STATE	[illegible]	SHEET NO.
MO		1
[illegible]		

MISSOURI HIGHWAY AND TRANSPORTATION COMMISSION

AWARDED
MAY 05 1995
TRANSPORTATION DEPT.

ROUTE 291 MISSOURI RIVER BRIDGE

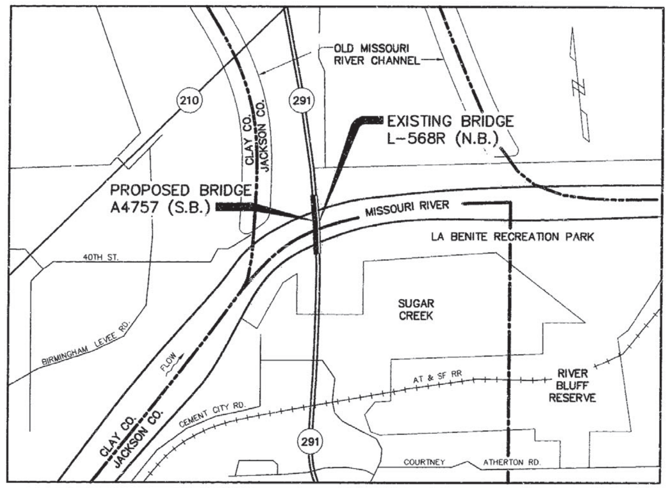
JACKSON COUNTY

CONTRACT 1

APPROACH BENTS, RIVER PIERS, PRESTRESSED GIRDERS AND BRIDGE DECK (Units 1 & 3)

1994

INDEX OF SHEETS



LOCATION SKETCH

Added sheets:
2A ... Summary (1 sheet)
2B.... Summary (1 sheet)
2C.... Traffic Control Plan (1 sheet)
60.... Standard Plan Index (1 sheet)

INDEX OF SHEETS

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STATE OF MISSOURI
KEVIN R. EISENBEIS
NUMBER E–20946
REGISTERED PROFESSIONAL ENGINEER

SUBMITTED BY: Kevin R. Eisenbeis
REGISTERED PROFESSIONAL ENGINEER
MISSOURI NO. E–20946

291COVER

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: B.T.K. 03/93
CHECKED: E.W.N. 03/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 1 OF 59

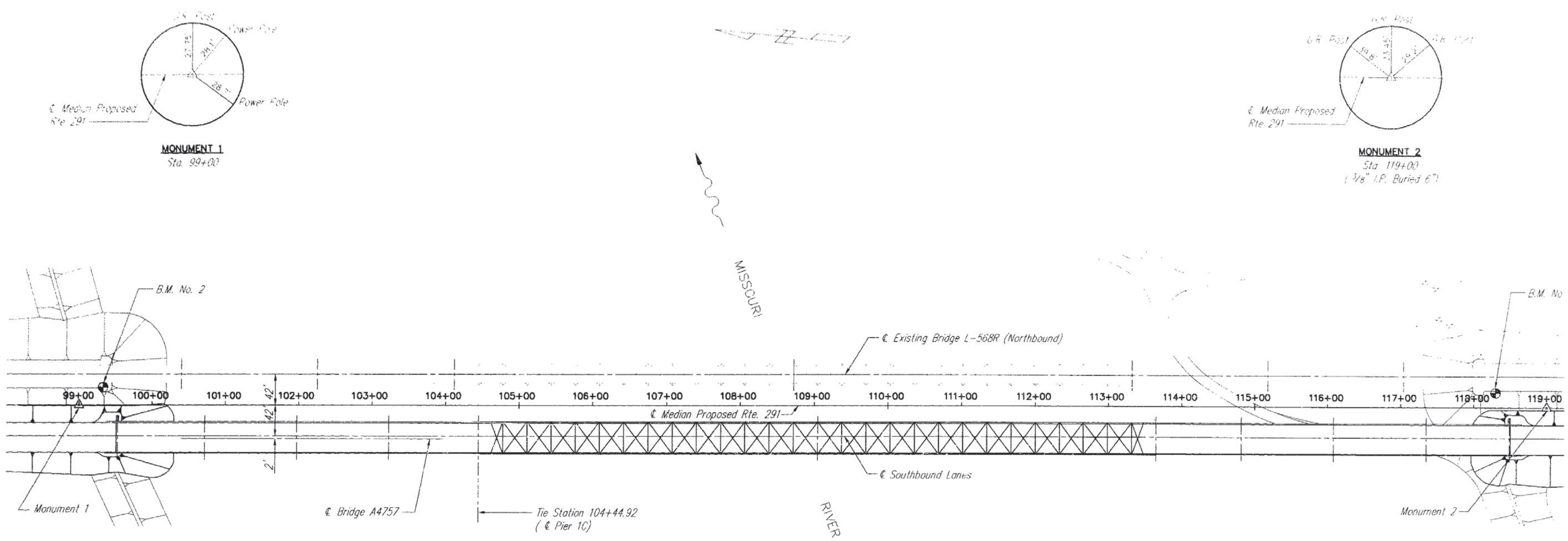
BRIDGE OVER MISSOURI RIVER

IN JACKSON COUNTY, MISSOURI
PROJECT NO. STA. 99+52.92
JOB NO. J4U0564C RTE. 291
JACKSON COUNTY

DATE

STD.
STD. 504.00
STD. 605.10
STD. 609.00
STD. 706.35

A4757



BENCH MARKS:

B.M. No. 2 Elev 763.54 – Chiseled "□" on West Wing of North Abut. of Missouri River Bridge L-568R 24' Lt. ₵ Med. Sta. 99+33 ±.

B.M. No. 5 Elev. 763.45 – USC&G B.M. Disk Stamped U-218 Quad 390942 20'± Lt. ₵ Med. Sta. 118+30 ±.

NOTE:

The Monuments shown on this drawing shall be used for stationing and alignment of the bridge.

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SURVEY TIES & ALIGNMENT DIAGRAM

ROUTE 291 MISSOURI RIVER BRIDGE

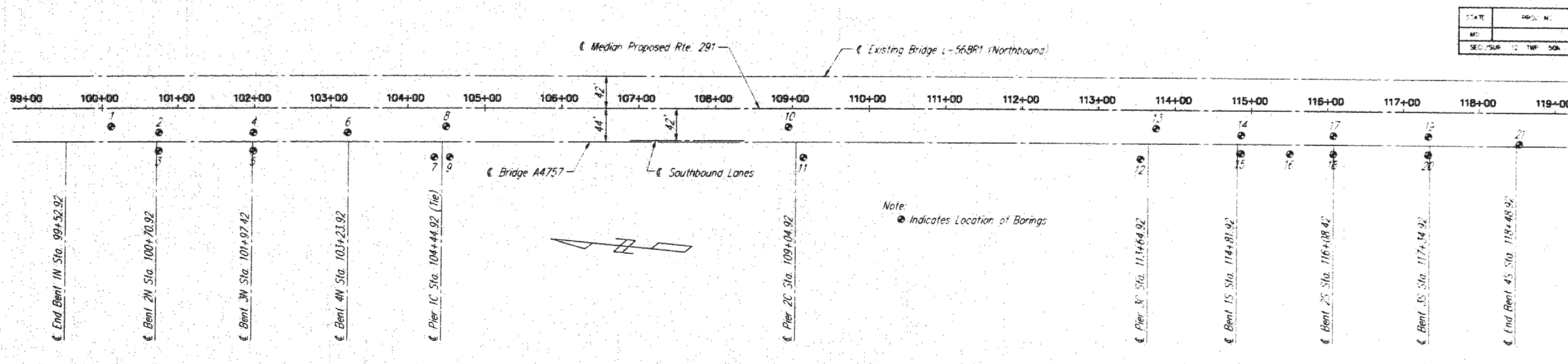
Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: B.T.K. 02/93
CHECKED: E.W.N. 02/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

A4757



BORING LOG LOCATIONS

DEPTH Ft.	ELEV.	
0.0'	728.9	
5.0'	723.9	Cobbles to boulders, (riprap).
80.0'	648.9	Fine to coarse sand.
103.5'	625.4	Coarse sand with scattered gravel.
106.8'	622.1	Hard shale.

1
100+12
20' Lt.
9/5/90

DEPTH Ft.	ELEV.	
0.0'	723.4	
1.0'	722.4	Cobbles to gravel, fill.
6.0'	717.4	Dark brown sandy silty clay.
20.0'	703.4	Brown fine silty sand.
32.5'	690.9	Fine to medium grained sand, wet.
74.6'	648.8	Medium to coarse sand, clean, wet.
85.0'	638.4	Medium to coarse sand, clean, wet with scattered gravel layers.
97.0'	626.4	Coarse clean sand, wet with gravel layers.
97.8'	625.6	Shale, slightly weathered.
102.0'	621.4	Hard shale.

2
100+75
12' Lt.
9/5/90

DEPTH Ft.	BLOWS 6"	POCKET PEN. tsf	ELEV.	
0.0'			723.1	
5.0'	9-13-16	2.0-3.0	718.1	Brown clayey sand, wet, stiff.
7.5'			715.6	
10.0'	10-14-18		713.1	Brown, fine to medium sand, round, dense, some lignite.
15.0'	9-13-12		708.1	
20.0'	6-5-5		703.1	
22.5'			700.6	
25.0'	3-3-4		698.1	Brown, medium to coarse sand, rounded, loose.
27.5'			695.6	
30.0'	20-25-21		693.1	Gray fine sand, rounded, dense to very dense, some lignite.
35.0'	9-7-5		688.1	
35.5'			687.6	
40.0'	6-6-5		683.1	Gray medium sand, rounded medium dense, some lignite, gray clay seam @ 49.5'-51.0'
45.0'	6-8-9		678.1	
50.0'	12-6-18		673.1	
51.0'			672.1	
55.0'	17-27-34		668.1	Gray fine sand, rounded, clean, very dense.
60.0'	14-19-22		663.1	
63.5'			659.6	
70.0'	13-15-10		653.1	Gray coarse sand with some fine gravel, medium dense.
85.0'	19-34-51		638.1	
86.6'			636.5	
87.2'			635.9	Boulder.
92.2'			630.9	Sand.
92.4'	100 in 5"	6.0-8.0	630.7	Gray areneceous silty shale.
97.5'	100 in 5.5"	9+	625.6	
100.8'			622.3	
102.5'			620.6	Limestone.

3
100+75
12' Rt.
10/4/90

DEPTH Ft.	BLOWS 6"	POCKET PEN. tsf	ELEV.	
0.0'			723.1	
2.0'			721.1	Limestone cobbles to gravel, fill.
5.0'	2-3-5	2.0	718.1	Dark brown sandy silty clay, stiff, moist.
7.5'			715.6	
10.0'	6-7-8		713.1	Brown fine silty sand, loose with some scattered clayey sand pockets, wet from 12.5'±
15.0'	4-3-3		708.1	
20.0'	3-3-5		703.1	
22.5'			700.6	
25.0'	8-5-7		698.1	Medium to coarse sand wet, loose to medium dense, clean.
30.0'	8-11-16		693.1	
32.5'			690.6	
35.0'	7-10-10		688.1	Fine to medium sand, medium dense, clean.
40.0'	6-6-7		683.1	
45.0'	9-11-21		678.1	
48.5'			674.6	
50.0'	13-15-11		673.1	Medium to coarse sand clean, rounded, scattered gravel.
55.0'	9-19-25		668.1	
55.5'			667.6	
60.0'	21-26-22		663.1	Fine to medium sand, clean, rounded, some fine gravel throughout.
68.5'			654.6	
70.0'	10-8-9		653.1	Coarse sand, clean, rounded, scattered cobbles with boulder at 73.0'-82.0', more abundant at 92.7'-95.2'.
80.0'	9-10-13		643.1	
85.0'	25-24-21		638.1	
95.0'	100 in 6"		628.1	
95.2'			627.9	
100.0'	100 in 6"		623.1	Gray silty shale, dry very hard.
102.5'			620.6	
104.2'			618.9	Gray shaley limestones, hard.
105.0'			618.1	Gray silty shale, dry, hard.

4
101+99
12' Lt.
9/6/90

Notice And Disclaimer Regarding Boring Log Data:

The approximate locations of all subsurface boring for this structure are as shown above for this structure. Boring data for the numbered locations is shown on this sheet and the following three sheets. The boring data for all locations indicated, as well as any other boring logs or other factual records of subsurface data and investigations performed by the department for the design of the project, is available from the district materials engineer upon written request as outlined in the project special provisions. No greater significance or weight should be given to the boring data depicted on the plan sheets than to subsurface data available from the district or elsewhere.

The commission does not represent or warrant that any such boring data accurately depicts the conditions to be encountered in constructing this project. A contractor assumes all risks it may encounter in basing its bid prices, time or schedule of performance on the boring data depicted here or those available from the district, or on any other documentation not expressly warranted, which the contractor may obtain from the commission.

DEPTH Ft.	ELEV.	
0.0'	723.4	
0.4'	723.0	Cobble, fill.
12.5'	710.9	Dark brown silty clay to clay.
30.0'	693.4	Sandy silt, wet.
74.8'	648.6	Medium sand.
75.9'	647.5	Gravel to scattered boulders with coarse sand.
96.7'	626.7	Coarse sand with some scattered gravel.
98.4'	625.0	Shale, hard.

5
101+99
12' Rt.
9/5/90

BORING LOG LOCATIONS AND BORING LOGS

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

342

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: T.L.W. 2/93
CHECKED: E.W.N. 2/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

A4757

STATE	PROJ. NO.	SHEET NO.
MO.		4

SEC./SUR. 12 TWP. 50N RGE. 32W

DEPTH Ft.	BLOWS 6"	POCKET PEN tsf	ELEV.	
0.0'			723.7	
5.0'	2-3-4	.5-1.0	718.7	Brown sandy silt, moist medium stiff.
6.0'			717.7	
10.0'	2-3-3	.5-1.0	713.7	Brown silty clay, moist medium stiff.
11.0'			712.7	
≠ 15.0'	3-3-3	.5	708.7	Gray silty sand, wet soft to medium stiff.
20.0'	2-2-2	.5	703.7	
23.5'			700.2	
25.0'	5-6-9		698.7	Gray fine sand, slightly silty, wet, medium dense.
30.0'	3-5-8		693.7	
35.0'	10-13-13		688.7	
37.5'			686.2	
40.0'	8-10-11		683.7	Medium grained sand rounded, dense with scattered coarse rounded gravel.
45.0'	13-20-29		678.7	
50.0'	9-14-11		673.7	
55.0'	15-20-14		668.7	
57.5'			666.2	
60.0'	16-32-47		663.7	Fine to medium grained sand, rounded, very dense.
70.0'	12-18-27		653.7	
74.7'			649.0	
80.0'	11-24-76 in 3"		643.7	Medium grained sand, rounded, scattered cobbles with boulders.
82.5'			641.2	
85.0'	100 in 2.5"	7.5	638.7	Gray shale, hard, dry.
90.0'	100 in 3"	8.0-9+	633.7	
95.0'	100 in 4"	8.0-9+	628.7	
105.0'			618.7	

≠ Water Elev. as of 8/30/90

6
103+22
12' Lt.
8/28-29/90

DEPTH Ft.	BLOWS 6"	POCKET PEN. tsf	ASTM CLASS	ELEV.	
0.0'				723.6	
5.0'	6-5-4	1.0	ML	718.6	Brown sandy silt with sand layers, moist, medium stiff.
10.0'	2-2-2	1.0	ML	713.6	
12.5'				711.1	
15.0'	3-1-2		ML	708.6	Dark gray silty fine sand, wet, soft to medium stiff.
20.0'	1-1-3		CL-ML	703.6	
25.0'	2-2-5		SM	698.6	
30.0'	5-12-15		SM	693.6	
30.5'				693.1	
35.0'	7-9-11		SP-SM	688.6	Gray fine sand, rounded, clean, medium dense to dense.
40.0'	7-8-7		SW	683.6	
44.5'				679.0	
45.0'	6-9-8		SW	678.6	Medium sand, medium dense clean, scattered rounded gravel.
50.0'	10-13-19		SW-SM	673.6	
55.0'	9-9-8		SW	668.6	
60.0'	10-17-13		SW	663.6	
65.0'	15-14-15		SW	658.6	
70.0'	8-11-15		SW	653.6	
74.5'				649.1	
75.0'	19-18-15		SW	648.6	Medium to coarse grained sand, rounded, dense, abundant cobbles with boulders.
80.0'	17-29-22		SW	643.6	
80.1'				643.5	
85.0'	11-21-79		SP	638.6	Fine grained sand, very dense, clean, rounded.
86.0'				637.6	
102.8'				620.8	Gray silty shale, dry, very hard, calcareous.
104.5'				619.1	Argillaceous limestone hard, fossiliferous, medium bedded.
108.6'				615.0	Gray silty, calcareous shale, hard.
110.9'				612.7	Argillaceous limestone, hard.
113.8'				609.8	Gray silty shale, hard.
117.7'				605.9	Argillaceous limestone to limestone, hard, medium to thick bedded.
119.8'				603.8	Dark gray shale.

7
104+35
20' Rt.
8/28/90

DEPTH Ft.	ELEV.	
0.0'	721.8	
18.0'	703.8	Brown sandy silt.
29.5'	692.3	Gray silty sand, wet and loose.
47.5'	674.3	Sand.
52.5'	669.3	Gravel in sand.
74.6'	647.2	Medium sand with some scattered gravel.
77.0'	644.8	Gravel to cobbles.
85.5'	636.3	Packed sand.
89.5'	632.3	Shale, slightly weathered.
92.5'	629.3	Hard shale.

9
104+55
20' Rt.
9/5/90

DEPTH Ft.	BLOWS 6"	POCKET PEN. tsf	ELEV.	
0.0'			712.4	Elevation of deck.
4.4'			708.0	Barge.
18.0'			694.4	Water
35.7'			676.7	Light brown and black sand, fine to medium grained, loose.
66.3'			646.1	Light brown to black medium grained sand with scattered gravel, loose coarse grained, some lignite at 61.5'.
88.1'			624.3	Brown and black, medium to coarse grained sand with scattered fine gravel, lignite becoming more abundant at 82.0'.
89.1'			623.3	Gray limestone, thin bedded with shale layers, hard.
91.1'			621.3	Dark gray clayey shale, hard.
93.6'	100 in 3"	9.5+	618.8	Gray clay shale.
94.8'			617.6	Gray shaley limestone, medium bedded, hard.
99.5'			612.9	Dark gray hard calcareous shale, clayey.
103.8'			608.6	Light gray shaley limestone, thick bedded, moderately hard.
104.8'			607.6	Gray clayey shale.
106.2'			606.2	Dark gray to green calcareous shale, clayey, soft, thinly laminated.
107.2'			605.2	Light gray to dark gray shaley limestone, medium hard to moderately hard, medium bedded.
108.2'			604.2	Dark gray calcareous shale, clayey, soft.
108.8'			603.6	Gray shaley limestone, medium bedded.
110.1'			602.3	Dark gray silty shale, hard to very hard, non-calcareous.
111.8'			600.6	Light gray, silty shale, calcareous, moderately hard to hard, with some limestone stringers.
112.4'			600.0	Light gray limestone with shale on bedding and fracture planes.
113.8'	100 in 1.5"	9.5+	598.6	Gray to green silty shale with scattered limestone stringers, dry.
113.9'			598.5	Dark gray silty shale hard.
114.2'			598.2	Brown limestone, hard fine grained.
115.3'			597.1	Dark gray silty shale moderately hard to hard.
118.9'			593.5	Medium to light gray silty shale, slightly calcareous, moderately hard to hard.
119.0'			593.4	Light brown argillaceous limestone, hard to very hard.

10
108+95
20' Lt.
10/2/90

DEPTH Ft	BLOWS 6"	POCKET PEN. tsf	ASTM CLASS	ELEV.	
0.0'				712.4	Elevation of deck.
4.4'				708.0	Barge.
17.0'				695.4	Water.
30.0'	8-7-8		SP	682.4	Sand, fine to medium grained, loose, clean
35.0'	7-6-7		SP	677.4	
37.5'				674.9	
40.0'	14-16-14		SP	672.4	Fine sand, medium dense, clean.
42.5'				669.9	
45.0'	11-10-11		SP	667.4	
50.0'	10-6-8		SW	662.4	
55.0'	15-15-13		SW	657.4	Fine to coarse sand, medium dense to loose, clean with some lignite pockets.
60.0'	15-10-12		SW	652.4	
65.0'	11-14-9		SP	647.4	
70.0'	9-10-12		SW	642.4	
72.5'				639.9	
75.0'	21-35-43		SP-SM	637.4	
80.0'	15-11-12		SP	632.4	Fine sand, medium dense to dense, with trace lignite.
85.0'	8-16-24		SW-SM	627.4	
88.1'				624.3	
89.2'				623.2	Gray shaly limestone, hard, thin bedded.
92.1'				620.3	Dark gray silty shale, thinly laminated, very hard.
93.4'	70-30 in 1"	9+		619.0	Gray silty shale, thinly laminated, moderately hard.
95.2'				617.2	Gray shaly limestone, thick bedded, very hard.
99.0'				613.4	Gray silty shale, thinly laminated, hard.
104.2'				608.2	Light gray shaly limestone, thick bedded, very hard.
108.0'	100 in 1.5"			604.4	Dark gray silty shale, thinly laminated, moderately hard with some hard calcareous shale stringers @ 111.4' to 112.6' & 114.0' to 114.8'.
118.2'				594.2	

11
109+15
20' Rt.
10/2-3/90

CORING LOG
(NX Double Tube Barrel)

	FROM	TO	RUN	REC	LOSS	% RQD	NOTES
BORING 7	87.0	92.0	5.0	5.0	0.0		
	92.0	97.0	5.0	5.0	0.0		
	97.0	100.3	3.3	3.3	0.0		
	100.3	105.0	4.7	5.0	+0.3	100	*
	105.0	109.8	4.8	5.0	+0.2		
	109.8	114.8	5.0	4.2	0.8	98	*
	114.8	119.8	5.0	5.0	0.0		
BORING 10	88.6	93.6	5.0	4.5	0.5		
	93.8	98.8	5.0	5.0	0.0	52	*
	98.8	103.8	5.0	5.0	0.0	100	*
	103.8	108.8	5.0	4.4	0.6		
	108.8	113.8	5.0	4.8	0.2		
	114.0	119.0	5.0	5.0	0.0		
BORING 11	88.4	93.4	5.0	5.0	0.0		
	94.0	99.0	5.0	4.1	0.9		**
	99.0	103.0	4.0	4.0	0.0	100	
	103.0	108.0	5.0	4.9	0.1		
	108.2	113.2	5.0	5.0	0.0		
	113.2	118.2	5.0	4.2	0.8		

* Limestone portion of core only.
** Loss in core probably due to shale core falling out of barrel.

UNCONFINED COMPRESSIVE STRENGTH TEST DATA

	DEPTH, FT.	Qu., tsf.
BORING 7	88.0	36.9
	94.0	17.0
	100.0	2.83
	102.0	6.90
	107.0	4.66
	113.0	32.30
BORING 10	92.0	1.33
	95.0	14.70
	101.0	813.0
	104.3	18.70
	109.0	49.64
	116.0	13.60
BORING 11	92.0	4.95
	97.0	19.60
	101.0	506.0
	106.0	18.82
	117.0	8.90

NOTE:
Test results for Pocket Pen is 9+ TSF for all depths at each boring.

DEPTH Ft.	ELEV.	
0.0'	714.4	
3.8'	710.6	Brown sandy silt, dry, soft.
12.5'	701.9	Brown sand, dry, medium, stiff.
45.0'	669.4	Gray fine sand, wet, dense scattered cobbles @ 52'.
83.1'	631.3	Gray course sand, wet, dense.
84.0'	630.4	Gray shale, dry, hard.

8
104+50
20' Lt.
9/5/90

DEPTH Ft.	ELEV.	
0.0'	711.3	
4.5'	706.8	Brown sandy silt, wet, soft, P.A.W.T. 0-4.5'.
33.5'	677.8	Medium to coarse grained sand, medium dense.
74.0'	637.3	Fine to medium grained sand, medium dense.
96.1'	615.2	Coarse grained sand rounded dense, heavy cobbles from 94.0' - 96.0'.
98.5'	612.8	Gray shale, dry, hard.

12
113+55
20' Rt.
8/30/90

Note:
P.A.W.T. = Pushed Augers Without Turning.

343

BORING-1

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: T.L.W. 2/93
CHECKED: E.W.N. 2/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

BORING LOGS

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

SHEET 4 OF 59

A4757

344

STATE	PROJ. NO.	SHEET NO.
MO.		5
SEC./SUR. 12 TWP. 50N RGE. 32W		

DEPTH Ft.	BLOWS 6"	POCKET PEN. tsf	ASTM CLASS	ELEV.	
0.0'				725.7	
5.0'	3-5-6	2.25	CH	720.7	Light brown to gray sand clayey silt.
7.5'				718.2	
10.0'	2-3-6		CL	715.7	Light brown to gray silty fine sand, moist to dry with limonite strains.
14.5'				711.2	
15.0'	2-1-1	0.25-0.5	CL	710.7	Gray clay, very soft to soft, trace sand.
16.5'				709.2	
18.1'	9/30/90 ▼ Water Elev.			707.6	
20.0'	10-12-11		SC	705.7	Medium to coarse sand medium dense, trace silt to 22.5'.
25.0'	9-15-15		SP	700.7	
27.5'				698.2	
30.0'	9-24-24		SP	695.7	Fine to medium sand; medium dense, loose from 32.5' to 42.5' then medium dense with some gravel layers from 48.0' with abundant lignite from 62.5' to 72.5'.
35.0'	7-8-9		SP-SM	690.7	
40.0'	9-7-8		SP-SM	685.7	
45.0'	19-15-10		SP-SM	680.7	
50.0'	21-25-25		SP-SM	675.7	
55.0'	14-18-17		SW-SM	670.7	
60.0'	17-21-25		SW-SM	665.7	
65.0'	10-12-17		SW-SM	660.7	
70.0'	14-12-11		SW	655.7	
72.5'				653.2	
75.0'	22-24-25		SW-SM	650.7	Fine to medium grained sand, medium dense with some lignite, and some gravel.
80.0'	15-13-13		SP-SM	645.7	
85.0'	15-14-12		SW	640.7	
87.0'				638.7	
88.4'				637.3	Heavy cobbles to boulders.
90.0'	16-12-16		SP	635.7	Medium to coarse sand with some gravel.
95.0'	13-12-11		SW	630.7	
100.0'	12-12-12		SW-SM	625.7	
105.0'	28-28-41		SW	620.7	
106.7'				619.0	
109.5'				616.2	Hard shale with limestone stringers.
110.6'				615.1	Gray clay shale.
111.9'				613.8	Gray calcareous shale, dry, hard.
115.6'				610.1	Gray slightly argillaceous limestone, medium grained, medium bedded, hard fossiliferous black from 115.2' to 115.6'.
116.2'				609.5	Gray calcareous shale very stiff to hard.
117.5'				608.2	Dark gray shale, hard.
118.7'				607.0	Light gray limestone, hard medium grained slightly argillaceous.
120.4'				605.3	Light gray argillaceous limestone to gray calcareous shale moderately soft to hard.
123.1'				602.6	Light gray limestone, hard, fine grained, medium bedded. argillaceous to 120.8'.
125.9'				599.8	Green gray argillaceous limestone, moderately hard.
130.4'				595.3	Dark gray shale, hard.
[illegible]				5[illegible].4	Gray crystalline limestone very hard, [illegible] bedded.
135.4'				590.3	Gray shale, hard.
137.9'				587.8	Dark gray argillaceous limestone, fine grained medium bedded.
140.1'				585.6	Dark gray calcareous shale, hard, medium bedded.
140.4'				585.3	Gray argilleceous limestone, hard.

13
113+75
20' Lt.
9/20/90

DEPTH Ft.	ELEV.	
0.0'	730.3	
11.7'	718.6	Sandy silt.
103.0'	727.3	Sand.
103.8'	626.5	Shale.

14
114+87
12' Lt.
8/30/90

DEPTH Ft.	ELEV.	
0.0'	728.9	
11.8'	717.1	Brown sandy silt, moist, soft.
23.1'	705.8	Medium to coarse grained sand, rounded, medium dense.
110.0'	618.9	Coarse grained sand, rounded, dense.
111.0'	617.9	Gray shale, dry hard.

15
114+87
12' Rt.
8/30/90

CORING LOG
(NX Double Tube Barrel)

	FROM	TO	RUN	REC	LOSS	% RQD	NOTES
BORING 13	109.5	111.8	2.3	2.3	0.0		
	111.8	116.8	5.0	5.0	0.0	100	*
	116.8	121.8	5.0	5.0	0.0	91	*
	[illegible]	[illegible]	5.0	5.0	0.0	56	*
	126.8	131.8	5.0	5.0	0.0	66	*
	131.8	135.4	3.6	3.6	0.0	65	*
	135.4	140.4	5.0	4.9	0.1	90	*
BORING 17							
	107.3	111.8	4.5	2.8	1.7		
	111.8	116.8	5.0	5.0	0.0		

*Limestone portion of core only.

DEPTH Ft.	BLOWS 6"	POCKET PEN. tsf	ELEV.	
0.0'			729.0	
5.0'	5-6-9	2.0-3.0	724.0	Dark brown sandy, silty clay, stiff to very stiff.
7.5'			721.5	
10.0'	5-6-8	1.0	719.0	Brown sandy silt.
12.5'			716.5	
15.0'	4-3-3	0.75	714.0	Fine silty sand with some gray brown clay pockets.
17.5'			711.5	
20.0'	8-8-11		709.0	Fine silty sand.
22.5'			706.5	
25.0'	14-20-31		704.0	Unsorted river sand, fairly clean, medium dense.
27.5'			701.5	
30.0'	13-18-20		699.0	Medium to coarse sand medium dense.
32.5'			696.5	
35.0'	19-16-17		694.0	Fine sand, medium dense.
40.0'	12-21-36		689.0	
42.5'			686.5	
45.0'	32-37-39		684.0	Fine sand, dense.
47.5'			681.5	
50.0'	24-17-15		679.0	Medium to coarse sand with some gravel, medium dense.
60.0'	17-15-15		669.0	
65.0'			664.0	
70.0'	35-39-44		659.0	Fine sand, dense.
75.0'			654.0	
80.0'	13-15-16		649.0	Medium coarse sand, medium dense.
90.0'	17-23-21		639.0	
100.0'	33-46-45		629.0	
109.2'			619.8	
110.0'	100 in 2"	9.0+	619.0	Calcareous shale, hard.
115.0'	100 in 1"		614.0	
117.5'			611.5	Hard limestone.
120.0'	61-39 in 2"	9.0+	609.0	Dark gray silty shale hard, dry.
120.7'			608.3	
121.7'			607.3	Hard limestone.
125.0'	100 in 2"	9.0+	604.0	Light gray calcoreous silty shale.
125.2'			603.8	

16
115+51
12' Rt.
8/13-14-15/90

DEPTH Ft.	BLOWS 6"	POCKET PEN. tsf	ELEV.	
0.0'			730.6	
7.5'			723.1	Sandy silt with scattered cobbles and gravel with clay pockets.
10.0'	8-10-9	0.75	720.6	Very sandy silt, fine, dry.
14.0'			716.6	
15.0'	10-9-8	0.75	715.6	Silty sand.
17.5'			713.1	
20.0'	7-9-10		710.6	Unsorted sand with some gravel, wet, medium dense.
25.0'	8-16-14		705.6	
30.0'	10-20-21		700.6	
35.0'	8-20-28		695.6	
35.5'			695.1	
40.0'	24-44-38		690.6	Fine sand, medium dense to dense.
45.0'	18-23-12		685.6	
47.5'			683.1	
50.0'	9-12-14		680.6	Medium sand, unsorted with cobbles to gravel at 51.0' to 55.0' loose to medium dense.
55.0'	8-10-8		675.6	
57.5'			673.1	
60.0'	10-12-12		670.6	Fine sand with some lignite, medium dense with heavy cobbles at 62.0'.
65.0'	12-14-14		665.6	
70.0'	12-16-18		660.6	
75.0'	22-26-22		655.6	
77.5'			653.1	
80.0'	12-13-14		650.6	Medium to coarse sand with some gravel, medium packed.
85.0'	9-8-7		645.6	
90.0'	15-18-16		640.6	
95.0'	16-13-9		635.6	
100.0'	16-19-15		630.6	
105.0'	24-76 in 3"		625.6	
106.6'			624.0	
111.8'			618.8	Light gray silty shale calcareous, very stiff.
112.2'			618.4	Hard argillaceous limestone.
114.9'			615.7	Green calcareous shale, hard.
116.8'	100 in 1.5"		613.8	Gray argillaceous limestone, hard.
116.9'			613.7	

17
116+08
12' Lt.
8/13-14-15/90

BORING LOGS
ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

BORING-2

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: T.L.W. 2/93
CHECKED: E.W.N. 2/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

A4757

STATE	PROJ. NO.	SHEET NO.
NO.		6
SEC./SUR 12	TWP. 50N	RGE. 32W

DEPTH Ft.	ELEV.	
0.0'	730.3	
4.9'	725.4	Brown sandy silt.
17.0'	713.3	Brown sandy clay, stiff cannot P.A.W.T., moist to dry.
30.0'	700.3	Light brown silty fine sand, dry.
108.2'	622.1	Medium grained, wet sand, trace of silt.
109.1'	621.2	Very stiff to hard shale.

18
116+08
12' Rt.
8/30/90

DEPTH Ft.	BLOWS 6"	POCKET PEN. tsf	ELEV.	
0.0'			733.6	
5.0'	7-13-9	0.50	728.6	Dark brown sandy silt with some gravel.
7.5'			726.1	
10.0'	7-10-11	1.50	723.6	Dark gray silty clay, moist, medium stiff.
12.5'			721.1	
15.0'	4-4-10	0.50	718.6	Gray silty clay, wet, soft to very soft.
20.0'	3-6-4	0.25	713.6	
22.0'			711.6	
25.0'	16-14-10		708.5	Brown fine silty sand.
27.5'			706.1	
30.0'	11-14-16		703.6	Medium to coarse sand with some gravel, clean medium dense.
32.5'			701.1	
35.0'	17-16-25		698.6	Fine gray sand, clean, medium dense to dense.
40.0'	16-38-40		693.6	
45.0'	20-26-30		688.6	
47.5'			686.1	
50.0'	7-7-11		683.6	Medium to coarse sand with chert cobbles, clean, medium dense.
55.0'	21-26-16		678.6	
57.5'			676.1	
60.0'	13-20-15		673.6	Fine grained gray sand rounded, clean, dense.
70.0'	15-27-26		663.6	
75.0'			658.6	
80.0'	14-14-23		653.6	Fine to medium grained sand, rounded, clean, dense.
90.0'	9-10-11		643.6	
100.0'	13-13-20		633.6	
114.0'	100 in 2"		619.6	
114.3'			619.3	
118.6'			615.0	Gray shaley sandy limestone, hard.
122.6'			611.0	Gray limestone, hard.
123.0'	70-30 in 2"		610.6	Gray shale, dry and hard.
129.0'			604.6	
130.0'			603.6	Gray limestone, hard.

19
117+33
12' Lt.
8/23/90

DEPTH Ft.	ELEV.	
0.0'	733.6	
7.5'	726.1	Brown sandy silt, dry, soft, P.A.W.T. 0-7.5'.
16.0'	717.6	Dark gray slightly sandy silt, soft, moist, P.A.W.T. 7.5'-16.0'.
35.0'	698.6	Brown sandy clay, wet, medium stiff.
114.0'	619.6	Coarse sand, wet, dense scattered cobbles at 55.0'.
116.4'	617.2	Coarse sand and cobbles.
118.0'	615.6	Gray silty shale, dry, hard.

20
117+33
12' Rt.
8/30/90

DEPTH Ft.	ELEV.	
0.0'	737.9	
0.8'	737.1	Asphalt and base.
29.0'	708.9	Gray sandy silty clay.
35.0'	702.9	Gray clay, stiff, P.A.W.T. with moderate difficulty.
52.0'	685.9	Gray silty fine sand, cannot P.A.W.T.
113.0'	624.9	Medium sand.
114.0'	623.9	Shale.

21
118+51
3' Lt.
8/30/90

345

BORING LOGS

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

Note:
P.A.W.T. = Pushed Augers Without Turning.

BORING-3

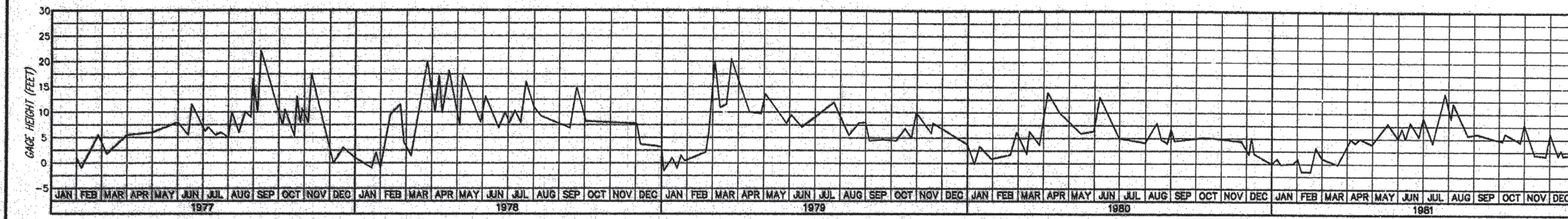
HARRINGTON & CORTELYOU, INC.
Consulting Engineers

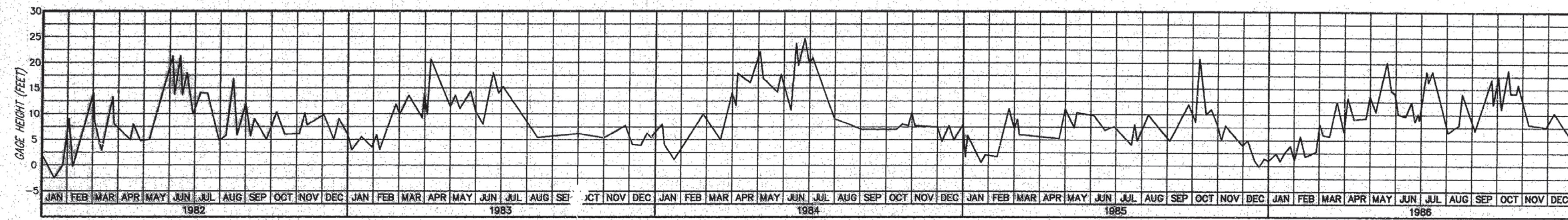
DETAILED: T.L.W. 2/93
CHECKED: E.W.N. 2/93

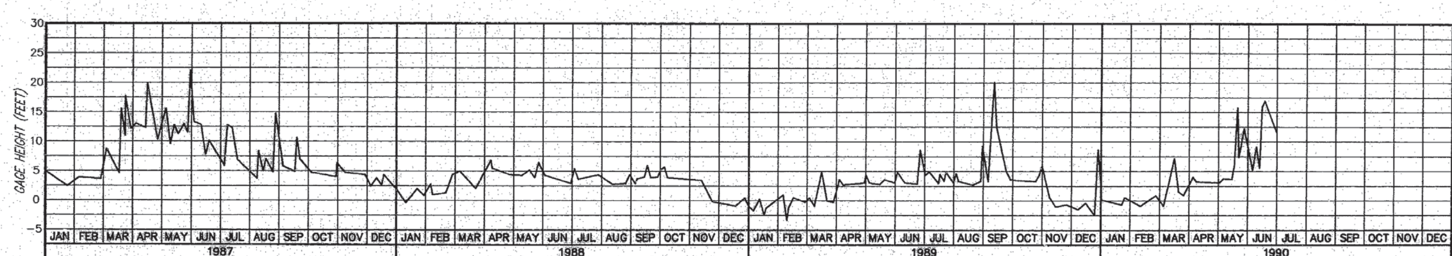
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

A4757

STATE	PROJ. NO.	SHEET NO.
MO.		7
SEC./SUR. 12 TWP. 50N RGE. 32W		







NOTES

Stage Hydrograph was plotted from readings of the Missouri River near the Hannibal Bridge located at river mile 366.1 in Kansas City, Missouri.

Gage Zero is 715.8 ft. M.S.L. (Mean Sea Level).

Seasonal variations in the water elevations at the Hannibal Bridge can be estimated by adding the gage reading to Elev. 715.8

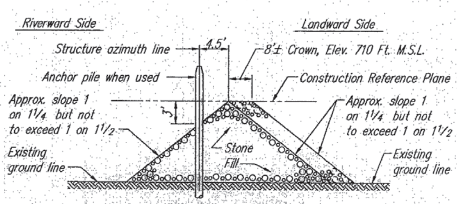
The Route 291 Bridge is located at river mile 352.7. A plot of the water surface elevation versus discharge curves for the Hannibal and Route 291 Bridges is shown on this drawing.

An estimate for seasonal variations in water surface elevations at the Route 291 Bridge can be made by deducting 11.7± to 14.6± feet from those at the Hannibal Bridge.

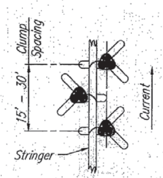
For approximate location of revetment see "Substructure Layout" sheet.

Revetment details are based on information provided by the U.S. Army Corps of Engineers. Accuracy of details or dimensions are not guaranteed.

This design data is included for information only and is not guaranteed to represent conditions at the site during construction.

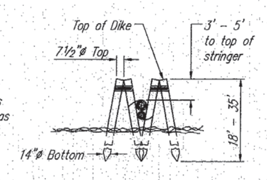


STONE FILL REVETMENT



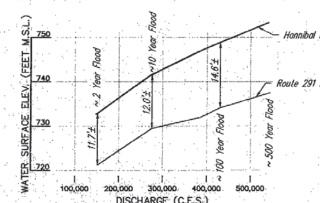
PLAN VIEW

Note:
Timber pile structure may be encountered in revetment along bank. Details shown are representative only, exact configuration and location is unknown. Timber pile structures encountered shall be removed as necessary for construction and do not need to be replaced. Stone fill revetment shall be reconstructed, see Special Provisions.



END VIEW

TIMBER PILE STRUCTURE – TWO ROW CLUMP



WATER SURFACE ELEVATION VS. DISCHARGE CURVES

STAGE HYDROGRAPH AND REVETMENT DETAILS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: S.A.K. 10/92
CHECKED: E.W.N. 2/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

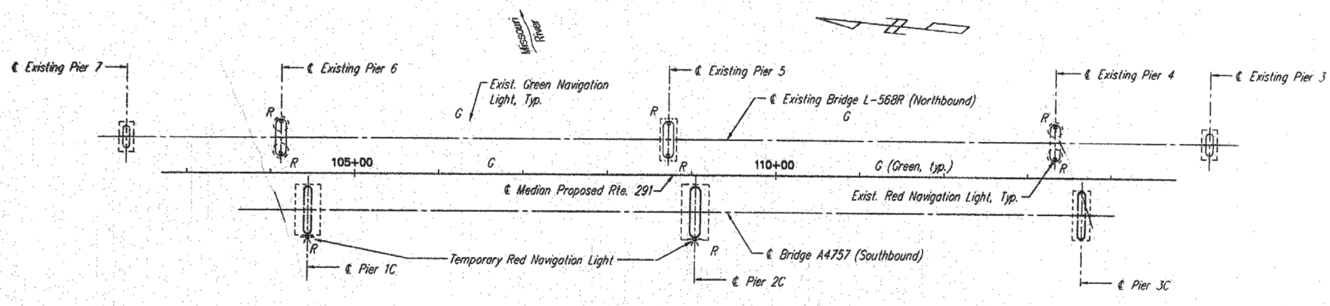
SHEET 7 OF 59

A4757

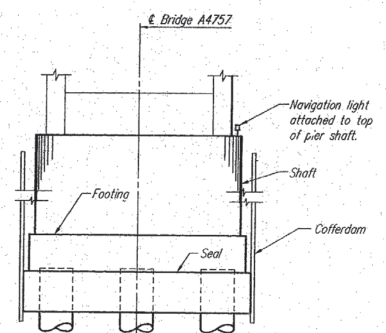
HYDRO

346

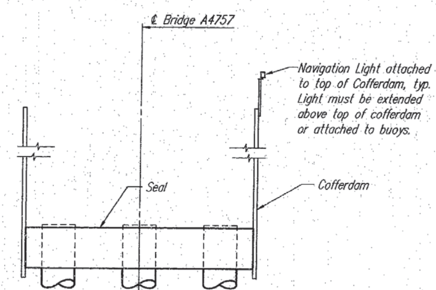
STATE	PROJ. NO.	SHEET NO.
MO.		8
SEC./SUR 12 TWP. 50N RGE. 32W		



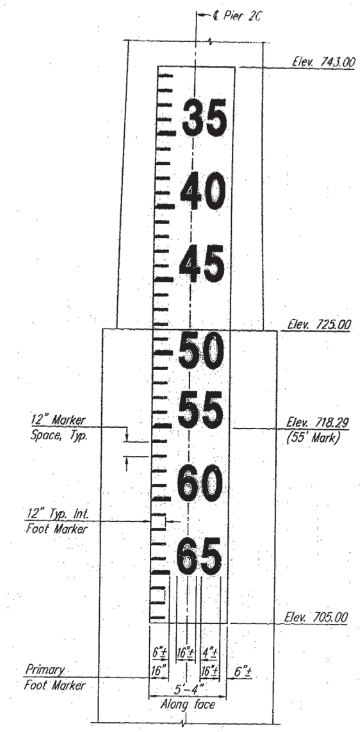
TEMPORARY NAVIGATION LIGHTING LAYOUT



LOCATION OF TEMPORARY LIGHT ON PIERS
(View shown looking upstation)



LOCATION OF TEMPORARY LIGHT ON COFFERDAM
(View shown looking upstation)



CLEARANCE GAUGE
(Gauge @ Pier 2C shown)

Clearance Gauge Notes:

Dimensions shown are for clearance to low steel at the South face of Pier 1C at Bridge A4757 (S.B.). Dimensions shall be adjusted as necessary to achieve that result.

Gauge shall be painted on downstream nose of the North Bank Pier (Pier 6) of Existing Bridge L-568R (N.B.) and upstream nose of Pier 2C at bridge A4757 (S.B.).

See Special Provisions for paint requirements.

Numeral type shall conform with that published in the Federal Highway Administration "Standard Alphabets for Highway Signs and Pavement Markings", 1977 edition. Series E numerals, 30" in height, shall be used. Stroke width of numerals and primary foot markers shall be 4".

Primary foot markers shall be spaced at 5'-0" intervals. Intermediate foot markers shall be spaced at 12" intervals between primary foot markers. Intermediate foot markers shall have a stroke width of 1/2 that noted for primary markers.

Notes:

Temporary lights shall be installed on cofferdams of piers 1C & 2C during construction. Relocate lights to completed base shafts prior to removal of cofferdams.

Temporary lights shall meet the requirements of the U.S. Coast Guard.

Existing navigation lighting system on Bridge L-568R shall remain operational.

Temporary lights will remain the property of the Commission after completion of construction and will then be maintained by others.

In addition to furnishing and maintaining temporary navigation lighting, the unit price bid for "Navigation Lighting System" per lump sum shall also include the cost of placing continuous 1¼"ø zinc coated rigid steel conduit in the west barrier curb of Unit 1. See "Slab Sections & Details – Units 1 & 3" sheet.

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T-NAV-LT

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.L.K. 2/93
CHECKED: E.W.N. 3/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

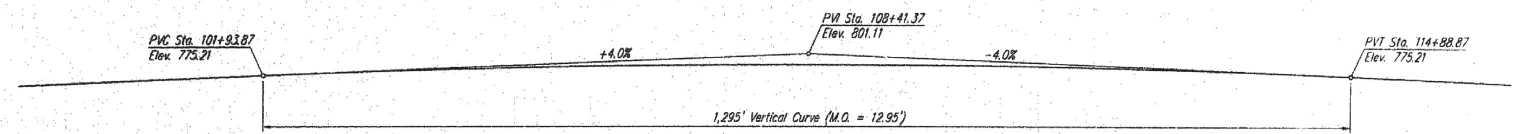
TEMPORARY NAVIGATION LIGHTING & CLEARANCE GAUGE

ROUTE 291 MISSOURI RIVER BRIDGE

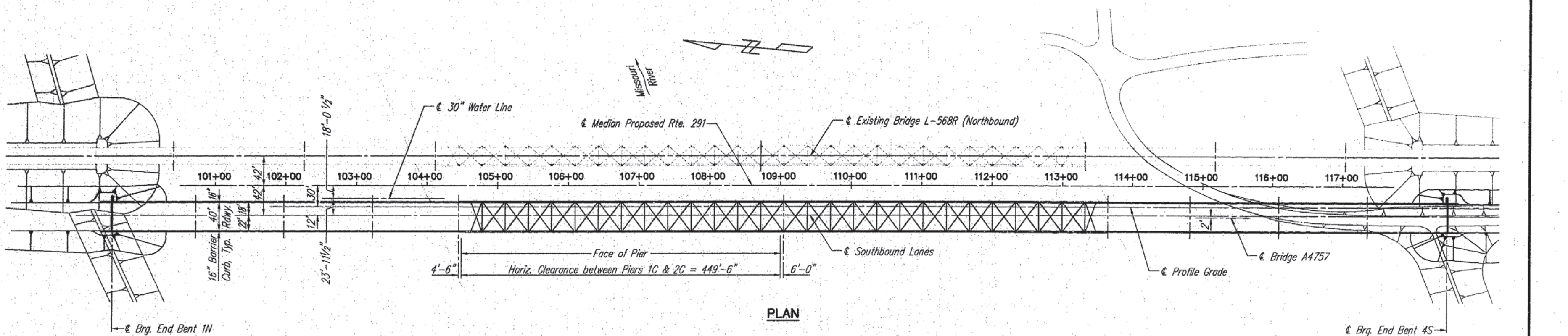
Jackson County

A4757

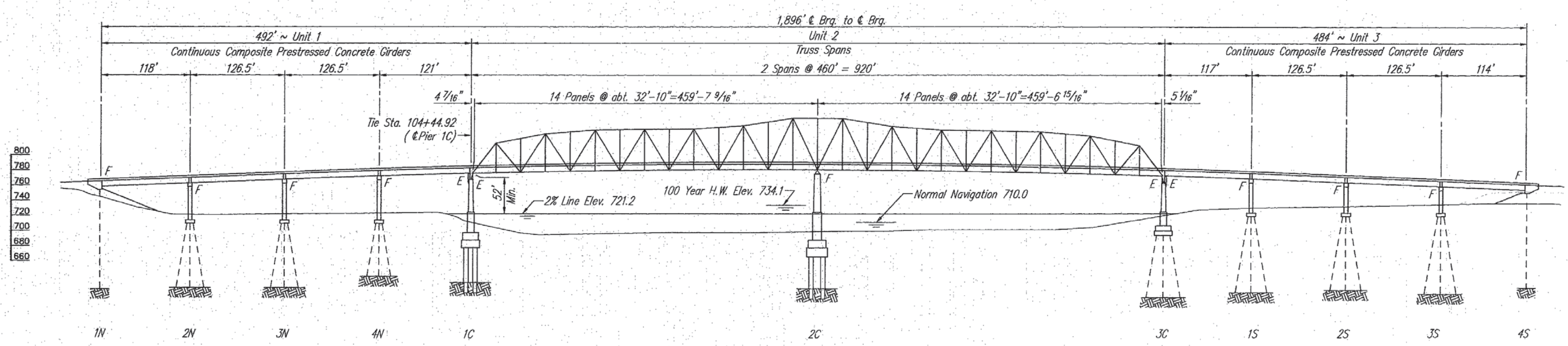
STATE	PROJ NO.	SHEET NO.
MO.		9
SEC/SUR 12 TWP. 50N RGE. 32W		



PROFILE GRADE



PLAN



ELEVATION

BASIC FLOOD DATA	
Discharge (100 yr.)	430,000 cfs
H.W. Elev.	734.1

GENERAL PLAN AND ELEVATION
ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

348

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

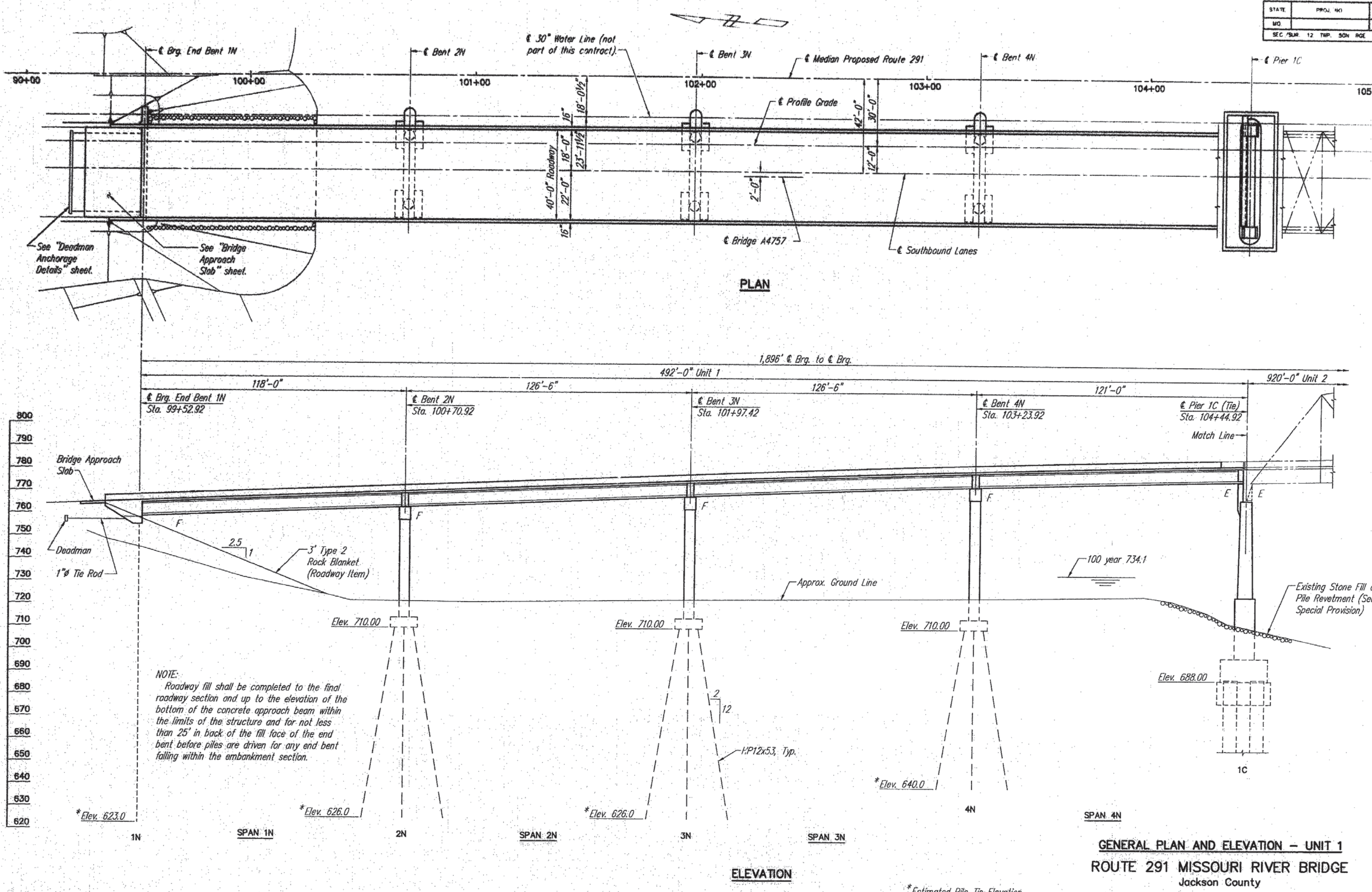
DETAILED: T.L.W. 10/92
CHECKED: E.W.N. 1/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 9 OF 59

A4757

GPE-291



STATE	PROJ. NO.	SHEET NO.
MO.		10
SEC. / SUR. 12 TWP. 50N RGE. 32W		

349

GENERAL PLAN AND ELEVATION – UNIT 1

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

UNIT-1

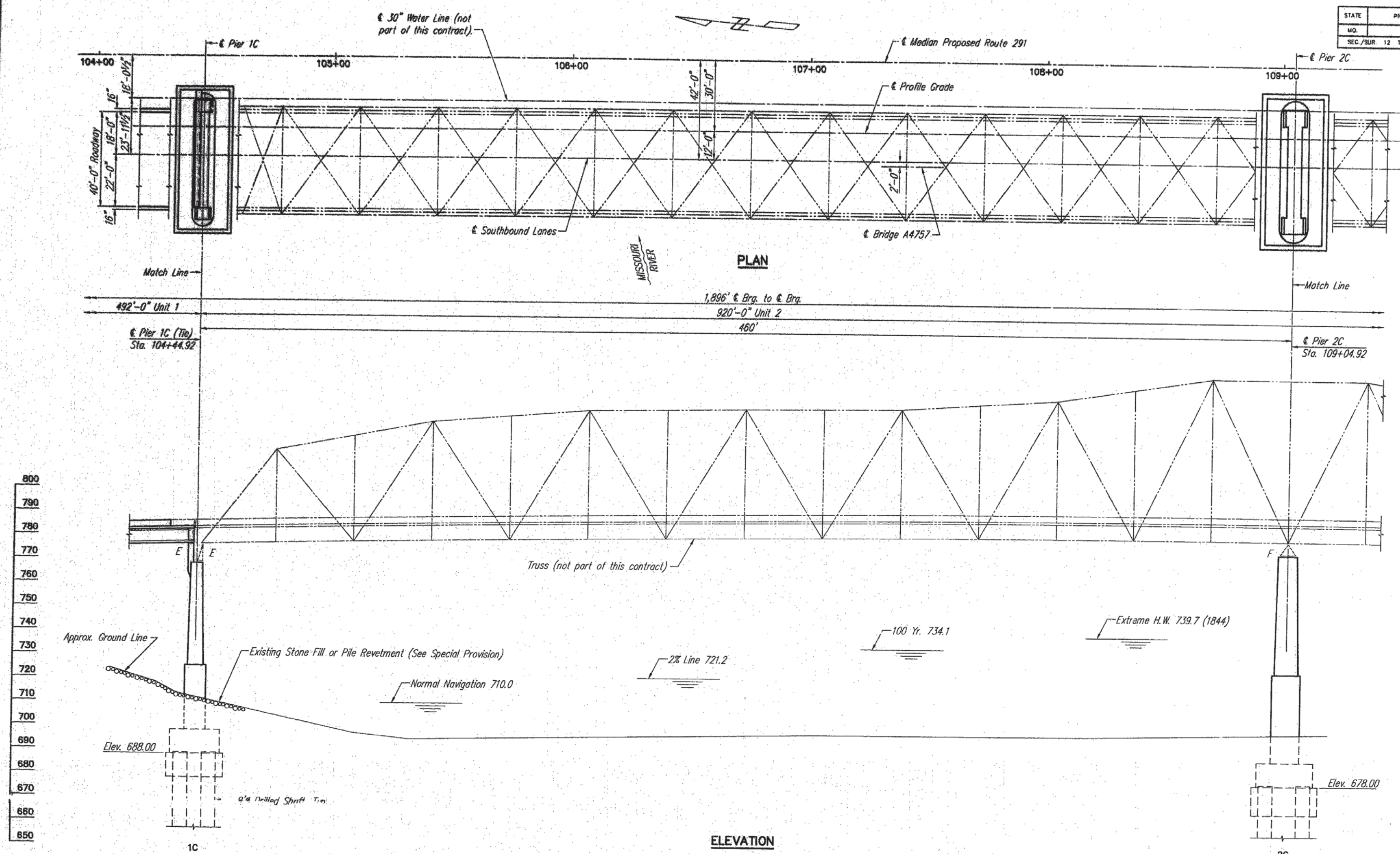
HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: T.L.W. 10/92
CHECKED: E.W.N. 1/92

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 10 OF 59

A4757



STATE	PROJ. NO.	SHEET NO.
MO.		11
SEC./SUR. 12 TWP. 50N RGE. 32W		

350

GENERAL PLAN AND ELEVATION – UNIT 2
NORTH SPAN

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

UNIT-2A

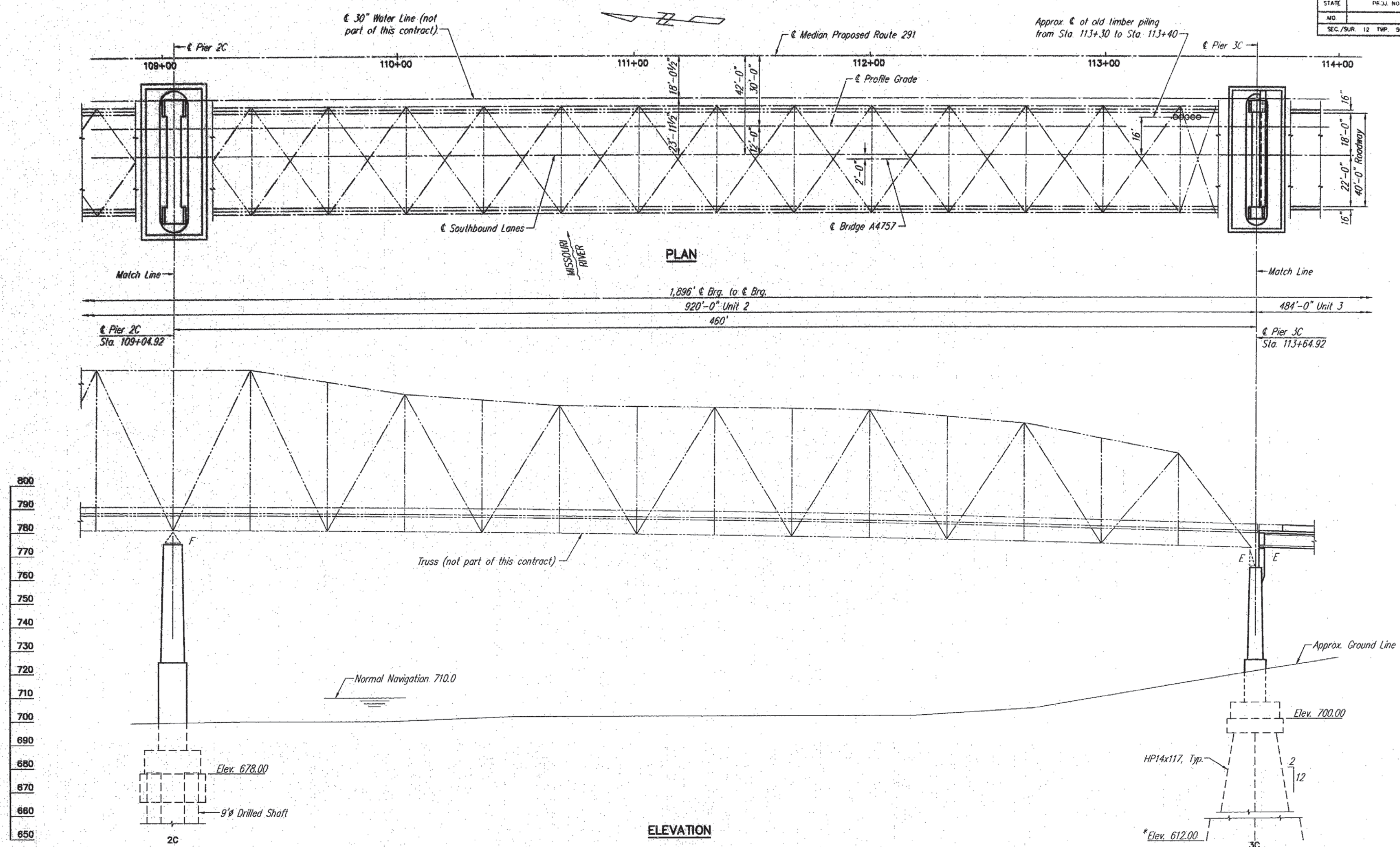
HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: T.L.W. 10/92
CHECKED: E.W.N. 1/92

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

A4757

STATE	PROJ. NO.	SHEET NO.
MO		12
SEC./SUR. 12 TWP. 50N RGE. 32W		



351

GENERAL PLAN AND ELEVATION – UNIT 2
SOUTH SPAN

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

*Estimated Pile Tip Elevation.

UNIT-2B

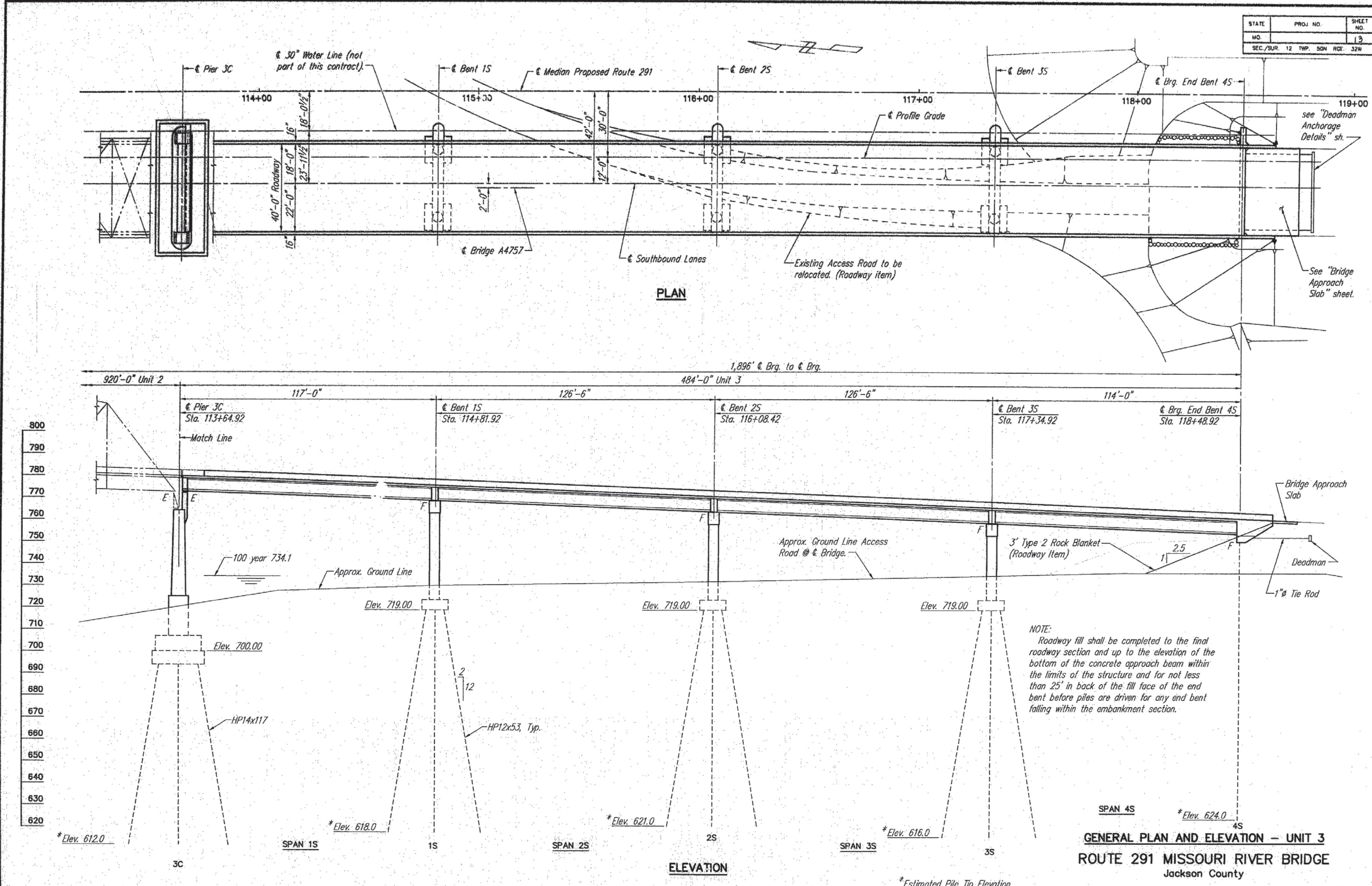
HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: T.L.W. 10/92
CHECKED: E.W.N. 1/92

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 12 OF 59

A4757



GENERAL PLAN AND ELEVATION – UNIT 3

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

UNIT-3

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: T.L.W. 10/92
CHECKED: E.W.N. 1/92

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 13 OF 59

A4757

STATE	PROJ. NO.	SHEET NO.
MO.		14
SEC./SUR. 12 TWP. 50N RGE. 32W		

GENERAL NOTES:

The scope of work consists of the construction of the end bents, intermediate bents, concrete superstructure girders, and slab for Units 1 & 3, and the construction of piers for Unit 2, along with other associated work as shown on the plans.

The existing Missouri Route 291 Bridge shall remain open during construction.

Utility companies whose facilities are shown on the plans or are known to be within the construction limits shall be notified by the contractor of the construction start date.

All dimensions are horizontal unless otherwise noted. Drawings shall not be scaled.

SPECIFICATIONS:

Design: 1992 Edition of the AASHTO Standard Specifications for Highway Bridges plus Interims.

Construction: Missouri State Highway Commission Standard Specifications For Highway Construction, 1993 Edition, plus project special provisions.

DESIGN LOADING:

Load Factor Design Method – Bridge Superstructure Framing, Bridge Deck, and Substructure (except footings). Simply supported non-composite for Dead Load, continuous composite for barrier curb, future wearing surface and Live Load.

Live Load – HS20 modified with modified 24,000 Lb. Tandem Axle.

Dead Load – An allowance of 35 Lbs. per sq. ft. of roadway for future wearing surface is included in the Dead Load.

Concrete Weight – 150 Lbs. per cu. ft.

Earth Weight – 120 Lbs. per cu.ft.

Equivalent Fluid Pressure – 45 Lbs. per sq. ft. per ft.

Earthquake – Category A

Barge Impact – 2,000 kips parallel to flow or 1,000 kips perpendicular to flow at elevation 725.0 at Piers 1C & 2C.

DESIGN UNIT STRESSES:

Class A1 Concrete (Prestressed Girders)----$f'c$ = 6,000 psi.
$f'ci$ = 4,600 psi. (Spans 2N, 3N & 1S thru 4S)
$f'ci$ = 4,800 psi. (Spans 1N & 4N)
Class B Concrete (Substructure)----------fc = 1,200 psi.
$f'c$ = 3,000 psi.
n = 10
Concrete (Class B1 & B2) ------------ fc = 1,600 psi.
$f'c$ = 4,000 psi.
n = 8
Reinforcing Steel (Grade 60)------------fs = 24,000 psi.
fy = 60,000 psi.
Prestressing Steel (Grade 270)---------- $f's$ = 270,000 psi.
Structural Carbon Steel (A709, Gr. 36)---- fs = 20,000 psi.
fy = 36,000 psi.
Steel Pile--------------------------fb = 12,000 psi.

CONCRETE:

All exposed edges of concrete shall be beveled 3/4" unless otherwise shown or noted.

Construction joints shall be made only at locations shown on the plans, except with the approval of the engineer.

Keys shall be provided for all construction joints unless otherwise shown. For construction joint treatment, see Special Provisions.

All concrete for bridge deck, diaphragms and wingwalls above the construction joint shall be Class B2.

All concrete for barrier curbs shall be Class B1.

All concrete for deadmen shall be Class B.

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JOINT FILLER:

All joint filler shall meet the requirements of standard specification 1057.2.4, except as noted.

REINFORCING STEEL:

Reinforcing steel shall be deformed billet steel bars conforming to ASTM A615, Grade 60. All dimensions to reinforcing steel on detail drawings are to centerline of bar, except where clear distance is noted from the face of concrete.

All reinforcing bars in top of substructure beam or cap and diaphragms shall be spaced to clear anchor bolts for bearings by at least 1/2".

Minimum clearance to reinforcing steel in pier caps and columns shall be 2" unless otherwise shown.

Minimum clearance to reinforcing steel in pier bases and footings shall be 3" unless otherwise shown.

Minimum clearance to reinforcing steel shall be 1 1/2" unless otherwise noted.

All reinforcing steel shall be lapped according to AASHTO 8.32 unless otherwise shown or noted.

All reinforcing in the bridge deck, barrier curbs, diaphragms and wingwalls shall be epoxy coated, except as noted.

The epoxy coated reinforcing bars shall be coated in accordance with Section 710 of Mo. Std. Specs. for Highway Construction.

BEARINGS:

Neoprene elastomeric bearing pads shall be 60 durometer at fixed bearings and 70 durometer at expansion bearings.

FOUNDATIONS:

Minimum energy requirement of pile hammer based on plan length and design bearing value of steel piles.

All steel piles shall be seated in rock and shall be driven to practical refusal.

Steel piles shall be HP14x117 and HP12x53 and conform to ASTM A709, Gr. 36.

Steel pile splices are included in the unit price bid per linear foot of piles.

Manufactured pile point reinforcement shall be used on all steel piles. See Special Provisions.

Prebore for piles at End Bent 1N to elevation 725.0 and at End Bent 4S to elevation 730.0.

For Pile Loading Test information, see Special Provisions.

Drilled Shafts shall be socketed into bedrock.

Prior to placing drilled shafts for Piers 1C and 2C, the contractor will be required to drill one NX size core hole at each pier for additional subsurface investigation. See "Substructure Layout" sheet.

Drilled shaft design is based on 100% of an allowable end bearing value of 25 Tons per Sq. Ft.

Seal courses are designed for a water surface elevation of 715.0.

For Cofferdams, see Special Provisions.

PILE DATA (Units 1–3)

Bent or Pier Number		1N	2N	3N	4N	3C	1S	2S	3S	4S
Pile Type and Size		HP12x53	HP12x53	HP12x53	HP12x53	HP14x117	HP12x53	HP12x53	HP12x53	HP12x53
Number		7	18	18	18	27	18	18	18	7
Approximate Length	Ft.	134	85	85	71	89	102	99	104	128
Design Bearing	Tons	86.7	93.0	93.0	93.0	195.0	93.0	90.4	90.4	86.7
Hammer Energy Required	Ft. Lbs.	21,300	20,900	20,900	20,900	44,000	20,900	20,300	20,300	20,400

REINFORCING BAR TAGS:

Tags for reinforcing steel shall be marked with a prefix to indicate the individual unit or element in which the steel is to be placed.

Example: Tag U1-5S1 indicates No. 5 bars in the slab of Unit 1.
Tag 2C-14F1 indicates No. 14 bars in the footing of Pier 2C.

BRIDGE DECK:

Bridge deck as detailed consists of an 8 1/2" roadway slab.

Alternate types of slab forms may be used in the construction of slabs. Cast-In-Place with conventional forming – Alt. a, or Precast Prestressed Panels – Alt. b. See Special Provisions.

ESTIMATED QUANTITIES

ITEM	UNIT	TOTAL
Cofferdam and Excavation – Pier 1C	Each	1
Cofferdam and Excavation – Pier 2C	Each	1
Cofferdam and Excavation – Pier 3C	Each	1
Class 1 Excavation	Cu. Yds.	926
Pre-bore for Piling	Lin. Ft.	356
Navigation Lighting System	Lump Sum	1
Structural Steel Piles (14")	Lin. Ft.	2,403
Pile Point Reinforcement (14")	Each	27
Loading Tests (14")	Each	1
Structural Steel Piles (12")	Lin. Ft.	11,662
Pile Point Reinforcement (12")	Each	122
Loading Tests (12")	Each	2
Drilled Shafts (9'-0" Dia.)	Lin. Ft.	732
Rock Sockets (8'-4" Dia.)	Lin. Ft.	237
Supplementary Foundation Test Holes (NX)	Lin. Ft.	40
Supplementary Cored Holes	Lin. Ft.	300
Supplementary Television Inspection	Each	4
Class B Concrete (Substructure)	Cu. Yds.	5,298
Seal Concrete	Cu. Yds.	1,969
Reinforcing Steel	Lbs.	878,380
Reinforcing Steel (Epoxy Coated)	Lbs.	40,390
Laminated Neoprene Bearing Pads	Each	70
Type N PTFE Bearings	Each	10
Prestressed Concrete Girders (118 Ft. Spans)	Each	5
Prestressed Concrete Girders (121 Ft. Spans)	Each	5
Prestressed Concrete Girders (126.5 Ft. Spans)	Each	20
Prestressed Concrete Girders (117 Ft. Spans)	Each	5
Prestressed Concrete Girders (114 Ft. Span)	Each	5
Painting Clearance Gauges	Lump Sum	1
Slab on Concrete Bulb-Tee Girders	Sq. Yds.	4,627
Safety Barrier Curb	Lin. Ft.	1,979
Bridge Approach Slab	Sq. Yds.	222
Deadman Anchorage Assembly	Each	2
Vertical Drain @ End Bents	Each	2
Water Transportation	L.S.	1

Notes:

Excavations for the footings of Bents 2N thru 4N and Bents 1S thru 3S shall be paid for as Class 1 Excavation. The contractor is cautioned that ground water may be encountered during excavation depending on the river surface elevation.

Square yards of slab concrete includes earthquake restrainers and all concrete and reinforcing steel for the slabs, diaphragms and wingwalls.

Lineal feet of safety barrier curb concrete includes all concrete, reinforcing steel, and plastic water stops for the barrier curbs.

ESTIMATED QUANTITIES FOR ALTERNATE SLAB FORMING

TYPE OF SLAB		SLAB ON CONCRETE BULB-TEE GIRDERS		
		Reinf. (Lbs.)		Conc. (Cu. Yd.)
		Epoxy	Plain	Slab, Conc. Diaph's. and Wingwalls
Alt. a	Cast-In-Place Conventional Forms	361,440	3,700	1,466
Alt. b	Precast Panel Forms	250,850	3,700	* 1,282

Notes:

The table of Estimated Quantities for Alternate Slabs represents the quantities used by the state in preparing the cost estimate for concrete slabs. Variations may be encountered in these estimated quantities but these variations cannot be used for an adjustment in the contract unit price per square yard of alternate slab used.

See Special Provisions for Alternate Methods of Forming Slabs.

* Cu. Yds. of concrete does not include precast prestressed panels.

GENERAL NOTES & QUANTITIES

ROUTE 291 MISSOURI RIVER BRIDGE

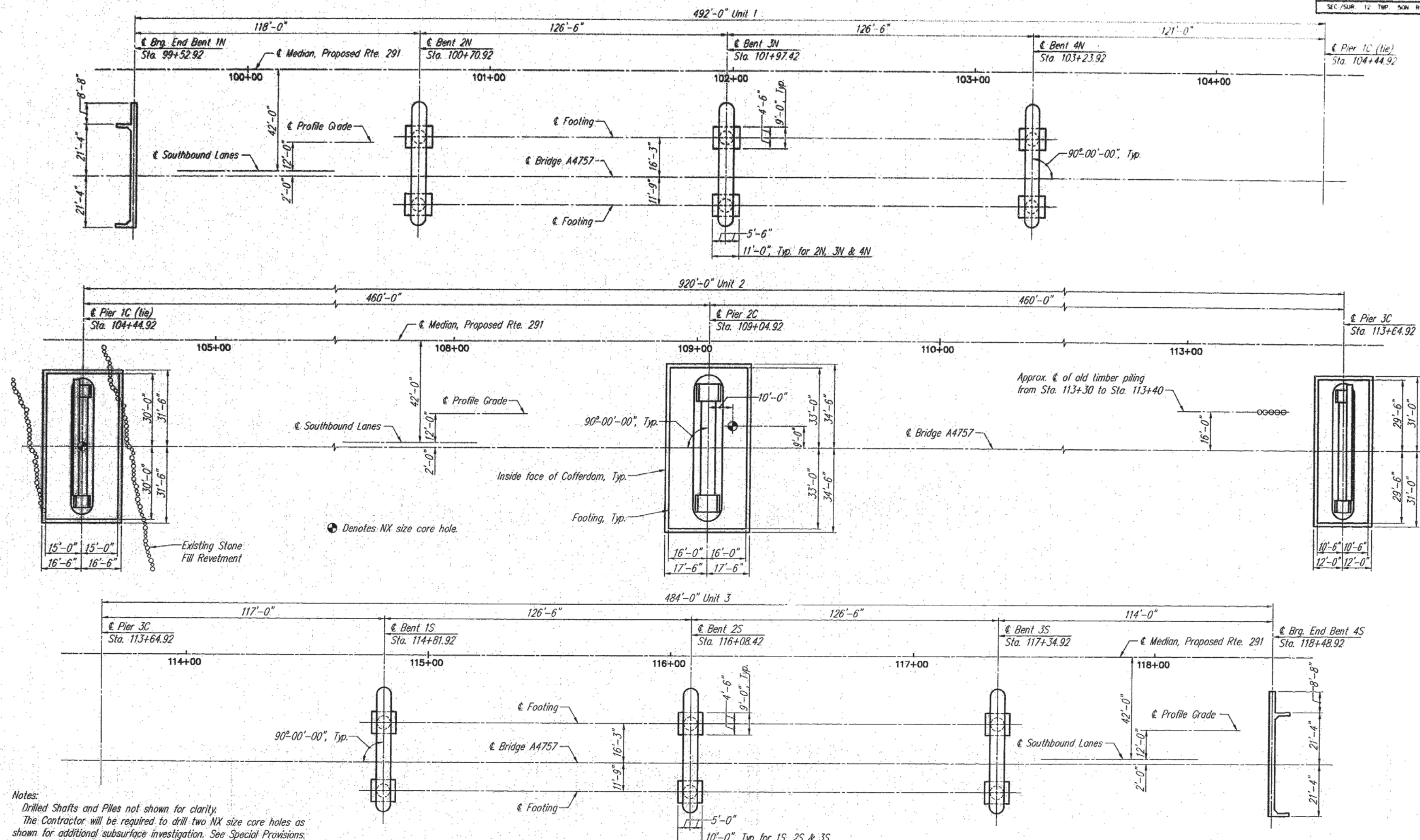
Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: T.L.W. 2/93
CHECKED: E.W.N. 3/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

A4757



Notes:
Drilled Shafts and Piles not shown for clarity.
The Contractor will be required to drill two NX size core holes as shown for additional subsurface investigation. See Special Provisions.
The Contractor will be required to remove any portions of the stone revetment encountered near Pier 1C which may interfere with the new construction. After the Pier has been completed, the Contractor will be required to replace the disturbed areas. See Special Provisions and "Stage Hydrograph and Revetment Details" sheet.

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SUBSTRUCTURE LAYOUT

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: T.L.W. 10/92
CHECKED: E.W.N. 2/92

NOTE: DO NOT SCALE THIS DRAWING, FOLLOW DIMENSIONS.

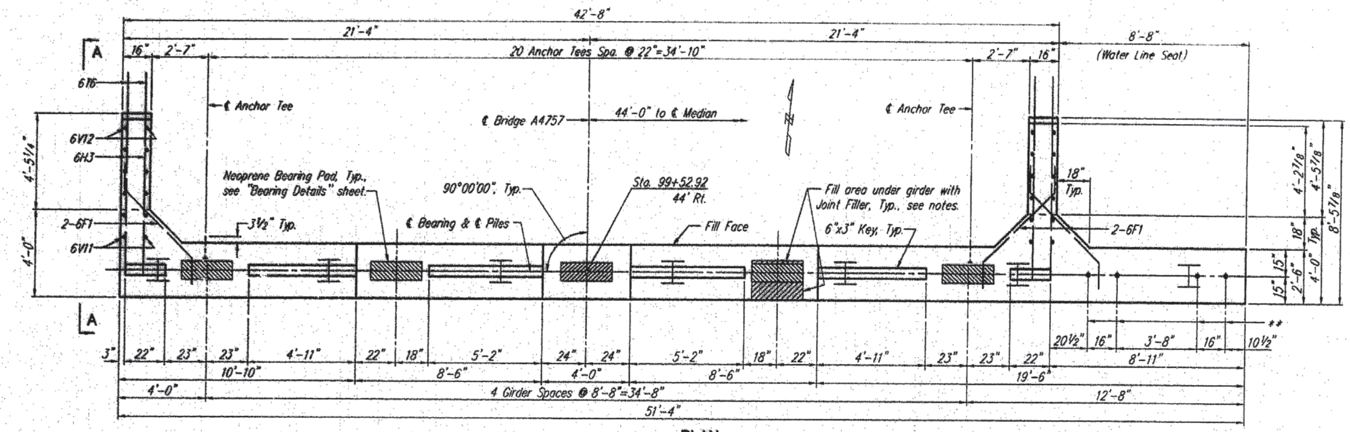
S-LAYOUT

A4757

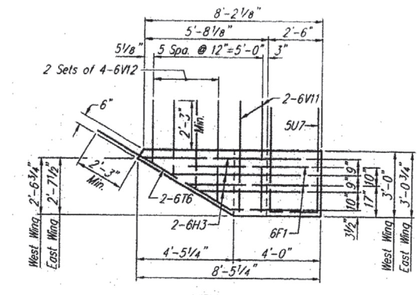
STATE	PROJ. NO.	SHEET NO.
MO		15

STATE	PROJ. NO.	SHEET NO.
MO		16

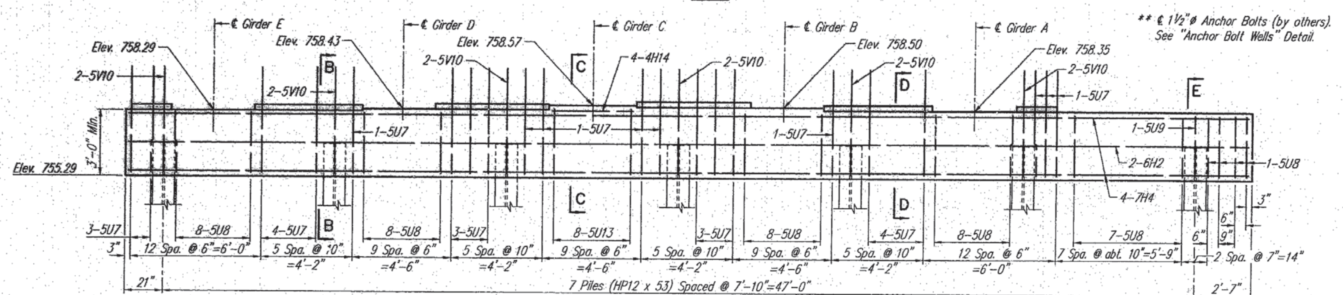
SEC./SUR. 12 TWP. 50N RGE. 32W



PLAN



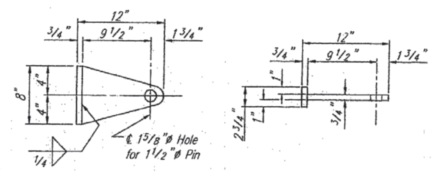
VIEW A–A



** ℄ 1½"ø Anchor Bolts (by others). See "Anchor Bolt Wells" Detail.

Notes: Adjust Anchor Tees to clear vertical bars as required.
Cost of joint filler shall be incidental to price bid for Prestressed Concrete Girders.

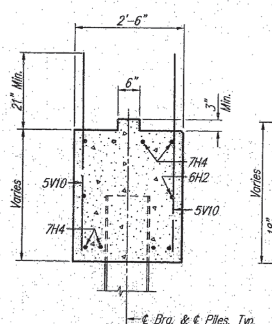
ELEVATION
(Looking Back Station)



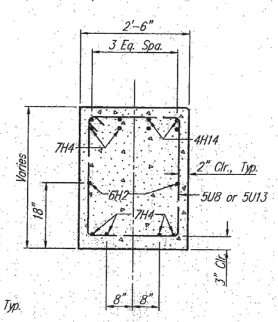
ELEVATION PLAN

DETAIL OF ANCHOR TEE

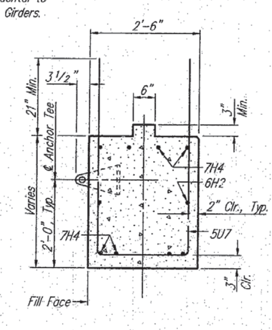
Material for anchor tee shall be ASTM A709 Gr. 36, A668 Class F or equivalent steel and galvanized in accordance with Section 712. Payment shall be included with Class B Concrete.



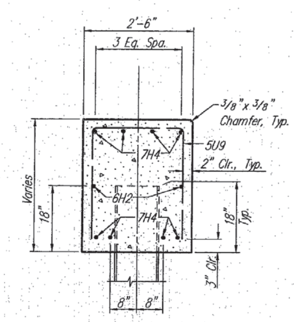
SECTION B–B



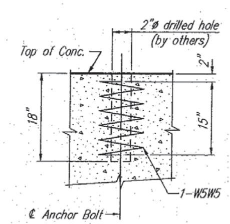
SECTION C–C



SECTION D–D



SECTION E–E



ANCHOR BOLT WELLS

ESTIMATED QUANTITIES

ITEM	UNIT	TOTAL
Prebore for Piles	Lin Ft.	212
Structural Steel Piles (12")	Lin Ft.	938
Pile Point Reinforcement (12")	Each	7
Class B Concrete	Cu. Yds.	17
Reinforcing Steel	Lbs.	1,790
Reinforcing Steel – Epoxy Coated	Lbs.	530

END BENT 1N

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: T.L.W. 2/93
CHECKED: T.L.N. 2/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

E-BT-1N1

SHEET 16 OF 59

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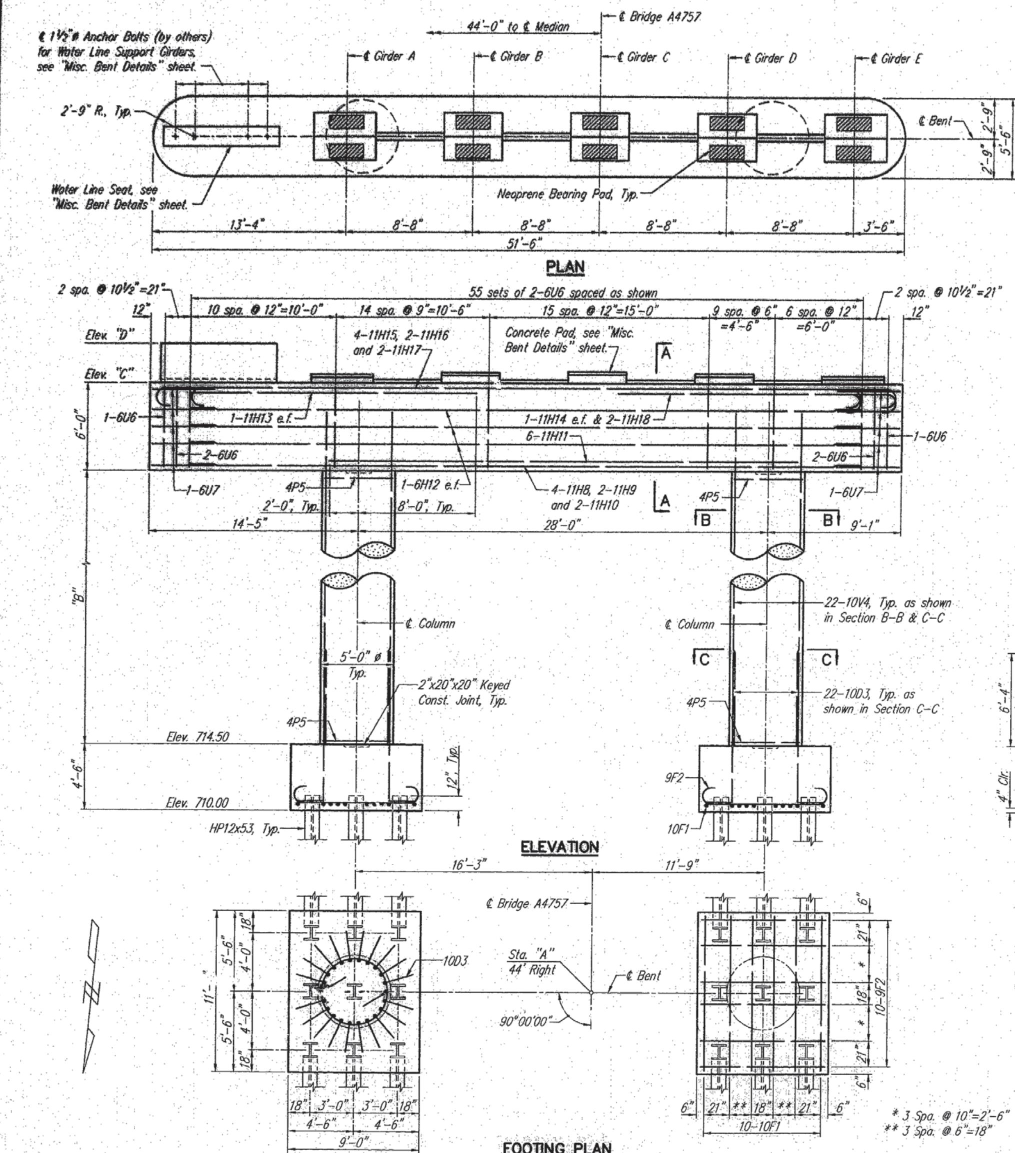
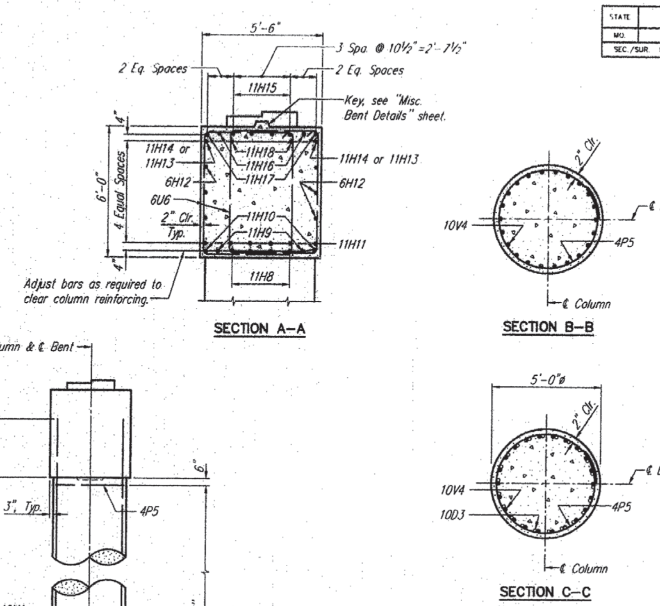
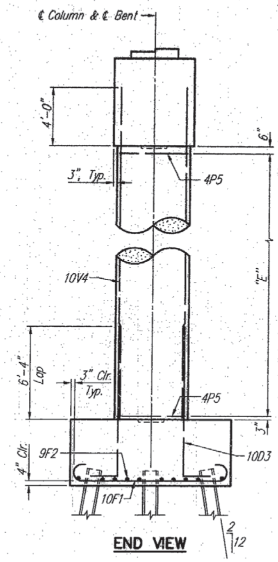
STATE	PROJ. NO.	SHEET NO.
MO.		17
SEC./SUR. 12 TWP. 50N RGE. 32W		







BENT DATA TABLE					
BENT	"A"	"B"	"C"	"D"	"E"
2N	100+70.92	42'–1⅝"	762.64	765.32	43–4P5 @ abt. 12"=41'–4⅝"
3N	101+97.42	47'–2¾"	767.73	771.58	48–4P5 @ abt. 12"=46'–5¾"
4N	103+23.92	51'–10¾"	772.40	776.57	53–4P5 @ abt. 12"=51'–1¾"

ESTIMATED QUANTITIES

ITEM	UNIT	BENT 2N	BENT 3N	BENT 4N
Class 1 Excavation	Cu. Yds.	165	165	171
Structural Steel Piles (12")	Lin Ft.	1,530	1,530	1,278
Pile Point Reinforcement (12")	Each	18	18	18
Class B Concrete	Cu. Yds.	158	166	173
Reinforcing Steel	Lbs.	24,490	25,590	26,590
Reinforcing Steel – Epoxy Coated	Lbs.	60	60	60

NOTES:

For Neoprene Bearing Pads see "Bearing Details" sheet.

For Concrete Pad Details, Water Line Seat Details, Anchor Bolt Wells, required keys, diaphragm dowel bars and additional notes see "Misc. Bent Details" sheet.

e.f. denotes each face.

Adjust 6U6 bars to clear Anchor Bolt Wells if wells are used.

* 3 Spa. @ 10"=2'–6"
** 3 Spa. @ 6"=18"

BENTS 2N THRU 4N

ROUTE 291 MISSOURI RIVER BRIDGE

Jacks... County

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BENT2–4N

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

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CHECKED: E.W.N. 2/93

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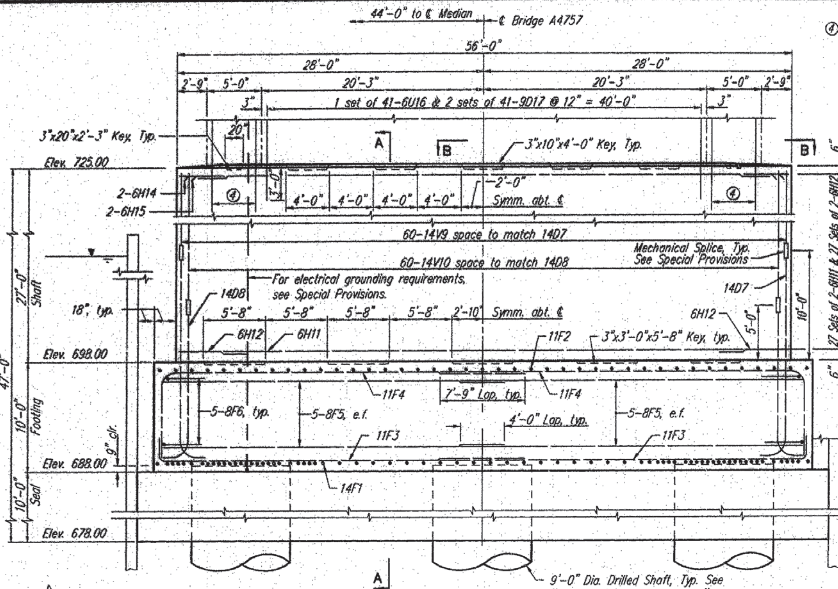
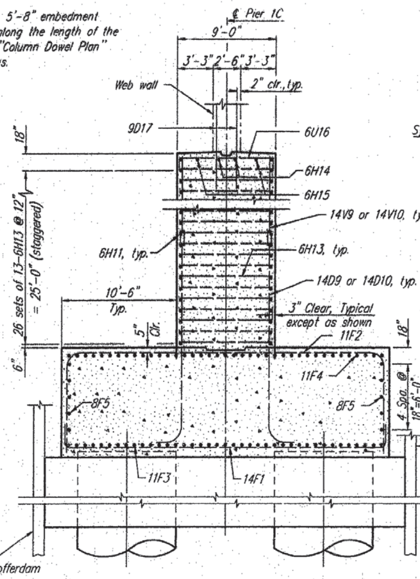
A4757

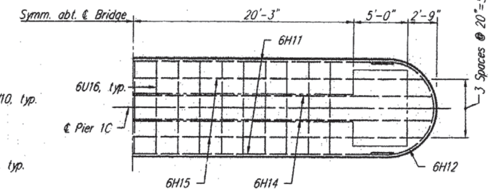


ELEVATION

④ 36-11D18, 5'-8" embedment measured along the length of the bar. See "Column Dowel Plan" for locations.



SECTION A-A

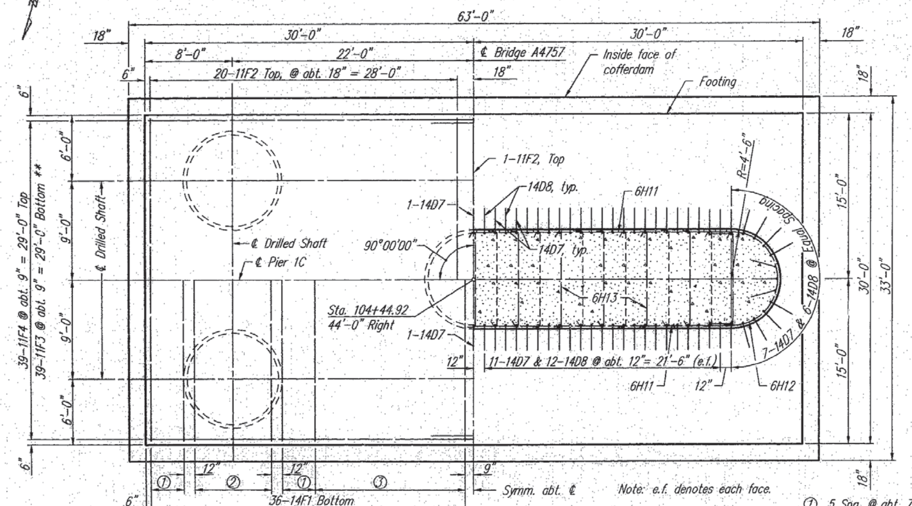


VIEW B-B

(Dowel bars not shown for clarity, see "Column Dowel Plan" and "Elevation" for details.)

‡ ESTIMATED QUANTITIES		
ITEM	UNIT	TOTAL
Drilled Shafts (9'-0" Dia.)	Lin Ft.	288
Rock Socket (8'-4" Dia.)	Lin Ft.	85
Class B Concrete	Cu. Yds.	1,388
Seal Concrete	Cu. Yds.	688
Reinforcing Steel	Lbs.	237,690
Reinforcing Steel -- Epoxy Coated	Lbs.	19,720

‡ Includes quantities for Drilled Shafts, Web Wall, Columns, Tie Beam, and Bridge Seat.

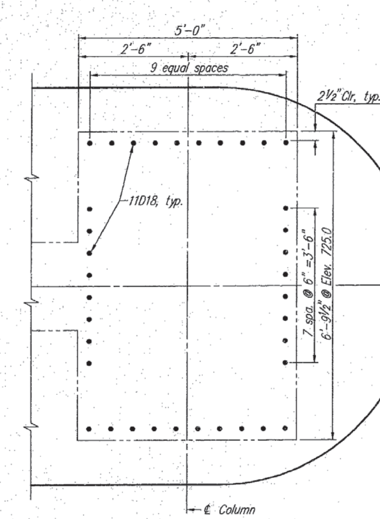


HALF PLAN AT FOOTING **HALF SECTION THRU SHAFT**

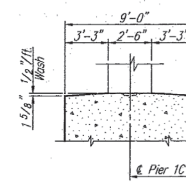
FOOTING PLAN

① 5 Spa. @ abt. 7"= 3'-0"
② 14 Spa. @ 6"= 7'-0" **
③ 9 Spa. @ abt. 18" = 13'-9" **

**Adjust spacing as req'd. to clear Drilled Shaft Reinf.



COLUMN DOWEL PLAN



WASH DETAIL

Note:
11D18 dowel bars along short faces of column are sloped.

STATE	PROJ. NO.	SHEET NO.
MO.		18
SEC./SUR. 12 TWP. 50N RGE. 32W		

PIER 1C – FOUNDATION DETAILS

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: S.A.K. 12/92
CHECKED: E.W.N. 1/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 18 OF 59

A4757

PIER-1CL

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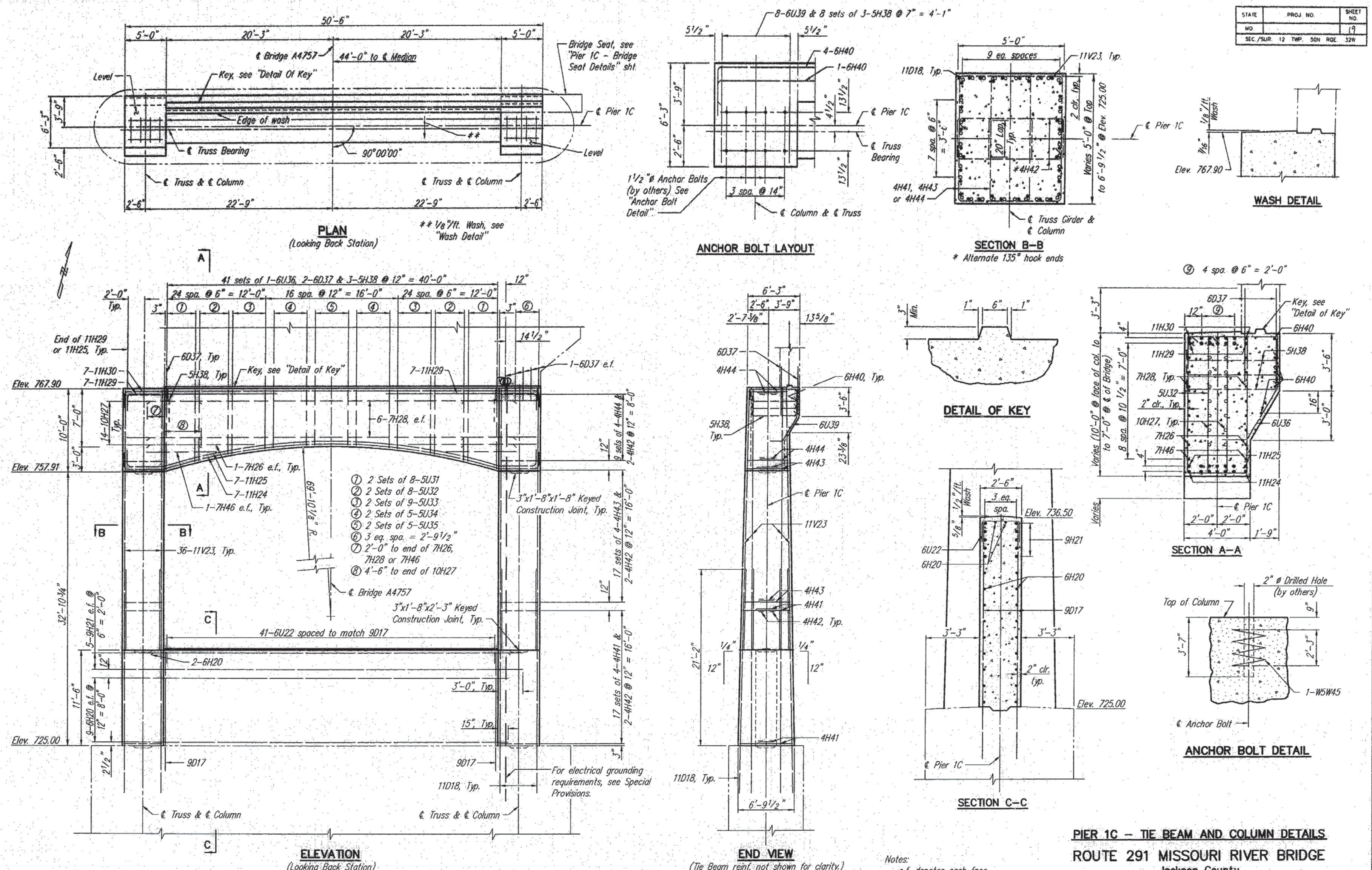

Notes:
e.f. denotes each face.
n.f. denotes near face.
See "Navigation Lighting & Clearance Gauge" sheet for conduit thru tie beam.

PIER 1C – TIE BEAM AND COLUMN DETAILS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: S.A.K. 02/93
CHECKED: E.W.N. 03/93

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A4757

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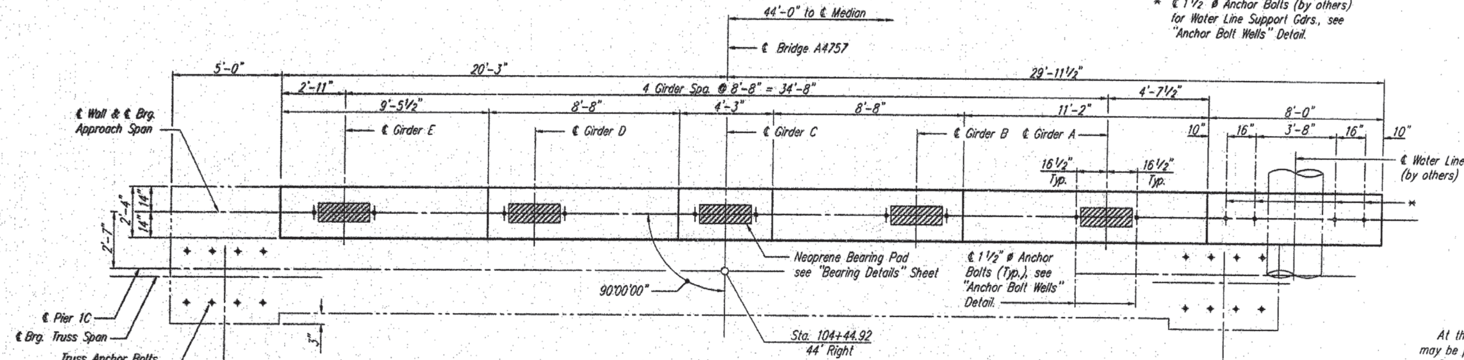
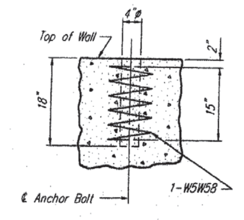
STATE	PROJ. NO.	SHEET NO.
MO		20
SEC./SUR. 12 TWP. 50N RGE. 32W		

* ℄ 1 1/2" ø Anchor Bolts (by others) for Water Line Support Gdrs., see "Anchor Bolt Wells" Detail.

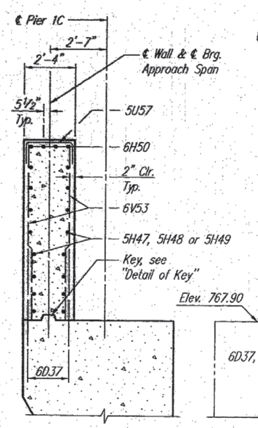


PLAN

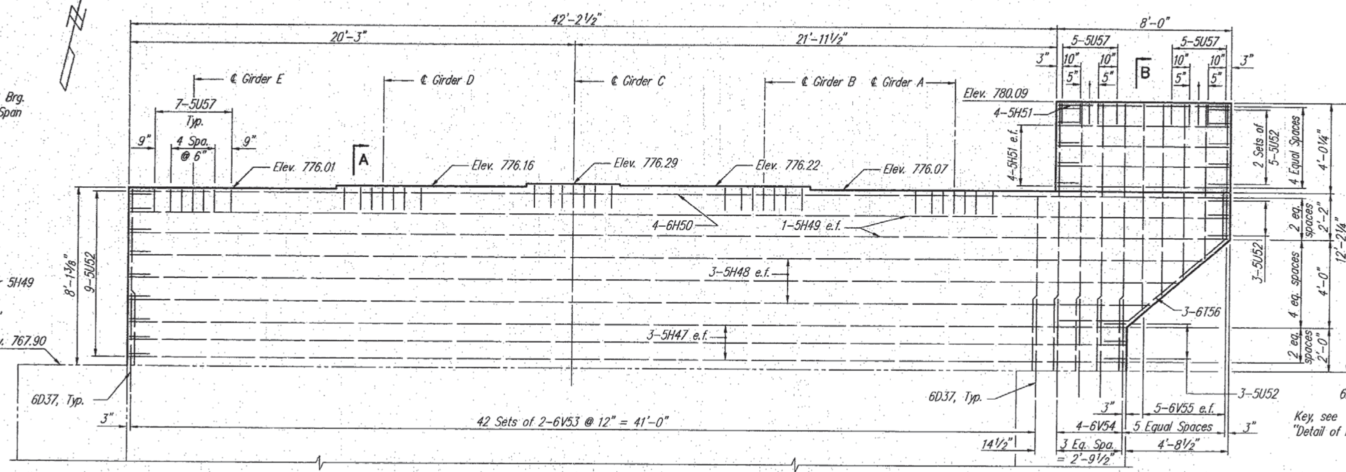


ANCHOR BOLT WELLS

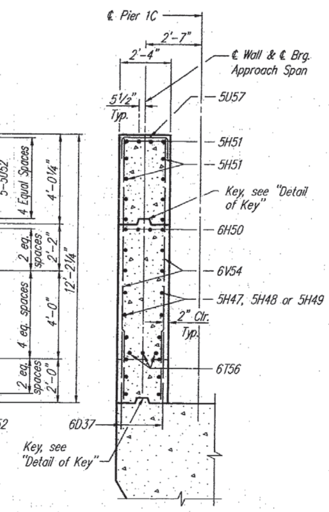
At the Contractors option, anchor bolts for P/S Girders may be placed in wells shown above or in drilled holes.
Drilled holes shall be 2"ø for 1 1/2"ø anchor bolts.
Holes for Anchor Bolts of the Water Line Support Girders to be drilled in by others.



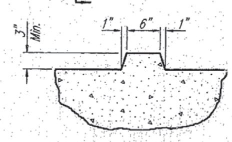
SECTION A–A



ELEVATION
(Looking Back Station)



SECTION B–B



DETAIL OF KEY

Notes:

Adjust 5U57 bars as req'd to clear anchor bolt wells, if wells are used, and 1/2"ø anchor bolts.
e.f denotes Each Face.

PIER 1C – BRIDGE SEAT DETAILS

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

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P1C-SEAT

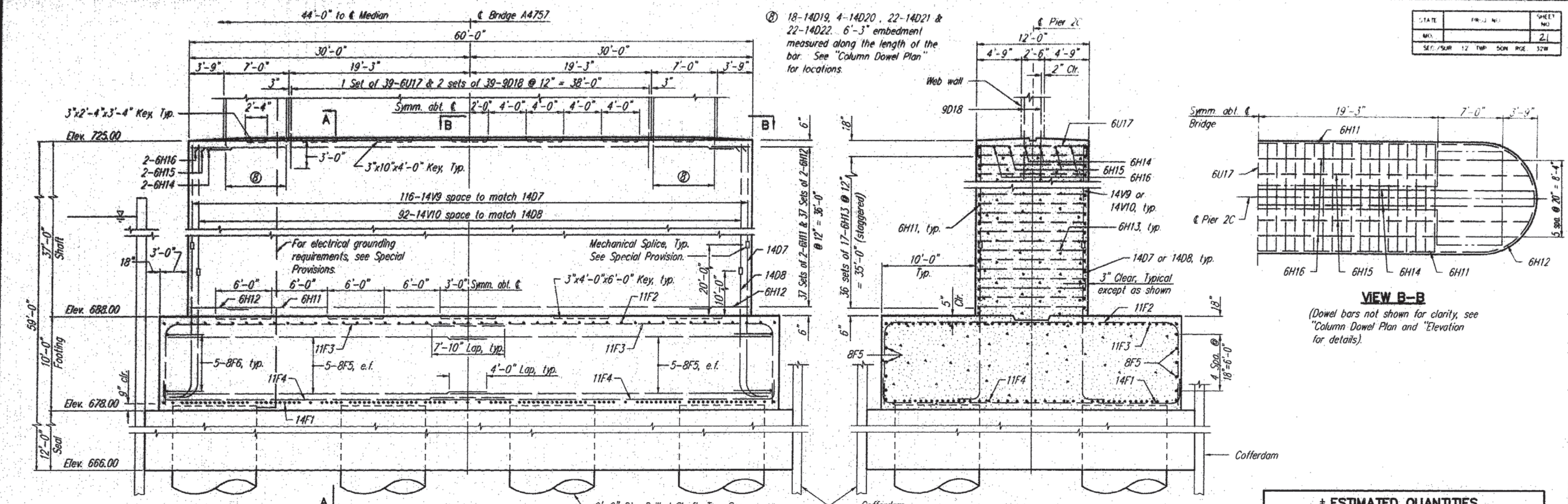
HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: B.T.K. 02/93
CHECKED: E.W.N. 03/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 20 OF 59

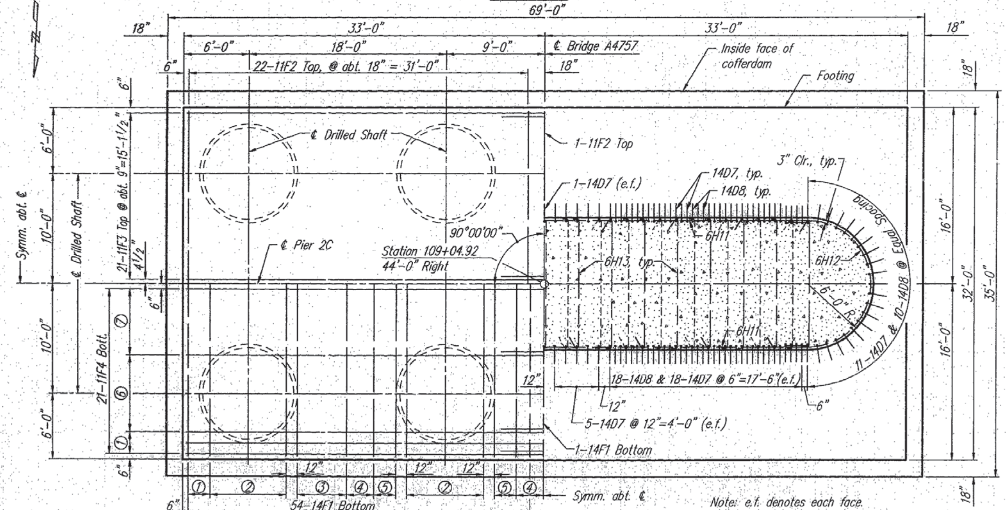
A4757



ELEVATION

SECTION A-A

VIEW B-B



HALF PLAN AT FOOTING

FOOTING PLAN

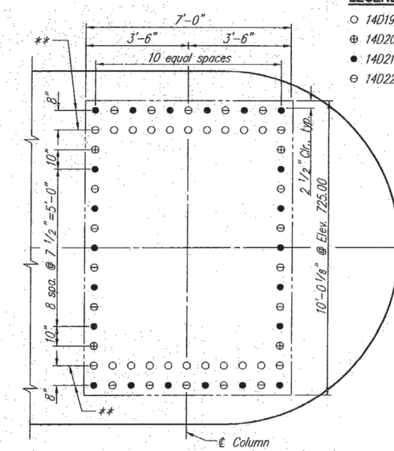
HALF SECTION THRU SHAFT

Note: e.f. denotes each face.

① 2 Spa. @ 12"=2'-0"
② 14 Spa. @ 6"=7'-0" *
③ 9 Spa. @ 6"=4'-6"
④ 2 Spa. @ 15"=2'-6"
⑤ 4 Spa. @ 6"=2'-0"
⑥ 12 Spc. @ 7"=7'-0" *
⑦ 6 Spa. @ 12"=6'-0"

* Adjust spacing as required to clear Drilled Shaft reinf.

** Rows of sloped dowel bars.



COLUMN DOWEL PLAN

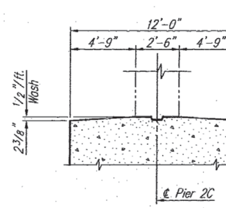
LEGEND

- ○ 14D19
- ⊕ 14D20
- ● 14D21
- ⊖ 14D22

‡ ESTIMATED QUANTITIES

ITEM	UNIT	TOTAL
Drilled Shafts (9'-0" Dia.)	Lin Ft.	444
Rock Socket (8'-4" Dia.)	Lin Ft.	152
Class B Concrete	Cu. Yds.	2,076
Seal Concrete	Cu. Yds.	932
Reinforcing Steel	Lbs.	407,480

‡ Includes quantities for Drilled Shafts, Web Wall, Columns, and Tie Beam.



WASH DETAIL

PIER 2C – FOUNDATION DETAILS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

360

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: S.A.K. 12/92
CHECKED: E.W.N. 02/93

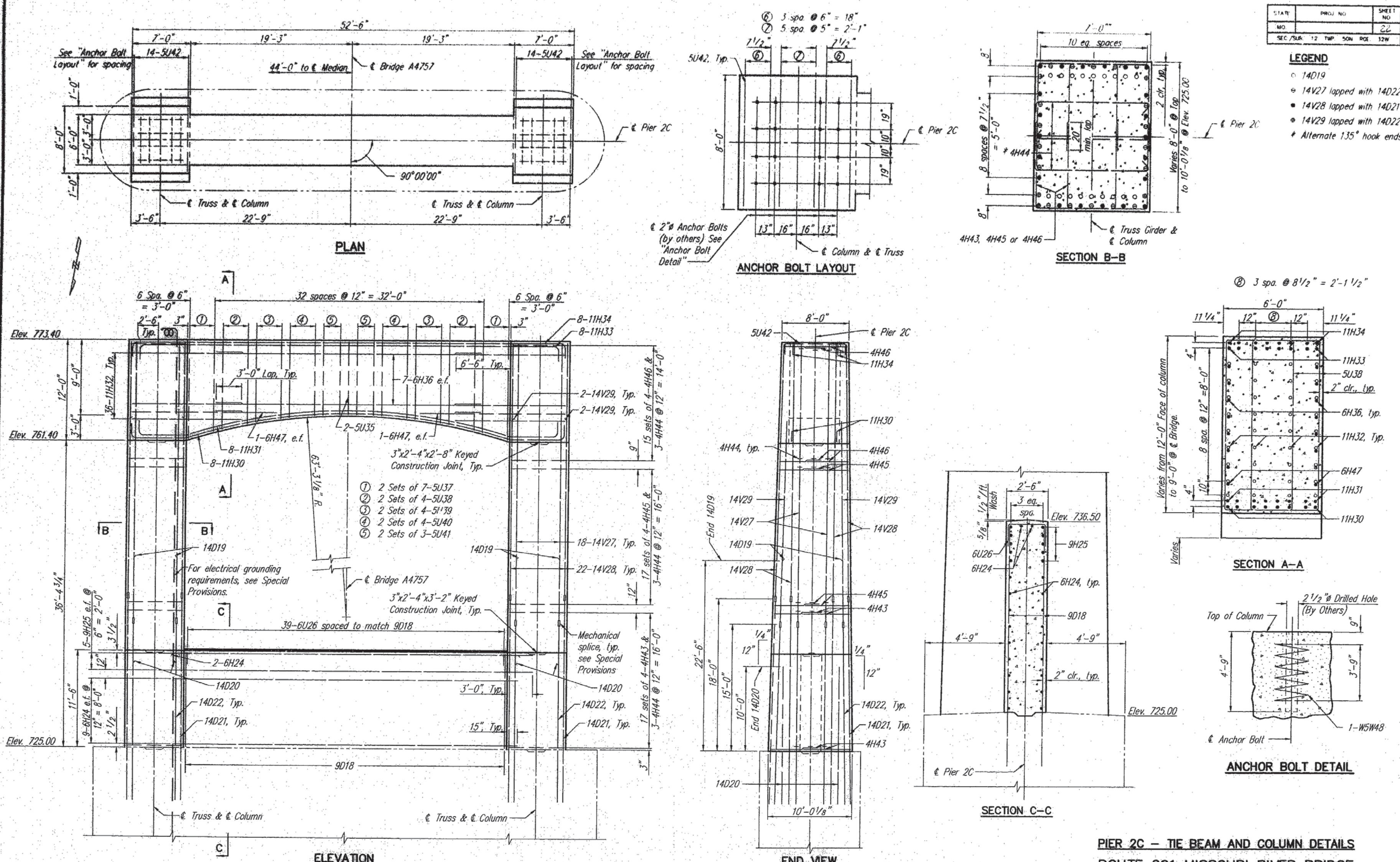
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 21 OF 59

A4757

PIER-2C1

STATE	PROJ. NO.	SHEET NO.
MO.		21



STATE	PROJ. NO.	SHEET NO.
MO.		22
SEC./SUR. 12 TWP. 50N RGE. 32W		

PIER 2C – TIE BEAM AND COLUMN DETAILS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

Notes:
e.f. denotes each face.
See "Navigation Lighting & Clearance Gauge" sheet for conduit thru tie beam.

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: S.A.K. 02/93
CHECKED: E.W.N. 03/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 22 OF 59

A4757

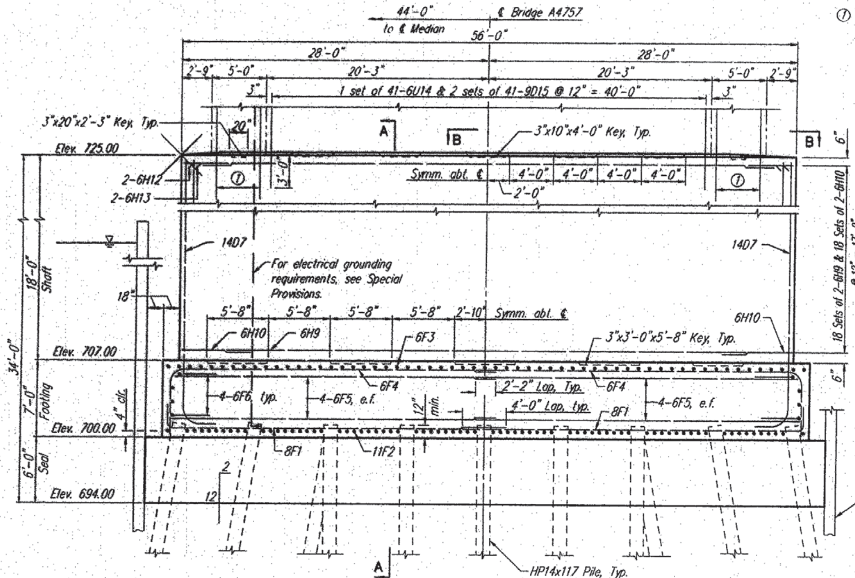
361

PIER-20U

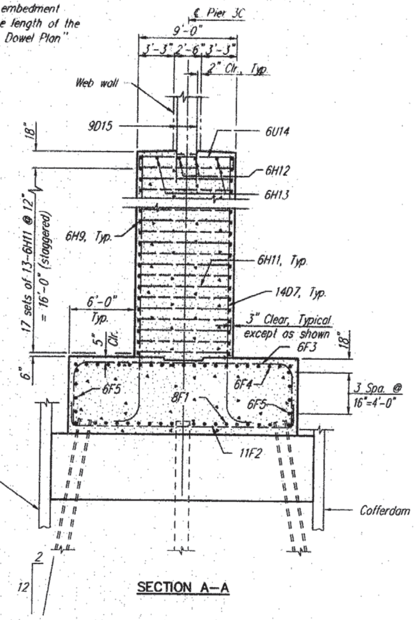
STATE	PROJ. NO.	SHEET NO.
MO		23

SEC./SUR. 12 TWP. 50N RGE. 32W

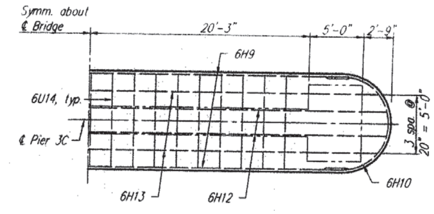
① 36-11D16. 5'-8" embedment measured along the length of the bar. See "Column Dowel Plan" for locations.



ELEVATION



SECTION A-A

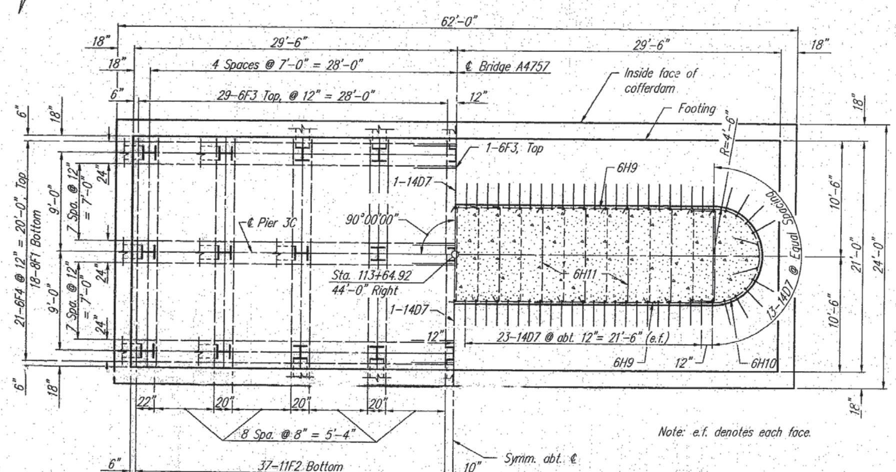


VIEW B-B

(Dowel bars not shown for clarity, see "Column Dowel Plan" and "Elevation" for details.)

‡ ESTIMATED QUANTITIES		
ITEM	UNIT	TOTAL
Structural Steel Piles (14")	Lin Ft.	2,403
Pile Point Reinforcement (14")	Each	27
Class B Concrete	Cu. Yds.	874
Seal Concrete	Cu. Yds.	349
Reinforcing Steel	Lbs.	82,290
Reinforcing Steel - Epoxy Coated	Lbs.	19,250

‡ Includes quantities for Web Wall, Columns, Tie Beam, and Bridge Seat.

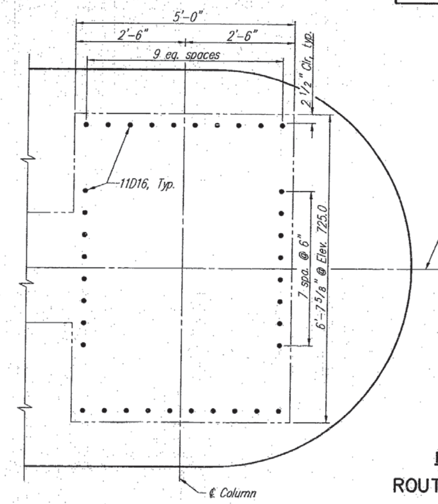


Note: e.f. denotes each face.

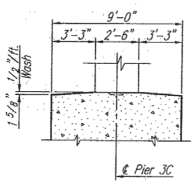
HALF PLAN AT FOOTING

HALF SECTION THRU SHAFT

FOOTING PLAN



COLUMN DOWEL PLAN



WASH DETAIL

Note:
11D16 dowel bars along short faces of column are sloped.

PIER 3C - FOUNDATION DETAILS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: S.A.K. 12/92
CHECKED: E.W.N. 01/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

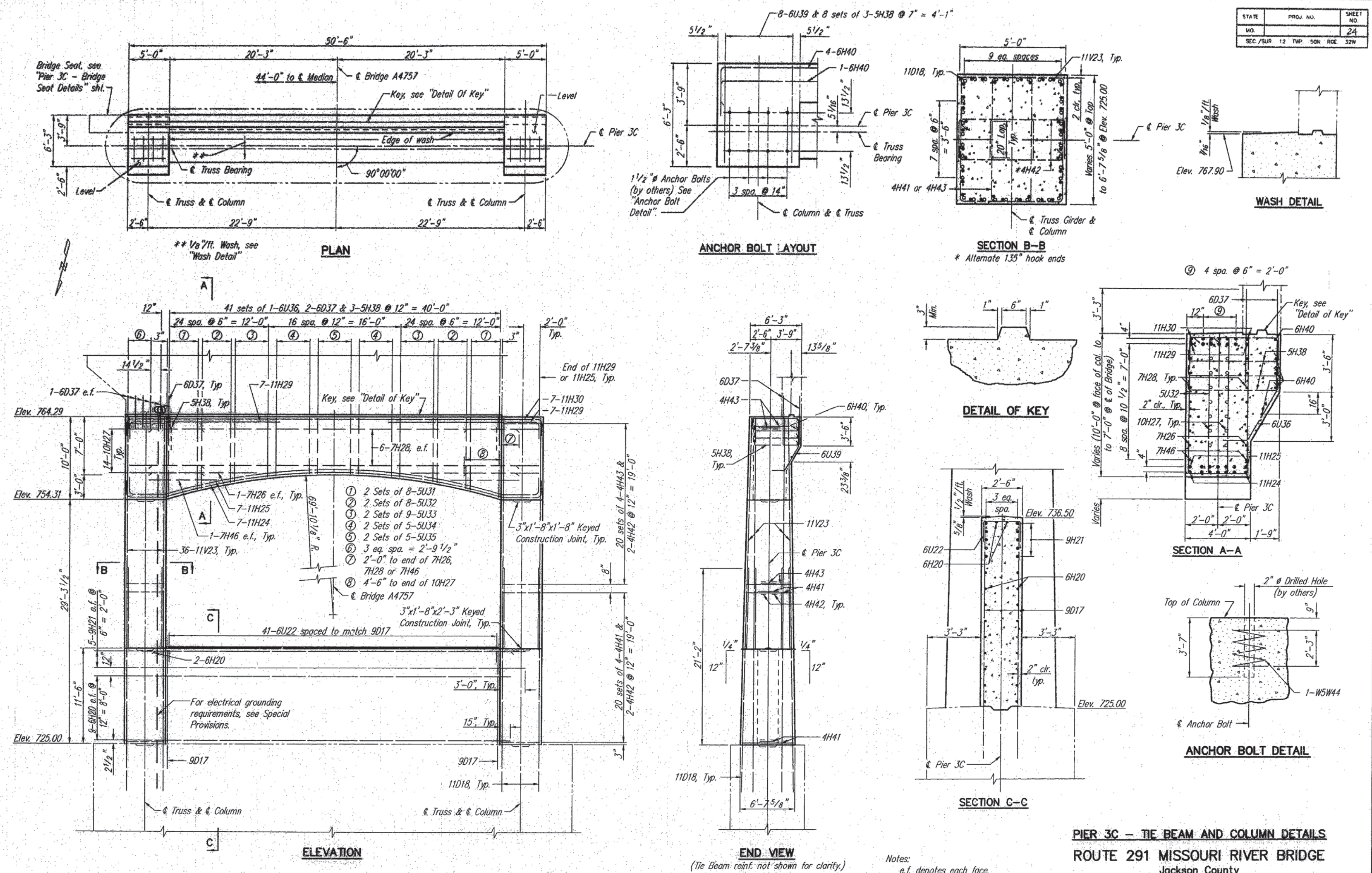
SHEET 23 OF 59

A4757

PIER-3C

36-2

STATE	PROJ. NO.	SHEET NO.
MO.		24
SEC./SUR 12 TWP. 50N RGE. 32W		



PIER–30U

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: S.A.K. 02/93
CHECKED: E.W.N. 03/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

Notes:
- e.f. denotes each face.
- n.f. denotes near face.
- See "Navigation Lighting & Clearance Gauge" sheet for conduit thru tie beam.

PIER 3C – TIE BEAM AND COLUMN DETAILS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

SHEET 24 OF 59

A4757

363

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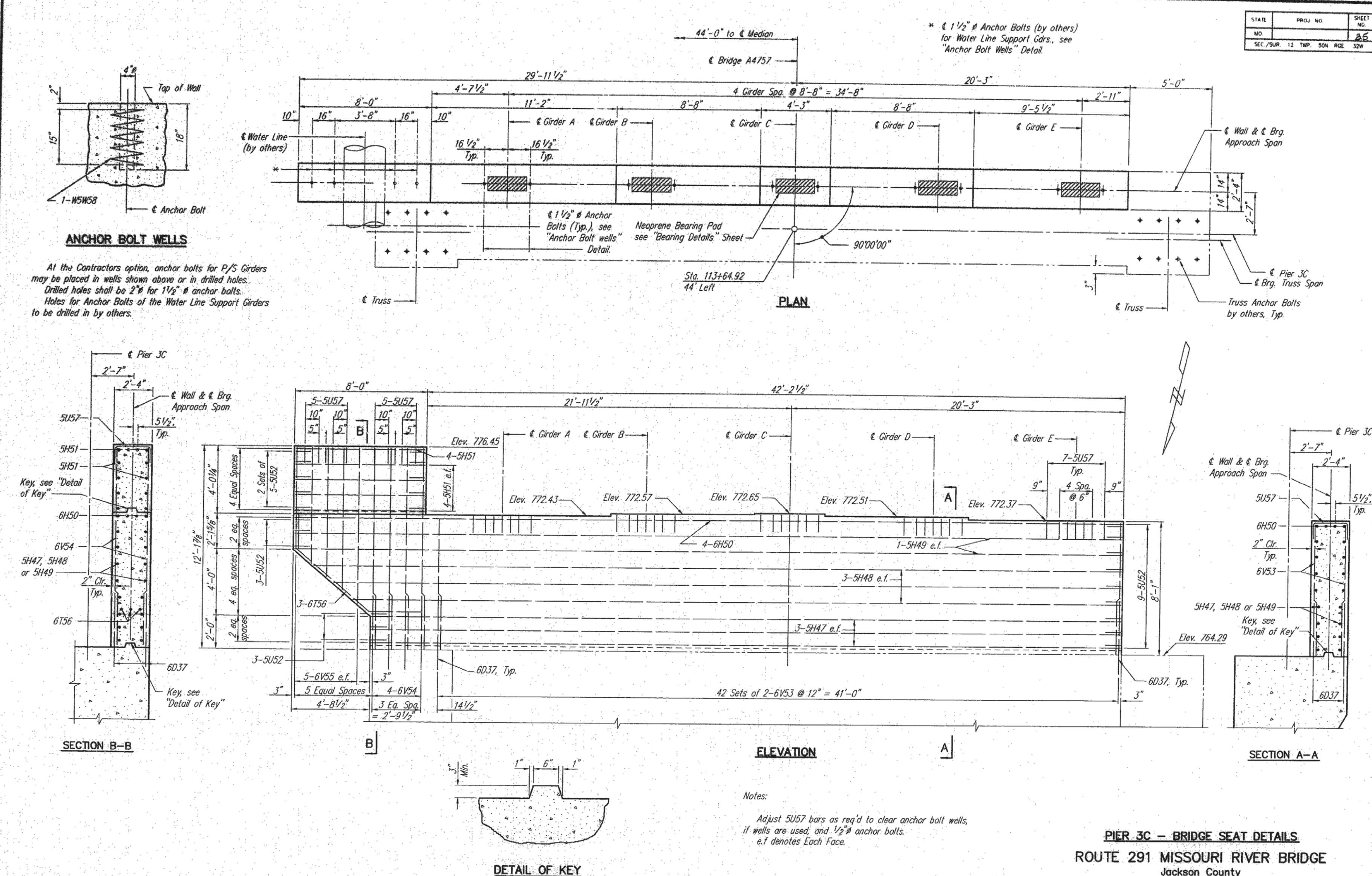


Notes:

Adjust 5U57 bars as req'd to clear anchor bolt wells, if wells are used, and ½"ø anchor bolts.
e.f denotes Each Face.

PIER 3C – BRIDGE SEAT DETAILS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

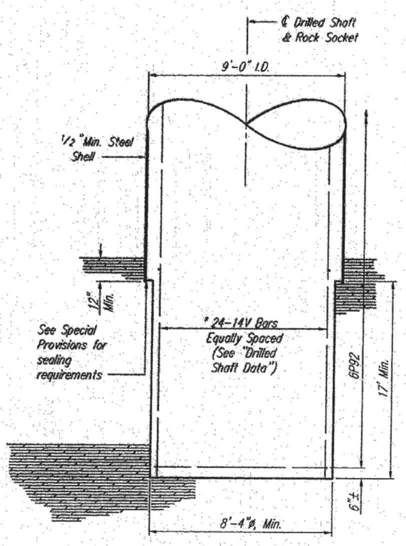
DETAILED: B.T.K. 02/93
CHECKED: E.W.N. 03/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

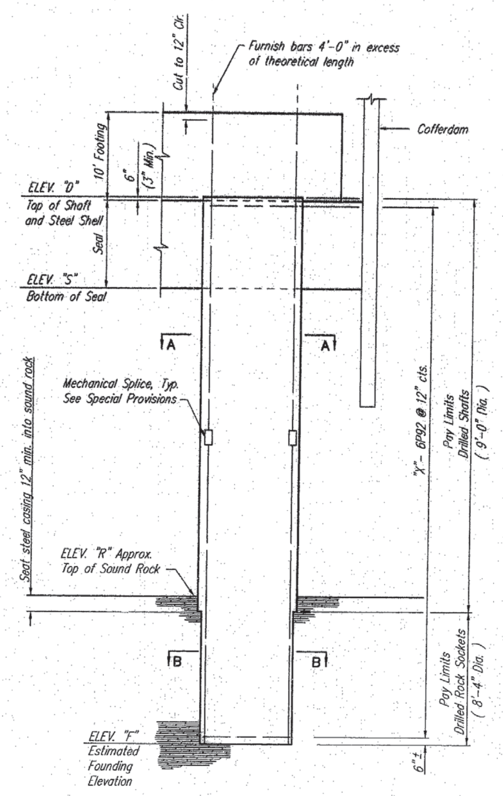
SHEET 25 OF 59

A4757

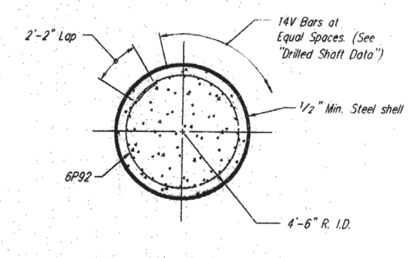
STATE	PROJ. NO.	SHEET NO.
MO.		26
SEC./SUR. 12 TWP. 50N RGE. 32W		



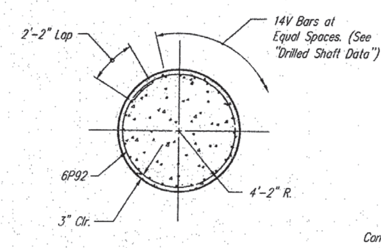
DETAIL OF ROCK SOCKET



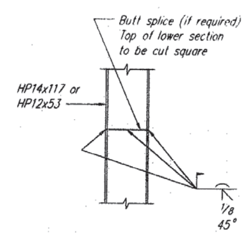
DRILLED SHAFT DETAIL



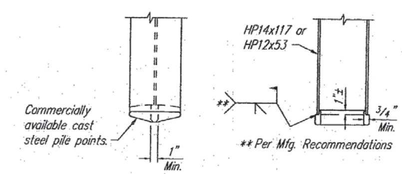
SECTION A-A



SECTION B-B



DETAIL OF STEEL PILE SPLICE



PILE DRIVING TIP DETAIL

PAY LIMITS PER SHAFT		
PIER	DRILLED SHAFT	ROCK SOCKET
1C	57'-6"	17'-0"
2C	55'-6"	19'-0"

DRILLED SHAFT DATA

PIER	ELEVATIONS				SHAFTS PER PIER	MARK	"X"
	"D"	"S"	"R"	"F"			
1C	688.5	678.00	632.0 ±	614.0	5	* 14V90	74
2C	678.5	666.00	624.0 ±	604.0	8	* 14V91	74

* Bar includes one mechanical splice. Splices at adjacent bars shall be staggered, 5'-0" min., see Special Provisions.

NOTES

Tremie seals shown in the plans are based on the following assumptions:

1. Shafts are concreted prior to dewatering.
2. Seal and cofferdam dimensions are as shown on the plans.
3. Bond stress between shaft & seal=1.44 ksf.
4. Bond stress between sheet piling and seal (seal depth less 2 ft.) = 0.288 ksf
5. Water Elev. 715.0 Min.

The Contractor may alter the construction sequence or seal dimensions, but the design shall be based on the above or more conservative assumptions.

The contractor shall submit shop drawings of cofferdams for the Engineers review.

Design End Bearing = 25 Tsf

The contract unit price for "Drilled Shafts (9'-0" Dia.)" shall be full compensation for construction of the drilled shafts to the pay limits shown in the "Drilled Shaft Detail". The contract price does not include the reinforcing steel.

The contract unit price for "Rock Sockets (8'-4" Dia.)" shall be full compensation for construction of the rock sockets to the pay limits shown in the "Drilled Shaft Detail". The contract price does not include the reinforcing steel.

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DRILLED SHAFT & STEEL PILING DETAILS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

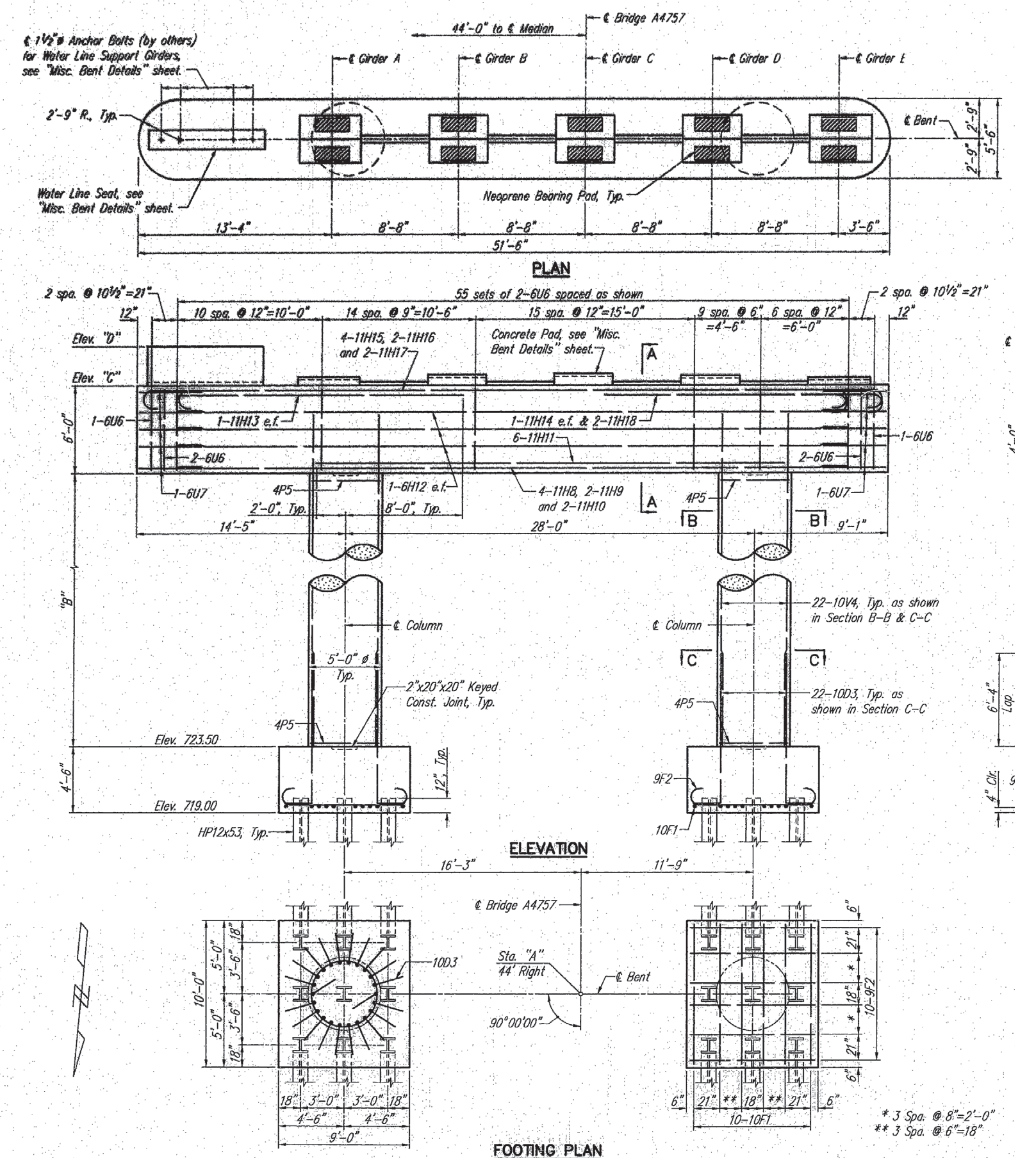
DRDSFT

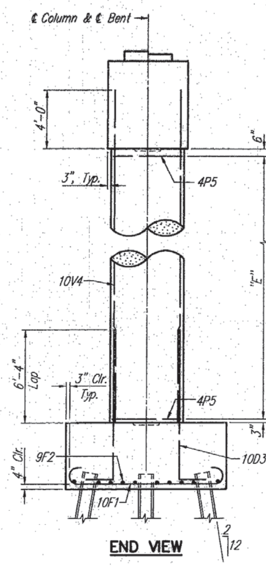
HARRINGTON & CORTELYOU, INC.
Consulting Engineers

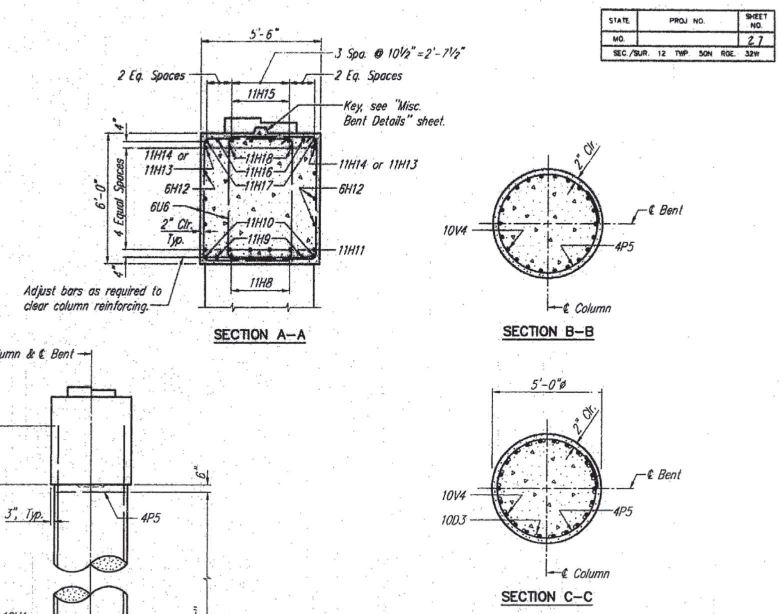
DETAILED: S.A.K. 12/92
CHECKED: E.W.N. 01/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

A4757







BENT DATA TABLE					
BENT	"A"	"B"	"C"	"D"	"E"
1S	114+81.92	38'-4⅜"	767.87	772.29	39-4P5 @ abt. 12"=37'-7⅜"
2S	116+08.42	33'-3¾"	762.81	766.78	34-4P5 @ abt. 12"=32'-6¾"
3S	117+34.92	28'-2½"	757.71	760.28	29-4P5 @ abt. 12"=27'-5½"

ESTIMATED QUANTITIES

ITEM	UNIT	BENT 1S	BENT 2S	BENT 3S
Class 1 Excavation	Cu. Yds.	123	133	169
Structural Steel Piles (12")	Lin Ft.	1,836	1,782	1,872
Pile Point Reinforcement (12")	Each	18	18	18
Class B Concrete	Cu. Yds.	151	143	135
Reinforcing Steel	Lbs.	23,650	25,560	21,460
Reinforcing Steel – Epoxy Coated	Lbs.	60	60	60

NOTES:

For Neoprene Bearing Pads see "Bearing Details" sheet.

For Concrete Pad Details, Water Line Seat Details, Anchor Bolt Wells, required keys, diaphragm dowel bars and additional notes see "Misc. Bent Details" sheet.

e.f. denotes each face.

Adjust 6U6 bars to clear Anchor Bolt Wells if wells are used.

STATE	PROJ NO.	SHEET NO.
MO.		27

SEC./SUR. 12 TWP. 50N RGE. 32W

BENTS 1S THRU 3S

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: T.L.W. 2/93
CHECKED: E.W.N. 2/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

A4757

BENT1-3S

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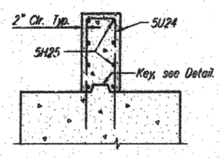
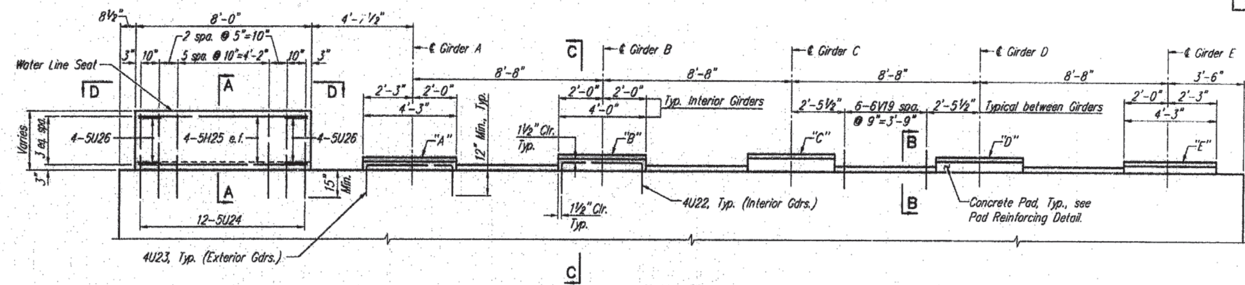
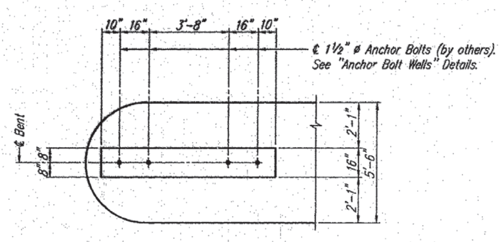
STATE	PROJ. NO.	SHEET NO.
MO.		28
SEC./SUR. 12 TWP. 50N RGE. 32W		



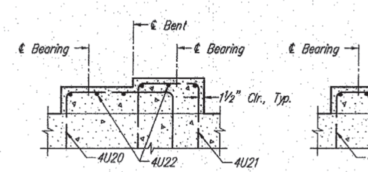
SECTION A–A



ELEVATION



VIEW D–D

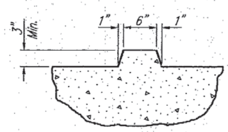


@ TYPICAL BENT

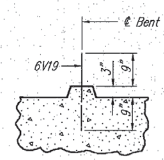
@ BENT 4N

SECTION C–C

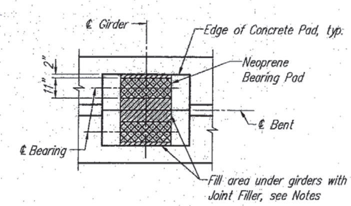
PAD ELEVATIONS										
BENT	"A"		"B"		"C"		"D"		"E"	
	NORTH	SOUTH	NORTH	SOUTH	NORTH	SOUTH	NORTH	SOUTH	NORTH	SOUTH
2N	763.05	763.17	763.20	763.32	763.27	763.35	763.14	763.25	762.99	763.11
3N	768.15	768.35	768.30	768.50	768.37	768.57	768.23	768.43	768.09	768.29
4N	772.80	772.82	772.96	772.96	773.03	773.03	772.90	772.90	772.75	772.75
1S	768.43	768.29	768.57	768.43	768.64	768.50	768.51	768.37	768.36	768.22
2S	763.31	763.23	763.45	763.37	763.53	763.45	763.39	763.31	763.25	763.17
3S	758.25	758.13	758.39	758.27	758.47	758.34	758.33	758.21	758.19	758.06



DETAIL OF KEY

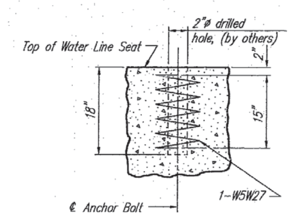


SECTION B–B

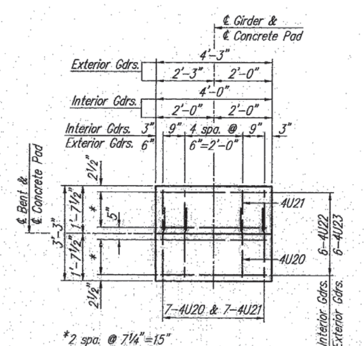


JOINT FILLER DETAIL

(Typical at all girders)



ANCHOR BOLT WELLS



*2 spa. @ 7¼"=15"

PAD REINFORCING DETAIL

NOTES:

Adjust pad reinforcing to clear anchor bolt wells if wells are used.

For Neoprene Bearing Pads, see "Bearing Details" sheet.

Cost of joint filler shall be incidental to price bid for Prestressed Concrete Girders.

e.f. denotes each face.

MISCELLANEOUS BENT DETAILS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

362

BENT-DET

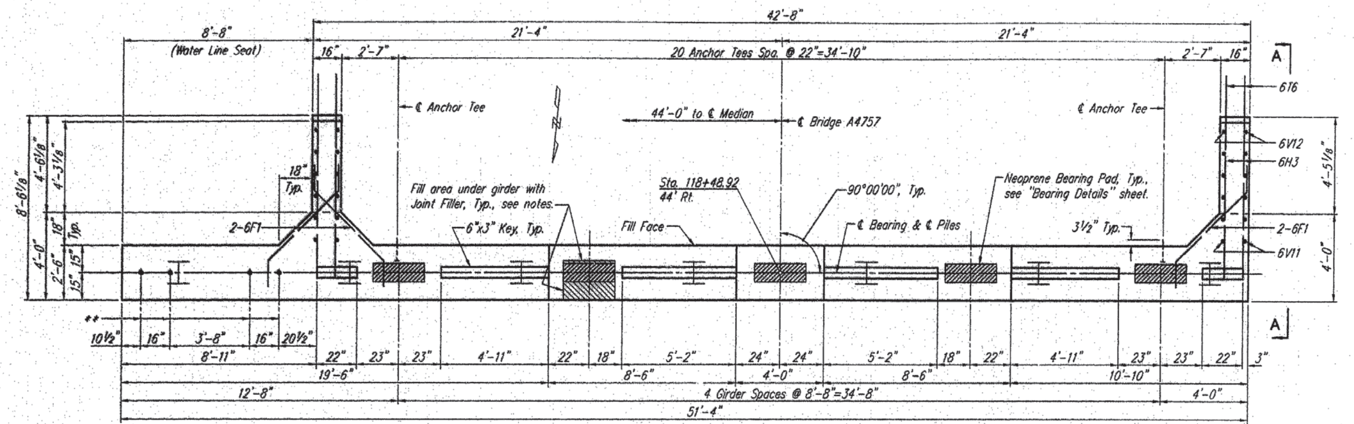
HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: T.L.W. 2/93
CHECKED: E.W.N. 2/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

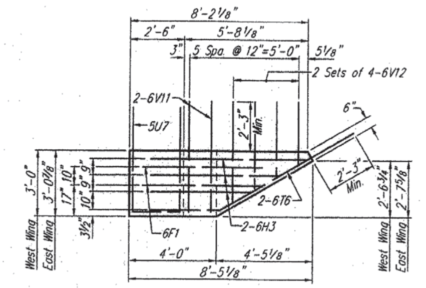
A4757

STATE	PROJ. NO.	SHEET NO.
MO.		29
SEC./SUR. 12 TWP. 50N RGE. 32W		

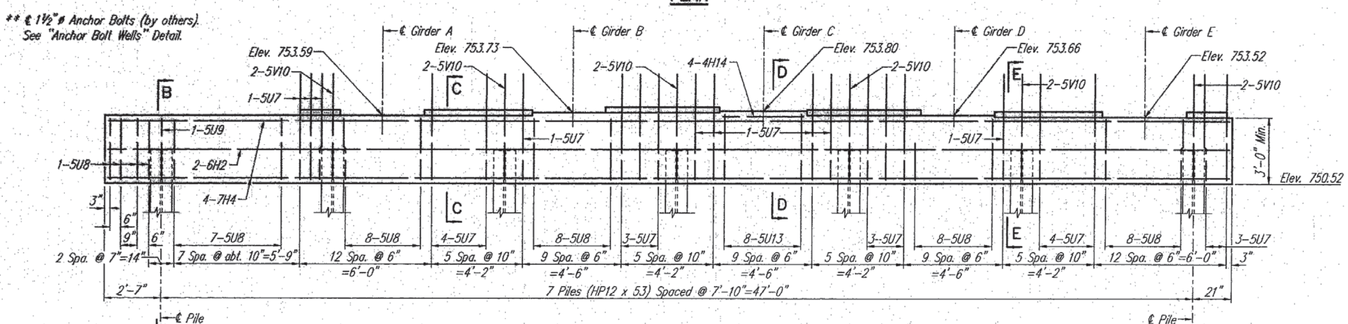


PLAN

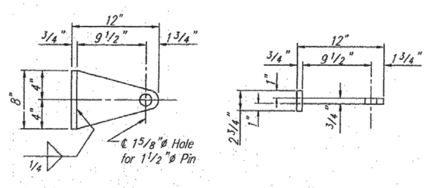
** ℄ 1½"ø Anchor Bolts (by others). See "Anchor Bolt Wells" Detail.



VIEW A–A



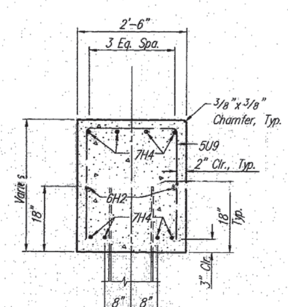
ELEVATION



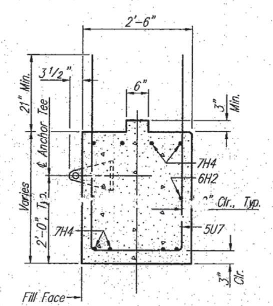
ELEVATION PLAN

DETAIL OF ANCHOR TEE

Material for anchor tee shall be ASTM A709 Gr. 36, A668 Class F or equivalent steel and galvanized in accordance with Section 712. Payment shall be included with Class B Concrete.

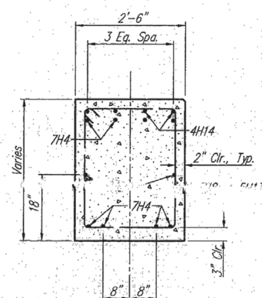


SECTION B–B

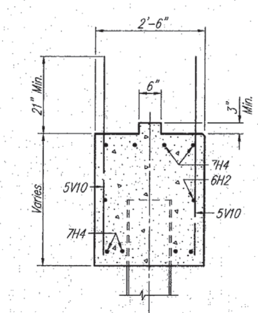


SECTION C–C

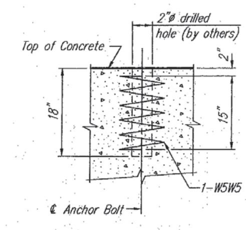
Notes:
Adjust Anchor Tees to clear vertical bars as req'd. Cost of joint filler shall be incidental to price bid for Prestressed Concrete Gdrs.



SECTION D–D



SECTION E–E



ANCHOR BOLT WELLS

ESTIMATED QUANTITIES

ITEM	UNIT	TOTAL
Prebore for Piles	Lin Ft.	144
Structural Steel Piles (12")	Lin Ft.	896
Pile Point Reinforcement (12")	Each	7
Class B Concrete	Cu. Yds.	17
Reinforcing Steel	Lbs.	1,790
Reinforcing Steel – Epoxy Coated	Lbs.	30

END BENT 4S

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: T.L.W. 2/93
CHECKED: T.L.N. 2/93

NOTE: DO NOT SCALE THIS DRAWING, FOLLOW DIMENSIONS.

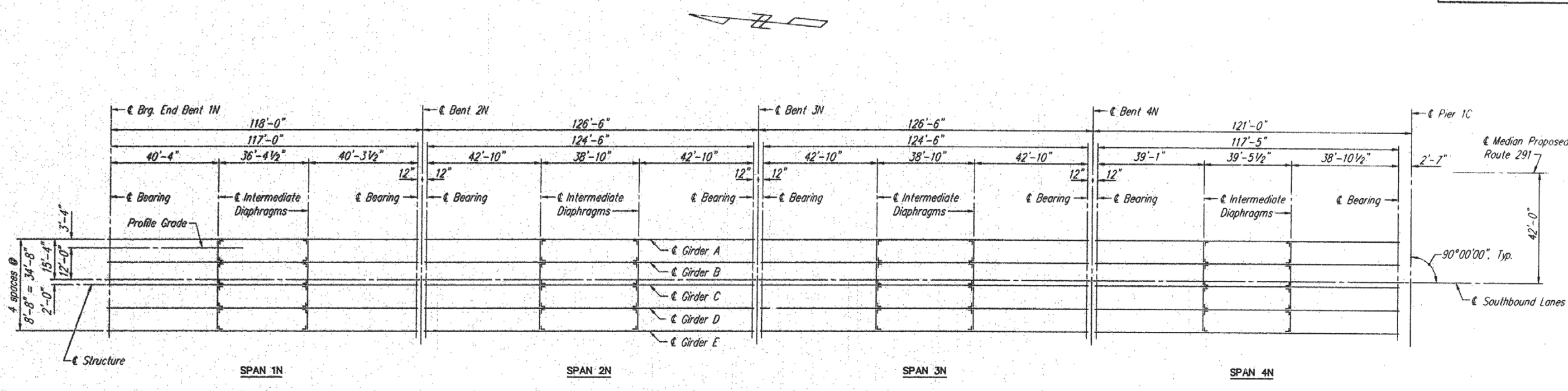
SHEET 29 OF 59

A4757

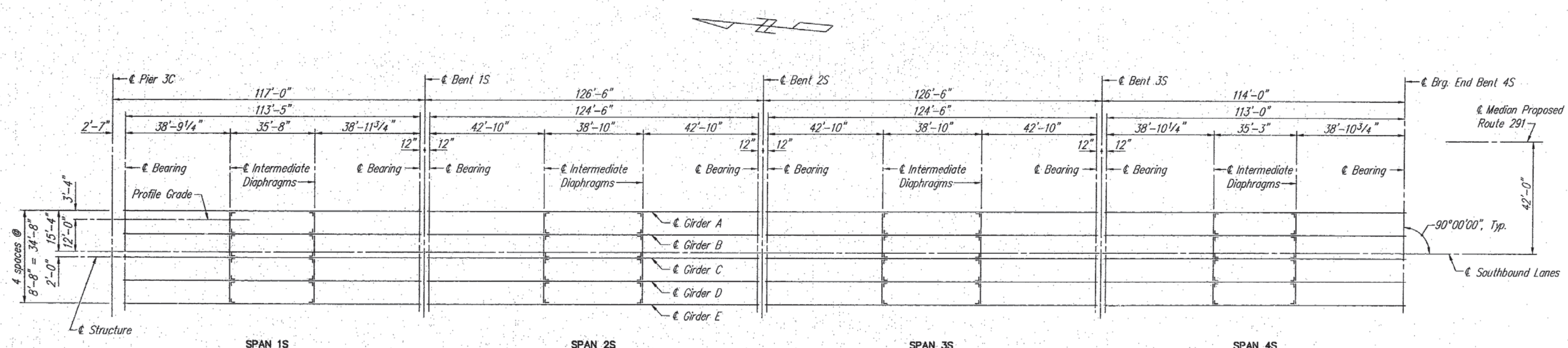
E-B7-4S1

368

STATE	PROJ. NO.	SHEET NO.
MO.		30
SEC./SUR. 12 TWP. 50N RGE. 32W		



FRAMING PLAN – UNIT 1



FRAMING PLAN – UNIT 3

369

NOTE:
All plan dimensions are measured horizontally. For Girder Notes see "Diaphragm Details" sheet.

FRAMING PLAN – UNITS 1 & 3

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

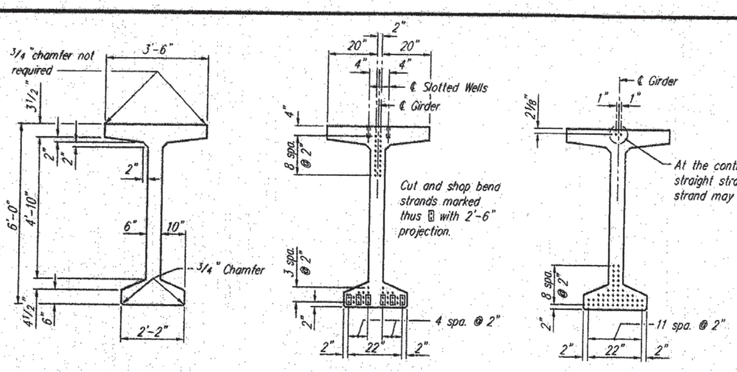
HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: T.L.W. 10/92
CHECKED: J.L.K. 2/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

A4757

STATE	PROJ. NO.	SHEET NO.
MO.		31
SEC./SUR. 12 TWP. 50N RGE. 32W		



GIRDER DIMENSIONS

END OF GIRDER

℄ OF GIRDER

STRAND ARRANGEMENT

Span 1N & 4N

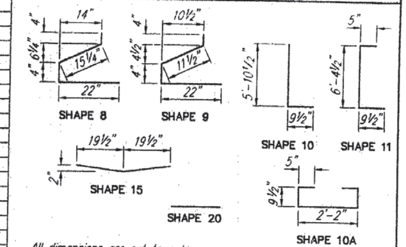
NOTE:
(+) indicates prestressed strand. Use 46 strands with an initial prestress force of 1426.0 kips.

At the contractors option two additional straight strands stressed @ 8 kips per strand may be included in the top flange.

BILL OF REINFORCING STEEL – EACH GIRDER

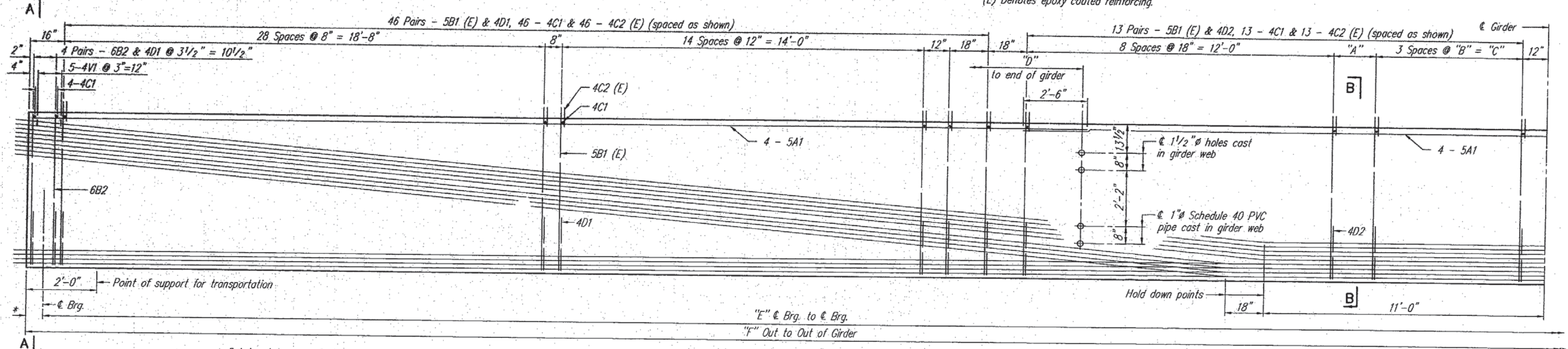
NO.	SIZE & MARK	ACTUAL LENGTH	SHAPE
SPAN 1N			
12	5 A1	41'-0"	20
236	5 B1(E)	7'-4 1/2"	11
16	6 B2	6'-6 1/8"	10
126	4 C1	3'-4"	20
118	4 C2(E)	4'-2"	10A
200	4 D1	3'-7 1/4"	8
52	4 D2	3'-3 1/4"	9
10	4 V1	3'-3"	15
SPAN 4N			
12	5 A1	41'-3"	20
236	5 B1(E)	7'-4 1/2"	11
16	6 B2	6'-6 1/8"	10
126	4 C1	3'-4"	20
118	4 C2(E)	4'-2"	10A
200	4 D1	3'-7 1/4"	8
52	4 D2	3'-3 1/4"	9
10	4 V1	3'-3"	15

BENDING DIAGRAMS

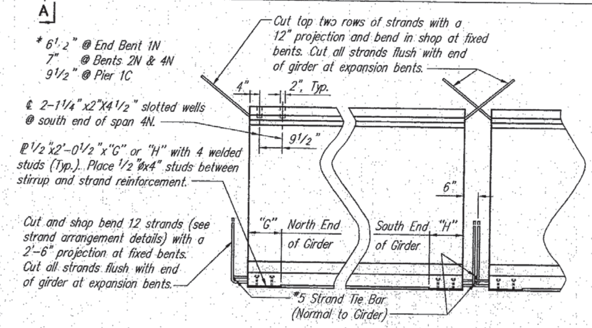


All dimensions are out to out.

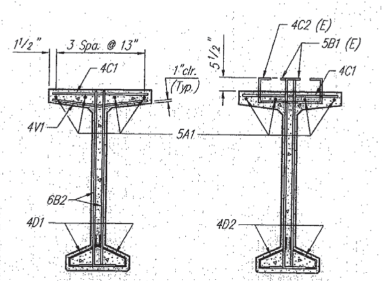
(E) Denotes epoxy coated reinforcing.



PART ELEVATION 118' & 121' GIRDERS



STRAND DETAILS AT GIRDER ENDS



SECTION A–A

SECTION B–B

NOTES:
For lifting loops, coil tie locations and additional notes, see "Intermediate Diaphragm Details" sheet.
All dimensions are out to out.
Where deflecting strands interfere with placement, in-place bending may be necessary.
Hooks and bends shall be in accordance with the CRSI Manual of Standard Practice for Detailing Reinforced Concrete Structures stirrup and tie dimensions.
Actual lengths are measured along centerline bar to the nearest inch.
Minimum clearance to reinforcing shall be 1".
All reinforcement shall be grade 60.
Dimensions shown are horizontal.
Adjust spacing of 4V1 & 4C1 bars as required to clear slotted wells by 1/2" min.

GIRDER DATA TABLE

SPAN	NO. GDRS.	A	B	C	D	E	F	G	H
1N	5	19 3/4"	23"	5'-9"	40'-10 1/2"	117'-0"	118'-1 1/2"	12"	13"
4N	5	20 3/4"	2'-0"	6'-0"	39'-8"	117'-5"	118'-9 1/2"	13"	18"

PRESTRESSED CONCRETE GIRDER DETAILS
118' SPAN 1N & 121' SPAN 4N

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

370

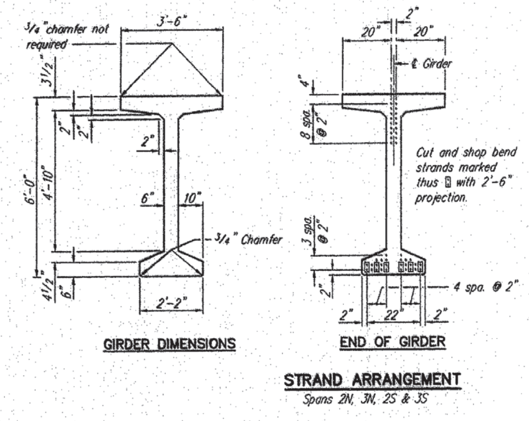
HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: T.L.W. 10/92
CHECKED: J.D.S. 8/94

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

A4757

STATE	PROJ. NO.	SHEET NO.
MO.		32
SEC./SUR. 12 TWP. 50N RGE. 32W		

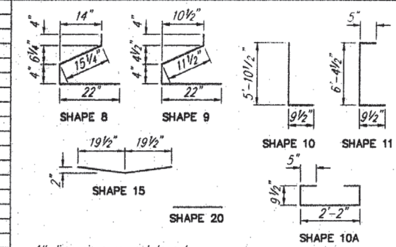


NOTE:
(+) indicates prestressed strand. Use 46 strands with an initial prestress force of 1426.0 kips.

At the contractors option two additional straight strands stressed @ 8 kips per strand may be included in the top flange.

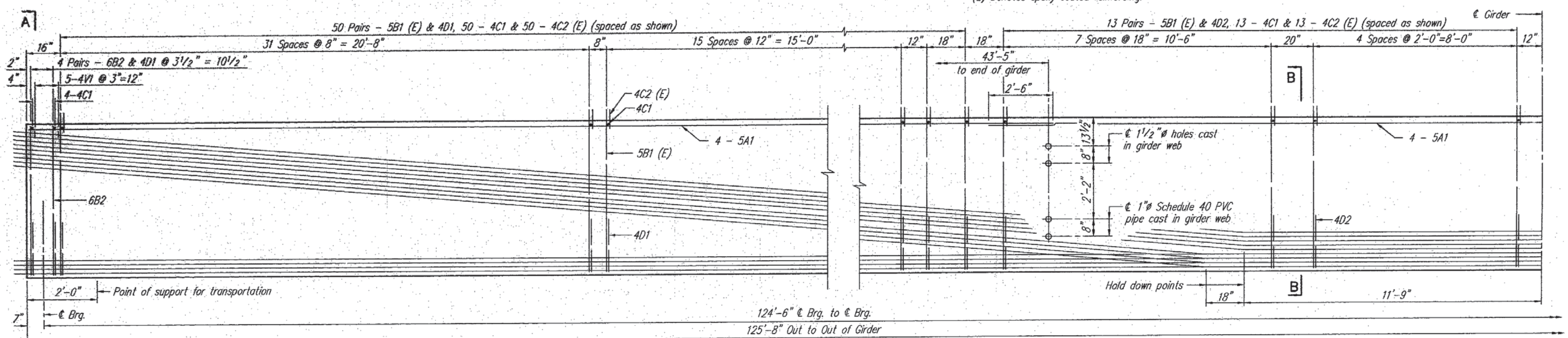
BILL OF REINFORCING STEEL – EACH GIRDER			
NO.	SIZE & MARK	ACTUAL LENGTH	SHAPE
SPANS 2N, 3N, 2S & 3S			
12	5 A1	43'-6"	20
252	5 B1(E)	7'-4 1/2"	11
16	6 B2	6'-6 1/8"	10
134	4 C1	3'-4"	20
126	4 C2(E)	4'-2"	10A
216	4 D1	3'-7 1/4"	8
52	4 D2	3'-3 1/4"	9
10	4 V1	3'-3"	15

BENDING DIAGRAMS



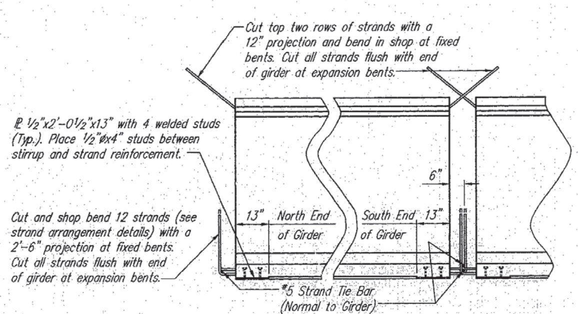
All dimensions are out to out.

(E) Denotes epoxy coated reinforcing.

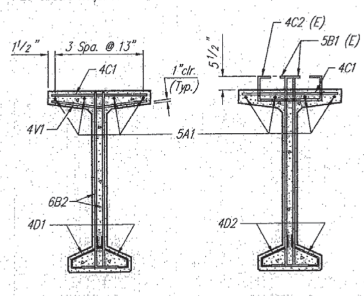


PART ELEVATION 126'-6" GIRDER

20 Girders Required



STRAND DETAILS AT GIRDER ENDS



NOTES:
For lifting loops, coil tie locations and additional notes, see "Intermediate Diaphragm Details" sheet.
All dimensions are out to out.
Where deflecting strands interfere with placement, in-place bending may be necessary.
Hooks and bends shall be in accordance with the CRSI Manual of Standard Practice for Detailing Reinforced Concrete Structures stirrup and tie dimensions.
Actual lengths are measured along centerline bar to the nearest inch.
Minimum clearance to reinforcing shall be 1".
All reinforcement shall be grade 60.
Dimensions shown are horizontal.

PRESTRESSED CONCRETE GIRDER DETAILS
126'-6" SPANS 2N, 3N, 2S & 3S

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

371

PDG-02

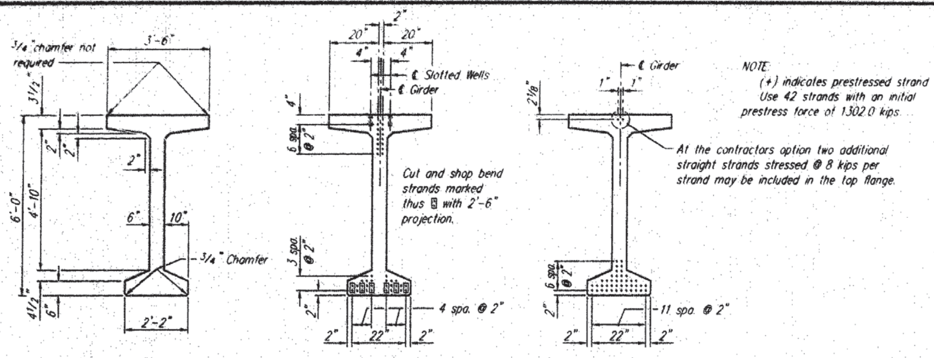
HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: T.L.W. 10/92
CHECKED: J.D.S. 8/94

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

A4757

STATE	PROJ. NO.	SHEET NO.
MO		33
SEC./SUR. 12 TWP. 50N RGE. 32W		



GIRDER DIMENSIONS — END OF GIRDER — ℄ OF GIRDER

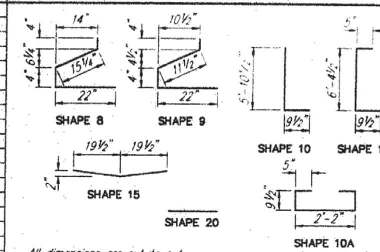
STRAND ARRANGEMENT

Span 1S & 4S

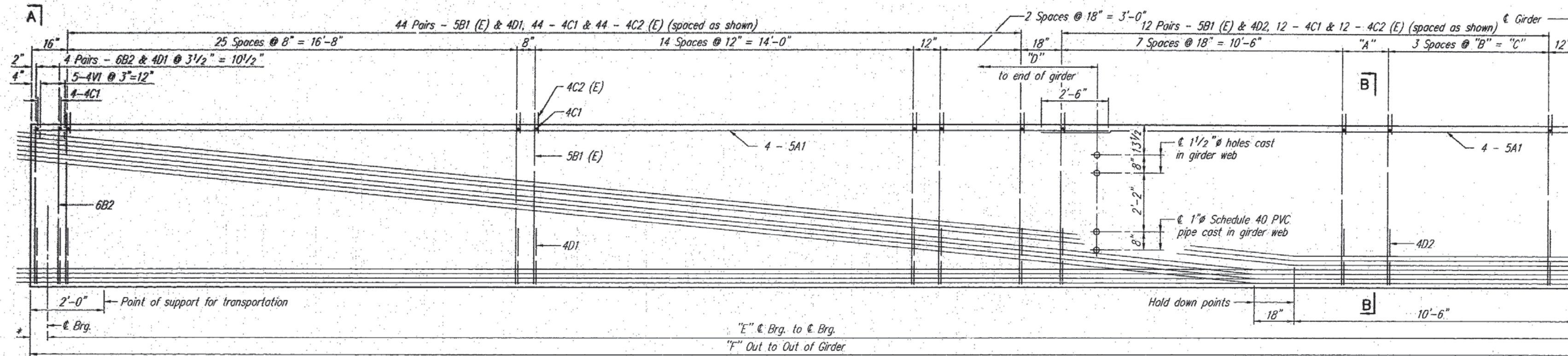
BILL OF REINFORCING STEEL – EACH GIRDER

NO.	SIZE & MARK	ACTUAL LENGTH	SHAPE
SPAN 1S			
12	5 A1	39'-11"	20
224	5 B1(E)	7'-4 1/2"	11
16	6 B2	6'-6 1/8"	10
120	4 C1	3'-4"	20
112	4 C2(E)	4'-2"	10A
192	4 D1	3'-7 1/4"	8
48	4 D2	3'-3 1/4"	9
10	4 V1	3'-3"	15
SPAN 4S			
12	5 A1	39'-8"	20
224	5 B1(E)	7'-4 1/2"	11
16	6 B2	6'-6 1/8"	10
120	4 C1	3'-4"	20
112	4 C2(E)	4'-2"	10A
192	4 D1	3'-7 1/4"	8
48	4 D2	3'-3 1/4"	9
10	4 V1	3'-3"	15

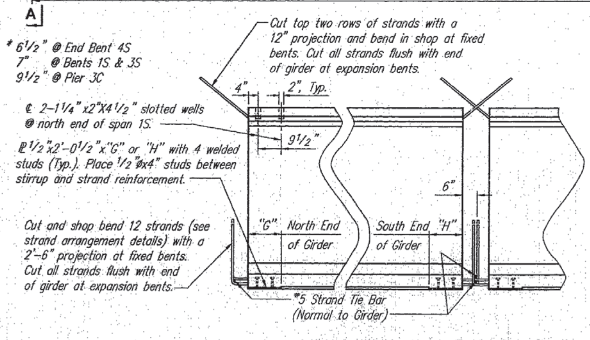
BENDING DIAGRAMS



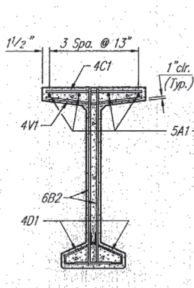
(E) Denotes epoxy coated reinforcing.



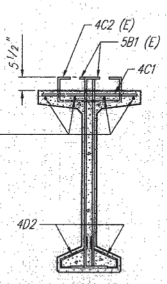
PART ELEVATION 117' & 114' GIRDERS



STRAND DETAILS AT GIRDER ENDS



SECTION A–A



SECTION B–B

NOTES:

For lifting loops, coil tie locations and additional notes, see "Intermediate Diaphragm Details" sheet.

All dimensions are out to out.

Where deflecting strands interfere with placement, in-place bending may be necessary.

Hooks and bends shall be in accordance with the CRSI Manual of Standard Practice for Detailing Reinforced Concrete Structures stirrup and tie dimensions.

Actual lengths are measured along centerline bar to the nearest inch.

Minimum clearance to reinforcing shall be 1".

All reinforcement shall be grade 60.

Dimensions shown are horizontal.

Adjust spacing of 4V1 & 4C1 bars as required to clear slotted wells by 1/2" min.

GIRDER DATA TABLE

SPAN	NO. GDRS.	A	B	C	D	E	F	G	H
1S	5	20 3/4"	2'-0"	6'-0"	39'-6 3/4"	113'-5"	114'-9 1/2"	18"	13"
4S	5	19 3/4"	23"	5'-9"	39'-5 1/4"	113'-0"	114'-1 1/2"	13"	12"

PRESTRESSED CONCRETE GIRDER DETAILS

117' SPAN 1S & 114' SPAN 4S

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

37a

PD0-03

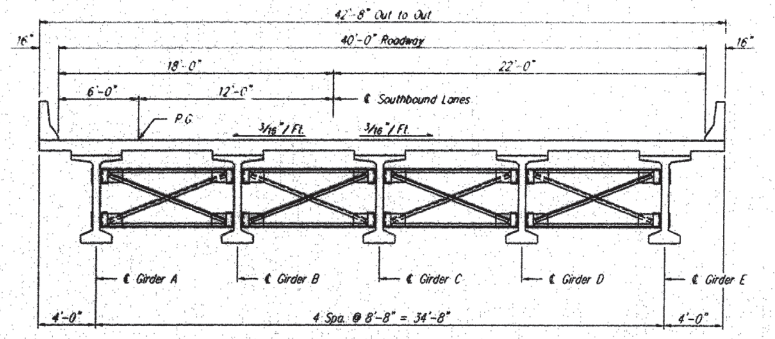
HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: T.L.W. 10/92
CHECKED: J.D.S. 8/94

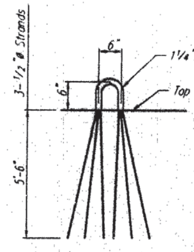
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

A4757

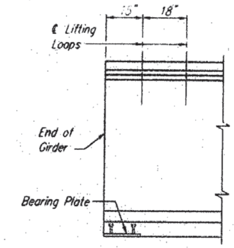
STATE	PROJ. NO.	SHEET NO.
MO		34
SEC./SUR. 12 TWP. 50N RGE. 32W		



TYPICAL SECTION @ INTERMEDIATE DIAPHRAGM



LIFTING DEVICE DETAIL



LOCATION OF LIFTING LOOPS

GIRDER NOTES

Concrete for girders shall be Class A1 with a 28-day compressive strength of 6,000 psi. At transfer of the tensioning load the compressive strength of concrete shall be 4,600 psi minimum for spans 2N, 3N, 1S, 2S, 3S and 4S and 4,800 psi minimum for spans 1N and 4N.

The top surface of girders shall be scored transversely. A 3-inch wide strip at each end and at 1/10 points across the top flange shall be smooth finished to accurate top flange depth.

Exposed corners of girder flanges shall be chamfered 3/4" or rounded to 3/4" radius unless otherwise shown or noted.

For details of 1/2" bearing plate, see "Prestressed Concrete Girder Details" sheets.

Galvanize the 1/2" bearing plate (A709 Gr. 63) in accordance with ASTM A123.

Cost of furnishing, galvanizing & installing the 1/2" bearing plate (A709 Gr. 36) and welded studs in the prestressed girder shall be included in the price bid for Prestressed Concrete Girders.

Cost of 3/4"Ø coil ties and coil tie rods to be included in contract unit price for Prestressed Concrete Girders.

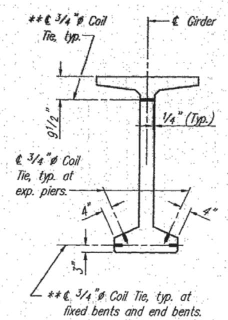
Coil ties shall be held in place in the forms by slotted wire-setting-studs projecting thru froms. Studs are to be left in place or replaced with temporary plugs until girders are erected, and then replaced with by coil tie rods.

Exterior surface of girder lines A & E shall receive a smooth texture finish free of air voids.

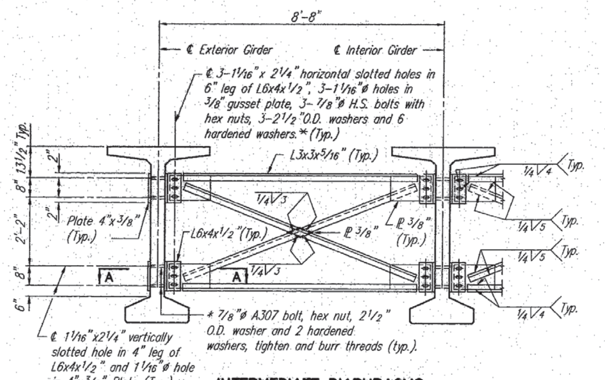
All pre-tensioning steel shall be uncoated seven wire low relaxation strands for prestressed concrete conforming to AASHTO M203, Grade 270 with a nominal diameter of 1/2", nominal area of 0.153 sq. in. and ultimate tensile strength of 270,000 psi. See Standard Specs. 705.4.8.

All prestressing strands for girders shall be cut off within 1" of the face of concrete unless otherwise indicated.

Extreme care shall be exercised in lifting, handling and storing the prestressed girders to prevent cracking or damage. Girders shall be lifted by means of the devices provided, or others of approved design, and shall be maintained in an upright position and supported near the ends at all times. Proper support bearings shall be used to avoid twisting of the girder.



COIL TIE DETAIL

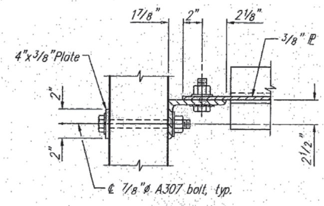


INTERMEDIATE DIAPHRAGMS

Notes:

**At fixed bents 2N-4N and 1S-3S omit the exterior coil tie at girder lines A & E.

For Coil Ties see Section 705.4.S of the Missouri Standard Specifications for Highway Construction. Coil Ties to be galvanized.



SECTION A-A

DIAPHRAGM NOTES

All steel in diaphragms shall conform to ASTM A709 Gr. 36.

All intermediate diaphragm materials including bolts, nuts and washers shall be galvanized.

* In lieu of 2 1/2"O.D. washers, Contractor may substitute a 3/16" (min. thickness) plate with 2 or 3-15/16"Ø holes as indicated and one hardened washer per bolt.

Shop drawings will be required for steel diaphragms and angle connections.

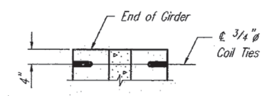
Payment for furnishing and installing steel intermediate diaphragms shall be included in contract unit price for Prestressed Concrete Girders.

Diaphragm Notes (continued)

7/8"Ø H.S. bolts shall be galvanized and conform to ASTM A325 and may be tensioned by turn-of-nut method.

High strength bolts, nuts, and washers shall be sampled for quality in accordance with Standard Specification 706 and Field Section (FS-712).

Fabricate intermediate diaphragms to conform to cross slope or provide additional lengths of L6x4x1/2 at interior girders to accommodate square (level) diaphragms.



TYPICAL SECTION ~~SHOWING~~ COIL TIE LOCATION

INTERMEDIATE DIAPHRAGM DETAILS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

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DIA-APPR

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

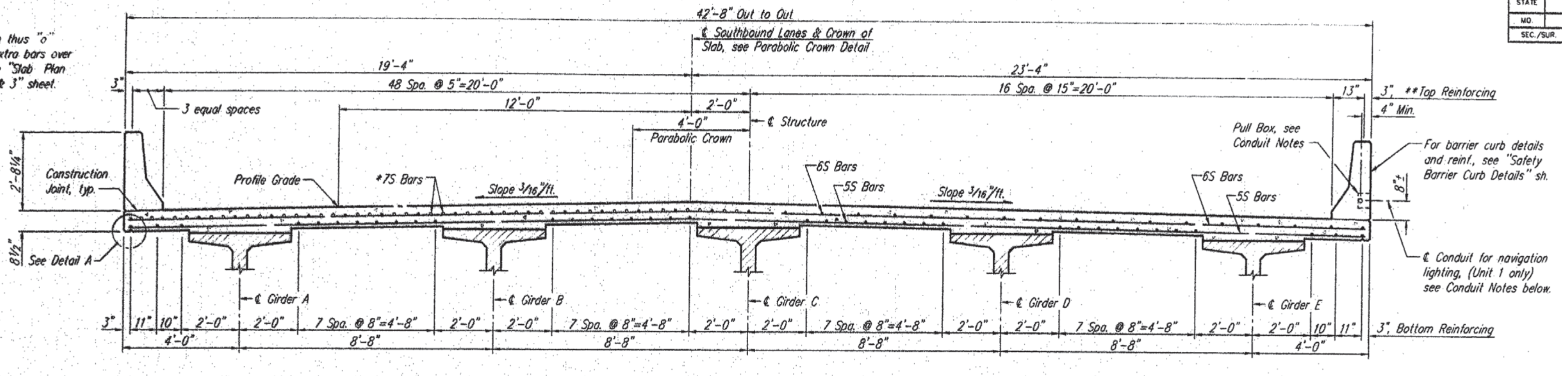
DETAILED: T.L.W. 10/92
CHECKED: J.D.S. 3/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

A4757

STATE	PROJ. NO.	SHEET NO.
MO.		35
SEC./SUR. 12 TWP. 50N RGE. 32W		

* Bars shown thus "o" indicates extra bars over bents. See "Slab Plan - Units 1 & 3" sheet.



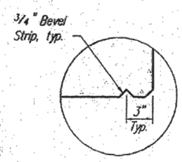
HALF SECTION NEAR BENT

SECTION THRU ROADWAY
(C.I.P. Option shown)

HALF SECTION @ MIDSPAN

Note:
For prestressed girder haunches see "Girder Camber & Haunching Diagrams - Units 1 & 3" sheet.

** Spacing for top reinforcing symmetrical about ℄ Structure.



DETAIL A

Conduit Notes:

The conduit shall be continuous and watertight through out the length of the west safety barrier curb of Unit 1.

All conduit shall be 1¼" zinc coated rigid steel sections with water-tight threaded connections. Each section shall bear the Underwriters Laboratories, Inc. (UL) label, and shall be in conformance with section 1060.1.1 of the Standard Specifications.

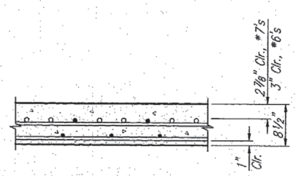
The conduit shall extend beyond the end of the safety barrier curb near Pier 1C at least 12". The threaded end of this extension shall be sealed with a galvanized, watertight cap.

Galvanized pull boxes shall be provided near Bents 2N, 3N, 4N and Pier 1C. The access covers of these boxes shall be watertight and aligned flush with the outside face of the barrier curb.

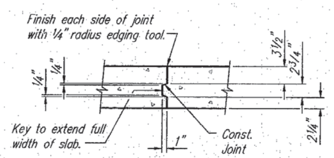
A galvanized junction box shall be provided at the west wingwall barrier curb of End Bent 1N. See "Elevation of Wing Detail" on the "Misc. Diaphragm & Vertical Drain Details" sheet for box location. The access cover of the junction box shall be watertight and aligned flush with the outside face of the barrier curb.

All conduit work shall be in accordance with section 707 of the Standard Specifications.

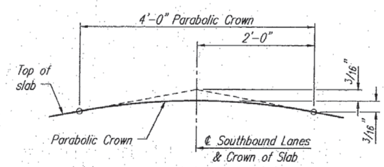
The cost of furnishing and installing all conduit, pull boxes, junction boxes, end caps, zinc coating, and any other incidential items, complete in place, shall be included in the unit price bid for "Navigation Lighting System" per lump sum.



CLEARANCE DETAIL



TYPICAL CONSTRUCTION JOINT



PARABOLIC CROWN DETAIL

328

SLAB SECTIONS & DETAILS - UNITS 1 & 3

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

ROSEC-C1

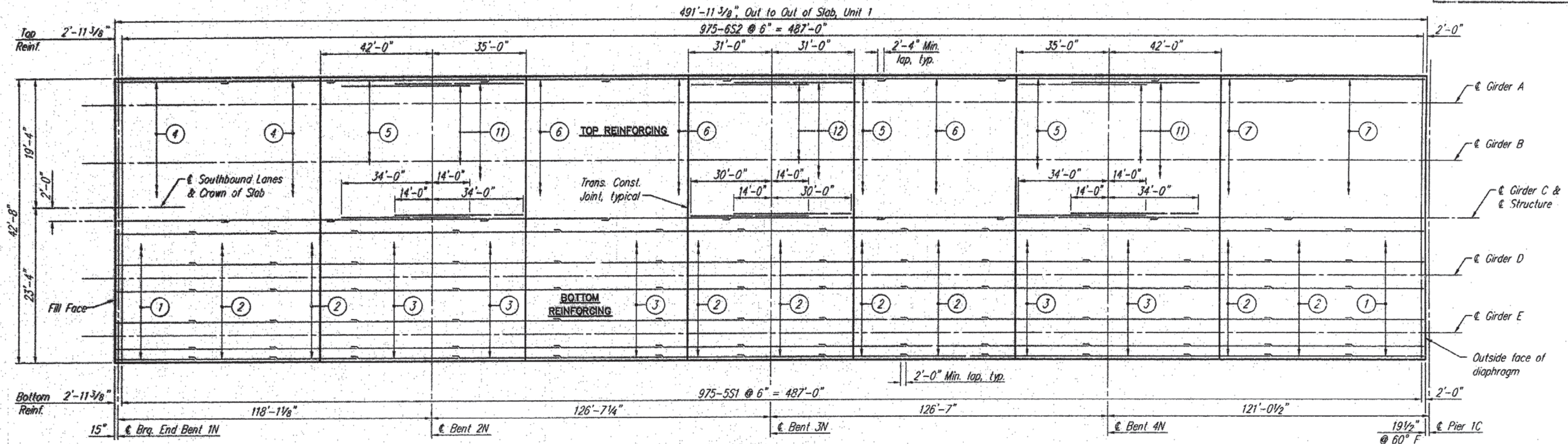
HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: T.L.W. 2/94
CHECKED: M.J.T. 2/94

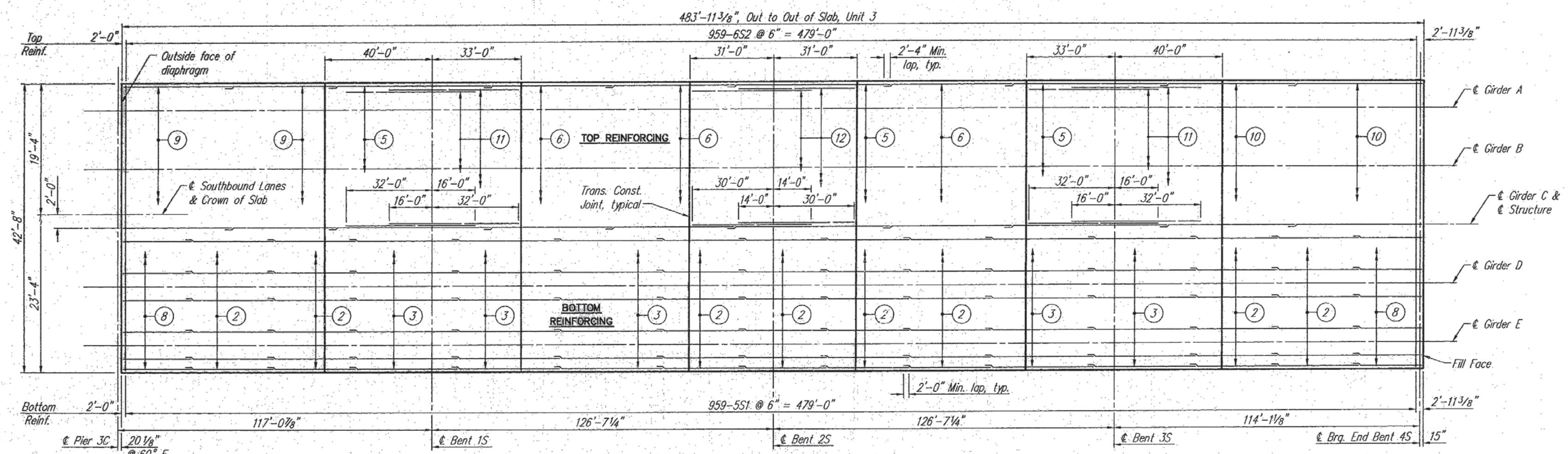
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

A4757

STATE	PROJ. NO.	SHEET NO.
MO.		36
SEC./SUR 12	TWP. 50N	RGE. 32W



SLAB PLAN – UNIT 1
(C.I.P. Alternate Shown)



SLAB PLAN – UNIT 3
(C.I.P. Alternate Shown)

(1) 38 – 5S3	(4) 35 – 6S6	(7) 35 – 6S9	(10) 35 – 6S12
(2) 38 – 5S4	(5) 35 – 6S7	(8) 38 – 5S10	(11) 34 – 7S13
(3) 38 – 5S5	(6) 35 – 6S8	(9) 35 – 6S11	(12) 34 – 7S14

Notes:
Slab to be built parallel to grade and a minimum thickness of 8½". Estimated quantities include slab, haunching & diaphragms.
Longitudinal dimensions are parallel to grade.

For spacing of above reinforcing and Detail A see "Slab Sections & Details – Units 1 & 3" sheet.
For additional end of slab details see diaphragm details sheets.

SLAB PLAN – UNITS 1 & 3
ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

SLAB-1-3

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.K.G. 3/94
CHECKED: M.J.T. 3/94

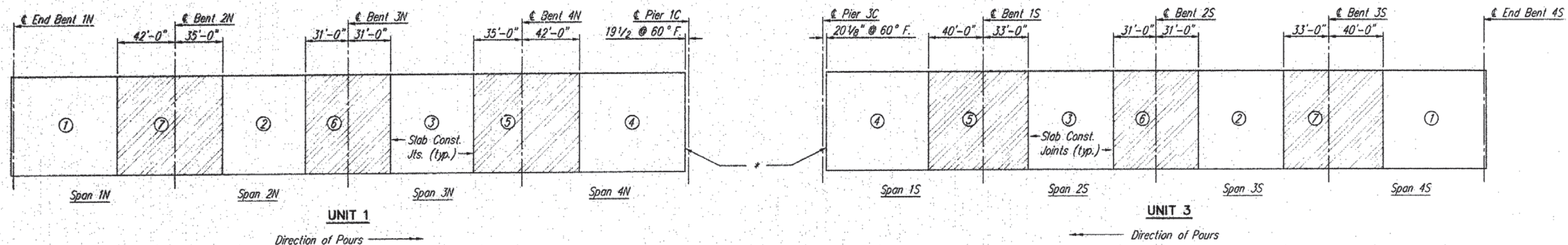
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 36 OF 59

A4757

375

STATE	PROJ. NO	SHEET NO.
MO.		37
SEC./SUR. 12 TWP. 50N RGE. 32W		



POURING SEQUENCE UNITS 1 & 3

UNIT 1 UNIT 3	SEQUENCE OF POURS Direction	Min. Rate of Pour Cu. Yds./Hr. With Retarder
Basic sequence	1 · 2 · 3 · 4 · 5 · 6 · 7 See Above	25
Alternate "A" Pours	1 · 7 + 2 · 6 + 3 · 5 + 4 End to 7 · 1 to 6 · 2 to 5 · 3 to End	43
Alternate "B" Pours	1 + 7 + 2 · 6 + 3 · 5 + 4 End to 6 · 2 to 5 · 3 to End	43
Alternate "C" Pours	1 + 7 + 2 · 6 + 3 + 5 + 4 End to 6 · 2 to End	43
Alternate "D" Pours	1 + 7 + 2 + 6 + 3 + 5 + 4 End to End	43

POURING SEQUENCE NOTES

The contractor shall pour and satisfactorily finish the slab at the rate given.

Alternate pours to the basic skip sequence are subject to approval by the engineer in accordance with section 703.3.12.4 of Missouri Standard Specifications.

Retarder shall be an approved type and retard the set of the concrete 2.5 hours.

If the precast prestressed panel option is used, the values shown for the minimum rate of pour may be reduced by 25% . However, in no case shall the minimum rate of pour be less than 25 cu. yds./hr.

Slab haunches to be adjusted for any difference in girder camber from that shown in the girder camber diagrams. Haunch thicknesses were determined from theoretical camber of prestressed girders and deflections due to slab and barrier curbs. Slab haunches also include a vertical curve correction. No payment will be made for additional concrete or forming required for variable haunching.

** See "Section C-C" on "Diaphragm Details @ Bents & Piers" sheet for expansion joint blockout.*

For additional notes, see "Std. Plan – Units 1 & 3" sheet.

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SLAB POURING SEQUENCE – UNITS 1 & 3

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

POUR-SEQ

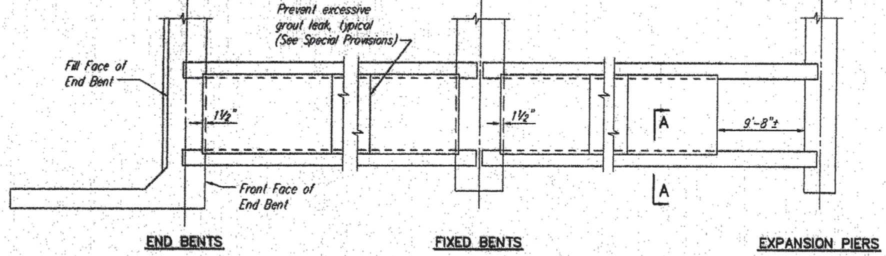
HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.K.G. 3/94
CHECKED: M.J.T. 4/94

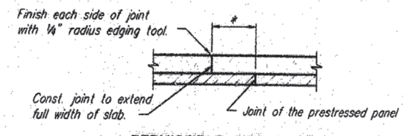
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

A4757

STATE	PROJ. NO.	SHEET NO.
MO		38
SEC./SUR. 12 TWP. 50N RGE. 32W		

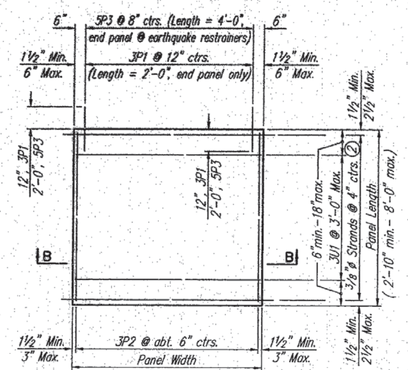


PLAN OF PRECAST PRESTRESSED PANEL PLACEMENT

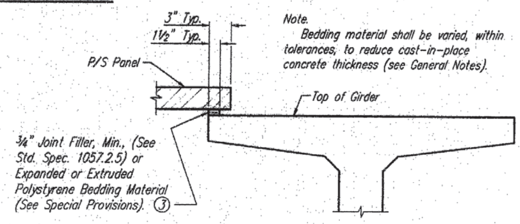


PERMISSIBLE CONST. JOINT

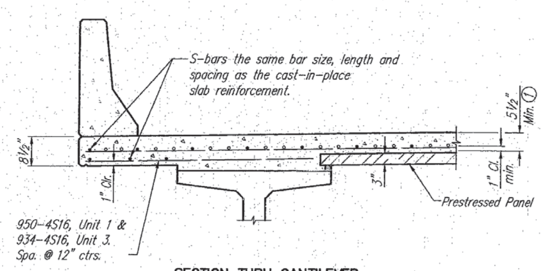
* Adjust the permissible const. joint to a clearance of 6" min. from the joints of the prestressed panels.



PLAN OF PRECAST PRESTRESSED PANEL

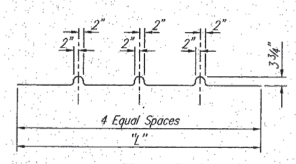


SECTION A-A

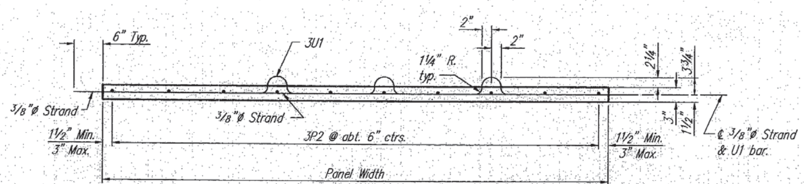


SECTION THRU CANTILEVER

Note: 3U1 bars may be oriented at right angles to location and spacing shown. U1 bars shall be placed between P1 bars.



BENDING DIAGRAM FOR U1 BAR



SECTION B-B

NOTES:

Slab exterior girder haunch to be the same as cast-in-place.

Slab thickness over prestressed panels varies due to girder camber.

① In order to maintain minimum slab thickness it may be necessary to raise the grade uniformly throughout the structure. No payment will be made for additional labor or materials required for necessary grade adjustment.

② Any strand 2'-0" or shorter shall have a #4 reinforcing bar on each side of it centered between strands. Strands 2'-0" or shorter may then be debonded at fabricators option.

③ All panel support pads shall be glued to the girder. When support thickness exceeds 1½" the pads shall be glued top and bottom. The glue used shall be the type recommended by the panel support pads manufacturer.

Use slab haunching diagrams to determine thickness of joint filler or polystyrene bedding material within the limits noted in the general notes.

GENERAL NOTES

PRESTRESSED PANELS:

Concrete for prestressed panels shall be class A1 with $f'c$ = 5,000 p.s.i. and $f'ci$ = 3,500 p.s.i.

The top surface of all panels shall receive a scored finish with a depth of scoring of ⅛" perpendicular to the prestressing strands in the panel (see Special Provisions).

Prestressing tendon shall be high-tensile strength uncoated seven wire (7) low relaxation strands for prestressed concrete conforming to AASHTO M203 except that nominal diameter of strands = 3/8" and nominal area = 0.085 sq. in. and minimum ultimate strength = 22,950 lbs (270 ksi.). Larger strands may be used with the same spacing and initial tension.

Initial prestressing force = 14.9 kips/strand.

The method and sequence of releasing the strands shall be shown on the shop drawings.

Suitable anchorage devices for lifting panels may be cast in panels provided they are shown on the shop drawings and approved by the engineer. Panel lengths shall be determined by the contractor and shown on the shop drawings.

Minimum joint filler or polystyrene bedding material thickness shall be ¾". Thicker joint filler or polystyrene bedding material shall be used on one or both sides of the girder to reduce cast-in-place concrete thickness, within tolerances. No more than 2" total thickness of joint filler or polystyrene bedding material shall be used.

The same thickness of joint filler material shall be used under any one edge of any panel and the maximum change in thickness between adjacent panels shall be ¼". The polystyrene bedding material shall be cut to match haunch height above top of flange.

At the contractors option the variation in slab thickness over prestressed panels may be eliminated or reduced by increasing and varying the girder top flange thickness. Dimensions shall be shown on the shop drawings.

REINFORCING STEEL:

All dimensions are out to out.

Minimum clearance to reinforcing steel shall be 1½" unless otherwise shown.

Hooks and bends shall be in accordance with the CRSI Manual Of Standard Practice For Detailing Reinforced Concrete Structures, stirrup and tie dimensions.

Actual lengths are measured along centerline bar to the nearest inch.

The prestressed panel quantities are not included in the table of estimated quantities for alternate slabs.

If U1 bars interfere with placement of slab steel, U1 loops may be bent over, as necessary, to clear slab steel.

Welded wire fabric or welded deformed bar mats providing a minimum area of reinforcing perpendicular to strands of 0.22 sq. in./ft., with spacing parallel to strands sufficient to insure proper handling, may be used in lieu of the 3P2 bars shown. Wire or bar diameter shall not be larger than 0.375 inches.

The reinforcing steel shall be tied securely to the 3/8"ø strands with the following maximum spacing in each direction:

3P2 bars at 16 inches.

Welded wire fabric or welded deformed bar mats at 24 inches.

Tie the 3U1 bars to the 3P2 bars, to the welded wire fabric or the welded deformed bar mats at about 36 inch centers.

All reinforcement other than prestressing strands shall be epoxy coated.

PRECAST PRESTRESSED PANEL DETAILS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

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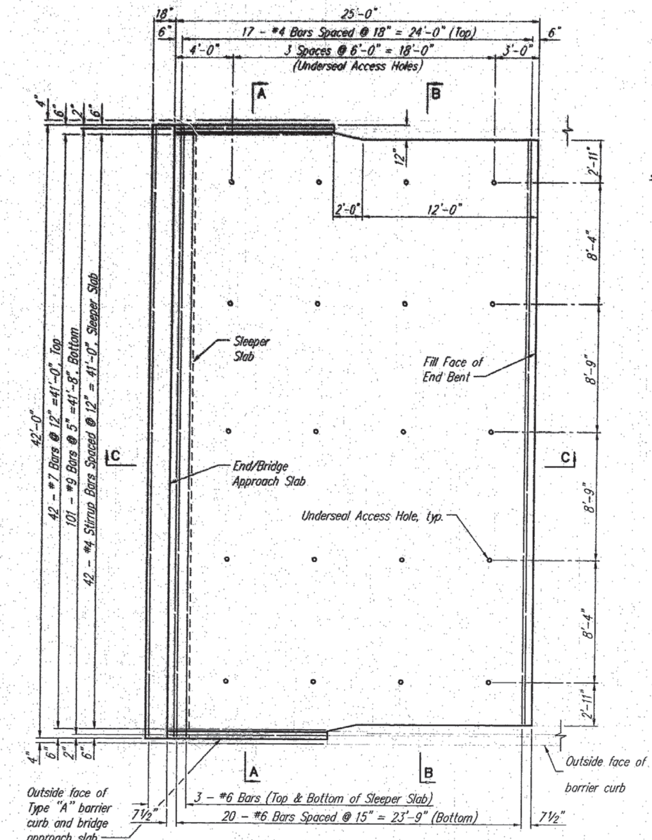
PP-U1&3

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.K.G. 2/94
CHECKED: M.J.T. 2/94

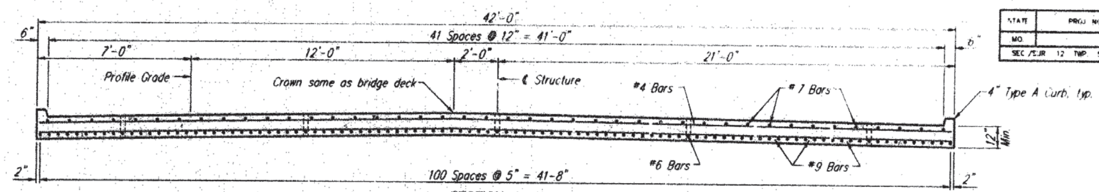
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

A4757



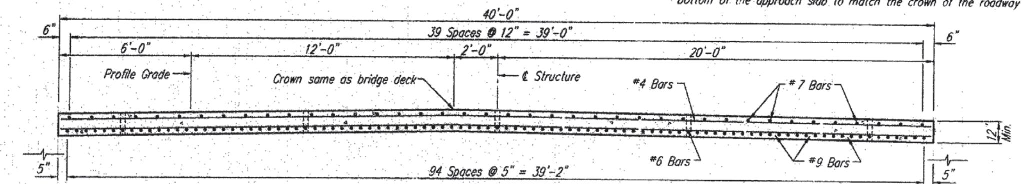
PLAN OF BRIDGE APPROACH SLAB AT END BENT 1N

Bridge approach slab at End Bent 4S similar

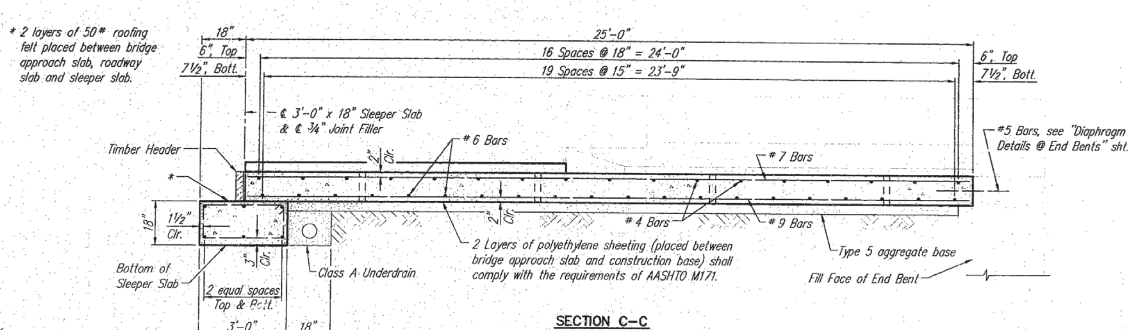


SECTION A-A

Note: With approval of the engineer, the contractor may crown the bottom of the approach slab to match the crown of the roadway surface.



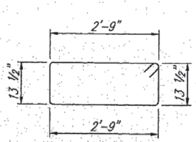
SECTION B-B



SECTION C-C

GENERAL NOTES:

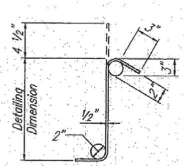
All concrete for the bridge approach and sleeper slabs shall be in accordance with Section 503 (f'c = 4,000 psi).
All joint filler shall meet the requirements of Section 1057.2.5, except as noted.
The reinforcing steel in the bridge approach slab and the sleeper slab shall be epoxy coated grade 60 with fy = 60,000 psi.
Minimum clearance to reinforcing steel shall be 1 1/2", unless otherwise shown.
The reinforcing steel in the bridge approach and sleeper slabs shall be continuous. The transverse reinforcing steel may be made continuous by lap splicing the #4 & #6 bars 22" and 34" respectively.
Mechanical bar splices will be permitted and shall develop at least 125 percent of the specified yield strength of the reinforcing bars being spliced. The contractor shall furnish the engineer the manufacturer's certification that this requirement is met and is required to follow the manufacturer's recommendation for installation.
Mechanical bar splices shall be epoxy coated in accordance with Missouri Standard Specifications 710.
Hooks and bends shall be in accordance with the CRSI Manual of Standard Practice for Detailing Reinforced Concrete Structures, Stirrup and Tie Dimensions.
Place Class A underdrain at face of sleeper slab under bridge approach slab and slope to lowest grade of ground line, also missing the bottom of sleeper slab by 1 1/2".
The contractor shall pour and satisfactorily finish the bridge slab before pouring the bridge approach slabs.
Payment for furnishing and installing all concrete and reinforcement for the bridge approach and sleeper slabs plus the construction base, underseal access holes, timber header, joint filler, roofing felt, mechanical splices and Class A underdrain shall be included in the contract unit price for "Bridge Approach Slab", per sq. yd.
See Missouri Standard Plans Drawing 504.00 for details not shown.
See Missouri Standard Plans Drawing 605.10 for details of Class A underdrain.
See Missouri Standard Plans Drawing 609.00 for details of Type A barrier curb.
Type 5 aggregate base shall conform to Sections 1.0 through 3.0 of MRSP-93-01 Base Material for Concrete Slabs. See Special Provisions.



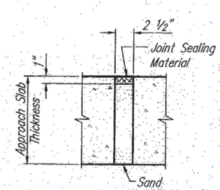
#4 STIRRUP BAR

Actual length = 8'-3"

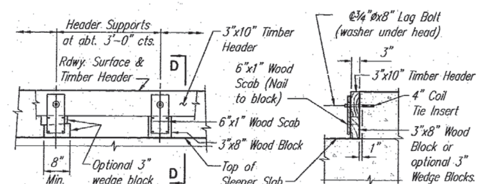
Note: Nominal lengths are based on out to out dimensions shown and are listed for fabricators use. (Nearest inch)



TYPICAL 135° STIRRUP HOOK DIMENSIONS BENDING DIAGRAM



TYPICAL UNDERSEAL ACCESS HOLE DETAIL



DETAILS OF TIMBER HEADER AT END/BRIDGE APPROACH SLAB

Note: Cost of timber headers complete in place to be included in contract unit price for bridge approach slab.
Remove timber header when concrete pavement is placed.

STATE	PROJ. NO.	SHEET NO.
MO.		39
SEC./S.UR 12 TWP 50N RGE 32W		

BRIDGE APPROACH SLAB

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.K.G. 2/94
CHECKED: M.J.T. 2/94

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

A4757

APP-SLAB

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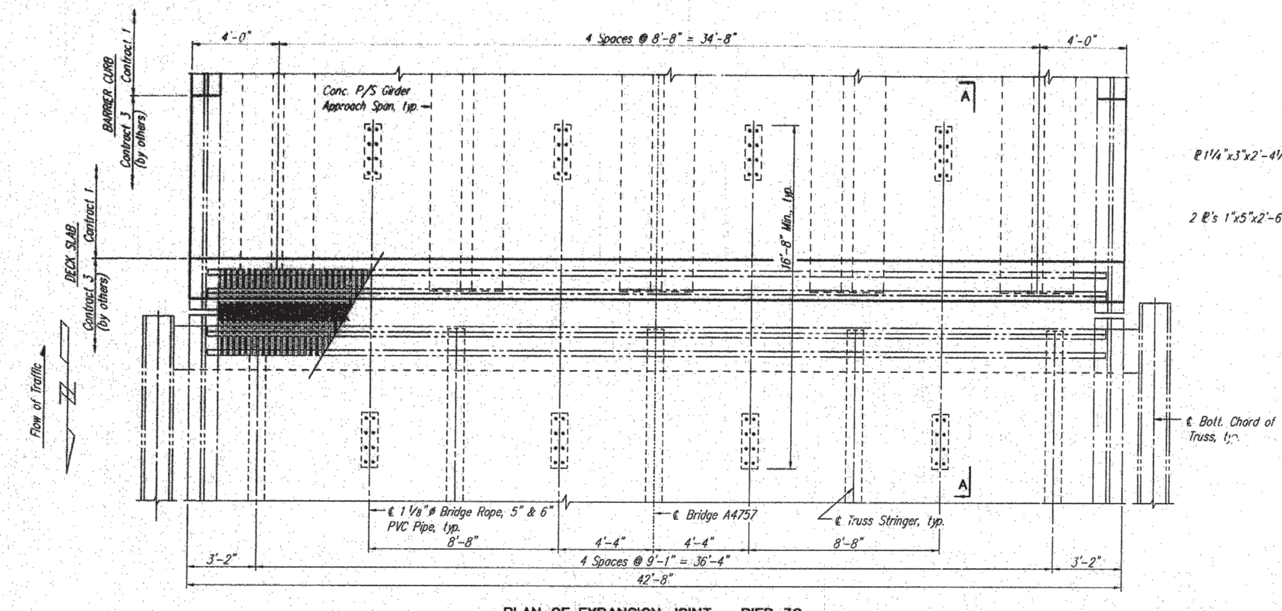
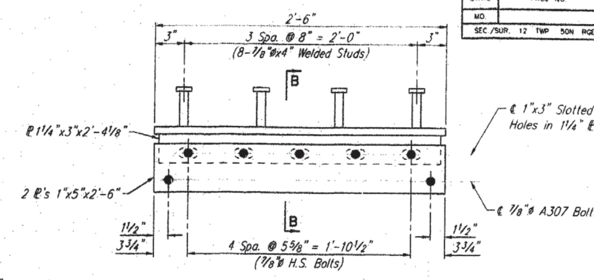
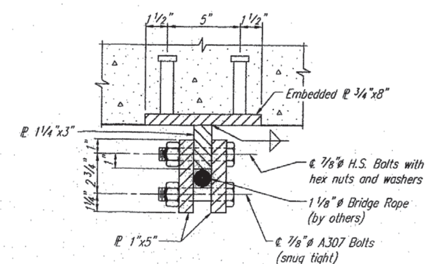


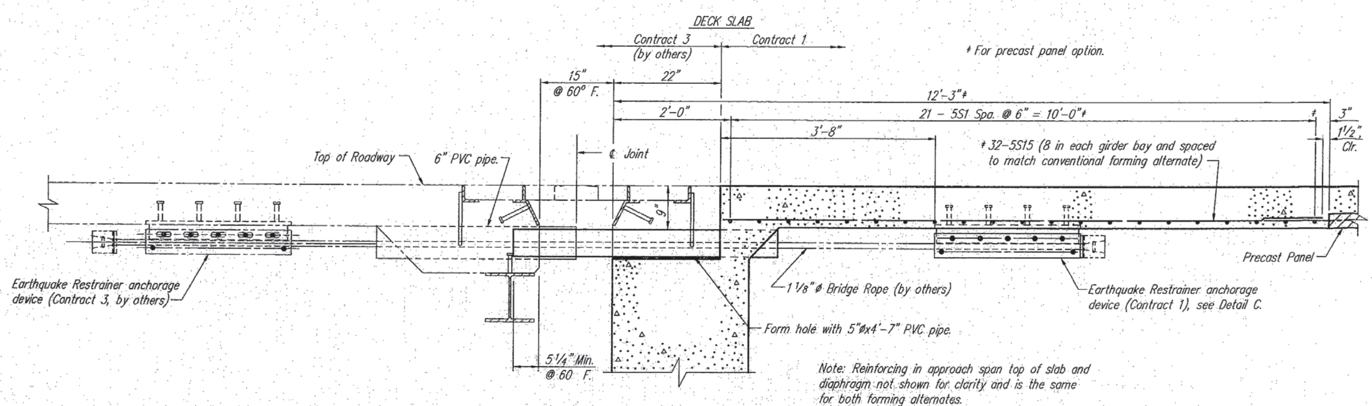
PLAN OF EXPANSION JOINT – PIER 3C
Pier 1C Similar



DETAIL C



SECTION B–B



SECTION A–A

GENERAL NOTES:

Structural Steel – ASTM A709 Gr. 36 except as shown.

Galvanizing – All steel used in earthquake restrainers shall be galvanized in accordance with ASTM A123 and Section 712 of Missouri Standard Specifications for Highway Construction.

Payment – Payment for all materials and labor to fabricate and install the earthquake restrainers, including all washers, nuts, bolts, steel anchor assemblies, welded studs, PVC pipe and other incidental work shall be included in price bid for "Slab on Concrete Bulb-Tee Girders".

STATE	PROJ. NO.	SHEET NO.
MO.		40
SEC./SUR. 12 TWP. 50N RGE. 32W		

EARTHQUAKE RESTRAINERS
ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.L.K. 03/94
CHECKED: E.W.N. 03/94

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

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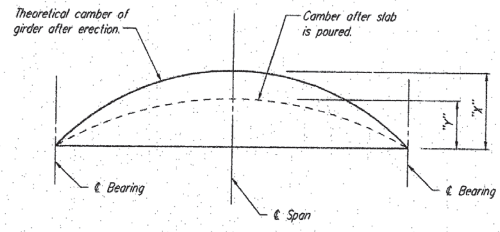
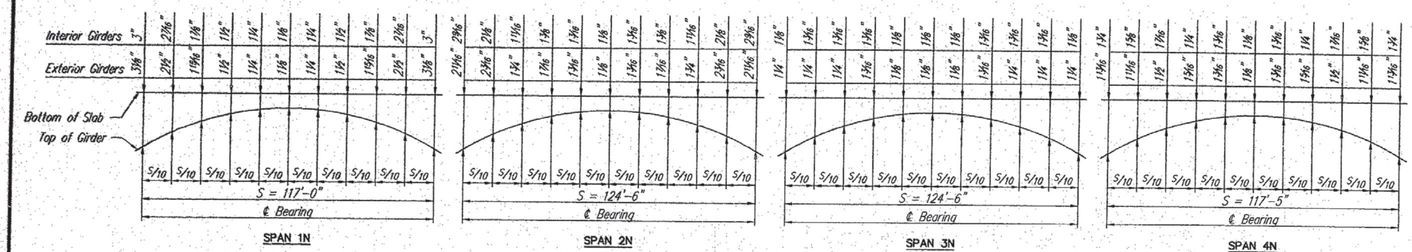
STATE	PROJ. NO	SHEET NO.
MO.		41
SEC./SUR. 12 TWP. 50N RGE. 32W		

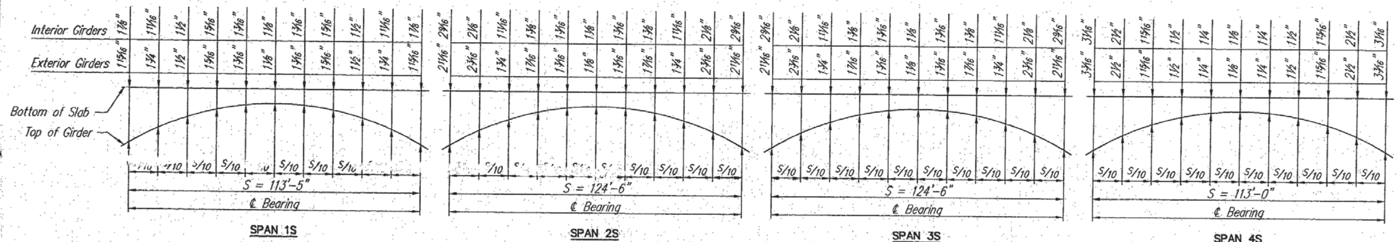
THEORETICAL GIRDER CAMBER DIAGRAM

UNIT	SPAN	GIRDERS			
		INTERIOR		EXTERIOR	
		"X"	"Y"	"X"	"Y"
1	1N	4 9/16"	1 7/8"	4 9/16"	2"
	2N	4 3/4"	1 7/16"	4 3/4"	1 9/16"
	3N	4 3/4"	1 7/16"	4 3/4"	1 9/16"
	4N	4 9/16"	1 7/8"	4 9/16"	2"
3	1S	4 1/4"	1 15/16"	4 1/4"	2"
	2S	4 3/4"	1 7/16"	4 3/4"	1 9/16"
	3S	4 3/4"	1 7/16"	4 3/4"	1 9/16"
	4S	4 1/4"	1 15/16"	4 1/4"	2 1/16"





THEORETICAL SLAB HAUNCH DIAGRAM – UNIT 1



THEORETICAL SLAB HAUNCH DIAGRAM – UNIT 3

Notes:

Interior girder cambers apply to girder lines B–D and exterior girder cambers apply to girder lines A & E.

See "Slab Sections and Details – Units 1 & 3" sheet for girder designations.

Slab haunches to be adjusted for any difference in girder camber from that shown in the "Theoretical Girder Camber Diagram". Haunch thicknesses were determined from theoretical camber of prestressed girders and deflections due to slab and barrier curbs. Slab haunches also include vertical curve correction.

Concrete in slab haunches is included in the estimated quantities as Class B2 concrete. No payment will be made for additional forming or concrete required for adjusted haunch depths.

3892

CAM-HAUN-

HC HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: S.A.K. 3/94
CHECKED: J.D.S. 8/94

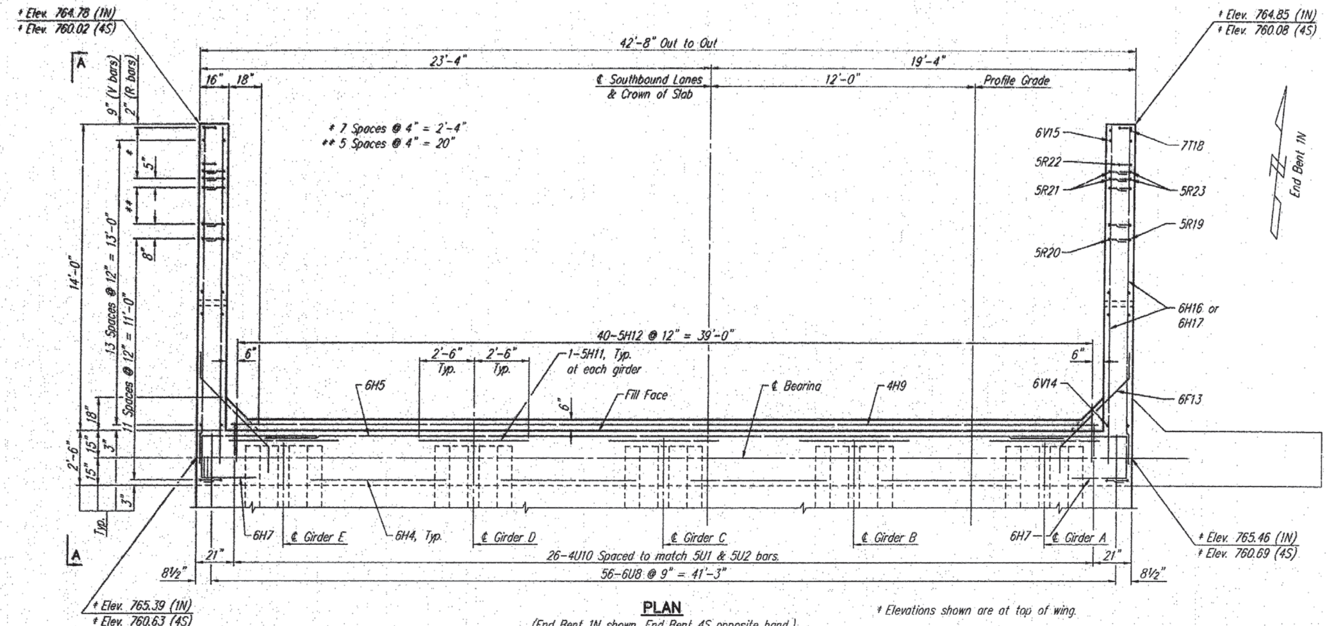
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

GIRDER CAMBER & HAUNCHING DIAGRAMS – UNITS 1 & 3

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

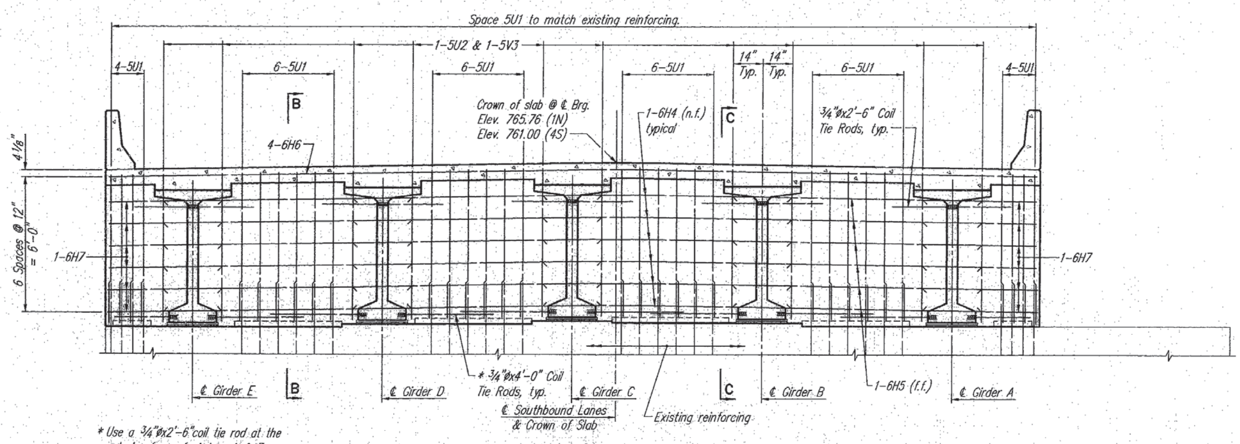
A4757



PLAN

(End Bent 1N shown, End Bent 4S opposite hand.)

* Elevations shown are at top of wing.



* Use a ¾"øx2'-6"coil tie rod at the exterior face of girders A & E.

ELEVATION

Approach Slab Notes:
At the contractors option, Grade 40 reinforcement may be substituted for the Grade 60 #5 dowel bars connecting the bridge approach slab to the bridge abutment. No additional payment will be made for this substitution.
When Grade 40 reinforcement is substituted for the Grade 60 #5 dowel bars connecting the bridge approach slab to the bridge abutment, the reinforcement may be bent up to 90 degrees with a 2" minimum radius near the abutment to allow compaction of the backfill material near the abutment. Damage to epoxy coating shall be repaired according to Missouri Standard Specifications 710.3.3.

Notes:
For details of View A-A, and Sections B-B & C-C, see "Misc. Diaphragm & Vertical Drain Details" sheet.
For additional safety barrier curb reinforcement, see "Safety Barrier Curb" sheets.
1N denotes End Bent 1N.
4S denotes End Bent 4S.
n.f. denotes near face.
f.f. denotes far face.

STATE	PROJ. NO.	SHEET NO.
MO.		42
SEC./SUR. 12 TWP. 50N RGE. 32W		

DIAPHRAGM DETAILS @ END BENTS

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.K.G. 3/94
CHECKED: M.J.T. 3/94

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 42 OF 59

A4757

EB-DIAPH

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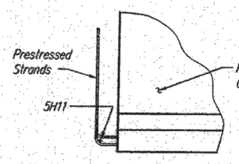
STATE	PROJ. NO.	SHEET NO.
MO.		43
SEC./SUR. 12 TWP. 50N RGE. 32W		

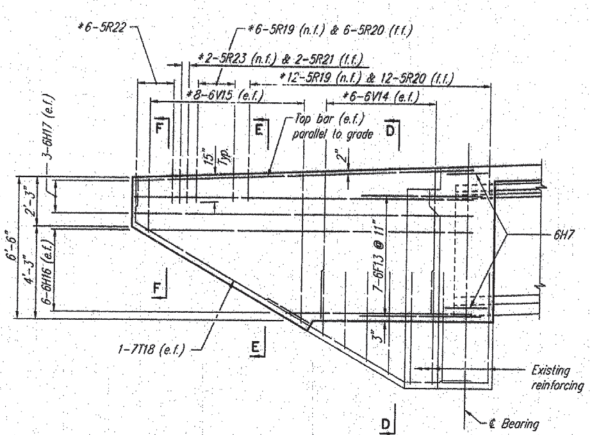
Notes:

End bent diaphragm is vertical and shall be poured a minimum of 30 minutes and a maximum of 2 hours before the slab is poured.

e.f. denotes each face
n.f. denotes near face
f.f. denotes far face

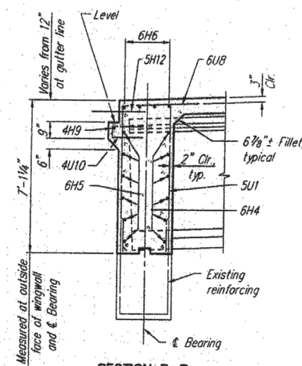


DETAIL A

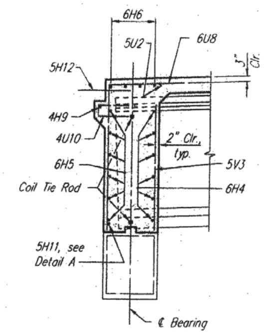


* For spacing of bars see Plan view on "Diaphragm Details @ End Bents" sheet.

VIEW A-A



SECTION B-B
(See Section C-C for additional information)



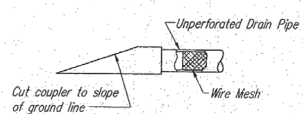
SECTION C-C

Notes for Drains:

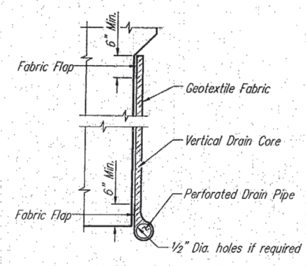
Drain pipe may be either 6" diameter corrugated metalic-coated steel pipe pipe, underdrain, 4" diameter corrugated polyvinyl chloride (PVC) drain pipe, or 4" diameter corrugated polyethylene (PE) drain pipe.

Place drain pipe at fill face of end bent and slope (¼"/ft.) to lowest grade of ground line, also missing the lower beam of end bent by 1½", see Elevation Of Drain At End Bent.

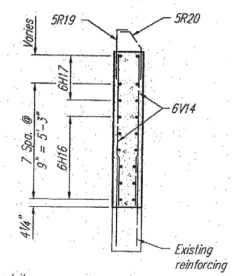
Perforated pipe shall be placed at fill face side at the bottom of end bent and plain pipe shall be used from where the vertical drain ends to the exit at ground line.



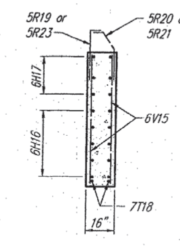
DETAIL B



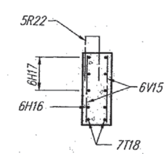
DETAIL C



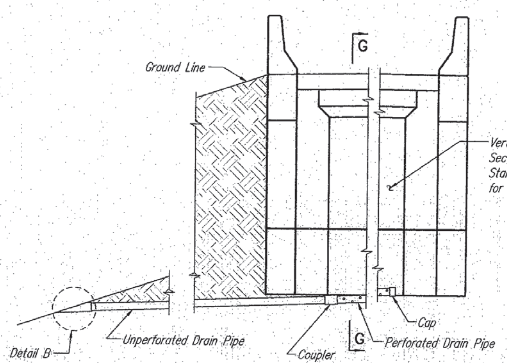
SECTION D-D



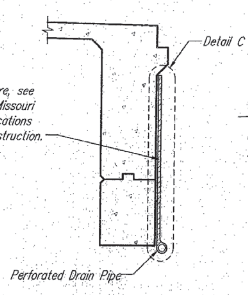
SECTION E-E



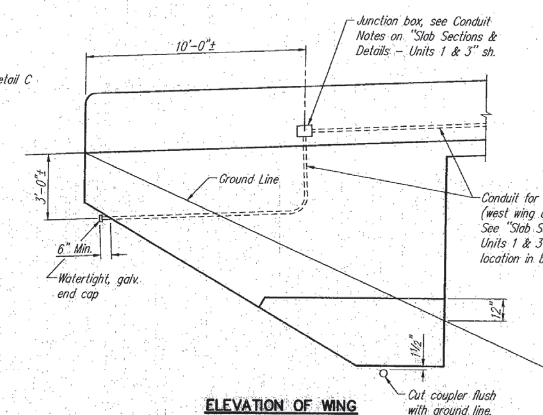
SECTION F-F



ELEVATION OF DRAIN AT END BENT



SECTION G-G



ELEVATION OF WING

MISC. DIAPHRAGM & VERTICAL DRAIN DETAILS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.K.G. 3/94
CHECKED: M.J.T. 3/94

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

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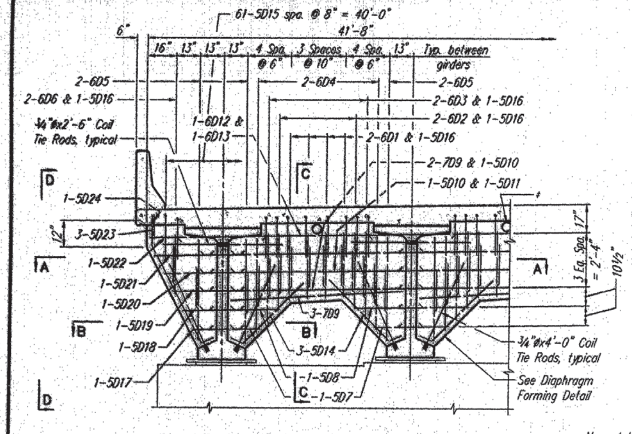
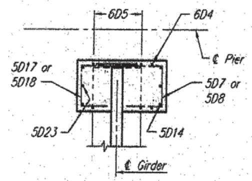


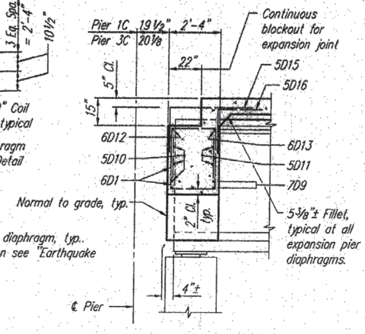
DIAPHRAGM DETAILS AT EXPANSION PIERS

(5⅝"± Fillet not shown for clarity.)

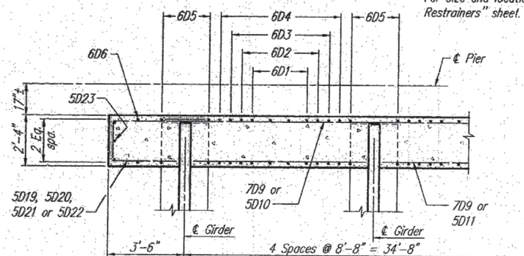
* P.V.C. pipe through diaphragm, typ.. For size and location see "Earthquake Restrainers" sheet.



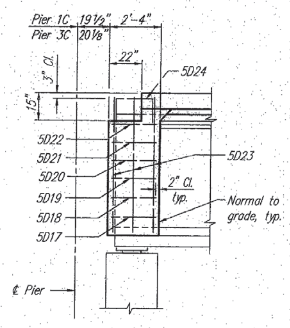
SECTION B-B



SECTION C-C

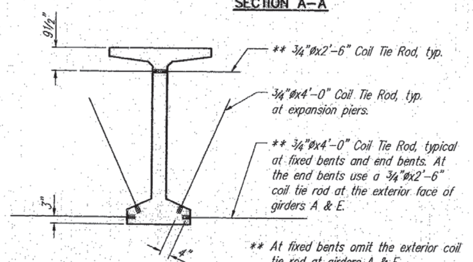


SECTION A-A



VIEW D-D

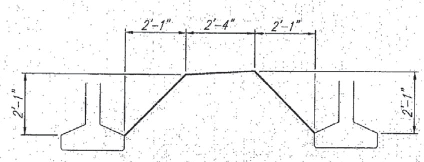
(Barrier curb not shown for clarity)



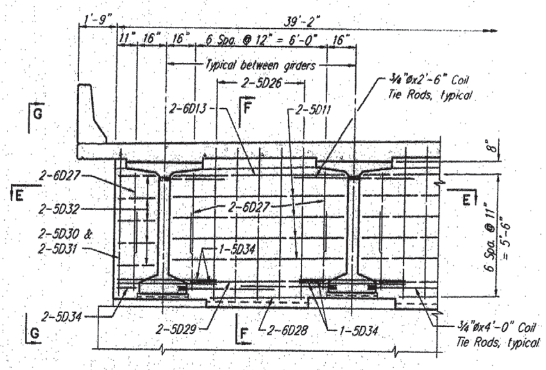
** At fixed bents omit the exterior coil tie rod at girders A & E.

DETAIL OF COIL TIE RODS

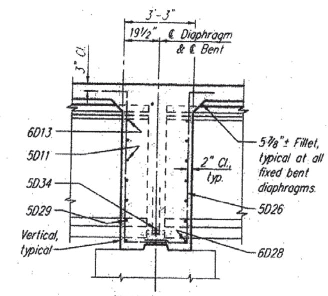
Note:
Coil tie rods shall be installed at all end bents, bents, and piers. Coil tie rods to be galvanized. See Section 705.4.8 of the Missouri Standard Specifications for Highway Construction.



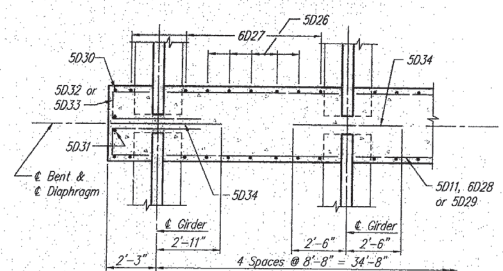
DIAPHRAGM FORMING DETAIL



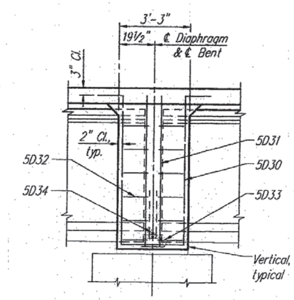
DIAPHRAGM DETAILS AT FIXED BENTS



SECTION F-F

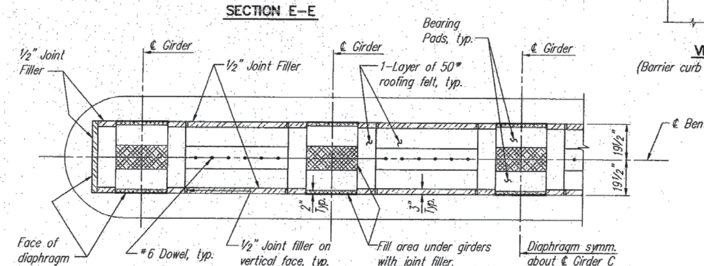


SECTION E-E



VIEW G-G

(Barrier curb not shown for clarity)



HALF PLAN – FIXED BENTS

DIAPHRAGM NOTES

For additional details see "Precast Prestressed Panel Details" sheet.

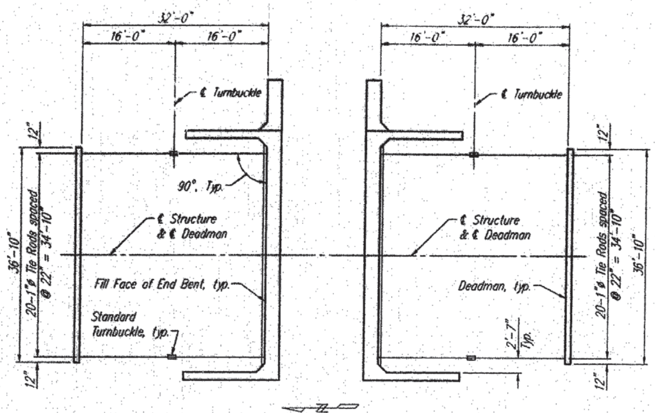
The diaphragms at fixed piers are vertical and shall be poured a minimum of 30 minutes and a maximum of 2 hours before the slab is poured.

The diaphragms at expansion piers are normal to grade and shall be poured a minimum of 30 minutes and a maximum of 2 hours before the slab is poured.

DIAPHRAGM DETAILS @ BENTS & PIERS

ROUTE 291 MISSOURI RIVER BRIDGE

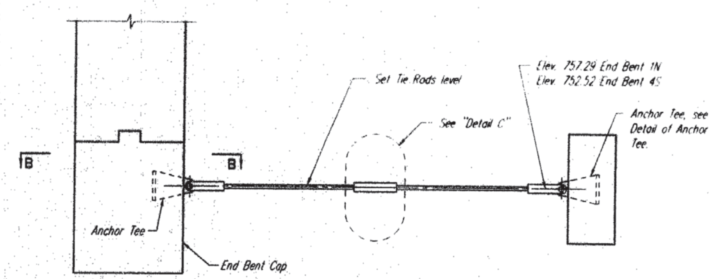
Jackson County



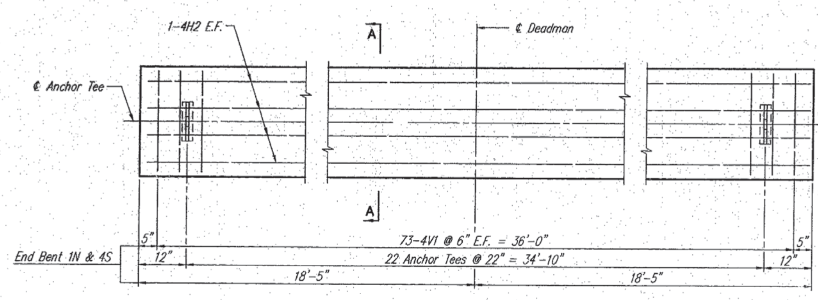
END BENT 1N

END BENT 4S

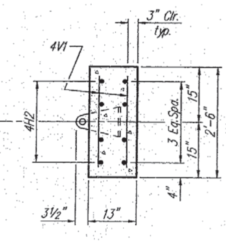
END BENT ANCHORAGE PLAN



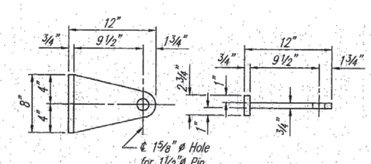
TYPICAL SECTION THRU END BENT ANCHORAGE
(End Bent 4S shown, End Bent 1N opposite hand)



ELEVATION OF DEADMAN



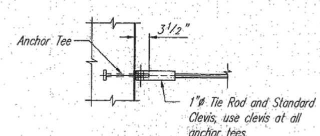
SECTION A–A



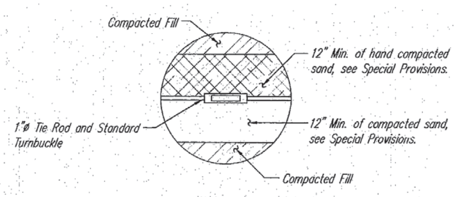
ELEVATION

PLAN

DETAIL OF ANCHOR TEE



SECTION B–B



DETAIL "C"

NOTES:

CONSTRUCTION SEQUENCE:

Machine compact fill up to elevation of 1"ø tie rod and turnbuckle.
Construct deadman with anchor tees in place.
Install 1"ø tie rod, clevis and turnbuckle assembly.
Tighten turnbuckle until snug.
Hand compact fill for 12" (min.) over 1"ø tie rod and turnbuckle.
Machine compact remaining fill.

DEADMAN ANCHORAGE MATERIAL:

All anchor tees, tie rods, clevises, turnbuckles, etc. shall be fabricated from A709 Gr. 36, A668 Class F or equivalent steel, and galvanized in accordance with Section 712, see Special Provisions. In addition, above items shall be coated with an approved bituminous paint, see Special Provisions.

Sand below tie rods shall be compacted to a horizontal plane so no bending of the tie rods will occur.

Sand above the tie rods shall be hand compacted in such a manner as to avoid damaging the protective coating on the anchorage assembly.

E.F. denotes each face.

The following material quantities are included in each Deadman Anchorage Assembly:

Class B Concrete	3.7 Cu. Yds.
Reinforcing Steel (Grade 60)	410 Lbs.

DEADMAN ANCHORAGE DETAILS

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

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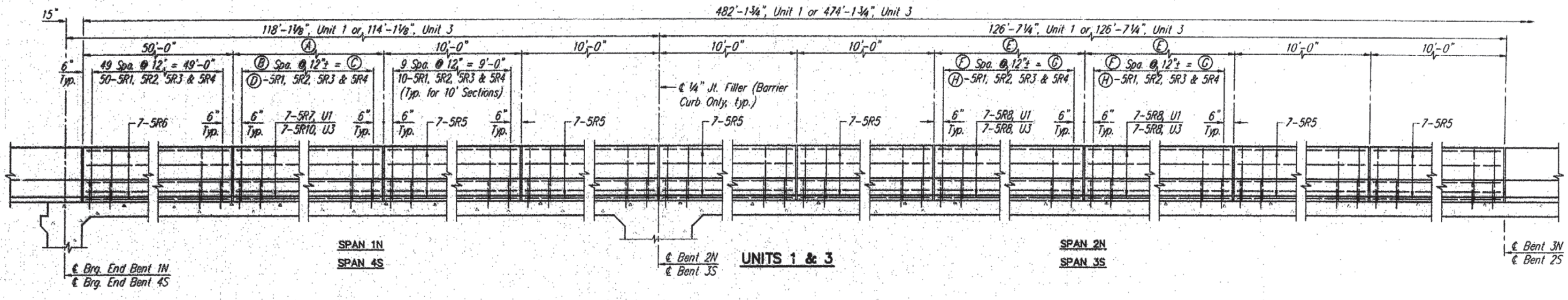
HARRINGTON & CORTELYOU, INC.
Consulting Engineers

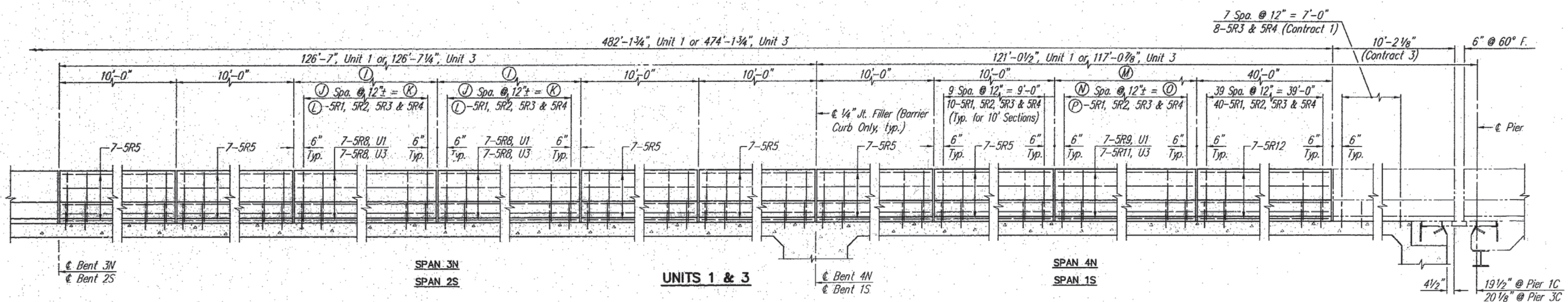
DETAILED: J.K.G. 2/94
CHECKED: M.J.T. 2/94

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

A4757

STATE	PROJ. NO.	SHEET NO.
MO		46
SEC./SUR. 12 TWP. 50N RGE. 32W		





BARRIER CURB DIMENSIONS											
DIM.	UNIT 1	UNIT 3	DIM.	UNIT 1	UNIT 3	DIM.	UNIT 1	UNIT 3	DIM.	UNIT 1	UNIT 3
A	46'-10⅛"	42'-10⅛"	E	43'-3⅝"	43'-3⅝"	I	43'-3½"	43'-3⅝"	M	49'-7⅜"	45'-7⅛"
B	46	42	F	43	43	J	43	43	N	49	45
C	45'-10⅛"	41'-10⅛"	G	42'-3⅝"	42'-3⅝"	K	42'-3½"	42'-3⅝"	O	48'-7⅜"	44'-7⅛"
D	47	43	H	44	44	L	44	44	P	50	46

Notes:

For barrier curb details at end bents and additional barrier curb details and notes, see "Safety Barrier Curb Details" sheet.

U1 denotes Unit 1

U3 denotes Unit 3

For Navigation Lighting conduit and pull boxes embeded in the west barrier curb of Unit 1, see "Slab Sections & Details – Units 1 & 3" sheet.

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SAFETY BARRIER CURB – UNITS 1 & 3

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

SBC-U123

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.K.G. 3/94
CHECKED: M.J.T. 3/94

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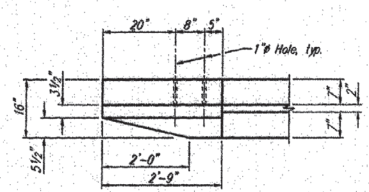
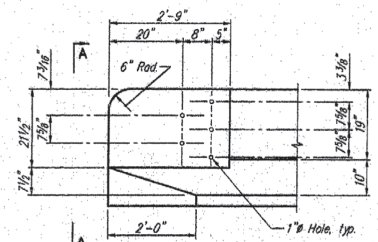
A4757

STATE	PROJ. NO.	SHEET NO.
MO.		47
SEC./SUR. 12 TWP. 50N RGE. 32W		

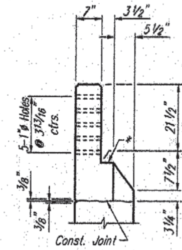


PARTIAL PLAN



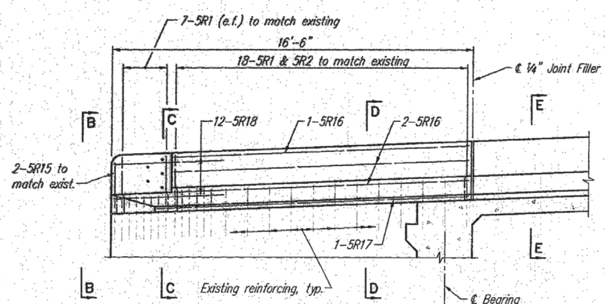
PARTIAL ELEVATION

DETAILS OF GUARD RAIL ATTACHMENT

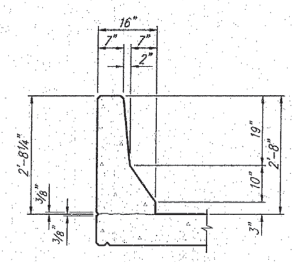


VIEW A–A

* Slope ¼" toward roadway.

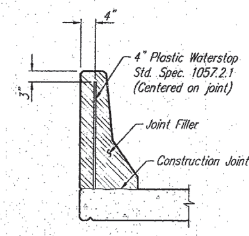


TYPICAL END BENT BARRIER CURB ELEVATION

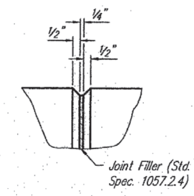


CURB DIMENSIONS

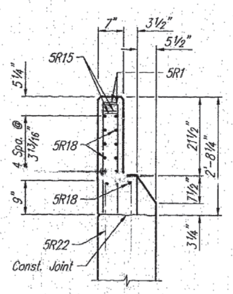
Note:
The cross sectional area above the slab = 2.27 sq. ft.



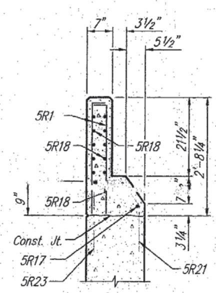
PLASTIC WATERSTOP DETAIL



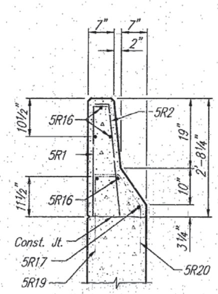
FILLED JOINT DETAIL



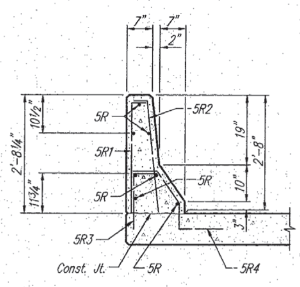
VIEW B–B



SECTION C–C



SECTION D–D



SECTION E–E

Notes:

Plastic waterstop shall be placed in all safety barrier curb filled joints.

Cost of plastic waterstop complete in place to be included in contract unit price for safety barrier curb.

Top of safety barrier curb shall be built parallel to grade with safety barrier curb joints (except at end bents) normal to grade.

All exposed edges of safety barrier curb shall have either a ½" radius or a ¾" bevel, unless otherwise noted.

When safety barrier curb is bid by linear feet, the contract unit price shall include the cost of all concrete and reinforcement, complete-in-place.

Concrete in the safety barrier curb shall be Class B1.

Measurement of safety barrier curb is to the nearest linear foot, measured along the outside top of slab from end of wing to end of wing.

e.f. denotes each face.

For navigation lighting conduit in the west side wingwall and safety barrier curb of End Bent 1N, see "Misc. Diaphragm & Vertical Drain Details" sheet.

SAFETY BARRIER CURB DETAILS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

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SBC-DTLS

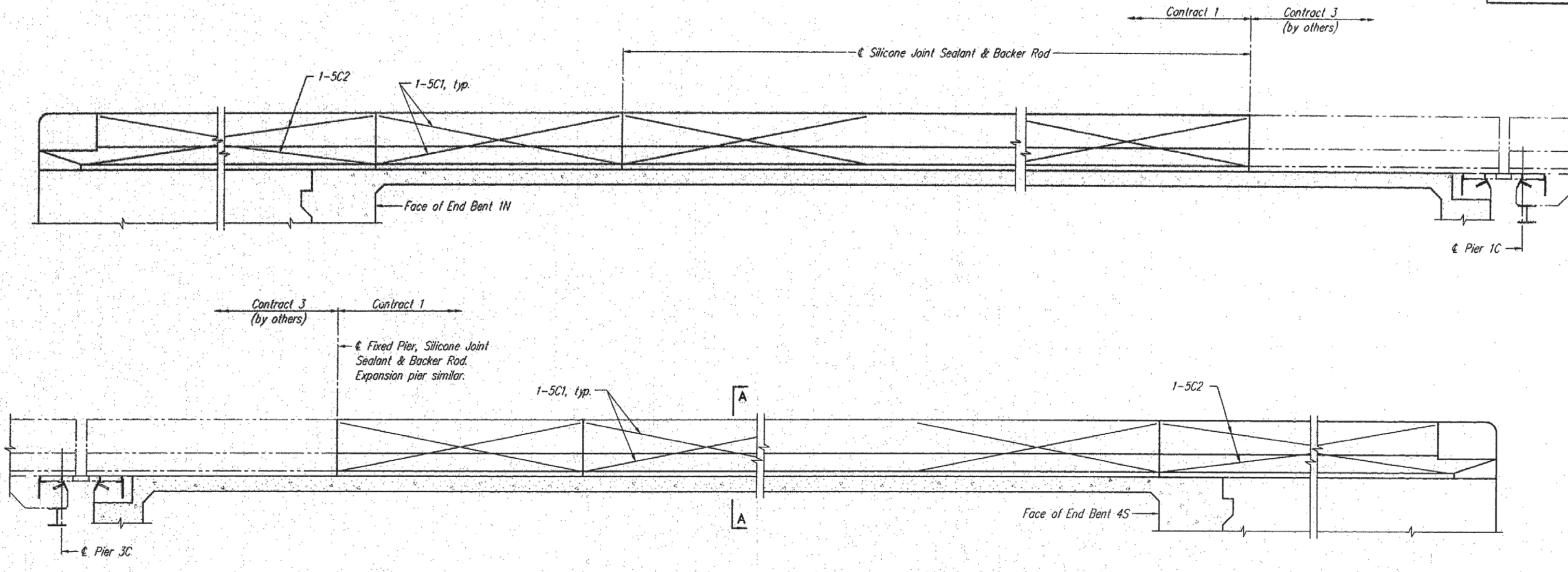
HC HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.K.G. 3/94
CHECKED: M.J.T. 4/94

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

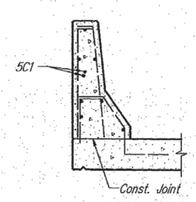
A4757

STATE	PROJ. NO.	SHEET NO.
MO.		48
SEC./SUR. 12 TWP. 50N RGE. 32W		

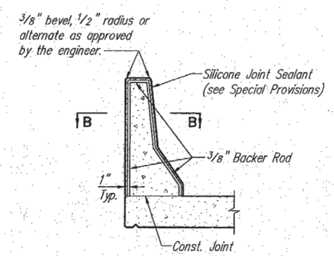


TYPICAL CURB ELEVATION

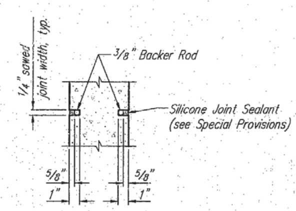
Notes:
Top of safety barrier curb shall be built parallel to grade with safety barrier curb joints normal to grade.
When safety barrier curb is bid by linear feet, the contract unit price shall include the cost of all concrete and reinforcement, complete-in-place.
Concrete in the safety barrier curb shall be Class B1.
Measurement of safety barrier curb is to the nearest linear foot, measured along the outside top of curb. See Safety Barrier Curb sheets for dimensions.
Joint sealant and backer rods shall be used on all slip-form bridge safety barrier curbs instead of joint filler.
Plastic waterstop shall not be used with slip-form option.
5C1 & 5C2 bars (slip-form option only) shall be used in addition to cast-in-place conventional forming reinforcement for bridge safety barrier curb. 5C1 bars shall be located on each side of each joint location, except at End Bents, where 5C1 bars shall be located on span side of joint and 5C2 bars on wing side of joint.
5C1 bar length = 10'-0" 5C2 bar length = 16'-4"
Number required = 224 Number required = 8
Total additional weight = 2,470 lbs.



PART SECTION A-A



SECTION THRU JOINT



SECTION B-B

Note:
Cost of silicone joint sealant and backer rod, complete-in-place, to be included in the contract unit price for safety barrier curb.

OPTIONAL SLIP-FORM
BRIDGE SAFETY BARRIER CURB
ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

387

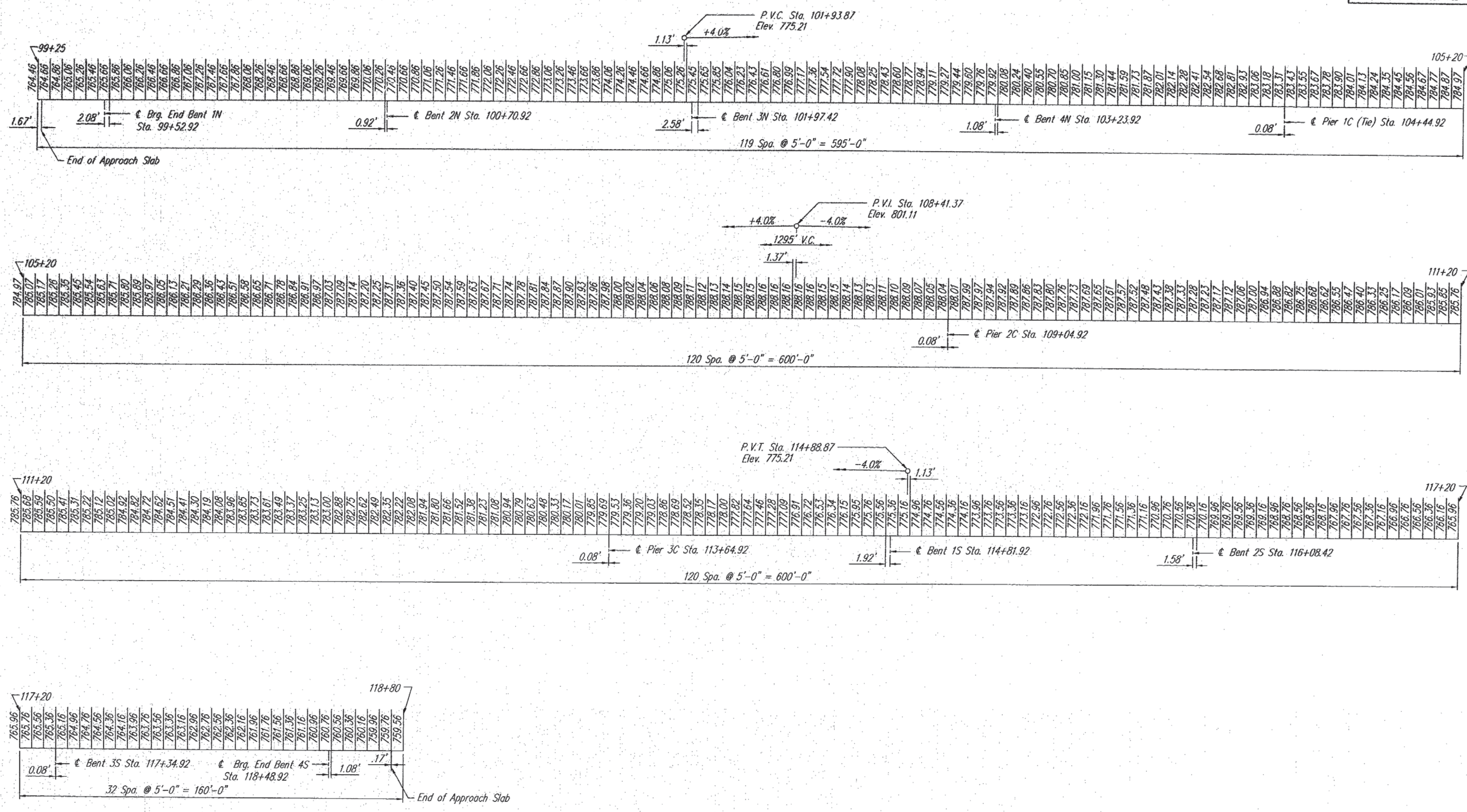
SLIP-CURB

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: S.A.K. 3/94
CHECKED: M.J.T. 4/94

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

A4757



STATE	PROJ. NO.	SHEET NO.
MO		49

SEC./SUR 12 TWP 50N RGE 32W

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PROFILE GRADE ELEVATIONS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

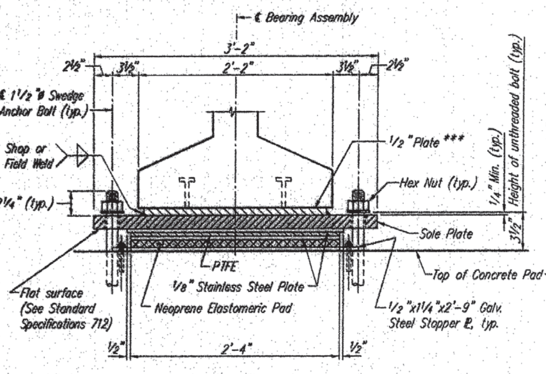
DETAILED: S.A.K. 03/94
CHECKED: M.J.T. 03/94

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

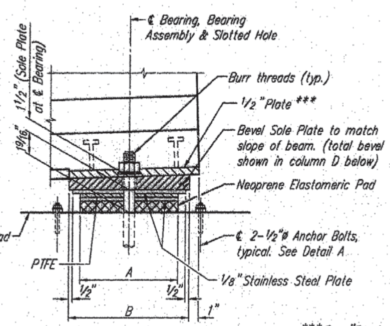
A4757

PRODEL

STATE	PROJ. NO.	SHEET NO.
MO.		50
SEC./SUR. 12 TWP. 50N RGE. 32W		



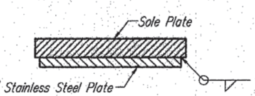
END VIEW

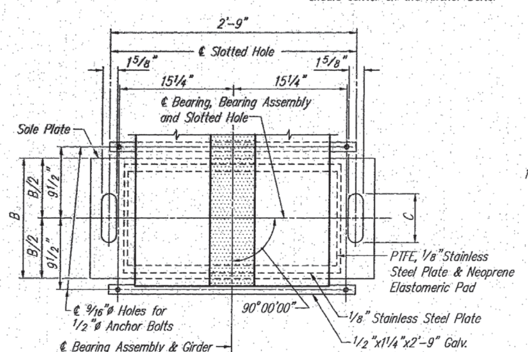


SIDE VIEW

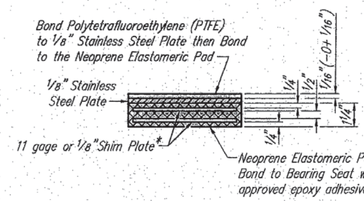
*** See "Prestressed Concrete Girder Details" sheets for details.

Note: The location of Anchor Bolts in relation to the Slotted Holes in the Sole Plate shall correspond with the temperature at the time of erection. At 60°F the Slotted Holes should center on the Anchor Bolts.





TYP. PART PLAN VIEW



NEOPRENE ELASTOMERIC PAD

70 Durometer

* Shim Plate(s) shall be placed between specified layers of elastomer and molded together to form an integral unit. 2 shim plates required per expansion bearing pad; 1 shim plate req'd per fixed bearing pad.

PTFE SLIDING BEARINGS

(5 @ Pier 1C & 3C for a total of 10)

PTFE SLIDING BEARINGS					
BENT NO	A	B	C	D	QTY.
1C	10"	17"	6½"	⅜"	5
3C	10"	17"	6½"	½"	5

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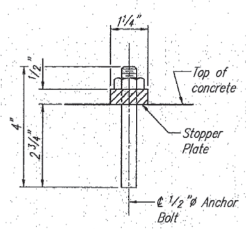
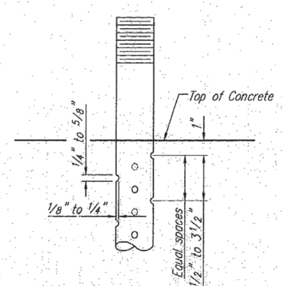
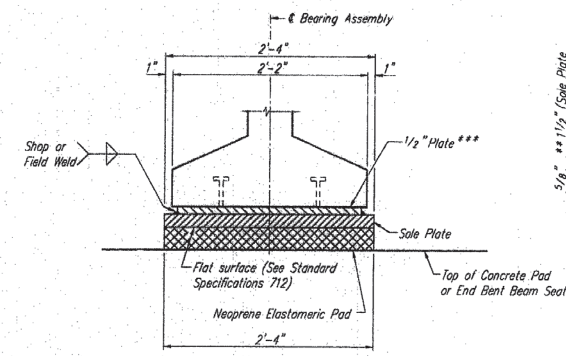


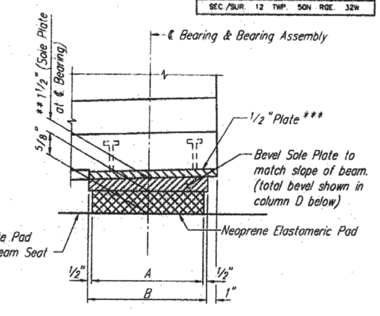
DETAIL A



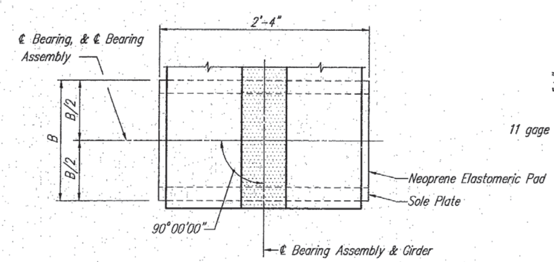
SWEDGE ANCHOR BOLT



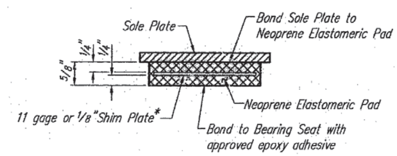
END VIEW



SIDE VIEW



TYP. PART PLAN VIEW



NEOPRENE ELASTOMERIC PAD

60 Durometer

FIXED BEARINGS

GENERAL NOTES:

Anchor Bolts shall be 1½"ø A588 Steel Swedged Bolts and shall extend 15" into the concrete with A194-2, 2H or A563-C, C3, D, DH, DH3 Heavy Hexagon Nuts. Actual Manufacturer's Certified Mill Test Reports (chemical and mechanical [including proof loads]) shall be provided. Swedging shall be 1" less than extension into the concrete.

All Structural Steel for the Sole Plate, Anchor Bolts and Heavy Hexagon Nuts shall be painted with 2 coats (5 mils min.) of inorganic zinc. Weld areas to be touched up after assembly.

Neoprene Elastomeric Pads shall be 60 Durometer at fixed bearings and 70 Durometer at expansion bearings.

The Sole Plate shall be furnished with the bearing and field or shop welded to the girders.

Structural Steel for Sole Plate shall be A709 Gr. 36.

Payment for the Sole Plate, Anchor Bolts, Heavy Hexagon Nuts, and Galvanized Steel Stopper Plates shall be included in the cost of the bearing assembly. See Special Provisions.

The accepted quantity of expansion bearing assemblies, complete-in-place, will be paid for at the contract unit price for "Type N PTFE Bearings", each.

The accepted quantity of fixed bearing assemblies, complete-in-place, will be paid for at the contract unit price for "Laminated Neoprene Bearing Pads", each.

End Bents have one bearing line only at the ℄ of End Bent.

FIXED BEARINGS				
BENT NO	A	B	D	QTY.
1N	10"	11"	½"	5 **
2N	11"	12"	½"	10
3N	11"	12"	½"	10
4N (North)	11"	12"	⅜"	5
4N (South)	11"	12"	⅜"	5 **
1S	11"	12"	½"	10
2S	11"	12"	½"	10
3S	11"	12"	½"	10
4S	10"	11"	½"	5 **

** Sole Plate thickness, at ℄ Bearing, for the five (5) South Bearings at Bent 4N equals 1 11/16".

Sole Plate thickness, at ℄ Bearing, for End Bents 1N & 4S shall be 1¾".

BEARING DETAILS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

BRG-DET

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: T.L.W. 10/92
CHECKED: J.L.K. 2/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 50 OF 59

A4757

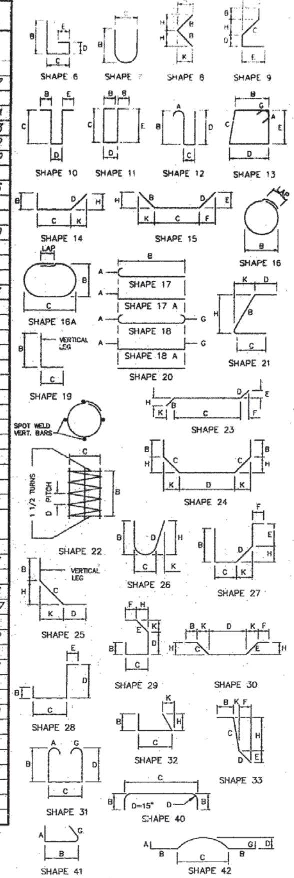
COMPLETE BILL OF REINFORCING STEEL

NO. REQD.	SIZE	MARK	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	B FT.	B IN.	C FT.	C IN.	D FT.	D IN.	E FT.	E IN.	F FT.	F IN.	H FT.	H IN.	K FT.	K IN.	NOMINAL LENGTH FT.	NOMINAL LENGTH IN.	ACTUAL LENGTH FT.	ACTUAL LENGTH IN.	WEIGHT LBS.
END BENT 1N																												
6	6	F1	FILLET		23		X			0	14	4	5	0	14	0	9.875	0	9.875	0	9.875	0	9.875	6	9	6	8	60
2	6	H2	BEAM		20		X			51	0													51	0	51	0	153
12	6	H3	WING		20		X	V	4	4	8													4	8	4	8	107
			Inc. = 15"							7	2													7	2	7	2	
8	7	H4	BEAM		20		X			51	0													51	0	51	0	834
4	W5	W5	BEAM		22		X			0	15	0	9.125	0	3									23	0	23	0	15
4	6	T6	WING		25		X					7	2	3	3					3	7.5	6	2	10	5	10	5	63
26	5	U7	BEAM	E	10	S	X					4	10	2	2									11	10	11	7	314
43	5	U8	"		13	S	X			2	2	2	7	2	2	2	7							10	5	10	1	452
1	5	U9	"		10	S	X					2	7	2	2									7	4	7	1	7
12	5	V10	BEAM	E	20		X			4	10													4	10	4	10	61
8	6	V11	WING	E	20		X			5	1													5	1	5	1	61
16	6	V12	WING	E	20		X	V	4	3	0													3	0	3	0	93
			Inc. = 7"							4	9													4	9	4	9	
8	5	U13	BEAM		13	S	X			2	2	2	10	2	2	2	10							10	11	10	7	88
4	4	H14	BEAM		20		X			3	8													3	8	3	8	10
BENT 2N																												
20	10	F1	FOOTING		18		X			10	6													13	4	13	4	1,147
20	9	F2	"		18		X			8	6													11	0	11	0	748
44	10	D3	FOOTING		17A		X			10	4													12	2	12	2	2,304
44	10	V4	COLUMN		20		X			46	2													46	2	46	2	8,741
86	4	P5	COLUMN		16		X			4	8													16	3	16	3	934
116	6	U6	CAP		13	S	X			4	2	5	8	4	2	5	8							21	0	20	6	3,572
10	6	U7	"		7		X			4	3	5	0.5											11	4	11	4	170
4	11	H8	"		20		X			50	2													50	2	50	2	1,066
2	11	H9	"		20		X			49	3													49	3	49	3	523
2	11	H10	"		20		X			46	0													46	0	46	0	489
6	11	H11	"		20		X			32	0													32	0	32	0	1,020
6	6	H12	"		20		X			46	0													46	0	46	0	415
2	11	H13	"		20		X			19	8													19	8	19	8	209
2	11	H14	"		17		X			14	4													15	11	15	11	169
4	11	H15	"		18		X			50	2													53	4	53	4	1,133
2	11	H16	"		18		X			49	3													52	5	52	5	557
2	11	H17	"		18		X			46	0													49	2	49	2	522
2	11	H18	"		17		X			16	5													18	0	18	0	191
24	6	V19	CAP	E	20		X			0	21													0	21	0	21	63
35	4	U20	PAD		10	S	X					0	18	2	5									5	5	5	3	123
35	4	U21	"		10	S	X					0	20.25	0	16.5									4	9	4	7	107
18	4	U22	"		10	S	X					0	20	3	9									7	1	6	11	83
12	4	U23	PAD		10	S	X					0	20	4	0									7	4	7	2	57
12	5	U24	WALL		10	S	X					3	10	0	12									8	8	8	5	105
8	5	H25	"		20		X			7	8													7	8	7	8	64
8	5	U26	WALL		10		X					0	12	0	10.5									2	11	2	8	22
4	W5	W27	PAD SPIRAL		22		X			0	15	0	9.125	0	3									23	0	23	0	15

COMPLETE BILL OF REINFORCING STEEL

NO. REQD.	SIZE	MARK	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	B FT.	B IN.	C FT.	C IN.	D FT.	D IN.	E FT.	E IN.	F FT.	F IN.	H FT.	H IN.	K FT.	K IN.	NOMINAL LENGTH FT.	NOMINAL LENGTH IN.	ACTUAL LENGTH FT.	ACTUAL LENGTH IN.	WEIGHT LBS.
BENT 3N																												
20	10	F1	FOOTING		18		X			10	6													13	4	13	4	1,147
20	9	F2	"		18		X			8	6													11	0	11	0	748
44	10	D3	FOOTING		17A		X			10	4													12	2	12	2	2,304
44	10	V4	COLUMN		20		X			51	3													51	3	51	3	9,703
96	4	P5	COLUMN		16		X			4	8													16	3	16	3	1,042
116	6	U6	CAP		13	S	X			4	2	5	8	4	2	5	8							21	0	20	6	3,572
10	6	U7	"		7		X			4	3	5	0.5											11	4	11	4	170
4	11	H8	"		20		X			50	2													50	2	50	2	1,066
2	11	H9	"		20		X			49	3													49	3	49	3	523
2	11	H10	"		20		X			46	0													46	0	46	0	489
6	11	H11	"		20		X			32	0													32	0	32	0	1,020
6	6	H12	"		20		X			46	0													46	0	46	0	415
2	11	H13	"		20		X			19	8													19	8	19	8	209
2	11	H14	"		17		X			14	4													15	11	15	11	169
4	11	H15	"		18		X			50	2													53	4	53	4	1,133
2	11	H16	"		18		X			49	3													52	5	52	5	557
2	11	H17	"		18		X			46	0													49	2	49	2	522
2	11	H18	"		17		X			16	5													18	0	18	0	191
24	6	V19	CAP	E	20		X			0	21													0	21	0	21	63
35	4	U20	PAD		10	S	X					0	18	2	5									5	5	5	3	123
35	4	U21	"		10	S	X					0	20.25	0	16.5									4	9	4	7	107
18	4	U22	"		10	S	X					0	20	3	9									7	1	6	11	83
12	4	U23	PAD		10	S	X					0	20	4	0									7	4	7	2	57
12	5	U24	WALL		10	S	X					5	0	0	12									11	0	10	9	135
8	5	H25	"		20		X			7	8													7	8	7	8	64
8	5	U26	WALL		10		X					0	12	0	10.5									2	11	2	8	22
4	W5	W27	PAD SPIRAL		22		X			0	15	0	9.125	0	3									23	0	23	0	15
BENT 4N																												
20	10	F1	FOOTING		18		X			10	6													13	4	13	4	1,147
20	9	F2	"		18		X			8	6													11	0	11	0	748
44	10	D3	FOOTING		17A		X			10	4													12	2	12	2	2,304
44	10	V4	COLUMN		20		X			55	11													55	11	55	11	10,587
106	4	P5	COLUMN		16		X			4	8													16	3	16	3	1,151
116	6	U6	CAP		13	S	X			4	2	5	8	4	2	5	8							20	0	20	6	3,572
10	6	U7	"		7		X			4	3	5	0.5											11	4	11	4	170
4	11	H8	"		20		X			50	2													50	2	50	2	1,066
2	11	H9	"		20		X			49	3													49	3	49	3	523
2	11	H10	"		20		X			46	0													46	0	46	0	489
6	11	H11	"		20		X			32	0													32	0	32	0	1,020
6	6	H12	"		20		X			46	0													46	0	46	0	415
2	11	H13	"		20		X			19	8													19	8	19	8	209
2	11	H14	"		17		X			14	4													15	11	15	11	169
4	11	H15	"		18		X			50	2													53	4	53	4	1,133
2	11	H16	"		18		X			49	3													52	5	52	5	557
			"																									

STATE	PROJ. NO.	SHEET NO.
MO.		51
SEC./SUR. 12 TWP. 50N RGE. 32W		



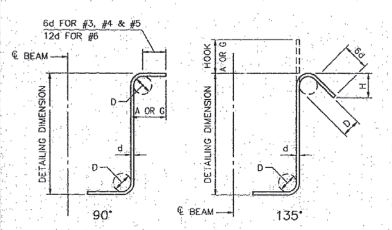
BENDING DIAGRAMS

NOMINAL LENGTHS – ARE BASED ON OUT TO OUT DIMENSIONS SHOWN IN BENDING DIAGRAMS AND ARE LISTED FOR FABRICATORS USE. (NEAREST INCH)

ACTUAL LENGTHS – ARE MEASURED ALONG CENTERLINE BAR TO THE NEAREST INCH.

PAYWEIGHTS ARE BASED ON ACTUAL LENGTHS.

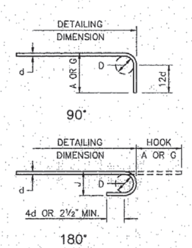
390



STIRRUP HOOK DIMENSIONS

GRADES 40 – 50 – 60 KSI

BAR SIZE	D	90° HOOK: HOOK A OR G	135° HOOK: HOOK A OR G	135° HOOK: APPROX. H
#3	1½"	4"	4"	2½"
#4	2"	4½"	4½"	3"
#5	2½"	6"	5½"	3¾"
#6	4½"	12"	8"	4½"



END HOOK DIMENSIONS

BAR SIZE	D	180° HOOKS, ALL GRADES: A OR G	180° HOOKS, ALL GRADES: J	90° HOOKS, ALL GRADES: A OR G
#3	2¼"	5"	3"	6"
#4	3"	6"	4"	8"
#5	3¾"	7"	5"	10"
#6	4½"	8"	6"	12"
#7	5¼"	10"	7"	14"
#8	6"	11"	8"	16"
#9	9½"	15"	11¾"	19"
#10	10¾"	17"	13¼"	22"
#11	12"	19"	14¾"	2'-0"
#14	18¼"	2'-3"	21¾"	2'-7"

NOTES: ALL STANDARD HOOKS AND BENDS OTHER THAN 180 DEG. ARE TO BE BENT WITH SAME PROCEDURE AS FOR 90 DEG. STANDARD HOOKS.

HOOKS AND BENDS SHALL BE IN ACCORDANCE WITH THE PROCEDURES AS SHOWN ON THIS SHEET.

E – EPOXY COATED REINFORCEMENT.
S – STIRRUP.
V – BAR DIMENSIONS VARY IN EQUAL INCREMENTS BETWEEN DIMENSIONS SHOWN ON THIS LINE AND THE FOLLOWING LINE.
X – BAR IS INCLUDED IN SUBSTRUCTURE QUANTITIES.

NO. EACH – NUMBER OF BARS OF EACH LENGTH.

TWO ADDITIONAL BARS ARE INCLUDED IN THE BAR BILL FOR TESTING.

UNLESS OTHERWISE NOTED DIAMETER "D" IS THE SAME FOR ALL BENDS AND HOOKS ON A BAR.

BILL OF REINFORCING STEEL

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

C1REINF1

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: T.L.W. 2/93
CHECKED: E.W.N. 3/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

A4757

391

STATE	PROJ. NO.	SHEET NO.
MO.		52
SEC./SUR. 12 TWP. 50N RGE. 32W		

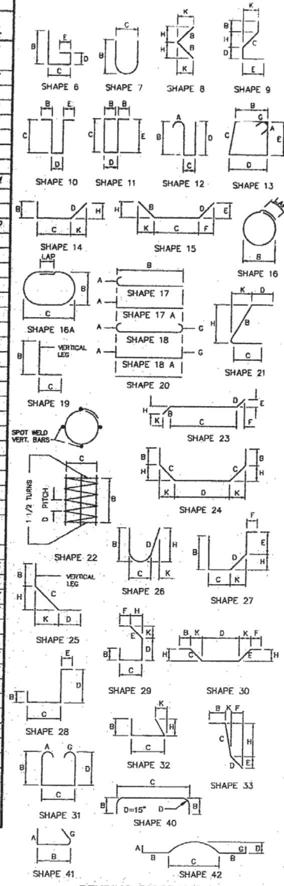
COMPLETE BILL OF REINFORCING STEEL

NO. REQD.	SIZE	MARK	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	B FT.	B IN.	C FT.	C IN.	D FT.	D IN.	E FT.	E IN.	F FT.	F IN.	H FT.	H IN.	K FT.	K IN.	NOMINAL LENGTH FT.	NOMINAL LENGTH IN.	ACTUAL LENGTH FT.	ACTUAL LENGTH IN.	WEIGHT LBS.
			BENT 4N *(CONT.)*																									
2	11	H17	CAP		18		X			46	0													49	2	49	2	522
2	11	H18	"		17		X			16	5													18	0	18	0	191
24	6	V19	CAP	E	20		X			0	21													0	21	0	21	63
35	4	U20	PAD		10	S	X					0	18	2	5									5	5	5	3	123
35	4	U21	"		10	S	X					0	20.25	1	16.5									4	9	4	7	107
18	4	U22	"		10	S	X					0	20	3	9									7	1	6	11	83
12	4	U23	PAD		10	S	X					0	20	4	0									7	3	7	1	57
12	5	U24	WALL		10	S	X					5	4	0	12									11	8	11	5	143
8	5	H25	"		20		X			7	8													7	8	7	8	64
8	5	U26	WALL		10		X					0	12	0	10.5									2	11	2	8	22
4	W5	W27	PAD SPIRAL		22		X			0	15	0	9.125	0	3									23	0	23	0	15
			PIER 1C																									
72	14	F1	FOOTING		18A		X			29	6													34	8	34	8	19,094
41	11	F2	"		40		X			8	10	29	6											47	2	46	4	10,093
78	11	F3	"		17A		X			33	8													35	8	35	8	14,781
78	11	F4	"		*19		X			33	8	8	9											42	5	42	0	17,405
20	8	F5	"		20		X			31	9													31	9	31	9	1,695
10	8	F6	FOOTING		10		X					4	0	29	2.5									37	3	36	10	983
60	14	D7	FOOTING/SHAFT		17A		X			19	0													21	7	21	7	9,907
60	14	D8	FOOTING/SHAFT		17A		X			14	0													16	7	16	7	7,612
60	14	V9	SHAFT		20		X			16	9													16	9	16	9	7,688
60	14	V10	"		20		X			21	9													21	9	21	9	9,983
54	6	H11	"		20		X			47	0													47	0	47	0	3,812
54	6	H12	"		7		X			6	5	8	6											17	7	17	7	1,426
338	6	H13	"		41		X			8	6													10	2	10	2	5,161
2	6	H14	"		20		X			55	4													55	4	55	4	166
2	6	H15	"		20		X			54	0													54	0	54	0	162
41	6	U16	SHAFT		10		X					0	15	8	6									11	0	10	8	657
82	9	D17	SHAFT/WEB WALL		20		X			14	4													14	4	14	4	3,996
72	11	D18	SHAFT/COLUMN		20		X			26	10													26	10	26	10	10,265
20	6	H20	WEB WALL		20		X			43	0													43	0	43	0	1,292
10	9	H21	"		20		X			46	6													46	6	46	6	1,581
41	6	U22	WEB WALL		10		X					0	15	2	2									4	8	4	4	267
72	11	V23	COLUMN		20		X			31	3													31	3	31	3	11,954
7	11	H24	COLUMN/TIE BEAM	E	42		X			4	10	40	6	3	1.25									54	9	54	9	2,036
7	11	H25	"	E	42		X			4	6	40	6	3	1.125									54	1	54	1	2,011
*6	7	H26	"	E	20		X			13	0													13	0	13	0	159
*30	10	H27	"	E	20		X			9	0													9	0	9	0	1,162
12	7	H28	"	E	20		X			44	6													44	6	44	6	1,091
*16	11	H29	"	E	17A		X			18	0													20	0	20	0	1,700
7	11	H30	COLUMN/TIE BEAM	E	18A		X			50	2													54	2	54	2	2,015
32	5	U31	TIE BEAM	E	13	S	X	V	4	2	5.5	9	7	2	5.5	9	7							25	0	24	8	793
			INC.=3.1429"							2	5.5	8	7.75	2	5.5	8	7.75							23	2	22	10	
32	5	U32	TIE BEAM	E	13	S	X	V	4	2	5.5	8	6.25	2	5.5	8	6.25							22	11	22	7	729
			INC.=2.5714"							2	5.5	7	9.5	2	5.5	7	9.5							21	5	21	1	

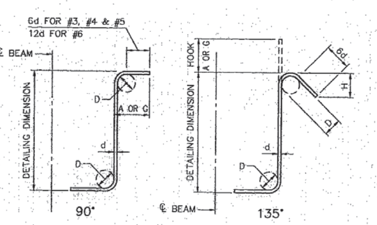
* D=15" for bend

COMPLETE BILL OF REINFORCING STEEL

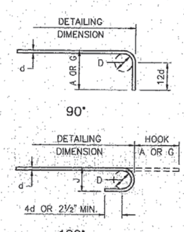
NO. REQD.	SIZE	MARK	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	B FT.	B IN.	C FT.	C IN.	D FT.	D IN.	E FT.	E IN.	F FT.	F IN.	H FT.	H IN.	K FT.	K IN.	NOMINAL LENGTH FT.	NOMINAL LENGTH IN.	ACTUAL LENGTH FT.	ACTUAL LENGTH IN.	WEIGHT LBS.
			PIER 1C *(CONT.)*																									
36	5	U33	TIE BEAM	E	13	S	X	V	4	2	5.5	7	8.5	2	5.5	7	8.5							21	3	20	11	763
			INC.=1.75"							2	5.5	7	1.5	2	5.5	7	1.5							20	1	19	9	
20	5	U34	TIE BEAM	E	13	S	X	V	4	2	5.5	7	0.25	2	5.5	7	0.25							19	11	19	7	402
			INC.=1.75"							2	5.5	6	8.75	2	5.5	6	8.75							19	4	19	0	
10	5	U35	TIE BEAM	E	13	S	X			2	5.5	6	8.375	2	5.5	6	8.375							19	3	18	11	197
41	6	U36	"	E	27		X			5	5	3	3	3	5.625	0	18			0	21	3	0	13	8	13	5	826
92	6	D37	"	E	20		X			6	6													6	6	6	6	898
153	5	H38	TIE BEAM	E	41	S	X			5	5													6	5	6	5	1,024
16	6	U39	COLUMN	E	29		X			0	15	5	11	3	3	3	5.625	0	18	0	21	3	0	15	5	15	1	362
5	6	H40	TIE BEAM	E	10		X					3	0	50	2									56	2	55	11	420
136	4	H41	COLUMN		10	S	X					4	1	3	2.5									11	5	11	3	1,022
172	4	H42	"		41	S	X			4	8													5	5	5	5	622
136	4	H43	"		10	S	X					3	9	3	2.5									10	9	10	7	961
72	4	H44	"		10	S	X					3	4	3	2.5									9	11	9	9	469
16	W5	W45	COLUMN	E	22		X			2	3	0	9.125	0	3									28	10	28	10	77
4	7	H46	TIE BEAM	E	20		X			9	0													9	0	9	0	74
*8	5	H47	BRIDGE SEAT	E	20		X			45	2													45	2	45	2	377
6	5	H48	BRIDGE SEAT	E	20		X	V	2	46	4													46	4	46	4	297
			INC.=14"							48	8													48	8	48	8	
4	5	H49	BRIDGE SEAT	E	20		X			49	10													49	10	49	10	208
4	6	H50	"	E	20		X			49	10													49	10	49	10	299
12	5	H51	"	E	20		X			7	8													7	8	7	8	96
25	5	U52	"	E	10		X					0	12	0	22									3	10	3	7	93
84	6	V53	"	E	20		X			7	11													7	11	7	11	999
*10	6	V54	"	E	20		X			12	0													12	0	12	0	180
10	6	V55	BRIDGE SEAT	E	20		X	V	2	6	0													6	0	6	0	115
			INC.=9.75"							9	3													9	3	9	3	
3	6	T56	BRIDGE SEAT	E	25		X			1	10	6	0.25	0	18					4	6	4	0	9	4	9	3	42
45	5	U57	BRIDGE SEAT	E	10		X					0	18	2	0									5	0	4	9	223
14	W5	W58	PAD SPIRAL	E	22		X			0	15	0	9.125	0	3									23	0	23	0	55
			PIER 2C																									
109	14	F1	FOOTING		18A		X			31	6													36	8	36	8	30,575
45	11	F2	"		*40		X			8	10	31	6											49	2	48	4	11,556
84	11	F3	"		19		X			36	8	8	9											45	5	45	0	20,283
84	11	F4	"		17A		X			36	8													38	8	38	8	17,257
20	8	F5	"		20		X			34	9													34	9	34	9	1,856
10	8	F6	FOOTING		10		X					4	0	31	2.5									39	3	38	10	1,037
116	14	D7	FOOTING/SHAFT		17A		X			29	0													31	7	31	7	28,027
92	14	D8	FOOTING/SHAFT		17A		X			19	0													21	7	21	7	15,190
116	14	V9	SHAFT		20		X			16	9													16	9	16	9	14,864
92	14	V10	"		20		X			26	9													26	9	26	9	18,827
74	6	H11	"		20		X			48	0													48	0	48	0	5,335
74	6	H12	"		7		X			8	0	11	6											22	4	22	4	2,482
612	6	H13	"		41		X			11	6													13	2	13	2	12,103
2	6	H14	"		20		X			59	6													59	6	59	6	179
2	6	H15	"		20		X			58	4													58	4	58	4	175
2	6	H16	"		20		X			56	0													56	0	56	0	168
39	6	U17	SHAFT		10		X					0	15	11	6									14	0	13	8	801



BENDING DIAGRAMS



STIRRUP HOOK DIMENSIONS				
GRADES 40 – 50 – 60 KSI				
BAR SIZE	D	90° HOOK	135° HOOK	
		HOOK A OR G	HOOK A OR G	APPROX. H
#3	1½"	4"	4"	2½"
#4	2"	4½"	4½"	3"
#5	2½"	6"	5½"	3¾"
#6	4½"	12"	8"	4½"



END HOOK DIMENSIONS				
BAR SIZE	D	180° HOOKS		90° HOOKS
		ALL GRADES		ALL GRADES
		A OR G	J	A OR G
#3	2¼"	5"	3"	6"
#4	3"	6"	4"	8"
#5	3¾"	7"	5"	10"
#6	4½"	8"	6"	12"
#7	5¼"	10"	7"	14"
#8	6"	11"	8"	16"
#9	9½"	15"	11¾"	19"
#10	10¾"	17"	13¼"	22"
#11	12"	19"	14¾"	2'-0"
#14	18¼"	2'-3"	21¾"	2'-7"

NOTES: ALL STANDARD HOOKS AND BENDS OTHER THAN 180 DEG. ARE TO BE BENT WITH SAME PROCEDURE AS FOR 90 DEG. STANDARD HOOKS.

HOOKS AND BENDS SHALL BE IN ACCORDANCE WITH THE PROCEDURES AS SHOWN ON THIS SHEET.

E – EPOXY COATED REINFORCEMENT.
S – STIRRUP.
V – BAR DIMENSIONS VARY IN EQUAL INCREMENTS BETWEEN DIMENSIONS SHOWN ON THIS LINE AND THE FOLLOWING LINE.
X – BAR IS INCLUDED IN SUBSTRUCTURE QUANTITIES.

NO. EACH – NUMBER OF BARS OF EACH LENGTH.

\# TWO ADDITIONAL BARS ARE INCLUDED IN THE BAR BILL FOR TESTING.

UNLESS OTHERWISE NOTED DIAMETER "D" IS THE SAME FOR ALL BENDS AND HOOKS ON A BAR.

NOMINAL LENGTHS – ARE BASED ON OUT TO OUT DIMENSIONS SHOWN IN BENDING DIAGRAMS AND ARE LISTED FOR FABRICATORS USE. (NEAREST INCH)

ACTUAL LENGTHS – ARE MEASURED ALONG CENTERLINE BAR TO THE NEAREST INCH.

PAYWEIGHTS ARE BASED ON ACTUAL LENGTHS.

C1REINF2

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: T.L.W. 2/93
CHECKED: E.W.N. 3/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

BILL OF REINFORCING STEEL

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

A4757

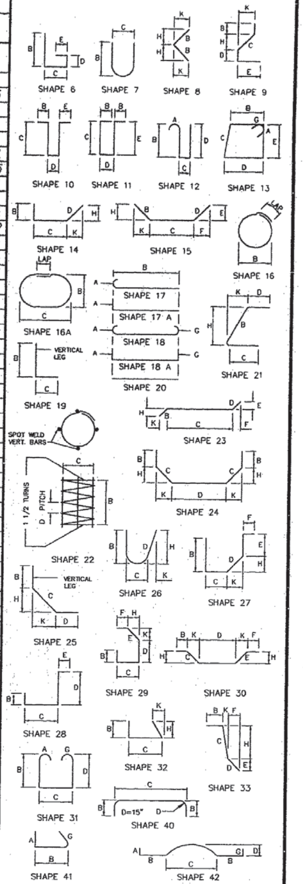
STATE	PROJ. NO.	SHEET NO.
MO.		53
SEC./SUR. 12 TWP. 50N RGE. 32W		

COMPLETE BILL OF REINFORCING STEEL

NO. REQD.	SIZE	MARK	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	B FT.	B IN.	C FT.	C IN.	D FT.	D IN.	E FT.	E IN.	F FT.	F IN.	H FT.	H IN.	K FT.	K IN.	NOMINAL LENGTH FT.	NOMINAL LENGTH IN.	ACTUAL LENGTH FT.	ACTUAL LENGTH IN.	WEIGHT LBS.
			PIER 2C (CONT.)																									
78	9	D18	SHAFT/WEB WALL		20		X			14	4													14	4	14	4	3,801
36	14	D19	SHAFT/COLUMN		20		X			28	9													28	9	28	9	7,918
8	14	D20	"		20		X			16	3													16	3	16	3	995
44	14	D21	"		20		X			24	3													24	3	24	3	8,163
44	14	D22	SHAFT/COLUMN		20		X			21	3													21	3	21	3	7,153
20	6	H24	WEB WALL		20		X			41	0													41	0	41	0	1,232
10	9	H25	"		20		X			44	6													44	6	44	6	1,513
39	6	U26	WEB WALL		10		X					0	15	2	2									4	8	4	4	254
36	14	V27	COLUMN		20		X			33	2													33	2	33	2	9,134
44	14	V28	"		20		X			30	2													30	2	30	2	10,154
8	14	V29	COLUMN		20		X			24	0													24	0	24	0	1,469
8	11	H30	COLUMN/TIE BEAM		42		X			6	10	38	6	3	1.25									56	9	56	9	2,412
8	11	H31	"		42		X			6	0	38	6	3	1.125									55	1	55	1	2,341
72	11	H32	"		20		X			13	0													13	0	13	0	4,973
8	11	H33	"		18A		X			50	6													54	6	54	6	2,316
8	11	H34	COLUMN/TIE BEAM		18A		X			52	2													56	2	56	2	2,387
2	5	U35	TIE BEAM		13	S	X			4	0	8	8	4	0	8	8							26	3	25	11	54
14	6	H36	"		20		X			31	6													31	6	31	6	662
28	5	U37	TIE BEAM		13	S	X	V	4	4	0	11	7	4	0	11	7							32	1	31	9	901
			INC. = 3.5"							4	0	10	8.625	4	0	10	8.625							30	4	30	0	
16	5	U38	TIE BEAM		13	S	X	V	4	4	0	10	5.625	4	0	10	5.625							29	10	29	6	482
			INC. = 5"							4	0	9	9.75	4	0	9	9.75							28	7	28	3	
16	5	U39	TIE BEAM		13	S	X	V	4	4	0	9	7.5	4	0	9	7.5							28	2	27	10	457
			INC. = 3.67"							4	0	9	2.125	4	0	9	2.125							27	3	26	11	
16	5	U40	TIE BEAM		13	S	X	V	4	4	0	9	0.625	4	0	9	0.625							27	0	26	8	441
			INC. = 2.00"							4	0	8	9.5	4	0	8	9.5							26	6	26	2	
12	5	U41	TIE BEAM		13	S	X	V	4	4	0	8	8.875	4	0	8	8.875							26	5	26	1	325
			INC. = 1"							4	0	8	8.125	4	0	8	8.125							26	3	25	11	
28	5	U42	COLUMN		10		X					0	15	7	8									10	2	9	11	290
136	4	H43	"		10	S	X					5	8	4	9									16	1	15	10	1,438
294	4	H44	"		41	S	X			6	8													7	5	7	5	1,457
136	4	H45	"		10	S	X					5	4	4	9									15	5	15	2	1,378
120	4	H46	COLUMN		10	S	X					5	0	4	9									14	9	14	6	1,162
4	6	H47	TIE BEAM		20		X			7	0													7	0	7	0	42
32	W5	W48	COLUMN		22		X			3	9	0	9.125	0	3									43	3	43	3	235
			PIER 3C																									
36	8	F1	FOOTING		17A		X			31	3													32	7	32	7	3,132
74	11	F2	"		18A		X			20	6													24	6	24	6	9,632
59	6	F3	"		10		X					6	3	20	6									33	0	32	8	2,895
42	6	F4	"		19		X			6	2	30	4											36	6	36	4	2,292
16	6	F5	"		20		X			31	2													31	2	31	2	749
8	6	F6	FOOTING		10		X					2	2	20	3									24	7	24	3	291
120	14	D7	FOOTING/SHAFT		17A		X			24	2.5													26	10	26	10	24,633
36	6	H9	SHAFT		20		X			47	0													47	0	47	0	2,541
36	6	H10	SHAFT		7		X			6	5	8	6											17	7	17	7	951

COMPLETE BILL OF REINFORCING STEEL

NO. REQD.	SIZE	MARK	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	B FT.	B IN.	C FT.	C IN.	D FT.	D IN.	E FT.	E IN.	F FT.	F IN.	H FT.	H IN.	K FT.	K IN.	NOMINAL LENGTH FT.	NOMINAL LENGTH IN.	ACTUAL LENGTH FT.	ACTUAL LENGTH IN.	WEIGHT LBS.
			PIER 3C (CONT.)																									
221	6	H11	SHAFT		41		X			8	6													10	2	10	2	3,375
2	6	H12	"		20		X			55	4													55	4	55	4	166
2	6	H13	"		20		X			54	0													54	0	54	0	162
41	6	U14	SHAFT		10		X					0	15	8	6									11	0	10	8	657
82	9	D15	SHAFT/WEB WALL		20		X			14	4													14	4	14	4	3,996
72	11	D16	SHAFT/COLUMN		20		X			26	10													26	10	26	10	10,265
20	6	H20	WEB WALL		20		X			43	0													43	0	43	0	1,292
10	9	H21	"		20		X			46	6													46	6	46	6	1,581
41	6	U22	WEB WALL		10		X					0	15	2	2									4	8	4	4	267
72	11	V23	COLUMN		20		X			27	7													27	7	27	7	10,552
7	11	H24	COLUMN/TIE BEAM	E	42		X			4	10	4	6	3	1.25									54	9	54	9	2,036
7	11	H25	"	E	42		X			4	6	40	6	3	1.125									54	1	54	1	2,011
4	7	H26	"	E	20		X			13	0													13	0	13	0	106
28	10	H27	"	E	20		X			9	0													9	0	9	0	1,084
12	7	H28	"	E	20		X			44	6													44	6	44	6	1,091
14	11	H29	"	E	17A		X			18	0													20	0	20	0	1,488
7	11	H30	COLUMN/TIE BEAM	E	18A		X			50	2													54	2	54	2	2,015
32	5	U31	TIE BEAM	E	13	S	X	V	4	2	5.5	9	7	2	5.5	9	7							25	0	24	8	793
			INC.=3.1429"							2	5.5	8	7.75	2	5.5	8	7.75							23	2	22	10	
32	5	U32	TIE BEAM	E	13	S	X	V	4	2	5.5	8	6.25	2	5.5	8	6.25							22	11	22	7	729
			INC.=2.5714"							2	5.5	7	9.5	2	5.5	7	9.5							21	5	21	1	
36	5	U33	TIE BEAM	E	13	S	X	V	4	2	5.5	7	8.5	2	5.5	7	8.5							21	3	20	11	763
			INC.=1.75"							2	5.5	7	1.5	2	5.5	7	1.5							20	1	19	9	
20	5	U34	TIE BEAM	E	13	S	X	V	4	2	5.5	7	0.25	2	5.5	7	0.25							19	11	19	7	402
			INC.=1.75"							2	5.5	6	8.75	2	5.5	6	8.75							19	4	19	0	
10	5	U35	TIE BEAM	E	13	S	X			2	5.5	6	8.375	2	5.5	6	8.375							19	3	18	11	197
41	6	U36	"	E	27		X			5	5	3	3	3	5.625	0	18			0	21	3	0	13	8	13	5	826
92	6	D37	"	E	20		X			6	6													6	6	6	6	898
153	5	H38	TIE BEAM	E	41	S	X			5	5													6	5	6	5	1,024
16	6	U39	COLUMN	E	29		X			0	15	5	11	3	3	3	5.625	0	18	0	21	3	0	15	5	15	1	362
5	6	H40	TIE BEAM	E	10		X					3	0	50	2									56	2	55	11	420
160	4	H41	COLUMN		10	S	X					4	0	3	2.5									11	3	11	1	1,185
160	4	H42	"		41	S	X			4	8													5	5	5	5	579
160	4	H43			10	S	X					3	7	3	2.5									10	5	10	3	1,096
16	W5	W44	COLUMN	E	22		X			2	3	0	9.125	0	3									28	10	28	10	77
4	7	H46	TIE BEAM	E	20		X			9	0													9	0	9	0	74
6	5	H47	BRIDGE SEAT	E	20		X			45	2													45	2	45	2	283
6	5	H48	BRIDGE SEAT	E	20		X	V	2	46	4													46	4	46	4	297
			INC.=14"							48	8													48	8	48	8	
4	5	H49	BRIDGE SEAT	E	20		X			49	10													49	10	49	10	208
4	6	H50	"	E	20		X			49	10													49	10	49	10	299
12	5	H51	"	E	20		X			7	8													7	8	7	8	96
25	5	U52	"	E	10		X					0	12	0	22									3	10	3	7	93
84	6	V53	"	E	20		X			7	11													7	11	7	11	999
8	6	V54	"	E	20		X			12	0													12	0	12	0	144
10	6	V55	BRIDGE SEAT	E	20		X	V	2	6	0													6	0	6	0	115
			INC.=9.75"							9	3													9	3	9	3	
3	6	T56	BRIDGE SEAT	E	25		X			1	10	6	0.25	0	18					4	6	4	0	9	4	9	3	42
45	5	U57	BRIDGE SEAT	E	10		X					0	18	2	0									5	0	4	9	223
14	W5	W58	PAD SPIRAL	E	22		X			0	15	0	9.125	0	3									23	0	23	0	55



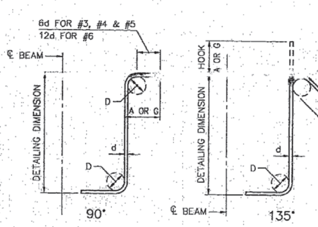
BENDING DIAGRAMS

NOMINAL LENGTHS – ARE BASED ON OUT TO OUT DIMENSIONS SHOWN IN BENDING DIAGRAMS AND ARE LISTED FOR FABRICATORS USE. (NEAREST INCH)

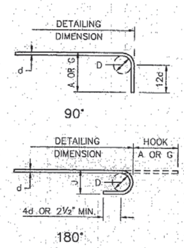
ACTUAL LENGTHS – ARE MEASURED ALONG CENTERLINE BAR TO THE NEAREST INCH.

PAYWEIGHTS ARE BASED ON ACTUAL LENGTHS.

392



STIRRUP HOOK DIMENSIONS				
GRADES 40 – 50 – 60 KSI				
BAR SIZE	D	90° HOOK	135° HOOK	
		HOOK A OR G	HOOK A OR G	APPROX. H
#3	1½"	4"	4"	2½"
#4	2"	4½"	4½"	3"
#5	2½"	6"	5½"	3¾"
#6	4½"	12"	8"	4½"



END HOOK DIMENSIONS				
BAR SIZE	D	180° HOOKS		90° HOOKS
		ALL GRADES		ALL GRADES
		A OR G	J	A OR G
#3	2¼"	5"	3"	6"
#4	3"	6"	4"	8"
#5	3¾"	7"	5"	10"
#6	4½"	8"	6"	12"
#7	5¼"	10"	7"	14"
#8	6"	11"	8"	16"
#9	9½"	15"	11¾"	19"
#10	10¾"	17"	13¼"	22"
#11	12"	19"	14¾"	2'–0"
#14	18¼"	2'–3"	21¾"	2'–7"

NOTES: ALL STANDARD HOOKS AND BENDS OTHER THAN 180 DEG. ARE TO BE BENT WITH SAME PROCEDURE AS FOR 90 DEG. STANDARD HOOKS.

HOOKS AND BENDS SHALL BE IN ACCORDANCE WITH THE PROCEDURES AS SHOWN ON THIS SHEET.

E – EPOXY COATED REINFORCEMENT.
S – STIRRUP.
V – BAR DIMENSIONS VARY IN EQUAL INCREMENTS BETWEEN DIMENSIONS SHOWN ON THIS LINE AND THE FOLLOWING LINE.
X – BAR IS INCLUDED IN SUBSTRUCTURE QUANTITIES.

NO. EACH – NUMBER OF BARS OF EACH LENGTH.

TWO ADDITIONAL BARS ARE INCLUDED IN THE BAR BILL FOR TESTING.

UNLESS OTHERWISE NOTED DIAMETER "D" IS THE SAME FOR ALL BENDS AND HOOKS ON A BAR.

BILL OF REINFORCING STEEL

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

C1RENF3

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: T.L.W. 3/93
CHECKED: E.W.N. 3/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

A4757

COMPLETE BILL OF REINFORCING STEEL

DRILLED SHAFTS

NO. REQD.	SIZE	MARK	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	B FT.	B IN.	C FT.	C IN.	D FT.	D IN.	E FT.	E IN.	F FT.	F IN.	H FT.	H IN.	K FT.	K IN.	NOMINAL LENGTH FT.	NOMINAL LENGTH IN.	ACTUAL LENGTH FT.	ACTUAL LENGTH IN.	WEIGHT LBS.
120	14	V90	DRILLED SHAFT		20		X			87	0													87	0	87	0	79,866
192	14	V91	"		20		X			87	0													87	0	87	0	127,786
962	6	P92	DRILLED SHAFT		16		X			7	10													26	7	26	7	38,411

BENT 1S

NO. REQD.	SIZE	MARK	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	B FT.	B IN.	C FT.	C IN.	D FT.	D IN.	E FT.	E IN.	F FT.	F IN.	H FT.	H IN.	K FT.	K IN.	NOMINAL LENGTH FT.	NOMINAL LENGTH IN.	ACTUAL LENGTH FT.	ACTUAL LENGTH IN.	WEIGHT LBS.
20	10	F1	FOOTING		18		X			9	6													12	4	12	4	1,061
20	9	F2	"		18		X			8	6													11	0	11	0	748
44	10	D3	FOOTING		17A		X			10	4													12	2	12	2	2,304
44	10	V4	COLUMN		20		X			42	5													42	5	42	5	8,031
78	4	P5	COLUMN		16		X			4	8													16	3	16	3	847
116	6	U6	CAP		13	S	X			4	2	5	8	4	2	5	8							21	0	20	6	3,572
10	6	U7	"		7		X			4	3	5	0.5											11	4	11	4	170
4	11	H8	"		20		X			50	2													50	2	50	2	1,066
2	11	H9	"		20		X			49	3													49	3	49	3	523
2	11	H10	"		20		X			46	0													46	0	46	0	489
6	11	H11	"		20		X			32	0													32	0	32	0	1,020
6	6	H12	"		20		X			46	0													46	0	46	0	415
2	11	H13	"		20		X			19	8													19	8	19	8	209
2	11	H14	"		17		X			14	4													15	11	15	11	169
4	11	H15	"		18		X			50	2													53	4	53	4	1,133
2	11	H16	"		18		X			49	3													52	5	52	5	557
2	11	H17	"		18		X			46	0													49	2	49	2	522
2	11	H18	"		17		X			16	5													18	0	18	0	191
24	6	V19	CAP	E	20		X			0	21													0	21	0	21	63
35	4	U20	PAD		10	S	X					0	18	2	5									5	5	5	3	123
35	4	U21	"		10	S	X					0	20.25	0	16.5									4	9	4	7	107
18	4	U22	"		10	S	X					0	20	3	9									7	1	6	11	83
12	4	U23	PAD		10	S	X					0	20	4	0									7	4	7	2	57
12	5	U24	WALL		10	S	X					5	7	0	12									12	2	11	11	149
8	5	H25	"		20		X			7	8													7	8	7	8	64
8	5	U26	WALL		10		X					0	12	0	10.5									2	11	2	8	22
4	W5	W27	PAD SPIRAL		22		X			0	15	0	9.125	0	3									23	0	23	0	15

BENT 2S

NO. REQD.	SIZE	MARK	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	B FT.	B IN.	C FT.	C IN.	D FT.	D IN.	E FT.	E IN.	F FT.	F IN.	H FT.	H IN.	K FT.	K IN.	NOMINAL LENGTH FT.	NOMINAL LENGTH IN.	ACTUAL LENGTH FT.	ACTUAL LENGTH IN.	WEIGHT LBS.
20	10	F1	FOOTING		18		X			9	6													12	4	12	4	1,061
20	9	F2	"		18		X			8	6													11	0	11	0	748
44	10	D3	FOOTING		17A		X			10	4													12	2	12	2	2,304
44	10	V4	COLUMN		20		X			37	4													37	4	37	4	7,068
68	4	P5	COLUMN		16		X			4	8													16	3	16	3	738
116	6	U6	CAP		13	S	X			4	2	5	8	4	2	5	8							20	0	20	6	3,572
10	6	U7	"		7		X			4	3	5	0.5											11	4	11	4	170
4	11	H8	CAP		20		X			50	2													50	2	50	2	1,066

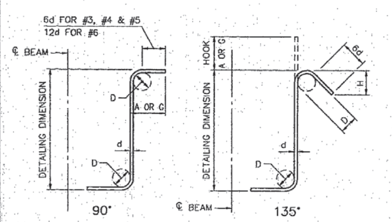
COMPLETE BILL OF REINFORCING STEEL

BENT 2S *(CONT.)*

NO. REQD.	SIZE	MARK	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	B FT.	B IN.	C FT.	C IN.	D FT.	D IN.	E FT.	E IN.	F FT.	F IN.	H FT.	H IN.	K FT.	K IN.	NOMINAL LENGTH FT.	NOMINAL LENGTH IN.	ACTUAL LENGTH FT.	ACTUAL LENGTH IN.	WEIGHT LBS.
2	11	H9	CAP		20		X			49	3													49	3	49	3	523
2	11	H10	"		20		X			46	0													46	0	46	0	489
6	11	H11	"		20		X			32	0													32	0	32	0	1,020
6	6	H12	"		20		X			46	0													46	0	46	0	415
2	11	H13	"		20		X			19	8													19	8	19	8	209
2	11	H14	"		17		X			14	4													15	11	15	11	169
4	11	H15	"		18		X			50	2													53	4	53	4	1,133
2	11	H16	"		18		X			49	3													52	5	52	5	557
2	11	H17	"		18		X			46	0													49	2	49	2	522
2	11	H18	"		17		X			16	5													18	0	18	0	191
24	6	V19	CAP	E	20		X			0	21													0	21	0	21	63
35	4	U20	PAD		10	S	X					0	18	2	5									5	5	5	3	123
35	4	U21	"		10	S	X					0	20.25	0	16.5									4	9	4	7	107
18	4	U22	"		10	S	X					0	20	3	9									7	1	6	11	83
12	4	U23	PAD		10	S	X					0	20	4	0									7	4	7	2	57
12	5	U24	WALL		10	S	X					5	1	0	12									11	2	10	11	137
8	5	H25	"		20		X			7	8													7	8	7	8	64
8	5	U26	WALL		10		X					0	12	0	10.5									2	11	2	8	22
4	W5	W27	PAD SPIRAL		22		X			0	15	0	9.125	0	3									23	0	23	0	15

BENT 3S

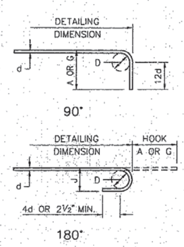
NO. REQD.	SIZE	MARK	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	B FT.	B IN.	C FT.	C IN.	D FT.	D IN.	E FT.	E IN.	F FT.	F IN.	H FT.	H IN.	K FT.	K IN.	NOMINAL LENGTH FT.	NOMINAL LENGTH IN.	ACTUAL LENGTH FT.	ACTUAL LENGTH IN.	WEIGHT LBS.
20	10	F1	FOOTING		18		X			9	6													12	4	12	4	1,061
20	9	F2	"		18		X			8	6													11	0	11	0	748
44	10	D3	FOOTING		17A		X			10	4													12	2	12	2	2,304
44	10	V4	COLUMN		20		X			32	3													32	3	32	3	6,106
58	4	P5	COLUMN		16		X			4	8													16	3	16	3	630
116	6	U6	CAP		13	S	X			4	2	5	8	4	2	5	8							21	0	20	6	3,572
10	6	U7	"		7		X			4	3	5	0.5											11	4	11	4	170
4	11	H8	CAP		20		X			50	2													50	2	50	2	1,066
2	11	H9	CAP		20		X			49	3													49	3	49	3	523
2	11	H10	"		20		X			46	0													46	0	46	0	489
6	11	H11	"		20		X			32	0													32	0	32	0	1,020
6	6	H12	"		20		X			46	0													46	0	46	0	415
2	11	H13	"		20		X			19	8													19	8	19	8	209
2	11	H14	"		17		X			14	4													15	11	15	11	169
4	11	H15	"		18		X			50	2													53	4	53	4	1,133
2	11	H16	"		18		X			49	3													52	5	52	5	557
2	11	H17	"		18		X			46	0													49	2	49	2	522
2	11	H18	"		17		X			16	5													18	0	18	0	191
24	6	V19	CAP	E	20		X			0	21													0	21	0	21	63
35	4	U20	PAD		10	S	X					0	18	2	5									5	5	5	3	123
35	4	U21	"		10	S	X					0	20.25	0	16.5									4	9	4	7	107
18	4	U22	"		10	S	X					0	20	3	9									7	1	6	11	83
12	4	U23	PAD		10	S	X					0	20	4	0									7	4	7	2	57
12	5	U24	WALL		10	S	X					3	8	0	12									8	4	8	1	101



STIRRUP HOOK DIMENSIONS

GRADES 40 – 50 – 60 KSI

BAR SIZE	D	90° HOOK	135° HOOK	
		HOOK A OR G	HOOK A OR G	APPROX. H
#3	1½"	4"	4"	2½"
#4	2"	4½"	4½"	3"
#5	2½"	6"	5½"	3¾"
#6	4½"	12"	8"	4½"



END HOOK DIMENSIONS

BAR SIZE	D	180° HOOKS ALL GRADES		90° HOOKS ALL GRADES
		A OR G	J	A OR G
#3	2¼"	5"	3"	6"
#4	3"	6"	4"	8"
#5	3¾"	7"	5"	10"
#6	4½"	8"	6"	12"
#7	5¼"	10"	7"	14"
#8	6"	11"	8"	16"
#9	9½"	15"	11¾"	19"
#10	10¾"	17"	13¼"	22"
#11	12"	19"	14¾"	2'–0"
#14	18¼"	2'–3"	21¾"	2'–7"

NOTES: ALL STANDARD HOOKS AND BENDS OTHER THAN 180 DEG. ARE TO BE BENT WITH SAME PROCEDURE AS FOR 90 DEG. STANDARD HOOKS.

HOOKS AND BENDS SHALL BE IN ACCORDANCE WITH THE PROCEDURES AS SHOWN ON THIS SHEET.

E – EPOXY COATED REINFORCEMENT.
S – STIRRUP.
V – BAR DIMENSIONS VARY IN EQUAL INCREMENTS BETWEEN DIMENSIONS SHOWN ON THIS LINE AND THE FOLLOWING LINE
X – BAR IS INCLUDED IN SUBSTRUCTURE QUANTITIES.

NO. EACH – NUMBER OF BARS OF EACH LENGTH.

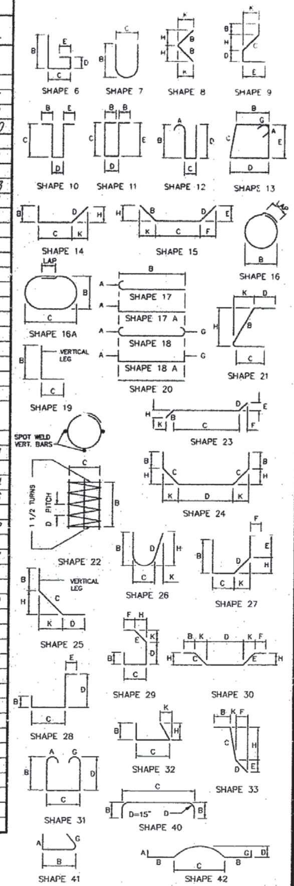
≠ TWO ADDITIONAL BARS ARE INCLUDED IN THE BAR BILL FOR TESTING.

UNLESS OTHERWISE NOTED DIAMETER "D" IS THE SAME FOR ALL BENDS AND HOOKS ON A BAR.

DRILLED SHAFT BARS 14V90 & 14V91 INCLUDE ONE MECHANICAL SPLICE. SPLICES AT ADJACENT BARS SHALL BE STAGGERED 5'–0" MIN., SEE SPECIAL PROVISIONS.

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

STATE	PROJ. NO	SHEET NO.
MO		54
SEC./SUR 12 TWP. 50N RGE. 32W		



BENDING DIAGRAMS

NOMINAL LENGTHS – ARE BASED ON OUT TO OUT DIMENSIONS SHOWN IN BENDING DIAGRAMS AND ARE LISTED FOR FABRICATORS USE. (NEAREST INCH)

ACTUAL LENGTHS – ARE MEASURED ALONG CENTERLINE BAR TO THE NEAREST INCH.

PAYWEIGHTS ARE BASED ON ACTUAL LENGTHS.

BILL OF REINFORCING STEEL

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

C1RENF4

323

DETAILED: T.L.W. 3/93
CHECKED: E.W.N. 3/93

A4757

394

STATE	PROJ. NO.	SHEET NO.
MO.		55
SEC./SUR. 12 TWP. 50N RGE. 32W		

COMPLETE BILL OF REINFORCING STEEL

BENT 3S (CONT.)

NO. REQD.	SIZE	MARK	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	B FT.	B IN.	C FT.	C IN.	D FT.	D IN.	E FT.	E IN.	F FT.	F IN.	H FT.	H IN.	K FT.	K IN.	NOMINAL LENGTH FT.	NOMINAL LENGTH IN.	ACTUAL LENGTH FT.	ACTUAL LENGTH IN.	WEIGHT LBS.
8	5	H25	WALL		20		X			7	8													7	8	7	8	64
8	5	U26	WALL		10		X					0	12	0	10.5									2	11	2	8	22
4	W5	W27	PAD SPIRAL		22		X			0	15	0	9.125	0	3									23	0	23	0	15

END BENT 4S

NO. REQD.	SIZE	MARK	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	B FT.	B IN.	C FT.	C IN.	D FT.	D IN.	E FT.	E IN.	F FT.	F IN.	H FT.	H IN.	K FT.	K IN.	NOMINAL LENGTH FT.	NOMINAL LENGTH IN.	ACTUAL LENGTH FT.	ACTUAL LENGTH IN.	WEIGHT LBS.
6	6	F1	FILLET		23		X			0	14	4	5	0	14	0	9.875	0	9.875	0	9.875	0	9.875	6	9	6	8	60
2	6	H2	BEAM		20		X			51	0													51	0	51	0	153
12	6	H3	WING		20		X	V	4	4	8													4	8	4	8	107
			Inc. = 15"							7	2													7	2	7	2	
8	7	H4	BEAM		20		X			51	0													51	0	51	0	834
4	W5	W5	BEAM		22		X			0	15	0	9.125	0	3									23	0	23	0	15
4	6	T6	WING		25		X					7	2	3	3					3	7.5	6	2	10	5	10	5	63
26	5	U7	BEAM	E	10	S	X					4	10	2	2									11	10	11	7	314
43	5	U8	"		13	S	X			2	2	2	7	2	2	2	7							10	5	10	1	452
1	5	U9	"		10	S	X					2	7	2	2									7	4	7	1	7
12	5	V10	BEAM	E	20		X			4	10													4	10	4	10	61
8	6	V11	WING	E	20		X			5	1													5	1	5	1	61
16	6	V12	WING	E	20		X	V	4	3	0													3	0	3	0	93
			Inc. = 7"							4	9													4	9	4	9	
8	5	U13	BEAM		13	S	X			2	2	2	10	2	2	2	10							10	11	10	7	88
4	4	H14	BEAM		20		X			3	8													3	8	3	8	10

SLAB – UNIT 1 CAST-IN-PLACE

NO. REQD.	SIZE	MARK	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	B FT.	B IN.	C FT.	C IN.	D FT.	D IN.	E FT.	E IN.	F FT.	F IN.	H FT.	H IN.	K FT.	K IN.	NOMINAL LENGTH FT.	NOMINAL LENGTH IN.	ACTUAL LENGTH FT.	ACTUAL LENGTH IN.	WEIGHT LBS.
975	5	S1	Trans. Bott.	E	20					42	4													42	4	42	4	,050
975	6	S2	Trans. Top	E	20					42	4													42	4	42	4	61,995
76	5	S3	Long. Bott.	E	20					30	0													30	0	30	0	2,378
304	5	S4	"	E	20					32	6													32	6	32	6	10,305
190	5	S5	"	E	20					40	0													40	0	40	0	7,927
70	6	S6	Long. Top	E	20					42	2													42	2	42	2	4,433
105	6	S7	"	E	20					60	0													60	0	60	0	9,463
105	6	S8	"	E	20					47	6													47	6	47	6	7,491
70	6	S9	"	E	20					53	0													53	0	53	0	5,572
136	7	S13	Long. Top @ Bents	E	20					48	0													48	0	48	0	13,343
68	7	S14	"	E	20					44	0													44	0	44	0	6,116

COMPLETE BILL OF REINFORCING STEEL

SLAB – UNIT 1 P/S PANEL

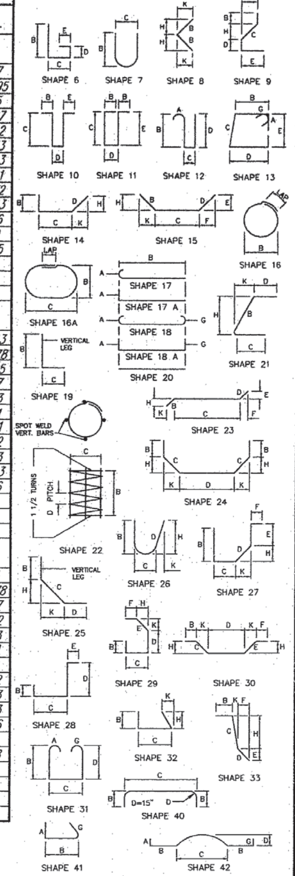
NO. REQD.	SIZE	MARK	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	B FT.	B IN.	C FT.	C IN.	D FT.	D IN.	E FT.	E IN.	F FT.	F IN.	H FT.	H IN.	K FT.	K IN.	NOMINAL LENGTH FT.	NOMINAL LENGTH IN.	ACTUAL LENGTH FT.	ACTUAL LENGTH IN.	WEIGHT LBS.
21	5	S1	Trans. Bott.	E	20					42	4													42	4	42	4	927
975	6	S2	Trans. Top	E	20					42	4													42	4	42	4	61,995
12	5	S3	Long. Bott.	E	20					30	0													30	0	30	0	375
48	5	S4	"	E	20					32	6													32	6	32	6	1,627
30	5	S5	"	E	20					40	0													40	0	40	0	1,252
70	6	S6	Long. Top	E	20					42	2													42	2	42	2	4,433
105	6	S7	"	E	20					60	0													60	0	60	0	9,463
105	6	S8	"	E	20					47	6													47	6	47	6	7,491
70	6	S9	"	E	20					53	0													53	0	53	0	5,572
136	7	S13	Long. Top @ Bents	E	20					48	0													48	0	48	0	13,343
68	7	S14	"	E	20					44	0													44	0	44	0	6,116
32	5	S15	Long. Bott.	E	20					10	2													10	2	10	2	339
950	4	S16	Trans. Bott.	E	20					5	4													5	4	5	4	3,385

SLAB – UNIT 3 CAST-IN-PLACE

NO. REQD.	SIZE	MARK	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	B FT.	B IN.	C FT.	C IN.	D FT.	D IN.	E FT.	E IN.	F FT.	F IN.	H FT.	H IN.	K FT.	K IN.	NOMINAL LENGTH FT.	NOMINAL LENGTH IN.	ACTUAL LENGTH FT.	ACTUAL LENGTH IN.	WEIGHT LBS.
959	5	S1	Trans. Bott.	E	20					42	4													42	4	42	4	42,343
959	6	S2	Trans. Top	E	20					42	4													42	4	42	4	60,978
304	5	S4	Long. Bott.	E	20					32	6													32	6	32	6	10,305
190	5	S5	"	E	20					40	0													40	0	40	0	7,927
105	6	S7	Long. Top	E	20					60	0													60	0	60	0	9,463
105	6	S8	"	E	20					47	6													47	6	47	6	7,491
76	5	S10	Long. Bott.	E	20					26	0													26	0	26	0	2,061
70	6	S11	Long. Top	E	20					40	11													40	11	40	11	4,302
70	6	S12	"	E	20					50	3													50	3	50	3	5,283
136	7	S13	Long. Top @ Bents	E	20					48	0													48	0	48	0	13,343
68	7	S14	"	E	20					44	0													44	0	44	0	6,116

SLAB – UNIT 3 P/S PANEL

NO. REQD.	SIZE	MARK	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	B FT.	B IN.	C FT.	C IN.	D FT.	D IN.	E FT.	E IN.	F FT.	F IN.	H FT.	H IN.	K FT.	K IN.	NOMINAL LENGTH FT.	NOMINAL LENGTH IN.	ACTUAL LENGTH FT.	ACTUAL LENGTH IN.	WEIGHT LBS.
21	5	S1	Trans. Bott.	E	20					42	4													42	4	42	4	927
959	6	S2	Trans. Top	E	20					42	4													42	4	42	4	60,978
48	5	S4	Long. Bott.	E	20					32	6													32	6	32	6	1,627
30	5	S5	"	E	20					40	0													40	0	40	0	1,252
105	6	S7	Long. Top	E	20					60	0													60	0	60	0	9,463
105	6	S8	"	E	20					47	6													47	6	47	6	7,491
12	5	S10	Long. Bott.	E	20					26	0													26	0	26	0	325
70	6	S11	Long. Top	E	20					40	11													40	11	40	11	4,302
70	6	S12	"	E	20					50	3													50	3	50	3	5,283
136	7	S13	Long. Top @ Bents	E	20					48	0													48	0	48	0	13,343
68	7	S14	"	E	20					44	0													44	0	44	0	6,116
32	5	S15	Long. Bott.	E	20					10	2													10	2	10	2	339
934	4	S16	Trans. Bott.	E	20					5	4													5	4	5	4	3,328

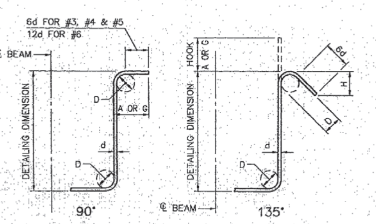


BENDING DIAGRAMS

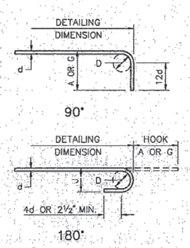
NOMINAL LENGTHS – ARE BASED ON OUT TO OUT DIMENSIONS SHOWN IN BENDING DIAGRAMS AND ARE LISTED FOR FABRICATORS USE. (NEAREST INCH)

ACTUAL LENGTHS – ARE MEASURED ALONG CENTERLINE BAR TO THE NEAREST INCH.

PAYWEIGHTS ARE BASED ON ACTUAL LENGTHS.



STIRRUP HOOK DIMENSIONS				
GRADES 40 – 50 – 60 KSI				
BAR SIZE	D	90° HOOK	135° HOOK	
		HOOK A OR G	HOOK A OR G	APPROX. H
#3	1½"	4"	4"	2½"
#4	2"	4½"	4½"	3"
#5	2½"	6"	5½"	3¾"
#6	4½"	12"	8"	4½"



END HOOK DIMENSIONS				
BAR SIZE	D	180° HOOKS		90° HOOKS
		ALL GRADES		ALL GRADES
		A OR G	J	A OR G
#3	2¼"	5"	3"	6"
#4	3"	6"	4"	8"
#5	3¾"	7"	5"	10"
#6	4½"	8"	6"	12"
#7	5¼"	10"	7"	14"
#8	6"	11"	8"	16"
#9	9½"	15"	11¾"	19"
#10	10¾"	17"	13¼"	22"
#11	12"	19"	14¾"	2'-0"
#14	18¼"	2'-3"	21¾"	2'-7"

NOTES: ALL STANDARD HOOKS AND BENDS OTHER THAN 180 DEG. ARE TO BE BENT WITH SAME PROCEDURE AS FOR 90 DEG. STANDARD HOOKS.

HOOKS AND BENDS SHALL BE IN ACCORDANCE WITH THE PROCEDURES AS SHOWN ON THIS SHEET.

E – EPOXY COATED REINFORCEMENT.

S – STIRRUP.

V – BAR DIMENSIONS VARY IN EQUAL INCREMENTS BETWEEN DIMENSIONS SHOWN ON THIS LINE AND THE FOLLOWING LINE.

X – BAR IS INCLUDED IN SUBSTRUCTURE QUANTITIES.

NO. EACH – NUMBER OF BARS OF EACH LENGTH.

TWO ADDITIONAL BARS ARE INCLUDED IN THE BAR BILL FOR TESTING.

UNLESS OTHERWISE NOTED DIAMETER "D" IS THE SAME FOR ALL BENDS AND HOOKS ON A BAR.

BILL OF REINFORCING STEEL

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: T.L.W. 3/93
CHECKED: E.W.N. 3/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

A4757

STATE	PROJ. NO.	SHEET NO.
MO		56

SEC./SUR. 12 TWP. 50N RGE. 32W

COMPLETE BILL OF REINFORCING STEEL

DIAPHRAGM – END BENT 1N

NO. REQD.	SIZE	MARK	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	B FT.	B IN.	C FT.	C IN.	D FT.	D IN.	E FT.	E IN.	F FT.	F IN.	H FT.	H IN.	K FT.	K IN.	NOMINAL LENGTH FT.	NOMINAL LENGTH IN.	ACTUAL LENGTH FT.	ACTUAL LENGTH IN.	WEIGHT LBS.
32	5	U1	Diaph. Vert.	E	10							6	10	2	2									15	10	15	7	520
10	5	U2	"	E	19					6	10	2	2											9	0	8	11	93
10	5	V3	"	E	20					5	5													5	5	5	5	56
24	6	H4	Diaph. Horiz.	E	20					6	3													6	3	6	3	225
6	6	H5	"	E	20					36	4													36	4	36	4	327
4	6	H6	"	E	20					42	4													42	4	42	4	254
12	6	H7	"	E	28					2	7	2	0.5	5	4.5									10	0	9	9	176
56	6	U8	Diaph. Vert.	E	19					6	10	3	6											10	4	10	2	855
‡3	4	H9	App Slab Seat	E	20					39	6													39	6	39	6	79
26	4	U10	"	E	10							0	17.5	0	6									3	5	3	3	56
5	5	H11	Diaph. Horiz.	E	20					5	0													5	0	5	0	26
40	5	H12	App Slab Seat	E	20					2	6													2	6	2	6	104
14	6	F13	Fillet	E	23					0	14	4	4	0	14	0	9.875	0	9.875	0	9.875	0	9.875	6	8	6	8	140
24	6	V14	Wing Vert.	E	20					6	8													6	8	6	8	240
32	6	V15	Wing Vert.	E	20					2	5													2	5	2	5	
			Inc. = 7.43							6	9													6	9	6	9	220
24	6	H16	Wing Horiz.	E	20					8	6													8	6	8	6	
			Inc. = 15.20"							14	10													14	10	14	10	421
12	6	H17	Wing Horiz.	E	20					15	4													15	4	15	4	276
‡6	7	T18	"	E	25					0	23	9	3							0	20.125	0	11.75	11	2	11	1	136
36	5	R19	Curb Dowels	E	19					2	3	0	6											2	9	2	8	100
36	5	R20	"	E	25					0	18	0	11.125	0	6					0	9.125	0	6.375	2	11	2	10	106
4	5	R21	"	E	25					0	18	0	8.125	0	6					0	6.625	0	4.625	2	8	2	7	11
12	5	R22	"	E	10							2	0	0	7.5									4	8	4	6	56
4	5	R23	"	E	19					2	0	0	6											2	6	2	5	10

FIXED & EXPANSION BENT DIAPHRAGMS – UNIT 1

NO. REQD.	SIZE	MARK	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	B FT.	B IN.	C FT.	C IN.	D FT.	D IN.	E FT.	E IN.	F FT.	F IN.	H FT.	H IN.	K FT.	K IN.	NOMINAL LENGTH FT.	NOMINAL LENGTH IN.	ACTUAL LENGTH FT.	ACTUAL LENGTH IN.	WEIGHT LBS.
32	6	D1	Exp. Vert.	E	10	S						2	4.5	2	0									6	9	6	6	312
16	6	D2	"	E	10	S						2	7.5	2	0									7	3	7	0	168
16	6	D3	"	E	10	S						2	10.5	2	0									7	9	7	6	180
16	6	D4	"	E	10	S						3	0	2	0									8	0	7	9	186
20	6	D5	"	E	10	S						3	3	2	0									8	6	8	3	248
4	6	D6	"	E	10	S						2	3	2	0									6	6	6	3	38
8	5	D7	Exp. Horiz.	E	28	S				0	15.5	0	22.5	2	9									5	11	5	8	47
8	5	D8	"	E	28	S				2	2.5	0	22.5	3	8									7	9	7	6	63
20	7	D9	"	E	20					7	10													7	10	7	10	320
12	5	D10	"	E	20					36	8													36	8	36	8	459
104	5	D11	Exp. & Fixed Horiz.	E	20					7	10													7	10	7	10	850
1	6	D12	Fixed Horiz.	E	20					36	8													36	8	36	8	55
28	6	D13	Fixed & Exp. Horiz.	E	20					7	10													7	10	7	10	329
24	5	D14	Fixed Horiz.	E	14							4	0	0	7					0	6.5	0	2.5	4	7	4	7	115
61	5	D15	Exp. Vert.	E	19					2	2	3	6											5	8	5	7	355
34	5	D16	"	E	19					2	0	1	9											3	9	3	8	130
2	5	D17	Exp. Horiz.	E	28	S				0	11	0	22.5	2	3.5									5	1	4	10	10
2	5	D18	"	E	28	S				0	16.5	0	22.5	2	10									6	1	5	10	12
2	5	D19	"	E	28	S				0	22	0	22.5	3	3.5									7	0	6	9	14
2	5	D20	"	E	28	S				2	3	0	22.5	3	8.5									7	10	7	7	16
2	5	D21	"	E	28	S				2	8.5	0	22.5	4	2									8	9	8	6	18
2	5	D22	"	E	28	S				0	17	0	22.5	4	5.5									7	9	7	6	16

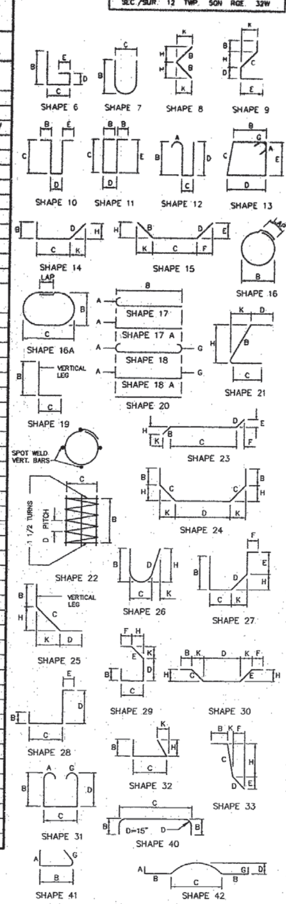
COMPLETE BILL OF REINFORCING STEEL

FIXED & EXPANSION BENT DIAPHRAGMS – UNIT 1 *(CONT.)*

NO. REQD.	SIZE	MARK	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	B FT.	B IN.	C FT.	C IN.	D FT.	D IN.	E FT.	E IN.	F FT.	F IN.	H FT.	H IN.	K FT.	K IN.	NOMINAL LENGTH FT.	NOMINAL LENGTH IN.	ACTUAL LENGTH FT.	ACTUAL LENGTH IN.	WEIGHT LBS.
6	5	D23	Exp. Vert.	E	14					0	7	5	0	0	16.75					0	7.75	0	14.875	7	0	6	10	43
2	5	D24	"	E	10	S						0	16	0	21.25									4	6	4	3	9
120	5	D26	Fixed Vert.	E	28	S						2	2.5	6	9	0	14							10	2	9	11	1,241
60	6	D27	"		10	S						3	7	2	11									10	1	9	10	886
24	6	D28	Fixed Horiz.		20					4	4													4	4	4	4	156
24	5	D29	"		20					6	2													6	2	6	2	154
12	5	D30	Fixed Vert.	E	28	S						2	2.5	6	8	0	14							10	1	9	10	123
12	5	D31	"	E	20					6	8													6	8	6	8	83
60	5	D32	Fixed Horiz.		28	S				0	20	0	14.5	4	1									7	0	6	9	422
12	5	D33	"		28	S				0	10	0	14.5	4	1									6	2	5	11	74
30	5	D34	"		20					5	0													5	0	5	0	156

FIXED & EXPANSION BENT DIAPHRAGMS – UNIT 3

NO. REQD.	SIZE	MARK	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	B FT.	B IN.	C FT.	C IN.	D FT.	D IN.	E FT.	E IN.	F FT.	F IN.	H FT.	H IN.	K FT.	K IN.	NOMINAL LENGTH FT.	NOMINAL LENGTH IN.	ACTUAL LENGTH FT.	ACTUAL LENGTH IN.	WEIGHT LBS.
32	6	D1	Exp. Vert.	E	10	S						2	4.5	2	0									6	9	6	6	312
16	6	D2	"	E	10	S						2	7.5	2	0									7	3	7	0	168
16	6	D3	"	E	10	S						2	10.5	2	0									7	9	7	6	180
16	6	D4	"	E	10	S						3	0	2	0									8	0	7	9	186
20	6	D5	"	E	10	S						3	3	2	0									8	6	8	3	248
4	6	D6	"	E	10	S						2	3	2	0									6	6	6	3	38
8	5	D7	Exp. Horiz.	E	28	S				0	15.5	0	22.5	2	9									5	11	5	8	47
8	5	D8	"	E	28	S				2	2.5	0	22.5	3	8									7	9	7	6	63
20	7	D9	"	E	20					7	10													7	10	7	10	320
12	5	D10	"	E	20					36	8													36	8	36	8	459
104	5	D11	Exp. & Fixed Horiz.	E	20					7	10													7	10	7	10	850
1	6	D12	Fixed Horiz.	E	20					36	8													36	8	36	8	55
28	6	D13	Fixed & Exp. Horiz.	E	20					7	10													7	10	7	10	329
24	5	D14	Fixed Horiz.	E	14							4	0	0	7					0	6.5	0	2.5	4	7	4	7	115
61	5	D15	Exp. Vert.	E	19					2	2	3	6											5	8	5	7	355
34	5	D16	"	E	19					2	0	1	9											3	9	3	8	130
2	5	D17	Exp. Horiz.	E	28	S				0	11	0	22.5	2	3.5									5	1	4	10	10
2	5	D18	"	E	28	S				0	16.5	0	22.5	2	10									6	1	5	10	12
2	5	D19	"	E	28	S				0	22	0	22.5	3	3.5									7	0	6	9	14
2	5	D20	"	E	28	S				2	3	0	22.5	3	8.5									7	10	7	7	16
2	5	D21	"	E	28	S				2	8.5	0	22.5	4	2									8	9	8	6	18
2	5	D22	"	E	28	S				0	17	0	22.5	4	5.5									7	9	7	6	16
6	5	D23	Exp. Vert.	E	14					0	7	5	0	0	16.75					0	7.75	0	14.875	7	0	6	10	43
2	5	D24	"	E	10	S						0	16	0	21.25									4	6	4	3	9
120	5	D26	Fixed Vert.	E	28	S						2	2.5	6	9	0	14							10	2	9	11	1,241
60	6	D27	"		10	S						3	7	2	11									10	1	9	10	886
24	6	D28	Fixed Horiz.		20					4	4													4	4	4	4	156
24	5	D29	"		20					6	2													6	2	6	2	154
12	5	D30	Fixed Vert.	E	28	S						2	2.5	6	8	0	14							10	1	9	10	123
12	5	D31	"	E	20					6	8													6	8	6	8	83
60	5	D32	Fixed Horiz.		28	S				0	20	0	14.5	4	1									7	0	6	9	422
12	5	D33	"		28	S				0	10	0	14.5	4	1									6	2	5	11	74
30	5	D34	"		20					5	0													5	0	5	0	156

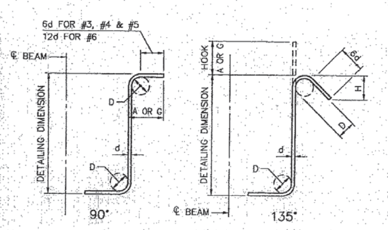


BENDING DIAGRAMS

NOMINAL LENGTHS – ARE BASED ON OUT TO OUT DIMENSIONS SHOWN IN BENDING DIAGRAMS AND ARE LISTED FOR FABRICATORS USE. (NEAREST INCH)

ACTUAL LENGTHS – ARE MEASURED ALONG CENTERLINE BAR TO THE NEAREST INCH.

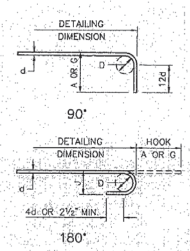
PAYWEIGHTS ARE BASED ON ACTUAL LENGTHS.



STIRRUP HOOK DIMENSIONS

GRADES 40 – 50 – 60 KSI

BAR SIZE	D	90° HOOK: HOOK A OR G	135° HOOK: HOOK A OR G	135° HOOK: APPROX. H
#3	1½"	4"	4"	2½"
#4	2"	4½"	4½"	3"
#5	2½"	6"	5½"	3¾"
#6	4½"	12"	8"	4½"



END HOOK DIMENSIONS

BAR SIZE	D	180° HOOKS (ALL GRADES): A OR G	180° HOOKS (ALL GRADES): J	90° HOOKS (ALL GRADES): A OR G
#3	2¼"	5"	3"	6"
#4	3"	6"	4"	8"
#5	3¾"	7"	5"	10"
#6	4½"	8"	6"	12"
#7	5¼"	10"	7"	14"
#8	6"	11"	8"	16"
#9	9½"	15"	11¾"	19"
#10	10¾"	17"	13¼"	22"
#11	12"	19"	14¾"	2'-0"
#14	18¼"	2'-3"	21¾"	2'-7"

NOTES: ALL STANDARD HOOKS AND BENDS OTHER THAN 180 DEG. ARE TO BE BENT WITH SAME PROCEDURE AS FOR 90 DEG. STANDARD HOOKS.

HOOKS AND BENDS SHALL BE IN ACCORDANCE WITH THE PROCEDURES AS SHOWN ON THIS SHEET.

E – EPOXY COATED REINFORCEMENT.

S – STIRRUP.

V – BAR DIMENSIONS VARY IN EQUAL INCREMENTS BETWEEN DIMENSIONS SHOWN ON THIS LINE AND THE FOLLOWING LINE.

X – BAR IS INCLUDED IN SUBSTRUCTURE QUANTITIES.

NO. EACH – NUMBER OF BARS OF EACH LENGTH.

‡ TWO ADDITIONAL BARS ARE INCLUDED IN THE BAR BILL FOR TESTING.

UNLESS OTHERWISE NOTED DIAMETER "D" IS THE SAME FOR ALL BENDS AND HOOKS ON A BAR.

BILL OF REINFORCING STEEL

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: D.E.B. 4/94
CHECKED: M.J.T. 4/94

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

A4757

C1REINF6

395

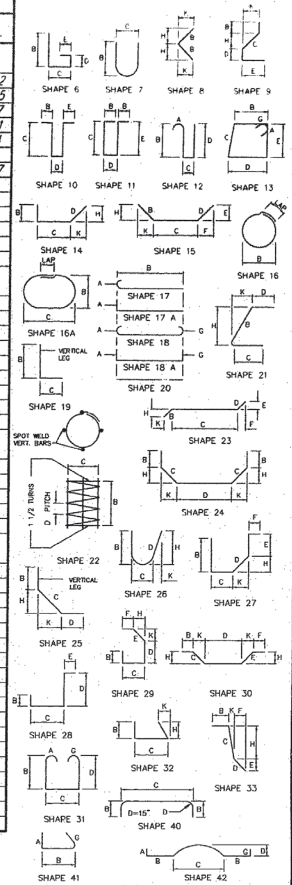
STATE	PROJ. NO.	SHEET NO.
MO.		57
SEC./SUR. 12 TWP. 50N RGE 32W		

COMPLETE BILL OF REINFORCING STEEL

NO. REQD.	SIZE	MARK	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	B FT. IN.	C FT. IN.	D FT. IN.	E FT. IN.	F FT. IN.	H FT. IN.	K FT. IN.	NOMINAL LENGTH FT. IN.	ACTUAL LENGTH FT. IN.	WEIGHT LBS.
DIAPHRAGM – END BENT 4S																			
32	5	U1	Diaph. Vert.	E	10						6 10	2 2					15 10	15 7	520
10	5	U2	"	E	19					6 10	2 2						9 0	8 11	93
10	5	V3	"	E	20					5 5							5 5	5 5	56
24	6	H4	Diaph. Horiz.	E	20					6 3							6 3	6 3	225
6	6	H5	"	E	20					36 4							36 4	36 4	327
4	6	H6	"	E	20					42 4							42 4	42 4	254
12	6	H7	"	E	28					2 7	2 0.5	5 4.5					10 0	9 9	176
56	6	U8	Diaph. Vert.	E	19					6 10	3 6						10 4	10 2	855
1	4	H9	App Slab Seat	E	20					39 6							39 6	39 6	26
26	4	U10	"	E	10						0 17.5	0 6					3 5	3 3	56
5	5	H11	Diaph. Horiz.	E	20					5 0							5 0	5 0	26
40	5	H12	App Slab Seat	E	20					2 6							2 6	2 6	104
14	6	F13	Fillet	E	23					0 14	4 4	0 14	0 9.875	0 9.875	0 9.875	0 9.875	6 8	6 8	140
24	6	V14	Wing Vert.	E	20					6 8							6 8	6 8	240
32	6	V15	Wing Vert.	E	20					2 5							2 5	2 5	
			Inc. = 7.43"							6 9							6 9	6 9	220
24	6	H16	Wing Horiz.	E	20					8 6							8 6	8 6	
			Inc. = 15.20"							14 10							14 10	14 10	421
12	6	H17	Wing Horiz.	E	20					15 4							15 4	15 4	276
4	7	T18	"	E	25					0 23	9 3				0 20.125	0 11.75	11 2	11 1	91
36	5	R19	Curb Dowels	E	19					2 3	0 6						2 9	2 8	100
36	5	R20	"	E	25					0 18	0 11.125	0 6			0 9.125	0 6.375	2 11	2 10	106
4	5	R21	"	E	25					0 18	0 8.125	0 6			0 6.625	0 4.625	2 8	2 7	11
12	5	R22	"	E	10						2 0	0 7.5					4 8	4 6	56
4	5	R23	"	E	19					2 0	0 6						2 6	2 5	10
SAFETY BARRIER CURB – WINGWALLS @ END BENT 1N																			
64	5	R1	Vert.	E	19					2 6	0 3.5						2 10	2 8	178
36	5	R2	"	E	15					2 6.125	0 3.5				2 6	0 3	2 10	2 9	103
4	5	R15	"	E	19					2 3.75	0 3.5						2 8	2 6	10
10	5	R16	Horiz.	E	20					13 5							13 5	13 5	140
2	5	R17	"	E	20					14 4							14 4	14 4	30
24	5	R18	"	E	20					5 0							5 0	5 0	125
SAFETY BARRIER CURB – UNIT 1																			
966	5	R1	Vert.	E	19					2 6	0 3.5						2 10	2 8	2,687
966	5	R2	"	E	15					2 6.125	0 3.5				2 6	0 3	2 10	2 9	2,771
982	5	R3	"	E	19					0 17	0 6						1 11	1 10	1,878
982	5	R4	"	E	27						0 6	0 11.125	0 7	0 12	0 9.125	0 6.375	3 0	2 9	2,817
168	5	R5	Horiz.	E	20					9 8							9 8	9 8	1,694
14	5	R6	"	E	20					49 8							49 8	49 8	725
14	5	R7	"	E	20					46 6							46 6	46 6	679
56	5	R8	"	E	20					42 11							42 11	42 11	2,507
14	5	R9	"	E	20					49 3							49 3	49 3	719
14	5	R12	"	E	20					39 8							39 8	39 8	579

COMPLETE BILL OF REINFORCING STEEL

NO. REQD.	SIZE	MARK	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	B FT. IN.	C FT. IN.	D FT. IN.	E FT. IN.	F FT. IN.	H FT. IN.	K FT. IN.	NOMINAL LENGTH FT. IN.	ACTUAL LENGTH FT. IN.	WEIGHT LBS.
SAFETY BARRIER CURB – UNIT 3																			
950	5	R1	Vert.	E	19					2 6	0 3.5						2 10	2 8	2,642
950	5	R2	"	E	15					2 6.125	0 3.5				2 6	0 3	2 10	2 9	2,725
966	5	R3	"	E	19					0 17	0 6						1 11	1 10	1,847
966	5	R4	"	E	27						0 6	0 11.125	0 7	0 12	0 9.125	0 6.375	3 0	2 9	2,771
#168	5	R5	Horiz.	E	20					9 8							9 8	9 8	1,714
14	5	R6	"	E	20					49 8							49 8	49 8	725
56	5	R8	"	E	20					42 11							42 11	42 11	2,507
14	5	R10	"	E	20					42 6							42 6	42 6	621
14	5	R11	"	E	20					45 3							45 3	45 3	661
14	5	R12	"	E	20					39 8							39 8	39 8	579
SAFETY BARRIER CURB – WINGWALLS @ END BENT 4S																			
64	5	R1	Vert.	E	19					2 6	0 3.5						2 10	2 8	178
36	5	R2	"	E	15					2 6.125	0 3.5				2 6	0 3	2 10	2 9	103
4	5	R15	"	E	19					2 3.75	0 3.5						2 8	2 6	10
10	5	R16	Horiz.	E	20					13 5							13 5	13 5	140
2	5	R17	"	E	20					14 4							14 4	14 4	30
24	5	R18	"	E	20					5 0							5 0	5 0	125
DEADMAN ANCHOR – END BENT 1N																			
146	4	V1	Vert.		20					2 2							2 2	2 2	211
8	4	H2	Horiz.		20					36 6							36 6	36 6	195
DEADMAN ANCHOR – END BENT 4S																			
146	4	V1	Vert.		20					2 2							2 2	2 2	211
8	4	H2	Horiz.		20					36 6							36 6	36 6	195



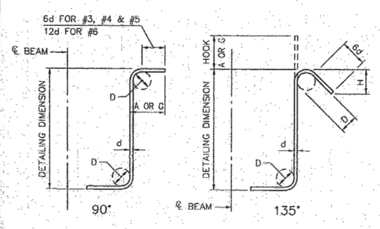
BENDING DIAGRAMS

NOMINAL LENGTHS – ARE BASED ON OUT TO OUT DIMENSIONS SHOWN IN BENDING DIAGRAMS AND ARE LISTED FOR FABRICATORS USE. (NEAREST INCH)

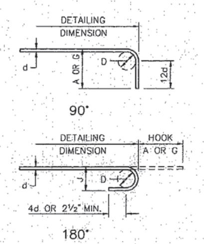
ACTUAL LENGTHS – ARE MEASURED ALONG CENTERLINE BAR TO THE NEAREST INCH.

PAYWEIGHTS ARE BASED ON ACTUAL LENGTHS.

396



STIRRUP HOOK DIMENSIONS				
GRADES 40 – 50 – 60 KSI				
BAR SIZE	D	90° HOOK	135° HOOK	
		HOOK A OR G	HOOK A OR G	APPROX. H
#3	1½"	4"	4"	2½"
#4	2"	4½"	4½"	3"
#5	2½"	6"	5½"	3¾"
#6	4½"	12"	8"	4½"



END HOOK DIMENSIONS				
BAR SIZE	D	180° HOOKS		90° HOOKS
		ALL GRADES		ALL GRADES
		A OR G	J	A OR G
#3	2¼"	5"	3"	6"
#4	3"	6"	4"	8"
#5	3¾"	7"	5"	10"
#6	4½"	8"	6"	12"
#7	5¼"	10"	7"	14"
#8	6"	11"	8"	16"
#9	9½"	15"	11¾"	19"
#10	10¾"	17"	13¼"	22"
#11	12"	19"	14¾"	2'-0"
#14	18¼"	2'-3"	21¾"	2'-7"

NOTES: ALL STANDARD HOOKS AND BENDS OTHER THAN 180 DEG. ARE TO BE BENT WITH SAME PROCEDURE AS FOR 90 DEG. STANDARD HOOKS.

HOOKS AND BENDS SHALL BE IN ACCORDANCE WITH THE PROCEDURES AS SHOWN ON THIS SHEET.

E – EPOXY COATED REINFORCEMENT.
S – STIRRUP.
V – BAR DIMENSIONS VARY IN EQUAL INCREMENTS BETWEEN DIMENSIONS SHOWN ON THIS LINE AND THE FOLLOWING LINE.
X – BAR IS INCLUDED IN SUBSTRUCTURE QUANTITIES.

NO. EACH – NUMBER OF BARS OF EACH LENGTH.

TWO ADDITIONAL BARS ARE INCLUDED IN THE BAR BILL FOR TESTING.

UNLESS OTHERWISE NOTED DIAMETER "D" IS THE SAME FOR ALL BENDS AND HOOKS ON A BAR.

C1REINF7

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: D.E.B. 4/94
CHECKED: J.K.G. 4/94

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

BILL OF REINFORCING STEEL

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

A4757

397

STATE	PROJ. NO.	SHEET NO.
MO		58
SEC./SUR. 12 TWP. 50N RGE. 32W		

"AS BUILT FOUNDATION DATA"

END BENT 1N (HP12x53)

PILE NO.	LENGTH IN PLACE (FT.)	COMPUTED BEARING (TONS)	REMARKS
1			
2			
3			
4			
5			
6			
7			

BENT 2N (HP12x53)

PILE NO.	LENGTH IN PLACE (FT.)	COMPUTED BEARING (TONS)	REMARKS
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			

BENT 3N (HP12x53)

PILE NO.	LENGTH IN PLACE (FT.)	COMPUTED BEARING (TONS)	REMARKS
26			
27			
28			
29			
30			
31			
32			
33			
34			
35			
36			
37			
38			
39			
40			
41			
42			
43			

BENT 4N (HP12x53)

PILE NO.	LENGTH IN PLACE (FT.)	COMPUTED BEARING (TONS)	REMARKS
44			
45			
46			
47			
48			
49			
50			
51			
52			

BENT 4N (CONTINUED)

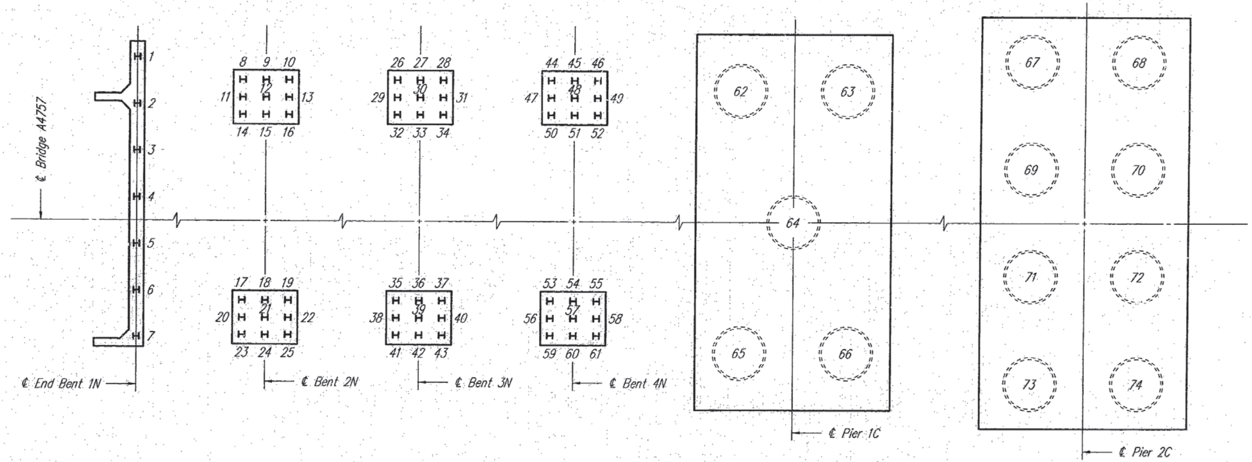
PILE NO.	LENGTH IN PLACE (FT.)	COMPUTED BEARING (TONS)	REMARKS
53			
54			
55			
56			
57			
58			
59			
60			
61			

PIER 1C

SHAFT NO.	BOTTOM OF DRILLED SHAFT (ELEV.)	BOTTOM OF ROCK SOCKET (ELEV.)	REMARKS
62			
63			
64			
65			
66			

PIER 2C

SHAFT NO.	BOTTOM OF DRILLED SHAFT (ELEV.)	BOTTOM OF ROCK SOCKET (ELEV.)	REMARKS
67			
68			
69			
70			
71			
72			
73			
74			



NOTES:
Indicate in remark column:
A.) If piling were driven to practical refusal.
B.) Pile batter if other than shown on "BENTS 2N THRU 4N" sheet.
C.) Type of piling used.

NOTE: This sheet to be completed by MHTD construction personnel.

AS BUILT FOUNDATION DATA

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: D.E.B. 5/94
CHECKED:

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

A4757

ABFD1

STATE	PROJ. NO.	SHEET NO.
MO.		59
SEC./SUR 12 TWP 50N RGE 32W		

"AS BUILT PILE" DATA

PIER 3C (HP14x117)

PILE NO.	LENGTH IN PLACE (FT.)	COMPUTED BEARING (TONS)	REMARKS
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			
101			

BENT 1S (HP12x53)

PILE NO.	LENGTH IN PLACE (FT.)	COMPUTED BEARING (TONS)	REMARKS
102			
103			
104			
105			
106			
107			
108			

BENT 1S (CONTINUED)

PILE NO.	LENGTH IN PLACE (FT.)	COMPUTED BEARING (TONS)	REMARKS
109			
110			
111			
112			
113			
114			
115			
116			
117			
118			
119			

BENT 2S (HP12x53)

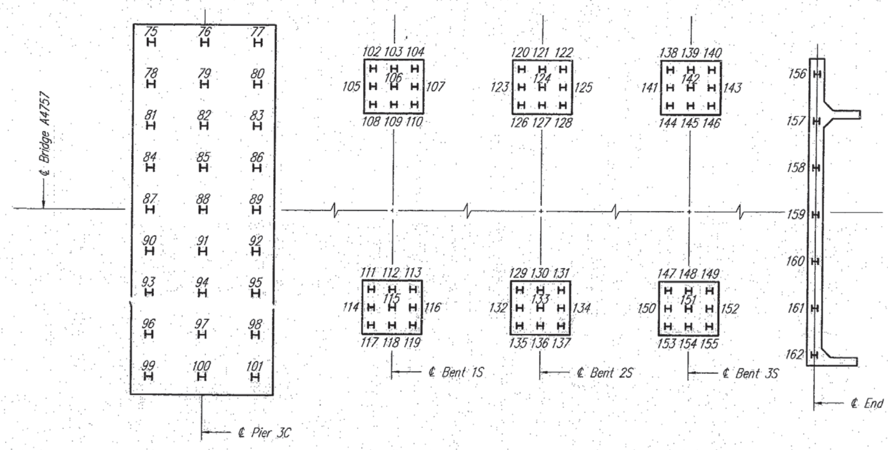
PILE NO.	LENGTH IN PLACE (FT.)	COMPUTED BEARING (TONS)	REMARKS
120			
121			
122			
123			
124			
125			
126			
127			
128			
129			
130			
131			
132			
133			
134			
135			
136			
137			

BENT 3S (HP12x53)

PILE NO.	LENGTH IN PLACE (FT.)	COMPUTED BEARING (TONS)	REMARKS
138			
139			
140			
141			
142			
143			
144			
145			
146			
147			
148			
149			
150			
151			
152			
153			
154			
155			

END BENT 4S (HP12x53)

PILE NO.	LENGTH IN PLACE (FT.)	COMPUTED BEARING (TONS)	REMARKS
156			
157			
158			
159			
160			
161			
162			



NOTES:
Indicate in remark column:
A.) If piling were driven to practical refusal.
B.) Pile batter if other than shown on "PIER 3C - FOUNDATION DETAILS" and "BENTS 1S THRU 3S" sheets.
C.) Type of piling used.

NOTE: This sheet to be completed by MHTD construction personnel.

AS BUILT FOUNDATION DATA
ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

359

ABF02

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: D.E.B. 5/94
CHECKED:

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

A4757

REVISED JAN. 1, 1995

STATE	JOB NO.	SHEET NO.
MO	J4UØ564C	6Ø
DIST NO.	PROJECT NO.	ROUTE
4	COUNTY Jackson	291

MISSOURI HIGHWAY AND TRANSPORTATION COMMISSION

STANDARD PLANS

✓	NO.	DESCRIPTION
	203.00E	EXCAVATION & EMBANKMENT
	203.02C	UNDERGRADING
	203.10B	TABULATED EARTHWORK & SECTION DATA
	203.20B	SUPERELEVATION SPIRALS & WIDENING (UNDIVIDED)
	203.21B	SUPERELEVATION SPIRALS & WIDENING (DIVIDED)
	203.35A	MAILBOX TURNOUTS
	203.40F	TYPICAL DETAILS-RAMPS FOR INTERCHANGES (OTHER THAN 6:1
		FORESLOPE) *
	203.41F	TYPICAL DETAILS-RAMPS FOR INTERCHANGES (6:1 FORESLOPE) *
	203.50J	TYPICAL CROSS-OVERS (DIVIDED HIGHWAYS)
	203.61	DRIVEWAY TYPE I
	203.62	DRIVEWAY TYPE II
	203.63	DRIVEWAY TYPE III
	203.64	DRIVEWAY TYPE IV
	203.65	DRIVEWAY TYPE V
	204.00D	EMBANKMENT CONTROL MEASURING DEVICES
	502.00P	CONCRETE PAVEMENT & BASE APPURTENANCES (2 SHEETS) *
	502.05	CONCRETE PAVEMENT & BASE APPURTENANCES, 15 FT. JOINT SPACING (2 SHEETS)
	502.10F	DOWEL SUPPORTING UNITS
✓	504.00A	CONCRETE APPROACH PAVEMENT (2 SHEETS)
	602.00A	RIGHT-OF-WAY & DRAIN MARKERS
	604.05B	PIPE CULVERT HEADWALLS - TYPE S
	604.10B	HEADWALL-WITH ENERGY DISSIPATOR - 18"
	604.11B	HEADWALL-WITH ENERGY DISSIPATOR - 24"
	604.12B	HEADWALL-WITH ENERGY DISSIPATOR - 30"
	604.13B	HEADWALL-WITH ENERGY DISSIPATOR - 36"
	604.14B	HEADWALL-WITH ENERGY DISSIPATOR - 42"
	604.15B	HEADWALL-WITH ENERGY DISSIPATOR - 48"
	604.20B	DROP INLET - TYPE B
	604.21B	DROP INLET - TYPE C
	604.22B	DROP INLET - TYPE D
	604.23B	DROP INLET - TYPE E
	604.24B	DROP INLET - TYPE EE
	604.25C	DROP INLET - TYPE F
	604.26D	DROP INLET - TYPE G
	604.27D	DROP INLET - TYPE S (3 SHEETS)
	604.28E	DROP INLET - TYPE T (ALSO INCLUDE 614.30)
	604.29C	DROP INLET - TYPE X
	604.30F	CONCRETE MANHOLES (ALSO INCLUDE 614.30)
	604.40E	PIPE COLLARS
	604.70	SLOTTED DRAIN (2 SHEETS)
✓	605.10A	CLASS A UNDERDRAINS
	606.00AA	GUARD RAIL (6 SHEETS) *
	606.22L	BRIDGE ANCHOR SECTION (SAFETY BARRIER CURB ON BRIDGE) *
		(ALSO INCLUDE 606.00)
	606.23C	BRIDGE ANCHOR SECTION (THRIE BEAM RAIL ON BRIDGE)(ALSO
		INCLUDE 606.00)
	606.30E	TERMINAL SECTION (ALSO INCLUDE 606.00)
	606.40A	GUARD CABLE
	607.10R	CHAIN LINK FENCE
	607.11B	CHAIN LINK FENCE FOR RETAINING WALLS
	607.20F	WOVEN WIRE FENCE (ALSO INCLUDE 607.10)

322

✓	NO.	DESCRIPTION
	608.00C	PAVED APPROACHES
	608.10G	CONCRETE SIDEWALK & WHEELCHAIR RAMPS
	608.20D	CONCRETE STEPS
✓	609.00G	CONCRETE CURB - CURB & GUTTER - GUTTER
	609.15C	PAVED DITCHES
	609.40F	DRAIN BASIN, SHLD. PAVE. & FILL SL. AT BR. ENDS (2 SHEETS)
	609.60C	ROCK DITCH LINER
	609.70C	ROCK LINING FOR CULVERT OUTLETS
	610.20E	BRICK MANHOLES (ALSO INCLUDE 614.30)
	611.60L	CONCRETE SLOPE PROTECTION
	612.10K	BARRICADES AND FLASHER SIGNS
	613.00B	PAVEMENT REPAIR
	614.10R	CURB INLETS, GRATES & BEARING PLATES
	614.30D	MANHOLE FRAMES & COVERS
	615.00A	OFFICE FOR ENGINEER
✓	616.10R	TRAFFIC CONTROL DEVICES (4 SHEETS)(ALSO INCLUDE 903.01) *
	617.00Z	CONCRETE TRAFFIC BARRIER (3 SHEETS) *
	702.01F	16" CONCRETE PILES (APPROVED TYPES)(2 SHEETS)
	702.02C	CAST-IN-PLACE CONCRETE PILES (APPROVED TYPES)
	703.21E	CONCRETE BOX CULVERTS, H20 LOADING (3 SHEETS)(FLARED
		WINGS)(INCL 706.35)
	703.24E	CONCRETE BOX CULVERTS, SKEW DATA (703.30)(INCL 706.35)
	703.25E	CONCRETE BOX CULVERTS, SKEW DATA (703.21)(3 SHTS)
		(FLRD WINGS)(INCL 706.35)
	703.30F	CONCRETE BOX CULVERTS, 4' SPANS & LESS-ALL LOADING
		(INCL 706.35)
	703.35C	CONCRETE BOX CULVERTS, CUTTING DETAILS (STRAIGHT WINGS)
		(INCL 706.35) *
	703.36B	CONCRETE BOX CULVERTS, CUTTING DETAILS (FLARED WINGS)
		(INCL 706.35) *
	703.50H	CONCRETE DOUBLE BOX STRUCTURE-SQUARE (INCL 706.35)
	703.51G	CONCRETE DOUBLE BOX STRUCTURE-SKEWED (INCL 706.35)
	703.52D	CONCRETE DOUBLE BOX STRUCTURE-CUT SECTIONS (INCL 706.35)
	703.54E	DOUBLE BOX STRUCTURE REINFORCEMENT-H20 OR HS20 LOADING
		(8 SHEETS)
	703.55E	CONCRETE DOUBLE BOX STRUCTURE (FLARED WINGS) SQUARE
		(INCL 706.35)
	703.56E	CONCRETE DOUBLE BOX STRUCTURE (FLARED WINGS) SKEWED
		(INCL 706.35)
	703.60C	CONCRETE BOX STRUCTURE-PIPE INLET
	703.70D	CONCRETE TRIPLE BOX STRUCTURE-SQUARE (2 SHEETS)
		(INCL 706.35)
	703.71D	CONCRETE TRIPLE BOX STRUCTURE-SKEWED (2 SHEETS)
		(INCL 706.35)
	703.72D	CONCRETE TRIPLE BOX STRUCTURE-(FLARED WINGS)(SQUARE)
		(2 SHEETS)(INCL 706.35)
	703.73D	CONCRETE TRIPLE BOX STRUCTURE-(FLARED WINGS)(SKEWED)
		(2 SHEETS)(INCL 706.35)
	703.74D	CONCRETE TRIPLE BOX STRUCTURE-CUT SECTIONS (INCL
		706.35)
	703.76B	CONCRETE TRIPLE BOX STRUCTURE REINFORCEMENT-H20 OR HS20
		LOADING (5 SHEETS)
	706.30E	REINFORCING BAR SUPPORTS
✓	706.35E	BAR SUPPORTS FOR CONCRETE REINFORCEMENT
	712.40E	STEEL DAMS FOR BRIDGES (6" CHANNEL)
	725.31C	METAL CURTAIN WALL AND METAL INLETS
	726.30C	CULVERT INSTALLATION METHODS
	731.00S	PRECAST MANHOLES (ALSO INCL 614.30)
	731.10K	PRECAST DROP INLETS (4 SHTS)(ALSO INCL 614.30 & 614.10)

✓	NO.	DESCRIPTION
	732.00L	FLARED END SECTION (2 SHEETS)
	732.10A	SAFETY SLOPE END SECTIONS (2 SHEETS)
	806.02A	STAPLE PLACEMENT FOR PLASTIC NETTING
		HIGHWAY LIGHTING
	901.00P	POLES & APPURTENANCES-30' (3 SHEETS)
	901.01U	POLES & APPURTENANCES-45' (3 SHEETS)
	901.05A	CONTROL PANEL CABINET DETAILS (2 SHEETS)(SEE NOTE)
	901.12C	POLE MOUNT CONT STA-SECONDARY SERV-480 V MULTI CIR (NOT
		METERED)
	901.15E	POLE MOUNT CONT STA-SEC SERV-120,240, & 480 V MULTI CIR
	901.16D	POLE MOUNT CONT STA-SEC SERV-480 V MULTI CIR (METERED)
	901.18D	POLE MOUNT CONT STA-SEC SERV-120/240 V MULTI CIR
	901.19D	POLE MOUNT CONT STA-SEC SERV-240 V MULTI CIR (NOT
		METERED)
	901.20D	POLE MOUNT CONT STA-SEC SERV-120/240 V MULTI CIR (SIG
		METERED)
	901.22E	POLE MOUNT CONT STA-SEC SERV-120/240 & 480 V MULTI CIR
		(BOTH METERED)
	901.23E	POLE MOUNT CONT STA-SEC SERV-240 V MULTI CIR (METERED)
	901.24D	POLE MOUNT CONT STA-SEC SERV-240 V MULTI CIR (LIGHTS &
		SIGNALS-BOTH METERED)
	901.25D	BASE MOUNT CONT STA-SEC SERV-120/240 V MULTI CIR
		NOTE: ALSO INCLUDE 901.05 WITH 901.12 THROUGH 901.25 EXCEPT 901.18
		TRAFFIC SIGNALS
	902.00F	SIGNAL HEADS, LENSES AND MOUNTING
	902.10J	PULL BOXES, CONTROLLERS, COND LOCATION
	902.15D	POWER SUPPLY ASSEMBLY
	902.21B	TELEPHONE INTERCONNECT
	902.30H	CONCRETE BASES
	902.40J	TUBULAR STEEL POST
	902.50H	DETECTORS *
	902.60F	SPAN WIRE DETAILS-STEEL POST
	902.70D	SPAN WIRE DETAILS-WOOD POLE
	902.80A	TRAFFIC SIGNAL SYMBOLS
		HIGHWAY SIGNING
✓	903.01C	ALPHABETS (2 SHEETS)
	903.02Z	HIGHWAY SIGNING (8 SHEETS) *
	903.03AQ	SIGN MOUNTING DETAILS (5 SHEETS) *
	903.04D	WEIGH STATION SIGNING
	903.05C	TUBULAR SPAN SUPPORT-ONE TUBE, TYPE S
	903.06C	TUBULAR SPAN SUPPORT-TWO TUBE, TYPE S
	903.07C	TUBULAR CANTILEVER SUPPORTS, TYPE C
	903.08C	TUBULAR BUTTERFLY SUPPORTS, TYPE B
	903.09D	LIGHTING SUPPORT BRACKET
	903.10T	SIGN TRUSSES-OVERHEAD ALUMINUM (8 SHEETS)(INCL 903.03)
	903.12N	SIGN TRUSSES-BUTTERFLY & CANTILEVER-STEEL (7 SHEETS)
		(INCL 903.03)
	903.60S	SIGN TRUSSES-OVERHEAD STEEL (7 SHEETS)(INCL 903.03)

NOTES:
PLANS FOR THIS PROJECT WERE DEVELOPED USING DRAWINGS FROM THIS INDEX

* REVISED OR NEW SINCE MARCH 1, 1994.

STATE	PROJ. NO.	SHEET NO.
MO		
SEC./SUR 12 TWP 50N RGE 32W		

MISSOURI HIGHWAY AND TRANSPORTATION COMMISSION

ROUTE 291 MISSOURI RIVER BRIDGE

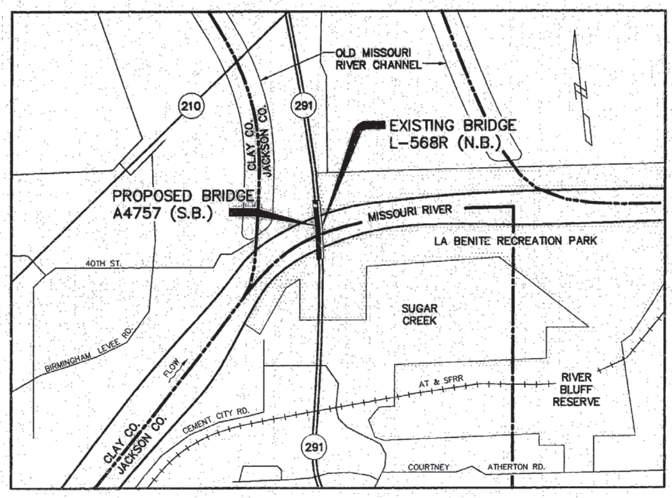
JACKSON COUNTY

CONTRACT 2

TRUSS SUPERSTRUCTURE STEEL

1993

INDEX OF SHEETS



LOCATION SKETCH

INDEX OF SHEETS

503

STATE OF MISSOURI
KEVIN R. EISENBEIS
NUMBER E-20946
REGISTERED PROFESSIONAL ENGINEER

SUBMITTED BY: Kevin R. Eisenbeis
REGISTERED PROFESSIONAL ENGINEER
MISSOURI MO. E-20946

BRIDGE OVER MISSOURI RIVER

IN JACKSON COUNTY, MISSOURI
PROJECT NO.
JOB NO. J4U0564D
JACKSON

STA. 99+52.92
RTE. 291
COUNTY

STD.
STD.
A4757

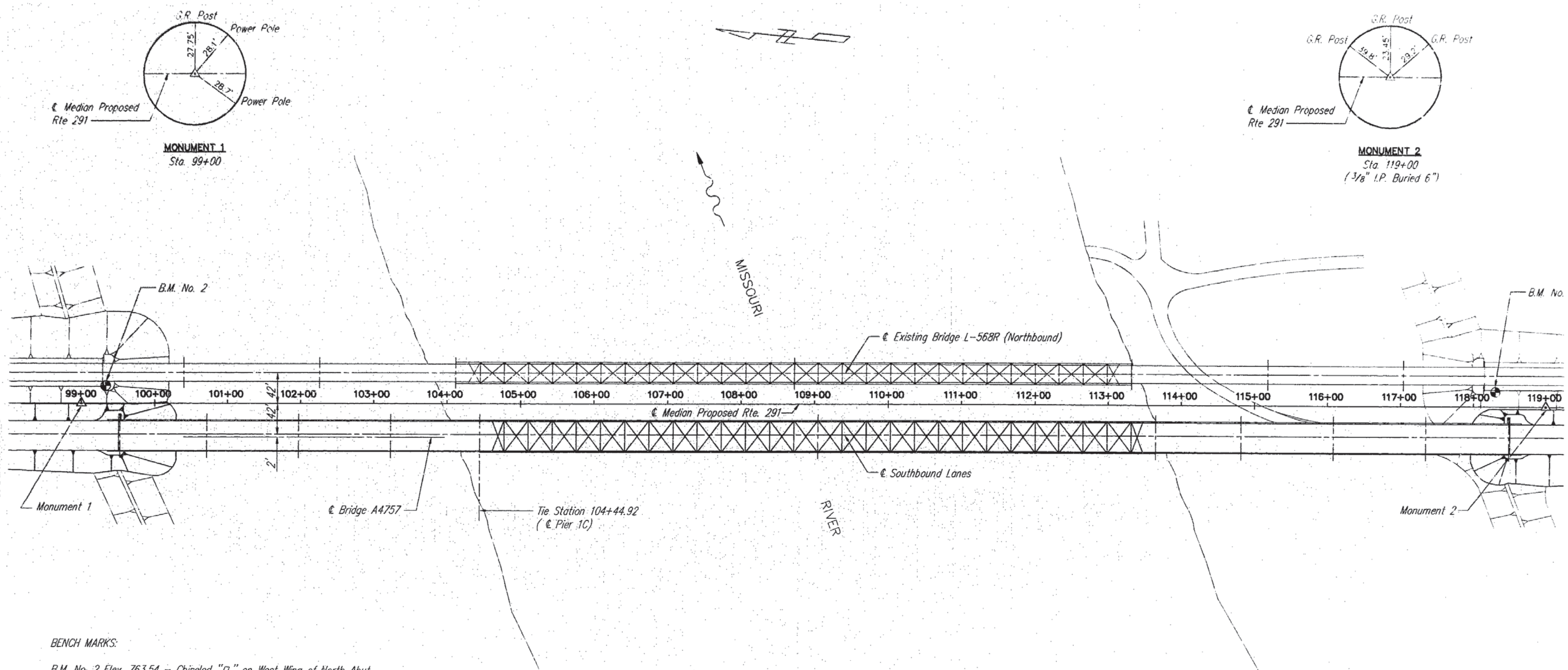
DATE 9/8/95

291COVC2

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.L.K. 03/93
CHECKED: K.R.E. 09/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.



BENCH MARKS:

B.M. No. 2 Elev. 763.54 – Chiseled "□" on West Wing of North Abut. of Missouri River Bridge L-568R 24' Lt. ℄ Med. Sta. 99+33 ±.

B.M. No. 5 Elev. 763.45 – USC&G B.M. Disk Stamped U-218 Quad 390942 20'± Lt. ℄ Med. Sta. 118+30 ±.

NOTE:

The Monuments shown on this drawing shall be used for stationing and alignment of the bridge.

509

SURVEY TIES & ALIGNMENT DIAGRAM

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

ALIGN-C2

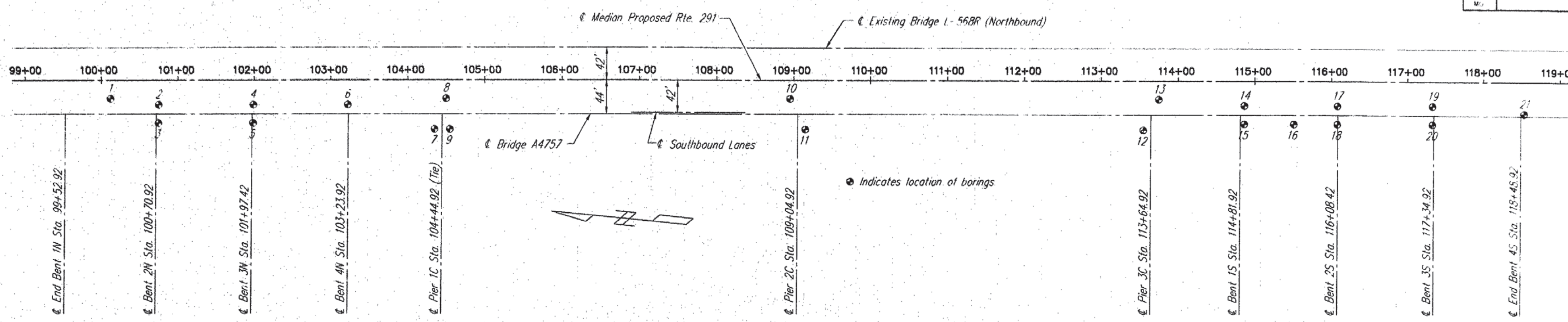
HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: B.T.K. 02/93
CHECKED: K.R.E. 09/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 2 OF 33

A4757



BORING LOG LOCATIONS

DEPTH Ft.	ELEV.	
0.0'	728.9	
5.0'	723.9	Cobbles to boulders, (riprap).
		Fine to coarse sand.
80.0'	648.9	
		Coarse sand with scattered gravel.
103.5'	625.4	
106.8'	622.1	Hard shale.

1
100+12
20' Lt.
9/5/90

DEPTH Ft.	ELEV.	
0.0'	723.4	
1.0'	722.4	Cobbles to gravel, fill.
6.0'	717.4	Dark brown sandy silty clay.
20.0'	703.4	Brown fine silty sand.
32.5'	690.9	Fine to medium grained sand, wet.
74.6'	648.8	Medium to coarse sand, clean, wet.
85.0'	638.4	Medium to coarse sand, clean, wet with scattered gravel layers.
97.0'	626.4	Coarse clean sand, wet with gravel layers.
97.8'	625.6	Shale, slightly weathered.
102.0'	621.4	Hard shale.

2
100+75
12' Lt.
9/5/90

DEPTH Ft.	BLOWS 6"	POCKET PEN. tsf	ELEV.	
0.0'			723.1	
5.0'	9-13-16	2.0-3.0	718.1	Brown clayey sand, wet, stiff.
7.5'			715.6	
10.0'	10-14-18		713.1	Brown, fine to medium sand, round, dense, some lignite.
15.0'	9-13-12		708.1	
20.0'	6-5-5		703.1	
22.5'			700.6	
25.0'	3-3-4		698.1	Brown, medium to coarse sand, rounded, loose.
27.5'			695.6	
30.0'	20-25-21		693.1	Gray fine sand, rounded, dense to very dense, some lignite.
35.0'	9-7-5		688.1	
35.5'			687.6	
40.0'	6-6-5		683.1	Gray medium sand, rounded medium dense, some lignite, gray clay seam @ 49.5'-51.0'
45.0'	6-8-9		678.1	
50.0'	12-6-18		673.1	
51.0'			672.1	
55.0'	17-27-34		668.1	Gray fine sand, rounded, clean, very dense.
60.0'	14-19-22		663.1	
63.5'			659.6	
70.0'	13-15-10		653.1	Gray coarse sand with some fine gravel, medium dense.
85.0'	19-34-51		638.1	
86.6'			636.5	
87.2'			635.9	Boulder.
92.2'			630.9	Sand.
92.4'	100 in 5"	6.0-8.0	630.7	Gray areneceous silty shale.
97.5'	100 in 5.5"	9+	625.6	
100.8'			622.3	
102.5'			620.6	Limestone.

3
100+75
12' Rt.
10/4/90

DEPTH Ft.	BLOWS 6"	POCKET PEN. tsf	ELEV.	
0.0'			723.1	
2.0'			721.1	Limestone cobbles to gravel, fill.
5.0'	2-3-5	2.0	718.1	Dark brown sandy silty clay, stiff, moist.
7.5'			715.6	
10.0'	6-7-8		713.1	Brown fine silty sand, loose with some scattered clayey sand pockets, wet from 12.5'±
15.0'	4-3-3		708.1	
20.0'	3-3-5		703.1	
22.5'			700.6	
25.0'	8-5-7		698.1	Medium to coarse sand wet, loose to medium dense, clean.
30.0'	8-11-16		693.1	
32.5'			690.6	
35.0'	7-10-10		688.1	Fine to medium sand, medium dense, clean.
40.0'	6-6-7		683.1	
45.0'	9-11-21		678.1	
48.5'			674.6	
50.0'	13-15-11		673.1	Medium to coarse sand clean, rounded, scattered gravel.
55.0'	9-19-25		668.1	
55.5'			667.6	
60.0'	21-26-22		663.1	Fine to medium sand, clean, rounded, some fine gravel throughout.
68.5'			654.6	
70.0'	10-8-9		653.1	Coarse sand, clean, rounded, scattered cobbles with boulder at 73.0'-82.0', more abundant at 92.7'-95.2'.
80.0'	9-10-13		643.1	
85.0'	25-24-21		638.1	
95.0'	100 in 6"		628.1	
95.2'			627.9	
100.0'	100 in 6"		623.1	Gray silty shale, dry very hard.
102.5'			620.6	
104.2'			618.9	Gray shaley limestones, hard.
105.0'			618.1	Gray silty shale, dry, hard.

4
101+99
12' Lt.
9/6/90

NOTICE AND DISCLAIMER REGARDING BORING LOG DATA

The locations of all subsurface borings for this structure are shown in the Boring Log Locations above. Boring data for the numbered locations is shown on this and the following three sheets. The boring data for all locations indicated, as well as any other boring logs or other factual records of sub-surface data and investigations performed by the department for the design of the project, is available from the district materials engineer upon written request as outlined in the project special provisions. No greater significance or weight should be given to the boring data depicted on the plan sheets than to sub-surface data available from the district or elsewhere.

The commission does not represent or warrant that any such boring data accurately depicts the conditions to be encountered in constructing this project. A contractor assumes all risks it may encounter in basing its bid prices, time or schedule of performance on the boring data depicted here or those available from the district, or on any other documentation not expressly warranted, which the contractor may obtain from the commission.

DEPTH Ft.	ELEV.	
0.0'	723.4	
0.4'	723.0	Cobble, fill.
12.5'	710.9	Dark brown silty clay to clay.
30.0'	693.4	Sandy silt, wet.
74.8'	648.6	Medium sand.
75.9'	647.5	Gravel to scattered boulders with coarse sand.
96.7'	626.7	Coarse sand with some scattered gravel.
98.4'	625.0	Shale, hard.

5
101+99
12' Rt.
9/5/90

BORING LOG LOCATIONS AND BORING LOGS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

505

BOLOC-C2

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: T.L.W. 2/93
CHECKED: E.W.N. 2/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

A4757

DEPTH Ft	BLOWS 6"	POCKET PEN. tsf	ELEV	
0.0'			723.7	
5.0'	3-4	.5-1.0	718.7	Brown sandy silt, moist, medium stiff.
6.0'			717.7	
10.0'	2-3-3	.5-1.0	713.7	Brown silty clay, moist, medium stiff.
11.0'			712.7	
# 15.0'	3-3-3	.5	708.7	Gray silty sand, wet soft to medium stiff.
20.0'	2-2-2	.5	703.7	
23.5'			700.2	
25.0'	5-6-9		698.7	Gray fine sand, slightly silty, wet, medium dense
30.0'	3-5-8		693.7	
35.0'	10-13-13		688.7	
37.5'			686.2	
40.0'	8-10-11		683.7	Medium grained sand rounded, dense with scattered coarse rounded gravel.
45.0'	13-20-29		678.7	
50.0'	9-14-11		673.7	
55.0'	15-20-14		668.7	
57.5'			666.2	
60.0'	16-32-47		663.7	Fine to medium grained sand, rounded, very dense.
70.0'	12-18-27		653.7	
74.7'			649.0	
80.0'	11-24-76 in 3"		643.7	Medium grained sand, rounded, scattered cobbles with boulders.
82.5'			641.2	
85.0'	100 in 2.5"	7.5	638.7	Gray shale, hard, dry.
90.0'	100 in 3"	8.0-9+	633.7	
95.0'	100 in 4"	8.0-9+	628.7	
105.0'			618.7	

Water Elev. as of 8/30/90

6
103+22
12' Lt.
8/28-29/90

DEPTH Ft.	BLOWS 6"	POCKET PEN tsf	ASTM CLASS	ELEV.	
0.0'				723.6	
5.0'	6-5-4	1.0	ML	718.6	Brown sandy silt with sand layers, moist, medium stiff.
10.0'	2-2-2	1.0	ML	713.6	
12.5'				711.1	
15.0'	3-1-2		ML	708.6	Dark gray silty fine sand, wet, soft to medium stiff.
20.0'	1-1-3		CL-ML	703.6	
25.0'	2-2-5		SM	698.6	
30.0'	5-12-15		SM	693.6	
30.5'				693.1	
35.0'	7-9-11		SP-SM	688.6	Gray fine sand, rounded, clean, medium dense to dense.
40.0'	7-8-7		SW	683.6	
44.5'				679.0	
45.0'	6-9-8		SW	678.6	Medium sand, medium dense clean, scattered rounded gravel.
50.0'	10-13-19		SW-SM	673.6	
55.0'	9-9-8		SW	668.6	
60.0'	10-17-13		SW	663.6	
65.0'	15-14-15		SW	658.6	
70.0'	8-11-15		SW	653.6	
74.5'				649.1	
75.0'	19-18-15		SW	648.6	Medium to coarse grained sand, rounded, dense, abundant cobbles with boulders.
80.0'	17-29-22		SW	643.6	
80.1'				643.5	
85.0'	11-21-79		SP	638.6	Fine grained sand, very dense, clean, rounded.
86.0'				637.6	
102.9'				620.8	Gray silty shale, dry, very hard, calcareous.
104.5'				619.1	Argillaceous limestone hard, fossiliferous, medium bedded.
108.6'				615.0	Gray silty, calcareous shale, hard.
110.9'				612.7	Argillaceous limestone, hard.
113.8'				609.8	Gray silty shale, hard.
117.7'				605.9	Argillaceous limestone to limestone, hard, medium to thick bedded.
119.8'				603.8	Dark gray shale.

7
104+35
20' Rt.
8/28/90

DEPTH Ft	ELEV	
0.0'	721.8	
18.0'	703.8	Brown sandy silt.
29.5'	692.3	Gray silty sand, wet and loose.
47.5'	674.3	Sand.
52.5'	669.3	Gravel in sand.
74.6'	647.2	Medium sand with some scattered gravel.
77.0'	644.8	Gravel to cobbles.
85.5'	636.3	Packed sand.
89.5'	632.3	Shale, slightly weathered.
92.5'	629.3	Hard shale.

9
104+55
20' Rt.
9/5/90

DEPTH Ft.	BLOWS 6"	POCKET PEN. tsf	ELEV.	
0.0'			712.4	Elevation of deck.
4.4'			708.0	Barge.
18.0'			694.4	Water.
35.7'			676.7	Light brown and black sand, fine to medium grained, loose.
66.3'			646.1	Light brown to black medium grained sand with scattered gravel, loose coarse grained, some lignite at 51.5'.
88.1'			624.3	Brown and black, medium to coarse grained sand with scattered fine gravel, lignite becoming more abundant at 82.0'.
89.1'			623.3	Gray limestone, thin bedded with shale layers, hard.
91.1'			621.3	Dark gray clayey shale, hard.
93.6'	100 in 3"	9.5+	618.8	Gray clay shale.
94.8'			617.6	Gray shaley limestone, medium bedded, hard.
99.5'			612.9	Dark gray hard calcareous shale, clayey.
103.8'			608.6	Light gray shaley limestone, thick bedded, moderately hard.
104.8'			607.6	Gray clayey shale.
106.2'			606.2	Dark gray to green calcareous shale, clayey, soft, thinly laminated.
107.2'			605.2	Light gray to dark gray shaley limestone, medium hard to moderately hard, medium bedded.
108.2'			604.2	Dark gray calcareous shale, clayey, soft.
108.8'			603.6	Gray shaley limestone, medium bedded.
110.1'			602.3	Dark gray silty shale, hard to very hard, non-calcareous.
111.8'			600.6	Light gray, silty shale, calcareous, moderately hard to hard, with some limestone stringers.
112.4'			600.0	Light gray limestone with shale on bedding and fracture planes.
113.8'	100 in 1.5"	9.5+	598.6	Gray to green silty shale with scattered limestone stringers, dry.
113.9'			598.5	Dark gray silty shale hard.
114.2'			598.2	Brown limestone, hard fine grained.
115.3'			597.1	Dark gray silty shale moderately hard to hard.
118.9'			593.5	Medium to light gray silty shale, slightly calcareous, moderately hard to hard.
119.0'			593.4	Light brown argillaceous limestone, hard to very hard.

10
108+95
20' Lt.
10/2/90

DEPTH Ft	BLOWS 6"	POCKET PEN tsf	ASTM CLASS	ELEV	
0.0'				712.4	Elevation of deck.
4.4'				708.0	Barge.
17.0'				695.4	Water.
30.0'	8-7-8		SP	682.4	Sand, fine to medium grained, loose, clean.
35.0'	7-6-7		SP	677.4	
37.5'				674.9	
40.0'	14-16-14		SP	672.4	Fine sand, medium dense, clean.
42.5'				669.9	
45.0'	11-10-11		SP	667.4	Fine to coarse sand, medium dense to loose, clean with some lignite pockets.
50.0'	10-6-8		SW	662.4	
55.0'	15-15-13		SW	657.4	
60.0'	15-10-12		SW	652.4	
65.0'	11-14-9		SP	647.4	
70.0'	9-10-12		SW	642.4	
72.5'				639.9	
75.0'	21-35-43		SP-SM	637.4	Fine sand, medium dense to dense. with trace lignite.
80.0'	15-11-12		SP	632.4	
85.0'	8-16-24		SW-SM	627.4	
88.1'				624.3	
89.2'				623.2	Gray shaly limestone, hard. thin bedded.
92.1'				620.3	Dark gray silty shale, thinly laminated, very hard.
93.4'	70-30 in 1"	9+		619.0	Gray silty shale, thinly laminated, moderately hard.
95.2'				617.2	Gray shaly limestone, thick bedded, very hard.
99.0'				613.4	Gray silty shale, thinly laminated, hard.
104.2'				608.2	Light gray shaly limestone, thick bedded, very hard.
108.0'	100 in 1.5"			604.4	Dark gray silty shale, thinly laminated, moderately hard with some hard calcareous shale stringers @ 111.4' to 112.6' & 114.0' to 114.8'.
118.2'				594.2	

11
109+15
20' Rt.
10/2-3/90

DEPTH Ft.	ELEV.	
0.0'	711.3	
4.5'	706.8	Brown sandy silt, wet, soft, P.A.W.T. 0-4.5.
33.5'	677.8	Medium to coarse grained sand, medium dense.
74.0'	637.3	Fine to medium grained sand, medium dense.
96.1'	615.2	Coarse grained sand, rounded dense, heavy cobbles from 94.0' - 96.0'.
98.5'	612.8	Gray shale, dry, hard.

12
113+55
20' Rt.
8/30/90

DEPTH Ft.	ELEV.	
0.0'	714.4	
3.8'	710.6	Brown sandy silt, dry, soft.
12.5'	701.9	Brown sand, dry, medium, stiff.
45.0'	669.4	Gray fine sand, wet, dense scattered cobbles @ 52'.
83.1'	631.3	Gray course sand, wet, dense.
84.0'	630.4	Gray shale, dry, hard.

8
104+50
20' Lt.
9/5/90

Note:
P.A.W.T. = Pushed Augers Without Turning.

CORING LOG
(NX Double Tube Barrel)

	FROM	TO	RUN	REC	LOSS	% RQD	NOTES
BORING 7	87.0	92.0	5.0	5.0	0.0		
	92.0	97.0	5.0	5.0	0.0		
	97.0	100.3	3.3	3.3	0.0		
	100.3	105.0	4.7	5.0	+0.3	100	*
	105.0	109.8	4.8	5.0	+0.2		
	109.8	114.8	5.0	4.2	0.8	98	*
	114.8	119.8	5.0	5.0	0.0		
BORING 10	88.6	93.6	5.0	4.5	0.5		
	93.8	98.8	5.0	5.0	0.0	52	*
	98.8	103.8	5.0	5.0	0.0	100	*
	103.8	108.8	5.0	4.4	0.6		
	108.8	113.8	5.0	4.8	0.2		
	114.0	119.0	5.0	5.0	0.0		
BORING 11	88.4	93.4	5.0	5.0	0.0		
	94.0	99.0	5.0	4.1	0.9		**
	99.0	103.0	4.0	4.0	0.0	100	
	103.0	108.0	5.0	4.9	0.1		
	108.2	113.2	5.0	5.0	0.0		
	113.2	118.2	5.0	4.2	0.8		

* Limestone portion of core only.
** Loss in core probably due to shale core falling out of barrel.

UNCONFINED COMPRESSIVE STRENGTH TEST DATA

	DEPTH, FT.	Qu., tsf.
BORING 7	88.0	36.9
	94.0	17.0
	100.0	2.83
	[illegible]	[illegible]
	107.0	4.66
	113.0	32.30
BORING 10	92.0	1.33
	95.0	14.70
	101.0	813.0
	104.3	18.70
	109.0	49.64
	116.0	13.60
BORING 11	92.0	4.95
	97.0	19.60
	101.0	506.0
	106.0	18.82
	117.0	8.90

NOTE:
Test results for Pocket Pen is 9+ TSF for all depths at each boring.

Note: For location of Borings, see Sheet 3 of 33.

STATE	PROJ. NO.	SHEET NO.
MO		

506

BOR-1-C2

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: T.L.W. 2/93
CHECKED: E.W.N. 2/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

BORING LOGS

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

A4757

507

Boring 13
113+75
20' Lt.
9/20/90

DEPTH Ft.	BLOWS 6"	POCKET PEN. tsf	ASTM CLASS	ELEV.	DESCRIPTION
0.0'				725.7	
5.0'	3-5-6	2.25	CH	720.7	Light brown to gray sand clayey silt.
7.5'				718.2	
10.0'	2-3-6		CL	715.7	Light brown to gray silty fine sand, moist to dry with limonite strains.
14.5'				711.2	
15.0'	2-1-1	0.25-0.5	CL	710.7	Gray clay, very soft to soft, trace sand.
16.5'				709.2	
18.1'	9/30/90	▼	Water Elev.	707.6	Medium to coarse sand medium dense, trace silt to 22.5'.
20.0'	10-12-11		SC	705.7	
25.0'	9-15-15		SP	700.7	
27.5'				698.2	
30.0'	9-24-24		SP	695.7	Fine to medium sand; medium dense, loose from 32.5' to 42.5' then medium dense with some gravel layers from 48.0' with abundant lignite from 62.5' to 72.5'.
35.0'	7-8-9		SP-SM	690.7	
40.0'	9-7-8		SP-SM	685.7	
45.0'	19-15-10		SP-SM	680.7	
50.0'	21-25-25		SP-SM	675.7	
55.0'	14-18-17		SW-SM	670.7	
60.0'	17-21-25		SW-SM	665.7	
65.0'	10-12-17		SW-SM	660.7	
70.0'	14-12-11		SW	655.7	
72.5'				653.2	
75.0'	22-24-25		SW-SM	650.7	Fine to medium grained sand, medium dense with some lignite, and some gravel.
80.0'	15-13-13		SP-SM	645.7	
85.0'	15-14-12		SW	640.7	
87.0'				638.7	
88.4'				637.3	Heavy cobbles to boulders.
90.0'	16-12-16		SP	635.7	Medium to coarse sand with some gravel.
95.0'	13-12-11		SW	630.7	
100.0'	12-12-12		SW-SM	625.7	
105.0'	28-28-41		SW	620.7	
106.7'				619.0	
109.5'				616.2	Hard shale with limestone stringers.
110.6'				615.1	Gray clay shale.
111.9'				613.8	Gray calcareous shale, dry, hard.
115.6'				610.1	Gray slightly argillaceous limestone, medium grained, medium bedded, hard fossiliferous black from 115.2' to 115.6'.
116.2'				609.5	Gray calcareous shale very stiff to hard.
117.5'				608.2	Dark gray shale, hard.
118.7'				607.0	Light gray limestone, hard medium grained slightly argillaceous.
120.4'				605.3	Light gray argillaceous limestone to gray calcareous shale moderately soft to hard.
123.1'				602.6	Light gray limestone, hard, fine grained, medium bedded. argilloceous to 120.8'.
125.9'				599.8	Green gray argillaceous limestone, moderately hard.
130.4'				595.3	Dark gray shale, hard.
134.3'				591.4	Gray crystalline limestone very hard, thick bedded.
135.4'				590.3	Gray shale, hard.
137.9'				587.8	Dark gray argillaceous limestone, fine grained medium bedded.
140.1'				585.6	Dark gray calcareous shale, hard, medium bedded.
140.4'				585.3	Gray argilleceous limestone, hard.

Boring 14
114+87
12' Lt.
8/30/90

DEPTH Ft.	ELEV.	DESCRIPTION
0.0'	730.3	
11.7'	718.6	Sandy silt.
103.0'	727.3	Sand.
103.8'	626.5	Shale.

Boring 15
114+87
12' Rt.
8/30/90

DEPTH Ft.	ELEV.	DESCRIPTION
0.0'	728.9	
11.8'	717.1	Brown sandy silt, moist, soft.
23.1'	705.8	Medium to coarse grained sand, rounded, medium dense.
110.0'	618.9	Coarse grained sand, rounded, dense.
111.0'	617.9	Gray shale, dry hard.

Boring 16
115+51
12' Rt.
8/13-14-15/90

DEPTH Ft.	BLOWS 6"	POCKET PEN. tsf	ELEV.	DESCRIPTION
0.0'			729.0	
5.0'	5-6-9	2.0-3.0	724.0	Dark brown sandy, silty clay, stiff to very stiff.
7.5'			721.5	
10.0'	5-6-8	1.0	719.0	Brown sandy silt.
12.5'			716.5	
15.0'	4-3-3	0.75	714.0	Fine silty sand with some gray brown clay pockets.
17.5'			711.5	
20.0'	8-8-11		709.0	Fine silty sand.
22.5'			706.5	
25.0'	14-20-31		704.0	Unsorted river sand, fairly clean, medium dense.
27.5'			701.5	
30.0'	13-18-20		699.0	Medium to coarse sand medium dense.
32.5'			696.5	
35.0'	19-16-17		694.0	Fine sand, medium dense.
40.0'	12-21-36		689.0	
42.5'			686.5	
45.0'	32-37-39		684.0	Fine sand, dense.
47.5'			681.5	
50.0'	24-17-15		679.0	Medium to coarse sand with some gravel, medium dense.
60.0'	17-15-15		669.0	
65.0'			664.0	
70.0'	35-39-44		659.0	Fine sand, dense.
75.0'			654.0	
80.0'	13-15-16		649.0	Medium coarse sand, medium dense.
90.0'	17-23-21		639.0	
100.0'	33-46-45		629.0	
109.2'			619.8	
110.0'	100 in 2"	9.0+	619.0	Calcareous shale, hard.
115.0'	100 in 1"		614.0	
117.5'			611.5	Hard limestone.
120.0'	61-39 in 2"	9.0+	60[illegible].0	Dark gray silty shale hard, dry.
120.7'			608.3	
121.7'			607.3	Hard limestone.
125.0'	100 in 2"	9.0+	604.0	Light gray calcareous silty shale.
125.2'			603.8	

Boring 17
116+08
12' Lt.
8/13-14-15/90

DEPTH Ft.	BLOWS 6"	POCKET PEN. tsf	ELEV.	DESCRIPTION
0.0'			730.6	
7.5'			723.1	Sandy silt with scattered cobbles and gravel with clay pockets
10.0'	8-10-9	0.75	720.6	Very sandy silt, fine, dry.
14.0'			716.6	
15.0'	10-9-8	0.75	715.6	Silty sand.
17.5'			713.1	
20.0'	7-9-10		710.6	Unsorted sand with some gravel, wet, medium dense.
25.0'	8-16-14		705.6	
30.0'	10-20-21		700.6	
35.0'	8-20-28		695.6	
35.5'			695.1	
40.0'	24-44-38		690.6	Fine sand, medium dense to dense.
45.0'	18-23-12		685.6	
47.5'			683.1	
50.0'	9-12-14		680.6	Medium sand, unsorted with cobbles to gravel at 51.0' to 55.0' loose to medium dense.
55.0'	8-10-8		675.6	
57.5'			673.1	
60.0'	10-12-12		670.6	Fine sand with some lignite, medium dense with heavy cobbles at 62.0'.
65.0'	12-14-14		665.6	
70.0'	12-16-18		660.6	
75.0'	22-26-22		655.6	
77.5'			653.1	
80.0'	12-13-14		650.6	Medium to coarse sand with some gravel, medium packed.
85.0'	9-8-7		645.6	
90.0'	15-18-16		640.6	
95.0'	16-13-9		635.6	
100.0'	16-19-15		630.6	
105.0'	24-76 in 3"		625.6	
106.6'			624.0	
111.8'			618.8	Light gray silty shale calcareous, very stiff.
112.2'			618.4	Hard argillaceous limestone.
114.9'			615.7	Green calcareous shale, hard.
116.8'	100 in 1.5"		613.8	Gray argillaceous limestone, hard.
116.9'			613.7	

CORING LOG
(NX Double Tube Barrel)

	FROM	TO	RUN	REC	LOSS	% RQD	NOTES
BORING 13	109.5	111.8	2.3	2.3	0.0		
	111.8	116.8	5.0	5.0	0.0	100	*
	116.8	121.8	5.0	5.0	0.0	91	*
	121.8	126.8	5.0	5.0	0.0	56	*
	126.8	131.8	5.0	5.0	0.0	66	*
	131.8	135.4	3.6	3.6	0.0	65	*
	135.4	140.4	5.0	4.9	0.1	90	*
BORING 17							
	107.3	111.8	4.5	2.8	1.7		
	111.8	116.8	5.0	5.0	0.0		

*Limestone portion of core only.

Note: For locations of Borings, see Sheet 3 of 33.

BORING LOGS

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

BDR-2-C2

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: T.L.W. 2/93
CHECKED: E.W.N. 2/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

A4757

STATE	PROJ. NO.	SHEET NO.
MO.		

18 — 116+08, 12' Rt., 8/30/90

DEPTH Ft.	ELEV.	
0.0'	730.3	
4.9'	725.4	Brown sandy silt.
17.0'	713.3	Brown sandy clay, stiff cannot P.A.W.T., moist to [illegible]
30.0'	700.3	Light brown silty fine sand, dry.
108.2'	622.1	Medium grained, wet sand, trace of silt.
109.1'	621.2	Very stiff to hard shale.

18
116+08
12' Rt.
8/30/90

19 — 117+33, 12' Lt., 8/23/90

DEPTH Ft.	BLOWS 6"	POCKET PEN. tsf	ELEV.	
0.0'			733.6	
5.0'	7-13-9	0.50	728.6	Dark brown sandy silt with some gravel.
7.5'			726.1	
10.0'	7-10-11	1.50	723.6	Dark gray silty clay, moist, medium stiff.
12.5'			721.1	
15.0'	4-4-10	0.50	718.6	Gray silty clay, wet, soft to very soft.
20.0'	3-6-4	0.25	713.6	
22.0'			711.6	
25.0'	16-14-10		708.6	Brown fine silty sand.
27.5'			706.1	
30.0'	11-14-16		703.6	Medium to coarse sand with some gravel, clean medium dense.
32.5'			701.1	
35.0'	17-16-25		698.6	Fine gray sand, clean, medium dense to dense.
40.0'	16-38-40		693.6	
45.0'	20-26-30		688.6	
47.5'			686.1	
50.0'	7-7-11		683.6	Medium to coarse sand with chert cobbles, clean, medium dense.
55.0'	21-26-16		678.6	
57.5'			676.1	
60.0'	13-20-15		673.6	Fine grained gray sand rounded, clean, dense.
70.0'	15-27-26		663.6	
75.0'			658.6	
80.0'	14-14-23		653.6	Fine to medium grained sand, rounded, clean, dense.
90.0'	9-10-11		643.6	
100.0'	13-13-20		633.6	
114.0'	100 in 2"		619.6	
114.3'			619.3	
118.6'			615.0	Gray shaley sandy limestone, hard.
122.6'			611.0	Gray limestone, hard.
123.0'	70-30 in 2"		610.6	Gray shale, dry and hard.
129.0'			604.6	
130.0'			603.6	Gray limestone, hard.

19
117+33
12' Lt.
8/23/90

20 — 117+33, 12' Rt., 8/30/90

DEPTH Ft.	ELEV.	
0.0'	733.6	
7.5'	726.1	Brown sandy silt, dry, soft, P.A.W.T. 0-7.5'.
16.0'	717.6	Dark gray slightly sandy silt, soft, moist, P.A.W.T. 7.5'-16.0'.
35.0'	698.6	Brown sandy clay, wet, medium stiff.
114.0'	619.6	Coarse sand, wet, dense scattered cobbles at 55.0'.
116.4'	617.2	Coarse sand and cobbles.
118.0'	615.6	Gray silty shale, dry, hard.

20
117+33
12' Rt.
8/30/90

21 — 118+51, 3' Lt., 8/30/90

DEPTH Ft.	ELEV.	
0.0'	737.9	
0.8'	737.1	Asphalt and base.
29.0'	708.9	Gray sandy silty clay.
35.0'	702.9	Gray clay, stiff, P.A.W.T. with moderate difficulty.
52.0'	685.9	Gray silty fine sand, cannot P.A.W.T.
113.0'	624.9	Medium sand.
114.0'	623.9	Shale.

21
118+51
3' Lt.
8/30/90

Note: For location of Borings, see Sheet 3 of 33.

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BOR-3-C2

HC HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: T.L.W. 2/93
CHECKED: E.W.N. 2/93

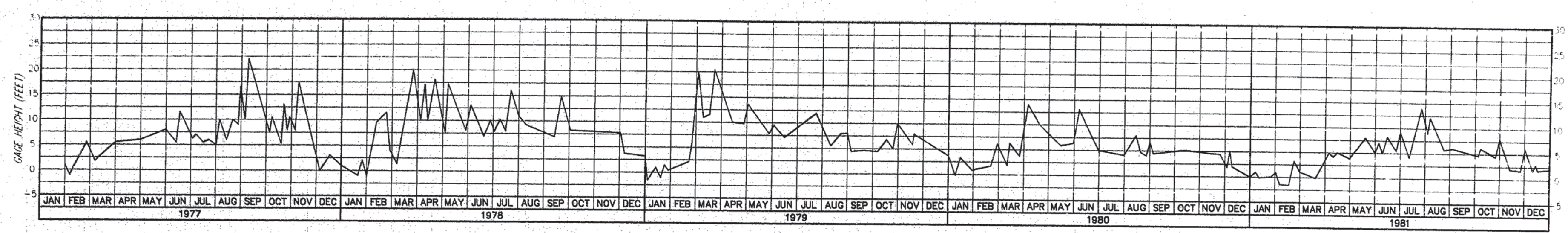
Note:
P.A.W.T. = Pushed Augers Without Turning.

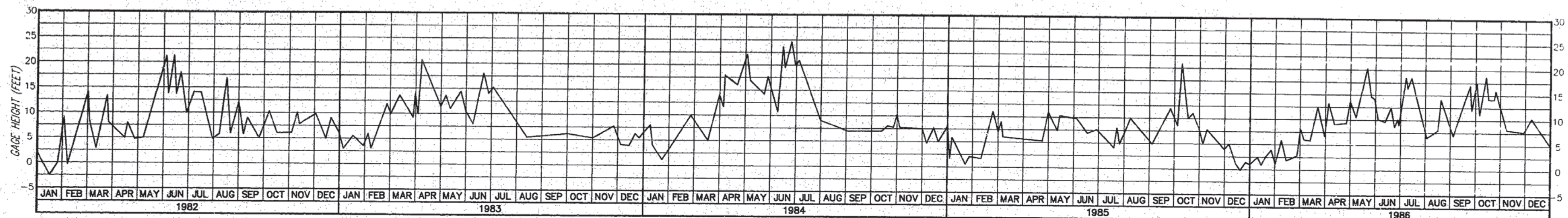
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

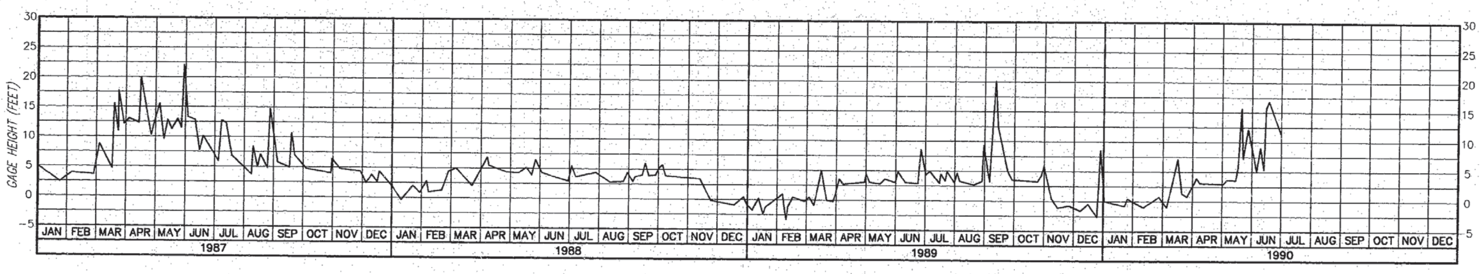
BORING LOGS
ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

SHEET 6 OF 33

A4757







NOTES

Stage Hydrograph was plotted from readings of the Missouri River near the Hannibal Bridge located at river mile 366.1 in Kansas City, Missouri.

Gage Zero is 715.8 ft. M.S.L. (Mean Sea Level).

Seasonal variations in the water elevations at the Hannibal Bridge can be estimated by adding the gage reading to Elev. 715.8

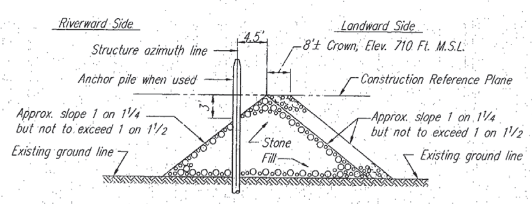
The Route 291 Bridge is located at river mile 352.7. A plot of the water surface elevation versus discharge curves for the Hannibal and Route 291 Bridges is shown on this drawing.

An estimate for seasonal variations in water surface elevations at the Route 291 Bridge can be made by deducting 11.7± to 14.6± feet from those at the Hannibal Bridge.

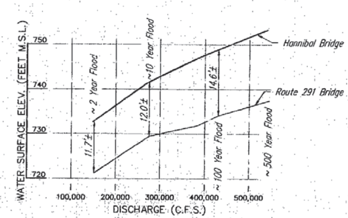
For approximate location of revetment see "Substructure Layout" sheet.

Revetment details are based on information provided by the U.S. Army Corps of Engineers. Accuracy of details or dimensions are not guaranteed.

This design data is included for information only and is not guaranteed to represent conditions at the site during construction.



STONE FILL REVETMENT



WATER SURFACE ELEVATION VS. DISCHARGE CURVES

STAGE HYDROGRAPH AND REVETMENT DETAILS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

STATE	PROJ. NO.	SHEET NO.
MO		

HC HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: S.A.K. 10/92
CHECKED: E.W.N. 2/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 7 OF 33

A4757

HYDRO-C2

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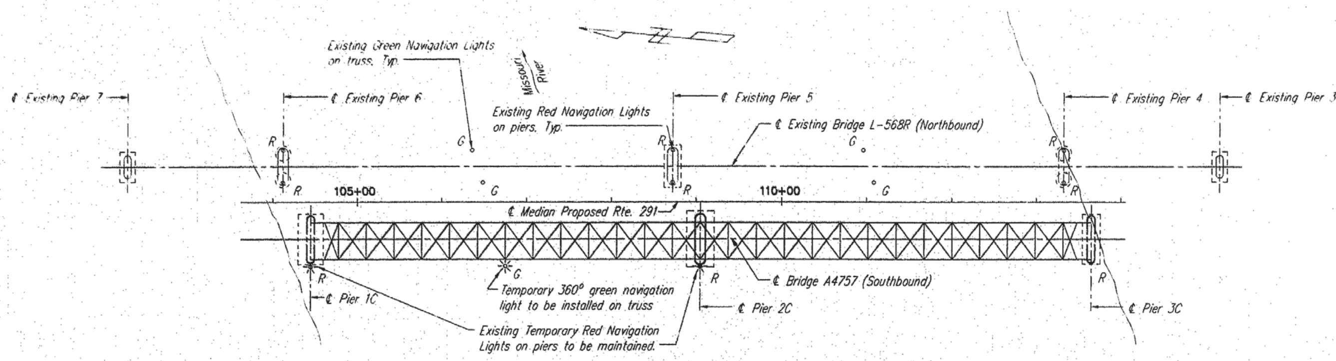
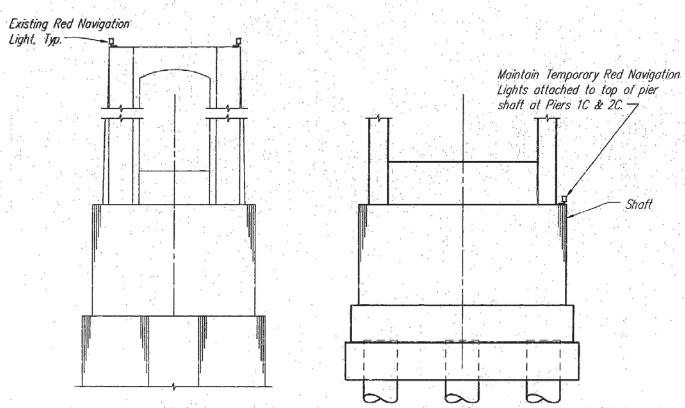
STATE	PROJ. NO.	SHEET NO.
MO		



TEMPORARY NAVIGATION LIGHTING LAYOUT

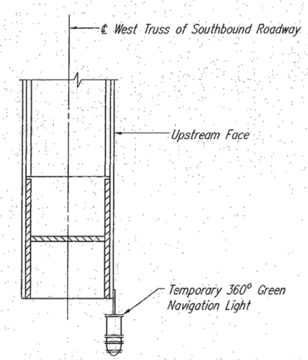


EXISTING BRIDGE

NEW SOUTHBOUND BRIDGE

LOCATION OF LIGHTS ON PIERS

(View shown looking upstation.)



LOCATION OF LIGHT ON TRUSS

(View shown looking upstation.)

NOTES:

Temporary lights installed on piers by others shall be maintained during the construction.

Red lights shall be installed on any temporary bents used during construction.

Temporary light on bottom of truss chord shall have 360° Green Lenses and shall meet the requirements of the U.S. Coast Guard.

Existing navigation lighting system on Bridge L-568R shall remain operational.

Temporary lights will remain the property of the Commission after completion of construction and will then be maintained by others.

The cost of furnishing and maintaining temporary navigation lights shall be considered as incidental to and completely covered by unit price of bid for various items of work in this contract.

See Special Provisions for additional requirements.

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T-NAV-LT

HC HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: JLK 02/93
CHECKED: KRE 09/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

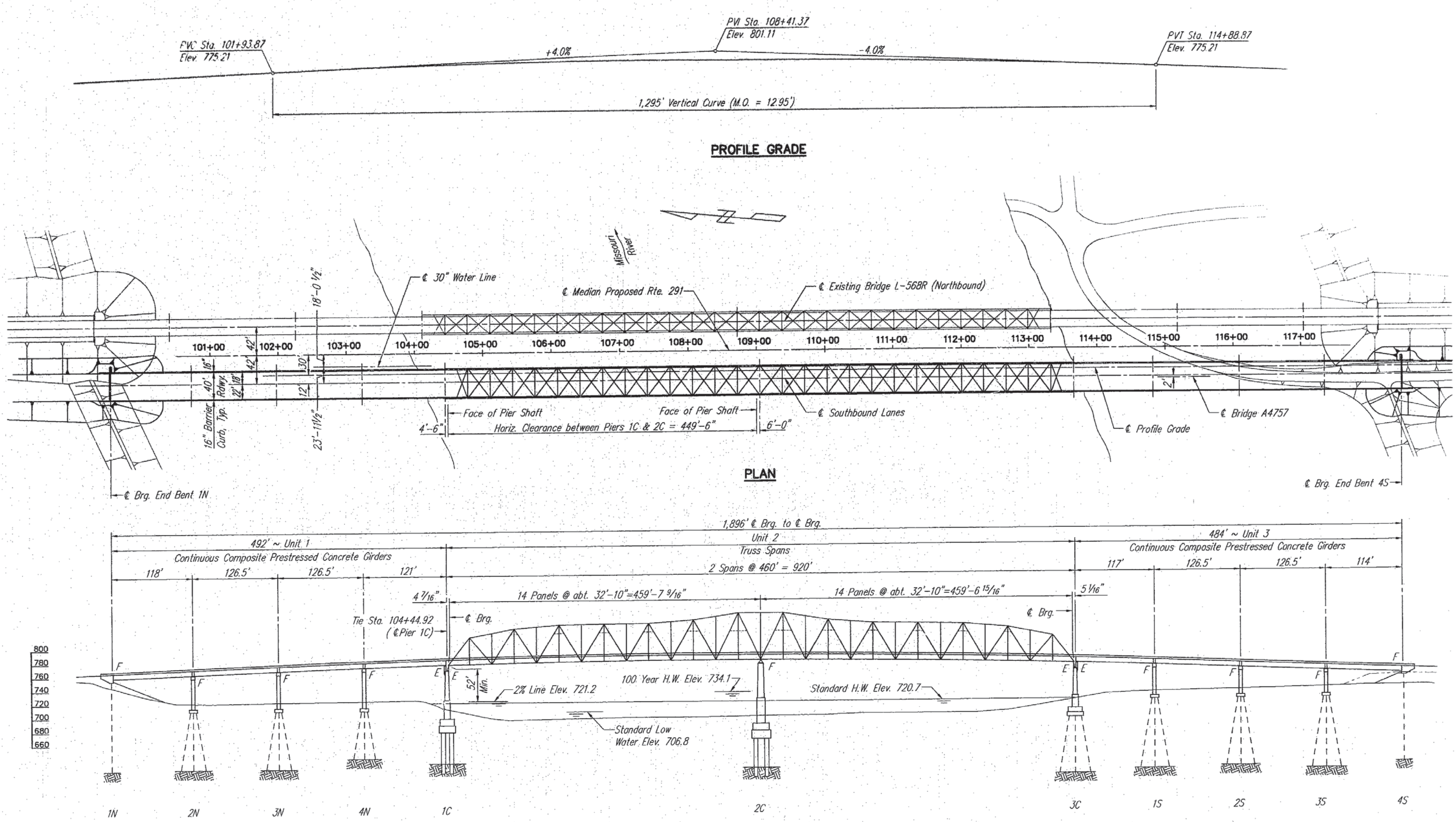
TEMPORARY NAVIGATION LIGHTING

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

SHEET 8 OF 33

A4757



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BASIC FLOOD DATA

Discharge (100 yr.)	430,000 cfs
H.W. Elev.	734.1

GENERAL PLAN AND ELEVATION

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

STATE	PROJ. NO.	SHEET NO.
MO		

GPE291C2

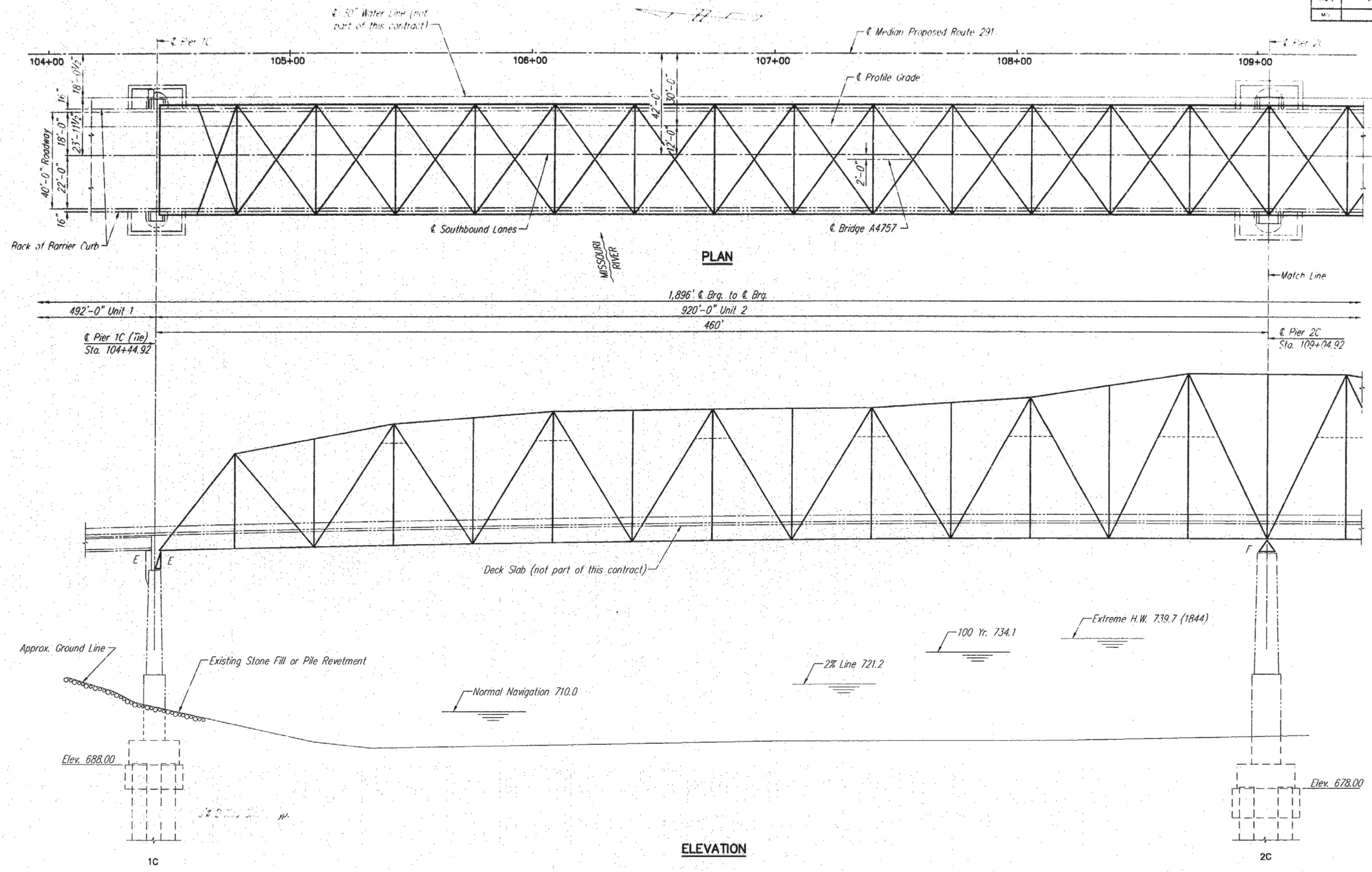
HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: T.L.W. 10/92
CHECKED: H.G.J. 09/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 9 OF 33

A4757



GENERAL PLAN AND ELEVATION – UNIT 2
NORTH SPAN

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.L.K. 03/93
CHECKED: H.G.J. 09/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 10 OF 33

A4757

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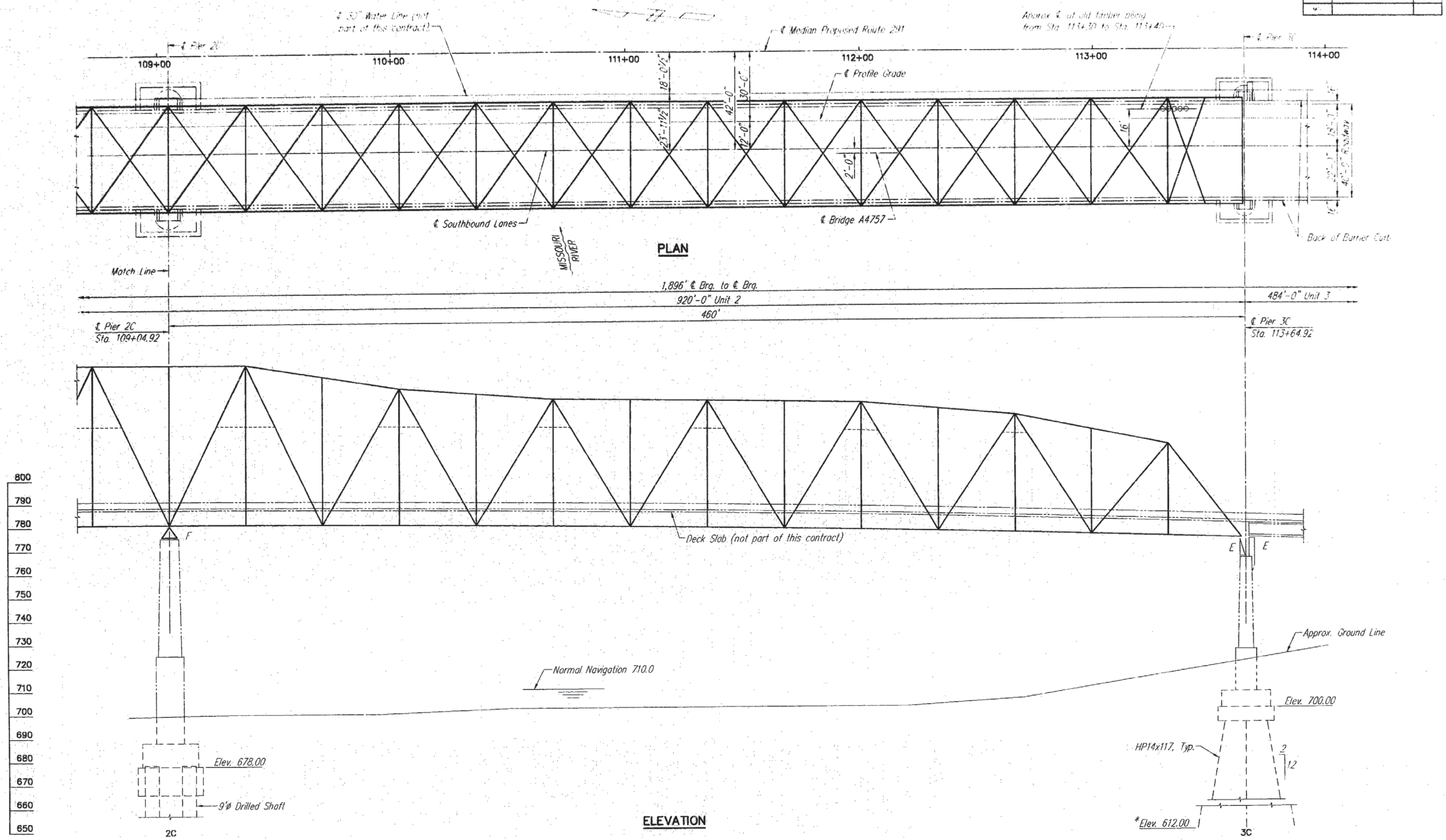

GENERAL PLAN AND ELEVATION – UNIT 2
SOUTH SPAN

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

*Estimated Pile Tip Elevation.

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.L.K. 03/93
CHECKED: H.G.J. 09/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 11 OF 33

A4757

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GENERAL NOTES:

The existing Missouri Route 291 shall remain open during construction.
Utility companies whose facilities are shown on the plans or are known to be within the construction limits shall be notified by the Contractor of the construction start date.
All dimensions are horizontal unless otherwise noted. Drawings shall not be scaled.

SPECIFICATIONS:

Design: AASHTO Standard Specifications for Highway Bridges 1992 Edition plus Interims.
Construction: Missouri State Highway Commission Standard Specifications For Highway Construction, 1993 Edition, plus general and job special provisions.
FHWA Technical Advisory (T 5140.20), Scour of Bridges.

DESIGN LOADING:

Load Factor Design Method – Stringers and Floorbeams.
Live Load – HS20 Modified with Modified 24,000 Lb. Tandem Axle.
Live Load Distribution: Truss Members – 1.50 Lane/Truss
Truss Floor System in accordance with AASHTO.
For Truss Members the concentrated load used in combination with lane load is 32,500 Lbs. for both Shear and Moment calculations.
Dead Load – An allowance of 35 Lbs. per sq. ft. of roadway for future wearing surface is included in the Dead Load.
Concrete Weight – 150 Lbs. per cu. ft.
An allowance of 16 Lbs. per sq. ft. of roadway is used for Stay-In-Place Forms.
Wind – As specified by AASHTO.
Fatigue – AASHTO Loading Case I.
Seismic Forces – In accordance with AASHTO Division I-A, Sec. 4.6 Design Forces for Seismic Performance Category A.

DESIGN UNIT STRESSES:

Structural Carbon Steel (A.S.T.M. A709 Gr. 36)--- fs = 20,000 psi.
fy = 36,000 psi.
Structural Low Alloy Steel----------------- fs = 27,000 psi.
(A.S.T.M. A709, Gr. 50 or A.S.T.M. A709 Gr. 50W)- fy = 50,000 psi.

DESIGNATION:

Far Side – (F.S.)
Near Side – (N.S.)
Low-Alloy Steel – (LA)
Milled Joint – (MJ)

TRUSS SPAN ERECTION:

Before ordering material and proceeding with shop drawings, the Contractor shall submit to the Engineer, for review, complete plans of his proposed erection scheme for the Truss Span showing erection Loads and Stresses. Erection Stresses shall be composed of the Dead Load Stresses of the structure and erection equipment plus the stress from a 45 psf wind on the structure and on the erection equipment. Erection Stresses shall not exceed design unit stresses (working stress design) by more than 33 1/3%. Review of the erection plans by the Engineer shall not be considered as relieving the Contractor of his full responsibility for the practicability and safety of the erection schemes used. An assumed possible erection scheme with erection stresses is shown on Sheet 15 of 31.

MATERIAL DESIGNATION:

All material shown on the Plans shall be Structural Carbon Steel unless otherwise noted. Material designated as (LA) shall be Structural Low-Alloy Steel.

HIGH STRENGTH (H.S.) BOLTS:

High Strength Bolts shall be galvanized friction type and shall conform to ASTM A325, except as noted. High Strength Bolts may not be reused after torquing.
High strength bolts, nuts and washers shall be sampled for quality in accordance with Standard Specification 106 and Field Section (FS 712).
All connections thru side plates of truss members to the gusset plates, angles and splice plates (main truss joints only) shall be made with 1"ø High Strength (H.S.) Bolts, unless otherwise noted.
All other connections shall be made using 7/8" ø H.S. Bolts, unless otherwise noted on the Plans.

FRACTURE CRITICAL MEMBERS AND NOTCH TOUGHNESS:

For Fracture Critical Members (FCM) and Notch Toughness requirements, see Special Provisions. Only ASTM A709 Gr. 50 Structural Low Alloy Steel shall be used for Low Alloy Fracture Critical Members.
Notch Toughness requirements are mandatory for all stringers and bottom flanges and webs of all floorbeams and Truss Tension Members including their Connecting Gusset Plates.

MILLED JOINTS:

Material of members at Joints specified (MJ) in the Plans shall be Milled to bevel of member to provide a theoretical gap of 1/16" after the Truss is erected. All other material at Joints shall be in Close Contact. See Special Provisions.

CAMBER:

Trusses and Floorbeams are shown cambered for full Dead Load, excluding Future Wearing Surface, and including vertical curve for Truss.

JACKING:

Provisions have been made for jacking the total superstructure Dead Load at Panel Points L0, L14 and L0' of the Truss Span, assuming all support Joints are raised simultaneously or proportionally in a manner to preclude any distortion of the Truss configuration at 150% of allowable working stress.

SPAN LENGTHS

All span lengths shown on plans are at a normal temperature of 60° F.

CONNECTIONS:

All shop and field connections, other than welded or as noted, shall be made with High Strength Bolts, with sizes as noted on the plans. Pitch for connectors shall be not less than 3" for 7/8"ø fasteners and 3 1/2" for 1"ø fasteners.

WELDING:

All welding shall conform to the ANSI/AASHTO/AWS D1.5-95 Bridge Welding Code as supplemented by the Standard Specifications and Special Provisions.

MISCELLANEOUS:

See Special Provisions for navigational considerations and construction in navigable waters.

PROTECTIVE COATING

Protective Coating: System G (Prime Coat only) by the Contractor in accordance with Special Provisions.
Prime Coat: The cost of the prime coat shall be included in the contract unit price of the Fabricated Structural Steel. Tint of the prime coat for System G shall be similar to the color of the field coat to be used (Gray – in future contract).

ESTIMATED QUANTITIES

ITEM	UNIT	TOTAL
Fabricated Structural Carbon Steel (Truss)	Lbs.	2,099,310
Fabricated Structural Low Alloy Steel (Truss)	Lbs.	2,063,210
Truss Bearing Devices	Lbs.	50,600
Water Transportation	Lump Sum	1

Note: Quantities shown are for Truss Span only.

GENERAL NOTES & QUANTITIES – TRUSS

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.L.K. 02/93
CHECKED: H.G.J. 09/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 12 OF 33

A4757

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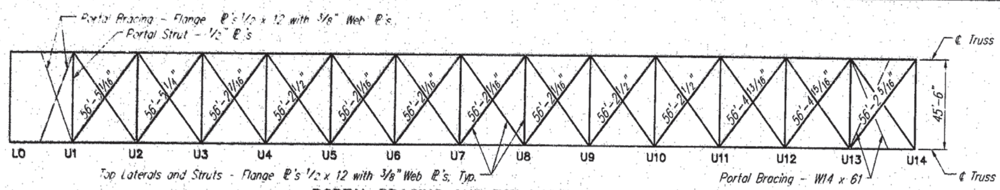
STATE	PROJ. NO.	SHEET NO.
MO		

Notes:

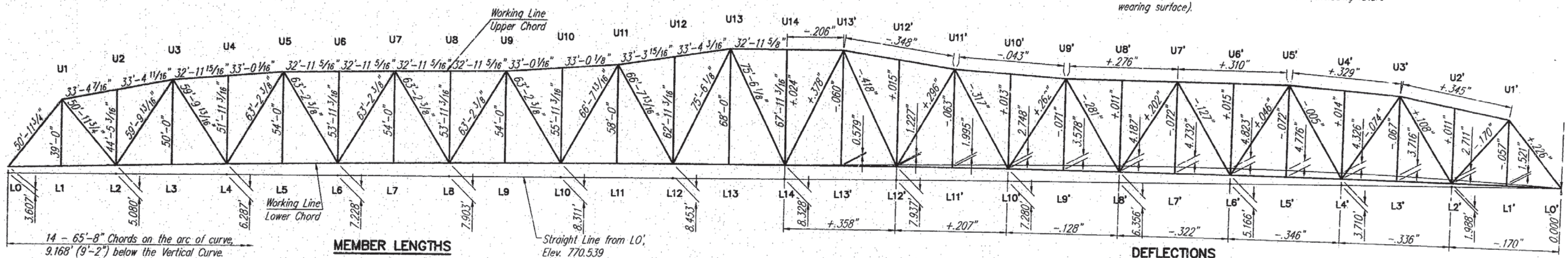
The geometric shape of the truss, after dead load (excluding future wearing surface) deflection has occurred, shall be as shown in the "Member Lengths" diagram. The angular relationship between members for fabrication shall be in accordance with this shape.

Chord and tie members shall be straight between splice points. Lower chord and tie member offsets are measured perpendicular to reference line at Elev. 770.54.

Lengths of members for fabrication are to be computed for geometric shape of truss shown in the "Member Lengths" diagram, and the corrections shown in the "Truss Deflections" diagram, are to be applied to these lengths. + Indicates lengthening, −indicates shortening. The blocking dimensions, shown in the "Truss Deflections" diagram, are the positions of lower chord and tie member joints above the geometric shape to provide for dead load deflection (excluding future wearing surface).

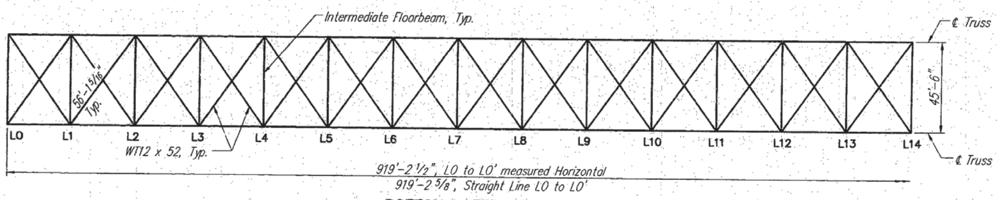


PORTAL BRACING AND TOP LATERALS

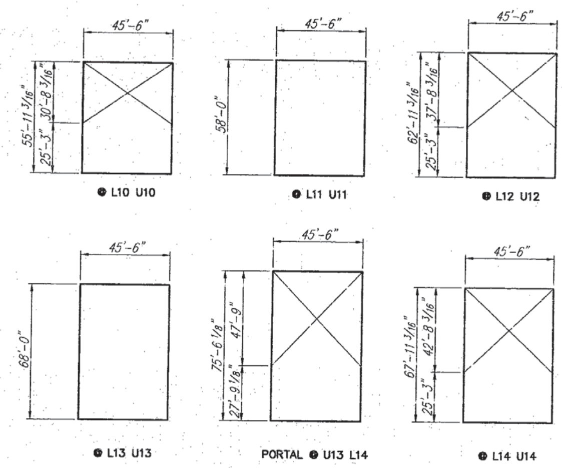


MEMBER LENGTHS

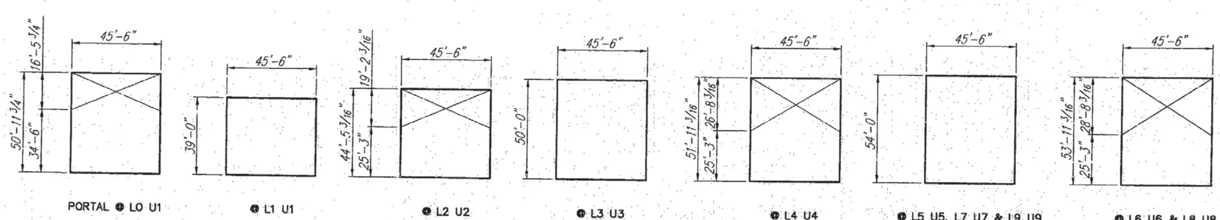
DEFLECTIONS



BOTTOM LATERALS



DIMENSIONS AT PANEL POINTS



DIMENSIONS AT PANEL POINTS

Note: Hangers shall be normal to the lower truss chord and posts shall be placed at the mid-point of upper chord.

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TRUSSLAY

TRUSS LAYOUT AND CAMBER

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.L.K. 08/93
CHECKED: H.C.J. 09/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 13 OF 33

A4757

MEMBER	DIRECT STRESSES (KIPS)						BENDING MOMENTS (FT. KIPS)			MEMBER SECTIONS ("H" SHAPES)		AREA (SQ. IN.)		S.M. (IN. ^{3})		ALLOWABLE UNIT STRESSES (KSI)			ACTUAL UNIT STRESSES (KSI)				MATERIAL	FCM	MEMBER
	DL	LL	I	TOTAL GROUP 1	WIND	TOTAL GROUP 2	DL My	LL+I Mx	WIND	SIDE OR TOP & BOTTOM PLATES	WEB PLATE	GROSS	NET	XX	YY	KL/r	Fa	Fb	GROUP 1 fa	GROUP 1 fb	GROUP 2 fa	GROUP 2 fb			
																			fa	fb	fa	fb			
L0 L2	726	218	19	963	①174	900	42	0	528 ②	24 x 1.625	13.75 x 1.00	91.8	77.1	570	312	-	27.0	27.0	12.5	1.6	11.7	12.7	LA	FCM	L0 L2
L2 L4	1330	424	38	1792	331	1661	39	0	20	24 x 1.50	14 x 1.00	86.0	72.5	537	288	- -	27.0	27.0	24.7	1.6	22.9	2.1	LA	FCM	L2 L4
L4 L6	1456	496	44	1996	403	1859	42	0	20	24 x 1.625	13.75 x 1.00	91.8	77.1	570	312	- -	27.0	27.0	25.9	1.6	24.1	2.0	LA	FCM	L4 L6
L6 L8	1159	490	44	1723	405	1594	37	0	20	24 x 1.375	14.25 x 1.00	80.3	67.9	504	264	- -	27.0	27.0	25.4	1.7	23.5	2.2	LA	FCM	L6 L8
L8 L10	434	377	34	845	346	780	34	0	20	24 x 1.25	14.50 x 1.00	74.5	63.3	487	240	- -	20.0	20.0	13.4	1.7	12.3	2.2	CS	FCM	L8 L10
L10 L12	-754	-298	-27	-1079	124	-630	48	0	20	30 x 1.50	14 x 1.00	104.0	- -	665	450	40.3	16.1	20.0	-10.4	-1.3	-6.1	-1.6	CS	Not	L10 L12
L12 L14	-2042	-462	-42	-2546	438	-1604	67	0	20	30 x 2.25	12.50 x 1.00	147.5	- -	890	675	41.5	21.8	27.0	-17.3	-1.2	-10.9	-1.5	LA	Not	L12 L14
L0 U1	-1151	-362	-33	-1546	55	-1096	61	0	797	24 x 1.50	14 x 1.00	86.0	- -	537	288	68.1	18.8	27.0	-18.0	-2.5	-12.7	-20.4	LA	Not	L0 U1
U1 U3	-1164	-357	-32	-1553	72	-1092	34	0	21	24 x 1.25	14.50 x 1.00	74.5	- -	469	350	48.2	21.2	27.0	-20.8	-1.2	-14.7	-1.7	LA	Not	U1 U3
U3 U5	-1466	-479	-43	-1988	139	-1327	45	0	20	24 x 1.75	13.50 x 1.00	97.5	- -	501	336	46.2	21.4	27.0	-20.4	-1.6	-13.6	-2.1	LA	Not	U3 U5
U5 U7	-1383	-508	-46	-1937	167	-1216	45	0	20	24 x 1.75	13.50 x 1.00	97.5	- -	601	336	46.2	21.4	27.0	-19.9	-1.6	-12.5	-2.0	LA	Not	U5 U7
U7 U9	-868	-447	-40	-1355	168	-700	32	0	20	24 x 1.125	14.75 x 1.00	68.8	- -	432	216	48.2	21.2	27.0	-19.7	-1.8	-10.2	-2.3	LA	Not	U7 U9
U9 U11	125	281	25	431	142	267	29	0	20	24 x 1.00	15 x 1.00	63.0	54.0	395	192	- -	27.0	27.0	8.0	1.8	4.9	2.4	LA	FCM	U9 U11
U11U13	1409	325	29	1763	136	1545	42	0	26	30 x 1.25	14.50 x 1.00	89.5	78.3	578	375	- -	27.0	27.0	22.5	1.3	19.7	1.9	LA	FCM	U11U13
U13U14	2904	646	58	3608	160	3064	71	0	25	30 x 2.375	12.25 x 1.00	154.8	133.4	922	713	- -	27.0	27.0	27.1	1.2	23.0	1.5	LA	FCM	U13U14
U1 L2	633	205	18	856	0	633	44	0	49	24 x 1.00	15 x 1.00	63.0	54.0	395	192	- -	20.0	20.0	15.9	2.8	11.7	4.2	CS	FCM	U1 L2
L2 U3	-342	-168	-15	-525	0	-342	53	0	67	24 x 1.00	15 x 1.00	63.0	- -	395	192	89.3	12.7	20.0	-8.3	-3.3	-5.4	-5.3	CS	Not	L2 U3
U3 L4	234	145	13	392	0	234	53	0	67	24 x 1.00	15 x 1.00	63.0	54.0	395	192	- -	20.0	20.0	7.3	3.3	4.3	5.3	CS	FCM	U3 L4
L4 U5	15	132	12	159	0	15	56	0	75	24 x 1.00	15 x 1.00	63.0	54.0	395	192	- -	20.0	20.0	2.9	3.5	0.3	5.8	CS	FCM	L4 U5
U5 L6	-138	-145	-13	-296	0	-138	56	0	75	24 x 1.00	15 x 1.00	63.0	- -	395	192	93.7	12.3	20.0	-4.7	-3.5	-2.2	-5.8	CS	Not	U5 L6
L6 U7	382	174	16	572	0	382	56	0	75	24 x 1.00	15 x 1.00	63.0	54.0	395	192	- -	20.0	20.0	10.6	3.5	7.1	5.8	CS	FCM	L6 U7
U7 L8	-608	-206	-19	-833	0	-608	56	0	75	24 x 1.00	15 x 1.00	63.0	- -	395	192	93.7	12.3	20.0	-13.2	-3.5	-9.7	-5.8	CS	Not	U7 L8
L8 U9	845	243	22	1110	0	845	56	0	75	24 x 1.00	15 x 1.00	63.0	54.0	395	192	- -	20.0	20.0	20.6	3.5	15.6	5.8	CS	FCM	L8 U9
U9 L10	-1066	-274	-25	-1365	0	-1066	76	0	75	24 x 1.50	14 x 1.00	86.0	- -	537	288	89.4	15.3	27.0	-15.9	-3.2	-12.4	-4.8	LA	Not	U9 L10
L10 U11	1282	312	28	1622	0	1282	83	0	104	30 x 1.25	14.50 x 1.00	89.5	78.3	578	375	- -	27.0	27.0	20.7	2.7	16.4	4.8	LA	FCM	L10 U11
U11L12	-1293	-304	-27	-1624	0	-1293	90	0	104	30 x 1.375	14.25 x 1.00	96.8	- -	622	412	80.3	16.9	27.0	-16.8	-2.6	-13.4	-4.6	LA	Not	U11L12
L12U13	1486	340	31	1857	0	1486	94	0	134	30 x 1.25	14.50 x 1.00	89.5	78.3	578	375	- -	27.0	27.0	23.7	3.0	19.0	5.8	LA	FCM	L12U13
U13L14	-1991	-436	-39	-2466	145	-1846	140	0	134	30 x 2.00	13 x 1.00	133.0	- -	820	600	82.0	16.7	27.0	-18.5	-2.8	-13.9	-4.8	LA	Not	U13L14
							DL Mx																		
U1 L1	179	115	34	328	0	179	51	60	21	18 x 0.75	15.50 x 0.75	38.6	31.9	237	81	- -	20.0	20.0	10.3	0.9	5.6	6.7	CS	FCM	U1 L1
U3 L3	164	110	33	307	0	164	34	42	35	18 x 0.75	15.50 x 0.75	38.6	31.9	237	81	- -	20.0	20.0	9.6	0.9	5.1	5.6	CS	FCM	U3 L3
U5 L5	164	110	33	307	0	164	34	42	41	18 x 0.75	15.50 x 0.75	38.6	31.9	237	81	- -	20.0	20.0	9.6	0.9	5.1	5.9	CS	FCM	U5 L5
U7 L7	163	110	33	306	0	163	34	42	41	18 x 0.75	15.50 x 0.75	38.6	31.9	237	81	- -	20.0	20.0	9.6	0.9	5.1	5.9	CS	FCM	U7 L7
U9 L9	163	110	33	306	0	163	34	42	41	18 x 0.75	15.50 x 0.75	38.6	31.9	237	81	- -	20.0	20.0	9.6	0.8	5.1	5.9	CS	FCM	U9 L9
U11 L11	167	110	33	310	0	167	34	42	55	21 x 0.875	15.25 x 0.75	48.2	40.3	307	129	- -	20.0	20.0	7.7	-0.9	4.1	-5.1	CS	FCM	U11 L11
U13L13	174	110	33	317	0	174	34	42	87	24 x 1.00	15.00 x 1.00	63.0	49.5	395	192	- -	20.0	20.0	5.9	-0.9	3.2	-5.0	CS	FCM	U13L13
L2 U2	-22	0	0	-22	0	-22	67	81	27	18 x 0.75	15.50 x 0.75	38.6	- -	237	81	91.1	15.4	20.0	-0.6	-1.4	-0.6	-8.9	CS	Not	L2 U2
L4 U4	-25	0	0	-25	0	-25	67	81	38	18 x 0.75	15.50 x 0.75	38.6	- -	237	81	108.0	10.8	18.5	-0.6	-0.9	-0.6	-9.4	CS	Not	L4 U4
L6 U6	-25	0	0	-25	0	-25	67	81	41	18 x 0.75	15.50 x 0.75	38.6	- -	237	81	111.8	10.4	17.6	-0.6	-1.1	-0.6	-9.6	CS	Not	L6 U6
L8 U8	-19	0	0	-19	0	-19	67	81	41	18 x 0.75	15.50 x 0.75	38.6	- -	237	81	111.8	10.4	17.6	-0.5	-0.9	-0.5	-9.6	CS	Not	L8 U8
L10U10	-22	0	0	-22	0	-22	67	81	44	18 x 0.75	15.50 x 0.75	38.6	- -	237	81	116.0	9.8	16.8	-0.6	-0.9	-0.6	-9.7	CS	Not	L10U10
L12U12	-28	0	0	-28	0	-28	67	81	74	21 x 0.875	15.25 x 0.75	48.2	- -	307	129	107.0	10.8	19.6	-0.6	0.9	-0.6	8.7	CS	Not	L12U12
L14U14	-41	0	0	-41	0	-41	67	81	87	21 x 1	15 x 0.75	53.2	- -	341	147	113.9	10.1	17.8	-0.8	0.9	-0.8	9.2	CS	Not	L14U14
Intermediate Floorbeam					-248	-248	1738	1931		20 x 1.50	72 x .50	96.0		2576	200		20.0	20.0			-2.6	17.1	CS	Not	
End Floorbeam @ L0							③ 4190	③ 1545		20 x 1.50	72 x .8125	118.5		2838	200		20.0	20.0				17.7	CS	Not	
Floorbeam @ L14							③ 15750④	③ 1931		24 x 2.50	70 x 2.25 & 70 x .625	277.5		4683	480		20.4	④40.5				40.4	LA	Not	

① in L1 L2
② @ L0
③ No x & y axis significance
④ Jacking Load

Compression Stresses are designated by (–) signs.

LA = AASHTO M223 (ASTM A709 Grade 50 or 50W)
CS = AASHTO M183 (ASTM A709 Grade 36)
Note: Only ASTM A709 Gr. 50 shall be used for Low Alloy Fracture Critical Members.

FCM = Fracture Critical Member
Not = Not a Fracture Critical Member

XX = Axis in plane of truss (for truss members)
YY = Axis perpendicular to plane of truss (for truss members)

Fa = Axial Unit Stress
Fb = Bending Unit Stress

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STRESS

HC HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.L.K. 08/93
CHECKED: H.G.J. 09/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

TRUSS STRESS SHEET

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

SHEET 14 OF 33

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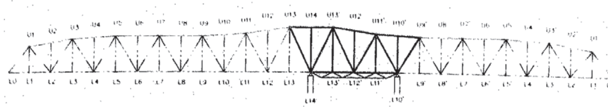
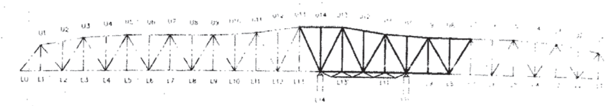
TABULATED ERECTION STRESSES ARE FOR TOTAL STEEL DEAD LOAD WITH 20 TON LOADS AT L2 AND L2'			
MEMBER	ERECTION STRESS (KIPS)	MEMBER	ERECTION STRESS (KIPS)
L0 L2	-25	U13'L14	-1091
L2 L4	-192	L12'U13'	535
L4 L6	-509	U11'L12'	-467
L6 L8	-1009	L10'U11'	674
L8 L10	-1669	U9'L10'	-612
L10 L12	-2321	L8'U9'	669
L12 L14	-2786	U7'L8'	-599
L12'L14	-2779	L6'U7'	519
L10'L12'	-2316	U5'L6'	-441
L8'L10'	-1665	L4'U5'	335
L6'L8'	-1006	U3'L4'	-262
L4'L6'	-507	L2'U3'	191
L2'L4'	-191	U1'L2'	-99
L0'L2'	-25		
		U1 L1	31
L0 U1	41	U3 L3	31
U1 U3	92	U5 L5	31
U3 U5	340	U7 L7	30
U5 U7	743	U9 L9	29
U7 U9	1324	U11 L11	34
U9 U11	1994	U13L13	41
U11U13	2581	U13'L13'	42
U13U13'	3259	U11'L11'	34
U13'U11'	2582	U9'L9'	29
U11'U9'	1995	U7'L7'	30
U9'U7'	1325	U5'L5'	31
U7'U5'	744	U3'L3'	30
U5'U3'	341	U1'L1'	31
U3'U1'	92		
U1'L0'	41	L2 U2	-22
		L4 U4	-25
U1 L2	-99	L6 U6	-25
L2 U3	191	L8 U8	-19
U3 L4	-262	L10U10	-22
L4 U5	335	L12U12	-28
U5 L6	-441	L14U14	-41
L6 U7	519	L12'U12'	-28
U7 L8	-599	L10'U10'	-22
L8 U9	669	L8'U8'	-19
U9 L10	-612	L6'U6'	-25
L10 U11	675	L4'U4'	-25
U11L12	-468	L2'U2'	-22
L12U13	536		
U13L14	-1092		

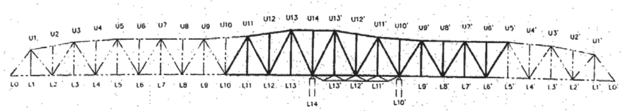
Erection Stresses are for Stage 5 including Dead Load of Steel (Stringers included) and a 40 K Concentrated Load at L2 and L2'.



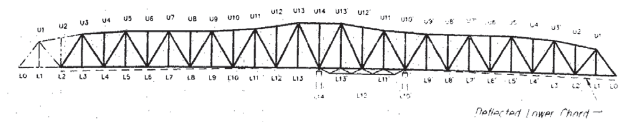
ERECTION STAGE 1
Supported @ L14 & L10'



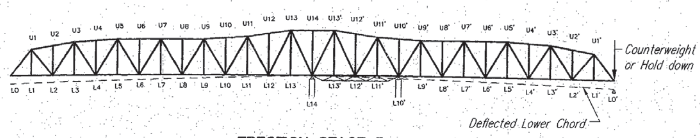
ERECTION STAGE 2
Supported @ L14 & L10'



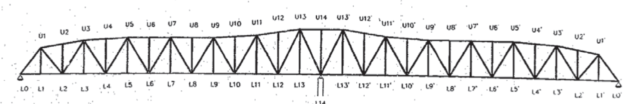
ERECTION STAGE 3
Supported @ L14 & L10'



ERECTION STAGE 4
Supported @ L14 & L10'



ERECTION STAGE 5
Supported @ L14 & L10'



ERECTION STAGE 6
Supported @ L0, L14 & L0'

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TRUSS STRESS SHEET – ERECTION CONDITION

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

ERECTION

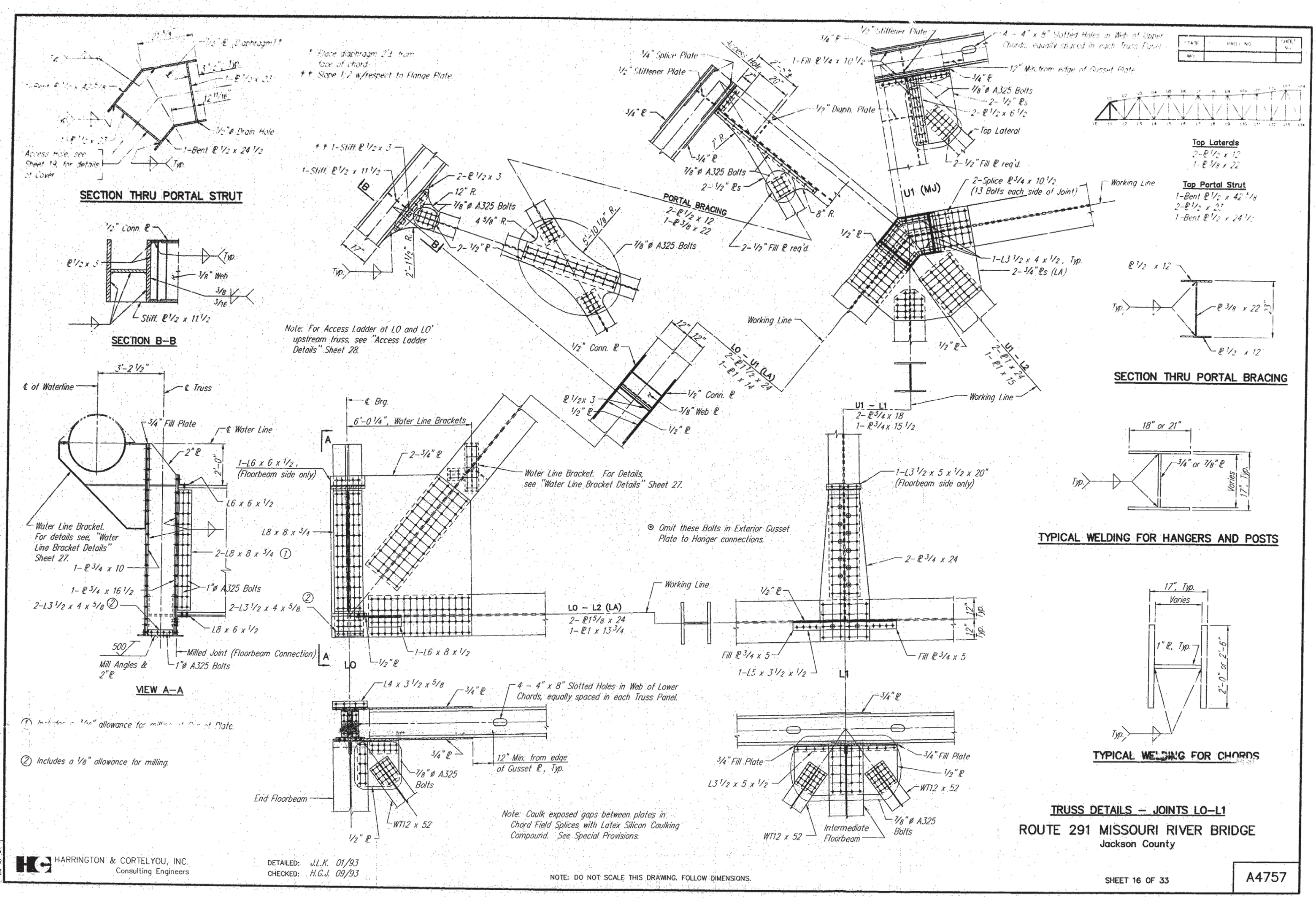
HC HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.L.K. 08/93
CHECKED: H.C.J. 09/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 15 OF 33

A4757


SECTION THRU PORTAL STRUT
1/2" Drain Hole
1-Bent ℘ 1/2 x 24 1/2
Access Hole, see Sheet 19, for details of Cover
* Place diaphragm 2'± from face of chord.
** Slope 1:2 w/respect to Flange Plate.
SECTION B-B
1/2" Conn. ℘
3/8" Web
Stiff. ℘ 1/2 x 11 1/2
Note: For Access Ladder at L0 and L0' upstream truss, see "Access Ladder Details" Sheet 28.
PORTAL BRACING
2-℘ 1/2 x 12
1-℘ 3/8 x 22
7/8" ø A325 Bolts
5'-10 1/8" R.
4 5/8" R.
12" R.
2-℘ 1/2 x 3
1-Stiff. ℘ 1/2 x 11 1/2
2-1/2" Fill ℘ req'd.
1/2" Diaph. Plate
3/4" Splice Plate
1/2" Stiffener Plate
Access Hole
1/2" Stiffener Plate
1-Fill ℘ 1/4 x 10 1/2
4 - 4" x 8" Slotted Holes in Web of Upper Chords, equally spaced in each Truss Panel.
12" Min. from edge of Gusset Plate
Top Lateral
2-1/2" Fill ℘ req'd.
U1 (MJ)
2-Splice ℘ 3/4 x 10 1/2 (13 Bolts each side of Joint)
Working Line
1-L3 1/2 x 4 x 1/2, Typ.
2-3/4" ℘s (LA)
L0 - U1 (LA)
2-℘ 1 1/2 x 24
1-℘ 1 x 14
U1 - L2
2-℘ 1 x 24
1-℘ 1 x 15
U1 - L1
2-℘ 3/4 x 18
1-℘ 3/4 x 15 1/2
Top Laterals
2-℘ 1/2 x 12
1-℘ 3/8 x 22
Top Portal Strut
1-Bent ℘ 1/2 x 42 1/8
2-℘ 1/2 x 23
1-Bent ℘ 1/2 x 24 1/2
SECTION THRU PORTAL BRACING
℘ 1/2 x 12
℘ 3/8 x 22
TYPICAL WELDING FOR HANGERS AND POSTS
18" or 21"
3/4" or 7/8" ℘
TYPICAL WELDING FOR CHORDS
17", Typ.
Varies
1" ℘, Typ.
2'-0" or 2'-6"
℄ of Waterline
℄ Truss
3'-2 1/2"
3/4" Fill Plate
2" ℘
℄ Water Line
Water Line Bracket. For details see, "Water Line Bracket Details" Sheet 27.
1-L6 x 6 x 1/2, (Floorbeam side only)
L6 x 6 x 1/2
L8 x 8 x 3/4
2-L8 x 8 x 3/4 ①
1-℘ 3/4 x 10
1-℘ 3/4 x 16 1/2
1" ø A325 Bolts
2-L3 1/2 x 4 x 5/8 ②
L8 x 6 x 1/2
Milled Joint (Floorbeam Connection)
Mill Angles & 2" ℘
1" ø A325 Bolts
VIEW A-A
① Includes a 1/16" allowance for milling of Plate.
② Includes a 1/8" allowance for milling.
℄ Brg.
6'-0 1/4", Water Line Brackets
2-3/4" ℘
Water Line Bracket. For Details, see "Water Line Bracket Details" Sheet 27.
1-L6 x 8 x 1/2
L0
L0 - L2 (LA)
2-℘ 1 5/8 x 24
1-℘ 1 x 13 3/4
⊙ Omit these Bolts in Exterior Gusset Plate to Hanger connections.
1-L3 1/2 x 5 x 1/2 x 20" (Floorbeam side only)
2-℘ 3/4 x 24
Fill ℘ 3/4 x 5
1-L5 x 3 1/2 x 1/2
L1
L4 x 3 1/2 x 5/8
4 - 4" x 8" Slotted Holes in Web of Lower Chords, equally spaced in each Truss Panel.
12" Min. from edge of Gusset ℘, Typ.
7/8" ø A325 Bolts
End Floorbeam
WT12 x 52
Note: Caulk exposed gaps between plates in Chord Field Splices with Latex Silicon Caulking Compound. See Special Provisions.
3/4" Fill Plate
L3 1/2 x 5 x 1/2
Intermediate Floorbeam
TRUSS DETAILS - JOINTS L0-L1
ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County
HARRINGTON & CORTELYOU, INC.
Consulting Engineers
DETAILED: J.L.K. 01/93
CHECKED: H.C.J. 09/93
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.
SHEET 16 OF 33
A4757

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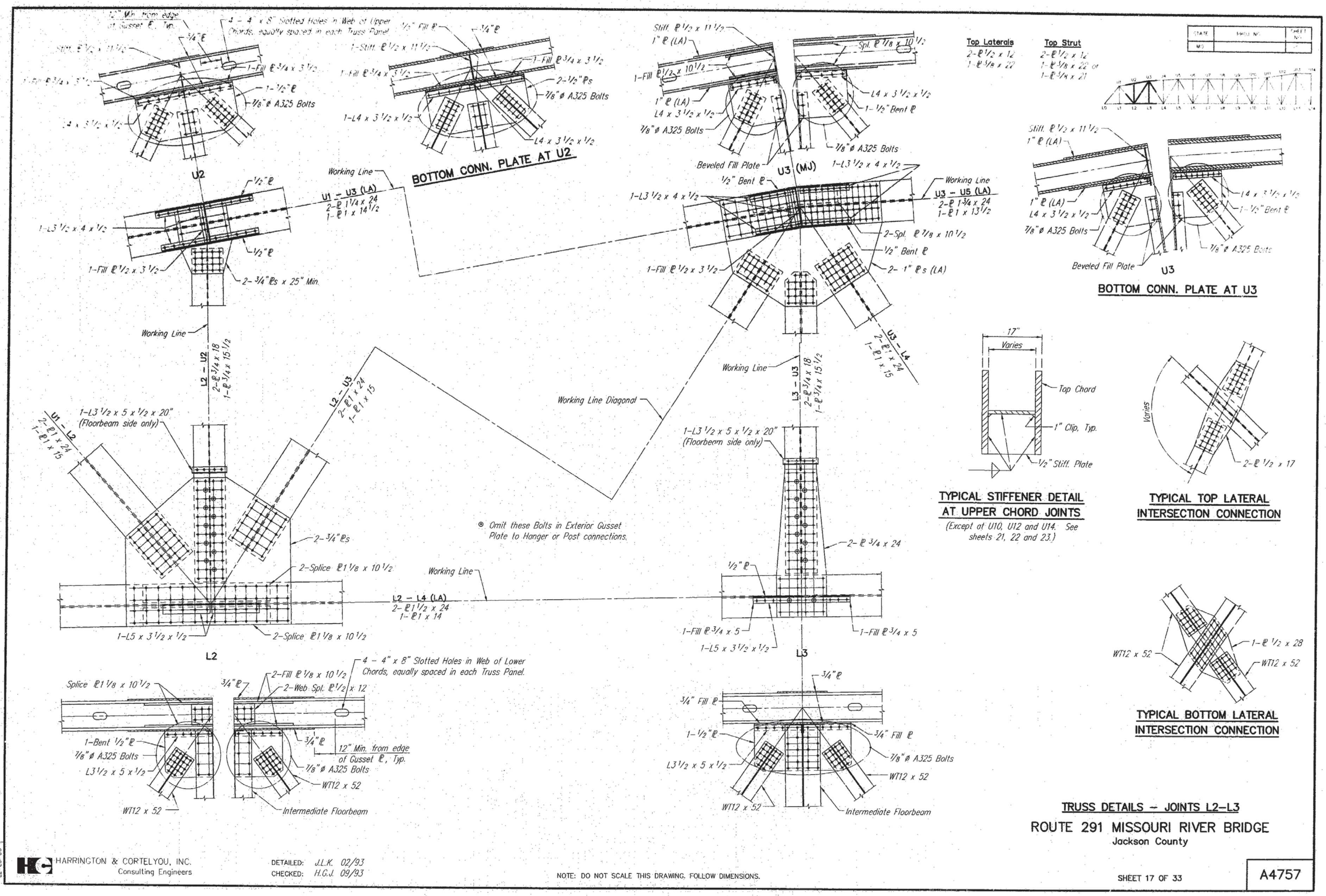
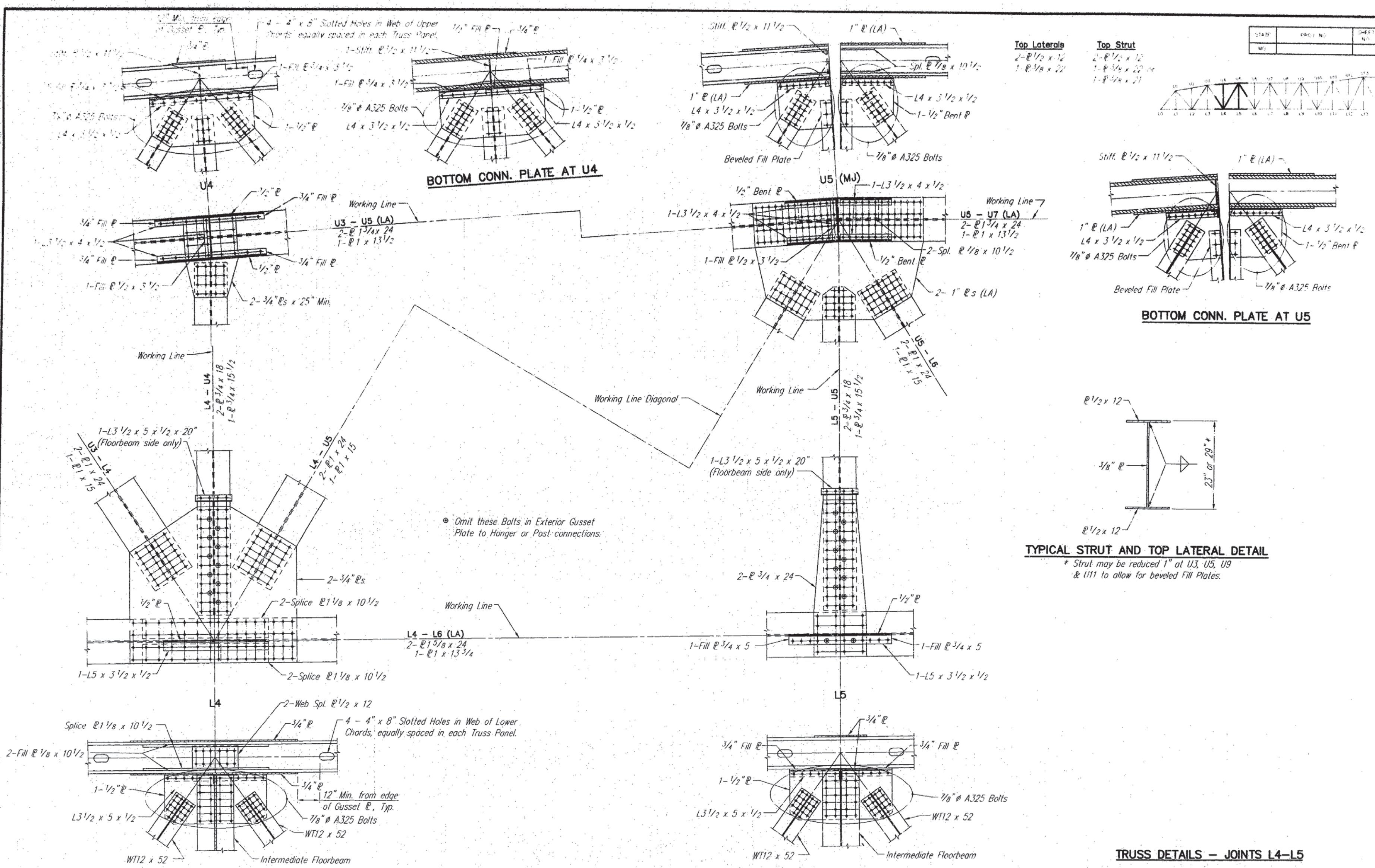


BOTTOM CONN. PLATE AT U2
U2
Working Line
U1 - U3 (LA)
2-℗ 1 1/4 x 24
1-℗ 1 x 14 1/2
1-L3 1/2 x 4 x 1/2
1/2" ℗
1-Fill ℗ 1/2 x 3 1/2
2-3/4" ℗s x 25" Min.
4 - 4" x 8" Slotted Holes in Web of Upper Chords, equally spaced in each Truss Panel.
1-Stiff. ℗ 1/2 x 11 1/2
1-Fill ℗ 3/4 x 3 1/2
2-1/2" ℗s
7/8" ø A325 Bolts
1-L4 x 3 1/2 x 1/2
L4 x 3 1/2 x 1/2
U3 (MJ)
U3 - U5 (LA)
2-℗ 1 3/4 x 24
1-℗ 1 x 13 1/2
Beveled Fill Plate
1/2" Bent ℗
1-L3 1/2 x 4 x 1/2
2-Spl. ℗ 7/8 x 10 1/2
2- 1" ℗s (LA)
1-Fill ℗ 1/2 x 3 1/2
U3 - L4
2-℗ 1 x 24
1-℗ 1 x 15
Top Laterals
2-℗ 1/2 x 12
1-℗ 3/8 x 22
Top Strut
2-℗ 1/2 x 12
1-℗ 3/8 x 22 or
1-℗ 3/4 x 21
BOTTOM CONN. PLATE AT U3
U3
L2 - U2
2-℗ 3/4 x 18
1-℗ 3/4 x 15 1/2
L2 - U3
2-℗ 1 x 24
1-℗ 1 x 15
U1 - L2
2-℗ 1 x 24
1-℗ 1 x 15
1-L3 1/2 x 5 x 1/2 x 20"
(Floorbeam side only)
Working Line Diagonal
L3 - U3
2-℗ 3/4 x 18
1-℗ 3/4 x 15 1/2
2-3/4" ℗s
2-Splice ℗ 1 1/8 x 10 1/2
⊗ Omit these Bolts in Exterior Gusset Plate to Hanger or Post connections.
L2 - L4 (LA)
2-℗ 1 1/2 x 24
1-℗ 1 x 14
1-L5 x 3 1/2 x 1/2
L2
L3
2-℗ 3/4 x 24
1-Fill ℗ 3/4 x 5
4 - 4" x 8" Slotted Holes in Web of Lower Chords, equally spaced in each Truss Panel.
Splice ℗ 1 1/8 x 10 1/2
2-Fill ℗ 1/8 x 10 1/2
2-Web Spl. ℗ 1/2 x 12
1-Bent 1/2" ℗
L3 1/2 x 5 x 1/2
12" Min. from edge of Gusset ℗, Typ.
WT12 x 52
Intermediate Floorbeam
3/4" Fill ℗
TYPICAL STIFFENER DETAIL AT UPPER CHORD JOINTS
(Except at U10, U12 and U14. See sheets 21, 22 and 23.)
17"
Varies
Top Chord
1" Clip, Typ.
1/2" Stiff. Plate
TYPICAL TOP LATERAL INTERSECTION CONNECTION
2-℗ 1/2 x 17
TYPICAL BOTTOM LATERAL INTERSECTION CONNECTION
1-℗ 1/2 x 28
TRUSS DETAILS - JOINTS L2-L3
ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County
HARRINGTON & CORTELYOU, INC.
Consulting Engineers
DETAILED: J.L.K. 02/93
CHECKED: H.G.J. 09/93
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.
SHEET 17 OF 33
A4757

517

520



TRUSS DETAILS – JOINTS L4–L5

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

L4-L5-U5

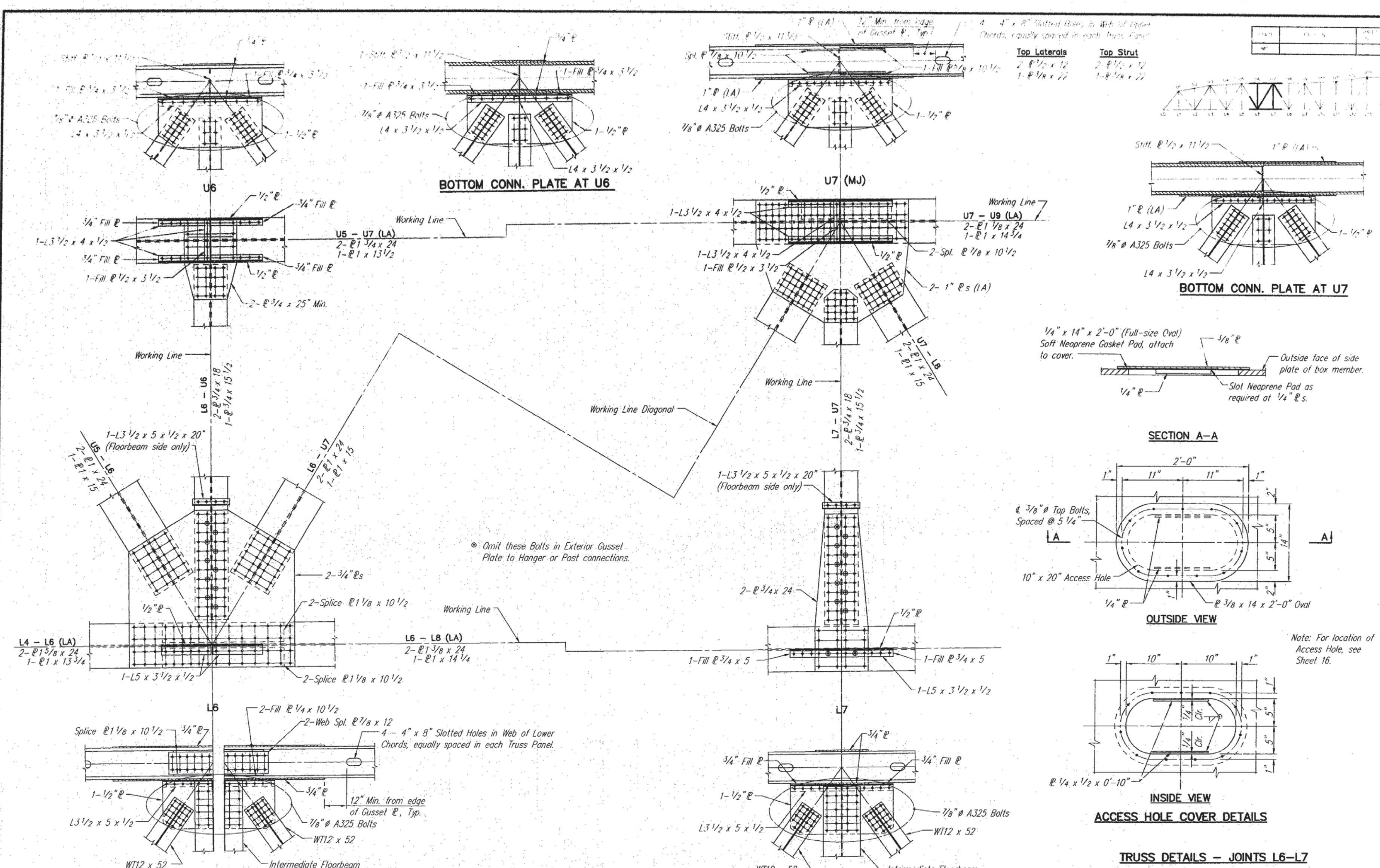
HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.L.K. 03/93
CHECKED: H.G.J. 09/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 18 OF 33

A4757



TRUSS DETAILS - JOINTS L6-L7

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

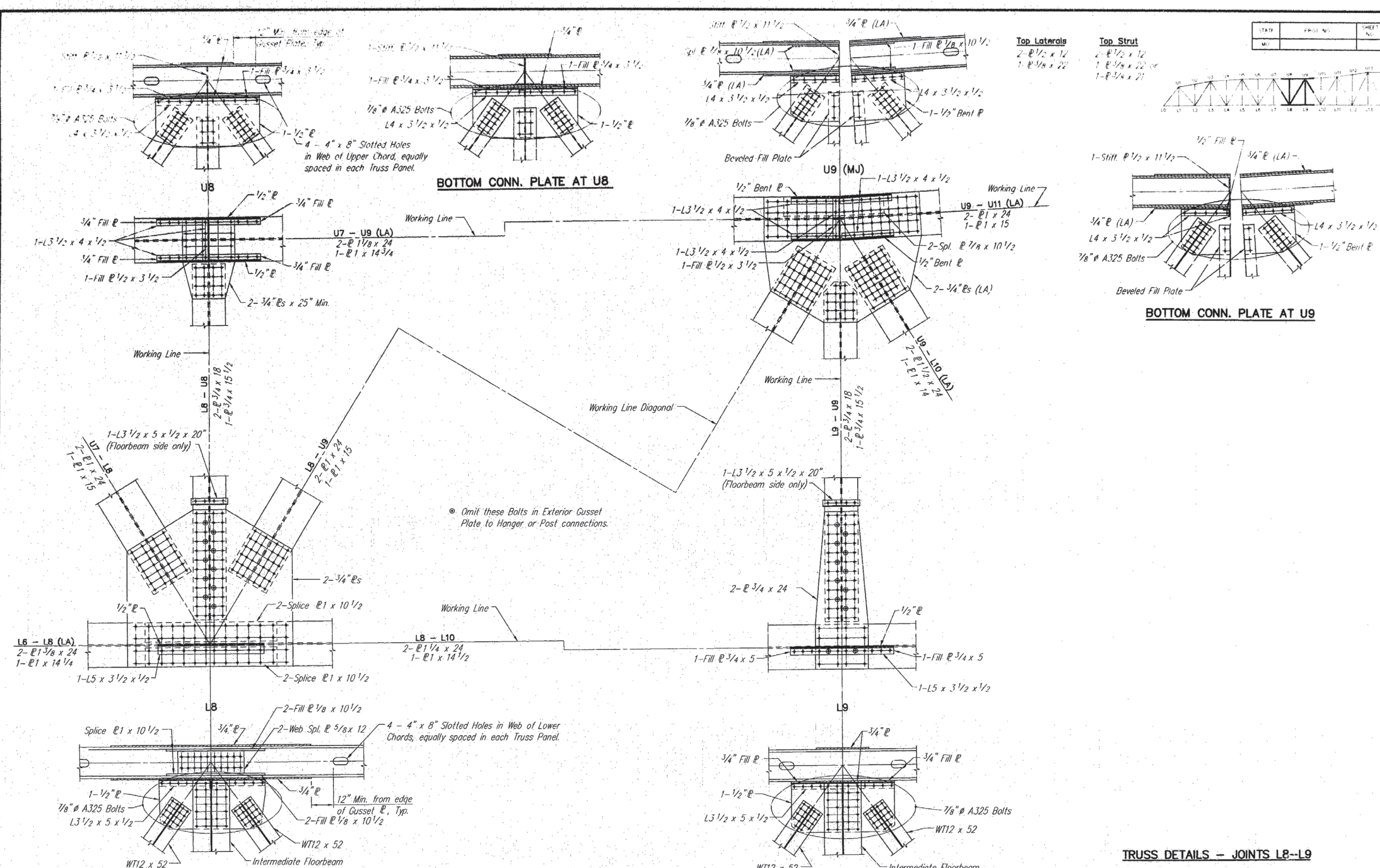
DETAILED: J.L.K. 03/93
CHECKED: H.G.J. 09/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 19 OF 33

A4757

521



TRUSS DETAILS – JOINTS L8--L9

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.L.K. 03/93
CHECKED: H.G.J. 09/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 20 OF 33

A4757

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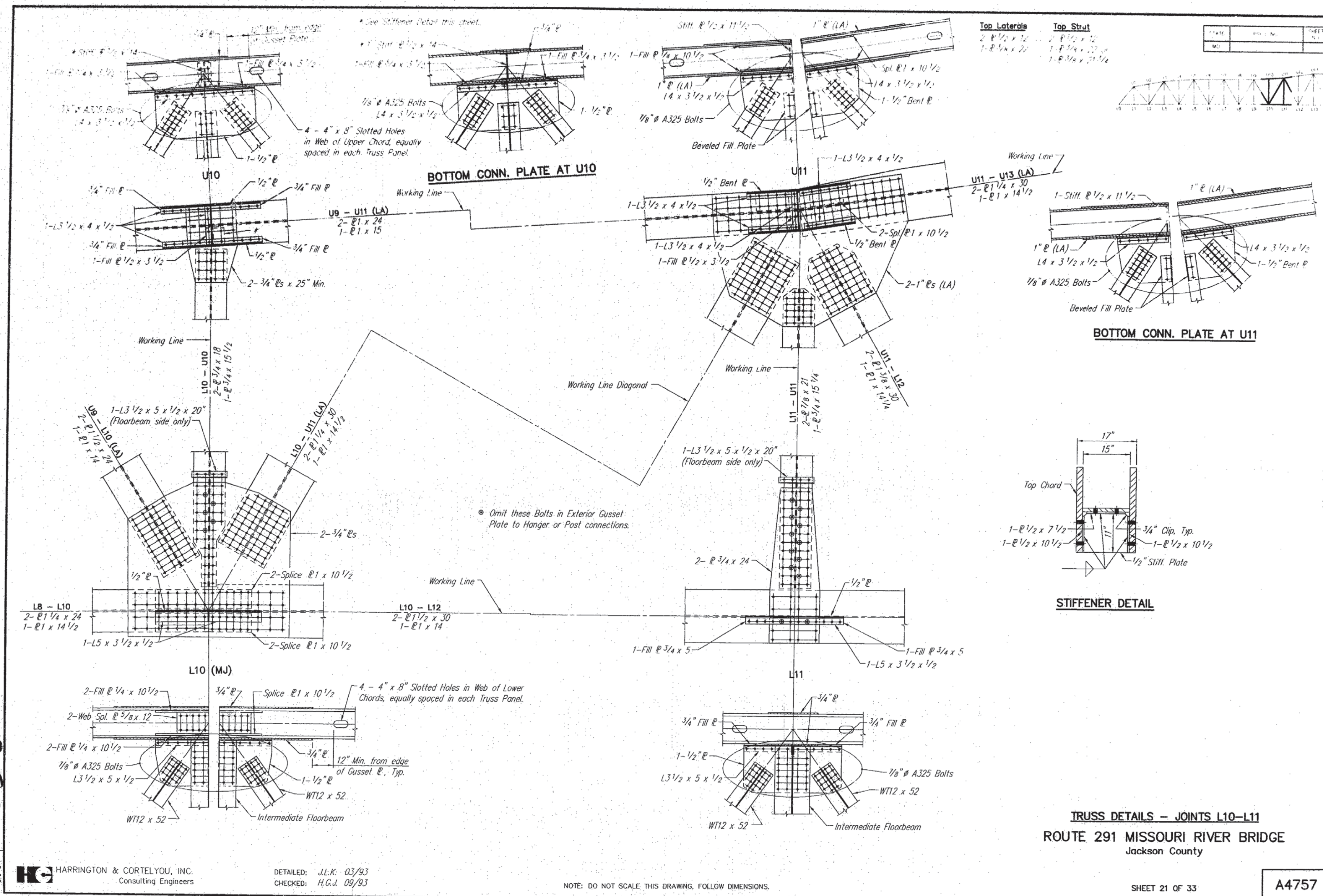
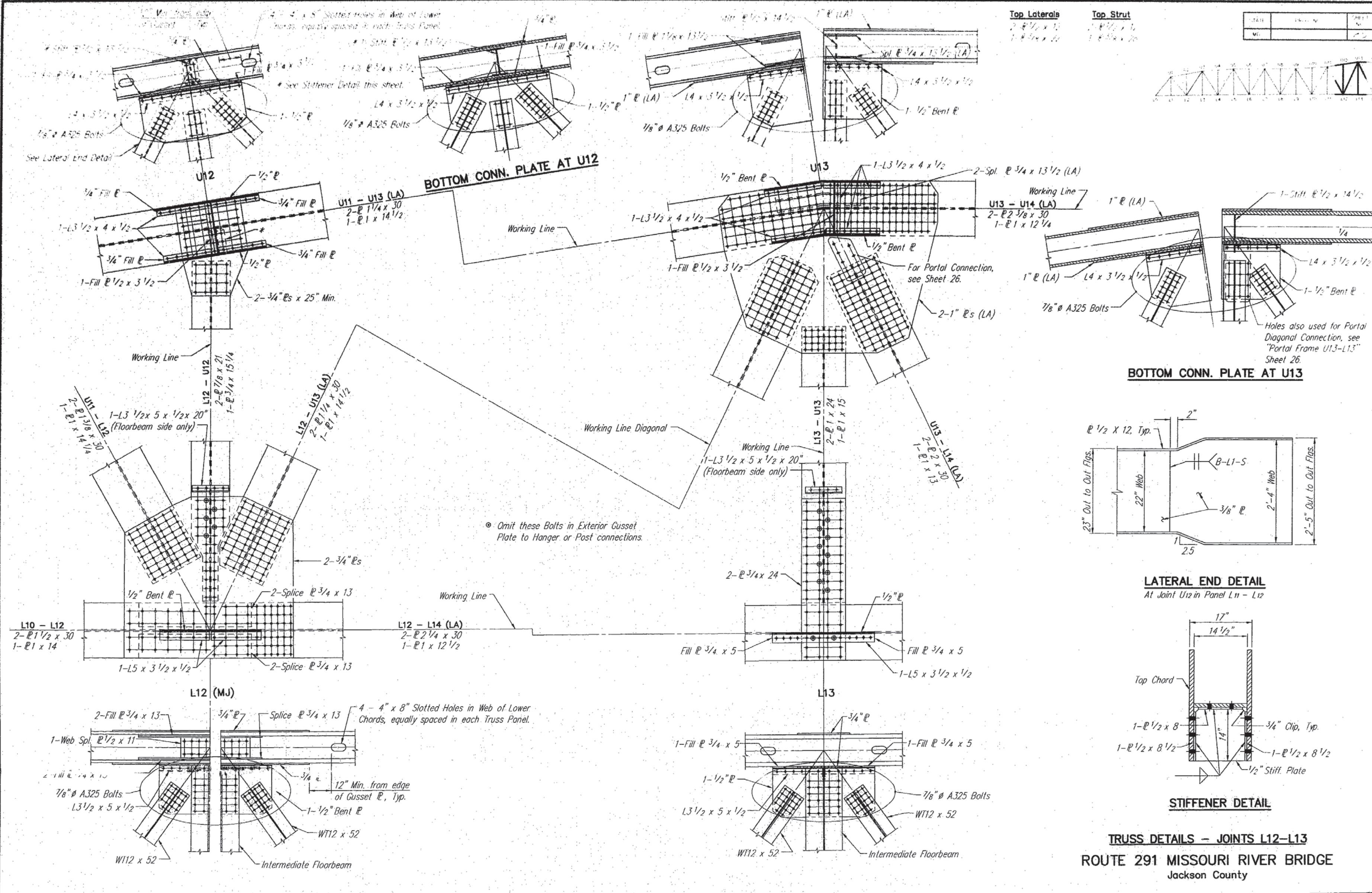
523


BOTTOM CONN. PLATE AT U10
BOTTOM CONN. PLATE AT U11
STIFFENER DETAIL
U10
U11
L10 (MJ)
L11
U9 – U11 (LA)
2– ℘1 x 24
1– ℘1 x 15
U11 – U13 (LA)
2– ℘1 1/4 x 30
1– ℘1 x 14 1/2
L10 – U10
2–℘3/4 x 18
1–℘3/4 x 15 1/2
L11 – U11
2–℘7/8 x 21
1–℘3/4 x 15 1/4
U11 – L12
2–℘1 3/8 x 30
1–℘1 x 14 1/4
U9 – L10 (LA)
2–℘1 1/2 x 24
1–℘1 x 14
L10 – U11 (LA)
2–℘1 1/4 x 30
1–℘1 x 14 1/2
L8 – L10
2– ℘1 1/4 x 24
1– ℘1 x 14 1/2
L10 – L12
2– ℘1 1/2 x 30
1– ℘1 x 14
Working Line
Working Line Diagonal
⊙ Omit these Bolts in Exterior Gusset Plate to Hanger or Post connections.
1–L3 1/2 x 5 x 1/2 x 20" (Floorbeam side only)
2– 3/4" ℘s
2–Splice ℘1 x 10 1/2
1–L5 x 3 1/2 x 1/2
2– ℘3/4 x 24
1–Fill ℘3/4 x 5
2– 3/4" ℘s x 25" Min.
2–Spl. ℘1 x 10 1/2
2–1" ℘s (LA)
1/2" Bent ℘
Beveled Fill Plate
7/8" ø A325 Bolts
4 – 4" x 8" Slotted Holes in Web of Upper Chord, equally spaced in each Truss Panel.
4 – 4" x 8" Slotted Holes in Web of Lower Chords, equally spaced in each Truss Panel.
12" Min. from edge of Gusset ℘, Typ.
2–Web Spl. ℘5/8 x 12
2–Fill ℘1/4 x 10 1/2
L3 1/2 x 5 x 1/2
WT12 x 52
Intermediate Floorbeam
Top Chord
3/4" Clip, Typ.
1/2" Stiff. Plate
1–℘1/2 x 7 1/2
1–℘1/2 x 10 1/2
17"
15"
Top Laterals
Top Strut
TRUSS DETAILS – JOINTS L10–L11
ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County
HARRINGTON & CORTELYOU, INC.
Consulting Engineers
DETAILED: J.L.K. 03/93
CHECKED: H.G.J. 09/93
NOTE: DO NOT SCALE THIS DRAWING, FOLLOW DIMENSIONS.
SHEET 21 OF 33
A4757



TRUSS DETAILS – JOINTS L12–L13

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.L.K. 03/93
CHECKED: H.G.J. 09/93

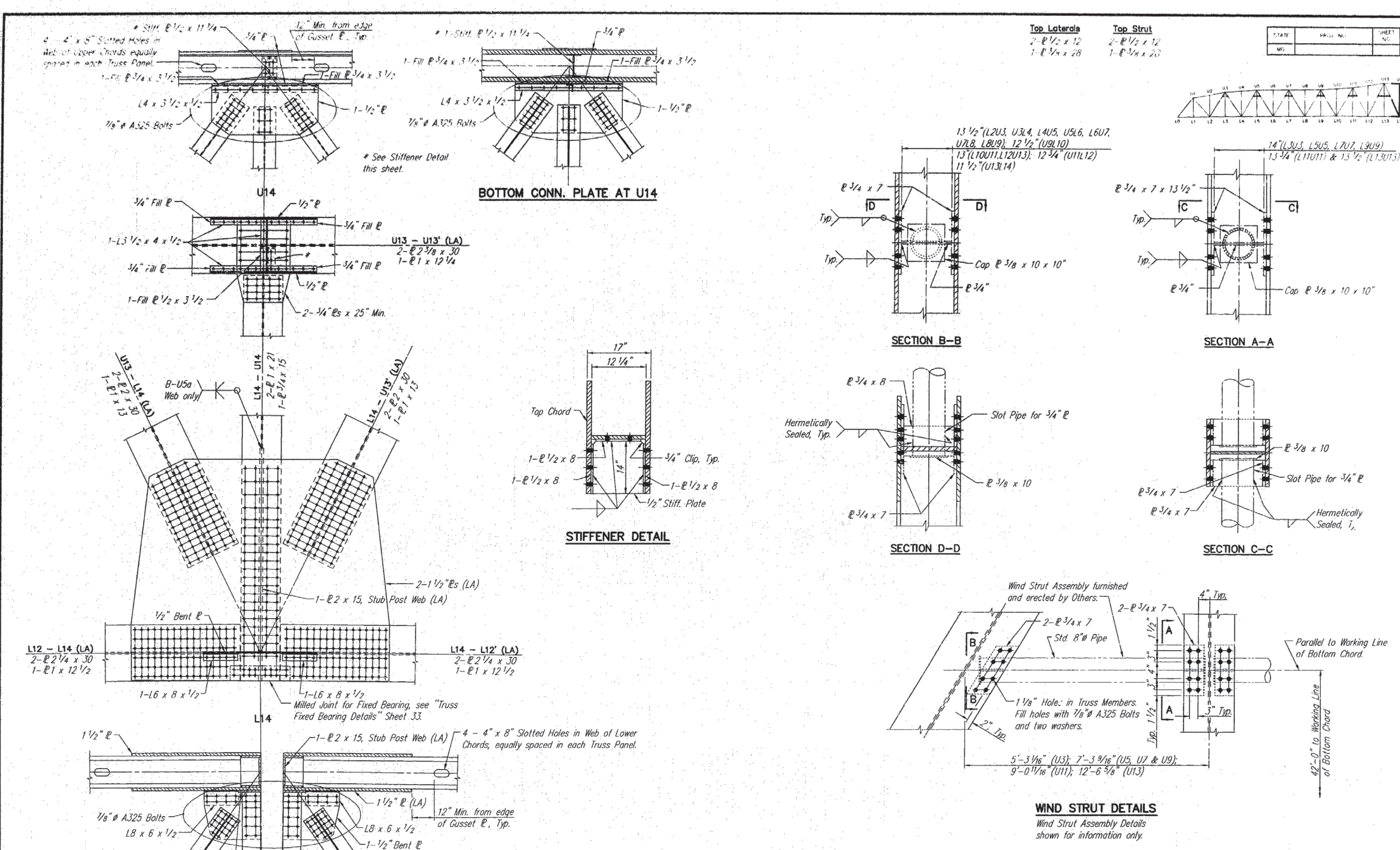
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 22 OF 33

A4757

L12-L13

527



525

TRUSS DETAILS – JOINT L14

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

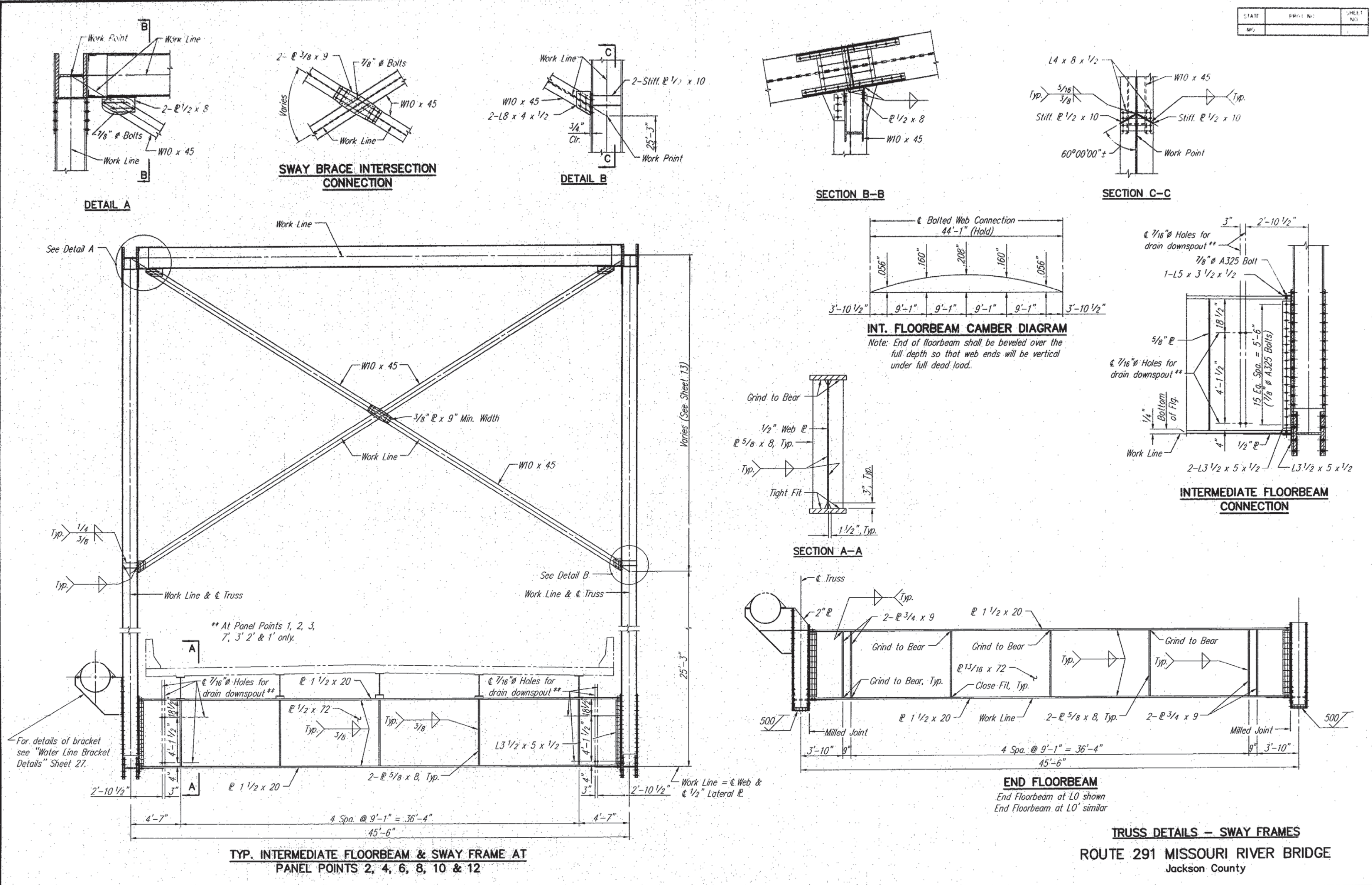
HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.L.K. 05/93
CHECKED: H.G.J. 09/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 23 OF 33

A4757



TRUSS DETAILS – SWAY FRAMES

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.L.K. 03/93
CHECKED: H.G.J. 09/93

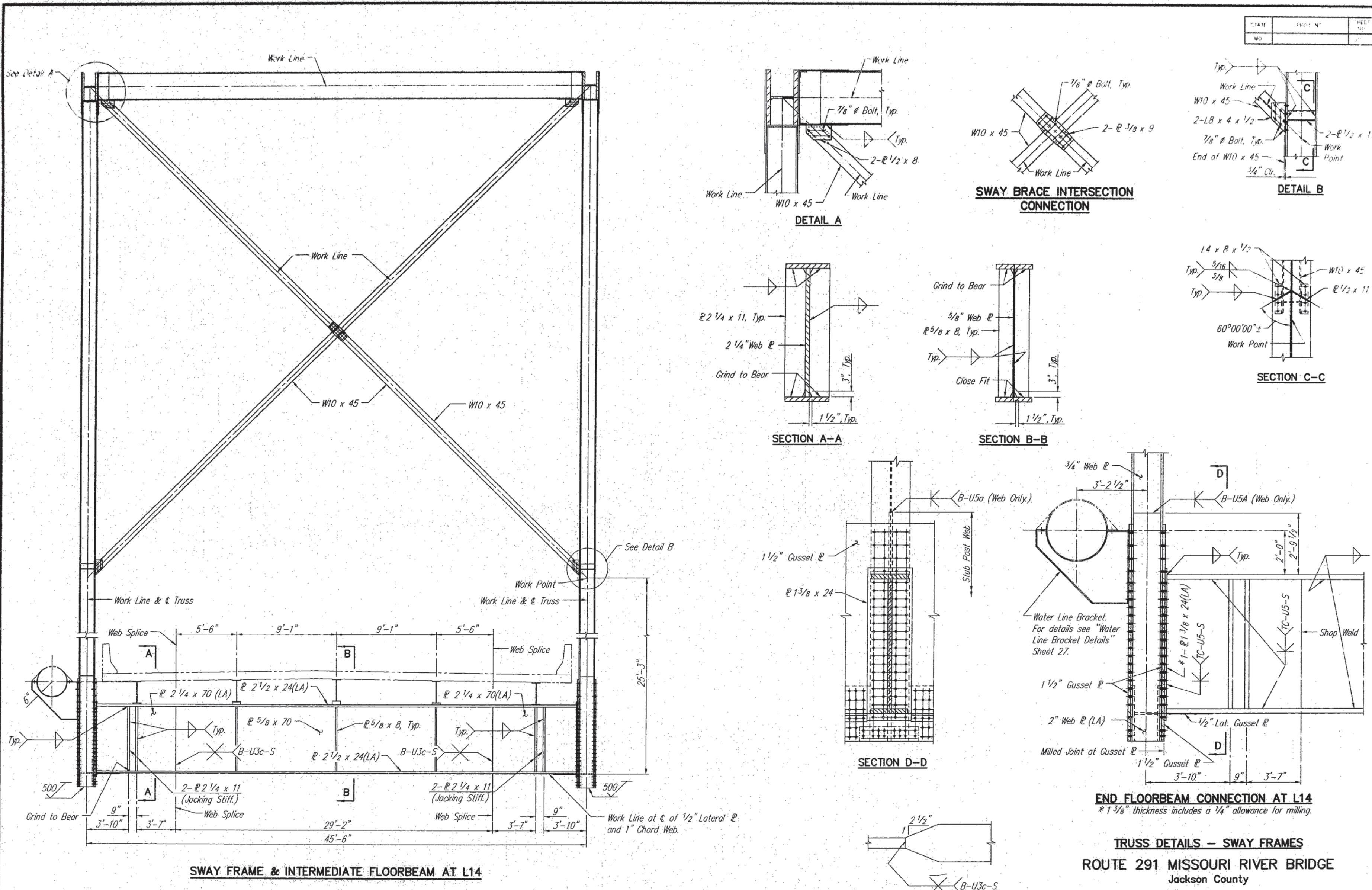
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 24 OF 33

A4757

SWAY-FRA

526



TRUSS DETAILS – SWAY FRAMES

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.L.K. 03/93
CHECKED: H.G.J. 09/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

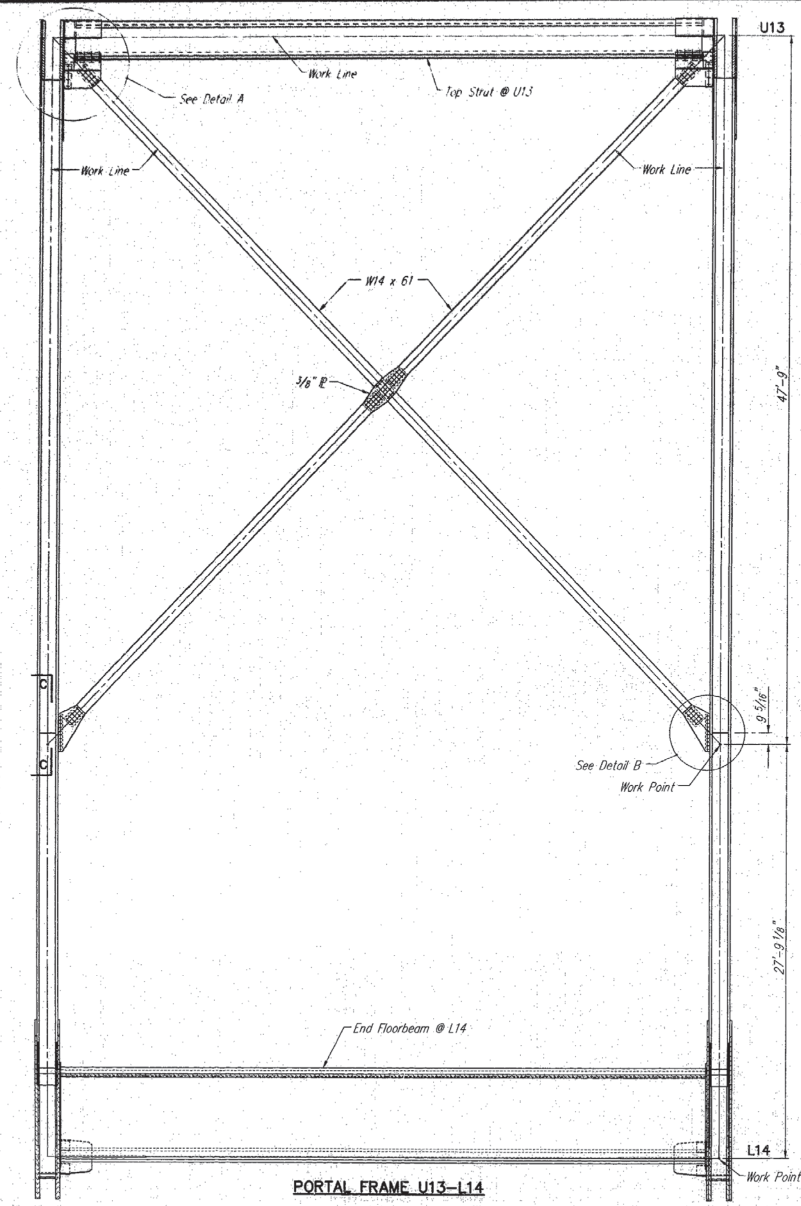
SHEET 25 OF 33

A4757

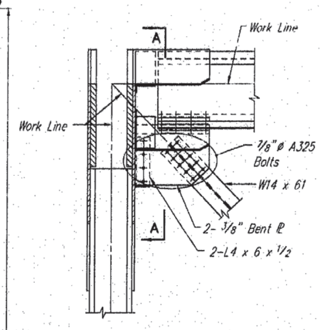
SWAY-L14

527

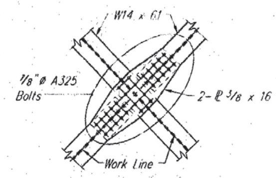
STATE	PROJ. NO.	SHEET NO.
MO		



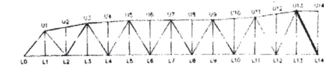
PORTAL FRAME U13–L14

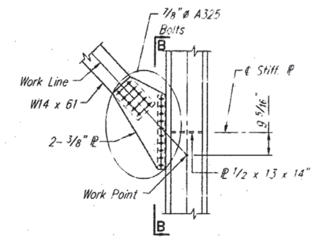


DETAIL A

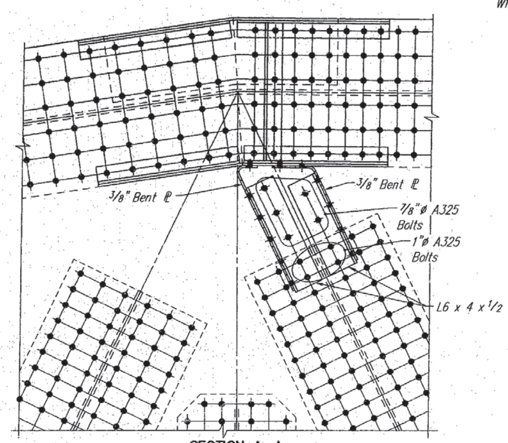


SWAY BRACE INTERSECTION CONNECTION

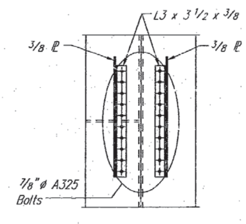




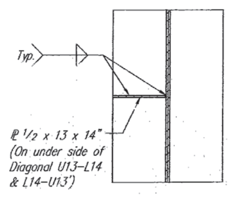
DETAIL B



SECTION A–A



SECTION B–B



SECTION C–C

528

U13-PORT

HC HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.L.K. 03/93
CHECKED: H.G.J. 09/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

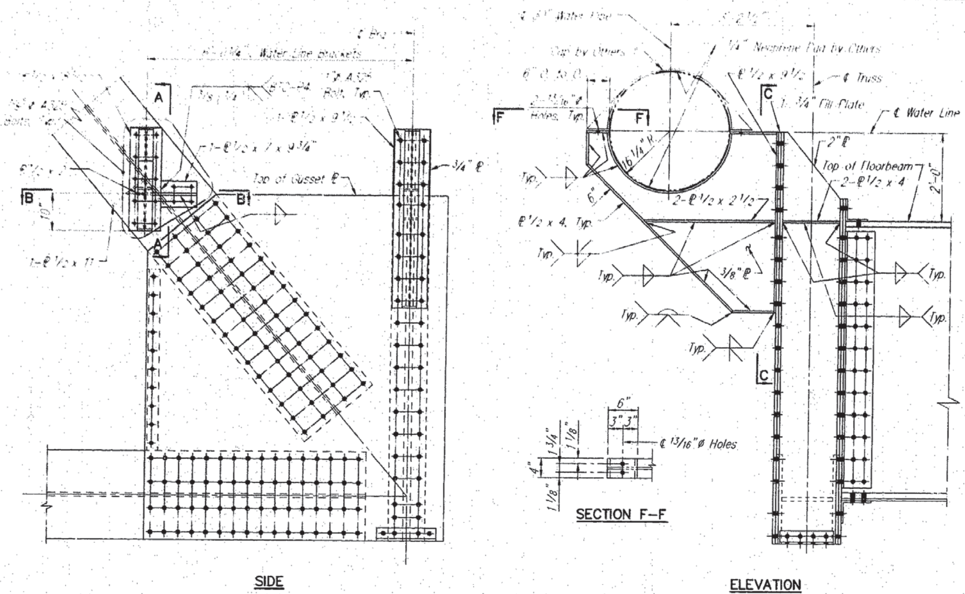
TRUSS DETAILS – PORTAL FRAME U13–L14

ROUTE 291 MISSOURI RIVER BRIDGE

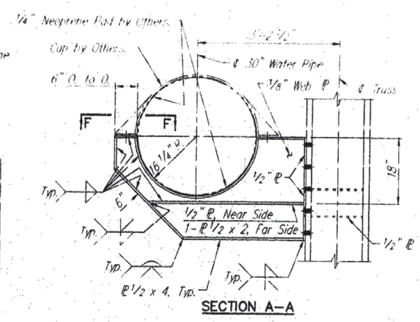
Jackson County

SHEET 26 OF 33

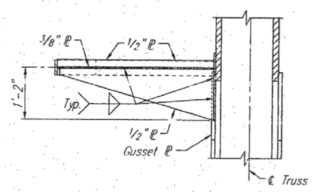
A4757



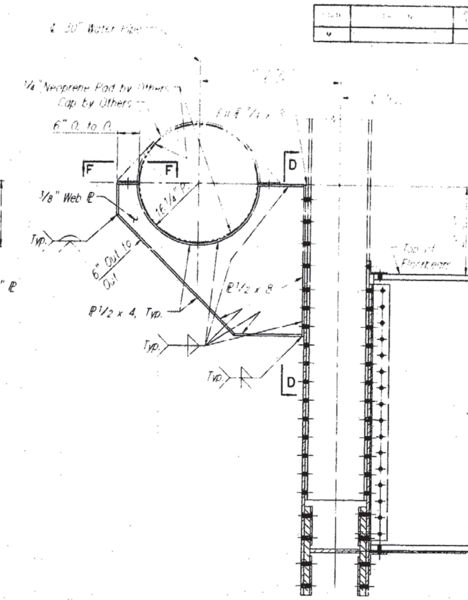
BRACKET DETAILS – END FLOORBEAMS LO & LO'



SECTION A–A

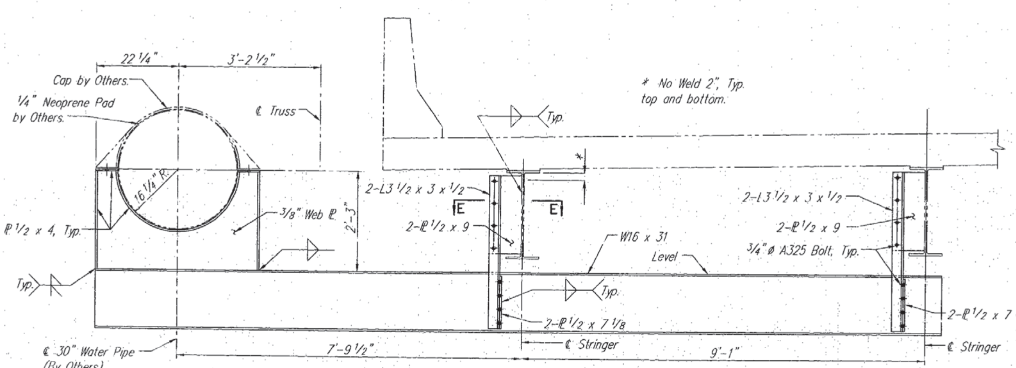


SECTION B–B

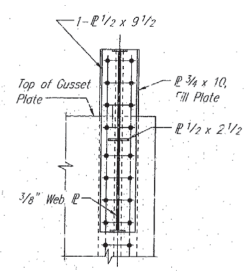


BRACKET DETAILS – INTERMEDIATE FLOORBEAMS

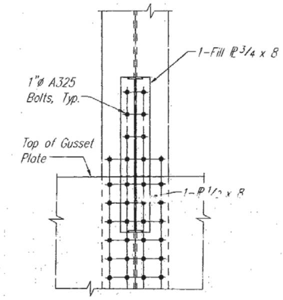
Note: Modify bracket as required to fit bolt pattern at L14.



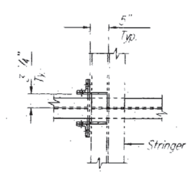
BRACKET DETAILS – MIDWAY BETWEEN FLOORBEAMS



SECTION C–C



SECTION D–D



SECTION E–E

WATER LINE BRACKET DETAILS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.L.K. 03/93
CHECKED: H.G.J. 09/93

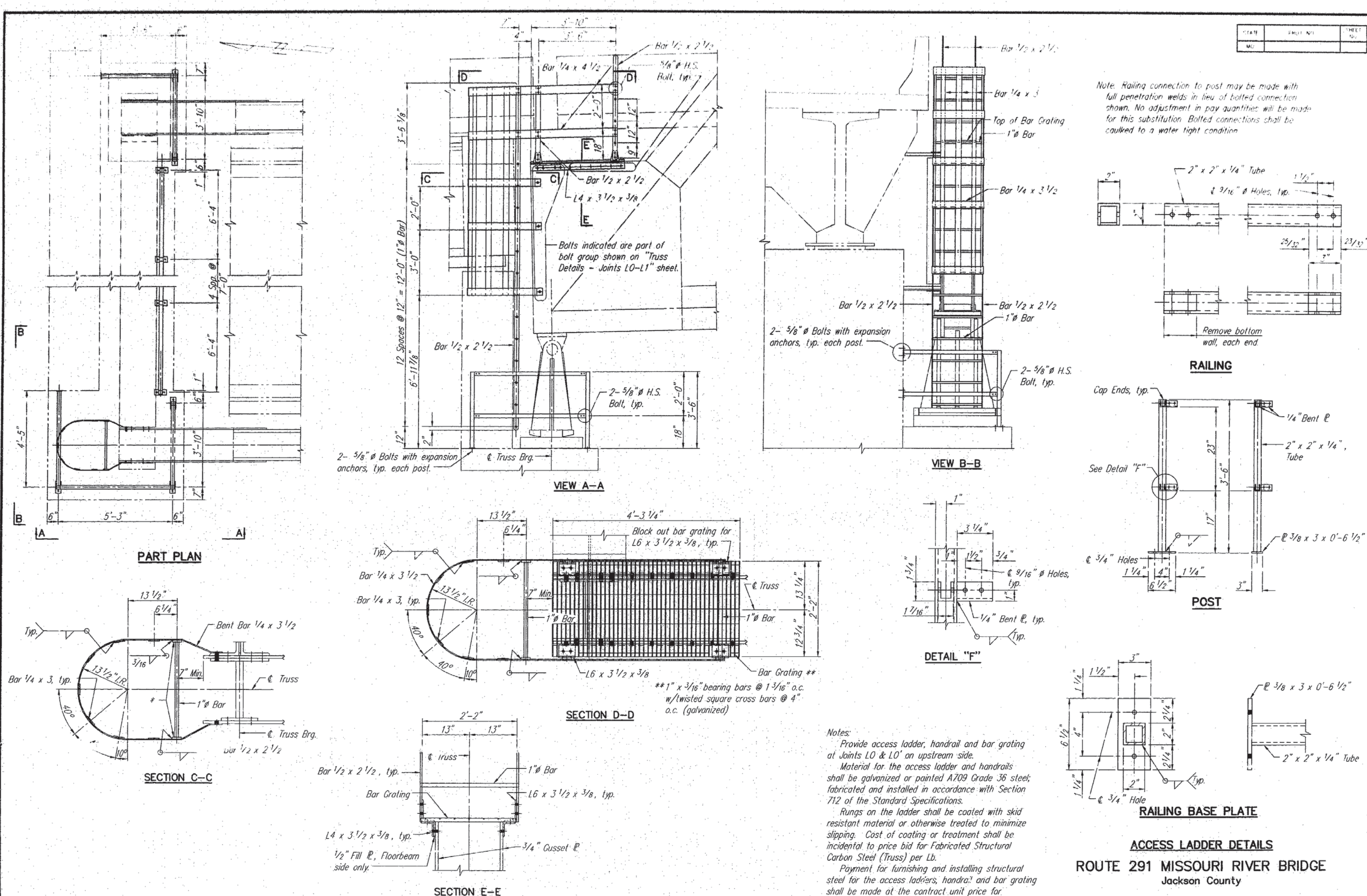
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 27 OF 33

A4757

PIPEBKT

329



Note: Railing connection to post may be made with full penetration welds in lieu of bolted connection shown. No adjustment in pay quantities will be made for this substitution. Bolted connections shall be caulked to a water tight condition.

STATE	PROJ. NO.	SHEET NO.
MO		

Notes:

Provide access ladder, handrail and bar grating at Joints L0 & L0' on upstream side.

Material for the access ladder and handrails shall be galvanized or painted A709 Grade 36 steel; fabricated and installed in accordance with Section 712 of the Standard Specifications.

Rungs on the ladder shall be coated with skid resistant material or otherwise treated to minimize slipping. Cost of coating or treatment shall be incidental to price bid for Fabricated Structural Carbon Steel (Truss) per Lb.

Payment for furnishing and installing structural steel for the access ladders, handrail and bar grating shall be made at the contract unit price for Fabricated Structural Carbon Steel (Truss) per Lb.

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

ACCESS LADDER DETAILS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

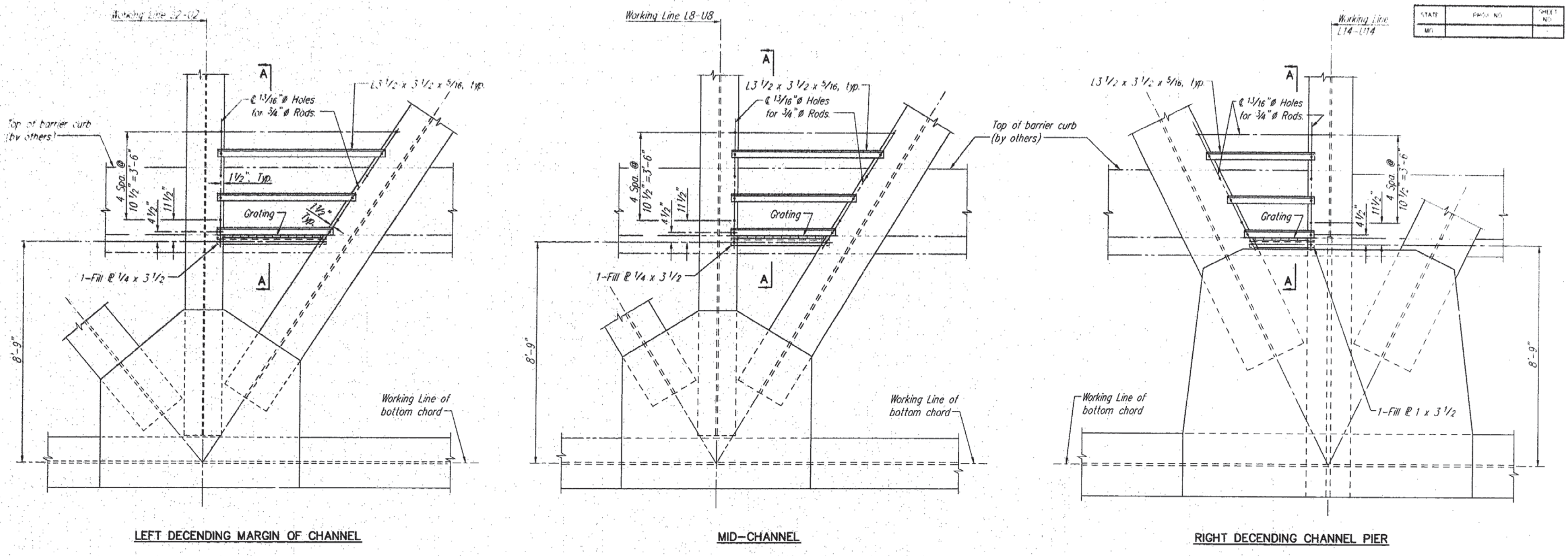
HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.L.K. 03/94
CHECKED: M.J.T. 04/94

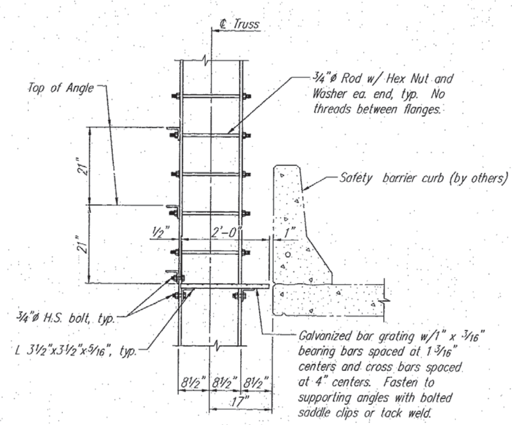
A4757

530

LADDER



PLATFORM DETAILS



SECTION A-A

Notes:
Material for access platforms shall be galvanized or painted A709 Grade A36 steel, fabricated and installed in accordance with Section 712 of the Standard Specifications.
The weight of all material for the access platforms (3 total) has been included in the quantity listed for "Fabricated Structural Carbon Steel (Truss)" per Lbs.

ACCESS PLATFORM DETAILS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

STATE	PROJ. NO.	SHEET NO.
MO		

531

PLATFORM

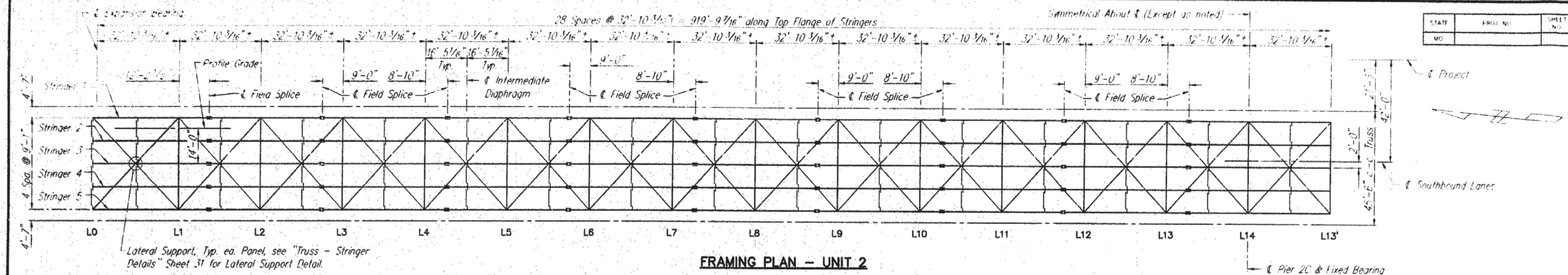
HC HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: JKG/JLK 10/94
CHECKED: E.W.N. 7/95

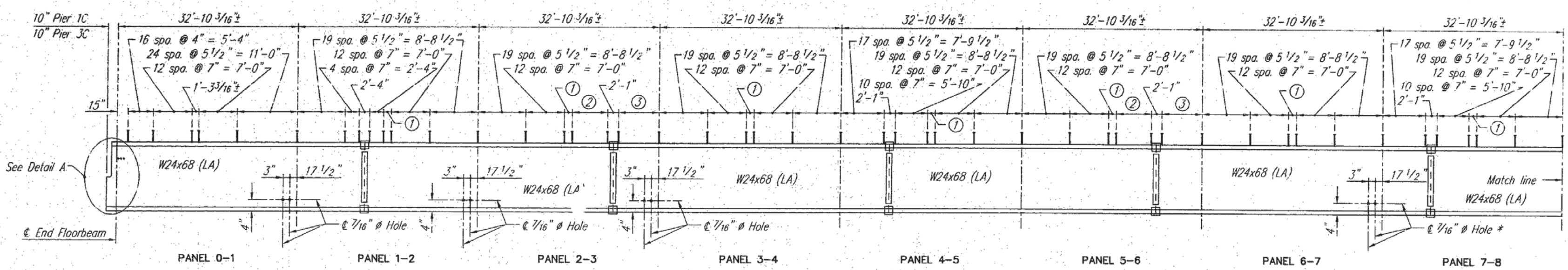
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

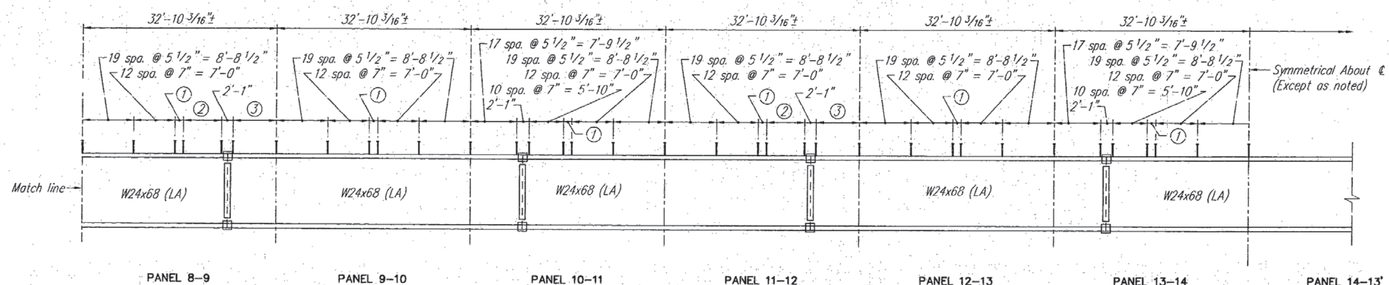
SHEET 29 OF 33

A4757

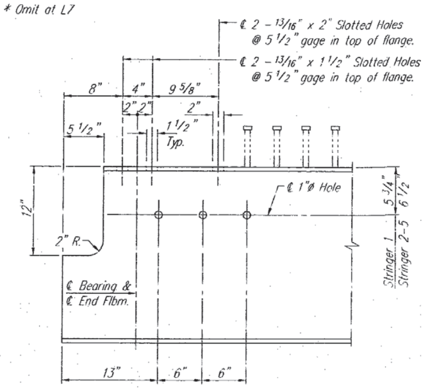


FRAMING PLAN – UNIT 2





STRINGER ELEVATION



DETAIL A

Note: Contractor may omit field splices if longer field sections are desired. No quantity change will be made for weight of omitted field splices.

Note: Spacing of Shear Connectors shown for information only. Shear Connectors to be installed by others.
① 2 spa. = 1'-5 3/16" ±
② 10 spa. @ 7" = 5'-10"
③ 17 spa. @ 5 1/2" = 7'-9 1/2"

FRAMING PLAN – UNIT 2

ROUTE 291 MISSOURI RIVER BRIDGE

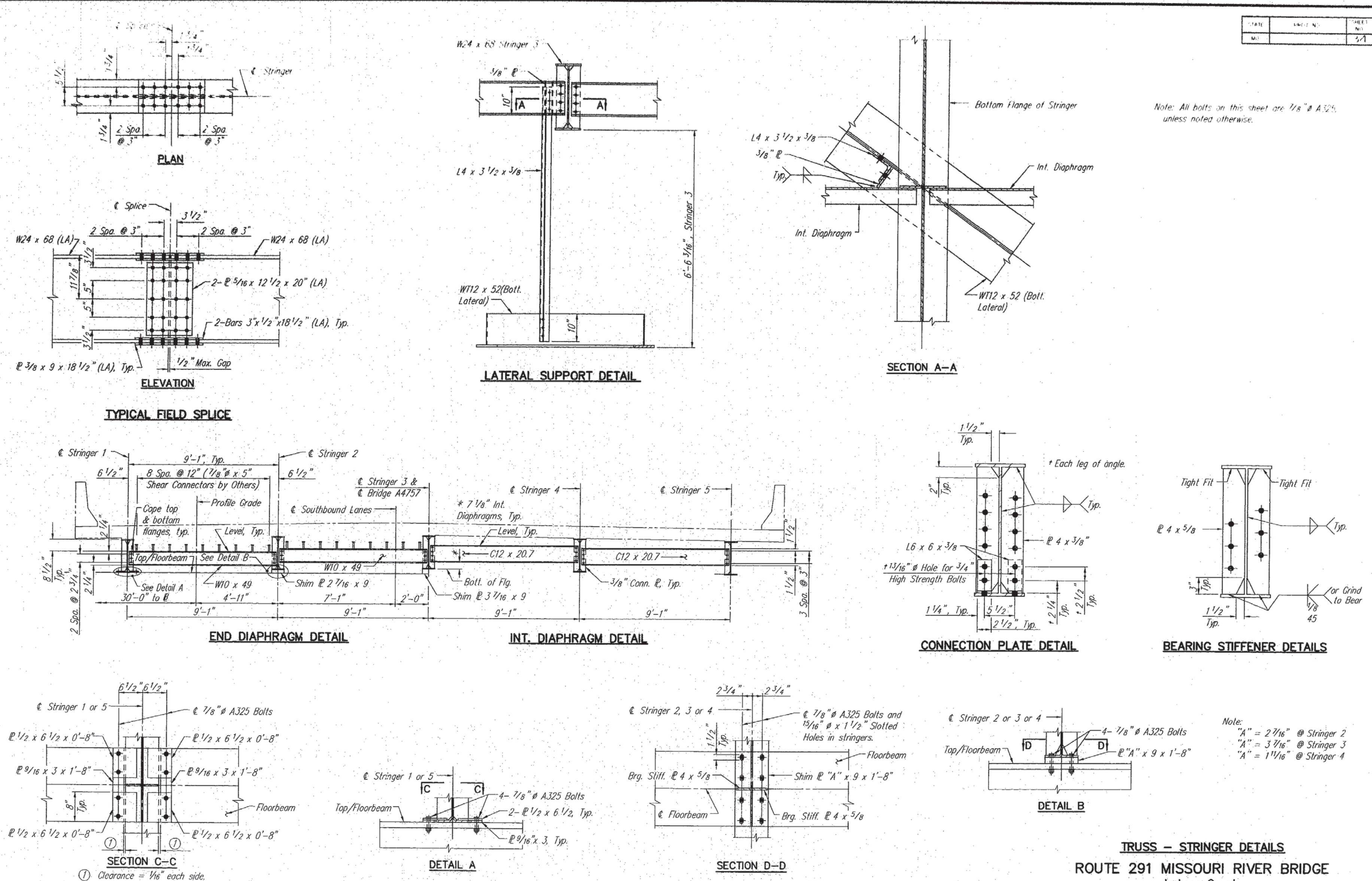
Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: S.A.K. 05/93
CHECKED: H.C.J. 09/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

A4757



TRUSS - STRINGER DETAILS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: S.A.K./J.L.K. 05/93
CHECKED: H.G.J. 09/93

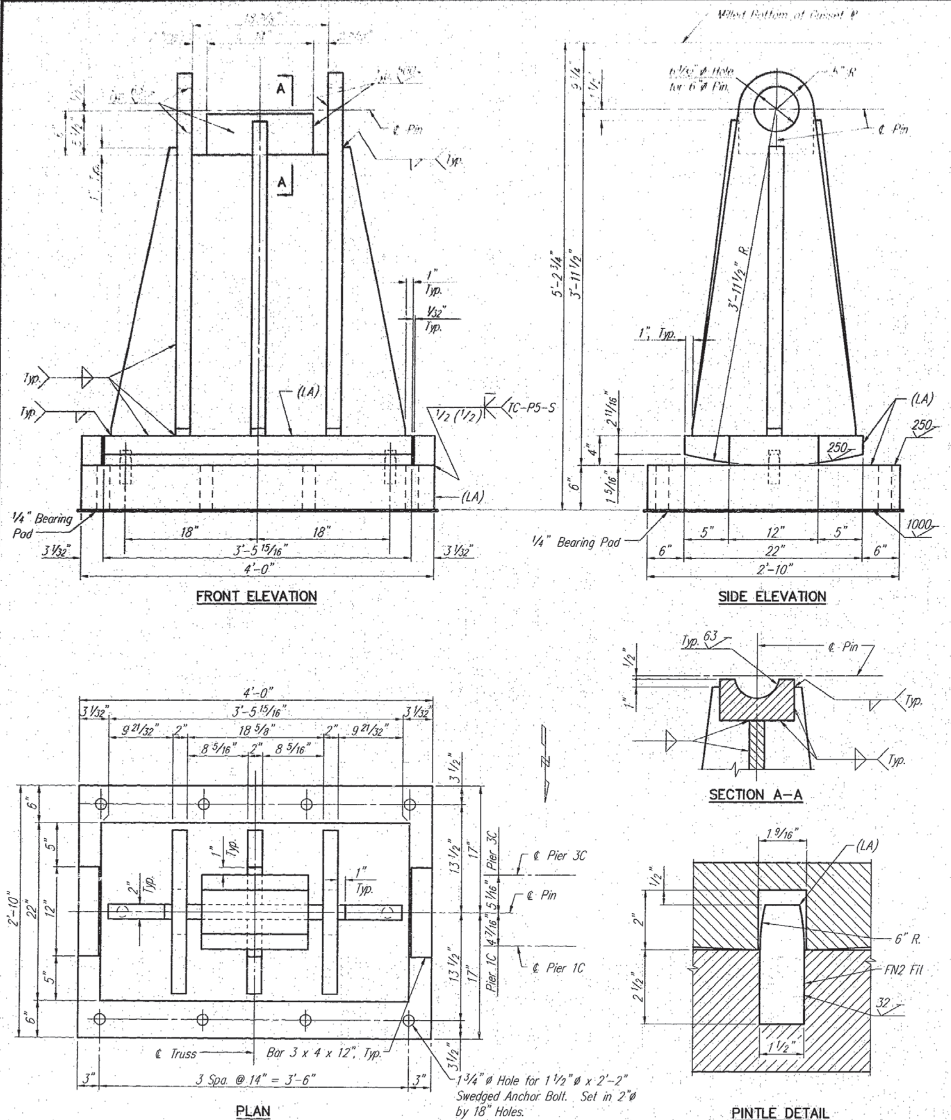
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 31 OF 33

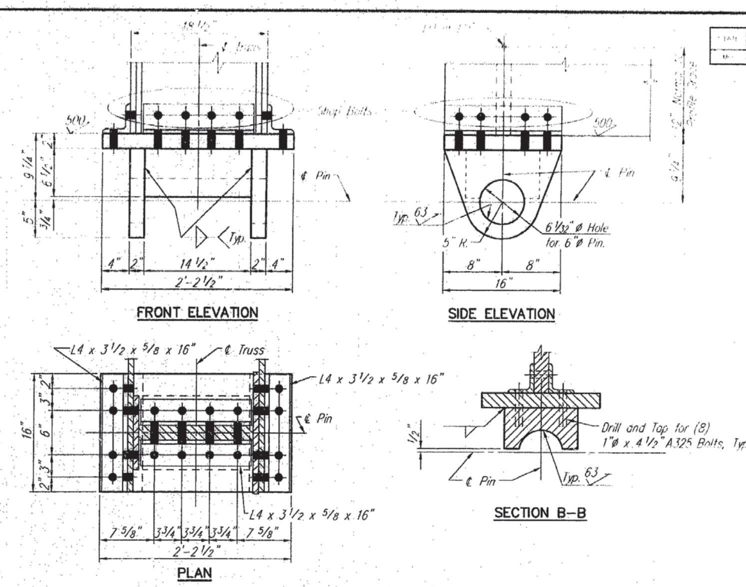
A4757

533

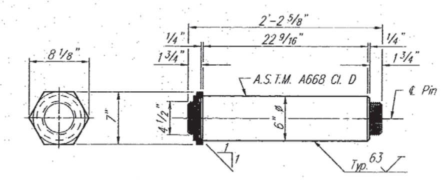
534



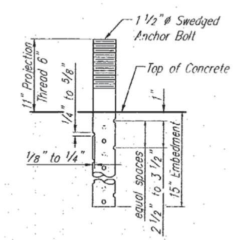
EXPANSION SHOE – TRUSS SPAN



SHOE CAP – TRUSS SPAN



PIN DETAILS



SWEDGE ANCHOR BOLT

Notes:

All connections shall be made with 1"ø High Strength (H.S.) Bolts.

All contact surface between plates to be welded shall be finished to 250.

Weldments shall be stress relieved and tested prior to any machining or boring.

Anchor Bolts shall conform to the requirements of A.S.T.M. A588.

Shop coat Pins and pin bearing surfaces with National Lubricating Institute No. 3 Multipurpose Grease or an approved equal upon completion of machining.

All Base Plates shall be scribed with longitudinal and transverse centerlines.

The Contractor shall drill Holes as specified into top of Pier Columns for Anchor Bolts. Anchor Bolts shall be set in drilled holes in accordance with Article 712.6 of the Standard Specifications.

Fill spaces around Anchor Bolts with Molten Zinc before placing Nuts.

Shop Bolts in connections of Shoe Caps to Truss shall be installed before machining contact surfaces.

The Shoe Caps and Rockers or Bases shall be assembled, bored as units and match marked before disassembly.

Anchor Bolts shall be 1½"ø A588 steel swedged bolts and shall extend 15" into the concrete with A194-2, 2H or A563-c, C3, D, DH, DH3 heavy hexagon nuts. Actual manufacturer's certified mill test reports (chemical and mechanical) shall be provided. (Swedging shall be 1" less than the extension into the concrete).

All structural steel for the Masonary Plate, Rocker Plates etc. and Anchor Bolts shall be painted with a minimum of 2 coats of inorganic zinc primer (5 mils min.) in accordance with the Special Provisions.

Structural steel for the Bearings shall be A709 Grade 50 or Grade 50W and A709 Grade A36.

Bearing pads shall be 60 durometer neoprene pads and extend ½" beyond masonry plate.

TRUSS EXPANSION BEARING DETAILS – PIERS 1C & 3C

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.L.K. 05/93
CHECKED: H.G.J. 09/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 32 OF 33

A4757

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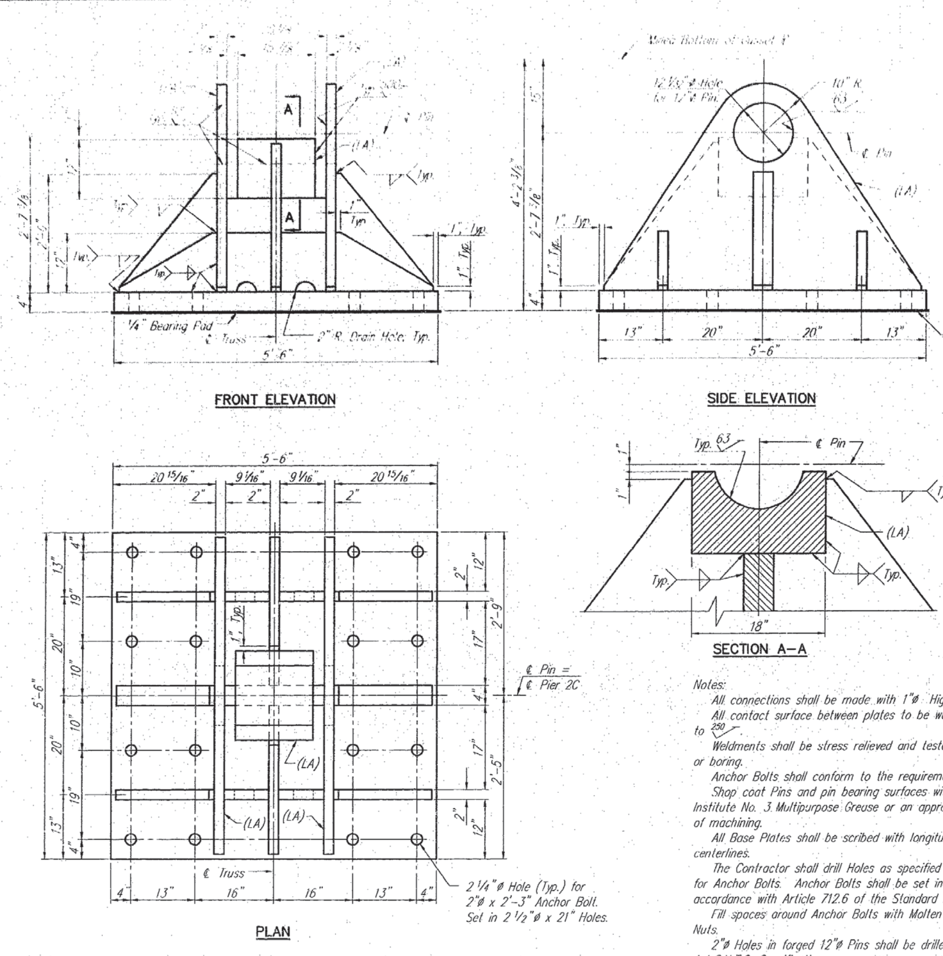
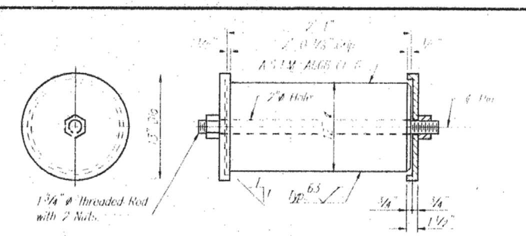
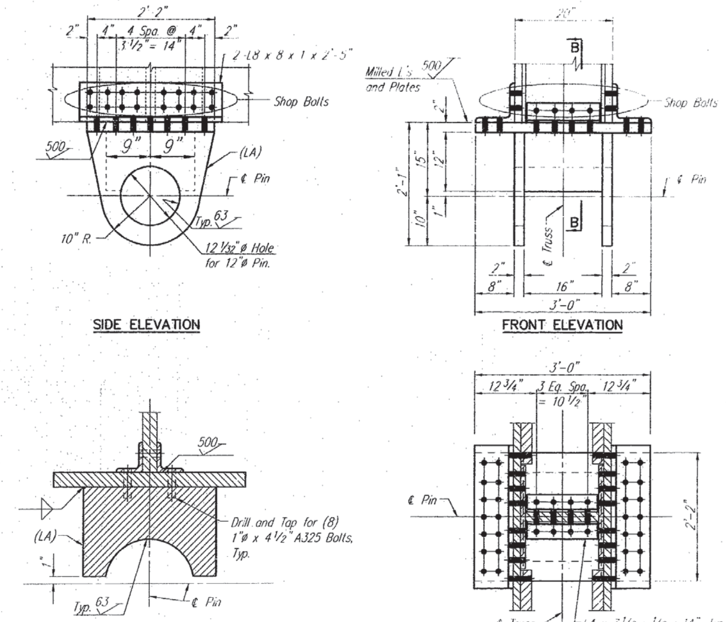


FIXED SHOE – TRUSS SPAN



PIN DETAILS



SHOE CAP – TRUSS SPAN

Notes:

All connections shall be made with 1"ø High Strength (H.S.) Bolts.

All contact surface between plates to be welded shall be finished to 250.

Weldments shall be stress relieved and tested prior to any machining or boring.

Anchor Bolts shall conform to the requirements of A.S.T.M. A588.

Shop coat Pins and pin bearing surfaces with National Lubricating Institute No. 3 Multipurpose Grease or an approved equal upon completion of machining.

All Base Plates shall be scribed with longitudinal and transverse centerlines.

The Contractor shall drill Holes as specified into top of Pier Columns for Anchor Bolts. Anchor Bolts shall be set in drilled holes in accordance with Article 712.6 of the Standard Specifications.

Fill spaces around Anchor Bolts with Molten Zinc before placing Nuts.

2"ø Holes in forged 12"ø Pins shall be drilled prior to cooling per A.A.S.H.T.O. Specifications.

Shop Bolts in connections of Shoe Caps to Truss shall be installed before machining contact surfa...

The Shoe Caps and Rockers or Bases shall be assembled, bored as units and match marked before disassembly.

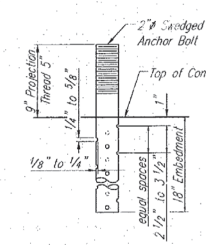
Anchor Bolts shall be 2"ø A588 steel swedged bolts and shall extend 18" into the concrete with A194-2, 2H or A563-c, C3, D, DH, DH3 heavy hexagon nuts. Actual manufacturer's certified mill test reports (chemical and mechanical) shall be provided. (Swedging shall be 1" less than the extension into the concrete).

All structural steel for the Masonary Plate, Rocker Plates etc. and Anchor Bolts shall be painted with a minimum of 2 coats of inorganic zinc primer (5 mils min.) in accordance with the Special Provisions.

Structural steel for the Bearings shall be A709 Grade 50 or Grade 50W and A709 Grade A36.

Bearing pads shall be 60 durometer neoprene pads and extend 1/2" beyond masonry plate.

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.



SWEDGE ANCHOR BOLT

TRUSS FIXED BEARING DETAILS – PIER 2C

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.L.K. 05/93
CHECKED: H.G.J. 09/93

SHEET 33 OF 33

A4757

REVISED JAN. 1, 1995

STATE	JOB NO.	SHEET NO.
MO	J4U0564D	37
DIST NO.	**PROJECT NO.**	**ROUTE**
4	COUNTY JACKSON	291

MISSOURI HIGHWAY AND TRANSPORTATION COMMISSION
STANDARD PLANS

✓	NO.	DESCRIPTION
	203.00E	EXCAVATION & EMBANKMENT
	203.02C	UNDERGRADING
	203.10B	TABULATED EARTHWORK & SECTION DATA
	203.20B	SUPERELEVATION SPIRALS & WIDENING (UNDIVIDED)
	203.21B	SUPERELEVATION SPIRALS & WIDENING (DIVIDED)
	203.35A	MAILBOX TURNOUTS
	203.40F	TYPICAL DETAILS-RAMPS FOR INTERCHANGES (OTHER THAN 6:1 FORESLOPE) •
	203.41F	TYPICAL DETAILS-RAMPS FOR INTERCHANGES (6:1 FORESLOPE) •
	203.50J	TYPICAL CROSS-OVERS (DIVIDED HIGHWAYS)
	203.61	DRIVEWAY TYPE I
	203.62	DRIVEWAY TYPE II
	203.63	DRIVEWAY TYPE III
	203.64	DRIVEWAY TYPE IV
	203.65	DRIVEWAY TYPE V
	204.00D	EMBANKMENT CONTROL MEASURING DEVICES
	502.00P	CONCRETE PAVEMENT & BASE APPURTENANCES (2 SHEETS) •
	502.05	CONCRETE PAVEMENT & BASE APPURTENANCES, 15 FT. JOINT SPACING (2 SHEETS)
	502.10F	DOWEL SUPPORTING UNITS
	504.00A	CONCRETE APPROACH PAVEMENT (2 SHEETS)
	602.00A	RIGHT-OF-WAY & DRAIN MARKERS
	604.05B	PIPE CULVERT HEADWALLS - TYPE S
	604.10B	HEADWALL-WITH ENERGY DISSIPATOR - 18"
	604.11B	HEADWALL-WITH ENERGY DISSIPATOR - 24"
	604.12B	HEADWALL-WITH ENERGY DISSIPATOR - 30"
	604.13B	HEADWALL-WITH ENERGY DISSIPATOR - 36"
	604.14B	HEADWALL-WITH ENERGY DISSIPATOR - 42"
	604.15B	HEADWALL-WITH ENERGY DISSIPATOR - 48"
	604.20B	DROP INLET - TYPE B
	604.21B	DROP INLET - TYPE C
	604.22B	DROP INLET - TYPE D
	604.23B	DROP INLET - TYPE E
	604.24B	DROP INLET - TYPE EE
	604.25C	DROP INLET - TYPE F
	604.26D	DROP INLET - TYPE G
	604.27D	DROP INLET - TYPE S (3 SHEETS)
	604.28E	DROP INLET - TYPE T (ALSO INCLUDE 614.30)
	604.29C	DROP INLET - TYPE X
	604.30F	CONCRETE MANHOLES (ALSO INCLUDE 614.30)
	604.40E	PIPE COLLARS
	604.70	SLOTTED DRAIN (2 SHEETS)
	605.10A	CLASS A UNDERDRAINS
	606.00AA	GUARD RAIL (6 SHEETS) •
	606.22L	BRIDGE ANCHOR SECTION (SAFETY BARRIER CURB ON BRIDGE) (ALSO INCLUDE 606.00) •
	606.23C	BRIDGE ANCHOR SECTION (THRIE BEAM RAIL ON BRIDGE)(ALSO INCLUDE 606.00)
	606.30E	TERMINAL SECTION (ALSO INCLUDE 606.00)
	606.40A	GUARD CABLE
	607.10R	CHAIN LINK FENCE
	607.11B	CHAIN LINK FENCE FOR RETAINING WALLS
	607.20F	WOVEN WIRE FENCE (ALSO INCLUDE 607.10)

536

✓	NO.	DESCRIPTION
	608.00C	PAVED APPROACHES
	608.10G	CONCRETE SIDEWALK & WHEELCHAIR RAMPS
	608.20D	CONCRETE STEPS
	609.00G	CONCRETE CURB - CURB & GUTTER - GUTTER
	609.15C	PAVED DITCHES
	609.40F	DRAIN BASIN, SHLD. PAVE. & FILL SL. AT BR. ENDS (2 SHEETS)
	609.60C	ROCK DITCH LINER
	609.70C	ROCK LINING FOR CULVERT OUTLETS
	610.20E	BRICK MANHOLES (ALSO INCLUDE 614.30)
	611.60L	CONCRETE SLOPE PROTECTION
	612.10K	BARRICADES AND FLASHER SIGNS
	613.00B	PAVEMENT REPAIR
	614.10R	CURB INLETS, GRATES & BEARING PLATES
	614.30D	MANHOLE FRAMES & COVERS
	615.00A	OFFICE FOR ENGINEER
■	616.10R	TRAFFIC CONTROL DEVICES (4 SHEETS)(ALSO INCLUDE 903.01) •
	617.00Z	CONCRETE TRAFFIC BARRIER (3 SHEETS) •
	702.01F	16" CONCRETE PILES (APPROVED TYPES)(2 SHEETS)
	702.02C	CAST-IN-PLACE CONCRETE PILES (APPROVED TYPES)
	703.21E	CONCRETE BOX CULVERTS, H20 LOADING (3 SHEETS)(FLARED WINGS)(INCL 706.35)
	703.24E	CONCRETE BOX CULVERTS, SKEW DATA (703.30)(INCL 706.35)
	703.25E	CONCRETE BOX CULVERTS, SKEW DATA (703.21)(3 SHTS) (FLRD WINGS)(INCL 706.35)
	703.30F	CONCRETE BOX CULVERTS, 4' SPANS & LESS-ALL LOADING (INCL 706.35)
	703.35C	CONCRETE BOX CULVERTS, CUTTING DETAILS (STRAIGHT WINGS) (INCL 706.35) •
	703.36B	CONCRETE BOX CULVERTS, CUTTING DETAILS (FLARED WINGS) (INCL 706.35) •
	703.50H	CONCRETE DOUBLE BOX STRUCTURE-SQUARE (INCL 706.35)
	703.51G	CONCRETE DOUBLE BOX STRUCTURE-SKEWED (INCL 706.35)
	703.52D	CONCRETE DOUBLE BOX STRUCTURE-CUT SECTIONS (INCL 706.35)
	703.54E	DOUBLE BOX STRUCTURE REINFORCEMENT-H20 OR HS20 LOADING (8 SHEETS)
	703.55E	CONCRETE DOUBLE BOX STRUCTURE (FLARED WINGS) SQUARE (INCL 706.35)
	703.56E	CONCRETE DOUBLE BOX STRUCTURE (FLARED WINGS) SKEWED (INCL 706.35)
	703.60C	CONCRETE BOX STRUCTURE-PIPE INLET
	703.70D	CONCRETE TRIPLE BOX STRUCTURE-SQUARE (2 SHEETS) (INCL 706.35)
	703.71D	CONCRETE TRIPLE BOX STRUCTURE-SKEWED (2 SHEETS) (INCL 706.35)
	703.72D	CONCRETE TRIPLE BOX STRUCTURE-(FLARED WINGS)(SQUARE) (2 SHEETS)(INCL 706.35)
	703.73D	CONCRETE TRIPLE BOX STRUCTURE-(FLARED WINGS)(SKEWED) (2 SHEETS)(INCL 706.35)
	703.74D	CONCRETE TRIPLE BOX STRUCTURE-CUT SECTIONS (INCL 706.35)
	703.76B	CONCRETE TRIPLE BOX STRUCTURE REINFORCEMENT-H20 OR HS20 LOADING (5 SHEETS)
	706.30E	REINFORCING BAR SUPPORTS
	706.35E	BAR SUPPORTS FOR CONCRETE REINFORCEMENT
	712.40E	STEEL DAMS FOR BRIDGES (6" CHANNEL)
	725.31C	METAL CURTAIN WALL AND METAL INLETS
	726.30C	CULVERT INSTALLATION METHODS
	731.00S	PRECAST MANHOLES (ALSO INCL 614.30)
	731.10K	PRECAST DROP INLETS (4 SHTS)(ALSO INCL 614.30 & 614.10)

✓	NO.	DESCRIPTION
	732.00L	FLARED END SECTION (2 SHEETS)
	732.10A	SAFETY SLOPE END SECTIONS (2 SHEETS)
	806.02A	STAPLE PLACEMENT FOR PLASTIC NETTING
		HIGHWAY LIGHTING
	901.00P	POLES & APPURTENANCES-30' (3 SHEETS)
	901.01U	POLES & APPURTENANCES-45' (3 SHEETS)
	901.05A	CONTROL PANEL CABINET DETAILS (2 SHEETS)(SEE NOTE)
	901.12C	POLE MOUNT CONT STA-SECONDARY SERV-480 V MULTI CIR (NOT METERED)
	901.15E	POLE MOUNT CONT STA-SEC SERV-120,240, & 480 V MULTI CIR
	901.16D	POLE MOUNT CONT STA-SEC SERV-480 V MULTI CIR (METERED)
	901.18D	POLE MOUNT CONT STA-SEC SERV-120/240 V MULTI CIR
	901.19D	POLE MOUNT CONT STA-SEC SERV-240 V MULTI CIR (NOT METERED)
	901.20D	POLE MOUNT CONT STA-SEC SERV-120/240 V MULTI CIR (SIG METERED)
	901.22E	POLE MOUNT CONT STA-SEC SERV-120/240 & 480 V MULTI CIR (BOTH METERED)
	901.23E	POLE MOUNT CONT STA-SEC SERV-240 V MULTI CIR (METERED)
	901.24D	POLE MOUNT CONT STA-SEC SERV-240 V MULTI CIR (LIGHTS & SIGNALS-BOTH METERED)
	901.25D	BASE MOUNT CONT STA-SEC SERV-120/240 V MULTI CIR
		NOTE: ALSO INCLUDE 901.05 WITH 901.12 THROUGH 901.25 EXCEPT 901.18
		TRAFFIC SIGNALS
	902.00F	SIGNAL HEADS, LENSES AND MOUNTING
	902.10J	PULL BOXES, CONTROLLERS, COND LOCATION
	902.15D	POWER SUPPLY ASSEMBLY
	902.21B	TELEPHONE INTERCONNECT
	902.30H	CONCRETE BASES
	902.40J	TUBULAR STEEL POST
	902.50H	DETECTORS •
	902.60F	SPAN WIRE DETAILS-STEEL POST
	902.70D	SPAN WIRE DETAILS-WOOD POLE
	902.80A	TRAFFIC SIGNAL SYMBOLS
		HIGHWAY SIGNING
■	903.01C	ALPHABETS (2 SHEETS)
	903.02Z	HIGHWAY SIGNING (8 SHEETS) •
	903.03AQ	SIGN MOUNTING DETAILS (5 SHEETS) •
	903.04D	WEIGH STATION SIGNING
	903.05C	TUBULAR SPAN SUPPORT-ONE TUBE, TYPE S
	903.06C	TUBULAR SPAN SUPPORT-TWO TUBE, TYPE S
	903.07C	TUBULAR CANTILEVER SUPPORTS, TYPE C
	903.08C	TUBULAR BUTTERFLY SUPPORTS, TYPE B
	903.09D	LIGHTING SUPPORT BRACKET
	903.10T	SIGN TRUSSES-OVERHEAD ALUMINUM (8 SHEETS)(INCL 903.03)
	903.12N	SIGN TRUSSES-BUTTERFLY & CANTILEVER-STEEL (7 SHEETS) (INCL 903.03)
	903.60S	SIGN TRUSSES-OVERHEAD STEEL (7 SHEETS)(INCL 903.03)

NOTES:
PLANS FOR THIS PROJECT WERE DEVELOPED USING DRAWINGS FROM THIS INDEX

• REVISED OR NEW SINCE MARCH 1, 1994.

STATE	PROJ. NO.	SHEET NO.
MO.	ACNH-291-1(4)	4
SEC./SUR. 12 TWP. 50N RGE. 32W		

MISSOURI HIGHWAY AND TRANSPORTATION COMMISSION

ROUTE 291 MISSOURI RIVER BRIDGE

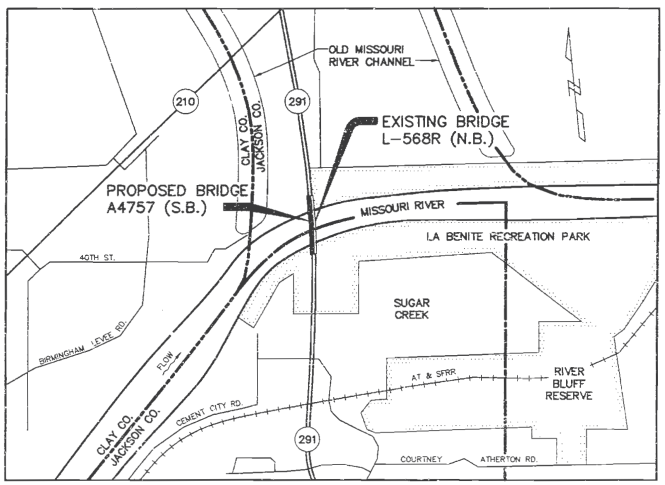
JACKSON COUNTY

CONTRACT 2

TRUSS SUPERSTRUCTURE STEEL

1993

INDEX OF SHEETS



LOCATION SKETCH

INDEX OF SHEETS

FINAL PLANS

I CERTIFY THAT THIS DRAWING ACCURATELY REFLECTS THE CONFIGURATION AND LOCATION OF THE ROADWAY AND APPURTENANCES AS CONSTRUCTED ON THIS PROJECT.

STATE OF MISSOURI CHRISTOPHER GRANT REDLIKE NUMBER E-27899 REGISTERED PROFESSIONAL ENGINEER

8-4-97

302

STATE OF MISSOURI KEVIN R. EISENBEIS NUMBER E-20946 REGISTERED PROFESSIONAL ENGINEER

SUBMITTED BY: Kevin R. Eisenbeis
REGISTERED PROFESSIONAL ENGINEER
MISSOURI MO. E-20946

BRIDGE OVER MISSOURI RIVER

IN JACKSON COUNTY, MISSOURI
PROJECT NO. STA. 99+52.92
JOB NO. J4U0564D RTE. 291
JACKSON COUNTY

DATE 9/8/95

STD.
STD.
A4757

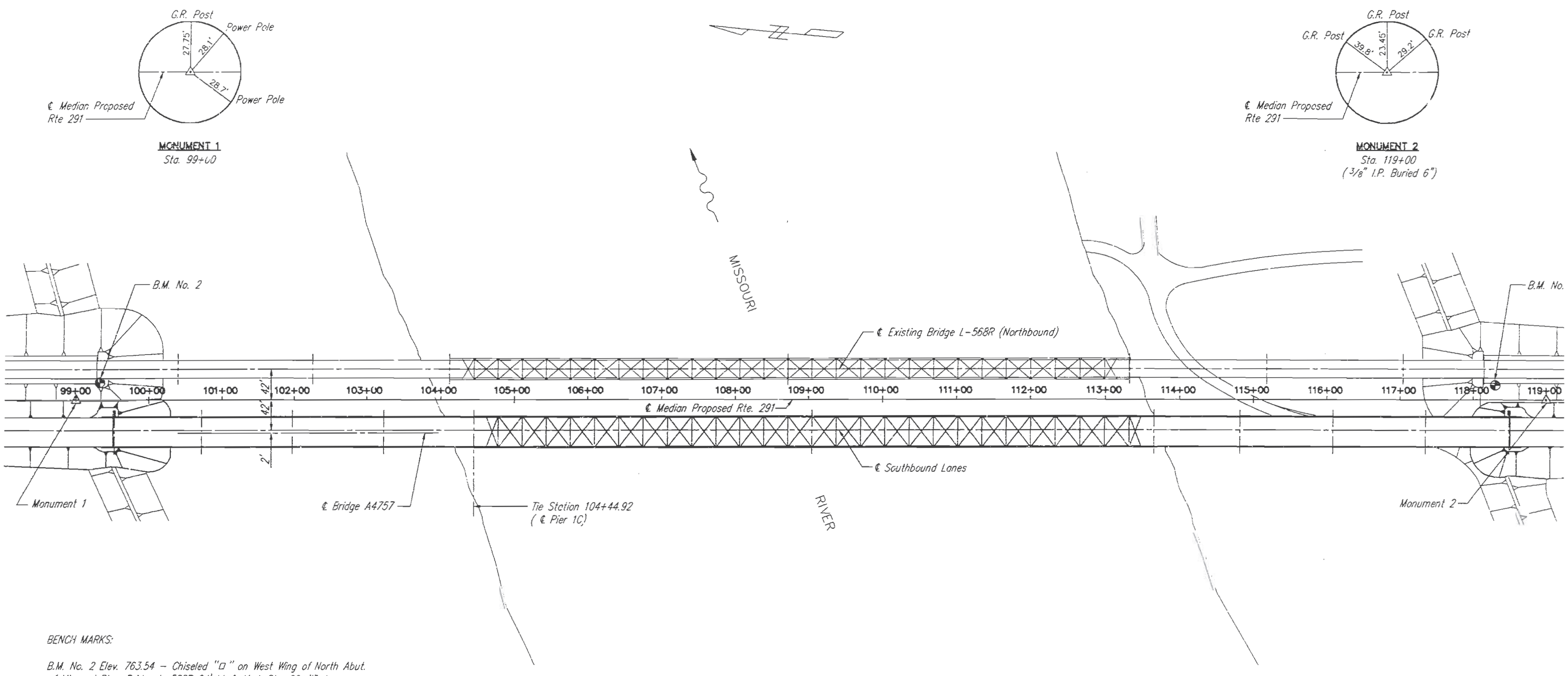
291COVC2

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.L.K. 03/93
CHECKED: K.R.E. 09/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

STATE	PROJ. NO.	SHEET NO.
MO.	ACNH-291-1(46)	5



BENCH MARKS:

B.M. No. 2 Elev. 763.54 – Chiseled "□" on West Wing of North Abut. of Missouri River Bridge L-568R 24' Lt. ℄ Med. Sta. 99+33 ±.

B.M. No. 5 Elev. 763.45 – USC&G B.M. Disk Stamped U-218 Quad 390942 20'± Lt. ℄ Med. Sta. 118+30 ±.

NOTE:

The Monuments shown on this drawing shall be used for stationing and alignment of the bridge.

303

FINAL PLANS

I CERTIFY THAT THIS DRAWING ACCURATELY REFLECTS THE CONFIGURATION AND LOCATION OF THE ROADWAY AND APPURTENANCES AS CONSTRUCTED ON THIS PROJECT.

REGISTERED PROFESSIONAL ENGINEER

8-6-99
DATE

SURVEY TIES & ALIGNMENT DIAGRAM

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

ALIGN-C2

HC HARRINGTON & CORTELYOU, INC.
Consulting Engineers

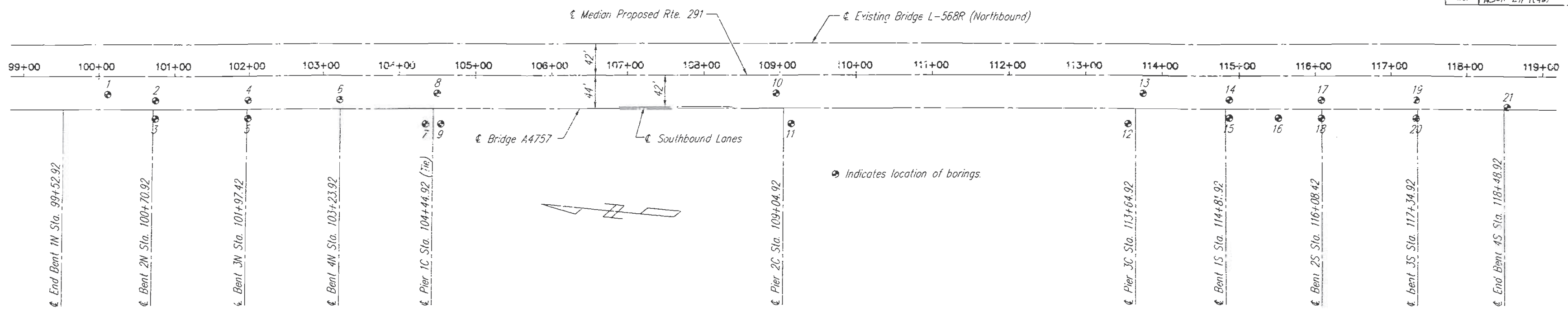
DETAILED: B.T.K. 02/93
CHECKED: K.R.E. 09/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 2 OF 33

A4757

STATE	PROJ. NO.	SHEET NO.
MO.	ACNH-291-1(46)	6



BORING LOG LOCATIONS

DEPTH Ft.	ELEV.	
0.0'	728.9	
5.0'	723.9	Cobbles to boulders, (riprap).
80.0'	648.9	Fine to coarse sand.
103.5'	625.4	Coarse sand with scattered gravel.
106.8'	622.1	Hard shale.

1
100+12
20' Lt.
9/5/90

DEPTH Ft.	ELEV.	
0.0'	723.4	
1.0'	722.4	Cobbles to gravel, fill.
6.0'	717.4	Dark brown sandy silty clay.
20.0'	703.4	Brown fine silty sand.
32.5'	690.9	Fine to medium grained sand, wet.
74.6'	648.8	Medium to coarse sand, clean, wet.
[illegible].0'	638.4	Medium to coarse sand, clean, wet with scattered gravel layers.
97.0'	626.4	Coarse clean sand, wet with gravel layers.
97.8'	625.6	Shale, slightly weathered.
102.0'	621.4	Hard shale.

2
100+75
12' Lt.
9/5/90

DEPTH Ft.	BLOWS 6"	POCKET PEN. tsf	ELEV.	
0.0'			723.1	
5.0'	9-13-16	2.0-3.0	718.1	Brown clayey sand, wet, stiff.
7.5'			715.6	
10.0'	10-14-18		713.1	Brown, fine to medium sand, round, dense, some lignite.
15.0'	9-13-12		708.1	
20.0'	6-5-5		703.1	
22.5'			700.6	
25.0'	3-3-4		698.1	Brown, medium to coarse sand, rounded, loose.
27.5'			695.6	
30.0'	20-25-21		693.1	Gray fine sand, rounded, dense to very dense, some lignite.
35.0'	9-7-5		688.1	
35.5'			687.6	
40.0'	6-6-5		683.1	Gray medium sand, rounded medium dense, some lignite, gray clay seam @ 49.5'-51.0'
45.0'	6-8-9		678.1	
50.0'	12-6-18		673.1	
51.0'			672.1	
55.0'	17-27-34		668.1	Gray fine sand, rounded, clean, very dense.
60.0'	14-19-22		663.1	
63.5'			659.6	
70.0'	13-15-10		653.1	Gray coarse sand with some fine gravel, medium dense.
85.0'	19-34-51		638.1	
86.6'			636.5	
87.2'			635.9	Boulder.
92.2'			630.9	Sand.
92.4'	100 in 5"	6.0-8.0	630.7	Gray areneceous silty shale.
97.5'	100 in 5.5"	9+	625.6	
100.8'			622.3	
102.5'			620.6	Limestone.

3
100+75
12' Rt.
10/4/90

DEPTH Ft.	BLOWS 6"	POCKET PEN. tsf	ELEV.	
0.0'			723.1	
2.0'			721.1	Limestone cobbles to gravel, fill.
5.0'	2-3-5	2.0	718.1	Dark brown sandy silty clay, stiff, moist.
7.5'			715.6	
10.0'	6-7-8		713.1	Brown fine silty sand, loose with some scattered clayey sand pockets, wet from 12.5'±
15.0'	4-3-3		708.1	
20.0'	3-3-5		703.1	
22.5'			700.6	
25.0'	8-5-7		698.1	Medium to coarse sand wet, loose to medium dense, clean.
30.0'	8-11-16		693.1	
32.5'			690.6	
35.0'	7-10-10		688.1	Fine to medium sand, medium dense, clean.
40.0'	6-6-7		683.1	
45.0'	9-11-21		678.1	
48.5'			674.6	
50.0'	13-15-11		673.1	Medium to coarse sand clean, rounded, scattered gravel.
55.0'	9-19-25		668.1	
55.5'			667.6	
60.0'	21-26-22		663.1	Fine to medium sand, clean, rounded, some fine gravel throughout.
68.5'			654.6	
70.0'	10-8-9		653.1	Coarse sand, clean, rounded, scattered cobbles with boulder at 73.0'-82.0', more abundant at 92.7'-95.2'.
80.0'	9-10-13		643.1	
85.0'	25-24-21		638.1	
95.0'	100 in 6"		628.1	
95.2'			627.9	
100.0'	100 in 6"		623.1	Gray silty shale, dry very hard.
102.5'			620.6	
104.2'			618.9	Gray shaley limestones, hard.
105.0'			618.1	Gray silty shale. dry, hard.

4
101+99
12' Lt.
9/6/90

NOTICE AND DISCLAIMER REGARDING BORING LOG DATA

The locations of all subsurface borings for this structure are shown in the Boring Log Locations above. Boring data for the numbered locations is shown on this and the following three sheets. The boring data for all locations indicated, as well as any other boring logs or other factual records of subsurface data and investigations performed by the department for the design of the project, is available from the district materials engineer upon written request as outlined in the project special provisions. No greater significance or weight should be given to the boring data depicted on the plan sheets than to subsurface data available from the district or elsewhere.

The commission does not represent or warrant that any such boring data accurately depicts the conditions to be encountered in constructing this project. A contractor assumes all risks it may encounter in basing its bid prices, time or schedule of performance on the boring data depicted here or those available from the district, or on any other documentation not expressly warranted, which the contractor may obtain from the commission.

DEPTH Ft.	ELEV.	
0.0'	723.4	
0.4'	723.0	Cobble, fill.
12.5'	710.9	Dark brown silty clay to clay.
30.0'	693.4	Sandy silt, wet.
74.8'	648.6	Medium sand.
75.9'	647.5	Gravel to scattered boulders with coarse sand.
96.7'	626.7	Coarse sand with some scattered gravel.
98.4'	625.0	Shale, hard.

5
101+99
12' Rt.
9/5/90

FINAL PLANS

I CERTIFY THAT THIS DRAWING ACCURATELY REFLECTS THE CONFIGURATION AND LOCATION OF THE ROADWAY AND APPURTENANCES AS CONSTRUCTED ON THIS PROJECT.

SIGNATURE — 8-6-98 DATE

GRANT REDENE — NUMBER E-27899 — REGISTERED PROFESSIONAL ENGINEER

BORING LOG LOCATIONS AND BORING LOGS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: T.L.W. 2/93
CHECKED: E.W.N. 2/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

A4757

BOLOC-C2

304

STATE	PROJ. NO.	SHEET NO.
MO.	RCSH-291-1(41)	7

DEPTH Ft.	BLOWS 6"	POCKET PEN. tsf	ELEV.	
0.0'			723.7	
5.0'	2-3-4	.5-1.0	718.7	Brown sandy silt, moist medium stiff.
6.0'			717.7	
10.0'	2-3-3	.5-1.0	713.7	Brown silty clay, moist medium stiff.
11.0'			712.7	
≠ 15.0'	3-3-3	.5	708.7	Gray silty sand, wet soft to medium stiff.
20.0'	2-2-2	.5	703.7	
23.5'			700.2	
25.0'	5-6-9		698.7	Gray fine sand, slightly silty, wet, medium dense
30.0'	3-5-8		693.7	
35.0'	10-13-13		688.7	
37.5'			686.2	
40.0'	8-10-11		683.7	Medium grained sand rounded, dense with scattered coarse rounded gravel.
45.0'	13-20-29		678.7	
50.0'	9-14-11		673.7	
55.0'	15-20-14		668.7	
57.5'			666.2	
60.0'	16-32-47		663.7	Fine to medium grained sand, rounded, very dense.
70.0'	12-18-27		653.7	
74.7'			649.0	
80.0'	11-24-76	in 3"	643.7	Medium grained sand, rounded, scattered cobbles with boulders.
82.5'			641.2	
85.0'	100 in 2.5"	7.5	638.7	Gray shale, hard, dry.
90.0'	100 in 3"	8.0-9+	633.7	
95.0'	100 in 4"	8.0-9+	628.7	
105.0'			618.7	

≠ Water Elev. as of 8/30/90

6
103+22
12' Lt.
8/28-29/90

CORING LOG
(NX Double Tube Barrel)

	FROM	TO	RUN	REC	LOSS	% RQD	NOTES
BORING 7	87.0	92.0	5.0	5.0	0.0		
	92.0	97.0	5.0	5.0	0.0		
	97.0	100.3	3.3	3.3	0.0		
	100.3	105.0	4.7	5.0	+0.3	100	*
	105.0	109.8	4.8	5.0	+0.2		
	109.8	114.8	5.0	4.2	0.8	98	*
	114.8	119.8	5.0	5.0	0.0		
BORING 10	88.6	93.6	5.0	4.5	0.5		
	93.8	98.8	5.0	5.0	0.0	52	*
	98.8	103.8	5.0	5.0	0.0	100	*
	103.8	108.8	5.0	4.4	0.6		
	108.8	113.8	5.0	4.8	0.2		
	114.0	119.0	5.0	5.0	0.0		
BORING 11	88.4	93.4	5.0	5.0	0.0		
	94.0	99.0	5.0	4.1	0.9		**
	99.0	103.0	4.0	4.0	0.0	100	
	103.0	108.0	5.0	4.9	0.1		
	108.2	113.2	5.0	5.0	0.0		
	113.2	118.2	5.0	4.2	0.8		

* Limestone portion of core only.
** Loss in core probably due to shale core falling out of barrel.

Note: For location of Borings, see Sheet 3 of 33.

DEPTH Ft.	BLOWS 6"	POCKET PEN. tsf	ASTM CLASS	ELEV.	
0.0'				723.6	
5.0'	6-5-4	1.0	ML	718.6	Brown sandy silt with sand layers, moist, medium stiff.
10.0'	2-2-2	1.0	ML	713.6	
12.5'				711.1	
15.0'	3-1-2		ML	708.6	Dark gray silty fine sand, wet, soft to medium stiff.
20.0'	1-1-3		CL-ML	703.6	
25.0'	2-2-5		SM	698.6	
30.0'	5-12-15		SM	693.6	
30.5'				693.1	
35.0'	7-9-11		SP-SM	688.6	Gray fine sand, rounded, clean, medium dense to dense.
40.0'	7-8-7		SW	683.6	
44.5'				679.0	
45.0'	6-9-8		SW	678.6	Medium sand, medium dense clean, scattered rounded gravel.
50.0'	10-13-19		SW-SM	673.6	
55.0'	9-9-8		SW	668.6	
60.0'	10-17-13		SW	663.6	
65.0'	15-14-15		SW	658.6	
70.0'	8-11-15		SW	653.6	
74.5'				649.1	
75.0'	19-18-15		SW	648.6	Medium to coarse grained sand, rounded, dense, abundant cobbles with boulders.
80.0'	17-29-22		SW	643.6	
80.1'				643.5	
85.0'	1?-21-79		SP	638.6	Fine grained sand, very dense, clean, rounded.
86.0'				637.6	
102.8'				620.8	Gray silty shale, dry, very hard, calcareous.
104.5'				619.1	Argillaceous limestone hard, fossiliferous, medium bedded.
108.6'				615.0	Gray silty, calcareous shale, hard.
110.9'				612.7	Argillaceous limestone, hard.
113.8'				609.8	Gray silty shale, hard.
117.7'				605.9	Argillaceous limestone to limestone, hard, medium to thick bedded.
119.8'				603.8	Dark gray shale.

7
104+35
20' Rt.
8/28/90

UNCONFINED COMPRESSIVE STRENGTH TEST DATA

	DEPTH, FT.	Qu., tsf.
BORING 7	88.0	36.9
	94.0	17.0
	100.0	2.83
	102.0	6.90
	107.0	4.66
	113.0	32.30
BORING 10	92.0	1.33
	95.0	14.70
	101.0	813.0
	104.3	18.70
	109.0	49.64
	116.0	13.60
BORING 11	92.0	4.95
	97.0	19.60
	101.0	506.0
	106.0	18.82
	117.0	8.90

NOTE:
Test results for Pocket Pen is 9+ TSF for all depths at each boring.

DEPTH Ft.	ELEV.	
0.0'	714.4	
3.8'	710.6	Brown sandy silt, dry, soft.
12.5'	701.9	Brown sand, dry, medium, stiff.
45.0'	669.4	Gray fine sand, wet, dense scattered cobbles @ 52'.
83.1'	631.3	Gray course sand, wet, dense.
84.0'	630.4	Gray shale, dry, hard.

8
104+50
20' Lt.
9/5/90

Note:
P.A.W.T. = Pushed Augers Without Turning.

DEPTH Ft.	ELEV.	
0.0'	721.8	
18.0'	703.8	Brown sandy silt.
29.5'	692.3	Gray silty sand, wet and loose.
47.5'	674.3	Sand.
52.5'	669.3	Gravel in sand.
74.6'	647.2	Medium sand with some scattered gravel.
77.0'	644.8	Gravel to cobbles.
85.5'	636.3	Packed sand.
89.5'	632.3	Shale, slightly weathered.
92.5'	629.3	Hard shale.

9
104+55
20' Rt.
9/5/90

DEPTH Ft.	BLOWS 6"	POCKET PEN. tsf	ELEV.	
0.0'			712.4	Elevation of deck.
4.4'			708.0	Barge.
18.0'			69?.4	Water
35.7'			676.7	Light brown and black sand, fine to medium grained, loose.
66.3'			646.1	Light brown to black medium grained sand with scattered gravel, loose coarse grained, some lignite at 61.5'.
88.1'			624.3	Brown and black, medium to coarse grained sand with scattered fine gravel, lignite becoming more abundant at 82.0'.
89.1'			623.3	Gray limestone, thin bedded with shale layers, hard.
91.1'			621.3	Dark gray clayey shale, hard.
93.6'	100 in 3"	9.5+	618.8	Gray clay shale.
94.8'			617.6	Gray shaley limestone, medium bedded, hard.
99.5'			612.9	Dark gray hard calcareous shale, clayey.
103.8'			608.6	Light gray shaley limestone, thick bedded, moderately hard.
104.8'			607.6	Gray clayey shale.
106.2'			606.2	Dark gray to green calcareous shale, clayey, soft, thinly laminated.
107.2'			605.2	Light gray to dark gray shaley limestone, medium hard to moderately hard, medium bedded.
108.2'			604.2	Dark gray calcareous shale, clayey, soft.
108.8'			603.6	Gray shaley limestone, medium bedded.
110.1'			602.3	Dark gray silty shale, hard to very hard, non-calcareous.
111.8'			600.6	Light gray, silty shale, calcareous, moderately hard to hard, with some limestone stringers.
112.4'			600.0	Light gray limestone with shale on bedding and fracture planes.
113.8'	100 in 1.5"	9.5+	598.6	Gray to green silty shale with scattered limestone stringers, dry.
113.9'			598.5	Dark gray silty shale hard.
114.2'			598.2	Brown limestone, hard fine grained.
115.3'			597.1	Dark gray silty shale moderately hard to hard.
118.9'			593.5	Medium to light gray silty shale, slightly calcareous, moderately hard to hard.
119.0'			593.4	Light brown argillaceous limestone, hard to very hard.

10
108+95
20' Lt.
10/2/90

DEPTH Ft.	BLOWS 6"	POCKET PEN. tsf	ASTM CLASS	ELEV.	
0.0'				712.4	Elevation of deck.
4.4'				708.0	Barge.
17.0'				695.4	Water.
30.0'	8-7-8		SP	682.4	Sand, fine to medium grained, loose, clean.
35.0'	7-6-7		SP	677.4	
37.5'				674.9	
40.0'	14-16-14		SP	672.4	Fine sand, medium dense, clean.
42.5'				669.9	
45.0'	11-10-11		SP	667.4	Fine to coarse sand, medium dense to loose, clean with some lignite pockets.
50.0'	10-6-8		SW	662.4	
55.0'	15-15-13		SW	657.4	
60.0'	15-10-12		SW	652.4	
65.0'	11-14-9		SP	647.4	
70.0'	9-10-12		SW	642.4	
72.5'				639.9	
75.0'	21-35-43		SP-SM	637.4	Fine sand, medium dense to dense, with trace lignite.
80.0'	15-11-12		SP	632.4	
85.0'	8-16-24		SW-SM	627.4	
88.1'				624.3	
89.2'				623.2	Gray shaly limestone, hard, thin bedded.
92.1'				620.3	Dark gray silty shale, thinly laminated, very hard.
93.4'	70-30 in 1"	9+		619.0	Gray silty shale, thinly laminated, moderately hard.
95.2'				617.2	Gray shaly limestone, thick bedded, very hard.
99.0'				613.4	Gray silty shale, thinly laminated, hard.
104.2'				608.2	Light gray shaly limestone, thick bedded, very hard.
108.0'	100 in 1.5"			604.4	Dark gray silty shale, thinly laminated, moderately hard with some hard calcareous shale stringers @ 111.4' to 112.6' & 114.0' to 114.8'.
118.2'				594.2	

11
109+15
20' Rt.
10/2-3/90

DEPTH Ft.	ELEV.	
0.0'	711.3	
4.5'	706.8	Brown sandy silt, wet, soft, P.A.W.T. 0-4.5'.
33.5'	677.8	Medium to course grained sand, medium dense.
74.0'	637.3	Fine to medium grained sand, medium dense.
96.1'	615.2	Coarse grained sand, rounded dense, heavy cobbles from 94.0' - 96.0'.
98.5'	612.8	Gray shale, dry, hard.

12
113+55
20' Rt.
8/30/90

I CERTIFY THAT THIS DRAWING ACCURATELY REFLECTS THE CONFIGURATION AND LOCATION OF ... APPURTENANCES AS CONSTRUCTED
FINAL PLANS
DATE

E-27899
REGISTERED PROFESSIONAL

305

BORING LOGS
ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: T.L.W. 2/93
CHECKED: E.W.N. 2/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 4 OF 33

A4757

BOR-1-C2

STATE	PROJ. NO.	SHEET NO.
MO.	ACNN-291-1(46)	8

DEPTH Ft.	BLOWS 6"	POCKET PEN. tsf	ASTM CLASS	ELEV.	Description
0.0'				725.7	
5.0'	3-5-6	2.25	CH	720.7	Light brown to gray sand clayey silt.
7.5'				718.2	
10.0'	2-3-6		CL	715.7	Light brown to gray silty fine sand, moist to dry with limonite strains.
14.5'				711.2	
15.0'	2-1-1	0.25-0.5	CL	710.7	Gray clay, very soft to soft, trace sand.
16.5'				709.2	
18.1'	9/30/90 ▼ Water Elev.			707.6	
20.0'	10-12-11		SC	705.7	Medium to coarse sand medium dense, trace silt to 22.5'.
25.0'	9-15-15		SP	700.7	
27.5'				698.2	
30.0'	9-24-24		SP	695.7	
35.0'	7-8-9		SP-SM	690.7	Fine to medium sand; medium dense, loose from 32.5' to 42.5' then medium dense with some gravel layers from 48.0' with abundant lignite from 62.5' to 72.5'.
40.0'	9-7-8		SP-SM	685.7	
45.0'	19-15-10		SP-SM	680.7	
50.0'	21-25-25		SP-SM	675.7	
55.0'	14-18-17		SW-SM	670.7	
60.0'	17-21-25		SW-SM	665.7	
65.0'	10-12-17		SW-SM	660.7	
70.0'	14-12-11		SW	655.7	
72.5'				653.2	
75.0'	22-24-25		SW-SM	650.7	Fine to medium grained sand, medium dense with some lignite, and some gravel.
80.0'	15-13-13		SP-SM	645.7	
85.0'	15-14-12		SW	640.7	
87.0'				638.7	
88.4'				637.3	Heavy cobbles to boulders.
90.0'	16-12-16		SP	635.7	Medium to coarse sand with some gravel.
95.0'	13-12-11		SW	630.7	
100.0'	12-12-12		SW-SM	625.7	
105.0'	28-28-41		SW	620.7	
106.7'				619.0	
109.5'				616.2	Hard shale with limestone stringers.
110.6'				615.1	Gray clay shale.
111.9'				613.8	Gray calcareous shale, dry, hard.
115.6'				610.1	Gray slightly argillaceous limestone, medium grained, medium bedded, hard fossiliferous black from 115.2' to 115.6'.
116.2'				609.5	Gray calcareous shale very stiff to hard.
117.5'				608.2	Dark gray shale, hard.
118.7'				607.0	Light gray limestone, hard medium grained slightly argillaceous.
120.4'				605.3	Light gray argillaceous limestone to gray calcareous shale moderately soft to hard.
123.1'				602.6	Light gray limestone, hard, fine grained, medium bedded argillaceous to 120.8'.
125.9'				599.8	Green gray argillaceous limestone, moderately hard.
130.4'				595.3	Dark gray shale, hard.
134.3'				591.4	Gray crystalline limestone very hard, thick bedded.
135.4'				590.3	Gray shale, hard.
137.9'				587.8	Dark gray argillaceous limestone, fine grained medium bedded.
140.1'				585.6	Dark gray calcareous shale, hard, medium bedded.
140.4'				585.3	Gray argilleceous limestone, hard.

13
113+75
20' Lt.
9/20/90

DEPTH Ft.	ELEV.	Description
0.0'	730.3	
11.7'	718.6	Sandy silt.
		Sand.
103.0'	727.3	
103.8'	626.5	Shale.

14
114+87
12' Lt.
8/30/90

DEPTH Ft.	ELEV.	Description
0.0'	728.9	
11.8'	717.1	Brown sandy silt, moist, soft.
23.1'	705.8	Medium to coarse grained sand, rounded, medium dense.
110.0'	618.9	Coarse grained sand, rounded, dense.
111.0'	617.9	Gray shale, dry hard.

15
114+87
12' Rt.
8/30/90

CORING LOG
(NX Double Tube Barrel)

	FROM	TO	RUN	REC	LOSS	% RQD	NOTES
BORING 13	109.5	111.8	2.3	2.3	0.0		
	111.8	116.8	5.0	5.0	0.0	100	*
	116.8	121.8	5.0	5.0	0.0	91	*
	121.8	126.8	5.0	5.0	0.0	56	*
	126.8	131.8	5.0	5.0	0.0	66	*
	131.8	135.4	3.6	3.6	0.0	65	*
	135.4	140.4	5.0	4.9	0.1	90	*
BORING 17	107.3	111.8	4.5	2.8	1.7		
	111.8	116.8	5.0	5.0	0.0		

*Limestone portion of core only.

DEPTH Ft.	BLOWS 6"	POCKET PEN. tsf	ELEV.	Description
0.0'			729.0	
5.0'	5-6-9	2.0-3.0	724.0	Dark brown sandy, silty clay, stiff to very stiff.
7.5'			721.5	
10.0'	5-6-8	1.0	719.0	Brown sandy silt.
12.5'			716.5	
15.0'	4-3-3	0.75	714.0	Fine silty sand with some gray brown clay pockets.
17.5'			711.5	
20.0'	8-8-11		709.0	Fine silty sand.
22.5'			706.5	
25.0'	14-20-31		704.0	Unsorted river sand, fairly clean, medium dense.
27.5'			701.5	
30.0'	13-18-20		699.0	Medium to coarse sand medium dense.
32.5'			696.5	
35.0'	19-16-17		694.0	Fine sand, medium dense.
40.0'	12-21-36		689.0	
42.5'			686.5	
45.0'	32-37-39		684.0	Fine sand, dense.
47.5'			681.5	
50.0'	24-17-15		679.0	Medium to coarse sand with some gravel, medium dense.
60.0'	17-15-15		669.0	
65.0'			664.0	
70.0'	35-39-44		659.0	Fine sand, dense.
75.0'			654.0	
80.0'	13-15-16		649.0	Medium coarse sand, medium dense.
90.0'	17-23-21		639.0	
100.0'	33-46-45		629.0	
109.2'			619.8	
110.0'	100 in 2"	9.0+	619.0	Calcareous shale, hard.
115.0'	100 in 1"		614.0	
117.5'			611.5	Hard limestone.
120.0'	61-39 in 2"	9.0+	609.0	Dark gray silty shale hard, dry.
120.7'			608.3	
121.7'			607.3	Hard limestone.
125.0'	100 in 2"	9.0+	604.0	Light gray calcareous silty shale.
125.2'			603.8	

16
115+51
12' Rt.
8/13-14-15/90

DEPTH Ft.	BLOWS 6"	POCKET PEN. tsf	ELEV.	Description
0.0'			730.6	
7.5'			723.1	Sandy silt with scattered cobbles and gravel with clay pockets.
10.0'	8-10-9	0.75	720.6	Very sandy silt, fine, dry.
14.0'			716.6	
15.0'	10-9-8	0.75	715.6	Silty sand.
17.5'			713.1	
20.0'	7-9-10		710.6	Unsorted sand with some gravel, wet, medium dense.
25.0'	8-16-14		705.6	
30.0'	10-20-21		700.6	
35.0'	8-20-28		695.6	
35.5'			695.1	
40.0'	24-44-38		690.6	Fine sand, medium dense to dense.
45.0'	18-23-12		685.6	
47.5'			683.1	
50.0'	9-12-14		680.6	Medium sand, unsorted with cobbles to gravel at 51.0' to 55.0' loose to medium dense.
55.0'	8-10-8		675.6	
57.5'			673.1	
60.0'	10-12-12		670.6	Fine sand with some lignite, medium dense with heavy cobbles at 62.0'.
65.0'	12-14-14		665.6	
70.0'	12-16-18		660.6	
75.0'	22-26-22		655.6	
77.5'			653.1	
80.0'	12-13-14		650.6	Medium to coarse sand with some gravel, medium packed.
85.0'	9-8-7		645.6	
90.0'	15-18-16		640.6	
95.0'	16-13-9		635.6	
100.0'	16-19-15		630.6	
105.0'	24-76 in 3"		625.6	
106.6'			624.0	
111.8'			618.8	Light grey silty shale calcareous, very stiff.
112.2'			618.4	Hard argillaceous limestone.
114.9'			615.7	Green calcareous shale, hard.
116.8'	100 in 1.5"		613.8	Gray argillaceous limestone, hard.
116.9'			613.7	

17
116+08
12' Lt.
8/13-14-15/90

Note: For locations of Borings, see Sheet 3 of 33.

FINAL PLANS
I CERTIFY THAT THIS DRAWING ACCURATELY REFLECTS THE CONFIGURATION AND LOCATION OF THE ... APPURTENANCES AS CONSTRUCTED ON THE PROJECT.
8/98
DATE
E-27899
PROFESSIONAL ENGINEER

306

BORING LOGS
ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: T.L.W. 2/93
CHECKED: E.W.N. 2/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

A4757

BOR-2-C2

STATE	PROJ. NO.	SHEET NO.
MO.	ACNH-291-1(4)	9

DEPTH Ft.	ELEV.	
0.0'	730.3	
4.9'	725.4	Brown sandy silt.
17.0'	713.3	Brown sandy clay, stiff cannot P.A.W.T., moist to dry.
30.0'	700.3	Light brown silty fine sand, dry.
108.2'	622.1	Medium grained, wet sand, trace of silt.
109.1'	621.2	Very stiff to hard shale.

18
116+08
12' Rt.
8/30/90

DEPTH Ft.	BLOWS 6"	POCKET PEN. tsf	ELEV.	
0.0'			733.6	
5.0'	7-13-9	0.50	728.6	Dark brown sandy silt with some gravel.
7.5'			726.1	
10.0'	7-10-11	1.50	723.6	Dark gray silty clay, moist, medium stiff.
12.5'			721.1	
15.0'	4-4-10	0.50	718.6	Gray silty clay, wet, soft to very soft.
20.0'	3-6-4	0.25	713.6	
22.0'			711.6	
25.0'	16-14-10		708.6	Brown fine silty sand.
27.5'			706.1	
30.0'	11-14-16		703.6	Medium to coarse sand with some gravel, clean medium dense.
32.5'			701.1	
35.0'	17-16-25		698.6	Fine gray sand, clean, medium dense to dense.
40.0'	16-38-40		693.6	
45.0'	20-26-30		688.6	
47.5'			686.1	
50.0'	7-7-11		683.6	Medium to coarse sand with chert cobbles, clean, medium dense.
55.0'	21-26-16		678.6	
57.5'			676.1	
60.0'	13-20-15		673.6	Fine grained gray sand rounded, clean, dense.
70.0'	15-27-26		663.6	
75.0'			658.6	
80.0'	14-14-23		653.6	Fine to medium grained sand, rounded, clean, dense.
90.0'	9-10-11		643.6	
100.0'	13-13-20		633.6	
114.0'	100 in 2"		619.6	
114.3'			619.3	
118.6'			615.0	Gray shaley sandy limestone, hard.
122.6'			611.0	Gray limestone, hard.
123.0'	70-30 in 2"		610.6	Gray shale, dry and hard.
129.0'			604.6	
130.0'			603.6	Gray limestone, hard.

19
117+33
12' Lt.
8/23/90

DEPTH Ft.	ELEV.	
0.0'	733.6	
7.5'	726.1	Brown sandy silt, dry, soft, P.A.W.T. 0-7.5'.
16.0'	717.6	Dark gray slightly sandy silt, soft, moist, P.A.W.T. 7.5'-16.0'.
35.0'	698.6	Brown sandy clay, wet, medium stiff.
114.0'	619.6	Coarse sand, wet, dense scattered cobbles at 55.0'.
115.4'	617.2	Coarse sand and cobbles.
118.0'	615.6	Gray silty shale, dry, hard.

20
117+33
12' Rt.
8/30/90

DEPTH Ft.	ELEV.	
0.0'	737.9	
0.8'	737.1	Asphalt and base.
29.0'	708.9	Gray sandy silty clay.
35.0'	702.9	Gray clay, stiff. P.A.W.T. with moderate difficulty.
52.0'	685.9	Gray silty fine sand, cannot P.A.W.T.
113.0'	624.9	Medium sand.
114.0'	623.9	Shale.

21
118+51
3' Lt.
8/30/90

FINAL PLANS
I CERTIFY THAT THIS DRAWING ACCURATELY REFLECTS THE CONFIGURATION AND LOCATION OF THE ROADWAY AND APPURTENANCES AS CONSTRUCTED ON THIS PROJECT.
8-6-98
DATE
STATE OF MISSOURI
CHRISTOPHER ... REDLINE
NUMBER
E-27899
REGISTERED PROFESSIONAL ENGINEER

Note: For location of Borings, see Sheet 3 of 33.

Note:
P.A.W.T. = Pushed Augers Without Turning.

BORING LOGS
ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

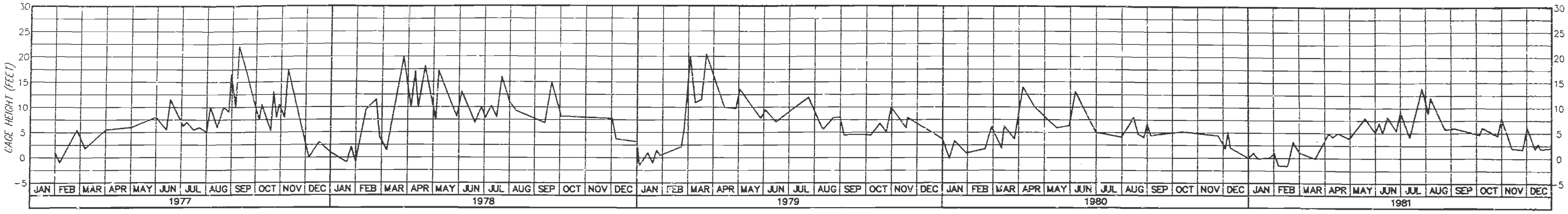
DETAILED: T.L.W. 2/93
CHECKED: E.W.N. 2/93

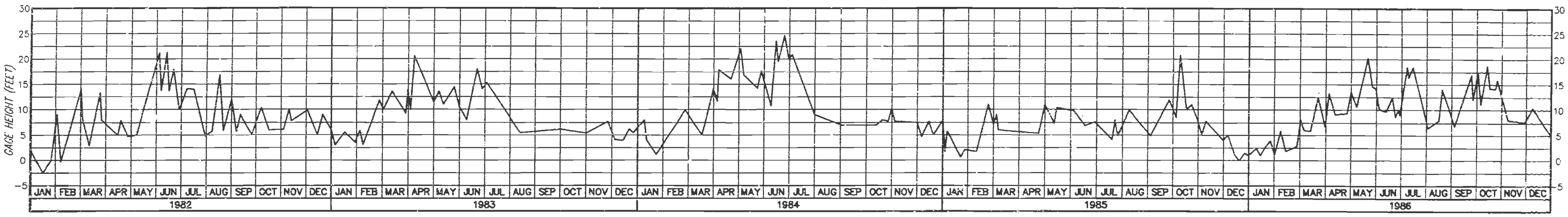
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

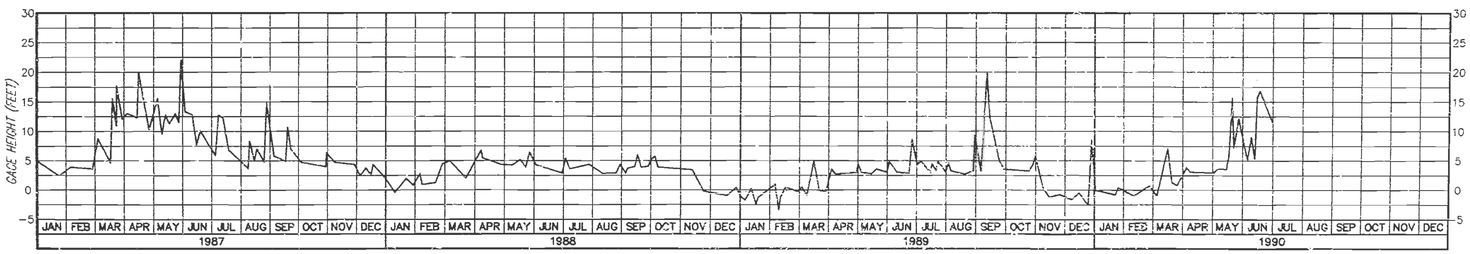
A4757

BOR-3-C2

302







NOTES

Stage Hydrograph was plotted from readings of the Missouri River near the Hannibal Bridge located at river mile 366.1 in Kansas City, Missouri.

Gage Zero is 715.8 ft. M.S.L. (Mean Sea Level).

Seasonal variations in the water elevations at the Hannibal Bridge can be estimated by adding the gage reading to Elev. 715.8

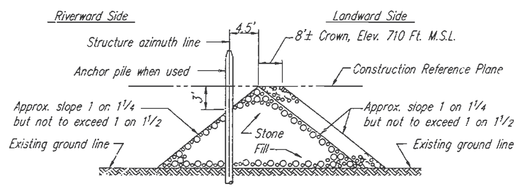
The Route 291 Bridge is located at river mile 352.7. A plot of the water surface elevation versus discharge curves for the Hannibal and Route 291 Bridges is shown on this drawing.

An estimate for seasonal variations in water surface elevations at the Route 291 Bridge can be made by deducting 11.7± to 14.6± feet from those at the Hannibal Bridge.

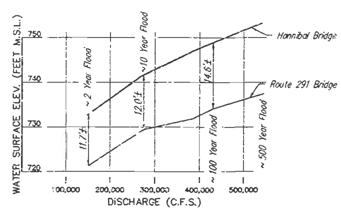
For approximate location of revetment see "Substructure Layout" sheet.

Revetment details are based on information provided by the U.S. Army Corps of Engineers. Accuracy of details or dimensions are not guaranteed.

This design data is included for information only and is not guaranteed to represent conditions at the site during construction.



STONE FILL REVETMENT



WATER SURFACE ELEVATION VS. DISCHARGE CURVES

FINAL PLANS

I CERTIFY THAT THIS DRAWING ACCURATELY REFLECTS THE ... CONFIGURATION AND LOCATION OF THE ... AND APPURTENANCES AS CONSTRUCTED ON THIS PROJECT.

CHRISTOPHER GRANT ... NUMBER E-27899 REGISTERED PROFESSIONAL ENGINEER

8-7-98
DATE

STAGE HYDROGRAPH AND REVETMENT DETAILS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HYDPO-C2

HC HARRINGTON & CORTELYOU, INC.
Consulting Engineers

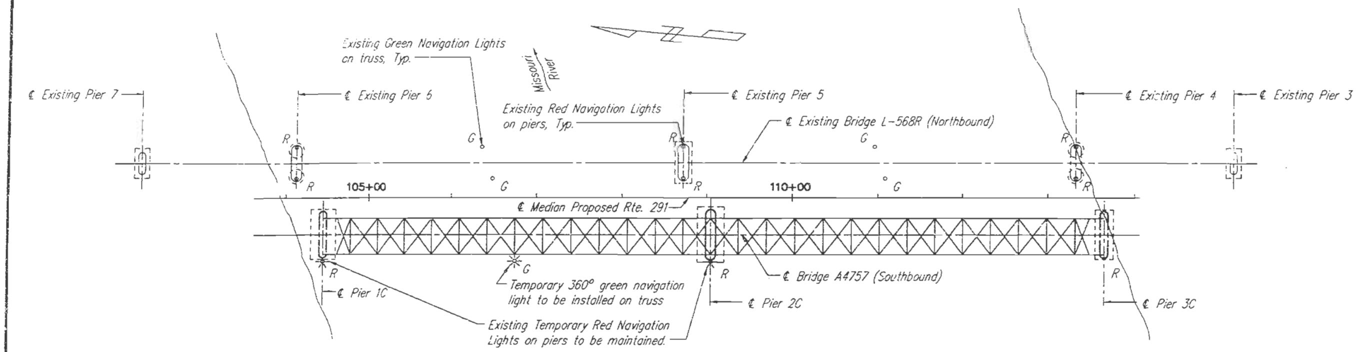
DETAILED: S.A.K. 10/92
CHECKED: E.W.N. 2/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

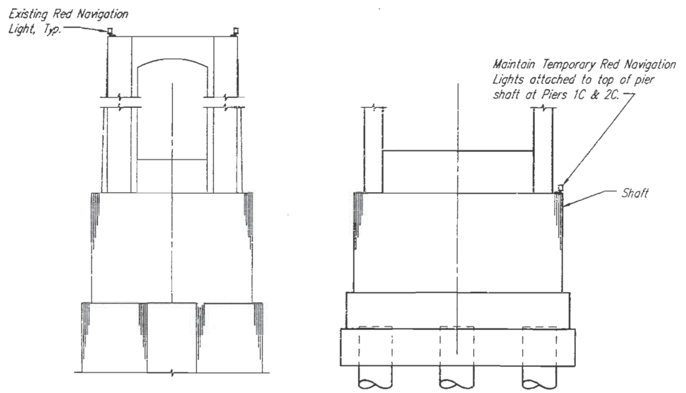
A4757

308

STATE	PROJ. NO.	SHEET NO.
MO.	RCNH-291-1(46)	11



TEMPORARY NAVIGATION LIGHTING LAYOUT

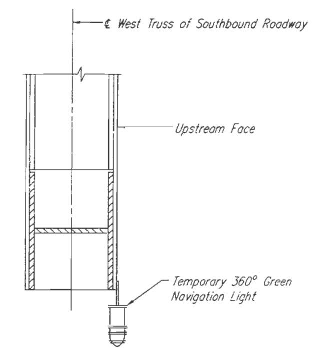


EXISTING BRIDGE

NEW SOUTHBOUND BRIDGE

LOCATION OF LIGHTS ON PIERS

(View shown looking upstation.)



LOCATION OF LIGHT ON TRUSS

(View shown looking upstation.)

NOTES:

Temporary lights installed on piers by others shall be maintained during the construction.

Red lights shall be installed on any temporary bents used during construction.

Temporary light on bottom of truss chord shall have 360° Green Lenses and shall meet the requirements of the U.S. Coast Guard.

Existing navigation lighting system on Bridge L-568R shall remain operational.

Temporary lights will remain the property of the Commission after completion of construction and will then be maintained by others.

The cost of furnishing and maintaining temporary navigation lights shall be considered as incidental to and completely covered by unit price of bid for various items of work in this contract.

See Special Provisions for additional requirements.

I CERTIFY THAT THIS DRAWING ACCURATELY REFLECTS THE ... AND LOCATION OF THE ... APPURTENANCES AS CONSTRUCTED ON THIS PROJECT.

CHRISTOPHER ... NUMBER E-27899 REGISTERED PROFESSIONAL ENGINEER

9-7-98
DATE

TEMPORARY NAVIGATION LIGHTING

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: JLK 02/93
CHECKED: KRE 09/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

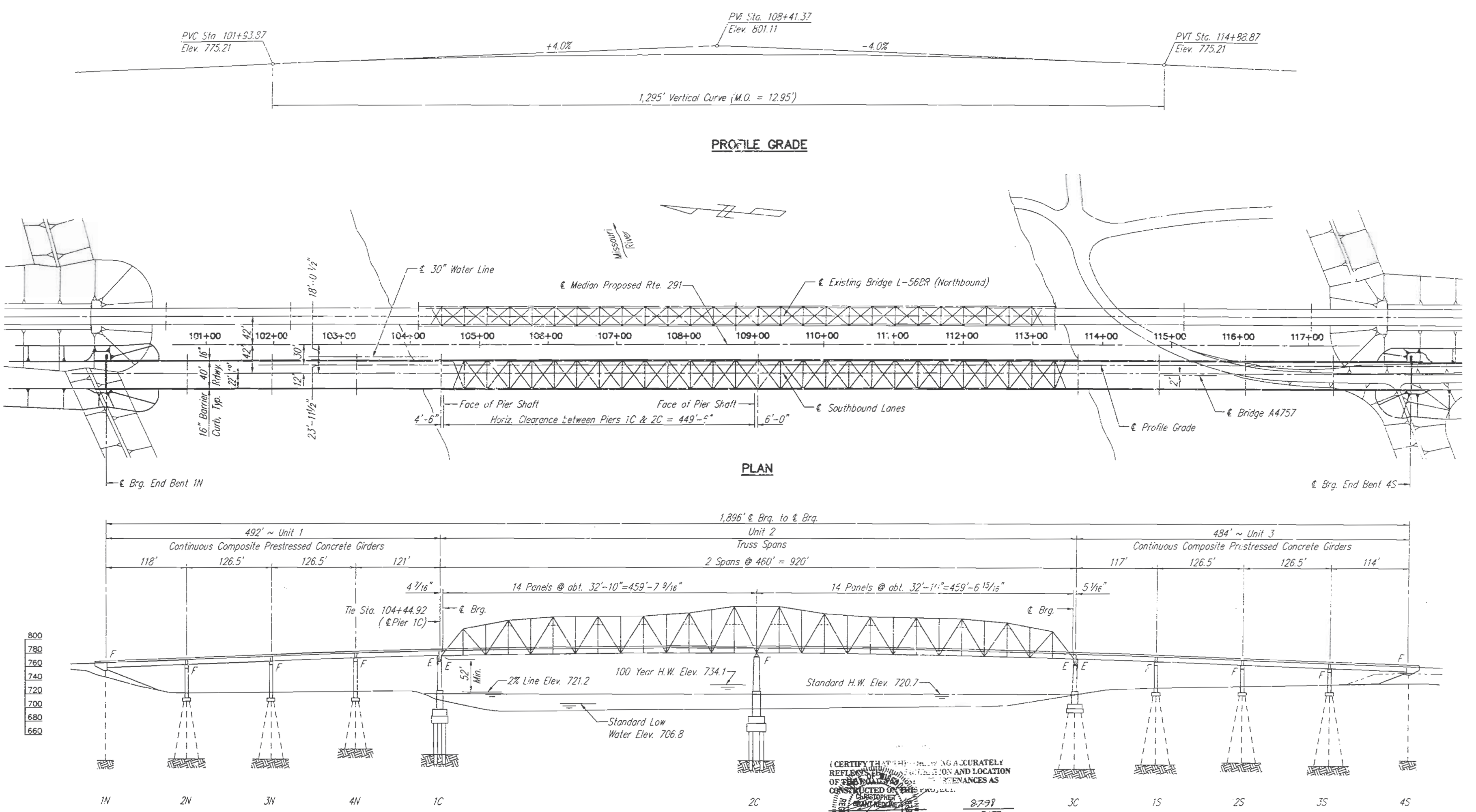
A4757

T-NAV-LT

309

310

STATE	PROJ. NO.	SHEET NO.
MO.	ACNH-291-1(44)	12



I CERTIFY THAT THIS DRAWING ACCURATELY REFLECTS THE ... AND LOCATION OF THE ... APPURTENANCES AS CONSTRUCTED ON THIS PROJECT.

8-7-98
DATE

BASIC FLOOD DATA	
Discharge (100 yr.)	430,000 cfs
H.W. Elev.	734.1

GENERAL PLAN AND ELEVATION

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

GPE291C2

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

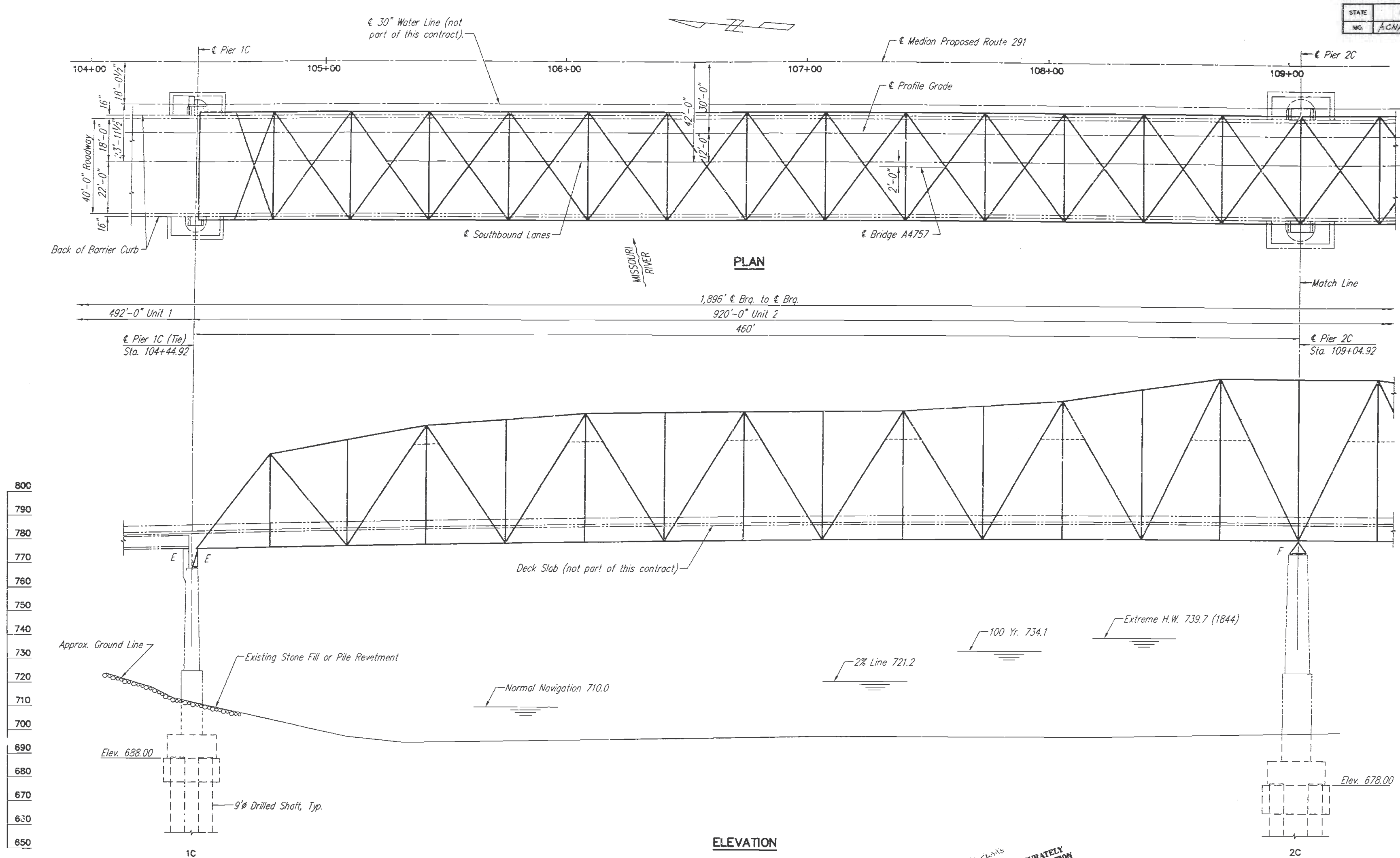
DETAILED: T.L.W. 10/92
CHECKED: H.G.J. 09/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 9 OF 33

A4757

STATE	PROJ. NO.	SHEET NO.
MO.	ACNH-291-1(46)	13



311

FINAL PLANS
I CERTIFY THAT THIS DRAWING ACCURATELY REFLECTS THE CONFIGURATION AND LOCATION OF THE BRIDGE AND APPURTENANCES AS CONSTRUCTED ON THIS PROJECT.
DATE
E-27899
REGISTERED PROFESSIONAL ENGINEER

GENERAL PLAN AND ELEVATION -- UNIT 2
NORTH SPAN

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

UNIT2AC2

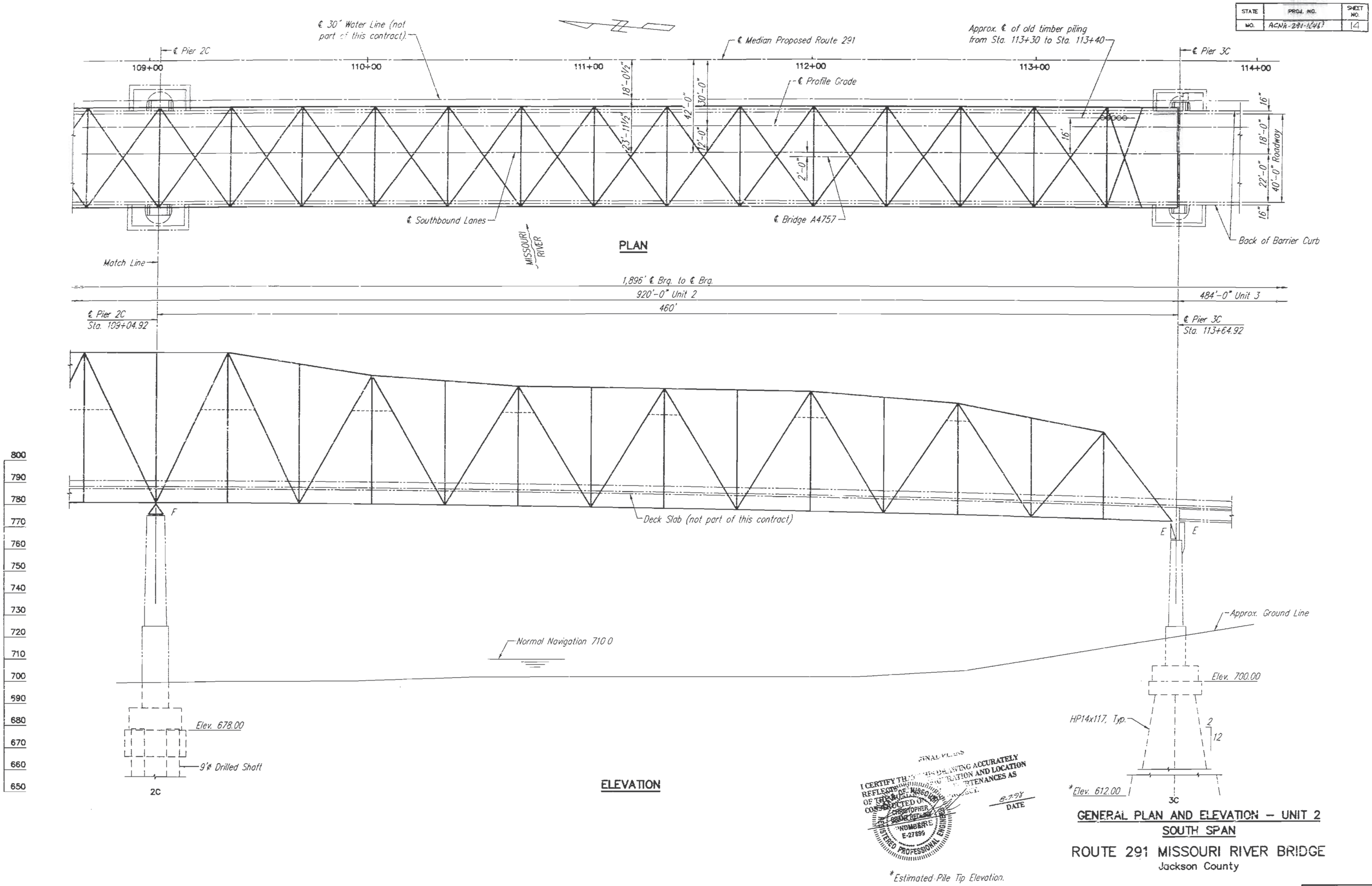
HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.L.K. 03/93
CHECKED: H.G.J. 09/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 10 OF 33

A4757



STATE	PROJ. NO.	SHEET NO.
MO.	ACNH-291-1(46)	14

GENERAL PLAN AND ELEVATION – UNIT 2
SOUTH SPAN

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.L.K. 03/93
CHECKED: H.G.J. 09/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 11 OF 33

A4757

312

STATE	PROJ. NO.	SHEET NO.
MO.	ACUH-291-1(46)	15

GENERAL NOTES:

The existing Missouri Route 291 shall remain open during construction.

Utility companies whose facilities are shown on the plans or are known to be within the construction limits shall be notified by the Contractor of the construction start date.

All dimensions are horizontal unless otherwise noted. Drawings shall not be scaled.

SPECIFICATIONS:

Design: AASHTO Standard Specifications for Highway Bridges 1992 Edition plus Interims.

Construction: Missouri State Highway Commission Standard Specifications For Highway Construction, 1993 Edition, plus general and job special provisions.

FHWA Technical Advisory (T 5140.20), Scour of Bridges.

DESIGN LOADING:

Load Factor Design Method – Stringers and Floorbeams.
Live Load – HS20 Modified with Modified 24,000 Lb. Tandem Axle.
Live Load Distribution: Truss Members – 1.50 Lane/Truss
Truss Floor System in accordance with AASHTO.
For Truss Members the concentrated load used in combination with lane load is 32,500 Lbs. for both Shear and Moment calculations.
Dead Load – An allowance of 35 Lbs. per sq. ft. of roadway for future wearing surface is included in the Dead Load.
Concrete Weight – 150 Lbs. per cu. ft.
An allowance of 16 Lbs. per sq. ft. of roadway is used for Stay-In-Place Forms.
Wind – As specified by AASHTO.
Fatigue – AASHTO Loading Case I.
Seismic Forces – In accordance with AASHTO Division I-A, Sec. 4.6 Design Forces for Seismic Performance Category A.

DESIGN UNIT STRESSES:

Structural Carbon Steel (A.S.T.M. A709 Gr. 36)--- fs = 20,000 psi.
fy = 36,000 psi.
Structural Low Alloy Steel------------------ fs = 27,000 psi.
(A.S.T.M. A709, Gr. 50 or. A.S.T.M. A709 Gr. 50W)- fy = 50,000 psi.

DESIGNATION:

Far Side – (F.S.)
Near Side – (N.S.)
Low-Alloy Steel – (LA)
Milled Joint – (MJ)

TRUSS SPAN ERECTION:

Before ordering material and proceeding with shop drawings, the Contractor shall submit to the Engineer, for review, complete plans of his proposed erection scheme for the Truss Span showing erection Loads and Stresses. Erection Stresses shall be composed of the Dead Load Stresses of the structure and erection equipment plus the stress from a 45 psf wind on the structure and on the erection equipment. Erection Stresses shall not exceed design unit stresses (working stress design) by more than 33 1/3%. Review of the erection plans by the Engineer shall not be considered as relieving the Contractor of his full responsibility for the practicability and safety of the erection schemes used. An assumed possible erection scheme with erection stresses is shown on Sheet 15 of 31.

MATERIAL DESIGNATION:

All material shown on the Plans shall be Structural Carbon Steel unless otherwise noted. Material designated as (LA) shall be Structural Low-Alloy Ste

HIGH STRENGTH (H.S.) BOLTS:

High Strength Bolts shall be galvanized friction type and shall conform to ASTM A325, except as noted. High Strength Bolts may not be reused after torquing.

High strength bolts, nuts and washers shall be sampled for quality in accordance with Standard Specification 106 and Field Section (FS-712).

All connections thru side plates of truss members to the gusset plates, angles and splice plates (main truss joints only) shall be made with 1"ø High Strength (H.S.) Bolts, unless otherwise noted.

All other connections shall be made using 7/8"ø H.S. Bolts, unless otherwise noted on the Plans.

FRACTURE CRITICAL MEMBERS AND NOTCH TOUGHNESS:

For Fracture Critical Members (FCM) and Notch Toughness requirements, see Special Provisions. Only ASTM A709 Gr. 50 Structural Low Alloy Steel shall be used for Low Alloy Fracture Critical Members.

Notch Toughness requirements are mandatory for all stringers and bottom flanges and webs of all floorbeams and Truss Tension Members including their Connecting Gusset Plates.

MILLED JOINTS:

Material of members at Joints specified (MJ) in the Plans shall be Milled to bevel of member to provide a theoretical gap of 1/16" after the Truss is erected. All other material at Joints shall be in Close Contact. See Special Provisions.

CAMBER:

Trusses and Floorbeams are shown cambered for full Dead Load, excluding Future Wearing Surface, and including vertical curve for Truss.

JACKING:

Provisions have been made for jacking the total superstructure Dead Load at Panel Points L0, L14 and L0' of the Truss Span, assuming all support Joints are raised simultaneously or proportionally in a manner to preclude any distortion of the Truss configuration at 150% of allowable working stress.

SPAN LENGTHS

All span lengths shown on plans are at a normal temperature of 60° F.

CONNECTIONS:

All shop and field connections, other than welded or as noted, shall be made with High Strength Bolts, with sizes as noted on the plans. Pitch for connectors shall be not less than 3" for 7/8"ø fasteners and 3 1/2" for 1"ø fasteners.

WELDING:

All welding shall conform to the ANSI/AASHTO/AWS D1.5-95 Bridge Welding Code as supplemented by the Standard Specifications and Special Provisions.

MISCELLANEOUS:

See Special Provisions for navigational considerations and construction in navigable waters.

PROTECTIVE COATING

Protective Coating: System G (Prime Coat only) by the Contractor in accordance with Special Provisions.

Prime Coat: The cost of the prime coat shall be included in the contract unit price of the Fabricated Structural Steel. Tint of the prime coat for System G shall be similar to the color of the field coat to be used (Gray – in future contract).

FINAL
[redacted] QUANTITIES

ITEM	UNIT	TOTAL
Fabricated Structural Carbon Steel (Truss)	Lbs.	2,099,310
Fabricated Structural Low Alloy Steel (Truss)	Lbs.	2,063,210
Truss Bearing Devices	Lbs.	50,600
Water Transportation	Lump Sum	1

Note: Quantities shown are for Truss Span only.

I CERTIFY THAT THIS DRAWING ACCURATELY REFLECTS THE CONFIGURATION AND LOCATION OF THE ROADWAY AND APPURTENANCES AS CONSTRUCTED ON THIS PROJECT.

CHRISTOPHER GRANT BEDKER
NUMBER E-27899
REGISTERED PROFESSIONAL ENGINEER

SIGNATURE

8-7-98
DATE

GENERAL NOTES & QUANTITIES – TRUSS

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

SHEET 12 OF 33

A4757

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

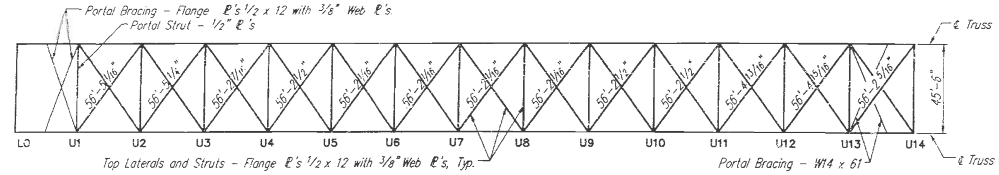
HC HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.L.K. 02/93
CHECKED: H.G.J. 09/93

GNOTR-C2

313

STATE	PROJ. NO.	SHEET NO.
MO.	ACNH-291-1(46)	15



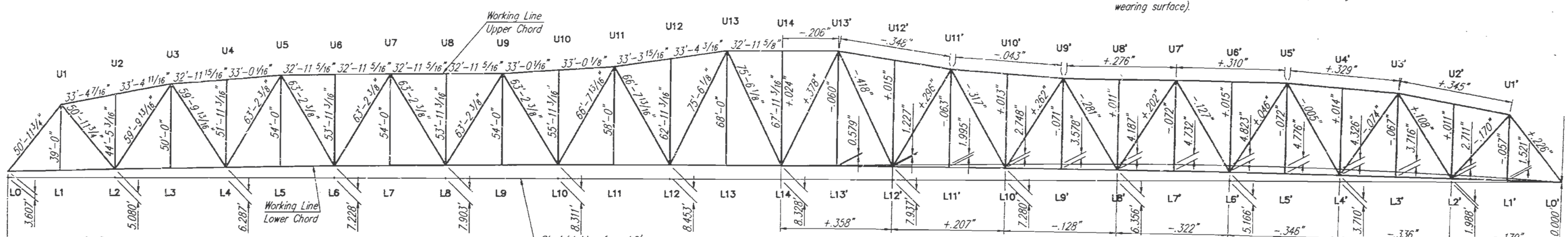
PORTAL BRACING AND TOP LATERALS

Notes:

The geometric shape of the truss, after dead load (excluding future wearing surface) deflection has occurred, shall be as shown in the "Member Lengths" diagram. The angular relationship between members for fabrication shall be in accordance with this shape.

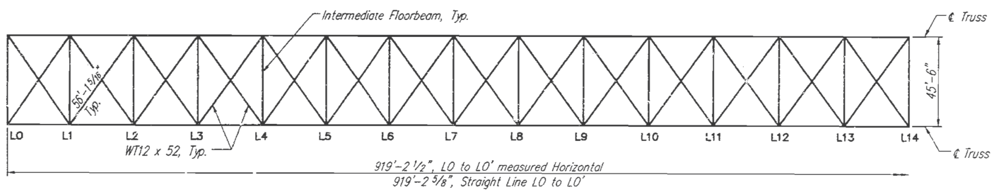
Chord and tie members shall be straight between splice points. Lower chord and tie member offsets are measured perpendicular to reference line at Elev. 770.54.

Lengths of members for fabrication are to be computed for geometric shape of truss shown in the "Member Lengths" diagram, and the corrections shown in the "Truss Deflections" diagram, are to be applied to these lengths. + Indicates lengthening, –indicates shortening. The blocking dimensions, shown in the "Truss Deflections" diagram, are the positions of lower chord and tie member joints above the geometric shape to provide for dead load deflection (excluding future wearing surface).

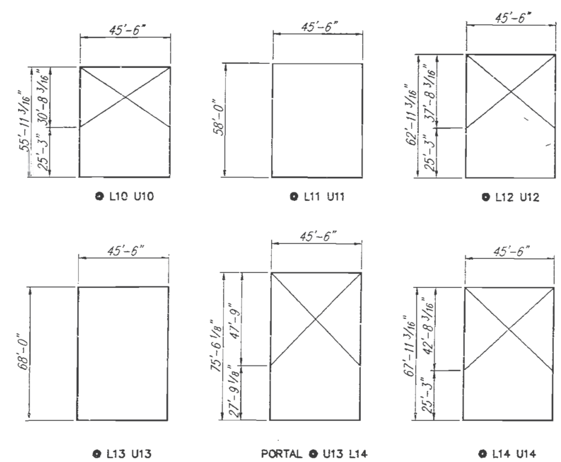


MEMBER LENGTHS

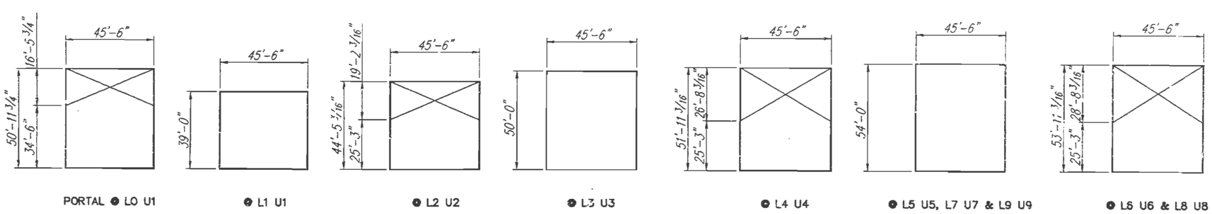
DEFLECTIONS



BOTTOM LATERALS



DIMENSIONS AT PANEL POINTS



DIMENSIONS AT PANEL POINTS

Note: Hangers shall be normal to the lower truss and posts shall be placed at the mid-point of the upper chord.

FINAL PLANS
I CERTIFY THAT THIS DRAWING ACCURATELY REFLECTS THE CONFIGURATION AND LOCATION OF THE ... AND APPURTENANCES AS CONSTRUCTED ON THIS PROJECT.
CHRISTOPHER ... NUMBER E-27899 REGISTERED PROFESSIONAL ENGINEER
8-7-98
DATE

TRUSS LAYOUT AND CAMBER

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

TRUSSLAY

HC HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.L.K. 08/93
CHECKED: H.G.J. 09/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 13 OF 33

A4757

3/4

STATE	PROJ. NO.	SHEET NO.
MO.	ACNH-291-1(4)	17

MEMBER	DIRECT STRESSES (KIPS) DL	LL	I	TOTAL GROUP 1	WIND	TOTAL GROUP 2	BENDING MOMENTS (FT. KIPS) DL My	LL+I Mx	WIND	MEMBER SECTIONS ("H" SHAPES) SIDE OR TOP & BOTTOM PLATES	WEB PLATE	AREA (SQ. IN.) GROSS	NET	S.M. ($IN.^3$) XX	YY	ALLOWABLE UNIT STRESSES (KSI) KL/r	Fa	Fb	ACTUAL UNIT STRESSES (KSI) GROUP 1 fa	GROUP 1 fb	GROUP 2 fa	GROUP 2 fb	MATERIAL	FCM	MEMBER
																			fa	fb	fa	fb			
L0 L2	726	218	19	963	①174	900	42	0	528 ②	24 x 1.625	13..75 x 1.00	91.8	77.1	570	312	- -	27.0	27.0	12.5	1.6	11.7	12.7	LA	FCM	L0 L2
L2 L4	1330	424	38	1792	331	1661	39	0	20	24 x 1.50	14 x 1.00	86.0	72.5	537	288	- -	27.0	27.0	24.7	1.6	22.9	2.1	LA	FCM	L2 L4
L4 L6	1456	496	44	1996	403	1859	42	0	20	24 x 1.625	13.75 x 1.00	91.8	77.1	570	312	- -	27.0	27.0	25.9	1.6	24.1	2.0	LA	FCM	L4 L6
L6 L8	1189	490	44	1723	405	1594	37	0	20	24 x 1.375	14.25 x 1.00	80.3	67.9	504	264	- -	27.0	27.0	25.4	1.7	23.5	2.2	LA	FCM	L6 L8
L8 L10	434	377	34	845	346	780	34	0	20	24 x 1.25	14.50 x 1.00	74.5	63.3	487	240	- -	20.0	20.0	13.4	1.7	12.3	2.2	CS	FCM	L8 L10
L10 L12	-754	-298	-27	-1079	124	-630	48	0	20	30 x 1.50	14 x 1.00	104.0	- -	665	450	40.3	16.1	20.0	-10.4	-1.3	-6.1	-1.6	CS	Not	L10 L12
L12 L14	-2042	-462	-42	-2546	438	-1604	67	0	20	30 x 2.25	12.50 x 1.00	147.5	- -	890	675	41.5	21.8	27.0	-17.3	-1.2	-10.9	-1.5	LA	Not	L12 L14
L0 U1	-1151	-362	-33	-1546	55	-1096	61	0	797	24 x 1.50	14 x 1.00	86.0	- -	537	288	68.1	18.8	27.0	-18.0	-2.5	-12.7	-20.4	LA	Not	L0 U1
U1 U3	-1164	-357	-32	-1553	72	-1092	34	0	21	24 x 1.25	14.50 x 1.00	74.5	- -	469	350	48.2	21.2	27.0	-20.8	-1.2	-14.7	-1.7	LA	Not	U1 U3
U3 U5	-1466	-479	-43	-1988	139	-1327	45	0	20	24 x 1.75	13.50 x 1.00	97.5	- -	501	336	46.2	21.4	27.0	-20.4	-1.6	-13.6	-2.1	LA	Not	U3 U5
U5 U7	-1383	-508	-46	-1937	167	-1216	45	0	20	24 x 1.75	13.50 x 1.00	97.5	- -	601	336	46.2	21.4	27.0	-19.9	-1.6	-12.5	-2.0	LA	Not	U5 U7
U7 U9	-868	-447	-40	-1355	168	-700	32	0	20	24 x 1.125	14.75 x 1.00	68.8	- -	432	216	48.2	21.2	27.0	-19.7	-1.8	-10.2	-2.3	LA	Not	U7 U9
U9 U11	125	281	25	431	142	267	29	0	20	24 x 1.00	15 x 1.00	63.0	54.0	395	192	- -	27.0	27.0	8.0	1.8	4.9	2.4	LA	FCM	U9 U11
U11U13	1409	325	29	1763	136	1545	42	0	26	30 x 1.25	14.50 x 1.00	89.5	78.3	578	375	- -	27.0	27.0	22.5	1.3	19.7	1.9	LA	FCM	U11U13
U13U14	2904	646	58	3608	160	3064	71	0	25	30 x 2.375	12.25 x 1.00	154.8	133.4	922	713	- -	27.0	27.0	27.1	1.2	23.0	1.5	LA	FCM	U13U14
U1 L2	633	205	18	856	0	633	44	0	49	24 x 1.00	15 x 1.00	63.0	54.0	395	192	- -	20.0	20.0	15.9	2.8	11.7	4.2	CS	FCM	U1 L2
L2 U3	-342	-168	-15	-525	0	-342	53	0	67	24 x 1.00	15 x 1.00	63.0	- -	395	192	89.3	12.7	20.0	-8.3	-3.3	-5.4	-5.3	CS	Not	L2 U3
U3 L4	234	145	13	392	0	234	53	0	67	24 x 1.00	15 x 1.00	63.0	54.0	395	192	- -	20.0	20.0	7.3	3.3	4.3	5.3	CS	FCM	U3 L4
L4 U5	15	132	12	159	0	15	56	0	75	24 x 1.00	15 x 1.00	63.0	54.0	395	192	- -	20.0	20.0	2.9	3.5	0.3	5.8	CS	FCM	L4 U5
U5 L6	-138	-145	-13	-296	0	-138	56	0	75	24 x 1.00	15 x 1.00	63.0	- -	395	192	93.7	12.3	20.0	-4.7	-3.5	-2.2	-5.8	CS	Not	U5 L6
L6 U7	382	174	16	572	0	382	56	0	75	24 x 1.00	15 x 1.00	63.0	54.0	395	192	- -	20.0	20.0	10.6	3.5	7.1	5.8	CS	FCM	L6 U7
U7 L8	-608	-206	-19	-833	0	-608	56	0	75	24 x 1.00	15 x 1.00	63.0	- -	395	192	93.7	12.3	20.0	-13.2	-3.5	-9.7	-5.8	CS	Not	U7 L8
L8 U9	845	243	22	1110	0	845	56	0	75	24 x 1.00	15 x 1.00	63.0	54.0	395	192	- -	20.0	20.0	20.6	3.5	15.6	5.8	CS	FCM	L8 U9
U9 L10	-1066	-274	-25	-1365	0	-1066	76	0	75	24 x 1.50	14 x 1.00	86.0	- -	537	288	89.4	15.3	27.0	-15.9	-3.2	-12.4	-4.8	LA	Not	U9 L10
L10 U11	1282	312	28	1622	0	1282	83	0	104	30 x 1.25	14.50 x 1.00	89.5	78.3	578	375	- -	27.0	27.0	20.7	2.7	16.4	4.8	LA	FCM	L10 U11
U11 L12	-1293	-304	-27	-1624	0	-1293	90	0	104	30 x 1.375	14.25 x 1.00	96.8	- -	622	412	80.3	16.9	27.0	-16.8	-2.6	-13.4	-4.6	LA	Not	U11 L12
L12 U13	1486	340	31	1857	0	1486	94	0	134	30 x 1.25	14.50 x 1.00	89.5	78.3	578	375	- -	27.0	27.0	23.7	3.0	19.0	5.8	LA	FCM	L12 U13
U13 L14	-1991	-436	-39	-2466	145	-1846	140	0	134	30 x 2.00	13 x 1.00	133.0	- -	820	600	82.0	16.7	27.0	-18.5	-2.8	-13.9	-4.8	LA	Not	U13 L14
							DL Mx																		
U1 L1	179	115	34	328	0	179	51	60	21	18 x 0.75	15.50 x 0.75	38.6	31.9	237	81	- -	20.0	20.0	10.3	0.9	5.6	6.7	CS	FCM	U1 L1
U3 L3	164	110	33	307	0	164	34	42	35	18 x 0.75	15.50 x 0.75	38.6	31.9	237	81	- -	20.0	20.0	9.6	0.9	5.1	5.6	CS	FCM	U3 L3
U5 L5	164	110	33	307	0	164	34	42	41	18 x 0.75	15.50 x 0.75	38.6	31.9	237	81	- -	20.0	20.0	9.6	0.9	5.1	5.9	CS	FCM	U5 L5
U7 L7	163	110	33	306	0	163	34	42	41	18 x 0.75	15.50 x 0.75	38.6	31.9	237	81	- -	20.0	20.0	9.6	0.9	5.1	5.9	CS	FCM	U7 L7
U9 L9	163	110	33	306	0	163	34	42	41	18 x 0.75	15.50 x 0.75	38.6	31.9	237	81	- -	20.0	20.0	9.6	0.8	5.1	5.9	CS	FCM	U9 L9
U11 L11	167	110	33	310	0	167	34	42	55	21 x 0.875	15.25 x 0.75	48.2	40.3	307	129	- -	20.0	20.0	7.7	-0.9	4.1	-5.1	CS	FCM	U11 L11
U13L13	174	110	33	317	0	174	34	42	87	24 x 1.00	15.00 x 1.00	63.0	49.5	395	192	- -	20.0	20.0	5.9	-0.9	3.2	-5.0	CS	FCM	U13L13
L2 U2	-22	0	0	-22	0	-22	67	81	27	18 x 0.75	15.50 x 0.75	38.6	- -	237	81	91.1	15.4	20.0	-0.6	-1.4	-0.6	-8.9	CS	Not	L2 U2
L4 U4	-25	0	0	-25	0	-25	67	81	38	18 x 0.75	15.50 x 0.75	38.6	- -	237	81	108.0	10.8	18.5	-0.6	-0.9	-0.6	-9.4	CS	Not	L4 U4
L6 U6	-25	0	0	-25	0	-25	67	81	41	18 x 0.75	15.50 x 0.75	38.6	- -	237	81	111.8	10.4	17.6	-0.6	-1.1	-0.6	-9.6	CS	Not	L6 U6
L8 U8	-19	0	0	-19	0	-19	67	81	41	18 x 0.75	15.50 x 0.75	38.6	- -	237	81	111.8	10.4	17.6	-0.5	-0.9	-0.5	-9.6	CS	Not	L8 U8
L10U10	-22	0	0	-22	0	-22	67	81	44	18 x 0.75	15.50 x 0.75	38.6	- -	237	81	116.0	9.8	16.8	-0.6	-0.9	-0.6	-9.7	CS	Not	L10U10
L12U12	-28	0	0	-28	0	-28	67	81	74	21 x 0.875	15.25 x 0.75	48.2	- -	307	129	107.0	10.8	19.6	-0.6	0.9	-0.6	8.7	CS	Not	L12U12
L14U14	-41	0	0	-41	0	-41	67	81	87	21 x i	15 x 0.75	53.2	- -	341	147	113.9	10.1	17.8	-0.8	0.9	-0.8	9.2	CS	Not	L14U14
Intermediate Floorbeam					-248	-248	1738	1931		20 x 1.50	72 x .50	96.0		2576	200		20.0	20.0			-2.6	17.1	CS	Not	
End Floorbeam @ L0							② 4190	③1545		20 x 1.50	72 x .8125	118.5		2838	200		20.0	20.0				17.7	CS	Not	
Floorbeam @ L14							⑤15750④	③ 1931		24 x 2.50	70 x 2.25 & 70 x .625	277.5		4683	480		20.4	④40.5				40.4	LA	Not	

① in L1 L2
② @ L0
③ No x & y axis significance
④ Jacking Load

Compression Stresses are designated by (-) signs.

LA = AASHTO M223 (ASTM A709 Grade 50 or 50W)
CS = AASHTO M183 (ASTM A709 Grade 36)
Note: Only ASTM A709 Gr. 50 shall be used for Low Alloy Fracture Critical Members.

FCM = Fracture Critical Member
Not = Not a Fracture Critical Member

XX = Axis in plane of truss (for truss members)
YY = Axis perpendicular to plane of truss (for truss members)

Fa = Axial Unit Stress
Fb = Bending Unit Stress

FINAL PLANS
I CERTIFY THAT THIS DRAWING ACCURATELY REFLECTS THE CONFIGURATION AND LOCATION OF THE ROADWAY AND APPURTENANCES AS CONSTRUCTED ON THIS PROJECT.
8-7-98
DATE

REGISTERED PROFESSIONAL ENGINEER
NUMBER
E-27899

TRUSS STRESS SHEET

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

STRESS

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.L.K. 08/93
CHECKED: H.G.J. 09/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

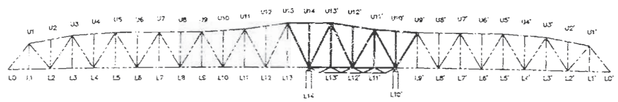
SHEET 14 OF 33

A4757

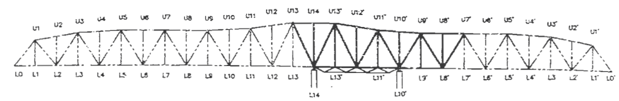
STATE	PROJ. NO.	SHEET NO.
MO.	RENH-291-1(46)	18

TABULATED ERECTION STRESSES ARE FOR TOTAL STEEL DEAD LOAD WITH 20 TON LOADS AT L2 AND L2'			
MEMBER	ERECTION STRESS (KIPS)	MEMBER	ERECTION STRESS (KIPS)
L0 L2	-25	U13'L14	-1091
L2 L4	-192	L12'U13'	535
L4 L6	-509	U11'L12'	-467
L6 L8	-1009	L10'U11'	674
L8 L10	-1669	U9' L10'	-612
L10 L12	-2321	L8' U9'	669
L12 L14	-2786	U7' L8'	-599
L12' L14	-2779	L6' U7'	519
L10' L12'	-2316	U5' L6'	-441
L8' L10'	-1665	L4' U5'	335
L6' L8'	-1006	U3' L4'	-262
L4' L6'	-507	L2' U3'	191
L2' L4'	-191	U1' L2'	-99
L0' L2'	-25		
		U1 L1	31
L0 U1	41	U3 L3	31
U1 U3	92	U5 L5	31
U3 U5	340	U7 L7	30
U5 U7	743	U9 L9	29
U7 U9	1324	U11 L11	34
U9 U11	1994	U13 L13	41
U11 U13	2581	U13' L13'	42
U13 U13'	3259	U11' L11'	34
U13' U11'	2582	U9' L9'	29
U11' U9'	1995	U7' L7'	30
U9' U7'	1325	U5' L5'	31
U7' U5'	744	U3' L3'	30
U5' U3'	341	U1' L1'	31
U3' U1'	92		
U1' L0'	41	L2 U2	-22
		L4 U4	-25
U1 L2	-99	L6 U6	-25
L2 U3	191	L8 U8	-19
U3 L4	-262	L10 U10	-22
L4 U5	335	L12 U12	-28
U5 L6	-441	L14 U14	-41
L6 U7	519	L12' U12'	-28
U7 L8	-599	L10' U10'	-22
L8 U9	669	L8' U8'	-19
U9 L10	-612	L6' U6'	-25
L10 U11	675	L4' U4'	-25
U11 L12	-468	L2' U2'	-22
L12 U13	536		
U13 L14	-1092		

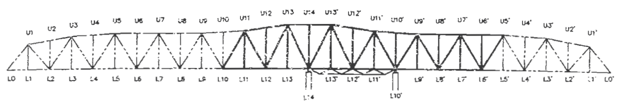
Erection Stresses are for Stage 5 including Dead Load of Steel (Stringers included) and a 40^K Concentrated Load at L2 and L2'.



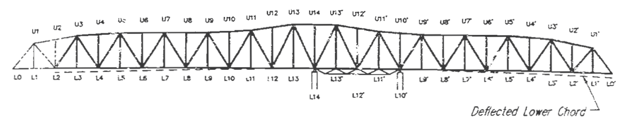
ERECTION STAGE 1
Supported @ L14 & L10'



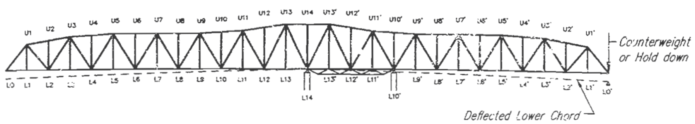
ERECTION STAGE 2
Supported @ L14 & L10'



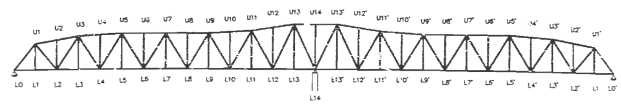
ERECTION STAGE 3
Supported @ L14 & L10'



ERECTION STAGE 4
Supported @ L14 & L10'



ERECTION STAGE 5
Supported @ L14 & L10'



ERECTION STAGE 6
Supported @ L0, L14 & L0'

FINAL PLANS
I CERTIFY THAT THIS DRAWING ACCURATELY REFLECTS THE CONFIGURATION AND LOCATION OF THE BRIDGE AND ITS APPURTENANCES AS CONSTRUCTED ON THIS PROJECT.
8-7-98
DATE
PROFESSIONAL ENGINEER E-27899

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TRUSS STRESS SHEET – ERECTION CONDITION

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

ERECTION

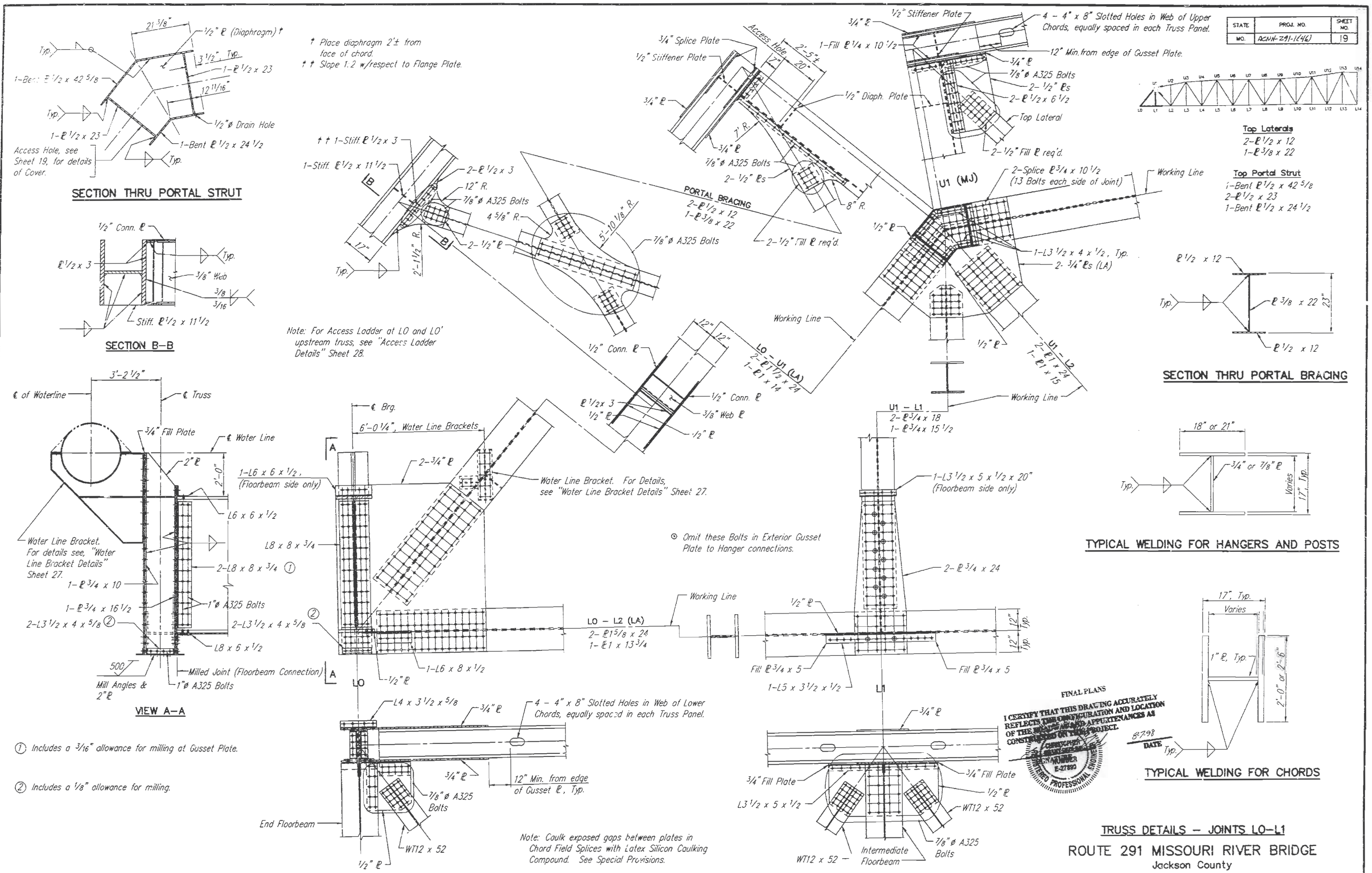
HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.L.K. 08/93
CHECKED: H.G.J. 09/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 15 OF 33

A4757



STATE	PROJ. NO.	SHEET NO.
MO.	ACNH-291-1(46)	19

TRUSS DETAILS – JOINTS L0–L1

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.L.K. 01/93
CHECKED: H.G.J. 09/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 16 OF 33

A4757

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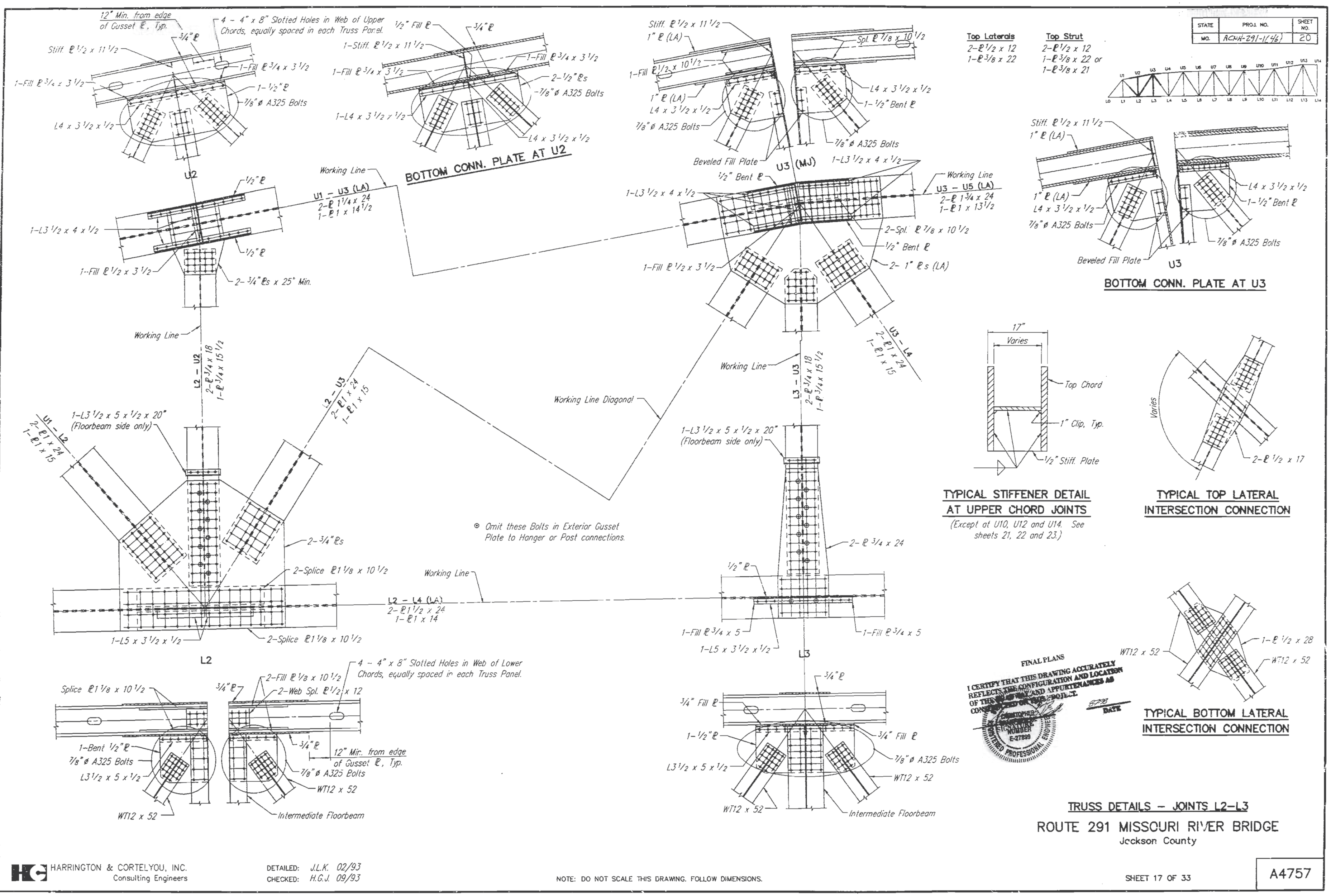
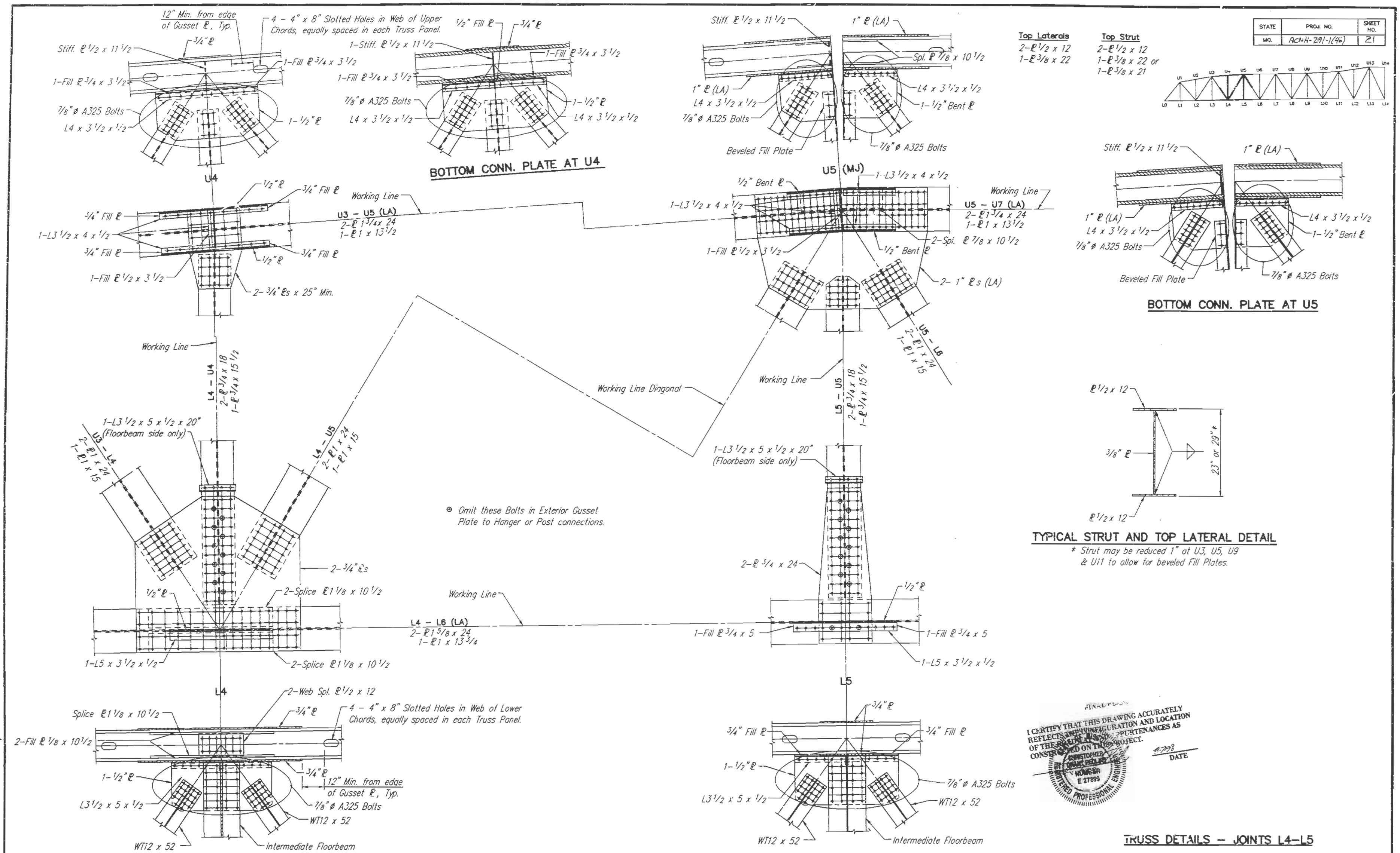

BOTTOM CONN. PLATE AT U2
BOTTOM CONN. PLATE AT U3
U2
U3 (MJ)
U3
L2
L3
12" Min. from edge of Gusset ℞, Typ.
4 - 4" x 8" Slotted Holes in Web of Upper Chords, equally spaced in each Truss Panel.
Stiff. ℞ 1/2 x 11 1/2
3/4" ℞
1-Fill ℞ 3/4 x 3 1/2
1-1/2" ℞
7/8" ø A325 Bolts
L4 x 3 1/2 x 1/2
1/2" Fill ℞
1-Stiff. ℞ 1/2 x 11 1/2
2-1/2" ℞s
1-L4 x 3 1/2 x 1/2
1" ℞ (LA)
Spl. ℞ 7/8 x 10 1/2
1-Fill ℞ 1/2 x 10 1/2
1-1/2" Bent ℞
Beveled Fill Plate
1/2" Bent ℞
1-L3 1/2 x 4 x 1/2
Working Line
U1 - U3 (LA)
2-℞ 1 1/4 x 24
1-℞ 1 x 14 1/2
U3 - U5 (LA)
2-℞ 1 3/4 x 24
1-℞ 1 x 13 1/2
2-Spl. ℞ 7/8 x 10 1/2
2- 1" ℞s (LA)
1-Fill ℞ 1/2 x 3 1/2
2- 3/4" ℞s x 25" Min.
L2 - U2
2-℞ 3/4 x 18
1-℞ 3/4 x 15 1/2
L2 - U3
2-℞ 1 x 24
1-℞ 1 x 15
L3 - U3
2-℞ 3/4 x 18
1-℞ 3/4 x 15 1/2
U3 - L4
2-℞ 1 x 24
1-℞ 1 x 15
U1 - L2
2-℞ 1 x 24
1-℞ 1 x 15
Working Line Diagonal
1-L3 1/2 x 5 x 1/2 x 20" (Floorbeam side only)
2- 3/4" ℞s
2-Splice ℞ 1 1/8 x 10 1/2
1-L5 x 3 1/2 x 1/2
⊛ Omit these Bolts in Exterior Gusset Plate to Hanger or Post connections.
L2 - L4 (LA)
2-℞ 1 1/2 x 24
1-℞ 1 x 14
2-℞ 3/4 x 24
1-Fill ℞ 3/4 x 5
1-L5 x 3 1/2 x 1/2
4 - 4" x 8" Slotted Holes in Web of Lower Chords, equally spaced in each Truss Panel.
Splice ℞ 1 1/8 x 10 1/2
2-Fill ℞ 1/8 x 10 1/2
2-Web Spl. ℞ 1/2 x 12
1-Bent 1/2" ℞
L3 1/2 x 5 x 1/2
WT12 x 52
Intermediate Floorbeam
3/4" Fill ℞
Top Laterals
2-℞ 1/2 x 12
1-℞ 3/8 x 22
Top Strut
2-℞ 1/2 x 12
1-℞ 3/8 x 22 or
1-℞ 3/8 x 21
STATE | PROJ. NO. | SHEET NO.
MO. | ACNH-291-1(46) | 20
17"
Varies
Top Chord
1" Clip, Typ.
1/2" Stiff. Plate
TYPICAL STIFFENER DETAIL AT UPPER CHORD JOINTS
(Except at U10, U12 and U14. See sheets 21, 22 and 23.)
2-℞ 1/2 x 17
TYPICAL TOP LATERAL INTERSECTION CONNECTION
1-℞ 1/2 x 28
TYPICAL BOTTOM LATERAL INTERSECTION CONNECTION
FINAL PLANS
I CERTIFY THAT THIS DRAWING ACCURATELY REFLECTS THE CONFIGURATION AND LOCATION OF THE ... AND APPURTENANCES AS CONSTRUCTED ON THIS PROJECT.
DATE
E-27899
PROFESSIONAL ENGINEER
TRUSS DETAILS - JOINTS L2-L3
ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County
HARRINGTON & CORTELYOU, INC.
Consulting Engineers
DETAILED: J.L.K. 02/93
CHECKED: H.G.J. 09/93
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.
SHEET 17 OF 33
A4757
L2-L3-U3



319

I CERTIFY THAT THIS DRAWING ACCURATELY REFLECTS THE CONFIGURATION AND LOCATION OF THE ... APPURTENANCES AS CONSTRUCTED ON THIS PROJECT.

DATE

TRUSS DETAILS - JOINTS L4-L5

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

L4-L5-U5

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.L.K. 03/93
CHECKED: H.G.J. 09/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 18 OF 33

A4757

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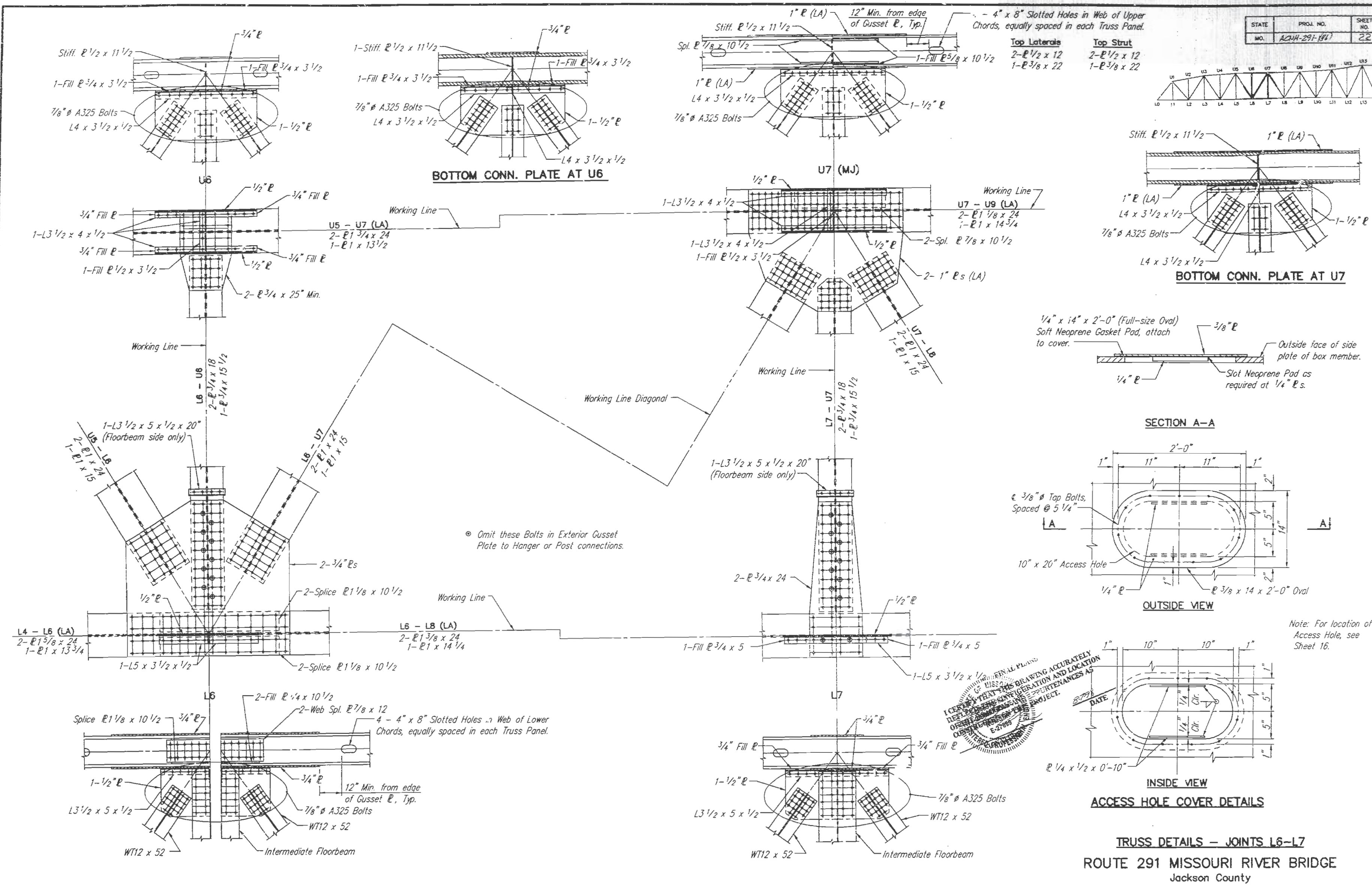

TRUSS DETAILS – JOINTS L6–L7

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.L.K. 03/93
CHECKED: H.G.J. 06/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 19 OF 33

A4757

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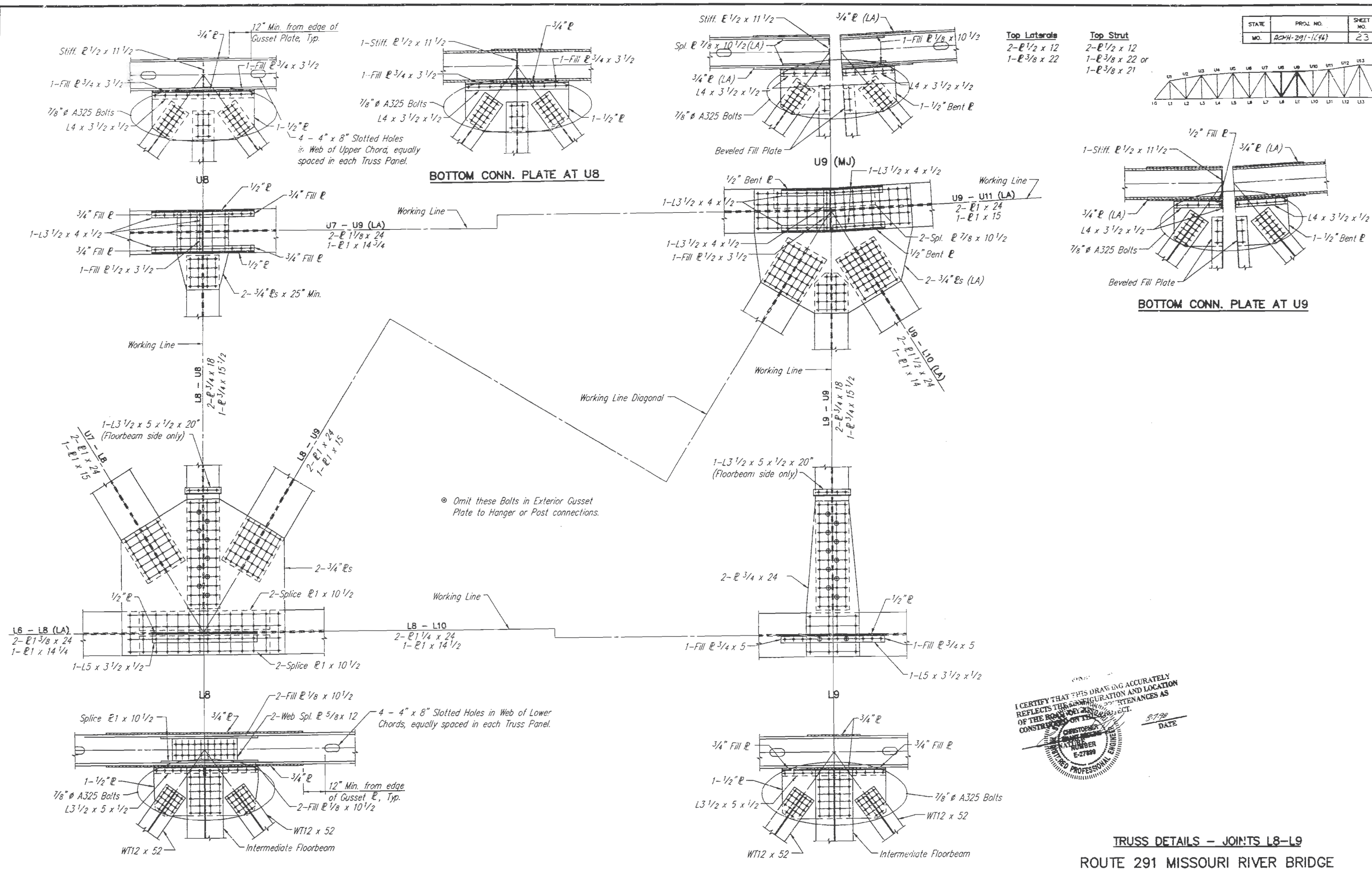


TRUSS DETAILS – JOINTS L8–L9

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

STATE	PROJ. NO.	SHEET NO.
MO.	ACXH-291-1(4)	23

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

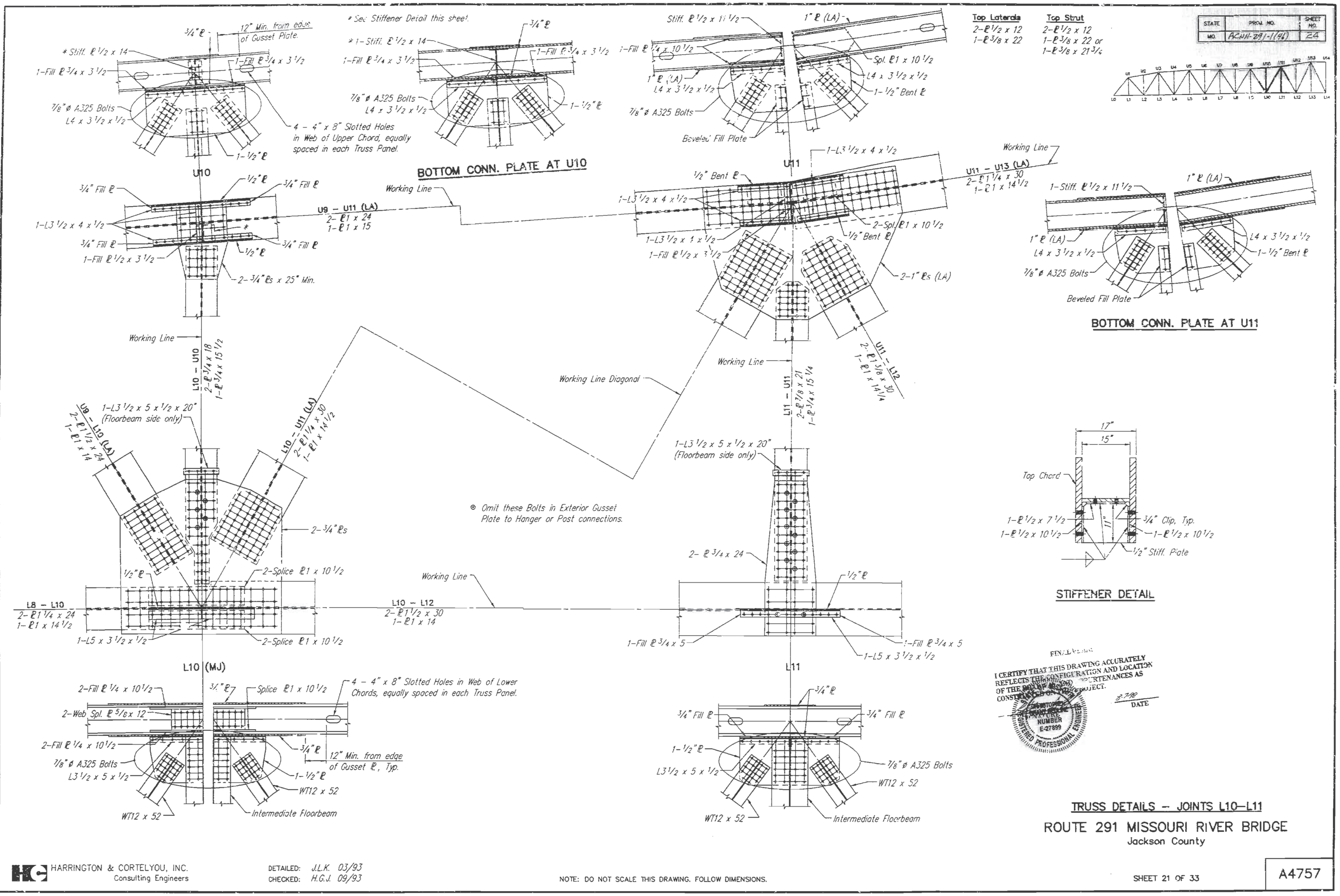
DETAILED: J.L.K. 03/93
CHECKED: H.G.J. 09/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 20 OF 33

A4757

L8-L9-U9


BOTTOM CONN. PLATE AT U10
BOTTOM CONN. PLATE AT U11
STIFFENER DETAIL
L10 (MJ)
L11
U10
U11
Working Line
Working Line Diagonal
⊗ Omit these Bolts in Exterior Gusset Plate to Hanger or Post connections.
Top Laterals
2-℄1/2 x 12
1-℄3/8 x 22
Top Strut
2-℄1/2 x 12
1-℄3/8 x 22 or
1-℄3/8 x 21 3/4
7/8" ⌀ A325 Bolts
WT12 x 52
Intermediate Floorbeam
I CERTIFY THAT THIS DRAWING ACCURATELY REFLECTS THE CONFIGURATION AND LOCATION OF THE ... APPURTENANCES AS CONSTRUCTED ON THIS PROJECT.
DATE
TRUSS DETAILS – JOINTS L10–L11
ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County
HARRINGTON & CORTELYOU, INC.
Consulting Engineers
DETAILED: J.L.K. 03/93
CHECKED: H.G.J. 09/93
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.
SHEET 21 OF 33
A4757
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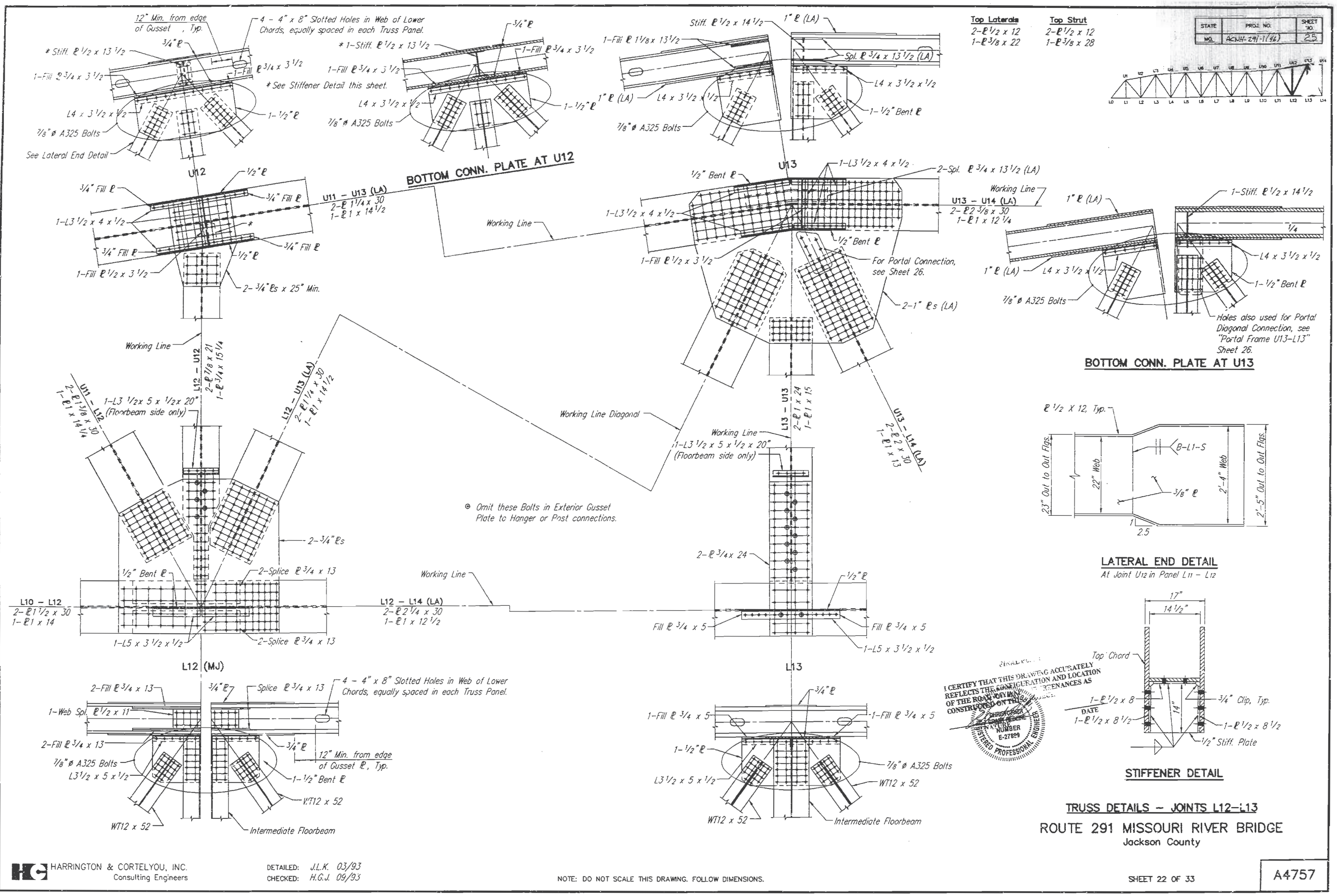
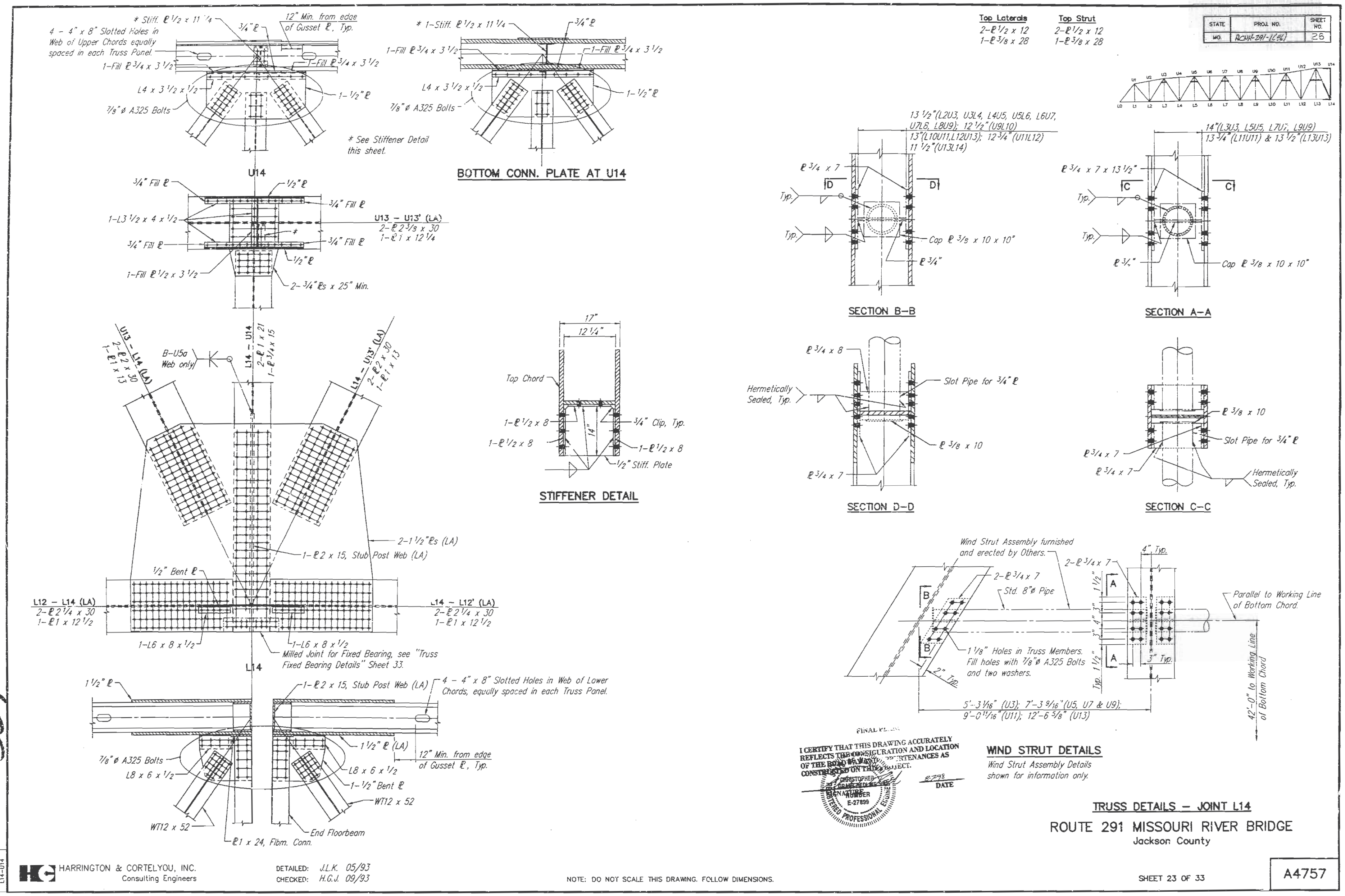
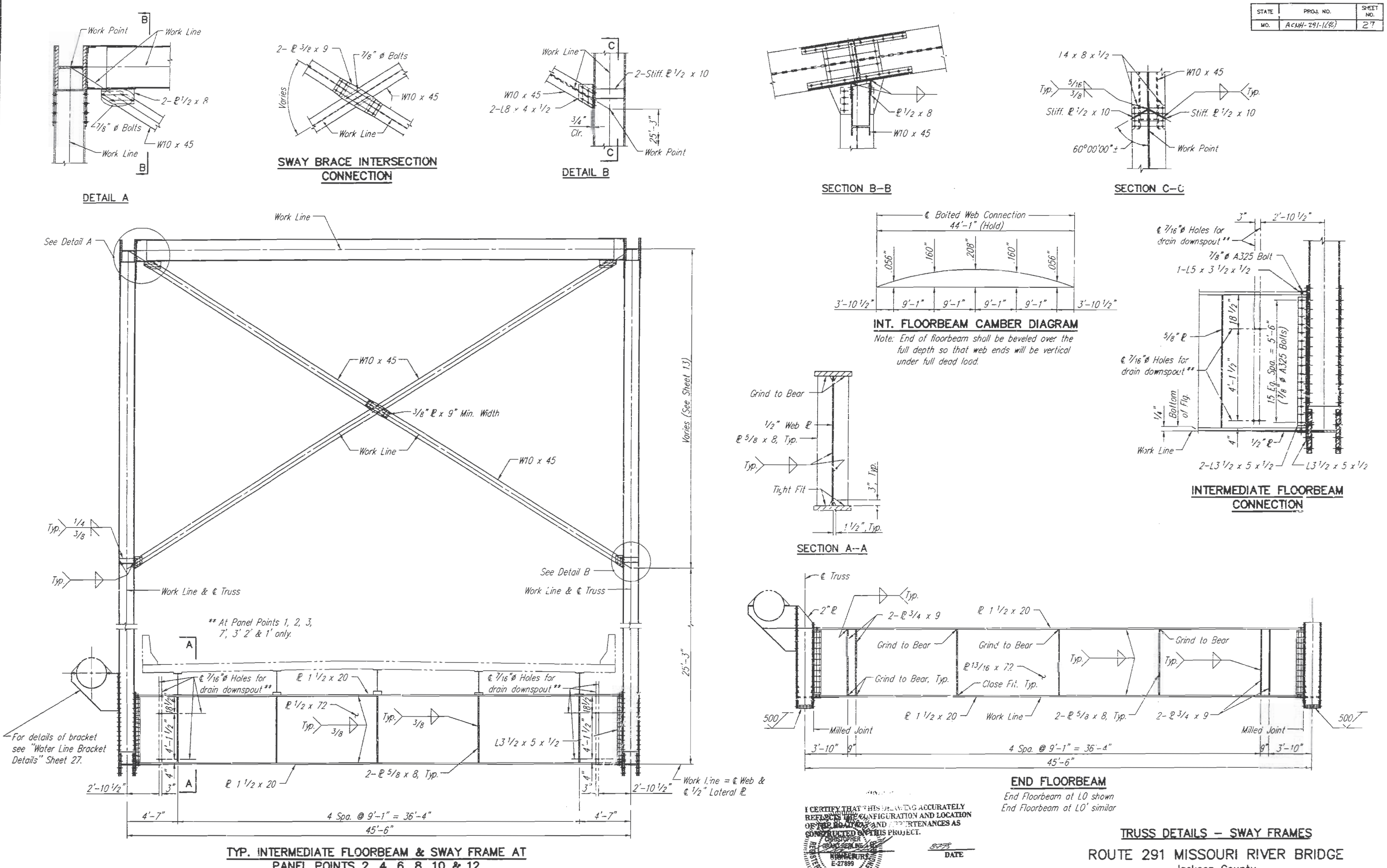


12" Min. from edge of Gusset, Typ.
4 - 4" x 8" Slotted Holes in Web of Lower Chords, equally spaced in each Truss Panel.
* Stiff. ℓ 1/2 x 13 1/2
3/4" ℓ
1-Fill ℓ 3/4 x 3 1/2
L4 x 3 1/2 x 1/2
7/8" ø A325 Bolts
See Lateral End Detail
1-1/2" ℓ
* 1-Stiff. ℓ 1/2 x 13 1/2
* See Stiffener Detail this sheet.
Stiff. ℓ 1/2 x 14 1/2
1" ℓ (LA)
1-Fill ℓ 1 1/8 x 13 1/2
Spl. ℓ 3/4 x 13 1/2 (LA)
1-1/2" Bent ℓ
Top Laterals
2-ℓ 1/2 x 12
1-ℓ 3/8 x 22
Top Strut
2-ℓ 1/2 x 12
1-ℓ 3/8 x 28
STATE
MO.
PROJ. NO.
ACNH-291-1(46)
SHEET NO.
25
U12
1/2" ℓ
3/4" Fill ℓ
1-L3 1/2 x 4 x 1/2
1-Fill ℓ 1/2 x 3 1/2
2-3/4" ℓs x 25" Min.
U11 - U13 (LA)
2-ℓ 1 1/4 x 30
1-ℓ 1 x 14 1/2
BOTTOM CONN. PLATE AT U12
Working Line
U13
1/2" Bent ℓ
1-L3 1/2 x 4 x 1/2
2-Spl. ℓ 3/4 x 13 1/2 (LA)
U13 - U14 (LA)
2-ℓ 2 3/8 x 30
1-ℓ 1 x 12 1/4
For Portal Connection, see Sheet 26.
2-1" ℓs (LA)
1-Stiff. ℓ 1/2 x 14 1/2
L4 x 3 1/2 x 1/2
1-1/2" Bent ℓ
Holes also used for Portal Diagonal Connection, see "Portal Frame U13-L13" Sheet 26.
BOTTOM CONN. PLATE AT U13
U11 - L12
2-ℓ 1 3/8 x 30
1-ℓ 1 x 14 1/4
1-L3 1/2 x 5 x 1/2 x 20" (Floorbeam side only)
L12 - U12
2-ℓ 7/8 x 21
1-ℓ 3/4 x 15 1/4
L12 - U13 (LA)
2-ℓ 1 1/4 x 30
1-ℓ 1 x 14 1/2
Working Line Diagonal
L13 - U13
2-ℓ 1 x 24
1-ℓ 1 x 15
U13 - L14 (LA)
2-ℓ 2 x 30
1-ℓ 1 x 13
ℓ 1/2 X 12, Typ.
B-L1-S
3/8" ℓ
23" Out to Out Flgs.
22" Web
2'-4" Web
2'-5" Out to Out Flgs.
2.5
LATERAL END DETAIL
At Joint U12 in Panel L11 - L12
⊕ Omit these Bolts in Exterior Gusset Plate to Hanger or Post connections.
2-3/4" ℓs
1/2" Bent ℓ
2-Splice ℓ 3/4 x 13
L10 - L12
2-ℓ 1 1/2 x 30
1-ℓ 1 x 14
1-L5 x 3 1/2 x 1/2
L12 - L14 (LA)
2-ℓ 2 1/4 x 30
1-ℓ 1 x 12 1/2
2-ℓ 3/4 x 24
Fill ℓ 3/4 x 5
L12 (MJ)
L13
2-Fill ℓ 3/4 x 13
1-Web Spl. ℓ 1/2 x 11
Splice ℓ 3/4 x 13
L3 1/2 x 5 x 1/2
WT12 x 52
Intermediate Floorbeam
1-Fill ℓ 3/4 x 5
1-1/2" ℓ
17"
14 1/2"
Top Chord
1-ℓ 1/2 x 8
1-ℓ 1/2 x 8 1/2
3/4" Clip, Typ.
1/2" Stiff. Plate
STIFFENER DETAIL
I CERTIFY THAT THIS DRAWING ACCURATELY REFLECTS THE CONFIGURATION AND LOCATION OF THE ROADWAY APPURTENANCES AS CONSTRUCTED
DATE
PROFESSIONAL ENGINEER
NUMBER E-27899
TRUSS DETAILS - JOINTS L12-L13
ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County
HARRINGTON & CORTELYOU, INC.
Consulting Engineers
DETAILED: J.L.K. 03/93
CHECKED: H.G.J. 09/93
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.
SHEET 22 OF 33
A4757
L12-L13


* Stiff. ℓ 1/2 x 11 1/4
4 - 4" x 8" Slotted Holes in Web of Upper Chords equally spaced in each Truss Panel.
12" Min. from edge of Gusset ℓ, Typ.
3/4" ℓ
1-Fill ℓ 3/4 x 3 1/2
L4 x 3 1/2 x 1/2
1-1/2" ℓ
7/8" ø A325 Bolts
* See Stiffener Detail this sheet.
* 1-Stiff. ℓ 1/2 x 11 1/4
BOTTOM CONN. PLATE AT U14
U14
3/4" Fill ℓ
1/2" ℓ
1-L3 1/2 x 4 x 1/2
U13 - U13' (LA)
2-ℓ 2 3/8 x 30
1-ℓ 1 x 12 1/4
1-Fill ℓ 1/2 x 3 1/2
2-3/4" ℓs x 25" Min.
U13 - L14 (LA)
2-ℓ 2 x 30
1-ℓ 1 x 13
B-U5a Web only
L14 - U14
2-ℓ 1 x 21
1-ℓ 3/4 x 15
L14 - U13' (LA)
2-ℓ 2 x 30
1-ℓ 1 x 13
2-1 1/2" ℓs (LA)
1-ℓ 2 x 15, Stub Post Web (LA)
1/2" Bent ℓ
L12 - L14 (LA)
2-ℓ 2 1/4 x 30
1-ℓ 1 x 12 1/2
L14 - L12' (LA)
2-ℓ 2 1/4 x 30
1-ℓ 1 x 12 1/2
1-L6 x 8 x 1/2
Milled Joint for Fixed Bearing, see "Truss Fixed Bearing Details" Sheet 33.
L14
1 1/2" ℓ
1-ℓ 2 x 15, Stub Post Web (LA)
4 - 4" x 8" Slotted Holes in Web of Lower Chords, equally spaced in each Truss Panel.
1 1/2" ℓ (LA)
12" Min. from edge of Gusset ℓ, Typ.
7/8" ø A325 Bolts
L8 x 6 x 1/2
1-1/2" Bent ℓ
WT12 x 52
End Floorbeam
ℓ 1 x 24, Flbm. Conn.
17"
12 1/4"
Top Chord
1-ℓ 1/2 x 8
3/4" Clip, Typ.
14"
1/2" Stiff. Plate
STIFFENER DETAIL
Top Laterals
2-ℓ 1/2 x 12
1-ℓ 3/8 x 28
Top Strut
2-ℓ 1/2 x 12
1-ℓ 3/8 x 28
STATE | PROJ. NO. | SHEET NO.
MO. | ACMH-291-(24) | 26
13 1/2" (L2U3, U3L4, L4U5, U5L6, L6U7, U7L8, L8U9); 12 1/2" (U9L10)
13" (L10U11, L12U13); 12 3/4" (U11L12)
11 1/2" (U13L14)
ℓ 3/4 x 7
Typ.
Cap ℓ 3/8 x 10 x 10"
ℓ 3/4"
SECTION B-B
14" (L3U3, L5U5, L7U7, L9U9)
13 3/4" (L11U11) & 13 1/2" (L13U13)
ℓ 3/4 x 7 x 13 1/2"
SECTION A-A
ℓ 3/4 x 8
Hermetically Sealed, Typ.
Slot Pipe for 3/4" ℓ
ℓ 3/8 x 10
ℓ 3/4 x 7
SECTION D-D
SECTION C-C
Wind Strut Assembly furnished and erected by Others.
2-ℓ 3/4 x 7
Std. 8" ø Pipe
4" Typ.
Parallel to Working Line of Bottom Chord.
1 1/8" Holes in Truss Members. Fill holes with 7/8" ø A325 Bolts and two washers.
2" Typ.
3" Typ.
5'-3 1/16" (U3); 7'-3 9/16" (U5, U7 & U9); 9'-0 11/16" (U11); 12'-6 5/8" (U13)
42'-0" to Working Line of Bottom Chord
WIND STRUT DETAILS
Wind Strut Assembly Details shown for information only.
I CERTIFY THAT THIS DRAWING ACCURATELY REFLECTS THE CONFIGURATION AND LOCATION OF THE ROAD AND APPURTENANCES AS CONSTRUCTED ON THIS PROJECT.
DATE
E-27899
TRUSS DETAILS - JOINT L14
ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County
HARRINGTON & CORTELYOU, INC.
Consulting Engineers
DETAILED: J.L.K. 05/93
CHECKED: H.G.J. 09/93
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.
SHEET 23 OF 33
A4757
L14-U14

308



STATE	PROJ. NO.	SHEET NO.
MO.	ACNH-291-1(8)	27

325

I CERTIFY THAT THIS DRAWING ACCURATELY REFLECTS THE CONFIGURATION AND LOCATION OF THE ROAD WAY AND APPURTENANCES AS CONSTRUCTED ON THIS PROJECT.

DATE

TRUSS DETAILS – SWAY FRAMES

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

SWAY-FRA

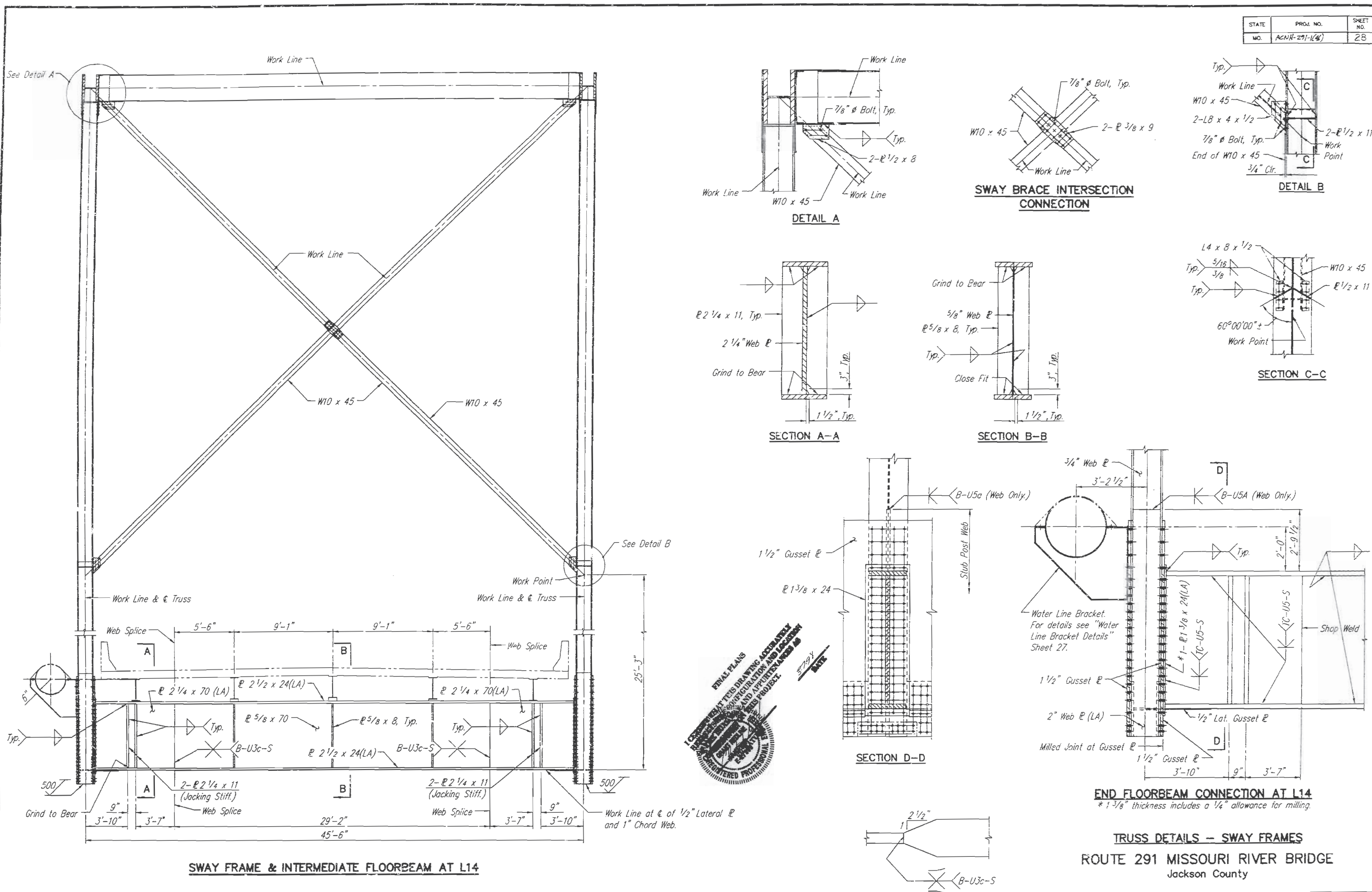
HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.L.K. 03/93
CHECKED: H.C.J. 09/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 24 OF 33

A4757



326

TRUSS DETAILS – SWAY FRAMES

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.L.K. 03/93
CHECKED: H.G.J. 09/93

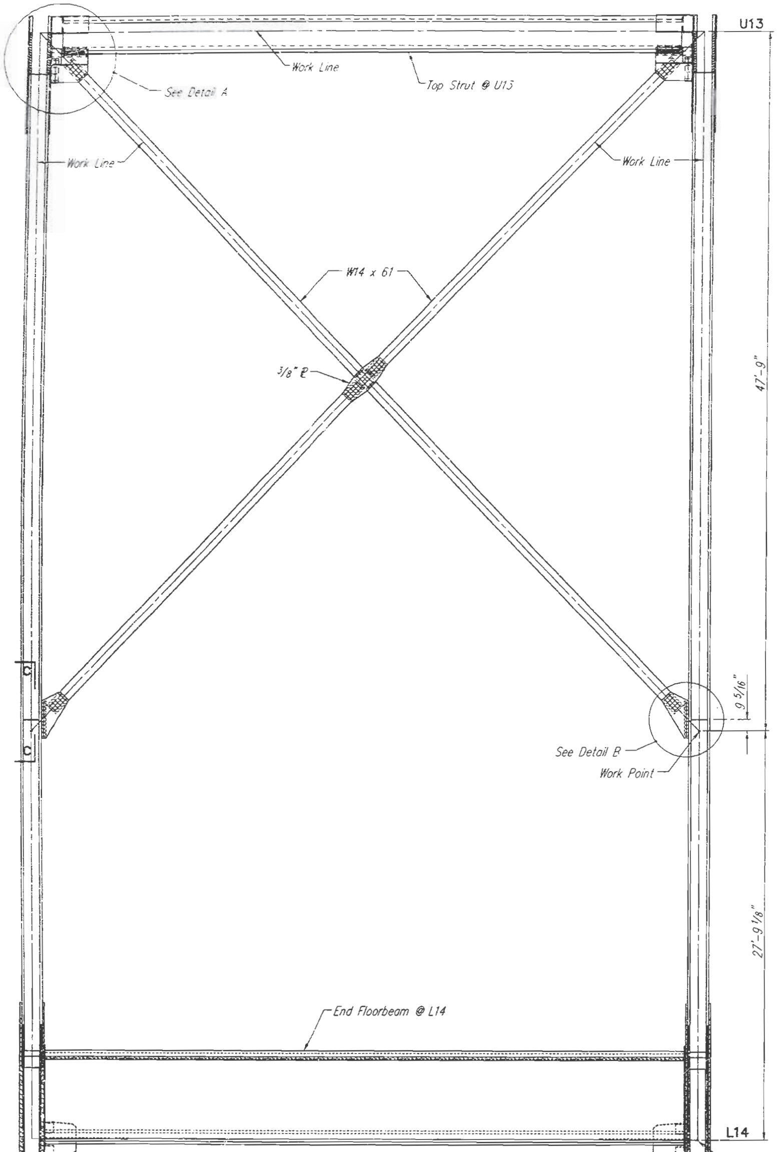
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SWAY-L14

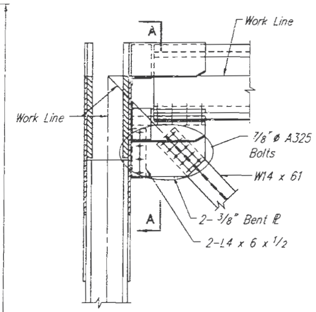
SHEET 25 OF 33

A4757

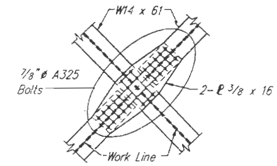
STATE	PROJ. NO.	SHEET NO.
MO.	ACNH-291-1(46)	23



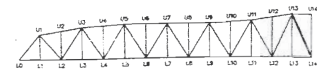
PORTAL FRAME U13–L14

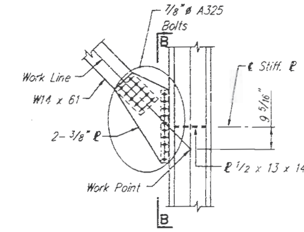


DETAIL A

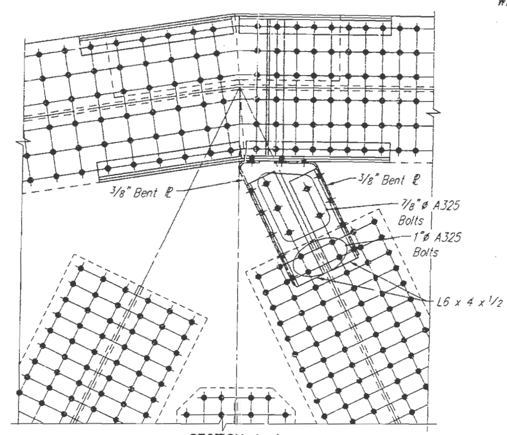


SWAY BRACE INTERSECTION CONNECTION

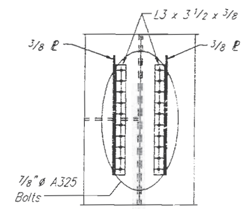




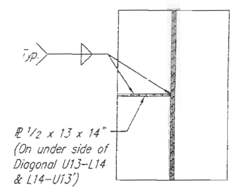
DETAIL B



SECTION A–A



SECTION B–B



SECTION C–C

FINAL PLANS

DATE

327

TRUSS DETAILS – PORTAL FRAME U13–L14

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

U13-PORT

HC HARRINGTON & CORTELYOU, INC.
Consulting Engineers

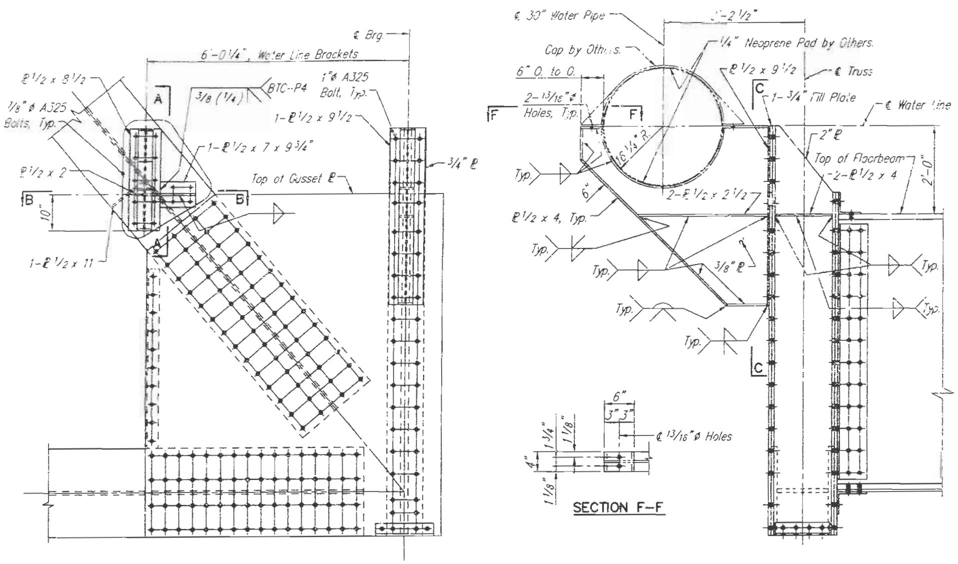
DETAILED: J.L.K. 03/93
CHECKED: H.G.J. 09/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

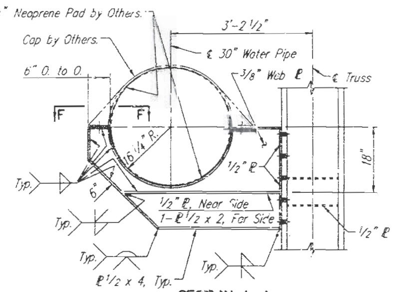
SHEET 26 OF 33

A4757

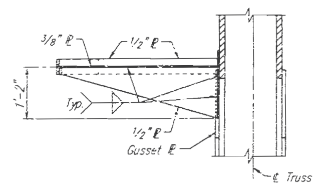
STATE	PROJ. NO.	SHEET NO.
MO.	BRO-H-291-1(46)	30



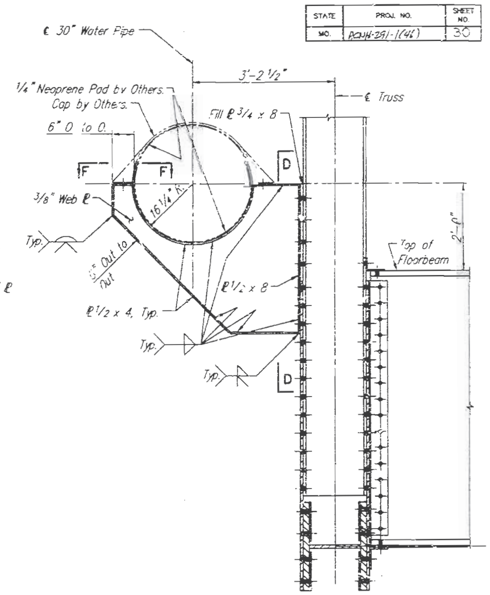
BRACKET DETAILS – END FLOORBEAMS LO & LO'



SECTION A–A

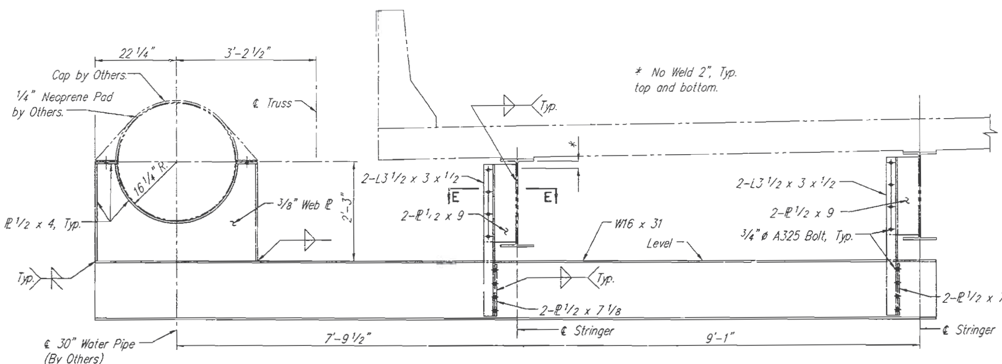


SECTION B–B

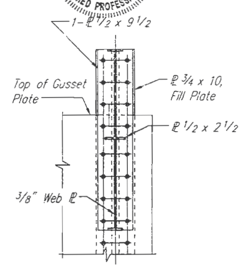


BRACKET DETAILS – INTERMEDIATE FLOORBEAMS

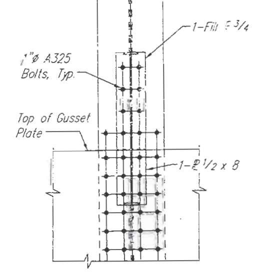
Note: Modify bracket as required to fit bolt pattern at L14.



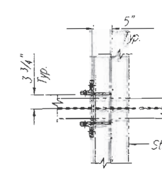
BRACKET DETAILS – MIDWAY BETWEEN FLOORBEAMS



SECTION C–C



SECTION D–D



SECTION E–E

WATER LINE BRACKET DETAILS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.L.K. 03/93
CHECKED: H.G.J. 09/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

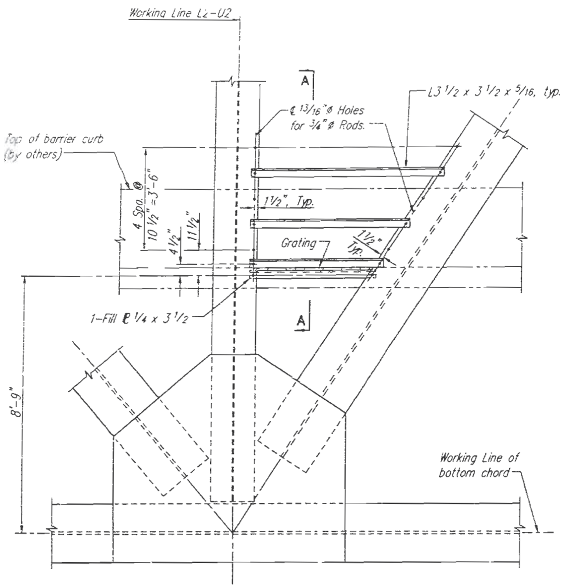
SHEET 27 OF 33

A4757

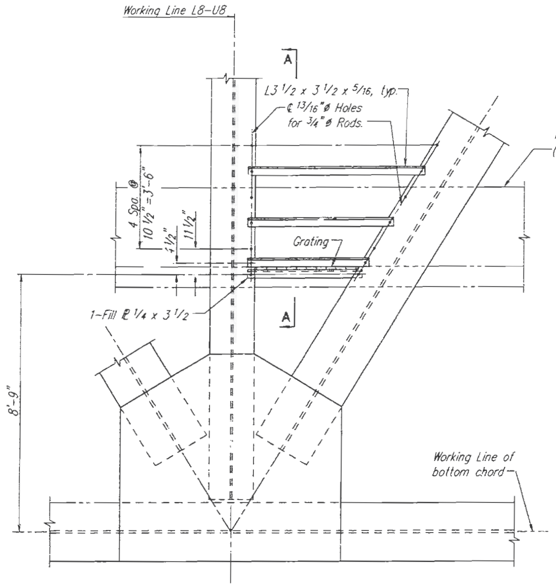
PIPEBKET

328

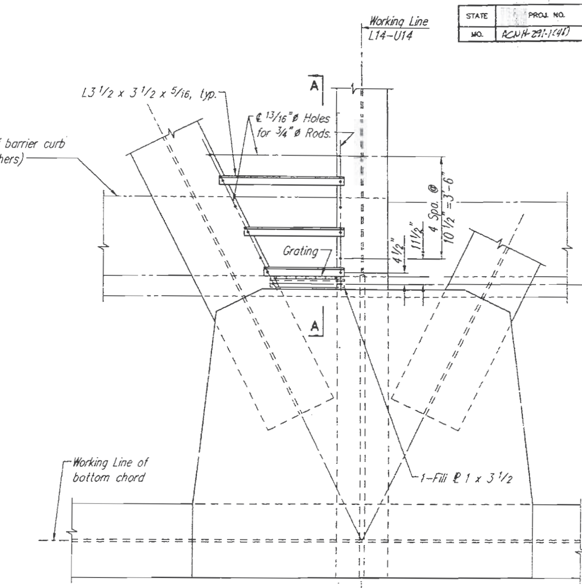
STATE	PROJ. NO.	SHEET NO.
MO.	ACNH-291-1(45)	32



LEFT DECENDING MARGIN OF CHANNEL

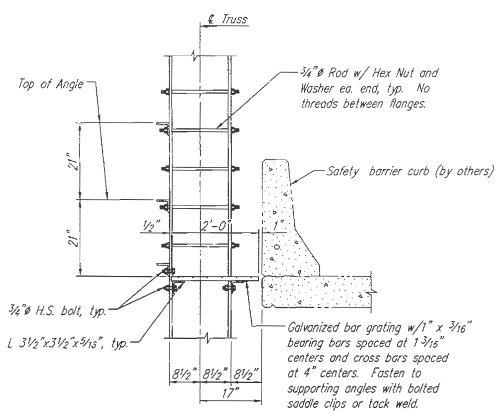


MID–CHANNEL



RIGHT DECENDING CHANNEL PIER

PLATFORM DETAILS



SECTION A–A

FINAL PLANS
I CERTIFY THAT THIS DRAWING ACCURATELY REFLECTS THE CONFIGURATION AND LOCATION OF ... APPURTENANCES AS CONSTRUCTED ON THE PROJECT.
CHRISTOPHER ... NUMBER E-27899 ... PROFESSIONAL ENGINEER
DATE

Notes:

Material for access platforms shall be galvanized or painted A709 Grade A36 steel, fabricated and installed in accordance with Section 712 of the Standard Specifications.

The weight of all material for the access platforms (3 total) has been included in the quantity listed for "Fabricated Structural Carbon Steel (Truss)" per Lbs.

ACCESS PLATFORM DETAILS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

PLATFORM

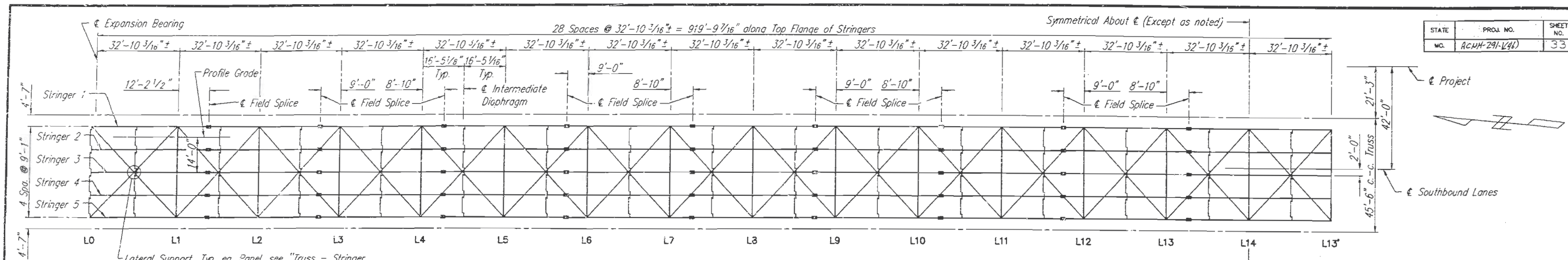
HC HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: JKG/JLK 10/94
CHECKED: E.W.N. 7/95

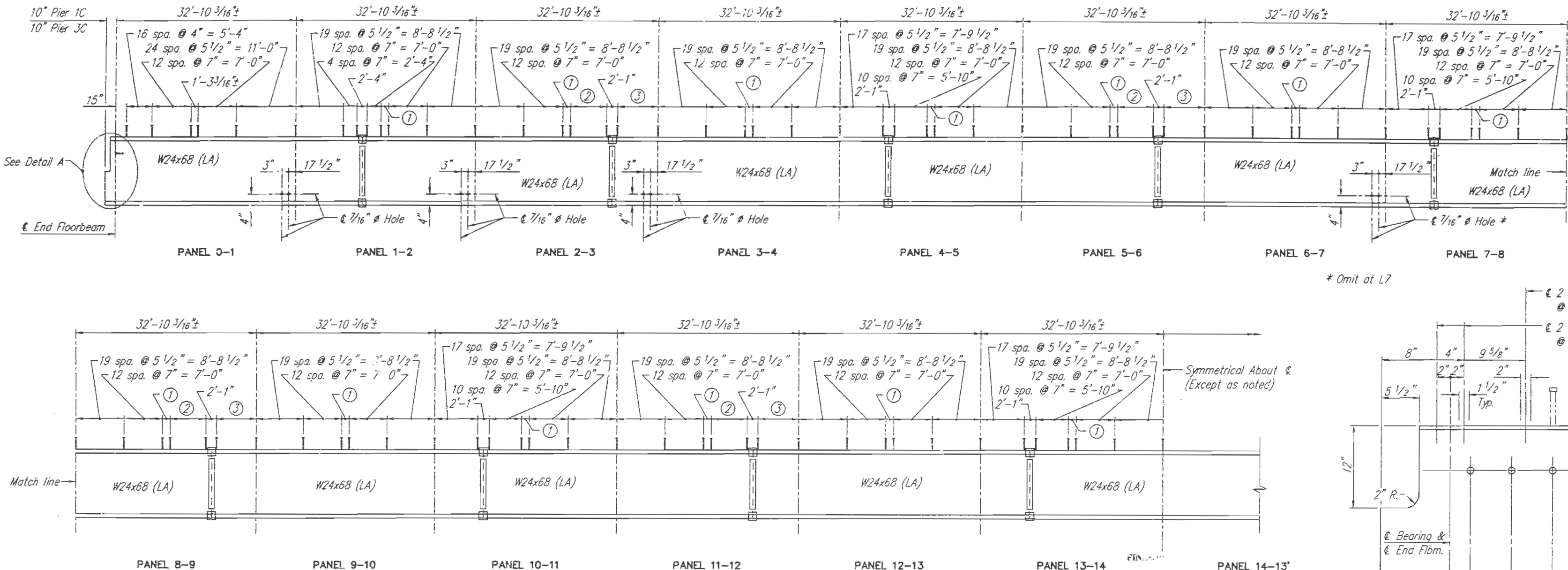
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

A4757

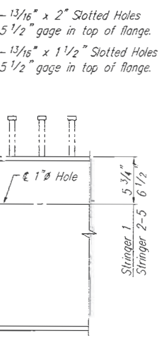
322



FRAMING PLAN – UNIT 2



STRINGER ELEVATION



DETAIL A

Note: Contractor may omit field splices if longer field sections are desired. No quantity change will be made for weight of omitted field splices.

I CERTIFY THAT THIS DRAWING ACCURATELY REFLECTS THE CONFIGURATION AND LOCATION OF THE ROADWAY AND APPURTENANCES AS CONSTRUCTED ON THIS PROJECT.

SIGNATURE 8-7-98 DATE

Note: Spacing of Shear Connectors shown for information only. Shear Connectors to be installed by others.
① 2 spa. = 1'-5 3/16"±
② 10 spa. @ 7" = 5'-10"
③ 17 spa. @ 5 1/2" = 7'-9 1/2"

FRAMING PLAN – UNIT 2

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

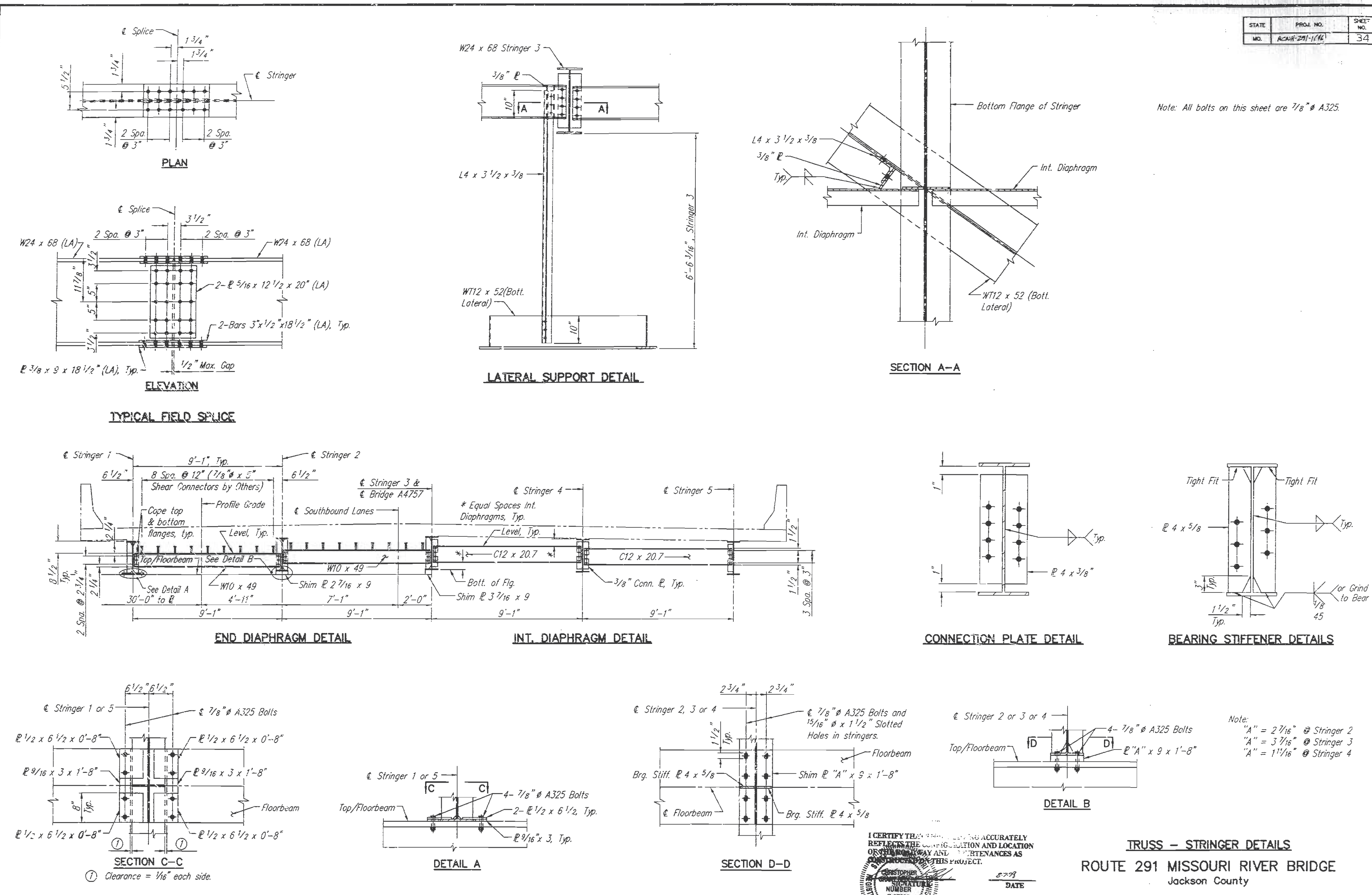
HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: S.A.K. 05/93
CHECKED: H.G.J. 09/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

A4757

330



I CERTIFY THAT ... ACCURATELY REFLECTS THE CONFIGURATION AND LOCATION OF THE ... AND APPURTENANCES AS CONSTRUCTED ON THIS PROJECT.

DATE

TRUSS – STRINGER DETAILS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: S.A.K./J.L.K. 05/93
CHECKED: H.G.J. 09/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 31 OF 33

A4757

STATE	PROJ. NO.	SHEET NO.
MO.	ACNH-291-1(46)	35

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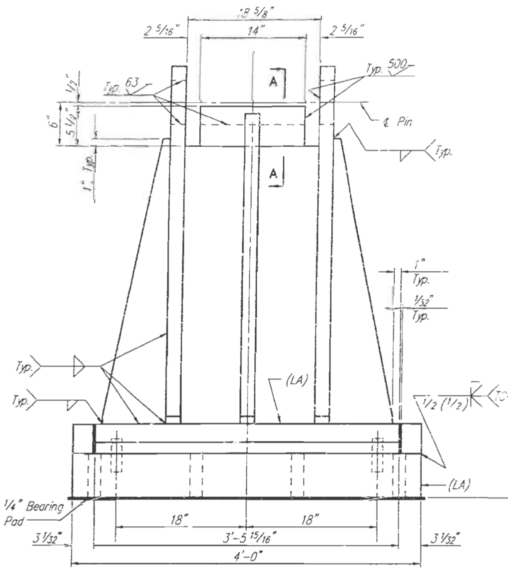
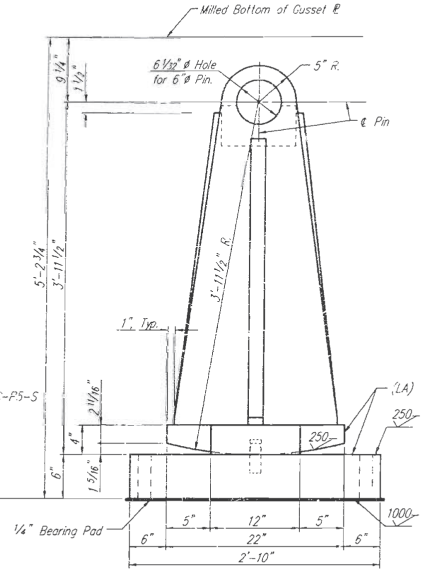
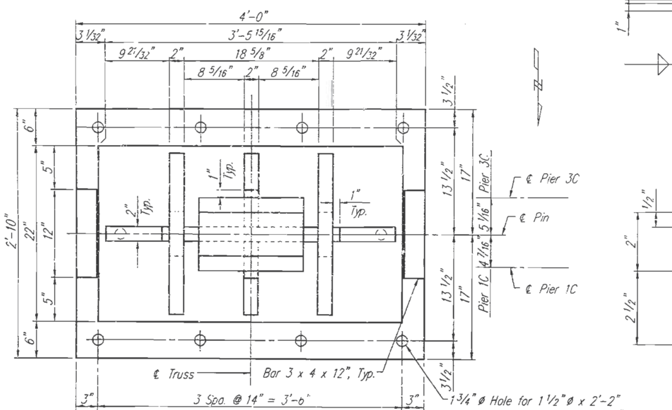
EXPANSION SHOE – TRUSS SPAN



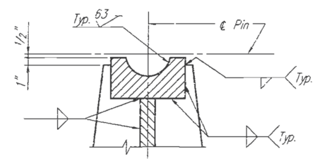
FRONT ELEVATION



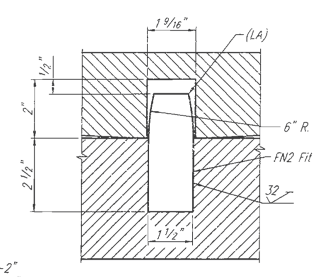
SIDE ELEVATION



PLAN

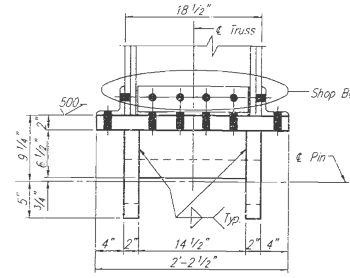


SECTION A–A

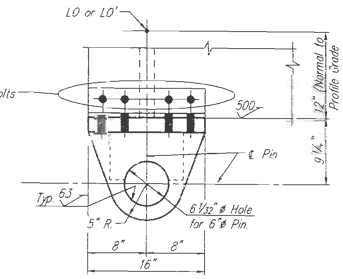


PINTLE DETAIL

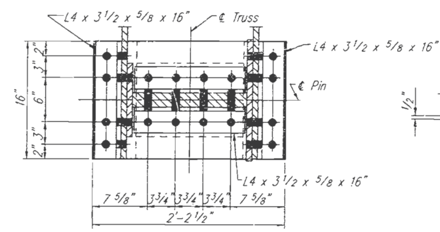
SHOE CAP – TRUSS SPAN



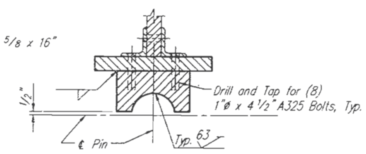
FRONT ELEVATION



SIDE ELEVATION

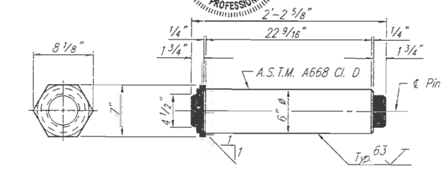


PLAN

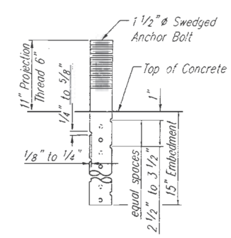


SECTION B–B

FINAL PLANS
I CERTIFY THAT THIS DRAWING ACCURATELY REFLECTS THE CONFIGURATION AND LOCATION OF THE ROADWAY AND APPURTENANCES AS CONSTRUCTED ON THIS PROJECT
REGISTERED PROFESSIONAL ENGINEER E-27899
DATE



PIN DETAILS



SWEDGE ANCHOR BOLT

Notes:

All connections shall be made with 1" ø High Strength (H.S.) Bolts.

All contact surface between plates to be welded shall be finished to 250.

Weldments shall be stress relieved and tested prior to any machining or boring.

Anchor Bolts shall conform to the requirements of A.S.T.M. A588.

Shop coat Pins and pin bearing surfaces with National Lubricating Institute No. 3 Multipurpose Grease or an approved equal upon completion of machining.

All Base Plates shall be scribed with longitudinal and transverse centerlines.

The Contractor shall drill Holes as specified into top of Pier Columns for Anchor Bolts. Anchor Bolts shall be set in drilled holes in accordance with Article 712.6 of the Standard Specifications.

Fill spaces around Anchor Bolts with Molten Zinc before placing Nuts.

Shop Bolts in connections of Shoe Caps to Truss shall be installed before machining contact surfaces.

The Shoe Caps and Rockers or Bases shall be assembled, bored as units and match marked before disassembly.

Anchor Bolts shall be 1 1/2" ø A588 steel swedged bolts and shall extend 15" into the concrete with A194-2, 2H or A563-c, C3, D, DH, DH3 heavy hexagon nuts. Actual manufacturer's certified mill test reports (chemical and mechanical) shall be provided. (Swedging shall be 1" less than the extension into the concrete).

All structural steel for the Masonary Plate, Rocker Plates etc. and Anchor Bolts shall be painted with a minimum of 2 coats of inorganic zinc primer (5 mils min.) in accordance with the Special Provisions.

Structural steel for the Bearings shall be A709 Grade 50 or Grade 50W and A709 Grade A36.

Bearing pads shall be 60 durometer neoprene pads and extend 1/2" beyond masonry plate.

TRUSS EXPANSION BEARING DETAILS – PIERS 1C & 3C

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.L.K. 05/93
CHECKED: H.G.J. 09/93

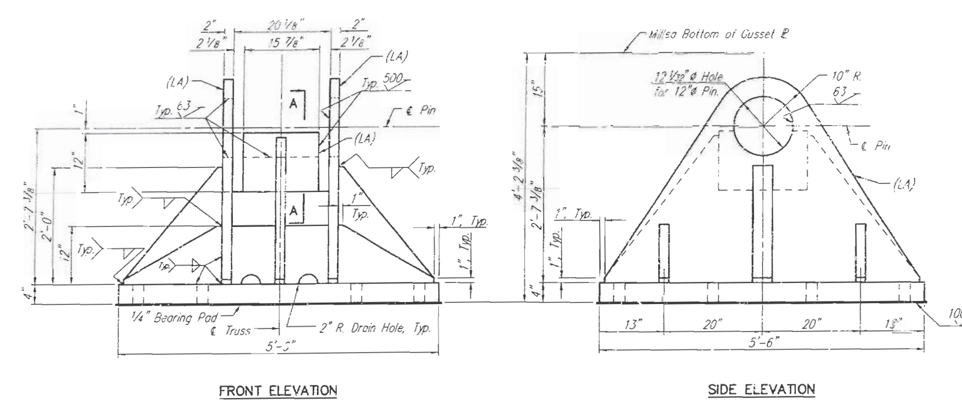
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 32 OF 33

A4757

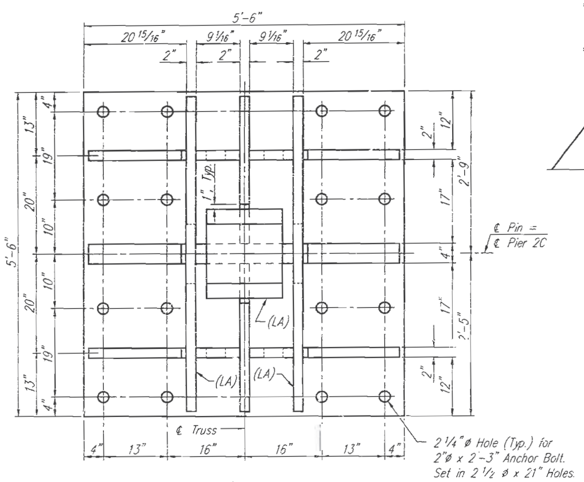
YS-BRG-E

STATE	PROJ. NO.	SHEET NO.
MO.	ACNH-291-1(48)	36

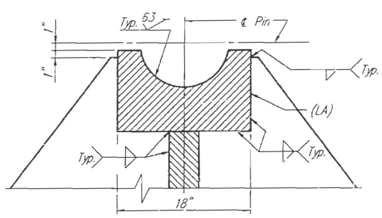


FRONT ELEVATION

SIDE ELEVATION



PLAN



SECTION A–A

FIXED SHOE – TRUSS SPAN

Notes:

All connections shall be made with 1"ø High Strength (H.S.) Bolts.

All contact surface between plates to be welded shall be finished to 250.

Weldments shall be stress relieved and tested prior to any machining or boring.

Anchor Bolts shall conform to the requirements of A.S.T.M. A588.

Shop coat Pins and pin bearing surfaces with National Lubricating Institute No. 3 Multipurpose Grease or an approved equal upon completion of machining.

All Base Plates shall be scribed with longitudinal and transverse centerlines.

The Contractor shall drill Holes as specified into top of Pier Columns for Anchor Bolts. Anchor Bolts shall be set in drilled holes in accordance with Article 712.6 of the Standard Specifications.

Fill spaces around Anchor Bolts with Molten Zinc before placing Nuts.

2"ø Holes in forged 12"ø Pins shall be drilled prior to cooling per A.A.S.H.T.O. Specifications.

Shop Bolts in connections of Shoe Caps to Truss shall be installed before machining contact surfaces.

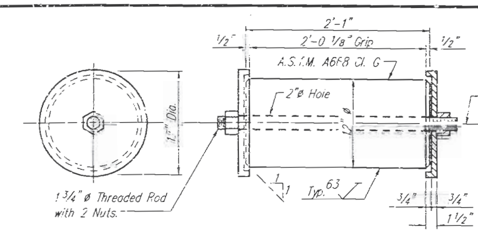
The Shoe Caps and Rockers or Bases shall be assembled, bored as units and match marked before disassembly.

Anchor Bolts shall be 2"ø A588 steel swedged bolts and shall extend 18" into the concrete with A194-2, 2H or A563-c, C3, D, DH, DH3 heavy hexagon nuts. Actual manufacturer's certified mill test reports (chemical and mechanical) shall be provided. (Swedging shall be 1 less than the extension into the concrete).

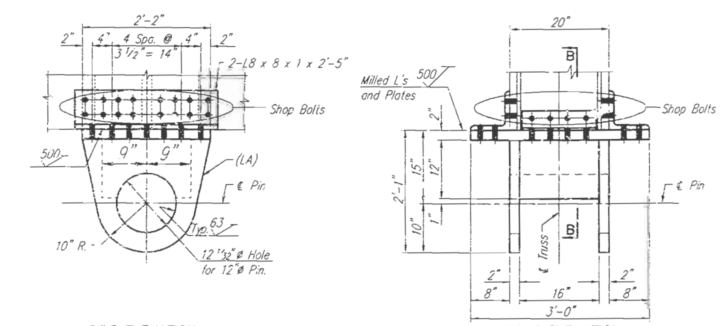
All structural steel for the Masonary Plate, Rocker Plates etc. and Anchor Bolts shall be painted with a minimum of 2 coats of inorganic zinc primer (5 mils min.) in accordance with the Special Provisions.

Structural steel for the Bearings shall be A709 Grade 50 or Grade 50W and A709 Grade A36.

Bearing pads shall be 60 durometer neoprene pads and extend 1/2" beyond masonry plate.

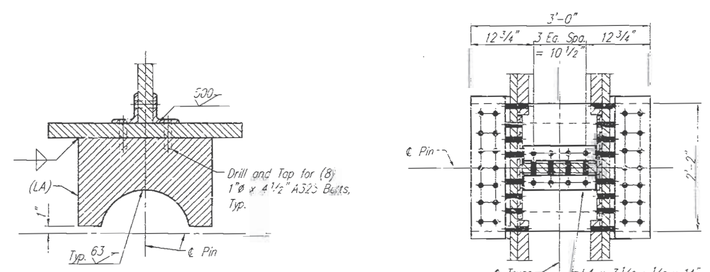


PIN DETAILS



SIDE ELEVATION

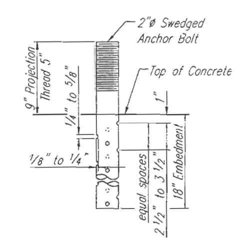
FRONT ELEVATION



SECTION B–B

PLAN

SHOE CAP – TRUSS SPAN



SWEDGE ANCHOR BOLT

FINAL PLANS

I CERTIFY THAT THIS DRAWING ACCURATELY REFLECTS THE CONFIGURATION AND LOCATION OF THE ROADWAY AND APPURTENANCES AS CONSTRUCTED ON THIS PROJECT.

CHRISTOPHER NUMBER E-27899 REGISTERED PROFESSIONAL ENGINEER

SIGNATURE DATE

TRUSS FIXED BEARING DETAILS – PIER 2C

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC. Consulting Engineers

DETAILED: J.L.K. 05/93
CHECKED: H.G.J. 09/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 33 OF 33

A4757

TS-BRG-F

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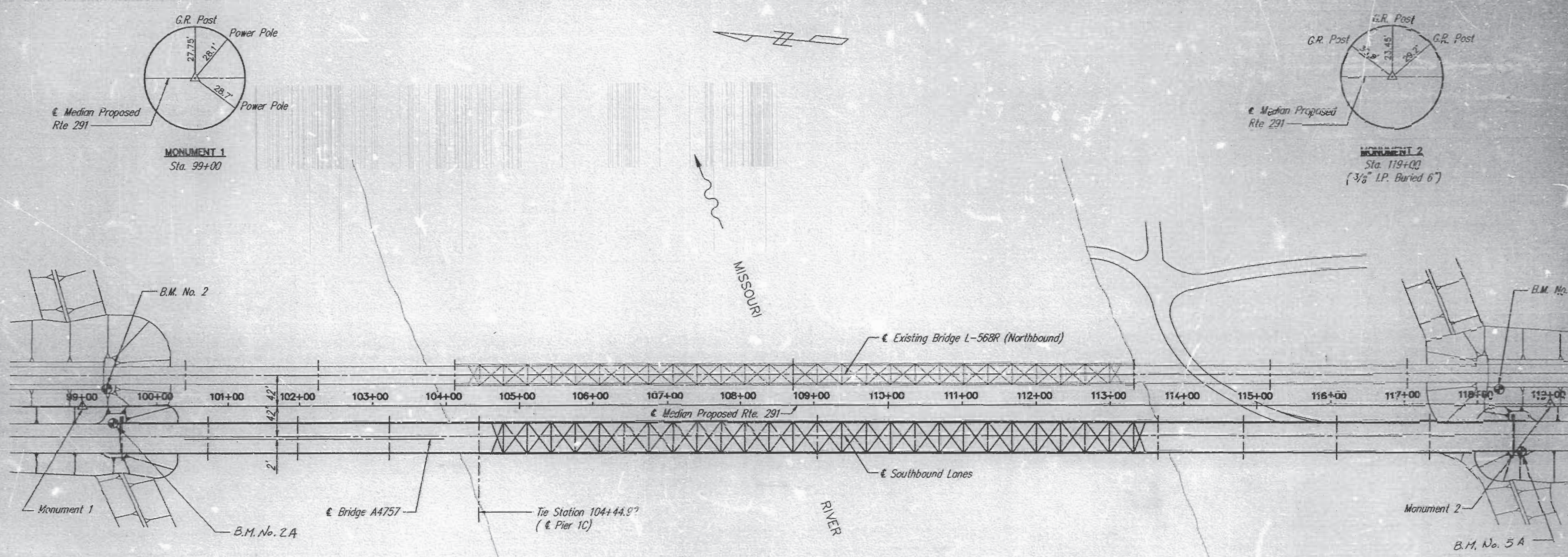
FINAL PLANS



BENCH MARKS:

B.M. No. 2 Elev. 763.54 – Chiseled "□" on West Wing of North Abut. of Missouri River Bridge L-568R 24' Lt. ℄ Med. Sta. 99+33 ±.

B.M. No. 5 Elev. 763.45 – USC&G B.M. Disk Stamped U-218 Quad 390942 20'± Lt. ℄ Med. Sta. 118+30 ±.

B.M. No. 2A Elev. 767.64 - Bolt in East wing of North abut. of Missouri River Bridge A-4757, 23' Rt. ℄ Med. Sta. 99+39 ±.

B.M. No. 5A Elev. 762.73 - Bolt in West wing of South abut. of Missouri River Bridge A-4757, 65' Rt. ℄ Med. Sta. 118+63 ±.

NOTE:

The Monuments shown on this drawing shall be used for stationing and alignment of the bridge.

FINAL PLANS

I CERTIFY THAT THIS DRAWING ACCURATELY REFLECTS THE CONFIGURATION AND LOCATION OF THE ROADWAY AND APPURTENANCES AS CONSTRUCTED ON THIS PROJECT.

3/16/98
DATE

SURVEY TIES & ALIGNMENT DIAGRAM

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: B.T.K. 02/93
CHECKED: E.W.N. 02/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 2 OF 59

A4757

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FINAL PLANS

STATE	PROJ. NO.	SHEET NO.
MO.	ACNH-291-1(44)	14
SEC./SUR. 12 TWP. 50N RGE. 32W		

GENERAL NOTES:

The scope of work consists of the construction of the end bents, intermediate bents, concrete superstructure girders, and slab for Units 1 & 3, and the construction of piers for Unit 2, along with other associated work as shown on the plans.

The existing Missouri Route 291 Bridge shall remain open during construction.

Utility companies whose facilities are shown on the plans or are known to be within the construction limits shall be notified by the contractor of the construction start date.

All dimensions are horizontal unless otherwise noted. Drawings shall not be scaled.

SPECIFICATIONS:

Design: 1992 Edition of the AASHTO Standard Specifications for Highway Bridges plus Interims.

Construction: Missouri State Highway Commission Standard Specifications For Highway Construction, 1993 Edition, plus project special provisions.

DESIGN LOADING:

Load Factor Design Method – Bridge Superstructure Framing, Bridge Deck, and Substructure (except footings). Simply supported non-composite for Dead Load, continuous composite for barrier curb, future wearing surface and Live Load.

Live Load – HS20 modified with modified 24,000 Lb. Tandom Axle.

Dead Load – An allowance of 35 Lbs. per sq. ft. of roadway for future wearing surface is included in the Dead Load.

Concrete Weight – 150 Lbs. per cu. ft.

Earth Weight – 120 Lbs. per cu.ft.

Equivalent Fluid Pressure – 45 Lbs. per sq. ft. per ft.

Earthquake – Category A

Barge Impact – 2,000 kips parallel to flow or 1,000 kips perpendicular to flow at elevation 725.0 at Piers 1C & 2C.

DESIGN UNIT STRESSES:

Class A1 Concrete (Prestressed Girders)----f'c = 6,000 psi.
f'ci= 4,600 psi. (Spans 2N, 3N & 1S thru 4S)
f'ci= 4,800 psi. (Spans 1N & 4N)

Class B Concrete (Substructure)---------fc = 1,200 psi.
f'c= 3,000 psi.
n = 10

Concrete (Class B1 & B2) ----------- fc = 1,600 psi.
f'c = 4,000 psi.
n = 8

Reinforcing Steel (Grade 60)------------ fs = 24,000 psi.
fy = 60,000 psi.

Prestressing Steel (Grade 270)--------- f's = 270,000 psi.

Structural Carbon Steel (A709, Gr. 36)---- fs = 20,000 psi.
fy = 36,000 psi.

Steel Pile----------------------- fb = 12,000 psi.

CONCRETE:

All exposed edges of concrete shall be beveled 3/4" unless otherwise shown or noted.

Construction joints shall be made only at locations shown on the plans, except with the approval of the engineer.

Keys shall be provided for all construction joints unless otherwise shown. For construction joint treatment, see Special Provisions.

All concrete for bridge deck, diaphragms and wingwalls above the construction joint shall be Class B2.

All concrete for barrier curbs shall be Class B1.

All concrete for deadmen shall be Class B.

JOINT FILLER:

All joint filler shall meet the requirements of standard specification 1057.2.4, except as noted.

REINFORCING STEEL:

Reinforcing steel shall be deformed billet steel bars conforming to ASTM A615, Grade 60. All dimensions to reinforcing steel on detail drawings are to centerline of bar, except where clear distance is noted from the face of concrete.

All reinforcing bars in top of substructure beam or cap and diaphragms shall be spaced to clear anchor bolts for bearings by at least 1/2".

Minimum clearance to reinforcing steel in pier caps and columns shall be 2" unless otherwise shown.

Minimum clearance to reinforcing steel in pier bases and footings shall be 3" unless otherwise shown.

Minimum clearance to reinforcing steel shall be 1 1/2" unless otherwise noted.

All reinforcing steel shall be lapped according to AASHTO 8.32 unless otherwise shown or noted.

All reinforcing in the bridge deck, barrier curbs, diaphragms and wingwalls shall be epoxy coated, except as noted.

The epoxy coated reinforcing bars shall be coated in accordance with Section 710 of Mo. Std. Specs. for Highway Construction.

BEARINGS:

Neoprene elastomeric bearing pads shall be 60 durometer at fixed bearings and 70 durometer at expansion bearings.

FOUNDATIONS:

Minimum energy requirement of pile hammer based on plan length and design bearing value of steel piles.

All steel piles shall be seated in rock and shall be driven to practical refusal.

Steel piles shall be HP14x117 and HP12x53 and conform to ASTM A709, Gr. 36.

Steel pile splices are included in the unit price bid per linear foot of piles.

Manufactured pile point reinforcement shall be used on all steel piles. See Special Provisions.

Prebore for piles at End Bent 1N to elevation 725.0 and at End Bent 4S to elevation 730.0.

For Pile Loading Test information, see Special Provisions.

Drilled Shafts shall be socketed into bedrock.

Prior to placing drilled shafts for Piers 1C and 2C, the contractor will be required to drill one NX size core hole at each pier for additional subsurface investigation. See "Substructure Layout" sheet.

Drilled shaft design is based on 100% of an allowable end bearing value of 25 Tons per Sq. Ft.

Seal courses are designed for a water surface elevation of 715.0.

For Cofferdams, see Special Provisions.

PILE DATA (Units 1–3)

Bent or Pier Number		1N	2N	3N	4N	3C	1S	2S	3S	4S
Pile Type and Size		HP12x53	HP12x53	HP12x53	HP12x53	HP14x117	HP12x53	HP12x53	HP12x53	HP12x53
Number		7	18	18	18	27	18	18	18	7
Average Length	Ft.	134	90	90	76	87	102	101	101	133
Design Bearing	Tons	86.7	93.0	93.0	93.0	195.0	93.0	90.4	90.4	86.7
Hammer Energy Required	Ft. Lbs.	21,300	20,900	20,900	20,900	44,000	20,900	20,300	20,300	20,400

REINFORCING BAR TAGS:

Tags for reinforcing steel shall be marked with a prefix to indicate the individual unit or element in which the steel is to be placed.

Example: Tag U1-5S1 indicates No. 5 bars in the slab of Unit 1.
Tag 2C-14F1 indicates No. 14 bars in the footing of Pier 2C.

BRIDGE DECK:

Bridge deck as detailed consists of an 8 1/2" roadway slab.

Alternate types of slab forms may be used in the construction of slabs. Cast-In-Place with conventional forming – Alt. a, or Precast Prestressed Panels – Alt. b. See Special Provisions.

QUANTITIES

ITEM	UNIT	TOTAL
Cofferdam and Excavation – Pier 1C	Each	1
Cofferdam and Excavation – Pier 2C	Each	1
Cofferdam and Excavation – Pier 3C	Each	1
Class 1 Excavation	Cu. Yds.	936
Pre-bore for Piling	Lin. Ft.	356
Navigation Lighting System	Lump Sum	1
Structural Steel Piles (14")	Lin. Ft.	2,346
Pile Point Reinforcement (14")	Each	27
Loading Tests (14")	Each	1
Structural Steel Piles (12")	Lin. Ft.	11,968
Pile Point Reinforcement (12")	Each	122
Loading Tests (12")	Each	2
Drilled Shafts (9'-0" Dia.)	Lin. Ft.	102.3
Rock Sockets (8'-4" Dia.)	Lin. Ft.	244.9
Supplementary Foundation Test Holes (NX)	Lin. Ft.	29
Supplementary Cored Holes	Lin. Ft.	84
Supplementary Television Inspection	Each	2
Class B Concrete (Substructure)	Cu. Yds.	5,298
Seal Concrete	Cu. Yds.	1,932
Reinforcing Steel	Lbs.	878,380
Reinforcing Steel (Epoxy Coated)	Lbs.	40,390
Laminated Neoprene Bearing Pads	Each	70
Type N PTFE Bearings	Each	10
Prestressed Concrete Girders (~~118 Ft. Spans~~)	Each	5
Prestressed Concrete Girders (121 Ft. Spans)	Each	5
Prestressed Concrete Girders (126.5 Ft. Spans)	Each	20
Prestressed ~~Concrete Girders (117 Ft. Spans)~~	Each	5
Prestressed Concrete Girders (114 Ft. Span)	Each	5
Painting Clearance Gauges	Lump Sum	1
Slab on Concrete Bulb-Tee Girders	Sq. Yds.	4,627
Safety Barrier Curb	Lin. Ft.	1,979
Bridge Approach Slab	Sq. Yds.	227
Deadman Anchorage Assembly	Each	2
Vertical Drain @ End Bents	Each	2
Water Transportation	L.S.	1
Rock Sockets @ 150 %	Lin. Ft.	96.3
Reinf. Steel, Bridge Gr. 60 @ 150 %	lbs.	5340

Notes; Excavations for the footings of Bents 2N thru 4N and Bents 1S thru 3S shall be paid for as Class 1 Excavation. The contractor is cautioned that ground water may be encountered during excavation depending on the river surface elevation.

Square yards of slab concrete includes earthquake restrainers and all concrete and reinforcing steel for the slabs, diaphragms and wingwalls.

Lineal feet of safety barrier curb concrete includes all concrete, reinforcing steel, and plastic water stops for the barrier curbs.

QUANTITIES FOR SLAB FORMING

TYPE OF SLAB		SLAB ON CONCRETE BULB-TEE GIRDERS Reinf. (lbs.) Epoxy	Reinf. (lbs.) Plain	Conc. (Cu. Yd.) Slab, Conc. Diaph's. and Wingwalls
Alt. b	Precast Panel Forms	250,850	3,700	* 1,282

Notes:

The table of Estimated Quantities for Alternate Slabs represents the quantities used by the state in preparing the cost estimate for concrete slabs. Variations may be encountered in these estimated quantities but these variations cannot be used for an adjustment in the contract unit price per square yard of alternate slab used.

See Special Provisions for Alternate Methods of Forming Slabs.

* Cu. Yds. of concrete does not include precast prestressed panels.

FINAL PLANS ... THIS DRAWING ACCURATELY ... AND LOCATION ... ANCES AS

3-10-98

GENERAL NOTES & QUANTITIES

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: T.L.W. 2/93
CHECKED: E.W.N. 3/93

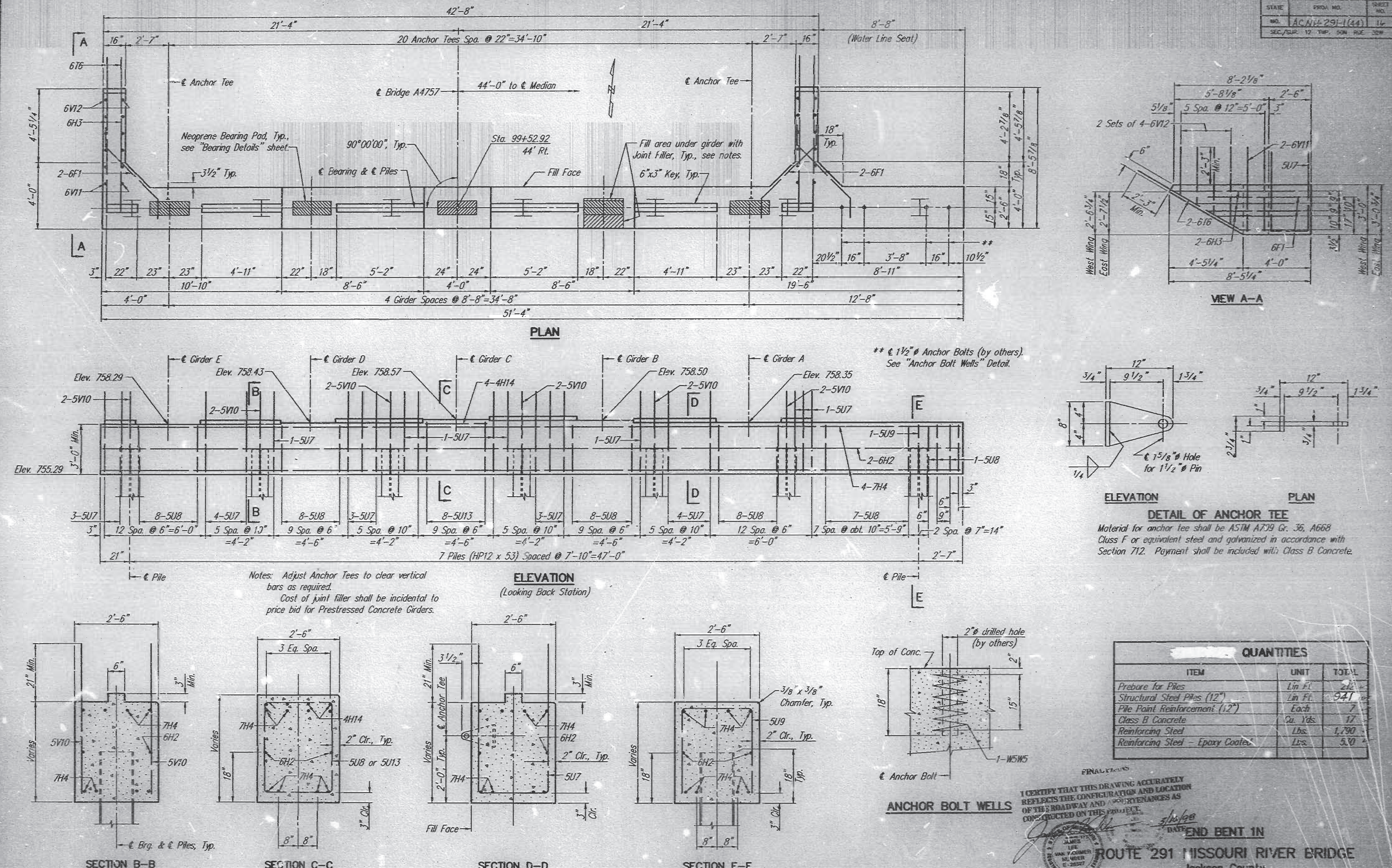
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

A4757

35-73

FINAL PLANS

STATE	PROJ. NO.	SHEET NO.
MO.	ACNH-291-1(44)	16



Notes: Adjust Anchor Tees to clear vertical bars as required.
Cost of joint filler shall be incidental to price bid for Prestressed Concrete Girders.

DETAIL OF ANCHOR TEE

ELEVATION — PLAN

℄ 1⅜"ø Hole for 1½"ø Pin

Material for anchor tee shall be ASTM A709 Gr. 36, A668 Class F or equivalent steel and galvanized in accordance with Section 712. Payment shall be included with Class B Concrete.

QUANTITIES

ITEM	UNIT	TOTAL
Prebore for Piles	Lin Ft.	212
Structural Steel Piles (12")	Lin Ft.	941
Pile Point Reinforcement (12")	Each	7
Class B Concrete	Cu. Yds.	17
Reinforcing Steel	Lbs.	1,790
Reinforcing Steel – Epoxy Coated	Lbs.	530

FINAL PLANS

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3/16/98
DATE

JAMES LEE VAN VOORMER NUMBER E-26527

END BENT 1N

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: T.L.W. 2/93
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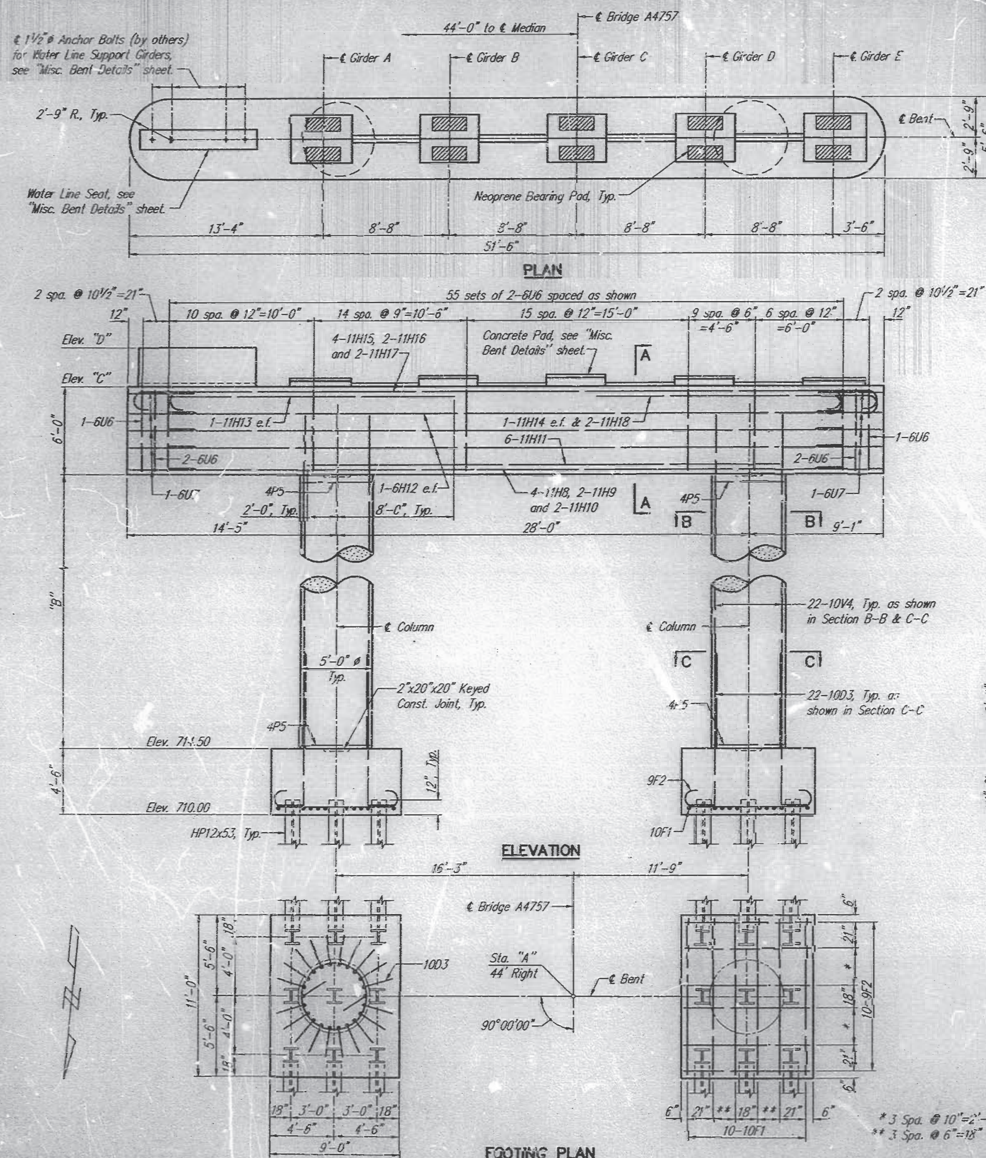
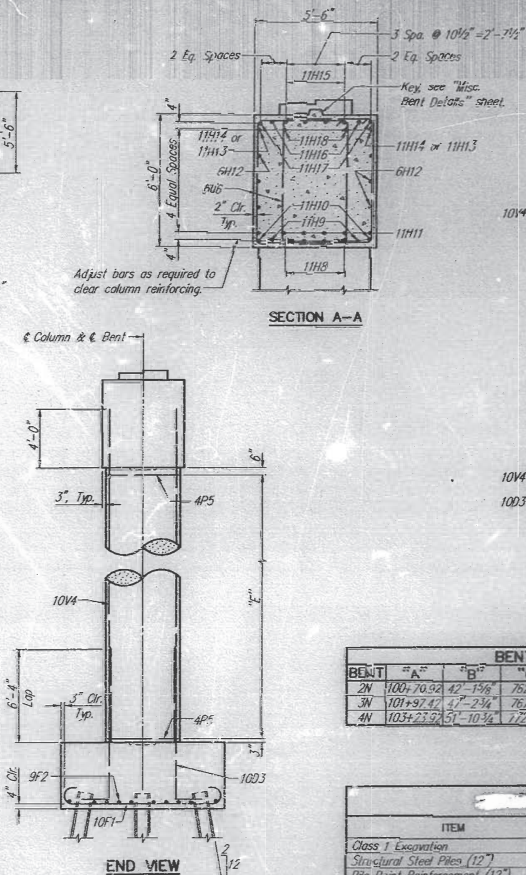
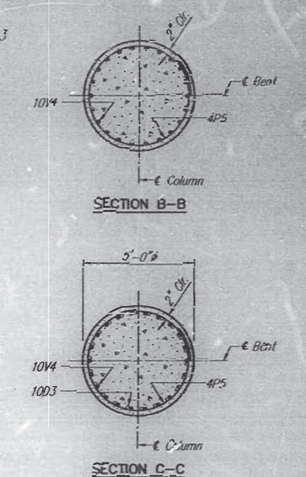
SHEET 16 OF 53

A4757







BENT DATA TABLE					
BENT	"A"	"B"	"C"	"D"	"E"
2N	100+70.92	42'-1⅝"	762.64	765.32	43-4P5 @ abt. 12"=41'-4⅝"
3N	101+97.42	47'-2¾"	767.73	771.58	48-4P5 @ abt. 12"=46'-5¾"
4N	103+23.92	51'-10¾"	772.40	776.57	53-4P5 @ abt. 12"=51'-1¾"

QUANTITIES

ITEM	UNIT	BENT 2N	BENT 3N	BENT 4N
Class 1 Excavation	Cu. Yds.	170	191	191
Structural Steel Piles (12")	Lin. Ft.	1628	1610	1370
Pile Point Reinforcement (12")	Each	18	18	18
Class B Concrete	Cu. Yds.	158	166	173
Reinforcing Steel	Lbs.	24,490	25,590	26,590
Reinforcing Steel - Epoxy Coated	Lbs.	60	60	60

NOTES:

For Neoprene Bearing Pads see "Bearing Details" sheet.

For Concrete Pad Details, Water Line Seat Details, Anchor Bolt Wells, required keys, diaphragm dowel bars and additional notes see "Misc. Bent Details" sheet.

e.f. denotes each face.

Adjust 6U6 bars to clear Anchor Bolt Wells if wells are used.

I CERTIFY THAT ... ACCURATELY REFLECTS THE ... AND LOCATION OF THE ROADWAY ... ENANCES AS CONSTRUCTED ...

3/16/98
DATE

BENTS 2N THRU 4N

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
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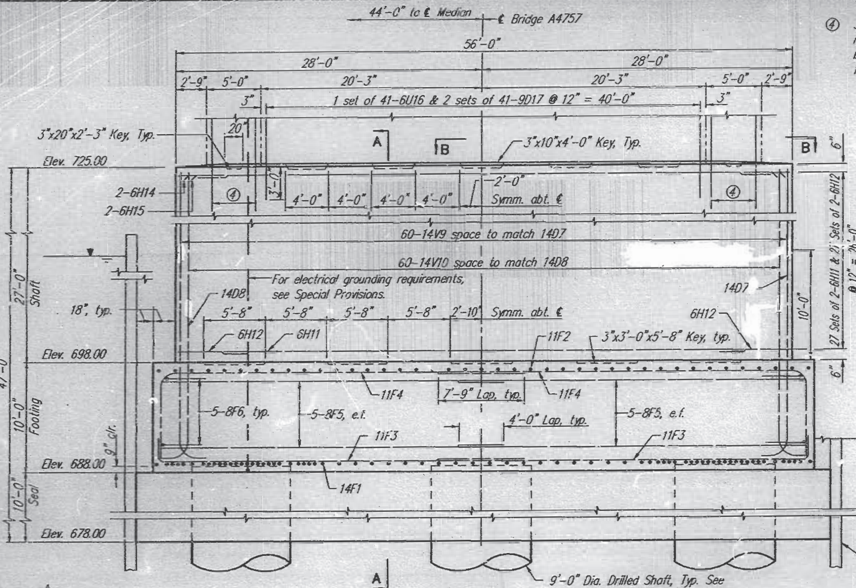
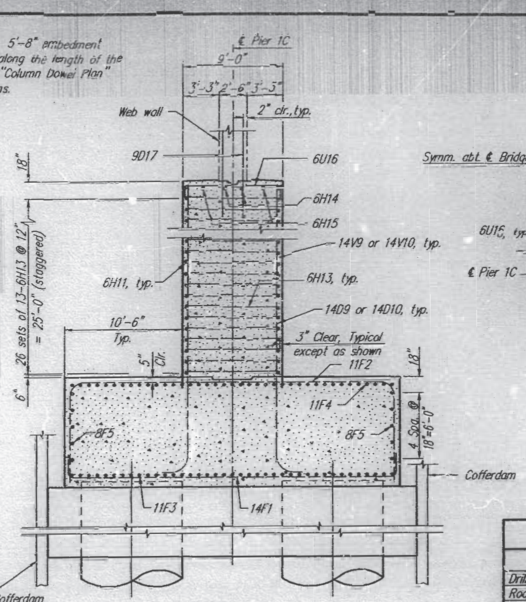
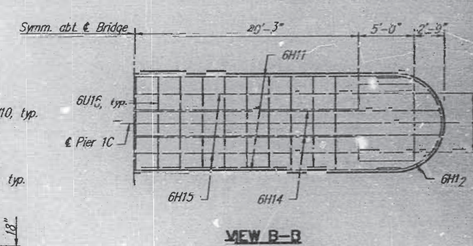


ELEVATION

④ 36-11D18. 5'-8" embedment measured along the length of the bar. See "Column Dowel Plan" for locations.



SECTION A-A

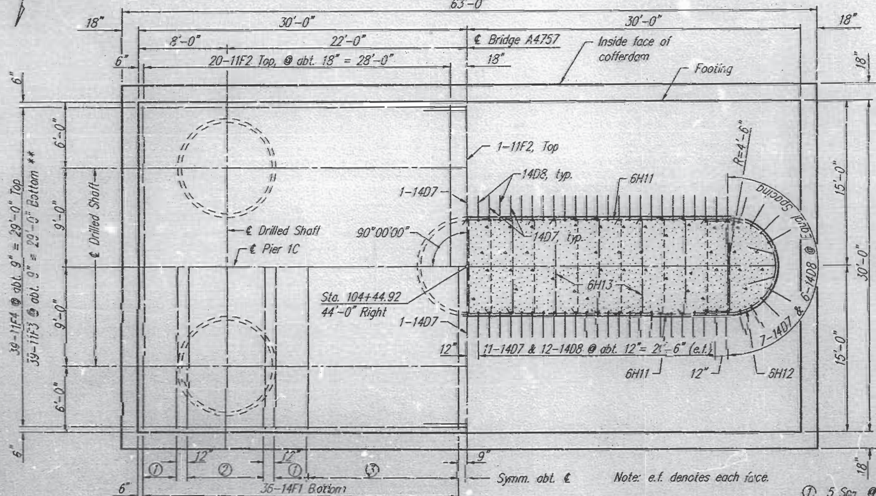


VIEW B-B

(Dowel bars not shown for clarity, see "Column Dowel Plan" and "Elevation" for details.)

QUANTITIES		
ITEM	UNIT	TOTAL
Drilled Shafts (9'-0" Dia.)	Lin. Ft.	266
Rock Socket (8'-4" Dia.)	Lin. Ft.	194
Class B Concrete	Cu. Yds.	1,388
Seal Concrete	Cu. Yds.	688
Reinforcing Steel	Lbs.	247,690
Reinforcing Steel - Epoxy Coated	Lbs.	19,720

* Includes quantities for Drilled Shafts, Web Wall, Columns, Tie Beam, and Bridge Seat



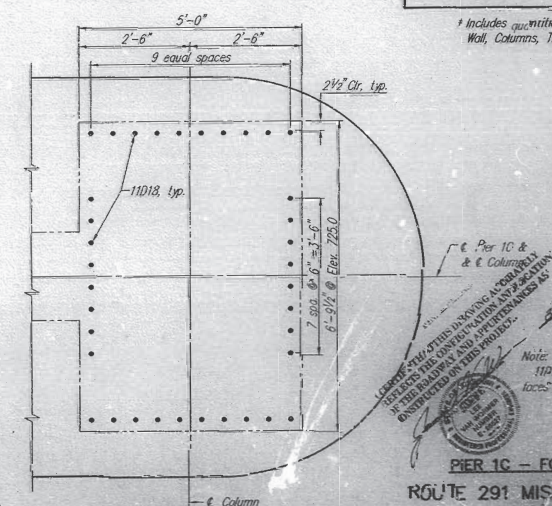
HALF PLAN AT FOOTING

FOOTING PLAN

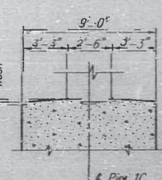
HALF SECTION THRU SHAFT

① 5 Spa. @ abt. 7" = 3'-0"
② 14 Spa. @ 6" = 7'-0" **
③ 9 Spa. @ abt. 18" = 13'-9" **

** Adjust spacing as req'd. to clear Drilled Shaft Reinf.



COLUMN DOWEL PLAN



WASH DETAIL

I CERTIFY THAT THIS DRAWING ACCURATELY REFLECTS THE CONFIGURATION AND LOCATION OF THE ROADWAY AND APPURTENANCES AS CONSTRUCTED ON THIS PROJECT.

Note: 11D18 dowel bars along short faces of Column are sloped.

STATE	PROJ. NO.	SHEET NO.
MO.	ACIR-291-1(44)	18

PIER 1C - FOUNDATION DETAILS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: S.A.K. 12/92
CHECKED: E.W.N. 1/93

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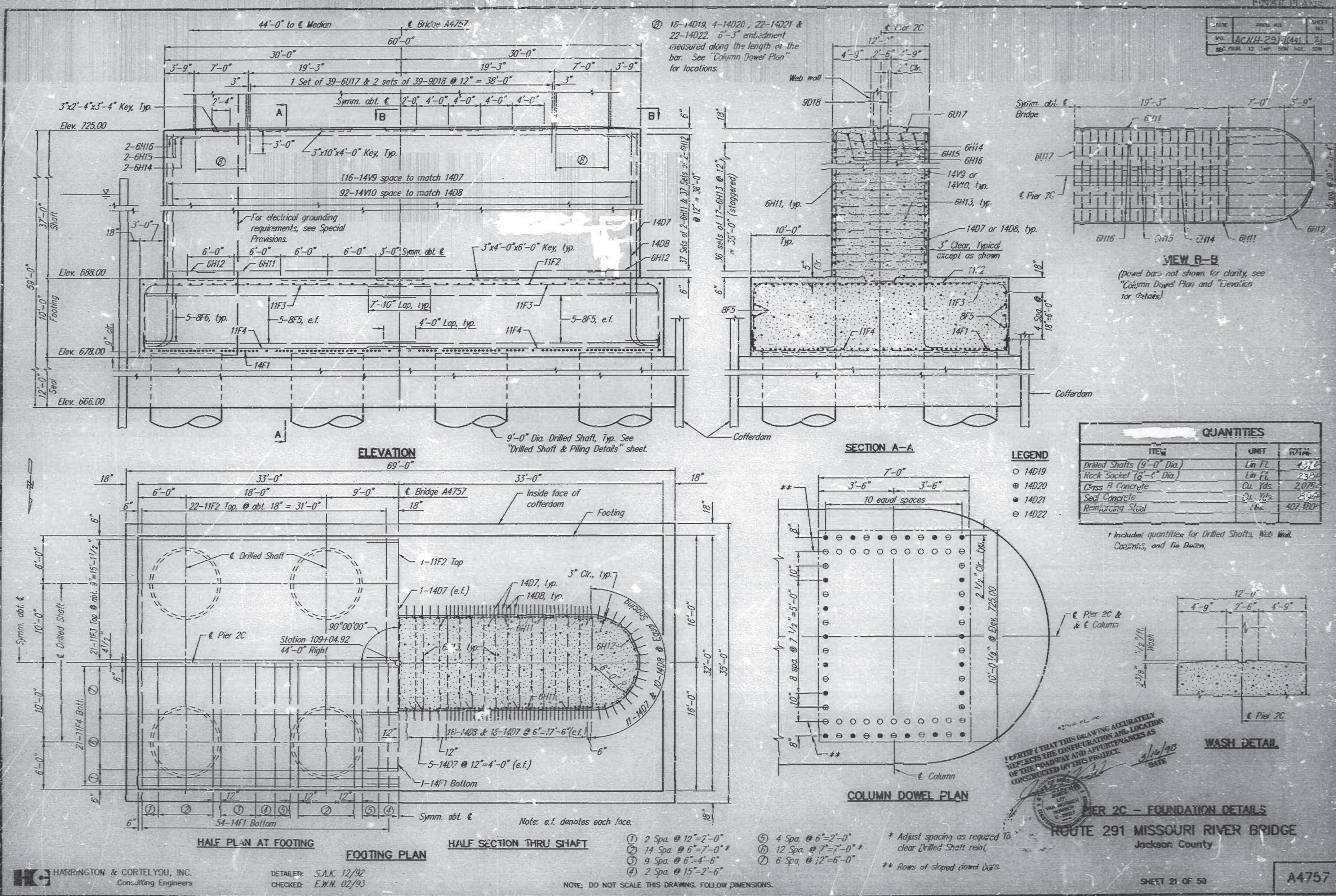
SHEET 18 OF 59

A4757



QUANTITIES		
ITEM	UNIT	TOTAL
Drilled Shafts (9'-0" Dia.)	Lin. Ft.	437
Rock Socket (8'-4" Dia.)	Lin. Ft.	238
Class B Concrete	Cu. Yds.	2,076
Seal Concrete	Cu. Yds.	894
Reinforcing Steel	Lbs.	407,180

† Includes quantities for Drilled Shafts, Web Wall, Columns, and Tie Beam.

① 2 Spa. @ 12"=2'-0"
② 14 Spa. @ 6"=7'-0" *
③ 9 Spa. @ 6"=4'-6"
④ 2 Spa. @ 15"=2'-6"
⑤ 4 Spa. @ 6"=2'-0"
⑥ 12 Spa. @ 7"=7'-0" *
⑦ 6 Spa. @ 12"=6'-0"

* Adjust spacing as required to clear Drilled Shaft reinf.

** Rows of sloped dowel bars.

I CERTIFY THAT THIS DRAWING ACCURATELY REFLECTS THE CONFIGURATION AND LOCATION OF THE ROADWAY AND APPURTENANCES AS CONSTRUCTED ON THIS PROJECT. 3/16/95 DATE

PIER 2C - FOUNDATION DETAILS
ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: S.A.K. 12/92
CHECKED: E.W.N. 02/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

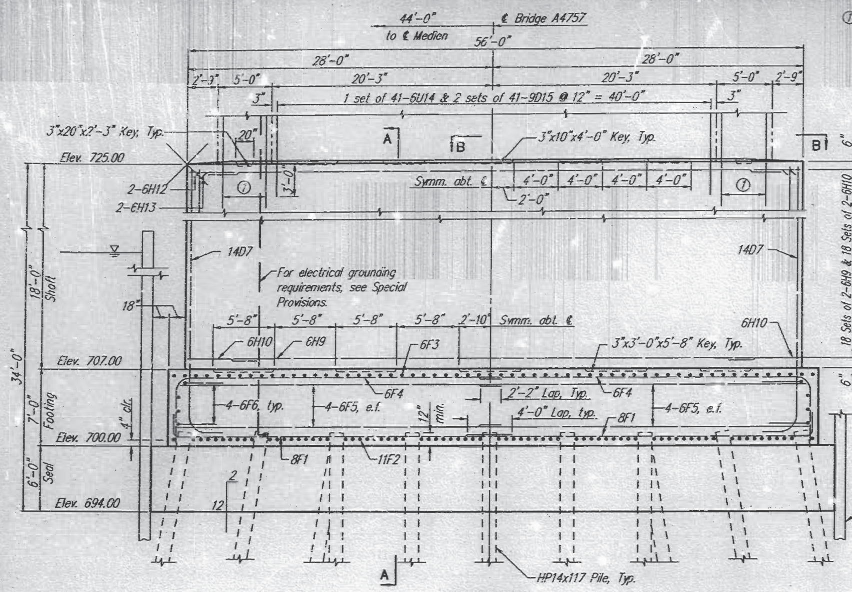
A4757

FINAL PLANS

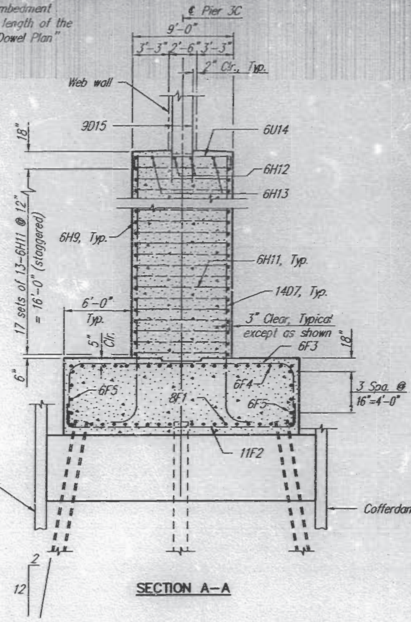
STATE	PROJ. NO.	SHEET NO.
MO.	ACN-291-1(4)	85

SEC./SUR. 12 TWP. 50N RGE. 32W

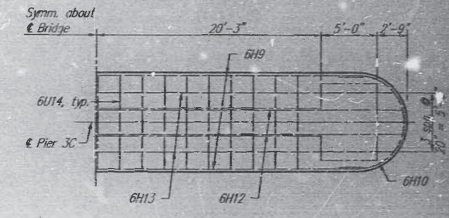
① 36-11D16. 5'-8" embedment measured along the length of the bar. See "Column Dowel Plan" for locations.



ELEVATION



SECTION A-A

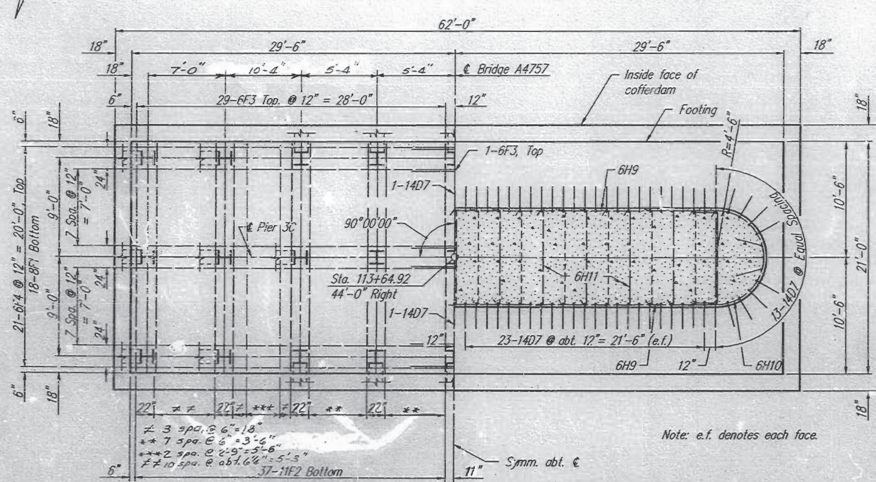


VIEW B-B

(Dowel bars not shown for clarity, see "Column Dowel Plan" and "Elevation" for details.)

[redacted] QUANTITIES		
ITEM	UNIT	TOTAL
Structural Steel Piles (14")	Lin Ft.	2346
Pile Point Reinforcement (14")	Each	27
Class B Concrete	Cu. Yds.	874
Seal Concrete	Cu. Yds.	350
Reinforcing Steel	Lbs.	92,290
Reinforcing Steel - Epoxy Coated	Lbs.	19,250

† Includes quantities for Web Wall, Columns, Tie Beam, and Bridge Seat.

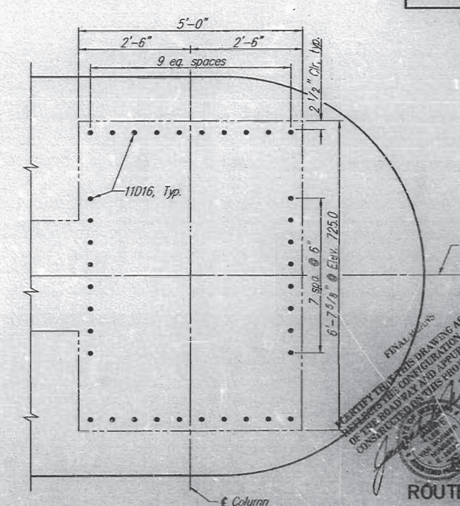


Note: e.f. denotes each face.

HALF PLAN AT FOOTING

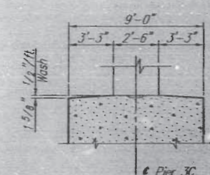
HALF SECTION THRU SHAFT

FOOTING PLAN



Note: 11D16 dowel bars along short faces of column are sloped.

COLUMN DOWEL PLAN



WASH DETAIL

I CERTIFY THAT THIS DRAWING ACCURATELY REFLECTS THE CONFIGURATION AND LOCATION OF THE ROADWAY AND APPURTENANCES AS CONSTRUCTED ON THIS PROJECT.

PIER 3C - FOUNDATION DETAILS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

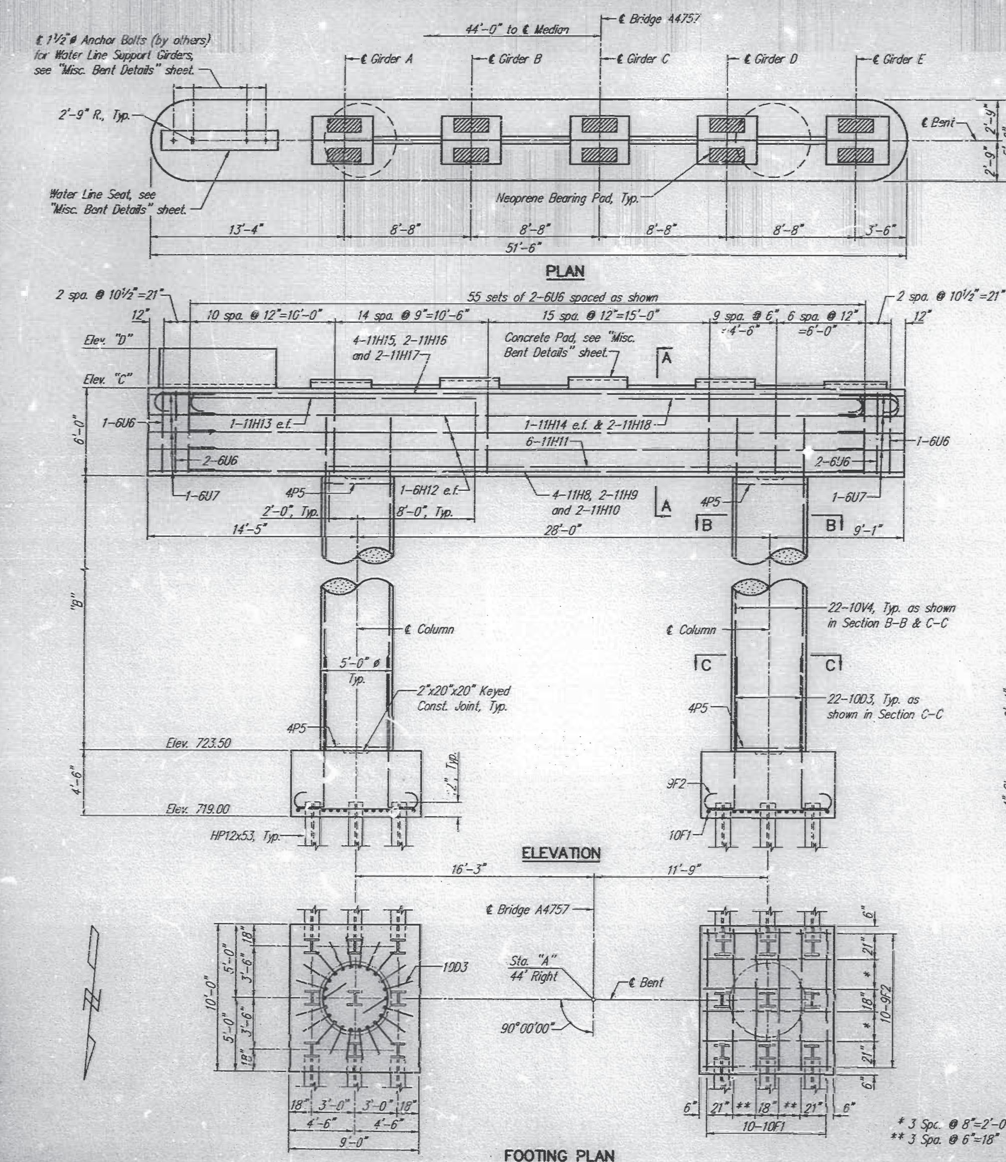
HARRINGTON & CORTELYOU, INC.
Consulting Engineers

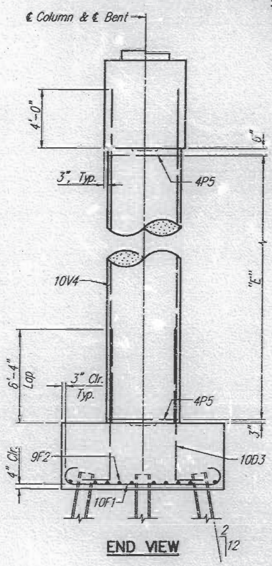
DETAILED: S.A.K. 12/92
CHECKED: E.W.N. 01/93

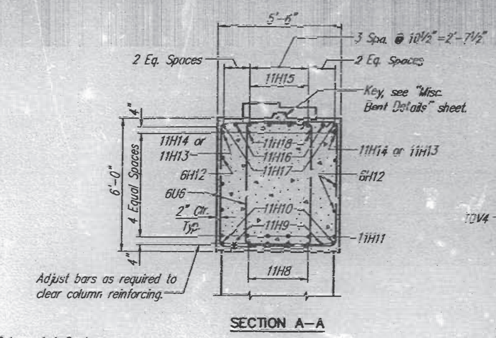
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

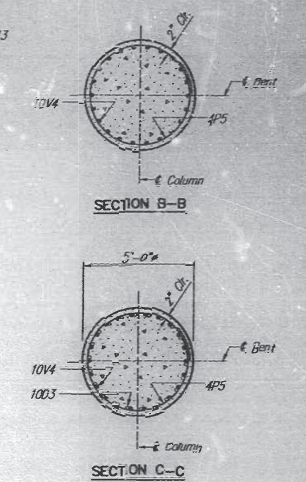
SHEET 25 OF 55

A4757









BENT DATA TABLE					
BENT	"A"	"B"	"C"	"D"	"E"
1S	114+81.92	38'-4⅜"	767.87	772.29	39-4P5 @ abt. 12"=37'-7⅜"
2S	116+03.42	33'-3¾"	762.81	766.78	34-4P5 @ abt. 12"=32'-6¾"
3S	117+34.92	28'-2½"	757.71	760.28	29-4P5 @ abt. 12"=27'-5½"

QUANTITIES				
ITEM	UNIT	BENT 1S	BENT 2S	BENT 3S
Class 1 Excavation	Cu. Yds.	129	129	136
Structural Steel Piles (12")	Lin. Ft.	1843	1812	1822
Pile Point Reinforcement (12")	Each	18	18	18
Class B Concrete	Cu. Yds.	151	141	135
Reinforcing Steel	Lbs.	23,650	25,550	21,460
Reinforcing Steel - Epoxy Coated	Lbs.	60	60	60

NOTES:

For Neoprene Bearing Pads see "Bearing Details" sheet.

For Concrete Pad Details, Water Line Seat Details, Anchor Bolt Wells, required keys, diaphragm dowel bars and additional notes see "Misc. Bent Details" sheet.

e.f. denotes each face.

Adjust 6U6 bars to clear Anchor Bolt Wells if wells are used.

FINAL PLANS

I CERTIFY THAT THIS DRAWING ACCURATELY REFLECTS THE CONFIGURATION AND LOCATION OF THE ROADWAY AND APPURTENANCES AS CONSTRUCTED ON THIS PROJECT.

3/16/98
DATE

STATE | PROJ. NO. | SHEET NO.
MO. | ACNH-291-1(41) | 27

366 78

BENTS 1S THRU 3S

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: T.L.W. 2/93
CHECKED: E.W.N. 2/93

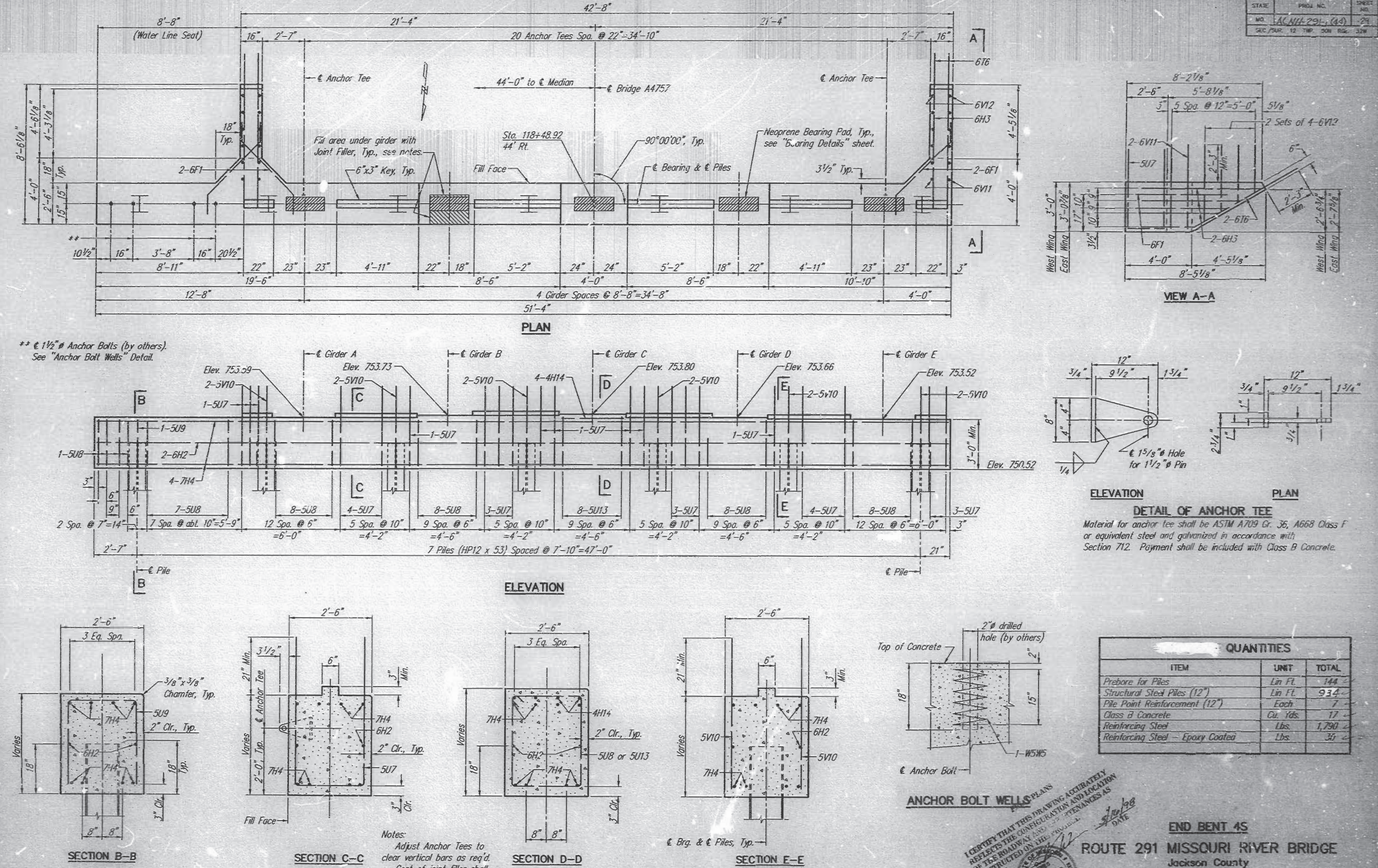
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 27 OF 59

A4757

FINAL PLANS

STATE	PROJ. NO.	SHEET NO.
MO.	ACNH-291-(44)	29



Material for anchor tee shall be ASTM A709 Gr. 36, A668 Class F or equivalent steel and galvanized in accordance with Section 712. Payment shall be included with Class B Concrete.

QUANTITIES		
ITEM	UNIT	TOTAL
Prebore for Piles	Lin Ft.	144
Structural Steel Piles (12")	Lin Ft.	934
Pile Point Reinforcement (12")	Each	7
Class B Concrete	Cu. Yds.	17
Reinforcing Steel	Lbs.	1,790
Reinforcing Steel – Epoxy Coated	Lbs.	36

Notes:
Adjust Anchor Tees to clear vertical bars as req'd.
Cost of joint filler shall be incidental to price bid for Prestressed Concrete Gdrs.

I CERTIFY THAT THIS DRAWING ACCURATELY REFLECTS THE CONFIGURATION AND LOCATION OF THE ROADWAY AND APPURTENANCES AS CONSTRUCTED ON THE PROJECT.

DATE

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: T.L.W. 2/93
CHECKED: T.L.N. 2/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

END BENT 4S

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

SHEET 29 OF 59

A4757

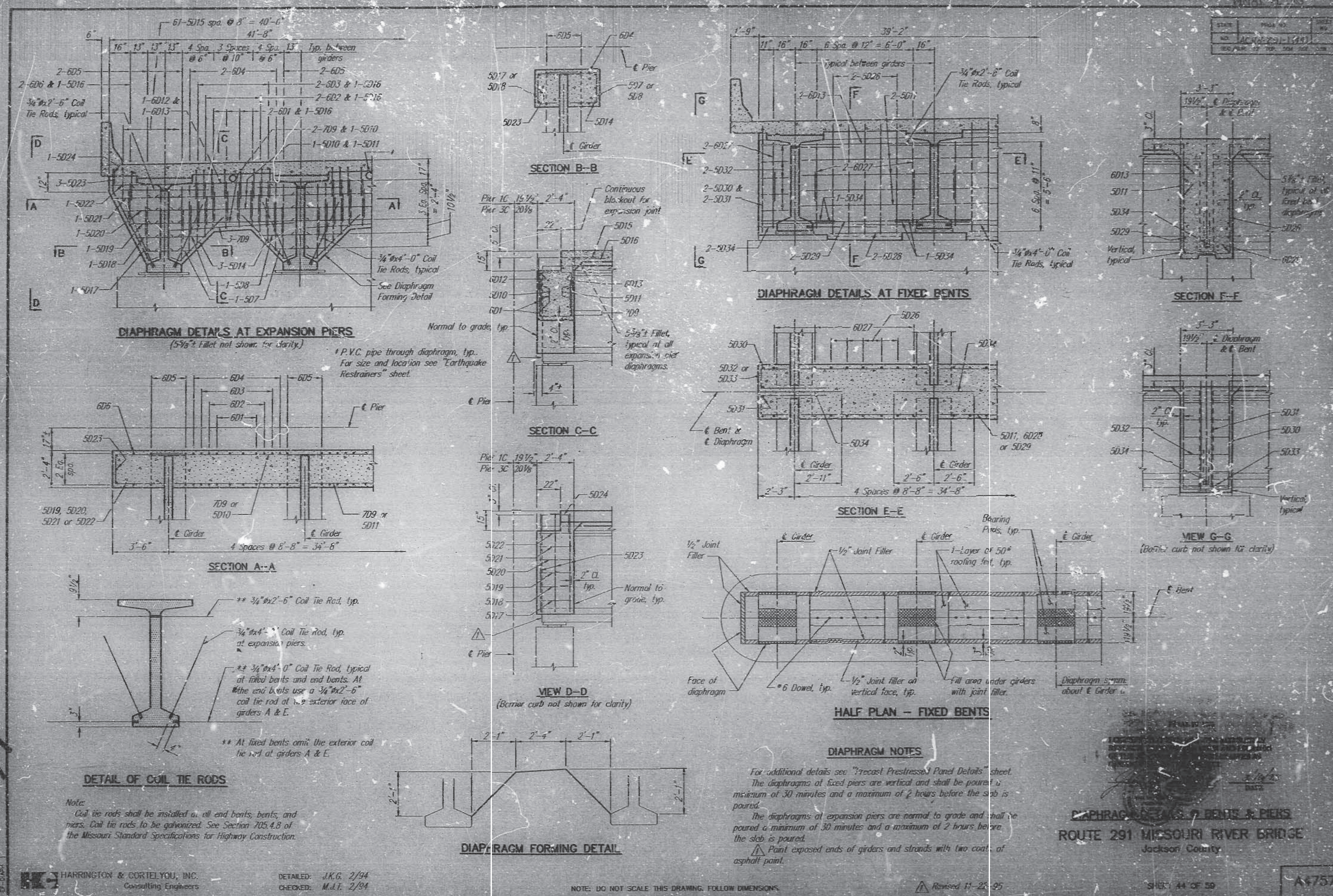


DIAGRAM DETAILS AT EXPANSION PIERS
(5⅝" Fillet not shown for clarity.)
SECTION B–B
SECTION C–C
VIEW D–D
(Barrier curb not shown for clarity)
SECTION A–A
DETAIL OF COIL TIE RODS
DIAPHRAGM FORMING DETAIL
DIAPHRAGM DETAILS AT FIXED BENTS
SECTION E–E
SECTION F–F
VIEW G–G
(Barrier curb not shown for clarity)
HALF PLAN – FIXED BENTS
* P.V.C. pipe through diaphragm, typ. For size and location see "Earthquake Restrainers" sheet.
** 3/4"ø×2'-6" Coil Tie Rod, typ.
3/4"ø×4'-0" Coil Tie Rod, typ. at expansion piers.
** 3/4"ø×4'-0" Coil Tie Rod, typical at fixed bents and end bents. At the end bents use a 3/4"ø×2'-6" coil tie rod at the exterior face of girders A & E.
** At fixed bents omit the exterior coil tie rod at girders A & E.
Note:
Coil tie rods shall be installed at all end bents, bents, and piers. Coil tie rods to be galvanized. See Section 705.4.8 of the Missouri Standard Specifications for Highway Construction.
DIAPHRAGM NOTES
For additional details see "Precast Prestressed Panel Details" sheet.
The diaphragms of fixed piers are vertical and shall be poured a minimum of 30 minutes and a maximum of 2 hours before the slab is poured.
The diaphragms at expansion piers are normal to grade and shall be poured a minimum of 30 minutes and a maximum of 2 hours before the slab is poured.
Paint exposed ends of girders and strands with two coats of asphalt paint.
DIAPHRAGM DETAILS @ BENTS & PIERS
ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County
HARRINGTON & CORTELYOU, INC.
Consulting Engineers
DETAILED: J.K.G. 2/94
CHECKED: M.J.T. 2/94
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.
Revised 11-22-95
SHEET 44 OF 59
A4757

FINAL PLANS

STATE	PROJ. NO.	SHEET NO.
MO.	ACNI-291-1(4)	58
SEC./SUR. 12	TWP 50N	RGE 32W

"AS BUILT FOUNDATION DATA"

END BENT 1N (HP12x53)

PILE NO.	LENGTH IN PLACE (FT.)	COMPUTED BEARING (TONS)	REMARKS
1	135	Refusal	
2	135	"	
3	134	"	
4	133	"	
5	135	"	
6	134	"	
7	135	"	

BENT 2N (HP12x53)

PILE NO.	LENGTH IN PLACE (FT.)	COMPUTED BEARING (TONS)	REMARKS
8	92	Refusal	2" Batter
9	90	"	
10	91	"	2" Batter
11	91	"	2" Batter
12	90	"	
13	91	"	2" Batter
14	92	"	2" Batter
15	90	"	
16	91	"	2" Batter
17	83	"	2" Batter
18	89	"	
19	89	"	2" Batter
20	91	"	2" Batter
21	90	"	
22	91	"	2" Batter
23	91	"	2" Batter
24	90	"	
25	91	"	2" Batter

BENT 3N (HP12x53)

PILE NO.	LENGTH IN PLACE (FT.)	COMPUTED BEARING (TONS)	REMARKS
26	90	Refusal	2" Batter
27	88	"	
28	90	"	2" Batter
29	90	"	2" Batter
30	88	"	
31	91	"	2" Batter
32	91	"	2" Batter
33	89	"	
34	91	"	2" Batter
35	90	"	2" Batter
36	90	"	
37	92	"	2" Batter
38	90	"	2" Batter
39	89	"	
40	90	"	2" Batter
41	90	"	2" Batter
42	89	"	
43	90	"	2" Batter

BENT 4N (HP12x53)

PILE NO.	LENGTH IN PLACE (FT.)	COMPUTED BEARING (TONS)	REMARKS
44	74	Refusal	2" Batter
45	73	"	
46	75	"	2" Batter
47	73	"	2" Batter
48	72	"	
49	74	"	2" Batter
50	73	"	2" Batter
51	72	"	
52	74		2" Batter

BENT 4N (CONTINUED)

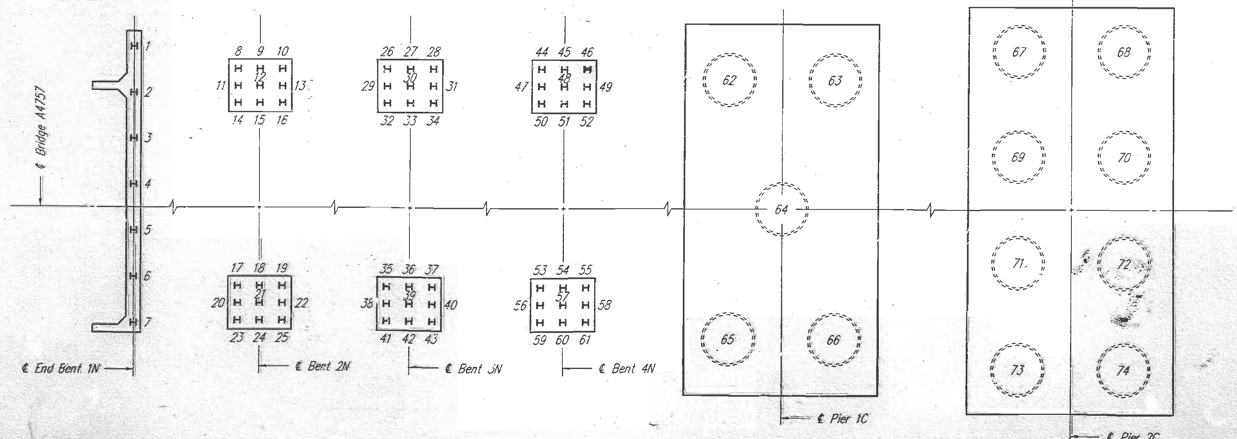
PILE NO.	LENGTH IN PLACE (FT.)	COMPUTED BEARING (TONS)	REMARKS
53	79	Refusal	2" Batter
54	78	"	
55	77	"	2" Batter
56	80	"	2" Batter
57	80	"	
58	77	"	2" Batter
59	81	"	2" Batter
60	80	"	
61	78	"	2" Batter

PIER 1C

SHAFT NO.	BOTTOM OF DRILLED SHAFT (ELEV.)	BOTTOM OF ROCK SOCKET (ELEV.)	REMARKS
62	635.4	615.0	
63	637.4	614.7	
64	636.6	6'5.4	
65	632.6	613.9	
66	634.9	614.3	

PIER 2C

SHAFT NO.	BOTTOM OF DRILLED SHAFT (ELEV.)	BOTTOM OF ROCK SOCKET (ELEV.)	REMARKS
67	623.7	594.0	
68	619.2	594.1	
69	624.0	595.8	
70	624.3	594.1	
71	625.6	594.3	
72	624.2	594.2	
73	626.5	593.4	
74	623.8	595.8	



FINAL PLANS

AS BUILT FOUNDATION DATA

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: D.E.B. 5/94
CHECKED:

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 58 OF 59

A4757

STATE	PROJ. NO.	SHEET NO.
MO.	ACNH-291-1(44)	59
SEC./SUR. 12	TWP. 50N	RGE. 32W

"AS BUILT PILE" DATA

PIER 3C (HP14x117)

PILE NO.	LENGTH IN PLACE (FT.)	COMPUTED BEARING (TONS)	REMARKS
75	87 ✓	Refusal	2" Batter ✓
76	87 ✓	"	" "
77	88 ✓	"	" "
78	87 ✓	"	" "
79	87 ✓	"	" "
80	87 ✓	"	" "
81	87 ✓	"	" "
82	87 ✓	"	" "
83	87 ✓	"	" "
84	87 ✓	"	" "
85	85 ✓	"	Used as test pile ✓
86	87 ✓	"	2" Batter
87	87 ✓	"	" "
88	85 ✓	"	
89	87 ✓	"	2" Batter
90	89 ✓	"	" "
91	85 ✓	"	
92	87 ✓	"	2" Batter
93	88 ✓	"	" "
94	86 ✓	"	" "
95	87 ✓	"	" "
96	87 ✓	"	" "
97	87 ✓	"	" "
98	87 ✓	"	" "
99	87 ✓	"	" "
100	87 ✓	"	" "
101	87 ✓	"	" " ✓

BENT 1S (HP12x53)

PILE NO.	LENGTH IN PLACE (FT.)	COMPUTED BEARING (TONS)	REMARKS
102	103 ✓	Refusal	2" Batter
103	104 ✓	"	
104	102 ✓	"	2" Batter
105	103 ✓	"	" "
106	101 ✓	"	
107	103 ✓	"	2" Batter
108	103 ✓	"	" "

BENT 1S (CONTINUED)

PILE NO.	LENGTH IN PLACE (FT.)	COMPUTED BEARING (TONS)	REMARKS
109	101 ✓	Refusal	
110	104 ✓	"	2" Batter ✓
111	102 ✓	"	" " ✓
112	101 ✓	"	
113	102 ✓		2" Batter ✓
114	103 ✓		" " ✓
115	102 ✓		
116	104 ✓		2" Batter
117	102 ✓		" " ✓
118	101 ✓		
119	102 ✓		2" Batter ✓

BENT 2S (HP12x53)

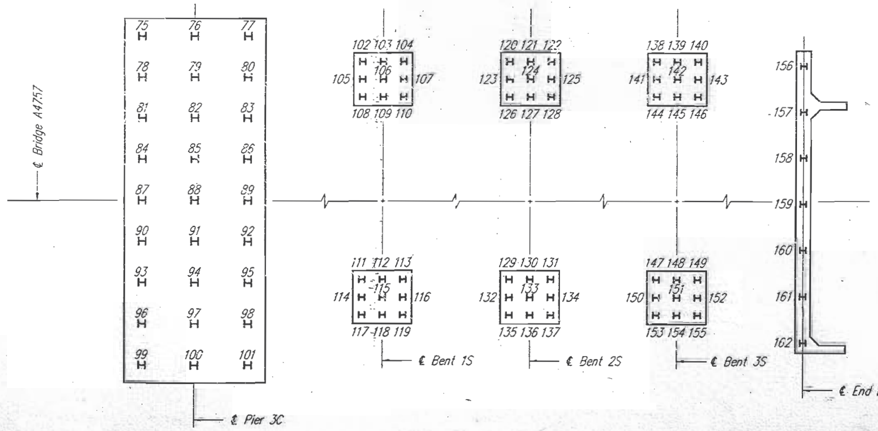
PILE NO.	LENGTH IN PLACE (FT.)	COMPUTED BEARING (TONS)	REMARKS
120	101 ✓	Refusal	2" Batter ✓
121	100 ✓	"	
122	101 ✓	"	2" Batter ✓
123	101 ✓	"	" "
124	100 ✓	"	
125	101 ✓	"	2" Batter ✓
126	102 ✓	"	" "
127	100 ✓	"	
128	101 ✓	"	2" Batter ✓
129	101 ✓	"	" "
130	100 ✓	"	
131	101 ✓	"	2" Batter ✓
132	100 ✓	"	" "
133	100 ✓	"	
134	101 ✓	"	2" Batter ✓
135	101 ✓	"	" "
136	100 ✓	"	
137	101 ✓	"	2" Batter ✓

BENT 3S (HP12x53)

PILE NO.	LENGTH IN PLACE (FT.)	COMPUTED BEARING (TONS)	REMARKS
138	101 ✓	Refusal ✓	2" Batter ✓
139	101 ✓	"	
140	102 ✓	"	2" Batter
141	102 ✓	"	" "
142	100 ✓	"	
143	102 ✓	"	2" Batter
144	101 ✓	"	" "
145	100 ✓	"	
146	103 ✓	"	2" Batter
147	101 ✓	"	" "
148	101 ✓	"	
149	102 ✓	"	2" Batter
150	101 ✓	"	" "
151	101 ✓	"	
152	102 ✓	"	2" Batter
153	100 ✓	"	" "
154	101 ✓	"	
155	101 ✓	"	2" Batter

END BENT 4S (HP12x53)

PILE NO.	LENGTH IN PLACE (FT.)	COMPUTED BEARING (TONS)	REMARKS
156	133 ✓	Refusal ✓	
157	135 ✓	"	
158	132 ✓	"	
159	134 ✓	"	
160	134 ✓	"	
161	133 ✓	"	
162	133 ✓	"	



FINAL PLANS
I CERTIFY THAT THIS PLAN ACCURATELY REFLECTS THE LOCATION AS CONSTRUCTED
5/10/98
DATE

AS BUILT FOUNDATION DATA

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: D.E.B. 5/94
CHECKED:

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 59 OF 59

A4757

STATE	PROJ. NO.	SHEET NO.
MO.	ACNH-291-1(46)	4
SEC./SUR. 12 TWP. 50N RGE. 32W		

MISSOURI HIGHWAY AND TRANSPORTATION COMMISSION

ROUTE 291 MISSOURI RIVER BRIDGE

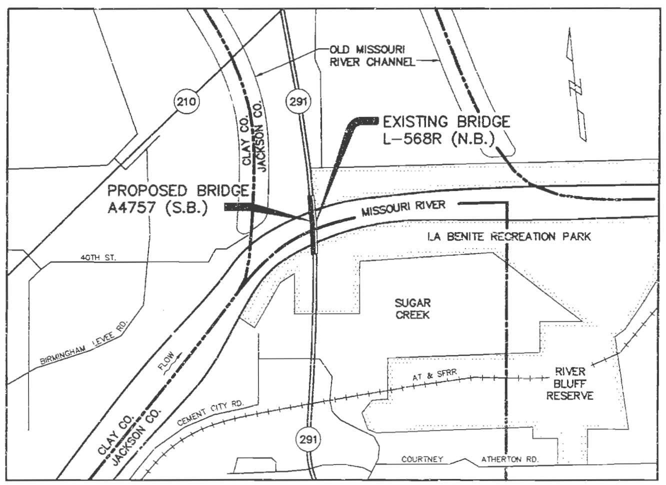
JACKSON COUNTY

CONTRACT 2

TRUSS SUPERSTRUCTURE STEEL

1993

INDEX OF SHEETS



LOCATION SKETCH

INDEX OF SHEETS

FINAL PLANS

I CERTIFY THAT THIS DRAWING ACCURATELY REFLECTS THE CONFIGURATION AND LOCATION OF THE ROADWAY AND APPURTENANCES AS CONSTRUCTED ON THIS PROJECT.

STATE OF MISSOURI — CHRISTOPHER GRANT HEDLUND — NUMBER E-27899 — REGISTERED PROFESSIONAL ENGINEER

8-4-97

302

STATE OF MISSOURI — KEVIN R. EISENBEIS — NUMBER E-20946 — REGISTERED PROFESSIONAL ENGINEER

SUBMITTED BY: Kevin R. Eisenbeis
REGISTERED PROFESSIONAL ENGINEER
MISSOURI NO. E-20946

BRIDGE OVER MISSOURI RIVER

IN JACKSON COUNTY, MISSOURI
PROJECT NO. STA. 99+52.92
JOB NO. J4U0564D RTE. 291
JACKSON COUNTY

DATE 9/8/95

STD.
STD.
A4757

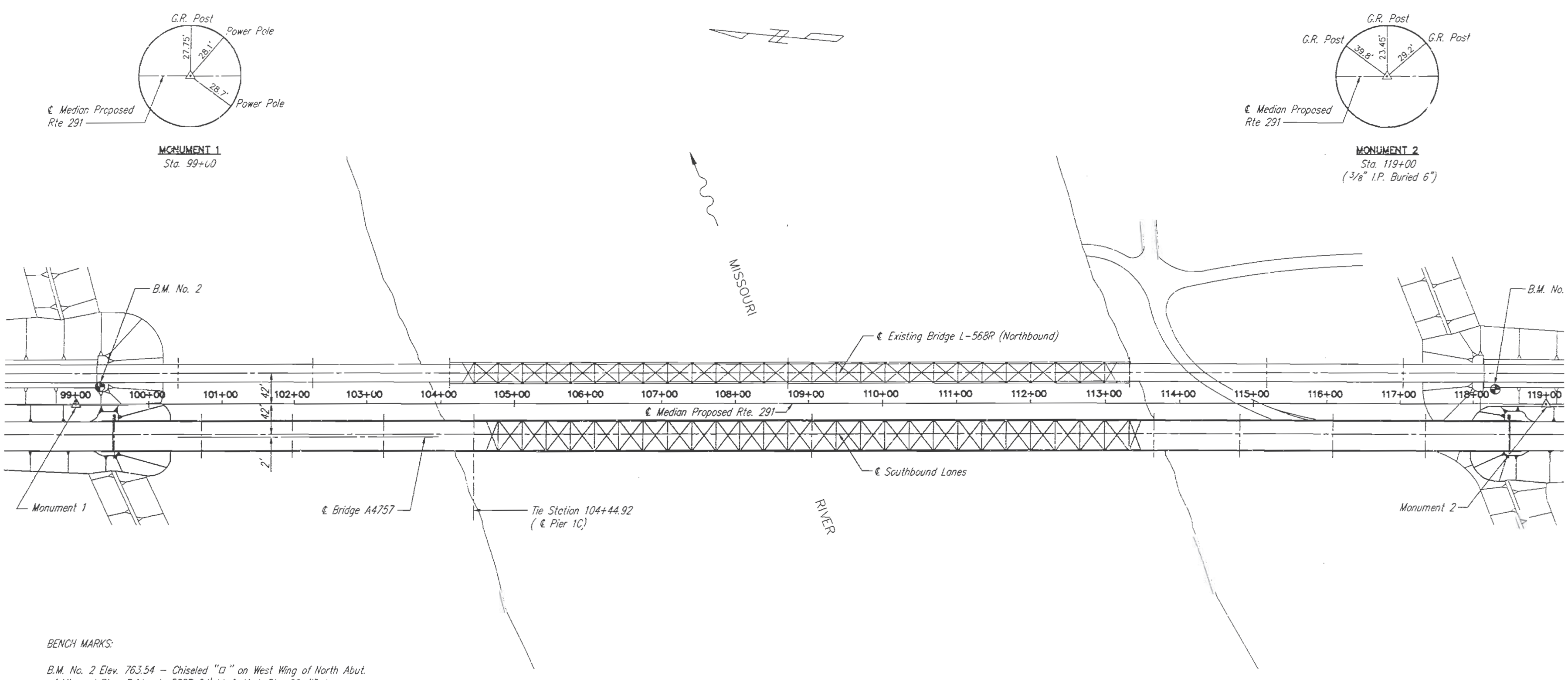
291COV02

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.L.K. 03/93
CHECKED: K.R.E. 09/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

STATE	PROJ. NO.	SHEET NO.
MO.	ACNH-291-1(46)	5



BENCH MARKS:

B.M. No. 2 Elev. 763.54 – Chiseled "□" on West Wing of North Abut. of Missouri River Bridge L-568R 24' Lt. ℄ Med. Sta. 99+33 ±.

B.M. No. 5 Elev. 763.45 – USC&G B.M. Disk Stamped U-218 Quad 390942 20'± Lt. ℄ Med. Sta. 118+30 ±.

NOTE:

The Monuments shown on this drawing shall be used for stationing and alignment of the bridge.

FINAL PLANS

I CERTIFY THAT THIS DRAWING ACCURATELY REFLECTS THE CONFIGURATION AND LOCATION OF THE ROADWAY AND APPURTENANCES AS CONSTRUCTED ON THIS PROJECT.

8-6-97
DATE

REGISTERED PROFESSIONAL ENGINEER

303

SURVEY TIES & ALIGNMENT DIAGRAM

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

ALIGN-C2

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

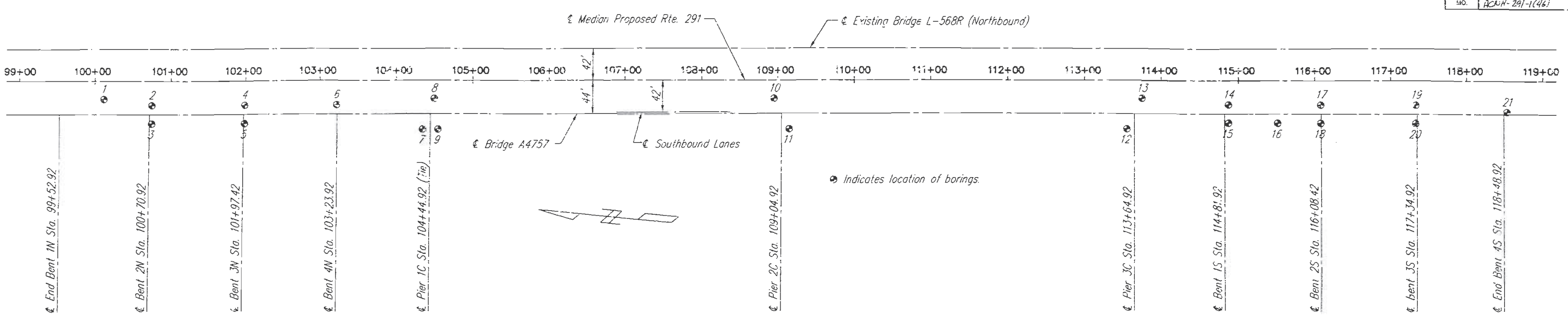
DETAILED: B.T.K. 02/93
CHECKED: K.R.E. 09/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 2 OF 33

A4757

STATE	PROJ. NO.	SHEET NO.
MO.	ACNH-291-1(46)	6



BORING LOG LOCATIONS

DEPTH Ft.	ELEV.	
0.0'	728.9	
5.0'	723.9	Cobbles to boulders, (riprap).
		Fine to coarse sand.
80.0'	648.9	
		Coarse sand with scattered gravel.
103.5'	625.4	
106.8'	622.1	Hard shale.

1
100+12
20' Lt.
9/5/90

DEPTH Ft.	ELEV.	
0.0'	723.4	
1.0'	722.4	Cobbles to gravel, fill.
6.0'	717.4	Dark brown sandy silty clay.
		Brown fine silty sand.
20.0'	703.4	
32.5'	690.9	Fine to medium grained sand, wet.
74.6'	648.8	Medium to coarse sand, clean, wet.
[illegible].0'	638.4	Medium to coarse sand, clean, wet with scattered gravel layers.
97.0'	626.4	Coarse clean sand, wet with gravel layers.
97.8'	625.6	Shale, slightly weathered.
102.0'	621.4	Hard shale.

2
100+75
12' Lt.
9/5/90

DEPTH Ft.	BLOWS 6"	POCKET PEN. tsf	ELEV.	
0.0'			723.1	
5.0'	9-13-16	2.0-3.0	718.1	Brown clayey sand, wet, stiff.
7.5'			715.6	
10.0'	10-14-18		713.1	Brown, fine to medium sand, round, dense, some lignite.
15.0'	9-13-12		708.1	
20.0'	6-5-5		703.1	
22.5'			700.6	
25.0'	3-3-4		698.1	Brown, medium to coarse sand, rounded, loose.
27.5'			695.6	
30.0'	20-25-21		693.1	Gray fine sand, rounded, dense to very dense, some lignite.
35.0'	9-7-5		688.1	
35.5'			687.6	
40.0'	6-6-5		683.1	Gray medium sand, rounded medium dense, some lignite, gray clay seam @ 49.5'-51.0'
45.0'	6-8-9		678.1	
50.0'	12-6-18		673.1	
51.0'			672.1	
55.0'	17-27-34		668.1	Gray fine sand, rounded, clean, very dense.
60.0'	14-19-22		663.1	
63.5'			659.6	
70.0'	13-15-10		653.1	Gray coarse sand with some fine gravel, medium dense.
85.0'	19-34-51		638.1	
86.6'			636.5	
87.2'			635.9	Boulder.
92.2'			630.9	Sand.
92.4'	100 in 5"	6.0-8.0	630.7	Gray areneceous silty shale.
97.5'	100 in 5.5"	9+	625.6	
100.8'			622.3	
102.5'			620.6	Limestone.

3
100+75
12' Rt.
10/4/90

DEPTH Ft.	BLOWS 6"	POCKET PEN. tsf	ELEV.	
0.0'			723.1	
2.0'			721.1	Limestone cobbles to gravel, fill.
5.0'	2-3-5	2.0	718.1	Dark brown sandy silty clay, stiff, moist.
7.5'			715.6	
10.0'	6-7-8		713.1	Brown fine silty sand, loose with some scattered clayey sand pockets, wet from 12.5'±
15.0'	4-3-3		708.1	
20.0'	3-3-5		703.1	
22.5'			700.6	
25.0'	8-5-7		698.1	Medium to coarse sand wet, loose to medium dense, clean.
30.0'	8-11-16		693.1	
32.5'			690.6	
35.0'	7-10-10		688.1	Fine to medium sand, medium dense, clean.
40.0'	6-6-7		683.1	
45.0'	9-11-21		678.1	
48.5'			674.6	
50.0'	13-15-11		673.1	Medium to coarse sand clean, rounded, scattered gravel.
55.0'	9-19-25		668.1	
55.5'			667.6	
60.0'	21-26-22		663.1	Fine to medium sand, clean, rounded, some fine gravel throughout.
68.5'			654.6	
70.0'	10-8-9		653.1	Coarse sand, clean, rounded, scattered cobbles with boulder at 73.0'-82.0', more abundant at 92.7'-95.2'.
80.0'	9-10-13		643.1	
85.0'	25-24-21		638.1	
95.0'	100 in 6"		628.1	
95.2'			627.9	
100.0'	100 in 6"		623.1	Gray silty shale, dry very hard.
102.5'			620.6	
104.2'			618.9	Gray shaley limestones, hard.
105.0'			618.1	Gray silty shale. dry, hard.

4
101+99
12' Lt.
9/6/90

NOTICE AND DISCLAIMER REGARDING BORING LOG DATA

The locations of all subsurface borings for this structure are shown in the Boring Log Locations above. Boring data for the numbered locations is shown on this and the following three sheets. The boring data for all locations indicated, as well as any other boring logs or other factual records of subsurface data and investigations performed by the department for the design of the project, is available from the district materials engineer upon written request as outlined in the project special provisions. No greater significance or weight should be given to the boring data depicted on the plan sheets than to subsurface data available from the district or elsewhere.

The commission does not represent or warrant that any such boring data accurately depicts the conditions to be encountered in constructing this project. A contractor assumes all risks it may encounter in basing its bid prices, time or schedule of performance on the boring data depicted here or those available from the district, or on any other documentation not expressly warranted, which the contractor may obtain from the commission.

DEPTH Ft.	ELEV.	
0.0'	723.4	
0.4'	723.0	Cobble, fill.
12.5'	710.9	Dark brown silty clay to clay.
30.0'	693.4	Sandy silt, wet.
74.8'	648.6	Medium sand.
75.9'	647.5	Gravel to scattered boulders with coarse sand.
96.7'	626.7	Coarse sand with some scattered gravel.
98.4'	625.0	Shale, hard.

5
101+99
12' Rt.
9/5/90

FINAL PLANS

I CERTIFY THAT THIS DRAWING ACCURATELY REFLECTS THE CONFIGURATION AND LOCATION OF THE ROADWAY AND APPURTENANCES AS CONSTRUCTED ON THIS PROJECT.

SIGNATURE 8-6-98 DATE

GRANT REDENE NUMBER E-27899 REGISTERED PROFESSIONAL ENGINEER

BORING LOG LOCATIONS AND BORING LOGS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: T.L.W. 2/93
CHECKED: E.W.N. 2/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 3 OF 33

A4757

B0L0C-C2

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STATE	PROJ. NO.	SHEET NO.
MO.	BCAN-291-1(41)	7

BORING LOGS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

Boring 6 — 103+22, 12' Lt., 8/28–29/90

DEPTH Ft.	BLOWS 6"	POCKET PEN. tsf	ELEV.	Description
0.0'			723.7	
5.0'	2-3-4	.5-1.0	718.7	Brown sandy silt, moist medium stiff.
6.0'			717.7	
10.0'	2-3-3	.5-1.0	713.7	Brown silty clay, moist medium stiff.
11.0'			712.7	
≠ 15.0'	3-3-3	.5	708.7	Gray silty sand, wet soft to medium stiff.
20.0'	2-2-2	.5	703.7	
23.5'			700.2	
25.0'	5-6-9		698.7	Gray fine sand, slightly silty, wet, medium dense
30.0'	3-5-8		693.7	
35.0'	10-13-13		688.7	
37.5'			686.2	
40.0'	8-10-11		683.7	Medium grained sand rounded, dense with scattered coarse rounded gravel.
45.0'	13-20-29		678.7	
50.0'	9-14-11		673.7	
55.0'	15-20-14		668.7	
57.5'			666.2	
60.0'	16-32-47		663.7	Fine to medium grained sand, rounded, very dense.
70.0'	12-18-27		653.7	
74.7'			649.0	
80.0'	11-24-76	in 3"	643.7	Medium grained sand, rounded, scattered cobbles with boulders.
82.5'			641.2	
85.0'	100 in 2.5"	7.5	638.7	Gray shale, hard, dry.
90.0'	100 in 3"	8.0-9+	633.7	
95.0'	100 in 4"	8.0-9+	628.7	
105.0'			618.7	

≠ Water Elev. as of 8/30/90

6
103+22
12' Lt.
8/28–29/90

Boring 7 — 104+35, 20' Rt., 8/28/90

DEPTH Ft.	BLOWS 6"	POCKET PEN. tsf	ASTM CLASS	ELEV.	Description
0.0'				723.6	
5.0'	6-5-4	1.0	ML	718.6	Brown sandy silt with sand layers, moist, medium stiff.
10.0'	2-2-2	1.0	ML	713.6	
12.5'				711.1	
15.0'	3-1-2		ML	708.6	Dark gray silty fine sand, wet, soft to medium stiff.
20.0'	1-1-3		CL-ML	703.6	
25.0'	2-2-5		SM	698.6	
30.0'	5-12-15		SM	693.6	
30.5'				693.1	
35.0'	7-9-11		SP-SM	688.6	Gray fine sand, rounded, clean, medium dense to dense.
40.0'	7-8-7		SW	683.6	
44.5'				679.0	
45.0'	6-9-8		SW	678.6	Medium sand, medium dense clean, scattered rounded gravel.
50.0'	10-13-19		SW-SM	673.6	
55.0'	9-9-8		SW	668.6	
60.0'	10-17-13		SW	663.6	
65.0'	15-14-15		SW	658.6	
70.0'	8-11-15		SW	653.6	
74.5'				649.1	
75.0'	19-18-15		SW	648.6	Medium to coarse grained sand, rounded, dense, abundant cobbles with boulders.
80.0'	17-29-22		SW	643.6	
80.1'				643.5	
85.0'	1?-21-79		SP	638.6	Fine grained sand, very dense, clean, rounded.
86.0'				637.6	
102.8'				620.8	Gray silty shale, dry, very hard, calcareous.
104.5'				619.1	Argillaceous limestone hard, fossiliferous, medium bedded.
108.6'				615.0	Gray silty, calcareous shale, hard.
110.9'				612.7	Argillaceous limestone, hard.
113.8'				609.8	Gray silty shale, hard.
117.7'				605.9	Argillaceous limestone to limestone, hard, medium to thick bedded.
119.8'				603.8	Dark gray shale.

7
104+35
20' Rt.
8/28/90

Boring 8 — 104+50, 20' Lt., 9/5/90

DEPTH Ft.	ELEV.	Description
0.0'	714.4	
3.8'	710.6	Brown sandy silt, dry, soft.
12.5'	701.9	Brown sand, dry, medium, stiff.
45.0'	669.4	Gray fine sand, wet, dense scattered cobbles @ 52'.
83.1'	631.3	Gray course sand, wet, dense.
84.0'	630.4	Gray shale, dry, hard.

8
104+50
20' Lt.
9/5/90

Boring 9 — 104+55, 20' Rt., 9/5/90

DEPTH Ft.	ELEV.	Description
0.0'	721.8	
18.0'	703.8	Brown sandy silt.
29.5'	692.3	Gray silty sand, wet and loose.
47.5'	674.3	Sand.
52.5'	669.3	Gravel in sand.
74.6'	647.2	Medium sand with some scattered gravel.
77.0'	644.8	Gravel to cobbles.
85.5'	636.3	Packed sand.
89.5'	632.3	Shale, slightly weathered.
92.5'	629.3	Hard shale.

9
104+55
20' Rt.
9/5/90

Boring 10 — 108+95, 20' Lt., 10/2/90

DEPTH Ft.	BLOWS 6"	POCKET PEN. tsf	ELEV.	Description
0.0'			712.4	Elevation of deck.
4.4'			708.0	Barge.
18.0'			69?.4	Water
35.7'			676.7	Light brown and black sand, fine to medium grained, loose.
66.3'			646.1	Light brown to black medium grained sand with scattered gravel, loose coarse grained, some lignite at 61.5'.
88.1'			624.3	Brown and black, medium to coarse grained sand with scattered fine gravel, lignite becoming more abundant at 82.0'.
89.1'			623.3	Gray limestone, thin bedded with shale layers, hard.
91.1'			621.3	Dark gray clayey shale, hard.
93.6'	100 in 3"	9.5+	618.8	Gray clay shale.
94.8'			617.6	Gray shaley limestone, medium bedded, hard.
99.5'			612.9	Dark gray hard calcareous shale, clayey.
103.8'			608.6	Light gray shaley limestone, thick bedded, moderately hard.
104.8'			607.6	Gray clayey shale.
106.2'			606.2	Dark gray to green calcareous shale, clayey, soft, thinly laminated.
107.2'			605.2	Light gray to dark gray shaley limestone, medium hard to moderately hard, medium bedded.
108.2'			604.2	Dark gray calcareous shale, clayey, soft.
108.8'			603.6	Gray shaley limestone, medium bedded.
110.1'			602.3	Dark gray silty shale, hard to very hard, non-calcareous.
111.8'			600.6	Light gray, silty shale, calcareous, moderately hard to hard, with some limestone stringers.
112.4'			600.0	Light gray limestone with shale on bedding and fracture planes.
113.8'	100 in 1.5"	9.5+	598.6	Gray to green silty shale with scattered limestone stringers, dry.
113.9'			598.5	Dark gray silty shale hard.
114.2'			598.2	Brown limestone, hard fine grained.
115.3'			597.1	Dark gray silty shale moderately hard to hard.
118.9'			593.5	Medium to light gray silty shale, slightly calcareous, moderately hard to hard.
119.0'			593.4	Light brown argillaceous limestone, hard to very hard.

10
108+95
20' Lt.
10/2/90

Boring 11 — 109+15, 20' Rt., 10/2–3/90

DEPTH Ft.	BLOWS 6"	POCKET PEN. tsf	ASTM CLASS	ELEV.	Description
0.0'				712.4	Elevation of deck.
4.4'				708.0	Barge.
17.0'				695.4	Water.
30.0'	8-7-8		SP	682.4	Sand, fine to medium grained, loose, clean.
35.0'	7-6-7		SP	677.4	
37.5'				674.9	
40.0'	14-16-14		SP	672.4	Fine sand, medium dense, clean.
42.5'				669.9	
45.0'	11-10-11		SP	667.4	Fine to coarse sand, medium dense to loose, clean with some lignite pockets.
50.0'	10-6-8		SW	662.4	
55.0'	15-15-13		SW	657.4	
60.0'	15-10-12		SW	652.4	
65.0'	11-14-9		SP	647.4	
70.0'	9-10-12		SW	642.4	
72.5'				639.9	
75.0'	21-35-43		SP-SM	637.4	Fine sand, medium dense to dense, with trace lignite.
80.0'	15-11-12		SP	632.4	
85.0'	8-16-24		SW-SM	627.4	
88.1'				624.3	
89.2'				623.2	Gray shaly limestone, hard, thin bedded.
92.1'				620.3	Dark gray silty shale, thinly laminated, very hard.
93.4'	70-30 in 1"	9+		619.0	Gray silty shale, thinly laminated, moderately hard.
95.2'				617.2	Gray shaly limestone, thick bedded, very hard.
99.0'				613.4	Gray silty shale, thinly laminated, hard.
104.2'				608.2	Light gray shaly limestone, thick bedded, very hard.
108.0'	100 in 1.5"			604.4	Dark gray silty shale, thinly laminated, moderately hard with some hard calcareous shale stringers @ 111.4' to 112.6' & 114.0' to 114.8'.
118.2'				594.2	

11
109+15
20' Rt.
10/2–3/90

Boring 12 — 113+55, 20' Rt., 8/30/90

DEPTH Ft.	ELEV.	Description
0.0'	711.3	
4.5'	706.8	Brown sandy silt, wet, soft, P.A.W.T. 0–4.5'.
33.5'	677.8	Medium to course grained sand, medium dense.
74.0'	637.3	Fine to medium grained sand, medium dense.
96.1'	615.2	Coarse grained sand, rounded dense, heavy cobbles from 94.0' – 96.0'.
98.5'	612.8	Gray shale, dry, hard.

12
113+55
20' Rt.
8/30/90

CORING LOG
(NX Double Tube Barrel)

Boring	FROM	TO	RUN	REC	LOSS	% RQD	NOTES
BORING 7	87.0	92.0	5.0	5.0	0.0		
	92.0	97.0	5.0	5.0	0.0		
	97.0	100.3	3.3	3.3	0.0		
	100.3	105.0	4.7	5.0	+0.3	100	*
	105.0	109.8	4.8	5.0	+0.2		
	109.8	114.8	5.0	4.2	0.8	98	*
	114.8	119.8	5.0	5.0	0.0		
BORING 10	88.6	93.6	5.0	4.5	0.5		
	93.8	98.8	5.0	5.0	0.0	52	*
	98.8	103.8	5.0	5.0	0.0	100	*
	103.8	108.8	5.0	4.4	0.6		
	108.8	113.8	5.0	4.8	0.2		
	114.0	119.0	5.0	5.0	0.0		
BORING 11	88.4	93.4	5.0	5.0	0.0		
	94.0	99.0	5.0	4.1	0.9		**
	99.0	103.0	4.0	4.0	0.0	100	
	103.0	108.0	5.0	4.9	0.1		
	108.2	113.2	5.0	5.0	0.0		
	113.2	118.2	5.0	4.2	0.8		

* Limestone portion of core only.
** Loss in core probably due to shale core falling out of barrel.

UNCONFINED COMPRESSIVE STRENGTH TEST DATA

Boring	DEPTH, FT.	Qu., tsf.
BORING 7	88.0	36.9
	94.0	17.0
	100.0	2.83
	102.0	6.90
	107.0	4.66
	113.0	32.30
BORING 10	92.0	1.33
	95.0	14.70
	101.0	813.0
	104.3	18.70
	109.0	49.64
	116.0	13.60
BORING 11	92.0	4.95
	97.0	19.60
	101.0	506.0
	106.0	18.82
	117.0	8.90

NOTE:
Test results for Pocket Pen is 9+ TSF for all depths at each boring.

Note: For location of Borings, see Sheet 3 of 33.

Note:
P.A.W.T. = Pushed Augers Without Turning.

FINAL PLANS
I CERTIFY THAT THIS DRAWING ACCURATELY REFLECTS THE CONFIGURATION AND LOCATION ... APPURTENANCES AS CONSTRUCTED ...
DATE

REGISTERED PROFESSIONAL ... NUMBER E-27899

305

BOR-1-C2

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: T.L.W. 2/93
CHECKED: E.W.N. 2/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 4 OF 33

A4757

STATE	PROJ. NO.	SHEET NO.
MO.	ACMN-291-1(46)	8

DEPTH Ft.	BLOWS 6"	POCKET PEN. tsf	ASTM CLASS	ELEV.	
0.0'				725.7	
5.0'	3-5-6	2.25	CH	720.7	Light brown to gray sand clayey silt.
7.5'				718.2	
10.0'	2-3-6		CL	715.7	Light brown to gray silty fine sand, moist to dry with limonite strains.
14.5'				711.2	
15.0'	2-1-1	0.25-0.5	CL	710.7	Gray clay, very soft to soft, trace sand.
16.5'				709.2	
18.1'	9/30/90 ▼ Water Elev.			707.6	
20.0'	10-12-11		SC	705.7	Medium to coarse sand medium dense, trace silt to 22.5'.
25.0'	9-15-15		SP	700.7	
27.5'				698.2	
30.0'	9-24-24		SP	695.7	
35.0'	7-8-9		SP-SM	690.7	Fine to medium sand; medium dense, loose from 32.5' to 42.5' then medium dense with some gravel layers from 48.0' with abundant lignite from 62.5' to 72.5'.
40.0'	9-7-8		SP-SM	685.7	
45.0'	19-15-10		SP-SM	680.7	
50.0'	21-25-25		SP-SM	675.7	
55.0'	14-18-17		SW-SM	670.7	
60.0'	17-21-25		SW-SM	665.7	
65.0'	10-12-17		SW-SM	660.7	
70.0'	14-12-11		SW	655.7	
72.5'				653.2	
75.0'	22-24-25		SW-SM	650.7	Fine to medium grained sand, medium dense with some lignite, and some gravel.
80.0'	15-13-13		SP-SM	645.7	
85.0'	15-14-12		SW	640.7	
87.0'				638.7	
88.4'				637.3	Heavy cobbles to boulders.
90.0'	16-12-16		SP	635.7	Medium to coarse sand with some gravel.
95.0'	13-12-11		SW	630.7	
100.0'	12-12-12		SW-SM	625.7	
105.0'	28-28-41		SW	620.7	
106.7'				619.0	
109.5'				616.2	Hard shale with limestone stringers.
110.6'				615.1	Gray clay shale.
111.9'				613.8	Gray calcareous shale, dry, hard.
115.6'				610.1	Gray slightly argillaceous limestone, medium grained, medium bedded, hard fossiliferous black from 115.2' to 115.6'.
116.2'				609.5	Gray calcareous shale very stiff to hard.
117.5'				608.2	Dark gray shale, hard.
118.7'				607.0	Light gray limestone, hard medium grained slightly argillaceous.
120.4'				605.3	Light gray argillaceous limestone to gray calcareous shale moderately soft to hard.
123.1'				602.6	Light gray limestone, hard, fine grained, medium bedded argillaceous to 120.8'.
125.9'				599.8	Green gray argillaceous limestone, moderately hard.
130.4'				595.3	Dark gray shale, hard.
134.3'				591.4	Gray crystalline limestone very hard, thick bedded.
135.4'				590.3	Gray shale, hard.
137.9'				587.8	Dark gray argillaceous limestone, fine grained medium bedded.
140.1'				585.6	Dark gray calcareous shale, hard, medium bedded.
140.4'				585.3	Gray argilleceous limestone, hard.

13
113+75
20' Lt.
9/20/90

DEPTH Ft.	ELEV.	
0.0'	730.3	
11.7'	718.6	Sandy silt.
		Sand.
103.0'	727.3	
103.8'	626.5	Shale.

14
114+87
12' Lt.
8/30/90

DEPTH Ft.	ELEV.	
0.0'	728.9	
11.8'	717.1	Brown sandy silt, moist, soft.
23.1'	705.8	Medium to coarse grained sand, rounded, medium dense.
		Coarse grained sand, rounded, dense.
110.0'	618.9	
111.0'	617.9	Gray shale, dry hard.

15
114+87
12' Rt.
8/30/90

CORING LOG
(NX Double Tube Barrel)

	FROM	TO	RUN	REC	LOSS	% RQD	NOTES
BORING 13	109.5	111.8	2.3	2.3	0.0		
	111.8	116.8	5.0	5.0	0.0	100	*
	116.8	121.8	5.0	5.0	0.0	91	*
	121.8	126.8	5.0	5.0	0.0	56	*
	126.8	131.8	5.0	5.0	0.0	66	*
	131.8	135.4	3.6	3.6	0.0	65	*
	135.4	140.4	5.0	4.9	0.1	90	*
BORING 17	107.3	111.8	4.5	2.8	1.7		
	111.8	116.8	5.0	5.0	0.0		

*Limestone portion of core only.

DEPTH Ft.	BLOWS 6"	POCKET PEN. tsf	ELEV.	
0.0'			729.0	
5.0'	5-6-9	2.0-3.0	724.0	Dark brown sandy, silty clay, stiff to very stiff.
7.5'			721.5	
10.0'	5-6-8	1.0	719.0	Brown sandy silt.
12.5'			716.5	
15.0'	4-3-3	0.75	714.0	Fine silty sand with some gray brown clay pockets.
17.5'			711.5	
20.0'	8-8-11		709.0	Fine silty sand.
22.5'			706.5	
25.0'	14-20-31		704.0	Unsorted river sand, fairly clean, medium dense.
27.5'			701.5	
30.0'	13-18-20		699.0	Medium to coarse sand medium dense.
32.5'			696.5	
35.0'	19-16-17		694.0	Fine sand, medium dense.
40.0'	12-21-36		689.0	
42.5'			686.5	
45.0'	32-37-39		684.0	Fine sand, dense.
47.5'			681.5	
50.0'	24-17-15		679.0	Medium to coarse sand with some gravel, medium dense.
60.0'	17-15-15		669.0	
65.0'			664.0	
70.0'	35-39-44		659.0	Fine sand, dense.
75.0'			654.0	
80.0'	13-15-16		649.0	Medium coarse sand, medium dense.
90.0'	17-23-21		639.0	
100.0'	33-46-45		629.0	
109.2'			619.8	
110.0'	100 in 2"	9.0+	619.0	Calcareous shale, hard.
115.0'	100 in 1"		614.0	
117.5'			611.5	Hard limestone.
120.0'	61-39 in 2"	9.0+	609.0	Dark gray silty shale hard, dry.
120.7'			608.3	
121.7'			607.3	Hard limestone.
125.0'	100 in 2"	9.0+	604.0	Light gray calcareous silty shale.
125.2'			603.8	

16
115+51
12' Rt.
8/13-14-15/90

DEPTH Ft.	BLOWS 6"	POCKET PEN. tsf	ELEV.	
0.0'			730.6	
7.5'			723.1	Sandy silt with scattered cobbles and gravel with clay pockets.
10.0'	8-10-9	0.75	720.6	Very sandy silt, fine, dry.
14.0'			716.6	
15.0'	10-9-8	0.75	715.6	Silty sand.
17.5'			713.1	
20.0'	7-9-10		710.6	Unsorted sand with some gravel, wet, medium dense.
25.0'	8-16-14		705.6	
30.0'	10-20-21		700.6	
35.0'	8-20-28		695.6	
35.5'			695.1	
40.0'	24-44-38		690.6	Fine sand, medium dense to dense.
45.0'	18-23-12		685.6	
47.5'			683.1	
50.0'	9-12-14		680.6	Medium sand, unsorted with cobbles to gravel at 51.0' to 55.0' loose to medium dense.
55.0'	8-10-8		675.6	
57.5'			673.1	
60.0'	10-12-12		670.6	Fine sand with some lignite, medium dense with heavy cobbles at 62.0'.
65.0'	12-14-14		665.6	
70.0'	12-16-18		660.6	
75.0'	22-26-22		655.6	
77.5'			653.1	
80.0'	12-13-14		650.6	Medium to coarse sand with some gravel, medium packed.
85.0'	9-8-7		645.6	
90.0'	15-18-16		640.6	
95.0'	16-13-9		635.6	
100.0'	16-19-15		630.6	
105.0'	24-76 in 3"		625.6	
106.6'			624.0	
111.8'			618.8	Light grey silty shale calcareous, very stiff.
112.2'			618.4	Hard argillaceous limestone.
114.9'			615.7	Green calcareous shale, hard.
116.8'	100 in 1.5"		613.8	Gray argillaceous limestone, hard.
116.9'			613.7	

17
116+08
12' Lt.
8/13-14-15/90

Note: For locations of Borings, see Sheet 3 of 33.

FINAL PLANS
I CERTIFY THAT THIS DRAWING ACCURATELY REFLECTS THE CONFIGURATION AND LOCATION OF THE BRIDGE AND APPURTENANCES AS CONSTRUCTED ON THIS PROJECT.
E-27699
PROFESSIONAL ENGINEER
8/98
DATE

306

BORING LOGS

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

BOR-2-C2

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: T.L.W. 2/93
CHECKED: E.W.N. 2/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

A4757

STATE	PROJ. NO.	SHEET NO.
MO.	ACNH-291-1(4)	9

302

DEPTH Ft.	ELEV.	
0.0'	730.3	
4.9'	725.4	Brown sandy silt.
17.0'	713.3	Brown sandy clay, stiff cannot P.A.W.T., moist to dry.
30.0'	700.3	Light brown silty fine sand, dry.
108.2'	622.1	Medium grained, wet sand, trace of silt.
109.1'	621.2	Very stiff to hard shale.

18
116+08
12' Rt.
8/30/90

DEPTH Ft.	BLOWS 6"	POCKET PEN. tsf	ELEV.	
0.0'			733.6	
5.0'	7-13-9	0.50	728.6	Dark brown sandy silt with some gravel.
7.5'			726.1	
10.0'	7-10-11	1.50	723.6	Dark gray silty clay, moist, medium stiff.
12.5'			721.1	
15.0'	4-4-10	0.50	718.6	Gray silty clay, wet, soft to very soft.
20.0'	3-6-4	0.25	713.6	
22.0'			711.6	
25.0'	16-14-10		708.6	Brown fine silty sand.
27.5'			706.1	
30.0'	11-14-16		703.6	Medium to coarse sand with some gravel, clean medium dense.
32.5'			701.1	
35.0'	17-16-25		698.6	Fine gray sand, clean, medium dense to dense.
40.0'	16-38-40		693.6	
45.0'	20-26-30		688.6	
47.5'			686.1	
50.0'	7-7-11		683.6	Medium to coarse sand with chert cobbles, clean, medium dense.
55.0'	21-26-16		678.6	
57.5'			676.1	
60.0'	13-20-15		673.6	Fine grained gray sand rounded, clean, dense.
70.0'	15-27-26		663.6	
75.0'			658.6	
80.0'	14-14-23		653.6	Fine to medium grained sand, rounded, clean, dense.
90.0'	9-10-11		643.6	
100.0'	13-13-20		633.6	
114.0'	100 in 2"		619.6	
114.3'			619.3	
118.6'			615.0	Gray shaley sandy limestone, hard.
122.6'			611.0	Gray limestone, hard.
123.0'	70-30 in 2"		610.6	Gray shale, dry and hard.
129.0'			604.6	
130.0'			603.6	Gray limestone, hard.

19
117+33
12' Lt.
8/23/90

DEPTH Ft.	ELEV.	
0.0'	733.6	
7.5'	726.1	Brown sandy silt, dry, soft, P.A.W.T. 0-7.5'.
16.0'	717.6	Dark gray slightly sandy silt, soft, moist, P.A.W.T. 7.5'-16.0'.
35.0'	698.6	Brown sandy clay, wet, medium stiff.
114.0'	619.6	Coarse sand, wet, dense scattered cobbles at 55.0'.
115.4'	617.2	Coarse sand and cobbles.
118.0'	615.6	Gray silty shale, dry, hard.

20
117+33
12' Rt.
8/30/90

DEPTH Ft.	ELEV.	
0.0'	737.9	
0.8'	737.1	Asphalt and base.
29.0'	708.9	Gray sandy silty clay.
35.0'	702.9	Gray clay, stiff, P.A.W.T. with moderate difficulty.
52.0'	685.9	Gray silty fine sand, cannot P.A.W.T.
113.0'	624.9	Medium sand.
114.0'	623.9	Shale.

21
118+51
3' Lt.
8/30/90

FINAL PLANS
I CERTIFY THAT THIS DRAWING ACCURATELY REFLECTS THE CONFIGURATION AND LOCATION OF THE ROADWAY AND APPURTENANCES AS CONSTRUCTED ON THIS PROJECT.
NUMBER E-27899 REGISTERED PROFESSIONAL ENGINEER
8-5-98
DATE

Note: For location of Borings, see Sheet 3 of 33.

Note:
P.A.W.T. = Pushed Augers Without Turning.

BOR-3-C2

HC HARRINGTON & CORTELYOU, INC.
Consulting Engineers

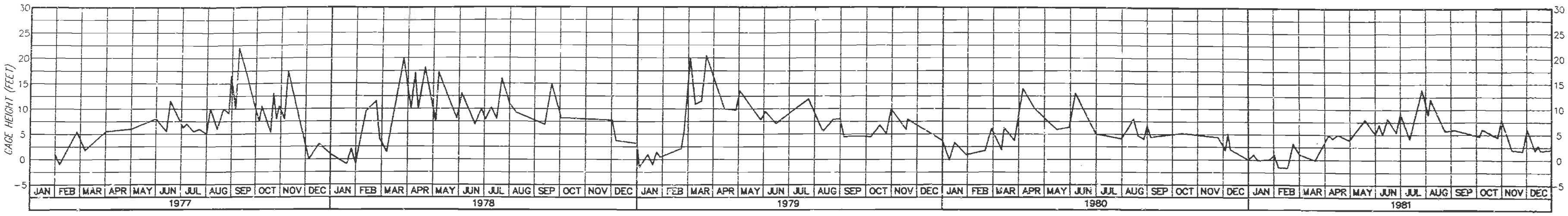
DETAILED: T.L.W. 2/93
CHECKED: E.W.N. 2/93

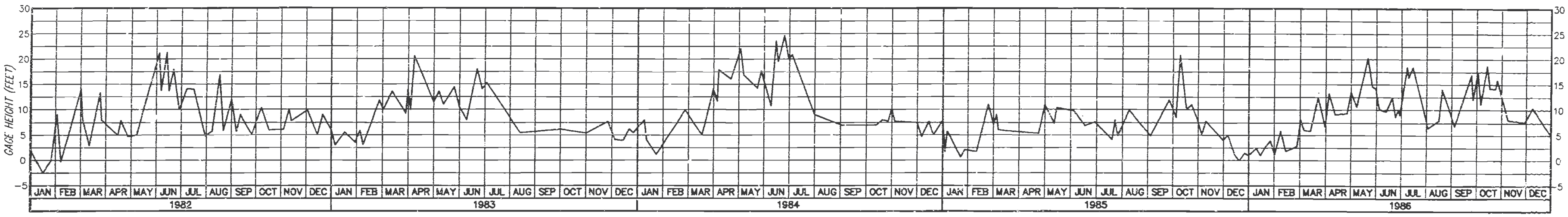
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

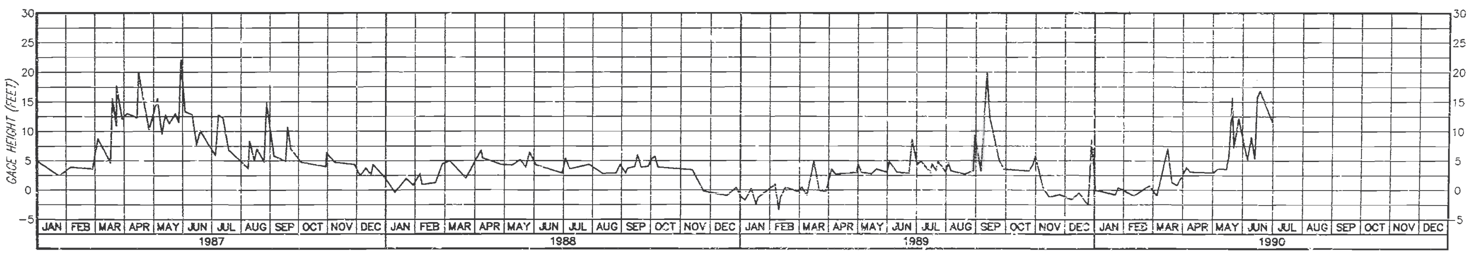
BORING LOGS
ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

A4757

STATE	PROJ. NO.	SHEET NO.
MO.	BCWH-291-1(46)	10







NOTES

Stage Hydrograph was plotted from readings of the Missouri River near the Hannibal Bridge located at river mile 366.1 in Kansas City, Missouri.

Gage Zero is 715.8 ft. M.S.L. (Mean Sea Level).

Seasonal variations in the water elevations at the Hannibal Bridge can be estimated by adding the gage reading to Elev. 715.8

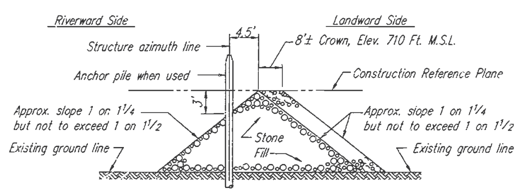
The Route 291 Bridge is located at river mile 352.7. A plot of the water surface elevation versus discharge curves for the Hannibal and Route 291 Bridges is shown on this drawing.

An estimate for seasonal variations in water surface elevations at the Route 291 Bridge can be made by deducting 11.7± to 14.6± feet from those at the Hannibal Bridge.

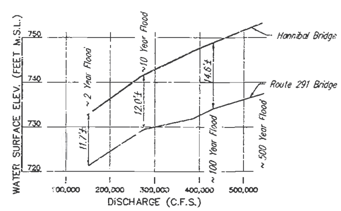
For approximate location of revetment see "Substructure Layout" sheet.

Revetment details are based on information provided by the U.S. Army Corps of Engineers. Accuracy of details or dimensions are not guaranteed.

This design data is included for information only and is not guaranteed to represent conditions at the site during construction.



STONE FILL REVETMENT



WATER SURFACE ELEVATION VS. DISCHARGE CURVES

FINAL PLANS

DATE

STAGE HYDROGRAPH AND REVETMENT DETAILS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HC HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: S.A.K. 10/92
CHECKED: E.W.N. 2/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

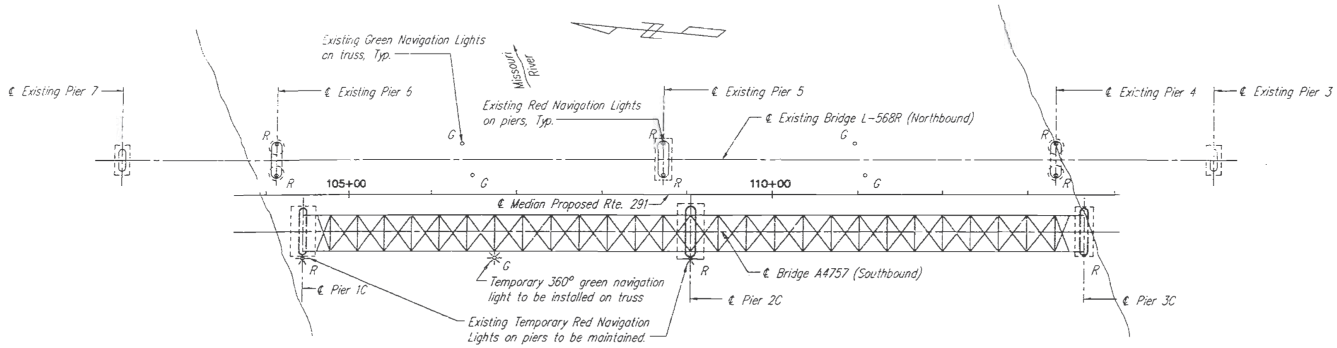
SHEET 7 OF 33

A4757

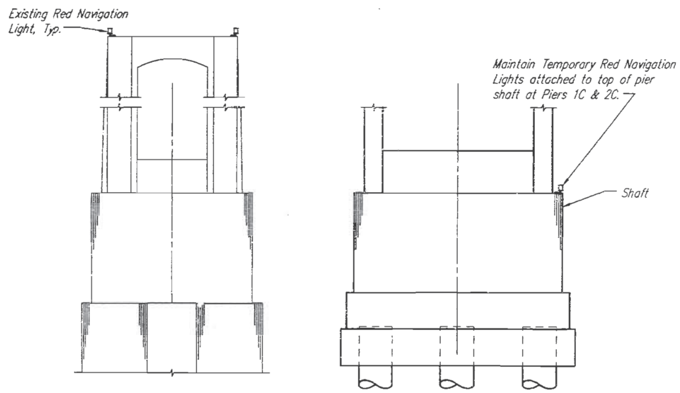
HYDPO-C2

308

STATE	PROJ. NO.	SHEET NO.
MO.	RCMH-291-1(46)	11



TEMPORARY NAVIGATION LIGHTING LAYOUT

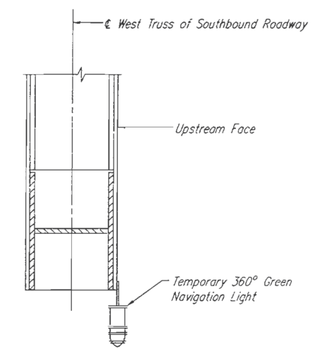


EXISTING BRIDGE

NEW SOUTHBOUND BRIDGE

LOCATION OF LIGHTS ON PIERS

(View shown looking upstation.)



LOCATION OF LIGHT ON TRUSS

(View shown looking upstation.)

NOTES:

Temporary lights installed on piers by others shall be maintained during the construction.

Red lights shall be installed on any temporary bents used during construction.

Temporary light on bottom of truss chord shall have 360° Green Lenses and shall meet the requirements of the U.S. Coast Guard.

Existing navigation lighting system on Bridge L-568R shall remain operational.

Temporary lights will remain the property of the Commission after completion of construction and will then be maintained by others.

The cost of furnishing and maintaining temporary navigation lights shall be considered as incidental to and completely covered by unit price of bid for various items of work in this contract.

See Special Provisions for additional requirements.

I CERTIFY THAT ... ACCURATELY REFLECTS ... AND LOCATION OF THE ... APPURTENANCES AS CONSTRUCTED ON THE PROJECT.

9-7-98
DATE

TEMPORARY NAVIGATION LIGHTING

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

T-NAV-LT

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: JLK 02/93
CHECKED: KRE 09/93

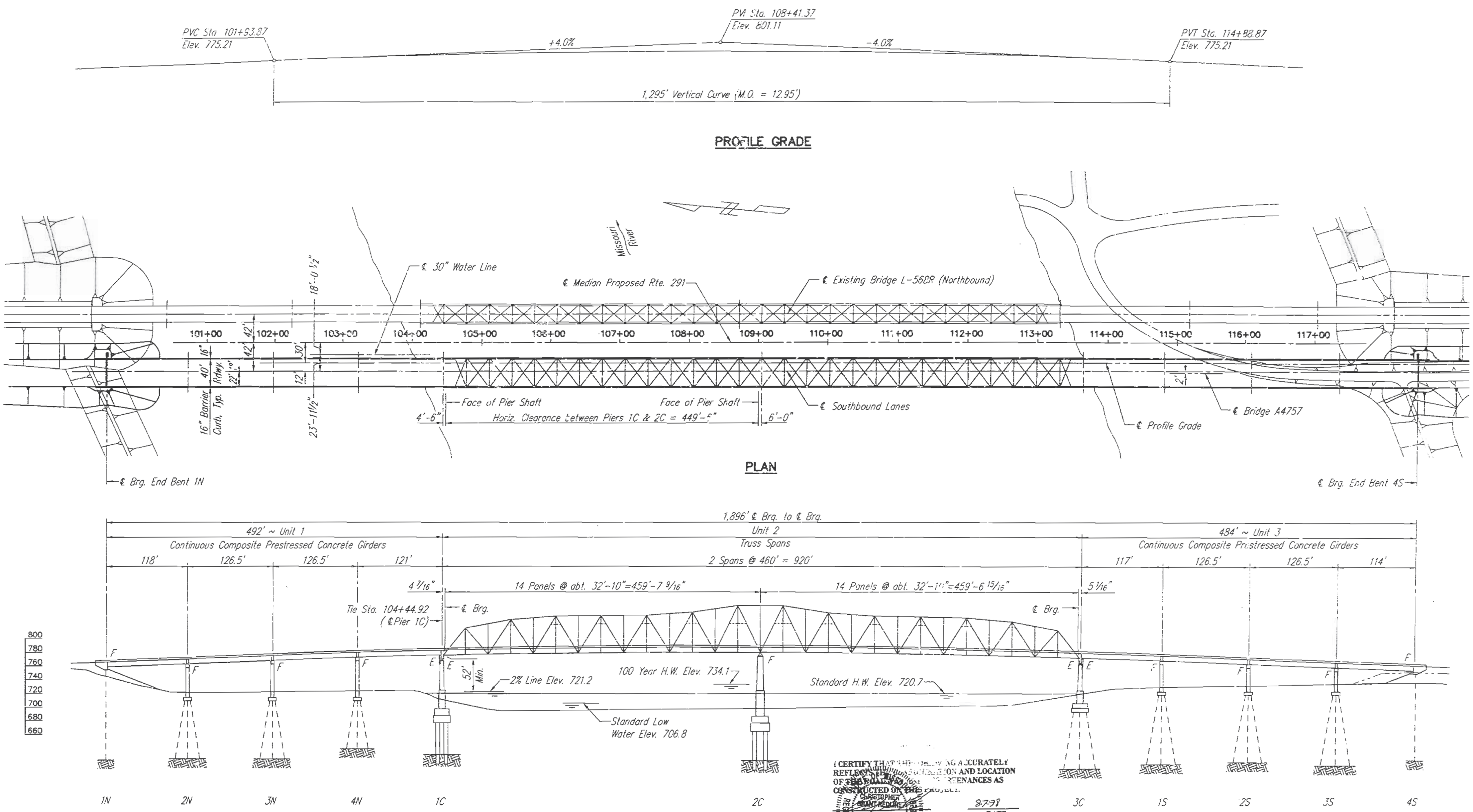
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 8 OF 33

A4757

309

STATE	PROJ. NO.	SHEET NO.
MO.	ACNH-291-1(44)	12



I CERTIFY THAT THIS DRAWING ACCURATELY REFLECTS THE CONDITION AND LOCATION OF THE ROADWAY AND APPURTENANCES AS CONSTRUCTED ON THIS PROJECT.

CHRISTOPHER GRANT NEWGEBRE E-27699 REGISTERED PROFESSIONAL ENGINEER

8-7-98
DATE

BASIC FLOOD DATA	
Discharge (100 yr.)	430,000 cfs
H.W. Elev.	734.1

GENERAL PLAN AND ELEVATION
ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: T.L.W. 10/92
CHECKED: H.G.J. 09/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

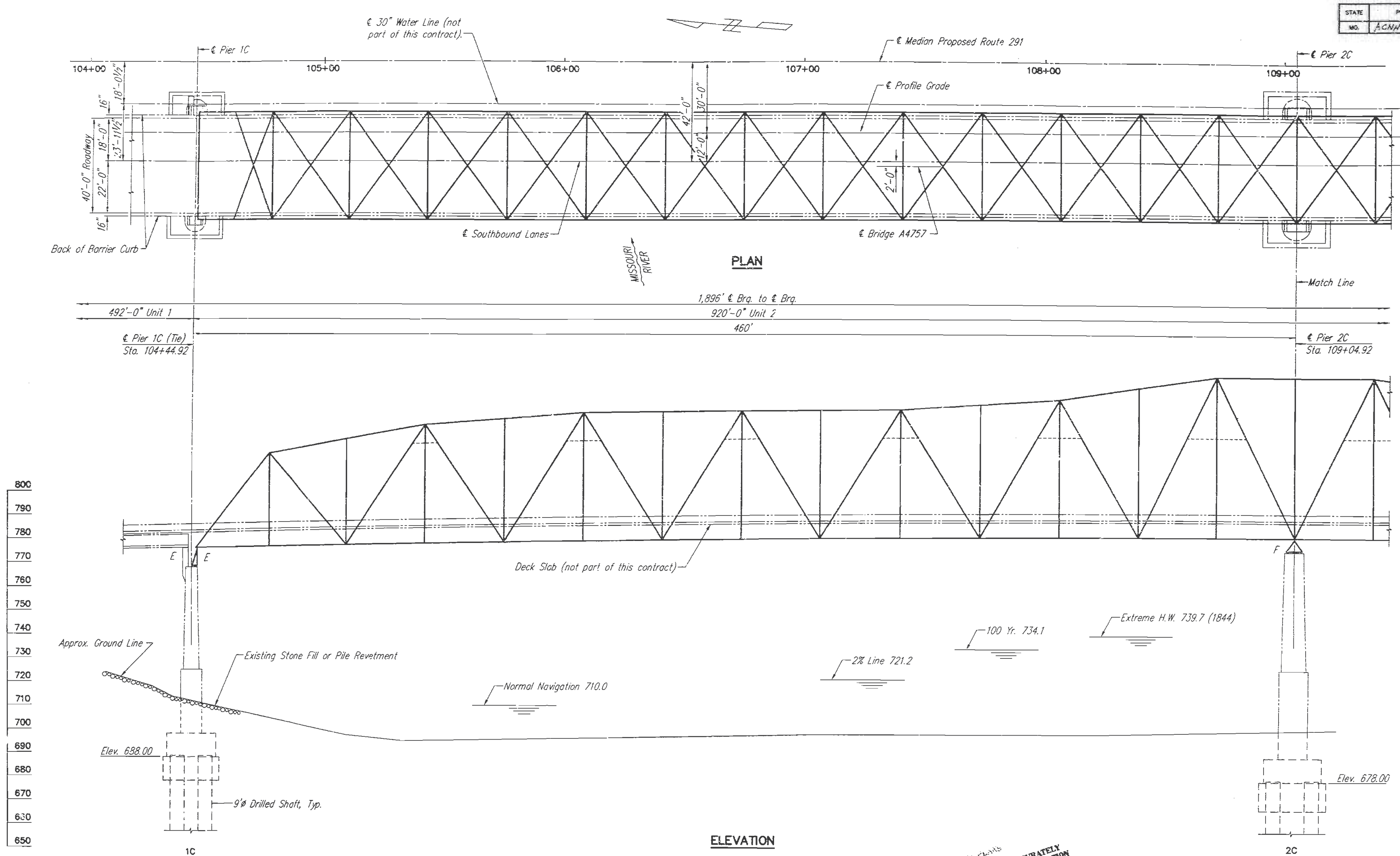
SHEET 9 OF 33

A4757

GPE291C2

310

STATE	PROJ. NO.	SHEET NO.
MO.	ACNH-291-1(46)	13



311

FINAL PLANS
I CERTIFY THAT THIS DRAWING ACCURATELY REFLECTS THE CONFIGURATION AND LOCATION OF THE BRIDGE AND APPURTENANCES AS CONSTRUCTED ON THIS PROJECT.
DATE
E-27899

GENERAL PLAN AND ELEVATION -- UNIT 2
NORTH SPAN

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

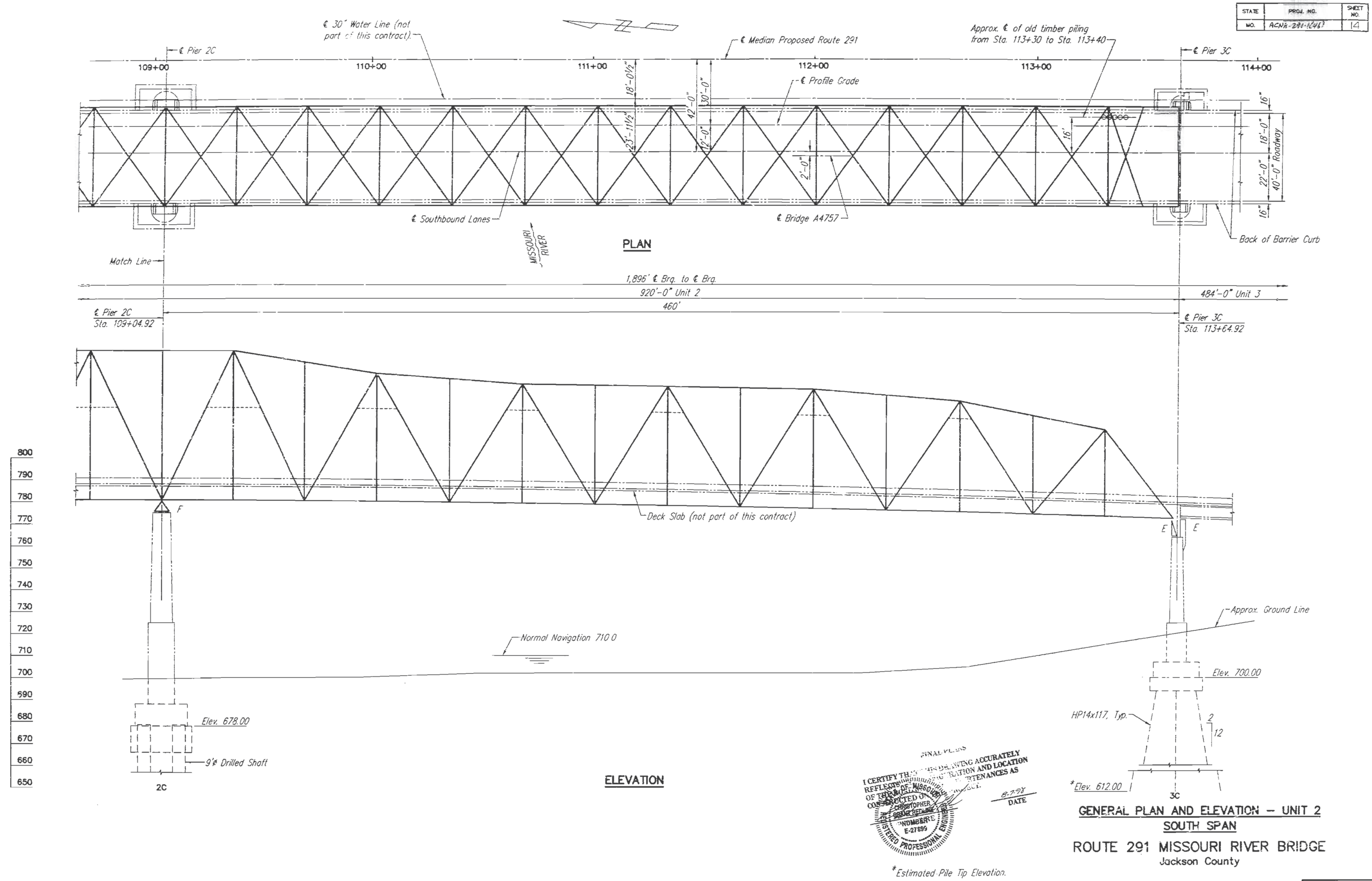
DETAILED: J.L.K. 03/93
CHECKED: H.G.J. 09/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 10 OF 33

A4757

UNIT2AC2



STATE	PROJ. NO.	SHEET NO.
MO.	ACNH-291-1(46)	14

I CERTIFY THAT THIS DRAWING ACCURATELY REFLECTS THE CONFIGURATION AND LOCATION OF THE APPURTENANCES AS CONSTRUCTED.

8-2-98
DATE

GENERAL PLAN AND ELEVATION – UNIT 2
SOUTH SPAN

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.L.K. 03/93
CHECKED: H.G.J. 09/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 11 OF 33

A4757

UNIT2BC2

312

STATE	PROJ. NO.	SHEET NO.
MO.	ACNH-291-1(46)	15

GENERAL NOTES:

The existing Missouri Route 291 shall remain open during construction.

Utility companies whose facilities are shown on the plans or are known to be within the construction limits shall be notified by the Contractor of the construction start date.

All dimensions are horizontal unless otherwise noted. Drawings shall not be scaled.

SPECIFICATIONS:

Design: AASHTO Standard Specifications for Highway Bridges 1992 Edition plus Interims.

Construction: Missouri State Highway Commission Standard Specifications For Highway Construction, 1993 Edition, plus general and job special provisions.

FHWA Technical Advisory (T 5140.20), Scour of Bridges.

DESIGN LOADING:

Load Factor Design Method – Stringers and Floorbeams.

Live Load – HS20 Modified with Modified 24,000 Lb. Tandem Axle.

Live Load Distribution: Truss Members – 1.50 Lane/Truss
Truss Floor System in accordance with AASHTO.
For Truss Members the concentrated load used in combination with lane load is 32,500 Lbs. for both Shear and Moment calculations.

Dead Load – An allowance of 35 Lbs. per sq. ft. of roadway for future wearing surface is included in the Dead Load.
Concrete Weight – 150 Lbs. per cu. ft.
An allowance of 16 Lbs. per sq. ft. of roadway is used for Stay-In-Place Forms.

Wind – As specified by AASHTO.

Fatigue – AASHTO Loading Case I.

Seismic Forces – In accordance with AASHTO Division I-A, Sec. 4.6 Design Forces for Seismic Performance Category A.

DESIGN UNIT STRESSES:

Structural Carbon Steel (A.S.T.M. A709 Gr. 36)--- fs = 20,000 psi.
fy = 36,000 psi.
Structural Low Alloy Steel------------------ fs = 27,000 psi.
(A.S.T.M. A709, Gr. 50 or A.S.T.M. A709 Gr. 50W)- fy = 50,000 psi.

DESIGNATION:

Far Side – (F.S.)
Near Side – (N.S.)
Low-Alloy Steel – (LA)
Milled Joint – (MJ)

TRUSS SPAN ERECTION:

Before ordering material and proceeding with shop drawings, the Contractor shall submit to the Engineer, for review, complete plans of his proposed erection scheme for the Truss Span showing erection Loads and Stresses. Erection Stresses shall be composed of the Dead Load Stresses of the structure and erection equipment plus the stress from a 45 psf wind on the structure and on the erection equipment. Erection Stresses shall not exceed design unit stresses (working stress design) by more than 33 1/3%. Review of the erection plans by the Engineer shall not be considered as relieving the Contractor of his full responsibility for the practicability and safety of the erection schemes used. An assumed possible erection scheme with erection stresses is shown on Sheet 15 of 31.

MATERIAL DESIGNATION:

All material shown on the Plans shall be Structural Carbon Steel unless otherwise noted. Material designated as (LA) shall be Structural Low-Alloy Ste

HIGH STRENGTH (H.S.) BOLTS:

High Strength Bolts shall be galvanized friction type and shall conform to ASTM A325, except as noted. High Strength Bolts may not be reused after torquing.

High strength bolts, nuts and washers shall be sampled for quality in accordance with Standard Specification 106 and Field Section (FS-712).

All connections thru side plates of truss members to the gusset plates, angles and splice plates (main truss joints only) shall be made with 1"ø High Strength (H.S.) Bolts, unless otherwise noted.

All other connections shall be made using 7/8"ø H.S. Bolts, unless otherwise noted on the Plans.

FRACTURE CRITICAL MEMBERS AND NOTCH TOUGHNESS:

For Fracture Critical Members (FCM) and Notch Toughness requirements, see Special Provisions. Only ASTM A709 Gr. 50 Structural Low Alloy Steel shall be used for Low Alloy Fracture Critical Members.

Notch Toughness requirements are mandatory for all stringers and bottom flanges and webs of all floorbeams and Truss Tension Members including their Connecting Gusset Plates.

MILLED JOINTS:

Material of members at Joints specified (MJ) in the Plans shall be Milled to bevel of member to provide a theoretical gap of 1/16" after the Truss is erected. All other material at Joints shall be in Close Contact. See Special Provisions.

CAMBER:

Trusses and Floorbeams are shown cambered for full Dead Load, excluding Future Wearing Surface, and including vertical curve for Truss.

JACKING:

Provisions have been made for jacking the total superstructure Dead Load at Panel Points L0, L14 and L0' of the Truss Span, assuming all support Joints are raised simultaneously or proportionally in a manner to preclude any distortion of the Truss configuration at 150% of allowable working stress.

SPAN LENGTHS

All span lengths shown on plans are at a normal temperature of 60° F.

CONNECTIONS:

All shop and field connections, other than welded or as noted, shall be made with High Strength Bolts, with sizes as noted on the plans. Pitch for connectors shall be not less than 3" for 7/8"ø fasteners and 3 1/2" for 1"ø fasteners.

WELDING:

All welding shall conform to the ANSI/AASHTO/AWS D1.5-95 Bridge Welding Code as supplemented by the Standard Specifications and Special Provisions.

MISCELLANEOUS:

See Special Provisions for navigational considerations and construction in navigable waters.

PROTECTIVE COATING

Protective Coating: System G (Prime Coat only) by the Contractor in accordance with Special Provisions.

Prime Coat: The cost of the prime coat shall be included in the contract unit price of the Fabricated Structural Steel. Tint of the prime coat for System G shall be similar to the color of the field coat to be used (Gray – in future contract).

FINAL [redacted] QUANTITIES

ITEM	UNIT	TOTAL
Fabricated Structural Carbon Steel (Truss)	Lbs.	2,099,310
Fabricated Structural Low Alloy Steel (Truss)	Lbs.	2,063,210
Truss Bearing Devices	Lbs.	50,600
Water Transportation	Lump Sum	1

Note: Quantities shown are for Truss Span only.

I CERTIFY THAT THIS DRAWING ACCURATELY REFLECTS THE CONFIGURATION AND LOCATION OF THE ROADWAY AND APPURTENANCES AS CONSTRUCTED ON THIS PROJECT.

CHRISTOPHER GRANT BE... NUMBER E-27899 REGISTERED PROFESSIONAL ENGINEER

DATE

GENERAL NOTES & QUANTITIES – TRUSS

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.L.K. 02/93
CHECKED: H.G.J. 09/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 12 OF 33

A4757

GNOTR-C2

313

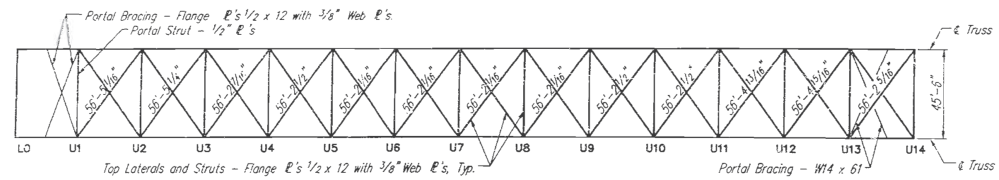
STATE	PROJ. NO.	SHEET NO.
MO.	ACNH-291-1(46)	16

Notes:

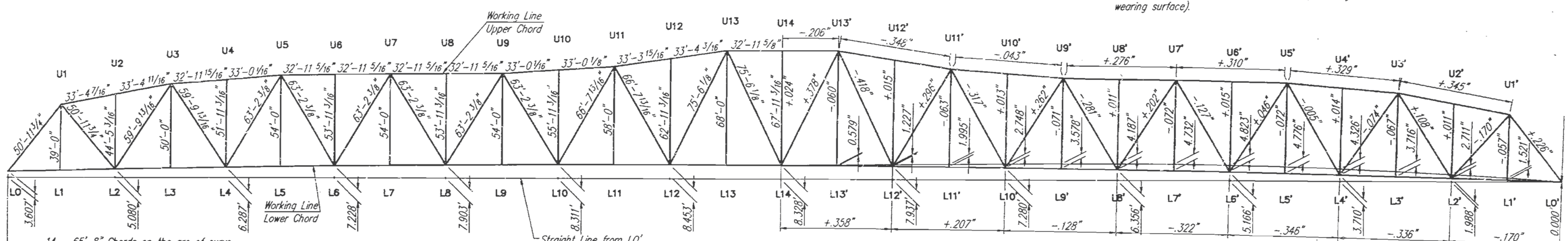
The geometric shape of the truss, after dead load (excluding future wearing surface) deflection has occurred, shall be as shown in the "Member Lengths" diagram. The angular relationship between members for fabrication shall be in accordance with this shape.

Chord and tie members shall be straight between splice points. Lower chord and tie member offsets are measured perpendicular to reference line at Elev. 770.54.

Lengths of members for fabrication are to be computed for geometric shape of truss shown in the "Member Lengths" diagram, and the corrections shown in the "Truss Deflections" diagram, are to be applied to these lengths. + indicates lengthening, − indicates shortening. The blocking dimensions, shown in the "Truss Deflections" diagram, are the positions of lower chord and tie member joints above the geometric shape to provide for dead load deflection (excluding future wearing surface).

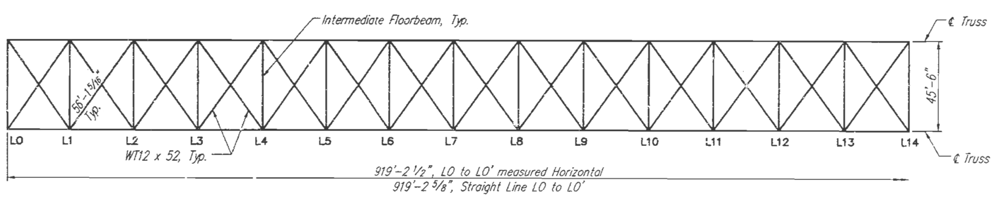


PORTAL BRACING AND TOP LATERALS

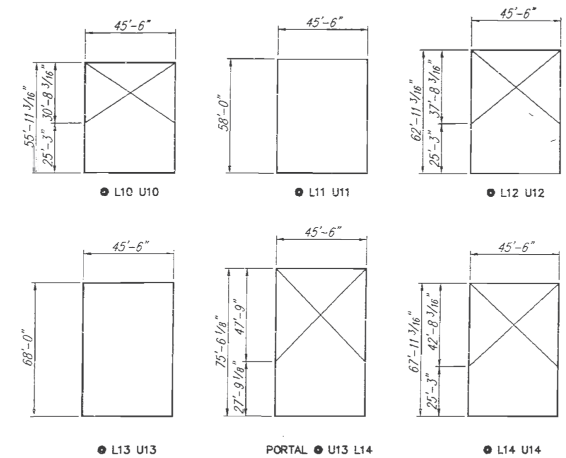


MEMBER LENGTHS

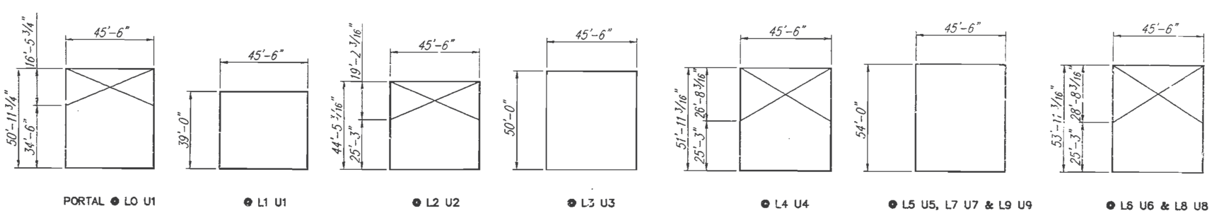
DEFLECTIONS



BOTTOM LATERALS



DIMENSIONS AT PANEL POINTS



DIMENSIONS AT PANEL POINTS

Note: Hangers shall be normal to the lower truss and posts shall be placed at the mid-point of the upper chord.

FINAL PLANS
I CERTIFY THAT THIS DRAWING ACCURATELY REFLECTS THE CONFIGURATION AND LOCATION OF THE ... AND APPURTENANCES AS CONSTRUCTED ON THIS PROJECT.
8/7/98 DATE
REGISTERED PROFESSIONAL ENGINEER E-27899

TRUSS LAYOUT AND CAMBER

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.L.K. 08/93
CHECKED: H.G.J. 09/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 13 OF 33

A4757

TRUSSLAY

3/4

STATE	PROJ. NO.	SHEET NO.
MO.	ACNH-291-1(4)	17

MEMBER	DIRECT STRESSES (KIPS)						BENDING MOMENTS (FT. KIPS)			MEMBER SECTIONS ("H" SHAPES)		AREA (SQ. IN.)		S.M. (IN.^{3})		ALLOWABLE UNIT STRESSES (KSI)			ACTUAL UNIT STRESSES (KSI)				MATERIAL	FCM	MEMBER
	DL	LL	I	TOTAL GROUP 1	WIND	TOTAL GROUP 2	DL My	LL+I Mx	WIND	SIDE OR TOP & BOTTOM PLATES	WEB PLATE	GROSS	NET	XX	YY	KL/r	Fa	Fb	GROUP 1 fa	GROUP 1 fb	GROUP 2 fa	GROUP 2 fb			
																			fa	fb	fa	fb			
L0 L2	726	218	19	963	①174	900	42	0	528 ②	24 x 1.625	13..75 x 1.00	91.8	77.1	570	312	- -	27.0	27.0	12.5	1.6	11.7	12.7	LA	FCM	L0 L2
L2 L4	1330	424	38	1792	331	1661	39	0	20	24 x 1.50	14 x 1.00	86.0	72.5	537	288	- -	27.0	27.0	24.7	1.6	22.9	2.1	LA	FCM	L2 L4
L4 L6	1456	496	44	1996	403	1859	42	0	20	24 x 1.625	13.75 x 1.00	91.8	77.1	570	312	- -	27.0	27.0	25.9	1.6	24.1	2.0	LA	FCM	L4 L6
L6 L8	1183	490	44	1723	405	1594	37	0	20	24 x 1.375	14.25 x 1.00	80.3	67.9	504	264	- -	27.0	27.0	25.4	1.7	23.5	2.2	LA	FCM	L6 L8
L8 L10	434	377	34	845	346	780	34	0	20	24 x 1.25	14.50 x 1.00	74.5	63.3	487	240	- -	20.0	20.0	13.4	1.7	12.3	2.2	CS	FCM	L8 L10
L10 L12	-754	-298	-27	-1079	124	-630	48	0	20	30 x 1.50	14 x 1.00	104.0	- -	665	450	40.3	16.1	20.0	-10.4	-1.3	-6.1	-1.6	CS	Not	L10 L12
L12 L14	-2042	-462	-42	-2546	438	-1604	67	0	20	30 x 2.25	12.50 x 1.00	147.5	- -	890	675	41.5	21.8	27.0	-17.3	-1.2	-10.9	-1.5	LA	Not	L12 L14
L0 U1	-1151	-362	-33	-1546	55	-1096	61	0	797	24 x 1.50	14 x 1.00	86.0	- -	537	288	68.1	18.8	27.0	-18.0	-2.5	-12.7	-20.4	LA	Not	L0 U1
U1 U3	-1164	-357	-32	-1553	72	-1092	34	0	21	24 x 1.25	14.50 x 1.00	74.5	- -	469	350	48.2	21.2	27.0	-20.8	-1.2	-14.7	-1.7	LA	Not	U1 U3
U3 U5	-1466	-479	-43	-1988	139	-1327	45	0	20	24 x 1.75	13.50 x 1.00	97.5	- -	501	336	46.2	21.4	27.0	-20.4	-1.6	-13.6	-2.1	LA	Not	U3 U5
U5 U7	-1383	-508	-46	-1937	167	-1216	45	0	20	24 x 1.75	13.50 x 1.00	97.5	- -	601	336	46.2	21.4	27.0	-19.9	-1.6	-12.5	-2.0	LA	Not	U5 U7
U7 U9	-868	-447	-40	-1355	168	-700	32	0	20	24 x 1.125	14.75 x 1.00	68.8	- -	432	216	48.2	21.2	27.0	-19.7	-1.8	-10.2	-2.3	LA	Not	U7 U9
U9 U11	125	281	25	431	142	267	29	0	20	24 x 1.00	15 x 1.00	63.0	54.0	395	192	- -	27.0	27.0	8.0	1.8	4.9	2.4	LA	FCM	U9 U11
U11U13	1409	325	29	1763	136	1545	42	0	26	30 x 1.25	14.50 x 1.00	89.5	78.3	578	375	- -	27.0	27.0	22.5	1.3	19.7	1.9	LA	FCM	U11U13
U13U14	2904	646	58	3608	160	3064	71	0	25	30 x 2.375	12.25 x 1.00	154.8	133.4	922	713	- -	27.0	27.0	27.1	1.2	23.0	1.5	LA	FCM	U13U14
U1 L2	633	205	18	856	0	633	44	0	49	24 x 1.00	15 x 1.00	63.0	54.0	395	192	- -	20.0	20.0	15.9	2.8	11.7	4.2	CS	FCM	U1 L2
L2 U3	-342	-168	-15	-525	0	-342	53	0	67	24 x 1.00	15 x 1.00	63.0	- -	395	192	89.3	12.7	20.0	-8.3	-3.3	-5.4	-5.3	CS	Not	L2 U3
U3 L4	234	145	13	392	0	234	53	0	67	24 x 1.00	15 x 1.00	63.0	54.0	395	192	- -	20.0	20.0	7.3	3.3	4.3	5.3	CS	FCM	U3 L4
L4 U5	15	132	12	159	0	15	56	0	75	24 x 1.00	15 x 1.00	63.0	54.0	395	192	- -	20.0	20.0	2.9	3.5	0.3	5.8	CS	FCM	L4 U5
U5 L6	-138	-145	-13	-296	0	-138	56	0	75	24 x 1.00	15 x 1.00	63.0	- -	395	192	93.7	12.3	20.0	-4.7	-3.5	-2.2	-5.8	CS	Not	U5 L6
L6 U7	382	174	16	572	0	382	56	0	75	24 x 1.00	15 x 1.00	63.0	54.0	395	192	- -	20.0	20.0	10.6	3.5	7.1	5.8	CS	FCM	L6 U7
U7 L8	-608	-206	-19	-833	0	-608	56	0	75	24 x 1.00	15 x 1.00	63.0	- -	395	192	93.7	12.3	20.0	-13.2	-3.5	-9.7	-5.8	CS	Not	U7 L8
L8 U9	845	243	22	1110	0	845	56	0	75	24 x 1.00	15 x 1.00	63.0	54.0	395	192	- -	20.0	20.0	20.6	3.5	15.6	5.8	CS	FCM	L8 U9
U9 L10	-1066	-274	-25	-1365	0	-1066	76	0	75	24 x 1.50	14 x 1.00	86.0	- -	537	288	89.4	15.3	27.0	-15.9	-3.2	-12.4	-4.8	LA	Not	U9 L10
L10 U11	1282	312	28	1622	0	1282	83	0	104	30 x 1.25	14.50 x 1.00	89.5	78.3	578	375	- -	27.0	27.0	20.7	2.7	16.4	4.8	LA	FCM	L10 U11
U11 L12	-1293	-304	-27	-1624	0	-1293	90	0	104	30 x 1.375	14.25 x 1.00	96.8	- -	622	412	80.3	16.9	27.0	-16.8	-2.6	-13.4	-4.6	LA	Not	U11 L12
L12 U13	1486	340	31	1857	0	1486	94	0	134	30 x 1.25	14.50 x 1.00	89.5	78.3	578	375	- -	27.0	27.0	23.7	3.0	19.0	5.8	LA	FCM	L12 U13
U13 L14	-1991	-436	-39	-2466	145	-1846	140	0	134	30 x 2.00	13 x 1.00	133.0	- -	820	600	82.0	16.7	27.0	-18.5	-2.8	-13.9	-4.8	LA	Not	U13 L14
							DL Mx																		
U1 L1	179	115	34	328	0	179	51	60	21	18 x 0.75	15.50 x 0.75	38.6	31.9	237	81	- -	20.0	20.0	10.3	0.9	5.6	6.7	CS	FCM	U1 L1
U3 L3	164	110	33	307	0	164	34	42	35	18 x 0.75	15.50 x 0.75	38.6	31.9	237	81	- -	20.0	20.0	9.6	0.9	5.1	5.6	CS	FCM	U3 L3
U5 L5	164	110	33	307	0	164	34	42	41	18 x 0.75	15.50 x 0.75	38.6	31.9	237	81	- -	20.0	20.0	9.6	0.9	5.1	5.9	CS	FCM	U5 L5
U7 L7	163	110	33	306	0	163	34	42	41	18 x 0.75	15.50 x 0.75	38.6	31.9	237	81	- -	20.0	20.0	9.6	0.9	5.1	5.9	CS	FCM	U7 L7
U9 L9	163	110	33	306	0	163	34	42	41	18 x 0.75	15.50 x 0.75	38.6	31.9	237	81	- -	20.0	20.0	9.6	0.8	5.1	5.9	CS	FCM	U9 L9
U11 L11	167	110	33	310	0	167	34	42	55	21 x 0.875	15.25 x 0.75	48.2	40.3	307	129	- -	20.0	20.0	7.7	-0.9	4.1	-5.1	CS	FCM	U11 L11
U13 L13	174	110	33	317	0	174	34	42	87	24 x 1.00	15.00 x 1.00	63.0	49.5	395	192	- -	20.0	20.0	5.9	-0.9	3.2	-5.0	CS	FCM	U13 L13
L2 U2	-22	0	0	-22	0	-22	67	81	27	18 x 0.75	15.50 x 0.75	38.6	- -	237	81	91.1	15.4	20.0	-0.6	-1.4	-0.6	-8.9	CS	Not	L2 U2
L4 U4	-25	0	0	-25	0	-25	67	81	38	18 x 0.75	15.50 x 0.75	38.6	- -	237	81	108.0	10.8	18.5	-0.6	-0.9	-0.6	-9.4	CS	Not	L4 U4
L6 U6	-25	0	0	-25	0	-25	67	81	41	18 x 0.75	15.50 x 0.75	38.6	- -	237	81	111.8	10.4	17.6	-0.6	-1.1	-0.6	-9.6	CS	Not	L6 U6
L8 U8	-19	0	0	-19	0	-19	67	81	41	18 x 0.75	15.50 x 0.75	38.6	- -	237	81	111.8	10.4	17.6	-0.5	-0.9	-0.5	-9.6	CS	Not	L8 U8
L10 U10	-22	0	0	-22	0	-22	67	81	44	18 x 0.75	15.50 x 0.75	38.6	- -	237	81	116.0	9.8	16.8	-0.6	-0.9	-0.6	-9.7	CS	Not	L10 U10
L12 U12	-28	0	0	-28	0	-28	67	81	74	21 x 0.875	15.25 x 0.75	48.2	- -	307	129	107.0	10.8	19.6	-0.6	0.9	-0.6	8.7	CS	Not	L12 U12
L14 U14	-41	0	0	-41	0	-41	67	81	87	21 x i	15 x 0.75	53.2	- -	341	147	113.9	10.1	17.8	-0.8	0.9	-0.8	9.2	CS	Not	L14 U14
Intermediate Floorbeam					-248	-248	1738	1931		20 x 1.50	72 x .50	96.0		2576	200		20.0	20.0			-2.6	17.1	CS	Not	
End Floorbeam @ L0							③ 4190	③ 1545		20 x 1.50	72 x .8125	118.5		2838	200		20.0	20.0				17.7	CS	Not	
Floorbeam @ L14							⑤ 15750 ④	③ 1931		24 x 2.50	70 x 2.25 & 70 x .625	277.5		4683	480		20.4	④ 40.5				40.4	LA	Not	

① in L1 L2
② @ L0
③ No x & y axis significance
④ Jacking Load

Compression Stresses are designated by (-) signs.

LA = AASHTO M223 (ASTM A709 Grade 50 or 50W)
CS = AASHTO M183 (ASTM A709 Grade 36)
Note: Only ASTM A709 Gr. 50 shall be used for Low Alloy Fracture Critical Members.

FCM = Fracture Critical Member
Not = Not a Fracture Critical Member

XX = Axis in plane of truss (for truss members)
YY = Axis perpendicular to plane of truss (for truss members)

Fa = Axial Unit Stress
Fb = Bending Unit Stress

FINAL PLANS
I CERTIFY THAT THIS DRAWING ACCURATELY REFLECTS THE CONFIGURATION AND LOCATION OF THE ROADWAY AND APPURTENANCES AS CONSTRUCTED ON THIS PROJECT.

8-7-98
DATE

REGISTERED PROFESSIONAL ENGINEER
NUMBER E-27899

TRUSS STRESS SHEET

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

STRESS

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.L.K. 08/93
CHECKED: H.G.J. 09/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 14 OF 33

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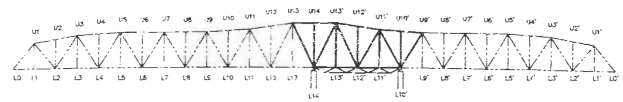
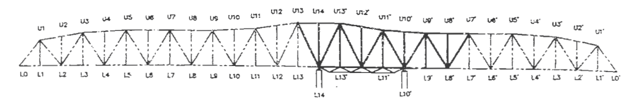
STATE	PROJ. NO.	SHEET NO.
MO.	BRNH-291-1(46)	18

TABULATED ERECTION STRESSES ARE FOR TOTAL STEEL DEAD LOAD WITH 20 TON LOADS AT L2 AND L2'			
MEMBER	ERECTION STRESS (KIPS)	MEMBER	ERECTION STRESS (KIPS)
L0 L2	-25	U13'L14	-1091
L2 L4	-192	L12'U13'	535
L4 L6	-509	U11'L12'	-467
L6 L8	-1009	L10'U11'	674
L8 L10	-1669	U9' L10'	-612
L10 L12	-2321	L8' U9'	669
L12 L14	-2786	U7' L8'	-599
L12' L14	-2779	L6' U7'	519
L10' L12'	-2316	U5' L6'	-441
L8' L10'	-1665	L4' U5'	335
L6' L8'	-1006	U3' L4'	-262
L4' L6'	-507	L2' U3'	191
L2' L4'	-191	U1' L2'	-99
L0' L2'	-25		
		U1 L1	31
L0 U1	41	U3 L3	31
U1 U3	92	U5 L5	31
U3 U5	340	U7 L7	30
U5 U7	743	U9 L9	29
U7 U9	1324	U11 L11	34
U9 U11	1994	U13 L13	41
U11 U13	2581	U13'L13'	42
U13 U13'	3259	U11'L11'	34
U13'U11'	2582	U9' L9'	29
U11' U9'	1995	U7' L7'	30
U9' U7'	1325	U5' L5'	31
U7' U5'	744	U3' L3'	30
U5' U3'	341	U1' L1'	31
U3' U1'	92		
U1' L0'	41	L2 U2	-22
		L4 U4	-25
U1 L2	-99	L6 U6	-25
L2 U3	191	L8 U8	-19
U3 L4	-262	L10 U10	-22
L4 U5	335	L12 U12	-28
U5 L6	-441	L14 U14	-41
L6 U7	519	L12'U12'	-28
U7 L8	-599	L10'U10'	-22
L8 U9	669	L8' U8'	-19
U9 L10	-612	L6' U6'	-25
L10 U11	675	L4' U4'	-25
U11 L12	-468	L2' U2'	-22
L12 U13	536		
U13 L14	-1092		

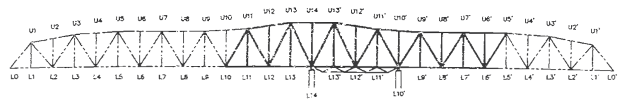
Erection Stresses are for Stage 5 including Dead Load of Steel (Stringers included) and a 40^{K} Concentrated Load at L2 and L2'.



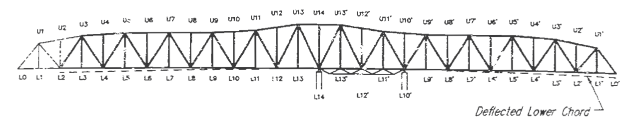
ERECTION STAGE 1
Supported @ L14 & L10'



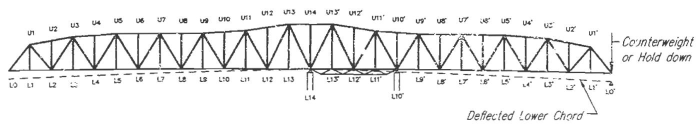
ERECTION STAGE 2
Supported @ L14 & L10'



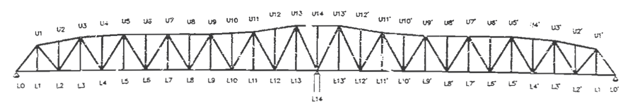
ERECTION STAGE 3
Supported @ L14 & L10'



ERECTION STAGE 4
Supported @ L14 & L10'



ERECTION STAGE 5
Supported @ L14 & L10'



ERECTION STAGE 6
Supported @ L0, L14 & L0'

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FINAL PLANS
I CERTIFY THAT THIS DRAWING ACCURATELY REFLECTS THE CONFIGURATION AND LOCATION OF THE BRIDGE AND ALL APPURTENANCES AS CONSTRUCTED ON THIS PROJECT.
E-27899
REGISTERED PROFESSIONAL ENGINEER
8-7-98
DATE

TRUSS STRESS SHEET – ERECTION CONDITION

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

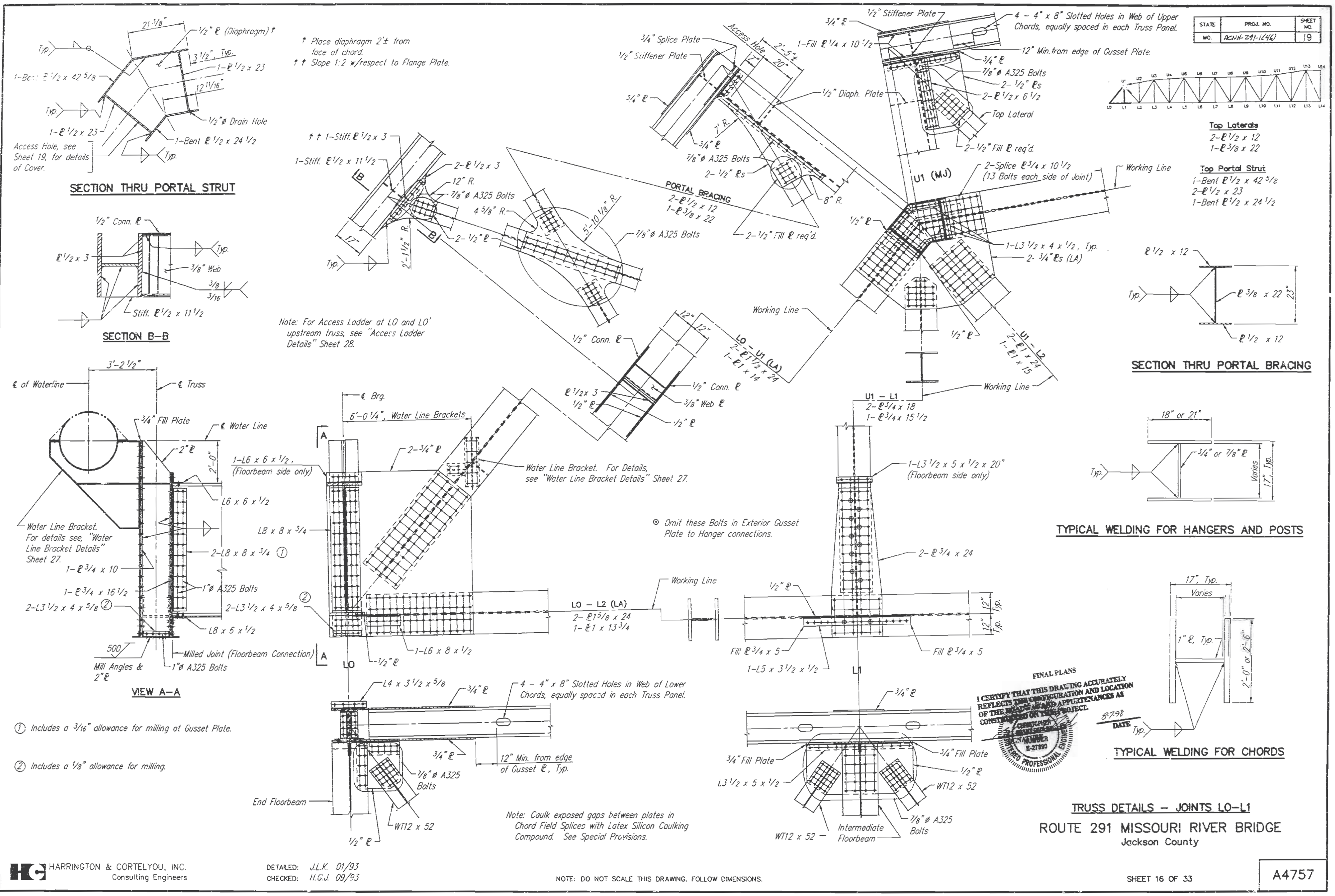
ERECTION

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.L.K. 08/93
CHECKED: H.G.J. 09/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

A4757



STATE MO. PROJ. NO. ACNH-291-1(46) SHEET NO. 19
SECTION THRU PORTAL STRUT
† Place diaphragm 2'± from face of chord.
†† Slope 1:2 w/respect to Flange Plate.
Access Hole, see Sheet 19, for details of Cover.
1/2" Ø Drain Hole
1-Bent ℙ 1/2 x 24 1/2
1-ℙ 1/2 x 23
SECTION B-B
Stiff. ℙ 1/2 x 11 1/2
Note: For Access Ladder at L0 and L0' upstream truss, see "Access Ladder Details" Sheet 28.
PORTAL BRACING
2-ℙ 1/2 x 12
1-ℙ 3/8 x 22
Working Line
U1 (MJ)
2-Splice ℙ 3/4 x 10 1/2 (13 Bolts each side of Joint)
4 - 4" x 8" Slotted Holes in Web of Upper Chords, equally spaced in each Truss Panel.
12" Min. from edge of Gusset Plate.
7/8" Ø A325 Bolts
Top Lateral
Top Laterals
2-ℙ 1/2 x 12
1-ℙ 3/8 x 22
Top Portal Strut
1-Bent ℙ 1/2 x 42 5/8
2-ℙ 1/2 x 23
1-Bent ℙ 1/2 x 24 1/2
L0 - U1 (LA)
2-ℙ 1 1/2 x 24
1-ℙ 1 x 14
U1 - L2
2-ℙ 1 x 24
1-ℙ 1 x 15
SECTION THRU PORTAL BRACING
VIEW A-A
Water Line Bracket. For details see, "Water Line Bracket Details" Sheet 27.
6'-0 1/4", Water Line Brackets
L0 - L2 (LA)
2- ℙ 1 5/8 x 24
1- ℙ 1 x 13 3/4
U1 - L1
2- ℙ 3/4 x 18
1- ℙ 3/4 x 15 1/2
⊙ Omit these Bolts in Exterior Gusset Plate to Hanger connections.
TYPICAL WELDING FOR HANGERS AND POSTS
TYPICAL WELDING FOR CHORDS
L0
L1
End Floorbeam
Intermediate Floorbeam
WT12 x 52
4 - 4" x 8" Slotted Holes in Web of Lower Chords, equally spaced in each Truss Panel.
Note: Caulk exposed gaps between plates in Chord Field Splices with Latex Silicon Caulking Compound. See Special Provisions.
① Includes a 3/16" allowance for milling at Gusset Plate.
② Includes a 1/8" allowance for milling.
FINAL PLANS
I CERTIFY THAT THIS DRAWING ACCURATELY REFLECTS THE CONFIGURATION AND LOCATION OF THE BRIDGE AND APPURTENANCES AS CONSTRUCTED ON THIS PROJECT.
8-7-98
DATE
TRUSS DETAILS – JOINTS L0–L1
ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County
HARRINGTON & CORTELYOU, INC.
Consulting Engineers
DETAILED: J.L.K. 01/93
CHECKED: H.G.J. 09/93
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.
SHEET 16 OF 33
A4757

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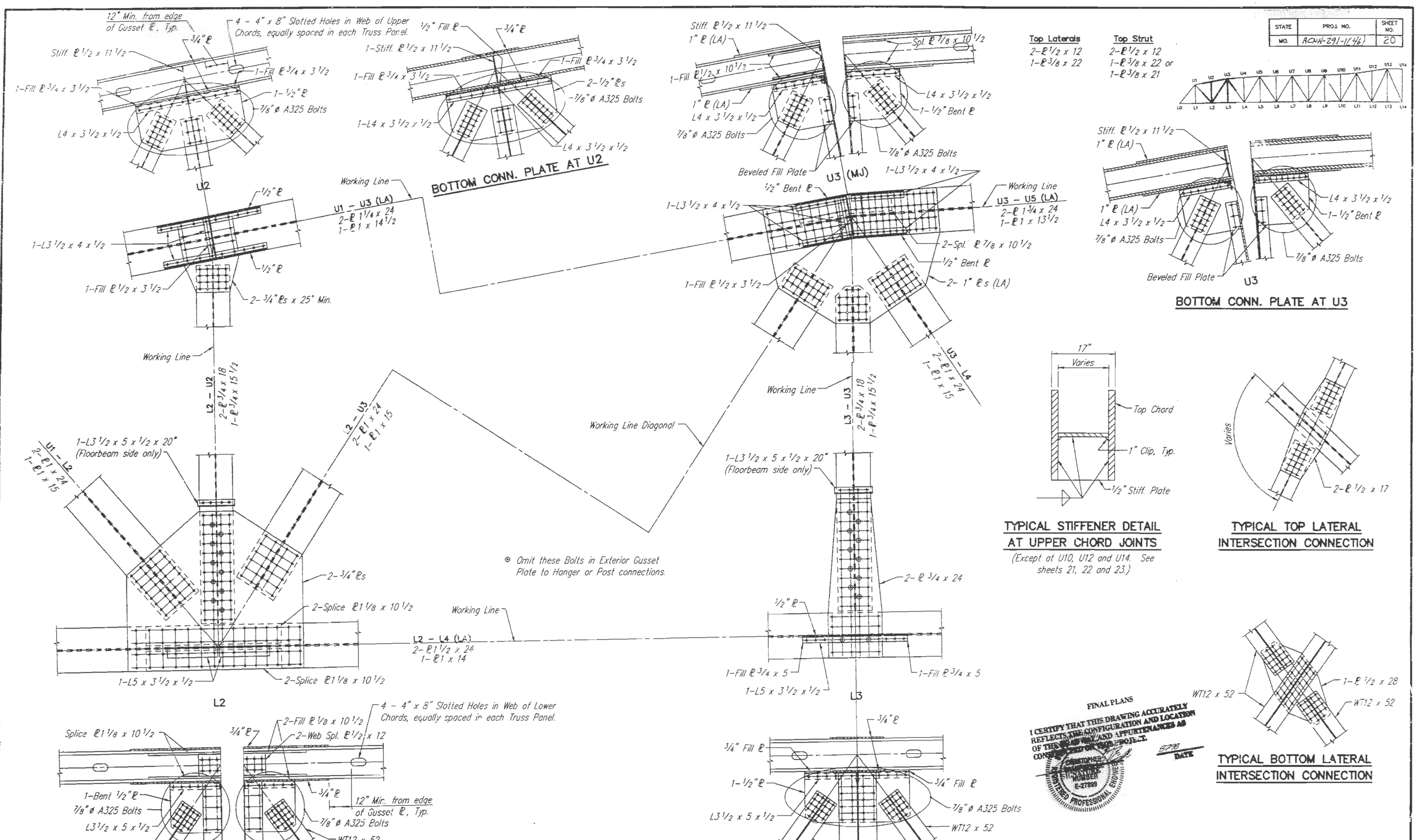

TRUSS DETAILS – JOINTS L2–L3

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.L.K. 02/93
CHECKED: H.G.J. 09/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 17 OF 33

A4757

L2-L3-U3

318

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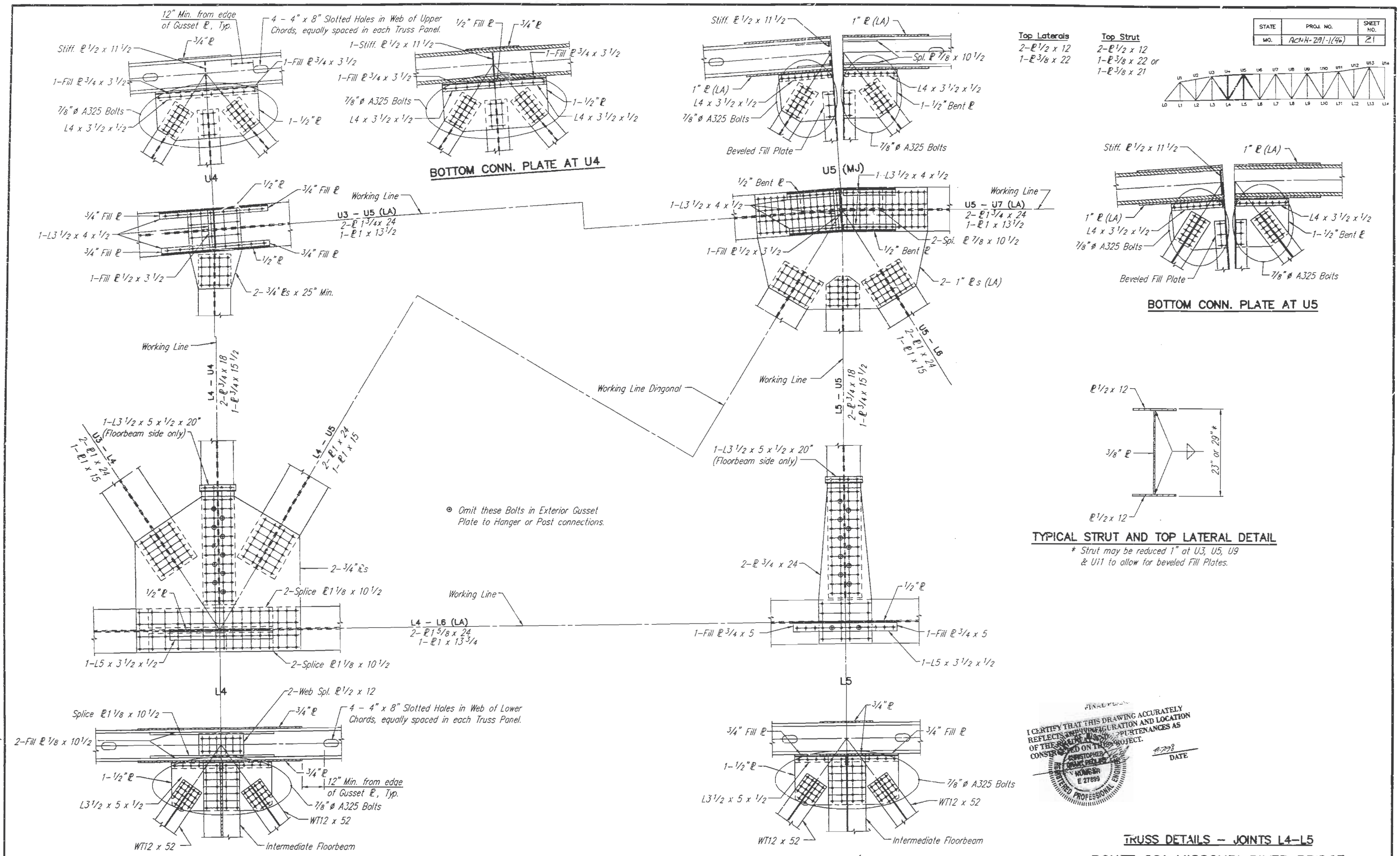


TRUSS DETAILS – JOINTS L4–L5

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

STATE	PROJ. NO.	SHEET NO.
MO.	ACNH-291-1(46)	21

I CERTIFY THAT THIS DRAWING ACCURATELY REFLECTS THE CONFIGURATION AND LOCATION OF THE ... APPURTENANCES AS CONSTRUCTED ON THIS PROJECT.

DATE

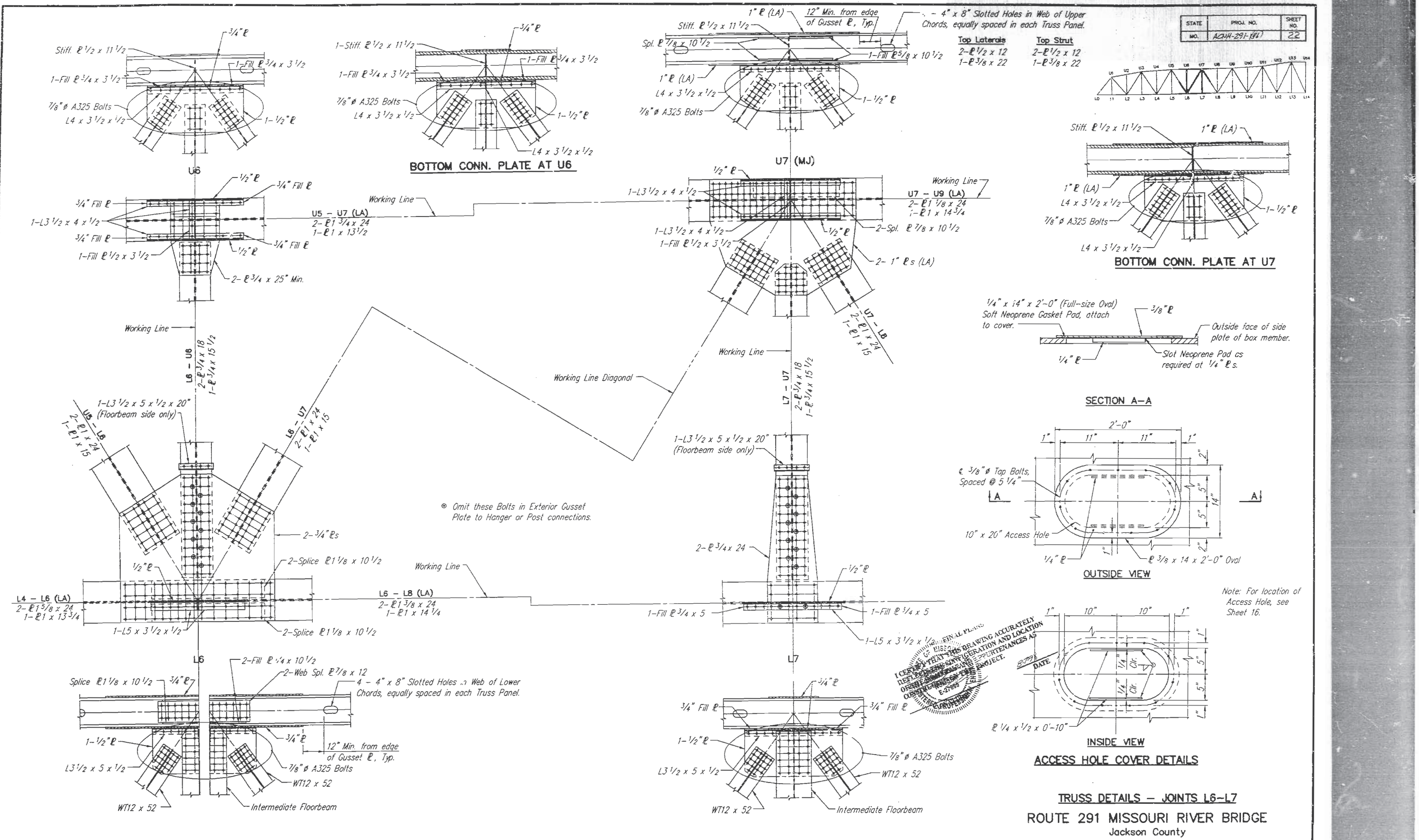
HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.L.K. 03/93
CHECKED: H.G.J. 09/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

A4757

L4-L5-U5



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TRUSS DETAILS – JOINTS L6–L7

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

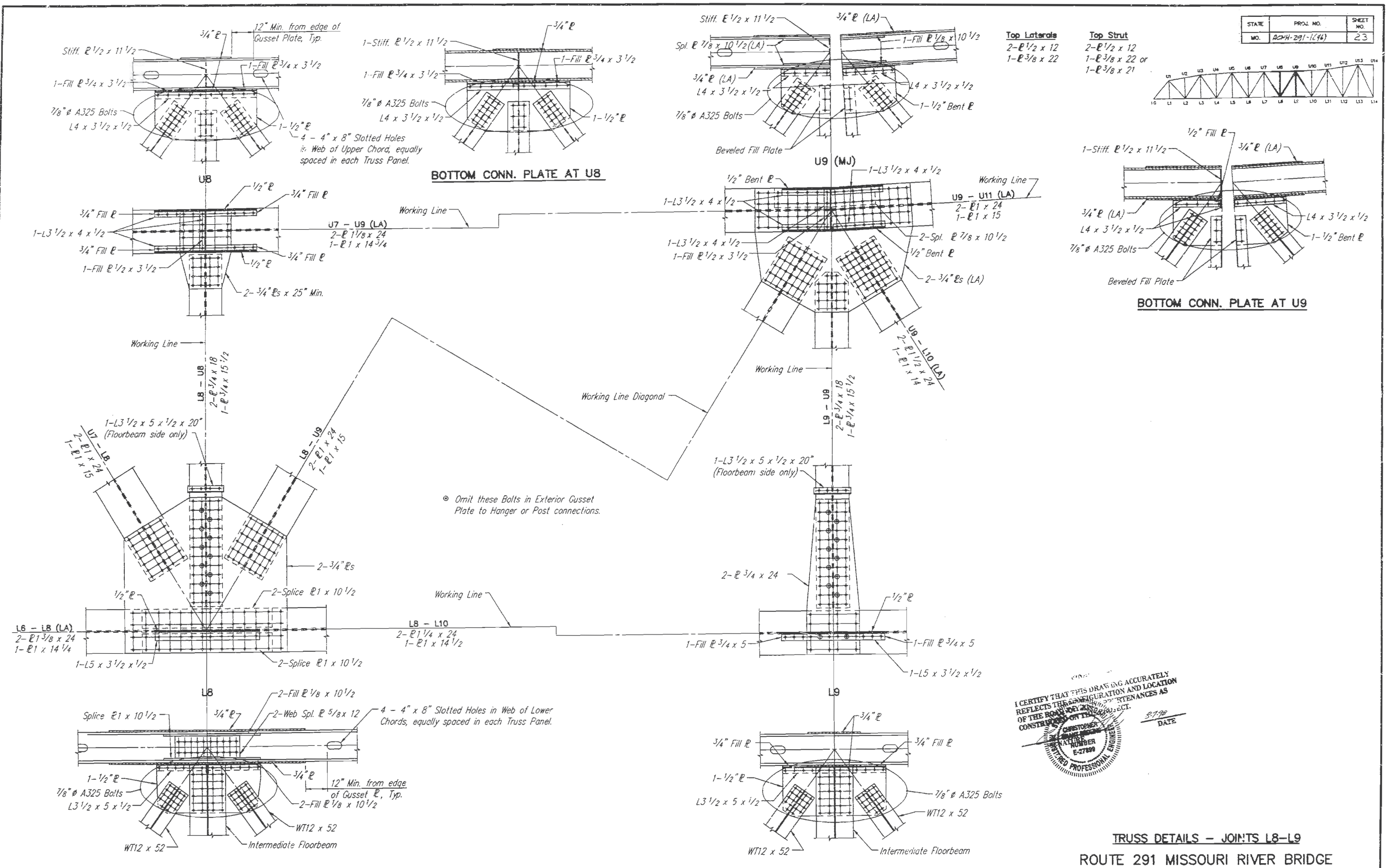
DETAILED: J.L.K. 03/93
CHECKED: H.G.J. 09/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 19 OF 33

A4757

L6-L7-U7



TRUSS DETAILS – JOINTS L8–L9

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.L.K. 03/93
CHECKED: H.G.J. 09/93

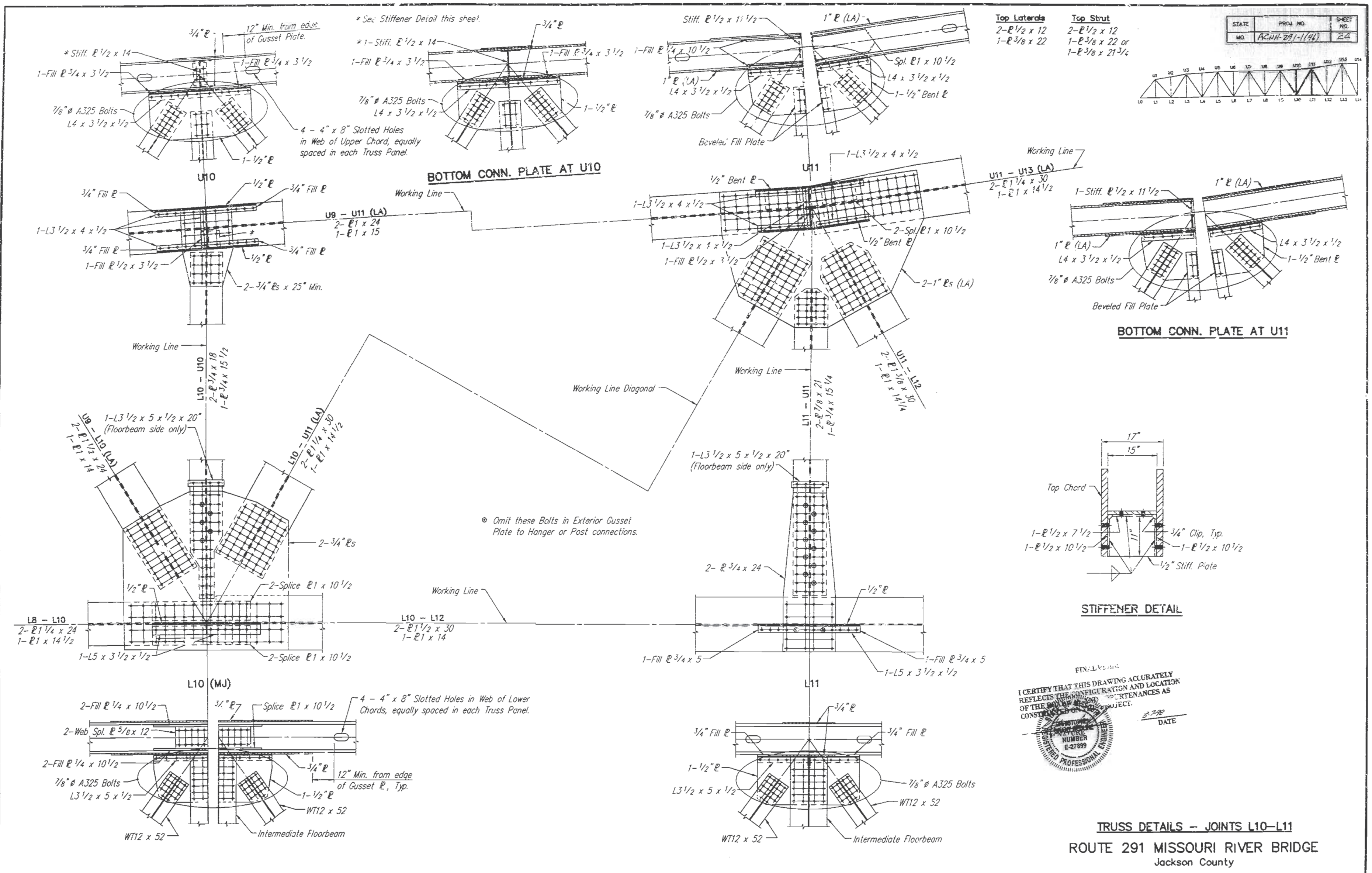
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 20 OF 33

A4757

L8-L9-U9

321



TRUSS DETAILS – JOINTS L10–L11

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

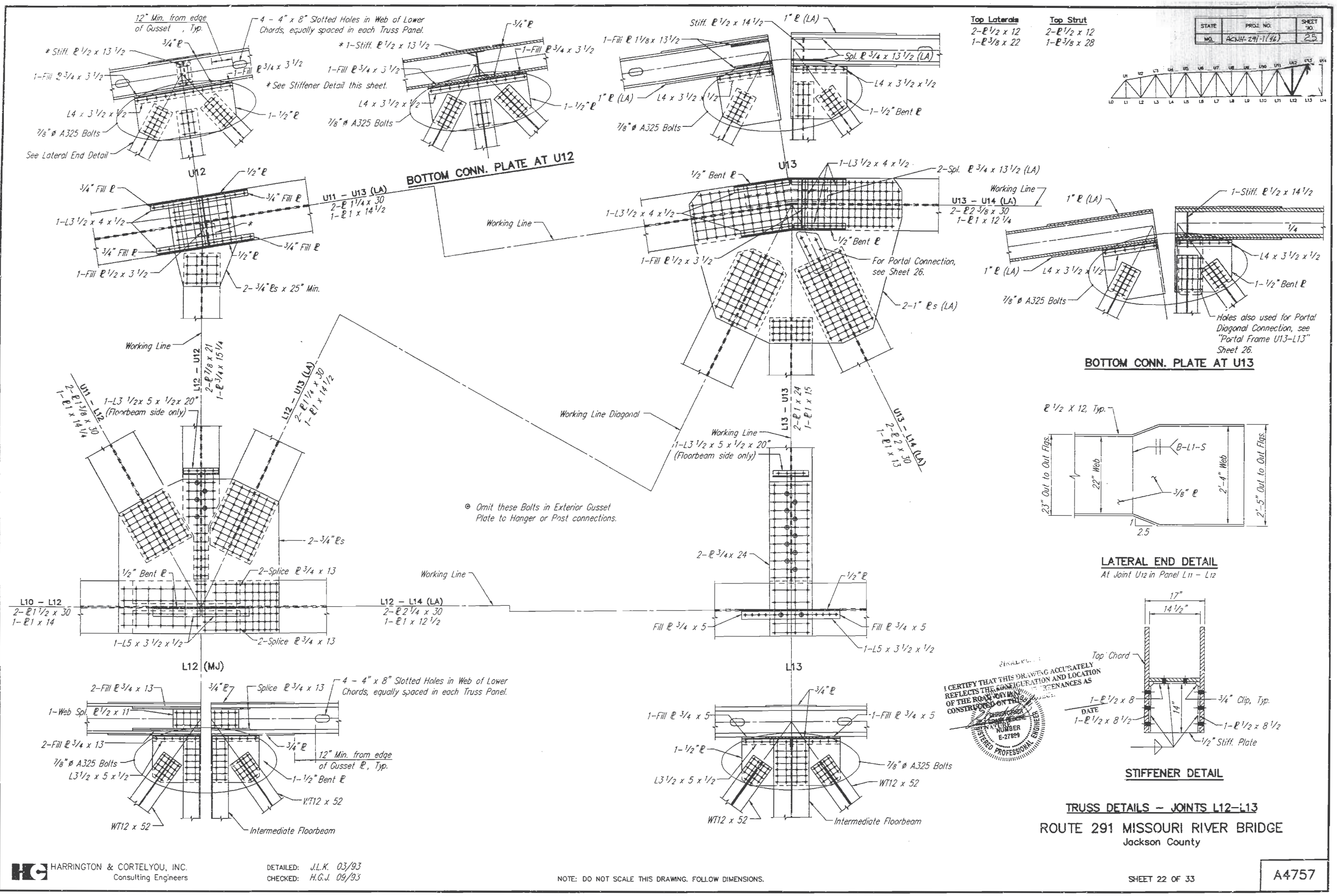
HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.L.K. 03/93
CHECKED: H.G.J. 09/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

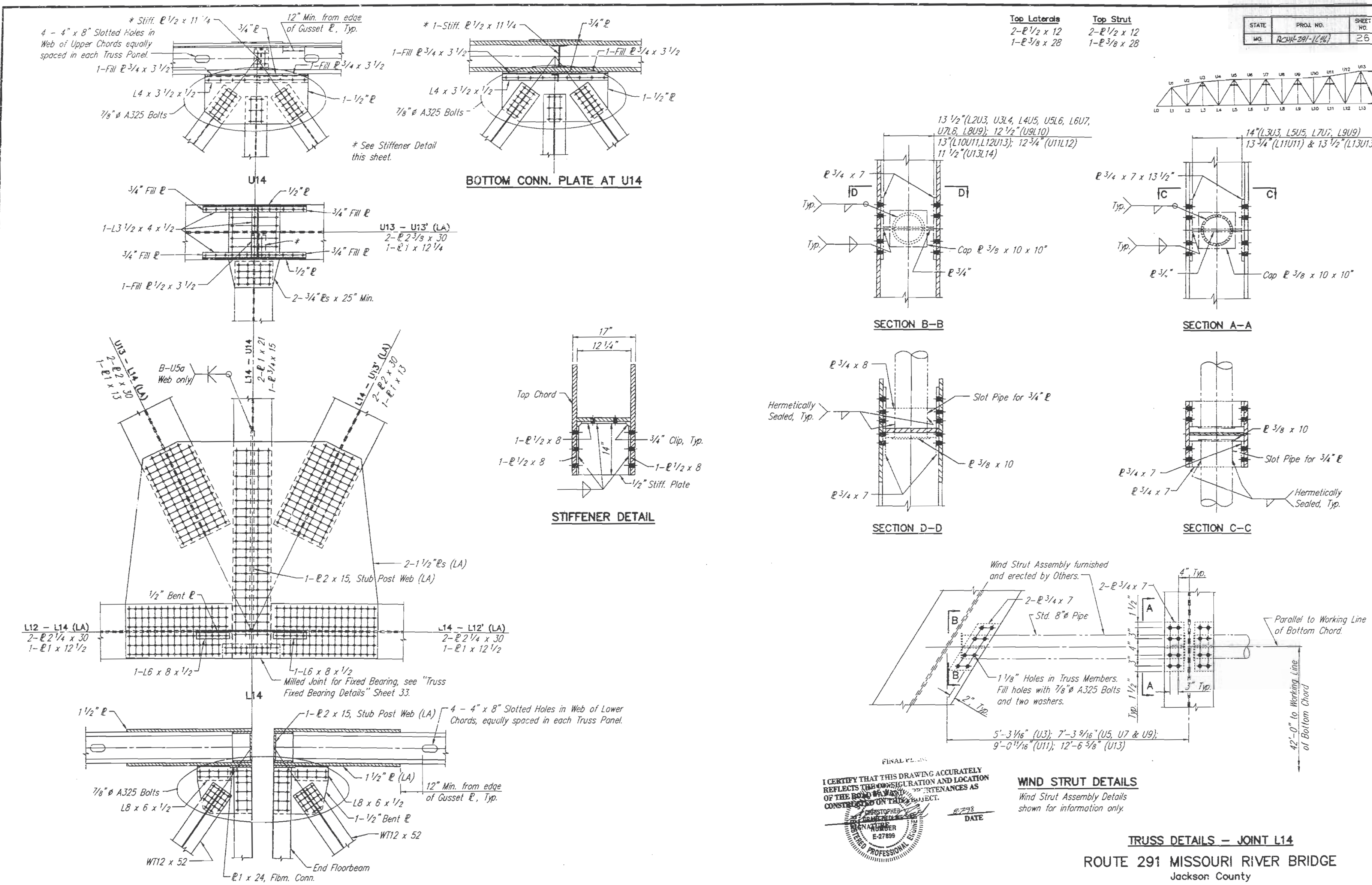
A4757

322



BOTTOM CONN. PLATE AT U12
BOTTOM CONN. PLATE AT U13
LATERAL END DETAIL
At Joint U12 in Panel L11 – L12
STIFFENER DETAIL
Top Laterals
2-℞1/2 x 12
1-℞3/8 x 22
Top Strut
2-℞1/2 x 12
1-℞3/8 x 28
U11 – U13 (LA)
U13 – U14 (LA)
L10 – L12
L12 – L14 (LA)
L12 (MJ)
L13
U12
U13
Working Line
Working Line Diagonal
7/8" ø A325 Bolts
See Lateral End Detail
* See Stiffener Detail this sheet.
4 – 4" x 8" Slotted Holes in Web of Lower Chords, equally spaced in each Truss Panel.
12" Min. from edge of Gusset ℞, Typ.
⊕ Omit these Bolts in Exterior Gusset Plate to Hanger or Post connections.
For Portal Connection, see Sheet 26.
Holes also used for Portal Diagonal Connection, see "Portal Frame U13-L13" Sheet 26.
Intermediate Floorbeam
WT12 x 52
(Floorbeam side only)
I CERTIFY THAT THIS DRAWING ACCURATELY REFLECTS THE CONFIGURATION AND LOCATION OF THE ROADWAY AND APPURTENANCES AS CONSTRUCTED
E-27899
PROFESSIONAL ENGINEER
STATE
PROJ. NO.
SHEET NO.
25
TRUSS DETAILS – JOINTS L12–L13
ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County
HARRINGTON & CORTELYOU, INC.
Consulting Engineers
DETAILED: J.L.K. 03/93
CHECKED: H.G.J. 09/93
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.
SHEET 22 OF 33
A4757
L12-L13

323



STATE	PROJ. NO.	SHEET NO.
MO.	ACMM-291-(24)	26

FINAL PLANS

I CERTIFY THAT THIS DRAWING ACCURATELY REFLECTS THE CONFIGURATION AND LOCATION OF THE ROAD OR APPURTENANCES AS CONSTRUCTED ON THIS PROJECT.

DATE

WIND STRUT DETAILS

Wind Strut Assembly Details shown for information only.

TRUSS DETAILS – JOINT L14

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.L.K. 05/93
CHECKED: H.G.J. 09/93

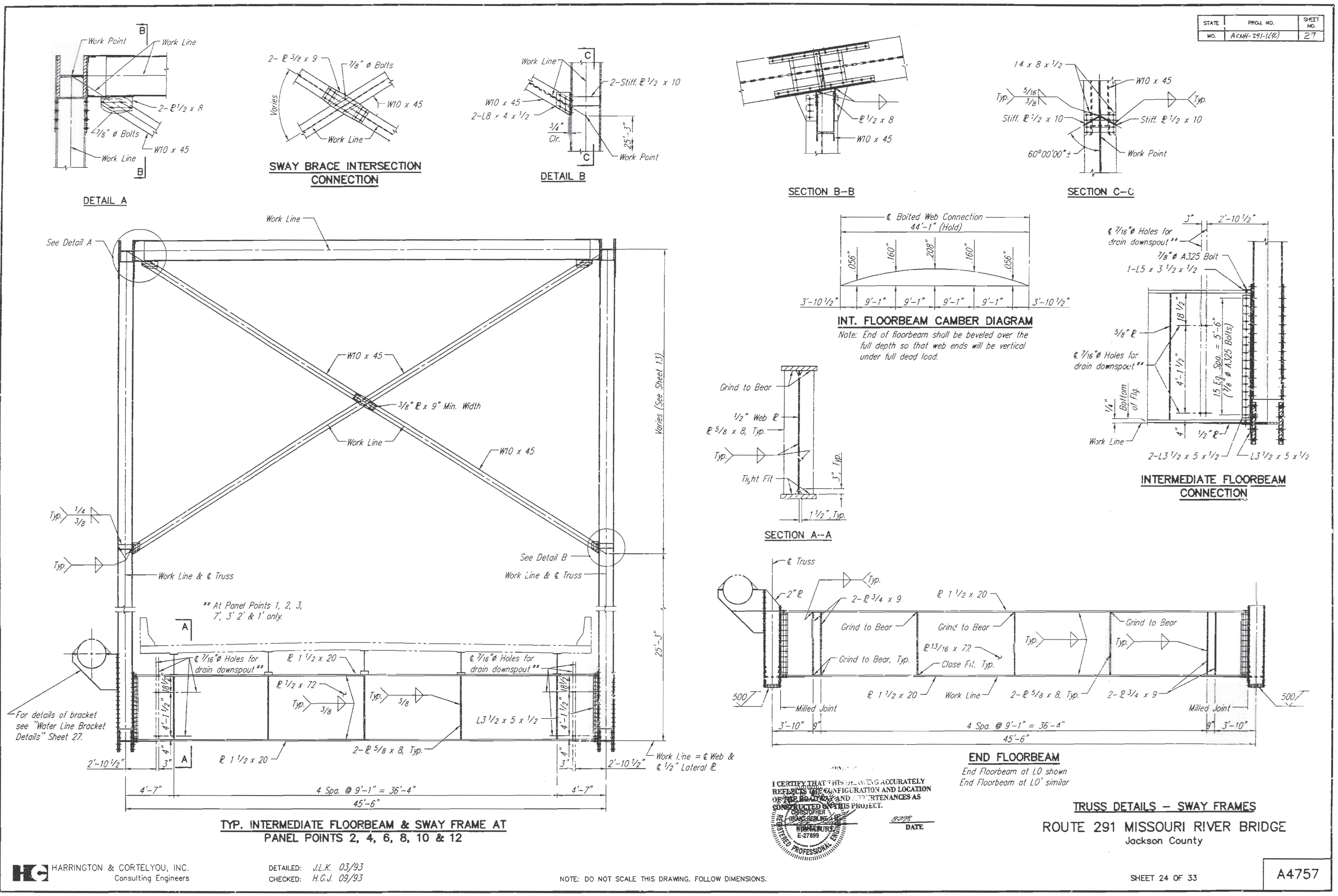
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

A4757

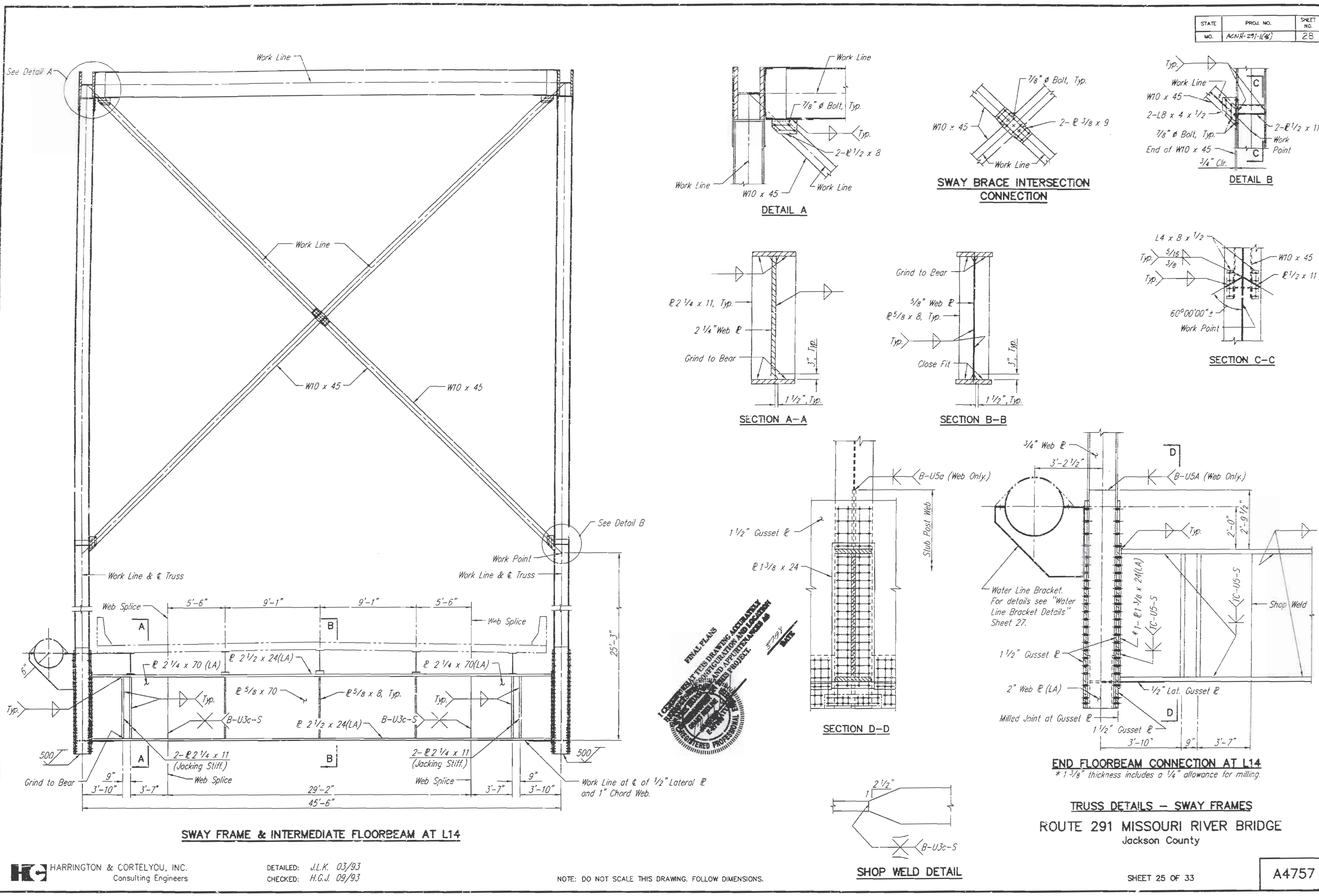
L14-U14

308

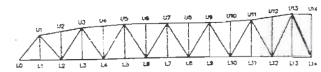
325

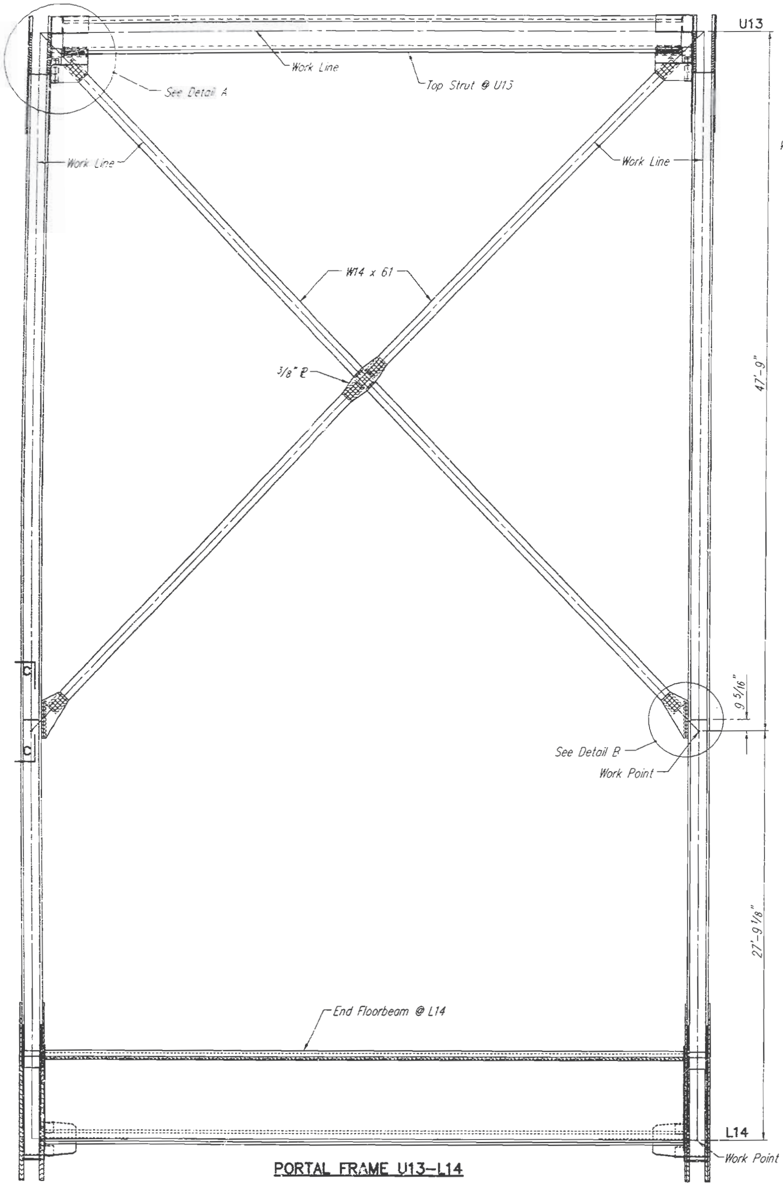

STATE
PROJ. NO.
SHEET NO.
MO.
ACNH-291-1(8)
27
DETAIL A
Work Point
Work Line
2-℞ 1/2 x 8
7/8" ø Bolts
W10 x 45
SWAY BRACE INTERSECTION CONNECTION
2-℞ 3/8 x 9
7/8" ø Bolts
W10 x 45
Varies
Work Line
DETAIL B
2-Stiff. ℞ 1/2 x 10
W10 x 45
2-L8 x 4 x 1/2
3/4" Clr.
25'-3"
Work Point
SECTION B–B
℞ 1/2 x 8
W10 x 45
SECTION C–C
14 x 8 x 1/2
W10 x 45
Typ.
5/16
3/8
Stiff. ℞ 1/2 x 10
60°00'00" ±
Work Point
℄ Bolted Web Connection
44'-1" (Hold)
.056"
.160"
.208"
.160"
.056"
3'-10 1/2"
9'-1"
9'-1"
9'-1"
9'-1"
3'-10 1/2"
INT. FLOORBEAM CAMBER DIAGRAM
Note: End of floorbeam shall be beveled over the full depth so that web ends will be vertical under full dead load.
3"
2'-10 1/2"
℄ 7/16"ø Holes for drain downspout **
7/8"ø A325 Bolt
1-L5 x 3 1/2 x 1/2
5/8" ℞
18 1/2"
4'-1 1/2"
15 Eq. Spa. = 5'-6" (7/8"ø A325 Bolts)
Bottom of Flg.
Work Line
1/2" ℞
2-L3 1/2 x 5 x 1/2
L3 1/2 x 5 x 1/2
INTERMEDIATE FLOORBEAM CONNECTION
Grind to Bear
1/2" Web ℞
℞ 5/8 x 8, Typ.
Tight Fit
3" Typ.
1 1/2", Typ.
SECTION A–A
See Detail A
Work Line
W10 x 45
3/8" ℞ x 9" Min. Width
Work Line
W10 x 45
Varies (See Sheet 13)
See Detail B
Work Line & ℄ Truss
** At Panel Points 1, 2, 3, 7', 3' 2' & 1' only.
℄ 7/16"ø Holes for drain downspout **
℞ 1 1/2 x 20
℞ 1/2 x 72
L3 1/2 x 5 x 1/2
2-℞ 5/8 x 8, Typ.
25'-3"
For details of bracket see "Water Line Bracket Details" Sheet 27.
Work Line = ℄ Web & ℄ 1/2" Lateral ℞
2'-10 1/2"
4'-7"
4 Spa. @ 9'-1" = 36'-4"
45'-6"
TYP. INTERMEDIATE FLOORBEAM & SWAY FRAME AT PANEL POINTS 2, 4, 6, 8, 10 & 12
℄ Truss
2" ℞
2-℞ 3/4 x 9
℞ 1 1/2 x 20
Grind to Bear
Grind to Bear, Typ.
℞ 13/16 x 72
Close Fit, Typ.
Work Line
2-℞ 5/8 x 8, Typ.
2-℞ 3/4 x 9
Milled Joint
500
3'-10"
9"
4 Spa. @ 9'-1" = 36'-4"
45'-6"
END FLOORBEAM
End Floorbeam at L0 shown
End Floorbeam at L0' similar
I CERTIFY THAT THIS DRAWING ACCURATELY REFLECTS THE CONFIGURATION AND LOCATION OF THE ROADWAY AND APPURTENANCES AS CONSTRUCTED ON THIS PROJECT.
DATE
TRUSS DETAILS – SWAY FRAMES
ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County
HARRINGTON & CORTELYOU, INC.
Consulting Engineers
DETAILED: J.L.K. 03/93
CHECKED: H.C.J. 09/93
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.
SHEET 24 OF 33
A4757
SWAY-FRA

326

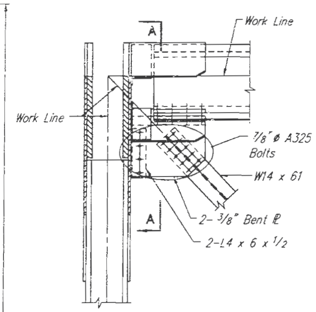

STATE MO. PROJ. NO. ACNH-291-1(8) SHEET NO. 28
SWAY FRAME & INTERMEDIATE FLOORBEAM AT L14
See Detail A
Work Line
W10 x 45
See Detail B
Work Point
Work Line & ℄ Truss
Web Splice
5'-6"
9'-1"
9'-1"
5'-6"
25'-3"
℘ 2 1/4 x 70 (LA)
℘ 2 1/2 x 24(LA)
℘ 5/8 x 70
℘ 5/8 x 8, Typ.
℘ 2 1/2 x 24(LA)
B-U3c-S
Typ.
2-℘ 2 1/4 x 11 (Jacking Stiff.)
Grind to Bear
500
9"
3'-10"
3'-7"
29'-2"
45'-6"
Work Line at ℄ of 1/2" Lateral ℘ and 1" Chord Web.
DETAIL A
7/8" ø Bolt, Typ.
2-℘ 1/2 x 8
SWAY BRACE INTERSECTION CONNECTION
2-℘ 3/8 x 9
DETAIL B
2-L8 x 4 x 1/2
2-℘ 1/2 x 11
End of W10 x 45
3/4" Clr.
SECTION A-A
℘ 2 1/4 x 11, Typ.
2 1/4" Web ℘
1 1/2", Typ.
3", Typ.
SECTION B-B
5/8" Web ℘
℘ 5/8 x 8, Typ.
Close Fit
SECTION C-C
L4 x 8 x 1/2
5/16
3/8
℘ 1/2 x 11
60°00'00" ±
SECTION D-D
B-U5a (Web Only.)
1 1/2" Gusset ℘
℘ 1 3/8 x 24
Stub Post Web
END FLOORBEAM CONNECTION AT L14
3/4" Web ℘
3'-2 1/2"
B-U5A (Web Only.)
2'-0"
2'-9 1/2"
Water Line Bracket. For details see "Water Line Bracket Details" Sheet 27.
*1-℘ 1 3/8 x 24(LA)
TC-U5-S
Shop Weld
2" Web ℘ (LA)
1/2" Lat. Gusset ℘
Milled Joint at Gusset ℘
3'-10"
9"
3'-7"
* 1 3/8" thickness includes a 1/4" allowance for milling.
SHOP WELD DETAIL
2 1/2"
B-U3c-S
FINAL PLANS
TRUSS DETAILS – SWAY FRAMES
ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County
HARRINGTON & CORTELYOU, INC.
Consulting Engineers
DETAILED: J.L.K. 03/93
CHECKED: H.G.J. 09/93
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.
SHEET 25 OF 33
A4757
SWAY-L14

STATE	PROJ. NO.	SHEET NO.
MO.	ACNH-291-1(46)	23

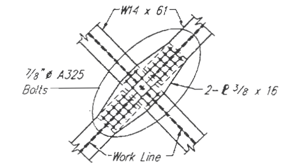




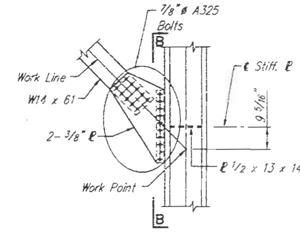
PORTAL FRAME U13–L14



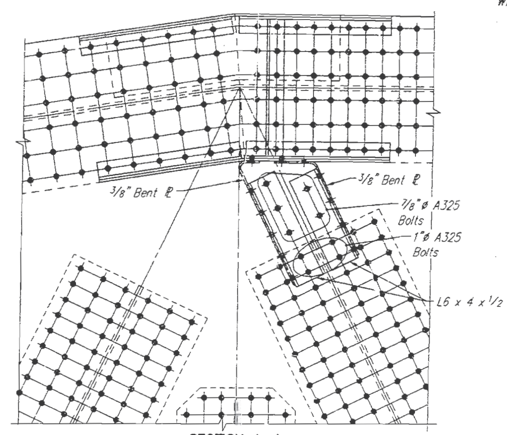
DETAIL A



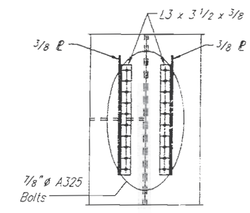
SWAY BRACE INTERSECTION CONNECTION



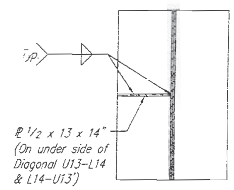
DETAIL B



SECTION A–A



SECTION B–B



SECTION C–C

327

TRUSS DETAILS – PORTAL FRAME U13–L14

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

U13-PORT

HC HARRINGTON & CORTELYOU, INC.
Consulting Engineers

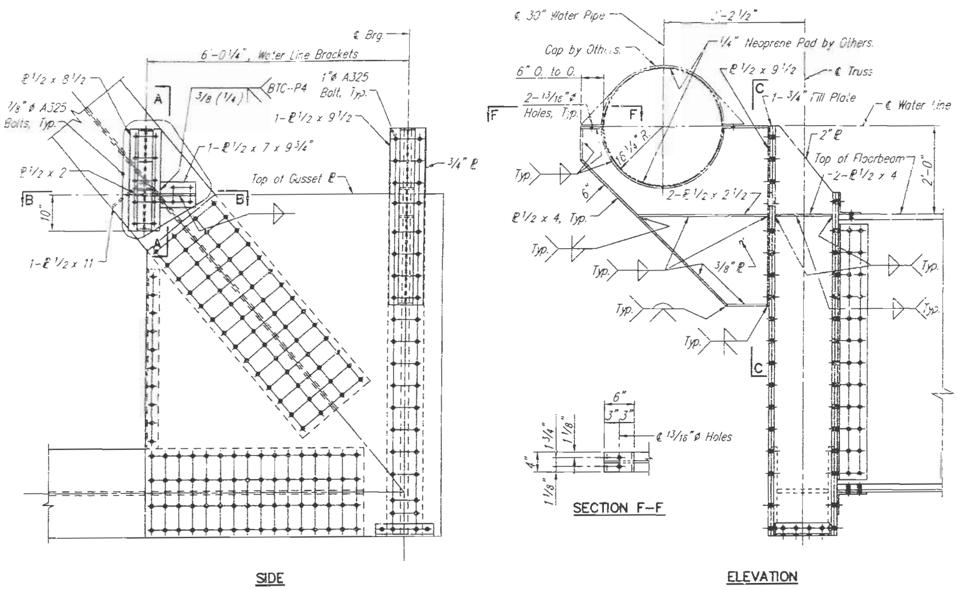
DETAILED: J.L.K. 03/93
CHECKED: H.G.J. 09/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 26 OF 33

A4757

STATE	PROJ. NO.	SHEET NO.
MO.	BRO-H-291-1(46)	30

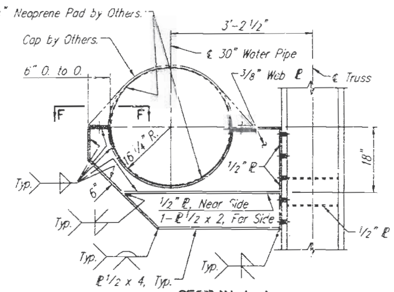


SIDE

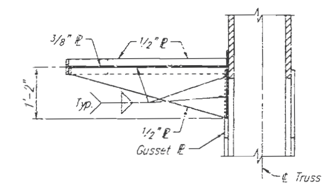
ELEVATION

SECTION F-F

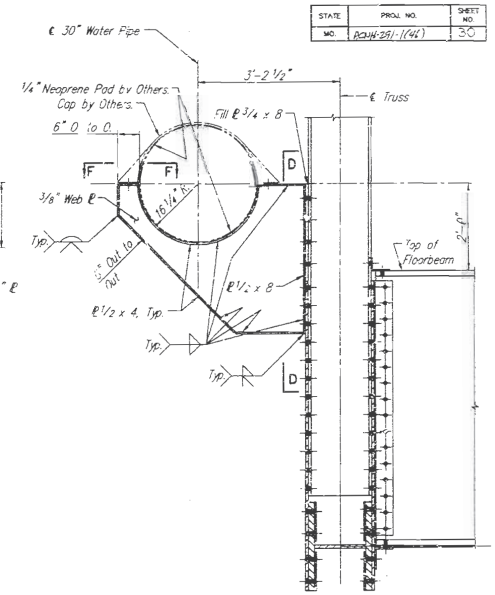
BRACKET DETAILS – END FLOORBEAMS LO & LO'



SECTION A-A

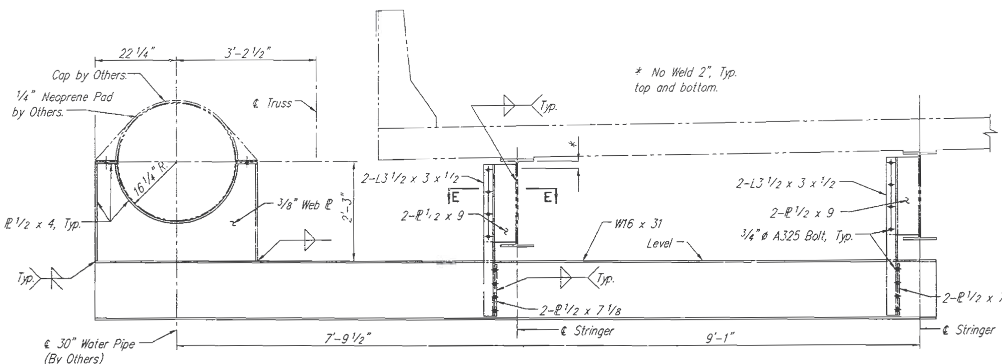


SECTION B-B



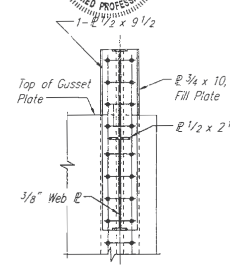
BRACKET DETAILS – INTERMEDIATE FLOORBEAMS

Note: Modify bracket as required to fit bolt pattern at L14.

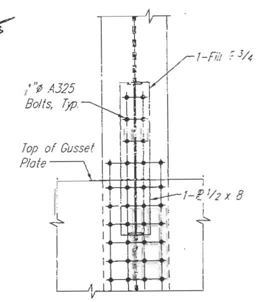


BRACKET DETAILS – MIDWAY BETWEEN FLOORBEAMS

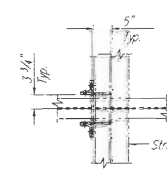
FINAL PLANS
I CERTIFY THAT THIS DRAWING ACCURATELY REFLECTS THE CONFIGURATION AND LOCATION OF THE ... AND APPURTENANCES AS CONSTRUCTED ON THIS PROJECT.
NUMBER E-27899
REGISTERED PROFESSIONAL ENGINEER
DATE



SECTION C-C



SECTION D-D



SECTION E-E

WATER LINE BRACKET DETAILS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

PIPEBKET

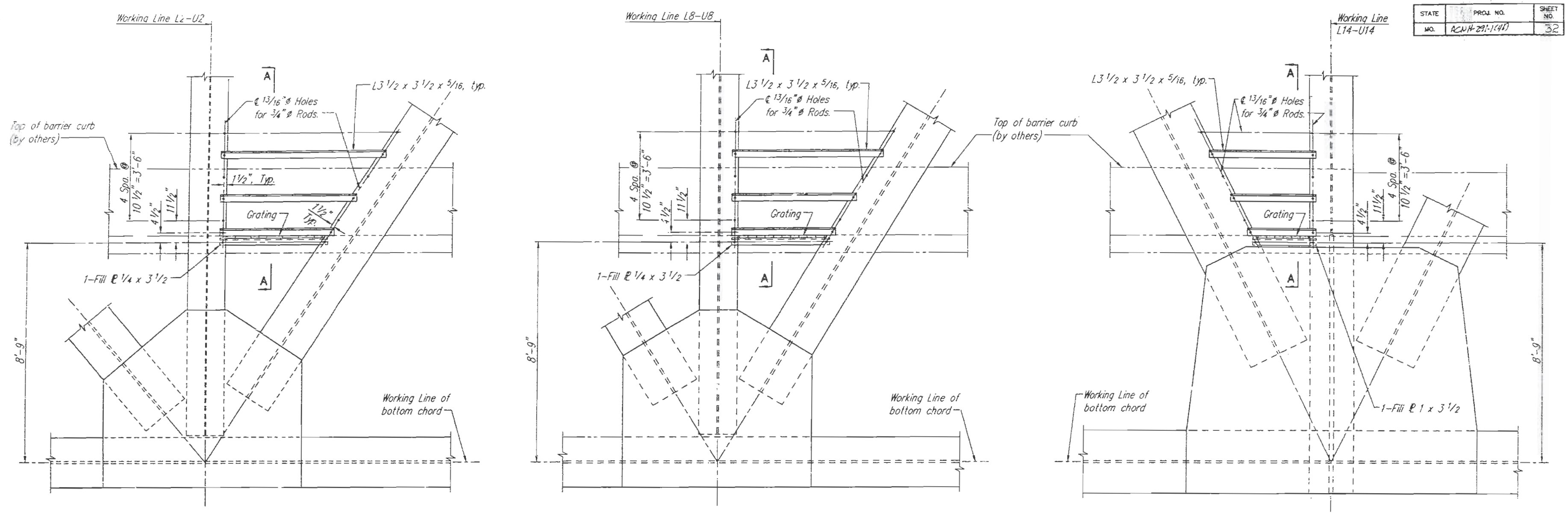
HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.L.K. 03/93
CHECKED: H.G.J. 09/93

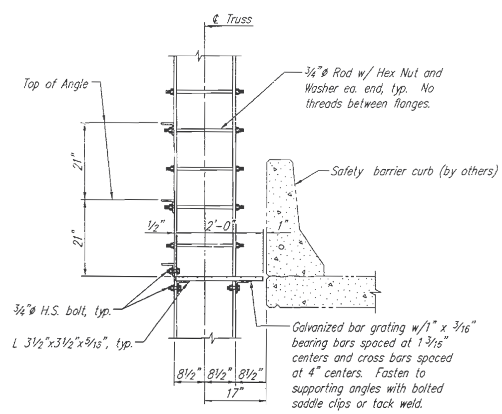
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

A4757

STATE	PROJ. NO.	SHEET NO.
MO.	ACNH-291-1(46)	32



PLATFORM DETAILS



SECTION A-A

FINAL PLANS
I CERTIFY THAT THIS DRAWING ACCURATELY REFLECTS THE CONFIGURATION AND LOCATION OF THE ... APPURTENANCES AS CONSTRUCTED ON THE PROJECT.
CHRISTOPHER ... NUMBER E-27899 ... PROFESSIONAL ENGINEER
DATE

Notes:
Material for access platforms shall be galvanized or painted A709 Grade A36 steel, fabricated and installed in accordance with Section 712 of the Standard Specifications.
The weight of all material for the access platforms (3 total) has been included in the quantity listed for "Fabricated Structural Carbon Steel (Truss)" per Lbs.

ACCESS PLATFORM DETAILS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

PLATFORM

HC HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: JKG/JLK 10/94
CHECKED: E.W.N. 7/95

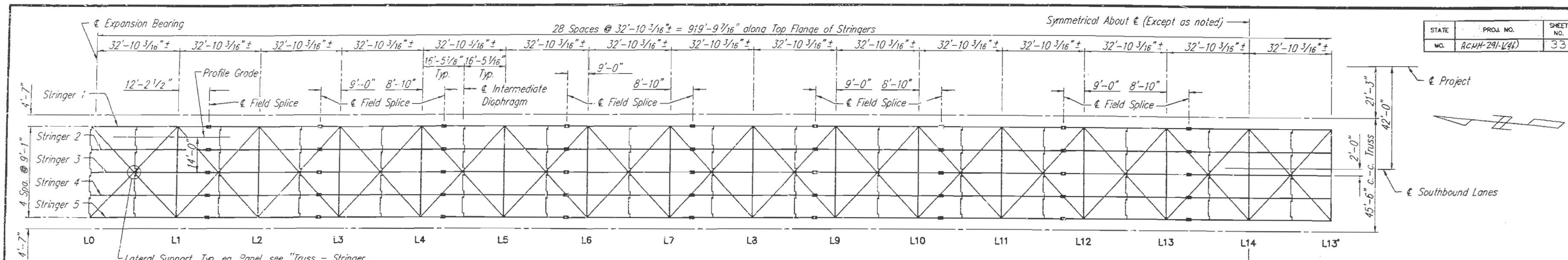
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 29 OF 33

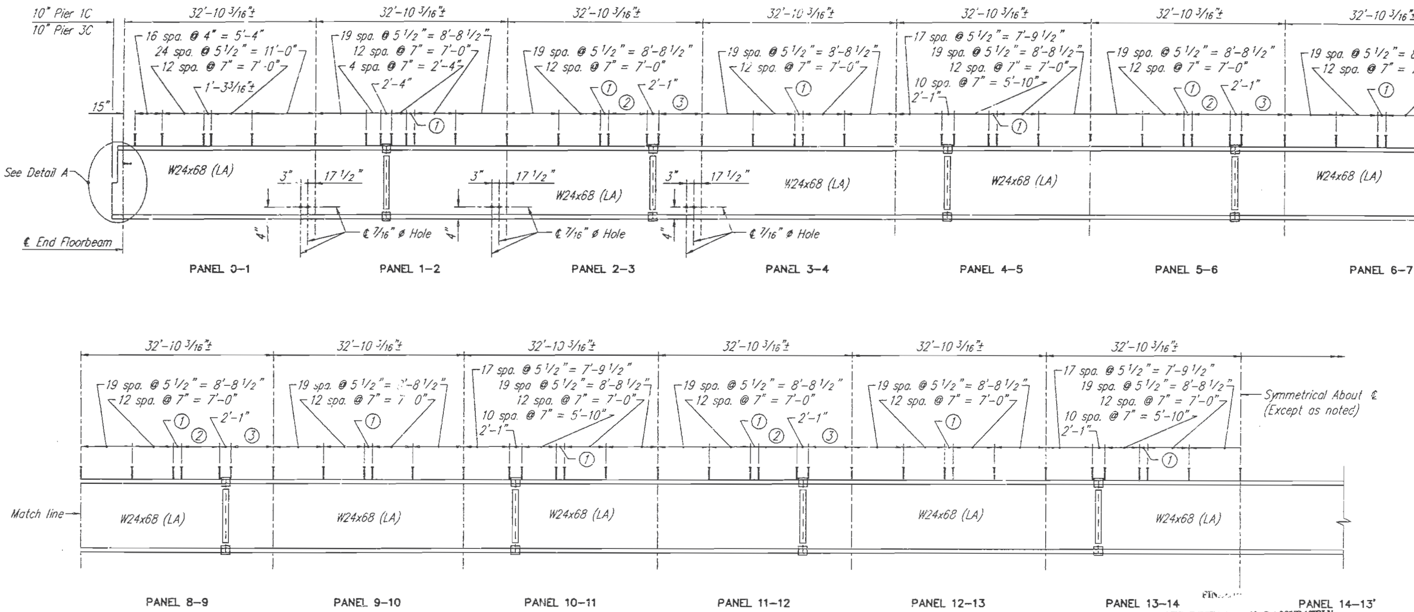
A4757

322

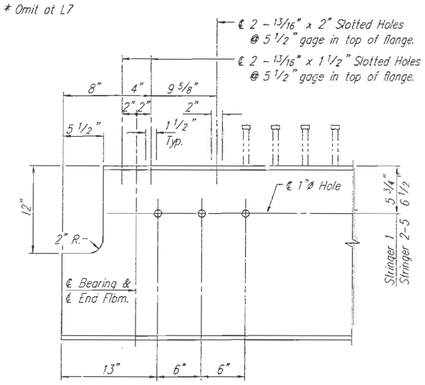
STATE	PROJ. NO.	SHEET NO.
MO.	ACHH-291-1(4)	33



FRAMING PLAN – UNIT 2



STRINGER ELEVATION



DETAIL A

Note: Contractor may omit field splices if longer field sections are desired. No quantity change will be made for weight of omitted field splices.

I CERTIFY THAT THIS DRAWING ACCURATELY REFLECTS THE CONFIGURATION AND LOCATION OF THE ROADWAY AND APPURTENANCES AS CONSTRUCTED ON THIS PROJECT.

SIGNATURE 8-7-98 DATE

E-27899 PROFESSIONAL ENGINEER

Note: Spacing of Shear Connectors shown for information only. Shear Connectors to be installed by others.
(1) 2 spa. = 1'-5 3/16"±
(2) 10 spa. @ 7" = 5'-10"
(3) 17 spa. @ 5 1/2" = 7'-9 1/2"

FRAMING PLAN – UNIT 2

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC. Consulting Engineers

DETAILED: S.A.K. 05/93
CHECKED: H.G.J. 09/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

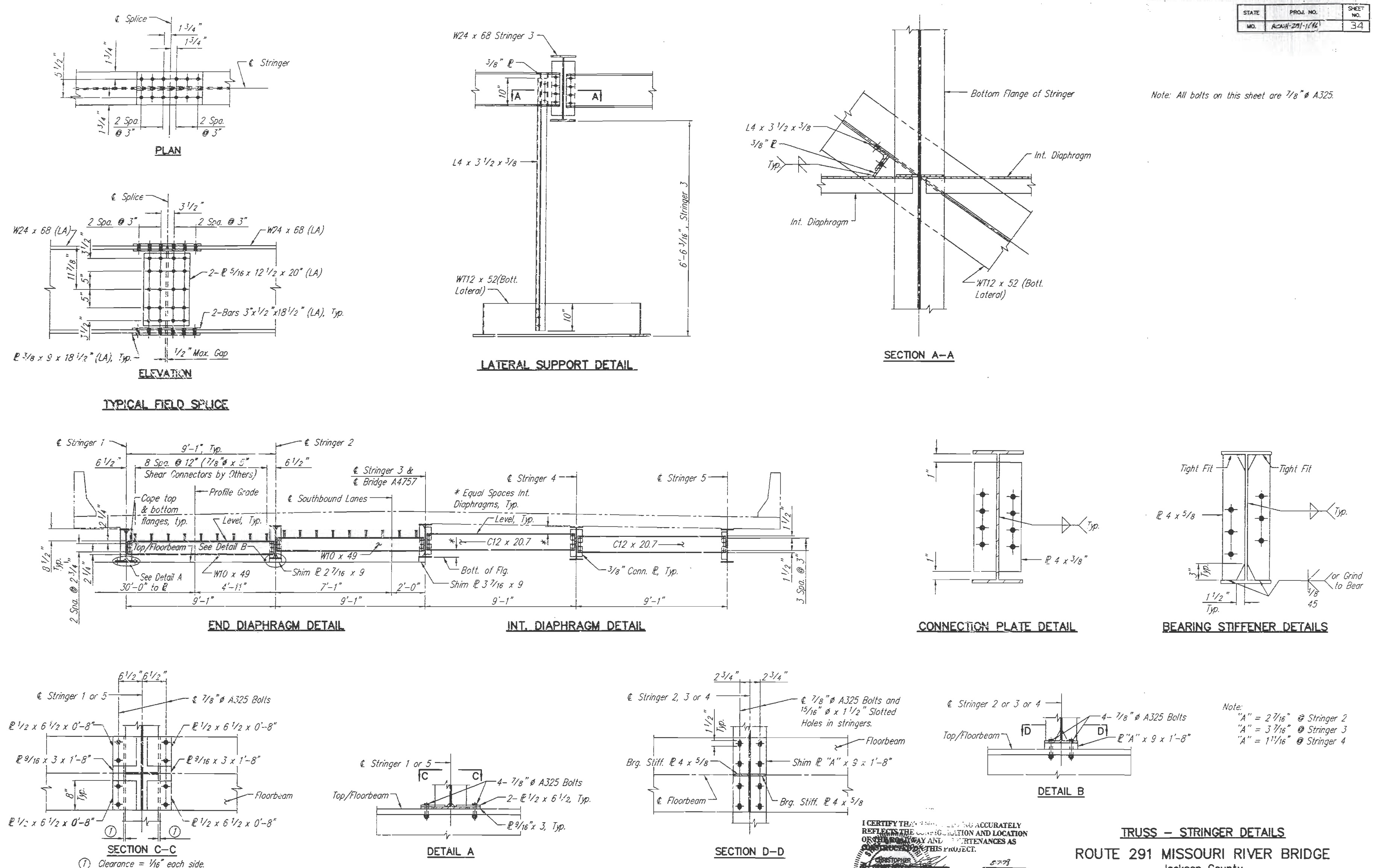
SHEET 30 OF 33

A4757

330

STATE	PROJ. NO.	SHEET NO.
MO.	ACNH-291-1(16)	34

Note: All bolts on this sheet are 7/8" ø A325.



I CERTIFY THAT THIS DRAWING ACCURATELY REFLECTS THE CONFIGURATION AND LOCATION OF THE ROADWAY AND APPURTENANCES AS CONSTRUCTED ON THIS PROJECT.

SIGNATURE — DATE

TRUSS – STRINGER DETAILS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

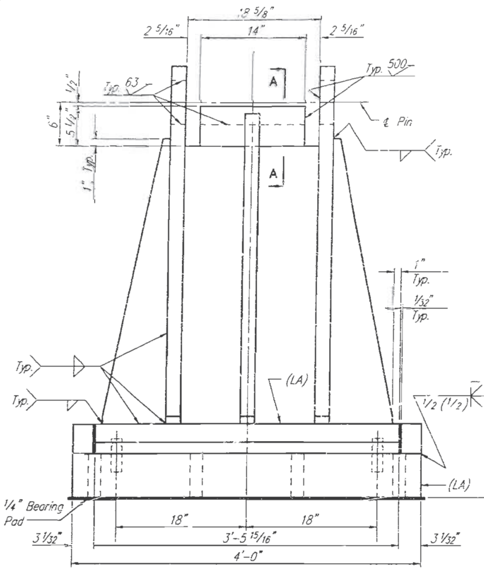
DETAILED: S.A.K./J.L.K. 05/93
CHECKED: H.G.J. 09/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

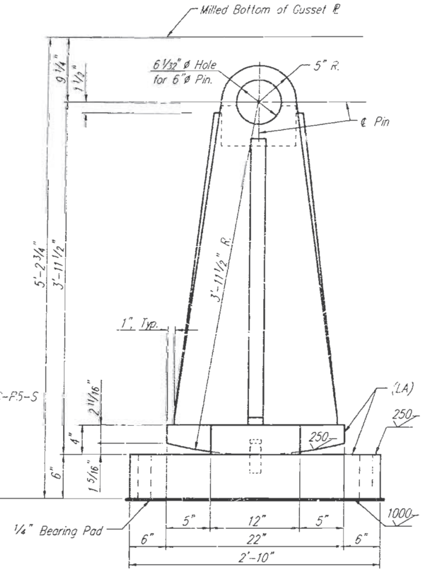
SHEET 31 OF 33

A4757

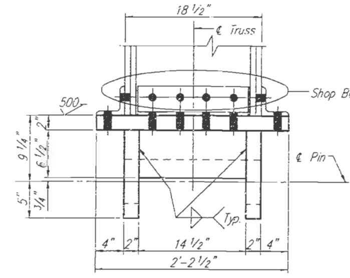
STRG01LS



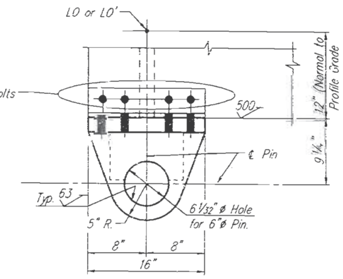
FRONT ELEVATION



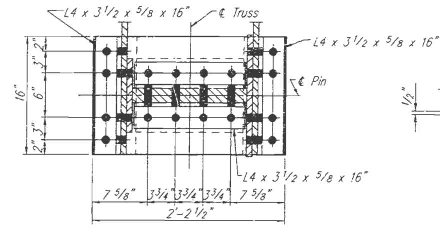
SIDE ELEVATION



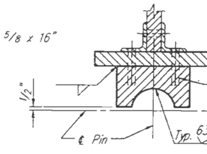
FRONT ELEVATION



SIDE ELEVATION



PLAN



SECTION B–B

SHOE CAP – TRUSS SPAN

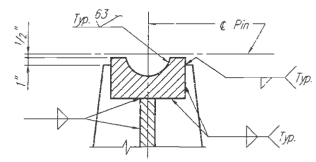
FINAL PLANS

I CERTIFY THAT THIS DRAWING ACCURATELY REFLECTS THE CONFIGURATION AND LOCATION OF THE ROADWAY AND APPURTENANCES AS CONSTRUCTED ON THIS PROJECT

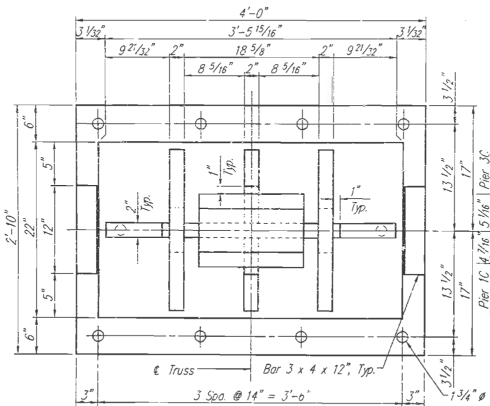
E-27899

REGISTERED PROFESSIONAL ENGINEER

DATE

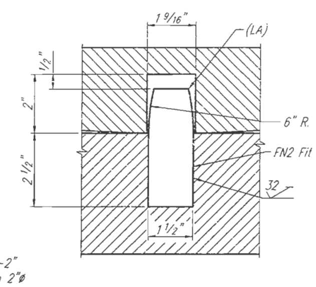


SECTION A–A



PLAN

EXPANSION SHOE – TRUSS SPAN



PINTLE DETAIL

Notes:

All connections shall be made with 1"ø High Strength (H.S.) Bolts.

All contact surface between plates to be welded shall be finished to 250.

Weldments shall be stress relieved and tested prior to any machining or boring.

Anchor Bolts shall conform to the requirements of A.S.T.M. A588.

Shop coat Pins and pin bearing surfaces with National Lubricating Institute No. 3 Multipurpose Grease or an approved equal upon completion of machining.

All Base Plates shall be scribed with longitudinal and transverse centerlines.

The Contractor shall drill Holes as specified into top of Pier Columns for Anchor Bolts. Anchor Bolts shall be set in drilled holes in accordance with Article 712.6 of the Standard Specifications.

Fill spaces around Anchor Bolts with Molten Zinc before placing Nuts.

Shop Bolts in connections of Shoe Caps to Truss shall be installed before machining contact surfaces.

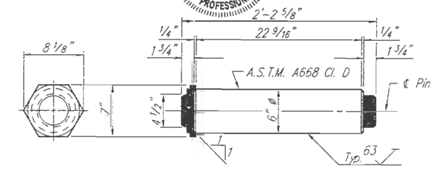
The Shoe Caps and Rockers or Bases shall be assembled, bored as units and match marked before disassembly.

Anchor Bolts shall be 1 1/2"ø A588 steel swedged bolts and shall extend 15" into the concrete with A194-2, 2H or A563-c, C3, D, DH, DH3 heavy hexagon nuts. Actual manufacturer's certified mill test reports (chemical and mechanical) shall be provided. (Swedging shall be 1" less than the extension into the concrete).

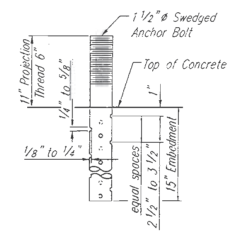
All structural steel for the Masonary Plate, Rocker Plates etc. and Anchor Bolts shall be painted with a minimum of 2 coats of inorganic zinc primer (5 mils min.) in accordance with the Special Provisions.

Structural steel for the Bearings shall be A709 Grade 50 or Grade 50W and A709 Grade A36.

Bearing pads shall be 60 durometer neoprene pads and extend 1/2" beyond masonry plate.



PIN DETAILS



SWEDGE ANCHOR BOLT

STATE	PROJ. NO.	SHEET NO.
MO.	ACNH-291-1(46)	35

TRUSS EXPANSION BEARING DETAILS – PIERS 1C & 3C

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

332

YS-BRG-E

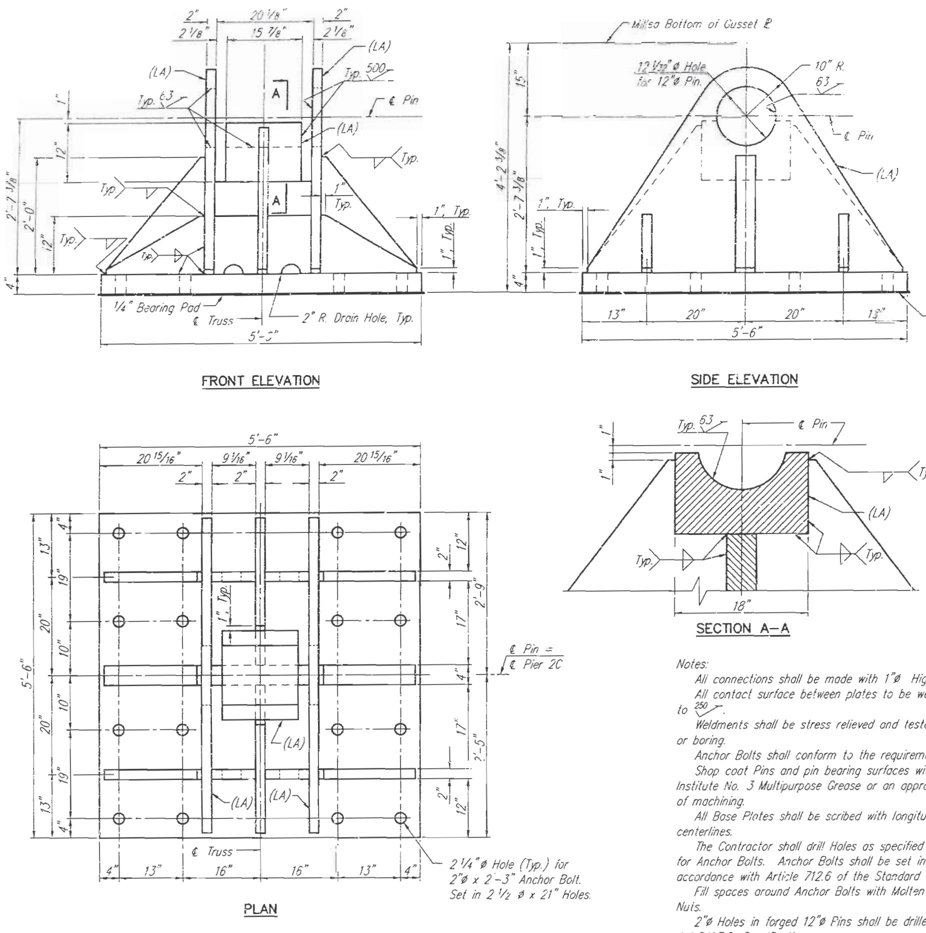
HC HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.L.K. 05/93
CHECKED: H.G.J. 09/93

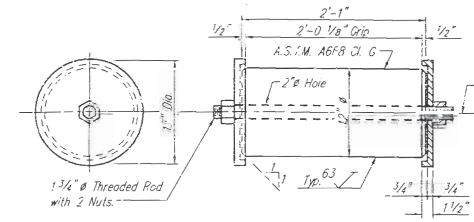
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

A4757

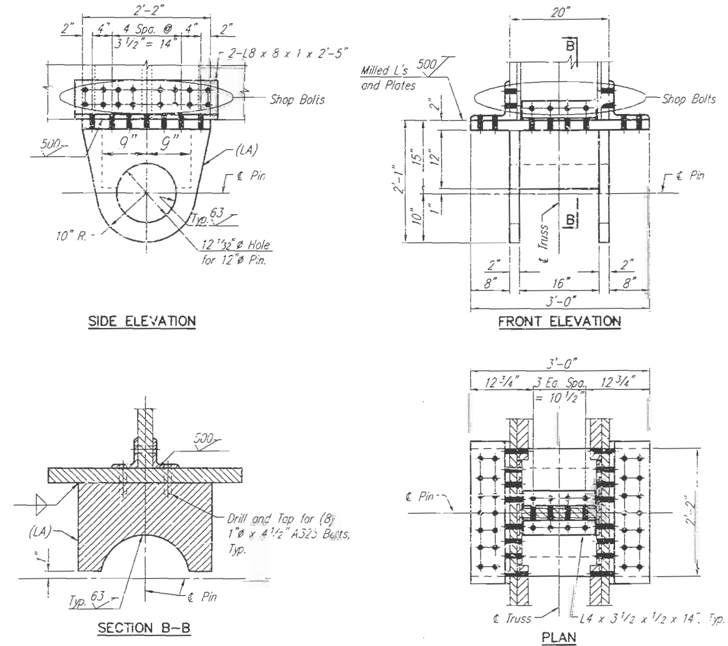
STATE	PROJ. NO.	SHEET NO.
MO.	ACNH-291-1(48)	36



FIXED SHOE – TRUSS SPAN



PIN DETAILS



SHOE CAP – TRUSS SPAN

Notes:

All connections shall be made with 1" ø High Strength (H.S.) Bolts.

All contact surface between plates to be welded shall be finished to 250.

Weldments shall be stress relieved and tested prior to any machining or boring.

Anchor Bolts shall conform to the requirements of A.S.T.M. A588.

Shop coat Pins and pin bearing surfaces with National Lubricating Institute No. 3 Multipurpose Grease or an approved equal upon completion of machining.

All Base Plates shall be scribed with longitudinal and transverse centerlines.

The Contractor shall drill Holes as specified into top of Pier Columns for Anchor Bolts. Anchor Bolts shall be set in drilled holes in accordance with Article 712.6 of the Standard Specifications.

Fill spaces around Anchor Bolts with Molten Zinc before placing Nuts.

2" ø Holes in forged 12" ø Pins shall be drilled prior to cooling per A.A.S.H.T.O. Specifications.

Shop Bolts in connections of Shoe Caps to Truss shall be installed before machining contact surfaces.

The Shoe Caps and Rockers or Bases shall be assembled, bored as units and match marked before disassembly.

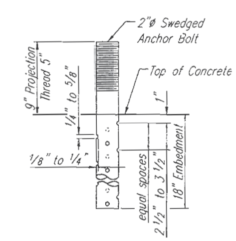
Anchor Bolts shall be 2" ø A588 steel swedged bolts and shall extend 18" into the concrete with A194-2, 2H or A563-c, C3, D, DH, DH3 heavy hexagon nuts. Actual manufacturer's certified mill test reports (chemical and mechanical) shall be provided. (Swedging shall be 1 less than the extension into the concrete).

All structural steel for the Masonary Plate, Rocker Plates etc. and Anchor Bolts shall be painted with a minimum of 2 coats of inorganic zinc primer (5 mils min.) in accordance with the Special Provisions.

Structural steel for the Bearings shall be A709 Grade 50 or Grade 50W and A709 Grade A36.

Bearing pads shall be 60 durometer neoprene pads and extend 1/2" beyond masonry plate.

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.



SWEDGE ANCHOR BOLT

FINAL PLANS

I CERTIFY THAT THIS DRAWING ACCURATELY REFLECTS THE CONFIGURATION AND LOCATION OF THE ROADWAY AND APPURTENANCES AS CONSTRUCTED ON THIS PROJECT.

DATE

TRUSS FIXED BEARING DETAILS – PIER 2C

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.L.K. 05/93
CHECKED: H.G.J. 09/93

SHEET 33 OF 33

A4757

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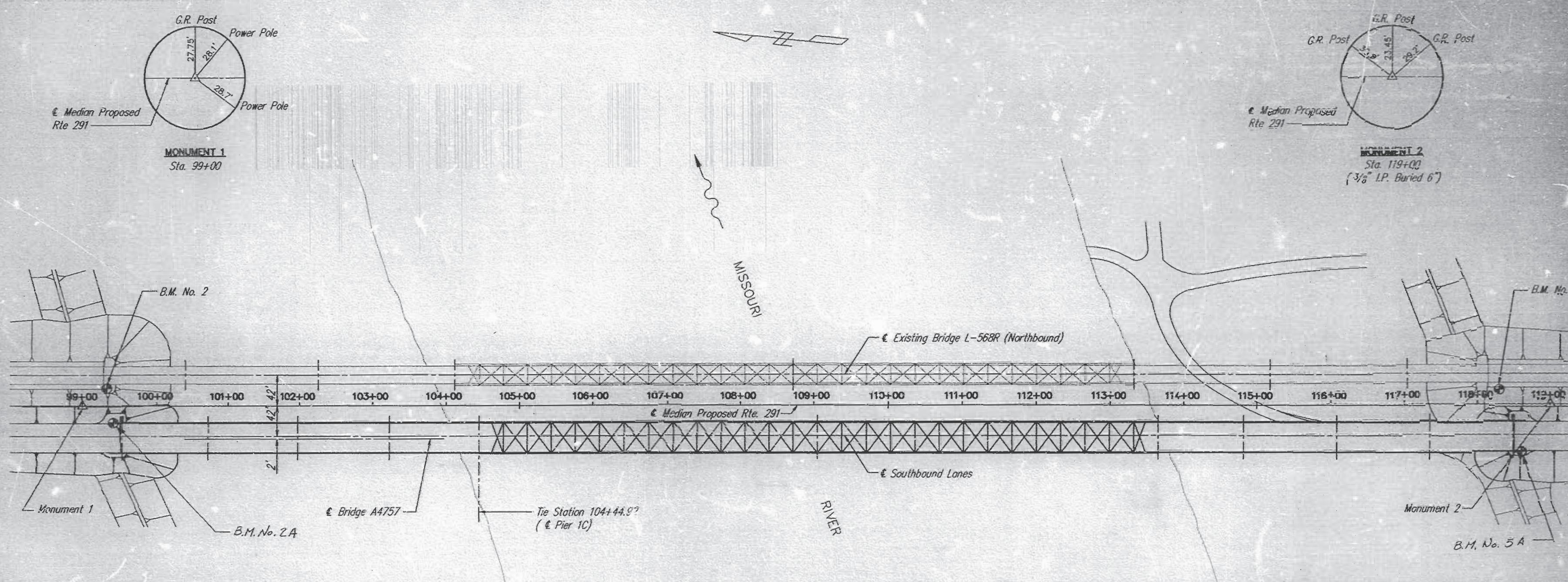
FINAL PLAN

STATE	PROJ. NO.	SHEET NO.
MO.	A-NH-291-1(44)	2
SEC./CUR. 12 TWP. 50N RGE. 32W		



BENCH MARKS:

B.M. No. 2 Elev. 763.54 – Chiseled "□" on West Wing of North Abut. of Missouri River Bridge L-568R 24' Lt. ℄ Med. Sta. 99+33 ±.

B.M. No. 5 Elev. 763.45 – USC&G B.M. Disk Stamped U-218 Quad 390942 20'± Lt. ℄ Med. Sta. 118+30 ±.

B.M. No. 2 A Elev. 767.64 - Bolt in East wing of North abut. of Missouri River Bridge A-4757, 23' Rt. ℄ Med. Sta. 99 + 39 ±.

B.M. No. 5A Elev. 762.73 - Bolt in West wing of South abut. of Missouri River Bridge A-4757, 65' Rt. ℄ Med. Sta. 118 + 63 ±.

NOTE:

The Monuments shown on this drawing shall be used for stationing and alignment of the bridge.

FINAL PLANS
I CERTIFY THAT THIS DRAWING ACCURATELY REFLECTS THE CONFIGURATION AND LOCATION OF THE ROADWAY AND APPURTENANCES AS CONSTRUCTED ON THIS PROJECT.

3/16/98
DATE

SURVEY TIES & ALIGNMENT DIAGRAM

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: B.T.K. 02/93
CHECKED: E.W.N. 02/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 2 OF 59

A4757

338 72

FINAL PLANS

STATE	PROJ. NO.	SHEET NO.
MO.	ACNH-291-1(44)	14
SEC./SUR. 12 TWP. 50N RGE. 32W		

GENERAL NOTES:

The scope of work consists of the construction of the end bents, intermediate bents, concrete superstructure girders, and slab for Units 1 & 3, and the construction of piers for Unit 2, along with other associated work as shown on the plans.

The existing Missouri Route 291 Bridge shall remain open during construction.

Utility companies whose facilities are shown on the plans or are known to be within the construction limits shall be notified by the contractor of the construction start date.

All dimensions are horizontal unless otherwise noted. Drawings shall not be scaled.

SPECIFICATIONS:

Design: 1992 Edition of the AASHTO Standard Specifications for Highway Bridges plus Interims.

Construction: Missouri State Highway Commission Standard Specifications For Highway Construction, 1993 Edition, plus project special provisions.

DESIGN LOADING:

Load Factor Design Method – Bridge Superstructure Framing, Bridge Deck, and Substructure (except footings). Simply supported non-composite for Dead Load, continuous composite for barrier curb, future wearing surface and Live Load.

Live Load – HS20 modified with modified 24,000 Lb. Tandom Axle.

Dead Load – An allowance of 35 Lbs. per sq. ft. of roadway for future wearing surface is included in the Dead Load.

Concrete Weight – 150 Lbs. per cu. ft.

Earth Weight – 120 Lbs. per cu.ft.

Equivalent Fluid Pressure – 45 Lbs. per sq. ft. per ft.

Earthquake – Category A

Barge Impact – 2,000 kips parallel to flow or 1,000 kips perpendicular to flow at elevation 725.0 at Piers 1C & 2C.

DESIGN UNIT STRESSES:

Class A1 Concrete (Prestressed Girders)----f'c = 6,000 psi.
f'ci= 4,600 psi. (Spans 2N, 3N & 1S thru 4S)
f'ci= 4,800 psi. (Spans 1N & 4N)

Class B Concrete (Substructure)---------fc = 1,200 psi.
f'c= 3,000 psi.
n = 10

Concrete (Class B1 & B2) ----------- fc = 1,600 psi.
f'c = 4,000 psi.
n = 8

Reinforcing Steel (Grade 60)----------- fs = 24,000 psi.
fy = 60,000 psi.

Prestressing Steel (Grade 270)--------- f's = 270,000 psi.

Structural Carbon Steel (A709, Gr. 36)---- fs = 20,000 psi.
fy = 36,000 psi.

Steel Pile--------------------------- fb = 12,000 psi.

CONCRETE:

All exposed edges of concrete shall be beveled $^3/_4$" unless otherwise shown or noted.

Construction joints shall be made only at locations shown on the plans, except with the approval of the engineer.

Keys shall be provided for all construction joints unless otherwise shown. For construction joint treatment, see Special Provisions.

All concrete for bridge deck, diaphragms and wingwalls above the construction joint shall be Class B2.

All concrete for barrier curbs shall be Class B1.

All concrete for deadmen shall be Class B.

JOINT FILLER:

All joint filler shall meet the requirements of standard specification 1057.2.4, except as noted.

REINFORCING STEEL:

Reinforcing steel shall be deformed billet steel bars conforming to ASTM A615, Grade 60. All dimensions to reinforcing steel on detail drawings are to centerline of bar, except where clear distance is noted from the face of concrete.

All reinforcing bars in top of substructure beam or cap and diaphragms shall be spaced to clear anchor bolts for bearings by at least $^1/_2$".

Minimum clearance to reinforcing steel in pier caps and columns shall be 2" unless otherwise shown.

Minimum clearance to reinforcing steel in pier bases and footings shall be 3" unless otherwise shown.

Minimum clearance to reinforcing steel shall be $1^1/_2$" unless otherwise noted.

All reinforcing steel shall be lapped according to AASHTO 8.32 unless otherwise shown or noted.

All reinforcing in the bridge deck, barrier curbs, diaphragms and wingwalls shall be epoxy coated, except as noted.

The epoxy coated reinforcing bars shall be coated in accordance with Section 710 of Mo. Std. Specs. for Highway Construction.

BEARINGS:

Neoprene elastomeric bearing pads shall be 60 durometer at fixed bearings and 70 durometer at expansion bearings.

FOUNDATIONS:

Minimum energy requirement of pile hammer based on plan length and design bearing value of steel piles.

All steel piles shall be seated in rock and shall be driven to practical refusal.

Steel piles shall be HP14x117 and HP12x53 and conform to ASTM A709, Gr. 36.

Steel pile splices are included in the unit price bid per linear foot of piles.

Manufactured pile point reinforcement shall be used on all steel piles. See Special Provisions.

Prebore for piles at End Bent 1N to elevation 725.0 and at End Bent 4S to elevation 730.0.

For Pile Loading Test information, see Special Provisions.

Drilled Shafts shall be socketed into bedrock.

Prior to placing drilled shafts for Piers 1C and 2C, the contractor will be required to drill one NX size core hole at each pier for additional subsurface investigation. See "Substructure Layout" sheet.

Drilled shaft design is based on 100% of an allowable end bearing value of 25 Tons per Sq. Ft.

Seal courses are designed for a water surface elevation of 715.0.

For Cofferdams, see Special Provisions.

PILE DATA (Units 1-3)

Bent or Pier Number		1N	2N	3N	4N	3C	1S	2S	3S	4S
Pile Type and Size		HP12x53	HP12x53	HP12x53	HP12x53	HP14x117	HP12x53	HP12x53	HP12x53	HP12x53
Number		7	18	18	18	27	18	18	18	7
Average Length	Ft.	134	90	90	76	87	102	101	101	133
Design Bearing	Tons	86.7	93.0	93.0	93.0	195.0	93.0	90.4	90.4	86.7
Hammer Energy Required	Ft. Lbs.	21,300	20,900	20,900	20,900	44,000	20,900	20,300	20,300	20,400

REINFORCING BAR TAGS:

Tags for reinforcing steel shall be marked with a prefix to indicate the individual unit or element in which the steel is to be placed.

Example: Tag U1-5S1 indicates No. 5 bars in the slab of Unit 1.
Tag 2C-14F1 indicates No. 14 bars in the footing of Pier 2C.

BRIDGE DECK:

Bridge deck as detailed consists of an $8^1/_2$" roadway slab.

Alternate types of slab forms may be used in the construction of slabs. Cast-In-Place with conventional forming – Alt. a, or Precast Prestressed Panels – Alt. b. See Special Provisions.

QUANTITIES

ITEM	UNIT	TOTAL
Cofferdam and Excavation – Pier 1C	Each	1
Cofferdam and Excavation – Pier 2C	Each	1
Cofferdam and Excavation – Pier 3C	Each	1
Class 1 Excavation	Cu. Yds.	936
Pre-bore for Piling	Lin. Ft.	356
Navigation Lighting System	Lump Sum	1
Structural Steel Piles (14")	Lin. Ft.	2,346
Pile Point Reinforcement (14")	Each	27
Loading Tests (14")	Each	1
Structural Steel Piles (12")	Lin. Ft.	11,968
Pile Point Reinforcement (12")	Each	122
Loading Tests (12")	Each	2
Drilled Shafts (9'-0" Dia.)	Lin. Ft.	702.3
Rock Sockets (8'-4" Dia.)	Lin. Ft.	244.9
Supplementary Foundation Test Holes (NX)	Lin. Ft.	29
Supplementary Cored Holes	Lin. Ft.	84
Supplementary Television Inspection	Each	2
Class B Concrete (Substructure)	Cu. Yds.	5,298
Seal Concrete	Cu. Yds.	1,932
Reinforcing Steel	Lbs.	878,380
Reinforcing Steel (Epoxy Coated)	Lbs.	40,390
Laminated Neoprene Bearing Pads	Each	70
Type N PTFE Bearings	Each	10
Prestressed Concrete Girders (118 ~~Ft. Spans~~)	Each	5
Prestressed Concrete Girders (121 Ft. Spans)	Each	5
Prestressed Concrete Girders (126.5 Ft. Spans)	Each	20
Prestressed ~~Concrete Girders (117 Ft. Spans)~~	Each	5
Prestressed Concrete Girders (114 Ft. Span)	Each	5
Painting Clearance Gauges	Lump Sum	1
Slab on Concrete Bulb-Tee Girders	Sq. Yds.	4,627
Safety Barrier Curb	Lin. Ft.	1,979
Bridge Approach Slab	Sq. Yds.	227
Deadman Anchorage Assembly	Each	2
Vertical Drain @ End Bents	Each	2
Water Transportation	L.S.	1
Rock Sockets @ 150 %	Lin. Ft.	96.3
Reinf. Steel, Bridge Gr. 60 @ 150 %	lbs.	5340

Notes; Excavations for the footings of Bents 2N thru 4N and Bents 1S thru 3S shall be paid for as Class 1 Excavation. The contractor is cautioned that ground water may be encountered during excavation depending on the river surface elevation.

Square yards of slab concrete includes earthquake restrainers and all concrete and reinforcing steel for the slabs, diaphragms and wingwalls.

Lineal feet of safety barrier curb concrete includes all concrete, reinforcing steel, and plastic water stops for the barrier curbs.

QUANTITIES FOR SLAB FORMING

TYPE OF SLAB		SLAB ON CONCRETE BULB-TEE GIRDERS: Reinf. (Lbs.) Epoxy	Reinf. (Lbs.) Plain	Conc. (Cu. Yd.) Slab, Conc. Diaph's and Wingwalls
Alt. b	Precast Panel Forms	250,850	3,700	* 1,282

Notes:

The table of Estimated Quantities for Alternate Slabs represents the quantities used by the state in preparing the cost estimate for concrete slabs. Variations may be encountered in these estimated quantities but these variations cannot be used for an adjustment in the contract unit price per square yard of alternate slab used.

See Special Provisions for Alternate Methods of Forming Slabs.

* Cu. Yds. of concrete does not include precast prestressed panels.

3-10-93

FINAL PLANS — I CERTIFY THAT THIS DRAWING ACCURATELY SHOWS THE DIMENSIONS AND LOCATION ... APPURTENANCES AS ...

GENERAL NOTES & QUANTITIES

ROUTE 291 MISSOURI RIVER BRIDGE

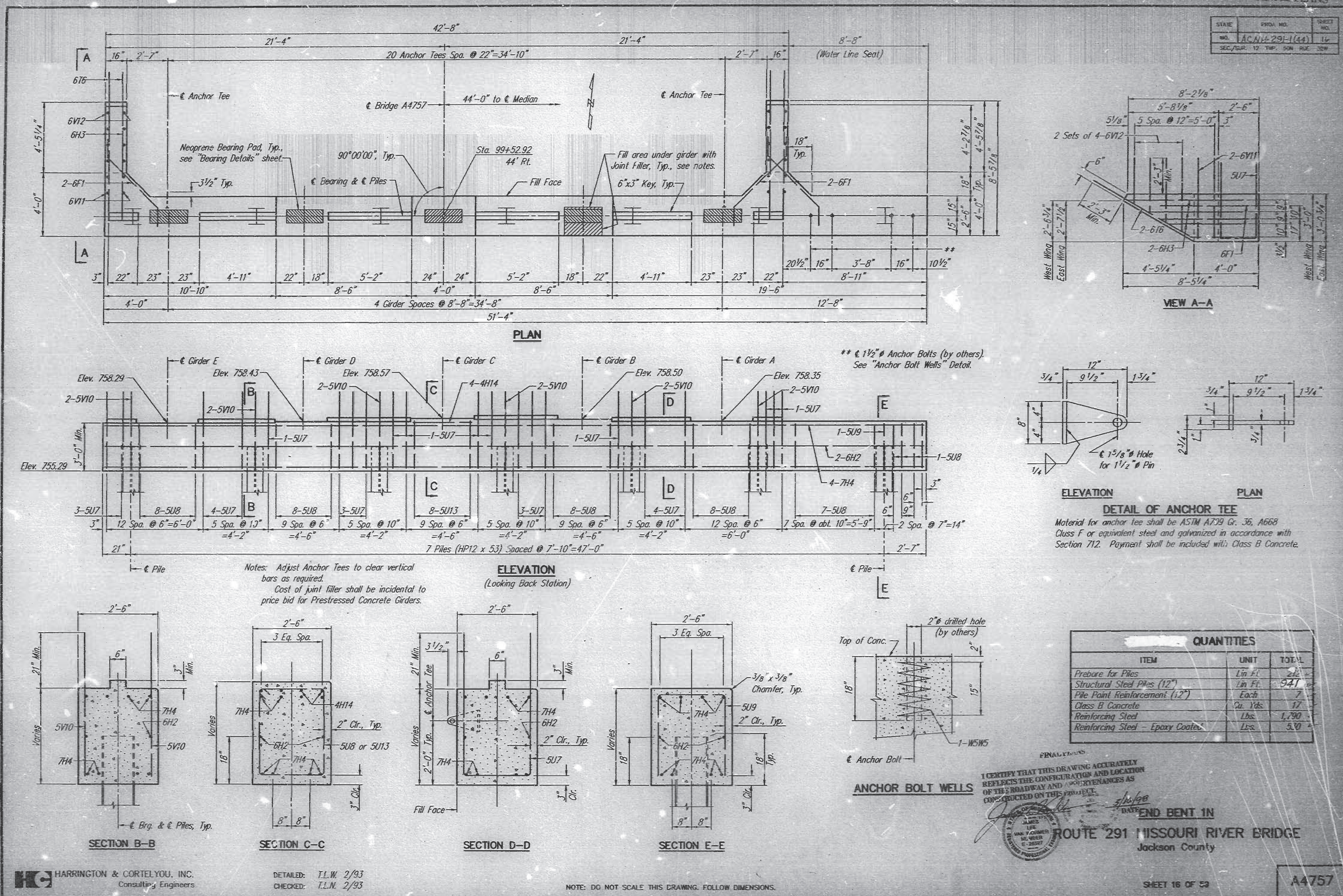
Jackson County

HARRINGTON & CORTELYOU, INC. Consulting Engineers

DETAILED: T.L.W. 2/93
CHECKED: E.W.N. 3/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

A4757



QUANTITIES		
ITEM	UNIT	TOTAL
Prebore for Piles	Lin Ft.	212
Structural Steel Piles (12")	Lin Ft.	941
Pile Point Reinforcement (12")	Each	7
Class B Concrete	Cu. Yds.	17
Reinforcing Steel	Lbs.	1,790
Reinforcing Steel - Epoxy Coated	Lbs.	530

FINAL PLANS
I CERTIFY THAT THIS DRAWING ACCURATELY REFLECTS THE CONFIGURATION AND LOCATION OF THE ROADWAY AND APPURTENANCES AS CONSTRUCTED ON THIS PROJECT.

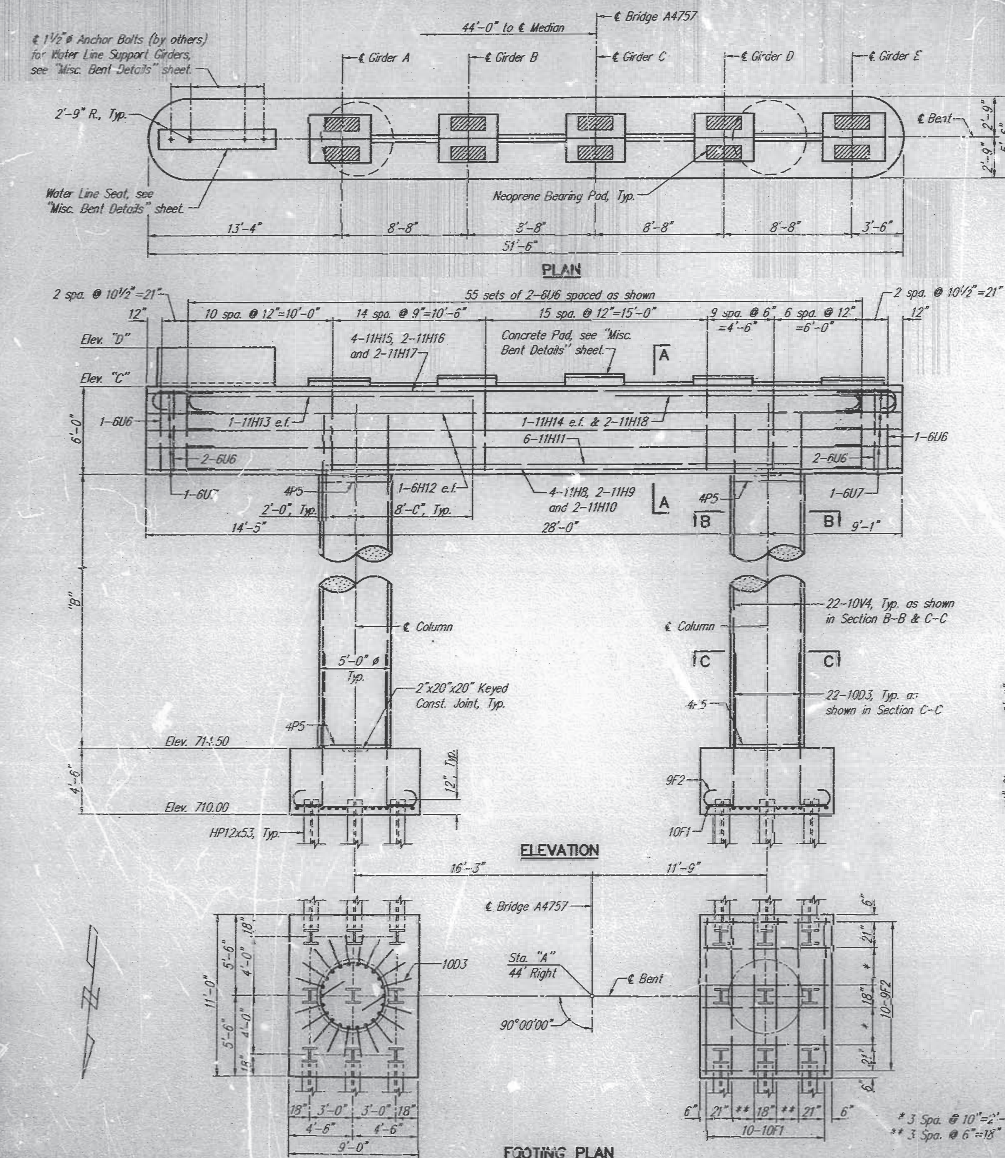
END BENT 1N
ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

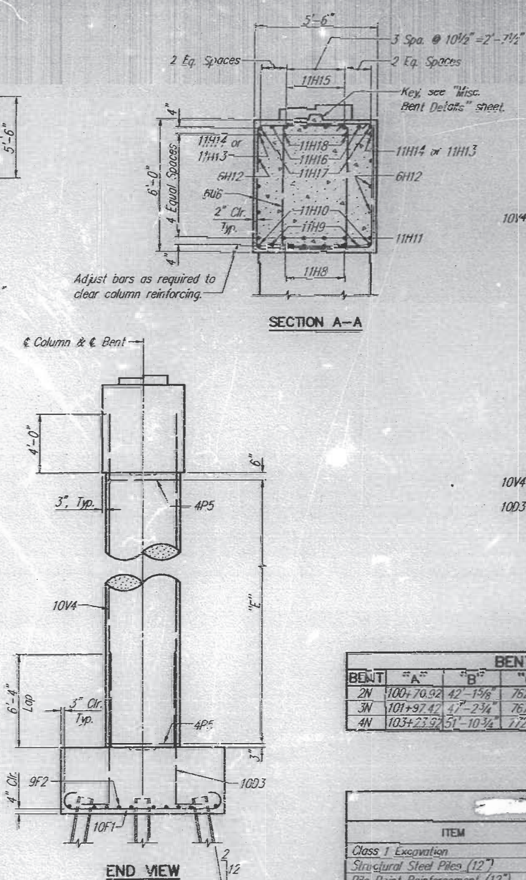
HARRINGTON & CORTELYOU, INC.
Consulting Engineers

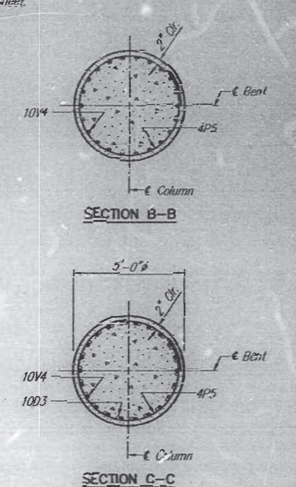
DETAILED: T.L.W. 2/93
CHECKED: T.L.N. 2/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 16 OF 53
A4757







BENT DATA TABLE					
BENT	"A"	"B"	"C"	"D"	"E"
2N	100+70.92	42'-1⅝"	762.64	765.32	43-4P5 @ abt. 12"=41'-4⅝"
3N	101+97.42	47'-2¾"	767.73	771.58	48-4P5 @ abt. 12"=46'-5¾"
4N	103+23.92	51'-10¾"	772.40	776.57	53-4P5 @ abt. 12"=51'-1¾"

QUANTITIES				
ITEM	UNIT	BENT 2N	BENT 3N	BENT 4N
Class 1 Excavation	Cu. Yds.	170	191	191
Structural Steel Piles (12")	Lin Ft	1628	1610	1370
Pile Point Reinforcement (12")	Each	18	18	18
Class B Concrete	Cu. Yds.	158	166	173
Reinforcing Steel	Lbs.	24,490	25,590	26,590
Reinforcing Steel - Epoxy Coated	Lbs.	60	60	60

NOTES:

For Neoprene Bearing Pads see "Bearing Details" sheet.

For Concrete Pad Details, Water Line Seat Details, Anchor Bolt Wells, required keys, diaphragm dowel bars and additional notes see "Misc. Bent Details" sheet.

e.f. denotes each face.

Adjust 6U6 bars to clear Anchor Bolt Wells if wells are used.

I CERTIFY THAT ... ACCURATELY REFLECTS THE ... AND LOCATION OF THE ROADWAY ... NANCES AS CONSTRUCTED ...

3/16/98
DATE

BENTS 2N THRU 4N

ROUTE 291 MISSOURI RIVER BRIDGE

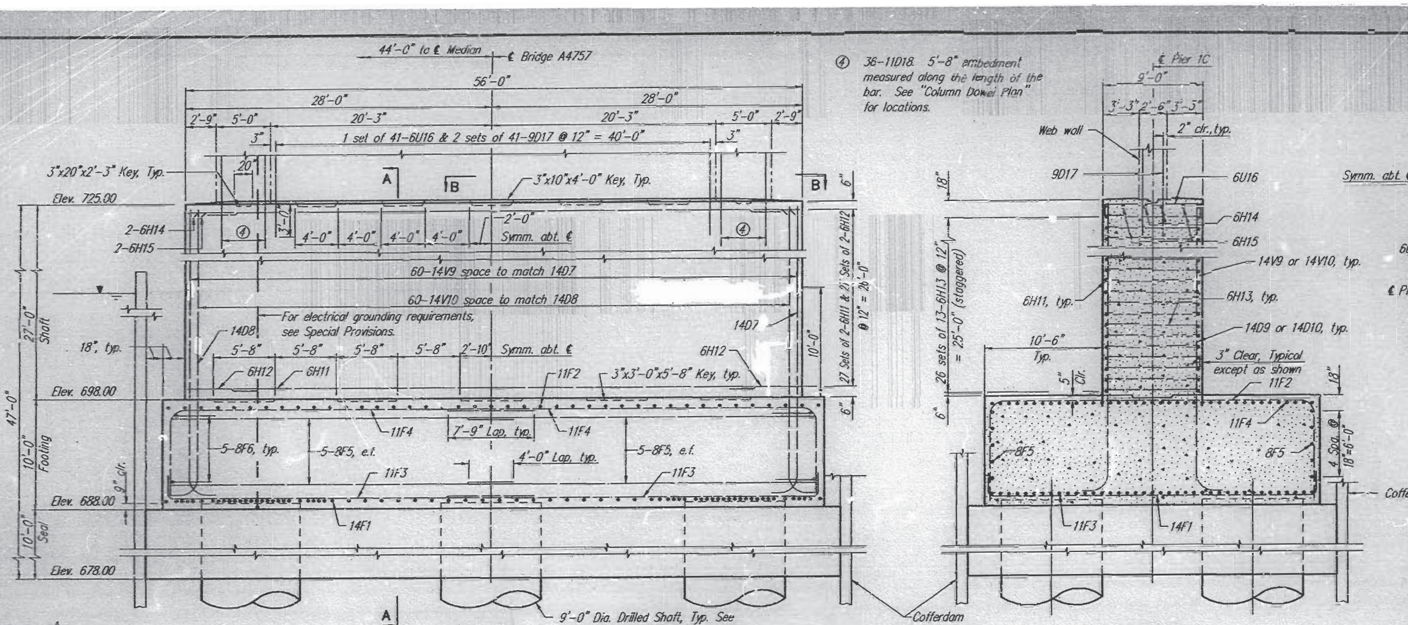
Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: T.L.W. 2/93
CHECKED: E.W.N. 2/93

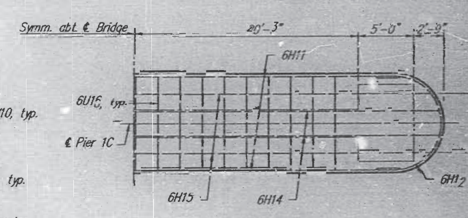
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

A4757



ELEVATION

SECTION A-A

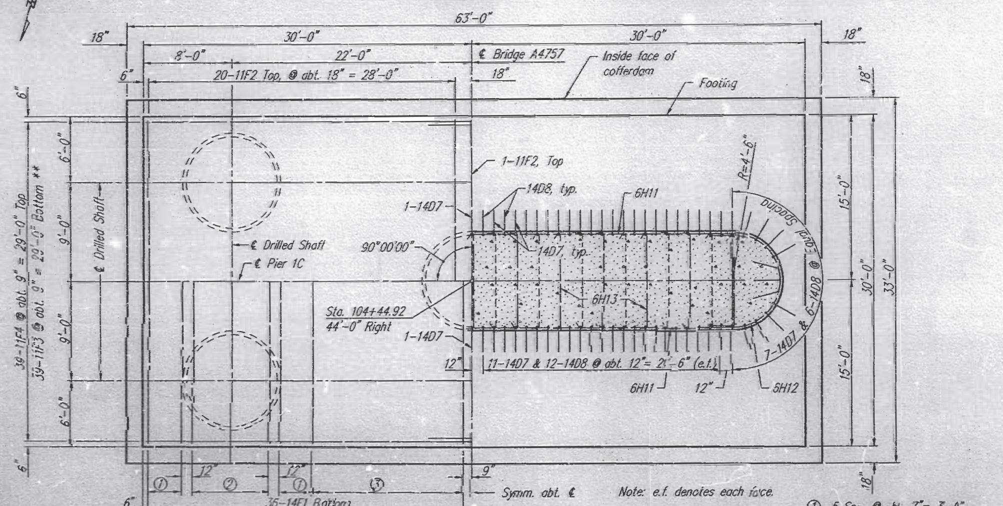


VIEW B-B

(Dowel bars not shown for clarity, see "Column Dowel Plan" and "Elevation" for details.)

QUANTITIES		
ITEM	UNIT	TOTAL
Drilled Shafts (9'-0" Dia.)	Lin. Ft.	266
Rock Socket (8'-4" Dia.)	Lin. Ft.	194
Class B Concrete	Cu. Yds.	1,388
Seal Concrete	Cu. Yds.	688
Reinforcing Steel	Lbs.	247,690
Reinforcing Steel - Epoxy Coated	Lbs.	19,720

‡ Includes quantities for Drilled Shafts, Web Wall, Columns, Tie Beam, and Bridge Seat.



HALF PLAN AT FOOTING

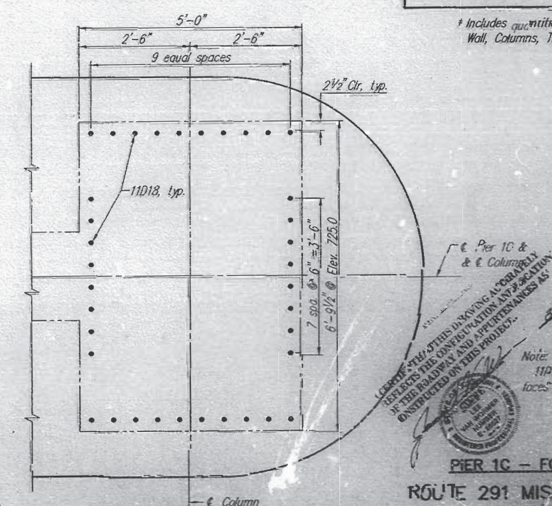
HALF SECTION THRU SHAFT

FOOTING PLAN

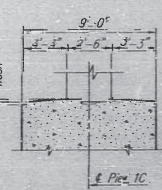
Note: e.f. denotes each face.

① 5 Spa. @ abt. 7" = 3'-0"
② 14 Spa. @ 6" = 7'-0" **
③ 9 Spa. @ abt. 18" = 13'-9" **

** Adjust spacing as req'd. to clear Drilled Shaft Reinf.



COLUMN DOWEL PLAN



WASH DETAIL

Note: 11D18 dowel bars along short faces of Column are sloped.

I CERTIFY THAT THIS DRAWING ACCURATELY REFLECTS THE CONFIGURATION AND LOCATION OF THE ROADWAY AND APPURTENANCES AS CONSTRUCTED ON THIS PROJECT.

PIER 1C - FOUNDATION DETAILS

ROUTE 291 MISSOURI RIVER BRIDGE

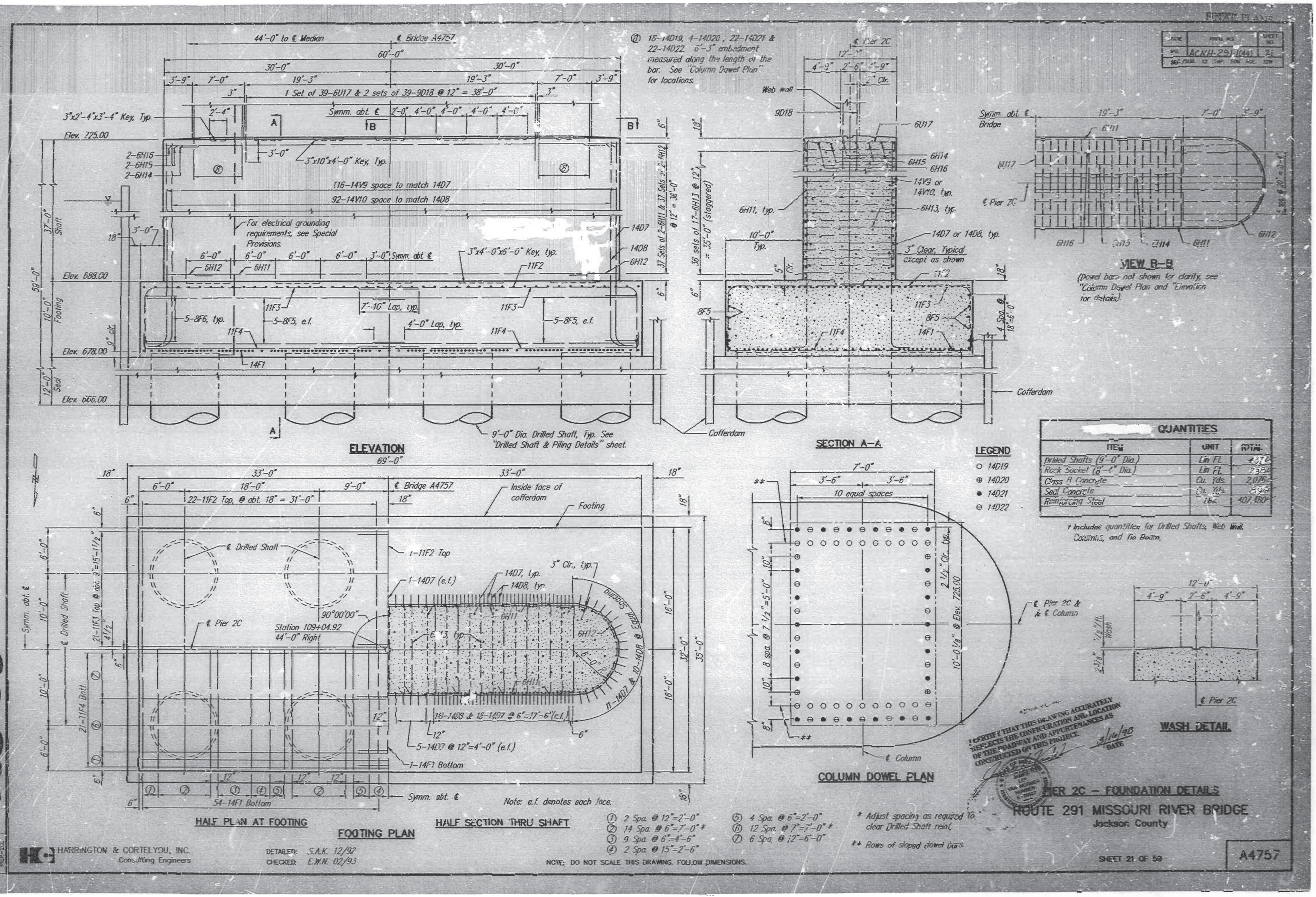
Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: S.A.K. 12/92
CHECKED: E.W.N. 1/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

A4757

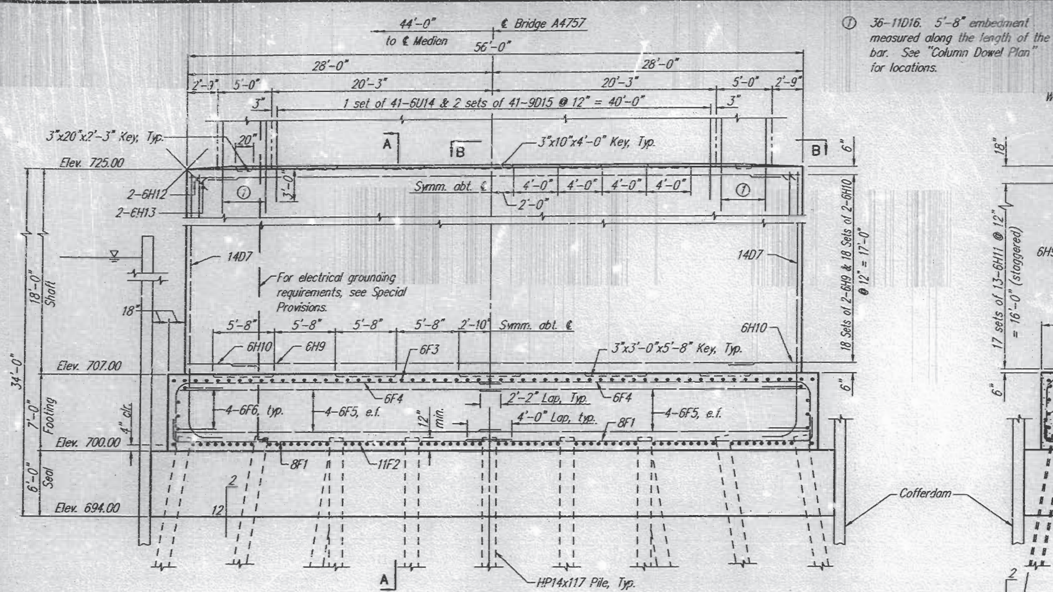


ELEVATION
SECTION A-A
VIEW B-B
(Dowel bars not shown for clarity, see "Column Dowel Plan" and "Elevation" for details)
LEGEND
○ 14D19
⊕ 14D20
● 14D21
⊖ 14D22
QUANTITIES
ITEM | UNIT | TOTAL
Drilled Shafts (9'-0" Dia.) | Lin. Ft. | 437
Rock Socket (8'-4" Dia.) | Lin. Ft. | 238
Class B Concrete | Cu. Yds. | 2,076
Seal Concrete | Cu. Yds. | 894
Reinforcing Steel | Lbs. | 407,480
† Includes quantities for Drilled Shafts, Web Wall, Columns, and Tie Beam.
WASH DETAIL
COLUMN DOWEL PLAN
HALF PLAN AT FOOTING
HALF SECTION THRU SHAFT
FOOTING PLAN
Note: e.f. denotes each face.
① 2 Spa. @ 12"=2'-0"
② 14 Spa. @ 6"=7'-0" *
③ 9 Spa. @ 6"=4'-6"
④ 2 Spa. @ 15"=2'-6"
⑤ 4 Spa. @ 6"=2'-0"
⑥ 12 Spa. @ 7"=7'-0" *
⑦ 6 Spa. @ 12"=6'-0"
* Adjust spacing as required to clear Drilled Shaft reinf.
** Rows of sloped dowel bars.
18-14D19, 4-14D20, 22-14D21 & 22-14D22. 6'-3" embedment measured along the length of the bar. See "Column Dowel Plan" for locations.
9'-0" Dia. Drilled Shaft, Typ. See "Drilled Shaft & Piling Details" sheet.
For electrical grounding requirements, see Special Provisions.
I CERTIFY THAT THIS DRAWING ACCURATELY REFLECTS THE CONFIGURATION AND LOCATION OF THE ROADWAY AND APPURTENANCES AS CONSTRUCTED ON THIS PROJECT.
3/16/98
DATE
PIER 2C - FOUNDATION DETAILS
ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County
SHEET 21 OF 59
A4757
HARRINGTON & CORTELYOU, INC.
Consulting Engineers
DETAILED: S.A.K. 12/92
CHECKED: E.W.N. 02/93
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

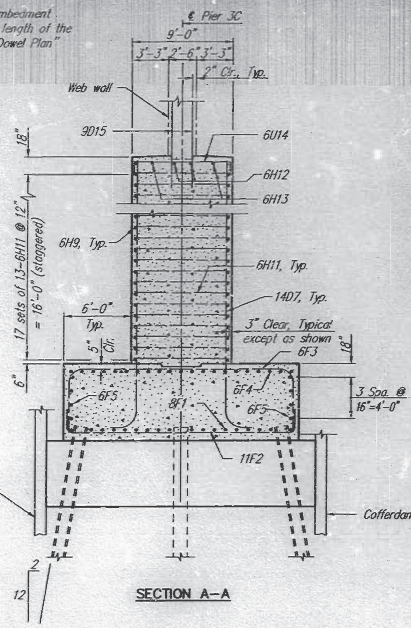
STATE	PROJ. NO.	SHEET NO.
MO.	ACNH-291-1(41)	85

SEC./SUR. 12 TWP. 50N RGE. 32W

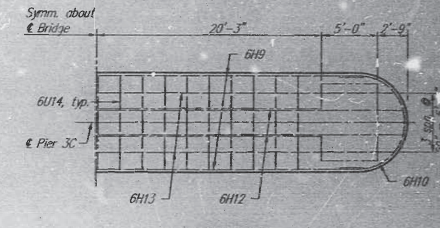
① 36-11D16. 5'-8" embedment measured along the length of the bar. See "Column Dowel Plan" for locations.



ELEVATION



SECTION A-A

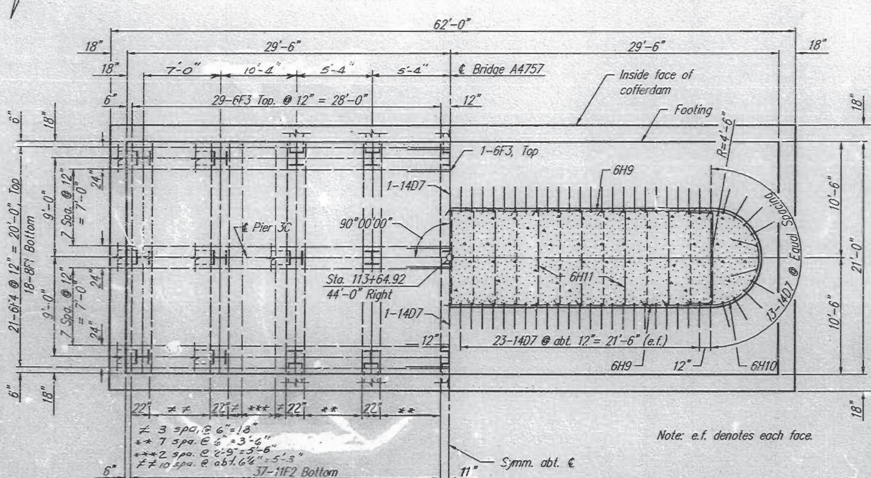


VIEW B-B

(Dowel bars not shown for clarity, see "Column Dowel Plan" and "Elevation" for details.)

QUANTITIES		
ITEM	UNIT	TOTAL
Structural Steel Piles (14")	Lin Ft.	2346
Pile Point Reinforcement (14")	Each	27
Class B Concrete	Cu. Yds.	874
Seal Concrete	Cu. Yds.	350
Reinforcing Steel	Lbs.	32,290
Reinforcing Steel - Epoxy Coated	Lbs.	19,250

‡ Includes quantities for Web Wall, Columns, Tie Beam, and Bridge Seat.

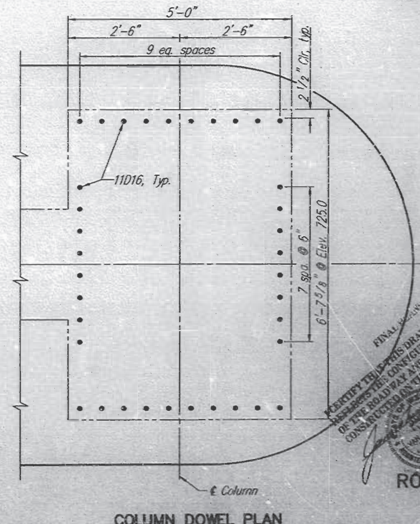


Note: e.f. denotes each face.

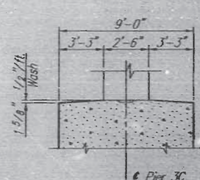
HALF PLAN AT FOOTING

HALF SECTION THRU SHAFT

FOOTING PLAN



COLUMN DOWEL PLAN



WASH DETAIL

Note:
11D16 dowel bars along short faces of column are sloped.

I CERTIFY THAT THIS DRAWING ACCURATELY REFLECTS THE CONFIGURATION AND LOCATION OF THE ROADWAY AND APPURTENANCES AS CONSTRUCTED ON THIS PROJECT.

PIER 3C - FOUNDATION DETAILS

ROUTE 291 MISSOURI RIVER BRIDGE

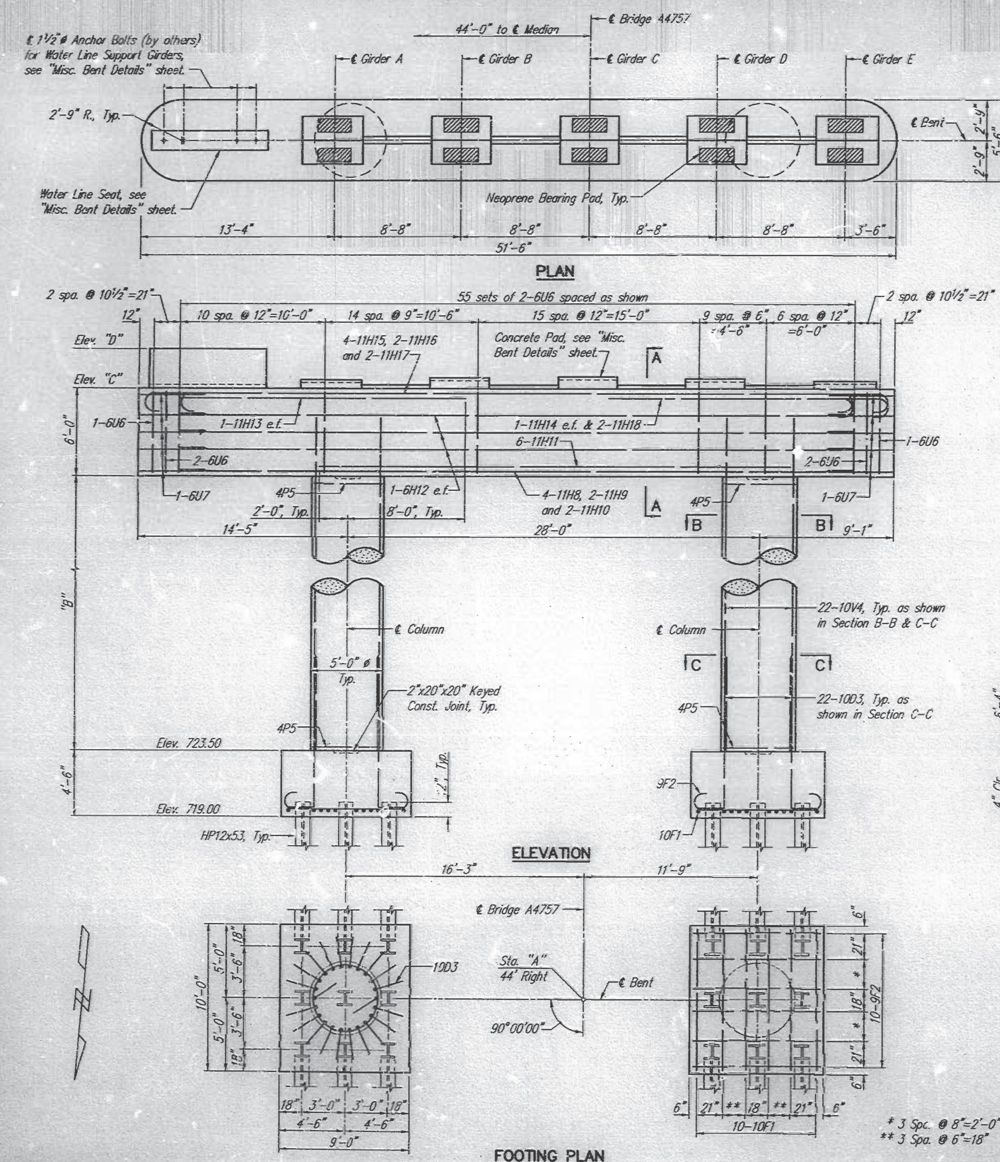
Jackson County

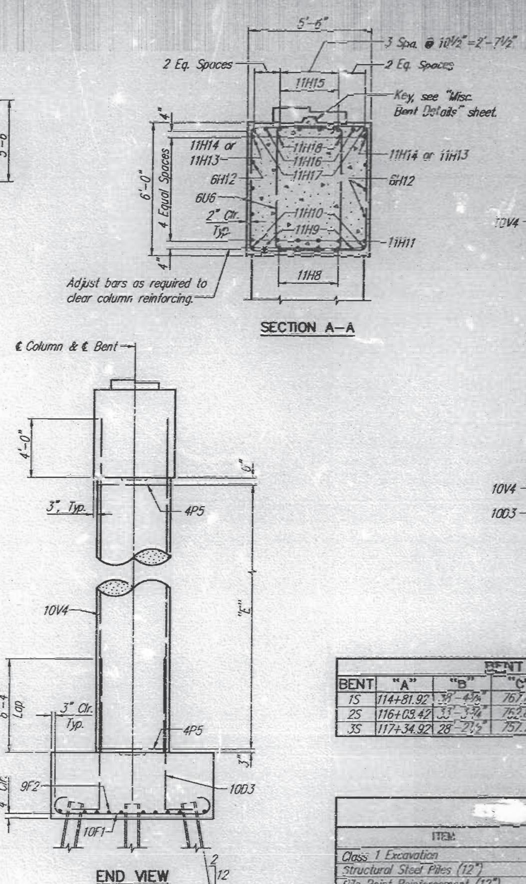
HARRINGTON & CORTELYOU, INC.
Consulting Engineers

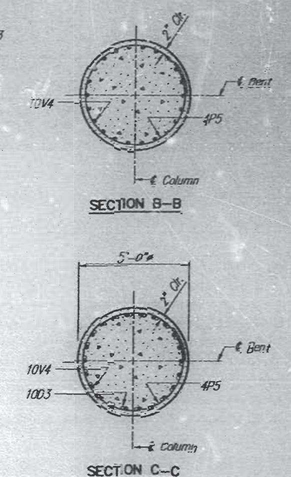
DETAILED: S.A.K. 12/92
CHECKED: E.W.N. 01/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

A4757







BENT DATA TABLE					
BENT	"A"	"B"	"C"	"D"	"E"
1S	114+81.92	38'-4¾"	767.87	772.29	39-4P5 @ abt. 12"=37'-7⅜"
2S	116+03.42	33'-3¾"	762.81	766.78	34-4P5 @ abt. 12"=32'-6¾"
3S	117+34.92	28'-2½"	757.71	760.28	29-4P5 @ abt. 12"=27'-5½"

QUANTITIES				
ITEM	UNIT	BENT 1S	BENT 2S	BENT 3S
Class 1 Excavation	Cu. Yds.	129	129	[illegible]
Structural Steel Piles (12")	Lin. Ft.	1843	1812	1822
Pile Point Reinforcement (12")	Each	18	18	18
Class B Concrete	Cu. Yds.	151	141	135
Reinforcing Steel	Lbs.	23,650	25,560	21,460
Reinforcing Steel - Epoxy Coated	Lbs.	60	60	60

NOTES:

For Neoprene Bearing Pads see "Bearing Details" sheet.

For Concrete Pad Details, Water Line Seat Details, Anchor Bolt Wells, required keys, diaphragm dowel bars and additional notes see "Misc. Bent Details" sheet.

e.f. denotes each face.

Adjust 6U6 bars to clear Anchor Bolt Wells if wells are used.

FINAL PLANS

I CERTIFY THAT THIS DRAWING ACCURATELY REFLECTS THE CONFIGURATION AND LOCATION OF THE ROADWAY AND APPURTENANCES AS CONSTRUCTED ON THIS PROJECT.

3/16/98
DATE

BENTS 1S THRU 3S

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: T.L.W. 2/93
CHECKED: E.W.N. 2/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 27 OF 59

A4757

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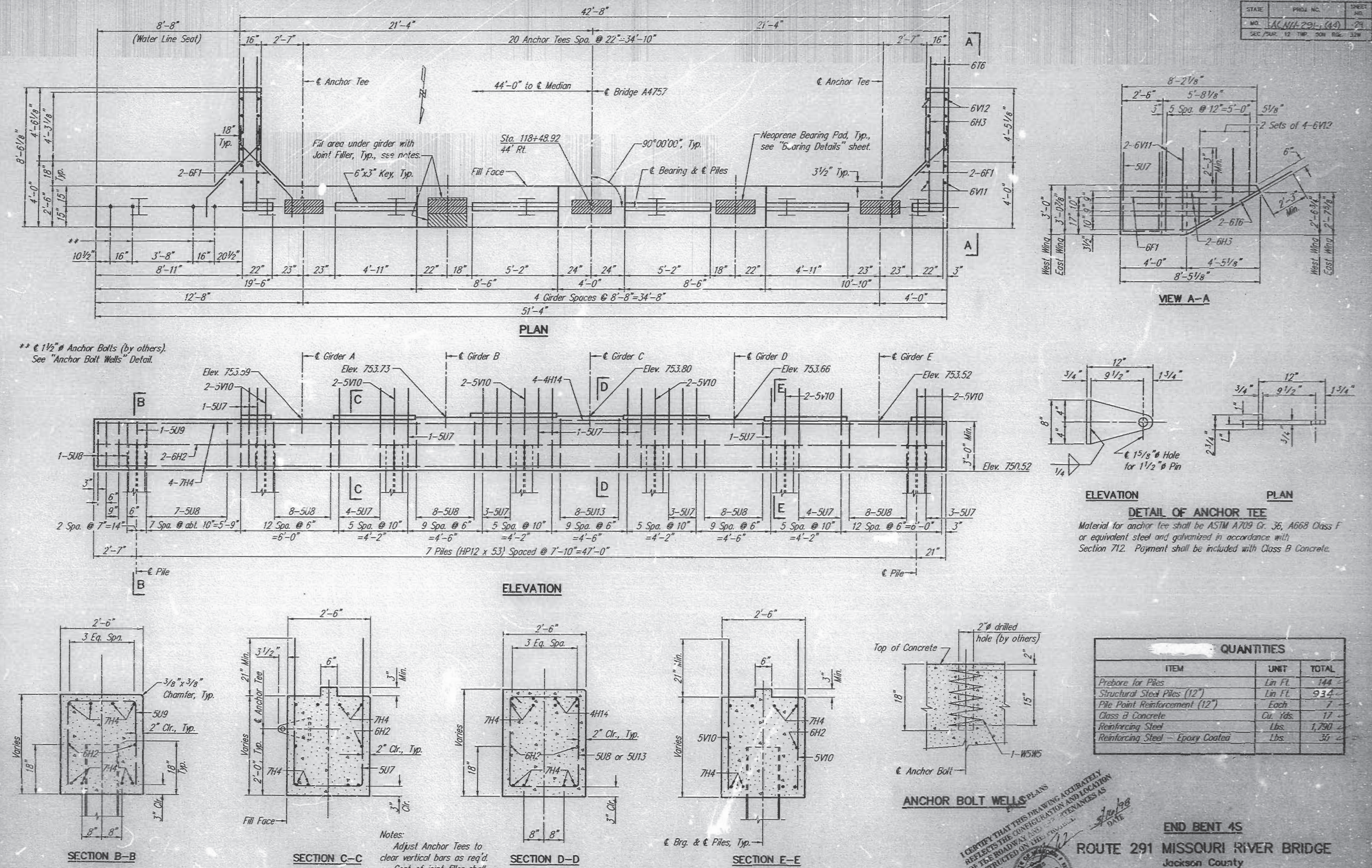
FINAL PLANS

STATE	PROJ. NO.	SHEET NO.
MO.	ACNH-291-(44)	29



ELEVATION **PLAN**

DETAIL OF ANCHOR TEE

℄ 1⅝"ø Hole for 1½"ø Pin

Material for anchor tee shall be ASTM A709 Gr. 36, A668 Class F or equivalent steel and galvanized in accordance with Section 712. Payment shall be included with Class B Concrete.

QUANTITIES		
ITEM	UNIT	TOTAL
Prebore for Piles	Lin Ft.	144
Structural Steel Piles (12")	Lin Ft.	934
Pile Point Reinforcement (12")	Each	7
Class B Concrete	Cu. Yds.	17
Reinforcing Steel	Lbs.	1,790
Reinforcing Steel – Epoxy Coated	Lbs.	35

Notes:
Adjust Anchor Tees to clear vertical bars as req'd.
Cost of joint filler shall be incidental to price bid for Prestressed Concrete Gdrs.

I CERTIFY THAT THIS DRAWING ACCURATELY REFLECTS THE CONFIGURATION AND LOCATION OF THE ROADWAY AND APPURTENANCES AS CONSTRUCTED ON THE PROJECT. DATE

HARRINGTON & CORTELYOU, INC. Consulting Engineers

DETAILED: T.L.W. 2/93
CHECKED: T.L.N. 2/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

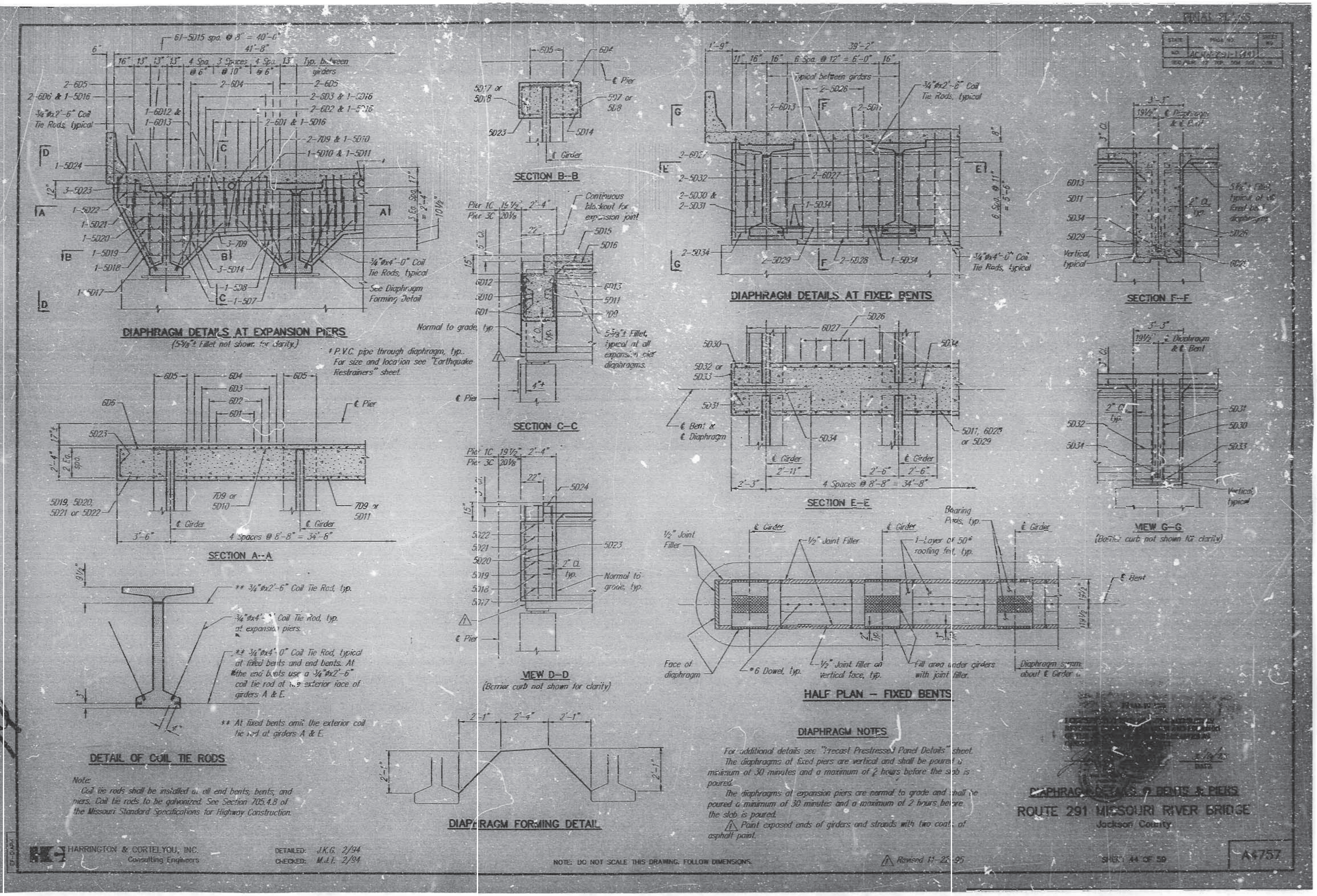
END BENT 4S

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

SHEET 29 OF 59

A4757



DIAPHRAGM DETAILS AT EXPANSION PIERS
(5⅝" Fillet not shown for clarity.)
SECTION B–B
SECTION C–C
SECTION A–A
VIEW D–D
(Barrier curb not shown for clarity)
DETAIL OF COIL TIE RODS
DIAPHRAGM FORMING DETAIL
DIAPHRAGM DETAILS AT FIXED BENTS
SECTION E–E
SECTION F–F
VIEW G–G
(Barrier curb not shown for clarity)
HALF PLAN – FIXED BENTS
* P.V.C. pipe through diaphragm, typ. For size and location see "Earthquake Restrainers" sheet.
** ¾"ø×2'-6" Coil Tie Rod, typ.
¾"ø×4'-0" Coil Tie Rod, typ. at expansion piers.
** ¾"ø×4'-0" Coil Tie Rod, typical at fixed bents and end bents. At the end bents use a ¾"ø×2'-6" coil tie rod at the exterior face of girders A & E.
** At fixed bents omit the exterior coil tie rod at girders A & E.
Note:
Coil tie rods shall be installed at all end bents, bents, and piers. Coil tie rods to be galvanized. See Section 705.4.8 of the Missouri Standard Specifications for Highway Construction.
DIAPHRAGM NOTES
For additional details see "Precast Prestressed Panel Details" sheet.
The diaphragms of fixed piers are vertical and shall be poured a minimum of 30 minutes and a maximum of 2 hours before the slab is poured.
The diaphragms at expansion piers are normal to grade and shall be poured a minimum of 30 minutes and a maximum of 2 hours before the slab is poured.
Paint exposed ends of girders and strands with two coats of asphalt paint.
DIAPHRAGM DETAILS @ BENTS & PIERS
ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County
HARRINGTON & CORTELYOU, INC.
Consulting Engineers
DETAILED: J.K.G. 2/94
CHECKED: M.J.T. 2/94
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.
Revised 11-23-95
SHEET 44 OF 59
A4757

FINAL PLANS

STATE	PROJ. NO.	SHEET NO.
MO.	ACNH-291-1(44)	56

SEC. 12 TWP. 50N RGE. 32W

"AS BUILT FOUNDATION DATA"

END BENT 1N (HP12x53)

PILE NO.	LENGTH IN PLACE (FT.)	COMPUTED BEARING (TONS)	REMARKS
1	135	Refusal	
2	135	"	
3	134	"	
4	133	"	
5	135	"	
6	134	"	
7	135	"	

BENT 2N (HP12x53)

PILE NO.	LENGTH IN PLACE (FT.)	COMPUTED BEARING (TONS)	REMARKS
8	92	Refusal	2" Batter
9	90	"	
10	91	"	2" Batter
11	91	"	2" Batter
12	90	"	
13	91	"	2" Batter
14	92	"	2" Batter
15	90	"	
16	91	"	2" Batter
17	83	"	2" Batter
18	89	"	
19	89	"	2" Batter
20	91	"	2" Batter
21	90	"	
22	91	"	2" Batter
23	91	"	2" Batter
24	90	"	
25	91	"	2" Batter

BENT 3N (HP12x53)

PILE NO.	LENGTH IN PLACE (FT.)	COMPUTED BEARING (TONS)	REMARKS
26	90	Refusal	2" Batter
27	88	"	
28	90	"	2" Batter
29	90	"	2" Batter
30	88	"	
31	91	"	2" Batter
32	91	"	2" Batter
33	89	"	
34	91	"	2" Batter
35	90	"	2" Batter
36	90	"	
37	92	"	2" Batter
38	90	"	2" Batter
39	89	"	
40	90	"	2" Batter
41	90	"	2" Batter
42	89	"	
43	90	"	2" Batter

BENT 4N (HP12x53)

PILE NO.	LENGTH IN PLACE (FT.)	COMPUTED BEARING (TONS)	REMARKS
44	74	Refusal	2" Batter
45	73	"	
46	75	"	2" Batter
47	73	"	2" Batter
48	72	"	
49	74	"	2" Batter
50	73	"	2" Batter
51	72	"	
52	74		2" Batter

BENT 4N (CONTINUED)

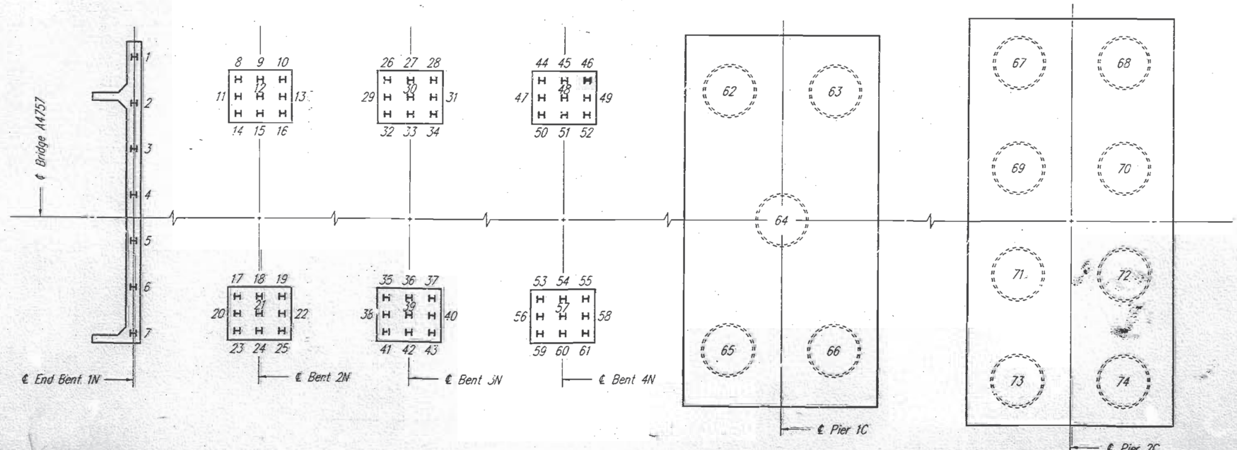
PILE NO.	LENGTH IN PLACE (FT.)	COMPUTED BEARING (TONS)	REMARKS
53	79	Refusal	2" Batter
54	78	"	
55	77	"	2" Batter
56	80	"	2" Batter
57	80	"	
58	77	"	2" Batter
59	81	"	2" Batter
60	80	"	
61	78	"	2" Batter

PIER 1C

SHAFT NO.	BOTTOM OF DRILLED SHAFT (ELEV.)	BOTTOM OF ROCK SOCKET (ELEV.)	REMARKS
62	635.4	615.0	
63	637.4	614.7	
64	636.6	615.4	
65	632.6	613.9	
66	634.9	614.3	

PIER 2C

SHAFT NO.	BOTTOM OF DRILLED SHAFT (ELEV.)	BOTTOM OF ROCK SOCKET (ELEV.)	REMARKS
67	623.7	594.0	
68	619.2	594.1	
69	624.0	593.8	
70	624.3	594.1	
71	625.6	594.3	
72	624.2	594.2	
73	626.5	593.4	
74	623.8	595.8	



FINAL PLANS

3/16/98

AS BUILT FOUNDATION DATA

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: D.E.B. 5/94
CHECKED:

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 58 OF 59

A4757

392-15

FINAL PLANS

STATE	PROJ. NO.	SHEET NO.
MO	ACNH-291-1(44)	59

"AS BUILT PILE" DATA

PIER 3C (HP14x117)

PILE NO.	LENGTH IN PLACE (FT.)	COMPUTED BEARING (TONS)	REMARKS
75	87	Refusal	2" Batter
76	87	"	" "
77	88	"	" "
78	87	"	" "
79	87	"	" "
80	87	"	" "
81	87	"	" "
82	87	"	" "
83	87	"	" "
84	87	"	" "
85	85	"	Used as test pile
86	87	"	2" Batter
87	87	"	" "
88	85	"	
89	87	"	2" Batter
90	89	"	" "
91	85	"	
92	87	"	2" Batter
93	88	"	" "
94	86	"	" "
95	87	"	" "
96	87	"	" "
97	87	"	" "
98	87	"	" "
99	87	"	" "
100	87	"	" "
101	87	"	" "

BENT 1S (HP12x53)

PILE NO.	LENGTH IN PLACE (FT.)	COMPUTED BEARING (TONS)	REMARKS
102	103	Refusal	2" Batter
103	104	"	
104	102	"	2" Batter
105	103	"	" "
106	101	"	
107	103	"	2" Batter
108	103	"	" "

BENT 1S (CONTINUED)

PILE NO.	LENGTH IN PLACE (FT.)	COMPUTED BEARING (TONS)	REMARKS
109	101	Refusal	
110	104	"	2" Batter
111	102	"	" "
112	101	"	
113	102		2" Batter
114	103		" "
115	102		
116	104		2" Batter
117	102		" "
118	101		
119	102		2" Batter

BENT 2S (HP12x53)

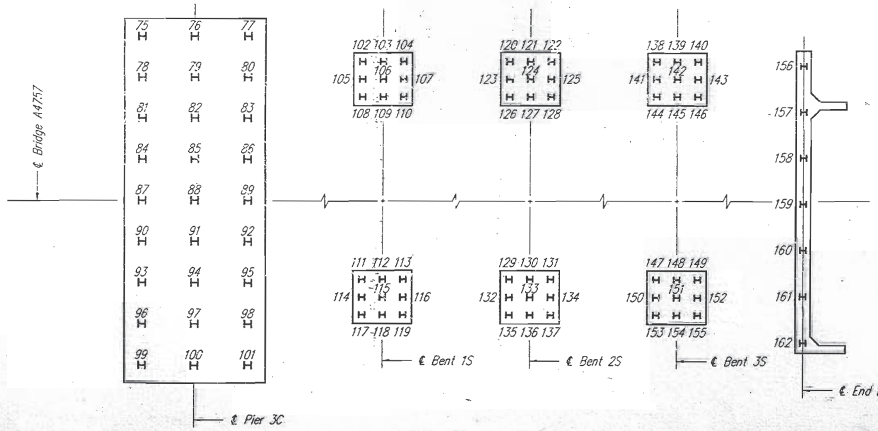
PILE NO.	LENGTH IN PLACE (FT.)	COMPUTED BEARING (TONS)	REMARKS
120	101	Refusal	2" Batter
121	100	"	
122	101	"	2" Batter
123	101	"	" "
124	100	"	
125	101	"	2" Batter
126	102	"	" "
127	100	"	
128	101	"	2" Batter
129	101	"	" "
130	100	"	
131	101	"	2" Batter
132	100	"	" "
133	100	"	
134	101	"	2" Batter
135	101	"	" "
136	100	"	
137	101	"	2" Batter

BENT 3S (HP12x53)

PILE NO.	LENGTH IN PLACE (FT.)	COMPUTED BEARING (TONS)	REMARKS
138	101	Refusal	2" Batter
139	101	"	
140	102	"	2" Batter
141	102	"	" "
142	100	"	
143	102	"	2" Batter
144	101	"	" "
145	100	"	
146	103	"	2" Batter
147	101	"	" "
148	101	"	
149	102	"	2" Batter
150	101	"	" "
151	101	"	
152	102	"	2" Batter
153	100	"	" "
154	101	"	
155	101	"	2" Batter

END BENT 4S (HP12x53)

PILE NO.	LENGTH IN PLACE (FT.)	COMPUTED BEARING (TONS)	REMARKS
156	133	Refusal	
157	135	"	
158	132	"	
159	134	"	
160	134	"	
161	133	"	
162	133	"	



I CERTIFY THAT THIS DRAWING ACCURATELY REFLECTS THE LOCATION ... AS CONSTRUCTED
5/10/95
DATE

AS BUILT FOUNDATION DATA

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: D.E.B. 5/94
CHECKED:

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

A4757

STATE	PROJ. NO.	SHEET NO.
MO.		36

SEC./SUR. 12 TWP. 50N RGE. 32W

MISSOURI HIGHWAY AND TRANSPORTATION COMMISSION

ROUTE 291 MISSOURI RIVER BRIDGE

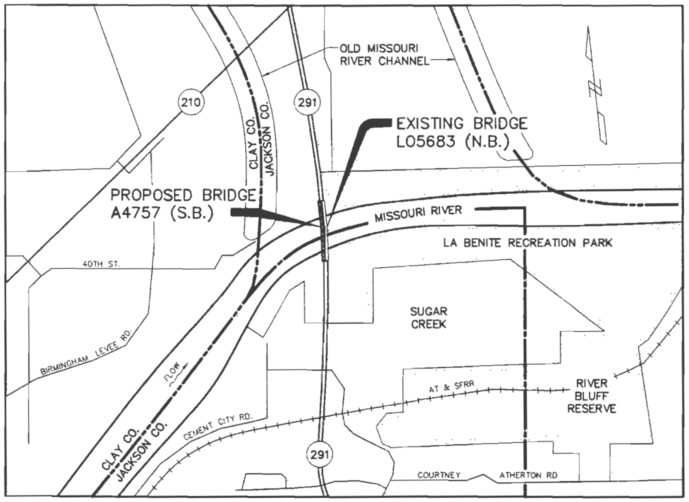
JACKSON COUNTY

CONTRACT 3

BRIDGE DECK (UNIT-2), WATER LINE, FIELD APPLIED PROTECTIVE COATING, AND NAVIGATION LIGHTING

1996

INDEX OF SHEETS



LOCATION SKETCH

INDEX OF SHEETS

STATE OF MISSOURI KEVIN R. EISENBEIS NUMBER E-20946 REGISTERED PROFESSIONAL ENGINEER

SUBMITTED BY: Kevin R. Eisenbeis
REGISTERED PROFESSIONAL ENGINEER 1-26-98
MISSOURI MO. E-20946

BRIDGE OVER MISSOURI RIVER

IN JACKSON COUNTY, MISSOURI
PROJECT NO. STA. 99+52.92
JOB NO. J4U0564E RTE. 291
JACKSON COUNTY

DATE 3/27/98

STD.
STD. 706.35

A4757

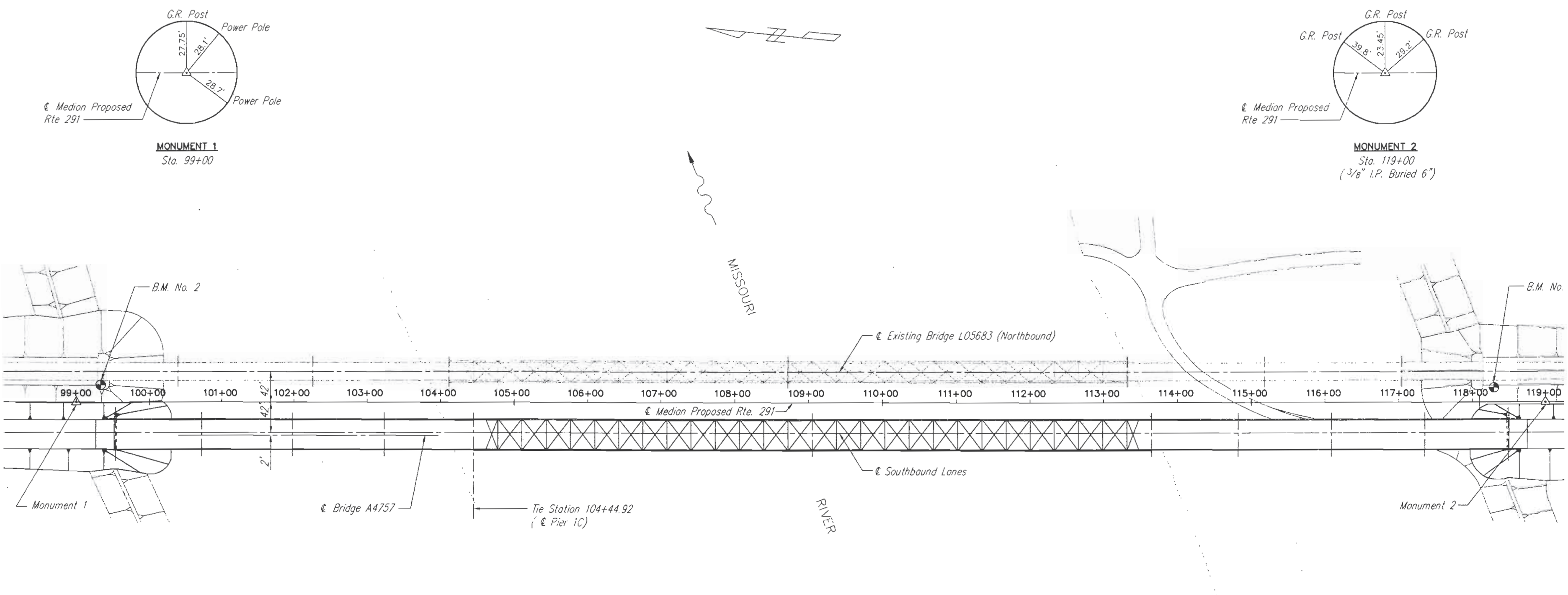
291COVC3

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: S.A.K. 04/94
CHECKED: M.J.T. 04/94

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

STATE	PROJ. NO.	SHEET NO
MO.		37



BENCH MARKS:

B.M. No. 2 Elev. 763.54 – Chiseled "□" on West Wing of North Abut. of Missouri River Bridge LC5683 24' Lt. ℄ Med. Sta. 99+33 ±.

B.M. No. 5 Elev. 763.45 – USC&G B.M. Disk Stamped U-218 Quad 390942 20'± Lt. ℄ Med. Sta. 118+30 ±.

NOTE:

The monuments shown on this drawing shall be used for stationing and alignment of the bridge.

STATE OF MISSOURI
KEVIN R. EISENBEIS
NUMBER E-20946
REGISTERED PROFESSIONAL ENGINEER
1-26-98

SURVEY TIES & ALIGNMENT DIAGRAM

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

ALIGN_C3

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

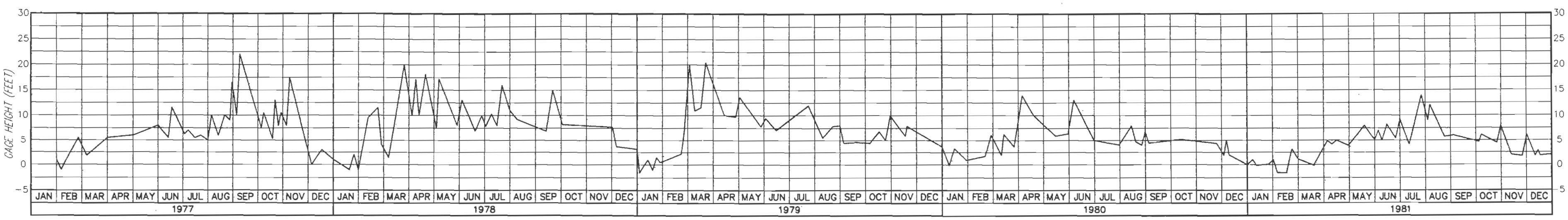
DETAILED: B.T.K. 02/93
CHECKED: K.R.E. 09/93

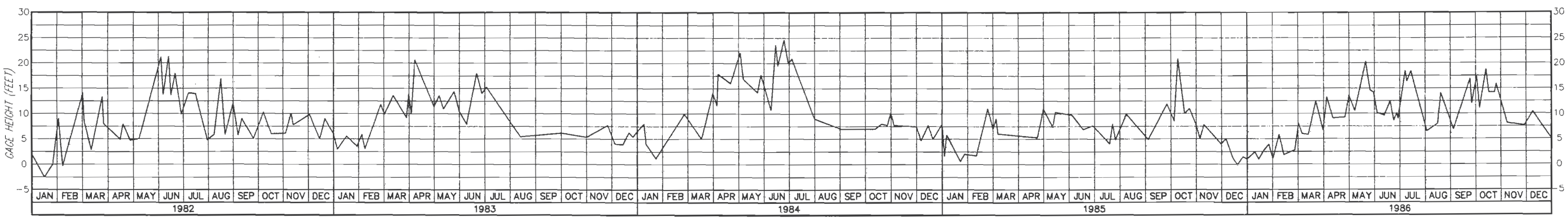
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

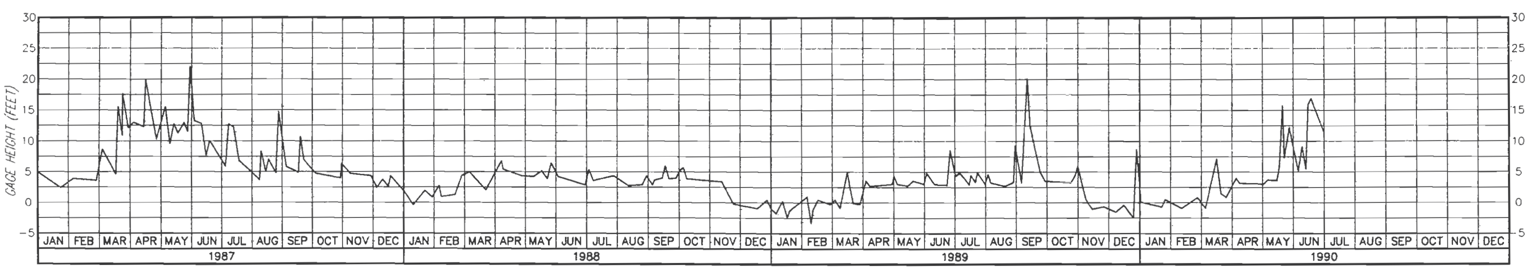
SHEET 2 OF 28

A4757

STATE	PROJ. NO.	SHEET NO.
MO.		38







NOTES

Stage hydrograph was plotted from readings of the Missouri River near the Hannibal Bridge located at river mile 366.1 in Kansas City, Missouri. Gage Zero is 715.8 ft. M.S.L. (Mean Sea Level).

Seasonal variations in the water elevations at the Hannibal Bridge can be estimated by adding the gage reading to Elev. 715.8

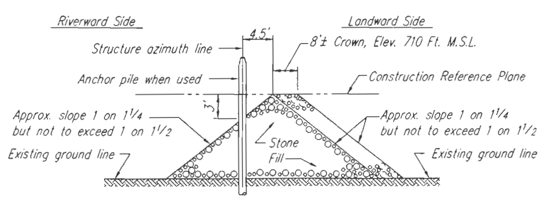
The Route 291 Bridge is located at river mile 352.7. A plot of the water surface elevation versus discharge curves for the Hannibal and Route 291 Bridges is shown on this drawing.

An estimate for seasonal variations in water surface elevations at the Route 291 Bridge can be made by deducting 11.7± to 14.6± feet from those at the Hannibal Bridge.

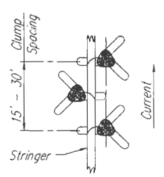
Stage hydrograph is based on information provided by the U.S. Army Corps of Engineers. Accuracy of details or dimensions are not guaranteed.

STATE OF MISSOURI KEVIN R. EISENBEIS NUMBER E-20548 REGISTERED PROFESSIONAL ENGINEER

1-26-98

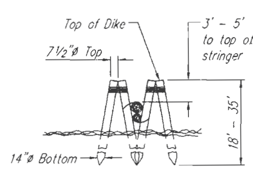


STONE FILL REVETMENT



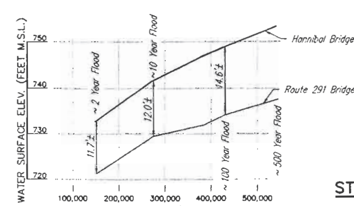
PLAN VIEW

Note:
Timber pile structure may be encountered in revetment along bank. Details shown are representative only, exact configuration and location is unknown.



END VIEW

TIMBER PILE STRUCTURE - TWO ROW CLUMP



WATER SURFACE ELEVATION VS. DISCHARGE CURVES

STAGE HYDROGRAPH AND REVETMENT DETAILS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HC HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: S.A.K. 03/94
CHECKED: M.J.T. 03/94

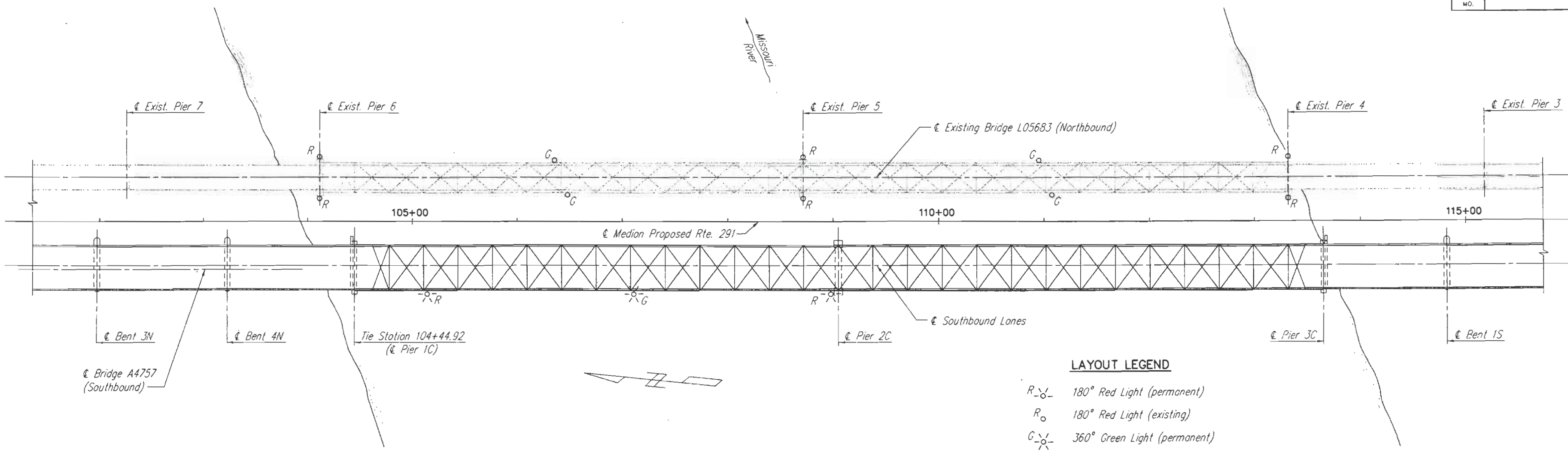
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 3 OF 28

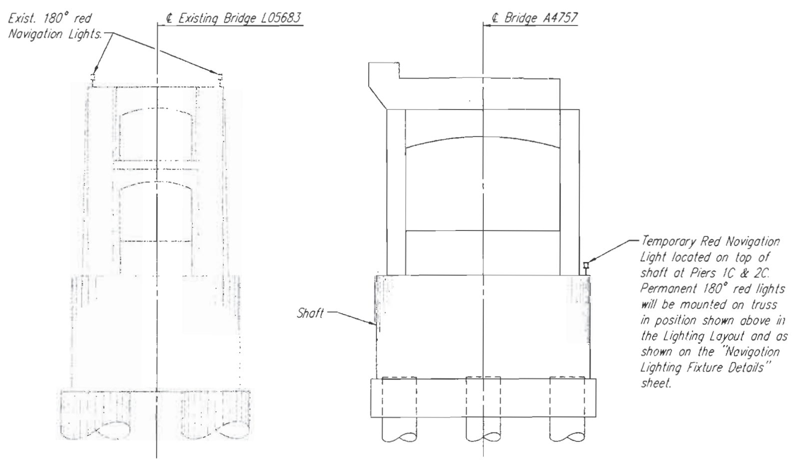
A4757

HYDRO_C3

STATE	PROJ. NO.	SHEET NO.
MO.		39

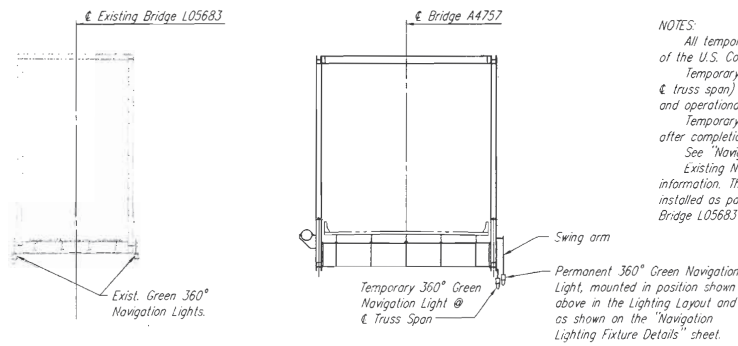


NAVIGATION LIGHTING LAYOUT



LOCATION OF TEMPORARY LIGHTS ON PIERS

(Superstructure not shown for clarity.)



LOCATION OF LIGHTS AT MID-CHANNEL

NOTES:

All temporary and permanent lighting shall meet the requirements of the U.S. Coast Guard.

Temporary lighting (red at Piers 1C & 2C and 360° green at ℄ truss span) shall be maintained until permanent lighting is in place and operational.

Temporary lighting will remain the property of the contractor after completion of construction.

See "Navigation Lighting Electrical Details" for additional notes.

Existing Navigation Lighting on Bridge L05683 has been shown for information. These lights will be removed and three new lights will be installed as part of the work in this contract. See plan sheets for Bridge L05683 and Special Provisions.

KEVIN R. EISENBEIS NUMBER E-20948 — STATE OF MISSOURI REGISTERED PROFESSIONAL ENGINEER — 1-26-98

STATE OF MISSOURI PROFESSIONAL ENGINEER E-15521 — 1/26/98

NAVIGATION LIGHTING

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.K.G. 4/94
CHECKED: E.W.N. 10/94

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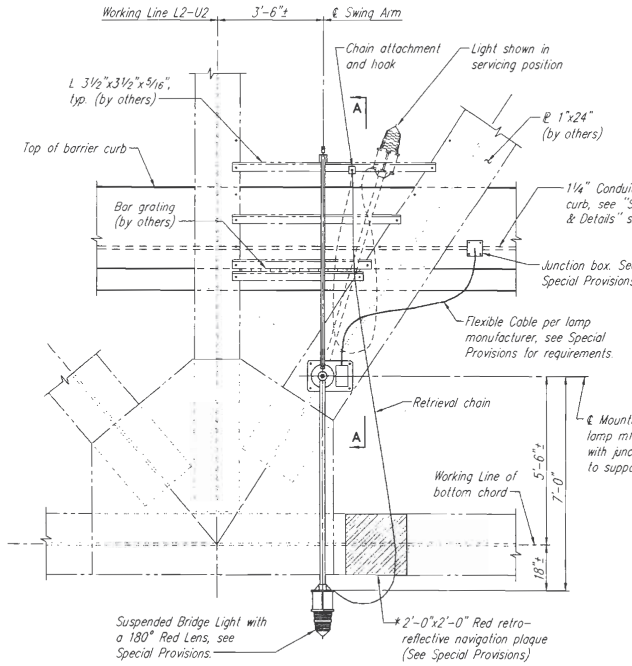
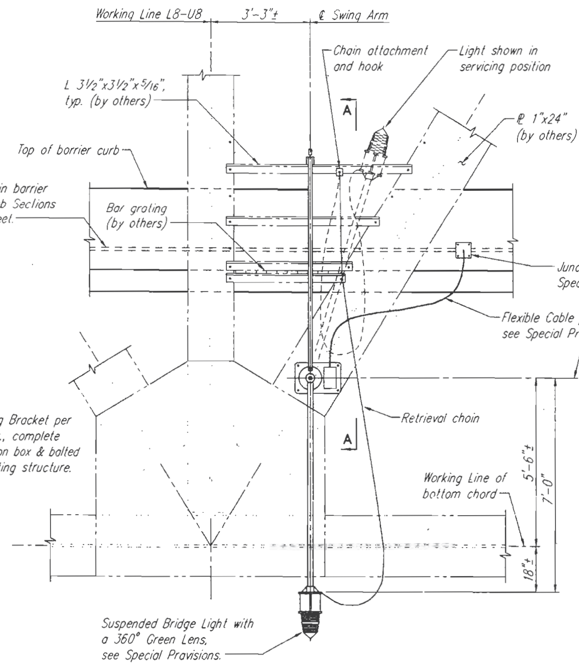
SHEET 4 OF 28

A4757

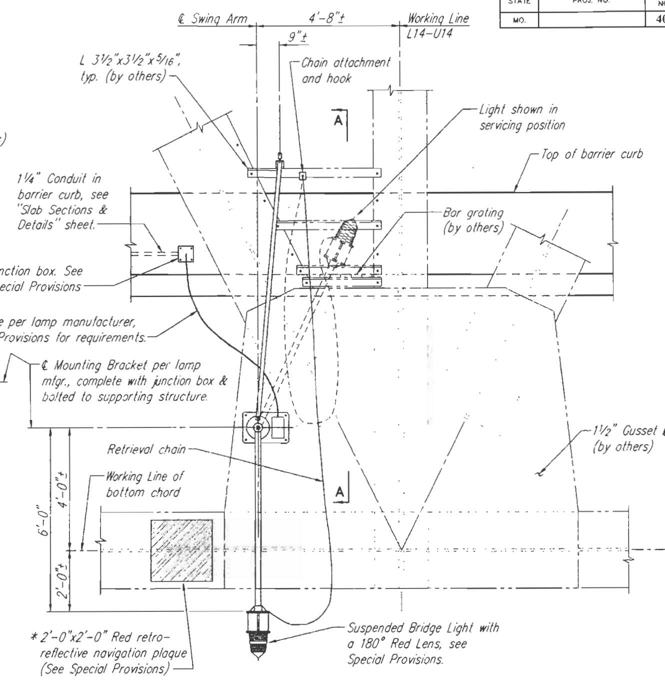
NAV_LIT1



LEFT DECENDING MARGIN OF CHANNEL

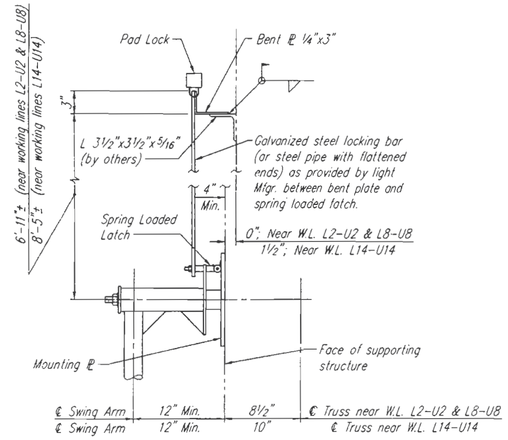


MID-CHANNEL



RIGHT DECENDING CHANNEL PIER

LIGHT FIXTURE DETAILS



SECTION A-A

* Type 2 reflective sheeting on an aluminum flat sheet in accordance with sec. 1042. For mounting use 3/8" ø stainless steel connectors with washers and nuts. Space aluminum flat plate away from existing steel with 3/8" stainless steel spacer.

Note:
For electrical details and lighting system notes, see "Navigation Lighting Electrical Details" sheet.
Contractor shall field verify all dimensions which affect the Navigation Light Fixtures prior to fabrication.

NAVLT_2

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.K.G. 10/94
CHECKED: E.W.N. 7/95

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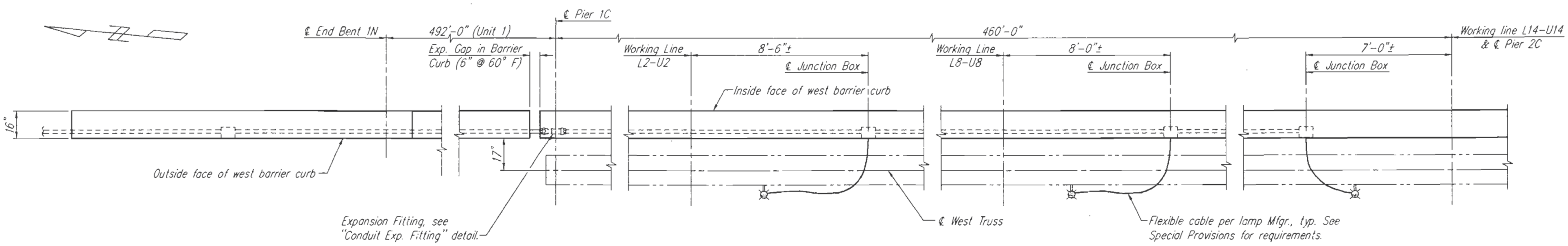
STATE OF MISSOURI — TERRANCE M. SUPER — E-18524 — REGISTERED PROFESSIONAL ENGINEER — 1/26/98

STATE OF MISSOURI — KEVIN R. EISENBEIS — NUMBER E-20946 — REGISTERED PROFESSIONAL ENGINEER — 1/26/98

NAVIGATION LIGHTING FIXTURE DETAILS
ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

A4757

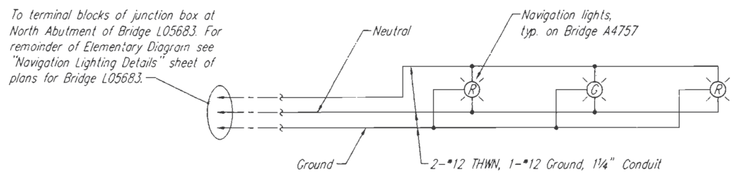
STATE	PROJ. NO.	SHEET NO.
MO.		41



ELECTRICAL PLAN

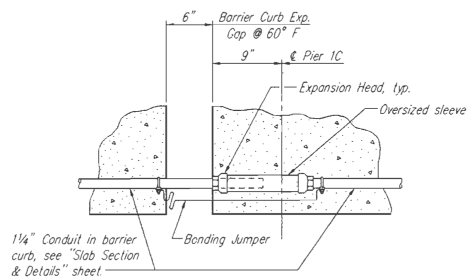
(Pull boxes not shown for clarity, see Special Provisions for requirements)

SYMBOLS	
⊠	Navigation Light (180° Red)
✱	Navigation Light (360° Green)
⊏⊐	Junction Box embeded in barrier curb.
=====	1¼" Zinc coated rigid steel conduit in barrier curb.



ELEMENTARY DIAGRAM

Lighting System Notes:
For location of conduit in barrier curb, see "Slab Section & Details" sheet. Weepholes shall be provided at appropriate locations to drain any moisture in conduit lines.
For conduit run between bridges A4757 and L05683, see Special Provisions.
Apply zinc rich paint to edges of all field drilled holes.
The cost of field drilled holes required for attachment of light fixtures and any other miscellaneous items shall be considered as incidental to the cost of other items included in the unit price bid for "Navigation Lighting System" per Lump Sum.
For additional Navigation Lighting System requirements see Special Provisions.



CONDUIT EXPANSION FITTING

Expansion fitting shall be galvanized, water tight and shall allow for a total movement range of 9⅝" due to a total temperature change of 140° F, from -20° F to 120° F (11/16" for every 10° F). Initial expansion gap in fitting shall be based on the temperature at the time of installation.

NAVIGATION LIGHTING ELECTRICAL DETAILS

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

HC HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.K.G. 3/94
CHECKED: E.W.N. 7/95

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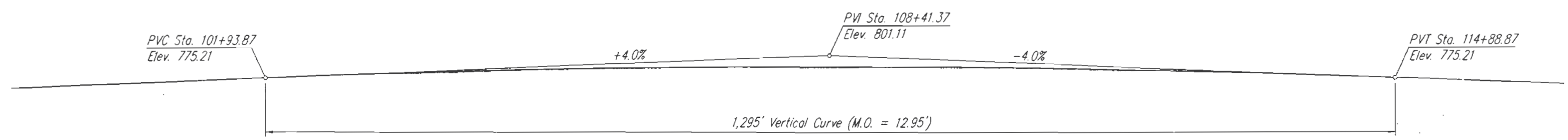
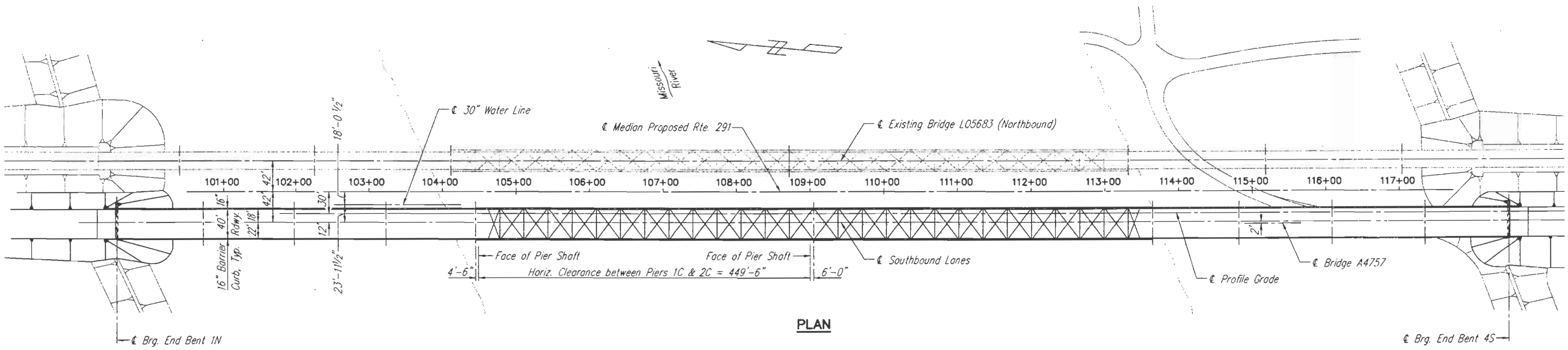
A4757

NAVLIT_3

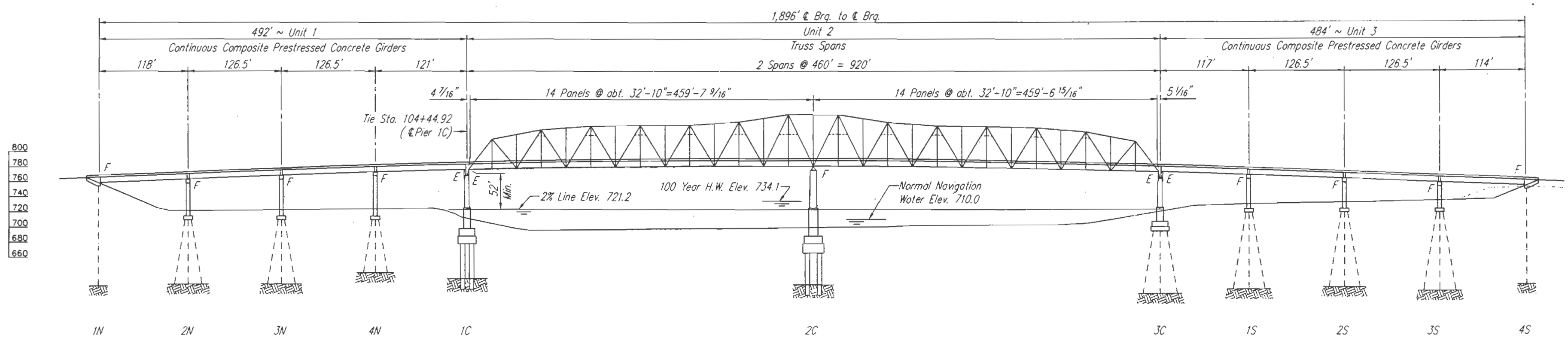
STATE	PROJ. NO.	SHEET NO.
MO.		42



PROFILE GRADE



PLAN



ELEVATION

BASIC FLOOD DATA	
Discharge (100 yr.)	430,000 cfs
H.W. Elev.	734.1

STATE OF MISSOURI KEVIN R. EISENBEIS NUMBER E-20946 REGISTERED PROFESSIONAL ENGINEER

1-26-98

GENERAL PLAN AND ELEVATION
ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

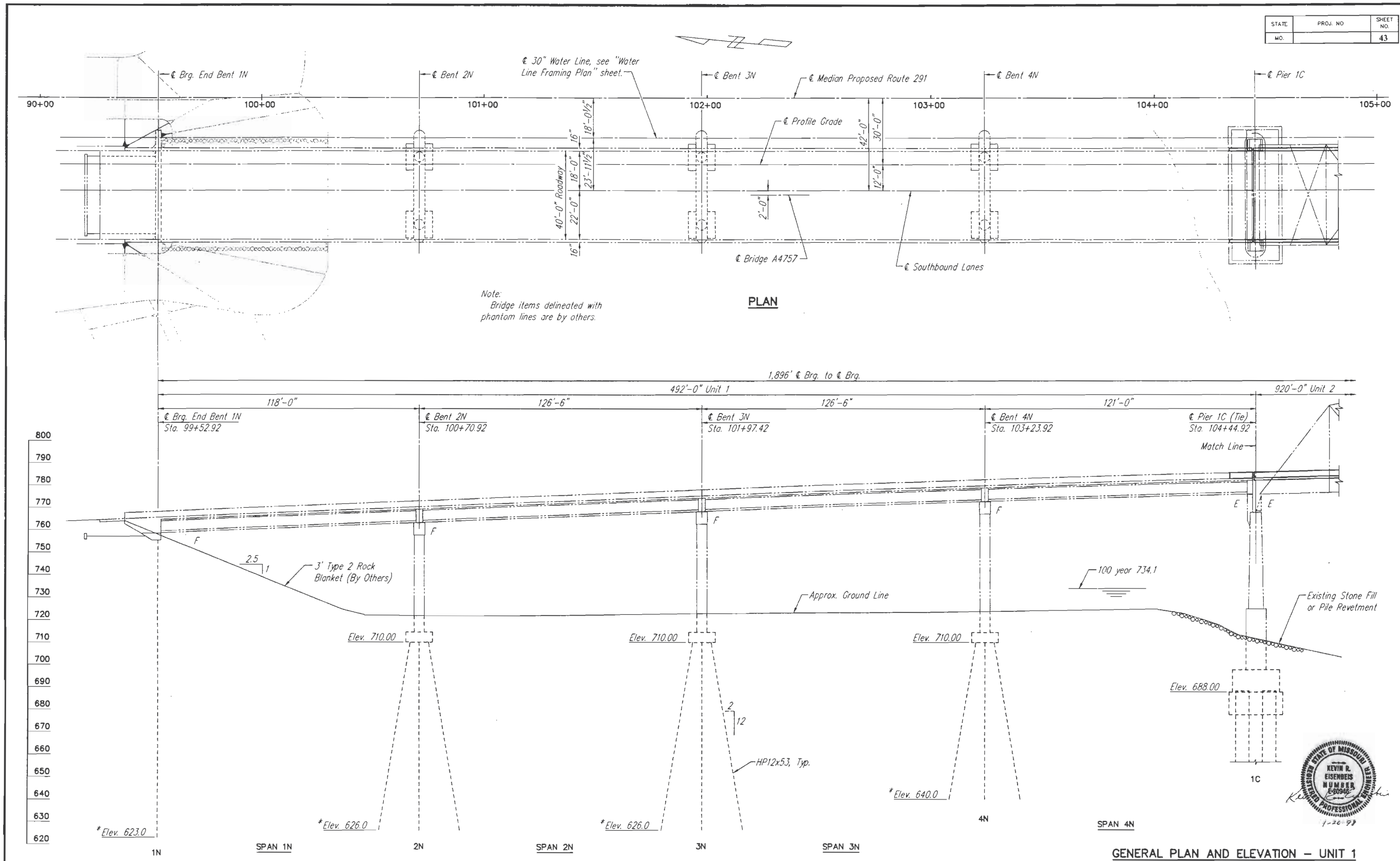
GPE291C3

DETAILED: T.L.W. 10/92
CHECKED: H.G.J. 09/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 7 OF 28

A4757



ELEVATION

*Estimated Pile Tip Elevation.

GENERAL PLAN AND ELEVATION – UNIT 1

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.K.G. 2/94
CHECKED: M.J.T. 2/94

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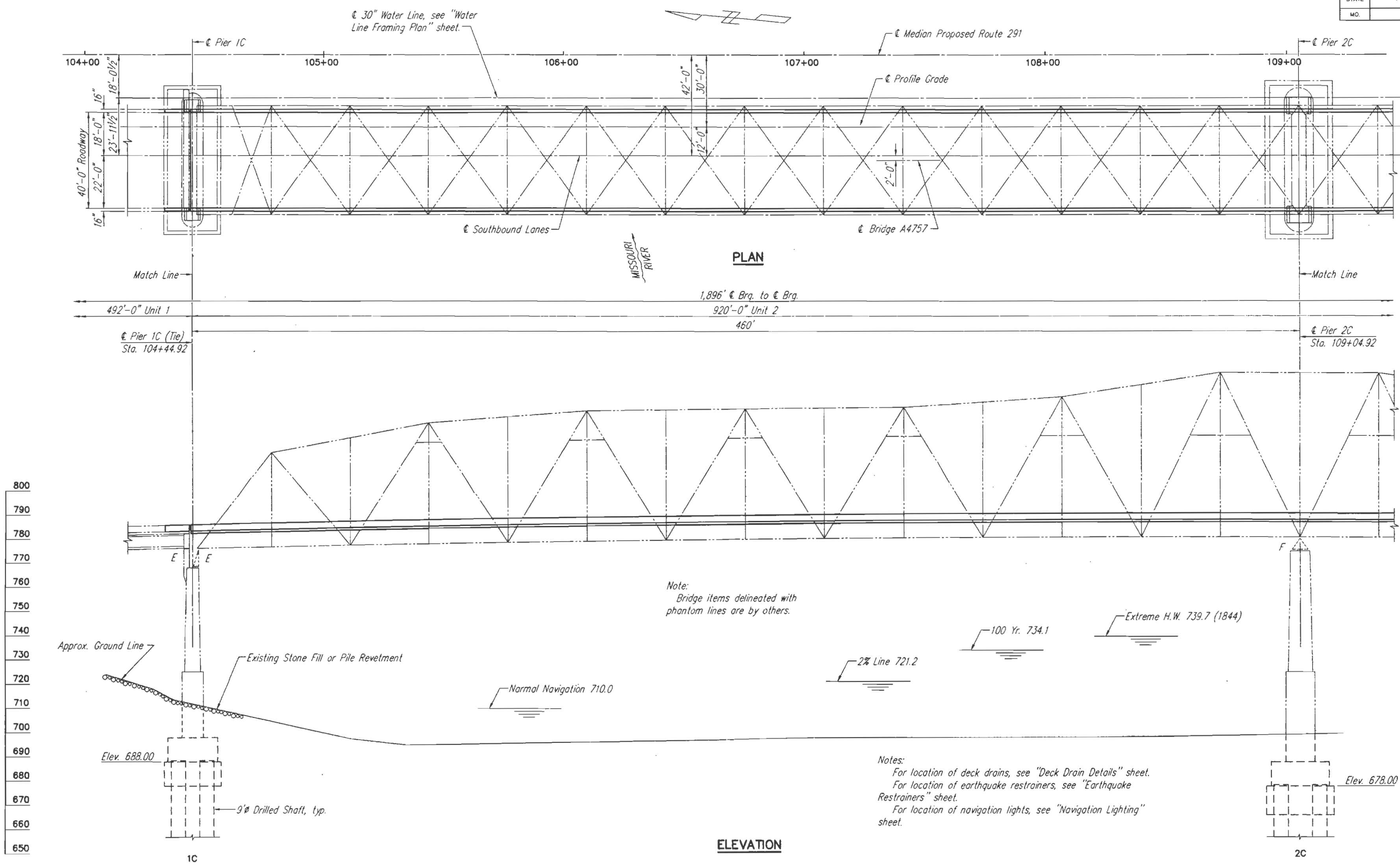
SHEET 8 OF 28

A4757



Notes:
For location of deck drains, see "Deck Drain Details" sheet.
For location of earthquake restrainers, see "Earthquake Restrainers" sheet.
For location of navigation lights, see "Navigation Lighting" sheet.

STATE	PROJ. NO.	SHEET NO.
MO.		44

GENERAL PLAN AND ELEVATION – UNIT 2 NORTH SPAN

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

STATE OF MISSOURI — KEVIN R. EISENBEIS — NUMBER E-20908 — REGISTERED PROFESSIONAL ENGINEER

1-26-98

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.K.C. 2/94
CHECKED: M.J.T. 2/94

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

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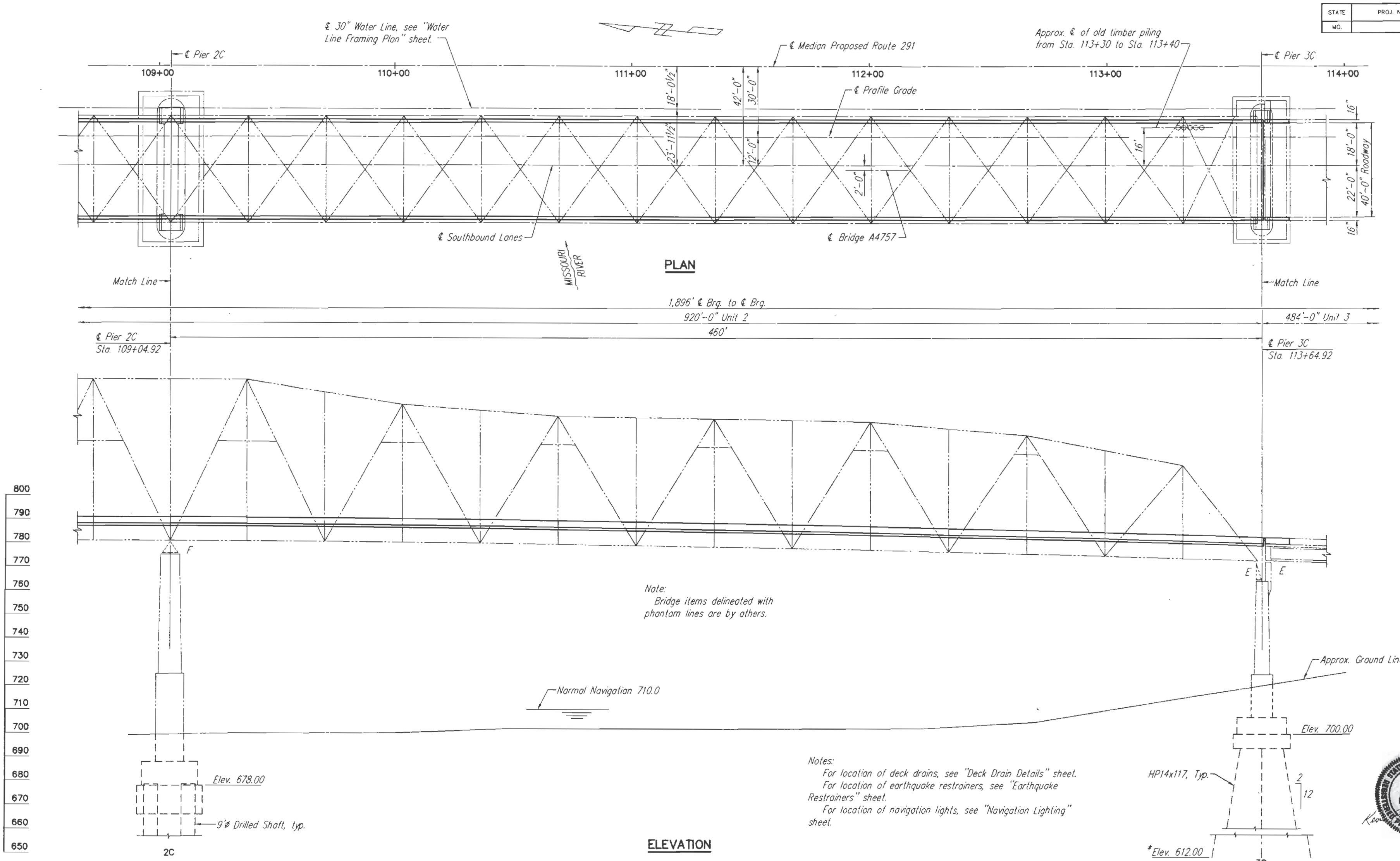
STATE	PROJ. NO.	SHEET NO.
MO.		45



Notes:

For location of deck drains, see "Deck Drain Details" sheet.

For location of earthquake restrainers, see "Earthquake Restrainers" sheet.

For location of navigation lights, see "Navigation Lighting" sheet.

*Estimated Pile Tip Elevation.

STATE OF MISSOURI KEVIN R. EISENBEIS NUMBER E-20346 PROFESSIONAL ENGINEER

1-26-98

GENERAL PLAN AND ELEVATION – UNIT 2
SOUTH SPAN

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

GPEU2BC3

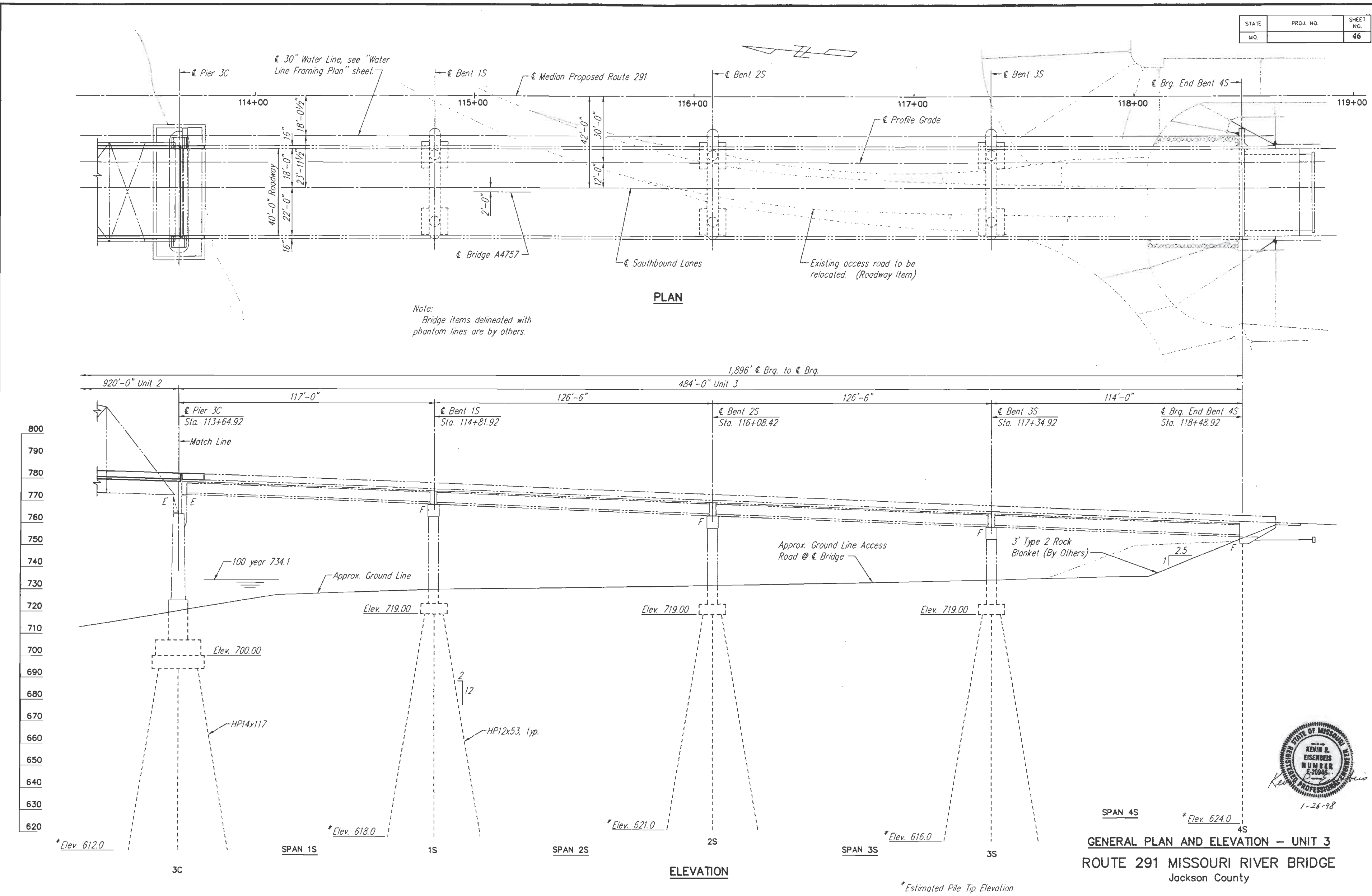
HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.K.G. 2/94
CHECKED: M.J.T. 2/94

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 10 OF 28

A4757



GENERAL PLAN AND ELEVATION – UNIT 3

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

GPE_U3C3

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.K.G. 2/94
CHECKED: M.J.T. 2/94

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 11 OF 28

A4757

STATE	PROJ. NO.	SHEET NO.
MO.		47

GENERAL NOTES:

The scope of work consists of the construction of slab and barrier curbs of Unit 2, the water line and its supporting structure and the navigation lighting system, along with other associated work as shown on the plans. The field coat of the Unit 2 Superstructure Steel is also part of the work in this contract.

The existing Missouri Route 291 shall remain open to traffic during construction.

Utility companies whose facilities are shown on the plans or are known to be within the construction limits shall be notified by the contractor of the construction start date.

All dimensions are horizontal unless otherwise noted. Drawings shall not be scaled.

SPECIFICATIONS:

Design: 1992 Edition of the AASHTO Standard Specifications for Highway Bridges plus Interims thru 1995.

Construction: Missouri State Highway Commission Standard Specifications For Highway Construction, 1996 Edition, plus project special provisions.

DESIGN LOADING:

Load Factor Design Method – Bridge Deck
Live Load – HS20 Modified with Modified 24,000 Lb. Tandem Axle. (Military Loading).
Dead Load – An allowance of 35 Lbs. per sq. ft. of roadway for future wearing surface is included in the dead load.
An allowance of 16 Lbs. per sq. ft. of roadway is used for Stay-In-Place Forms.
Concrete Weight – 150 Lbs. per cu. ft.
Earthquake – Category A

DESIGN UNIT STRESSES:

Concrete (Class B1 & B2) ----------- f_c = 1,600 psi.
f'_c = 4,000 psi.
n = 8
Reinforcing Steel (Grade 60) --------- f_s = 24,000 psi.
f_y = 60,000 psi.

CONCRETE:

All exposed edges of concrete shall be beveled 3/4" unless otherwise shown or noted.

Construction joints shall be made only at locations shown on the plans, except with the approval of the engineer.

Keys shall be provided for all construction joints unless otherwise shown.

All concrete for bridge deck shall be Class B2.

All concrete for barrier curbs shall be Class B1.

JOINT FILLER:

All joint filler shall meet the requirements of standard specification 1057.2.4, except as noted.

REINFORCING STEEL:

Reinforcing steel shall be deformed billet steel bars conforming to ASTM A615, Grade 60. All dimensions to reinforcing steel on detail drawings are to centerline of bar, except where clear distance is noted from the face of concrete.

Minimum clearance to reinforcing steel shall be 1 1/2" unless otherwise shown.

All reinforcing steel shall be lapped according to AASHTO 8.32 unless otherwise shown or noted.

All reinforcing in the bridge deck and barrier curbs shall be epoxy coated, except as noted.

The epoxy coated reinforcing bars shall be coated in accordance with Section 710 of Mo. Std. Spec's. for Highway Construction.

PROTECTIVE COATING:

Protective Coating: System G (Field Coat only) by the contractor in accordance with the Special Provisions.

Field Coat: The cost of the intermediate and finish coats shall be included in the contract unit price per tons of "Field Coat (System G) Gray". See Special Provisions.

Water Line Supports: All surfaces of water line support beams, framing and bearing plates in Units 1 & 3 and support bracket caps in Unit 2 shall be coated per System G (Gray). The cost of all materials and labor shall be included in the Contract bid price for "Water Line on Bridge".

BRIDGE DECK:

Bridge deck as detailed consists of an 8 1/2" roadway slab.

Alternate types of slab forms may be used in the construction of slabs. Cast-In-Place with conventional forming – Alt. a, or Stay-In-Place Corrugated Metal Forms – Alt. b. See Special Provisions.

Stud type shear connectors will be applied to structural steel stringers and diaphragms as a part of this contract.

TABLE OF ESTIMATED QUANTITIES – BRIDGE DECK, WATER LINE, ELECTRICAL, AND COATING

ITEM	UNIT	TOTAL
Slab on Steel	Sq. Yd.	4,366
Safety Barrier Curb	Lin. Ft	1,884
Expansion Device (Bar Type Joint)	Lin. Ft.	82
Drainage System (On Structure)	L.S.	1
Navigation Lighting System	L.S.	1
Protective Coating – Concrete Piers (Deleterious Agents)	L.S.	1
Field Coat (System G) Gray	Tons	2,106.6
Fabricated Structural Carbon Steel (Shear Connectors)	Lbs.	25,660
Earthquake Restrainer Assemblies	Each	8
Water Line on Bridge	L.S.	1

Notes:

Square yards of slab concrete includes all concrete and reinforcing steel for the Unit 2 slab. Concrete and reinforcing at expansion joint blockout in Units 1 and 3 shall be considered as incidental to price bid for "Slab on Steel".

Lineal feet of safety barrier curb concrete includes all concrete, reinforcing steel, plastic water stops and movement gauges for the barrier curbs.

ESTIMATED QUANTITIES FOR ALTERNATE SLAB FORMING

TYPE OF SLAB		SLAB ON STEEL		
		Reinf. (Lbs.)		Conc. (Cu. Yd.)
		Epoxy	Plain	Slab
Alt. a	Cast-In-Place Conventional Forms	363,740	—	1,075
Alt. b	Stay-In-Place Forms	** 363,740	—	*1,020

Notes:

The table of Estimated Quantities for Alternate Slabs represents the quantities used by the state in preparing the cost estimate for concrete slabs. Variations may be encountered in these estimated quantities but these variations cannot be used for an adjustment in the contract unit price per square yard of alternate slab used.

See Special Provisions for Alternate Methods of Forming Slabs.

* Does not include concrete in fill corrugations of S.I.P. forms.

** Does not include reinforcing bars used as bar supports.

STATE OF MISSOURI
KEVIN R. EISENBEIS
NUMBER E-20936
REGISTERED PROFESSIONAL ENGINEER

1/26/98

GENERAL NOTES & QUANTITIES
ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

GNO_C3

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: S.A.K. 3/94
CHECKED: M.J.T. 3/94

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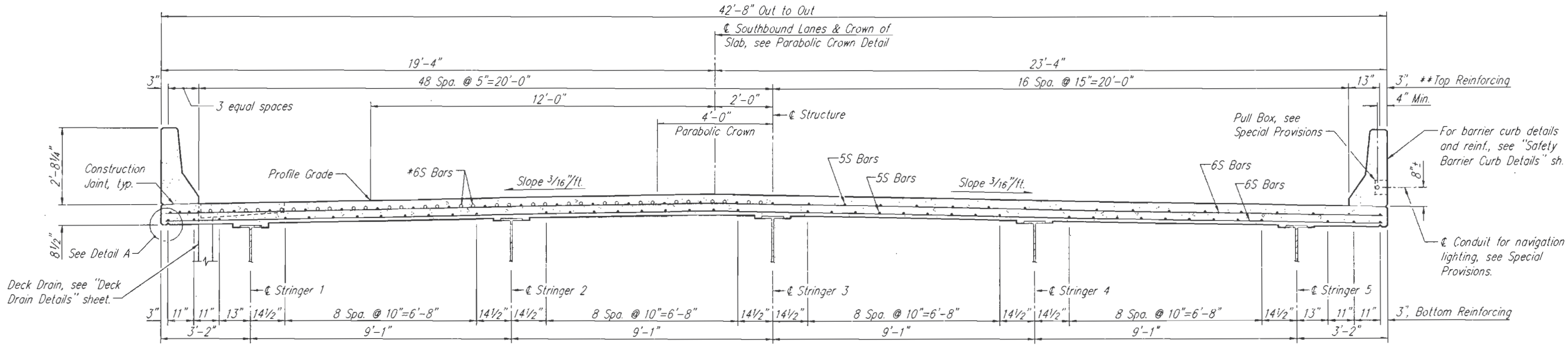
A4757

STATE	PROJ. NO.	SHEET NO.
MO.		48



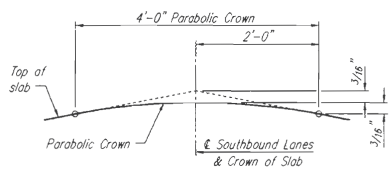
* Bars shown thus "o" indicates extra bars over floorbeams. See "Slab Plan" sheets.

HALF SECTION NEAR FLOORBEAM

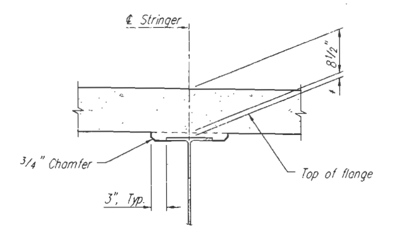
HALF SECTION @ MID PANEL

SECTION THRU ROADWAY
(Looking South)

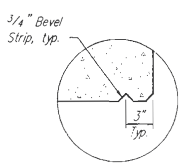
** Spacing for top reinforcing symmetrical about ℄ Structure.



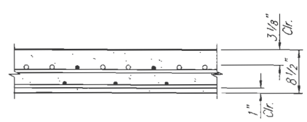
PARABOLIC CROWN DETAIL



THEORETICAL SLAB HAUNCH



DETAIL A



CLEARANCE DETAIL

* Use 1" haunch at floorbeam for stringers 2-5 and 1¾" haunch at floorbeam for stringer 1. No payment will be made for additional forming or concrete req'd. for variable haunching.

STATE OF MISSOURI — KEVIN R. EISENBEIS — NUMBER E-20946 — REGISTERED PROFESSIONAL ENGINEER
1-26-98

SLAB SECTIONS & DETAILS
ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

RDWY_SEC

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: T.L.W. 2/94
CHECKED: M.J.T. 2/94

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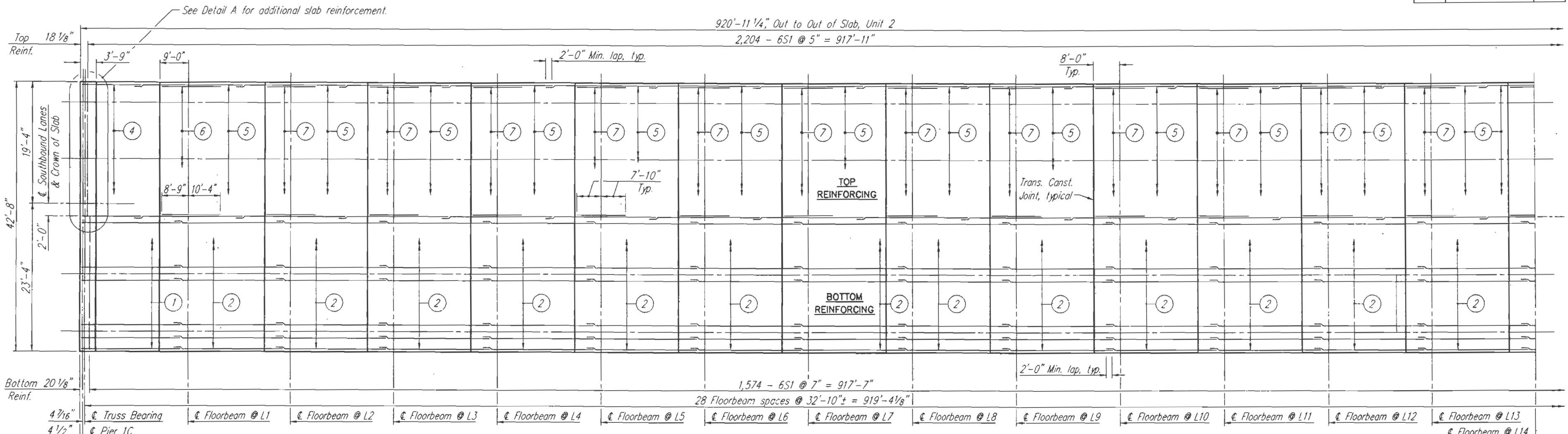
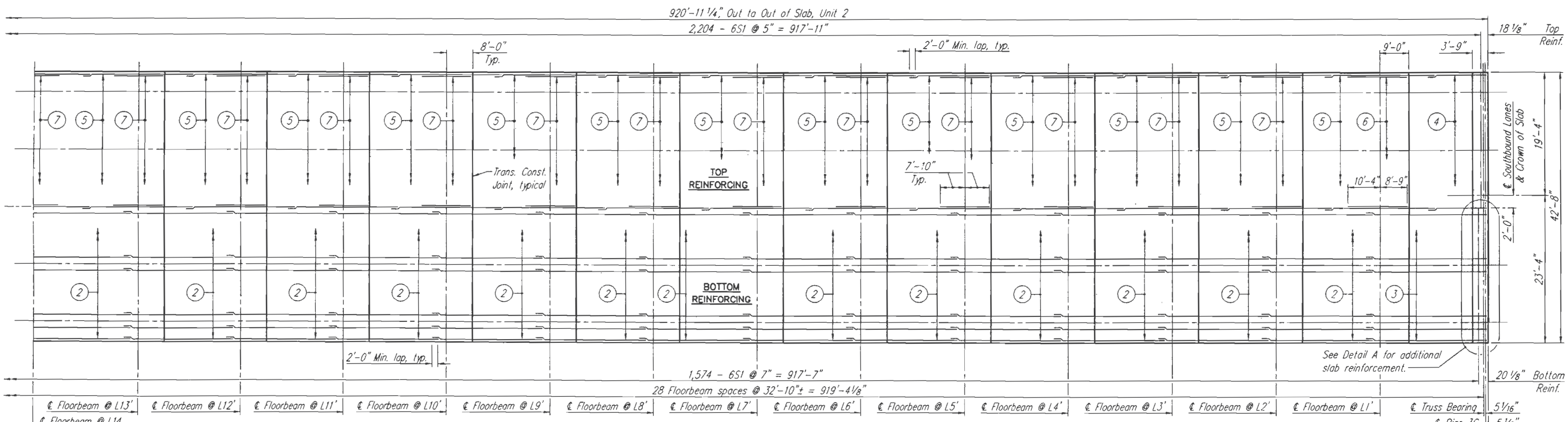
SHEET 13 OF 28

A4757

STATE	PROJ. NO.	SHEET NO.
MO.		49



SLAB PLAN



SLAB PLAN

(1) 42 - 5S2
(2) 42 - 5S3
(3) 42 - 5S4
(4) 35 - 5S5
(5) 35 - 5S3
(6) 68 - 6S6
(7) 68 - 6S7

Notes:
Slab to be built parallel to grade and a minimum thickness of 8 1/2". Estimated quantities include slab and haunching.
Longitudinal dimensions are parallel to grade.
For spacing of above reinforcing see "Slab Sections & Details" sh.

For deck drain, see "Deck Drain Details" sheet.
For Detail A and additional slab details, see "Miscellaneous Slab Details" sheet.

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SLAB PLAN
ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

STATE OF MISSOURI
KEVIN R. EISENBEIS
NUMBER E-20948
REGISTERED PROFESSIONAL ENGINEER
1-26-98

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

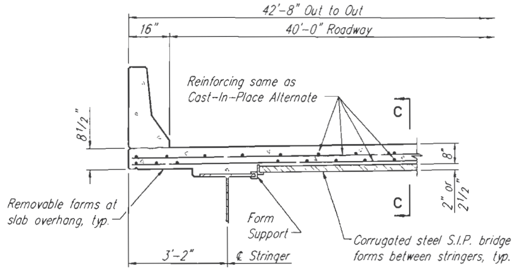
DETAILED: S.A.K. & J.K.G. 3/94
CHECKED: M.J.T. 3/94

SLAB_U2

SHEET 14 OF 28

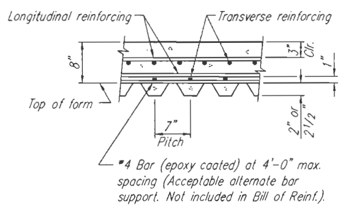
A4757

STATE	PROJ. NO	SHEET NO.
MO.		50



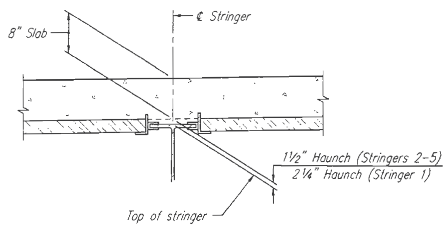
PART SECTION THRU SLAB

Note:
Details shown are intended only to basically describe the use of stay-in-place forms for construction of the slab. Details not shown are the same as for the cost-in-place alternate, except as otherwise shown or noted. See "Slab Sections & Details" sheet.
The contractor shall submit complete details to the engineer for his approval. See Special Provisions.
Stay-in-place forms and supporting elements shall not be welded to stringer flanges.
Stay-in-place forming shall not be used at 1⅛"⌀ bridge rope anchorage device locations, see "Earthquake Restrainers" sheet.



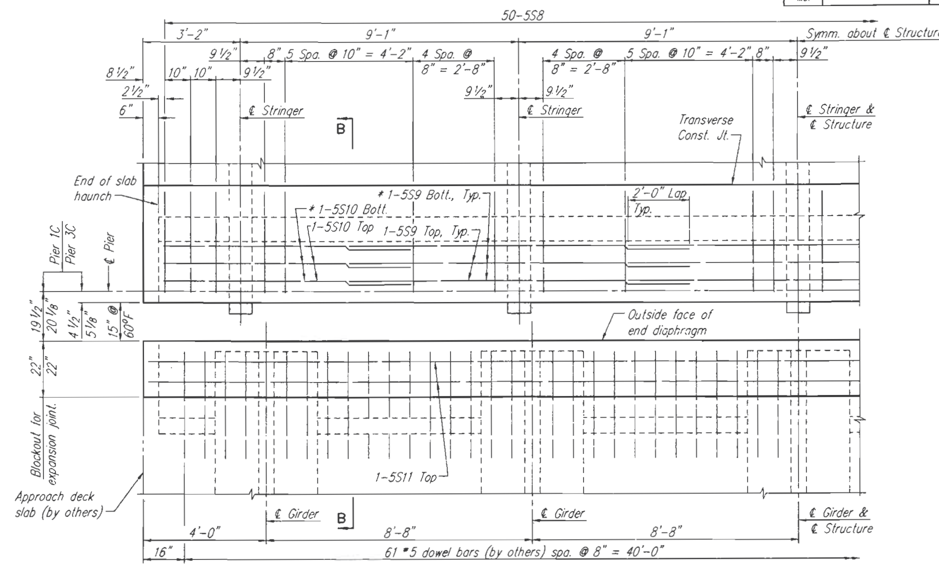
SECTION C-C

Note:
The corrugation valleys of the forms shall match the bottom transverse reinforcing steel spacing as shown.



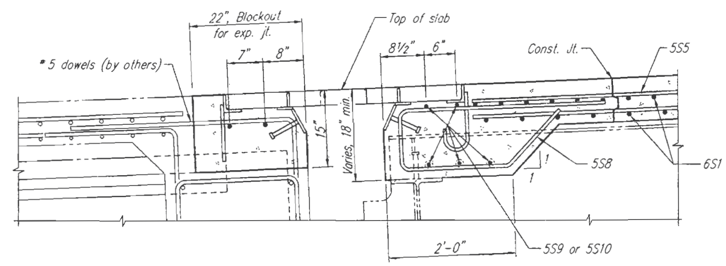
THEORETICAL SLAB HAUNCH

STAY-IN-PLACE PANEL OPTION DETAILS



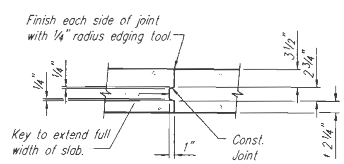
DETAIL A

5S9 Or 5S10 bars thru holes in web of stringers.



SECTION B-B

(Details of expansion joint omitted for clarity.)



TYPICAL CONSTRUCTION JOINT

C.I.P. Option shown. Varies for S.I.P. Panel Option.

Note:
Stringers, P/S girders & end diaphragms are by others.
5S9 & 5S10 bars in bottom of haunch placed thru holes in stringer web.

MISCELLANEOUS SLAB DETAILS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

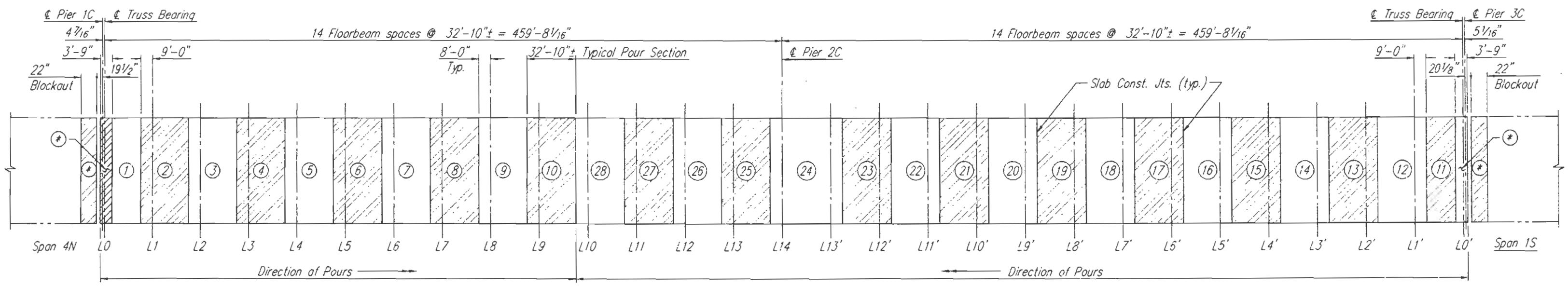
DETAILED: J.K.G. 3/94
CHECKED: M.J.T. 3/94

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

A4757

MSLAB01L

STATE	PROJ. NO	SHEET NO.
MO.		51



UNIT 1

UNIT 2

UNIT 3

POURING SEQUENCE

Note:
The basic sequence for Unit 2 consists of pouring sections 1 through 28 consecutively.

POURING SEQUENCE NOTES

The contractor shall pour and satisfactorily finish the slab at a minimum rate of 25 cu. yds./hr.

As an alternate to the basic pour sequence, the Contractor may combine the pours of any number of sequential slab sections, as long as they are poured in the direction indicated. Any alternate pouring sequence that does not follow the numbered sequence or pour direction indicated, will not be allowed, unless a written request is approved by the Engineer.

Retarder shall be an approved type and retard the set of the concrete 2.5 hours. Haunch thicknesses were determined from theoretical camber of floorbeams and truss, and deflections due to slab and barrier curbs. Slab haunches also include a vertical curve correction. No payment will be made for additional concrete or forming required for variable haunching.

** Expansion joint slab pour shall be placed in pairs and simultaneously at each expansion joint, and only after completion of the numbered sequence of pours.*

See "Slab Plan" sheet, for additional notes.

STATE OF MISSOURI — KEVIN R. EISENBEIS — REGISTERED PROFESSIONAL ENGINEER

1-26-98

SLAB POURING SEQUENCE

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.K.C. 3/94
CHECKED: M.J.T. 4/94

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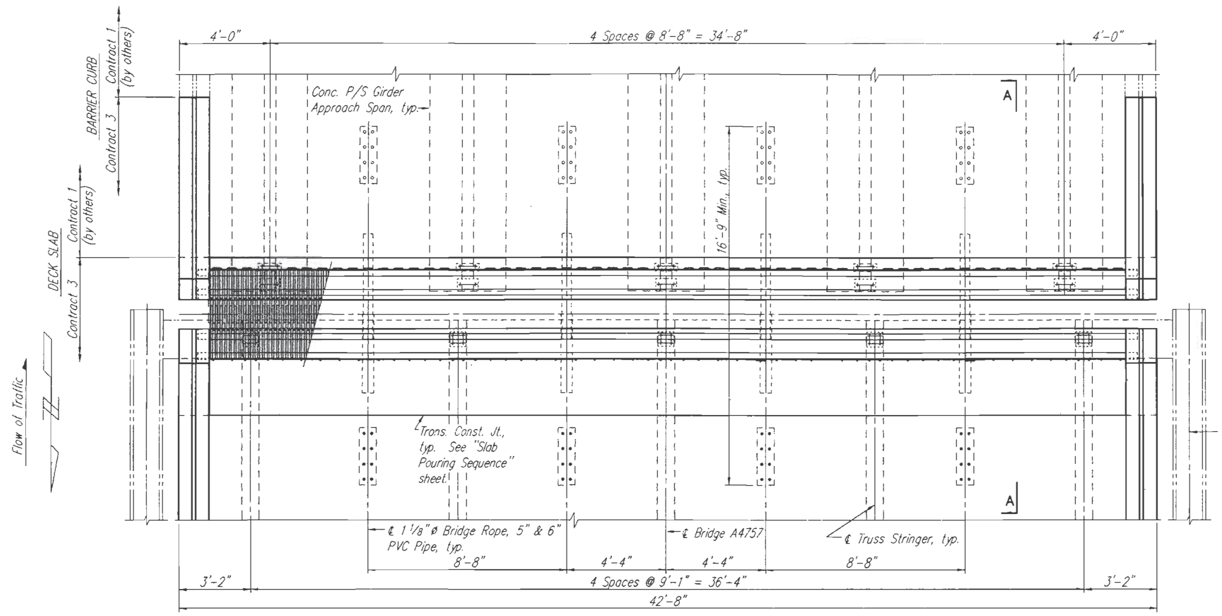
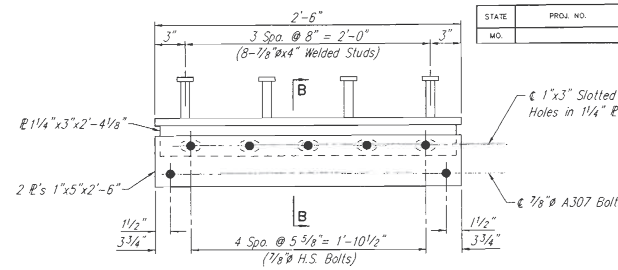
POUR_SEQ

STATE	PROJ. NO.	SHEET NO.
MO.		52

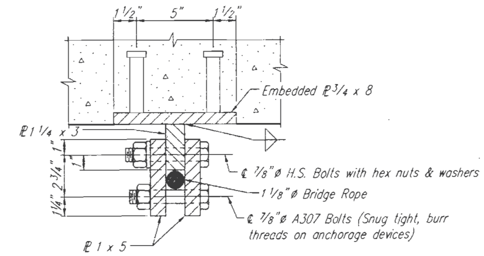


PLAN OF EXPANSION JOINT – PIER 3C

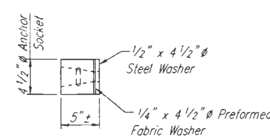
Pier 1C Similar



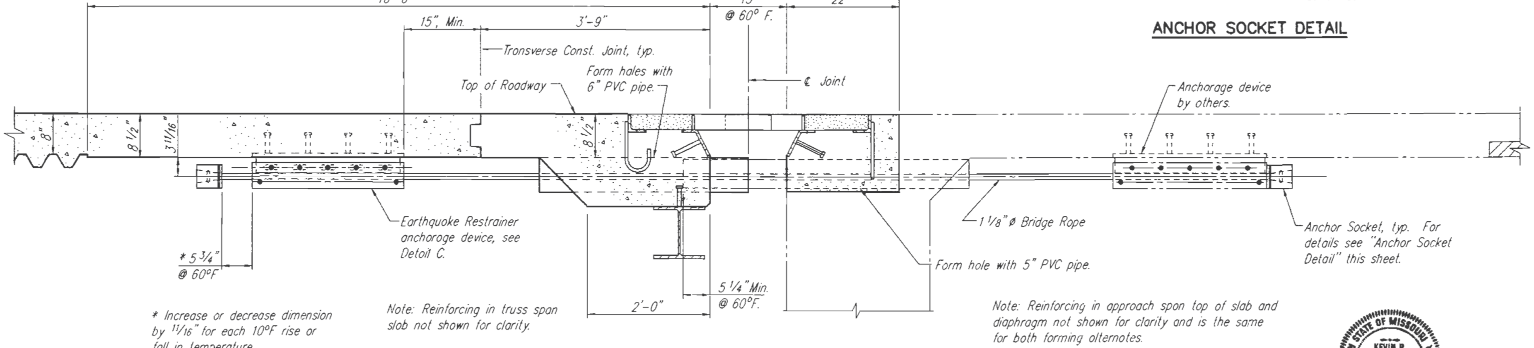
DETAIL C



SECTION B–B



ANCHOR SOCKET DETAIL



* Increase or decrease dimension by 1/16" for each 10°F rise or fall in temperature.

Note: Reinforcing in truss span slab not shown for clarity.

Note: Reinforcing in approach span top of slab and diaphragm not shown for clarity and is the same for both forming alternates.

SECTION A–A

GENERAL NOTES:

Structural Steel:
ASTM A709 Grade 36 except as shown.
All bolts shall be HS A325-Type unless otherwise noted. High strength bolts, nuts and washers will be sampled for quality assurance as specified in Standard Specification 106 and Field Section (FS-712) from the Materials Manual.

Bridge Rope:
1 1/8"ø with ASTM A603, Class A Galvanized coating.
Min. Breaking Strength 57.8 Tons.
Min. Yield Strength 150,000 psi.
Lay 7 1/2 to 11 times diameter.

Sockets:
Forged steel with zinc filled anchorage to develop full breaking strenth of rope. Washers shall be installed prior to socketing then bonded to sockets with an epoxy adhesive.

Galvanizing:
All steel used in earthquake restrainers shall be galvanized in accordance with ASTM A123 and Section 712 of Missouri Standard Specifications for Highway Construction.

Payment:
The cost of all materials and labor to fabricate and install the earthquake restrainer assemblies, including all washers, nuts, bolts, steel anchor assemblies, welded studs, PVC pipe, bridge rope, anchor sockets and other incidental items shall be completely covered in the unit price bid for "Earthquake Restrainer Assemblies" per each.

EARTHQUAKE RESTRAINERS

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

STATE OF MISSOURI
KEVIN R. EISENBEIS
NUMBER E-20848
REGISTERED PROFESSIONAL ENGINEER
1/26/98

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.L.K. 03/94
CHECKED: E.W.N. 03/94

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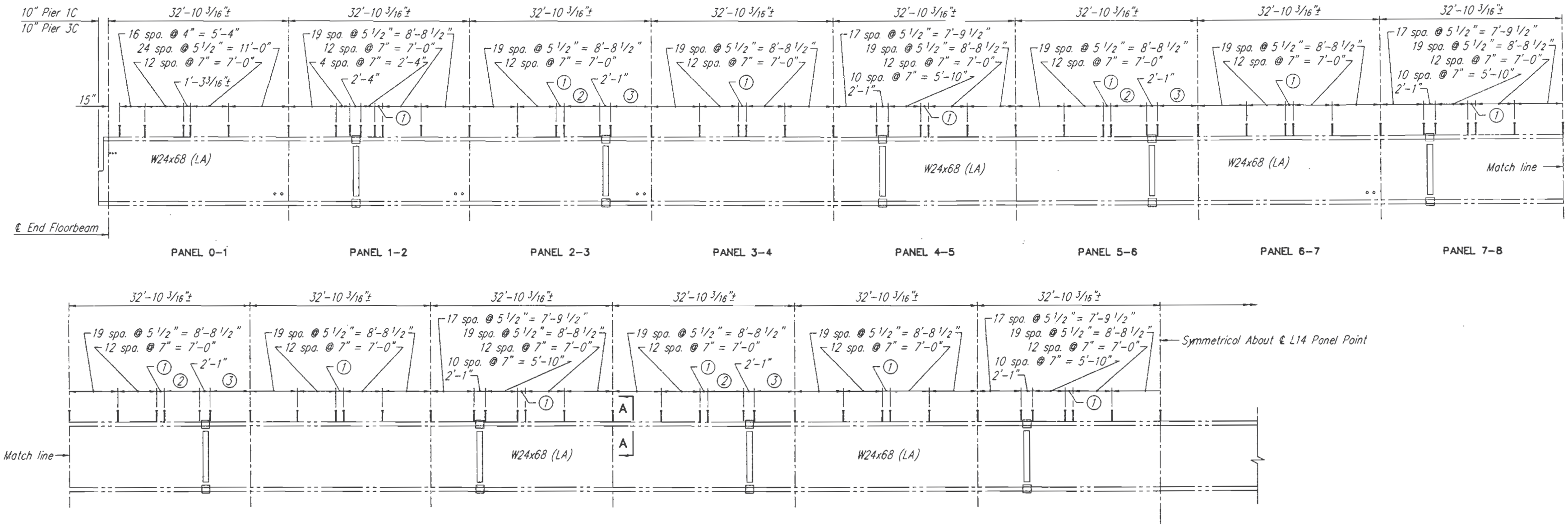
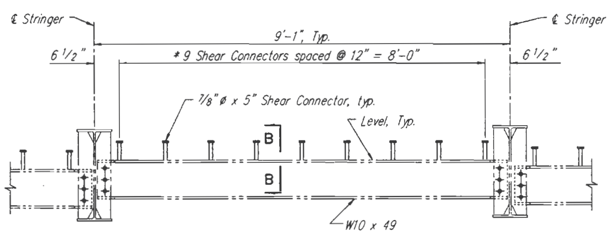
EARTHQUA

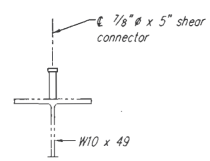
STATE	PROJ. NO.	SHEET NO.
MO.		53



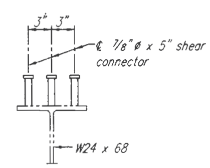
ELEVATION



END DIAPHRAGM DETAIL



SECTION B–B



SECTION A–A

* Adjust spacing of shear connectors as req'd. to clear earthquake restrainers (1" minimum), see "Earthquake Restrainers" sheet.

Notes:

1. 2 spa. = 1'-5 3/16"±
2. 10 spa. @ 7" = 5'-10"
3. 17 spa. @ 5 1/2" = 7'-9 1/2"

Shear connector studs shall conform to ASTM A-108 and shall be field welded to the top flanges of stringers and end diaphragms in accordance with Section 712.3.4 of Missouri Standard Specifications for Highway Construction.

The quantity "Fabricated Structural Carbon Steel (Shear Connectors)" represents the weight of all shear connectors.

STATE OF MISSOURI KEVIN R. EISENBEIS NUMBER E-20996 REGISTERED PROFESSIONAL ENGINEER

1-24-98

SHEAR CONNECTOR DETAILS

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

SHEET 18 OF 28

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SHEAR

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.L.K. 03/94
CHECKED: M.J.T. 04/94

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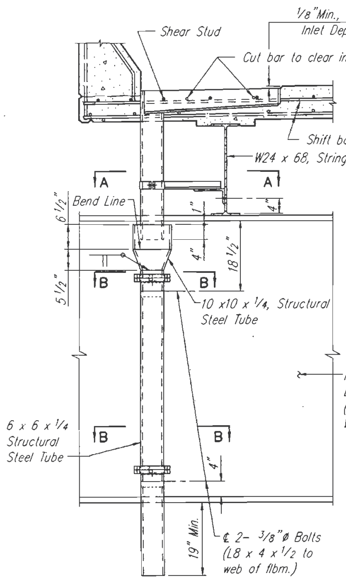
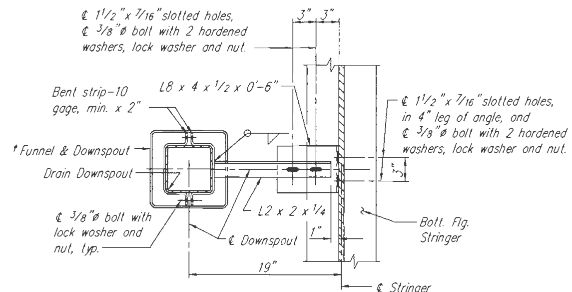
STATE	PROJ. NO.	SHEET NO.
MO.		54



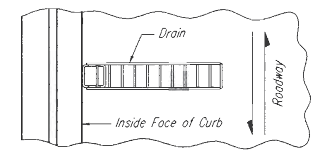
BRIDGE DRAIN

(Stringer 1 shown. Stringer 5 similar)



† Center funnel on drain downspout after slab is poured.

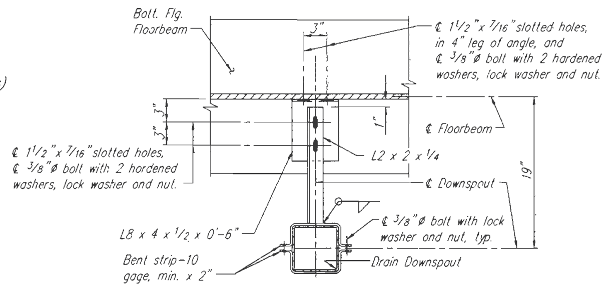
SECTION A–A



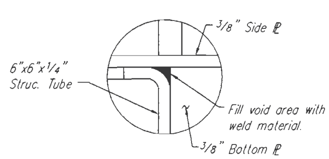
TYPICAL PART PLAN OF SLAB AT DRAIN

TABLE OF DRAIN STATIONS

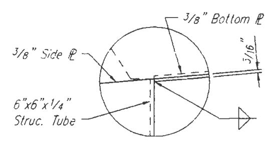
UNIT	STRINGER	EAST SIDE AND WEST SIDE
2	1 & 5	104+76.54
	1 & 5	105+09.36
	1 & 5	105+42.20
	1 & 5	111+36.32
	1 & 5	112+67.62
	1 & 5	113+00.43
	1 & 5	113+33.26



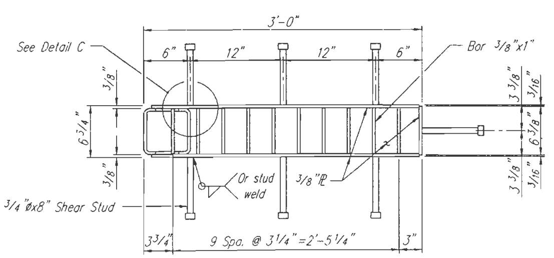
SECTION B–B



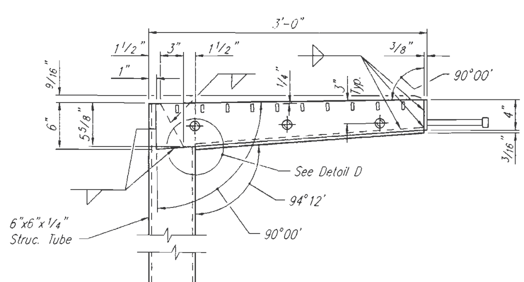
DETAIL C



DETAIL D



PLAN



ELEVATION

Note:
Approximate weight per each drain assembly = 339 lbs.

BRIDGE DRAIN DETAILS

Drain Notes:

Structural steel used in the fabrication of the drains and support brackets shall conform to ASTM A709 Grade 36.

The outside dimensions of the downspouts are 6"x6". The downspouts may be fabricated from welded 1/4" structural steel or from structural steel tubing conforming to ASTM A500 or A501.

Studs and their attachment shall conform to the standard specifications.

Nuts and bolts for the bracket assembly shall conform to ASTM designation A307.

Shift transverse slab reinforcing in the field to clear drains 1". A maximum of two longitudinal top slab reinforcing bars may be cut a maximum of 1" clear of inlet for placement of drains.

The drains and bracket assembly shall be galvanized in accordance with ASTM A123.

All bolts, hardened washers, lock washers and nuts shall be galvanized in accordance with ASTM A153.

Bolt holes for the bracket assembly attachment have been provided in the stringers. The drains shall be placed so the downspout is vertical and the holes in the bracket and the stringer line up.

Shop drawings will be required for the drains, funnel & downspout and the bracket assemblies.

STATE OF MISSOURI KEVIN R. EISENBEIS NUMBER E-20946 REGISTERED PROFESSIONAL ENGINEER

DECK DRAIN DETAILS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.L.K. 02/94
CHECKED: M.J.T. 03/94

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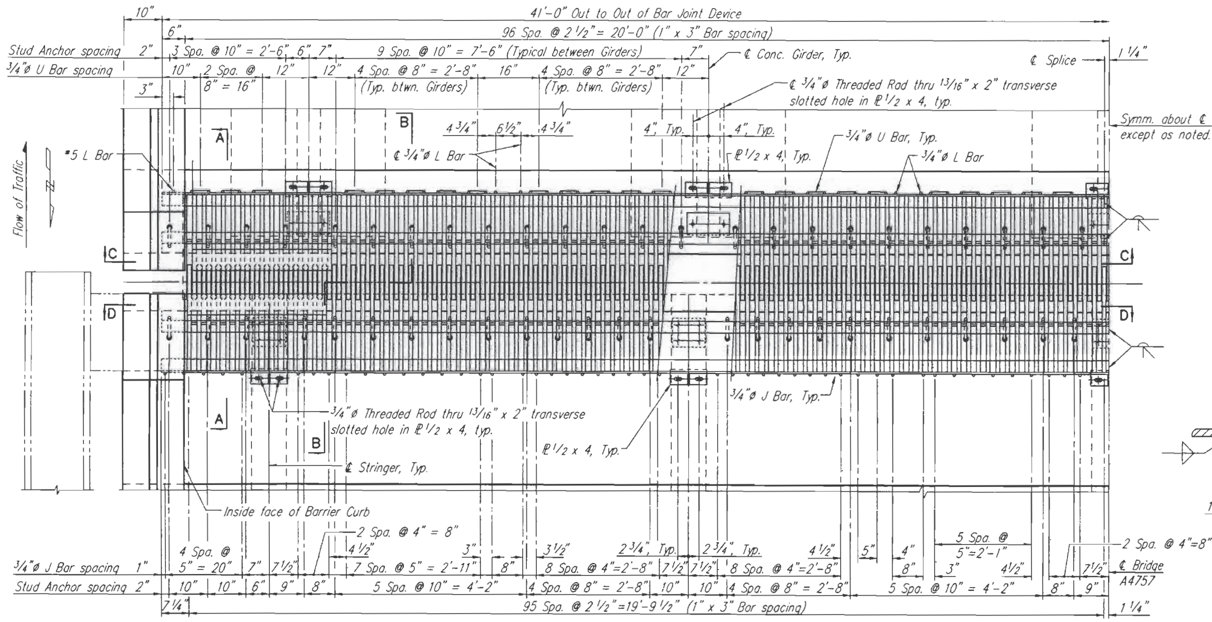
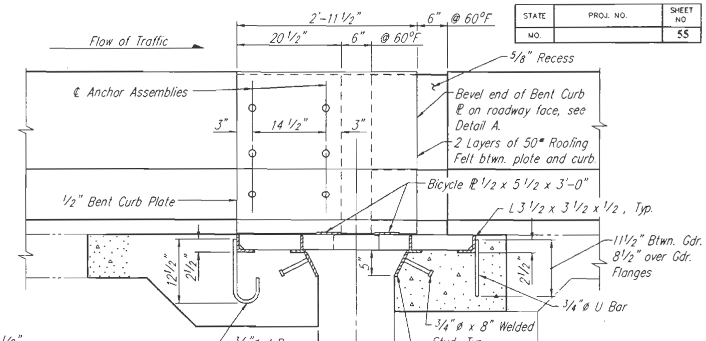
DRAIN_C3

STATE	PROJ. NO.	SHEET NO
MO.		55

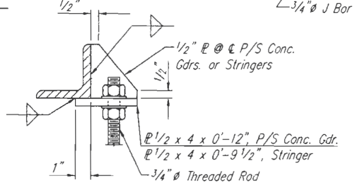


PLAN OF EXPANSION JOINT – PIER 3C

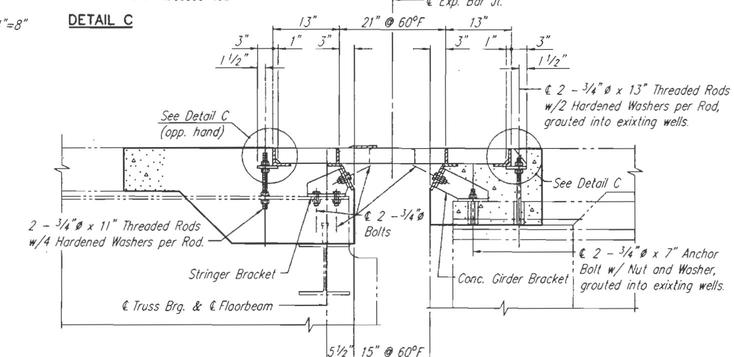
Pier 1C Similar



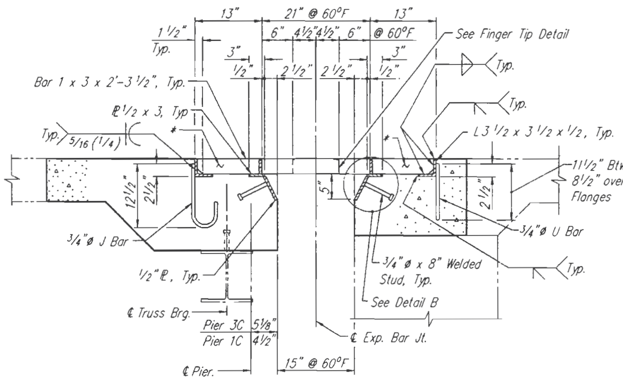
SECTION A–A



DETAIL C

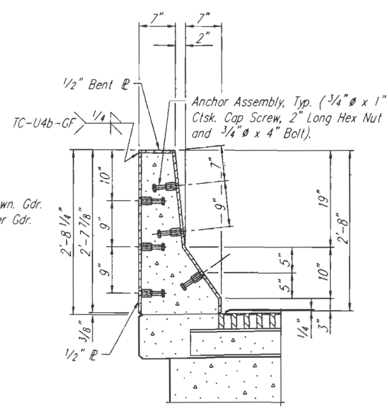


SECTION B–B



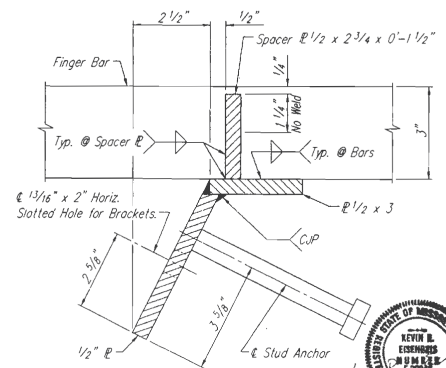
TYPICAL SECTION THRU BAR JOINT

(Shown between Stringers & Girders.)



SECTION THRU BENT CURB PLATE

* Concrete shall be forced under and around 1"x3" bars, plates, angles, headed studs and 3/4" ø bar anchors. Proper consolidation of the concrete shall be achieved by localized internal vibration.



DETAIL B

Notes:

For notes see "Expansion Joint Details" sheet.

For Detail A, Finger Tip Detail, Bicycle Plate Detail and Sections C-C & D-D, see "Expansion Joint Details" sheet.

For Stringer Bracket Detail and Conc. Girder Bracket Detail, see "Expansion Joint Details" sheet.

Slab reinforcing not shown for clarity. See "Misc. Slab Details" sheet.

Adjust 5S8 bars as required to clear 3/4"ø J bars. See "Misc. Slab Details" sheet.

See "Expansion Joint Details" sheet for 3/4"ø U Bar, J Bar and L Bar details.

For grout, see Standard Specifications, Section 1066.

EXPANSION JOINT – PIERS 1C & 3C

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.L.K. 6/95
CHECKED: J.K.G. 7/95

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STATE OF MISSOURI — KEVIN B. EISENBEIS — NUMBER E-20888 — REGISTERED PROFESSIONAL ENGINEER

1-26-98

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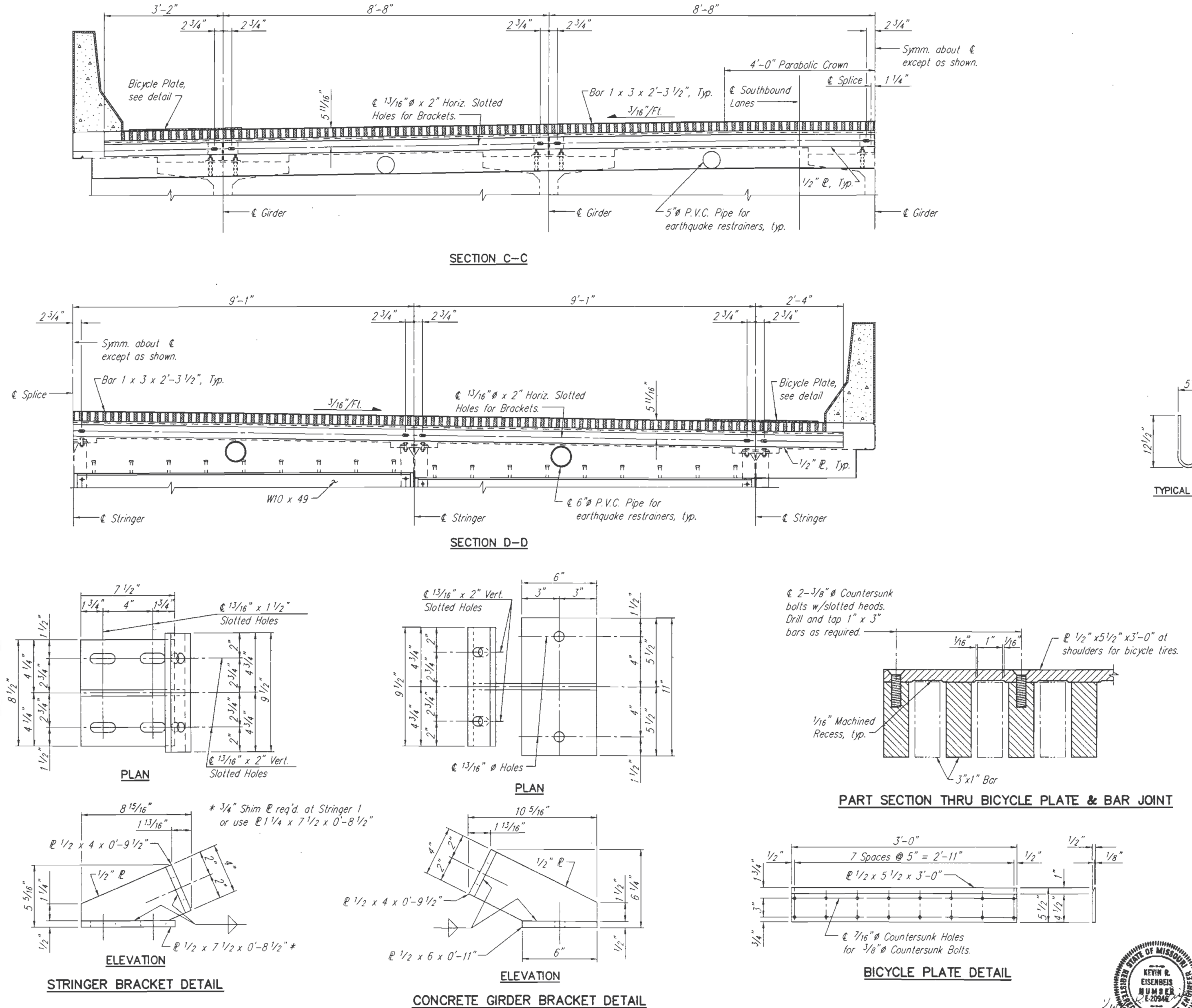
EXPJT_3C



STATE	PROJ. NO.	SHEET NO.
MO.		56

Notes:

Material for the expansion device shall be ASTM A709 Grade 36: fabricated, galvanized and installed in accordance with Section 712 of the Standard Specifications. Anchors for the expansion device shall be approved stud-welded anchors C1010 thru C1020.

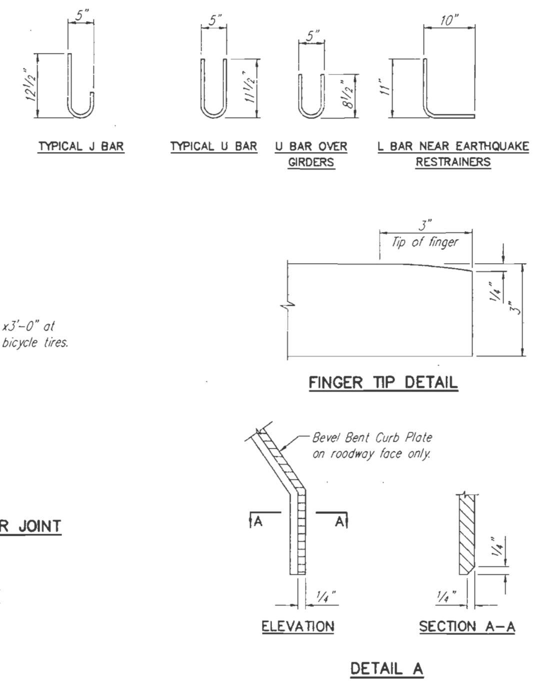
All fasteners in expansion device shall be galvanized 3/4" ø Machine Bolts except as noted.

Final adjustment of expansion devices shall be made just prior to placement of abutting concrete.

Continuous transverse plates and angles shall be fabricated to conform to roadway crown.

Gap settings shown are for a normal temperature of 60°F. under full dead load conditions. The indicated gap settings shall be increased or decreased by 11/16" for every 10° fall or rise in temperature respectively.

Payment for furnishing and installing structural steel for expansion device will be made at the Contract Unit Price for Expansion Device (Bar Type Joint) per linear foot.



KEVIN R. EISENBEIS NUMBER E-20946 STATE OF MISSOURI REGISTERED PROFESSIONAL ENGINEER

1-26-98

EXPANSION JOINT DETAILS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.L.K. 6/95
CHECKED: J.K.G. 7/95

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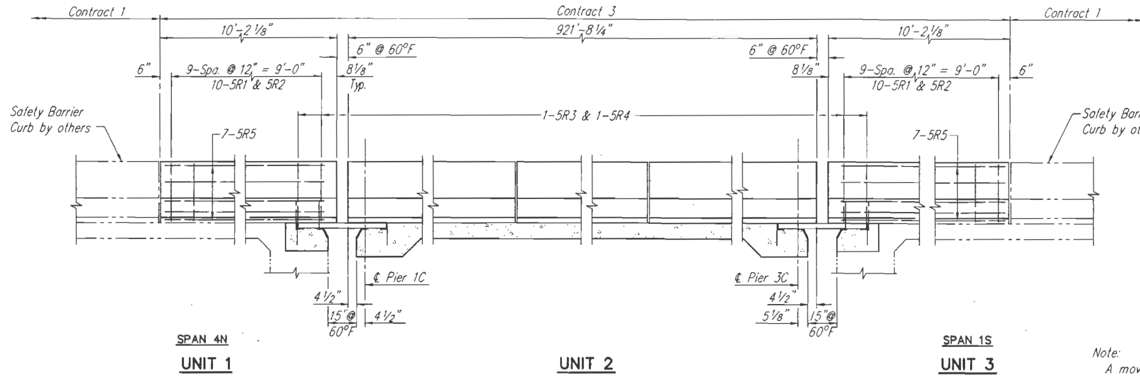
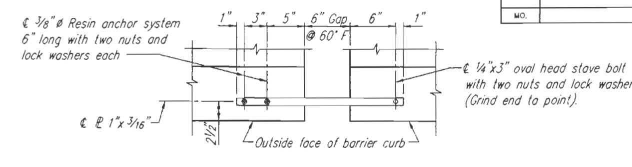
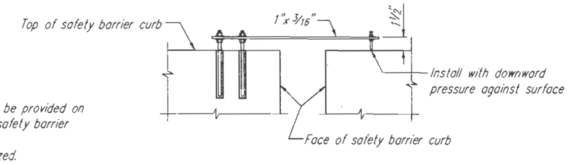
EXPJTDET

STATE	PROJ. NO.	SHEET NO.
MO.		57



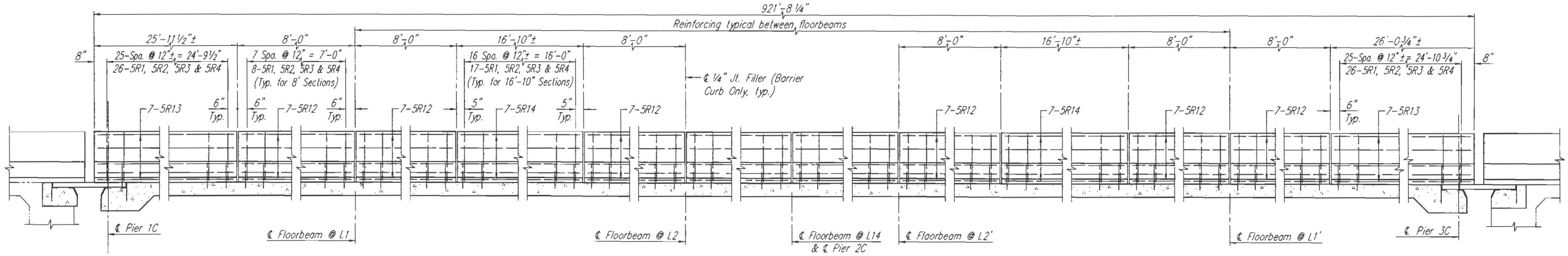


PART PLAN OF BARRIER CURB SHOWING MOVEMENT GAUGE

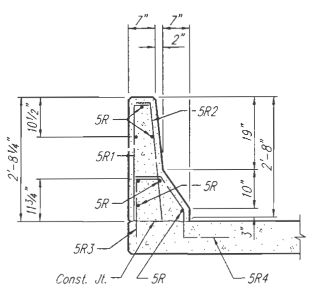


Note:
A movement gauge shall be provided on west side of bridge at all safety barrier curb expansion joints.
All steel shall be galvanized.
Cost of movement gauge complete in place shall be included in contract unit price bid for safety barrier curb.

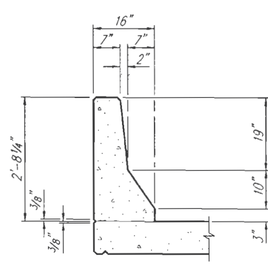
PART ELEVATION OF BARRIER CURB SHOWING MOVEMENT GAUGE



UNIT 2

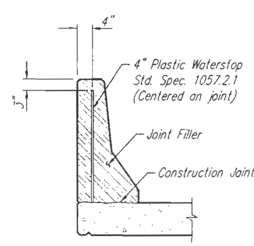


SECTION E-E

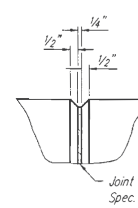


CURB DIMENSIONS

Note:
The cross sectional area above the slab = 2.27 sq. ft.



PLASTIC WATERSTOP DETAIL



FILLED JOINT DETAIL

Notes:
Plastic waterstop shall be placed in all safety barrier curb filled joints.
Cost of plastic waterstop complete in place to be included in contract unit price for safety barrier curb.
Top of safety barrier curb shall be built parallel to grade with curb joints normal to grade.
All exposed edges of safety barrier curb shall have either a 1/2" radius or a 3/4" bevel, unless otherwise noted.
When safety barrier curb is bid by linear feet, the contract unit price shall include the cost of all concrete and reinforcement, complete-in-place.
Concrete in the safety barrier curb shall be Class B1.
Measurement of safety barrier curb is to the nearest linear foot, measured along the outside top of slab.
e.f. denotes each face.

STATE OF MISSOURI KEVIN R. EISENBEIS NUMBER E-20946 REGISTERED PROFESSIONAL ENGINEER
1-26-98

SAFETY BARRIER CURB
ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.K.G. 3/94
CHECKED: M.J.T. 3/94

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SBC_U123

STATE	PROJ. NO.	SHEET NO.
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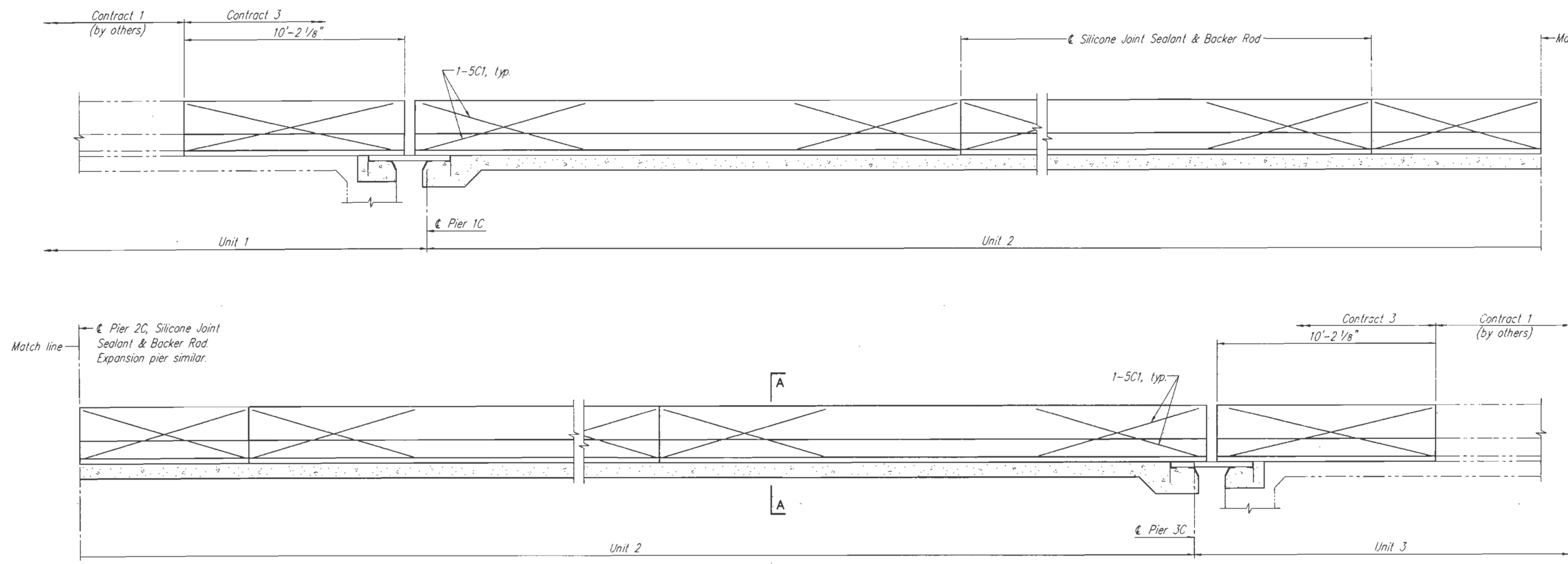


TYPICAL CURB ELEVATION

Notes:

Top of safety barrier curb shall be built parallel to grade with safety barrier curb joints normal to grade.

When safety barrier curb is bid by linear feet, the contract unit price shall include the cost of all concrete and reinforcement, complete-in-place.

Concrete in the safety barrier curb shall be Class B1.

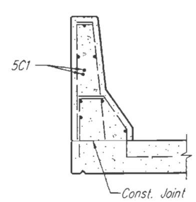
Measurement of safety barrier curb is to the nearest linear foot, measured along the outside top of curb. See "Safety Barrier Curb" sheet for dimensions.

Joint sealant and backer rods shall be used on all slip-form bridge safety barrier curbs instead of joint filler.

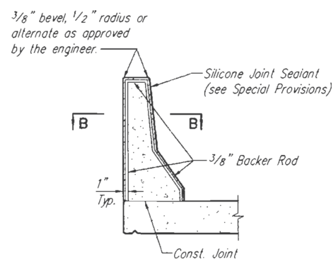
Plastic waterstop shall not be used with slip-form option.

5C1 bars (slip-form option only) shall be used in addition to cast-in-place conventional forming reinforcement for bridge safety barrier curb. 5C1 bars shall be located on each side of each joint location.

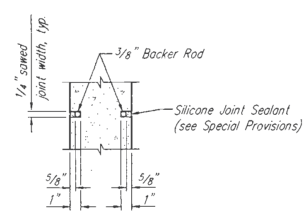
5C1 bar length = 10'-0" (Units 1 & 3); 8'-0" (Unit 2)
Number required = 8 @ 10'-0"; 440 @ 8'-0"
Total additional weight = 3,755 lbs.



PART SECTION A–A



SECTION THRU JOINT



SECTION B–B

Note:
Cost of silicone joint sealant and backer rod, complete-in-place, to be included in the contract unit price for safety barrier curb.

STATE OF MISSOURI
KEVIN R. EISENBEIS
NUMBER E-20948
REGISTERED PROFESSIONAL ENGINEER
1-26-98

OPTIONAL SLIP-FORM
BRIDGE SAFETY BARRIER CURB
ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

SHEET 23 OF 28

A4757

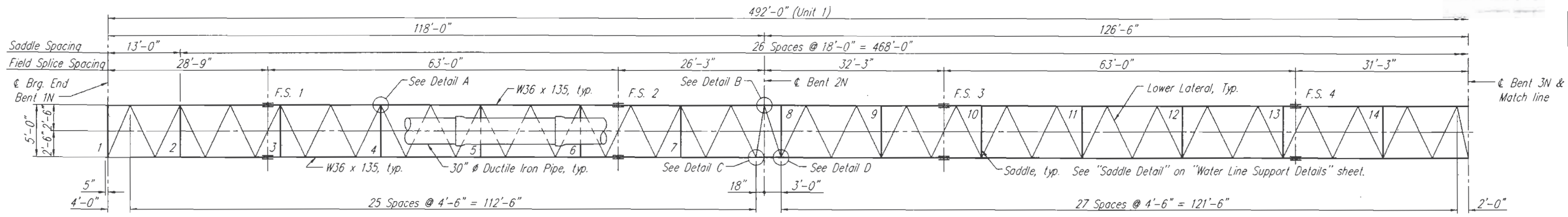
SLP_CURB

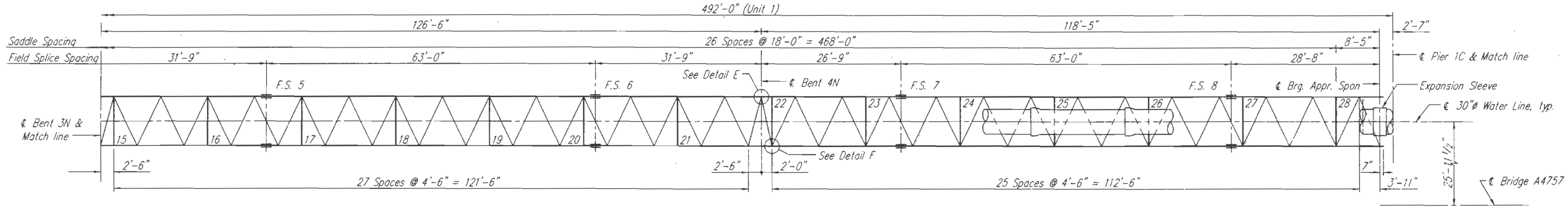
HARRINGTON & CORTELYOU, INC.
Consulting Engineers

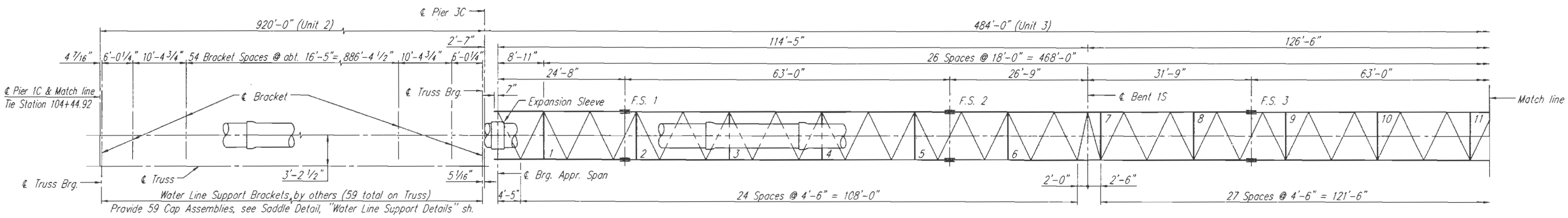
DETAILED: S.A.K. 3/94
CHECKED: M.J.T. 4/94

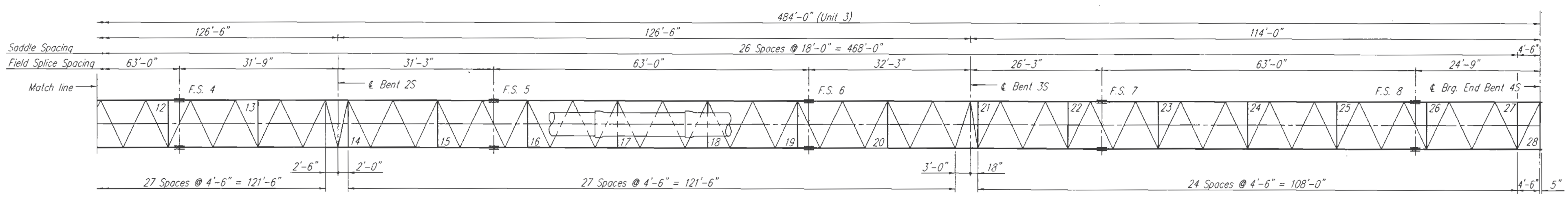
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

STATE	PROJ. NO.	SHEET NO.
MO.		59









FRAMING PLAN

Note:
For Detail A, Detail B, Detail C, Detail D, Detail E, Detail F and Notes see "Water Line Support Details" sheet.

WATER LINE FRAMING PLAN

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

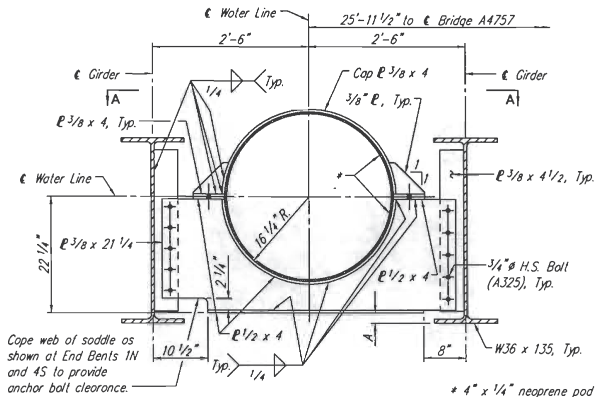
DETAILED: J.L.K. 03/94
CHECKED: E.W.N. 04/94

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

STATE OF MISSOURI
KEVIN R. EISENBEIS
NUMBER E-20948
REGISTERED PROFESSIONAL ENGINEER

1-26-18

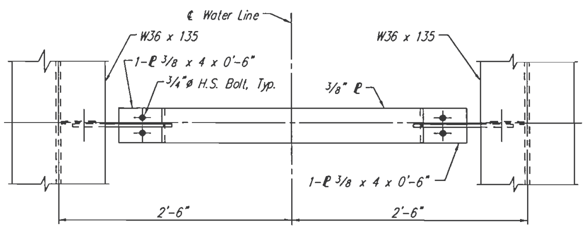
A4757



SADDLE DETAIL

* 4" x 1/4" neoprene pad (50 durometer) bonded to steel.

Note: 59 additional cap assemblies, including top & bottom neoprene pads, shall be provided for existing support brackets in Unit 2. The weight of these additional assemblies has been included in the estimated quantities. See Water Line Notes.

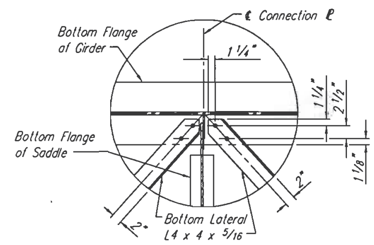


VIEW A-A

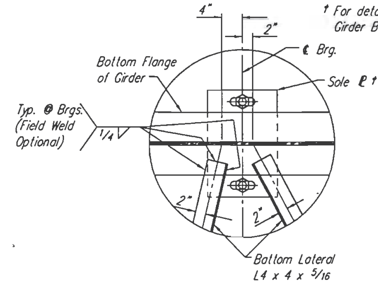
DIMENSION A TABLE

UNIT 1		UNIT 3	
SADDLE	DIM. A	SADDLE	DIM. A
1	2"	1	2 1/16"
2	2 1/8"	2	2 1/16"
3	2 1/16"	3	2 5/16"
4	2 7/16"	4	2 3/8"
5	2 7/16"	5	2 1/8"
6	2 3/16"	6	2 3/16"
7	2 1/4"	7	2 5/16"
8	2 7/16"	8	2 3/16"
9	2 1/4"	9	2 1/8"
10	2 3/16"	10	2 3/8"
11	2 7/16"	11	2 5/16"
12	2 7/16"	12	2 1/16"
13	2 1/16"	13	2 1/4"
14	2 3/8"	14	2 3/8"
15	2 1/2"	15	2 3/16"
16	2 1/4"	16	2 1/8"
17	2 3/16"	17	2 3/8"
18	2 7/16"	18	2 5/16"
19	2 7/16"	19	2 1/16"
20	2 1/16"	20	2 1/4"
21	2 5/16"	21	2 5/16"
22	2 3/8"	22	2 1/8"
23	2 3/16"	23	2 3/16"
24	2 1/4"	24	2 3/8"
25	2 1/2"	25	2 1/4"
26	2 3/8"	26	2"
27	2"	27	2 1/16"
28	2 1/16"	28	2"

Note: Dimension "A" corrects for vertical curvature of the water line within straight field sections. Any natural camber of field sections shall be placed up and dimension A shall be reduced to compensate for the camber. The minimum dimension for A shall be 2".



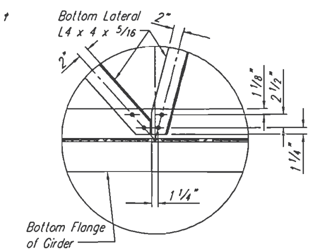
DETAIL A



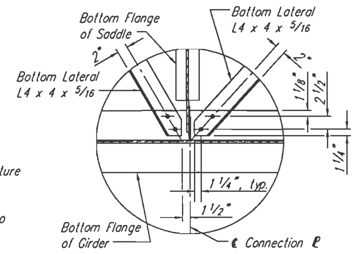
DETAIL B

† For details, see "Water Line Girder Bearing Detail" sheet.

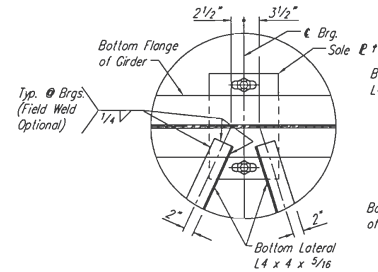
STATE	PROJ. NO.	SHEET NO.
MO.		



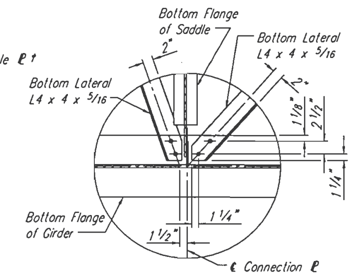
DETAIL C



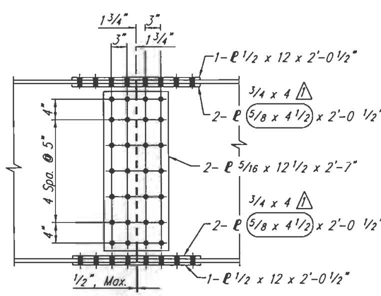
DETAIL D



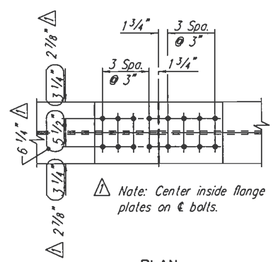
DETAIL E



DETAIL F



ELEVATION



PLAN

FIELD SPLICE

Note: Field splices shall be fabricated with the appropriate angle break so that theoretical bottom of bottom flange elevations conform to those shown in the adjacent table.

BOTTOM OF BOTTOM FLANGE ELEVATIONS

UNIT 1		UNIT 3	
LOCATION	ELEV.	LOCATION	ELEV.
℄ End Bent 1N	758.59	℄ Brg. (Pier 3C)	776.69
Field Splice 1	760.40	Field Splice 1	775.87
Field Splice 2	764.13	Field Splice 2	773.60
Field Splice 3	767.32	Field Splice 3	771.28
Field Splice 4	770.43	Field Splice 4	768.53
Field Splice 5	773.23	Field Splice 5	765.54
Field Splice 6	775.71	Field Splice 6	762.30
Field Splice 7	777.72	Field Splice 7	759.07
Field Splice 8	779.59	Field Splice 8	755.36
℄ Brg. (Pier 1C)	780.33	℄ End Bent 4S	753.83

WATER LINE NOTES:

Longitudinal dimensions are horizontal and measured at a normal temperature of 60°F.

Structural steel for girders, saddles and lower laterals shall be ASTM A709 Gr.36.

All bolts shall be H.S. ASTM A325. Use 7/8"⌀ bolts at field splices and 3/4"⌀ bolts for all other connections.

High strength bolts, nuts and washers will be sampled for quality assurance as specified in Standard Specification 106 and Field Section (FS-712) from the Materials Manual.

All structural steel assemblies shall have a protective coating (System G) applied in accordance with the Special Provisions. Color of finish coat shall be gray. Any damaged areas of the shop applied protective coating resulting from erection or other construction activities shall be repaired in the field in accordance with Standard Specification Section 712.

Saddles shall be placed normal to flanges.

Water line shall be 30"⌀ unrestrained push-on joint, ductile iron pipe of thickness class 51. See Special Provisions.

Bell end of pipe segments to face north.

An expansion device shall be provided in the water line at Piers 1C & 3C. The expansion joint gap at 60 degree F. shall be 12". Increase or decrease the dimension by 3/4" for every 10 degree F. fall or rise in temperature as needed during construction. The expansion device shall accommodate movement from a temperature range of -20 degree F. to 130 degree F. The expansion devices must be rated for a working pressure of 350 psi.

As part of the water line work, the contractor shall furnish and install a continuous 50-pair, 16 Ga. control cable to the ductile iron pipe. See Special Provisions for additional requirements.

WATER LINE NOTES (CONT.):

Cost of furnishing and installing fabricated structural steel, girder bearing assemblies, 30"⌀ ductile iron pipe, 50-pair control cable and any other miscellaneous hardware required for complete installation of the water line from fill face of End Bent 1N to fill face of End Bent 4S shall be included in the unit price bid for "Water Line on Bridge" per Lump Sum. The following estimated quantities are included in the Lump Sum item:

Fabricated Structural Carbon Steel	297,510 Lbs.
Type 'N' PTFE Bearings	16 Ea.
Laminated Neoprene Bearings (Steel Structures)	4 Ea.
30" Ductile Iron Pipe	7,900 Ft.
30" Ductile Iron Pipe Expansion Sleeves	2 Ea.
50-pair, 16 Ga. Cable	1,900 Ft.

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

STATE OF MISSOURI ERIC W. NEPPAUD NUMBER E-23281 PROFESSIONAL ENGINEER

1/21/99

⚠ Revised Flange Splice 1-21-99

WATER LINE SUPPORT DETAILS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

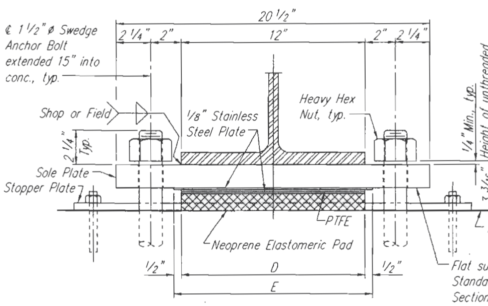
HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.L.K. 03/94
CHECKED: E.W.N. 04/94

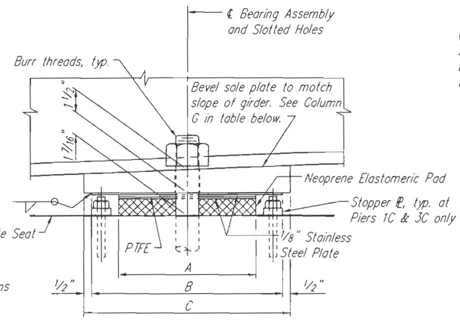
SHEET 25 OF 28

A4757

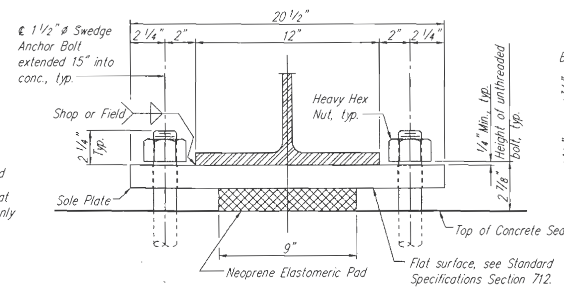
STATE	PROJ. NO.	SHEET NO.
MO.		61



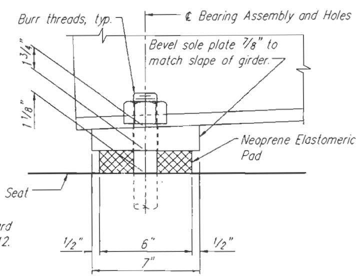
END VIEW



SIDE VIEW

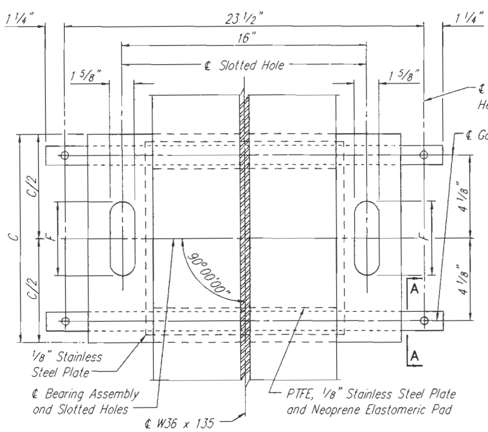


END VIEW



SIDE VIEW

Note: The location of anchor bolts in relation to the slotted holes in the sole plate shall correspond with the temperature at the time of erection. At 60° F. the slotted hole shall be centered on the anchor bolts.

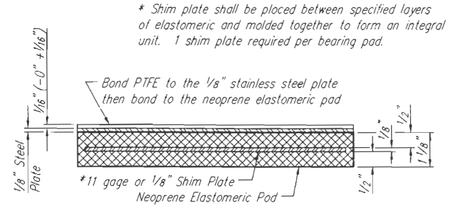


PART PLAN VIEW

PTFE SLIDING BEARINGS

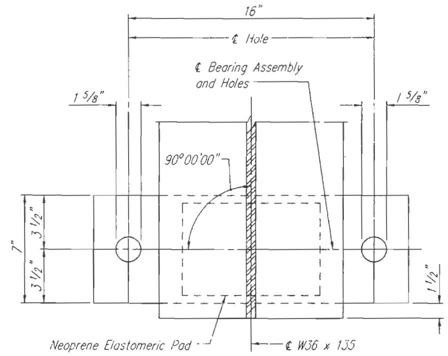
16 required, see table below.

* Shim plate shall be placed between specified layers of elastomeric and molded together to form an integral unit. 1 shim plate required per bearing pad.

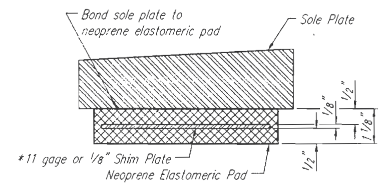


NEOPRENE ELASTOMERIC PAD

70 Durometer



PART PLAN VIEW

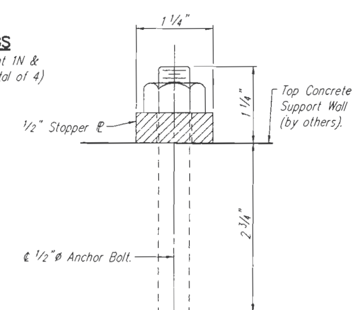


NEOPRENE ELASTOMERIC PAD

60 Durometer

FIXED BEARINGS

(Quantitiy of 2 @ End Bent 1N & 2 @ End Bent 4S for a total of 4)



SECTION A-A

PTFE SLIDING BEARINGS								
SUBSTR. UNIT	A	B	C	D	E	F	G	QTY.
Bent 2N	9"	12 1/2"	13 1/2"	12"	13"	4 3/4"	3/4"	2
Bent 3N	9"	12 1/2"	13 1/2"	12"	13"	4 3/4"	5/8"	2
Bent 4N	9"	12 1/2"	13 1/2"	12"	13"	4 3/4"	1/2"	2
Pier 1C	6"	10 1/2"	11 1/2"	9"	10"	5 3/8"	1/4"	2
Pier 3C	6"	10 1/2"	11 1/2"	9"	10"	5 3/8"	3/8"	2
Bent 1S	9"	12 1/2"	13 1/2"	12"	13"	4 3/4"	1/2"	2
Bent 2S	9"	12 1/2"	13 1/2"	12"	13"	4 3/4"	5/8"	2
Bent 3S	9"	12 1/2"	13 1/2"	12"	13"	4 3/4"	3/4"	2

GENERAL NOTES:

Anchor bolts shall be 1 1/2"ø A588 steel swedged bolts and shall extend 15" into the concrete with A194-2, 2H or A563-C, C3, D, DH, DH3 heavy hexagon nuts except as noted. Actual manufacturer's certified chemical and mechanical mill test reports (including proof loads) shall be provided. Swedging shall be 1" less than extension into the concrete.

Drill and bond anchor bolts to concrete with an approved Resin Anchor System in accordance with the Special Provisions.

All structural steel for the sole plate, anchor bolts and heavy hexagon nuts shall be painted with a minimum of two coats of inorganic zinc primer (5 mils minimum) in accordance with the Special Provisions. Weld areas to be touched up after assembly.

Neoprene elastomeric pads for fixed bearings shall be 60 Durometer.

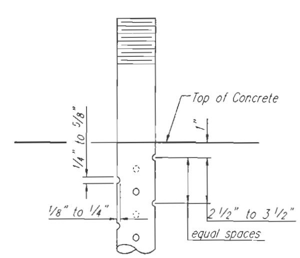
Neoprene elastomeric pads for PTFE sliding bearings shall be 70 Durometer.

The sole plate shall be furnished with the bearing and field or shop welded to the girders.

Structural steel for the sole plate and stopper plate shall be A709 Grade 36.

The cost of furnishing and installing all items for the fixed and sliding bearings shall be included in the unit price bid for "Water Line on Bridge" per lump sum.

The neoprene elastomeric pad shall be bonded to the bearing seat with an epoxy adhesive as approved by the bearing manufacturer for bonding neoprene to concrete.



SWEDGE ANCHOR BOLT

WATER LINE GIRDER BEARING DETAILS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

STATE OF MISSOURI KEVIN R. EISENBEIS NUMBER E-20548 REGISTERED PROFESSIONAL ENGINEER

1-26-98

HC HARRINGTON & CORTELYOU, INC. Consulting Engineers

DETAILED: J.L.K. 03/94
CHECKED: E.W.N. 04/94

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 26 OF 28

A4757

WL_BRG

STATE	PROJ. NO.	SHEET NO.
MO.		62

P.V.C. Sta. 101+93.87
Elev. 775.21

1.13' +4.0%

99+25 — 105+20

764.46	764.66	764.86	765.06	765.26	765.46	765.66	765.86	766.06	766.26
766.46	766.66	766.86	767.06	767.26	767.46	767.66	767.86	768.06	768.26
768.46	768.66	768.86	769.06	769.26	769.46	769.66	769.86	770.06	770.26
770.46	770.66	770.86	771.06	771.26	771.46	771.66	771.86	772.06	772.26
772.46	772.66	772.86	773.06	773.26	773.46	773.66	773.86	774.06	774.26
774.46	774.66	774.86	775.06	775.26	775.45	775.65	775.85	776.04	776.23
776.43	776.61	776.80	776.99	777.17	777.36	777.54	777.72	777.90	778.08
778.25	778.43	778.60	778.77	778.94	779.11	779.27	779.44	779.60	779.76
779.92	780.08	780.24	780.40	780.55	780.70	780.85	781.00	781.15	781.30
781.44	781.59	781.73	781.87	782.01	782.14	782.28	782.41	782.54	782.68
782.81	782.93	783.06	783.18	783.31	783.43	783.55	783.67	783.78	783.90
784.01	784.13	784.24	784.35	784.45	784.56	784.67	784.77	784.87	784.97

1.67'
2.08' — ℄ Brg. End Bent 1N Sta. 99+52.92
0.92' — ℄ Bent 2N Sta. 100+70.92
2.58' — ℄ Bent 3N Sta. 101+97.42
1.08' — ℄ Bent 4N Sta. 103+23.92
0.08' — ℄ Pier 1C (Tie) Sta. 104+44.92

119 Spa. @ 5'-0" = 595'-0"

End of Approach Slab

P.V.I. Sta. 108+41.37
Elev. 801.11

+4.0% −4.0%

1295' V.C.

1.37'

105+20 — 111+20

784.97	785.07	785.17	785.26	785.35	785.45	785.54	785.63	785.71	785.80
785.89	785.97	786.05	786.13	786.21	786.29	786.36	786.43	786.51	786.58
786.65	786.71	786.78	786.84	786.91	786.97	787.03	787.09	787.14	787.20
787.25	787.31	787.36	787.40	787.45	787.50	787.54	787.59	787.63	787.67
787.71	787.74	787.78	787.81	787.84	787.87	787.90	787.93	787.96	787.98
788.00	788.02	788.04	788.06	788.08	788.09	788.11	788.12	788.13	788.14
788.15	788.15	788.16	788.16	788.16	788.16	788.16	788.15	788.15	788.14
788.13	788.13	788.11	788.10	788.09	788.07	788.05	788.04	788.01	787.99
787.97	787.94	787.92	787.89	787.86	787.83	787.80	787.76	787.73	787.69
787.65	787.61	787.57	787.52	787.48	787.43	787.38	787.33	787.28	787.23
787.17	787.12	787.06	787.00	786.94	786.88	786.82	786.75	786.69	786.62
786.55	786.47	786.40	786.33	786.25	786.17	786.09	786.01	785.93	785.85
785.76									

0.08' — ℄ Pier 2C Sta. 109+04.92

120 Spa. @ 5'-0" = 600'-0"

P.V.T. Sta. 114+88.87
Elev. 775.21

−4.0% 1.13'

111+20 — 117+20

785.76	785.68	785.59	785.50	785.41	785.31	785.22	785.12	785.02	784.92
784.82	784.72	784.62	784.51	784.41	784.30	784.19	784.08	783.96	783.85
783.73	783.61	783.49	783.37	783.25	783.13	783.00	782.88	782.75	782.62
782.49	782.35	782.22	782.08	781.94	781.80	781.66	781.52	781.38	781.23
781.08	780.94	780.79	780.63	780.48	780.33	780.17	780.01	779.85	779.69
779.53	779.36	779.20	779.03	778.86	778.69	778.52	778.35	778.17	778.00
777.82	777.64	777.46	777.28	777.09	776.91	776.72	776.53	776.34	776.15
775.95	775.76	775.56	775.36	775.16	774.96	774.76	774.56	774.36	774.16
773.96	773.76	773.56	773.36	773.16	772.96	772.76	772.56	772.36	772.16
771.96	771.76	771.56	771.36	771.16	770.96	770.76	770.56	770.36	770.16
769.96	769.76	769.56	769.36	769.16	768.96	768.76	768.56	768.36	768.16
767.96	767.76	767.56	767.36	767.16	766.96	766.76	766.56	766.36	766.16
765.96									

0.08' — ℄ Pier 3C Sta. 113+64.92
1.92' — ℄ Bent 1S Sta. 114+81.92
1.58' — ℄ Bent 2S Sta. 116+08.42

120 Spa. @ 5'-0" = 600'-0"

117+20 — 118+80

765.96	765.76	765.56	765.36	765.16	764.96	764.76	764.56	764.36	764.16
763.96	763.76	763.56	763.36	763.16	762.96	762.76	762.56	762.36	762.16
761.96	761.76	761.56	761.36	761.16	760.96	760.76	760.56	760.36	760.16
759.96	759.76	759.56							

0.08' — ℄ Bent 3S Sta. 117+34.92
℄ Brg. End Bent 4S Sta. 118+48.92 — 1.08'
.17'

32 Spa. @ 5'-0" = 160'-0"

End of Approach Slab

KEVIN R. EISENBEIS NUMBER E-20948
STATE OF MISSOURI REGISTERED PROFESSIONAL ENGINEER
1-26-98

PROFILE GRADE ELEVATIONS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

PRCDEL

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: S.A.K. 03/94
CHECKED: M.J.T. 03/94

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

A4757

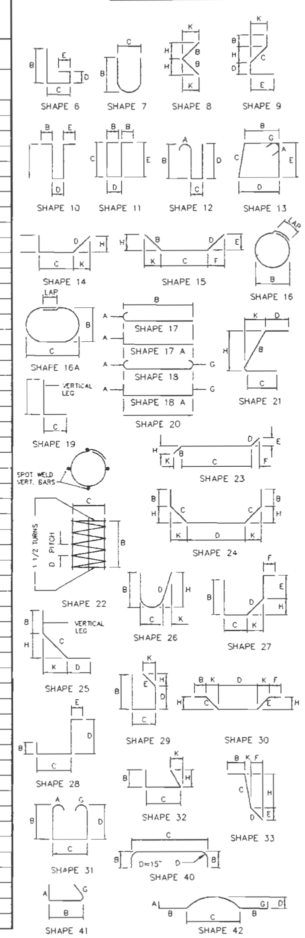
COMPLETE BILL OF REINFORCING STEEL

NO. REQD.	SIZE	MARK	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	B FT.	B IN.	C FT.	C IN.	D FT.	D IN.	E FT.	E IN.	F FT.	F IN.	H FT.	H IN.	K FT.	K IN.	NOMINAL LENGTH FT.IN.	ACTUAL LENGTH FT.IN.	WEIGHT LBS.
SLAB – UNIT 2 CAST-IN-PLACE OR STAY-IN-PLACE																										
3,778	6	S1	Trans. T & B	E	20					42	4													42 4	42 4	240,223
42	5	S2	Long. Bott.	E	20					29	7													29 7	29 7	1,296
2,037	5	S3	Long. T & B	E	20					34	10													34 10	34 10	74,007
42	5	S4	Long. Bott.	E	20					36	9													36 9	36 9	1,610
*72	5	S5	Long. Top	E	20					16	9													16 9	16 9	1,258
*138	6	S6	Long. Top @ Flbm's	E	20					19	1													19 1	19 1	3,956
1,700	6	S7	"	E	20					15	8													15 8	15 8	40,003
100	5	S8	Long. End Haunch	E	29	S				3	5	0	13	0	16	0	15			0	10.625	0	10.625	7 1	6 10	713
30	5	S9	Trans. End Haunch	E	20					11	1													11 1	11 1	347
20	5	S10	"	E	20					7	1													7 1	7 1	148
4	5	S11	Trans. Blockout	E	20					42	4													42 4	42 4	177
SAFETY BARRIER CURB – UNIT 1																										
20	5	R1	Vert.	E	19					2	6	0	3.5											2 10	2 8	56
20	5	R2	"	E	15					2	6.125	0	3.5							2	6	0	3	2 10	2 9	57
4	5	R3	"	E	19					0	17	0	6											1 11	1 10	8
4	5	R4	"	E	27							0	6	0	11.125	0	7	0	12	0	9.125	0	6.375	3 0	2 9	11
14	5	R5	Horiz.	E	20					9	10													9 10	9 10	144
SAFETY BARRIER CURB – UNIT 2																										
1,852	5	R1	Vert.	E	19					2	6	0	3.5											2 10	2 8	5,151
1,852	5	R2	"	E	15					2	6.125	0	3.5							2	6	0	3	2 10	2 9	5,312
1,852	5	R3	"	E	19					0	17	0	6											1 11	1 10	3,541
1,852	5	R4	"	E	27							0	6	0	11.125	0	7	0	12	0	9.125	0	6.375	3 0	2 9	5,312
756	5	R12	Horiz.	E	20					7	8													7 8	7 8	6,045
28	5	R13	"	E	20					25	7													25 7	25 7	747
364	5	R14	"	E	20					16	6													16 6	16 6	6,264
SAFETY BARRIER CURB – UNIT 3																										
20	5	R1	Vert.	E	19					2	6	0	3.5											2 10	2 8	56
20	5	R2	"	E	15					2	6.125	0	3.5							2	6	0	3	2 10	2 9	57
4	5	R3	"	E	19					0	17	0	6											1 11	1 10	8
4	5	R4	"	E	27							0	6	0	11.125	0	7	0	12	0	9.125	0	6.375	3 0	2 9	11
14	5	R5	Horiz.	E	20					9	10													9 10	9 10	144

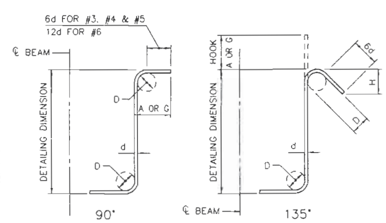
COMPLETE BILL OF REINFORCING STEEL

NO. REQD.	SIZE	MARK	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	B FT.	B IN.	C FT.	C IN.	D FT.	D IN.	E FT.	E IN.	F FT.	F IN.	H FT.	H IN.	K FT.	K IN.	NOMINAL LENGTH FT.IN.	ACTUAL LENGTH FT.IN.	WEIGHT LBS.

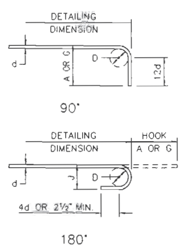
STATE	PROJ. NO.	SHEET NO.
MO.		63



BENDING DIAGRAMS



STIRRUP HOOK DIMENSIONS				
GRADES 40 – 50 – 60 KSI				
BAR SIZE	D	90° HOOK	135° HOOK	
		HOOK A OR G	HOOK A OR G	APPROX. H
#3	1½"	4"	4"	2½"
#4	2"	4½"	4½"	3"
#5	2½"	6"	5½"	3¾"
#6	4½"	12"	8"	4½"



END HOOK DIMENSIONS				
BAR SIZE	D	180° HOOKS		90° HOOKS
		ALL GRADES		ALL GRADES
		A OR G	J	A OR G
#3	2¼"	5"	3"	6"
#4	3"	6"	4"	8"
#5	3¾"	7"	5"	10"
#6	4½"	8"	6"	12"
#7	5¼"	10"	7"	14"
#8	6"	11"	8"	16"
#9	9½"	15"	11¾"	19"
#10	10¾"	17"	13¼"	22"
#11	12"	19"	14¾"	2'–0"
#14	18¼"	2'–3"	21¾"	2'–7"

NOTES:
ALL STANDARD HOOKS AND BENDS OTHER THAN 180 DEG. ARE TO BE BENT WITH SAME PROCEDURE AS FOR 90 DEG. STANDARD HOOKS.

HOOKS AND BENDS SHALL BE IN ACCORDANCE WITH THE PROCEDURES AS SHOWN ON THIS SHEET.

E – EPOXY COATED REINFORCEMENT.
S – STIRRUP.
V – BAR DIMENSIONS VARY IN EQUAL INCREMENTS BETWEEN DIMENSIONS SHOWN ON THIS LINE AND THE FOLLOWING LINE.
X – BAR IS INCLUDED IN SUBSTRUCTURE QUANTITIES.

NO. EACH – NUMBER OF BARS OF EACH LENGTH.

* TWO ADDITIONAL BARS ARE INCLUDED IN THE BAR BILL FOR TESTING

UNLESS OTHERWISE NOTED DIAMETER "D" IS THE SAME FOR ALL BENDS AND HOOKS ON A BAR.

NOMINAL LENGTHS – ARE BASED ON OUT TO OUT DIMENSIONS SHOWN IN BENDING DIAGRAMS AND ARE LISTED FOR FABRICATORS USE. (NEAREST INCH)

ACTUAL LENGTHS – ARE MEASURED ALONG CENTERLINE BAR TO THE NEAREST INCH.

PAYWEIGHTS ARE BASED ON ACTUAL LENGTHS.

STATE OF MISSOURI KEVIN R. EISENBEIS NUMBER E-20946 REGISTERED PROFESSIONAL ENGINEER

Kevin R. Eisenbeis
1-26-98

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

BILL OF REINFORCING STEEL

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.K.G. 8/94
CHECKED: M.J.T. 8/94

SHEET 28 OF 28

A4757

C3REINF1

STATE	PROJ. NO.	SHEET NO.
MO.	F.A.M.-291-1(52) J4U0564E	36
SEC./SUR. 12 TWP. 50N RGE. 32W		

ID-980821-401

MISSOURI HIGHWAY AND TRANSPORTATION COMMISSION

ROUTE 291 MISSOURI RIVER BRIDGE

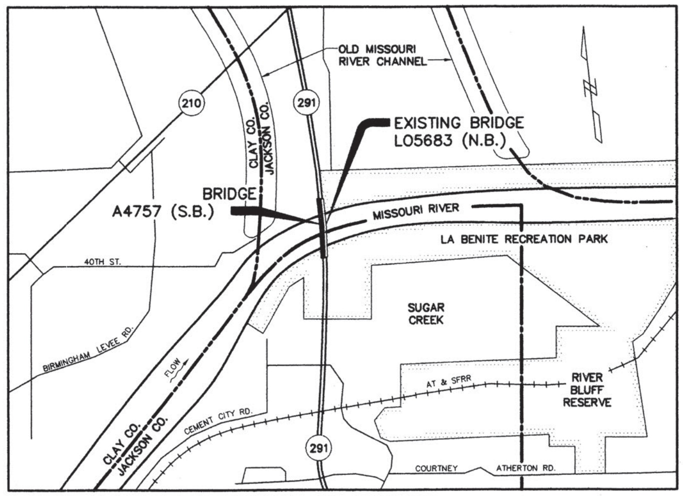
JACKSON COUNTY

CONTRACT 3

BRIDGE DECK (UNIT-2), WATER LINE, FIELD APPLIED PROTECTIVE COATING, AND NAVIGATION LIGHTING

1996

INDEX OF SHEETS



LOCATION SKETCH

INDEX OF SHEETS

FINAL PLANS

I certify that this plan sheet accurately depicts the configuration and location of the roadway and all its appurtenant features, [illegible] my knowledge as I and my staff [illegible] contractor's construction of this project. I [illegible]ally disclaim any responsibility [illegible] this project, except as I [illegible] authorized the [illegible] modified or during its construction [illegible] the project design for the contract[illegible] responsibility except as I and my staff [illegible] the project, that the project be [illegible] directed or ordered

Signature ______ Date ______

KEVIN R. EISENBEIS NUMBER E-20946 STATE OF MISSOURI REGISTERED PROFESSIONAL ENGINEER

SUBMITTED BY: Kevin R. Eisenbeis
REGISTERED PROFESSIONAL ENGINEER 1-26-98
MISSOURI MO. E-20946

BRIDGE OVER MISSOURI RIVER

IN JACKSON COUNTY, MISSOURI
PROJECT NO. F.A.M.-291-1(52) STA. 99+52.92
JOB NO. J4U0564E RTE. 291
JACKSON COUNTY

DATE 3/27/98

STD.
STD. 706.35
A4757

291COVC3

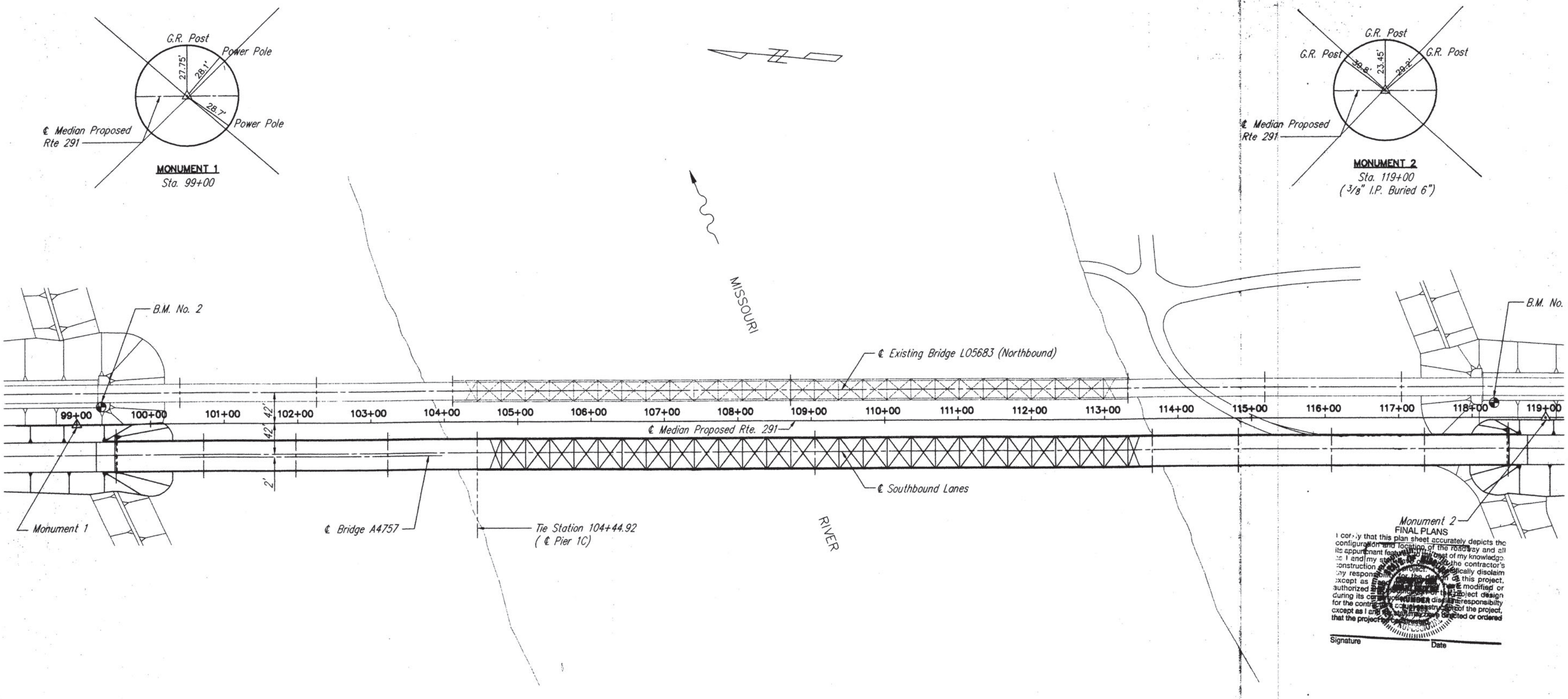
HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: S.A.K. 04/94
CHECKED: M.J.T. 04/94

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

STATE	PROJ. NO.	SHEET NO.
MO.	F.A.M.-291-1(52) J4U0564E	37

1D-980821-401



FINAL PLANS

I certify that this plan sheet accurately depicts the configuration and location of the roadway and all its appurtenant features to the best of my knowledge and my state of the contractor's construction ... specifically disclaim any responsibility ... of this project except as ... authorized ... modified or ... during its construction ... disclaim responsibility for the contractor's construction of the project, except as I ... that the project ... directed or ordered

Signature Date

KEVIN R. EICHHORN

1-26-98

BENCH MARKS:

B.M. No. 2 Elev. 763.54 – Chiseled "□" on West Wing of North Abut. of Missouri River Bridge L05683 24' Lt. ℄ Med. Sta. 99+33 ±.

B.M. No. 5 Elev. 763.45 – USC&G B.M. Disk Stamped U-218 Quad 390942 20'± Lt. ℄ Med. Sta. 118+30 ±.

NOTE:

The monuments shown on this drawing shall be used for stationing and alignment of the bridge.

SURVEY TIES & ALIGNMENT DIAGRAM

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

ALIGN_C3

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: B.T.K. 02/93
CHECKED: K.R.E. 09/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 2 OF 28

A4757

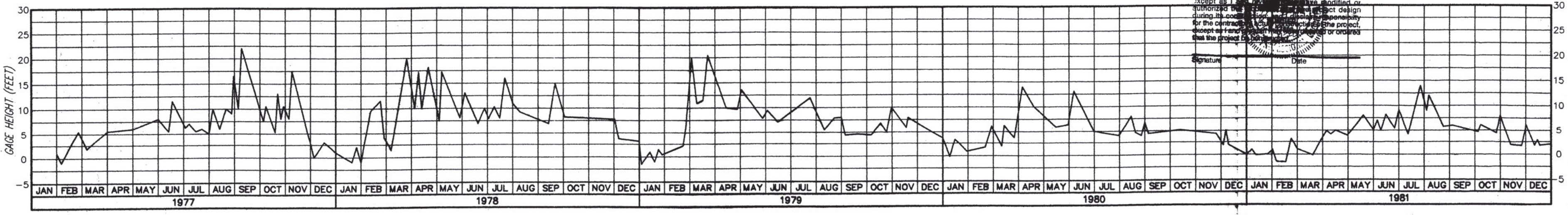
FINAL PLANS

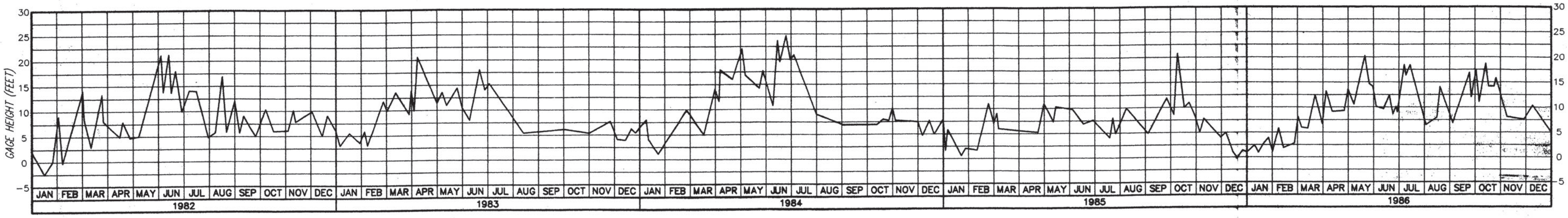
I certify that this plan sheet accurately depicts the configuration and location of the roadway and all its appurtenant features to the best of my knowledge. … I and my staff … the contractor's construction of … specifically disclaim any responsibility … the design of this project, except as I … modified or authorized … project design during its construction … responsibility for the contractor's actual construction of the project, except as I and … ordered that the project be constructed.

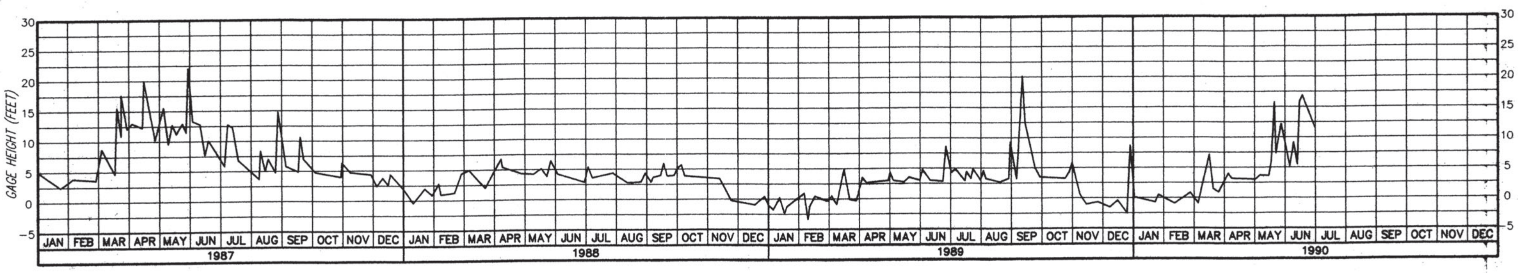
Signature Date

STATE	PROJ. NO.	SHEET NO.
MO.	F.A.M.-291-1(52) J4U0564E	38

ID-980821-401







NOTES

Stage hydrograph was plotted from readings of the Missouri River near the Hannibal Bridge located at river mile 366.1 in Kansas City, Missouri.

Gage Zero is 715.8 ft. M.S.L. (Mean Sea Level).

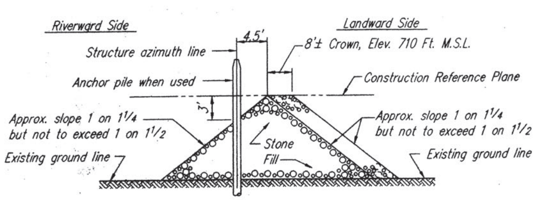
Seasonal variations in the water elevations at the Hannibal Bridge can be estimated by adding the gage reading to Elev. 715.8.

The Route 291 Bridge is located at river mile 352.7. A plot of the water surface elevation versus discharge curves for the Hannibal and Route 291 Bridges is shown on this drawing.

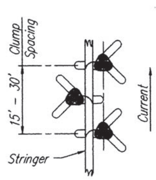
An estimate for seasonal variations in water surface elevations at the Route 291 Bridge can be made by deducting 11.7± to 14.6± feet from those at the Hannibal Bridge.

Stage hydrograph is based on information provided by the U.S. Army Corps of Engineers. Accuracy of details or dimensions are not guaranteed.

1-26-98

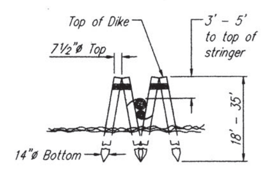


STONE FILL REVETMENT



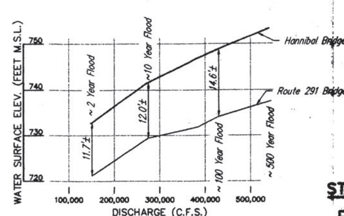
PLAN VIEW

Note:
Timber pile structure may be encountered in revetment along bank. Details shown are representative only, exact configuration and location is unknown.



END VIEW

TIMBER PILE STRUCTURE – TWO ROW CLUMP



WATER SURFACE ELEVATION VS. DISCHARGE CURVES

STAGE HYDROGRAPH AND REVETMENT DETAILS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HYDRO_C3

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: S.A.K. 03/94
CHECKED: M.J.T. 03/94

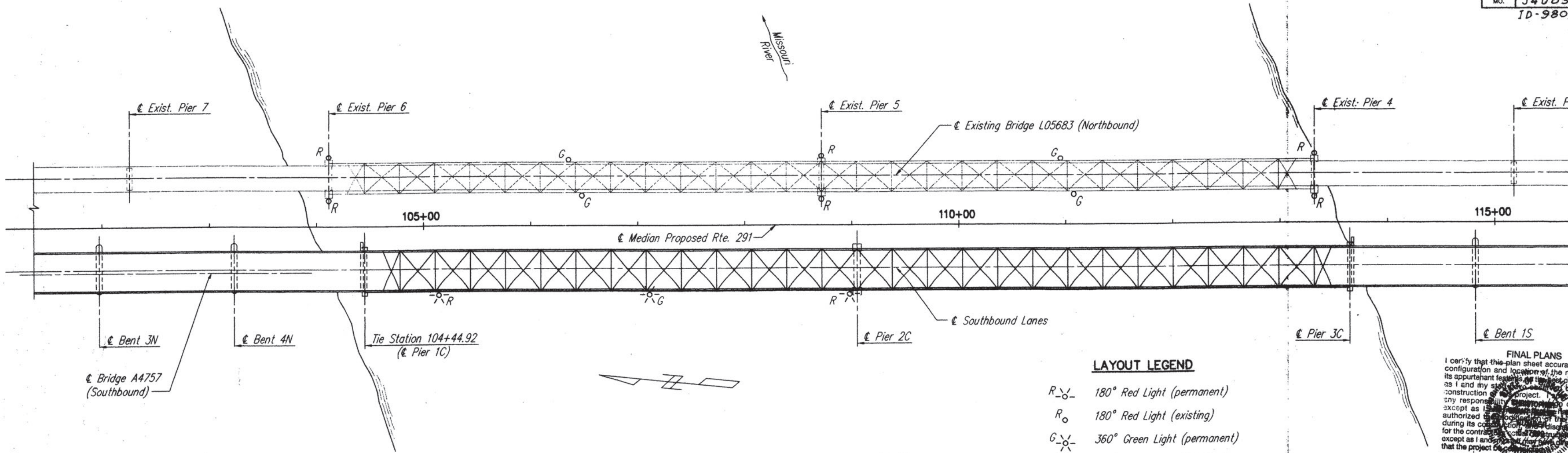
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 3 OF 28

A4757

STATE	PROJ. NO.	SHEET NO.
MO.	F.A.M.-291-1(52) J4U0564E	39

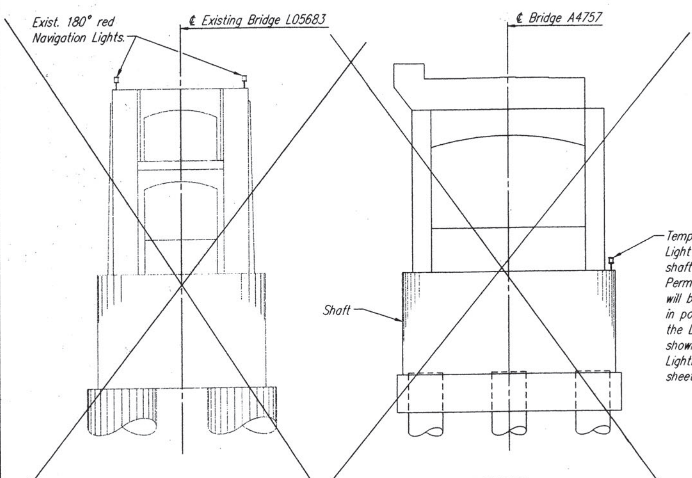
ID-980821-401



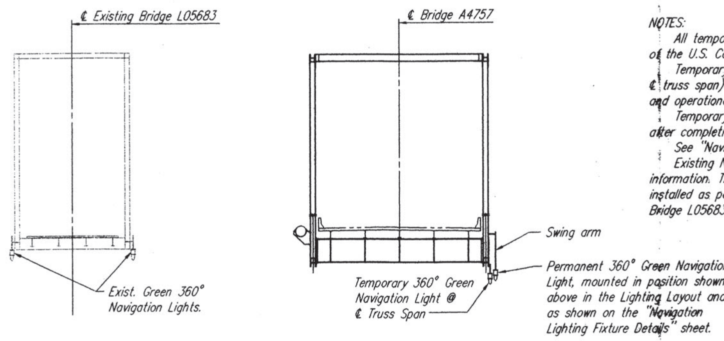
FINAL PLANS
I certify that this plan sheet accurately depicts the configuration and location of the roadway and all its appurtenant features to the best of my knowledge. ... the contractor's construction of this project. I specifically disclaim any responsibility ... of this project, except as ... modified or authorized ... project design during its construction ... responsibility for the contractor's ... of the project, except as I ... ordered that the project be constructed.

Signature Date

NAVIGATION LIGHTING LAYOUT



LOCATION OF TEMPORARY LIGHTS ON PIERS
(Superstructure not shown for clarity.)



LOCATION OF LIGHTS AT MID-CHANNEL

NOTES:
All temporary and permanent lighting shall meet the requirements of the U.S. Coast Guard.
Temporary lighting (red at Piers 1C & 2C and 360° green at ℄ truss span) shall be maintained until permanent lighting is in place and operational.
Temporary lighting will remain the property of the contractor after completion of construction.
See "Navigation Lighting Electrical Details" for additional notes.
Existing Navigation Lighting on Bridge L05683 has been shown for information. These lights will be removed and three new lights will be installed as part of the work in this contract. See plan sheets for Bridge L05683 and Special Provisions.

1-26-98
1/26/98

NAVIGATION LIGHTING

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

NAV_LIT1

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

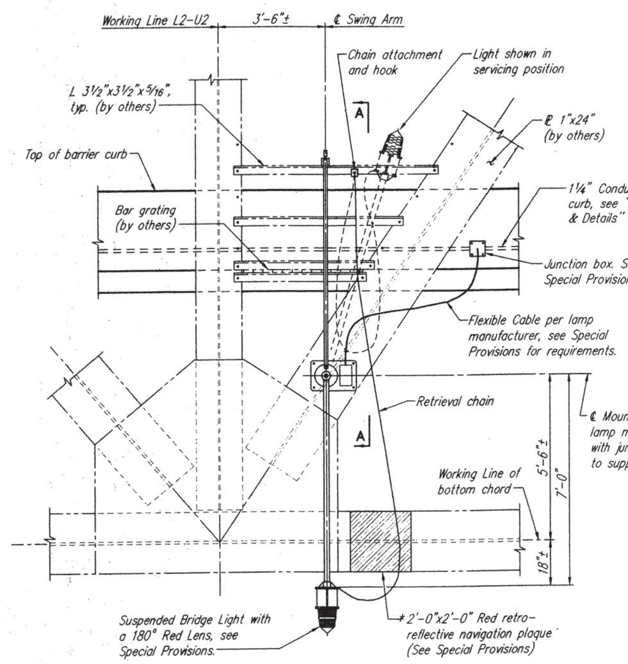
DETAILED: J.K.G. 4/94
CHECKED: E.W.N. 10/94

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

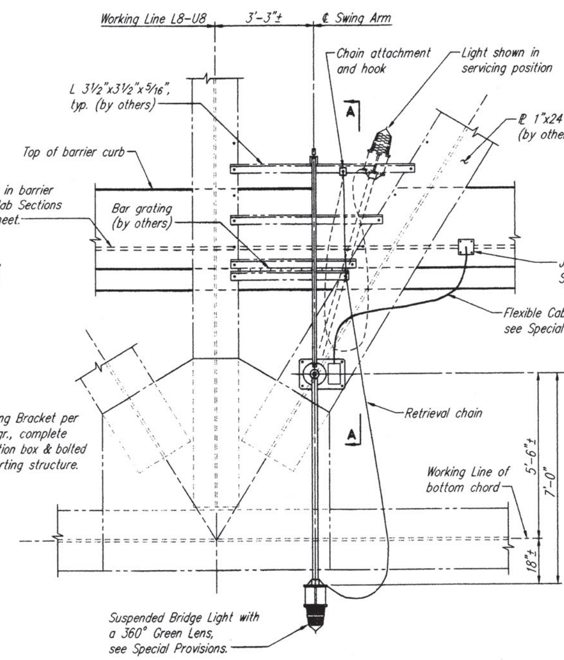
A4757

STATE	PROJ. NO.	SHEET NO.
MO.	F.R.M-291-1(52) J4U0564E	40

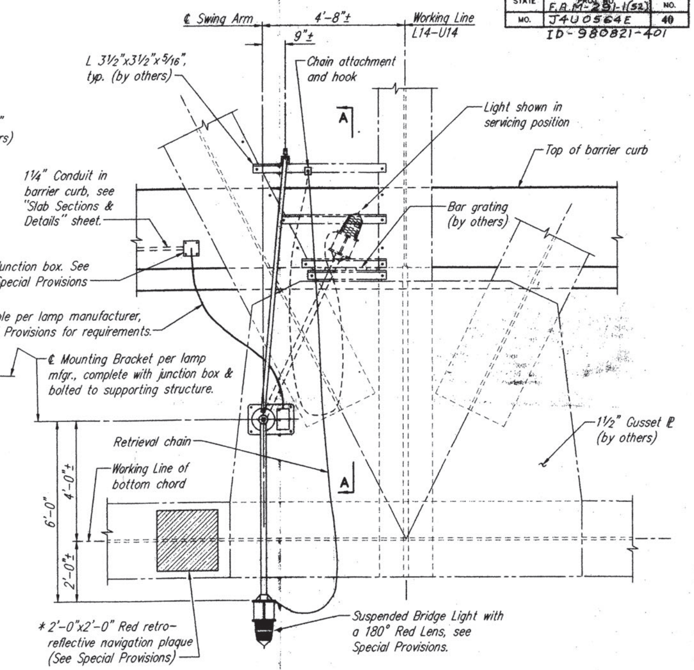
ID-980821-401



LEFT DECENDING MARGIN OF CHANNEL

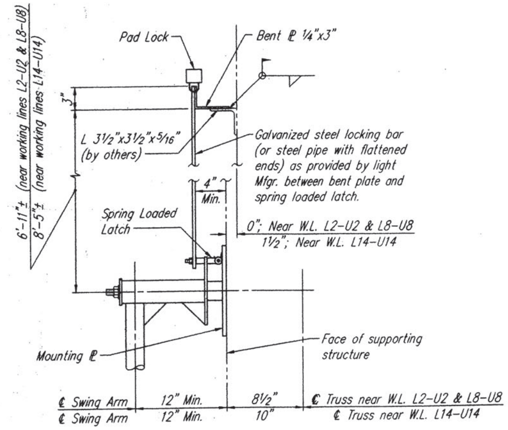


MID-CHANNEL



RIGHT DECENDING CHANNEL PIER

LIGHT FIXTURE DETAILS



SECTION A-A

* Type 2 reflective sheeting on an aluminum flat sheet in accordance with sec. 1042. For mounting use 3/8" ø stainless steel connectors with washers and nuts. Space aluminum flat plate away from existing steel with 3/8" stainless steel spacer.

FINAL PLANS

Signature Date

Note:
For electrical details and lighting system notes, see "Navigation Lighting Electrical Details" sheet.
Contractor shall field verify all dimensions which affect the Navigation Light Fixtures prior to fabrication.

1/26/98 1/26/98

NAVIGATION LIGHTING FIXTURE DETAILS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

SHEET 5 OF 28

A4757

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

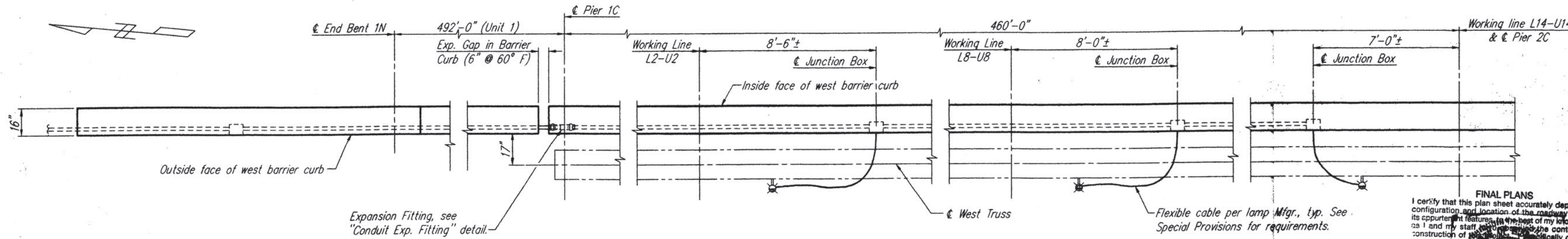
DETAILED: J.K.G. 10/94
CHECKED: E.W.N. 7/95

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

NAVLIT_2

STATE	PROJ. NO.	SHEET NO.
MO.	F.AM.-291-1(52) J4U0564E	41

ID-980821-401



ELECTRICAL PLAN

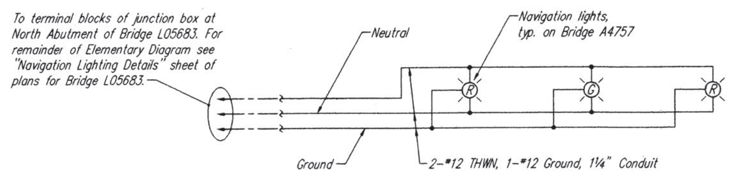
(Pull boxes not shown for clarity, see Special Provisions for requirements)

FINAL PLANS

I certify that this plan sheet accurately depicts the configuration and location of the roadway and all its appurtenant features, to the best of my knowledge, as I and my staff ... construction of ... any responsib... except as I ... authorized the ... during its construction ... for the contract ... except as I and ... that the project ...

Signature ___ Date

SYMBOLS	
⛯	Navigation Light (180° Red)
✱	Navigation Light (360° Green)
⬚	Junction Box embeded in barrier curb.
=====	1¼" Zinc coated rigid steel conduit in barrier curb.



ELEMENTARY DIAGRAM

Lighting System Notes:

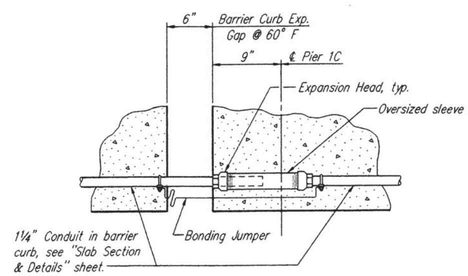
For location of conduit in barrier curb, see "Slab Section & Details" sheet. Weepholes shall be provided at appropriate locations to drain any moisture in conduit lines.

For conduit run between bridges A4757 and L05683, see Special Provisions.

Apply zinc rich paint to edges of all field drilled holes.

The cost of field drilled holes required for attachment of light fixtures and any other miscellaneous items shall be considered as incidental to the cost of other items included in the unit price bid for "Navigation Lighting System" per Lump Sum.

For additional Navigation Lighting System requirements see Special Provisions.



CONDUIT EXPANSION FITTING

Expansion fitting shall be galvanized, water tight and shall allow for a total movement range of 9⅝" due to a total temperature change of 140° F, from −20° F to 120° F (1⁄16" for every 10° F). Initial expansion gap in fitting shall be based on the temperature at the time of installation.

1/26/98 1-26-98

NAVIGATION LIGHTING ELECTRICAL DETAILS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

NAVLIT_3

HARRINGTON & CORTELYOU, INC. Consulting Engineers

DETAILED: J.K.G. 3/94
CHECKED: E.W.N. 7/95

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 6 OF 28

A4757

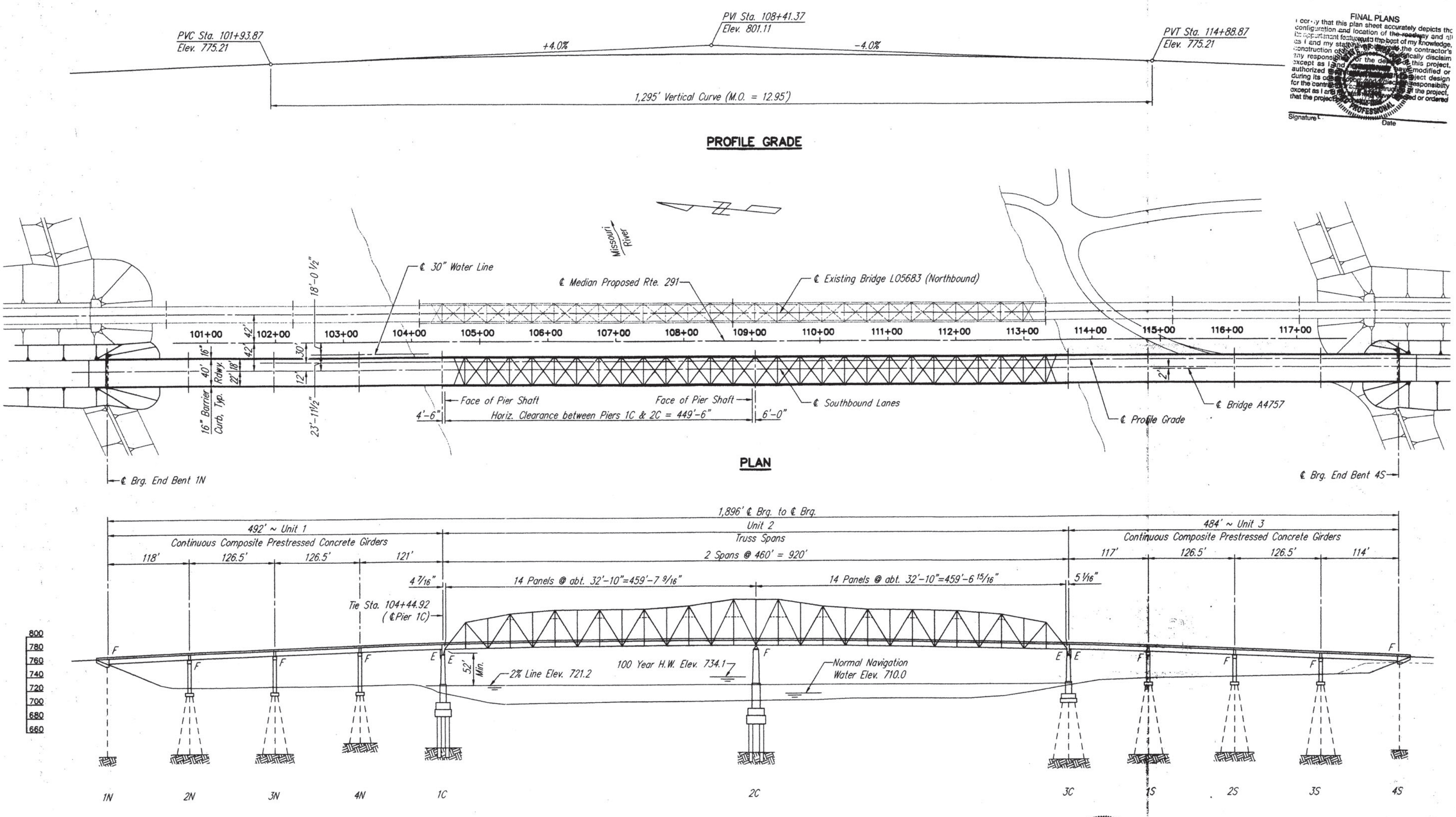
STATE	PROJ. NO.	SHEET NO.
MO.	F.A.M-291-1 (32) J4U0564E	42

ID-980821-401

FINAL PLANS

I certify that this plan sheet accurately depicts the configuration and location of the roadway and all as I and my staff ... to the best of my knowledge, ... the contractor's ... responsibility ... specifically disclaim ... except as I and ... of the design of this project, ... modified or ... during its ... project design ... for the contractor ... responsibility ... except as I ... the project ... that the project ... or ordered

Signature ... Date



BASIC FLOOD DATA	
Discharge (100 yr.)	430,000 cfs
H.W. Elev.	734.1

1-26-98

GENERAL PLAN AND ELEVATION

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

SHEET 7 OF 28

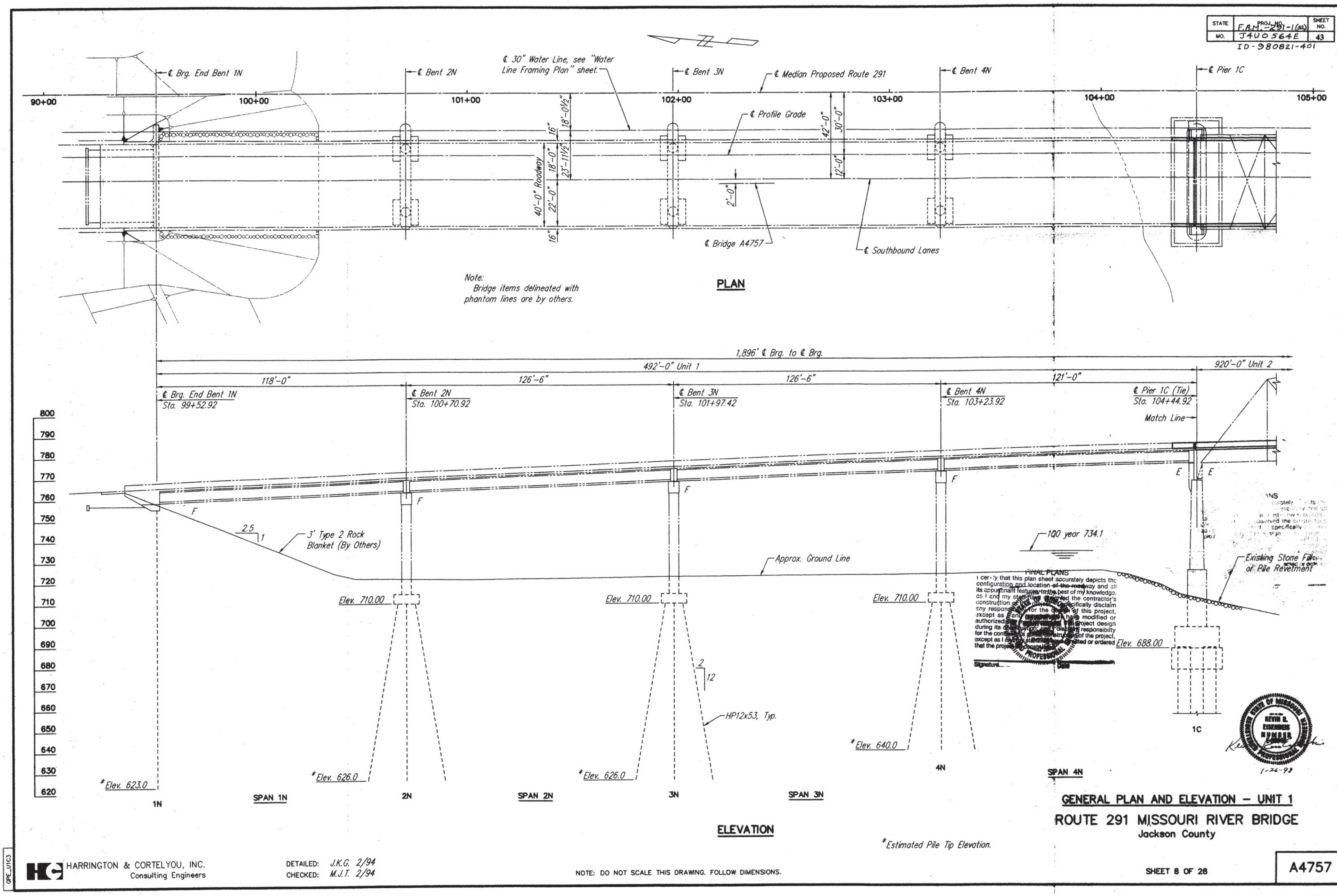
A4757

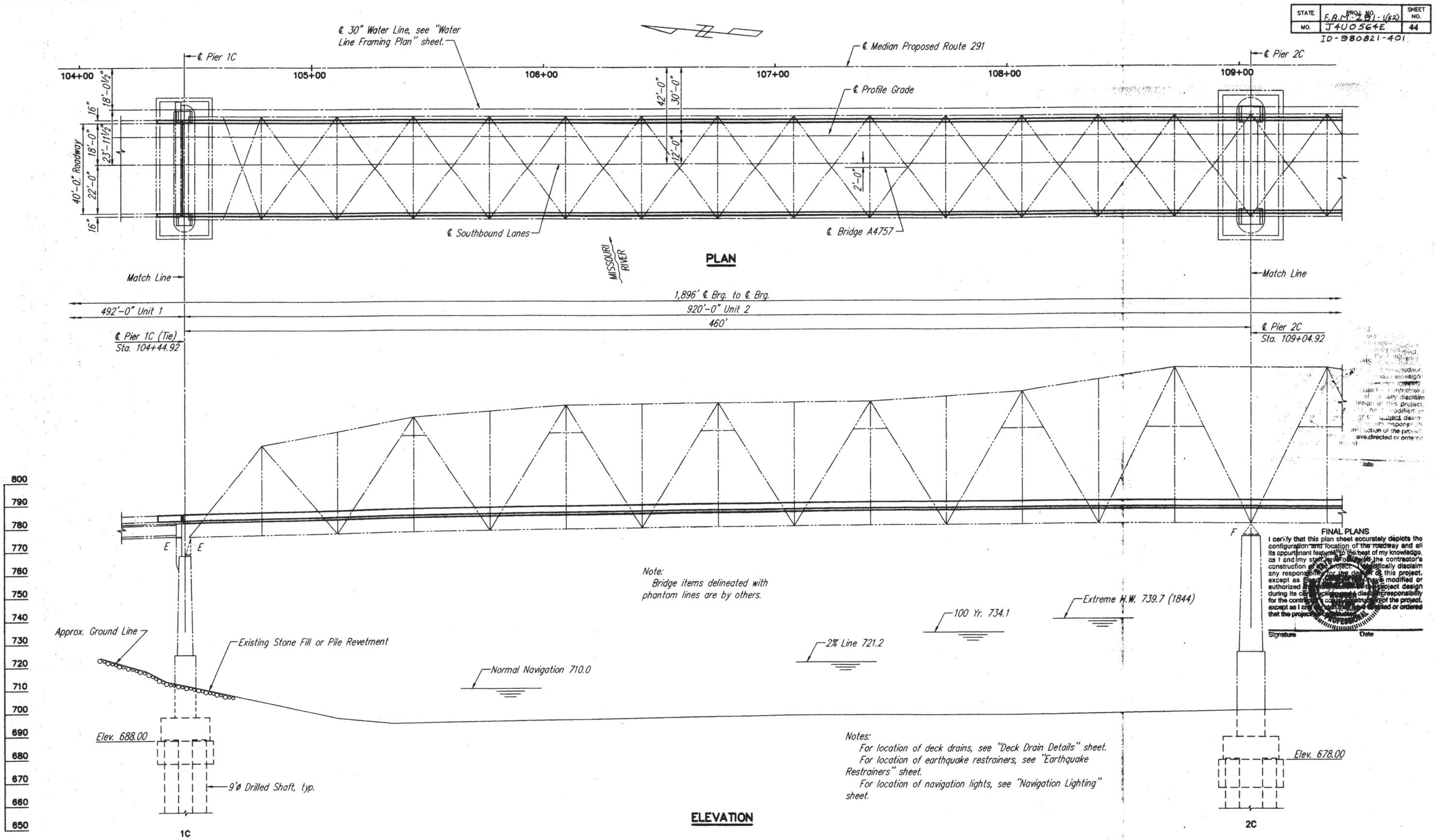
GPE291C3

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: T.L.W. 10/92
CHECKED: H.G.J. 09/93

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.


STATE
MO.
PROJ. NO. F.A.M.-291-1(52)
J4U0564E
SHEET NO. 43
ID-980821-401
℄ 30" Water Line, see "Water Line Framing Plan" sheet.
℄ Brg. End Bent 1N
℄ Bent 2N
℄ Bent 3N
℄ Median Proposed Route 291
℄ Bent 4N
℄ Pier 1C
90+00
100+00
101+00
102+00
103+00
104+00
105+00
℄ Profile Grade
40'-0" Roadway
18'-0½"
18'-0"
23'-11½"
22'-0"
16"
42'-0"
30'-0"
12'-0"
2'-0"
℄ Bridge A4757
℄ Southbound Lanes
Note:
Bridge items delineated with phantom lines are by others.
PLAN
1,896' ℄ Brg. to ℄ Brg.
492'-0" Unit 1
920'-0" Unit 2
118'-0"
126'-6"
126'-6"
121'-0"
℄ Brg. End Bent 1N
Sta. 99+52.92
℄ Bent 2N
Sta. 100+70.92
℄ Bent 3N
Sta. 101+97.42
℄ Bent 4N
Sta. 103+23.92
℄ Pier 1C (Tie)
Sta. 104+44.92
Match Line
3' Type 2 Rock Blanket (By Others)
Approx. Ground Line
100 year 734.1
Existing Stone Fill or Pile Revetment
Elev. 710.00
Elev. 710.00
Elev. 710.00
Elev. 688.00
HP12x53, Typ.
*Elev. 623.0
*Elev. 626.0
*Elev. 626.0
*Elev. 640.0
1N
2N
3N
4N
1C
SPAN 1N
SPAN 2N
SPAN 3N
SPAN 4N
ELEVATION
*Estimated Pile Tip Elevation.
FINAL PLANS
GENERAL PLAN AND ELEVATION – UNIT 1
ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County
HARRINGTON & CORTELYOU, INC.
Consulting Engineers
DETAILED: J.K.G. 2/94
CHECKED: M.J.T. 2/94
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.
SHEET 8 OF 28
A4757
GPE_U1C3
1-26-98



STATE	PROJ. NO.	SHEET NO.
MO.	F.A.P.-291-(52) J4U0564E	44

ID-980821-401

FINAL PLANS
I certify that this plan sheet accurately depicts the configuration and location of the roadway and all its appurtenant features to the best of my knowledge, as I and my staff ... the contractor's construction ... specifically disclaim any responsibility for the ... of this project, except as ... modified or authorized ... project design during its ... responsibility for the ... of the project, except as I ... directed or ordered that the project ...

Signature   Date

GENERAL PLAN AND ELEVATION – UNIT 2
NORTH SPAN

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

1-26-98

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

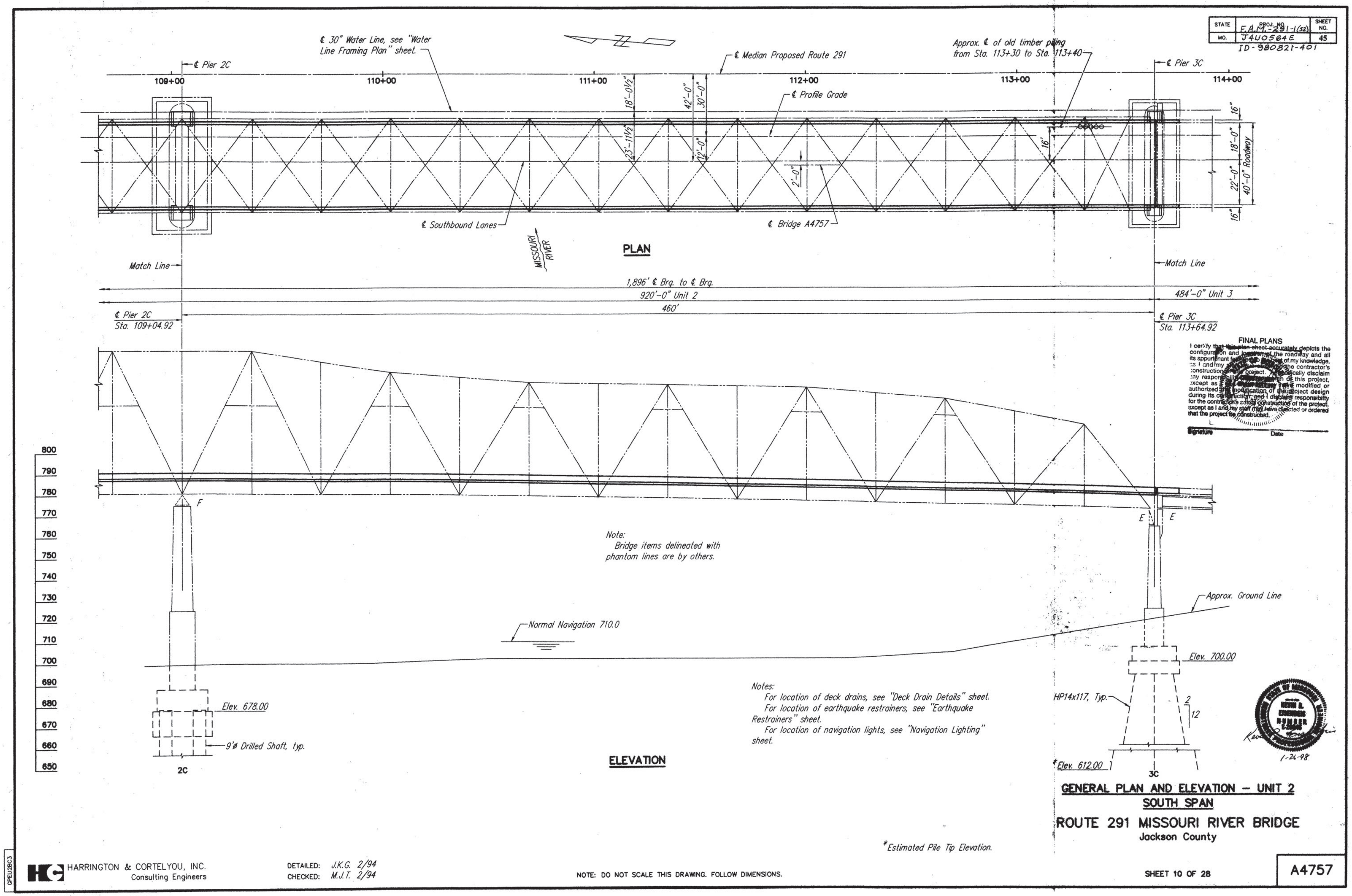
DETAILED: J.K.G. 2/94
CHECKED: M.J.T. 2/94

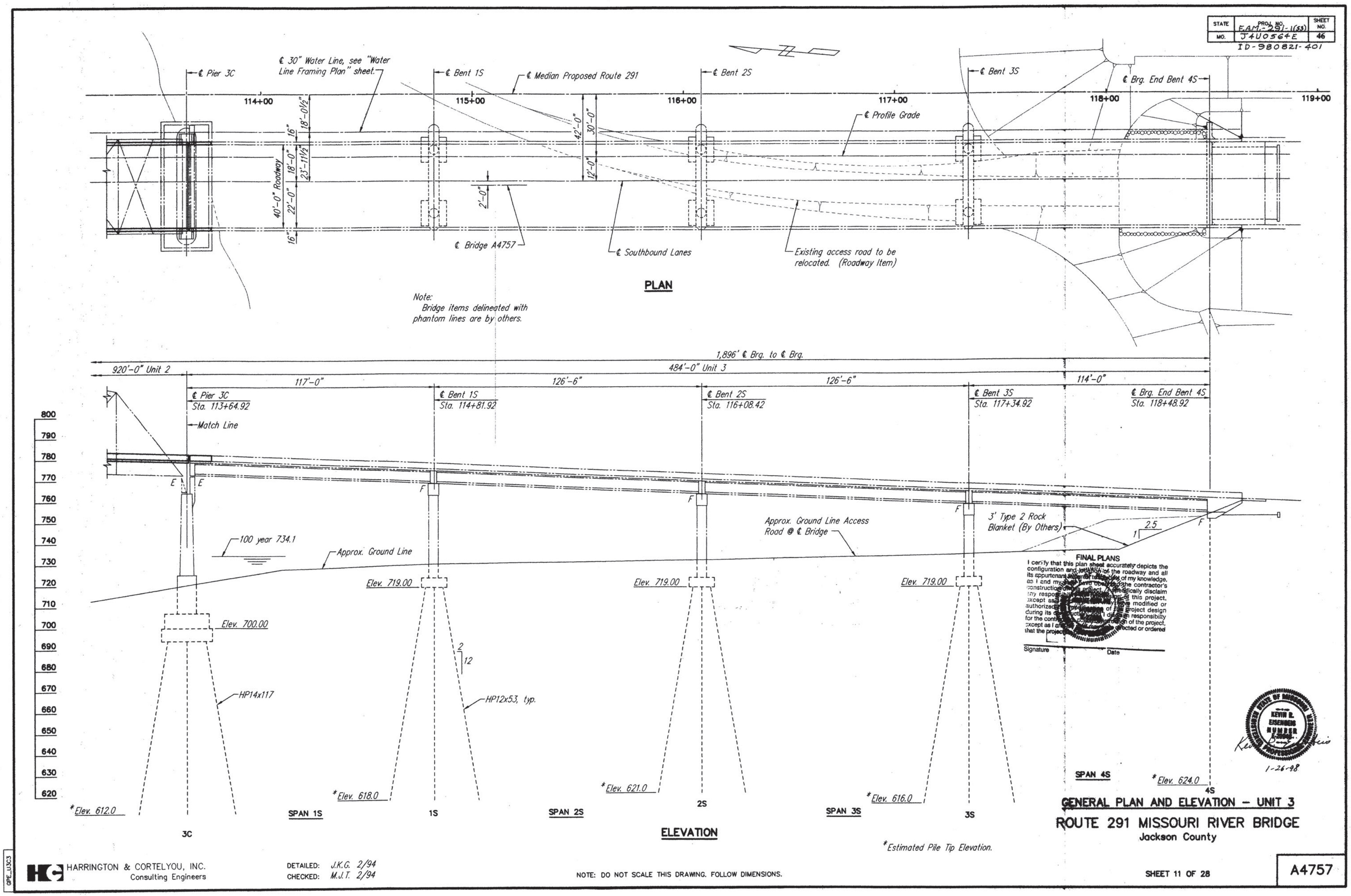
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 9 OF 28

A4757

GPEU2AC3


STATE MO.
PROJ. NO. F.A.M.-291-1(52) J4U0564E
SHEET NO. 45
ID-980821-401
℄ 30" Water Line, see "Water Line Framing Plan" sheet.
℄ Pier 2C
℄ Median Proposed Route 291
Approx. ℄ of old timber piling from Sta. 113+30 to Sta. 113+40
℄ Pier 3C
109+00
110+00
111+00
112+00
113+00
114+00
℄ Profile Grade
18'-0½"
42'-0"
30'-0"
23'-11½"
12'-0"
2'-0"
16'
16"
18'-0"
22'-0"
40'-0" Roadway
℄ Southbound Lanes
℄ Bridge A4757
MISSOURI RIVER
PLAN
Match Line
1,896' ℄ Brg. to ℄ Brg.
920'-0" Unit 2
484'-0" Unit 3
460'
℄ Pier 2C Sta. 109+04.92
℄ Pier 3C Sta. 113+64.92
FINAL PLANS
Signature
Date
800
790
780
770
760
750
740
730
720
710
700
690
680
670
660
650
F
E
E
Note:
Bridge items delineated with phantom lines are by others.
Approx. Ground Line
Normal Navigation 710.0
Elev. 700.00
Elev. 678.00
9'ø Drilled Shaft, typ.
2C
Notes:
For location of deck drains, see "Deck Drain Details" sheet.
For location of earthquake restrainers, see "Earthquake Restrainers" sheet.
For location of navigation lights, see "Navigation Lighting" sheet.
HP14x117, Typ.
2
12
*Elev. 612.00
3C
ELEVATION
1-26-98
GENERAL PLAN AND ELEVATION – UNIT 2
SOUTH SPAN
ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County
*Estimated Pile Tip Elevation.
GPEU2BC3
HARRINGTON & CORTELYOU, INC.
Consulting Engineers
DETAILED: J.K.G. 2/94
CHECKED: M.J.T. 2/94
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.
SHEET 10 OF 28
A4757


STATE MO. PROJ. NO. F.A.M.-291-1(53) J4U0564E SHEET NO. 46
ID-980821-401
℄ Pier 3C
℄ 30" Water Line, see "Water Line Framing Plan" sheet.
℄ Bent 1S
℄ Median Proposed Route 291
℄ Bent 2S
℄ Bent 3S
℄ Brg. End Bent 4S
114+00
115+00
116+00
117+00
118+00
119+00
℄ Profile Grade
40'-0" Roadway
16"
18'-0½"
18'-0"
23'-11½"
22'-0"
42'-0"
30'-0"
12'-0"
2'-0"
℄ Bridge A4757
℄ Southbound Lanes
Existing access road to be relocated. (Roadway Item)
PLAN
Note: Bridge items delineated with phantom lines are by others.
1,896' ℄ Brg. to ℄ Brg.
920'-0" Unit 2
484'-0" Unit 3
117'-0"
126'-6"
126'-6"
114'-0"
℄ Pier 3C Sta. 113+64.92
℄ Bent 1S Sta. 114+81.92
℄ Bent 2S Sta. 116+08.42
℄ Bent 3S Sta. 117+34.92
℄ Brg. End Bent 4S Sta. 118+48.92
Match Line
800
790
780
770
760
750
740
730
720
710
700
690
680
670
660
650
640
630
620
100 year 734.1
Approx. Ground Line
Approx. Ground Line Access Road @ ℄ Bridge
3' Type 2 Rock Blanket (By Others)
2.5
1
Elev. 719.00
Elev. 700.00
HP14x117
HP12x53, typ.
2
12
*Elev. 612.0
*Elev. 618.0
*Elev. 621.0
*Elev. 616.0
*Elev. 624.0
3C
SPAN 1S
1S
SPAN 2S
2S
SPAN 3S
3S
SPAN 4S
4S
ELEVATION
*Estimated Pile Tip Elevation.
FINAL PLANS
Signature
Date
1-26-98
GENERAL PLAN AND ELEVATION – UNIT 3
ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County
HARRINGTON & CORTELYOU, INC. Consulting Engineers
DETAILED: J.K.G. 2/94
CHECKED: M.J.T. 2/94
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.
SHEET 11 OF 28
A4757
GPE_U3C3

STATE	PROJ. NO.	SHEET NO.
MO.	F.A.M.-291-1(52) J4U0564E	47

ID-980821-401

GENERAL NOTES:

The scope of work consists of the construction of slab and barrier curbs of Unit 2, the water line and its supporting structure and the navigation lighting system, along with other associated work as shown on the plans. The field coat of the Unit 2 Superstructure Steel is also part of the work in this contract.

The existing Missouri Route 291 shall remain open to traffic during construction.

Utility companies whose facilities are shown on the plans or are known to be within the construction limits shall be notified by the contractor of the construction start date.

All dimensions are horizontal unless otherwise noted. Drawings shall not be scaled.

SPECIFICATIONS:

Design: 1992 Edition of the AASHTO Standard Specifications for Highway Bridges plus Interims thru 1995.

Construction: Missouri State Highway Commission Standard Specifications For Highway Construction, 1996 Edition, plus project special provisions.

DESIGN LOADING:

Load Factor Design Method – Bridge Deck
Live Load – HS20 Modified with Modified 24,000 Lb. Tandem Axle. (Military Loading).
Dead Load – An allowance of 35 Lbs. per sq. ft. of roadway for future wearing surface is included in the dead load.
An allowance of 16 Lbs. per sq. ft. of roadway is used for Stay-In-Place Forms.
Concrete Weight – 150 Lbs. per cu. ft.
Earthquake – Category A

DESIGN UNIT STRESSES:

Concrete (Class B1 & B2) ------------ fc = 1,600 psi.
f'c = 4,000 psi.
n = 8
Reinforcing Steel (Grade 60) --------- fs = 24,000 psi.
fy = 60,000 psi.

CONCRETE:

All exposed edges of concrete shall be beveled $3/4$" unless otherwise shown or noted.

Construction joints shall be made only at locations shown on the plans, except with the approval of the engineer.

Keys shall be provided for all construction joints unless otherwise shown.

All concrete for bridge deck shall be Class B2.

All concrete for barrier curbs shall be Class B1.

JOINT FILLER:

All joint filler shall meet the requirements of standard specification 1057.2.4, except as noted.

REINFORCING STEEL:

Reinforcing steel shall be deformed billet steel bars conforming to ASTM A615, Grade 60. All dimensions to reinforcing steel on detail drawings are to centerline of bar, except where clear distance is noted from the face of concrete.

Minimum clearance to reinforcing steel shall be $1^1/_2$" unless otherwise shown.

All reinforcing steel shall be lapped according to AASHTO 8.32 unless otherwise shown or noted.

All reinforcing in the bridge deck and barrier curbs shall be epoxy coated, except as noted.

The epoxy coated reinforcing bars shall be coated in accordance with Section 710 of Mo. Std. Spec's. for Highway Construction.

PROTECTIVE COATING:

Protective Coating: System G (Field Coat only) by the contractor in accordance with the Special Provisions.

Field Coat: The cost of the intermediate and finish coats shall be included in the contract unit price per tons of "Field Coat (System G) Gray". See Special Provisions.

Water Line Supports: All surfaces of water line support beams, framing and bearing plates in Units 1 & 3 and support bracket caps in Unit 2 shall be coated per System G (Gray). The cost of all materials and labor shall be included in the Contract bid price for "Water Line on Bridge".

BRIDGE DECK:

Bridge deck as detailed consists of an $8^1/_2$" roadway slab.

Alternate types of slab forms may be used in the construction of slabs. ~~Cast-In-Place with conventional forming – Alt. a, or~~ Stay-In-Place Corrugated Metal Forms – Alt. b. See Special Provisions.

Stud type shear connectors will be applied to structural steel stringers and diaphragms as a part of this contract.

FINAL PLANS
I certify that this plan sheet accurately depicts the configuration and location of the roadway and all its appurtenant features, to the best of my knowledge, as I and my staff have observed the contractor's construction of this project. I specifically disclaim any responsibility for the design of this project, except as I and my staff may have modified or authorized the modification of the project design during its construction and disclaim responsibility for the contractor's actual construction of the project, except as I and my staff have inspected or ordered that the project be constructed.

Signature Date

TABLE OF *FINAL* QUANTITIES – BRIDGE DECK, WATER LINE, ELECTRICAL, AND COATING

ITEM	UNIT	TOTAL
Slab on Steel	Sq. Yd.	4,366
Safety Barrier Curb	Lin. Ft	1,884
Expansion Device (Bar Type Joint)	Lin. Ft.	82
Drainage System (On Structure)	L.S.	1
Navigation Lighting System	L.S.	1
Protective Coating – Concrete Piers (Deleterious Agents)	L.S.	1
Field Coat (System G) Gray	Tons	2,106.6
Fabricated Structural Carbon Steel (Shear Connectors)	Lbs.	25,660
Earthquake Restrainer Assemblies	Each	8
Water Line on Bridge	L.S.	1

Notes:
Square yards of slab concrete includes all concrete and reinforcing steel for the Unit 2 slab. Concrete and reinforcing at expansion joint blockout in Units 1 and 3 shall be considered as incidental to price bid for "Slab on Steel".

Lineal feet of safety barrier curb concrete includes all concrete, reinforcing steel, plastic water stops and movement gauges for the barrier curbs.

QUANTITIES FOR ALTERNATE SLAB FORMING

TYPE OF SLAB		SLAB ON STEEL Reinf. (Lbs.) Epoxy	Reinf. (Lbs.) Plain	Conc. (Cu. Yd.) Slab
~~Alt. a~~	~~Cast-In-Place Conventional Forms~~	~~363,740~~	—	~~1,075~~
Alt. b	Stay-In-Place Forms	** 363,740	—	*1,020

Notes:
The table of Quantities for Alternate Slabs represents the quantities used by the state in preparing the cost estimate for concrete slabs. Variations may be encountered in these estimated quantities but these variations cannot be used for an adjustment in the contract unit price per square yard of alternate slab used.

See Special Provisions for Alternate Methods of Forming Slabs.
** Does not include concrete in fill corrugations of S.I.P. forms.*
*** Does not include reinforcing bars used as bar supports.*

1/26/98

GENERAL NOTES & QUANTITIES
ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: S.A.K. 3/94
CHECKED: M.J.T. 3/94

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

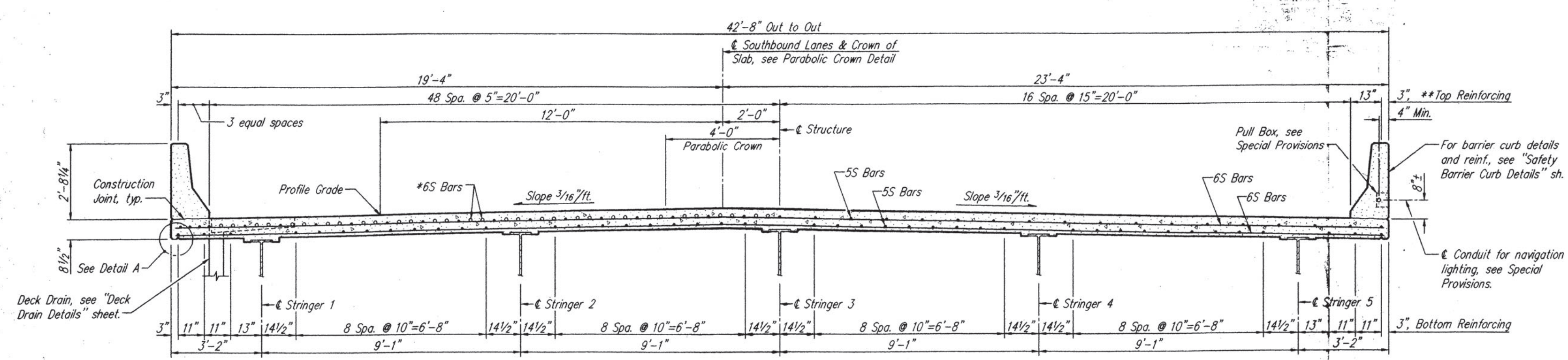
SHEET 12 OF 28

A4757

GNO_C3

STATE	PROJ. NO.	SHEET NO.
MO.	FAM-291-1(53) J4U0564E	48

ID-980821-401



*Bars shown thus "o" indicates extra bars over floorbeams. See "Slab Plan" sheets.

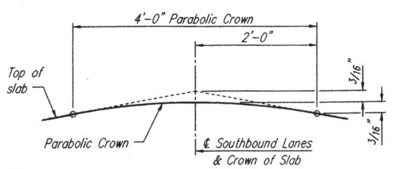
HALF SECTION NEAR FLOORBEAM

HALF SECTION @ MID PANEL

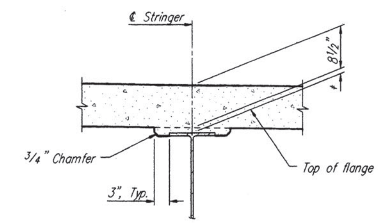
SECTION THRU ROADWAY
(Looking South)

** Spacing for top reinforcing symmetrical about ℄ Structure.

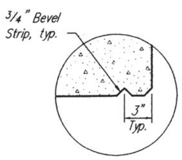
FINAL PLANS
I certify that this plan sheet accurately depicts the configuration and location of the roadway and all its appurtenant features to the best of my knowledge. ... construction of ... any responsibility ... except as I ... authorized the ... during its construction ... for the contractor's ... except as I ... that the project ...
Signature Date



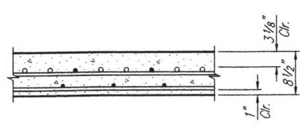
PARABOLIC CROWN DETAIL



THEORETICAL SLAB HAUNCH



DETAIL A



CLEARANCE DETAIL

*Use 1" haunch at floorbeam for stringers 2-5 and 1¾" haunch at floorbeam for stringer 1. No payment will be made for additional forming or concrete req'd. for variable haunching.

SLAB SECTIONS & DETAILS
ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

SHEET 13 OF 28

A4757

1-26-98

RDWY_SEC

HC HARRINGTON & CORTELYOU, INC.
Consulting Engineers

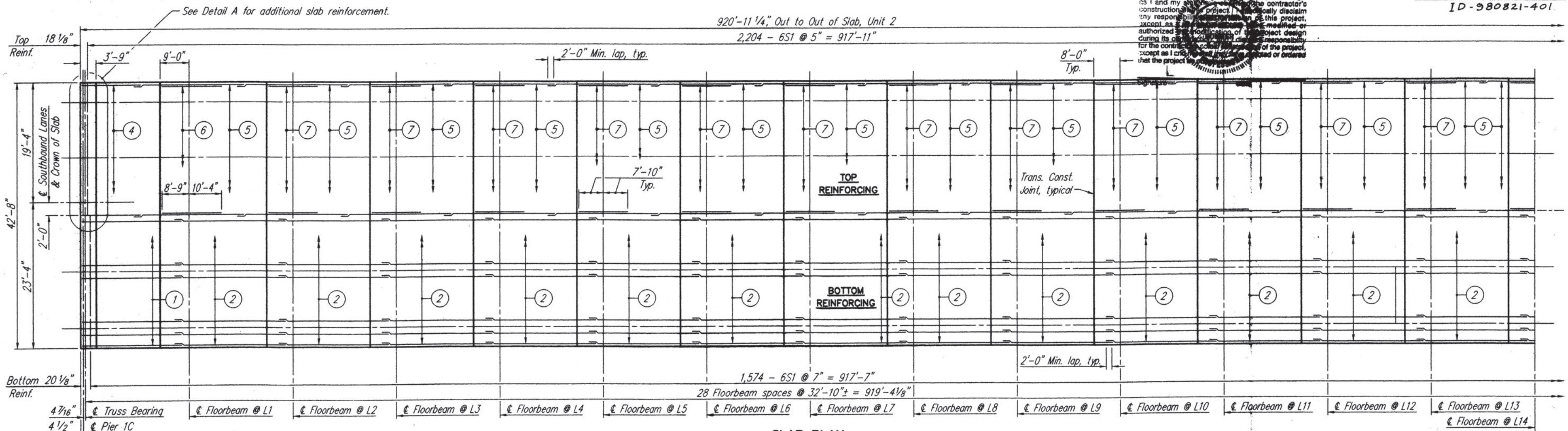
DETAILED: T.L.W. 2/94
CHECKED: M.J.T. 2/94

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

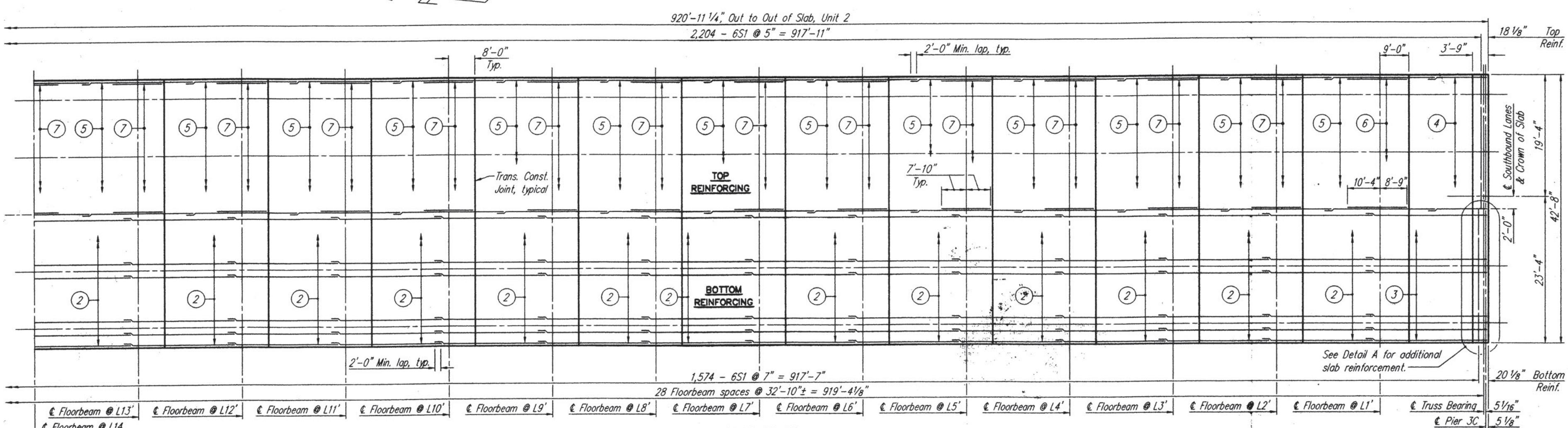
STATE	PROJ. NO.	SHEET NO.
MO.	F.A.M.-291-1(52) J4U0564E	49

ID-980821-401

FINAL PLANS



SLAB PLAN



SLAB PLAN

1 42 - 5S2
2 42 - 5S3
3 42 - 5S4
4 35 - 5S5
5 35 - 5S3
6 68 - 6S6
7 68 - 6S7

Notes:
Slab to be built parallel to grade and a minimum thickness of 8 1/2". Estimated quantities include slab and haunching.
Longitudinal dimensions are parallel to grade.
For spacing of above reinforcing see "Slab Sections & Details" sh.
For deck drain, see "Deck Drain Details" sheet.
For Detail A and additional slab details, see "Miscellaneous Slab Details" sheet.

SLAB PLAN

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

1-26-98

SLAB_U2

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: S.A.K. & J.K.G. 3/94
CHECKED: M.J.T. 3/94

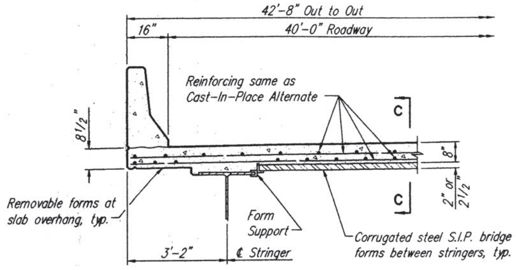
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 14 OF 28

A4757

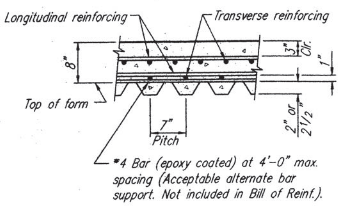
STATE	PROJ. NO.	SHEET NO.
MO.	EA.MO.291-1(32) J4U0564E	50

ID-980821-401



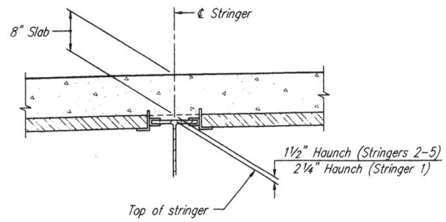
PART SECTION THRU SLAB

Note:
Details shown are intended only to basically describe the use of stay-in-place forms for construction of the slab. Details not shown are the same as for the cast-in-place alternate, except as otherwise shown or noted. See "Slab Sections & Details" sheet.
The contractor shall submit complete details to the engineer for his approval. See Special Provisions.
Stay-in-place forms and supporting elements shall not be welded to stringer flanges.
Stay-in-place forming shall not be used at 1 1/8"ø bridge rope anchorage device locations, see "Earthquake Restrainers" sheet.



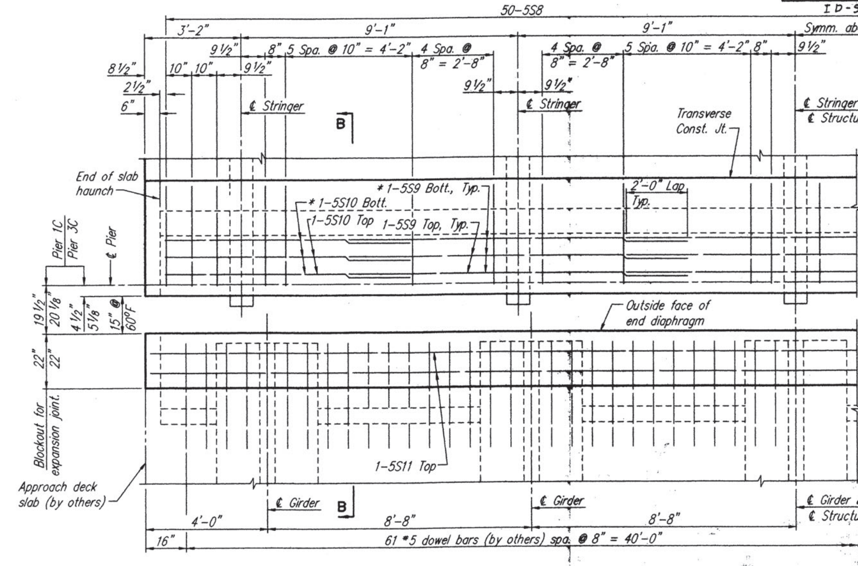
SECTION C-C

Note:
The corrugation valleys of the forms shall match the bottom transverse reinforcing steel spacing as shown.



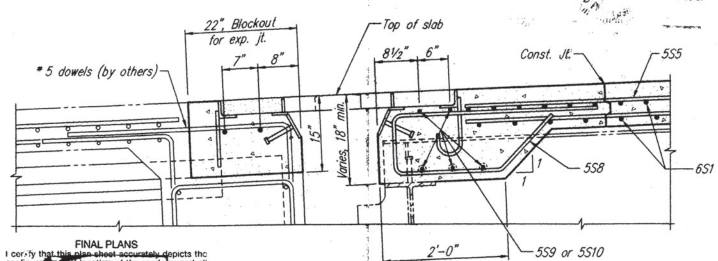
THEORETICAL SLAB HAUNCH

STAY-IN-PLACE PANEL OPTION DETAILS

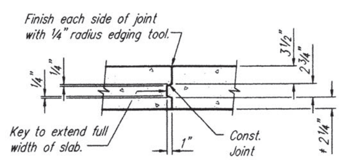


DETAIL A

* 5S9 Or 5S10 bars thru holes in web of stringers.



SECTION B-B
(Details of expansion joint omitted for clarity.)



TYPICAL CONSTRUCTION JOINT
* C.I.P. Option shown. Varies for S.I.P. Panel Option.

FINAL PLANS
I certify that this plan sheet accurately depicts the configuration and location of the roadway and all its appurtenant features to the best of my knowledge, as I and my staff designed this project. I specifically disclaim any responsibility for the contractor's construction of this project, except as modified or authorized during its construction. I disclaim responsibility for the contractor's construction of the project, except as I and my staff may have directed or ordered that the project be constructed.
Signature Date

Note:
Stringers, P/S girders & end diaphragms are by others.
5S9 & 5S10 bars in bottom of haunch placed thru holes in stringer web.

KEVIN R. EISENBEIS
1-26-98

MISCELLANEOUS SLAB DETAILS
ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.K.G. 3/94
CHECKED: M.J.T. 3/94

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

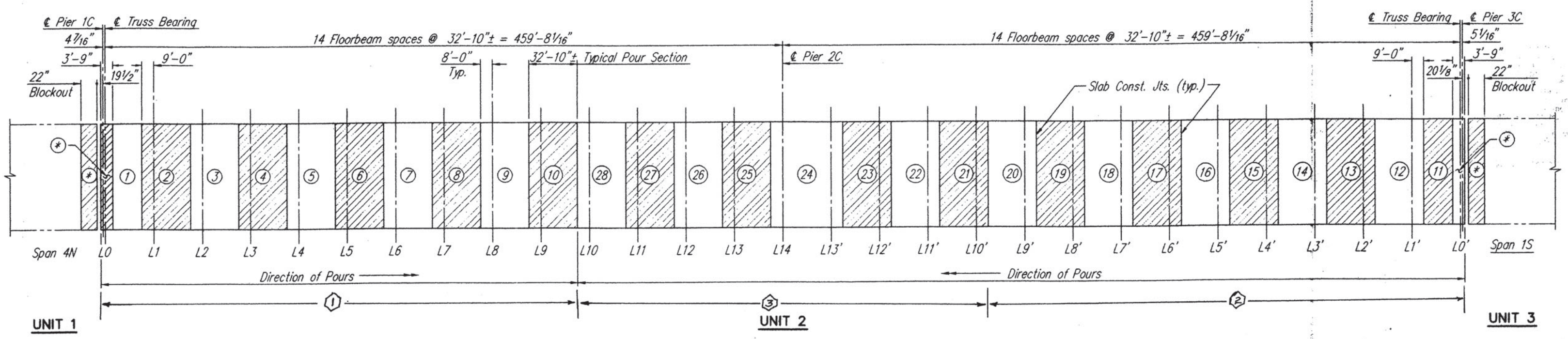
SHEET 15 OF 28

A4757

MSLABDTL

STATE	PROJ. NO.	SHEET NO.
MO.	F.A.M.-291-1(52) J4U0564E	51

ID-980821-401



POURING SEQUENCE

Note:
The basic sequence for Unit 2 consists of pouring sections 1 through 28 consecutively.

FINAL PLANS
I certify that this plan sheet accurately depicts the configuration and location of the roadway and all its appurtenant features to the best of my knowledge, as I and my staff have observed the contractor's construction of the project. I specifically disclaim any responsibility for the design of this project, except as I and ... have modified or authorized the ... during its construction ... project design for the contract ... responsibility except as I and ... the project, that the project ... or ordered

Signature Date

POURING SEQUENCE NOTES

The contractor shall pour and satisfactorily finish the slab at a minimum rate of 25 cu. yds./hr.

As an alternate to the basic pour sequence, the Contractor may combine the pours of any number of sequential slab sections, as long as they are poured in the direction indicated. Any alternate pouring sequence that does not follow the numbered sequence or pour direction indicated, will not be allowed, unless a written request is approved by the Engineer.

Retarder shall be an approved type and retard the set of the concrete 2.5 hours.
Haunch thicknesses were determined from theoretical camber of floorbeams and truss, and deflections due to slab and barrier curbs. Slab haunches also include a vertical curve correction. No payment will be made for additional concrete or forming required for variable haunching.

* Expansion joint slab pour shall be placed in pairs and simultaneously at each expansion joint, and only after completion of the numbered sequence of pours.

See "Slab Plan" sheet, for additional notes.

POURING SEQUENCE USED
1 L0 to L10
2 L0' to L10'
3 L10' to L10

1-26-98

SLAB POURING SEQUENCE
ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

POUR_SEQ

HC HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.K.G. 3/94
CHECKED: M.J.T. 4/94

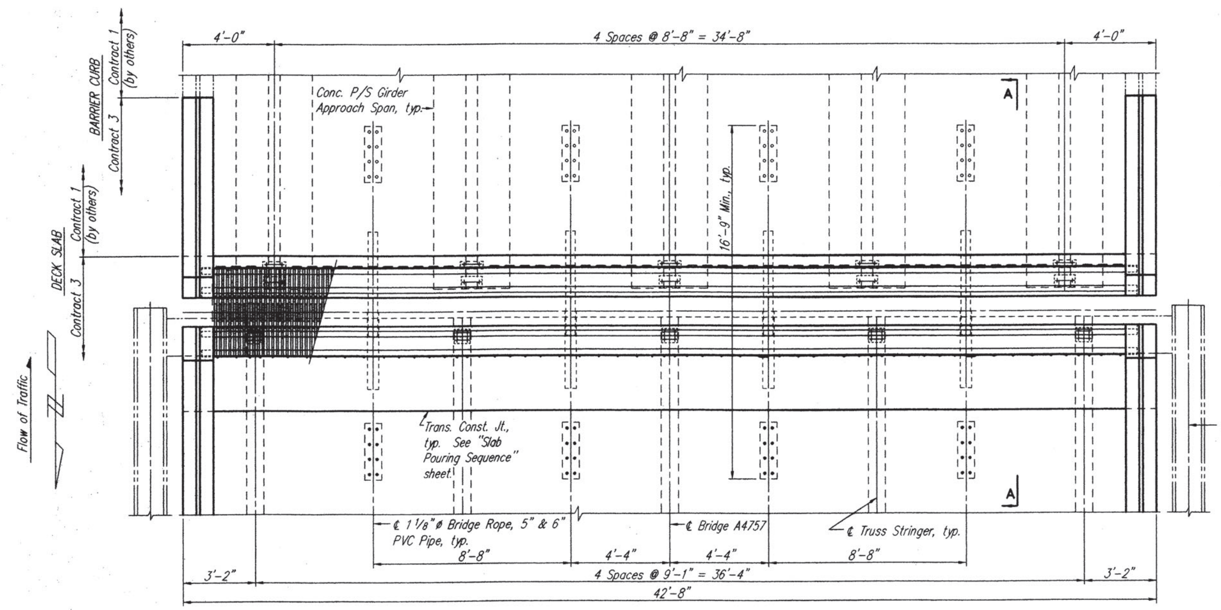
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 16 OF 28

A4757

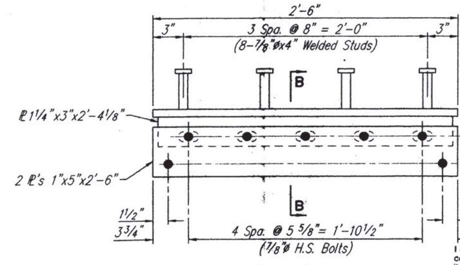
STATE	PROJ. NO.	SHEET NO.
MO.	F.A.M.-291-1(52) J4U0564E	52

ID-980821-401



PLAN OF EXPANSION JOINT – PIER 3C

Pier 1C Similar



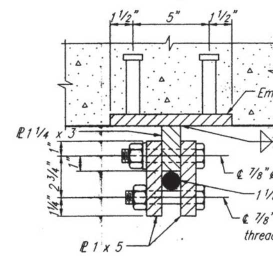
DETAIL C

FINAL PLANS

I certify that this plan sheet accurately depicts the configuration and location of the roadway and all its appurtenant features to the best of my knowledge... construction ... responsibility ... except as ... authorized ... modified or ... during its construction ... design ... for the contract ... of the project, except as I ... that the project be ... ordered

Signature

Date



SECTION B–B

GENERAL NOTES:

Structural Steel:

ASTM A709 Grade 36 except as shown.

All bolts shall be HS A325-Type unless otherwise noted. High strength bolts, nuts and washers will be sampled for quality assurance as specified in Standard Specification 106 and Field Section (FS-712) from the Materials Manual.

Bridge Rope:

1 1/8"ø with ASTM A603, Class A Galvanized coating.
Min. Breaking Strength 57.8 Tons.
Min. Yield Strength 150,000 psi.
Lay 7 1/2 to 11 times diameter.

Sockets:

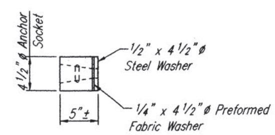
Forged steel with zinc filled anchorage to develop full breaking strenth of rope. Washers shall be installed prior to socketing then bonded to sockets with an epoxy adhesive.

Galvanizing:

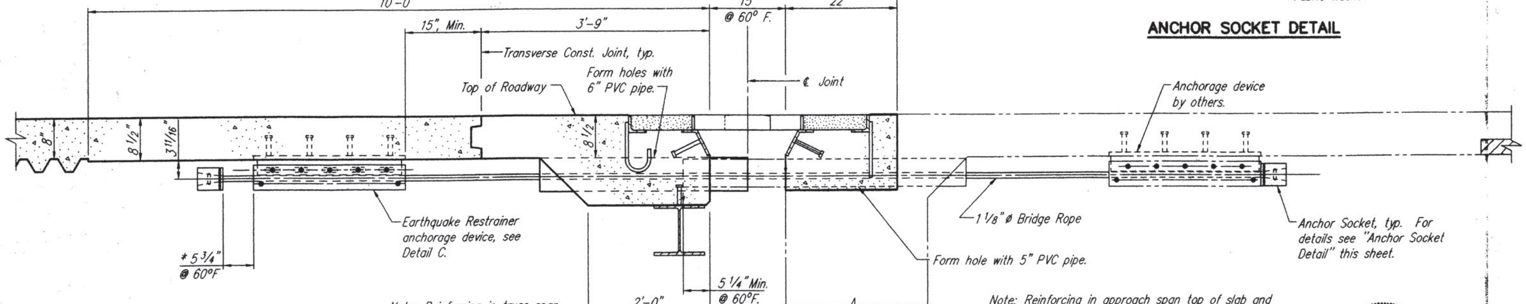
All steel used in earthquake restrainers shall be galvanized in accordance with ASTM A123 and Section 712 of Missouri Standard Specifications for Highway Construction.

Payment:

The cost of all materials and labor to fabricate and install the earthquake restrainer assemblies, including all washers, nuts, bolts, steel anchor assemblies, welded studs, PVC pipe, bridge rope, anchor sockets and other incidental items shall be completely covered in the unit price bid for "Earthquake Restrainer Assemblies" per each.



ANCHOR SOCKET DETAIL



* Increase or decrease dimension by 11/16" for each 10°F rise or fall in temperature.

Note: Reinforcing in truss span slab not shown for clarity.

Note: Reinforcing in approach span top of slab and diaphragm not shown for clarity and is the same for both forming alternates.

SECTION A–A

EARTHQUAKE RESTRAINERS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

STATE OF MISSOURI KEVIN R. EISENBEIS NUMBER ... PROFESSIONAL ENGINEER

1/26/98

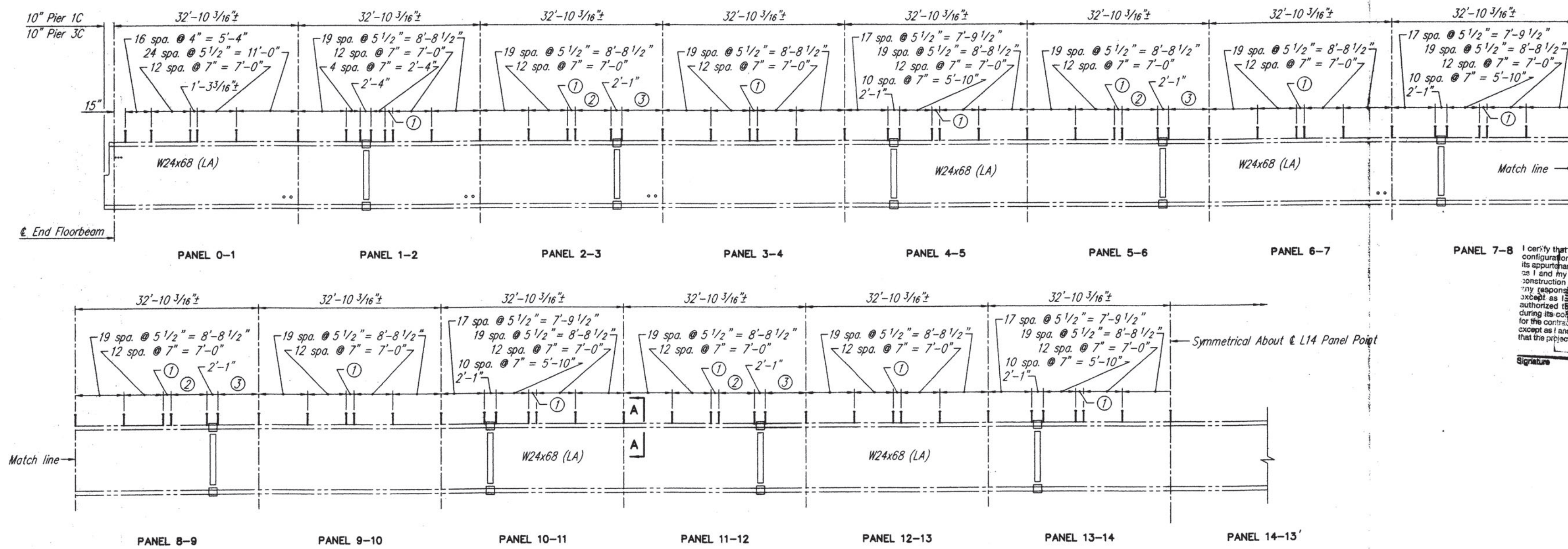
EARTHQUA

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.L.K. 03/94
CHECKED: E.W.N. 03/94

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

A4757

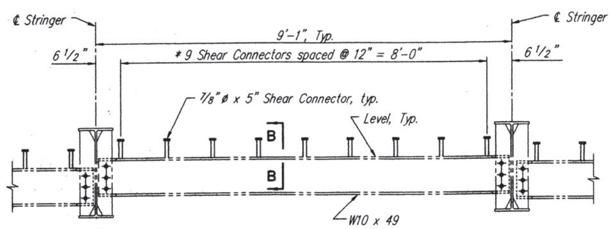


ELEVATION

FINAL PLANS

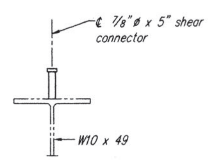
I certify that this plan sheet accurately depicts the configuration and location of the roadway and all its appurtenant features ... my knowledge ... contractor's ... disclaim ... this project, except as ... authorized ... modified or during its construction ... project design ... responsibility ... of the project, except as I and ... or ordered that the project be ...

Signature Date

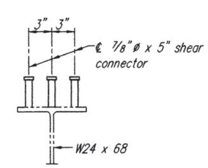


END DIAPHRAGM DETAIL

* Adjust spacing of shear connectors as req'd. to clear earthquake restrainers (1" minimum), see "Earthquake Restrainers" sheet.



SECTION B-B



SECTION A-A

Notes:

① 2 spa. = 1'-5 3/16"±
② 10 spa. @ 7" = 5'-10"
③ 17 spa. @ 5 1/2" = 7'-9 1/2"

Shear connector studs shall conform to ASTM A-108 and shall be field welded to the top flanges of stringers and end diaphragms in accordance with Section 712.3.4 of Missouri Standard Specifications for Highway Construction.

The quantity "Fabricated Structural Carbon Steel (Shear Connectors)" represents the weight of all shear connectors.

SHEAR CONNECTOR DETAILS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

1-26-98

SHEET 18 OF 28

A4757

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

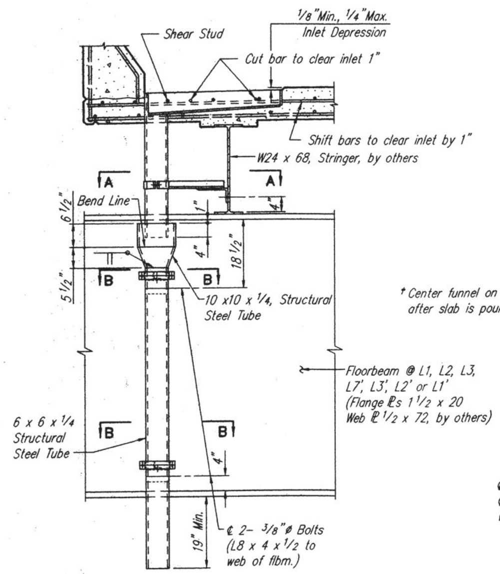
SHEAR

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.L.K. 03/94
CHECKED: M.J.T. 04/94

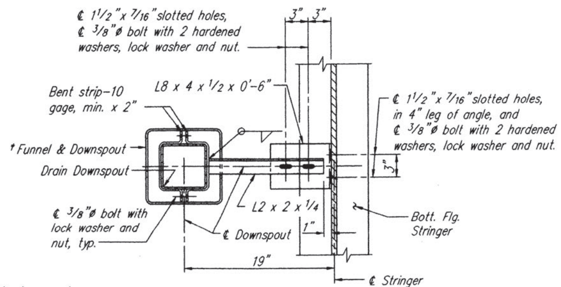
STATE	PROJ. NO.	SHEET NO.
MO.	F.A.M.-291-1(52) J4U0564E	54

ID-980821-401

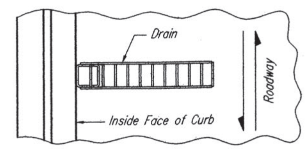


BRIDGE DRAIN
(Stringer 1 shown. Stringer 5 similar)

† Center funnel on drain downspout after slab is poured.



SECTION A–A



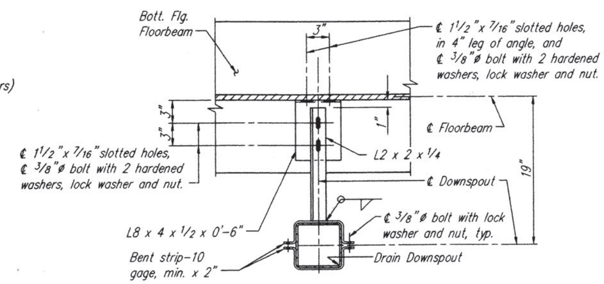
TYPICAL PART PLAN OF SLAB AT DRAIN

TABLE OF DRAIN STATIONS		
UNIT	STRINGER	EAST SIDE AND WEST SIDE
2	1 & 5	104+76.54
	1 & 5	105+09.36
	1 & 5	105+42.20
	1 & 5	111+36.32
	1 & 5	112+67.62
	1 & 5	113+00.43
	1 & 5	113+33.26

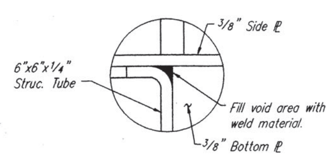
FINAL PLANS

I certify that this plan sheet accurately depicts the configuration and location of the roadway and all its appurtenant features ... construction of ... project ... specifically disclaim any responsibility ... except as I ... authorized the ... modified or ... during its construction ... project design ... for the contract ... except as I and ... that the project be ...

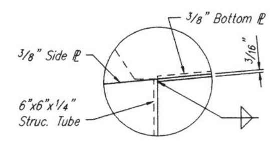
Signature Date



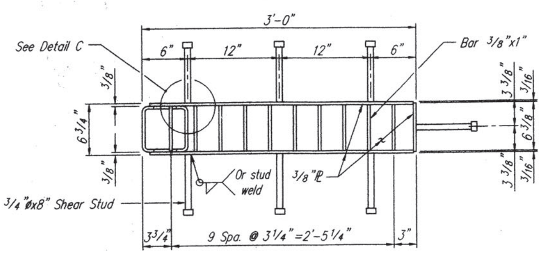
SECTION B–B



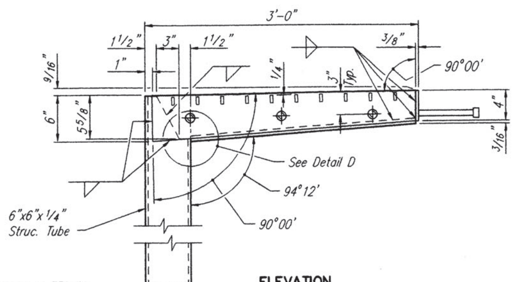
DETAIL C



DETAIL D



PLAN



ELEVATION

Note:
Approximate weight per each drain assembly = 339 lbs.

BRIDGE DRAIN DETAILS

Drain Notes:

Structural steel used in the fabrication of the drains and support brackets shall conform to ASTM A709 Grade 36.

The outside dimensions of the downspouts are 6"x6". The downspouts may be fabricated from welded 1/4" structural steel or from structural steel tubing conforming to ASTM A500 or A501.

Studs and their attachment shall conform to the standard specifications.

Nuts and bolts for the bracket assembly shall conform to ASTM designation A307.

Shift transverse slab reinforcing in the field to clear drains 1". A maximum of two longitudinal top slab reinforcing bars may be cut a maximum of 1" clear of inlet for placement of drains.

The drains and bracket assembly shall be galvanized in accordance with ASTM A123.

All bolts, hardened washers, lock washers and nuts shall be galvanized in accordance with ASTM A153.

Bolt holes for the bracket assembly attachment have been provided in the stringers. The drains shall be placed so the downspout is vertical and the holes in the bracket and the stringer line up.

Shop drawings will be required for the drains, funnel & downspout and the bracket assemblies.

DECK DRAIN DETAILS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

SHEET 19 OF 28

A4757

DRAIN_C3

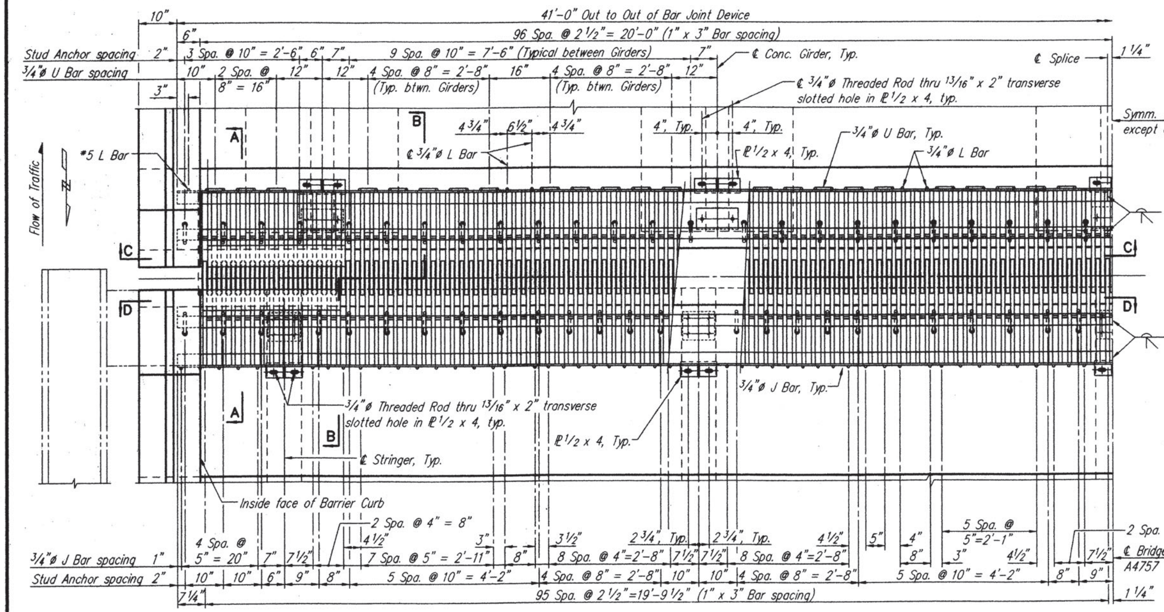
HC HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.L.K. 02/94
CHECKED: M.J.T. 03/94

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

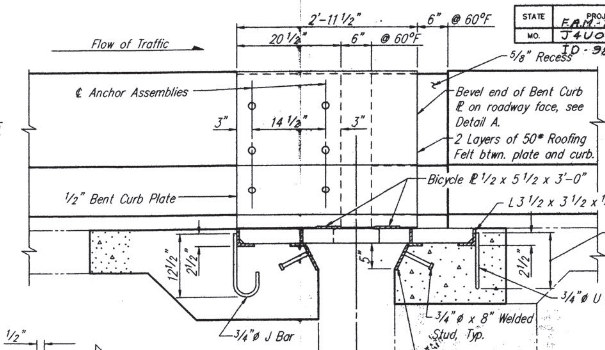
STATE	PROJ. NO.	SHEET NO.
MO.	F.A.M.-291-1(32) J4U0564E	55

ID-980821-401

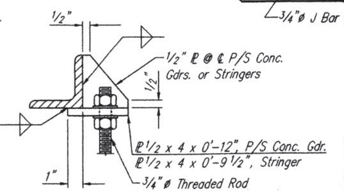


PLAN OF EXPANSION JOINT – PIER 3C

Pier 1C Similar



SECTION A–A

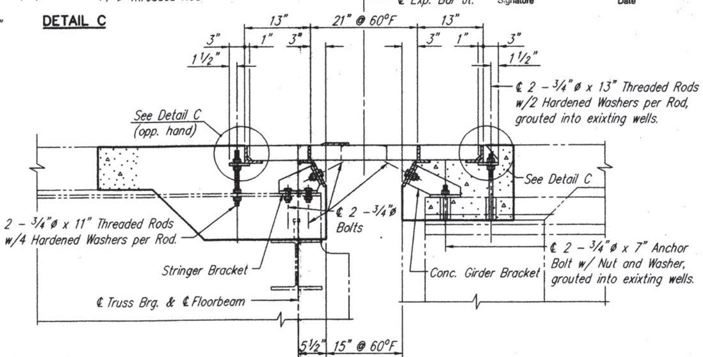


DETAIL C

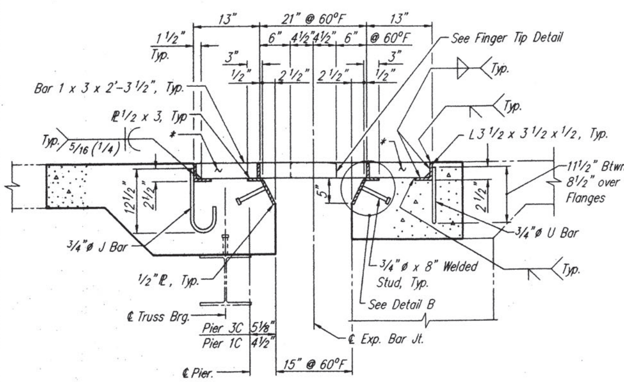
FINAL PLANS

I certify that this plan sheet accurately depicts the configuration and location of the roadway and all its appurtenant features ... of my knowledge, ... the contractor's ... specifically disclaim any responsibility ... of this project, except as I ... modified or authorized ... project design during its construction ... responsibility for the contractor's ... of the project, except as I ... ordered that the project be ...

Signature Date

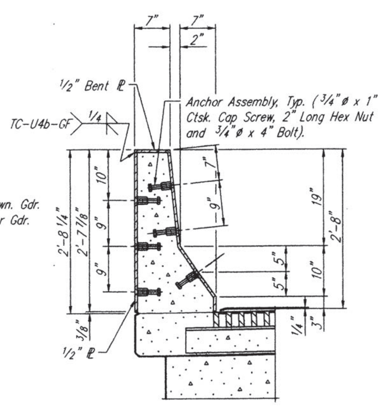


SECTION B–B



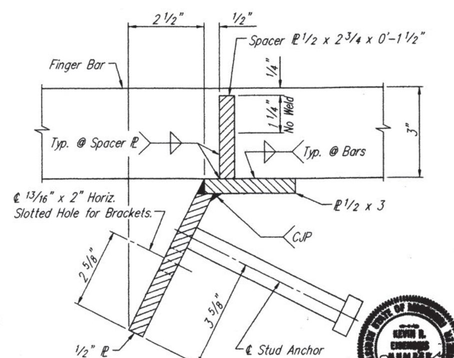
TYPICAL SECTION THRU BAR JOINT

(Shown between Stringers & Girders.)



SECTION THRU BENT CURB PLATE

* Concrete shall be forced under and around 1"x3" bars, plates, angles, headed studs and 3/4" ø bar anchors. Proper consolidation of the concrete shall be achieved by localized internal vibration.



DETAIL B

Notes:

For notes see "Expansion Joint Details" sheet.

For Detail A, Finger Tip Detail, Bicycle Plate Detail and Sections C-C & D-D, see "Expansion Joint Details" sheet.

For Stringer Bracket Detail and Conc. Girder Bracket Detail, see "Expansion Joint Details" sheet.

Slab reinforcing not shown for clarity. See "Misc. Slab Details" sheet.

Adjust 558 bars as required to clear 3/4"ø J bars. See "Misc. Slab Details" sheet.

See "Expansion Joint Details" sheet for 3/4"ø U Bar, J Bar and L Bar details.

For grout, see Standard Specifications, Section 1066.

EXPANSION JOINT – PIERS 1C & 3C

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

1-24-98

SHEET 20 OF 28

A4757

EXPJT_3C

HC HARRINGTON & CORTELYOU, INC. Consulting Engineers

DETAILED: J.L.K. 6/95
CHECKED: J.K.G. 7/95

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

STATE	PROJ. NO.	SHEET NO.
MO.	F.A.M.-291-1(52) J4U0564E	56

ID-980821-401

Notes:

Material for the expansion device shall be ASTM A709 Grade 36: fabricated, galvanized and installed in accordance with Section 712 of the Standard Specifications. Anchors for the expansion device shall be approved stud-welded anchors C1010 thru C1020.

All fasteners in expansion device shall be galvanized 3/4"ø Machine Bolts except as noted.

Final adjustment of expansion devices shall be made just prior to placement of abutting concrete.

Continuous transverse plates and angles shall be fabricated to conform to roadway crown.

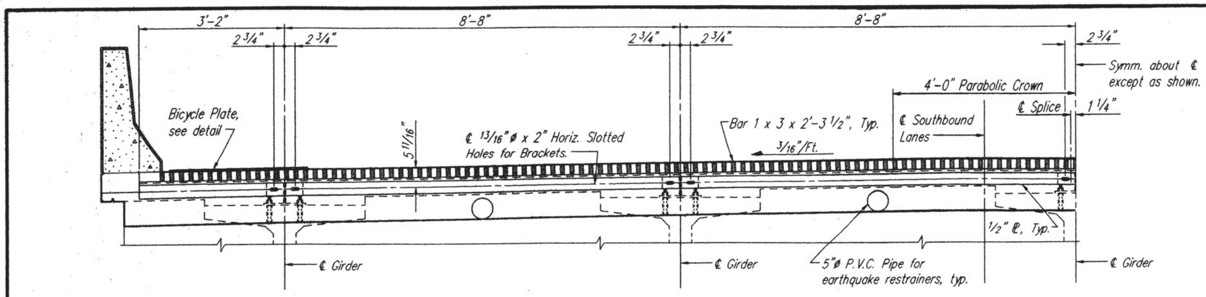
Gap settings shown are for a normal temperature of 60°F. under full dead load conditions. The indicated gap settings shall be increased or decreased by 11/16" for every 10° fall or rise in temperature respectively.

Payment for furnishing and installing structural steel for expansion device will be made at the Contract Unit Price for Expansion Device (Bar Type Joint) per linear foot.

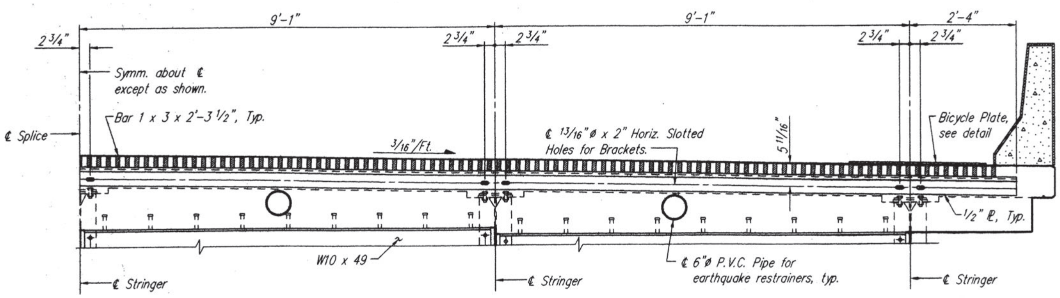
FINAL PLANS

I certify that this plan sheet accurately depicts the configuration and location of the roadway and all its appurtenant features to the best of my knowledge, as I and my staff observed the contractor's construction of this project. I specifically disclaim any responsibility for the design of this project, except as I and my staff have modified or authorized the modification of the project design during its construction and disclaim responsibility for the contractor's actual construction of the project, except as I and my staff may have directed or ordered that the project be constructed.

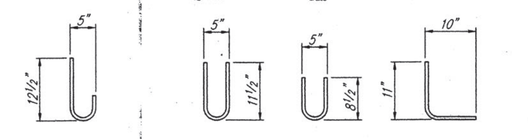
Signature Date



SECTION C-C



SECTION D-D

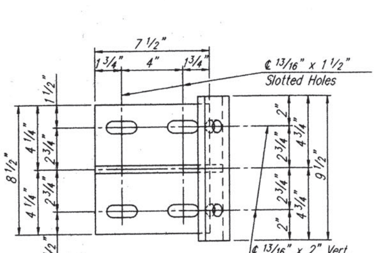


TYPICAL J BAR

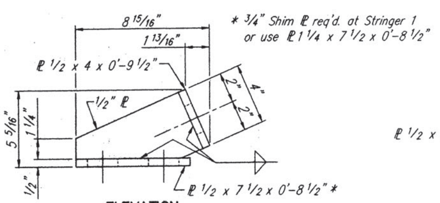
TYPICAL U BAR

U BAR OVER GIRDERS

L BAR NEAR EARTHQUAKE RESTRAINERS

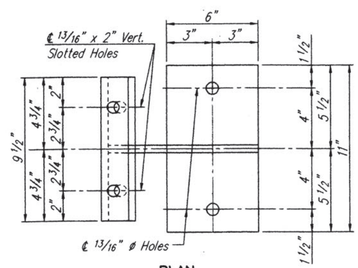


PLAN

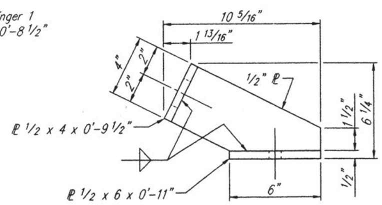


ELEVATION

STRINGER BRACKET DETAIL

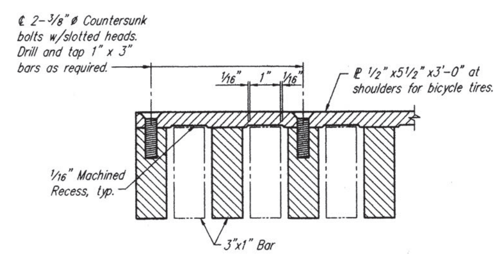


PLAN

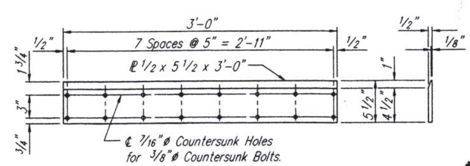


ELEVATION

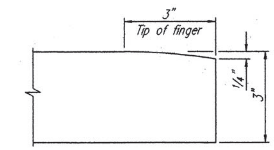
CONCRETE GIRDER BRACKET DETAIL



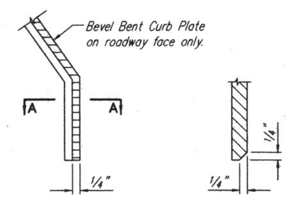
PART SECTION THRU BICYCLE PLATE & BAR JOINT



BICYCLE PLATE DETAIL



FINGER TIP DETAIL



ELEVATION

SECTION A-A

DETAIL A

EXPANSION JOINT DETAILS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.L.K. 6/95
CHECKED: J.K.G. 7/95

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

KEVIN R. EISENBEIS

1-26-98

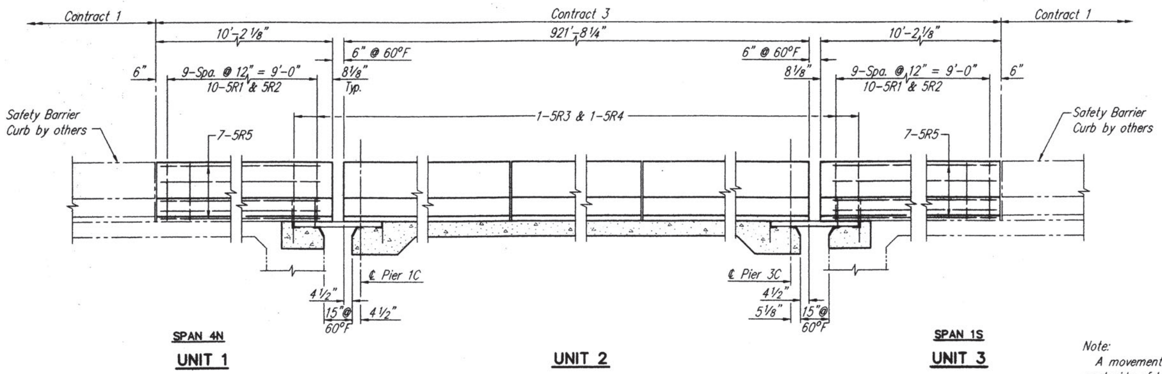
SHEET 21 OF 28

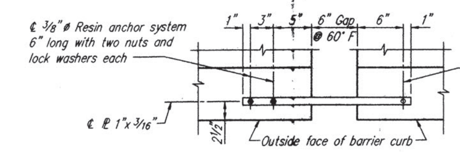
A4757

EXPJTDET

STATE	PROJ. NO.	SHEET NO.
MO.	F.A.M.-291-1(52) J4U0564E	57

ID-980821-401



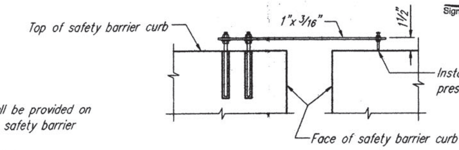


PART PLAN OF BARRIER CURB SHOWING MOVEMENT GAUGE

FINAL PLANS

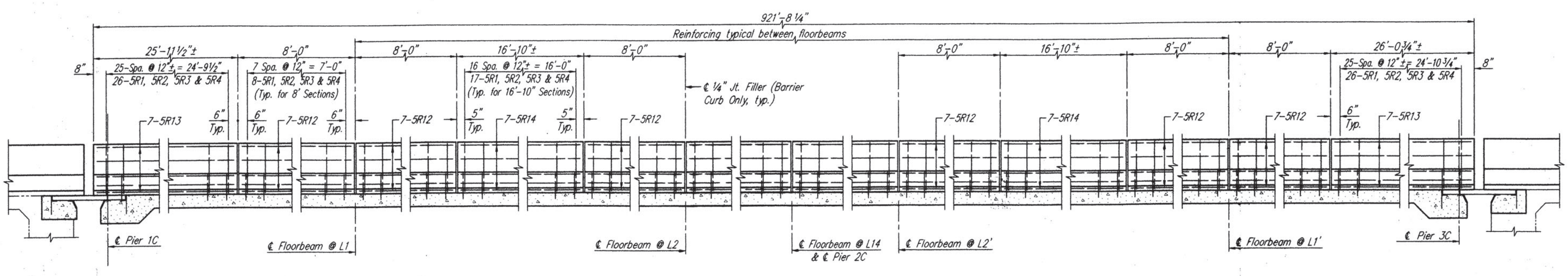
I certify that this plan sheet accurately depicts the configuration and location of the roadway and all its appurtenant features to the best of my knowledge...

Signature Date

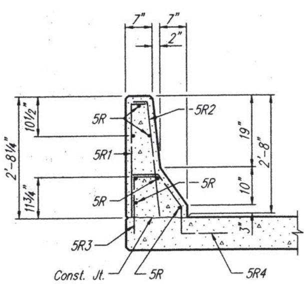


PART ELEVATION OF BARRIER CURB SHOWING MOVEMENT GAUGE

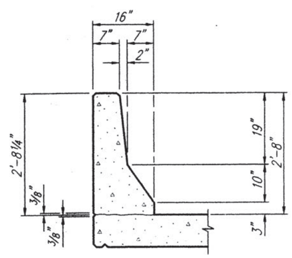
Note:
A movement gauge shall be provided on west side of bridge at all safety barrier curb expansion joints.
All steel shall be galvanized.
Cost of movement gauge complete in place shall be included in contract unit price bid for safety barrier curb.



UNIT 2

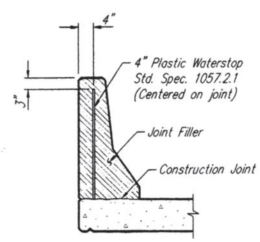


SECTION E-E

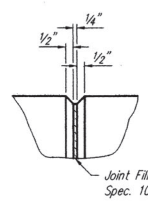


CURB DIMENSIONS

Note:
The cross sectional area above the slab = 2.27 sq. ft.



PLASTIC WATERSTOP DETAIL



FILLED JOINT DETAIL

Notes:
Plastic waterstop shall be placed in all safety barrier curb filled joints.
Cost of plastic waterstop complete in place to be included in contract unit price for safety barrier curb.
Top of safety barrier curb shall be built parallel to grade with curb joints normal to grade.
All exposed edges of safety barrier curb shall have either a 1/2" radius or a 3/4" bevel, unless otherwise noted.
When safety barrier curb is bid by linear feet, the contract unit price shall include the cost of all concrete and reinforcement, complete-in-place.
Concrete in the safety barrier curb shall be Class B1.
Measurement of safety barrier curb is to the nearest linear foot, measured along the outside top of slab.
e.f. denotes each face.

* CONTRACTOR USED OPTIONAL SLIP-FORM BRIDGE SAFETY BARRIER CURB

SAFETY BARRIER CURB

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

1-26-98

HARRINGTON & CORTELYOU, INC. Consulting Engineers

DETAILED: J.K.G. 3/94
CHECKED: M.J.T. 3/94

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

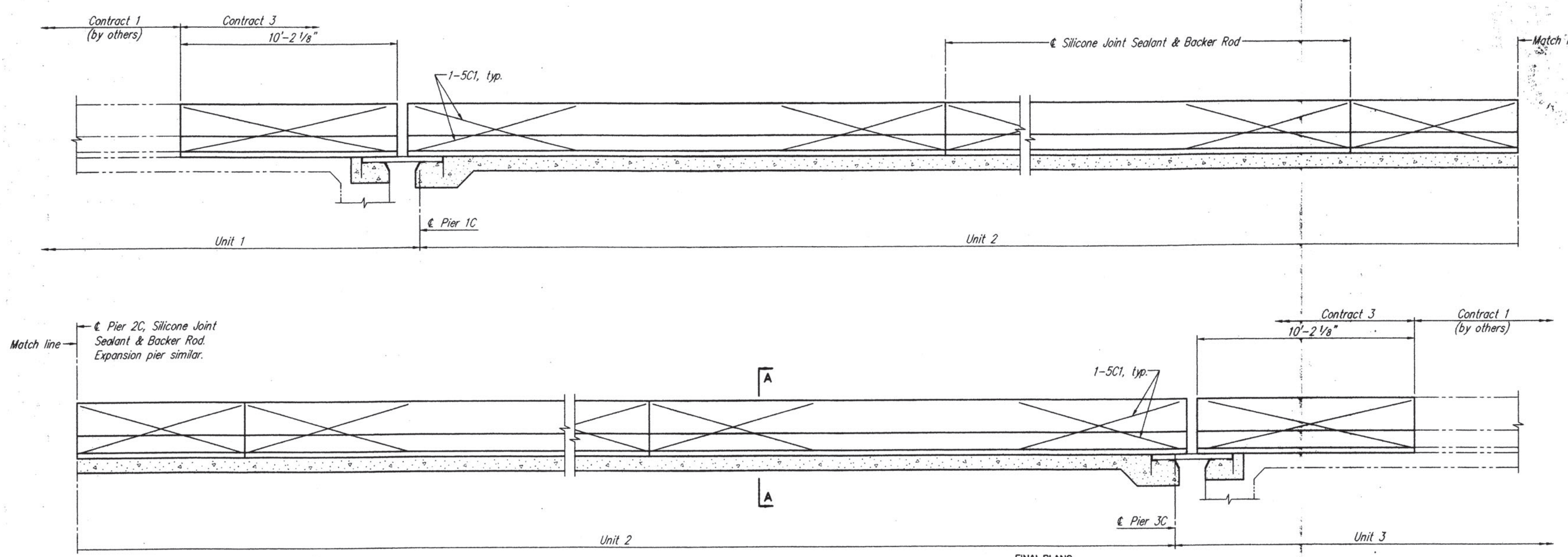
SHEET 22 OF 28

A4757

SBC_U123

STATE	PROJ. NO.	SHEET NO.
MO.	F.A.M.-291-1(52) J4U0564E	58

ID-980821-401

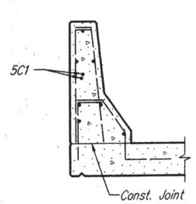


TYPICAL CURB ELEVATION

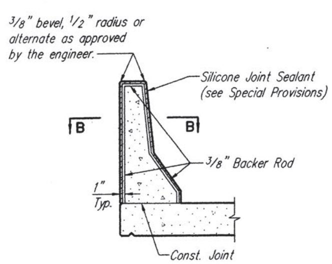
FINAL PLANS
I certify that this plan sheet accurately depicts the configuration and location of the roadway and all its appurtenant features to the best of my knowledge. ... that the project be constructed or ordered

Signature Date

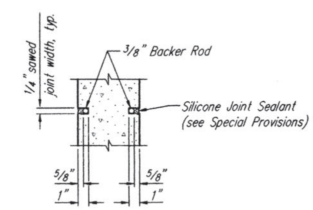
Notes:
Top of safety barrier curb shall be built parallel to grade with safety barrier curb joints normal to grade.
When safety barrier curb is bid by linear feet, the contract unit price shall include the cost of all concrete and reinforcement, complete-in-place.
Concrete in the safety barrier curb shall be Class B1.
Measurement of safety barrier curb is to the nearest linear foot, measured along the outside top of curb. See "Safety Barrier Curb" sheet for dimensions.
Joint sealant and backer rods shall be used on all slip-form bridge safety barrier curbs instead of joint filler.
Plastic waterstop shall not be used with slip-form option.
5C1 bars (slip-form option only) shall be used in addition to cast-in-place conventional forming reinforcement for bridge safety barrier curb. 5C1 bars shall be located on each side of each joint location.
5C1 bar length = 10'-0" (Units 1 & 3); 8'-0" (Unit 2)
Number required = 8 @ 10'-0", 440 @ 8'-0"
Total additional weight = 3,755 lbs.



PART SECTION A-A



SECTION THRU JOINT



SECTION B-B

Note:
Cost of silicone joint sealant and backer rod, complete-in-place, to be included in the contract unit price for safety barrier curb.

STATE OF MISSOURI KEVIN R. EISENBEIS NUMBER E-26944 PROFESSIONAL ENGINEER

1-26-98

OPTIONAL SLIP-FORM
BRIDGE SAFETY BARRIER CURB
ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

SLP_CURB

HC HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: S.A.K. 3/94
CHECKED: M.J.T. 4/94

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 23 OF 28

A4757

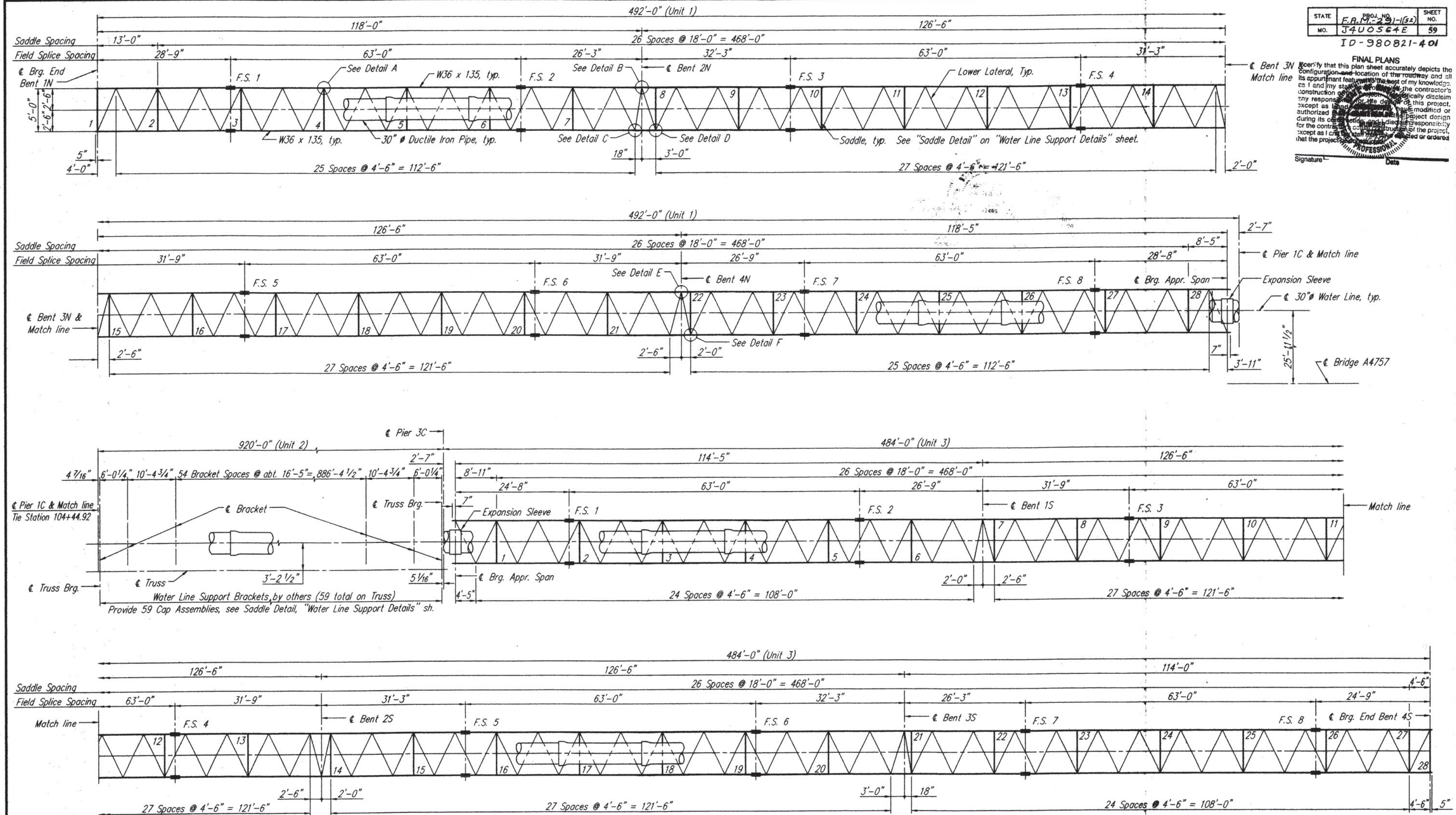
STATE	PROJ. NO.	SHEET NO.
MO.	F.A.M.-291-1(32) J4U0564E	59

ID-980821-401

FINAL PLANS

I certify that this plan sheet accurately depicts the configuration and location of the roadway and all its appurtenant features to the best of my knowledge. I and my staff disclaim the contractor's responsibility for the design of this project, except as authorized, during its construction; except as I certify that the project was constructed or ordered.

Signature — Date



FRAMING PLAN

Note:
For Detail A, Detail B, Detail C, Detail D, Detail E, Detail F and Notes see "Water Line Support Details" sheet.

WATER LINE FRAMING PLAN

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

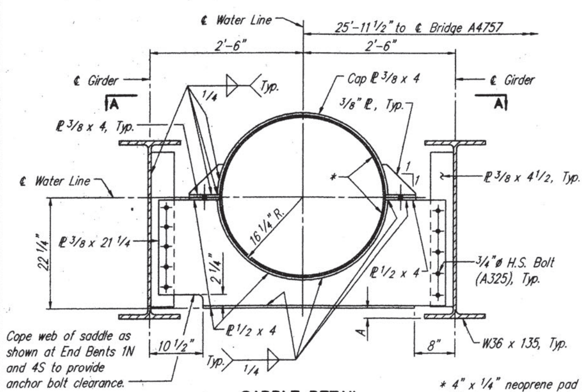
DETAILED: J.L.K. 03/94
CHECKED: E.W.N. 04/94

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

1-26-98

SHEET 24 OF 28

A4757



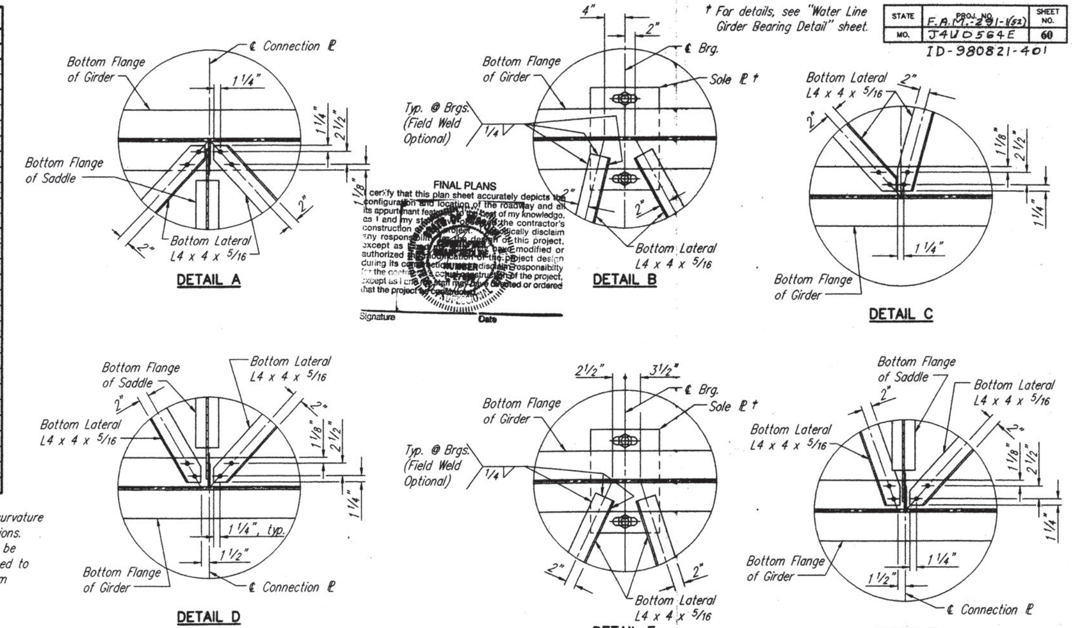
SADDLE DETAIL

* 4" x 1/4" neoprene pad (50 durometer) bonded to steel.

Note: 59 additional cap assemblies, including top & bottom neoprene pads, shall be provided for existing support brackets in Unit 2. The weight of these additional assemblies has been included in the estimated quantities. See Water Line Notes.

DIMENSION A TABLE			
UNIT 1		UNIT 3	
SADDLE	DIM. A	SADDLE	DIM. A
1	2"	1	2 1/16"
2	2 1/8"	2	2 1/16"
3	2 1/16"	3	2 5/16"
4	2 7/16"	4	2 3/8"
5	2 7/16"	5	2 1/8"
6	2 3/16"	6	2 3/16"
7	2 1/4"	7	2 5/16"
8	2 7/16"	8	2 3/16"
9	2 1/4"	9	2 1/8"
10	2 3/16"	10	2 3/8"
11	2 7/16"	11	2 5/16"
12	2 7/16"	12	2 1/16"
13	2 1/16"	13	2 1/4"
14	2 3/8"	14	2 3/8"
15	2 1/2"	15	2 3/16"
16	2 1/4"	16	2 1/8"
17	2 3/16"	17	2 3/8"
18	2 7/16"	18	2 5/16"
19	2 7/16"	19	2 1/16"
20	2 1/16"	20	2 1/4"
21	2 5/16"	21	2 5/16"
22	2 3/8"	22	2 1/8"
23	2 3/16"	23	2 3/16"
24	2 1/4"	24	2 3/8"
25	2 1/2"	25	2 1/4"
26	2 3/8"	26	2"
27	2"	27	2 1/16"
28	2 1/16"	28	2"

Note: Dimension "A" corrects for vertical curvature of the water line within straight field sections. Any natural camber of field sections shall be placed up and dimension A shall be reduced to compensate for the camber. The minimum dimension for A shall be 2".



DETAIL A

DETAIL B

DETAIL C

DETAIL D

DETAIL E

DETAIL F

† For details, see "Water Line Girder Bearing Detail" sheet.

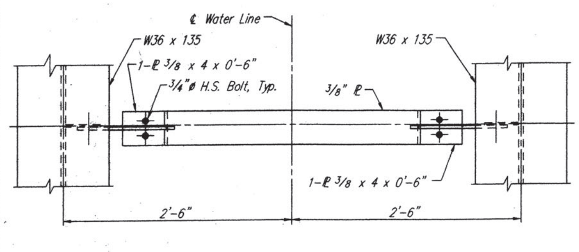
STATE	PROJ. NO.	SHEET NO.
MO.	F.A.M.-291-(52) J4U0564E	60

ID-980821-401

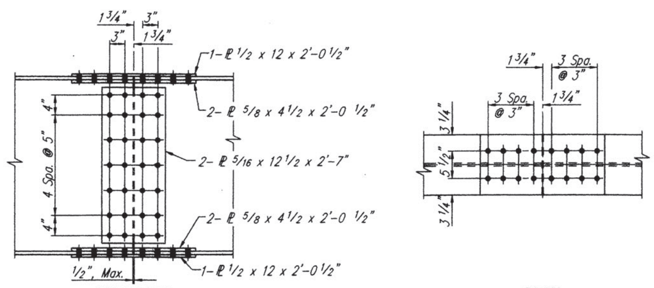
FINAL PLANS

I certify that this plan sheet accurately depicts the configuration and location of the roadway and its appurtenant features to the best of my knowledge, as I and my staff ... the contractor's construction ... specifically disclaim any responsibility ... design of this project, except as ... modified or authorized ... during its construction ... responsibility for the ... of the project, except as ... directed or ordered that the project ...

Signature Date



VIEW A-A



ELEVATION

PLAN

FIELD SPLICE

Note: Field splices shall be fabricated with the appropriate angle break so that theoretical bottom of bottom flange elevations conform to those shown in the adjacent table.

BOTTOM OF BOTTOM FLANGE ELEVATIONS			
UNIT 1		UNIT 3	
LOCATION	ELEV.	LOCATION	ELEV.
℄ End Bent 1N	758.59	℄ Brg. (Pier 3C)	776.69
Field Splice 1	760.40	Field Splice 1	775.87
Field Splice 2	764.13	Field Splice 2	773.60
Field Splice 3	767.32	Field Splice 3	771.28
Field Splice 4	770.43	Field Splice 4	768.53
Field Splice 5	773.23	Field Splice 5	765.54
Field Splice 6	775.71	Field Splice 6	762.30
Field Splice 7	777.72	Field Splice 7	759.07
Field Splice 8	779.59	Field Splice 8	755.36
℄ Brg. (Pier 1C)	780.33	℄ End Bent 4S	753.83

WATER LINE NOTES (CONT.):

Cost of furnishing and installing fabricated structural steel, girder bearing assemblies, 30"ø ductile iron pipe, 50-pair control cable and any other miscellaneous hardware required for complete installation of the water line from fill face of End Bent 1N to fill face of End Bent 4S shall be included in the unit price bid for "Water Line on Bridge" per Lump Sum. The following estimated quantities are included in the Lump Sum item:

- Fabricated Structural Carbon Steel ------------ 297,510 Lbs.
- Type 'N' PTFE Bearings -------------------- 16 Ea.
- Laminated Neoprene Bearings (Steel Structures) ---- 4 Ea.
- 30" Ductile Iron Pipe ---------------------- 1,900 Ft.
- 30" Ductile Iron Pipe Expansion Sleeves ---------- 2 Ea.
- 50-pair, 16 Ga. Cable --------------------- 1,900 Ft.

WATER LINE NOTES:

Longitudinal dimensions are horizontal and measured at a normal temperature of 60°F.

Structural steel for girders, saddles and lower laterals shall be ASTM A709 Gr.36.

All bolts shall be H.S. ASTM A325. Use 7/8"ø bolts at field splices and 3/4"ø bolts for all other connections.

High strength bolts, nuts and washers will be sampled for quality assurance as specified in Standard Specification 106 and Field Section (FS-712) from the Materials Manual.

All structural steel assemblies shall have a protective coating (System G) applied in accordance with the Special Provisions. Color of finish coat shall be gray. Any damaged areas of the shop applied protective coating resulting from erection or other construction activities shall be repaired in the field in accordance with Standard Specification Section 712.

Saddles shall be placed normal to flanges.

Water line shall be 30"ø unrestrained push-on Joint, ductile iron pipe of thickness class 51. See Special Provisions.

Bell end of pipe segments to face north.

An expansion device shall be provided in the water line at Piers 1C & 3C. The expansion joint gap at 60 degree F. shall be 12". Increase or decrease the dimension by 3/4" for every 10 degree F. fall or rise in temperature as needed during construction. The expansion device shall accommodate movement from a temperature range of -20 degree F. to 130 degree F. The expansion devices must be rated for a working pressure of 350 psi.

As part of the water line work, the contractor shall furnish and install a continuous 50-pair, 16 Ga. control cable to the ductile iron pipe. See Special Provisions for additional requirements.

* SEE REVISED SHEET

KEVIN R. EISENBEIS NUMBER E-26944

2-12-98

WATER LINE SUPPORT DETAILS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

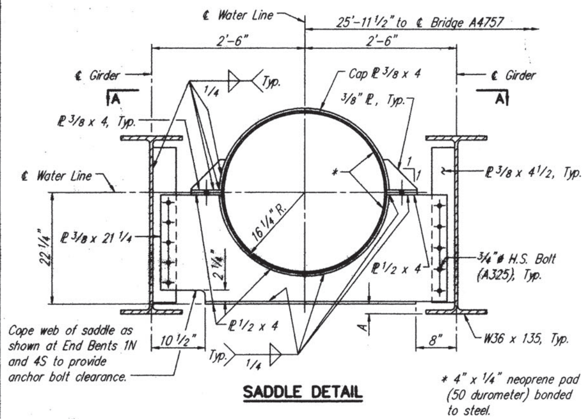
DETAILED: J.L.K. 03/94
CHECKED: E.W.N. 04/94

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 25 OF 28

A4757

W_DLT



Note: 59 additional cap assemblies, including top & bottom neoprene pads, shall be provided for existing support brackets in Unit 2. The weight of these additional assemblies has been included in the estimated quantities. See Water Line Notes.

DIMENSION A TABLE			
UNIT 1		UNIT 3	
SADDLE	DIM. A	SADDLE	DIM. A
1	2"	1	2 1/16"
2	2 1/8"	2	2 1/16"
3	2 1/16"	3	2 5/16"
4	2 7/16"	4	2 3/8"
5	2 7/16"	5	2 1/8"
6	2 3/16"	6	2 3/16"
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10	2 3/16"	10	2 3/8"
11	2 7/16"	11	2 5/16"
12	2 7/16"	12	2 1/16"
13	2 1/16"	13	2 1/4"
14	2 3/8"	14	2 3/8"
15	2 1/2"	15	2 3/16"
16	2 1/4"	16	2 1/8"
17	2 3/16"	17	2 3/8"
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19	2 7/16"	19	2 1/16"
20	2 1/16"	20	2 1/4"
21	2 5/16"	21	2 5/16"
22	2 3/8"	22	2 1/8"
23	2 3/16"	23	2 3/16"
24	2 1/4"	24	2 3/8"
25	2 1/2"	25	2 1/4"
26	2 3/8"	26	2"
27	2"	27	2 1/16"
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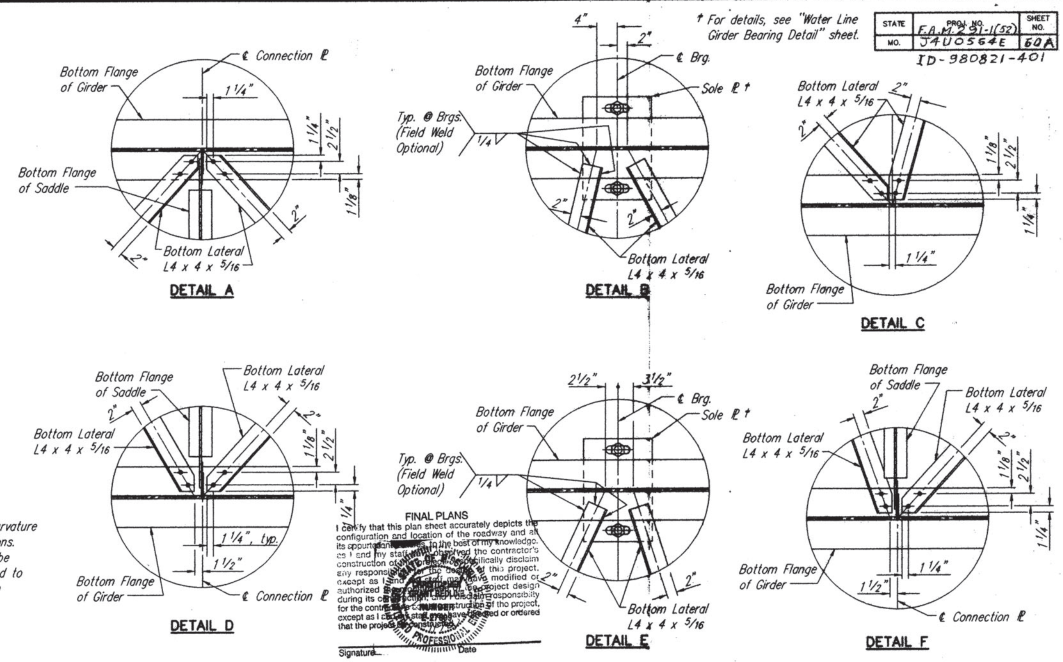
Note: Dimension "A" corrects for vertical curvature of the water line within straight field sections. Any natural camber of field sections shall be placed up and dimension A shall be reduced to compensate for the camber. The minimum dimension for A shall be 2".



† For details, see "Water Line Girder Bearing Detail" sheet.

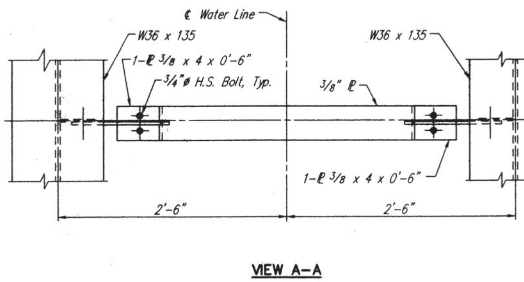
STATE	PROJ. NO.	SHEET NO.
MO.	F.A.M.291-1(52) J4U0564E	60A

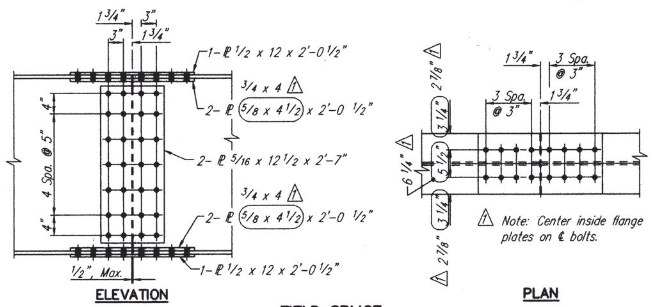
ID-980821-401

FINAL PLANS

I certify that this plan sheet accurately depicts the configuration and location of the roadway and all its appurtenances ... to the best of my knowledge ... constructed ... the contractor's ... construction ... specifically disclaim any responsibility ... except as I ... signed or ordered.

Signature ... Date





FIELD SPLICE

Note: Field splices shall be fabricated with the appropriate angle break so that theoretical bottom of bottom flange elevations conform to those shown in the adjacent table.

WATER LINE NOTES:

Longitudinal dimensions are horizontal and measured at a normal temperature of 60°F.

Structural steel for girders, saddles and lower laterals shall be ASTM A709 Gr.36.

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As part of the water line work, the contractor shall furnish and install a continuous 50-pair, 16 Ga. control cable to the ductile iron pipe. See Special Provisions for additional requirements.

BOTTOM OF BOTTOM FLANGE ELEVATIONS			
UNIT 1		UNIT 3	
LOCATION	ELEV.	LOCATION	ELEV.
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Field Splice 5	773.23	Field Splice 5	765.54
Field Splice 6	775.71	Field Splice 6	762.30
Field Splice 7	777.72	Field Splice 7	759.07
Field Splice 8	779.59	Field Splice 8	755.36
℄ Brg. (Pier 1C)	780.33	℄ End Bent 4S	753.83

WATER LINE NOTES (CONT.):

Cost of furnishing and installing fabricated structural steel, girder bearing assemblies, 30"⌀ ductile iron pipe, 50-pair control cable and any other miscellaneous hardware required for complete installation of the water line from fill face of End Bent 1N to fill face of End Bent 4S shall be included in the unit price bid for "Water Line on Bridge" per Lump Sum. The following estimated quantities are included in the Lump Sum item:

Fabricated Structural Carbon Steel ------------ 297,510 Lbs.
Type 'N' PTFE Bearings --------------------- 16 Ea.
Laminated Neoprene Bearings (Steel Structures) ---- 4 Ea.
30" Ductile Iron Pipe ------------------------ 7,900 Ft.
30" Ductile Iron Pipe Expansion Sleeves ---------- 2 Ea.
50-pair, 16 Ga. Cable ------------------------ 1,900 Ft.

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

STATE OF MISSOURI
ERIC W. NEPRUD
NUMBER
PROFESSIONAL ENGINEER
1/21/99

Revised Flange Splice 1-21-99

WATER LINE SUPPORT DETAILS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

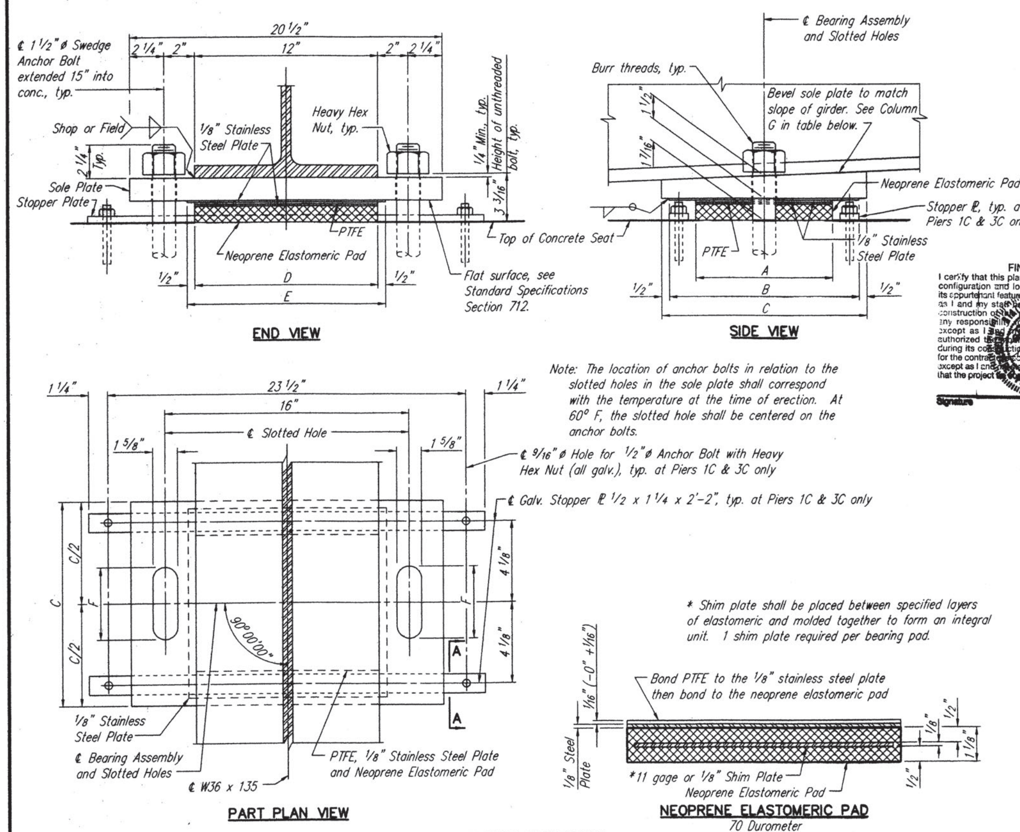
DETAILED: J.L.K. 03/94
CHECKED: E.W.N. 04/94

SHEET 25 OF 28

A4757

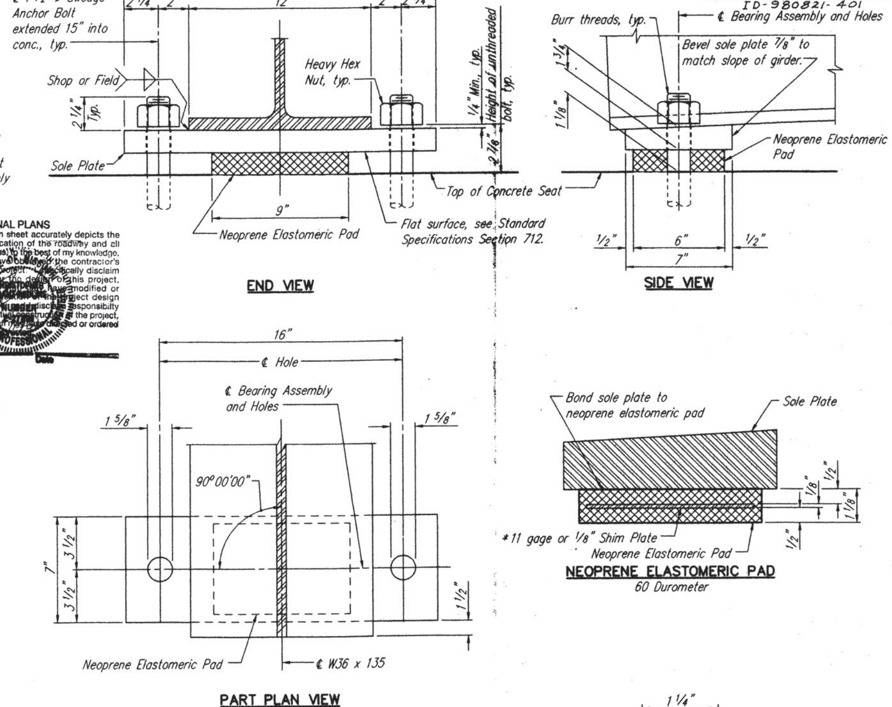
STATE	PROJ. NO.	SHEET NO.
	F.A.M.-291-1(52)	
NO.	J4U0564E	61

ID-980821-401



FINAL PLANS
I certify that this plan sheet accurately depicts the configuration and location of the roadway and all its appurtenant features to the best of my knowledge, as I and my staff have observed the contractor's construction of this project. ... any responsibility ... this project, except as ... modified or authorized ... project design during its construction ... responsibility for the contractor's construction of the project, except as I ... or ordered that the project ...

Signature   Date



PTFE SLIDING BEARINGS

SUBSTR. UNIT	A	B	C	D	E	F	G	QTY.
Bent 2N	9"	12 1/2"	13 1/2"	12"	13"	4 3/4"	3/4"	2
Bent 3N	9"	12 1/2"	13 1/2"	12"	13"	4 3/4"	5/8"	2
Bent 4N	9"	12 1/2"	13 1/2"	12"	13"	4 3/4"	1/2"	2
Pier 1C	6"	10 1/2"	11 1/2"	9"	10"	5 3/8"	1/4"	2
Pier 3C	6"	10 1/2"	11 1/2"	9"	10"	5 3/8"	3/8"	2
Bent 1S	9"	12 1/2"	13 1/2"	12"	13"	4 3/4"	1/2"	2
Bent 2S	9"	12 1/2"	13 1/2"	12"	13"	4 3/4"	5/8"	2
Bent 3S	9"	12 1/2"	13 1/2"	12"	13"	4 3/4"	3/4"	2

GENERAL NOTES:

Anchor bolts shall be 1 1/2"ø A588 steel swedged bolts and shall extend 15" into the concrete with A194-2, 2H or A563-C, C3, D, DH, DH3 heavy hexagon nuts except as noted. Actual manufacturer's certified chemical and mechanical mill test reports (including proof loads) shall be provided. Swedging shall be 1" less than extension into the concrete.

Drill and bond anchor bolts to concrete with an approved Resin Anchor System in accordance with the Special Provisions.

All structural steel for the sole plate, anchor bolts and heavy hexagon nuts shall be painted with a minimum of two coats of inorganic zinc primer (5 mils minimum) in accordance with the Special Provisions. Weld areas to be touched up after assembly.

Neoprene elastomeric pads for fixed bearings shall be 60 Durometer.

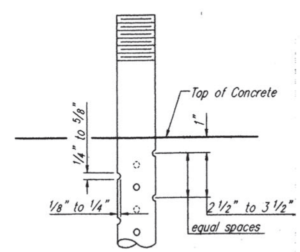
Neoprene elastomeric pads for PTFE sliding bearings shall be 70 Durometer.

The sole plate shall be furnished with the bearing and field or shop welded to the girders.

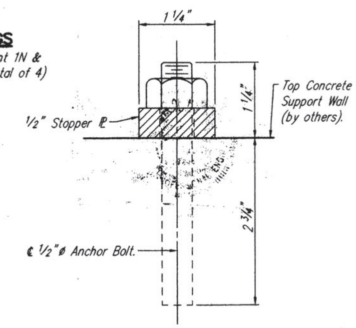
Structural steel for the sole plate and stopper plate shall be A709 Grade 36.

The cost of furnishing and installing all items for the fixed and sliding bearings shall be included in the unit price bid for "Water Line on Bridge" per lump sum.

The neoprene elastomeric pad shall be bonded to the bearing seat with an epoxy adhesive as approved by the bearing manufacturer for bonding neoprene to concrete.



SWEDGE ANCHOR BOLT



SECTION A–A

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.L.K. 03/94
CHECKED: E.W.N. 04/94

W_BRG

WATER LINE GIRDER BEARING DETAILS
ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

KEVIN R. EISENBEIS

1-26-98

SHEET 26 OF 28

A4757

27

STATE	PROJ. NO.	SHEET NO.
MO.	F.A.M.-291-1(52) J4U0564E	62

ID-980821-401

P.V.C. Sta. 101+93.87
Elev. 775.21
+4.0%
1.13'

99+25 — 105+20

764.46	764.66	764.86	765.06	765.26	765.46	765.66	765.86	766.06	766.26
766.46	766.66	766.86	767.06	767.26	767.46	767.66	767.86	768.06	768.26
768.46	768.66	768.86	769.06	769.26	769.46	769.66	769.86	770.06	770.26
770.46	770.66	770.86	771.06	771.26	771.46	771.66	771.86	772.06	772.26
772.46	772.66	772.86	773.06	773.26	773.46	773.66	773.86	774.06	774.26
774.46	774.66	774.86	775.06	775.26	775.45	775.65	775.85	776.04	776.23
776.43	776.61	776.80	776.99	777.17	777.36	777.54	777.72	777.90	778.08
778.25	778.43	778.60	778.77	778.94	779.11	779.27	779.44	779.60	779.76
779.92	780.08	780.24	780.40	780.55	780.70	780.85	781.00	781.15	781.30
781.44	781.59	781.73	781.87	782.01	782.14	782.28	782.41	782.54	782.68
782.81	782.93	783.06	783.18	783.31	783.43	783.55	783.67	783.78	783.90
784.01	784.13	784.24	784.35	784.45	784.56	784.67	784.77	784.87	784.97

1.67'
2.08' ℄ Brg. End Bent 1N Sta. 99+52.92
0.92' ℄ Bent 2N Sta. 100+70.92
2.58' ℄ Bent 3N Sta. 101+97.42
1.08' ℄ Bent 4N Sta. 103+23.92
0.08' ℄ Pier 1C (Tie) Sta. 104+44.92
119 Spa. @ 5'-0" = 595'-0"
End of Approach Slab

P.V.I. Sta. 108+41.37
Elev. 801.11
+4.0% −4.0%
1295' V.C.
1.37'

105+20 — 111+20

784.97	785.07	785.17	785.26	785.35	785.45	785.54	785.63	785.71	785.80
785.89	785.97	786.05	786.13	786.21	786.29	786.36	786.43	786.51	786.58
786.65	786.71	786.78	786.84	786.91	786.97	787.03	787.09	787.14	787.20
787.25	787.31	787.36	787.40	787.45	787.50	787.54	787.59	787.63	787.67
787.71	787.74	787.78	787.81	787.84	787.87	787.90	787.93	787.96	787.98
788.00	788.02	788.04	788.06	788.08	788.09	788.11	788.12	788.13	788.14
788.15	788.15	788.16	788.16	788.16	788.16	788.16	788.15	788.15	788.14
788.13	788.13	788.11	788.10	788.09	788.07	788.05	788.04	788.01	787.99
787.97	787.94	787.92	787.89	787.86	787.83	787.80	787.76	787.73	787.69
787.65	787.61	787.57	787.52	787.48	787.43	787.38	787.33	787.28	787.23
787.17	787.12	787.06	787.00	786.94	786.88	786.82	786.75	786.68	786.62
786.55	786.47	786.40	786.33	786.25	786.17	786.09	786.01	785.93	785.85
785.76									

0.08' ℄ Pier 2C Sta. 109+04.92
120 Spa. @ 5'-0" = 600'-0"

P.V.T. Sta. 114+88.87
Elev. 775.21
−4.0%
1.13'

111+20 — 117+20

785.76	785.68	785.59	785.50	785.41	785.31	785.22	785.12	785.02	784.92
784.82	784.72	784.62	784.51	784.41	784.30	784.19	784.08	783.96	783.85
783.73	783.61	783.49	783.37	783.25	783.13	783.00	782.88	782.75	782.62
782.49	782.35	782.22	782.08	781.94	781.80	781.66	781.52	781.38	781.23
781.08	780.94	780.79	780.63	780.48	780.33	780.17	780.01	779.85	779.69
779.53	779.36	779.20	779.03	778.86	778.69	778.52	778.35	778.17	778.00
777.82	777.64	777.46	777.28	777.09	776.91	776.72	776.53	776.34	776.15
775.95	775.76	775.56	775.36	775.16	774.96	774.76	774.56	774.36	774.16
773.96	773.76	773.56	773.36	773.16	772.96	772.76	772.56	772.36	772.16
771.96	771.76	771.56	771.36	771.16	770.96	770.76	770.56	[illegible]	770.16
769.96	769.76	769.56	769.36	769.16	768.96	768.76	768.56	768.36	768.16
767.96	767.76	767.56	767.36	767.16	766.96	766.76	766.56	766.36	766.16
765.96									

0.08' ℄ Pier 3C Sta. 113+64.92
1.92' ℄ Bent 1S Sta. 114+81.92
1.58' ℄ Bent 2S Sta. 116+08.42
120 Spa. @ 5'-0" = 600'-0"

117+20 — 118+80

765.96	765.76	765.56	765.36	765.16	764.96	764.76	764.56	764.36	764.16
763.96	763.76	763.56	763.36	763.16	762.96	762.76	762.56	762.36	762.16
761.96	761.76	761.56	761.36	761.16	760.96	760.76	760.56	760.36	760.16
759.96	759.76	759.56							

0.08' ℄ Bent 3S Sta. 117+34.92
℄ Brg. End Bent 4S Sta. 118+48.92
1.08'
.17'
32 Spa. @ 5'-0" = 160'-0"
End of Approach Slab

FINAL PLANS
I certify that this plan sheet accurately depicts the configuration and location of the roadway and all its appurtenant features ... of my knowledge ... the contractor's construction of ... project ... disclaim any responsibility ... of this project, except as I ... modified or authorized ... during its construction ... project design for the contractor ... responsibility except as I and ... the project, that the project ... or ordered

Signature Date

KEVIN R. EISENBEIS

1-26-98

PROFILE GRADE ELEVATIONS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

PRODEL

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: S.A.K. 03/94
CHECKED: M.J.T. 03/94

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 27 OF 28

A4757

STATE	PROJ. NO.	SHEET NO.
MO.	F.A.M.-291-1(52) J4U0564E	63

ID-980821-401

COMPLETE BILL OF REINFORCING STEEL

NO. REQD.	SIZE	MARK	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	B FT.	B IN.	C FT.	C IN.	D FT.	D IN.	E FT.	E IN.	F FT.	F IN.	H FT.	H IN.	K FT.	K IN.	NOMINAL LENGTH FT. IN.	ACTUAL LENGTH FT. IN.	WEIGHT LBS.
SLAB – UNIT 2 ~~CAST-IN-PLACE OR~~ STAY-IN-PLACE																										
3,778	6	S1	Trans. T & B	E	20					42	4													42 4	42 4	240,223
42	5	S2	Long. Bott.	E	20					29	7													29 7	29 7	1,296
2,037	5	S3	Long. T & B	E	20					34	10													34 10	34 10	74,007
42	5	S4	Long. Bott.	E	20					36	9													36 9	36 9	1,610
*72	5	S5	Long. Top	E	20					16	9													16 9	16 9	1,258
*138	6	S6	Long. Top @ Fbm's	E	20					19	1													19 1	19 1	3,956
1,700	6	S7	"	E	20					15	8													15 8	15 8	40,003
100	5	S8	Long. End Haunch	E	29	S				3	5	0	13	0	16	0	15			0	10.625	0	10.625	7 1	6 10	713
30	5	S9	Trans. End Haunch	E	20					11	1													11 1	11 1	347
20	5	S10	"	E	20					7	1													7 1	7 1	148
4	5	S11	Trans. Blockout	E	20					42	4													42 4	42 4	177
SAFETY BARRIER CURB – UNIT 1																										
20	5	R1	Vert.	E	19					2	6	0	3.5											2 10	2 8	56
20	5	R2	"	E	15					2	6.125	0	3.5							2	6	0	3	2 10	2 9	57
4	5	R3	"	E	19					0	17	0	6											1 11	1 10	8
4	5	R4	"	E	27							0	6	0	11.125	0	7	0	12	0	9.125	0	6.375	3 0	2 9	11
14	5	R5	Horiz.	E	20					9	10													9 10	9 10	144
SAFETY BARRIER CURB – UNIT 2																										
1,852	5	R1	Vert.	E	19					2	6	0	3.5											2 10	2 8	5,151
1,852	5	R2	"	E	15					2	6.125	0	3.5							2	6	0	3	2 10	2 9	5,312
1,852	5	R3	"	E	19					0	17	0	6											1 11	1 10	3,541
1,852	5	R4	"	E	27							0	6	0	11.125	0	7	0	12	0	9.125	0	6.375	3 0	2 9	5,312
756	5	R12	Horiz.	E	20					7	8													7 8	7 8	6,045
28	5	R13	"	E	20					25	7													25 7	25 7	747
364	5	R14	"	E	20					16	6													16 6	16 6	6,264
SAFETY BARRIER CURB – UNIT 3																										
20	5	R1	Vert.	E	19					2	6	0	3.5											2 10	2 8	56
20	5	R2	"	E	15					2	6.125	0	3.5							2	6	0	3	2 10	2 9	57
4	5	R3	"	E	19					0	17	0	6											1 11	1 10	8
4	5	R4	"	E	27							0	6	0	11.125	0	7	0	12	0	9.125	0	6.375	3 0	2 9	11
14	5	R5	Horiz.	E	20					9	10													9 10	9 10	144

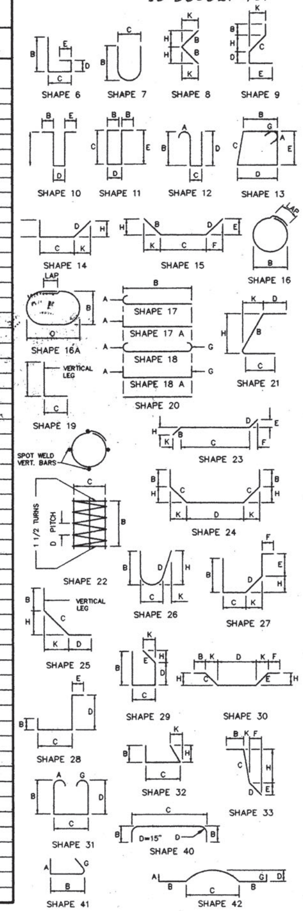
COMPLETE BILL OF REINFORCING STEEL

NO. REQD.	SIZE	MARK	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	B FT.	B IN.	C FT.	C IN.	D FT.	D IN.	E FT.	E IN.	F FT.	F IN.	H FT.	H IN.	K FT.	K IN.	NOMINAL LENGTH FT. IN.	ACTUAL LENGTH FT. IN.	WEIGHT LBS.

FINAL PLANS

I certify that this plan sheet accurately depicts the configuration and location of the roadway and all its appurtenant features to the best of my knowledge as I and my staff have observed the contractor's construction of this project. I specifically disclaim any responsibility for the design of this project, except as I and my staff may have modified or authorized the modification of the project design during its construction. I disclaim responsibility for the contractor's actual construction of the project, except as I and my staff directed or ordered that the project be constructed.

Signature Date

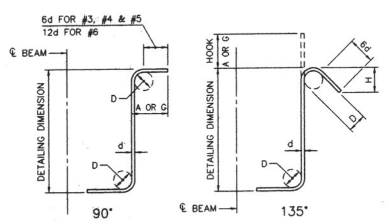


BENDING DIAGRAMS

NOMINAL LENGTHS – ARE BASED ON OUT TO OUT DIMENSIONS SHOWN IN BENDING DIAGRAMS AND ARE LISTED FOR FABRICATORS USE. (NEAREST INCH)

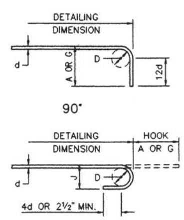
ACTUAL LENGTHS – ARE MEASURED ALONG CENTERLINE BAR TO THE NEAREST INCH.

PAYWEIGHTS ARE BASED ON ACTUAL LENGTHS.



STIRRUP HOOK DIMENSIONS

BAR SIZE	D	90° HOOK: HOOK A OR G	135° HOOK: HOOK A OR G	135° HOOK: APPROX. H
GRADES 40 – 50 – 60 KSI				
#3	1½"	4"	4"	2½"
#4	2"	4½"	4½"	3"
#5	2½"	6"	5½"	3¾"
#6	4½"	12"	8"	4½"



END HOOK DIMENSIONS

BAR SIZE	D	180° HOOKS ALL GRADES: A OR G	180° HOOKS ALL GRADES: J	90° HOOKS ALL GRADES: A OR G
#3	2¼"	5"	3"	6"
#4	3"	6"	4"	8"
#5	3¾"	7"	5"	10"
#6	4½"	8"	6"	12"
#7	5¼"	10"	7"	14"
#8	6"	11"	8"	16"
#9	9½"	15"	11¾"	19"
#10	10¾"	17"	13¼"	22"
#11	12"	19"	14¾"	2'-0"
#14	18¼"	2'-3"	21¾"	2'-7"

NOTES:

ALL STANDARD HOOKS AND BENDS OTHER THAN 180 DEG. ARE TO BE BENT WITH SAME PROCEDURE AS FOR 90 DEG. STANDARD HOOKS.

HOOKS AND BENDS SHALL BE IN ACCORDANCE WITH THE PROCEDURES AS SHOWN ON THIS SHEET.

E – EPOXY COATED REINFORCEMENT.
S – STIRRUP.
V – BAR DIMENSIONS VARY IN EQUAL INCREMENTS BETWEEN DIMENSIONS SHOWN ON THIS LINE AND THE FOLLOWING LINE.
X – BAR IS INCLUDED IN SUBSTRUCTURE QUANTITIES.

NO. EACH – NUMBER OF BARS OF EACH LENGTH.

* TWO ADDITIONAL BARS ARE INCLUDED IN THE BAR BILL FOR TESTING.

UNLESS OTHERWISE NOTED DIAMETER "D" IS THE SAME FOR ALL BENDS AND HOOKS ON A BAR.

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

1-26-98

BILL OF REINFORCING STEEL

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

SHEET 28 OF 28

A4757

C3REINF1

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: J.K.G. 8/94
CHECKED: M.J.T. 8/94

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
	MO.				64

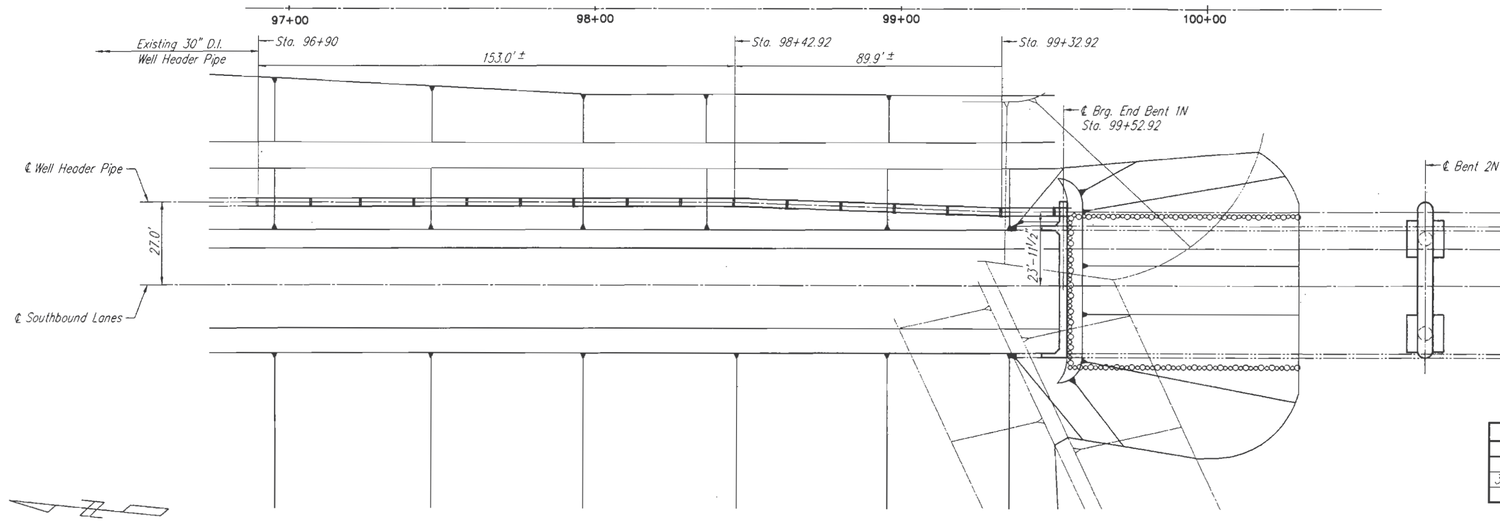
MISSOURI HIGHWAY AND TRANSPORTATION COMMISSION

ROUTE 291 MISSOURI RIVER BRIDGE

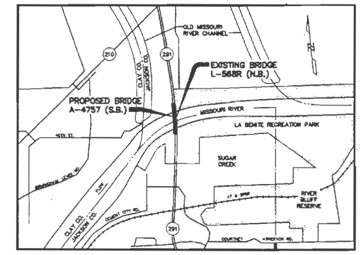
JACKSON COUNTY

CONTRACT 3

30" D.I. Well Header Pipe off bridge

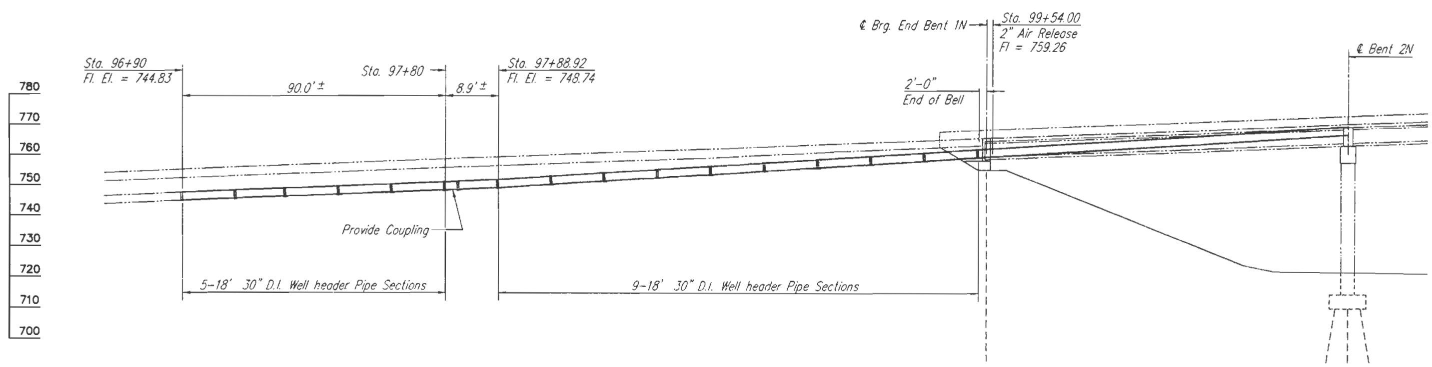


PLAN



LOCATION SKETCH

ESTIMATED QUANTITIES		
ITEM	UNIT	TOTAL
30" D.I. Well Header Pipe off bridge	Lump Sum	1



ELEVATION

Fl = Flowline
Dimensions shown are horizontal

GENERAL PLAN AND ELEVATION – NORTH

BRIDGE OVER MISSOURI RIVER

IN JACKSON COUNTY, MISSOURI

PROJECT NO.

JOB NO. J4U0564E

JACKSON COUNTY

STA. 99+52.92

RTE. 291

STATE OF MISSOURI KEVIN R. EISENBEIS NUMBER E-20946 REGISTERED PROFESSIONAL ENGINEER

2-9-98

DATE 3/27/98

SHEET 1 OF 4

STD.

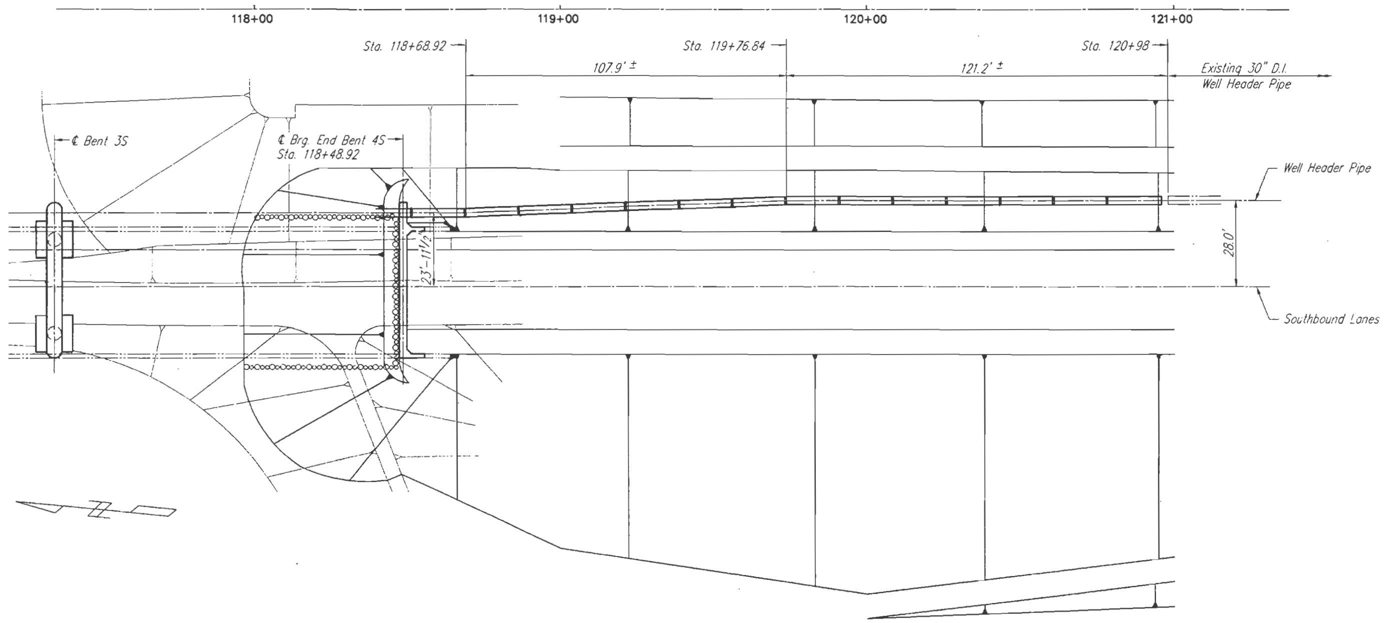
A4757

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

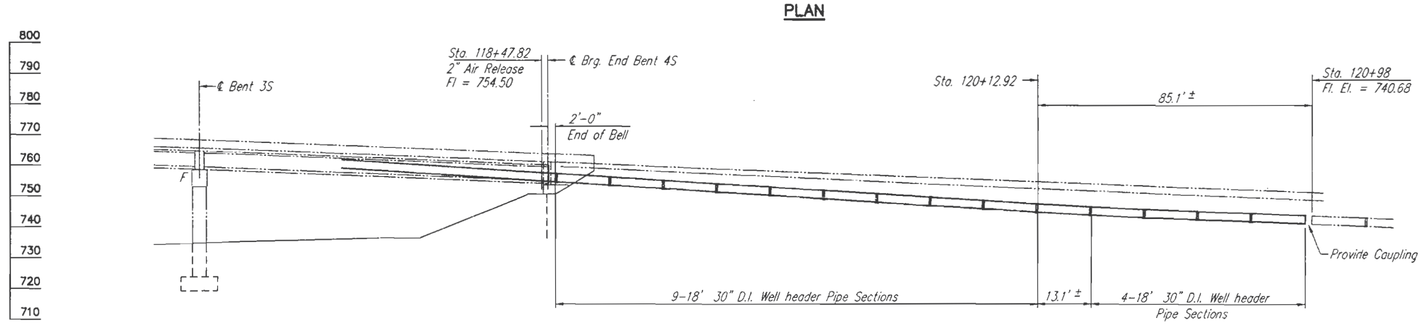
DETAILED: T.L.W.
CHECKED: H.G.J.

NOTE: DO NOT SCALE THIS DRAWING; FOLLOW DIMENSIONS.

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
	MO.				65



PLAN



Fl = Flowline
Dimensions shown are horizontal

ELEVATION

STATE OF MISSOURI
KEVIN R.
EISENBEIS
NUMBER
E-20846
REGISTERED PROFESSIONAL ENGINEER
2-4-98

GENERAL PLAN AND ELEVATION – SOUTH

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

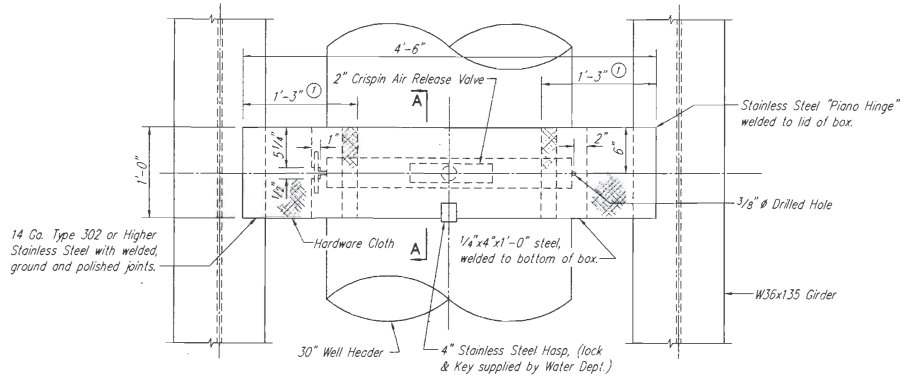
DETAILED: T.L.W.
CHECKED: H.G.J.

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

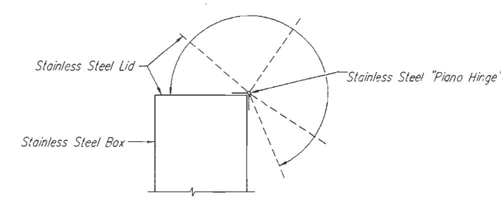
SHEET 2 OF 4

A–4757

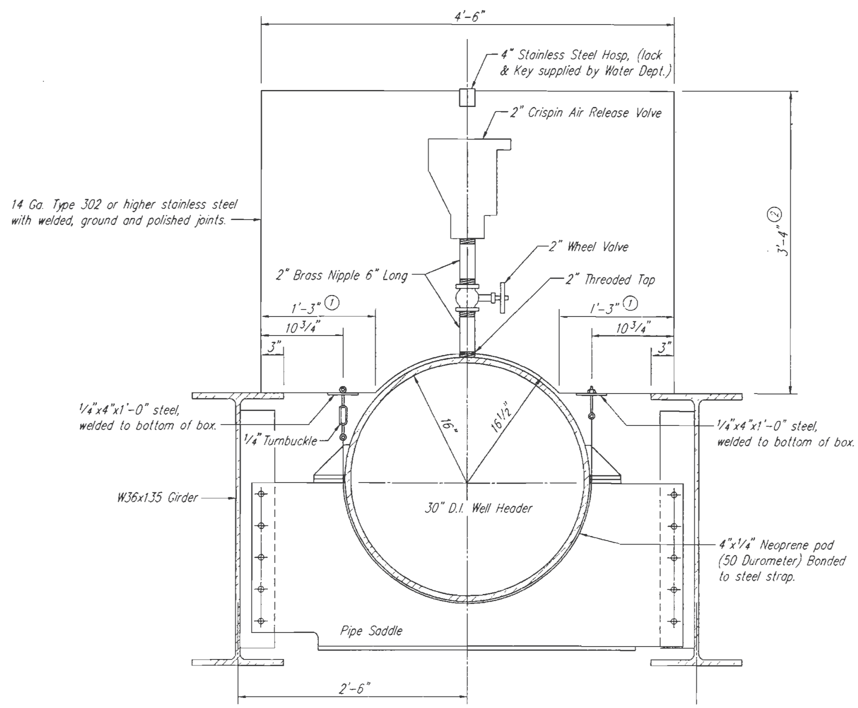
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
	MO.				66



PLAN



SECTION A–A



ELEVATION

NOTES

① Cover opening between flange to 1/4" plate and 1/4" plate to 30" D.I. Well Header with hardware cloth.

② Contractor shall verify for air release valve actually furnished.

See Special Provisions for additional information.

STATE OF MISSOURI
KEVIN R. EISENBEIS
NUMBER E-20946
REGISTERED PROFESSIONAL ENGINEER

2-9-98

30" WELL HEADER – 2" AIR RELEASE

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

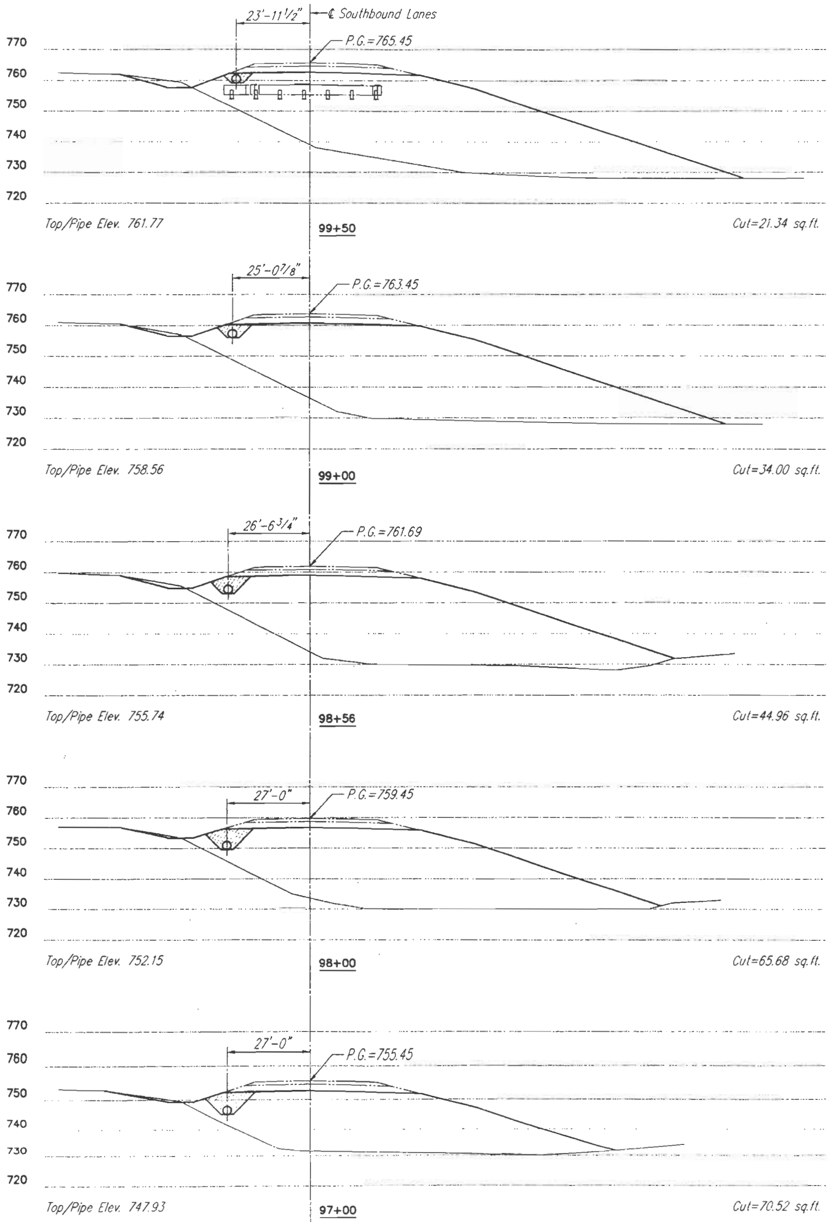
HARRINGTON & CORTELYOU, INC.
Consulting Engineers

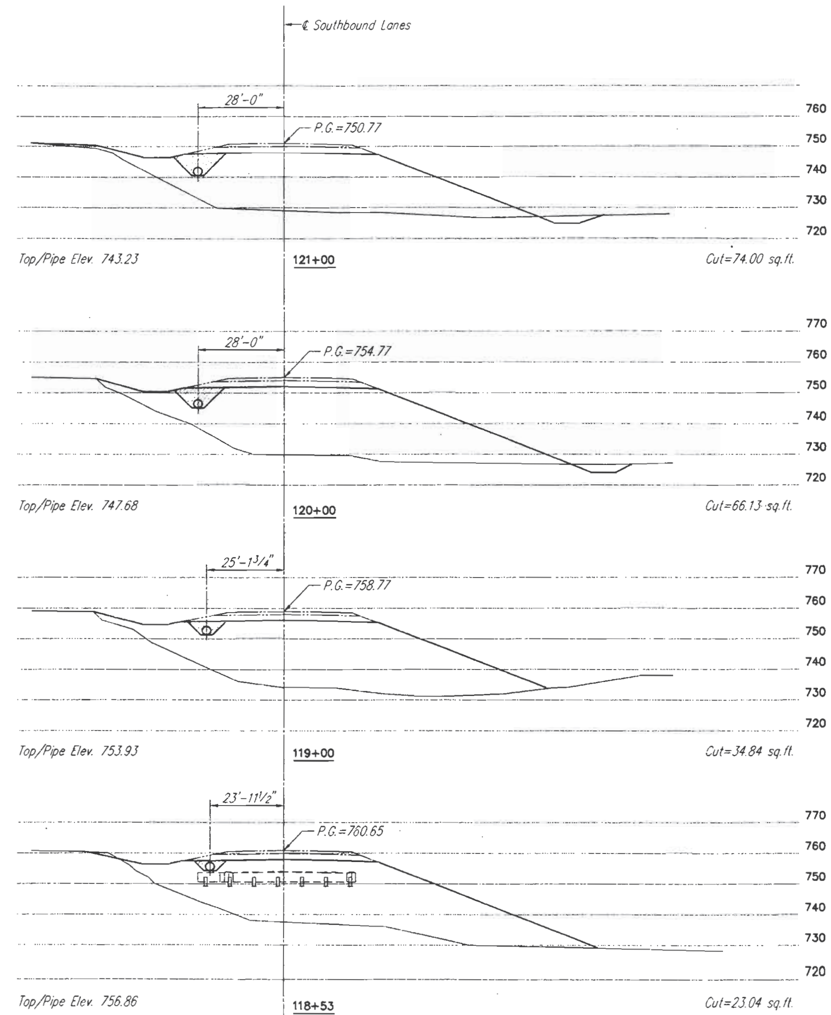
DETAILED: T.L.W.
CHECKED: H.G.J.

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

A–4757

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
	MO.				67





Note:
End areas are approximate and given for information only.

STATE OF MISSOURI
KEVIN R. EISENBEIS
NUMBER E-20945
REGISTERED PROFESSIONAL ENGINEER

2-4-18

ROADWAY CROSS SECTIONS
ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: T.L.W.
CHECKED: H.G.J.

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 4 OF 4

A-4757

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
4	MO.	F.A.M.-291-1(52)			64

JOB No. J4U0564E
ID-980821-401

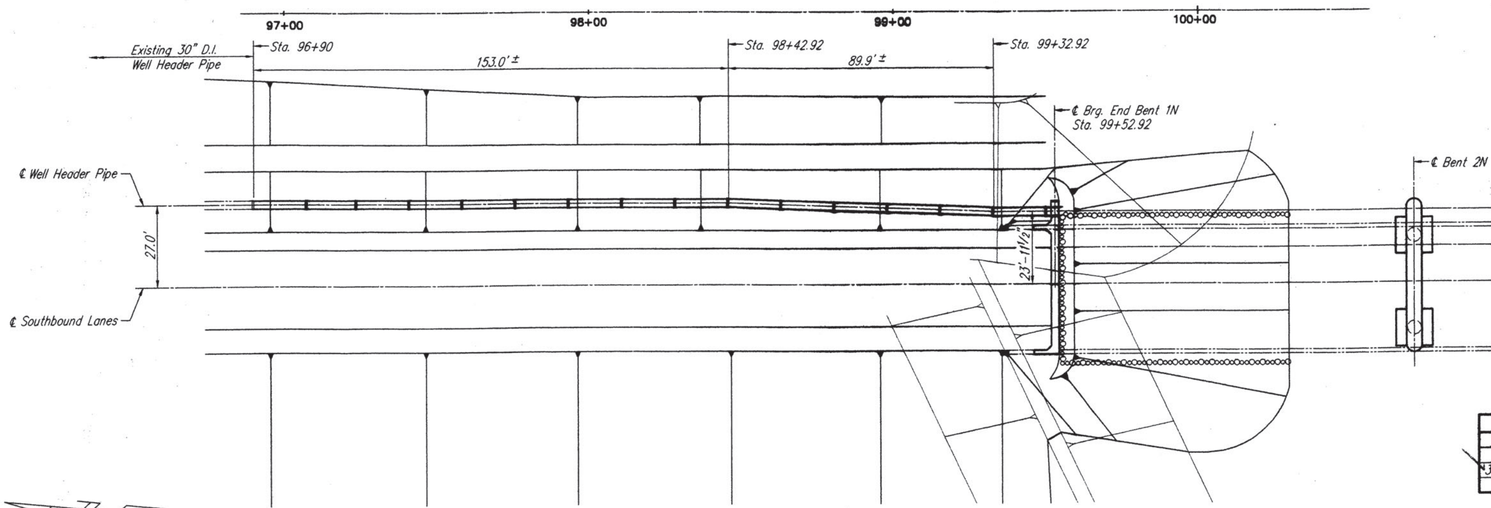
MISSOURI HIGHWAY AND TRANSPORTATION COMMISSION

ROUTE 291 MISSOURI RIVER BRIDGE

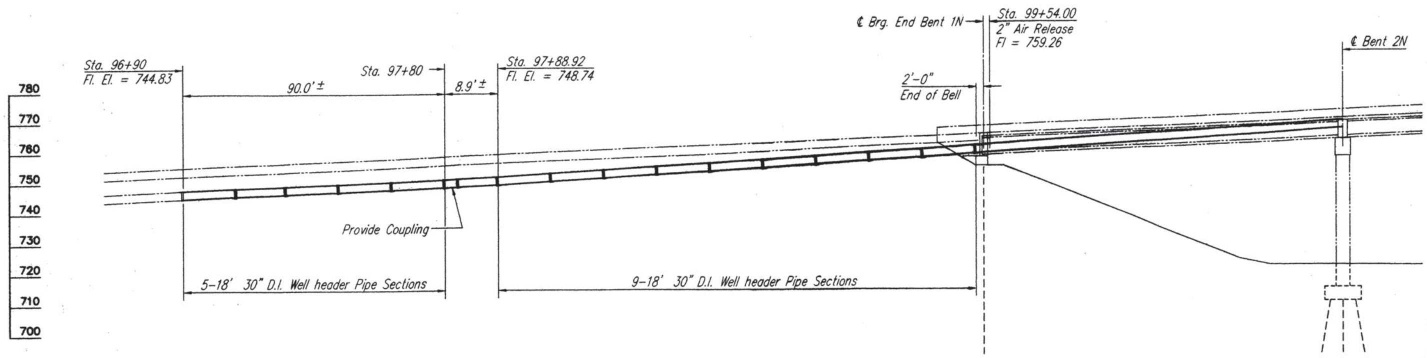
JACKSON COUNTY

CONTRACT 3

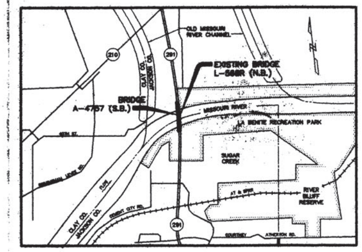
30" D.I. Well Header Pipe off bridge



PLAN



ELEVATION



LOCATION SKETCH

FINAL PLANS

I certify that this plan sheet accurately depicts the configuration and location of the roadway and all its appurtenant features [illegible] of my knowledge, as I and my [illegible] the contractor's construction [illegible] project. [illegible] disclaim any responsibility [illegible] of this project, except as [illegible] modified or authorized [illegible] of the project design during its [illegible] responsibility for the contract[illegible] of the project, except as I and [illegible] directed or ordered that the project [illegible]

Signature Date

FINAL QUANTITIES		
ITEM	UNIT	TOTAL
30" D.I. Well Header Pipe off bridge	Lump Sum	1

Fl = Flowline
Dimensions shown are horizontal

GENERAL PLAN AND ELEVATION – NORTH

BRIDGE OVER MISSOURI RIVER

IN JACKSON COUNTY, MISSOURI
PROJECT NO.
JOB NO. J4U0564E
JACKSON

STA. 99+52.92
RTE. 291
COUNTY

DATE 3/27/98

2-9-98

SHEET 1 OF 4

STD.

A4757

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: T.L.W.
CHECKED: H.G.J.

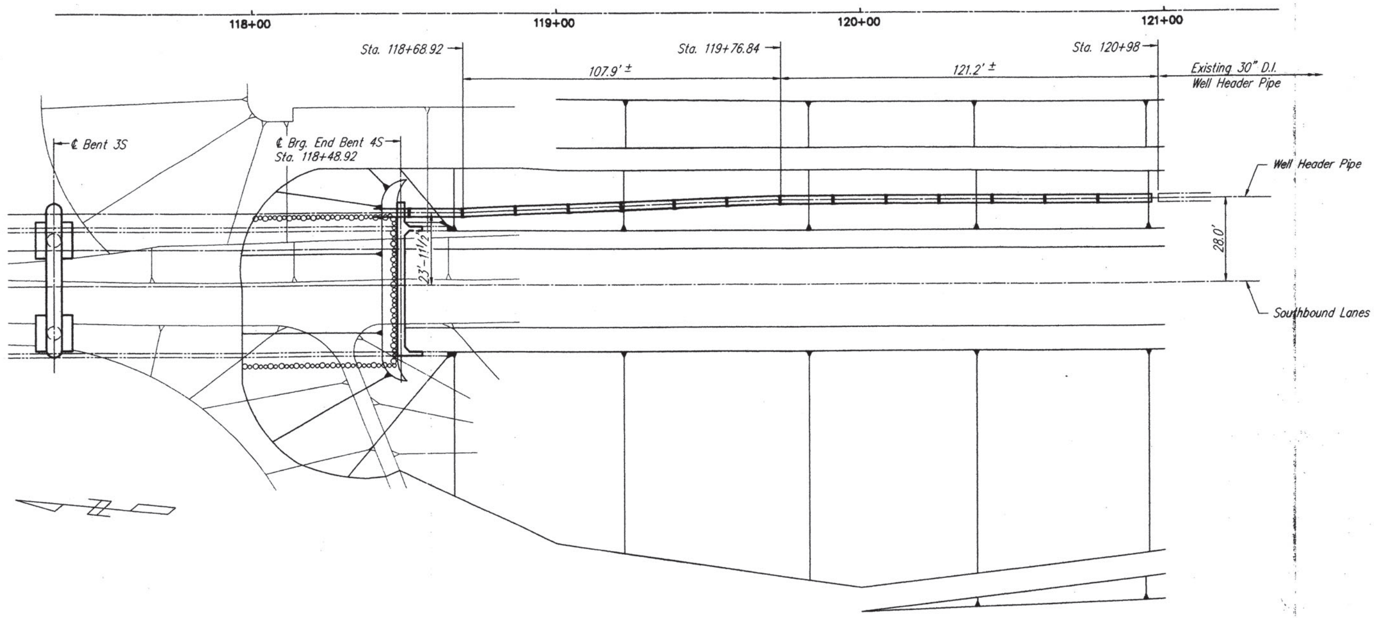
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
4	MO.	F.A.M.-291-1(52) J4U0564E			65

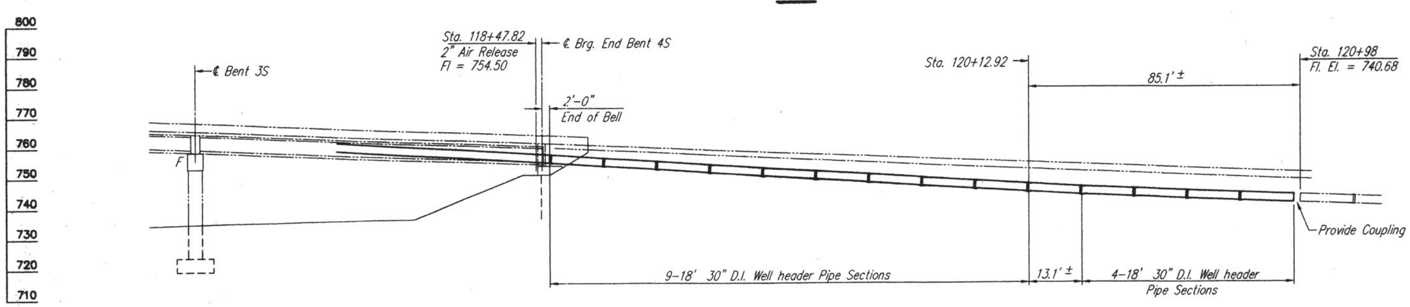
ID-980821-401

FINAL PLANS

Signature Date



PLAN



Fl = Flowline
Dimensions shown are horizontal

ELEVATION

GENERAL PLAN AND ELEVATION – SOUTH
ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

2-9-98

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: T.L.W.
CHECKED: H.G.J.

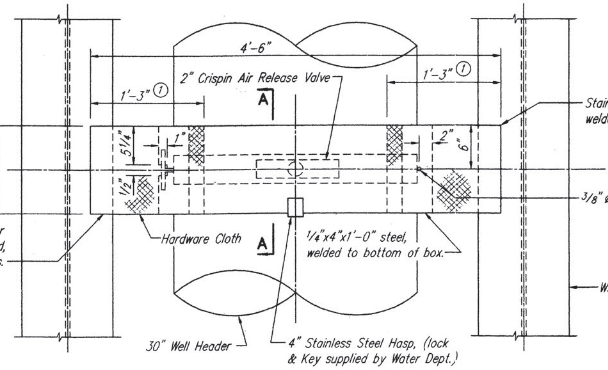
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 2 OF 4

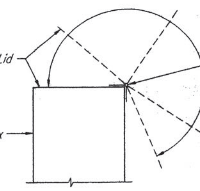
A–4757

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
4	MO.	F.R.M.-291-1(52) J4U0564E			66

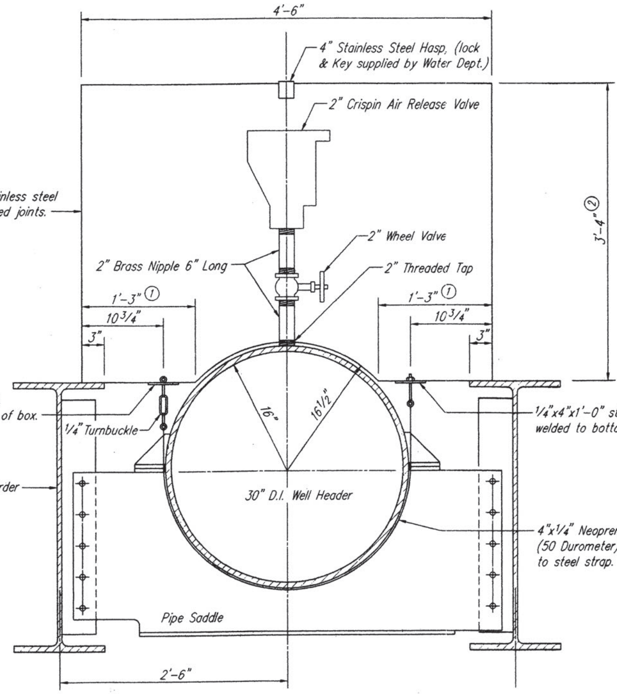
ID-980821-401



PLAN



SECTION A–A



ELEVATION

NOTES

① Cover opening between flange to 1/4" plate and 1/4" plate to 30" D.I. Well Header with hardware cloth.

② Contractor shall verify for air release valve actually furnished.

See Special Provisions for additional information.

FINAL PLANS

I certify that this plan sheet accurately depicts the configuration and location of the roadway and all its appurtenant features to the best of my knowledge. ... construction ... any responsibility ... except as ... authorized ... during its construction ... for the contractor's ... except as I ... that the project ...

Signature Date

KEVIN R. EISENBEIS

2-9-98

30" WELL HEADER – 2" AIR RELEASE

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

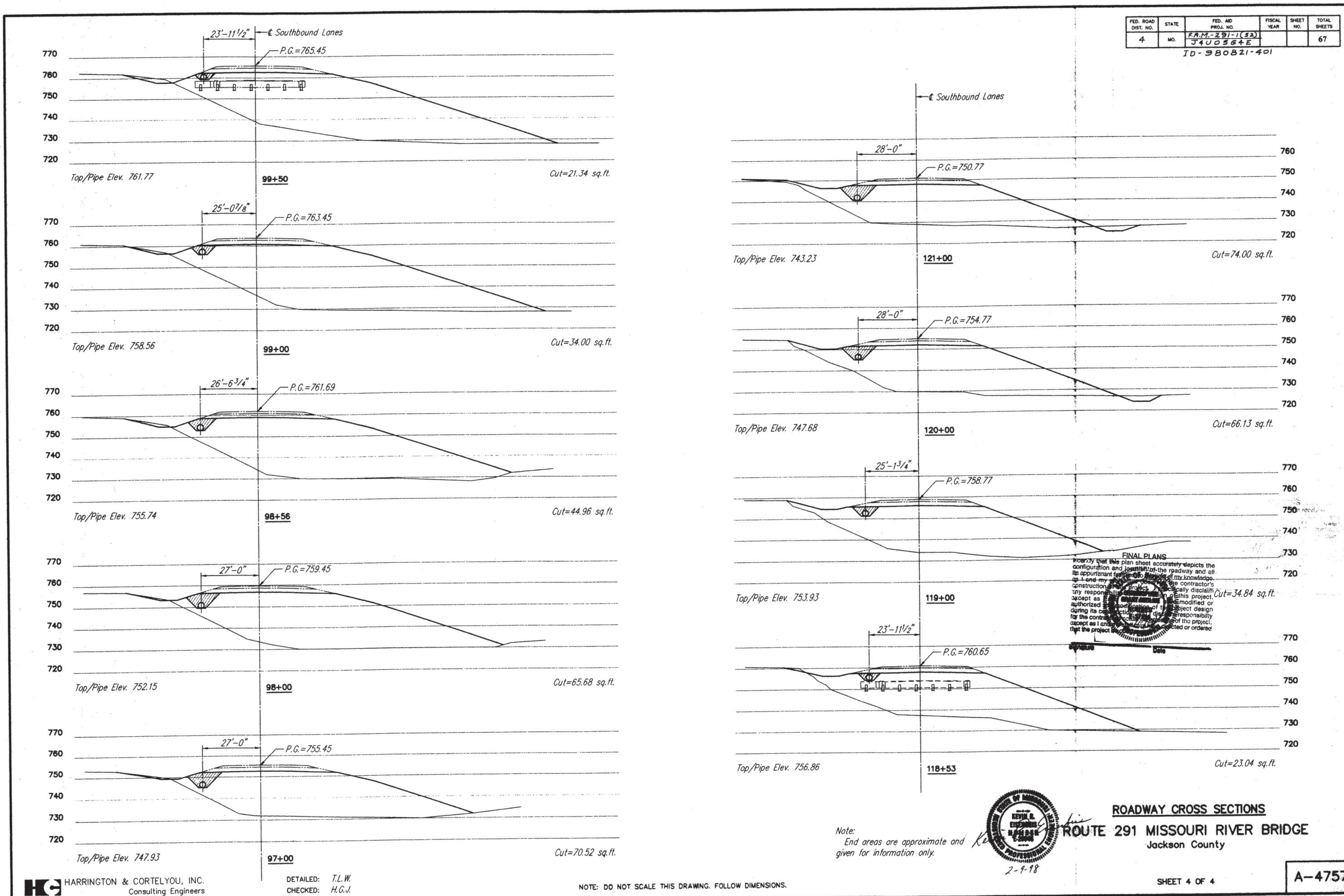
SHEET 3 OF 4

A–4757

HC HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: T.L.W.
CHECKED: H.G.J.

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.



FED. ROAD DIST. NO. 4
STATE MO.
FED. AID PROJ. NO. F.R.M.-291-1(52) J4U0564E
FISCAL YEAR
SHEET NO.
TOTAL SHEETS 67
ID-980821-401
23'-11 1/2"
℄ Southbound Lanes
P.G.=765.45
Top/Pipe Elev. 761.77
99+50
Cut=21.34 sq.ft.
25'-0 7/8"
P.G.=763.45
Top/Pipe Elev. 758.56
99+00
Cut=34.00 sq.ft.
26'-6 3/4"
P.G.=761.69
Top/Pipe Elev. 755.74
98+56
Cut=44.96 sq.ft.
27'-0"
P.G.=759.45
Top/Pipe Elev. 752.15
98+00
Cut=65.68 sq.ft.
27'-0"
P.G.=755.45
Top/Pipe Elev. 747.93
97+00
Cut=70.52 sq.ft.
℄ Southbound Lanes
28'-0"
P.G.=750.77
Top/Pipe Elev. 743.23
121+00
Cut=74.00 sq.ft.
28'-0"
P.G.=754.77
Top/Pipe Elev. 747.68
120+00
Cut=66.13 sq.ft.
25'-1 3/4"
P.G.=758.77
Top/Pipe Elev. 753.93
119+00
Cut=34.84 sq.ft.
FINAL PLANS
23'-11 1/2"
P.G.=760.65
Top/Pipe Elev. 756.86
118+53
Cut=23.04 sq.ft.
770
760
750
740
730
720
Note:
End areas are approximate and given for information only.
2-4-98
ROADWAY CROSS SECTIONS
ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County
HARRINGTON & CORTELYOU, INC.
Consulting Engineers
DETAILED: T.L.W.
CHECKED: H.G.J.
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.
SHEET 4 OF 4
A-4757