

PLAN

APPROVAL IS SUBJECT TO CONTRACT REQUIREMENTS AND CHANGES INDICATED IN RED, IF ANY HEREIN.

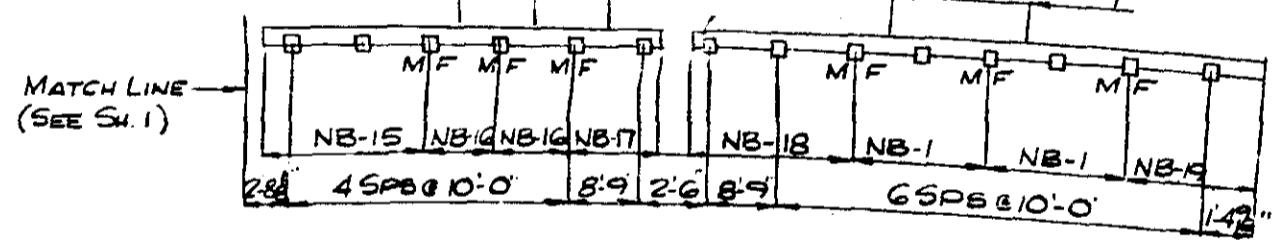
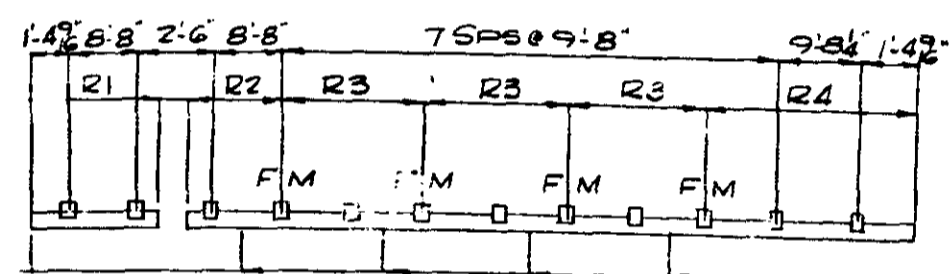
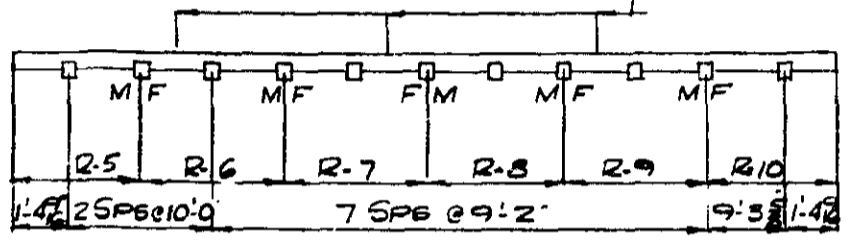
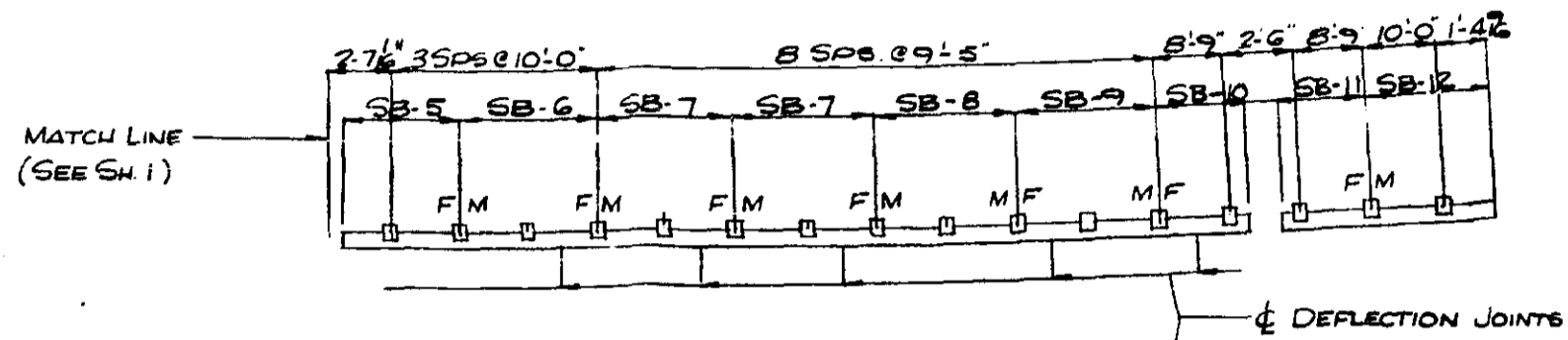
**APPROVED**  
STATE OF MINNESOTA  
MAR 21 1967  
DEPT. OF HIGHWAYS  
*R. L. Johnson*  
ENGINEER

**BRIDGE NO. 9340**

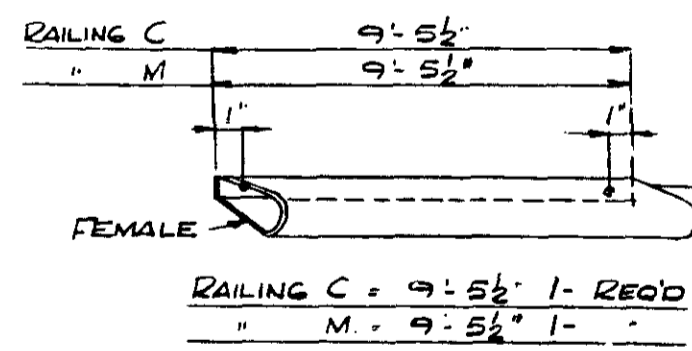
ONE LINE STEEL BRIDGE RAIL  
STATE PROJ. NO. 2783-08 (T.H. 35W-394)  
MINN. PROJ. NO. TIG 35W-3 (SB) 112  
FABRICATOR: MILLERBERND MANUFACTURING CO.  
SUPPLIER: WHEELER LUMBER BRIDGE & SUPPLY CO.  
CONTRACTOR: INDUSTRIAL CONSTRUCTION CO.

MAR 1967  
REC'D  
BRIDGE  
DIV.  
1001842522

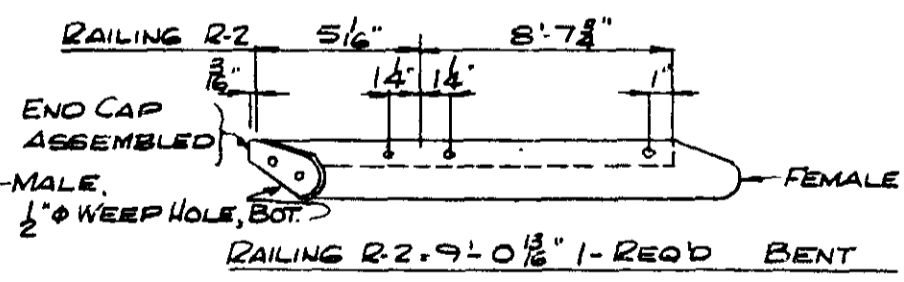
M. H. D. - FILE



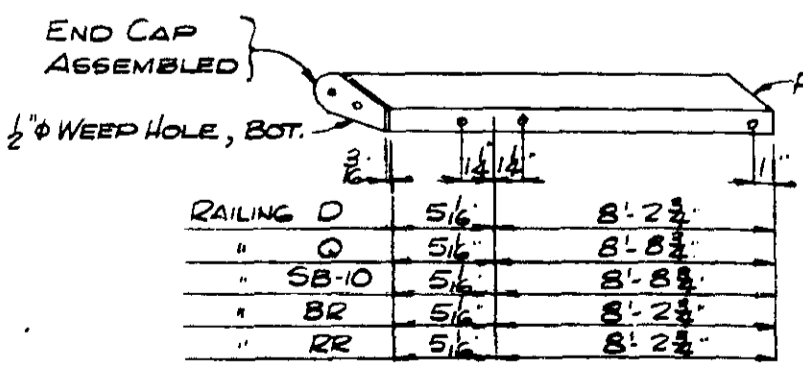
PLAN



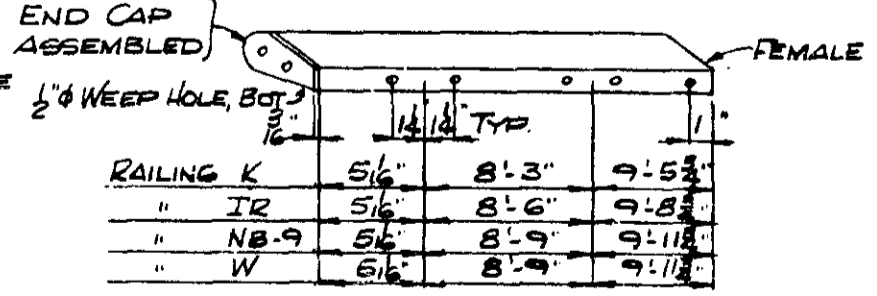
RAILING C = 9'-5 1/2" 1-REQ'D  
" M = 9'-5 1/2" 1-



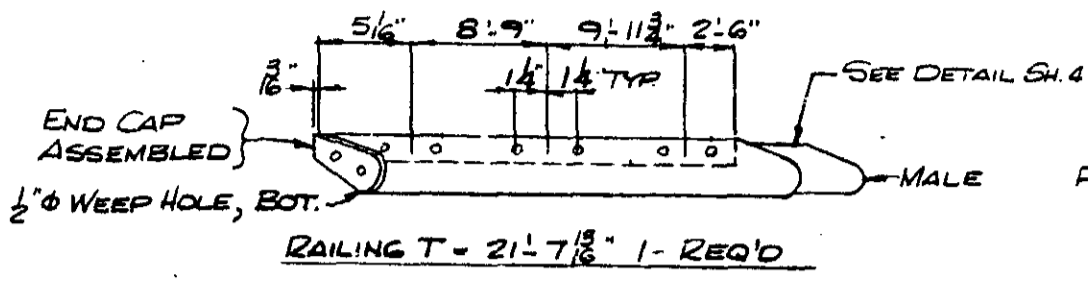
RAILING R-2 = 9'-0 1/2" 1-REQ'D BENT



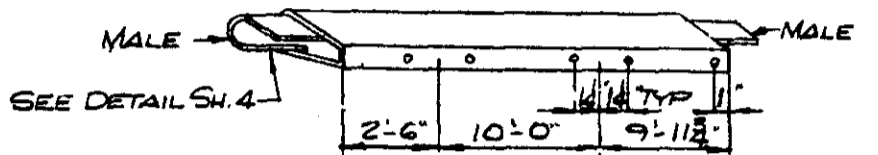
RAILING D = 8'-7 3/8" 6-REQ'D  
" O = 9'-1 1/2" 1- BENT  
" SB-10 = 9'-1 1/2" 1- BENT  
" BR = 8'-7 3/8" 1- "  
" RR = 8'-7 3/8" 1- "



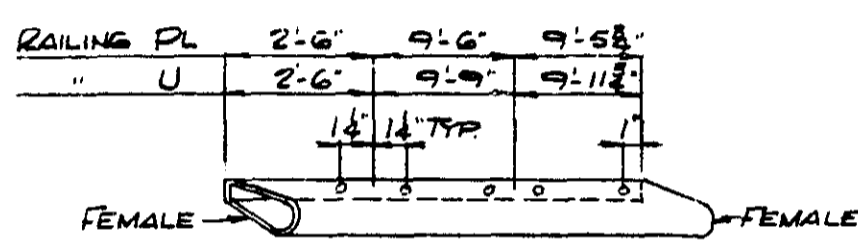
RAILING K = 18'-1 1/2" 2-REQ'D  
" IR = 18'-7 1/2" 1- BENT  
" NB-9 = 19'-1 1/2" 1- "  
" W = 19'-1 1/2" 1- "



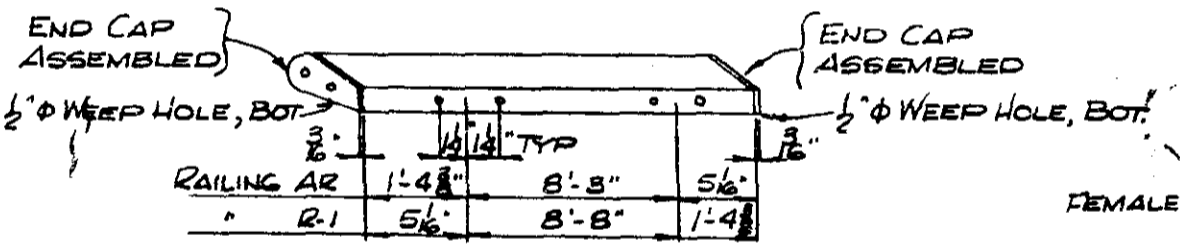
RAILING T = 21'-7 1/8" 1-REQ'D



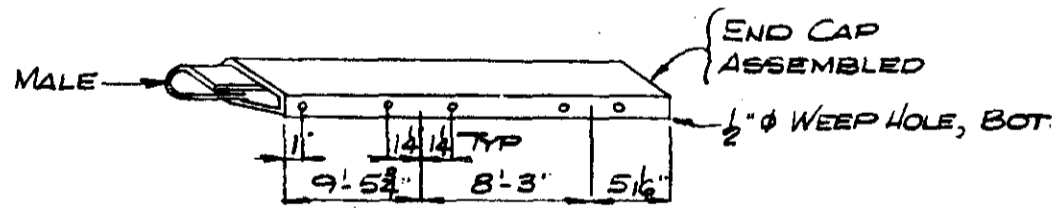
RAILING OL = 22'-5 3/4" 1-REQ'D BENT



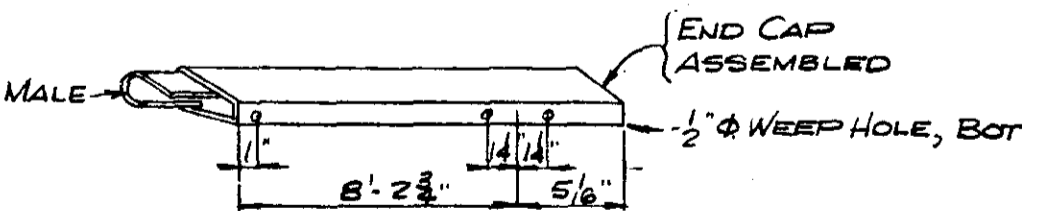
RAILING PL = 21'-5 3/8" 1-REQ'D BENT  
" U = 22'-2 3/4" 1-



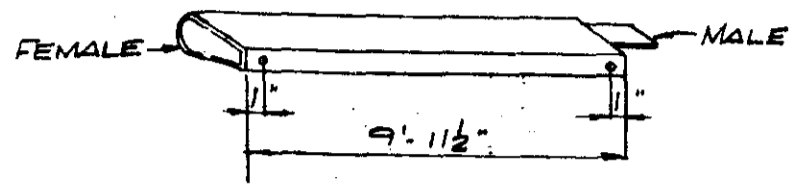
RAILING AR = 10'-0 7/8" 1-REQ'D BENT  
" R-1 = 10'-5 1/2" 1-



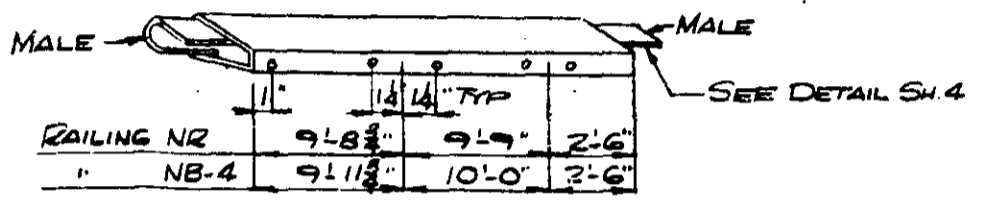
RAILING J = 18'-1 1/2" 2-REQ'D



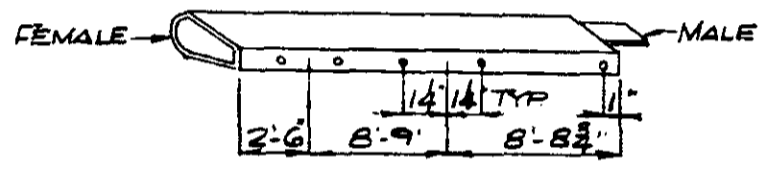
RAILING S = 8'-7 1/8" 1-REQ'D



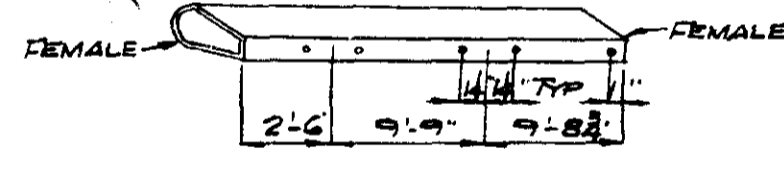
RAILING NB-16 = 9'-11 1/2" 2-REQ'D BENT



RAILING NR = 21'-11 3/8" 1-REQ'D BENT  
" NB-4 = 22'-5 3/4" 1-



RAILING OR = 19'-11 3/8" 1-REQ'D BENT



RAILING NB-5 = 21'-11 3/8" 1-REQ'D BENT

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STATE OF MINNESOTA  
MAR 21 1967  
DEPT. OF HIGHWAYS  
D. H. WILSON  
BRIDGE ENGINEER

MAR 1967  
REC'D  
BRIDGE DIV.

BRIDGE NO. 9340  
ONE LINE STEEL BRIDGE RAIL  
STATE PROJ. NO. 2783-08 (TH. 35W-394)  
MINN. PROJ. NO. I-16 35W-3(58)112  
FABRICATOR: MILLERBERND MANUFACTURING CO.  
SUPPLIER: WHEELER LUMBER BRIDGE & SUPPLY CO.  
CONTRACTOR: INDUSTRIAL CONSTRUCTION CO.

M. H. D. - FILE

RAILING BL	9'-2 1/2"	9'-2 1/2"
JL	9'-11 1/2"	9'-11 1/2"
DR	9'-5 1/2"	9'-5 1/2"
A	9'-5 1/2"	9'-5 1/2"
O	9'-11 1/2"	9'-11 1/2"
NB-7	9'-8 1/2"	9'-8 1/2"
NB-10	9'-11 1/2"	9'-11 1/2"
NB-13	9'-7 1/2"	9'-7 1/2"
SB-8	9'-4 1/2"	9'-4 1/2"
R-8	9'-7 1/2"	9'-7 1/2"
JR	9'-8 1/2"	9'-8 1/2"

RAILING BL = 18'-5 1/2" 2-REQ'D BENT

JL	19'-11 1/2"	2-
DR	18'-11 1/2"	1-
A	18'-11 1/2"	19-
O	19'-11 1/2"	4-
NB-7	19'-5 1/2"	1- BENT
NB-10	19'-11 1/2"	1-
NB-13	19'-3 1/2"	1-
SB-8	18'-9 1/2"	1-
R-8	18'-3 1/2"	1-
JR	19'-5 1/2"	2-

RAILING CL	9'-2 1/2"	9'-2 1/2"
LL	9'-11 1/2"	9'-11 1/2"
KR	9'-8 1/2"	9'-8 1/2"
LR	9'-8 1/2"	9'-5 1/2"
F	9'-5 1/2"	9'-5 1/2"
V	9'-11 1/2"	9'-11 1/2"
NB-2	9'-11 1/2"	9'-11 1/2"
SB-3	9'-8 1/2"	9'-8 1/2"
R-7	9'-1 1/2"	9'-1 1/2"

RAILING CL = 18'-5 1/2" 1-REQ'D BENT

LL	19'-11 1/2"	2-
KR	19'-5 1/2"	1-
LR	19'-2 1/2"	1-
F	18'-11 1/2"	13-
V	19'-11 1/2"	1-
NB-2	19'-11 1/2"	1- BENT
SB-3	19'-5 1/2"	1-
R-7	18'-5 1/2"	1-

RAILING AL	1'-4 1/2"	9'-3"	9'-2 1/2"
ER	2'-5 1/2"	9'-6"	9'-5 1/2"
HR	5/8"	8'-6"	9'-8 1/2"
QR	5/8"	8'-3"	9'-5 1/2"
E	5/8"	8'-3"	9'-5 1/2"
NB-8	5/8"	8'-6"	9'-8 1/2"
NB-14	2'-5 1/2"	9'-8"	9'-7 1/2"

RAILING AL = 19'-10 1/2" 1-REQ'D BENT

ER	21'-5 1/2"	1-
HR	18'-7 1/2"	1-
QR	18'-1 1/2"	1-
E	18'-1 1/2"	3-
NB-8	18'-7 1/2"	1- BENT
NB-14	21'-9 1/2"	1-

RAILING DL	9'-2 1/2"	9'-2 1/2"
KL	9'-11 1/2"	9'-11 1/2"
CR	9'-5 1/2"	9'-5 1/2"
MR	9'-8 1/2"	9'-8 1/2"
B	9'-5 1/2"	9'-5 1/2"
P	9'-11 1/2"	9'-11 1/2"
R	9'-5 1/2"	9'-11 1/2"
NB-3	9'-11 1/2"	9'-11 1/2"
NB-6	9'-8 1/2"	9'-8 1/2"
NB-12	9'-7 1/2"	9'-7 1/2"
SB-1	9'-11 1/2"	9'-11 1/2"
SB-2	9'-8 1/2"	9'-8 1/2"
SB-9	9'-4 1/2"	9'-4 1/2"

RAILING DL = 18'-5 1/2" 1-REQ'D BENT

KL	19'-11 1/2"	3-
CR	18'-11 1/2"	4-
MR	19'-5 1/2"	1-
B	18'-11 1/2"	17-
P	19'-11 1/2"	3-
R	19'-5 1/2"	1-
NB-3	19'-11 1/2"	1- BENT
NB-6	19'-5 1/2"	2-
NB-12	19'-3 1/2"	1-
SB-1	19'-11 1/2"	1-
SB-2	19'-5 1/2"	1-
SB-9	18'-9 1/2"	1-

RAILING IL	9'-11 1/2"	9'-11 1/2"
QL	9'-5 1/2"	9'-5 1/2"
GR	9'-8 1/2"	9'-8 1/2"
PR	8'-8 1/2"	9'-5 1/2"
G	9'-5 1/2"	9'-5 1/2"
N	9'-11 1/2"	9'-11 1/2"
NB-1	9'-11 1/2"	9'-11 1/2"
NB-11	9'-7 1/2"	9'-7 1/2"
SB-6	9'-11 1/2"	9'-11 1/2"
SB-7	9'-4 1/2"	9'-4 1/2"
R-6	9'-11 1/2"	9'-1 1/2"
R-9	9'-1 1/2"	9'-1 1/2"
R-3	9'-7 1/2"	9'-7 1/2"

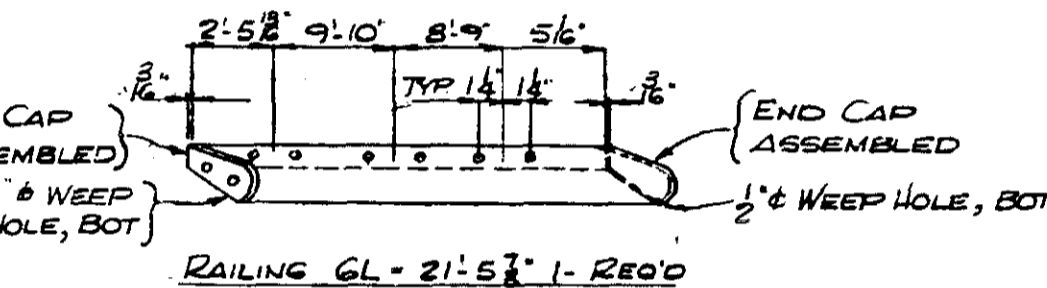
RAILING IL = 19'-11 1/2" 4-REQ'D BENT

QL	18'-11 1/2"	4-
GR	19'-5 1/2"	7-
PR	18'-2 1/2"	1-
G	18'-11 1/2"	27-
N	19'-11 1/2"	4-
NB-1	19'-11 1/2"	5- BENT
NB-11	19'-3 1/2"	3-
SB-6	19'-11 1/2"	1-
SB-7	18'-9 1/2"	2-
R-6	19'-1 1/2"	1-
R-9	18'-3 1/2"	1-
R-3	19'-3 1/2"	3- BENT

RAILING FL	2'-5 1/2"	9'-3"	9'-2 1/2"
FR	2'-5 1/2"	8'-0"	9'-8 1/2"
NB-15	2'-5 1/2"	10'-0"	9'-11 1/2"
NB-18	5/8"	8'-9"	9'-11 1/2"
R-4	1'-4 1/2"	9'-8 1/2"	9'-7 1/2"

RAILING FL = 20'-11 1/2" 1-REQ'D BENT

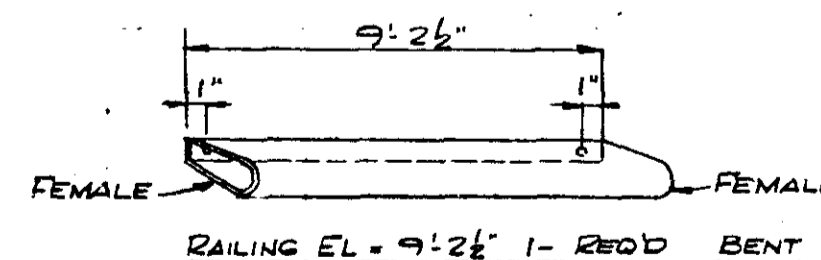
FR	20'-2 1/2"	1-
NB-15	22'-5 1/2"	1-
NB-18	19'-1 1/2"	1-
R-4	20'-8 1/2"	1-



RAILING HL	5/8"	8'-8 1/2"
NL	5/8"	8'-8 1/2"
I	5/8"	8'-2 1/2"
L	5/8"	8'-8 1/2"
NB-17	5/8"	8'-8 1/2"
NB-19	1'-4 1/2"	9'-11 1/2"
SB-5	2'-5 1/2"	9'-11 1/2"
SB-11	5/8"	8'-8 1/2"
R-10	1'-4 1/2"	9'-1 1/2"

RAILING HL = 9'-1 1/2" 1-REQ'D BENT

NL	9'-1 1/2"	1-
I	8'-7 1/2"	1-
L	9'-1 1/2"	3-
NB-17	9'-1 1/2"	1- BENT
NB-19	11'-4 1/2"	1-
SB-5	12'-5 1/2"	1-
SB-11	9'-1 1/2"	1-
R-10	10'-7 1/2"	1-



NOTE: 1 3/8" HOLES EXCEPT AS SHOWN

RAILING ML	5/8"	8'-8 1/2"
H	5/8"	8'-2 1/2"
SB-4	2'-5 1/2"	9'-8 1/2"
SB-12	1'-4 1/2"	9'-11 1/2"
R-5	1'-4 1/2"	9'-11 1/2"

RAILING ML = 9'-1 1/2" 1-REQ'D BENT

H	8'-7 1/2"	1-
SB-4	12'-2 1/2"	1- BENT
SB-12	11'-4 1/2"	1-
R-5	11'-4 1/2"	1-

**BILL OF MATERIAL**

- 222 RAIL SECTIONS (PER DETAILED LIST)
- 440 RAIL POSTS, DETAIL B32
- 400 RAIL POST ANCHOR ASSEMBLIES, DETAIL B110
- 56 RAIL END CAPS (ASSEMBLED WITH RAIL)
- 929 5/8" x 2 1/4" STAINLESS STEEL HEX. CAP SCREWS (M.H.D. 3391E) TYPE 302, 303, 304, OR 316
- 929 5/8" GALVANIZED HVY. STD. LOCK WASHERS 3/16" THICK.
- 830 5/8" INSERT EXPANSION TYPE UNIT FASTENERS (GALV)
- 880 8 1/4" x 8" #4 LBS. LEAD SHIMS.
- 160 SHEAR DOWEL ASSEMBLIES DETAIL B100 (GALV.)
- 929 5/8" GALV. CUT WASHERS, 10 GAGE 1 1/2" x 1 1/2" HOLE
- 112 1/4" x 1" STAINLESS STEEL PHILLIPS FLAT HEAD SCREWS (M.H.D. 3391E) TYPE 302, 303, 304 OR 316
- 20 ANCHOR BOLT ASSEMBLIES FOR LIGHT STD DETAIL B103

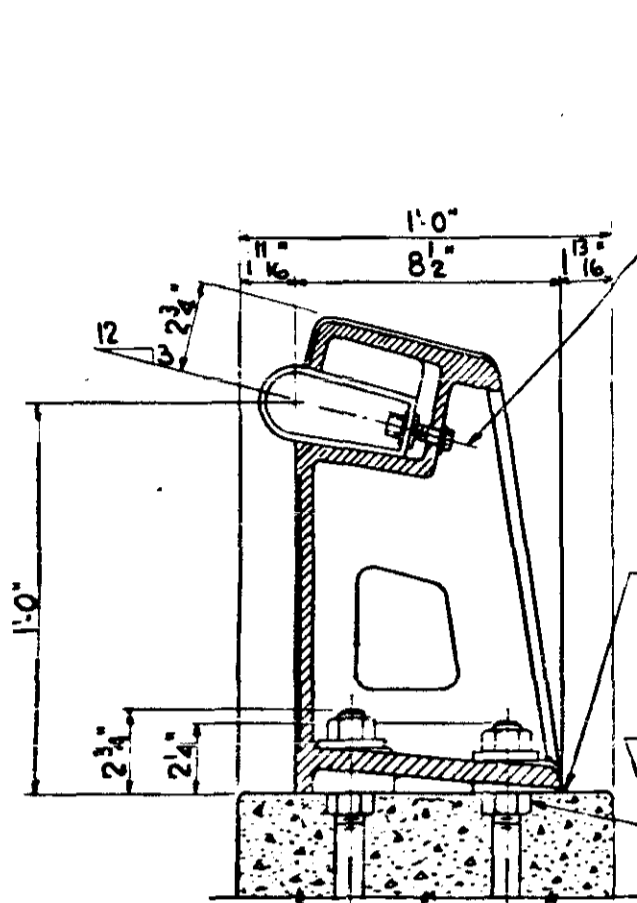
NOTE: RAILING TO BE STRUCTURAL STEEL M.H.D. 3317 GALV. (PER M.H.D. 2471.312 & M.H.D. 3394) MALLEABLE IRON POST M.H.D. 3324 GRADE NO. 35018 GALV. AS PER M.H.D. 3394. SHOP INSPECTION BEFORE AND AFTER GALVANIZING. BY M.H.D. MATERIAL AND WORKMANSHIP TO BE IN ACCORDANCE WITH M.H.D. SPECIFICATIONS FOR HIGHWAY CONSTRUCTIONS DATED JAN. 1, 1964 AND SPECIAL PROVISIONS.

FOR DETAILS SEE SH. NO. 2  
ALL WELDING ON RAILING SHALL BE BY THE 'LOW HYDROGEN' PROCESS. SEE M.H.D. 3339.  
RAILING TO BE GALVANIZED IN ONE DIP. NO PAINT.

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D. H. WILKINSON  
BRIDGE ENGINEER

BRIDGE No. 9340  
ONE LINE STEEL BRIDGE RAIL  
STATE PROJ. No. 2783-08 (T.H. 35W-394)  
MINN. PROJ. No. I. IG 35W-3 (58) 112  
FABRICATOR: MILLERBERND MANUFACTURING CO.  
SUPPLIER: WHEELER LUMBER BRIDGE & SUPPLY CO.  
CONTRACTOR: INDUSTRIAL CONSTRUCTION CO.

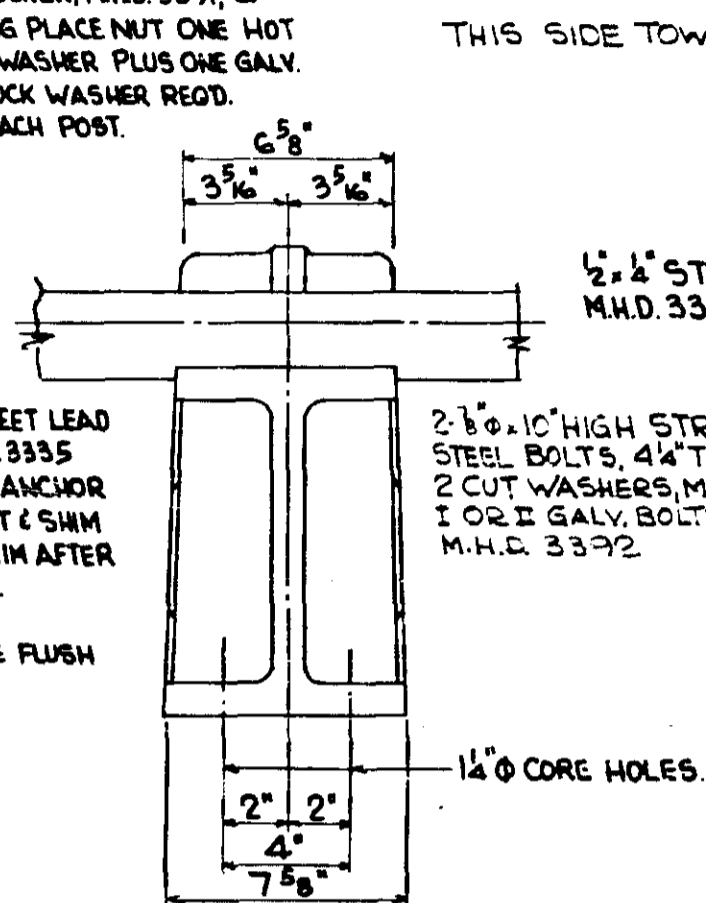
**M. H. D. - FILE**



5/8" x 2" STAINLESS STEEL HEX. HD. CAP SCREW, M.H.D. 3391, & EXPANDING PLATE NUT ONE HOT GALV. CUT WASHER PLUS ONE GALV. SPRING LOCK WASHER REQD. 2 BOLTS EACH POST.

2 PCS. OF 4 GA. SHEET LEAD 8 1/4" x 8" M.H.D. SPEC. 3335 PUNCH HOLES FOR ANCHOR BOLTS. LEVEL POST & SHIM AS NECESSARY. TRIM AFTER POST IS PLACED.

PEARING SURFACE FLUSH WITH CONCRETE

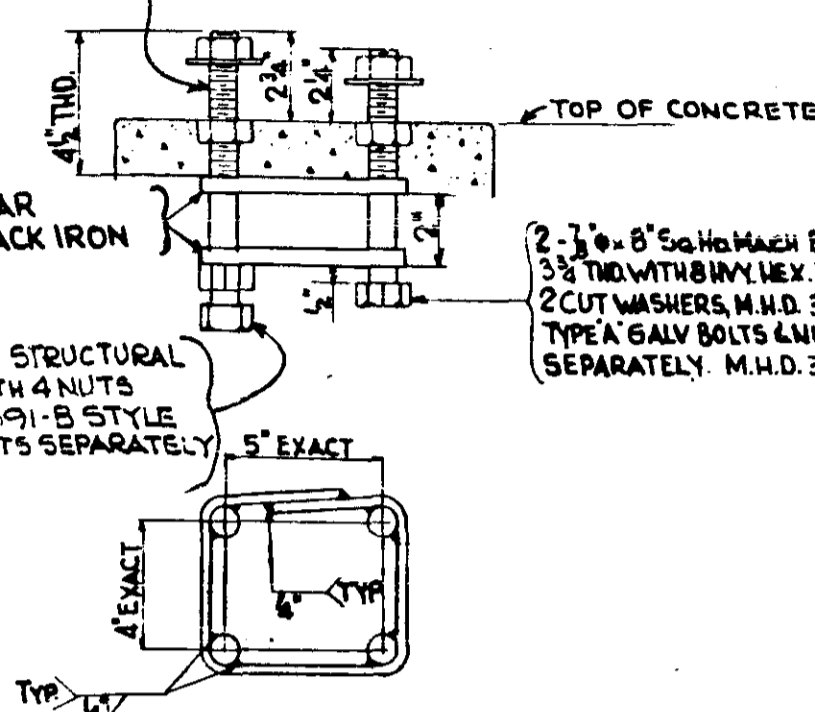


THIS SIDE TOWARD ROWY.

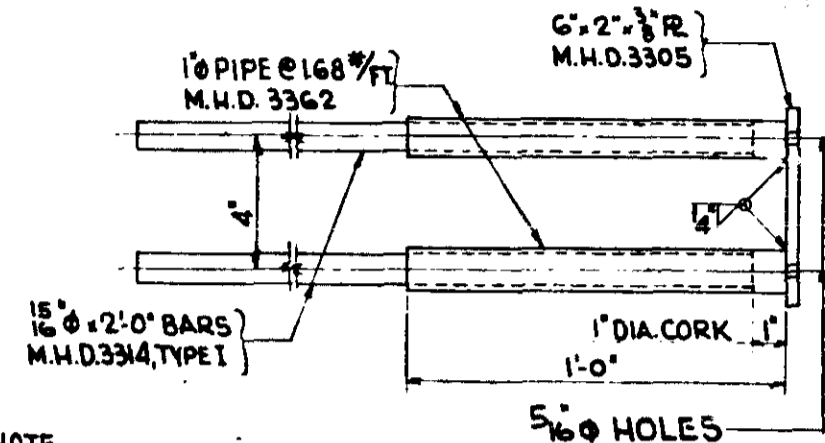
1/2" x 1/4" STEEL BAR M.H.D. 3305 BLACK IRON

2 1/8" x 10" HIGH STRENGTH STRUCTURAL STEEL BOLTS, 4 1/4" THD. WITH 4 NUTS 2 CUT WASHERS, M.H.D. 3391-B STYLE I OR II GALV. BOLTS & NUTS SEPARATELY. M.H.D. 3392

1 1/4" CORE HOLES.



2 1/8" x 8" 50 HO. MACH. BOLTS, 3/4" THD. WITH 8 WY. HEX. NUTS, 2 CUT WASHERS, M.H.D. 3391 TYPE A GALV. BOLTS & NUTS SEPARATELY. M.H.D. 3392

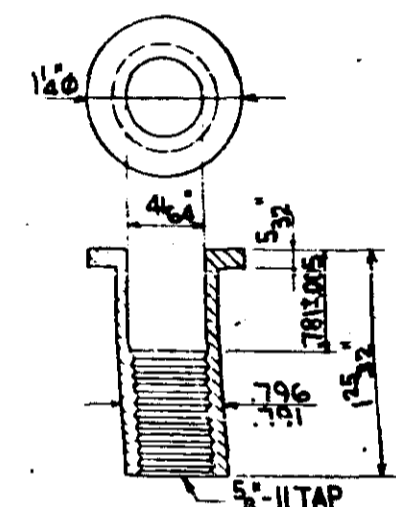
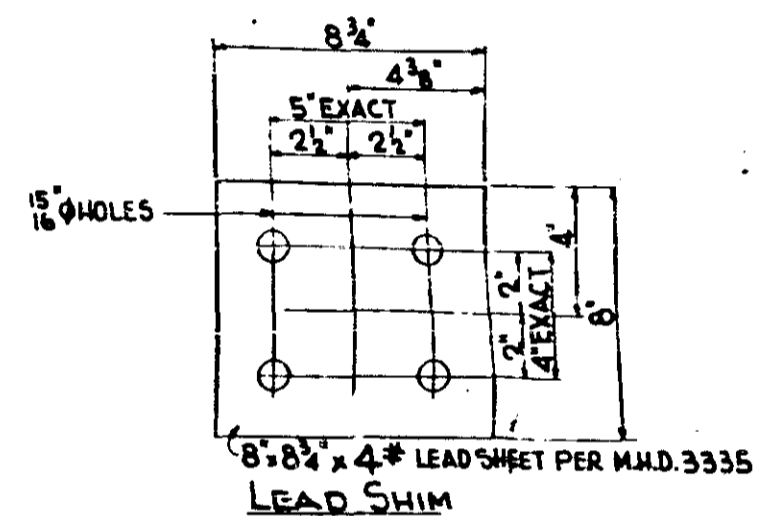


NOTE: OPEN END OF PIPE MUST BE DE-BURRED AFTER CUTTING AND BEFORE GALVANIZING. BARS TO BE SAWED TO LENGTH. GALVANIZE AS PER M.H.D. 3394 AFTER FABRICATION.

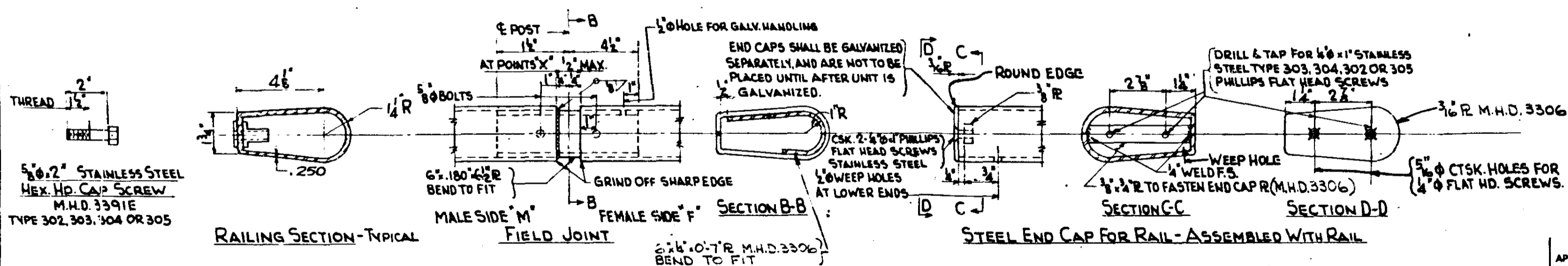
SECTION THROUGH RAILING  
MALLEABLE IRON RAIL POST  
SEE M.H.D. DETAIL B 33

FRONT ELEVATION

ANCHOR BOLT SPACER  
SEE M.H.D. DETAIL NO. B 110



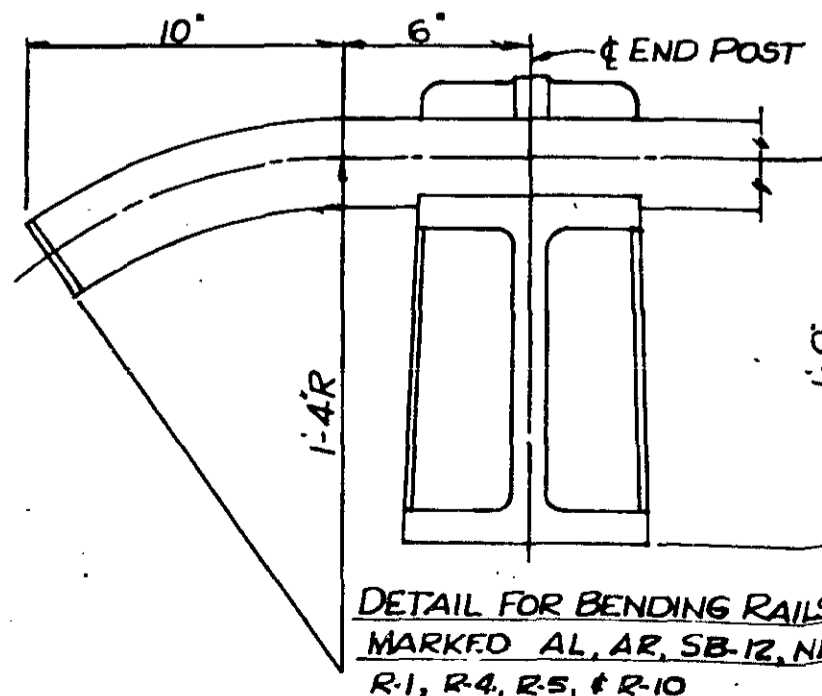
INSERT EXPANSION FASTENER  
TYPE "A"  
GALVANIZE ASSEMBLED WITH RAIL.



RAILING OL.	2'-6"	2'-3 1/2"	
RR	2'-6"	2'-4 1/2"	
T	2'-6"	1'-2"	
NB-4	2'-6"	1'-2 1/2"	

DETAIL SHOWING MALE END AT UO & UO'

EXPANSION DEVICES - OL, RR, T, & NB-4 RAILING



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P. L. Anderson  
BRIDGE DIV.  
ENGINEER

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ONE LINE STEEL BRIDGE RAIL  
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