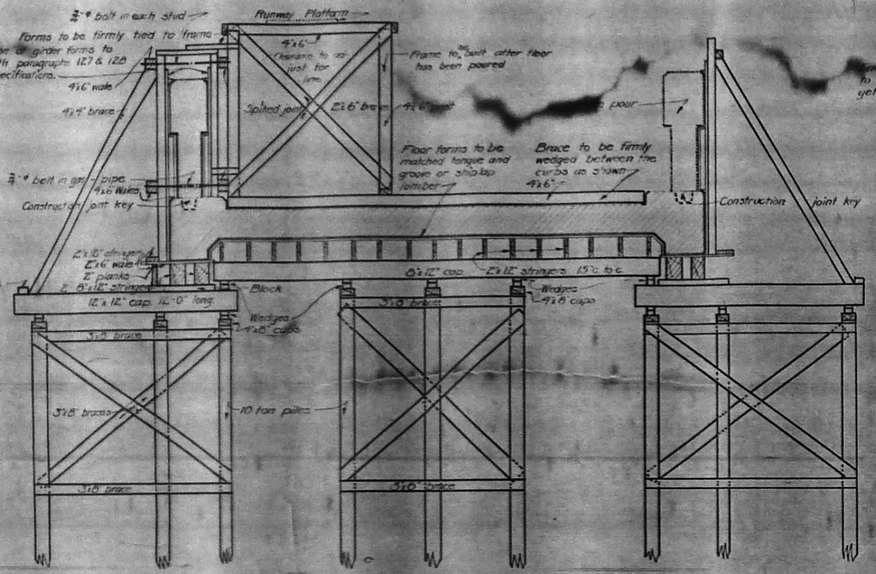
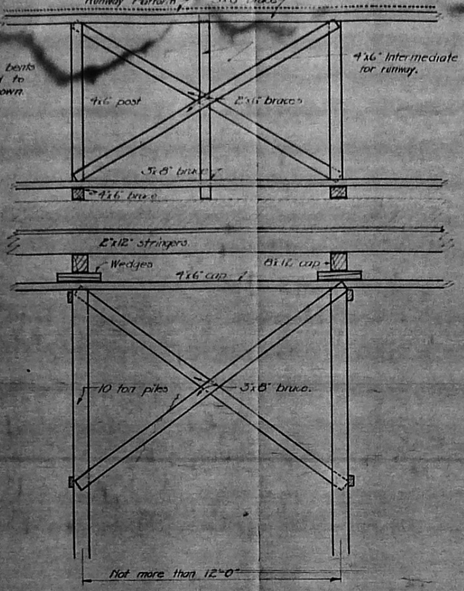
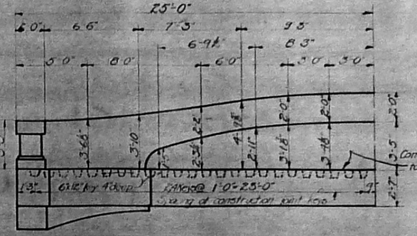


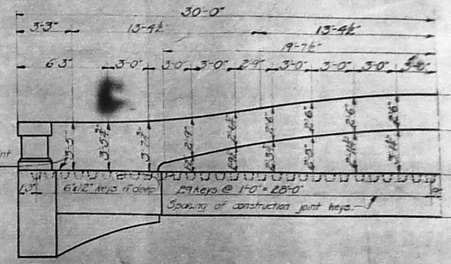
FALSEWORK BENT



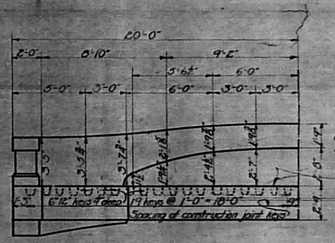
SECTION ON ℄ ROADWAY



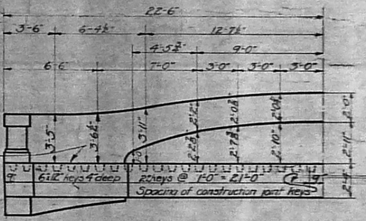
50'-0" R.C. GIRDER
22' ROADWAY



60'-0" R.C. GIRDER
20' & 22' ROADWAY



22' ROADWAY
40'-0" R.C. GIRDER



22' ROADWAY
45'-0" R.C. GIRDER

COORDINATES FOR LAYING OUT FORMS, CURVED TOP GIRDERS

Note:

All material and workmanship to be in accordance with Michigan State Highway Department's Specifications for Steel and Concrete Highway Bridges 1922 Edition, Revised.

Substitutions of equal strength may be made, subject to the approval of the Michigan State Highway Department.

All piles for falsework to be not less than eight inches in diameter at the top, nor less than five inches in diameter at the bottom.

All falsework piles to be driven to 10 (ton) ton capacity.

All bents to be braced laterally and longitudinally as shown.

Forms to be removed, only when the inspector is present.

Forms to be removed in small units, as all exposed surfaces must be finished the same day that the forms are removed.

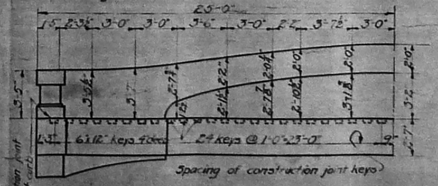
Immediately after forms are removed, cut off all the wires at least ½ inch beneath the surface and fill the hole with 1:2 grout.

Construction joint note

The floor and girder section below the top of curb to be poured as shown on standard plan. Each girder above the top of curb to be poured in one continuous run.

Where bolts are used to space and tie the forms, they are to be removed from the finished concrete. The following method of placing is prescribed: enclose the bolt in a gas pipe, when the bolt is removed ram the gas pipe full of 1:2 grout. The pipe should be of such a length that the ends do not come closer to the surface than ¾ inch.

The girder and floor to be allowed to set 7 days at 75° Fahrenheit or equivalent as specified in paragraph 154 of the Specifications, before concrete is poured above the top of curb.



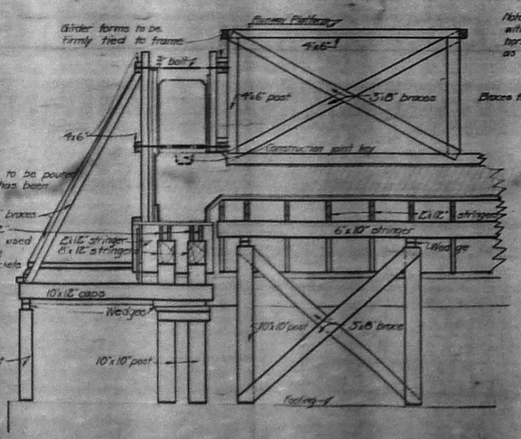
50' R.C. GIRDER.
20' ROADWAY.

MICHIGAN STATE HIGHWAY DEPARTMENT.
STANDARD 35', 40, 45, 50' & 60' R.C. GIRDERS, FLAT SLAB FLOORS
FALSEWORK PLANS — FORM COORDINATES.

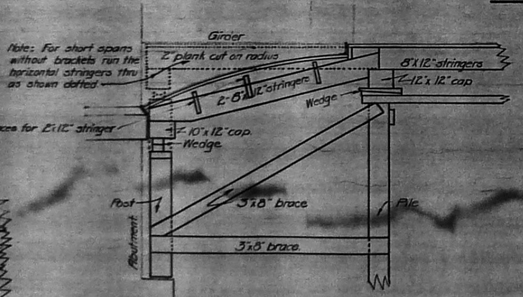
Correct _____ Asst Bridge Engineer

Approved _____ Bridge Engineer

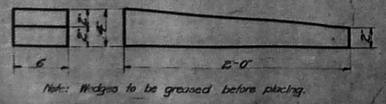
Drawn by	JDC	3-6-23
Traced by	JDC	3-6-23
Checked by	REE	3-11-23
Filed by	ERS	3-16-23



END BENT WITH FOOTING SUPPORT

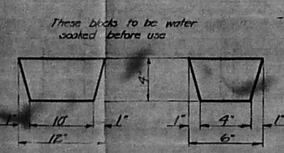


ELEVATION SHOWING BRACKET



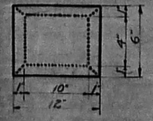
Note: Wedges to be greased before placing.

DETAILS OF WHITE OAK WEDGES



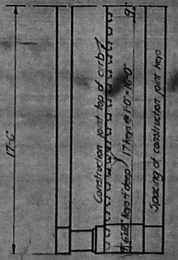
ELEVATIONS

Note: Blocks to be greased before placing.

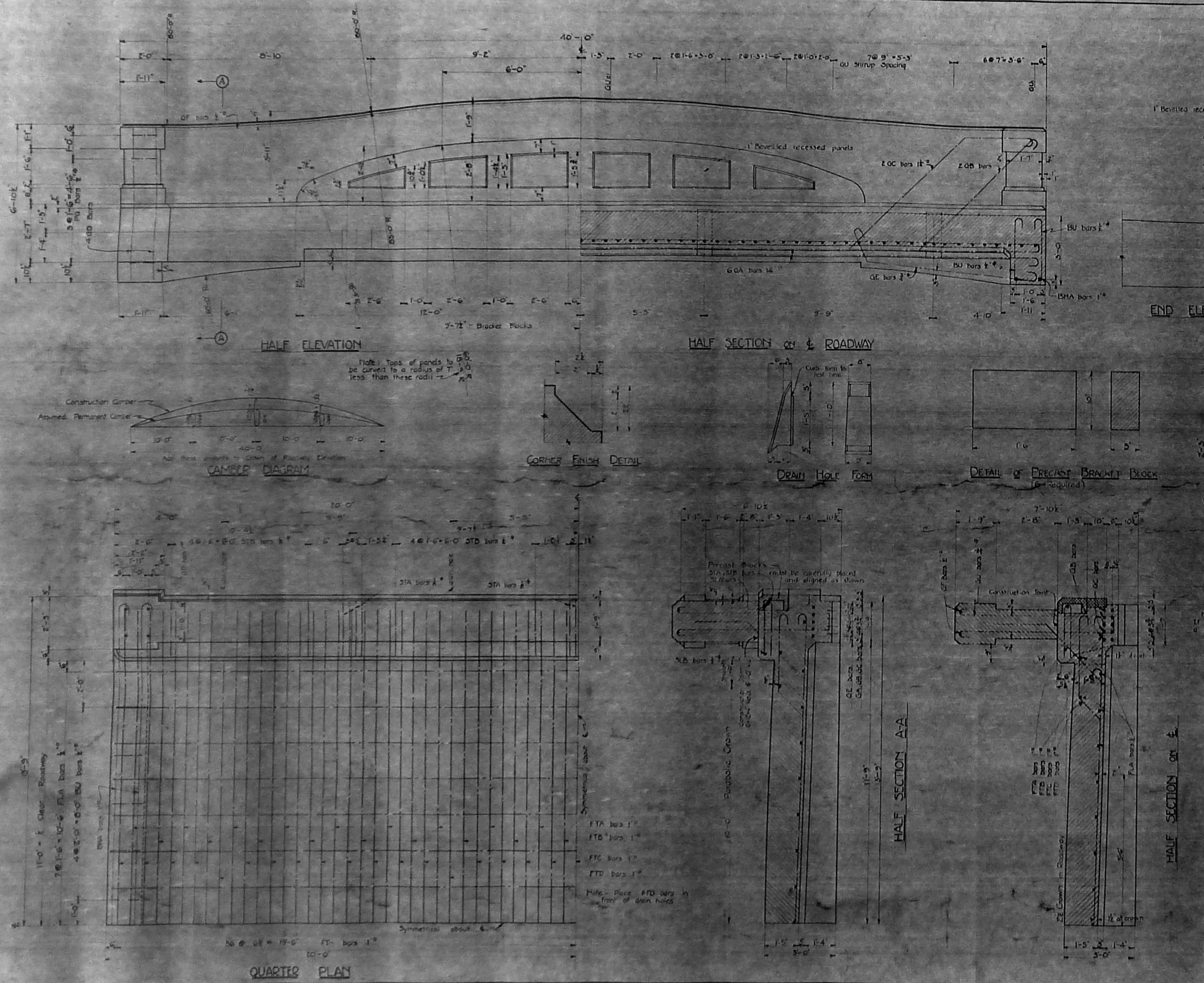


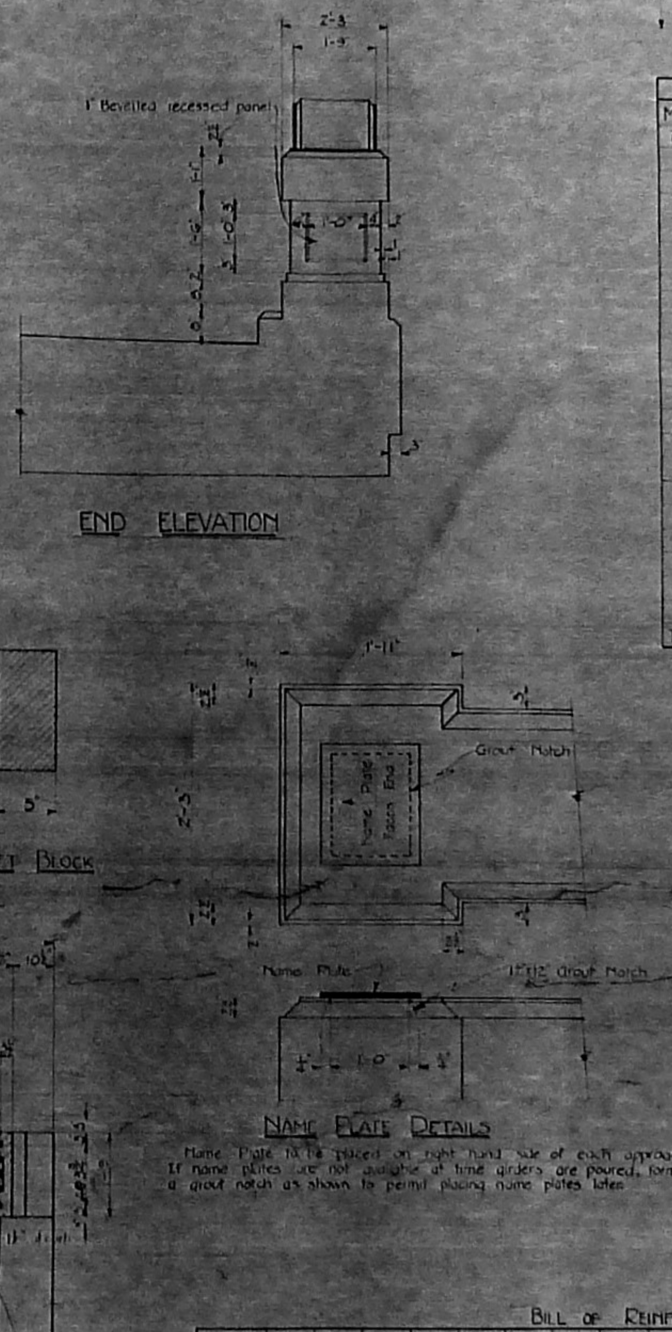
PLAN

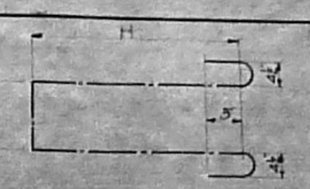
DETAILS WOODEN KEY BLOCK.



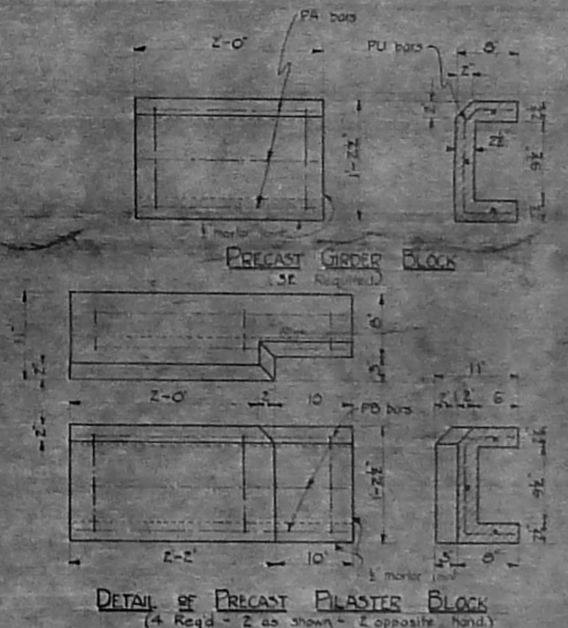
35' R.C. GIRDER
20 & 22' ROADWAY

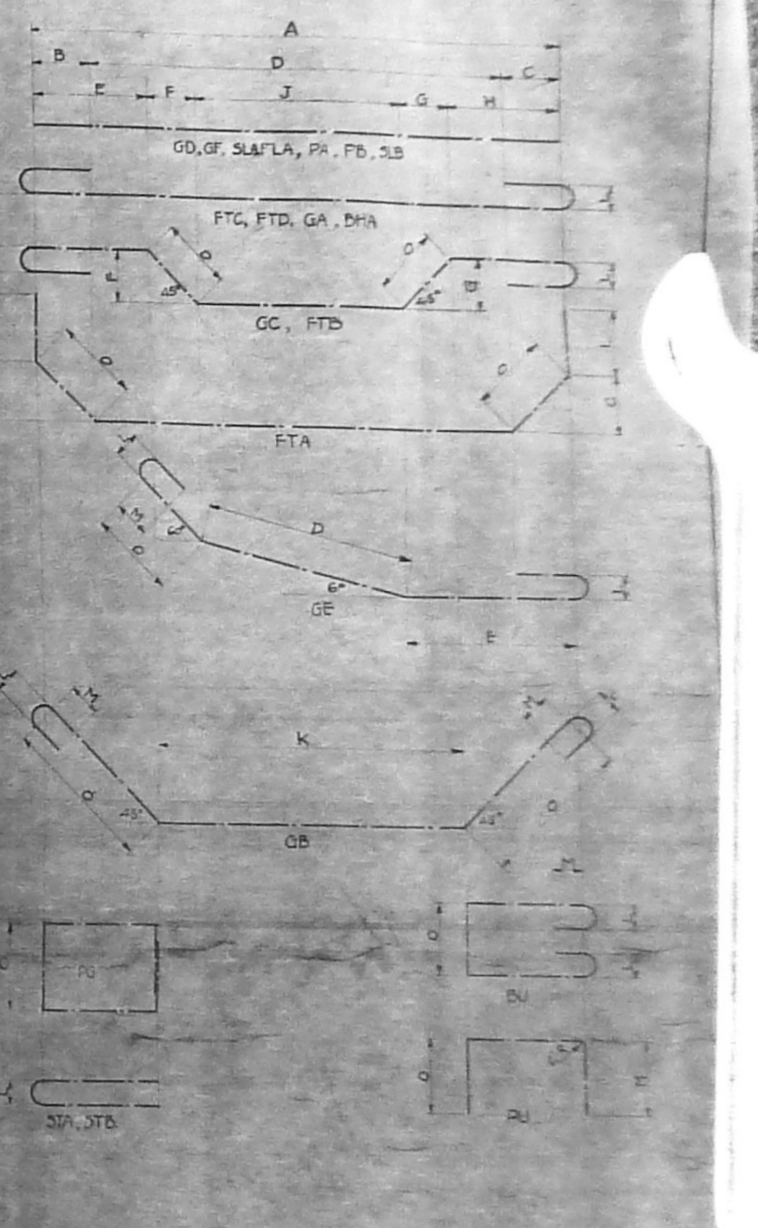






GU BARS ¾" φ				
Mark	H	No	Length	Weight
GU1	6'-3"	4	14'-11"	90#
2	6'-3"	4	14'-11"	90
3	6'-2"	4	14'-9"	89
4	6'-2"	4	14'-9"	89
5	6'-1"	4	14'-7"	88
6	6'-1"	4	14'-7"	88
7	6'-0"	4	14'-5"	87
8	5'-11"	4	14'-3"	86
9	5'-11"	4	14'-3"	86
10	5'-11"	4	14'-3"	86
11	5'-10"	4	14'-1"	84
12	5'-10"	4	14'-1"	84
13	5'-8"	4	13'-9"	83
14	5'-8"	4	13'-9"	83
15	5'-10"	4	14'-1"	84
16	6'-0"	4	14'-5"	87
17	6'-1"	4	14'-7"	88
18	6'-2"	4	14'-9"	89
19	6'-3"	4	14'-11"	90
20	6'-4"	4	15'-1"	91
21	6'-4"	4	15'-1"	91
Total				1833#





BILL OF REINFORCING BARS

Location	Mark	A	B	C	D	E	F	G	J	K	L	H	M	O	No	Size	Kind	Length	Weight
Girder	GA	38'-10"	0'-5"	0'-5"							0'-7½"				12	1¼" □	Def	41'-8"	2660
	GB									29'-0"	0'-7½"		0'-5"	6'-4½"	4	1¼" □	"	44'-7"	946
	GC	38'-10	0'-5"	0'-5"		3'-5"	4'-6"	4'-6"	23'-0"		0'-7½"	3'-5"		6'-4½"	4	1¼" □	"	45'-5"	965
	GD	6'-6"													16	1" □	"	6'-6"	353
	GE			0'-5"	5'-10"	1'-2"			5'-9"		0'-7½"		0'-5"	0'-10"	16	¾" φ	"	10'-8"	259
	GF	39'-6"													4	½" □	"	39'-6"	134
	GU		See	Diagram												¾" φ	"		1833
	SLA	38'-0"													2	1" φ	"	38'-0"	203
	SLB	38'-0"													2	½" φ	"	38'-0"	57
	STA					2'-3"					0'-5"				24	⅝" φ	"	4'-11"	242
	STB					2'-3"					0'-3"				44	½" φ	"	4'-11"	144
	PG					1'-2"								1'-2"	20	½" φ	"	5'-8"	76
Floor	FLA	34'-6"													19	½" □	"	34'-6"	640
	FTA		2'-6"	2'-6"	20'-6"						2'-0"			3'-6½"	18	1" □	"	31'-7"	1430
	FTB		0'-4"	0'-4"		2'-10"	1'-1"	1'-1"	17'-4"		0'-6	2'-10"		1'-6½"	18	1" □	"	28'-4"	1730
	FTC	25'-9	0'-4"	0'-4"							0'-6				33	1" □	"	28'-0"	3140
	FTD	21'-0	0'-4"	0'-4"							0'-6"				4	1" □	"	23'-3"	316
Backwall	BU										0'-5"	2'-2"	0'-2"	1'-2"	20	½" φ		6'-8"	90
	BHA	26'-6"	0'-4"	0'-4"							0'-6"				4	1" □	"	28'-9"	390
Precast	PA	1'-10"													96	¼" φ		1'-10"	30
Blocks	PB	2'-10"													12	½" φ	"	2'-10"	6
	PU											1'-0"	0'-6"	0'-6"	76	¼" φ	"	2'-0"	26
Total -																			16170#

89.8 CU. YDS. GRADE A CONCRETE IN SUPERSTRUCTURE.

Note -

All material and workmanship to be in accordance with Michigan State Highway Departments Specifications for Steel and Concrete Highway Bridges, 1922 Edition, revised.

All sections shown as distinct units on these plans are to be poured in one continuous run.

All concrete in superstructure to be Grade A mix.

No substitutions of reinforcing steel will be permitted in this work unless it can be shown that sections called for cannot be purchased in the open market.

The Contractor shall sort and store reinforcing steel on the ground in such a manner as to be accessible for checking by the Inspector.

The top of the floor slab is to be floated and trowelled to produce a smooth hard surface true to the section shown.

The reinforcing steel in the girders is to be supported on bar chairs of approved pattern spaced at not more than 6 feet apart, and in the slab at not more than 6 feet in either direction.

The use of mudsills for falsework will not be permitted except on the written permission of the State Highway Commissioner.

MICHIGAN STATE HIGHWAY DEPARTMENT

GENERAL DETAILS

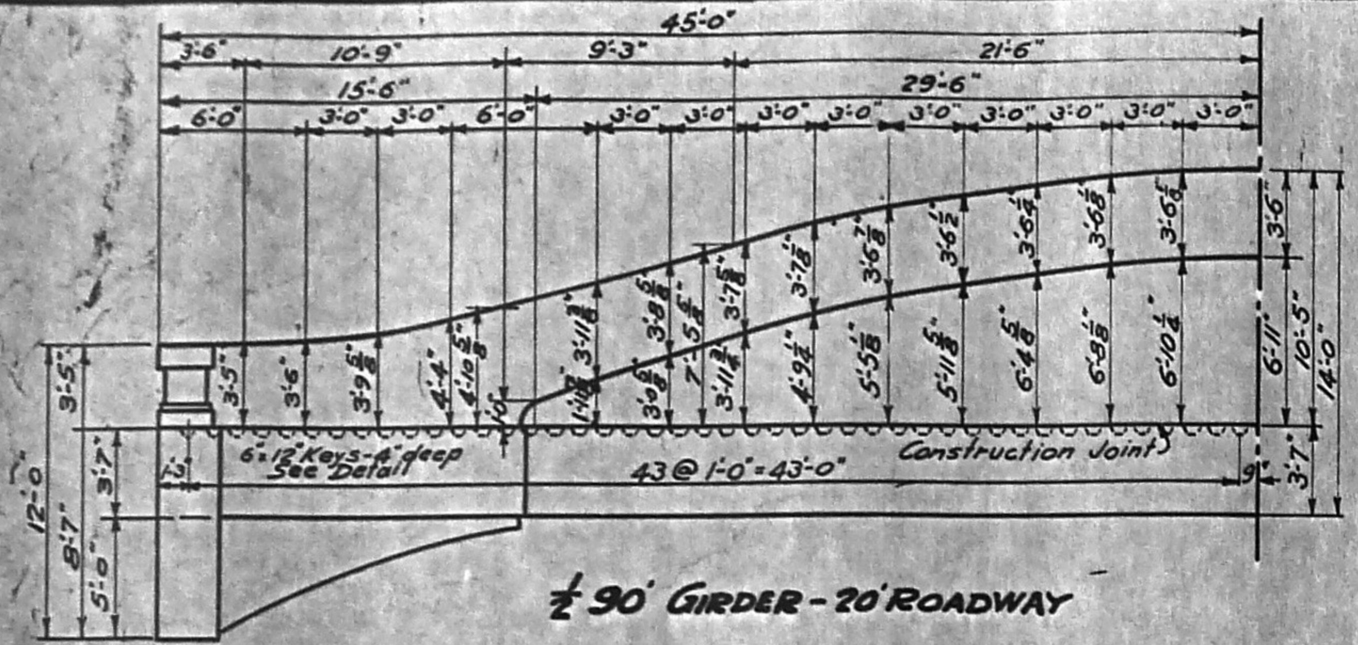
STANDARD 40 FT R.C. GIRDER 22 FT ROADWAY
WITH PROVISION FOR 2-5 FT SIDEWALKS

Correct .... Asst. Bridge Engineer

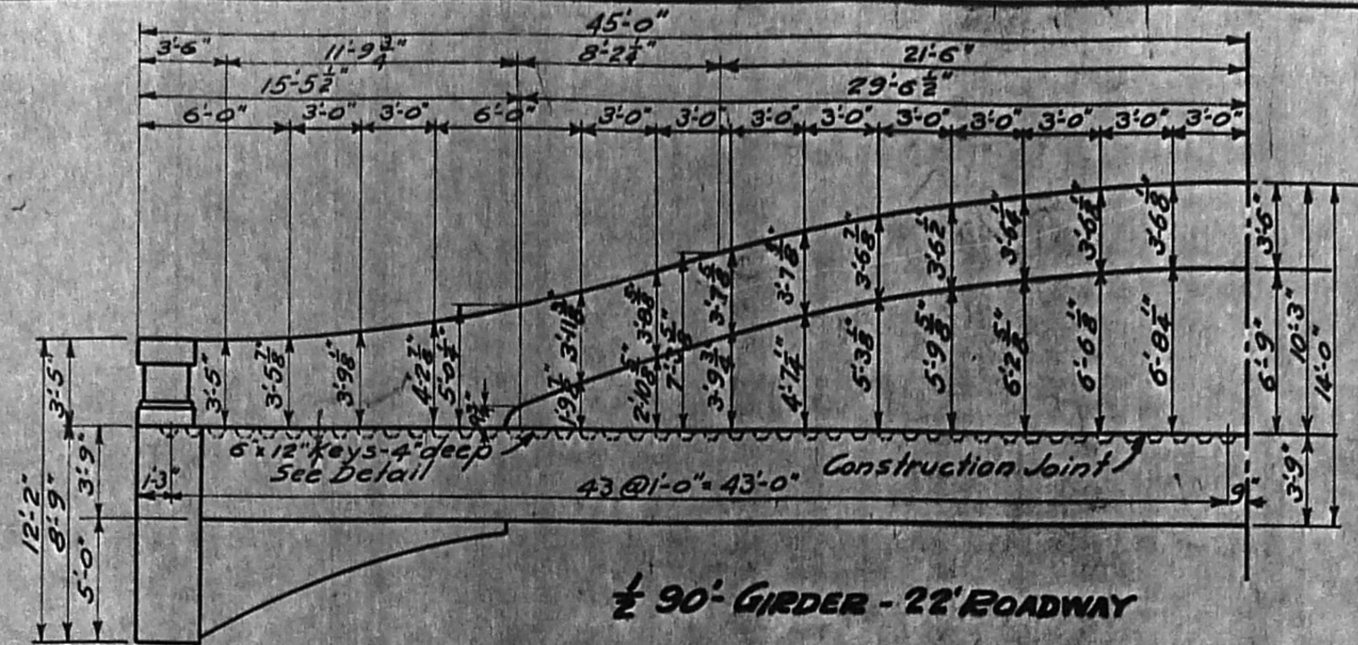
Approved by .... Bridge Engineer

Drawn by	R.C.E.	[illegible]
Traced by	R.C.E.	[illegible]
Checked by	C.P.W.	5-1923
Filed by	E.P.S.	[illegible]

A-3-G-5.



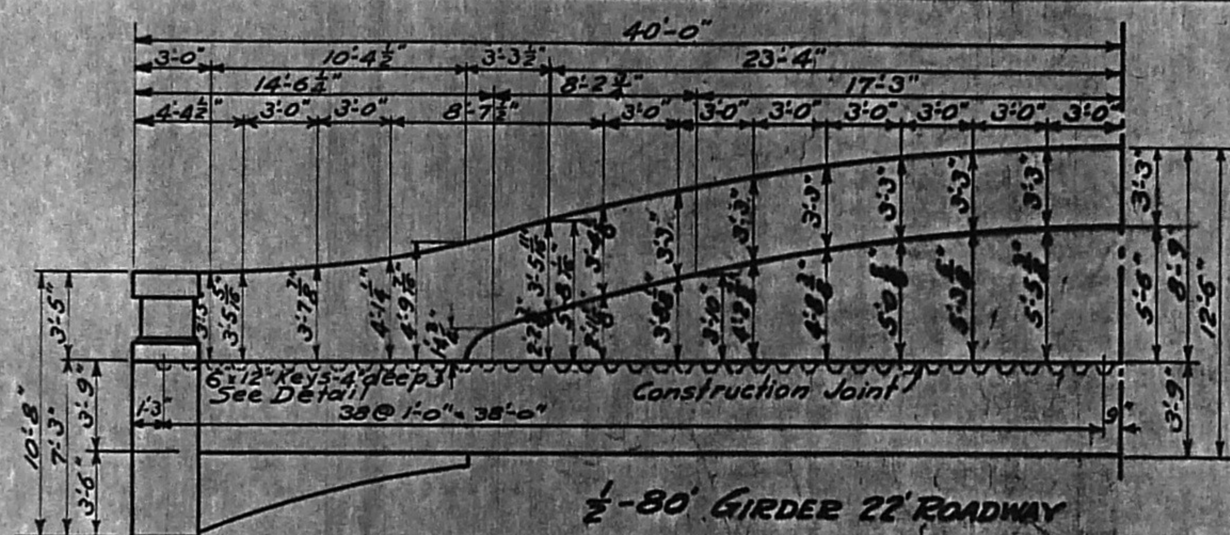
½ 90' Girder - 20' Roadway



½ 90' Girder - 22' Roadway

½ 90' Girder 24' Roadway

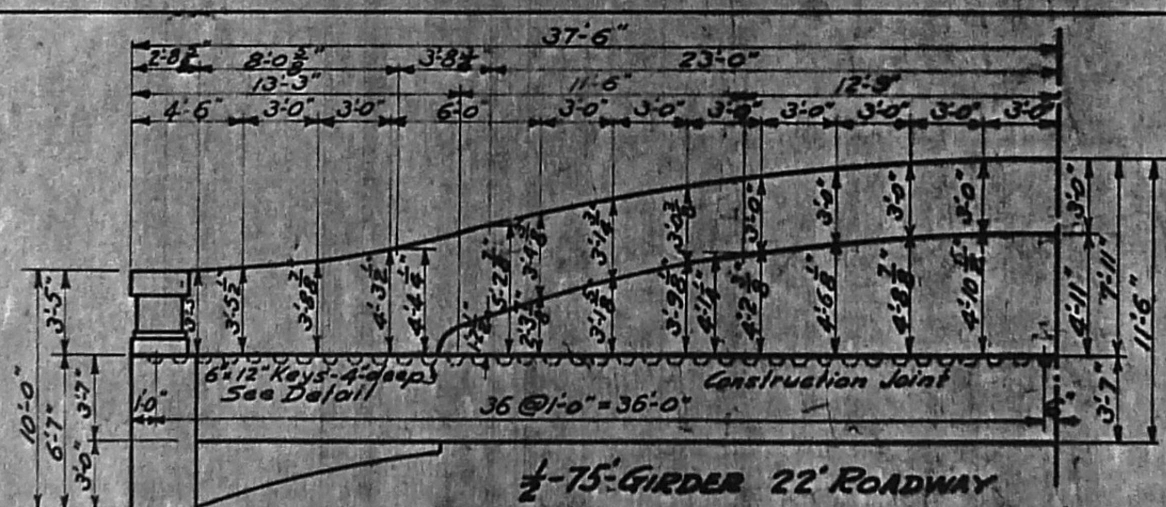
½ 80' Girder 20' Roadway



½ 80' Girder 22' Roadway

½ 80' Girder 24' Roadway

½ 75' Girder 20' Roadway

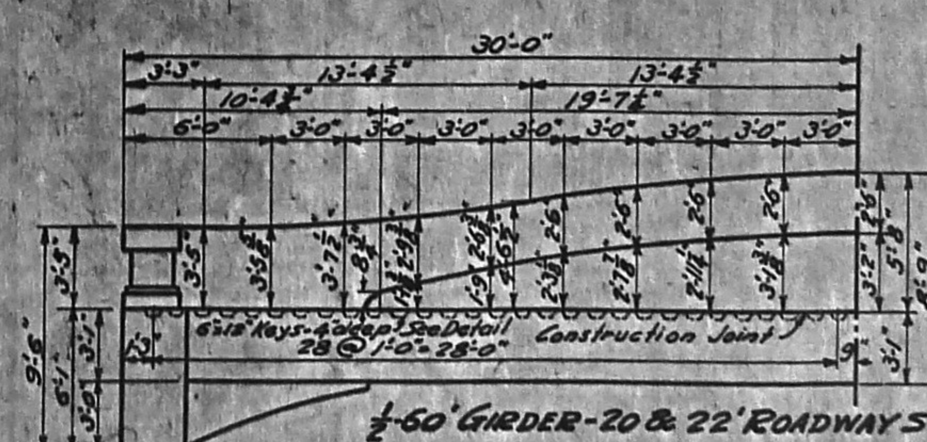


½ 75' Girder 22' Roadway

½ 75' Girder 24' Roadway

½ 70' Girder 20 & 22' Roadway

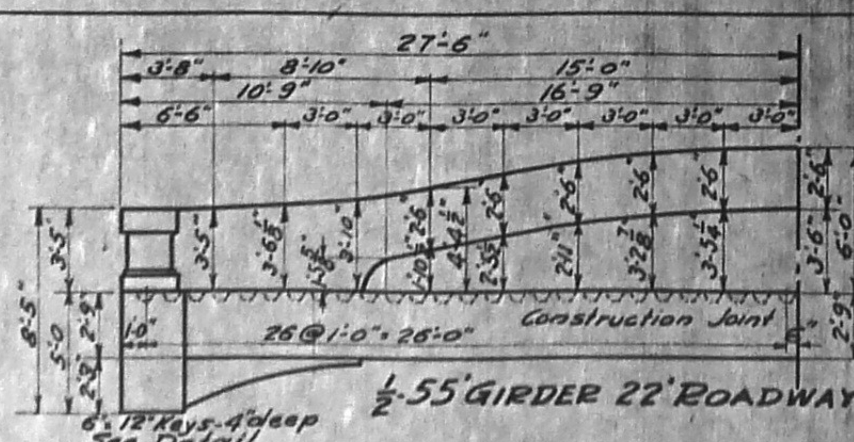
½ 70' Girder 24' Roadway



½ 60' Girder - 20 & 22' Roadways

½ 60' Girder 24' Roadway

½ 55' Girder 20' Roadway



½ 55' Girder 22' Roadway

½ 55' Girder 24' Roadway

MICHIGAN STATE HIGHWAY DEPARTMENT

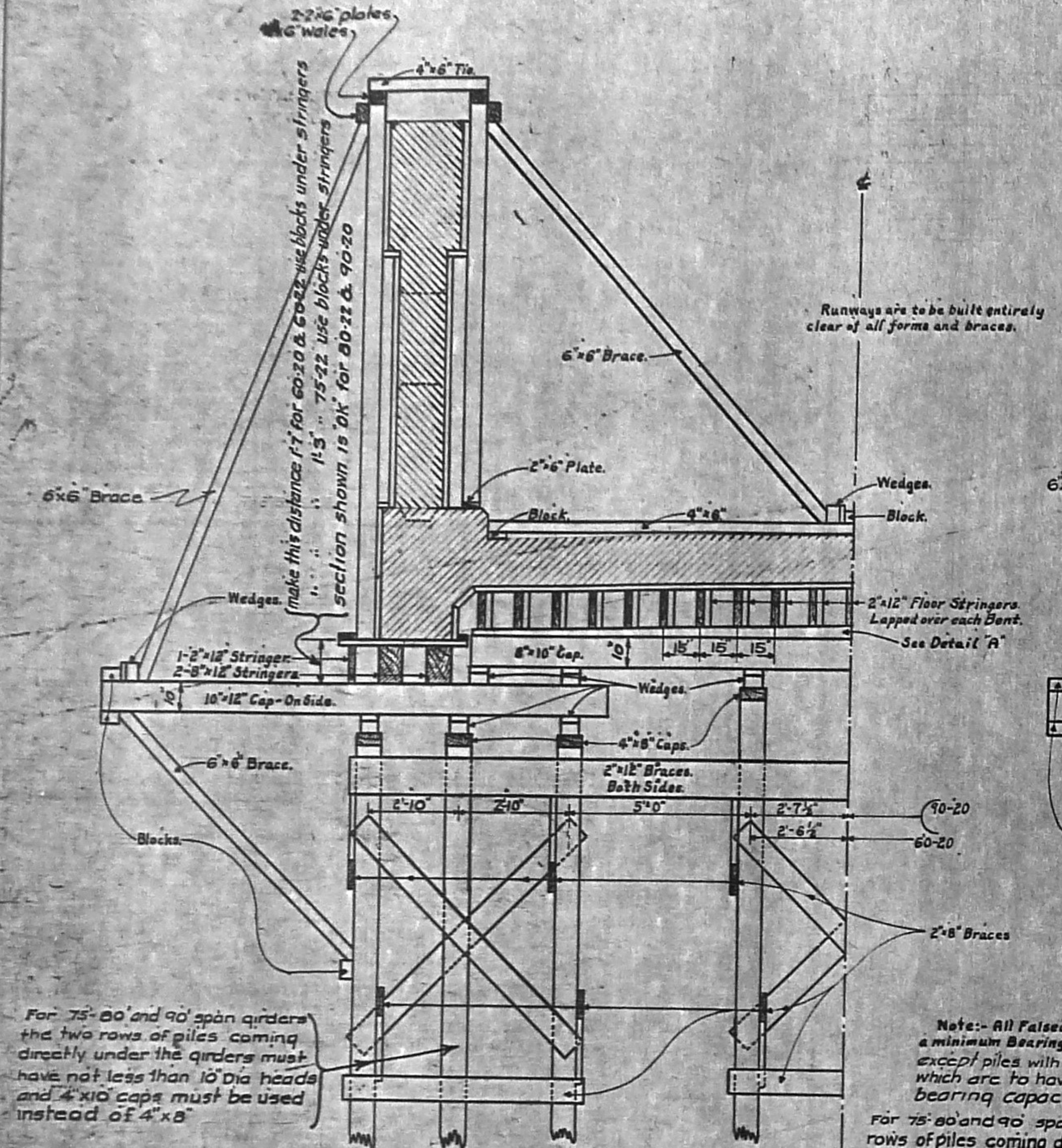
COORDINATES FOR STANDARD R.C. GIRDERS 55' TO 90' INCLUSIVE

Approved: [signature] Engineer of Design

Approved: [signature] Bridge Engineer

Drawn by	W.J.B.
Traced by	H.R.F.
Checked by	M.G.H.S.
Filed by	

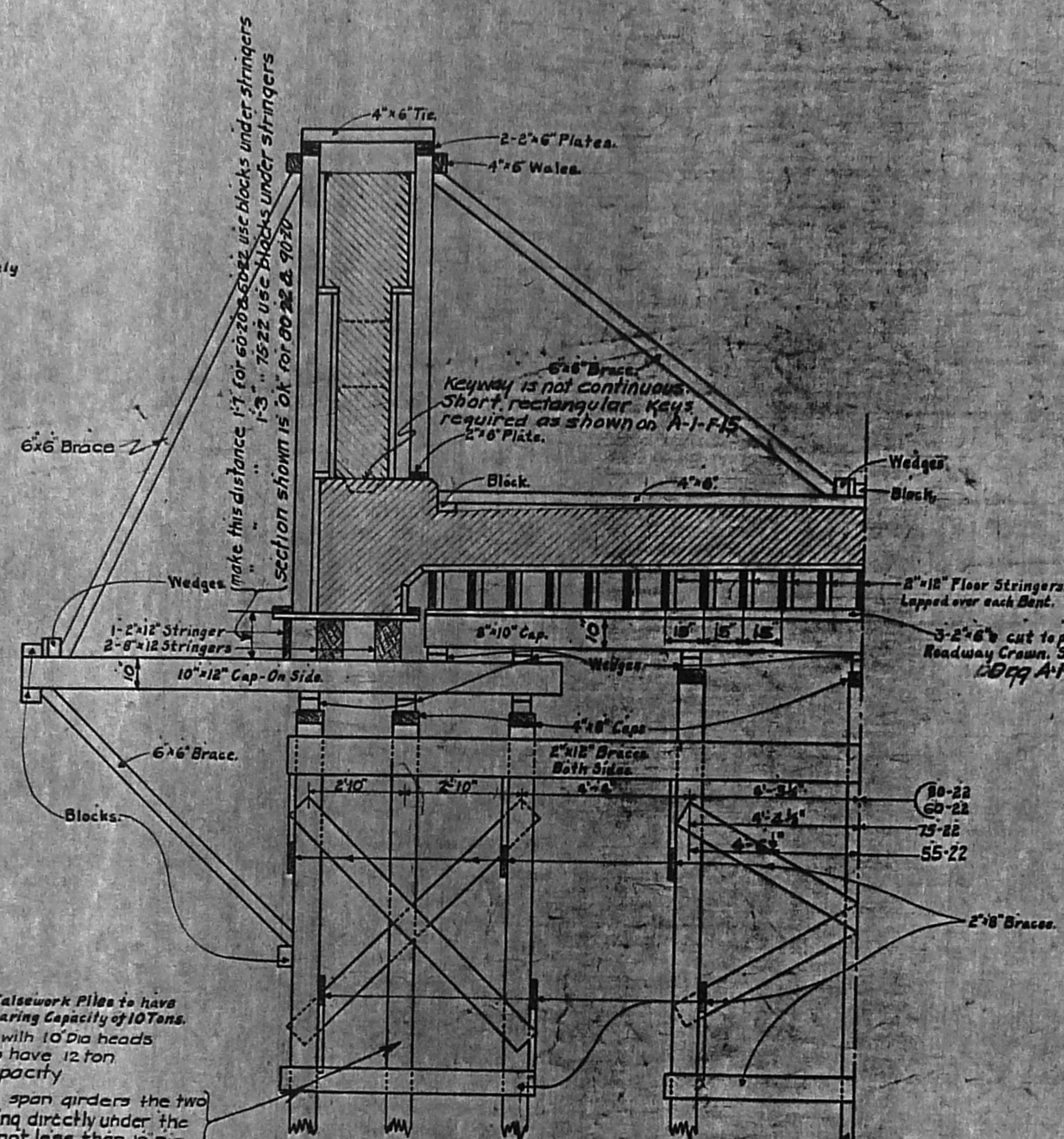
A-1-F-16



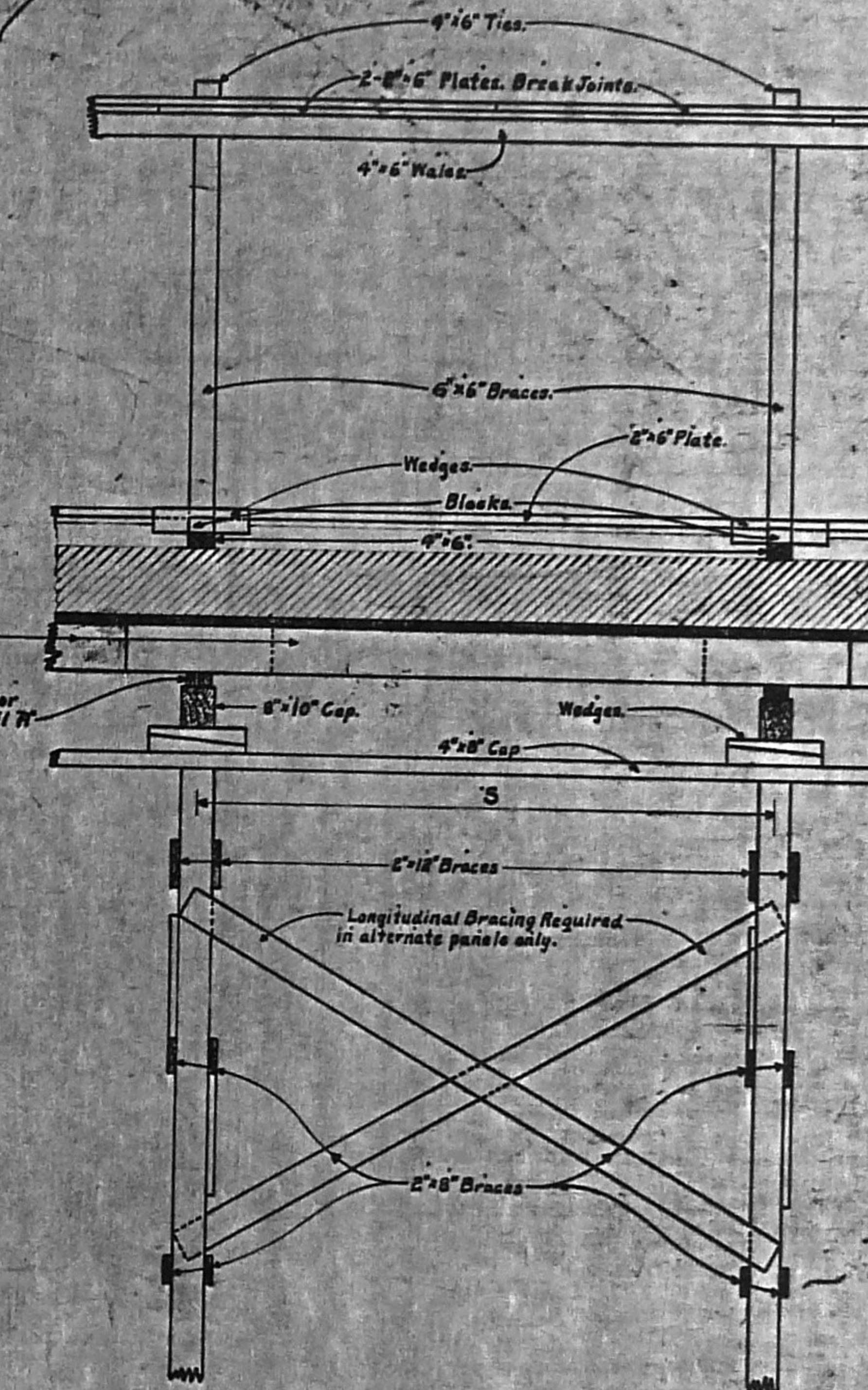
½ Falsework Bent.
20' Roadways.

Note:- All Falsework Piles to have a minimum Bearing Capacity of 10 Tons. except piles with 10" Dia heads which are to have 12 ton bearing capacity

For 75-80 and 90 span girders the two rows of piles coming directly under the girders must have not less than 10" dia heads and 4"x10" caps must be used instead of 4"x8"



½ Falsework Bent.
22' Roadways.



Section on ℄ of Roadway.

Material Estimate

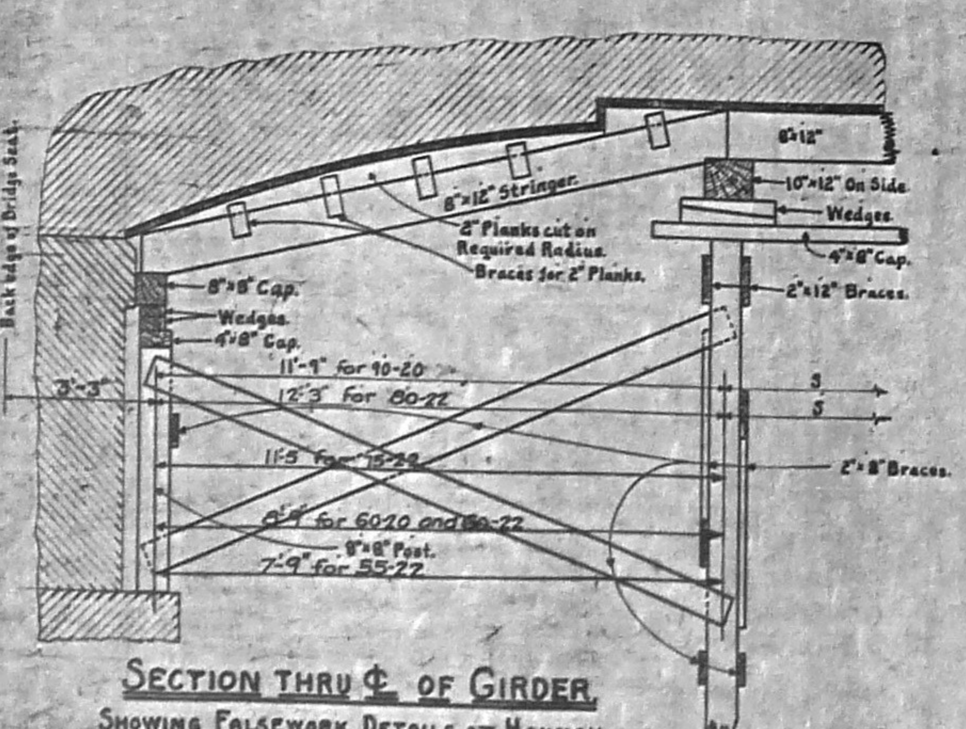
Span	Roadway	Falsework Lumber Required	Piles Required
90	20	14.4	48
80	20		
80	22	14.2	45
75	20		
75	22	13.2	45
70	20		
70	22		
60	20	10.0	32
60	22	10.8	36
55	20		
55	22	10.3	36

Falsework lumber required is given in thousands of feet board measure. These quantities are for falsework only including floor stringers but exclusive of all form lumber.

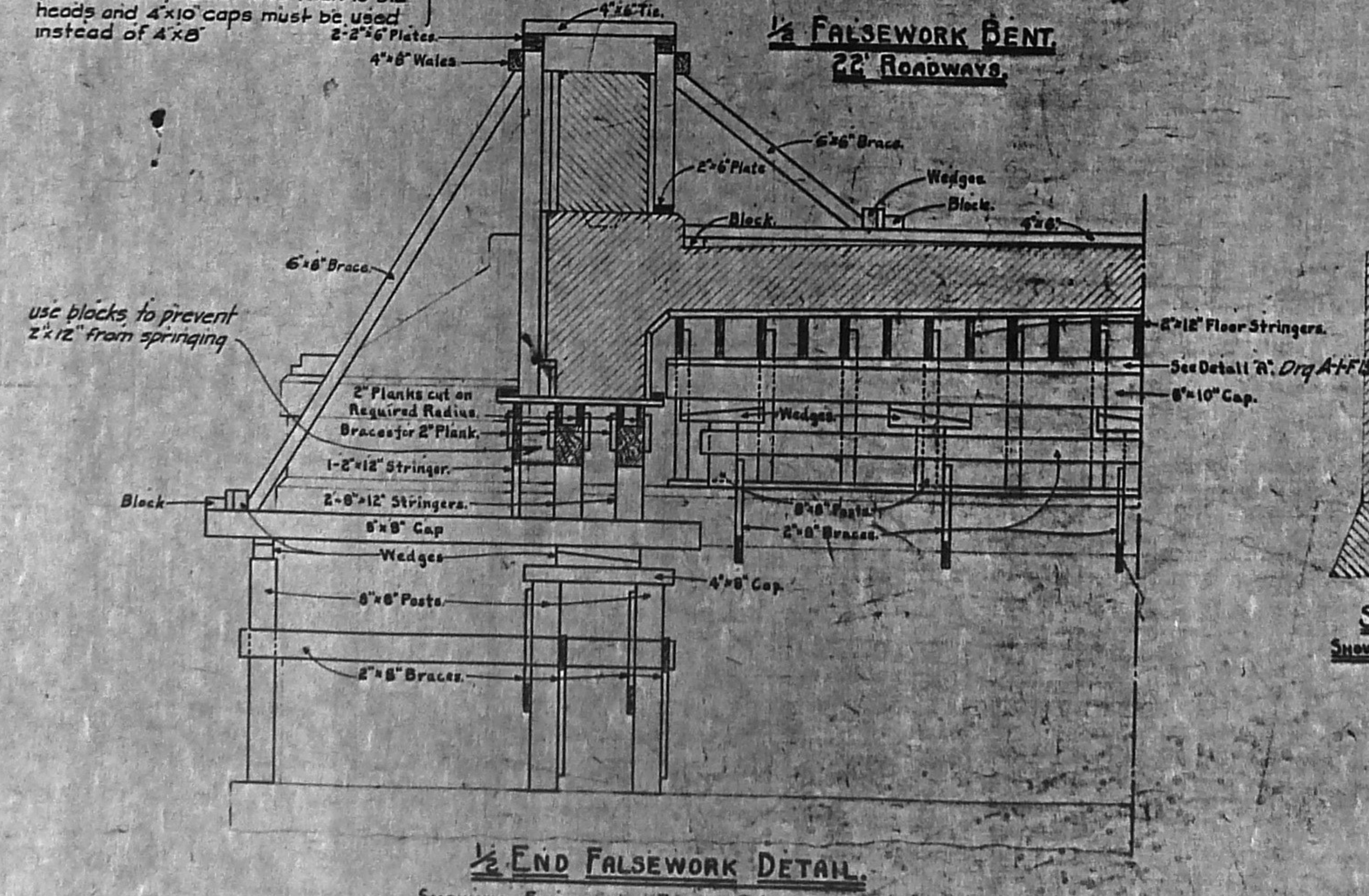
The estimated quantities are based on the average job with pile bents and allowances must be made for exceptional conditions

Bent Spacing.

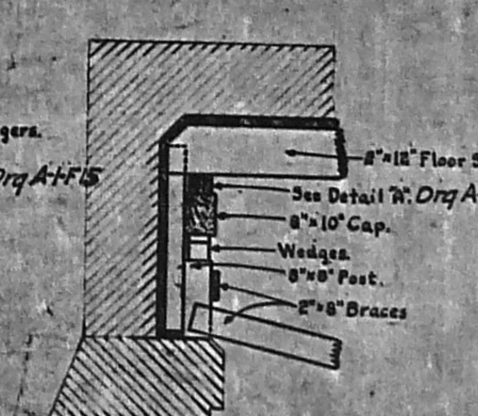
Span	Rd'y	S
90	20	12'-0"
80	22	12'-3"
75	22	11'-5"
75	20	
60	22	12'-0"
60	20	12'-0"
55	22	11'-0"



Section thru ℄ of Girder.
Showing Falsework Details at Haunch.



½ End Falsework Detail.
Showing Footing and Bridge Seat Supports.



Section thru Backwall.
Showing Bridge Seat Support for Floor.

Notes -

Proposed substitutions shall be submitted to the Resident Engineer and will be subject to the approval of the Bridge Engineer. Substitutions of equal strength for any member may be authorized by the Resident Engineer except substitutions proposing members of less depth than shown, which will generally not be allowed on account of rapid increase in deflection for decreased depths. Proposed substitutions to provide equal strength must have a coefficient "bd²" not less than provided by the details shown, "b" and "d" being actual width and depth respectively of a member and not nominal dimensions.

Stringers under the main girder are proportioned to carry all of the superimposed load below the construction joint, the girder section below the curb line being assumed to carry the balance. The lower sections must therefore be allowed to set 7 days at 70° F, or until an equivalent compressive strength is acquired, before casting the corresponding upper sections. Otherwise heavier stringers must be used.

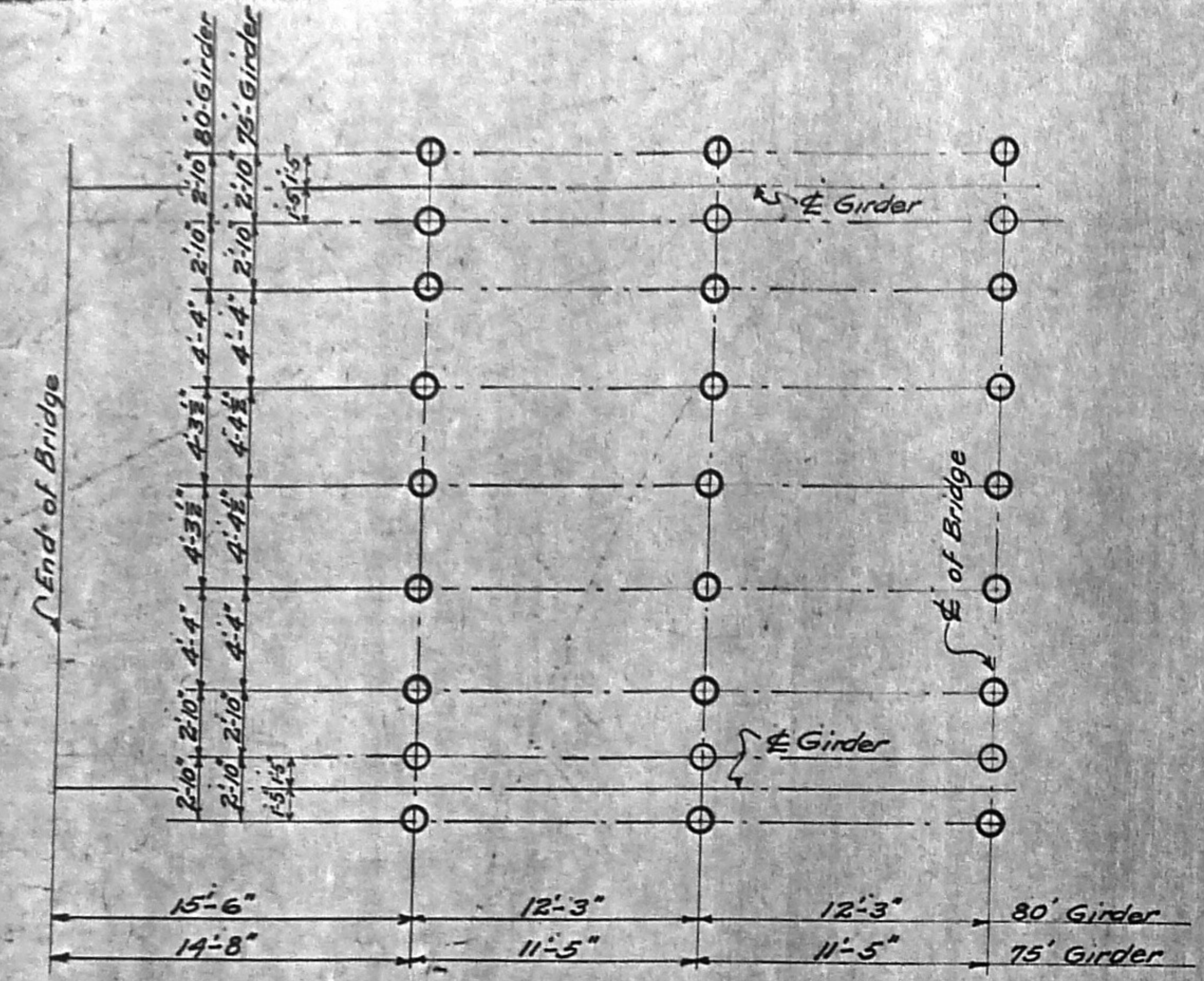
Michigan State Highway Department.
Standard Falsework Details
for
55, 60, 75, 80, and 90' R.C. Girders with Slab Floors.

Approved: W. M. [illegible signature]
Engineer of Design.

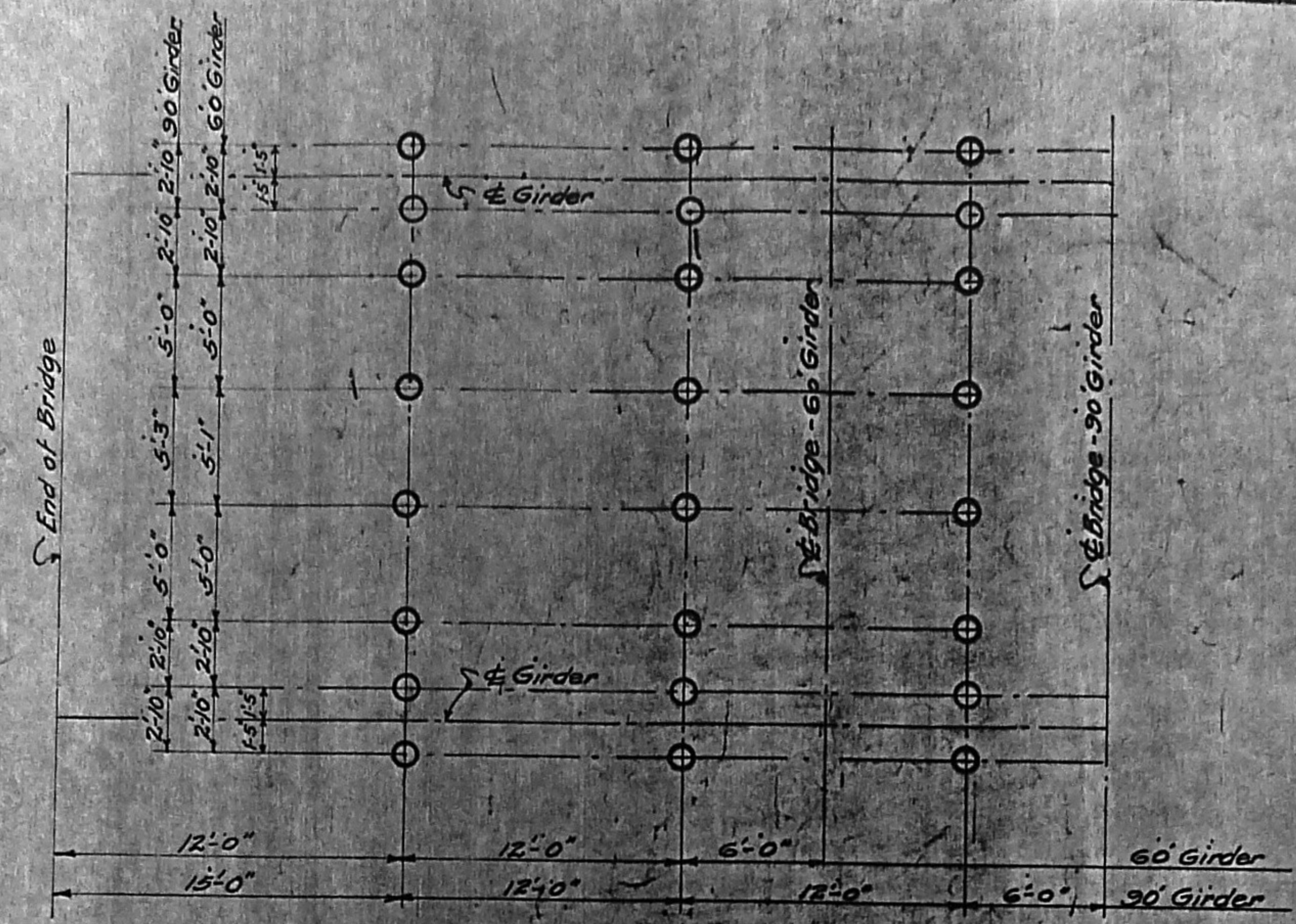
Approved: [illegible signature]
Bridge Engineer.

Drawn by	M.L.S.	3-20-25
Traced by	M.L.S.	4-1-25
Checked by	[illegible]	[illegible]
Filed by	G.E.T.	[illegible]

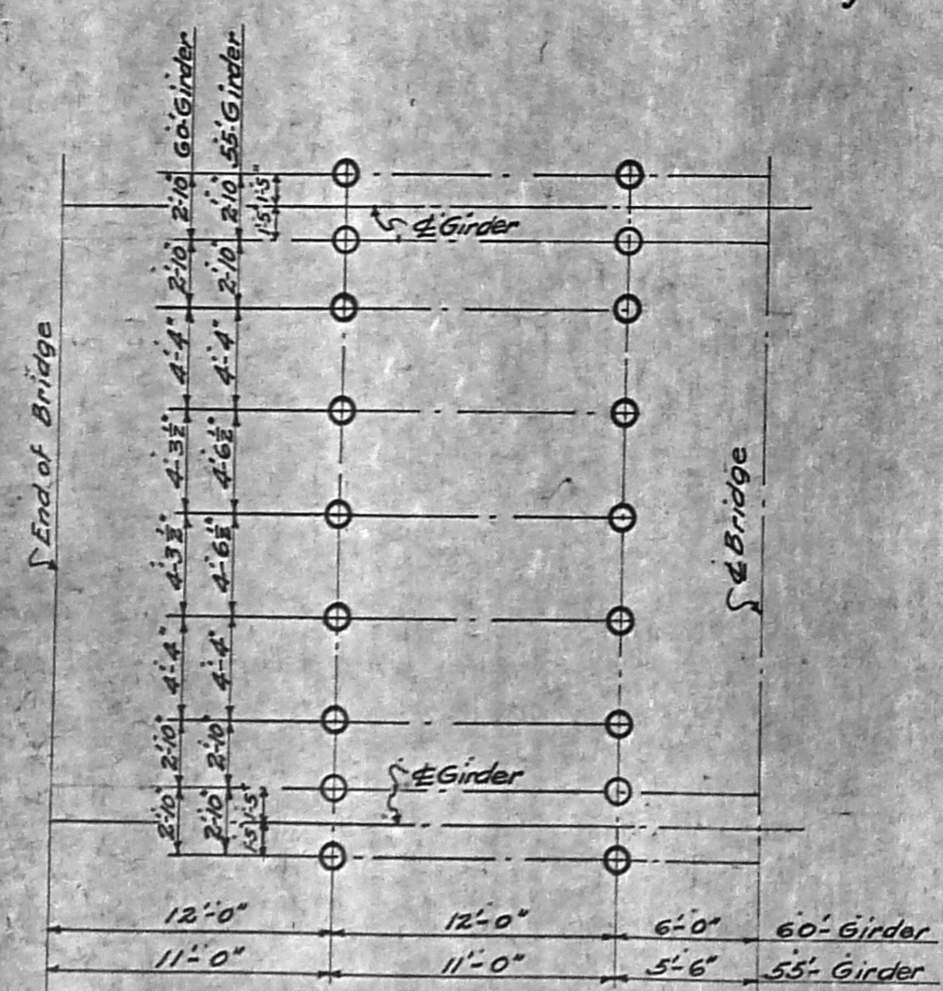
A-1-F-12



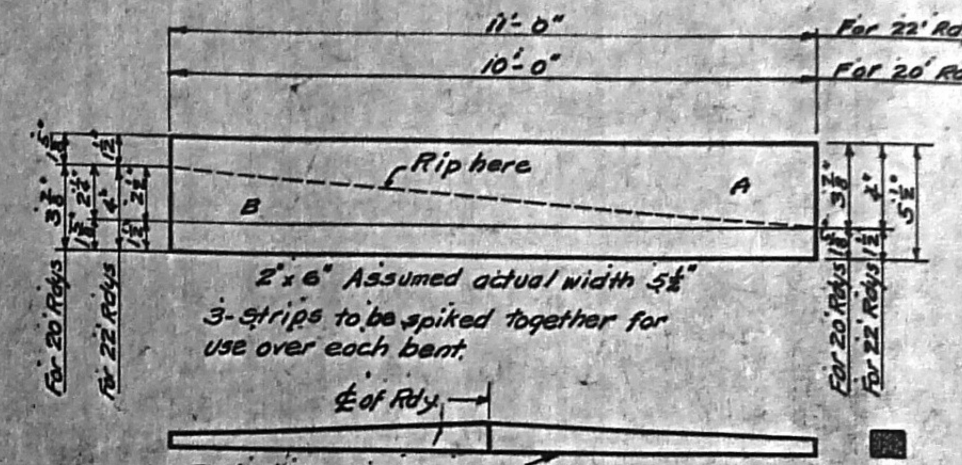
75'+80' Girders with 22' Rdy.



60'+90' Girders with 20' Rdy.



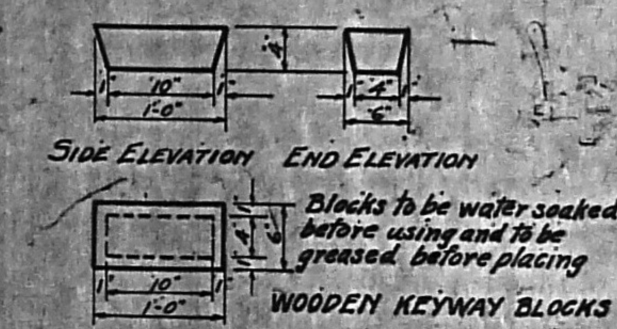
55'+60' Girders with 22' Rdy.



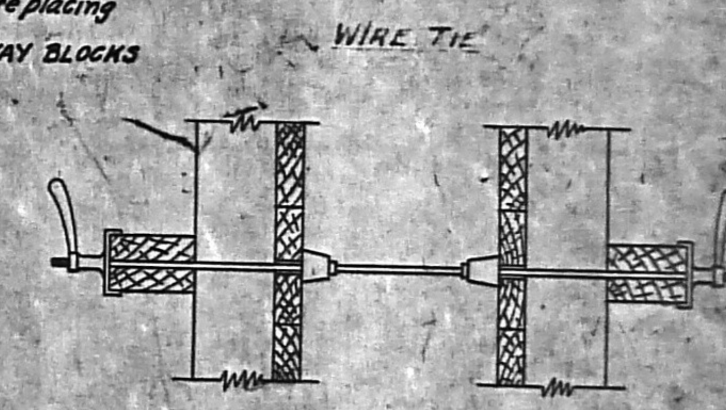
Both pieces may be used as shown.

TIMBER STRIPS TO PROVIDE FOR SLOPE IN BOTTOM OF FLOOR SLAB

DETAIL "A"

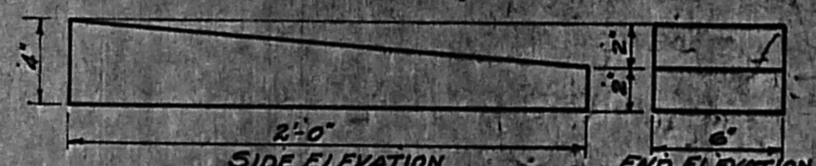


DETAIL "B"



ROD TIE

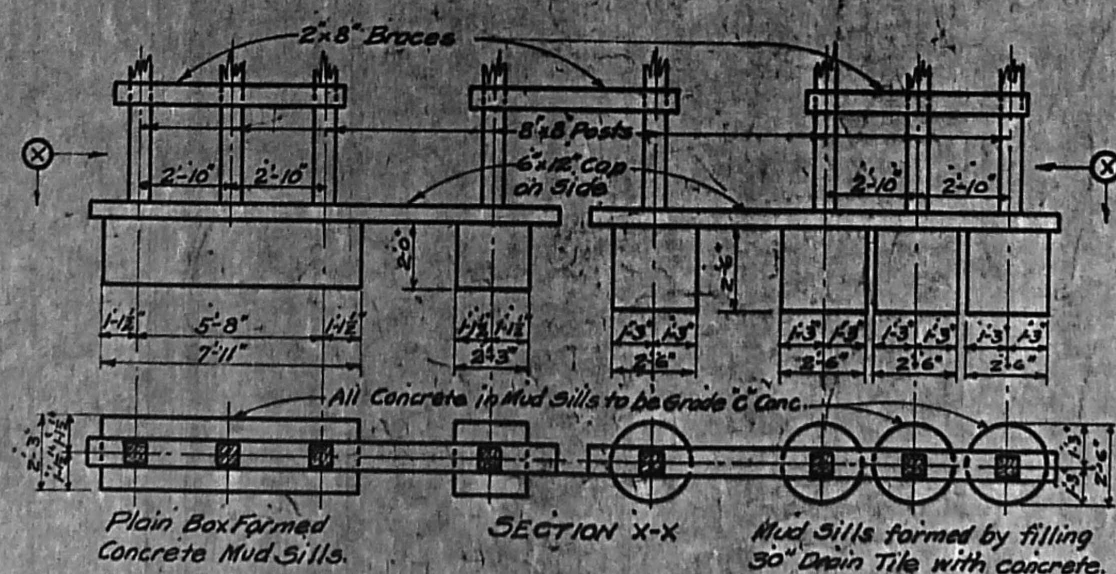
Note:- Form ties to be subject to the approval of the Bridge Engineer. Cones must be of a minimum size and the holes carefully patched so as to stand a hammer test as per special specifications. Patches must be free from Shrinkage Cracks.



Wedges to be of any good sound hardwood including long leaf Yellow Pine. Wedges must be greased before placing.

WEDGES

DETAIL "C"



ELEVATION AND PLAN.
Showing two acceptable types of Mud Sills.
The use of mud sills will not be allowed except with the written permission of the Bridge Engineer.

DETAIL "D"

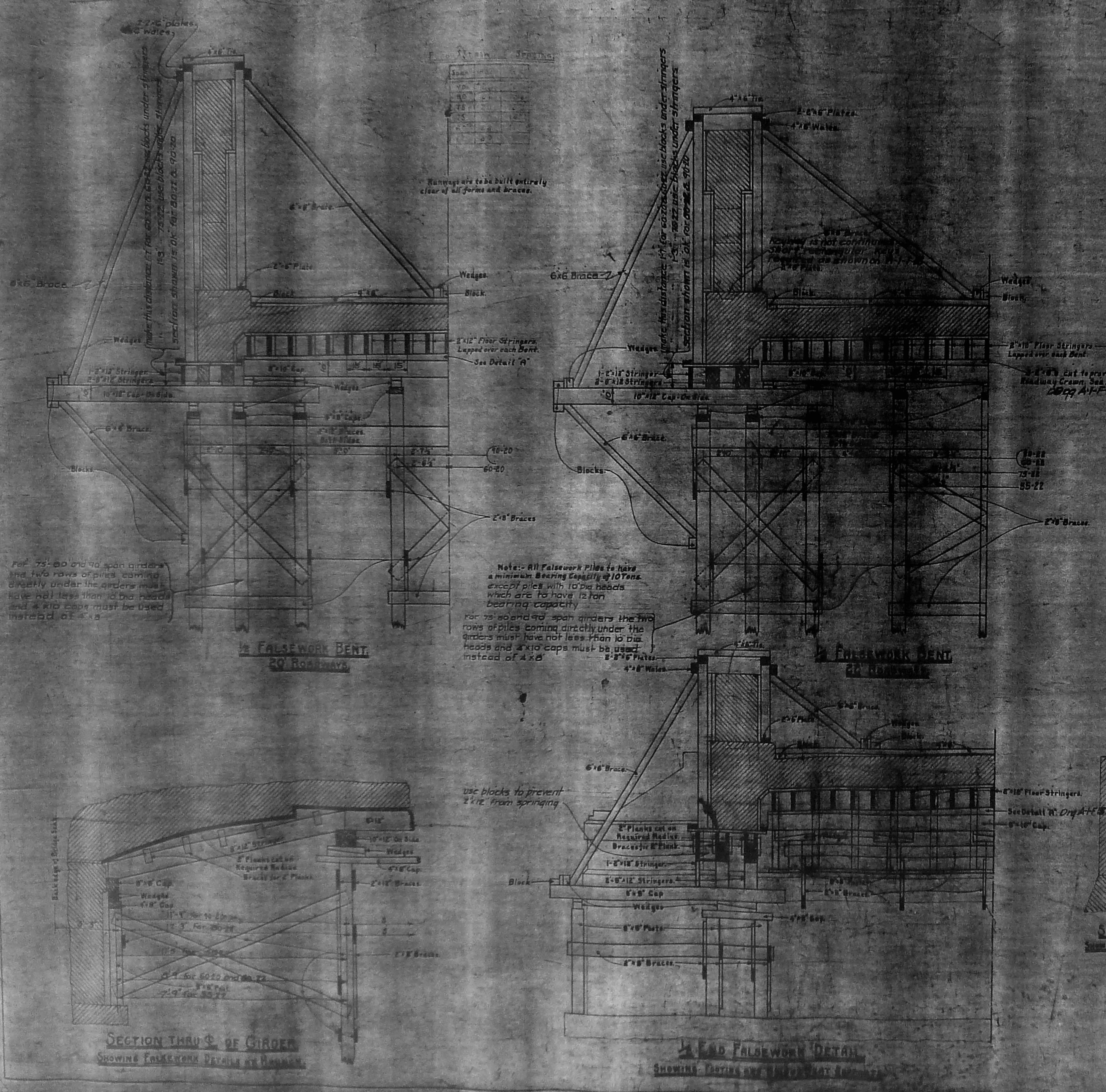
Note:
When tile are used for Mud Sills on 80' & 90' Girders, Soil should be capable of carrying 5000# Per Sq. Ft.

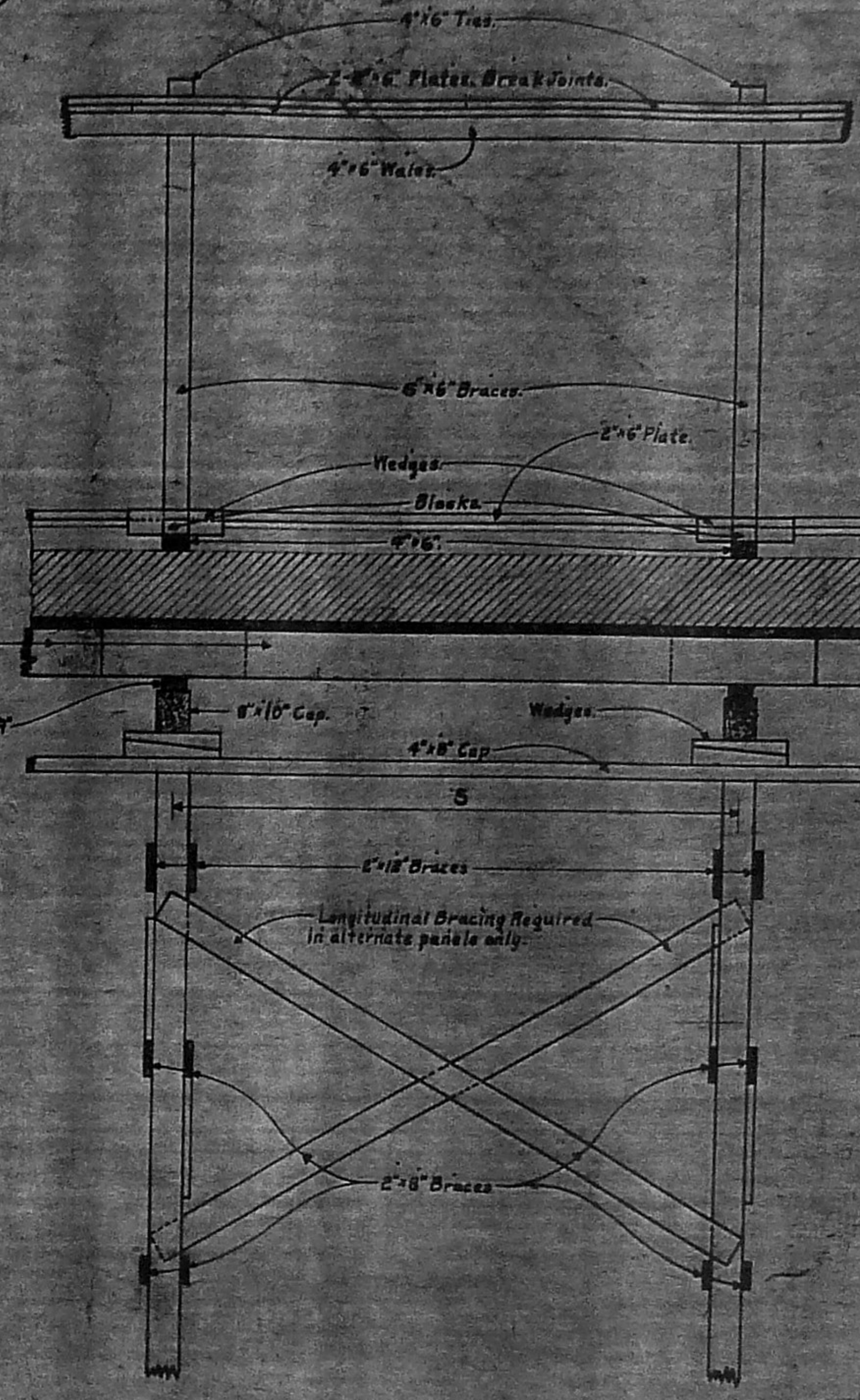
MICHIGAN STATE HIGHWAY DEPARTMENT

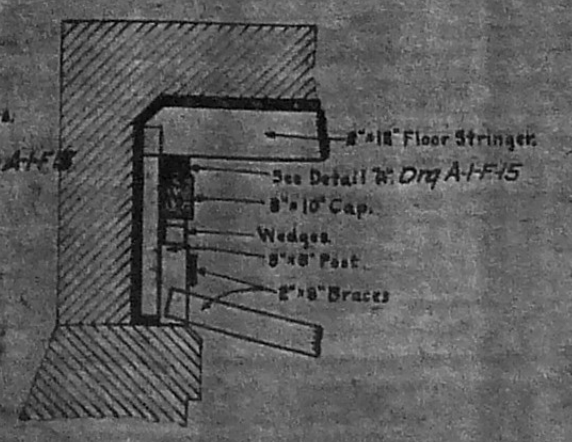
SPECIAL DETAILS AND PILE PLAN FOR 55'-60'-70'-75'-80'-90' R.C. GIRDERS WITH SLAB FLOORS

Approved [signature] Engineer of Design

Approved [signature] Bridge Engineer







Material Estimate

Span	Roadway	Falsework Lumber Required	Piles Required
90	20	14.4	48
80	20		
80	22	14.2	45
75	20		
75	22	13.2	45
70	20		
70	22		
60	20	10.0	32
60	22	10.8	36
55	20		
55	22	10.3	36

Falsework lumber required is given in thousands of feet board measure. These quantities are for falsework only including floor stringers but exclusive of all form lumber.

The estimated quantities are based on the average job with pile bents and allowances must be made for exceptional conditions.

Bent Spacing

Span	Rd'y	S
90	20	12'-0"
80	22	12'-3"
75	22	11'-5"
75	20	
60	22	12'-0"
60	20	12'-0"
55	22	11'-0"

Notes –

Proposed substitutions shall be submitted to the Resident Engineer and will be subject to the approval of the Bridge Engineer. Substitutions of equal strength for any member may be authorized by the Resident Engineer except substitutions proposing members of less depth than shown, which will generally not be allowed on account of rapid increase in deflection for decreased depths. Proposed substitutions to provide equal strength must have a coefficient "bd²" not less than provided by the details shown, "b" and "d" being actual width and depth respectively of a member and not nominal dimensions.

Stringers under the main girder are proportioned to carry all of the superimposed load below the construction joint, the girder section below the curb line being assumed to carry the balance. The lower sections must therefore be allowed to set 7 days at 70° F, or until an equivalent compressive strength is acquired before casting the corresponding upper sections. Otherwise heavier stringers must be used.

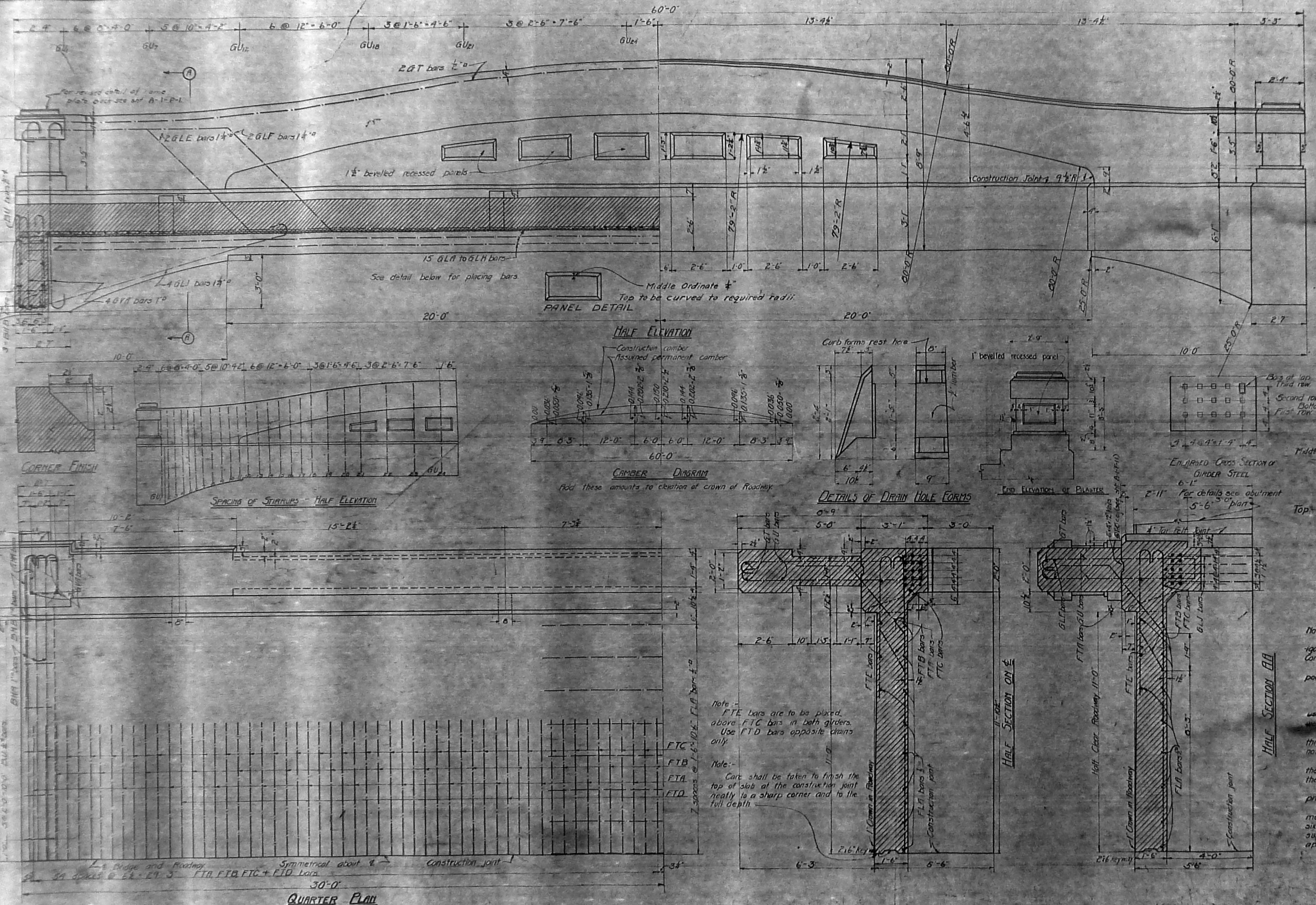
MICHIGAN STATE HIGHWAY DEPARTMENT

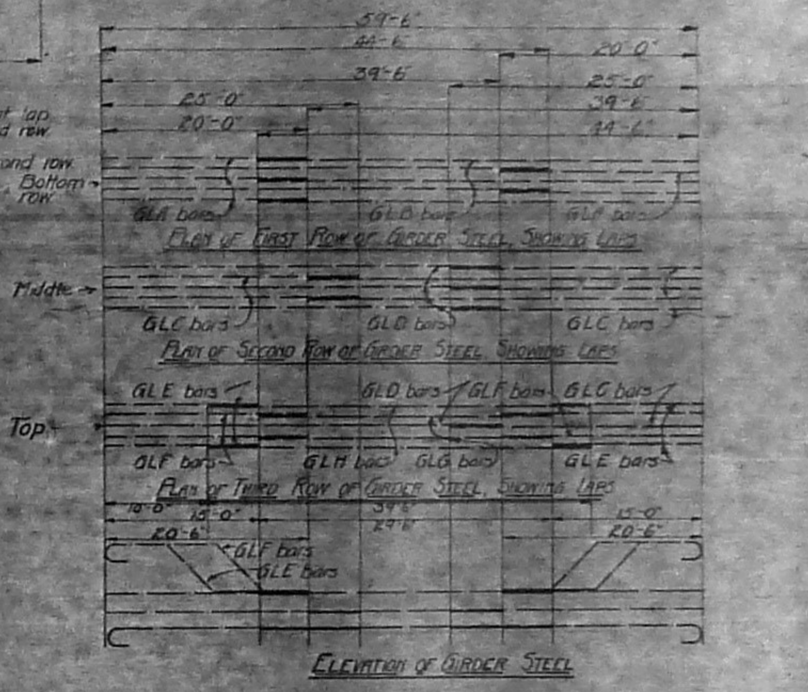
STANDARD FALSEWORK DETAILS FOR 55, 60, 75, 80 & 90' R.C. GIRDERS WITH SLAB FLOORS

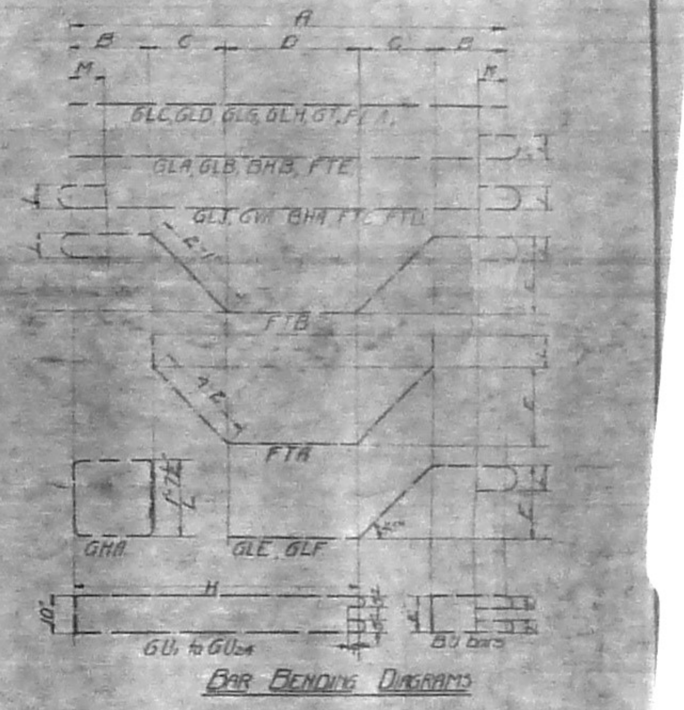
Approved: .... Engineer of Design

Approved: .... Bridge Engineer

B-I-F-12







Stirrup Table

Mark	No.	A	Length	Weight
GU1	4	8-7	20-0"	163
GU2	4	8-4	19-6"	159
GU3	4	8-2	19-2"	157
GU4	4	7-11	18-8	153
GU5	4	7-8	18-2"	149
GU6	4	7-6	17-10"	146
GU7	4	7-3	17-4"	142
GU8	4	7-1"	17-0"	139
GU9	4	6-10	16-6"	135
GU10	4	6-7	16-0"	131
GU11	4	6-5	15-8"	128
GU12	4	6-3	15-4"	125
GU13	4	6-3	15-4"	125
GU14	4	6-5	15-8"	128
GU15	4	6-6	15-10"	129
GU16	4	6-8	16-2"	132
GU17	4	6-10	16-6"	135
GU18	4	7-0	16-10"	138
GU19	4	7-3	17-4"	142
GU20	4	7-6	17-10"	146
GU21	4	7-8	18-2"	149
GU22	4	7-10	18-6"	152
GU23	4	8-1	19-0"	155
GU24	4	8-2	19-2"	157
			Total	3415

Bill of Steel Bars

Location	Mark	A	B	C	D	E	L	M	No.	Size	Kind	Length	Weight
Girder	GLA	20-0					7½"	5"	10	1¼"⌀	Def	21-5"	1130
	GLB	44-6"					7½"	5	10	1¼"⌀	Def	45-11"	2428
	GLC	25-0"							12	1¼"⌀	Def	25-0"	1592
	GLD	39-6							12	1¼"⌀	Def	39-6"	2517
	GLE		4-10	4-10	5-0"	4-10	7½"	5	8	1¼"⌀	Def	18-1"	767
	GLF		9-10	4-10	5-0"	4-10	7½"	5	8	1¼"⌀	Def	25-1"	978
	GLG	29-6"							4	1¼"⌀	Def	29-6"	627
	GLH	39-6							4	1¼"⌀	Def	39-6"	839
	GLJ	12-9"					7½"	5"	16	1¼"⌀	Def	15-7"	1323
	GHA		1-4"				1-7½"		32	½⌀	Plain	6-11"	136
	GVA	8-6					6"	4	16	1"⌀	Plain	10-9"	584
	GT	32-0							8	½"⌀	Plain	32-0"	218
	GU		See Stirrup Table							⅜⌀	Plain		3415
Floor	FTA			3-4"	20-0"	2-6"	2-6"		26	1"⌀	Plain	33-4"	3170
	FTB		3-5	1-0"	16-6	1-2"	6"	4"	25	1"⌀	Plain	29-9"	2831
	FTC	26-10"					6"	4"	50	1"⌀	Plain	29-1"	4943
	FTD	19-2"					6	4"	4	1"⌀	Plain	21-5"	291
	FTE	6-9					6"	4"	100	1"⌀	Plain	7-10"	2662
	FLA	32-0"							46	½"⌀	Plain	32-0"	1246
	BHA	27-2"					6"	4"	12	1"⌀	Plain	29-5"	1200
	BHB	6-9					6"	4	12	1"⌀	Plain	7-10"	320
	B.U.		4-0"			1-2	3"	2"	24	½"⌀	Plain	10-3"	164
												Total →	[illegible]

160.0 Cu yds Concrete in Superstructure (GRADE A CONCRETE) → 33400#

Notes:

All material and workmanship to be in accordance with Michigan State Highway Departments Specifications for Steel and Concrete Bridges, 1922 Edition.

All sections shown as distinct units on these plans are to be poured in one continuous run.

No unscreened gravel will be permitted.

Grade "A" concrete is to be used for the superstructure.

~~Tiger Brand Hydrated Lime is to be added to the cement used in the superstructure concrete in proportion of 5% by weight of hydrated lime to cement~~

No substitutions of reinforcing steel will be permitted in this work unless it can be shown that sections called for can not be secured in the open market.

The Contractor shall sort and store reinforcing steel on the ground in such a manner as to be accessible for checking by the inspector.

The top of the floor slab is to be floated and troweled to produce a smooth hard surface true to the section shown.

The reinforcing steel in the girders is to be supported on metal bar chairs of an approved pattern, spaced not more than six (6) feet apart. The reinforcing steel in the floor slab to be supported on metal bar chairs spaced not more than 6 feet apart in any direction.

Notes: Continued

All exposed surfaces to be rubbed with carborundum brick within the time set and in the manner specified by clause No 729 of specifications.

The use of mud sills for falsework will not be permitted except upon the written permission of the State Highway Commissioner.

MICHIGAN STATE HIGHWAY DEPARTMENT

STANDARD 60' FT. R.C. GIRDER. 22' FT. ROADWAY.

Correct ______ Ass't Bridge Engineer

Approved ______ Bridge Engineer

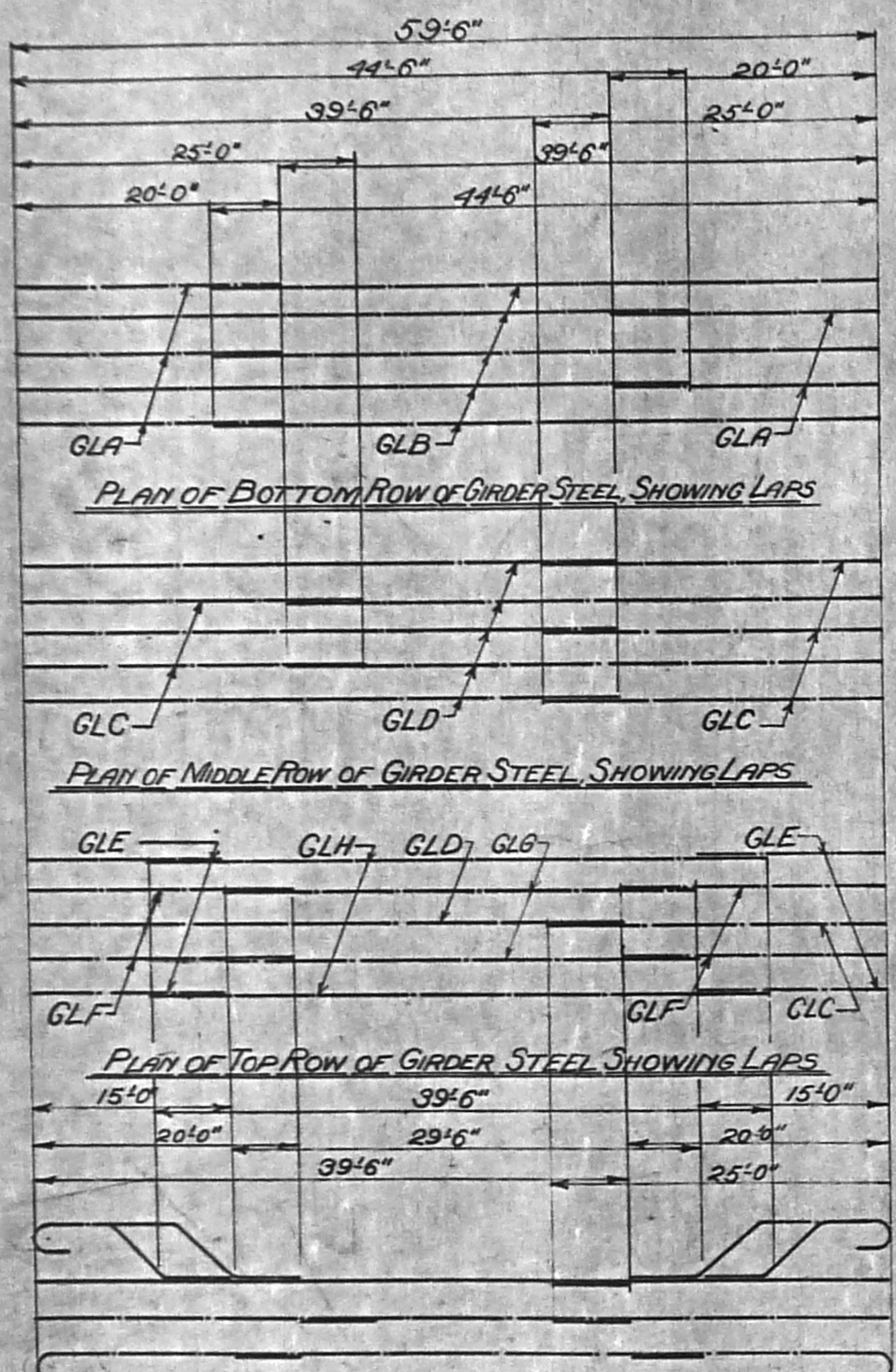
Drawn by	J.D.C.	4-13-[illegible]
Traced by	J.D.C.	4-19-[illegible]
Checked by	[illegible]	[illegible]
Filed by	C.V.E.	6-4-22

Revised 1-15-23 REE.

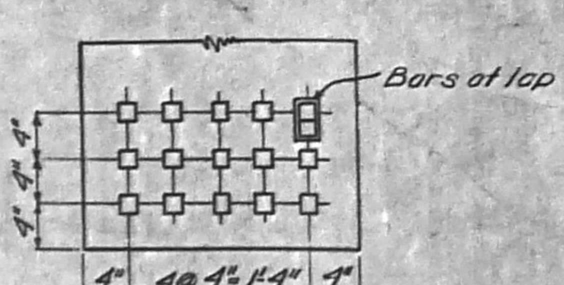
Revised: - 11-2-1922. T.R.C.

A-2-G-67

Detail of Girder Steel



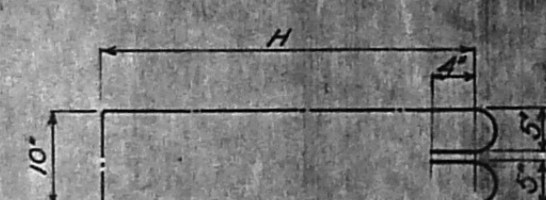
Elevation of Girder Steel



Enlarged Section of Girder Steel

Bill of Steel Bars

Location	Mark	A	B	C	D	L	J	M	O	No	Size	Kind	Length	Weight
Girder	GLA	20'-0"				7½"		5"		10	1¼"□	Def.	21'-5"	1138
	GLB	44'-2"				7½		5"		10	1¼"□	"	45'-7"	2422
	GLC	25'-0"								12	1¼"□	"	25'-0"	1594
	GLD	39'-6"								12	1¼"□	"	39'-6"	2518
	GLE		4'-10"	4'-10"	5'-0"	7½"	4'-10"	5"	6'-10"	8	1¼"□	"	18'-1"	768
	GLF		9'-10"	4'-10"	5'-0"	7½"	4'-10"	5"	6'-10"	8	1¼"□	"	23'-1"	981
	GLG	29'-6"								4	1¼"□	"	29'-6"	627
	GLH	39'-6"								4	1¼"□	"	39'-6"	839
	GLJ	12'-9"				7½"		5"		16	1¼"□	"	15'-7"	1324
	GT	32'-0"								8	½"□	"	32'-0"	218
	GU	See Table of GU Bars										"		3,415
	GHA		1'-4"				1'-7½"			32	½"□	"	6'-11"	188
	GVA	9'-0"								16	1"□	"	9'-0"	490
Backwall	BHA	27'-2				6"		4"		10	1"□	"	29'-5"	1000
	BHB	6'-9"				6"		4"		12	1"□	"	7'-11"	323
	BHC	24'-0"								4	½"□	"	24'-0"	82
	BU	4'-7½"				3"	1'-2"	2"		24	½"□	"	11'-6"	235
Floor	FTA	26'-2"	1'-1"		24'-0"	1'-0"	1'-1"		1'-6½"	32	1"□	"	35'-1"	3817
	FTB	26'-8"	2'-6"	1'-1"	19'-6"	6"	1'-1"	4"	1'-6½"	36	1"□	"	29'-10"	3651
	FTC	26'-8"	4'-0"	1'-1"	16'-6"	6"	1'-1"	4"	1'-6½"	34	1"□	"	29'-10"	3449
	FTD	19'-6"				6"		4"		2	1"□	"	21'-9"	148
	FLA	32'-0"								40	½"□	"	32'-0"	1088
Ⓒ Girder	GPA	1'-10"				4½"		3"		4	¾"⌀	"	3'-8½"	22
Total														
160.8 Cu Yds Grade A Concrete in Superstructure.														30337

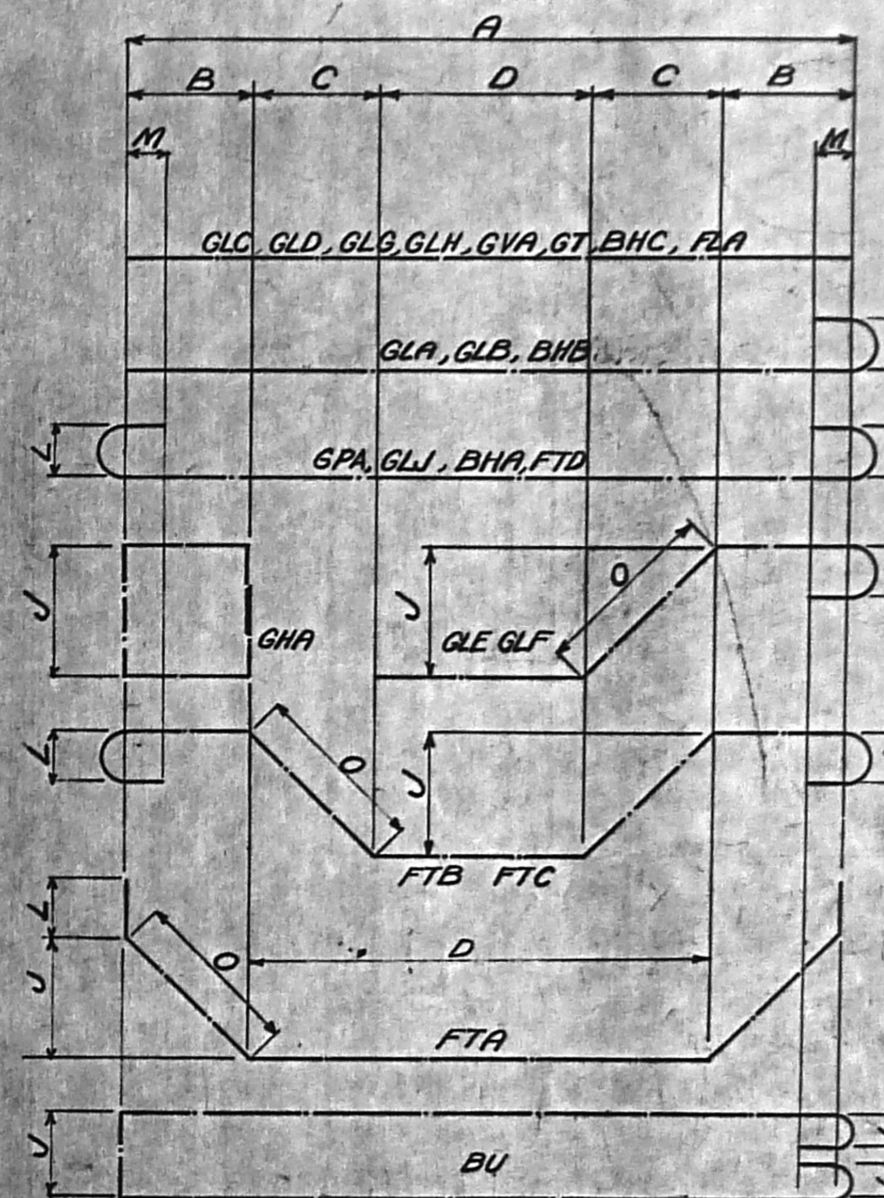


GU, to GU24 Bars ⅞"⌀				
Mark	No.	H	Length	Weight
GU1	4	8'-7"	20'-0"	164 #
"2	4	8'-4"	19'-6"	159
"3	4	8'-2"	19'-2"	157
"4	4	7'-11"	18'-8"	153
"5	4	7'-8"	18'-2"	149
"6	4	7'-6"	17'-10"	146
"7	4	7'-3"	17'-4"	142
"8	4	7'-1"	17'-0"	139
"9	4	6'-10"	16'-6"	135
"10	4	6'-7"	16'-0"	131
"11	4	6'-5"	15'-8"	128
"12	4	6'-3"	15'-4"	125
"13	4	6'-3"	15'-4"	125
"14	4	6'-5"	15'-8"	128
"15	4	6'-6"	15'-10"	129
"16	4	6'-8"	16'-2"	132
"17	4	6'-10"	16'-6"	135
"18	4	7'-0"	16'-10	138
"19	4	7'-3"	17'-4"	142
"20	4	7'-6"	17'-10"	146
"21	4	7'-8"	18'-2"	149
"22	4	7'-10"	18'-6"	151
"23	4	8'-1"	19'-0"	155
"24	4	8'-2"	19'-2"	157
Total				3415 #

Concrete Pours Ⓐ

Unit	Cu. Yds.
Floor	63.0
Floor	63.0
Girder	17.4
Girder	17.4
Total	160.8

Steel Bending Diagram



Ⓐ Ⓑ Note:- All materials and workmanship to be in accordance with the Michigan State Highway Department's Specifications for Roads and Bridges, 1926 Edition.

No substitutions of reinforcing Steel will be permitted unless it can be shown that sections called for cannot be purchased in the open market.

All sections shown as distinct units, on these plans, to be poured in one continuous run.

All concrete in superstructure to be Grade "A".

The reinforcing steel in the girders and in the floor slab shall be supported on concrete bar chairs as shown on sheet A-2-M-18

Offsets for copings and bevels may be revised slightly to conform with commercial sizes of form lumber subject to approval of Engineer.

Rev.	Description	Date	By
Ⓐ	Quantities, Notes	10-13-25	F.B.C.
Ⓑ	Notes	5-5-27	K.E.W.
Ⓒ	Bar added	6-27-27	K.E.W.

MICHIGAN STATE HIGHWAY DEPARTMENT

BAR LIST AND DETAILS
STANDARD 60 FT R.C. GIRDER 22 FT. ROADWAY

Approved ____________ Engineer of Design

Approved ____________ Bridge Engineer

Drawn by		
Traced by	R.M.M.	[illegible]
Checked by	M.P.L.	[illegible]
Filed by	G.E.T.	[illegible]

A-4-B-69

HALF SECTION ON ℄ ROADWAY

HALF ELEVATION

QUARTER PLAN

CORNER FINISH

CAMBER DIAGRAM

Add these amounts to Elevation of Crown of Floor Slab

END PILASTER VIEW

HALF SECTION ON ℄

HALF SECTION AA

Rev.	Description	Date	By
Ⓐ	Camber Diagram, Drain Detail	10-18-26	P.B.C.
Ⓑ	Haunch raised 1½" at face of Wall	12-2-26	H.W.R.
Ⓒ	Note on modification of Surfacing	12-4-26	H.W.R.
Ⓓ	Thickness of Wearing Surface Increased ½"	6-23-27	N.R.P.
Ⓔ	6PA bar added	6-27-27	H.E.W.

MICHIGAN STATE HIGHWAY DEPARTMENT

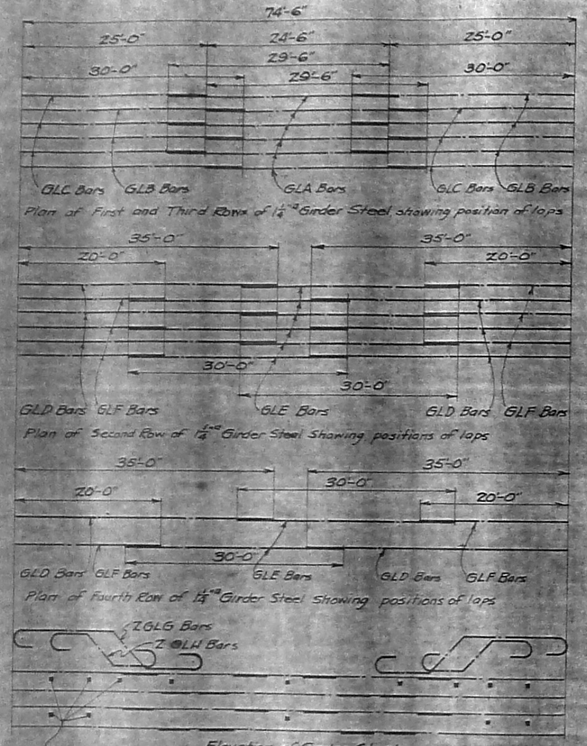
GENERAL DETAILS —

STANDARD 60 Ft. R.C. GIRDER 22 Ft. ROADWAY

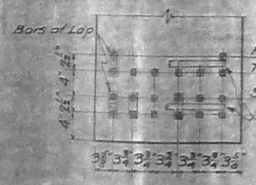
Approved _____ Comm'r of Public Works

Approved _____ Bridge Engineer

Drawn by	
Traced by	
Checked by	
Filed in	A-1-G



Note—
Bars in the first and second rows, also the bars in the third and fourth rows are to be securely wired together their entire length with №14 wire (B.W.G.)



ENLARGED CROSS SECTION OF GIRDER

BAR BENDING DIAGRAM

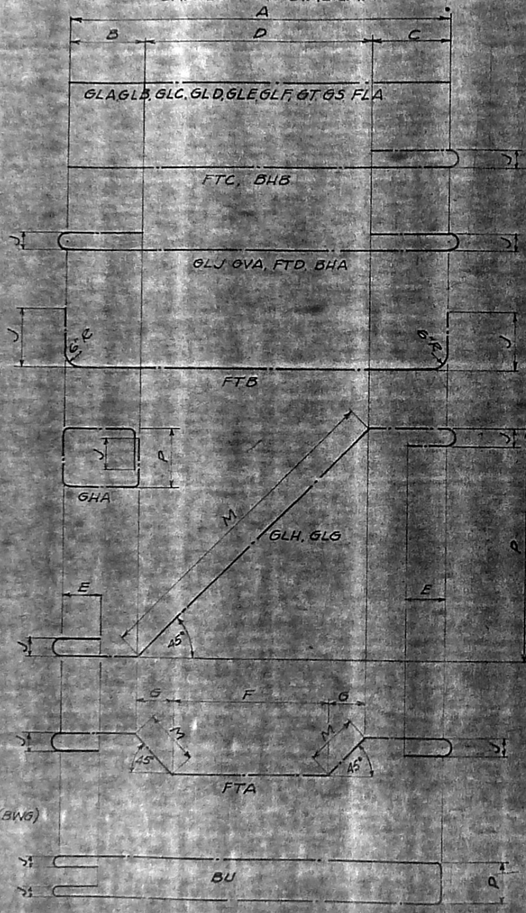
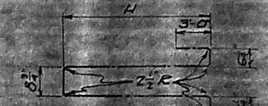


DIAGRAM №1



GU₁ to GU₂₈ BARS 1" ⌀				
MARK	№	H	LENGTH	WEIGHT
GU_1	4	8'-10	24'-11"	266
GU_2	4	8'-9"	24'-9"	264
GU_3	4	8'-8"	24'-7"	263
GU_4	4	8'-7"	24'-5"	261
GU_{5}	4	8'-5"	24'-1"	257
GU_6	4	8'-5"	23'-9"	254
GU_7	4	8'-7"	23'-7"	252
GU_8	4	8'-1"	23'-5"	250
GU_9	4	8'-0"	23'-3"	248
GU_{10}	4	8'-0"	23'-3"	248
GU_{11}	4	8'-0"	23'-3"	248
GU_{12}	4	8'-0"	23'-3"	248
GU_{13}	4	8'-0"	23'-3"	248
GU_{14}	4	8'-3"	23'-5"	254
GU_{15}	4	8'-6"	24'-3"	259
GU_{16}	4	8'-9"	24'-9"	264
GU_{17}	4	8'-11"	25'-1"	268
GU_{18}	4	9'-2"	25'-7"	273
GU_{19}	4	9'-4"	25'-11"	277
GU_{20}	4	9'-7"	26'-5"	282
GU_{21}	4	9'-10"	26'-11"	287
GU_{22}	4	10'-0"	27'-3"	291
GU_{23}	4	10'-3"	27'-9"	296
GU_{24}	4	10'-6"	28'-3"	302
GU_{25}	8	10'-8½"	28'-10"	616
GU_{26}	8	11'-0"	29'-3"	625
				7601

CONCRETE POURS

UNIT	CU YDS
QUARTER FLOOR	43 1/2
"	43 1/2
"	43 1/2
"	43 1/2
GIRDER No. 1	270
GIRDER No. 2	270
TOTAL	226.5

BILL OF STEEL

LOCATION	MARK	A	B	C	D	E	F	G	J	M	P	NO	SIZE	KIND	SPC	LENGTH	WEIGHT
GIRDER	GLA	29-6										24	1¼"	DEF		29-6	3762
	GLB	30-0										24	1¼"	"		30-0	3825
	GLC	25-0										24	1¼"	"		25-0	3190
	GLD	35-0										16	1¼"	"		35-0	2975
	GLE	30-0										16	1¼"	"		30-0	2550
	GLF	20-0										16	1¼"	"		20-0	1700
	GLG		3-4	3-6	5-6	0-4			0-6	7-9½	5-6	8	1"	"		26-10	730
	GLH		3-4	3-4	5-6	0-4			0-6	7-9½	5-6	8	1"	"		16-8	453
	GS	1-7										28	½"	PL		1-7	235
	GLJ	18-0	0-5	0-5					0-7½			16	1¼"	DEF		20-9½	1767
	BHA		1-4						1-8		1-10	36	½"	"		8-0	245
	GVA	9-0	0-5	0-5					0-7½			16	1¼"	"		11-3½	1002
	GT	28-4										12	⅜"	"		28-4	380
	GU		See Diagram No 1									1"	DEF				7601
FLOOR	FLA	38-3										52	½"	"		38-5	691
	FTA		3-6	3-6		0-4	1-10	1-2	0-6	1-7½		68	1"	"		30-4½	7022
	FTB	26-11							4-0			66	1"	"		34-6	7142
	FTC	7-2		0-4					0-6			132	1"	"		8-3½	8721
	FTD	19-6	0-4	0-4					0-6			2	1"	"		21-9	148
	BHA	26-6	0-4	0-4					0-6			14	1"	"		28-9	1357
	BHB	7-9		0-4					0-6			16	1"	"		8-10½	493
	BU	5-1				0-2			0-3		1-1½	24	½"	"		12-5	453
TOTAL STEEL IN SUPERSTRUCTURE																	52751

226.5 Cu Yds GRADE "A" CONCRETE IN SUPERSTRUCTURE

Notes:

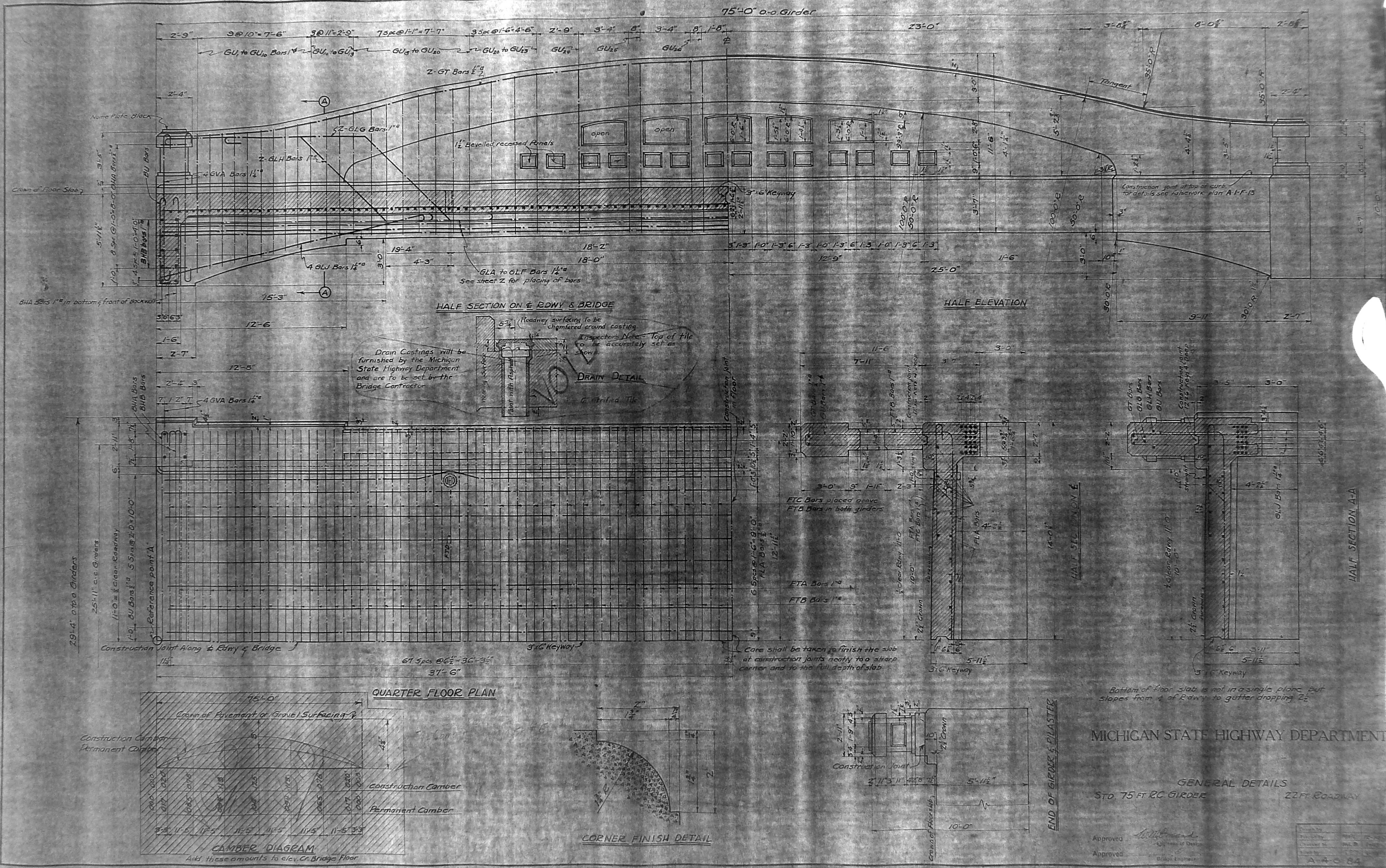
All material and workmanship to be in accordance with Michigan State Highway Department's "STANDARD ROAD AND BRIDGE SPECIFICATIONS" 1926 EDITION.

All Concrete in superstructure to be Grade "A"

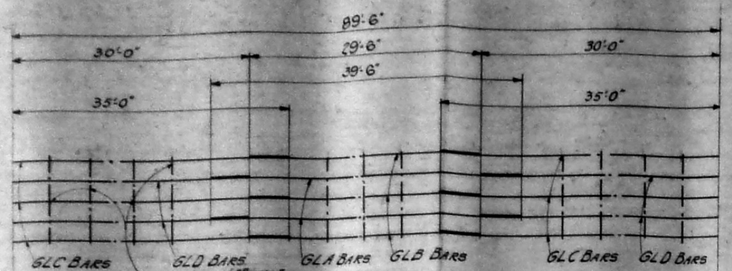
No substitutions of reinforcing steel shall be permitted in this work unless it can be shown that the sections called for cannot be secured in the open market.

All sections shown as distinct units on these plans are to be poured in one continuous run.

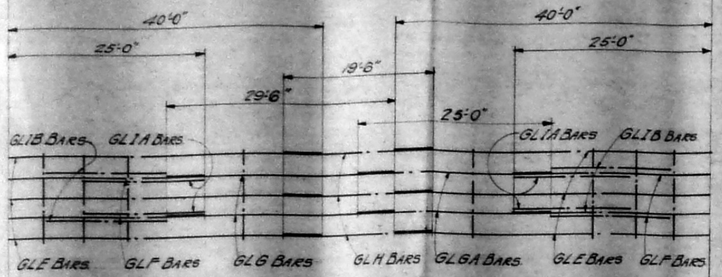
Reinforcing steel in girders and floor slab shall be supported on concrete bar chairs, as shown on drawing A-2-M.18



75'-0" o-o Girder
Z-GT Bars
Name Plate Block
Z-GLG Bars
Z-GLH Bars
1½" Bevelled recessed Panels
open
4 GVA Bars
BU Bars
Crown of Floor Slab
BHB bars
4 GLJ Bars
GLA to GLF Bars
See sheet 2 for placing of bars
BHA Bars 1" in bottom & front of backwall
3"x6" Keyway
Tangent
Construction joint at top of curb, for details see falsework plan A-1-F-13
HALF SECTION ON ℄ RDWY & BRIDGE
HALF ELEVATION
Roadway surfacing to be chamfered around casting
Inspectors Note:- Top of tile to be accurately set as shown
Drain Castings will be furnished by the Michigan State Highway Department and are to be set by the Bridge Contractor
VOID
DRAIN DETAIL
Construction Joint in Floor
4 GVA Bars
Reference point A
Construction Joint Along ℄ Rdwy & Bridge
3"x6" Keyway
67 Spcs @ 6½" = 36'-3½"
37'-6"
QUARTER FLOOR PLAN
Care shall be taken to finish the slab at construction joints neatly to a sharp corner and to the full depth of slab
FTC Bars placed above FTB Bars in both girders
FTA Bars
FTB Bars
FLA Bars
HALF SECTION ON ℄
HALF SECTION A-A
3"x6" Keyway
Bottom of floor slab is not in a single plane but slopes from ℄ of Rdwy to gutter dropping 2½"
Crown of Pavement or Gravel Surfacing
Construction Camber
Permanent Camber
CAMBER DIAGRAM
Add these amounts to elev. Cr. Bridge Floor
CORNER FINISH DETAIL
Construction Joint
Crown of Floor Slab
END OF GIRDER & PILASTER
MICHIGAN STATE HIGHWAY DEPARTMENT
GENERAL DETAILS
STD 75 FT RC GIRDER
22 FT ROADWAY
Approved
Approved



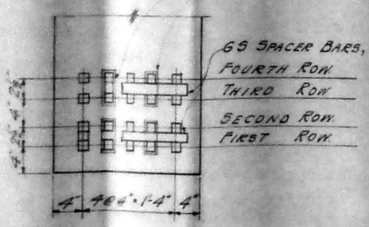
PLAN OF FIRST AND THIRD ROWS OF GIRDER STEEL, SHOWING POSITIONS OF LAPS.



PLAN OF SECOND AND FOURTH ROWS OF GIRDER STEEL, SHOWING POSITIONS OF LAPS
OMIT GLI AND GLIA BARS IN SECOND ROW

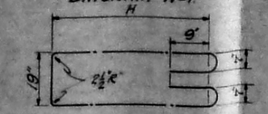
ELEVATION OF GIRDER STEEL.

BARS IN FIRST AND SECOND ROWS AND BARS IN THIRD AND FOURTH ROWS ARE TO BE WIRED TOGETHER FOR THEIR ENTIRE LENGTH. NO 18 WIRE (B.W.G.) IS TO BE USED.

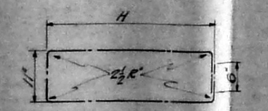


ENLARGED CROSS SECTION OF GIRDER STEEL.

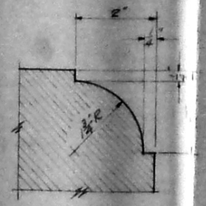
DIAGRAM No. 1



GU1 TO GU9 - 1"ø BARS				
MARK	No	H	LENGTH	WEIGHT
GU1	4	10'-3"	25'-5"	346
GU2	4	9'-10"	24'-7"	334
GU3	4	9'-6"	23'-11"	325
GU4	4	9'-1"	23'-1"	314
GU5	4	8'-11"	22'-9"	309
GU6	4	8'-8"	22'-3"	303
GU7	4	8'-5"	21'-9"	296
GU8	4	8'-3"	21'-5"	291
GU9	4	8'-2"	21'-3"	289
TOTAL				2807



GU10 TO GU21 - 1"ø BARS				
MARK	No	H	LENGTH	WEIGHT
GU10	4	8'-5"	19'-2"	260
GU11	4	8'-9"	19'-10"	270
GU12	4	9'-3"	20'-10"	284
GU13	4	9'-11"	22'-2"	301
GU14	4	10'-7"	23'-6"	320
GU15	4	11'-3"	24'-10"	338
GU16	4	12'-0"	26'-4"	358
GU17	4	12'-8"	27'-8"	376
GU18	4	13'-2"	28'-8"	390
GU19	4	13'-8"	28'-10"	392
GU20	4	13'-6"	29'-4"	400
GU21	4	13'-6"	29'-4"	400
TOTAL				4069

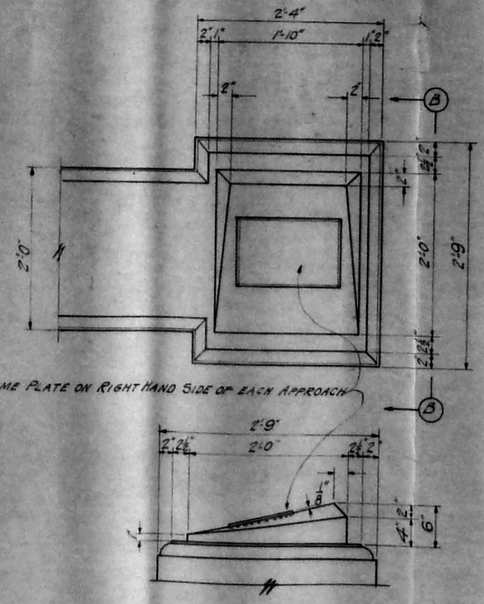


CORNER FINISH

BILL OF STEEL BARS

LOCATION	MARK	A	B	C	D	L	M	P	No	SIZE	KIND	SPCG	LENGTH	WEIGHT
GIRDER	GLA	39'6"							8	1¼"ø	DEF		39'-6"	1680
	GLB	29'6"							12	1¼"ø	"		29'-6"	1882
	GLC	34'8"		0'-6"			0'-7½"		24	1¼"ø	"		34'-2"	4612
	GLD	29'8"		0'-6"			0'-7½"		16	1¼"ø	"		31'-2"	2650
	GLE	39'8"		0'-6"			0'-7½"		24	1¼"ø	"		41'-2"	5250
	GLF	24'8"		0'-6"			0'-7½"		16	1¼"ø	"		26'-2"	2223
	GLG	29'6"							8	1¼"ø	"		29'-6"	1264
	GLGA	25'0"							8	1¼"ø	"		25'-0"	1062
	GLH	19'6"							12	1¼"ø	"		19'-6"	1243
	GLIA	14'-5"	4'6"		6'0	0'-6"	0'-7½"	4'-6"	8	1¼"ø	"		20'-6"	870
	GLIB	16'-5"	4'6"		7'-0"	0'-6"	0'-7½"	4'-6"	8	1¼"ø	"		21'-10"	928
	GLJ	19'6"	0'-6"	0'-6"			0'-7½"		16	1¼"ø	"		22'-6"	1913
	GCA	37'0"		0'-6"			0'-7½"		8	1¼"ø	PLAIN		38'-6"	1636
	GCB	27'0"		0'-6"			0'-7½"		28	1¼"ø	"		28'-6"	4240
	GCC	25'0"							4	1¼"ø	"		25'-0"	530
	GHA			1'-5¾"			1'-7⅞"		32	⅝"ø	"		7'-0"	150
	GVA	11'-0"	0'-6"	0'-6"			0'-7½"		16	1¼"ø	"		14'-0"	1190
	GS	1'-7"							38	1¼"ø	"		1'-7"	318
	GU	SEE DIAGRAM No. 1								1"ø	"			6896
FLOOR	FLA	32'-0"							54	½"ø	"		32'-0"	1470
	FTA	23'-4"	5'-9"	5'-9"			1'-0"		66	1"ø	"		38'-0	8527
	FTB	24'4"					4'8"		72	1"ø	"		33'-8"	8242
	FTC	18'-6"	3'-3"	3'-3"			1'-0"		6	1"ø	"		28'-2"	575
	BHA	25'-3"	0'-4"	0'-4"			0'-6"		16	1"ø	"		27'-6"	1496
	BHB	6'8½"		0'-4"			0'-6"		20	1"ø	"		7'-10"	533
	BVA	6'-3"							24	½"ø	"		6'-3	130
TOTAL														61,500

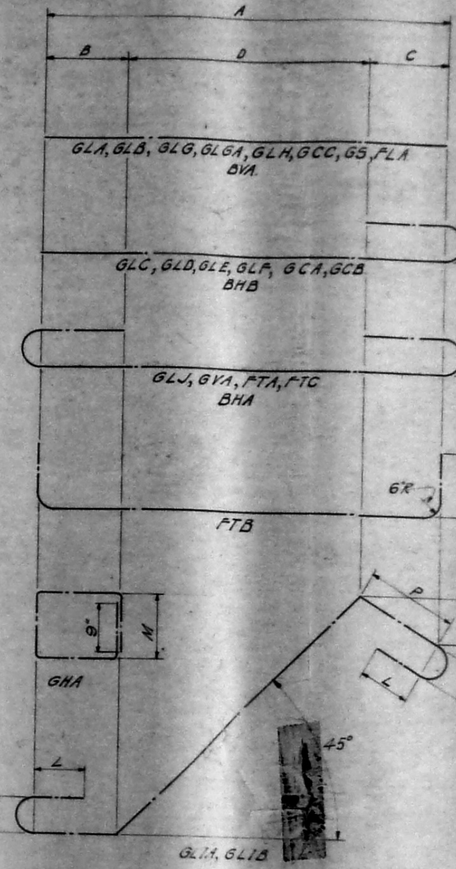
255.0 CU YDS 1:4½-2500# CONCRETE

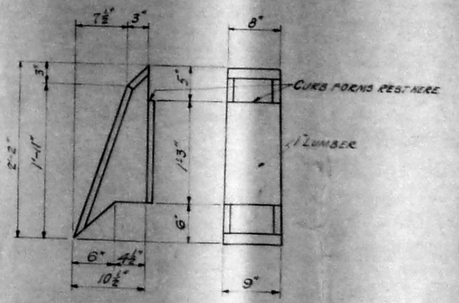


VIEW B-B

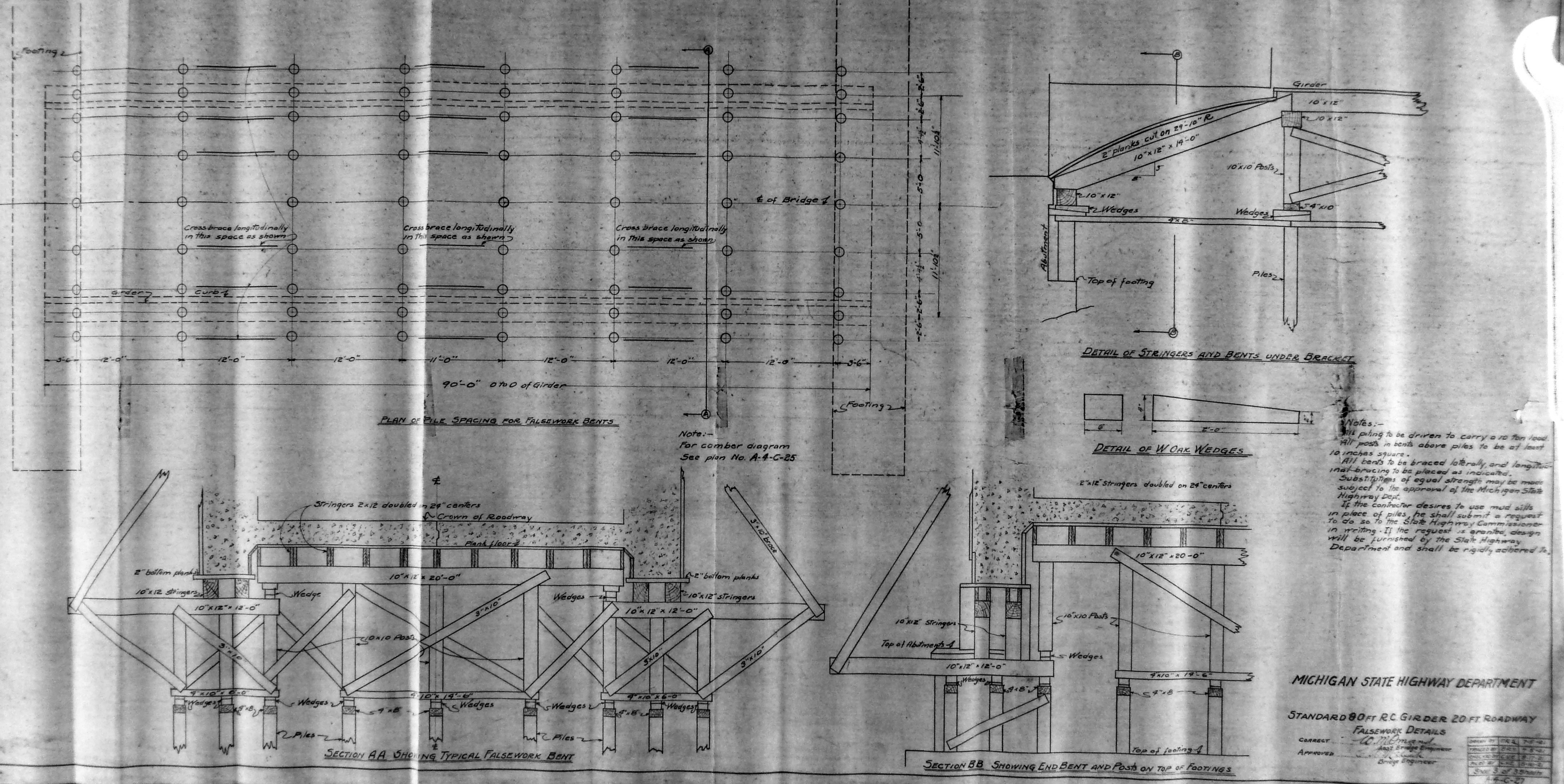
NAME PLATE BLOCK DETAILS

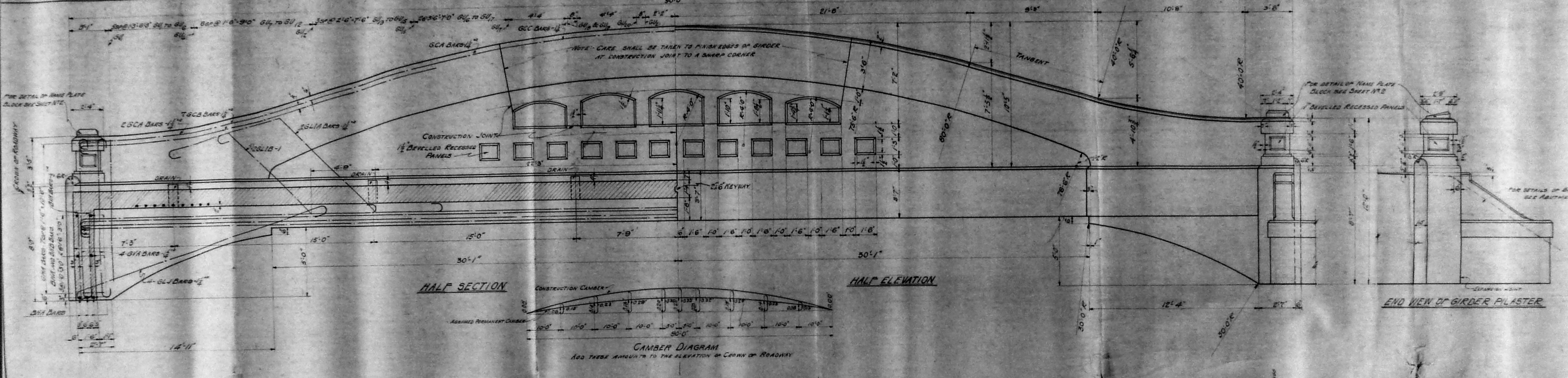
BAR BENDING DIAGRAM

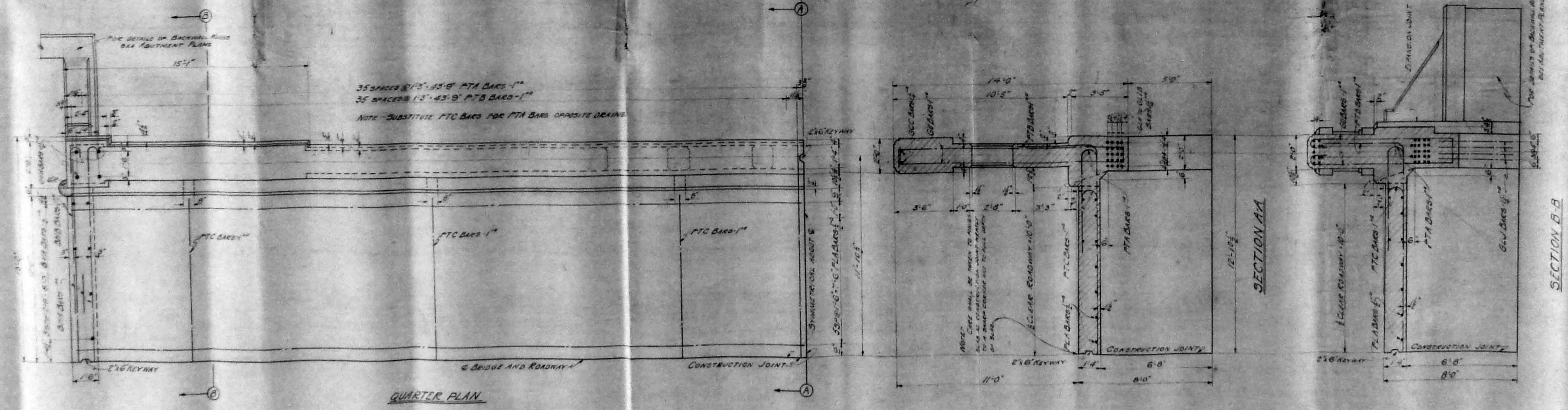




DETAILS OF DRAIN HOLE FORMS


Footing
Cross brace longitudinally in this space as shown
Cross brace longitudinally in this space as shown
Cross brace longitudinally in this space as shown
℄ of Bridge
Girder
Curb
3'-6"
12'-0"
12'-0"
12'-0"
11'-0"
12'-0"
12'-0"
12'-0"
3'-6"
90'-0" 0 to 0 of Girder
2'-6"
2'-6"
5'-0"
5'-0"
11'-10½"
11'-10½"
Footing
PLAN OF PILE SPACING FOR FALSEWORK BENTS
Note:-
For camber diagram
See plan No. A-4-C-25
Girder
10"x12"
10"x12"
2" planks cut on 29'-10" R
10"x12" x 19'-0"
10"x10" Posts
10"x12"
Wedges
Wedges
4"x10"
4"x8"
Abutment
Top of footing
Piles
DETAIL OF STRINGERS AND BENTS UNDER BRACKET
6
4"
2'-0"
DETAIL OF W. OAK WEDGES
Stringers 2x12 doubled on 24" centers
Crown of Roadway
Plank floor
2" bottom planks
10"x12 Stringers
10"x12" x 20'-0"
10"x12" x 12'-0"
Wedge
Wedges
2" bottom planks
10"x12" Stringers
10"x12" x 12'-0"
3"x10" brace
3"x10"
3"x10"
10x10 Posts
3"x10"
3"x10"
4"x10" x 6'-0"
4"x10" x 19'-6"
4"x10" x 6'-0"
Wedges
4"x8
Wedges
4"x8
Wedges
Wedges
4"x8
Piles
Piles
SECTION AA SHOWING TYPICAL FALSEWORK BENT
2"x12" Stringers doubled on 24" centers
10"x12" x 20'-0"
10"x12" Stringers
Top of Abutments
10"x10 Posts
Wedges
10"x12" x 12'-0"
Wedges
4"x8"
4"x10" x 19'-6"
4"x8
Top of footing
SECTION BB SHOWING END BENT AND POSTS ON TOP OF FOOTINGS
Notes:-
All piling to be driven to carry a 10 ton load.
All posts in bents above piles to be at least 10 inches square.
All bents to be braced laterally, and longitudinal bracing to be placed as indicated.
Substitutions of equal strength may be made subject to the approval of the Michigan State Highway Dept.
If the contractor desires to use mud sills in place of piles, he shall submit a request to do so to the State Highway Commissioner in writing. If the request is granted, design will be furnished by the State Highway Department and shall be rigidly adhered to.
MICHIGAN STATE HIGHWAY DEPARTMENT
STANDARD 80 FT R.C. GIRDER 20 FT ROADWAY
FALSEWORK DETAILS
CORRECT
Asst Bridge Engineer
APPROVED
Bridge Engineer
Sheet 3 of 3 Sheets
A-4-C-27





NOTE: -

All material and workmanship to be in accordance with Michigan State Highway Department's Specifications for Steel and Concrete Highway Bridges 1920 Edition.

All sections shown as distinct units on these plans are to be poured in one continuous run.

No unscreened gravel will be permitted.

"1:4½ 2500" concrete is to be used for the superstr...

No substitutions of reinforcing steel will be perm... this work unless it can be shown that sections ... cannot be secured in the open market.

The contractor shall sort and store reinforcing steel on the ground in such a manner as to be accessible for checking by the inspector.

The top of the floor slab to be floated and troweled to produce a smooth hard surface and true to the section shown.

The reinforcing steel in the girders to be supported on bar chairs of approved pattern spaced not more than 6 ft. apart and the reinforcing steel in the floor slab to be supported on bar chairs not more than 6 ft. apart in either direction.

All exposed surfaces to be rubbed with carborundum brick within the time set and the manner prescribed by Clause No. 126 of the Specifications.

Where reinforcing bars of deformed type are required only bars with a distinct transverse rib will be accepted.

MICHIGAN STATE HIGHWAY DEPARTMENT

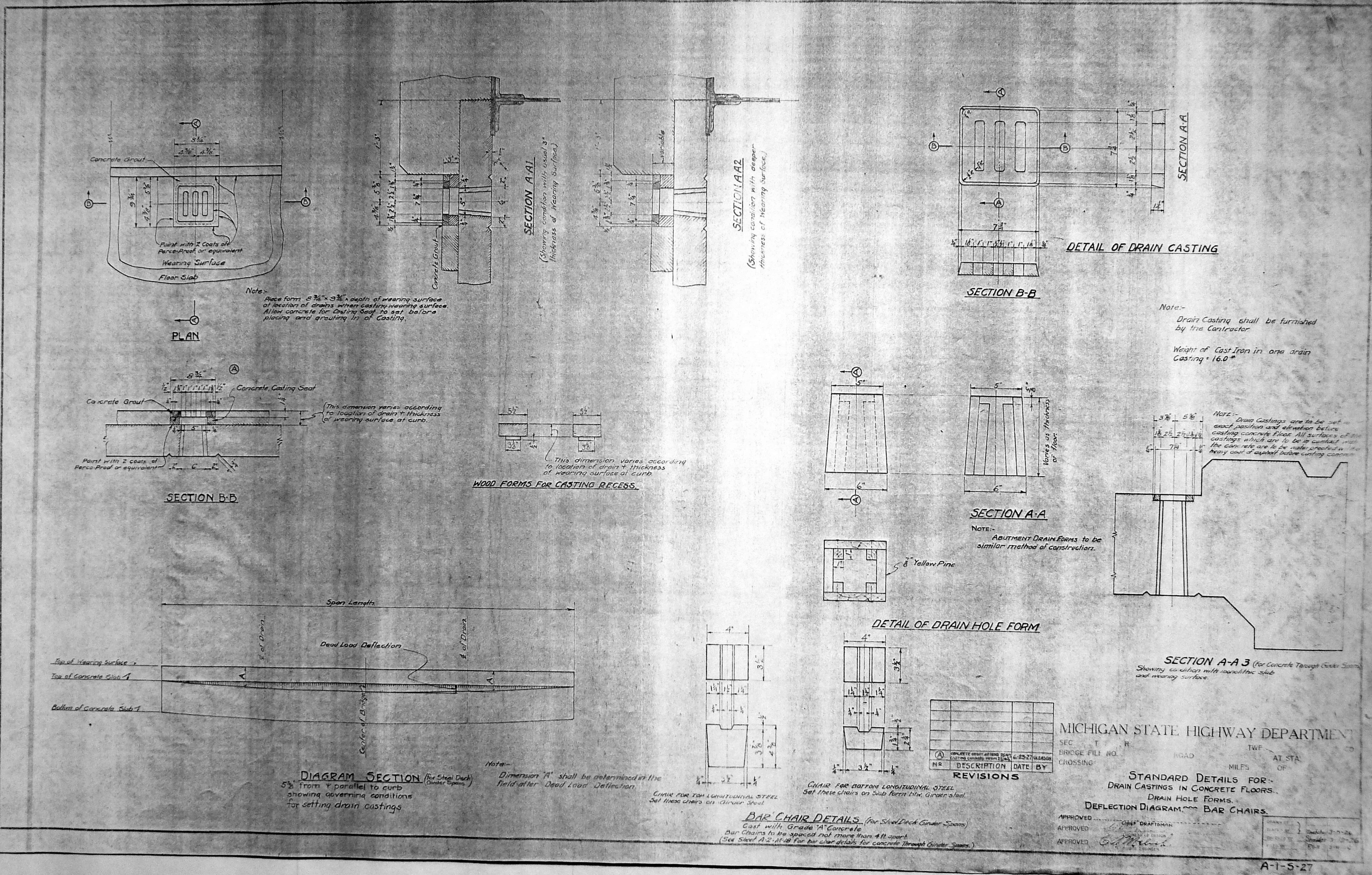
GENERAL DETAILS

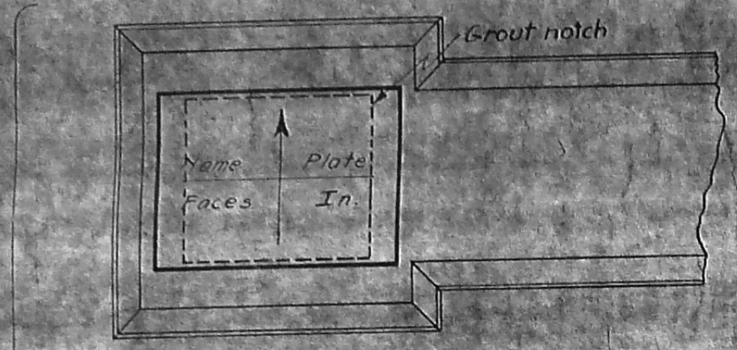
STANDARD 90 FT. R.C. GIRDER, 20 FT. ROADWAY

CORRECT — [signature]

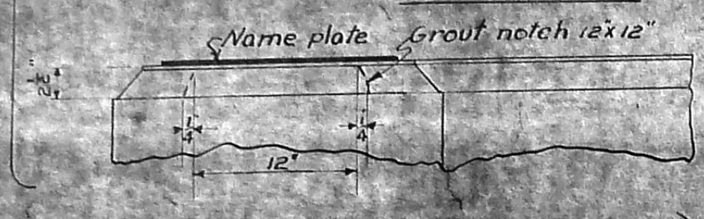
APPROVED — [signature]

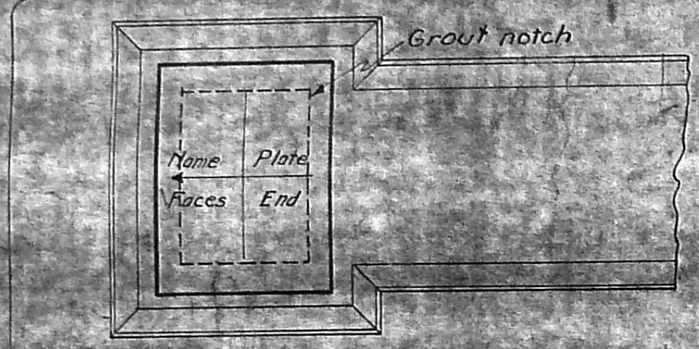
A-4-C-25


PLAN
Concrete Grout
Paint with 2 Coats of Perco-Proof or equivalent
Wearing Surface
Floor Slab
Note:- Place form 8 3/4" x 9 3/4" x depth of wearing surface at location of drains when casting wearing surface. Allow concrete for Casting Seat to set before placing and grouting in of Casting.
SECTION A-A1 (Showing condition with usual 3" thickness of Wearing Surface)
SECTION A-A2 (Showing condition with deeper thickness of Wearing Surface)
Concrete Grout
variable
DETAIL OF DRAIN CASTING
SECTION A-A
SECTION B-B
Note:- Drain Casting shall be furnished by the Contractor.
Weight of Cast Iron in one drain Casting = 16.0#
Concrete Grout
Concrete Casting Seat
This dimension varies according to location of drain & thickness of wearing surface at curb.
Paint with 2 coats of Perco-Proof or equivalent
SECTION B-B
This dimension varies according to location of drain & thickness of wearing surface at curb.
WOOD FORMS FOR CASTING RECESS.
Varies as thickness of floor.
SECTION A-A
Note:- Abutment Drain Forms to be similar method of construction.
7/8" Yellow Pine
DETAIL OF DRAIN HOLE FORM
Note:- Drain Castings are to be set in exact position and elevation before casting concrete floor. All surfaces of the castings which are to be in contact with the concrete are to be water proofed with a heavy coat of asphalt before casting concrete.
SECTION A-A 3 (For Concrete Through Girder Spans) Showing condition with monolithic slab and wearing surface.
Span Length
Top of Wearing Surface
Top of Concrete Slab
Bottom of Concrete Slab
Dead Load Deflection
℄ of Drain
Center of Bridge ℄
DIAGRAM SECTION (for Steel Deck Girder Spans)
5 3/8" from ℄ parallel to curb showing governing conditions for setting drain castings
Note:- Dimension "A" shall be determined in the field after Dead Load Deflection.
CHAIR FOR TOP LONGITUDINAL STEEL Set these chairs on Girder Steel
CHAIR FOR BOTTOM LONGITUDINAL STEEL Set these chairs on Slab form btw. Girder steel.
BAR CHAIR DETAILS (for Steel Deck Girder Spans)
Cast with Grade "A" Concrete
Bar Chairs to be spaced not more than 4 ft apart.
(See Sheet A-2-A-18 for bar chair details for concrete Through Girder Spans.)
A CONCRETE GROUT AROUND DRAIN CASTING CHANGED 6-23-27
Nº DESCRIPTION DATE BY
REVISIONS
MICHIGAN STATE HIGHWAY DEPARTMENT
SEC T R TWP
BRIDGE FILE NO. ROAD AT STA
CROSSING MILES OF
STANDARD DETAILS FOR:-
DRAIN CASTINGS IN CONCRETE FLOORS.
DRAIN HOLE FORMS.
DEFLECTION DIAGRAM. BAR CHAIRS.
APPROVED
APPROVED CHIEF DRAFTSMAN
APPROVED
A-1-5-27

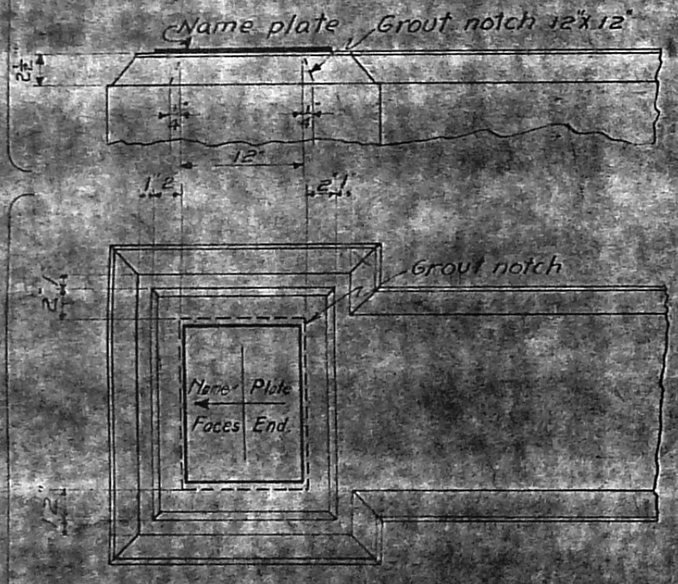


DETAIL A

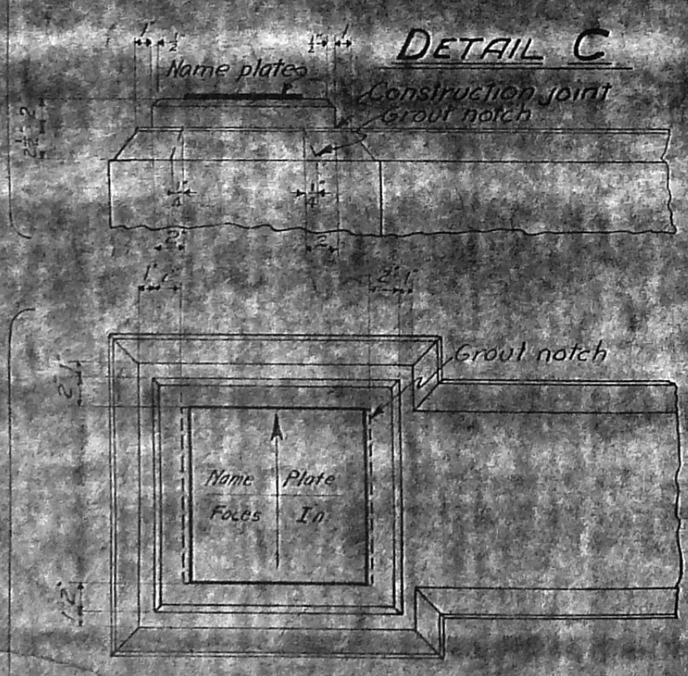




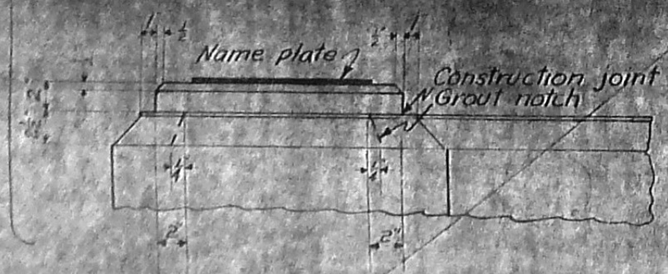
DETAIL B



DETAIL C



DETAIL D



NAME PLATE DETAILS FOR REINF. CONC. GIRDER PILASTERS

Assumed Size of Name Plate			10"x16"	10"x15"	12"x16½"	16½"x16½"
					State	Reward
Span	Roadway	Sidewalks	Federal Aid	Trunk Line	1 County	2 Counties
35'-0"	18'-0"	Without				
		With				
	20'-0"	Without	A	D	A	A
		With				
	22'-0"	Without	C	C	C	B
		With				
	24'-0"	Without	A	D	A	A
		With	C	C	C	B
40'-0"	18'-0"	Without				
		With				
	20'-0"	Without	C	C	C	B
		With				
	22'-0"	Without	B	B	B	B
		With				
	24'-0"	Without	C	C	B	B
		With				
45'-0"	18'-0"	Without	C	C	C	B
		With				
	20'-0"	Without	C	C	C	B
		With				
	22'-0"	Without	C	C	C	B
		With				
	24'-0"	Without	C	C	C	B
		With				
50'-0"	18'-0"	Without				
		With				
	20'-0"	Without	C	C	C	B
		With				
	22'-0"	Without	C	C	C	B
		With	C	C	C	B
	24'-0"	Without	C	C	C	B
		With				
60'-0"	18'-0"	Without				
		With				
	20'-0"	Without	C	C	C	C
		With				
	22'-0"	Without	C	C	C	C
		With				
	24'-0"	Without				
		With				
75'-0"	18'-0"	Without	C	C	C	C
		With				
	20'-0"	Without	C	C	C	C
		With				
	22'-0"	Without	C	C	C	C
		With	C	C	C	C
	24'-0"	Without				
		With				
90'-0"	18'-0"	Without				
		With				
	20'-0"	Without	C	C	C	C
		With				
	22'-0"	Without	C	C	C	C
		With	C	C	C	C
	24'-0"	Without	C	C	C	C
		With				

NOTES:-

Name plate to be placed on right hand side of each approach.
In case 2" raised name plate block is required as per detail, similar blocks are required on the left hand pilasters.
If name plates are not available at time girders are cast form a grout notch as shown to permit placing name plates later.

MICHIGAN STATE HIGHWAY DEPARTMENT

REVISED NAME PLATE DETAILS

CORRECT: _____ Ass't. Bridge Engineer.

APPROVED: _____ Bridge Engineer.

Drawn by	T.R.C.	8-12-22
Traced by	T.R.C.	8-12-22
Checked by		
Filed by	C.H.E.	

B-18-B-30

A-1-P-1