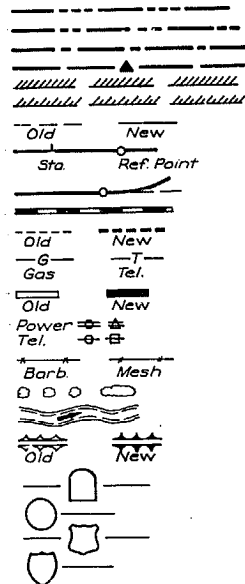


State Line
Co. Line
Twp. Line
Sec. Line
Corp. Line
Urban Bdry.
R.O.W. Lines
Survey Line

Profile Grade
Railroad
Field Tile
Underground Lines
Culverts
Utility Poles
Fences
Trees Or Brush
Stream
Dike

County Road No.
Primary Road No.
U. S. Road No.
Interstate Road No.

CONVENTIONAL SIGNS



STATE OF IOWA
STATE HIGHWAY COMMISSION

PLANS OF PROPOSED IMPROVEMENT
ON THE

PRIMARY ROAD SYSTEM
CASS COUNTY
CULVERTS

12.464 MILES ON U. S. NO. 71 FROM 1.014 MILES SOUTH OF LYMAN TO 0.500 MILES SOUTH OF ATLANTIC

SCALES: AS NOTED

THE IOWA STATE HIGHWAY COMMISSION STANDARD SPECIFICATIONS
FOR CONSTRUCTION WORK, SERIES OF 1964 SHALL
APPLY TO WORK ON THIS PROJECT

(Plus current Special Provisions, and Supplemental Specifications)

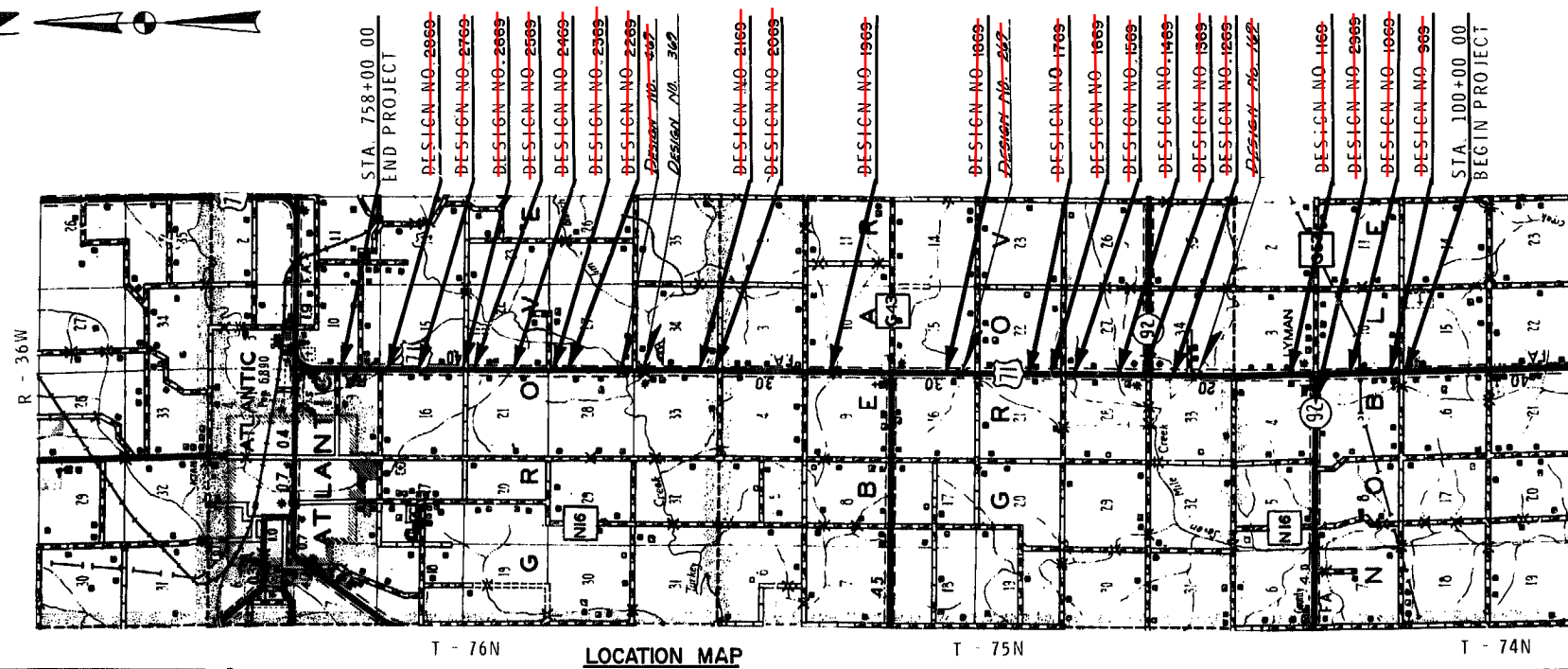
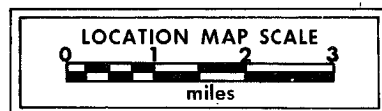
DESIGN STRESSES for the following materials are in accordance with
A. A. S. H. O. Standard Specifications for Highway Bridges, Series of 1965.

Concrete in accordance with Section 2403. $f'_c = 3500$ psi.
Reinforcing Steel in accordance with Section 2404.
"Reinforcement" for Intermediate, Hard, or Rail
Steel Grade.

DESIGN STRESSES: For Design's 169-269-369-469

Design Stresses for the following materials are in accordance with
AASHO Standard Specifications for Highway Bridges, Series of 1967.
Concrete in accordance with Section 1.5.1 $f'_c = 3500$ psi.
Reinforcing Steel in accordance with Section 1.5.1 $f'_s = 20,000$ psi.
Prestressing Steel in accordance with Section 1.6.7 $f'_s = 270,000$ psi.
Prestress Concrete in accordance with Section 1.6.7 $f'_c = 5000$ psi.

MILEAGE SUMMARY		
	LIN. FT.	MILES
BRIDGE AT STA. 221+49.00	204,437	.039
STR. AT STA. 370+00.00	21,569	.004
BRIDGE AT STA. 565+93.00	204,286	.038
BRIDGE AT STA. 580+13.00	204,667	.039
TOTAL		.120



STATE	FED. ROAD DIST. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
IOWA	5		1	77
PROJECT NUMBER				
F-71-3(2)--20-15				
R.O.W. PROJECT NUMBER				
FN-71-3(5)--21-15				

INDEX OF SHEETS		105.3
NO.	DESCRIPTION	
1	TITLE SHEET	
2-2A	ESTIMATE SHEET	
3	MISCELLANEOUS DETAIL SHEET	
4	MISCELLANEOUS DETAIL SHEET (RF-1)	
5	MISCELLANEOUS DETAIL SHEET (RF-2)	
6	MISCELLANEOUS DETAIL SHEET (RF-3)	
7	MISCELLANEOUS DETAIL SHEET (RF-4)	
8	MISCELLANEOUS DETAIL SHEET (RF-13)	
9	MISCELLANEOUS DETAIL SHEET (RF-14)	
10-11	CULVERT DESIGN NO. 969	
12-13	CULVERT DESIGN NO. 1069	
14	CULVERT DESIGN NO. 1169	
15	CULVERT DESIGN NO. 1269	
16-17	CULVERT DESIGN NO. 1369	
18-20	CULVERT DESIGN NO. 1469	
21-22	CULVERT DESIGN NO. 1569	
23	CULVERT DESIGN NO. 1669	
24-25	CULVERT DESIGN NO. 1769	
26	CULVERT DESIGN NO. 1869	
27-31	CULVERT DESIGN NO. 1969	
32	CULVERT DESIGN NO. 2069	
33	CULVERT DESIGN NO. 2169	
34	CULVERT DESIGN NO. 2269	
35	CULVERT DESIGN NO. 2369	
36-37	CULVERT DESIGN NO. 2469	
38	CULVERT DESIGN NO. 2569	
39	CULVERT DESIGN NO. 2669	
40-41	CULVERT DESIGN NO. 2769	
42-43	CULVERT DESIGN NO. 2869	
44	CULVERT DESIGN NO. 2969	
45-54	BRIDGE DESIGN NO. 169	
55-57	TWIN CULVERT DESIGN NO. 299	
58-67	BRIDGE DESIGN NO. 369	
68-77	BRIDGE DESIGN NO. 469	

IOWA STATE HIGHWAY COMMISSION STANDARDS
(AVAILABLE AT THE I.S.H.C. STOREROOM)

DES. NO.'S 169 - 269 - 369 - 469

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED
UNDER MY SUPERVISION AND THAT ENGINEERING
DECISIONS WITH REGARD TO THE DESIGN WERE MADE
BY ME OR BY OTHER DULY REGISTERED PROFESSIONAL
ENGINEERS UNDER THE LAWS OF THE STATE OF IOWA.
DATE 2-13 1970 IOWA REG. NO. 2792

DESIGN DATA RURAL

196.9 AADT 1570 V.P.D.
198.9 AADT 1870 V.P.D.
198.9 DHV 224 V.P.H.
DIRECTIONAL 54 %
TRUCKS 17 %
DESIGN V 70 M.P.H.
III ACCESS CONTROL



STANDARD	ISSUED	REVISED
C1P	1932	1967
CFP	1945	
C8P	1932	1944
C3P	1932	1944
C4P	1932	1944
C5P	1932	1944
C3J	1959	
C4J	1959	1964
C5J	1959	1964
C6J	1959	1964
C8J	1959	1964
C10J	1959	1964
CBH-00	1960	
CHP 2.5 - 65	1965	1967
F3J	1960	1964
F4J	1960	1964
F5J	1960	1964
F6J1	1960	1964
F8J1	1960	1964
C8F	1952	1955
F10J2	1960	1964

APPROVED
DEPUTY CHIEF ENGINEER
IOWA HIGHWAY COMMISSION
DATE 2/10/70

DES. NO.'S 969 THRU 2969
I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED UNDER MY SUPERVISION AND THAT ENGINEERING DECISIONS WITH REGARD TO THE DESIGN WERE MADE BY ME OR BY OTHER DULY REGISTERED PROFESSIONAL ENGINEERS UNDER THE LAWS OF THE STATE OF IOWA.
Richard S. McManis
DATE May 19 69 IOWA REG. NO. 6110
KIRKHAM MICHAEL & ASSOCIATES
OMAHA, NEBR.

U.S. DEPT. TRANSPORTATION
BUREAU OF PUBLIC ROADS
APPROVED
DIVISION ENGINEER
DATE 100

HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT PERSONAL SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF IOWA.

DATE 2-12-70 WILLIAM C. EYER REG. NO. 2926

DESIGN NO. 169 U.S. #71 STA. 221+49.00
CASS COUNTY OVER SEVEN MILE CREEK (Q. OFF. RELOC. U.S. #71)
SECTIONS 33-34 T - 75N R - 36W BEAR GROVE TOWNSHIP

IN LETTING OF MARCH 31, 1970

DESIGN FOR 15° SKEW
201'-4 x 44' PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE

ESTIMATE OF QUANTITIES			
ITEM		UNIT	TOTAL
Structural Concrete		Cu. Yds.	518.9
Reinforcing Steel		Lbs.	116 853
Pretensioned Prestressed Concrete Beams	B63:	No.	7
	B67:	No.	14
Class 10 Channel Excavation		Cu. Yds.	1 400
Class 20 Excavation		Cu. Yds.	211
Class 21 Excavation		Cu. Yds.	312
Granular Backfill		Cu. Yds.	112
4" Tile Subdrain		Lin. Ft.	190
Aluminum Handrail		Lin. Ft.	410.5
Steel Handrail		Lin. Ft.	410.5
108P42 Steel	Furnish	Lin. Ft.	1 791
Bearing Piling	Drive	Lin. Ft.	1 791

(1) Includes 187.6 cu. yds. of Class "C" and 331.3 cu. yds. of Class "D" concrete.

THESE BRIDGES WILL REQUIRE BRIDGE SIGN ASSEMBLIES, FURNISHED AND PLACED BY OTHERS, AS SPECIFIED IN SECTION 2 C-5 OF THE I. S. H. C. MANUAL ON "UNIFORM TRAFFIC CONTROL DEVICES", DATED JANUARY - 1963.

HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT PERSONAL SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF IOWA.

DATE 2-12-70 WILLIAM C. EYER REG. NO. 2926

DESIGN NO. 469 U.S. #71 STA. 580+13.00
CASS COUNTY OVER TURKEY CREEK (Q. OFF. RELOC. U.S. #71)
SECTIONS 27 & 28 T - 76N R - 36W BEAR GROVE TOWNSHIP

IN LETTING OF MARCH 31, 1970

DESIGN FOR 26° SKEW
201'-4 x 44' PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE

ESTIMATE OF QUANTITIES			
ITEM		UNIT	TOTAL
Structural Concrete		Cu. Yds.	522.2
Reinforcing Steel		Lbs.	114 846
Pretensioned Prestressed Concrete Beams	B63:	No.	7
	B67:	No.	14
Class 10 Channel Excavation		Cu. Yds.	1 785
Class 20 Excavation		Cu. Yds.	194
Class 21 Excavation		Cu. Yds.	219
Granular Backfill		Cu. Yds.	128
4" Tile Subdrain		Lin. Ft.	228
Removal of Existing Structure		L. S.	LumpSum
Aluminum Handrail		Lin. Ft.	411.0
Steel Handrail		Lin. Ft.	411.0
108P42 Steel	Furnish	Lin. Ft.	1 688
Bearing Piling	Drive	Lin. Ft.	1 688

(1) Includes 184.4 cu. yds. of Class "C" and 337.8 cu. yds. of Class "D" concrete.

HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT PERSONAL SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF IOWA.

DATE 2-12-70 DALE E. QERBY REG. NO. 3049

DESIGN NO. 269 STATION 370+00
CASS COUNTY (Q. OFF. RELOC. U.S. #71)
SECTIONS 15-16 T - 75N R - 36W BEAR GROVE TOWNSHIP

IN LETTING OF MARCH 31, 1970

DESIGN FOR
TWIN 10'x10'x128' REINFORCED CONCRETE BOX CULVERT
15° SKEW

ESTIMATE OF QUANTITIES		
ITEM	UNIT	TOTAL
Concrete Structural Class "C"	Cu. Yds.	429.2
Reinforcing Steel	Lbs.	63 912
Excavation Class 20	Cu. Yds.	878
Removal As Per Plan	L. S.	LumpSum
Removal of Old Pavement	Sq. Yds.	124

HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT PERSONAL SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF IOWA.

DATE 2-12-70 WILLIAM C. EYER REG. NO. 2926

DESIGN NO. 369 U.S. #71 STA. 565+93.00
CASS COUNTY OVER LONE TREE CREEK (Q. OFF. RELOC. U.S. #71)
SECTIONS 33 & 34 T - 76N R - 36W BEAR GROVE TOWNSHIP

IN LETTING OF MARCH 31, 1970

DESIGN FOR 15° SKEW
201'-4 x 44' PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE

ESTIMATE OF QUANTITIES			
ITEM		UNIT	TOTAL
Structural Concrete		Cu. Yds.	525.0
Reinforcing Steel		Lbs.	117 521
Pretensioned Prestressed Concrete Beams	B 63	No.	7
	B 67	No.	14
Class 10 Channel Excavation		Cu. Yds.	963
Class 20 Excavation		Cu. Yds.	348
Class 21 Excavation		Cu. Yds.	227
Granular Backfill		Cu. Yds.	118
4" Tile Subdrain		Lin. Ft.	220
Removal of Existing Structure		L. S.	LumpSum
Aluminum Handrail		Lin. Ft.	410.5
Steel Handrail		Lin. Ft.	410.5
108P42 Steel	Furnish	Lin. Ft.	2 690
Bearing Piling	Drive	Lin. Ft.	2 690

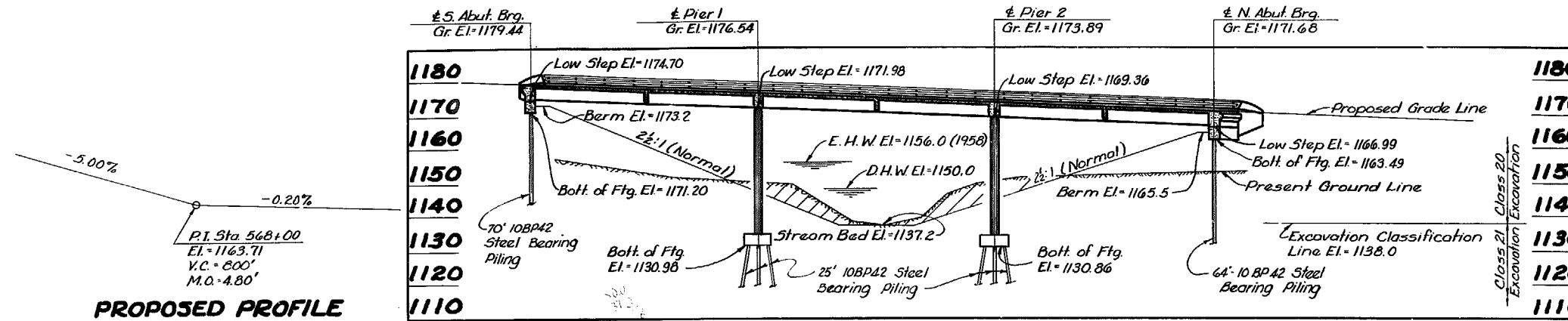
(1) Includes 193.8 cu. yds. of Class "C" and 331.2 cu. yds. of Class "D" concrete.

ESTIMATE SHEET

Cass County Project No. F-71-3(2)--20-16 File No. 23225

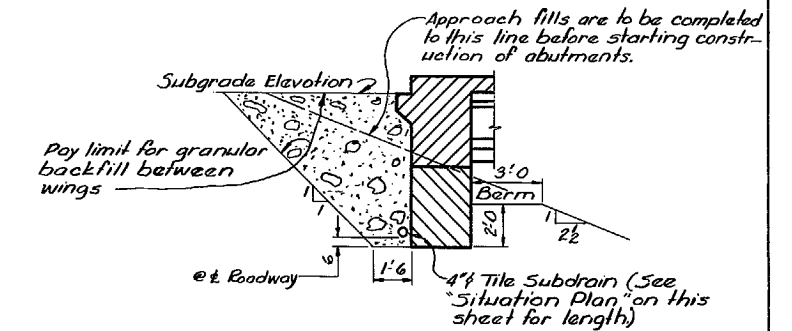
STATE	FED. ROAD DIST. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
IOWA	5		24	77

Bench Mark #34: Sta. 565+10, 198' Lt.; 60d spike in 46" tree: El. = 1157.45

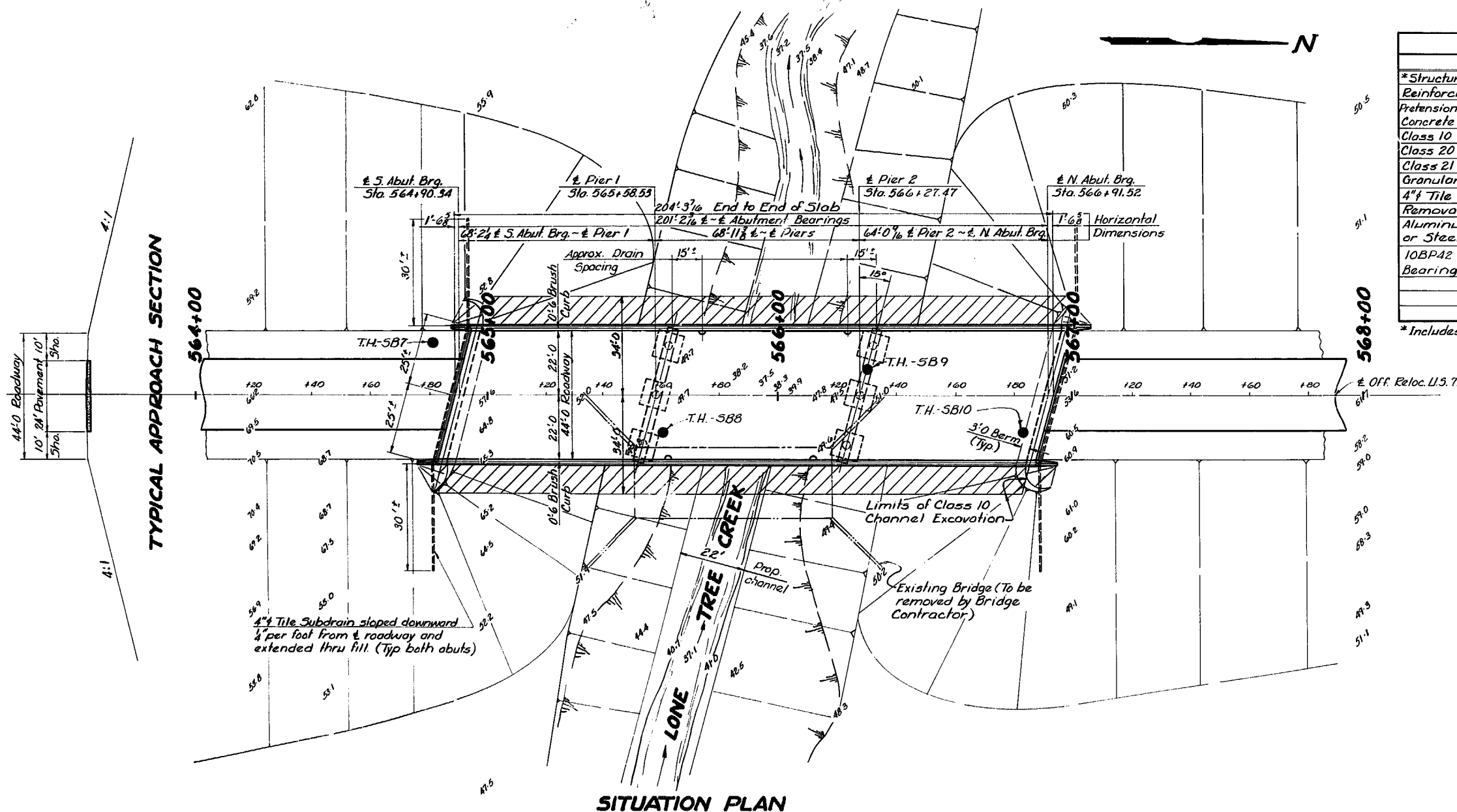


PROPOSED PROFILE GRADE DATA

LONGITUDINAL SECTION ALONG & ROADWAY
(Note: Pre-drill abutment fill to El. = 1165.2 @ S. abutment and El. = 1157.5 @ N. abutment.)



GRANULAR BACKFILL DETAILS



SITUATION PLAN

TOTAL ESTIMATED QUANTITIES				
Item	Units	Superstr. & Integral Abuts.	Piers	Total
*Structural Concrete	Cu. Yds.	373.3	151.7	525.0
Reinforcing Steel	Lbs.	81,459	56,062	117,521
Prestressed Prestressed Concrete Beams	No.	7		7
		14		14
Class 10 Channel Excavation	Cu. Yds.			963
Class 20 Excavation	Cu. Yds.	105	243	348
Class 21 Excavation	Cu. Yds.		227	227
Granular Backfill	Cu. Yds.	116		116
4" Tile Subdrain	Lin. Ft.			220
Removal of Existing Structure	L.S.			Lump Sum
Aluminum Handrail or Steel Handrail	Lin. Ft.			410.5 or 410.5
10BP42 Steel	Lin. Ft.	10 @ 70' ; 10 @ 64'	54 @ 25'	2690
Bearing Piling	Lin. Ft.	10 @ 70' ; 10 @ 64'	54 @ 25'	2690

*Includes 193.8 Cu. Yds. of Class "C" and 331.2 Cu. Yds. of Class "D" concrete.

Traffic Count 1850 V.P.D. (1988)

LOCATION:
Cass County
T-76-N R-36-W
Sections 33-34
Grove Twp.
U.S. #71 over
Lone Tree Creek

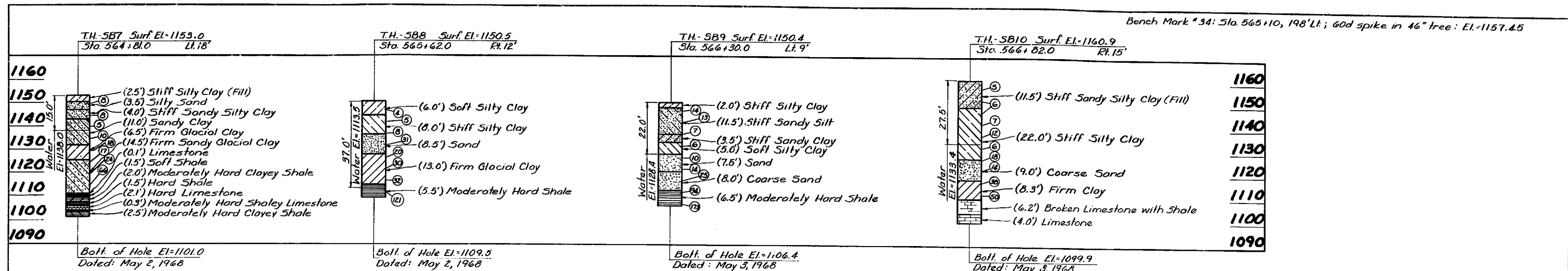
Design for 15° Skew
201' 4x44' PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE
68' 3" & 64' 1" End Spans 69' 0" Center Span
SITUATION PLAN
Station: 565+93.00 (± Off. Reloc. U.S. #71) August, 1969
CASS COUNTY
Iowa State Highway Commission
Design Sh. No. 1 of 10 File No. 23225 Design No. 969

Detailed by: J. Matney
Traced by: J. Matney
Checked by: J. Har Kim

Section Leader: W.C. Eyer

CASS COUNTY

PROJECT NUMBER	FED. ROAD DIST. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
F-71-3(2)-20-15	5		58	77



SOUNDING DATA

Note: Encircled figures indicate blows per foot.

GENERAL NOTES:

This bridge is designed for HS20-44 loading, plus 20 Lbs. per square foot of roadway for future wearing surface.

The approach fills as shown are not a part of this contract, 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 and dimensions shown. Dressing of slopes outside the bridge area not disturbed by the bridge contractor shall be paid for as extra work.

The Bridge Contractor is to install tile subdrain behind each abutment as detailed. The price bid for "4" Tile Subdrain" is to include the excavation necessary for the installation.

The Bridge Contractor is to clear the channel under the bridge for a distance of 34'-0" on either side of the centerline of roadway as shown by the hatched areas on the "Situation Plan" and "Longitudinal Section Along Centerline of Roadway" on sheet #1.

Pier excavation is based on the assumption that the Class 10 Channel Excavation will have been completed.

The bottom of the abutment footings of the piles shall be formed to exclude concrete from the pre-drilled holes.

The Bridge Contractor shall take care not to damage or interfere with operation of the subdrains at the ends of this bridge. (See sheet #10).

The Bridge Contractor is to remove the existing 72' x 20' Pony Truss Bridge with concrete floor and substructure. All material removed, including structural steel, shall become the property of the Bridge Contractor and shall be removed from the site or disposed of in accordance with applicable specifications. The bid item "Removal of Existing Structure" includes approximately 300 Cu Yds. of concrete and 45,000 Lbs. of structural steel.

SPECIFICATIONS:

Design: AASHTO, Series of 1969.

Construction: Standard Specifications of the Iowa State Highway Commission, Series of 1964, plus current Special Provisions and Supplemental Specifications.

PILE NOTE:

The 108P42 steel bearing piles required at the abutments and piers shall be driven to practical refusal in the shale and limestone layers. Each abutment and pier pile is designed for 37 ton bearing value.

The abutment piles shall be driven thru 18" holes drilled to El.=1165.2 at the south abutment and El.=1167.5 at the north abutment. Voids around piles shall not be backfilled. Drilling of holes is considered incidental to pile driving.

Seating of piles shall be done with a diesel hammer of at least (18,000 for pier piles, 26,000 for abutment piles) ft.-lbs. of rated energy operating at full capacity; or a gravity hammer having an effective weight of at least (4500 for pier piles, 6000 for abutment piles) pounds and a driving energy of not less than (36,000 for pier piles, 38,000 for abutment piles) ft.-lbs. but not more than 40,000 ft.-lbs.

DESIGN STRESSES:

Design stresses for the following materials are in accordance with AASHTO Standard Specifications for Highway Bridges, Series of 1969.

Concrete in accordance with Section 1.5.1, $f'_c = 3500$ psi.

Reinforcing Steel in accordance with Section 1.5.1, $f'_s = 20,000$ psi.

Prestressing Steel in accordance with Section 1.6.7, $f'_s = 270,000$ psi.

Prestress Concrete in accordance with Section 1.6.7, $f'_c = 5000$ psi.

Traced by: J. Matney

Detailed by: J. Matney

Checked by: J. Harkin

Design for 15° Skew 201'4x44' PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE

68'3" x 64'1" End Spans 69'0" Center Span

Station: 565+93.00 (± Off Reloc. U.S. #71) August, 1969

CASS COUNTY

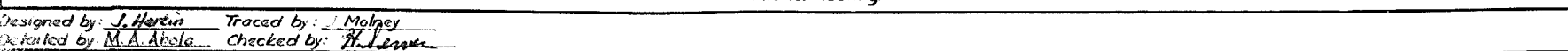
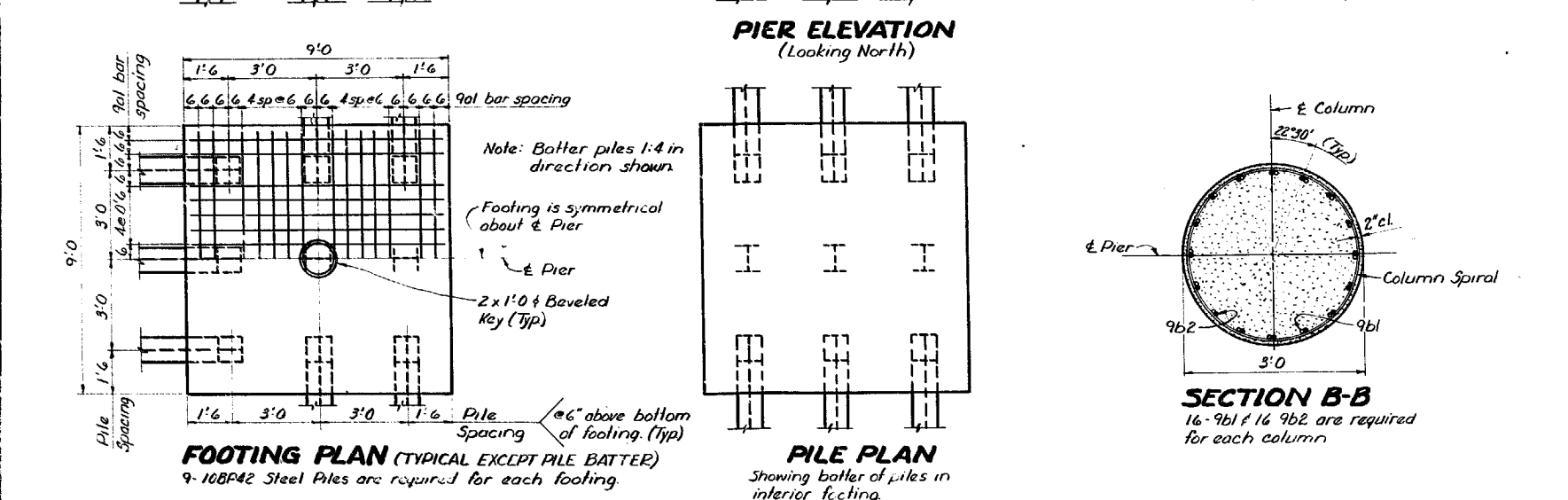
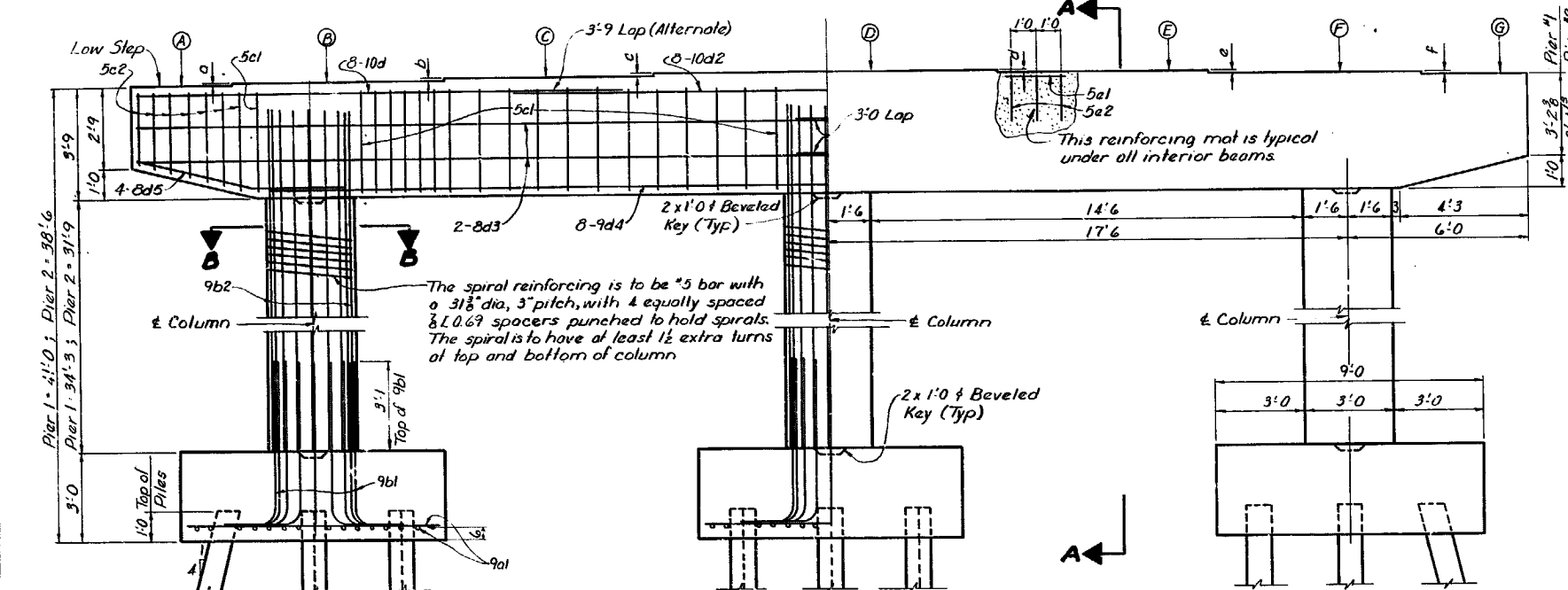
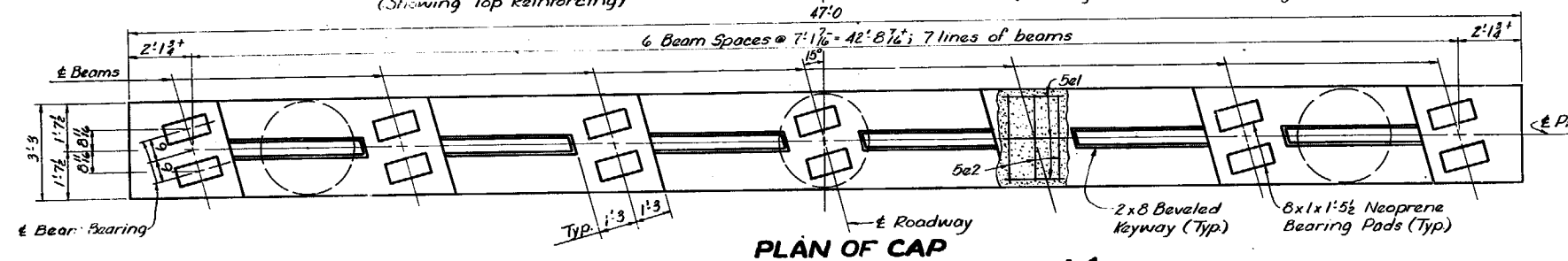
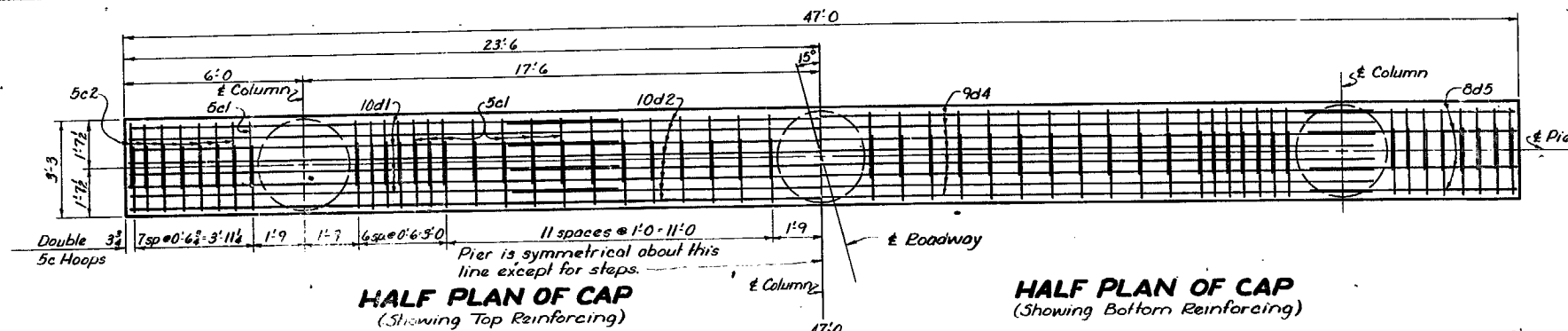
Iowa State Highway Commission

Design Sh. No. 2 of 10 File No. 23225 Design No. 369

CASS COUNTY

PROJECT NUMBER
F-71-3(2)-20-15

STATE	FED. ROAD DIST. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
IOWA	5		57	77

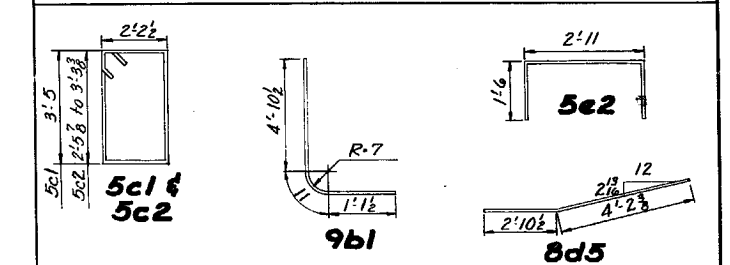


ELEVATION TABLE		
<i>Point</i>	<i>Pier #1</i>	<i>Pier #2</i>
<i>A (Low Step)</i>	1171.98	1169.3
<i>B</i>	1172.16	1169.5
<i>C</i>	1172.34	1169.7
<i>D (Pier Top)</i>	1172.49	1169.8
<i>E</i>	1172.49	1169.8
<i>F</i>	1172.46	1169.7
<i>G</i>	1172.43	1169.7
<i>± Grade Elev</i>	1176.34	1173.8
<i>Bottom of Ftg El</i>	1130.98	1130.8
<i>Gr to Pier Top</i>	4'-0"	4'-0"

* Lower figure is for pier 1

[illegible]

BENT BAR DETAILS



Note: All dimensions are out to out. Radii are to $\pm$ bar.

CONC. PLACEMENT QUANTITIES

	Pier 1	Pier 2
Footings	27.0	27.0
Columns	26.9	24.9
Cap	22.9	22.8
Total (Cu. Yds.)	76.8	74.9

TOTAL ESTIMATED QUANTITIES - TWO PIERS

Item		Units	Quantity
Structural Concrete, Class "C"		Cu.Yds.	151.7
Reinforcing Steel		Lbs.	36,062
Class 20 Excavation		Cu.Yds.	243
Class 21 Excavation		Cu.Yds.	227
108P42 Steel	Furnish 54 @ 25'	Lin.Ft.	1350
Bearing Piling	Drive 54 @ 25'	Lin.Ft.	1350

PIER NOTES:

All exposed corners 90° or sharper are to be filletted with a $\frac{3}{8}$ " dressed and beveled strip.

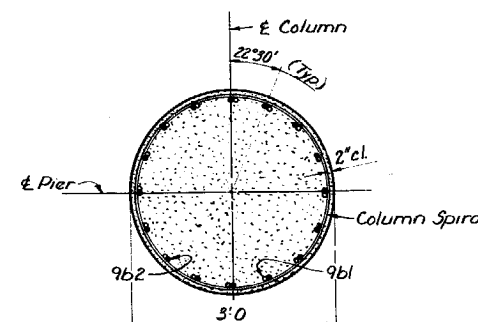
Minimum clear distance from face of concrete to near reinforcing is to be 2" unless otherwise noted or shown.

Reinforcing steel is to be securely wired in place before concrete is poured.

The spiral reinforcing may be made of plain structural grade steel and spliced by lapping $1\frac{1}{2}$ turns. The length of the spiral shown does not include the lapped length of the splices. The cost of laps at splices is to be included in the price bid for other reinforcement. *5 spirals shall be of material permitted for *4 spirals.

See "Pile Notes" on sheet #2.

	Pier 1	Pier 2
a	2 1/8	2 1/8
b	2 1/8	2 1/8
c	1 1/8	1 3/4
d	0	8
e	3 1/8	7/8
f	3/8	1/4



SECTION B-B
16-9b1 & 16-9b2 are required
for each column

Design for 15° Skew
**201'4"x44' PRETENSIONED PRESTRESSED
CONCRETE BEAM BRIDGE**

68'-3" & 64'-1" End Spans 69'-0" Center Span

PIER DETAILS

Station: 565+93.00 (2 Off. Reloc. U.S.#71) August, 1969

Iowa State Highway Commission
Design 5b N^o 3 of 10 File N^o 23225 Design N^o 369

STATE	FED. ROAD DIST. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
IOWA	5		60	77

CASS COUNTY

PROJECT NUMBER	F-7
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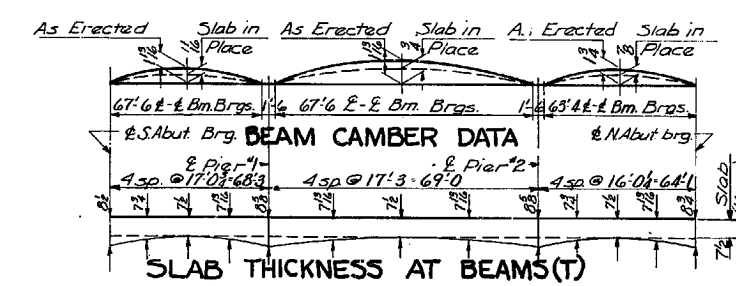
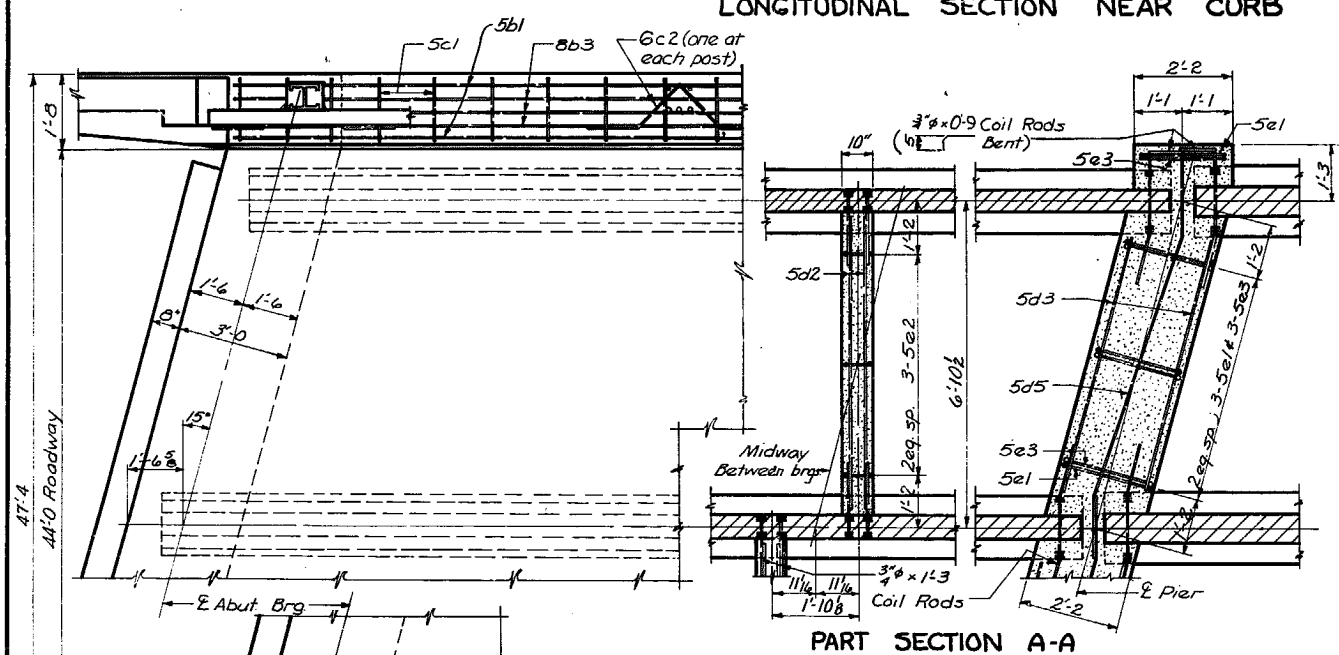
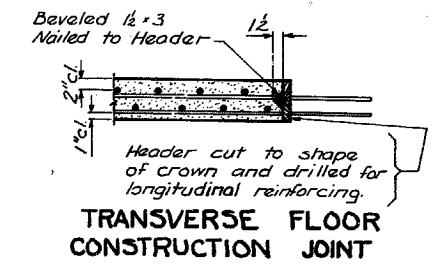
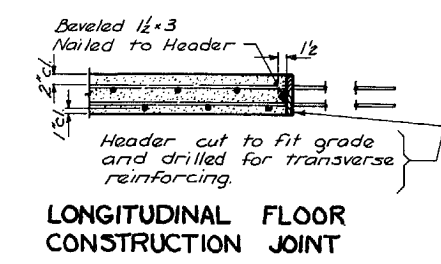
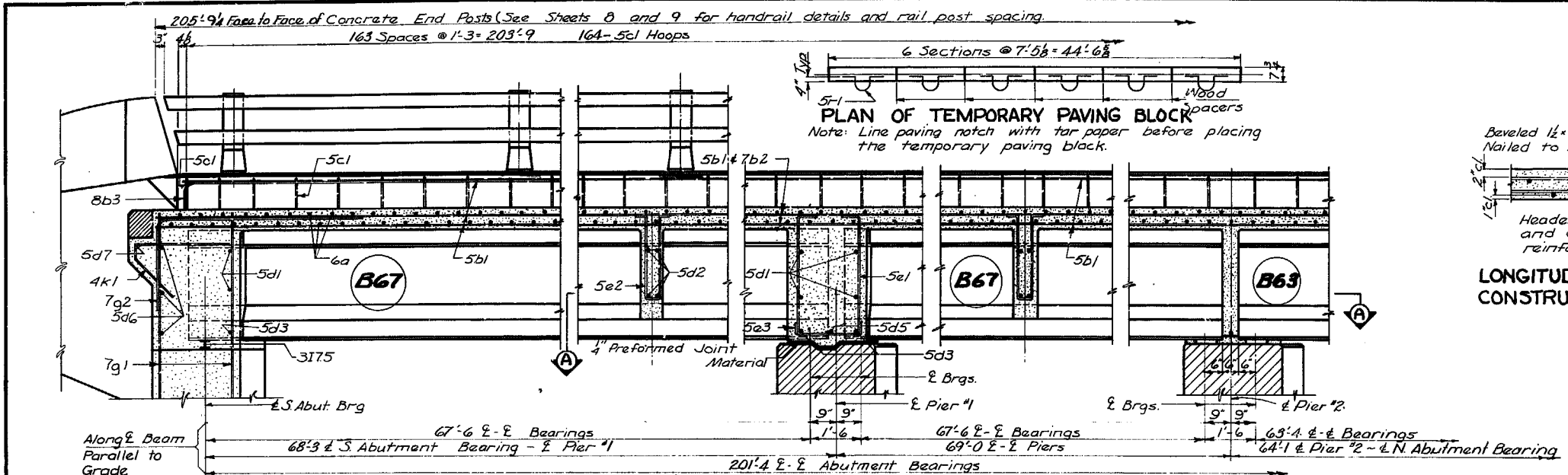
100-20-15

STATE	FED. ROAD DIST. NO.
IOWA	5

FISCAL YEAR	SHEET NO.	TOTAL SHEETS
	60	77

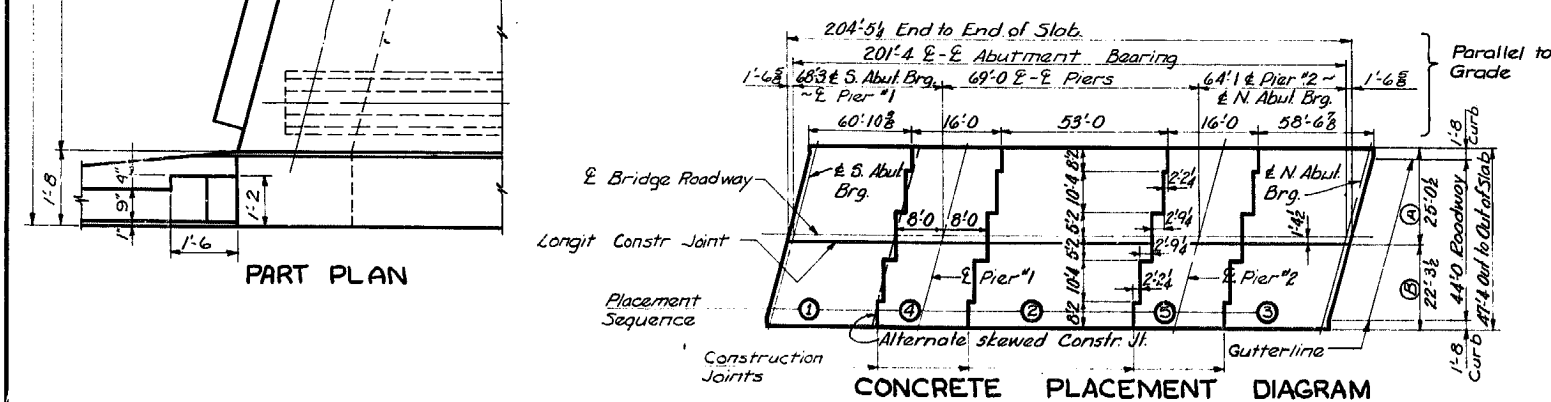
Standard Film Print Co. T

This sheet to be used with PC66 Prestress Beams and wood piles. Use a minimum detailing haunch of 2".

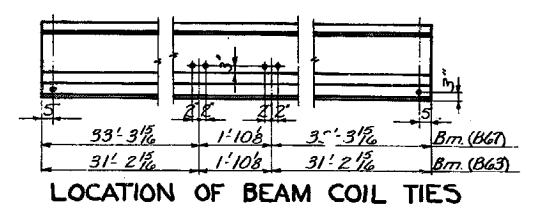


SLAB THICKNESS DETAILS

Note: The slab thickness (T) at beams is based on the anticipated beam camber remaining after placing the slab, but is not guaranteed for construction. If beam is under cambered, increase slab thickness (T) at beams to compensate. If beam is over cambered, the slab thickness (T) at beam may be decreased to a maximum of 1/2" embedment at the beam (T). If more than 1/2" embedment is required, or if the haunch exceeds 2", the grade line is to be revised.



Note: Roadway slab shall be placed in sections and sequences indicated and preferably at intervals not exceeding 24 hours. Alternate procedures for placing slab 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 results. Curbs may be poured continuously.



CONC. PLACEMENT QUANT.-1 SUPER. & 2 ABUTS.				
Item	A	B	Class "C"	Class "D"
Section 1 Slab & Diaph.	47.9	42.2		90.1
Section 2 Slab & Diaph.	32.6	29.0		61.6
Section 3 Slab & Diaph.	45.4	40.1		85.5
Section 4 Slab & Diaph.	15.1	13.5		28.6
Section 5 Slab & Diaph.	15.1	13.5		28.6
Curbs 2 @ 12.8				25.6
*Paving Blocks 2 @ 1.1				2.2
Abutment Wings 4 @ 1.85				7.4
Abut. Flgs. 5 @ 21.2; N=20.9			42.1	
End Posts 4 @ 0.4				1.6
Total (Cu. Yd.)			42.1	331.2

ESTIMATED QUANT.-1 BRIDGE (SUPER. & ABUTS.)		
Item	Units	Quantity
Structural Concrete Class "D"	Cu. Yds.	331.2
Structural Concrete Class "C"	Cu. Yds.	42.1
Prestensioned Prestressed Concrete Beams	63'4; B63	N° 7
Reinforcing Steel	Lbs.	81,459
Class 20 Excavation	Cu. Yds.	105
Granular Backfill	Cu. Yds.	118
10BP42 Steel	Furnish 10 @ 70'; 10 @ 64'	Lin. Ft. 1340
Bearing Piling	Drive 10 @ 70'; 10 @ 64'	Lin. Ft. 1340

*May be Class "C" or Class "D" Concrete

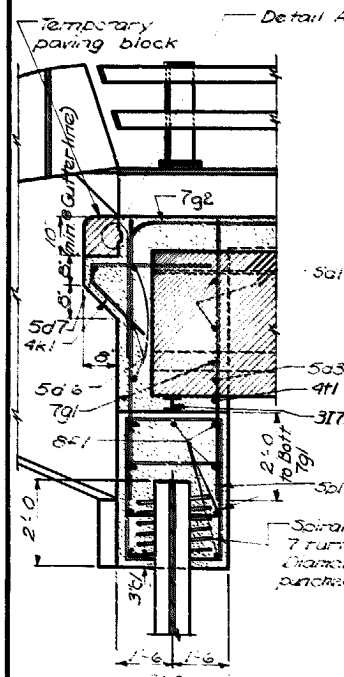
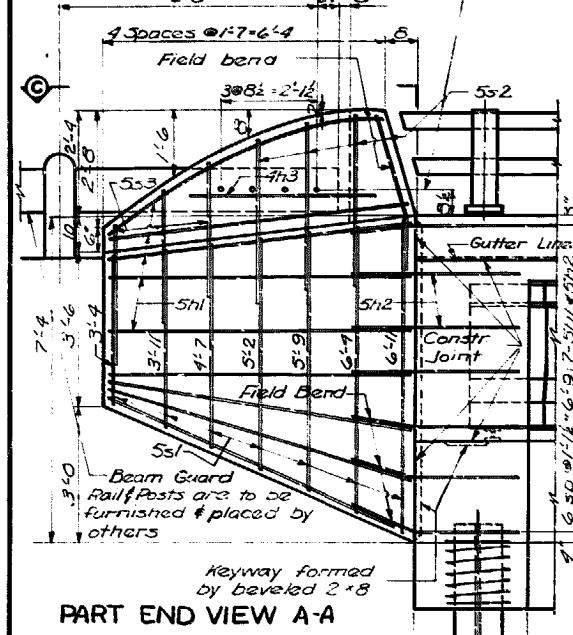
Design for 15° Skew
201'4x44' PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE
68'9" & 64'1" End Spans 69'0" Center Span
SUPERSTRUCTURE DETAILS
Station: 565+93.00 (± Off. Reloc. US #71) August, 1969
CASS COUNTY
Iowa State Highway Commission
Des. Sh. No. 4 of 10 File No. 25225 Des. No. 369

DESIGNED BY	TRACED BY	PROJECT NUMBER	STATE	FED. ROAD	FISCAL	SHEET	TOTAL
DETAILED BY	CHECKED BY	F-71-3(2)-20-15	IOWA	5	YEAR	61	77

DESIGNED BY: J. M. M...
DETAILED BY: J. M. M...
TRACED BY: J. M. M...
CHECKED BY: J. M. M...

This sheet is to be used with PC66 Prestress Beams and wood piles. Use a minimum detailing haunch at 12'.

Holes for 3/4" bolts are to be formed with 1" (nominal dia) 5/8" steel pipe sleeves which are to be galvanized after cutting to proper length. The pipe sleeves shall be securely fixed in exact location as shown before concrete is poured. The cost of pipe sleeves is to be included in the price bid for concrete. The 3/4" bolts are to be furnished and placed by others.

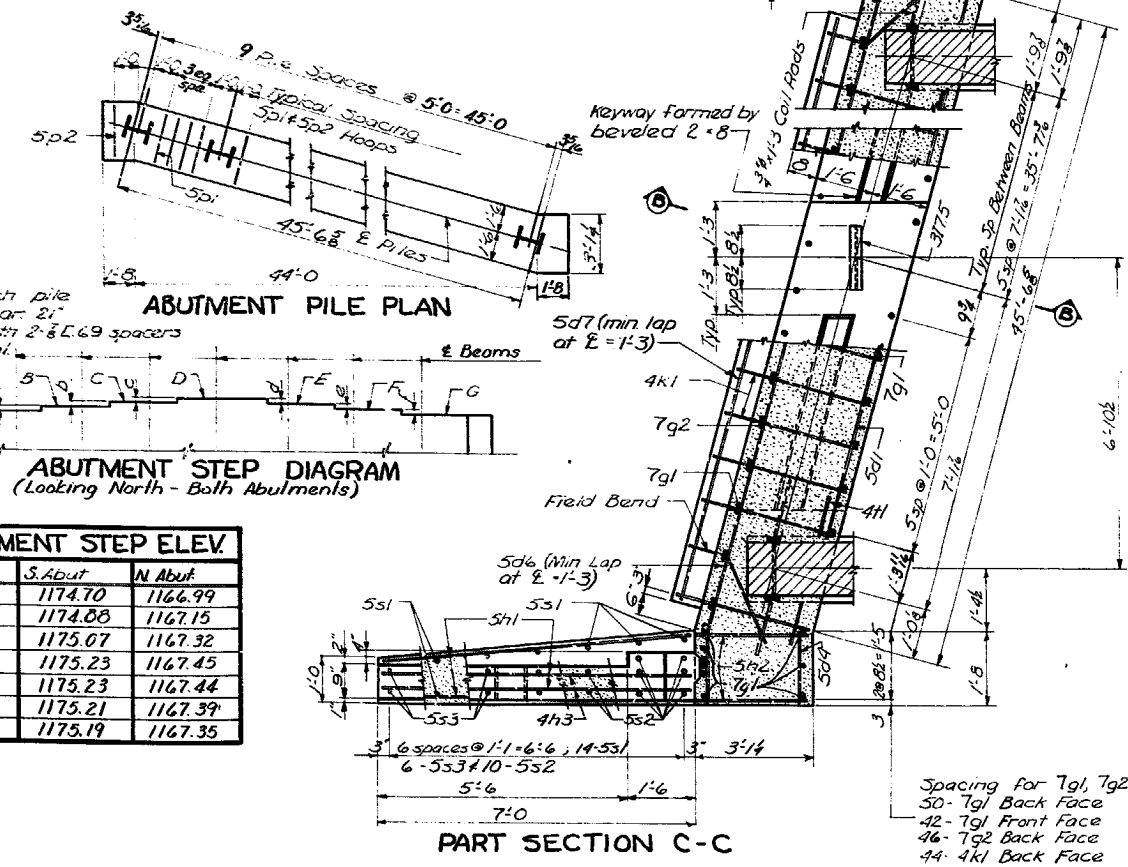


PART SECTION B-B

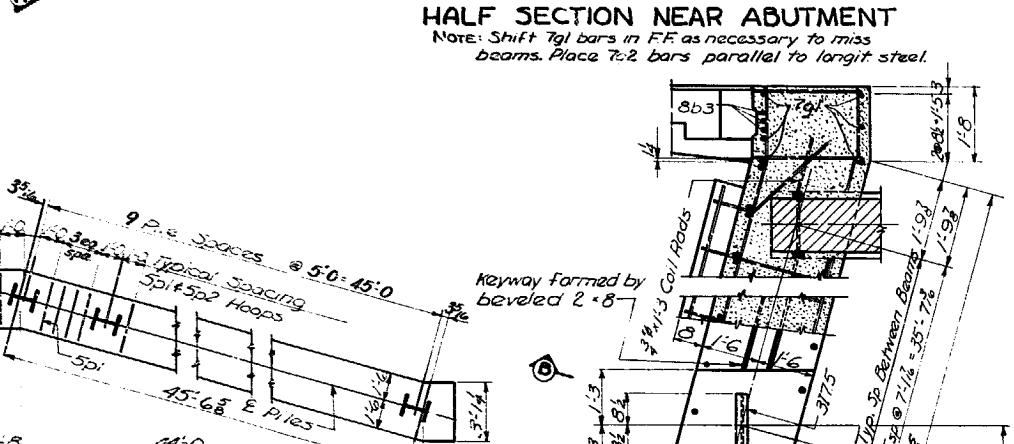
ABUTMENT STEPS		
Step	S. Abut	N. Abut
a	2 1/2	1 1/2
b	2 1/2	1 1/2
c	1 1/2	1 1/2
d	0	1/2
e	1/2	1/2
f	1/2	1/2

ABUTMENT STEP ELEV.		
Point	S. Abut	N. Abut
A	1174.70	1166.99
B	1174.08	1167.15
C	1175.07	1167.32
D	1175.23	1167.45
E	1175.23	1167.44
F	1175.21	1167.39
G	1175.19	1167.35

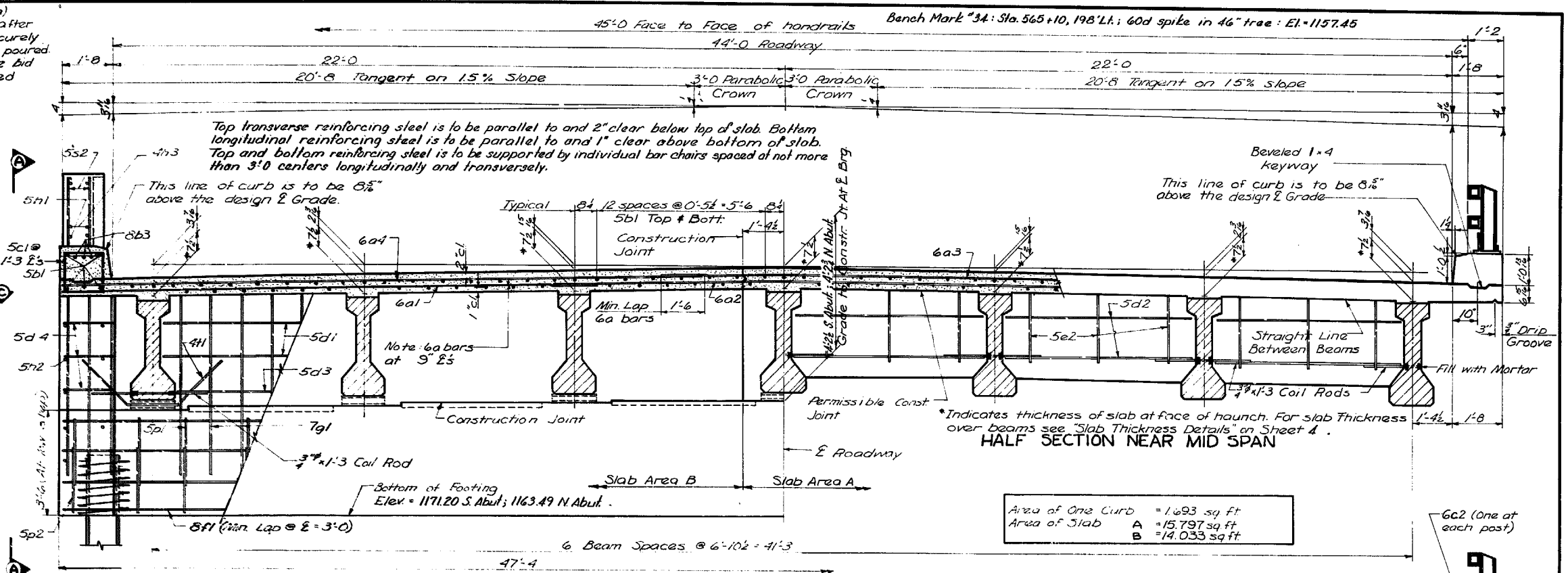
ABUTMENT PILE PLAN



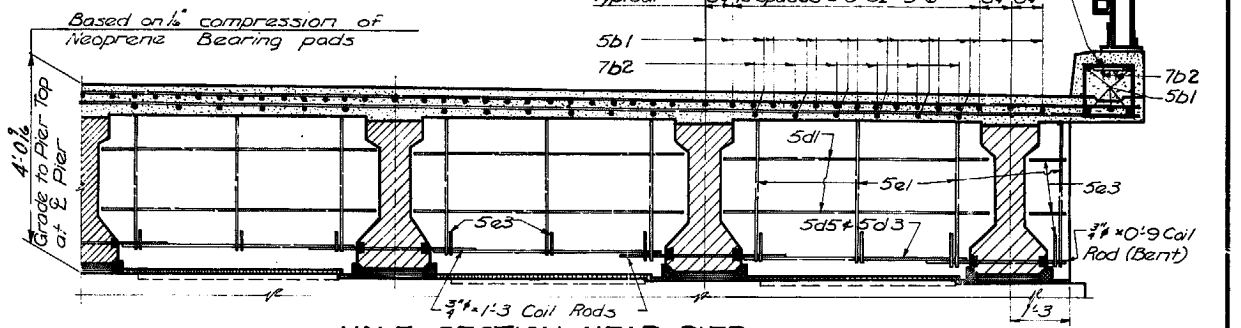
PART SECTION C-C



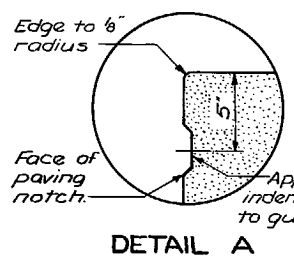
HALF SECTION NEAR ABUTMENT



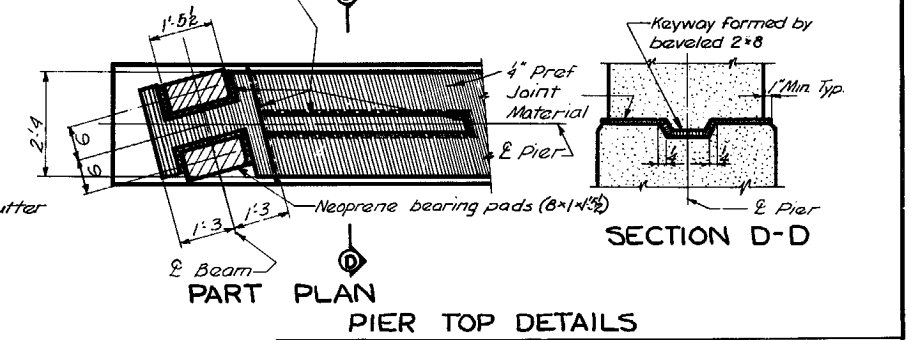
Area of One Curb = 1.693 sq ft
Area of Slab A = 15.797 sq ft
Area of Slab B = 14.033 sq ft



HALF SECTION NEAR PIER



DETAIL A



SECTION D-D

Design for 15° Skew
201'4" x 44' PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE
68'3" & 64'1" End Spans 69'0" Center Span
SUPERSTRUCTURE DETAILS
Station: 565+93.00 (E. Off. Loc. U.S. 71) August, 1969
CASS COUNTY

IOWA	STATE	Highway	Commission
Design Sheet No. 5 of 10	File No. 23225	Design No. 369	
CASS COUNTY	PROJECT NUMBER	F-71-3(2)--20-15	
IOWA	STATE	Highway	Commission
Design Sheet No. 5 of 10	File No. 23225	Design No. 369	
CASS COUNTY	PROJECT NUMBER	F-71-3(2)--20-15	
IOWA	STATE	Highway	Commission
Design Sheet No. 5 of 10	File No. 23225	Design No. 369	
CASS COUNTY	PROJECT NUMBER	F-71-3(2)--20-15	

DESIGNED BY: J. Matney
CHECKED BY: J. Matney

BENT BAR DETAILS

Note: All dimensions are out to out Radii are to $\bar{E}$ bar

Design for 15° skew

201'4" x 44' PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE

68'3" & 64'1" End Spans 69'0" Center Span

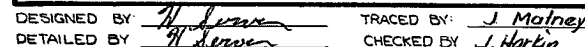
SUPERSTRUCTURE DETAILS

Station: 565+93.00 (± Off Reloc. US 571) August, 1969

CASS COUNTY

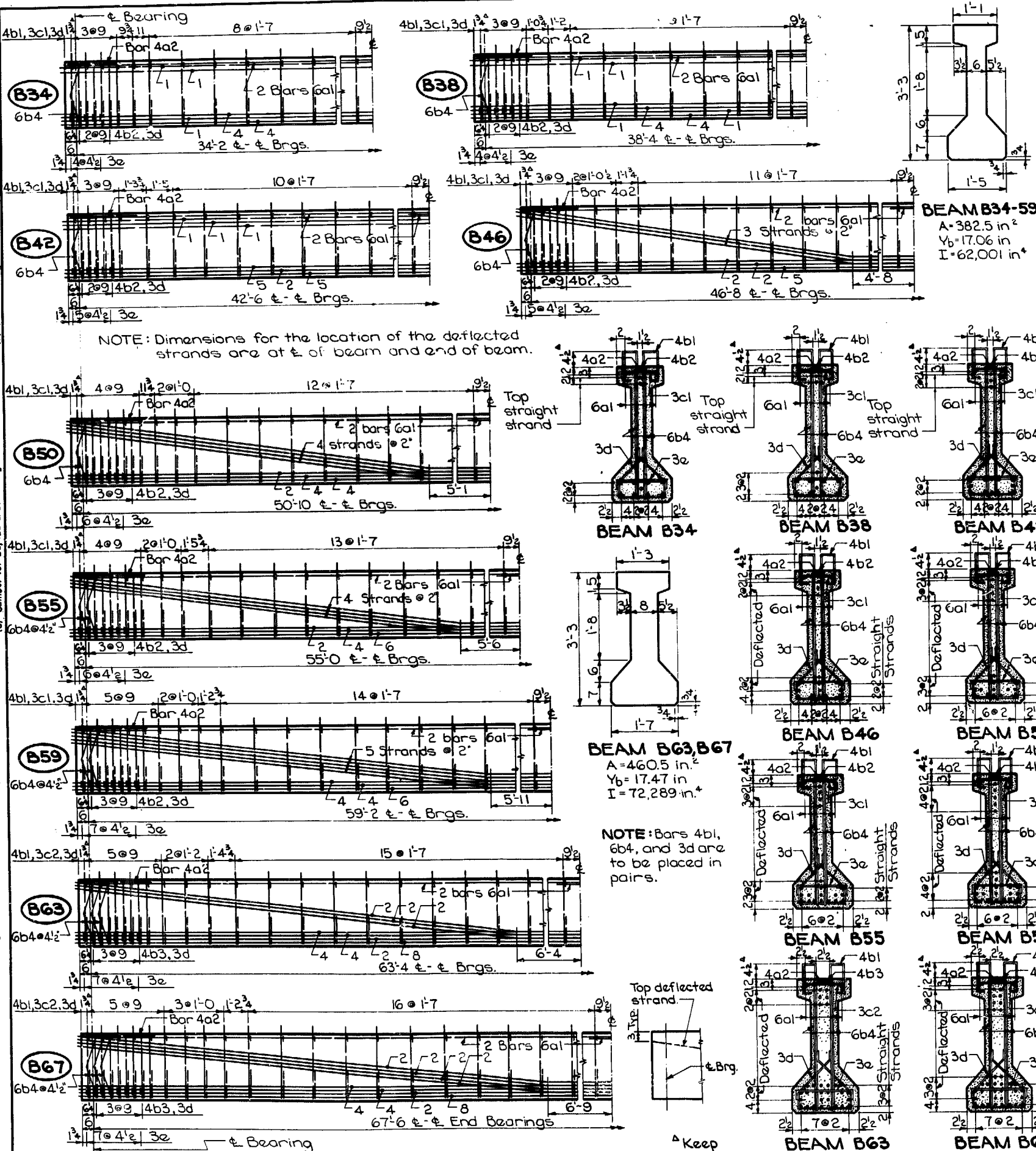
IOWA	STATE	HIGHWAY
COMMISSION		
DESIGN SH. NO 6 OF 10 FILE NO 23225 DESIGN NO 369		
		STD. SH.

NUMBER	STATE	FED. ROAD DIST. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
6-71-3(2) - 20-15	IOWA	5		63	77



Revised (9-12-67)
 (1) End of beam changed from sloped to square.
 (2) Projection of Bar 4b1 above top flange changed from 4 1/2" to 4".
 (3) Stirrup spacings near beam end changed.
 (4) Bend detail of projected bottom strands at beam end changed.
 (5) Length of bar 5a1 & 4b1 changed.
 (6) Detail showing location of top deflected strands at beam end added.
 (7) Prestressing strand number and pattern changed in B1, B2 & B3 Beams.

Revised (17-8-66) Lower figures of D.L. deflection due to creep and shrinkage in Beam Data table changed.
 Revised (1-25-67) Bars 3c added & No. of 3d Bars increased, deflection note re-written.
 Revised 5-2-67: Note concerning roughening of beams at diaphragms added.
 Revised 6-1-67: Initial Prestress for B3 changed.
 Revised 9-4-68: Projection of Bar 4b1 above top flange changed from 4" to 4 1/2". Also Future W.S. Loading changed.
 Revised 3-6-69: Beam designation numbers changed.



REINFORCING BAR LIST											
Beam	B34	B38	B42	B46	B50	B55	B59	B63	B67		
Span	34'-2"	38'-4"	42'-6"	46'-8"	50'-10"	55'-0"	59'-2"	63'-4"	67'-6"		
Bar Shape	No. length	No. length	No. length	No. length	No. length	No. length	No. length	No. length	No. length		
6a1	2 34'-11"	2 39'-1"	4 22'-7"	4 24'-8"	4 26'-9"	4 28'-10"	4 30'-11"	4 33'-0"	4 35'-1"		
4a2	2 2'-6"	2 2'-6"	2 2'-6"	2 2'-6"	2 2'-6"	2 2'-6"	2 2'-6"	2 2'-6"	2 2'-6"		
4b1	56 4'-8"	60 4'-8"	64 4'-8"	72 4'-8"	80 4'-8"	84 4'-8"	92 4'-8"	96 4'-8"	104 4'-8"		
4b2	6 6'-2"	6 6'-2"	6 6'-2"	6 6'-2"	6 6'-2"	6 6'-2"	6 6'-2"	6 6'-2"	6 6'-2"		
4b3	1	1	1	1	1	1	1	1	1		
6b4	4 3'-3"	4 3'-3"	4 3'-3"	4 3'-3"	4 3'-3"	4 3'-3"	4 3'-3"	4 3'-3"	4 3'-3"		
3c1	28 1'-1"	30 1'-1"	32 1'-1"	36 1'-1"	40 1'-1"	42 1'-1"	46 1'-1"	48 1'-1"	52 1'-1"		
3c2	1	1	1	1	1	1	1	1	1		
*3d	68 2'-8"	72 2'-8"	76 2'-8"	84 2'-8"	96 2'-8"	100 2'-8"	108 2'-8"	112 2'-8"	120 2'-8"		
3e	10 1'-5"	10 1'-5"	12 1'-5"	12 1'-5"	14 1'-5"	14 1'-5"	16 1'-5"	16 1'-5"	16 1'-5"		

All dimensions are out to out except as shown.

BEAM DATA											
Beam	B34	B38	B42	B46	B50	B55	B59	B63	B67		
Span	34'-2"	38'-4"	42'-6"	46'-8"	50'-10"	55'-0"	59'-2"	63'-4"	67'-6"		
Initial Prestress Kips	318	347	434	347	405	462	548	694	752		
Size Strands	2	2	2	2	2	2	2	2	2		
Straight Strands	11	12	15	9	10	12	14	18	18		
Deflected Strands	1	1	1	1	1	1	1	1	1		
Hold Down Stress Kips				11.2	13.8	12.7	13.7	16.6	19.3		
Camber @	.13	.18	.18	.25	.26	.37	.46	.65	.60		
D.L. Deflection @ in. (7'-35pcg)	.08	.04	.04	.04	.05	.05	.07	.07	.07		
D.L. Deflection @ in. (8'-05pcg)	.09	.02	.02	.02	.02	.02	.02	.02	.02		
D.L. Deflection @ in. (9'-65pcg)	.10	.03	.03	.03	.03	.03	.03	.03	.03		
Reinforcing Steel Lbs.	411	441	478	526	585	635	684	744	792		
Concrete C.Y.	3.47	3.87	4.28	4.69	5.10	5.51	5.92	7.62	8.11		

NOTES

① Due to weight of slab and diaphragms.
 ② Upper figure is the beam camber at release. Lower figure is the beam camber just before slab is placed.
 ③ Upper figure is the elastic deflection of beam due to weight of slab. Lower figure is the deflection due to the combined effect of creep due to weight of slab and shrinkage of slab. Total deflection of beam is upper figure + 75% of lower figure for end spans and upper figure + 50% of lower figure for interior spans.

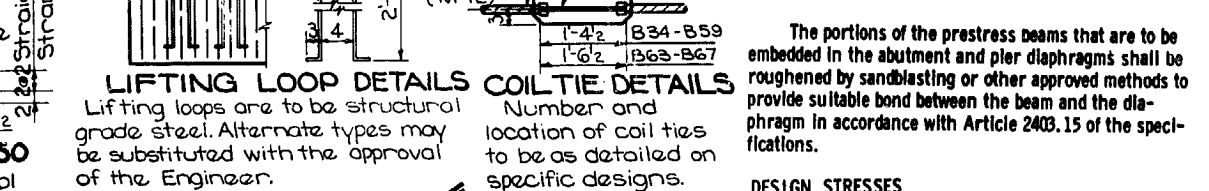
Unless otherwise noted lengths of all beams shall be increased .0005 L to compensate for creep shrinkage and elastic shortening.

All deflected strands are to be held down at 4 points except that the hold down point may be moved toward the end of the beam a distance not to exceed .05 span at the producer's option.

Tops of beams are to be struck off level and artificially roughened in accordance with the I. H. C. Materials Department recommendations.

Bearing details will be as detailed on the Bridge design sheets. All strands are to be 1/2" ϕ 270 kip grade. Beams for continuous bridges shall be at least 4 weeks old before the slab is placed except as otherwise approved by the Engineer.

The portions of the prestress beams that are to be embedded in the abutment and pier diaphragms shall be roughened by sandblasting or other approved methods to provide suitable bond between the beam and the diaphragm in accordance with Article 2403.15 of the specifications.



BEAM END DETAIL AT PIER AND ABUT.

Cut 4 bottom and all deflected & top straight strands with a 12" projection & shop bend as shown.

MAXIMUM SPACING OF BEAMS FOR SPANS SHOWN

Loading	Future W. S.	Maximum Spacing
H20 - S16 (Primary)	20' 0"	7' 3"
H20 (Primary)	20' 0"	8' 0"
H15 (Secondary)		9' 6"

DESIGN STRESSES
 Design stresses for the following materials are to be in accordance with A. A. S. H. O. Standard Specifications for Highway Bridges, Series of 1969.
 Reinforcing steel in accordance with section 1.5.1 $f_s = 20,000$ p.s.i.

Concrete in accordance with 1.6.7, $f'_c = 5000$ p.s.i.
 Prestressing steel in accordance with 1.6.7 $f'_s = 270,000$ p.s.i.

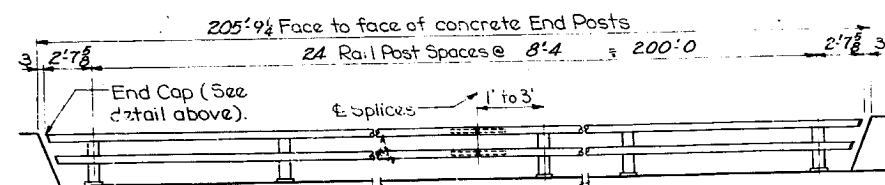
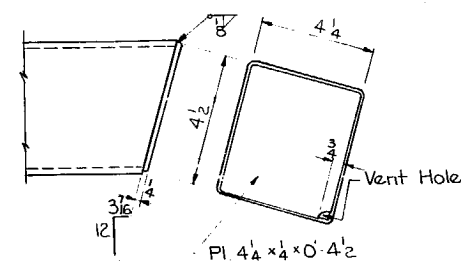
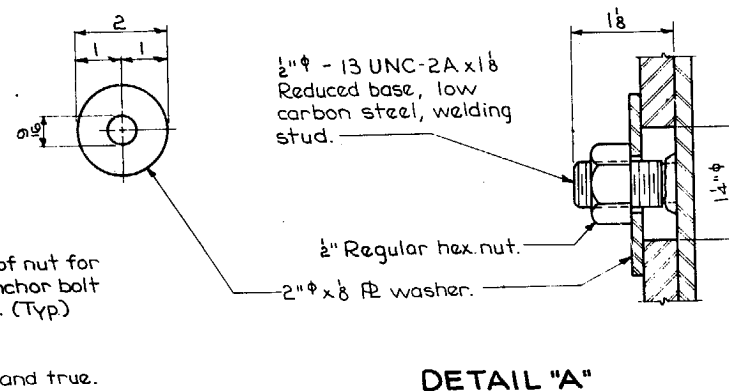
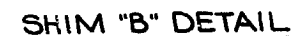
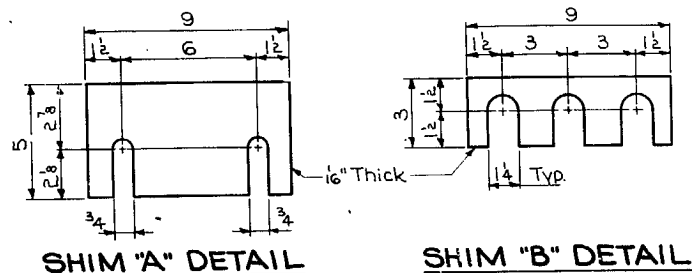
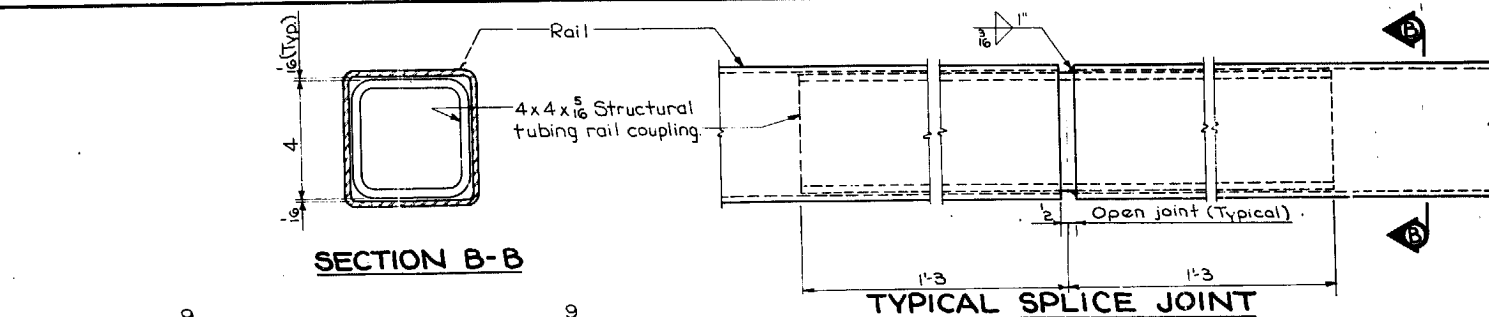
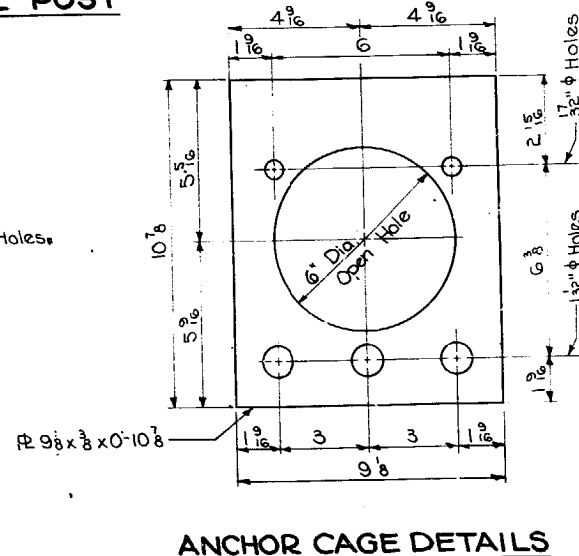
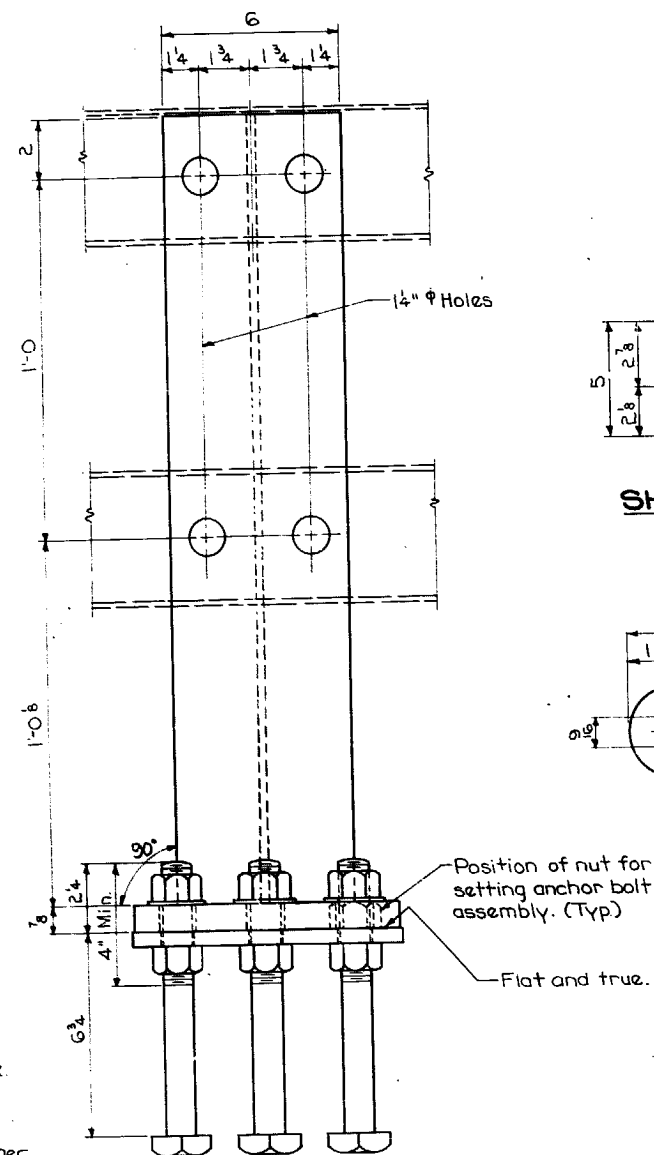
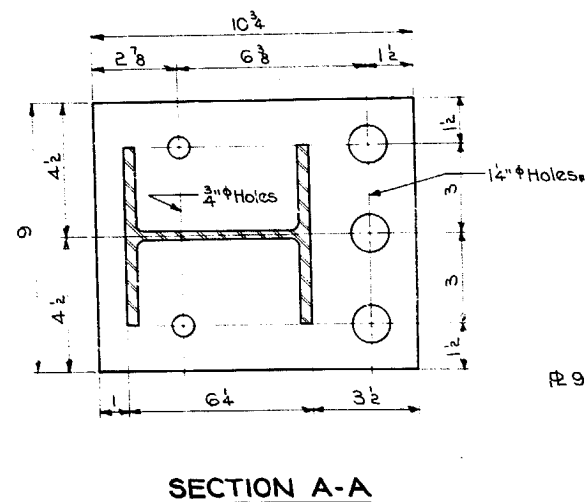
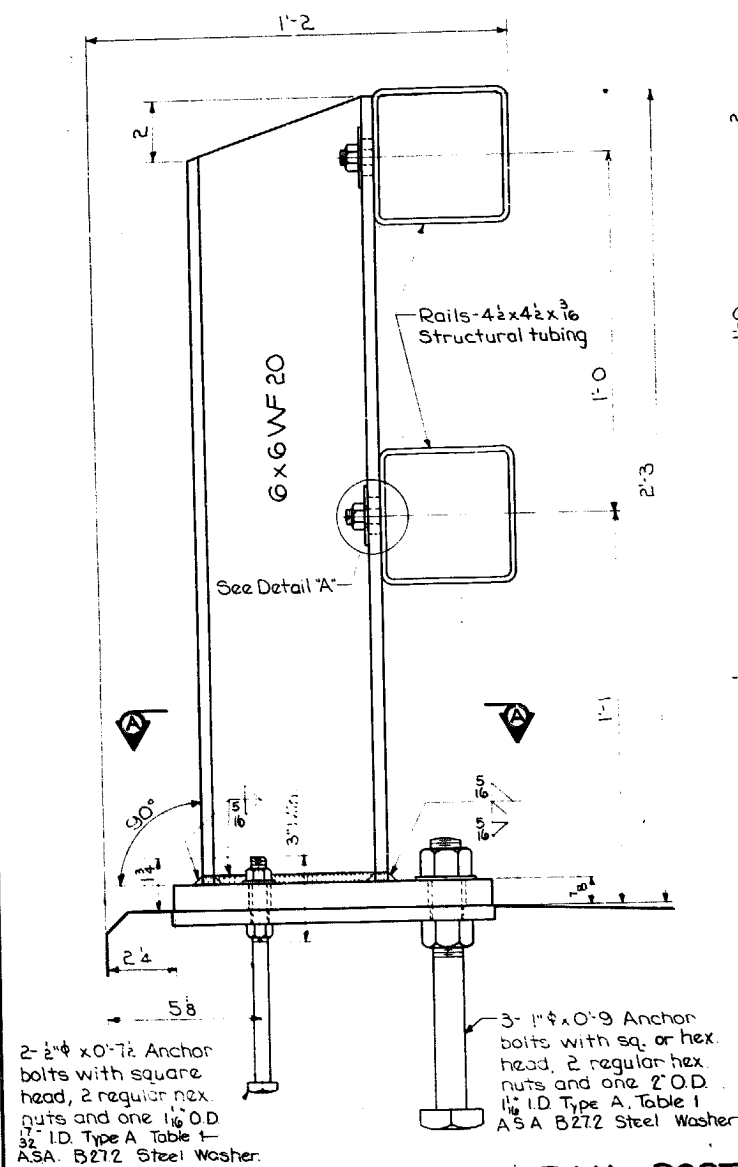
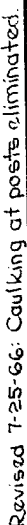
SPECIFICATIONS
 DESIGN: A. A. S. H. O. Series 1969.
 CONSTRUCTION: Standard Specifications of the Iowa State Highway Commission, current series, plus current special provisions and supplemental specifications.

Design for 15° Skew
201'-4 x 44' PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE
 68'-3 & 64'-1 End Spans 69'-0 Interior Spans
BEAM DETAILS PC 66 B
 Station: 565+93.00 (Off. Reloc. U.S. #71) August, 1969
CASS COUNTY
 IOWA STATE HIGHWAY COMMISSION
 Des. Sh. No. 7 of 10 File No. 23225 Des. No. 369

DETAILS AT PIER BEFORE PLACING PIER DIAPHRAGM

PROJECT NUMBER
 F-71-3(2)-20-15

STATE	FED. ROAD DIST. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
IOWA	5		66	77



NOTE:
Maximum rail post spacing = 8'-6".

STEEL HANDRAIL NOTES:

The steel handrail is to be bid on a lineal foot basis measured from end to end of rail. 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.

Each rail section must be attached to as many posts as possible, but to at least three posts before being spliced.

Material for rail tubing, post, base plate and anchor cage shall be A.S.T.M. A-36 and are to be galvanized after fabrication to A.S.T.M. A-123.

Material for anchor bolts and nuts, and rail to post attachment nuts shall be A.S.T.M. A-307 - 61T, Grade A.

Anchor bolts and nuts, rail to post attachment nuts, end caps, washers and shims are to be galvanized to A.S.T.M. A-153.

Ends of tube sections to be sawed or milled. Cut ends to be true, smooth and free from burrs or ragged edges.

Welding shall be in accordance with Section 2408.15 of the Standard Specifications.

Handling, storage and installation of steel handrail shall be in accordance with Section 2414.06 of the Standard Specifications, except that no caulking will be required.

One shim "A" and one shim "B" is to be furnished for each post, to be used as required.

A surface is considered to be "Flat and True" when the deviation from a straight edge placed on this surface in any position, is less than $\frac{1}{16}$

No painting will be required.

Rail studs shall be provided with adequate protection during shipment

DESIGN SPECIFICATIONS:

Designed in accordance with 1964 Interim A.A.S.H.O. Specifications.

STEEL HANDRAIL QUANTITIES	
Steel Handrail	410.5 Lin. Ft.

Design for 15° Skew
**201'-4 x 44' PRETENSIONED PRESTRESSED
CONCRETE BEAM BRIDGE**

68'-3 1/2' End Spans 69'-0' Center Span

68-3f 64-1 End Spans
STEEL HANDRAIL DETAILS
August 10, 1968

CASS COUNTY

IOWA STATE
Design Sh. N° 8 of 10

HIGHWAY COMMISSION
File No 29225 Design No 369

PROJECT NUMBER	STATE	FED ROAD DIST. No.	FISCAL YEAR	SHEET No.	Total SHEETS
E-71-3(2)-20-15	IOWA	5		65	77

