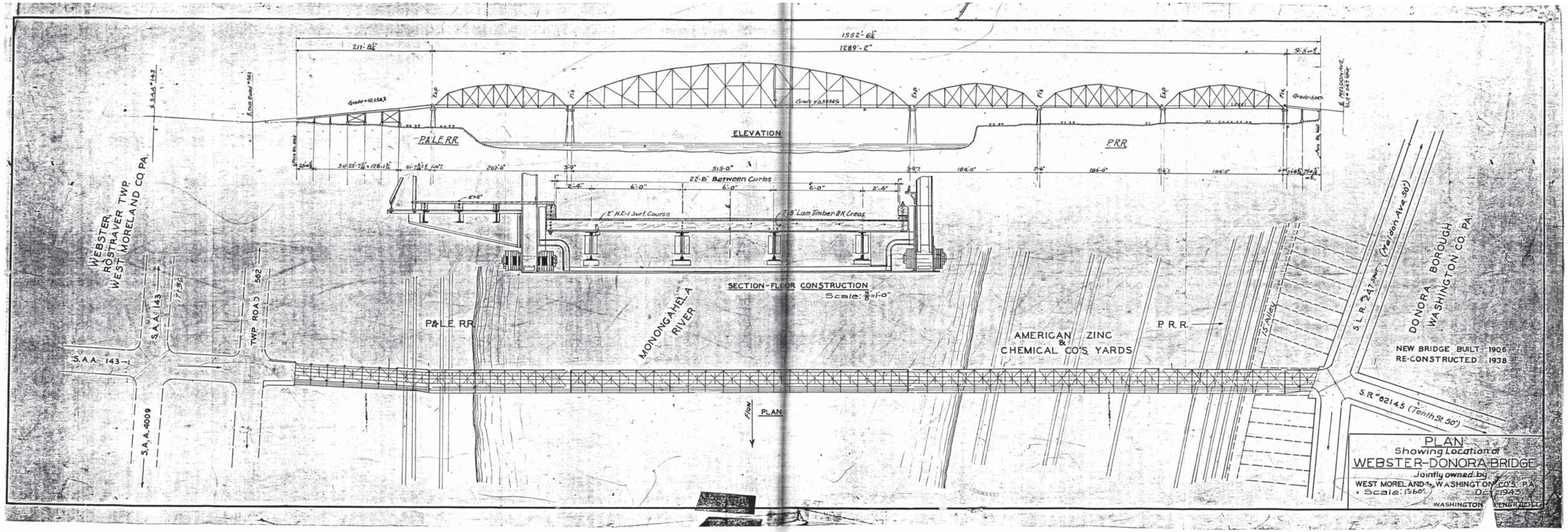
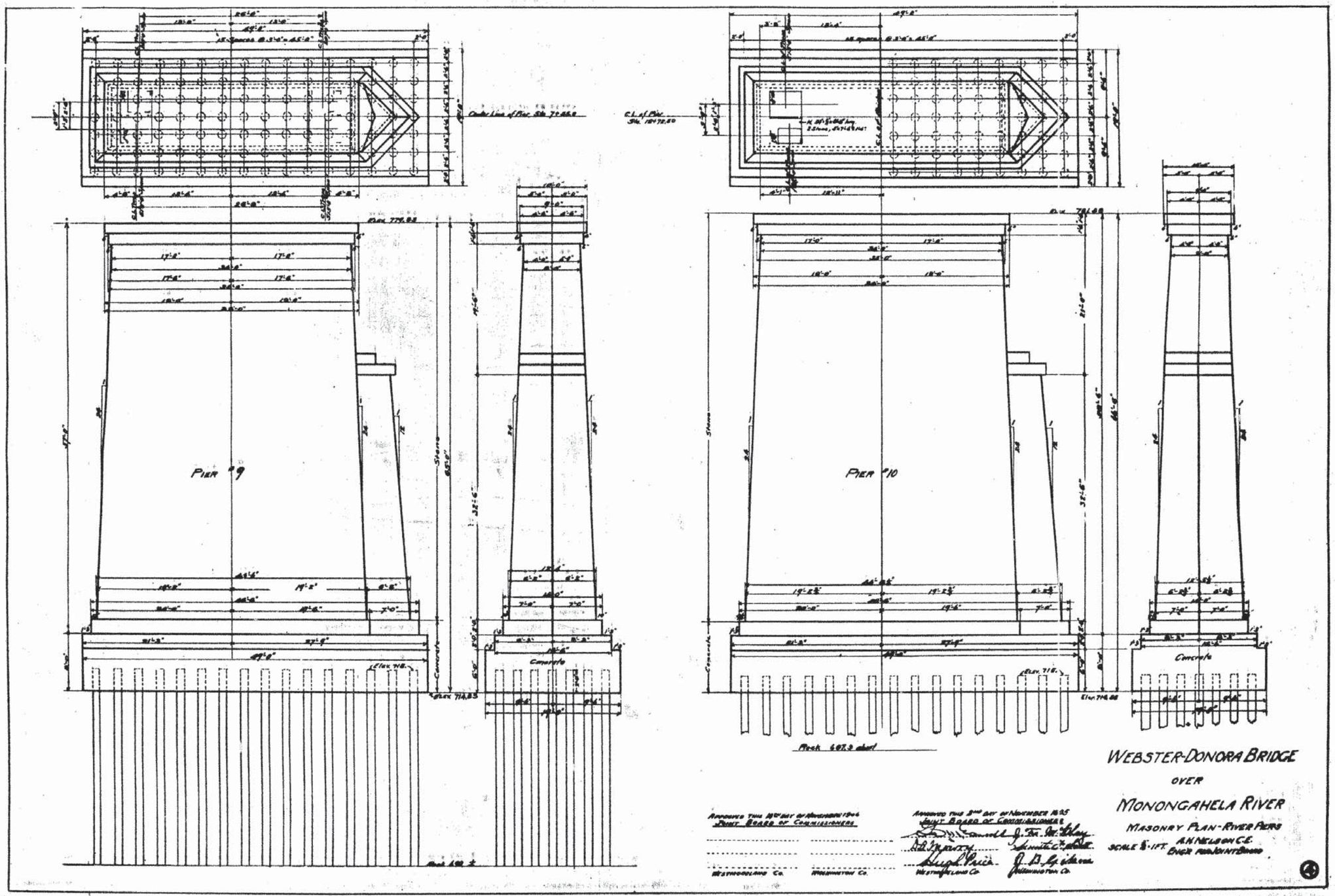
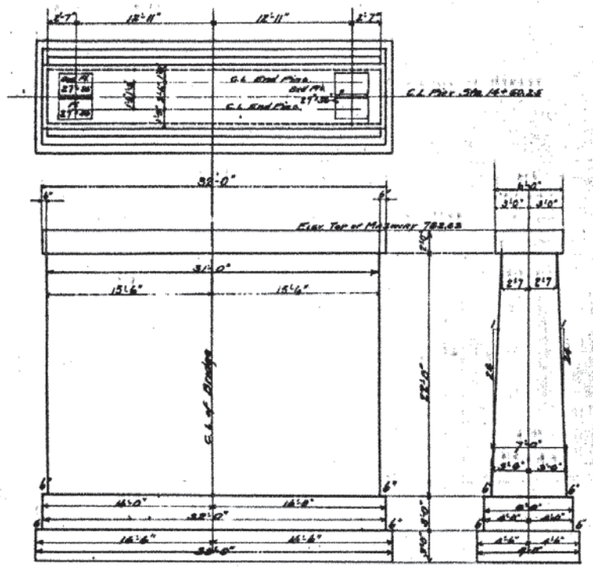
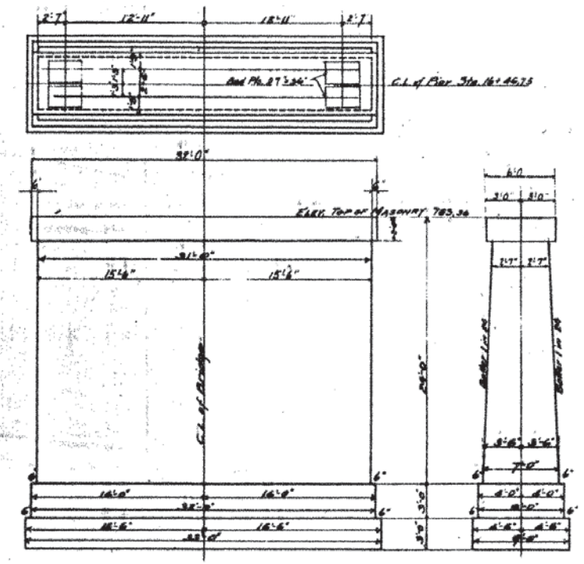

ELEVATION
P&LE RR.
PRR
515'-0"
22'-8" Between Curbs
SECTION-FLOOR CONSTRUCTION
Scale: 3/8"=1'-0"
WEBSTER
ROSTRAVER TWP.
WEST MORELAND CO. PA.
S.A.A. 143
TWP. ROAD 562
S.A.A. 4009
P&LE. RR.
MONONGAHELA RIVER
AMERICAN ZINC & CHEMICAL CO'S. YARDS
P.R.R.
75' Alley
S.L.R. 24745 (Washington Ave 50')
DONORA BOROUGH
WASHINGTON CO. PA.
NEW BRIDGE BUILT 1906
RE-CONSTRUCTED 1938
S.R. 62145 (Tenth St. 50')
Flow
PLAN
PLAN
Showing Location of
WEBSTER-DONORA BRIDGE
Jointly owned by
WEST MORELAND & WASHINGTON CO'S. PA.
Scale: 1"=60'
Oct. 1943
WASHINGTON

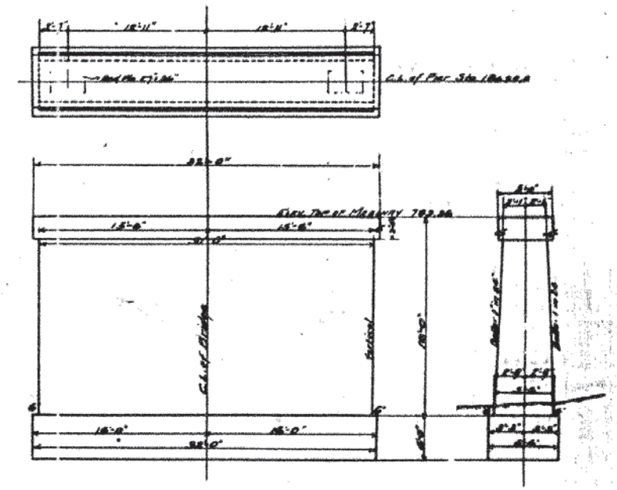

PIER #9
PIER #10
Concrete
Elev. 714.83
Elev. 714.88
Elev. 716.
Elev. 718.
Elev. 779.83
Elev. 781.88
Elev. 687.3 about
Elev. 690 ±
Approved this 10th day of November 1904
Joint Board of Commissioners
Westmoreland Co.
Washington Co.
Approved this 3rd day of November 1905
Joint Board of Commissioners
Westmoreland Co.
Washington Co.
WEBSTER-DONORA BRIDGE
OVER
MONONGAHELA RIVER
MASONRY PLAN-RIVER PIERS
A.H. NELSON C.E.
SCALE 1/8" = 1 FT.
ENGR. FOR JOINT BOARD



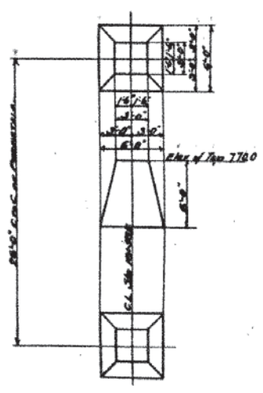
PIER #11



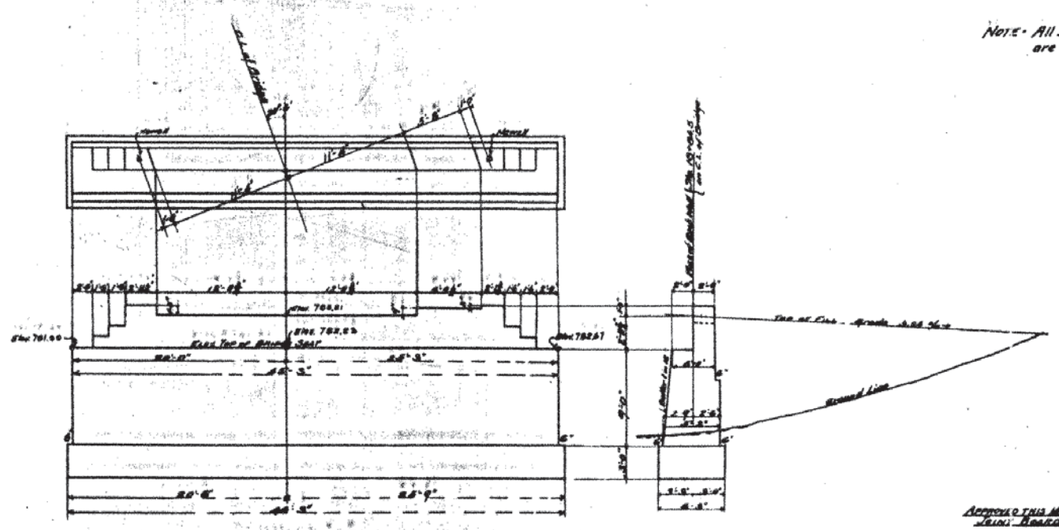
PIER #12



PIER #13



PEDESTALS #14



ABUTMENT #15

NOTE - All structures on this plan are of Concrete.

WEBSTER-DONORA BRIDGE
OVER
MONONGAHELA RIVER

MASONRY PLAN. DONORA END.

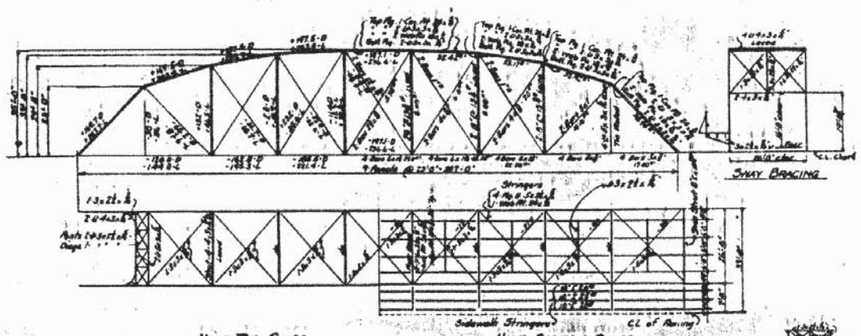
SCALE 1/8"-1'-0"

A.H. NELSON C.E.
ENGR. FOR JOINT BOARD.

APPROVED THIS 14TH DAY OF NOVEMBER 1906
JOINT BOARD OF COMMISSIONERS.

WESTMORELAND CO. WASHINGTON CO.

5



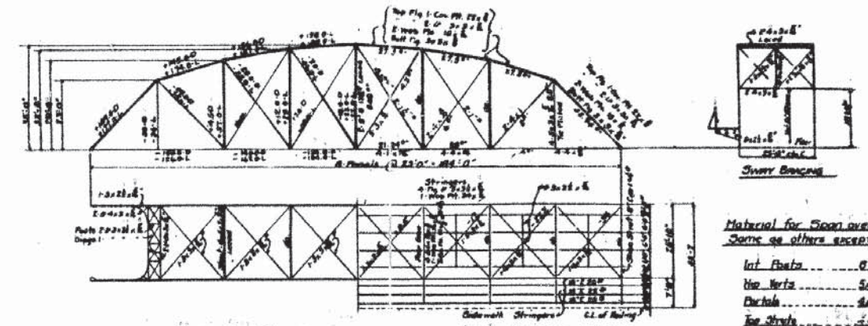
HALF TOP CHORD

HALF BOTTOM CHORD

1-SPAN REQ.

Live Load	390 per foot
Dead "	2600 " "
Wind "	300 " " L.C.

Section showing cross frame for all spans.



HALF TOP CHORD

HALF BOTTOM CHORD

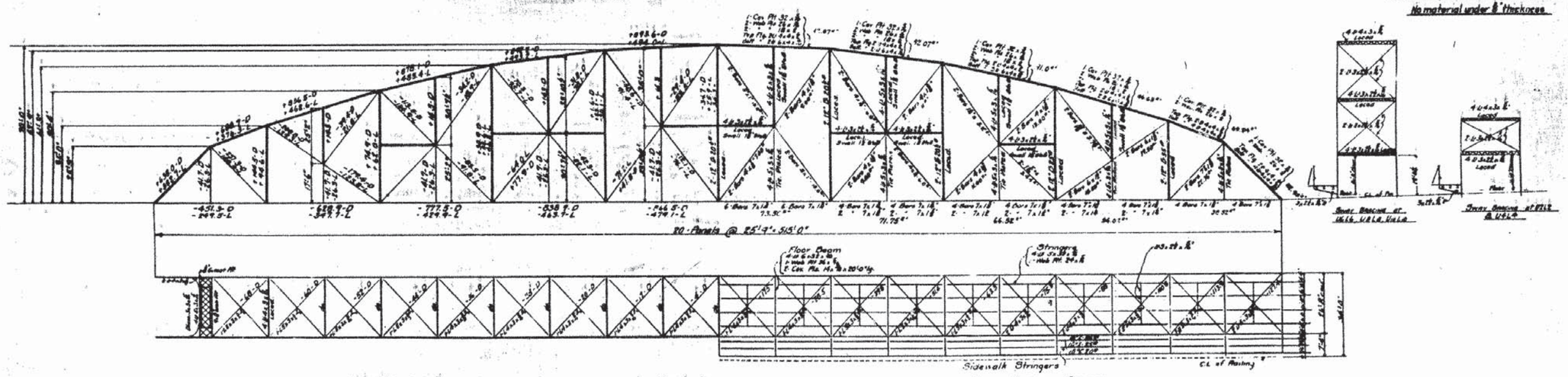
3-SPAN REQ.

Live Load	1130 per foot
Dead "	2600 " "
Wind "	300 " " L.C.

Material for Span over P.R.R. Tracks same as others except as follows:-

Int. Posts	[illegible]
Hip Verts	[illegible]
Portals	[illegible]
Top Struts	[illegible]
Sway Braces	[illegible]
Struts	[illegible]
Laterals	[illegible]
Stringers	[illegible]
Floor beam	[illegible]
S.W. Brackets	[illegible]
S.W. Stringers	[illegible]

No material under 8" thickness



HALF TOP CHORD

1-SPAN REQ.

Dead Load	3630# per foot
Live "	2040# " "
Wind "	375# " " L.C.

HALF BOTTOM CHORD

-: GENERAL NOTE :-

Floor dead (own) weight Lumber at 4# per foot B.M.
Steel at 3.4 per square inch area 1 foot long.
Live one car of 24 tons on two axles 10 feet centers on each track

Stringers { Max end shear 23,000#
Bending moment 121,000 foot lbs
1 Web plate 24 x 3/8
each flange 2 3x3x3/8 angles - 2 3x3x3/8 for all stringers 24 ft or more in length

Floor Beam { Max end shear 54,000#
bending moment 378,000 foot lbs
Web plate 36 x 3/8
Each flange 4 6x6x3/8
1 Car pit 16 x 3/8 x 20'-0" long.

-:WEBSTER DONORA BRIDGE:-

over

MONONGAHELA RIVER

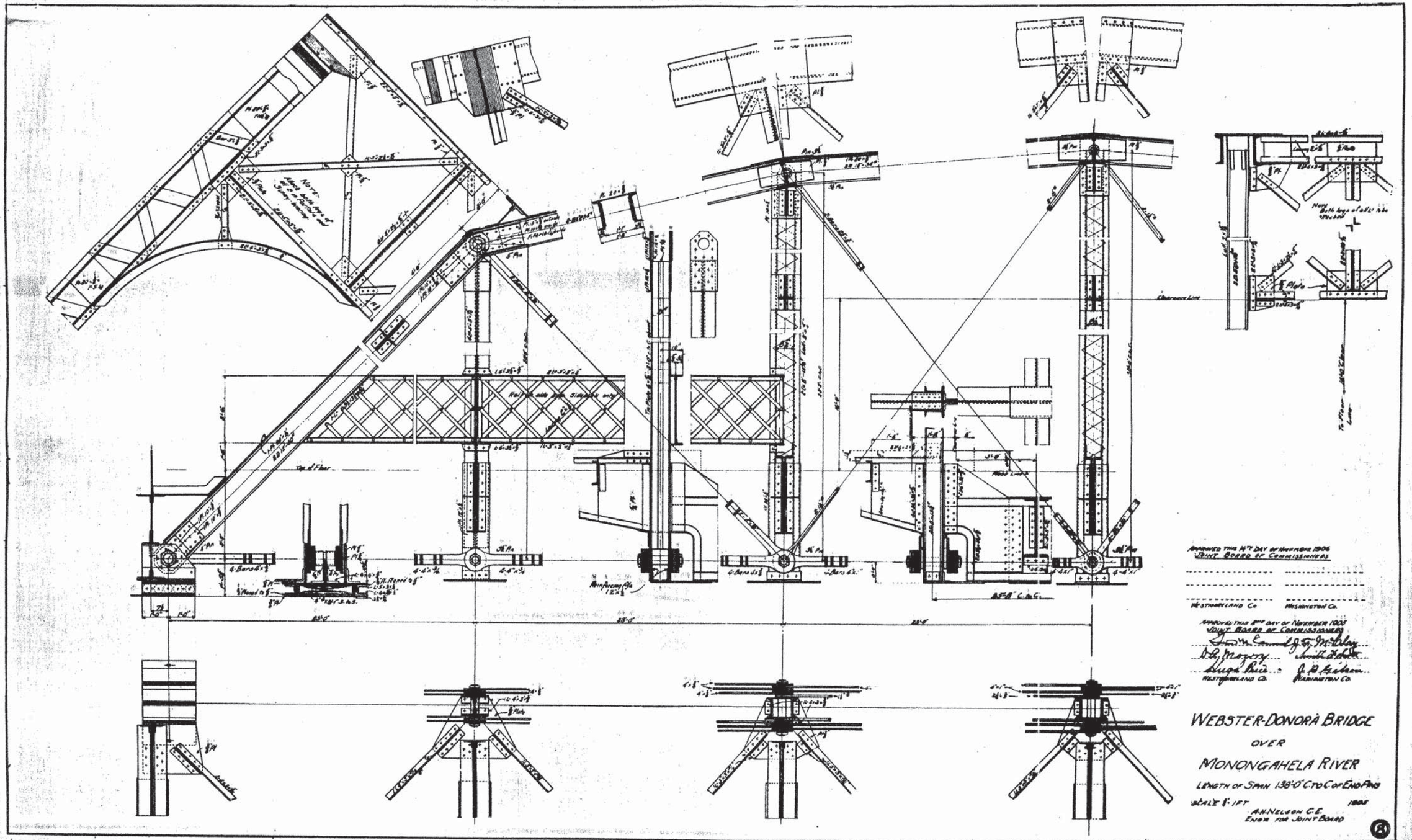
Stress sheet for all spans

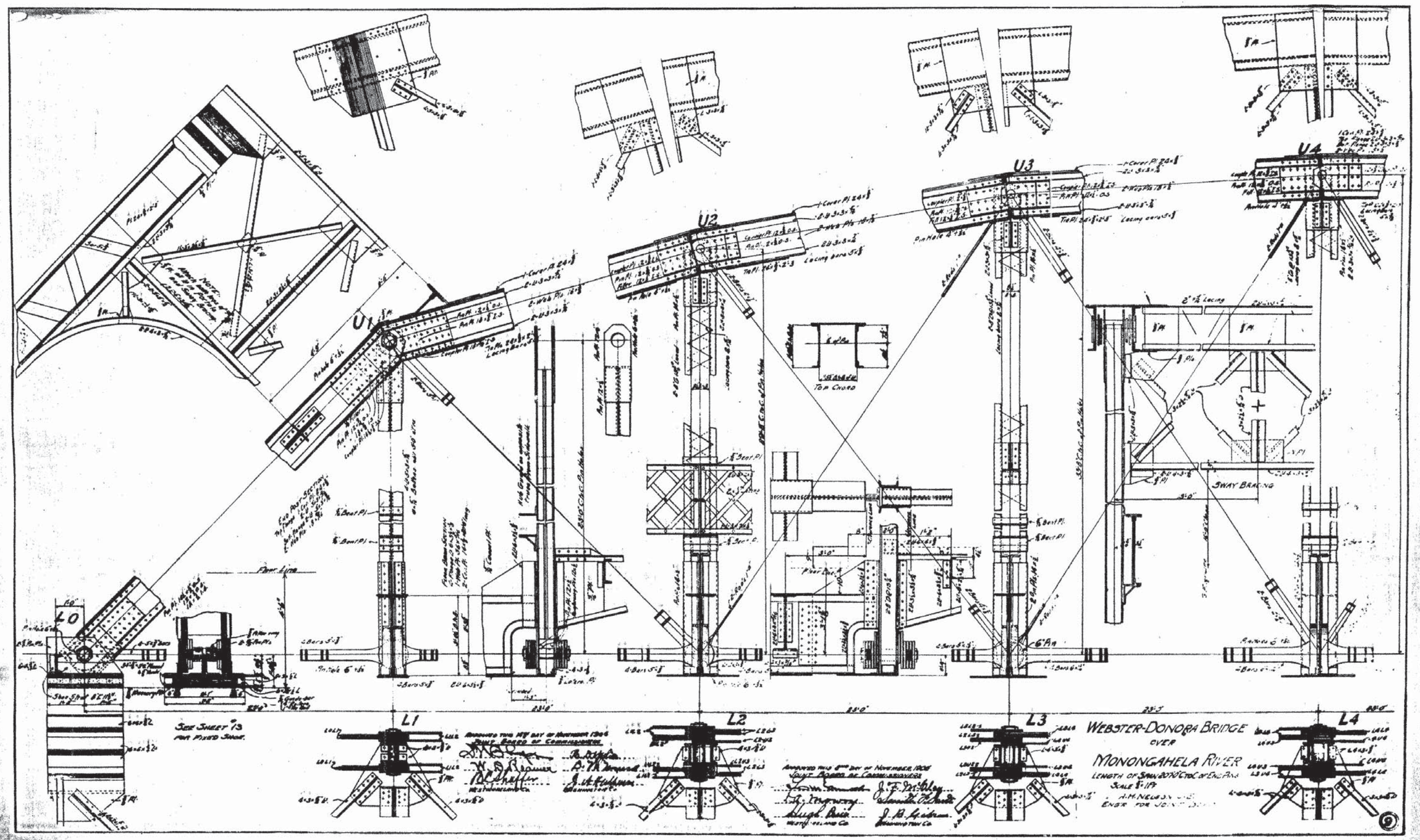
APPROVED THIS 14TH DAY OF NOVEMBER, 1906
JOINT BOARD OF COMMISSIONERS

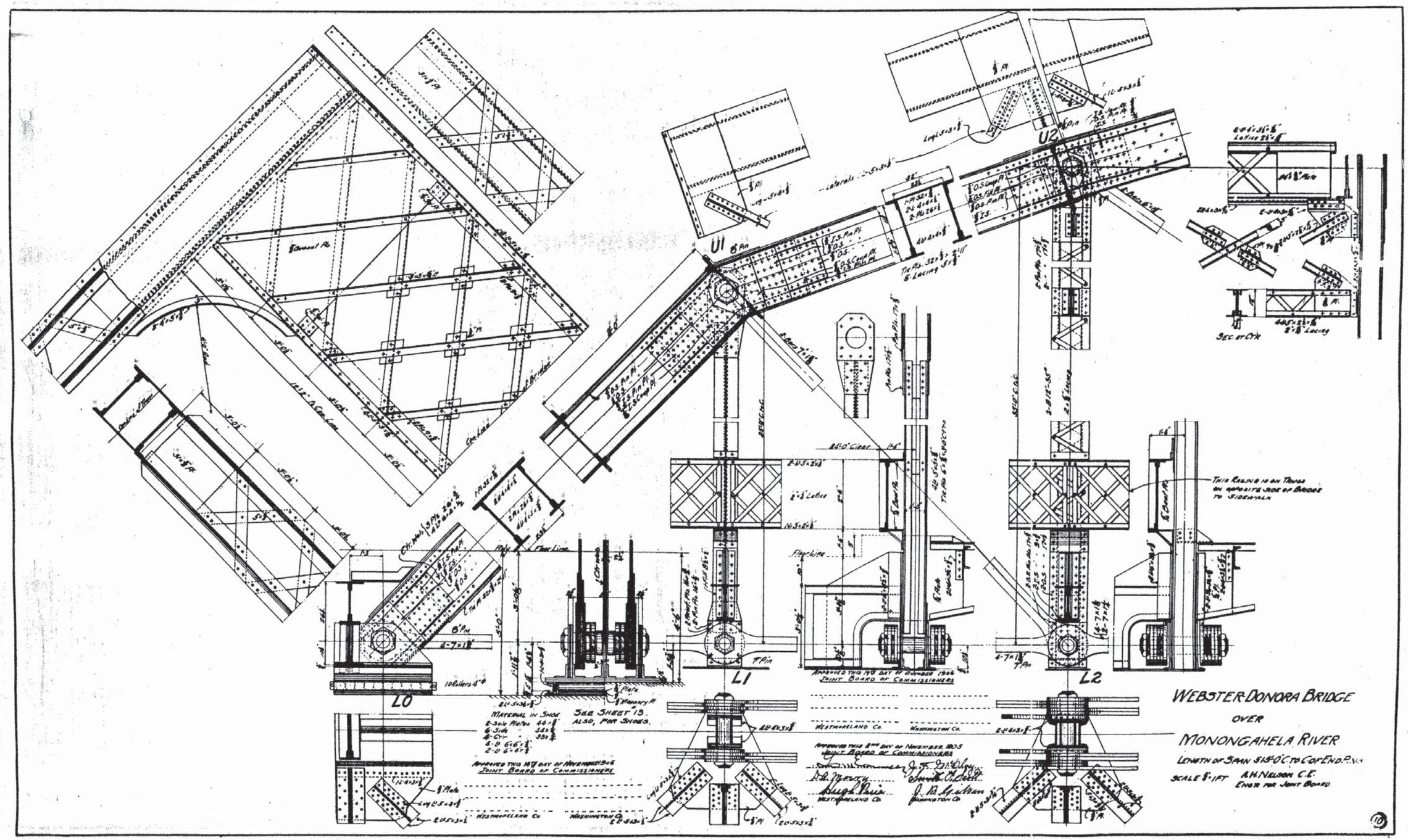
A.H. NELSON C.E.
Engr. for Joint Board

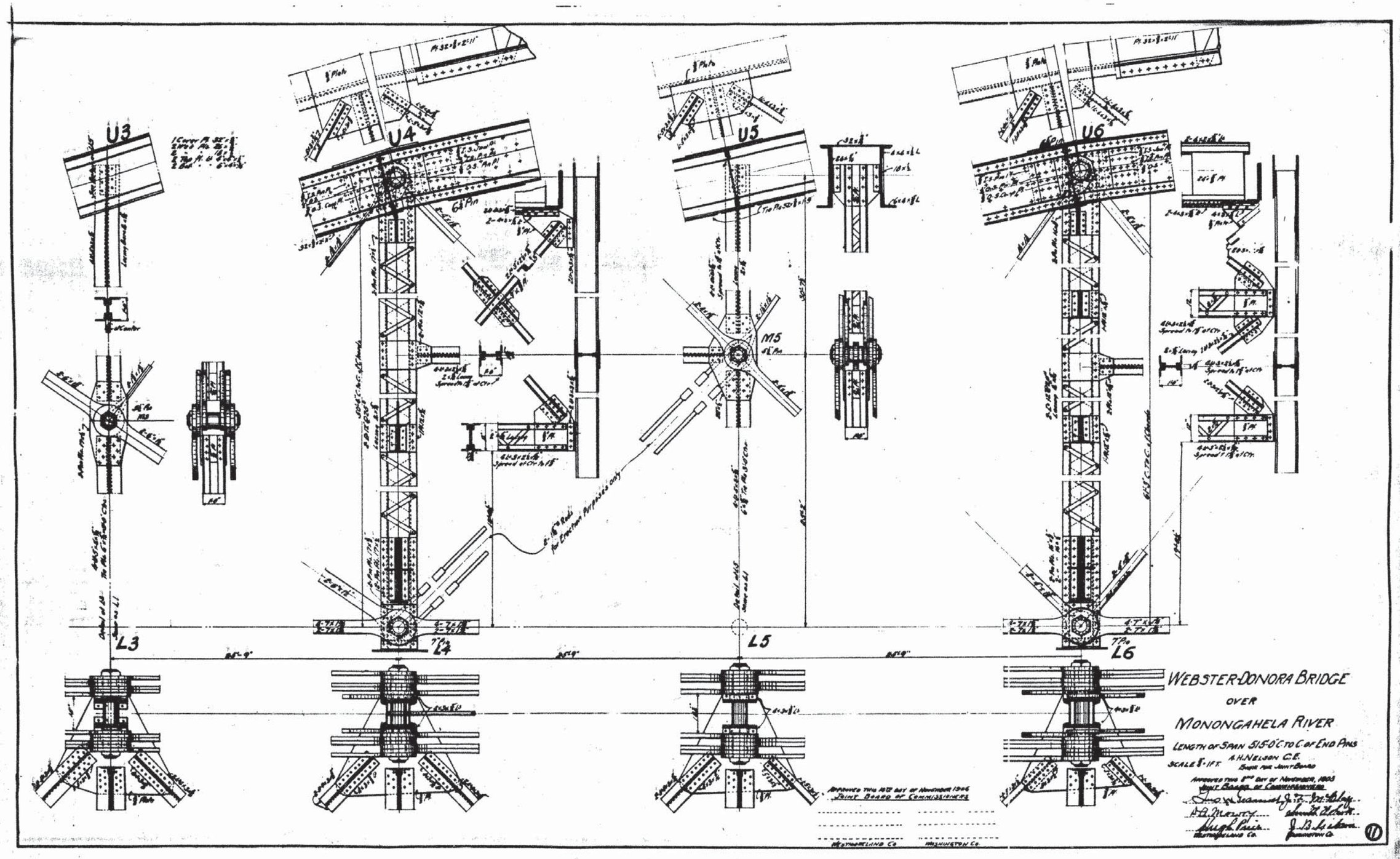
WESTMORELAND CO. WASHINGTON CO.

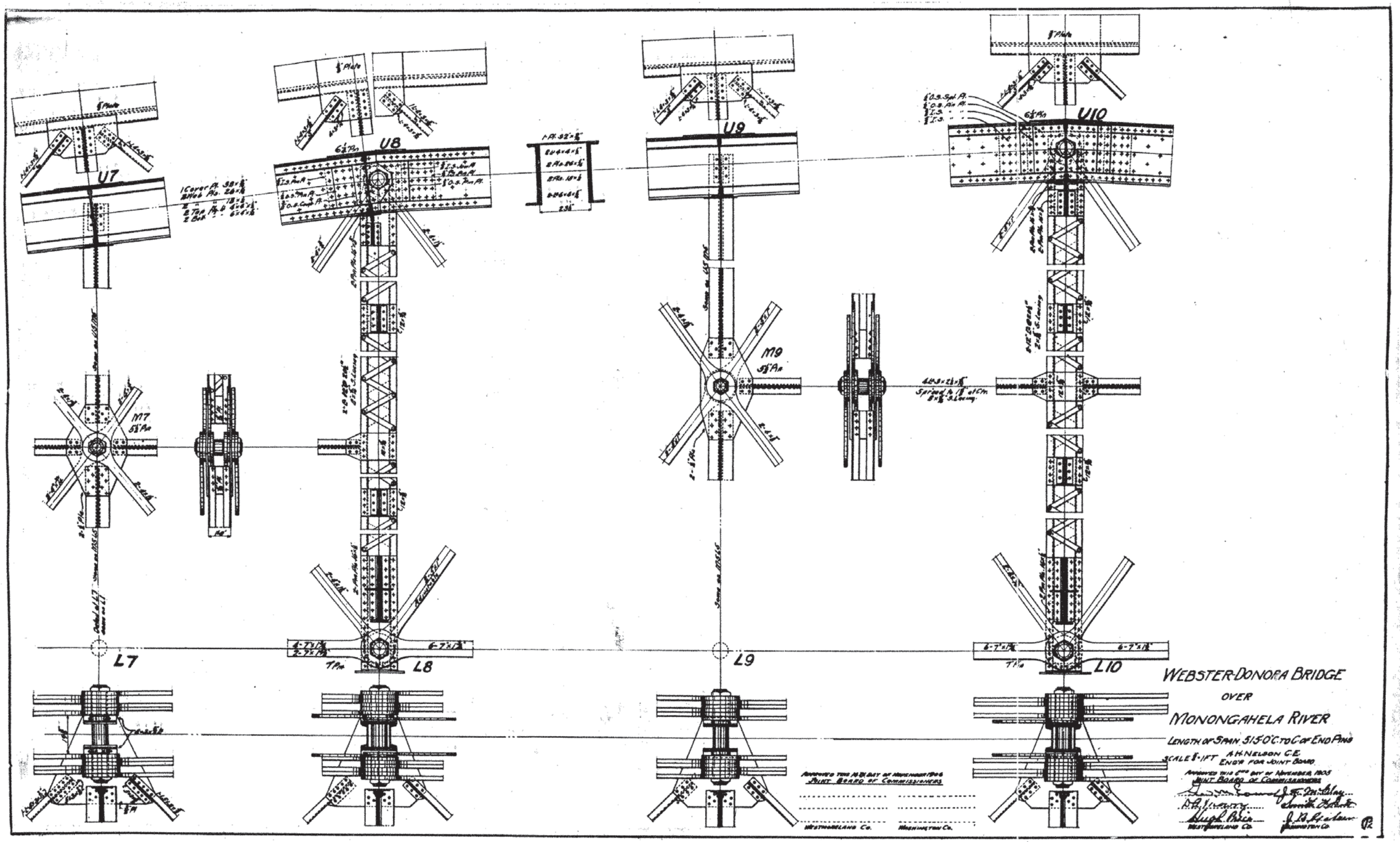
Scale 20 ft = 1"

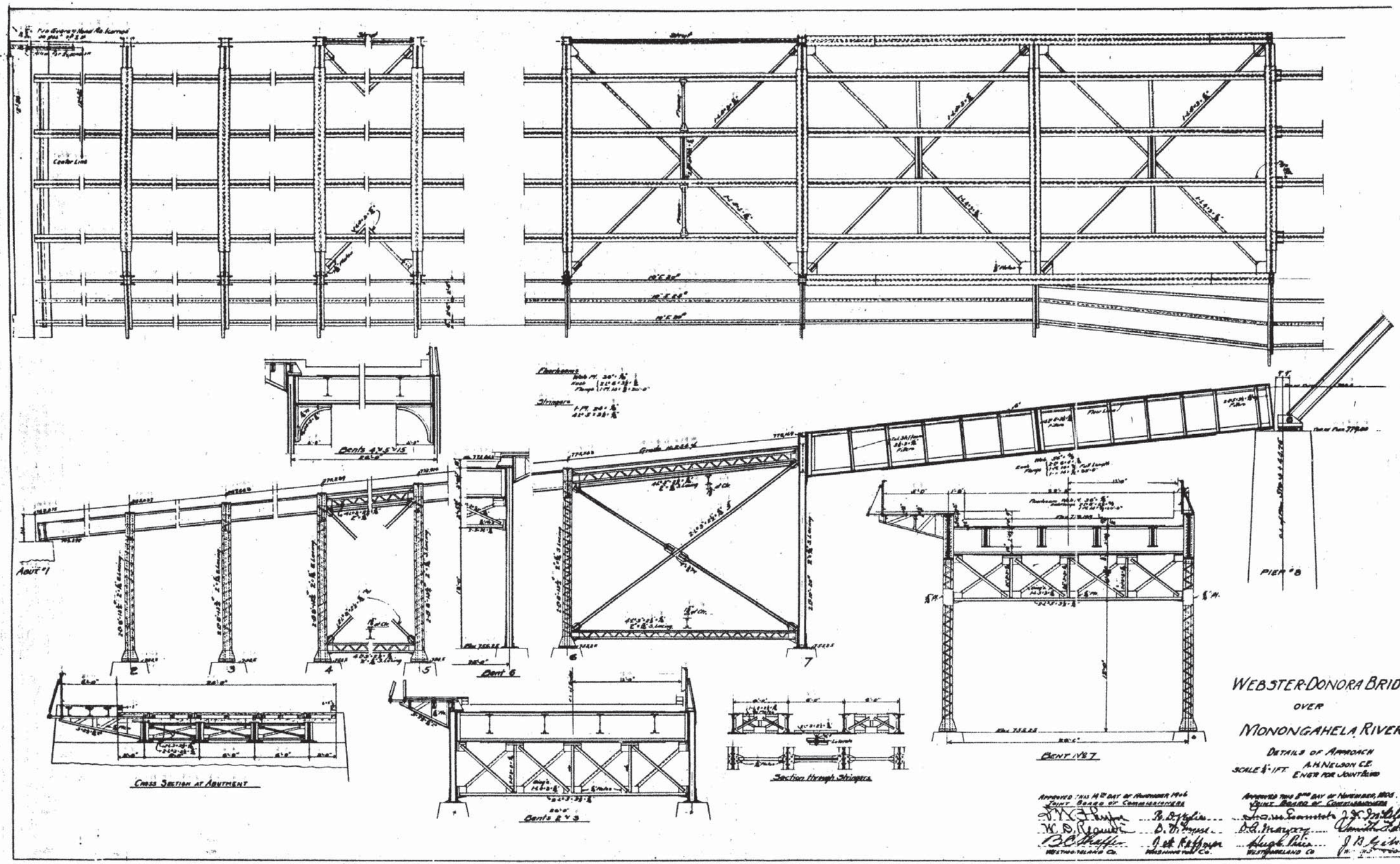

Approved this 14th day of November 1906
Joint Board of Commissioners
Westmoreland Co
Washington Co
Approved this 8th day of November 1905
Joint Board of Commissioners
Westmoreland Co
Washington Co
WEBSTER-DONORA BRIDGE
OVER
MONONGAHELA RIVER
LENGTH OF SPAN 138'-0" C to C of End Pins
SCALE 1/8" = 1 FT
1905
A.H. NELSON C.E.
ENGR. FOR JOINT BOARD
8

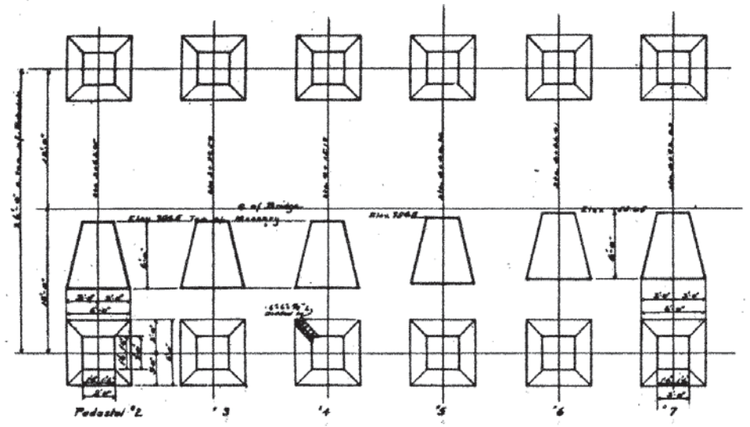

U1
U2
U3
U4
L0
L1
L2
L3
L4
Top Chord
Sway Bracing
Floor Line
See Sheet 13 for Fixed Shoe.
WEBSTER-DONORA BRIDGE
OVER
MONONGAHELA RIVER
LENGTH OF SPAN BETW CTS OF END PINS
SCALE 1" = 1'-0"
A.M. NEUBAUER
ENGR FOR JOINT BOARD

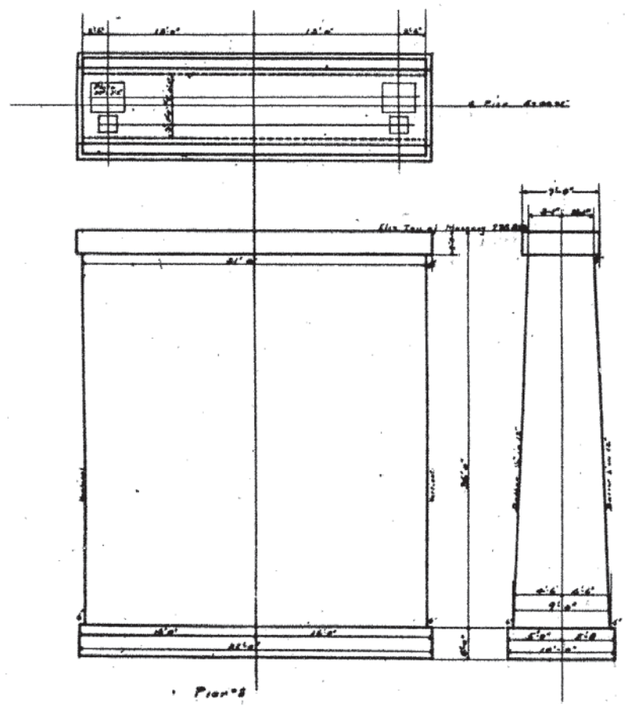

WEBSTER-DONORA BRIDGE
OVER
MONONGAHELA RIVER
LENGTH OF SPAN 515'0" C. TO C. OF END PINS
SCALE ½" = 1 FT
A.H. NELSON C.E.
ENGR. FOR JOINT BOARD
U1
U2
L0
L1
L2
SEE SHEET 15.
ALSO, FOR SHOES.
MATERIAL IN SHOE
JOINT BOARD OF COMMISSIONERS
WESTMORELAND CO.
WASHINGTON CO.
THIS RAILING IS ON TRUSS ON OPPOSITE SIDE OF BRIDGE TO SIDEWALK
10

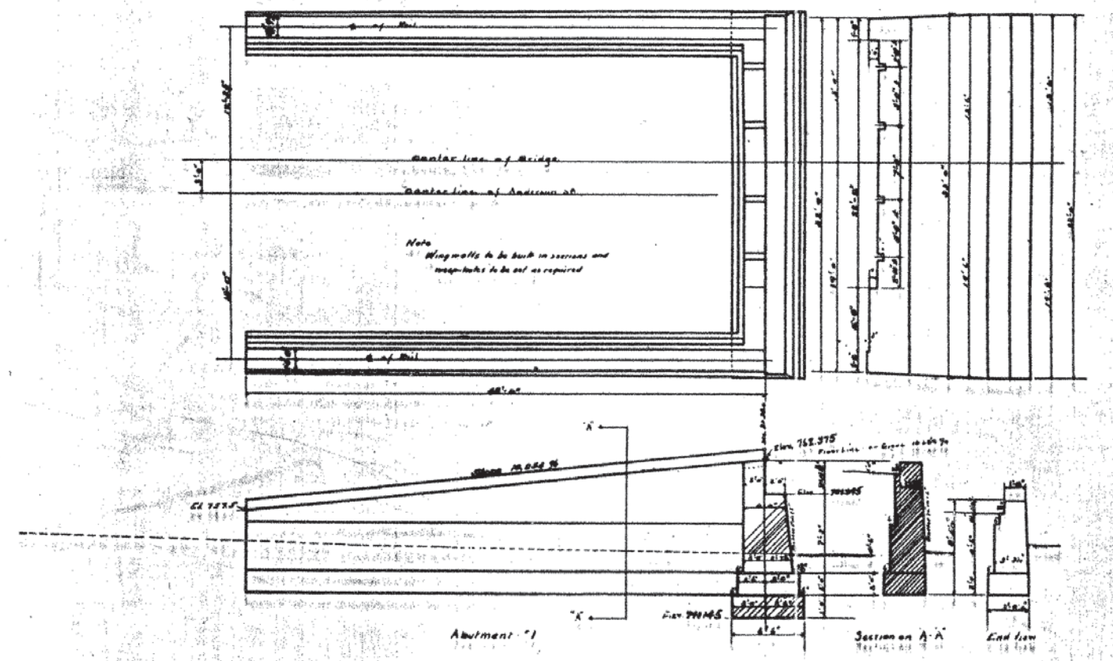

U3
U4
U5
U6
M5
L3
L4
L5
L6
WEBSTER-DONORA BRIDGE
OVER
MONONGAHELA RIVER
LENGTH OF SPAN 515'-0" C. TO C. OF END PINS
SCALE 1/8" = 1 FT.
A.H. NELSON C.E.
Chief for Joint Board
Approved this 10th day of November 1906
Joint Board of Commissioners
Approved this 8th day of November, 1905
Joint Board of Commissioners
Westmoreland Co.
Washington Co.


U7
U8
U9
U10
M7
M9
L7
L8
L9
L10
WEBSTER-DONORA BRIDGE
OVER
MONONGAHELA RIVER
LENGTH OF SPAN 515'0" C. TO C. OF END PINS
SCALE 1" = 1 FT
A.H. NELSON C.E.
ENGR. FOR JOINT BOARD
APPROVED THIS 6TH DAY OF NOVEMBER, 1905
JOINT BOARD OF COMMISSIONERS
WESTMORELAND CO.
WASHINGTON CO.


Center Line
Bents 4 & 5 & 15
Abut #1
Bent 6
Bent 7
Pier #8
Cross Section at Abutment
Section through Stringers
Bents 2 & 3
Bent No 7
WEBSTER-DONORA BRIDGE
OVER
MONONGAHELA RIVER
DETAILS OF APPROACH
SCALE 1/4" = 1 FT.
A.H. NELSON C.E.
ENGR FOR JOINT BOARD
Approved this 14th day of November 1906
Joint Board of Commissioners
Approved this 8th day of November, 1905.
Joint Board of Commissioners
Westmoreland Co.
Washington Co.
Westmoreland Co.







Note - All Structures shown on this plan to be of Concrete

Approved this 14th day of November 1906
Joint Board of Commissioners

Westmoreland Co. Washington Co.

WEBSTER-DONORA BRIDGE
OVER
MONONGAHELA RIVER
MASONRY PLAN - WEBSTER END

SCALE 1/8" = 1 FT

A. H. Nelson C.E.
Engr. for Joint Board

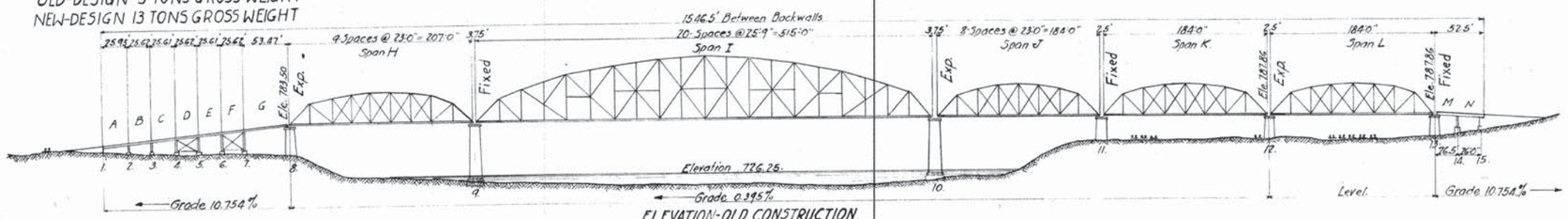
Approved this 2nd day of November, 1908
Joint Board of Commissioners

Hugh Price
Westmoreland Co.

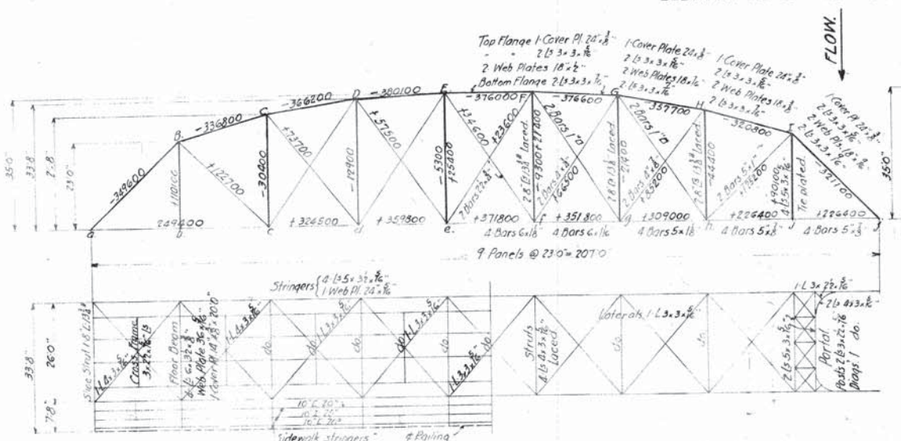
Washington Co.

DONORA
AMERICAN STEEL & WIRE CO.
MONONGAHELA RIVER
WEBSTER
ANDERSON ST.
FIRST STREET
ALLEY
WATER ST.
2ND ST.
3RD ST.
40 FT.
33 FT.
GENERAL PLAN OF SURVEY
FOR
WEBSTER, DONORA BRIDGE
OVER
MONONGAHELA RIVER
1905
WASHINGTON CO.
Scale 1" = 50 FT.

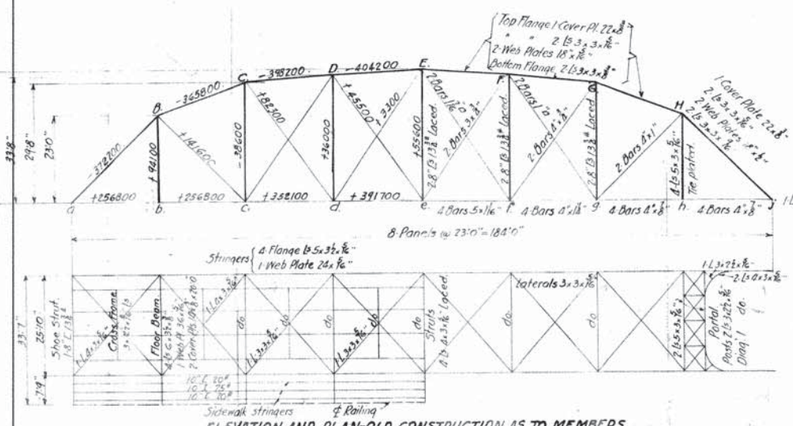
LOAD LIMIT
OLD-DESIGN 5 TONS GROSS WEIGHT
NEW-DESIGN 13 TONS GROSS WEIGHT



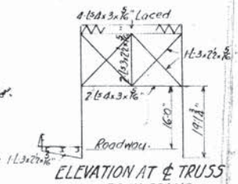
ELEVATION-OLD CONSTRUCTION.



ELEVATION AND PLAN-OLD CONSTRUCTION-AS TO MEMBERS.

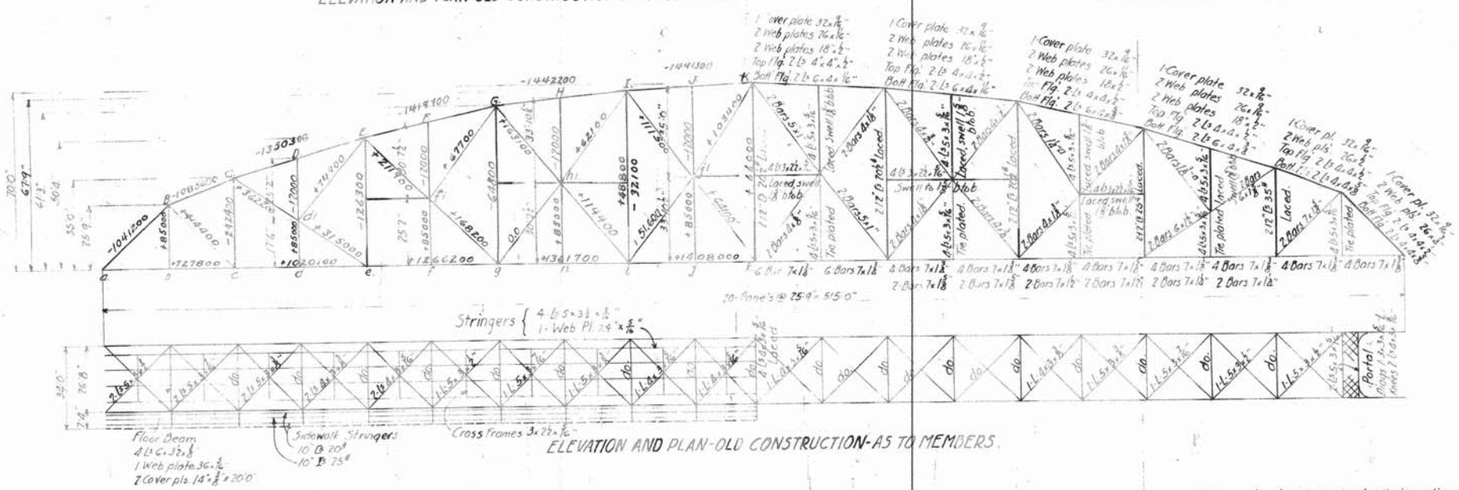


ELEVATION AND PLAN-OLD CONSTRUCTION AS TO MEMBERS.

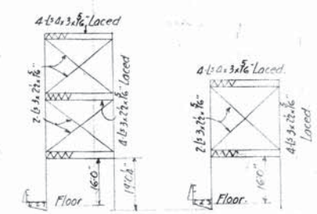


ELEVATION AT ℄ TRUSS BOTH SPANS

CROSS FRAMES FOR ALL SPANS



ELEVATION AND PLAN-OLD CONSTRUCTION-AS TO MEMBERS.



Note-- figures indicate old material unless otherwise noted.

The constructor shall check all plan dimensions, make additional field measurements and be responsible for both, in order that the new work shall fit the old work.

BRIDGE NO 88 WEBSTER-DONORA.
MONONGAHELA RIVER.
ROSTRAVER TOWNSHIP.
DEPARTMENT OF ROADS AND BRIDGES
WESTMORELAND COUNTY, PA
1935.

Sheet Nº 1 of 7

LOAD LIMIT
OLD DESIGN 5 TONS GROSS WEIGHT
NEW DESIGN 13 TONS GROSS WEIGHT

207'-SPAN

13-Ton Truck Train Loading for One Truss } 11,700 For Moment, 16,900 For Shears; Roadway - 416, Sidewalk - 160 | 576

Member	Live Load Stresses in thousands of Lbs. DL.	LL.	I.	Total	Unit Stress Allowable	Existing	Area Req.	In Bridge
j-I a-B	-214.5 -243.0	-89.3	-16.3	-321.1 -349.6	-12,970	-8250 -9010	24.76 26.95	38.94
H-I B-C	-216.0 -232.0	-88.6	-16.2	-320.8 -336.8	-13,500	-9340 -9800	23.76 24.94	30.92
G-H C-D	-239.5 -248.0	-100.0	-18.2	-357.7 -366.2	-13,500	-10,600 -10,840	26.49 27.12	33.17
F-G D-E	-253.5 -257.0	-104.1	-19.0	-376.6 -380.1	-13,500	-10,640 -10,740	27.90 28.15	35.42
E-F	-253.0	-104.0	-19.0	-376.0	-13,500	-10620	27.85	35.42
h-i-j a-b-c	+151.5 +174.5	+63.4	+11.5	+226.4 +249.4	+19500	+12930 +14250	11.61 12.79	17.50
g-h c-d	+207.5 +223.0	+85.8	+15.7	+309.0 +324.5	+19500	+13720 +14400	15.84 16.64	22.50
f-g d-e	+236.5 +244.5	+97.5	+17.8	+351.8 +359.8	+19500	+13780 +14100	18.04 18.45	25.50
e-f	+256.5	+97.5	+17.8	+371.8	+19500	+13770	19.07	27.00
h-I B-c	+77.5 +75.0	+39.4	+8.3	+125.2 +122.7	+19500	+12520 +12270	6.42 6.29	10.00
g-H C-d	+47.0 +35.5	+31.3	+6.9	+85.2 +73.7	+19500	+12200 +10530	4.37 3.78	7.00
f-G D-e	+31.0 +22.0	+28.6	+6.9	+66.5 +57.5	+19500	+11100 +9600	3.41 2.95	6.00
e-F E-f	-5.5 +5.5	+23.1	+6.0	+23.6 +34.6	+19500	+6300 +9230	1.21 1.77	3.75
G-h c-D					+19500			2.00
F-g d-e					+19500			2.00
I-i B-b	+37.0 +57.0	+33.2	+19.9	+90.1 +110.1	+19500	+10800 +13200	4.62 6.64	8.36
H-h C-c	-18.5 -4.5	-21.2	-4.7	-44.4 -30.4	-7680	-5540 -3780	5.78 3.96	8.04
G-g D-d	+1.0 +9.5	-18.1	-4.3	-21.4 -12.9	-6820	-2660 -1610	3.14 1.89	6.98
F-f E-e	+15.0 +19.0	-19.3 +6.4	-5.0 +1.2	-9.3 @ +21.4 -5.3 @ +25.4	-6530 +19500	-1160 @ +3070 -660 @ +3640	3.28 1.30	6.98

515'-SPAN

13-Ton Truck Train Loading per Truss } 11700 For Moments, 16900 " Shears; Roadway 416, Sidewalk 140 | 556

Member	Live Load Stresses in thousands of Lbs. DL.	LL.	I.	Total	Unit Stresses Allowable	Existing	Area Req.	In Bridge
a-B	-802.5	-216.0	-22.7	+1041.2	13500	-12550	77.2	82.94
B-C	-842.5	-220.0	-23.1	-1085.6	13500	-15500	80.5	69.94
C-D-E	-1057.5	-265.0	-27.8	-1350.3	13500	-15600	100.0	86.64
E-F-G	-1110.5	-280.0	-29.4	-1419.9	13500	-15600	105.2	90.98
G-H-I	-1129.0	-283.5	-29.7	-1442.2	13500	-15700	107.0	92.06
I-J-K	-1127.5	-284.0	-29.8	-1441.3	13500	-15680	107.0	92.06
a-b-c	+565.0	+147.3	+15.5	+727.8	19500	+18950	37.4	38.5
c-d-e	+792.5	+204.0	+21.6	+1020.1	19500	+18200	52.5	56.0
e-f-g	+985.0	+254.5	+26.7	+1266.2	19500	+19000	65.0	66.5
g-h-i	+1060.0	+273.0	+28.7	+1361.7	19500	+18980	70.0	71.75
i-j-K	+1097.5	+281.0	+29.5	+1408.0	19500	+19150	72.3	73.5
B-c	+320.0	+88.4	+10.0	+414.4	19500	+18250	21.3	22.75
C-d'	+270.0	+82.5	+9.7	+362.2	19500	+18600	18.6	19.5
d'-e	+232.5	+73.5	+9.0	+315.0	19500	+17530	16.2	18.0
E-f'	+142.5	+61.5	+7.9	+211.9	19500	+16300	10.9	13.0
f'-g	+107.0	+54.0	+7.2	+168.2	19500	+15330	8.65	11.0
G-h'	+98.5	+56.7	+7.9	+163.1	19500	+14850	8.40	11.0
h'-i'	+58.0	+49.1	+7.3	+114.4	19500	+12730	5.88	9.0
I-j'	+47.5	+55.4	+8.6	+111.5	19500	+12500	5.74	9.0
j'-K	+10.0	+46.5	+7.6	+64.1	19500	+9150	3.29	7.0
d'-E	+47.5	+21.1	+6.3	+74.9	19500	+19800	3.84	3.78
f'-G	+43.5	+18.6	+5.6	+67.7	19500	+21700	3.47	3.12
h'-I	+40.0	+17.1	+5.1	+62.1	19500	+10370	3.19	6.0
j'-K	+39.0	+54.8	+9.6	+103.4	19500	+10340	5.32	10.0
i-j'	(-1.0)	+44.4	+8.2	+51.6	19500	+5160	2.65	10.0
g-h'	(-56.3)	+42.4	+9.0	------	19500	------	----	6.0
B-b, d'-d, f'-f h'-h, j'-j	+44.0	+25.6	+15.4	+85.0	19500	+10000	4.36	8.50
D-d', F-f' H-h', J-j'	-12.0			-12.0	-4350	-1250	2.76	9.60
C-c	-180.0	-56.0	-6.4	-242.4	-11570	-11830	21.10	20.52
E-e	-85.0	-36.8	-4.5	-126.3	-10400	-8620	12.15	14.64
G-g	-27.5	-32.9	-4.4	-64.8	-12730	-5380	5.09	12.06
I-i	+5.0	+36.5 -32.1	+7.3 -5.0	+48.8 -32.1	+19500 -11480	+4410 -2660	2.50 2.66	11.08
K-k	+35.0	+28.0 -17.8	+3.0 -3.1	+66.0	+19500	+5970	3.38	11.08

184'-SPANS

13 Ton Truck Train Loading for One Truss } 11700 For Moments, 16900 " Shears; Roadway 416, Sidewalk 170 | 586

Member	Live Load Stresses in thousands of Lbs. DL.	LL.	I.	Total	Unit Stresses Allowable	Existing	Area Req.	In Bridge
a-B	-266.5	-88.4	-17.3	-372.2	-12880	-10200	28.9	36.59
B-C	-271.0	-79.3	-15.5	-365.8	-13500	-12050	27.1	30.19
C-D	-296.0	-85.5	-16.7	-398.2	-13500	-13120	29.5	30.19
D-E	-301.0	-86.3	-16.9	-404.2	-13500	-13300	30.0	30.19
a-b-c	+188.0	+57.5	+11.3	+256.8	+19500	+18360	13.2	14.0
c-d	+261.0	+76.2	+14.9	+352.1	+19500	+17600	18.1	20.0
d-e	+291.0	+84.2	+16.5	+391.7	+19500	+18450	20.1	21.24
B-c	+101.0	+33.3	+7.3	+141.6	+19500	+17700	7.25	8.0
C-d	+51.0	+25.2	+6.1	+82.3	+19500	+13700	4.22	6.0
D-e	+17.0	+22.6	+5.9	+45.5	+19500	+10100	2.33	4.50
a-D	-(51.0)				+19500			2.0
d-E	-(18.0)	+16.6	+4.7	+3.3	+19500	+800	.17	4.12
B-b	+41.8	+32.7	+19.6	+94.1	+19500	+11250	4.83	8.36
C-c	-17.0	-17.4	-4.2	-38.6	-7680	-4800	5.02	8.04
D-d	+21.0	+12.1 -14.0	+2.9 -3.6	+36.0	+19500 -6870	+5170	1.95	6.98
E-e	+32.0	+19.7	+3.9	+55.6	+19500	+7960	2.85	6.98

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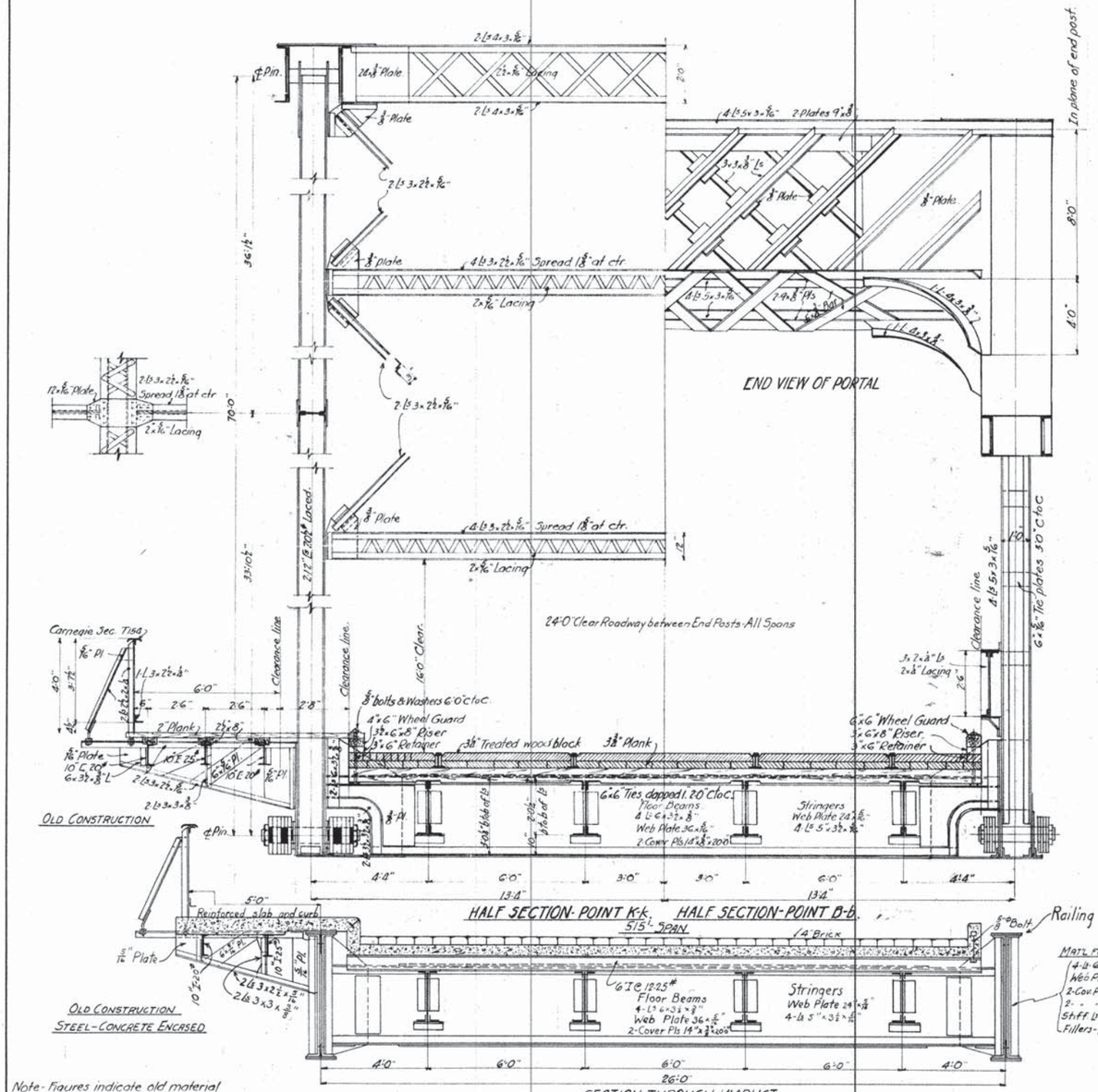

Note- Figures indicate old material unless otherwise noted.

NEW REQUIREMENTS: -- See Drawing and General Specifications.

A. Welds -- Metal 3/8" thick or greater shall have 3/8" fillet welds -- in other cases the fillet shall be the thickness of the metal welded. Parts 3" or less shall have continuous welds, longer parts shall have a fillet weld of 1" at ends with 2" tack welds spaced at intervals as specified. Ends shall be sealed with full welds.

B. Painting -- All new steel shall receive one coat of red lead paint in the shop, excepting steel that is to be field welded, then the shop coating shall be linseed oil. All old metal work shall be thoroughly cleaned of rust, scales and loose paint. All exposed metal shall be spot painted with one coat of red lead except where welding work is required and then linseed oil shall be used. Where old steel is to be covered with new steel, it shall receive a coat of Red paint before covering. After the steel has been erected in place, all metal work shall receive two coats of blue lead paint of approved color and quality. In general, all existing paint, rust and loose scales shall be removed down to the bare metal.

1. Roadway -- On the five truss spans, remove the old street car rails, creosoted block wearing surface, plank sub-base and crossties and place steel- concrete grid floor with repairs to the old steel joist and additional new steel joist, as shown on the plan- welded work.

2. Wheel Guards -- Steel wheel guards shall be placed on either side of the roadway, fitted and welded into place, as shown on the plan.

3. Walkway -- On all the truss spans, remove the old sidewalk brackets, joist, creosoted plank decking and place new sidewalk brackets, joist and steel- concrete grid floor, as shown on the plan- welded work.

4. Floor Expansion -- At Piers 8, 10 and 12 place expansion joints, both roadway and walkway, as shown on plan -- welded work.

5. Steel Grid Floor. The roadway and the walkway shall have a steel grid filled with concrete. The grid shall be either I-Beam-Lok, T-Tri-Lok, Kahn-Lok, or its equal, fabricated in accordance with the manufacturers requirements and specifications and shall be welded to the steel joist. The concrete filler in the grid shall consist of 1 part cement, 2 parts sand and 3 parts hard, screened crushed slag, all of approved quality. A vibrator shall be used to settle the concrete in place as it is poured.

6. Railing -- On all truss spans and on all viaduct spans, remove both the roadway railing and the walkway railing and replace with new, as shown on the plans -- welded work. Also place the roadway railing and walkway railing on the top of the wing walls of the approaches, doweling it and fastening it to the concrete walls, as shown on plan.

7. End Bearings -- All Truss Spans -- Clean the shoes of all rust, scales and loose paint and replace all pits and pockets found in the metal from deterioration with heavy welding. Remove the old masonry plates from under all shoes, the roller nests from under expansion shoes, the grillage from under Span J at Pier 10 and replace all with new, as shown on the plan. Furnish new shoe plates under all shoes and weld to the old shoe plates.

8. Roadway Joist -- Previous repairs placed a 13"x 5/16" plate on the top of all four roadway joist in spans as follows: Span H, panels a-b and b-c, Span J, panels e-f and f-g, Span K, panels b-c and c-d, and Span L, panels c-d, d-e, e-f and f-g. Drill two lines of 3/4" holes 3" c.c. alternately spaced through these plates and plug weld to top flanges of the joist. Span L, panel g-h - remove the top flange angles from the four joist and replace with new - 5"x 3 1/2"x 7/16" angles. Weld all joist to the shelf angle and weld shelf angle to the beam web. Provide new stringer seats and connections where the ends of stringers connect with floor beams at Pier 8, 10 and 12 and place a new 6"x 6"x 3/8" shelf angle under each seat.

9. Floor Beams -- On Span L remove the old deteriorated top flange angles at each end of the beam and replace with new angles - 4 required. 6"x 3 1/2"x 3/8" - 3' -- riveted and welded work. On all truss spans the top cover plate of the floor beam is 14"x 3/8"x 20'-0", located symmetrically on the centerline of the beam. The plate shall be extended for full length of the beam using a plate 10"x 3/8" welded work.

10. Portals -- On the portals of all truss spans weld the top splice plate to the cover plate of the end posts. Span I -- remove the two upstanding angles of the low cord of the portals and replace with new 5"x 3"x 5/16" angles. On all other spans remove the single upstanding angle of the low chord of the portals and replace with new 5"x 3"x 5/16" angles. Punch 1" holes in horizontal leg of angles for drainage.

11. Struts -- On all truss spans remove the upstanding angle of the low chord of the top struts and replace with new - 4"x 3"x 5/16" angles. Punch 1" holes in horizontal leg of angles for drainage.

12. Laterals -- In all truss spans the lateral connecting plates at the bottom of the vertical posts shall be provided with a 2" hole for drainage. Span L replace the bottom lateral plates at point "h" both trusses.

13. Diagonals, Counters, Hangers -- In all truss spans, adjust the bars in all panels, when the bridge is under dead load only, to take full stress. Where there is not turnbuckle or sleeve construction to facilitate in this adjustment, the loose bar shall be heated and upset until the stresses in bars of any panels are equalized, each taking full stress. Relocate the bars on the pins at the top chords and tack weld to the pins.

14. Low Chords -- Span I -- Where the bars are packed adjacent, there is a swelling and separating from rust accumulation. At a distance of approximately 4' from the pins, drive a 3/8" steel wedge plate giving adjacent bars a uniform separation throughout. Clean the vertical faces of bars so separated to the bare metal, weld the wedge to the bar at the top and the bottom, seal the openings between the bars at the top for the full distance between wedge and pin with heavy welding. Apply three coats of approved paint to vertical faces of bars between wedges.

15. Bar Heads -- On all truss spans, the heads of the bars, chords, diagonals, counters and hangers, shall have all scale and loose paint removed to the bare metal and the pits and pockets found in the metal from deterioration, filled with heavy welding.

16. Tower - - Stairs -- The metal work in the tower shall be cleaned and painted as per specifications for the bridge proper. The stairs including the supports, railing, treads and other parts shall be completely reconstructed in accordance with the original plans.

17. Navigation Lights -- In carrying on the work, the navigation lights shall be maintained and shall be left in the same condition as when the work started.

18. Travel - During the construction work, foot travel shall be maintained, but vehicle shall be discontinued.

The constructor shall check all plan dimensions, make additional field measurements and be responsible for both, in order that the new work shall fit the old work.

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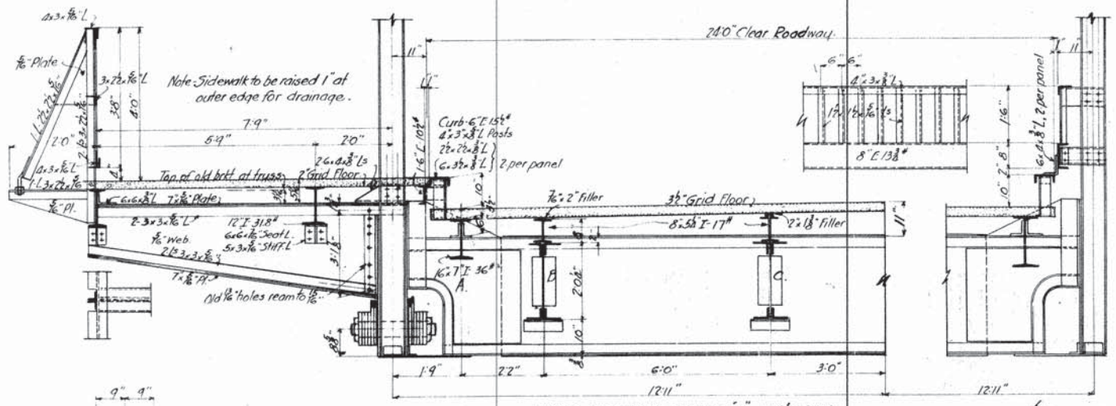
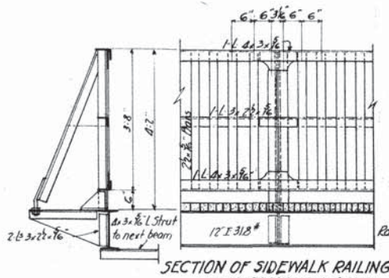
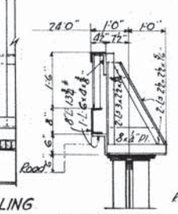


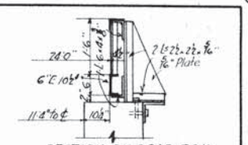
HALF SECTION, POINT "C" 184' SPAN.
TYPICAL FOR ALL TRUSS SPANS.



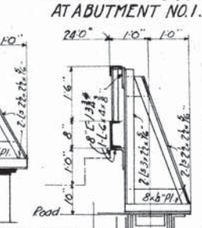
SECTION OF SIDEWALK RAILING AT INTERMEDIATE POSTS 2-PER PANEL



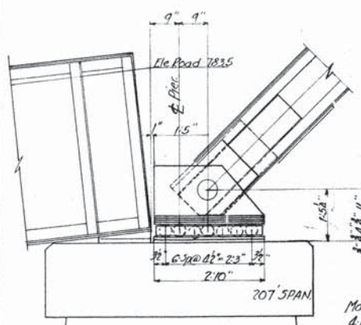
SECTION OF ROAD RAIL BETWEEN BENT 7 AND PIER NO. 8.



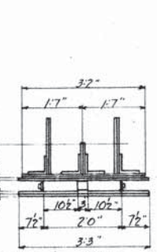
SECTION OF ROAD RAIL AT ABUTMENT NO. 1.



SECTION OF ROAD RAIL AT BENT NO. 6.



PIER NO. 8.
EXPANSION END.

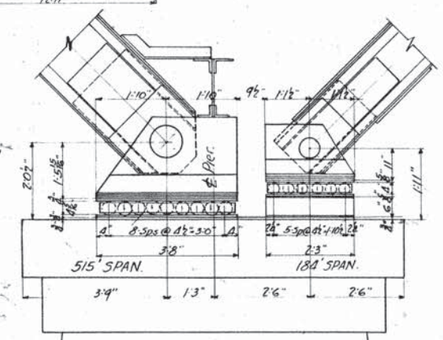


Material for U.S. and D.S. Truss, 207' Span.
4-Plates ⅞"x 34"x 3'-3" Tonqued, Plane to ⅞"
2-Masonry Plates ⅞"x 34"x 3'-3"
14-Rollers 4"ø x 2'-0" Grooved to 3½"
4-Side bars 3"x ⅞"x 2'-9"
28-Tap bolts 1"ø x 1½"

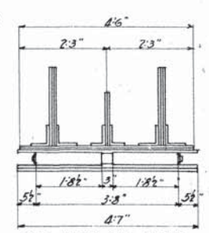
PIER NO. 9. FIXED ENDS.
Material for U.S. and D.S. Trusses, both spans.
2-Shoe Pls 34"x ⅞"x 3'-3" 207' SPAN 2-Shoe Pls. 44"x ⅞"x 4'-7" 515' SPAN
2-Masonry Pls 34"x ⅞"x 3'-3 Do. 2-Masonry Pls 44"x ⅞"x 4'-7" Do.

PIER NO. 11. FIXED ENDS.
Material for U.S. and D.S. Trusses, both spans 184'.
2-Shoe Pls. 27"x ⅞"x 3'-1"
4-Masonry Pls 27"x ⅞"x 3'-1"

PIER NO. 13, FIXED ENDS.
Material for U.S. and D.S. Trusses, both spans 184'
2-Shoe Pls 27"x ⅞"x 3'-1"
2-Masonry Pls. 27"x ⅞"x 3'-1"

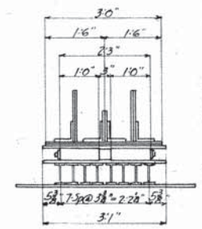


PIER NO. 10
EXPANSION ENDS.



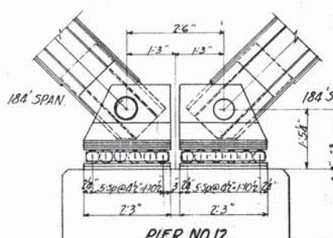
END VIEW 515 SPAN.

Material for U.S. and D.S. Truss 515' Span.
4-Plates 44"x ⅞"x 4'-7" Tonqued, Plane to ⅞"
18-Rollers 4⅛"ø x 3'-8" Groove to 3⅛"-dia
4-Side bars 3"x ⅞"x 3'-6"
36-Tap bolts 1"ø x 1½"
2-Masonry Plates 55"x ⅞"x 6'-8½" for both spans.

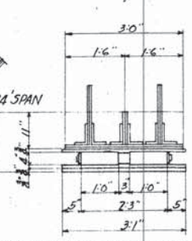


END VIEW 184' SPAN.

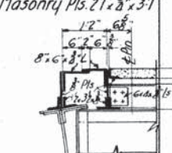
Material for U.S. and D.S. Truss 184' Span.
4-Plates 27"x ⅞"x 3'-0" Tonqued, Plane to ⅞"
12-Rollers 4"ø x 2'-3" Groove to 3½"
4-Side bars 3"x ⅞"x 2'-4½"
24-Tap bolts 1"ø x 1½"
16-6" [13-14.8# 2'-3"



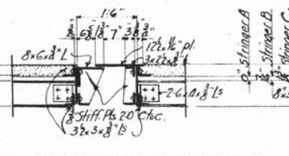
PIER NO. 12.
EXPANSION END.



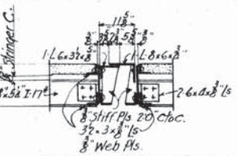
Material for U.S. and D.S. Trusses, both spans
8-Plates 27"x ⅞"x 3'-1" Tonqued, Plane to ⅞"
4-Masonry Plates 27"x ⅞"x 3'-1"
24-Rollers 4"ø x 2'-3" Groove to 3½"
8-Side bars 3"x ⅞"x 2'-4½"
48-Tap bolts 1"ø x 1½"



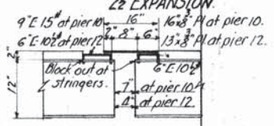
EXPANSION DAM, PIER Nº 8.
2½" EXPANSION.



EXPANSION DAM, 515 & 184' SPANS.
PIER Nº 10 - 7" EXPANSION.



EXPANSION DAM, 184' SPAN.
PIER Nº 12 - 4" EXPANSION.



EXPANSION DAM
FOR SIDEWALKS.

Note- All material shown on this sheet is new construction

The constructor shall check all plan dimensions, make additional field measurements and be responsible for both, in order that the new work shall fit the old work.

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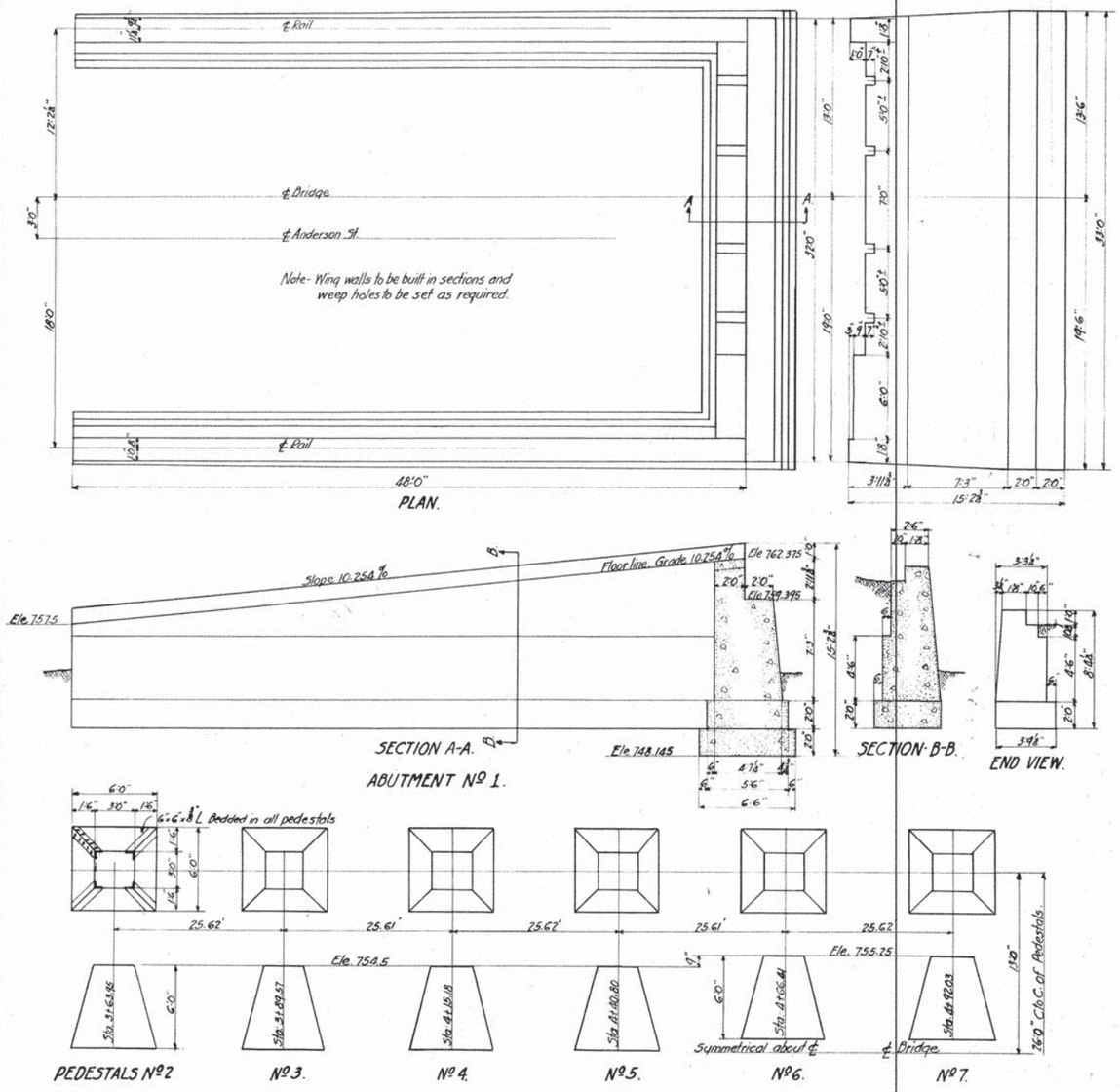

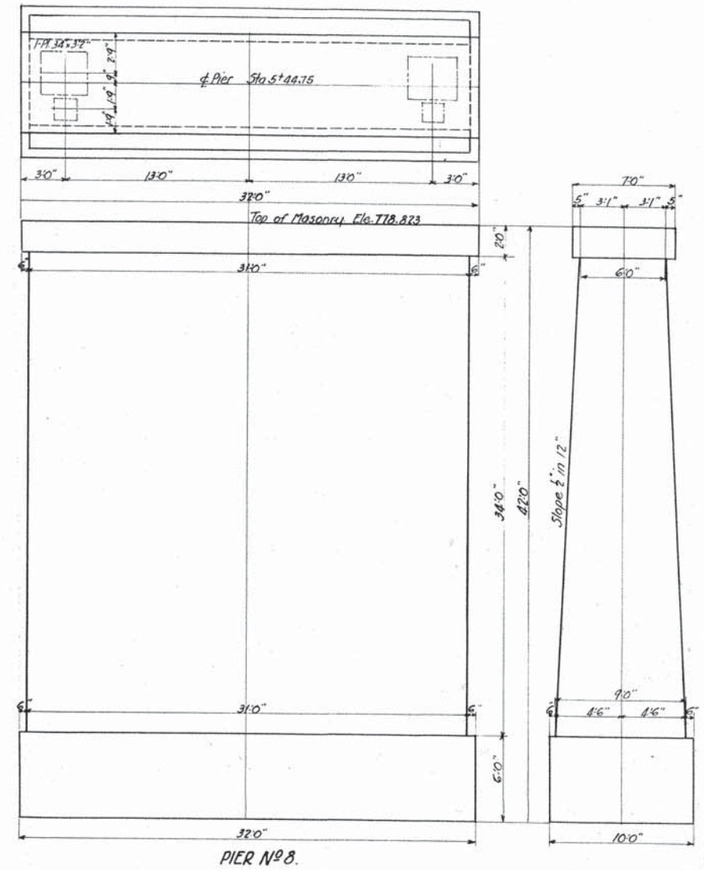

Note- Figures indicate old material unless otherwise noted.

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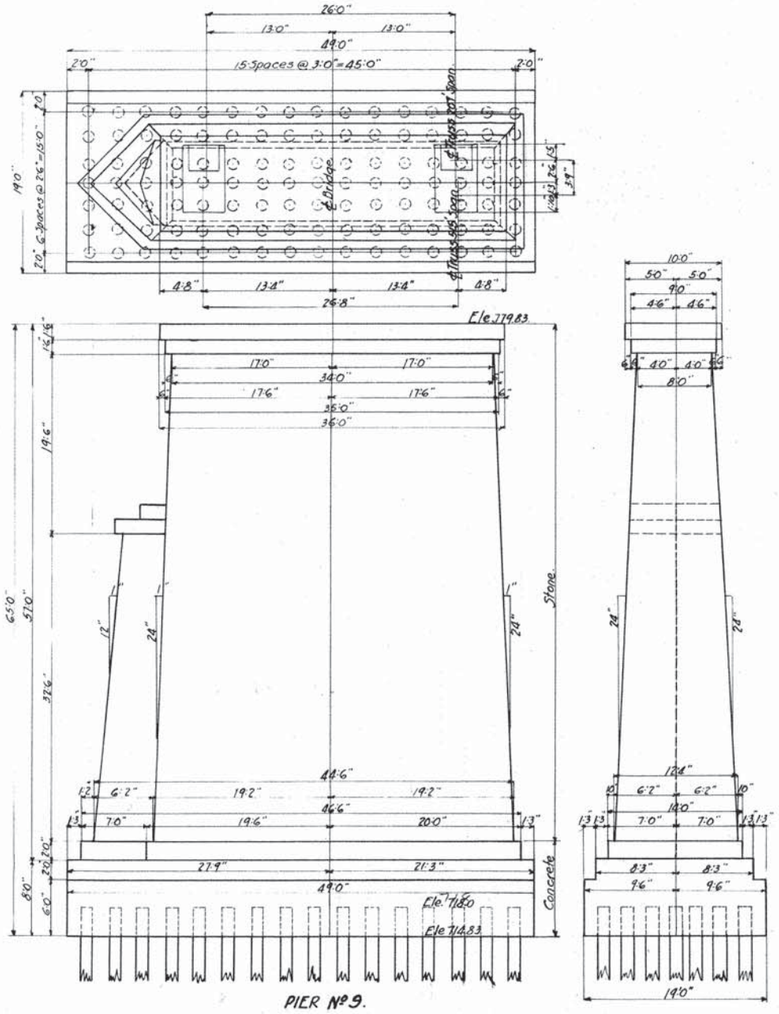
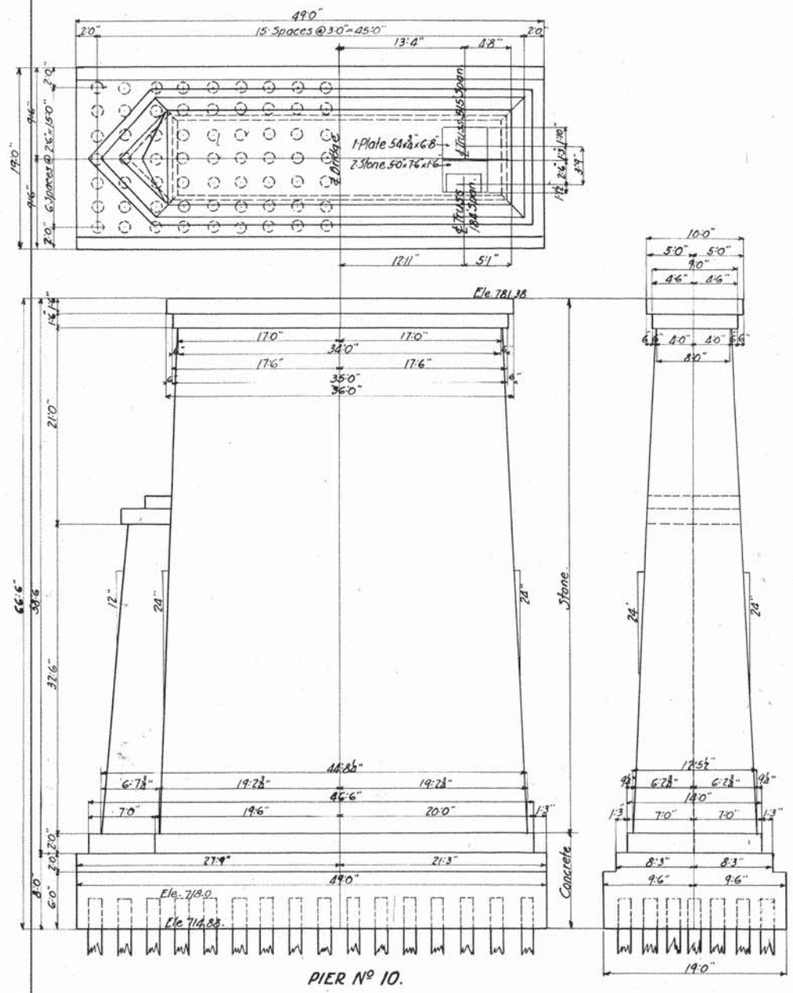
Sheet Nº 5 of 7



PIER Nº 9.



PIER Nº 10.

Note:- Figures indicate old material unless otherwise noted.

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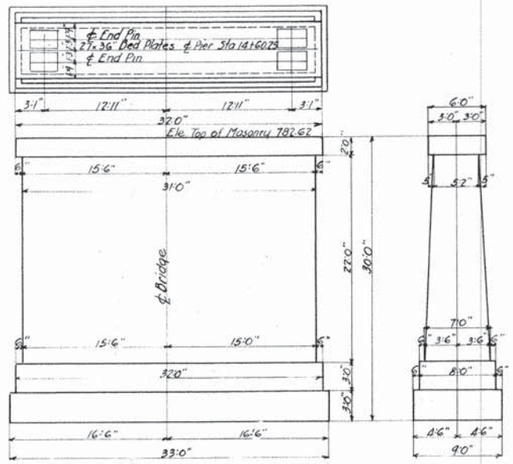

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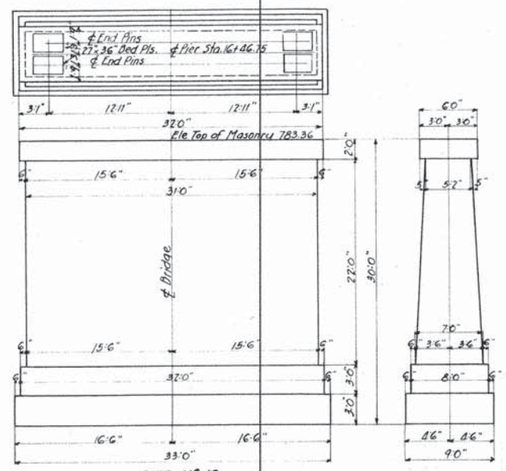
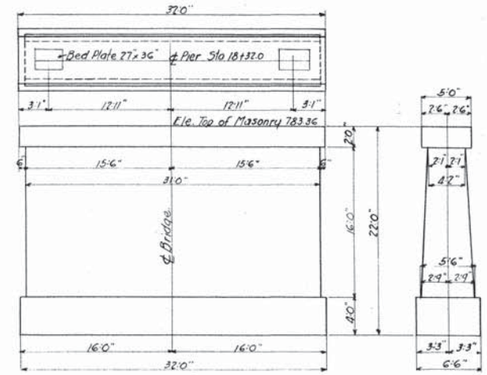


PIER Nº 12.



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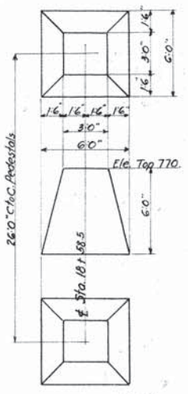
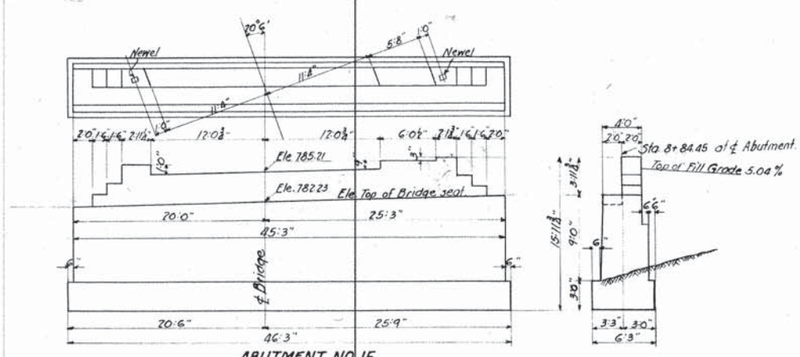


PEDESTALS Nº 14.



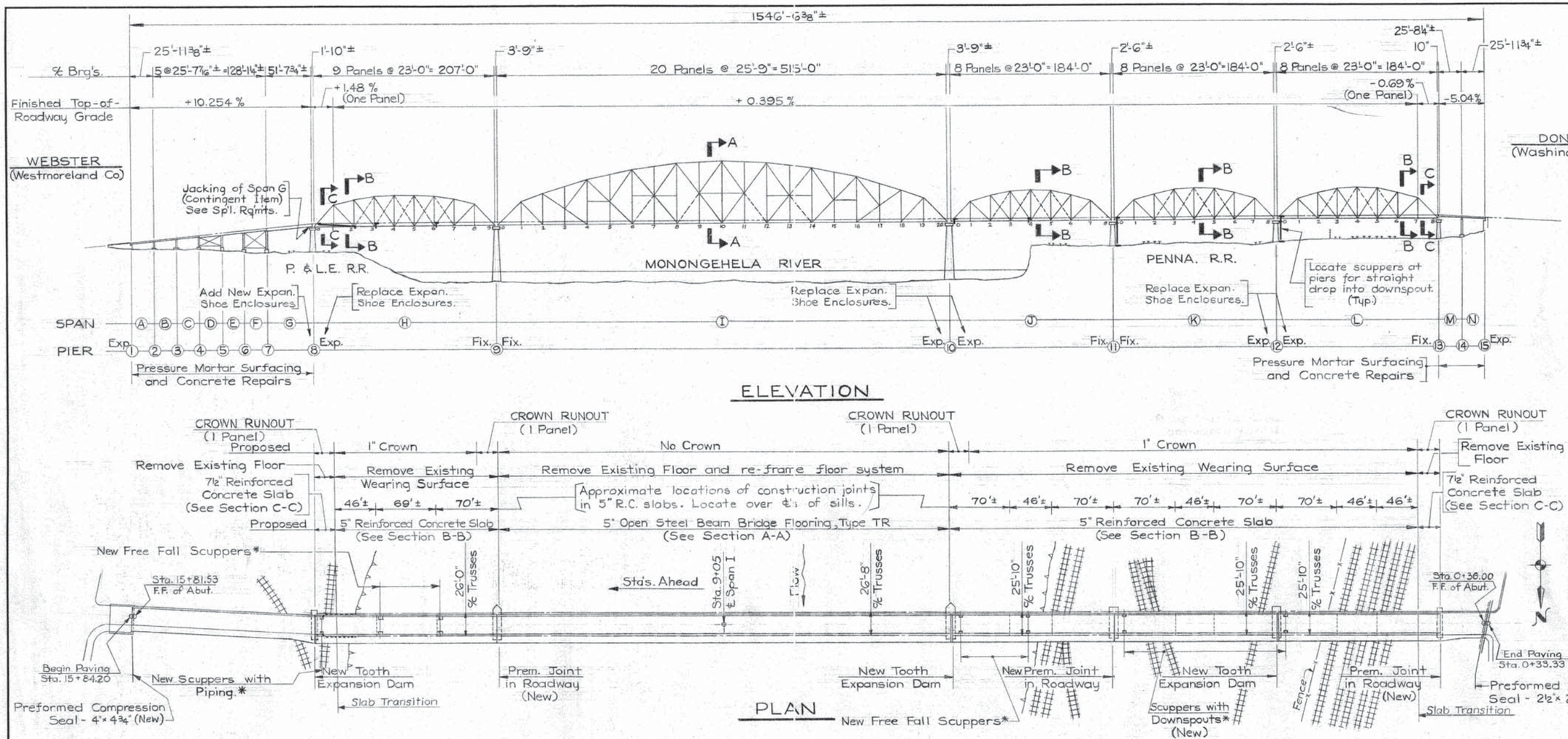
ABUTMENT NO 15.

Note--figures indicate old work unless otherwise noted.

The construc[illegible] shall check all plan dimensions, make additional [illegible] measurements and be responsible for both, in or[illegible] that the new work shall fit the old work.

BRIDGE NO 88 WEBSTER DONORA.
MONONGAHELA RIVER
ROSTRAVER TOWNSHIP
DEPARTMENT OF ROADS AND BRIDGES
WESTMORELAND COUNTY, PA.
1935

Sheet Nº 7 of 7



ELEVATION

PLAN

* Pay Item = Fabricated Structural Steel (Typ.)

General Notes Cont'd.

directed by the Engineer.

- Existing metal, including lacing bars and batten plates, shall be removed only as called for by plan or permitted by the Engineer. Metal so removed to permit access for repairs shall be replaced in kind; payment shall be incidental to the associated items of work unless otherwise specified.
- No welding or burning will be allowed when the temperature is lower than 0° F. When the temperature of the metal is between 0° F and 32° F, the metal shall be preheated to at least 70° F and maintained at this minimum temperature during welding and burning. The area to be heated shall extend at least 3 inches beyond the weld in all directions.
- Shop drawings are required, and shall be submitted to the Bridge Engineer for approval, prior to fabrication of any new materials, including drainage.
- Live Load : HS 20-44.
- Dead Load does not include allowance for a future wearing surface.
- Design Specifications: Applicable Provisions of Design Division of 1961-AASHO "Standard Specifications for Highway Bridges".

ESTIMATED QUANTITIES**

Item	Unit	Total
Removal of Existing Wearing Surface	Sq. Yd.	1830
Removal of Existing Bridge Flooring	Sq. Ft.	12900
Remove and Reset Sills	L. S.	Lump Sum
Fabricated Structural Steel	Lbs.	71,700
Fabricated Structural Steel (Expansion Dams)	Lbs.	11,100
Open Steel Beam Bridge Flooring, Type TR	Sq. Ft.	11,800
Reinforcement Bars	Lbs.	71,000
Class AA Concrete	Cu. Yd.	375
Replace Expansion Shoe Enclosures	L. S.	Lump Sum
Surface Preparation of Existing Flooring	Sq. Ft.	1250
Painting	L. S.	Lump Sum
Cement used in Pressure Mortar Build-up	Bags	150
Jacking of Span G	L. S.	Lump Sum
Class 3 Excavation	Cu. Yd.	25
Preformed Compression Seal, 4" × 4¾"	Lin. Ft.	32
Preformed Compression Seal, 2½" × 2¾"	Lin. Ft.	35

** Quantities shown are approximate.

GENERAL NOTES:

- All materials and workmanship shall be in accordance with P.D.H. Forms 408/60, 409/49 and 1963 A.W.S. Standard Specifications for Welded Highway and Railway Bridges
- Structural Steel shall conform to ASTM A36-62T designation except as noted.
- All dimensions shall be verified in the field by the contractor.
- Electrodes shall be of the low hydrogen type conforming to ASTM designation E-6016, E-6018, E-6028, E-7016, E-7018 or E-7028.
- For butt-welds without backing strips, gouge roots of joints before welding second side.
- Tack welds shall be made with the same type of electrode as the final weld.
- All fillet welds shall be 5/16" unless otherwise specified.
- No welding will be allowed when surfaces are wet or exposed to rain, snow or wind, or when welders are exposed to inclement conditions that will hamper good workmanship
- Any moisture from fog, dew, etc., present at the point of welding shall be driven off by heat before welding commences. Windbreaks shall be required to protect working areas from direct wind.
- Low hydrogen electrodes shall be dried for at least two hours at a temperature above 250° F prior to use, and electrodes so dried that are not used within four hours shall be redried before being used. Electrodes which have dried out and cracked, or those which have been wet shall not be used. Storage of all low hydrogen electrodes shall be in suitable ovens.
- All concrete shall be Class AA, unless otherwise specified. Exposed concrete edges shall be chamfered 1" × 1"
- Steel reinforcement bars designed for f_s = 20,000 psi and detailed in accordance with ACI Code. Bars shall be lapped 30 dia. min.. Structural grade reinforcement bars shall not be used.
- Surfaces of existing metal which are to be covered by new material shall be cleaned of dirt, rust and other foreign matter except adherent paint film. The portions of such surfaces that are to receive welds shall be cleaned thoroughly of all foreign matter including paint film for a distance of two inches from each side of the outside lines of welds.
- Edges that are to be welded and have been reduced to a thickness which is less than the size of weld specified shall be cut away or built up to provide a thickness equal to the size of the weld, unless otherwise called for by plan or

(Con't. Above Right)

APPROVED: FEB - 1 1965
R. H. Jensen
Bridge Engineer

Commonwealth of Pennsylvania
DEPARTMENT OF HIGHWAYS
BRIDGE DIVISION

WASHINGTON-WESTMORELAND CO'S.
APPL. 143, SPUR E, SEC. 1-B STA. 9+05
NEW FLOOR FOR
DONORA-WEBSTER BRIDGE
OVER
MONONGEHELA RIVER, P.R.R. & P. & L.E. R.R.

GENERAL PLAN

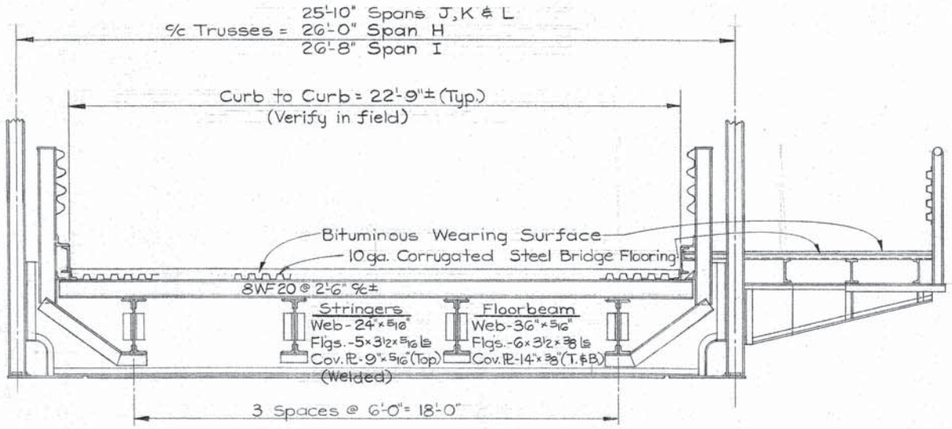
SCALE: 1" = 60'
SHEET 1 OF 5 & S-2723

S-7274

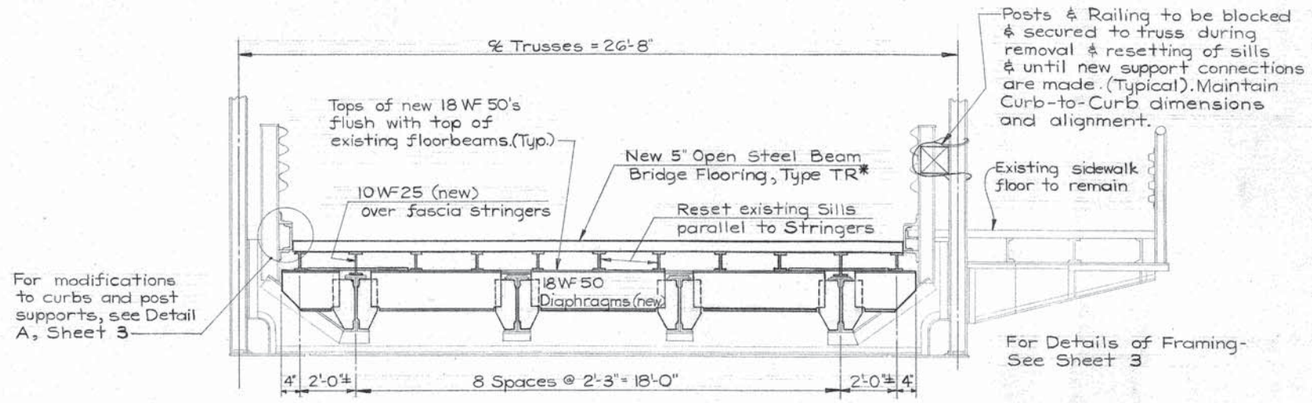
DJH 2/23/65
HL 2-17-65
SRS
J.R.H.
JLS 1-29-65

Division of Bridge Engineering - Harrisburg

621022 06100036

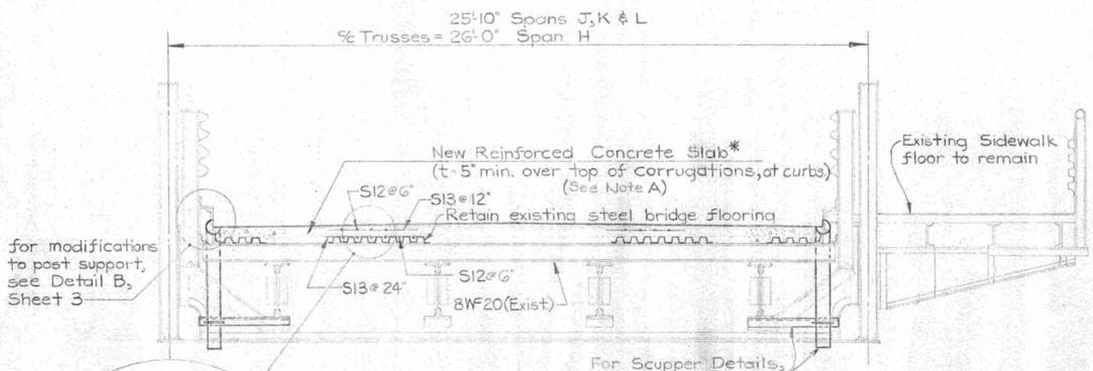


TYPICAL SECTION (EXISTING)
SPANS H, I, J, K & L



SECTION A-A (PROPOSED)
(TO APPLY AS SHOWN ON SHEET 1)

* For crowns and runouts, see sheet 1.



SECTION B-B (PROPOSED)
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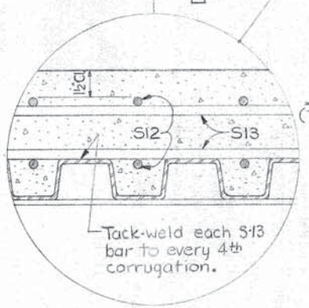
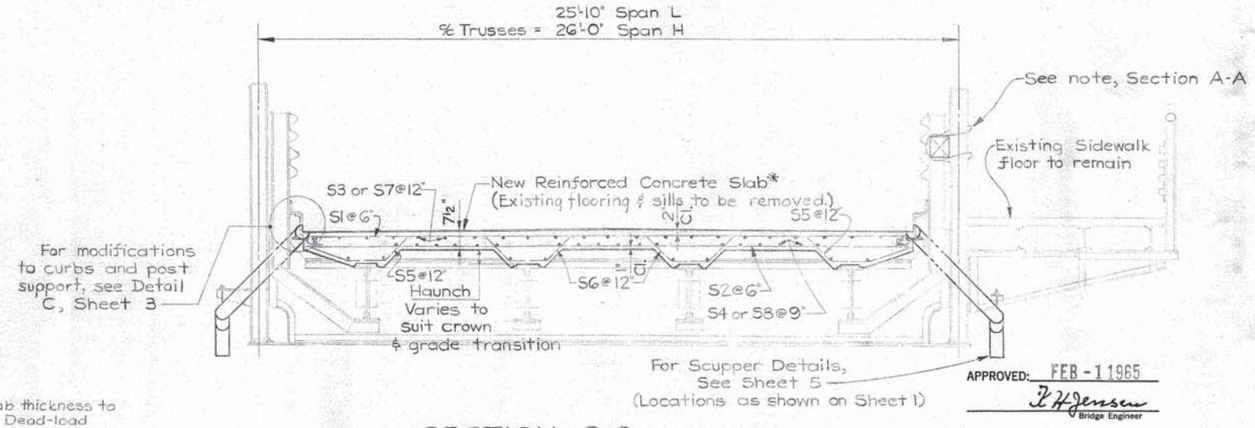


Note A: Vary slab thickness to compensate for Dead-load deflection due to slab weight, as directed by the Engineer.



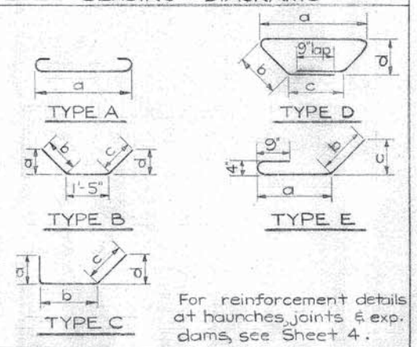
APPROVED: FEB - 1 1965
T. H. Jensen
Bridge Engineer

SECTION C-C (PROPOSED)
(TO APPLY AS SHOWN ON SHEET 1)

DECK BAR SCHEDULE

Mark	No.	Size	Length	Type	Remarks	Mark	No.	Size	Length	Type	Remarks
S1	95	5	23'-8"	A	a=22'-6"						
S2	95	5	22'-6"	Str.		S17	30	4	2'-5"	C	a=9", b=10", c=10", d=9"
S3	23	4	23'-0"	Str.		S18	30	5	2'-0"	Str.	
S4	28	5	23'-0"	Str.		S19	30	4	2'-10"	E	a=12", b=10", c=8"
S5	96	4	3'-11"	B	a=(var) b=1'-9 1/2", c=12 1/2", d=9"	S20	14	5	22'-4"	Str.	
S6	96	4	3'-6"	B	a=9", b=12 1/2", c=12 1/2", d=9"						
S7	23	4	23'-8"	Str.							
S8	28	5	23'-8"	Str.							
S9	24	4	2'-3"	C	a=9", b=6", c=12", d=9"						
S10	24	4	2'-4"	C	a=8", b=8", c=12", d=8"						
S11	48	4	6'-2"	D	a=2'-4", b=12", c=1'-1", d=10"						
S12	2,852	4	24'-3"	Str.							
S13	1,071	4	22'-6"	Str.							
S14	24	4	3'-2"	E	a=12", b=14", c=10"						
S15	72	4	2'-8"	C	a=9", b=9 1/2", c=13 1/2", d=10"						

BENDING DIAGRAMS



For reinforcement details at haunches, joints & exp. dams, see Sheet 4.

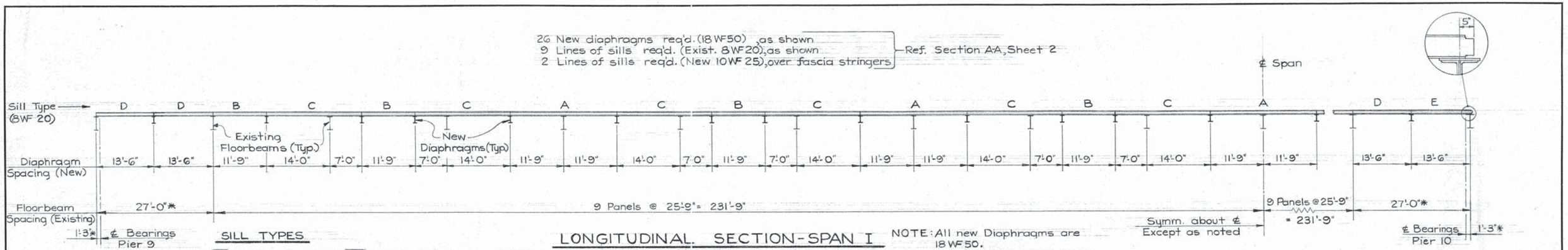
Commonwealth of Pennsylvania
DEPARTMENT OF HIGHWAYS
BRIDGE DIVISION

WASHINGTON-WESTMORELAND CO'S.
APPL. 143, SPUR E, SEC. 1-B STA. 9+05
NEW FLOOR FOR
DONORA-WEBSTER BRIDGE

CROSS-SECTIONS
AND BAR SCHEDULE

SCALE: 3/8" = 1'-0"
SHEET 2 OF 5

S-7274



SILL TYPES

Nominal Lengths - (Trim for Clearance)

- A - Full-Length Sill - 23'-6"
- B - Half-Length Sill - 11'-9"
- C - Part-Length Sill - 21'-0"
- D - Part-Length Sill - 13'-6"
- E - Part-Length Sill - 13'-11"

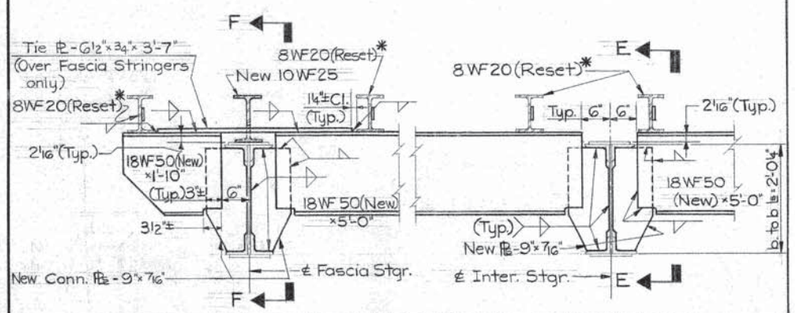
Existing Sill Lengths = 23'-6" (Verify in field) Cut all required lengths from existing 8WF material

LONGITUDINAL SECTION - SPAN I

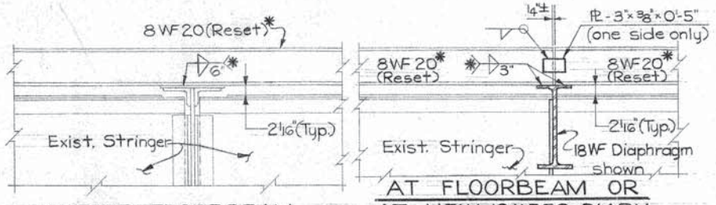
(Showing Re-framing Details)
(Work with Section A-A, Sh. 2)
(Stringers & Flooring not shown)
Scale: 1" = 10'-0"

NOTE: All new Diaphragms are 18WF50. Length of New 10WF Sills to be multiples of full-panel lengths, Min. L = 25'-9" (27'-0"* or 27'-5"* in end panels)

*Verify in field. Adjust Length of Sills, Type D & E, as required.

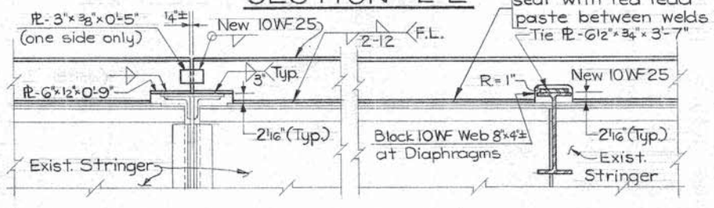


PART ELEVATION - NEW 18WF50 DIAPHRAGM



AT TYP. FLOORBEAM — AT FLOORBEAM OR AT NEW 18WF50 DIAPH.

SECTION E-E



AT TYP. FLOORBEAM — AT NEW 18WF50 DIAPH.

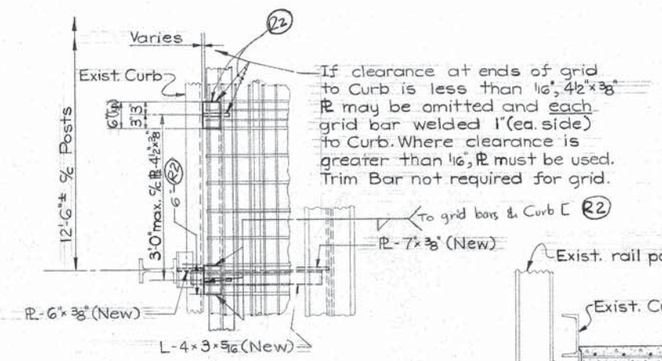
SECTION F-F

*Pay Item = Remove and Reset Sills.

FRAMING DETAILS - SPAN I

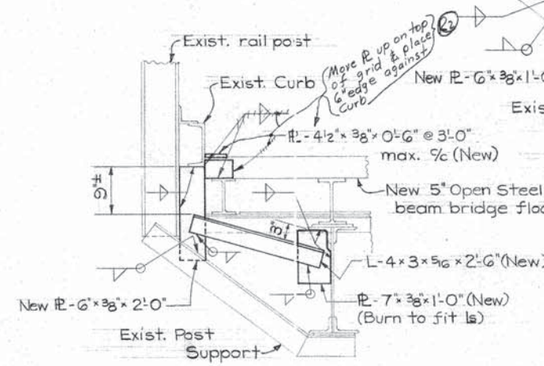
(Pay Item = Fabricated Struct. Steel - except as noted thus *)

J.R.H.
JLS 1-18-65



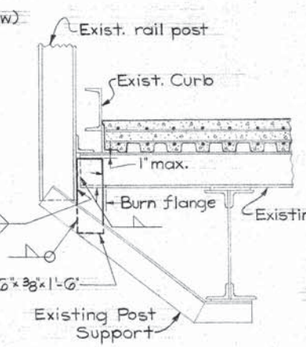
PLAN - DETAIL A

(Showing Grid-to-Curb Connection)



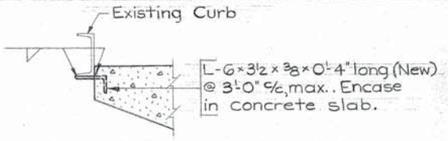
DETAIL A

(Estimated No. Req'd. = 84)



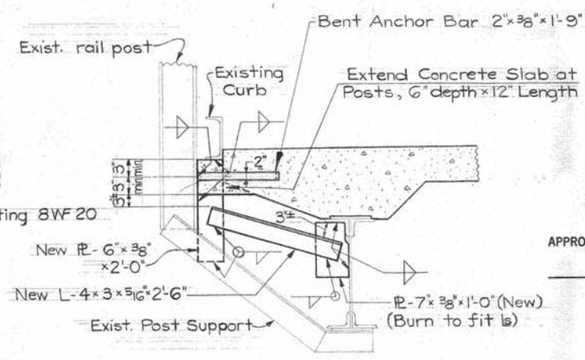
DETAIL B

(Estimated No. Req'd. = 118)



DETAIL C (TYPICAL BETWEEN RAILING POSTS)

(Estimated No. Req'd. = 32)



DETAIL C (TYPICAL AT RAILING POSTS)

(Estimated No. Req'd. = 8)

MODIFICATIONS TO CURBS & POST SUPPORTS

(Pay Item = Fabricated Structural Steel)

Revision	Description	Date	By
R2	4"×3/8"×0'-6" PL moved	5-2-66	J.R.H.

APPROVED: FEB - 1 1965
K. H. Jensen
Bridge Engineer

Commonwealth of Pennsylvania
DEPARTMENT OF HIGHWAYS
BRIDGE DIVISION

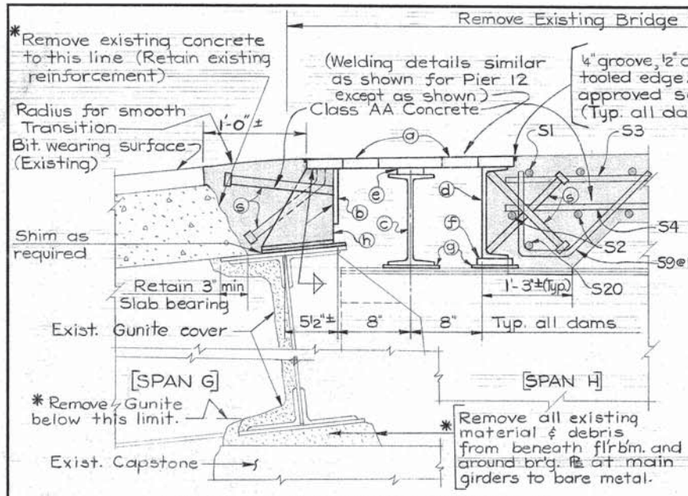
WASHINGTON-WESTMORELAND CO'S.
APPL. 143, SPUR E, SEC. 1-B STA. 9+05
NEW FLOOR FOR DONORA-WEBSTER BRIDGE
FRAMING DETAILS

Scale: ¾" = 1'-0" except as noted

SHEET 3 OF 5

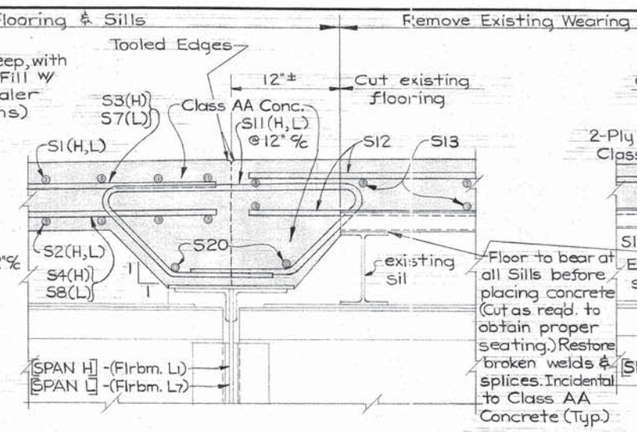
S-7274

GE 1011 0010 0036



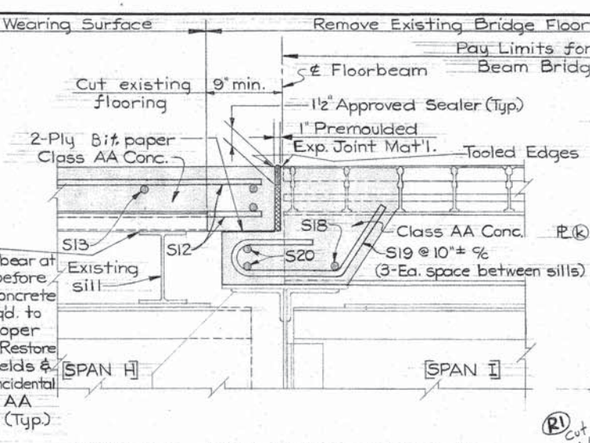
LONGIT. SECTION - PIER 8

*=Incidental to Class AA Conc.

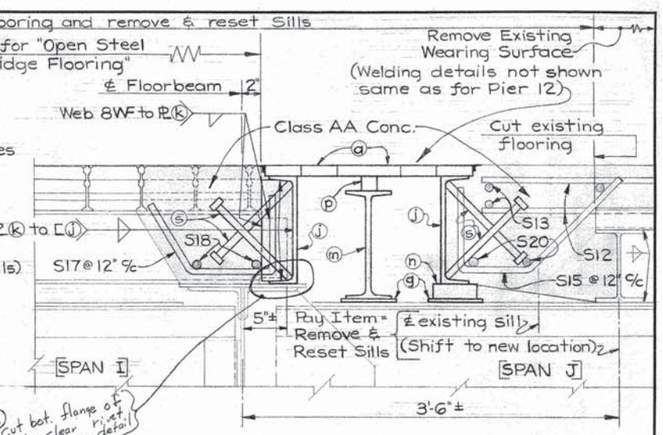


LONGIT. SECTION
SLAB TRANSITION

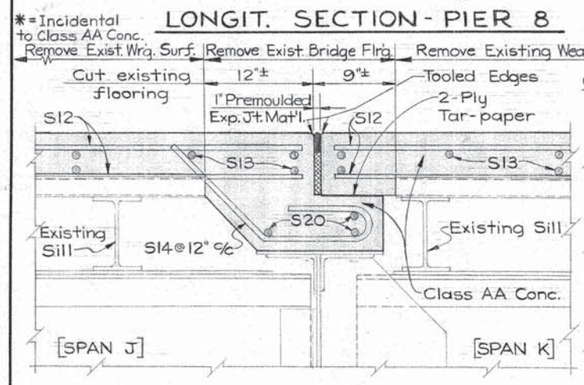
SPAN H - as shown
SPAN L - opposite hand



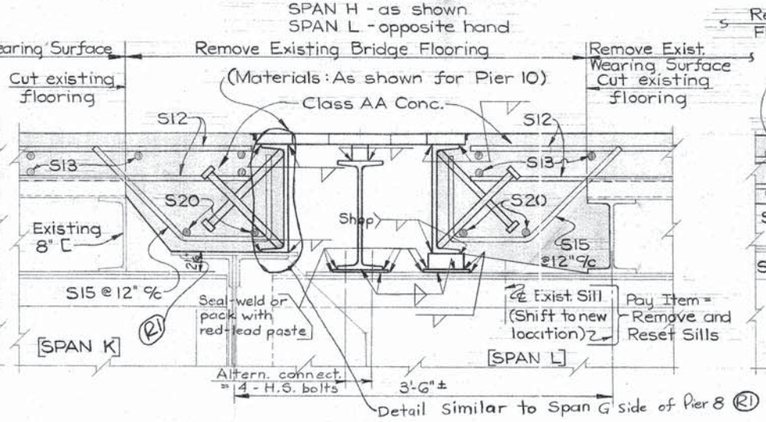
LONGIT. SECTION - PIER 9



LONGIT. SECTION - PIER 10

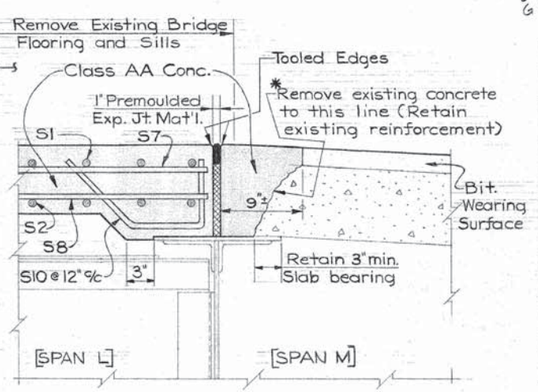


LONGIT. SECTION - PIER 11



LONGIT. SECTION - PIER 12

Dam must be detailed to provide 1" Crown at ℄ Roadway (R1)

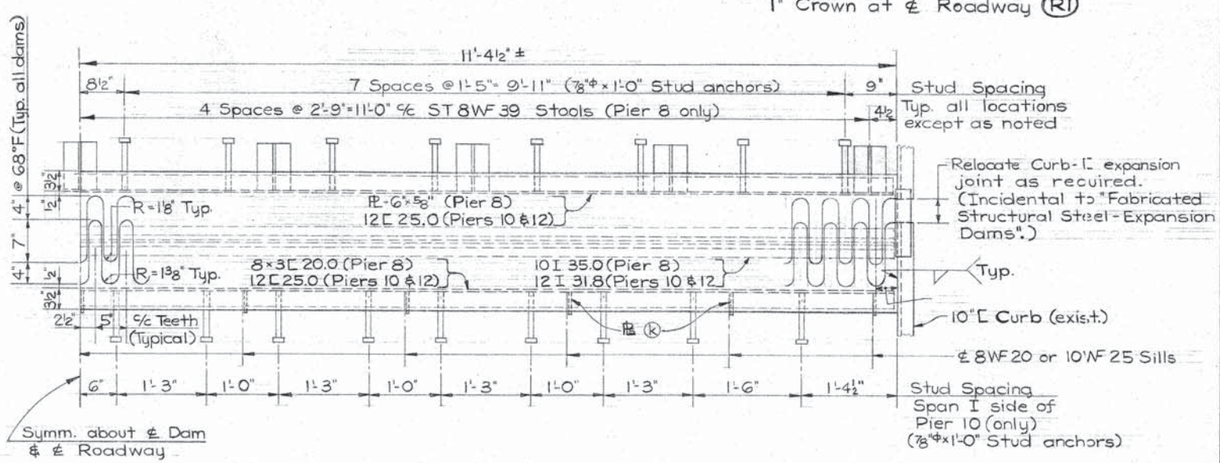


LONGIT. SECTION - PIER 13

EXPANSION DAM MATERIAL REQUIREMENTS

Mark	Section	Length	No. Required
a	Tooth Pl., t=1¼"	22'-9"	3 matched pairs
b	Pl. 6"×⅝"	22'-8"	1
c	10 I 35.0	22'-8"	1
d	10 [25.0	22'-8"	1
e	Bar 2"×¾"	22'-8"	1
f	Bar 5"×¾"	0'-11"	4
g	Pl. 6"×t as req'd.	0'-10"	Shims (24 Locations)
h	Pc. ST 8 WF 39	0'-8"	9
j	12 [25.0	22'-8"	2
k	Bar 3½"×⅜"	0'-11½"	11 (Pier 10 only)
m	12 I 31.8	22'-8"	2
n	Bar 4"×1¾"	0'-11"	8
p	Bar 1¾"×1¾"	22'-8"	2
s	*Studs - ⅞"Φ	1'-0"	98

*Anchor studs shall conform to A.S.T.M. designation A-108-61T, and shall be automatically welded by use of a welding gun. The welds shall be of sufficient strength to permit the studs to be bent 30° from the final position.

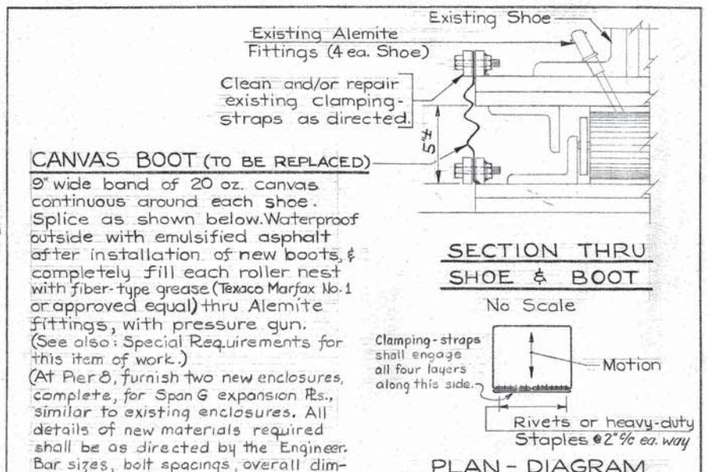


HALF PLAN - TOOTH EXPANSION DAM @ PIERS 8, 10 & 12

(For materials not shown - see Longit. Sections)

Revision	Description	Date	By
R1	Changes to tooth Exp. Dams	5-4-66	J.R.H.

J.R.H. 4-18-65



DETAILS - REPLACE EXP. - SHOE ENCLOSURES

APPROVED: FEB - 1 1965
R H Jensen
Bridge Engineer

Commonwealth of Pennsylvania
DEPARTMENT OF HIGHWAYS
BRIDGE DIVISION

WASHINGTON-WESTMORELAND CO'S.
APPL. 143, SPUR E, SEC. 1-B STA. 9+05
NEW FLOOR FOR
DONORA-WEBSTER BRIDGE

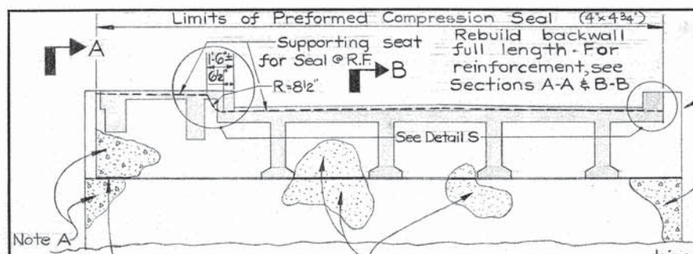
ROADWAY JOINT DETAILS & SHOE ENCLOSURES

Scales: 1½"=1'-0" and 1"=1'-0"

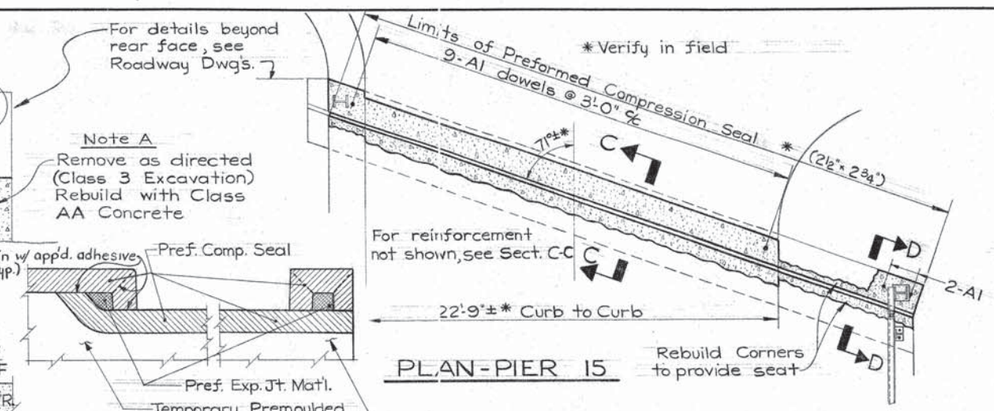
SHEET 4 OF 5

S-7274

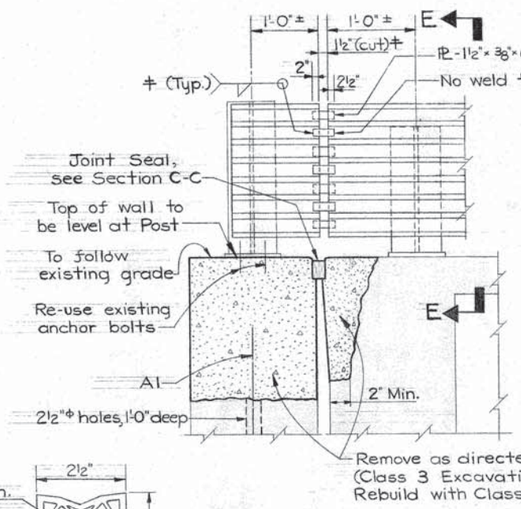
GZ/022 00100036



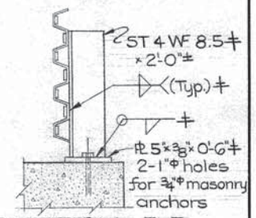
ELEVATION - PIER 1



PLAN - PIER 15

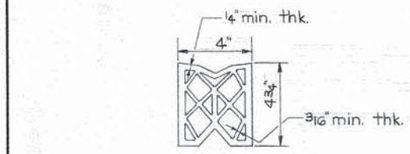


SECTION D-D

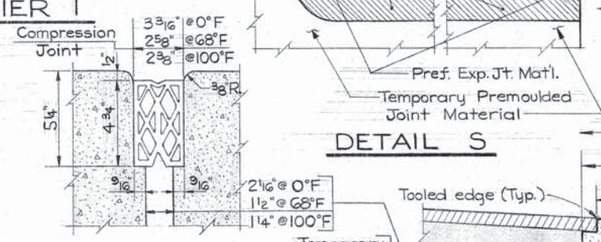


SECTION E-E

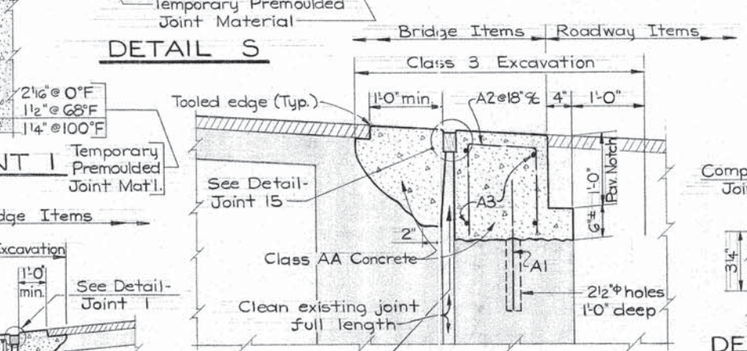
± Pay Item = Fabricated Structural Steel



4" x 4¾" - PREFORMED COMPRESSION SEAL

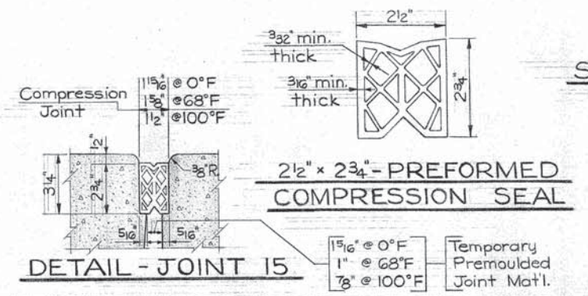


DETAIL - JOINT 1



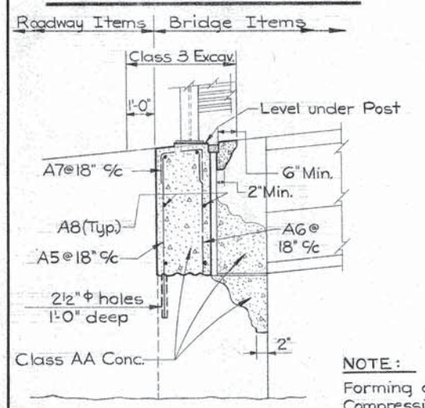
DETAIL S

SECTION C-C

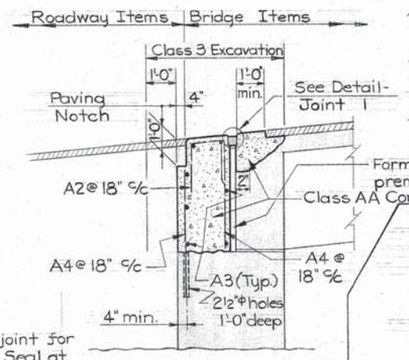


2½" x 2¾" - PREFORMED COMPRESSION SEAL

DETAIL - JOINT 15

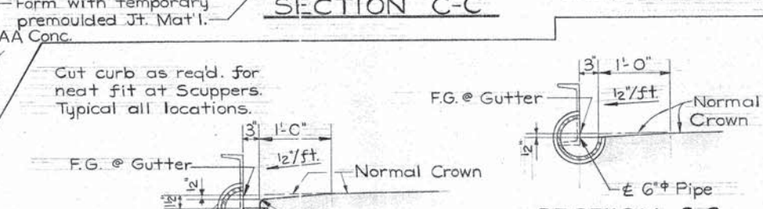


VIEW A-A



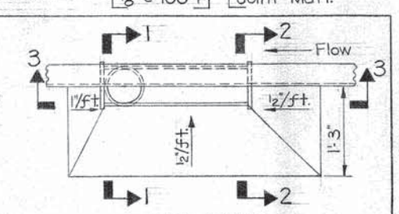
SECTION B-B

NOTE:
Forming of joint for Compression Seal at Pier 1 shall be deferred until after completion of all work at Span G bearings on Pier 8.

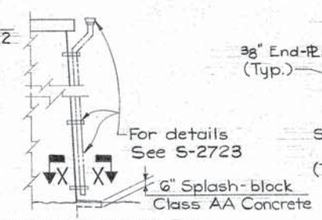


SECTION 1-1

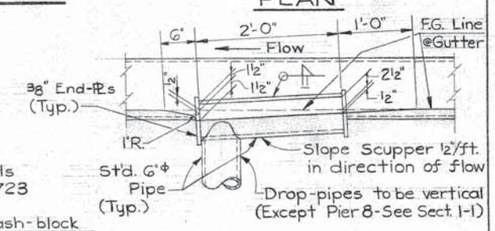
SECTION 2-2



PLAN

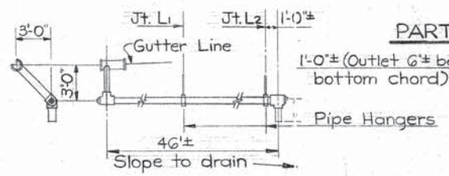


PART ELEV. @ PIER

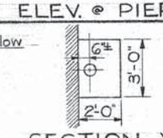


SECTION 3-3

TYPICAL SCUPPER
(FREE FALL OR WITH DOWNSPOUT EXCEPT AT PIER 8)
[6 Req'd. - as shown ; 6 Req'd. - opp. hand]



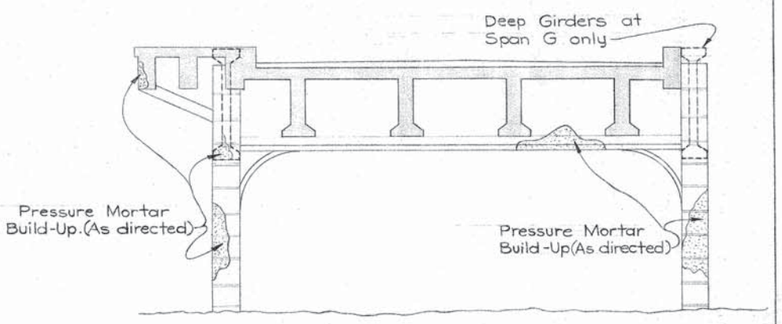
SCUPPER & PIPING AT PIER 8
[1 Req'd. - as shown ; 1 Req'd. - opp. hand]



SECTION X-X
SPLASH-BLOCK DETAIL
[4-Required]

SCUPPER DETAILS

NOTE: Materials shall be as specified on S-2723, and welded construction shall be used throughout. Pay Item = Fabricated Structural Steel. (Includes required burning and fit-up)

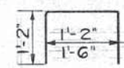


TYPICAL SECTION - APPROACH SPANS

J.R.H.
LS 2-3-65

BAR SCHEDULE - PIERS 1 & 15

Mark	No.	Size	Length	Type
A1	11	6	2'-0"	Str.
A2	37	4	3'-6"	Bent
A3	22	5	13'-9"	Str.
A4	36	5	3'-6"	Str.
A5	6	5	4'-6"	Str.
A6	6	4	3'-6"	Str.
A7	6	4	3'-10"	Bent
A8	6	4	7'-6"	Str.



A2, A7

APPROVED: FEB - 1 1965
K. H. Jensen
Bridge Engineer

Commonwealth of Pennsylvania
DEPARTMENT OF HIGHWAYS
BRIDGE DIVISION

WASHINGTON - WESTMORELAND CO'S.
APPL. 143, SPUR E, SEC. 1-B STA. 9+05
NEW FLOOR FOR DONORA-WEBSTER BRIDGE

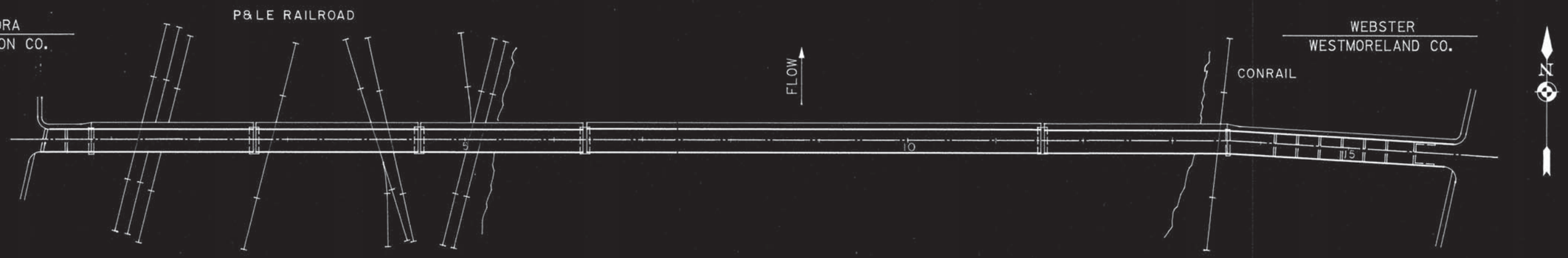
SCUPPER DETAILS AND REPAIRS TO APPROACH SPANS

SCALE: AS NOTED

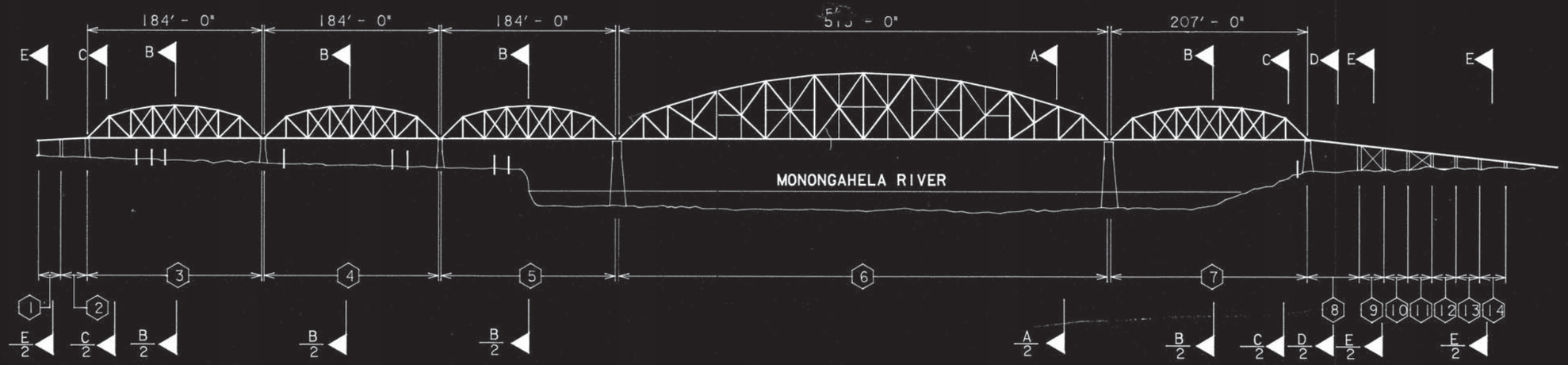
SHEET 5 OF 5

S-7274

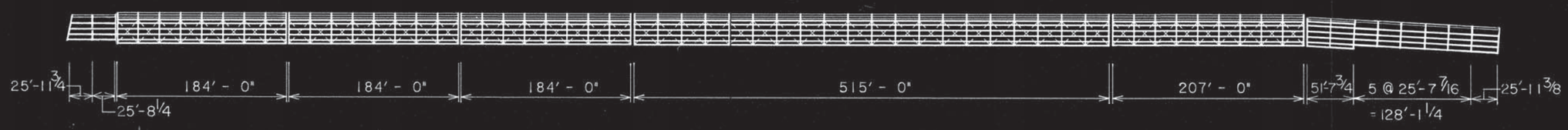
6210220100035



PLAN



ELEVATION



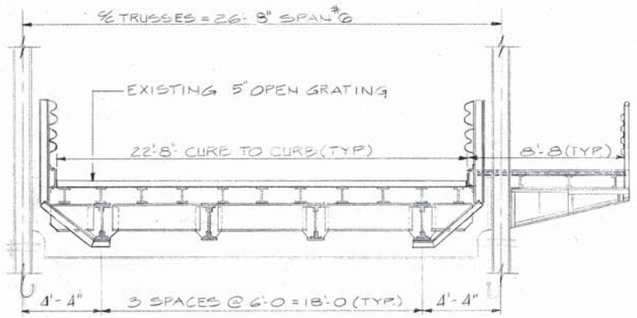
FLOOR FRAMING PLAN

SCALE

0 30 60 120

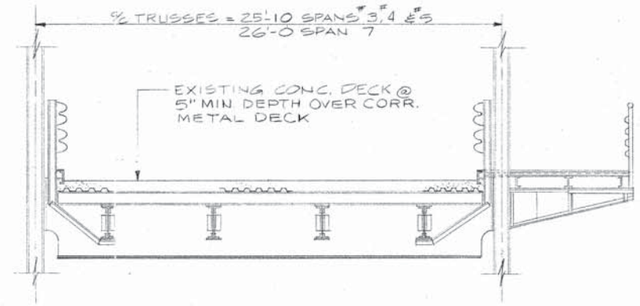
DONORA - WEBSTER BRID
EXISTING STRUCTURE
GENERAL PLAN & ELEVATIO

DATE: 5/15/82 SHEET: A1 OF



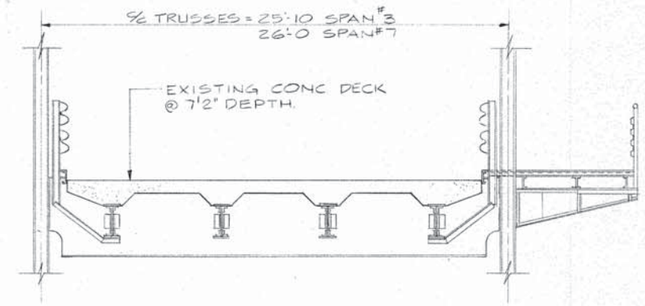
SECTION A-A (EXISTING)

0 2 4 6 8



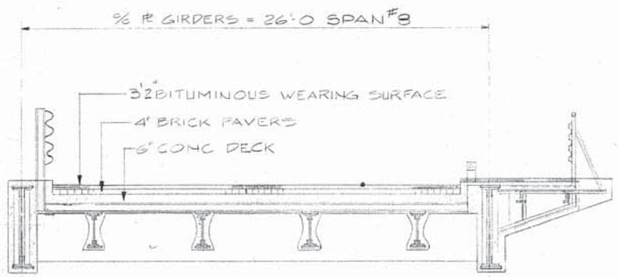
SECTION B-B (EXISTING)

0 2 4 6 8



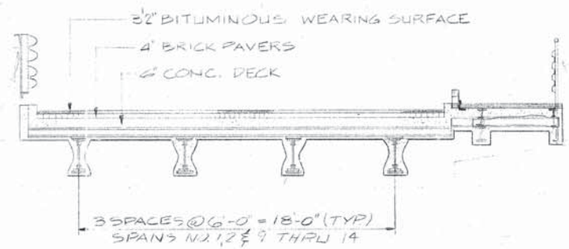
SECTION C-C (EXISTING)

0 2 4 6 8



SECTION D-D (EXISTING)

0 2 4 6 8



SECTION E-E (EXISTING)

0 2 4 6 8

STEEL SUPERSTRUCTURE OF EXISTING FLOOR SYSTEM		
MEMBER TYPE	SPANS	DESCRIPTION OF ELEMENTS
STRINGER	NO. 1, 2 & 8-14	WEB PLATE 24" X 5/16" 4 ANGLES 5" X 3-1/2" X 5/16"
STRINGER	NO. 3-7	COVER PLATE 9" X 1/4" WEB PLATE 24" X 5/16" 4 ANGLES 5" X 3-1/2" X 5/16"
FLOORBEAM	NO. 3-8	2 COVER PLATES 14" X 3/8" X 20'-0" WEB PLATE 36" X 5/16" 4 ANGLES 6" X 3-1/2" X 3/8"
GIRDER	NO. 8	2 COVER PLATES 14" X 5/16" X 20'-0". 2 COVER PLATES 14" X 3/8" FULL LGTH. WEB PLATE 56" X 3/8" 4 ANGLES 6" X 4" X 7/16", FILLER PL. STIFFENER ANGLES 5" X 3-1/2" X 5/16"

DONORA APPROACH SPANS NO. 1 & 2					
APPROACH SPAN NO.	ALLOWABLE BENDING STRESS (KSI)	STRINGER ANALYSIS ACTUAL STRESS (KSI)		FLOORBEAM ANALYSIS ACTUAL STRESS (KSI)	
		HS20-44 LIVE LOAD	H13 LIVE LOAD	HS20-44 LIVE LOAD	H13 LIVE LOAD
1	16.0	25.2	19.8	----	----
2	16.0	24.7	19.5	----	----

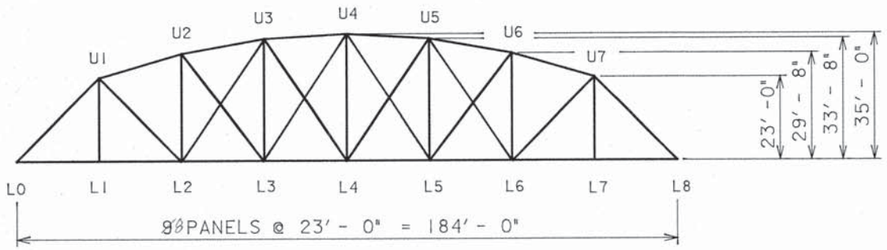
NOTE: "OVERSTRESSED" FOR BOTH HS20-44 & H13 LIVE LOADS UNDER EXISTING DEAD LOAD CONDITION THROUGHOUT EACH DONORA APPROACH SPAN.

WEBSTER APPROACH SPANS NO. 8 THRU 14							
APPROACH SPAN NO.	ALLOWABLE BENDING STRESS (KSI)	STRINGER ANALYSIS ACTUAL STRESS (KSI)		FLOORBEAM ANALYSIS ACTUAL STRESS (KSI)		GIRDER ANALYSIS ACTUAL STRESS (KSI)	
		HS20-44 LIVE LOAD	H13 LIVE LOAD	HS20-44 LIVE LOAD	H13 LIVE LOAD	HS20-44 LIVE LOAD	H13 LIVE LOAD
8	16.0	24.9	19.8	27.7	20.5	24.0	19.0
9	16.0	25.0	19.8	----	----	----	----
10	16.0	24.6	19.4	----	----	----	----
11	16.0	25.0	19.8	----	----	----	----
12	16.0	24.6	19.4	----	----	----	----
13	16.0	24.6	19.4	----	----	----	----
14	16.0	25.1	19.8	----	----	----	----

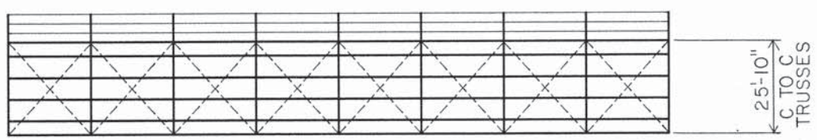
NOTE: "OVERSTRESSED" FOR BOTH HS20-44 & H13 LIVE LOADS UNDER EXISTING DEAD LOAD CONDITION THROUGHOUT ALL SEVEN WEBSTER APPROACH SPANS.

DONORA - WEBSTER BRIDGE
EXISTING STRUCTURE
TYPICAL CROSS SECTIONS

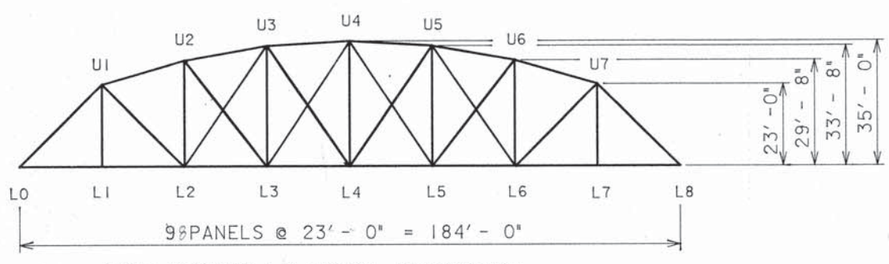
DATE: 5/15/82 SHEET: A2 OF



SIDEWALK TRUSS ELEVATION
SPANS NO. 3, 4 & 5



FLOOR PLAN
SPANS NO. 3, 4 & 5



NON-SIDEWALK TRUSS ELEVATION
SPANS NO. 3, 4 & 5

184' SPANS NO. 3, 4 & 5		
TRUSS MEMBERS		DESCRIPTION OF ELEMENTS
UPPER CHORD	L0U1 & U7L8	1 COVER PL 22 X 3/8 & 2 ∠s 3 X 3 X 5/16, T. 2 WEB PLs 18 X 1/2, 2 ∠s 3 X 3 X 9/16, B.F.
	U1 THRU U7	1 COVER PL 22 X 3/8 & 2 ∠s 3 X 3 X 5/16, T. 2 WEB PLs 18 X 5/16, 2 ∠s 3 X 3 X 3/8, B.F.
VERTICALS	U1L1 & U7L7	4 ANGLES (∠s) 5 X 5 X 5/16 W/TIE PLs
	U2L2, U3L3, U4L4, U5L5, U6L6	2 CHANNELS (C8 X 13-3/8#) LACED
DIAGONALS	U1L2 & L6U7	2 I-BARS 4" X 1"
	U2L3 & L5U6	2 I-BARS 4" X 3/4"
	L2U3 & U5L6	2 I-BARS 1" X 1" (COUNTERS)
	U3L4 & L4U5	2 I-BARS 3" X 3/4"
	L3U4 & U4L5	2 I-BARS 1-7/16" X 1-7/16" (COUNTERS)
LOWER CHORD	L0L1 & L7L8	4 I-BARS 4" X 7/8"
	L1L2 & L6L7	4 I-BARS 4" X 7/8"
	L2L3 & L5L6	4 I-BARS 4" X 1-1/4"
	L3L4 & L4L5	4 I-BARS 5" X 1-1/16"

STEEL SUPERSTRUCTURE OF EXISTING FLOOR SYSTEM		
MEMBER TYPE	SPANS	DESCRIPTION OF ELEMENTS
STRINGER	NO. 1, 2 & 8-14	WEB PLATE 24" X 5/16" 4 ANGLES 5" X 3-1/2" X 5/16"
STRINGER	NO. 3-7	COVER PLATE 9" X 1/4" WEB PLATE 24" X 5/16" 4 ANGLES 5" X 3-1/2" X 5/16"
FLOORBEAM	NO. 3-8	2 COVER PLATES 14" X 3/8" X 20'-0" WEB PLATE 36" X 5/16" 4 ANGLES 6" X 3-1/2" X 3/8"
GIRDER	NO. 8	2 COVER PLATES 14" X 5/16" X 20'-0". 2 COVER PLATES 14" X 3/8" FULL LGTH. WEB PLATE 56" X 3/8" 4 ANGLES 6" X 4" X 7/16", FILLER PL. STIFFENER ANGLES 5" X 3-1/2" X 5/16"

OK w/o section losses

184' TRUSS SPAN NO. 3		STRINGER (L0L1)				FLOORBEAM (@ L1)			
TYPE OF STRESS	ALLOWABLE STRESS (KSI)	ACTUAL STRESS (KSI)				ACTUAL STRESS (KSI)			
		BEAM		CONN.		BEAM		CONN.	
		HS20	H13	HS20	H13	HS20	H13	HS20	H13
BENDING MOMENT	16.0	15.8	12.0	----	----	*19.1	12.7	----	----
SHEAR	9.5	5.6	3.5	9.4	6.0	9.5	6.5	12.1	8.2
BEARING	24.0	----	----	*29.6	18.8	----	----	14.2	9.7

*NOTE: "OVERSTRESSED" FOR HS20 LIVE LOAD.
NOTE: ALL CALCULATED VALUES (ACTUAL STRESSES) IN THE ABOVE STRESS TABLE BASED ON ORIGINAL SECTION & EXISTING DEAD LOAD CONDITION.

OK w/o section losses

184' SPAN NO. 3		STRINGER (L1-L8)				FLOORBEAM (L2-L7)			
TYPE OF STRESS	ALLOWABLE STRESS (KSI)	ACTUAL STRESS (KSI)				ACTUAL STRESS (KSI)			
		BEAM		CONN.		BEAM		CONN.	
		HS20	H13	HS20	H13	HS20	H13	HS20	H13
BENDING MOMENT	16.0	14.7	10.9	----	----	*17.7	11.2	----	----
SHEAR	9.5	5.3	3.2	8.9	5.5	8.7	5.7	11.1	7.2
BEARING	24.0	----	----	28.1	17.1	----	----	13.0	8.5

*NOTE: "OVERSTRESSED" FOR HS20 LIVE LOAD.
NOTE: ALL CALCULATED VALUES (ACTUAL STRESSES) IN THE ABOVE STRESS TABLE BASED ON ORIGINAL SECTION & EXISTING DEAD LOAD CONDITION.

OK w/o section losses

184' SPAN NOS. 4 & 5		STRINGER (TYP.)				FLOORBEAM (TYP.)			
TYPE OF STRESS	ALLOWABLE STRESS (KSI)	ACTUAL STRESS (KSI)				ACTUAL STRESS (KSI)			
		BEAM		CONN.		BEAM		CONN.	
		HS20	H13	HS20	H13	HS20	H13	HS20	H13
BENDING MOMENT	16.0	14.7	10.9	----	----	*17.7	11.2	----	----
SHEAR	9.5	5.3	3.2	8.9	5.5	8.7	5.7	*11.1	7.2
BEARING	24.0	----	----	*28.1	17.1	----	----	13.0	8.5

*NOTE: "OVERSTRESSED" FOR HS20 LIVE LOAD.
NOTE: ALL CALCULATED VALUES (ACTUAL STRESSES) IN THE ABOVE STRESS TABLE BASED ON ORIGINAL SECTION & EXISTING DEAD LOAD CONDITION.

SCALE
0 10 20 40

DONORA - WEBSTER BRIDGE
EXISTING STRUCTURE
STRESS ANALYSIS
184 FT. SPANS NO. 3, 4 & 5
DATE: 5/15/82 SHEET: A3 OF

184 FT. TRUSS SPAN NO. 3 (SIDEWALK TRUSS)

	TRUSS MEMBER	HS 20-44 LL STRESSES (K) D.L.	U.LL	C.LL	T.LL	IMP	T.L.	H 13 LL STRESSES (K) D.L.	T.LL	IMP	T.L.	AREAS (IN²) A_G	A_N	A_R	L/r	STRESSES (KSI) ALLOW F_A	HS 20-44 ORG.	REM.	H 13 LL ORG.	REM.
UPPER CHORD	L0U1	279	76	34	110	18	407	279	72	12	363	36.0			56.2	13.0	11.3		10.1	
	U7L8	277	"	"	"	"	405	277	"	"	361	"			"	"	11.2		10.0	
	U1U2	272	75	23	98	16	386	272	64	10	346	27.3			41.1	13.5	14.1		12.7	
	U6U7	271	"	"	"	"	385	271	"	"	345	"			"	"	14.1		12.6	
	U2U3	292	80	25	105	17	414	292	68	11	371	27.3			40.0	13.6	15.2		13.6	
	U5U6	291	"	"	"	"	413	291	"	"	370	"			"	"	15.1		13.6	
	U3U4	295	82	25	107	17	419	295	69	11	375	27.3			39.5	13.6	15.3		13.8	
	U4U5	295	"	"	"	"	419	295	"	"	375	"			"	"	15.3		13.8	
VERTICALS	U1L1	53		50	50	15	118	53	28	8	89		8.5	NO SIGNIFICANT AREA REDUCTION		16.0	13.8	NO CHANGES	10.4	NO CHANGES
	U7L7	50		"	"	"	115	50	"	"	86		"			"	13.5		10.1	
	U2L2	13	16	9	25	5	43	13	16	3	33	8.04			77.5	11.9	5.4		4.0	
	U6L6	14	"	"	"	"	44	14	"	"	"	"			"	"	5.5		4.1	
	U3L3	18	19	9	28	6	52	18	18	4	40	8.04			88.0	11.3	6.4		4.9	
	U5L5	17	"	"	29	"	51	17	"	"	39	"			"	"	6.3		4.8	
	U4L4	26	20	9	29	7	62	26	18	5	49	8.04			91.5	11.0	7.6		6.1	
DIAGONALS	U1L2	90	32	16	48	9	147	90	31	6	127		8.0			16.0	18.3		15.8	
	L6U7	91	"	"	"	"	148	91	"	"	128		"			"	18.5		16.0	
	U2L3	43	24	14	38	8	89	43	24	5	72		6.0			16.0	14.8		12.1	
	L5U6	44	"	"	"	"	90	44	"	"	73		"			"	14.9		12.3	
	U3L4	13	20	14	34	8	55	13	22	5	40		4.5			16.0	12.3		9.0	
	L4U5	"	"	"	"	"	"	"	"	"	"		"			"	"		"	
	L2U3	0.0		33	33	10	43	0.0	18	5.3	23.3		2.0			16.0	21.3		11.7	
	U5L6	"		"	"	"	"	"	"	"	"		"			"	"		"	
	L3U4	0.0		35	35	9	44	0.0	20.4	5.3	25.7		4.13			16.0	10.7		6.2	
	U4L5	"		"	"	"	"	"	"	"	"		"			"	"		"	
LOWER CHORD	L0L1	197	54	17	71	11	279	197	46	7	250		14.0			16.0	20.0		17.9	
	L7L8	195	"	"	"	"	277	195	"	"	248		"			"	19.8		17.8	
	L1L2	197	"	"	"	"	279	197	"	"	250		"			"	20.0		17.9	
	L6L7	195	"	"	"	"	277	195	"	"	248		"			"	19.8		17.8	
	L2L3	261	72	22	94	15	370	261	61	10	331		20.0			16.0	20.0		17.9	
	L5L6	260	"	"	"	"	"	"	"	"	"		"			"	"		"	
	L3L4	287	79	24	103	17	407	287	67	11	365		21.3			16.0	19.2		17.2	
	L4L5	287	"	"	"	"	407	287	"	"	365		"			"	19.2		17.2	

H 6±

H 10.8 ±

184 FT. TRUSS SPAN NO. 3 (NON-SIDEWALK TRUSS)

	TRUSS MEMBER	HS 20-44 LL STRESSES (K) D.L.	U.LL	C.LL	T.LL	IMP	T.L.	H 13 LL STRESSES (K) D.L.	T.LL	IMP	T.L.	AREAS (IN²) A_G	A_N	A_R	L/r	STRESSES (KSI) ALLOW F_A	HS 20-44 ORG.	REM.	H 13 LL ORG.	REM.
UPPER CHORD	L0U1	199	76	34	110	18	327	198	72	12	282	36.0			56.2	13.0	9.1		7.8	
	U7L8	196	"	"	"	"	324	196	"	"	280	"			"	"	9.0		7.8	
	U1U2	193	75	23	98	16	307	193	64	10	267	27.3			41.1	13.5	11.2		9.8	
	U6U7	192	"	"	"	"	306	192	"	"	266	"			"	"	11.2		9.7	
	U2U3	207	80	25	105	17	329	207	68	11	286	27.3			40.0	13.6	12.1		10.5	
	U5U6	207	"	"	"	"	"	"	"	"	285	"			"	"	12.0		10.5	
	U3U4	210	82	25	107	17	334	210	69	11	290	27.3			39.5	13.6	12.2		10.6	
	U4U5	210	"	"	"	"	"	"	"	"	290	"			"	"	12.2		10.6	
VERTICALS	U1L1	35		50	50	15	100	35	28	8	71		8.5	NO SIGNIFICANT AREA REDUCTION		16.0	11.8	NO CHANGES	8.3	NO CHANGES
	U7L7	34		"	"	"	99	34	"	"	70		"			"	11.6		8.2	
	U2L2	10	16	9	25	5	41	10	16	3	30	8.04			77.5	11.9	5.1		3.7	
	U6L6	11	"	"	"	"	42	"	"	"	31	"			"	"	5.2		3.8	
	U3L3	12	19	9	28	6	46	12	18	4	33	8.04			88.0	11.3	5.6		4.1	
	U5L5	11	"	"	29	"	45	"	"	"	22	"			"	"	5.5		4.0	
	U4L4	20	20	9	29	7	56	20	18	5	43	8.04			91.5	11.0	6.9		5.3	
DIAGONALS	U1L2	62	32	16	48	9	120	63	31	6	100		8.0			16.0	15.0		12.5	
	L6U7	64	"	"	"	"	121	65	"	"	102		"			"	15.2		12.5	
	U2L3	30	24	14	38	8	76	30	24	5	60		6.0			16.0	12.7		10.0	
	L5U6	31	"	"	"	"	77	31	"	"	61		"			"	12.8		10.2	
	U3L4	9	20	14	34	8	51	9	22	5	36		4.5			16.0	11.2		8.0	
	L4U5	10	"	"	"	"	52	10	"	"	37		"			"	11.4		8.2	
	L2U3	0.0		33	33	10	43	0.0	18	5.3	23.3		2.0			16.0	21.3		11.7	
	U5L6	"		"	"	"	"	"	"	"	"		"			"	"		"	
	L3U4	0.0		35	35	9	44	0.0	20.4	5.3	25.7		4.13			16.0	10.7		6.2	
	U4L5	"		"	"	"	"	"	"	"	"		"			"	"		"	
LOWER CHORD	L0L1	141	54	17	71	11	223	141	46	7	194		14.0			16.0	15.9		13.9	
	L7L8	139	"	"	"	"	221	139	"	"	192		"			"	15.7		13.7	
	L1L2	141	"	"	"	"	223	141	"	"	194		"			"	15.9		13.9	
	L6L7	139	"	"	"	"	221	139	"	"	192		"			"	15.7		13.7	
	L2L3	186	72	22	94	15	295	186	61	10	257		20.0			16.0	14.7		12.8	
	L5L6	185	"	"	"	"	294	185	"	"	256		"			"	"		"	
	L3L4	204	79	24	103	17	324	204	67	11	282		21.3			16.0	15.3		13.3	
	L4L5	204	"	"	"	"	324	204	"	"	282		"			"	"		"	

GENERAL NOTES:

D.L. = DEAD LOAD (KIPS)
U.L.L. = UNIFORM LIVE LOAD (KIPS)
C.L.L. = CONCENTRATED LIVE LOAD (KIPS)
T.L.L. = U.L.L. + C.L.L. = TOTAL LIVE LOAD (KIPS)
IMP = IMPACT LOAD (KIPS)
T.L. = D.L. + T.L.L. + IMP = TOTAL LOAD (KIPS)
A_G = GROSS AREA FOR ORIGINAL COMPOSITE MEMBER (IN^2)
A_N = NET AREA FOR ORIGINAL TENSION MEMBER (IN^2)
A_R = REMAINING AREA FOR DETERIORATED MEMBER (IN^2)
L/R = LENGTH/RADIUS OF GYRATION = SLENDERNESS RATIO (IN) (IN)
F_A = ALLOWABLE STRESS (KSI)

DONORA - WEBSTER BRIDGE
EXISTING STRUCTURE
STRESS ANALYSIS SUMMARY
184 FT. SPAN NO. 3
DATE: 5/15/82 SHEET: A4 OF

184 FT. TRUSS SPAN NO. 4 & 5 (SIDEWALK TRUSS)

	TRUSS MEMBER	HS 20-44 LL STRESSES (K)						H 13 LL STRESSES (K)				AREAS (IN²)			L/r	STRESSES (KSI) ALLOW	HS 20-44		H 13 LL	
		D. L.	U. LL	C. LL	T. LL	IMP	T. L.	D. L.	T. LL	IMP	T. L.	A_G	A_N	A_R		F_A	ORG.	REM.	ORG.	REM.
UPPER CHORD	L0U1	276	76	34	110	18	404	276	72	12	360	36.0			56.2	13.0	11.2		10.0	
	U7L8	"	"	"	"	"	"	"	"	"	"	"			"	"	"		"	
	U1U2	270	75	23	98	16	384	270	64	10	344	27.3			41.1	13.5	14.1		12.6	
	U6U7	"	"	"	"	"	"	"	"	"	"	"			"	"	"		"	
	U2U3	291	80	25	105	17	413	291	68	11	370	27.3			40.0	13.6	15.1		13.6	
	U5U6	"	"	"	"	"	"	"	"	"	"	"			"	"	"		"	
	U3U4	294	82	25	107	17	418	294	69	11	374	27.3			39.5	13.6	15.3		13.7	
	U4U5	"	"	"	"	"	"	"	"	"	"	"			"	"	"		"	
VERTICALS	U1L1	50		50	50	15	115	50	28	8	86		8.5			16.0	13.5		10.1	
	U7L7	"		"	"	"	"	"	"	"	"		"			"	"		"	
	U2L2	14	16	9	25	5	43	14	16	3	33	8.04			77.5	11.9	5.5		4.1	
	U6L6	"	"	"	"	"	"	"	"	"	"	"			"	"	"		"	
	U3L3	17	19	9	28	6	51	17	18	4	39	8.04			88.0	11.3	6.3		4.9	
	U5L5	"	"	"	29	"	"	"	"	"	"	"			"	"	"		"	
	U4L4	26	20	9	29	7	62	26	18	5	49	8.04			91.5	11.0	7.7		6.1	
DIAGONALS	U1L2	91	32	16	48	9	148	91	31	6	128		8.0			16.0	18.4		16.0	
	L6U7	"	"	"	"	"	"	"	"	"	"		"			"	"		"	
	U2L3	44	24	14	38	8	90	43	24	5	73		6.0			16.0	14.9		12.2	
	L5U6	"	"	"	"	"	"	"	"	"	"		"			"	"		"	
	U3L4	13	20	14	34	8	55	13	22	5	40		4.5			16.0	12.2		9.0	
	L4U5	"	"	"	"	"	"	"	"	"	"		"			"	"		"	
	L2U3	0.0		33	33	10	43	0.0	18	5.3	23.3		2.0			16.0	21.3		11.7	
	U5L6	"		"	"	"	"	"	"	"	"		"			"	"		"	
	L3U4	0.0		35	35	9	44	0.0	20.4	5.3	25.7		4.13			16.0	10.7		6.2	
	U4L5	"		"	"	"	"	"	"	"	"		"			"	"		"	
LOWER CHORD	L0L1	195	54	17	71	11	277	195	46	7	248		14.0			16.0	19.8		17.8	
	L7L8	"	"	"	"	"	"	"	"	"	"		"			"	"		"	
	L1L2	"	"	"	"	"	"	"	"	"	"		"			"	"		"	
	L6L7	"	"	"	"	"	"	"	"	"	"		"			"	"		"	
	L2L3	260	72	22	94	15	369	260	61	10	331		20.0			16.0	18.4		16.5	
	L5L6	"	"	"	"	"	"	"	"	"	"		"			"	"		"	
	L3L4	286	79	24	103	17	406	286	67	11	364		21.3			16.0	19.1		17.1	
	L4L5	"	"	"	"	"	"	"	"	"	"		"			"	"		"	

NO SIGNIFICANT AREA REDUCTION

NO CHANGES

NO CHANGES

184 FT. TRUSS SPAN NO. 4 & 5 (NON-SIDEWALK TRUSS)

	TRUSS MEMBER	HS 20-44 LL STRESSES (K)						H 13 LL STRESSES (K)				AREAS (IN²)			L/r	STRESSES (KSI) ALLOW	HS 20-44		H 13 LL	
		D. L.	U. LL	C. LL	T. LL	IMP	T. L.	D. L.	T. LL	IMP	T. L.	A_G	A_N	A_R		F_A	ORG.	REM.	ORG.	REM.
UPPER CHORD	L0U1	196	76	34	110	18	324	196	72	12	280	36.0			56.2	13.0	9.0		7.8	
	U7L8	"	"	"	"	"	"	"	"	"	"	"			"	"	"		"	
	U1U2	191	75	23	98	16	305	192	64	10	266	27.3			41.1	13.5	11.2		9.7	
	U6U7	"	"	"	"	"	"	"	"	"	"	"			"	"	"		"	
	U2U3	206	80	25	105	17	328	206	68	11	285	27.3			40.0	13.6	12.0		10.5	
	U5U6	"	"	"	"	"	"	"	"	"	"	"			"	"	"		"	
	U3U4	209	82	25	107	17	333	209	69	11	289	27.3			39.5	13.6	12.2		10.6	
	U4U5	"	"	"	"	"	"	"	"	"	"	"			"	"	"		"	
VERTICALS	U1L1	34		50	50	15	99	34	28	8	70		8.5			16.0	11.6		8.2	
	U7L7	"		"	"	"	"	"	"	"	"		"			"	"		"	
	U2L2	11	16	9	25	5	41	11	16	3	30	8.04			77.5	11.9	5.2		3.8	
	U6L6	"	"	"	"	"	"	"	"	"	"	"			"	"	"		"	
	U3L3	11	19	9	28	6	45	11	18	4	33	8.04			88.0	11.3	5.5		4.1	
	U5L5	"	"	"	29	"	"	"	"	"	"	"			"	"	"		"	
	U4L4	20	20	9	29	7	56	20	18	5	43	8.04			91.5	11.0	6.9		5.3	
DIAGONALS	U1L2	64	32	16	48	9	121	64	31	6	101		8.0			16.0	15.1		12.7	
	L6U7	"	"	"	"	"	"	"	"	"	"		"			"	"		"	
	U2L3	31	24	14	38	8	77	31	24	5	60		6.0			16.0	12.8		10.1	
	L5U6	"	"	"	"	"	"	"	"	"	"		"			"	"		"	
	U3L4	9	20	14	34	8	51	9	22	5	36		4.5			16.0	11.4		8.1	
	L4U5	"	"	"	"	"	"	"	"	"	"		"			"	"		"	
	L2U3	0.0		33	33	10	43	0.0	18	5.3	23.3		2.0			16.0	21.3		11.7	
	U5L6	"		"	"	"	"	"	"	"	"		"			"	"		"	
	L3U4	0.0		35	35	9	44	0.0	20.4	5.3	25.7		4.13			16.0	10.7		6.2	
	U4L5	"		"	"	"	"	"	"	"	"		"			"	"		"	
LOWER CHORD	L0L1	139	54	17	71	11	221	139	46	7	202		14.0			16.0	15.8		14.4	
	L7L8	"	"	"	"	"	"	"	"	"	"		"			"	"		"	
	L1L2	139	"	"	"	"	221	139	"	"	202		"			"	15.8		14.4	
	L6L7	"	"	"	"	"	"	"	"	"	"		"			"	"		"	
	L2L3	184	72	22	94	15	293	184	61	10	255		20.0			16.0	14.7		12.8	
	L5L6	"	"	"	"	"	"	"	"	"	"		"			"	"		"	
	L3L4	203	79	24	103	17	323	203	67	11	281		21.3			16.0	15.2		13.2	
	L4L5	"	"	"	"	"	"	"	"	"	"		"			"	"		"	

NO SIGNIFICANT AREA REDUCTION

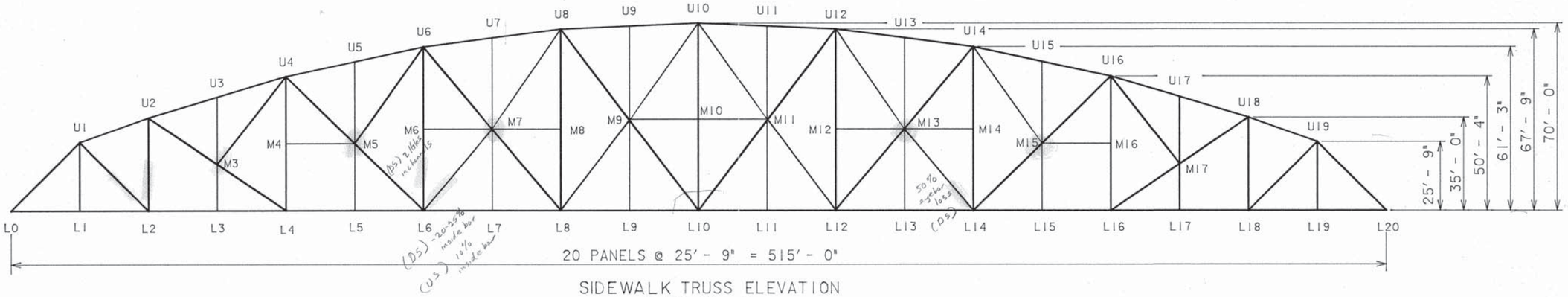
NO CHANGES

NO CHANGES

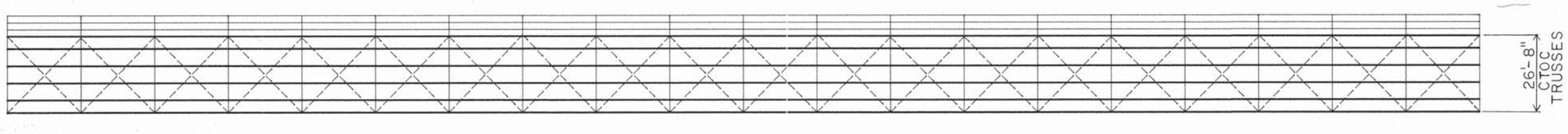
GENERAL NOTES:

D.L. = DEAD LOAD (KIPS)
U.L.L. = UNIFORM LIVE LOAD (KIPS)
C.L.L. = CONCENTRATED LIVE LOAD (KIPS)
T.L.L. = U.L.L. + C.L.L. = TOTAL LIVE LOAD (KIPS)
IMP == IMPACT LOAD (KIPS)
T.L. = D.L. + T.L.L. + IMP = TOTAL LOAD (KIPS)
A_G = GROSS AREA FOR ORIGINAL COMPOSITE MEMBER (IN^2)
A_N = NET AREA FOR ORIGINAL TENSION MEMBER (IN^2)
A_R = REMAINING AREA FOR DETERIORATED MEMBER (IN^2)
L/R = LENGTH/RADIUS OF GYRATION = SLENDERNESS RATIO (IN) (IN)
F_A = ALLOWABLE STRESS (KSI)

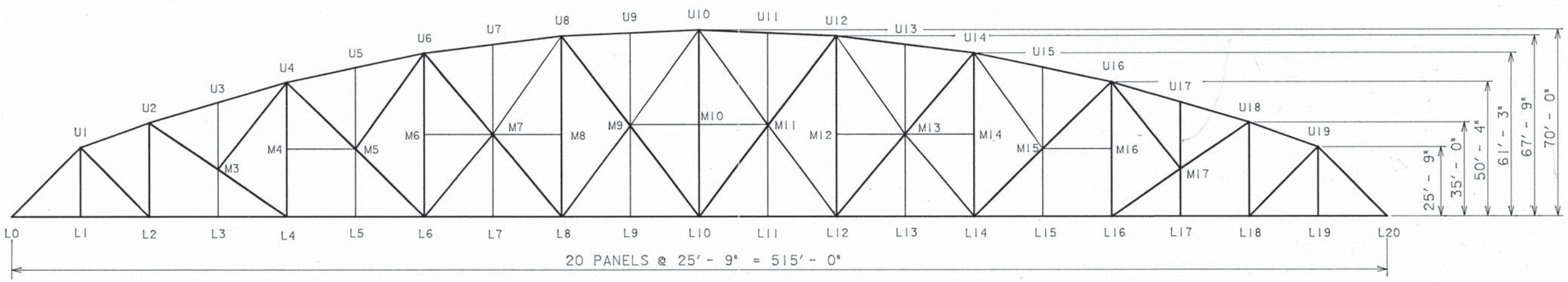
DONORA - WEBSTER BRIDGE
EXISTING STRUCTURE
STRESS ANALYSIS SUMMARY
184 FT. SPANS NO. 4 & 5
DATE: 5/15/82 SHEET: A5 OF



SIDEWALK TRUSS ELEVATION
SPAN NO. 6



FLOOR PLAN
SPAN NO. 6



NON-SIDEWALK TRUSS ELEVATION
SPAN NO. 6

SCALE
0 10 20 40

DONORA - WEBSTER BRIDGE
EXISTING STRUCTURE
STRESS ANALYSIS
515 FT. SPAN NO. 6

DATE: 5/15/82 SHEET: A6 OF

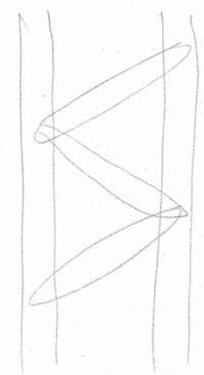
D-9002 (3-77)

515' TRUSS SPAN NO. 6	
TRUSS MEMBER	DESCRIPTION
L0U1 & U19L20	1 COVER PLATE 32 X 9/16, 2 ANGLES 4 X 4 X 1/2 (TOP FLANGE) 2 WEB PLATES 26 X 3/4 & 2 ANGLES 4 X 4 X 3/8 (BOTTOM FLANGE)
U1U2 & U18U19	1 COVER PLATE 32 X 9/16, 2 ANGLES 4 X 4 X 1/2 (TOP FLANGE) 2 WEB PLATES 26 X 1/2 & 2 ANGLES 4 X 4 X 5/8 (BOTTOM FLANGE)
U2U3, U17U18, U3U4, U16U17	1 COVER PLATE 32 X 9/16, 2 ANGLES 4 X 4 X 1/2 (TOP FLANGE), 2 WEB PLATES 18 X 1/2 2 WEB PLATES 26 X 9/16 & 2 ANGLES 6 X 4 X 3/4 (BOTTOM FLANGE)
U4U5, U15U16, U5U6, U14U15	1 COVER PLATE 32 X 9/16, 2 ANGLES 4 X 4 X 1/2 (TOP FLANGE),2 WEB PLATES 18 X 1/2 2 WEB PLATES 26 X 11/16 & 2 ANGLES 6 X 4 X 5/8 (BOTTOM FLANGE)
U6U7, U13U14, U7U8, U12U13	1 COVER PLATE 32 X 9/16, 2 ANGLES 4 X 4 X 1/2 (TOP FLANGE), 2 WEB PLATES 18 X 1/2 2 WEB PLATES X /16 & 2 ANGLES 6 X 4 X 1/2 X 11/16 (BOTTOM FLANGE)
U8U9, U11U12, U9U10, U10U11	1 COVER PLATE 32 X 9/16, 2 ANGLES 4 X 4 X 1/2 (TOP FLANGE), 2 WEB PLATES 18 X 1/2 2 WEB PLATES 26 X 11/16 & 2 ANGLES 6 X 4 X 11/16 (BOTTOM FLANGE)
L0L1, L19L20, L1L2, L18L19	4 I-BARS 7" X 1-3/8"
L2L3, L17L18, L3L4, L16L17	4 I-BARS 7" X 1-3/8" & 2 I-BARS 7" X 1-1/4"
L4L5, L15L16, L5L6, L14L15	4 I-BARS 7" X 1-5/8" & 2 I-BARS 7" X 1-1/2"
L6L7, L13L14, L7L8, L12L13	4 I-BARS 7" X 1-3/4" & 2 I-BARS 7" X 1-5/8"
L8L9, L11L12, L9L10, L10L11	6 I-BARS 7" X 1-3/4"
U1L1, U19L19, M3L3, M17L17, M5L5, M15L15, M7L7, M13L13, M9L9, M11L11	4 ANGLES 5" X 3" X 5/16" WITH TIE PLATES
U2L2, U18L18, U4L4, U16L16, U6L6, U14L14, U8L8, U12L12, U10L10	2 CHANNELS (C12 X 35 LBS.) WITH LACING
U1L2 & L18U19	2 I-BARS 7" X 1-5/8"
U2M3 & M17U18	2 I-BARS 6" X 1-5/8"
M3L4 & L16M17	2 I-BARS 6" X 1-1/2"
M3U4 & U16M17	2 I-BARS 1-3/8" X 1-3/8" & 1 LOOP BAR 1" X 1" WITH TURNBUCKLES
U4M5 & M15U16	2 I-BARS 4" X 1-5/8"
M5L6 & L14M15	2 I-BARS 4" X 1-3/8"
M5U6 & U14M15	2 I-BARS 1-1/4" X 1-1/4" & 1 LOOP BAR 1" X 1" WITH TURNBUCKLES
U6M7 & M13U14	2 I-BARS 4" X 1-3/8"
M7L8 & L12M13	2 I-BARS 4" X 1-1/8"
L6M7, M3L14, M7U8, U12M13	2 I-BARS 4" X 3/4"
U8M9 & M11U12	2 I-BARS 4" X 1-1/8"
M9L10 & L19M11	2 I-BARS 4" X 7/8"
L8M9, M11L12, M9U10, U10M11	1 I-BARS 5" X 1"

NOTE: T.F. = TOP FLANGE
B.F. = BOTTOM FLANGE

515' SPAN NO. 6		STRINGER (INT)				FLOORBEAM (TYP.)			
TYPE OF STRESS	ALLOWABLE STRESS (KSI)	ACTUAL STRESS (KSI)				ACTUAL STRESS (KSI)			
		BEAM		CONN.		BEAM		CONN.	
		HS20	H13	HS20	H13	HS20	H13	HS20	H13
BENDING MOMENT	16.0	*17.1	10.9	----	----	*16.8	12.8	----	----
SHEAR	9.5	5.4	2.9	9.2	5.0	7.7	6.0	9.8	7.6
BEARING	24.0	----	----	*28.7	15.6	----	----	11.6	8.9

*NOTE: "OVERSTRESSED" FOR HS20 LIVE LOAD.
NOTE: ALL CALCULATED VALUES (ACTUAL STRESSES) IN THE ABOVE STRESS TABLE BASED ON ORIGINAL SECTION & EXISTING DEAD LOAD CONDITION.



515' SPAN NO. 6		STRINGER (EXTERIOR) (WITHOUT DETERIORATION)				STRINGER (EXTERIOR) (WITH DETERIORATION)			
TYPE OF STRESS	ALLOWABLE STRESS (KSI)	ACTUAL STRESS (KSI)				ACTUAL STRESS (KSI)			
		BEAM		CONN.		BEAM		CONN.	
		HS20	H13	HS20	H13	HS20	H13	HS20	H13
BENDING MOMENT	16.0	15.2	11.3	----	----	*>>16	*>>16	----	----
SHEAR	9.5	4.9	3.0	8.34	5.16	4.9	3.0	8.34	5.2
BEARING	24.0	----	----	*26.23	16.22	----	----	*26.2	16.2

*NOTE: "OVERSTRESSED" FOR HS20 LIVE LOAD
NOTE: THE CALCULATED VALUES (ACTUAL STRESSES) IN THE ABOVE STRESS TABLE ARE BASED ON ORIGINAL SECTION (LEFT) AND DETERIORATED SECTION (RIGHT).
NOTE: "OVERSTRESSED" FOR HS20 LIVE LOAD & H13 LIVE LOAD.

STEEL SUPERSTRUCTURE OF EXISTING FLOOR SYSTEM		
MEMBER TYPE	SPANS	DESCRIPTION OF ELEMENTS
STRINGER	NO. 3-7	COVER PLATE 9" X 1/4" WEB PLATE 24" X 5/16" 4 ANGLES 5" X 3-1/2" X 5/16"
FLOORBEAM	NO. 3-8	2 COVER PLATES 14" X 3/8" X 20'-0" WEB PLATE 36" X 5/16" 4 ANGLES 6" X 3-1/2" X 3/8"

DONORA - WEBSTER BRIDGE
EXISTING STRUCTURE
STRESS ANALYSIS
515 FT. SPAN NO. 6

DATE: 5/15/82 SHEET: A7 OF

BARCLAY BROS., INC.

515 FT TRUSS SPAN NO. 6 (SIDEWALK TRUSS)

	TRUSS MEMBER	HS 20-44 LL STRESSES (K)						H 13 LL STRESSES (K)				AREAS (IN²)			L/r	STRESSES (KSI) ALLOW	HS 20-44		H 13 LL	
		D.L.	U.LL	C.LL	T.LL	IMP	T.L.	D.L.	T.LL	IMP	T.L.	A_G	A_N	A_R		F_A	ORG.	REM.	ORG.	REM.
UPPER CHORD	L0U1	741	221	37	258	20	1019	741	168	13	922	73.7			44.6	13.4	13.8		12.5	
	U19L20	"	"	"	"	"	"	"	"	"	"	"			"	"				
	U1U2	777	232	27	259	20	1056	777	168	13	958	60.7			32.4	13.8	17.4		15.8	
	U18U19	"	"	"	"	"	"	"	"	"	"	"			"	"	"		"	
	U2U3	972	282	32	314	24	1310	972	204	16	1192	86.7			33.4	13.7	15.1		13.7	
	U17U18	"	"	"	"	"	"	"	"	"	"	"			"	"	"		"	
	U3U4	"	"	"	"	"	"	"	"	"	"	"			"	"	"		"	
	U16U17	"	"	"	"	"	"	"	"	"	"	"			"	"	"		"	
	U4U5	1025	297	34	331	26	1382	1025	215	17	1256	91			33.8	13.7	15.2		13.8	
	U15U16	"	"	"	"	"	"	"	"	"	"	"			"	"	"		"	
	U5U6	"	"	"	"	"	"	"	"	"	"	"			"	"	"		"	
	U14U15	"	"	"	"	"	"	"	"	"	"	"			"	"	"		"	
	U6U7	1044	303	35	308	26	1408	1044	219	17	1280	92			32.9	13.8	15.3		13.9	
	U13U14	"	"	"	"	"	"	"	"	"	"	"			"	"	"		"	
	U7U8	"	"	"	"	"	"	"	"	"	"	"			"	"	"		"	
	U12U13	"	"	"	"	"	"	"	"	"	"	"			"	"	"		"	
	U8U9	1045	303	35	338	26	1409	1045	220	17	1282	92			32.8	13.8	15.3		13.9	
	U11U12	"	"	"	"	"	"	"	"	"	"	"			"	"	"		"	
	U9U10	"	"	"	"	"	"	"	"	"	"	"			"	"	"		"	
	U10U11	"	"	"	"	"	"	"	"	"	"	"			"	"	"		"	
LOWER CHORD	L0L1	524	157	18	175	14	713	524	114	9	647	38.5	38.5			16.0	18.5		16.8	
	L19L20	"	"	"	"	"	"	"	"	"	"	"	"			"	"		"	
	L1L2	"	"	"	"	"	"	"	"	"	"	"	"			"	"		"	
	L18L19	"	"	"	"	"	"	"	"	"	"	"	"			"	"		"	
	L2L3	732	218	25	243	19	994	732	158	12	902	56	56			16.0	17.8		16.1	
	L17L18	"	"	"	"	"	"	"	"	"	"	"	"			"	"		"	
	L3L4	"	"	"	"	"	"	"	"	"	"	"	"			"	"		"	
	L16L17	"	"	"	"	"	"	"	"	"	"	"	"			"	"		"	
	L4L5	908	270	31	301	23	1232	908	196	15	1119	66.5	66.5			16.0	18.5		16.8	
	L15L16	"	"	"	"	"	"	"	"	"	"	"	"			"	"		"	
	L5L6	"	"	"	"	"	"	"	"	"	"	"	"			"	"		"	
	L14L15	"	"	"	"	"	"	"	"	"	"	"	"			"	"		"	
	L6L7	983	291	33	324	25	1332	983	211	16	1210	71.8	71.8			16.0	18.6		16.9	
	L13L14	"	"	"	"	"	"	"	"	"	"	"	"			"	"		"	
	L7L8	"	"	"	"	"	"	"	"	"	"	"	"			"	"		"	
	L12L13	"	"	"	"	"	"	"	"	"	"	"	"			"	"		"	
	L8L9	1017	301	34	335	26	1378	1017	218	17	1252	73.5	73.5			16.0	18.8		17.0	
	L11L12	"	"	"	"	"	"	"	"	"	"	"	"			"	"		"	
	L9L10	"	"	"	"	"	"	"	"	"	"	"	"			"	"		"	
	L10L11	"	"	"	"	"	"	"	"	"	"	"	"			"	"		"	
VERTICALS	U1L1	40		53	53	15	108	40	28	8	76	9.6	8.5			16.0	12.7		9.0	
	U19L19	"		"	"	"	"	"	"	"	"	"	"			"	"		"	
	U2L2	164	60	11	71	6	241	164	46	4	214	20.5			73	12.2	11.7		10.4	
	U18L18	"	"	"	"	"	"	"	"	"	"	"			"	"	"		"	
	M3L3	46		53	53	15	114	46	28	8	82	9.6	8.5			16.0	13.4		9.7	
	M17L17	"		"	"	"	"	"	"	"	"	"	"			"	"		"	
	U4L4	73	38	8	46	5	124	73	30	3	106	14.6			56.2	13.1	8.46		7.23	
	U16L16	"	"	"	"	"	"	"	"	"	"	"			"	"	"		"	
	M5L5	46		53	53	15	114	46	29	8	83	9.6	8.5			16.0	13.4		9.7	
	M15L15	"		"	"	"	"	"	"	"	"	"	"			"	"		"	

NO SIGNIFICANT AREA REDUCTION

NO CHANGES

NO CHANGES

515 FT TRUSS SPAN NO. 6 (SIDEWALK TRUSS)

	TRUSS MEMBER	HS 20-44 LL STRESSES (K)						H 13 LL STRESSES (K)				AREAS (IN²)			L/r	STRESSES (KSI) ALLOW	HS 20-44		H 13 LL	
		D.L.	U.LL	C.LL	T.LL	IMP	T.L.	D.L.	T.LL	IMP	T.L.	A_G	A_N	A_R		F_A	ORG.	REM.	ORG.	REM.
VERTICALS	U6L6	28	39	8	47	5	80	28	31	3	62	12.1			63.8	12.6	6.7		5.1	
	U14L14	"	"	"	"	"	"	"	"	"	"	"			"	"	"		"	
	M7L7	47		53	53	15	115	47	29	8	84	9.6	8.5			16.0	13.5		9.9	
	M13L13	"		"	"	"	"	"	"	"	"	"	"			"	"		"	
	U8L8	71	60	11	71	9	151	71	46	6	123	12.1			70.3	12.3	12.5		10.2	
	U12L12	"	"	"	"	"	"	"	"	"	"	"			"	"	"		"	
	M9L9	48		53	53	15	116	48	29	8	85	9.6	8.5			16.0	13.6		10.0	
	M11L11	"		"	"	"	"	"	"	"	"	"	"			"	"		"	
	U10L10	44	62	10	72	10	126	44	47	7	98	12.1			75.3	12.0	10.5		8.1	
DIAGONALS	U1L2	293	94	16	110	10	413	293	72	6	371		22.8			16.0	18.2		16.3	
	L18U19	"	"	"	"	"	"	"	"	"	"		"			"	"		"	
	U2M3	246	88	16	104	9	359	246	68	6	320		19.5			16.0	18.4		16.4	
	M17U18	"	"	"	"	"	"	"	"	"	"		"			"	"		"	
	M3L4	213	78	15	93	9	315	213	61	6	280		18			16.0	17.5		15.5	
	L16M17	"	"	"	"	"	"	"	"	"	"		"			"	"		"	
	M3U4	44		44	44	12	100	44	24	6	74		5.73			16.0	17.4		12.9	
	U16M17	"		"	"	"	"	"	"	"	"		"			"	"		"	
	U4M5	136	66	14	80	8	224	136	52	5	193		13.0			16.0	17.2		14.8	
	M15U16	"	"	"	"	"	"	"	"	"	"		"			"	"		"	
	M5L6	104	58	13	71	7	182	104	46	5	155		11.0			16.0	16.5		14.1	
	L14M15	"	"	"	"	"	"	"	"	"	"		"			"	"		"	
	M5U6	39		38	38	11	88	39	21	6	66		5.12			16.0	17.2		12.8	
	U14M15	"		"	"	"	"	"	"	"	"		"			"	"		"	
	U6M7	86	60	14	74	8	168	86	49	5	140		11.0			16.0	15.3		12.7	
	M13U14	"	"	"	"	"	"	"	"	"	"		"			"	"		"	
	M7L8	54	52	13	65	7	126	54	42	5	101		9.0			16.0	14.0		11.2	
	L12M13	"	"	"	"	"	"	"	"	"	"		"			"	"		"	
	L6M7		37	17	54	9	63		35	6	41		6.0			16.0	10.5		6.8	
	M13L14		"	"	"	"	"		"	"	"		"			"	"		"	
	M7U8	36	49	20	69	11	116	36	45	7	88		6.0			16.0	19.3		14.7	
	U12M12	"	"	"	"	"	"	"	"	"	"		"			"	"		"	
	U8M9	47	57	16	73	9	129	47	48	6	101		9.0			16.0	14.4		11.2	
	M11U12	"	"	"	"	"	"	"	"	"	"		"			"	"		"	
	M9L1	11	48	14	62	8	81	11	40	5	57		7.0			16.0	11.6		8.1	
	L10M11	"	"	"	"	"	"	"	"	"	"		"			"	"		"	
	L8M9	0.	44	16	60	9	69	0.	39	6	45		10.			16.0	6.9		4.5	
	M11L12	"	"	"	"	"	"	"	"	"	"		"			"	"		"	
	M9U10	42	55	18	73	10	125	42	47	7	96		10.0			16.0	12.5		9.6	
	U10M11	"	"	"	"	"	"	"	"	"	"		"			"	"		"	

NO SIGNIFICANT AREA REDUCTION

NO CHANGES

NO CHANGES

GENERAL NOTES:

D.L. = DEAD LOAD (KIPS)

U.L.L. = UNIFORM LIVE LOAD (KIPS)

C.L.L. = CONCENTRATED LIVE LOAD (KIPS)

T.L.L. = U.L.L. + C.L.L. = TOTAL LIVE LOAD (KIPS)

IMP == IMPACT LOAD (KIPS)

T.L. = D.L. + T.L.L. + IMP = TOTAL LOAD (KIPS)

A_G = GROSS AREA FOR ORIGINAL COMPOSITE MEMBER (IN^2)

A_N = NET AREA FOR ORIGINAL TENSION MEMBER (IN^2)

A_R = REMAINING AREA FOR DETERIORATED MEMBER (IN^2)

L/R = LENGTH/RADIUS OF GYRATION = SLENDERNESS RATIO
(IN) (IN)

F_A = ALLOWABLE STRESS (KSI)

DONORA - WEBSTER BRIDGE
EXISTING STRUCTURE
STRESS ANALYSIS SUMMARY
515 FT. SPAN NO. 6

DATE: 5/15/82 SHEET: A8 OF

515 FT TRUSS SPAN NO. 6 (NON-SIDEWALK TRUSS)

	TRUSS MEMBER	HS 20-44 LL STRESSES (K)						H 13 LL STRESSES (K)				AREAS (IN²)			L/r	STRESSES (KSI) ALLOW	HS 20-44		H 13 LL	
		D.L.	U.LL	C.LL	T.LL	IMP	T.L.	D.L.	T.LL	IMP	T.L.	A_G	A_N	A_R		F_A	ORG.	REM.	ORG.	REM.
UPPER CHORD	L0U1	506	221	37	258	20	784	506	168	13	687	73.7			44.6	13.4	10.6		9.3	
	U19L20	"	"	"	"	"	"	"	"	"	"	"			"	"	"		"	
	U1U2	531	232	27	258	20	809	531	168	13	712	60.7			32.4	13.8	13.3		11.7	
	U18U19	"	"	"	"	"	"	"	"	"	"	"			"	"	"		"	
	U2U3	672	282	32	314	24	1010	672	204	16	892	86.7			33.4	13.7	11.7		10.3	
	U17U18	"	"	"	"	"	"	"	"	"	"	"			"	"	"		"	
	U3U4	"	"	"	"	"	"	"	"	"	"	"			"	"	"		"	
	U16U17	"	"	"	"	"	"	"	"	"	"	"			"	"	"		"	
	U4U5	708	297	34	332	26	1066	708	216	17	941	91			33.8	13.7	11.7		10.3	
	U15U16	"	"	"	"	"	"	"	"	"	"	"			"	"	"		"	
	U5U6	"	"	"	"	"	"	"	"	"	"	"			"	"	"		"	
	U14U15	"	"	"	"	"	"	"	"	"	"	"			"	"	"		"	
	U6U7	721	303	35	338	26	1085	721	220	17	958	92			32.9	13.8	11.8		10.4	
	U13U14	"	"	"	"	"	"	"	"	"	"	"			"	"	"		"	
	U7U8	"	"	"	"	"	"	"	"	"	"	"			"	"	"		"	
	U12U13	"	"	"	"	"	"	"	"	"	"	"			"	"	"		"	
	U8U9	722	303	35	338	27	1087	722	220	17	959	92			32.8	13.8	11.8		10.4	
	U11U12	"	"	"	"	"	"	"	"	"	"	"			"	"	"		"	
	U9U10	"	"	"	"	"	"	"	"	"	"	"			"	"	"		"	
	U10U11	"	"	"	"	"	"	"	"	"	"	"			"	"	"		"	
LOWER CHORD	L0L1	358	156	18	174	14	546	358	113	9	480	38.5	38.5			16.0	14.2		12.5	
	L19L20	"	"	"	"	"	"	"	"	"	"	"	"			"	"		"	
	L1L2	"	"	"	"	"	"	"	"	"	"	"	"			"	"		"	
	L18L19	"	"	"	"	"	"	"	"	"	"	"	"			"	"		"	
	L2L3	500	218	25	243	19	762	500	158	12	670	56	56			16.0	13.6		12.0	
	L17L18	"	"	"	"	"	"	"	"	"	"	"	"			"	"		"	
	L3L4	"	"	"	"	"	"	"	"	"	"	"	"			"	"		"	
	L16L17	"	"	"	"	"	"	"	"	"	"	"	"			"	"		"	
	L4L5	621	270	31	301	26	1023	673	211	16	900	71.8	71.8			16.0	14.3		12.6	
	L15L16	"	"	"	"	"	"	"	"	"	"	"	"			"	"		"	
	L5L6	"	"	"	"	"	"	"	"	"	"	"	"			"	"		"	
	L14L15	"	"	"	"	"	"	"	"	"	"	"	"			"	"		"	
	L6L7	673	291	33	324	26	1023	673	211	16	900	71.8	71.8			16.0	14.3		12.6	
	L13L14	"	"	"	"	"	"	"	"	"	"	"	"			"	"		"	
	L7L8	"	"	"	"	"	"	"	"	"	"	"	"			"	"		"	
	L12L13	"	"	"	"	"	"	"	"	"	"	"	"			"	"		"	
	L8L9	698	301	34	335	26	1059	698	218	17	933	73.5	73.5			16.0	14.4		12.7	
	L11L12	"	"	"	"	"	"	"	"	"	"	"	"			"	"		"	
	L9L10	"	"	"	"	"	"	"	"	"	"	"	"			"	"		"	
	L10L11	"	"	"	"	"	"	"	"	"	"	"	"			"	"		"	
VERTICALS	U1L1	22		53	53	15	80	22	29	8	59	9.6	8.5			16.0	9.4		6.9	
	U19L19	"		"	"	"	"	"	"	"	"	"	"			"	"		"	
	U2L2	116	59	11	70	6	192	116	46	4	166	20.5			73	12.2	9.4		8.1	
	U18L18	"	"	"	"	"	"	"	"	"	"	"			"	"	"		"	
	M3L3	28		53	53	15	96	28	29	8	65	9.6	8.5			16.0	11.3		7.6	
	M17L17	"		"	"	"	"	"	"	"	"	"	"			"	"		"	
	U4L4	56	39	8	47	5	108	56	31	3	90	14.6			52.6	13.1	7.4		6.1	
	U16L16	"	"	"	"	"	"	"	"	"	"	"			"	"	"		"	
	M5L5	28		53	53	15	96	28	29	8	65	9.6	8.5			16.0	11.3		7.6	
	M15L15	"		"	"	"	"	"	"	"	"	"	"			"	"		"	

AREA REDUCTION — NO SIGNIFICANT

NO CHANGES

515 FT TRUSS SPAN NO. 6 (NON-SIDEWALK TRUSS)

	TRUSS MEMBER	HS 20-44 LL STRESSES (K)						H 13 LL STRESSES (K)				AREAS (IN²)			L/r	STRESSES (KSI) ALLOW	HS 20-44		H 13 LL	
		D.L.	U.LL	C.LL	T.LL	IMP	T.L.	D.L.	T.LL	IMP	T.L.	A_G	A_N	A_R		F_A	ORG.	REM.	ORG.	REM.
VERTICALS	U6L6	24	39	8	47	5	76	24	31	3	58	12.1			63.8	12.6	6.3		4.8	
	U14L14	"	"	"	"	"	"	"	"	"	"	"			"	"	"		"	
	M7L7	30		53	53	15	98	30	29	8	67	9.6	8.5			16.0	11.5		7.8	
	M13L13	"		"	"	"	"	"	"	"	"	"	"			"	"		"	
	U8L8	49	60	11	71	9	129	49	46	6	101	12.1			70.3	12.3	10.7		8.4	
	U12L12	"	"	"	"	"	"	"	"	"	"	"			"	"	"		"	
	M9L9	31		53	53	15	99	31	29	8	68	9.6	8.5			16.0	11.6		8.0	
	M11L11	"		"	"	"	"	"	"	"	"	"	"			"	"		"	
	U10L10	31	62	10	72	10	113	31	47	7	85	12.1			75.3	12.1	9.4		7.0	
DIAGONALS	U1L2	200	94	16	110	10	320	200	72	6	278		22.8			16.0	14.1		12.2	
	L18U19	"	"	"	"	"	"	"	"	"	"		"			"	"		"	
	U2M3	169	88	16	104	9	282	169	67	6	242		19.5			16.0	14.5		12.4	
	M17U18	"	"	"	"	"	"	"	"	"	"		"			"	"		"	
	M3L4	147	78	15	93	9	249	147	60	6	213		18.0			16.0	13.8		11.8	
	L16M17	"	"	"	"	"	"	"	"	"	"		"			"	"		"	
	M3U4	29	14	23	37	10	76	29	24	7	60		5.73			16.0	13.2		10.4	
	U16M17	"	"	"	"	"	"	"	"	"	"		"			"	"		"	
	U4M5	94	66	14	80	8	182	94	52	5	151		13.0			16.0	14.0		11.6	
	M15U16	"	"	"	"	"	"	"	"	"	"		"			"	"		"	
	M5L6	73	58	13	71	7	151	73	46	5	124		11.0			16.0	13.7		11.2	
	L14M15	"	"	"	"	"	"	"	"	"	"		"			"	"		"	
	M5U6	26	12	20	32	9	67	26	21	6	53		5.12			16.0	13.1		10.3	
	U14M15	"	"	"	"	"	"	"	"	"	"		"			"	"		"	
	U6M7	60	61	14	75	8	143	60	49	5	114		11.0			16.0	13.0		10.3	
	M13U14	"	"	"	"	"	"	"	"	"	"		"			"	"		"	
	M7L8	38	52	13	65	7	110	38	42	5	85		9.0			16.0	12.3		9.4	
	L12M13	"	"	"	"	"	"	"	"	"	"		"			"	"		"	
	L6M7	0.0	37	17	54	10	64	0.0	35	6	41		6.0			16.0	10.5		6.8	
	M13L14	"	"	"	"	"	"	"	"	"	"		"			"	"		"	
	M7U8	24	49	20	69	11	104	24	45	7	76		6.0			16.0	17.4		12.7	
	U12M13	"	"	"	"	"	"	"	"	"	"		"			"	"		"	
	U8M9	32	57	16	73	9	114	32	48	6	86		9.0			16.0	12.7		9.5	
	M11U12	"	"	"	"	"	"	"	"	"	"		"			"	"		"	
	M9L1	7	48	14	62	8	77	11	40	5	56		7.0			16.0	11.0		8.0	
	L10M11	"	"	"	"	"	"	"	"	"	"		"			"	"		"	
	L8M9	0.0	44	16	60	9	69	0.0	39	6	45		10.0			16.0	6.9		4.5	
	M11L12	"	"	"	"	"	"	"	"	"	"		"			"	"		"	
	M9U10	29	55	18	73	10	112	29	47	7	83		10.0			16.0	11.2		8.3	
	U10M11	"	"	"	"	"	"	"	"	"	"		"			"	"		"	

AREA REDUCTION — NO SIGNIFICANT

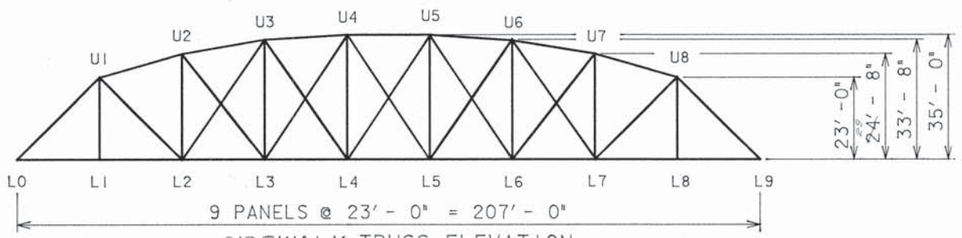
NO CHANGES

GENERAL NOTES:

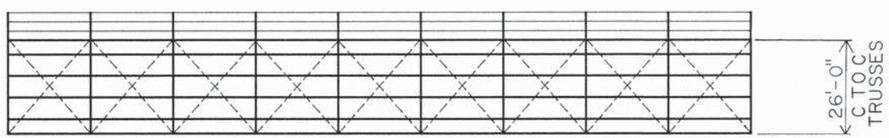
D.L. = DEAD LOAD (KIPS)
U.L.L. = UNIFORM LIVE LOAD (KIPS)
C.L.L. = CONCENTRATED LIVE LOAD (KIPS)
T.L.L. = U.L.L. + C.L.L. = TOTAL LIVE LOAD (KIPS)
IMP == IMPACT LOAD (KIPS)
T.L. = D.L. + T.L.L. + IMP = TOTAL LOAD (KIPS)
A_G = GROSS AREA FOR ORIGINAL COMPOSITE MEMBER (IN²)
A_N = NET AREA FOR ORIGINAL TENSION MEMBER (IN²)
A_R = REMAINING AREA FOR DETERIORATED MEMBER (IN²)
L/R = LENGTH/RADIUS OF GYRATION = SLENDERNESS RATIO (IN) (IN)
F_A = ALLOWABLE STRESS (KSI)

DONORA - WEBSTER BRIDGE
EXISTING STRUCTURE
STRESS ANALYSIS SUMMARY
515 FT. SPAN NO. 6

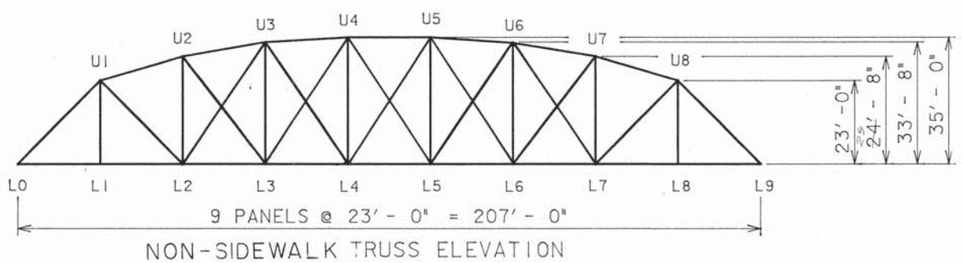
DATE: 5/15/82 SHEET: A9 OF



SIDEWALK TRUSS ELEVATION
SPAN NO. 7



FLOOR PLAN
SPAN NO. 7



NON-SIDEWALK TRUSS ELEVATION
SPAN NO. 7

207' SPAN NO. 7		
	TRUSS MEMBERS	DESCRIPTION OF ELEMENTS
UPPER CHORD	L0U1 & U8L9	1 COVER PL 24 X 3/8 & 2 ∠s 3 X 3 X 5/16, T.F. 2 WEB PLs 18 X 9/16, 2 ∠s 3 X 3 X 9/16, B.F.
	U1U2 & U7U8	" 1 COVER PL 24 X 3/8 & 2 ∠s 3 X 3 X 5/16, T.F. 2 WEB PLs 18 X 3/8, 2 ∠s 3 X 3 X 7/16, B.F.
	U2U3 & U6U7	" 1 COVER PL 24 X 3/8 & 2 ∠s 3 X 3 X 5/16, T.F. 2 WEB PLs 10 X 7/16, 2 ∠s 3 X 3 X 7/16, B.F
	U3U4, U4U5 & U5U6	" 1 COVER PL 24 X 3/8 & 2 ∠s 3 X 3 X 5/16, T.F. 2 WEB PLs 18 X 1/2, 2 ∠s 3 X 3 X 7/16, B.F.
VERTICALS	U2L2, U3L3, U4L4, U5L5, U6L6, U7L7	4 ANGLES (∠s) 5 X 3 X 5/16 W/TIE PLs
	U1L1 & U8L8	2 CHANNELS (C8 X 13-3/4#) LACED
DIAGONALS	U1L2 & L7U8	2 I-BARS 5" X 1"
	U2L3 & L6U7	2 I-BARS 4" X 7/8"
	L2U3 & U6L7	2 I-BARS 1" X 1" (COUNTERS)
	U3L4 & L5U6	2 I-BARS 4" X 3/4"
	L3U4, U5L6, U4L5 & L4U5	2 I-BARS 1" X 1" (COUNTERS)
LOWER CHORD	L0L1, L1L2, L7L8 & L7L8	4 I-BARS 5" X 7/8"
	L2L3 & L6L7	4 I-BARS 5" X 1-1/8"
	L3L4 & L5L6	4 I-BARS 6" X 1-1/16"
	L4L5	4 I-BARS 6" X 1-1/8"

207' SPAN NO. 7		STRINGER (L0-L8)				FLOORBEAM (L1-L7)			
TYPE OF STRESS	ALLOWABLE STRESS (KSI)	ACTUAL STRESS (KSI)				ACTUAL STRESS (KSI)			
		BEAM		CONN.		BEAM		CONN.	
		HS20	H13	HS20	H13	HS20	H13	HS20	H13
BENDING MOMENT	16.0	14.7	10.9	----	----	*17.7	11.2	----	----
SHEAR	9.5	5.3	3.2	8.9	5.5	8.7	5.7	11.1	7.2
BEARING	24.0	----	----	*28.1	17.1	----	----	13.0	8.5

*NOTE: "OVERSTRESSED" FOR HS20 LIVE LOAD.

NOTE: ALL CALCULATED VALUES (ACTUAL STRESSES) IN THE ABOVE STRESS TABLE BASED ON ORIGINAL SECTION & EXISTING DEAD LOAD CONDITION.

STEEL SUPERSTRUCTURE OF EXISTING FLOOR SYSTEM		
MEMBER TYPE	SPANS	DESCRIPTION OF ELEMENTS
STRINGER	NO. 1, 2 & 8-14	WEB PLATE 24" X 5/16" 4 ANGLES 5" X 3-1/2" X 5/16"
STRINGER	NO. 3-7	COVER PLATE 9" X 1/4" WEB PLATE 24" X 5/16" 4 ANGLES 5" X 3-1/2" X 5/16"
FLOORBEAM	NO. 3-8	2 COVER PLATES 14" X 3/8" X 20'-0" WEB PLATE 36" X 5/16" 4 ANGLES 6" X 3-1/2" X 3/8"
GIRDER	NO. 8	2 COVER PLATES 14" X 5/16" X 20'-0". 2 COVER PLATES 14" X 3/8" FULL LGTH. WEB PLATE 56" X 3/8" 4 ANGLES 6" X 4" X 7/16", FILLER PL. STIFFENER ANGLES 5" X 3-1/2" X 5/16"

207' SPAN NO. 7		STRINGER (L8L9)				FLOORBEAM (@ L8)			
TYPE OF STRESS	ALLOWABLE STRESS (KSI)	ACTUAL STRESS (KSI)				ACTUAL STRESS (KSI)			
		BEAM		CONN.		BEAM		CONN.	
		HS20	H13	HS20	H13	HS20	H13	HS20	H13
BENDING MOMENT	16.0	15.8	12.0	----	----	*19.1	12.7	----	----
SHEAR	9.5	5.6	3.5	9.4	6.0	9.5	6.5	12.1	8.2
BEARING	24.0	----	----	29.6	18.8	----	----	14.2	9.7

*NOTE: "OVERSTRESSED" FOR HS20 LIVE LOAD.

NOTE: ALL CALCULATED VALUES (ACTUAL STRESSES) IN THE ABOVE STRESS TABLE BASED ON ORIGINAL SECTION & EXISTING DEAD LOAD CONDITION.

SCALE
0 10 20 40

DONORA - WEBSTER BRIDGE
EXISTING STRUCTURE
STRESS ANALYSIS
207 FT. SPAN NO. 7

DATE: 5/15/82 SHEET: A10 OF

207 FT TRUSS SPAN NO. 7 (SIDEWALK TRUSS)

	TRUSS MEMBER	HS 20-44 LL STRESSES (K)						H 13 LL STRESSES (K)				AREAS (IN²)			L/r	STRESSES (KSI) ALLOW	HS 20-44		H 13 LL	
		D.L.	U.LL	C.LL	T.LL	IMP	T.L.	D.L.	T.LL	IMP	T.L.	A_G	A_N	A_R		F_A	ORG.	REM.	ORG.	REM.
UPPER CHORD	L0U1	321	88	34	122	18	461	321	79	12	412	38.9			56.7	13.0	11.8		10.6	
	U8L9	324	"	"	"	"	464	324	"	"	415	"			"	"	11.9		10.7	
	U1U2	321	87	24	111	17	449	321	72	11	404	30.9			41.1	13.5	14.5		13.0	
	U7U8	322	"	"	"	"	450	322	"	"	405	"			"	"	14.6		13.1	
	U2U3	355	97	26	123	18	496	355	80	12	447	33.2			40.0	13.6	15.0		13.5	
	U6U7	"	"	"	"	"	"	"	"	"	"	"			"	"	"		"	
	U3U4	374	102	28	130	19	523	374	84	13	471	35.4			40.4	13.5	14.8		13.3	
	U5U6	"	"	"	"	"	"	"	"	"	"	"			"	"	"		"	
	U4U5	374	102	28	130	19	523	374	84	13	471	"			40.4	13.5	14.8		13.3	
VERTICALS	U1L1	51		50	50	15	116	51	28	8	87	9.6	8.5			16.0	13.6		10.3	
	U8L8	53		"	"	"	118	53	"	"	89	"	"			"	13.9		10.5	
	U2L2	29	20	10	30	6	65	29	19	4	52	8.04			77.5	11.9	8.1		6.5	
	U7L7	28	"	"	"	"	64	28	"	"	51	"			"	"	8.		6.4	
	U3L3	1	17	9	27	6	34	1	18	4	23	8.04			88.0	11.3	4.3		2.9	
	U6L6	"	"	"	"	"	"	"	"	"	"	"			"	"	"		"	
	U4L4	15	20	10	30	7	52	15	20	5	40	8.04			91.5	11.0	6.6		4.9	
	U5L5	"	"	"	"	"	"	"	"	"	"	"			"	"	"		"	
DIAGONALS	U1L2	115	37	17	54	9	178	115	35	6	156	10.0	10.0			16.0	17.8		15.6	
	L7U8	114	"	"	"	"	177	114	"	"	155	"	"			"	17.7		15.5	
	U2U3	67	29	15	44	8	120	67	29	5	101	7.0	7.0			16.0	17.1		14.5	
	L6U7	"	"	"	"	"	119	"	"	"	"	"	"			"	17.0		14.4	
	L2U3	0.		31.6	31.6	9.2	40.8	0.	17.2	5.	22.2	2.	2.			16.	20.4		11.1	
	U6L7	"		"	"	"	"	"	"	"	"	"	"			"	"		"	
	U3L4	43	26	16	42	9	94	43	27	6	76	6.	6.			16.0	15.6		12.6	
	L5U6	"	"	"	"	"	"	"	"	"	"	"	"			"	"		"	
	L3U4	0.		32.2	32.2	8.4	40.6	0.	18.7	4.81	23.5	2.0	2.0			16.0	18.1		11.8	
	U5L6	"		"	"	"	"	"	"	"	"	"	"			"	"		"	
	U4L5	0.		36.2	36.2	8.4	44.6	0.	22.8	5.2	28	3.75	3.75			16.0	11.9		7.5	
	L4U5	"		"	"	"	"	"	"	"	"	"	"			"	"		"	
LOWER CHORD	L0L1	227	62	17	79	12	318	227	51	8	286	17.5	17.5			16.0	18.2		16.3	
	L8L9	229	"	"	"	"	320	229	"	"	288	"	"			"	18.3		16.4	
	L1L2	227	"	"	"	"	318	227	"	"	286	"	"			"	18.2		16.3	
	L7L8	229	"	"	"	"	320	229	"	"	288	"	"			"	18.3		16.4	
	L2L3	308	84	23	107	16	431	308	69	11	388	22.5	22.5			16.0	19.2		17.2	
	L6L7	309	"	"	"	"	432	309	"	"	389	"	"			"	19.2		17.3	
	L3L4	349	95	26	121	18	488	349	79	12	440	25.5	25.5			16.0	19.2		17.2	
	L5L6	350	"	"	"	"	489	350	"	"	441	"	"			"	19.2		17.3	
	L4L5	374	102	27	129	19	522	374	84	12	470	27.0	27.0			16.0	19.3		17.4	

NO SIGNIFICANT AREA REDUCTION — NO CHANGES

207 FT TRUSS SPAN NO. 7 (NON-SIDEWALK TRUSS)

	TRUSS MEMBER	HS 20-44 LL STRESSES (K)						H 13 LL STRESSES (K)				AREAS (IN²)			L/r	STRESSES (KSI) ALLOW	HS 20-44		H 13 LL	
		D.L.	U.LL	C.LL	T.LL	IMP	T.L.	D.L.	T.LL	IMP	T.L.	A_G	A_N	A_R		F_A	ORG.	REM.	ORG.	REM.
UPPER CHORD	L0U1	228	88	34	122	18	368	228	79	12	319	38.9			56.7	13.0	9.5		8.2	
	U8L9	231	"	"	"	"	371	231	"	"	322	"			"	"	9.5		8.3	
	U1U2	228	87	24	111	17	356	228	72	11	311	30.9			41.1	13.5	11.5		10.1	
	U7U8	229	"	"	"	"	357	229	"	"	312	"			"	"	11.6		10.1	
	U2U3	252	97	26	123	18	393	252	80	12	344	33.2			40.0	13.6	11.9		10.4	
	U6U7	253	"	"	"	"	394	253	"	"	345	"			"	"	11.9		10.4	
	U3U4	266	102	28	130	19	415	266	84	13	363	35.4			40.4	13.5	11.7		10.3	
	U5U6	"	"	"	"	"	"	"	"	"	"	"			"	"	11.7		10.3	
	U4U5	266	102	28	130	19	415	266	84	13	363	35.4			40.4	13.6	11.7		10.3	
VERTICALS	U1L1	35		50	50	15	100	35	28	8	71	9.6	8.5			16.0	11.6		8.4	
	U8L8	37		"	"	"	102	37	"	"	73	"	"			"	12.0		8.6	
	U2L2	22	20	10	30	6	58	22	19	4	45	8.04			77.5	8.90	7.1		5.6	
	U7L7	21	"	"	"	"	57	21	"	"	44	"			"	"	7.0		5.5	
	U3L3	2	18	10	28	5	35	2	18	4	24	8.04			88.0	7.40	4.4		2.9	
	U6L6	1	"	"	"	"	34	1	"	"	23	"			"	"	4.3		2.9	
	U4L4	11	21	10	31	7	49	11	20	5	36	8.04			91.5	6.84	6.1		4.5	
	U5L5	"	"	"	"	"	"	"	"	"	"	"			"	"	"		"	
DIAGONALS	U1L2	82	37	17	54	9	145	82	35	6	123	10.0	10.0			16.0	14.5		12.3	
	L7U8	80	"	"	"	"	143	80	"	"	121	"	"			"	14.4		12.2	
	U2L3	48	29	15	44	8	100	48	29	5	82	7.0	7.0			16.0	14.4		11.7	
	L6U7	47	"	"	"	"	99	47	"	"	81	"	"			"	14.3		11.6	
	L2U3	0.		31.6	31.6	9.2	40.8	0.	17	5	22	2.	2.			16.	20.4		11.1	
	U6L7	"		"	"	"	"	"	"	"	"	"	"			"					
	U3L4	31	26	16	42	9	82	31	27	6	64	6.0	6.0			16.0	13.6		10.6	
	L5U6	30	"	"	"	"	81	30	"	"	63	"	"			"	13.5		10.5	
	L3U4	0.		32.2	32.2	8.4	40.6	0.	18.7	4.8	23.5	2.0	2.0			16.0	18.1		11.8	
	U5L6	"		"	"	"	"	"	"	"	"	"	"			"	"		"	
	U4L5	"		36.2	36.2	8.4	44.6	"	22.8	5.2	28	3.75	3.75			16.0	11.9		7.5	
	L4U5	"		"	"	"	"	"	"	"	"	"	"			"	"		"	
LOWER CHORD	L0L1	161	62	17	79	12	252	161	51	8	220	17.5	17.5			16.0	14.4		12.6	
	L8L9	163	"	"	"	"	254	163	"	"	222	"	"			"	14.5		12.7	
	L1L2	161	"	"	"	"	252	161	51	8	220	17.5	17.5			16.0	14.4		12.6	
	L7L8	163	"	"	"	"	254	163	"	"	222	"	"			"	14.5		12.7	
	L2L3	219	84	23	107	16	342	219	69	11	299	22.5	22.5			16.0	15.2		13.3	
	L6L7	220	"	"	"	"	343	220	"	"	300	"	"			"	"		13.4	
	L3L4	249	95	26	121	18	388	249	78	12	339	25.5	25.5			16.0	15.2		13.3	
	L5L6	"	"	"	"	"	"	"	"	"	"	"	"			"	"		"	
	L4L5	265	102	28	130	19	415	266	84	12	362	27	27			16.0	15.4		13.4	

NO SIGNIFICANT AREA REDUCTION — NO CHANGES

GENERAL NOTES:

D.L. = DEAD LOAD (KIPS)
U.L.L. = UNIFORM LIVE LOAD (KIPS)
C.L.L. = CONCENTRATED LIVE LOAD (KIPS)
T.L.L. = U.L.L. + C.L.L. = TOTAL LIVE LOAD (KIPS)
IMP = IMPACT LOAD (KIPS)
T.L. = D.L. + T.L.L. + IMP = TOTAL LOAD (KIPS)
A_G = GROSS AREA FOR ORIGINAL COMPOSITE MEMBER (IN^2)
A_N = NET AREA FOR ORIGINAL TENSION MEMBER (IN^2)
A_R = REMAINING AREA FOR DETERIORATED MEMBER (IN^2)
L/R = LENGTH/RADIUS OF GYRATION = SLENDERNESS RATIO (IN) (IN)
F_A = ALLOWABLE STRESS (KSI)

DONORA - WEBSTER BRIDGE
EXISTING STRUCTURE
STRESS ANALYSIS SUMMARY
207 FT. SPAN NO. 7
DATE: 5/15/82 SHEET: A11 OF

D-9002 (8-81)

STRESS ANALYSIS SUMMARY OF EXISTING 184' TRUSS SPANS NO. 3, 4, & 5

TYPE & LOCATION OF OVERSTRESSED TRUSS MEMBERS	NUMBER OF OVERSTRESSED TRUSS MEMBERS					
	SIDEWALK (D.S.) TRUSS		NON-SIDEWALK (U.S.) TRUSS		TOTALS	
	HS20-44	H13	HS20-44	H13	HS20-44	H13
UPPER CHORD COMPRESSION TRUSS MEMBERS	6	---	---	---	6	---
VERTICAL TENSION TRUSS MEMBERS	---	---	---	---	---	---
VERTICAL COMP. TRUSS MEMBERS	---	---	---	---	---	---
MAIN DIAGONAL TENSION MEMBERS	2	---	---	---	2	---
SECONDARY DIAGONAL TENSION MEMBERS (COUNTERS)	2	---	2	---	4	---
LOWER CHORD TENSION MEMBERS	8	8	---	---	8	8
TOTAL NUMBER OF OVERSTRESSED TRUSS MEMBERS PER EACH 184' SPANS NO. 3, 4, & 5 FOR EACH LIVE LOAD CONDITION =					20	8

STRESS ANALYSIS SUMMARY OF EXISTING 515' TRUSS SPAN NO. 6

TYPE & LOCATION OF OVERSTRESSED TRUSS MEMBERS	NUMBER OF OVERSTRESSED TRUSS MEMBERS					
	SIDEWALK (D.S.) TRUSS		NON-SIDEWALK (U.S.) TRUSS		TOTALS	
	HS20-44	H13	HS20-44	H13	HS20-44	H13
UPPER CHORD COMPRESSION TRUSS MEMBERS	20	2	---	---	20	2
VERTICAL TENSION TRUSS MEMBERS	---	---	---	---	---	---
VERTICAL COMP. TRUSS MEMBERS	2	---	---	---	2	---
MAIN DIAGONAL TENSION MEMBERS	10	4	2	---	12	4
SECONDARY DIAGONAL TENSION MEMBERS (COUNTERS)	---	---	---	---	---	---
LOWER CHORD TENSION MEMBERS	20	16	---	---	20	16
TOTAL NUMBER OF OVERSTRESSED TRUSS MEMBERS IN 515' SPAN NO. 6 FOR EACH LIVE LOAD CONDITION =					54	22

STRESS ANALYSIS SUMMARY OF EXISTING 207' TRUSS SPAN NO. 7

TYPE & LOCATION OF OVERSTRESSED TRUSS MEMBERS	NUMBER OF OVERSTRESSED TRUSS MEMBERS					
	SIDEWALK (D.S.) TRUSS		NON-SIDEWALK (U.S.) TRUSS		TOTALS	
	HS20-44	H13	HS20-44	H13	HS20-44	H13
UPPER CHORD COMPRESSION TRUSS MEMBERS	7	---	---	---	7	---
VERTICAL TENSION TRUSS MEMBERS	---	---	---	---	---	---
VERTICAL COMP. TRUSS MEMBERS	---	---	---	---	---	---
MAIN DIAGONAL TENSION MEMBERS	4	---	---	---	4	---
SECONDARY DIAGONAL TENSION MEMBERS (COUNTERS)	4	---	4	---	8	---
LOWER CHORD TENSION MEMBERS	9	9	---	---	9	9
TOTAL NUMBER OF OVERSTRESSED TRUSS MEMBERS IN 207' SPAN NO. 7 FOR EACH LIVE LOAD CONDITION =					28	9

STRESS ANALYSIS SUMMARY OF EXISTING TRUSS SPANS NO. 3 THRU 7

TYPE & LOCATION OF OVERSTRESSED TRUSS MEMBERS	NUMBER OF OVERSTRESSED TRUSS MEMBERS					
	SIDEWALK (D.S.) TRUSS		NON-SIDEWALK (U.S.) TRUSS		TOTALS	
	HS20-44	H13	HS20-44	H13	HS20-44	H13
UPPER CHORD COMPRESSION TRUSS MEMBERS	45	2	---	---	45	2
VERTICAL TENSION TRUSS MEMBERS	--	--	--	--	--	--
VERTICAL COMP. TRUSS MEMBERS	2	--	--	--	2	--
MAIN DIAGONAL TENSION MEMBERS	20	4	2	--	22	4
SECONDARY DIAGONAL TENSION MEMBERS (COUNTERS)	10	--	10	--	20	--
LOWER CHORD TENSION MEMBERS	53	49	--	--	53	49
TOTAL NUMBER OF OVERSTRESSED TRUSS MEMBERS IN ALL FIVE TRUSS SPANS NO. 3 THRU 7 FOR EACH LIVE LOAD COND.					142	55

NOTE:

REFER TO PLAN SHEET(S) A4-A5/_____ FOR STRESS ANALYSIS SUMMARY TABLES ON 184 FT. TRUSS SPAN NO. 3,4&5 TO VERIFY THE NUMBER AND TYPE OF "OVERSTRESSED" TRUSS MEMBERS.

BY DEFINITION, "OVERSTRESSED" TRUSS MEMBERS ARE THOSE MEMBERS WHICH THE ACTUAL STRESS VALUE EXCEEDS THE ALLOWABLE STRESS VALUE (F_A) FOR A PARTICULAR DEAD LOAD AND LIVE LOAD CONDITION, AS SHOWN ALONG THE RIGHT-HAND SIDE OF EACH STRESS TABLE UNDER BOTH HS20-44 AND H13 LIVE LOADS.

NOTE:

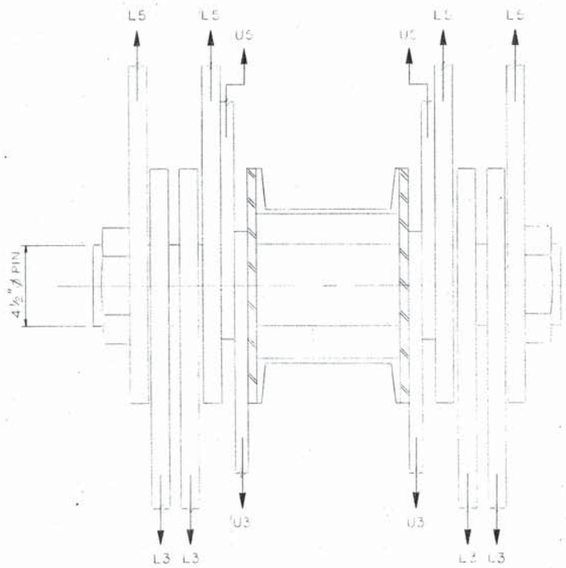
REFER TO PLAN SHEET(S) A8-A9/_____ FOR STRESS ANALYSIS SUMMARY TABLES ON 515 FT. TRUSS SPAN NO. 6 TO VERIFY THE NUMBER AND TYPE OF "OVERSTRESSED" TRUSS MEMBERS.

NOTE:

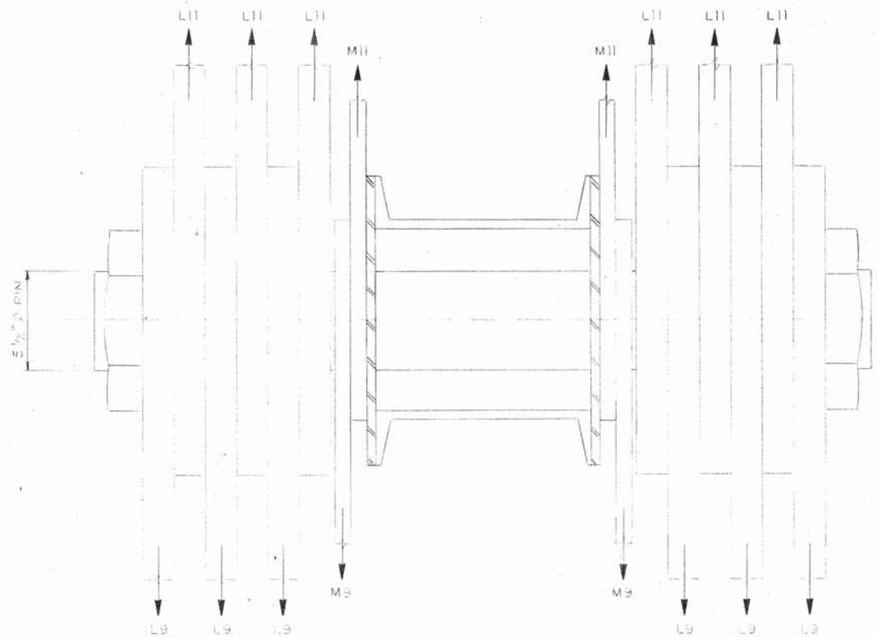
REFER TO PLAN SHEET(S) A11/_____ FOR STRESS ANALYSIS SUMMARY TABLES ON 207 FT. TRUSS SPAN NO. 7 TO VERIFY THE NUMBER AND TYPE OF "OVERSTRESSED" TRUSS MEMBERS.

DONORA - WEBSTER BRIDGE
EXISTING STRUCTURE
STRESS ANALYSIS SUMMARY
"OVERSTRESSED" TRUSS MEMBERS
DATE: 5/15/82 SHEET: A12 OF

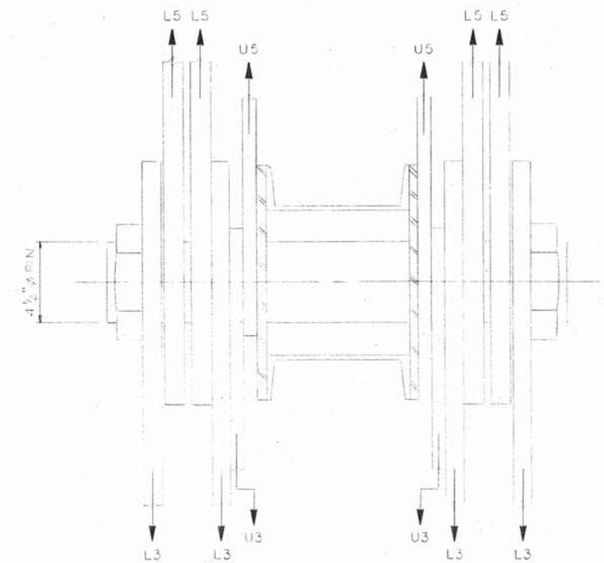
K&E 10 1233 12-81 MC 3206+



LOWER CHORD PIN CONNECTION AT L4
184 FT SPANS NO. 3,4 AND 5



LOWER CHORD PIN CONNECTION AT L10
515 FT SPAN NO. 6



LOWER CHORD PIN CONNECTION AT L4
207 FT SPAN NO. 7

184' TRUSS SPANS NO. 3, 4 & 5				
LOWER CHORD PIN CONNECTION @ L4	STRESS ANALYSIS			
	STRESS (KSI)		STRESS (KSI)	
	ALLOW	HS20-44	ALLOW	H13
SHEAR	12.0	6.4	12.0	5.8
BEARING	24.0	22.7	24.0	20.3
BENDING	16.0	0.0	16.0	0.0

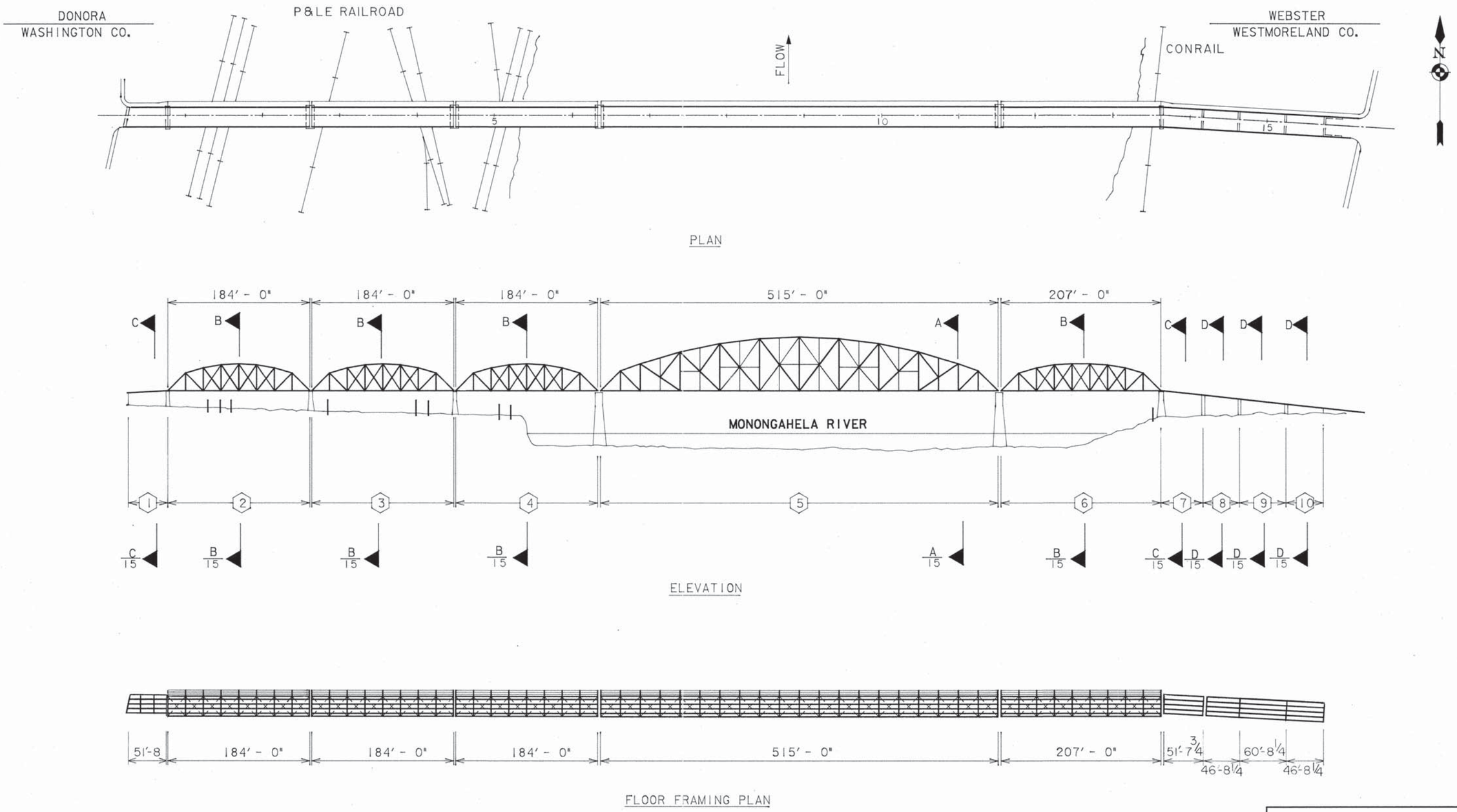
515' TRUSS SPAN NO. 6				
LOWER CHORD PIN CONNECTION @ L10	STRESS ANALYSIS			
	STRESS (KSI)		STRESS (KSI)	
	ALLOW	HS20-44	ALLOW	H13
SHEAR	12.0	9.7	12.0	8.8
BEARING	24.0	23.9	24.0	21.7
BENDING	16.0	0.0	16.0	0.0

207' TRUSS SPAN NO. 7				
LOWER CHORD PIN CONNECTION @ L4 & L5	STRESS ANALYSIS			
	STRESS (KSI)		STRESS (KSI)	
	ALLOW	HS20-44	ALLOW	H13
SHEAR	12.0	8.2	12.0	7.4
BEARING	24.0	*25.8	24.0	23.2
BENDING	16.0	0.0	16.0	0.0

*NOTE: "OVERSTRESSED" FOR HS20-44 LIVE LOAD UNDER EXISTING DEAD LOAD CONDITION.

DONORA - WEBSTER BRIDGE
EXISTING STRUCTURE
STRESS ANALYSIS SUMMARY
LOWER CHORD PIN CONNECTIONS

DATE: 5/15/82 SHEET: A13 OF



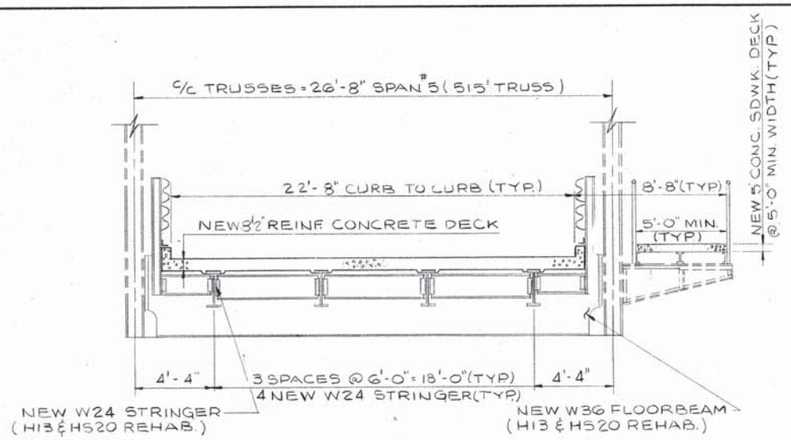
SCALE

0 30 60 120

DONORA - WEBSTER BRIDGE
REHABILITATION (H13 & H20)
GENERAL PLAN & ELEVATION

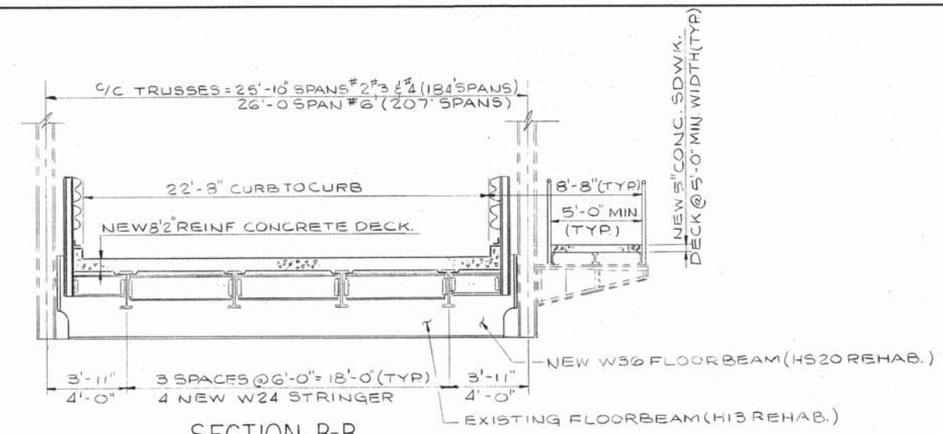
DATE: 5/15/82 SHEET: A14 OF

D-9002 (3-77)



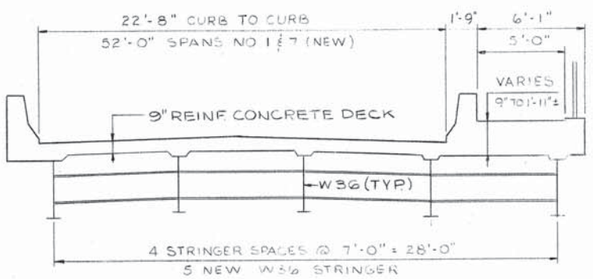
SECTION A-A

0 2 4 6 8



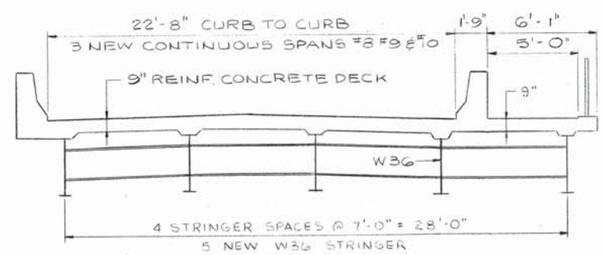
SECTION B-B

0 2 4 6 8



SECTION C-C

0 2 4 6 8



SECTION D-D

0 2 4 6 8

DONORA - WEBSTER BRIDGE
REHABILITATION (H13 & H20)
TYPICAL CROSS SECTIONS

DATE: 5/15/82 SHEET: A15 OF

BARCLAY BROS. INC.

184 FT. TRUSS SPANS NO. 2, 3 & 4 (SIDEWALK TRUSS)

	TRUSS MEMBER	HS 20-44 LL STRESSES (K)						H 13 LL STRESSES (K)				AREAS (IN^2)			L/r	STRESSES (KSI) ALLOW	HS 20-44		H 13 LL	
		D. L.	U. LL	C. LL	T. LL	IMP	T. L.	D. L.	T. LL	IMP	T. L.	A_0	$A_{HS\ 20}$	$A_{H\ 13}$		F_A	ORG.	NEW	ORG.	NEW
UPPER CHORD	L0U1	335	76	34	110	18	463	335	72	12	419	36.0			56.2	13.0	12.9	$\leq F_A$	11.6	$\leq F_A$
	U7L8	"	"	"	"	"	"	"	"	"	"	"			"	"	"	"	"	"
	U1U2	328	75	23	98	16	441	328	64	10	402	27.3	33.3	30.3	41.1	13.5	16.2	$\leq F_A$	14.7	$\leq F_A$
	U6U7	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
	U2U3	352	80	25	105	17	474	352	68	11	431	27.3	36.3	33.3	40.0	13.6	17.4	$\leq F_A$	15.8	$\leq F_A$
	U5U6	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
	U3U4	357	82	25	107	17	481	357	69	11	437	27.3	36.3	33.3	39.5	13.6	17.6	$\leq F_A$	16.0	$\leq F_A$
	U4U5	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
VERTICALS	U1L1	62		50	50	15	127	62	28	8	98	8.5				16.0	14.9	$\leq F_A$	11.5	$\leq F_A$
	U7L7	"		"	"	"	"	"	"	"	"	"	"	"		"	"	"	"	"
	U2L2	16	16	9	25	5	46	16	16	3	35	8.04			77.5	11.9	5.7	$\leq F_A$	4.4	$\leq F_A$
	U6L6	"	"	"	"	"	"	"	"	"	"	"			"	"	"	"	"	"
	U3L3	22	19	9	28	6	56	22	18	4	44	8.04			88.0	11.3	6.9	$\leq F_A$	5.4	$\leq F_A$
	U5L5	"	"	"	29	"	"	"	"	"	"	"			"	"	"	"	"	"
	U4L4	37	20	9	29	7	73	37	18	5	60	8.04			91.5	11.0	9.0	$\leq F_A$	7.5	$\leq F_A$
DIAGONALS	U1L2	110	32	16	48	9	167	110	31	6	147	8.0	11.0	10.0		16.0	20.8	$\leq F_A$	18.4	$\leq F_A$
	L6U7	"	"	"	"	"	"	"	"	"	"	"	"	"		"	"	"	"	"
	U2L3	53	24	14	38	8	99	53	24	5	82	6.0	7.0			16.0	16.4	$\leq F_A$	13.7	$\leq F_A$
	L5U6	"	"	"	"	"	"	"	"	"	"	"	"			"	"	"	"	"
	U3L4	16	20	14	34	8	58	16	22	5	43	4.5				16.0	12.8	$\leq F_A$	9.6	$\leq F_A$
	L4U5	"	"	"	"	"	"	"	"	"	"	"				"	"	"	"	"
	L2U3			33	33	10	43		18	5.3		2.0	3.			16.0	21.3	$\leq F_A$	11.7	$\leq F_A$
	U5L6			"	"	"	"		"	"		"	"	"		"	"	"	"	"
	L3U4			35	35	9	44		20.4	5.3		4.13				16.0	10.7	$\leq F_A$	6.2	$\leq F_A$
	U4L5			"	"	"	"		"	"		"				"	"	"	"	"
LOWER CHORD	L0L1	237	54	17	71	11	319	237	46	7	290	14.0	21.5	19.5		16.0	22.8	$\leq F_A$	20.7	$\leq F_A$
	L7L8	"	"	"	"	"	"	"	"	"	"	"	"	"		"	"	"	"	"
	L1L2	237	"	"	"	"	319	237	"	"	290	"	21.5	19.5		"	22.8	$\leq F_A$	22.8	$\leq F_A$
	L6L7	"	"	"	"	"	"	"	"	"	"	"	"	"		"	"	"	"	"
	L2L3	315	72	22	94	15	424	315	61	10	386	20.0	28.5	25.5		16.0	21.2	$\leq F_A$	19.3	$\leq F_A$
	L5L6	"	"	"	"	"	"	"	"	"	"	"	"	"		"	"	"	"	"
	L3L4	347	79	24	103	17	467	347	67	11	425	21.3	32	28		16.0	22.0	$\leq F_A$	20.0	$\leq F_A$
	L4L5		"	"	"	"	"	"	"	"		"	"	"		"		"		"

184 FT. TRUSS SPANS NO. 2, 3 & 4 (NON-SIDEWALK TRUSS)

	TRUSS MEMBER	HS 20-44 LL STRESSES (K)						H 13 LL STRESSES (K)				AREAS (IN^2)			L/r	STRESSES (KSI) ALLOW	HS 20-44		H 13 LL	
		D. L.	U. LL	C. LL	T. LL	IMP	T. L.	D. L.	T. LL	IMP	T. L.	A_0	$A_{HS\ 20}$	$A_{H\ 13}$		F_A	ORG.	NEW	ORG.	NEW
UPPER CHORD	L0U1	267	76	34	110	18	395	267	72	12	351	36.0			56.2	13.0	11.0	$\leq F_A$	9.7	$\leq F_A$
	U7L8	"	"	"	"	"	"	"	"	"	"	"			"	"	"	"	"	"
	U1U2	261	75	23	98	16	375	261	64	10	335	27.3	30.3		41.1	13.5	13.7	$\leq F_A$	12.3	$\leq F_A$
	U6U7	"	"	"	"	"	"	"	"	"	"	"	"		"	"	"	"	"	"
	U2U3	281	80	25	105	17	403	281	68	11	360	27.3	31.8		40.0	13.6	14.8	$\leq F_A$	13.2	$\leq F_A$
	U5U6	"	"	"	"	"	"	"	"	"	"	"	"		"	"	"	"	"	"
	U3U4	285	82	25	107	17	409	285	69	11	365	27.3	31.8		39.5	13.6	15.0	$\leq F_A$	13.4	$\leq F_A$
	U4U5	"	"	"	"	"	"	"	"	"	"		"		"	"	"	"	"	"
VERTICALS	U1L1	48		50	50	15	113	48	28	8	84	8.5				16.0	13.3	$\leq F_A$	9.9	$\leq F_A$
	U7L7	"		"	"	"	"	"	"	"	"	"				"	"	"	"	"
	U2L2	14	16	9	25	5	44	14	16	3	33	8.04			77.5	11.9	5.5	$\leq F_A$	4.1	$\leq F_A$
	U6L6	"	"	"	"	"	"	"	"	"	"	"			"	"	"	"	"	"
	U3L3	16	19	9	28	6	50	16	18	4	38	8.04			88.0	11.3	6.2	$\leq F_A$	4.8	$\leq F_A$
	U5L5	"	"	"	29	"	"	"	"	"	"	"			"	"	"	"	"	"
	U4L4	28	20	9	29	7	64	28	18	5	51	8.04			91.5	11.0	8.0	$\leq F_A$	6.4	$\leq F_A$
DIAGONALS	U1L2	88	32	16	48	9	145	88	31	6	125	8.0	9.5			16.0	18.0	$\leq F_A$	15.6	$\leq F_A$
	L6U7	"	"	"	"	"	"	"	"	"	"	"	"			"	"	"	"	"
	U2L3	42	24	14	38	8	88	42	24	5	71	6.0				16.0	14.6	$\leq F_A$	12.0	$\leq F_A$
	L5U6	"	"	"	"	"	"	"	"	"	"	"				"	"	"	"	"
	U3L4	13	20	14	34	8	55	13	22	5	40	4.5				16.0	12.1	$\leq F_A$	8.9	$\leq F_A$
	L4U5	"	"	"	"	"	"	"	"	"	"	"				"	"	"	"	"
	L2U3			33	33	10	43		18	5.3		2.0	3.			16.0	21.3	$\leq F_A$	11.7	$\leq F_A$
	U5L6			"	"	"	"		"	"		"	"			"	"	"	"	"
	L3U4			35	35	9	44		20.4	5.3		4.13				16.0	10.7	$\leq F_A$	6.2	$\leq F_A$
	U4L5			"	"	"	"		"	"		"				"	"	"	"	"
LOWER CHORD	L0L1	189	54	17	71	11	271	189	46	7	242	14.0	18.0	16.0		16.0	19.3	$\leq F_A$	17.3	$\leq F_A$
	L7L8	"	"	"	"	"	"	"	"	"	"	"	"	"		"	"	"	"	"
	L1L2	189	"	"	"	"	271	189	"	"	242	"	18.0	16.0		"	19.3	$\leq F_A$	17.3	$\leq F_A$
	L6L7	"	"	"	"	"	"	"	"	"	"	"	"	"		"	"	"	"	"
	L2L3	251	72	22	94	15	360	251	61	10	322	20.0	24.0			16.0	18.0	$\leq F_A$	16.1	$\leq F_A$
	L5L6	"	"	"	"	"	"	"	"	"	"	"	"			"	"	"	"	"
	L3L4	277	79	24	103	17	397	277	67	11	355	21.3	26.2	22.7		16.0	18.7	$\leq F_A$	16.7	$\leq F_A$
	L4L5	"	"	"	"	"	"	"	"	"	"	"	"	"		"	"	"	"	"

GENERAL NOTES:

D.L. = DEAD LOAD (KIPS)
U.L.L. = UNIFORM LIVE LOAD (KIPS)
C.L.L. = CONCENTRATED LIVE LOAD (KIPS)
T.L.L. = U.L.L. + C.L.L. = TOTAL LIVE LOAD (KIPS)
IMP = IMPACT LOAD (KIPS)
T.L. = D.L. + T.L.L. + IMP = TOTAL LOAD (KIPS)
A_0 = AREA FOR ORIGINAL MEMBER (IN^2)
A_{HS20} = AREA REQUIRED FOR HS20-44 LIVE LOAD (IN^2)
A_{H13} = AREA REQUIRED FOR H13 LIVE LOAD (IN^2)
L/R = LENGTH/RADIUS OF GYRATION = SLENDERNESS RATIO (IN) (IN)
F_A = ALLOWABLE STRESS (KSI)

*NOTE: THE NEW MEMBER AREAS, REQUIRED TO MAINTAIN STRESSES EQUAL TO OR LESS THAN THE ALLOWABLE STRESSES, WERE BASED ON CALCULATIONS ASSUMING THAT THE NEW DECK (SIDEWALK AND ROADWAY) AND ANY ADDITIONAL STEEL WOULD BE CARRIED BY BOTH THE NEW AND EXISTING MEMBER ELEMENTS.

DONORA - WEBSTER BRIDGE
REHABILITATION (H13 & HS20)
STRESS ANALYSIS SUMMARY
184 FT. SPANS NO. 2, 3 & 4
DATE: 5/15/82 SHEET: A16 OF

515 FT TRUSS SPAN NO. 5 (SIDEWALK TRUSS)

	TRUSS MEMBER	HS 20-44 LL STRESSES (K)						H 13 LL STRESSES (K)				AREAS (IN²)			L/r	STRESSES (KSI) ALLOW	HS 20-44		H 13 LL	
		D. L.	U. LL	C. LL	T. LL	IMP	T. L.	D. L.	T. LL	IMP	T. L.	A_G	$A_{HS\ 20}$	$A_{H\ 13}$		F_A	ORG.	NEW	ORG.	NEW
UPPER CHORD	L0U1	1148	221	37	258	20	1426	1148	168	13	1329	73.7	127	117	44.6	13.4	19.4	≤F_A	18.0	≤F_A
	U19L20	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
	U1U2	1203	232	27	259	20	1481	1203	168	13	1384	60.7	124	115	32.4	13.8	24.4	≤F_A	22.8	≤F_A
	U18U19	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
	U2U3	1509	282	32	314	24	1847	1509	204	16	1729	86.7	159	149	33.4	13.7	21.3	≤F_A	20.0	≤F_A
	U17U18	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
	U3U4	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
	U16U17	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
	U4U5	1586	297	34	331	26	1944	1586	215	17	1819	91	163	154	33.8	13.7	21.4	≤F_A	20.0	≤F_A
	U15U16	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
	U5U6	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
	U14U15	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
	U6U7	1614	303	35	308	26	1978	1614	219	17	1851	92	164	155	32.9	13.8	21.5	≤F_A	20.1	≤F_A
	U13U14	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
	U7U8	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
	U12U13	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
	U8U9	1616	303	35	338	26	1981	1616	220	17	1853	92	164	155	32.8	13.8	21.5	≤F_A	20.1	≤F_A
	U11U12	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
	U9U10	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
	U10U11	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
LOWER CHORD	L0L1	812	157	18	175	14	1000	812	114	9	934	38.5	70.5	65.5		16.0	26.0	≤F_A	24.3	≤F_A
	L19L20	"	"	"	"	"	"	"	"	"	"	"	"	"		"	"	"	"	"
	L1L2	"	"	"	"	"	"	"	"	"	"	"	"	"		"	"	"	"	"
	L18L19	"	"	"	"	"	"	"	"	"	"	"	"	"		"	"	"	"	"
	L2L3	1133	218	25	243	19	1395	1133	158	12	1303	56	98.0	91.0		16.0	24.9	≤F_A	23.3	≤F_A
	L17L18	"	"	"	"	"	"	"	"	"	"	"	"	"		"	"	"	"	"
	L3L4	"	"	"	"	"	"	"	"	"	"	"	"	"		"	"	"	"	"
	L16L17	"	"	"	"	"	"	"	"	"	"	"	"	"		"	"	"	"	"
	L4L5	1404	270	31	301	23	1728	1404	196	15	1614	66.5	121	112		16.0	26.0	≤F_A	24.3	≤F_A
	L15L16	"	"	"	"	"	"	"	"	"	"	"	"	"		"	"	"	"	"
	L5L6	"	"	"	"	"	"	"	"	"	"	"	"	"		"	"	"	"	"
	L14L15	"	"	"	"	"	"	"	"	"	"	"	"	"		"	"	"	"	"
	L6L7	1517	291	33	324	25	1867	1517	211	16	1744	71.8	130	121		16.0	26.0	≤F_A	24.3	≤F_A
	L13L14	"	"	"	"	"	"	"	"	"	"	"	"	"		"	"	"	"	"
	L7L8	"	"	"	"	"	"	"	"	"	"	"	"	"		"	"	"	"	"
	L12L13	"	"	"	"	"	"	"	"	"	"	"	"	"		"	"	"	"	"
	L8L9	1569	301	34	335	26	1930	1569	218	17	1804	73.5	135	122		16.0	26.3	≤F_A	24.6	≤F_A
	L11L12	"	"	"	"	"	"	"	"	"	"	"	"	"		"	"	"	"	"
	L9L10	"	"	"	"	"	"	"	"	"	"	"	"	"		"	"	"	"	"
	L10L11	"	"	"	"	"	"	"	"	"	"	"	"	"		"	"	"	"	"
VERTICALS	U1L1	70		53	53	15	138	70	28	8	107	8.5	9.5			16.0	16.2	≤F_A	12.6	≤F_A
	U19L19	"		"	"	"	"	"	"	"	"	"	"			"	"	"	"	"
	U2L2	247	60	11	71	6	324	247	46	4	297	20.5	31.0	27.5	73	12.2	15.8	≤F_A	14.5	≤F_A
	U18L18	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
	M3L3	79		53	53	15	147	79	28	8	116	8.5				16.0	17.2	≤F_A	13.6	≤F_A
	M17L17	"		"	"	"	"	"	"	"	"	"				"	"	"	"	"
	U4L4	110	38	8	46	5	162	110	30	3	143	14.6			52.6	13.1	11.0	≤F_A	9.8	≤F_A
	U16L16	"	"	"	"	"	"	"	"	"	"	"			"	"	"	"	"	"
	M5L5	80		53	53	15	148	80	29	8	117	8.5				16.0	17.3	≤F_A	13.7	≤F_A
	M15L15	"		"	"	"	"	"	"	"	"	"				"	"	"	"	"

515 FT TRUSS SPAN NO. 5 (SIDEWALK TRUSS)

	TRUSS MEMBER	HS 20-44 LL STRESSES (K)						H 13 LL STRESSES (K)				AREAS (IN²)			L/r	STRESSES (KSI) ALLOW	HS 20-44		H 13 LL	
		D. L.	U. LL	C. LL	T. LL	IMP	T. L.	D. L.	T. LL	IMP	T. L.	A_G	$A_{HS\ 20}$	$A_{H\ 13}$		F_A	ORG.	NEW	ORG.	NEW
VERTICALS	U6L6	35	39	8	47	5	87	35	31	3	69	12.1			63.8	12.6	7.3	≤F_A	5.8	≤F_A
	U14L14	"	"	"	"	"	"	"	"	"	"	"			"	"	"	"	"	"
	M7L7	80		53	53	15	148	80	29	8	117	8.5				16.0	17.3	≤F_A	13.8	≤F_A
	M13L13	"		"	"	"	"	"	"	"	"	"				"	"	"	"	"
	U8L8	120	60	11	71	9	200	120	46	6	172	12.1	19	17.3	70.3	12.3	16.7	≤F_A	14.3	≤F_A
	U12L12	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
	M9L9	81		53	53	15	149	81	29	8	118	8.5				16.0	17.5	≤F_A	13.9	≤F_A
	M11L11	"		"	"	"	"	"	"	"	"	"				"	"	"	"	"
	U10L10	74	62	10	72	10	157	74	47	7	128	12.1	15.6		75.3	12.0	13.0	≤F_A	10.6	≤F_A
DIAGONALS	U1L2	453	94	16	110	10	573	453	72	6	531	22.8	40.8	36.8		16.0	25.2	≤F_A	23.4	≤F_A
	L18U19	"	"	"	"	"	"	"	"	"	"	"	"	"		"	"	"	"	"
	U2M3	379	88	16	104	9	492	379	68	6	452	19.5	34.5	31.5		16.0	25.2	≤F_A	23.2	≤F_A
	M17U18	"	"	"	"	"	"	"	"	"	"	"	"	"		"	"	"	"	"
	M3L4	328	78	15	93	9	430	328	61	6	394	18	30.0	29.0		16.0	23.9	≤F_A	21.9	≤F_A
	L16M17	"	"	"	"	"	"	"	"	"	"	"	"	"		"	"	"	"	"
	M3U4	69		44	44	12	126	69	24	6	100	5.73	8.73	7.23		16.0	21.8	≤F_A	17.3	≤F_A
	U16M17	"		"	"	"	"	"	"	"	"	"	"	"		"	"	"	"	"
	U4M5	208	66	14	80	8	296	208	52	5	265	13.0	21.0	19.0		16.0	22.7	≤F_A	20.4	≤F_A
	M15U16	"	"	"	"	"	"	"	"	"	"	"	"	"		"	"	"	"	"
	M5L6	158	58	13	71	7	236	158	46	5	209	11.0	17.0	15.0		16.0	21.5	≤F_A	19.0	≤F_A
	L14M15	"	"	"	"	"	"	"	"	"	"	"	"	"		"	"	"	"	"
	M5U6	61		38	38	11	110	61	21	6	88	5.12	8.12	6.62		16.0	21.5	≤F_A	17.0	≤F_A
	U14M15	"		"	"	"	"	"	"	"	"	"	"	"		"	"	"	"	"
	U6M7	131	60	14	74	8	214	131	49	5	185	11.0	15.0	13.0		16.0	19.5	≤F_A	16.8	≤F_A
	M13U14	"	"	"	"	"	"	"	"	"	"	"	"	"		"	"	"	"	"
	M7L8	82	52	13	65	7	154	82	42	5	129	9.0	11.			16.0	17.1	≤F_A	14.3	≤F_A
	L12M13	"	"	"	"	"	"	"	"	"	"	"	"			"	"	"	"	"
	L6M7	0.0	37	17	54	9	64	0.0	35	6	41	6.0				16.0	10.5	≤F_A	6.8	≤F_A
	M13L14	"	"	"	"	"	"	"	"	"	"	"				"	"	"	"	"
	M7U8	56	49	20	69	11	136	56	45	7	108	6.0	9.0	7.5		16.0	22.7	≤F_A	18.0	≤F_A
	U12M12	"	"	"	"	"	"	"	"	"	"	"	"	"		"	"	"	"	"
	U8M9	75	57	16	73	9	157	75	48	6	129	9.0	11.0			16.0	17.4	≤F_A	14.2	≤F_A
	M11U12	"	"	"	"	"	"	"	"	"	"	"	"			"	"	"	"	"
	M9L1	23	48	14	62	8	93	23	40	5	68	7.0				16.0	13.4	≤F_A	9.75	≤F_A
	L10M11	"	"	"	"	"	"	"	"	"	"	"				"	"	"	"	"
	L8M9	0.0	44	16	60	9	69	0.0	39	6	45	10.0				16.0	6.0	≤F_A	4.5	≤F_A
	M1L12	"	"	"	"	"	"	"	"	"	"	"				"	"	"	"	"
	M9U10	54	55	18	73	10	137	54	47	7	108	10.0				16.0	13.7	≤F_A	10.8	≤F_A
	U10M11	"	"	"	"	"	"	"	"	"	"	"				"	"	"	"	"

GENERAL NOTES:

D.L. = DEAD LOAD (KIPS)
U.L.L. = UNIFORM LIVE LOAD (KIPS)
C.L.L. = CONCENTRATED LIVE LOAD (KIPS)
T.L.L. = U.L.L. + C.L.L. = TOTAL LIVE LOAD (KIPS)
IMP = IMPACT LOAD (KIPS)
T.L. = D.L. + T.L.L. + IMP = TOTAL LOAD (KIPS)
A_0 = AREA FOR ORIGINAL MEMBER (IN^2)
A_{HS20} = AREA REQUIRED FOR HS20-44 LIVE LOAD (IN^2)
A_{H13} = AREA REQUIRED FOR H13 LIVE LOAD (IN^2)
L/R = LENGTH/RADIUS OF GYRATION = SLENDERNESS RATIO (IN) (IN)
F_A = ALLOWABLE STRESS (KSI)

*NOTE: THE NEW MEMBER AREAS, REQUIRED TO MAINTAIN STRESSES EQUAL TO OR LESS THAN THE ALLOWABLE STRESSES, WERE BASED ON CALCULATIONS ASSUMING THAT THE NEW DECK (SIDEWALK AND ROADWAY) AND ANY ADDITIONAL STEEL WOULD BE CARRIED BY BOTH THE NEW AND EXISTING MEMBER ELEMENTS.

DONORA - WEBSTER BRIDGE REHABILITATION (H13 & HS20)
STRESS ANALYSIS SUMMARY
515 FT. SPAN NO. 5
DATE: 5/15/82 SHEET: A17 OF

515 FT TRUSS SPAN NO. 5 (NON-SIDEWALK TRUSS)

	TRUSS MEMBER	HS 20-44 LL STRESSES (K)						H 13 LL STRESSES (K)				AREAS (IN²)			L/r	STRESSES (KSI) ALLOW	HS 20-44		H 13 LL	
		D. L.	U. LL	C. LL	T. LL	IMP	T. L.	D. L.	T. LL	IMP	T. L.	A_G	$A_{HS\ 20}$	$A_{H\ 13}$		F_A	ORG.	NEW	ORG.	NEW
UPPER CHORD	L0U1	952	221	37	258	20	1230	952	168	13	1133	73.7	101	91.7	44.6	13.4	16.7	≤F_A	15.4	≤F_A
	U19L20	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
	U1U2	997	232	27	258	20	1276	997	168	13	1178	60.7	106	92.2	32.4	13.8	21.0	≤F_A	19.4	≤F_A
	U18U19	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
	U2U3	1251	282	32	314	24	1589	1251	204	16	1471	86.7	132	118	33.4	13.7	18.3	≤F_A	17.0	≤F_A
	U17U18	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
	U3U4	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
	U16U17	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
	U4U5	1316	297	34	332	26	1674	1316	216	17	1549	91	136	122	33.8	13.7	18.4	≤F_A	17.0	≤F_A
	U15U16	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
	U5U6	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
	U14U15	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
	U6U7	1339	303	35	338	26	1703	1339	220	17	1576	92	137	124	32.9	13.8	18.5	≤F_A	17.1	≤F_A
	U13U14	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
	U7U8	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
	U12U13	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
	U8U9	1341	303	35	338	27	1706	1341	220	17	1578	92	137	124	32.8	13.8	18.5	≤F_A	17.1	≤F_A
	U11U12	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
	U9U10	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
	U10U11	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
LOWER CHORD	L0L1	673	156	18	174	14	861	673	113	9	795	38.5	60.0	53.0		16.0	22.4	≤F_A	20.7	≤F_A
	L19L20	"	"	"	"	"	"	"	"	"	"	"	"	"		"	"	"	"	"
	L1L2	"	"	"	"	"	"	"	"	"	"	"	"	"		"	"	"	"	"
	L18L19	"	"	"	"	"	"	"	"	"	"	"	"	"		"	"	"	"	"
	L2L3	939	218	25	243	19	1201	939	158	12	1109	56	82.0	72.0		16.0	21.4	≤F_A	19.8	≤F_A
	L17L18	"	"	"	"	"	"	"	"	"	"	"	"	"		"	"	"	"	"
	L3L4	"	"	"	"	"	"	"	"	"	"	"	"	"		"	"	"	"	"
	L16L17	"	"	"	"	"	"	"	"	"	"	"	"	"		"	"	"	"	"
	L4L5	1164	270	31	301	26	1488	1164	211	16	1375	71.8	102	92.0		16.0	22.4	≤F_A	20.7	≤F_A
	L15L16	"	"	"	"	"	"	"	"	"	"	"	"	"		"	"	"	"	"
	L5L6	"	"	"	"	"	"	"	"	"	"	"	"	"		"	"	"	"	"
	L14L15	"	"	"	"	"	"	"	"	"	"	"	"	"		"	"	"	"	"
	L6L7	1258	291	33	324	26	1608	1258	211	16	1485	71.8	110	100		16.0	22.4	≤F_A	20.7	≤F_A
	L13L14	"	"	"	"	"	"	"	"	"	"	"	"	"		"	"	"	"	"
	L7L8	"	"	"	"	"	"	"	"	"	"	"	"	"		"	"	"	"	"
	L12L13	"	"	"	"	"	"	"	"	"	"	"	"	"		"	"	"	"	"
	L8L9	1302	301	34	335	26	1663	1302	218	17	1537	73.5	113	102		16.0	22.6	≤F_A	20.9	≤F_A
	L11L12	"	"	"	"	"	"	"	"	"	"	"	"	"		"	"	"	"	"
	L9L10	"	"	"	"	"	"	"	"	"	"	"	"	"		"	"	"	"	"
	L10L11	"	"	"	"	"	"	"	"	"	"	"	"	"		"	"	"	"	"
VERTICALS	U1L1	55		53	53	15	123	55	29	8	92	8.5				16.0	14.5	≤F_A	10.8	≤F_A
	U19L19	"		"	"	"	"	"	"	"	"	"				"	"	"	"	"
	U2L2	207	59	11	70	6	283	207	46	4	257	20.5	25.8	24.0	73	12.2	13.8	≤F_A	12.5	≤F_A
	U18L18	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
	M3L3	68		53	53	15	136	68	29	8	105	8.5				16.0	16.0	≤F_A	12.4	≤F_A
	M17L17	"		"	"	"	"	"	"	"	"	"				"	"	"	"	"
	U4L4	93	39	8	47	5	145	93	31	3	127	14.6			52.6	13.1	9.9	≤F_A	8.7	≤F_A
	U16L16	"	"	"	"	"	"	"	"	"	"	"			"	"	"	"	"	"
	M5L5	69		53	53	15	137	69	29	8	106	8.5				16.0	16.1	≤F_A	12.5	≤F_A
	M15L15	"		"	"	"	"	"	"	"	"	"				"	"	"	"	"

515 FT TRUSS SPAN NO. 5 (NON-SIDEWALK TRUSS)

	TRUSS MEMBER	HS 20-44 LL STRESSES (K)						H 13 LL STRESSES (K)				AREAS (IN²)			L/r	STRESSES (KSI) ALLOW	HS 20-44		H 13 LL	
		D. L.	U. LL	C. LL	T. LL	IMP	T. L.	D. L.	T. LL	IMP	T. L.	A_G	$A_{HS\ 20}$	$A_{H\ 13}$		F_A	ORG.	NEW	ORG.	NEW
VERTICALS	U6L6	32	39	8	47	5	84	32	31	3	66	12.1			63.8	12.6	7.0	≤F_A	5.5	≤F_A
	U14L14	"	"	"	"	"	"	"	"	"	"	"			"	"	"	"	"	"
	M7L7	70		53	53	15	138	70	29	8	107	8.5				16.0	16.2	≤F_A	12.5	≤F_A
	M13L13	"		"	"	"	"	"	"	"	"	"				"	"	"	"	"
	U8L8	105	60	11	71	9	185	105	46	6	157	12.1	17.4	15.6	70.3	12.3	15.4	≤F_A	13.0	≤F_A
	U12L12	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
	M9L9	71		53	53	15	139	71	29	8	108	8.5	9.5			16.0	16.3	≤F_A	12.7	≤F_A
	M11L11	"		"	"	"	"	"	"	"	"	"	"			"	"	"	"	"
	U10L10	65	62	10	72	10	147	65	47	7	119	12.1	15.6		75.3	12.1	12.2	≤F_A	9.8	≤F_A
DIAGONALS	U1L2	376	94	16	110	10	496	376	72	6	454	22.8	32.8	30.8		16.0	21.8	≤F_A	20.0	≤F_A
	L18U19	"	"	"	"	"	"	"	"	"	"	"	"	"		"	"	"	"	"
	U2M3	315	88	16	104	9	428	315	67	6	388	19.5	29.5	25.5		16.0	21.9	≤F_A	19.9	≤F_A
	M17U18	"	"	"	"	"	"	"	"	"	"	"	"	"		"	"	"	"	"
	M3L4	272	78	15	93	9	374	272	60	6	338	18.0	26.0	23.0		16.0	20.8	≤F_A	18.8	≤F_A
	L16M17	"	"	"	"	"	"	"	"	"	"	"	"	"		"	"	"	"	"
	M3U4	56	14	23	37	10	113	56	24	7	87	5.73	7.73			16.0	19.7	≤F_A	15.2	≤F_A
	U16M17	"	"	"	"	"	"	"	"	"	"	"	"			"	"	"	"	"
	U4M5	173	66	14	80	8	261	173	52	5	230	13.0	18.0	16.0		16.0	20.0	≤F_A	17.7	≤F_A
	M15U16	"	"	"	"	"	"	"	"	"	"	"	"	"		"	"	"	"	"
	M5L6	132	58	13	71	7	210	132	46	5	183	11.0	14.0	12.0		16.0	19.1	≤F_A	16.6	≤F_A
	L14M15	"	"	"	"	"	"	"	"	"	"	"	"	"		"	"	"	"	"
	M5U6	50	12	20	32	9	99	50	21	6	77	5.12	6.62			16.0	19.4	≤F_A	15.0	≤F_A
	U14M15	"	"	"	"	"	"	"	"	"	"	"	"			"	"	"	"	"
	U6M7	109	61	14	75	8	192	109	49	5	163	11.0	13.0			16.0	17.5	≤F_A	14.8	≤F_A
	M13U14	"	"	"	"	"	"	"	"	"	"	"	"			"	"	"	"	"
	M7L8	68	52	13	65	7	140	68	42	5	115	9.0	9.5			16.0	15.6	≤F_A	12.8	≤F_A
	L12M13	"	"	"	"	"	"	"	"	"	"	"	"			"	"	"	"	"
	L6M7	0.0	37	17	54	10	64	0.0	35	6	41	6.0				16.0	10.5	≤F_A	6.8	≤F_A
	M13L14	"	"	"	"	"	"	"	"	"	"	"	"			"	"	"	"	"
	M7U8	46	49	20	69	11	126	46	45	7	98	6.0	9.5	7.5		16.0	21.0	≤F_A	16.4	≤F_A
	U12M13	"	"	"	"	"	"	"	"	"	"	"	"	"		"	"	"	"	"
	U8M9	62	57	16	73	9	144	62	48	6	116	9.0	10.			16.0	16.0	≤F_A	12.8	≤F_A
	M11U12	"	"	"	"	"	"	"	"	"	"	"	"			"	"	"	"	"
	M9L1	20	48	14	62	8	90	20	40	5	65	7.0				16.0	12.9	≤F_A	9.2	≤F_A
	L10M11	"	"	"	"	"	"	"	"	"	"	"				"	"	"	"	"
	L8M9	0.0	44	16	60	9	"	"	39	6	"	10.0				16.0	6.9	≤F_A	4.5	≤F_A
	M11L12	"	"	"	"	"	"	"	"	"	"	"				"	"	"	"	"
	M9U10	45	55	18	73	10	128	45	47	7	99	10.0				16.0	12.8	≤F_A	9.9	≤F_A
	U10M11	"	"	"	"	"	"	"	"	"	"	"				"	"	"	"	"

GENERAL NOTES:

D.L. = DEAD LOAD (KIPS)
U.L.L. = UNIFORM LIVE LOAD (KIPS)
C.L.L. = CONCENTRATED LIVE LOAD (KIPS)
T.L.L. = U.L.L. + C.L.L. = TOTAL LIVE LOAD (KIPS)
IMP = IMPACT LOAD (KIPS)
T.L. = D.L. + T.L.L. + IMP = TOTAL LOAD (KIPS)
A_o = AREA FOR ORIGINAL MEMBER (IN^2)
A_{HS20} = AREA REQUIRED FOR HS20-44 LIVE LOAD (IN^2)
A_{H13} = AREA REQUIRED FOR H13 LIVE LOAD (IN^2)
L/R = LENGTH/RADIUS OF GYRATION = SLENDERNESS RATIO (IN) (IN)
F_A = ALLOWABLE STRESS (KSI)

*NOTE: THE NEW MEMBER AREAS, REQUIRED TO MAINTAIN STRESSES EQUAL TO OR LESS THAN THE ALLOWABLE STRESSES, WERE BASED ON CALCULATIONS ASSUMING THAT THE NEW DECK (SIDEWALK AND ROADWAY) AND ANY ADDITIONAL STEEL WOULD BE CARRIED BY BOTH THE NEW AND EXISTING MEMBER ELEMENTS.

DONORA - WEBSTER BRIDGE
REHABILITATION (H13 & HS
STRESS ANALYSIS SUMMAF
515 FT. SPAN NO. 5
DATE: 5/15/82 SHEET: A18

DONORA-WEBSTER

207 FT TRUSS SPAN NO. 6 (SIDEWALK TRUSS)

	TRUSS MEMBER	HS 20-44 LL STRESSES (K)						H 13 LL STRESSES (K)				AREAS (IN²)			L/r	STRESSES (KSI) ALLOW	HS 20-44		H 13 LL	
		D.L.	U.LL	C.LL	T.LL	IMP	T.L.	D.L.	T.LL	IMP	T.L.	A_O	$A_{HS\ 20}$	$A_{H\ 13}$		F_A	ORG.	NEW	ORG.	NEW
UPPER CHORD	L0U1	381	88	34	122	18	521	381	79	12	472	38.9	42		56.7	13.0	13.4	≤F_A	12.1	≤F_A
	U8L9	"	"	"	"	"	"	"	"	"	"	"	"			"	"	"	"	"
	U1U2	380	87	24	111	17	508	380	72	11	463	30.9	39.9	36.9	41.1	13.5	16.4	≤F_A	15.0	≤F_A
	U7U8	"	"	"	"	"	"	"	"	"	"	"	"	"		"	"	"	"	"
	U2U3	420	97	26	123	18	561	420	80	12	512	33.2	47.2	39.2	40.0	13.6	16.9	≤F_A	15.4	≤F_A
	U6U7	"	"	"	"	"	"	"	"	"	"	"	"	"		"	"	"	"	"
	U3U4	443	102	28	130	19	592	443	84	13	548	35.4	47.4	41.4	40.4	13.5	16.7	≤F_A	13.2	≤F_A
	U5U6	"	"	"	"	"	"	"	"	"	"	"	"	"		"	"	"	"	"
	U4U5	442	102	28	130	19	591	442	84	13	539	"	47.4	41.4	40.4	13.5	16.7	≤F_A	13.2	≤F_A
VERTICALS	U1L1	62		50	50	15	127	61	28	8	98	8.5				16.0	14.9	≤F_A	11.5	≤F_A
	U8L8	"		"	"	"	"	"	"	"	"	"				"	"	"	"	"
	U2L2	33	20	10	30	6	69	33	19	4	56	8.04			77.5	11.9	8.6	≤F_A	7.0	≤F_A
	U7L7	"	"	"	"	"	"	"	"	"	"	"				"	"	"	"	"
	U3L3	1	17	9	27	6	34	1	18	4	23	8.04			88.0	11.3	3.9	≤F_A	2.8	≤F_A
	U6L6	1	"	"	"	"	"	"	"	"	"	"				"	"	"	"	"
	U4L4	21	20	10	30	7	58	21	20	5	46	8.04			91.5	11.0	7.2	≤F_A	5.7	≤F_A
	U5L5	"	"	"	"	"	"	"	"	"	"	"				"	"	"	"	"
DIAGONALS	U1L2	136	37	17	54	9	199	136	35	6	177	10.0	14.0	12.0		16.0	19.9	≤F_A	17.7	≤F_A
	L7U8	"	"	"	"	"	"	"	"	"	"	"	"	"		"	"	"	"	"
	U2U3	80	29	15	44	8	132	80	29	5	114	7.0	10.0	8.0		16.0	18.9	≤F_A	16.3	≤F_A
	L6U7	"	"	"	"	"	"		"	"	"	"	"	"		"		"		"
	L2U3	0.0		31.6	31.6	9.2	40.8	0.0	17.2	5.	22.2	2.	3.			16.	20.4	≤F_A	11.1	≤F_A
	U6L7	"		"	"	"	"	"	"	"	"	"	"			"	"	"	"	"
	U3L4	51	26	16	42	9	102	51	27	6	84	6.	7.			16.0	17.0	≤F_A	14.0	≤F_A
	L5U6	"	"	"	"	"	"	"	"	"	"	"	"			"	"	"	"	"
	L3U4	0.0		32.2	32.2	8.4	40.6	0.0	18.7	4.81	23.5	2.0	3.			16.0	18.0	≤F_A	11.8	≤F_A
	U5L6	"		"	"	"	"	"	"	"	"	"	"			"	"	"	"	"
	U4L5	0.0		36.2	36.2	8.4	44.6	0.0	22.8	5.2	28.0	2.0	3.75			16.0	11.9	≤F_A	7.5	≤F_A
	L4U5	"		"	"	"	"	"	"	"	"	"	"			"	"	"	"	"
LOWER CHORD	L0L1	269	62	17	79	12	360	269	51	8	328	17.5	24.5	21.5		16.0	20.6	≤F_A	18.7	≤F_A
	L8L9	"	"	"	"	"	"	"	"	"	"	"	"	"		"	"	"	"	"
	L1L2	269	"	"	"	"	360	269	"	"	328	"	24.5	21.5		"	20.6	≤F_A	18.7	≤F_A
	L7L8	"	"	"	"	"	"	"	"	"	"	"	"	"		"	"	"	"	"
	L2L3	365	84	23	107	16	488	365	69	11	445	22.5	31.5	28.5		16.0	21.7	≤F_A	19.8	≤F_A
	L6L7	"	"	"	"	"	"	"	"	"	"	"	"	"		"	"	"	"	"
	L3L4	414	95	26	121	18	553	414	79	12	504	25.5	37.0	34.0		16.0	22.1	≤F_A	19.8	≤F_A
	L5L6	"	"	"	"	"	"	"	"	"	"	"	"	"		"	"	"	"	"
	L4L5	443	102	27	129	19	591	443	84	12	539	27.0	40.0	36.0		16.0	21.9	≤F_A	20.0	≤F_A

207 FT TRUSS SPAN NO. 6 (NON-SIDEWALK TRUSS)

	TRUSS MEMBER	HS 20-44 LL STRESSES (K)						H 13 LL STRESSES (K)				AREAS (IN²)			L/r	STRESSES (KSI) ALLOW	HS 20-44		H 13 LL	
		D.L.	U.LL	C.LL	T.LL	IMP	T.L.	D.L.	T.LL	IMP	T.L.	A_O	$A_{HS\ 20}$	$A_{H\ 13}$		F_A	ORG.	NEW	ORG.	NEW
UPPER CHORD	L0U1	303	88	34	122	18	443	303	79	12	394	38.9			56.7	13.0	11.4	≤F_A	10.1	≤F_A
	U8L9	"	"	"	"	"	"	"	"	"	"	"				"	"	"	"	"
	U1U2	303	87	24	111	17	431	303	72	11	386	30.9	33.9		41.1	13.5	13.9	≤F_A	12.5	≤F_A
	U7U8	"	"	"	"	"	"	"	"	"	"	"	"			"	"	"	"	"
	U2U3	335	97	26	123	18	476	335	80	12	427	33.2	36.2		40.0	13.6	14.4	≤F_A	12.9	≤F_A
	U6U7	"	"	"	"	"	"	"	"	"	"	"	"			"	"	"	"	"
	U3U4	353	102	28	130	19	502	353	84	13	450	35.4	38.4		40.4	13.5	14.2	≤F_A	12.7	≤F_A
	U5U6	"	"	"	"	"	"	"	"	"	"	"	"			"	"	"	"	"
	U4U5	352	102	28	130	19	501	352	84	13	449	35.4	38.4		40.4	13.6	14.2	≤F_A	12.7	≤F_A
VERTICALS	U1L1	48		50	50	15	113	48	28	8	84	8.5				16.0	13.3	≤F_A	9.9	≤F_A
	U8L8	"		"	"	"	"	"	"	"	"	"				"	"	"	"	"
	U2L2	27	20	10	30	6	63	27	19	4	50	8.04			77.5	8.90	7.8	≤F_A	6.3	≤F_A
	U7L7	"	"	"	"	"	"	"	"	"	"	"				"	"	"	"	"
	U3L3	1	18	10	28	5	34	1	18	4	23	8.04			88.0	7.40	4.2	≤F_A	2.9	≤F_A
	U6L6	"	"	"	"	"	"	"	"	"	"	"				"	"	"	"	"
	U4L4	16	21	10	31	7	53	16	20	5	51	8.04			91.5	6.84	6.6	≤F_A	6.3	≤F_A
	U5L5	"	"	"	"	"	"	"	"	"	"	"				"	"	"	"	"
DIAGONALS	U1L2	108	37	17	54	9	171	108	35	6	149	10.0	11.0			16.0	17.2	≤F_A	14.9	≤F_A
	L7U8	"	"	"	"	"	"	"	"	"	"	"	"			"	"	"	"	"
	U2L3	64	29	15	44	8	116	52	29	5	98	7.0	8.			16.0	16.6	≤F_A	14.0	≤F_A
	L6U7	"	"	"	"	"	"	"	"	"	"	"				"		"		"
	L2U3	0.0		31.6	31.6	9.2	40.8	0.0	17	5	22.2	2.	3.			16.	20.4	≤F_A	11.1	≤F_A
	U6L7	"		"	"	"	"	"	"	"	"	"	"			"	"	"	"	"
	U3L4	40	26	16	42	9	91	40	27	6	73	6.0				16.0	15.2	≤F_A	12.2	≤F_A
	L5U6	"	"	"	"	"	"	"	"	"	"	"				"	"	"	"	"
	L3U4	0.0		32.2	32.2	8.4	40.6	0.0	18.7	4.8	23.5	2.0	3.			16.0	18.0	≤F_A	11.8	≤F_A
	U5L6	"		"	"	"	"	"	"	"	"	"	"			"	"	"	"	"
	U4L5	0.0		36.2	36.2	8.4	44.6	0.0	22.8	5.2	28.0	2.0	3.			16.0	21.6	≤F_A	14.0	≤F_A
	L4U5	"		"	"	"	"	"	"	"	"	"	"			"	"	"	"	"
LOWER CHORD	L0L1	214	62	17	79	12	305	214	51	8	273	17.5	20.			16.0	17.4	≤F_A	15.6	≤F_A
	L8L9	"	"	"	"	"	"	"	"	"	"	"	"			"	"	"	"	"
	L1L2	214	"	"	"	"	305	214	51	8	273	17.5	20.			16.0	17.4	≤F_A	15.6	≤F_A
	L7L8	"	"	"	"	"	"	"	"	"	"	"	"			"	"	"	"	"
	L2L3	291	84	23	107	16	414	291	69	11	371	22.5	27.0	23.5		16.0	18.4	≤F_A	16.5	≤F_A
	L6L7	"	"	"	"	"	"	"	"	"	"	"	"	"		"	"	"	"	"
	L3L4	330	95	26	121	18	469	330	78	12	421	25.5	31.1	27.2		16.0	18.8	≤F_A	16.8	≤F_A
	L5L6	"	"	"	"	"	"	"	"	"	"	"	"	"		"	"	"	"	"
	L4L5	353	102	28	130	19	501	353	84	12	449	27	32.6	28.5		16.0	18.6	≤F_A	16.6	≤F_A

GENERAL NOTES:

D.L. = DEAD LOAD (KIPS)
U.L.L. = UNIFORM LIVE LOAD (KIPS)
C.L.L. = CONCENTRATED LIVE LOAD (KIPS)
T.L.L. = U.L.L. + C.L.L. = TOTAL LIVE LOAD (KIPS)
IMP = IMPACT LOAD (KIPS)
T.L. = D.L. + T.L.L. + IMP = TOTAL LOAD (KIPS)
A_O = AREA FOR ORIGINAL MEMBER (IN²)
A_{HS20} = AREA REQUIRED FOR HS20-44 LIVE LOAD (IN²)
A_{H13} = AREA REQUIRED FOR H13 LIVE LOAD (IN²)
L/R = LENGTH/RADIUS OF GYRATION = SLENDERNESS RATIO (IN) (IN)
F_A = ALLOWABLE STRESS (KSI)

*NOTE: THE NEW MEMBER AREAS, REQUIRED TO MAINTAIN STRESSES EQUAL TO OR LESS THAN THE ALLOWABLE STRESSES, WERE BASED ON CALCULATIONS ASSUMING THAT THE NEW DECK (SIDEWALK AND ROADWAY) AND ANY ADDITIONAL STEEL WOULD BE CARRIED BY BOTH THE NEW AND EXISTING MEMBER ELEMENTS.

DONORA - WEBSTER BRIDGE
REHABILITATION (H13 & HS20)
STRESS ANALYSIS SUMMARY
207 FT. SPAN NO. 6
DATE: 5/15/82 SHEET: A19 OF

D-9002 (3-77)

STRESS ANALYSIS SUMMARY OF 184' TRUSS SPANS NO. 2, 3, & 4 (REHABILITATION)

TYPE & LOCATION OF OVERSTRESSED TRUSS MEMBERS	NUMBER OF OVERSTRESSED TRUSS MEMBERS					
	SIDEWALK (D.S.) TRUSS		NON-SIDEWALK (U.S.) TRUSS		TOTALS	
	HS20-44	H13	HS20-44	H13	HS20-44	H13
UPPER CHORD COMPRESSION TRUSS MEMBERS	6	6	6	---	12	6
VERTICAL TENSION TRUSS MEMBERS	---	---	---	---	---	---
VERTICAL COMP. TRUSS MEMBERS	---	---	---	---	---	---
MAIN DIAGONAL TENSION MEMBERS	2	2	2	---	4	2
SECONDARY DIAGONAL TENSION MEMBERS (COUNTERS)	2	---	2	---	4	---
LOWER CHORD TENSION MEMBERS	8	8	8	6	16	14
TOTAL NUMBER OF OVERSTRESSED TRUSS MEMBERS PER EACH 184' SPANS NO. 2, 3 & 4 FOR EACH LIVE LOAD CONDITION =					36	22

NOTE:

REFER TO PLAN SHEET(S) A16 / _____ FOR STRESS ANALYSIS SUMMARY TABLES ON 184 FT. TRUSS SPAN NO. 2,3&4 TO VERIFY THE NUMBER AND TYPE OF "OVERSTRESSED" TRUSS MEMBERS.

BY DEFINITION, "OVERSTRESSED" TRUSS MEMBERS ARE THOSE MEMBERS WHICH THE ACTUAL STRESS VALUE EXCEEDS THE ALLOWABLE STRESS VALUE (F_A) FOR A PARTICULAR DEAD LOAD AND LIVE LOAD CONDITION, AS SHOWN ALONG THE RIGHT-HAND SIDE OF EACH STRESS TABLE UNDER BOTH HS20-44 AND H13 LIVE LOADS.

STRESS ANALYSIS SUMMARY OF 515' TRUSS SPAN NO. 5 (REHABILITATION)

TYPE & LOCATION OF OVERSTRESSED TRUSS MEMBERS	NUMBER OF OVERSTRESSED TRUSS MEMBERS					
	SIDEWALK (D.S.) TRUSS		NON-SIDEWALK (U.S.) TRUSS		TOTALS	
	HS20-44	H13	HS20-44	H13	HS20-44	H13
UPPER CHORD COMPRESSION TRUSS MEMBERS	20	20	20	20	40	40
VERTICAL TENSION TRUSS MEMBERS	10	---	8	---	18	---
VERTICAL COMP. TRUSS MEMBERS	5	4	5	4	10	8
MAIN DIAGONAL TENSION MEMBERS	22	18	20	10	42	28
SECONDARY DIAGONAL TENSION MEMBERS (COUNTERS)	---	---	---	---	---	---
LOWER CHORD TENSION MEMBERS	20	20	20	20	40	40
TOTAL NUMBER OF OVERSTRESSED TRUSS MEMBERS IN 515' SPAN NO. 6 FOR EACH LIVE LOAD CONDITION =					150	116

NOTE:

REFER TO PLAN SHEET(S) A17-A18/ _____ FOR STRESS ANALYSIS SUMMARY TABLES ON 515 FT. TRUSS SPAN NO. 5 TO VERIFY THE NUMBER AND TYPE OF "OVERSTRESSED" TRUSS MEMBERS.

STRESS ANALYSIS SUMMARY OF 207' TRUSS SPAN NO. 6 (REHABILITATION)

TYPE & LOCATION OF OVERSTRESSED TRUSS MEMBERS	NUMBER OF OVERSTRESSED TRUSS MEMBERS					
	SIDEWALK (D.S.) TRUSS		NON-SIDEWALK (U.S.) TRUSS		TOTALS	
	HS20-44	H13	HS20-44	H13	HS20-44	H13
UPPER CHORD COMPRESSION TRUSS MEMBERS	9	9	7	5	16	14
VERTICAL TENSION TRUSS MEMBERS	---	---	---	---	---	---
VERTICAL COMP. TRUSS MEMBERS	---	---	---	---	---	---
MAIN DIAGONAL TENSION MEMBERS	6	4	---	---	6	4
SECONDARY DIAGONAL TENSION MEMBERS (COUNTERS)	4	---	4	---	8	---
LOWER CHORD TENSION MEMBERS	9	9	9	5	18	14
TOTAL NUMBER OF OVERSTRESSED TRUSS MEMBERS IN 207' SPAN NO. 6 FOR EACH LIVE LOAD CONDITION =					48	32

NOTE:

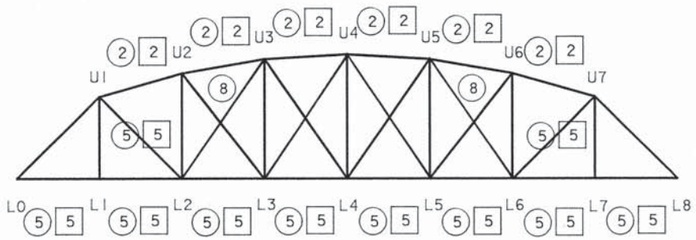
REFER TO PLAN SHEET(S) A19 / _____ FOR STRESS ANALYSIS SUMMARY TABLES ON 207 FT. TRUSS SPAN NO. 6 TO VERIFY THE NUMBER AND TYPE OF "OVERSTRESSED" TRUSS MEMBERS.

STRESS ANALYSIS SUMMARY OF ALL TRUSS SPANS NO. 2 THRU 6 (REHABILITATION)

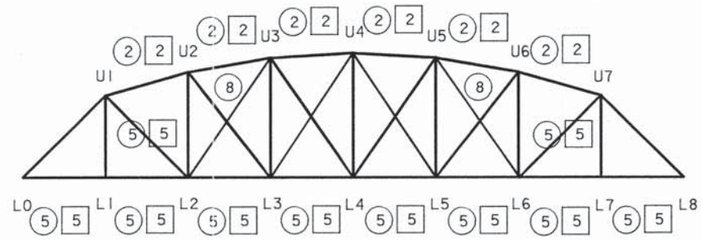
TYPE & LOCATION OF OVERSTRESSED TRUSS MEMBERS	NUMBER OF OVERSTRESSED TRUSS MEMBERS					
	SIDEWALK (D.S.) TRUSS		NON-SIDEWALK (U.S.) TRUSS		TOTALS	
	HS20-44	H13	HS20-44	H13	HS20-44	H13
UPPER CHORD COMPRESSION TRUSS MEMBERS	47	47	45	25	92	72
VERTICAL TENSION TRUSS MEMBERS	10	--	8	--	18	--
VERTICAL COMP. TRUSS MEMBERS	5	4	5	4	10	8
MAIN DIAGONAL TENSION MEMBERS	34	28	26	10	60	38
SECONDARY DIAGONAL TENSION MEMBERS (COUNTERS)	10	--	10	--	20	--
LOWER CHORD TENSION MEMBERS	53	53	53	43	106	96
TOTAL NUMBER OF OVERSTRESSED TRUSS MEMBERS IN ALL FIVE TRUSS SPANS NO. 2 THRU 6 FOR EACH LIVE LOAD COND.					306	214

DONORA - WEBSTER BRIDGE
REHABILITATION (H13 & HS20)
STRESS ANALYSIS SUMMARY
"OVERSTRESSED" TRUSS MEMBERS
DATE: 5/15/82 SHEET: A20 OF

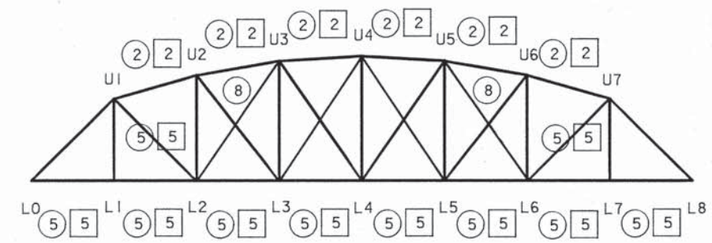
BARCLAY BROS. INC.



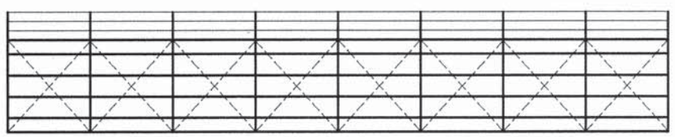
SIDEWALK TRUSS ELEVATION
SPAN NO. 2



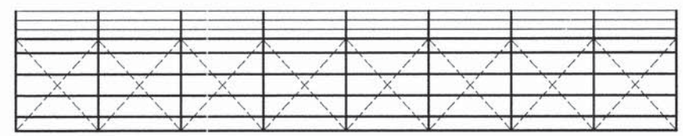
SIDEWALK TRUSS ELEVATION
SPAN NO. 3



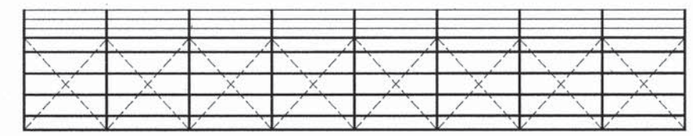
SIDEWALK TRUSS ELEVATION
SPAN NO. 4



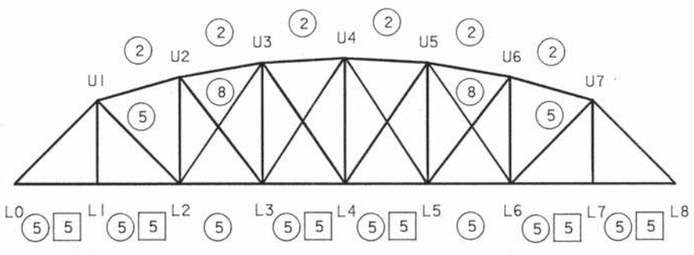
FLOOR PLAN
SPAN NO. 2



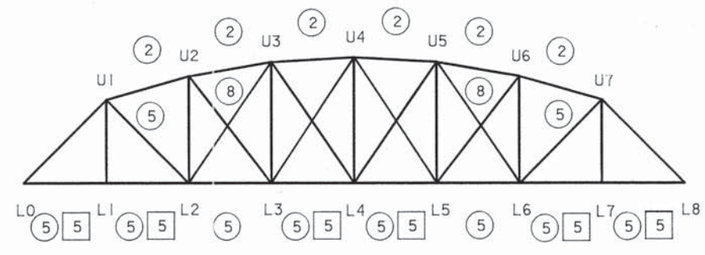
FLOOR PLAN
SPAN NO. 3



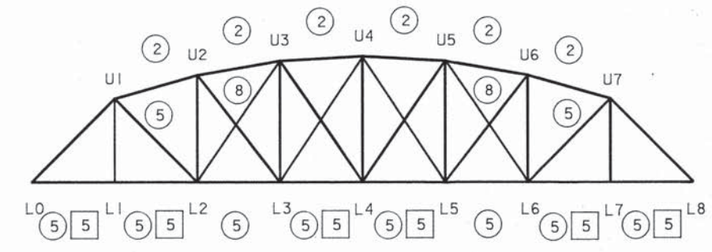
FLOOR PLAN
SPAN NO. 4



NON-SIDEWALK TRUSS ELEVATION
SPAN NO. 2



NON-SIDEWALK TRUSS ELEVATION
SPAN NO. 3



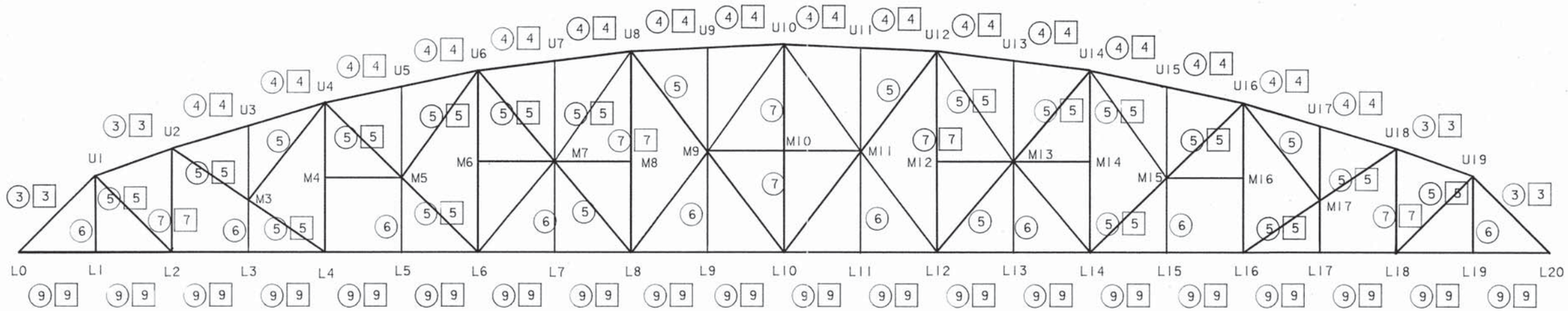
NON-SIDEWALK TRUSS ELEVATION
SPAN NO. 4

NOTE:
REFER TO PLAN SHEET A24 FOR GENERAL DESCRIPTION AND SKETCH OF EACH TYPE OF REHABILITATION REPAIR

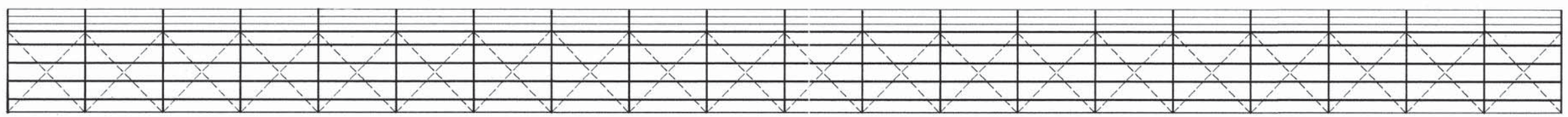
NOTE:
"○" DENOTES TYPE & LOCATION OF EACH TRUSS MEMBER STRENGTHENING REPAIR UNDER HS20-44 REHABILITATION
"□" DENOTES TYPE & LOCATION OF EACH TRUSS MEMBER STRENGTHENING REPAIR UNDER H-13 REHABILITATION

SCALE
0 10 20 40

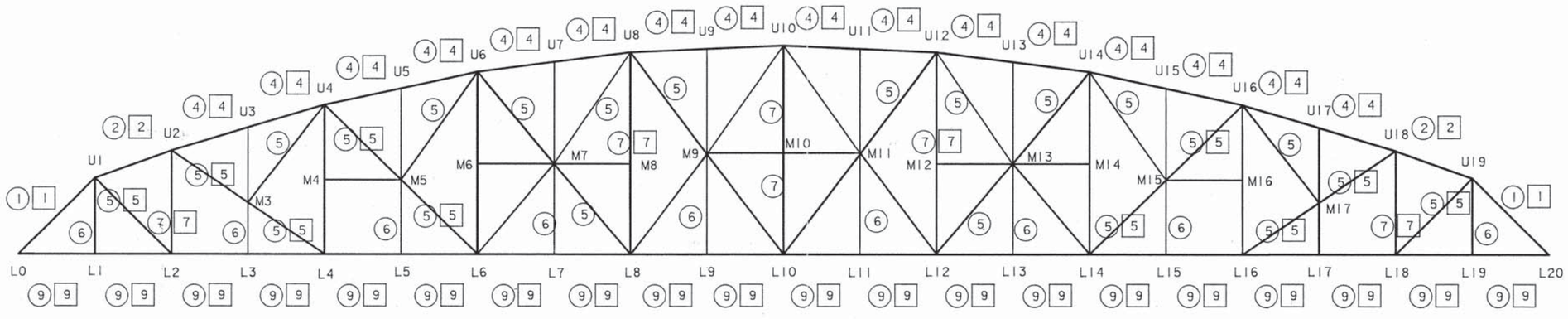
DONORA - WEBSTER BRIDGE
REHABILITATION (H13 & H20)
TRUSS REPAIR DIAGRAMS
184 FT. SPANS NO. 2, 3 & 4
DATE: 5/15/82 SHEET: A21



SIDEWALK TRUSS ELEVATION
SPAN NO. 5



FLOOR PLAN
SPAN NO. 5



NON-SIDEWALK TRUSS ELEVATION
SPAN NO. 5

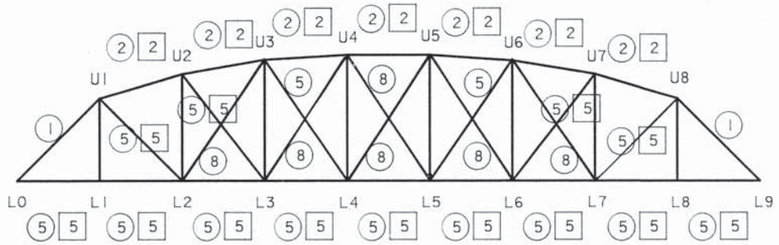
NOTE:
REFER TO PLAN SHEET A24 FOR GENERAL DESCRIPTION AND SKETCH OF EACH TYPE OF REHABILITATION REPAIR

NOTE:
"○" DENOTES TYPE & LOCATION OF EACH TRUSS MEMBER STRENGTHENING REPAIR UNDER HS20-44 REHABILITATION
"□" DENOTES TYPE & LOCATION OF EACH TRUSS MEMBER STRENGTHENING REPAIR UNDER H-13 REHABILITATION

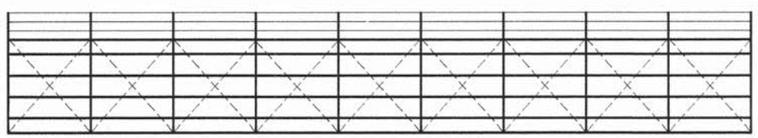
SCALE
0 10 20 40

DONORA - WEBSTER BRIDGE
REHABILITATION (H13 & H20)
TRUSS REPAIR DIAGRAMS
515 FT. SPAN NO. 5

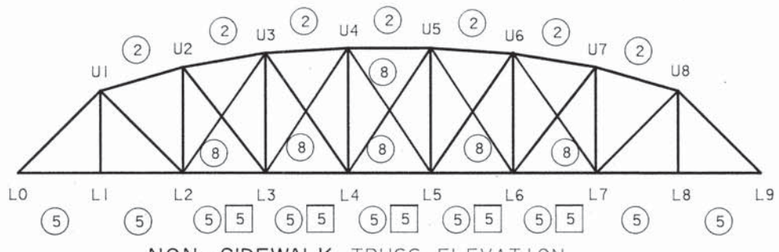
DATE: 5/15/82 SHEET: A22



SIDEWALK TRUSS ELEVATION
SPAN NO. 6



FLOOR PLAN
SPAN NO. 6



NON-SIDEWALK TRUSS ELEVATION
SPAN NO. 6

NOTE:

REFER TO PLAN SHEET A24 FOR GENERAL DESCRIPTION AND SKETCH OF EACH TYPE OF REHABILITATION REPAIR

NOTE:

'○' DENOTES TYPE & LOCATION OF EACH TRUSS MEMBER STRENGTHENING REPAIR UNDER HS20-44 REHABILITATION

'□' DENOTES TYPE & LOCATION OF EACH TRUSS MEMBER STRENGTHENING REPAIR UNDER H-13 REHABILITATION

SCALE
0 10 20 40

DONORA - WEBSTER BRIDGE
REHABILITATION (H13 & H20)
TRUSS REPAIR DIAGRAMS
207 FT. SPAN NO. 6

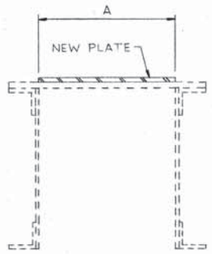
DATE: 5/15/82 SHEET: A23

D-9002 (3-77)

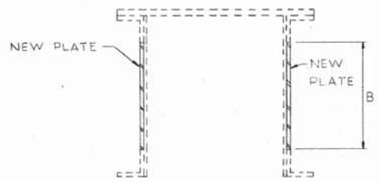
TRUSS SPAN	DIMENSION			
	A	B	C	D
184'	18"	12"	12"	VARIES/ MEMBER
515'	24"	18"	14"	VARIES/ MEMBER
207'	18"	12"	12"	VARIES/ MEMBER

GENERAL NOTES:

1. TYPE (1) THRU (4) ARE UPPER CHORD COMPRESSION MEMBER REPAIRS.
2. TYPE (5) IS MAIN DIAGONAL AND LOWER CHORD TENSION MEMBER REPAIR.
3. TYPE (6) IS VERTICAL TENSION MEMBER REPAIR.
4. TYPE (7) IS VERTICAL COMPRESSION MEMBER REPAIR
5. TYPE (8) IS THE DIAGONAL TENSION (COUNTER) MEMBER REPAIR.
6. TYPE (9) IS AN ALTERNATE LOWER CHORD REPAIR



TYPE (1)
NO SCALE



TYPE (2)
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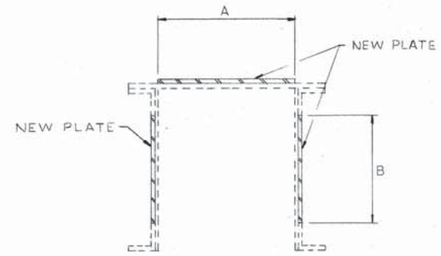

TYPE (3)
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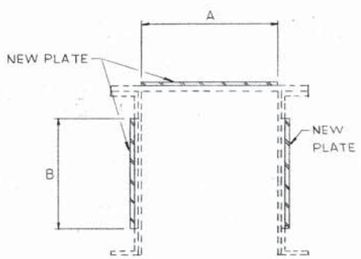

TYPE (4)
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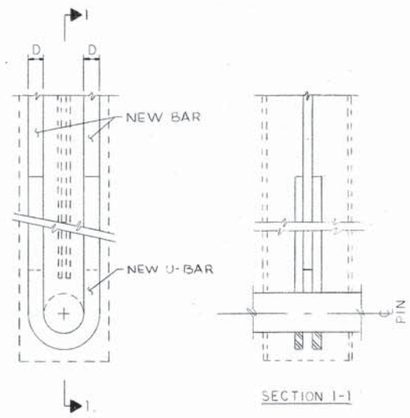

TYPE (6)
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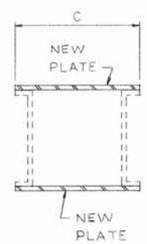

TYPE (7)
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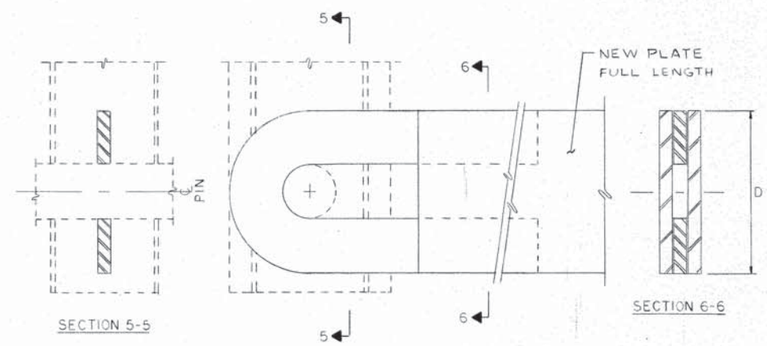

TYPE (9)
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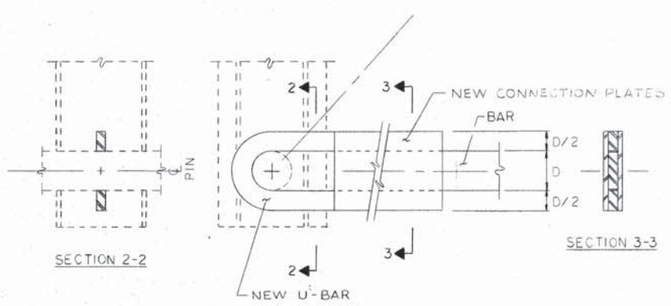

TYPE (5)
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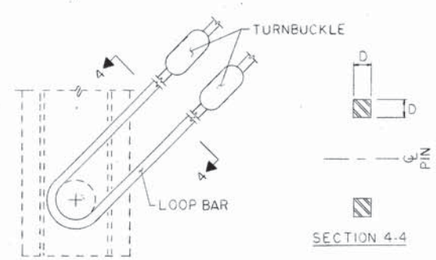
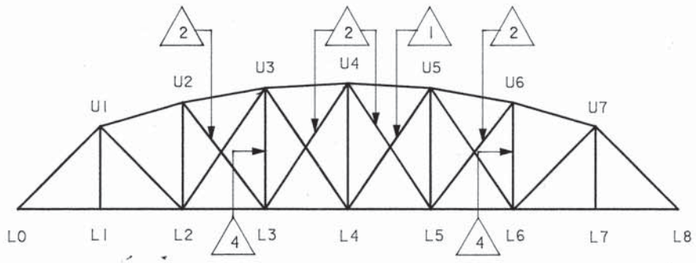


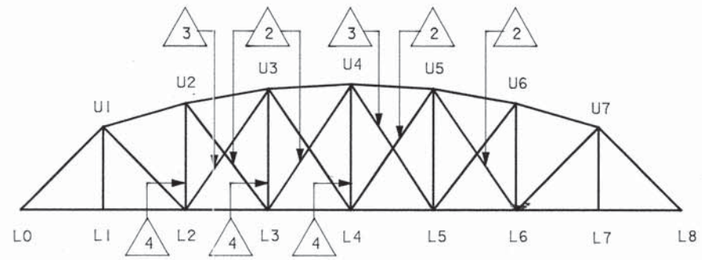
TYPE (8)
NO SCALE

DONORA - WEBSTER BRIDGE
REHABILITATION (H13 & H20)
TYPICAL REPAIR TYPES
ALL TRUSS SPANS NO. 2 - 6
DATE: 5/15/82 SHEET: A24 OF

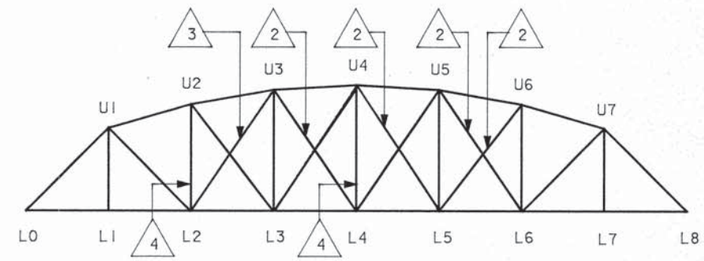
BARCLAY BROS., INC.



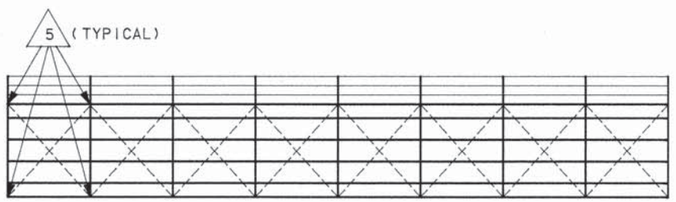
SIDEWALK TRUSS ELEVATION
SPAN NO. 2



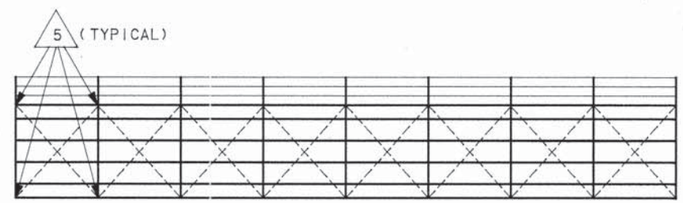
SIDEWALK TRUSS ELEVATION
SPAN NO. 3



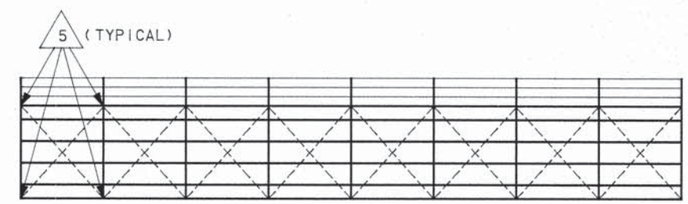
SIDEWALK TRUSS ELEVATION
SPAN NO. 4



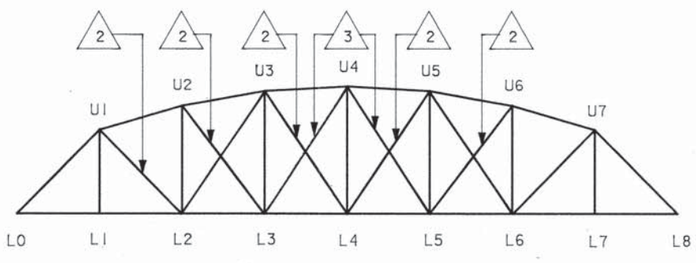
FLOOR PLAN
SPAN NO. 2



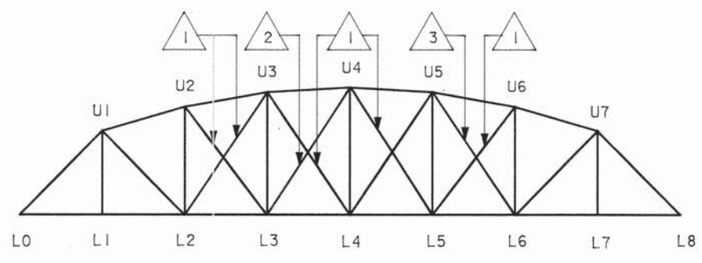
FLOOR PLAN
SPAN NO. 3



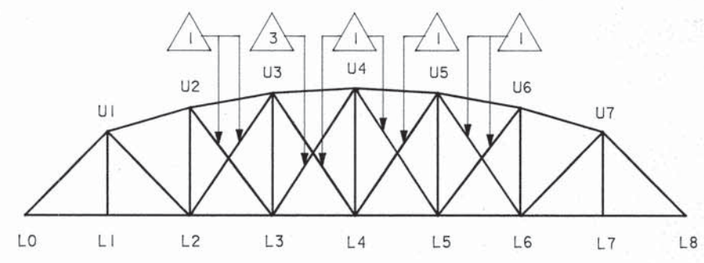
FLOOR PLAN
SPAN NO. 4



NON-SIDEWALK TRUSS ELEVATION
SPAN NO. 2



NON-SIDEWALK TRUSS ELEVATION
SPAN NO. 3



NON-SIDEWALK TRUSS ELEVATION
SPAN NO. 4

GENERAL REPAIR NOTES:

I. TIGHTEN ALL LOOSE I-BARS OF DIAGONAL TENSION TRUSS MEMBERS BY USE OF EXISTING TURNBUCKLES (IF ANY) OR BY USING THE HEAT-CLAMP TIGHTENING PROCESS FOR THE FOLLOWING REPAIR LOCATIONS:

1. OUTSIDE I-BAR LOOSE AND NEEDS TIGHTENING.
2. INSIDE I-BAR LOOSE AND NEEDS TIGHTENING.
3. BOTH I-BARS (COUNTERS) LOOSE AND NEED TIGHTENING.

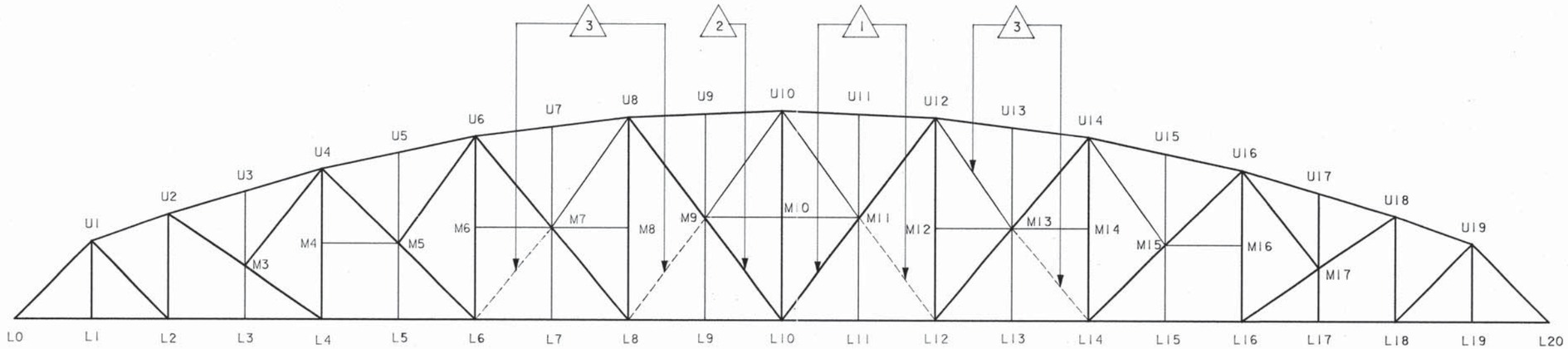
II. REPAIR ALL DETERIORATED VERTICAL COMPRESSION TRUSS MEMBERS WITH MAJOR SECTION LOSS IN THE WEB AREAS OF THE CHANNELS BY WELDING PLATES AROUND THE HOLES (REPAIR LOCATION 4).

III. REPLACE ALL DETERIORATED LOWER LATTER GUSSET PLATES AND ANGLES THROUGHOUT THE FLOOR SYSTEM OF EACH TRUSS SPAN (REPAIR LOCATION 5).

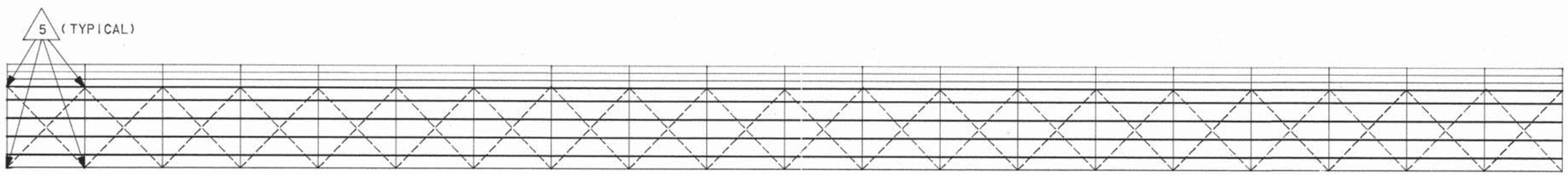
SCALE
0 10 20 40

DONORA - WEBSTER BRIDGE
GENERAL REHABILITATION
TRUSS REPAIR DIAGRAMS
184 FT. SPANS NO. 2, 3 & 4

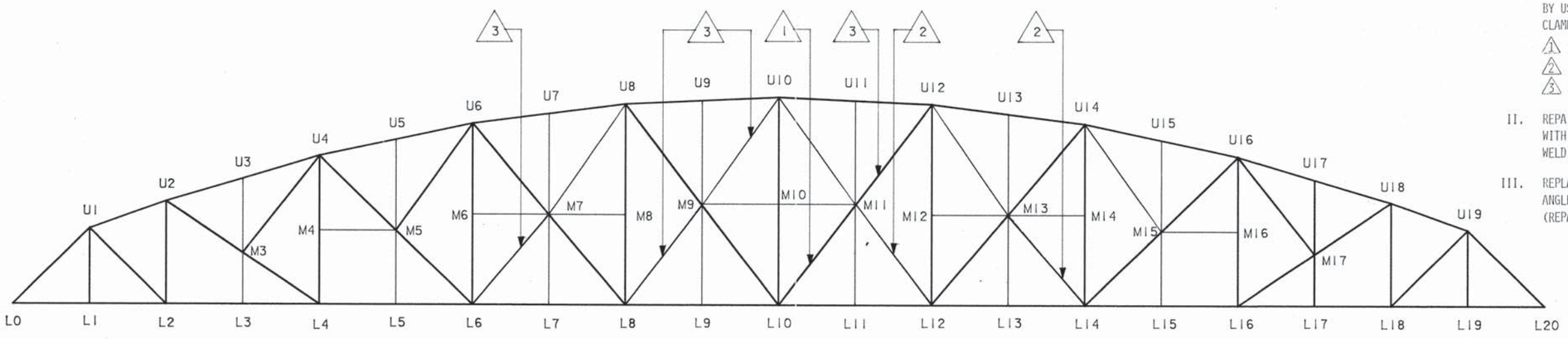
DATE: 5/15/82 SHEET: A25 OF



SIDEWALK TRUSS ELEVATION
SPAN NO. 5



FLOOR PLAN
SPAN NO. 5



NON-SIDEWALK TRUSS ELEVATION
SPAN NO. 5

GENERAL REPAIR NOTES:

I. TIGHTEN ALL LOOSE I-BARS OF DIAGONAL TENSION TRUSS MEMBERS BY USE OF EXISTING TURNBUCKLES (IF ANY) OR BY USING THE HEAT-CLAMP TIGHTENING PROCESS FOR THE FOLLOWING REPAIR LOCATIONS:

1. OUTSIDE I-BAR LOOSE AND NEEDS TIGHTENING.
2. INSIDE I-BAR LOOSE AND NEEDS TIGHTENING.
3. BOTH I-BARS (COUNTERS) LOOSE AND NEED TIGHTENING.

II. REPAIR ALL DETERIORATED VERTICAL COMPRESSION TRUSS MEMBERS WITH MAJOR SECTION LOSS IN THE WEB AREAS OF THE CHANNELS BY WELDING PLATES AROUND THE HOLES (REPAIR LOCATION 4).

III. REPLACE ALL DETERIORATED LOWER LATTER GUSSET PLATES AND ANGLES THROUGHOUT THE FLOOR SYSTEM OF EACH TRUSS SPAN (REPAIR LOCATION 5).

SCALE
0 10 20 40

DONORA - WEBSTER BRIDGE
GENERAL REHABILITATION
TRUSS REPAIR DIAGRAMS
515 FT. SPAN NO. 5

DATE: 5/15/82 SHEET: A26 OF