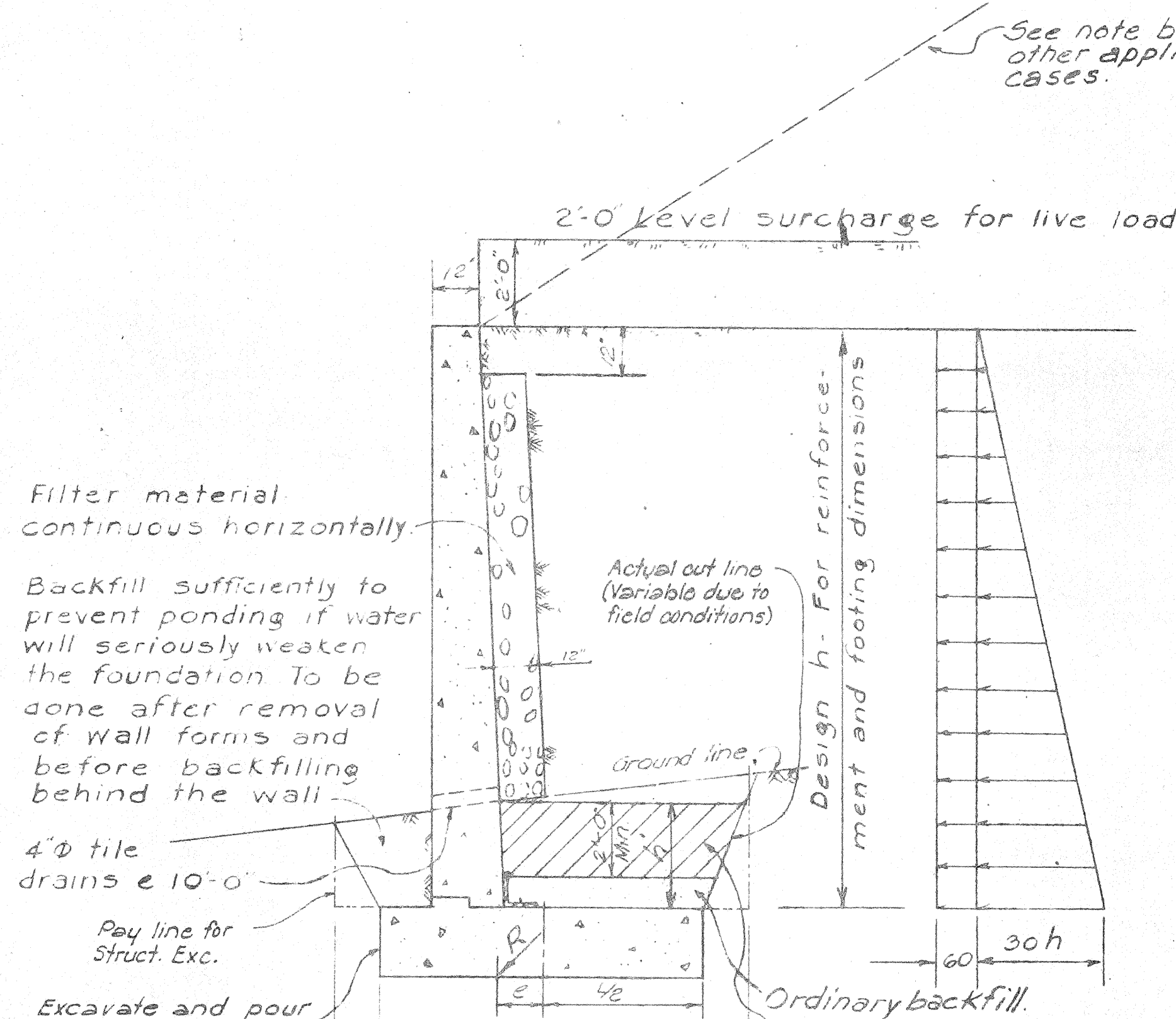
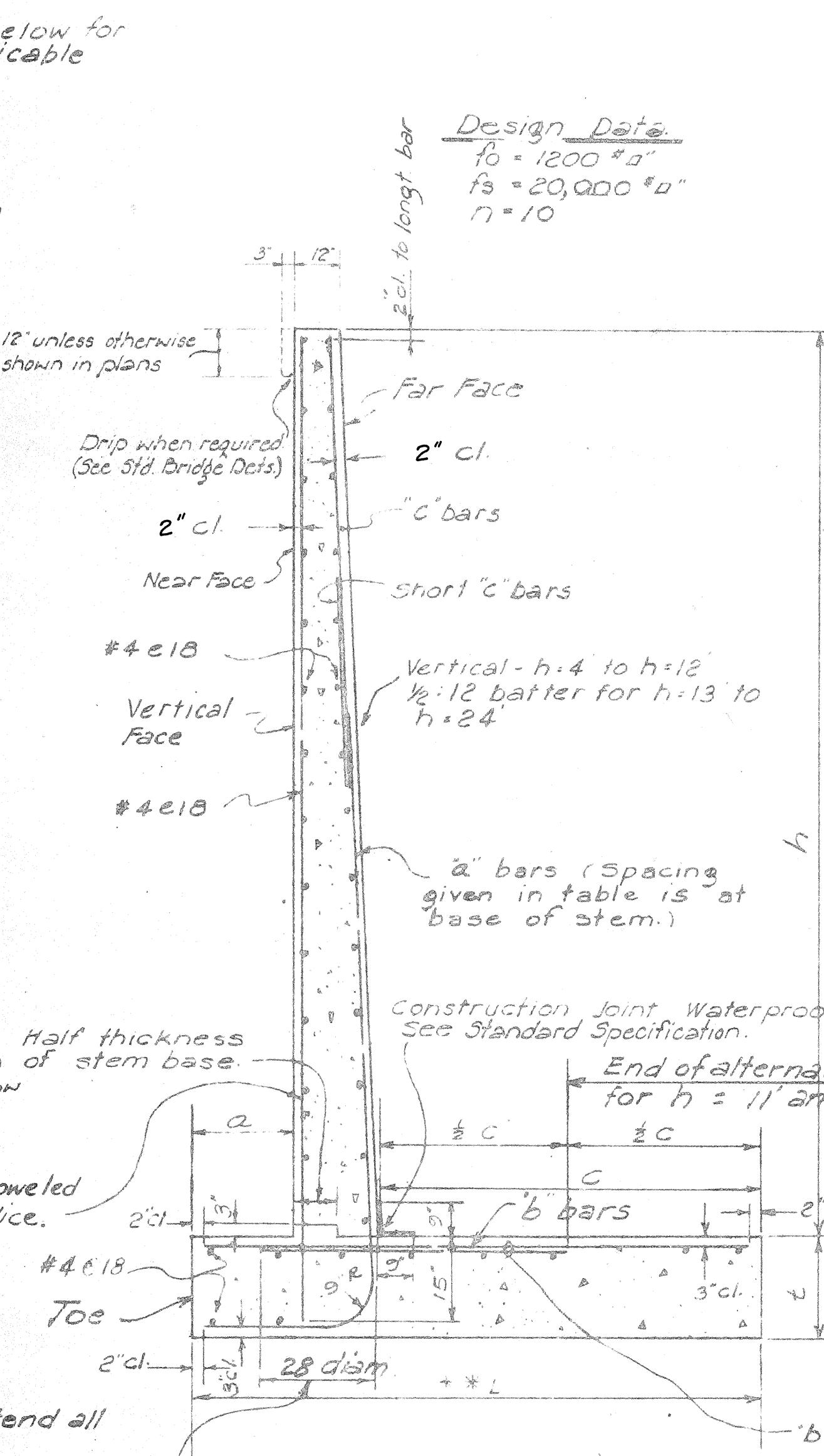
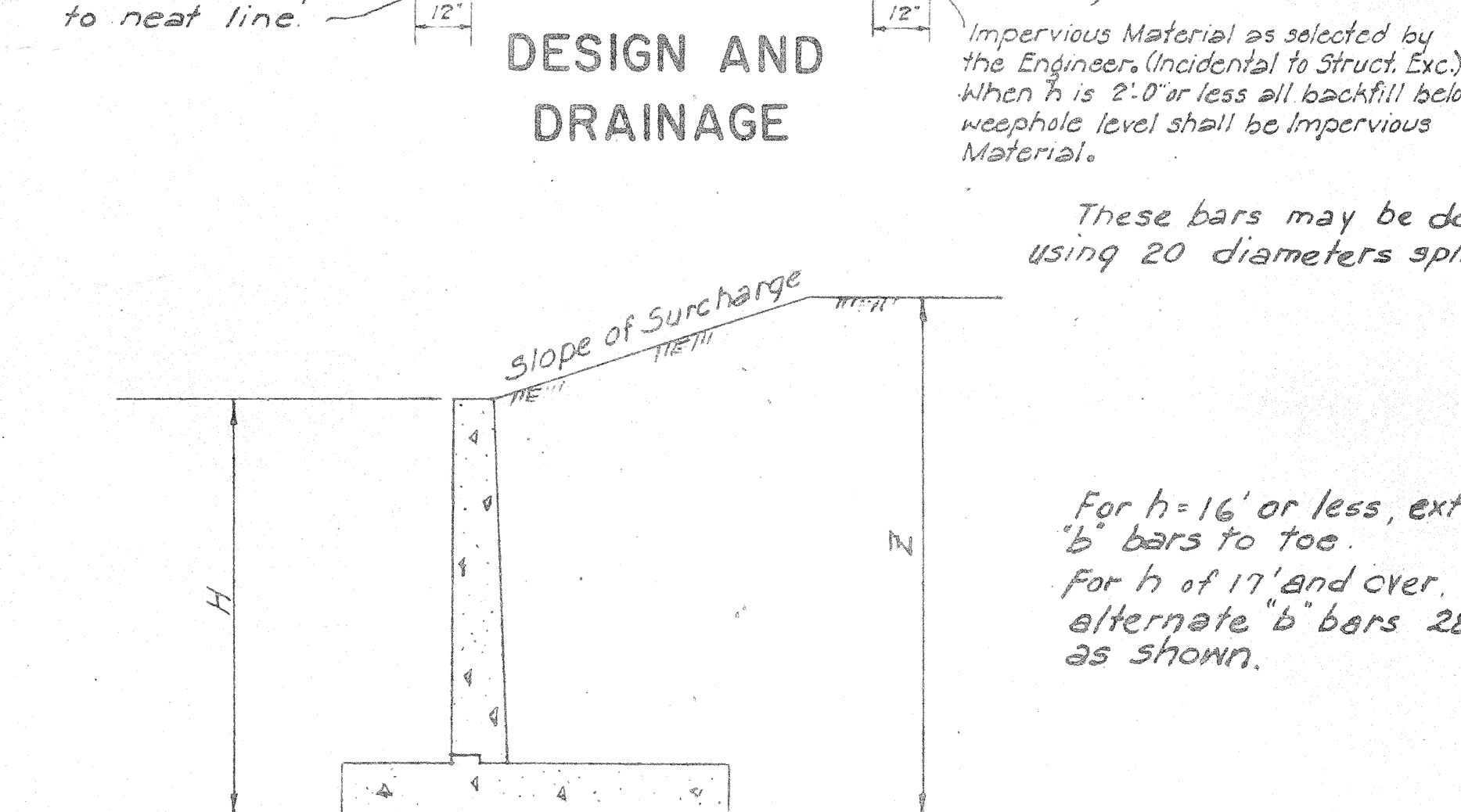


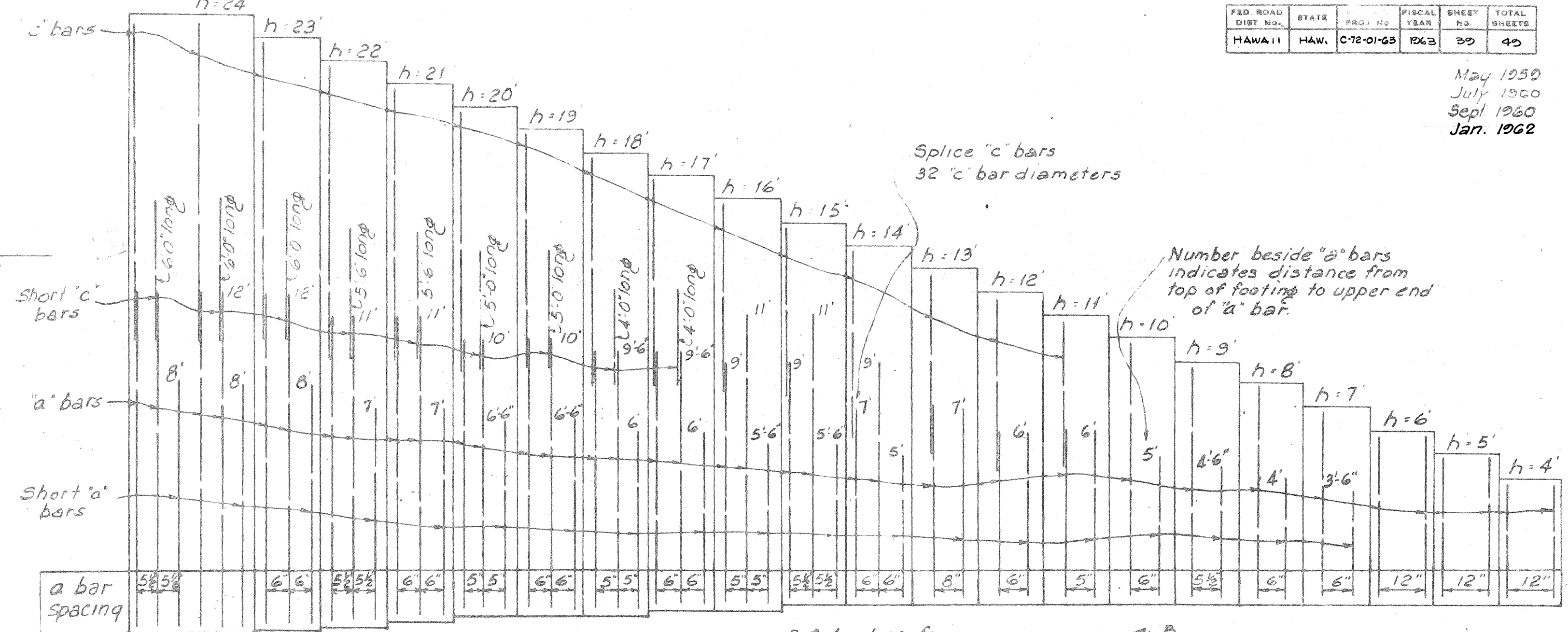
May 1950
July 1950
Sept. 1960
Jan. 1962



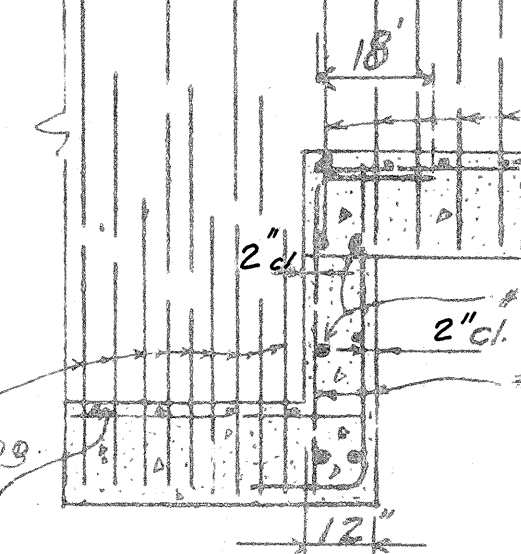
DESIGN AND DRAINAGE



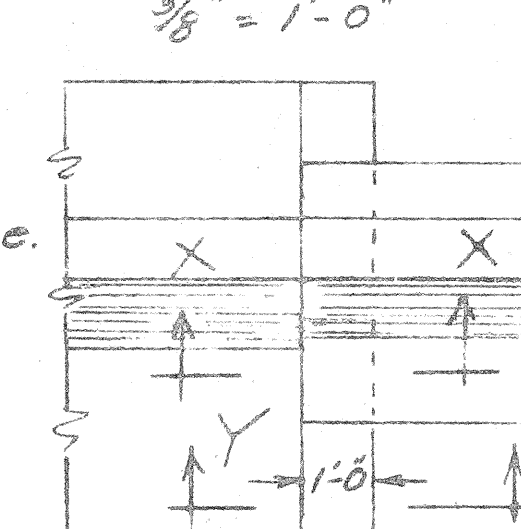
WALL SECTION



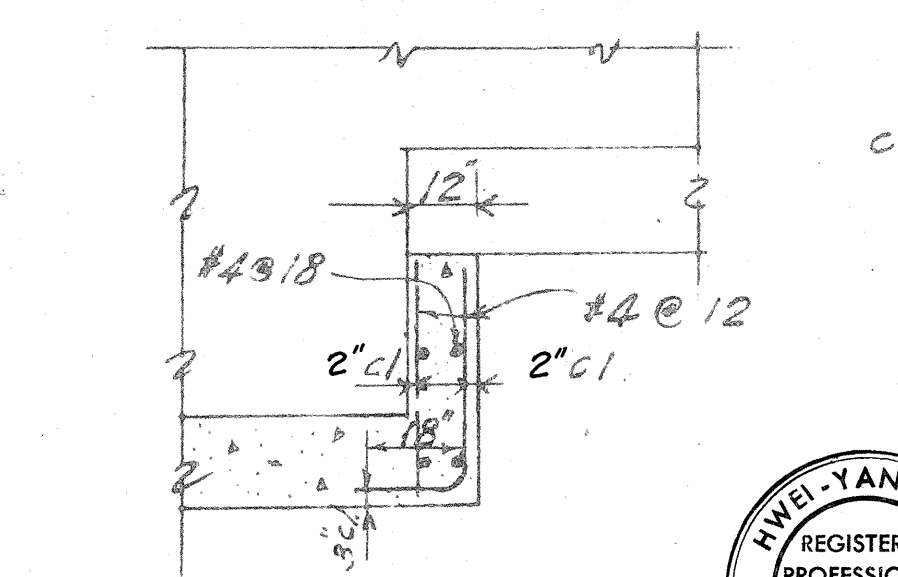
SECTION X-X



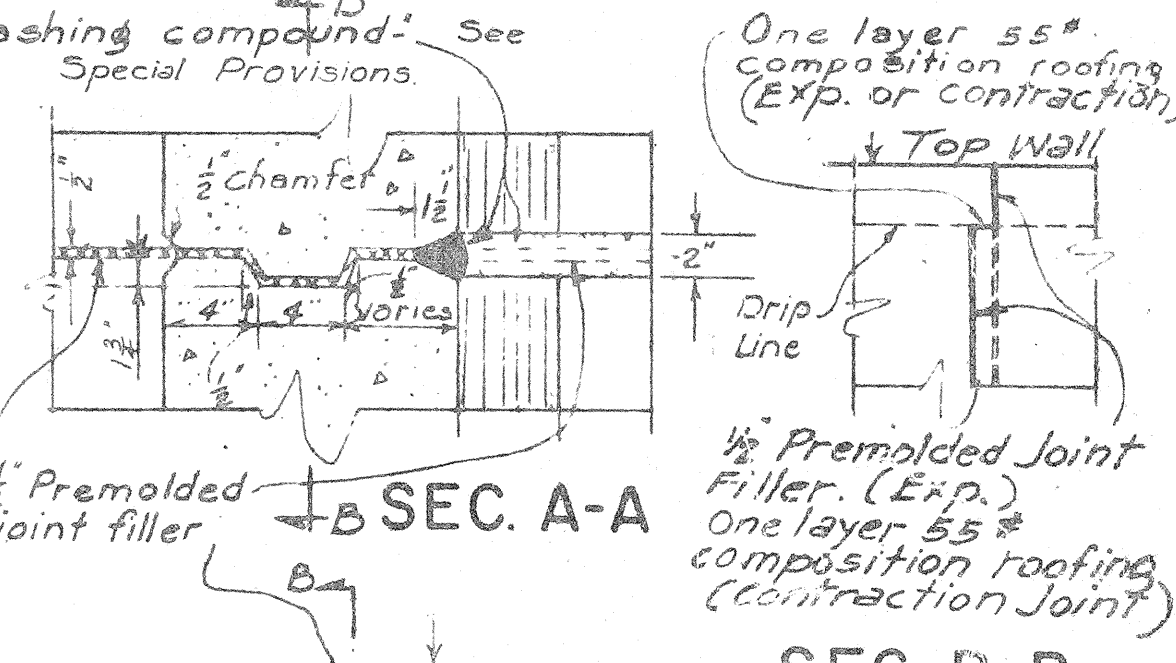
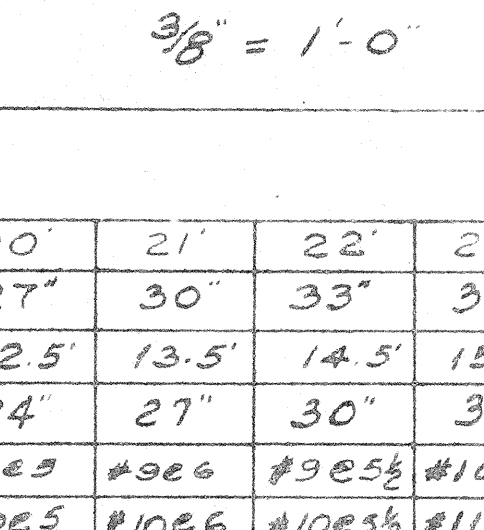
PLAN FOOTING STEP



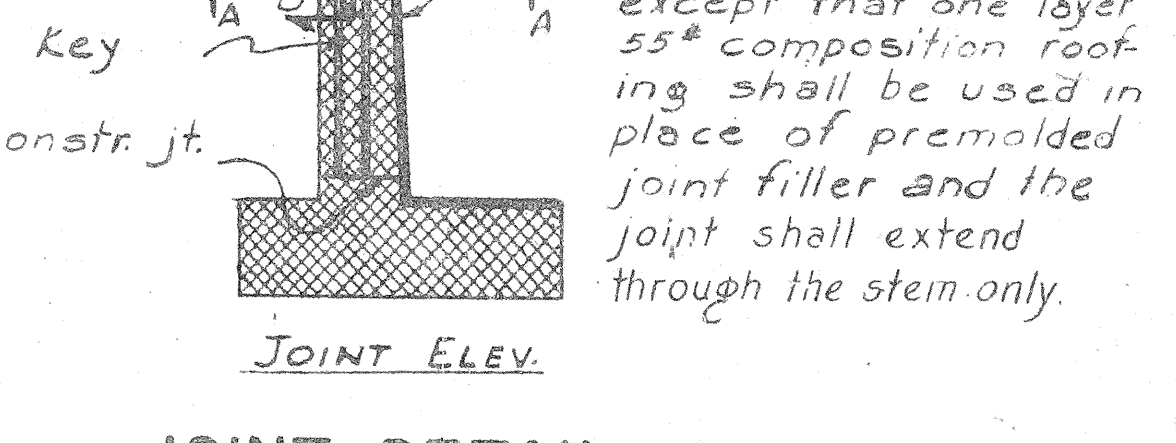
TYPICAL ARRANGEMENT FOR SLOPING WALLS



SECTION Y-Y



JOINT DETAIL



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.

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

- For h = 4' to 7', 1.58:1 or less sloping surcharge unlimited
- For h of 8 and 9', 1.5:1 sloping surcharge limited to $\frac{L}{H} = 2.3$
- For h of 10 and 11', 1.62:1 or less sloping surcharge unlimited
- For h of 12 and 13', 1.5:1 sloping surcharge limited to $\frac{L}{H} = 1.8$
- For h of 14 and 15', 1.9:1 or less sloping surcharge unlimited
- For h of 16 and 17', 1.5:1 sloping surcharge limited to $\frac{L}{H} = 1.4$
- For h of 18 and 19', 2.2:1 or less sloping surcharge unlimited
- For h of 20 and 21', 1.5:1 sloping surcharge limited to $\frac{L}{H} = 1.2$
- For h of 22 and 23', 2.7:1 or less sloping surcharge unlimited
- For h of 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.

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"	18"	21"	24"	24"	24"	27"	30"	31"	33"
"a" bars	#3 @ 12	#3 @ 12	#3 @ 12	#3 @ 6	#4 @ 6	#4 @ 6	#4 @ 6	#5 @ 5	#5 @ 5	#5 @ 5	#6 @ 5	#6 @ 5	#6 @ 5	#7 @ 5	#7 @ 5	#7 @ 5	#8 @ 5	#8 @ 5	#9 @ 5	#9 @ 5	#10 @ 5
"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 @ 5	#6 @ 5	#7 @ 6	#7 @ 5	#7 @ 5	#8 @ 5	#8 @ 5	#9 @ 5	#9 @ 5	#10 @ 5
"c" bars								#4	#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	1.20	1.23	1.25	1.21	1.25	1.26	1.33	1.39	1.42	1.48	1.53	1.53	1.54	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	13.5	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	222.1	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

APPROVED: _____ DATE: Aug. 25, 1959
STATE HIGHWAY ENGINEER

HAWAII STATE HIGHWAY DEPARTMENT
STATE OF HAWAII

RETAINING WALL STANDARDS

SCALES AS NOTED MAY 1956

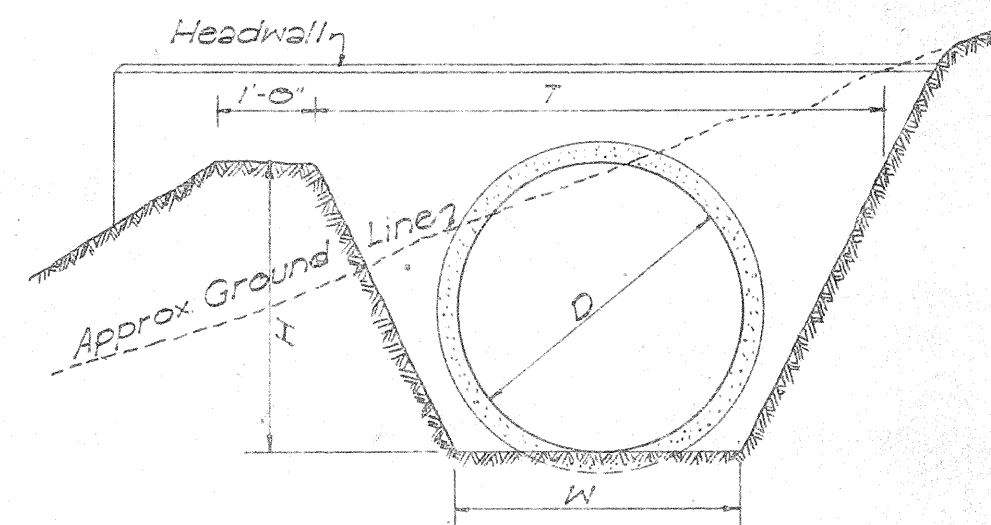
SHEET No. 39 OF 49 SHEETS

2/17/57

ED. ROAD DIST. NO.	STATE	PROJ. NO.	YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	C-72-01-63	1963	40	49

AUG. 1957

DATA FOR OUTLET DITCH				
D	W	H	T=W+H	
18"	24"	2'-0"	4'-0"	
24"	30"	2'-0"	4'-6"	
30"	36"	2'-6"	5'-0"	
36"	36"	3'-0"	6'-0"	



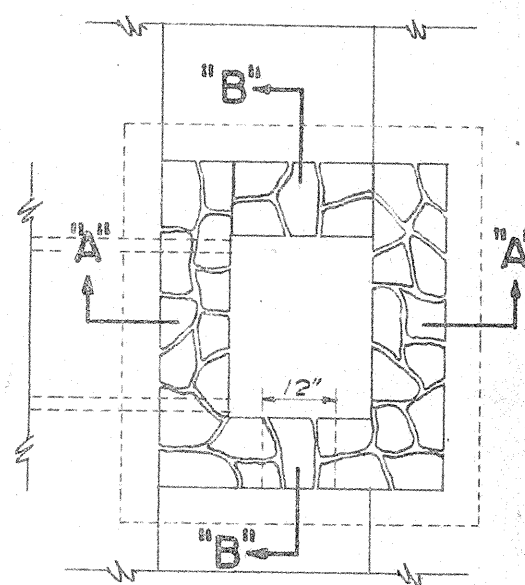
DETAIL OF OUTLET DITCH

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

DATA FOR MASONRY DROP INTAKE					Where Variables Equal
D'	D	L=D+G	Cu. Yds.		
23"	18"	2'-5"	3.02	4'-6"	
30"	24"	3'-0"	3.61	5'-0"	
37"	30"	3'-7"	4.21	5'-6"	
44"	36"	4'-2"	4.85	6'-0"	

NOTE:

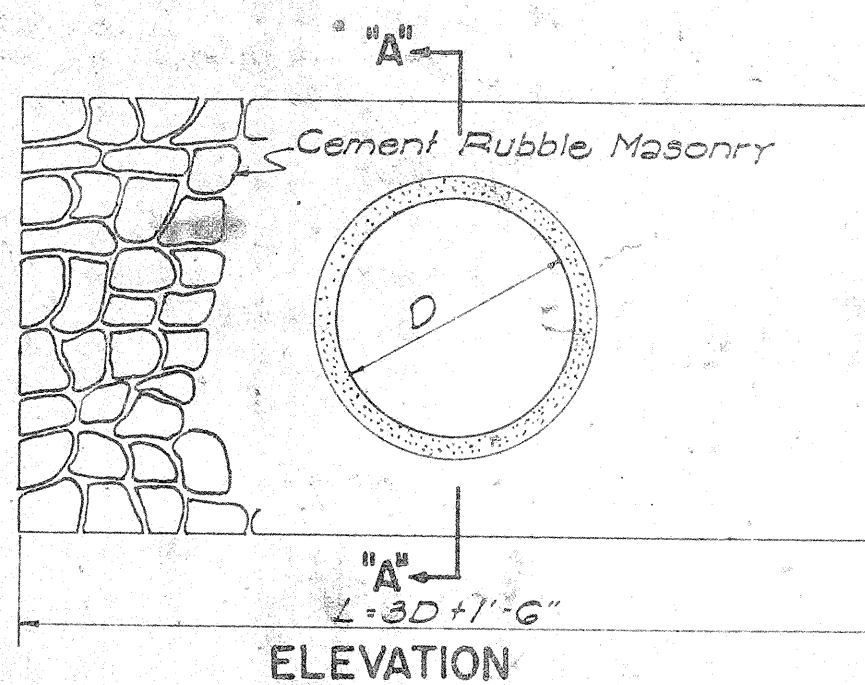
Dimension "X" is assumed as 2'-4" in figuring the above quantities.



DETAIL OF MASONRY DROP INTAKE

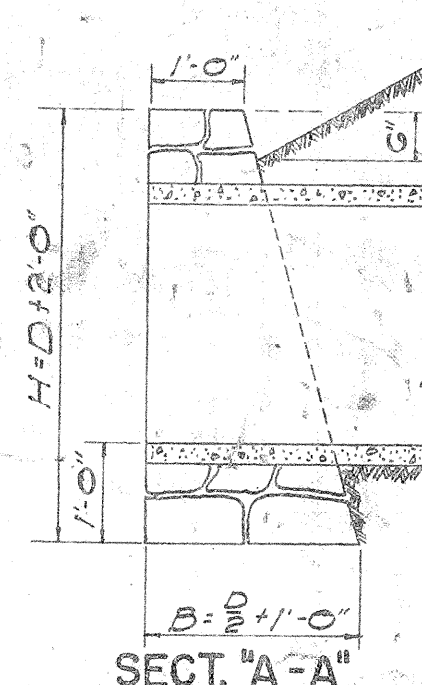
Scale: 3/8" = 1'-0"

DATA - MASONRY HEADWALL			Cast-in-Place Conc. Culvert	Conc. Pipe Culvert	Corrugated Pipe Culvert
D'	H	B	Cu. Yds.	Cu. Yds.	Cu. Yds.
18"	3'-6"	1'-0"	0.85	0.95	0.93
24"	4'-0"	2'-0"	1.23	1.45	1.41
30"	4'-6"	2'-3"	1.83	2.06	2.00
36"	5'-0"	2'-6"	2.49	2.84	2.72

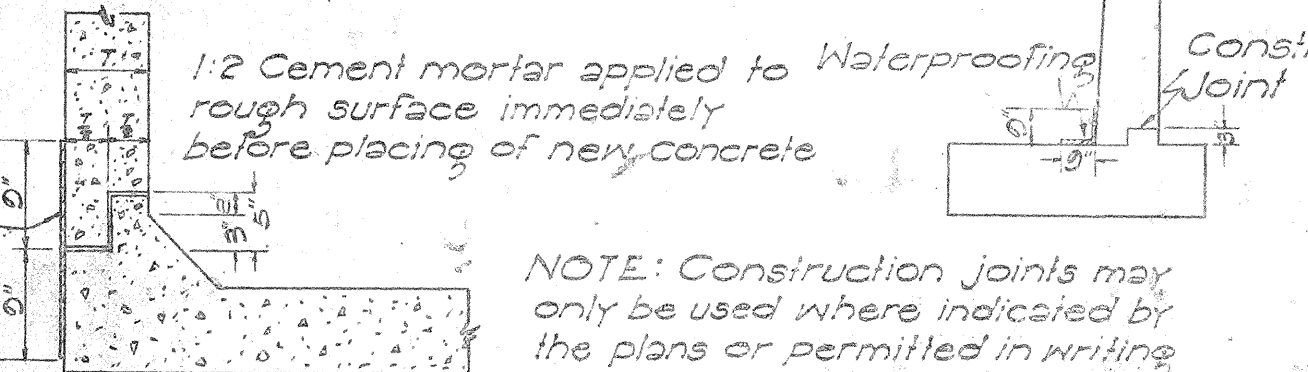


DETAIL OF MASONRY HEADWALL

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



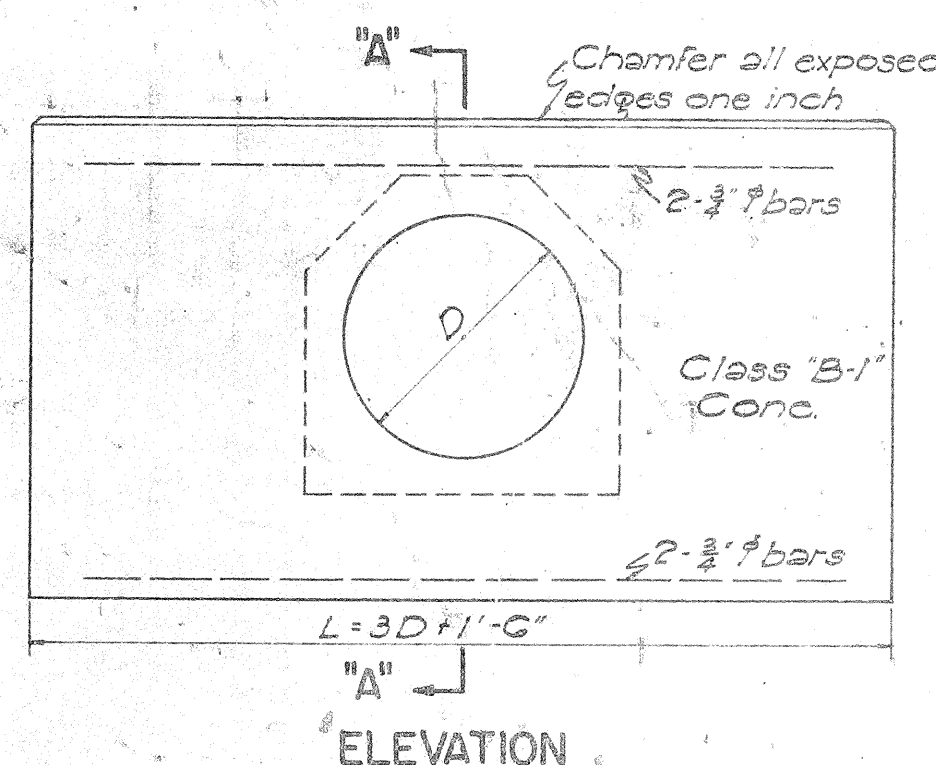
SECT. "A-A"



CONSTR. JOINT DETAILS

NOTE: Construction joints may only be used where indicated by the plans or permitted in writing by the Engineer.

Note: When subgrade is below top of jacket, it shall be fully compacted to this line and then re-excavated (struck) to proper subgrade. This surface shall be rolled again.



ELEVATION

SECTION "A-A"

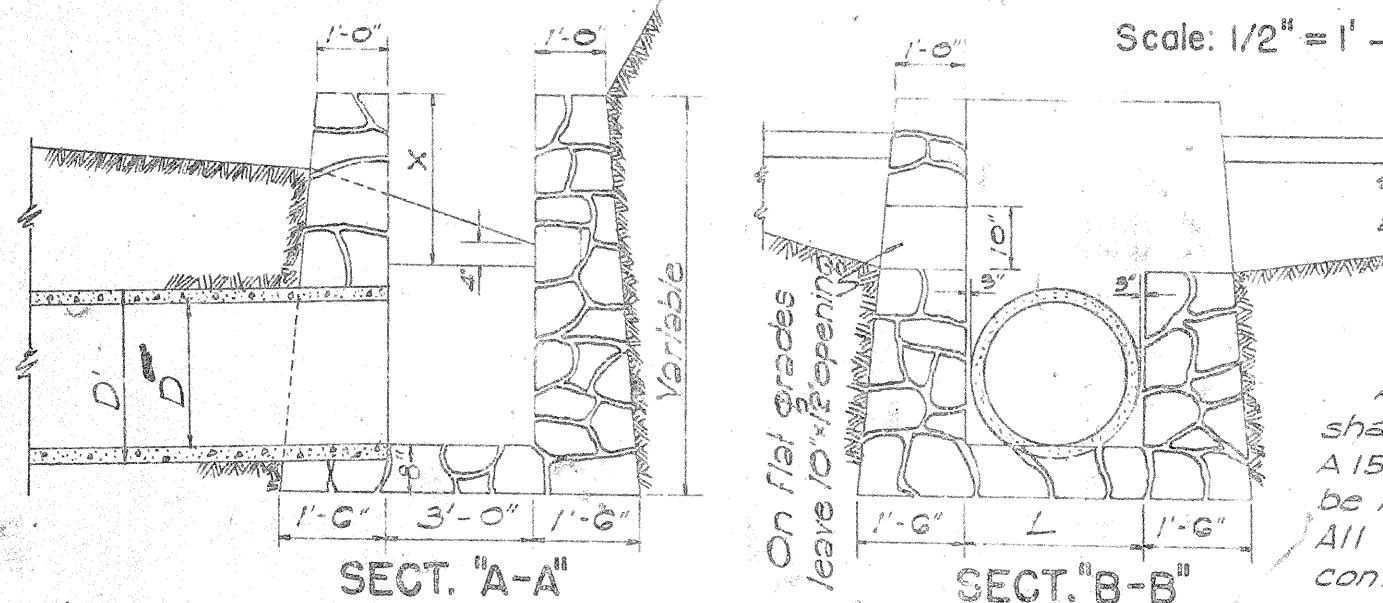
DATA FOR CONC. HEADWALL			Cast-in-Place Conc. Culvert	Conc. Pipe Culvert	Steel For One Headwall
D	B	L	Cu. Yds.	Cu. Yds.	No. of Bars Size Length Lbs.
18"	1'-6"	6'-0"	0.92	1.00	4 3/4" 5'-6" 33
24"	1'-6"	7'-6"	1.25	1.33	4 3/4" 7'-0" 42
30"	2'-0"	9'-0"	1.95	2.17	4 3/4" 8'-6" 51
36"	2'-0"	10'-0"	2.49	2.74	4 3/4" 10'-0" 60
42"	2'-6"	12'-0"	3.87	4.26	4 3/4" 11'-6" 69
48"	2'-6"	13'-6"	4.66	5.06	4 3/4" 13'-0" 78

DETAIL OF CONCRETE HEADWALL

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

SECTION "A-A"
CONC. COLLAR FOR CONC. BOX CULVERT

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



SECT. "A-A"

SECT. "B-B"

REINFORCING BARS

All reinforcing bars for concrete shall be Billet Steel bars, ASTM A15, intermediate grade. Steel shall be made by the open-hearth process. All bars shall be deformed type conforming to ASTM A-305.

SECTION OF HIGH CEMENT RUBBLE MASONRY RETAINING WALL OR SEAWALL

SECTION OF LOW MASONRY RETAINING WALL OR SEAWALL

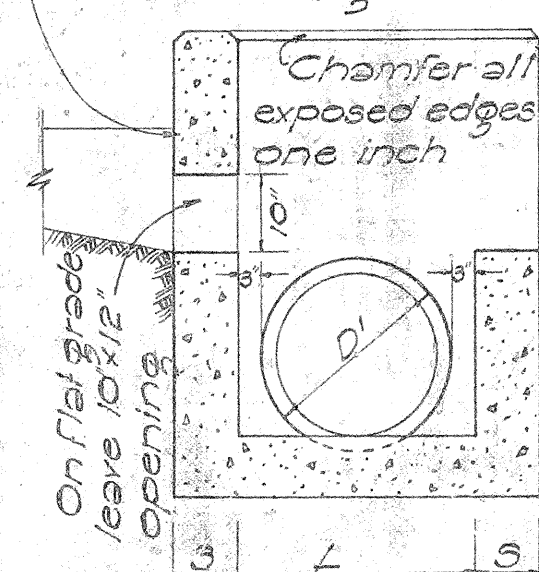
DATA - CONC. DROP INTAKE					Where Variables Equal
D'	D	L=D+G	S	Cu. Yds.	
23"	18"	2'-5"	8'	1.41	4'-6"
30"	24"	3'-0"	8'	1.72	5'-0"
37"	30"	3'-7"	9'	2.32	5'-6"
44"	36"	4'-2"	9'	2.73	6'-0"
51"	42"	4'-9"	10'	3.54	6'-6"
58"	48"	5'-4"	10'	4.01	7'-0"

Note: Dimension "X" is assumed as 2'-4" in figuring the above quantities.

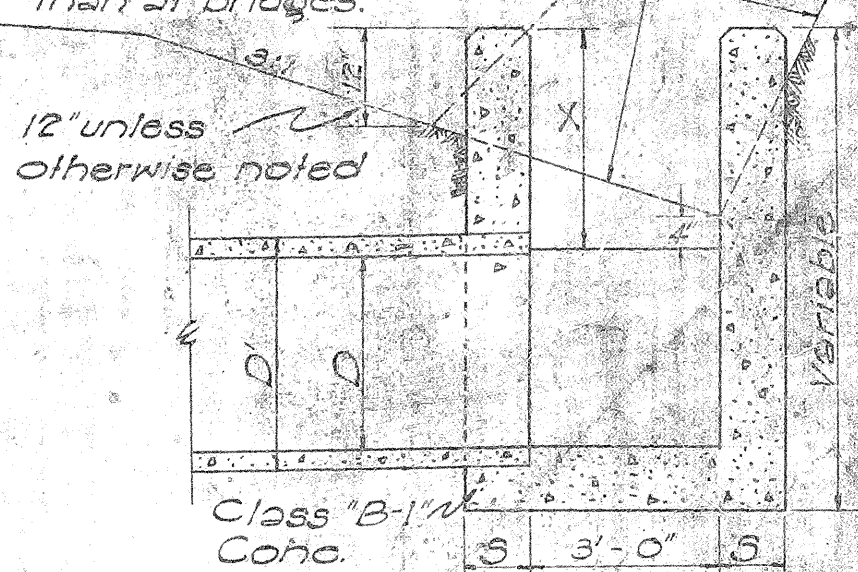
Note: This type of structure shall also be used for the Drop Intakes of Siphons connected with Irrigation Ditches or Flumes with appropriate changes to dimensions. In this case all joints must be made water tight.

Where drainage comes from both sides lower to this wall to same elevation as shown for opposite wall.

Excavate recess in roadway excavation slope for inlet to dimensions and form designated by Engineer. This is "Unclassified" Excavation. Top limits of structure excavation other than at bridges.



SECTION "B-B"



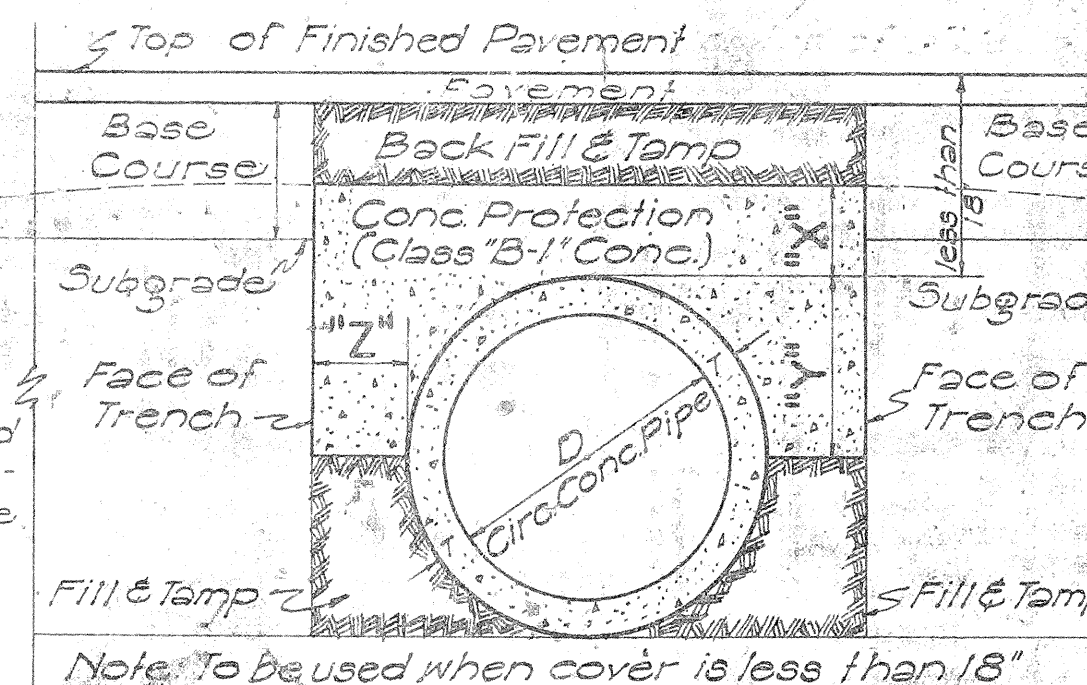
SECTION "A-A"

DETAIL OF CONCRETE DROP INTAKE

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

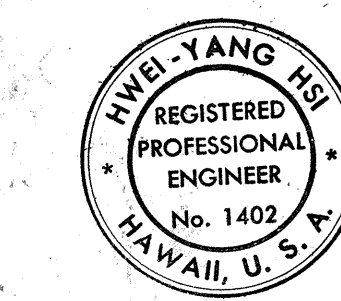
SECT. OF CULVERT WITH CONC. PROTECTION

Scale: 1" = 1'-0"



Note: To be used when cover is less than 18"

DATA FOR CONCRETE PROTECTION OVER CULVERTS		
X	Y	Z
6" for 18" D		Z must be from pipe to face of trench
7" " 24" D		
8" " 30" D	D/2 + T	Minimum = X
9" " 36" D		Maximum pay quantity will be Z - 12"
10" " 42" D		
11" " 48" D		
12" " 54" D		

APPROVED: DATE: AUG. 26, 1957
STATE HIGHWAY ENGINEERDEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STATE OF HAWAII
STANDARD DETAILS
DROP INTAKES, RETAINING WALLS,
HEADWALLS, CONSTRUCTION JOINTS
SCALES AS NOTED

SHEET No 40 OF 49 SHEETS

47 (1)

DESIGNED BY: DATE: 2/17/57
CHECKED BY: CA/SHS
NOTED BY: CA/SHS
ORIGINAL PLAN: No. 40

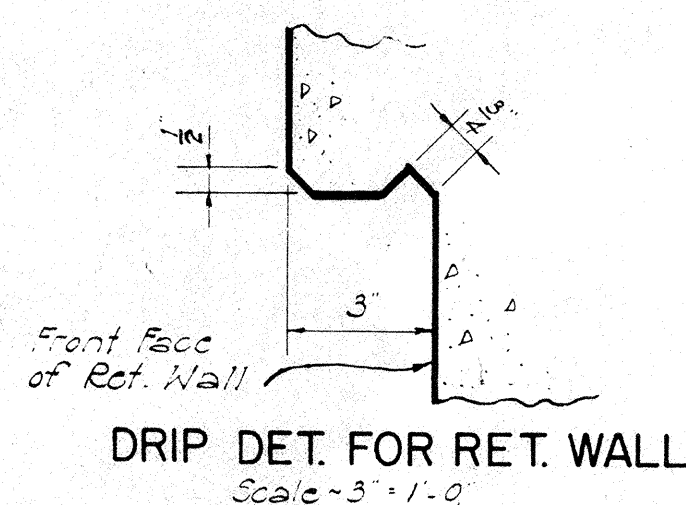
NAME DATE

Use correct name of bridge
LEFT HAND SIDE

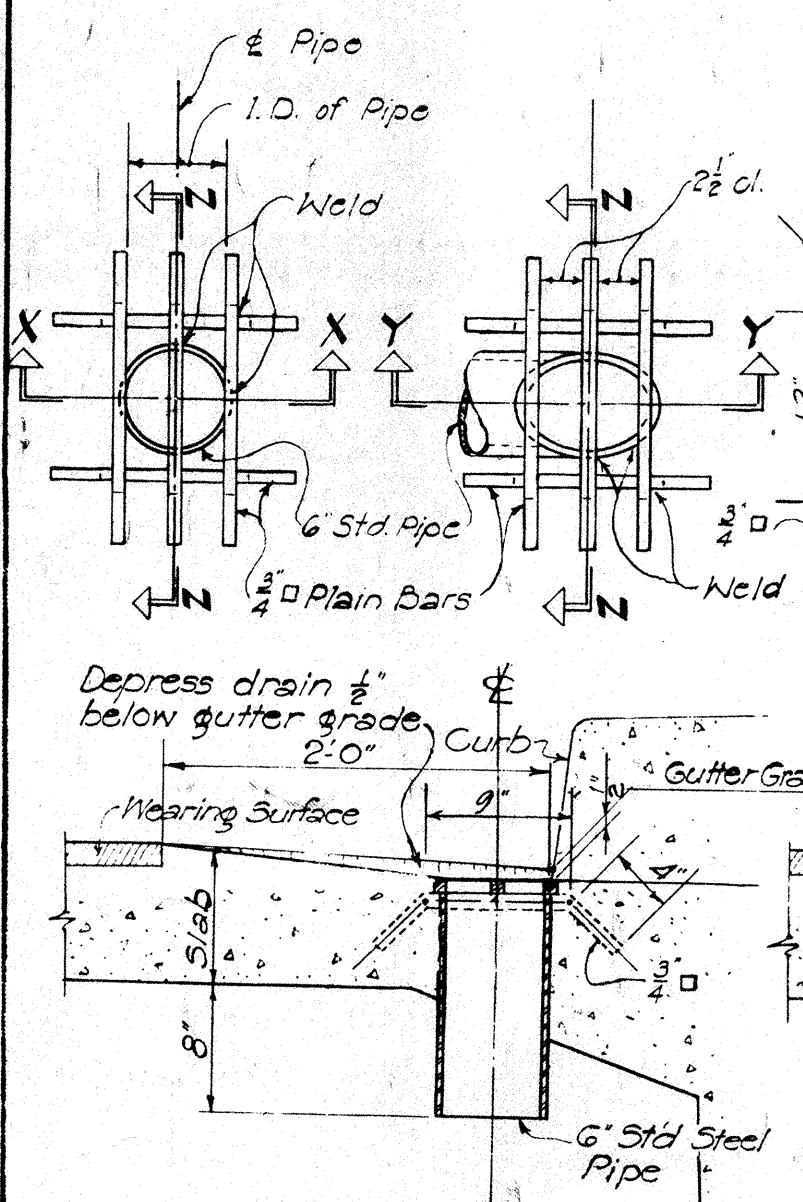
Date of year built
RIGHT HAND SIDE

DETAIL OF LETTERS AND FIGURES AT BOTH APPROACHES

NOTE: Name of bridge to be placed in left end post panels and date in right end 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.

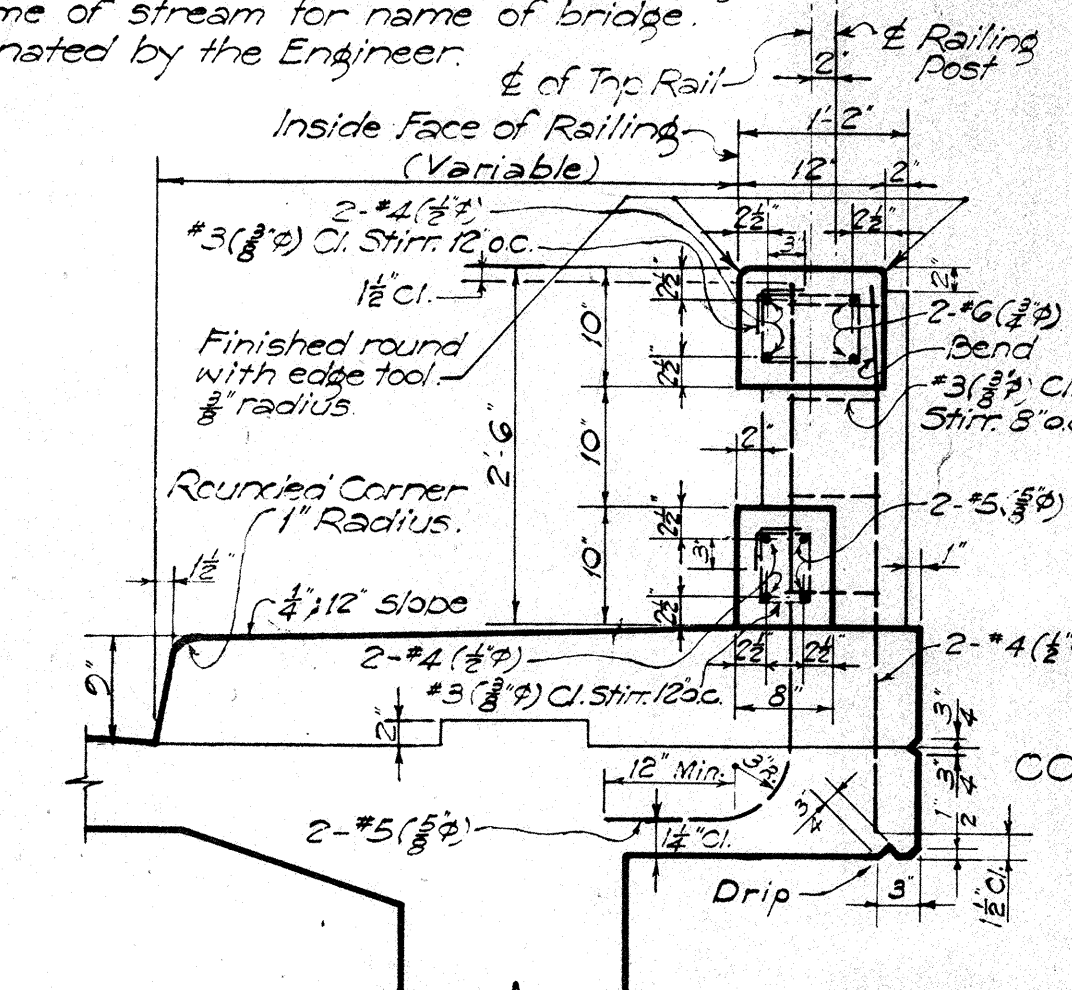
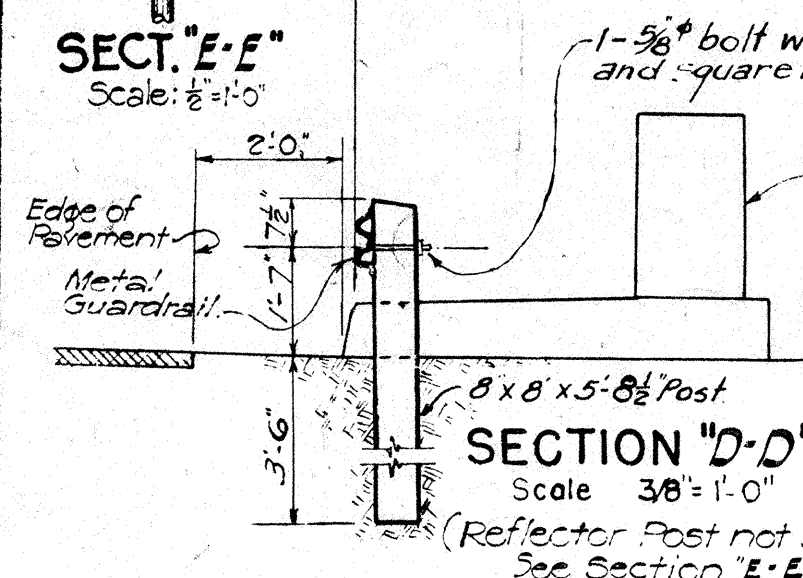


END POST GROOVE DET.
Scale: 3/4" = 1'-0"



SECTION "Y-Y"
Scale: 1" = 1'-0"

NOTE: See REGULATORY & WARNING Signs sheet for details of RM's, and railing posts. See Std. Details Sheet for reinforcement of conc. posts.



NOTE: Sidewalk, curb and railing to be poured after release of falsework. Forms for railing and endpost to be made of plywood.

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.

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.

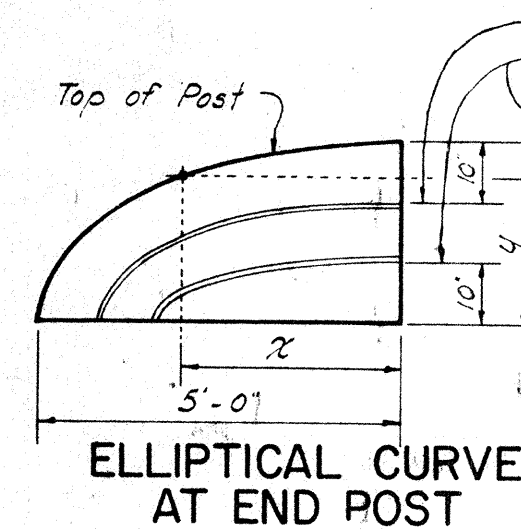
Minimum spacing between parallel bars shall be 2 1/2 times the diameter of bars, but in no case shall the clear distance between the bars be less than 1 1/2 times the maximum size of the coarse aggregate.

All dimensions relating to reinforcing are to centers of bars unless otherwise noted.

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



GUARDRAIL OFFSET

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

8x8x5-8 1/2 Post. See Proposal Schedule for material.

Shoulder Line?

End Post

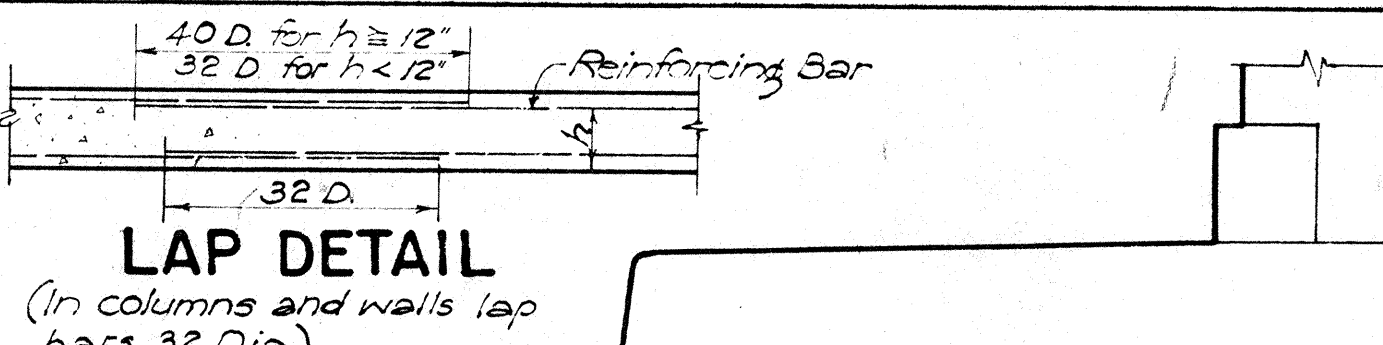
RM-3 Reflector Post

Top Curb

End of Bridge

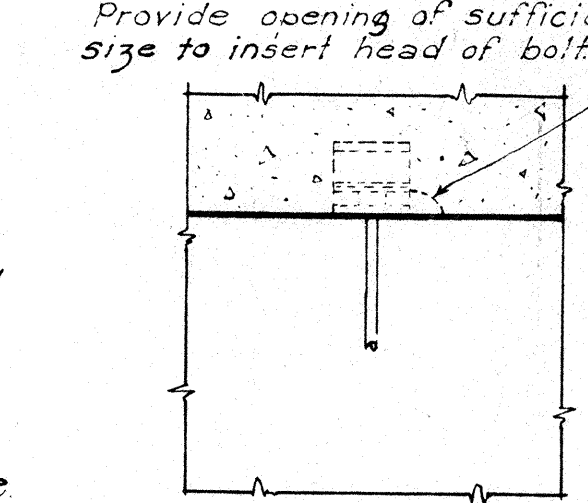
12'-6" Spacing for stakeout of guardrail flare (Not for location of posts)

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



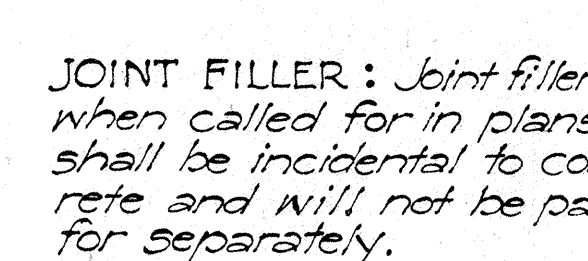
SECTION "G-G"

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



INSERTS

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

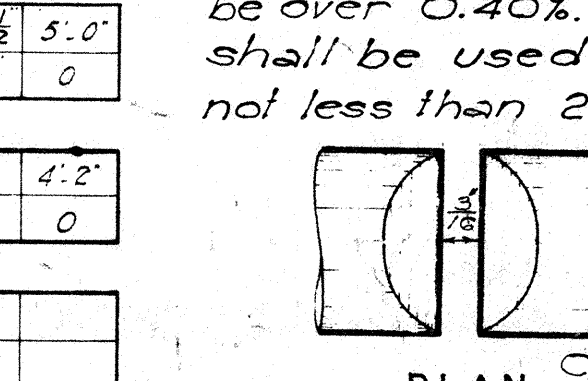


DETAIL OF PIPE HANGERS AND INSERTS

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.

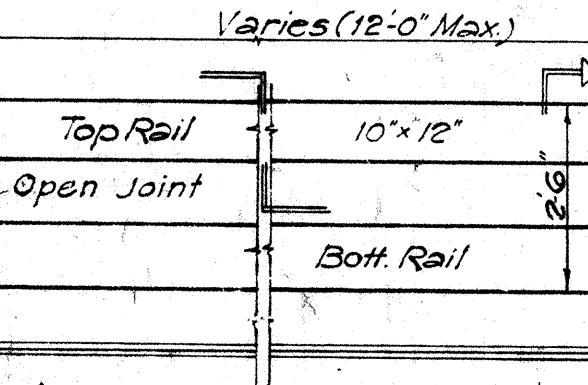
REINFORCING BAR SPLICE

Scale: Full Size



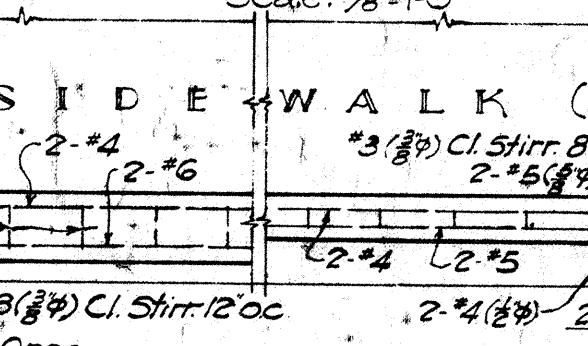
"ELEVATION" "B"

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



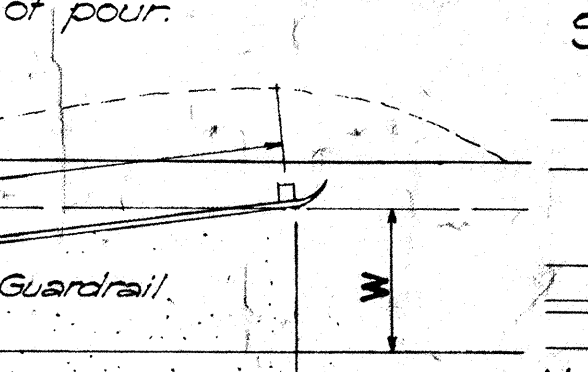
SIDEWALK (OR CURB)

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



PLAN "A-A"

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



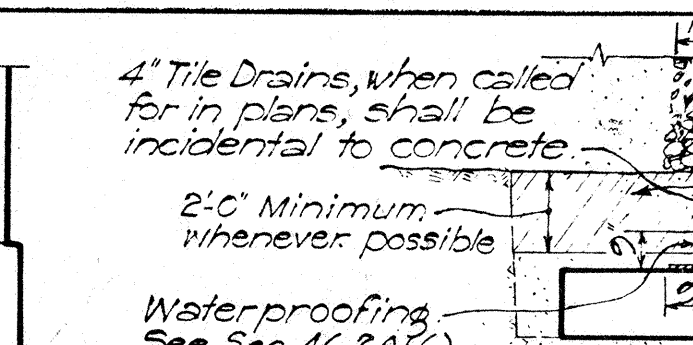
GENERAL NOTE

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

2-lane highway

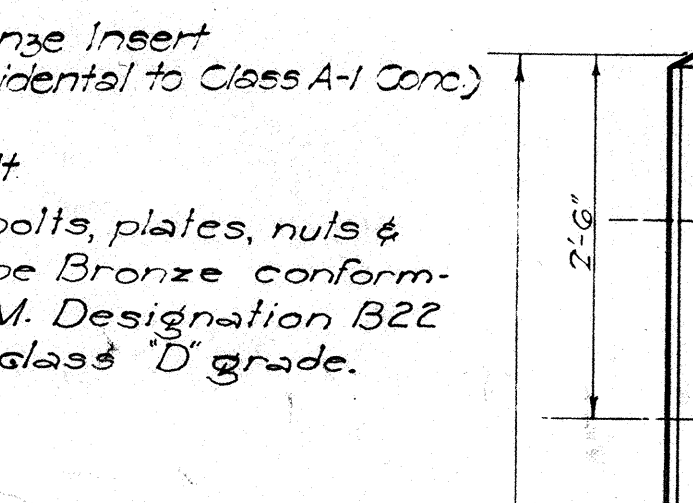
Multi-lane with median strip on bridge

Multi-lane with separate structure



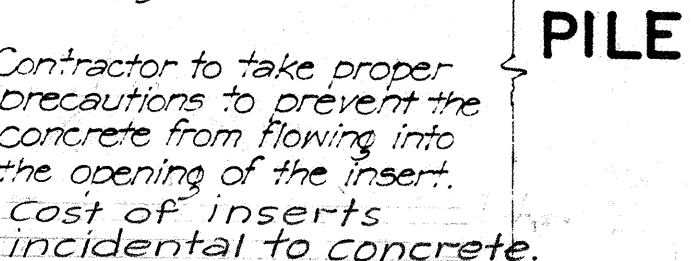
PILE CUTOFF

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



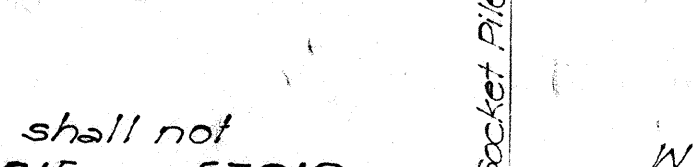
CONCRETE SOCKET

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



TIMBER PILE SPLICE

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



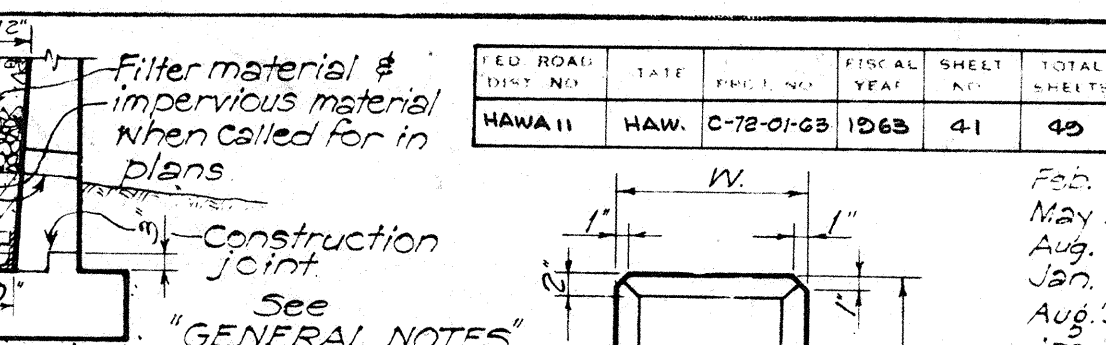
GENERAL NOTE

Unless otherwise noted all sharp corners and re-entrant angles in concrete work shall be chamfered. See Section 46.3(C) of the Standard Specifications. Chamfer to be 3/4"

2-lane highway

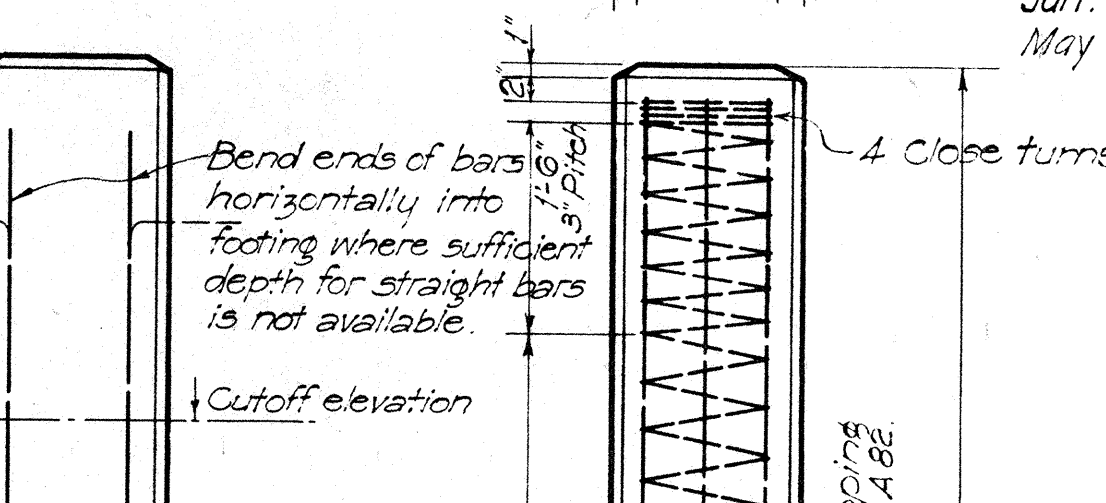
Multi-lane with median strip on bridge

Multi-lane with separate structure



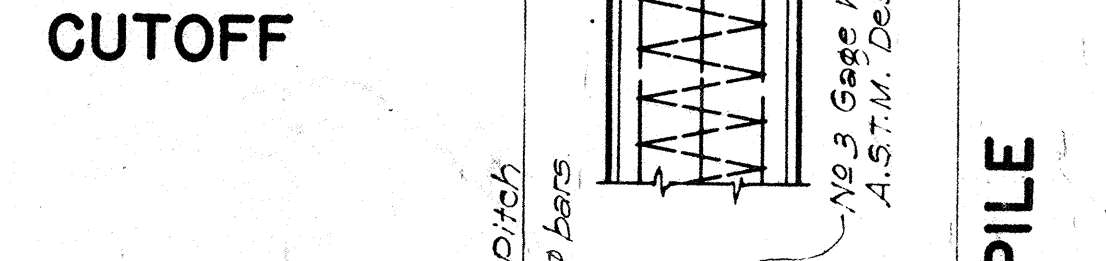
DETAIL OF LETTERS AND FIGURES

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



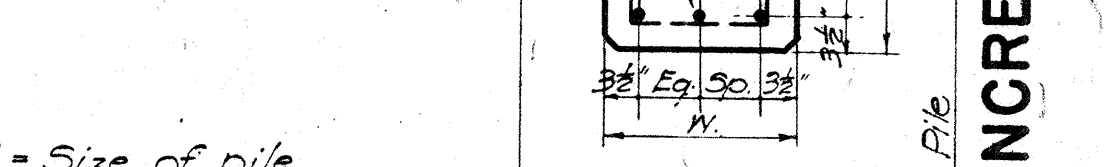
DETAIL OF LETTERS AND FIGURES

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



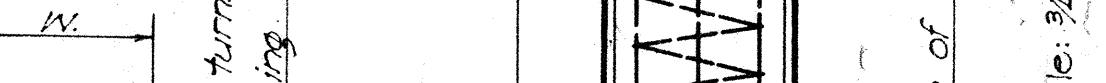
DETAIL OF LETTERS AND FIGURES

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



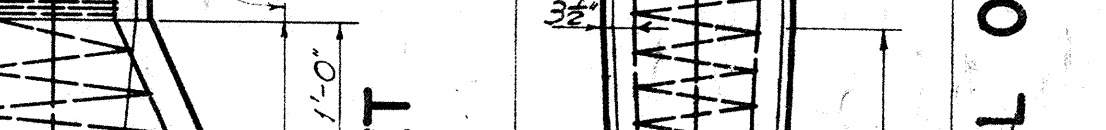
DETAIL OF LETTERS AND FIGURES

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



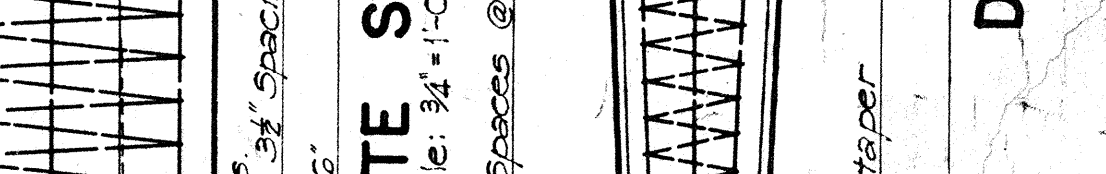
DETAIL OF LETTERS AND FIGURES

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



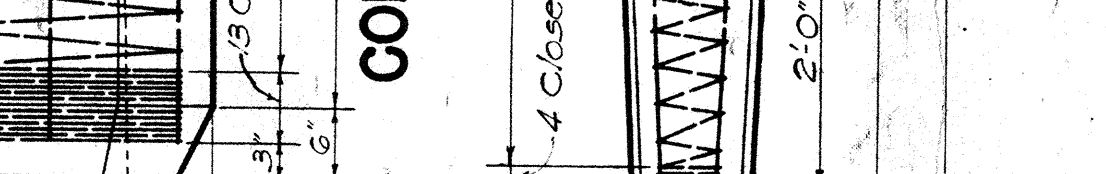
DETAIL OF LETTERS AND FIGURES

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



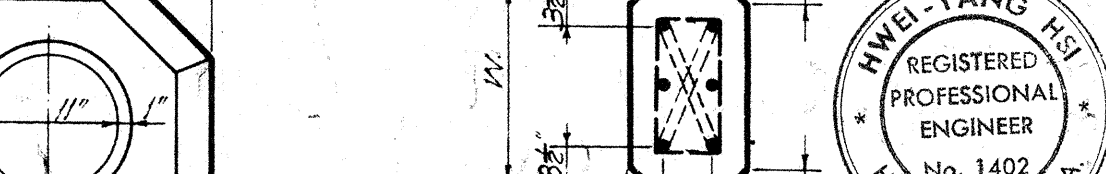
DETAIL OF LETTERS AND FIGURES

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



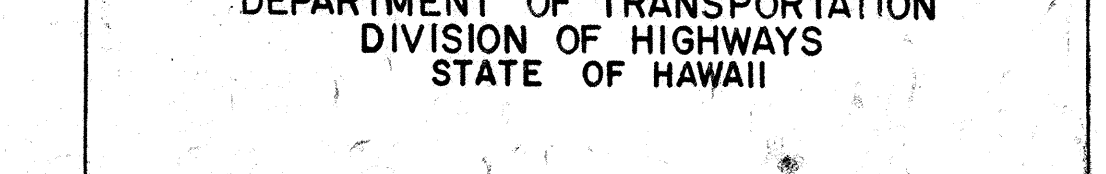
DETAIL OF LETTERS AND FIGURES

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



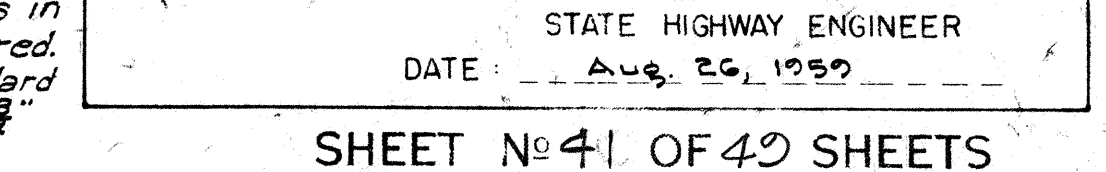
DETAIL OF LETTERS AND FIGURES

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



DETAIL OF LETTERS AND FIGURES

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



DETAIL OF LETTERS AND FIGURES

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

DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STATE OF HAWAII

STANDARD BRIDGE DETAILS

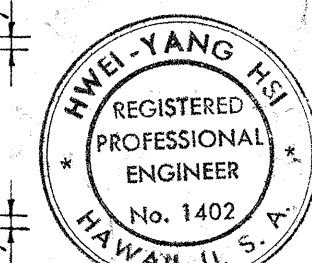
Scales as Noted

APPROVED BY:

STATE HIGHWAY ENGINEER

DATE: Aug. 26, 1959

SHEET No. 41 OF 40 SHEETS



HWEI-YANG HSI
REGISTERED PROFESSIONAL ENGINEER
No. 1402
HAWAII, U.S.A.

DATE: Aug. 26, 1959

SHEET No. 41 OF 40 SHEETS

APPROVED BY:

STATE HIGHWAY ENGINEER

DATE: Aug. 26, 1959

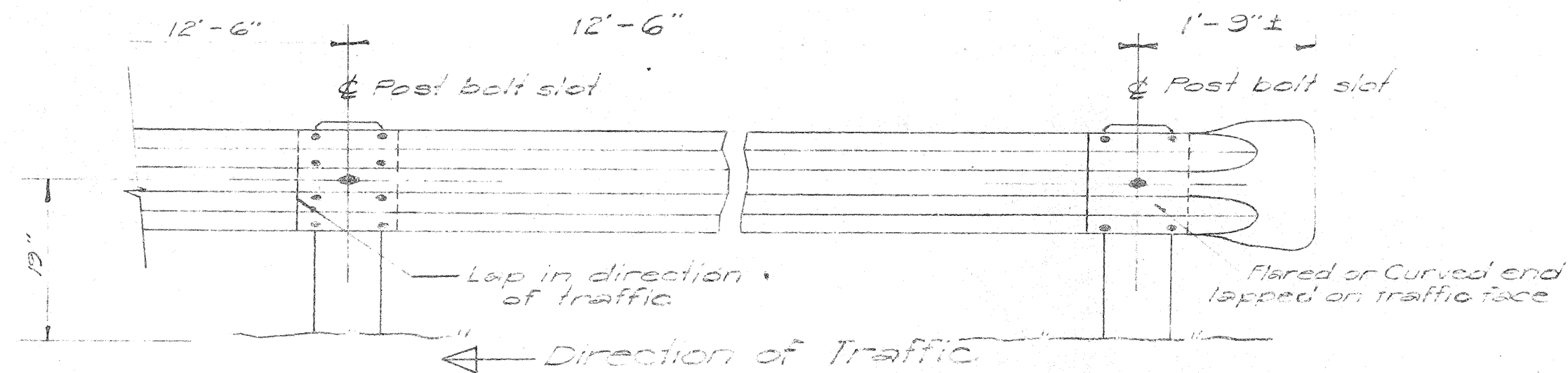
SHEET No. 41 OF 40 SHEETS

APPROVED BY:

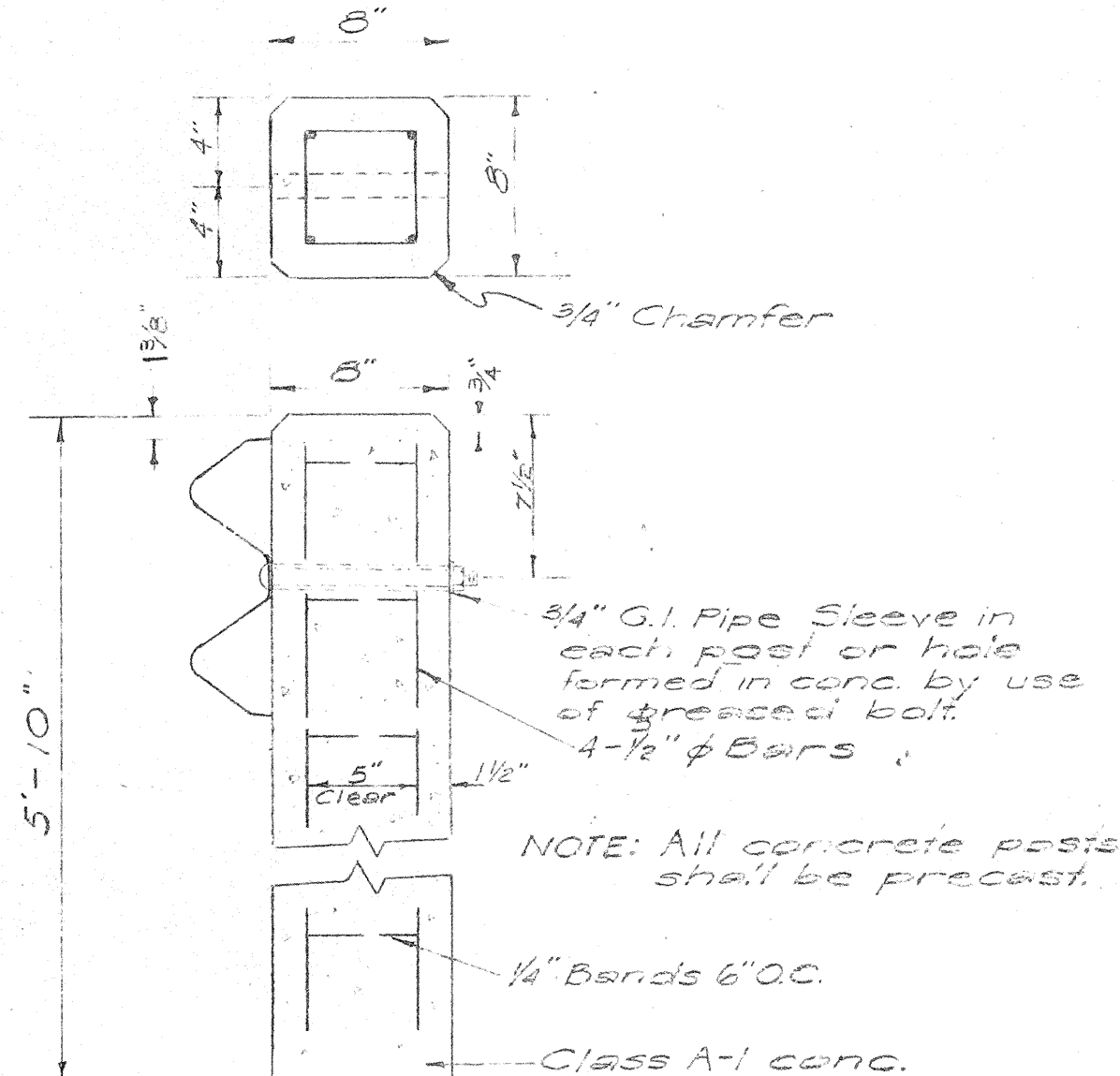
STATE HIGHWAY ENGINEER

DATE: Aug. 26, 1959

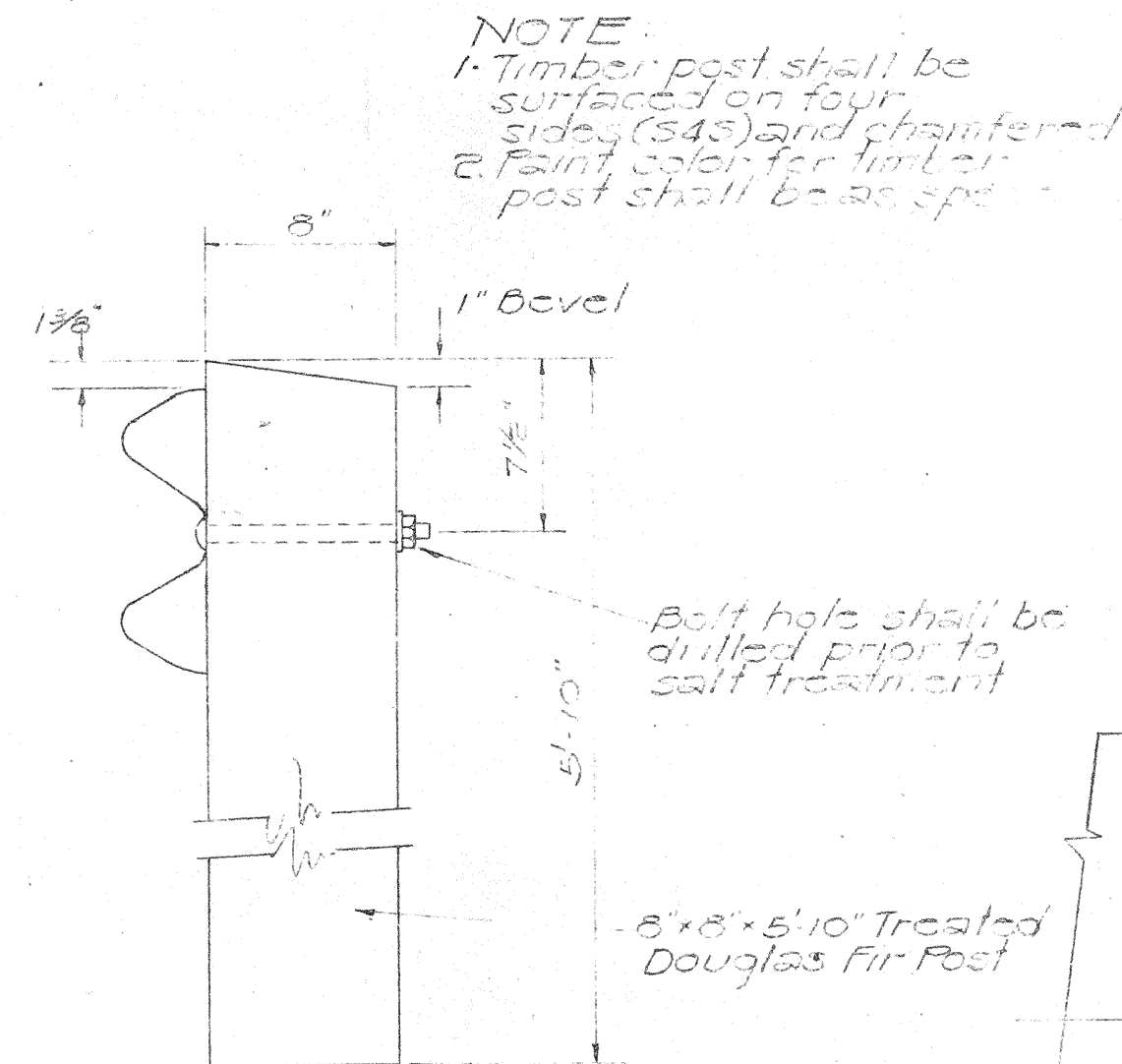
SHEET No. 41 OF 40 SHEETS



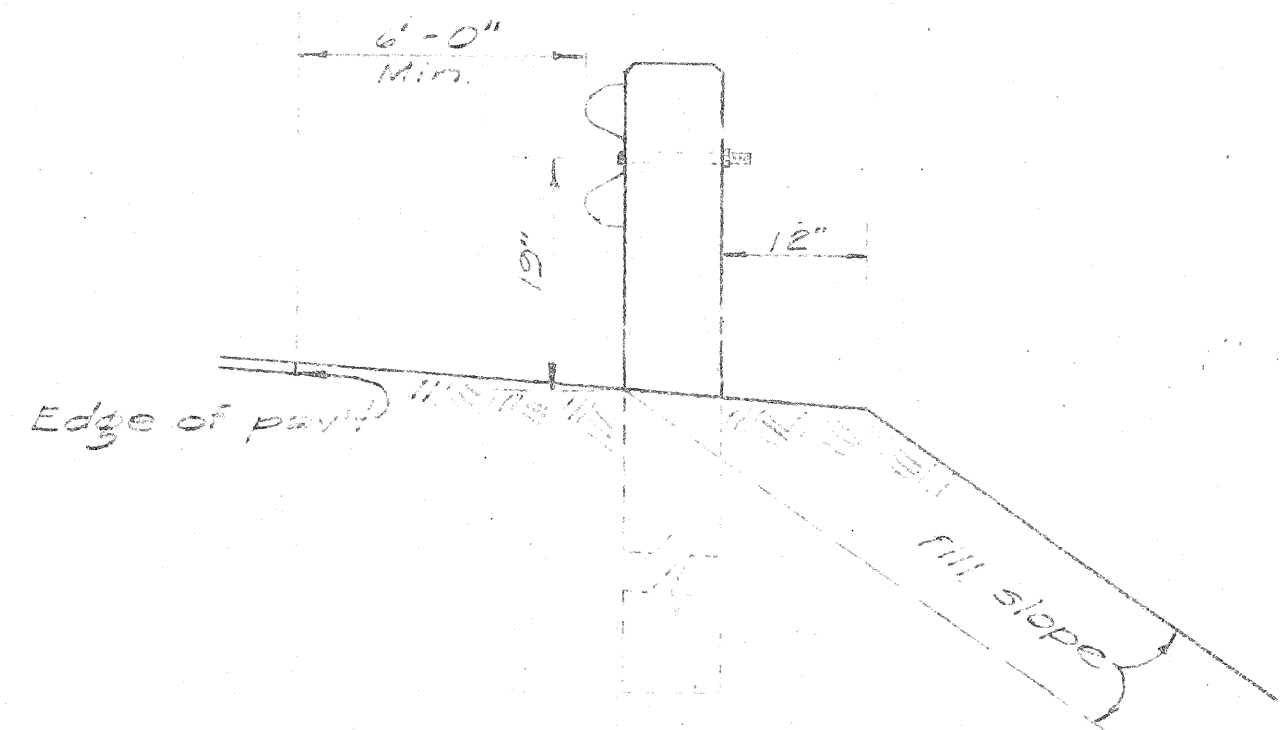
METAL GUARDRAIL
Scale: 3/4"=1'-0"



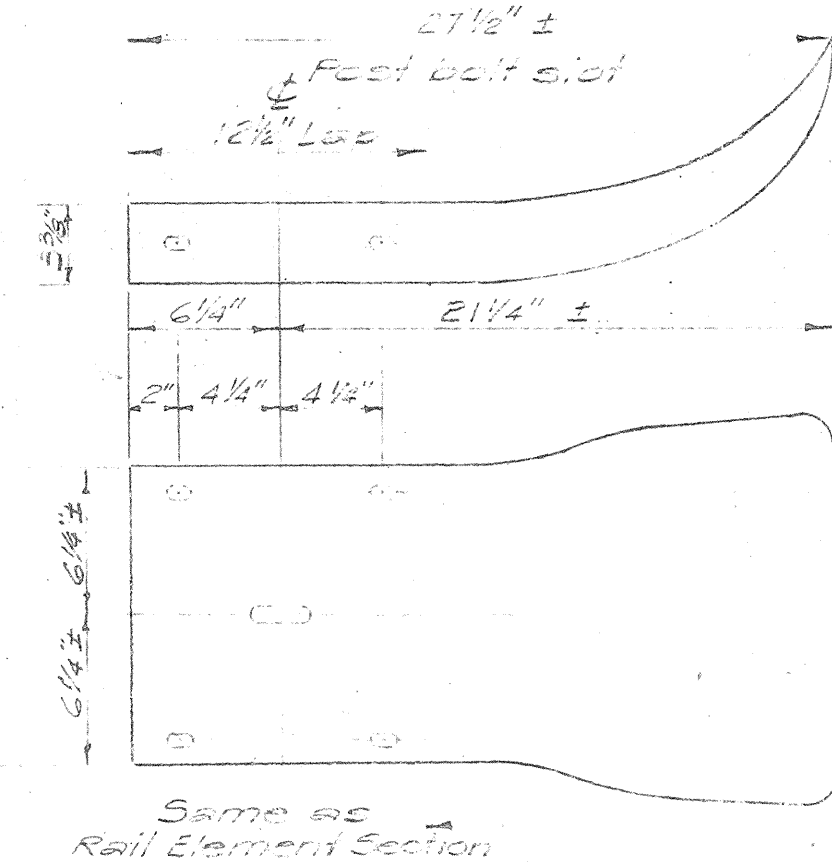
DETAIL OF CONC. POST
Scale: 1 1/2"=1'-0"



DETAIL OF TIMBER POST
Scale: 1 1/2"=1'-0"

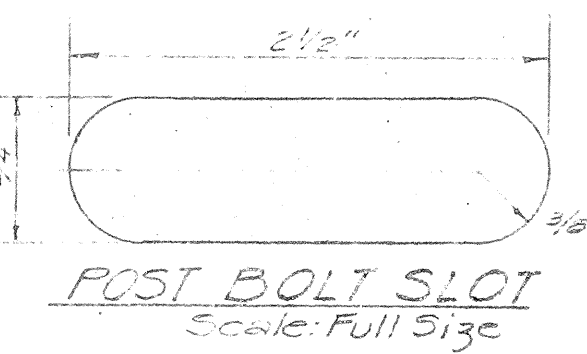


RAIL ELEMENT SECTION
Scale: Half Size

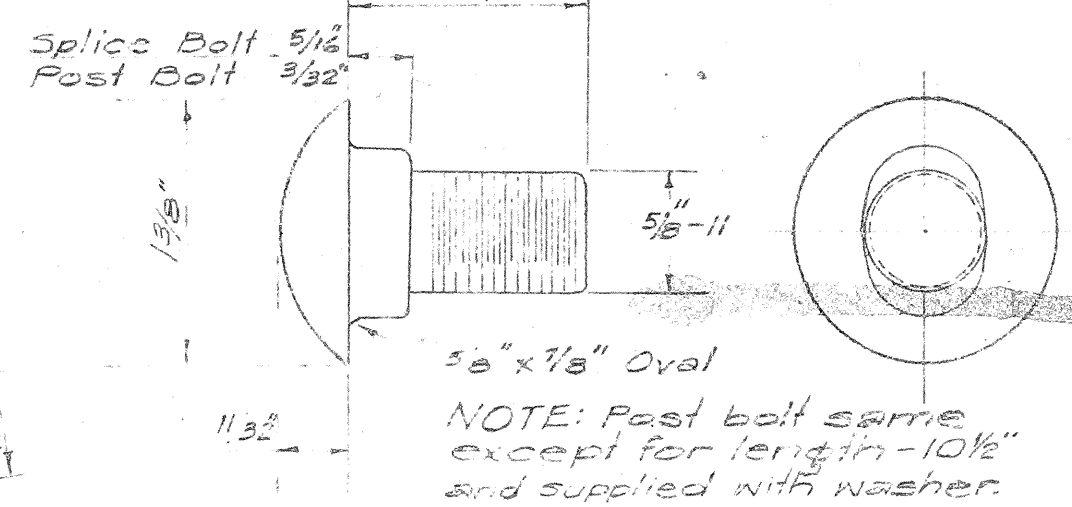


FLARED END
Scale: 1 1/2"=1'-0"

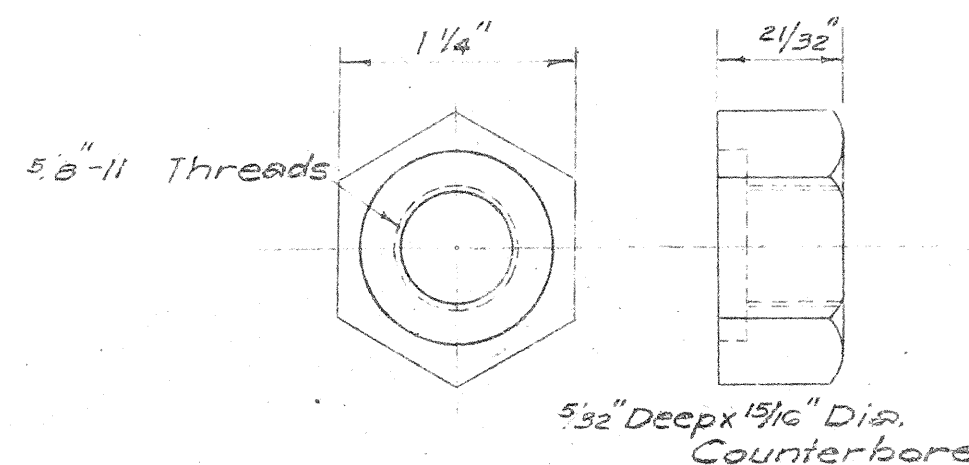
SPlice BOLT SLOT FOR ALL ENDS
Scale: Full Size



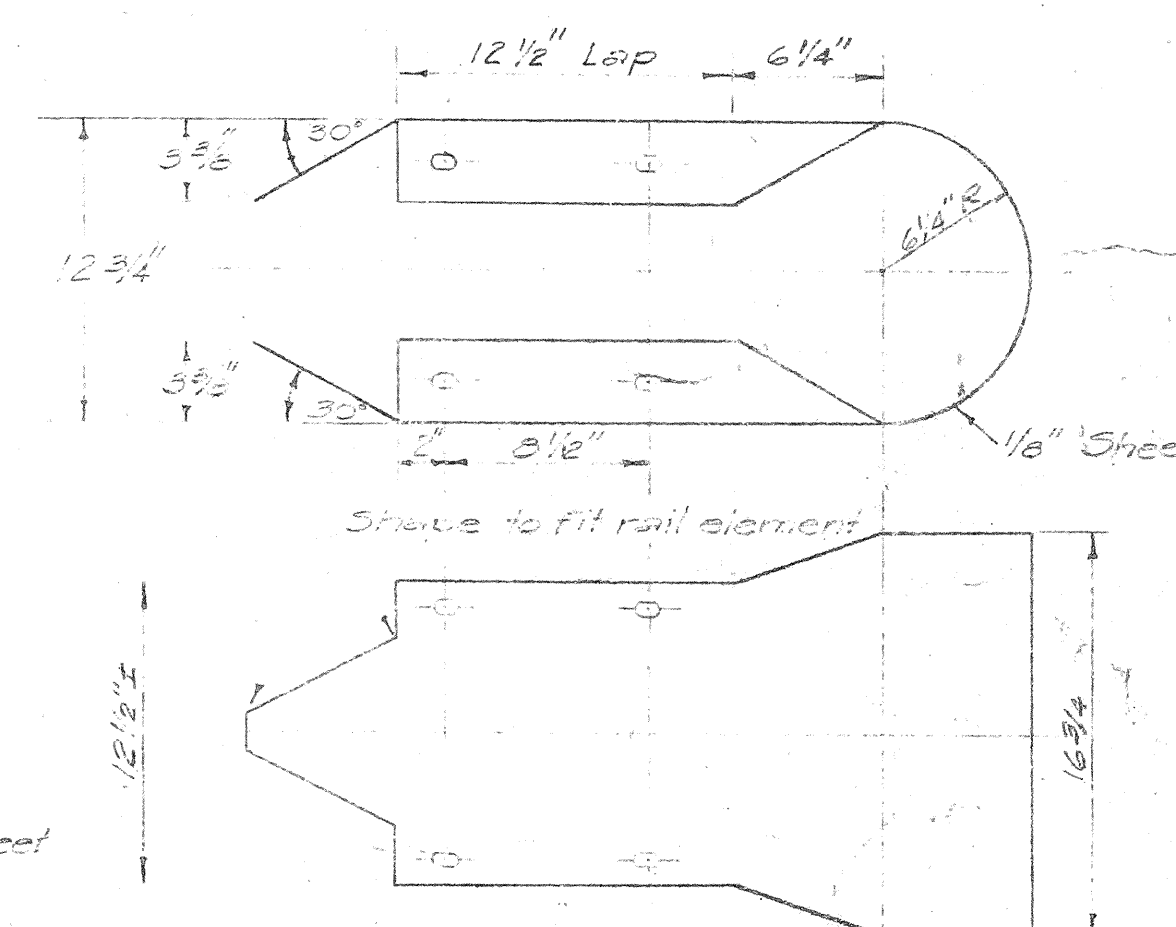
SPlice BOLT SLOT
Scale: Full Size



SPlice BOLT POST BOLT
Scale: Full Size

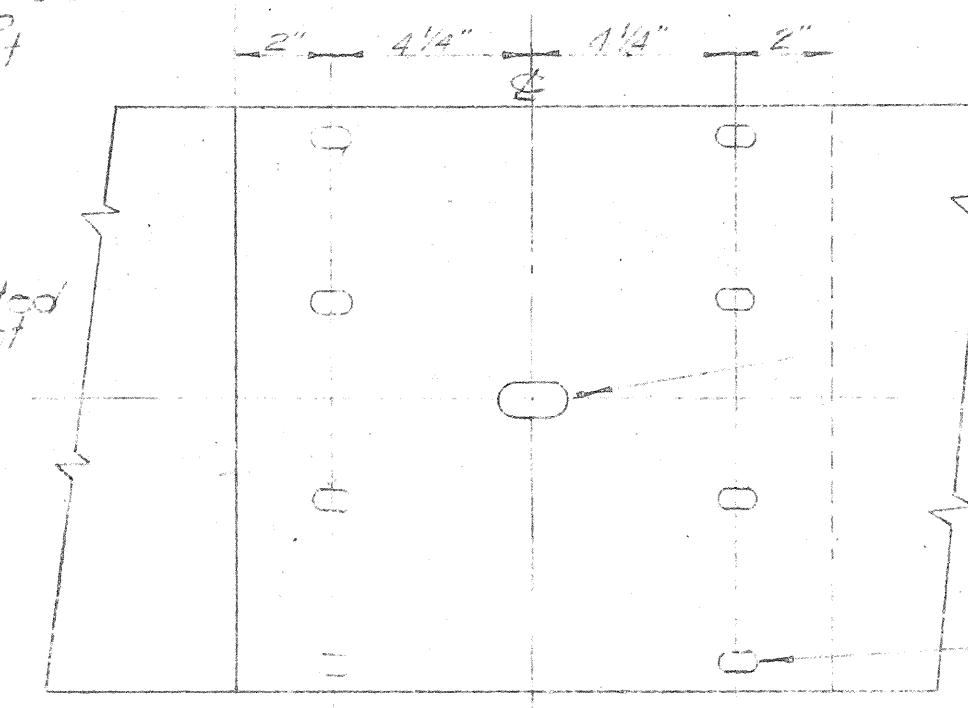


HEXAGON NUT
Scale: Full Size

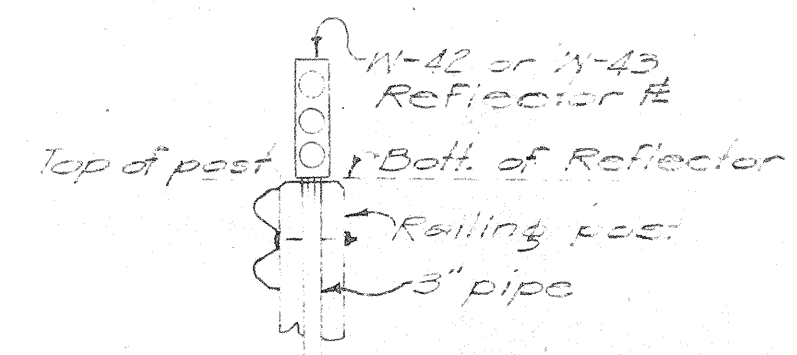


MEDIAN END
Scale: 1 1/2"=1'-0"

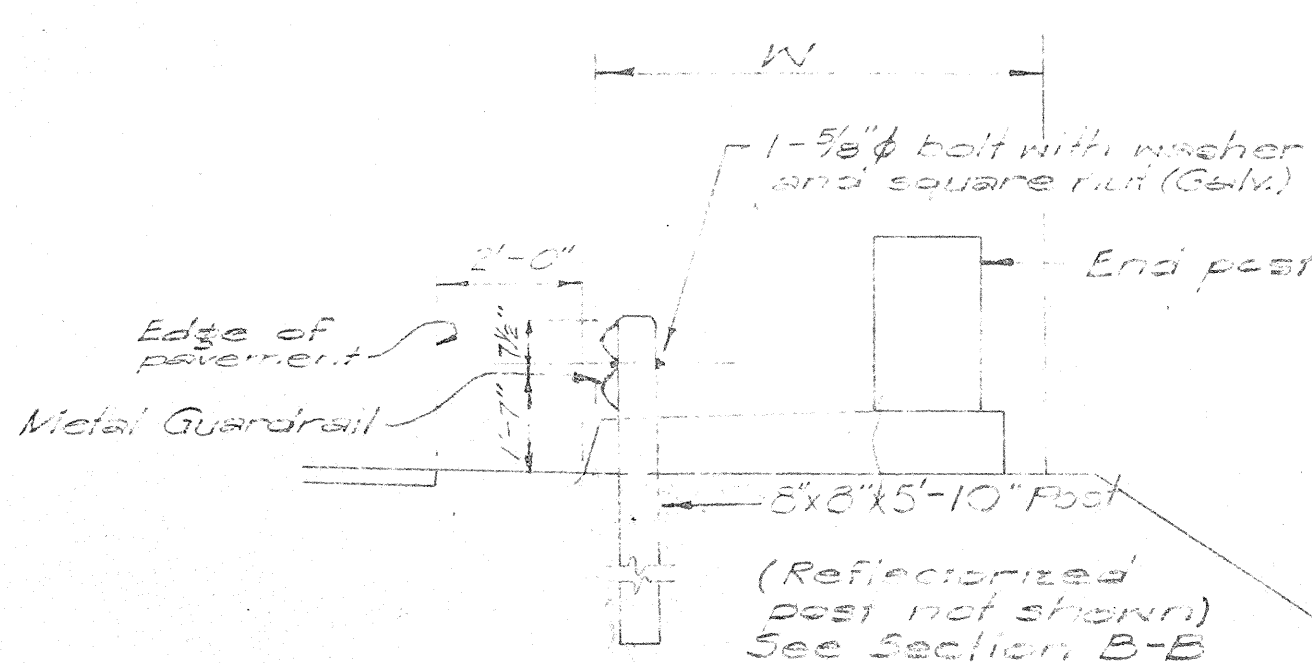
RAIL SPlice
Scale: 3/4"=1'-0"



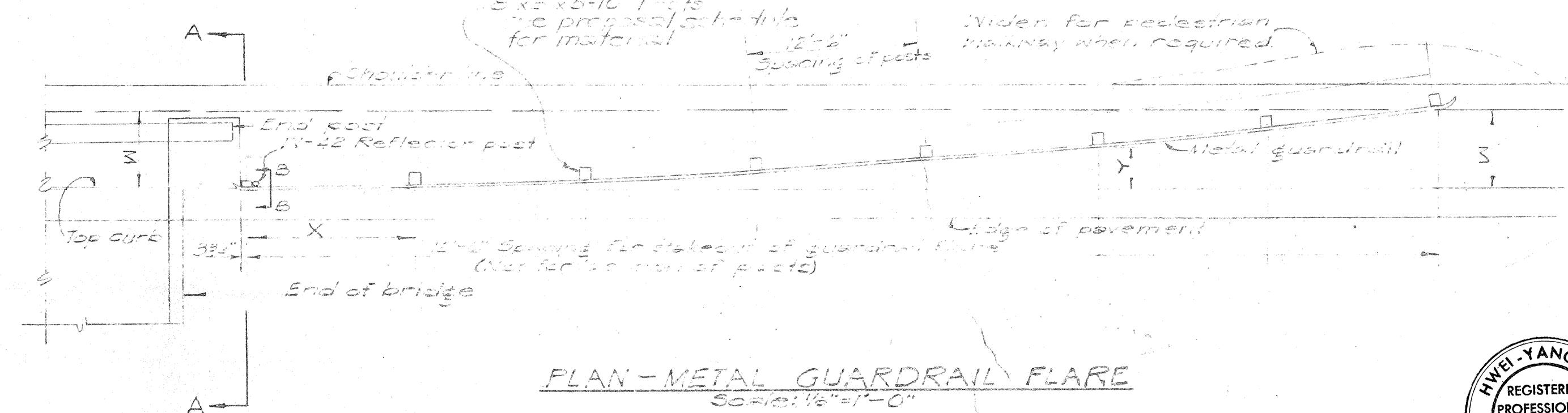
NOTE: See Regulatory & Warning Signs Sheet for details of N-42, N-43, and railing posts.



SECTION B-B
Scale: 1/2"=1'-0"



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



PLAN-METAL GUARDRAIL FLARE
Scale: 1/2"=1'-0"



GUARDRAIL OFFSET										
X	N=3'	N=4'	N=5'	N=6'	N=7'	N=8'	N=9'	N=10'	N=11'	N=12'
12.5	0.19	0.14	0.12	0.09	0.08	0.07	0.06	0.05	0.04	0.03
25.0	0.75	0.64	0.55	0.49	0.35	0.32	0.28	0.25	0.22	0.19
37.5	1.69	1.44	1.25	1.10	0.78	0.72	0.64	0.55	0.49	0.43
50.0	3.00	2.56	2.22	1.96	1.38	1.28	1.12	0.96	0.84	0.75
62.5		4.00	3.47	3.06	2.16	2.00	1.76	1.52	1.36	1.22
75.0			5.00	4.41	3.11	2.88	2.56	2.24	2.00	1.78
87.5				6.00	4.23	3.92	3.52	3.12	2.76	2.44
100.0					5.55	5.12	4.64	4.16	3.72	3.28
112.5						7.00	6.48	5.92	5.40	4.88
125.0							8.00	7.36	6.72	6.12

N = Guardrail Flare
X = Distance from post at bridge to offset point
Y = Guardrail flare offset

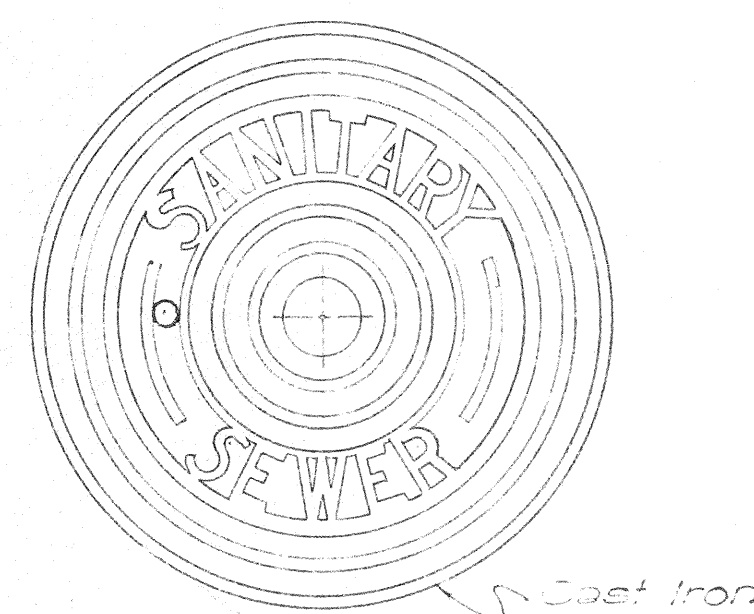
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STATE OF HAWAII

STANDARD GUARDRAIL DETAILS

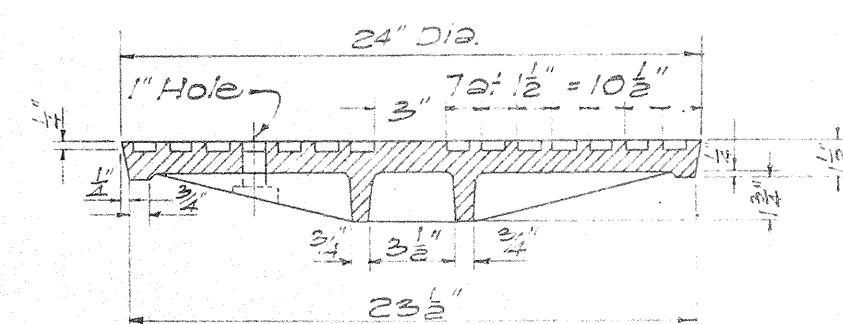
SURVEY PLOTTED BY: _____
DATE: _____
DESIGNED BY: _____
DRAWN BY: _____
CHECKED BY: _____
NOTE BOOK NO. _____

2/17/59
8/14/59

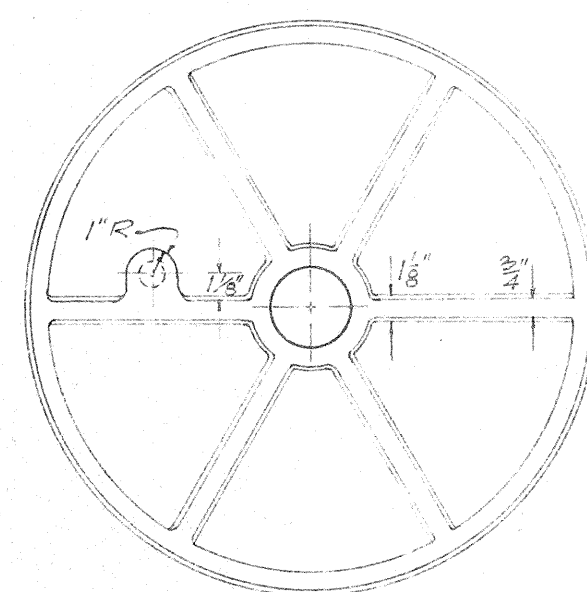
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	C-72-01-03	1958	44	49
August 1957					



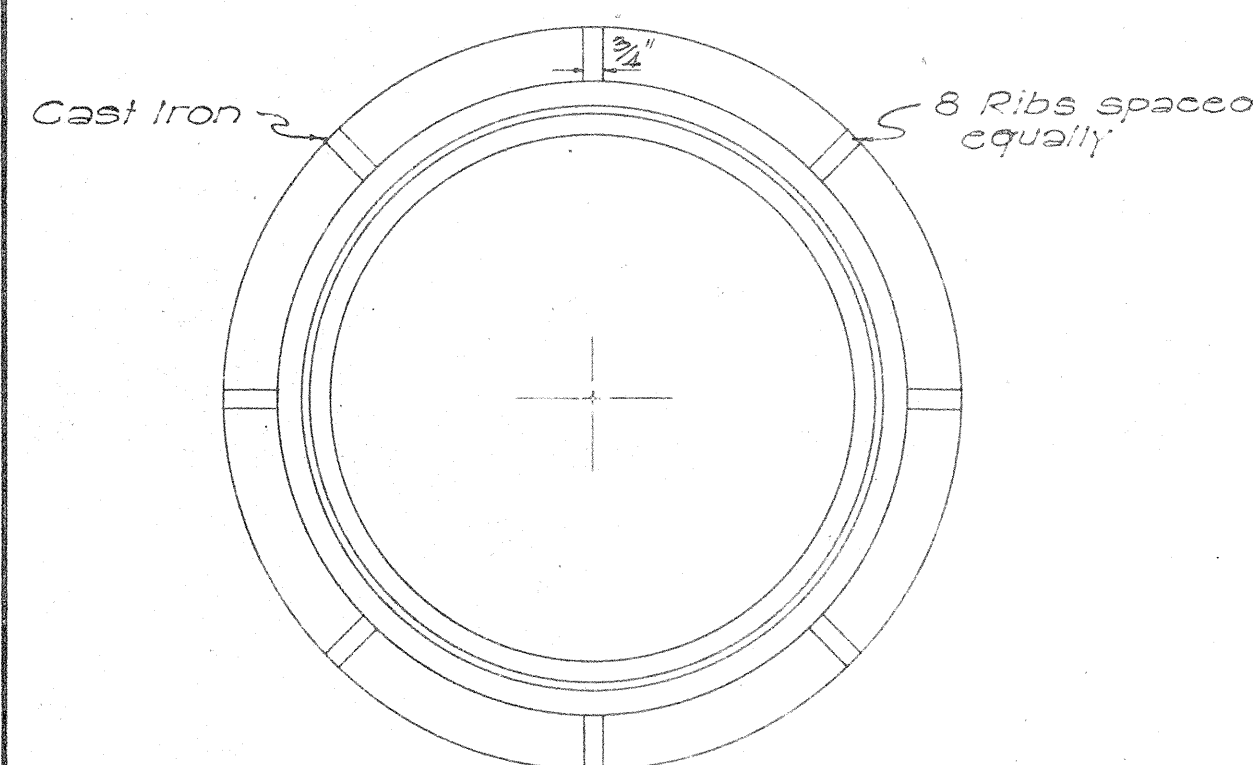
TOP VIEW OF COVER



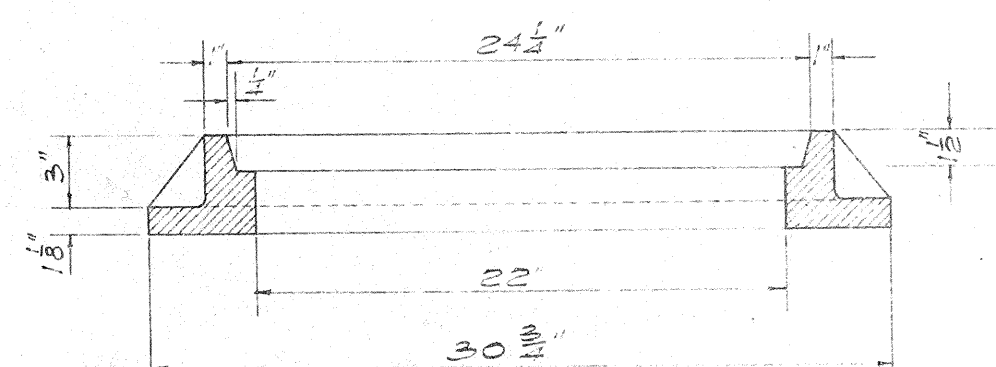
SECTION



BOTTOM VIEW OF COVER

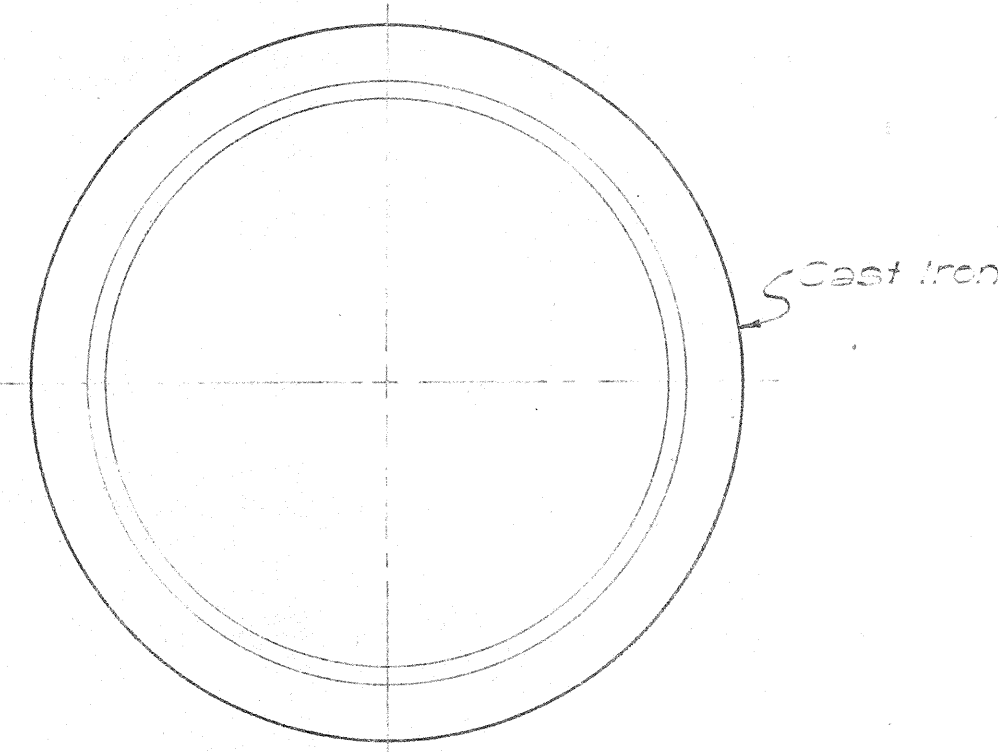


PLAN OF RIM

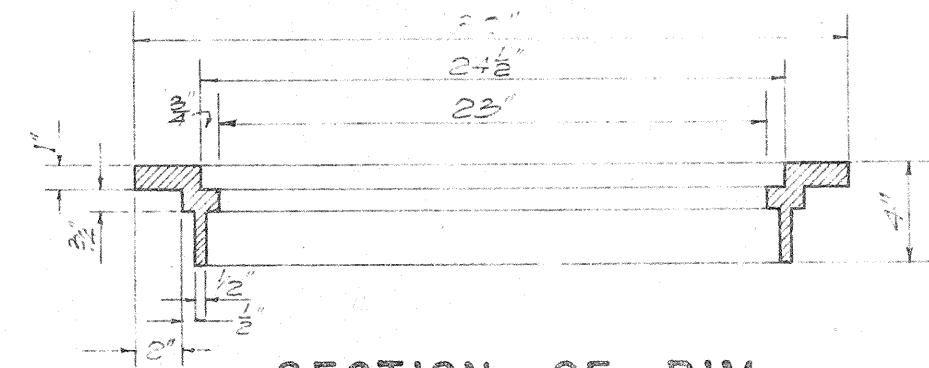


DETAILS OF TYPE "C"
MANHOLE CASTINGS

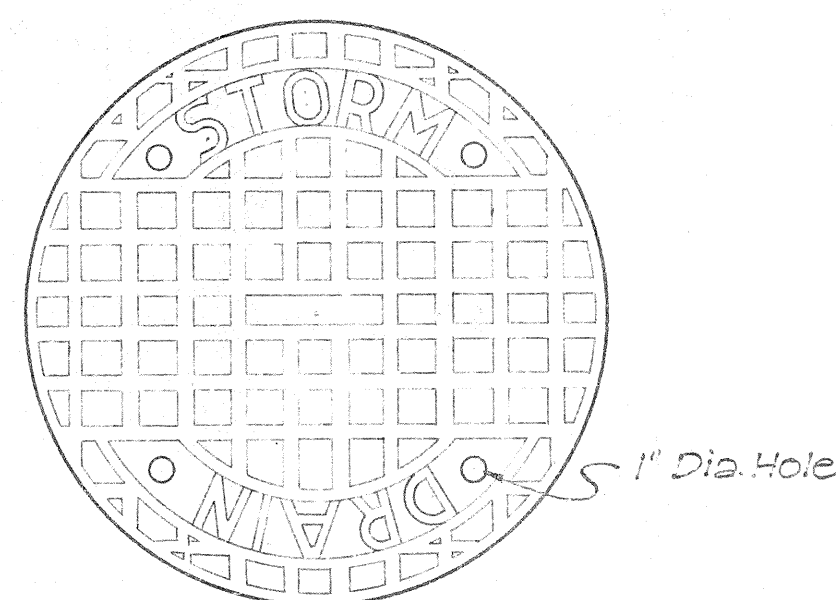
SCALE: 1-1/2" = 1'-0"



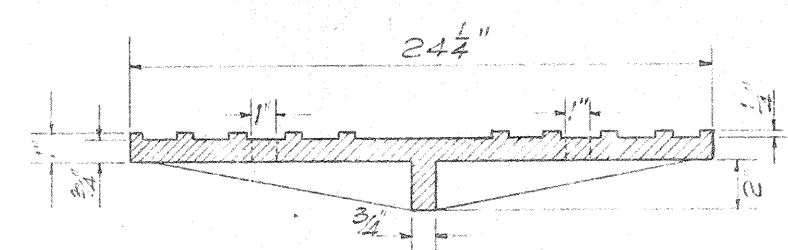
PLAN OF RIM



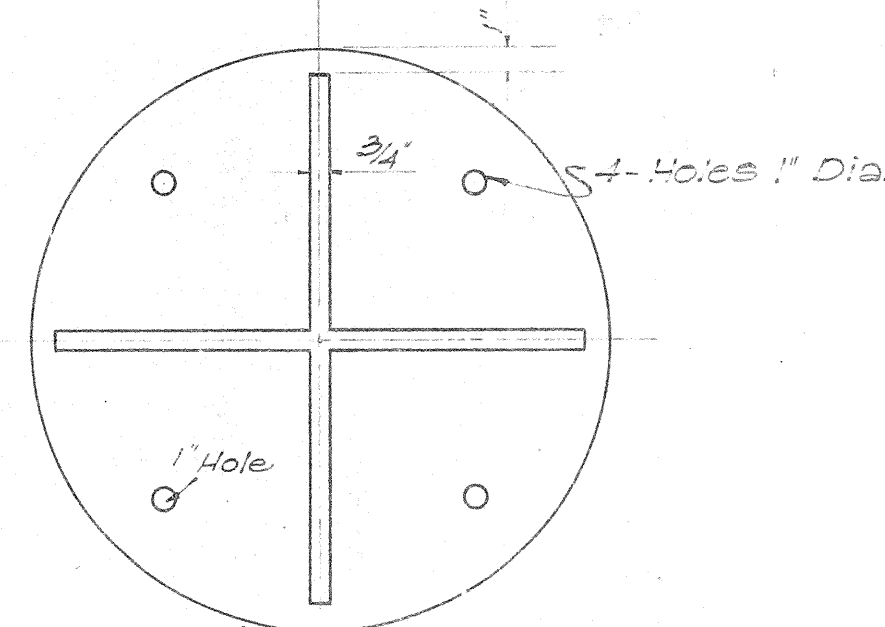
SECTION OF RIM



TOP VIEW OF COVER



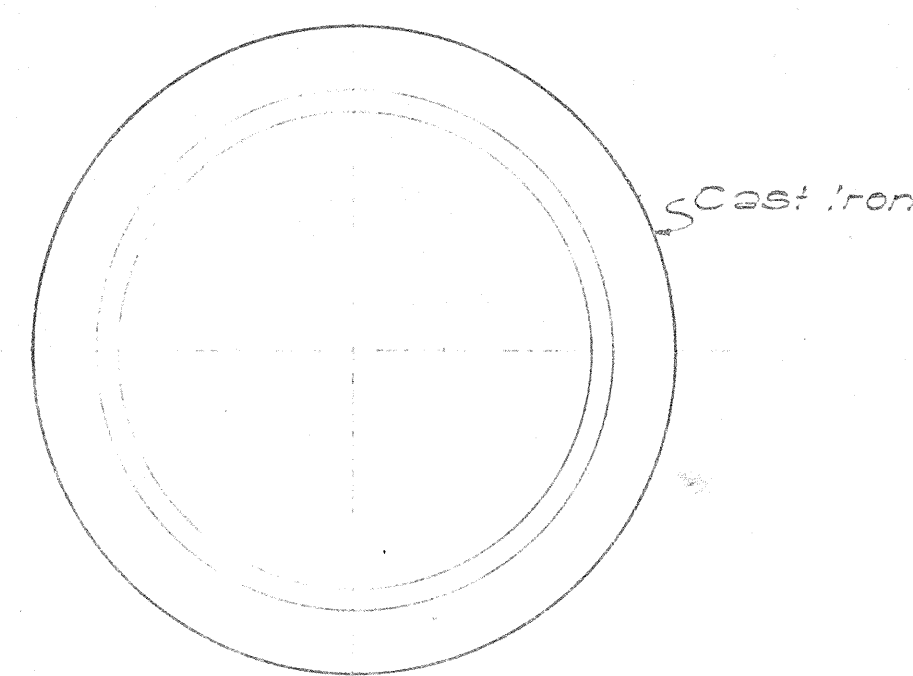
SECTION



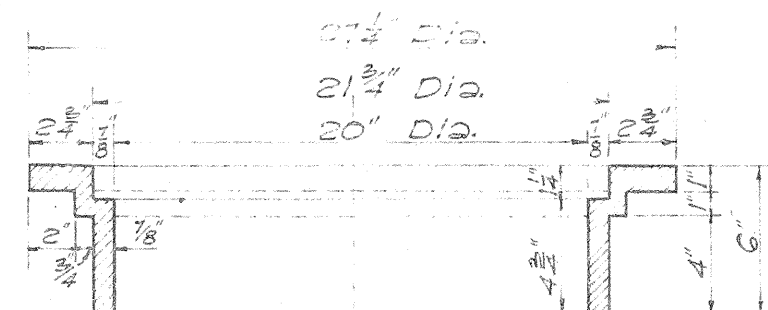
BOTTOM VIEW OF COVER

DETAILS OF TYPE "B"
CATCH BASIN CASTINGS

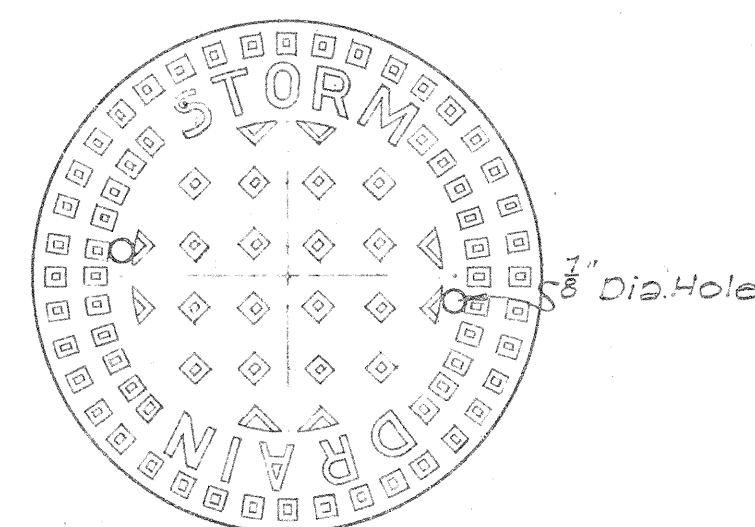
SCALE: 1-1/2" = 1'-0"



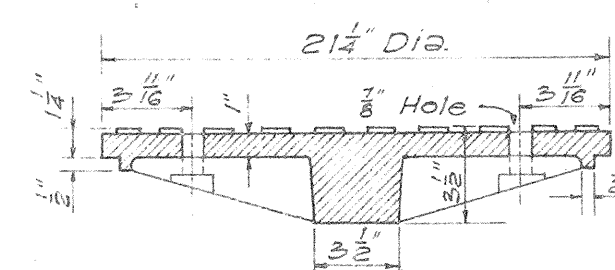
PLAN OF RIM



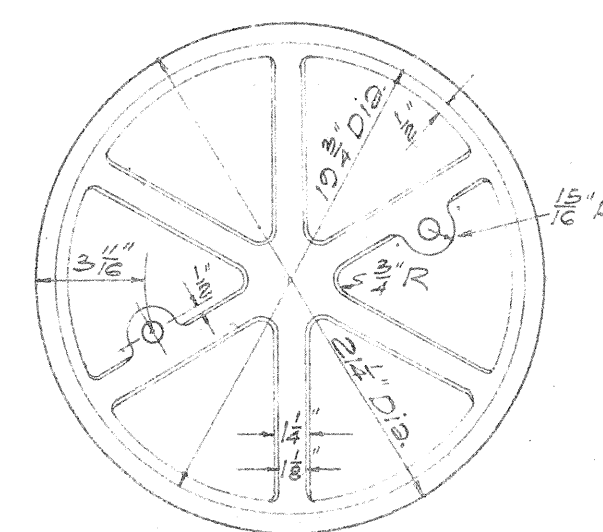
SECTION OF RIM



TOP VIEW OF COVER



SECTION

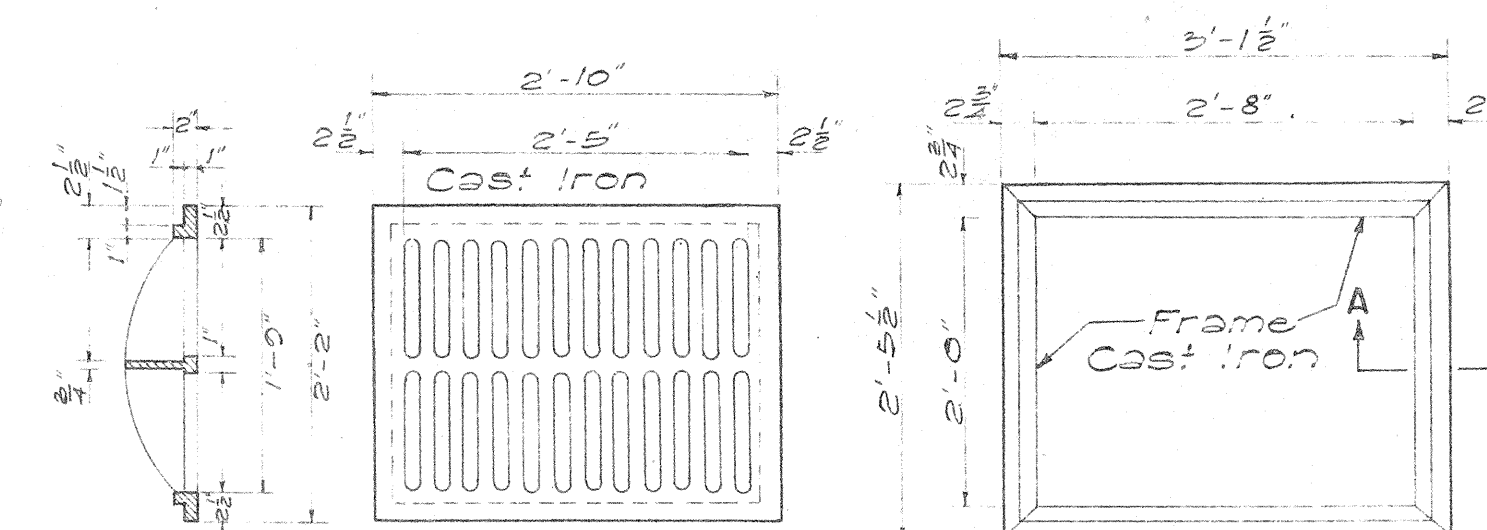


BOTTOM VIEW OF COVER

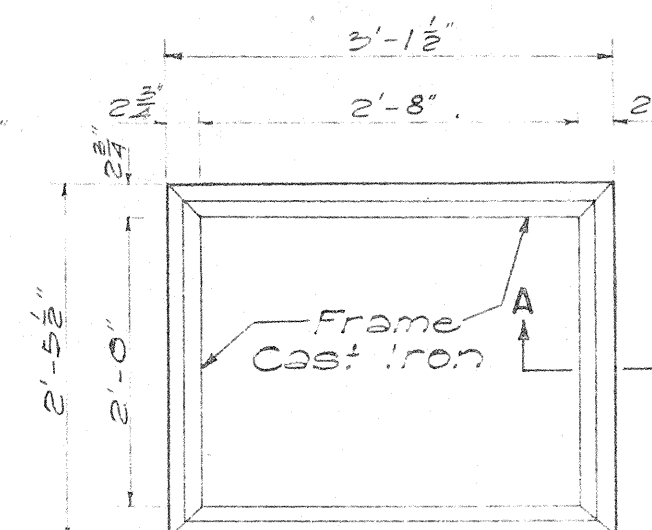
DETAILS OF TYPE "A"
MANHOLE CASTINGS

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

NOTE: Stock Pattern From Novelty Foundry ~ Honolulu



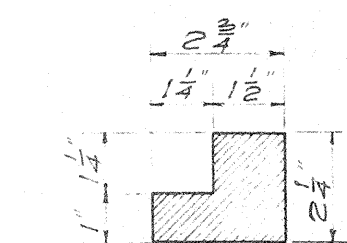
SECTION TOP VIEW



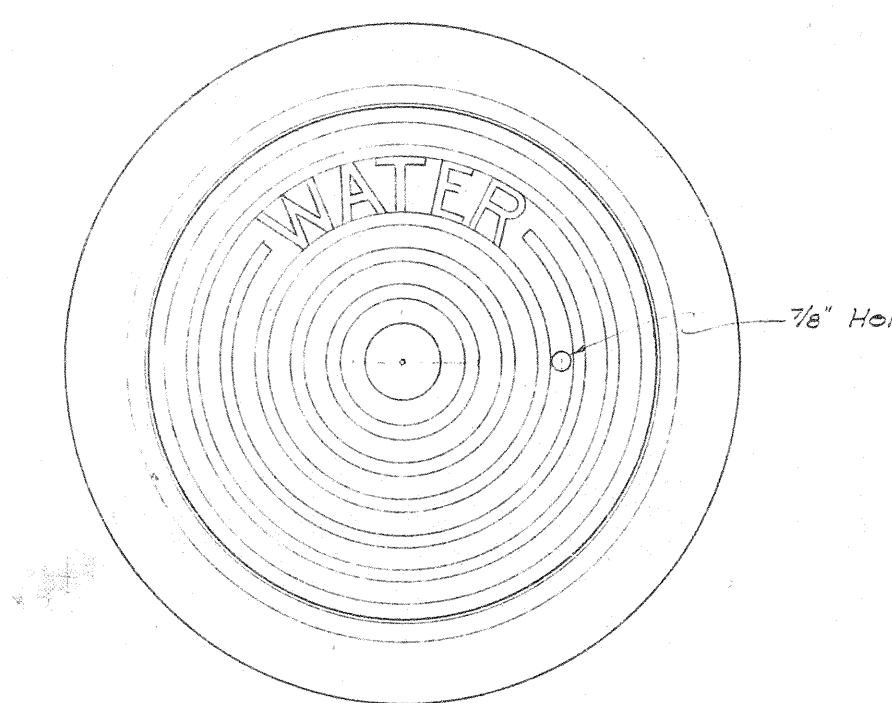
TOP VIEW

TYPE C C.I. FRAME AND GRATING

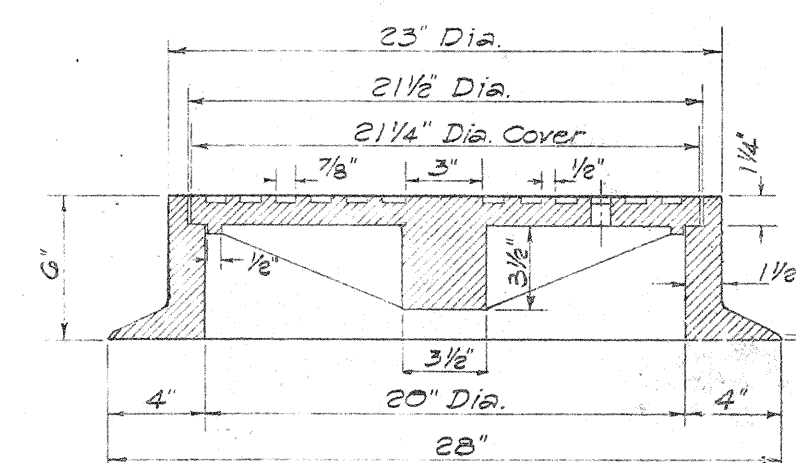
SCALE: 3/4" = 1'-0"



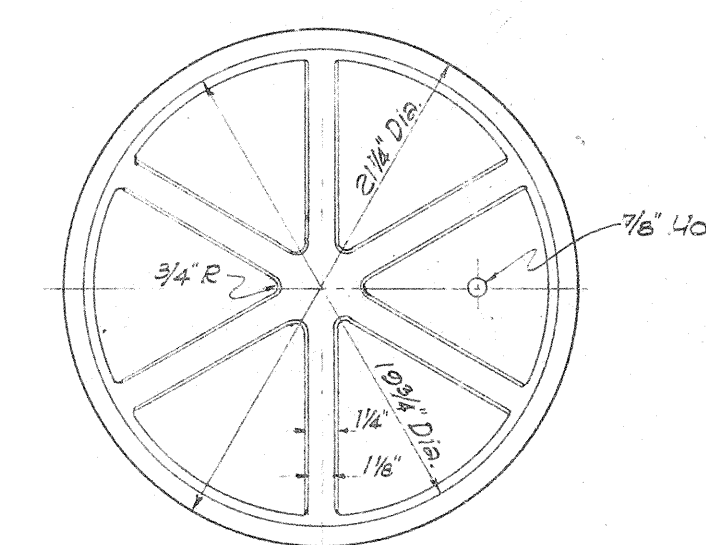
SECTION "A-A"
SCALE 3' = 1'-0"



PLAN OF FRAME AND COVER



SECTION OF FRAME AND COVER



BOTTOM VIEW OF COVER

DETAILS OF 20" CAST IRON
FRAME AND COVER FOR
WATER MANHOLE

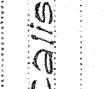
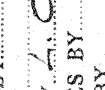
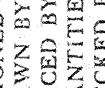
SCALE: 1 1/2" = 1'-0"

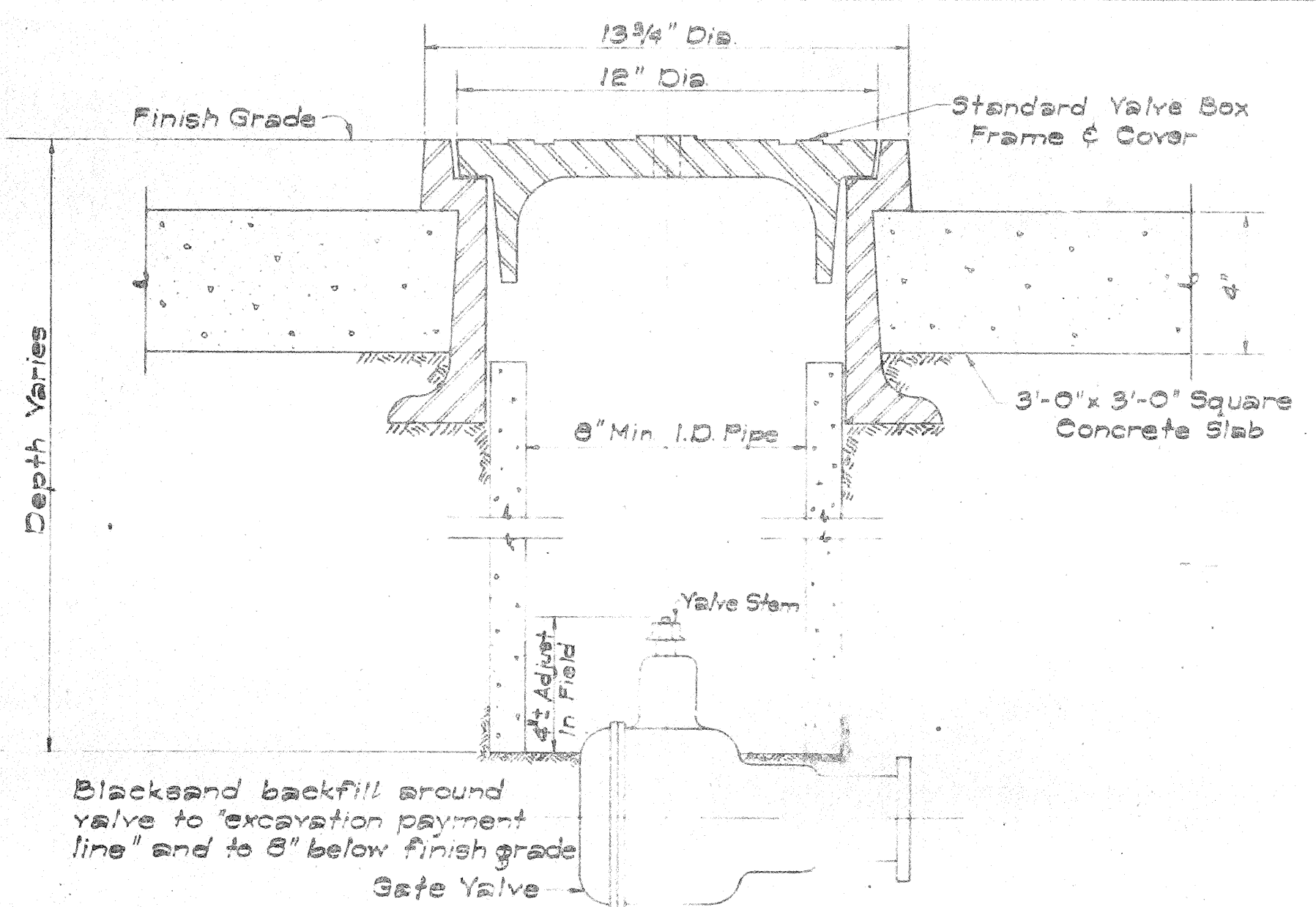
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STATE OF HAWAII
STANDARD DETAILS
CATCH BASIN AND
MANHOLE CASTINGS

SCALES AS NOTED

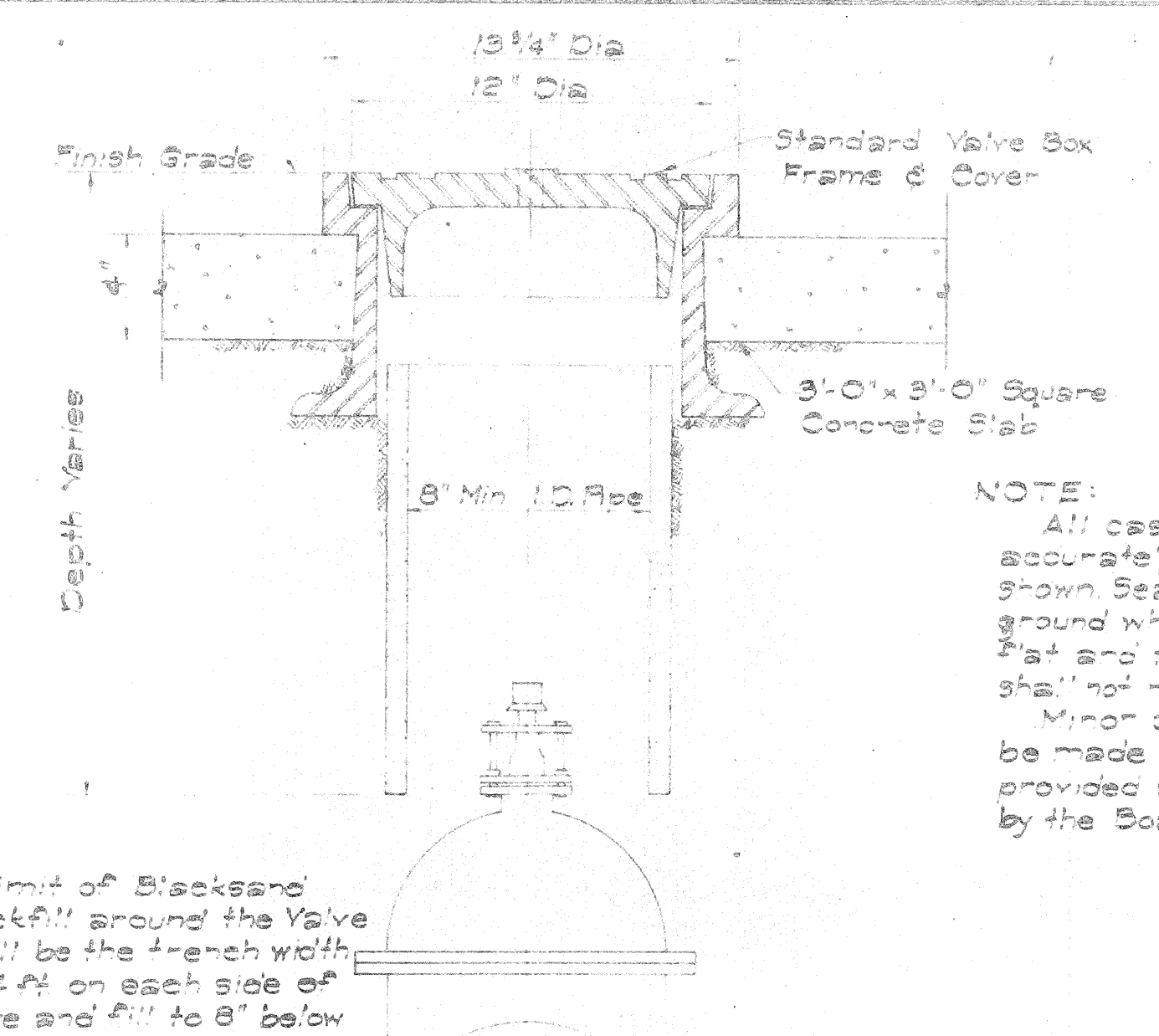
SHEET NO 44 OF 49 SHEETS

APPROVED:  DATE: Aug. 29, 1957
STATE HIGHWAY ENGINEER

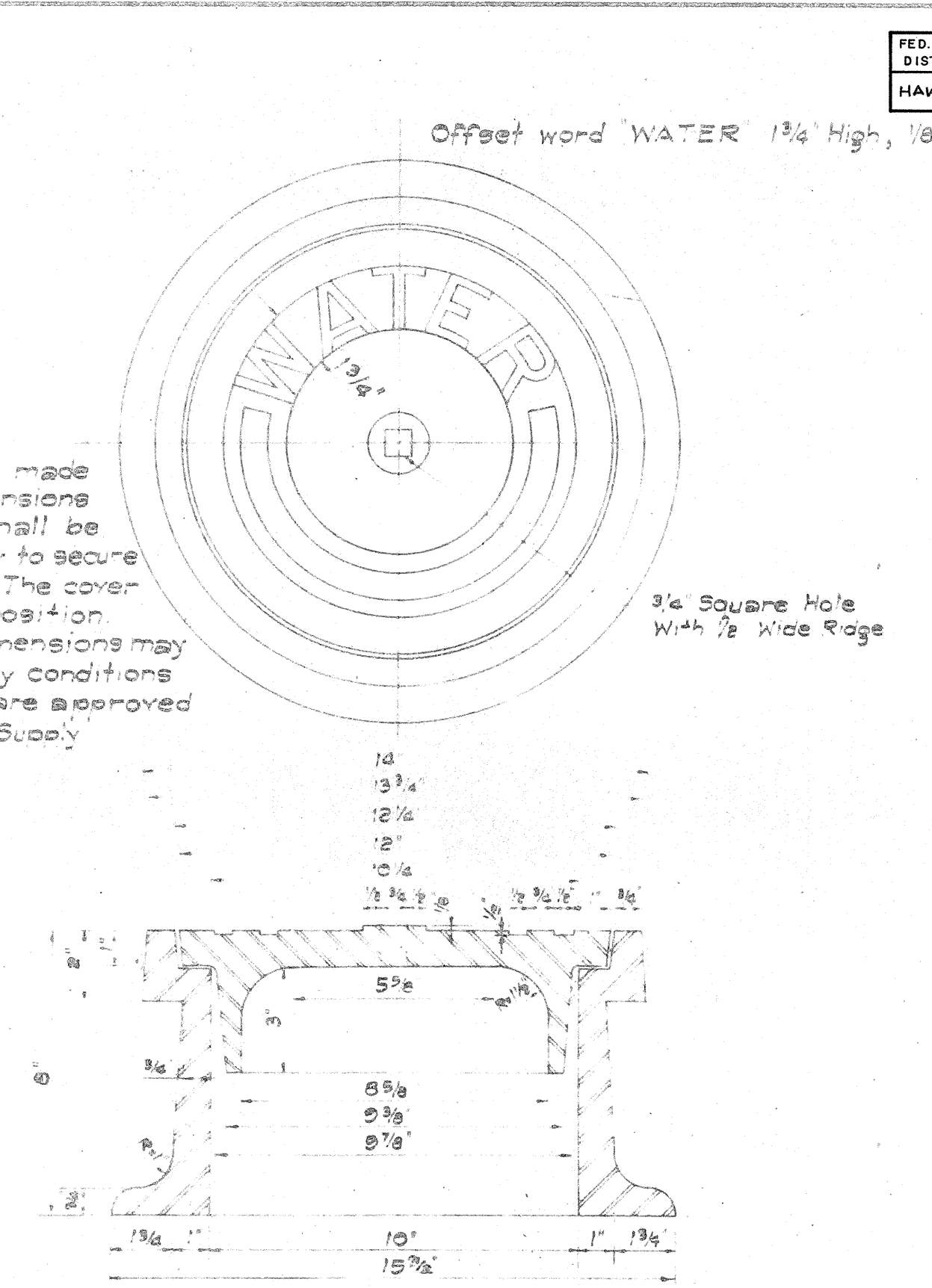
ORIGINAL PLAN
DESIGNED BY: 
DRAWN BY: 
CHECKED BY: 
DATE: 



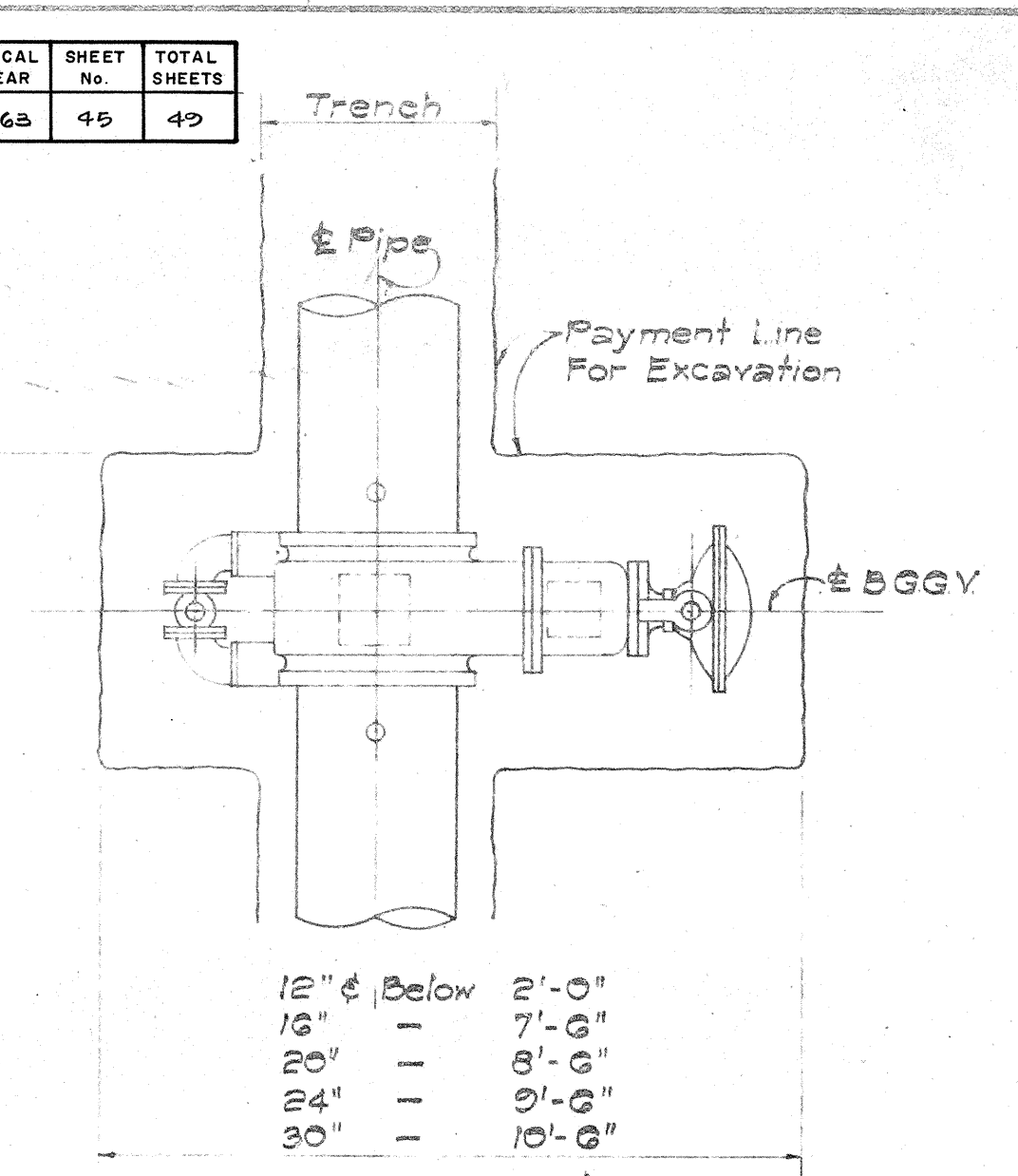
TYPICAL DETAIL OF VALVE BOX FOR BEVEL GEARED GATE VALVE
Scale: 1/4" = 1'



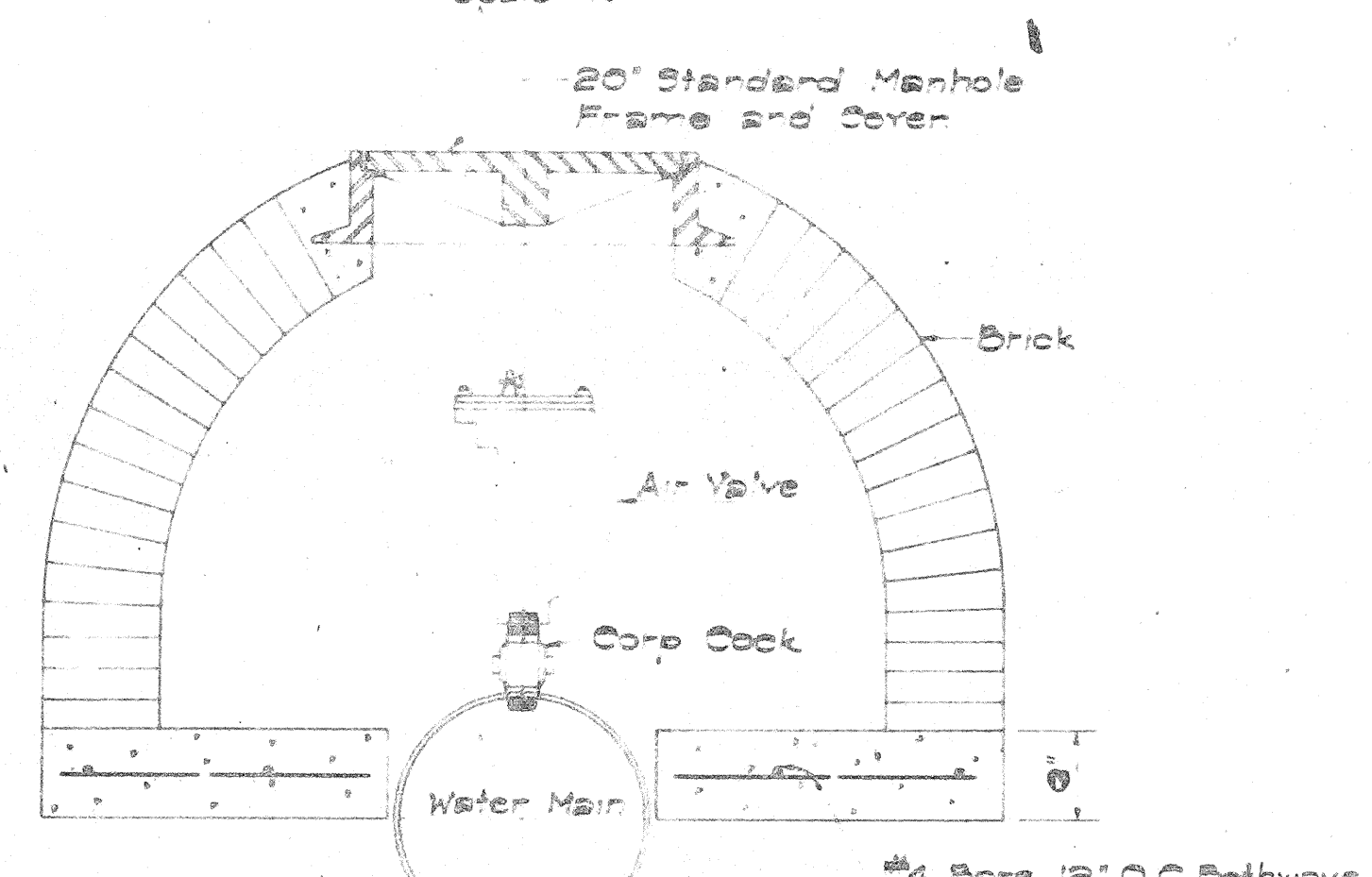
TYPICAL DETAIL OF VALVE BOX FOR 12" GATE VALVE OR SMALLER
Not To Scale



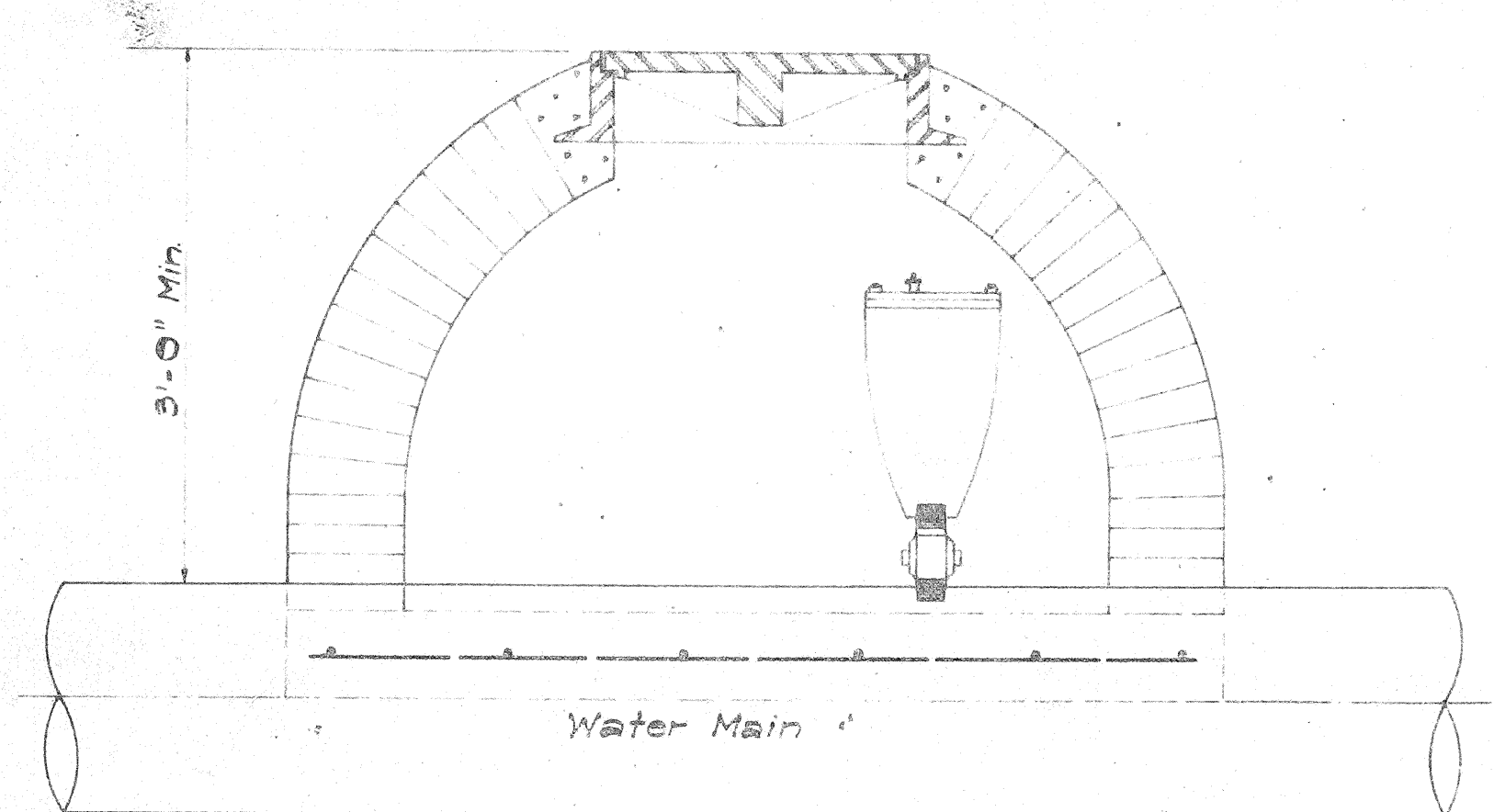
CAST IRON FRAME & COVER VALVE BOX FOR GATE VALVES
Scale: 1/4" = 1'



PLAN



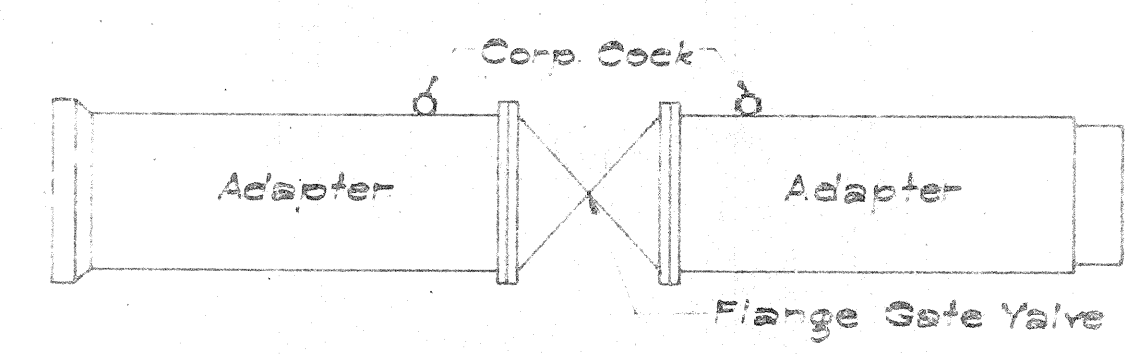
FRONT VIEW



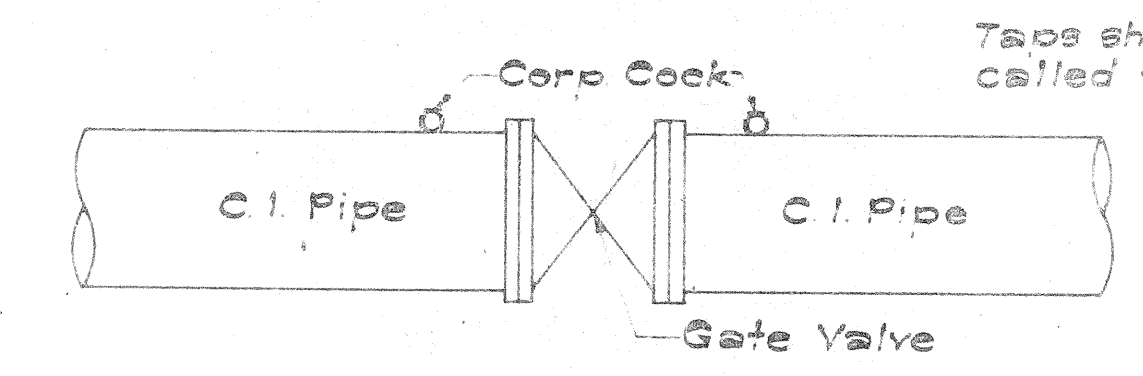
SIDE VIEW

3/4" AND 2" AIR VALVE MANHOLE
Scale: 1" = 1'-0"

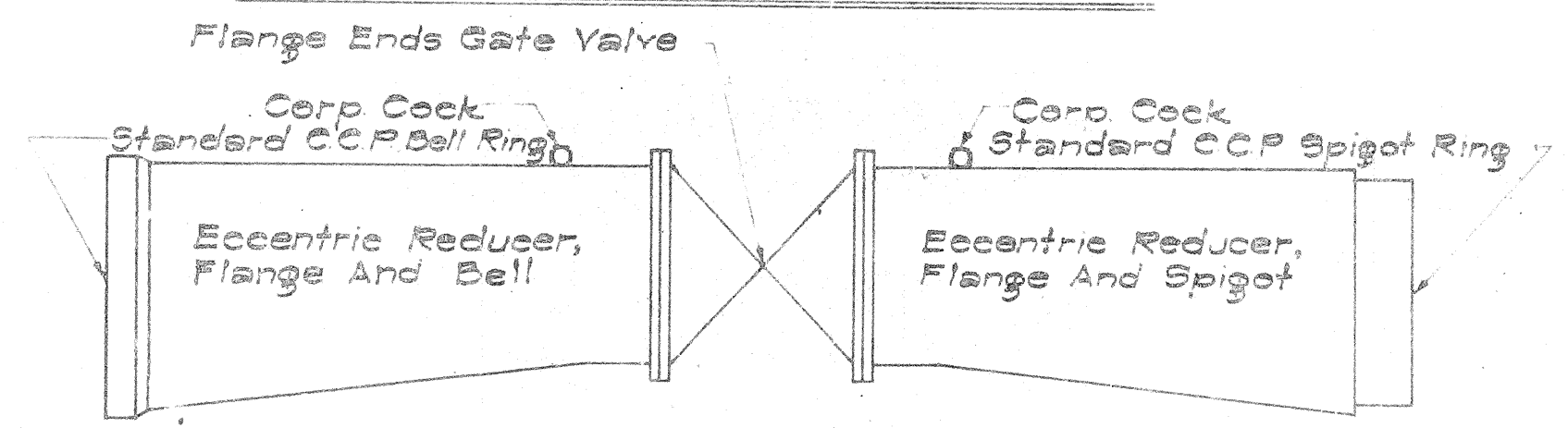
NOTE: For 3/4" Air Relief Valve Install 1" x 3/4" Corp. Cock With Bushing.



TYPICAL DETAIL OF GATE VALVE AND CORPORATION COCK FOR CONCRETE PIPE



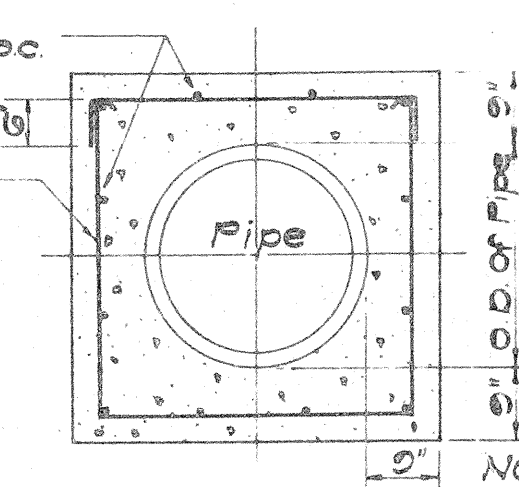
TYPICAL DETAIL OF GATE VALVE AND CORPORATION COCK FOR CAST IRON PIPE



TYPICAL DETAIL OF ECCENTRIC REDUCER AT GATE VALVE
Scale: 1/2" = 1'-0"

TABLE FOR REQUIRED CORP COCK SIZES

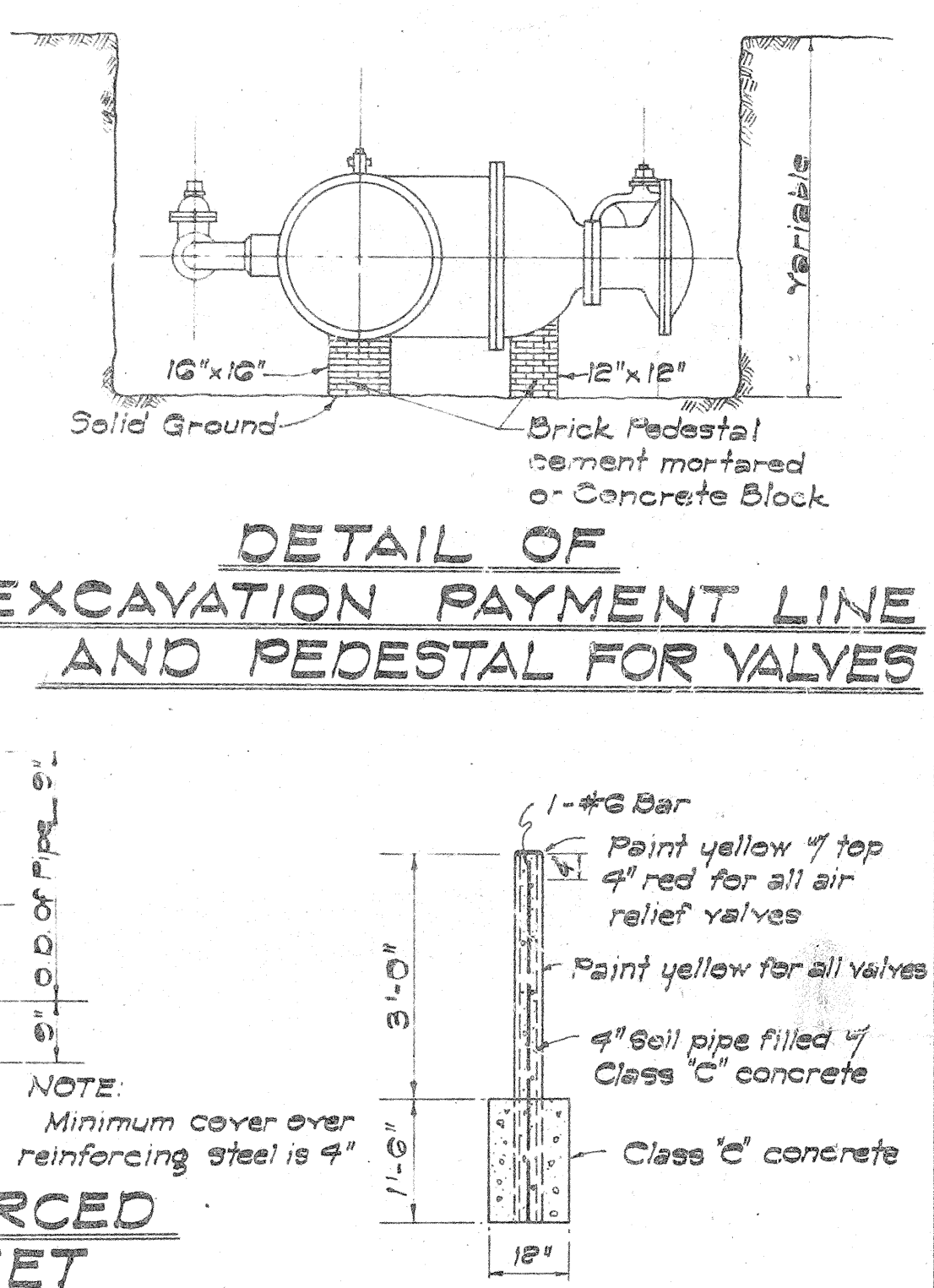
Diameter of Main (Inches)	Inlet Size Corp. Cock	#5 @ 12" oc	#4 @ 12" oc
6	1"		
8	1"		
12	1"		
16	1"		
20	1 1/2"		
24	1 1/2"		
30	1 1/2"		
36	1 1/2"		



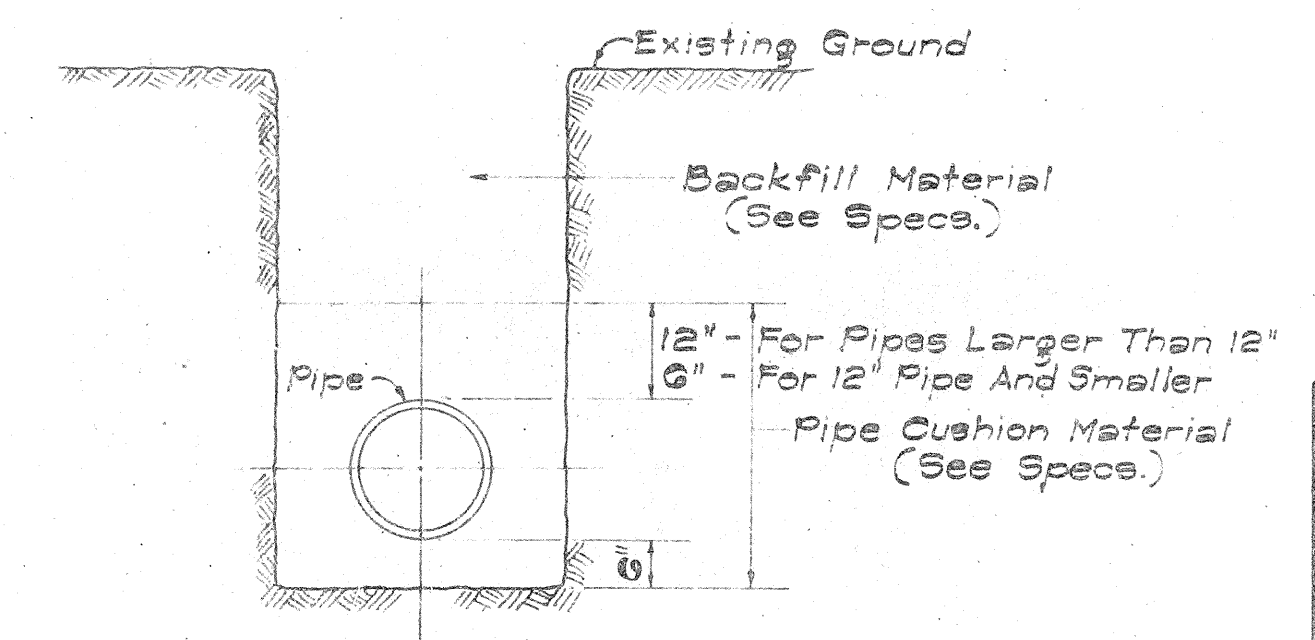
SECTION

TYPICAL REINFORCED CONCRETE JACKET
Scale: 1/2" = 1'-0"

DETAIL OF EXCAVATION PAYMENT LINE AND PEDESTAL FOR VALVES



DETAIL OF VALVE MARKER
Scale: 1/2" = 1'-0"



TYPICAL DETAIL OF TRENCH BACKFILL

Revised Dec. 5, 1961

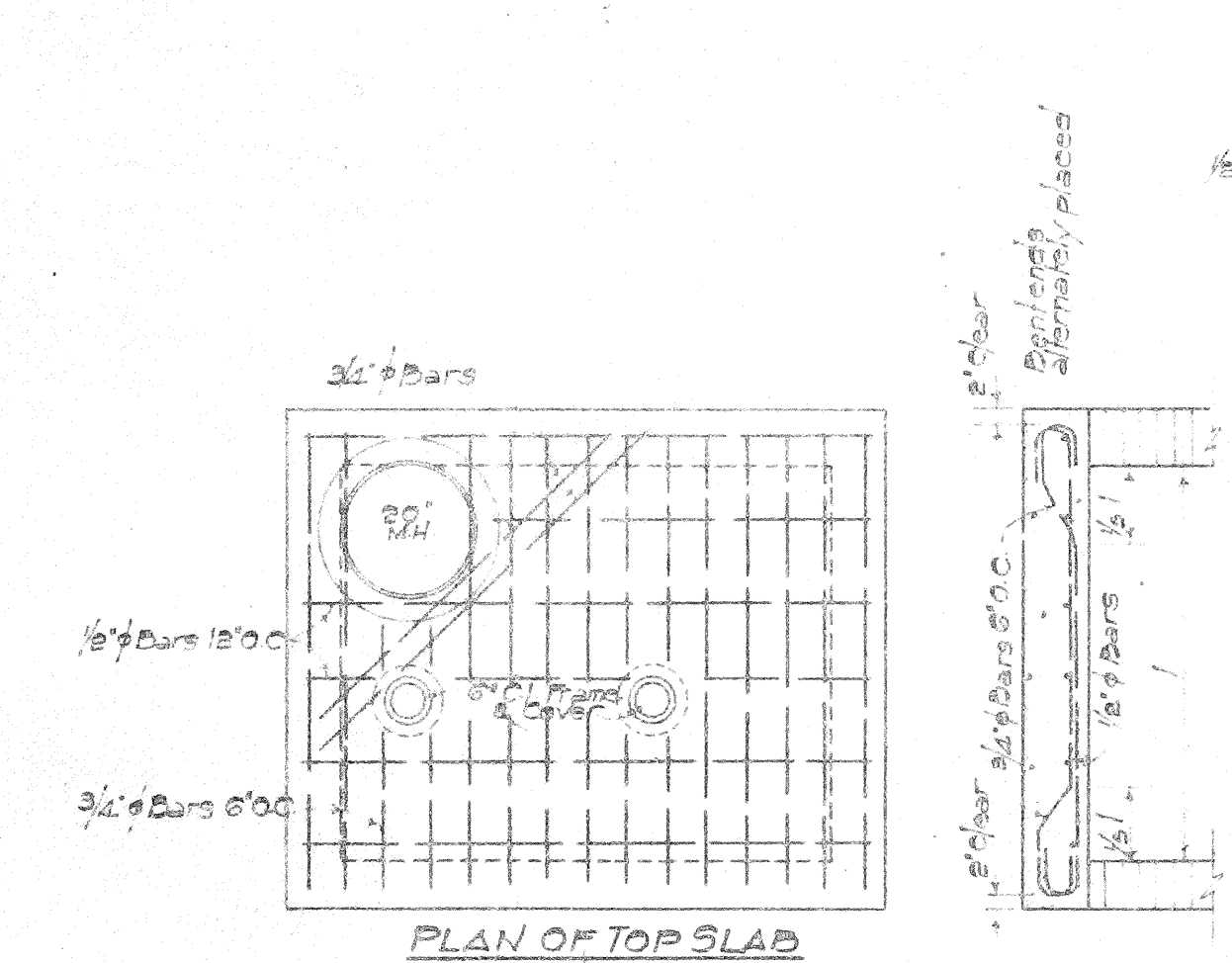
SURVEYED BY:		DRAWN BY: K.L.	
TRACED BY: K.L.		ENGINEER:	
CHECKED BY:		FILE	
APPROVED: <i>[Signature]</i>		POCKET FOLDER NO.	
SCALE: As Shown		DATE: July 24, 1961	
BOARD OF WATER SUPPLY			
HONOLULU, HAWAII			
SHEET 45 OF 49 SHEETS		FIELD BOOK NO.	

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	C-72-0143	1963	46	49

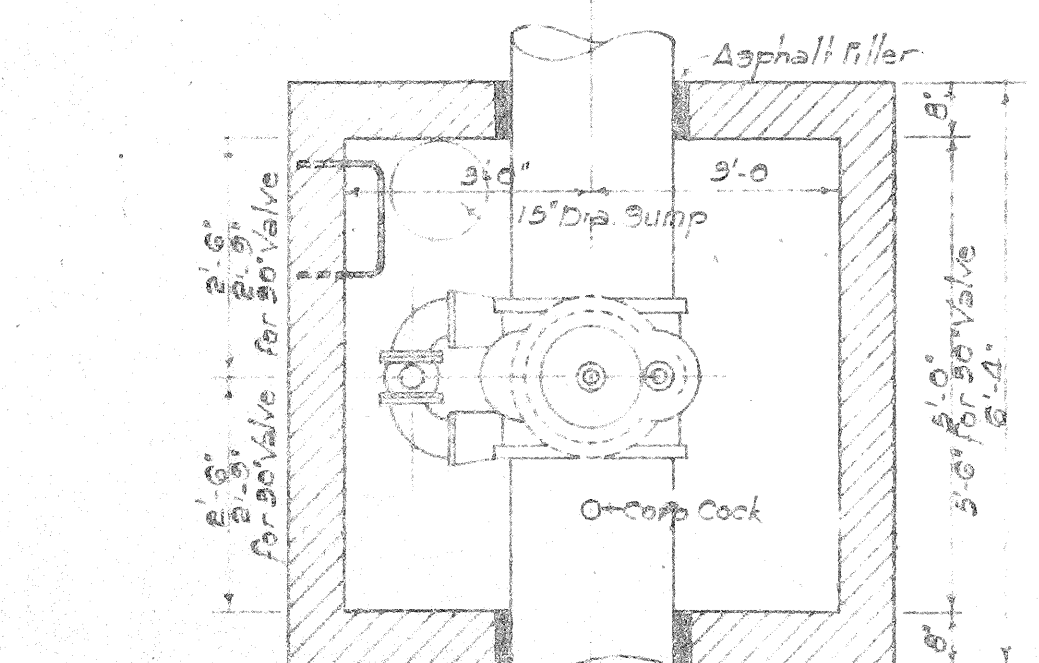
20" Min. (Standard Curb)
20" Min. (Flat Curb)

STANDARD LENGTHS FOR HYDRANT ELBOWS
30"
36"
42"
48"

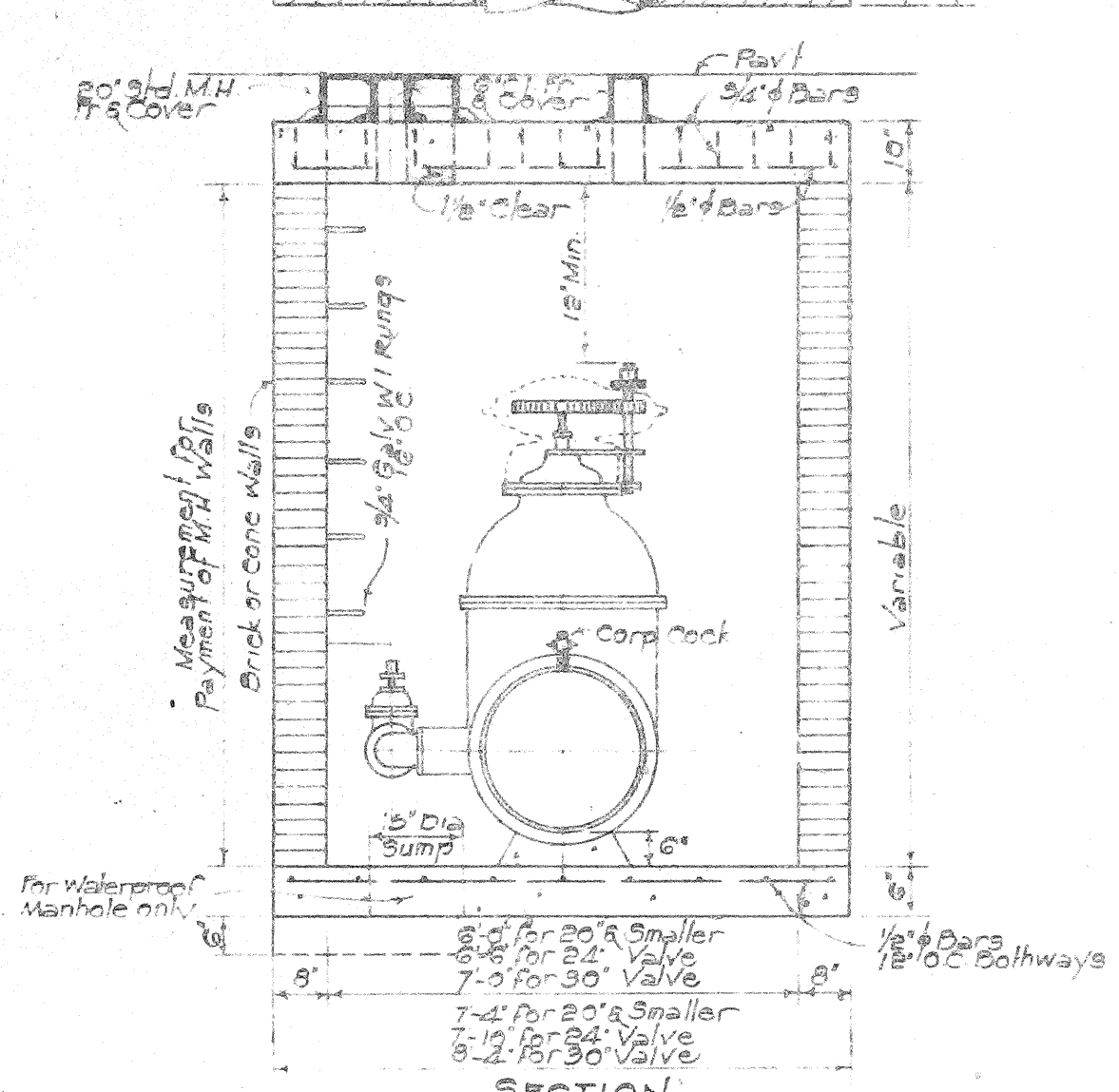
STANDARD HYDRANT EXTENSIONS ARE AVAILABLE IN THE FOLLOWING LENGTHS:
6 to 30 inches long in increments of 6 in.



PLAN OF TOP SLAB

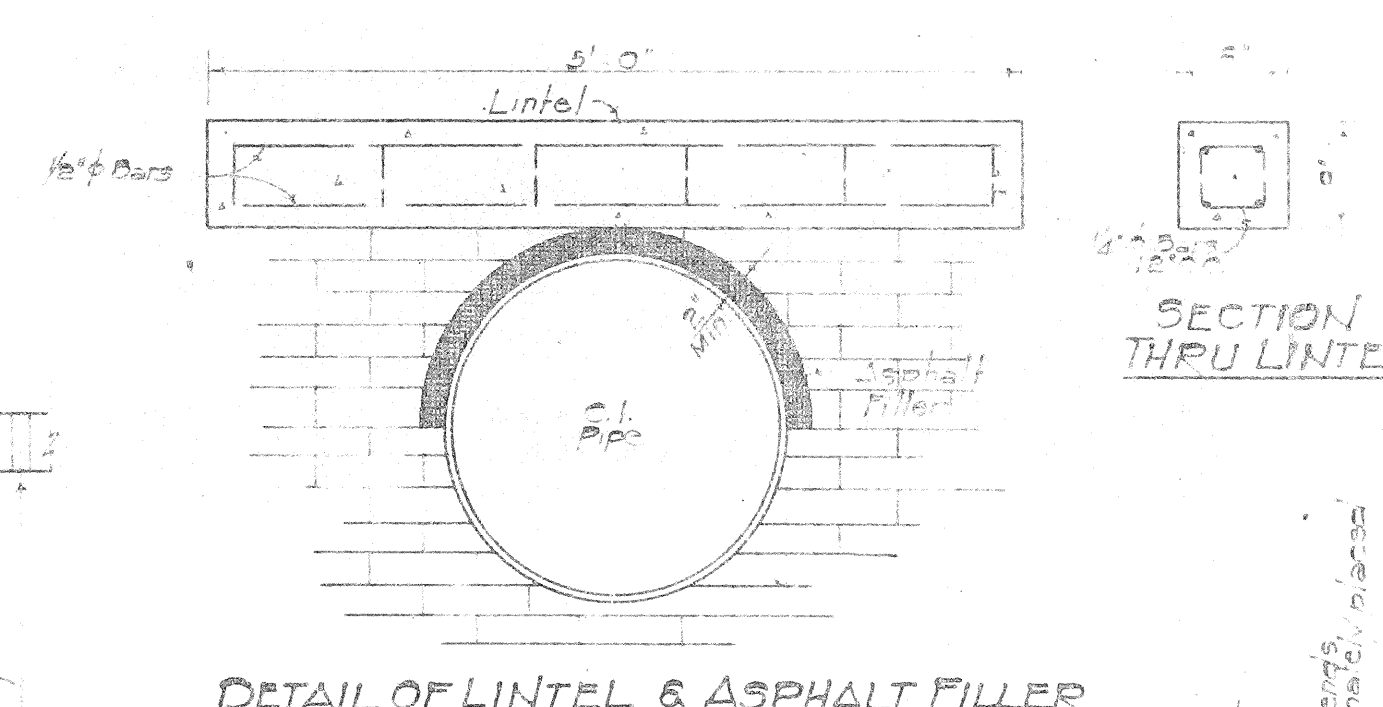


SECTION

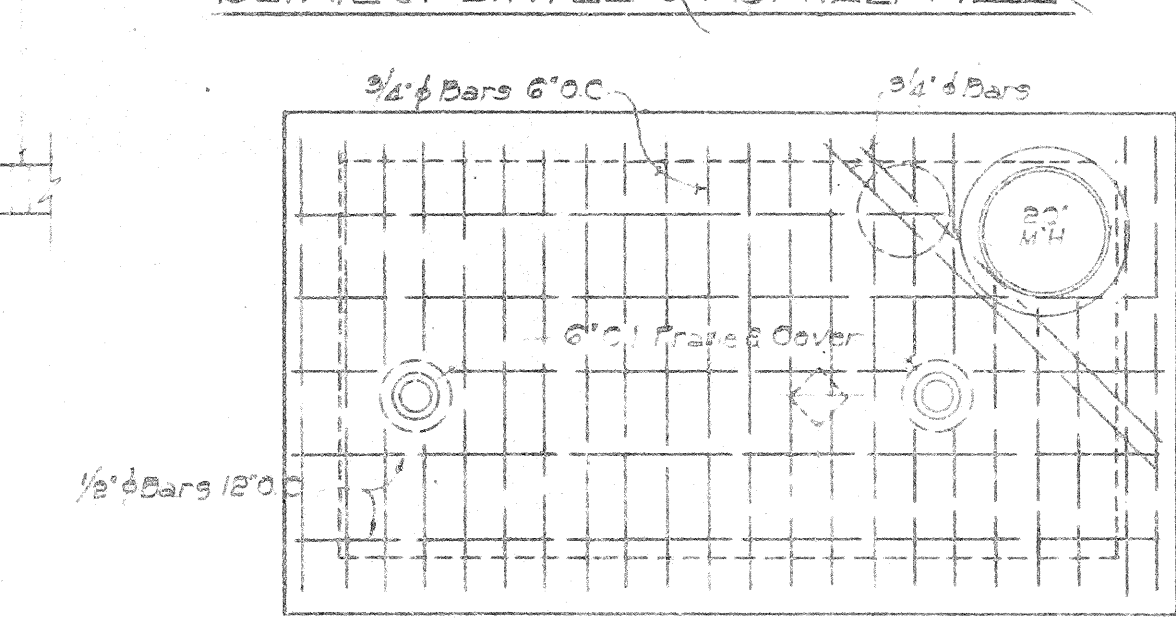


SECTION

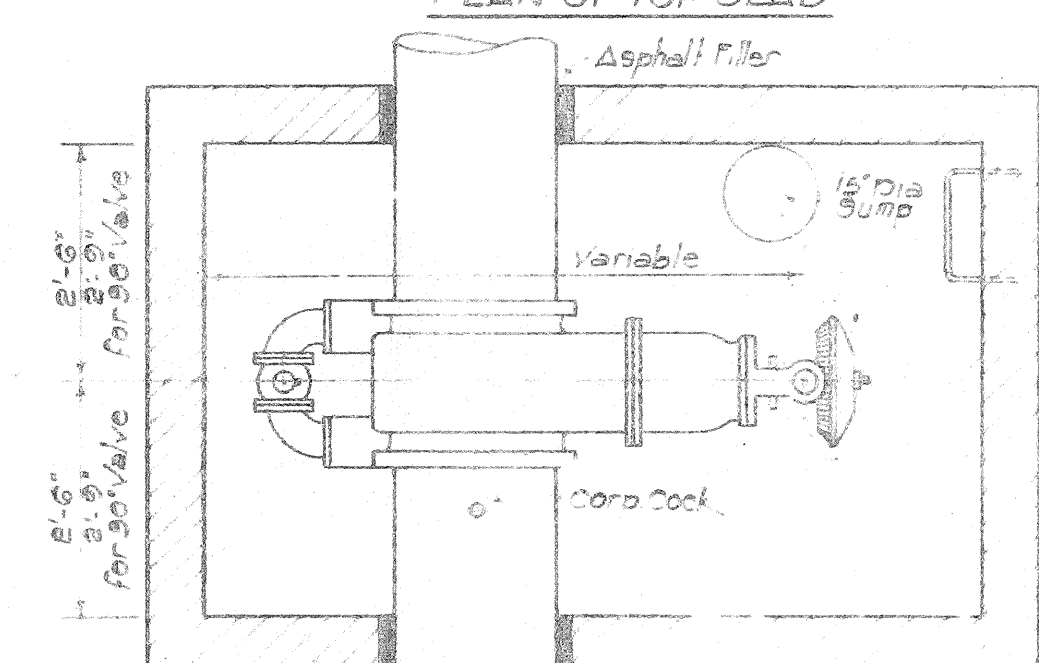
BAR BENDING DETAIL



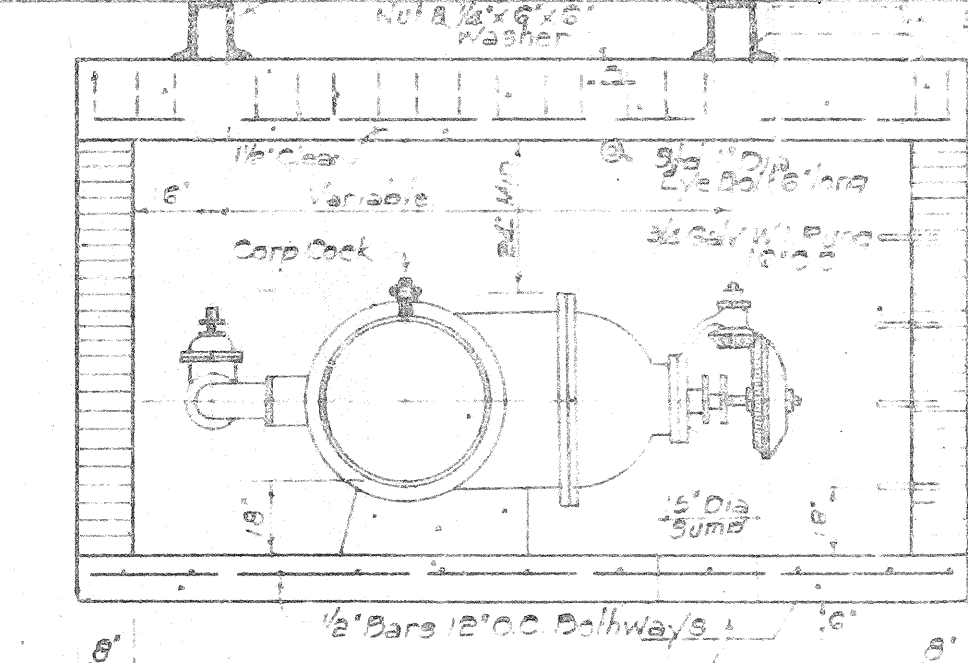
DETAIL OF LINTEL & ASPHALT FILLER



PLAN OF TOP SLAB

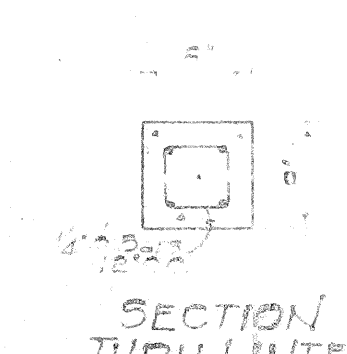


SECTION

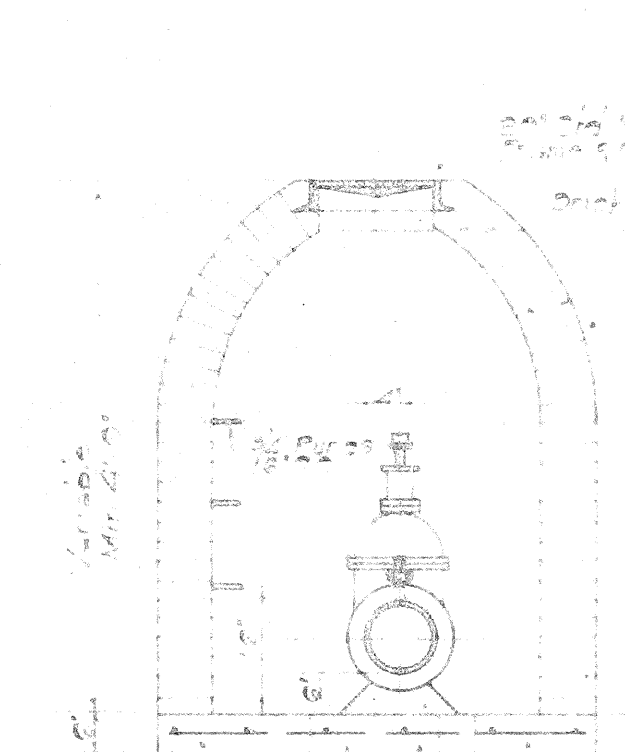


SECTION

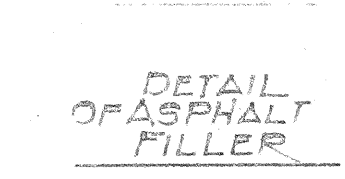
TYPE 'A' MANHOLE FOR BEVEL GEARED GATE VALVES



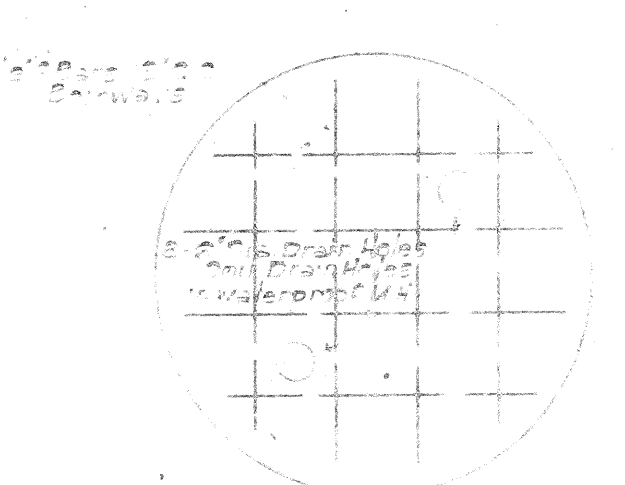
SECTION THRU LINTEL



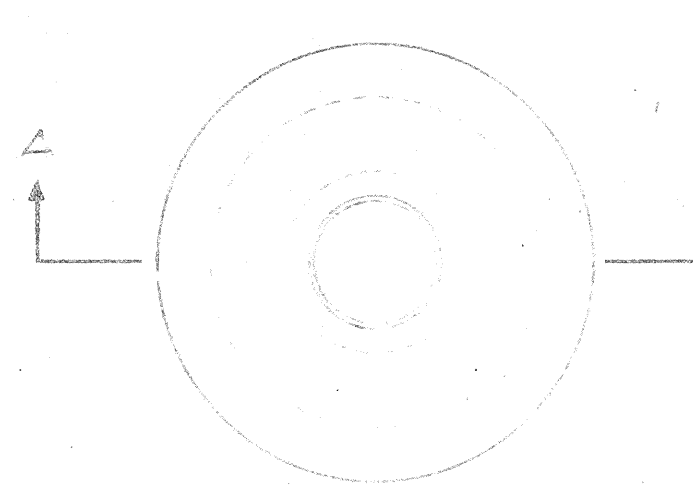
SECTION A-A



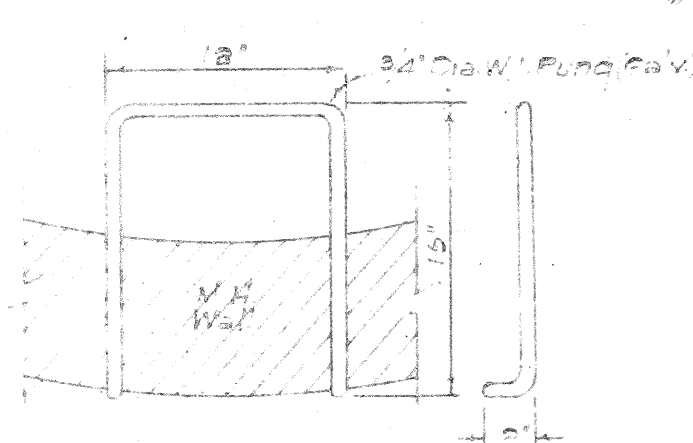
DETAIL OF ASPHALT FILLER



STEEL DETAIL IN BOTTOM SLAB

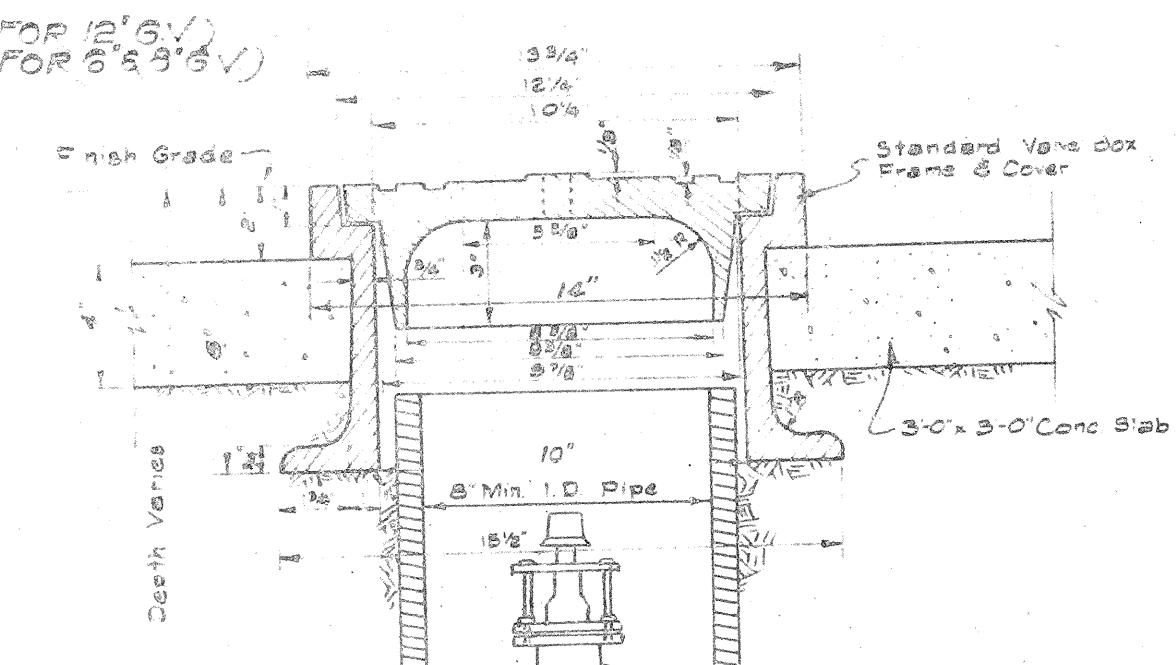


TYPE 'B' & 'C' MANHOLES
TYPE 'B' 4'-0\"/>



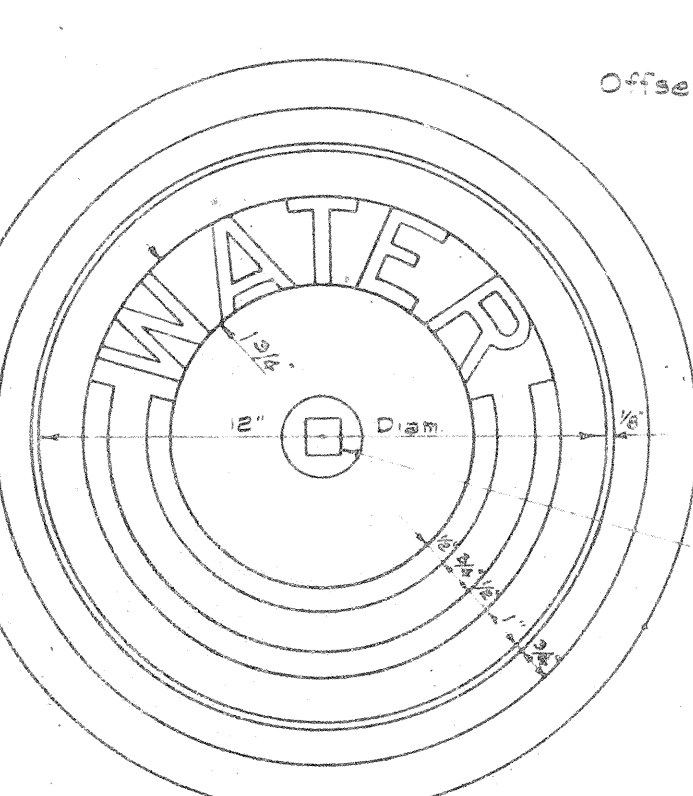
DETAIL OF CURBING AT HYDRANT WHERE REQUIRED

DETAIL OF RUNG



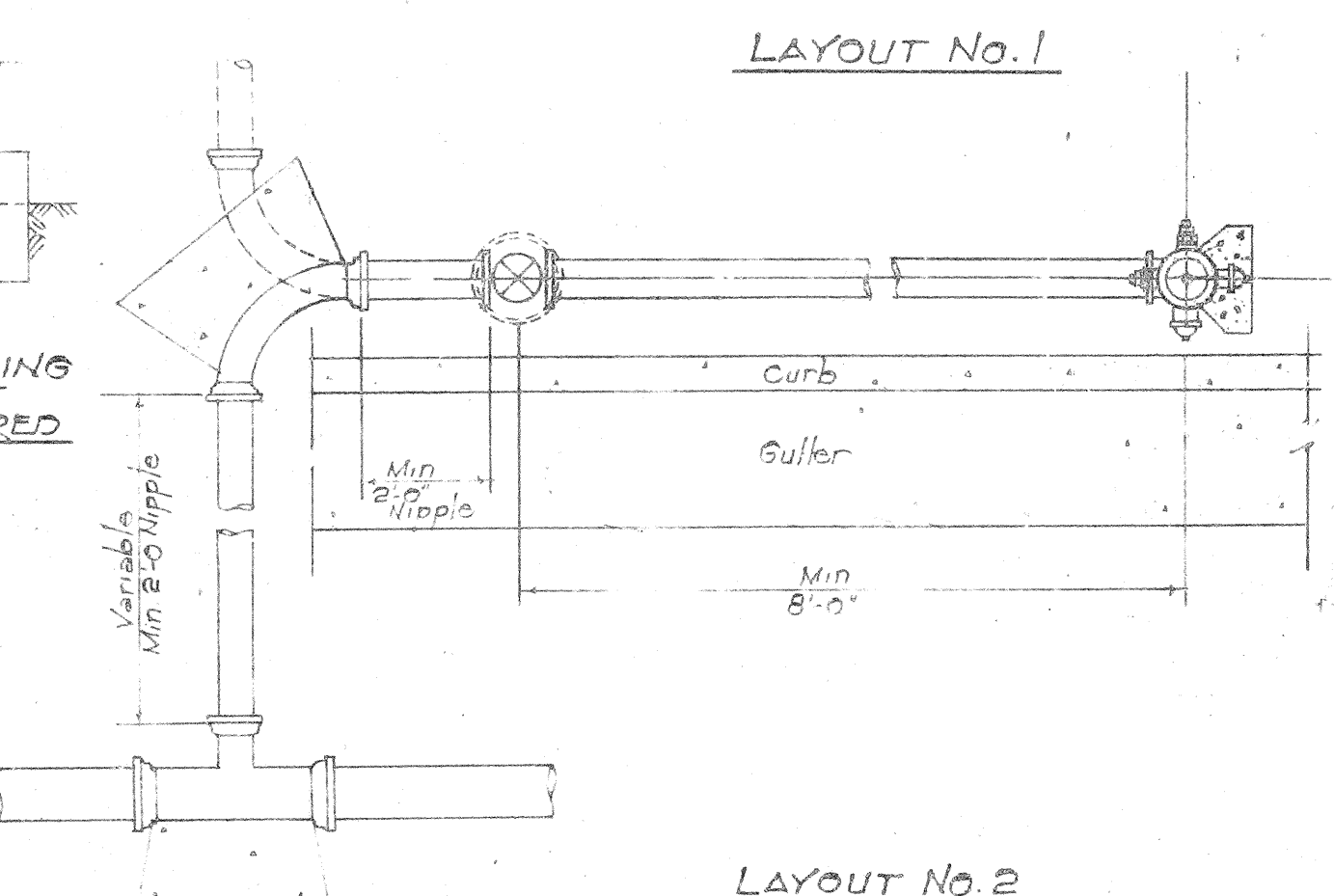
INSTALLATION OF VALVE BOX FOR GATE VALVES

NOTE: For Bevel Geared Gate Valves see B.W.S. Standard (Detail Sheet Filed in B.W.S. Eng. Div.)



CAST IRON FRAME & COVER

STANDARD FIRE HYDRANT LAYOUT



LAYOUT No. 1

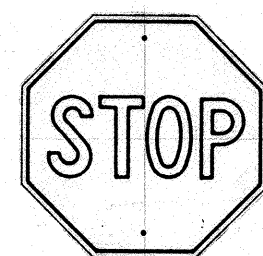
LAYOUT No. 2

NOTE: All castings shall be made accurately to the dimensions shown. Seat and cover shall be ground where necessary to secure flat and true surfaces. The cover shall not rattle in any position. Minor changes in dimensions may be made to suit foundry conditions provided such changes are approved by the Board of Water Supply.

STANDARD DETAILS

APPROVED	MANAGER & CHIEF ENGINEER	FILE	1
SCALE: AS SHOWN	DATE: 1-5-58	POCKET FOLDER	NO.
BOARD OF WATER SUPPLY		DRAWING NO. 1367	
Honolulu, T.H.		SHEET 46 OF 49 SHEETS	

Revised: June 20, 1962
Revised: Mar. 3, 1962



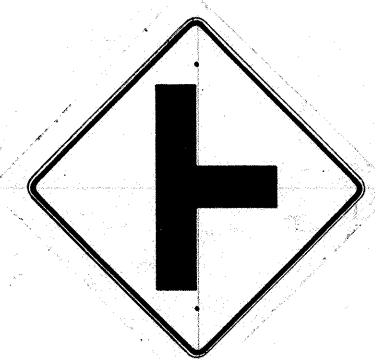
R1-1
30" x 30"



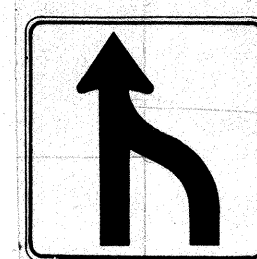
R4-7
24" x 30"



W6-1
36" x 36"



W2-2
30" x 30"



R3-9
30" x 30"

SUMMARY OF DIRECTIONAL REGULATORY & WARNING SIGNS			
DESCRIPTION	NEW	REL.	REM.
STOP R1-1	1	5	
DO NOT PASS			2
KEEP RIGHT R4-7	4		
SCHOOL ZONE SLOW			1
SPEED LIMIT 25		+2	
SPEED LIMIT 35		6	
NO CROSSING DOUBLE LINE			2
NO PASSING WHEN SOLID LINE IS ON YOUR SIDE			2
			1
			1
W2-2	1		3
SPEED LIMIT 25 WHEN FLASHING		2	
SCHOOL CROSSING (Paid Separately)		42	
DIVIDED HIGHWAY W6-1	1		
DIVIDED HIGHWAY AHEAD			1
PASS WITH CARE			2
CROSS WALK		3	
ROUTE MARKER		2	
R3-9	1		
LITTER SIGN		3	
BOARD OF PUBLIC PARK & RECREATION SIGN		1	
HAWAII VISITORS BUREAU SIGN		2	
Street Sign (May Way & Kalaniana'ole)		1	
YELLOW BUNKERS			3
BUS STOP		26 27 55	
TOTALS	8	56	13

NOTE:

- The shape, color, plate details, lettering and reflectorization of Regulatory Signs(Prefix R) and Warning Signs(Prefix W) shall be in accordance with the "Manual of Uniform Traffic Control Devices for Streets and Highways", dated June 1961 and the BPR Manual "Standard Highway Signs", dated September 1961, unless otherwise specified.
- All regulatory and warning signs shall be reflectorized unless otherwise specified.
- All regulatory and warning signs shall have 3/8" bolt holes drilled at appropriate locations unless otherwise noted.

1. All signs and road delineators shall be placed 2' outside the usable roadway shoulder or 1' outside unmountable curbing present and within the limits shown below.
2. Except as noted below, sign posts shall be 3" galv. std. pipe for signs larger than 24" in any dimension and 2" galv. std. pipe for signs not over 24" in any dimension, with two $\frac{3}{8}$ " ϕ bolt holes or adjustable band brackets.
3. Sign shall be attached to post with $\frac{5}{16}$ " galvanized carriage bolts with nuts and $\frac{7}{8}$ " x $\frac{17}{16}$ " x .120 stainless - steel washers with neoprene rubber gasket.
4. Clearance Markers (RM-4, RM-3) shall be installed with the inside edge of the marker in line with the inner edge of the obstruction.
5. Signs 48" and wider or larger than 10 sq. ft. in area shall be mounted on two 3" galv. std. pipe with appropriate $\frac{3}{4}$ " bolt holes.

Diagram illustrating the cross-section of a bridge deck, showing dimensions and components:

- ADVISORY SPEED PLATE:** Indicated by a dashed line and dimensioned as **2'**.
- Deck Width:** Dimensioned as **6' TO 12'** with the instruction **See Note**.
- Not Less Than 4'**: Dimensioned for the width of the deck section below the advisory speed plate.
- Not Less Than 5'**: Dimensioned for the total width of the deck section.
- Usable Shoulder:** Indicated by an arrow pointing to the sloped area on the left.
- 3/8" x 12" Steel Bar:** Indicated by an arrow pointing to a reinforcement bar at the bottom.
- 12"**: Dimensioned for the height of the concrete section above the steel bar.
- 2' - 6" min.**: Dimensioned for the minimum width of the concrete section at the bottom right.

RURAL DISTRICT

6' TO 12'

See Note

2'

3"

Not Less

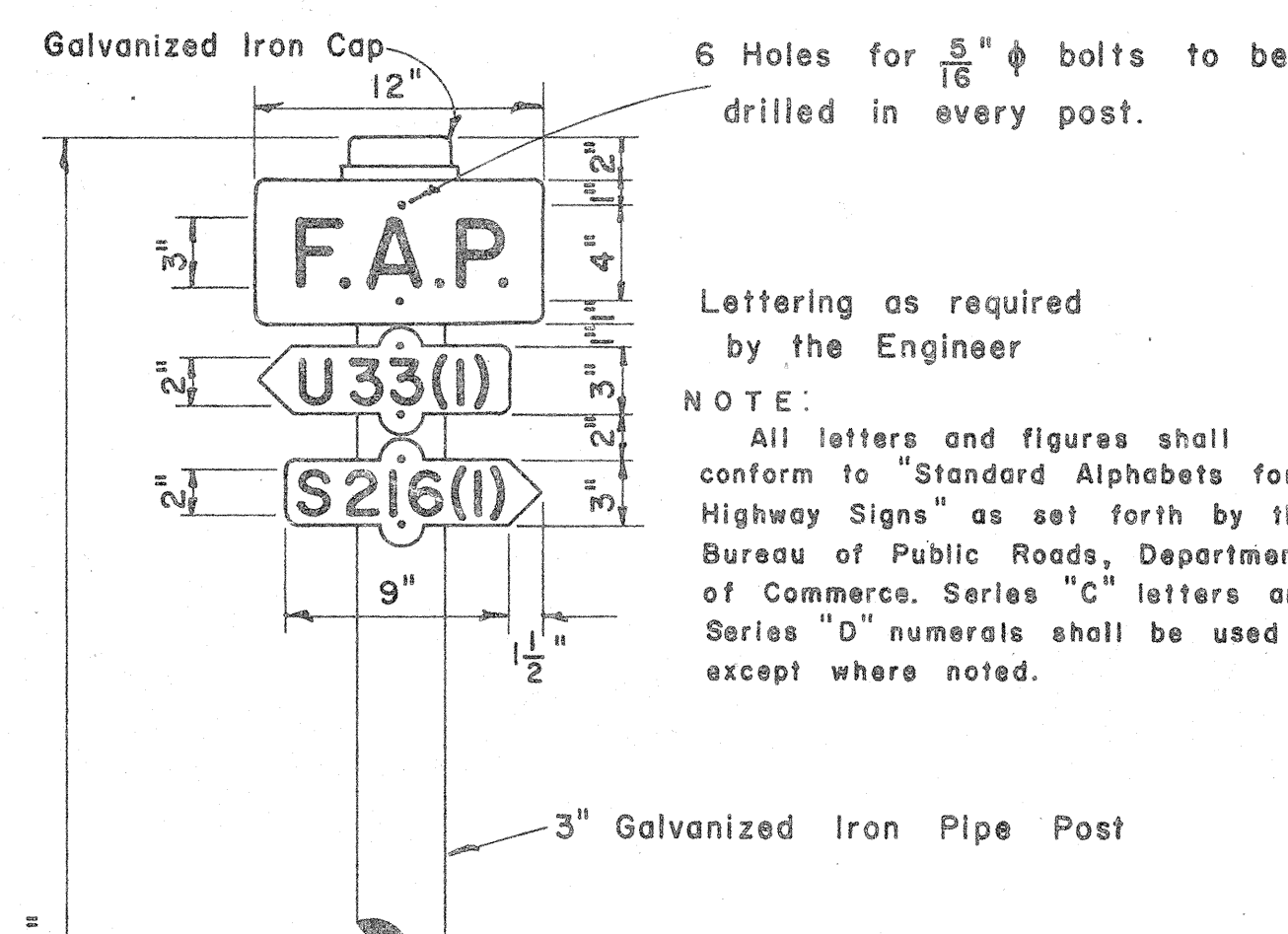
Usable Shoulder

2 - 6" min.

Diagram illustrating the dimensions and components of a vertical post:

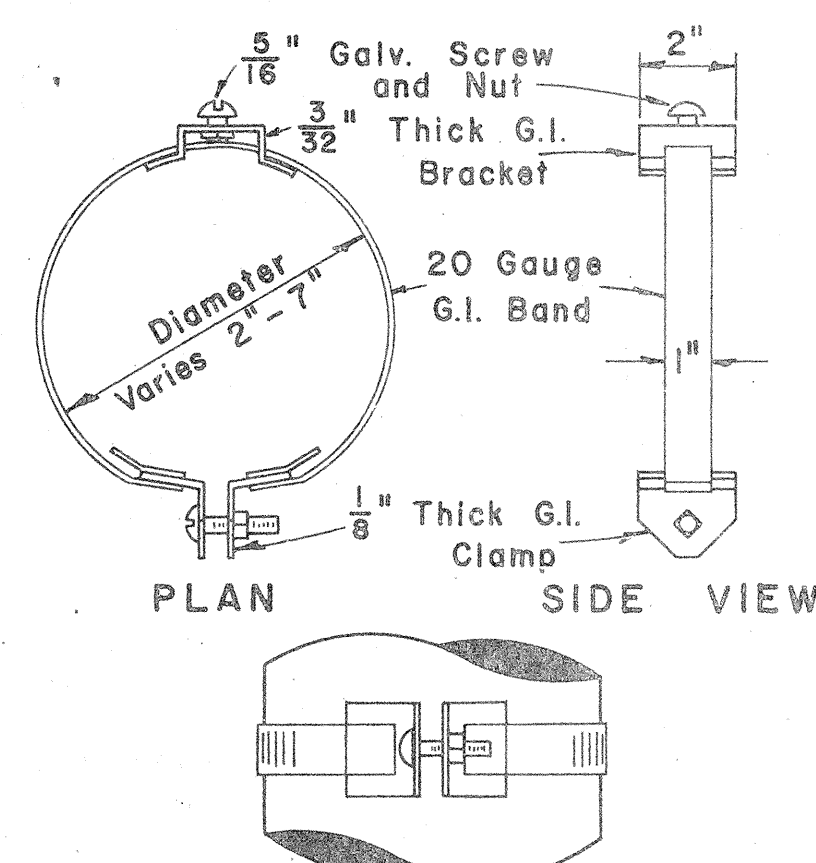
- RM- 1,2 or 3**: Label pointing to the top section of the post.
- 2' TO 12'**: Dimension indicating the height of the post above the ground line.
- See Note**: Text below the height dimension.
- 4'**: Dimension indicating the height of the post above the ground line.
- 2' min.**: Dimension indicating the minimum height of the post above the ground line.

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

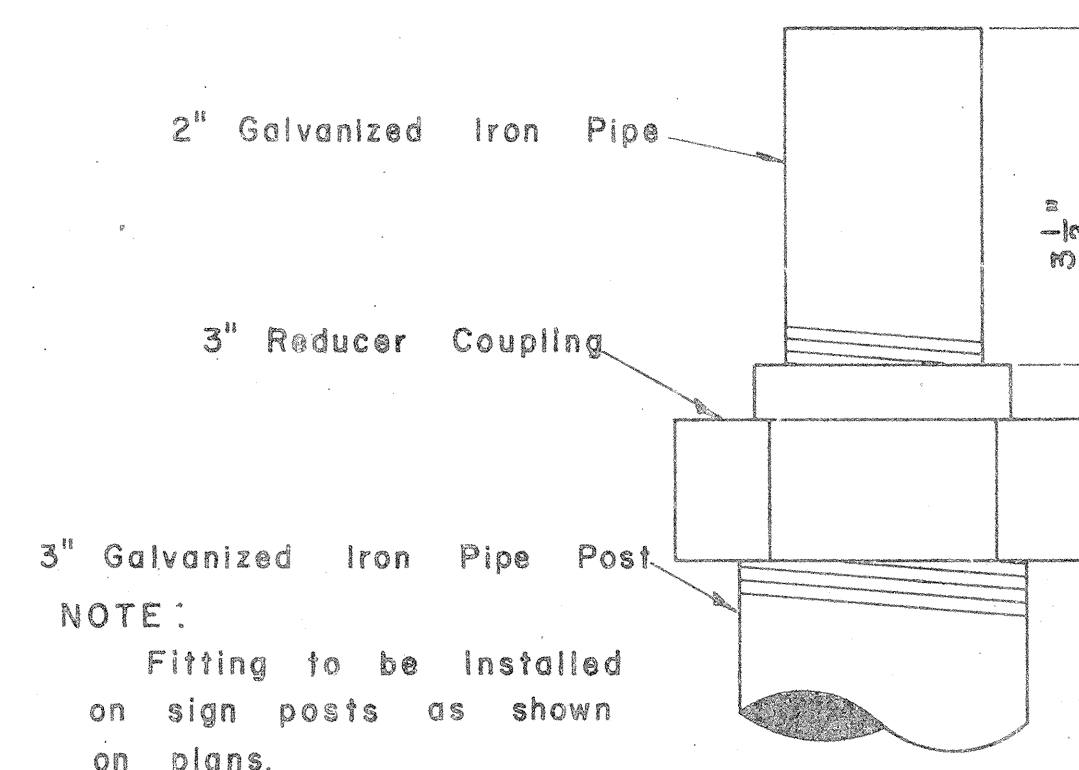


Lettering as required
by the Engineer

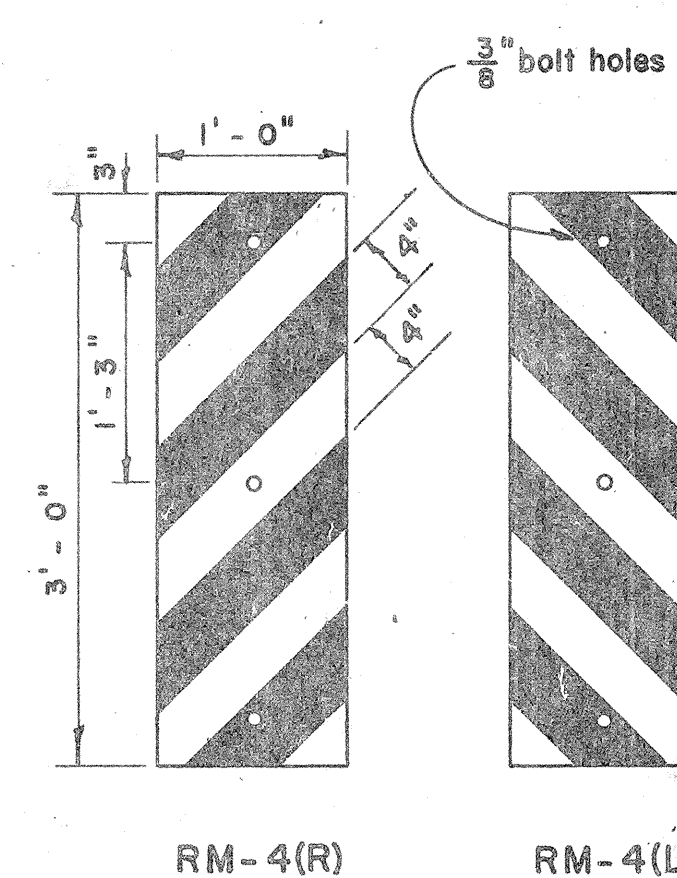
NOTE: All letters and figures shall conform to "Standard Alphabets for Highway Signs" as set forth by the Bureau of Public Roads, Department of Commerce. Series "C" letters and Series "D" numerals shall be used except where noted.



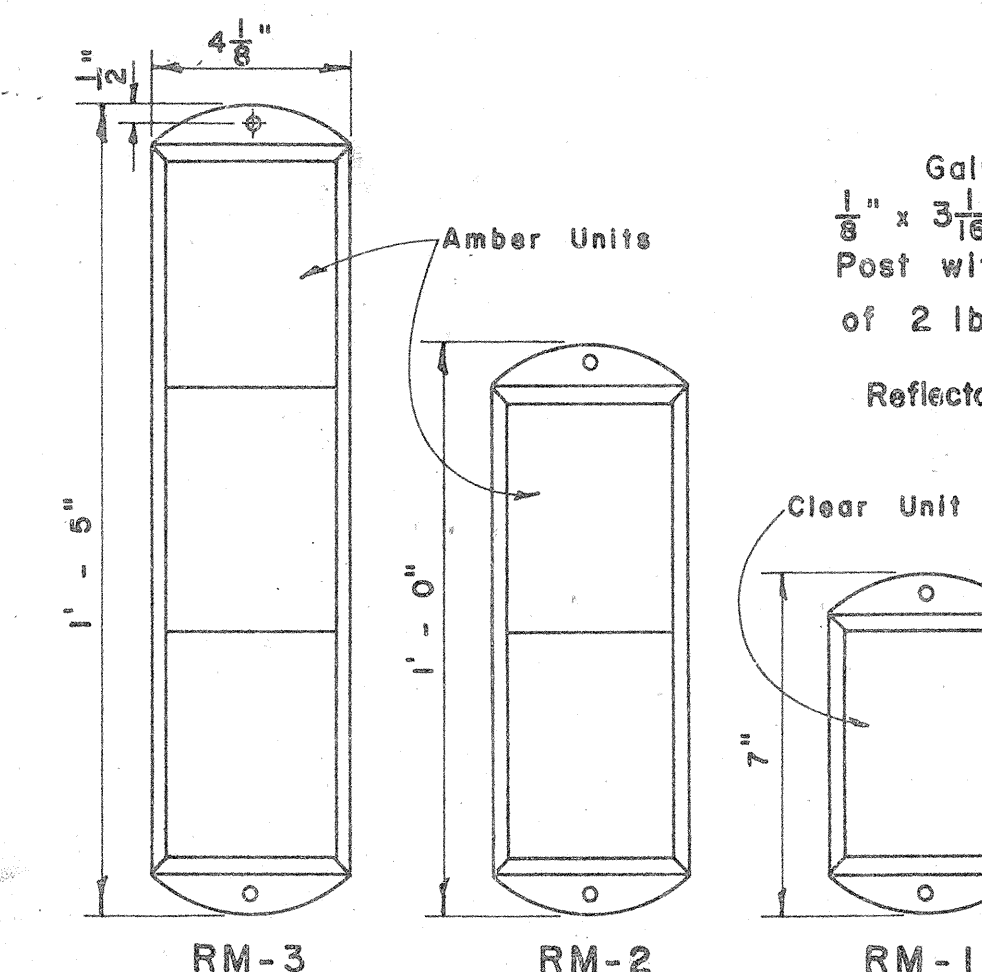
FRONT VIEW
ADJUSTABLE BAND BRACKET
FOR MOUNTING TRAFFIC SIGNS
Scale: 3" = 1' - 0"



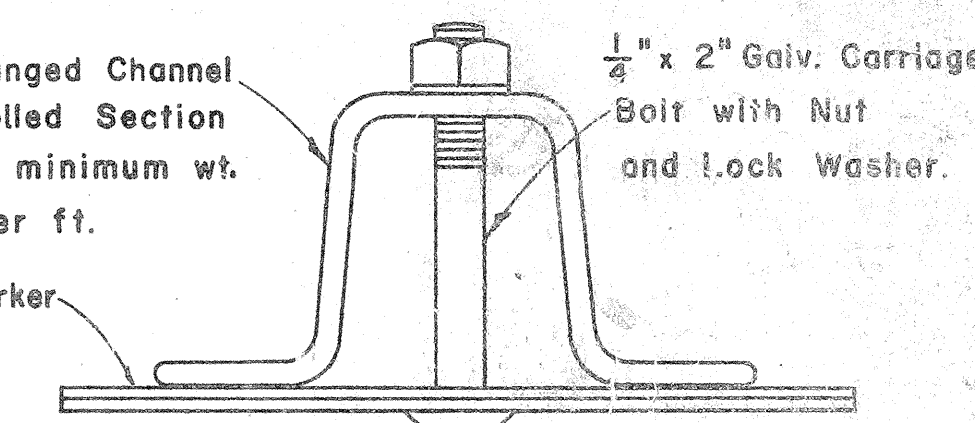
NOTE:
Fitting to be installed
on sign posts as shown
on plans.



Scale: 1" = 1' - 0"



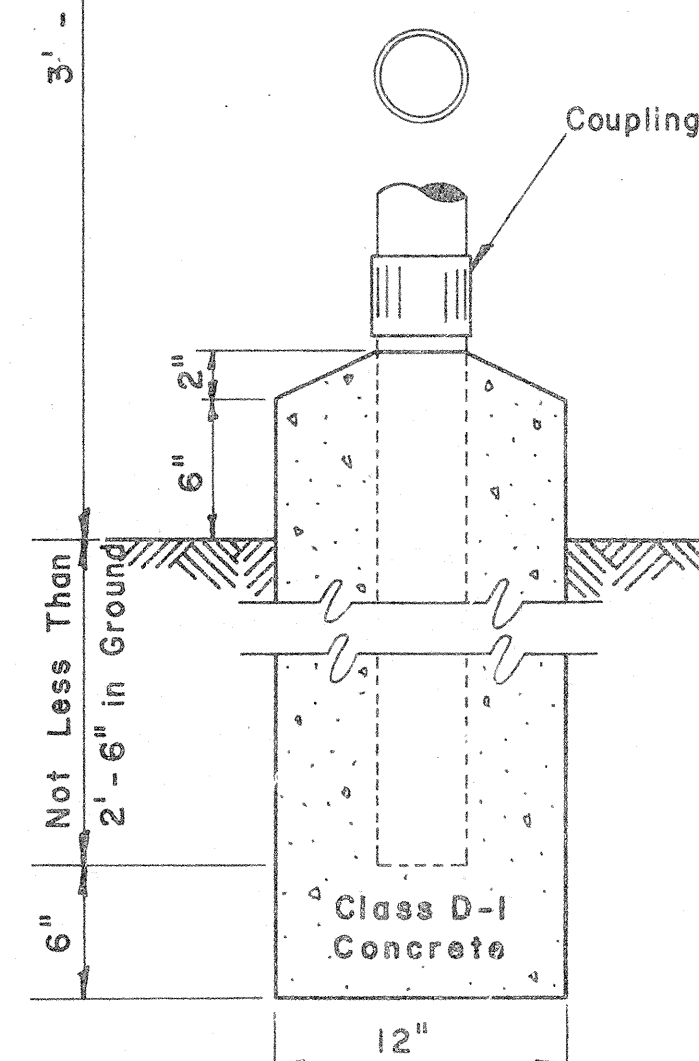
Scale: 3" = 1' - 0"



TYPICAL SECTION
OF ROAD DELINEATOR

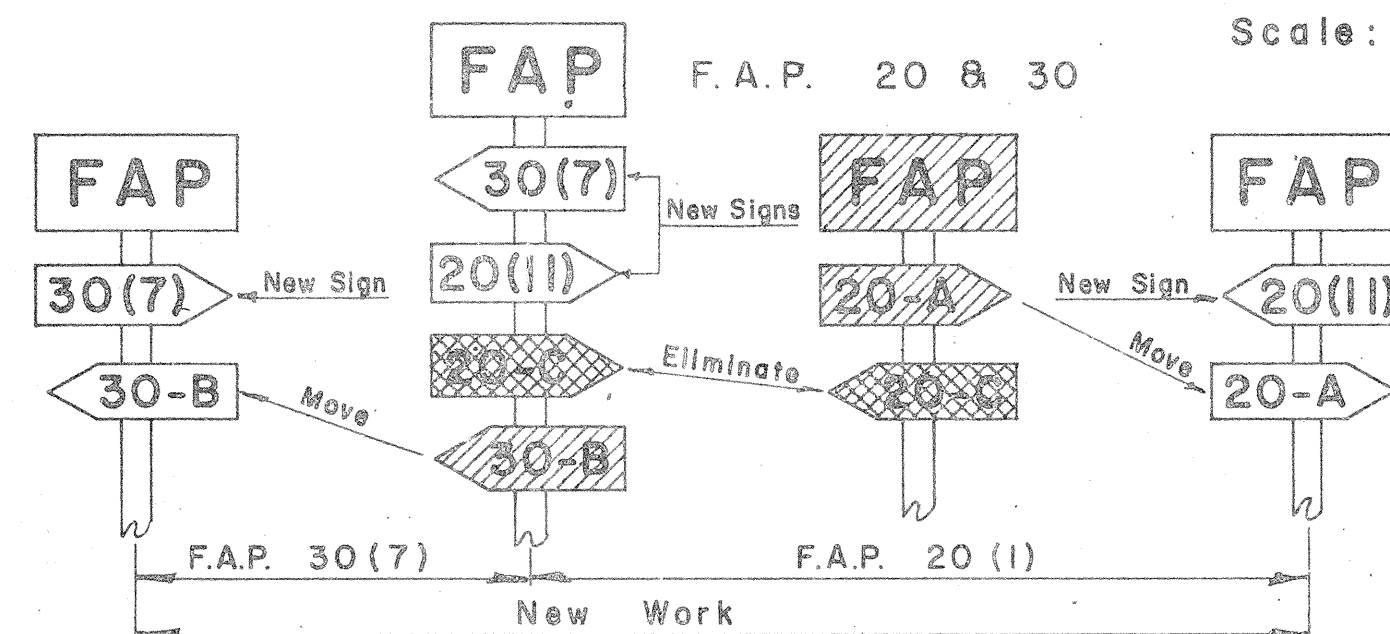
Full Size

NOTE:
Reflector Units for RM-1,2,3 shall be
4" x 5" in size and shall consist of
reflective sheeting encapsulated in acrylic
plastic.



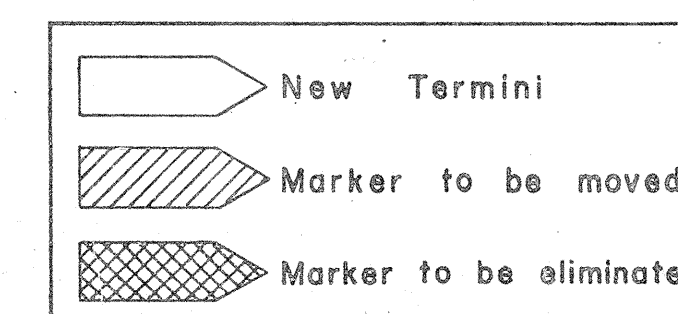
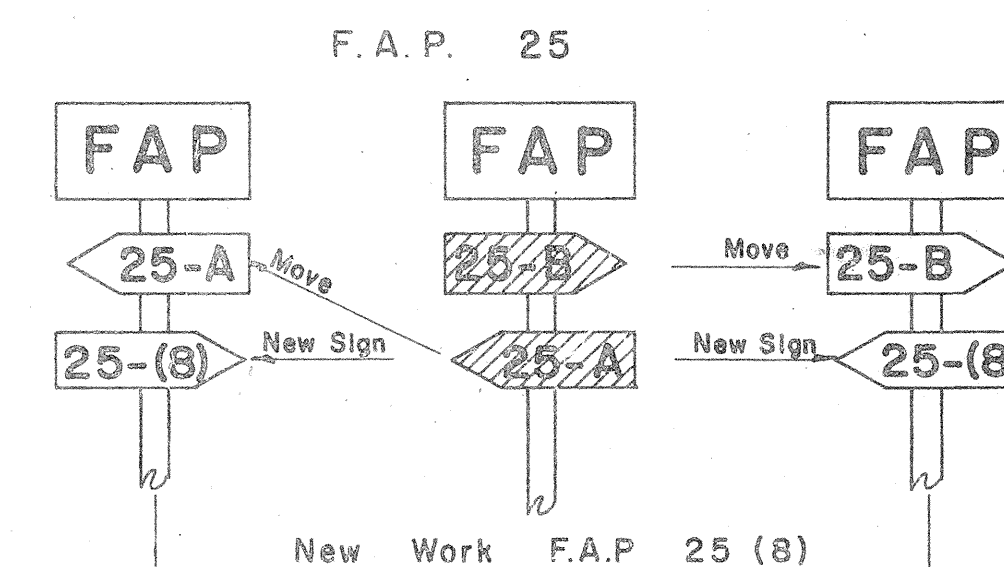
FEDERAL AID MARKER

Scale: $\frac{1}{2}'' = 1' - 0''$



NOTE 2

Federal Aid Markers should be placed at the termini of suffix designated sections. Intermediate letter designated markers of adjacent sections located within the limits of new improvements should be moved to the termini of the new work. The same procedure should be followed on each successive improvement until all markers for letter designated sections are eventually eliminated.



APPROVED

DATE 1/32/61

Wendell
DIRECTOR OF TRANSPORTATION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DETAILS
F. A. MARKER
AND
MISCELLANEOUS SIGN
DETAILS

SHEET No. 42 OF 42 SHEETS