Kansas Department of Transportation

MEMO TO: Brian Schafer, Area Construction Engineer
District Four, Area Two Construction Office, Garnett

FROM: Gary Chan. P.E. Gmc
Senior Squad Leader
Bridge Design Section

EXAMPLE 2 :
Erection Review &
Recommendations
to the Field Staff

DATE: September 16, 2008

SUBJECT: Field Erection plans
Project No. 152-54 KA-0197-01
Bridge No. 152-54-7.92(074)
Linn County

The Field Erection plans (sheets 13 thru 15 of 15) have been reviewed for those operations that pertain to Field Operation Three as defined in the KDOT Special Provision "Field Erection". Those items that pertain to Field Operation Three in the Field Erection plans (sheets 13 thru 15 of 15) are recommended for your approval.

Please contact Michelle LaRoche at (785)296-2606 or e-mail mlaroche@ksdot.org if you have any questions.

Attachments
c:

A.M. Cohron & Son, Inc.

PO Box 2304
Emporia KS 66801
Phone: (620) 342-4844
Fax: (620) 342-5253

KDOT Project # 154-52 KA 0197-01
AMC Project 36300
Linn County

Structural Steel Beam Erection Procedure

Erection Plan – Minimum Requirements:

1. Background Information:
    a. Shop Drawings – Attached
    b. Camber Diagram – Attached
    c. List of Field Bolts – Attached
    d. Shipping Statements / Weights – Attached
2. Proposed Methods of Erection:
    a. List of Equipment:
        i. American 5299 Crane (50 ton)
        ii. Terex HC80 Crane (80 ton)
        iii. American 599 Crane (40 ton)
        iv. American 399 Crane (23 ton)
        v. 40 ton and/or 25 ton capacity spreaders
    b. Crane pick locations and loads – see attached procedure
    c. Falsework plans – n/a
    d. Temporary bracing – see attached procedure
    e. Blocking diagrams – n/a
3. Specific Details for Girder Erection:
    a. Spliced pieces – n/a
    b. Multiple girders – n/a
    c. Pick descriptions – see attached procedure
    d. Bolting locations – n/a
    e. Number of fully tightened at each splice – 25%, see attached procedure
    f. Cross-frames or diaphragms – see attached procedure
    g. Anchor bolts – installed and grouted prior to beginning beam erection
    h. Temporary bracing – see attached procedure

Refer to the attached procedure for the sequence of beam erection, placement of cranes, approximate pick locations, and temporary stabilization details.

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AMERICAN 399 CRAWLER CRANE LIFTING CAPACITIES

For Hook – Clamshell & Dragline

Boom Length	Radius Feet	Radius Degree	Capacity Hook Work	Capacity Clam or Drag Work
30'	10	76	47,050	34,700
	12	72	34,450	27,600
	15	66	24,550	19,700
	20	54	16,350	13,000
	25	42	12,150	9,500
	30	24	9,550	7,500
40'	10	79	46,900	34,500
	12	76	34,300	27,400
	15	72	24,400	19,500
	20	64	16,200	12,800
	25	56	12,000	9,300
	30	46	9,400	7,300
	35	36	7,700	6,000
	40	20	6,400	5,100
50'	10	82	46,800	34,300
	12	79	34,200	27,200
	15	76	24,300	19,300
	20	70	16,100	12,600
	25	63	11,900	9,100
	30	56	9,300	7,100
	35	50	7,600	5,800
	40	42	6,300	4,900
	45	32	5,400	4,100
	50	18	4,600	3,500
60'	12	81	34,100	27,000
	15	78	24,200	19,100
	20	73	16,000	12,400
	25	68	11,800	8,900
	30	63	9,200	6,900
	35	57	7,500	5,600
	40	52	6,200	4,700
	45	45	5,300	3,900
	50	38	4,500	3,300
	55	29	3,900	2,800
	60	16	3,400	2,400
70'	15	80	24,100	18,900
	20	76	15,900	12,200
	25	72	11,700	8,700
	30	67	9,100	6,700
	35	62	7,400	5,400
	40	58	6,100	4,500
	45	52	5,200	3,700
	50	48	4,400	3,100
70'	55	42	3,800	2,600
	60	35	3,300	2,200
	65	27	2,900	
	70	16	2,600	
80'	15	81	24,000	18,700
	20	78	15,800	12,000
	25	74	11,600	8,500
	30	70	9,000	6,500
	35	66	7,300	5,200
	40	62	6,000	4,300
	45	58	5,100	3,500
	50	54	4,300	2,900
	55	49	3,700	2,400
	60	44	3,200	2,000
	65	38	2,800	
	70	32	2,500	
	75	25	2,200	
	80	14	1,900	
90'	17	80	19,800	
	20	79	15,700	
	25	76	11,500	
	30	72	8,900	
	35	69	7,200	
	40	66	5,900	
	45	62	5,000	
	50	58	4,200	
	55	54	3,600	
	60	50	3,100	
	65	46	2,700	
	70	42	2,400	
	75	36	2,100	
	80	30	1,800	
100'	20	80	15,600	
	25	77	11,400	
	30	74	8,800	
	35	71	7,100	
	40	68	5,800	
	45	65	4,900	
	50	62	4,100	
	55	58	3,500	
	60	55	3,000	
	65	52	2,600	
	70	48	2,300	
	75	44	2,000	
	80	39	1,700	

High gantry must be raised for boom lengths over 60 ft. Capacities given are based on 75% of tipping load. Blocks, slings, magnet, bucket and other load carrying devices are to be considered as part of the load.

When using 15' jib, allowable main boom capacity must be reduced 800 lbs. When using 30' jib, allowable main boom capacity must be reduced 1400 lbs. Capacities using a jib are the same as the reduced main boom capacities with the boom lowered to that radius but must not exceed 6,000 lbs. Offset of the jib from the centerline of the boom must not exceed 7 feet.

FOR MAXIMUM CONTINUOUS DRAGLINE SERVICE, THE BUCKET AND LOAD CAPACITY SHALL NOT EXCEED 5,000 POUNDS.

FOR MAXIMUM CONTINUOUS CLAMSHELL SERVICE, THE BUCKET AND LOAD CAPACITY SHALL NOT EXCEED 6,500 POUNDS.

3-18-58
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49-997

AMERICAN HOIST & DERRICK CO.
ST. PAUL 1, MINNESOTA

AMERICAN HOIST & DERRICK CO.
ST. PAUL, MINNESOTA 55107

MODEL 599 C CRAWLER CRANE RATINGS IN POUNDS
20,500 lb. Counter Weight
For Lifting Crane Service Only.

Boom Length	Radius Feet	Boom Radius Degrees	Ratings In Pounds
40	12	78	80,000
	15	74	57,900
	20	66	37,000
	25	58	27,300
	30	49	21,000
	35	39	16,700
	40	25	13,700
50	12	81	80,000
	15	77	57,700
	20	71	36,800
	25	65	27,100
	30	58	20,800
	35	51	16,500
	40	45	13,500
	50	22	10,400
60	15	79	57,500
	20	74	36,600
	25	69	26,900
	30	64	20,600
	35	59	16,300
	40	53	13,300
	50	39	10,200
	60	20	7,800
70	15	81	57,300
	20	77	36,400
	25	73	26,700
	30	68	20,400
	35	63	16,100
	40	59	13,100
	50	49	10,000
	60	37	7,600
	70	19	6,000
80	20	78	36,200
	25	75	26,500
	30	71	20,200
	35	67	15,900
	40	63	12,900
	50	55	9,800
	60	45	7,400
	70	34	5,800
	80	17	4,700
90	20	80	36,000
	25	77	26,300
	30	73	20,000
	35	70	15,700
	40	66	12,700
	50	59	9,600
	60	52	7,200
	70	43	5,600
	80	32	4,500
	90	17	3,700
100	20	81	35,800
	25	78	26,100
	30	75	19,800
	35	72	15,500
	40	68	12,500
	50	63	9,400
	60	56	7,000
	70	49	5,400
	80	40	4,300
	90	30	3,500
	100	15	2,900
110	25	79	25,900
	30	76	19,600
	35	74	15,300
	40	69	12,300
	50	65	9,200
	60	59	6,800
	70	53	5,200
	80	46	4,100
	90	40	3,300
	100	29	2,700
120	25	80	25,700
	30	78	19,400
	35	75	15,100
	40	73	12,100
	50	67	9,000
	60	62	6,600
	70	57	5,000
	80	51	3,900
	90	44	3,100
	100	37	2,500
130	25	82	25,500
	30	79	19,200
	35	76	14,900
	40	74	11,900
	50	69	8,800
	60	64	6,400
	70	60	4,800
	80	56	3,700
	90	50	2,900
	100	43	2,300
140	30	79	19,000
	35	77	14,700
	40	75	11,700
	50	71	8,600
	60	67	6,200
	70	62	4,600
	80	57	3,500
	90	52	2,700
	100	47	2,100
150	30	80	18,800
	35	78	14,500
	40	76	11,500
	50	72	8,400
	60	68	6,000
	70	64	4,400
	80	60	3,300
	90	55	2,500
	100	51	1,900

NOTE: Ratings do not exceed 75% of tipping load. Blocks, slings, buckets and other load carrying devices are considered part of the load. These ratings apply only to cranes equipped with a standard American Hoist Boom and retractable "A" Frame. Booms over 60 Ft. long require the retractable "A" Frame in the raised position.

JIB RATINGS	20 ft. Jib	30 ft. Jib	40 ft. Jib
Maximum Rating	12000 lbs.	10000 lbs.	6000 lbs.
Reduction in Main Boom Rating	960 lbs.	1280 lbs.	1640 lbs.
Permissable Offset of Jib from Boom Centerline	8 ft.	8 ft.	8 ft.

Jib ratings at various radii are the same as main boom ratings, reduced by 960, 1280 or 1640 lbs. depending on jib length, but not exceeding the maximum rating of the jib.

"These ratings apply for lifting crane service only. . For duty cycle service (dragline, clamshell, grapple, magnet, etc.) the counterweight must be reduced to 15,700 lbs. by removing inserts "F_1" "F_2" and "E". See separate chart for duty cycle ratings. Failure to reduce counterweight for duty cycle operation will void the warranty of this machine."

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AMERICAN MODEL 5299 LIFTING CRANE RATINGS

Angle Chord Boom

Boom Length	Radius in Feet	Boom Angle Degrees	Side Frames Retracted	Side Frames Extended
40′	10	81	—	100,000
	12	78	—	100,000
	15	74	—	80,000
	20	66	—	51,240
	25	58	—	37,420
	30	49	—	29,290
	35	39	19,370	23,930
	40	25	16,360	20,140
50′	11	82	—	100,000
	12	81	—	100,000
	15	77	—	79,910
	20	71	—	51,120
	25	65	—	37,280
	30	59	—	29,140
	35	52	19,200	23,780
	40	44	16,200	19,980
	50	23	12,150	14,940
60′	13	82	—	100,000
	15	80	—	79,800
	20	75	—	50,980
	25	70	—	37,120
	30	64	23,190	28,970
	35	59	19,020	23,610
	40	53	16,010	19,810
	50	40	11,960	14,770
	60	21	9,360	11,580
70′	15	81	—	79,680
	20	77	—	50,820
	25	73	—	36,950
	30	68	23,000	28,800
	35	64	18,820	23,430
	40	59	15,820	19,620
	50	49	11,770	14,580
	60	37	9,170	11,390
	70	19	7,350	9,190
80′	16	82	—	71,530
	20	79	—	50,670
	25	75	29,000	36,780
	30	71	22,800	28,610
	35	67	18,620	23,240
	40	63	15,610	19,430
	50	55	11,560	14,390
	60	46	8,960	11,200
	70	34	7,150	9,000
	80	18	5,800	7,380

Boom Length	Radius in Feet	Boom Angle Degrees	Side Frames Retracted	Side Frames Extended
90′	18	81	—	59,240
	20	80	—	50,500
	25	77	28,800	36,600
	30	73	22,600	28,430
	35	70	18,420	23,050
	40	67	15,410	19,230
	50	60	11,360	14,190
	60	52	8,760	11,000
	70	43	6,940	8,790
	80	32	5,600	7,180
	90	17	4,570	5,940
100′	19	82	—	54,390
	20	81	—	50,340
	25	78	28,610	36,420
	30	75	22,400	28,240
	35	72	18,210	22,850
	40	69	15,200	19,030
	50	63	11,140	13,980
	60	56	8,540	10,790
	70	49	6,730	8,590
	80	41	5,390	6,970
	90	31	4,360	5,740
	100	16	3,540	4,760
110′	21	81	36,060	46,660
	25	79	28,410	36,240
	30	77	22,190	28,050
	35	74	18,000	22,650
	40	71	14,990	18,330
	50	66	10,930	13,780
	60	60	8,330	10,580
	70	53	6,510	8,380
	80	47	5,180	6,760
	90	39	4,150	5,530
	100	29	3,330	4,550
	110	15	2,660	3,760
120′	22	82	33,620	43,400
	25	80	28,200	36,060
	30	78	21,980	27,850
	35	75	17,790	22,450
	40	73	14,770	18,630
	50	68	10,710	13,570
	60	63	8,110	10,370
	70	57	6,300	8,170
	80	51	4,960	6,550
	90	44	3,930	5,320
	100	37	3,110	4,340
	110	28	2,450	3,550
	120	15	1,890	2,890

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TEREX LIFTING

AMERICAN HC 80

Hydraulic Crawler Crane
47 HI Boom

LIFT RATINGS IN POUNDS

With 47HI Offset Tip Boom and 58,100 Pound Counterweight

Boom	Radius (Feet)	Boom Angle (Degrees)	Side Frames Extended (Pounds)	From Boom Pt. to Ground (Feet)
40' (12.2M)	11	80.5	160,000 *	45
	12	79.0	160,000 *	45
	15	74.6	141,480	44
	20	67.0	87,810	42
	25	58.8	63,360	40
	30	49.9	49,350	36
	35	39.5	40,320	31
	40	25.8	33,970	23
50' (15.2M)	13	80.1	160,000 *	55
	15	77.8	141,440	54
	20	71.8	87,750	53
	25	65.6	63,280	51
	30	59.1	49,250	48
	35	52.0	40,220	45
	40	44.2	33,860	40
	50	22.9	25,540	25
60' (18.3M)	14	80.8	145,370 *	65
	15	79.8	141,380	64
	20	74.9	87,660	63
	25	69.9	63,170	62
	30	64.7	49,120	60
	35	59.2	40,100	57
	40	53.4	33,730	54
	50	40.2	25,400	44
	60	20.8	20,230	27
70' (21.3M)	16	80.5	125,040 *	74
	20	77.1	87,590	74
	25	72.9	63,090	72
	30	68.5	49,040	71
	35	64.0	40,020	68
	40	59.3	33,640	66
	50	49.2	25,310	58
	60	37.0	20,150	48
	70	19.2	16,580	28
80' (24.4M)	17	80.9	109,250 *	84
	20	78.8	87,470	84
	25	75.1	62,960	83
	30	71.3	48,880	81
	35	67.5	39,870	79
	40	63.5	33,480	77
	50	55.1	25,140	71
	60	45.8	20,000	63
	70	34.5	16,430	51
	80	17.9	13,830	30
90' (27.4M)	19	80.7	94,540	94
	20	80.0	87,330	94
	25	76.8	62,810	93
	30	73.5	48,720	92
	35	70.1	39,720	90
	40	66.7	33,320	88
	50	59.5	24,970	83
	60	51.7	19,840	76
	70	43.0	16,260	67
	80	32.5	13,660	54
	90	16.9	11,690	32

Boom	Radius (Feet)	Boom Angle (Degrees)	Side Frames Extended (Pounds)	From Boom Pt. to Ground (Feet)
100' (30.5M)	21	80.4	80,910	104
	25	78.1	62,690	103
	30	75.2	48,580	102
	35	72.2	39,590	101
	40	69.1	33,190	99
	50	62.8	24,840	94
	60	56.1	19,720	88
	70	48.9	16,130	81
	80	40.7	13,540	71
	90	30.7	11,560	56
	100	16.0	10,010	33
110' (33.5M)	22	80.8	72,040 *	114
	25	79.2	62,530	113
	30	76.5	48,420	112
	35	73.8	39,430	111
	40	71.1	33,020	109
	50	65.5	24,650	105
	60	59.6	19,560	100
	70	53.3	15,970	94
	80	46.4	13,360	85
	90	38.7	11,380	74
	100	29.2	9,840	59
	110	15.2	8,590	34
120' (36.6M)	24	80.6	60,160 *	124
	25	80.1	60,160 *	124
	30	77.7	48,260	123
	35	75.2	39,260	121
	40	72.7	32,850	120
	50	67.6	24,470	116
	60	62.3	19,390	112
	70	56.8	15,800	106
	80	50.8	13,190	98
	90	44.3	11,210	89
	100	37.0	9,660	78
	110	28.0	8,410	62
	120	14.5	7,390	36
130' (39.6M)	25	80.9	50,970 *	134
	30	78.6	48,100	133
	35	76.4	39,120	132
	40	74.1	32,700	130
	50	69.4	24,320	127
	60	64.7	19,240	123
	70	59.6	15,650	118
	80	54.4	13,040	111
	90	48.7	11,060	103
	100	42.5	9,510	93
	110	35.4	8,250	81
	120	26.8	7,230	64
	130	13.9	6,380	37
140' (42.7M)	27	80.7	42,380 *	144
	30	79.5	42,370 *	143
	35	77.4	38,950	142
	40	75.3	32,530	141
	50	71.0	24,140	138
	60	66.6	19,070	134
	70	62.0	15,480	129

Boom	Radius (Feet)	Boom Angle (Degrees)	Side Frames Extended (Pounds)	From Boom Pt. to Ground (Feet)
140' (42.7M)	80	57.3	12,860	123
	90	52.2	10,880	116
	100	46.8	9,330	108
	110	40.9	8,070	97
	120	34.1	7,040	84
	130	25.8	6,180	66
	140	13.4	5,470	38
150' (45.7M)	28	80.9	36,630 *	154
	30	80.2	36,540 *	153
	35	78.2	36,070 *	152
	40	76.3	32,360	151
	50	72.3	23,960	148
	60	68.2	18,900	145
	70	64.0	15,310	140
	80	59.7	12,690	135
	90	55.1	10,710	128
	100	50.3	9,150	121
	110	45.1	7,890	112
	120	39.4	6,860	101
	130	32.9	6,000	87
	140	24.9	5,270	69
	150	12.9	4,650	39
160' (48.8M)	30	80.8	31,770 *	163
	35	79.0	31,370 *	162
	40	77.1	30,790 *	161
	50	73.4	23,800	159
	60	69.7	18,750	155
	70	65.8	15,150	151
	80	61.8	12,530	146
	90	57.6	10,550	141
	100	53.2	8,990	134
	110	48.6	7,730	125
	120	43.6	6,690	116
	130	38.1	5,830	104
	140	31.8	5,100	90
	150	24.1	4,480	71
	160	12.5	3,950	40
170' (51.8M)	31	81.0	27,710 *	173
	35	79.6	27,340 *	173
	40	77.9	26,810 *	172
	50	74.4	23,610	169
	60	70.9	18,580	166
	70	67.3	14,980	162
	80	63.6	12,360	158
	90	59.7	10,360	152
	100	55.7	8,800	146
	110	51.5	7,540	139
	120	47.1	6,510	130
	130	42.2	5,650	120
	140	36.9	4,920	108
	150	30.8	4,290	93
	160	23.4	3,750	73
	170	12.1	3,290	41
180' (54.9M)	33	80.9	24,240 *	183
	35	80.2	24,110 *	183
	40	78.6	23,210 *	182

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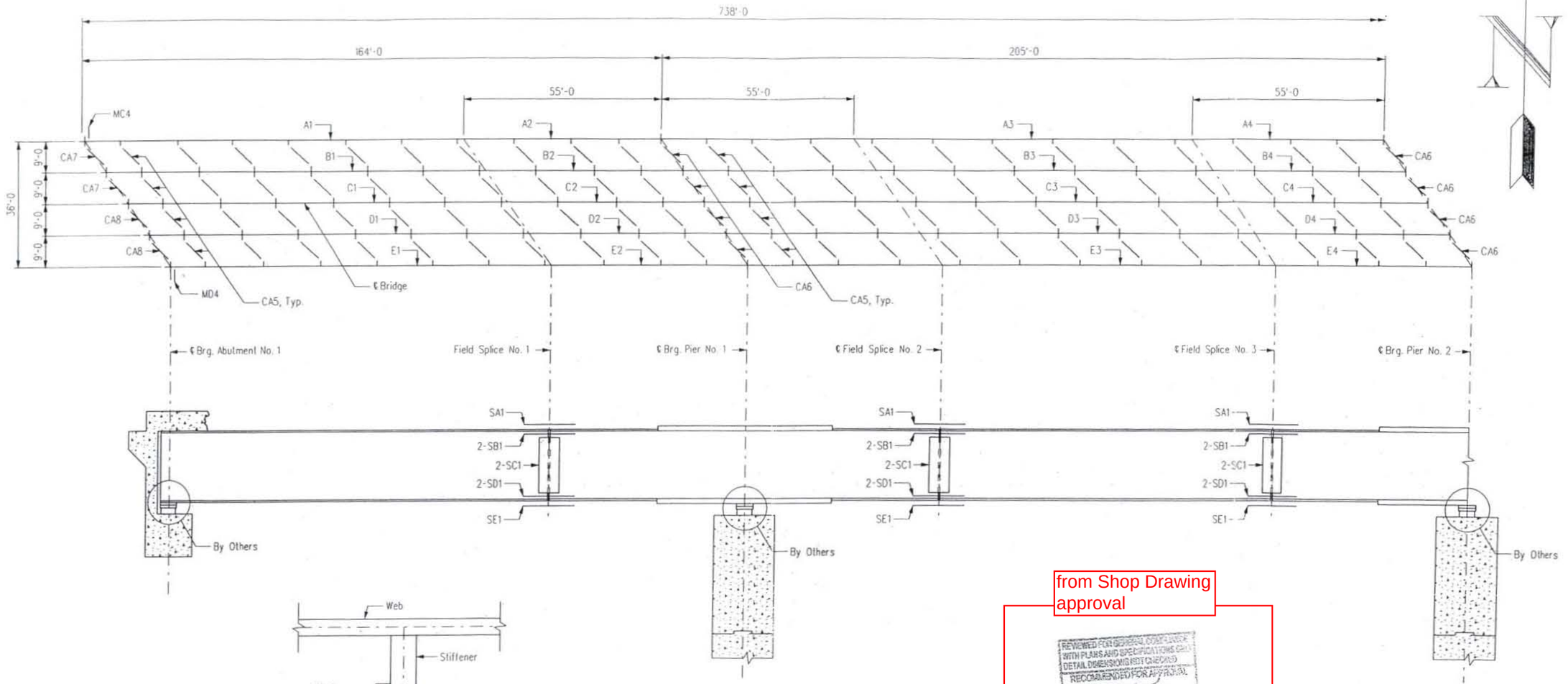
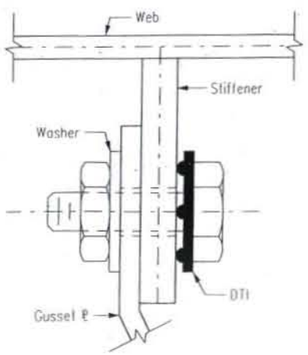


SUPERSTRUCTURAL STEEL ERECTION LAYOUT



Bolt Detail

from Shop Drawing approval

REVIEWED FOR GENERAL COMPLIANCE WITH PLANS AND SPECIFICATIONS ONLY. DETAIL DIMENSIONS NOT CHECKED. RECOMMENDED FOR APPROVAL.
Chief of Bureau of Design
APPROVED
Assistant Secretary and State Transportation Engineer
MAR 25 2008

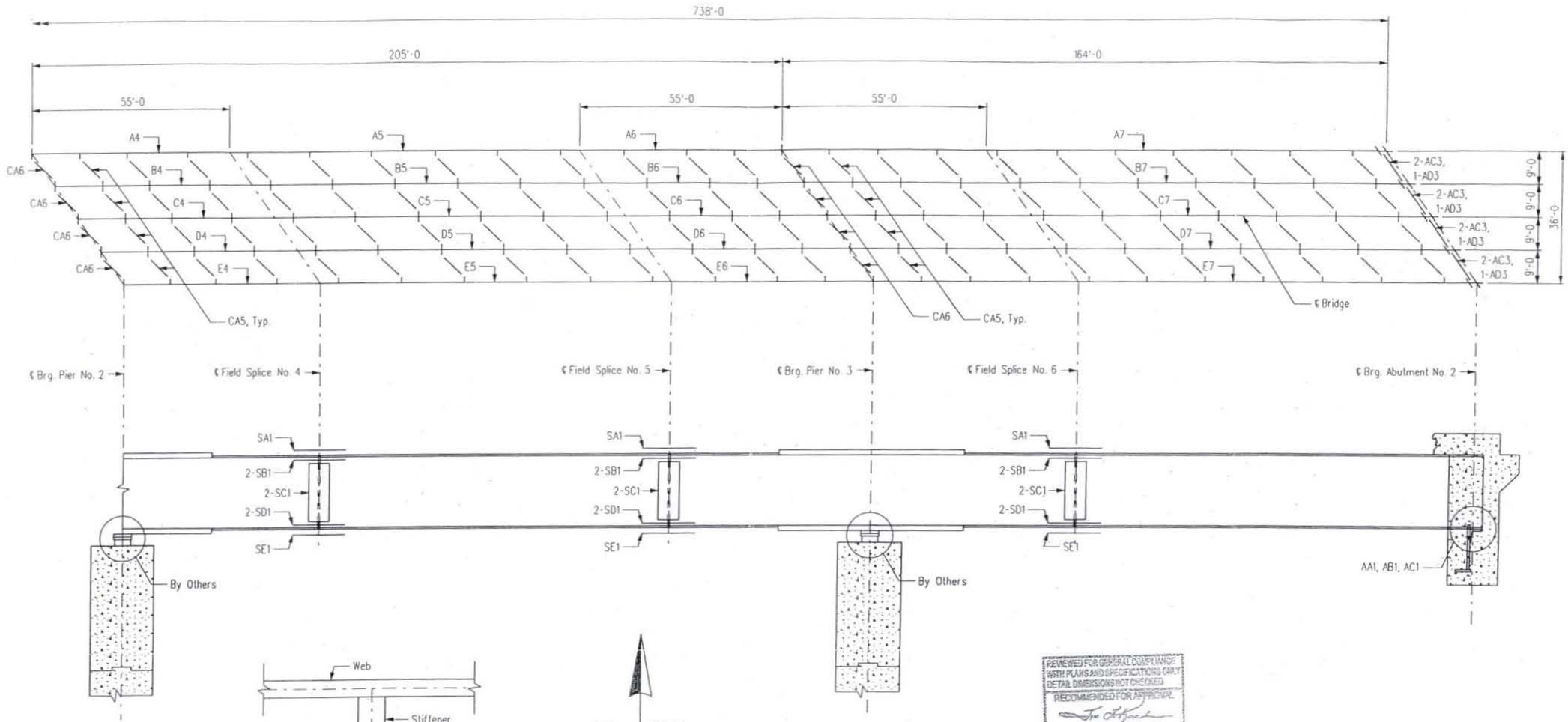
REVISIONS

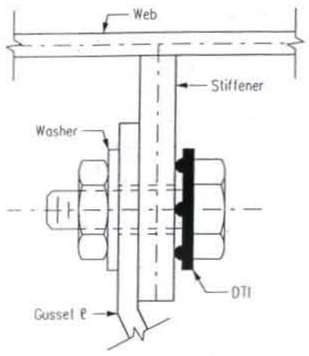
NO.	DESCRIPTION	DATE REVISED	DATE APPROVED
-	-	-	-

CAPITAL CONTRACTORS, INC.
CAPITAL STEEL DIVISION, LINCOLN, NE
1001 H. 9TH STREET, P.O. BOX 80068, ZIP 68501, PH. (402) 476-1001

STRUCTURE NUMBER:	
APPROVAL DATE:	CONTRACTOR: JAM CONRON & SON
O.S. OR NOTES	STRUCTURE: 164'-2 @ 205'-164' CONT. COMP. WEATHERING STEEL WELDED PLATE GIRDERS (WWCC)
DESIGN NO.:	LOCATION: K-152 OVER THE MARAIS DES CYGNES RIVER
WELD: AS NOTED	CUSTOMER: KANSAS DEPARTMENT OF TRANSPORTATION
PAINT: SEE NOTES	PROJECT: 152-54 KA-0197-01 / COUNTY: LINN
DRAWN: 11-12-07 R. AVERY	STATION: 380 + 45.90 / ROADWAY: 40'-0
CHECKED: DWC 2-4-2008	LOADING: HL-93 / SKEW: 35° LAB
BRIDGE NO.: 152-54-7.92 (074)	SHEET NO.: E1 OF 2 / ORDER NO.: 35318W

6/15





Bolt Detail

SUPERSTRUCTURAL STEEL ERECTION LAYOUT

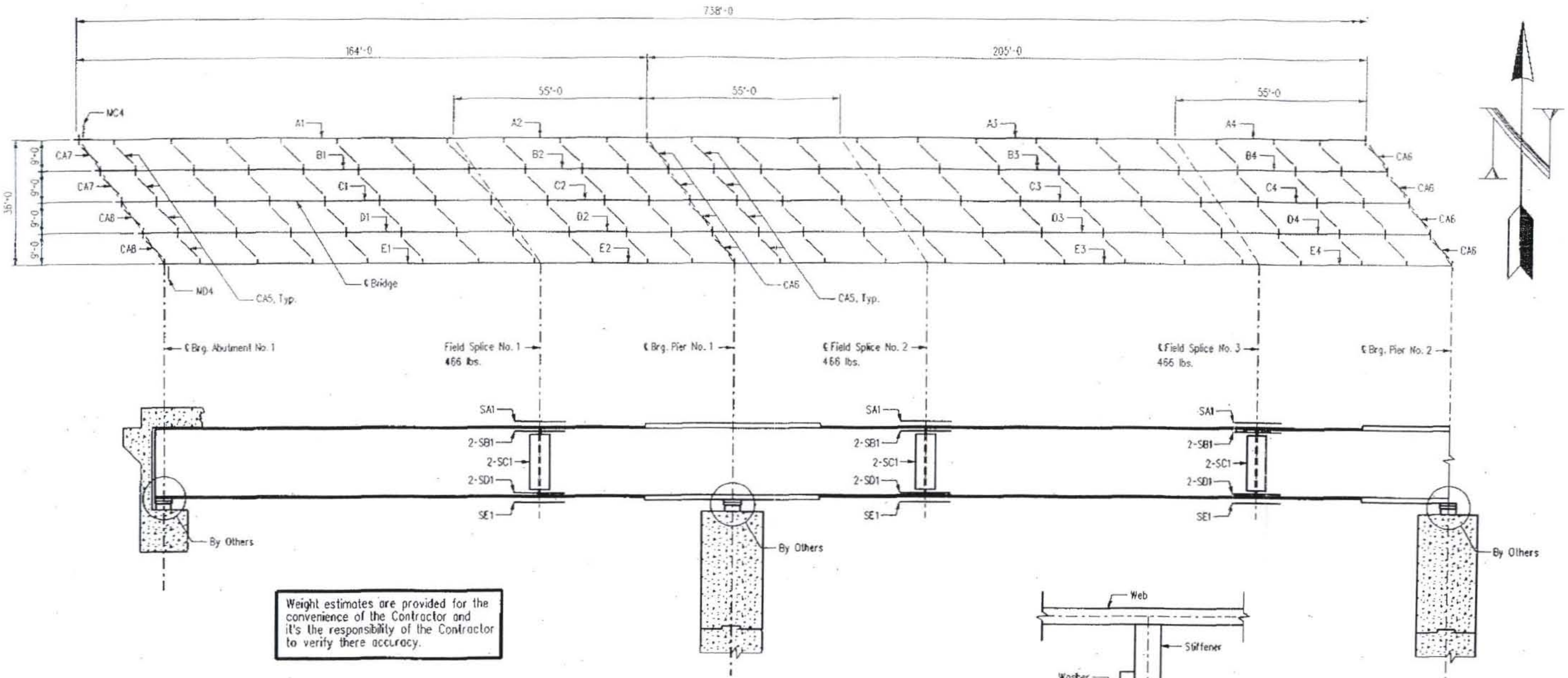
REVIEWED FOR GENERAL COMPLIANCE WITH PLANS AND SPECIFICATIONS ONLY. DETAIL DIMENSIONS NOT CHECKED.
RECOMMENDED FOR APPROVAL
Chief of Bureau of Design
APPROVED
Assistant Secretary and State Transportation Engineer
MAR 25 2008

REVISIONS			
NO.	DESCRIPTION	DATE REVISED	DATE APPROVED
-	-	-	-

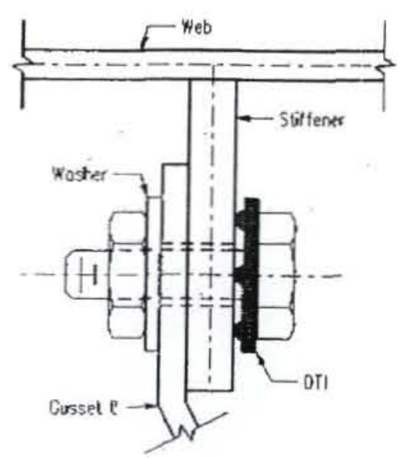
CAPITAL CONTRACTORS, INC.
CAPITAL STEEL DIVISION, LINCOLN, NE
1001 H. 9TH STREET, BOX 80898, ZIP 68501, PH. (402) 476-1001

STRUCTURE NUMBER:	
APPROVAL DATE:	CONTRACTOR: J&J COMRON & SON
F.I.R. O.K. OR NOTED	STRUCTURE: 164'-2 @ 205'-164' CONT. COMP. WEATHERING STEEL WELDED PLATE GIRDERS (NWCC)
DESIGN NO.:	LOCATION: K-152 OVER THE MARAIS DES CYGNES (RMR)
WELDS: AS NOTED	CUSTOMER: KANSAS DEPARTMENT OF TRANSPORTATION
PAINT: SEE NOTES	PROJECT: 152-54 KA-0187-01 / COUNTY: LINN
DRAWN: 10-12-07 R. AVERY	STATION: 380 + 45.90 / SKEW/RAD: 40°-0
CHECKED: DWC 2-4-2008	LOADING: HL-93 / SIZE: 39" LHB
BRIDGE NO.: 152-54-7.92 (0741)	SHEET NO.: E2 OF 2 / ORDER NO.: Y536W

7/15



Weight estimates are provided for the convenience of the Contractor and it's the responsibility of the Contractor to verify there accuracy.



Bolt Detail

SUPERSTRUCTURAL STEEL ERECTION LAYOUT

	Mark	Quantity	Weight	Total Weight
Abutment Beam Supports:	AA1	5	57 lbs.	285 lbs.
	AB1	5	36 lbs.	180 lbs.
	AC1	5	36 lbs.	180 lbs.
Crossframes:	CA5	176	390 lbs.	68,640 lbs.
	CA6	12	456 lbs.	5,472 lbs.
	CA7	2	998 lbs.	1,996 lbs.
	CA8	2	998 lbs.	1,996 lbs.
Field Bolts:				7,698 lbs.
Total Weight:				86,447 lbs.

	Mark	Wieght	Length		Mark	Wieght	Length
Girder:	A1	28,199 lbs.	110'-3 1/16	Girder:	A3	24,115 lbs.	94'-11 3/4
	B1	28,738 lbs.	110'-3 1/16		B3	24,577 lbs.	94'-11 3/4
	C1	28,738 lbs.	110'-3 1/16		C3	24,577 lbs.	94'-11 3/4
	D1	28,738 lbs.	110'-3 1/16		D3	24,577 lbs.	94'-11 3/4
	E1	28,199 lbs.	110'-3 1/16		E3	24,115 lbs.	94'-11 3/4
	A2	39,618 lbs.	109'-11 15/16		A4	39,618 lbs.	109'-11 3/4
	B2	40,080 lbs.	109'-11 15/16		B4	40,080 lbs.	109'-11 3/4
	C2	40,080 lbs.	109'-11 15/16		C4	40,080 lbs.	109'-11 3/4
	D2	40,080 lbs.	109'-11 15/16		D4	40,080 lbs.	109'-11 3/4
	E2	39,618 lbs.	109'-11 15/16		E4	39,618 lbs.	109'-11 3/4

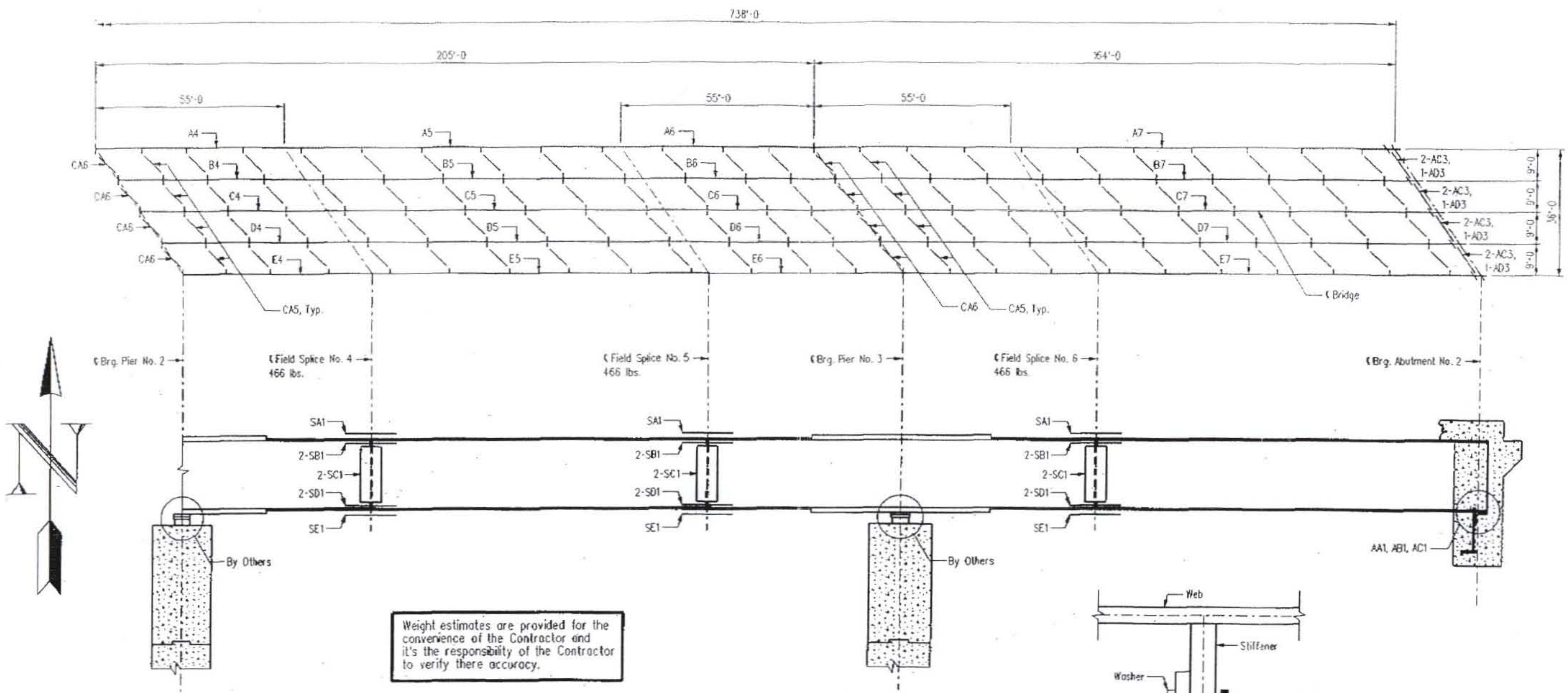
REVISIONS			
No.	Description	Date Revised	Date Approved
-	-	-	-

CAPITAL CONTRACTORS, INC.

CAPITAL STEEL DIVISION, LINCOLN, NE

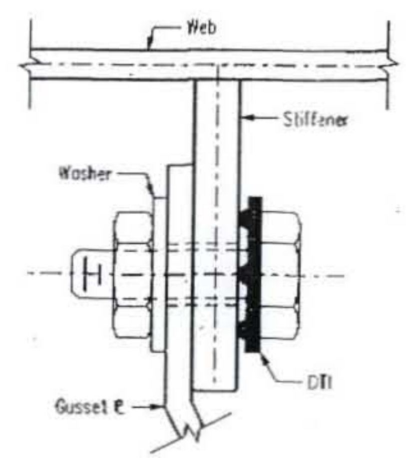
3-25-2008	Contractor: [illegible] CONROY & SON	
AS NOTED	Structure: 164'-0 & 205'-0 CONT. COMP. WEATHERING STEEL WELDED PLATE GIRDERS	
	Location: K-152 OVER THE MARAIS DES CYGNES RIVER	
AS NOTED	Customer: KANSAS DEPARTMENT OF TRANSPORTATION	
SEE NOTES	Project: 152-54 KA-0197-01	County: LINN
5-12-07 R. AVERY	Station: 380 + 45.90	Roadway: 40'-0
DWC 2-4-2008	Loading: HL-93	Skew: 35° LHB
152-54-7.32 (074)	Sheet No.: E1 of 2	Order No.: 15309

8/15



Weight estimates are provided for the convenience of the Contractor and it's the responsibility of the Contractor to verify there accuracy.

SUPERSTRUCTURAL STEEL ERECTION LAYOUT



Bolt Detail

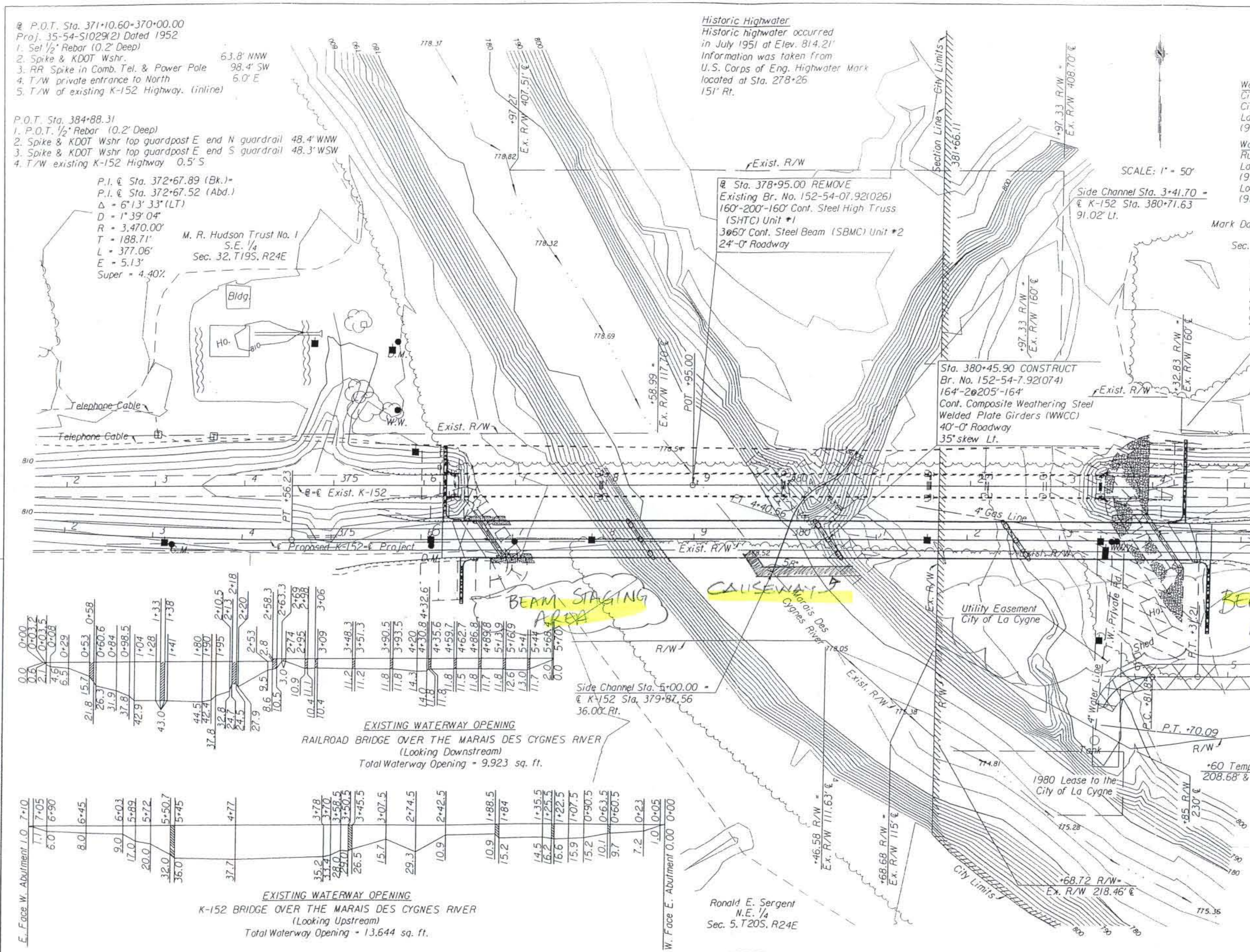
	Mark	Wieght	Length		Mark	Wieght	Length
Girder:	A4	39,618 lbs.	109'-11 3/4	Girder:	A6	39,618 lbs.	109'-11 3/4
	B4	40,080 lbs.	109'-11 3/4		B6	40,080 lbs.	109'-11 3/4
	C4	40,080 lbs.	109'-11 3/4		C6	40,080 lbs.	109'-11 3/4
	D4	40,080 lbs.	109'-11 3/4		D6	40,080 lbs.	109'-11 3/4
	E4	39,618 lbs.	109'-11 3/4		E6	39,618 lbs.	109'-11 3/4
	A5	24,115 lbs.	94'-11 3/4		A7	28,572 lbs.	110'-3 1/16
	B5	24,577 lbs.	94'-11 3/4		B7	29,111 lbs.	110'-3 1/16
	C5	24,577 lbs.	94'-11 3/4		C7	29,111 lbs.	110'-3 1/16
	D5	24,577 lbs.	94'-11 3/4		D7	29,111 lbs.	110'-3 1/16
	E5	24,115 lbs.	94'-11 3/4		E7	28,572 lbs.	110'-3 1/16

REVISIONS			
NO.	DESCRIPTION	MADE BY	DATE APPROVED
-	-	-	-

CAPITAL CONTRACTORS, INC.
CAPITAL STEEL DIVISION, LINCOLN, NE

Approval Date: 3-25-2006	Contractor: AM COHRON & SON
SCALE: AS NOTED	Customer: KANSAS DEPARTMENT OF TRANSPORTATION
Paint: SEE NOTES	Project: 152-54 KA-0157-01
Drawn: 5-12-07 R. AVERY	Station: 380 - 45.90
Checked: DMC 2-4-2008	Loading: HL-93
Sheet No.: E2 of 7	Order No.: 31309

9/15


℄ P.O.T. Sta. 371+10.60=370+00.00
Proj. 35-54-S1029(2) Dated 1952
1. Set 1/2" Rebar (0.2' Deep)
2. Spike & KDOT Wshr. 63.8' NNW
3. RR Spike in Comb. Tel. & Power Pole 98.4' SW
4. T/W private entrance to North 6.0' E
5. T/W of existing K-152 Highway. (inline)
P.O.T. Sta. 384+88.31
1. P.O.T. 1/2" Rebar (0.2' Deep)
2. Spike & KDOT Wshr top guardpost E end N guardrail 48.4' WNW
3. Spike & KDOT Wshr top guardpost E end S guardrail 48.3' WSW
4. T/W existing K-152 Highway 0.5' S
P.I. ℄ Sta. 372+67.89 (Bk.)=
P.I. ℄ Sta. 372+67.52 (Ahd.)
Δ = 6°13' 33" (LT)
D = 1°39' 04"
R = 3,470.00'
T = 188.71'
L = 377.06'
E = 5.13'
Super = 4.40%
M. R. Hudson Trust No. 1
S.E. 1/4
Sec. 32, T19S, R24E
Historic Highwater
Historic highwater occurred in July 1951 at Elev. 814.21'
Information was taken from U.S. Corps of Eng. Highwater Mark located at Sta. 278+26 151' Rt.
℄ Sta. 378+95.00 REMOVE
Existing Br. No. 152-54-07.92(026)
160'-200'-160' Cont. Steel High Truss (SHTC) Unit #1
3@60' Cont. Steel Beam (SBMC) Unit #2
24'-0" Roadway
Sta. 380+45.90 CONSTRUCT
Br. No. 152-54-7.92(074)
164'-2@205'-164'
Cont. Composite Weathering Steel Welded Plate Girders (WWCC)
40'-0" Roadway
35° skew Lt.
SCALE: 1" = 50'
Side Channel Sta. 3+41.70 =
℄ K-152 Sta. 380+71.63
91.02' Lt.
Side Channel Sta. 5+00.00 =
℄ K-152 Sta. 379+87.56
36.00' Rt.
Mark David Stevermer, ETAL
S.W. 1/4
Sec. 33, T19S, R24E
P.I. ℄ Sta. 387+22.52 (Bk.) =
P.I. ℄ Sta. 387+21.98 (Ahd.)
Δ = 9° 35' 35" (LT)
D = 4°10' 56"
R = 1,370.00'
T = 114.96'
L = 229.38'
E = 4.81'
Super = 4.00%
UTILITY OWNERS
Water, Gas and Sanitary Sewer:
City of La Cygne
City Hall, P.O. Box 600
La Cygne, KS 66040
(913) 757-2314
Water:
Rural Water District #3
La Cygne, KS 66040
(913) 757-2099
Locator: Paula McQuire
(913) 285-0671
Telephone Lines:
Peoples Communications
208 N. Broadway
La Cygne, KS 66040
(913) 757-2500
Fiber Optic Lines:
Quest Communications
(800) 283-4237
REVISED PLANS
Section Line
City Limits
Exist. R/W
Telephone Cable
Bldg.
Ho.
Exist. K-152
Proposed K-152-℄ Project
℄ Proposed Bridge
4" Gas Line
Ex. 24"x20" CMP
Marais Des Cygnes River
BEAM STAGING AREA
CAUSEWAY
BEAM STAGING AREA
Utility Easement
City of La Cygne
1980 Lease to the City of La Cygne
4" Water Line
T.W. Private Rd.
Tank
Shed
+60 Temp. Esmt.
208.68' & 230' ℄
+50 Temp. Esmt.
197.72' & 220' ℄
George Hecke
N.W. 1/4
Sec. 4, T20S, R24E
Ronald E. Sergent
N.E. 1/4
Sec. 5, T20S, R24E
+68.72 R/W=
Ex. R/W 218.46' ℄
EXISTING WATERWAY OPENING
RAILROAD BRIDGE OVER THE MARAIS DES CYGNES RIVER
(Looking Downstream)
Total Waterway Opening = 9.923 sq. ft.
EXISTING WATERWAY OPENING
K-152 BRIDGE OVER THE MARAIS DES CYGNES RIVER
(Looking Upstream)
Total Waterway Opening = 13.644 sq. ft.
E. Face W. Abutment
W. Face E. Abutment
Plotted By: mlaroche
File: 01970l-074-01.dgn (01970l-074-01)
Plot Date: 29-MAY-2008 08:33
Plot Location: Bridge Design

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	152-54 KA-0197-01	2007	36R	135

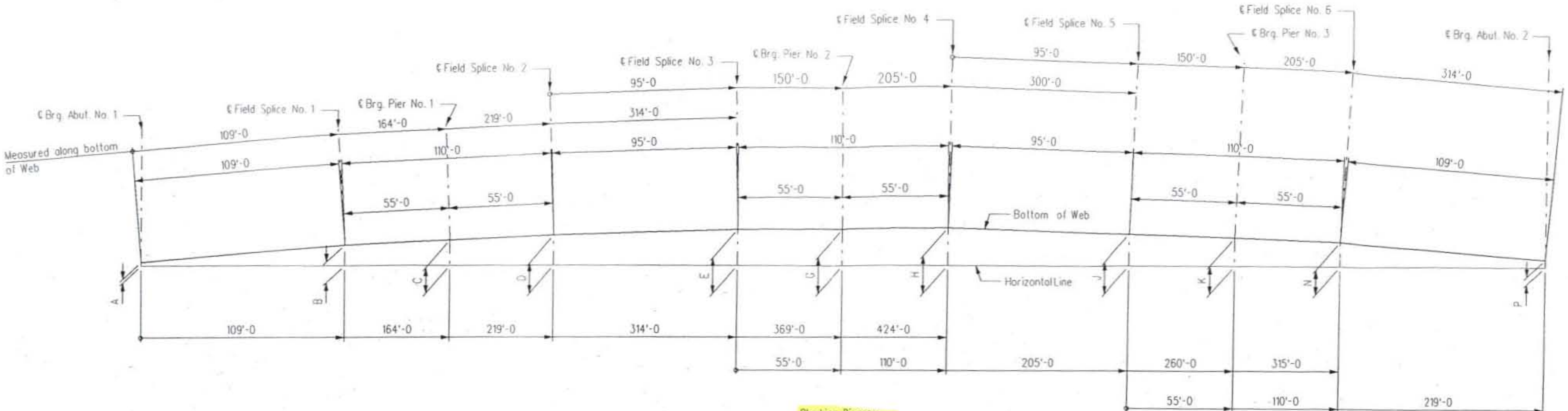
NO.	DATE	REVISIONS	BY	APP'D
3				
2				
1	5/29/08	Replace incorrect sheet in plans	MLL	KFH

KANSAS DEPARTMENT OF TRANSPORTATION
Br. No. 152-54-7.92 (074) Sta. 380+45.90
CONTOUR MAP
K-152 over the
Marais Des Cygnes River
Proj. No. 152-54 KA-0197-01 Linn Co.

SHEET NO. OF	SCALE	APP'D	
DESIGNED NJM	DETAILED NJM	QUANTITIES NJM	CADD RCJ
DESIGN CK. MLL	DETAIL CK. MLL	QUAN. CK. KMC/MLL	CADD CK. NJM

Sheet No. 36R

10/15



Blocking Diagram

-NOTES-

All steel shall be A.S.T.M. A709 Grade 50W. Steel marked thus ◒ shall conform to the requirements of A.A.S.H.T.O. M270 Grade 50WT3 and shall meet the longitudinal charpy V-notch test of 15 ft./lbs. @ 10°F.

Web plates shall be cut to camber using the "Automatic Torch" with a mechanical guide. See shop drawings for details.

All flange plate and web plate butt-welded splices shall be completely welded separately by the "Submerged Arc Process" or by the "Shielded Metal Arc Process" before assembly in girders.

Flange plate to web plate welds shall be by the "Automatic Submerged Arc Welder." All other welds shall be by the "Submerged Arch Process," "Flux-Cored Arc Process," or by the "Shielded Metal Arc Process," using E7018, or E7028 electrodes.

Flange plate butt-welded splices shall be inspected by using the "Radiographic Test" by the Fabricator.

All welding shall be done in accordance with the standard specifications and shall conform to the American Welding Society and A.A.S.H.T.O. joint publication D1.5-02 and approved Capital Steel welding procedures.

The turned element of secondary bolted connection are to be placed on the member side, with the non-turned element on the stiffener side of the connection (See the bolting detail on sheet E1). This does not apply to Abutment *2 connections as oversized holes are not used at this location.

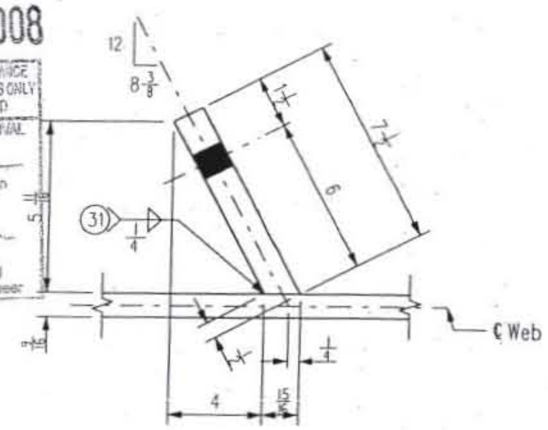
All surfaces to be painted shall be blast-cleaned in accordance with Steel Structures Painting Council Specifications SSPC-SP10. Apply one coat of Inorganic Zinc-Silicate primer with a dry film thickness a minimum of 3.0 mils. Prime paint girder ends as designated, abutment diaphragms, girder supports, and all splice plates as designated. Prime paint all top of top flanges and studs. The facia side of the exterior girders are to be painted the entire length.

-CLEANING OF WEATHERING STEEL-

All surfaces of girders, including splice plates and the contact surfaces of all bolted splices, shall be blast-cleaned in accordance with "Steel Structures Painting Council Specification" SSPC-SP6, commercial blast-cleaning. Such Cleaning shall remove all rust, mill scale, paint, and other markings, dirt and all other foreign materials. The cleaning shall produce a uniformly clean bare metal surface with only slight shadows, streaks, or discolorations from rust and mill scale oxides remaining. Before blast-cleaning operations begin, all grease, oil, and paint shall be removed by suitable solvents. All other steel surfaces(except those specified to be metalized or galvanized) shall be cleaned only to the extent necessary to remove oil, grease and dirt.

DIMENSION	A	B	C	D	E	G	H	J	K	N	P
Girder A	0	1'-0	1'-1	1'-5 15/16	1'-9	1'-7 3/8	1'-9 7/16	1'-7 3/16	1'-2 11/16	1'-2 1/8	3
Girder B	0	11 13/16	1'-0 3/4	1'-5 9/16	1'-8 1/2	1'-6 3/4	1'-8 3/4	1'-6 5/16	1'-1 3/4	1'-1 1/16	1 13/16
Girder C	0	11 5/8	1'-0 1/2	1'-5 1/4	1'-8	1'-6 3/16	1'-8 1/16	1'-5 7/16	1'-0 13/16	1'-0 1/16	9/16
Girder D	5/8	1'-0 1/8	1'-0 7/8	1'-5 1/2	1'-8 1/8	1'-6 3/16	1'-8	1'-5 1/4	1'-0 1/2	11 5/8	0
Girder E	1 7/8	1'-1 1/8	1'-1 13/16	1'-6 3/8	1'-8 13/16	1'-6 13/16	1'-8 1/2	1'-5 5/8	1'-0 3/4	11 13/16	0

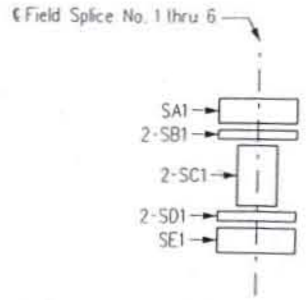
MAR 25 2008
REVIEWED FOR GENERAL COMPLIANCE WITH PLANS AND SPECIFICATIONS ONLY DETAIL DIMENSIONS NOT CHECKED
RECOMMENDED FOR APPROVAL
Chief of Bureau of Design
APPROVED
Assistant Secretary and State Transportation Engineer



Skewed Stiffener Detail: KG2, KH2, KJ2, KK6, KS6, KR6, KU2
(Stiffener KG2 has no holes)

FIELD BOLT LIST

NUMBER	DIA.	DESCRIPTION	LGTH.	CONNECTION	ADD.	SHIP
2816	3/4⌀	A325-3 Hvy. Hex, Hd.	2 1/4	Intermediate Crossframes to Stiffener	144	2960
155	3/4⌀	A325-3 Hvy. Hex, Hd.	2 1/2	Abutment Crossframes to Stiffeners	10	165
240	3/4⌀	A325-3 Hvy. Hex, Hd.	2 1/4	Pier Crossframes to Stiffeners	15	255
3211	3/4⌀	A563-DH3 Hvy. Hex, Hd.	-	One at each 3/4⌀ bolt	169	3380
3211	3/4⌀	F436-3 Str. Washer	-	One at each 3/4⌀ bolt	169	3380
3211	3/4⌀	DTI's	-	One at each 3/4⌀ bolt	169	3380
2640	7/8⌀	A325-3 Hvy. Hex, Hd.	2 3/4	Web Splice	135	2775
10	7/8⌀	A325-3 Hvy. Hex, Hd.	3	Abutment Beam Supports	5	15
1680	7/8⌀	A325-3 Hvy. Hex, Hd.	3 1/2	Top & Bottom Flange Splice	85	1765
4330	7/8⌀	A563-DH3 Hvy. Hex, Hd.	-	One at each 7/8⌀ bolt	225	4555
4330	7/8⌀	F436-3 Str. Washer	-	One at each 7/8⌀ bolt	225	4555
4330	7/8⌀	DTI's	-	One at each 7/8⌀ bolt	225	4555
-	-	-	-	-	-	-



MATCH MARK ILLUSTRATION

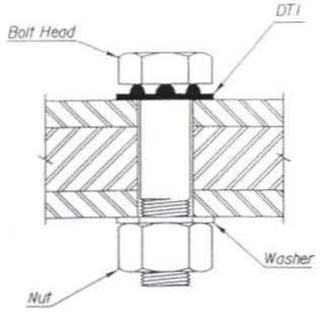
REVISIONS			
NO.	DESCRIPTION	DATE REVISED	DATE APPROVED

CAPITAL CONTRACTORS, INC.
CAPITAL STEEL DIVISION, LINCOLN, NE

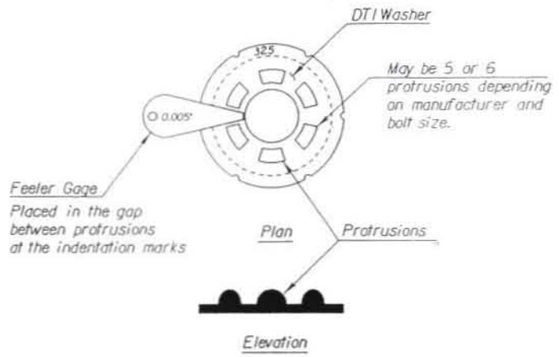
STRUCTURE NUMBER:		
APPROVAL DATE:	CONTRACTOR: WM COHRON & SON	
STRUCTURE: 164'-2 @ 205'-164' CONT. COMP. WEATHERING STEEL WELDED PLATE GIRDERS (WWGC)		
DESIGN NO.:	LOCATION: K-152 OVER THE MARAIS DES CYGNES RIVER	
WELDS: AS NOTED	CUSTOMER: KANSAS DEPARTMENT OF TRANSPORTATION	
PAINT: SEE NOTES	PROJECT: 152-54 KA-0197-01	COUNTY: LINN
DRAWN: 11-12-07 R. AVERY	STATION: 380 + 45.90	ROADWAY: 40'-0
CHECKED: DWC 2-4-2008	LOADING: HL-93	SKEW: 35° LHB
BRIDGE NO.: 152-54-7.92 (074)	SHEET NO.: 9 OF 14	ORDER NO.: 3536W

11/15

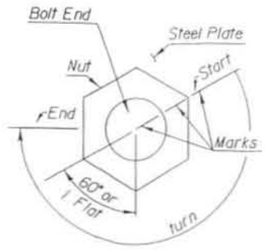
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	152-54 KA-0197-01	2007	55	135



TYPICAL BOLT AND
DIRECT TENSION INDICATOR (DTI)

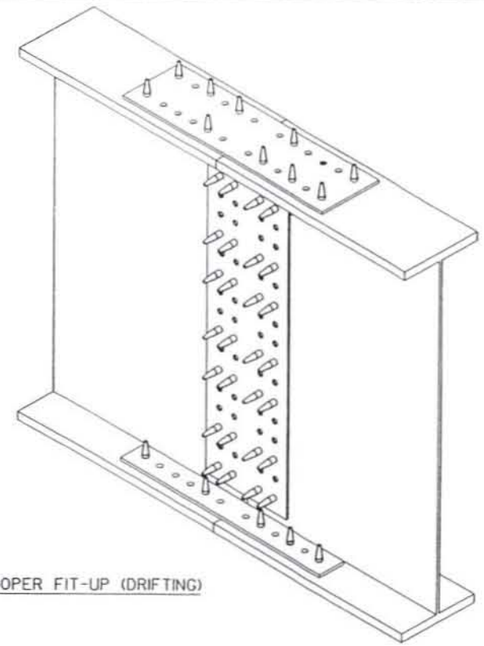


TYPICAL DIRECT TENSION INDICATOR (DTI)

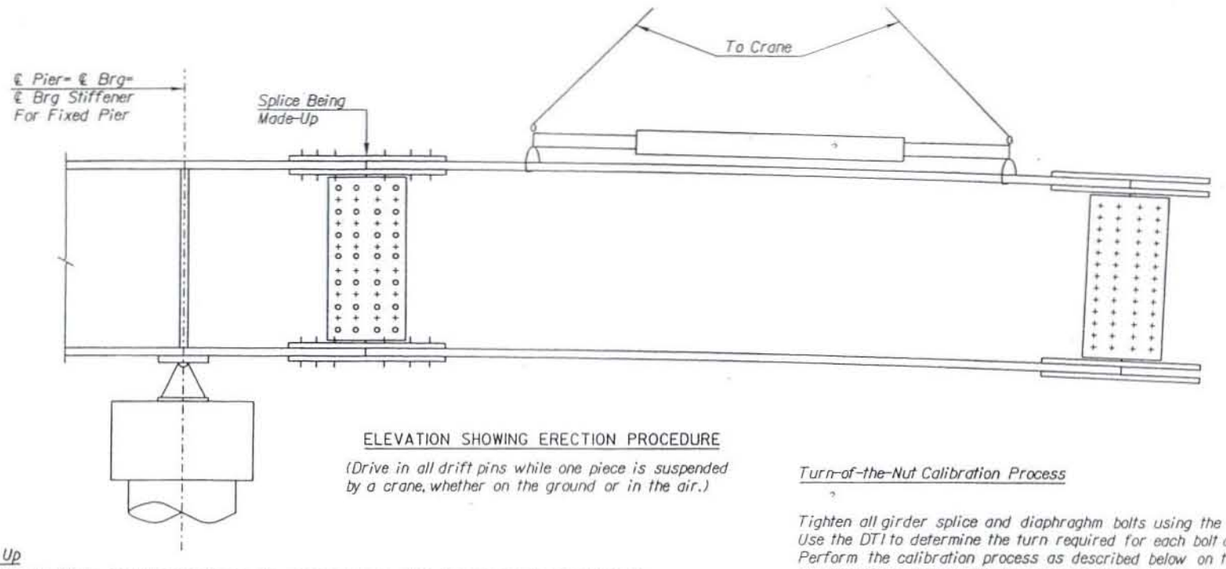


REQUIRED MARKING DETAIL

(shows calibrated turn = 3½ flats from snug tight condition). Example only, calibrated turn may be more or less than shown.



PROPER FIT-UP (DRIFTING)



ELEVATION SHOWING ERECTION PROCEDURE

(Drive in all drift pins while one piece is suspended by a crane, whether on the ground or in the air.)

Drift Pin Diameter - Hole Diameter
Hole ø - 15/16" for girder splice
Hole ø - 13/16" for X-frame or diaphram connection.

DRIFT PIN

Fit Up

During the fit up, install drift pins in all corner bolt holes, plus 25 percent of the bolt holes (as a min.), evenly distributed throughout the splice. Fill at least 25 percent of the bolt holes with high strength bolts. Fully tighten these bolts by the calibrated turn-of-the-nut method before removing any drift pins or moving the members. These bolts may be either erection bolts or production bolts. Erection bolts are used during fit up, to compress the plies of the splice to achieve a snug condition. Erection bolts are the property of the Contractor and do not remain in the bridge permanently. Erection bolts must be A325, and can be reused. Erection bolts are required when the abutting plates are of different thickness and no fill plate is provided. This situation usually results in a slight bending of the splice plates. If erection bolts are not used, the DTI's may fully compress before the plates are in firm contact. This would be cause for rejecting the splice. Clearly mark the erection bolts so that they are not left in the splice.

Erection

Two independent crews will survey the bearing seat elevations. The Engineer will verify that the results of those surveys show that the bearing seat elevations are within ± 1/4 inch of the plan elevations before erection begins. Use the blocking diagram, as shown on the shop drawings, when erecting the beams/girders on the ground. Do not lift the assembled pieces into position until at least 25 percent of the holes are filled with fully tightened bolts. Locate the centerline of the bearing stiffener with the centerline of bearing device. Secure the beams/girders to the top of the pier cap prior to placement of the bearing device anchor bolts.

Turn-of-the-Nut Calibration Process

Tighten all girder splice and diaphraghm bolts using the calibrated turn-of-the-nut method. Use the DTI to determine the turn required for each bolt diameter & length. Perform the calibration process as described below on the actual beam splice or using 3 plies of steel plate with the same thickness as the actual splice.

1. Bring at least 25 percent of the bolts in the splice to a "snug-tight-condition". "Snug tight condition" is defined as (with all plies in firm contact) "the full effort of a man on a spud wrench". Usually a smaller impact gun (1/2" drive) is used to snug the splice and a larger impact gun (1" drive) is used for final tigntening. This is preferred over the use of a spud wrench. Production bolting and calibration must use the same tools and lubricating procedures. If an impact wrench is used to "iron the plates" and snug the bolts for calibration, then an impact wrench must be used during the snugging process during production bolting.

2. See "Required Marking Detail" (choose a bolt at the center of the splice and recheck snug on adjacent bolts)
- *a. Mark the outside of the socket at one of the corners.*
- *b. Mark the bolt, plate, and nut at a corner with a start line.*
- *c. Align the mark on the socket with the start mark on the bolt end.*
- *d. While holding a backup wrench on the head of the bolt, turn the nut 1/2 turn (3 flats).*
- *e. Record the number of refusals.*
- *f. If all of the gaps refuse, go to another bolt and turn the nut 2 flats (1/3 turn).*
- *g. If there are fewer than 3 refusals turn the nut an additional 1/4 of a flat (15 degrees).*
- *h. Repeat step g, turning the nut 1/3 of a flat or less each time, until all of the gaps refuse the feeler gage. Record the amount required to cause all of the gaps to refuse the feeler gage. This is the target rotation.*

3. Repeat this process for each bolt diameter and length.

Production Bolt Tightening

1. Install bolts and tighten to "snug tight" in a pattern, starting at the center of the splice and working toward the edge. On large girders this may have to be done twice, as the center bolts will become loose as plates are "ironed out". This step is important because typically, any variation in results during production bolting is the result of a change in the materials, lubricant or equipment used to take the bolts to a "snug tight" condition during the calibration process.

2. Mark all of the bolts, nuts and the plate as shown in the marking detail. Mark the socket with a start and stop point. The stop point corresponds to the target rotation determined earlier.

3. Align the start mark on the socket with the line on the plate. While the bolt is being backed up, turn the nut until the stop mark on the socket lines up with the start mark on the plate.

4. Repeat with all bolts of the same length in the splice.

Acceptance and Rejection of Bolts

1. The Engineer will check all bolts with a feeler gage.

2. All nuts must be turned at least the target rotation beyond "snug tight".

3. All DTI's must have at least 3 refusals of the 0.005" gage.

4. If all gaps refuse the 0.005" gage, and the nut, plate and bolt are not marked, reject the bolt.

5. If all gaps refuse the 0.005" gage, and the turned element has not been rotated more than 45° beyond the calibrated turn, accept the bolt.

6. If all gaps refuse the 0.005" gage, and the turned element has been rotated more than 45° beyond the calibrated turn, reject the bolt.

For additonal information see the structural steel section of the Bridge Construction Manual.

Suggested Impact wrench models:
CP 611
IR 2940
Cleco WS2110
ATP 1011/1040
Norbar PTI500

NO.	DATE	REVISIONS	BY	APP'D
3				
2				
1				

KANSAS DEPARTMENT OF TRANSPORTATION
Br. No. 152-54-7.92 (074) Sta. 380+45.90

STEEL ERECTION FIT-UP
And Bolting Procedure

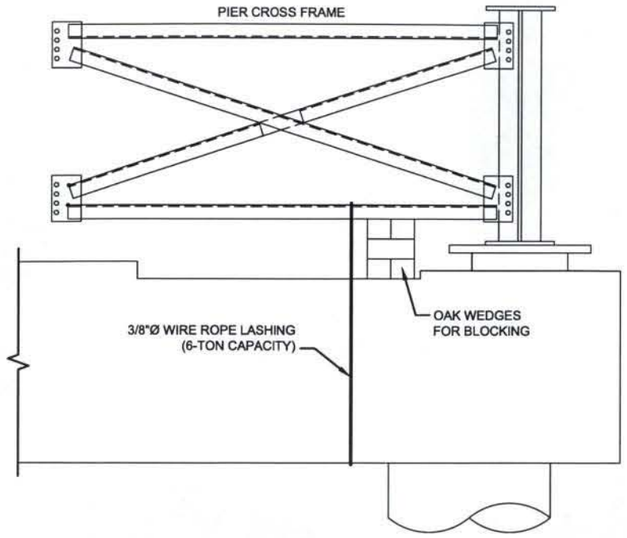
Proj. No. 152-54 KA-0197-01 Linn Co.

SHEET NO. OF	SCALE	APP'D	
DESIGNED	DETAILED	QUANTITIES	CADD
DESIGN CK.	DETAIL CK.	QUAN. CK.	CADD CK.

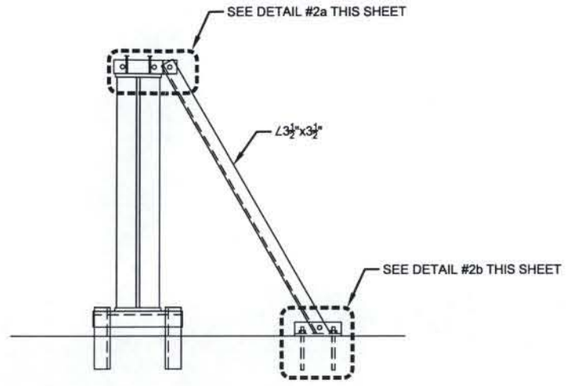
12/15

Plotted By: nathonm | Plot Location: Bridge Design
File: 0197O1-074-43.dgn (0197O1-074-43)
Plot Date: 22-JUN-2007 09:12

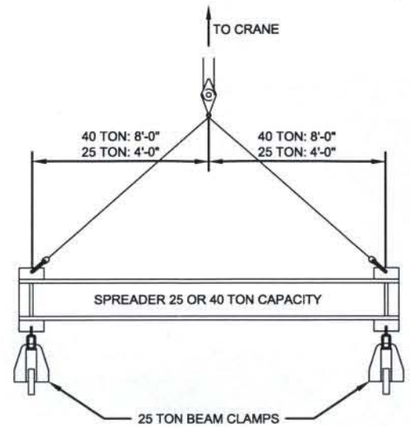
PRE-QUALIFIED ERECTION SUPERVISOR:
BJ HARLAN



1 DETAIL
TYPICAL TIE DOWN AT PIER NO. 1,2, & 3
SCALE: N.T.S.



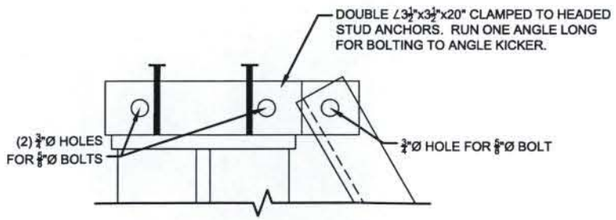
2 DETAIL
TYPICAL TIE DOWN AT ABUTMENTS AND BENTS
SCALE: N.T.S.



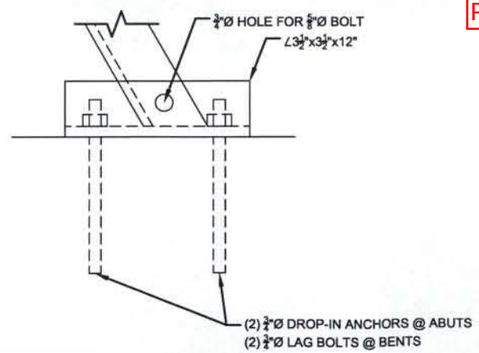
3 DETAIL
RIGGING
SCALE: N.T.S.

GENERAL NOTES

1. SPLICES ARE TO BE 25% BOLTED WITH BOLTS FULLY TIGHTENED BEFORE CRANE RELEASES THE GIRDER.
2. CROSS FRAME CONNECTIONS AS DESIGNATED ARE TO BE 50% BOLTED BETWEEN EACH PAIR OF GIRDERS BEFORE ERECTING NEXT GIRDER.
3. GIRDER PLACEMENT NO. 1-4, 11-14, AND 21-24, AS A MINIMUM, SHALL BE COMPLETE AT THE END OF THE WORK DAY. OTHER GIRDER PLACEMENTS SHALL HAVE THE DESIGNATED CROSS FRAMES IN PLACE AT THE END OF THE WORK DAY. NO GIRDER SHALL BE RELEASED THAT DOES NOT HAVE THE FIELD SPLICES 25% BOLTED WITH FULLY TIGHTENED BOLTS AND DESIGNATED CROSS FRAMES 50% BOLTED AT THE END OF THE WORK DAY.
4. NO WORK SHALL BE PERFORMED IF WIND GUSTS EXCEED 20 MPH.
5. NO CRANE WILL BE OPERATED IN A MANNER THAT WILL EXCEED ITS RATED CAPACITY AT ANY RADIUS AS SPECIFIED BY THE CRANE MANUFACTURER.
6. BEAM PICK LOCATIONS SHOWN ARE APPROXIMATE. IT MAY BE NECESSARY FOR THE CONTRACTOR TO SLIGHTLY ALTER BEAM PICK LOCATIONS.
7. SEE SHOP DRAWINGS FOR FURTHER INFORMATION ON BEAM AND DIAPHRAGM DESIGNATIONS AND WEIGHTS.



2a DETAIL
TIE DOWN TOP ASSEMBLY
SCALE: N.T.S.



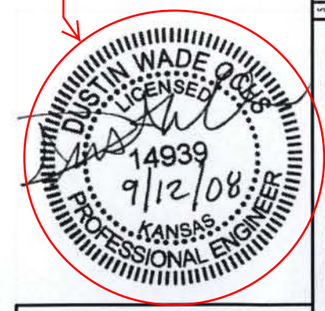
2b DETAIL
TIE DOWN BOTTOM ASSEMBLY
SCALE: N.T.S.

Recommendations to the Field

Date: Sep 15, 2008
Reviewer: Michelle LaRoche
☒ Recommended for Approval
☐ Recommended for Approval (As Noted in Red)
☐ Not Recommended for Approval

Except for Detail 3 which falls under the Field Operation Two category as defined in the KDOT Special Provision "Field Erection" and is reviewed by the Field Engineer.

Contractors PE Stamp



CONTRACTOR INFORMATION

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P.O. BOX 2304
20 WEAVER ST.
EMPORIA, KS 66801
PHONE: 620.342.4844
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620.343.6621 FAX 620.343.6622

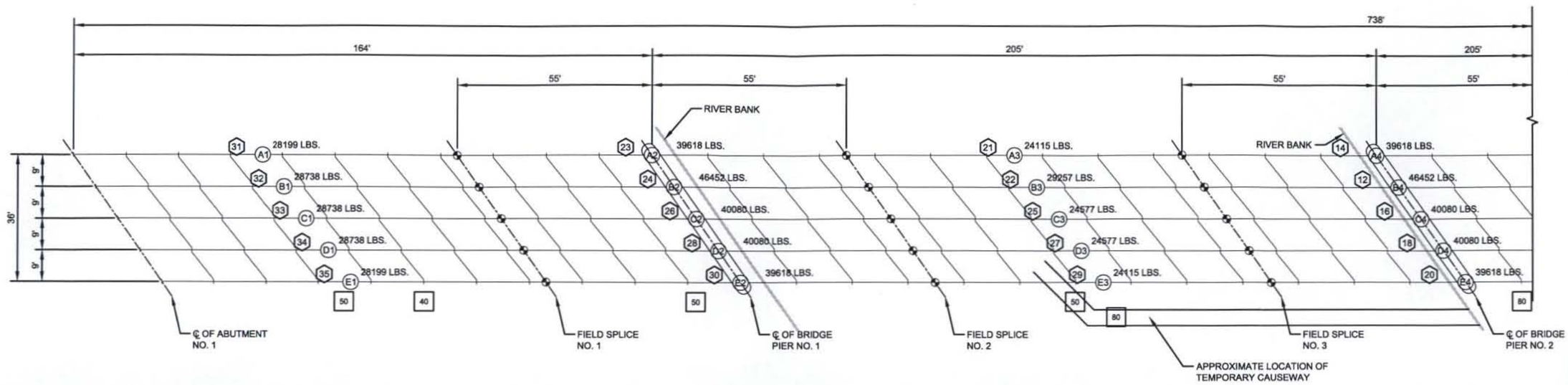
No.	Date	Revisions
5		
4		
3		
2		
1	09/12/2008	REVISIONS AS PER KDOT COMMENTS

ERECTION PROCEDURE
#152-54KA 0197-01
A.M. COHRON & SON

Date:	08/20/08
Designed:	DWO
Drawn:	AJW
Checked:	DWO
Approved:	
Proj. No.	08.032
Sheet No:	1

Drawing Path: Z:\Projects\2008\032_Cohron_Steel Erection Procedure\Steel Erection Procedure (09-05-2008).dwg
Plotted at: Sep 12, 2008 - 11:08am

13/15



1 DETAIL
STEEL ERECTION PROCEDURE
SCALE: 1" = 30'-0"

ERECTION PLAN - FIELD OPERATION DISCUSSIONS:

SEQUENCE 4: - SAME AS 1 - FOR BEAMS B5 AND B4

SEQUENCE 5: - SAME AS 2 - FOR BEAMS A5 AND A4

SEQUENCE 6: - SAME AS 3 - FOR BEAMS C5-E5 AND C4-E4

SEQUENCE 7:
- WITH 50-TON CRANE PICK AND POSITION BEAM A3. MAKE FIELD SPLICE #3 BETWEEN A3 AND A4. MAINTAIN POSITION.
- WITH 50-TON CRANE PICK AND POSITION BEAM A2 MAKE FIELD SPLICE #2 BETWEEN A2 AND A3. SECURE DIAPHRAGM CA6 AT PIER CAP. RELEASE CRANE FROM BEAM A2.
- WITH 80-TON CRANE PICK AND POSITION BEAM B3 WITH DIAPHRAGMS CA5 LOOSELY BOLTED TO BOTH SIDES OF BEAM. MAKE FIELD SPLICE #3 BETWEEN B3 AND B4. MAINTAIN POSITION.
- WITH 50-TON CRANE PICK AND POSITION BEAM B2 WITH DIAPHRAGMS CA5 LOOSELY BOLTED TO BOTH SIDES OF THE BEAM. MAKE FIELD SPLICE #2 BETWEEN B2 AND B3.
- CONNECT DIAPHRAGMS BETWEEN ROWS A AND B. RELEASE 50-TON CRANE ON BEAM A3, 80-TON CRANE ON BEAM B3 AND 50-TON CRANE ON BEAM B2.

SEQUENCE 8:
- WITH 80-TON CRANE PICK AND POSITION BEAM C3. MAKE FIELD SPLICE #3 BETWEEN C3 AND C4.
- WITH 50-TON CRANE PICK AND POSITION BEAM C2. MAKE FIELD SPLICE #2 BETWEEN C2 AND C3.
- BOLT-UP DIAPHRAGMS BETWEEN LINES B AND C. RELEASE 50-TON AND 80-TON CRANES.
- ATTACH DIAPHRAGMS TO THE SOUTH SIDE OF ROW C.
- REPEAT SAME SEQUENCE FOR LINES D AND E.

SEQUENCE 9:
- WITH 50-TON CRANE PICK AND POSITION BEAM A1. MAKE FIELD SPLICE #1 BETWEEN A1 AND A2. SECURE WEST END OF BEAM A1 AT ABUTMENT #1. RELEASE 50-TON CRANE.
- WITH 50-TON CRANE PICK AND POSITION BEAM B1. MAKE FIELD SPLICE #1 BETWEEN B1 AND B2. WITH 40-TON AUXILIARY CRANE INSTALL DIAPHRAGMS BETWEEN LINES A AND B. RELEASE THE 50-TON CRANE WHEN EVERY OTHER DIAPHRAGM HAS 50% OF THE BOLTS FULLY TIGHTENED.
- REPEAT SAME SEQUENCE FOR LINES C, D AND E.

Date: Sep 15, 2008
Reviewer: Michelle LaRoche
☒ Recommended for Approval
☐ Recommended for Approval (As Noted in Red)
☐ Not Recommended for Approval

Except those operations that fall under the Field Operation Two category as defined in the KDOT Special Provision "Field Erection" and is reviewed by the Field Engineer.

DUSTIN WADE OHS
LICENSED
14939
9/12/08
KANSAS
PROFESSIONAL ENGINEER

LEGEND	
	FIELD SPLICE
50	ERECTION SEQUENCE NUMBER
A3	BEAM DESIGNATION (APPROX. C.O.G.)
50	AMERICAN 5299 CRANE (50 TON)*
80	TEREX HC80 CRANE (80 TON)
40	AMERICAN 599 CRANE (40 TON)
23	AMERICAN 3999 CRANE (23 TON)

*NOTE: TWO ONSITE

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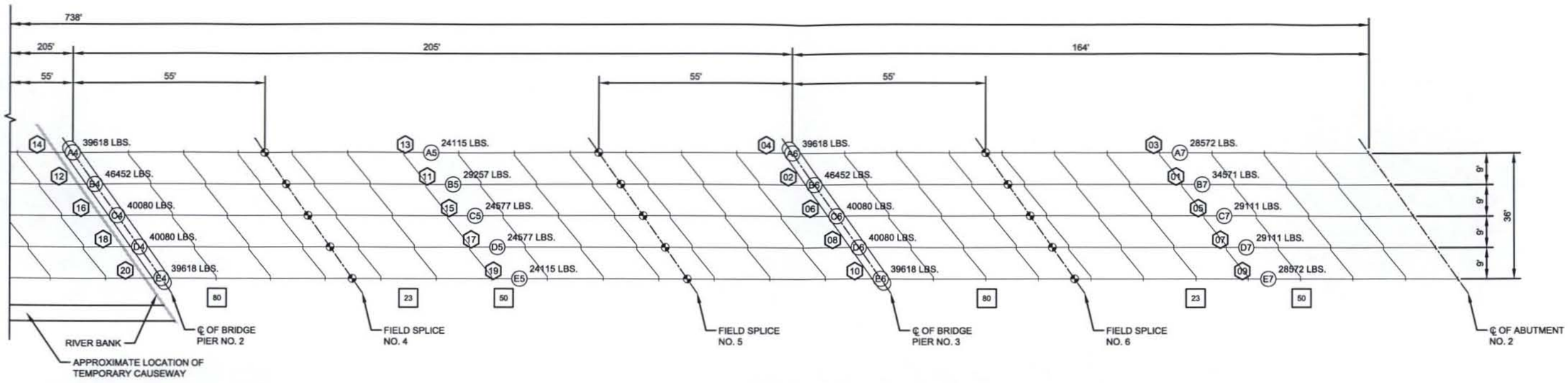
CK

No.	DWG	SEC
1	09/12/2008	REVISIONS AS PER KDOT COMMENTS
2		
3		
4		
5		

ERECTION PROCEDURE
#152-54KA 0197-01
A.M. COHRON & SON

Date:	08/20/08
Designed:	DWO
Drawn:	AFW
Checked:	DWO
Approved:	
Proj. No.	08.032
Sheet No:	2



1 **DETAIL**
STEEL ERECTION PROCEDURE
SCALE: 1" = 30'-0"

ERECTION PLAN - FIELD OPERATION DISCUSSIONS:

TRAFFIC CONTROL
- SINGLE LANE DROPS WILL BE IN PLACE AS/IF NECESSARY FOR DELIVERY OF BEAMS TO EITHER THE EAST OR WEST SIDE OF THE BRIDGE.
- NO TRAFFIC CONTROL WILL BE REQUIRED DURING ERECTION OF STRUCTURAL STEEL.

PICK AND PLACE:

SEQUENCE 1:
- WITH 50-TON CRANE, PICK AND POSITION BEAM B7 WITH DIAPHRAGMS CA5 LOOSELY BOLTED TO BOTH SIDES OF BEAM. SECURE BEAM B7 AT ABUTMENT #2. MAINTAIN POSITION.
- WITH 80-TON CRANE PICK AND POSITION BEAM B6 WITH DIAPHRAGMS CA5 LOOSELY BOLTED TO BOTH SIDES OF BEAM. MAKE FIELD SPLICE #6 BETWEEN THESE BEAMS. SECURE BEAM B6 AT PIER #3. MAINTAIN POSITION.
- POSITION 23-TON AUXILIARY CRANE JUST EAST OF SPLICE #6 AND PROVIDE VERTICAL STABILITY TO THE B6/B7 ASSEMBLY DURING SEQUENCE 2. RELEASE BEAM B7 FROM 50-TON CRANE AND B6 FROM 80-TON CRANE.

SEQUENCE 2:
- WITH 50-TON CRANE PICK AND POSITION BEAM A7.
- WITH 80-TON CRANE PICK AND POSITION BEAM A6. MAKE FIELD SPLICE #6. BOLT CA5 DIAPHRAGMS BETWEEN A6/A7 AND B6/B7.
- RELEASE ALL 3 CRANES WHEN EVERY OTHER DIAPHRAGM HAS 50% OF THE BOLTS FULLY TIGHTENED.

SEQUENCE 3:
- WITH 50-TON CRANE PICK AND POSITION BEAM C7/D7/E7 (1 LINE AT A TIME, JUST REPEAT 3 TIMES.)
- WITH 80-TON CRANE, PICK AND POSITION BEAM C6/D6/E6. MAKE FIELD SPLICE #6.
- USING 18-TON CRANE, PICK AND POSITION CA5 DIAPHRAGMS. RELEASE THE 50-TON AND 80-TON CRANES WHEN EVERY OTHER DIAPHRAGM HAS 50% OF THE BOLTS FULLY TIGHTENED.

SEQUENCE 4: - SAME AS 1 - FOR BEAMS B5 AND B4

SEQUENCE 5: - SAME AS 2 - FOR BEAMS A5 AND A4

SEQUENCE 6: - SAME AS 3 - FOR BEAMS C5-E5 AND C4-E4

Date: Sep 15, 2008
Reviewer: Michelle LaRoche
☒ Recommended for Approval
☐ Recommended for Approval (As Noted in Red)
☐ Not Recommended for Approval

Except those operations that fall under the Field Operation Two category as defined in the KDOT Special Provision "Field Erection" and are reviewed by the Field Engineer.

DUSTIN WADE OCHS
LICENSED
14939
9/12/08
KANSAS
PROFESSIONAL ENGINEER

LEGEND	
⊠	FIELD SPLICE
⑥	ERECTION SEQUENCE NUMBER
(A3)	BEAM DESIGNATION (APPROX. C.O.G.)
50	AMERICAN 5299 CRANE (50 TON)*
80	TEREX HC80 CRANE (80 TON)
40	AMERICAN 599 CRANE (40 TON)
25	AMERICAN 3999 CRANE (23 TON)

*NOTE: TWO ONSITE

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No.	Date	Description
1	09/12/2008	REVISIONS AS PER KDOT COMMENTS

ERECTION PROCEDURE
#152-54KA 0197-01
A.M. COHRON & SON

Date:	08/20/08
Designed:	DWO
Drawn:	APW
Checked:	DWO
Approved:	
Proj. No.	08.032
Sheet No:	3

15/15