This Plan Set is for Informational Purposes Only ---------- This Plan Set is for Informational Purposes Only

MICROFILMED

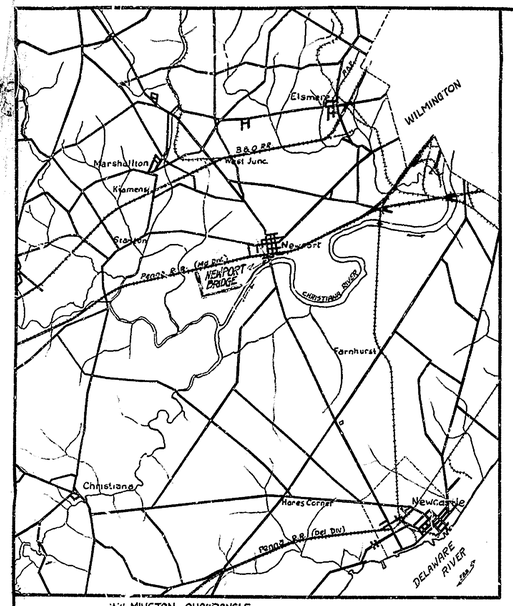
3-3 103A

Pr. #159

ROUTE	CONTRACT	COUNTY	SHEETS
	103	NEWCASTLE	1

NEWPORT BRIDGE

FED. ROAD DIST. NO.	STATE	FED AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
10	DEL	48A	1928		



WILMINGTON QUADRANGLE
SCALE 1:62500
2 0 2 MILES

SHEETS NOT IN CONTRACT
ORIGINAL DATA ON PRESENT BRIDGE
CROSSING-JAMES ST.
PRESENT BRIDGE- JAMES ST.
WATERWAY SECTIONS S1-S2
ROADWAY SECTIONS 1-2-3
WASH BORINGS

THE ABOVE ARE AVAILABLE IN OFFICE OF THE STATE HIGHWAY DEPARTMENT.

THE STATE OF DELAWARE

STATE HIGHWAY DEPARTMENT

PLAN
FOR
CONSTRUCTION
OF
ROUTE Nº CONTRACT Nº103 & 103A

STA. 5+20± TO STA. 7+98±

277 FEET: 0.052 MILES

SCALES: PLAN: 1 IN.=50 FT.
PROFILE: HOR. 1 IN.=50 FT.
VERT. 1 IN.= 5 FT.

FEDERAL AID PROJECT NO 48 A

(Western Union Cable - Reconstruction
May - 1931)

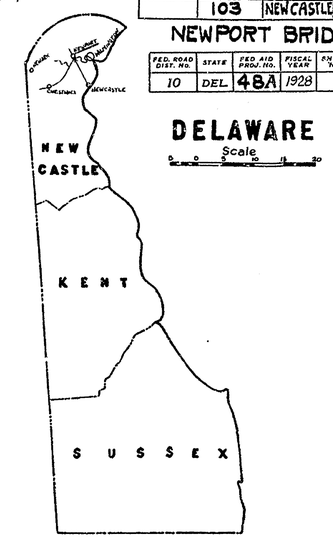
SUBSTRUCTURE
SHEETS IN CONTRACT Nº 103
INDEX SHEET (THIS SHEET)
TEMPORARY BRIDGE SEPT.-1928.
SERIES 1262

GENERAL PLAN	A1
PILE PLAN & FENDER	A2
PIER NO. 2	A3
ABUTMENTS & PIER NO. 1	A4
BALUSTRADE FOR PIER NO. 2	A5

SUPERSTRUCTURE
NOVEMBER 10, 1928
SHEETS IN CONTRACT Nº 103A
INDEX SHEET (THIS SHEET)
~~TEMPORARY BRIDGE SEPT. 1928~~
SERIES 1262-B

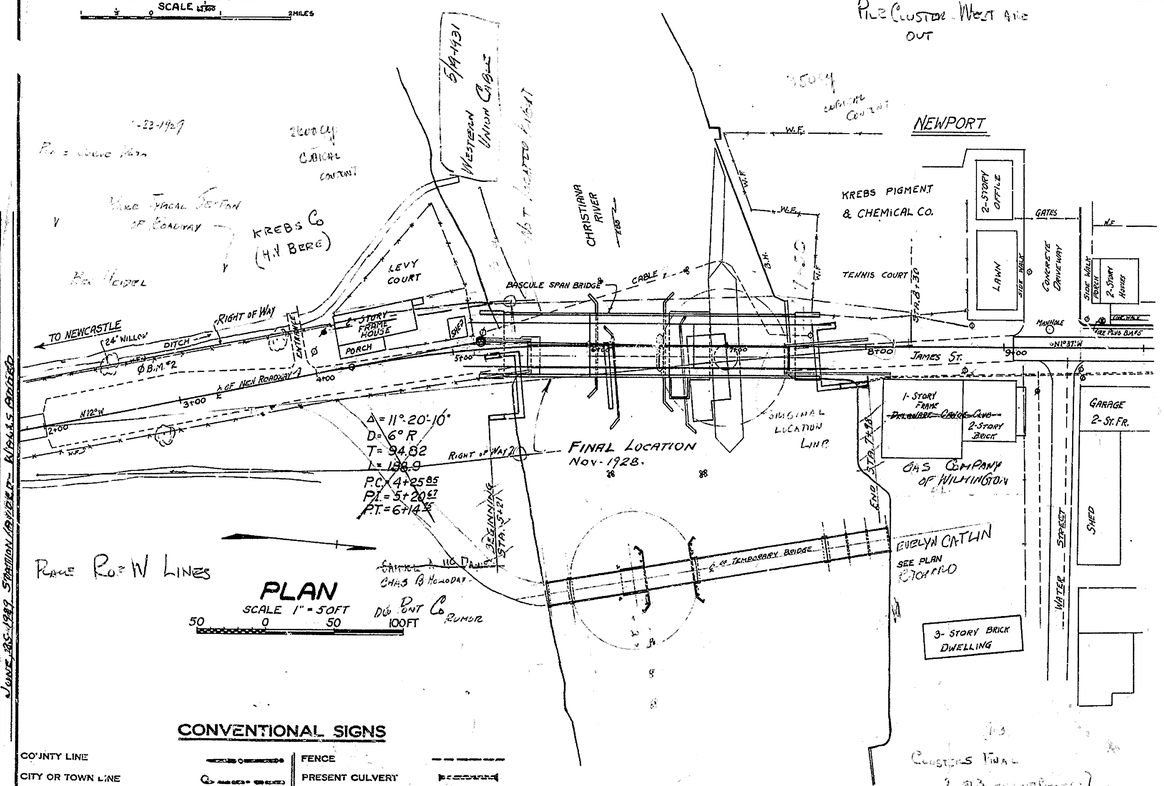
STRESS SHEET	B-1
TRACK GIRDER & RACK SUPPORT	B2
APPROACH GIRDERS	B3
BASCULE GIRDERS	B4
FLOOR BEAMS & BRACKETS	B5
CWT TRUSSES & STRINGERS	B6
BASCULE SPAN BRACING	B7
MACHINERY FLOOR	B8
RAILING DETAILS	B9
OPERATING MACHINERY	B10
LOCK AND BUFFER	B11
OPERATOR'S HOUSE	B12

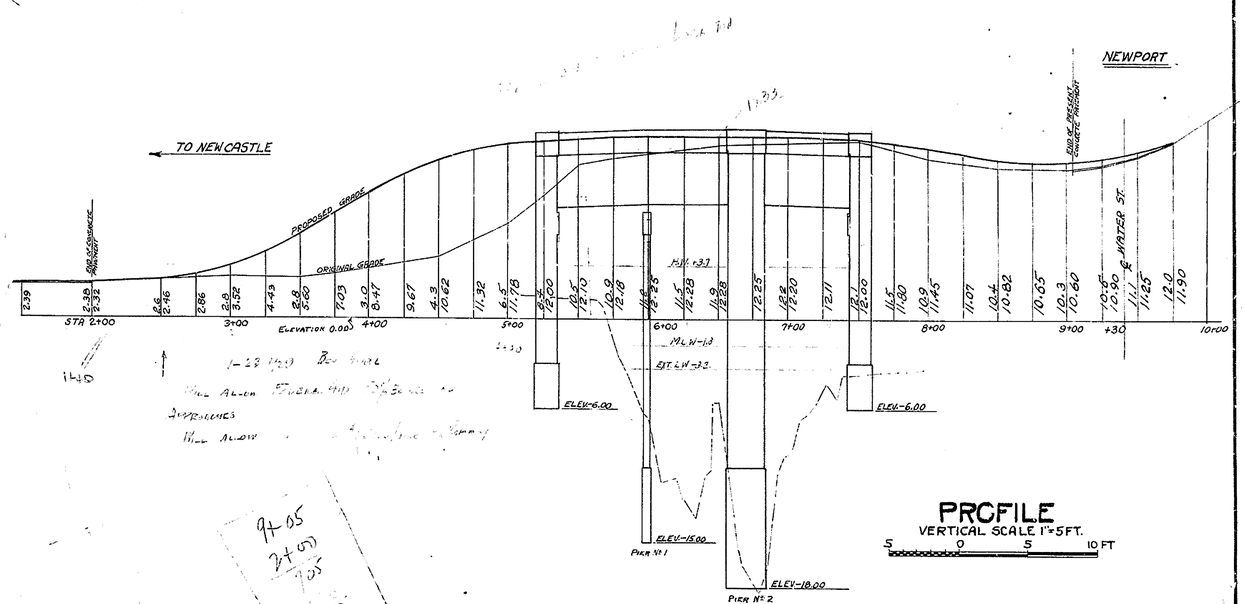
See Contract 103B for Grade Elevations



BENCH MARKS		
No.	ELEV.	DESCRIPTION
1	2.23	NAIL IN WILLOW TREE RIGHT OF STA. 1+50
2	2.30	NAIL IN TEL. POLE LEFT OF STA. 3+00
3	9.09	+ MARK N.E. COR. BRIDGE ABUT. USED D.=103
4	6.16	TOP OF WALL, N.W. BULKHEAD + MARK
5	13.87	FIRE PLUG LEFT OF STA 9+70
6	19.48	SW of RR ON CULVERT. MARKED U.S.G.S. B.M. ELEV. ABOVE SEA = 19 FT.

Jan 1944
Pile Cluster West Side Out





REVISIONS:
Dec. 5-1928. Final Location and Alignment added. (D.R.M.)
Dec. 5-1928. Added Notes. D.R.M. Added List of Drawings, Superstructure. D.R.M.
Dec. 6-1928. Added Stations. D.R.M.
June 25-1929. Station Labels - N.Wales & Bridge

CONVENTIONAL SIGNS

COUNTY LINE	FENCE
CITY OR TOWN LINE	PRESENT CULVERT
PROPERTY RIGHT OF WAY LINE	PROPOSED CULVERT
CENTRE LINE, PROPOSED ROAD	TELEGRAPH POLE
MACADAM, OR TRAVELLED ROAD	TREE
TROLLEY OR RAILROAD	SURVEY, OR BASE LINE

Profile

DRAWN	W.M.L.
TRACED	W.M.L.
CHECKED	Z.C.H.
	9/15/28

See Sheet Contract 103B
9/17-1929 New Stationing & New Grades
New Survey on Final Line

CLOSED PRESENT BRIDGE (1879) TO TRAFFIC
12-14-1928

103	
BIDS RECEIVED	10-16-1928
CONTRACT SIGNED	11-2-1928
CONTRACT BEGAN	11-12-1928
CONTRACT FINISHED	JUNE-1929
WAR DEPT. PERMITS	7-31-1928 & 10-24-1928 (Temporary Bridge)
WAR DEPT HEARING	NONE
WAR DEPT APPLICATIONS	5-19-1928, 8-28-1928
AWARD OF CONTRACT	10-30-1928

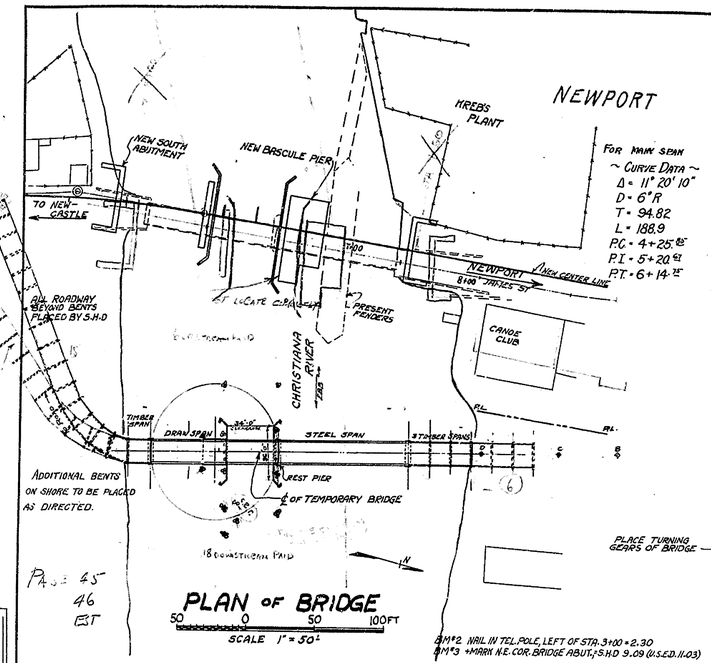
103A
JAN 8-1929
~~FEB 5-1929~~
JUNE 18, 1929
JAN 22-1929

EXAMINED	10/2	1928	A. G. Livingston, Bridge Engineer
APPROVED	10/6	1928	[illegible], Chief Engineer
APPROVED	11/8	1928	[illegible], Chairman-State Highway Dept.

ROUTE	CONTRACT	COUNTY	SHEET
	103	NEW CASTLE	

NEWPORT BRIDGE (TEMPORARY)

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
10	DEL.	48A			



PLAN OF BRIDGE

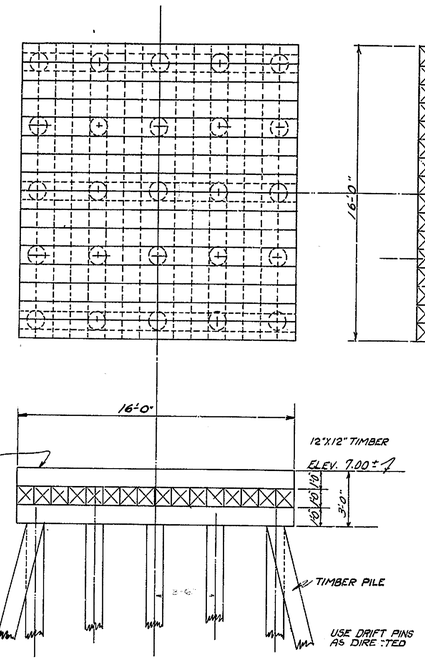
SCALE 1" = 50'

B.M.#2 NAIL IN TEL. POLE, LEFT OF STA. 3+00 = 2.30
B.M.#3 +MARK N.E. COR. BRIDGE ABUT. S.H.D 9.09 (U.S.E.D. 11.03)

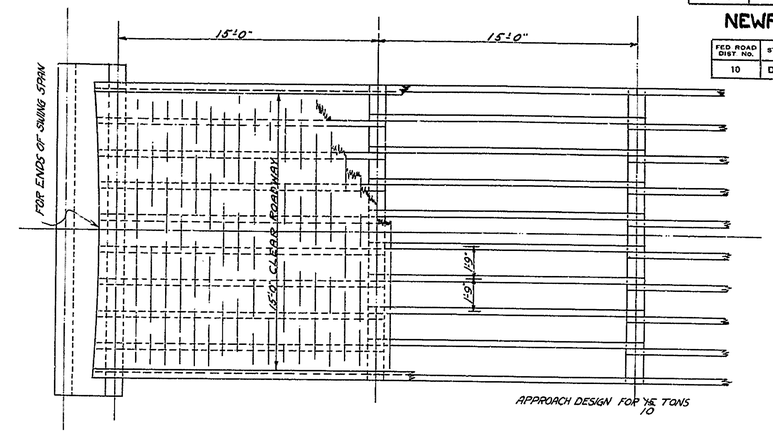
12-16-1929
STEEL FIXED SPAN BUMPER
INTO CREEK

GUY BRACING NOT SHOWN

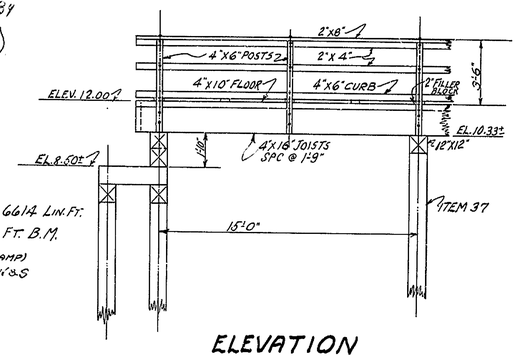
FINAL CONDITIONS AS BUILT PLATTED FROM FIELD NOTES BY W.H.L. 7.9.29



CENTER PIER

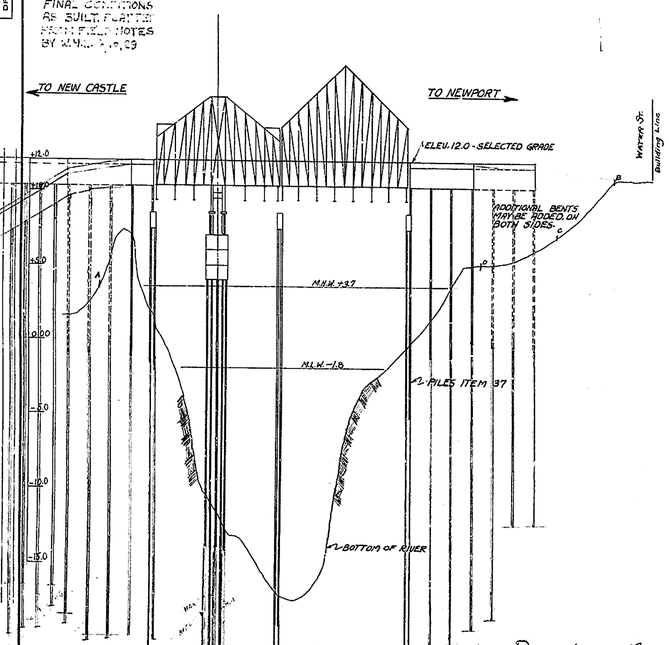


PLAN OF TIMBER SPAN



ELEVATION

1-4-1929
219 TOTAL PILES IN BRIDGE 6614 LIN. FT.
TOTAL LUMBER 63.943 M. FT. B.M.
CU. YDS. FILL 4.8 C.Y. (C.R.CAMP)
CU. YDS. FILL = 115 (PETRILLO) K.&S.

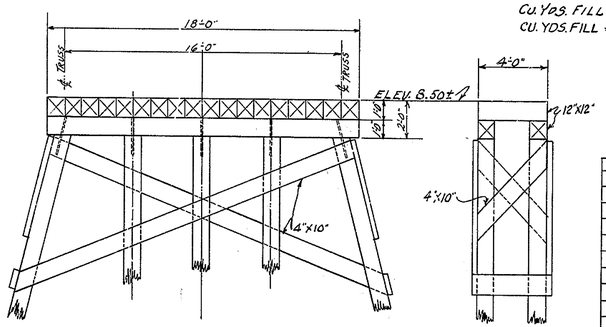


PROFILE OF BRIDGE

HORIZONTAL SCALE 1" = 50'
VERTICAL SCALE 1" = 5'

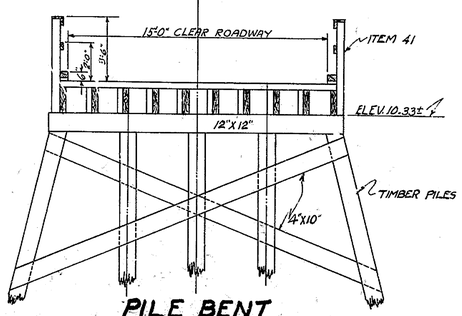
DRAWN W.M.L.
TRACED W.M.L.
CHECKED A.G.L.
9/1/28

J. H. W. & Co. 300. 4-18-28.



REST PIER

3 REQUIRED



PILE BENT

AS SHOWN

BILL OF MATERIALS

NO	SIZE	LENGTH	LOCATION	FT. B.M.
			LUMBER	
37	12"X12"	16'-0"	CAPS & DECKING	
			TOTAL FOR CENTER PIER	7104
9	12"X12"	18'-0"	PILE CAPS	
3	10"X12"	18'-0"	SILLS	
54	12"X12"	4'-0"	DECKING	
6	4"X10"	22'-0"	BRACES	
6	4"X10"	7'-0"	"	
6	4"X10"	5'-0"	"	
			TOTAL FOR REST PIERS (3)	5756
4	12"X12"	17'-0"	PILE CAPS	
8	4"X10"	21'-0"	BRACES	
			TOTAL FOR PILE BENTS (4)	1376
20	4"X16"	17'-0"	JOISTS	
21	4"X16"	16'-0"	JOISTS	
78	4"X10"	16'-0"	FLOOR PLANKS	
9	4"X6"	16'-0"	CURB	
20	4"X6"	5'-0"	BALUSTRADE POSTS	
9	2"X8"	16'-0"	" RAIL	
18	2"X4"	16'-0"	" "	
			TOTAL FOR FLOOR SPANS (4)	8636
			TOTAL TIMBER	22872
			PILES	
25	12" φ	36'-0"±	CENTER PIER	900 L
10	12" φ	26'-0"±	REST PIER, SOUTH	260 L
10	12" φ	38'-0"±	REST PIER, INT.	380 L
10	12" φ	30'-0"±	REST PIER, NORTH	300 L
5	12" φ	26'-0"±	PILE BENT, SOUTH	130 L
15	12" φ	30'-0"±	PILE BENTS, NORTH	450 L
			TOTAL LIN. FT. TIMBER PILING	2420±

THE ABOVE FOR DISTANCE SHORE TO SHORE.

NOTES

See sheet entitled "Crossing - James St, Chr. Stiana River - Newport" for information on the site of this structure. The present bridge, fenders and all piers and abutments, must be entirely removed.

It is proposed to use the two steel spans now in the present bridge, place them on suitable timber piers and add the requisite number of timber spans. The present span must be moved to its new location in as good condition as it now is, the contractor taking the entire responsibility. Adequate bolts and spikes must be used.

All roadway work on the South side, and North side beyond the timber spans will be done by The Department forces. The earth fill will be maintained by the forces of the S.H.D.

Operation and maintainance of the bridge and timber approaches will be included in the Lump sum bid.

A Government Application for this temporary span has been made under the date of August-1928 (Permit 10-24-1928)

Item 36 provides for the erection, and constructing of the temporary span. Item 37 provides for payment on the piles used. Item 41 provides for payment for timber used in the temporary structure.

Item 49 provides for the entire removal of the present bridge.

The list of materials is taken from the drawing as shown. They should be checked by the contractor for his own satisfaction.

An interruption of Highway traffic for a week will be allowed to permit the moving of the two steel spans to their new position.

The rest pier of the old span must be removed immediately when the two steel spans are moved to their new position. The central rest pier of the new span must be constructed last. This is done so the least interference to river navigation will result.

NOTES - CONTRACT 103A

DEC. 13, 1928

~~ALL PILES SHALL BE REMOVED AND PILED AS DIRECTED BY ENGINEER IN A NEAT AND ORDERLY MANNER. IT WILL NOT BE REQUIRED THAT THEY BE MOVED OVER 200 FEET ON LAND.~~

~~ALL TIMBER IN THE BRIDGE SHALL BE PILED AS DIRECTED. REASONABLE CARE SHALL BE TAKEN NOT TO BREAK UP THE TIMBER AND THUS PREVENT ITS FURTHER USE AT A FUTURE DATE.~~

~~ALL METAL WORK IN THE TIMBER SHALL BE CARED FOR SO THEY MAY BE USED IN ANY LATTER CONSTRUCTION.~~

~~ALL THE STRUCTURAL STEEL IN THE FIXED AND MOVABLE SPAN SHALL BECOME THE PROPERTY OF THE CONTRACTOR.~~

ALL MATERIALS IN TEMPORARY BRIDGE, WHEN ORDERED, SHALL BE REMOVED AS DIRECTED BY STATE ENGINEER AND APPROVED BY THE U.S. ENGINEER. THEY SHALL BECOME THE PROPERTY OF THE CONTRACTOR.

APPROVED A. S. Livingston BRIDGE ENGINEER

APPROVED C. W. Rech CHIEF ENGINEER

DISMANTLED Dec. April 1930
CLOSED TO TRAFFIC Nov 8-1924
OPEN TO TRAFFIC 1-2-1929
STARTED WORK 11-12-1928
WAR DEPT PERMIT 10-24-1928
WAR DEPT HEARING NONE
WAR DEPT APPLICATION 8-28-1928

FEDERAL AID PROJECT No. 48A

HIGHWAY DEPARTMENT
DELAWARE
TEMPORARY BRIDGE
CHRISTIANA RIVER
NEWPORT, DEL.
CONTRACT 103

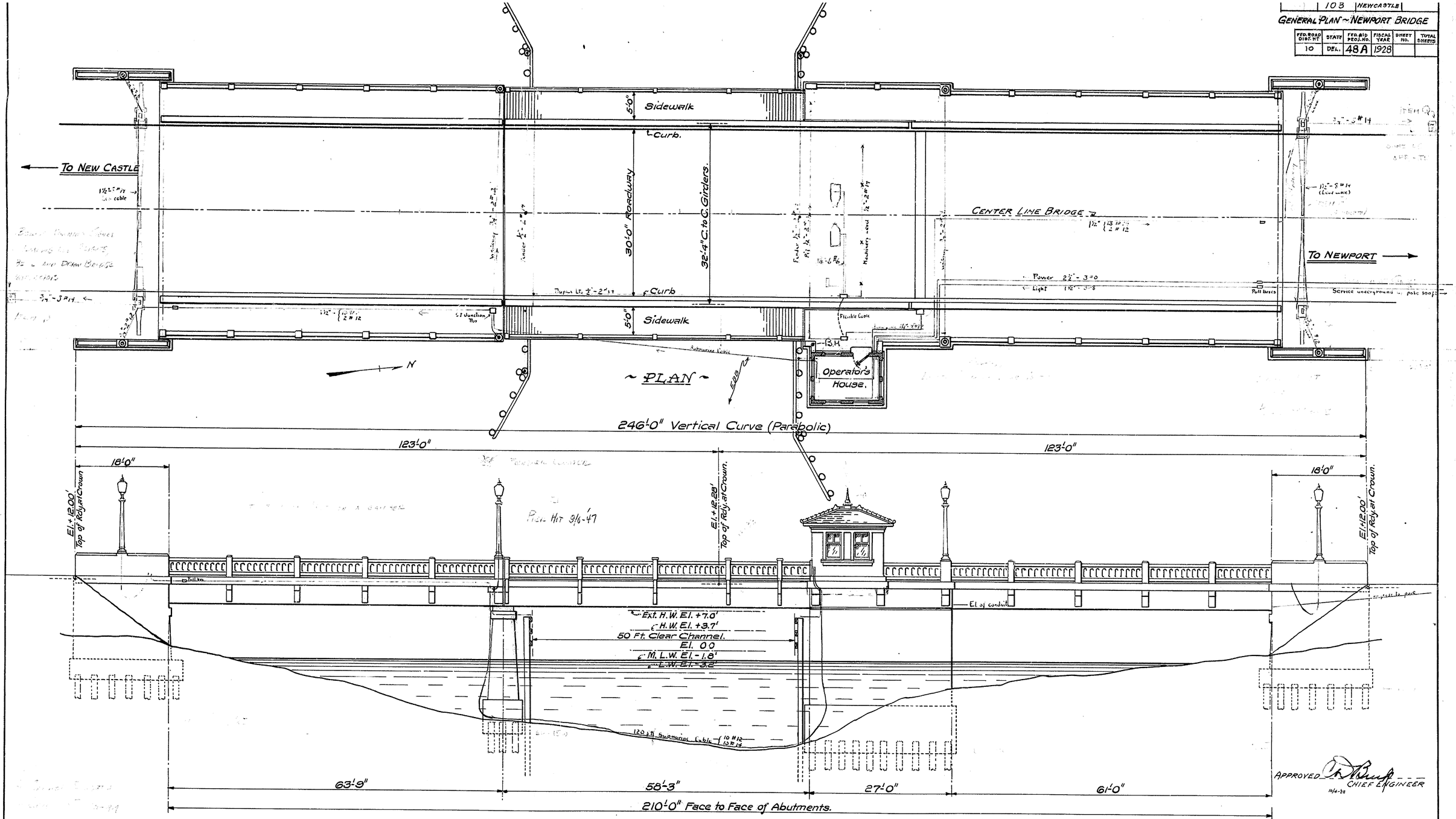
SCALE 1/4" = 1'-0"

SEPTEMBER 1928

103 NEWCASTLE

GENERAL PLAN ~ NEWPORT BRIDGE

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
10	DEL.	48A	1928		



Approved Chas. D. Bunn
10/4-28
Chief Engineer

Contract 103 Substructure
- 1262 A1 General Plan
- 1262 A2 Pile Plan & Fender
- 1262 A3 Bascule Pier No 2.
- 1262 A4 Abutments & Pier No 1.
- 1262 A5 Balustrade - Pier No 2

Contract 103A Superstructure 12-13-1928
- 1262 B1 Stress Sheet
- 1262 B2 Track Girder & Rack Support
- 1262 B3 Approach Girders
- 1262 B4 Bascule Girders
- 1262 B5 Floor Beams & Brackets
- 1262 B6 Cwt Trusses & Stringers
- 1262 B7 Bascule Span Bracing
- 1262 B8 Machinery Floor
- 1262 B9 Railing Details
- 1262 B10 Operating Machinery
- 1262 B11 Lock and Buffer
- 1262 B12 Operator's House

Note Location of Field Mt. & Elevation Also on Detail Sheet
Top Wall at End of Bridge.

10/16 - 1929
Opened 11/27-1929

Approved A. G. Livingston
10/3-1928
Bridge Engineer

Contract 103 - 103A
Delaware
State Highway Department
Newport Bridge
Across
Christiana River

Designed by
Keller and Harrington ~ Consulting Engineers
Chicago, Ill.

Date ~ 9-10-28
Scale: 1/8" = 1'-0"

GENERAL PLAN

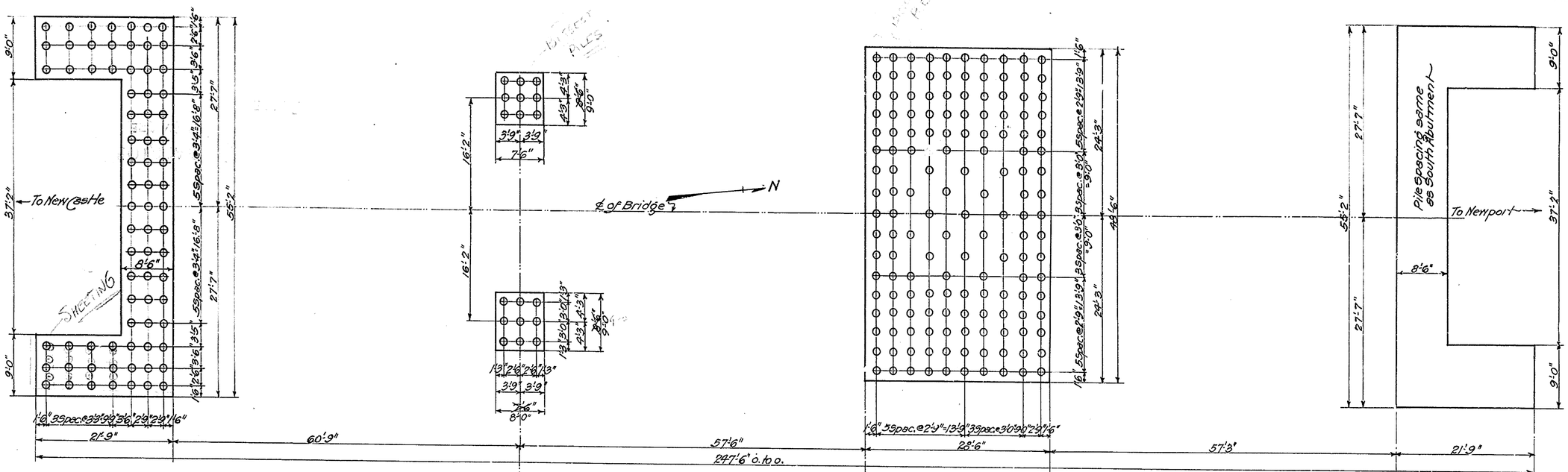
1262-A1

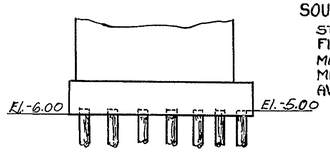
M.L.W. El. -1.8

ROUTE	CONTRACT	COUNTY	SHEET
	103	NEW CASTLE	

PILE PLAN AND FENDER ~ NEWPORT BRIDGE

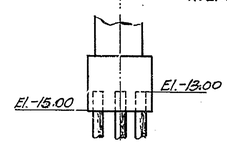
FED ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
10	DEL.	48 A	1928		





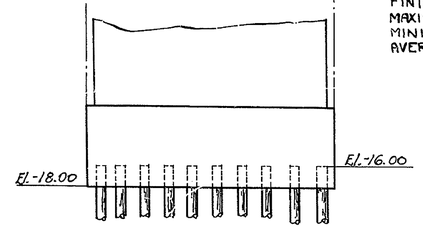
South Abutment

SOUTH ABUTMENT
STARTED DRIVING 2/19/29
FINISHED DRIVING 2/20/29
MAXIMUM LENGTH 20'-0"
MINIMUM LENGTH 16'-0"
AVERAGE LENGTH 18.7'



Pier No 1
FOOTING POURED

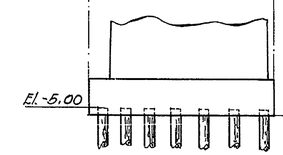
REST PIER
STARTED DRIVING 4/18/29
FINISHED DRIVING 4/18/29
MAXIMUM LENGTH 22'-0"
MINIMUM LENGTH 13'-0"
AVERAGE LENGTH 18.6'



Pier No 2
FOOTING POURED 2/25, 3/1, & 3/3/29

BASCULE PIER
STARTED DRIVING 2/12/29
FINISHED DRIVING 2/18/29
MAXIMUM LENGTH 20'-0"
MINIMUM LENGTH 13'-0"
AVERAGE LENGTH 17.2'

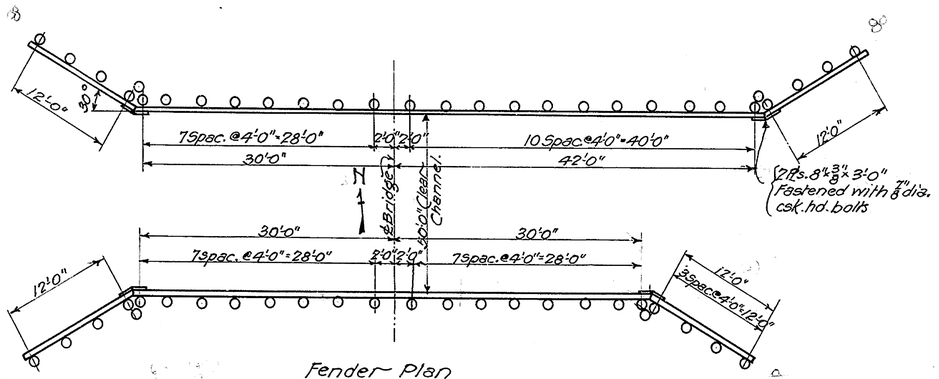
To piles of old structure never pulled
Elev of cut off = -17.0



North Abutment

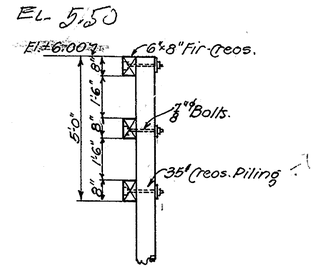
NORTH ABUTMENT
STARTED DRIVING 1/4/29
FINISHED DRIVING 1/10/29
MAXIMUM LENGTH 25'-0"
MINIMUM LENGTH 16'-0"
AVERAGE LENGTH 23.2'

Footing Poured 1/12 & 1/13/29



Fender Plan

SEE FENDER PLAN
MARCH - 1929



Fender Detail
Scale 3/8" = 1'-0"

2.25 M.Ft. B.M. ± TIMBER

PILE LIST

No	LENGTH	LOCATION
75		SOUTH ABUTMENT
18	—	PIER No 1
150		PIER No 2
75		NORTH ABUTMENT
55		FENDER
373±		TOTAL

General Notes

Piling in fenders to be creosoted.
Other piling to be untreated.
Fender piling to be at least 15" at bottom end, and 9" at tip.
Other piles to be in accordance with the specifications.
Foundation piles to be driven until they will sustain a load of 18 tons.
Wrap cluster piles four times around with 1/2" cable using necessary clips and staples.
The regulations made by the U.S. War Dept. concerning floating equipment and construction materials in navigable streams shall be complied with.

CONTRACT 103
DELAWARE
STATE HIGHWAY DEPARTMENT
NEWPORT BRIDGE
ACROSS
CHRISTIANA RIVER

Approved A. G. Livingston
Bridge Engineer

DESIGNED BY
KELLER AND HARRINGTON ~ CONSULTING ENGINEERS
CHICAGO, ILL.

DATE - 9-10-28

SCALE 1/8" = 1'-0"

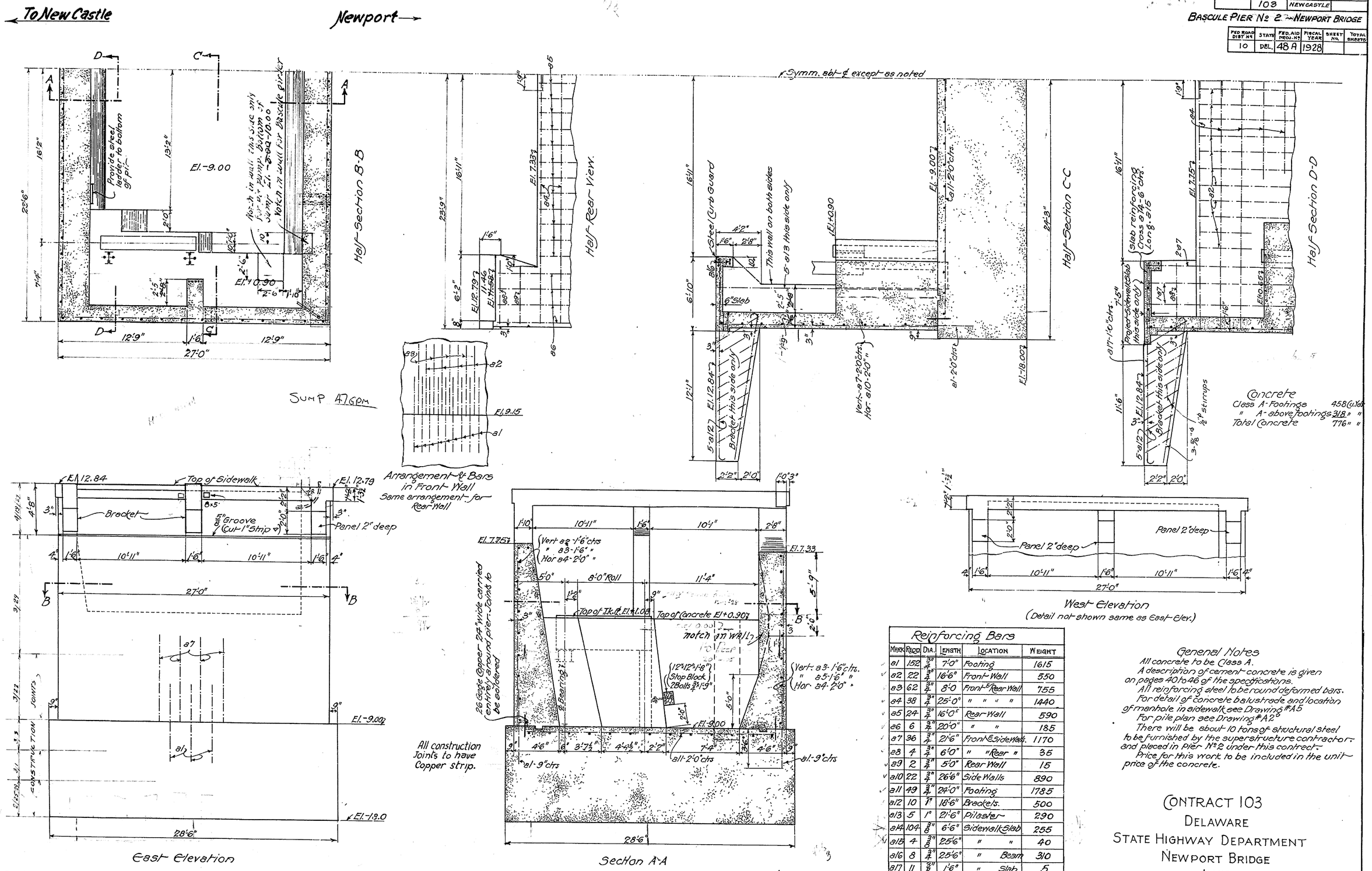
PILE PLAN AND FENDER

1262-A2

ROUTE	CONTRACT	COUNTY	SHEET
	103	NEWCASTLE	

BASCULE PIER No 2 — NEWPORT BRIDGE

FED ROAD DIST No	STATE	FED. AID PROJ. No	FISCAL YEAR	SHEET No.	TOTAL SHEETS
10	DEL.	48 A	1928		



POURED CONCRETE
FOOTING - 2/25/29, 3/1/29 & 3/3/29
ABOVE FTGS 3/22/29, 3/29/29 & 4/19/29.

Reinforcing Bars					
MARK	REQD.	DIA.	LENGTH	LOCATION	WEIGHT
a1	152	3/4"	7'-0"	Footing	1615
a2	22	3/4"	16'-6"	Front Wall	550
a3	62	3/4"	8'-0	Front & Rear Wall	755
a4	38	3/4"	25'-0"	" " " "	1440
a5	24	3/4"	16'-0"	Rear Wall	590
a6	6	3/4"	20'-0"	" "	185
a7	36	3/4"	21'-6"	Front & Side Walls	1170
a8	4	3/4"	6'-0"	" " Rear "	35
a9	2	3/4"	5'-0"	Rear Wall	15
a10	22	3/4"	26'-6"	Side Walls	890
a11	49	3/4"	24'-0"	Footing	1785
a12	10	1"	18'-6"	Brackets.	500
a13	5	1"	21'-6"	Pilaster	290
a14	104	3/8"	6'-6"	Sidewalk Slab	255
a15	4	3/8"	25'-6"	" "	40
a16	8	3/4"	25'-6"	" Beam	310
a17	11	3/8"	1'-6"	" Slab	5

General Notes

All concrete to be Class A.

A description of cement concrete is given on pages 40 to 46 of the specifications.

All reinforcing steel to be round deformed bars.

For detail of concrete balustrade and location of manhole in sidewalk see Drawing #A5

For pile plan see Drawing #A2

There will be about 10 tons of structural steel to be furnished by the superstructure contractor and placed in Pier No 2 under this contract.

Price for this work to be included in the unit price of the concrete.

CONTRACT 103
DELAWARE
STATE HIGHWAY DEPARTMENT
NEWPORT BRIDGE
ACROSS
CHRISTIANA RIVER

Approved A. G. Livingston
Bridge Engineer

DESIGNED BY
KELLER AND HARRINGTON ~ CONSULTING ENGINEERS
CHICAGO, ILL.

DATE - 9-10-28

SCALE 1/4" = 1'-0"

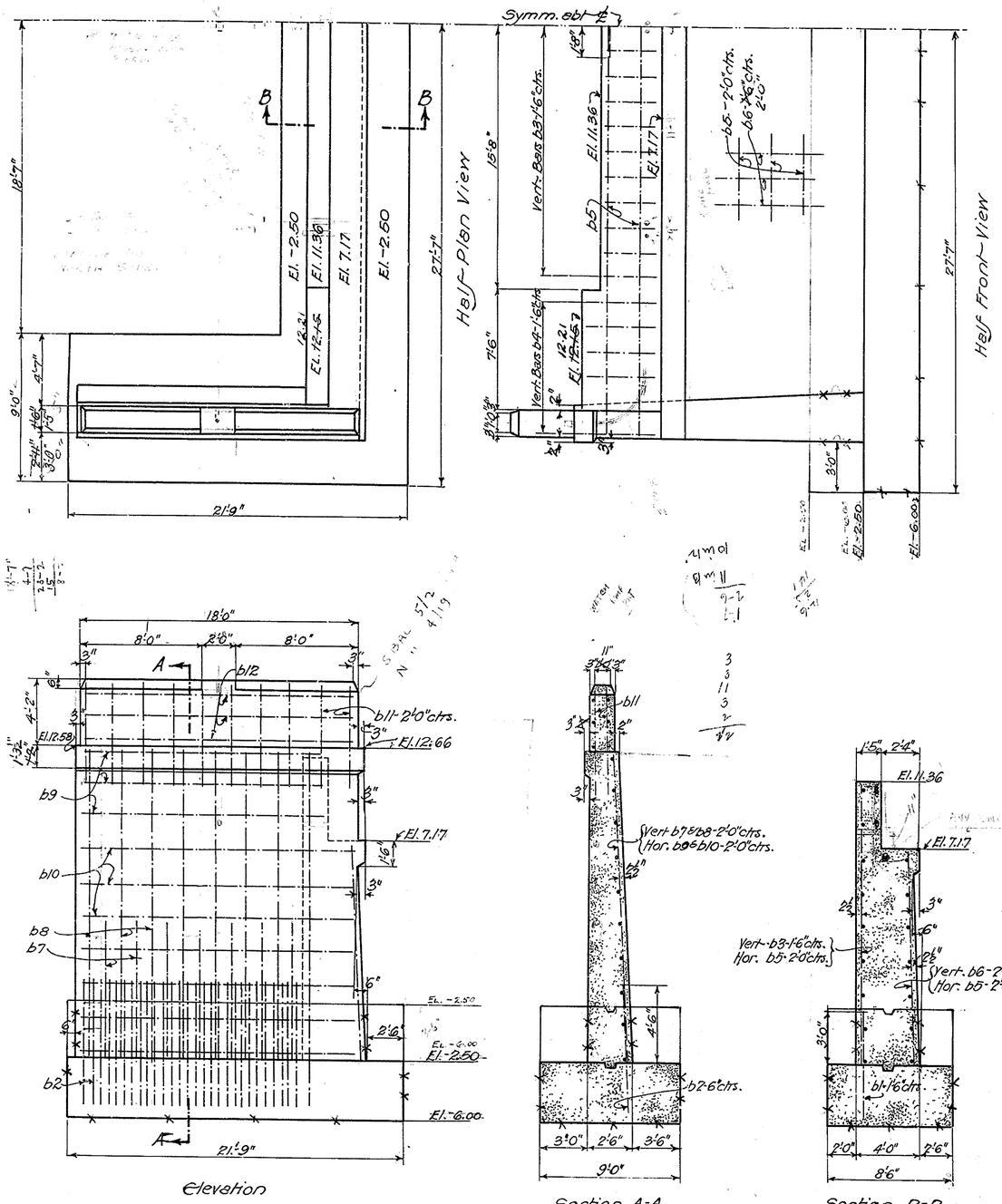
BASCULE PIER No 2

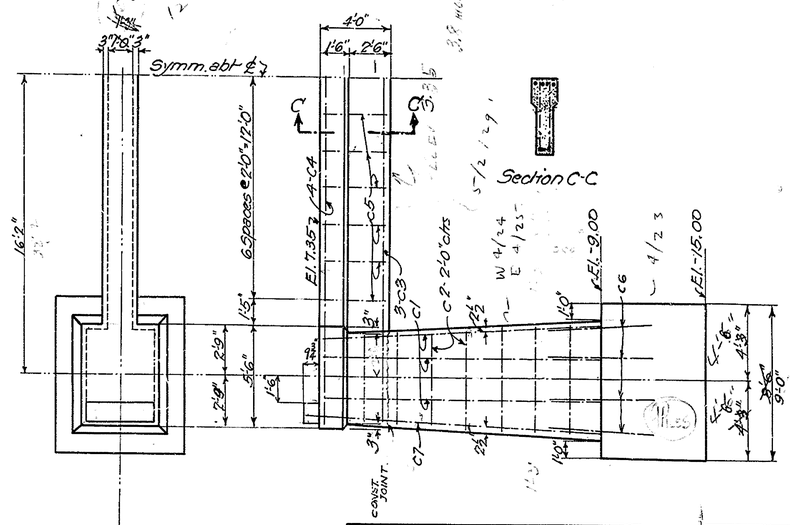
1262-A3

ROUTE	CONTRACT	COUNTY	SHEET
	103	NEWCASTLE	

ABUTMENTS AND PIER No 1 - NEWPORT BRIDGE.

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
10	DEL.	48A	1928		





A PRINT SENT TO N.M.L 5-3-1929

① ELEV IN RED ARE THEY O.K.

② HOW ABOUT 1'-3" ON PIER

Reinforcing Bars for One Abutment - 2 Req'd.					
MARK	REQ'D	DIA.	LENGTH	LOCATION	WEIGHT
b1	33	3/4"	6'-0"	Footing	300
b2	56	3/4"	7'-6"	"	640
b3	21	3/4"	13'-6"	Cross Wall	430
b4	12	3/4"	14'-0"	" "	~~730~~ 252#
b5	32	1/2"	26'-0"	" "	560
b6	26	1/2"	9'-0"	" "	155
b7	14	3/4"	8'-0"	Wing Wall	170
b8	14	3/4"	14'-6"	" "	305
b9	6	1/2"	16'-0"	" "	65
b10	14	1/2"	18'-0"	" "	170
b11	40	1/2"	6'-0"	Balustrade	160
b12	12	1/2	17'-6"	"	140

TOTAL WT. 3324#

EXTRA IN CORNERS 34

341 8#

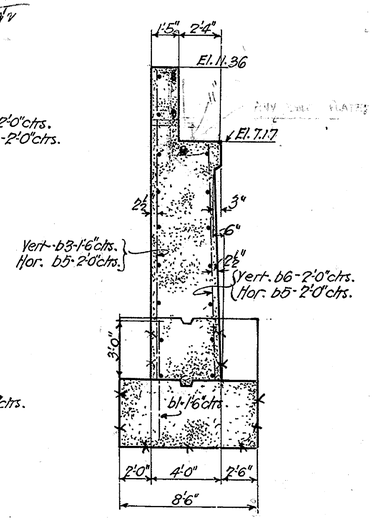
Reinforcing Bars for Pier No 1.					
MARK	REQ'D	DIA.	LENGTH	LOCATION	WEIGHT
C1	14	3/4"	16'-0"	Body	340
C2	64	1/2"	7'-6"	" (see detail)	325
C3	3	7/8"	37'-0"	Cross Strut	230
C4	8	3/4"	20'-6"	" "	250
C5	13	1/2"	8'-0"	" " (see detail)	70
C6	20	3/4"	6'-0"	Footing	180
C7	6	3/4"	17'-0	Body	155

TOTAL WT. ~~1683#~~ 1529

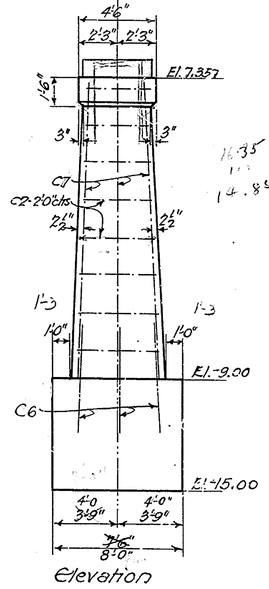
Concrete Class A - Footings 212 cu. yds
" " A - above Footings 262 " "
" " AA - Balustrade 16 " "
Total Concrete 490 " "
Concrete includes total amount for two abutment and one pier.

Elevation

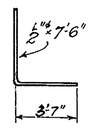
Section A-A



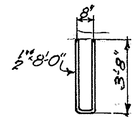
Section B-B



Elevation



Bars C2
(See Table)



Bars C5
(See Table)

REST PIER
POURED FOOTING 4/23/29
" WEST PIER 4/24/29
" EAST " 4/25/29
" BEAM 5/2/29

General Notes

All concrete to be Class A except balustrade.
Balustrade to be Class AA.
A description of concrete masonry is given on pages 40 to 46 of the specifications.
All reinforcing steel to be round deformed bars.
For Pile Plan see Drawing #A2.
Concrete below high water to be painted.

POURED CONCRETE
NO. ABUT. ABOVE FOOTINGS 1/28/29
FOOTINGS 1/12/29 & 1/15/29
SO. ABUT. ABOVE FOOTINGS 3/12/29
FOOTINGS 2/27/29
SOUTH ABUTMENT FOOTING DEEPENED 1 FT.

Abutment
(2 Req'd.)

Pier No 1
(one Req'd.)

Pier Hit 9/6-1947
See Drawing Sent 1947
V.J. 9/8-47

Approved A. G. Livingston
Bridge Engineer

CONTRACT 103
DELAWARE
STATE HIGHWAY DEPARTMENT
NEWPORT BRIDGE
ACROSS
CHRISTIANA RIVER

DESIGNED BY
KEILER AND HARRINGTON ~ CONSULTING ENGINEERS
CHICAGO, ILL.

DATE - 9-10-28

SCALE 1/4" = 1'-0"

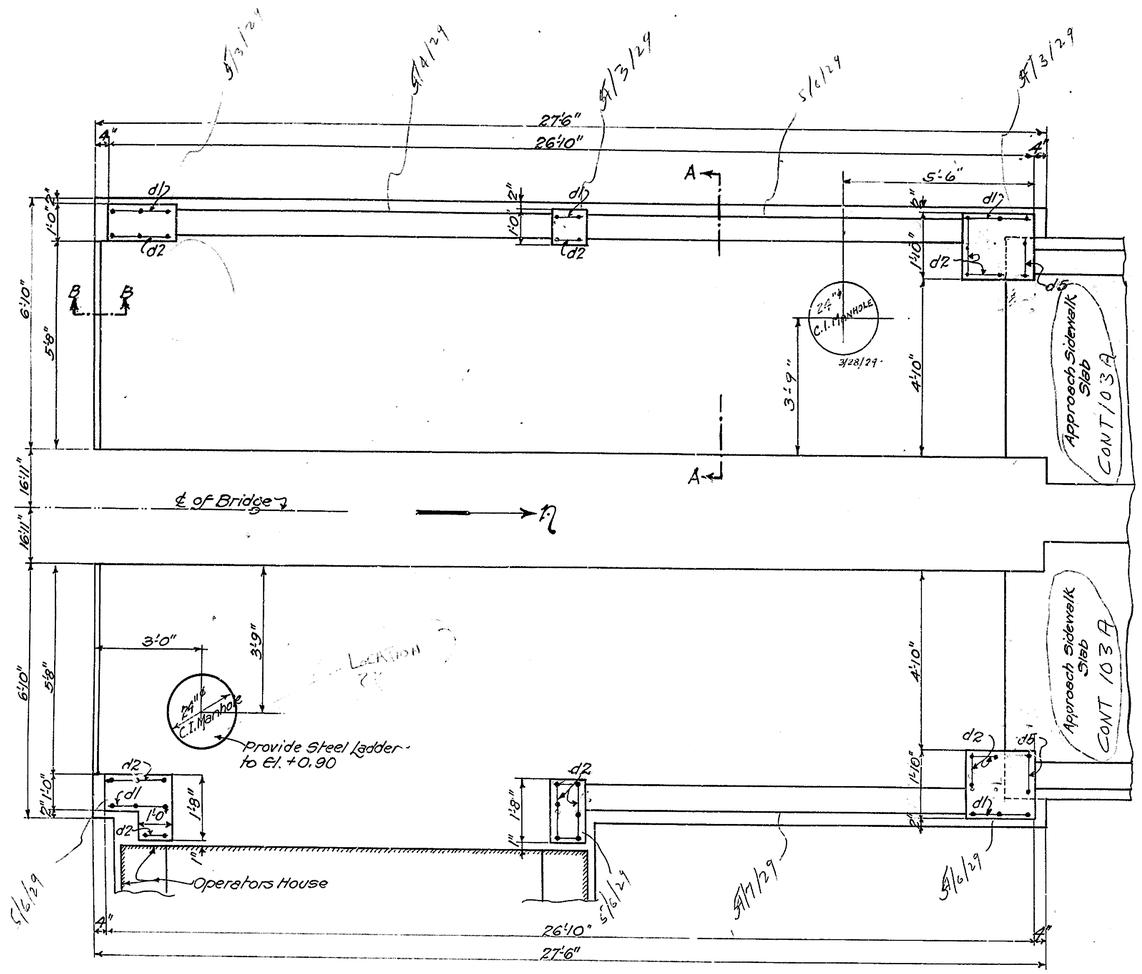
ABUTMENTS AND PIER No 1

1262-A4

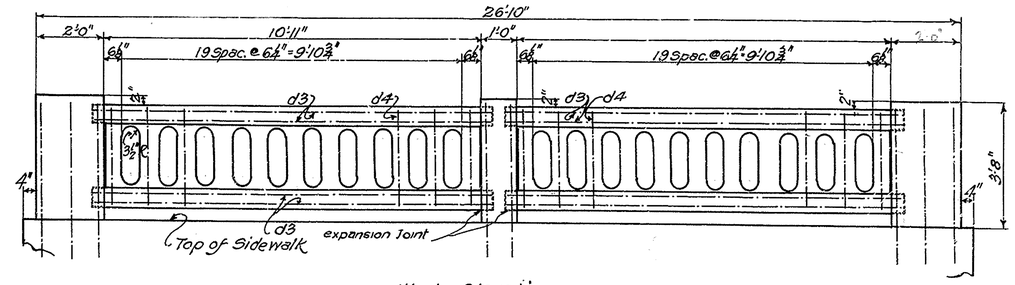
ROUTE	CONTRACT	COUNTY	SHEET
	103	NEW CASTLE	

BALUSTRADE FOR PIER No. 2 ~ NEWPORT BRIDGE

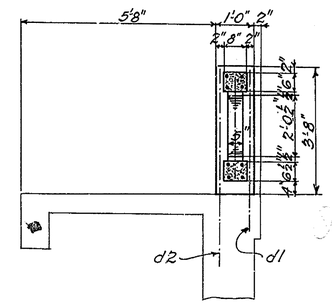
FED. PROJ. DIST. No.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET No.	TOTAL SHEETS
10	DEL.	48A	1928		



Plan View



West Elevation

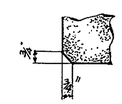


Section A-A

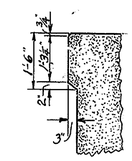
Reinforcing Bars					
MARK	REQ'D	DIA.	LENGTH	LOCATION	WEIGHT
d1	13	½"	4'-3"	Posts	35
d2	22	½"	5'-3"	"	85
d3	24	½"	13'-0"	Rail	210
d4	33	½"	2'-9"	"	60
d5	4	½"	3'-3"	Posts.	10

Concrete Class A* 9 Cu. Yds.

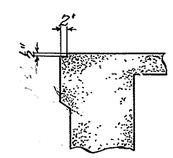
3



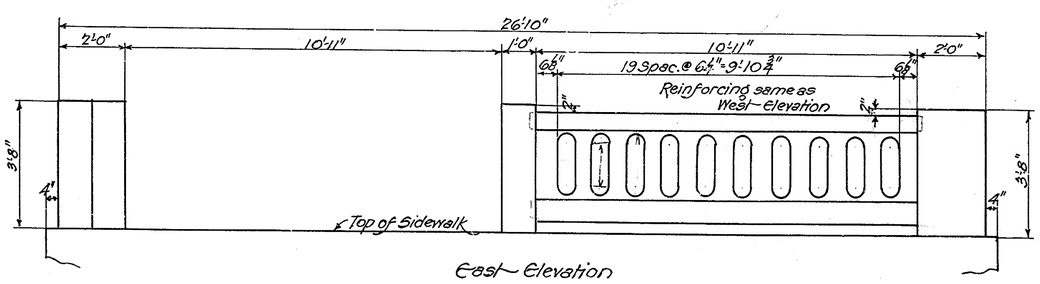
All corners to be finished as shown above.



All copings shall be finished as shown above



Section B-B



East Elevation

CONCRETE
SIDEWALK POURED 4/19/29
BALUSTRADE
POSTS POURED 5/3/29 & 5/6/29
RAILS POURED 5/4/29, 5/6/29 & 5/7/29.

General Notes
All concrete to be Class A*
A description of Cement-Concrete is given on Pages 40 to 46 of the specifications.
All reinforcing steel to be round deformed bars.
Extreme care will be required on the alignment of the balustrade.

CONTRACT 103
DELAWARE
STATE HIGHWAY DEPARTMENT
NEWPORT BRIDGE
ACROSS
CHRISTIANA RIVER

Approved A. H. Burrington
Bridge Engineer

DESIGNED BY
KELLER AND HARRINGTON — CONSULTING ENGINEERS
CHICAGO, ILL.

DATE - 9-10-28

SCALE: ½" = 1'-0"

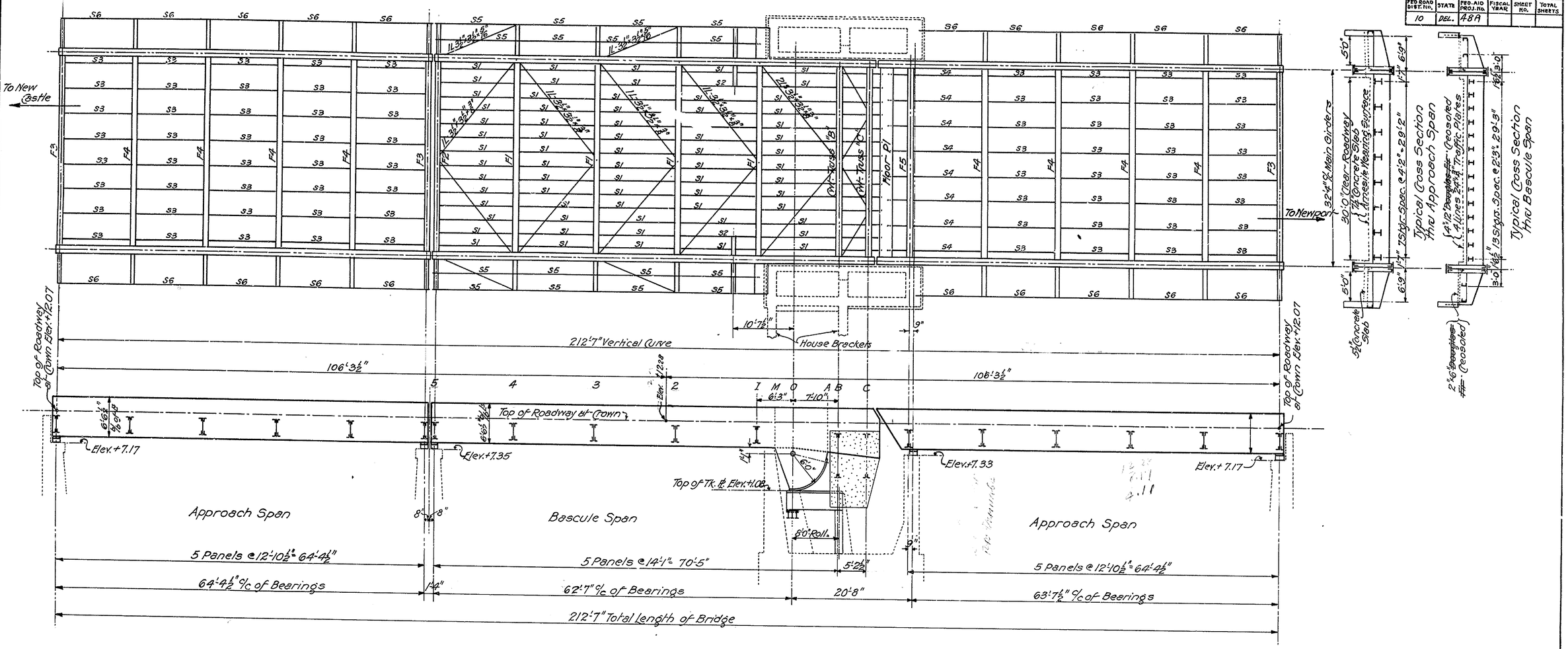
BALUSTRADE FOR PIER No. 2

1262-A5

ROUTE	CONTRACT	COUNTY	SHEET
	103A	NEW CASTLE	

STRESS SHEET

FED ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
10	DEL.	48A			



Tabulation of Stresses for Bascule Girders

Moments								Shears							
Point	Dead Load	L.L. Roadway	L.L. Sidewalk	Impact	Add for Reversals	Design Stress	Flange	Panel	Dead Load	L.L. Roadway	L.L. Sidewalk	Impact	Add for Reversal	Design Stress	Web
4	-142	-110 +520	+122	-33 +109	143	+794	2L's 6"x6"x½"	4-5	-12	+37 -8	+9	+8 -2	11	+57	78"x⅜"
3	-508	-219 +735	+171	-66 +155	353	-1146	2L's 6"x6"x½"	3-4	-28	+24 -8	+5 -1	+6 -2	12	-59	78"x⅜"
2	-1103	-328 +647	+148	-98 +135	80	-1609	2L's 6"x6"x½" 1 Cov. Pl. 14"x½"	2-3	-44	-18	-4	-5	—	-71	78"x⅜"
1	-1937	-440	—	-176	—	-2553	2L's 6"x6"x½" 2 Cov. Pls. 14"x½"	1-2	-62	-31	-7	-7	—	-107	78"x⅜"
M	-2147	-460	—	-138	—	-2745	2L's 6"x6"x½" 2 Cov. Pls. 14"x½"	M-1	-75	-44	-9	-10	—	-138	78"x⅜"
A	-1015	-280	—	-84	—	-1379	2L's 6"x6"x½"	A-B	-234	-27	—	-8	—	-269	⅜"
B	-593	-161	—	-48	—	-802	2L's 6"x6"x½"	B-C	-114	-23	—	-7	—	-207	⅜"

Moments given in thousands of ft. lbs.
Shears given in thousands of lbs.

Tabulation of Stresses for Floor System

Moments					Shear				
Mark	Dead Load	Live Load	Impact	Total	Dead Load	Live Load	Impact	Total	Section
S1	2	29	9	40	1	12	4	17	10" C. B. @ 30#
S2	-5	+34 -14	10	50	-1	+12	+4	+15	10" C. B. @ 42#
S3	13	33	10	56	4	12	4	20	14" C. B. @ 38
S4	-5	-41	-24	-70	3	12	7	22	4L's 3½"x3½"x⅜" Web Pl. 19"x⅜"
S5	1	2	—	3	1	6	—	7	10" [@ 20#
S6	2	2	—	4	6	6	—	12	10" [@ 20#
F1	92	296	89	477	11	35	11	57	4L's 6"x6"x7/16" Web Pl. 34"x⅜"
F2	59	296	178	533	7	35	21	63	4L's 6"x6"x7/16" Web Pl. 34"x⅜"
F3	148	296	178	622	19	35	21	75	4L's 6"x6"x7/16" Web Pl. 34"x⅜"
F4	270	296	89	655	34	35	11	80	4L's 6"x6"x7/16" Web Pl. 34"x⅜"
F5	263	390	234	887	32	46	27	105	4L's 6"x6"x7/16" Web Pl. 38"x7/16"

Moments given in thousands of ft. lbs.
Shears given in thousands of lbs.

Approach Girder

	Max. Moment	Max. Shear
Dead Load	1738000'#	90000#
L.L. Roadway	730000'#	36000#
L.L. Sidewalk	174000'#	9000#
Impact	152000'#	8000#
Total	2794000'#	145000#

Flange - 2L's 6"x6"x⅝" ~ 2 Cov. Pls. 14"x½"
Web " - 78"x⅜"

General Notes

Specifications:- American Association of State Highway Officials Standard Specifications for Highway Bridges 1925, in conjunction with those accompanying these plans.
Live Load:- Class H15.

Approved A. H. Livingston 12-13-1928 Bridge Engineer

Approved [signature] 12-14-1928 Chief Engineer

CONTRACT 103A
DELAWARE
STATE HIGHWAY DEPARTMENT
NEWPORT BRIDGE
ACROSS
CHRISTIANA RIVER

DESIGNED BY
KELLER AND HARRINGTON — CONSULTING ENGINEERS
CHICAGO, ILL.

DATE 11-17-28

SCALE: ⅛" = 1'-0"

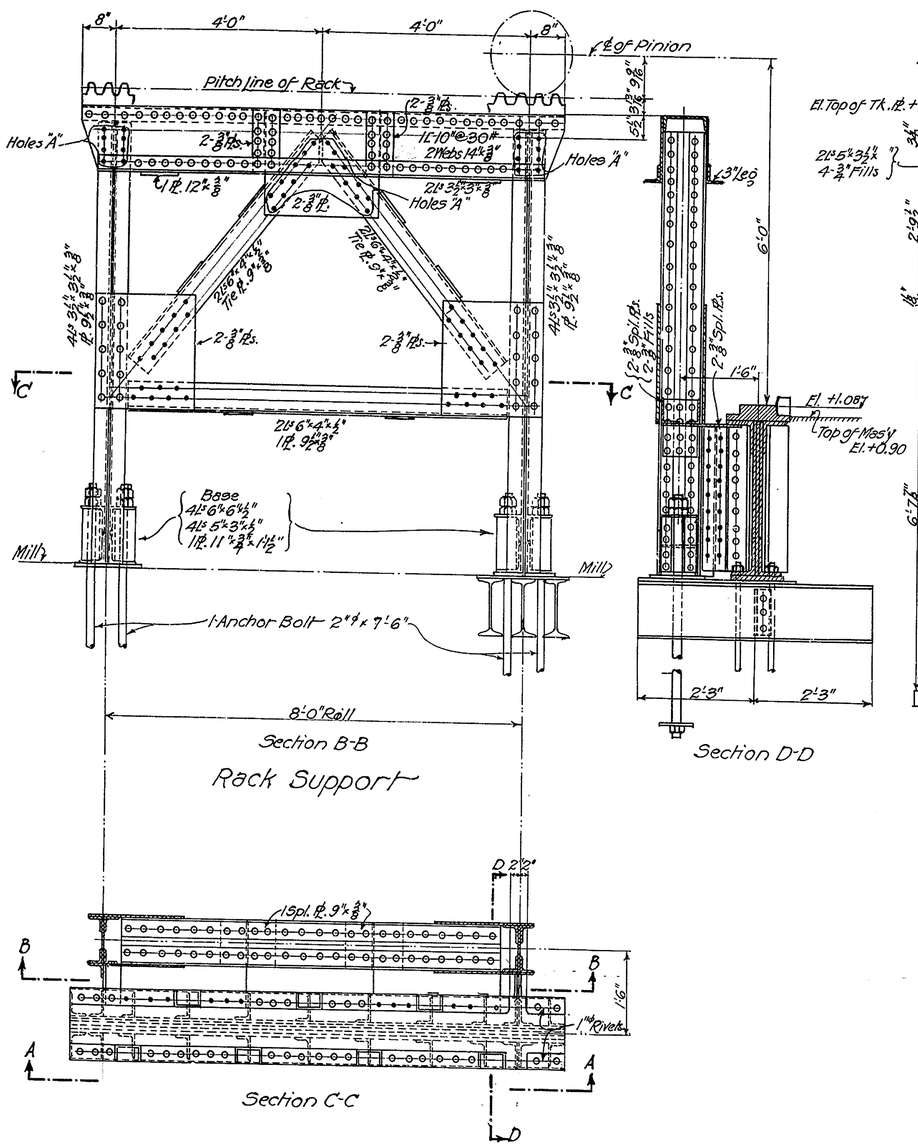
STRESS SHEET

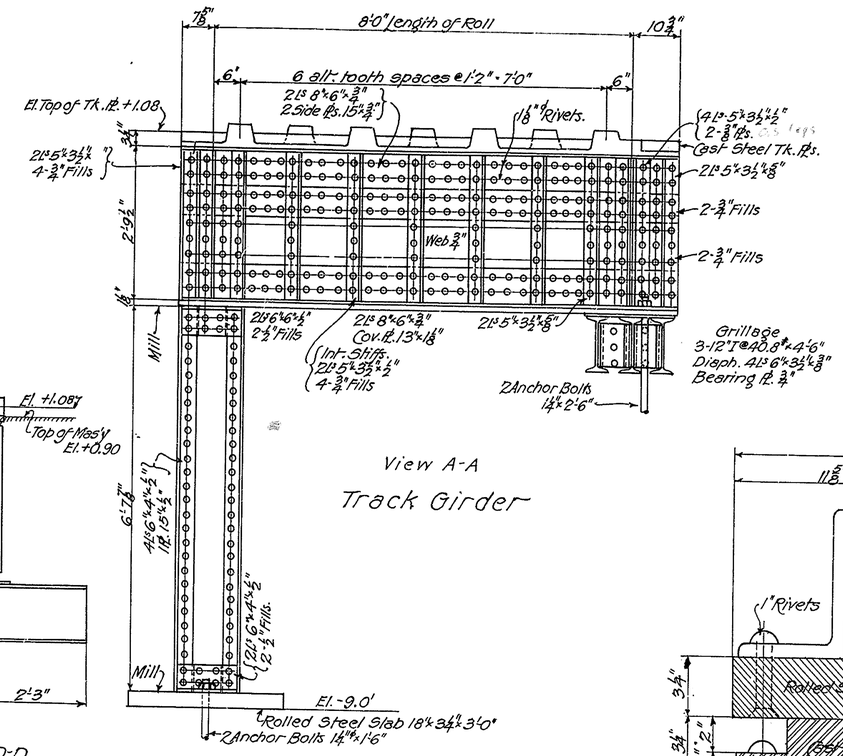
1262-B1

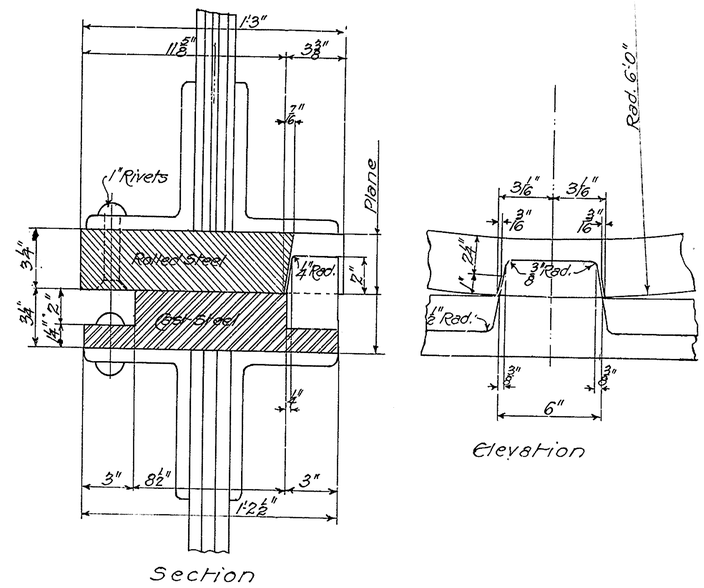
ROUTE	CONTRACT	COUNTY	SHEET
	103A	NEW CASTLE	

TRACK GIRDERS & RACK SUPPORT

FED. ROAD DIST. No.	STATE	FED. AID PROJ. No.	FISCAL YEAR	SHEET No.	TOTAL SHEETS
10	DEL.				







Enlarged Detail of Track Plates
Scale 3"=1'-0"

General Notes

Rivets $\frac{7}{8}$" dia. unless noted.
Holes "A" to be sub-punched $\frac{9}{16}$" in shop and temporarily bolted in field with $\frac{7}{8}$"ϕ bolts.
After bridge has been operated and racks adjusted in field ream to $\frac{15}{16}$"ϕ and rivet with $\frac{7}{8}$" rivets.
See special clause in specifications governing rack supports and track girders.
All steel in bedded in concrete not to be painted or oiled.

C.L.K. 12-15-1928
ALL THIS TO BE PAID BY SUB STRUCTURE CONTRACTOR

CONTRACT 103A
DELAWARE
STATE HIGHWAY DEPARTMENT
NEWPORT BRIDGE
ACROSS
CHRISTIANA RIVER

Approved A. J. Livingston
Bridge Engineer

Approved
Chief Engineer

DESIGNED BY
KELLER AND HARRINGTON ~ CONSULTING ENGINEERS
CHICAGO, ILL.

DATE 11-17-'28

SCALE $\frac{3}{4}$"=1'-0"

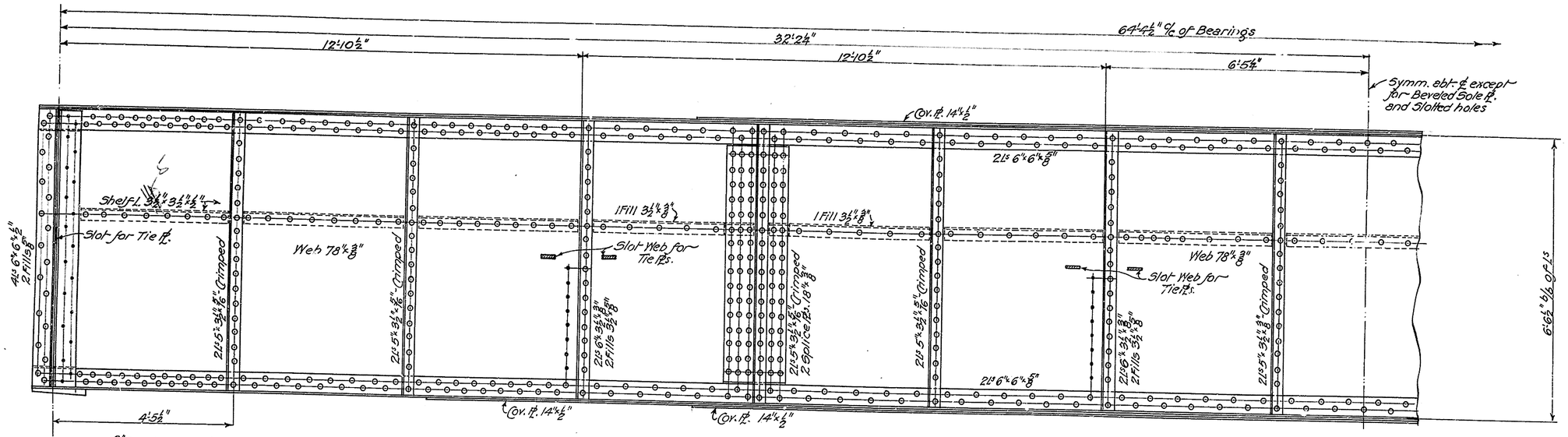
TRACK GIRDERS & RACK SUPPORT

1262-B2

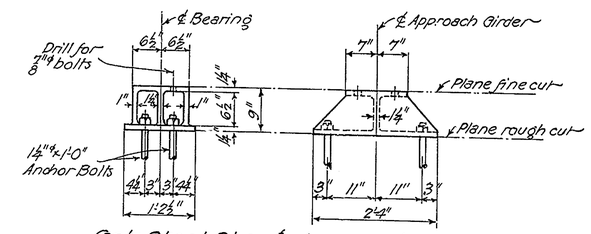
ROUTE	CONTRACT	COUNTY	SHEET
	103A	NEW CASTLE	

APPROACH GIRDERS

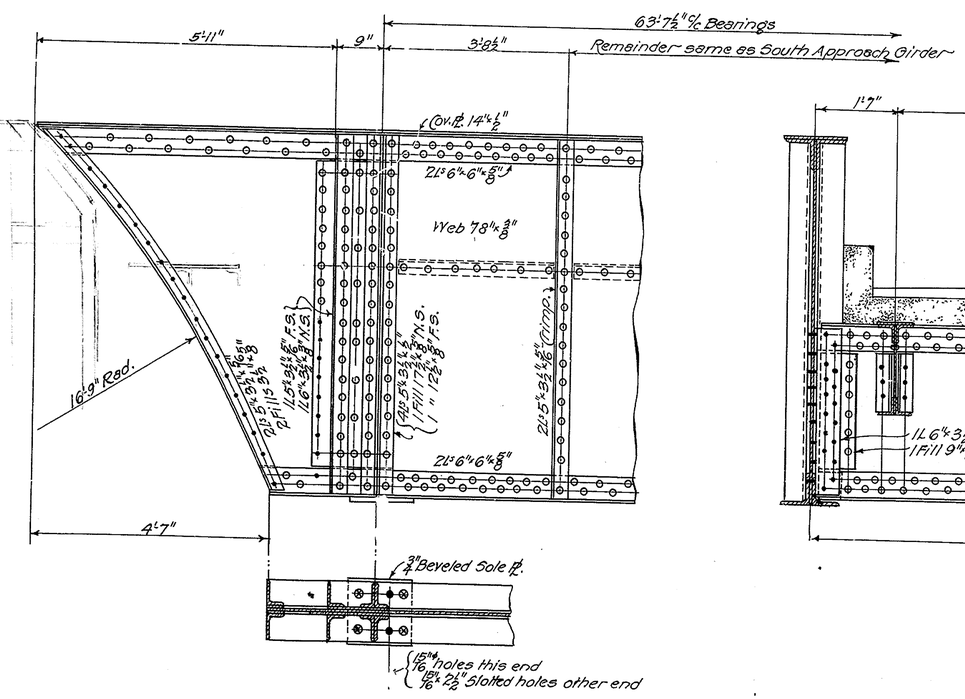
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET No.	TOTAL SHEETS
10	DEL.				



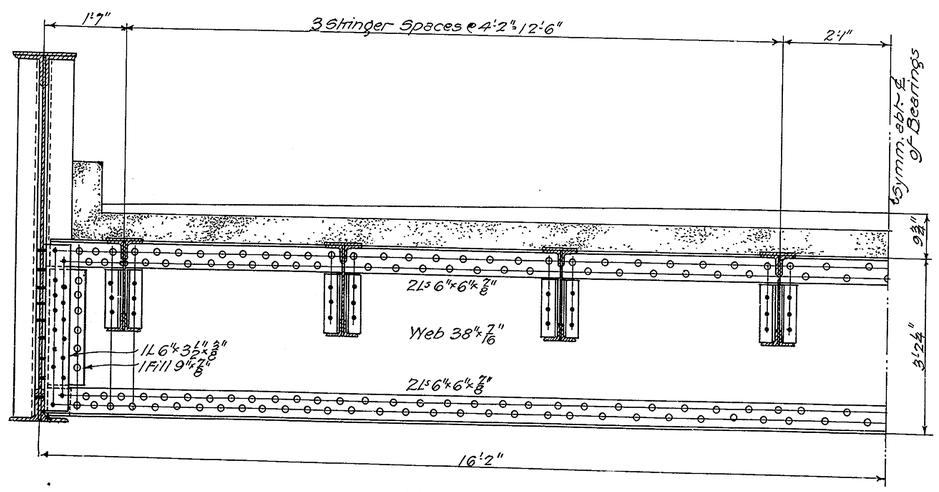
South Approach Girder



Cast Steel Shoe ℄ Approach Girders.
8 Req'd.



North Approach Girder



Floor Beam F5

General Note
Rivets ⅞" diameter.

Approved A. G. Livingston
Bridge Engineer

Approved .....
Chief Engineer

CONTRACT 103A
DELAWARE
STATE HIGHWAY DEPARTMENT
NEWPORT BRIDGE
ACROSS
CHRISTIANA RIVER

DESIGNED BY
KELLER AND HARRINGTON ~ CONSULTING ENGINEERS
CHICAGO, ILL.

DATE 11-17-'28

SCALE: ¾" = 1'-0"

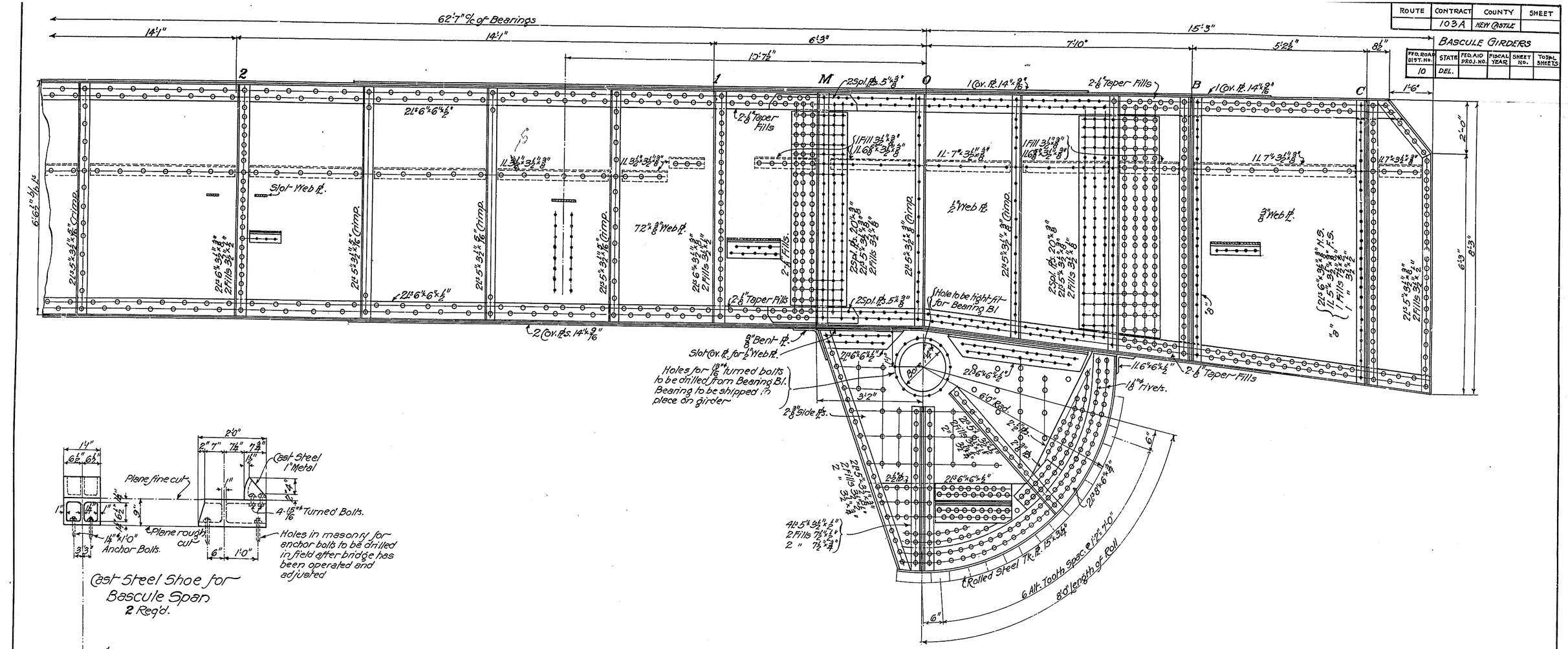
APPROACH GIRDERS

1262-B3

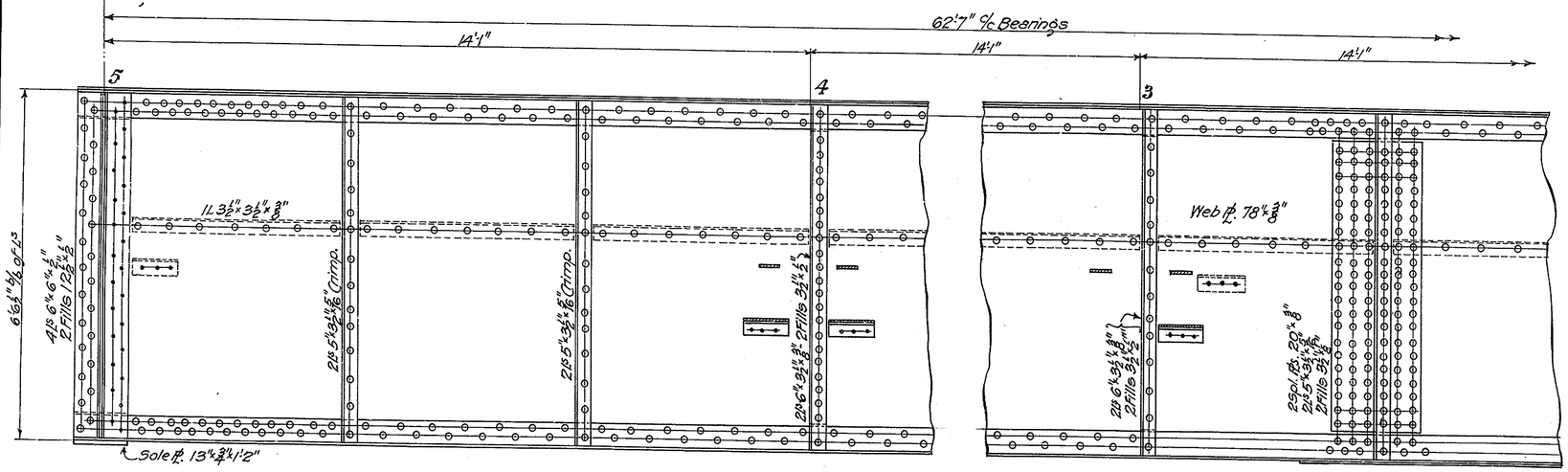
ROUTE	CONTRACT	COUNTY	SHEET
	103A	NEW CASTLE	

BASCULE GIRDERS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEARS	SHEET NO.	TOTAL SHEETS
10	DEL.				



Cast Steel Shoe for Bascule Span
2 Req'd.



General Notes
Rivets ⅞" dia. unless noted.
See special clause in specifications governing Segmental Girders.

Approved A. J. Livingston
Bridge Engineer

Approved
Chief Engineer

CONTRACT 103A
DELAWARE
STATE HIGHWAY DEPARTMENT
NEWPORT BRIDGE
ACROSS
CHRISTIANA RIVER

DESIGNED BY
KELLER AND HARRINGTON — CONSULTING ENGINEERS
CHICAGO, ILL.

DATE 11-17-'28

SCALE: ¾" = 1'-0"

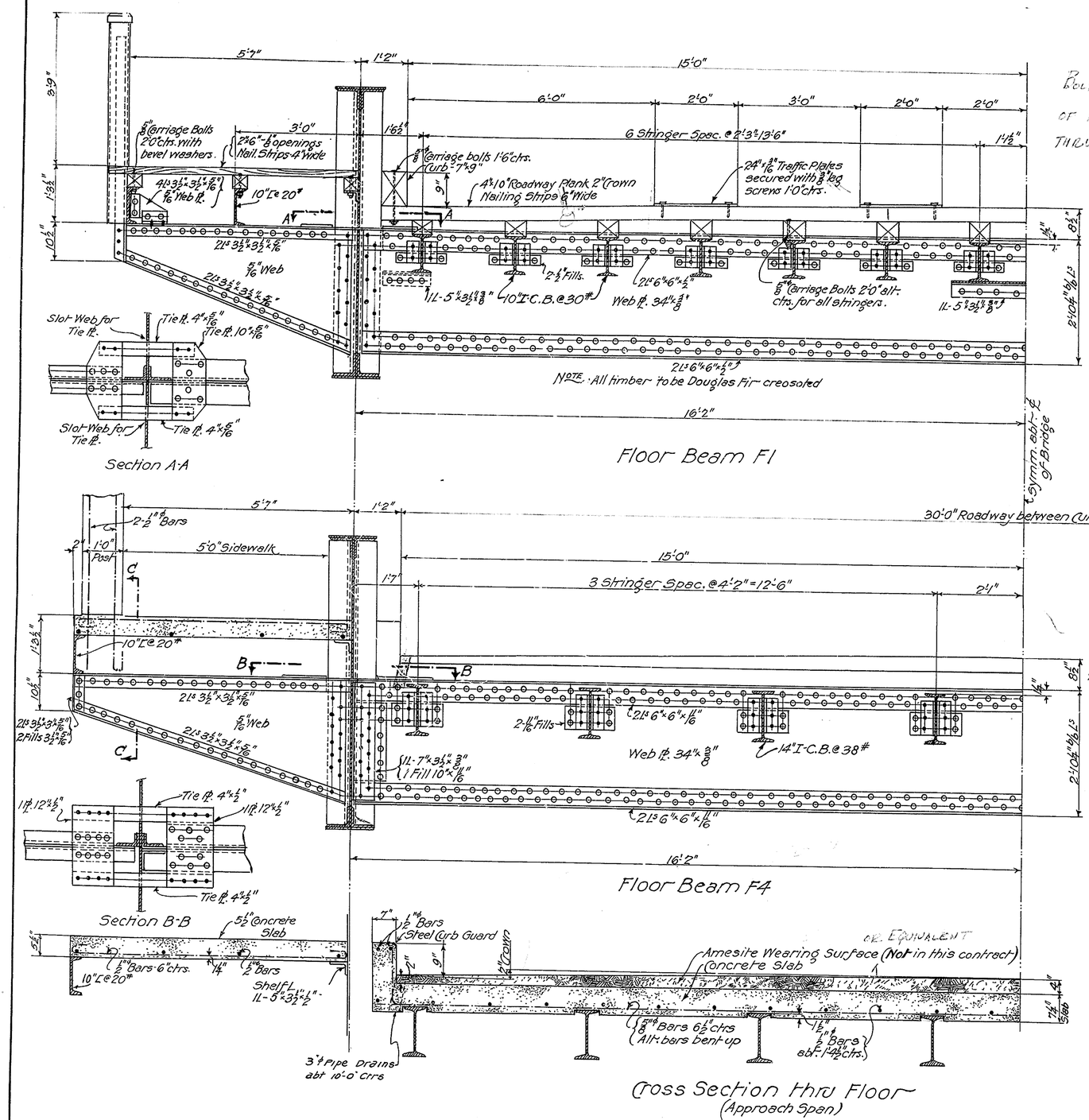
BASCULE GIRDERS

1262-B4

ROUTE	CONTRACT	COUNTY	SHEET
	103A	NEW CASTLE	

FLOOR BEAMS & BRACKETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
10	DEL.				



Floor Beam F4

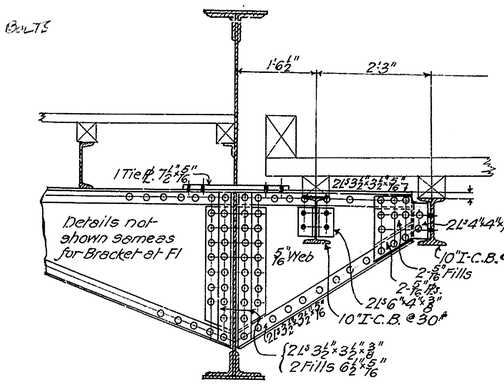
Floor Beam F1

Section A-A

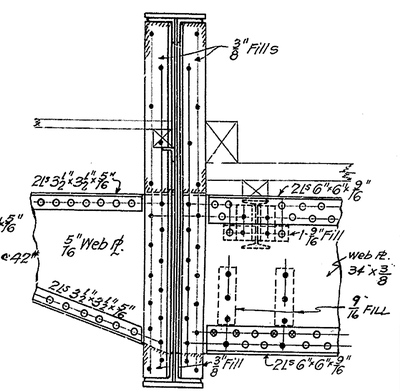
Section B-B

Cross Section thru Floor (Approach Span)

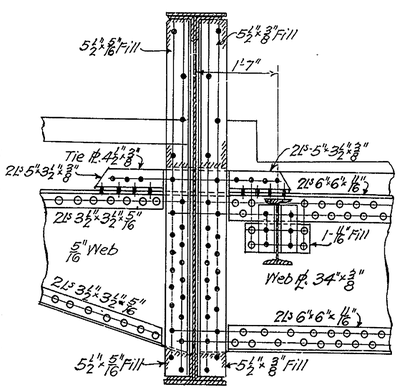
Bolt down each end of plates with 6 bolts thru 4" planks



Sidewalk Bracket Near Point 1
(Bascule Span)



Floor Beam F2



Floor Beam F3

General Notes

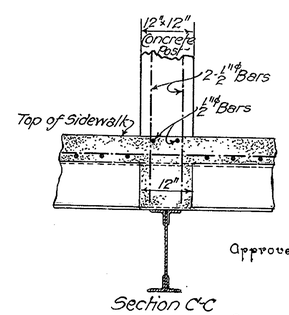
Rivets ⅞" dia. except in flanges of 10 Is. These to be ¾" dia.

All reinforcing steel to be round deformed bars.

Concrete for Roadway and Sidewalk Slabs to be Class A.

A description of cement concrete is given on pages 40 to 46 of the specifications.

All reinforcing steel to be lapped 50 diameters.



Section C-C

Approved A. G. Livingston
Bridge Engineer

Approved
Chief Engineer

CONTRACT 103A
DELAWARE
STATE HIGHWAY DEPARTMENT
NEWPORT BRIDGE
ACROSS
CHRISTIANA RIVER

DESIGNED BY
KELLER AND HARRINGTON — CONSULTING ENGINEERS
CHICAGO, ILL.

DATE: 11-17-'28

SCALE ¾" = 1'-0"

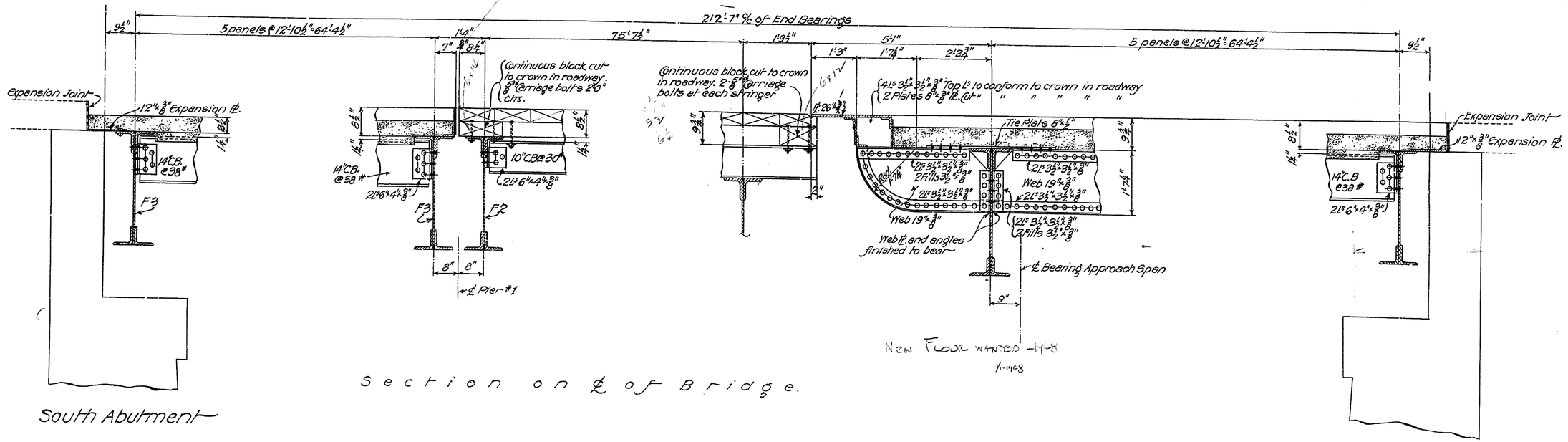
FLOOR BEAMS & BRACKETS

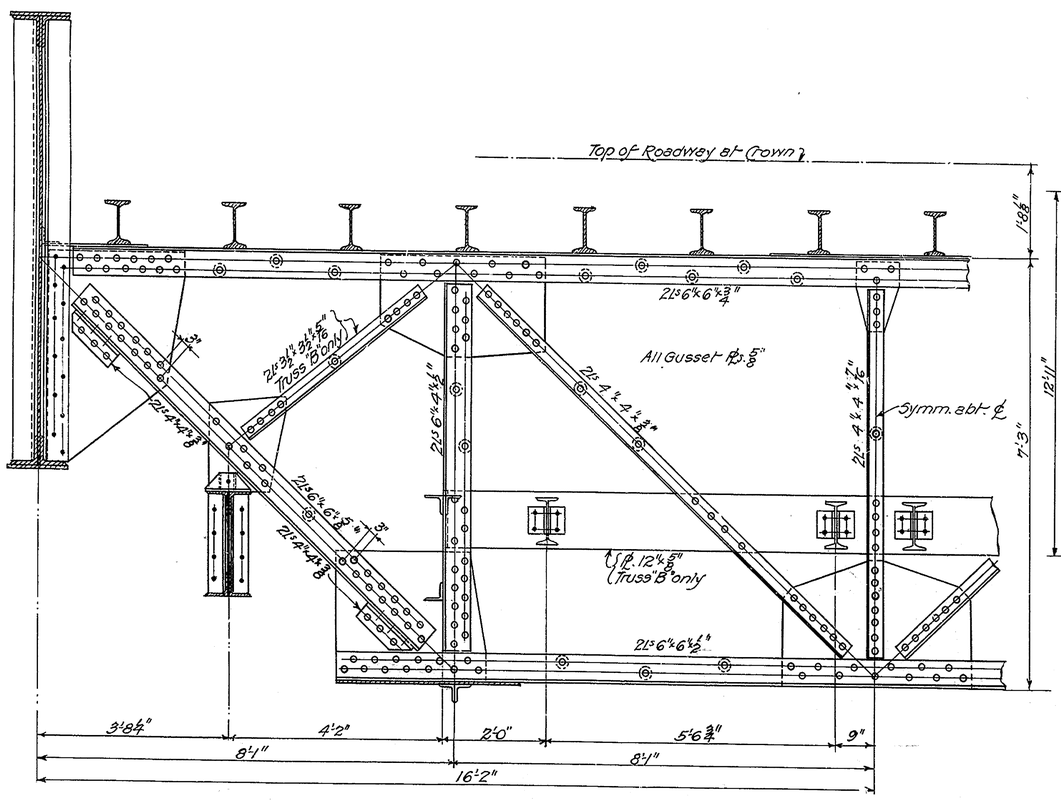
1262-B5

	103 A	NEW CASTLE	

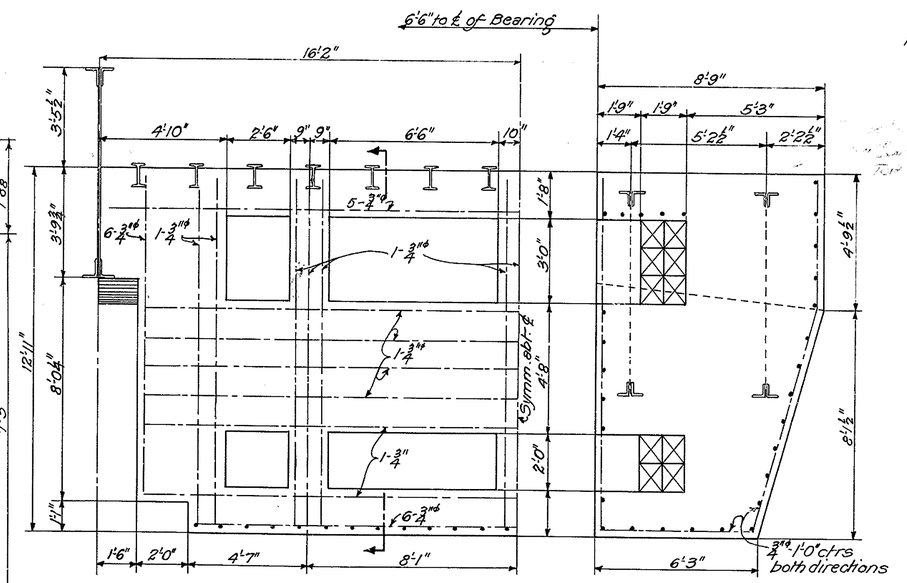
CWT. TRUSSES & STRINGERS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
10	DEL.				

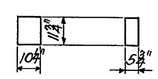




Counterweight Truss "B"
Truss "C" same as for Truss "B" except for connections for machinery floor and lateral bracing.



Counterweight
Scale: ¾" = 1'-0"



Adjustment Block

General Notes

Counterweight to consist of 430000 lbs of concrete weighing in place 148# per cu. ft. This includes 23400# of loose adjustment blocks so placed in pockets as to balance the bridge for all position of roll.

All reinforcing steel to be round deformed bars placed 2½" from face of counterweight.

Approved A. J. Livingston Bridge Engineer

Approved ..... Chief Engineer

CONTRACT 103A
DELAWARE
STATE HIGHWAY DEPARTMENT
NEWPORT BRIDGE
ACROSS
CHRISTIANA RIVER

DESIGNED BY
KELLER AND HARRINGTON ~ CONSULTING ENGINEERS
CHICAGO, ILL.

DATE 11-17-'28 SCALE: ¾" = 1'-0"

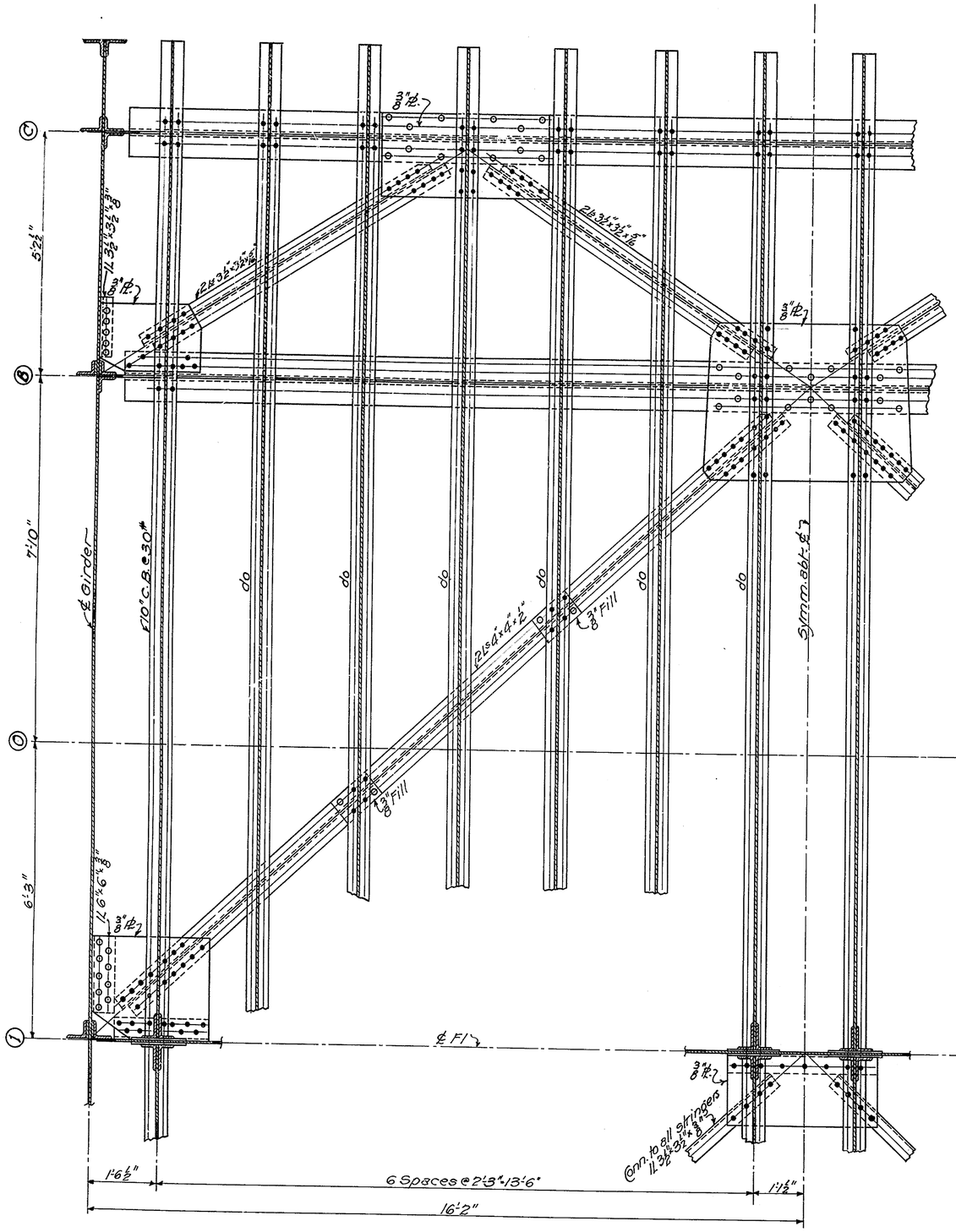
CWT TRUSSES & STRINGERS

1262-B6

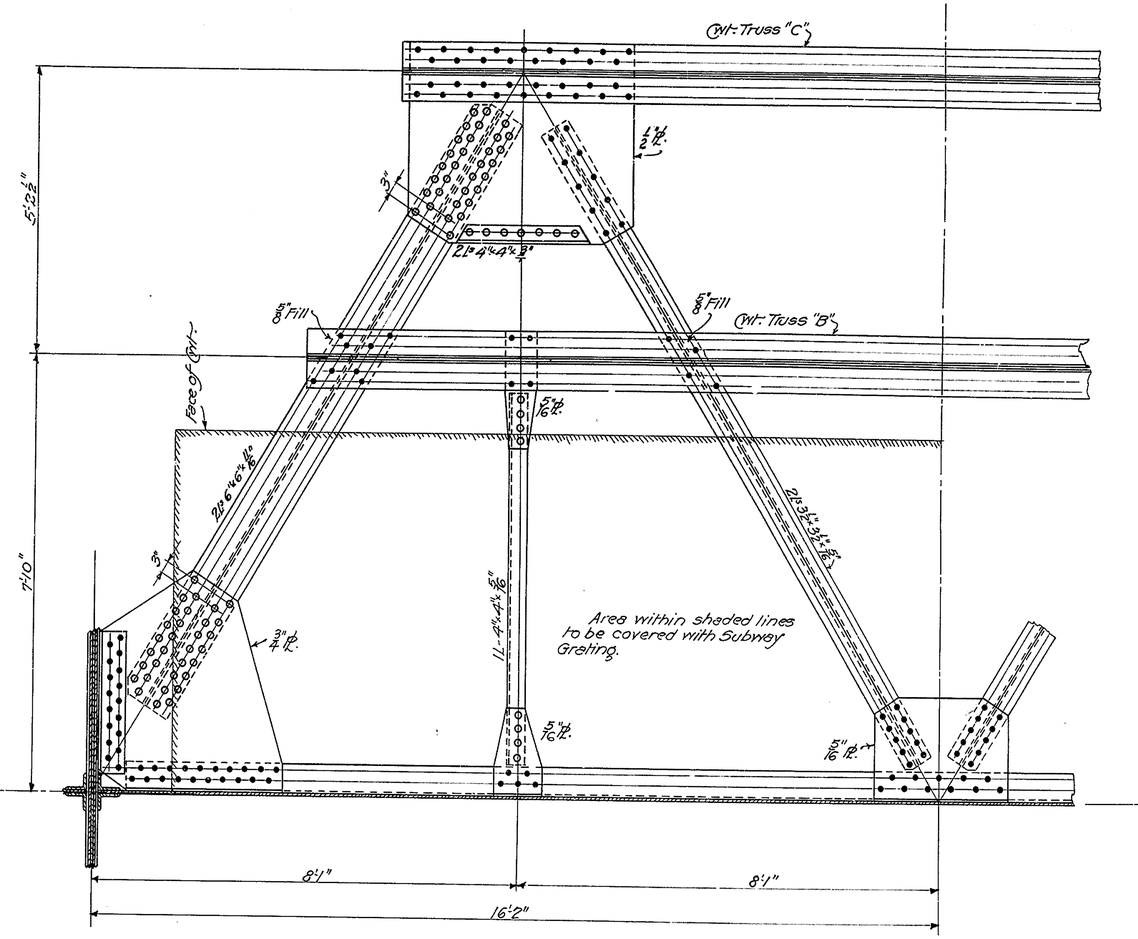
ROUTE	CONTRACT	COUNTY	SHEET
	103A	NEWCASTLE	

BASCULE SPAN BRACING

FED. ROAD DIST. Nº	STATE	FED. AID PROJ. Nº	FISCAL YEAR	SHEET No.	TOTAL SHEETS
10	DEL.				



Top Bracing



Bottom Wt. Bracing

General Notes

Rivets to be $\frac{3}{8}$" diameter.

All steel imbedded in concrete not to be painted or oiled.

Subway Grating to be 1¼" Grating, Type A3X manufactured by William F. Klemp of Chicago Ill. or equivalent.

CONTRACT 103A

DELAWARE

STATE HIGHWAY DEPARTMENT

NEWPORT BRIDGE

ACROSS

CHRISTIANA RIVER

Approved A. H. Livingston
Bridge Engineer

Approved
Chief Engineer

DESIGNED BY

KELLER AND HARRINGTON ~ CONSULTING ENGINEERS

CHICAGO, ILL.

DATE 11-17-'28

SCALE $\frac{3}{4}$" = 1'-0"

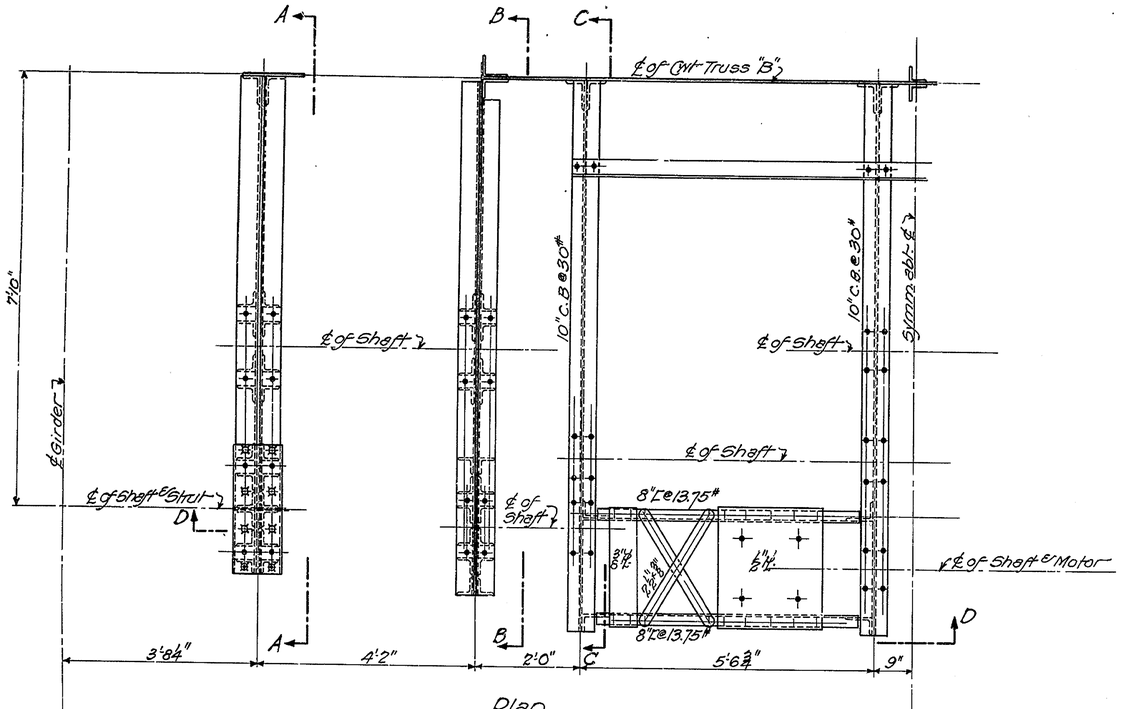
BASCULE SPAN BRACING

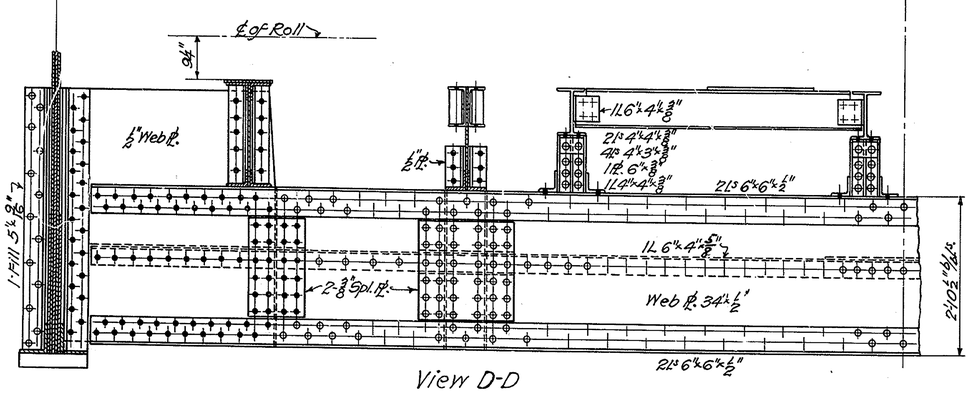
1262-B7

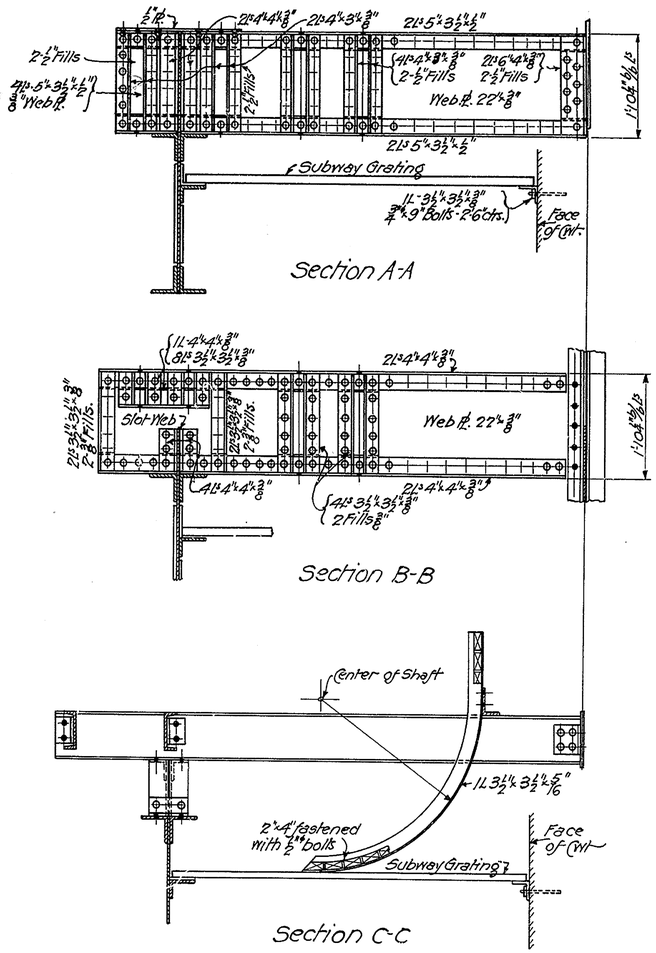
ROUTE	CONTRACT	COUNTY	SHEET
	103A	NEW CASTLE	

MACHINERY FLOOR

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
10	Del.				







General Notes

All rivets ⅞" except those in flange of 8" [s which are ¾".

All holes for machinery bearings to be drilled in field.

Subway grating to be 1¼" Grating, Type A3X manufactured by William F. Klemp of Chicago, Ill. or equivalent.

CONTRACT 103A

DELAWARE

STATE HIGHWAY DEPARTMENT

NEWPORT BRIDGE

ACROSS

CHRISTIANA RIVER

Approved A. H. Livingston Bridge Engineer

Approved ..... Chief Engineer

DESIGNED BY

KELLER AND HARRINGTON ~ CONSULTING ENGINEERS

CHICAGO, ILL.

DATE: 11-17-28

SCALE: ¾" = 1'-0"

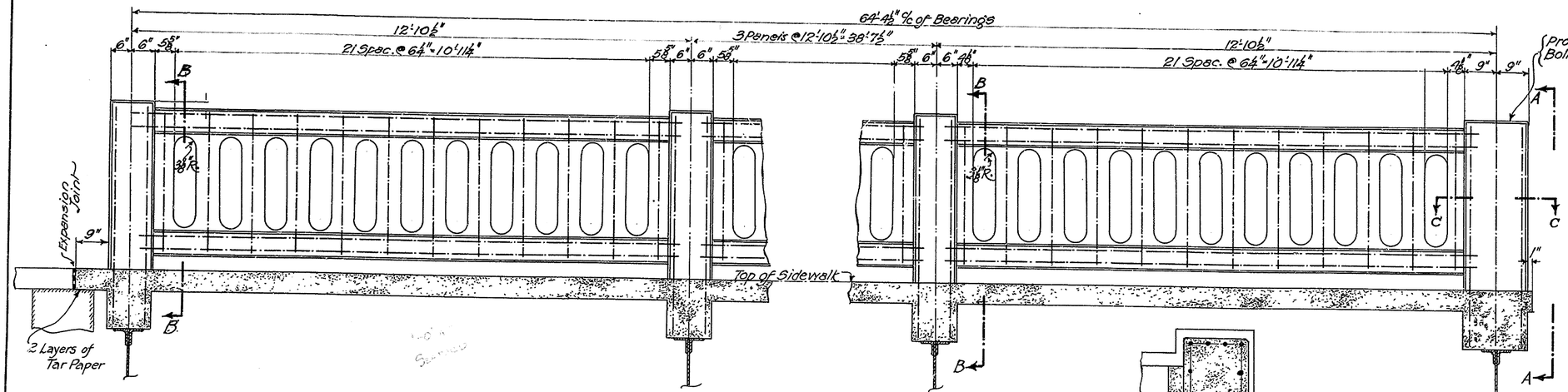
MACHINERY FLOOR

1262-B8

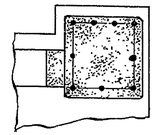
ROUTE	CONTRACT	COUNTY	SHEET
	103A	NEW CASTLE	

RAILING

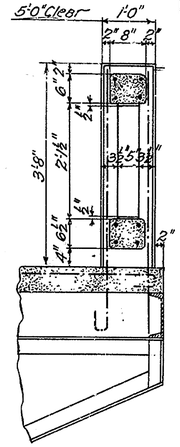
FED. ROAD DIST. No.	STATE	FED. AID PROJ. No.	FISCAL YEAR	SHEET No.	TOTAL SHEETS
10	DEL.				



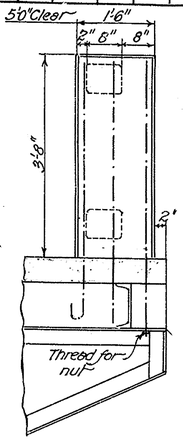
Concrete Railing South Approach Span



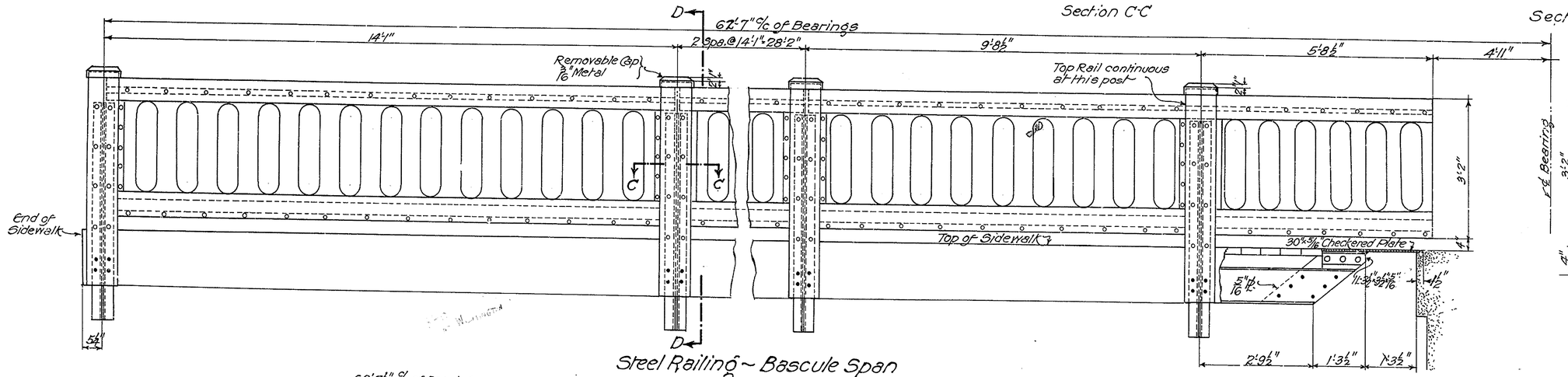
Section C-C



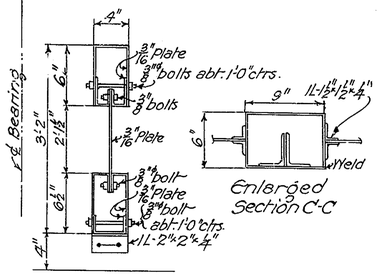
Section B-B



View A-A

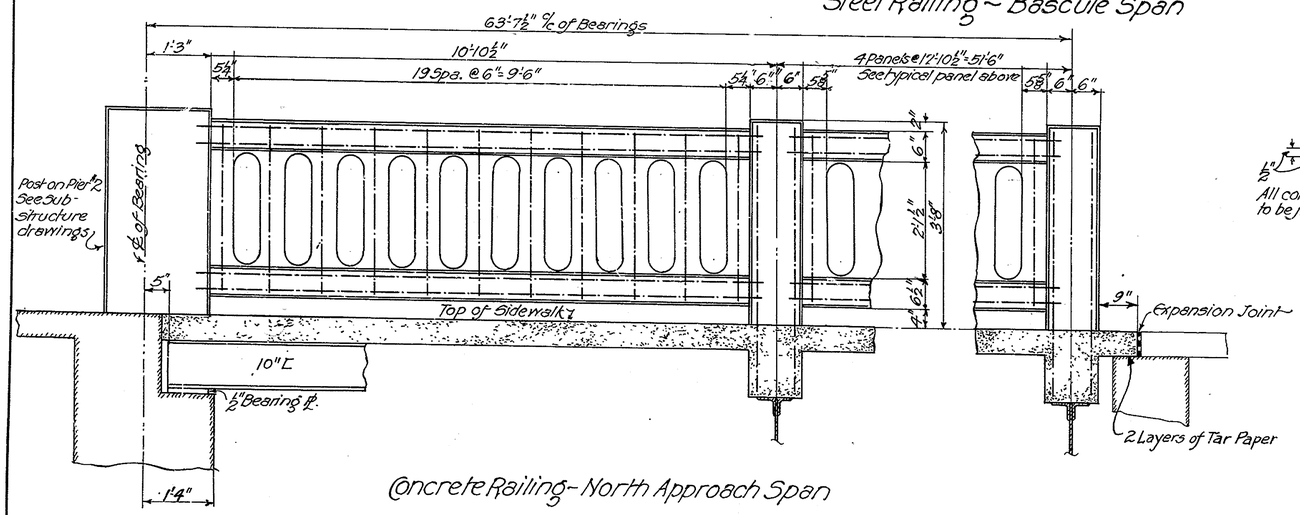


Steel Railing ~ Bascule Span

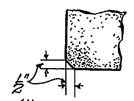


Enlarged Section C-C

Enlarged Section D-D



Concrete Railing ~ North Approach Span



All corners of Balustrade to be finished as shown above.

General Notes

All Concrete for Balustrade to be Class A-X.
A description of Cement-Concrete is given on Page 40 to 46 of the specifications.
All reinforcing steel to be ½" round deformed bars except bars which are threaded for nuts, these to be ½" round plain bars.
Extreme care will be required on the alignment of the balustrade.

1/2-1929
PRINT TO
PITTSBURG FORGE & IRON CO
PITTSBURG
PA

Approved A. G. Livingston
Bridge Engineer

Approved .....
Chief Engineer

CONTRACT 103A
DELAWARE
STATE HIGHWAY DEPARTMENT
NEWPORT BRIDGE
ACROSS
CHRISTIANA RIVER

DESIGNED BY
KELLER AND HARRINGTON ~ CONSULTING ENGINEERS
CHICAGO, ILL.

DATE 11-17-28

SCALE ¾"=1'-0"

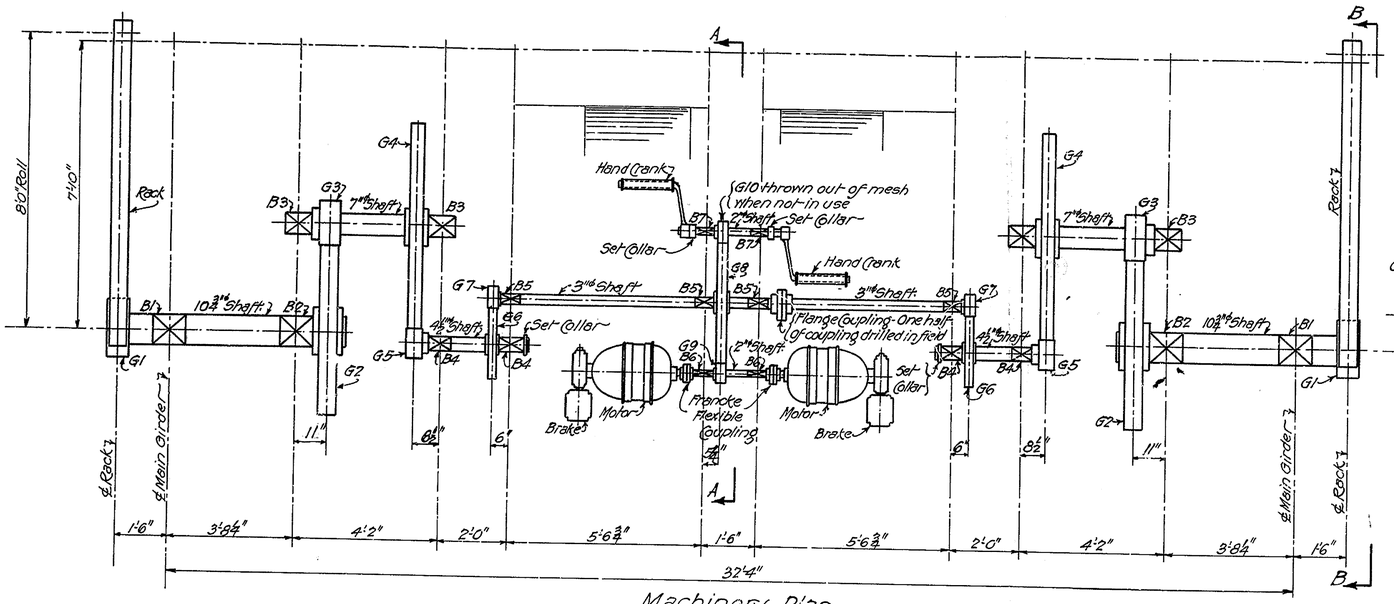
RAILING

1262-B9

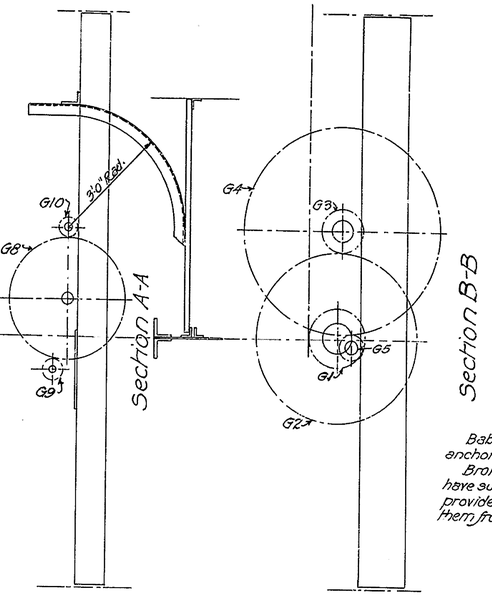
ROUTE	CONTRACT	COUNTY	SHEET
	103 A	NEW CASTLE	

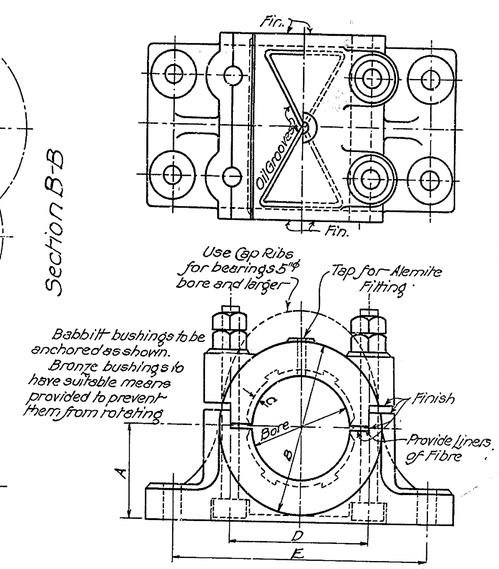
OPERATING MACHINERY

FED ROAD DIST. NO.	STATE	FED-AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
10	DEL.				



Machinery Plan
One Set Req'd.
Scale:- 1½" = 1'-0"





Typical Bearing
See table of bearings

Table of Gears

Total Req'd	Mark	No. of Teeth	Pitch	Pitch Diam.	Face	Bore	a	b	c	d	e	f	g	Teeth	Keys per Gear
4	Rack	14	4" Cir.		10½"									Special 20° Involute Stub Cu	
2	G1	15	4" Cir.	19.10"	11"	9"				4½"	4½"			" " " " "	2-2"
2	G2	63	2¾" Cir.	55.15"	6½"	9"	⅞"	7"	1⅜"	5½"	5½"	5"	16"	Standard 20° Involute Cut	do
2	G3	17	2¾" Cir.	14.88"	7"	7"				5½"	3½"		12½"	" " " "	2-1¼"x¾"
2	G4	134	2 D.P.	67.00"	3½"	7"	½"	4"	⅞"	4"	4"	2¾"	12½"	" " " "	do.
2	G5	19	2 D.P.	9.50"	4"	4½"				4"	2"		8"	" " " "	1-⅞"x⅝"
2	G6	70	3 D.P.	23.33"	2½"	4½"	⅜"	3"	⅝"	2½"	2½"	2"	8"	" " " "	do.
2	G7	19	3 D.P.	6.33"	3"	3"				2½"	1½"		5¼"	" " " "	1-¾"x 9/16"
1	G8	120	3 D.P.	40.00"	2½"	3"	⅜"	3"	⅝"	2¼"	2¼"	2"	5½"	" " " "	do.
1	G9	17	3 D.P.	5.67	3"	½"				2¼"	1½"		3¾"	" " " "	1-½"x⅜"
1	G10	17	3 D.P.	5.67	3"	2"				2¼"	1½"		3¾"	" " " "	do.

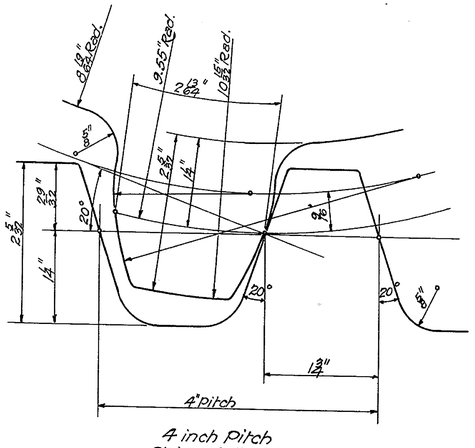
Table of Bearings

Total Req'd	Mark	Bore	Length	Base Bolts.	Cap Bolts.	Lining	A	B	C	D	E	Type
2	B1	10¾"	11	—		Bronze		See detail				Collar
2	B2	9"	11"	4-2 3/16"dia.	4-2 3/16"dia.	Bronze	9"	13½"	⅝"	12¼"	19"	Typical
4	B3	7"	9"	4-1 5/16"	4-1 5/16"	Babbitt	7"	11"	7/16"	9¾"	16"	"
4	B4	4½"	7"	4-15/16"	4-15/16"	"	4½"	7⅞"	5/16"	6⅞"	11¼"	"
4	B5	3"	6"	4-13/16"	2-⅞"	"	3"	5¾"	¼"	4⅞"	8¾"	"
2	B6	2"	6"	4-11/16"	2-13/16"	"	2¼"	4"	¼"	4"	8"	"
2	B7	2"	6"	4-11/16"	2-13/16"	"	2¼"	4"	¼"	4"	8"	"

Diameter of turned bolts are given for shank of bolt.
Threaded portion to be 1/16" less.
Provide ½" of shims under all bearings - ¼" normal.

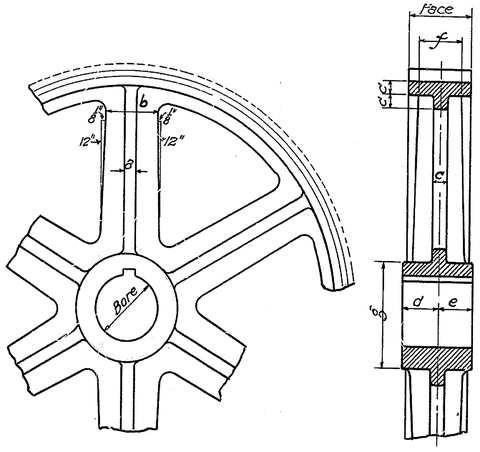
Electrical Equipment

Current:- 3 phase, 60 cycle, 220 Volt.
Motors:- 2 Westinghouse Type C.I. Frame 460C 10 H.P. 870 R.P.M. full load.
Brakes:- 2 Westinghouse Type A1 - 83 M. Magnetic Brakes. Retarding Torque of each brake 65 ft. lbs. Brakes to be set at factory so above torques cannot be exceeded.

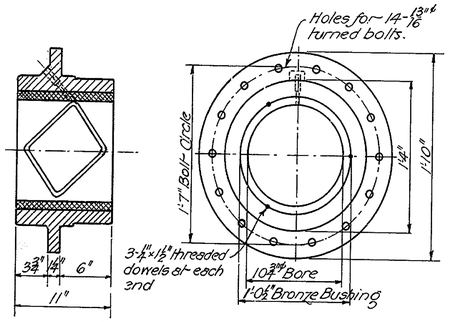


4 inch Pitch
Pinion of 15 Teeth

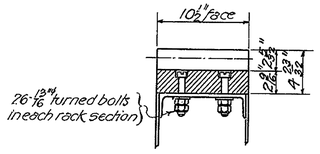
Special Tooth ½ Rack & ½ Pinion
20° Involute



Typical Gear
See table of gears



Bearing B1
Bearing to be light fit in Girder
Scale:- 1½" = 1'-0"



Connection of Rack to Structural Steel

Approved A. G. Livingston
Bridge Engineer

Approved .....
Chief Engineer

CONTRACT 103A
DELAWARE
STATE HIGHWAY DEPARTMENT
NEWPORT BRIDGE
ACROSS
CHRISTIANA RIVER

DESIGNED BY
KELLER AND HARRINGTON — CONSULTING ENGINEERS
CHICAGO, ILL.

DATE 11-17-'28 SCALE

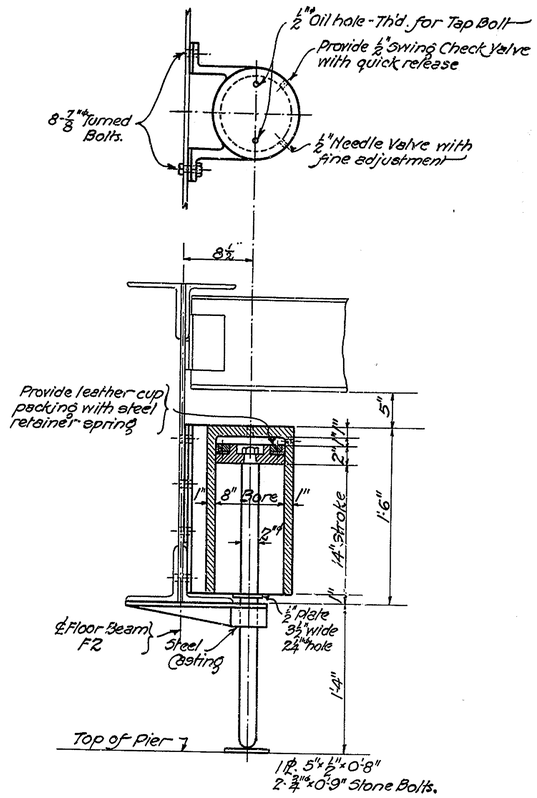
OPERATING MACHINERY.

1262-B10

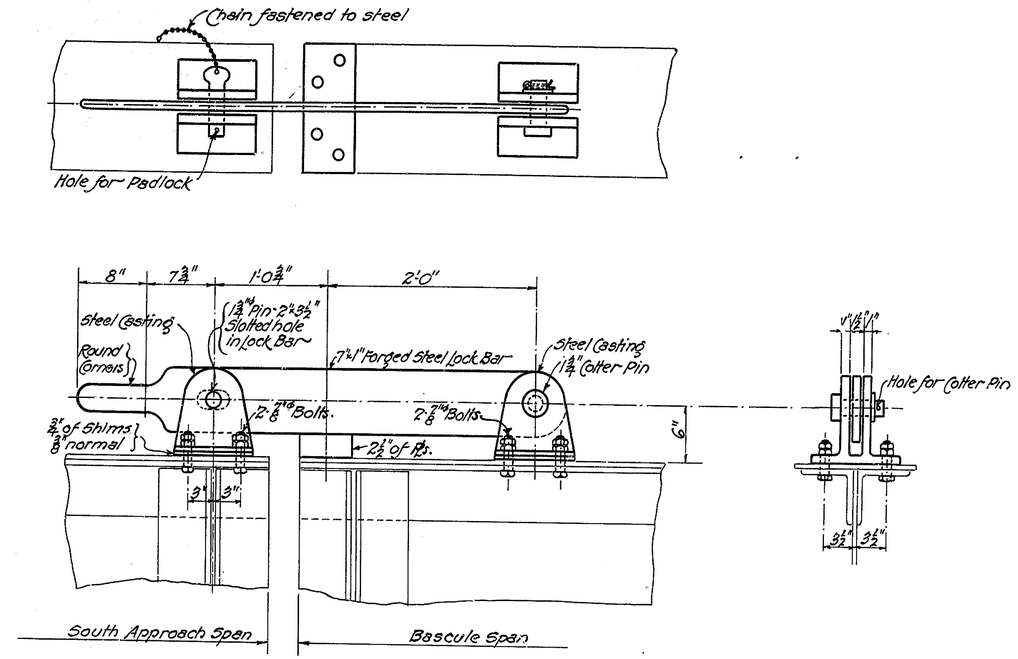
ROUTE	CONTRACT	COUNTY	SHEET
	103A	NEW CASTLE	

Lock & Buffer

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
10	DEL.				



Buffer - 2 Req'd.
Scale 1 1/2" = 1'-0"



Bascule Span Lock
2 Req'd.

Approved A. G. Livingston
Bridge Engineer

Approved .....
Chief Engineer

CONTRACT 103A
DELAWARE
STATE HIGHWAY DEPARTMENT
NEWPORT BRIDGE
ACROSS
CHRISTIANA RIVER

DESIGNED BY
KELLER AND HARRINGTON ~ CONSULTING ENGINEERS
CHICAGO, ILL.

DATE 11-17-'28

SCALE 1 1/2" = 1'-0"

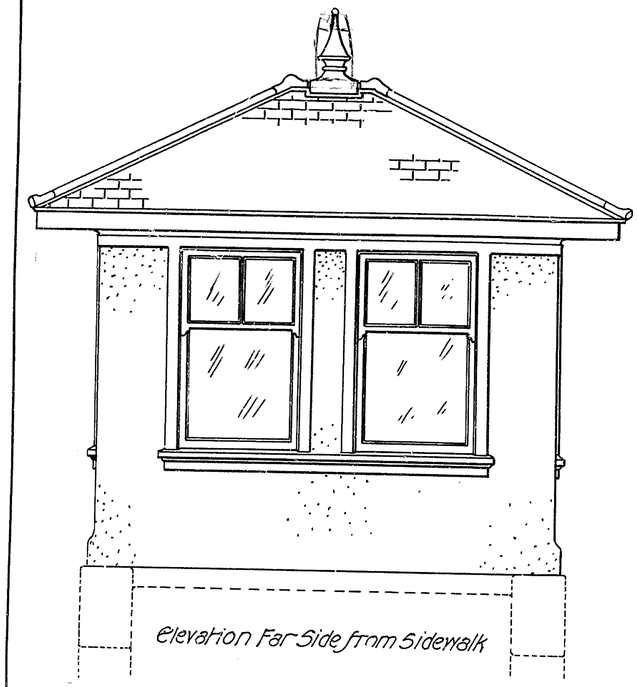
LOCK & BUFFER

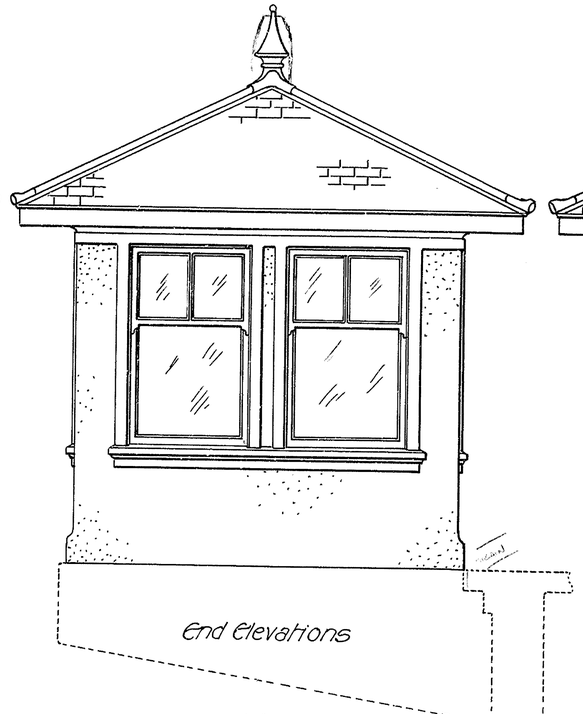
1262-B11

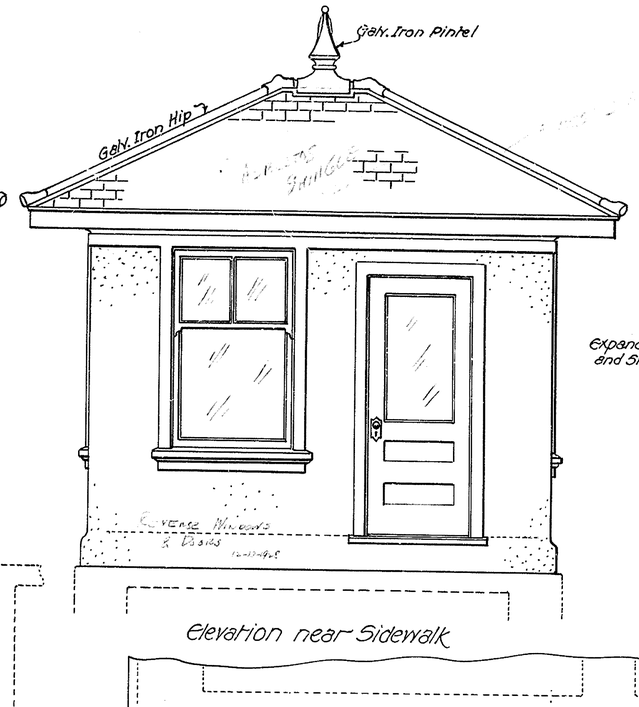
ROUTE	CONTRACT	COUNTY	SHEET
	103 A	NEW CASTLE	

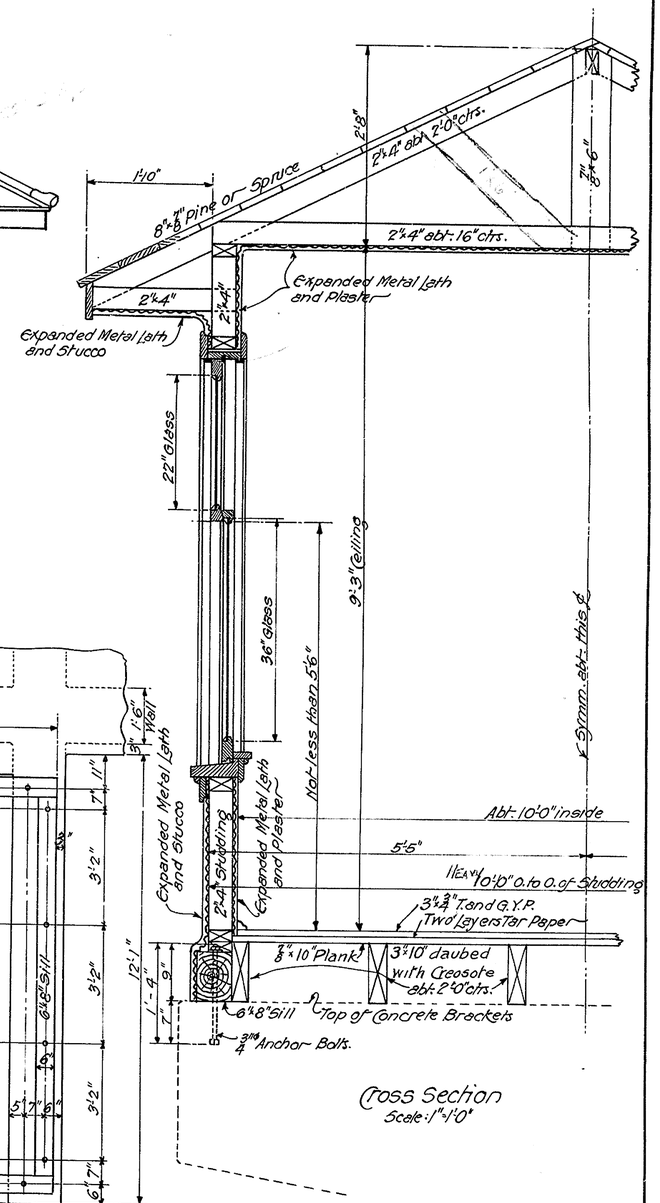
OPERATOR'S HOUSE

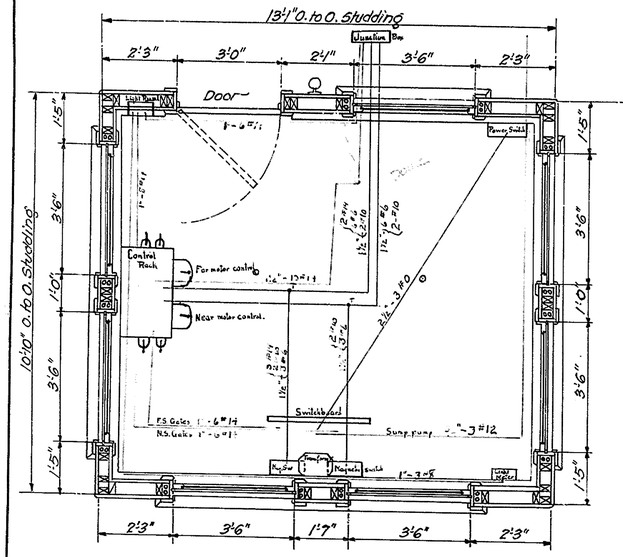
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
	DEL.				



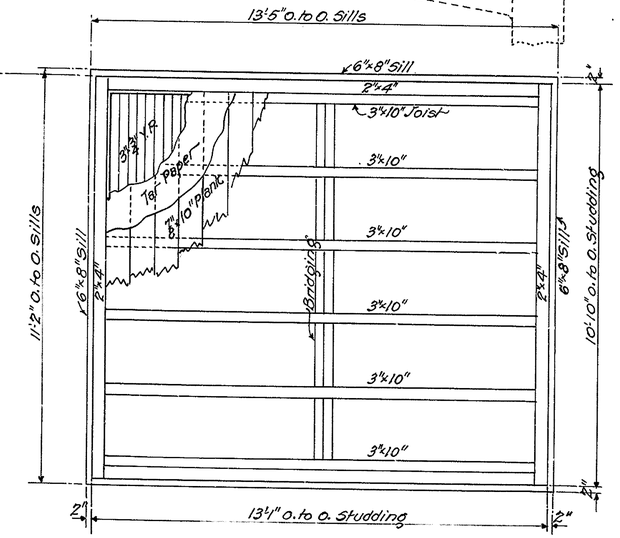




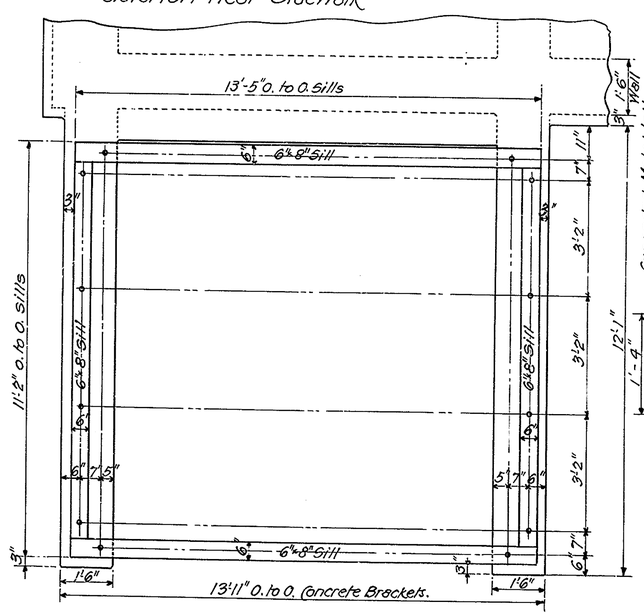




Sectional Plan



Floor Plan



Anchor Bolt Plan

THIS SHOULD FOLLOW THE BEST BUILDING PRACTICE THRU OUT IN CONSTRUCTION.
NO CRACKS IN STUCCO NO LEAKS.

Approved A. G. Livingston
Bridge Engineer

Approved
Chief Engineer

CONTRACT 103A
DELAWARE
STATE HIGHWAY DEPARTMENT
NEWPORT BRIDGE
ACROSS
CHRISTIANA RIVER

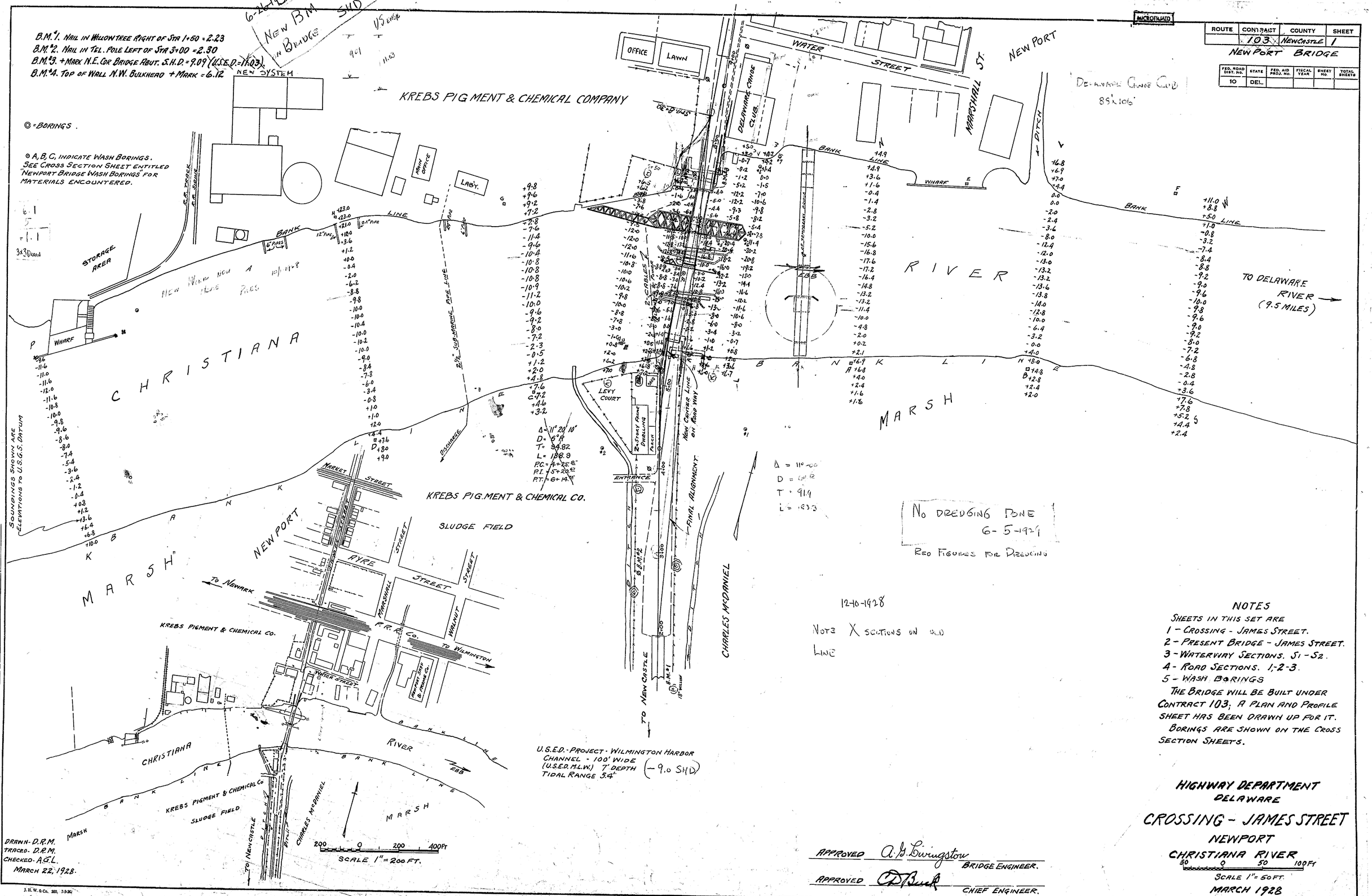
DESIGNED BY
KELLER AND HARRINGTON — CONSULTING ENGINEERS
CHICAGO, ILL.

DATE 11-17-'28

SCALE: 1/2" = 1'-0"

OPERATOR'S HOUSE

1262-B12



ROUTE	CONTRACT	COUNTY	SHEET
	103	NEWCASTLE	1

NEWPORT BRIDGE

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
10	DEL.				

NO DREDGING DONE
6-5-1929
RED FIGURES FOR DREDGING

12-10-1928
NOTE X SECTIONS ON OLD LINE

NOTES

SHEETS IN THIS SET ARE
1 - CROSSING - JAMES STREET.
2 - PRESENT BRIDGE - JAMES STREET.
3 - WATERWAY SECTIONS. S1 - S2.
4 - ROAD SECTIONS. 1, 2-3.
5 - WASH BORINGS

THE BRIDGE WILL BE BUILT UNDER CONTRACT 103; A PLAN AND PROFILE SHEET HAS BEEN DRAWN UP FOR IT.

BORINGS ARE SHOWN ON THE CROSS SECTION SHEETS.

APPROVED A. G. Livingston BRIDGE ENGINEER.
APPROVED C. D. Buck CHIEF ENGINEER.

HIGHWAY DEPARTMENT
DELAWARE

CROSSING - JAMES STREET
NEWPORT
CHRISTIANA RIVER

50 0 50 100 Ft
SCALE 1" = 50 FT.
MARCH 1928

Note Books 542, 668, 912.

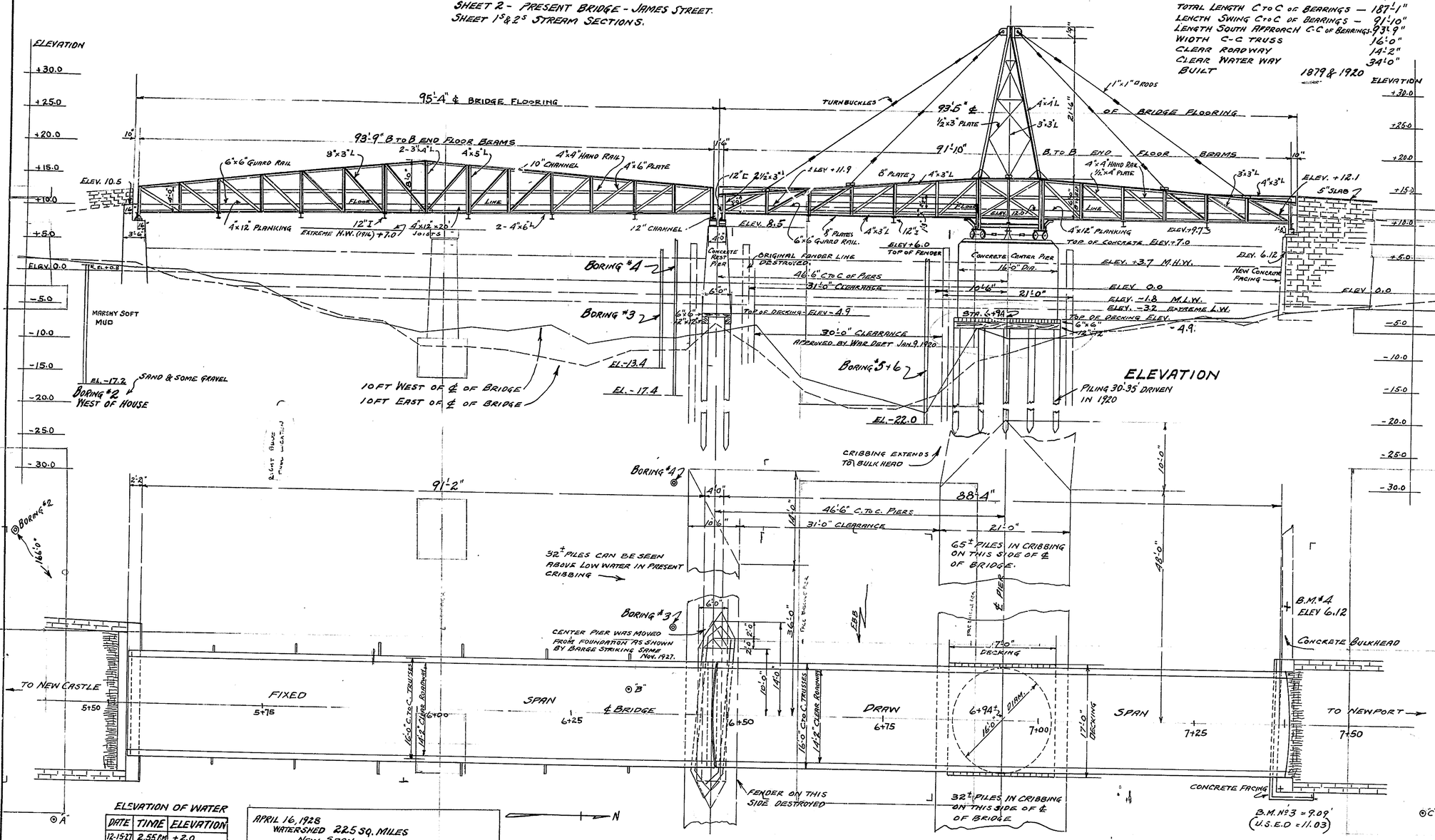
SHEET 1 — CROSSING - JAMES STREET NEWPORT
SHEET 2 - PRESENT BRIDGE - JAMES STREET.
SHEET 1st & 2d STREAM SECTIONS.

ROUTE	CONTRACT	COUNTY	SHEET
	XD3	NEWCASTLE	2

NEWPORT - BRIDGE

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
10	DEL.				

TOTAL LENGTH C TO C OF BEARINGS — 187'-1"
LENGTH SWING C TO C OF BEARINGS — 91'-10"
LENGTH SOUTH APPROACH C-C OF BEARINGS 93'-9"
WIDTH C-C TRUSS 16'-0"
CLEAR ROADWAY 14'-2"
CLEAR WATER WAY 34'-0"
BUILT 1879 & 1920



ELEVATION OF WATER

DATE	TIME	ELEVATION
12-15-27	2.55 P.M.	+2.0
12-20-27	9.35 A.M.	+0.6
12-20-27	12.00 Noon	-0.3
12-20-27	2.00 P.M.	-1.6
12-20-27	4.30 P.M.	-3.2 L.W.
12-21-27	9.00 A.M.	+2.1 FLOOD
12-21-27	10.20 "	+3.2 "
12-21-27	11.30 "	+3.7 H.W.
12-21-27	12.00 Noon	+3.5
1-23-28	3.15 P.M.	+1.0 EBB
1-23-28	4.30 P.M.	-0.3 "
1-24-28	10.20 A.M.	-0.3 EBB
1-24-28	11.45 A.M.	+1.7 FLOOD
1-24-28	12.30 P.M.	+2.3 "
1-24-28	12.50 P.M.	+2.7 "
1916	——	+7.0 EXTREME H.W.
4-26-28	2. P.M.	-3.5
4-26-28	4.30 P.M.	+4.0
10-2-29	1.00 PM	+6.5

APRIL 16, 1928
WATERSHED 225 SQ. MILES
NEW SPAN
AREA REQUIRED C=.40 = 2940 SQ. FT.
(TIDAL CONDITIONS NOT CONSIDERED)
AVAILABLE EL. +0.00 BOTTOM = 1520 □'
EL. +3.00 BOTTOM = 2050 □'
NEW BRIDGE SPAN 50'-0" HORIZONTAL CLEARANCE

⊙ A, B, C, INDICATE WASH BORINGS.
SEE CROSS SECTION SHEET ENTITLED "NEWPORT BRIDGE WASH BORINGS" FOR MATERIALS ENCOUNTERED.

DRAWN. D.R.M.
TRACED. D.R.M.
CHECKED. W.M.L.
MARCH 12. 1928.

CLOSED TO TRAFFIC. 12-14-1928.
REMOVED COMPLETELY.

APPROVED A. H. Livingston BRIDGE ENGINEER
APPROVED C. D. Bond CHIEF ENGINEER

NOTES

SEE WILMINGTON QUADRANGLE U.S.G. SURVEY OF DELAWARE FOR LOCATION OF THIS BRIDGE. IT IS LOCATED AT THE SOUTH END OF JAMES ST. NEWPORT, OVER THE CHRISTIANA RIVER, ABOUT 9.5 MILES FROM THE DELAWARE RIVER. THE NEW BRIDGE WILL BE CONSTRUCTED UNDER CONTRACT 103.

THE WIDTH OF THE NEW BRIDGE WILL BE ~~24~~ 30 FEET CLEAR ROADWAY WITH TWO SIDEWALKS 5 FT WIDE. IT SHOULD BE LOCATED CENTRAL TO THE STREAM AS SHOWN BY SOUNDINGS AND SHOULD PROVIDE A CLEAR CHANNEL OPENING OF 50 FEET BETWEEN FENDERS. THE FENDERS ARE NOT TO BE PLACED MORE THAN 3 FEET FROM MASONRY PIERS. A GRADE OF ELEVATION ~~7.0~~ 12.0 HAS BEEN SELECTED AS SHOWN.

A BASCULE TYPE BRIDGE IS PREFERRED WITH THE COUNTERWEIGHT NOT EXPOSED; THE BRIDGE TO HAVE THE OPERATING UNITS ON THE NORTH SIDE. ELECTRICITY IS AVAILABLE, FROM THE DELAWARE POWER COMPANY, OF WILMINGTON. A LENGTH OF 210 FEET, FACE TO FACE OF ABUTMENT, WILL BE CONSIDERED AS THE BRIDGE LENGTH, NOTICE THAT THE WIDTH OF THE STREAM IS 200 FEET UPSTREAM AND 250 FEET DOWN STREAM.

A FIVE SPAN BRIDGE IS DESIRED, BUT THREE SPANS IF MORE ECONOMICAL AND PRESENTS A GOOD APPEARANCE MAY BE ACCEPTABLE; A PLEASING ELEVATION, FROM AN ARCHITECTURAL STAND POINT, WILL BE REQUIRED.

ALL DESIGN FEATURES SHOULD MEET THE SPECIFICATIONS OF THE AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICIALS ALSO ADOPTED BY THE BUREAU OF PUBLIC ROADS, DEPT OF AGRICULTURE. THE OPEN SPAN SHOULD FOLLOW THE BEST PRACTICE IN ADDITION TO THESE SPECIFICATIONS.

THE BRIDGE OPENS ON AN AVERAGE OF 300 TIMES IN A YEAR; USUALLY ONE MONTH WHEN ICE IS PRESENT THERE ARE NO OPENINGS. THE PRODUCTS TAKEN ARE ACID AND ORE, ABOUT 60 OPENINGS FOR ACID BARGES AND 240 OPENINGS FOR ORE BARGES. THE KREBS PIGMENT & CHEMICAL CO. IS THE ONLY INDUSTRY, UPSTREAM FROM THE BRIDGE, NOW OPERATING, WHICH REQUIRES THE OPENING OF THE BRIDGE.

THE PRESENT BRIDGE IS HAND OPERATED. THE ORIGINAL STRUCTURE WAS BUILT IN 1879 BY THE EDGE MOOR IRON WORKS. NEW WORK ON FOUNDATIONS AND SUPPORTING CENTER TOWER WAS ADDED IN 1920. TWO PRINTS ON FILE SHOW THE OLD CONDITION.

A NEW BRIDGE WAS BUILT AT WILMINGTON IN 1927 OVER THE CHRISTIANA RIVER.

HIGHWAY DEPARTMENT
DELAWARE
PRESENT BRIDGE - JAMES STREET
NEWPORT
CHRISTIANA RIVER
10 2 6 10 14 18 22 FT
SCALE 1/8" = 1 FT.
MARCH 1928.

BEARINGS
TIE POINTS
BENCH MARKS
EARTHWORK
DRAINAGE

J. H. W. & Co. 300. 7-9-28.

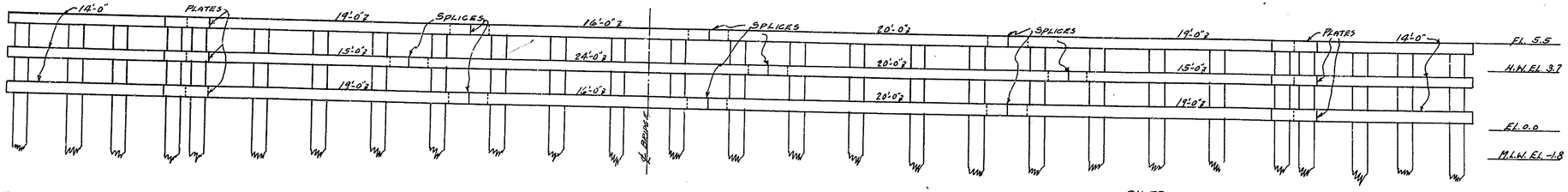
159 3-3

ROUTE	CONTRACT	COUNTY	SHEET
	103	NEW CASTLE	

FENDER SYSTEM

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
10	DEL.	48A	1928		

NEWPORT BRIDGE



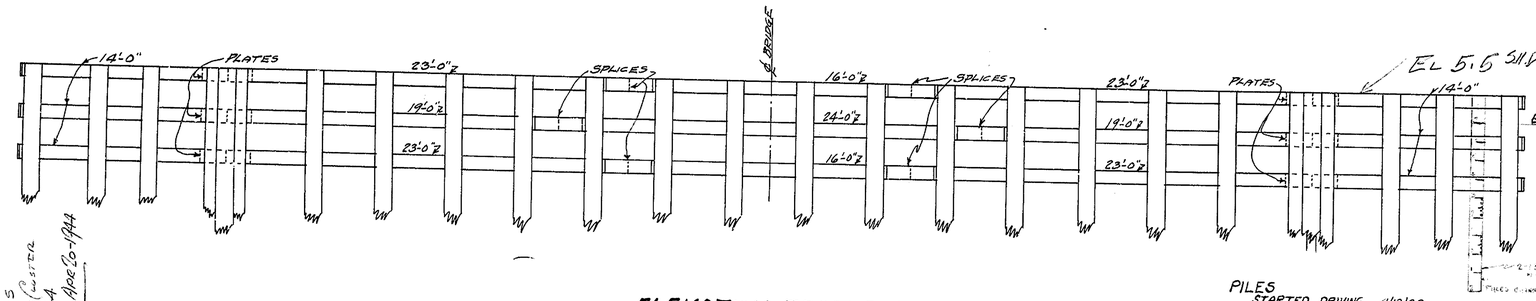
ELEVATION BASCULE PIER FENDER

SCALE $\frac{1}{4}$" = 1'-0"

PILES
STARTED DRIVING 4/10/29
FINISHED DRIVING 5/6/29
MAXIMUM LENGTH 35'-2"
MINIMUM LENGTH 33'-6"
AVERAGE LENGTH 34'-6"

4/2-1944
2 - Pile Clusters - West Side
10 Piles - S. D. Collins #697
#5 Pine Piles pulled out

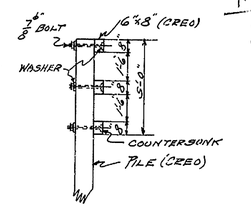
5.5
1.1
6.6
HIGH WATER.
1.3
7



ELEVATION REST PIER FENDER (INSIDE)

SCALE $\frac{1}{4}$" = 1'-0"

PILES
STARTED DRIVING 4/13/29
FINISHED DRIVING 5/6/29
MAXIMUM LENGTH 36'-0"
MINIMUM LENGTH 33'-6"
AVERAGE LENGTH 34.6'



GAUGE BOLTON

FENDER DETAIL

SCALE $\frac{1}{4}$" = 1'-0"

HAIL VERT 8.6 = SHD 5.5

BILL OF MATERIAL

LUMBER (CREO)				
No	SIZE	LENGTH	LOCATION	FT.B.M.
2	6"x8"	24'-0"	Rest & Bas. Pier Fender	192
4	"	23'-0"	Rest Pier "	368
3	"	20'-0"	Basc. " "	240
6	"	19'-0"	Rest & Bas. "	456
4	"	16'-0"	" " " "	256
2	"	15'-0"	Basc. "	120
12	"	14'-0"	" & Rest "	672
15	"	2'-6"	Splices	150
TOTAL LUMBER				2454
71 CREO. PILES @ 36'-0 = 2556 LIN. FT.				
12 PLATES 8"x$\frac{3}{8}$" x 3'-0" = 367#				

—NOTES—

THE FENDER PLAN WITH DETAILS IS SHOWN ON CONTRACT 103-1262.A2 PILE PLAN AND FENDER. ALL NOTES ON 1262.A2 APPLY TO THIS SHEET.

THE SPECIFICATION OF THE BUREAU OF PUBLIC ROADS FOR CREOSOTED LUMBER HAS BEEN ADOPTED BY THE STATE HIGHWAY DEPARTMENT.

ITEM 47 AND ITEM 48 COVER THE CREOSOTED TIMBER AND CREOSOTED PILES TO BE USED.

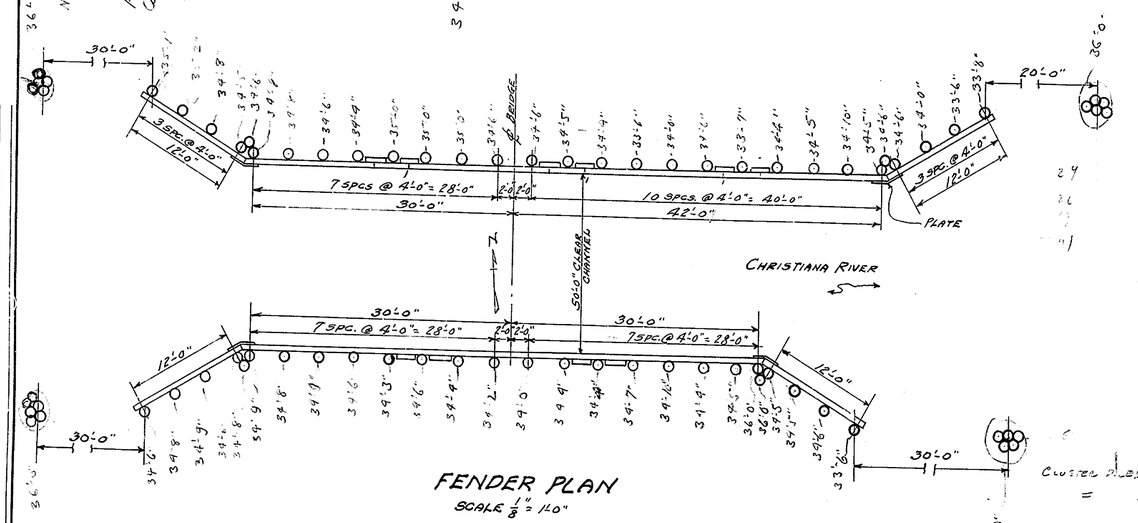
USE 36 FOOT CREOSOTED PILING.

THE GRADE OF TIMBER SHALL EQUAL THE SPECIFICATIONS OF AMERICAN SOCIETY OF TESTING MATERIALS. THE DIVISION IS D245-27 No 27.

APRIL-1944 - TWO NEW PILE CLUSTERS (5x2=10) REPLACED ON THE WEST SIDE.

SEE ALSO ANOTHER SHEET FOR REPAIRS 1943

REPAIRS UNDER CONTRACT 9167



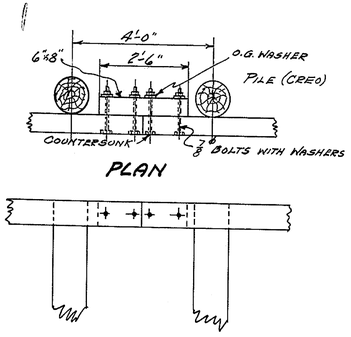
FENDER PLAN

SCALE $\frac{1}{8}$" = 1'-0"

New Pile Clusters 5 Piles in Cluster April-1944 Completed April 20-1944

This Fender on South Side Broken up Feb 5-13-1947 See Report

Clusters Piles = Ft

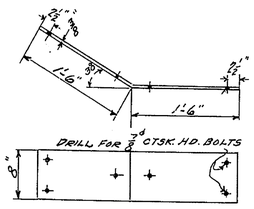


PLAN

ELEVATION

DETAIL OF SPLICE

SCALE $\frac{1}{2}$" = 1'-0"



DETAIL FENDER PLATE

SCALE 1" = 1'-0"

6-5-1949

USE MALLEABLE IRON FITTINGS FOR OTHER CONTRACTS

W. W. LITTLE
1312 HALLOWAY COURT
NORFOLK VA

DRAWN - R.T.
TRACED - R.T.
CHECKED - A.G.L.
2/1/29

J. H. W. & Co. 100. 4-18-28.

FENDER SYSTEM — NEWPORT

APPROVED G. G. Livingston BRIDGE ENGINEER

APPROVED W. W. Wilson CHIEF ENGINEER

CONTRACT 103
HIGHWAY DEPARTMENT
DELAWARE
FENDER SYSTEM
NEWPORT BRIDGE

2 0 2 4 6 8 10 FT.

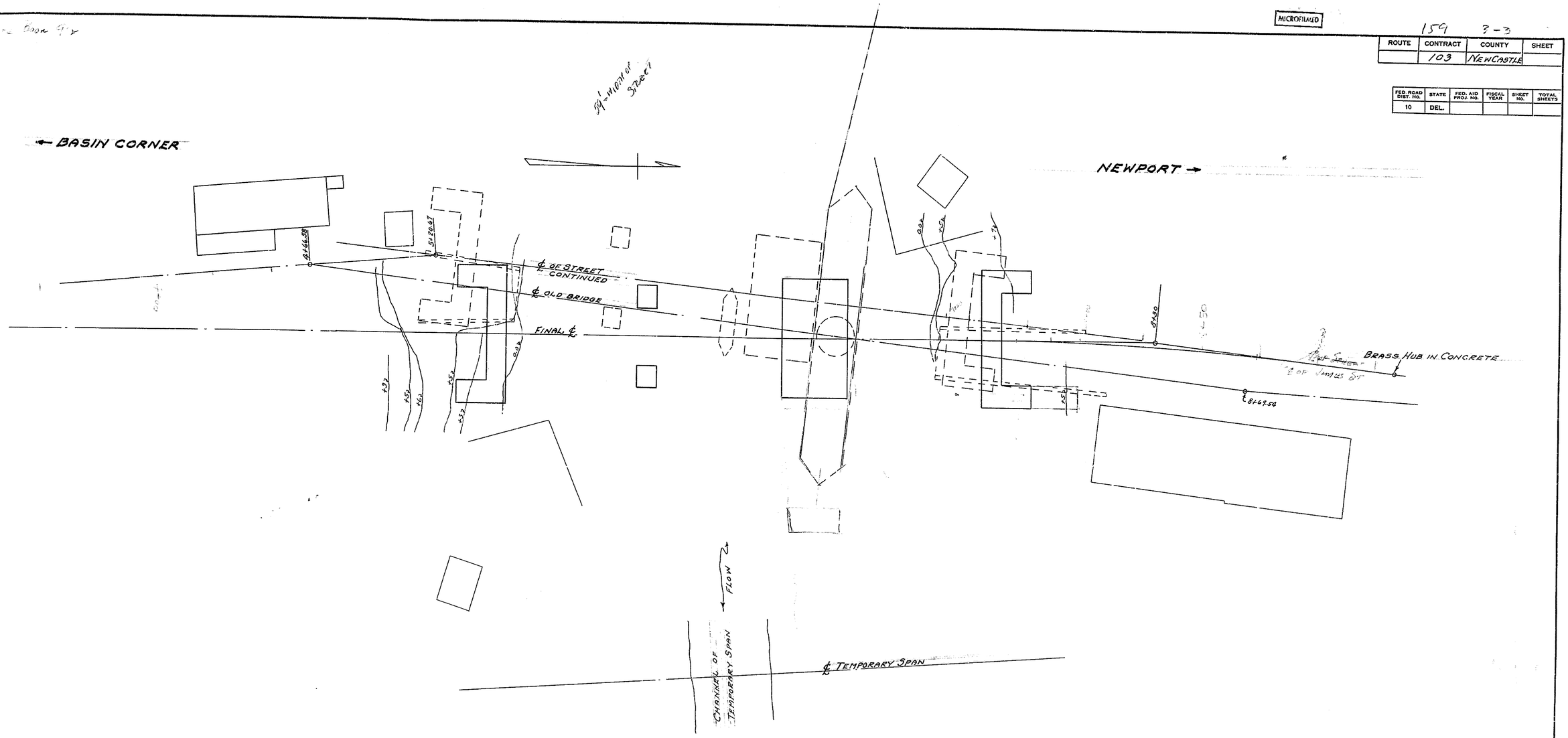
SCALE $\frac{1}{4}$" = 1'-0"

FEBUARY - 1929

MICROFILMED

ROUTE	CONTRACT	COUNTY	SHEET
	103	NEWCASTLE	

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
10	DEL.				



BEARINGS
TIE POINTS
BENCH MARKS
EARTHWORK
DRAINAGE

D- A.G.L.
T- R.T.
C-
4/20/29

J. H. W. & Co. 100. 4-18-28.

CONTRACT 103
NEWPORT BRIDGE
ALIGNMENT

20 0 20 40 FT.

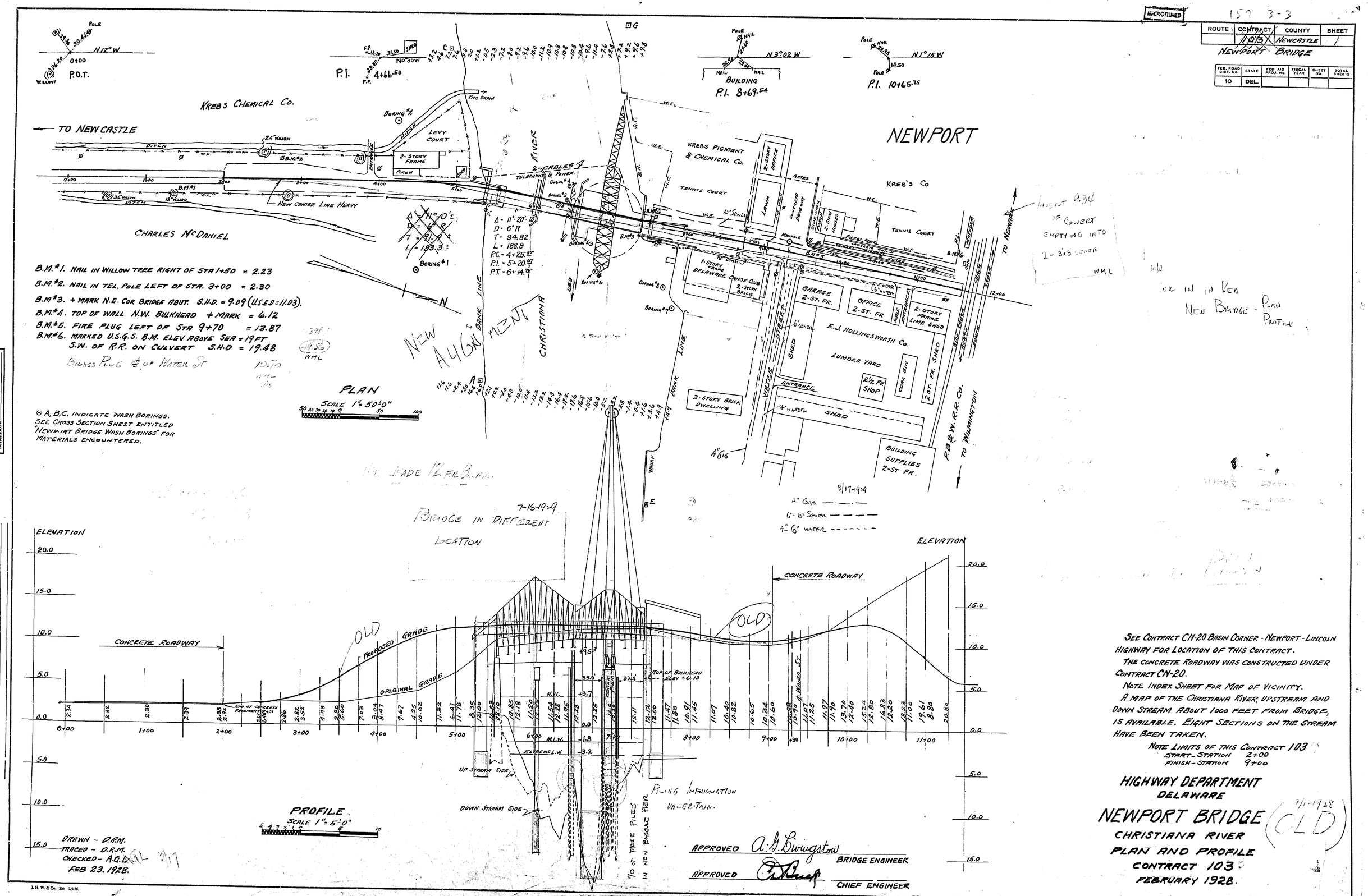
SCALE 1" = 20 FEET
APRIL 1929

MICROFILMED

ROUTE	CONTRACT	COUNTY	SHEET
	103	NEWCASTLE	1

NEWPORT BRIDGE

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
10	DEL.				



J. H. W. & Co. 300, 7-9-28.

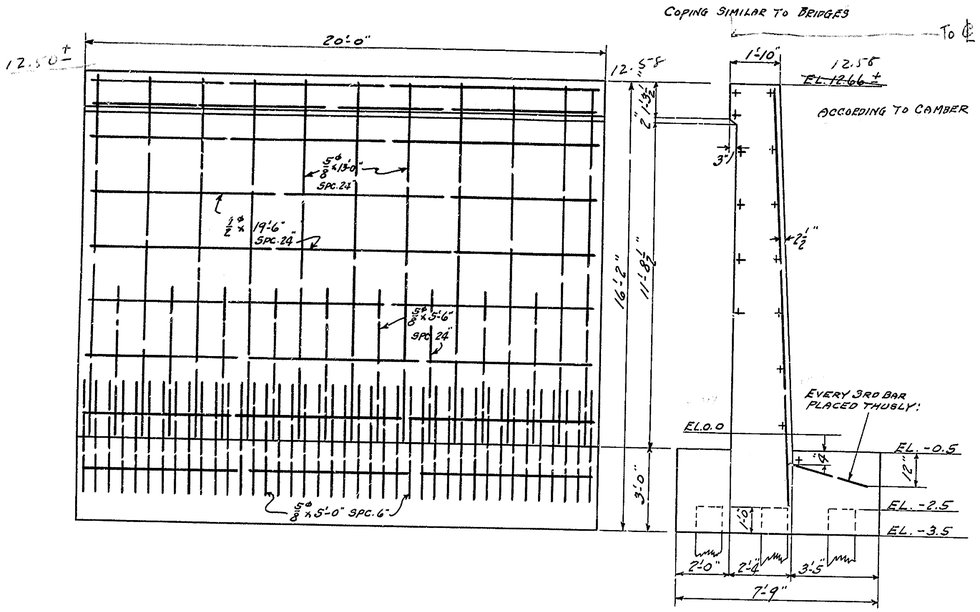
159 7-3

ROUTE	CONTRACT	COUNTY	SHEET
	103	NEWCASTLE	

RETAINING WALLS

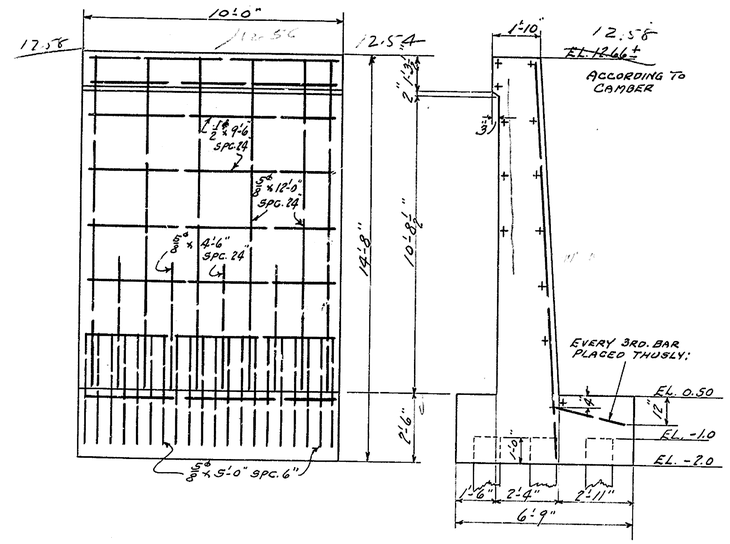
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
10	DEL.	48A	1928		

NEWPORT BRIDGE



ELEVATION

END ELEVATION



ELEVATION

END ELEVATION

SE & SW WALLS

DROVE SE PILES	3/21/29
DROVE SW PILES	3/28/29
MAXIMUM LENGTH	23'-0"
MINIMUM LENGTH	20'-6"
AVERAGE LENGTH	22.6'
POURED FOOTINGS	3/28/29
POURED WALLS	4/23/29

BILL OF MATERIAL

No	Size	Length	Location	Weight
11	5/8φ	13'-0"	N.E. WALL VER.	
12	"	12'-0"	S.E. SW. WALL VER.	
9	"	5'-6"	N.E. WALL VER.	
80	"	5'-0"	N.E, S.E, SW, WALL VER	
8	"	4'-6"	S.E. SW. WALL VER	806#
14	1/2φ	19'-6"	N.E. WALL HOR.	
24	"	9'-6"	S.E, SW, WALL HOR	335
TOTAL REINFORCEMENT				1141#
CU. YD. CLASS "A" CONC. FOOTINGS = 29.7				
" " " " ABOVE FOOTINGS = 37.2				
36 PILES				

-NOTES-

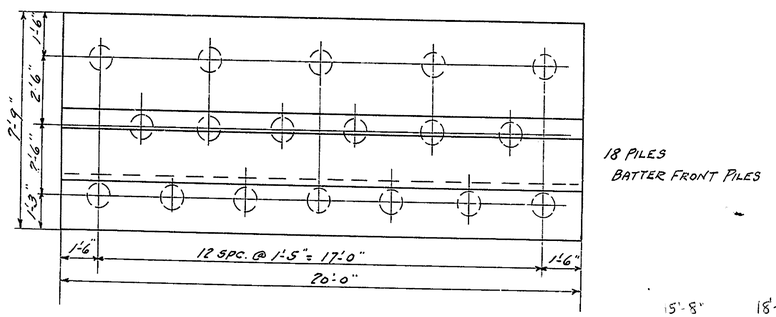
THESE WALLS WILL BE LOCATED ON THE N.E. SIDE, THE S.W. SIDE, AND S.E. SIDE OF THE NORTH AND SOUTH ABUTMENTS. NOTE LOCATION MAP. PLACE EXPANSION MATERIAL NEXT TO PRESENT ABUTMENT. NO DOWELS.

PROVIDE 2" GALVANIZED IRON PIPES FOR ATTACHING OF WIRE MESH GUARD RAIL.

THE SPECIFICATIONS COVER THE CEMENT CONCRETE MASONRY AND STEEL REINFORCEMENT. USE CLASS "A" CONCRETE.

PILES SHOULD SUSTAIN A LOAD OF 18 TONS.

ALL ITEMS FOR THESE WALLS WILL BE PAID FOR AT CONTRACT PRICES.



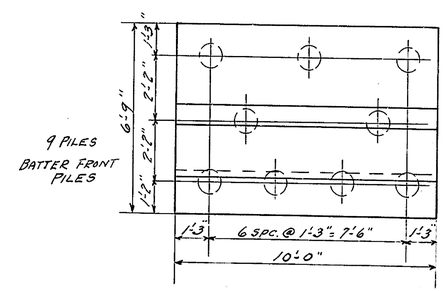
PLAN

NORTHEAST WALL

STARTED DRIVING PILES	3/26/29
FINISHED DRIVING PILES	3/27/29
MAXIMUM LENGTH	23'-0"
MINIMUM LENGTH	15'-0"
AVERAGE LENGTH	17.7'
POURED FOOTING	3/28/29
POURED WALL	4/19/29

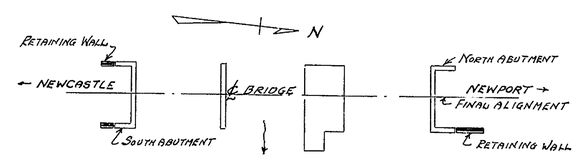
NORTHEAST WALL

15'-8"	18'-7
7-6	4'-7
3	3
11	11
3	3
3	3
14'-10	24'-10



PLAN

SOUTHEAST AND SOUTHWEST WALL



LOCATION MAP
SCALE 1" = 50 FT.

D - R.T.
T - R.T.
C - A.G.L.
3/13/29

J. H. W. & Co. 100. 4-18-28.

4/16/

APPROVED A. G. Livingston BRIDGE ENGINEER

APPROVED CHIEF ENGINEER

CONTRACT 103
HIGHWAY DEPARTMENT
DELAWARE
RETAINING WALLS
NEWPORT BRIDGE

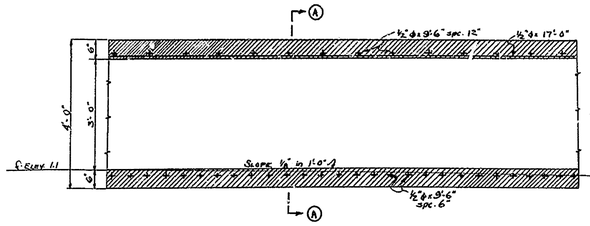
1 0 1 2 3 4 5 6 7 FT.
SCALE 3/8" = 1'-0"
MARCH - 1929

BEARINGS
TIE POINTS
BENCH MARKS
BRIDGE WORK
DRAINAGE

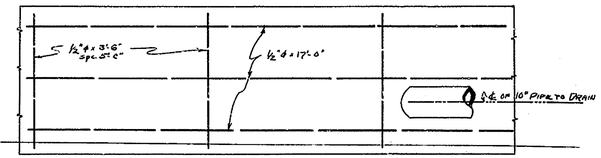
ROUTE	CONTRACT	COUNTY	SHEET
	103	NEW CASTLE	

DRAINS & BULKHEAD – NEWPORT BRIDGE

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
10	DEL.				

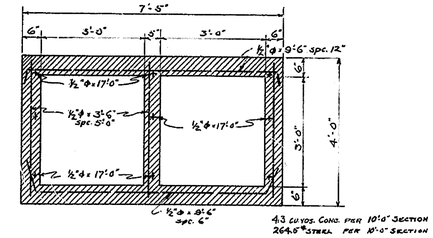


PART LONGITUDINAL SECTION

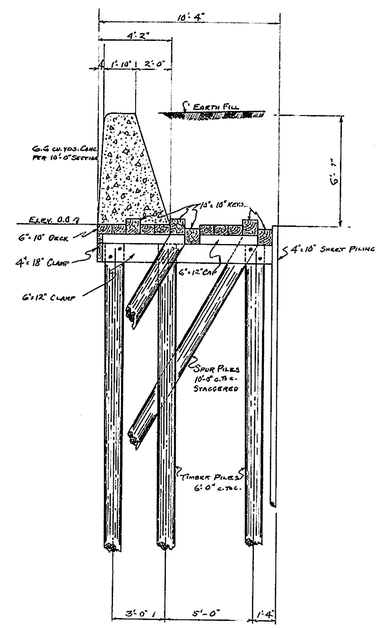


PART ELEVATION
(Note 10" Pipe)

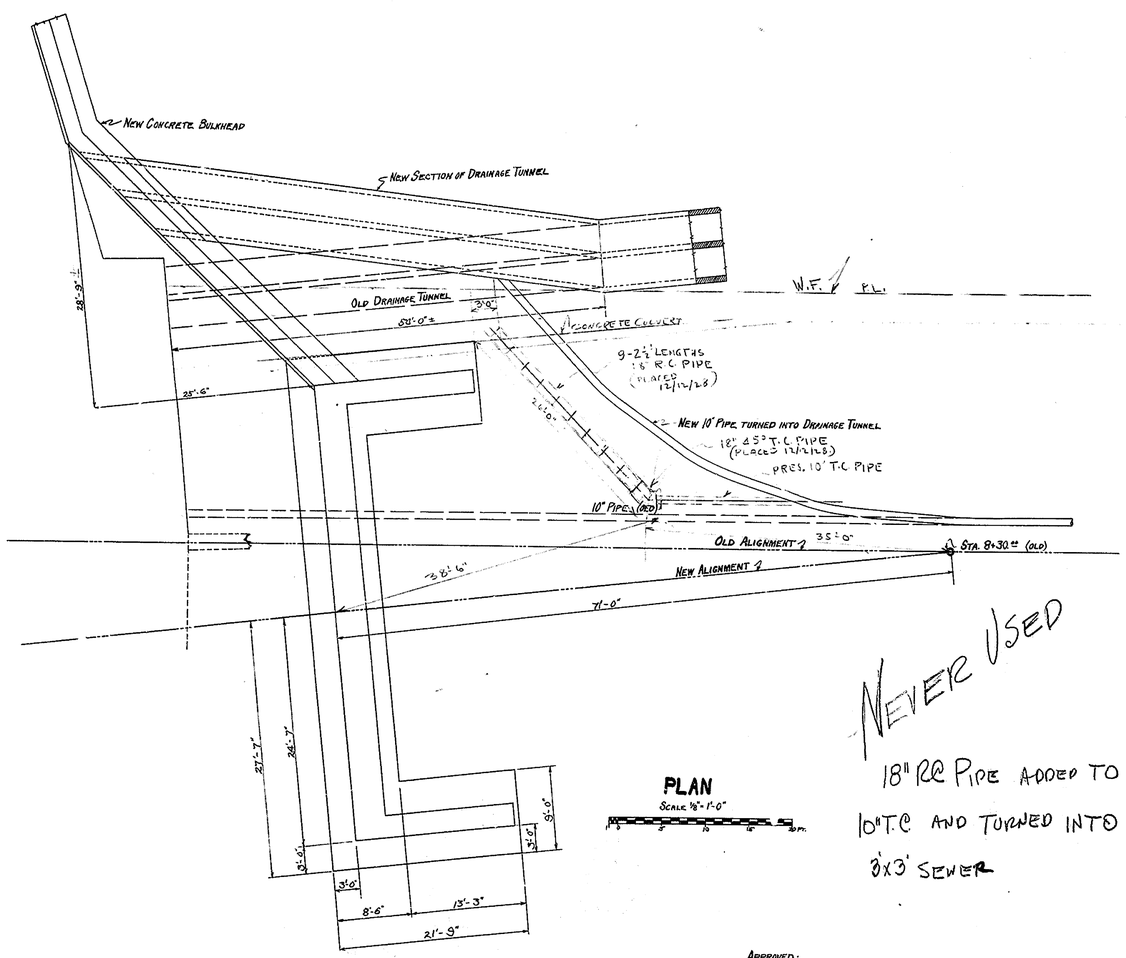
DRAINAGE TUNNEL
Scale ½" = 1'-0"



SECTION "A-A"



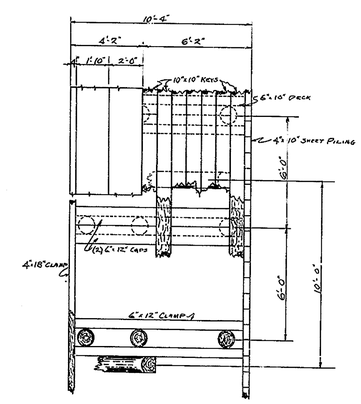
TYPICAL SECTION



NEVER USED

18" RC Pipe added to 10" T.C and turned into 3'x3' sewer

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



PART PLAN
BULKHEAD
Scale ½" = 1'-0"

NOTES

The location of this work is west of the North abutment of the Newport Bridge. If this work is done the section of the present drain will be used and turned west to avoid the North abutment.

The bulkhead is shown; if the drain is retained a section similar to this bulkhead will be built parallel to the drain and east of it.

All provisions of the specifications for concrete, steel, timber and piles shall hold for any new work.

Quantities will be paid for according to actual work ordered. Unit quantities are given.

CONTRACT 103
HIGHWAY DEPARTMENT
DELAWARE
DRAINS AND BULKHEAD
KREB'S PLANT

DECEMBER 1928

Bearings
Tie Points
Bench Marks
Earthwork
Drainage

Drawn: Z.C.H.
Traced: Z.C.H.
Checked:

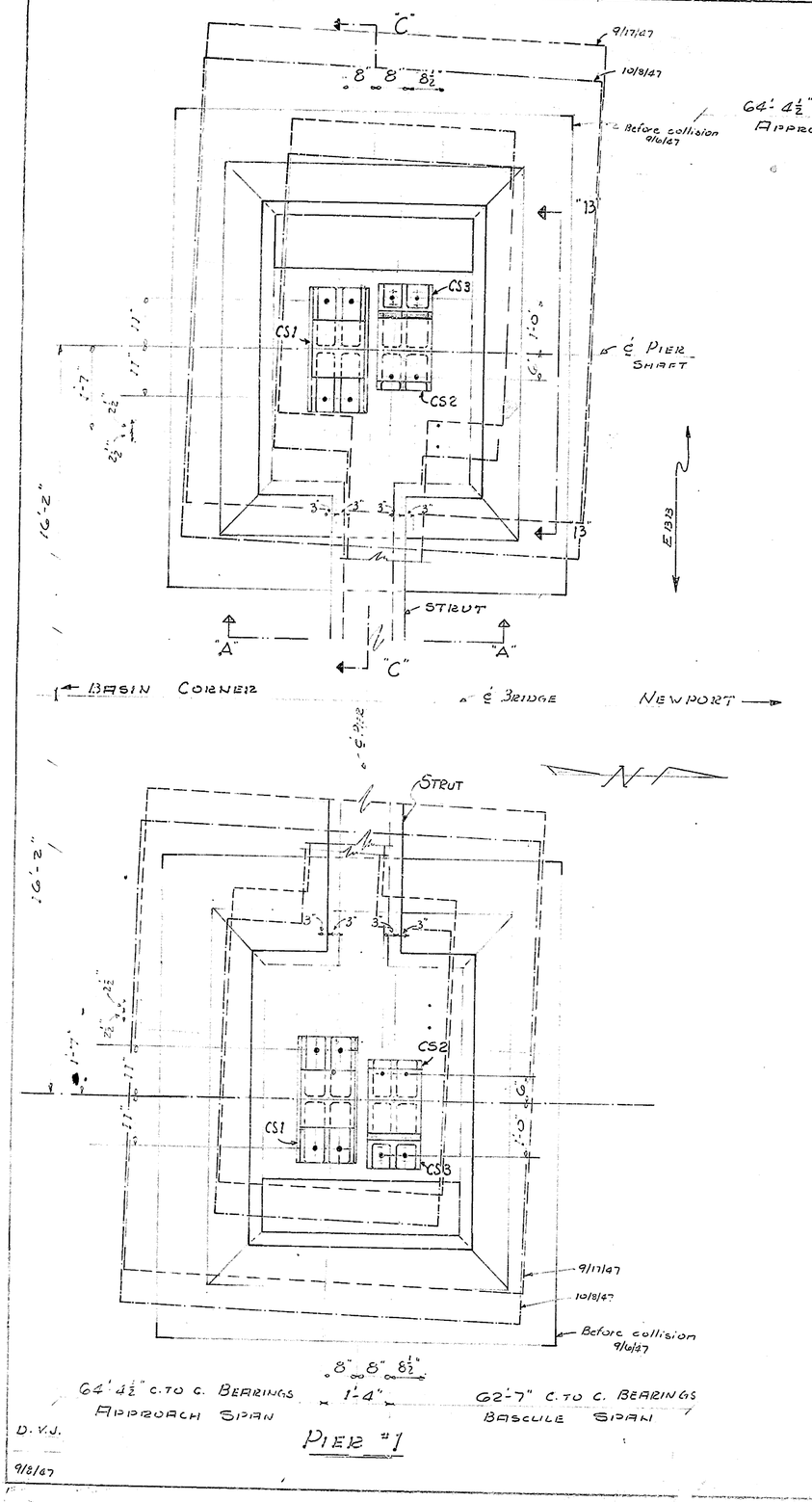
Approved: _____ Bridge Engineer

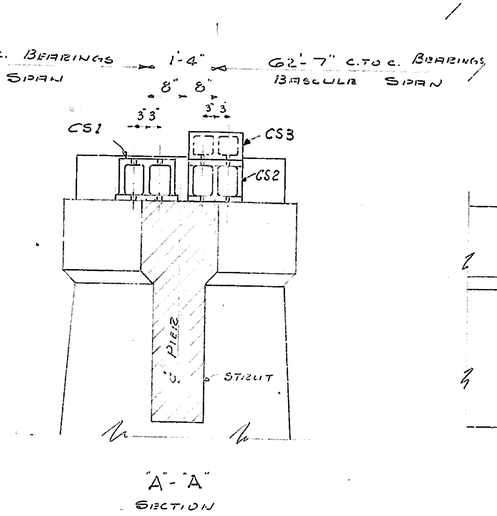
Approved: _____ Chief Engineer

J. H. W. & Co. 300. 4-18-28.

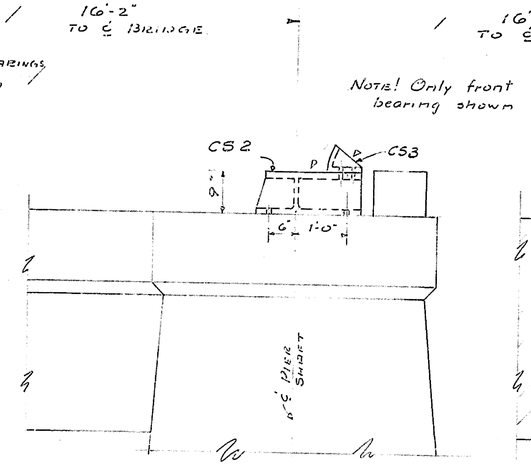
Dr. #159 3-3

CONTRACT 103 A.
NEWPORT BRIDGE
REPAIRS

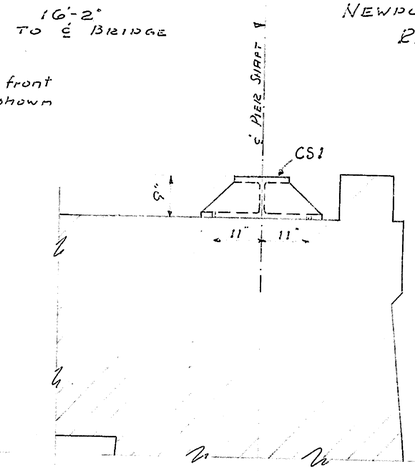




"A"-"A"
SECTION



"B"-"B"
VIEW



"C"-"C"
SECTION

LEGEND

ORIGINAL LOCATION (BEFORE COLLISION) 9/6/47

AFTER COLLISION 9/17/47

EIGHT DAYS AFTER BRIDGE IS REOPENED TO HIGHWAY TRAFFIC 10/3/47.

REFERENCE:-

1. GENERAL PLAN - DWG. 1262 A1
2. ABUTMENTS & PIER #1 DWG. 1262-A4
3. ERECTION DIAGRAM (FIXED PART) ANCHOR BOLT DIAGRAM DWG. 1262-E1
4. CAST STEEL SHOES BEARINGS, COLLARS & COUPLINGS. DWG 1262-M2
5. PHOTOS - R.C. DENSTEN

BRIDGE DAMAGED BY BOAT SEPT. 6 - 1947

ACCOUNTING NUMBER OF BRIDGE - 101

REPAIR PROGRESS:
SEP. 20, 1947. CABLES CUT & SET SOUTH APPROACH - JACKED & BLOCKED & PLACED ON ROLLERS. PIER & APPROACH BROUGHT INTO EQUILIBRIUM. DRIVE MOTOR REMOVED TO BE REBUILT. FAULTY WIRING REPLACED.
SEPT. 27, 1947 - STRAINED SOUTH APPROACH BEARING BOLTS REPLACED. APPROACH JACKED TO FINAL ELEVATION.

9/8/ 1947
A NEW TRACING MADE FOR PIER ON CONTRACT 96Y

DELAWARE
STATE HIGHWAY DEPARTMENT
NEWPORT BRIDGE
CHRISTINA RIVER

PIER NO. 1

1 0 1 2 3 4 5
3/4" = 1'-0"

A.G. LIVINGSTON BRIDGE ENGR. - REPAIRS -

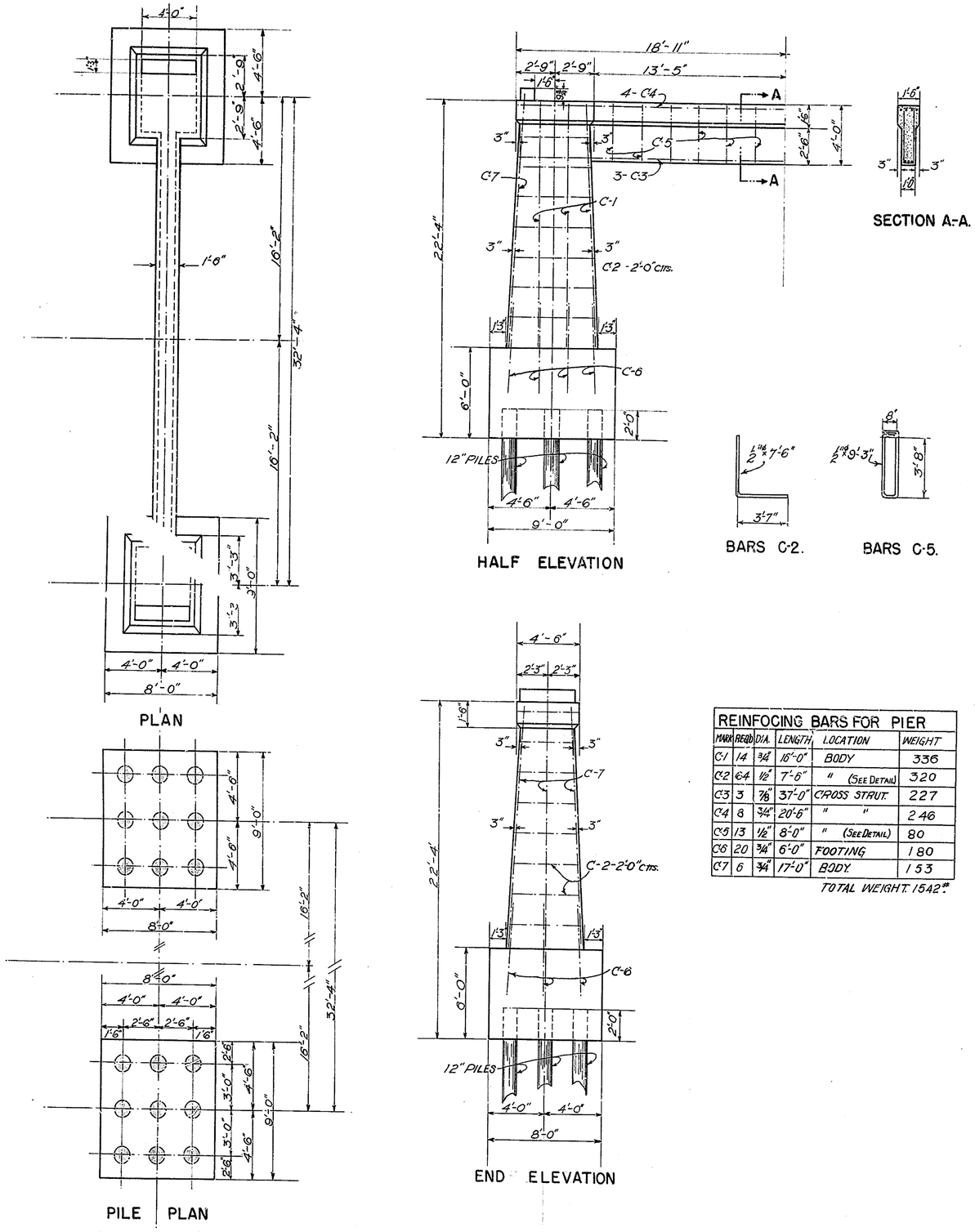
SEPTEMBER - 1947

COUNTY	CONTRACT	F.R.A. DIV. NO.	STATE	FED. AID PROJECT NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
		2	DEL.				

Pr 159 3-3

NEWPORT BRIDGE

2/6-1948

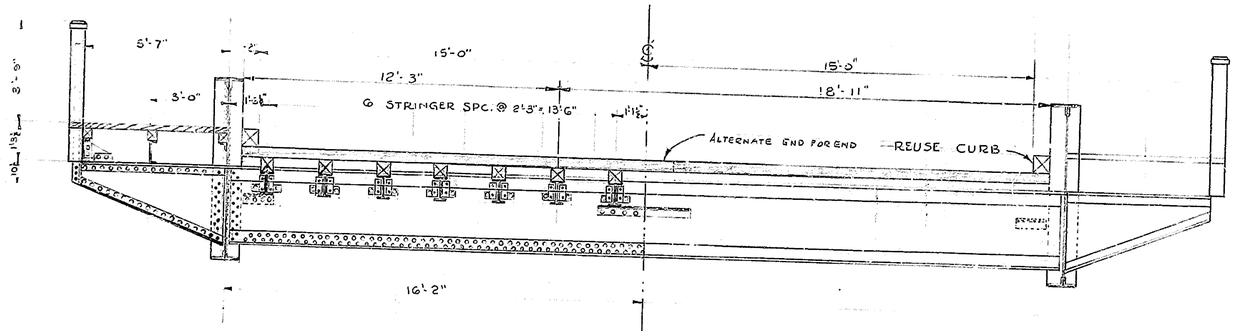


REINFOCING BARS FOR PIER					
MARK	REQ'D	DIA.	LENGTH	LOCATION	WEIGHT
C-1	14	3/4"	16'-0"	BODY	336
C-2	64	1/2"	7'-6"	" (SEE DETAIL)	320
C-3	3	7/8"	37'-0"	CROSS STRUT.	227
C-4	8	3/4"	20'-6"	" "	246
C-5	13	1/2"	8'-0"	" (SEE DETAIL)	80
C-6	20	3/4"	6'-0"	FOOTING	180
C-7	6	3/4"	17'-0"	BODY.	153

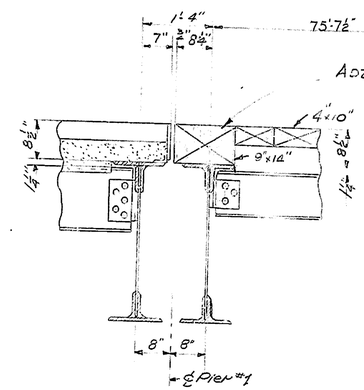
TOTAL WEIGHT 1542#

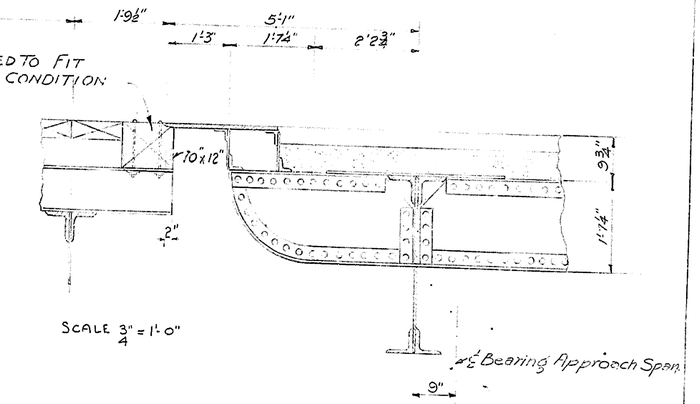
REVISIONS

CHECKED
GRADE
BEARINGS
TIE POINTS
BENCH MARKS
EARTHWORK
DRAINAGE

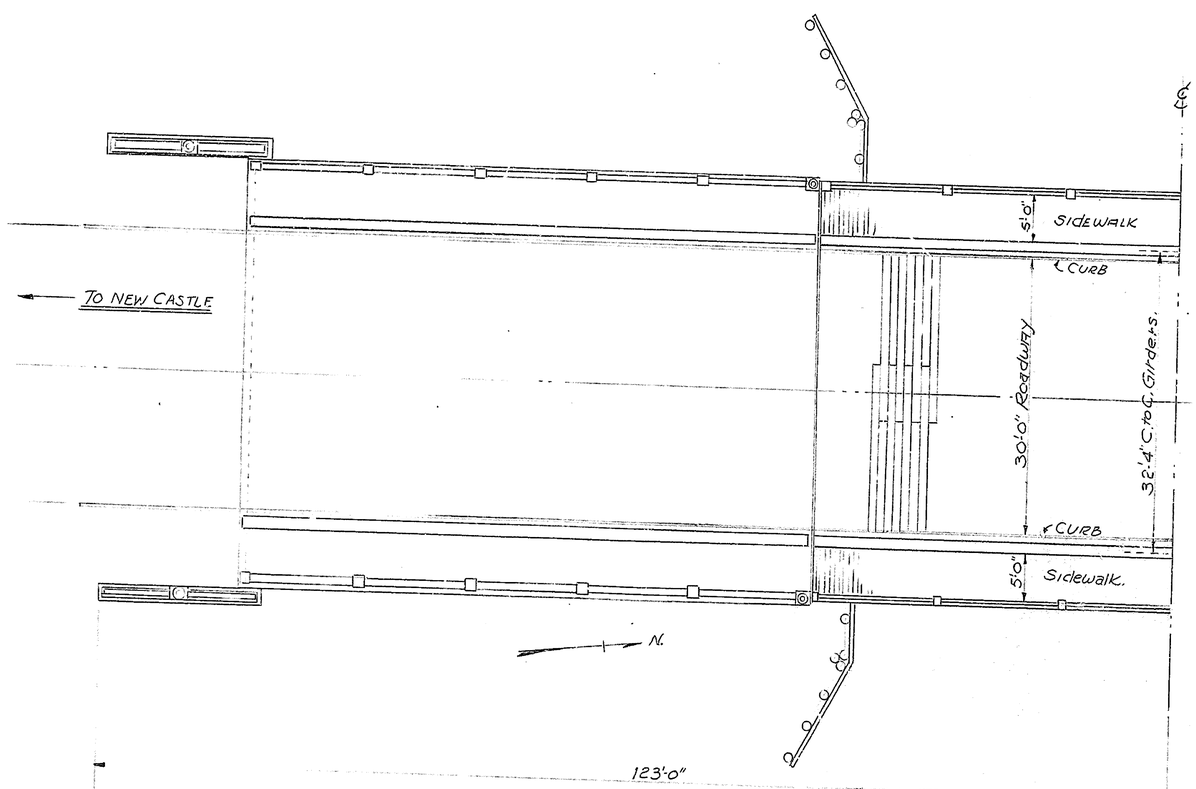


SCALE 3/8" = 1'-0"





SCALE 3/4" = 1'-0"



"HALF PLAN"

SCALE 1/8" = 1'-0"

APPROXIMATE QUANTITIES

3,178	FT. B.M. –	6" x 6"
9,392	FT. B.M. –	4" x 10"
310	FT. B.M. –	10" x 12"
326	FT. B.M. –	9" x 14"
13,206	TOTAL.	
1,878	TOTAL – 20%	
11,328		

NOTE:
ESTIMATED 20% OF FLOORING SALVAGEABLE.

APPROVED J. M. Gordon
BRIDGE ENGINEER

NEW CASTLE CO.

NEWPORT BRIDGE

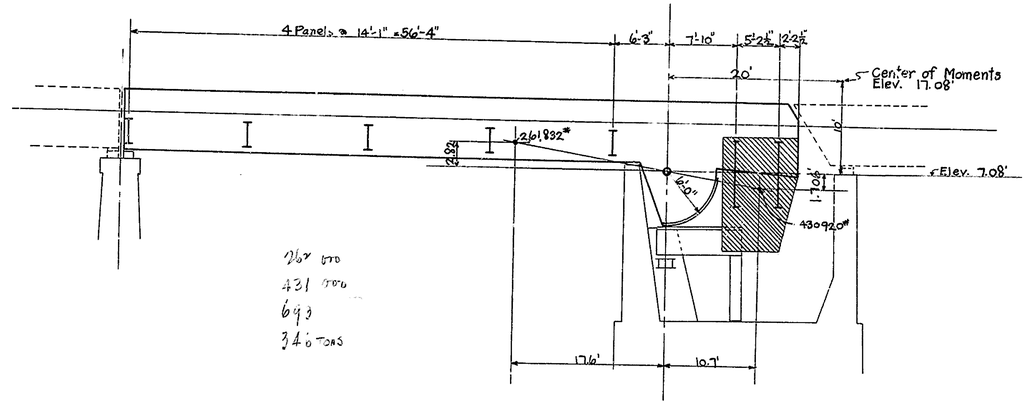
"MAINTENANCE"

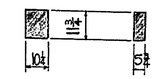
SCALE AS SHOWN

SEPTEMBER 1948.

HCW
9/27/48

MICROFILMED



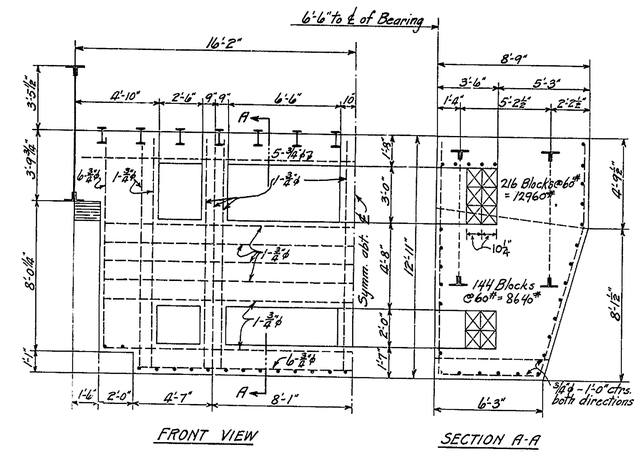


360 Concrete Adjustment Blocks reqd to balance bridge as per computations below.

	Member	No Pcs	Estimated Weight	H	Mh		V	Mv	
Machinery	G 1	2	1620						
	G 2	2	3200	20.00	200000		10.00	100000	
	10¾"φ × 7'-0"	2	4320						
	B 1	2	860						
	B 2	2	1180	20.00	23600		10.40	12300	
	G 3	2	700						
	G 4	2	1600	7.08	61600		10.02	36200	
	7"φ × 5'-0"	2	1308						
	B 3	4	1500	17.08	25600		10.32	15500	
	G 5	2	160						
	G 6	2	420	20.25	19400		10.37	10000	
	4½"φ × 3'-6"	2	880						
	B 4	4	440	20.25	8900		10.45	4600	
	G 7	2	58						
	G 8	1	810	19.04	23500		10.50	13000	
	3"φ × 14'-0"	1	336						
	Coupling	1	30						
	B 5	4	240	19.04	4600		10.62	2500	
	G 9	1	44						
	2"φ × 2'-6"	1	27						
	Couplings	2	60						
	Motors	2	960						
	Brakes	2	240	20.94	35600		10.56	18000	
	Limit Switch	1	100						
	Wire & Conduit		200						
	B 6	2	70						
	G 10	1	22						
	2"φ × 3'-3"	1	35	17.29	1900		10.50	1100	
	Cranks	2	50						
	B 7	2	190	17.29	3300		10.70	2000	
	Nav. Lights	2	175	53.00	9300		9.0	1570	
	Totals		21,335	19.6	417300		10.18	216770	
	Was advised 9-25-29 by Del. Rv. Engr that 2.0" would be more nearly correct (actual tests showed 1.94" per B.M.)								
Roadway (All Floor Timber to be Creosoted Douglas Fir)									
4"×10" Roadway	2730 BM Nailers @	3.6	9820				5.41	55000	
	Bolts		330						
	3740 BM Floor @	3.6	35000				5.05	177500	
	Nails		190	44.14	2380000				
	820 BM Curb @	3.6	2950				4.60	14300	
	Bolts		150						
	24×¾" Wearing Pls.		5450				4.85	26800	
	Lag Screws		70						
	Totals		53960	44.14	2380000		5.06	273600	
Sidewalk	Sidewalk								
	890 BM Nailers @	3.6	1405				4.54	6900	
	Bolts		120	5.43	348000				
	1310 BM Plank @	3.6	4725				4.30	20400	
	Nails		20						
	Totals		6270	5.543	348000		4.35	27300	
Platform	Platform.								
	76 B.M. (2×3)	3.6	275	15.00	4100		11.40	3130	

	Dwg No.	Member	No Pcs	Estimated Weight	H	Mh		V	Mv	
EB 4689 - Structural Steel	1	T 1	1	6055	6.96	42100		9.31	56300	
		LP 7	2	752	8.13	6100		13.77	10360	
	2	T 2	1	7177	12.17	87400		9.77	70100	
	3	FB 9	1	6072	20.00	121440		13.81	84000	
		10	2	2796	17.40	48600		11.74	56750	
		11	2	2042	17.68	36100				
		12	2	590	17.21	20350		11.23	12060	
		FB 13	2	590						
		MS 11	2	626	20.89	13100		11.10	6950	
		A 1	4	184	15.25	2810		11.92	2200	
		A 2	1	162	14.12	2290		10.58	1710	
	4	S 22	1	324	13.46	4360		13.70	4440	
		P 5	2	448	26.43	11850		4.25	1900	
		FB 5	1	4296	68.50	294200				
		6	2	8610	47.37	408000		.690	149500	
		7	1	4434	82.58	366000				
		FB 8	1	4308	26.25	113200				
		BK 4	2	788	30.62	24100				
		5	4	1500	54.40	119100		6.70	24600	
		6	2	692						
		BK 7	2	682	82.55	56400				
		P 2	2	62	54.00	3350				
		3	12	132	54.40	7180		5.50	2170	
		P 4	2	200	82.40	16470				
		BK 8	2	722	30.62	22100		6.70	4830	
	5	G 3	2	66068	36.25	2395000		7.02	463800	
	6	L 1	8	416	54.40	77000				
		L 2	2	1056	19.20	20300		6.60	19100	
		L 3	2	214	19.64	4080				
		L 4	2	210						
		L 5	2	1940	13.60	31650		13.95	32700	
		L 6	2	404						
		L 7	4	3888	61.45	238200				
		LP 1	8	304	57.90	17600				
		LP 2	4	260	54.40	14100		6.60	8200	
		LP 3	2	178	26.00	4630				
		LP 4	2	110	12.00	1320				
		LP 5	1	79	19.25	1520		13.95	1100	
		BS 1	22	9801	56.33	524240				
		BS 2	6	2538	61.45	155800				
		BS 3	8	3384						
		BS 4	8	3384	54.40	552270				
		BS 5	8	3384						
		BS 6	1	1232						
		S 7	2	1232				6.05	190600	
		S 8	2	1232	15.66	115600				
		S 9	2	1232						
		S 10	4	2464						
		S 11	2	1236						
		S 12	2	296	33.29	7100				
		S 13	2	600						
		S 14	4	1124	54.40	122200				
		S 15	4	1124						
		S 16	2	578	15.54	8980		5.12	23700	
		S 17	2	578						
		S 18	2	608	33.80	41000				
		S 19	2	608						
		S 20	2	174	16.10	2800		13.60	2370	
		S 21	2	1232	15.66	19300		6.05	7450	
	F1	UTP 1	2	2860	16.30	46600		14.58	41700	
	F2	Subway Grating		2840	16.75	47600		13.70	38900	
		Hand Railing		7300	53.75	392400		2.5	18250	
		Totals		177415	37.15	6595730		7.52	1335740	

Dwg No.	Member	No. Pcs	Est. Weight	H	Mh		V	Mv	
	SUMMARY (Center of Moments at Elev. 17.08')								
	Machinery		21335	19.60	417300		10.18	216770	
	Roadway		53960	44.14	2380000		5.06	273600	
	Sidewalk		6270	55.43	348000		4.35	27300	
	Platform		275	15.00	4100		11.40	3130	
	Str. Steel		177415	37.15	6595730		7.52	1335740	
	Paint (#/ton str. steel)		707	37.15	92000		7.52	18600	
	Field Riv. Hds. (% str. steel)		1770						
			261832	37.60	9837130		7.18	1875140	
	Above About Trunnion		261832	17.60	4600000		2.82	738000	
	COUNTERWEIGHT ABOUT TRUNNION								
	Gross concrete ft³		2789	10.81	30200		1.66	4630	
	Deduct enc. steel								
	T1, LP7, T2	1394	29						
	Stringers (#)	2620	51	10.53	410		0		0
	Rein Rods	2320	51						
	Net concrete		2750	10.80	29790		1.69	4630	
	Concrete @ 148#		407000	10.80	4390000		1.69	688000	
	Reinf. Rods		2320	10.53	24400		3.00	6960	
	Adjust. Blocks								
	Upper Pockets		12960	9.12	197100		-1.00	-12960	
	Lower "		8640				6.18	53280	
			430920	10.7	4611500		1.706	735280	



FRONT VIEW

SECTION A-A

COUNTERWEIGHT

SCALE ¼" = 1'-0"

Counterweight including rods furnished and placed by General Contractors.
Final Weight of Concrete 148# per cu. ft.

Counterweight Volume

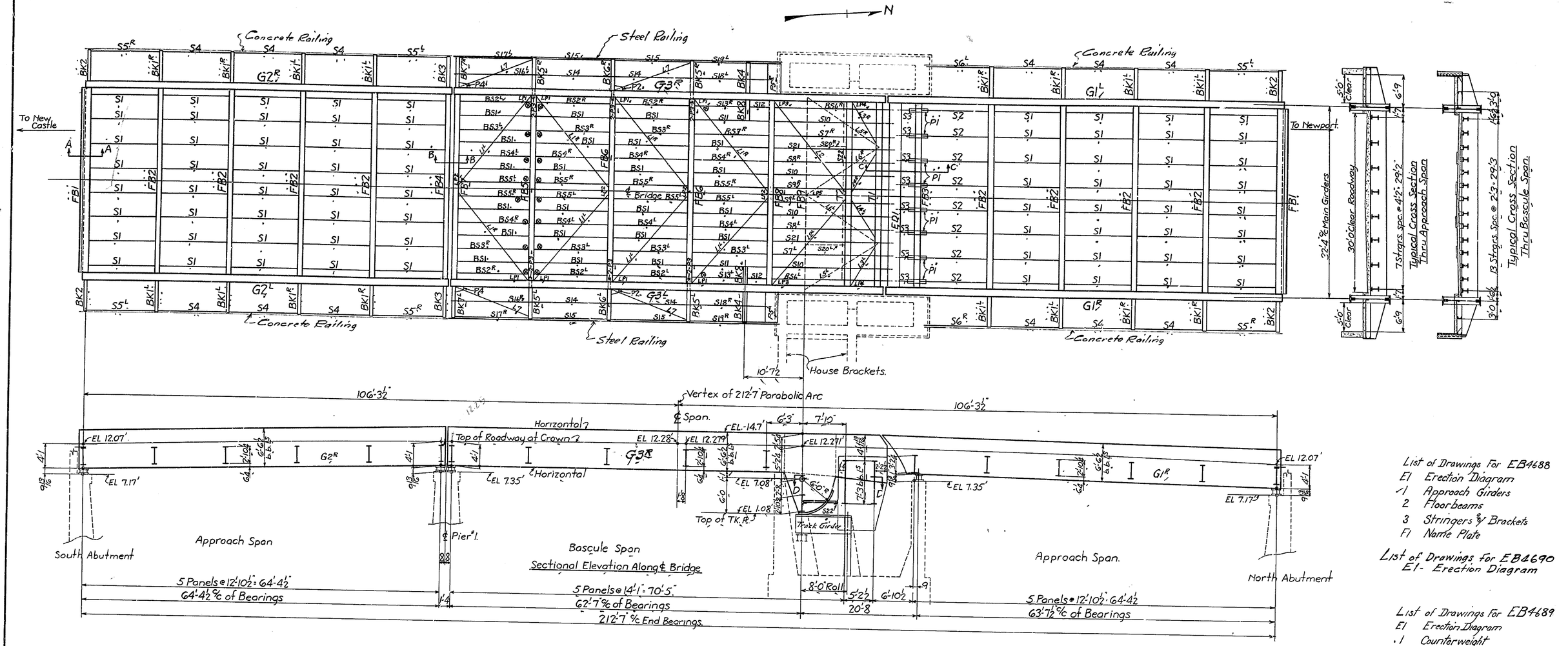
32.33 x 8.75 x 4.79 - - - +1355.5
29.33 x 8.13 (over) x 7.5 - - +1789.0
3.0 x 8.75 x 1.08/2 - - - - - 12.85
1.08 x 4.0 x 6.4 - - - - - 27.65
Pockets 3.5 x 5.0 x 18.0 - - - - 315.0
Total - - - 2789 cu. ft.

Approved June 3, 1929
Keller & Harrington
Signed by H. P. Harrington

Counterweight Computation
Newport Bridge across Christiana River
for State Highway Dept. of Delaware
Customer — Al. S. Fox & Co.

BETHLEHEM STEEL COMPANY
ERECTION DEPARTMENT
BETHLEHEM, PA.

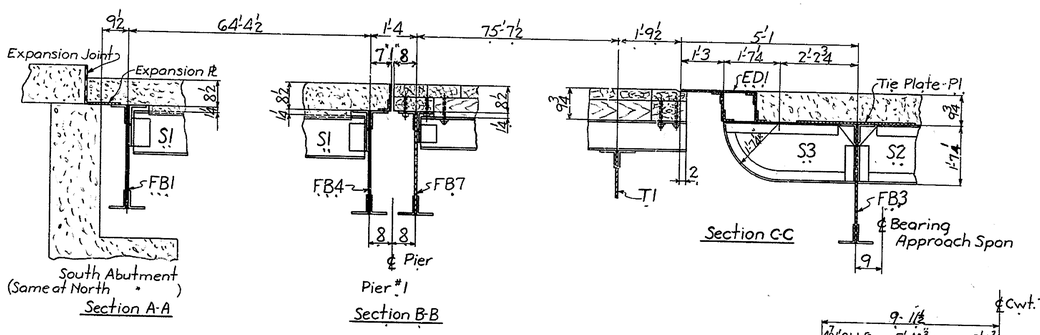
SCALE ⅛" = 1'-0" SHOP ORDER —
MADE L.S.-M. SHOP BILLS —
CHECKED S+M CONTRACT EN 1504
DATE April 27, 1929 DRAWING 2

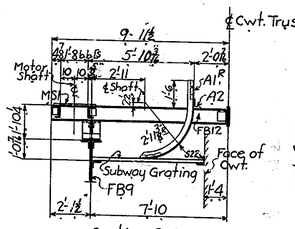


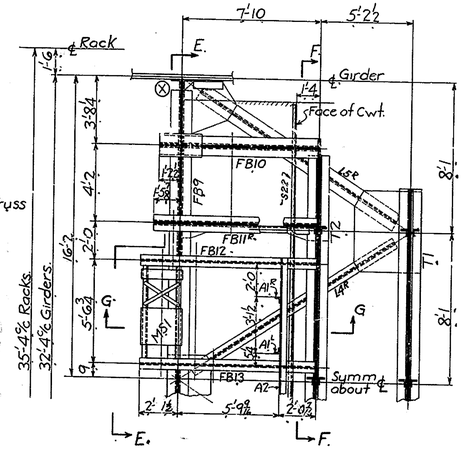
List of Drawings For EB4688
E1 Erection Diagram
1 Approach Girders
2 Floorbeams
3 Stringers & Brackets
F1 Name Plate

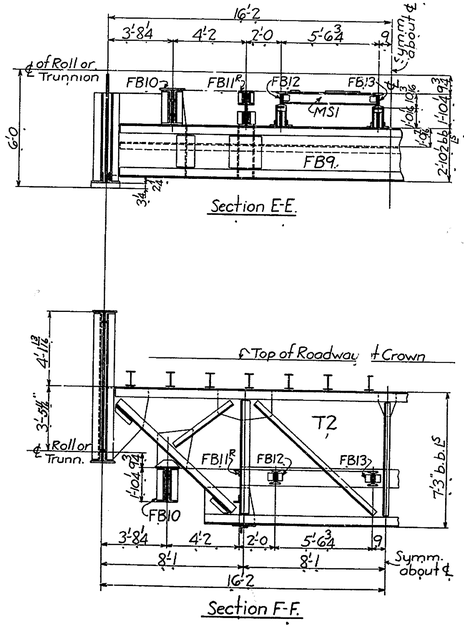
List of Drawings for EB4690
E1- Erection Diagram

List of Drawings for EB4689
E1 Erection Diagram
1 Counterweight
2 " "
3 Machinery Support
4 Floorbeams & Brackets
5 Main Girders
5A " "
6 Stringers & Laterals
F1 Track Plate
F2 Subway Grating









Field Paint- Two coats Dupont's Antoxide or equal.

NOTES:-
Rack and Track Support (Complete) furnished and erected by others.
All operating machinery, buffers, end locks and shoes furnished and erected by others.
Operators house furnished by others.
All timber flooring, steel wearing plates, and fastenings on the bascule span furnished and erected by others.
Reinforced concrete for roadway, sidewalks and railing on approach spans furnished and erected by others.
Concrete for counterweight to be furnished and erected by others.

BETHLEHEM STEEL COMPANY
Fabrication and Erection Dept. BETHLEHEM, PA.

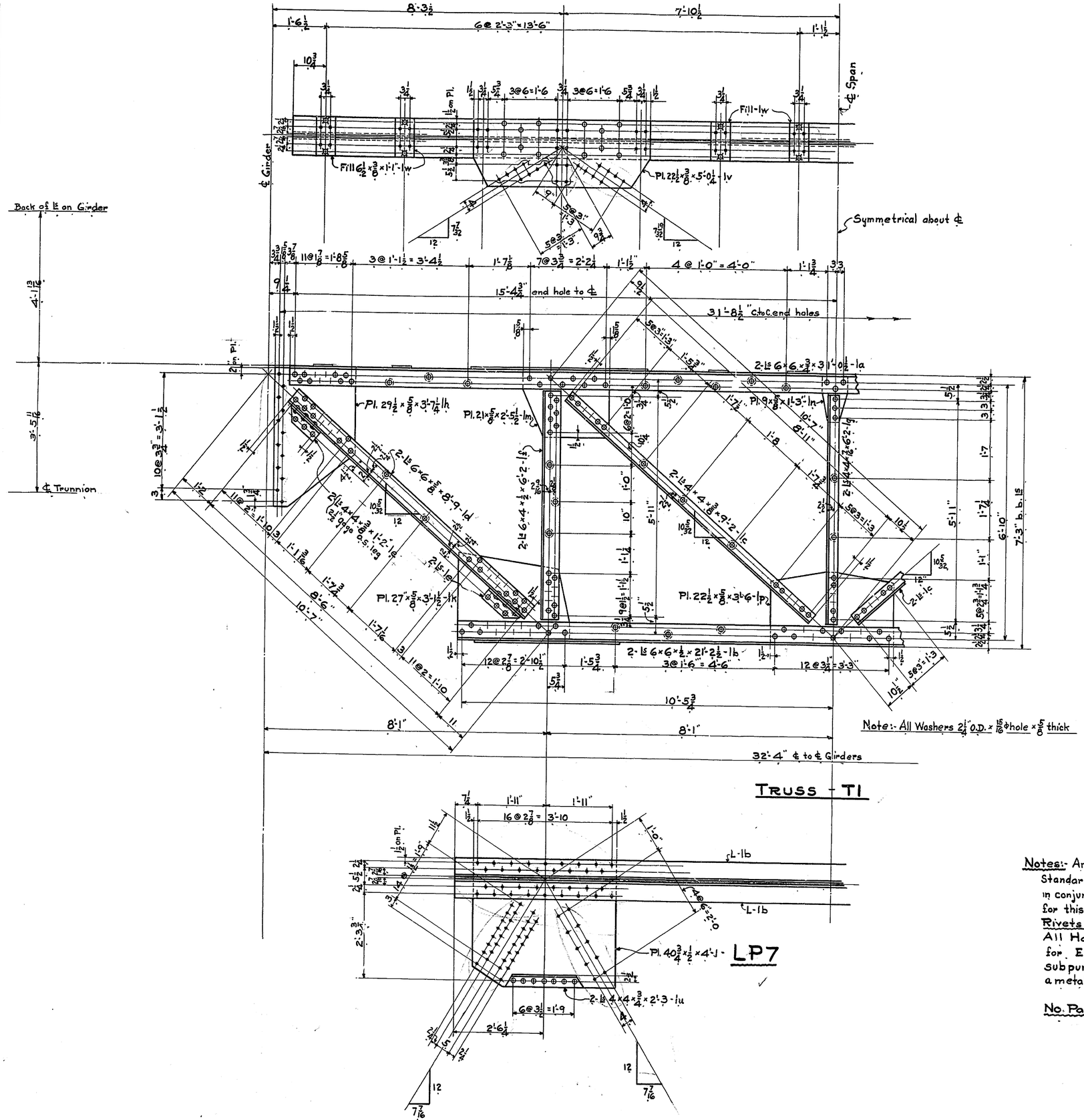
DETAIL OF Erection Diagram
STRUCTURE Newport Bridge across Christiana River. For State Hwy. Dept. of Delaware.
CUSTOMER Al. S. Fox & Co.

SHOP PAINT
RIVETS OPEN HOLES UNLESS NOTED

DRAWN BY	DATE	CHECKED BY	DATE	SQUAD
J.H.B.		J.G.I. T.C.M. W.	3/1/27	Chas. A. Wells

REVISIONS No.	DATE	BY	DESCRIPTION

FILE F8579 CONT. E B4688 B4690 DWG. E1



Required List
One - Truss - T1.
2 - Laterial Pl. - LP7.

Notes:- Am. Ass. of State Highway Officials Standard Spec. for Highway Bridge - 1925 in conjunction with those of Keller and Harrington for this Bridge
Rivets: ⅞", Open holes 15/16" except as noted. All Holes punched full size except those for End connections, which are to be subpunched 11/16" ϕ and Reamed to size to a metal templet.

No. Paint.

Compare Templets with Dwg. EB4689/2.

BETHLEHEM STEEL COMPANY
Fabrication and Erection Dept. BETHLEHEM, PA.

DETAIL OF Counterweight Truss. (T1)
STRUCTURE Newport Bridge across Christiana River For State Highway Dept. of Delaware
CUSTOMER Al. S. Fox and Co.

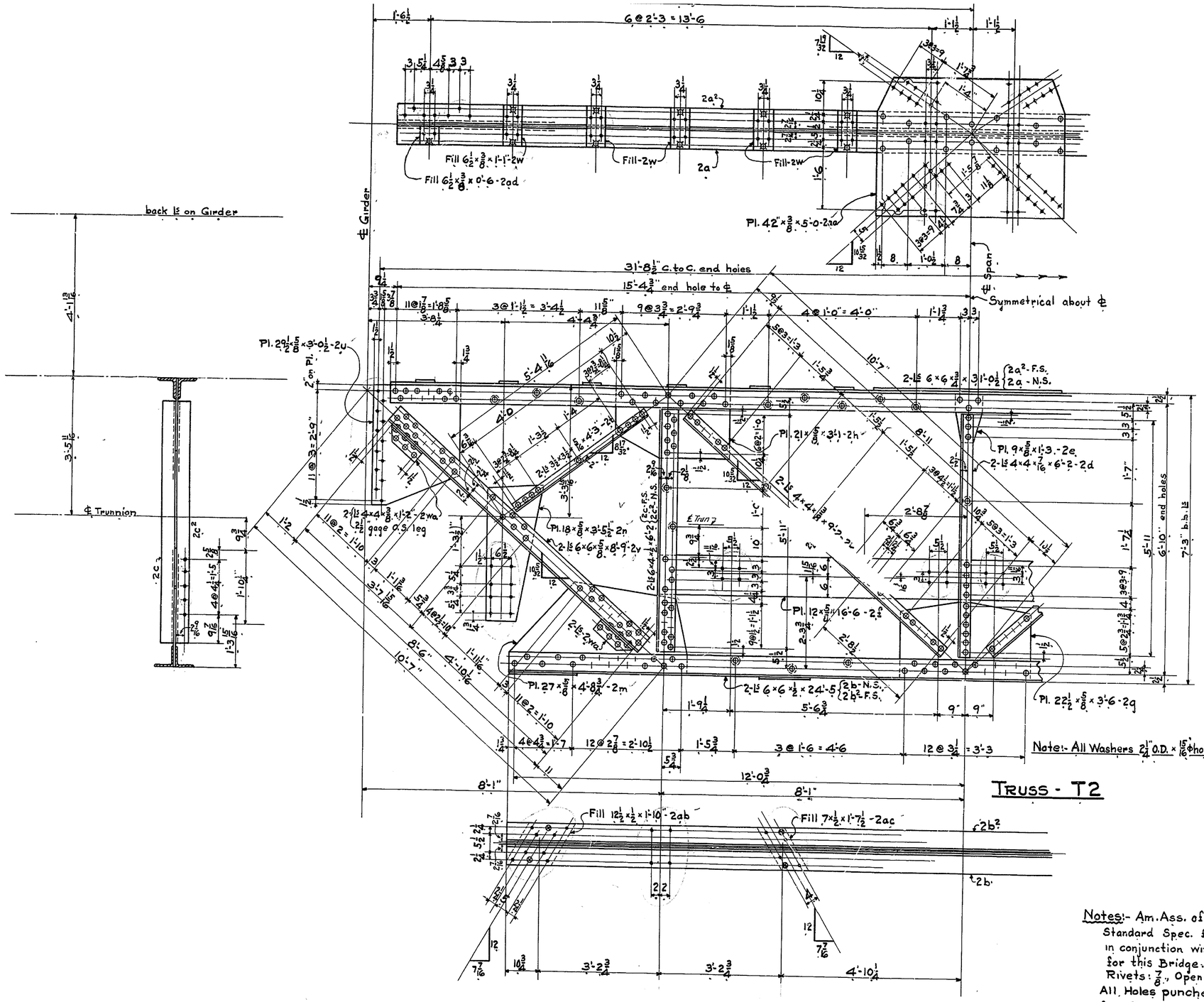
SHOP PAINT See Note
RIVETS ~~ OPEN HOLES ~~ UNLESS NOTED

DRAWN BY	DATE	CHECKED BY	DATE	SQUAD
R.V.K.	2/14/29	W	3.6.29	Chas H. Noble

REVISIONS No.	DATE	BY	DESCRIPTION

Adv. Bill #3

FILE-F8579 CONT.-EB4689 DWG. 1



Required List

One. - Truss. - T2.

Notes:- Am. Ass. of State Highway Officials Standard Spec. for Highway Bridges - 1925 in conjunction with those of Keller & Harrington for this Bridge.
Rivets: ⅞", Open Holes 15/16" except as noted.
All Holes punched full size exept those for End Connections, which are to be subpunched 11/16" ϕ and Reamed to size to a metal templet.

No Paint

Compare Templets with Dwg. EB4689. 1

BETHLEHEM STEEL COMPANY

Fabrication and Erection Dept. BETHLEHEM, PA.

DETAIL OF Counterweight TRUSS (T2)

STRUCTURE Newport Bridge across Christiana River For State Highway Dept. of Delaware

CUSTOMER Al. S. Fox & Co.

SHOP PAINT See Note

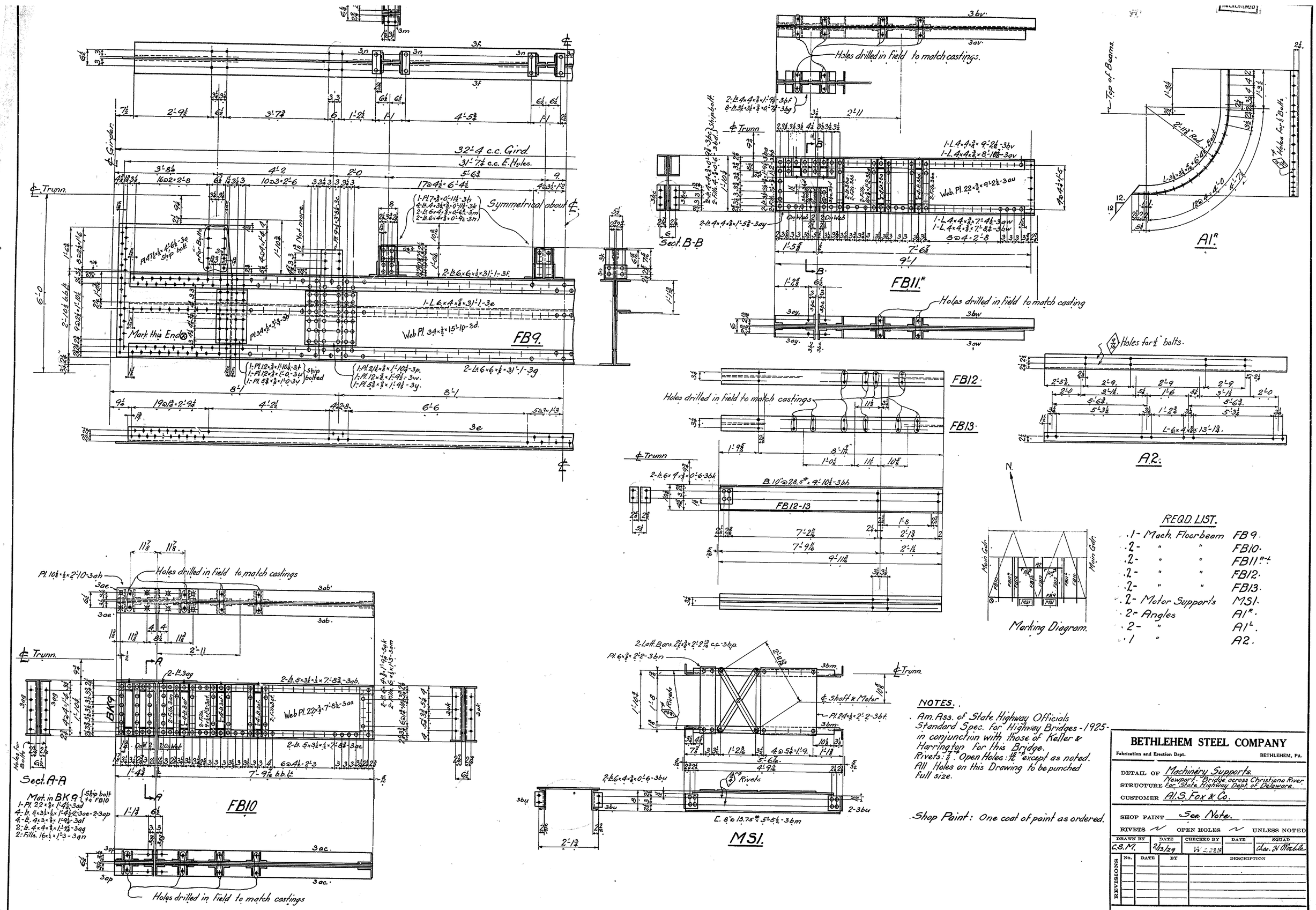
RIVETS ~ OPEN HOLES ~ UNLESS NOTED

DRAWN BY	DATE	CHECKED BY	DATE	SQUAD
R.V.K	3/17/29	W	3.6.29	Chas. H. Noehle

REVISIONS No.	DATE	BY	DESCRIPTION

FILE F8579 CONT. EB4689 DWG. 2

Adv. Bill #4



REQD. LIST.

1-	Mach. Floorbeam	FB9.
2-	" "	FB10.
2-	" "	FB11.R-L
2-	" "	FB12.
2-	" "	FB13.
2-	Motor Supports	MS1.
2-	Angles	A1R.
2-	"	A1L.
1	"	A2.

NOTES.

Am. Ass. of State Highway Officials Standard Spec. for Highway Bridges - 1925 - in conjunction with those of Keller & Harrington for this Bridge.
Rivets: 7/8" Open Holes: 15/16" except as noted.
All Holes on this Drawing to be punched full size.

Shop Paint: One coat of paint as ordered.

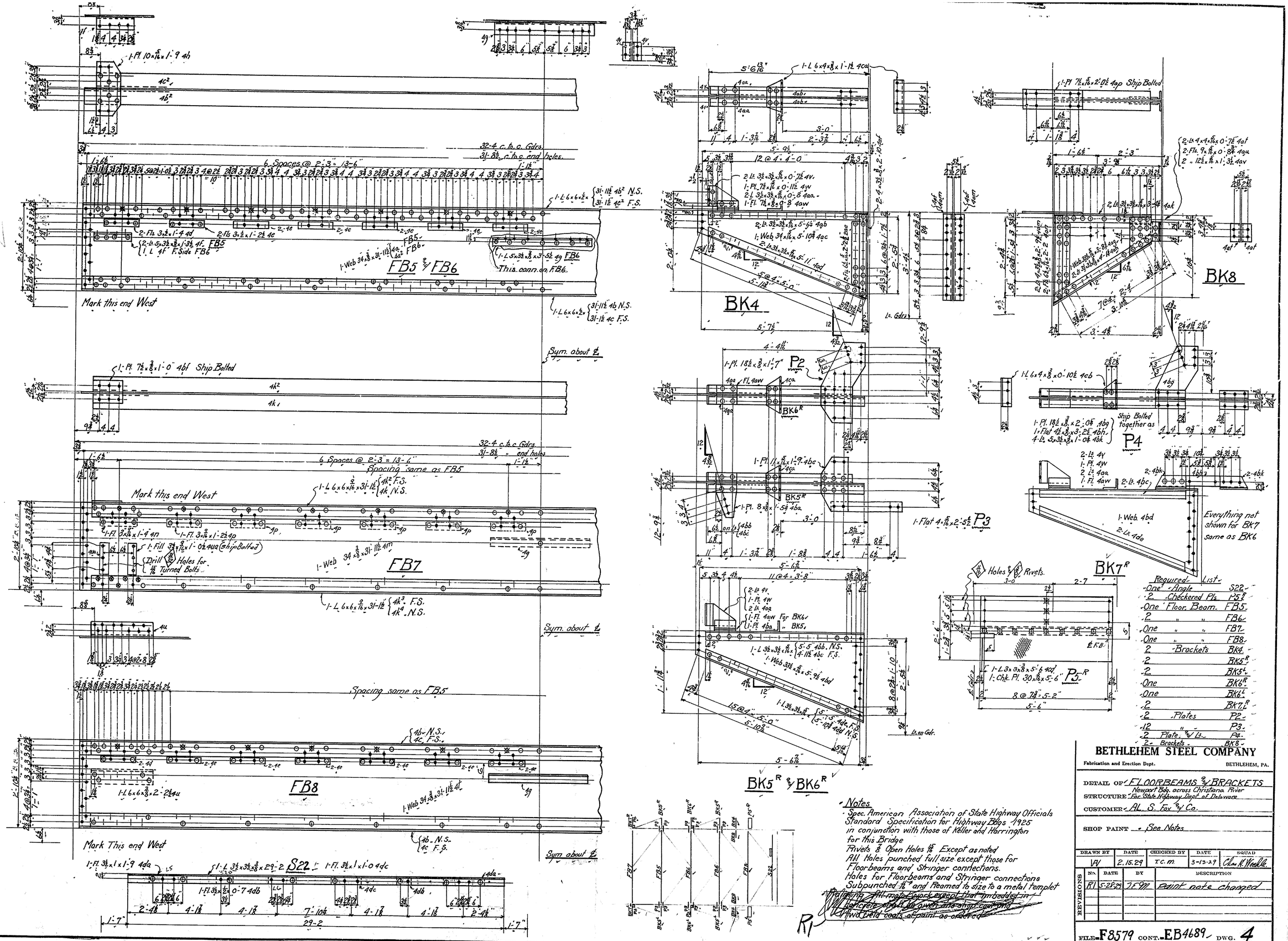
BETHLEHEM STEEL COMPANY
Fabrication and Erection Dept. BETHLEHEM, PA.

DETAIL OF Machinery Supports.
STRUCTURE Newport. Bridge across Christiana River for State Highway Dept. of Delaware.
CUSTOMER Al. S. Fox & Co.
SHOP PAINT See Note.
RIVETS ~ OPEN HOLES ~ UNLESS NOTED

DRAWN BY	DATE	CHECKED BY	DATE	SQUAD
C.S.M.	2/13/29	W. 2.28.29		Chas. H. Noble

REVISIONS No.	DATE	BY	DESCRIPTION

FILE F8579 CONT. F.B4689 DWG. 3



Required List

One	Angle	S22
2	Checkered Pls.	P5R
One	Floor Beam	FB5
2	" "	FB6
One	" "	FB7
One	" "	FB8
2	Brackets	BK4
2		BK5R
2		BK5L
One		BK6R
One		BK6L
2		BK7R
2	Plates	P2
12	"	P3
2	Plate & Ls.	P4
2	Brackets	BK8

Notes

Spec. American Association of State Highway Officials Standard Specification for Highway Bdgs 1925 in conjunction with those of Keller and Harrington for this Bridge

Rivets 7/8 Open Holes 15/16 Except as noted

All Holes punched full size except those for Floorbeams and Stringer connections.

Holes for Floorbeams and Stringer connections Subpunched 1/16" and Reamed to size to a metal templet

~~Painting All metal work except that imbedded in concrete shall be given one ship coat and two field coats of paint as ordered~~

R1

BETHLEHEM STEEL COMPANY

Fabrication and Erection Dept. BETHLEHEM, PA.

DETAIL OF FLOORBEAMS & BRACKETS

STRUCTURE Newport Bdg. across Christiana River For State Highway Dept of Delaware

CUSTOMER AL. S. Fox & Co.

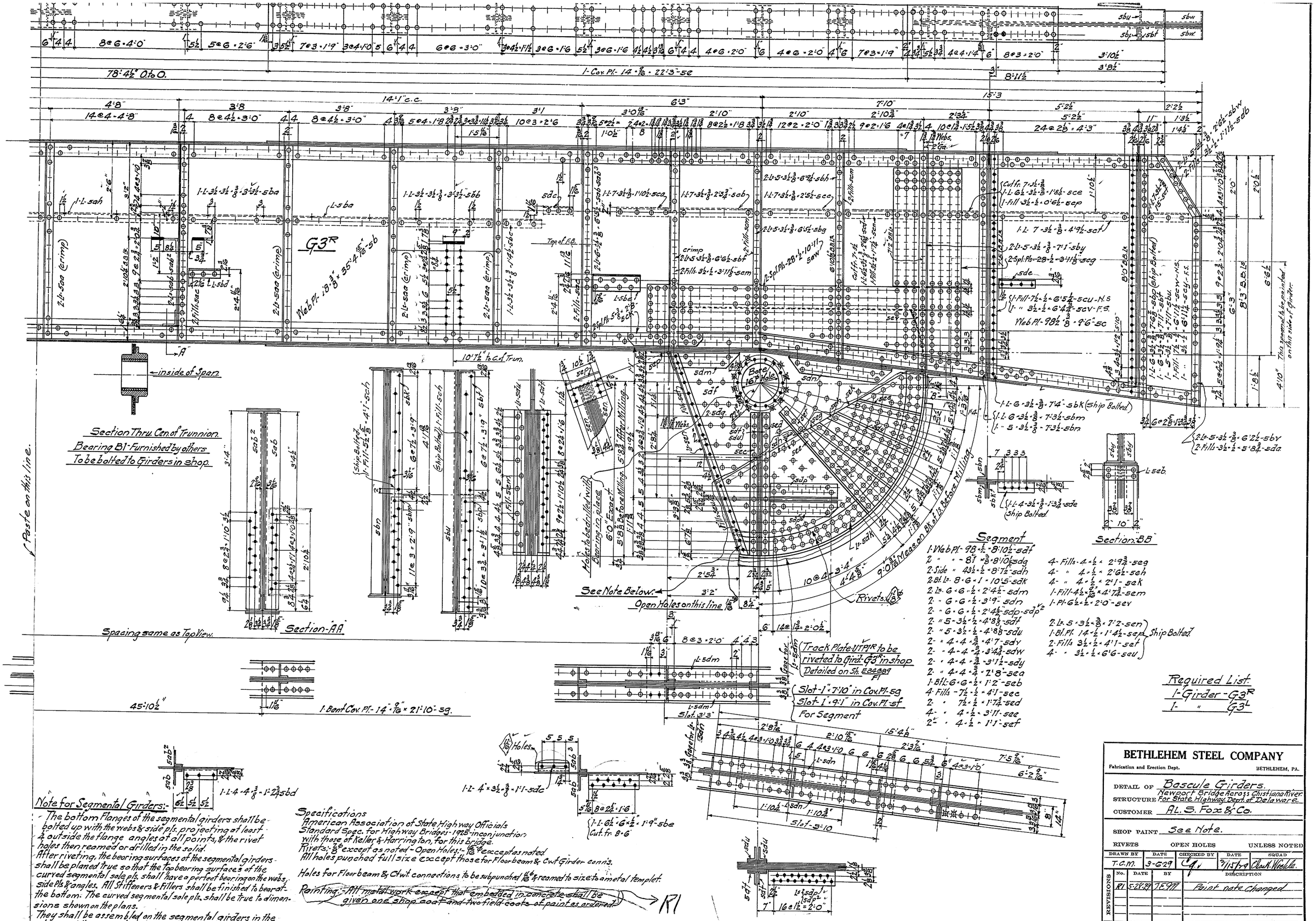
SHOP PAINT See Notes

DRAWN BY	DATE	CHECKED BY	DATE	SQUAD
VA	2.15.29	T.C.M.	3-13-29	Chas. K. Woehle

REVISIONS No.	DATE	BY	DESCRIPTION
R1	5-28-29	JEM	Paint note changed

FILE F8579 CONT. EB4689 DWG. 4

Adv. Bills 5-6-10



BETHLEHEM STEEL COMPANY

Fabrication and Erection Dept. BETHLEHEM, PA.

DETAIL OF Bascule Girders.

STRUCTURE Newport Bridge Across Christiana River. For State Highway Dept. of Delaware.

CUSTOMER AL. S. Fox & Co.

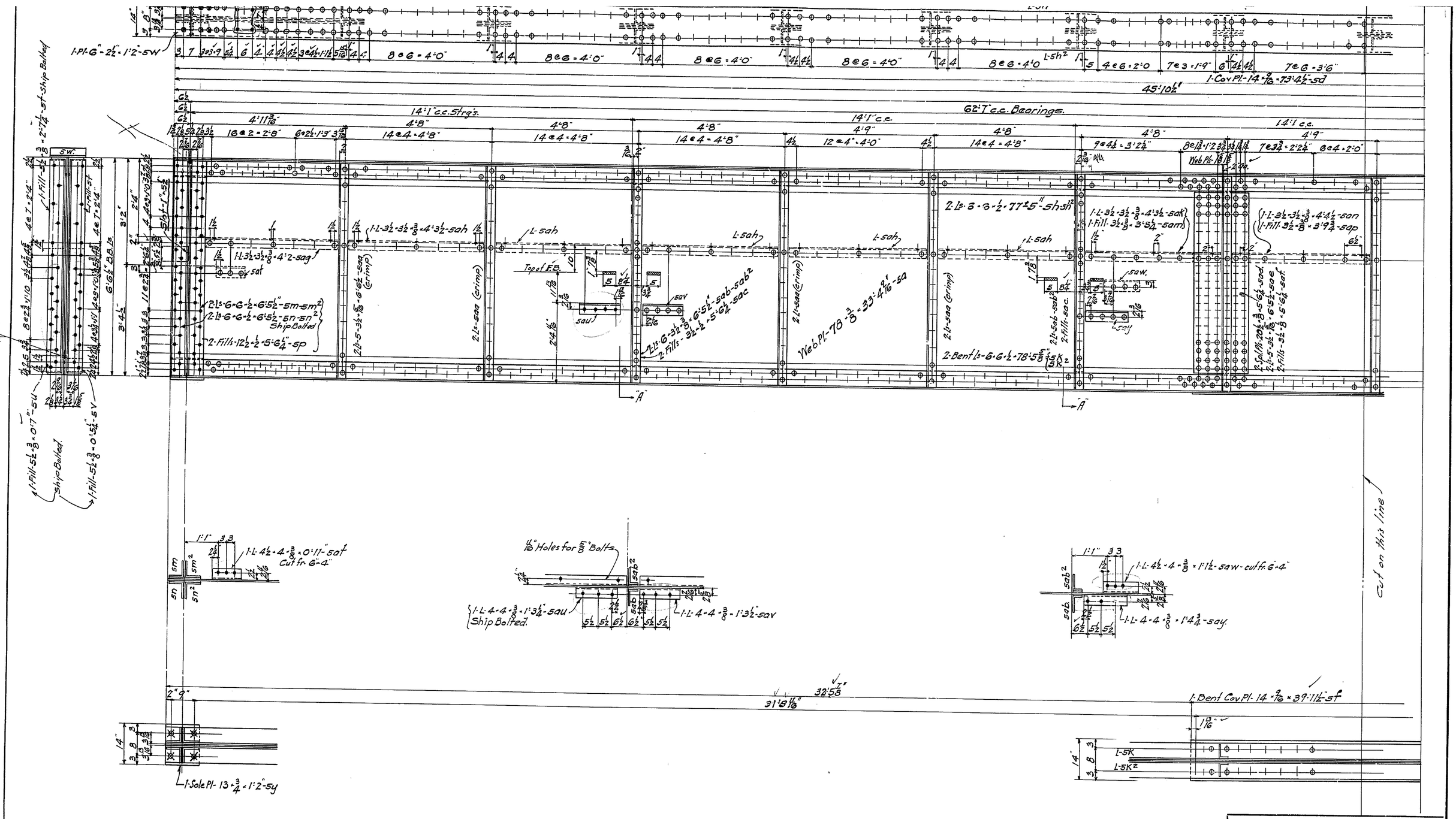
SHOP PAINT See Note.

RIVETS OPEN HOLES UNLESS NOTED

DRAWN BY	DATE	CHECKED BY	DATE	SQUAD
T.C.M.	3-6-29	C.A.	3/15/29	Clark Wheeler

REVISIONS No.	DATE	BY	DESCRIPTION
R1	5-28-29	T.C.M.	Paint note changed

FILE F8579 CONT. F.B.4689 DWG. 5



BETHLEHEM STEEL COMPANY

Fabrication and Erection Dept. BETHLEHEM, PA.

DETAIL OF Bascule Girders

STRUCTURE Newport Bridge

CUSTOMER A.L.S. Fox & Co.

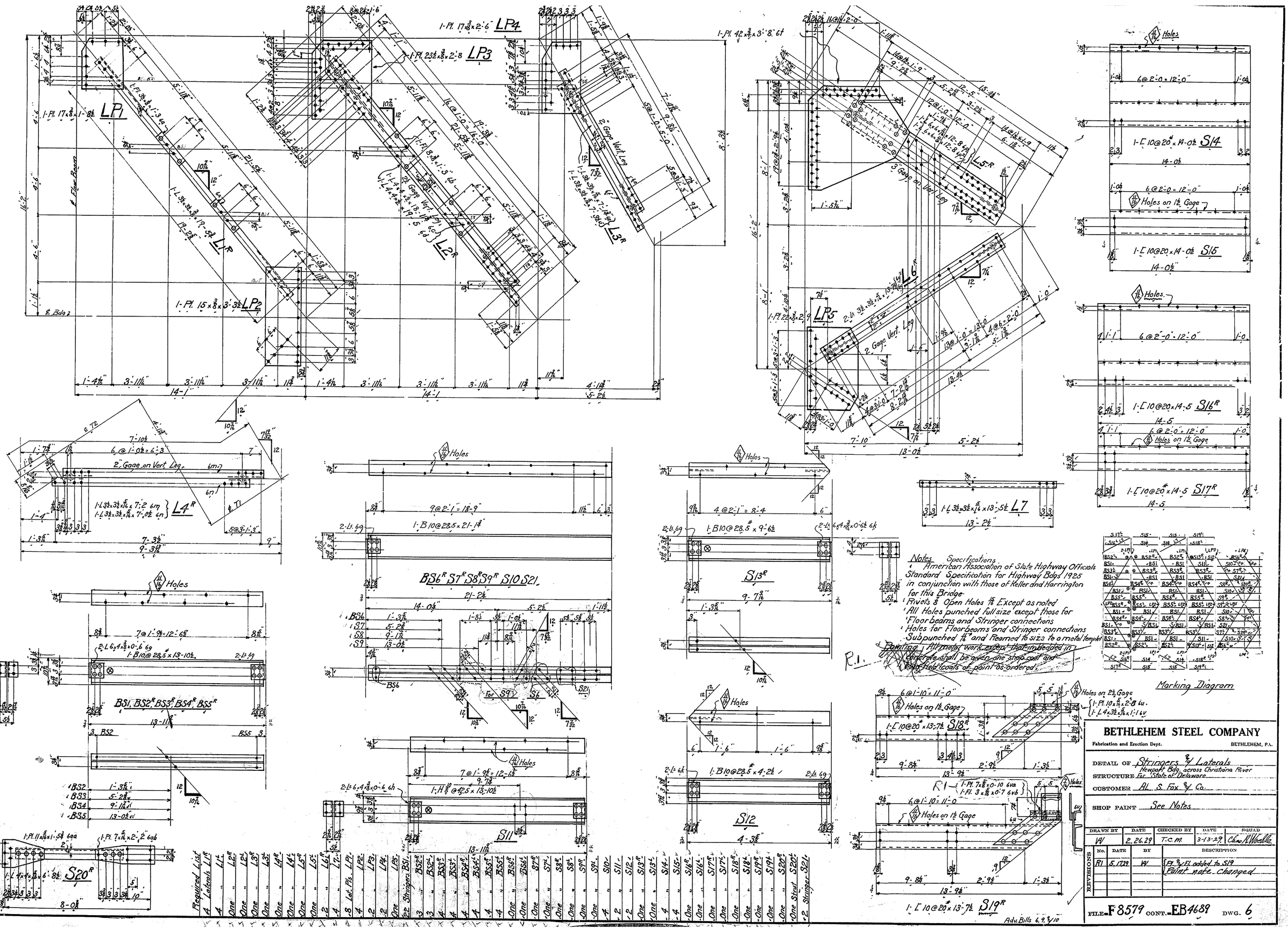
SHOP PAINT

RIVETS OPEN HOLES UNLESS NOTED

DRAWN BY	DATE	CHECKED BY	DATE	SQUAD
T.C.M.		Cy	3/15/29	Chas. H. Woelfle

REVISIONS No.	DATE	BY	DESCRIPTION

FILE-F8579 CONT.-EB4689 DWG. 5A



Notes Specifications
American Association of State Highway Officials
Standard Specification for Highway Bdgs 1925
in conjunction with those of Keller and Harrington
for this Bridge
Rivets 7/8 Open Holes 15/16 Except as noted
All Holes punched full size except those for
Floor beams and Stringer connections
Holes for Floorbeams and Stringer connections
Subpunched 11/16" and Reamed to size to a metal templet
Painting All metal work except that imbedded in
concrete shall be given one shop coat and
two field coats of paint as ordered.

R.1.

Marking Diagram

BETHLEHEM STEEL COMPANY

Fabrication and Erection Dept. BETHLEHEM, PA.

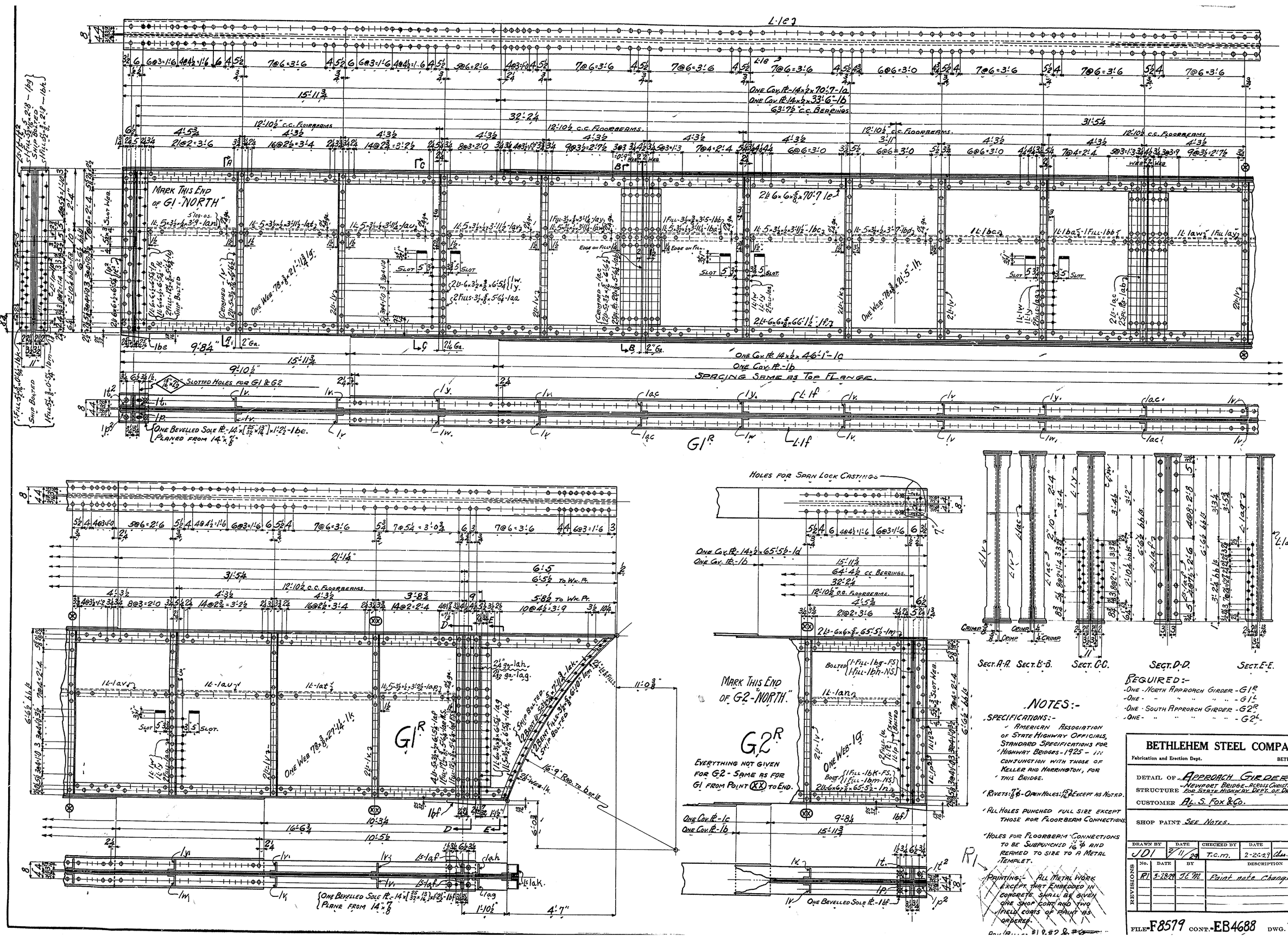
DETAIL OF Stringers & Laterals
STRUCTURE Newport Bdg. across Christiana River For State of Delaware
CUSTOMER Al. S. Fox & Co.
SHOP PAINT See Notes

DRAWN BY	DATE	CHECKED BY	DATE	SQUAD
W	2.26.29	T.C.M.	3-13-29	Chas. R. Woelfle

REVISIONS No.	DATE	BY	DESCRIPTION
R1	5.17.29	W	Pl. 3/8 El. added to S19 Paint note changed

FILE F8579 CONT. EB4689 DWG. 6

Adv. Bills 6, 9, 9/10



REQUIRED:-
- ONE - NORTH APPROACH GIRDER - G1R
- ONE - " " " " " - G1L
- ONE - SOUTH APPROACH GIRDER - G2R
- ONE - " " " " " - G2L

NOTES:-

SPECIFICATIONS:-
- AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICIALS, STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES - 1925 - IN CONJUNCTION WITH THOSE OF KELLER AND HARRINGTON, FOR THIS BRIDGE.
- RIVETS: 7/8"ϕ - OPEN HOLES: 15/16"ϕ EXCEPT AS NOTED.
- ALL HOLES PUNCHED FULL SIZE EXCEPT THOSE FOR FLOORBEAM CONNECTIONS.
- HOLES FOR FLOORBEAM CONNECTIONS TO BE SUBPUNCHED 1/16"ϕ AND REAMED TO SIZE TO A METAL TEMPLET.
- PAINTING:- ALL METAL WORK EXCEPT THAT EMBEDDED IN CONCRETE SHALL BE GIVEN ONE SHOP COAT AND TWO FIELD COATS OF PAINT AS ORDERED.

R1

BETHLEHEM STEEL COMPANY

Fabrication and Erection Dept. BETHLEHEM, PA.

DETAIL OF APPROACH GIRDERS.

STRUCTURE NEWPORT BRIDGE - ACROSS CHRISTIANA RIVER FOR STATE HIGHWAY DEPT. OF DELAWARE

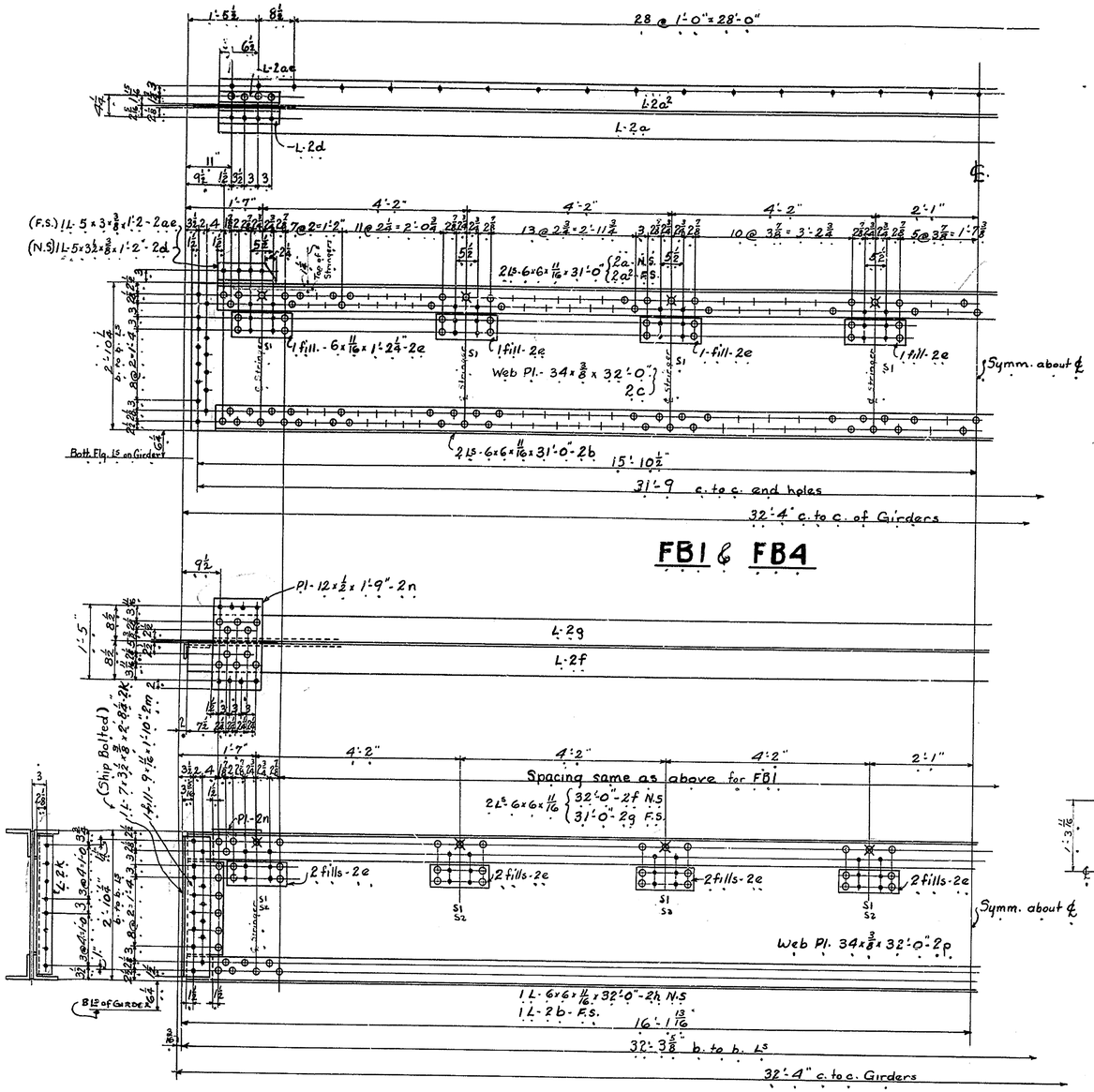
CUSTOMER AL. S. FOX & CO.

SHOP PAINT SEE NOTES.

DRAWN BY	DATE	CHECKED BY	DATE	SQUAD
JDI	2/11/29	T.C.M.	2-26-29	Chas. H. Noble

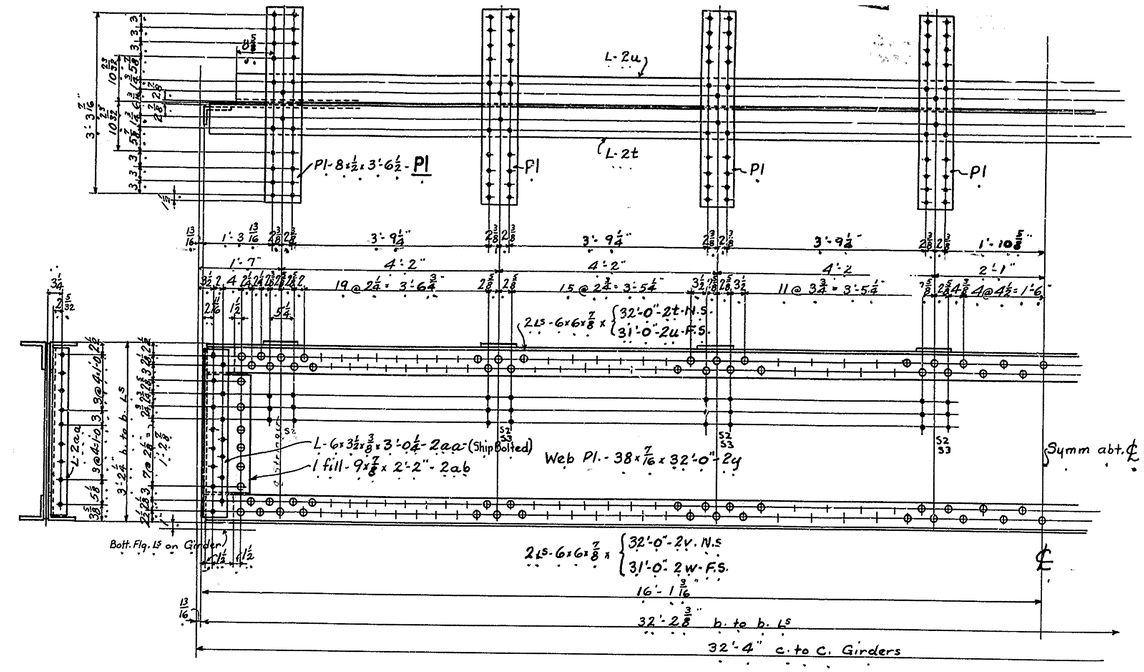
REVISIONS No.	DATE	BY	DESCRIPTION
R1	5-28-29	JCM	Paint note changed

FILE F8579 CONT. EB4688 DWG. #1.

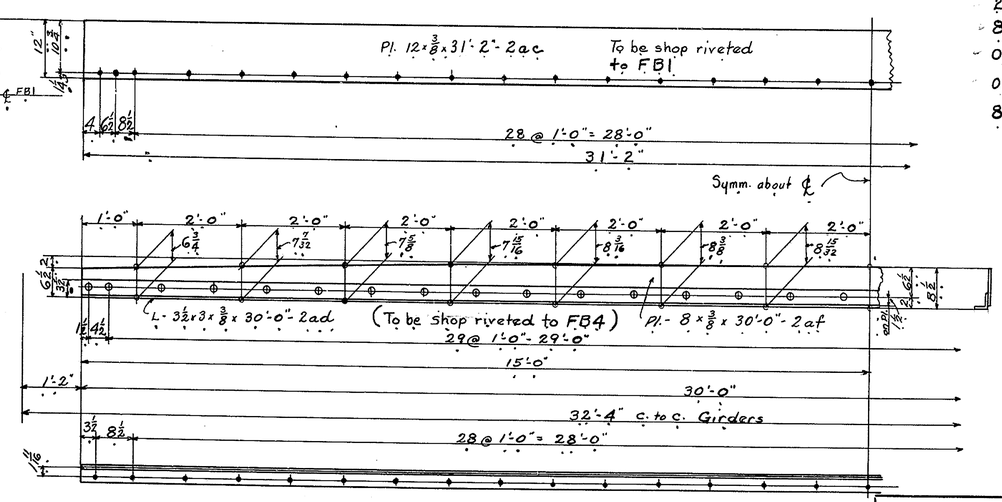


FB1 & FB4

FB2

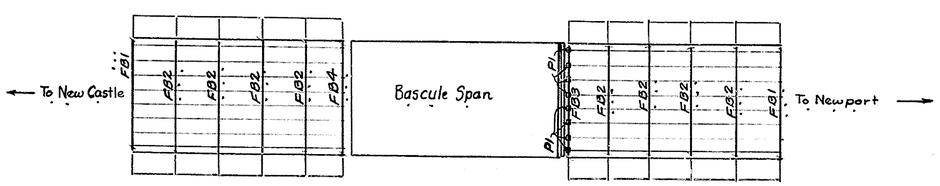


FB3



Required List

2	Floor beams	FB1
8	"	FB2
One	"	FB3
One	"	FB4
8	Plates	Pl



Marking Diagram

Notes:

American Association of State Highway Officials, Standard Specifications for Highway Bridges-1925-in conjunction with those of Keller and Harrington, for this bridge.

Rivets: 7/8"-Open Holes: 15/16" Except as noted.

All holes punched full size except those for Floor-beams and Stringer connections.

Holes for Floor beams and Stringer connections Subpunched 11/16" and reamed to size to a metal templet.

~~Painting: All Metal Work except that Imbedded in concrete shall be given one Shop coat and two Field coats of paint as ordered.~~

R1

BETHLEHEM STEEL COMPANY

Fabrication and Erection Dept. BETHLEHEM, PA.

DETAIL OF Floor beams

STRUCTURE Newport Bridge across Christiana River for State Highway Dept. of Delaware

CUSTOMER Al. S. Fox & Co.

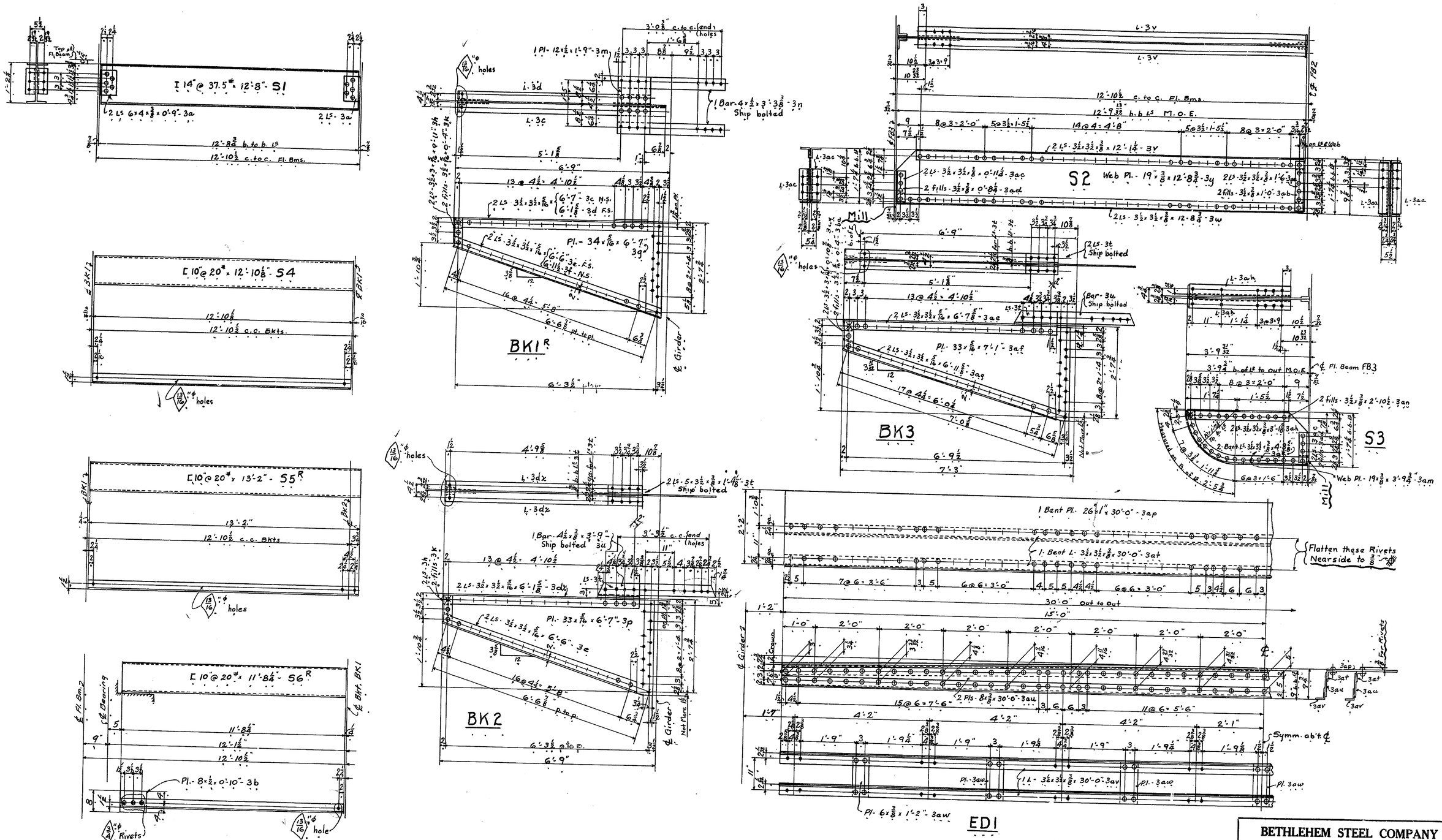
SHOP PAINT See Notes

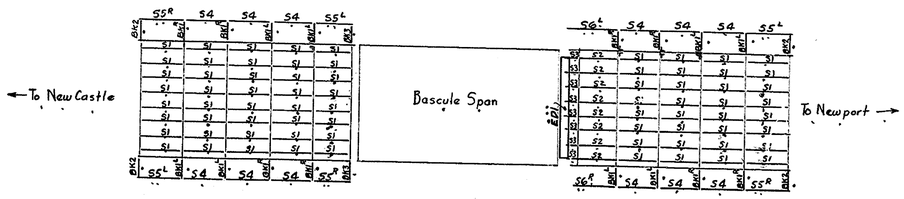
RIVETS OPEN HOLES UNLESS NOTED

DRAWN BY	DATE	CHECKED BY	DATE	SQUAD
J.E.M.	2-18-29	J.D.I.	2/19/29	Chas. H. Noble

REVISIONS No.	DATE	BY	DESCRIPTION
R1	5-28-29	J.E.M.	Paint note changed

FILE F8579 CONT. F.B4688 DWG. 2





Marking Diagram

Required List

72 -	Stringers -	S1
8 -	"	S2
8 -	"	S3
12 -	"	S4
3 -	"	S5R
3 -	"	S5L
One -	"	S6R
One -	"	S6L
8 -	Brackets -	BK1R
8 -	"	BK1L
4 -	"	BK2
2 -	"	BK3
One -	End Dam -	ED1

Notes:-

American Association of State Highway Officials, Standard Specifications for Highway Bridges - 1925 - in conjunction with those of Keller and Harrington, for this bridge.

Rivets 7/8" φ Open Hole 15/16" φ Except as Noted.

All holes punched full size except those for Floorbeams and Stringer connections.

R1 ~~Painting - All Metal Work except that Imbedded in concrete shall be given one Shop coat and two field coats of paint as ordered.~~

Holes for Floorbeams and Stringer connections Subpunched 11/16" φ and reamed to size to a metal templet. (Adv. Bills: 4-5)

BETHLEHEM STEEL COMPANY

Fabrication and Erection Dept. BETHLEHEM, PA.

DETAIL OF Stringers - Brackets & Dam

STRUCTURE Newport Bridge across Christiana R. For State Highway Dept. of Delaware

CUSTOMER Al. S. Fox & Co.

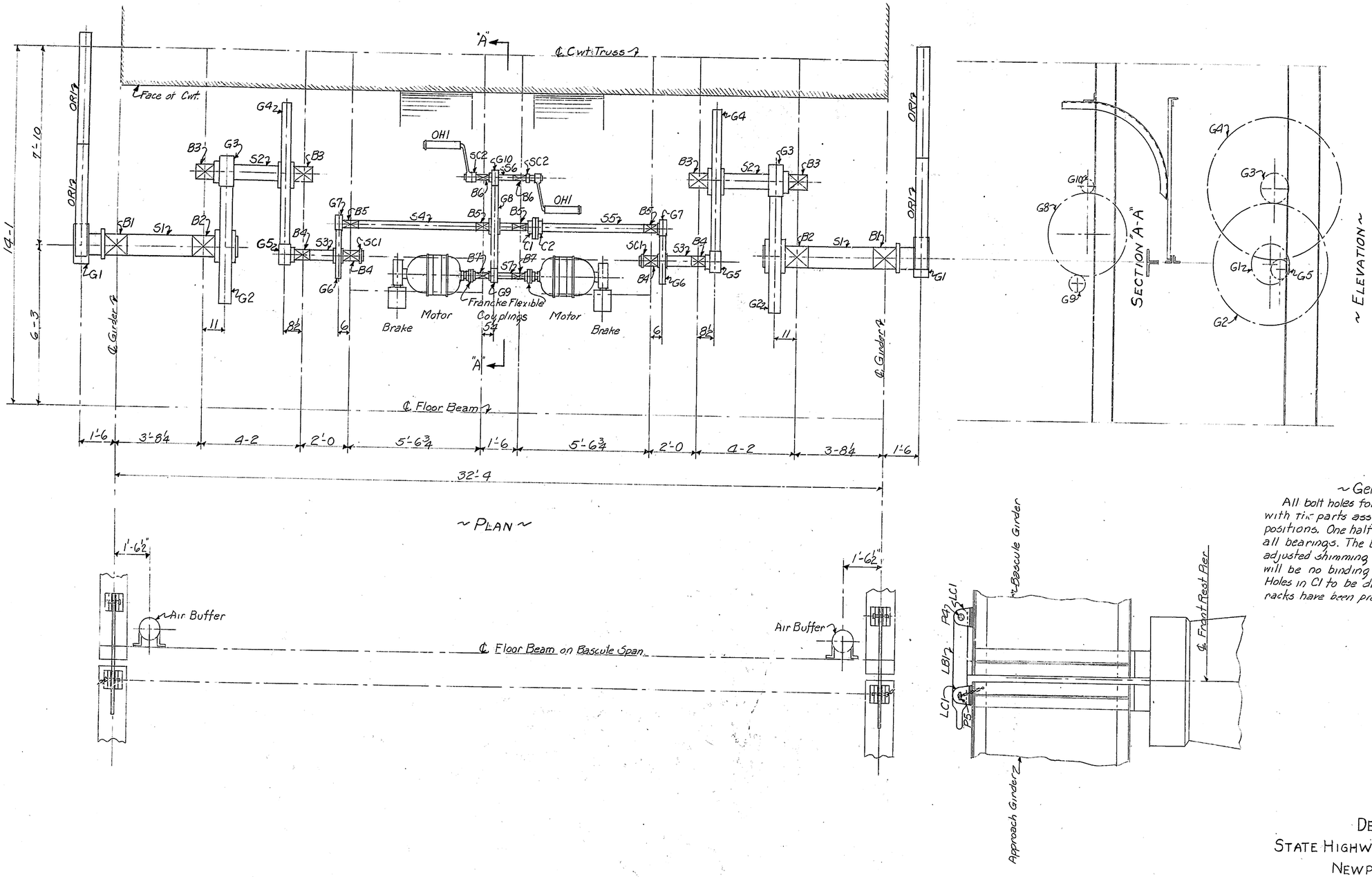
SHOP PAINT See Notes

RIVETS — OPEN HOLES — UNLESS NOTED

DRAWN BY	DATE	CHECKED BY	DATE	SQUAD
J.E.M.	2-16-29	J.D.I.	2/19/29.	Ass. Al. Wolle

REVISIONS No.	DATE	BY	DESCRIPTION
R1	5-28-29	J.E.M.	Paint note Changed

FILE - F 8579 CONT. - E B 4688 DWG. 3



~ General Notes ~

All bolt holes for bearings to be drilled in field with the parts assembled in the correct relative positions. One half inch of shims are provided for all bearings. The bearings shall be carefully adjusted shimming where necessary so that there will be no binding and all shafting will move easily. Holes in C1 to be drilled in field after gears and racks have been properly meshed.

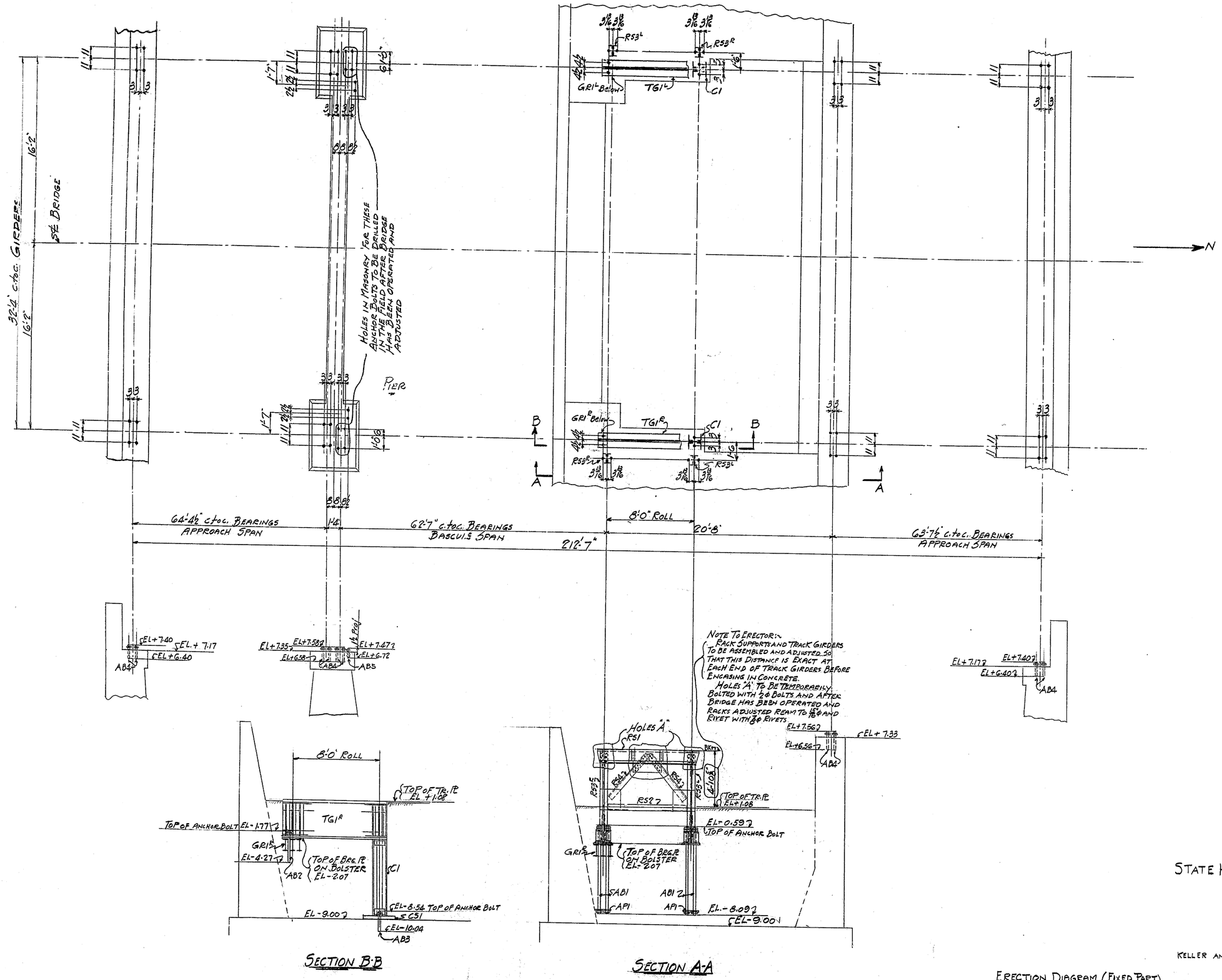
DELAWARE
STATE HIGHWAY DEPARTMENT
NEWPORT BRIDGE
ACROSS
CHRISTIANA RIVER

DESIGNED BY
KELLER AND HARRINGTON CONSULTING ENGINEERS
CHICAGO ILL.

DATE 2-27-29

MACHINERY ASSEMBLY

1262-ME1



NOTE TO ERECTOR:-
RACK SUPPORTS AND TRACK GIRDERS TO BE ASSEMBLED AND ADJUSTED SO THAT THIS DISTANCE IS EXACT AT EACH END OF TRACK GIRDERS BEFORE ENCASING IN CONCRETE.
HOLES "A" TO BE TEMPORARILY BOLTED WITH ½ϕ BOLTS AND AFTER BRIDGE HAS BEEN OPERATED AND RACKS ADJUSTED REAM TO 15/16ϕ AND RIVET WITH ⅞ϕ RIVETS.

PIER HIT ON SEPT 6-1947 AND MOVED INTO STREAM AND UP STREAM - SEE DRAWING SEPT-1947

SECTION B-B

SECTION A-A

DELAWARE
STATE HIGHWAY DEPARTMENT
NEWPORT BRIDGE
ACROSS
CHRISTIANA RIVER

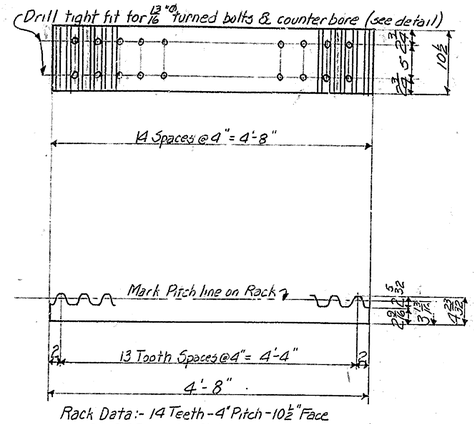
DESIGNED BY
KELLER AND HARRINGTON ~ CONSULTING ENGINEERS
CHICAGO ILL

ERECTION DIAGRAM (FIXED PART)
ANCHOR BOLT DIAGRAM

DRAWN H.W.
CHECKED H.W.-1-22-29

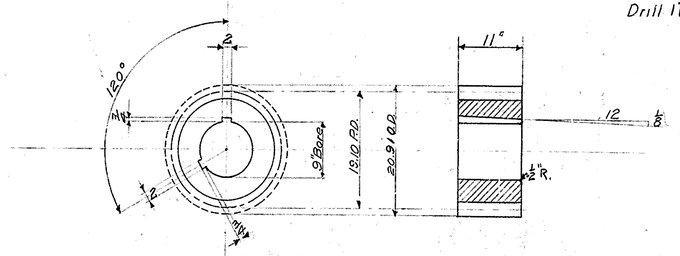
A.G. LIVINGSTON BRIDGE ENGR

1262-E1



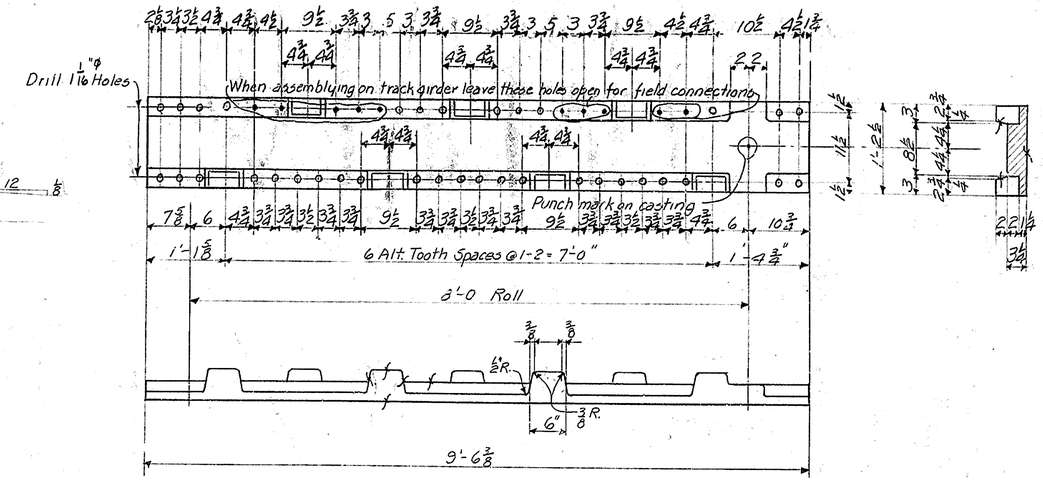
Rack Data:- 14 Teeth - 4" Pitch - 10½" Face
Spl. 20° Involute Stub Cut Tooth (See Detail)

4 RACK SECTIONS REQ'D O.R1
(Cast Steel)

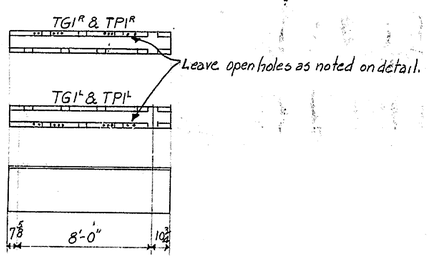


Pinion Data:- 15 Teeth - 4" Pitch - 19.10 P.D. - 11" Face
Spl. 20° Involute Stub Cut Tooth (See Detail)

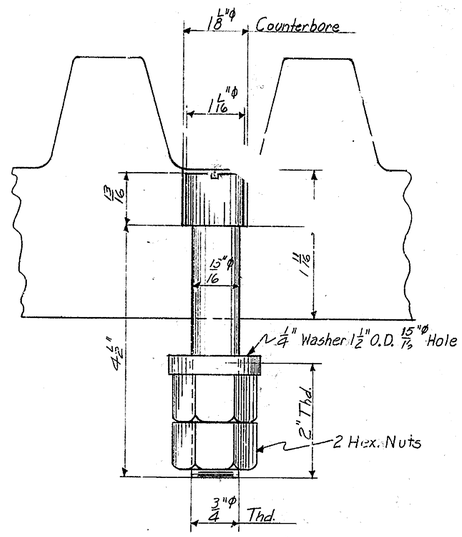
2 PINIONS REQ'D G1
(Teeth to mesh with O.R1)
(Cast Steel)



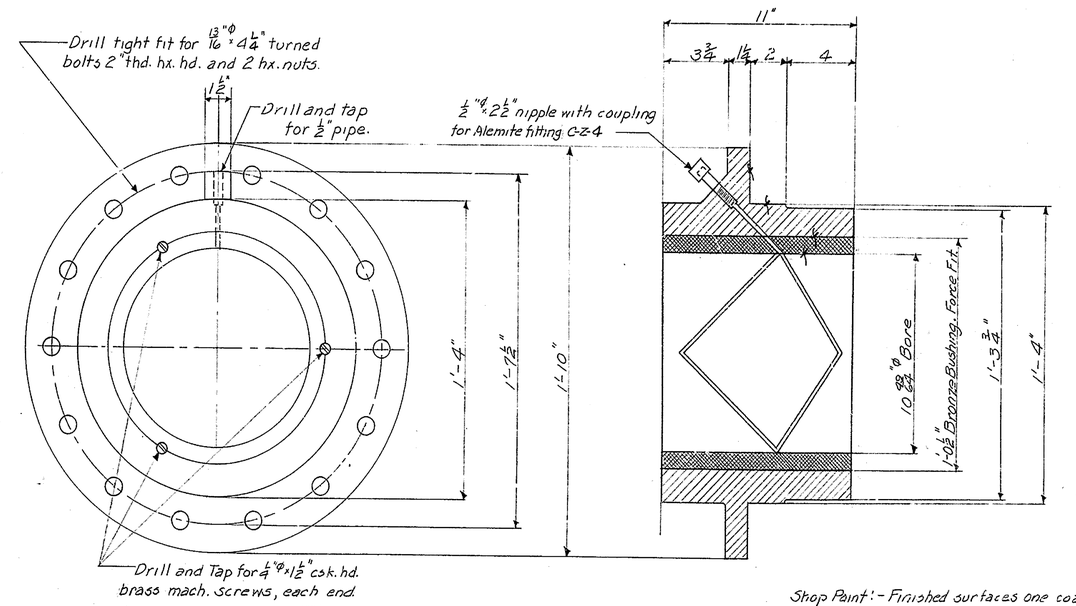
1 TRACK PLATE REQ'D AS SHOWN TP1R
1 " " " OPP. HAND TP1L
(Cast Steel)



ASSEMBLY DIAGRAM
FOR TRACK PLATES

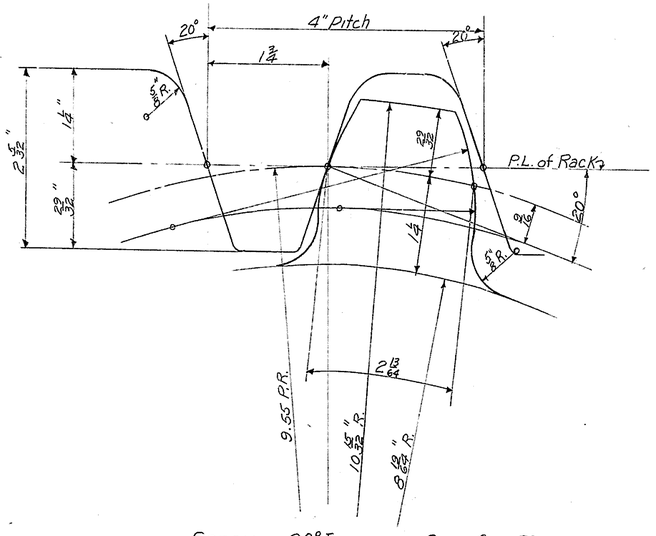


DETAIL OF RACKS BOLTS
104 Turned Bolts Req'd



2 BEARINGS REQ'D B1 (Cast Steel)
2 BUSHINGS " BB1 (Bronze)

Shop Paint:- Finished surfaces one coat of white lead and tallow. All other surfaces one coat red lead and oil.



SPECIAL 20° INVOLUTE STUB CUT TOOTH
FOR G1 AND O.R1

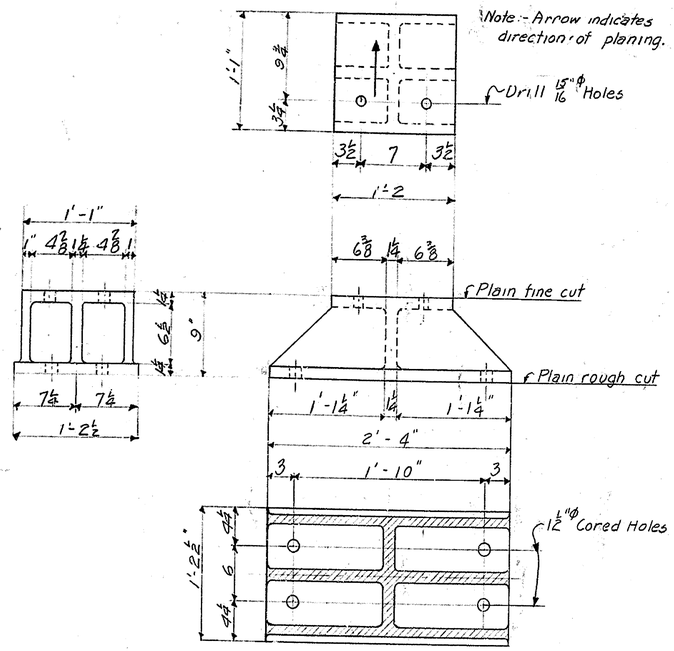
DELAWARE
STATE HIGHWAY DEPARTMENT
NEWPORT BRIDGE
ACROSS
CHRISTIANA RIVER

DESIGNED BY
KELLER AND HARRINGTON ~ CONSULTING ENGINEERS
CHICAGO, ILL.

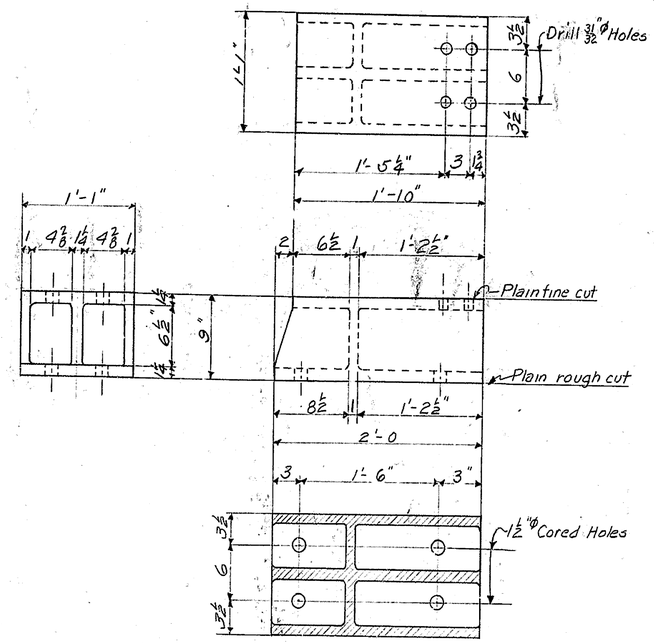
DATE 1-21-29

TRACK PLATES & RACKS

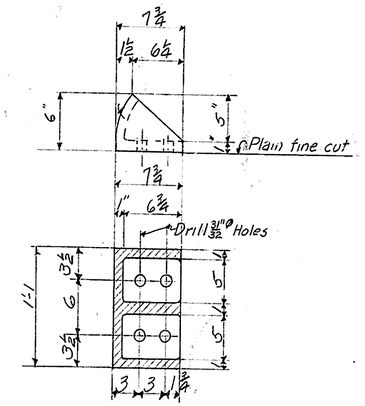
1262-M1



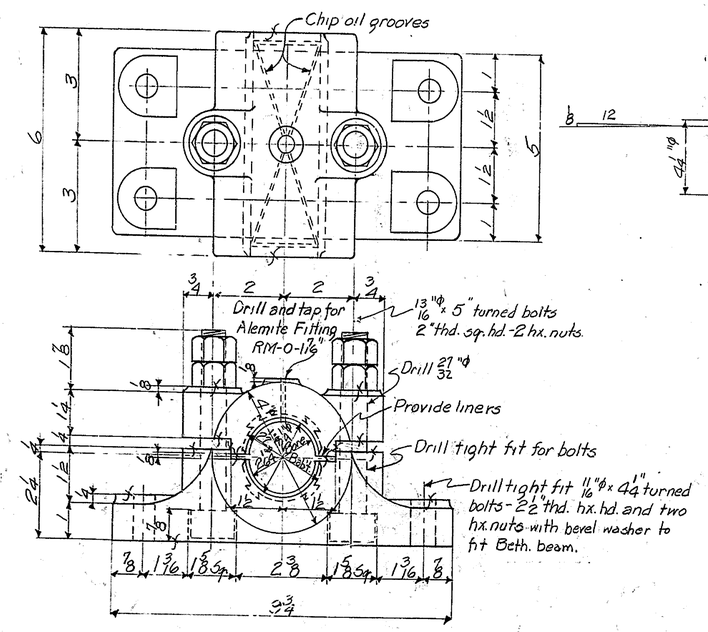
8 Castings Req'd CS1
(Cast Steel)



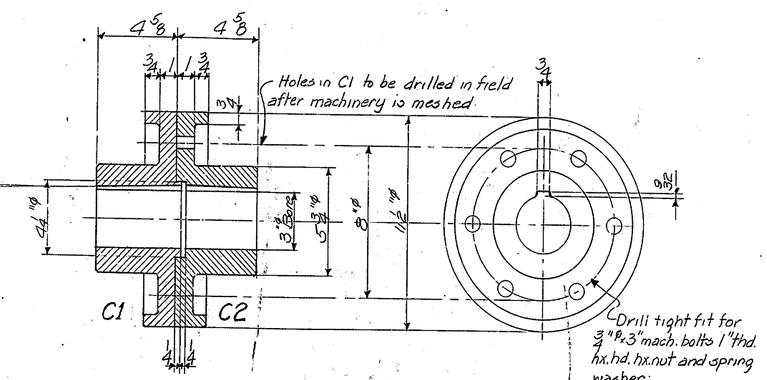
2 Castings Req'd CS2
(Cast Steel)



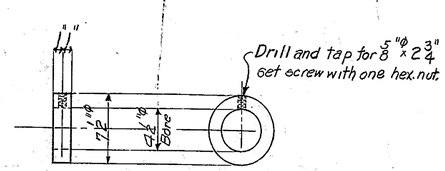
2 Castings Req'd CS3
(Cast Steel)
(Bolt to Casting CS2)



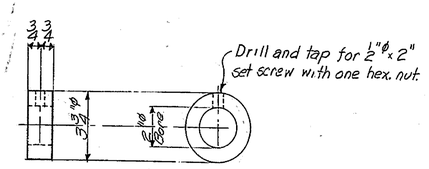
2 Bearings Req'd B6
(Cast Steel)



1 Half Coupling Req'd C1
1 " " " C2
(Cast Steel)



2 Set Collars Req'd SC1
(Cast Steel)



2 Set Collars Req'd SC2
(Cast Steel)

~NOTES~

Dimensions of keyways given at deep end
Diameter of turned bolts given for shank of bolt - threaded portion 1/16" less.
Provide 1/8" liners made up of 1-1/16 : 1-1/32 : 2-1/64 Plates.
Shop Paint :- Finished surface one coat of white lead and tallow. All other surfaces one coat of red lead and oil.

Delaware
State Highway Department
Newport Bridge
Across
Christiana River

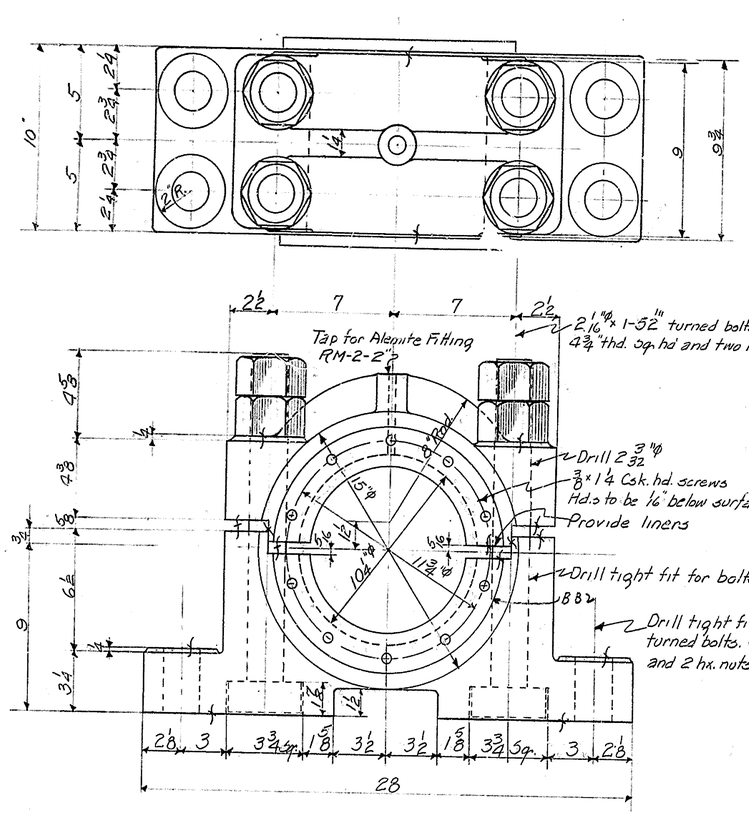
Designed by
Keller and Harrington Consulting Engineers
Chicago Ill.

Date 1-21-29
Completed 3-21-29

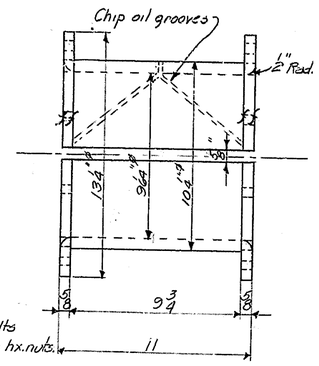
Cast Steel Shoes.
Bearings-Collars & Couplings

A. Livingston Bridge Engr.

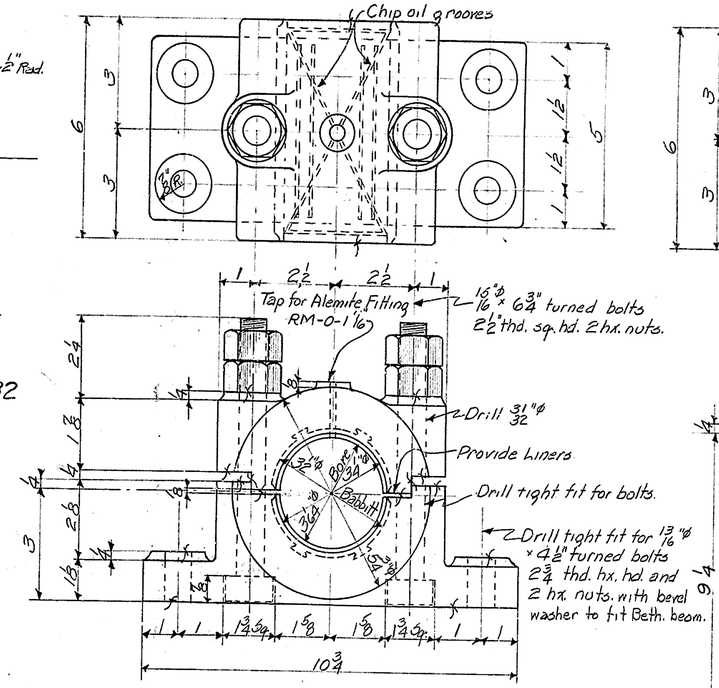
1262-M2



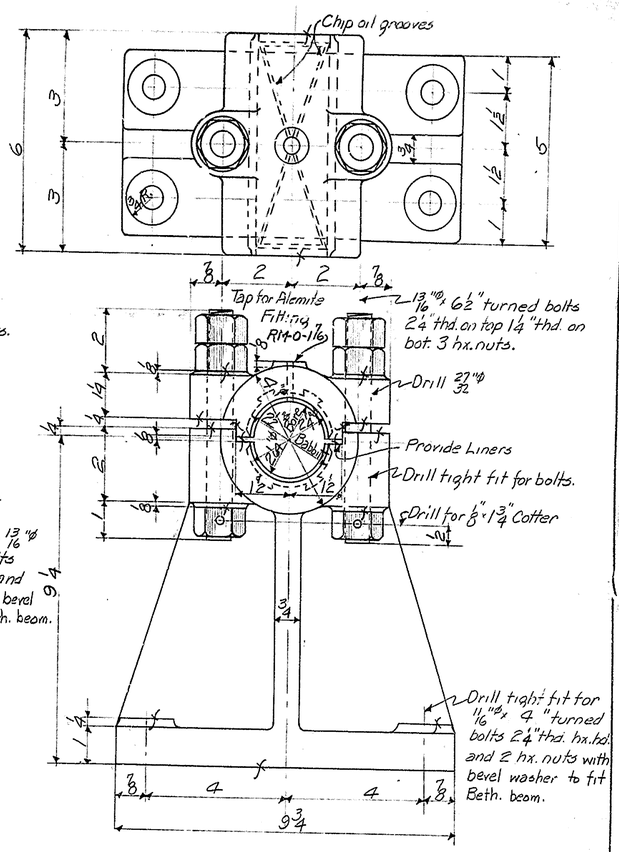
2 BEARINGS REQ'D B2
(Cast Steel)



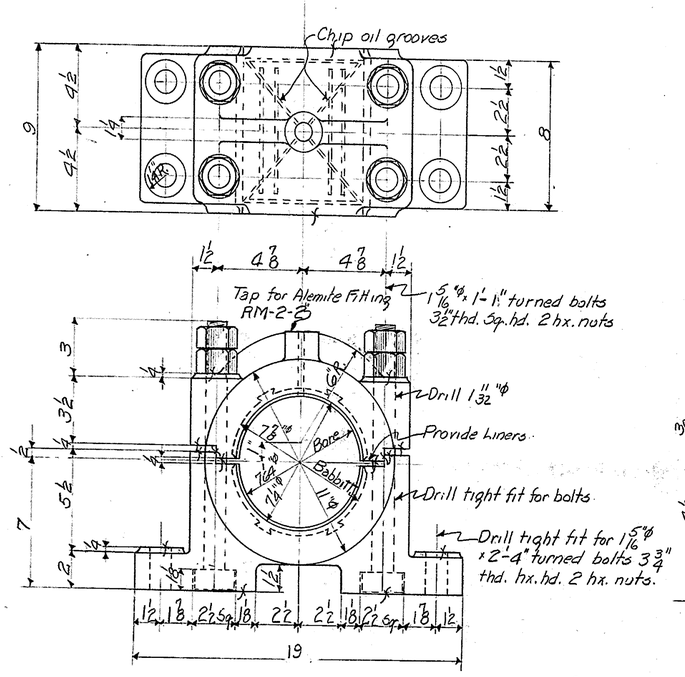
2 BUSHINGS REQ'D BB2
(Bronze)
(Ship assembled on B2)



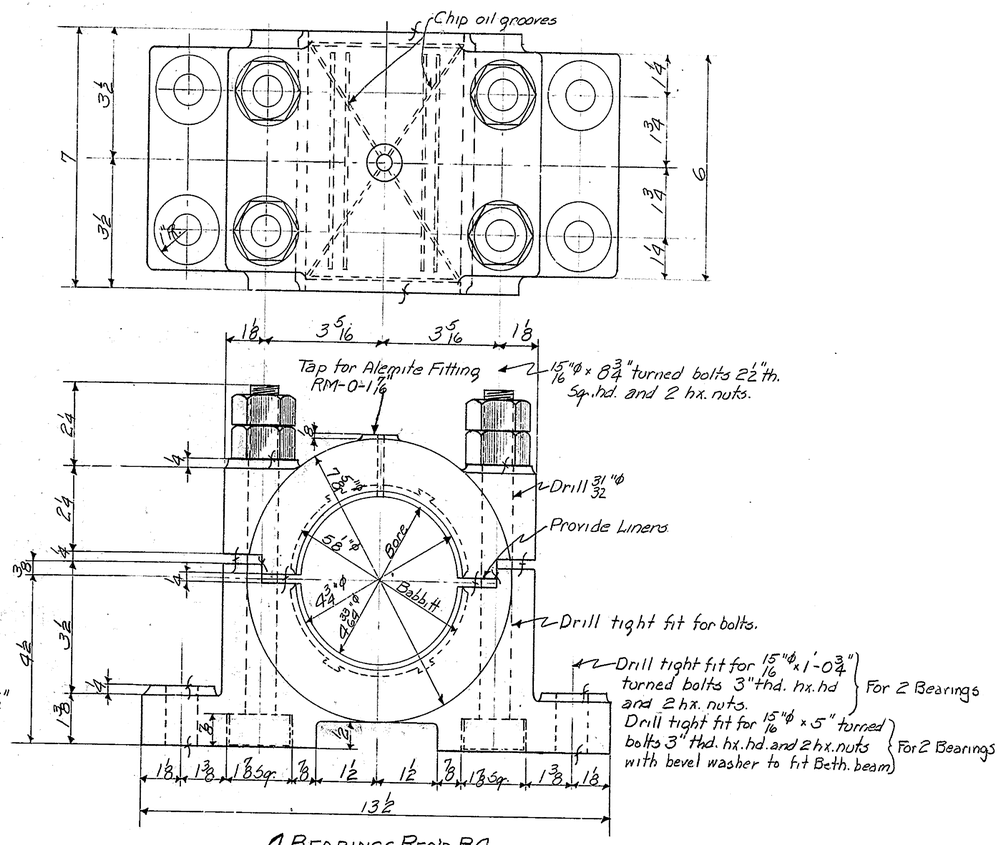
4 BEARINGS REQ'D B5
(Cast Steel)



2 BEARINGS REQ'D B7
(Cast Steel)



4 BEARINGS REQ'D B3
(Cast Steel)



4 BEARINGS REQ'D B4
(Cast Steel)

~ NOTES ~

Diameter of turned bolts given for the shank of the bolt, threaded portion to be 1/16" less.

Shop paint all finished surfaces one coat white lead and tallow, all other surfaces one coat red lead and oil.

5/8" Liners to be made up of 1-1/4" : 2-1/8" : 1-1/16" : 1-1/32" : 2-1/64" Plates

1/4" Liners to be made up of 1-1/8" : 1-1/16" : 1-1/32" : 2-1/64" Plates

3/8" " " " " " " 1-1/16" : 1-1/32" : 2-1/64" Plates.

Provide wrenches to fit the following hex. nuts 2" - 1 1/4" - 1 1/8" - 3/4" - 5/8" - 1/2"

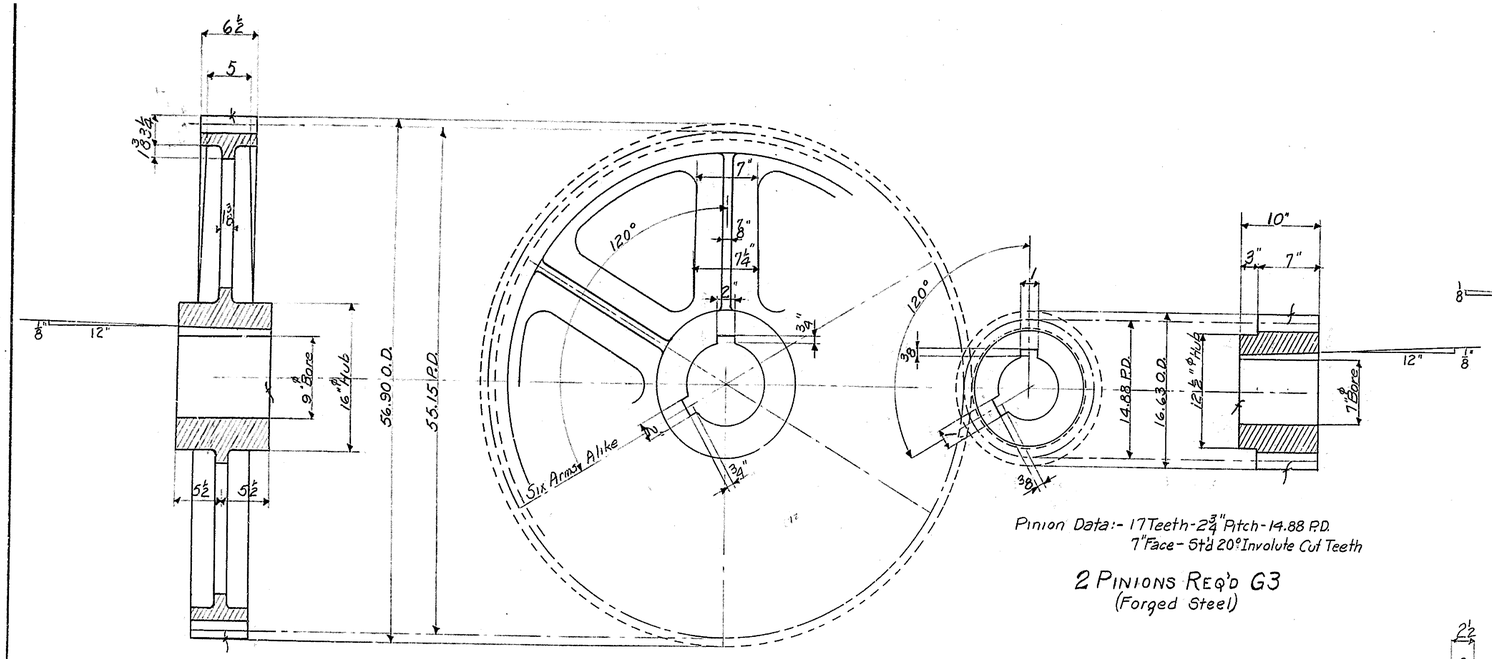
DELAWARE
STATE HIGHWAY DEPARTMENT
NEWPORT BRIDGE
ACROSS
CHRISTIANA RIVER

DESIGNED BY
KELLER AND HARRINGTON ~ CONSULTING ENGINEERS
CHICAGO ILL.

DATE 2- -29

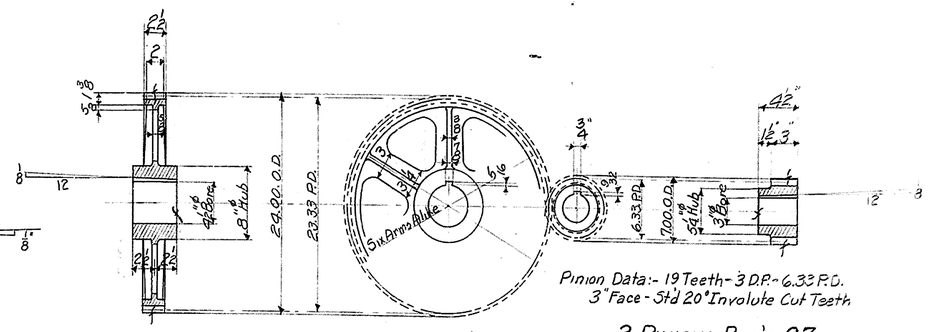
BEARINGS.

1262-M3



Gear Data:- 63 Teeth-2¾" Pitch-55.15 P.D.-6½" Face
Std 20° Involute Cut Teeth

2 GEARS REQ'D G2
(Cast Steel)



Gear Data:- 70 Teeth-3 D.P.-23.33 P.D.-2½" Face
Std 20° Involute Cut Teeth.

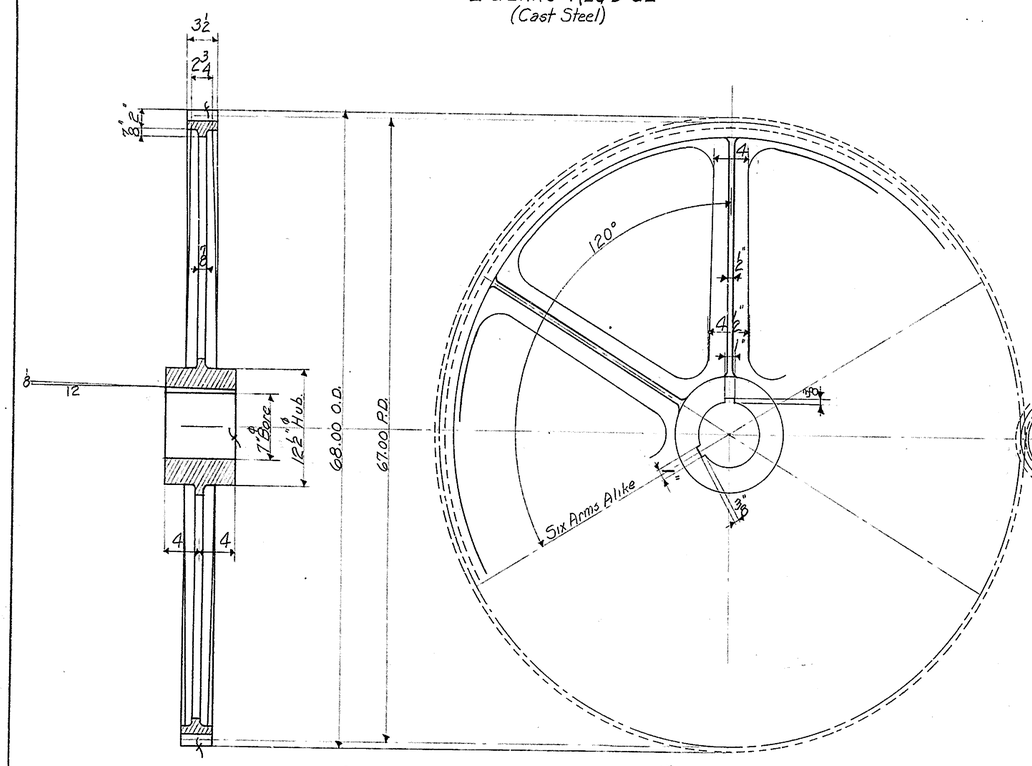
2 GEARS REQ'D G6
(Cast Steel)

Pinion Data:- 17 Teeth-2¾" Pitch-14.88 P.D.
7" Face-Std 20° Involute Cut Teeth

2 PINIONS REQ'D G3
(Forged Steel)

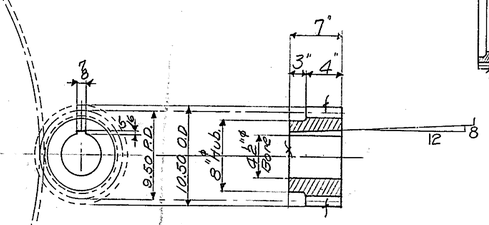
Pinion Data:- 19 Teeth-3 D.P.-6.33 P.D.
3" Face-Std 20° Involute Cut Teeth.

2 PINIONS REQ'D G7
(Forged Steel)



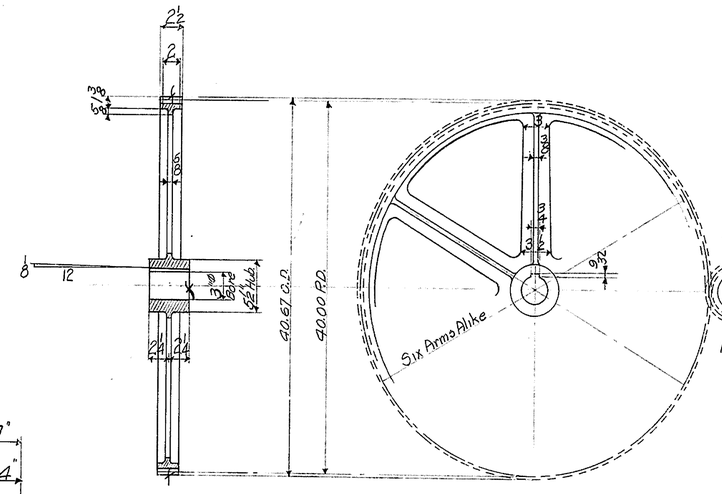
Gear Data:- 134 Teeth-2 D.P.-67.00 P.D.-3½" Face
Std 20° Involute Cut Teeth

2 GEARS REQ'D G4
(Cast Steel)



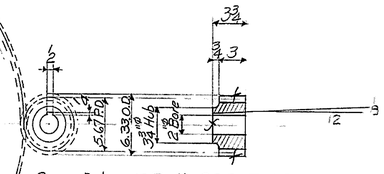
Pinion Data:- 19 Teeth-2 D.P.-9.5 P.D.
4" Face-Std 20° Involute Cut Teeth

2 PINIONS REQ'D G5
(Forged Steel)



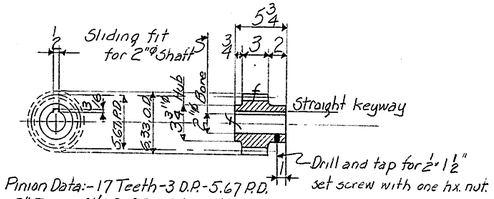
Gear Data:- 120 Teeth-3 D.P.-40.00 P.D.-2½" Face
Std 20° Involute Cut Teeth.

1 GEAR REQ'D G8
(Cast Steel)



Pinion Data:- 17 Teeth-3 D.P.-5.67 P.D.
3" Face-Std 20° Involute Cut Teeth

1 PINION REQ'D G9
(Forged Steel)



Pinion Data:- 17 Teeth-3 D.P.-5.67 P.D.
3" Face-Std 20° Involute cut teeth.

1 PINION REQ'D G10
(Forged Steel)

~ NOTES ~

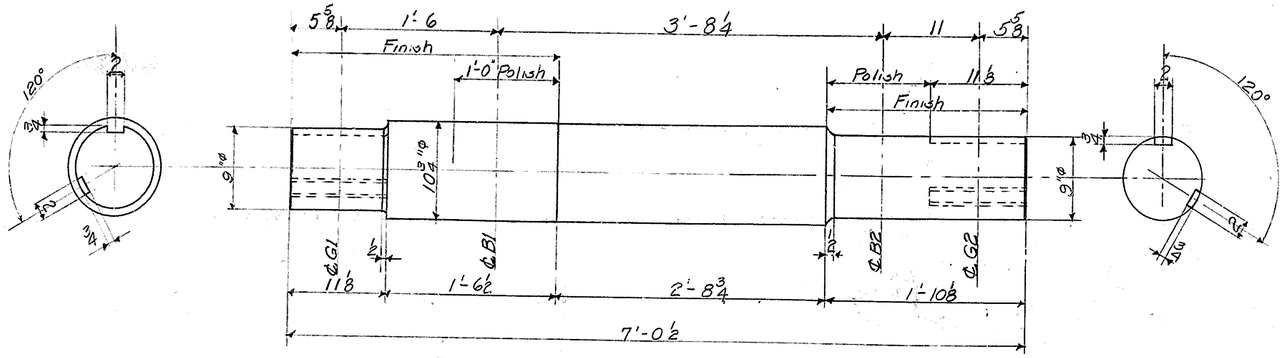
Dimensions of all keyways given at deep side.
Shop Paint-all finished surfaces one coat white lead & tallow-all other surfaces one coat of red lead and oil.
Pitch line to be marked clearly on both sides of all gears.

DELAWARE
STATE HIGHWAY DEPARTMENT
NEWPORT BRIDGE
ACROSS
CHRISTIANA RIVER

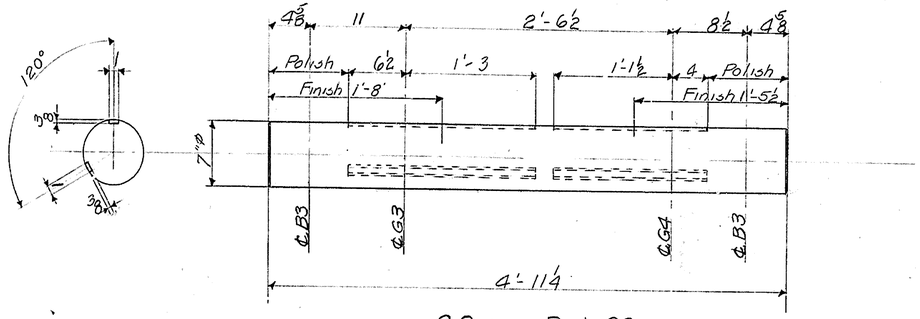
DESIGNED BY
KELLER AND HARRINGTON ~ CONSULTING ENGINEERS
CHICAGO ILL.
DATE 2-27-29

GEARS & PINIONS

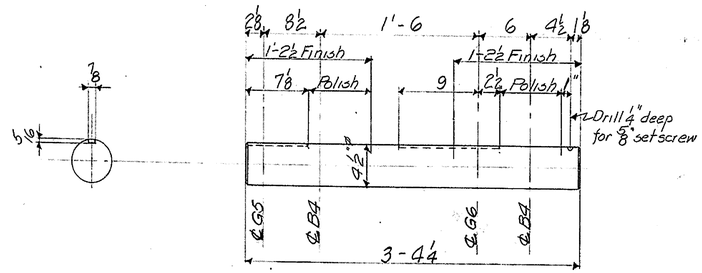
1262-M4



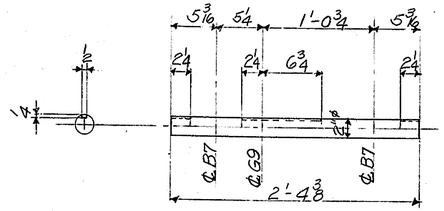
2 Shafts Req'd S1
(Forged Steel)



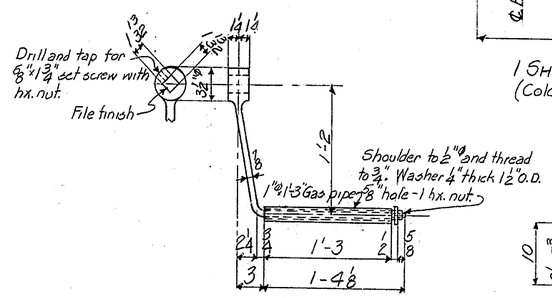
2 Shafts Req'd S2
(Forged Steel)



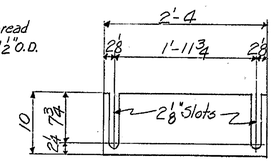
2 Shafts Req'd S3
(Forged Steel)



1 Shaft Req'd S7
(Cold Rolled Steel)

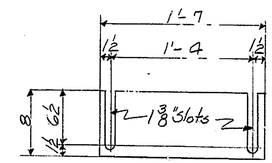


2 Operating Handles Req'd OH1
(Forged Steel)



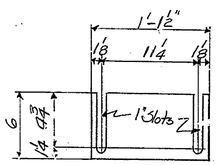
Each set consists of
- 1 Pl. 10 × 1/4 × 2'-4"
- 1 Pl. 10 × 1/8 × 2'-4"
- 2 Pls 10 × 1/16 × 2'-4"

2 Sets of Shim Pl's Req'd for B2
(Steel)



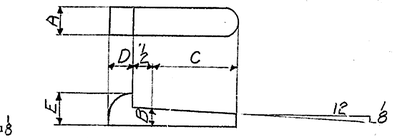
Each set consists of
- 1 Pl. 8 × 1/4 × 1'-7
- 1 Pl. 8 × 1/8 × 1'-7
- 2 Pls 8 × 1/16 × 1'-7

4 Sets of Shim Pl's. Req'd for B3
(Steel)



Each set consists of
- 1 Pl. 6 × 1/4 × 1'-1 1/2"
- 1 Pl. 6 × 1/8 × 1'-1 1/2"
- 2 Pls 6 × 1/16 × 1'-1 1/2"

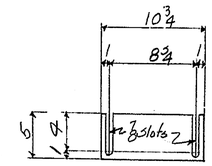
4 Sets of Shim Pl's Req'd for B4
(Steel)



2 Keys Req'd K10
(For C1 & C2)

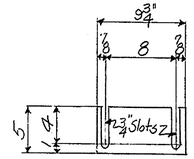
~Gib Head Keys~

Location	No. Req'd	A	B	C	D	E	Mark
G1-G2	8	2	1 1/2	10 3/4	1 3/4	2 1/2	K1
G3	4	1	3/4	9 3/4	7/8	1 1/4	K3
G4	4	1	3/4	7 3/4	7/8	1 1/4	K4
G5	2	7/8	5/8	6 3/4	3/4	1 1/8	K5
G6	2	7/8	5/8	4 3/4	3/4	1 1/8	K6
G7-G8	3	3/4	9/16	4 1/4	5/8	1	K7
G9	1	1/2	1/2	3 1/2	5/8	7/8	K9



Each set consists of
- 1 Pl. 5 × 1/4 × 0'-10 3/4
- 1 Pl. 5 × 1/8 × 0-10 3/4
- 2 Pls 5 × 1/16 × 0-10 3/4

4 Sets of Shim Pl's Req'd for B5
(Steel)

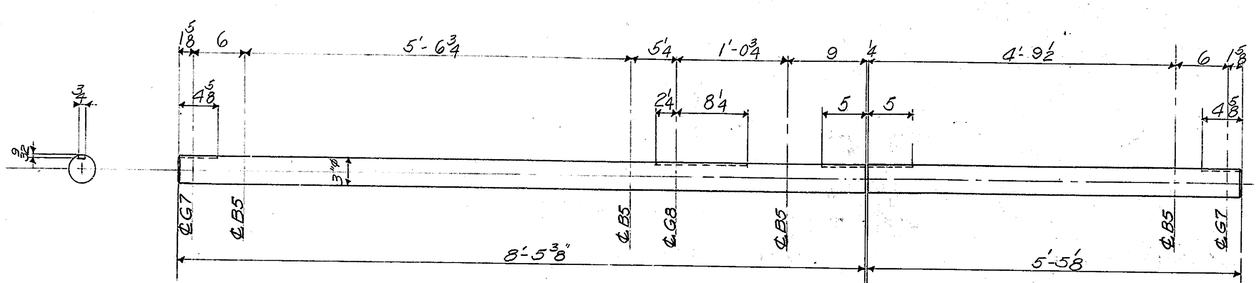


Each set consists of
- 1 Pl. 5 × 1/4 × 0-9 3/4
- 1 Pl. 5 × 1/8 × 0-9 3/4
- 2 Pls 5 × 1/16 × 0-9 3/4

4 Sets of Shim Pl's Req'd for B6 & B7
(Steel)

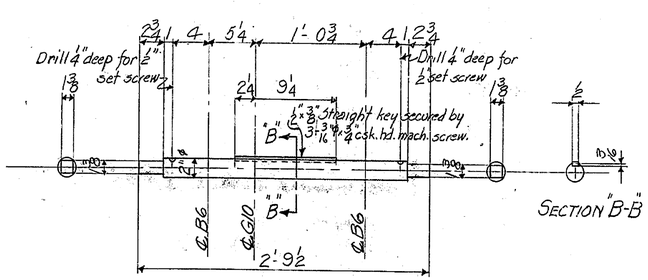
~Notes~

Shop paint all finished surfaces one coat of white lead and tallow - all other surfaces one coat of red lead and oil.



1 Shaft Req'd S4
(Cold Rolled Steel)

1 Shaft Req'd S5
(Cold Rolled Steel)



1 Shaft Req'd S6
(Cold Rolled Steel)

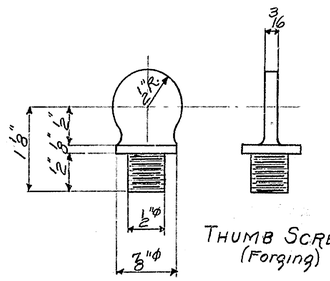
Delaware
State Highway Department
Newport Bridge
Across
Christiana River

Designed by
Keller and Harrington ~ Consulting Engineers
Chicago, Ill.

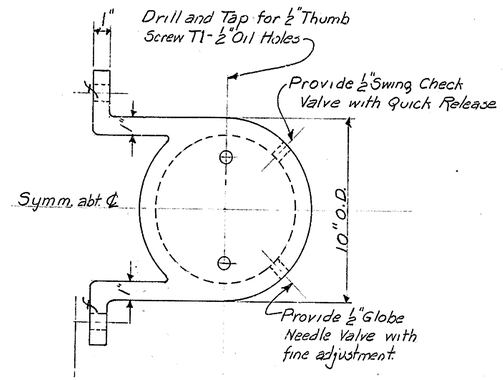
Date 2-29-29

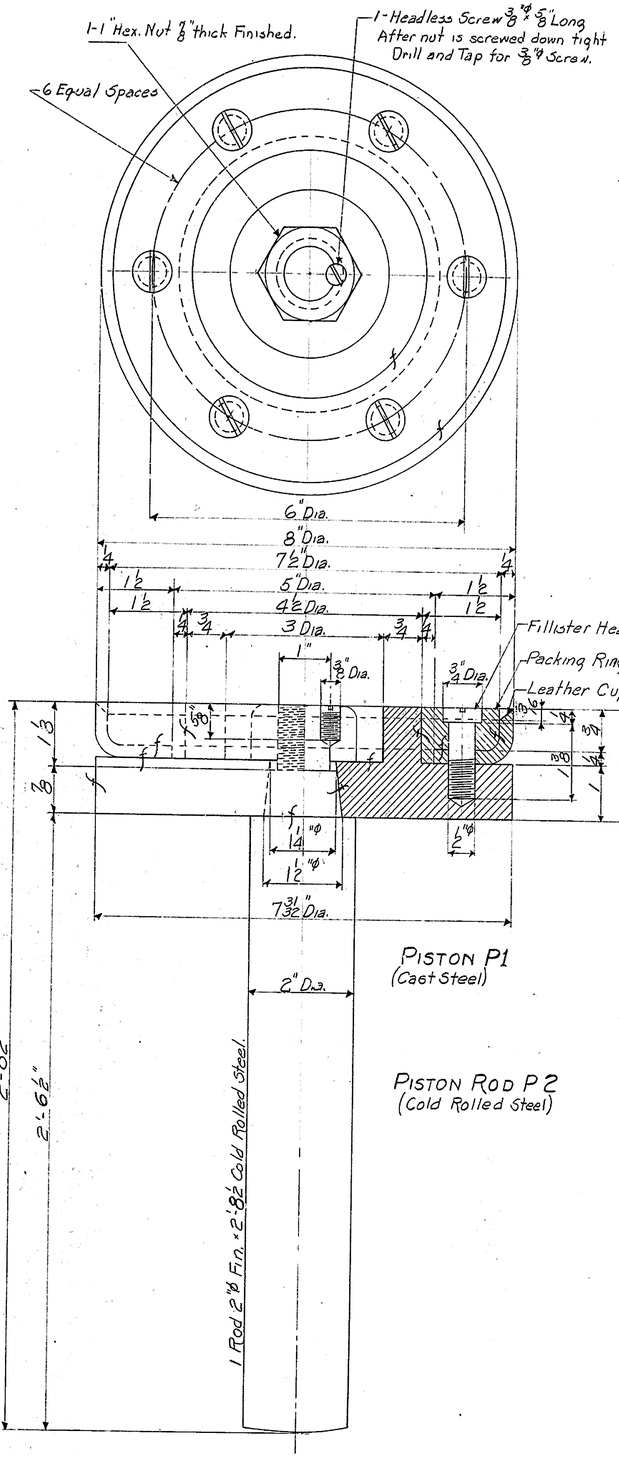
Shafts - Keys - Shims.

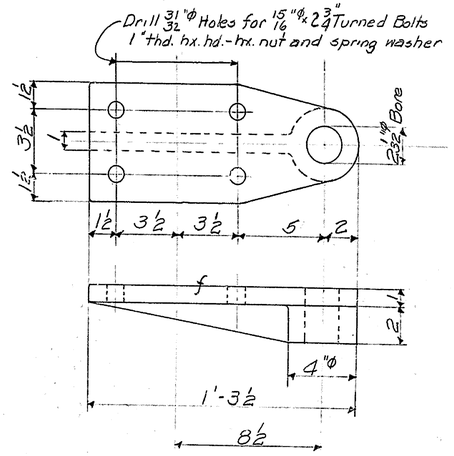
1262-M5



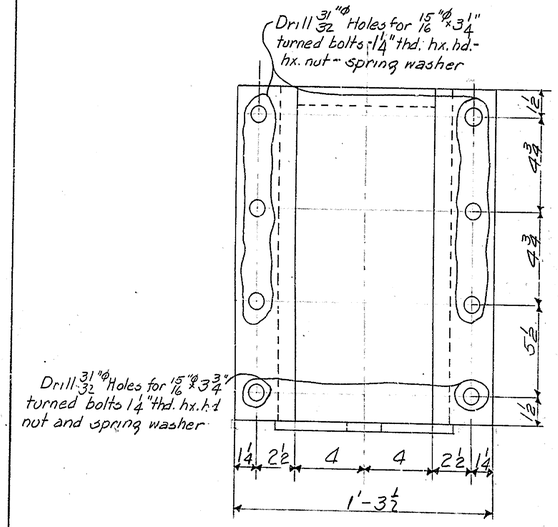
THUMB SCREW T1
(Forging)



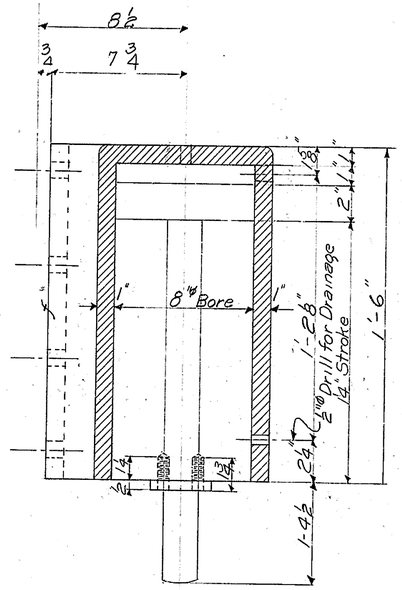


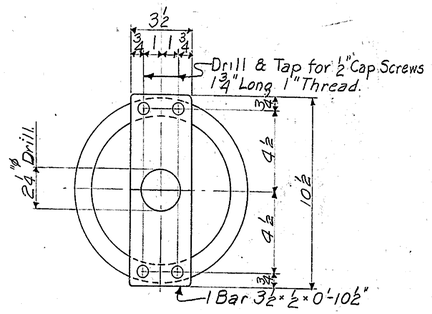


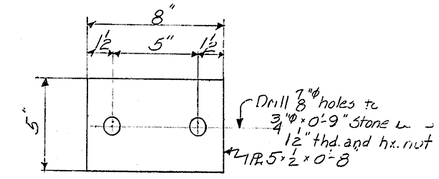
PISTON SUPPORT P5I
(Cast Steel)



AIR BUFFER
(Cast Steel)







BUFFER PLATE P4

PISTON P1
(Cast Steel)

PISTON ROD P2
(Cold Rolled Steel)

~ REQUIRED ~

2 AIR BUFFERS
2 PACKING RINGS
2 PISTONS _ _ _ _ _ _ _ _ P1
4 THUMB SCREWS _ _ _ _ _ T1
2 PISTON RODS _ _ _ _ _ _ P2
2 LEATHER CUP PACKING _ _ P3
2 PISTON SUPPORTS _ _ _ _ P5I
2 BUFFER PLATES _ _ _ _ _ P4

Shop Paint one coat red lead and oil except finished surfaces.

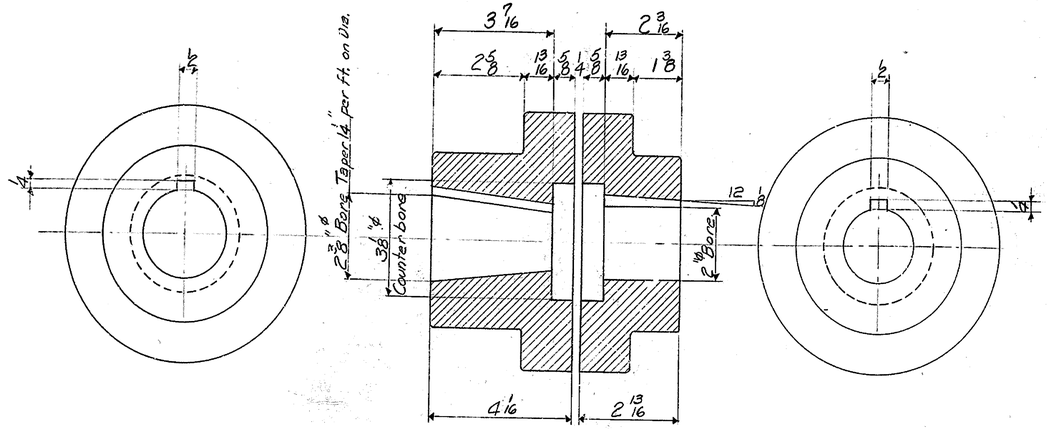
DELAWARE
STATE HIGHWAY DEPARTMENT
NEWPORT BRIDGE
ACROSS
CHRISTIANA RIVER

DESIGNED BY
KELLER AND HARRINGTON ~ CONSULTING ENGINEERS
CHICAGO ILL.

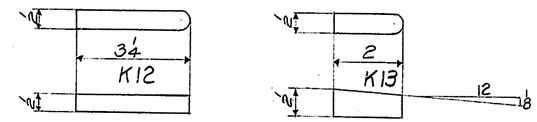
DATE 3-21-29

AIR BUFFER

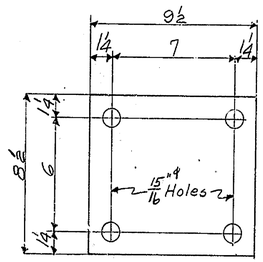
1262-M6



2 FRANCKE FLEXIBLE COUPLINGS #7 (SPECIAL) REQ'D.

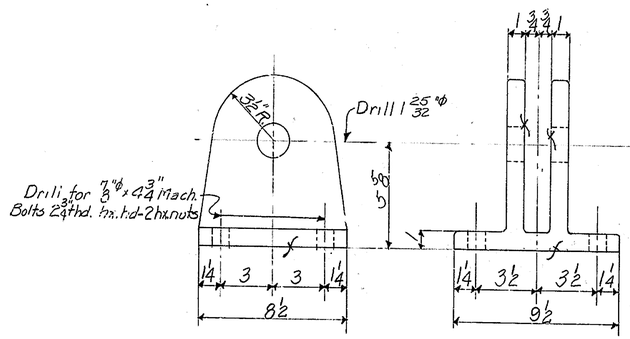


2 KEYS REQ'D K12
2 " " K13
(For Franke Couplings)

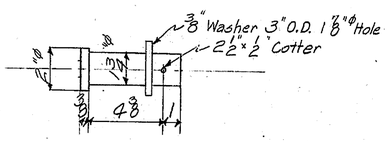


4 Pls. 8 1/2 × 3/8 × 0'-9 1/2"
2 Pl. 8 1/2 × 1/4 × 0'-9 1/2"
2 Pl. 8 1/2 × 1/8 × 0'-9 1/2"

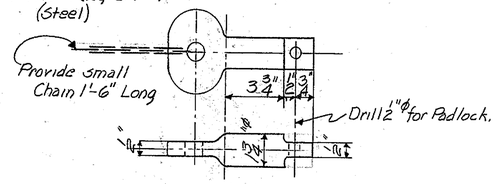
SHIM PLS FOR LOCK CASTINGS LC1



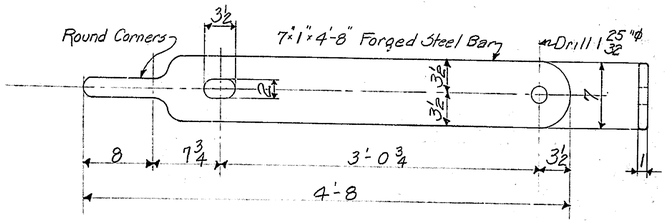
4 CASTINGS REQ'D LC1
(Cast Steel)



2 PINS REQ'D P4
(Steel)



2 PINS REQ'D P5
(Steel)



2 LOCK BARS REQ'D LB1
(Forged Steel)

~ NOTES ~
Shop Paint One Coat of Red Lead and Oil except finished surfaces.

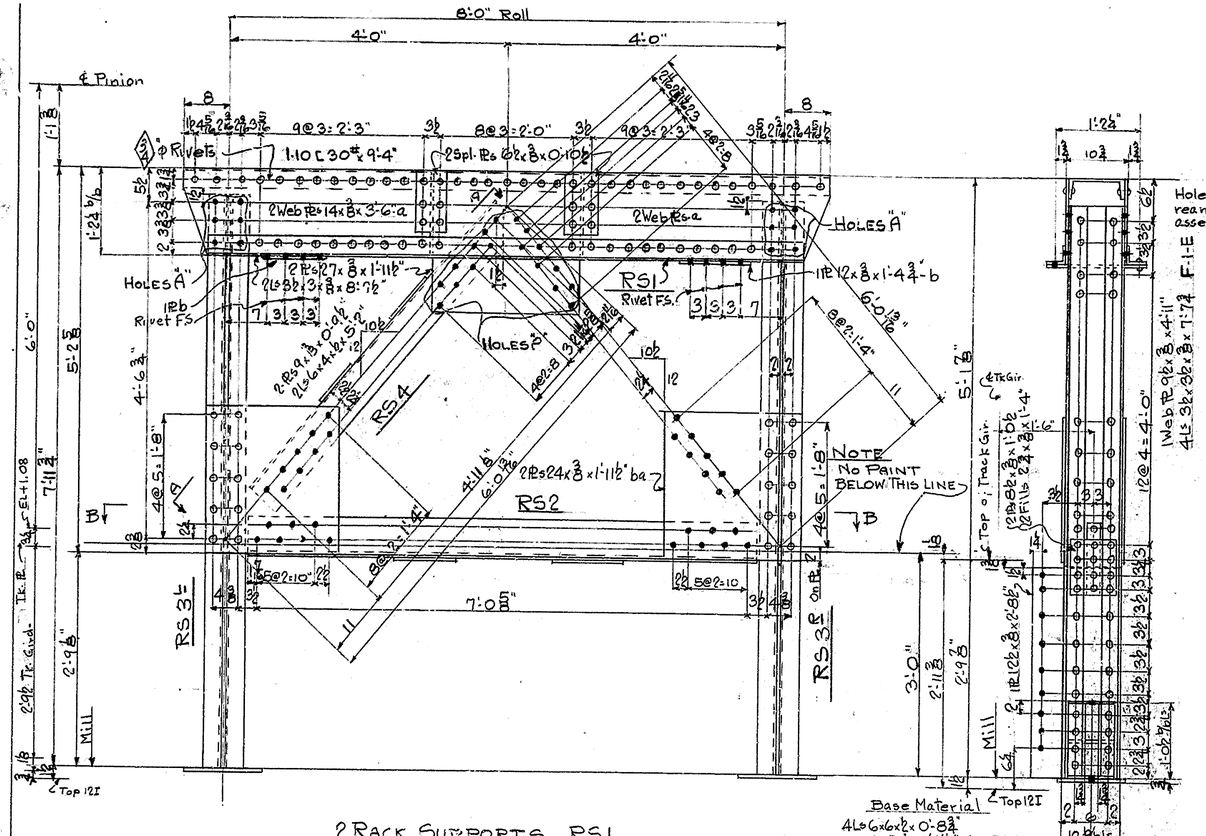
DELAWARE
STATE HIGHWAY DEPARTMENT
NEWPORT BRIDGE
ACROSS
CHRISTIANA RIVER

DESIGNED BY
KELLER AND HARRINGTON ~ CONSULTING ENGINEERS
CHICAGO, ILL.

DATE 3-21-29

COUPLING & LOCK

1262-M8



2	Rack Supports		RS1
2	do	do	RS2
2	do	do	As shown RS3R
2	do	do	Opp Hand RS3L
4	do	do	RS4

~Notes~

Rack Supports:- The top flange of the Rack Supports must be planed if necessary to obtain a true bearing for the operating racks. The operating racks, detailed on drawing #M1, shall be assembled on the Rack Supports, and the connecting holes drilled thru the flange angles of the Rack Supports, while thus assembled, for a driving fit for 15/16" φ turned bolts, and bolted to the Rack Supports in the shop.

Track Girders:- The Track Girders shall be bolted up with the web and side plates projecting 4" beyond the back of the flange angles top and bottom and reamed as noted on drawing and riveted up.

After riveting, the plates shall be planed flush with the top and bottom flange angles. The Track Plates shall be assembled on the Track Girders in the shop in accordance with assembly diagram shown on the drawing #M1 and the connecting holes drilled from the Track Plates while thus assembled and riveted with 1" φ rivets. All Stiffener Angles and fills to be finished to bear Top and Bottom

Field Rivets & Bolts Required

85	Rivets	⅞ φ x 2⅜	
210	do	do x 2½	
65	do	do x 2¾	
25	do	do x 2⅞	
15	do	do x 4⅜	
30	do	1" φ x 4¼	
100	Bolts	½ φ x 1½"	
20	do	do x 1¾	
20	do	do x 2	

General Notes

Rivets - ⅞ φ unless noted
Holes - 15/16" φ do
Holes "A" to be subpunched 9/16" φ in shop and temporarily bolted in field with ½ φ bolts. After bridge has been operated and racks adjusted in field ream to 15/16" φ and rivet with ⅞ φ rivets.
Paint: One coat of red lead and oil unless noted.

Delaware
State Highway Department
Newport Bridge
Across
Christiana River
Designed by
Keller and Harrington ~ Consulting Eng'rs
Chicago Ill

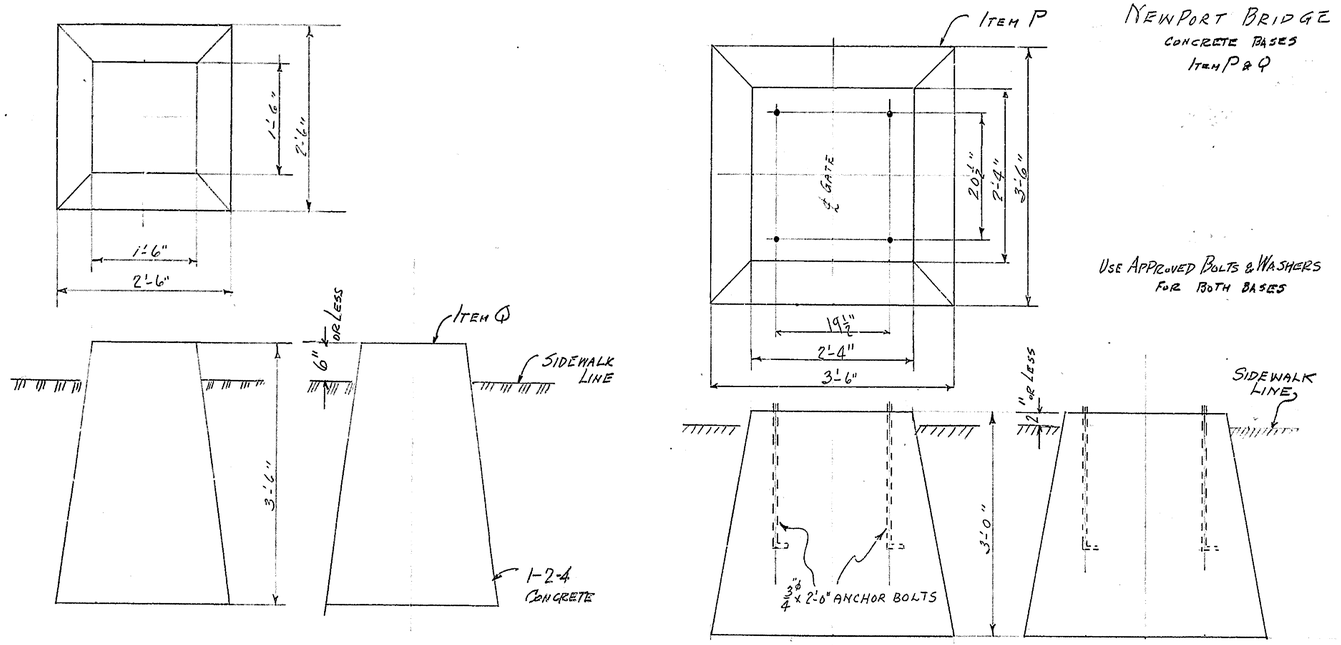
Rack Supports, Track Girders and Anchor Bolts

Drawn. E.W.
Checked H.N. 1-21-20

1262 S1

MICROFILMED

CONTRACT 103A
NEWPORT BRIDGE
CONCRETE BASES
ITEM P & Q



2 REQUIRED

4 REQUIRED

CONCRETE BASE FOR AUTOMATIC FLAGMAN

CONCRETE BASE FOR ROADWAY GATES

PROVIDE OPENINGS FOR CONDUITS

TOTAL CONCRETE 5.0± cy.

IF THE BASE OF THE GATE IS ADDED TO THE ABUTMENT, NO PART OF THE GATE MAY BE NEARER THAN 6" TO GIRDER.

CONTRACT 103A
HIGHWAY DEPARTMENT
DELAWARE
CONCRETE BASES
FLAGMEN & GATES
SCALE 1" = 1'-0"
SEPTEMBER-1929

D.R.T.
9-5-1929

A. G. Livingston BRIDGE ENGR

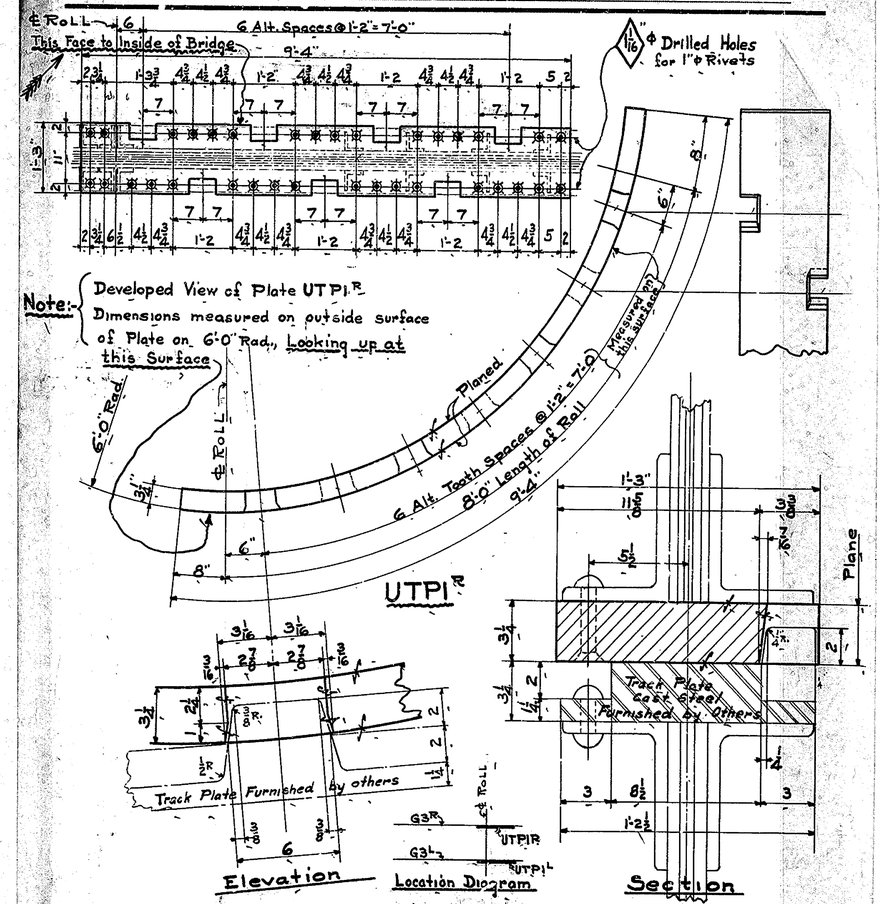
BWC 3903-3m-12,28-B.S.Co.

BETHLEHEM STEEL COMPANY

FABRICATION AND ERECTION DEPARTMENT—BETHLEHEM, PA.

NAME OF STRUCTURE { Newport Bridge Over Christiana River For State Highway Dept. of Delaware

NAME OF CUSTOMER AL. S. FOX & Co.



SHOP ORDER					MILL ORDER						
Mark	No. Pcs.	Section	length	Assm'b Mark	No. Pcs.	Section	length	Req.	Wt. Pr. Piece	Total Weight	Remarks
UTPI R	One	15" x 3¼" Fin.	9'-4		2	15" x 3¾"	10'-4	H-103 [illegible]			
UTPI L	One	15" x 3¼" Fin.	9'-4								

MADE BY R.V.K. CHECKED BY [signature] 3/11/29 IN CHARGE OF WORK FILE No. F 79

MICROFILMED

RIVETS ____ OPEN HOLES ____ UNLESS NOTED

PAINT ____

CONTRACT No. EB4689

SHEET No. F 1

REVISION TABLE

BWC 11032-8-26-B.S.Co.

BETHLEHEM STEEL COMPANY

BRIDGE AND FABRICATION DEPARTMENT
BETHLEHEM, PA.

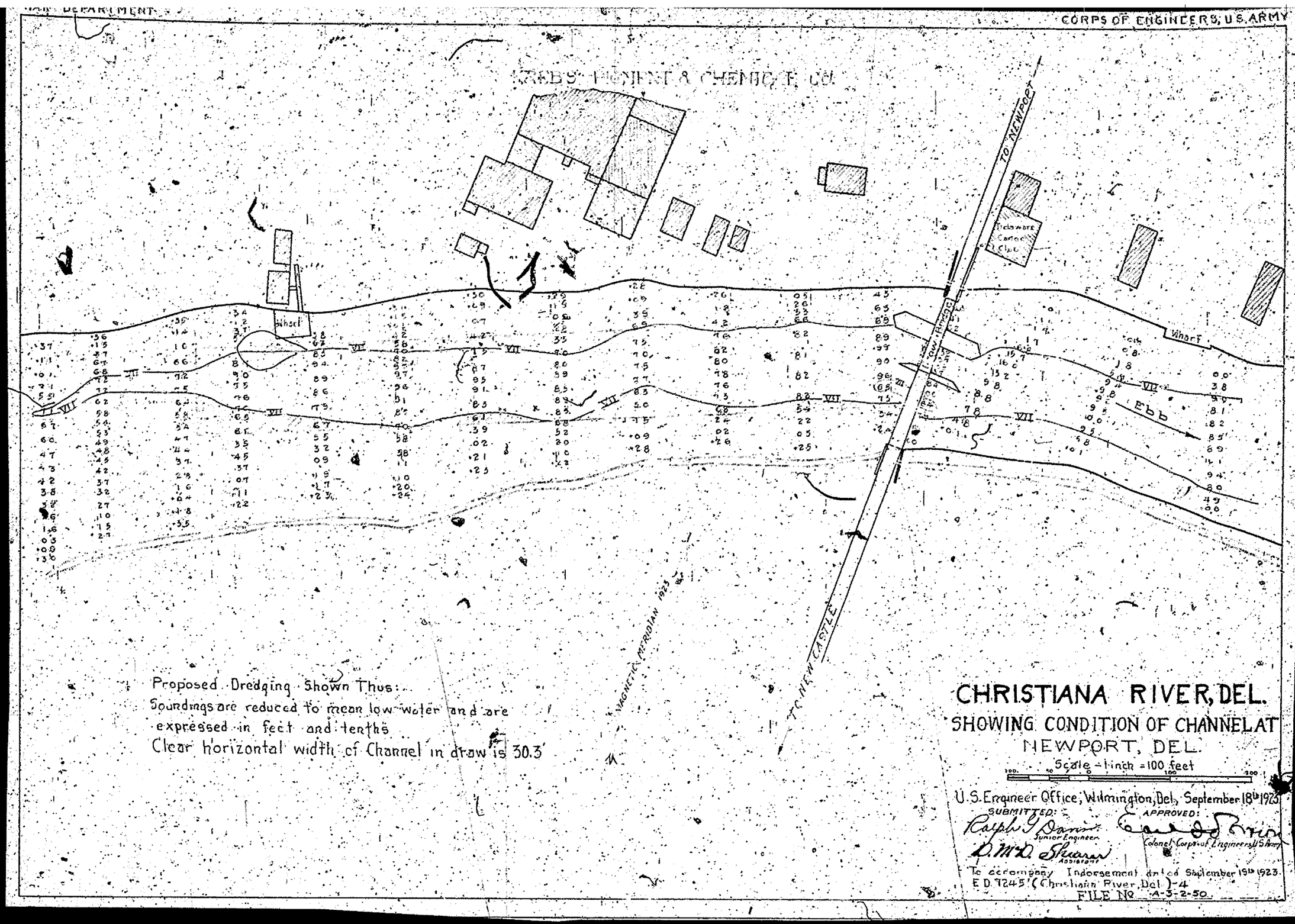
157 3-3

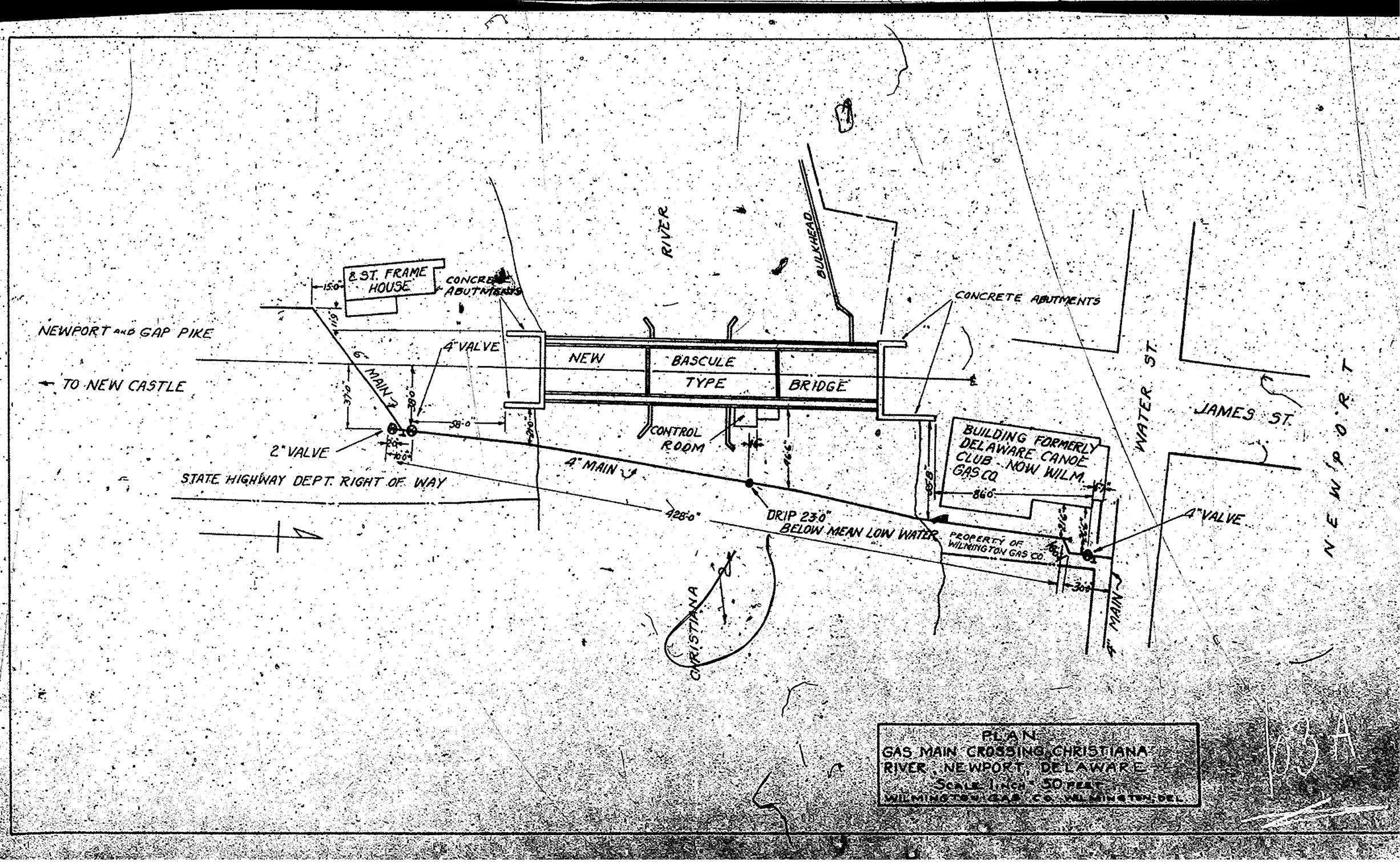
BILL OF BOLTS AND FIELD RIVETS

FOR Newport Bridge across Christiana River - State of Del. A.S. Fox & Co.

Line No.	No. Pcs.	Dia.	Rivets Head	Rivets Length	Bolts Type of Bolt	Bolts Head	Bolts Length under head	Bolts Length threaded at end	Requisition	Grip	Thickness of Material Connected	Nuts No. Pcs.	Nuts Kind	Nuts Tapped	Nuts Requisition	Weight	Pieces Connected or Remarks
1																	
2			SUMMARY														
3			OF														
4			RIVETS &		BOLTS												
5	250	7/8	⊖	2 1/4													
6	175			2 3/8													
7	140			2 1/2													
8	345			2 5/8													
9	80			2 3/4													
10	360			3													
11	280			3 1/8					X								
12	30			3 3/8													
13	25			3 3/4													
14	125			3 7/8													
15	50			4													
16	435			4 1/4													
17	135			4 3/8													
18																	
19																	
20																	
21	55	3/4	⊖	2 1/4					X								
22																	
23																	
24																	
25	5	3/4			Hx	2	1/4		Hole 2754			5	Hx	3/4	X		
26																	
27																	
28			The above Numbers of														
29			Rivets include 10% added														
30																	
31			One extra bolt added.														
32																	
33																	

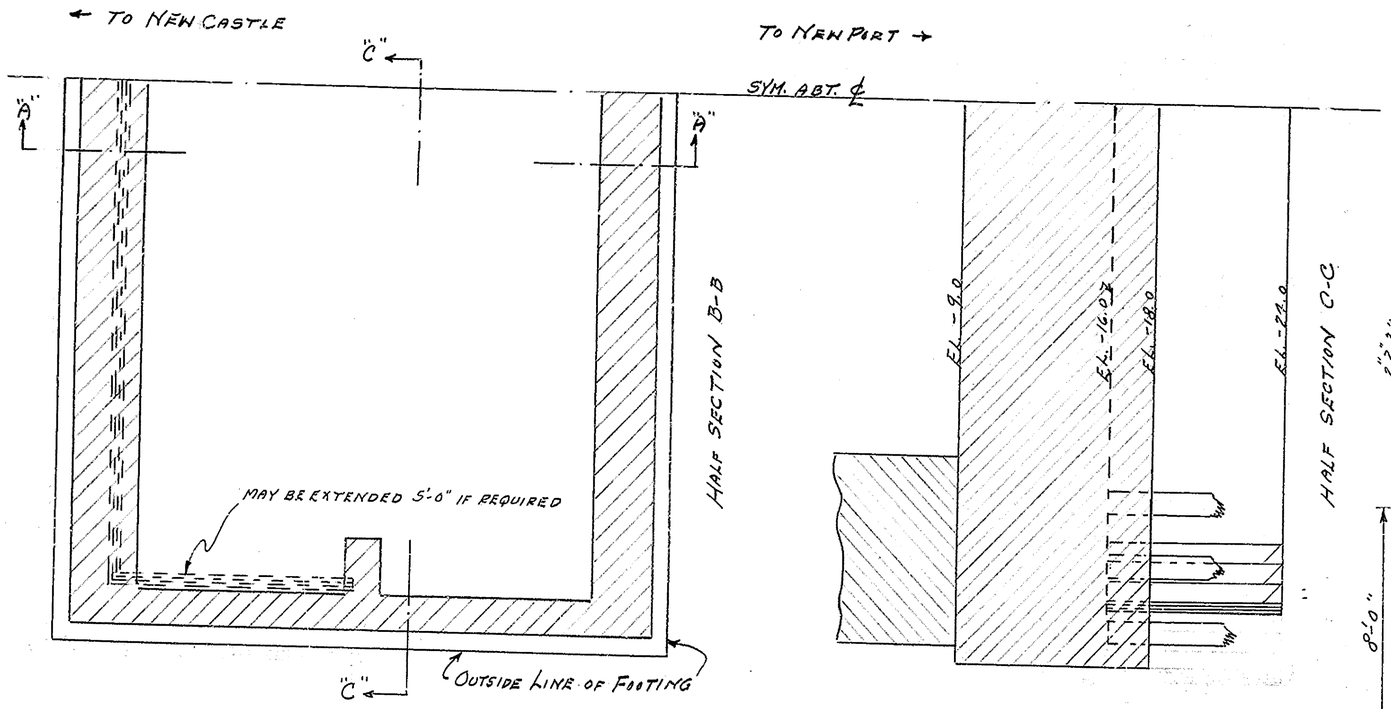
Made by Cgs. Date 2/20/29	FILE No.	CONT. No.	SHEET No.
Checked by ____ Date ____	F 8579	E B4688	SR1 of 1
Squad Wrecke			

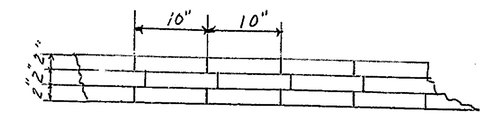

Wharf
Wharf
TO NEWPORT
TO NEW CASTLE
MAGNETIC MERIDIAN 1923
Ebb
Proposed Dredging Shown Thus:
Soundings are reduced to mean low water and are expressed in feet and tenths
Clear horizontal width of Channel in draw is 30.3'
CHRISTIANA RIVER, DEL.
SHOWING CONDITION OF CHANNEL AT
NEWPORT, DEL.
Scale - 1 inch = 100 feet
U.S. Engineer Office, Wilmington, Del., September 18th 1923
SUBMITTED:
Ralph G. Dennis
Junior Engineer
D. M. D. Shuman
Assistant
APPROVED:
Colonel, Corps of Engineers, U.S. Army
To accompany Indorsement dated September 19th 1923.
E.D. 7245 (Christiana River, Del.)-4
FILE No. A-3-2-50.


RIVER
BULKHEAD
8 ST. FRAME HOUSE
CONCRETE ABUTMENTS
CONCRETE ABUTMENTS
NEWPORT AND GAP PIKE
TO NEW CASTLE
4" VALVE
6" MAIN
NEW BASCULE TYPE BRIDGE
CONTROL ROOM
2" VALVE
STATE HIGHWAY DEPT. RIGHT OF WAY
4" MAIN
428'-0"
DRIP 23'-0" BELOW MEAN LOW WATER
BUILDING FORMERLY DELAWARE CANOE CLUB - NOW WILM. GAS CO.
PROPERTY OF WILMINGTON GAS CO.
4" VALVE
4" MAIN
WATER ST.
JAMES ST.
NEWPORT
CHRISTIANA
PLAN
GAS MAIN CROSSING CHRISTIANA RIVER, NEWPORT, DELAWARE
SCALE 1 INCH = 50 FEET
WILMINGTON GAS CO. WILMINGTON, DEL.
103A

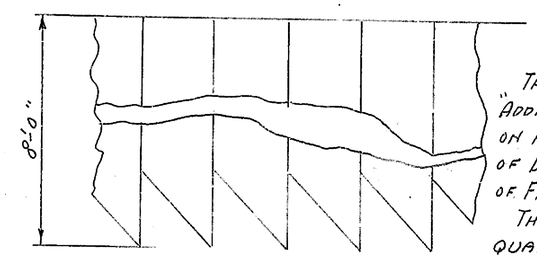
MICROFILMED 159 3-2

CONTRACT 103
NEWPORT BRIDGE
BASCULE PIER





DETAIL OF SHEETING
2"x10" TIMBER
SCALE 1" = 1'-0"



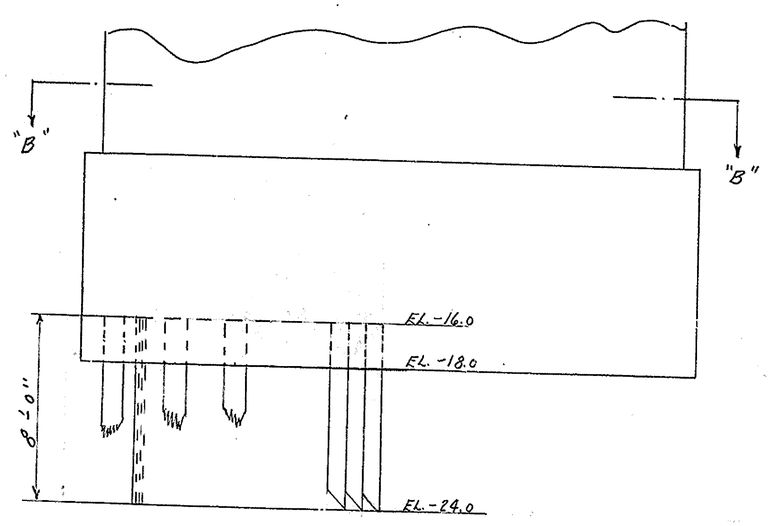
-NOTES-

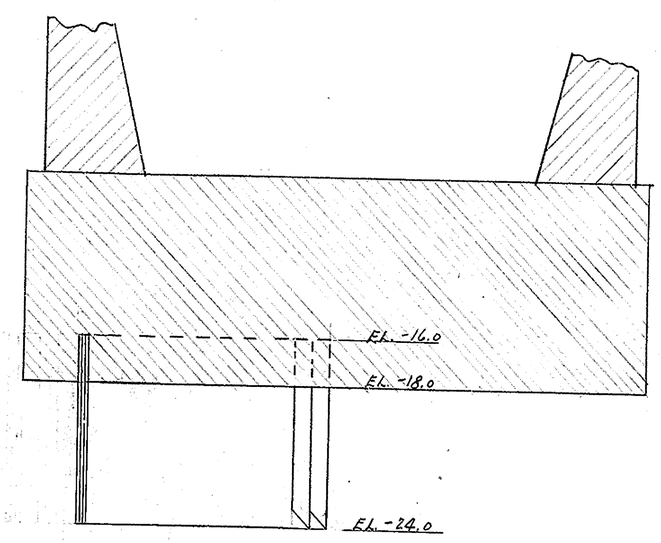
THIS SHEET IS SUBSTITUTED FOR "ADDITIONAL CONCRETE". ALL NOTES ON PLACING CONCRETE IN BASE OF BASCULE PIER APPLY. (LETTER OF FEBUARY 8, 1929).

THE TIMBER SHOULD BE GOOD QUALITY, FREE FROM ANY KNOTS LIKELY TO IMPAIR ITS STRENGTH. IT SHOULD EQUAL THE TIMBER USED IN TEMPORARY SPAN. (A.S.T.M. D 245-27 No 27)

NAIL ALL TIMBER TOGETHER SECURELY WITH 5" SPIKES.

EXERCISE CARE IN DRIVING SHEETING SO IT IS NOT CRUSHED IN THE DRIVING.





SECTION "A-A"

BOUGHT OF
E. J. HOLLINGSHORTH Co
FIR 2x10 - 8'-0

ABOUT 3.8 M OF LUMBER
4.2 M IN PLACE
2x6"

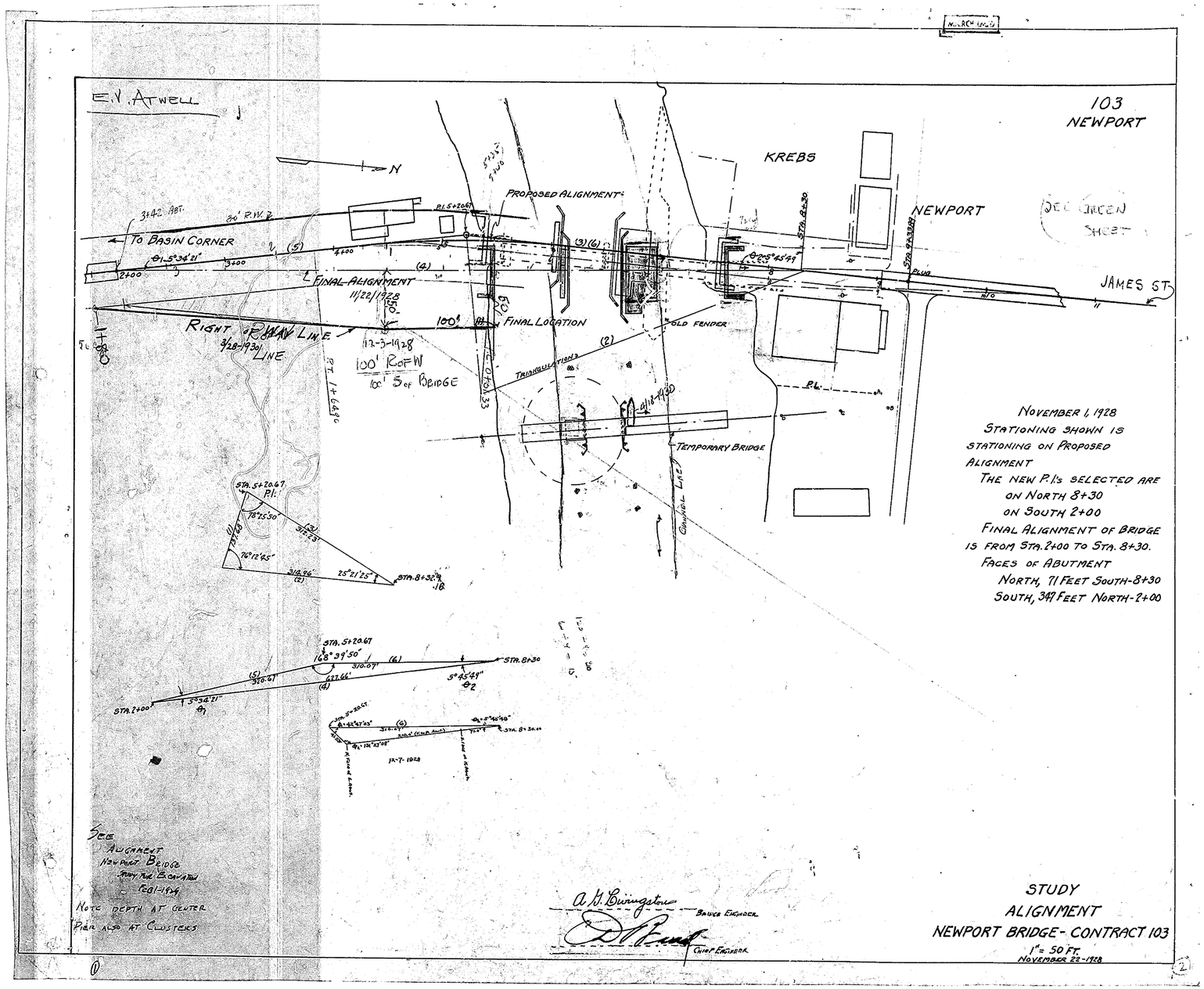
D-R.T.
2-8-1929

APPROVED A. G. Livingston
BRIDGE ENGINEER
APPROVED [signature]
CHIEF ENGINEER

CONTRACT 103
HIGHWAY DEPARTMENT
DELAWARE

TIMBER SHEETING
BASE OF BASCULE PIER

2 0 2 4 6 8 10 FT.
SCALE 1/4" = 1'-0"
FEBRUARY 27, 1929


E.V. ATWELL
103
NEWPORT
KREBS
NEWPORT
JAMES ST.
PROPOSED ALIGNMENT
TO BASIN CORNER
FINAL ALIGNMENT
11/22/1928
FINAL LOCATION
RIGHT OF WAY LINE
3/28-1930
LINE
12-3-1928
100' R of W
100' S of BRIDGE
OLD FENDER
TRIANGULATION
TEMPORARY BRIDGE
CHANNEL LINE
P.L.
STA. 5+20.67
P.I.
STA. 8+30
STA. 2+00
SEE GREEN SHEET
NOVEMBER 1, 1928
STATIONING SHOWN IS
STATIONING ON PROPOSED
ALIGNMENT
THE NEW P.I.'s SELECTED ARE
ON NORTH 8+30
ON SOUTH 2+00
FINAL ALIGNMENT OF BRIDGE
IS FROM STA. 2+00 TO STA. 8+30.
FACES OF ABUTMENT
NORTH, 71 FEET SOUTH-8+30
SOUTH, 347 FEET NORTH-2+00
SEE
ALIGNMENT
NEWPORT BRIDGE
NOTE DEPTH AT CENTER
PIER ALSO AT CLUSTERS
A. G. Livingston
BRIDGE ENGINEER
CHIEF ENGINEER
STUDY
ALIGNMENT
NEWPORT BRIDGE - CONTRACT 103
1" = 50 FT.
NOVEMBER 22-1928

MICROFILMED

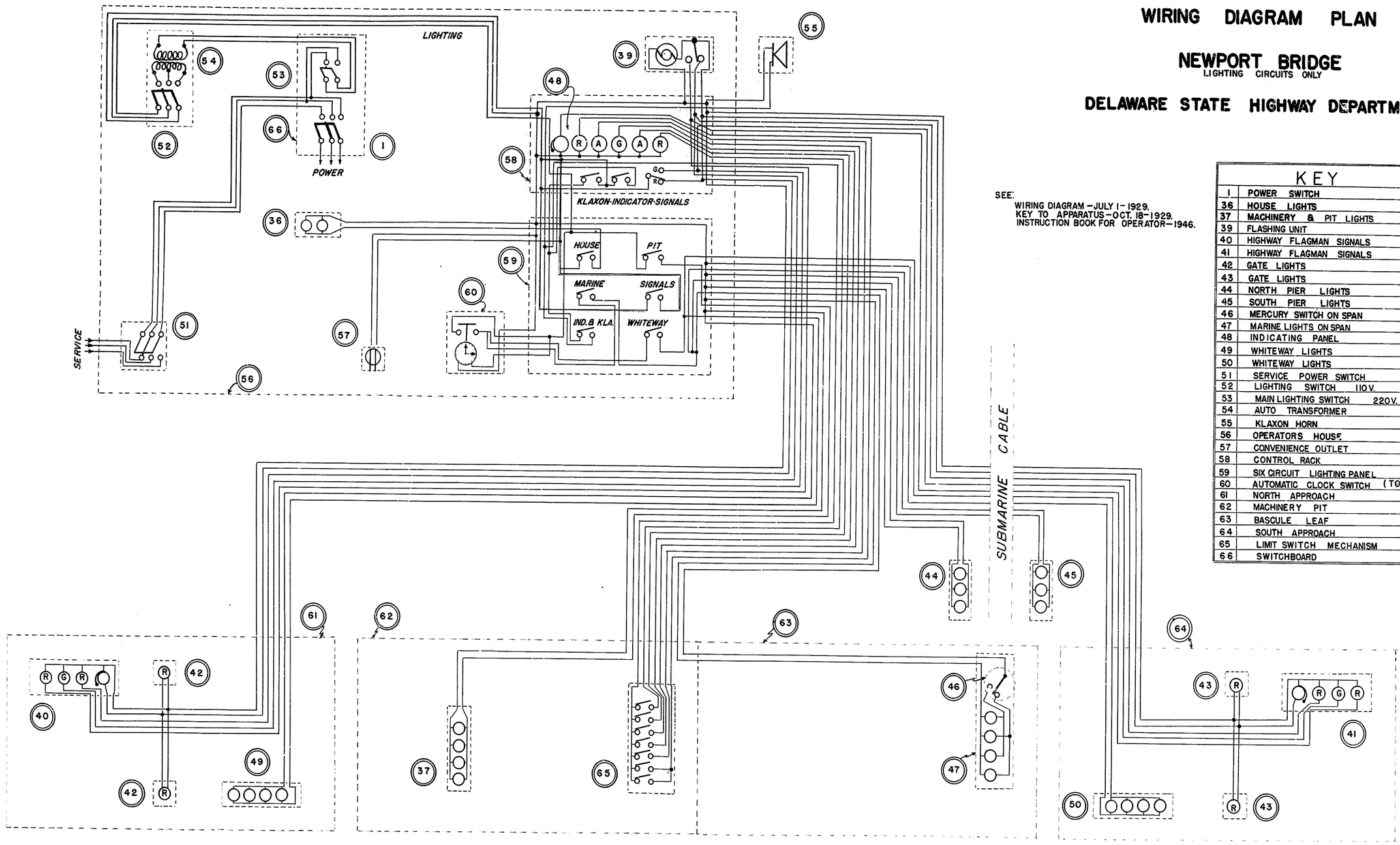
159 3-3

COUNTY	CONTRACT	F.A.A. DIV. NO.	STATE	FED. AID PROJECT NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
NC	103-1929	2	DEL.				

WIRING DIAGRAM PLAN

NEWPORT BRIDGE
LIGHTING CIRCUITS ONLY

DELAWARE STATE HIGHWAY DEPARTMENT



SEE:
WIRING DIAGRAM – JULY 1 – 1929.
KEY TO APPARATUS – OCT. 18 – 1929.
INSTRUCTION BOOK FOR OPERATOR – 1946.

KEY	
1	POWER SWITCH
36	HOUSE LIGHTS
37	MACHINERY & PIT LIGHTS
39	FLASHING UNIT
40	HIGHWAY FLAGMAN SIGNALS
41	HIGHWAY FLAGMAN SIGNALS
42	GATE LIGHTS
43	GATE LIGHTS
44	NORTH PIER LIGHTS
45	SOUTH PIER LIGHTS
46	MERCURY SWITCH ON SPAN
47	MARINE LIGHTS ON SPAN
48	INDICATING PANEL
49	WHITEWAY LIGHTS
50	WHITEWAY LIGHTS
51	SERVICE POWER SWITCH
52	LIGHTING SWITCH 110V.
53	MAIN LIGHTING SWITCH 220V.
54	AUTO TRANSFORMER
55	KLAXON HORN
56	OPERATORS HOUSE
57	CONVENIENCE OUTLET
58	CONTROL RACK
59	SIX CIRCUIT LIGHTING PANEL
60	AUTOMATIC CLOCK SWITCH (TORK)
61	NORTH APPROACH
62	MACHINERY PIT
63	BASCULE LEAF
64	SOUTH APPROACH
65	LIMIT SWITCH MECHANISM
66	SWITCHBOARD

GRADE
BEARINGS
TIE POINTS
BENCH MARKS
EARTHWORK
DRAINAGE

REVISIONS

D. T.H. Simpson
T. McW.

1/10-1947

APPROVED A.H. Livingston
BRIDGE ENGINEER

.103

NEWPORT BRIDGE – WIRING – LIGHTS.

JANUARY 1947

D C B A A B

NEWPORT BRIDGE

KEY TO APPARATUS FOR ELECTRICAL EQUIPMENT
FOR
NEWPORT. DELEWARE BRIDGE.

NEWPORT BRIDGE

CONTRACT 103 A

No.	DESCRIPTION.	LOCATION AND USE.
1.	100 amp. 250 volt T.P. fused switch with three 100 amp NEC fuses.	Main line power switch on switchboard.
2.	60 amp. 250 volt T.P. fused switch with 50 ampere NEC fuses	One operating motor. Near
3.	Same as No. 2	Other operating motor. Far.
4.	Three 5 ampere 250 volt NEC fuses	On switchboard for protection to Voltmeter.
5.	Voltmeter plugs and jacks	On switchboard for voltage testing.
6.	Weston Model 155 7 inch pattern Voltmeter. 0 to 250 scale.	On switchboard.
7.	Weston Model 156 7 inch pattern Ammeter 0 to 150 scale.	On switchboard.
8.	G.E. Cos. CR 7006 magnetic switch with thermal overload relays and undervoltage release	Back of switchboard for motor control
9.	Same as No. 8.	Same as No. 8 other motor.
10.	30 ampere 250 volt DP fused switch with 15 ampere NEC fuses.	On switchboard for motor heaters.
11.	Same as No. 10/	On switchboard for other motor heater.
~~12.~~	~~Resistor tube.~~ J. Westinghouse 1.5 KVA. 4 to 1. 220 volts to 55 volts Type S Style 39-875	~~On switchboard for one motor heater.~~
13.	~~Resistor tube.~~ Serial # 1566323	On switchboard for ~~other~~ both motor heater.
14.	Limit switch UP and Down.	Connected to operating machinery with chain and gears.
15.	General electric Cos START and STOP push button station.	On control rack, for bypassing limit switches.
16.	Westinghouse Cos. Reversible Drum control Type FA 13A. Class 12.750 Style 450262	On control rack for control of one motor.
17.	Same as No. 16 mechanically interlocked to No. 16.	On control rack for control of other motor.
18.	Westinghouse Cos. 10 H.P. 3 phase 60 cycle 220 volt 860 RPM Type CI motor Frame 460 C Style 2M775 Serial 4955987	Connected to operting machinery.
19.	Same as No. 18. Serial # 4955986	Connected to operating machinery.
20.	Westinghouse Cos. Type A1 Frame 83M motor mounted brake, retarding torque 120 ft pounds. Coil # 511911	Mounted on one operating motor.
21.	Same as No. 20. S.O. 2M776. Coil # 511911.	Mounted on other operating motor.
22.	Westinghouse Cos. Class 12790 resistor.	On control rack for reducing spped of motor.
23.	Same as No. 22.	On control rack for reducing speed of other motor.
24.	30 ampere 250 volt TP fused switch with 10 ampere NEC fuses.	On switchboard for fuse protectionto gate.
25.	Same as No. 24.	Same as 24.
26.	Same as No. 24.	Same as 24.
27.	Same as No. 24.	Same as 24.
28.	Terminal board and limit switch of NORWOOD NOONAN R.R. CROSSING GATE @ NN-9-296 Westinghouse ¼ H.P. 3 phase 60 cycle 220 volt, frame motor 23B. Style 9985214. Serial 7229527	MOUNTED IN GATE STANDARD. North East Gate — Worm Speed Reducer. Foote Bros Co. Chicago. Type S.P.C. Ratio 45 to 1 # C65320.
29.	Same as 28. NN-9-294. Motor serial 7238429	Same as 28. North West Gate
30.	Same as 28. NN-9-297 " " 7229579	Same as 28. South East Gate
31.	Same as 28. NN9-295 " " 7229509	Samesas 28. South West Gate
32.	Norwood Noonan Cos. Reversible drum. Westinghouse Type N 103 Form E. Style 505173.	On control rack for control of gate.
33.	Same as No. 32.	Same as No. 32.
34.	Same as No. 32	Same as No. 32.
35.	Same as No. 32.	Same as No. 32.
36.	Two 60 watt lights for house.	One inside and one outside of operators house.
37.	Machinery and pit lights. 60 watt.	Four ~~two~~ over machinery and Four ~~two~~ in pit.
38.	Three way switch.	Turns off safety green light and turns on flashing red light and red lights on gates.
39.	Betts and Co. Flashing Unit. (?)	Flashes red lights alternately on HIGHWAY FLAGMAN.
40.	Adams and WestlakeHIGHWAY FLAGMAN, one green light with two red lights and bell Railroad Supply Motor driven bell # 376	On curb of roadway N.S.
41.	Same as No. 40/ Motor # 135807. Motor 1/20 H.P. # 135809	On curb of roadway F.S.
42.	Two vapor proof red lamps Crouse Hinds Type V.	On roadway arms of crossing gates. N.S.
43.	Same as No. 42.	On roadway arms of crossing gates F.S.
44.	Adams and Westlake # 197 Pier lamps. 25 watt lamps.	Pier lamps N.S.
45.	Adams and Westlake # 197 Per lamps 25 watt lamps.	Pier lamps F.S.
46.	Mercury switch. Absolute Contactor Co.	Control of Duplex lamps.
47.	Adams and Westlake Cos Duplex Marine lamps.	Bridge lamps.
48.	Indicating pannel with colored lenses and single stroke bell.	On control rack for indicating position of bridge.
49.	Westinghouse co's Sheridan #8 Hollow spun posts with Serpentine granite, Solling glassware, bilux refractor and Type R fitter. 100 watt lamps.	Whiteway lights. N.S.
50.	Same as No. 49.	Whiteway lights F.S.
12.	Swaby Centrafugal Pump with Howell Redband totally inclosed 3 phase 60 cycle 220 volt 1750 RPM 3/4 H.P. motor, frame D03 Type SCRB Serial # 94613 - Capacity of pump 30 G.P.M. - 1½" intake with 1½" Discharge.	Motor on same elevation as track, pump at bottom of sump.

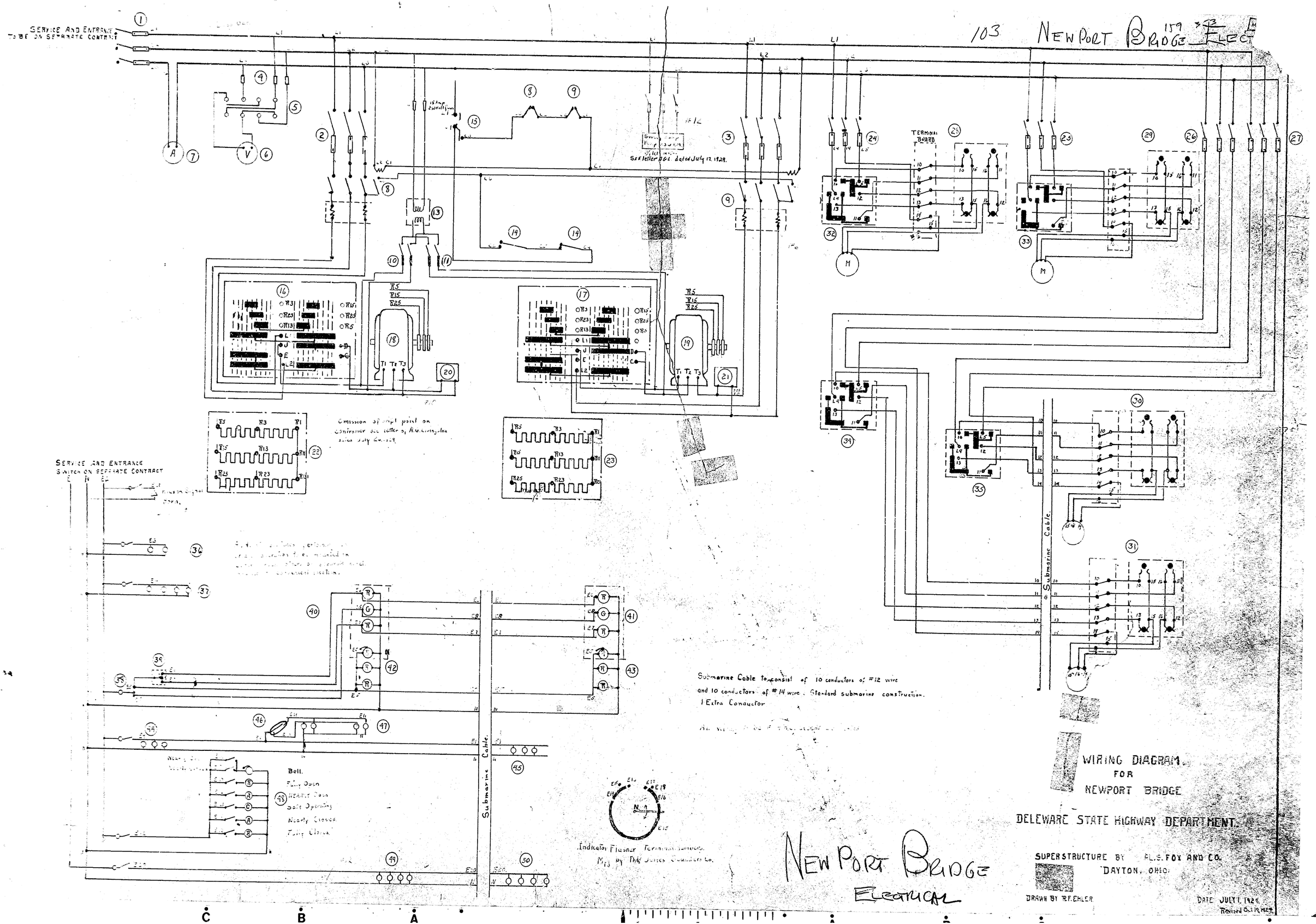
NEWPORT BRIDGE
SUPERSTRUCTURE — AL S FOX CO. DAYTON OHIO
SEE SHEET WIRING DIAGRAM - JULY 1-1929

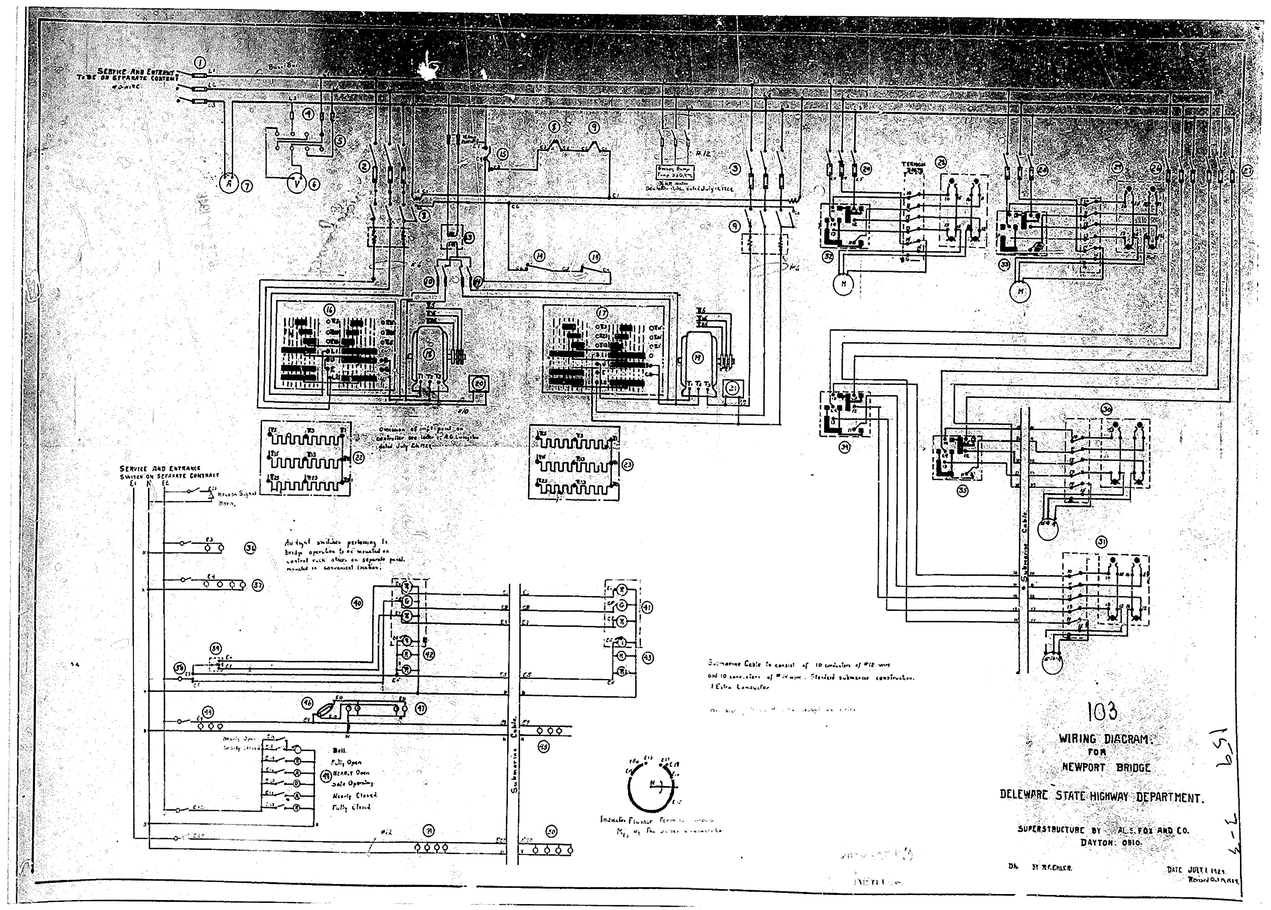
SEE WIRING DIAGRAM
LIGHTING CIRCUITS — JANUARY-1927

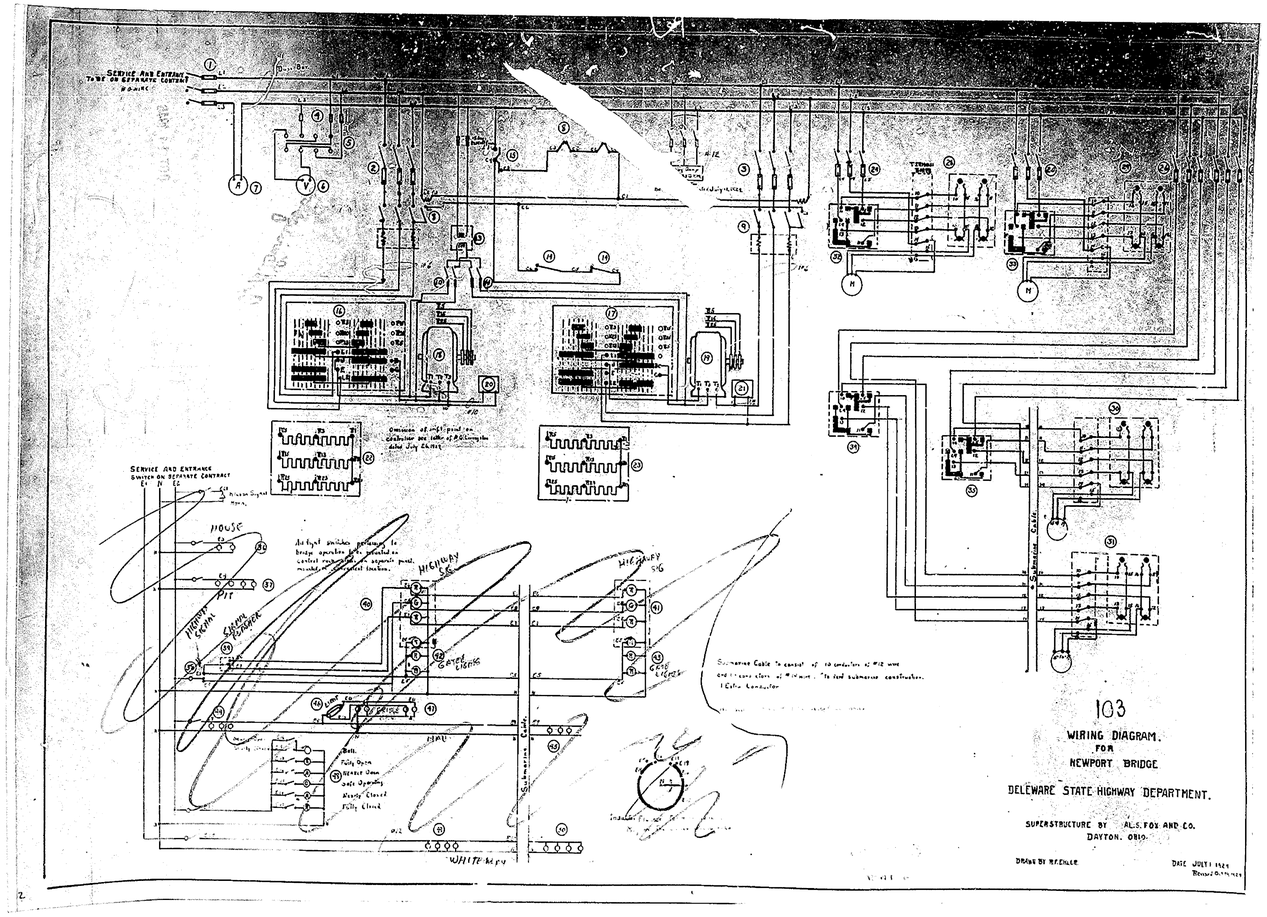
SEE WIRING DIAGRAM
JULY 1-1929

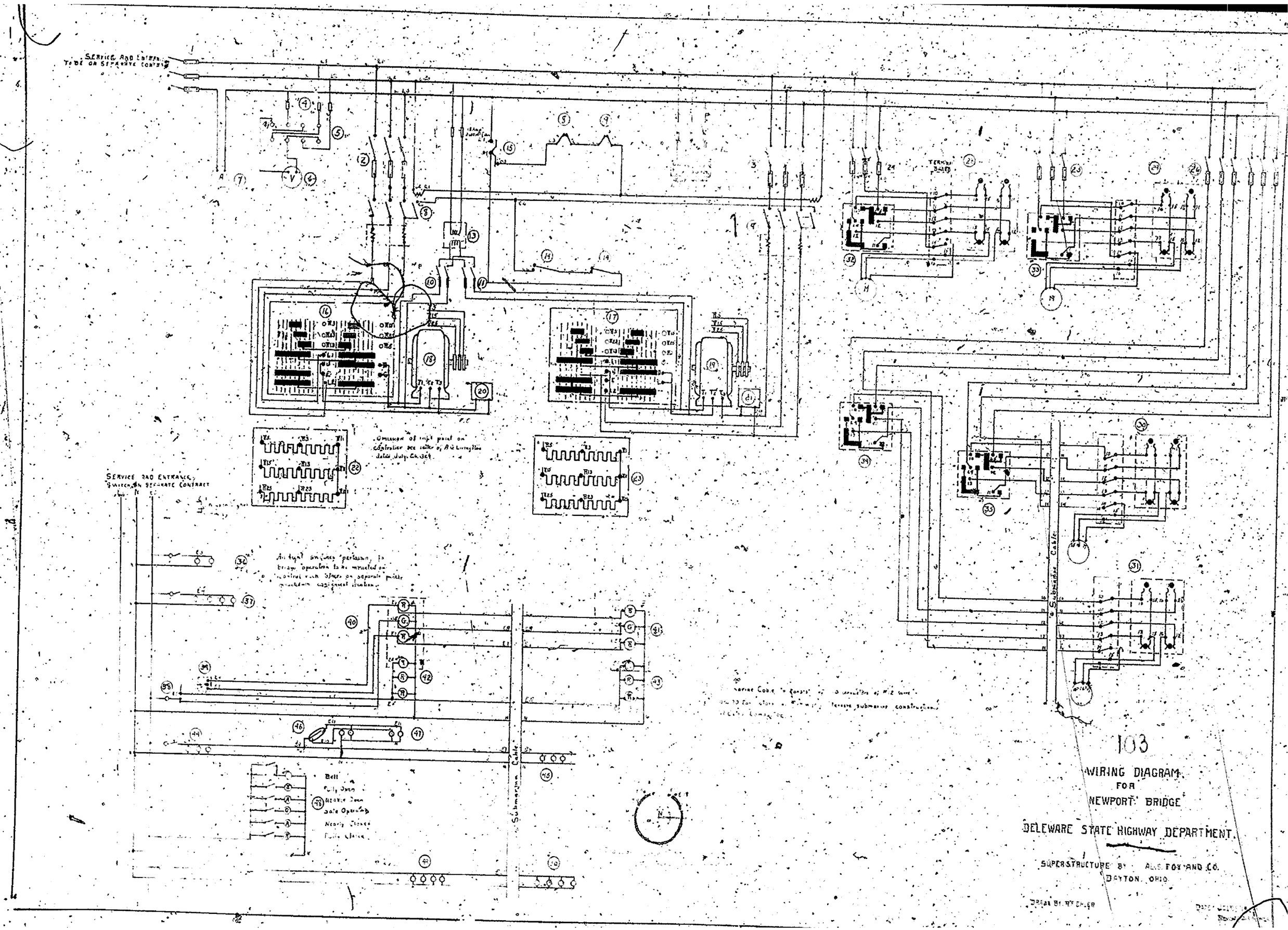
CONTRACT 103 B

Revised Oct 18, 1929
Ralph F Ehler


103 NEWPORT BRIDGE ELECT
SERVICE AND ENTRANCE TO BE ON SEPARATE CONTRACT
SERVICE AND ENTRANCE SWITCH ON SEPARATE CONTRACT
TERMINAL BOARD
Submarine Cable
Submarine Cable to consist of 10 conductors of #12 wire and 10 conductors of #14 wire. Standard submarine construction. 1 Extra Conductor
Bell.
Fully Open
Nearly Open
Safe Operating
Nearly Closed
Fully Closed
Indicator Flasher Terminal Numbers.
WIRING DIAGRAM FOR NEWPORT BRIDGE
DELEWARE STATE HIGHWAY DEPARTMENT.
SUPERSTRUCTURE BY AL.S. FOX AND CO. DAYTON, OHIO.
DRAWN BY R.F. EHLER
DATE JULY 1, 1929
NEWPORT BRIDGE ELECTRICAL


103
WIRING DIAGRAM
FOR
NEWPORT BRIDGE
DELEWARE STATE HIGHWAY DEPARTMENT.
SUPERSTRUCTURE BY AL. S. FOX AND CO.
DAYTON, OHIO.
SERVICE AND ENTRANCE SWITCH ON SEPARATE CONTRACT
Submarine Cable
Submarine Cable to consist of 10 conductors of #12 wire and 10 conductors of #14 wire. Standard submarine construction. 1 Extra Conductor
Bell
Fully Open
Nearly Open
Safe Opening
Nearly Closed
Fully Closed
DATE JULY 1929


103
WIRING DIAGRAM.
FOR
NEWPORT BRIDGE
DELEWARE STATE HIGHWAY DEPARTMENT.
SUPERSTRUCTURE BY AL.S. FOX AND CO.
DAYTON, OHIO.
DRAWN BY R.F. ENLLE
DATE JULY 1 1924
SERVICE AND ENTRANCE
SWITCH ON SEPARATE CONTRACT
HOUSE
PIT
HIGHWAY SIGNAL
SIGNAL PLATFORM
HIGHWAY SIG
GATED LIGHTS
WHITE WAY
Submarine Cable


SERVICE AND ENTRANCE
TO BE ON SEPARATE CONTRACT
SERVICE AND ENTRANCE
SWITCH ON SEPARATE CONTRACT
Submarine Cable
Bell
Fully Open
Nearly Open
Safe Operating
Nearly Closed
Fully Closed
103
WIRING DIAGRAM
FOR
NEWPORT BRIDGE
DELEWARE STATE HIGHWAY DEPARTMENT.
SUPERSTRUCTURE BY ALLS FOX AND CO.
DAYTON, OHIO

KEY TO APPARAT OR ELECERICAL EQUIPMENT

R

NEWPO DELEWARE BRIDGE.

	DESCRIPTION.	LOCATION AND USE.
.	100 amp. 250 volt T.P. fused switch with three 100 amp NEC fuses.	Main line power switch on switchboard.
.	60 amp. 250 volt T.P. fused switch with 50 ampere NEC fuses	One operating motor. Near
.	Same as No. 2	Other operating motor. Far.
.	Three 5 ampere 250 volt NEC fuses	On switchboard for protection to Voltmeter.
.	Voltmeter plugs and jacks	On switchboard for voltage testing.
.	Weston Model 155 7 inch pattern Voltmeter. 0 to 260 scale.	On switchboard.
.	Weston Model 156 7 inch pattern Ammeter 0 to 150 scale.	On switchboard.
.	G.E. Cos. CR 7006 magnetic switch with thermal overload relays and undervoltag ease.	Back of switchboard for motor control
.	Same as No. 8.	Same as No. 8 other motor.
.	30 ampere 250 volt DP fused switch with 15 ampere NEC fuses.	On switchboard for motor heaters.
.	Same as No. 10/	On switchboard for other motor heater.
11.	Resistor tube. } 1. Westinghouse 1.5 KVA. 4 to 1. 220 volts to 55 volts Type S Style 38-878	~~On switchboard for one motor heater.~~
.	~~Resistor tube.~~ } Serial # 1566323	On switchboard for ~~other~~ both motor heater.
.	Limit switch UP and Down.	Connected to operating machinery with chain and gears.
.	General electric Cos START and STOP push button station.	On control rack, for bypassing limit switches.
.	Westinghouse Cos. Reversible Drum control Type FA 13A. Class 2.750 Style 450862	On control rack for co trol of one motor.
7.	Same as No. 16 mechanically interlocked to No. 16.	On control rack for control of other motor.
8.	Westinghouse Cos. 10 H.P. 3 phase 60 cycle 220 volt 880 RPM Type CI motor Fra 0 0 Style 2 MJ715 Serial 4955987	Connected to operting machinery.
9.	Same as No. 18. Serial # 4955986	Connected to operating machinery.
0.	Westinghouse Cos. Type Al Frame 83M motor mounted brake, retarding torque 120 ounds. Coil # 511911	Mounted on one operating motor.
1.	Same as No. 20. S.O. 2 MJ776. Coil # 511911	Mounted on other operating motor.
2.	Westinghouse Cos. Class 12790 resistor.	On control rack for reducing spped of motor.
3.	Same as No. 22.	On control rack for reducing speed of other motor.
4.	30 ampere 250 volt TP fused switch with 10 ampere NEC fuses.	On switchboard for fuse protectio to gate.
5.	Same as No. 24.	Same as 24.
.		Same as 24.
29.	Same as 28. NN-9-294. Motor Serial 7238429 @ NN-9-296 } Westinghouse ½ H.P. 3 phase 60 cycle 220 volt, frame motor 23B. Style 495521A. Serial 7229527	North East Gate
30.	Same as 28. NN-9-297 " " 7229579	North West Gate
31.	Same as 28. NN9-295 " " 7229509	South East Gate
32.	Norwood Nobnan Cos. Reversible drum. Westinghouse Type N 103 Form E. Style 505173.	South West Gate } Worm Speed Reducer. Foote Bros Co. Chicago. Type S.P.C. Ratio 45 to 1 # C65320.
33.	Same as No. 32.	Same as 28.
34.	Same as No. 32	Same as 28.
35.	Same as No. 32.	Same as 28.
36.	Two 60 watt lights for house.	On control rack for control of gate.
37.	Machinery and pit lights. 60 watt.	Same as No. 32.
38.	Three way switch.	Same as No. 32.
		Same as No. 32.
		One inside and one outside of operators house.
		~~Two~~ over machinery and ~~two~~ in pit.
		Turns off safety green light and turns on flashing red light and red lights on gates.
39.	Betts and Co. Flashing Unit.	Flashes red lights alternately on HIGHWAY FLAGMAN.
40.	Adams and Westlake HIGHWAY FLAGMAN, one green light with two red lights an bell. } Railroad Supply Motor driven bell # 376	On curb of roadway N.S.
41.	Same as No. 40/ Motor # 185807. Motor 1/20 HP # 185809	On curb of roadway F.S.
42.	Two vapor proof red lamps Crouse Hinds Type V.	On roadway arms of crossing gates. N.S.
43.	Same as No. 42.	On roadway arms of crossing gates F.S.
44.	Adams and Westlake # 197 Pier Lamps. 25 watt lamps.	Pier lamps N.S.
45.	Adams and Westlake # 197 Per lamps 25 watt lamps	Pier lamps F.S.
46.	Mercury switch. Absolute Contactor Co.	Control of Duplex lamps.
47.	Adams and Westlake Cos Duplex Marine lamps.	Bridge lamps.
48.	Indicating pannel with colored lenses and single stroke bell.	On control rack for indicating position of bridge.
49.	4 Westinghouse co's Sheridan #8 Hollow spun posts with Serpentine granite, olling glassware, bilux refractor and Type R fitter. 100 watt lamps.	Whiteway lights. N.S.
50.	Same as No. 49.	Whiteway lights F.S.
12.	Swaby Centrifugal Pump with Howell Redband totally inclosed. 3 phase 60 cycle 220 volt 1750 RPM ¾ H.P. motor, frame D08 Type SCRB Serial # 94613 - Capacity of pump 30 G.P.M. - 1½" intake with 1½" Discharge.	Motor on same elevation as track, pump at bottom of sump.

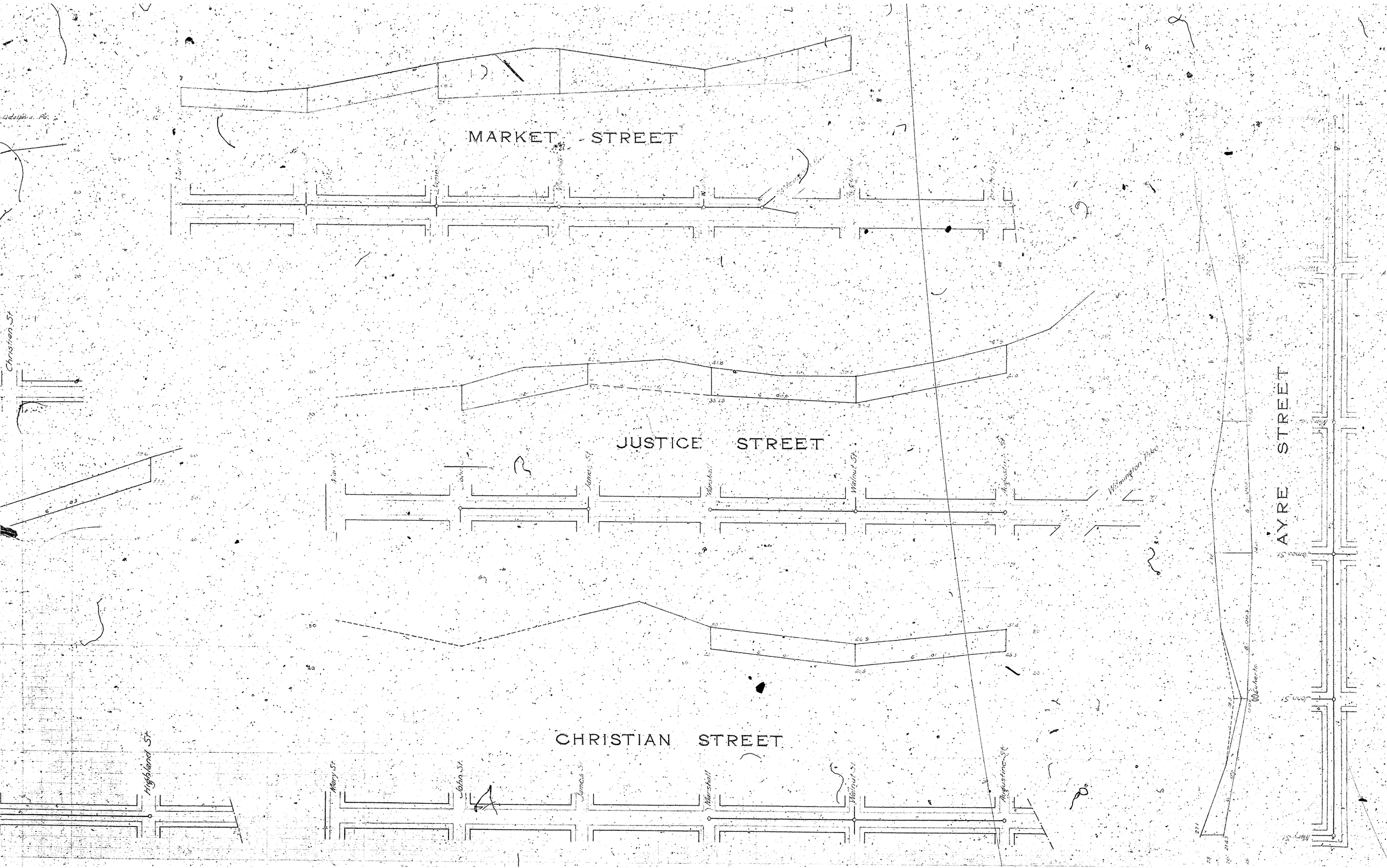
New Point Comfort

A. Stein Engineer Cons

Sec Cons. Hunter Mass. July 1-1928

Contract 10 3

T

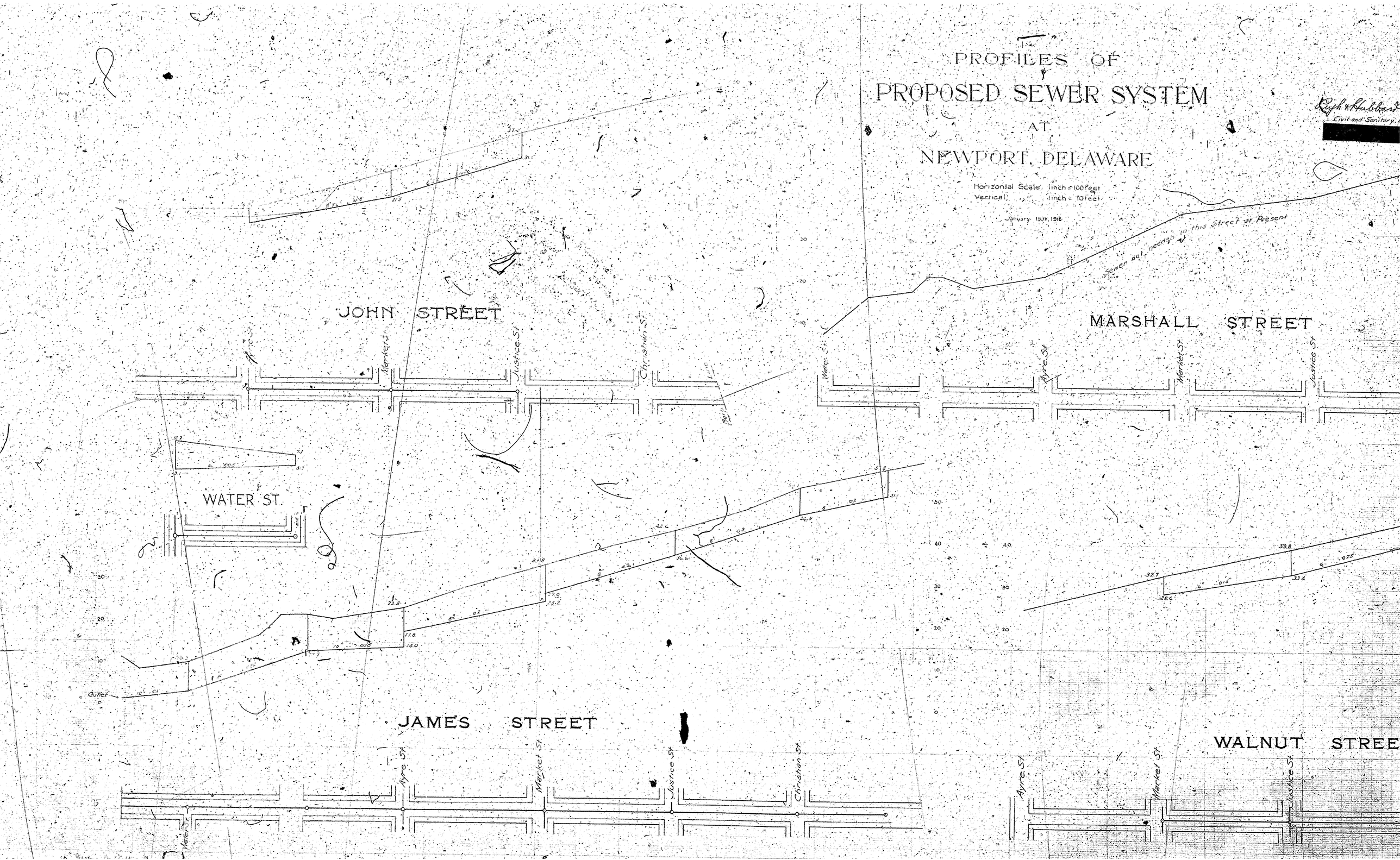

MARKET STREET
JUSTICE STREET
CHRISTIAN STREET
AYRE STREET
Christian St
Highland St
Mary St
John St
James St
Marshall
Walnut St
Augustine St
Wilmington Pike
Washington
James St
John St
Mary St

PROFILES OF
PROPOSED SEWER SYSTEM
AT
NEWPORT, DELAWARE

Horizontal Scale: 1 inch = 100 feet
Vertical: 1 inch = 10 feet

January 15th, 1918

Ralph W. Hubbard
Civil and Sanitary E...
[redacted]

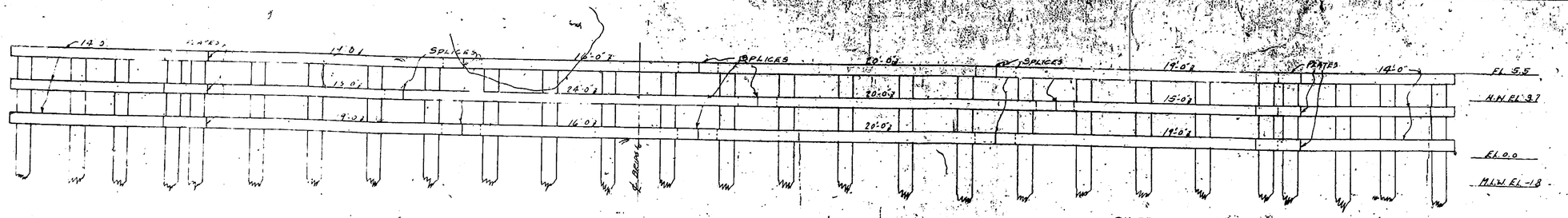


ROUTE	CONTRACT	COUNTY	SHEET
	103	NEW CASTLE	

FENDER SYSTEM

FED ROAD DIST NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
10	DEL.	48A	1928		

NEWPORT BRIDGE

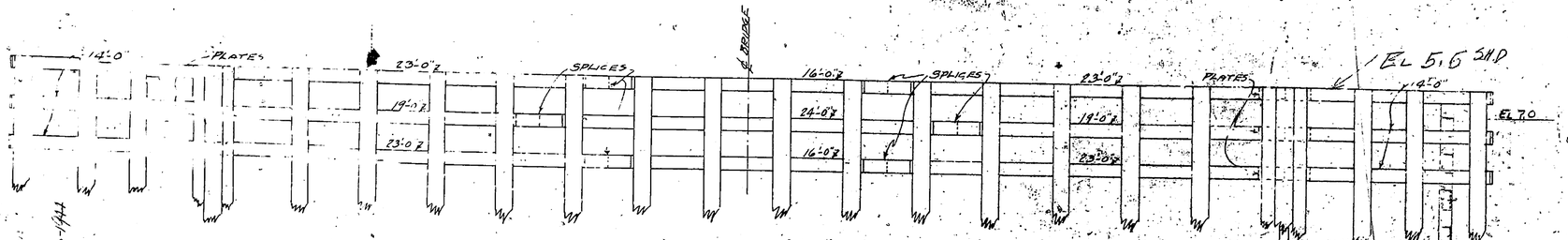


ELEVATION BASCULE PIER FENDER

SCALE $\frac{1}{4}$" = 1'-0"

PILES
STARTED DRIVING 4/10/29
FINISHED DRIVING 5/6/29
MAXIMUM LENGTH 35'-2"
MINIMUM LENGTH 33'-6"
AVERAGE LENGTH 34'-6"

5.5
1.1
6.6
HIGH WATER
1.8

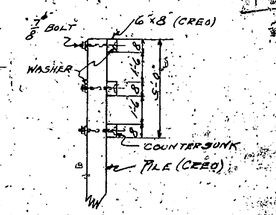


ELEVATION REST PIER FENDER (INSIDE)

SCALE $\frac{1}{4}$" = 1'-0"

PILES
STARTED DRIVING 4/13/29
FINISHED DRIVING 5/6/29
MAXIMUM LENGTH 36'-0"
MINIMUM LENGTH 33'-6"
AVERAGE LENGTH 34.6'

(1-1/8" Bolts)



FENDER DETAIL

SCALE $\frac{1}{4}$" = 1'-0"

Mar Dept 8.6 = STD 5.5

BILL OF MATERIAL

LUMBER (CREO)				
No	SIZE	LENGTH	LOCATION	F.B.M.
2	6x8	24'-0"	Rest & Bas Pier Fender	192
4	"	23'-0"	Rest Pier "	368
3	"	20'-0"	Basc. " "	240
6	"	19'-0"	Rest & Bas. "	456
4	"	16'-0"	" " " "	256
2	"	15'-0"	Basc. "	120
12	"	14'-0"	" & Rest "	672
15	"	2'-6"	Splices	150
TOTAL LUMBER				2459
71 CREO. PILES @ 36'-0" = 2556 LIN. FT.				
12 PLATES 8" x $\frac{3}{8}$" x 3'-0" = 367#				

—NOTES—

THE FENDER PLAN WITH DETAILS IS SHOWN ON CONTRACT 103-1262A2 PILE PLAN AND FENDER. ALL NOTES ON 1262A2 APPLY TO THIS SHEET.

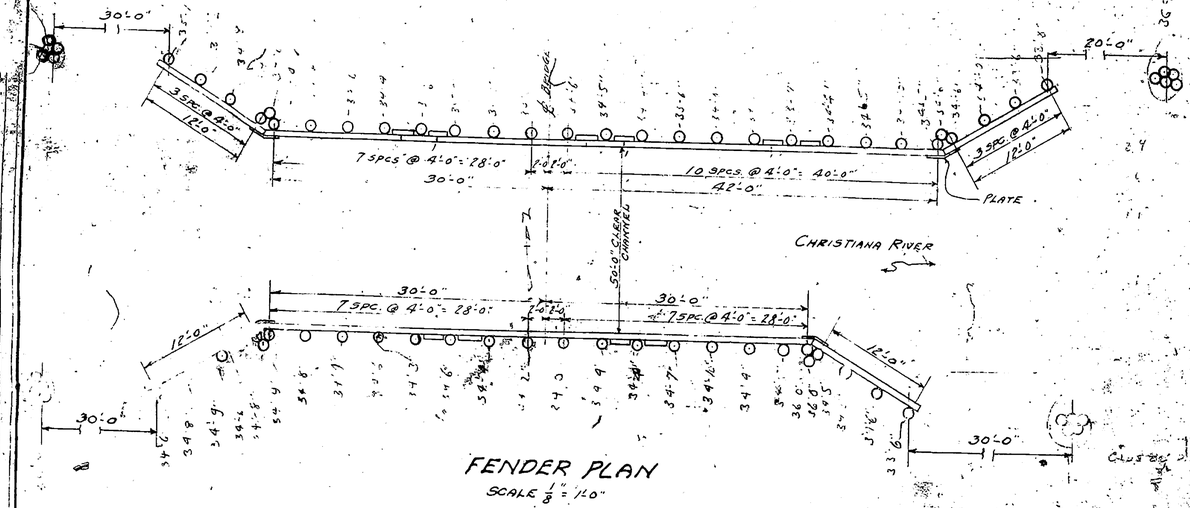
THE SPECIFICATION OF THE BUREAU OF PUBLIC ROADS FOR CREOSOTED LUMBER HAS BEEN ADOPTED BY THE STATE HIGHWAY DEPARTMENT.

ITEM 47 AND ITEM 48 COVER THE CREOSOTED TIMBER AND CREOSOTED PILES TO BE USED.

USE 36 FOOT CREOSOTED PILING.

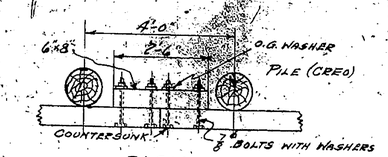
THE GRADE OF LUMBER SHALL EQUAL THE SPECIFICATIONS OF AMERICAN SOCIETY OF TESTING MATERIALS. THE DIVISION IS D245-27 No 27.

APRIL-1944 - TWO NEW PILE CLUSTERS (5x2=10) ADDED ON THE WEST SIDE.



FENDER PLAN

SCALE $\frac{1}{8}$" = 1'-0"

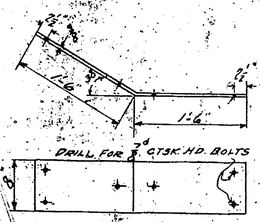


PLAN

ELEVATION

DETAIL OF SPLICE

SCALE $\frac{1}{2}$" = 1'-0"



DETAIL FENDER PLATE

SCALE 1" = 1'-0"

6-5-19-29

USE MALLEABLE IRON FITTINGS FOR OTHER CONTRACTS

W. H. LITTLE
1312 MALLORY COURT
NORFOLK, VA.

This Fender on South Side
Broken up Feb 5-13-1947
See Report

Drawn - R.T.
Traced - R.T.
Checked - A.G.L.
2/1/29

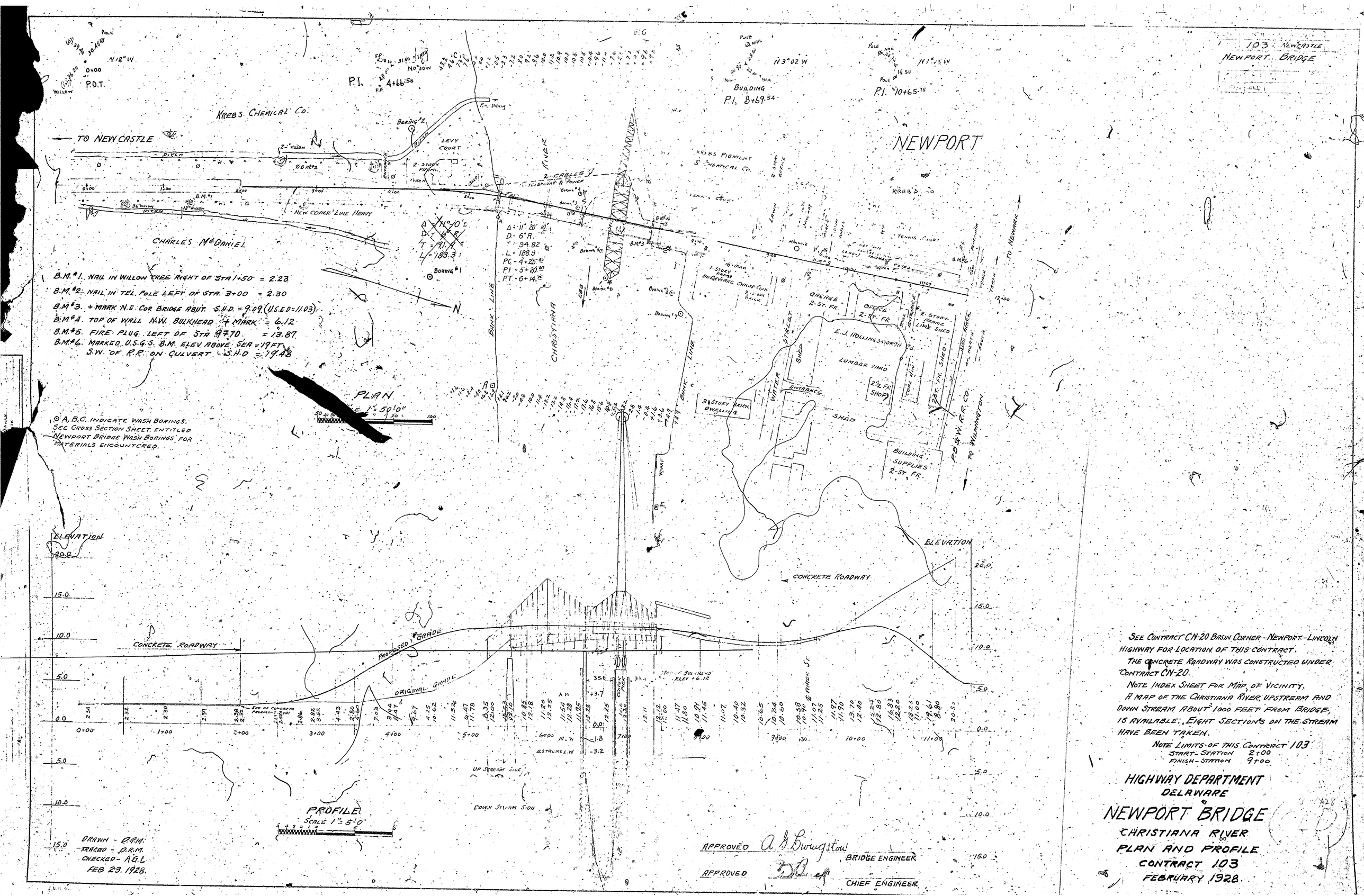
J. H. W. & CO. 100 C1828

CONTRACT 103
HIGHWAY DEPARTMENT
DELAWARE
FENDER SYSTEM
NEWPORT BRIDGE

SCALE $\frac{1}{4}$" = 1'-0"
FEBRUARY 1929

APPROVED: [signature] BRIDGE ENGINEER
APPROVED: [signature] CHIEF ENGINEER

103 NEWCASTLE
NEWPORT BRIDGE



SEE CONTRACT CN-20 BASIN CORNER - NEWPORT - LINCOLN HIGHWAY FOR LOCATION OF THIS CONTRACT.

THE CONCRETE ROADWAY WAS CONSTRUCTED UNDER CONTRACT CN-20.

NOTE INDEX SHEET FOR MAP OF VICINITY.

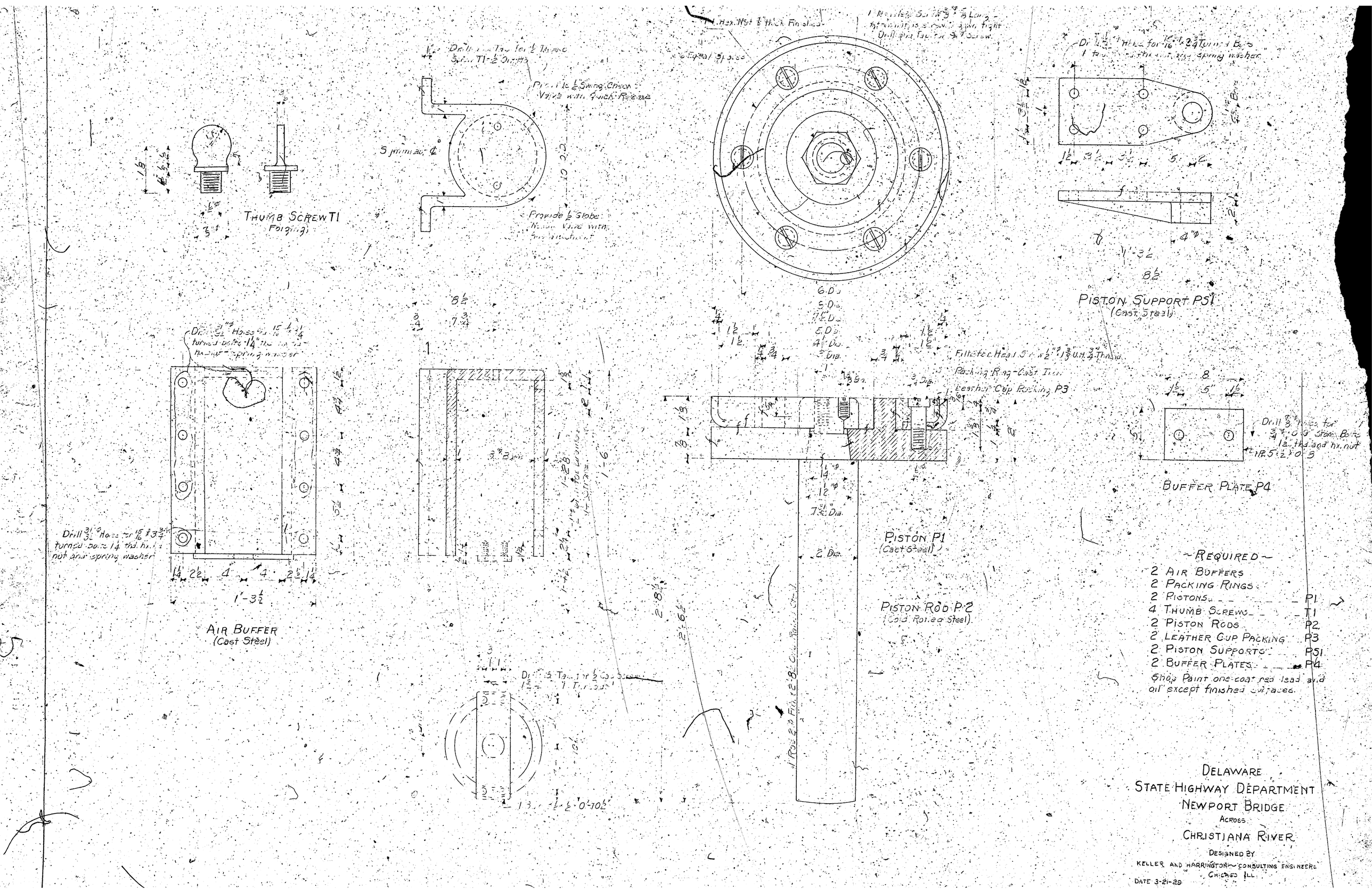
A MAP OF THE CHRISTIANA RIVER, UPSTREAM AND DOWN STREAM ABOUT 1000 FEET FROM BRIDGE, IS AVAILABLE. EIGHT SECTIONS ON THE STREAM HAVE BEEN TAKEN.

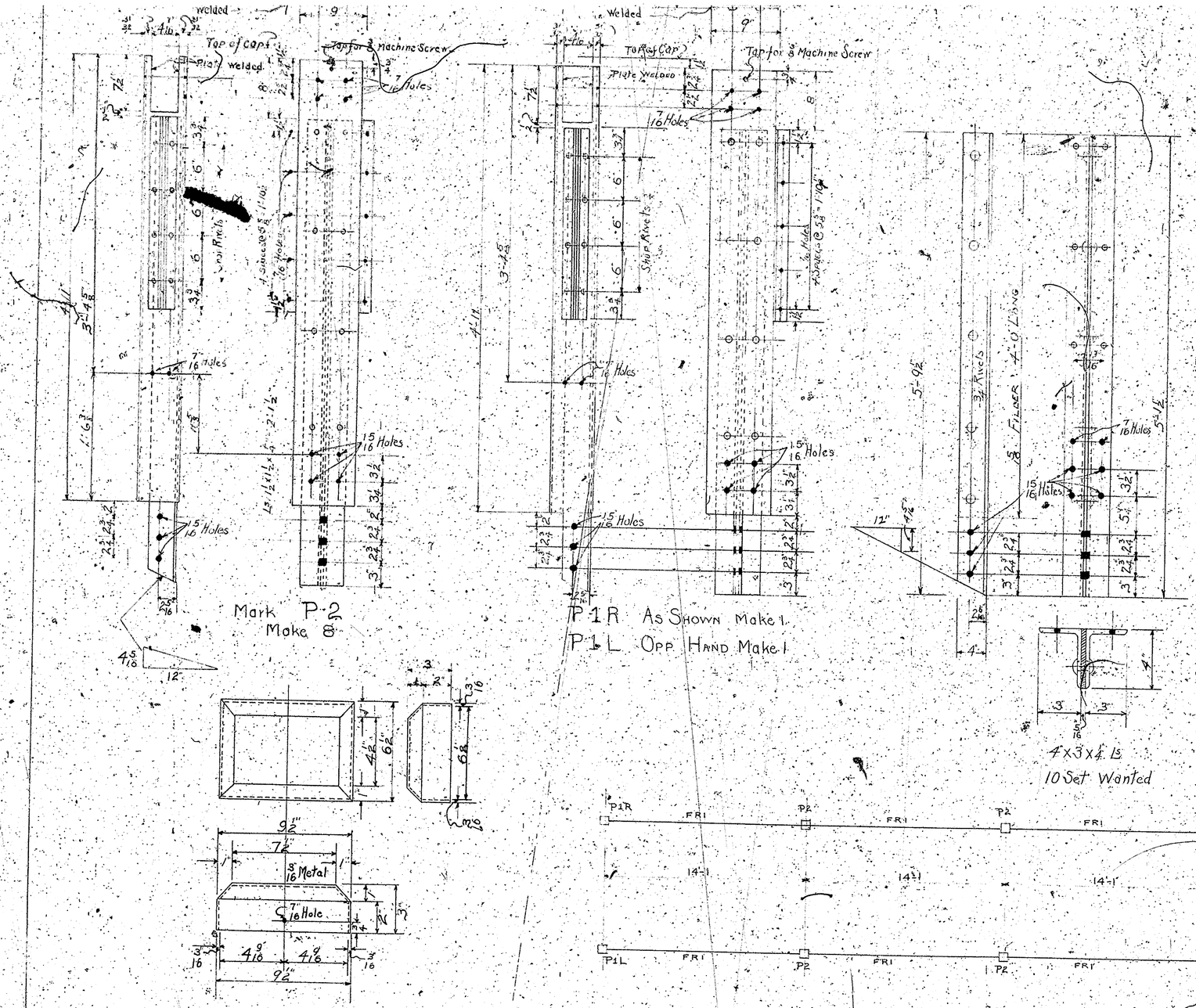
NOTE LIMITS OF THIS CONTRACT 103
START - STATION 2+00
FINISH - STATION 9+00

HIGHWAY DEPARTMENT
DELAWARE

NEWPORT BRIDGE

CHRISTIANA RIVER
PLAN AND PROFILE
CONTRACT 103
FEBRUARY 1928.


THUMB SCREW T1
(Forging)
Provide ½ Globe
Provide ½ Swing Check Valve with Quick Release
PISTON SUPPORT PS1
(Cast Steel)
Packing Ring-Cast Iron
Leather Cup Packing P3
BUFFER PLATE P4
AIR BUFFER
(Cast Steel)
PISTON P1
(Cast Steel)
PISTON ROD P2
(Cold Rolled Steel)
~REQUIRED~
2 AIR BUFFERS
2 PACKING RINGS
2 PISTONS P1
4 THUMB SCREWS T1
2 PISTON RODS P2
2 LEATHER CUP PACKING P3
2 PISTON SUPPORTS PS1
2 BUFFER PLATES P4
Shop Paint one coat red lead and oil except finished surfaces.
DELAWARE
STATE HIGHWAY DEPARTMENT
NEWPORT BRIDGE
ACROSS
CHRISTIANA RIVER
DESIGNED BY
KELLER AND HARRINGTON ~ CONSULTING ENGINEERS
CHICAGO ILL.
DATE 3-21-29



Shop paint
one Coat of Du Pont's
Antoxide paint

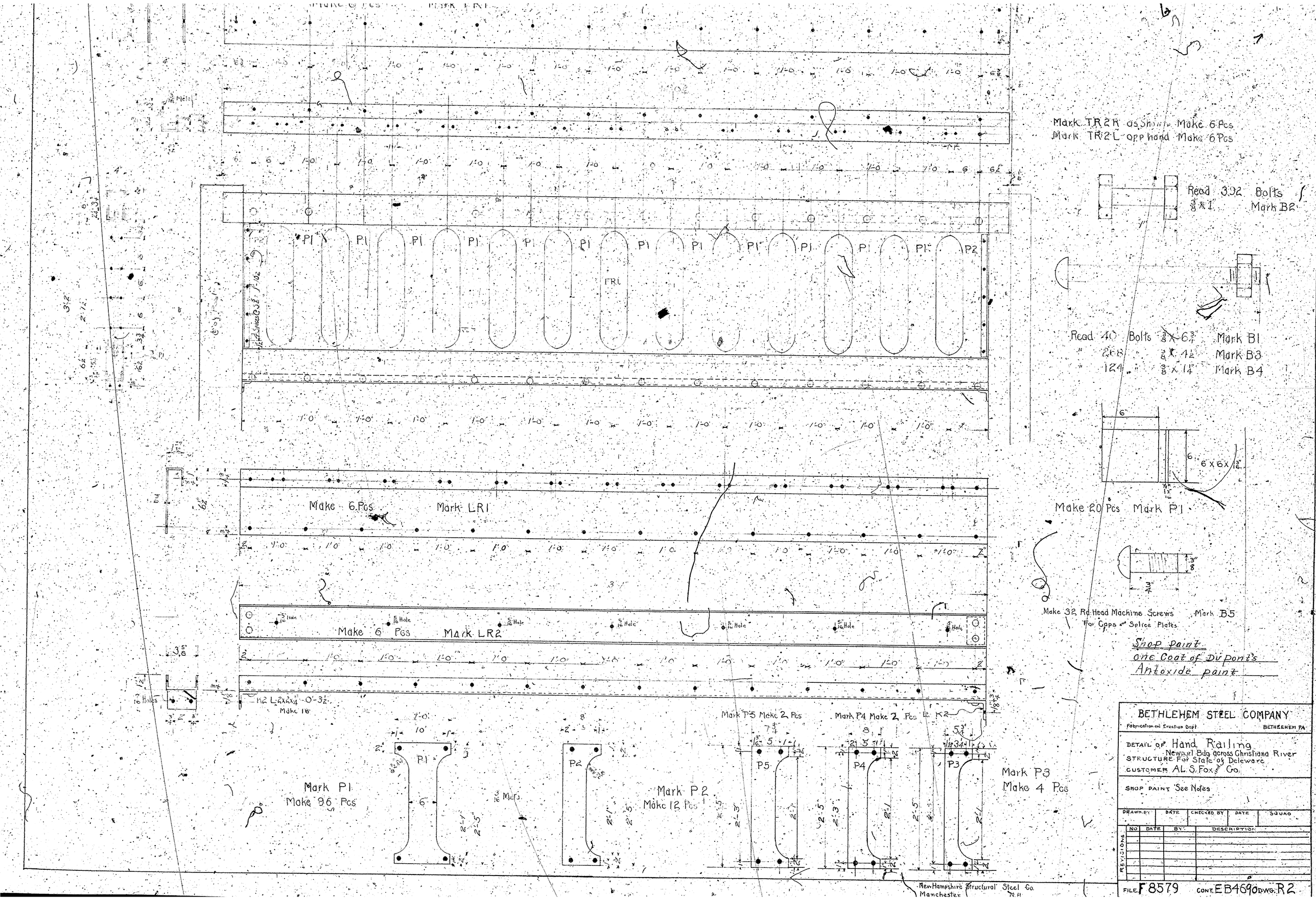
BETHLEHEM STEEL COMPANY
Fabrication and Erection Dept. BETHLEHEM PA.

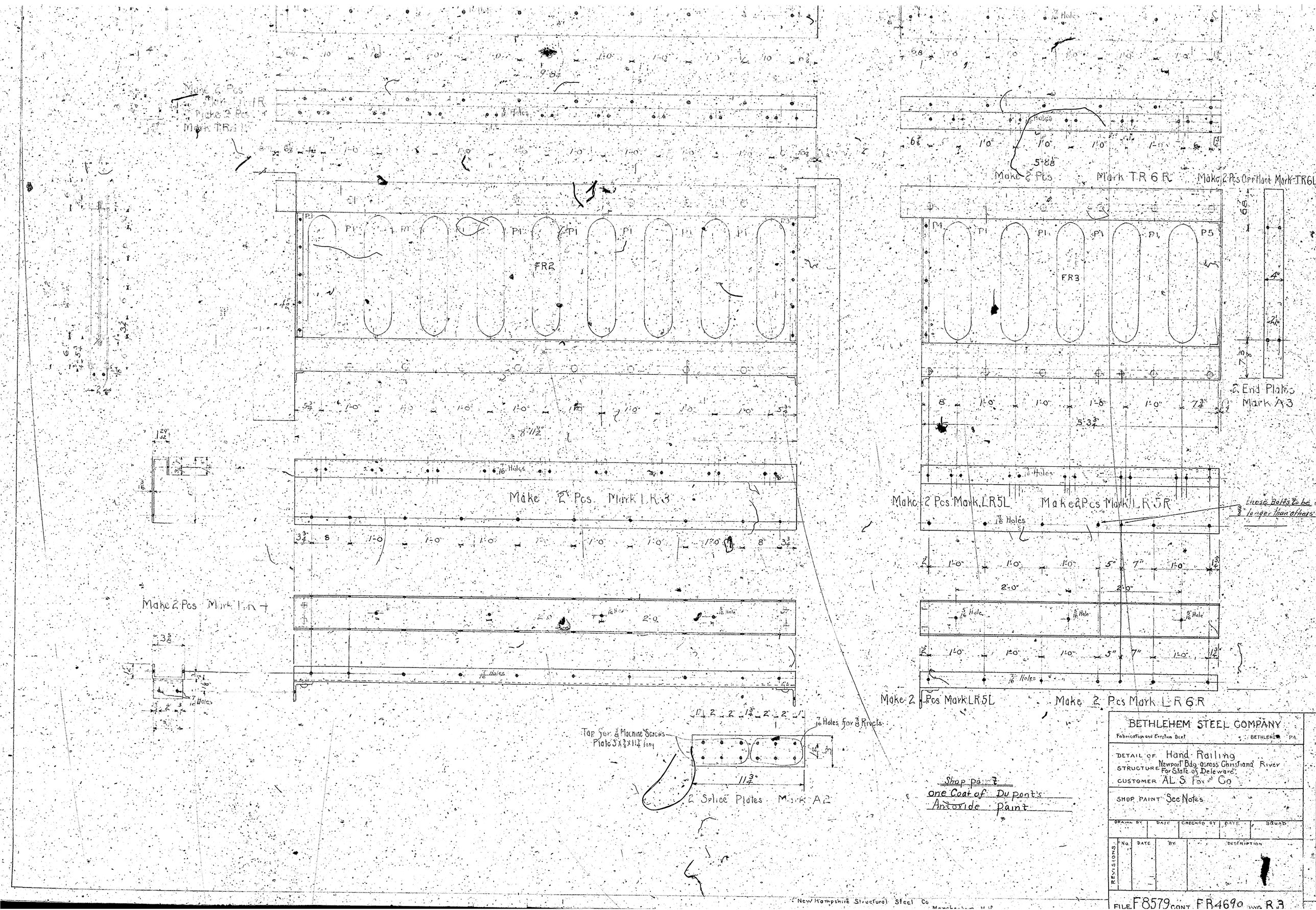
DETAIL OF Hand Railing
STRUCTURE Newport Bdg across Christiana River For State of Delaware
CUSTOMER AL. S. Fox and Co.

SHOP PAINT See Notes

DRAWN BY	DATE	CHECKED BY	DATE	SQUAD

REVISIONS	NO	DATE	BY	DESCRIPTION


Mark TR2R as Shown Make 6 Pcs
Mark TR2L opp hand Make 6 Pcs
Read 392 Bolts 3/8 x 1 Mark B2
Read 40 Bolts 3/8 x 6 3/4 Mark B1
" 268 " 3/8 x 1 1/2 Mark B3
" 124 " 3/8 x 1 1/4 Mark B4
Make 20 Pcs Mark P1
Make 32 Rd Head Machine Screws Mark B5
For Caps & Splice Plates
Shop paint
one Coat of Du Pont's
Antoxide paint
Make 6 Pcs Mark LR1
Make 6 Pcs Mark LR2
Make 18
Mark P1
Make 96 Pcs
Mark P2
Make 12 Pcs
Mark P5 Make 2 Pcs
Mark P4 Make 2 Pcs
Mark P3
Make 4 Pcs
BETHLEHEM STEEL COMPANY
Fabrication and Erection Dept
BETHLEHEM PA
DETAIL OF Hand Railing
Newport Bdg across Christiana River
STRUCTURE For State of Deleware
CUSTOMER AL. S. Fox & Co.
SHOP PAINT See Notes
DRAWN BY
DATE
CHECKED BY
DATE
SQUAD
REVISIONS
NO
DATE
BY
DESCRIPTION
FILE F 8579
CONT. EB4690
DWG. R2
New Hampshire Structural Steel Co.
Manchester N.H.



BETHLEHEM STEEL COMPANY

Fabrication and Erection Dept. BETHLEHEM PA.

DETAIL OF Hand Railing

STRUCTURE Newport Bdg across Christiana River For State of Deleware

CUSTOMER AL S Fox and Co

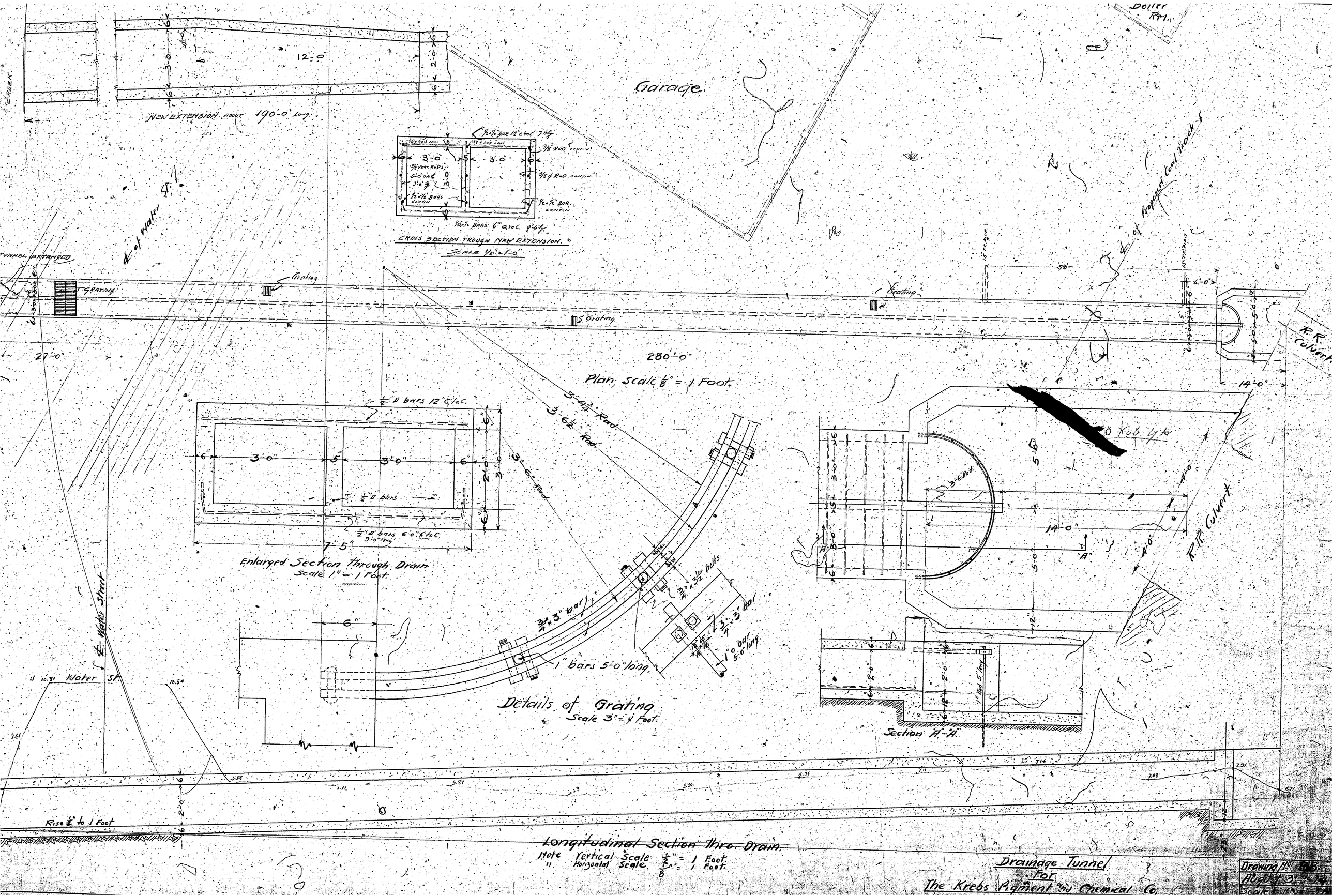
SHOP PAINT See Notes

DRAWN BY	DATE	CHECKED BY	DATE	SQUAD

REVISIONS	NO.	DATE	BY	DESCRIPTION

FILE F8579 CONT. FR4690 DWG. R3

New Hampshire Structural Steel Co

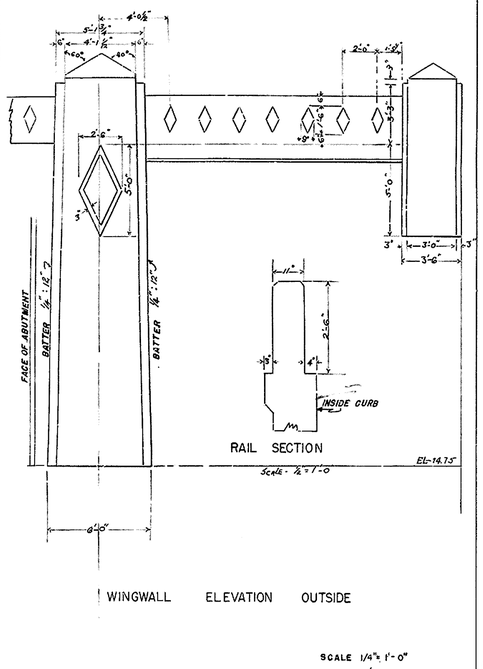


Garage
Boiler RM.
NEW EXTENSION about 190'-0" long
12'-0"
CROSS SECTION THROUGH NEW EXTENSION.
SCALE 1/2" = 1'-0"
℄ of Water St.
℄ of Proposed Coal Track
TUNNEL EXTENDED
Grating
Grating
Grating
27'-0"
280'-0"
Plan, Scale 1/8" = 1 Foot.
R.R. Culvert
14'-0"
3'-4 3/4" Rad.
3'-6 1/2" Rad.
3'-6" Rad.
1/2" D bars 12" C to C.
1/2" D bars
1/2" D bars 6'-0" C to C. 9'-0" long
7'-5"
Enlarged Section through Drain
Scale 1" = 1 Foot.
3/4" x 3" bar
3/4" x 3 1/2" bolts
1" bars 5'-0" long
1" D bar 5'-0" long
Details of Grating
Scale 3" = 1 Foot.
℄ Water Street
Water St.
Rise 1/8" to 1 Foot
Section "A"-"A"
Longitudinal Section thro. Drain.
Note Vertical Scale 1/2" = 1 Foot.
" Horizontal Scale 1/8" = 1 Foot.
Drainage Tunnel
For
The Krebs Pigment and Chemical Co.
Drawing No.
August 31st
Scale

COUNTY	CONTRACT	F.R.A. DIV. NO.	STATE	FED. AID PROJECT NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
		2	DEL.				

BALUSTRADES
CONCRETE— OPEN TYPE

I LAKE COMO BRIDGE SMYRNA U.S.13.

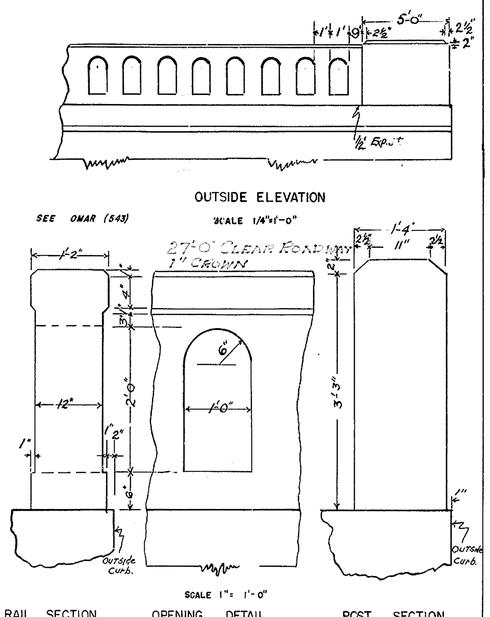


WINGWALL ELEVATION OUTSIDE

SCALE 1/4"= 1'-0"

KENT COUNTY ROUTE U.S.13 CONTRACT 281 1940.

II NEWARK OVERHEAD COLLEGE AVE NEWARK

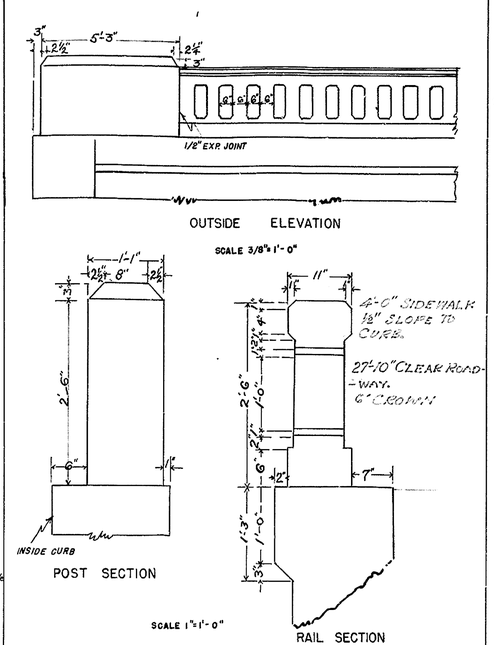


RAIL SECTION OPENING DETAIL POST SECTION

SCALE 1"= 1'-0"

NEW CASTLE COUNTY ROUTE 896 CONTRACT 462 1936

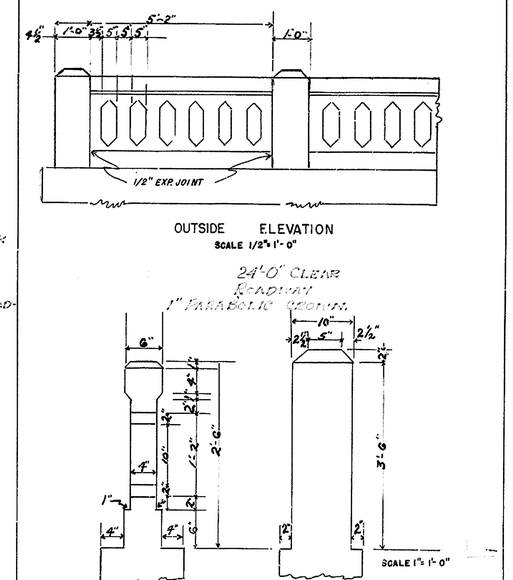
III VINES CREEK BRIDGE SUSSEX



SCALE 1"=1'-0"

SUSSEX COUNTY ROUTE 26 CONTRACT 409 1935

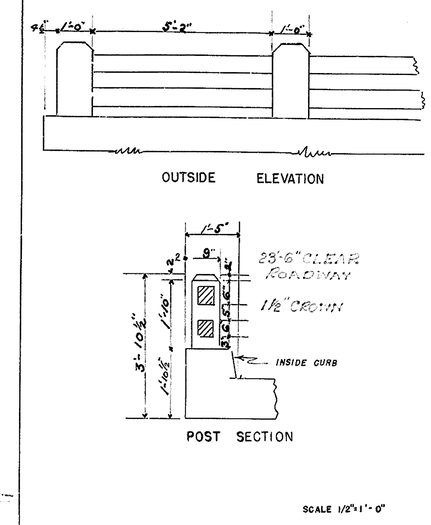
IV LAKE BRIDGE REHOBOTH



SCALE 1"= 1'-0"

SUSSEX COUNTY ROUTE 14 CONTRACT 532 1932

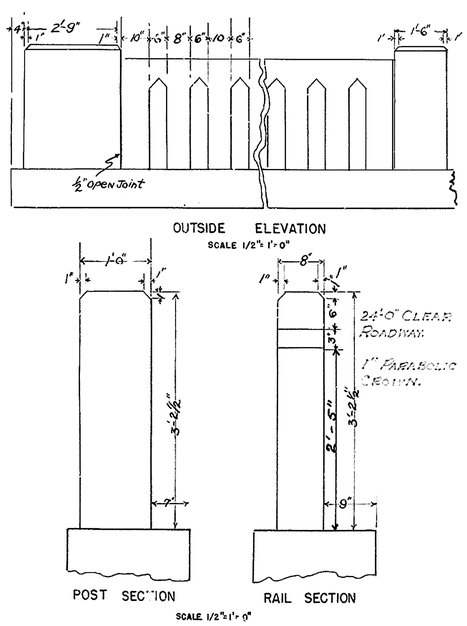
V MILL CREEK BRIDGE



SCALE 1/2"=1'-0"

KENT COUNTY ROUTE 6 CONTRACT 412 1936

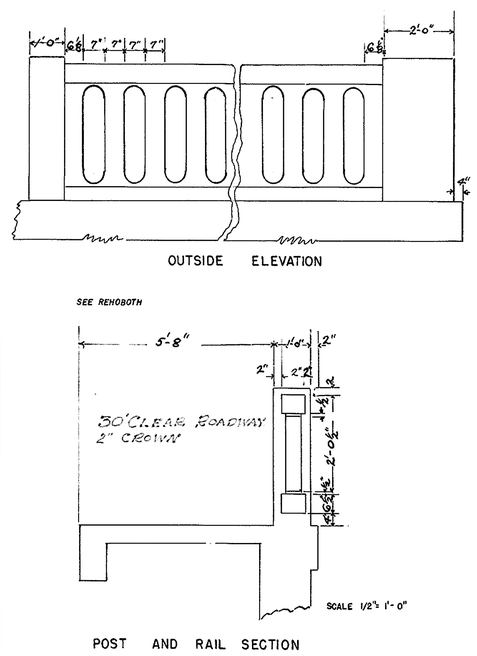
VI INDIAN RIVER INLET BRIDGE



SCALE 1/2"=1'-0"

SUSSEX COUNTY ROUTE 14 CONTRACT 600 1938

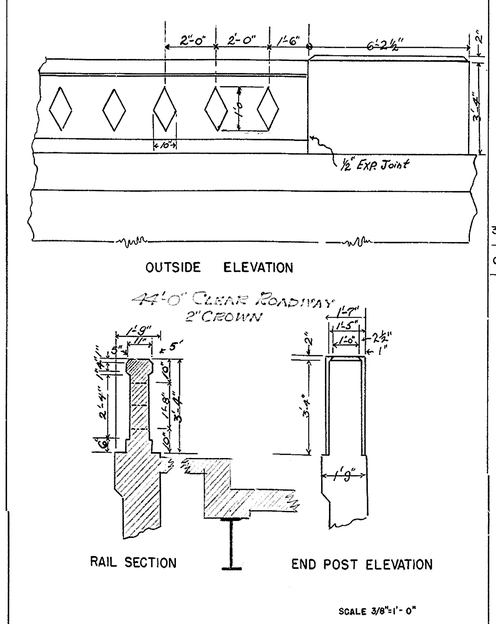
VII NEWPORT BRIDGE CHRISTIANA RIVER



SCALE 1/2"= 1'-0"

NEW CASTLE COUNTY ROUTE 41 CONTRACT 103 1928

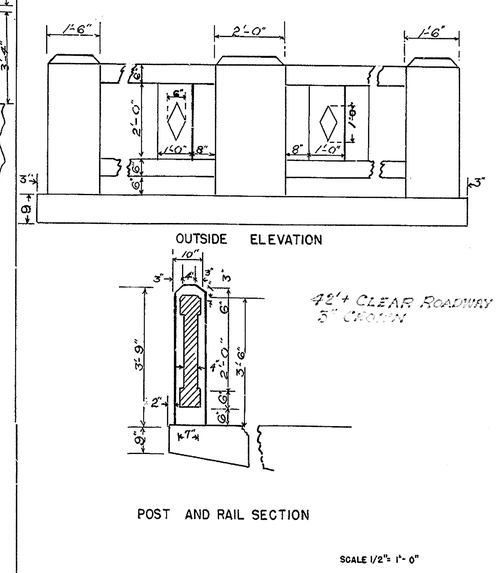
VIII NEW CASTLE OVERHEAD



SCALE 3/8"=1'-0"

NEW CASTLE COUNTY ROUTE U.S. 40 CONTRACT 381 1935.

IX FARNHURST BRIDGE OVERHEAD



SCALE 1/2"= 1'-0"

NEW CASTLE COUNTY ROUTE U.S. 13 CONTRACT 218A 1932

BALUSTRADE SHEETS
1. METAL TYPE — DECEMBER 1946
2. METAL TYPE - JANUARY 1947.
3. OPEN TYPE - CONCRETE. NOV. 1946
4. CLOSED TYPE - CONCRETE. NOV. 1946.

"NOTE"
THIS SHEET SHOWS VARIOUS BALUSTRADES USED ON BRIDGES IN THE STATE OF DELAWARE.

PICTURES USUALLY ARE AVAILABLE TITLE SHOWN LOCATIONS.

See Bridge Plans - Index

DELAWARE STATE HIGHWAY DEPARTMENT

BALUSTRADES

OPEN TYPE—CONCRETE

APPROVED A. H. Livingston
BRIDGE ENGINEER

NOVEMBER 1946

CHECKED
GRADE
BEARINGS
TIE POINTS
BENCH MARKS
ELEVATIONS
DRAINAGE

REVISIONS

H.C.W.