

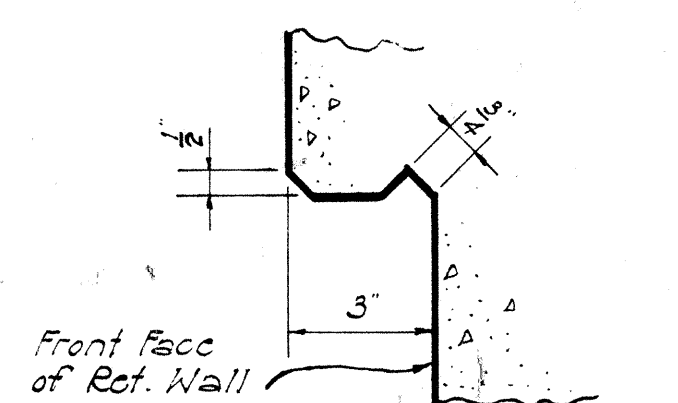
NAME DATE

Use correct name of bridge
LEFT HAND SIDE

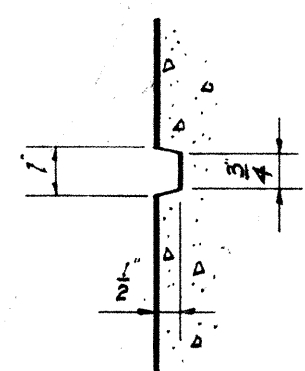
Date of year built
RIGHT HAND SIDE

DETAIL OF LETTERS AND FIGURES AT BOTH APPROACHES

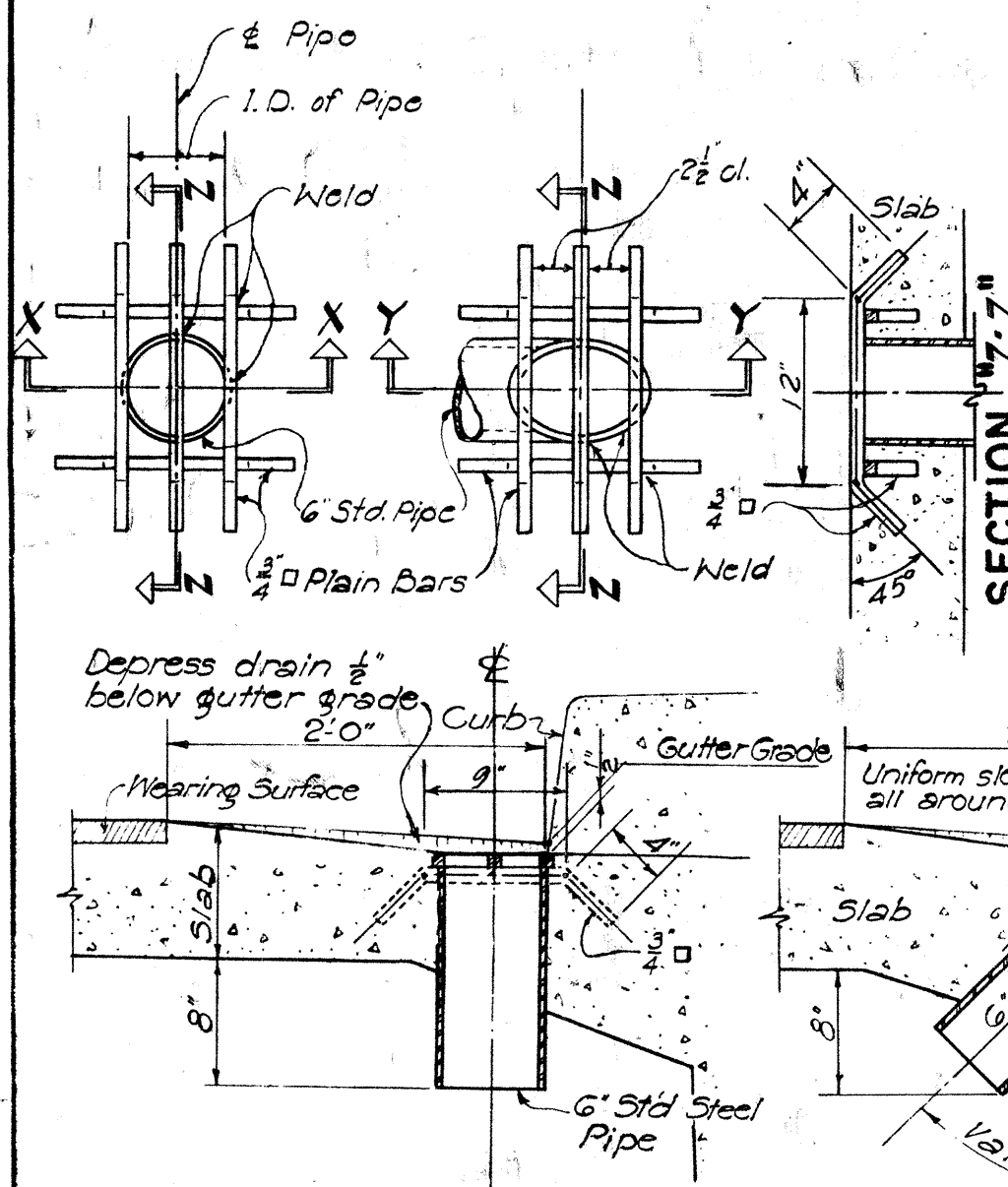
NOTE: Name of bridge to be placed in left end post panels and date in right post panels on entering bridge using modified block letters 3" in height. In case of stream crossings use name of stream for name of bridge. For all others use name as designated by the Engineer.



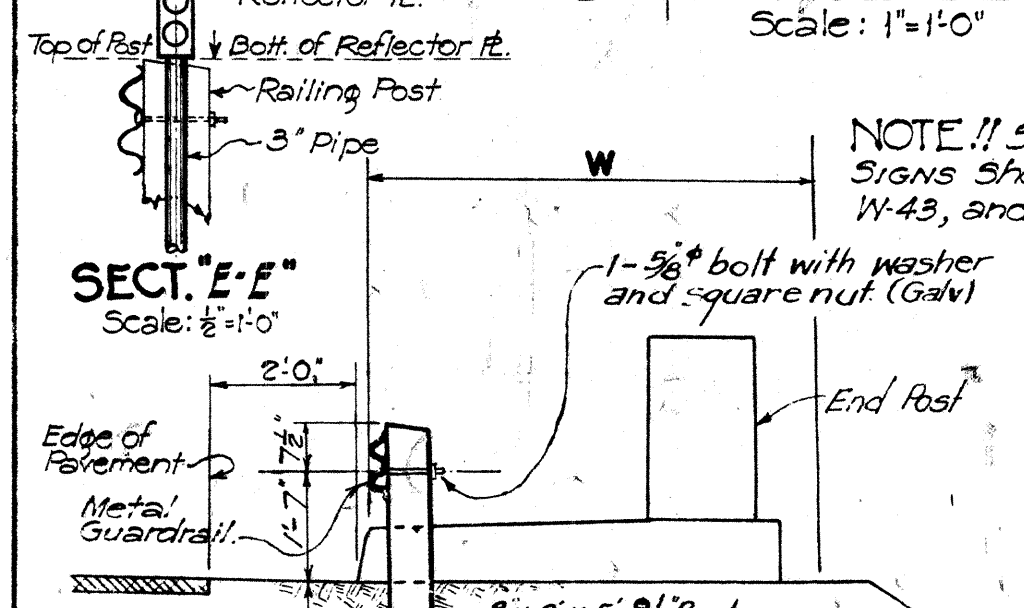
DRIP DET. FOR RET. WALL
Scale: 3/4" = 1'-0"



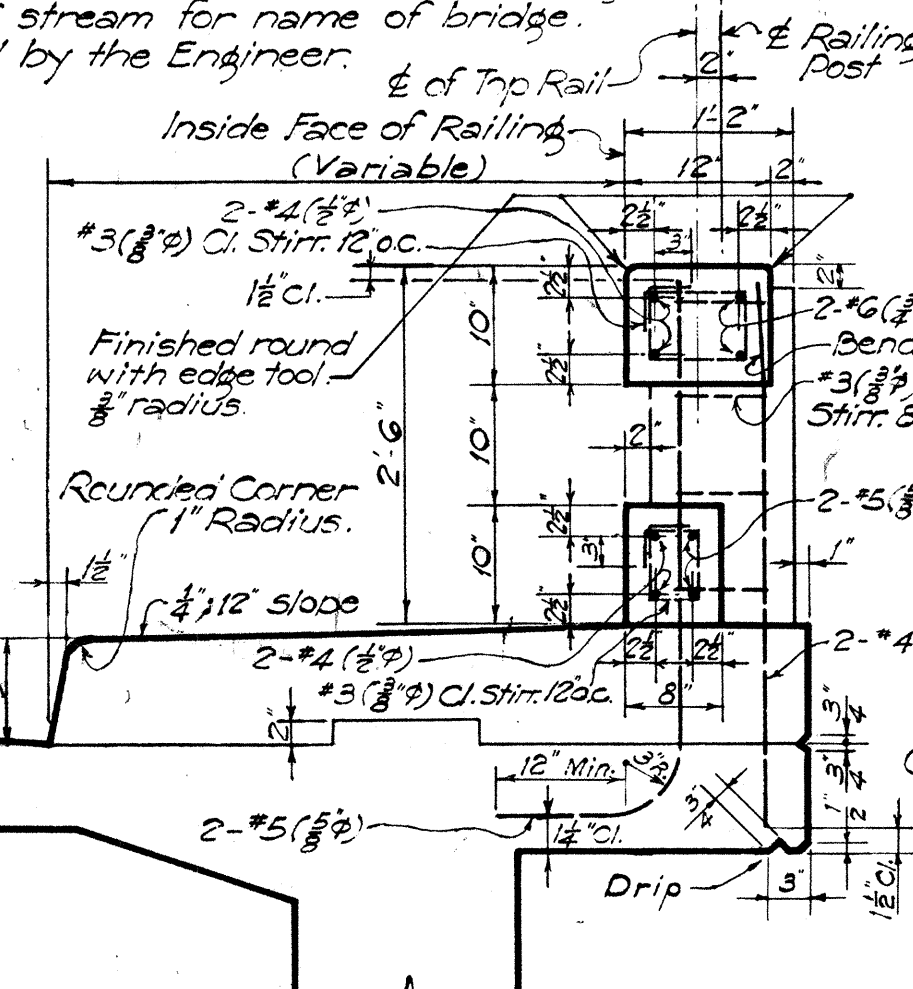
END POST GROOVE DET.
Scale: 3/4" = 1'-0"



SECTION "X-X"
DRAINAGE DETAIL
Scale: 1" = 1'-0"



SECTION "D-D"
Scale: 3/8" = 1'-0"



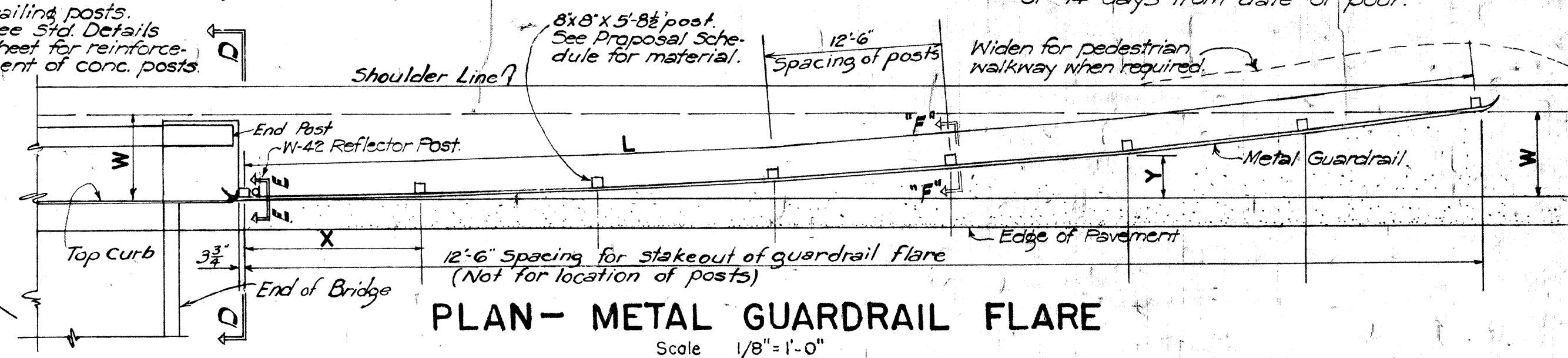
SECTION "B-B"
RAILING DETAIL
Scale: 3/4" = 1'-0"

NOTE! Sidewalk, curb and railing to be poured after release of falsework. Forms for railing and endpost to be made of plywood.
SURFACE FINISH: The surface of the concrete railings shall be given a Class 2 Rubbed Finish as specified under Sub-article 46.3 (C) (3) of Section 46 Concrete of the Standard Specifications.

NOTE! Metal drains shall be considered incidental to Class A-1 Concrete in both concrete and steel bridges and will not be paid for separately.
Assembly of grillage and pipe shall be hot-dip galvanized after all welding is completed.

X	W=3'	W=4'	W=5'	W=6'	W=7'	W=8'
12.5	0.19	0.16	0.14	0.12	0.09	0.08
25.0	0.75	0.64	0.55	0.49	0.35	0.32
37.5	1.69	1.44	1.25	1.10	0.78	0.72
50.0	3.00	2.56	2.22	1.96	1.38	1.28
62.5		4.00	3.47	3.06	2.16	2.00
75.0			5.00	4.41	3.11	2.88
87.5				6.00	4.23	3.92
100.0					5.53	5.12
112.5					7.00	6.48
125.0						8.00

W = Guardrail flare
X = Distance from post at bridge to offset points.
Y = Guardrail flare offset



PLAN - METAL GUARDRAIL FLARE
Scale: 1/8" = 1'-0"

GENERAL NOTES

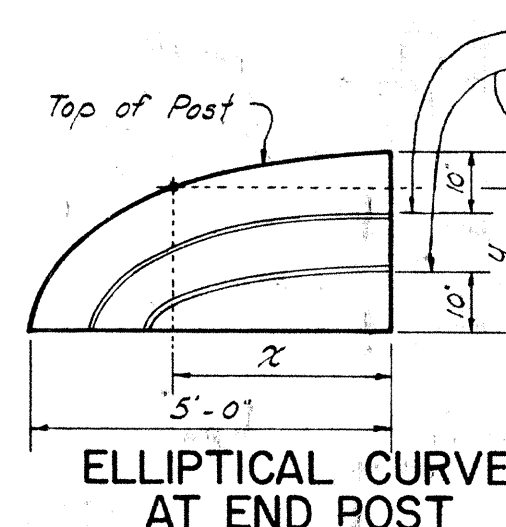
CONCRETE: Class of concrete to be used in different parts of the structure are as noted on plans.
REINFORCING STEEL: All reinforcing steel shall be Billet Steel Bars A.S.T.M. A15 intermediate grade. Steel shall be made by the open-hearth or Electric Furnace Process. Mill certificate shall be required.

Deformations shall conform to A.S.T.M.-A305. Splicing of reinforcing other than in main deck slab, girder and frame bars shall be done as shown in above sketch except where shown otherwise. Splices are to be staggered. Splices in main girder and frame bars are permitted only in bars exceeding 60'-0" in length at points to be indicated by the Engineer. These splices to be electrically welded according to detail and specifications. No allowance will be made in the quantities for extra weight of steel required for splices not shown on the plans.
Minimum spacing between parallel bars shall be 2 1/2 times the diameter of bars, but in no case shall the clear distance between the bars be less than 1 1/2 times the maximum size of the coarse aggregate.

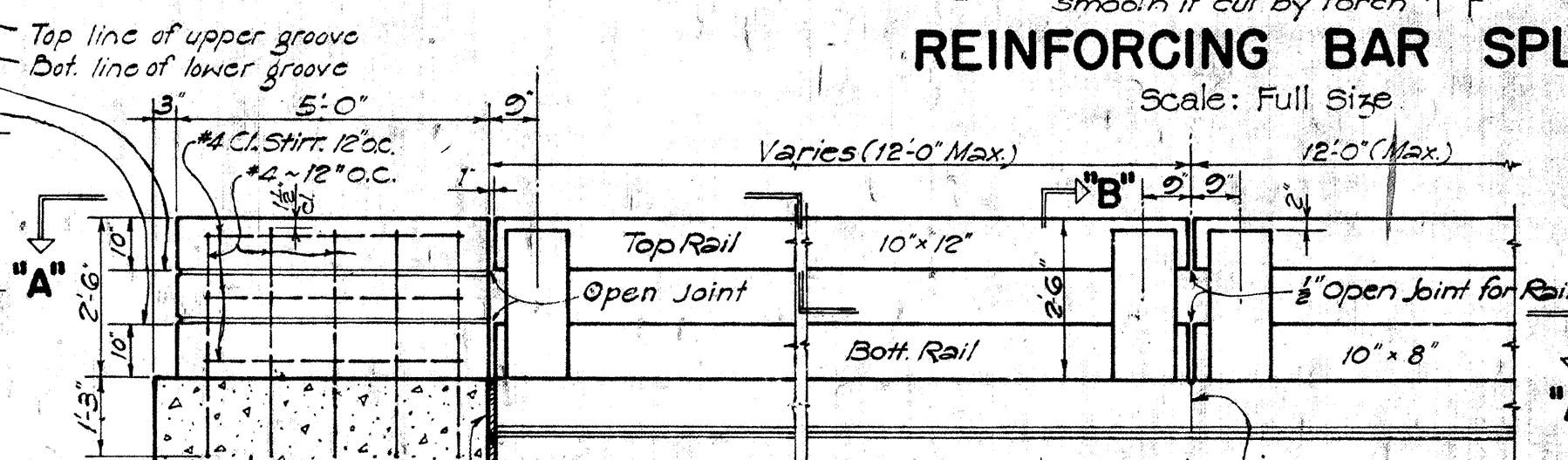
CONSTRUCTION JOINTS: All construction joints to have surface roughened and 1:2 cement grout applied immediately before the second pour. Construction joints to be located at places indicated in the plans. See Sec. 46.3(F)(3) of the "Standard Specifications".

ELLIPSE COORDINATES

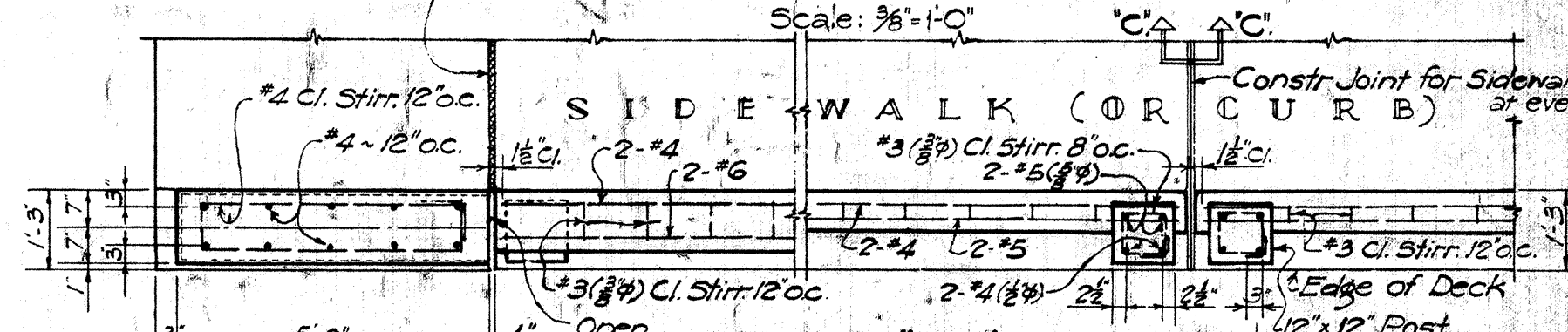
Top of Post	X	0	1'-0"	1'-6"	2'-0"	2'-6"	3'-0"	3'-6"	4'-0"	4'-3"	4'-6"	4'-9"	4'-10 1/2"	5'-0"
Y	0	2'-6"	2'-5 1/2"	2'-4 3/8"	2'-3 1/2"	2'-2"	2'-0"	1'-9 1/2"	1'-6"	1'-3 1/2"	1'-1 1/2"	9 5/8"	6 1/2"	0
Top Line of Upper Groove	X	0	6"	1'-0"	1'-6"	2'-0"	2'-6"	3'-0"	3'-3"	3'-6"	3'-9"	4'-0"	4'-1"	4'-2"
Y	0	1'-8"	1'-7 1/2"	1'-7 1/8"	1'-6 1/2"	1'-5 1/2"	1'-4"	1'-1 1/2"	1'-0 1/2"	10 5/8"	8 1/2"	5 5/8"	4"	0
Bot. Line of Lower Groove	X	0	6"	1'-0"	1'-6"	2'-0"	2'-6"	3'-0"	3'-2"	3'-3"	3'-4"			
Y	0	10"	9 1/2"	9 1/8"	8 1/2"	8"	6 5/8"	5 5/8"	4 3/8"	3 5/8"	2 1/2"	0		



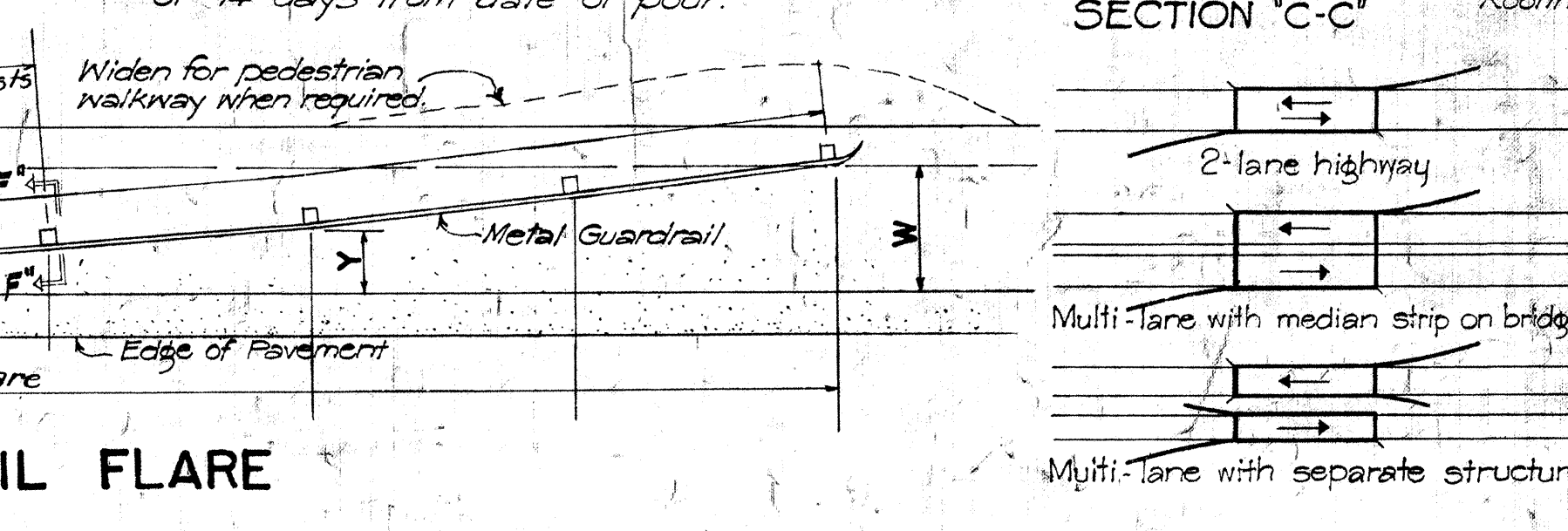
ELLIPSE COORDINATES



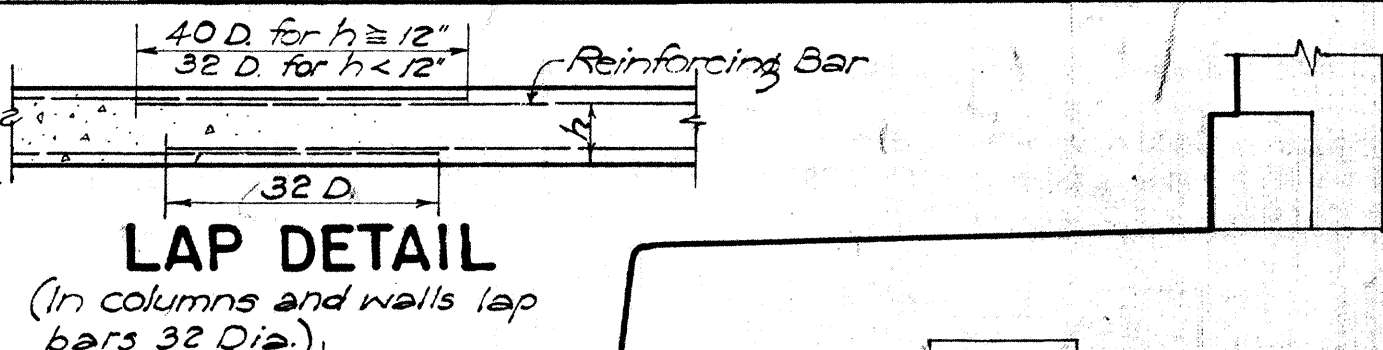
SECTION "C-C"



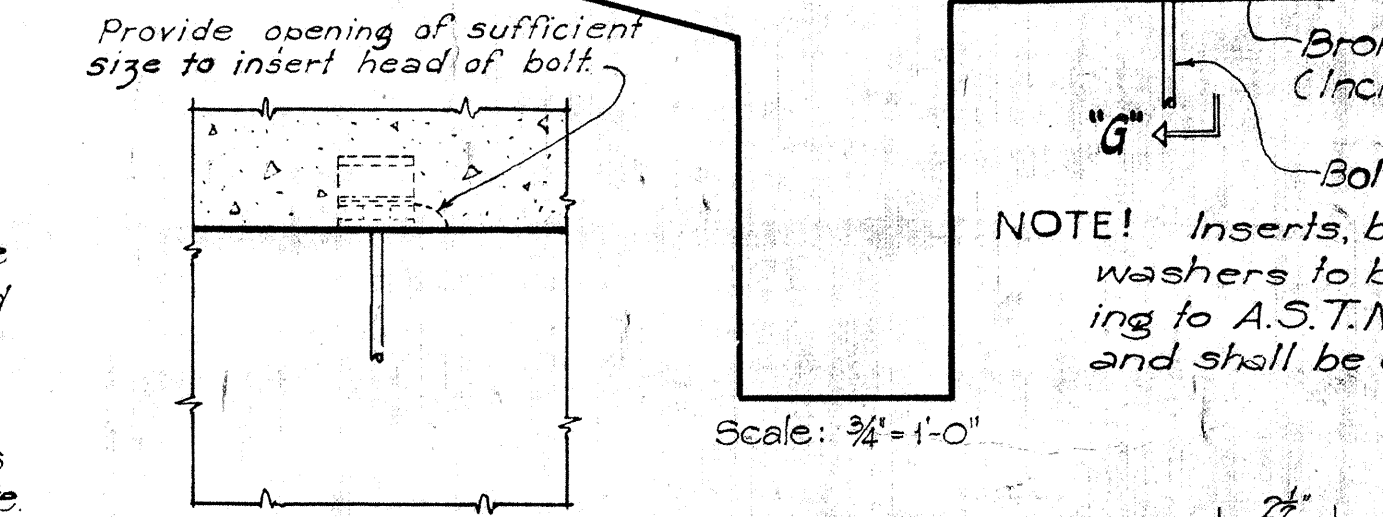
SECTION "A-A"



SECTION "B-B"

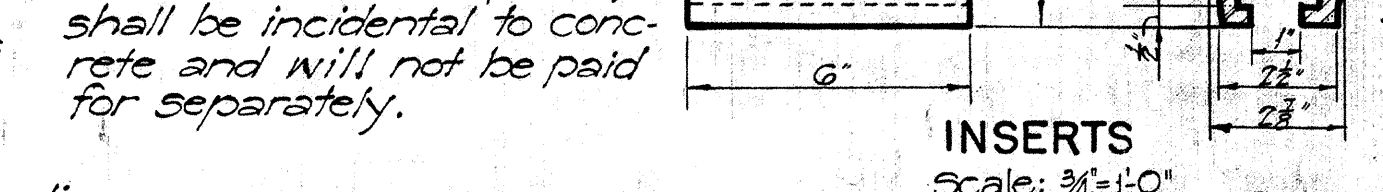


LAP DETAIL
(In columns and walls lap bars 32 Dia.)



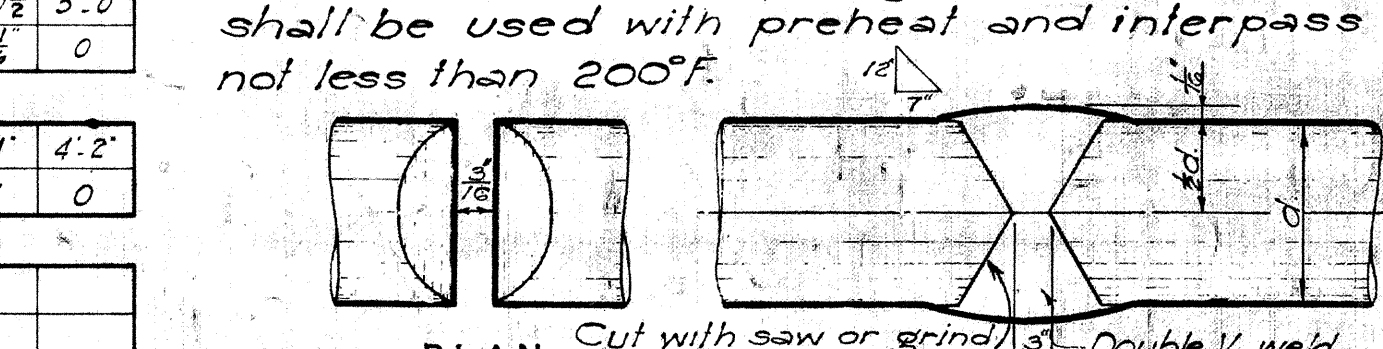
SECTION "G-G"

JOINT FILLER: Joint filler, when called for in plans, shall be incidental to concrete and will not be paid for separately.

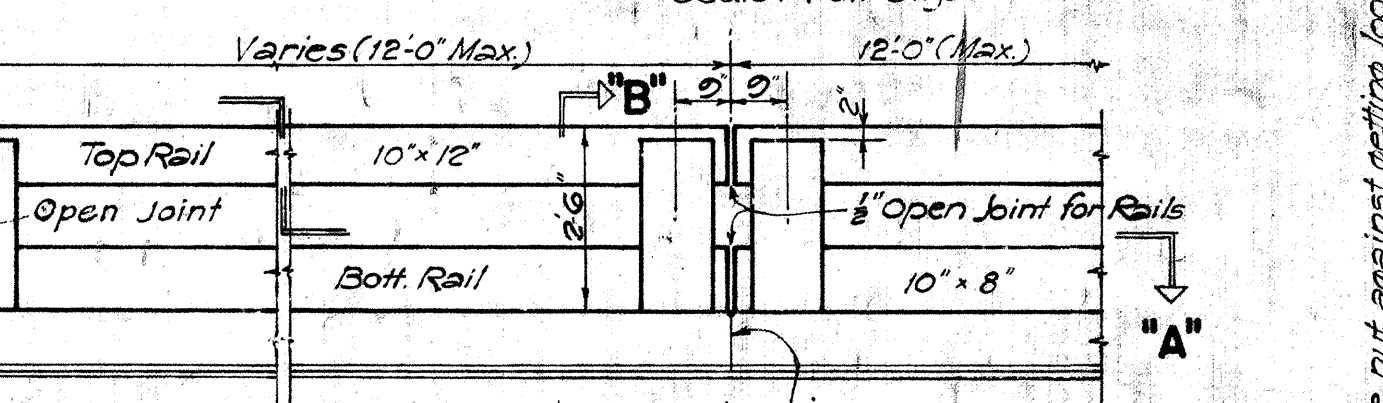


SECTION "H-H"

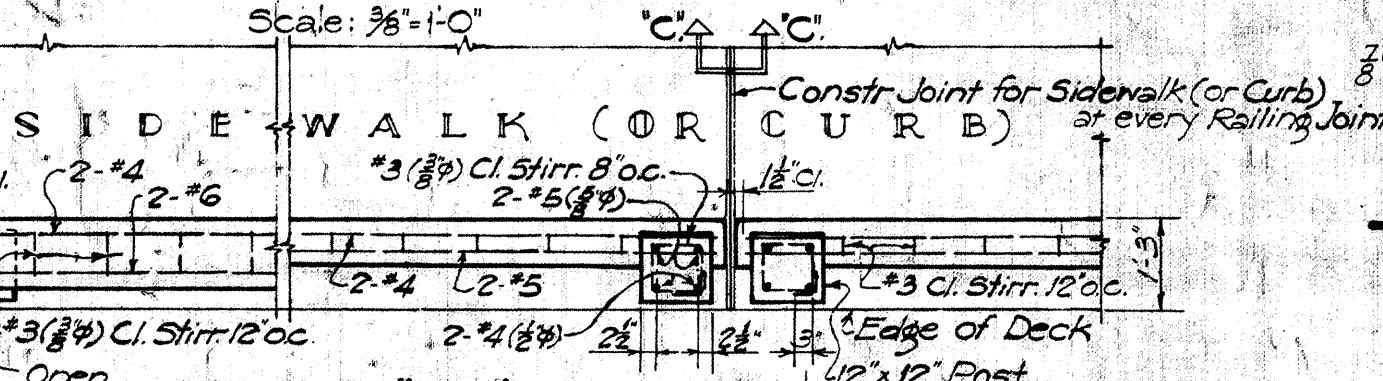
NOTE! Carbon content of reinforcing bars for welding shall not be over 0.40%. Low hydrogen electrodes E7015 or E7016 shall be used with preheat and interpass temperature not less than 200°F.



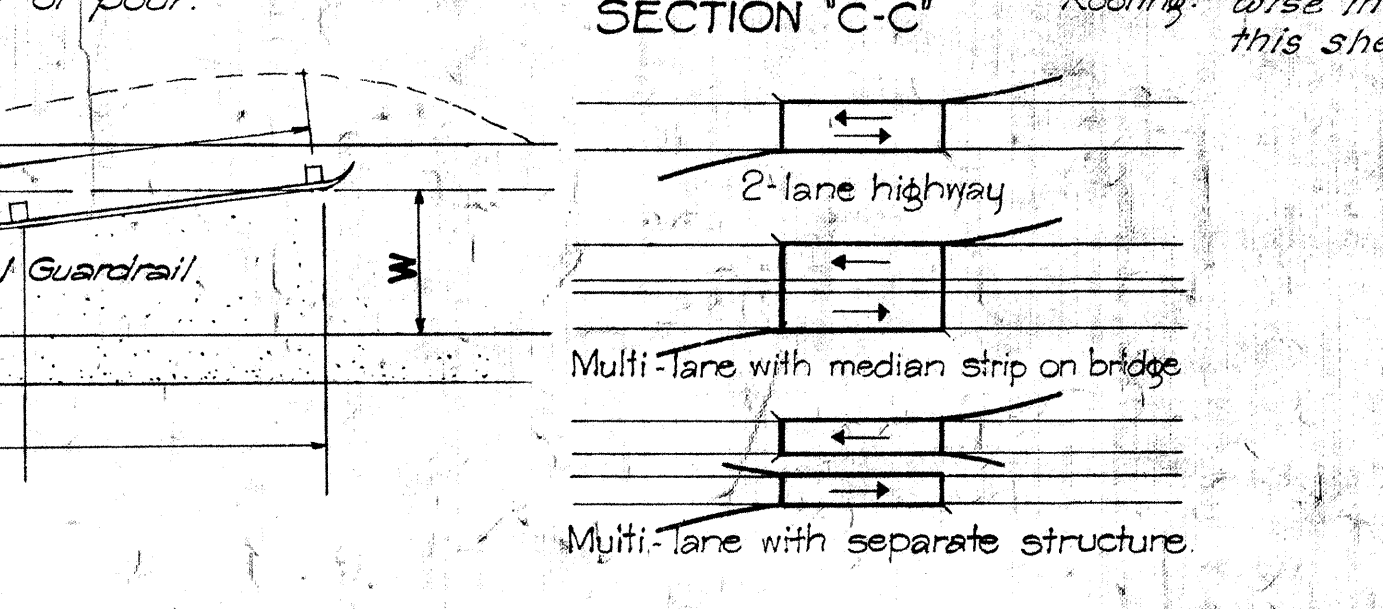
SECTION "I-I"



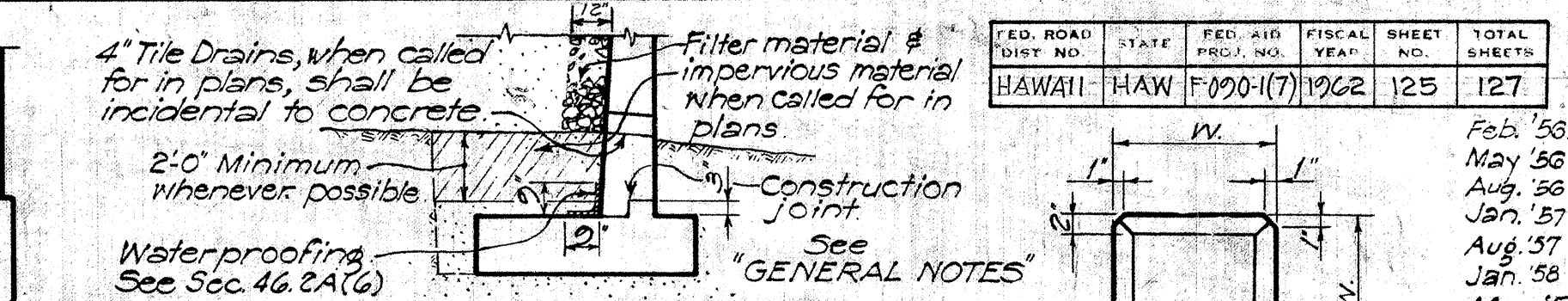
SECTION "J-J"



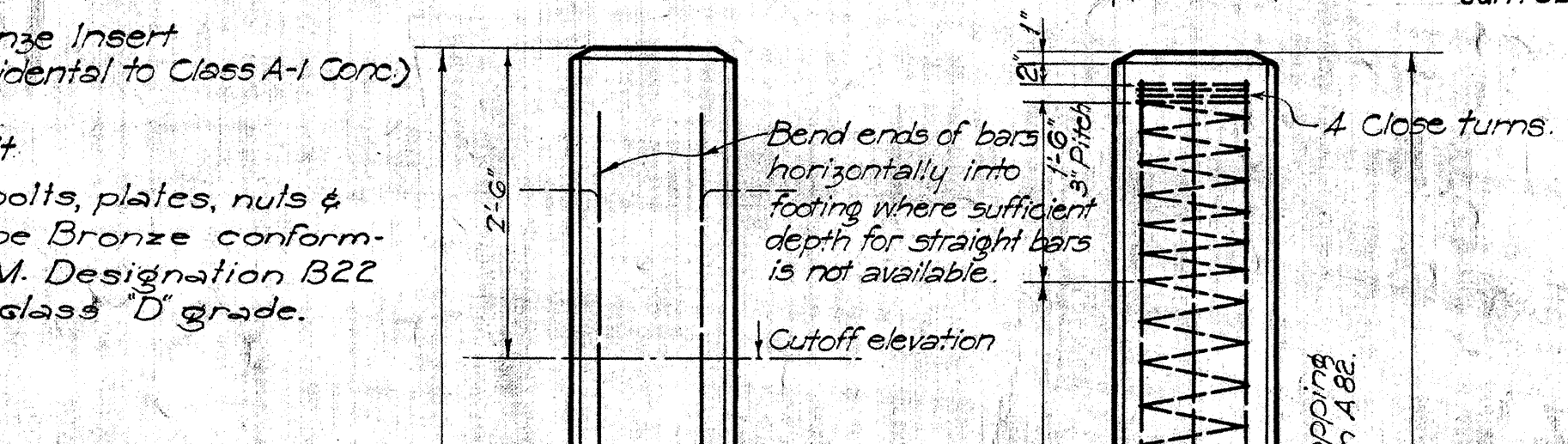
SECTION "K-K"



SECTION "L-L"



SECTION "M-M"



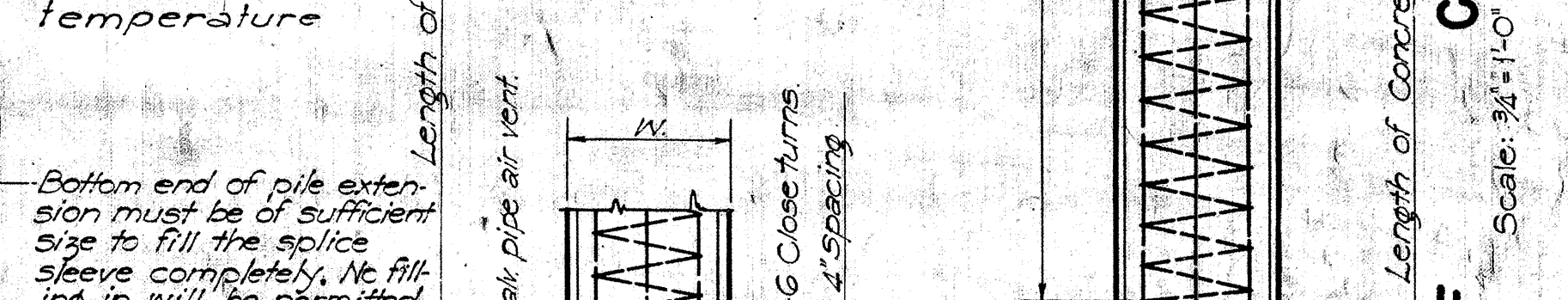
SECTION "N-N"

NOTE! Inserts, bolts, plates, nuts & washers to be Bronze conforming to A.S.T.M. Designation B22 and shall be class 'D' grade.

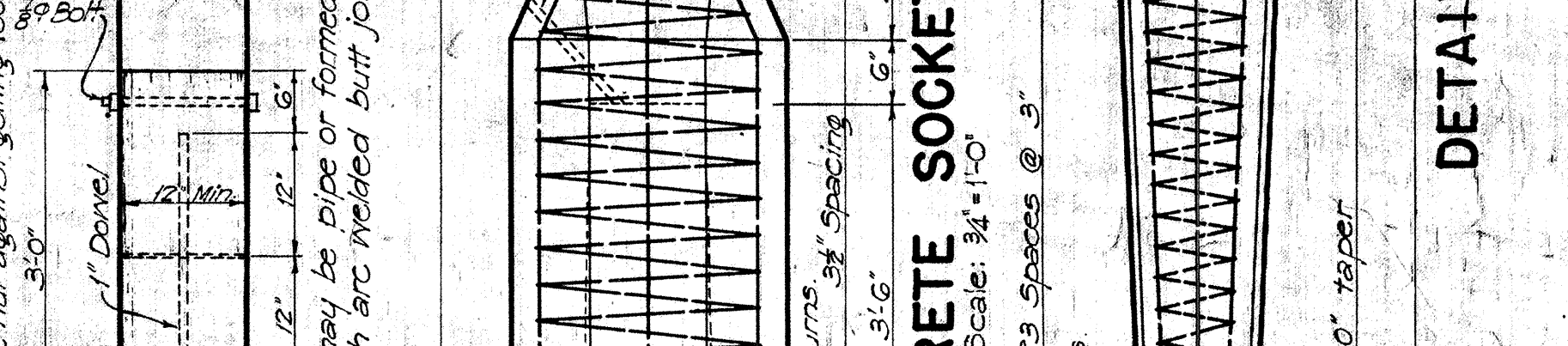


SECTION "O-O"

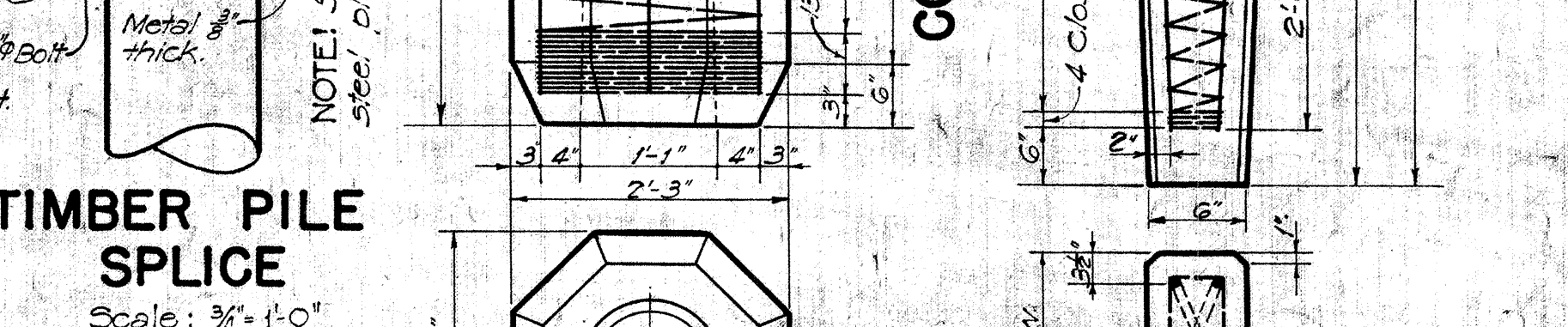
CONTRACTOR TO TAKE PROPER PRECAUTIONS TO PREVENT THE CONCRETE FROM FLOWING INTO THE OPENING OF THE INSERT.



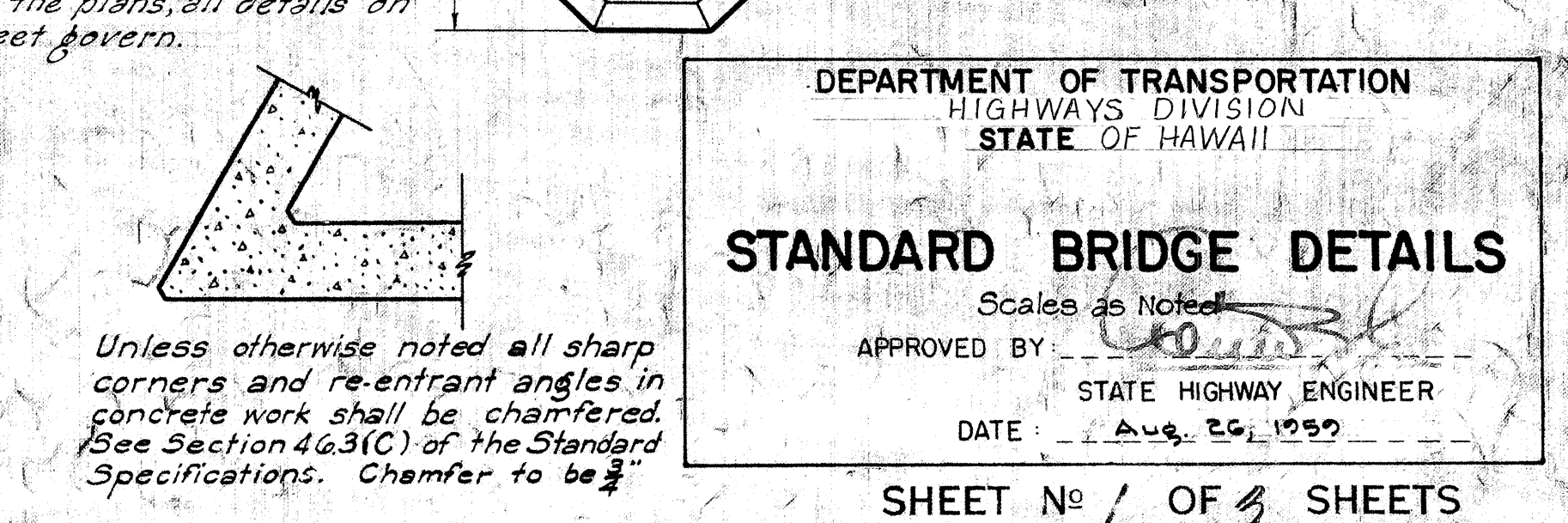
SECTION "P-P"



SECTION "Q-Q"

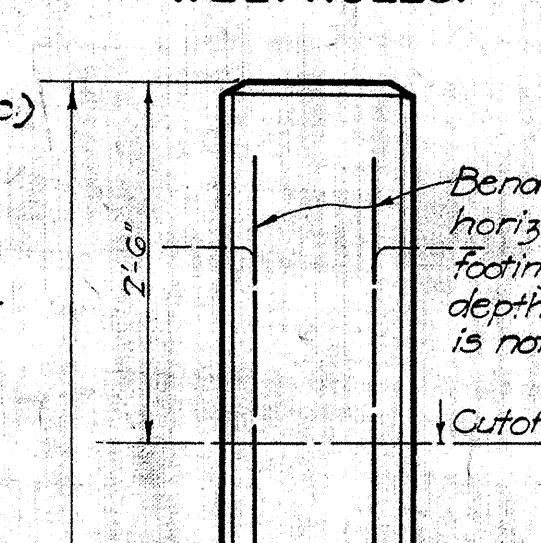


SECTION "R-R"



SECTION "S-S"

CONSTRUCTION JOINT, WATERPROOFING AND WEEPHOLES.



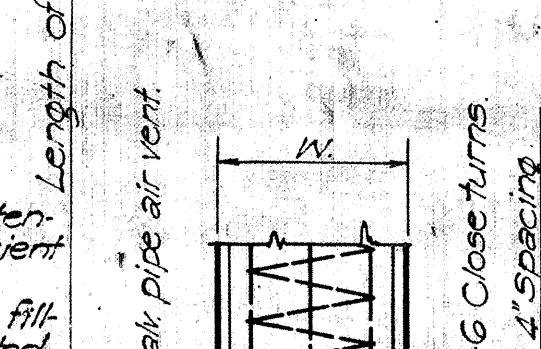
CONSTRUCTION JOINT

NOTE! Inserts, bolts, plates, nuts & washers to be Bronze conforming to A.S.T.M. Designation B22 and shall be class 'D' grade.

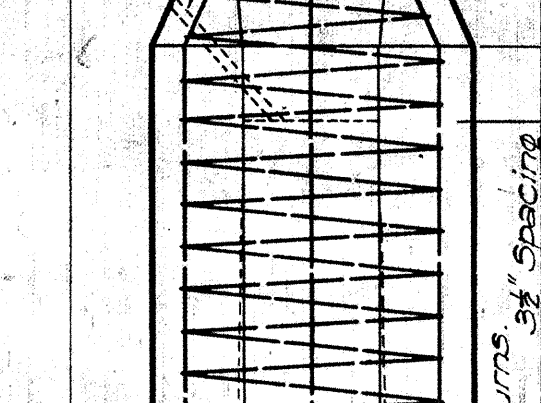


SECTION "T-T"

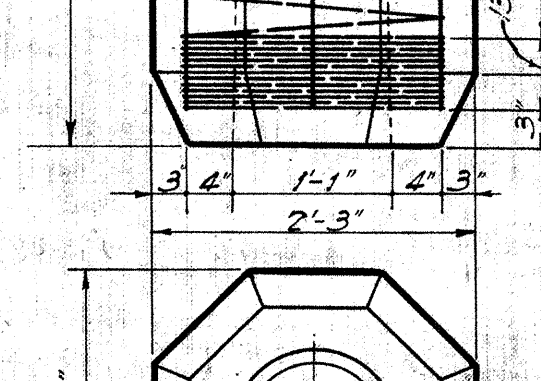
CONTRACTOR TO TAKE PROPER PRECAUTIONS TO PREVENT THE CONCRETE FROM FLOWING INTO THE OPENING OF THE INSERT.



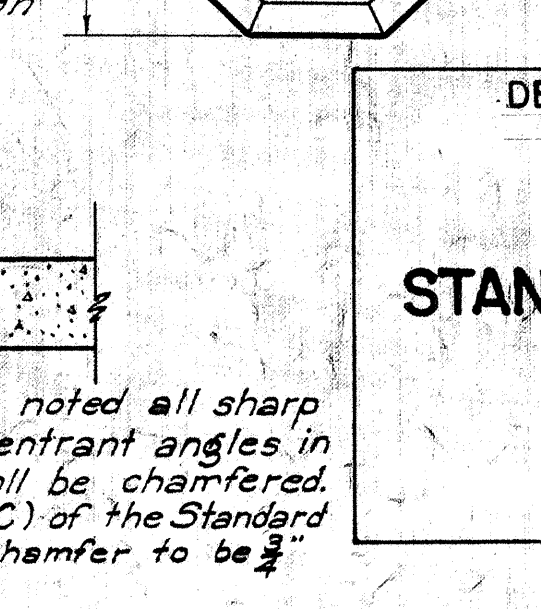
SECTION "U-U"



SECTION "V-V"

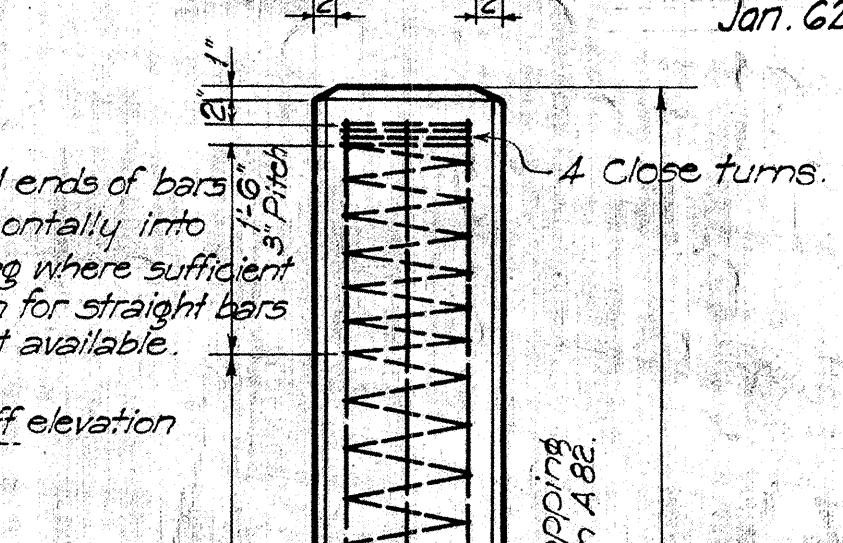


SECTION "W-W"



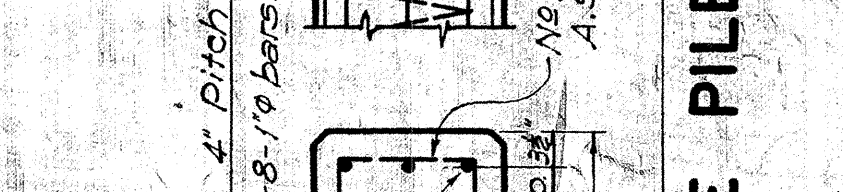
SECTION "X-X"

PILE CUTOFF



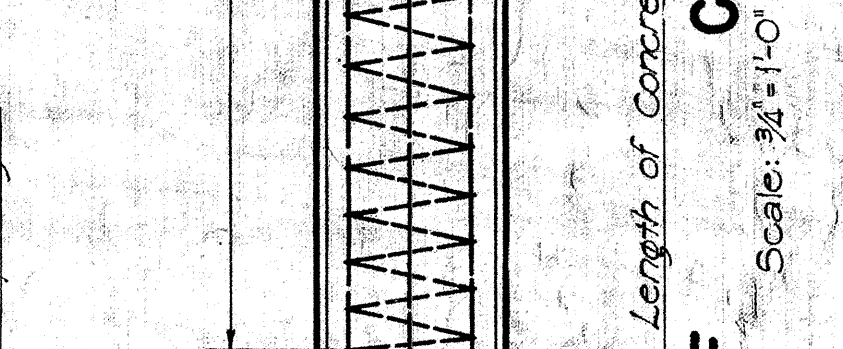
PILE CUTOFF

NOTE! Inserts, bolts, plates, nuts & washers to be Bronze conforming to A.S.T.M. Designation B22 and shall be class 'D' grade.

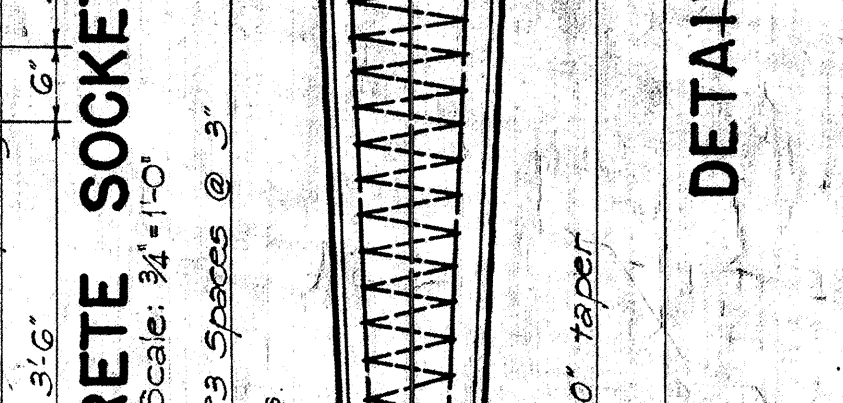


SECTION "Y-Y"

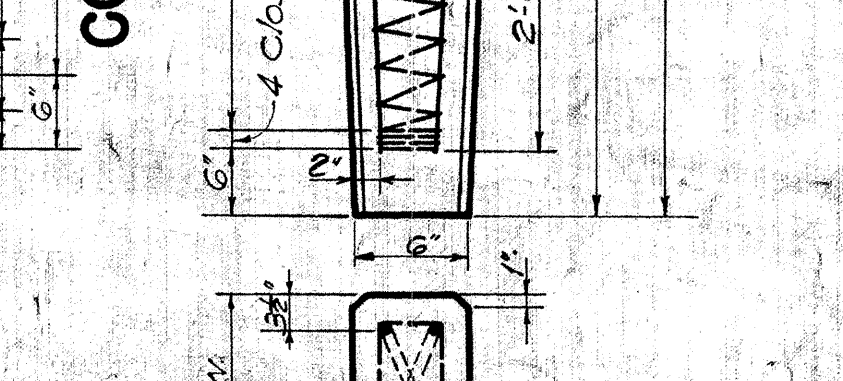
CONTRACTOR TO TAKE PROPER PRECAUTIONS TO PREVENT THE CONCRETE FROM FLOWING INTO THE OPENING OF THE INSERT.



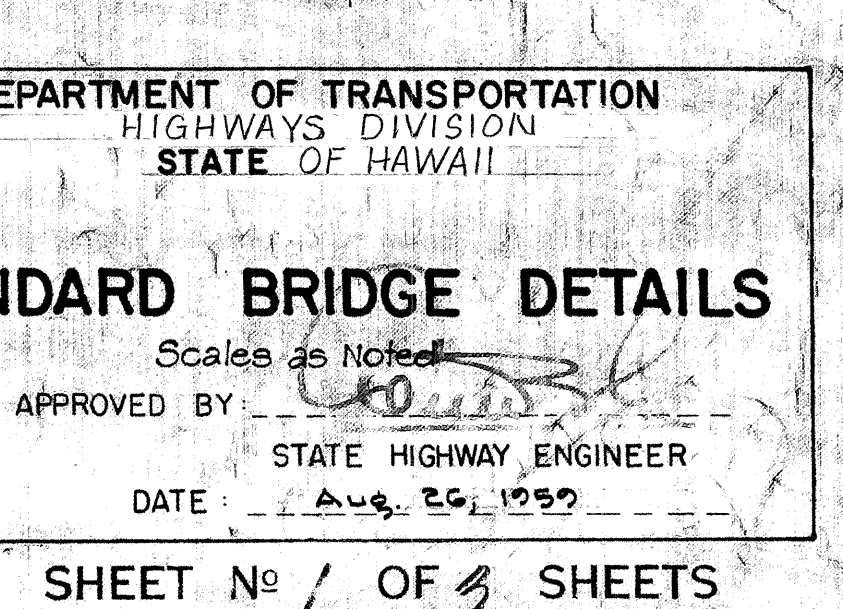
SECTION "Z-Z"



SECTION "A-A"



SECTION "B-B"



SECTION "C-C"

DETAIL OF CONCRETE PILE

Scale: 3/4" = 1'-0"

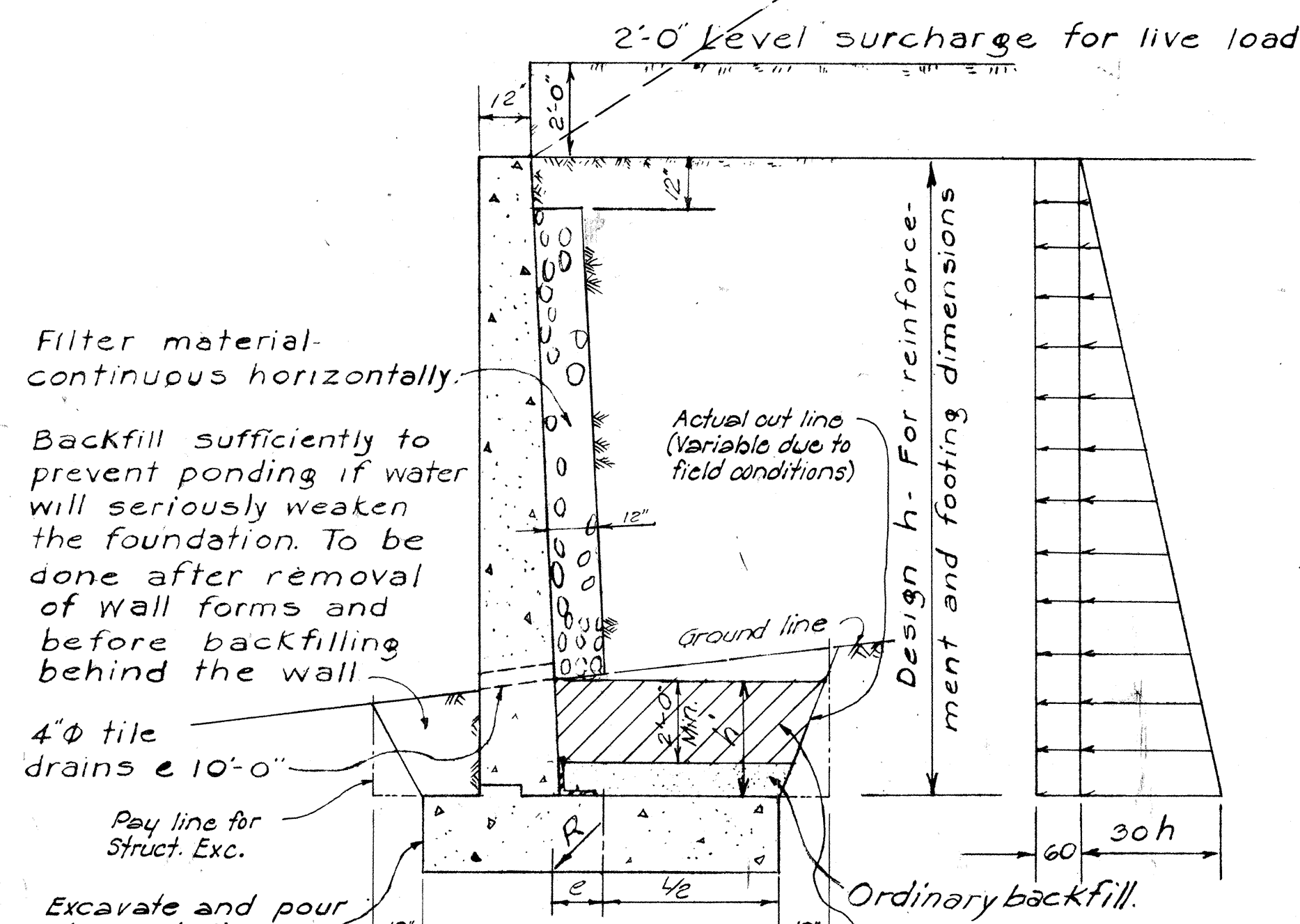
DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STATE OF HAWAII

STANDARD BRIDGE DETAILS

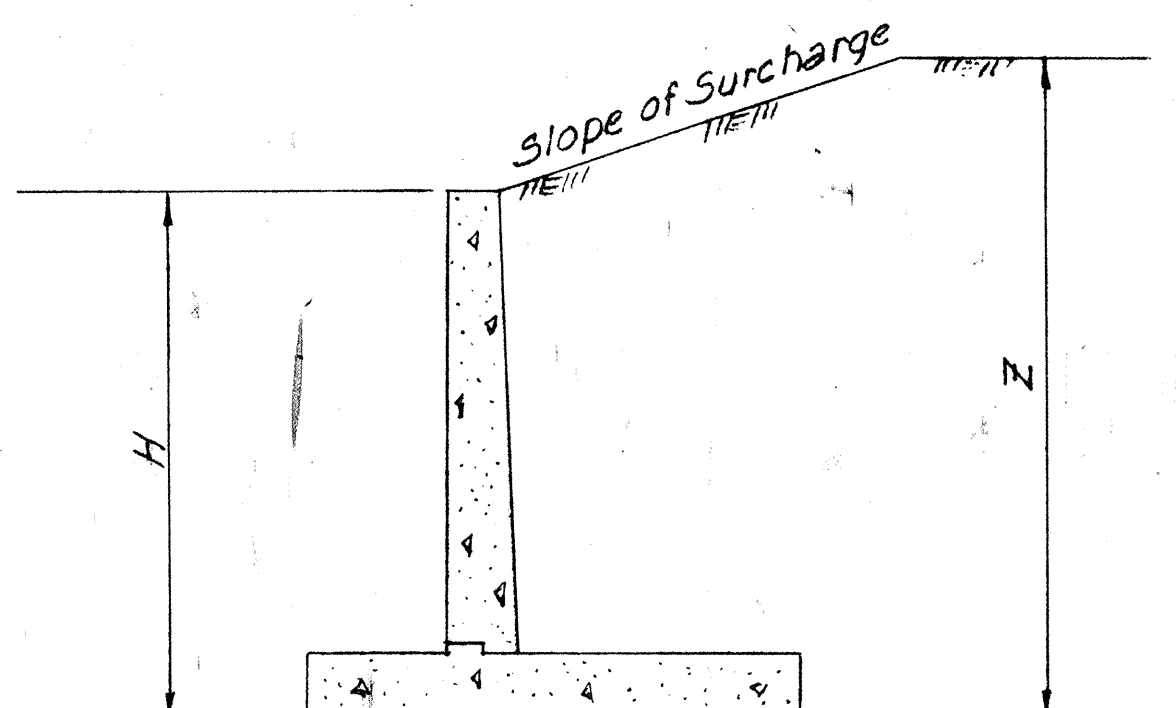
Scales as Noted
APPROVED BY: [Signature]
STATE HIGHWAY ENGINEER
DATE: Aug. 26, 1959

SHEET No. 1 OF 3 SHEETS

May 1959
July 1960
Sept 1960
Jan. 1962



DESIGN AND DRAINAGE

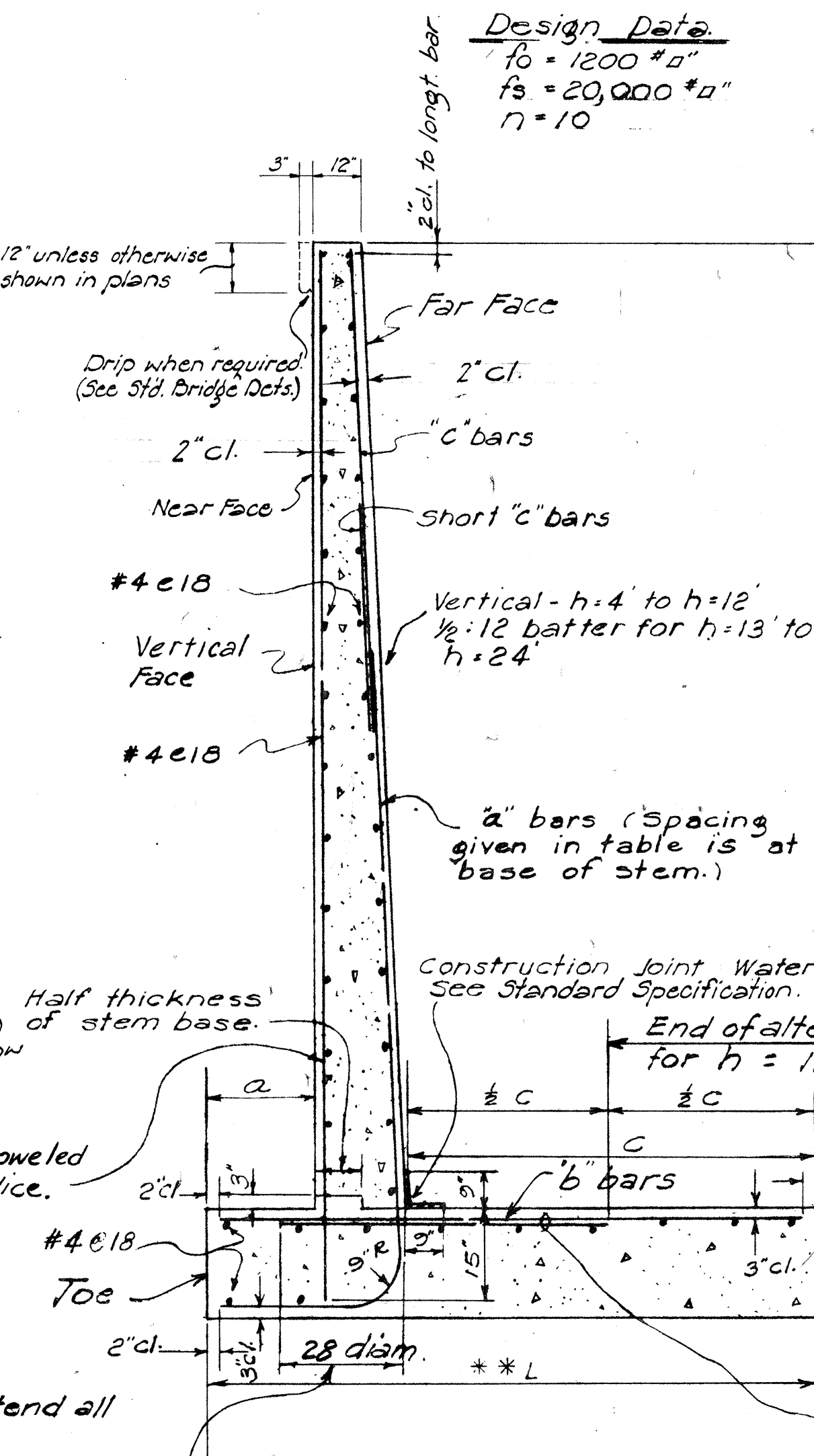


SPECIAL CASES:
Retaining walls shown are also applicable for the following conditions of loading:

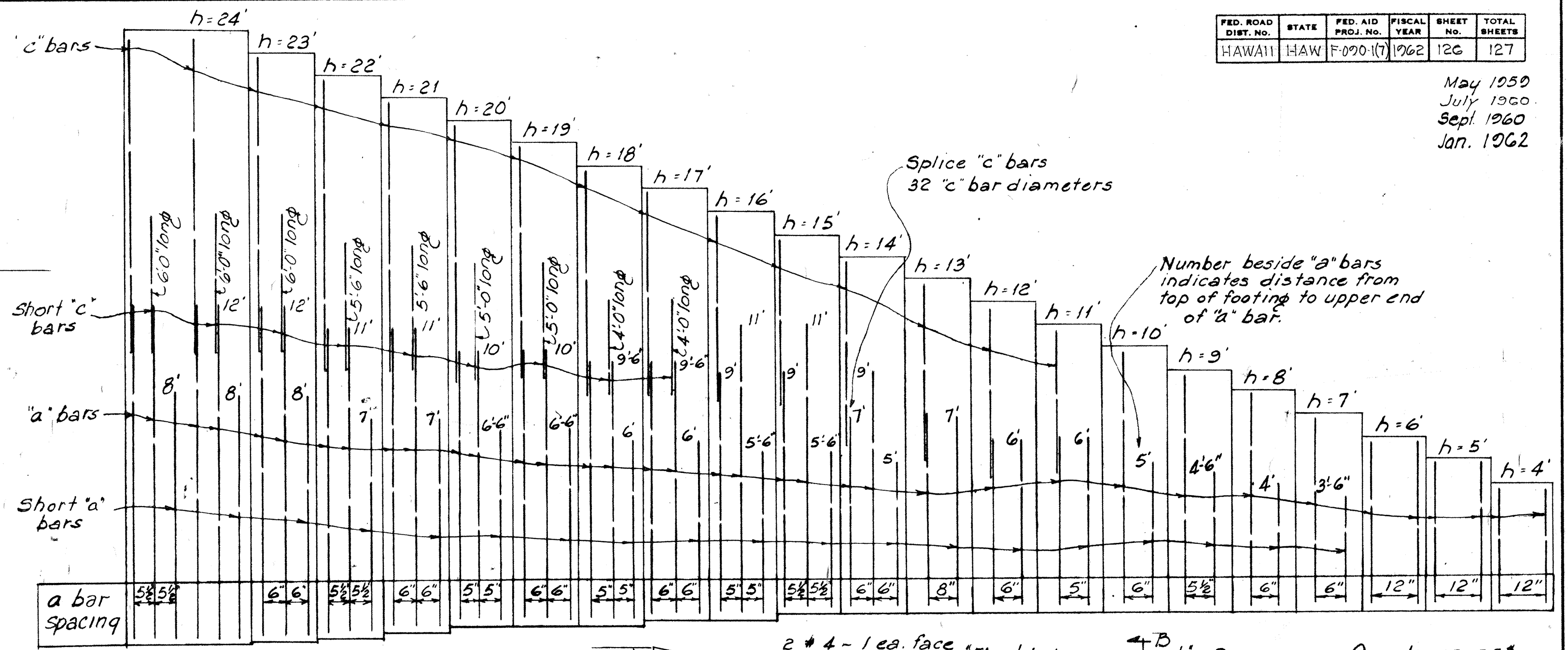
- For h = 4' to 1' 1.58:1 or less sloping surcharge unlimited. 1.5:1 sloping surcharge limited to $\frac{H}{H} = 2.3$
- For h of 8 and 9' 1.62:1 or less sloping surcharge unlimited. 1.5:1 sloping surcharge limited to $\frac{H}{H} = 1.8$
- For h of 10 and 11' 1.9:1 or less sloping surcharge unlimited. 1.5:1 sloping surcharge limited to $\frac{H}{H} = 1.4$
- For h = 13, 14, and 15' 2.2:1 or less sloping surcharge unlimited. 1.5:1 sloping surcharge limited to $\frac{H}{H} = 1.2$
- For h = 18 to 21' 2.7:1 or less sloping surcharge unlimited.
- For h = 22' to 24' 3:1 sloping surcharge unlimited

* Special cases are not applicable if traffic can come within a distance from the top of the stem equal to one-half its height.

** When footing is on rock, L shall be reduced to $L_p = 0.4(h+t+2')$ to increase footing pressure. L_p shall be measured from the toe. Adjust footing design accordingly.



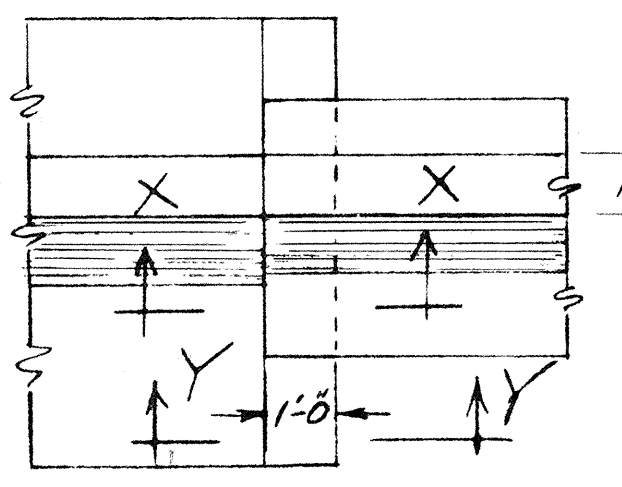
WALL SECTION



TYPICAL ARRANGEMENT FOR SLOPING WALLS

SECTION X-X

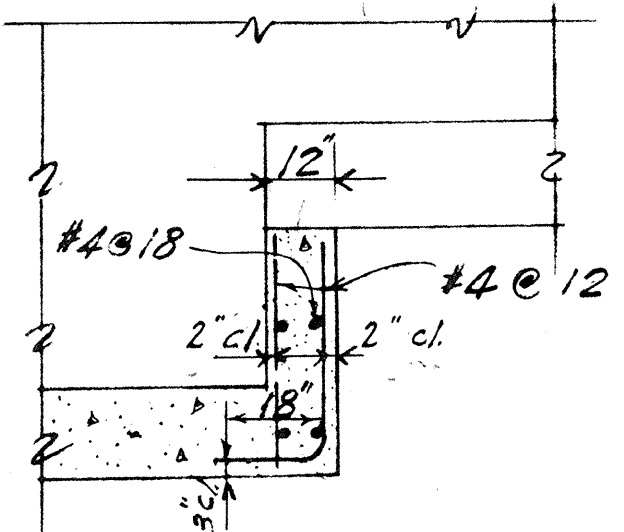
$\frac{3}{8} = 1'-0"$



FOOTING STEP

SECTION Y-Y

$\frac{3}{8} = 1'-0"$



JOINT DETAIL

(Spacing of Joints)
Contraction Joint - 30'-0" Max
Expansion Joint - 20'-0" Max

GENERAL NOTE

Except where detailed otherwise in the plans, all details on this sheet govern.

APPROVED: _____ DATE: Aug. 29, 1960
STATE HIGHWAY ENGINEER

DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STATE OF HAWAII

RETAINING WALL STANDARDS

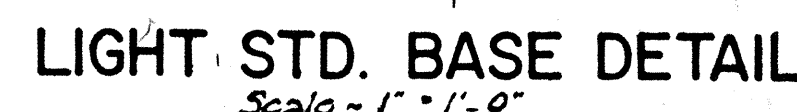
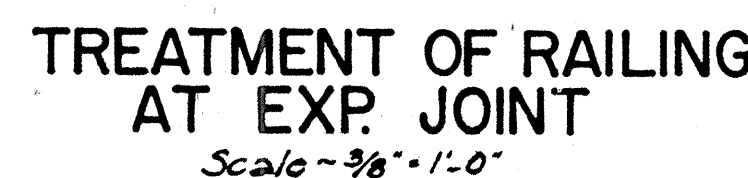
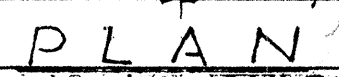
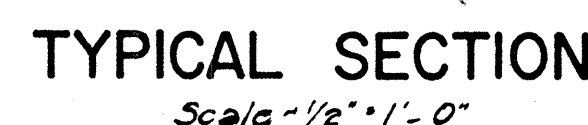
SCALES AS NOTED MAY 1956

SHEET NO. 2 OF 3 SHEETS

TABLE OF DIMENSIONS AND REINFORCING STEEL																								
h	4'	5'	6'	7'	8'	9'	10'	11'	12'	13'	14'	15'	16'	17'	18'	19'	20'	21'	22'	23'	24'			
a	6"	6"	6"	12"	12"	12"	12"	12"	12"	12"	15"	18"	21"	24"	24"	24"	27"	30"	33"	36"	39"			
**L	2.5'	3.0'	3.5'	4.0'	4.5'	5.0'	5.5'	6.0'	6.5'	7.0'	7.75'	8.25'	9.0'	9.75'	10.5'	11.5'	12.5'	13.5'	14.5'	15.25'	16.0'			
t	14"	14"	14"	14"	14"	14"	14"	18"	18"	18"	18"	18"	21"	21"	24"	24"	24"	27"	30"	31"	33"			
"a" bars	#3 @ 12	#3 @ 12	#4 @ 12	#3 @ 6	#4 @ 6	#4 @ 5½	#5 @ 6	#5 @ 5	#6 @ 6	#6 @ 8	#6 @ 6	#6 @ 5½	#6 @ 5	#7 @ 6	#7 @ 5	#8 @ 6	#8 @ 5	#9 @ 6	#9 @ 5½	#10 @ 6	#10 @ 5½			
"b" bars	#3 @ 12	#3 @ 12	#3 @ 12	#3 @ 12	#3 @ 12	#4 @ 11	#5 @ 12	#5 @ 10	#5 @ 6	#6 @ 8	#6 @ 6	#6 @ 5½	#6 @ 5	#7 @ 6	#7 @ 5	#9 @ 6	#9 @ 5	#10 @ 6	#10 @ 5½	#11 @ 6	#11 @ 5½			
"c" bars	—	—	—	—	—	—	—	—	#4	#4	#4	#4	#4	#4	#4	#5	#5	#6	#6	#7	#7			
F.S. Sliding *	1.30	1.29	1.28	1.16	1.17	1.18	1.17	1.17	1.20	1.23	1.25	1.21	1.25	1.26	1.33	1.39	1.42	1.48	1.53	1.53	1.54			
F.S. Overturning	1.38	1.45	1.50	1.54	1.61	1.64	1.63	1.71	1.76	1.81	1.96	1.97	2.05	2.19	2.47	2.49	2.70	2.85	3.02	3.06	3.11			
Concr. c.y./ft	0.26	0.32	0.37	0.43	0.49	0.55	0.61	0.74	0.81	1.00	1.10	1.19	1.37	1.49	1.69	1.83	1.97	2.26	2.53	2.72	2.97			
Steel lbs./ft	11.1	13.3	17.7	20.0	27.3	32.8	43.8	51.0	67.7	59.6	76.2	87.8	103.7	125.8	145.4	178.3	222.7	249.2	278.4	339.0	376.6			
Eccentricity e	0.88'	1.01'	1.14	1.21	1.20	1.42	1.63	1.63	1.74	1.83	1.83	1.89	1.93	1.89	1.98	1.94	1.86	2.00	1.75	1.82	1.82			
Toe Pressure	2800	2600	3200	2800	2900	3200	3700	3600	3800	4100	3800	3900	3900	3800	3800	4000	3900	4100	3900	4100	4100			

* F.S. Against Sliding based on friction factor of 0.40

ORIGINAL
DESIGNED BY
DRAWN BY
CHECKED BY
NOTED BY
DATE
1960
11/11



Aluminum railing concrete parapet & end post to receive "Class 2 Surface Finish."

ITEM	DESCRIPTION	ALLOY	UNIT WT.
Top Rail	Al. Alloy Drawn Or Extruded Tube 4" o.d. x 1/8" thick wall.	6061 - T6	1.70 #/ft.
Bot. Rail	Al. Alloy Drawn Or Extruded Tube 3 1/2" o.d. x 1/8" thick wall.	6061 - T6	1.56 #/ft.
* Rail Post	Permanent Mold Casting See Rail Post Detail	Post A-356-T6 Post Sc. 2024-T4	16.0 #/ea.
Rail Cap	See Rail Cap Detail	Cap 356-T6	Top ~.415 #/ft. Bot. ~.340 #/ft.
Bolts	See Anchor Bolt Detail Provide Hexagon Nut and Plain Washer	Bolt 2024-T4 Nut 6061-T6 Wash. 2024-T4	—

* Rail Post Finish: Front, top and rear faces of post shall receive a standard scratch brush finish, to be approved by the Engineer.

DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STATE OF HAWAII

STANDARD DETAILS

ALUMINUM RAILING

SCALE AS NOTED

SHEET No. 3 OF 3 SHEETS