2-149.111L

FHWA REGION	STATE	PROJECT	SHEET NO.
8	N.D.	F-FG-4-002(10)147	1

DESIGN DATA

Traffic	Average Daily			Est. 30th Max. Hr.
Current Traffic (1980)	3350 Pass.	650 Trucks	4000 Total	600
Traffic Forecast (2000)	6800 Pass.	1200 Trucks	8000 Total	880
Design Speed	70 MPH			
Traffic Classification "M"				
Minimum Sight Distance (Stopping)	850'			

Bridges

Sta.	Clear Rdwy. Width	Design Loading
63+69.6	45'	H.S. 20
92+79.8	40'	H.S. 20
374+33.65	40'	H.S. 20

Mile Point	Stationing
147.00	368+82.6
148.00	4+05.24
149.00	56+85.24
150.00	110+34.44
151.00	163+14.44
152.00	216+14.64
153.00	268+94.64
154.00	321+74.64
155.00	374+54.64
156.00	427+34.64
156.482	452+79.6 Bk.

NORTH DAKOTA
STATE HIGHWAY DEPARTMENT

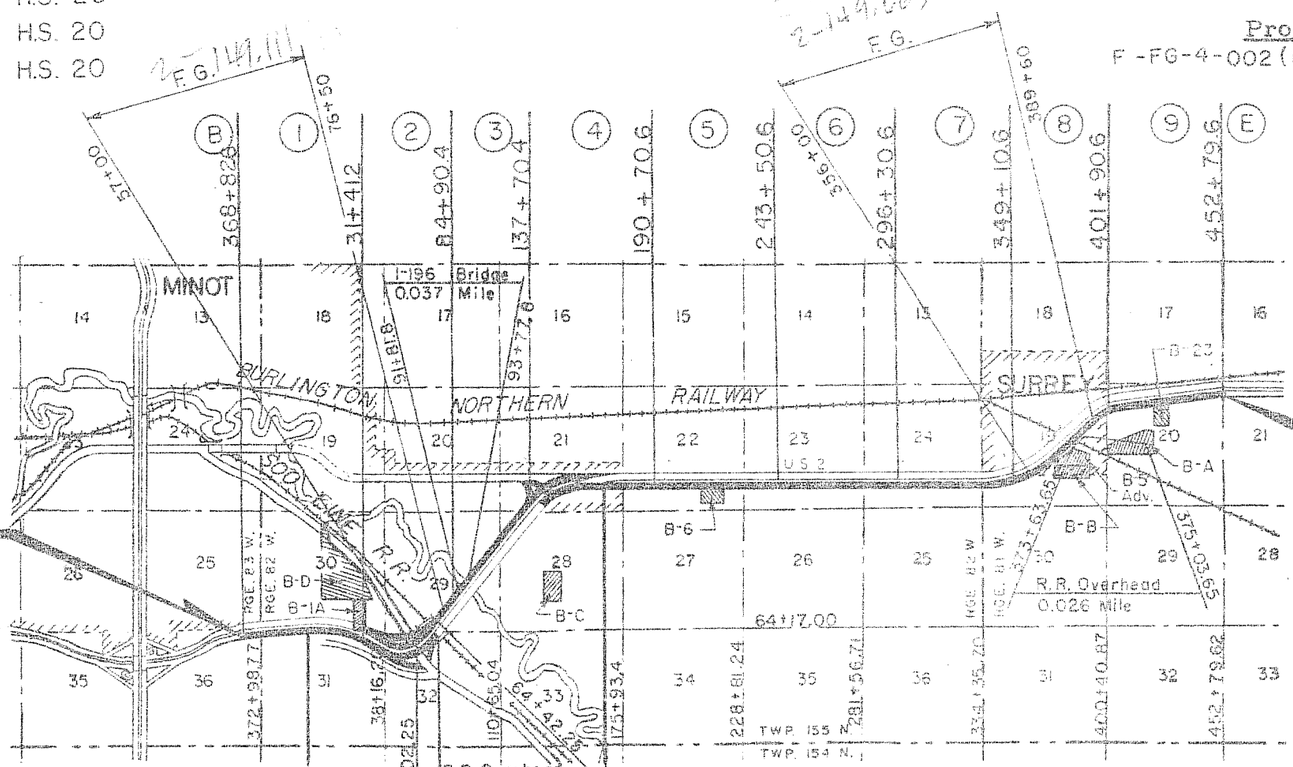
GRADING
IN WARD COUNTY
FEDERAL AID PROJECT F-FG-4-002(10)147
Grading And Structural

GOVERNING SPECIFICATIONS:

Standard Specifications adopted by the North Dakota State Highway Department, Oct. 1976, and approved by the Federal Highway Administration on December 17, 1976, and other Contract Provisions submitted herewith.

LENGTH OF PROJECT

Project	Miles-Gross	Miles-Net
F-FG-4-002(10)147	8.963	8.963



BEG. PROJ. F-FG-4-002(10)147
STA. 368+82.6
SEC 36, Twp. 155 N., Rge. 82 W.

END PROJ. F-FG-4-002(10)
STA. 452+79.62
SEC 20, Twp. 155 N., Rge. 81 W.

EQUATION:
390+21.39 Bk. =
0+00 Ahd.

EQUATION:
164+56.23 Bk. =
164+76.43 Ahd.

EQUATION:
62+023 Bk. =
62+715 Ahd.

BORROW AREAS

B-5 Adv.
B-6
B-23
B-A
B-B
B-C
B-D
B-1A

LIMITED CONTROL ACCESS

Access Limited to Point Designated Thus.
No access except those shown on plans. Access Points as shown may be shifted slightly during construction if necessary to better serve property owners and traffic.

APPROVED DATE 3-14-80

R. L. Bradley

CHIEF ENGINEER
NORTH DAKOTA
STATE HIGHWAY DEPARTMENT

R. L. BRADLEY
REGISTERED
PROFESSIONAL
ENGINEER
NORTH DAKOTA 2208

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED

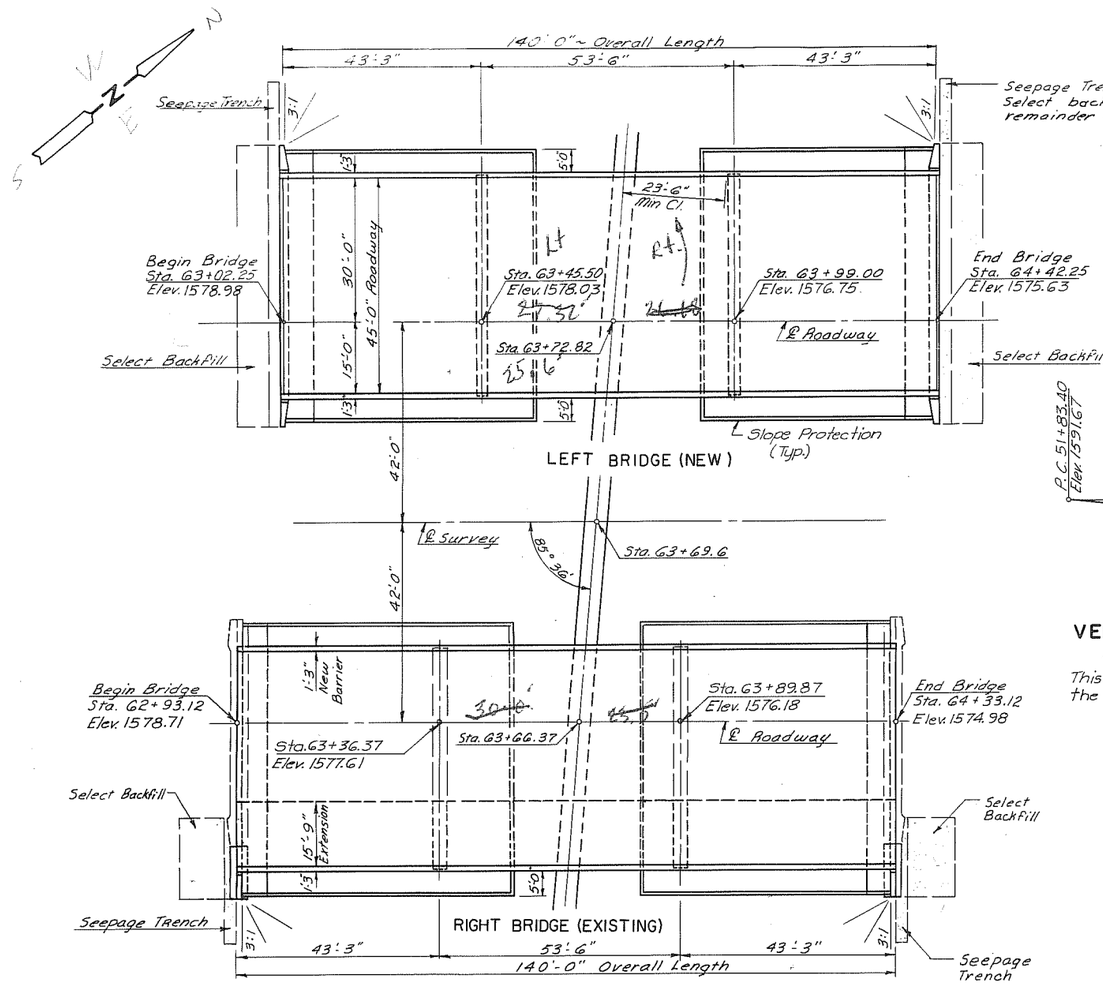
DIVISION ENGINEER DATE

2-149-111

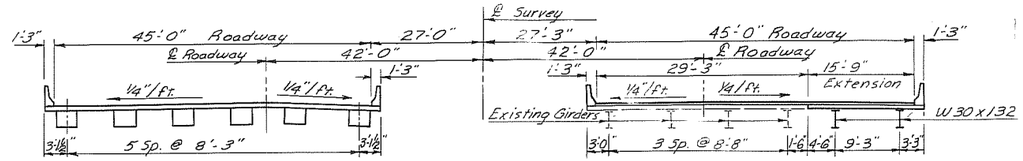
BRIDGE CODE	FED. ROAD DIST. NO.	STATE	PROJ. NO	SHEET NO.	TOTAL SHEETS
X-181	5	N. D.	F-FG-4-002(110)	66	

REVISIONS	DATE	CHK'D BY
No. 1		

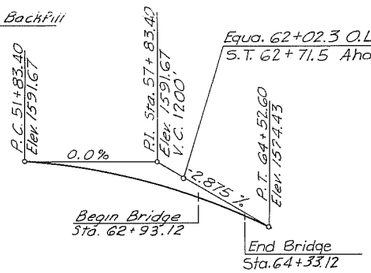
	PLOTTED BY	CHECKED BY
TOPOGRAPHY	MADE BY	CHECKED BY
DETAILS	MADE BY	CHECKED BY
TRACING	CHECKED BY	MADE BY
QUANTITIES	MADE BY	CHECKED BY



PLAN



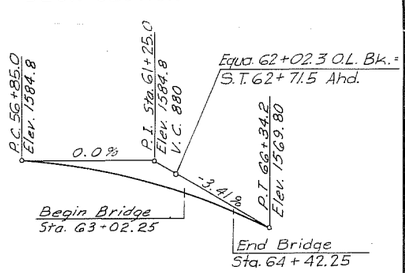
DECK SECTION



VERTICAL CURVE DATA

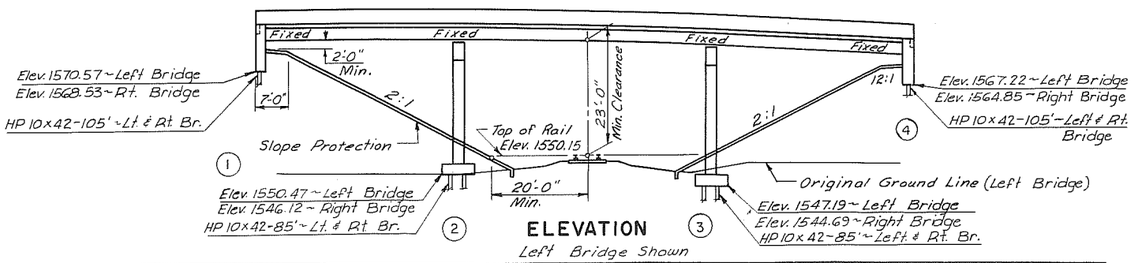
Right Bridge

This curve data to be used for widening the existing bridge only.



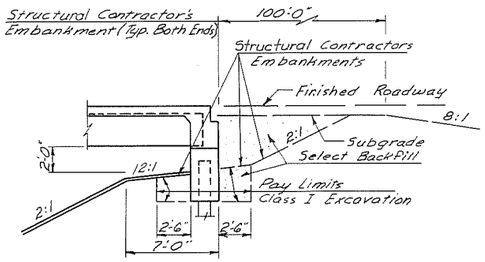
VERTICAL CURVE DATA

Left Bridge



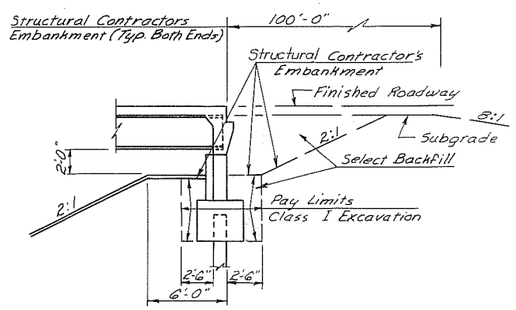
ELEVATION

Left Bridge Shown



DETAILS AT ABUTMENT

Left Bridge



DETAILS AT ABUTMENT

Right Bridge

BENCH MARKS

NO.	DESCRIPTION	LOCATION	ELEV.
8	Point spot S.W. cor.	Sta 52+52-270' Rt	1588.91
	conc. base for light		
	pole Hwy. # 2		
9	Point spot N.W. Abut	Sta. 64+42-26' Rt	1575.28
	for R.R. Bridge		

PILE LOADING

LOCATION	DEAD LOAD + EARTH	LIVE LOAD	MINIMUM * PENETRATION	EMBANKMENT SETTLEMENT	DESIGN LOAD	MAXIMUM REQUIRED BEARING
Abuts.	32.2 T.	11.9 T.	60'	10.9 T.	55.0 T.	55.0 T.
Piers	22.3 T.	15.6 T.	50'		37.9 T.	55.0 T.
Existing Structure						
Abuts.	18.0 T.	13.5 T.	60'	10.9 T.	42.4 T.	55.0 T.
Piers	33.3 T.	11.2 T.	50'		44.5 T.	55.0 T.

*Below bottom of footing

SPECIAL PROVISIONS

NO.	NAME
193	RAILWAY PROTECTION INSURANCE
254	EPOXY COATED REINFORCING STEEL
103-3	AWARD AND EXECUTION OF CONTRACT
208-1	EXCAVATION FOR BOX CULVERTS AND BRIDGES
610-3	PORTLAND CEMENT CONCRETE
616-1	STRUCTURAL STEEL
622-3	PILING
806-1	AGGREGATES FOR PORTLAND CEMENT CONC.
806-3	AGGREGATE FOR PORTLAND CEMENT CONCRETE
844-1	STRUCTURAL STEEL
299	REPAIR AND OVERLAY OF PCC BRIDGE DECKS

ESTIMATE OF QUANTITIES

CODE NO.	SPEC. NO.	BID ITEM		
0100	103	CONTRACT BOND		LUMP SUM
0105	202	REMOVAL OF STRUCTURE		LUMP SUM
0290	202	REMOVAL OF SLOPE PROTECTION	45	S.Y.
1110	602	CLASS AE-1 CONCRETE	188.4	CU. YD.
0130	602	CLASS AAE-3 CONCRETE	282.7	CU. YD.
9610	604	PRESTRESS BOX BEAM - 27" (12 @ 42'-1", 6 @ 52'-10")	822	L.F.
0100	208	CLASS I EXCAVATION	200	CU. YD.
0201	208	FOUNDATION PREPARATION		1 EA.
0100	228	SELECT BACKFILL	325	CU. YD.
0115	612	REINFORCING STEEL - GRADE 60	55,085	LB.
0116	612	REINFORCING STEEL - GRADE 60 (EPOXY COATED)	31,292	LB.
5890	616	STRUCTURAL STEEL (A 36 - ESTIMATED TOTAL 45,241)		LUMP SUM
0020	622	STEEL PILING HP 10 X 42	4720	L.F.
0393	622	STEEL TEST PILING HP 10 X 42	210	L.F.
0100	704	CONCRETE SLOPE PROTECTION	934	S.Y.
0100	705	MOBILIZATION		LUMP SUM
0100	750	LINSEED OIL	39.0	GAL.
0100	756	FIELD LAB. - TYPE A		LUMP SUM
3000	900	BENCH MARKS	1	SET
9700	900	CLASS I OVERLAY	700	S.Y.
0140	203	BORROW	65,800	CU. YD.
0100	216	WATER	684	M. GAL.
9701	900	CLASS II OVERLAY	50	S.Y.
9702	900	CLASS III OVERLAY	25	S.Y.

STRUCTURAL DRAWINGS

GENERAL DRAWING THIS SHEET, 2-149.111-1, 2

SUBSTRUCTURE 2-149.111-3L, 4L; 2-149.111-7R THRU 10R

SUPERSTRUCTURE 2-149.111-5L, 6L; 2-149.111-11R, 12R; H-7010, D-900-1, D-704-2

DESIGN LOADING	SCALE
HS 20	1 INCH = 15 FEET

NORTH DAKOTA
STATE HIGHWAY DEPARTMENT

SOO LINE SEPARATION

BRIDGE LAYOUT

PROJECT F-FG-4-002( )147 STA. 63 + 69.6

WARD COUNTY

APPROVED

3-17-82 Stanley Haas
DATE BRIDGE ENGINEER

2-149.111

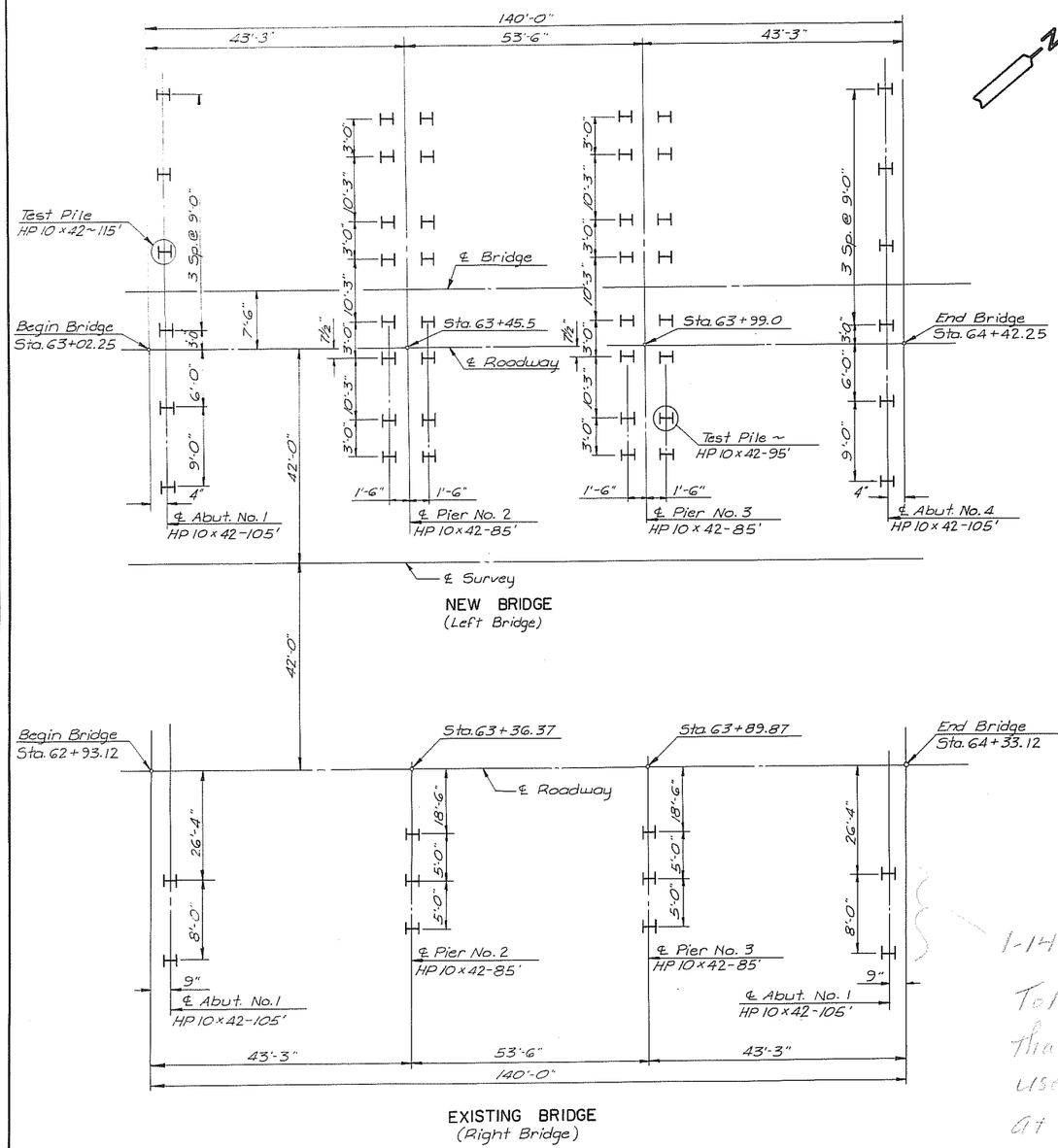
H-E 17 5153

MATHISON CO. 100 3-79 704264

2-149.111

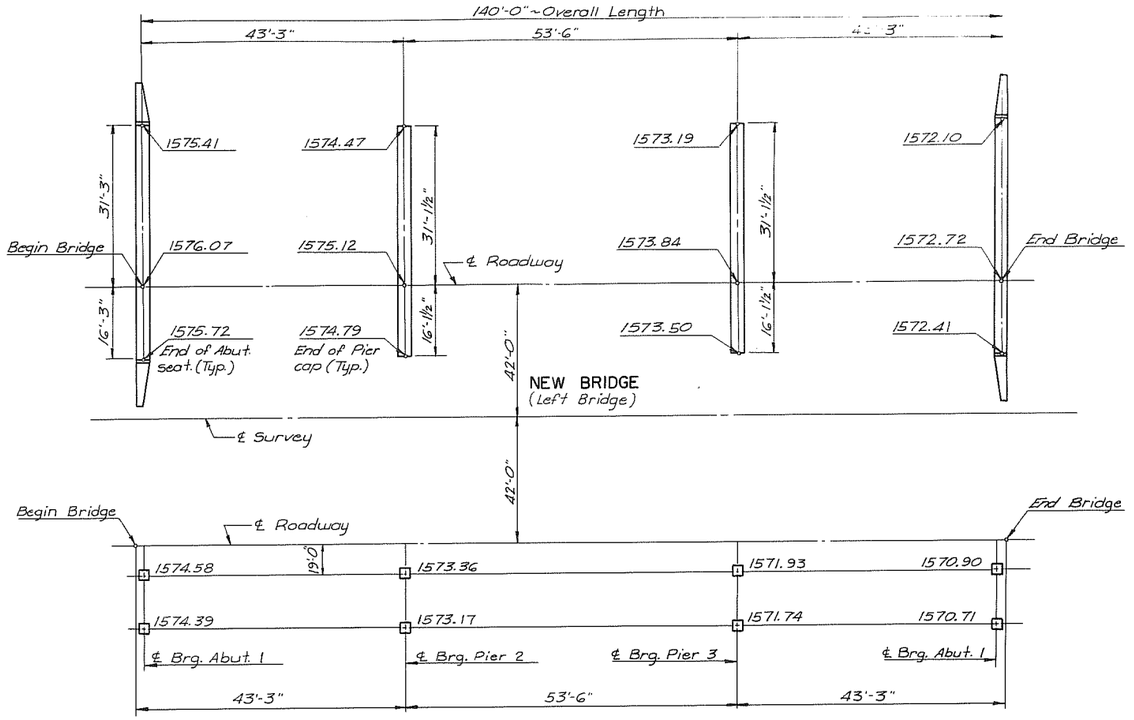
FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
8	N. D.	F-FG-4-002(10)	67	

	CHECKED BY
DETAILS	MADE BY
	CHECKED BY
TRACING	MADE BY
	CHECKED BY
QUANTITIES	MADE BY
	CHECKED BY



EXISTING BRIDGE
(Right Bridge)

PILING LAYOUT
(Not to scale)



EXISTING BRIDGE
(Right Bridge)

BEARING PLATE LAYOUT
Elevations are to top of finished concrete
(Not to scale)

1-14-81
Told Barry Ingerson that Contractor could use 12" pile in abut. at no additional cost to the State.
DDB

SOO LINE SEPARATION

PILING LAYOUT

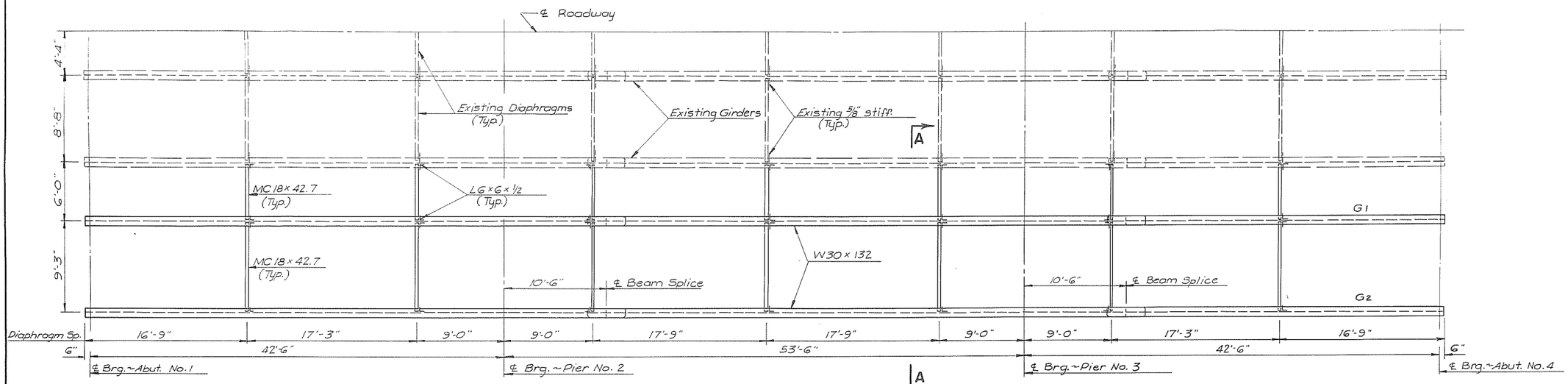
BEARING PLATE LAYOUT

2-149.111-1

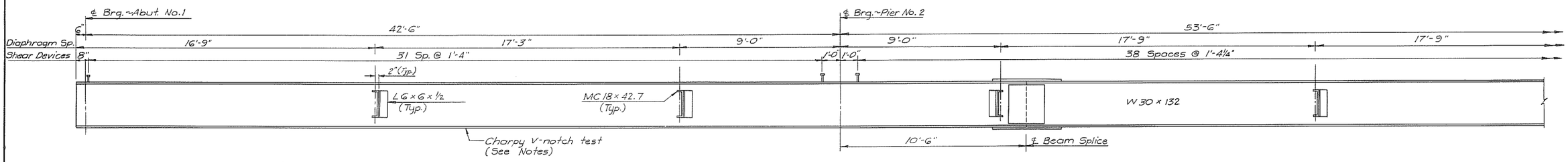
MATHISON CO. 100 3-79 704284

2-149.111

FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
8	N. D.	F-FG-4-002(10)	77	



PLAN



GIRDER NO. 1 ELEVATION

Note:
The materails supplied shall meet the longitudinal charpy V-notch test for 15 Ft. lbs. at 40° F.

QUANTITIES

See Dwg. 2-149.111-10R.

SOO LINE SEPARATION

GIRDER DETAILS

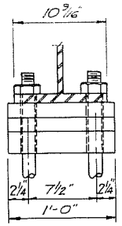
RIGHT BRIDGE

MADE BY
CHECKED BY
QUANTITIES
MADE BY
CHECKED BY
TRACING
MADE BY
CHECKED BY

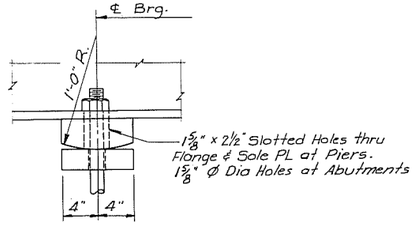
2-149.111-9R

FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
8	N. D.	F-FG-4-002(10)	78	

2-149.111

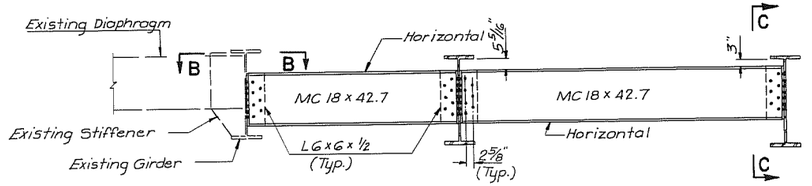


BEARINGS @ ABUT.
Sole PL ~ 8" x 2 1/4" x 1'-0"
Masonry PL ~ 8" x 1 1/2" x 1'-0"
Swedge Bolts ~ 1 1/2" Ø x 1'-9"

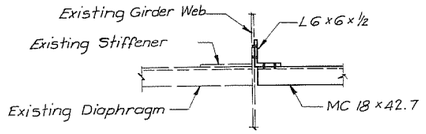


BEARING @ PIER
Sole PL ~ 8" x 3 1/4" x 1'-0"
Masonry PL ~ 8" x 2 1/4" x 1'-0"
Swedge Bolts ~ 1 1/2" Ø 1'-9"

BEARINGS AT ABUTMENT & PIER

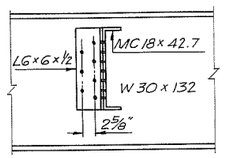


A-A

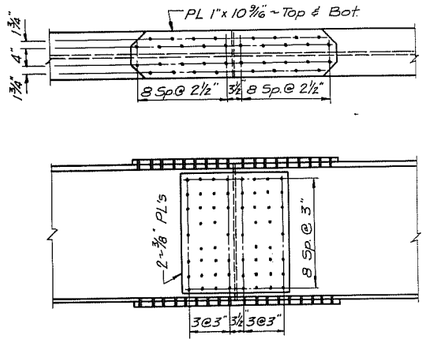


B-B

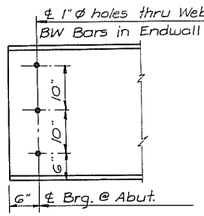
Note: Holes in existing girder wed will require drilling in the field.



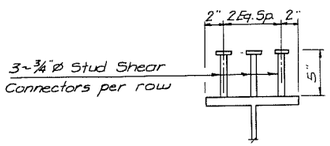
C-C



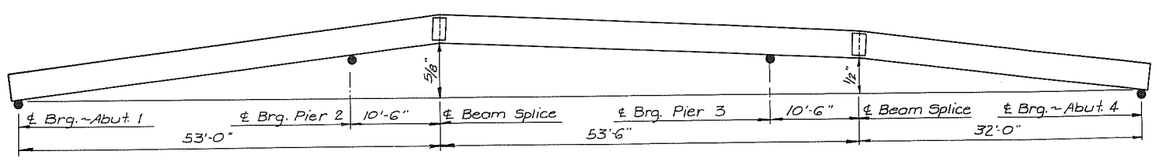
BEAM SPLICE DETAIL
Spans 2 & 3



GIRDER END DETAIL



SHEAR DEVICE DETAILS



SHOP CAMBER DIAGRAM

QUANTITIES

Structural Steel-A 36 45241 Lbs.

SOO LINE SEPARATION

GIRDER DETAILS

RIGHT BRIDGE

2-149.111-10R

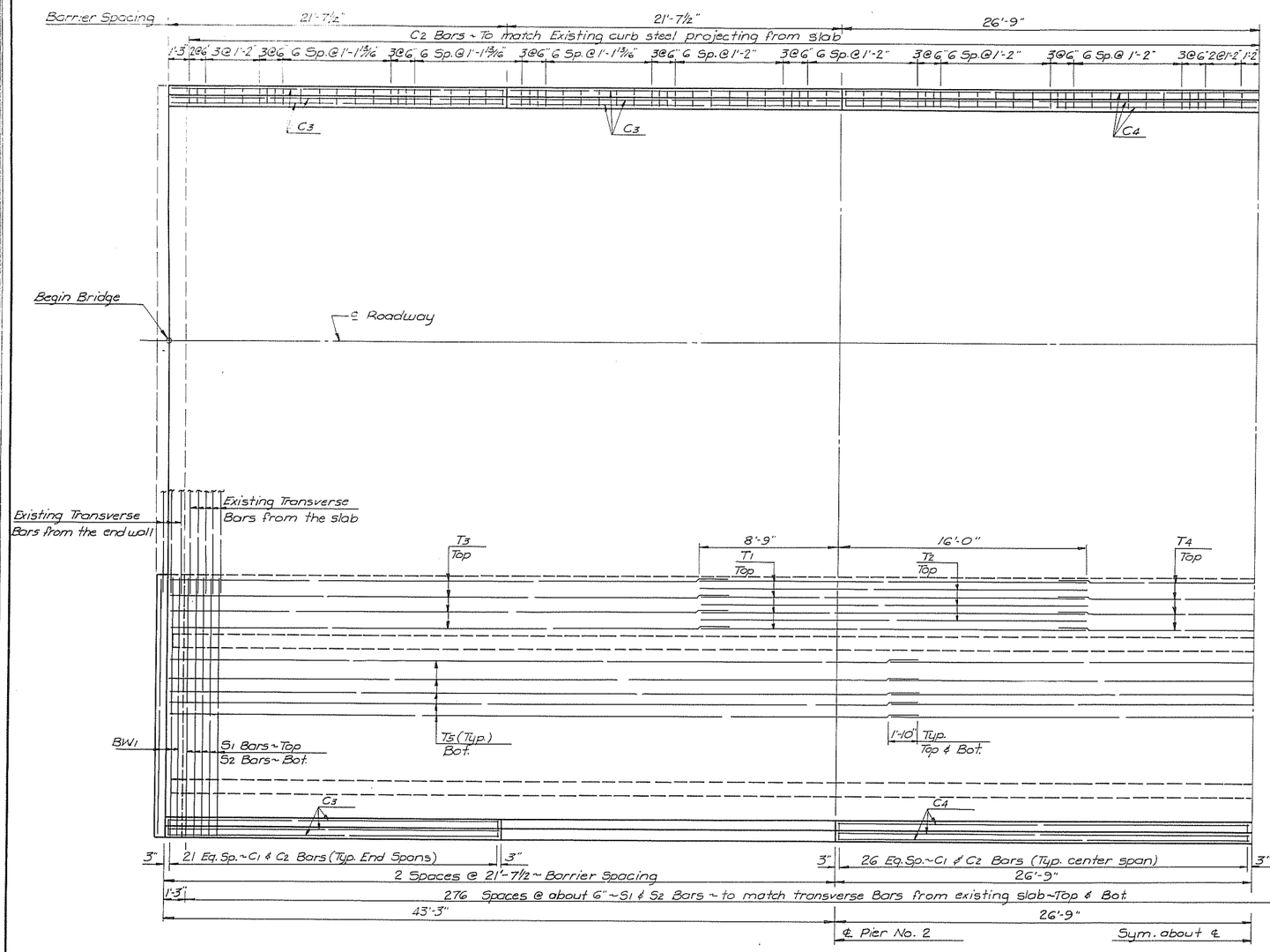
QUANTITIES MADE BY CHECKED BY

MATHISON CO. 100 3-79 704284

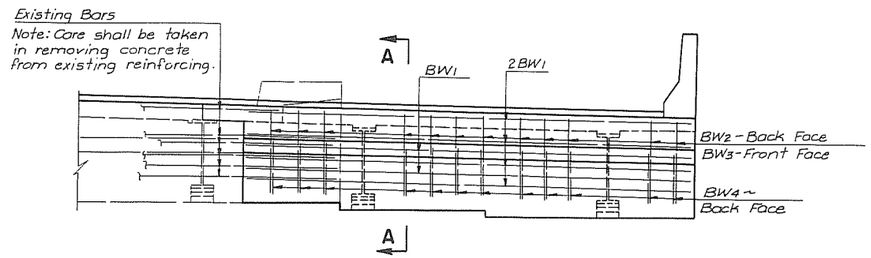
2-149.111

FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
8	N. D.	F-FS-4-002(10)	79	

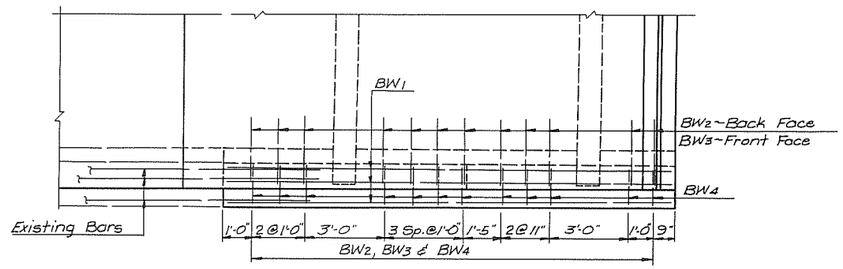
DESIGN — DATE
DETAILS — MADE BY — CHECKED BY
TRACING — MADE BY — CHECKED BY
QUANTITIES — MADE BY — CHECKED BY
REVISIONS



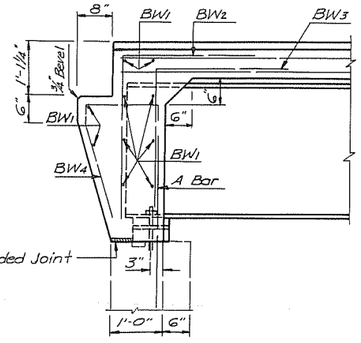
HALF PLAN



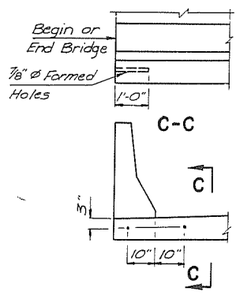
ENDWALL ELEVATION



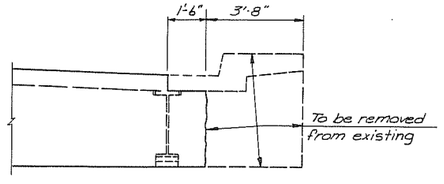
ENDWALL PLAN



A-A



CURB SLEEVE DETAIL
For the new Section



ENDWALL REMOVAL DETAIL

QUANTITIES

See Dwg. No. 2-149.111-12 R.

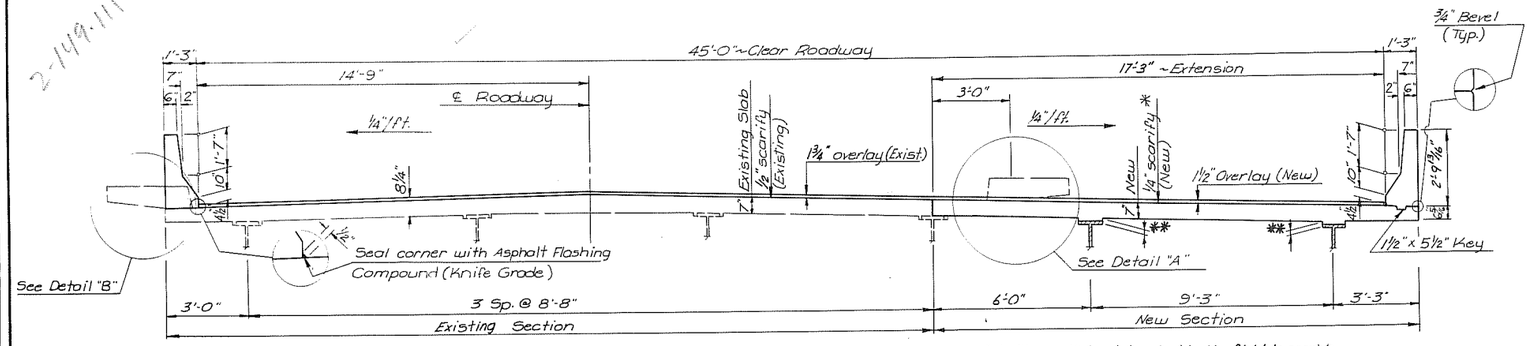
SOO LINE SEPARATION

SUPERSTRUCTURE DETAILS

RIGHT BRIDGE

FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
8	N. D.	F-FG-4-002(10)	80	

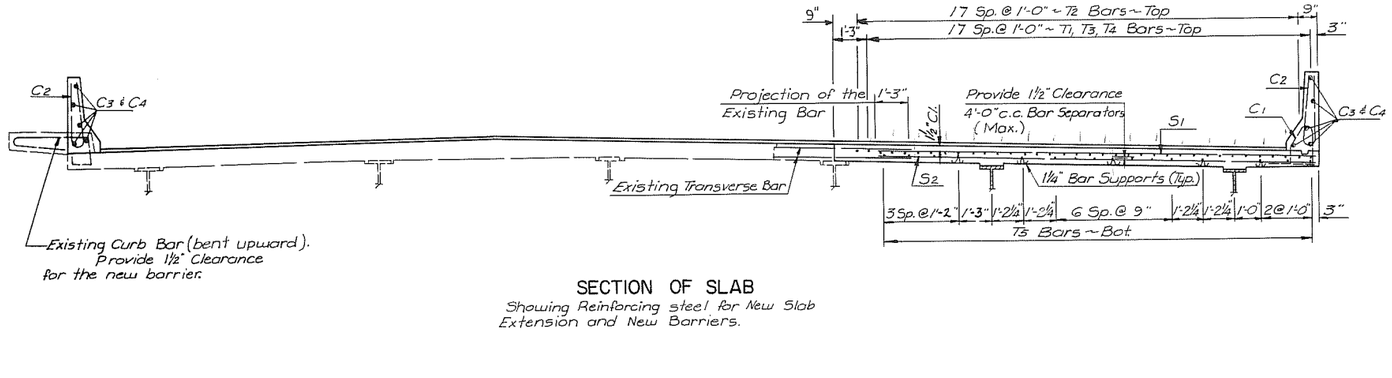
2-149.111



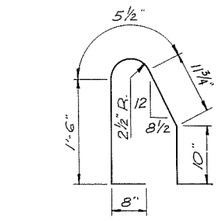
SECTION OF SLAB
Showing Dimensions

** Riser will be determined in the field to provide the 7" slab thickness below the screed.

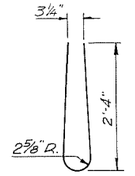
* See special provision for overlay.



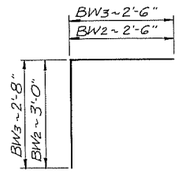
SECTION OF SLAB
Showing Reinforcing steel for New Slab Extension and New Barriers.



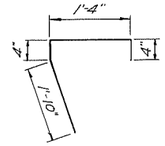
C1



C2



BW2 & BW3



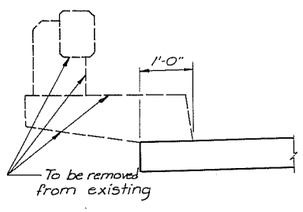
BW4

BENT BAR DETAILS
Dimensions shown are out to out

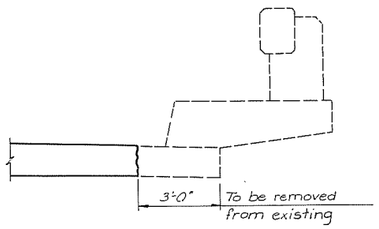
	MARK	NO.	SIZE	LENGTH	SHAPE
	BW1	20	5	16'-9"	Str.
	BW2	24	4	5'-6"	Bent
	BW3	24	4	5'-2"	"
	BW4	24	4	3'-10"	"
*	C1	142	5	5'-1"	Bent
	C2	291	5	5'-5"	"
	C3	40	4	21'-3"	Str.
	C4	20	4	26'-5"	"
*	S1	277	5	16'-9"	Str.
	S2	277	5	16'-9"	"
*	T1	36	5	24'-9"	Str.
*	T2	36	6	24'-9"	"
*	T3	36	4	36'-2"	"
*	T4	18	4	25'-2"	"
	T5	48	4	47'-9"	"

BAR LIST

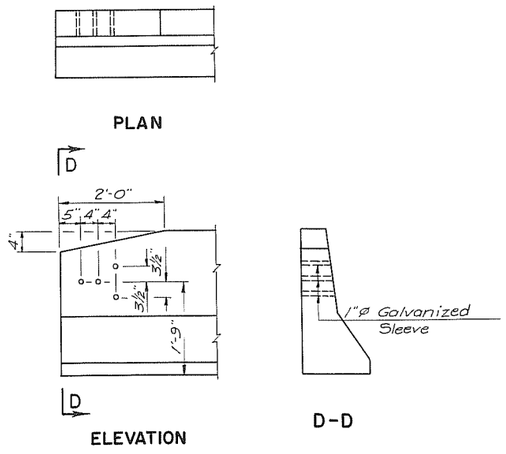
*Reinforcing Bar shall be Epoxy coated. (See Special Provisions)



DETAIL "B"



DETAIL "A"



BARRIER END DETAILS

QUANTITIES	
Class AAE-3 Concrete	78.3 C.Y.
Reinforcing Steel	9516 Lbs.
Reinforcing Steel (Epoxy C.)	9032 Lbs.

SOO LINE SEPARATION

SUPERSTRUCTURE DETAILS

RIGHT BRIDGE

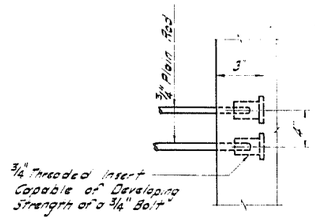
QUANTITIES MADE BY CHECKED BY

2-149.111-12R

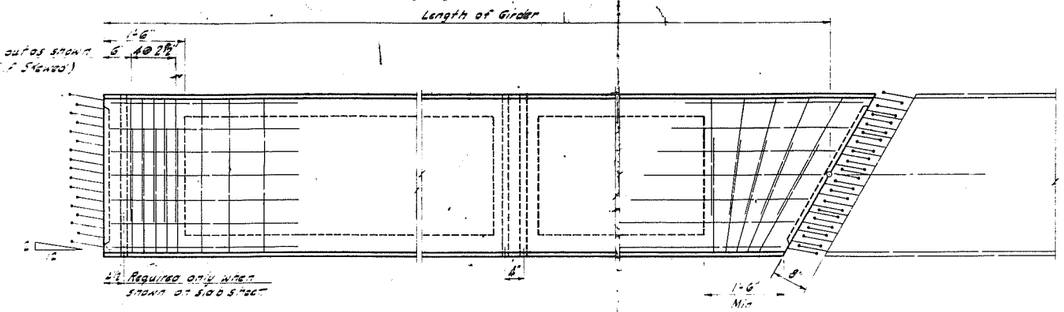
2-149.111

FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
5	N.D.	[illegible] 10	81	

Weight of Girder in Tons = (0.2536)(Length of Girder in Feet) + (0.2010)(No. of Diaphragms) + (0.242)(Length of End Blocks)

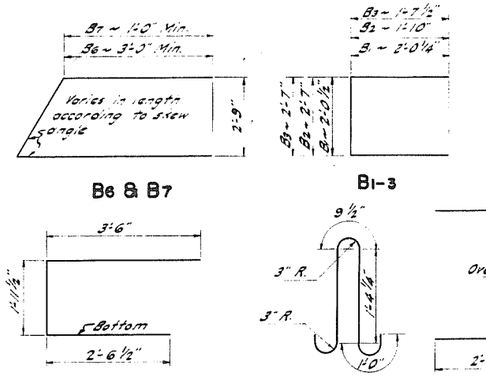


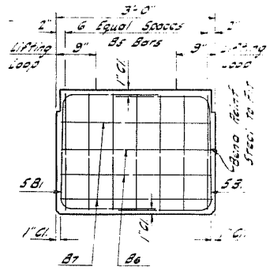
DIAPHRAGM BAR INSERT
Outer Girders Only



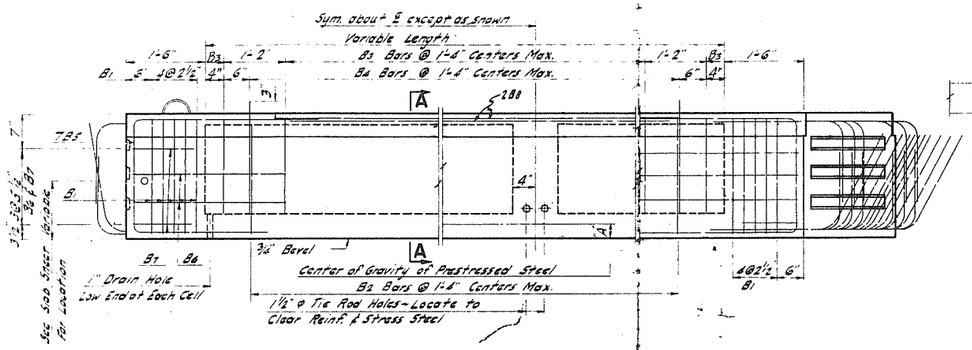
PARTIAL PLAN
Showing Square End

PARTIAL PLAN
Showing Skewed End



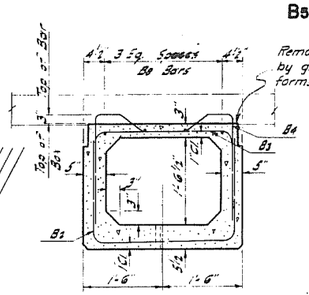


END BLOCK

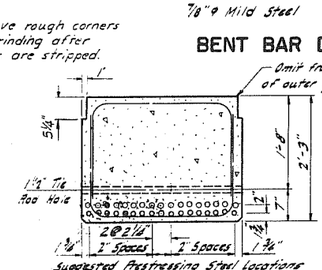


PARTIAL ELEVATION
Showing Square End

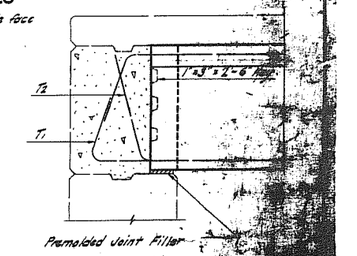
PARTIAL ELEVATION
Showing Skewed End



A – A



℄ SECTION OF DIAPHRAGM



ASSEMBLY AT ABUTMENT
Showing T-Bars

	GIRDER DATA												
LENGTH "L"	SPACE BETWEEN BEAMS	THICKNESS OF SLAB BETW. BMS	THICKNESS OF SLAB ON TOP BEAMS	BRIDGE NO.	LIVE LOAD	FINAL STRESSING A	FINAL STRESSING KIPS	FORCE AT MIDSPAN A	FORCE AT MIDSPAN KIPS	A	KIPS	WEIGHT "TONS"
35'-2"	4'-8"	7"	6"		H20	2.25	631.2	2.75	238.3	3.25	245.7	10.1
38'-10"	4'-6"	8"	7 1/2"	83-92I	HS20	2.25	289.9	2.75	298.6	3.25	307.9	11.0
41'-6"	4'-0"	8"	7 1/2"	8-45.03	HS20	2.25	320.7	2.75	330.4	3.25	340.7	13.3
36'-7"	4'-0"	8"	7 1/2	94-283.5R	HS20	2.25	252.8	2.75	260.4	3.25	268.5	10.1
48'-10	4'-0"	8"	7 1/2"	94-283.5R	HS20	2.25	424.5	2.75	437.3	3.25	450.9	13.2
42'-10"	4'-6"	8"	7 1/2	83-92I	HS20	2.25	345.8	2.75	356 3	3.25	376.3	12.0
49'-0"	4'-0"	7"	6 1/2"	29-23.51	HS20	2.75	451.7	3.25	465.7	3.75	480.7	13.7
49'-4"	4'-8"	7"	6"		H20	2.25	404.4	3.25	420.7	3.75	433.8	13.7
42'-7"	5'-3"	8"	7 1/2"	2-149	HS20	2.25	353.9	2.75	364.5	3.25	375.9	11.7
50-11 1/2"	2'-6"	7"	6 1/2"	81-7	HS20	2.50	415.9	3.00	428.6	3.50	442.1	14.8
①51'-4"	6'-0"	7"	6 1/2"	49-13	HS20	2.25	559.6	2.75	576.5	3.25	594.4	14.3
51'-11"	5'-0"	7"	6 1/2"	11-4	HS20	3.00	572.4	3.50	590.5	4.00	609.8	14.4
52'-2"	5'-0"	7"	6 1/2"	11-4	HS20	3.00	567.6	3.50	585.5	4.00	604.6	14.5
52'-8"	5'-0"	7"	6 1/2"	29-66	HS20	2.50	569.8	3.00	587.2	3.50	605.8	14.6
52'-10	5'-0	7"	6 1/2"	29-66	HS20	2.50	572.8	3.00	590.2	3.50	608.8	14.6
53'-1"	5'-3"	8"	7 1/2"	2-149	HS20	3.25	594.4	3.75	613.6	4.25	633.8	14.5
63'-4"	6'-6"	8"	7 1/2"	37-2.18	HS20	1.75	653.6	2.25	672.8	2.75	693.0	17.4
55'-3 1/2"	4'-8"	7"	6 1/2"	116-03	H15	2.25	489.7	2.75	504.5	3.25	520.2	15.0
②55'-0"	7'-0"	7"	6 1/2"	200A-18.1	HS20	2.25	547.9	2.75	564.4	3.25	581.9	15.0
③58'-8"	4'-0"	7"	6 1/2"	23-10.91	HS20	2.25	651.8	2.75	671.4	3.25	692.3	16.1
59'-0"	7'-0"	7"	6 1/2"	(R)-82-(5)	H20	2.25	540.7	2.75	557.0	3.25	574.3	16.2

① 5140 PSI CONCRETE @ DETENSIONING
② 4500 PSI CONCRETE @ DETENSIONING
③ 4600 PSI CONCRETE @ DETENSIONING

DESIGN SPECIFICATIONS: A.A.S.H.O.
DESIGN AND SHOP DRAWING: AT LEAST 14 DAYS PRIOR TO THE FORMING AND POURING OF ANY GIRDERS, THE CONTRACTOR SHALL SUBMIT CHECKED DESIGN FIGURES AND SHOP DRAWINGS FOR THE APPROVAL OF THE BRIDGE ENGINEER OF THE STATE HIGHWAY DEPARTMENT. THE DESIGN FIGURES SHALL SHOW THE TOTAL INITAL PRESTRESS FORCE REQUIRED AS THE SUM OF THE FINAL PRESTRESS FORCE TAKEN FROM THE CONTRACT DRAWINGS AND THE LOSSES IN PRESTRESS DUE TO FRICTION, ELASTIC SHORTENING OF CONCRETE, SHRINKAGE OF CONCRETE, CREEP OF CONCRETE AND RELAXATION OF STEEL STESS AS DETERMINED BY THE CONTRACTOR FOR HIS METHOD OF STRESSING. IF THE CONTRACTOR WISHES, THE LOSS OF STEEL STRESS NOT INCLUDING FRICTION LOSSES MAY BE ASSUMED AS 35,000 P.S.I. FOR PRETENSIONING AND 25,000 P.S.I. FOR POST-TENSIONING.

SHOP DRAWINGS SHALL SHOW WIRE, STRAND OR BAR LAYOUT; END ANCHOR PLATE DETAILS; PULL DOWN LOCATIONS; TENSIONING FORCES, ELONGATION AND ORDER OF TENSIONING AND ANY PROPOSED CHANGES IN REINFORCING STEEL.

* THE FINAL PRESTRESS FORCE (REMAINING AFTER ALL LOSSES HAVE BEEN ACCOUNTED FOR) AND ITS CORRESPONDING DIMENSION "A" SHALL BE SELECTED FROM THOSE ON A CURVE DETERMINED BY THE THREE VALUES SHOWN ON THIS DRAWING.

THE GIRDERS SHALL BE POURED IN ALL-STEEL FORMS.
ALL REINFORCING STEEL SHALL BE INTERMEDIATE GRADE.

MINOR CHANGES TO THE SHAPE OF THE GIRDER AND TO THE REINFORCING STEEL MAY BE MADE TO ACCOMMODATE THE FORMS OF VARIOUS CONTRACTORS AND THEIR CONSTRUCTION METHODS WITH THE APPROVAL OF THE BRIDGE ENGINEER.

ALL TENSION IN THE TOP OF THE BEAM SHALL BE TAKEN CARE OF BY DRAPING PRESTRESS STEEL, BY ADDING MILD STEEL IN THE TOP OR BY A COMBINATION OF THE TWO.

THE DEAD LOAD PROVISIONS IN THE DESIGN INCLUDE COMPOSITE CONCRETE SLAB, 25 P.S.F. FUTURE WEARING SURFACE AND CURB WEIGHT UNIFORMLY DISTRIBUTED OVER ALL UNITS.

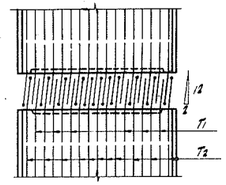
* IF NOT SHOWN ON THIS DRAWING, SEE PLANS ON SPECIFIC PROJECT.

C G = 12.11" from bottom
Area = 493.5 Sq In.
Moment of Inertia = 43,621 In.⁴

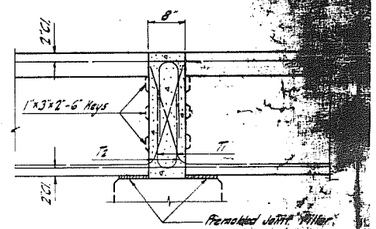
THE CENTER OF GRAVITY OF THE TENSIONING UNITS AT ALL POINTS ALONG THE GIRDER SHALL LIE ON OR BELOW THE CURVE OF A DRAPED CHALK LINE THAT SAGS FREELY WITH DIMENSION "A" AS SHOWN AND WITH THE END 7" ABOVE THE BOTTOM OF THE GIRDER.

CONCRETE TEST CYLINDER STRENGTH AT TIME OF STRESS TRANSFER SHALL BE AT LEAST 4000 P.S.I.

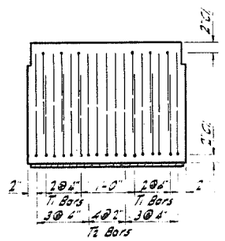
STRESSING FORCES FOR LENGTHS NOT SHOWN SHALL BE INTERPOLATED FROM VALUES IN TABLE.



PLAN VIEW
Showing T-Bars



ASSEMBLY AT PIER
Showing T-Bars



END VIEW
Showing T-Bars

** T1 & T2 bars shall be straight when concrete is poured. After the concrete has set the bars shall be bent by the beam fabricator as shown.

BAR LIST			
MARK	SIZE	LENGTH	SHAPE
B1	4	6'-1"	Bent
B2	4	6'-3"	"
B3	4	5'-10"	"
B4	4	6'-10"	"
B5	4	8'-0"	"
B6	4	Variable	Bent
B7	4	"	"
B8	4	"	Str.
**T1	4	4'-0"	Str.
**T2	5	4'-7"	"

27" x 36" SPREAD SUSPENDED PRESTRESSED BOX GIRDER

COMPOSITE SLAB

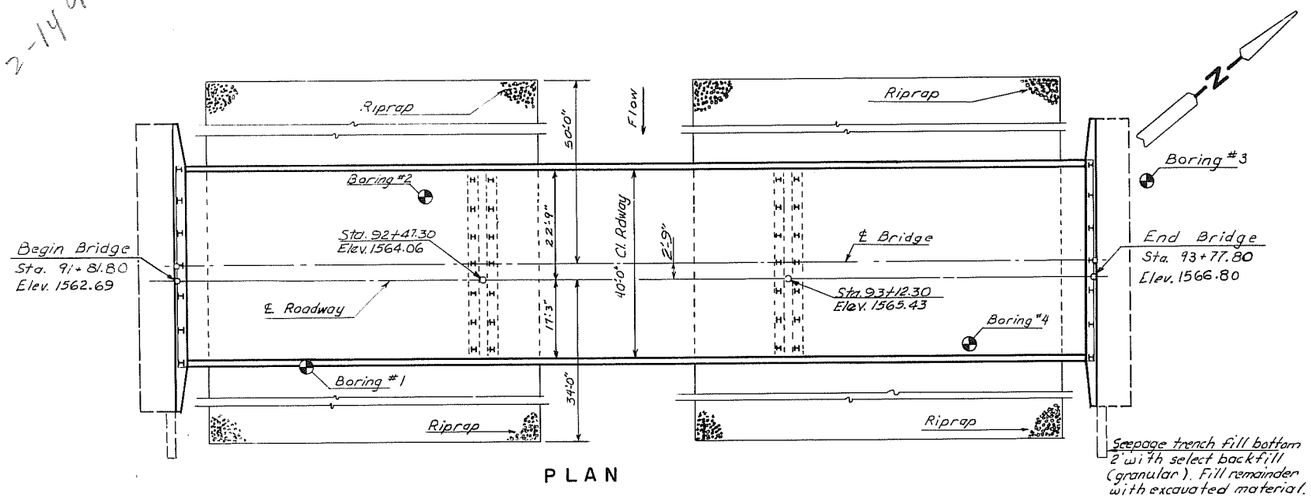
QUANTITIES MADE BY CHECKED BY

H-7010

H-7010

2-14-80 1.63

BRIDGE CODE	FED ROAD DIST NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
X-081	5	N. D.	F-FG-4-002(10)147	82	



PLAN

HYDRAULIC DESIGN DATA

DRAINAGE AREA	4025 SQ. MI.
DESIGN FREQUENCY	50 YRS.
DESIGN DISCHARGE	9260 CFS.
DESIGN STAGE	1546.9
STREAM GRADIENT	0.0001
WATERWAY PROVIDED BELOW DESIGN STAGE	2230 SQ. FT.
WATERWAY PROVIDED BELOW CLEARANCE	4550 SQ. FT.
AVERAGE VELOCITY OF FLOW IN NATURAL CHANNEL	3.3±
DEPTH OF FLOW	25.4 FT.
VELOCITY OF FLOW UNDER BRIDGE	4.2 FT/SEC.
FREEBOARD PROVIDED	11.9 FT.±
100-YEAR FREQUENCY DISCHARGE	4460 CFS
100-YEAR FREQUENCY STAGE	1549.7
MAXIMUM RECORDED STAGE (1969)	1548.0
MAXIMUM RECORDED DISCHARGE (1904)	12000 CFS

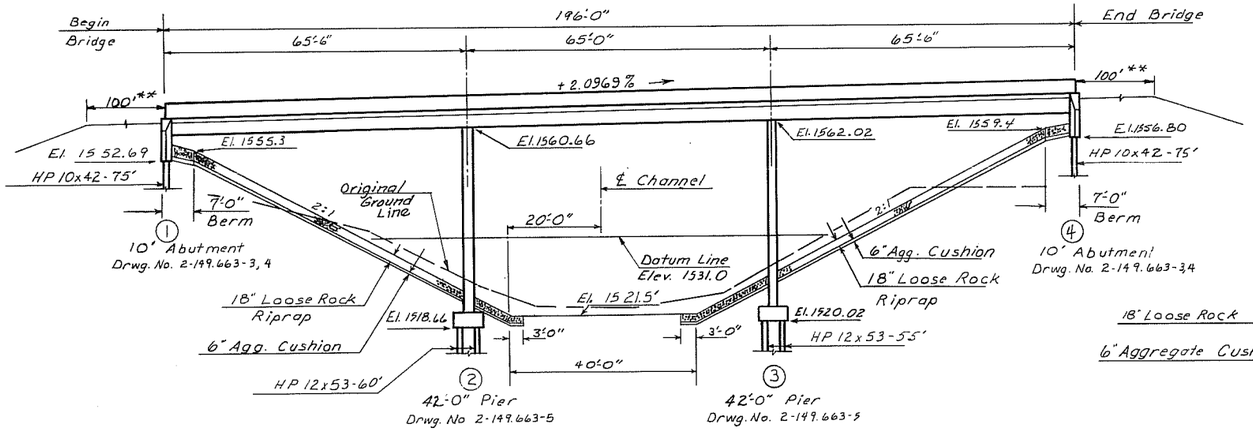
SPECIAL PROVISIONS

NO.	NAME
254	EPOXY COATED REINFORCING STEEL
208-1	EXCAVATION FOR BOX CULVERTS & BRIDGES
610-3	PORTLAND CEMENT CONCRETE
622-3	PILING
806-1	AGGREGATES FOR PORTLAND CEMENT CONCRETE
806-3	AGGREGATE FOR PORTLAND CEMENT CONCRETE, STRUCTURAL & PAVING MOTAR SAND & UNDER-DRAIN GRANULAR FILL

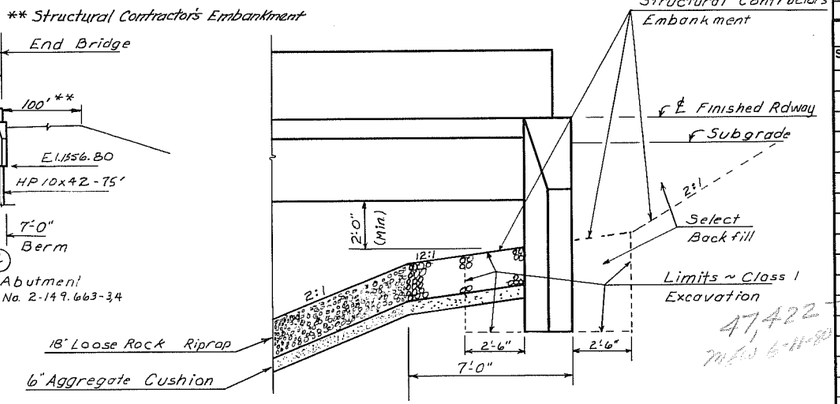
ESTIMATE OF QUANTITIES

SPEC NO.	CODE NO.	BID ITEM		
103	0100	CONTRACT BOND	1	L.S.
203	0140	BORROW	10,765	C.Y.
208	0100	CLASS I EXCAVATION	107	C.Y.
208	0110	CLASS II EXCAVATION	167	C.Y.
208	0201	FOUNDATION PREPARATION	1	E.A.
216	0100	WATER	309	M GAL.
228	0100	SELECT BACKFILL	213	C.Y.
604	9620	PRESTRESSED BOX BEAM-33"(15@64'4")	965.0	L.F.T.
602	0130	CLASS AAE-3 CONCRETE	256.6	C.Y.
602	1110	CLASS AE-1 CONCRETE	300	C.Y.
612	0115	REINFORCING STEEL- GRADE 60	57,177	LBS.
612	0116	REINFORCING STEEL-(GR.60) EPOXY COATED	31,878	LBS.
622	0020	STEEL PILING- HP10X42	900	L.F.
622	0040	STEEL PILING- HP12X53	1,495	L.F.
622	0393	STEEL TEST PILING- HP10X42	170	L.F.
622	1200	STEEL TEST PILING- HP12X53	135	L.F.
702	0130	LOOSE ROCK RIPRAP	850.2	C.Y.
703	0100	AGGREGATE CUSHION	283.4	C.Y.
616	5890	STRUCTURAL STEEL A36(APPROX. 2156 LBS.)	1	L.S.
750	0100	LINSEED OIL TREATMENT	35	GAL.
900	3000	BRIDGE BENCH MARKS	1	SET

47422 lbs 6-11-80

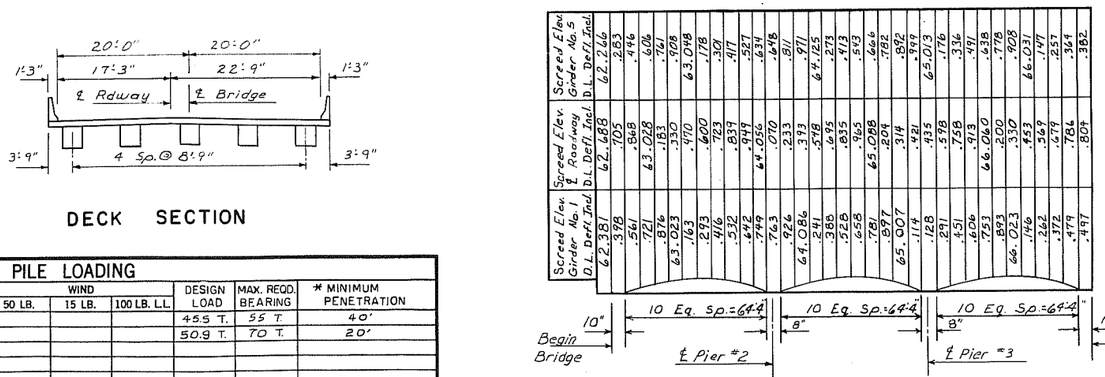


ELEVATION



DETAIL AT ABUTMENT

NOT TO SCALE



DECK SECTION

Screed Elev. Girder No. 5 D.L. Defl. Incl.	Screed Elev. ℄ Roadway L.L. Defl. Incl.	Screed Elev. Girder No. 1 D.L. Defl. Incl.
62.246	62.688	62.381
.285	.705	.378
.446	.868	.561
.606	63.028	.721
.761	.163	.876
.908	.330	63.023
63.048	.470	.163
.178	.600	.293
.309	.723	.416
.417	.839	.532
.527	.944	.642
.634	64.036	.749
.648	.010	.763
.811	.233	64.026
.911	.373	64.086
64.125	.518	.241
.213	.695	.386
.413	.835	.528
.543	.965	.658
.666	65.088	.781
.782	.204	.897
.892	.314	65.007
.949	.421	.114
65.013	.435	.128
.176	.578	.291
.336	.758	.451
.491	.913	.606
.638	66.060	.753
.778	.200	.893
.908	.330	66.023
66.031	.453	.146
.147	.569	.262
.257	.679	.372
.364	.784	.479
.362	.809	.497

10" Begin Bridge — 10 Eq. Sp. = 64.4 — ℄ Pier #2 — 10 Eq. Sp. = 64.4 — 9" — ℄ Pier #3 — 10 Eq. Sp. = 64.4 — 9" — 10" End Bridge

SCREED ELEVATIONS

BENCH MARKS

NO.	DESCRIPTION	LOCATION	ELEV.
11	Point Spot on N. end of CSP	80+18 .02' RT	1538.71
12	Point Spot on SW Corner of wing wall for Bridge	92+06 24' RT	1562.61
13	Point Spot on SW Corner of water [illegible]	101+87 274' RT	1588.29

PILE LOADING

LOCATION	DEAD LOAD + EARTH	LIVE LOAD	EARTH O. T. M.	WIND 50 LB.	WIND 15 LB.	WIND 100 LB. L.L.	DESIGN LOAD	MAX. REQD. BEARING	* MINIMUM PENETRATION
Abut. 1 & 4	34.1 T	11.4 T					45.5 T.	55 T.	40'
Pier 2 & 3	39.3 T	11.6 T					50.9 T.	70 T.	20'

*in ft. below footing

STRUCTURAL DRAWINGS

GENERAL DRAWING	2-149.663-1,2
SUBSTRUCTURE	2-149.663-3,4,5
SUPERSTRUCTURE	2-149.663-6 87 H-0401 D-900-1 H-7008

DESIGN LOADING	SCALE
HS 20	1 INCH = 15 FEET

NORTH DAKOTA
STATE HIGHWAY DEPARTMENT

SOURIS RIVER

BRIDGE LAYOUT

PROJECT F-FG-4-002()147 STA. 92+79.80

WARD COUNTY

APPROVED

3-14-80 Stanley Hoss
DATE BRIDGE ENGINEER

2-149.663

MADE BY / CHECKED BY / QUANTITIES

2-149.111

FED. ROAD DIV. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	N. D.	FG-701(2)		1	2

NORTH DAKOTA
STATE HIGHWAY DEPARTMENT

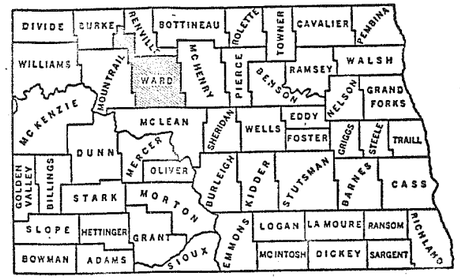
PLANS

FOR THE PROPOSED IMPROVEMENT OF A

STATE HIGHWAY

IN WARD COUNTY

FEDERAL AID PROJECT NO. FG-701(2)



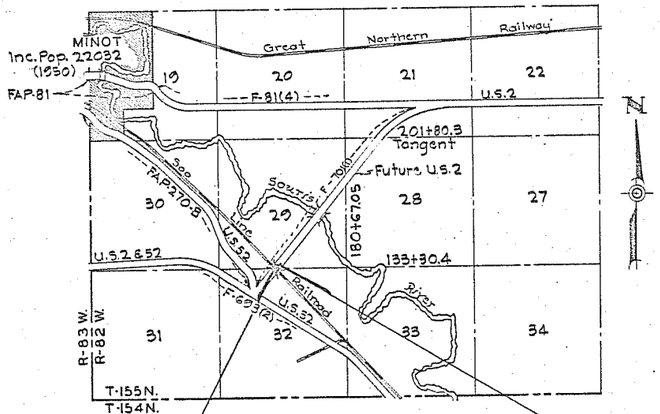
SKETCH-MAP OF NORTH DAKOTA
SHOWING COUNTIES

SCALES
- LAYOUT SHEET: 1 IN. = 3000'
- PLAN AND PROFILE DRAWINGS (HOR. 1 IN. = 100 FT. / VERT. 1 IN. = 10 FT.
- STRUCTURAL DRAWINGS:- AS SHOWN
- CROSS SECTION SHEETS:- 1 IN. = 10 FT.

DESIGN DATA

TRAFFIC	AVERAGE DAILY	EST. 30TH MAX. HR.
CURRENT TRAFFIC (1950)	788 PASS. 262 TRUCKS 1050 TOTAL	137
TRAFFIC FORECAST (1979)	2400 PASS. 800 TRUCKS 3200 TOTAL	416

DESIGN SPEED 70 MPH
TRAFFIC CLASSIFICATION 'M'
MINIMUM SIGHT DISTANCE (NON PASSING) 600'
MINIMUM SIGHT DISTANCE (SAFE PASSING) 3200'
MINIMUM PASSING SIGHT DISTANCE FOR MARKING 1200'
BRIDGES H20 S16 (1957) DESIGN LOADING
MINIMUM WIDTH 30'



LAYOUT MAP
3000' 0 3000'

BEG. FG-701(2) STA. 132+40.52= Sta. 132+40.52 on F-701(1) A point 2234.08' East & 69.47' South of the N.W. Cor. of sec. 32, Twp. 155, Rge. 82 W.

END FG-701(2) STA. 133+80.52= Sta. 133+80.52 on F-701(1) A point 2322.86' East & 38.79' North of the N.W. Cor. of Sec. 32, Twp. 155, Rge. 82 W.

INDEX OF DRAWINGS

SHEET NO. 1 TITLE PAGE
SHEET NO. 2 INCL. PLAN AND PROFILE DRAWING
SHEET NO. 3 TO 8 INCL. STRUCTURAL DRAWINGS

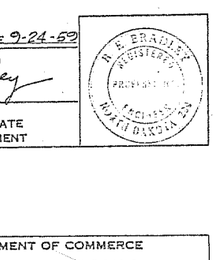
LENGTH OF PROJECT		
PROJECT	MILES-GROSS	MILES-NET
FG-701(2)	0.026	0.026
TOTALS	0.026	0.026

STRUCTURAL DRAWINGS	STANDARD DRAWINGS
2-12.5-1	7.5
2-12.5-2	7.6
H-1173-1	14.9
H-1173-2	H-0112
H-1278	H-0901
H-1397	H-0301

GOVERNING SPECIFICATIONS:
Standard Specifications adopted by the North Dakota State Highway department Jan. 1936 and approved as standard by the Bureau of Public Roads May 7, 1936 Required Special Provisions dated June 15, 1939 and approved by the Bureau of Public Roads July 8, 1939 and others submitted herewith.

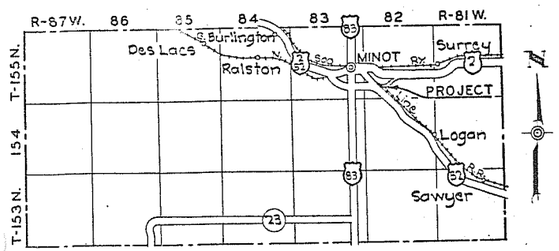
KEY TO CONVENTIONAL SIGNS

STATE & NATIONAL LINES
COUNTY LINE
TOWNSHIP & RANGE LINES
GRADE LINE
CENTERLINE OF CONSTRUCTION
OLD RIGHT OF WAY LINE
NEW RIGHT OF WAY LINE
ABANDONED RIGHT OF WAY LINE
PROPERTY LINE
STONE WALL
OTHER FENCES
POLE LINES
POWER LINES
BRIDGE
GROUND ELEVATION
GRADE
TRAVELED WAY
RAILROADS
HEDGES AND TREES
TRAILS
CITY OR VILLAGE CORPORATE LIMITS
SECTION CORNER
QUARTER SECTION CORNER
BUILDINGS
OLD CULVERTS
NEW CULVERTS
DRAINAGE
BENCH MARKS
WATERS EDGE
MARSH
WIRE ROPE GUARD RAIL
SNOW FENCE
RIPRAP
GUARD POSTS
COBBLE GUTTERS
CONCRETE GUTTERS



APPROVED DATE 9-24-59
CHIEF ENGINEER
NORTH DAKOTA STATE
HIGHWAY DEPARTMENT

N. E. BRADLEY REGISTERED ENGINEER FARGO, N. DAKOTA



SKETCH MAP OF PART OF WARD COUNTY

Add 1240.15 to datum of proj. plans to get C & G. datum.
See Dir. Survey Aug. 26, 1958

QUANTITIES ① See Special Provisions									
LOCATION	15B EXCAVATION CLASS 2	60A CONCRETE CLASS A-1	60A CONCRETE CLASS A-1Va	62A REINFORCING STEEL	63A STRUCTURAL STEEL	65G STEEL-ENCASED PILING	SLOPE PROTECTION	22B SELECT BACKFILL	BRIDGE BENCH MARKS
	CU.YD.	CU.YD.	CU.YD.	LB.	LB.	Lin.Ft.	SQ.FT.	CU.YD.	SET
Sta. 133+19.77	261	6.9	255.9	49,204	93,585	1980	5373	75	1
Grand Totals	261	6.9	255.9	49,204	93,585	1980	5373	75	1

① 15 I

DEPARTMENT OF COMMERCE
BUREAU OF PUBLIC ROADS
APPROVED
DIVISION ENGINEER DATE

FG-701(2)

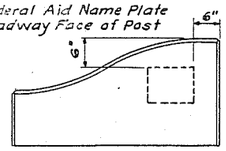
DESIGNED BY	JC
MADE BY	DCA
CHECKED BY	THR
TRACING	
QUANTITIES	THR
CHECKED BY	MEW

1960
FEDERAL AID
PROJECT
F-701(2)
NORTH DAKOTA
2-12.5

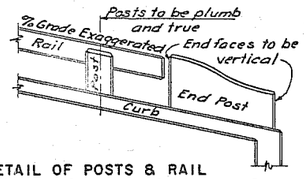
FG

FEDERAL AID NAME PLATE
2 Required

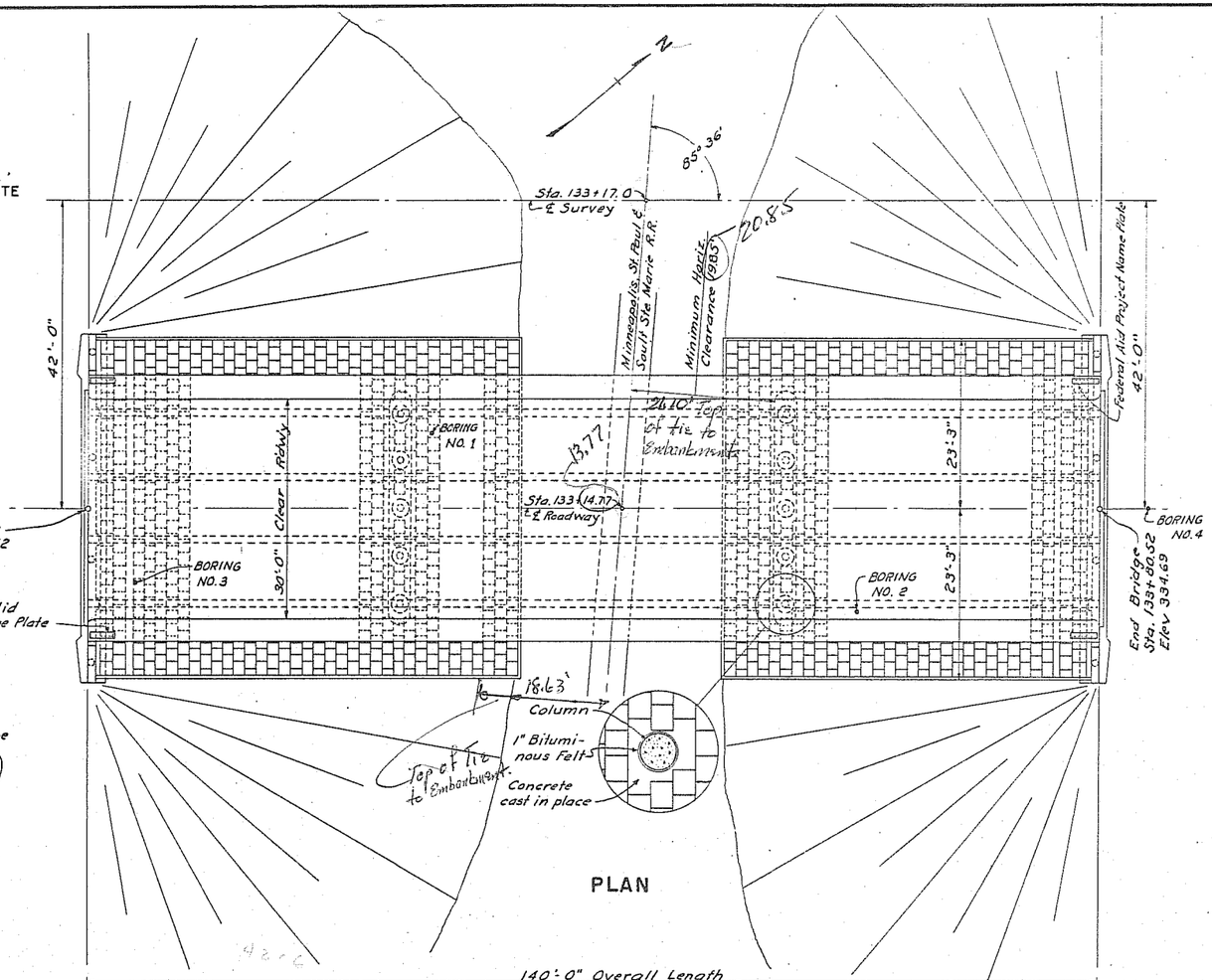
Federal Aid Name Plate
Roadway Face of Post



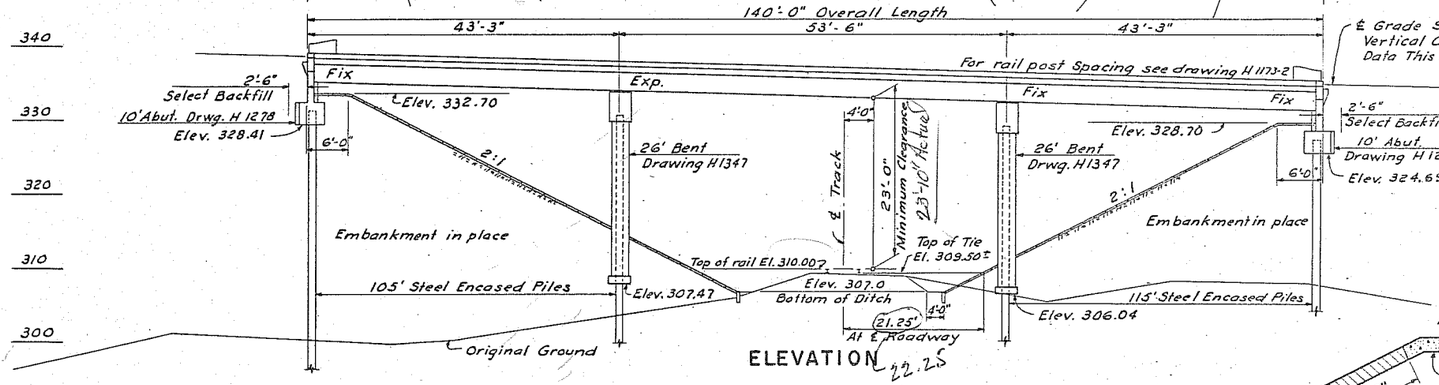
NAME PLATE LOCATION ON END POST
Also see plan (This drawing) Railing Details Drawing H-0112, H-1173 & Standard Drawing 14.9.



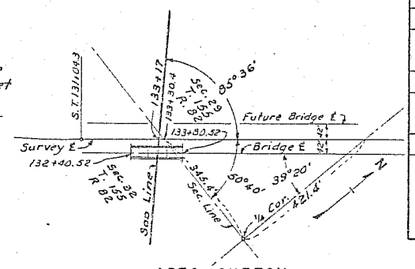
DETAIL OF POSTS & RAIL
Showing Supplemental Drawing for Railing Details, Sheet H-0112 (Outside View)



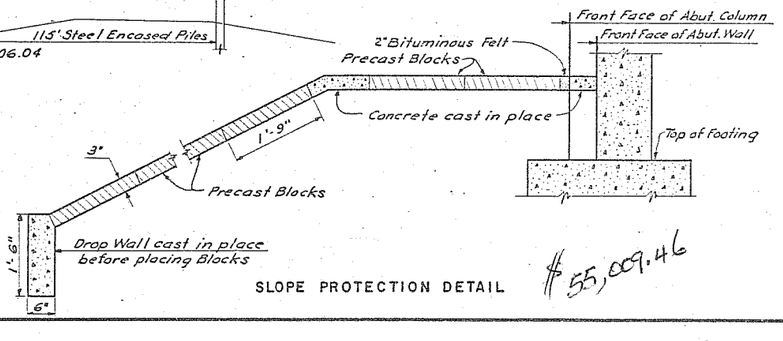
PLAN



ELEVATION



AREA SKETCH



SLOPE PROTECTION DETAIL

$55,009.46

NOTES

GENERAL:
A vibrating strike-off template shall be used when finishing the deck slab concrete. Care shall be taken that the vibrator is shut off when the forward movement of the template is stopped. The final strike-off shall be made on a fairly long surface without continual starting and stopping.
The cost of furnishing and placing joint filler, asphalt curb seal, name plates, end post pipe sleeves, and other miscellaneous items shall be included in the price bid for Class A-1½ Concrete.
For painting, welding, and deflection notes see drawing H-1173-1.
For rail post spacing and slab pouring sequence notes see drawing H-1173-2.

EXCAVATION:
All structural excavation shall be Excavation Class 2

EMBANKMENT:
The roadway embankment has been previously placed under separate contract, but additional shaping and placement will be required in order to conform to the exact limits as defined on this sheet and as directed by the Engineer; any cost accruing due to these operations shall be included in the unit price bid for precast block.
Earth consolidation shall be in accordance with Section 17.3(a)4 of the Standard Specifications using "Extra Compaction".
Embankment material, if required shall be obtained from Highway Right-of-Way as staked by the Engineer.

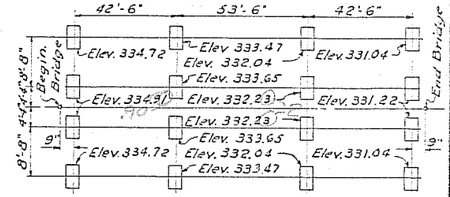
PRECAST BLOCK:
The precast block panels shall be placed in accordance with the standard drawing 7.5, the details as shown on this sheet, and as specifically directed by the Engineer.

REINFORCING STEEL: (Intermediate Grade)
Bent bar details are given center to center unless noted.
The Bar fabricator shall add a prefix to all bar designations to differentiate between the several parts of the structure or structures.

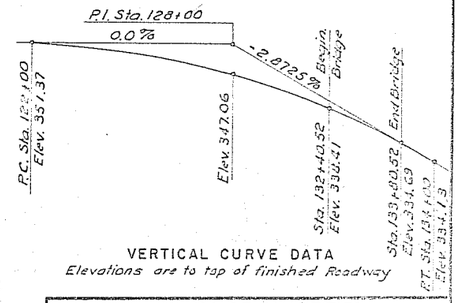
CONCRETE:
All exposed edges of concrete shall be beveled with ¾" triangular molding except as shown on the plans.
The "Rubbed Surface Finish" shall be given to the railing end posts, to the outside and roadway vertical faces of curbs, and to the exposed faces of the abutment wing walls. All other surfaces shall be given the "Ordinary Surface Finish".
All concrete shall be Class A-1½ except railings which are Class A-1 and shall be compacted by vibration.
Air-entrained portland cement shall be used in the bridge slab and curb concrete. Concrete made from both regular and air-entrained cement shall be considered Class A-1½ as a pay item.
The Deck Slab may be placed in one continuous pour provided the Contractor can supply concrete at a rate not less than 25 Cu. Yd. per hour.

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	N.D.	F-701(2)		3	8

CODE: X-131



BEARING PLATE LAYOUT
Elevations are to top of finished Concrete



VERTICAL CURVE DATA
Elevations are to top of finished Roadway

ESTIMATE OF QUANTITIES

SPCL. PROV.	SPEC. NO.	BID ITEM		
	12	REMOVING EXISTING STRUCTURE AT STA.		
	15 B	EXCAVATION CLASS		CU. YD.
		" CLASS 2	251	CU. YD.
		" CLASS 3		CU. YD.
	60 A	CONCRETE CLASS A-1	6.9	CU. YD.
		" CLASS A-1½	255.9	CU. YD.
	624	REINFORCING STEEL	49,204	LB.
	63 A	STRUCTURAL STEEL	93,595	LB.
	64 A	UNTREATED TIMBER		M.B.M.
	64 B	TREATED TIMBER		M.B.M.
	65 A	UNTREATED TIMBER PILING	@ FT.	LIN. FT.
15 I	65 G	STEEL ENCASED PILING	9 @ 105 FT. 9 @ 115 FT. 1980	LIN. FT.
	65 E	UNTREATED TIMBER TEST PILES		EACH
15 I	65 S	STEEL ENCASED TEST PILES		EACH
		SLOPE PROTECTION	5373	SQ. FT.
	81	TEMPORARY CROSSING AND DETOUR		
	22 B	SELECT BACKFILL	75	CU. YD.
		BRIDGE BENCH MARKS	1	SET

STRUCTURAL DRAWINGS

GENERAL DRAWING	2-12.5-1(THIS SHEET), 2-12.5-2, 7.6, H-0501
SUBSTRUCTURE	H-1278, H-1347, H-0401, 7.5
SUPERSTRUCTURE	H-1173-1, H-1173-2, H-0112, 14.9

DESIGN LOADING	SCALE
H20 S16 (1957)	1 INCH = 10 FEET

NORTH DAKOTA
STATE HIGHWAY DEPARTMENT
OVERHEAD
MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE R.R.
BRIDGE LAYOUT

PROJECT FG-701(2) STA. 132+40.52

WARD COUNTY

APPROVED
9-18-59
DATE

Joseph O. Kirby
BRIDGE ENGINEER

PROFESSIONAL ENGINEER

BENCH MARKS

NO.	DESCRIPTION	LOCATION	ELEV.
11	2"x2" Hub by P.P.	Sta. 121+35~225'Rt.	348.27
12	Spot on huge rock	Sta. 130+45~336'Lt.	308.71
13	Iron Pin ~2"x2" Gds.	Sta. 135+70~243'Rt.	304.92
14	Iron Pin ~2"x2" Gds	Sta. 148+60~197'Lt.	306.92

PILE LOADING

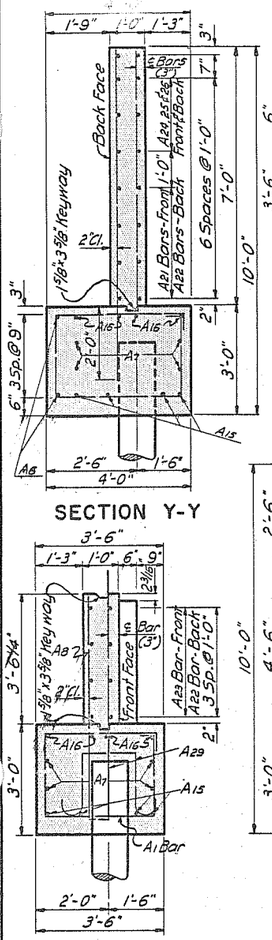
LOCATION	DEAD LOAD + EARTH	LIVE LOAD	EARTH O. T. M.	WIND 50 LB.	WIND 15 LB.	WIND 100 LB. L.L.	LONG. FORCE	DESIGN LOAD	MINIMUM REQUIRED BEARING	⊕ MINIMUM PENETRATION
Abutment	31.4 T.	13.3 T.						44.7 T.	65 T.	60
Pier	47.6 T.	23.7 T.						71.3 T.	73 T.	50
								⊕ Below bottom of footing		

2-12.5

2-12.5-1

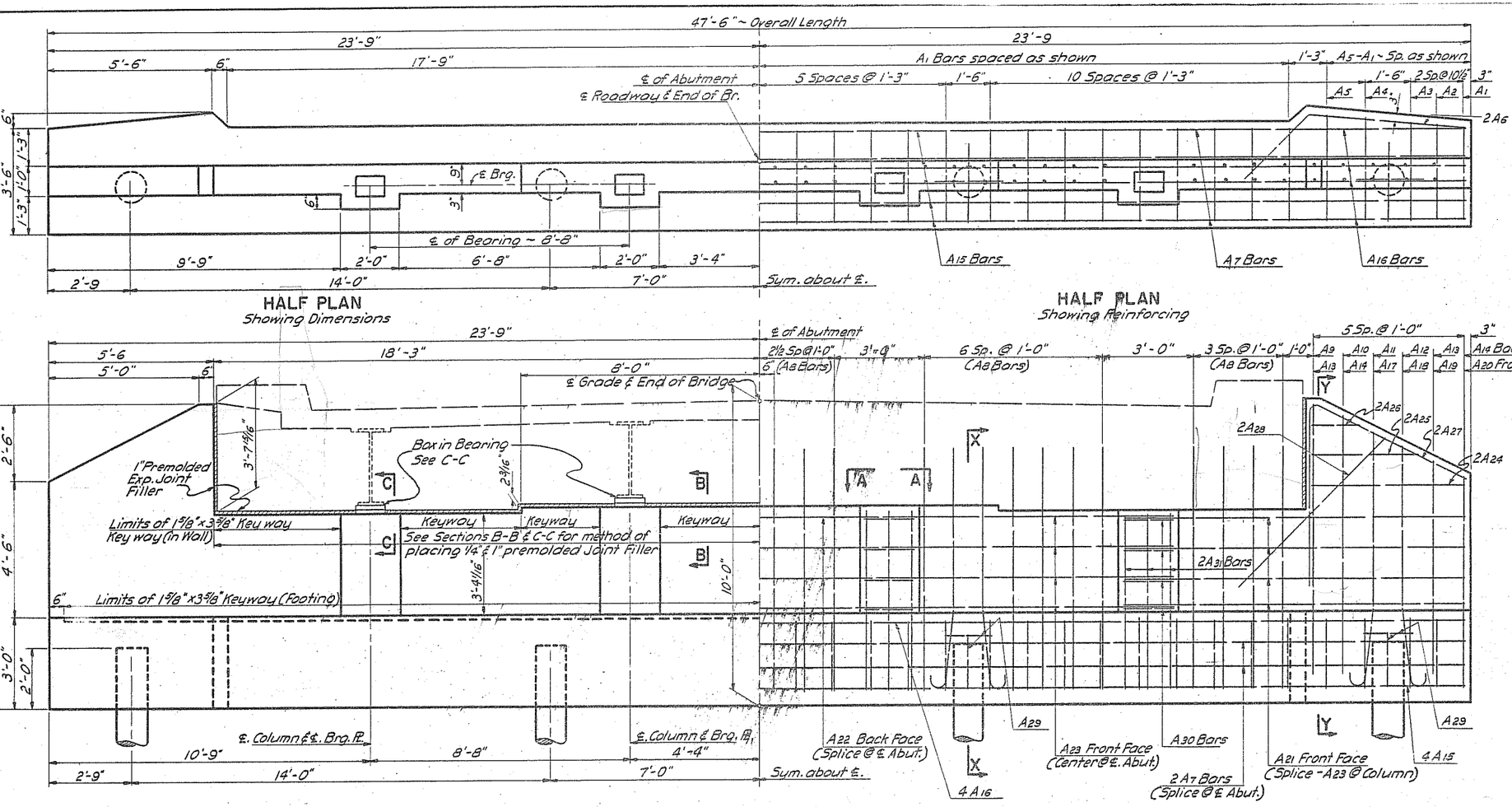
FED. ROAD DIST. NO	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	N. D.	FG-TCR(2)		7	8

DETAILS T.H.R.
TRACING CHECKED BY P.H.S.
QUANTITIES MADE BY B.L.S.
CHECKED BY M.E.W.
CHECKED BY T.H.R.



SECTION Y-Y

SECTION X-X



HALF PLAN
Showing Dimensions

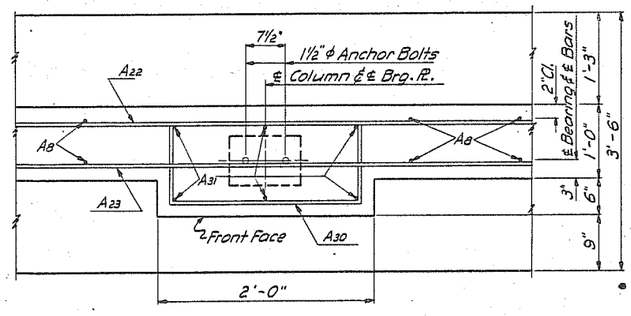
HALF PLAN
Showing Reinforcing

HALF ELEVATION
Showing Dimensions

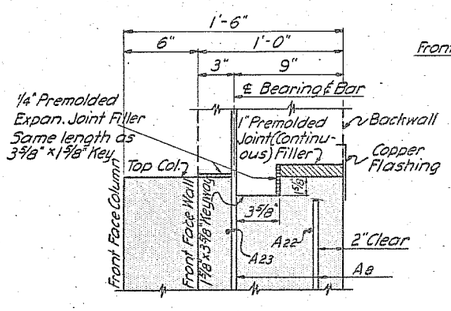
HALF ELEVATION
Showing Reinforcing.

BAR LIST (ONE ABUT.)

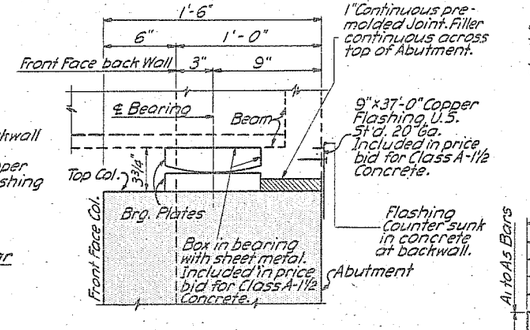
MARK	NO.	SIZE	LENGTH	SHAPE
A1	31	4	11'-4"	Bent
A2	2	4	11'-10"	"
A3	2	4	12'-0"	"
A4	2	4	12'-4"	"
A5	2	4	12'-6"	"
A6	4	6	8'-3"	"
A7	8	6	24'-9"	Str.
A8	28	4	14'-3"	Bent
A9	2	4	8'-9"	Str.
A10	2	4	8'-3"	"
A11	2	4	7'-9"	"
A12	2	4	7'-3"	"
A13	4	4	6'-9"	"
A14	4	4	6'-3"	"
A15	8	10	25'-8"	"
A16	8	11	26'-0"	"
A17	2	4	5'-9"	"
A18	2	4	5'-3"	"
A19	2	4	4'-9"	"
A20	2	4	4'-3"	"
A21	8	4	11'-6"	"
A22	8	4	24'-4"	"
A23	4	4	27'-8"	"
A24	4	4	5'-0"	"
A25	4	4	3'-6"	"
A26	4	4	1'-6"	"
A27	4	6	12'-0"	Bent
A28	4	6	7'-0"	Str.
A29	8	6	6'-11"	Bent
A30	16	5	5'-4"	"
A31	24	6	5'-8"	Str.



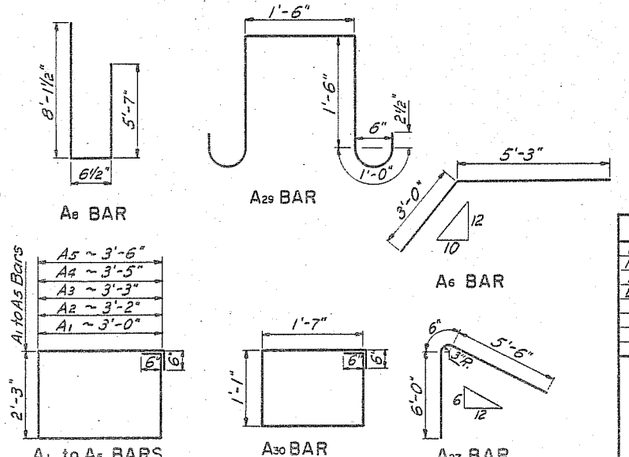
SECTION A-A



SECTION B-B



SECTION C-C
Through Column



BENT BAR DETAILS

QUANTITIES (ONE ABUT.)

Concrete Class A-1 1/2	26.1 Cu. Yd.
Reinforcing Steel	3,805 lb.
Piling (See Layout)	
Excavation (See Layout)	

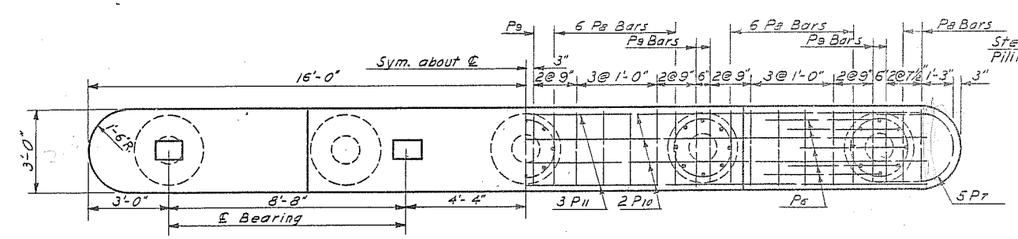
10 FT. ABUTMENT
FOR I BEAM SPANS
FIXED END
30 FT. ROADWAY

H-1278

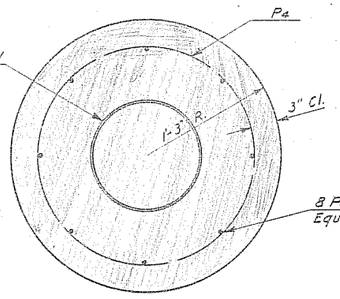
H-1278

FED. ROAD DIST. NO	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	N.D.	FG-7012		8	8

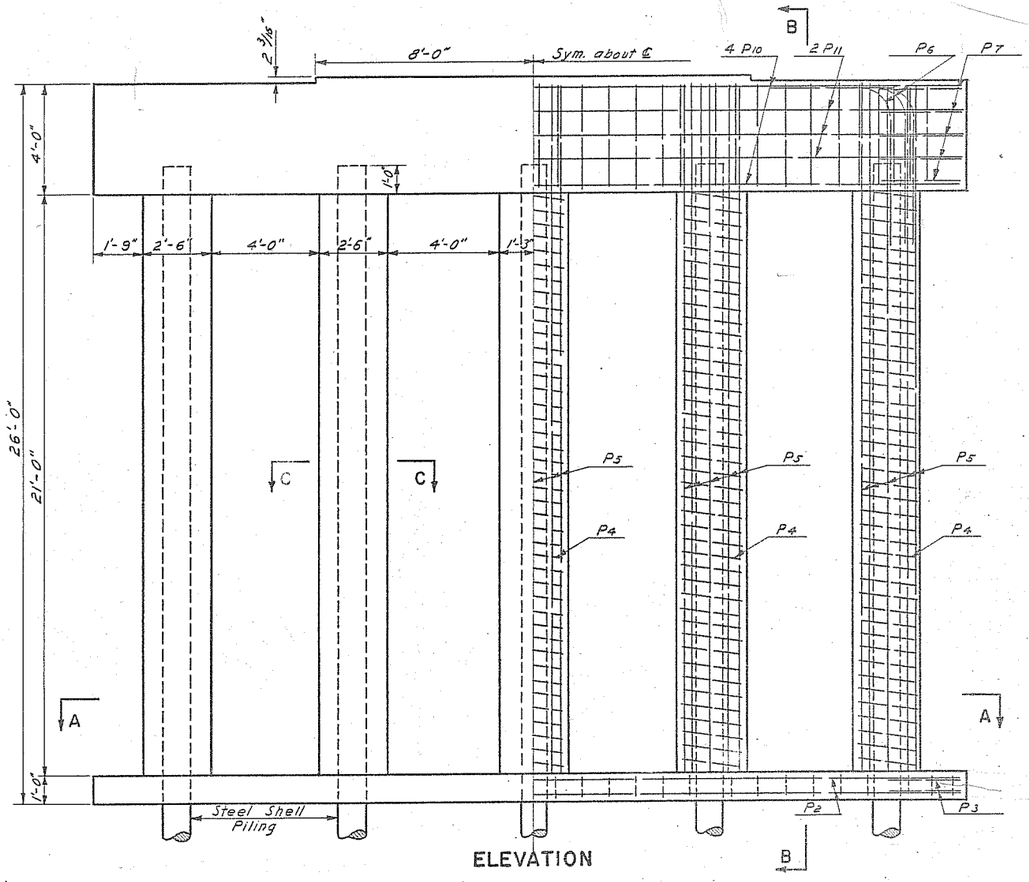
DETAILS	CHECKED BY	M.E.W.
	MADE BY	T.H.R.
TRACING	CHECKED BY	T.H.R.
	MADE BY	M.E.W.
QUANTITIES	CHECKED BY	M.E.W.



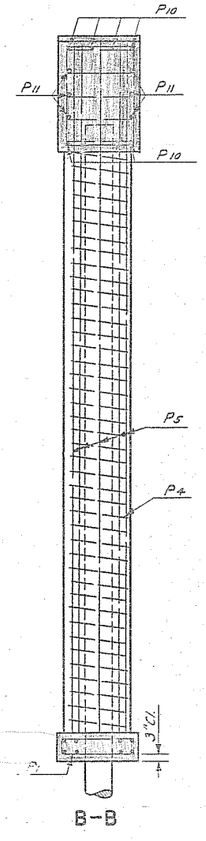
TOP PLAN



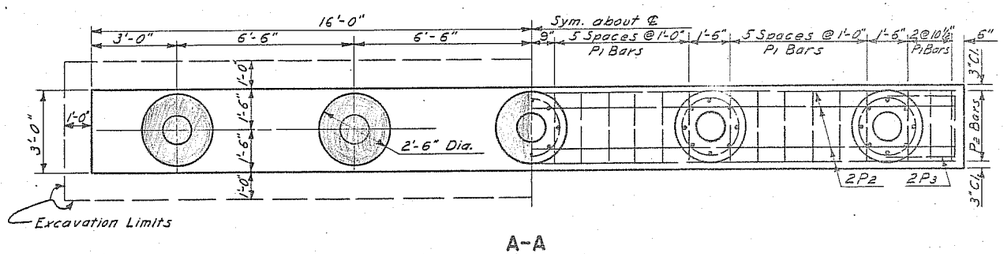
C-C



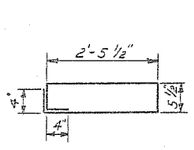
ELEVATION



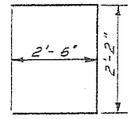
B-B



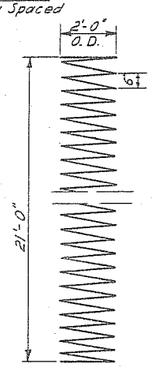
A-A



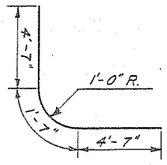
P1 BAR



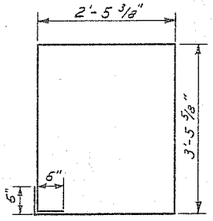
P3 BAR



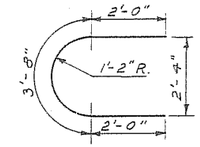
P4 BAR



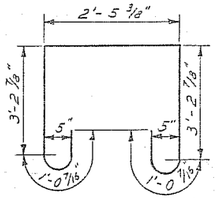
P6 BAR



P8 BAR



P7 BAR



P9 BAR

BENT BAR DETAILS

NOTE:
Column concrete shall be allowed to set a minimum of two hours before pier cap reinforcing is placed or concrete poured.

BAR LIST (One Bent)

MARK	NO.	SIZE	LENGTH	SHAPE
P1	30	4	5'-6"	Bent
P2	8	8	31'-0"	Str.
P3	4	6	7'-2"	Bent
P4	5	3	278'-6"	"
P5	40	5	24'-9"	Str.
P6	10	7	10'-9"	Bent
P7	10	5	7'-9"	"
P8	28	5	12'-10"	"
P9	10	5	11'-0"	"
P10	8	3	29'-0"	Str.
P11	6	8	29'-0"	"

QUANTITIES (One Bent)

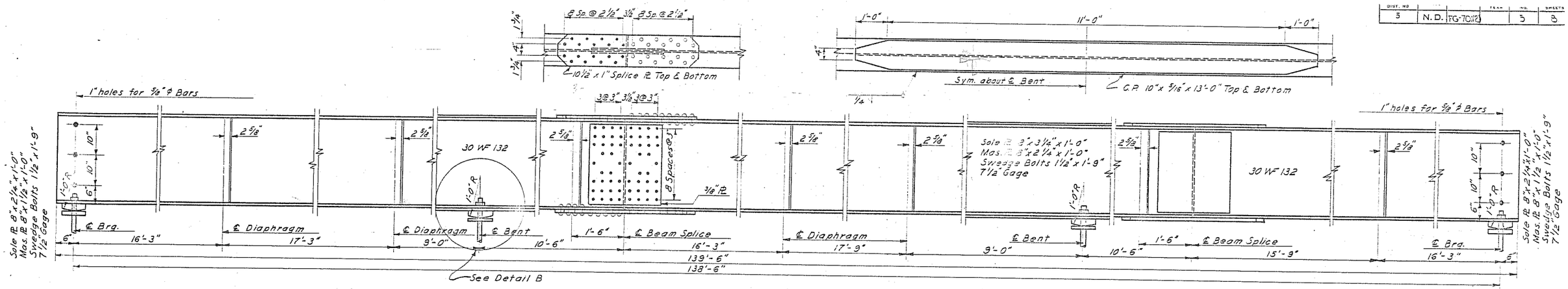
Concrete Class A-1½	33.1 C.Y.
Reinforcing Steel	4231 Lb.
Piling (See Layout)	
Excavation (See Layout)	

26' BENT DETAIL FOR I-BEAM SPANS 30' ROADWAY

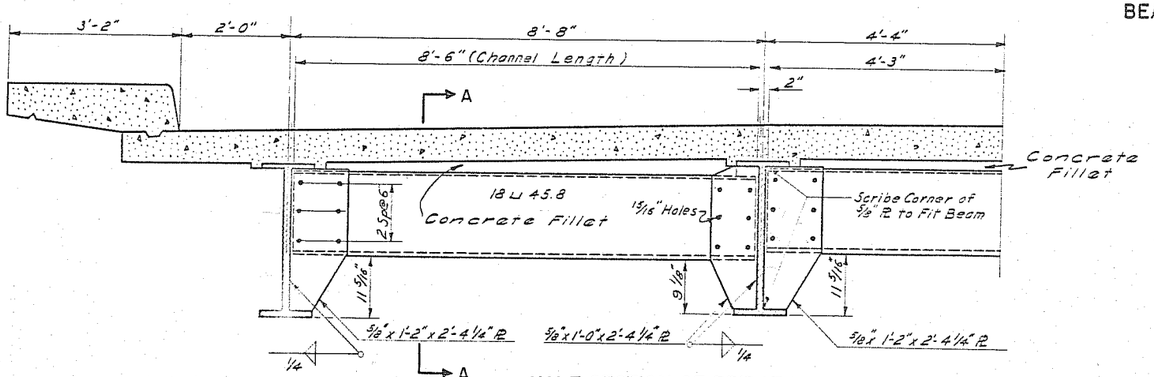
H-1347

H-1347

DIST. NO.			YEAR	NO.	SHEETS
5	N.D.	FG-70112		5	8

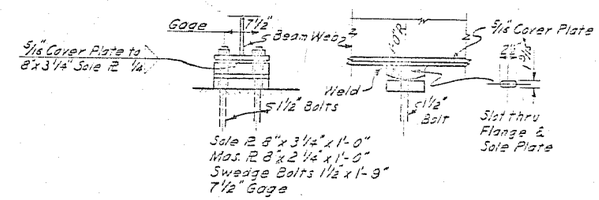


BEAM ELEVATION



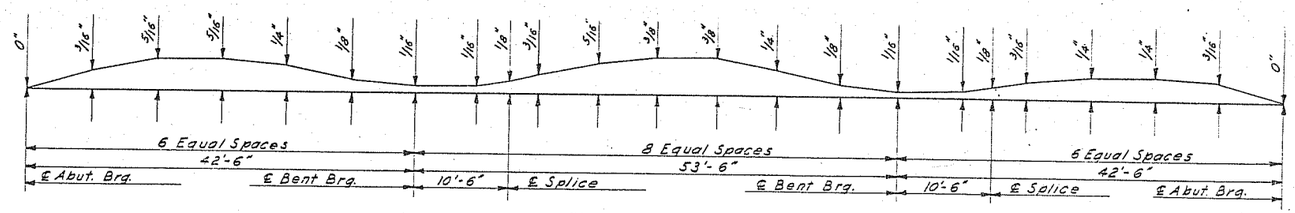
HALF SECTION OF BRIDGE

Showing Steel Diaphragm & Connectors
See Sheet H 1173-(Sheet 2) for A-A



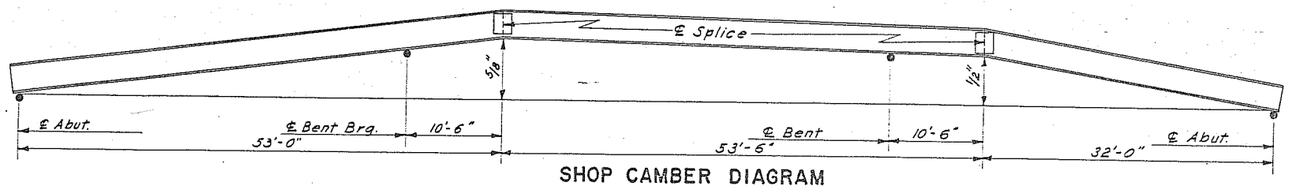
DETAIL B

Showing Expansion Bearing



FIELD RISER DIAGRAM

Showing Dimension "a"



SHOP CAMBER DIAGRAM

STRUCTURAL STEEL:

All Structural Carbon Steel shall conform to the latest ASTM A-7 Specifications.

GENERAL:

All rivets are to be ⅞".

Open holes are to be 15/16" except as noted.

Field connections shall be made with high tensile strength bolts or shall be riveted.

The placement of pier swedge bolts shall be in accordance with the approved Shop drawings.

Bearing areas are to be finished true to plan & elevation by grinding if necessary, before bearing plates are set.

The Field Riser Diagram shows dimensions from an assumed chord drawn between supports. Additions or subtractions must be made to the riser dimensions to compensate for the tolerances in the beam and deflection due to weight of the beam.

PAINT:

Paint and painting shall conform to the North Dakota Standard Specifications for Road and Bridge Construction, Sections 80 & 132.17. All exposed steel surfaces shall be given one shop coat of red lead paint, one spot coat of red lead paint after erection and concrete work is completed and two field coats of aluminum paint (first field coat tinted with Prussian Blue). No paint, shop or field, on top of beams.

WELDING:

The metal arc process shall be used for all Shop and Field fabrication. All welding shall conform to the current "Standard Specifications for Welding Highway & Railway Bridges, Design, Construction and Repair," of the American Welding Society.

Welding will not be paid for directly, but shall be included in the unit price bid for structural steel.

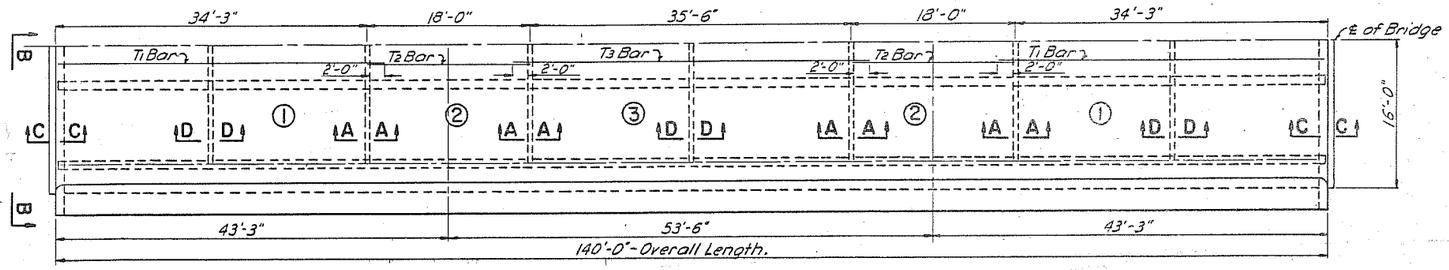
QUANTITIES	
Structural Steel	93,585 lb.

SUPERSTRUCTURE
THREE SPAN CONTINUOUS
I-BEAM
140'-0" OVERALL LENGTH
30' ROADWAY
SHEET 1 OF 2

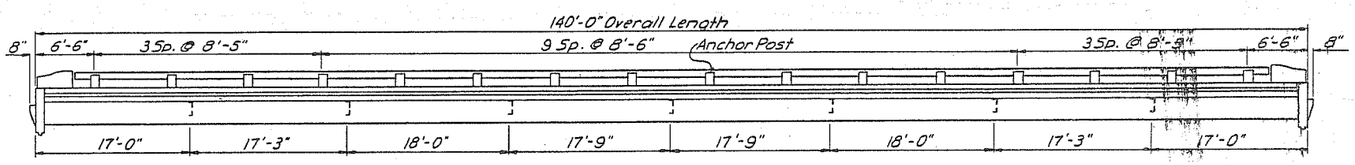
DETAILS	CHECKED BY B.L.S.
TRACING	MADE BY M.E.W.
	CHECKED BY J.C.&T.H.R.
QUANTITIES	MADE BY M.W.&R.H.S.
	CHECKED BY T.H.R.

H 1173

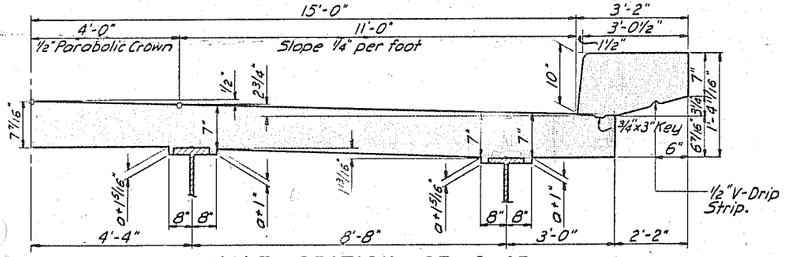
DIST. NO.	STATE	PROJ. NO.	YEAR	No.	SHEETS
5	N. D.	FG-7011(2)		6	8



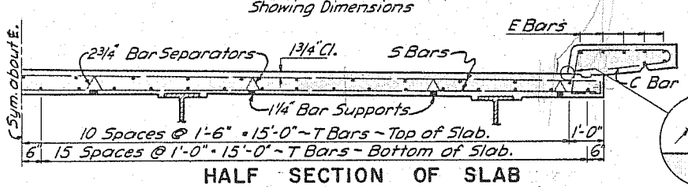
HALF PLAN



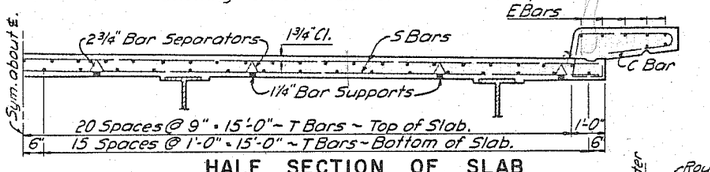
ELEVATION



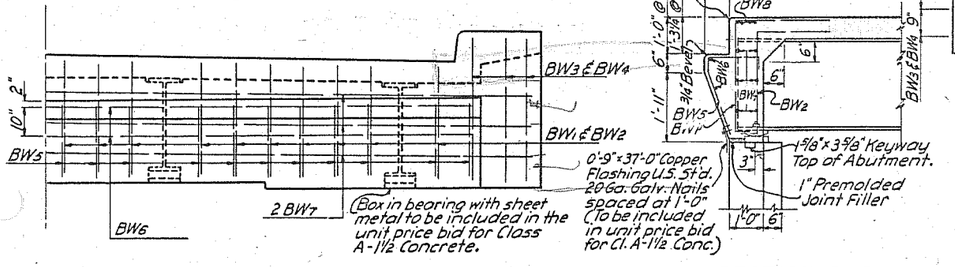
HALF SECTION OF SLAB
Showing Dimensions



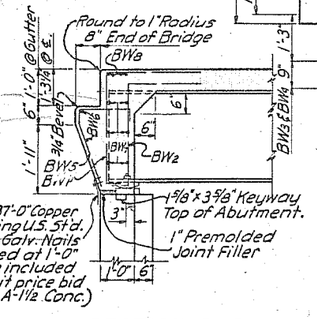
HALF SECTION OF SLAB
Showing Reinforcement for Slab Number 1 & 3



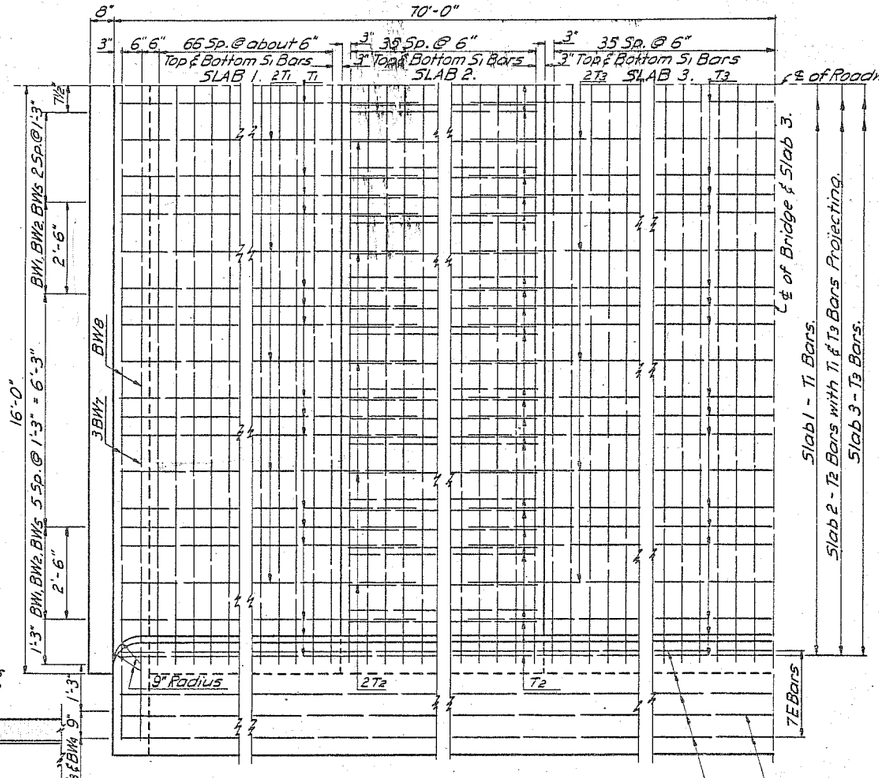
HALF SECTION OF SLAB
Showing Reinforcement for Slab Number 2.



SECTION B-B

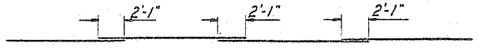


SECTION C-C

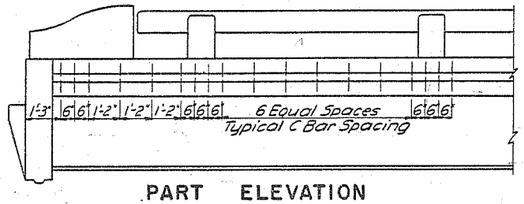


SLAB REINFORCEMENT DETAILS

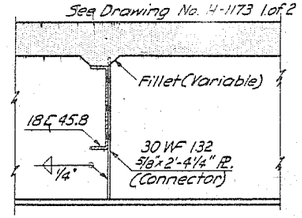
T1 & T3 Bar Projections shown in half plan above



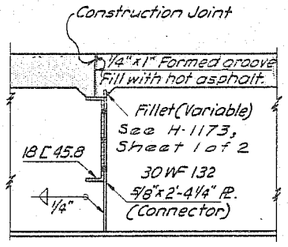
E Bars ~ Field splicing details in curb.
R Bars ~ Field splicing details in rail.



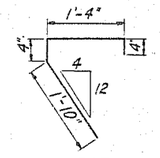
PART ELEVATION
Showing C Bar Spacing



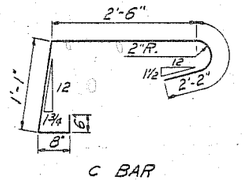
SECTION D-D



SECTION A-A

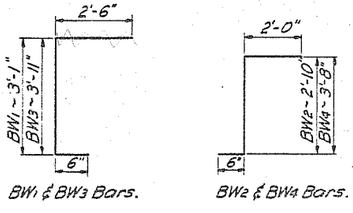


BW5 BAR



BENT BAR DETAILS

C BAR



BW1 & BW3 Bars. BW2 & BW4 Bars.

BAR LIST

MARK	NO.	SIZE	LENGTH	SHAPE
BW1	40	4	6'-1"	Bent
BW2	40	4	5'-4"	"
BW3	12	4	6'-11"	"
BW4	12	4	6'-2"	"
BW5	44	4	3'-10"	"
BW6	4	5	31'-6"	Str.
BW7	12	5	36'-0"	"
BW8	4	5	36'-0"	"
C	298	5	6'-11"	Bent
E	36	5	36'-6"	Str.
S1	554	5	31'-6"	Str.
T1	106	4	36'-0"	Str.
T2	146	5	17'-6"	"
T3	53	4	39'-6"	"
△ P10	60	5	3'-4"	Bent
△ P11	4	5	4'-0"	"
△ P12	64	5	3'-6"	"
△ P13	68	3	3'-8"	"
△ P14	60	3	2'-8"	"
△ RC	222	3	2'-8"	Bent
△ R	48	5	34'-6"	Str.

NOTES:

The slab shall be poured in the following sequence:
1. Slab sections 1.
2. Slab section 3.
3. Slab sections 2 over piers.

Each curb shall be placed in one continuous operation.

Bevel all exposed edges with ¾" triangular molding except as shown.

Quantities shown below include handrail end posts.

△ See Drawing H-0112

For railing details see Drawing H-0112.

Designed for 25 #/□' future wearing surface.

QUANTITIES

*Concrete Class A-1	6.9 Cu. Yds.
*Concrete Class A-1½	137.5 Cu. Yd.
*Reinforcing Steel	33,132 lb.

*Includes End Post & Railing Quant.

SUPERSTRUCTURE
THREE SPAN
I - BEAM
OVERALL LENGTH 140 FT.
H20 S16 LOADING
SHEET 2 OF 2

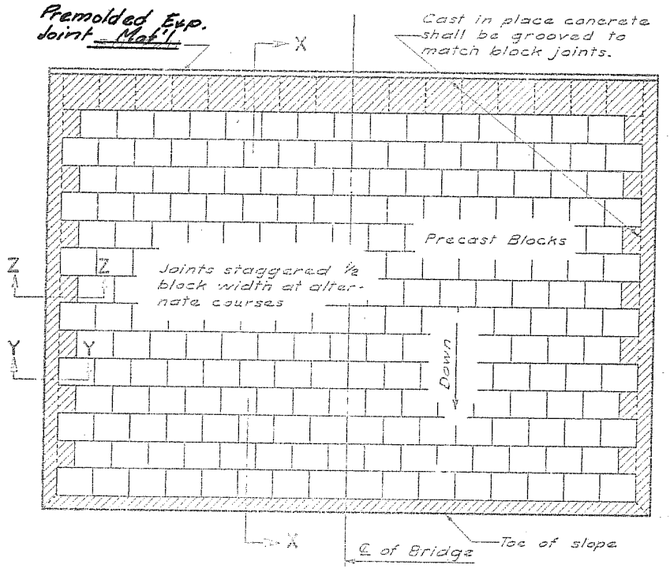
MADE BY R.M.S.
CHECKED BY J.C.W.
TRACING
MADE BY M.W.
CHECKED BY R.M.S.
QUANTITIES

H-117-2

H-1173-2

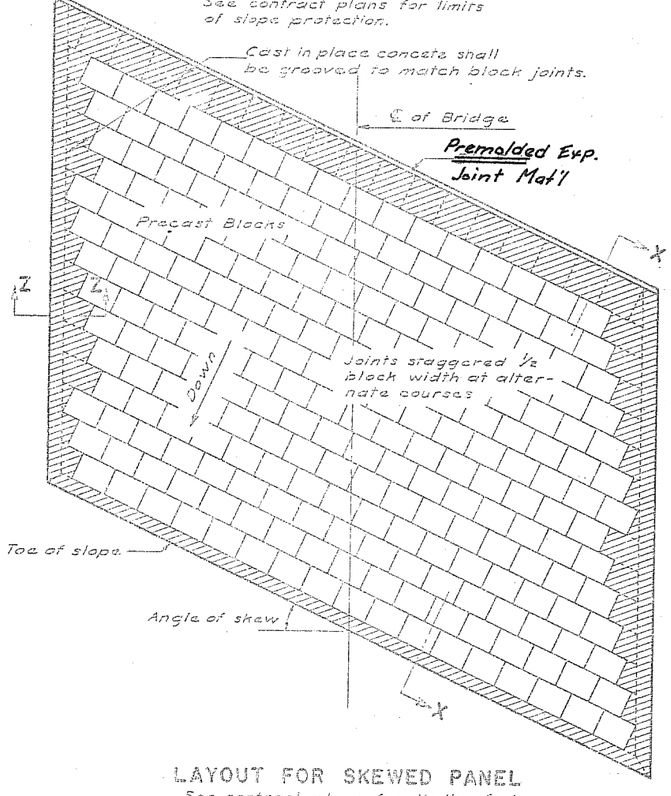
STANDARD SLOPE PROTECTION UNDER BRIDGES

GROUTED PRECAST CONCRETE BLOCKS



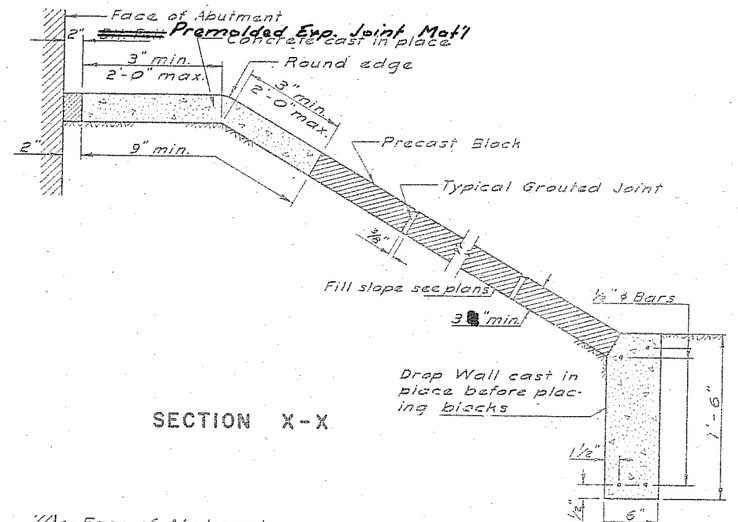
LAYOUT FOR SQUARE PANEL

See contract plans for limits of slope protection.

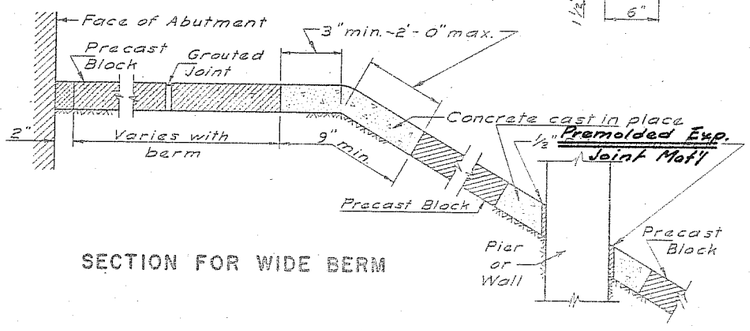


LAYOUT FOR SKEWED PANEL

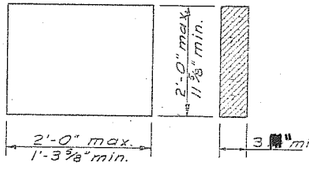
See contract plans for limits of slope protection & angle of skew.



SECTION X-X



SECTION FOR WIDE BERM



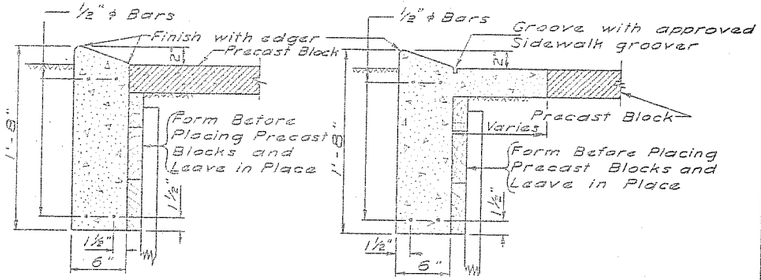
NOTE:

Wherever parts of bridge, such as pier columns or walls, are contacted by the Slope Protection material, ½" thick Bituminous Felt Joint Filler shall be provided between contact areas.

The areas around such piers or walls, where the regular block pattern is interrupted, shall be constructed with cast in place concrete and shall be marked into sections with an approved Sidewalk groover.

~~*Bituminous Felt Joint Filler shall be in accordance with the Standard Specifications for Preformed Expansion Joint Fillers For Concrete, AASHO Designation; M 33.*~~

DETAILS OF PRECAST BLOCKS ½" depth grooves to be provided.



SECTION Y-Y

SECTION Z-Z

CONSTRUCTION NOTES

Where applicable, Construction methods shall conform to Section 60 of the N.D.H.D. Standard Specifications.

The contractor will be allowed to cast the slope protection in place, however, when he does this he will be required to groove the finished surface to give the same appearance which would be obtained with the precast blocks. Poured in place concrete slope protection will be required to develop a minimum compressive strength of 3000 ℔/sq.in. in 28 days. The gradation of coarse aggregate shall be optional with the contractor.

Precast Concrete Blocks for slope protection shall develop a minimum compressive strength of 3000 ℔/sq.in. in 28 days. The gradation of coarse aggregate shall be optional with the contractor. All joints between precast blocks shall be grouted and the joints grooved as shown on this sheet. All precast blocks shall be sound and free from cracks or other defects that would interfere with the proper placing of the unit, or impair the strength or permanence of the construction.

Only one size of precast block shall be used at a structure location.

The embankment slope to be protected shall conform to the plan cross-section, be free of rubbish, and have all loose material thoroughly compacted.

The cast-in-place concrete shown at all edges and around pier columns or walls of the slope protection as detailed on this sheet, shall be provided regardless of which type of slope protection is used.

Rectangular shaped blocks shall be placed with the long dimension horizontal.

The adjacent slope areas shall be left in a smooth, uniform condition.

METHOD OF MEASUREMENT

Slope protection shall be measured by the square foot and the area to be paid for shall include all that area within the outside limits of the concrete edges and ~~bituminous~~ ½" Premolded Exp. Joint Mat'l without deducting for pier columns or pier walls.

BASIS OF PAYMENT

Slope protection shall be paid for at the contract unit price bid per square foot for Slope Protection. The payment of this price shall be full compensation for furnishing, delivering, and placing all material, for all reinforcing steel, excavation, backfill, preparation of slope surfaces, form lumber, ~~bituminous~~ ½" Premolded Exp. Joint Mat'l, equipment, tools, labor, and all incidentals necessary to complete this item in accordance with the plan and these specifications.

CONSTRUCTION NOTES (cont.)

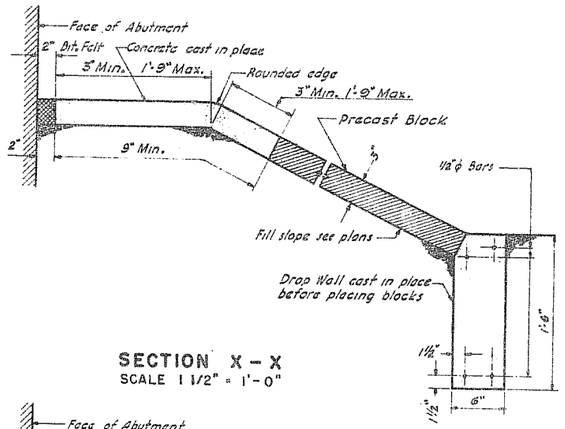
Test cylinders for determining Compressive strength of the concrete shall be cured along with and under the same curing conditions as for the poured in place concrete or precast concrete blocks.

Precast Concrete block joints shall be grout filled, using grout consisting of one part of Portland Cement and two parts of clean sharp sand by volume, corrected for moisture.

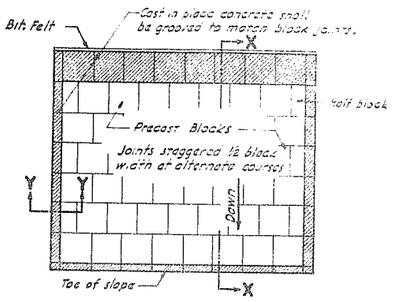
1-20-58 REVISIONS 12-11-59	NORTH DAKOTA STATE HIGHWAY DEPARTMENT Submitted: Joseph A. Kirby Bridge Engineer Recommended: M. Bjerke Director Staff Division Approved: R. E. Ley Chief Engineer

7.5

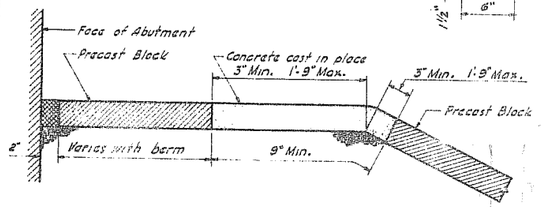
SLOPE PROTECTION DETAIL



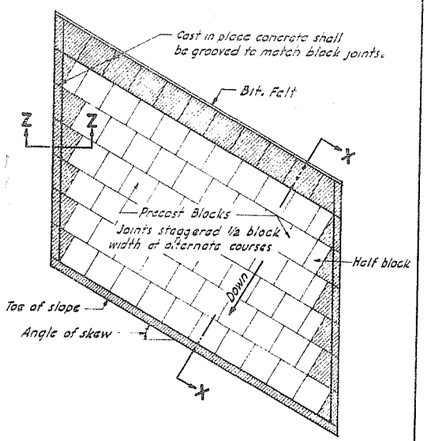
SECTION X – X
SCALE 1 1/2" = 1'-0"



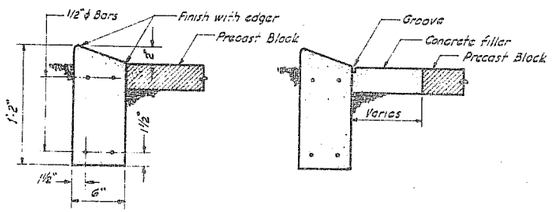
LAYOUT FOR SQUARE PANEL
See contract plans for limits of slope protection.



SECTION FOR WIDE BERM
SCALE 1 1/2" = 1'-0"

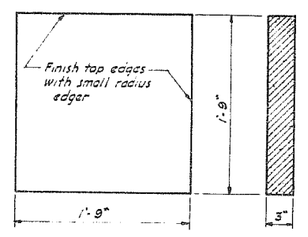


LAYOUT FOR SKEWED PANEL
See contract plans for limits of slope protection & angle of skew.



SECTION Y–Y
SCALE 1 1/2" = 1'-0"

SECTION Z–Z



DETAILS OF PRECAST BLOCK
SCALE 1 1/2" = 1'-0"

METHOD OF MEASUREMENT
Slope protection block shall be measured by the square foot and shall include all that area within the outside limits of the concrete edges and bituminous felt.

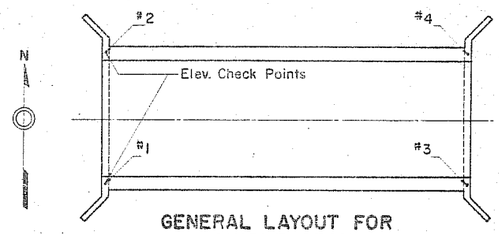
BASIS OF PAYMENT
Slope protection block shall be paid for at the contract price per square foot and shall include all precast block, concrete, reinforcing steel, excavation, bituminous felt and all other materials, equipment, tools, labor and work incidental to construction.

CONSTRUCTION NOTES
Construction methods & materials shall conform to N.D.H.D. specifications Sect. 60
Poured concrete shall be class A-1½"
Precast conc. block shall conform to A.S.T.M specification C 145-52 for grade A block.
Blocks shall be laid up with dry joints tight & true to line and level with a full bed resulting in a smooth even surface over the entire panel.
All joints shall be kept free of earth.
Blocks shall be sound & free of chips, cracks, and other blemishes.
The slope receiving the panel shall conform to the designated cross section, free of rubbish with all loose material thoroughly compacted.

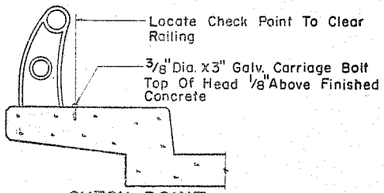
Void

NORTH DAKOTA
STATE HIGHWAY DEPARTMENT
Submitted: Joseph O. Kirby
Bridge Engineer
Recommended: M. Engrud Cope
Director, Staff Division
Approved: R. O. Bradley
1-20-58 Chief Engineer

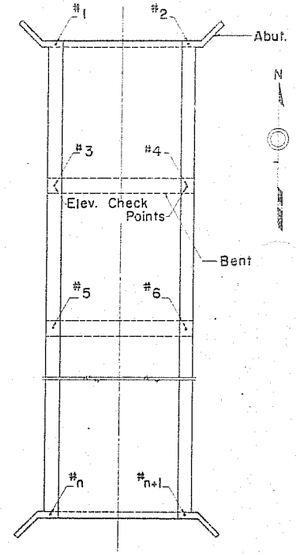
BRIDGE BENCH MARKS



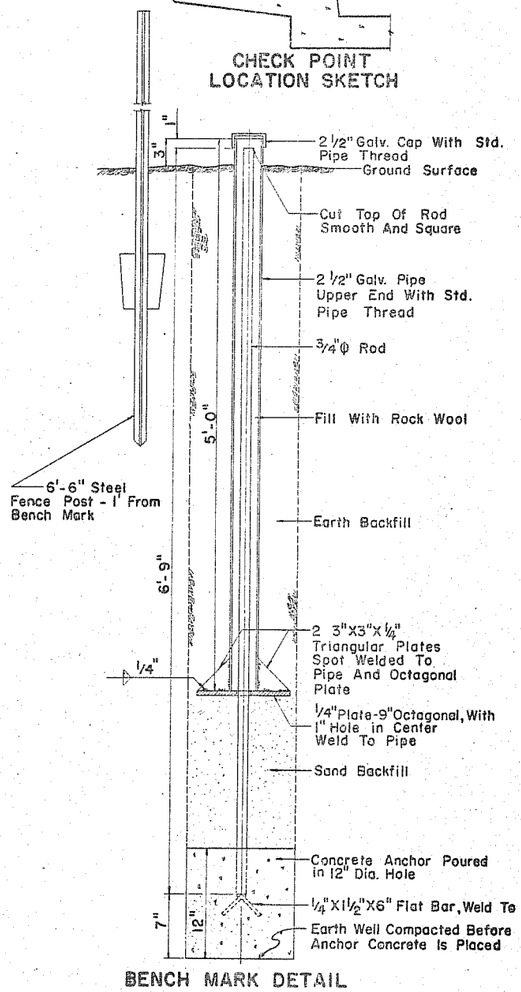
GENERAL LAYOUT FOR SINGLE SPAN



CHECK POINT LOCATION SKETCH



GENERAL LAYOUT FOR MULTIPLE SPAN



BENCH MARK DETAIL

NOTES:

Elevation check points shall consist of 3/8"x 3" galvanized carriage bolts (or equal) set in the concrete curb at the points indicated on the General Layout Sketches. The top of bolt head shall project above the finished concrete 1/8". Elevation check points shall be placed on each curb over each unit of the substructure for each bridge at a structural location.

Two bench marks as detailed hereon shall be set at diagonal opposite positions away from the structure location and at least 300 feet from the nearest point on the bridge or bridges (if more than one at a location). These bench marks shall be constructed as detailed on this sheet and located near the Highway Right-of-way lines. The steel fence post shall extend 4'-0" above ground and be painted with two coats of white paint suitable for steel surfaces.

The Project Engineer shall run a set of levels determining the elevation of each check point on the structure and the two bench marks immediately after the completion of the bridge. This information shall be submitted to the Bridge Engineer with adequate information locating each check point and bench mark.

Except for fence posts, all metal parts to be hot dip galvanized after punching, shearing, welding, and fabrication.

Threads of cap and pipe are not to be galvanized. At time of installation these threads are to be coated with grease and cap screwed to snug fit.

METHOD OF MEASUEMENT:

Each set of Bridge Bench Marks consisting of two bench marks and the required number of elevation check points shall be considered as one unit for bidding purposes and the quantity to be paid for shall be the number of sets of bridge bench marks which have been installed complete in place and accepted by the Engineer.

BASIS OF PAYMENT:

Bridge Bench Marks shall be paid for at the contract price bid for each set of Bridge Bench Marks, which price shall be full compensation for all excavation, backfill and clean-up, and for furnishing, hauling and placing all elevation check points, fence posts, galvanized pipe, caps, rods, sand backfill, concrete, rock equipment, tools and incidentals, including galvanizing, necessary to complete this item.

NORTH DAKOTA
STATE HIGHWAY DEPARTMENT

Submitted: Joseph R. Kuchy
Bridge Engineer

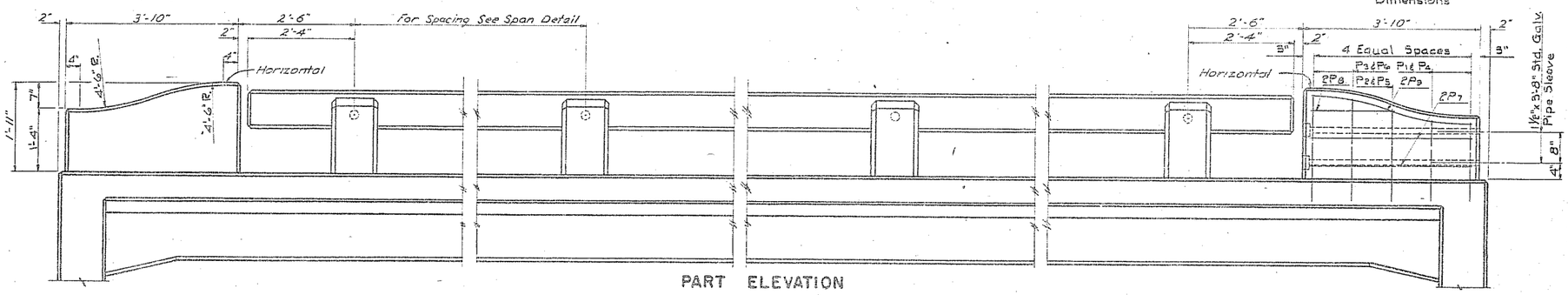
Recommended:
Director Staff Division

Approved:
Chief Engineer

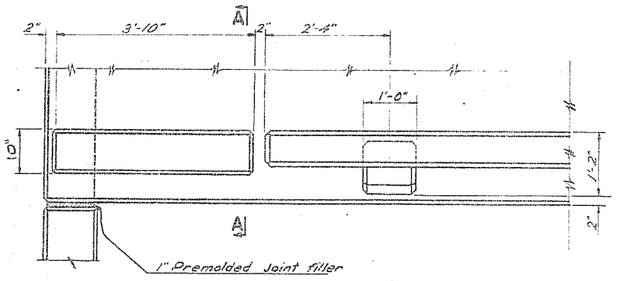
Date: 3-3-58 Revised: 6-9-58

FED. ROAD DIV. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	N. D.				

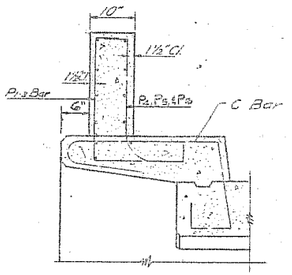
DETAILS — MADE BY L.A.G. — CHECKED BY J.C.
TRACING — MADE BY B.G.N. & R.R.L. — CHECKED BY C.E.G.
QUANTITIES — MADE BY B.G.N. — CHECKED BY C.E.G.



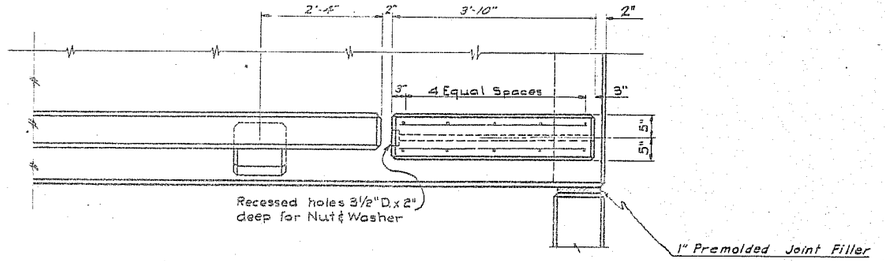
PART ELEVATION



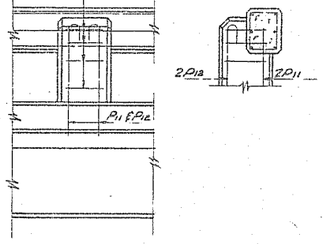
PART PLAN



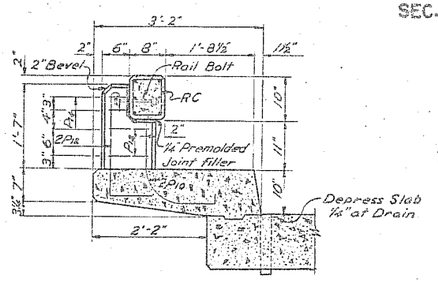
SEC. A-A



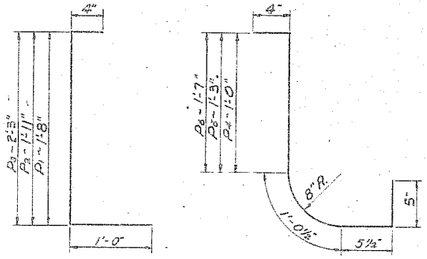
PART PLAN



ANCHOR POST DETAIL
See Layout For Placement



TYPICAL SECTION



P1, P2 & P3 BARS — P4, P5 & P6 BARS

BENT BAR DETAILS FOR END POSTS

NOTES:

All concrete above top of curb shall be Class A-1 except concrete end posts.

"Rubbed Surface Finish" will be required for the roadway faces of curbs, the outside vertical faces of curb and slab, and all faces of rails, intermediate and end posts. All other surfaces shall be given the "Ordinary Surface Finish".

BAR LIST
(BARS FOR RAILING AND POSTS)

MARK	NO.	SIZE	LENGTH	SHAPE
P10	*	5	3'-4"	Bent
P11	*	5	4'-0"	Bent
P12	*	5	3'-6"	Bent
P13	*	3	3'-8"	Bent
P14	*	3	2'-8"	Bent
RC	*	3	2'-8"	Bent
P***	**	5	* *	Str.

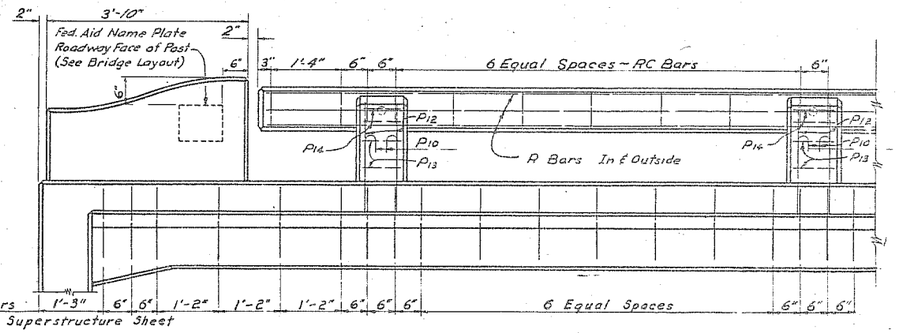
* Number of bars shown on Superstructure Sheet.
** Number, Length & Splicing information of R bars shown on Superstructure Sheet.

BAR LIST
(4 END POSTS)

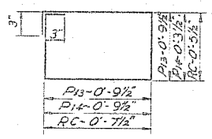
MARK	NO.	SIZE	LENGTH	SHAPE
P1	8	5	3'-0"	Bent
P2	4	5	3'-3"	"
P3	8	5	3'-7"	"
P4	8	5	3'-3"	"
P5	4	5	3'-6"	"
P6	8	5	3'-10"	"
P7	16	4	3'-6"	Str.
P8	8	4	1'-9"	Str.
P9	8	5	3'-9"	Field Bend

QUANTITIES ~ 4 END POSTS	
Concrete Class A-1½	0.8 Cu.Yd.
Reinforcing Steel	221 Lbs.

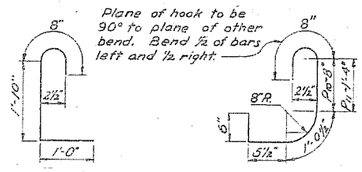
* Railing and end post quantities are included in slab quantities on Superstructure Sheet.



HAND RAIL DETAILS

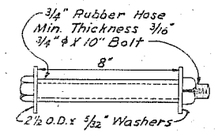


P13, P14 & RC BARS



P12 BARS — P10 & P11 BARS

BENT BAR DETAILS FOR RAILING POSTS & RAILING



RAIL BOLT
(Galvanized)
(To be included in the unit price bid for Class A-1½ Concrete)

STANDARD RAILING DETAILS

H-011

H-0112