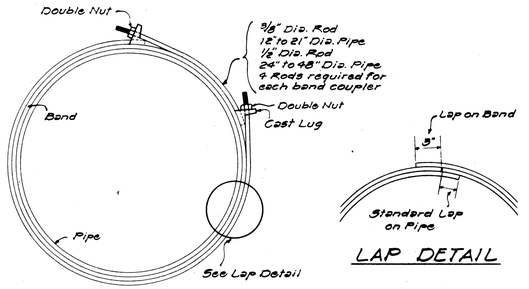
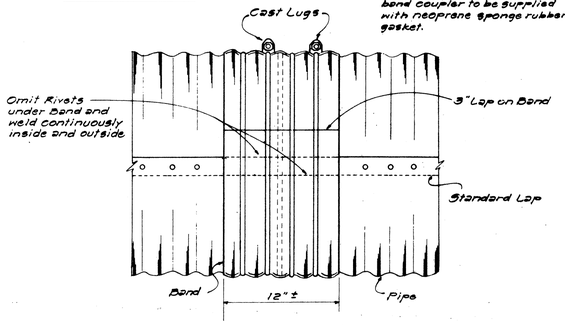


END VIEW

LAP DETAIL

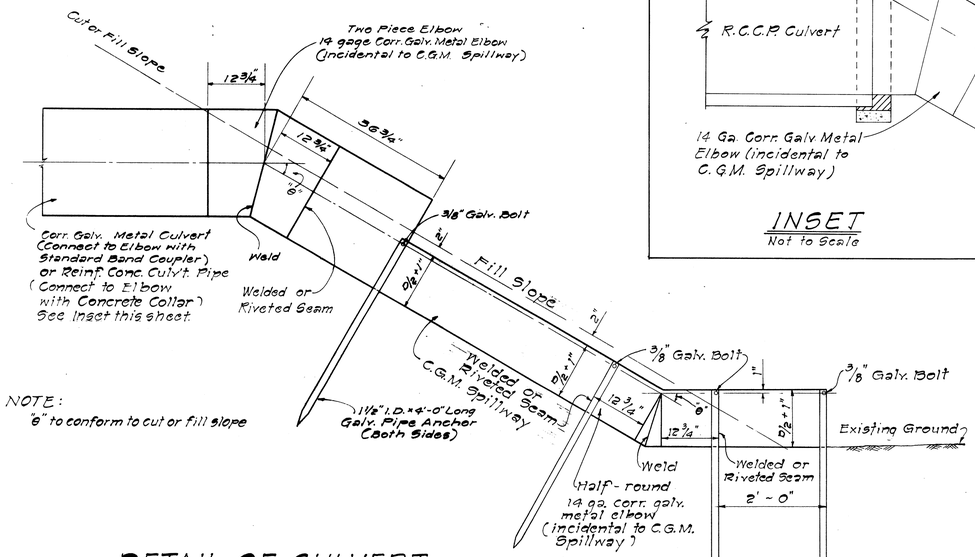
NOTE:
Each watertight band coupler to be supplied with neoprene sponge rubber gasket.



SIDE VIEW

DETAIL OF WATERTIGHT BAND COUPLER

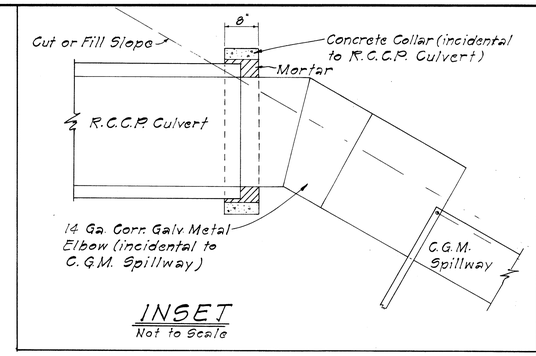
NOT TO SCALE



NOTE:
"B" to conform to cut or fill slope

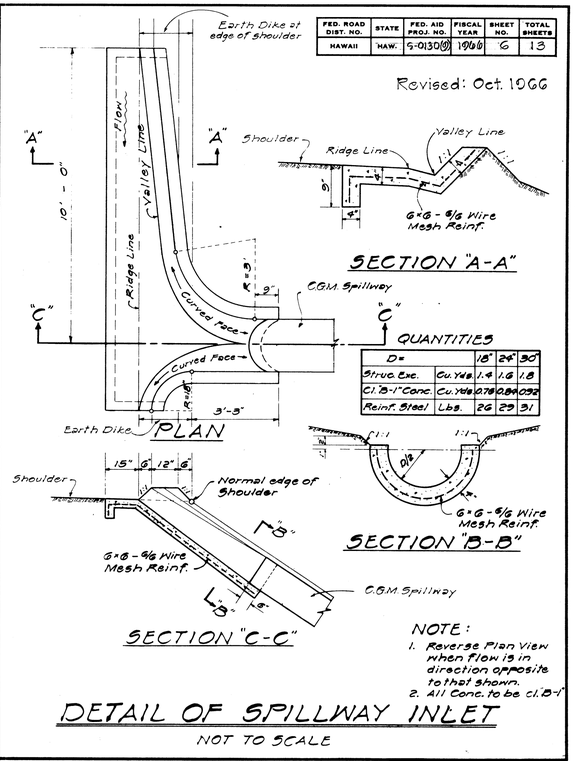
DETAIL OF CULVERT TO SPILLWAY CONNECTION

Not to Scale



INSET

Not to Scale



QUANTITIES

D=		18"	24"	30"
Struc. Exc.	Cu. Yds.	1.4	1.6	1.8
Cl. B-1" Conc.	Cu. Yds.	0.78	0.84	0.92
Reinf. Steel	Lbs.	26	29	31

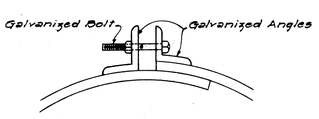
NOTE:
1. Reverse Plan View when flow is in direction opposite to that shown.
2. All Conc. to be cl. B-1"

DETAIL OF SPILLWAY INLET

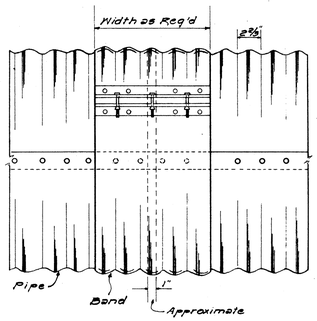
NOT TO SCALE

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	S-0130(9)	1966	6	13

Revised: Oct. 1966



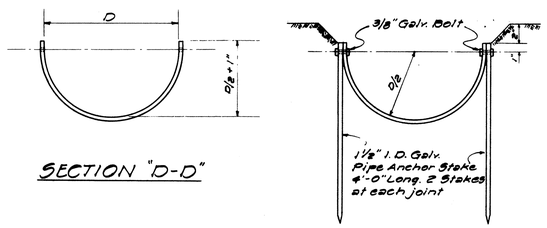
BAND DETAIL



SIDE VIEW

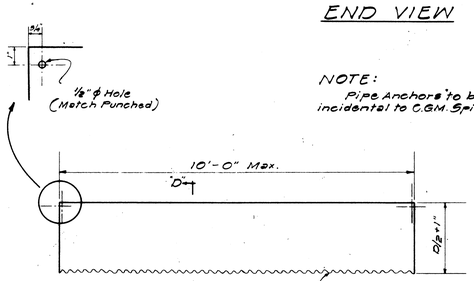
DETAIL OF STANDARD BAND COUPLER

NOT TO SCALE



SECTION "D-D"

END VIEW

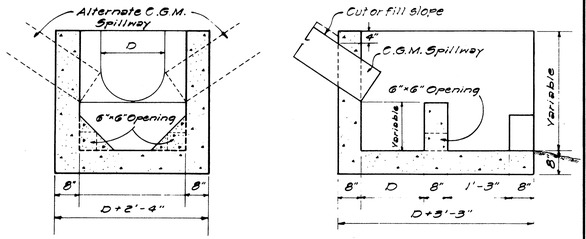


NOTE:
Pipe Anchors to be incidental to C.G.M. Spillway

SIDE VIEW

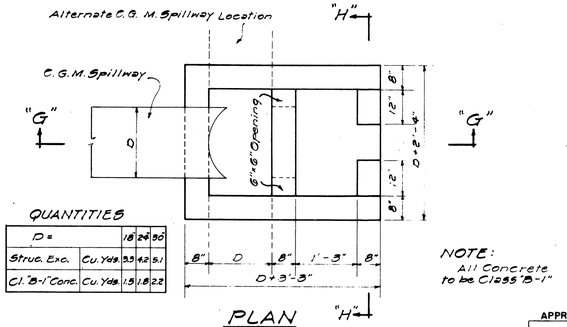
C.G.M. SPILLWAY

NOT TO SCALE



SECTION "H-H"

SECTION "G-G"



QUANTITIES

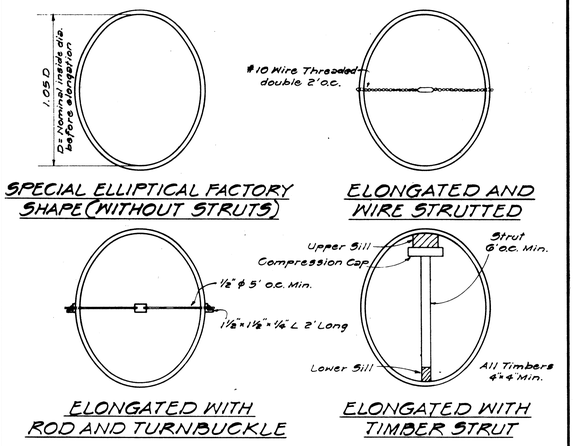
D=		18"	24"	30"
Struc. Exc.	Cu. Yds.	3.3	4.2	5.1
Cl. B-1" Conc.	Cu. Yds.	1.5	1.8	2.2

NOTE:
All Concrete to be Class "B-1"

PLAN

DETAILS OF CONC. DROP BOX AT OUTLET OF C.G.M. SPILLWAY

NOT TO SCALE



SPECIAL ELLIPTICAL FACTORY SHAPE (WITHOUT STRUTS)

ELONGATED AND WIRE STRUTTED

ELONGATED WITH ROD AND TURNBUCKLE

ELONGATED WITH TIMBER STRUT

METHOD OF ELONGATING AND STRUTTING CORRUGATED PIPE

NOT TO SCALE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS

CORRUGATED GALVANIZED METAL CULVERTS, SPILLWAYS, AND SPECIAL DETAILS

SCALES AS NOTED

APPROVED: DATE 5-4-67
DIRECTOR OF TRANSPORTATION

SHEET No 1 OF 4 SHEETS

ORIGINAL PLAN		DATE
	SURVEY PLOTTED BY	
	DRAWN BY	R.Y. 5-24-67
	TRACED BY	
NOTE BOOK	DESIGNED BY	O.M. 5-24-67
No.	QUANTITIES BY	
	CHECKED BY	

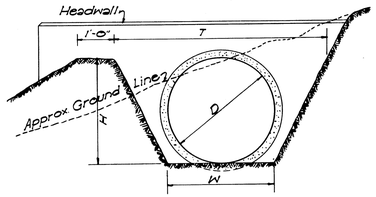
LIETZ 1103 ARKWRIGHT TRACING CLOTH 10-60 200P

6

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	S-0130(9)	1966	7	13

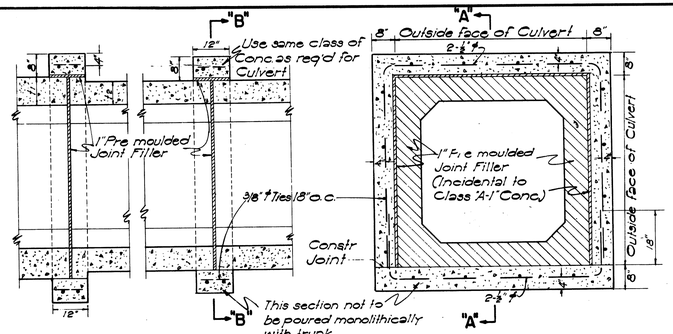
Revised - June, 1965

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"

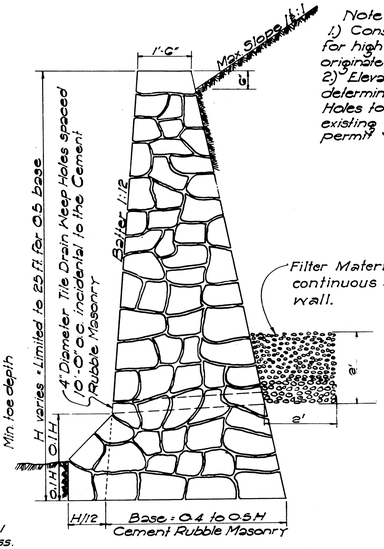


SECTION "A-A" SECTION "B-B"

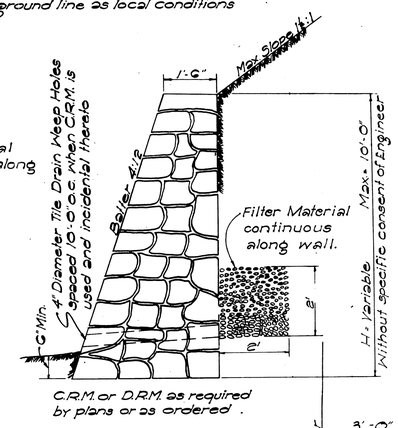
CONC. COLLAR FOR CONC. BOX CULVERT

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

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.



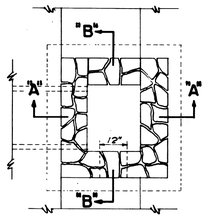
SECTION OF HIGH CEMENT RUBBLE MASONRY RETAINING WALL OR SEAWALL

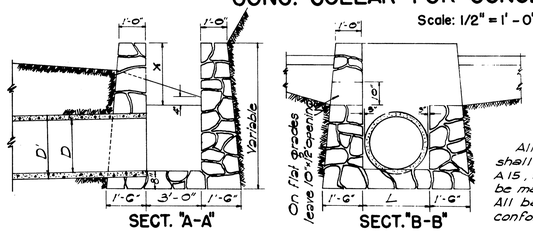


SECTION OF LOW MASONRY RETAINING WALL OR SEAWALL

DATA 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.





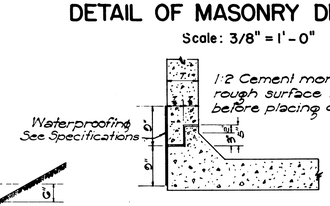
REINFORCING BARS

All reinforcing bars for concrete shall be Billet Steel bars, ASTM A.15, intermediate grade. Steel shall be made by the open-hearth process. All bars shall be deformed type conforming to ASTM A-305.

DETAIL OF MASONRY DROP INTAKE

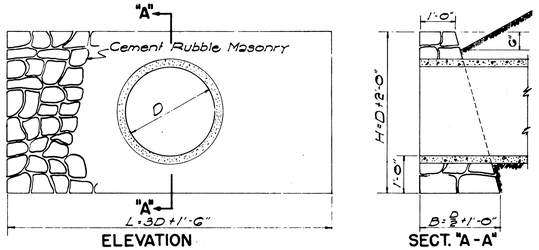
Scale: 3/8" = 1'-0"

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"	2.49	2.84	2.72



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

CONSTR. JOINT DETAILS

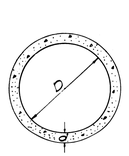


ELEVATION

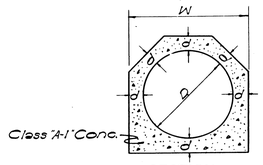
SECT. "A-A"

DETAIL OF MASONRY HEADWALL

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



SECTION



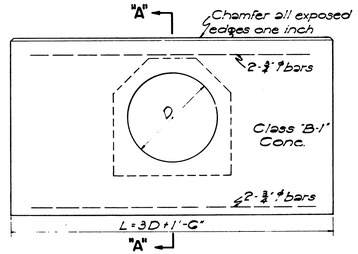
SECTION

CONC. PIPE CULVERT

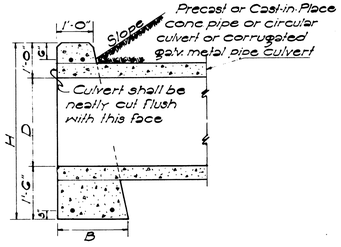
NOTE:
Thickness 'd', reinforcing, and Concrete used, are to conform with the approved design as provided by the Specifications.

DATA - CAST-IN-PLACE CONC. CULV'T			
D	d	W	Cu Yd per Ft.
18"	4"	2'-2"	0.11
24"	4½"	2'-0"	0.14
30"	5"	3'-4"	0.19
36"	5½"	3'-11"	0.26

CAST-IN-PLACE CONC. CULVERT



ELEVATION

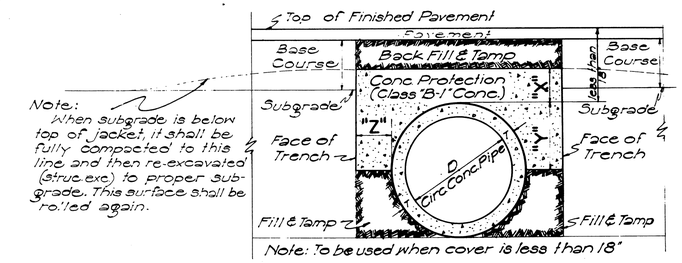


SECTION "A-A"

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"	0.92	1.00	4	¾" ϕ	5'-6"	33
24"	1'-6"	7'-6"	4'-6"	1.25	1.38	4	¾" ϕ	7'-0"	42
30"	2'-0"	9'-0"	5'-0"	1.93	2.17	4	¾" ϕ	8'-6"	51
36"	2'-0"	10'-6"	5'-6"	2.45	2.74	4	¾" ϕ	10'-0"	60
42"	2'-6"	12'-0"	6'-0"		3.87	4	¾" ϕ	11'-6"	69
48"	2'-6"	13'-6"	6'-6"		4.66	4	¾" ϕ	13'-0"	78

DETAIL OF CONCRETE HEADWALL

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



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

DATA FOR CONCRETE PROTECTION OVER CULVERTS		
X	Y	Z
6" for 18" D	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		

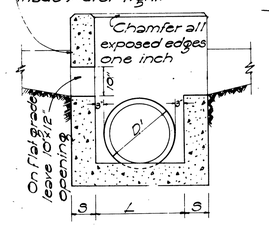
SECT. OF CULVERT WITH CONC. PROTECTION

Scale: 1" = 1'-0"

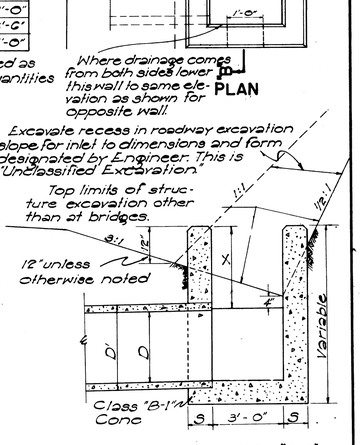
DATA - CONC. DROP INTAKE					Where Variable Equals
D'	D	L=D'+6"	S	Cu Yds	
23"	18"	2'-5"	8"	1.41	4'-6"
30"	24"	3'-0"	8"	1.72	5'-0"
37"	30"	3'-7"	9"	2.32	5'-6"
44"	36"	4'-2"	9"	2.73	6'-0"
51"	42"	4'-9"	10"	3.54	6'-6"
58"	48"	5'-4"	10"	4.01	7'-0"

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 Syphons connected with Irrigation Ditches or Flumes with appropriate changes to dimensions. In this case all joints must be made water tight.



SECTION "B-B"



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 "A-A"

DETAIL OF CONCRETE DROP INTAKE

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

ORIGINAL PLAN | SURVEY PLOTTED BY | DRAWN BY J. Calistro | TRACED BY | DESIGNED BY | QUANTITIES COMPUTED BY | CHECKED BY | DATE | SHEET NO. | No.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS

DROP INTAKES, RETAINING WALLS, HEADWALLS, CONSTRUCTION JOINTS

SCALES AS NOTED

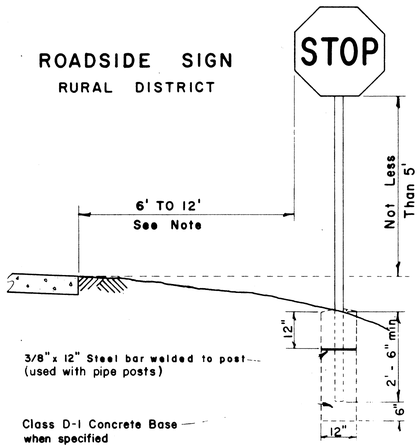
SHEET № 2 OF 4 SHEETS

7

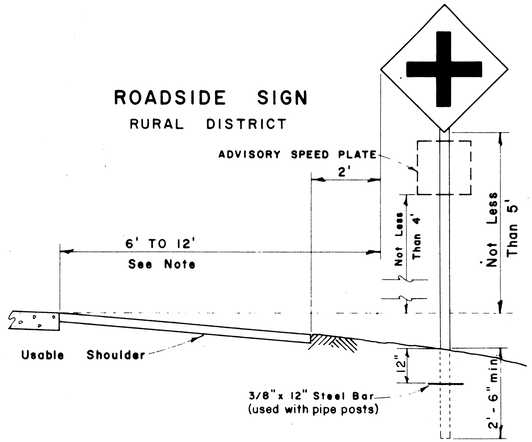
NOTE:
1. All signs and road delineators shall be placed 2' outside the usable roadway shoulder or 1' outside unmountable curbing present and within the limits shown below.
2. Except as noted below, sign posts shall be either 3" galv. std. pipe or 2½" x 2½" galv. square tube posts for signs larger than 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.	S-0130(6)	1966	8	13

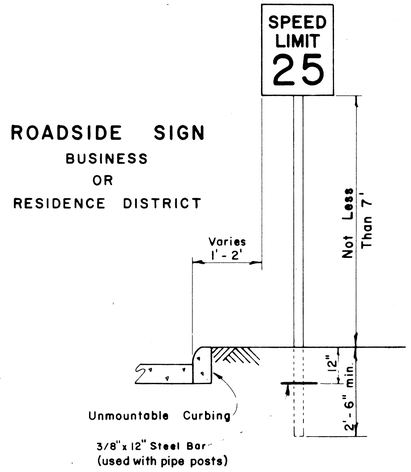
ROADSIDE SIGN
RURAL DISTRICT



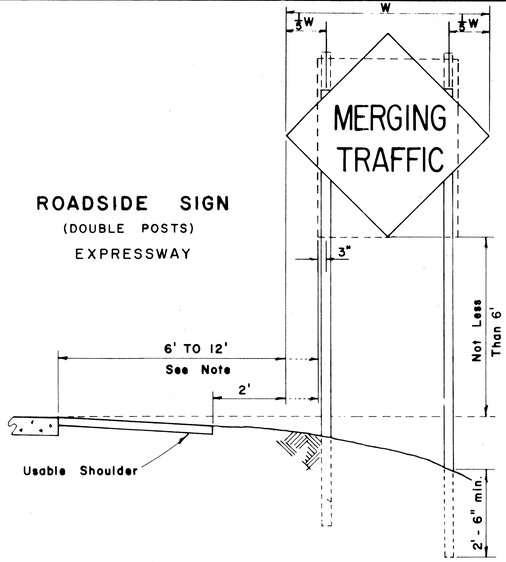
ROADSIDE SIGN
RURAL DISTRICT



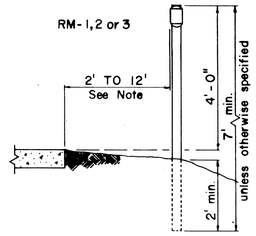
ROADSIDE SIGN
BUSINESS OR RESIDENCE DISTRICT

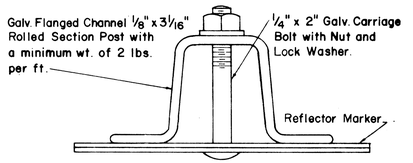


ROADSIDE SIGN
(DOUBLE POSTS)
EXPRESSWAY

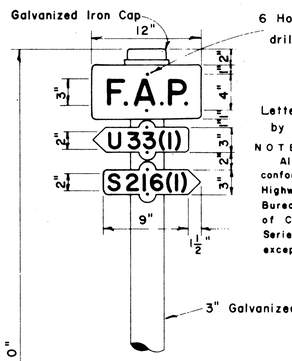


ROAD DELINEATOR
Scale: ½" = 1' - 0"





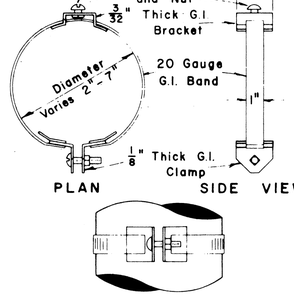
HEIGHT AND LATERAL LOCATION OF SIGNS - TYPICAL INSTALLATIONS
Scale: ½" = 1' - 0"



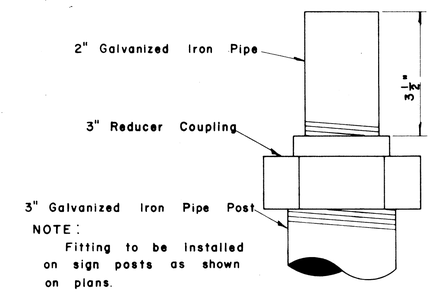
NOTE:
All letters and figures shall conform to "Standard Alphabets for Highway Signs" as set forth by the Bureau of Public Roads, Department of Commerce, Series "C" letters and Series "D" numerals shall be used except where noted.

NOTE:
Markers and Number plates shall be 0.081" thick with 3/16" 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"

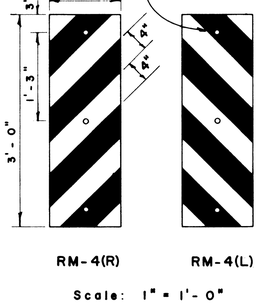


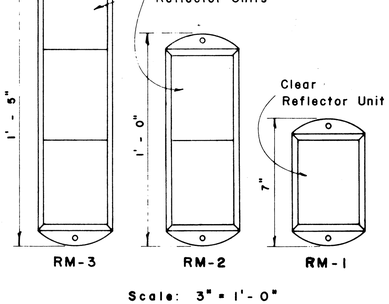
TYPICAL BAND BRACKET FOR MOUNTING TRAFFIC SIGNS
Scale: 3" = 1' - 0"



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"

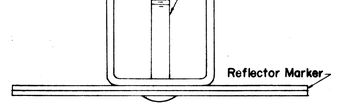




Scale: 1" = 1' - 0"

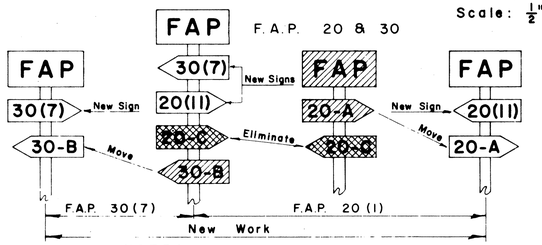
Scale: 3" = 1' - 0"

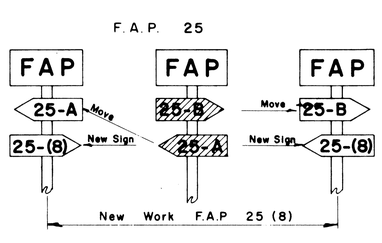
REFLECTOR MARKERS
Scale: As Shown

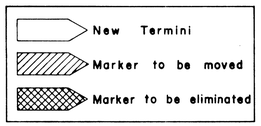


TYPICAL SECTION OF ROAD DELINEATOR
Full Size

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: 1/26/65

DIRECTOR OF TRANSPORTATION

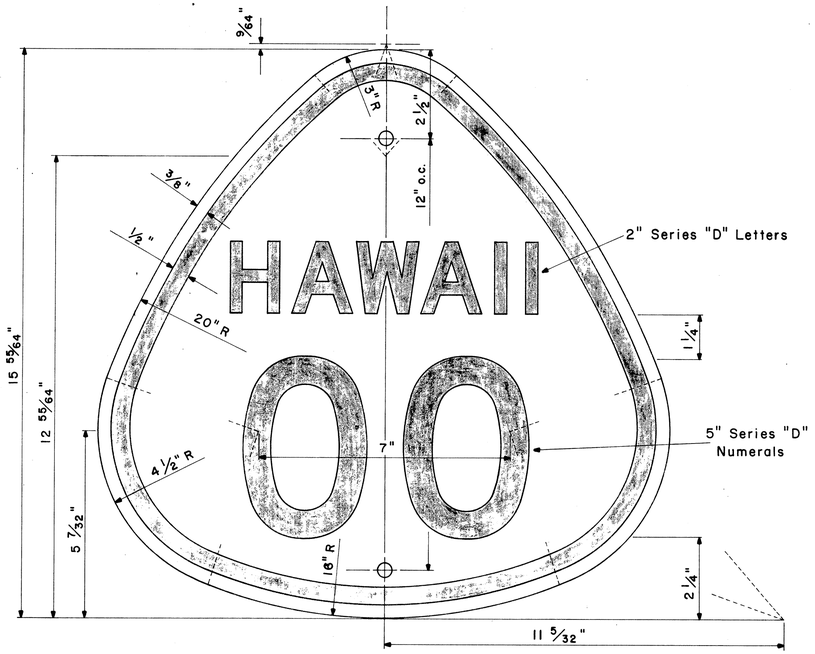
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS
F. A. MARKER AND MISCELLANEOUS SIGN DETAILS

Scale: As Shown

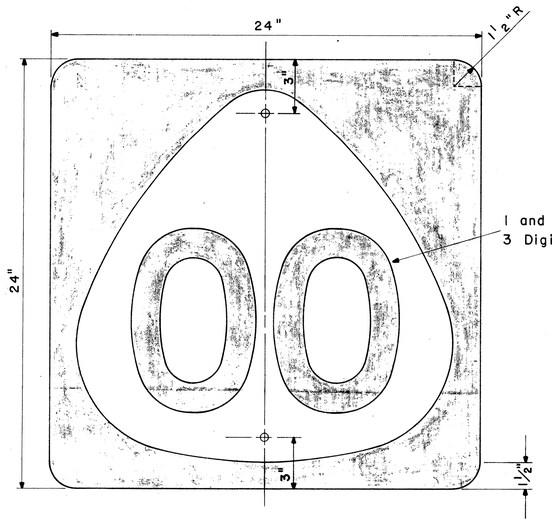
SHEET No. 3 OF 4 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	S-0130(9)	1966	9	13



STATE ROUTE MARKER
M1-3(00)

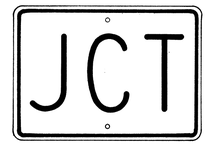
Scale: 1/2" = 1"



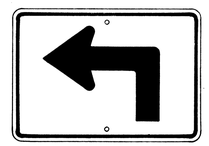
STATE ROUTE MARKER
M1-4(00)

Scale: 1/4" = 1"

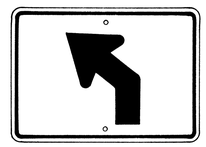
NOTE:
Multiply all dimensions of State Route Marker M1-3 by 1.3 for the dimensions of the shield for M1-4.



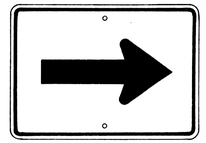
M2-1
21" x 15"



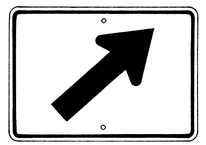
M3-1-L
* M3-1-R
21" x 15"



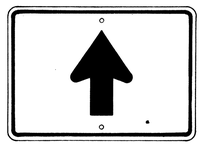
M3-2-L
* M3-2-R
21" x 15"



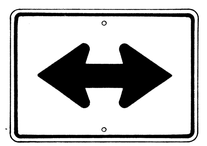
M4-1
21" x 15"



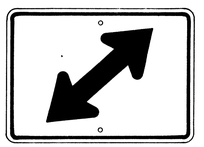
M4-2-R
* M4-2-L
21" x 15"



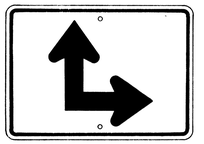
M4-3
21" x 15"



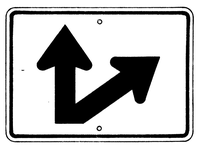
M4-4
21" x 15"



M4-5-R
* M4-5-L
21" x 15"



M4-6-R
* M4-6-L
21" x 15"



M4-7-R
* M4-7-L
21" x 15"

AUXILIARY MARKERS

Scale: 1/8" = 1"

* NOTE:
Signs shall be similar but opposite in direction.

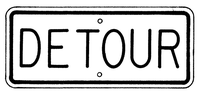
M5-1
21" x 9"

M5-2
21" x 9"

M5-3
21" x 9"

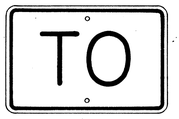
M5-4
21" x 9"

M5-5
21" x 9"



M5-6
21" x 9"

M6-1-N
21" x 9"
(See Note 6)



M7-1
18" x 12"

GENERAL NOTES

1. The shape, color, dimensions, symbols, wording, lettering and reflectorizing of all signs shall be in accordance with the "Manual on Uniform Traffic Control Devices for Streets and Highways," dated June 1961 and the BPR manual "Standard Highway Signs," dated September 1961, unless otherwise specified.
2. All letters and figures shall conform to the manual "Standard Alphabets for Highway Signs," Dept. of Commerce, Bureau of Public Roads, 1952.
3. All markers shall be reflectorized unless otherwise specified.
4. All markers shall have 3/8" bolt holes drilled at appropriate locations unless otherwise specified.
5. All markers shall have a black legend on a white background unless otherwise specified.
6. Sign message of Cardinal Direction Marker (M6-1) shall be denoted by the following suffixes:
   - M6-1-N : NORTH
   - M6-1-E : EAST
   - M6-1-S : SOUTH
   - M6-1-W : WEST
7. Auxiliary markers denoted with the suffix "I": (M4-1-I) shall have a white legend on a blue background.
8. Cardinal Direction Marker (M6-1) with suffix I(3) shall have a white legend on a blue background and shall be 30" x 15" in size.
9. For M1-3, and M1-4 signs, number in ( ) indicates route number and shall be as shown on the plan.

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS
STATE ROUTE MARKERS AND AUXILIARY MARKERS

Scale: As Noted

SHEET Nº 4 OF 4 SHEETS