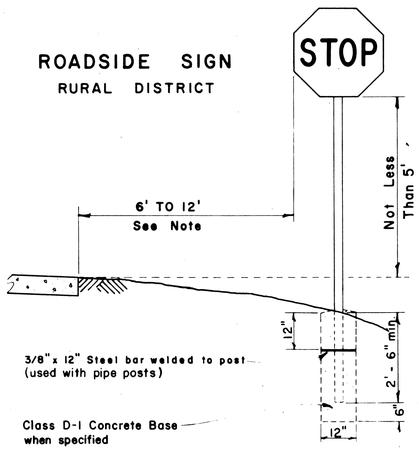
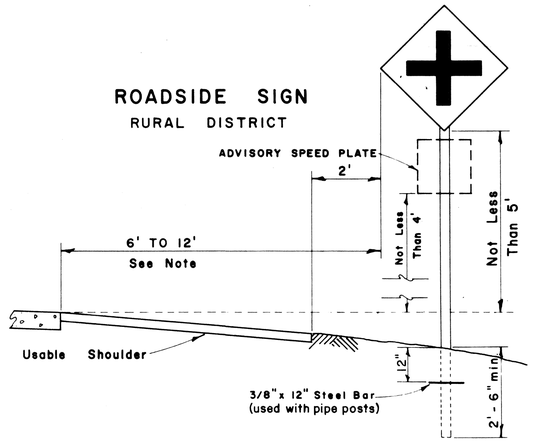
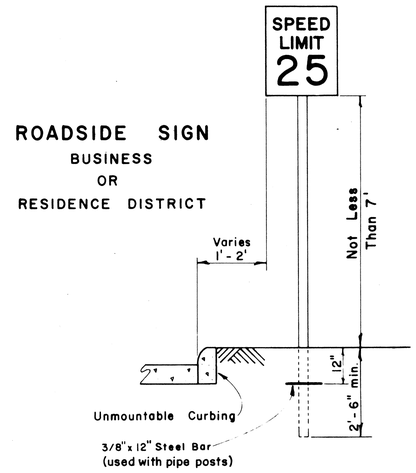
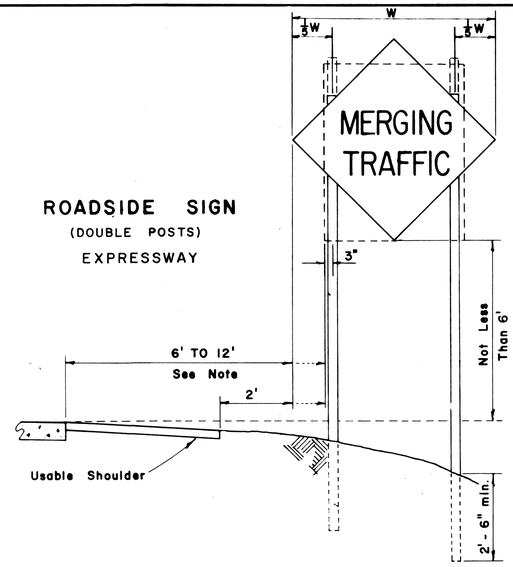
NOTE:
1. All signs and road delineators shall be placed 2' outside the usable roadway shoulder or 1' outside unmountable curbing present and within the limits shown below.
2. Except as noted below, sign posts shall be either 3" galv. std. pipe or 2½" x 2½" galv. square tube posts for signs larger than 24" in any dimension; 2" galv. std. pipe or 2" x 2" galv. square tube posts for signs 24" or less in any dimension.
3. Sign shall be attached to post with 5/16" galvanized bolts with nuts and 7/8" x 7/8" x .120" stainless-steel washers with neoprene rubber gasket.
4. Clearance Markers (RM-3, RM-4) 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 or two 2½" x 2½" galv. square tube posts.

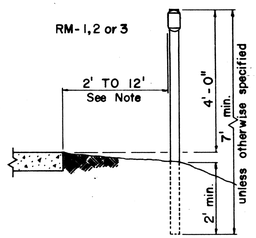
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	A-820-01-66 UNIT 1	1965	9	14



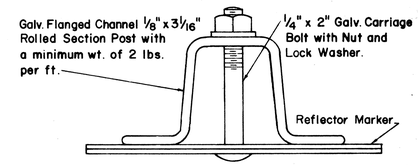






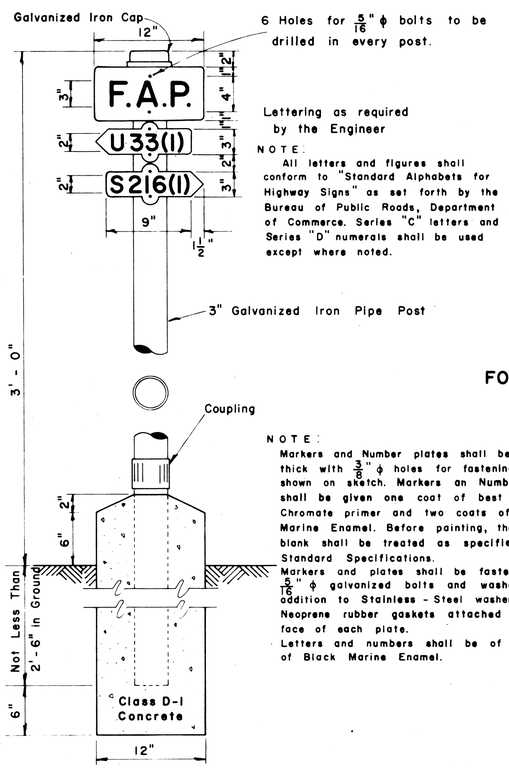


ROAD DELINEATOR
Scale: ½" = 1'-0"



HEIGHT AND LATERAL LOCATION OF SIGNS - TYPICAL INSTALLATIONS

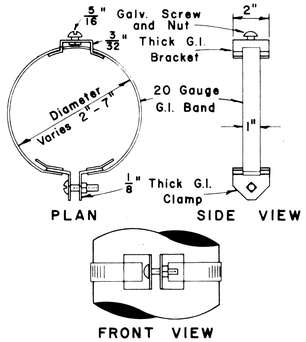
Scale: ½" = 1'-0"



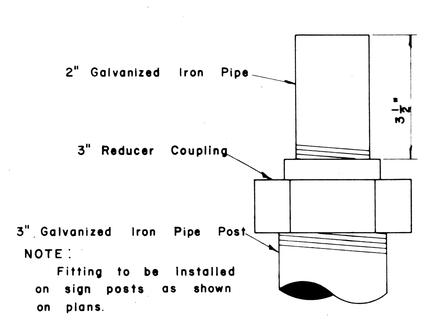
NOTE:
All letters and figures shall conform to "Standard Alphabets for Highway Signs" as set forth by the Bureau of Public Roads, Department of Commerce. Series "C" letters and Series "D" numerals shall be used except where noted.

NOTE:
Markers and Number plates shall be 0.081" thick with 3/8" ϕ holes for fastening as shown on sketch. Markers an Number plates shall be given one coat of best Zinc Chromate primer and two coats of White Marine Enamel. Before painting, the Aluminum blank shall be treated as specified in the Standard Specifications.
Markers and plates shall be fastened with 5/16" ϕ galvanized bolts and washers in addition to Stainless - Steel washers with Neoprene rubber gaskets attached on front face of each plate.
Letters and numbers shall be of two coats of Black Marine Enamel.

FEDERAL AID MARKER
Scale: ½" = 1'-0"

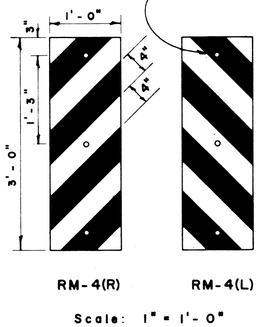


TYPICAL BAND BRACKET FOR MOUNTING TRAFFIC SIGNS
Scale: 3" = 1'-0"

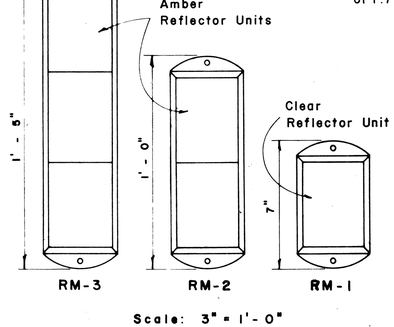


NOTE:
Fitting to be installed on sign posts as shown on plans.

DETAIL OF SIGN POST FITTING FOR CITY & COUNTY STREET NAME SIGNS
Scale: ½" = 1"

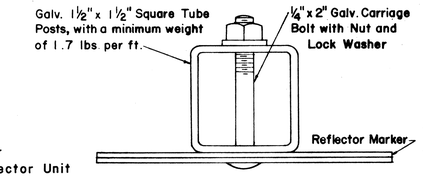


Scale: 1" = 1'-0"



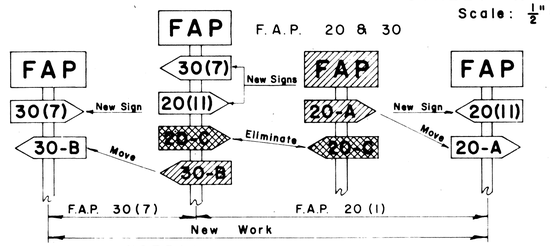
Scale: 3" = 1'-0"

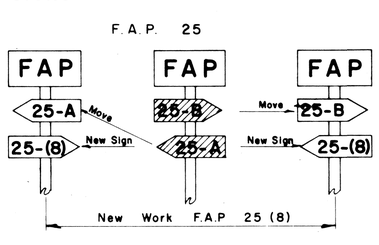
REFLECTOR MARKERS
Scale: As Shown

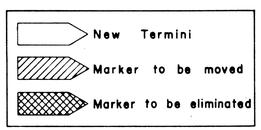


TYPICAL SECTION OF ROAD DELINEATOR
Full Size

NOTE:
Reflector Markers RM-1,2,3 shall be glass sphere reflector markers with 4" x 5" reflector units (as shown) or plastic prismatic reflector markers with 3" diameter reflector units.







NOTE:
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.

METHOD OF MARKING F.A. PROJECTS AT OVERLAPS
(USING NUMBER SUFFIX ON NEW WORK)

DECEMBER 8, 1964
REVISED: FEBRUARY 25, 1964

APPROVED: DATE: 12/28/64

DIRECTOR OF TRANSPORTATION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS
F. A. MARKER
AND
MISCELLANEOUS SIGN
DETAILS

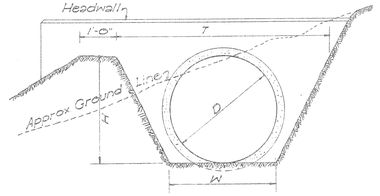
Scale: As Shown

SHEET No. 1 OF 3 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	A-B200(26)66 UNIT 1	1969	10	14

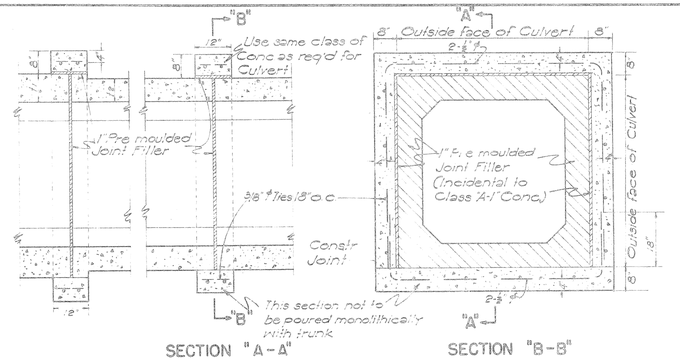
Revised : June , 1969

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



DETAIL OF OUTLET DITCH

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



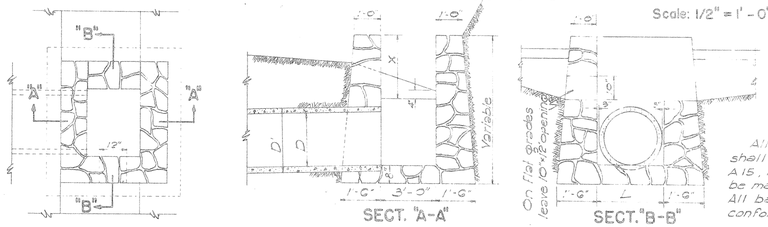
SECTION "A-A" SECTION "B-B"

CONC. COLLAR FOR CONC. BOX CULVERT

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

DATA FOR MASONRY DROP INTAKE				Where Variables Equal
D	D	L=D+6"	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"

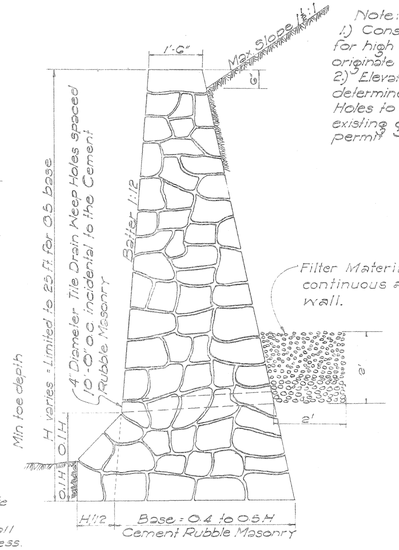
NOTE:
Dimension "X" is assumed as 2'-4" in figuring the above quantities.



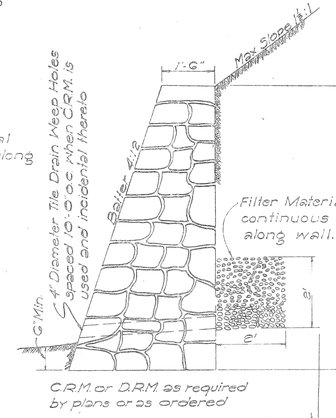
DETAIL OF MASONRY DROP INTAKE

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

Note: To Resident Engineer
1) Consider economy of reinf. conc for high retaining walls which did not originate on plan layout.
2) Elevation of weep holes to be determined by Resident Engineer. Holes to be placed as close to the existing ground line as local conditions permit.



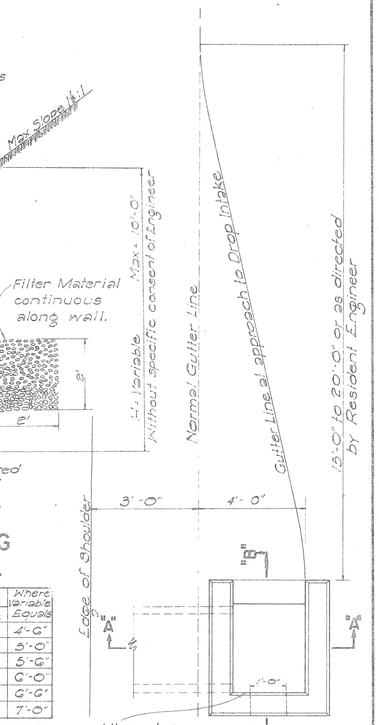
SECTION OF HIGH CEMENT RUBBLE MASONRY RETAINING WALL OR SEAWALL



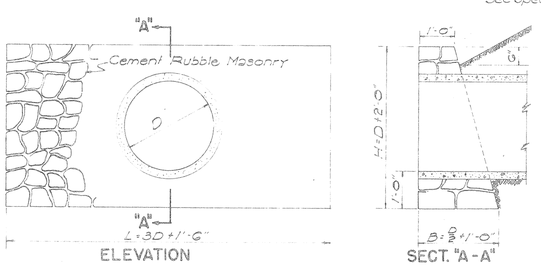
SECTION OF LOW MASONRY RETAINING WALL OR SEAWALL

DATA - CONC. DROP INTAKE					Where Variable Equals
D'	D	L=D'+6"	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"	0"	2.32	5'-6"
44"	36"	4'-2"	0"	2.73	6'-0"
51"	42"	4'-0"	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



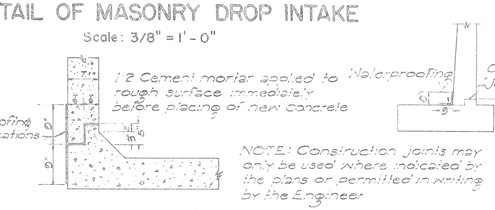
DATA - MASONRY HEADWALL				Cast-in-Place Conc Culv't	Conc Pipe Culvert	Corrugated Pipe Culv't
D	H	B	L	Cu Yds	Cu Yds.	Cu Yds
18"	3'-6"	1'-0"	6'-0"	0.85	0.05	0.03
24"	4'-0"	2'-0"	7'-6"	1.28	1.45	1.41
30"	4'-6"	2'-3"	9'-0"	1.83	2.06	2.00
36"	5'-0"	2'-6"	10'-6"	2.40	2.84	2.72



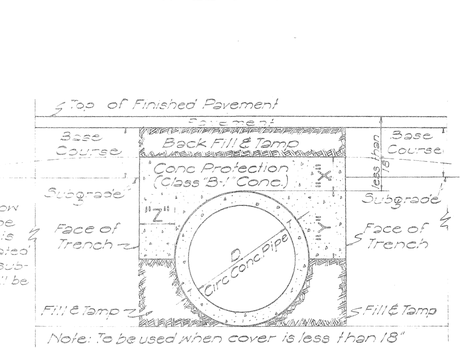
ELEVATION SECT. "A-A"

DETAIL OF MASONRY HEADWALL

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



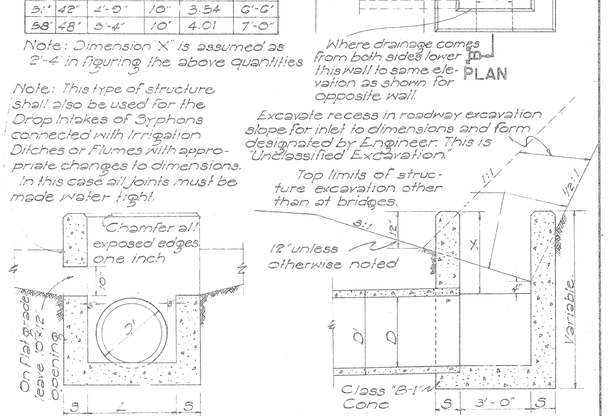
CONSTR. JOINT DETAILS



SECT. OF CULVERT WITH CONC. PROTECTION

Scale: 1" = 1'-0"

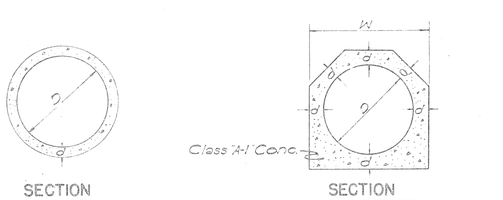
DATA FOR CONCRETE PROTECTION OVER CULVERTS		
X	Y	Z
6" for 18" D	$\frac{D}{2}+T$	Z must be from pipe to face of trench.
7" " 24" D		
8" " 30" D		Minimum = X
9" " 36" D		
10" " 42" D		Maximum pay quantity will be Z = 12"
11" " 48" D		
12" " 54" D		



SECTION "B-B" SECTION "A-A"

DETAIL OF CONCRETE DROP INTAKE

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



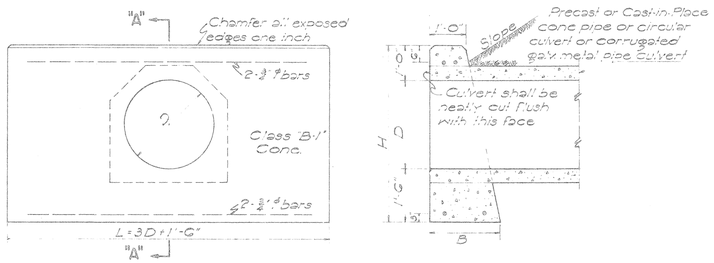
SECTION SECTION

CONC. PIPE CULVERT

NOTE:
Thickness 'd', reinforcing, and Concrete used, are to conform with the approved design as provided by the Specifications.

DATA - CAST-IN-PLACE CONC. CULV'T			
D	d	W	Cu Yd. per Ft.
18"	4"	2'-2"	0.11
24"	4½"	2'-9"	0.14
30"	5"	3'-4"	0.19
36"	5½"	3'-11"	0.26

CAST-IN-PLACE CONC. CULVERT



ELEVATION SECTION "A-A"

DATA FOR CONC. HEADWALL				Cast-in-Place Conc Culvert	Conc Pipe Culvert	Steel For One Headwall			
D	B	L	H	Cu Yd.	Cu Yd.	No. of Bars	Size	Length	Lbs.
18"	1'-6"	6'-0"	4'-0"	0.82	1.00	4	¾" ø	5'-6"	33
24"	1'-6"	7'-6"	4'-6"	1.25	1.38	4	¾" ø	7'-0"	42
30"	2'-0"	9'-0"	5'-0"	1.95	2.17	4	¾" ø	8'-6"	51
36"	2'-0"	10'-6"	5'-6"	2.45	2.74	4	⅞" ø	10'-0"	60
42"	2'-6"	12'-0"	6'-0"		3.87	4	¾" ø	11'-6"	69
48"	2'-6"	13'-6"	6'-6"		4.66	4	¾" ø	13'-0"	78

DETAIL OF CONCRETE HEADWALL

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS

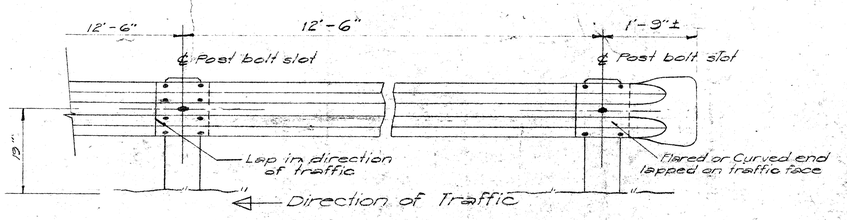
DROP INTAKES, RETAINING WALLS, HEADWALLS, CONSTRUCTION JOINTS

SCALES AS NOTED

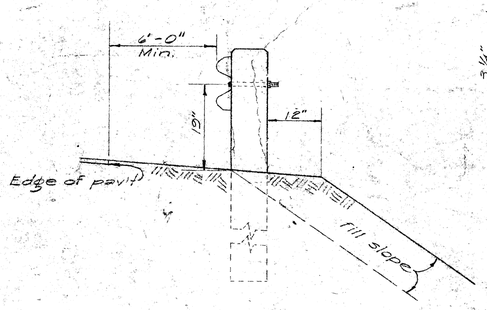
SHEET Nº 2 OF 3 SHEETS

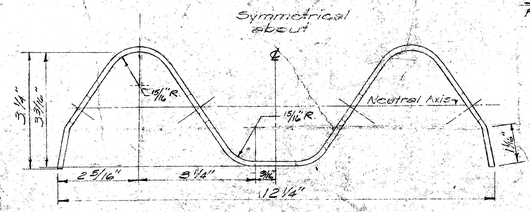
10

FED. ROAD DIST. No.	STATE	FED. AID PROJ. No.	FISCAL YEAR	SHEET No.	TOTAL SHEETS
HAWAII	HAW.	A-820-(1)66 UNIT 1	1965	11	14

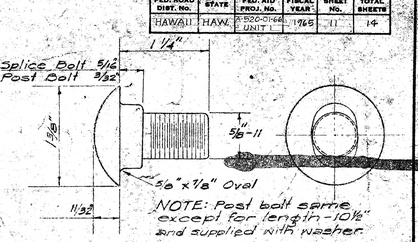


METAL GUARDRAIL
Scale: 3/4"=1'-0"



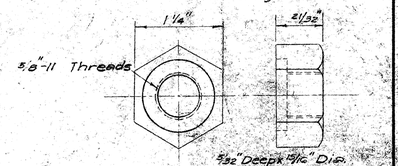


RAIL ELEMENT SECTION
Scale: Half Size

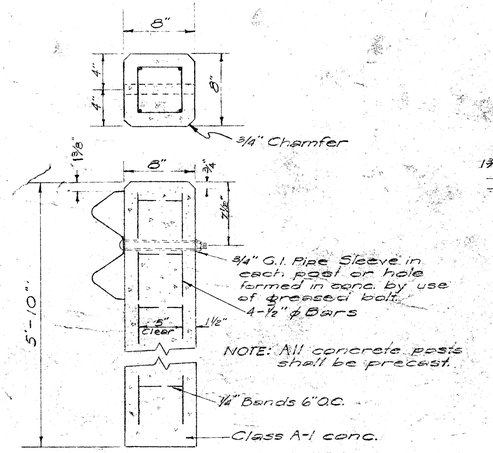


NOTE: Post bolt same except for length-10½" and supplied with washer.

SPLICE BOLT
POST BOLT
Scale: Full Size

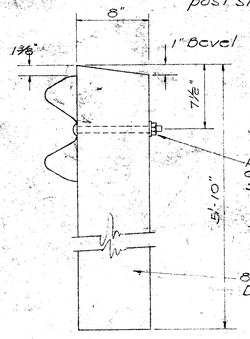


HEXAGON NUT
Scale: Full Size

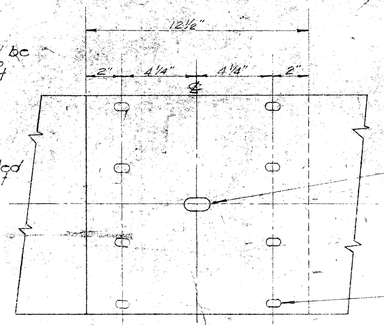


DETAIL OF CONC. POST
Scale: 1 1/2"=1'-0"

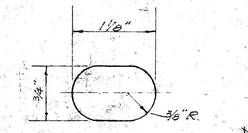
NOTE:
1. Timber post shall be surfaced on four sides (S4S) and chamfered.
2. Paint color for timber post shall be as specified



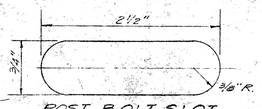
DETAIL OF TIMBER POST
Scale: 1 1/2"=1'-0"



RAIL SPLICE
Scale: 3"=1'-0"

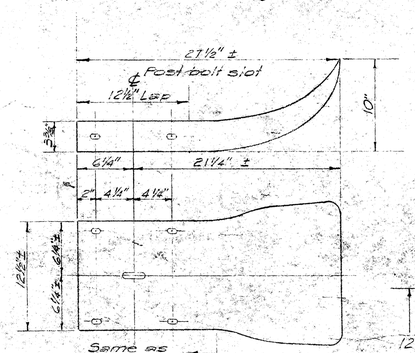


SPLICE BOLT SLOT
FOR ALL ENDS
Scale: Full Size



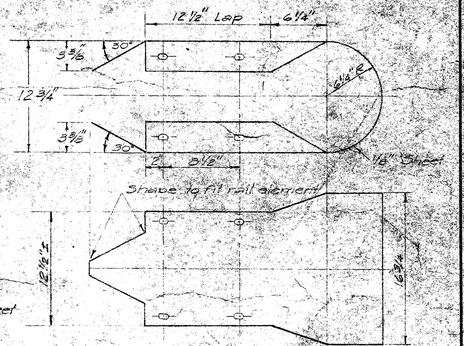
POST BOLT SLOT
Scale: Full Size

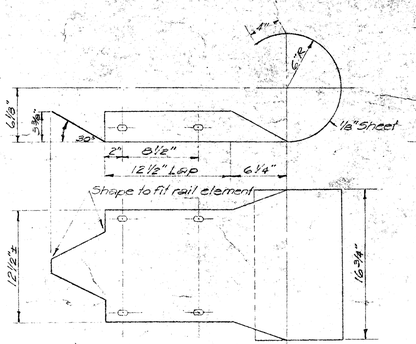
SPLICE BOLT SLOT
Scale: Full Size



Same as Rail Element Section

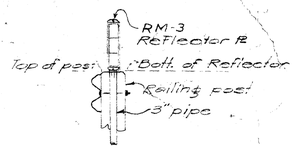
FLARED END
Scale: 1½"=1'-0"





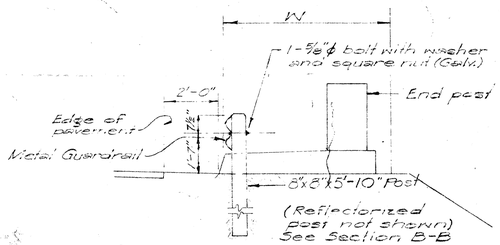
CURVED END
Scale: 1½"=1'-0"

MEDIAN END
Scale: 1½"=1'-0"

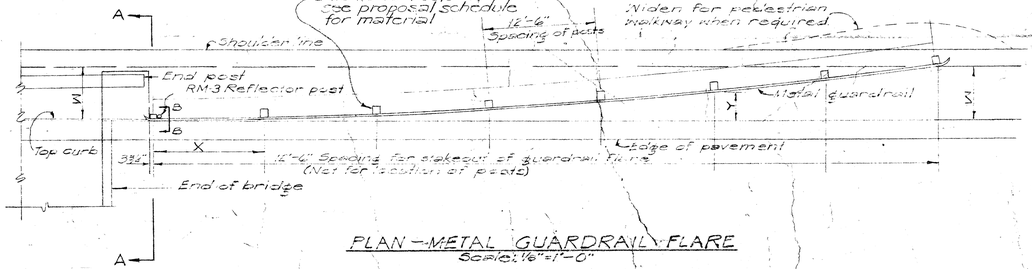


SECTION B-B
Scale: 1½"=1'-0"

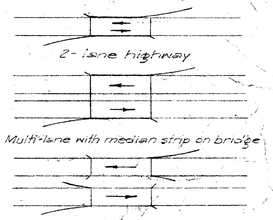
NOTE: See Regulatory & Warning Signs Sheet for details of W-42, W-43, and railing posts.



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



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



GUARDRAIL OFFSET

X	Y					
	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					5.55	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.

DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STATE OF HAWAII

STANDARD DETAILS

METAL GUARD RAIL

SHEET NO. 3 OF 3 SHEETS

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DESIGNED BY	
	DRAWN BY	
	TRACED BY	
NOTE BOOK No.	DIMENSIONS CHECKED BY	
	QUANTITIES CHECKED BY	
	CHECKED BY	

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