INDEX TO DRAWINGS	
SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	DETAIL PLAN
3	STANDARD DETAILS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.				

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

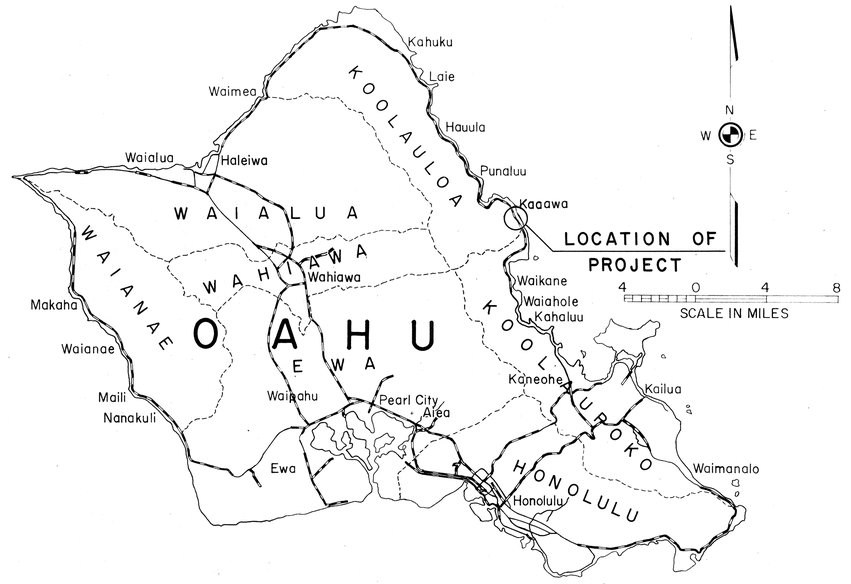
HIGHWAYS DIVISION

HONOLULU, HAWAII

"AS BUILT"

PLANS FOR

CONSTRUCTION OF



DRAINAGE IMPROVEMENTS
ON
KAMEHAMEHA HIGHWAY
VICINITY OF OHELO KAI ROAD IN KAAAWA

PROJECT NO. 83E-03-68

NOTE:

NO "AS BUILT" CHANGES.

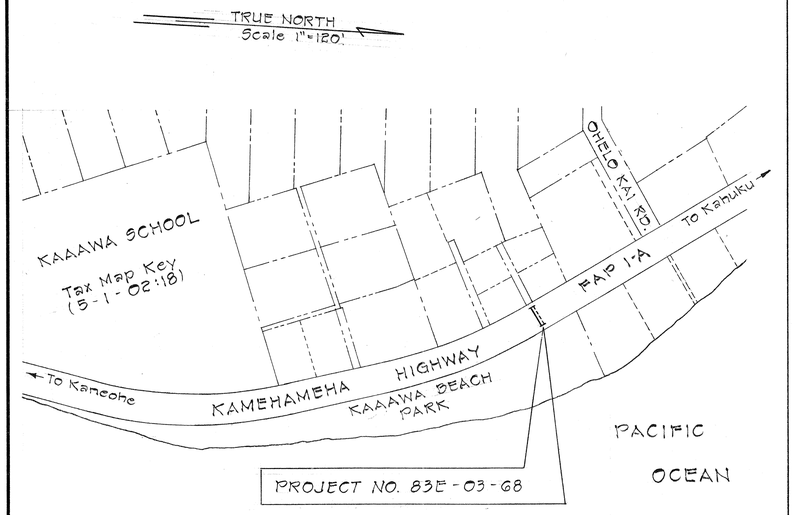
DISTRICT OF KOOLAULOA
ISLAND OF OAHU

DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

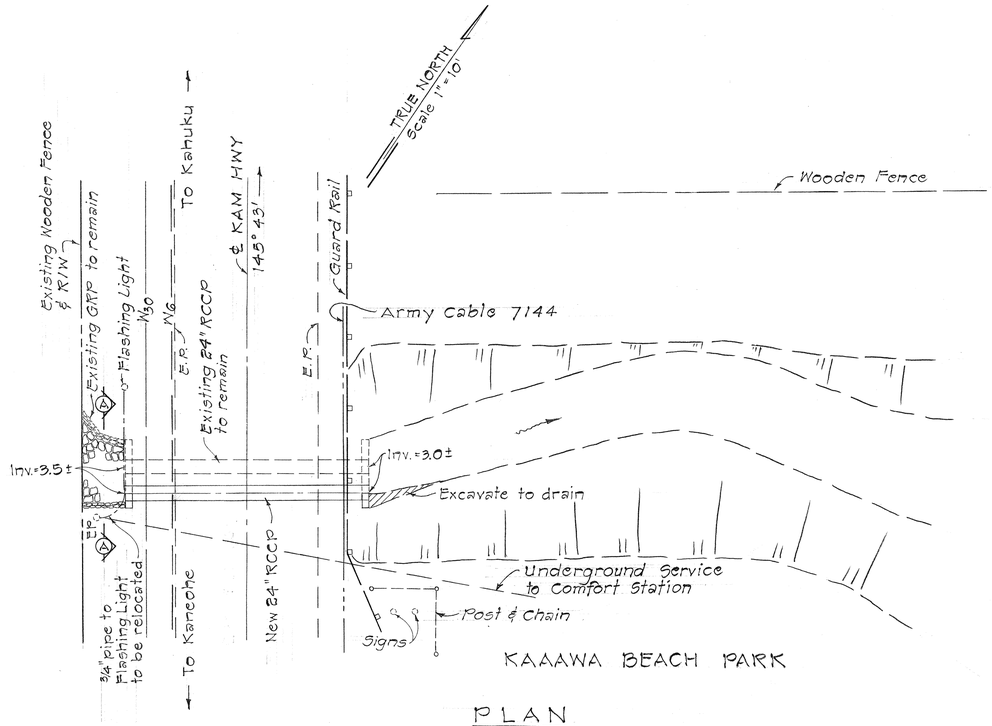
APPROVED:

DIR. OF TRANSPORTATION — 11/15/67 DATE

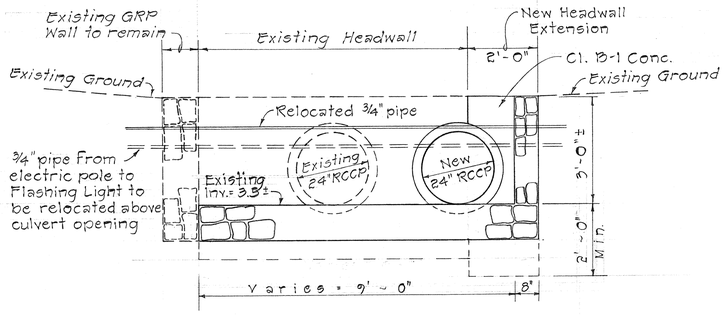
SHEET No. 1 OF 3 SHEETS



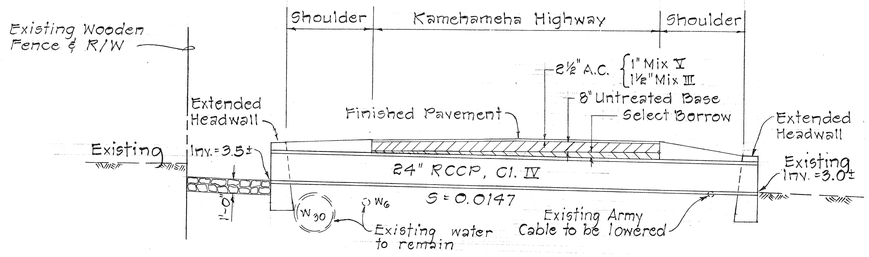
LOCATION PLAN



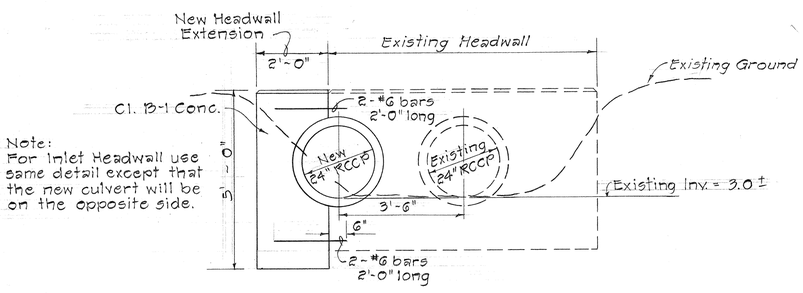
PLAN



SECTION "A-A"
GRP INLET STRUCTURE
Scale: ½" = 1'-0"



PROFILE
Scale: Hor. 1" = 5'-0"
Vert. 1" = 5'-0"



Note:
For inlet Headwall use same detail except that the new culvert will be on the opposite side.

DETAIL OF OUTLET CONC. HEADWALL
Scale: ½" = 1'-0"

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.				

Demolish portions of existing conc. headwalls as required to install new culvert.
Construct extension to existing conc. headwalls
Construct inlet GRP structure (For Details, see this sheet)
Install 24" RCCP, Cl. IV

ESTIMATED QUANTITIES

Structure Exc.	=	21 C.Y.
Cl. B-1 Conc.	=	1 C.Y.
Reinf. Steel	=	25 lbs.
GRP	=	3 C.Y.
24" Pipe Culvert	=	34 L.F.
Restoring Highway Pavement	=	Lump Sum

GENERAL NOTES

1 - The locations of existing utilities shown are approximate. The Contractor shall verify the exact location.

2 - All elevations indicated are approximate.

3 - Demolishing portions of the existing headwalls to install the new culvert shall be considered incidental to Structure Excavation.

4 - Excavating to drain shall be considered incidental to Structure Excavation.

5 - The Contractor shall notify Hawaiian Telephone Company in writing 7 calendar days prior to construction to coordinate the work involving Army Cable 7144.

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DETAIL PLAN OF DRAINAGE SYSTEM

KAMEHAMEHA HIGHWAY
(Vicinity of Ohelo Kai Road)
Proj. No. 83E-03-68

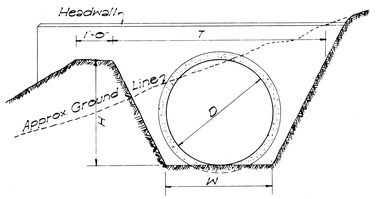
Scale: As Shown Date: Dec., 1967

SHEET No. 2 OF 3 SHEETS

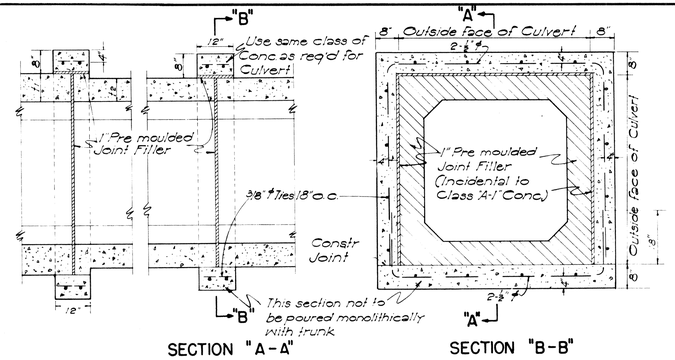
FED.ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO	TOTAL SHEETS
HAWAII	HAW.				

Revised: June 1965
Revised: August 1967

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"



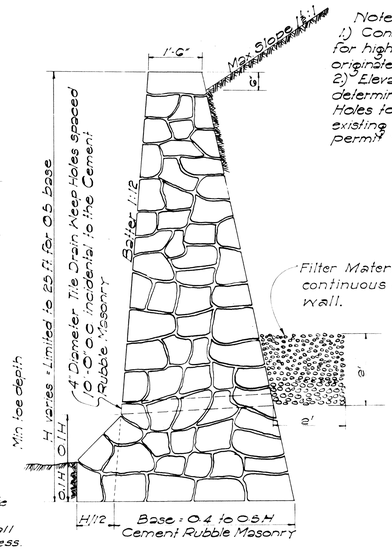
DETAIL OF OUTLET DITCH
Scale: 1/2" = 1'-0"



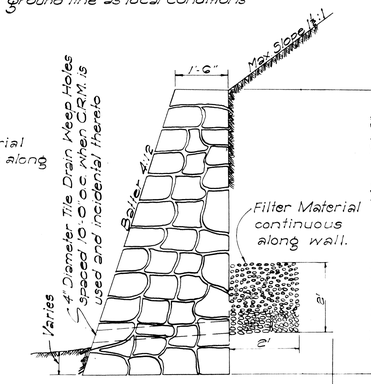
SECTION "A-A" SECTION "B-B"

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



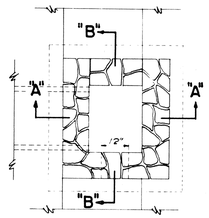
SECTION OF HIGH CEMENT RUBBLE MASONRY RETAINING WALL OR SEAWALL

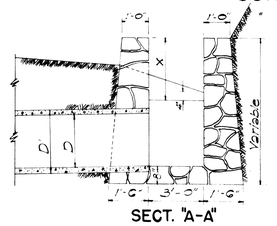


SECTION OF LOW MASONRY RETAINING WALL OR SEAWALL

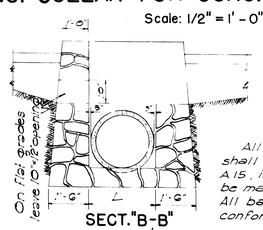
DATA FOR MASONRY DROP INTAKE				Where Variables Equal
D'	D	L=D'+6"	Cu Yds.	
23"	18"	2'-5"	3.02	4'-6"
30"	24"	3'-0"	3.61	5'-0"
37"	30"	3'-7"	4.21	5'-6"
44"	36"	4'-2"	4.85	6'-0"

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





SECT. "A-A"

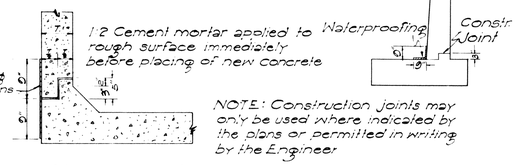


SECT. "B-B"

DETAIL OF MASONRY DROP INTAKE
Scale: 3/8" = 1'-0"

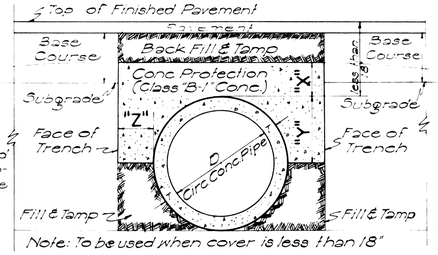
REINFORCING BARS
All reinforcing bars for concrete shall be Billet Steel bars ASTM A15, intermediate grade. Steel shall be made by the open-hearth process. All bars shall be deformed type conforming to ASTM A-305.

DATA - MASONRY HEADWALL				C.R.M. for RCCP	C.R.M. for CGM'P
D	H	B	L	Cu Yds.	Cu Yds.
18"	4'-6"	1'-9"	6'-0"	1.24	1.20
24"	5'-0"	2'-0"	7'-6"	1.83	1.98
30"	5'-6"	2'-3"	9'-0"	2.56	2.70
36"	6'-0"	2'-6"	10'-6"	3.45	3.66



CONSTR. JOINT DETAILS

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.



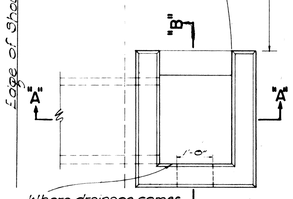
Note: To be used when cover is less than 18"

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		

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"

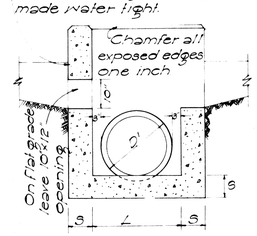
Note: Dimension "X" is assumed as 2'-4" in figuring the above quantities



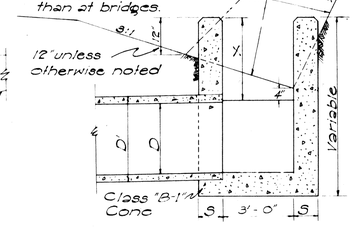
Note: This type of structure shall also be used for the Drop Intakes of Syphons connected with Irrigation Ditches or Flumes with appropriate changes to dimensions. In this case all joints must be made water tight.

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.

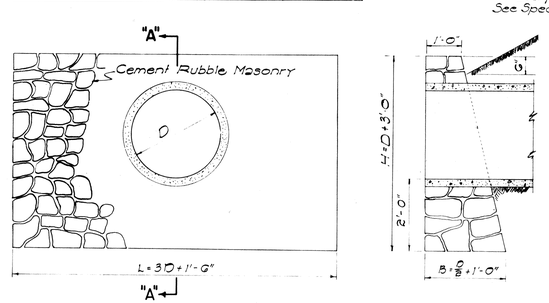


SECTION "B-B"



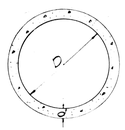
SECTION "A-A"

DETAIL OF CONCRETE DROP INTAKE
Scale: 1/2" = 1'-0"



ELEVATION SECT. "A-A"

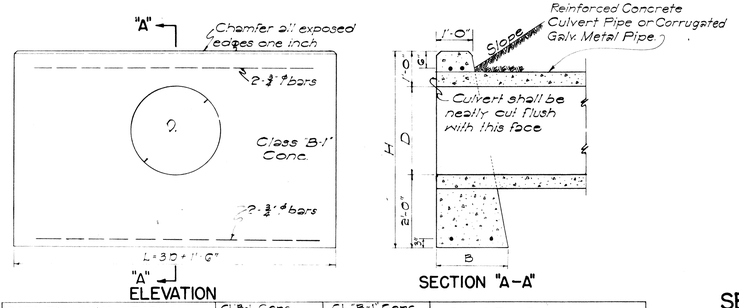
DETAIL OF MASONRY HEADWALL
Scale: 1/2" = 1'-0"



SECTION

CONC. PIPE CULVERT

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



ELEVATION SECTION "A-A"

DATA FOR CONC. HEADWALL				Cl 'B-1' Conc For RCCP	Cl 'B-1' Conc For CGMP	Steel For One Headwall			
D	B	L	H	Cu Yd.	Cu Yd.	No. of Bars	Size	Length	Lbs.
18"	1'-6"	6'-0"	4'-6"	1.12	1.17	4	¾" ϕ	5'-6"	33
24"	1'-6"	7'-6"	5'-0"	1.52	1.60	4	¾" ϕ	7'-0"	42
30"	2'-0"	9'-0"	5'-6"	2.36	2.49	4	¾" ϕ	8'-6"	51
36"	2'-0"	10'-6"	6'-0"	2.84	3.13	4	¾" ϕ	10'-0"	60
42"	2'-6"	12'-0"	6'-6"	4.10	4.47	4	¾" ϕ	11'-6"	69
48"	2'-6"	13'-6"	7'-0"	5.01	5.36	4	¾" ϕ	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 3 OF 3 SHEETS