL	17	10 13/16	A588	PAINT		6	6	3	3		18
5	SSCX-50-P-588	"SSCM" FRAME RAIL	18	0	A588	PAINT		6	6	3	3		18
6	SSCX-50-U-588	"SSCM" FRAME RAIL	4	5	A588	PAINT	UPTURN CUT RH		6				6
7	SSCX-50-U-588	"SSCM" FRAME RAIL	4	5	A588	PAINT	UPTURN CUT LH		6				6
8	SSCX-50-U-588	"SSCM" FRAME RAIL	4	2 5/16	A588	PAINT	UPTURN CUT R.H.					4	4
9	SSCX-50-U-588	"SSCM" FRAME RAIL	4	2 5/16	A588	PAINT	UPTURN CUT L.H.					4	4
10	SSCX-50-U-588	"SSCM" FRAME RAIL	16	6 11/16	A588	PAINT	UPTURN CUT R.H.			3	3		6
11	SSCX-50-U-588	"SSCM" FRAME RAIL	16	6 11/16	A588	PAINT	UPTURN CUT L.H.			3	3		6
12	SSCX-50-U-588	"SSCM" FRAME RAIL	0	9 3/16	A588	PAINT	UPTURN CUT R.H.	6	6	3	3	4	22
13	SSCX-50-U-588	"SSCM" FRAME RAIL	0	9 3/16	A588	PAINT	UPTURN CUT L.H.	6	6	3	3	4	22
14	SD12X6	1/2" STUD ANCHOR	0	6	A108			480	480	144	144	216	1464
15	SD12X8	1/2" BENT STUD ANCHOR	0	8	A108		BENT 1" @ 64"	462	462	135	135	216	1410
16	BL12X3.5	1/2"-13 BOLT	0	3 1/2			TEMP. SUPPORT	84	84	27	27	40	262
17	NT12	1/2"-13 HEX NUT					TEMP. SUPPORT	84	84	27	27	40	262
18	FWA12	1/2" I.D. FLAT WASHER					TEMP. SUPPORT	336	336	108	108	160	1048
19	BP58	5/8" I.D. BLACK PIPE	0	2			TEMP. SUPPORT	84	84	27	27	40	262
20	NSX-68	"AC" STYROFOAM GASKETING (1"Ø)			STYRO		FIELD USE	12061	12061	6037	6037	4082	2236
21	NX-77	LUBRICANT ADHESIVE					GALLONS	1 1/2	1 1/2	1	1	1	6
22	KX-74	4" MOVEMENT STRIP SEAL			NEO		FIELD INSTALL	6061	6061	3037	3037	2082	1118

DSB FILE NO: 90-2116\SH-01

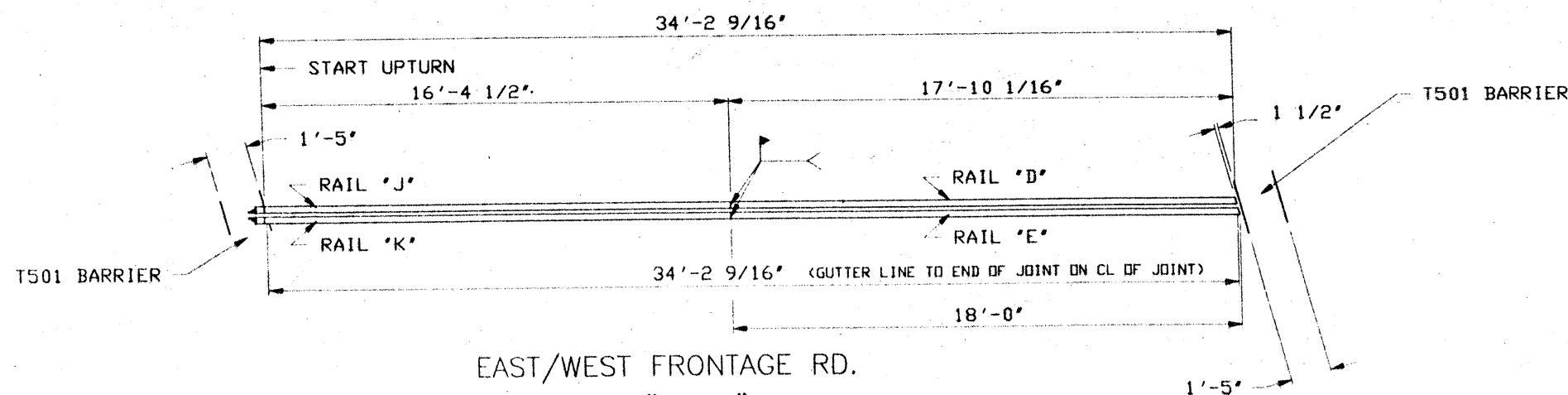
THE D.S. BROWN COMPANY 300 E. CHERRY ST. P.O. BOX 158 NORTH BALTIMORE, OHIO 45872-0158				DATE	SYM	REVISION	DR	CK
CONTRACTOR JASCON								
STATE	PROJECT NO.	COUNTY	SECTION NO.	THE D.S. BROWN COMPANY, INC. NORTH BALTIMORE, OHIO 45872-0158 U.S.A.				
TEXAS	IR 35-2(157)173	GUADALUPE	18-6-20	SCALE: 5-8-90				
DATE	5-8-90	DRAWN BY: WFM			CIBOLO CREEK BRIDGE			
JOB NO: 90-2116				DESCRIPTION: PLAN VIEW		SHEET 1		TEXAS
				DELTEX		90-2116-01		



### SCHERTZ PARKWAY UNDERPASS

PLAN OF "SSCM" 400

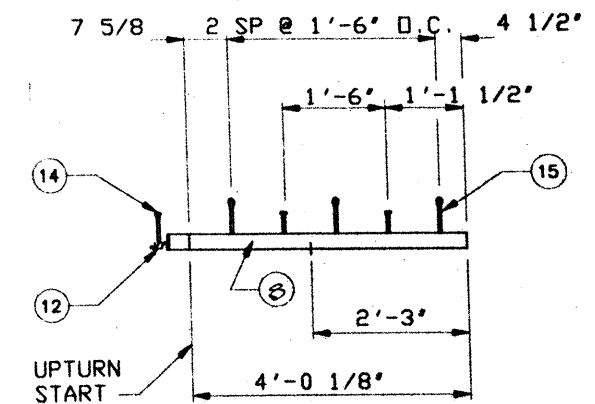
LOCATED @ BENTS #1 & #2  
2 JOINTS



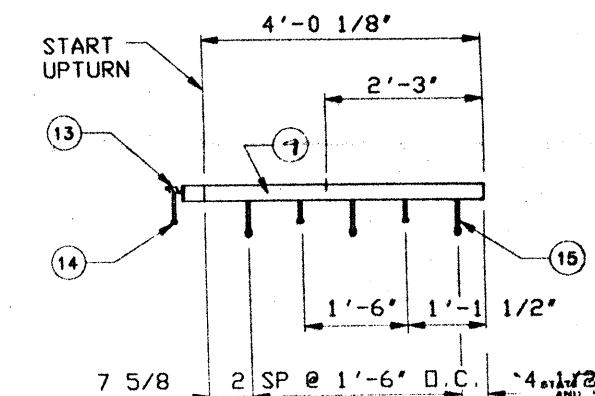
### EAST/WEST FRONTAGE RD.

PLAN OF "SSCM" 400

LOCATED @ BENTS 1,3,5  
6 JOINTS TOTAL



ASSEMBLY "H"  
(4) REQUIRED



ASSEMBLY "I"  
(4) REQUIRED

### NOTES:

IF ANCHOR STUDS INTERFERE WITH ERECTION HOLES, RE-LOCATE STUDS.

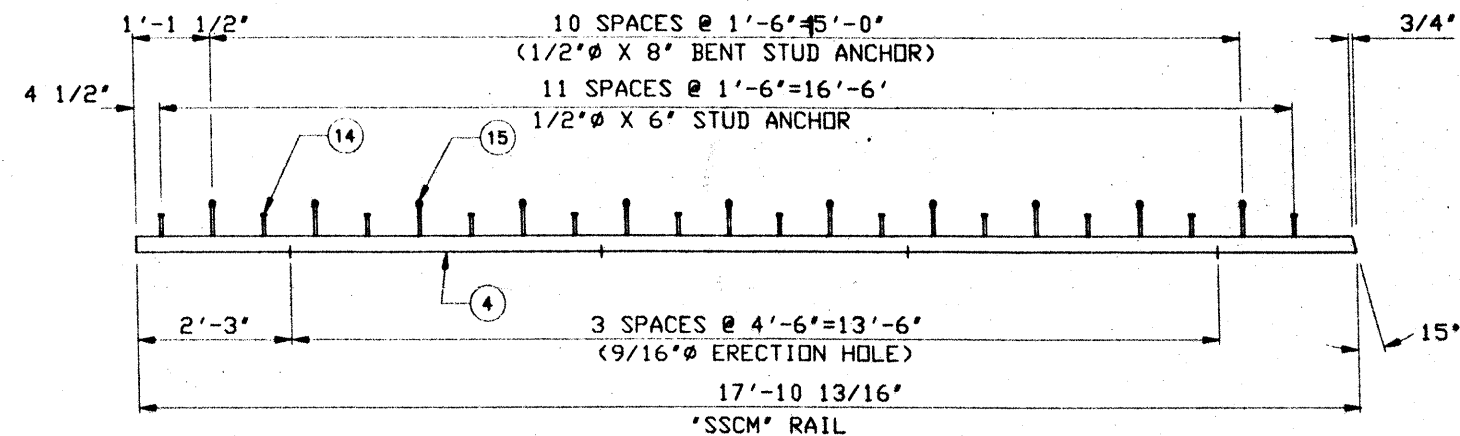
FOR UPTURN DETAIL SEE SHEET NO. 5

EXPANSION JOINTS FABRICATED BY:  
DELTEX STEEL FABRICATING COMPANY  
CUT 'N' SHOOT, TEXAS 77303  
OR THE D.S. BROWN CO.  
NORTH BALTIMORE, OHIO 45872

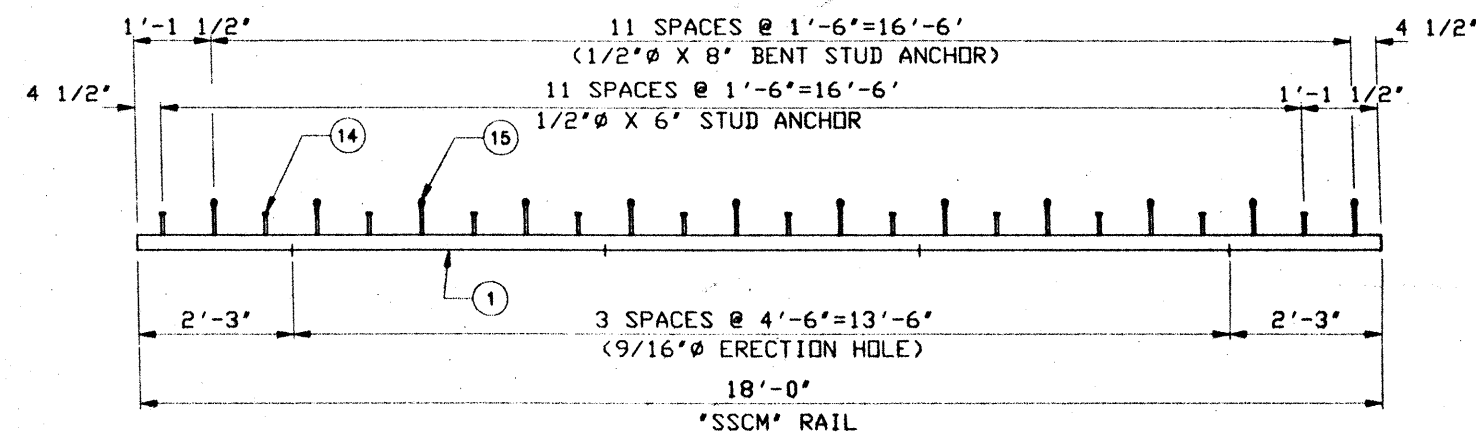
D.S. BROWN 90-2116 SHEET 2 OF 5

THE D.S. BROWN COMPANY 331 E. CHERRY ST. P.O. BOX 151 NORTH BALTIMORE, OHIO 45872				DATE	SYM	REVISION	DR	CK
CONTRACTOR JASCON								
FED. RD. DIST. NO. 6	STATE TEXAS	PROJECT NO. IR 35-2(157)173	SECTION NO. I.H. 35	THE D.S. BROWN COMPANY, INC. NORTH BALTIMORE, OHIO 45872-0168 U.S.A.				
STATE DIST. NO. 15	COUNTY GUADALUPE	CMTL. NO. 16-6-39	JOE NO.	SCALE	DATE: 5-8-90			
DRAWN: WFM	CHECK:	DATE: 5-8-90	SHEET 2	CIBOLO CREEK BRIDGE				
JOB NO. 90-2116	DESCRIPTION: PLAN VIEW			GUADALUPE COUNTY				DRAWING NUMBER 90-2116-02
				DELTEX				

DSB FILE NO. 90-2116-SHT-02



ASSEMBLY "D"  
(18) REQUIRED



ASSEMBLY "A"  
(64) REQUIRED

23

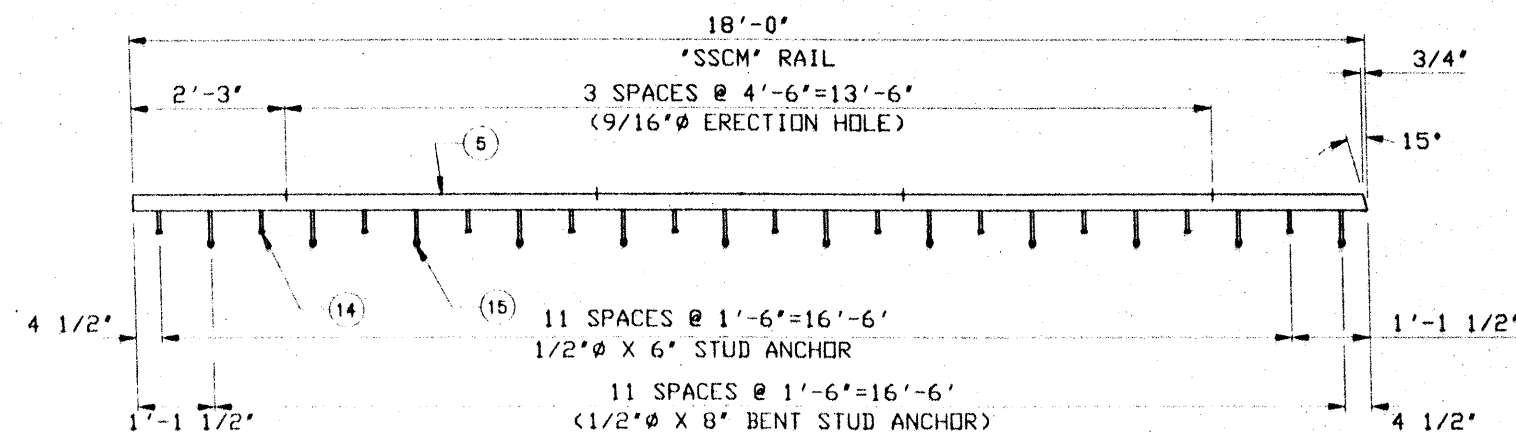
STATE DEPARTMENT OF HIGHWAY  
AND PUBLIC TRANSPORTATION  
APPROVED  
JUN 13 1990  
APPROVAL OF THIS DRAWING DOES NOT  
RELIEVE THE CONTRACTOR OF THE  
RESPONSIBILITY FOR THE CORRECTNESS  
OF DETAIL

NOTES:

IF ANCHOR STUDS INTERFERE  
WITH ERECTION HOLES, RE-  
LOCATE STUDS.

FOR UPTURN DETAIL  
SEE SHEET NO. 5

EXPANSION JOINTS FABRICATED BY:  
DELTEX STEEL FABRICATING COMPANY  
CUT 'N' SHOOT, TEXAS 77303  
OR THE D.S. BROWN CO.  
NORTH BALTIMORE, OHIO 45872

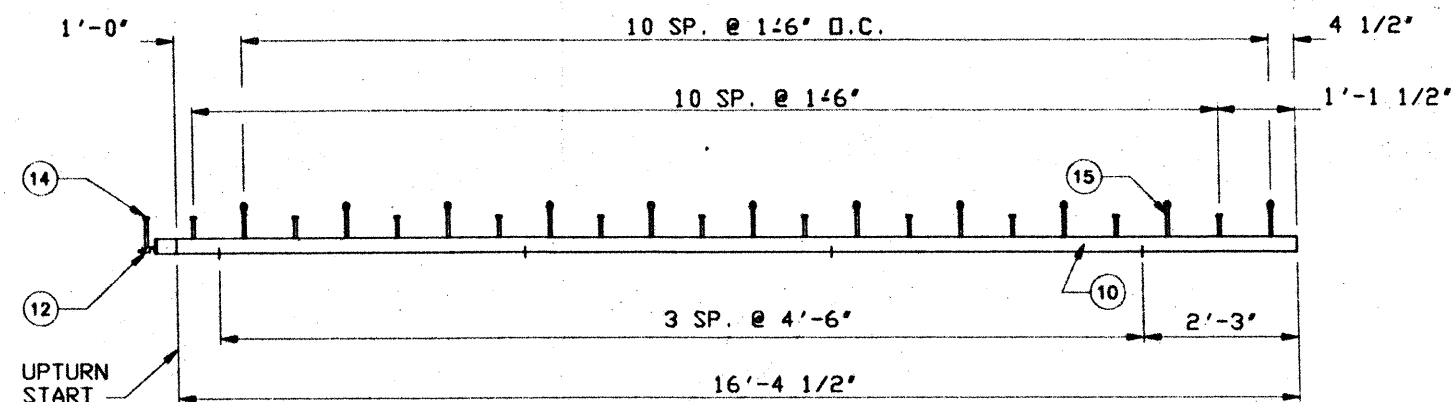


ASSEMBLY "E"  
(18) REQUIRED

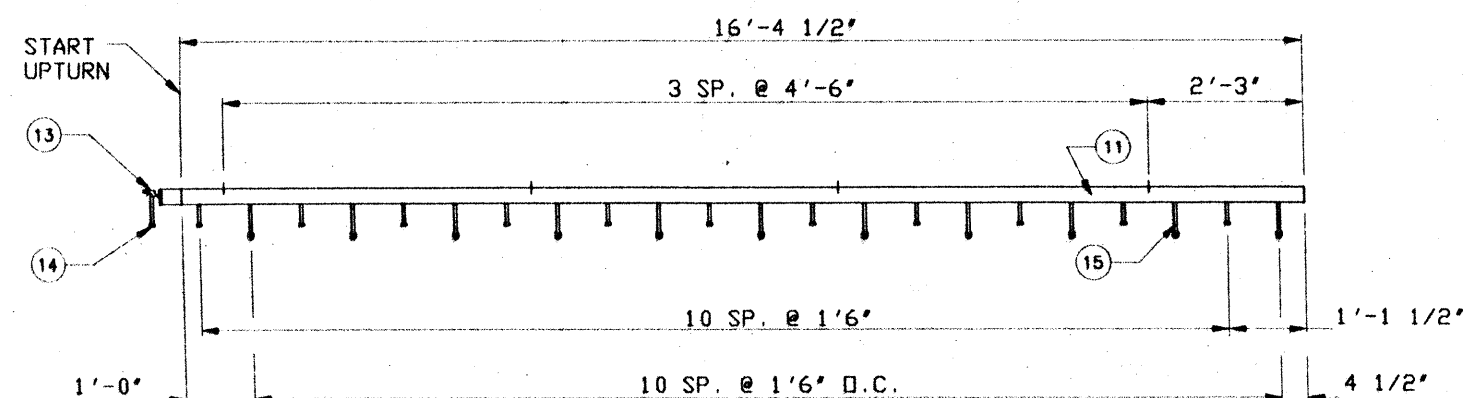
D.S. BROWN 90-2116 SHEET 3 OF 5

THE D.S. BROWN COMPANY 300 E. CHERRY ST. P.O. BOX 158 NORTH BALTIMORE, OHIO 45872-0158				DATE	SYM	REVISION	DR	CK
CONTRACTOR: JASCON								
FED. RD. DIST. NO.	STATE	PROJECT NO.	HIGHWAY NO.					
6	TEXAS	IR 35-2(157)173	I.H. 35					
STATE DIST. NO.	COUNTY	CEN. NO.	SECTION NO.	SCALE:	DATE:	DRAWN BY:		
15	GUADALUPE	16-8-28		5-8-90	5-8-90	WFM		
DRAWN:	CHECK:	DATE:	SHEET:					
WFM		5-8-90	3					
JOB NO:	DESCRIPTION:							
90-2116								
				THE D.S. BROWN COMPANY, INC. NORTH BALTIMORE, OHIO 45872-0158 U.S.A.				
				CIBOLO CREEK BRIDGE				
				GUADALUPE COUNTY TEXAS				
				DELTEX		EXPANSION NUMBER 90-2116-03		

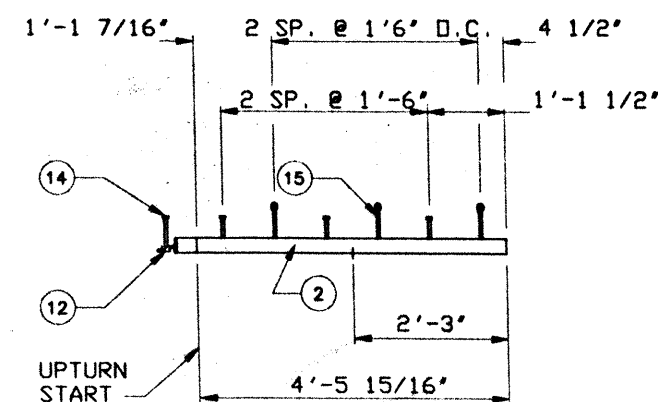
DSB FILE NO: 90-2116\SH1-03



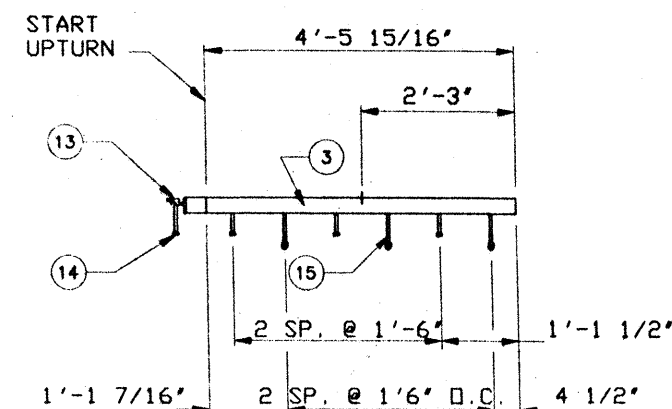
ASSEMBLY "J"  
(6) REQUIRED



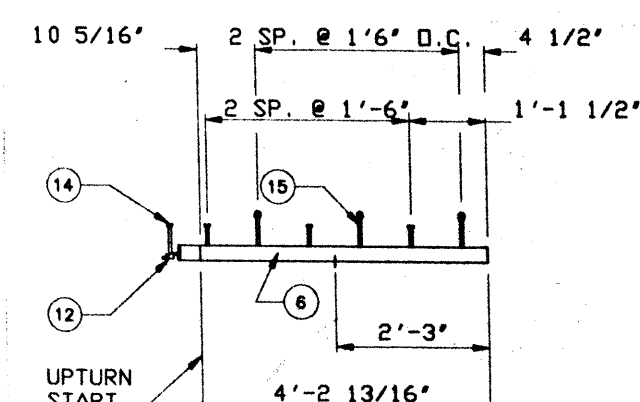
ASSEMBLY "K"  
(6) REQUIRED



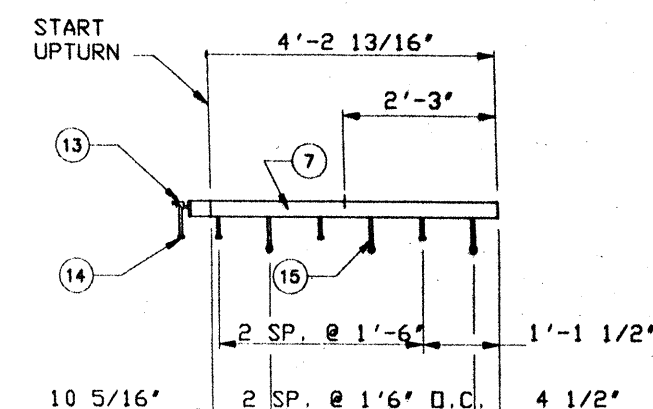
ASSEMBLY "B"  
(6) REQUIRED



ASSEMBLY "C"  
(6) REQUIRED



ASSEMBLY "F"  
(6) REQUIRED



ASSEMBLY "G"  
(6) REQUIRED

NOTES:

IF ANCHOR STUDS INTERFERE  
WITH ERECTION HOLES, RE-  
LOCATE STUDS.

FOR UPTURN DETAIL  
SEE SHEET NO. 5

EXPANSION JOINTS FABRICATED BY:  
DELTEX STEEL FABRICATING COMPANY  
CUT 'N' SHOOT, TEXAS 77303  
OR THE D.S. BROWN CO.  
NORTH BALTIMORE, OHIO 45872

STATE DEPARTMENT OF HIGHWAY  
AND PUBLIC TRANSPORTATION  
APPROVED  
BRIDGE DIVISION  
JUN 13 1990  
APPROVAL OF THIS DRAWING DOES NOT  
RELIEVE THE CONTRACTOR OF THE  
RESPONSIBILITY FOR THE CORRECTNESS  
OF DETAIL

D.S. BROWN 90-2116 SHEET 4 OF 5

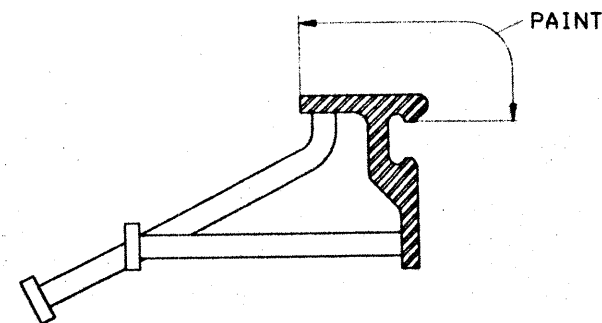
THE D.S. BROWN COMPANY 300 E. CHERRY ST. P.O. BOX 158 NORTH BALTIMORE, OHIO 45872-0158				DATE	SYM	REVISION	OR	CK
CONTRACTOR JASCON								
FED. RD. DIST. NO. 6	STATE TEXAS	PROJECT NO. IR 35-2(157)173	HIGHWAY NO. I.H. 35	THE D.S. BROWN COMPANY, INC. NORTH BALTIMORE, OHIO 45872-0158 U.S.A.				
STATE DIST. NO. 15	COUNTY GUADALUPE	CITY NO. 16-6-29	JOB NO. 5-1-90	SCALE DATE: 5-8-90	DRAWN BY: WFM			
DRAWN WFM	CHECK	DATE 5-1-90	SHEET 4	CIBOLO CREEK BRIDGE GUADALUPE COUNTY TEXAS				
JOB NO. 90-2116	DESCRIPTION PLAN VIEW			DELTEX 90-2116-04				

DSB FILE NO: 90-2116\SH-04

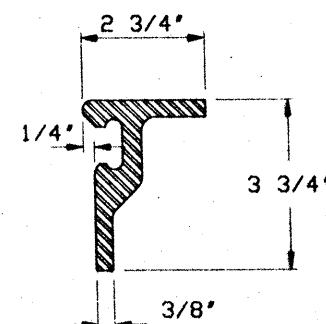


# GENERAL NOTES

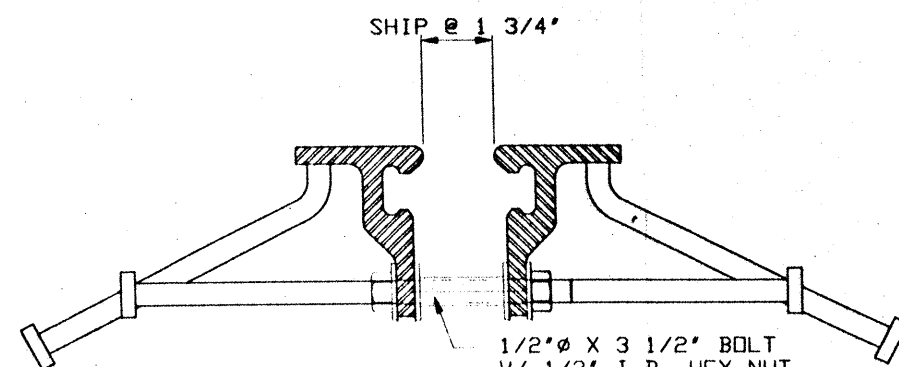
- \*SSCM\* FRAME RAILS TO BE ASTM-A588.
- ALL STUD ANCHORS TO BE ASTM-A108 STEEL.
- ALL STUD ANCHORS TO BE ELECTRIC ARC END-WELDED W/ COMPLETE FUSION.
- EXPANSION JOINTS TO FOLLOW RDWY. SLOPE.
- NEOPRENE SEAL TO BE CONTINUOUS.
- ALL ASSEMBLIES TO BE PIECE-MARKED.
- SHOP CLEAN AND SHOP PAINT W/ PROTECTION SYSTEM 1, PRIME COAT ONLY TO LIMITS SHOWN.
- REMOVE ALL BURRS WHICH MAY BE IN CONTACT WITH THE SEAL PRIOR TO MAKING SPLICE.



PAINT LIMITS

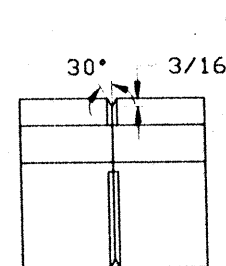


\*SSCM\* FRAME RAIL

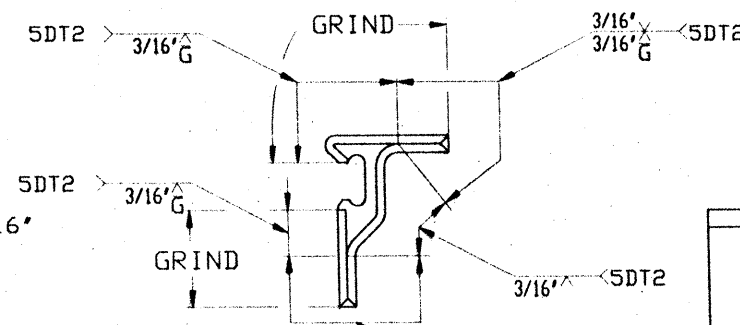


TEMPORARY ADJUSTMENT DEVICE

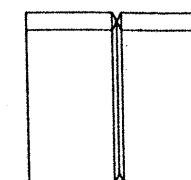
1/2" X 3 1/2" BOLT  
W/ 1/2" I.D. HEX NUT,  
1/2" I.D. FLAT WASHERS,  
5/8" I.D. X 2" BLACK  
PIPE



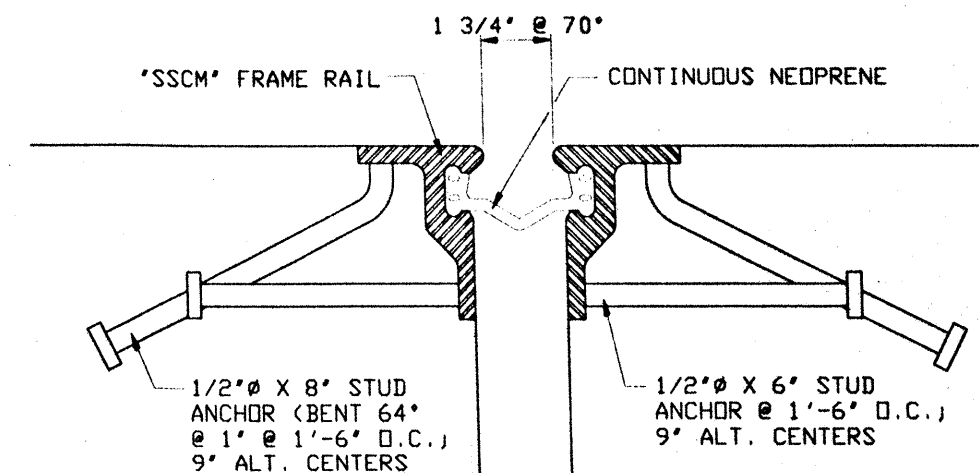
FRONT VIEW



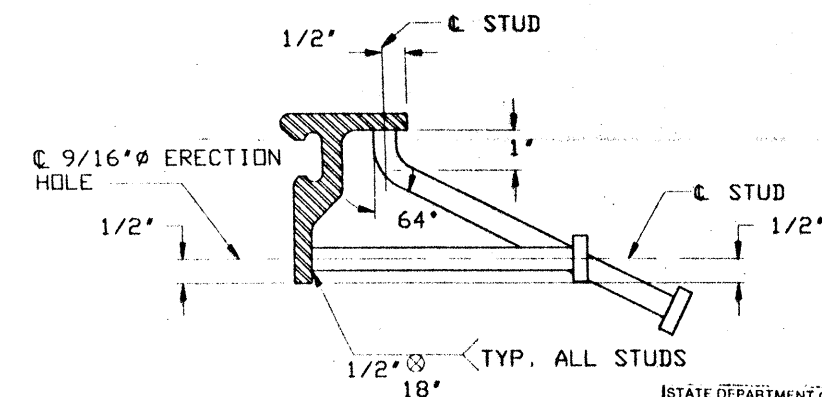
WELD LIMITS  
SPLICE DETAIL



REAR VIEW

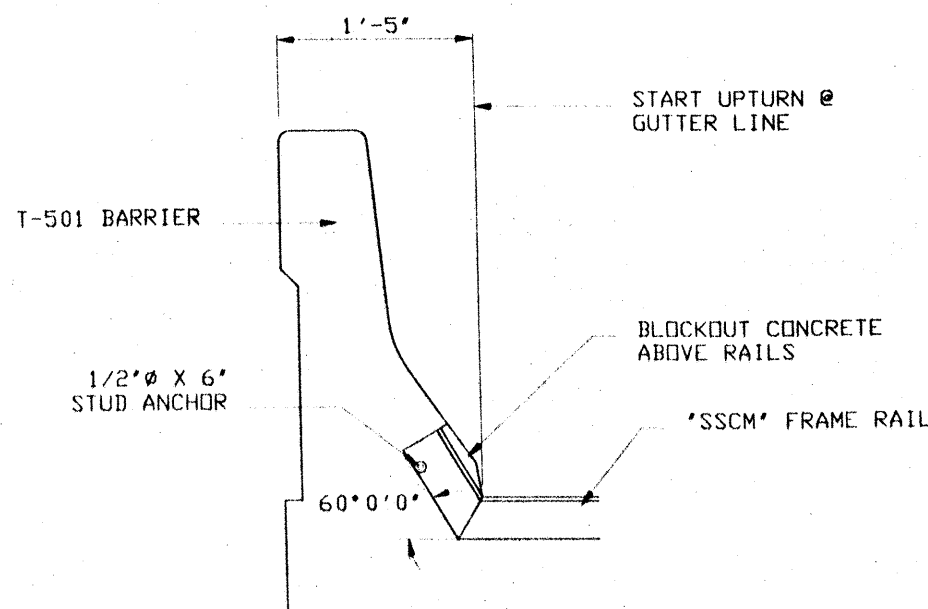


SECTION THRU EXPANSION JOINT

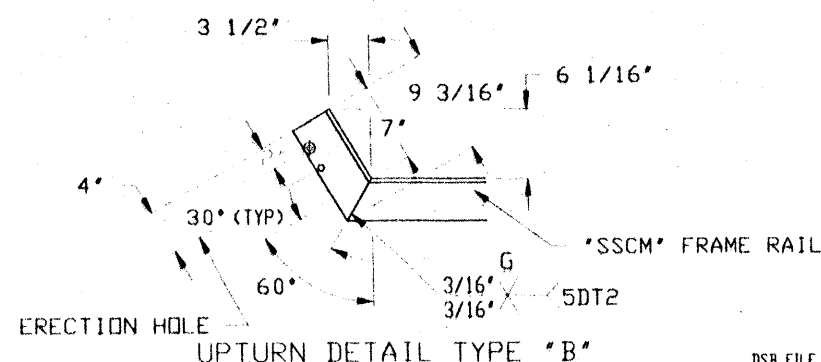


\*SSCM\* ANCHORAGE DETAIL

STATE DEPARTMENT OF HIGHWAY  
AND PUBLIC TRANSPORTATION  
APPROVED  
BRIDGE DIVISION  
JUN 13 1990  
APPROVAL OF THIS DRAWING DOES NOT  
RELIEVE THE CONTRACTOR OF THE  
RESPONSIBILITY FOR THE CORRECTNESS  
OF DETAIL



TYP. BARRIER DETAIL



UPTURN DETAIL TYPE "B"

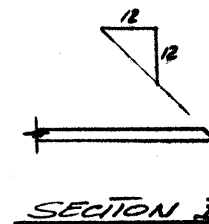
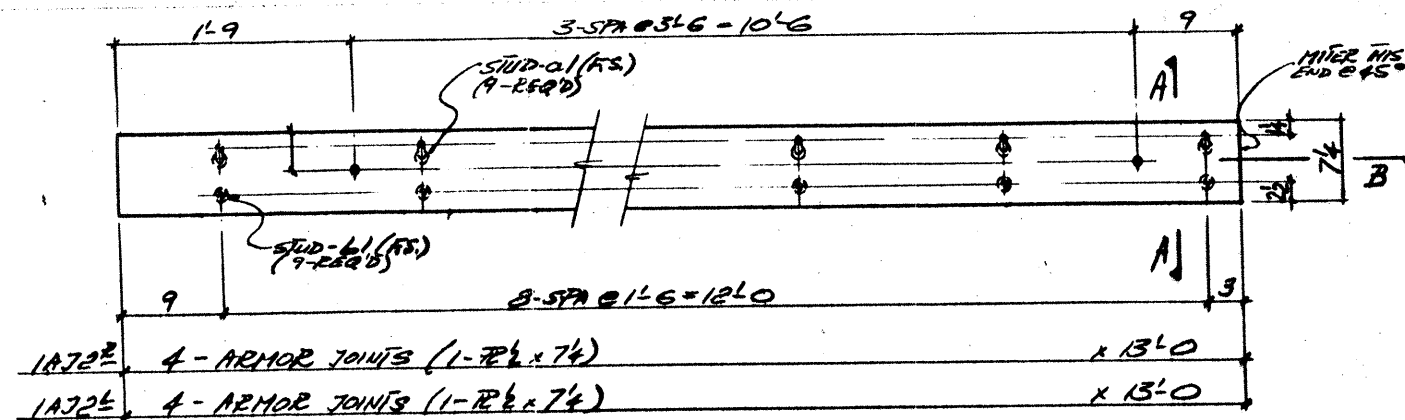
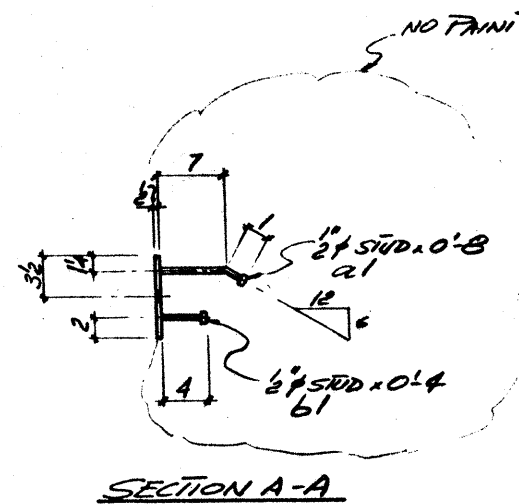
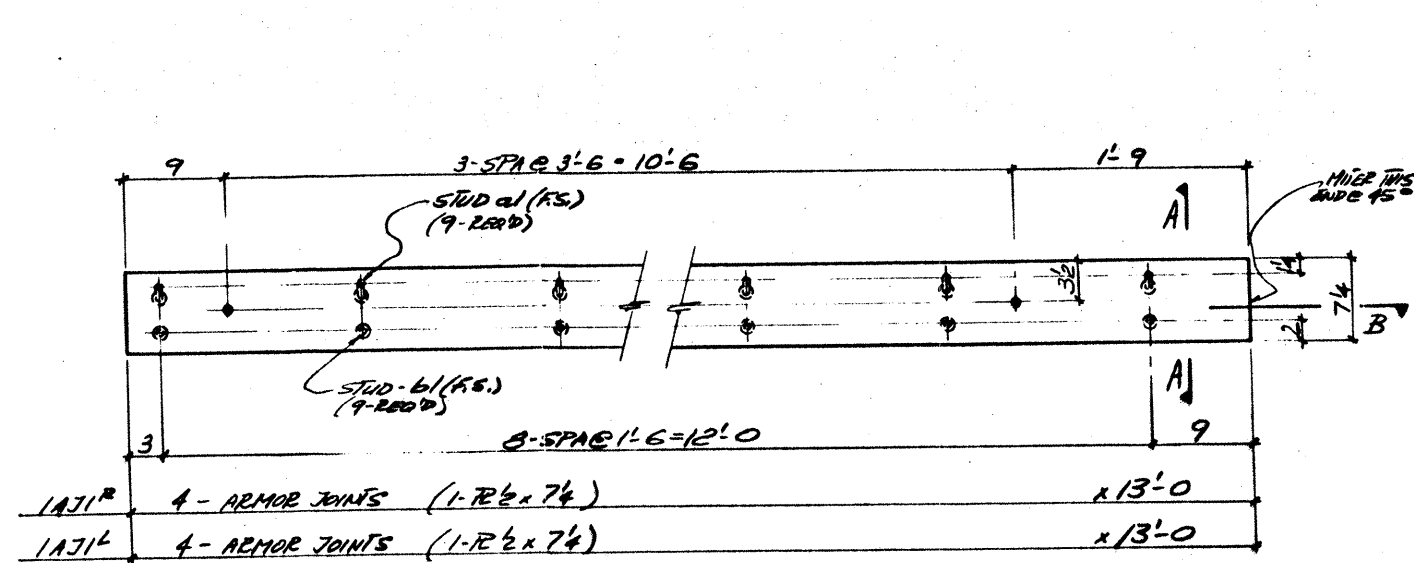
DSB FILE NO. 90-2116/SH-05

EXPANSION JOINTS FABRICATED BY:  
DELTEX STEEL FABRICATING COMPANY  
CUT 'N' SHOOT, TEXAS 77303  
OR THE D.S. BROWN CO.  
NORTH BALTIMORE, OHIO 45872

D.S. BROWN 90-2116 SHEET 5 OF 5

THE D.S.BROWN COMPANY 300 E. CHERRY ST. P.O. BOX 158 NORTH BALTIMORE, OHIO 45872-0158						DATE	SYM	REVISION	OR	CK
CONTRACTOR: JASCON										
FED. RD. DIST. NO.	STATE	PROJECT NO.		HIGHWAY NO.						
6	TEXAS	IR 35-2(157)173		I.H. 35						
STATE DIST. NO.	COUNTY	CITIZEN NO.	SECTION NO.	JOB NO.						
15	GUADALUPE	15-6-28								
DRAWN:	CHECK:	DATE:	SHEET:		SCALE:					
WFM		5-8-90	5		DATE: 5-8-90 <i>And Jan</i> DRAWN BY: WFM					
JOB NO.	DESCRIPTION:		5			CIBLO CREEK BRIDGE				
90-2116						GUADALUPE COUNTY TEXAS				
					DELETED					
					DRAWING NUMBER 90-2116-0					





8121  
02

Notice to contractors and erectors  
back charges for correction work  
or replacement material will not be  
accepted unless authorized by  
CAPITOL CITY STEEL CO. INC.  
before any such costs are incurred

APPROVAL/REVIEW AUTHORITY  
PLEASE REVIEW THIS DRAWING CAREFULLY

It represents our interpretation of the intent of the contract documents.  
However, the steel fabricator and the structural steel detailer assume  
no responsibility for the design of the information shown on this drawing.  
This is the responsibility of the buyer.

Unless noted to the contrary, on this drawing, when it is returned from  
approval it will be assumed that all information shown herein has the  
attestation of the approval authority.

Subsequent changes to information shown on these drawings after first  
submission will be considered as contract changes.

NOTE:  
ALL DIM. & ELEVATIONS MUST  
BE STRICTLY ADHERED TO OR  
STEEL WILL NOT FIT. REPORT  
ANY DISCREPANCIES TO  
C.C.S.C. IMMEDIATELY.

PRINT RECORD			
CHK'D	NO	REVISION	DATE
B. CHK'D	5/78	Approval	2/7/78
S. BY		Shop	
C. CHK'D		Shop Rev.	
Revision		Erection	
Revision		Erection	
Revision		Er. Rev.	

4	1/2" x 7/4"	13'-0"	4	1/2" x 7/4"	AS SHW
4	1/2" x 7/4"	13'-0"	4	1/2" x 7/4"	APP. HAD
21	7/8" STUD	0'-8"			BENT
61	7/8" STUD	0'-4"			

4	1/2" x 7/4"	13'-0"	4	1/2" x 7/4"	AS SHW
4	1/2" x 7/4"	13'-0"	4	1/2" x 7/4"	APP. HAD
21	7/8" STUD				BENT
61	7/8" STUD				

SHOT BOLT  
3/4" A307HW 0'-2 1/2"  
3/4" NUT & WASH  
3/4" STUD THE 0'-3"

SPACER

8.7

FOR APPROVAL ONLY

STATE DEPARTMENT OF HIGHWAY  
AND PUBLIC TRANSPORTATION  
APPROVED  
FEB 27 1978

Reproducible

Gen Notes:  
1. Studs shall be electric arc welded with complete fusion. Material  
for studs shall conform to A.S.T.M. A108, Grades 1015, 1018 or 1020.  
2. STEEL SPECIFICATION A-36

OPEN HOLES UNL. NTD. 1/2" SHOP PAINT END SYSTEM

CAPITOL CITY STEEL COMPANY, INC.		A SUBSIDIARY OF COMMERCIAL METALS COMPANY	
P.O. BOX 3105		AC 512-282-0829	
AUSTIN, TEXAS 78704			
CUSTOMER	JASCON	WORK ORDER	90-733
PROJECT	GUADALUPE (21255-2157) 113	DATE	2-90
LOCATION	SEMA, TEXAS	DWN	EM
ARCH or ENG	TEXAS HIGHWAY DEPARTMENT	CHK'D	
ARMOR JOINTS		SHEET NO	1
		(SEE E1)	