

BRIDGES & CULVERTS
IOWA CO.
POWESHIEK CO.
I-80-6(24)208
JANUARY 8, 1963

DESIGN NO. 162	STA. 58+58.9	1-80
SECTION 32	STA. 1058+45.8	LOCAL RD.
HARTFORD TOWNSHIP	OVER LOCAL ROAD "V"	
DUAL 125'-10" X 40' PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES		
2'-40' SKEW		
TOTAL QUANTITIES		
Concrete	602.6 c.y.	
Reinforcing Steel	125,164	125,018 lbs.
Pretensioned Prestressed Concrete Beam	13 38'-4"	36 only
Aluminum Handrail (4'-4" End Posts)	A5 46'-8"	18 only
Steel Handrail (4'-4" End Posts)	or 465 L.F.	
Class 20 Excavation	465 L.F.	
Granular Backfill	335 c.y.	
10 D.P. 42 Steel	Furnish 9@70; 18@80; 9@90	2880 L.F.
Bearing Piling Drive	9@70; 18@80; 9@90	2880 L.F.
Crested Piles	40@50; 40@55	4200 L.F.
4" x 6" Tile Drain		268 L.F.

DESIGN NO. 262	STA. 1058+45.8	LOCAL RD.
SECTIONS 31 & 32	HARTFORD TOWNSHIP	STA. 58+58.9
1-80		
TWIN 10' X 10' X 325' REINFORCED CONCRETE BOX CULVERT		
TOTAL QUANTITIES		
Concrete	915.6 c.y.	
Reinforcing Steel	129,990 lbs.	
Class 20 Excavation	3400 c.y.	
Removal of Existing Structure	Lump Sum	

DESIGN NO. 462	STA. 254+00	
SECTION 31	HARTFORD TOWNSHIP	
TWIN 10' X 10' X 69' REINFORCED CONCRETE BOX CULVERT - 30° SKEW		
TOTAL QUANTITIES		
Concrete	294.2 c.y.	
Reinforcing Steel	37,601 lbs.	
Class 20 Excavation	590 c.y.	

DESIGN NO. 562	STA. 560+23	
SECTION 32	HARTFORD TOWNSHIP	
TWIN 10' X 10' X 61' REINFORCED CONCRETE BOX CULVERT - 15° SKEW		
TOTAL QUANTITIES		
Concrete	258.0 c.y.	
Reinforcing Steel	34,581 lbs.	
Class 20 Excavation	450 c.y.	

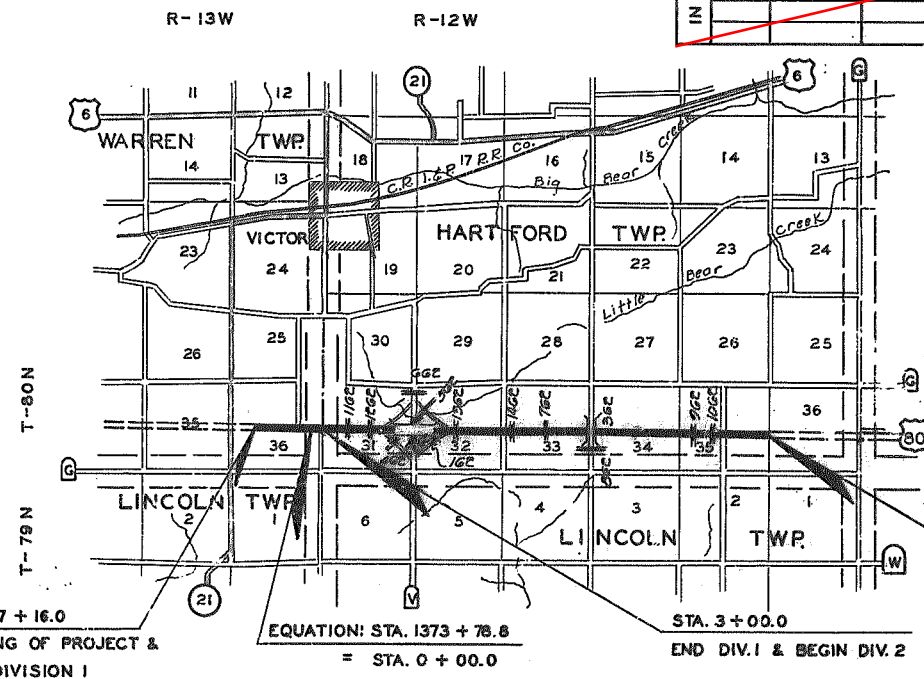
DESIGN NO. 362	LOCAL ROAD OVER 1-80	STA. 1163+90.3	LOCAL RD.
SECTIONS 33 & 34	HARTFORD TOWNSHIP	STA. 163+90.3	1-80
215'-5" X 24' PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE			
TOTAL QUANTITIES			
Concrete	310.0 c.y.		
Reinforcing Steel	64,114 lbs.		
Pretensioned Prestressed Concrete Beams	45'-6" (B1)	8 only	
Crested Piling	63'-4" (B6)	8 only	
Class 20 Excavation	20@35; 40@40; 9@50; 9@55	3245 L.F.	
Granular Backfill		285 c.y.	
Concrete Slope Protection		130 tons	
4" x 6" Tile Drain		352 L.F.	
Aluminum Handrail (4'-4" End Posts)		160 L.F.	
Steel Handrail (4'-4" End Posts)		411.7 L.F.	

DESIGN NO. 662	STA. 1068+20	
SECTIONS 31 & 32	HARTFORD TOWNSHIP	
TWIN 8' X 8' X 80' REINFORCED CONCRETE BOX CULVERT - 30° SKEW		
TOTAL QUANTITIES		
Concrete	219.7 c.y.	
Reinforcing Steel	28,083 lbs.	
Class 20 Excavation	757 c.y.	
Removal of Existing Structure	Lump Sum	

IN LETTING OF JANUARY 8, 1963

DESIGN	LOCATION			DESCRIPTION	ESTIMATE OF QUANTITIES					
	SECTION	TOWNSHIP	STATION		SIZE & TYPE	CONCRETE CU. YDS.	REINF. STEEL LBS.	EXCAVATION CU. YDS.		REMOVALS
								CL. 20	CL. 24	
762	33	Hartford	138 + 76	6' x 8' x 168' Reinf. Conc. Box Culv. - 30° Skew	196.9	22,201	215		As per plan	
862	33 & 34	Hartford	1162 + 53	2' x 3' x 151' Reinf. Conc. Box Culv. - 9° Skew	56.2	3476	72	20		
962	35	Hartford	226 + 40	8' x 4' x 144' Reinf. Conc. Box Culv. - 30° Skew	144.3	15,340	111			
1062	34	Hartford	233 + 80	4' x 4' x 177' Reinf. Conc. Box Culv. - 30° Skew	89.3	7,727	78			
1162	31	Hartford	17 + 20	2' x 3' x 223' Reinf. Conc. Box Culv. - 35° Skew	82.0	4,758	65			
1262	31	Hartford	27 + 62	3' x 4' x 250' Reinf. Conc. Box Culv. - 35° Skew	116.7	8,825	89			
1362	32	Hartford	75 + 35	3' x 3' x 216' Reinf. Conc. Box Culv.	89.2	6,889	63	10		
1462	33	Hartford	113 + 00	2' x 3' x 220' Reinf. Conc. Box Culv. - 30° Skew	81.0	4,706	90			
Totals					855.6	73,842	781	39		

POWESHIEK CO. IOWA CO.



Specifications:
Design stresses for the following materials are in accordance with A.A.S.H.O. Standard Specifications for Highway Bridges, Series of 1961.
Concrete in accordance with Section 1.4.11 $f'_c = 3500$ p.s.i.
Reinforcing Steel in accordance with Section 1.4.12 "Reinforcement" for Intermediate, Hard, or Rail Steel Grade.
Prestressed Concrete in accordance with Section 1.13.7, $f'_c = 5000$ p.s.i.
Prestressing Steel in accordance with Section 1.13.7, $f'_s = 250,000$ p.s.i.

Construction: Standard Specification of the Iowa State Highway Commission, Series of 1960, plus current Special Provisions and Supplemental Specifications.

This Bridge will require Bridge Sign Assemblies furnished and placed by others as specified in Traffic and Highway planning Instruction No. 11- Revised October 1, 1961. (Design 362)

Mileage Summary:
Bridge at Sta. 58+58.9 = 128.667' = .024 mile.

APPROVED
R.M. Tutton
DEPUTY CHIEF ENGINEER
IOWA HIGHWAY COMMISSION
DATE 11-27-62

DEPARTMENT OF COMMERCE
BUREAU OF PUBLIC ROADS
APPROVED
DIVISION ENGINEER
DATE

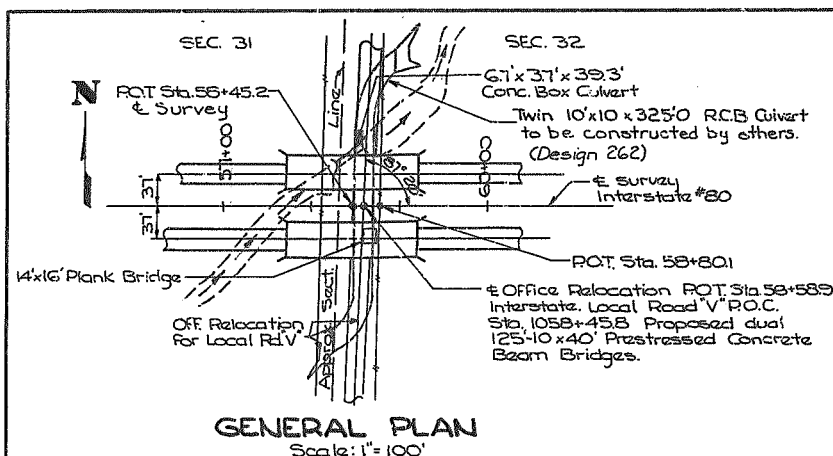
Design 162-Revised 11-15-63: Reinforcing Steel Quantity changed on sheet 1 & 4 of 9

IOWA - POWESHIEK COUNTY PROJECT NO. 1-80-6 (24) 208 FILE NO. 21236

MML

SLR

90



GENERAL NOTES:

These bridges are designed for H20-S16-44 loading and alternate loading designated in B.P.R's PPM 20-4, section 42, plus an allowance of 19 lbs. per sq. ft. of roadway for future wearing surface.

The formed steel beam guardrails and crossroads posts are to be furnished and placed by others and are not a part of this estimate.

The Bridge Contractor is to install the tile drain behind each abutment as noted or shown on sheet 1#2. The price bid for "tile drain" is to include the excavation necessary for installation.

Stream channel change and culvert under Local Road V are to be done by others and are not a part of this design. The culvert is to be in place and backfilled before construction of the piers is started.

The approach fills are not a part of this estimate, but are to be in place before abutment piles are driven. The Bridge Contractor is to level off and shape the berms to the elevations shown. Abutment berms are to be in place 60 days before abutment piles are driven.

Abutment piles are to be driven in oversize holes drilled through the fill to elevation 848.0. The minimum diameter of the drilled holes is to be 16 inches.

Voids around piles are to be filled with dry sand. No separate payment will be made for holes or filling voids since it is considered incidental to driving piles.

Care is to be exercised while driving the pier piles to avoid hitting the twin 10'x10' culvert.

Red lines on tracing and faint lines on print indicate existing construction and proposed 10'x10'x325'0 RCB Culvert.

DESIGN STRESSES:

Design stresses for the following materials are in accordance with AASHTO Standard Specifications for Highway Bridges, Series of 1961.

Reinforcing Steel in accordance with Section 14.12 "Reinforcement" for Intermediate, Hard, or Rail Steel Grade.

Concrete in accordance with Section 14.11 $f_c = 3500$ psi.

See sheet 7 for design stresses for prestressed beams.

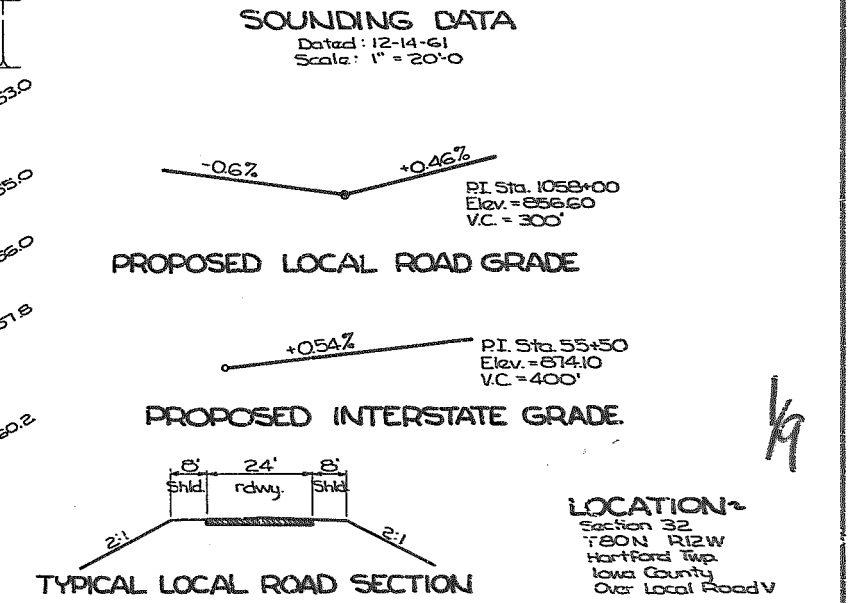
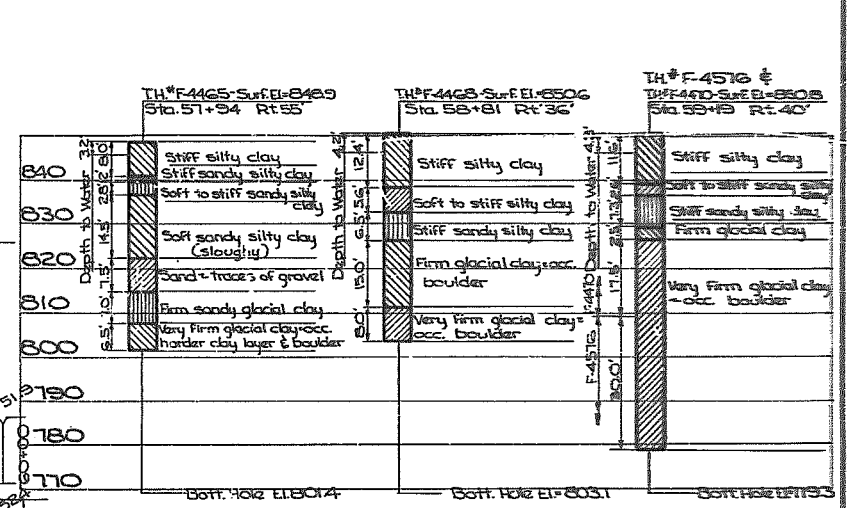
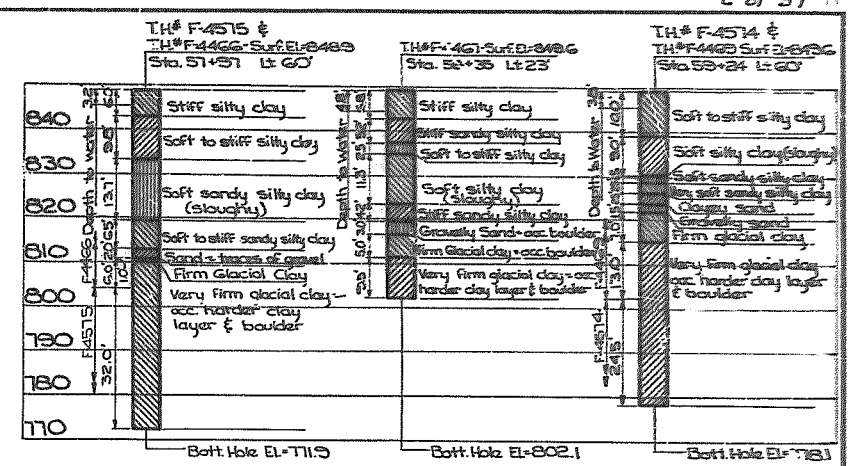
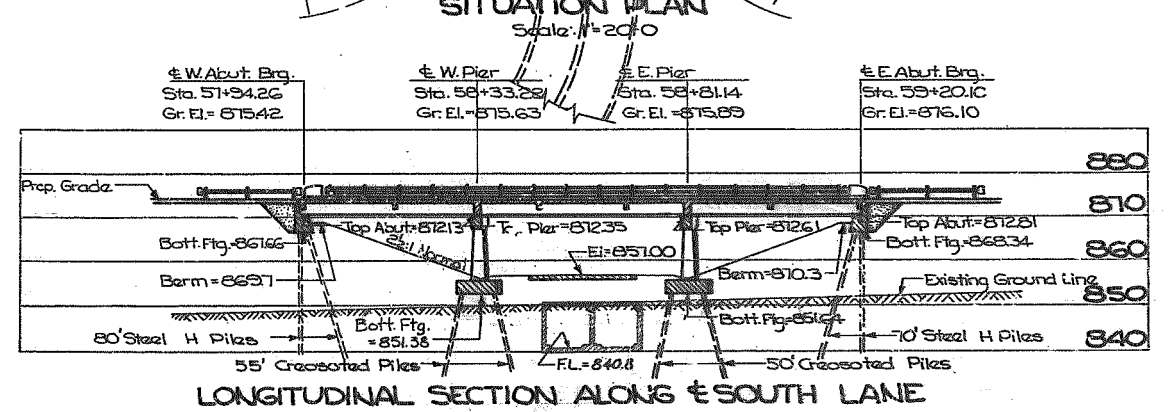
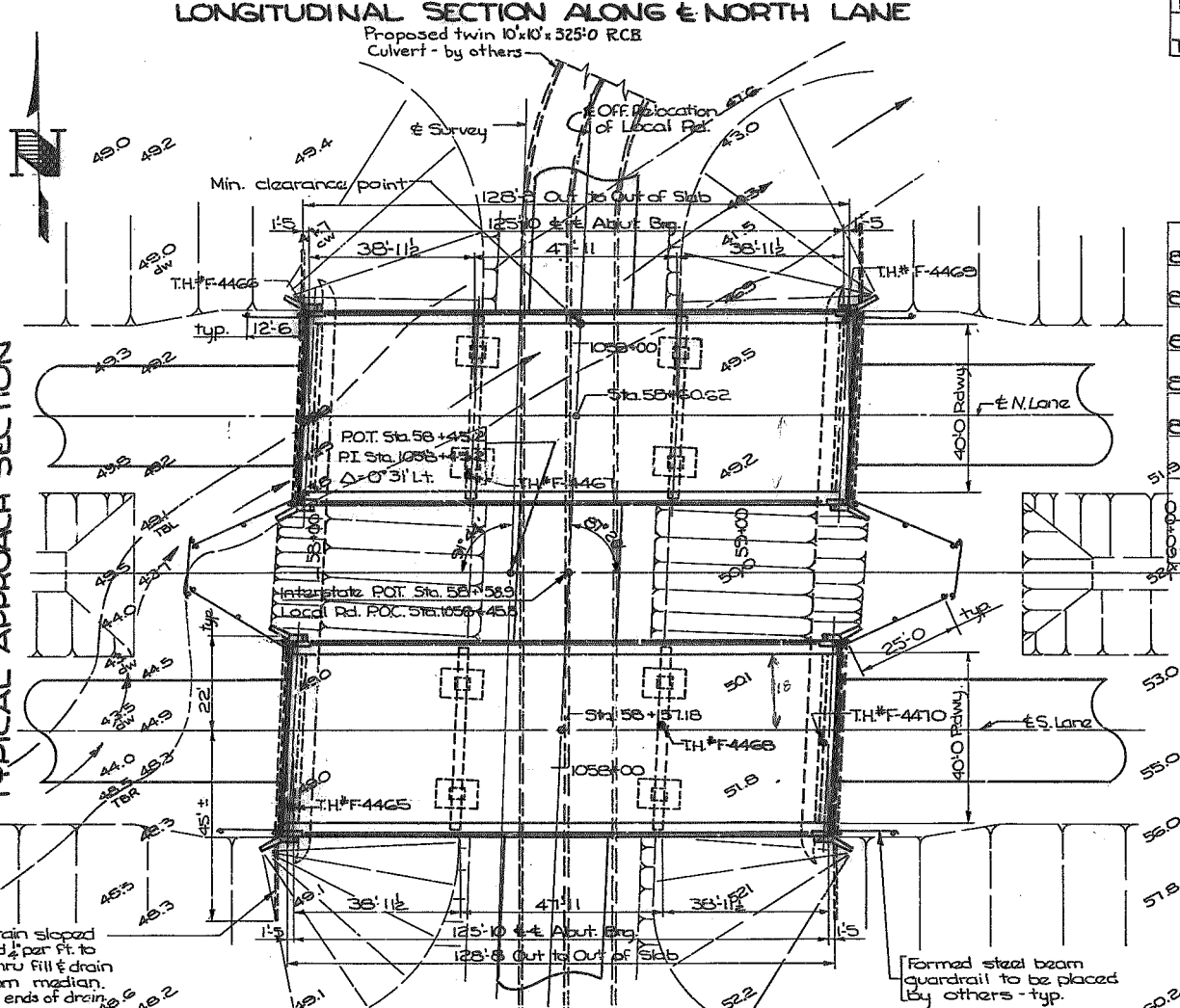
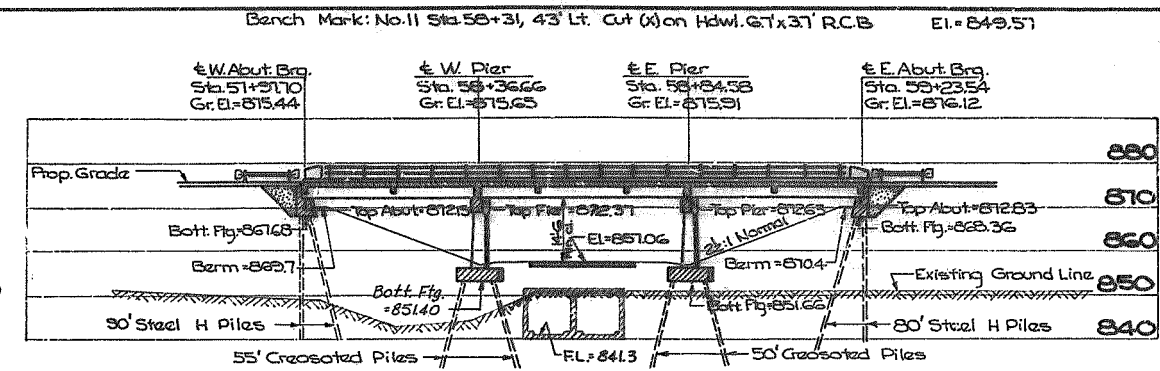
SPECIFICATIONS:

Design: AASHTO, Series of 1961.

Construction: Standard Specifications of the Iowa State Highway Commission, Series of 1960, plus current Supplemental Specifications and Special Provisions.

TOTAL ESTIMATED QUANTITIES				
Item	4 Abuts	4 Piers	2 Superstr.	Total
Concrete	156.0	147.6	319.0	602.6 cu
Reinforcing Steel	13688	24812	3656	165256 lbs
Presten. Prestr. A3(384)			36	36 only
Concrete Beam A5(468)			18	18 only
Aluminum Handrail			465	465 lf
Steel Handrail			465	465 lf
Class 20 Excavation	340	198		538 cu
Granular Backfill	348			348 bns
10 B.P.42 Steel	990(1000,970)			2880 lf
Bearing Piling	990(1000,970)			2880 lf
Crossroads Piles				4200 lf
4" Tile Drain				265 lf

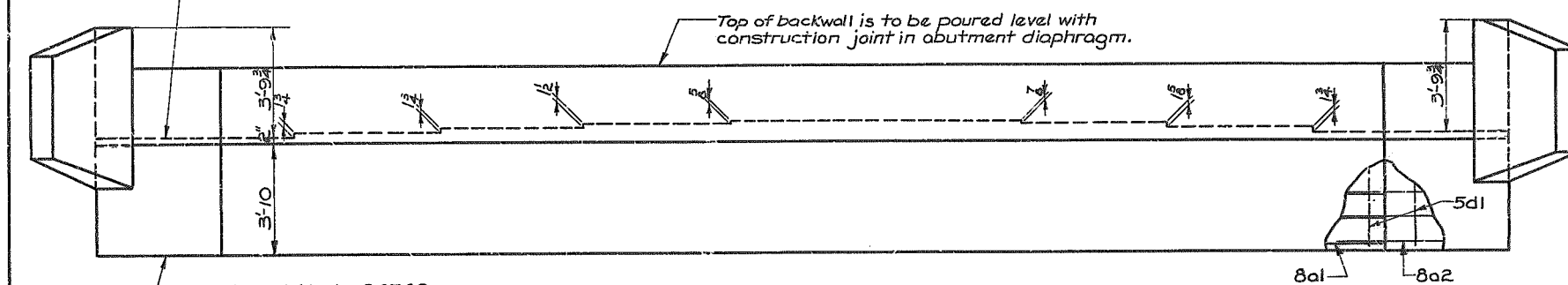
Revised 11-15-63: Reinforcing Steel quantity changed.



Bench Mark: No. 11 Sta. 58+31, 43' Lt. Cut (X) on Hdwl. 6.7x3.7' R.C.B. -----Elev. 84957

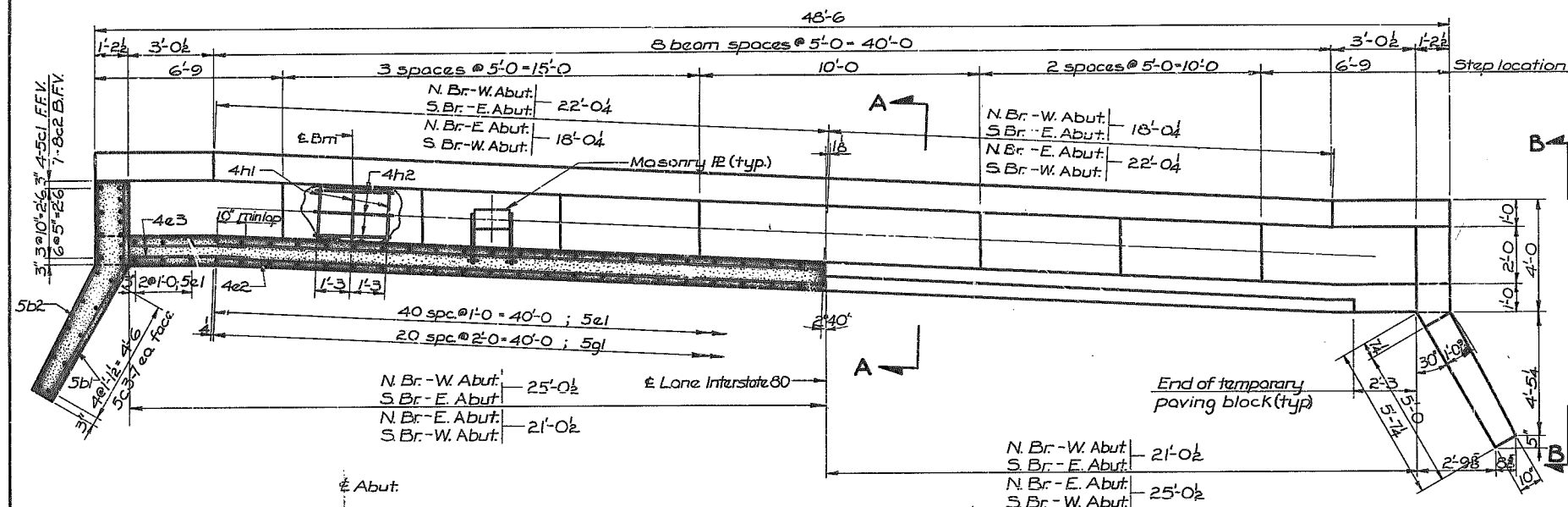
Note: Steps shown for N.Br.-W. Abut. & S.Br.-E. Abut. Other abutments are similar as shown or noted.

Low bearing elevation for N.Br.-W. Abut. & S.Br.-E. Abut.

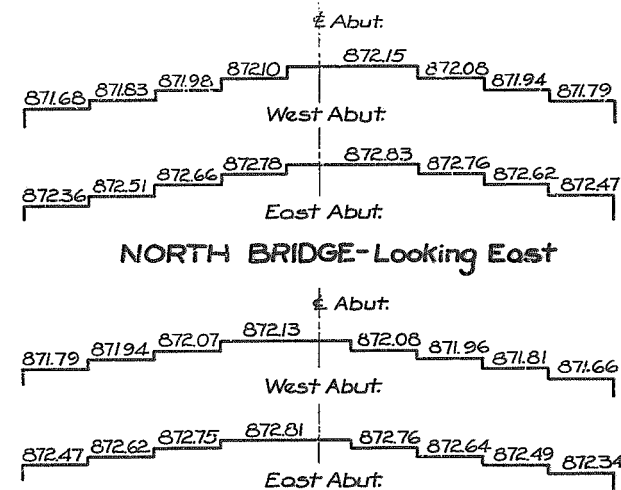


N.Br.-W. Abut. = 867.68
N.Br.-E. Abut. = 868.36
S.Br.-W. Abut. = 867.66
S.Br.-E. Abut. = 868.34

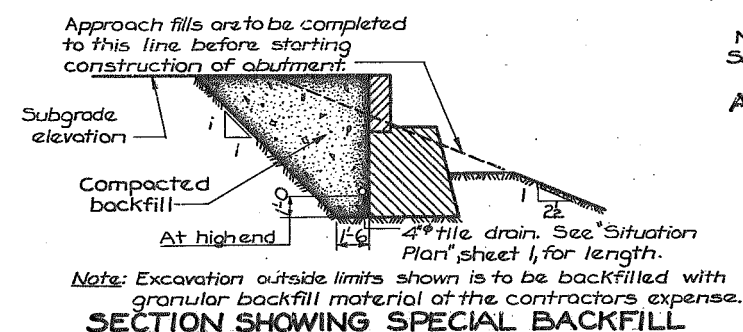
REAR ELEVATION
(Piles not shown)



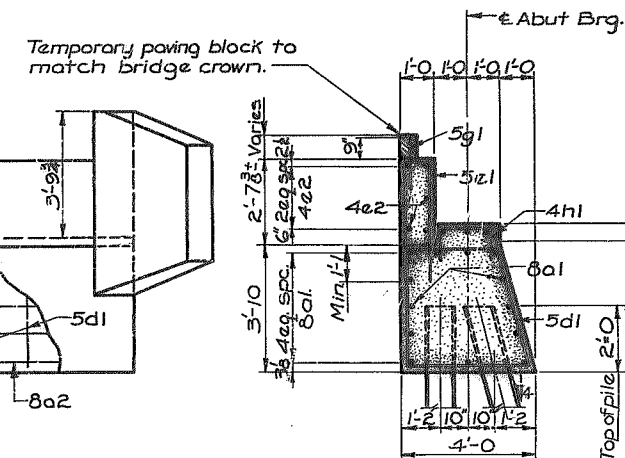
PLAN
Scale: 3/8" = 1'-0"



ABUTMENT BEARING ELEVATIONS

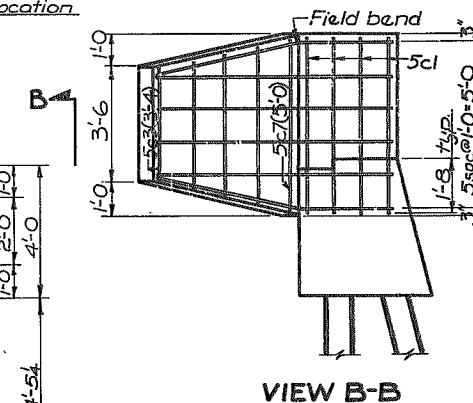


SECTION SHOWING SPECIAL BACKFILL



SECTION A-A

Note: Temporary paving block is to be placed as shown after banding down paving dowels, 5g1, and covering dowels with two layers of tarpaper. Place paving block after superstructure slab has been poured.

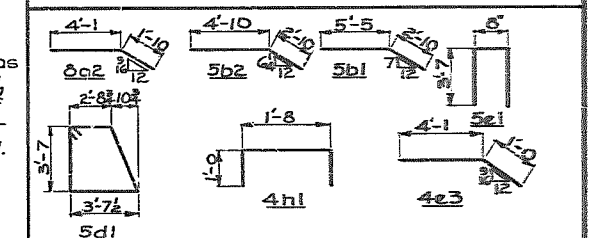


VIEW B-B

BAR	LOCATION	SHAPE NO.	LENGTH	WT.
8a1	Footings, Longitudinal	13	40'-0"	1368
8a2	" " " " - Ends	26	5'-11"	411
5b1	Wing, Horizontal - B.F.	12	8'-3"	103
5b2	" " " " - F.F.	12	7'-8"	96
5c1	" " " " - F.F.	8	5'-4"	45
8c2	" " " " - B.F.	14	5'-4"	199
5c3-7	" " " " - FF & BF	20	Varies	87
5d1	Footings Hoops	26	14'-5"	391
5e1	Backwall, Vertical	47	7'-8"	376
4e2	" " " " Horizontal	6	40'-0"	160
4e3	" " " " - Ends	12	5'-1"	41
*5g1	Paving Dowels	21	1'-6"	33
4h1	Beam Steps @ Int. Bms.	21	3'-7"	50
4h2	" " " " " "	21	3'-0"	42

* Structural Grad: Total, lbs 3422

BENT BAR DETAILS



CONCRETE PLACEMENT QUANT-ONE ABUT

Location	Quantity
Footings	258 cu.
Back Wall	45 cu.
Wings	27 cu.
Paving Block	1.0 cu.
Total	34.0 cu.

ESTIMATED QUANTITIES FOUR ABUTMENTS

Item	Quantity
Concrete	136.0 cu.
Reinforcing Steel	136.88 lbs
Steel H Piles (10BP42)	1530 lf
Class 20 Excavation	340 cu.
Granular Backfill	345 lbs

ABUTMENT NOTES:

Minimum clear distance from face of concrete to near reinforcing bar is to be 2" unless otherwise shown. All exposed corners of 90° or sharper are to be filled with a 3/4" dressed and beveled strip. Reinforcing steel is to be securely wired in place before concrete is poured. Bridge contractor is to backfill abutments between wingwalls to subgrade elevation with granular backfill material complying with Section 4133 of the Iowa State Highway Commission Specifications. Pile location dimensions shown are at bottom of footing. Batter piles 1:4 in direction shown. Abutment piles are to be driven to full penetration, if practicable, but in no case to less than 30 tons bearing value.

Design for 2'40" Skew DUAL 125'-10"x40" PRETENSIONED PRESTR'D CONCRETE BEAM BRIDGES

38'-11 1/2" End Spans 47'-11" Center Span
Concrete Floor & Substructure Tubular Handrail
ABUTMENT DETAILS

Sta. 58+58.9 Interstate #80
Sta. 1058+45.8 Local Road Proj. No. I-80-6(24)208
IOWA - POWESHIEK COUNTY

Iowa State Highway Commission
June 1962 Sheet 2 of 9

Design 162

Iowa County

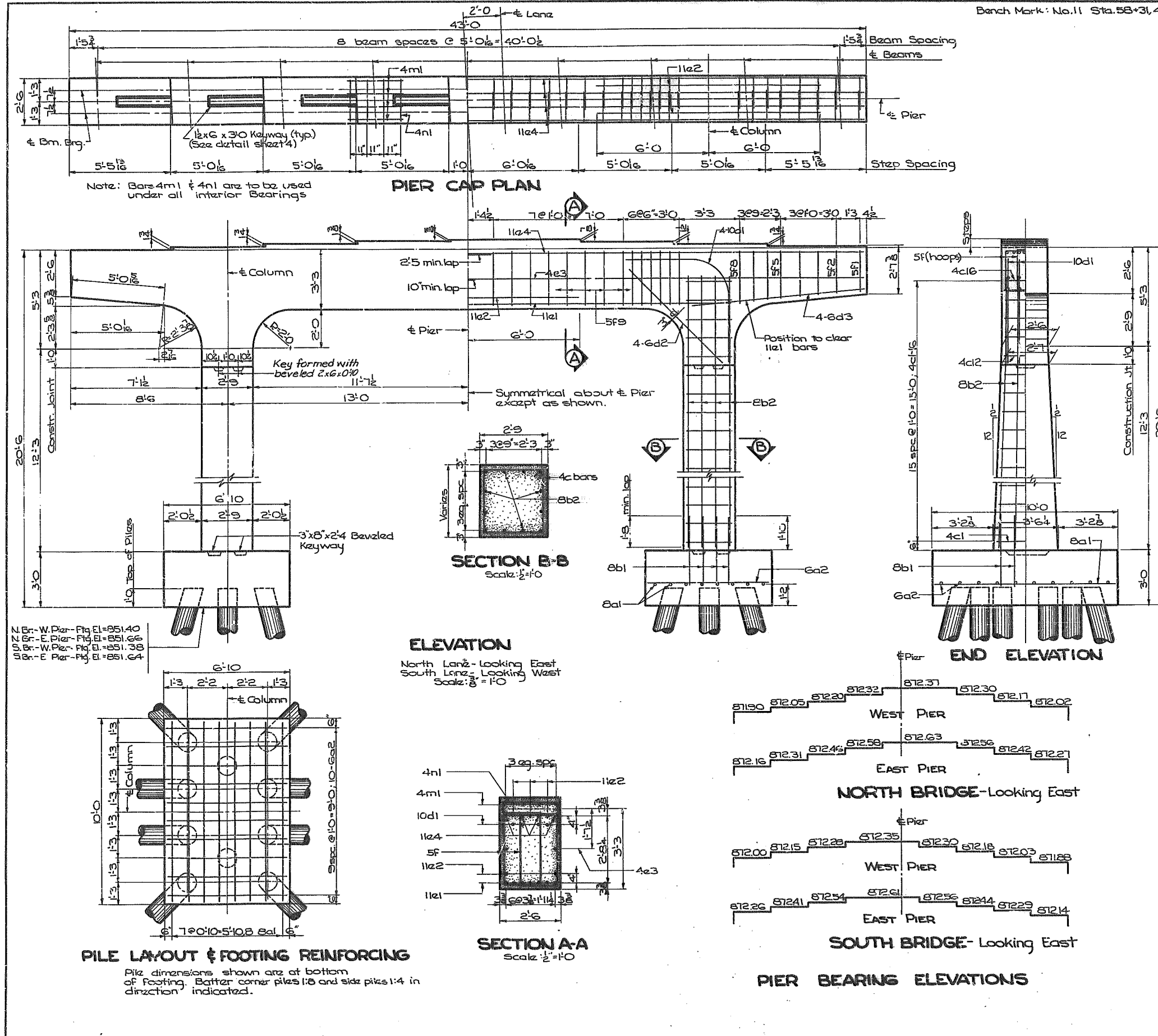
File No. 21236

Designed by:

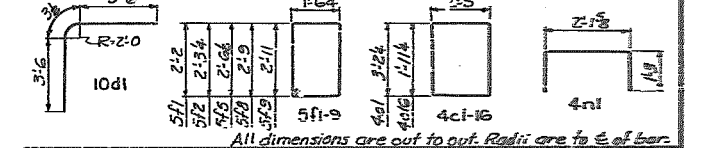
Traced by:

Checked by:

Bench Mark: No. 11 Sta. 58+31.43' Lt. Cut(X) on Hdw. 6" x 3" R.C.B. Elev. 849.51

**REINFORCING BAR LIST - ONE PIER**

Bar	Location	Shape	No.	Length	Weight
8a1	Footing, Longitudinal	—	16	9'-6"	406
6a2	" Transverse	—	20	6'-4"	190
8b1	Column, Dowels	—	24	3'-8"	235
8b2	" Vertical	—	24	16'-0"	1025
4c1-16	Column, Hoops	□	32	Varies	226
10d1	Corner	—	8	10'-2"	350
6d2	Fillet	—	8	7'-0"	84
6d3	Contilever, Longit. - Bott.	—	8	9'-3"	111
11e1	Bzam, Longit. - Bott.	—	7	28'-0"	1041
11e2	" " - Top & Bott	—	8	12'-0"	510
4e3	" " - Middle	—	4	21'-9"	58
11e4	" " - Top	—	8	22'-6"	296
5f1-8	Contilever, Hoops	□	32	Varies	291
5f9	Bzam, "	□	58	9'-7"	580
4m1	Bearing, Longitudinal	—	28	3'-0"	56
4n1	Bearing, Transverse	—	28	4'-6"	84
Total					6203

BENT BAR DETAILS**CONC. PLACEMENT QUANT-ONE PIER**

Beam (Above Construction Joint)	5.3 cu
Columns	7.0 cu
Footing	14.6 cu
Total	36.9 cu

ESTIMATED QUANTITIES-FOUR PIERS

Item	Quantity
Concrete	147.6 cu
Reinforcing Steel	24,812 lbs
Class 20 Excavation	196 cu
Crested Piling	40 @ 55', 40 @ 50'

PIER NOTES:

All exposed corners of 30° or sharper are to be filleted with a 3" dressed and beveled strip.
Minimum clear distance from face of concrete to near reinforcing is to be 2" unless otherwise noted or shown.
Piles are to be driven to full penetration if practicable but in no case to less than 20 tons or more than 40 tons bearing value.
Column construction joint may be filleted with a 3" dressed and beveled fillet.

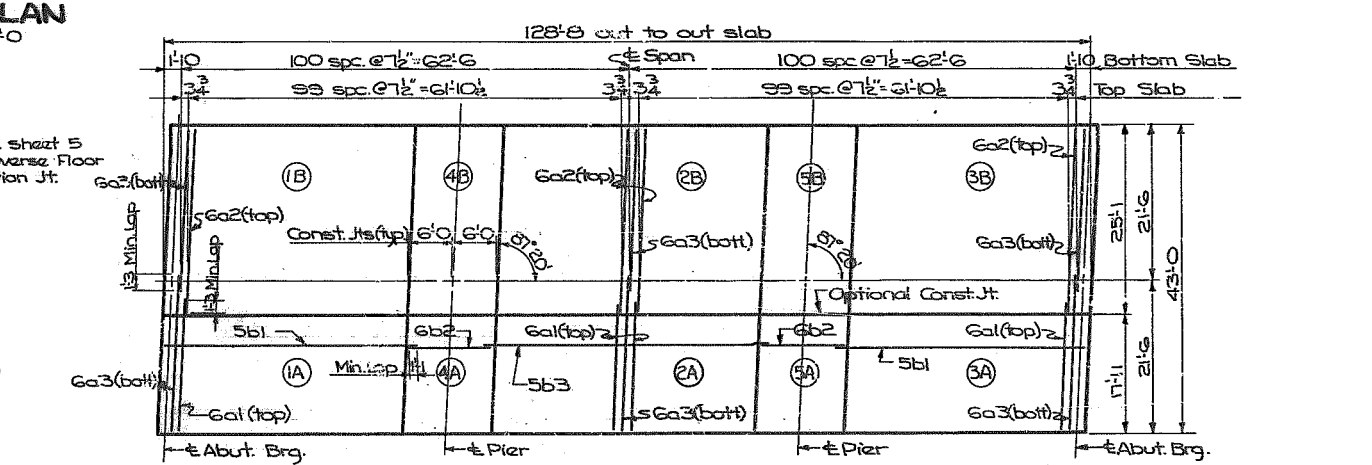
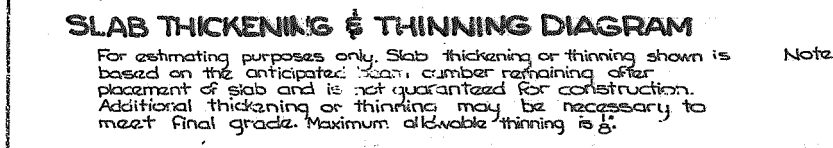
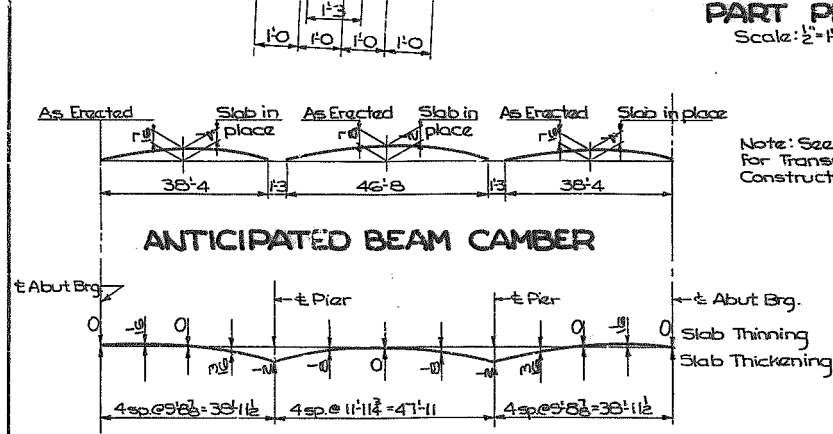
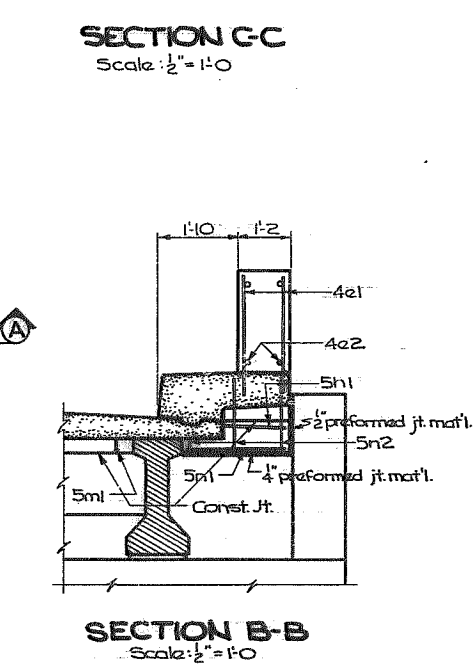
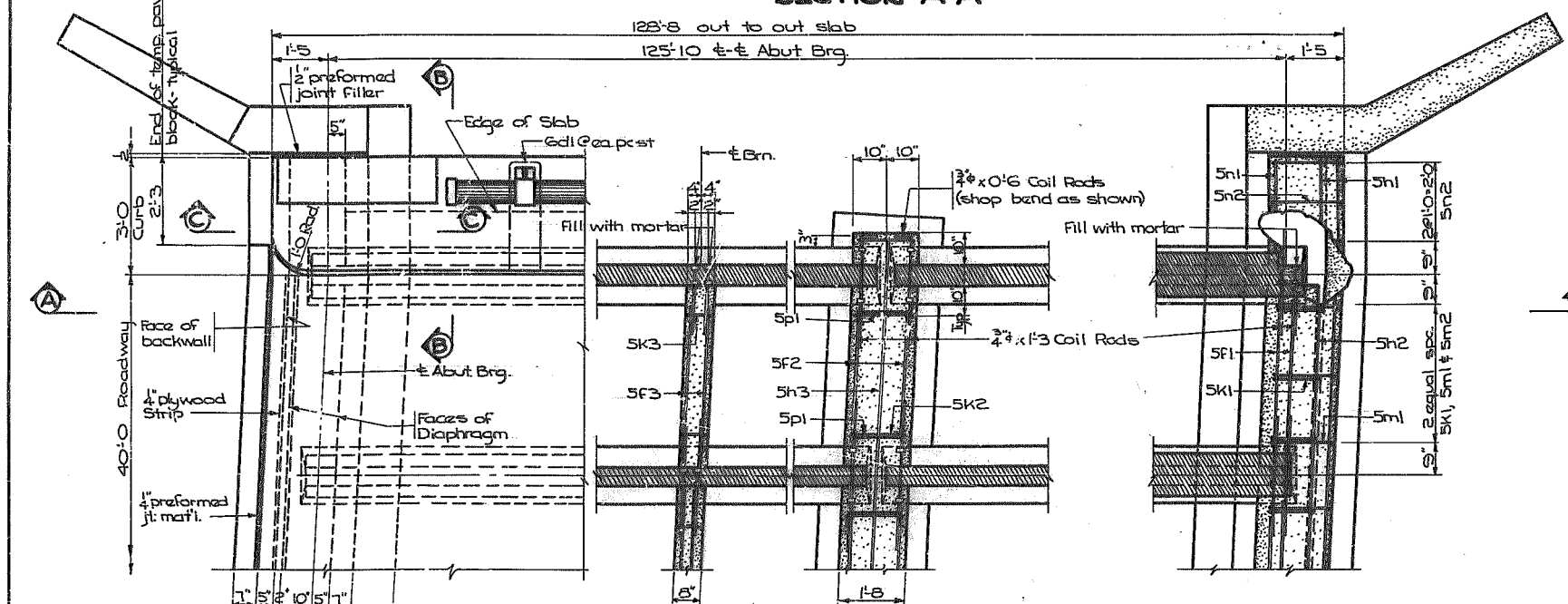
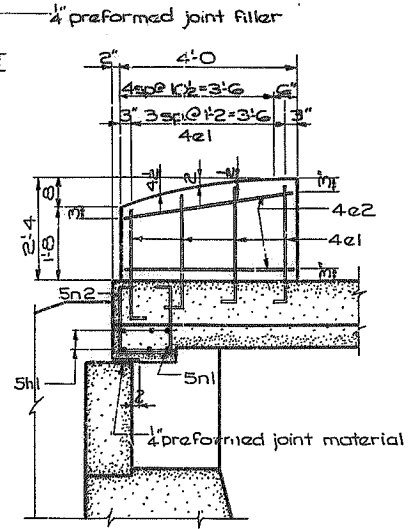
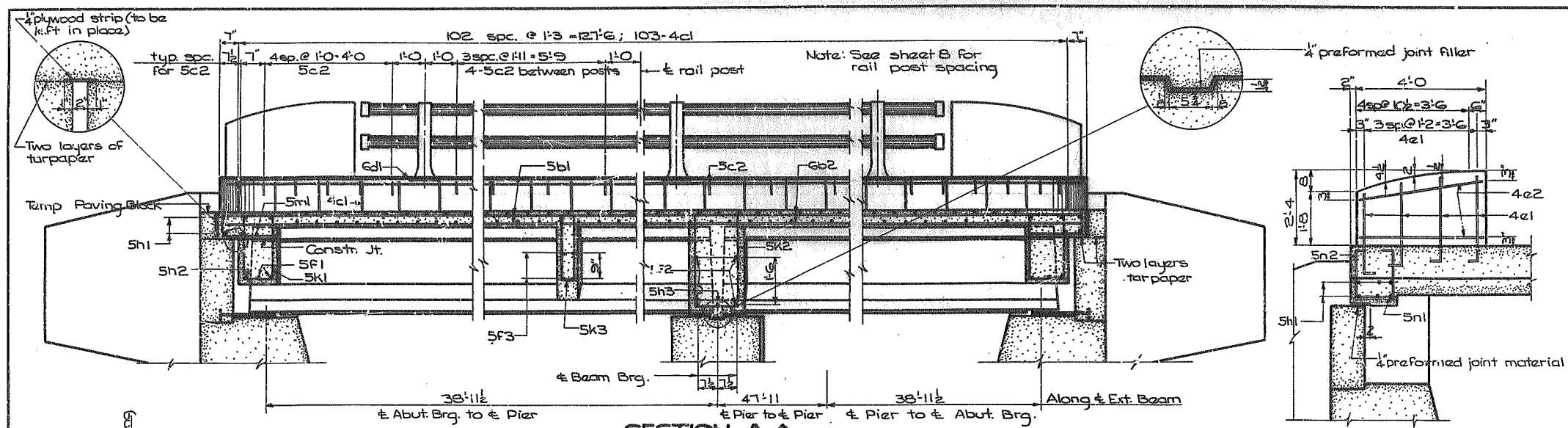
Design for 2°40' Skew
DUAL 125'-10" x 40' PRETENSIONED PRESTR. CONCRETE BEAM BRIDGES

38'-11 1/2" End Spans 47'-11" Center Span
 Concrete Floor & Substructure Tubular Handrail
PIER DETAILS

Sta. 58+58.9 Interstate #80
 Sta. 1058+45.8 Local Road Proj. No. I80-G(24) 208
IOWA - POWESHIEK COUNTY
 Iowa State Highway Commission
 June 1962 Sheet 3 of 9

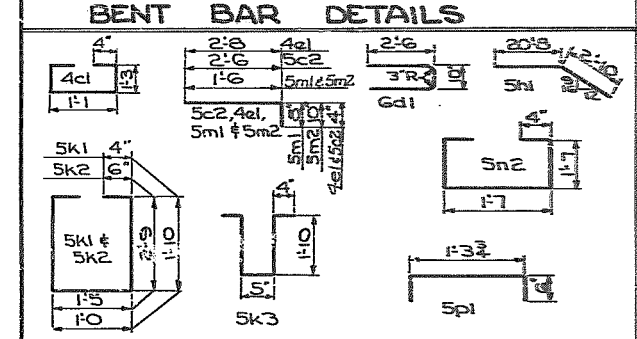
Design 162 Iowa County File No. 21236

Designed by: [Signature] Traced by: [Signature] Checked by: [Signature]



Note: The roadway slab shall be placed in sections in the sequence indicated by encircled figures and preferably at intervals not exceeding 24 hours. Alternate procedures for placing concrete may be submitted for approval, together with a statement of the proposed method and evidence that the contractor possesses the necessary equipment and facilities to accomplish the required result. Curb may be poured continuously. Longitudinal construction joint is optional.

REINFORCING BAR LIST-ONE SUPERSTR.				
Bar	Location	Shape	No.	Length Weight
6a1	Slab, Transverse, top	—	200	19'-3 5783
6a2	" " " " " "	—	200	24'-10 7460
6a3	" " " " " "	—	402	22'-1 13324
5b1	Slab & Curb Longitudinal, End Span	—	168	35'-6 6224
6b2	" " " " " "	—	134	11'-8 3400
5b3	" " " " " "	—	84	38'-5 3366
4c1	Curb Hoops	□	206	4'-0 550
5c2	" " Transverse	—	144	2'-9 413
6d1	Rail Post Anchor	—	32	5'-6 264
4e1	End Post Vertical	—	32	2'-11 62
4e2	" " Horizontal	—	16	3'-8 39
5f1	Abutment Diaphragm, Horizontal	—	32	4'-2 139
5f2	Pier " " "	—	64	3'-3 217
5f3	Intermediate " " "	—	36	4'-2 477
5n1	Abutment " " "	—	20	23'-6 490
5n2	" " " " "	—	2	39'-3 82
5n3	Pier " " "	—	4	21'-6 90
5k1	Abutment Diaphragm Hoops	□	48	5'-0 250
5k2	Pier " " "	—	32	7'-7 253
5k3	Intermediate " " "	—	32	4'-5 148
5m1	Slab, Over Backwall	—	12	2'-1 26
5m2	" " " " "	—	36	2'-3 84
5n1	Abutment Diaphragm Under Curb	—	4	2'-1 9
5n2	" " " " "	—	12	5'-1 64
5p1	Pier " " Transverse	—	44	2'-2 99
			Total	43,332

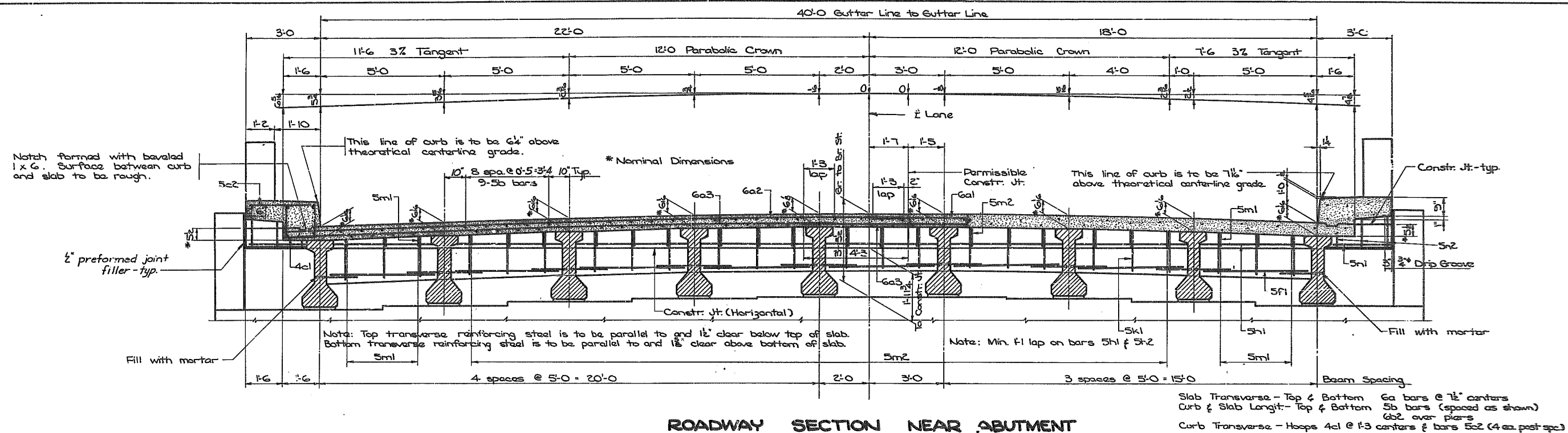


CONC. PLACEMENT QUANT-ONE SUPERSTR.		
Location	Quantity	
Sections 1A & 3A	28134	= 268 cy.
Section 2A		133 cy.
Sections 4A & 5A	2870	= 140 cy.
Sections 1B & 3B	28184	= 368 cy.
Section 2B		184 cy.
Section 4B & 5B	2896	= 192 cy.
Curbs	28128	= 256 cy.
End Posts		15 cy.
Abutment Diaphragm (below const. jt.)		39 cy.
Totals		1535 cy.

EST. QUANTITIES-TWO SUPERSTRUCTURES		
Item	Quantity	
Concrete	3130	cy.
Reinforcing Steel	86,664	lb.
Prestressed Concrete	A3(38'-4)	36 only
Concrete Beams	A5(46'-8)	18 only

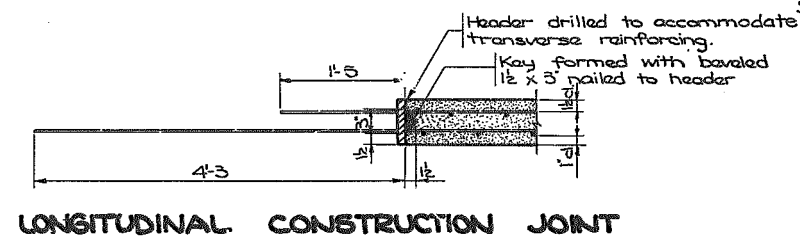
Revised 11-15-63: 16-5k3 bars added. Reinforcing Steel quantity changed.

Design for 2'-40' Skew
DUAL 12'-10" x 40' PRETENSIONED PRESTR. CONCRETE BEAM BRIDGES
 38'-1 1/2' End Spans 47'-11' Center Span
 Concrete Floor & Substructure Tubular Handrail
SUPERSTRUCTURE DETAILS
 Sta. 58+58.9 Interstate #80
 Sta. 1058+45.8 Local Road Proj. No. I-80-G(24)208
IOWA-POWESHIEK COUNTY
 Iowa State Highway Commission
 June 1962 Sheet 4 of 9



ROADWAY SECTION NEAR ABUTMENT

North Bridge - Looking East
South Bridge - Looking West



SUPERSTRUCTURE NOTES -

This bridge is designed for H20-S16-44 loading, plus 19 lbs. per sq. ft. of roadway for future wearing surface, and alternate loading designated in BPR RPM 20-4, Section 4c.

All exposed corners of 90° or sharper are to be filleted 3/4".

Clear distance from face of concrete to near reinforcing bar is to be 1 1/2" unless otherwise noted or shown.

All reinforcing is to be securely wired in place and adequately supported on bar chairs before pouring concrete.

Cost of all bearing material is to be included in price bid for the beams.

Cost of all preformed joint material and celotex is to be included in price bid for concrete.

Slab as shown includes 1/2" of wearing surface.

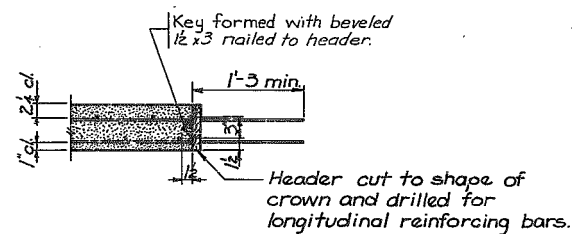
Forms for slab and curbs are to be supported by the beams.

See Sheet 7 for prestressed concrete beam details.

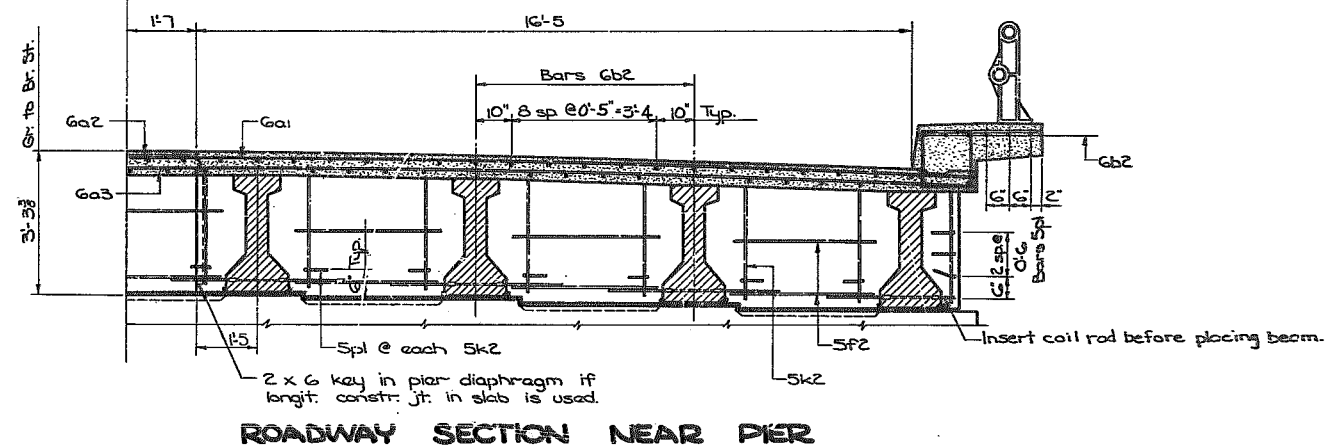
Masonry plates are to be set in paint and canvas.

Grade to bridge seat dimensions allow 1 1/2" for paint and canvas at abutment bearing and 1 1/2" compression of Neoprene Pads at pier bearing.

On sliding bearings and masonry plates for sliding bearings finish ASA 125.



TRANSV. FLOOR CONSTR. JOINT



ROADWAY SECTION NEAR PIER

Note: See Sheet 6 for bearing details, location of beam coil ties, and intermediate diaphragm details.

Design for 2° 40' Skew
DUAL 125'-10" x 40' PRETENSIONED PRESTR'D CONCRETE BEAM BRIDGES

38'-11 1/2" End Spans 47'-11" Center Span
Concrete Floor & Substructure Tubular Handrail

SUPERSTRUCTURE DETAILS

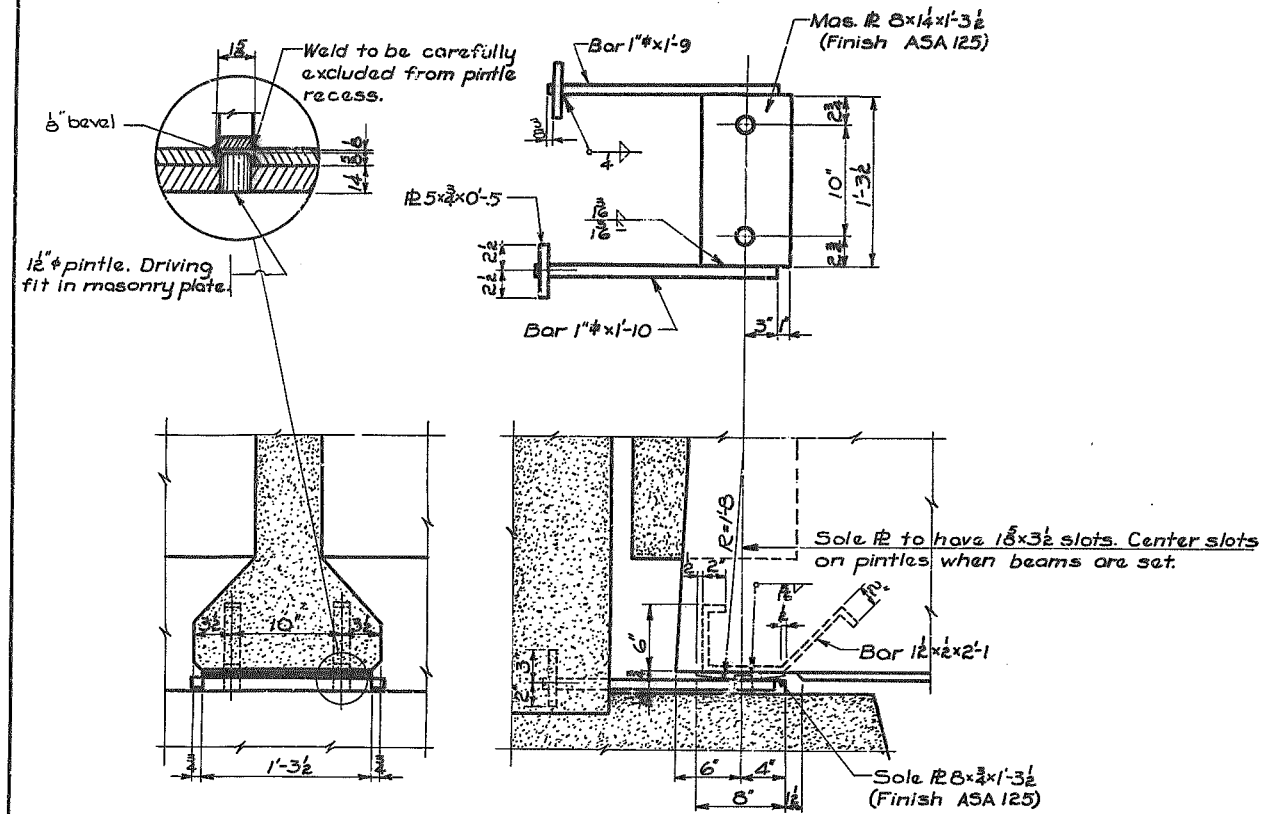
Sta. 58+58.9 Interstate #80
Sta. 1058+45.6 Local Road Proj. No. I-80-6(24)208

IOWA - POWESHIEK COUNTY

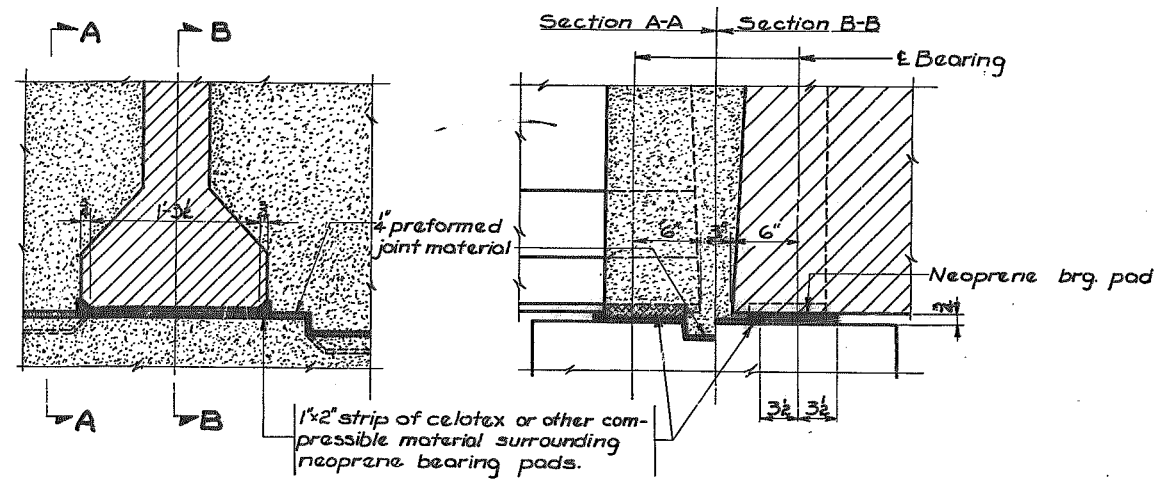
Iowa State Highway Commission
June 1962 Sheet 5 of 9

Design 162 Iowa County File No. 21236

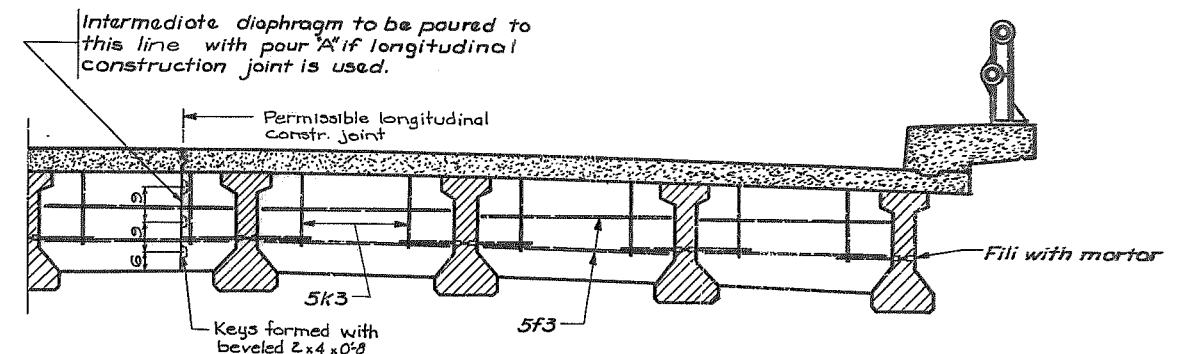
Designed by: [Signature] Traced by: [Signature] Checked by: [Signature]



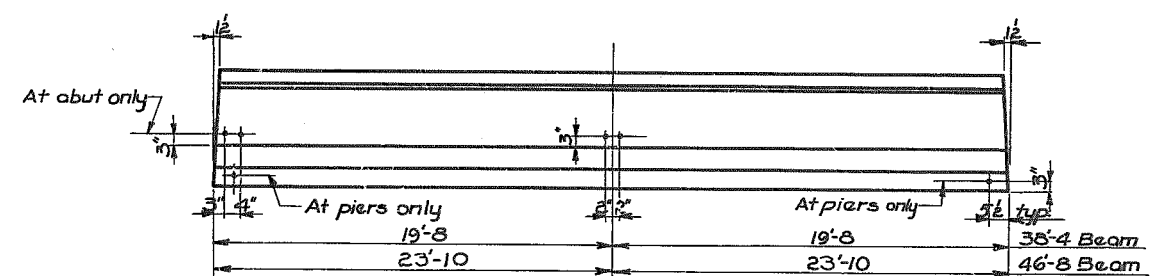
ABUTMENT BEARING DETAILS



PIER BEARING DETAILS



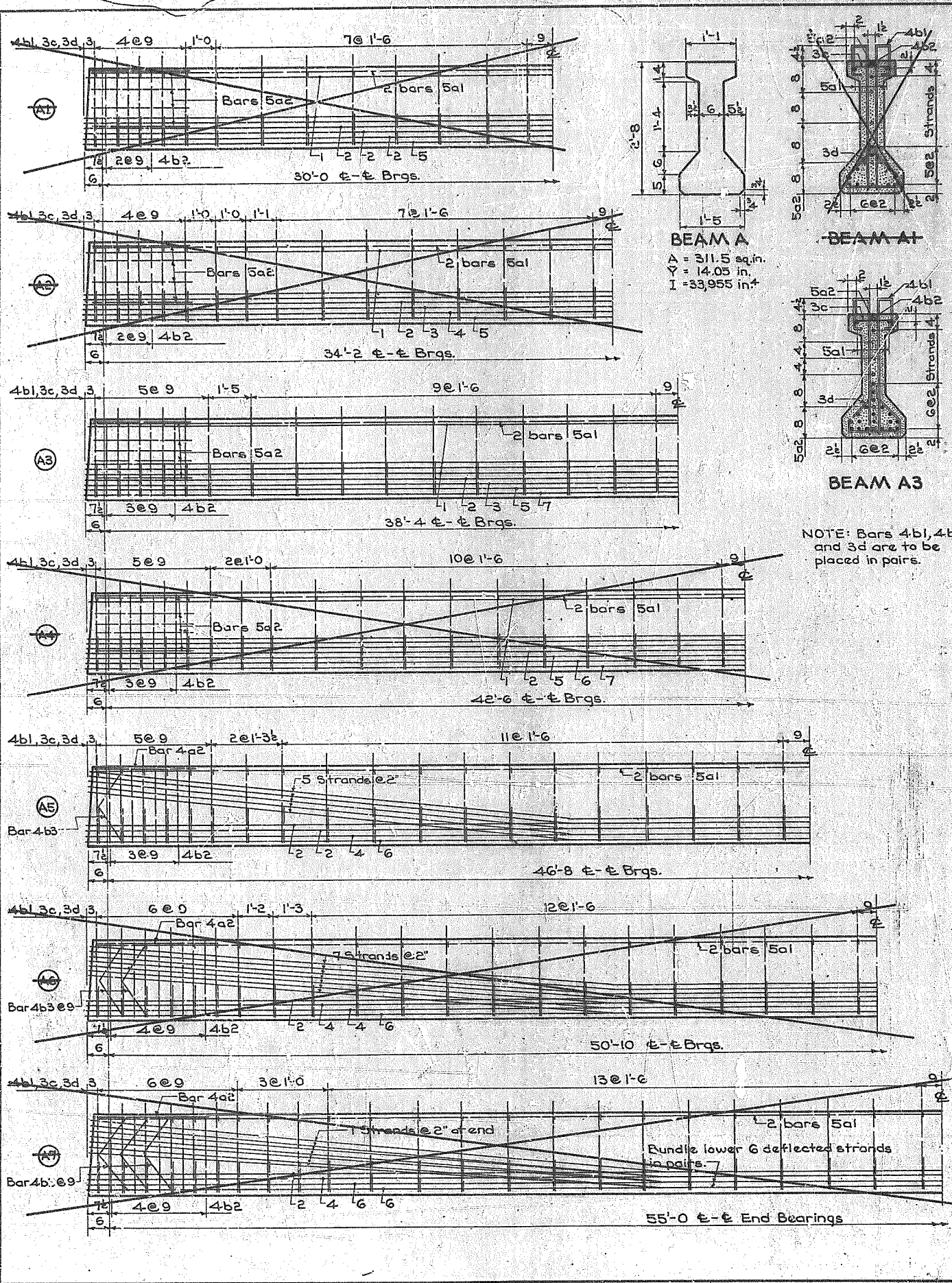
ROADWAY SECTION NEAR INTERMEDIATE DIAPHRAGM



LOCATION OF BEAM COIL TIES

Design for 2°40' Skew
DUAL 125'-10" x 40' PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES
 38'-11 1/2 End Spans 47'-11 Center Span
 Concrete Floor & Substructure Tubular Handrail
SUPERSTRUCTURE DETAILS
 Sta. 58+58.9 Interstate #80
 Sta. 1058+45.8 Local Road Proj. No. I-80-6(24)203
IOWA-POWESHIEK COUNTY
 Iowa State Highway Commission
 1962 Sheet 6 of 9

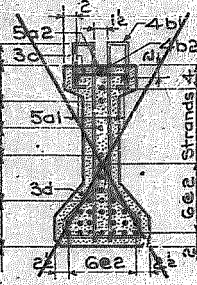
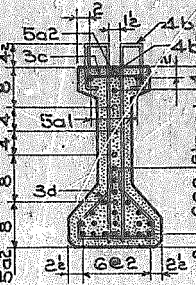
Design 162 Iowa County File No. 21236
 Designed by: [Signature] Traced by: [Signature] Checked by: [Signature]



BEAM A
 $A = 311.5 \text{ sq. in.}$
 $\gamma = 14.05 \text{ in.}$
 $I = 33,955 \text{ in.}^4$

BEAM A1

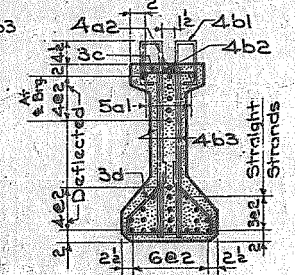
BEAM A2



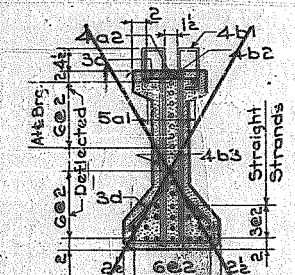
BEAM A3

BEAM A4

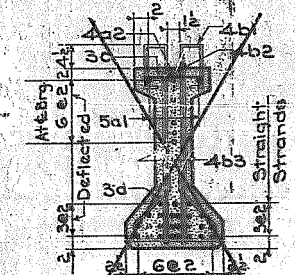
NOTE: Bars 4b1, 4b2, and 3d are to be placed in pairs.



BEAM A5

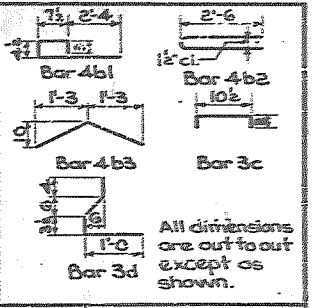


BEAM A6



BEAM A7

REINFORCING BAR LIST									
Beam	Span	A1	A2	A3	A4	A5	A6	A7	
Bar	Shape	No	Length	No	Length	No	Length	No	Length
5a1	—	2	30'-7"	2	34'-9"	2	38'-11"	2	42'-7"
4a2	—	—	—	—	—	—	—	—	—
5a2	—	8	5'-0"	8	5'-3"	10	5'-6"	10	5'-9"
4b1	—	52	4'-0"	60	4'-0"	64	4'-0"	76	4'-0"
4b2	—	6	5'-0"	6	5'-0"	8	5'-0"	8	5'-0"
4b3	—	—	—	—	—	—	—	—	—
3c	—	26	1'-2"	30	1'-2"	32	1'-2"	38	1'-2"
3d	—	52	2'-2"	60	2'-2"	64	2'-2"	76	2'-2"



All dimensions are out to out except as shown.

BEAM DATA							
Beam	Span	A1	A2	A3	A4	A5	A6
Initial Prestress	Kips	196	238	294	336	359	435
Size Strands		3	3	3	3	3	3
Straight Strands		14	17	21	24	14	18
Deflected Strands		—	—	—	—	5	7
Hold Down Stress	Kips	—	—	—	—	10.40	12.00
Camber	in.	—	—	—	—	.58	.53
D.L. Deflection in. (5'-0" Spec.)		.06	.10	.16	.24	.38	.53
D.L. Deflection in. (6'-6" Spec.)		.08	.13	.21	.34	.50	.70
Reinforcing Steel	lb.	318	358	403	446	425	524
Concrete	cy.	2.48	2.82	3.15	3.48	3.82	4.15

NOTES:
 Unless otherwise specified an allowance of .0005 L is to be made on all beams for shrinkage and elastic shortening.
 All deflected strands are to be held down at the third points of the beams except that the hold down point may be moved toward the center of the beam a distance not to exceed .05 span at the producer's option.
 Tops of beams are to be scored transversely at about 3' centers with a pointed tool. Scores are to be 5/8" deep.
 Hold down devices and procedure for tensioning and detensioning must be approved by the Engineer.
 Bearing details will be as detailed on sheet 6.
 Unless otherwise noted, the cost of bearing details, including masonry plates and/or neoprene pads, coil ties, coil rods and lifting loops is to be included in the price bid for prestressed concrete beams.
 Strand ends which will be encased in concrete in the finished structure are to be cut with a 1" projection with the exception of four strands at the pier end of the beam which are to be cut with a 2" projection and bent as detailed.
 Strand ends which will be exposed in the finished structure are to be cut flush and pointed with 2 coats of red lead at the plant.

DESIGN STRESSES: Design stresses for the following materials are in accordance with A.A.S.H.O. Standard Specifications for Highway Bridges, Series of 1961.
 Reinforcing steel in accordance with Section 1.4.12 "Reinforcement" for Intermediate, Hard or Rail Steel Grade.
 Concrete in accordance with Sec. 1.13.7, $f'_c = 5000 \text{ p.s.i.}$ Prestressing steel in accordance with Sec. 1.13.7, $f'_s = 250,000 \text{ p.s.i.}$

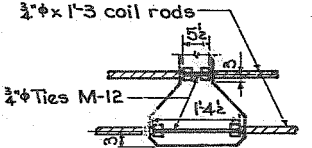
SPECIFICATIONS:
 DESIGN: A.A.S.H.O. 1961
 CONSTRUCTION: Standard Specifications of the Iowa State Highway Commission, Series of 1960, plus current Supplemental Specifications and Special Provisions.

MAXIMUM SPACING OF BEAMS FOR SPANS SHOWN			
Loading	Future W.S.	Maximum Spacing	
H-20-S16 (Primary)	19'7"	5'-0"	
H-20 (Primary)	19'7"	6'-0"	
H-20 (Secondary)	19'7"	6'-6"	
H-15 (Secondary)	—	7'-3"	

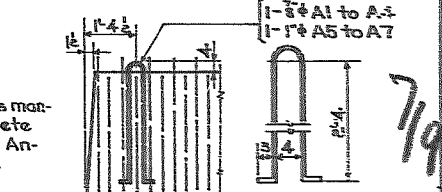
BEAM END DETAIL AT PIER
 Cut these 4 strands with a 9" projection & shop bend.

DETAILS AT PIER BEFORE PLACING PIER DIAPHRAGM

SECTION A-A



COILTIE DETAIL
 Number and location of coil ties to be as detailed on specific designs.
 Coil ties and anchors are to be as manufactured by the Superior Concrete Products Co., Richmond Screw Anchor Co. or an approved equal.



LIFTING LOOP DETAILS
 Lifting loops are to be structural grade steel. Alternate types may be substituted with the approval of the Engineer.

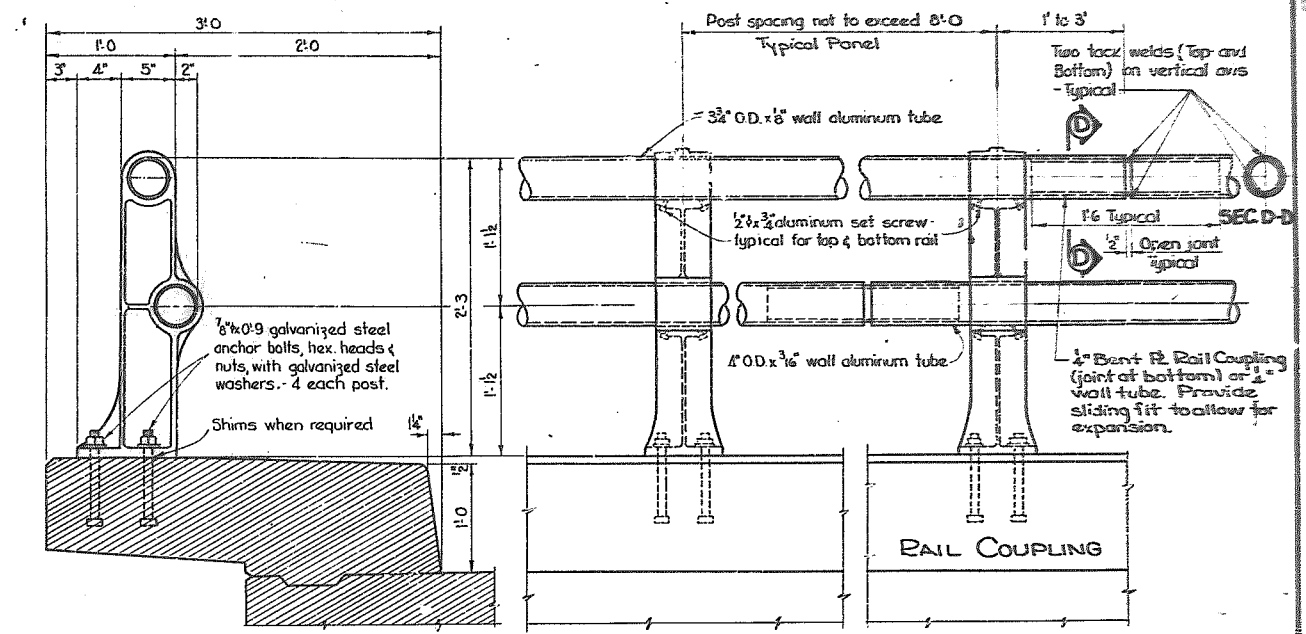
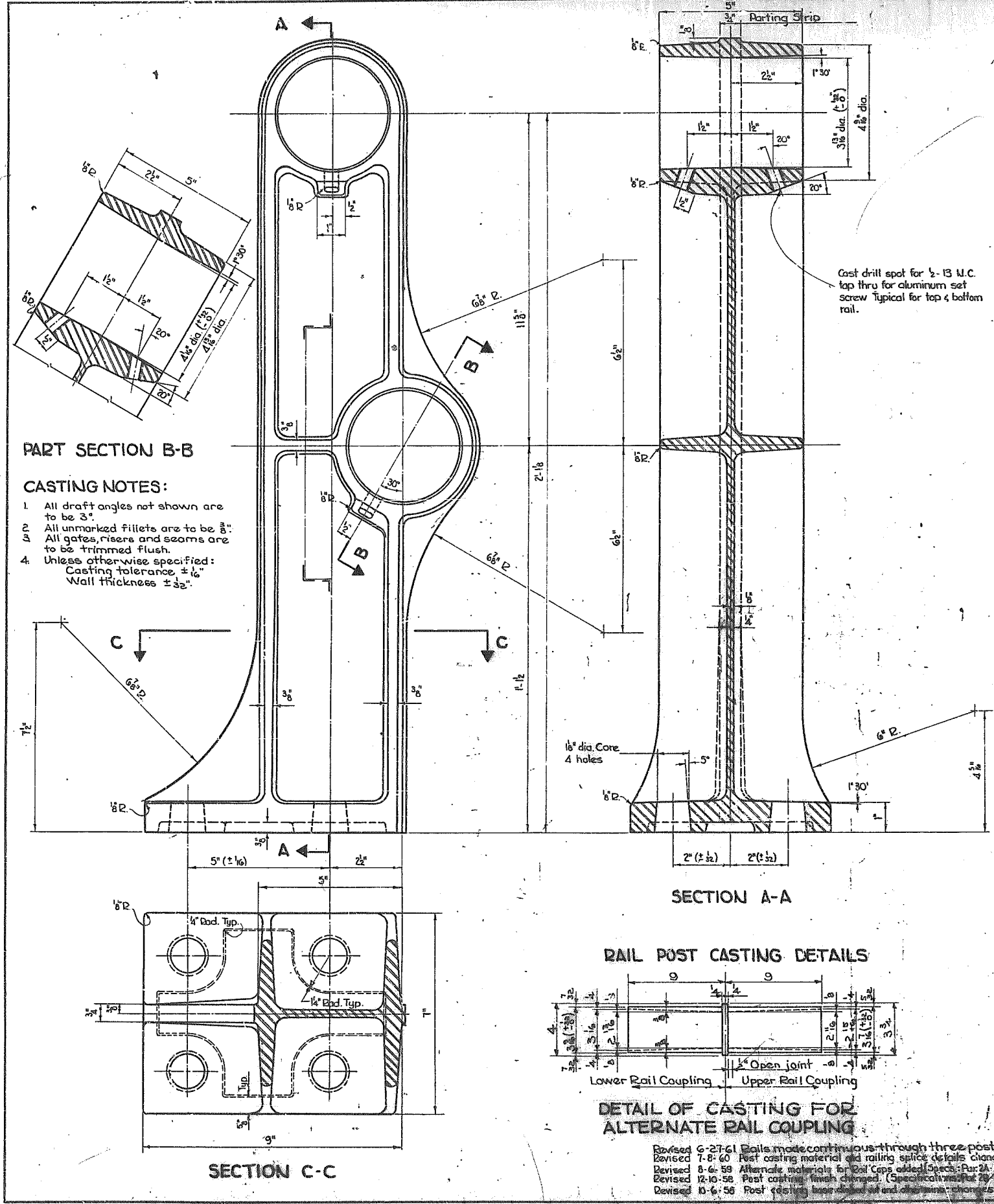
DUAL 125'-10" x 40' PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

38'-11 1/2" End Spans 47'-11" Center Span
 Concrete Floor & Substructure Tubular Handrail

BEAM DETAILS
 Sta. 58+58.9 Interstate #80
 Sta. 1058+45.8 Local Road Proj. No. I-80-6(24)208
IOWA - POWESHIEK COUNTY
 Iowa State Highway Commission

Revised (12-8-60): Minor mistakes corrected. Number of strands shown in beam section for A2 corrected.

NOTE: Top and bottom rail to be spliced in different rail panels.



SPECIFICATIONS:

- DESCRIPTION OF BID ITEM**
A. Aluminum handrail is to be bid on a linear foot basis measured from center to center of end posts. The price bid for "Aluminum Handrail" shall consist of furnishing, fabricating, erecting, and cleaning all metal handrail and shall include the furnishing and installation of anchor bolts and all other incidental items in accordance with these plans and specifications.
- COMPONENT PARTS AND MATERIALS**
A. Aluminum Bridge Rail Tubing
1. Aluminum tubing shall comply with the A.S.T.M. Specification B 235 - alloy 6061A condition T6 (commercial designation 6061-T6). The rail tubing is to be fabricated from random length tubing and joined as indicated. Each rail section must pass thru at least three posts before being spliced, for as many rail sections as possible.
2. The aluminum rail tubing shall be closed at the ends next to the concrete end post, as detailed, by means of cast caps or plugs or by means of welded end plates. The cast caps or plugs shall comply with the material specifications as outlined for post castings or with A.S.T.M. Specification B 108 or B 26 alloy 505A (AA Alloy 505A) condition F.
B. Aluminum Castings For Rail Posts, End Caps And Rail Couplings
1. Aluminum castings shall comply with the Iowa State Highway Commission Supplemental Specifications for "Aluminum Rail Posts And Cast End Caps" dated May 22, 1962.

3. CONSTRUCTION

- The specifications for construction shall be the Standard Specifications of the Iowa State Highway Commission, Series of 1960, plus current Special Provisions and current Supplemental Specifications with these added provisions:
1. The anchor bolts for the aluminum posts shall be set at the line and elevations shown on the plans. They shall be firmly held in place by suitable templates that will assure their correct position during the placement of concrete. Aluminum shims, as detailed, shall be used if necessary to insure the correct elevation of the rails.
2. The cast aluminum posts and the aluminum tube rails shall be carefully handled during their unloading, handling, and erection. Members that are marred, disfigured or damaged to the extent that they impair their usefulness or appearance shall be rejected and replaced at the contractor's expense.
3. The aluminum handrail shall be stored above ground upon suitable platforms and kept free from dirt, grease, and contact with dissimilar metals. The stored aluminum handrail shall be protected from moisture as far as practical.
4. After anchor bolts have been tightened, the excess caulking compound shall be removed and all openings around the base of the post pointed full and flush with caulking compound.
5. After erection, rails and posts and the concrete around the post bases shall be thoroughly cleaned of all dirt, grease, caulking compound and other foreign material by an approved means as directed by the Engineer.
6. Set screws are to be tightened to prevent rails from rattling, but they are not to be tightened so as to prevent movement due to rail expansion.

ALUMINUM HANDRAIL QUANTITIES	
Aluminum Handrail (4-4 End Posts)	232.5 lin. ft.

* Shown for one bridge

Design for 2'40" Skew
DUAL 125'-10" x 40' PRETENSIONED PRESTR'D CONCRETE BEAM BRIDGES

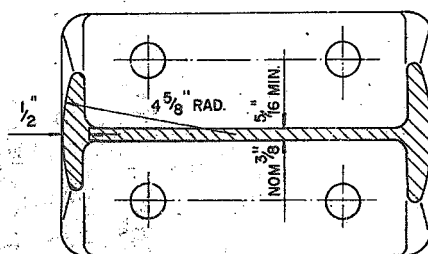
38'-11 1/2" End Spans
Concrete Floor & Substructure
47'-11" Center Span
Tubular Handrail

ALUMINUM HANDRAIL DETAILS
Station: 58+58.9 Interstate #80
Station: 1058+45.8 Local Road
IOWA - POWESHIEK COUNTY

Iowa State Highway Commission
June 1962
Design: 162
Iowa County
Filed by: 162
Checked by: 162

Revised 1-3-62: Specifications changed.
Revised 5-4-62: Cast coupling added and location of couplings changed.

Revised 6-27-61 Rails made continuous through three posts.
Revised 7-8-60 Post casting material and railing splice details changed.
Revised 8-6-59 Alternate materials for Rail Caps added (Specs. Part 2A Item 1).
Revised 12-10-58 Post casting finish changed (Specification Part 2B Item 4).
Revised 10-6-56 Post casting base detail and dimensions changed.



45

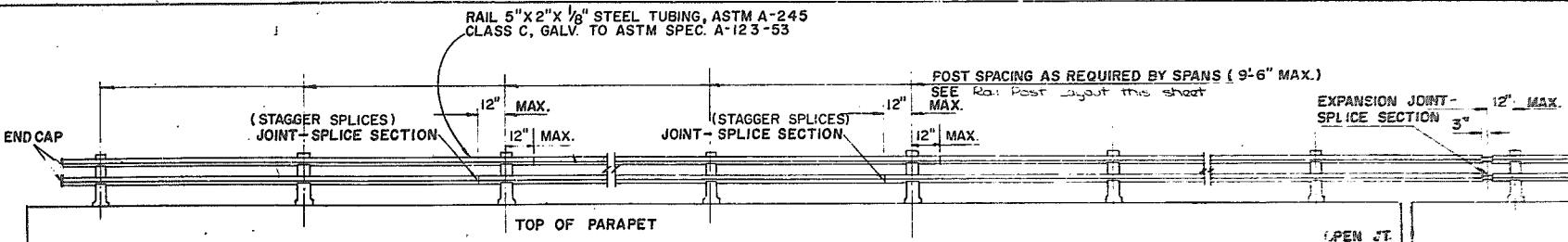


Diagram illustrating a splice joint for a 2x4 beam. The diagram shows a cross-section of the beam with a splice plate. Dimensions include a 2" vertical distance from the top edge to the center of the splice, a 1/8" gap, a 5/16" gap, and a 5" horizontal distance from the center of the splice to the right edge. Labels include "P HOLE (APPROX.)" and "SPlice".

Technical drawing of a rail assembly showing a side view and a cross-section view.

Side View:

- Overall length: 2"
- Overall diameter: 5 5/16"
- End cap: Labeled "END CAP"
- Flanges: Labeled "FLANGES 'SQUEEZED' TO FIT INSIDE RAIL"
- Internal structure: Labeled "RAIL"

Cross-section View:

- Overall width: 6 1/8"
- Overall height: 4 1/4"
- Hole: Labeled "1/4" DIA. HOLE"

Technical drawing showing a bolt and nut assembly. The bolt has a hexagonal head and a threaded shank. The nut is a hexagonal nut. The drawing includes the following dimensions and labels:

- $\frac{5}{8}$ " N.C. FINISHED HEX. NUT WITH $\frac{5}{8}$ " SPRING LOCK WASHER
- $\frac{1}{2}$ " DIA.
- 3" CENTRE
- MAX.
- 4"
- $\frac{5}{8}$ "
- $\frac{5}{8}$ DIA.

WEDGE BOLT & WASHER
GALVANIZED TO A.S.T.M.
A-153-53

Provide 4-1/8" thick galvanized
shims each post.

120'4" face to face of concrete end posts

13 sp. @ 7'9"

16 posts

End cap (See details above)

110'0"

1010

The steel handrail is to be bid on a lineal foot basis measured from centerline to centerline of end posts. The price bid for "Steel Handrail" shall be full compensation for furnishing all material including the anchor bolts and all equipment and labor required to erect the rail in accordance with these plans and Specifications.

No painting will be required.

For handling, storage and installation of steel handrail, Section 2414.06 of the Standard Specifications shall apply.

Each rail section must pass thru at least three posts before being spliced, for as many rail sections as possible.

Note that anchor bolt spacing for steel rail posts is not the same as for aluminum posts

Design 162 Iowa County File #21236
Designed by: Traced by (\$) Checked by:

Design 162 Iowa County File #21236
Designed by: Traced by (\$) Checked by: