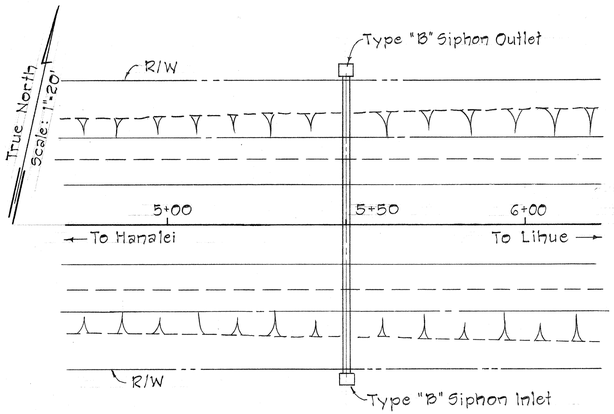
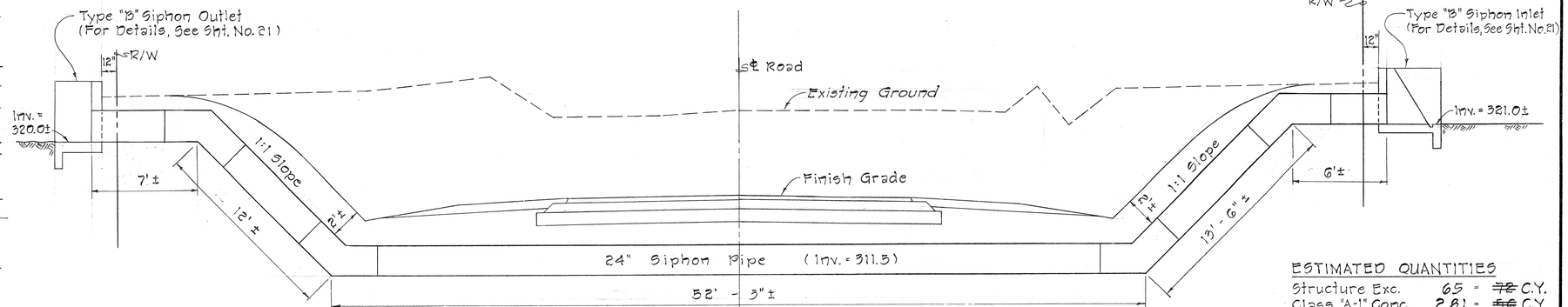
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-056-1(8)	1967	14	64



PLAN

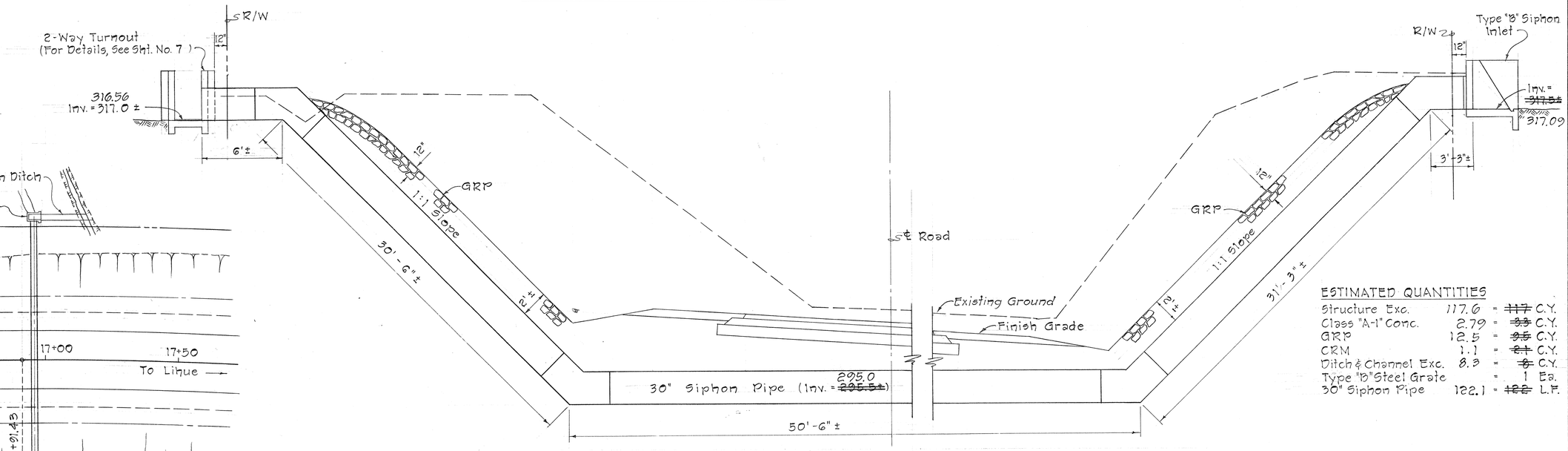


PROFILE
Scale: ¼"=1'-0"

ESTIMATED QUANTITIES

Structure Exc.	65	=	~~75~~ C.Y.
Class "A-1" Conc.	2.81	=	~~5.6~~ C.Y.
Type "B" Steel Grate		=	1 Ea.
24" Siphon Pipe	91	=	~~95~~ L.F.

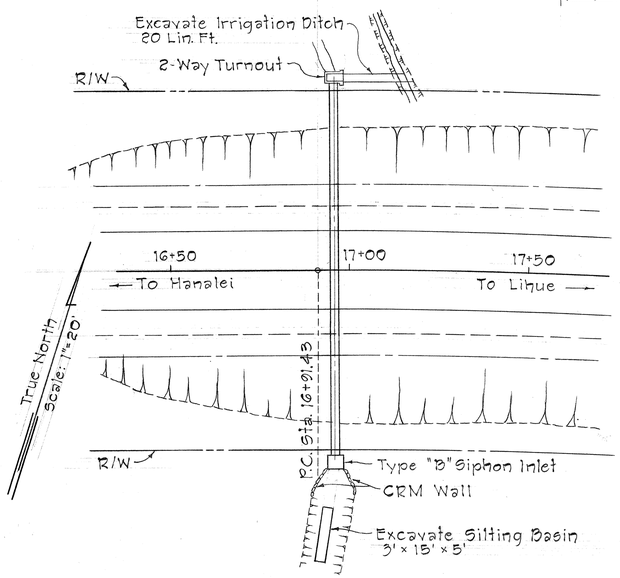
SIPHON AT STA. 5+50



PROFILE
Scale: ¼"=1'-0"

ESTIMATED QUANTITIES

Structure Exc.	117.6	=	~~117~~ C.Y.
Class "A-1" Conc.	2.79	=	~~3.3~~ C.Y.
GRP	12.5	=	~~9.5~~ C.Y.
CRM	1.1	=	~~2.1~~ C.Y.
Ditch & Channel Exc.	8.3	=	~~8~~ C.Y.
Type "B" Steel Grate		=	1 Ea.
30" Siphon Pipe	122.1	=	~~125~~ L.F.



PLAN

SIPHON AT STA. 16+96

GENERAL SIPHON NOTES

1. - All bends shall be 45° except where it is noted on the profiles.
2. - Wood Gates shall be considered incidental to Cl. "A-1" Conc.
3. - Width of Slope Paving (GRP) at Siphon Locations shall be pipe O.D. plus one foot (1'-0") on each side.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

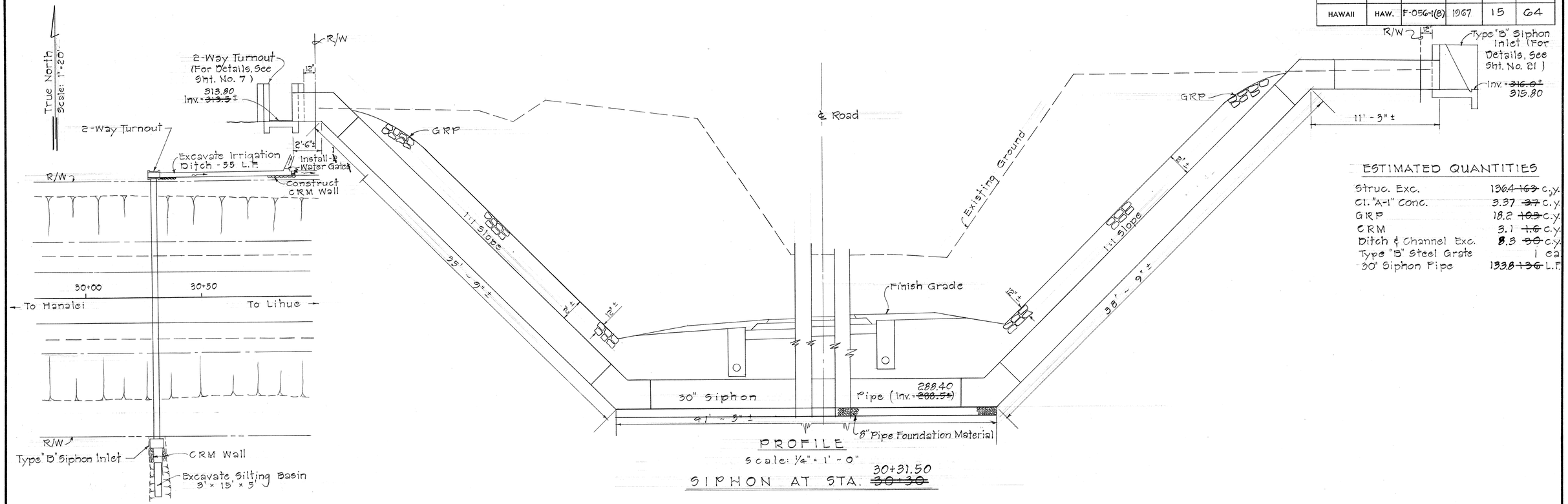
SIPHON DETAIL
KAUAI BELT ROAD
PROJ. NO. F-056-1(8)
KAHILI TO PILAA

Scale: As Shown Date: July, 1967

SHEET No. 1 OF 18 SHEETS

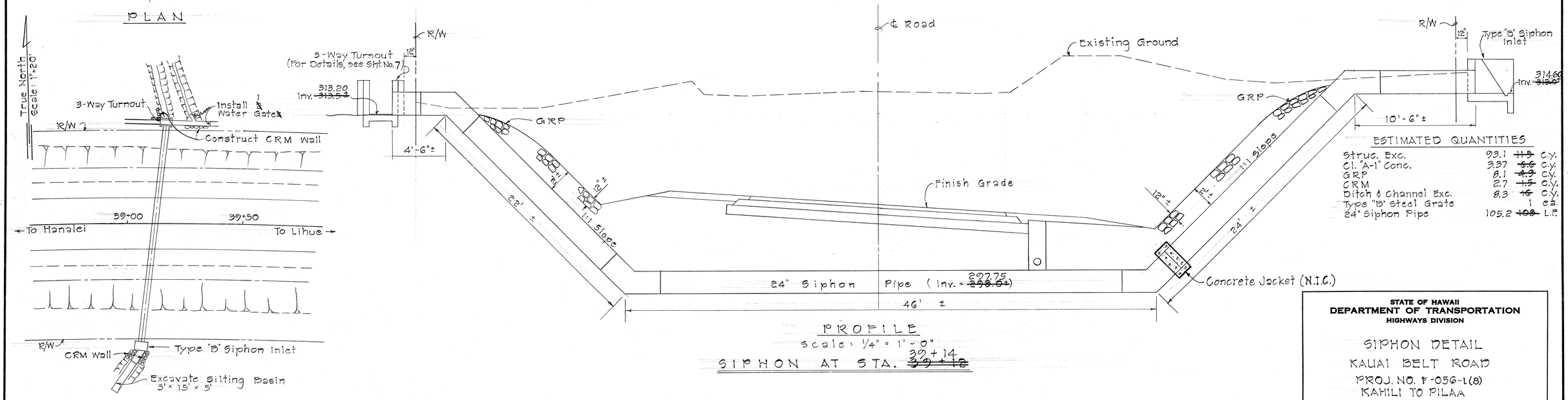
ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	
	TRACED BY	
NOTE BOOK	DESIGNED BY	
No.	QUANTITIES BY	
	CHECKED BY	

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-056-1(8)	1967	15	64



ESTIMATED QUANTITIES

Struc. Exc.	1364 ~~163~~ C.Y.
Cl. "A-1" Conc.	3.37 ~~.37~~ C.Y.
GRP	18.2 ~~10.5~~ C.Y.
CRM	3.1 ~~1.6~~ C.Y.
Ditch & Channel Exc.	8.3 ~~.50~~ C.Y.
Type "B" Steel Grate	1 ea.
30" Siphon Pipe	133.8 ~~136~~ L.F.



ESTIMATED QUANTITIES

Struc. Exc.	93.1 ~~115~~ C.Y.
Cl. "A-1" Conc.	3.37 ~~6.6~~ C.Y.
GRP	8.1 ~~4.9~~ C.Y.
CRM	2.7 ~~1.5~~ C.Y.
Ditch & Channel Exc.	8.3 ~~.10~~ C.Y.
Type "B" Steel Grate	1 ea.
24" Siphon Pipe	105.2 ~~108~~ L.F.

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

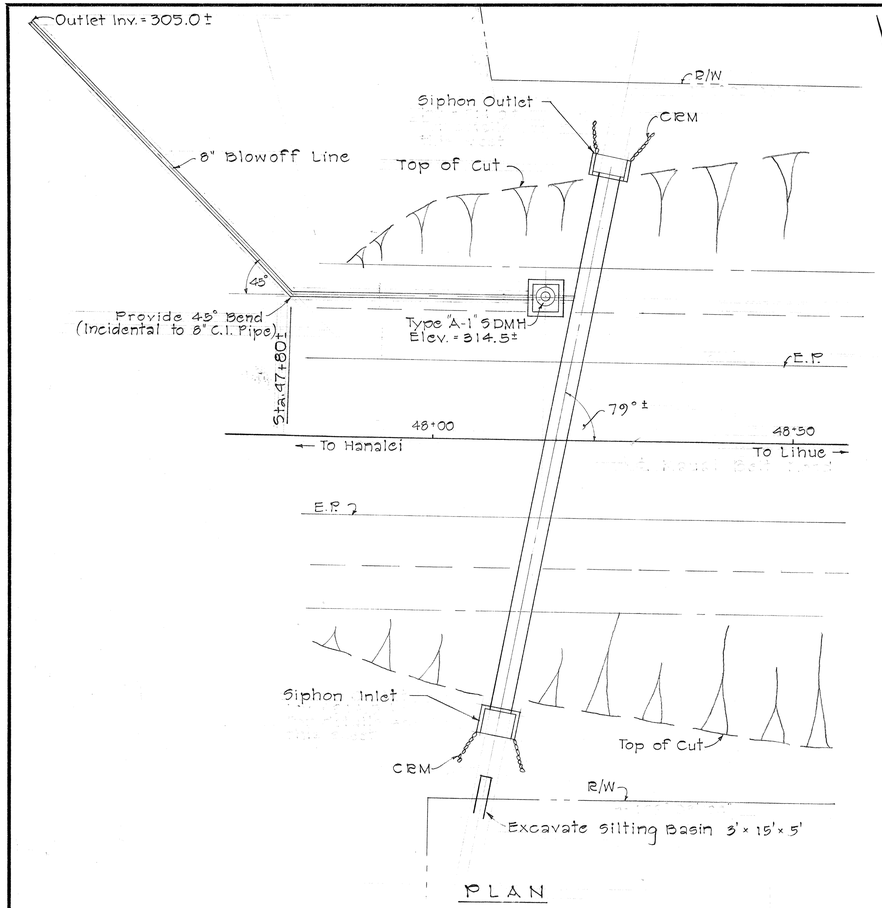
SIPHON DETAIL
KAUAI BELT ROAD
PROJ. NO. F-056-1(8)
KAHILI TO PILAA

Scale: As Shown Date: July, 1967

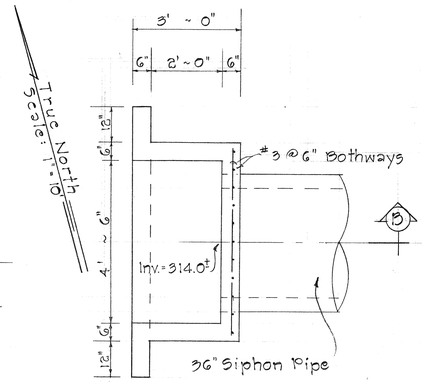
SHEET No. 2 OF 18 SHEETS

15

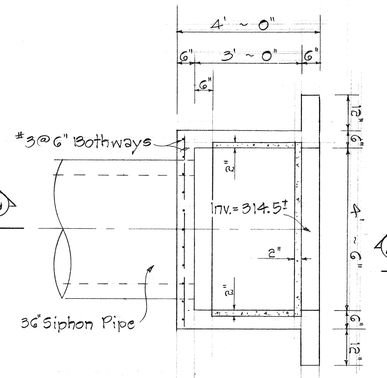
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-056-1(8)	1967	16	64



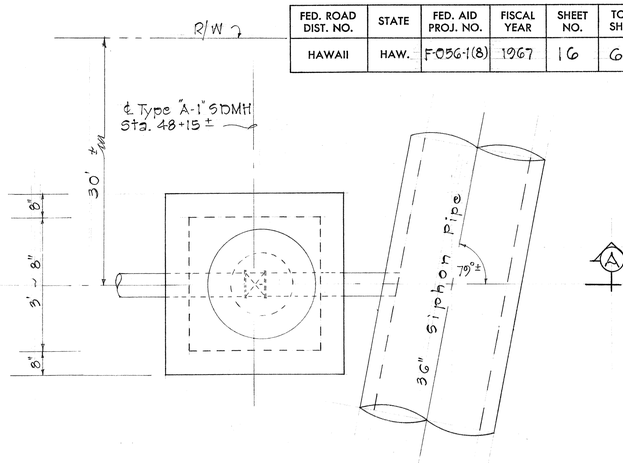
PLAN



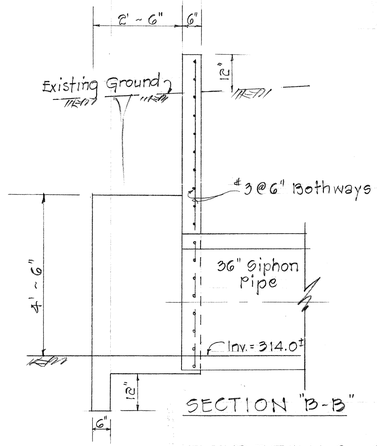
PLAN ~ OUTLET



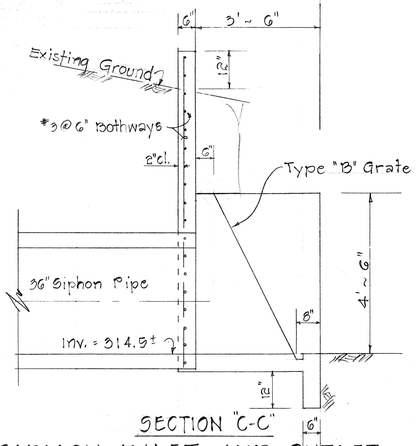
PLAN ~ INLET



PLAN



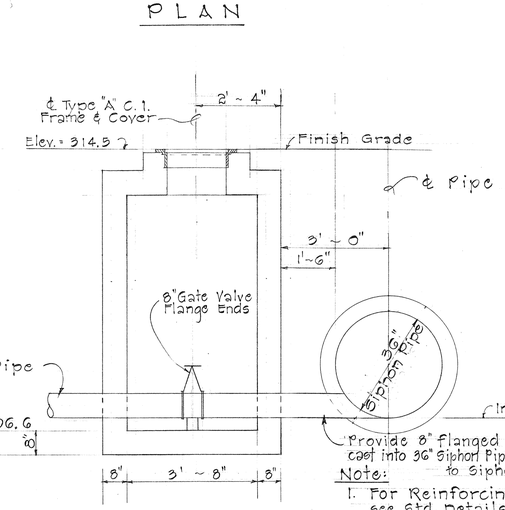
SECTION "B-B"



SECTION "C-C"

DETAILS OF SIPHON INLET AND OUTLET

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



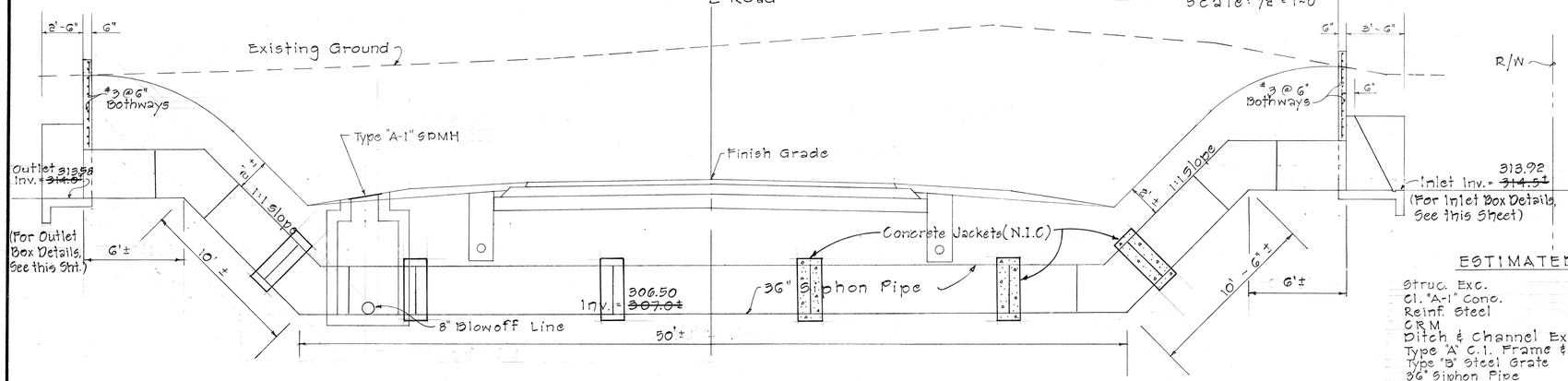
SECTION "A-A"

Note:

1. For Reinforcing Details see Std. Details of Type "A-1" S.D.M.H.
2. The Final Location of Std. Manhole Rungs (Incidental to Class "A-1" Concrete) to be determined by the Engineer.
3. The valve shall be in accordance with AWWA Standard Specification C-500 of latest revision.

BLOW-OFF DETAIL

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



PROFILE ~ (SIPHON & SDMH)

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

SIPHON AT STA. 48+17.50

ESTIMATED QUANTITIES

Struc. Exc.	159.8 ~~255~~	C.Y.
Cl. "A-1" Conc.	8.94 ~~52~~	C.Y.
Reinf. Steel	275 ~~2110~~	lbs.
CRM	3.3 ~~34~~	C.Y.
Ditch & Channel Exc.	8.3 ~~0~~	C.Y.
Type "A" C.I. Frame & Cover	1	ea.
Type "B" Steel Grate	1	ea.
36" Siphon Pipe	83.7 ~~84~~	L.F.
8" C.I. Pipe	89.2 ~~94~~	L.F.
8" Gate Valve	1	ea.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

SIPHON DETAIL
KAUAI BELT ROAD
PROJ. NO. F-056-1(8)
KAHILI TO PILAA

Scale: As Shown Date: July, 1967

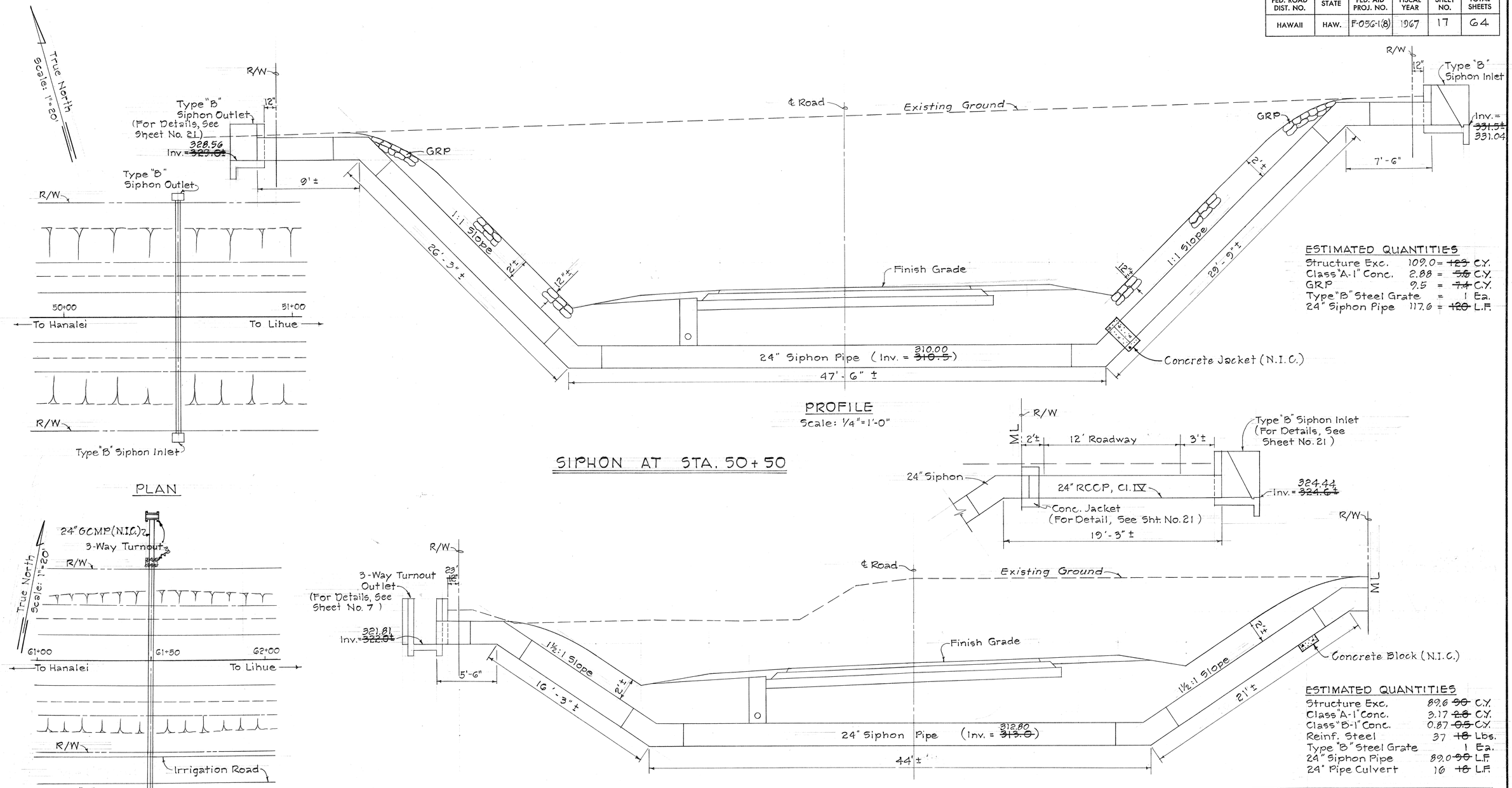
SHEET No. 3 OF 18 SHEETS

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

PRINTED ON NO. 1000H CLEARPRINT

16

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-056-1(8)	1967	17	64



PLAN

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

SIPHON AT STA. 50+50

PLAN

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

SIPHON AT STA. 61+50

ESTIMATED QUANTITIES

Structure Exc.	109.0 = ~~123~~	C.Y.
Class "A-1" Conc.	2.88 = ~~5.6~~	C.Y.
GRP	9.5 = ~~7.4~~	C.Y.
Type "B" Steel Grate	= 1	Ea.
24" Siphon Pipe	117.6 = ~~120~~	L.F.

ESTIMATED QUANTITIES

Structure Exc.	89.6 ~~90~~	C.Y.
Class "A-1" Conc.	3.17 ~~2.8~~	C.Y.
Class "B-1" Conc.	0.87 ~~0.5~~	C.Y.
Reinf. Steel	37 ~~18~~	Lbs.
Type "B" Steel Grate	1	Ea.
24" Siphon Pipe	89.0 ~~90~~	L.F.
24" Pipe Culvert	16 ~~18~~	L.F.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

SIPHON DETAIL
KAUAI BELT ROAD
PROJ. NO. F-056-1(8)
KAHILI TO PILAA

Scale: As Shown Date: July, 1967

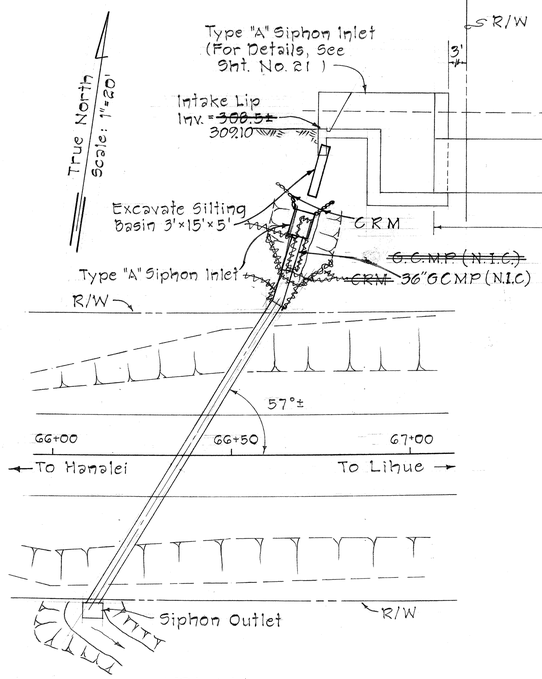
SHEET No. 4 OF 18 SHEETS

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

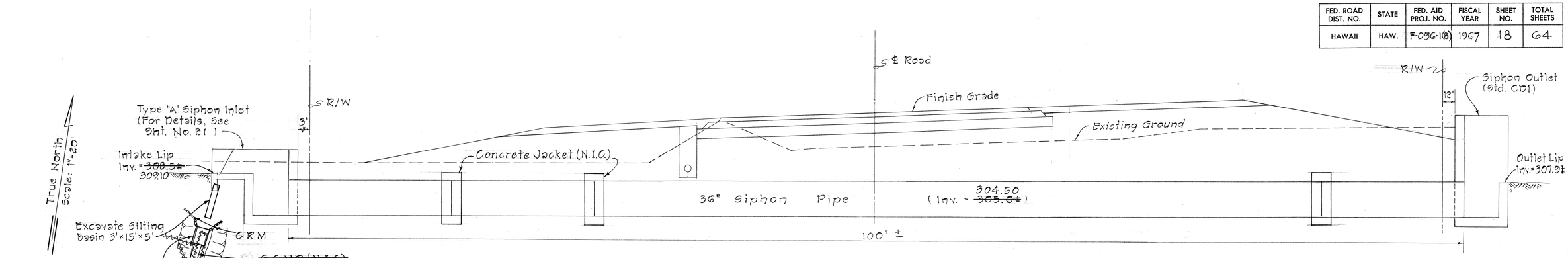
PRINTED ON NO. 1000H CLEARPRINT

17

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-056-1(8)	1967	18	64



PLAN

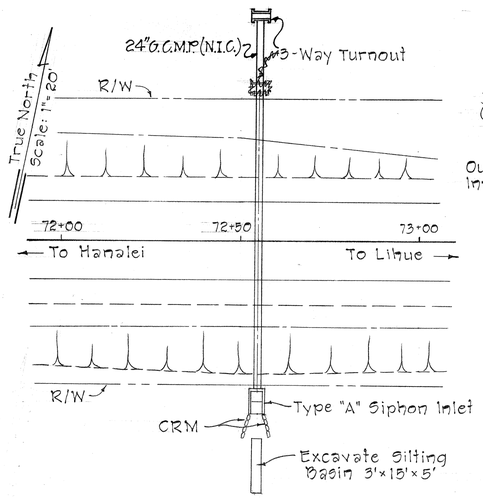


PROFILE
Scale: ¼"=1'-0"

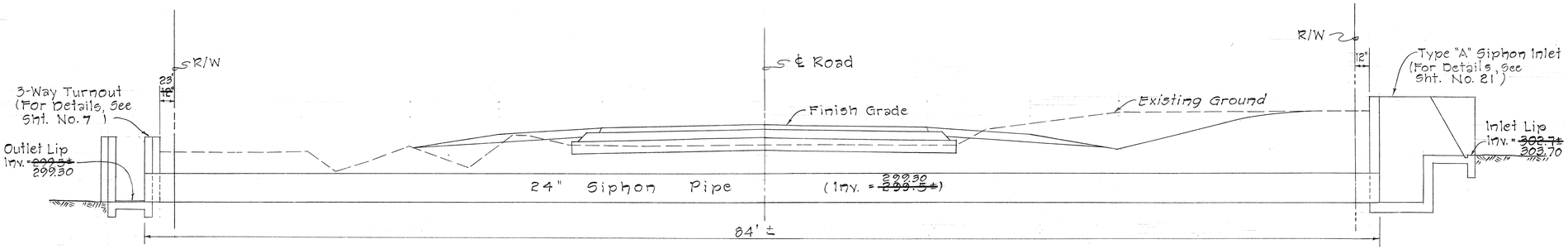
SIPHON AT STA. 66+36

ESTIMATED QUANTITIES

Structure Exc.	127.2	=	~~128.6~~ C.Y.
Class "A-1" Conc.	9.11	=	~~7.7~~ C.Y.
CRM	1.8	=	~~1.8~~ C.Y.
Ditch & Channel Exc.	8.3	=	~~0~~ C.Y.
Type "A" Steel Grate		=	1 Ea.
36" Siphon Pipe	101.8	=	~~100~~ L.F.



PLAN



PROFILE
Scale: ¼"=1'-0"

SIPHON AT STA. ~~72+55~~ 72+68

ESTIMATED QUANTITIES

Structure Exc.	62.5	=	~~70~~ C.Y.
Class "A-1" Conc.	5.56	=	~~4.5~~ C.Y.
CRM	1.7	=	~~1.5~~ C.Y.
Ditch & Channel Exc.	8.3	=	~~0~~ C.Y.
Type "A" Steel Grate		=	1 Ea.
24" Siphon Pipe	84.7	=	~~84~~ L.F.

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

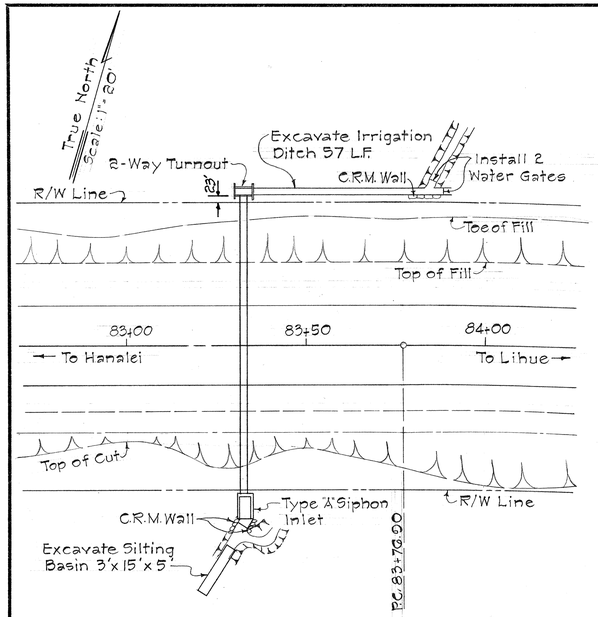
SIPHON DETAIL
KAUAI BELT ROAD
PROJ. NO. F-056-1(8)
KAHILI TO PILAA

Scale: As Shown Date: July, 1967

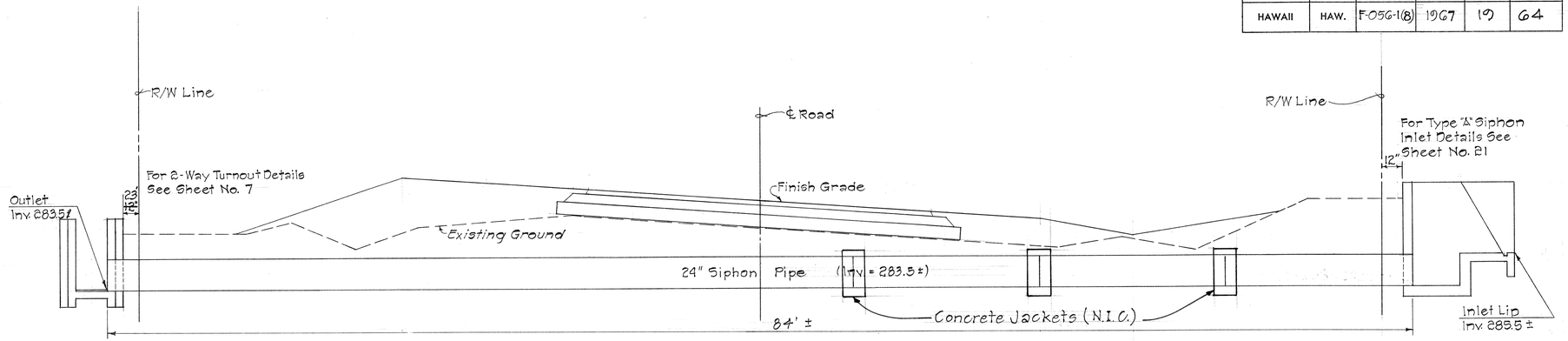
SHEET No. 5 OF ~~18~~ SHEETS

18

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-056-1(8)	1967	19	64



PLAN

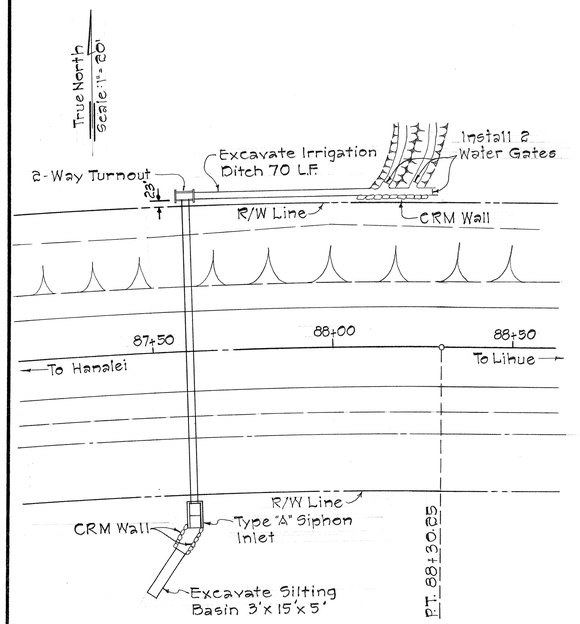


PROFILE
Scale: 1/4" = 1'-0"

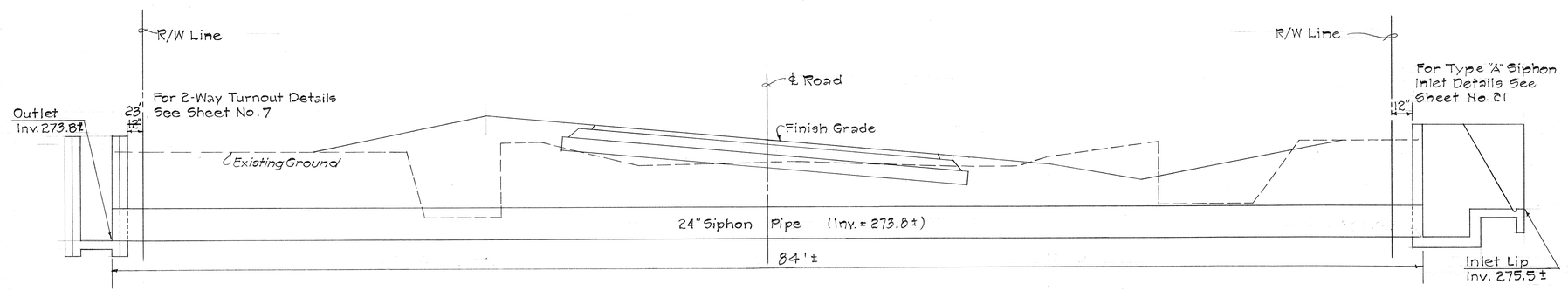
SIPHON AT STA. 83 + 33

ESTIMATED QUANTITIES

Structure Exc.	67.2 =	~~89~~	C.Y.
Class "A-1" Conc.	5.95 =	~~5~~	C.Y.
C.R.M.	1.3 =	~~1.6~~	C.Y.
Ditch & Channel Exc.	=83	~~30~~	C.Y.
Type "A" Steel Grate	=	1	Ea.
24" Siphon Pipe	84.7 =	~~84~~	L.F.



PLAN



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

SIPHON AT STA. 87 + 60

ESTIMATED QUANTITIES

Structure Exc.	= ~~86~~	C.Y.	91.5
Class "A-1" Conc.	= ~~5.1~~	C.Y.	5.59
C.R.M.	= ~~1.9~~	C.Y.	2.5
Ditch & Channel Exc.	= ~~26~~	C.Y.	8.3
Type "A" Steel Grate	=	1	Ea.
24" Siphon Pipe	= ~~84~~	L.F.	84.5

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

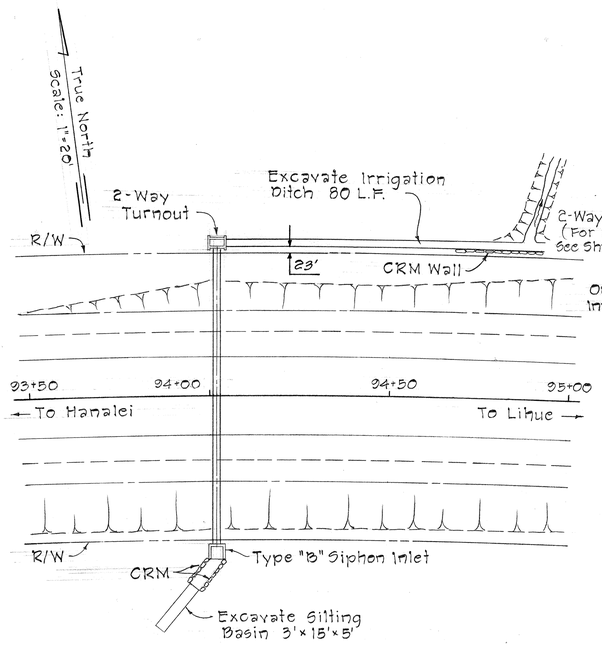
SIPHON DETAIL
KAUAI BELT ROAD
PROJ. NO. F-056-1(8)
KAHILI TO PILAA

Scale: As Shown Date: July, 1967

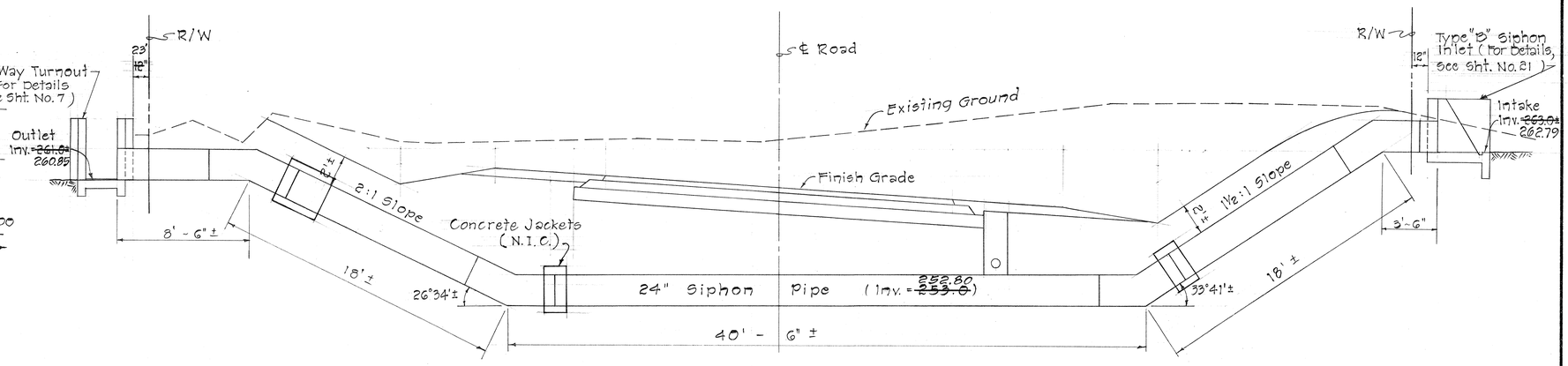
SHEET No. 6 OF 18 SHEETS

19

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-056-1(8)	1967	20	64



PLAN

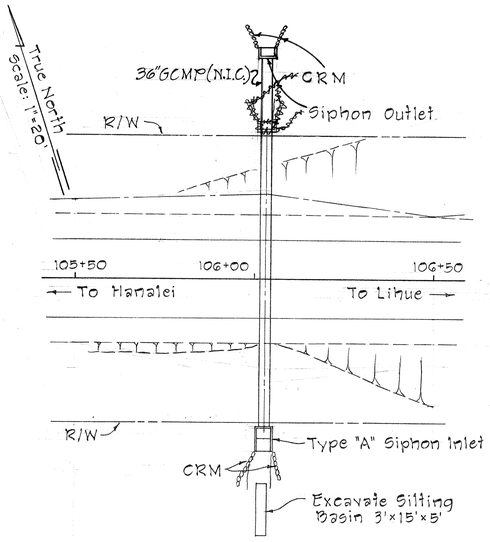


PROFILE
Scale: 1/4"=1'-0"

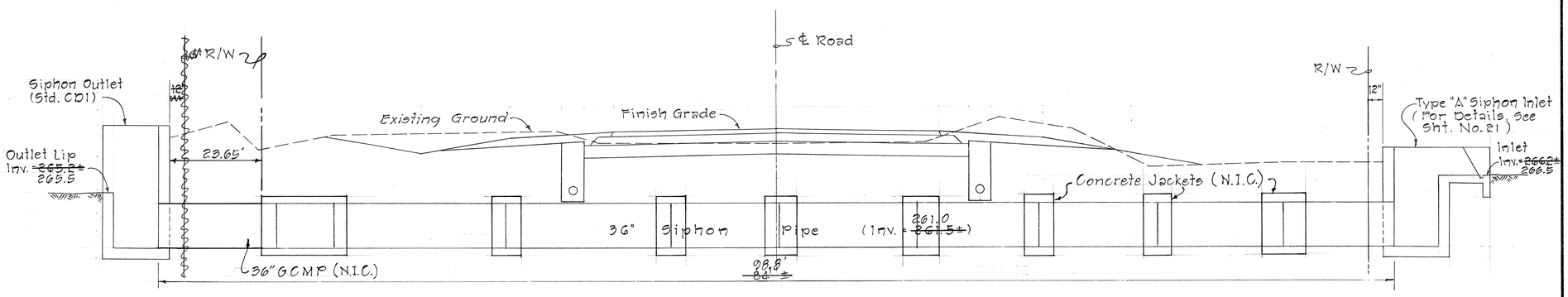
ESTIMATED QUANTITIES

Structure Exc.	84.6 =	~~73~~ C.Y.
Class "A-1" Conc.	3.20 =	~~2.6~~ C.Y.
CRM	3.4 =	~~2.3~~ C.Y.
Ditch & Channel Exc.	8.3 =	~~33~~ C.Y.
Type "B" Steel Grate	=	1 Ea.
24" Siphon Pipe	89.3 =	~~90~~ L.F.

SIPHON AT STA. 94+02



PLAN



PROFILE
Not to Scale: ~~1/4"=1'-0"~~

ESTIMATED QUANTITIES

Structure Exc.	209.8 =	~~131~~ C.Y.
Class "A-1" Conc.	5.69 =	~~3.7~~ C.Y.
CRM	4.7 =	~~1.5~~ C.Y.
Ditch & Channel Exc.	8.3 =	~~8~~ C.Y.
Type "A" Steel Grate	=	1 Ea.
36" Siphon Pipe	98.8 =	~~84~~ L.F.

SIPHON AT STA. ~~106+03~~ 106+26

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

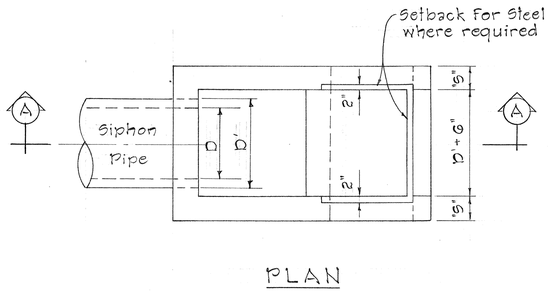
SIPHON DETAIL
KAUAI BELT ROAD
PROJ. NO. F-056-1(8)
KAHILI TO PILAA

Scale: As Shown Date: July, 1967

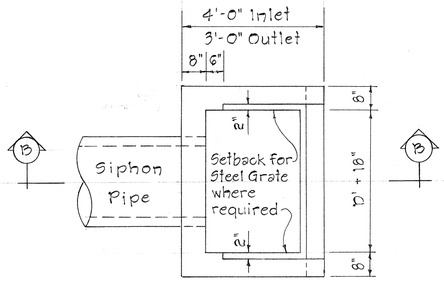
SHEET No. 7 OF 18 SHEETS

20

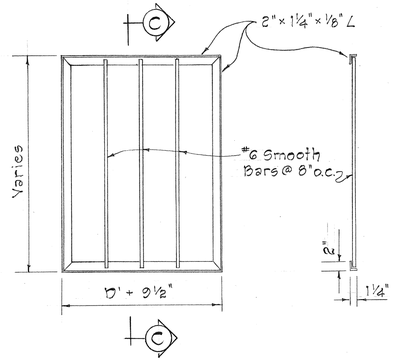
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-056-1(8)	1967	21	64



PLAN

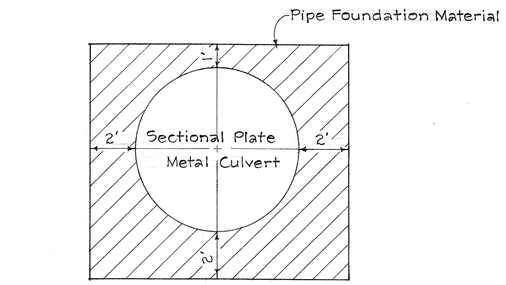


PLAN

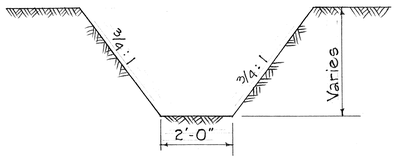


PLAN SECTION "C-C"

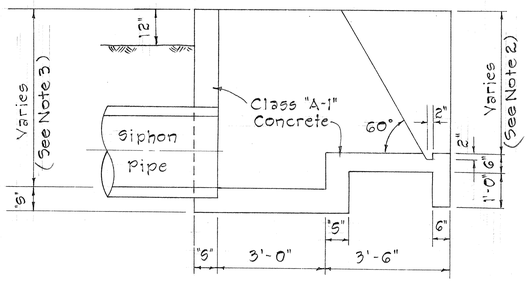
TYPE "A" GRATE
(For Type "A" Inlet)



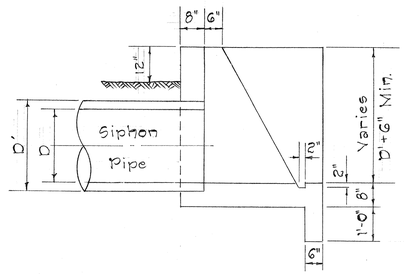
TYPICAL CULVERT INSTALLATION AT STA'S. 15+47, 27+40 & 44+39
Not To Scale



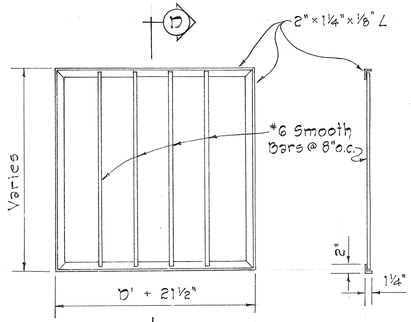
TYPICAL SECTION OF IRRIGATION DITCH
Scale: ½" = 1'-0"



SECTION "A-A"



SECTION "B-B"



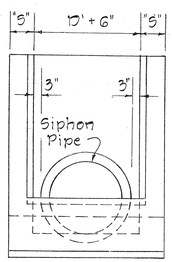
PLAN SECTION "D-D"

TYPE "B" GRATE
(For Type "B" Inlet)

TABLE OF WALL THICKNESS

"D"	"S"
in.	in.
24"	8"
30"	9"
36"	9"

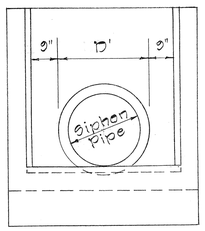
Notes:
1- Siphon Outlet similar except no Grates are required.
2.- Varies according to Lip Invert and top of Siphon Inlet or Outlet. Top to be 12" minimum from top of ditch bank.
3.- Varies according to Pipe Invert and top of Siphon Inlet or Outlet.



ELEVATION

DETAILS OF TYPE "A" SIPHON INLET & OUTLET
Scale: ½" = 1'-0"

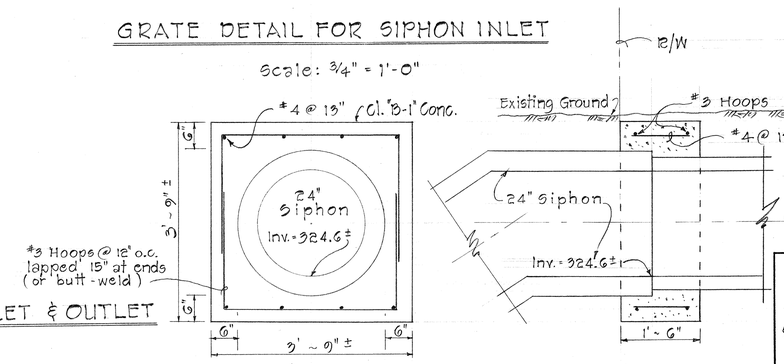
Note:
Siphon Outlet similar except no Grates are required.



ELEVATION

DETAILS OF TYPE "B" SIPHON INLET & OUTLET
Scale: ½" = 1'-0"

GRATE DETAIL FOR SIPHON INLET
Scale: ¾" = 1'-0"



CONNECTION DETAIL OF 24" SIPHON TO 24" RCCP, AT STA. 61+50
Scale: ¾" = 1'-0"

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

SIPHON AND DRAINAGE DETAILS
KAUAI BELT ROAD
PROJ. NO. F-056-1(8)
KAHILI TO PILAA

Scale: As Shown Date: July, 1967

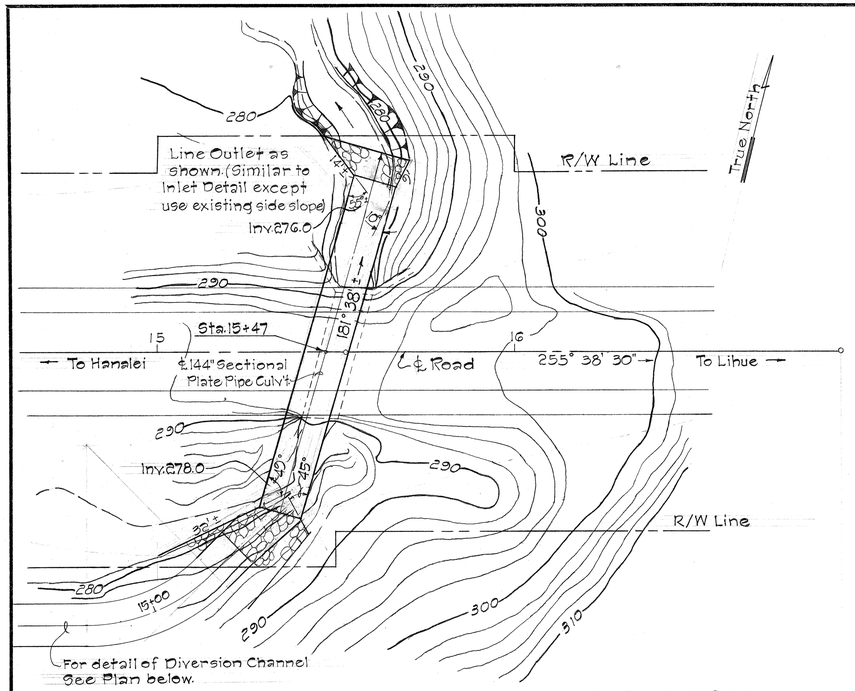
SHEET No. 8 OF 18 SHEETS

21

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

PRINTED ON NO. 1000H CLEARPRINT

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-056-1(8)	1967	22	64



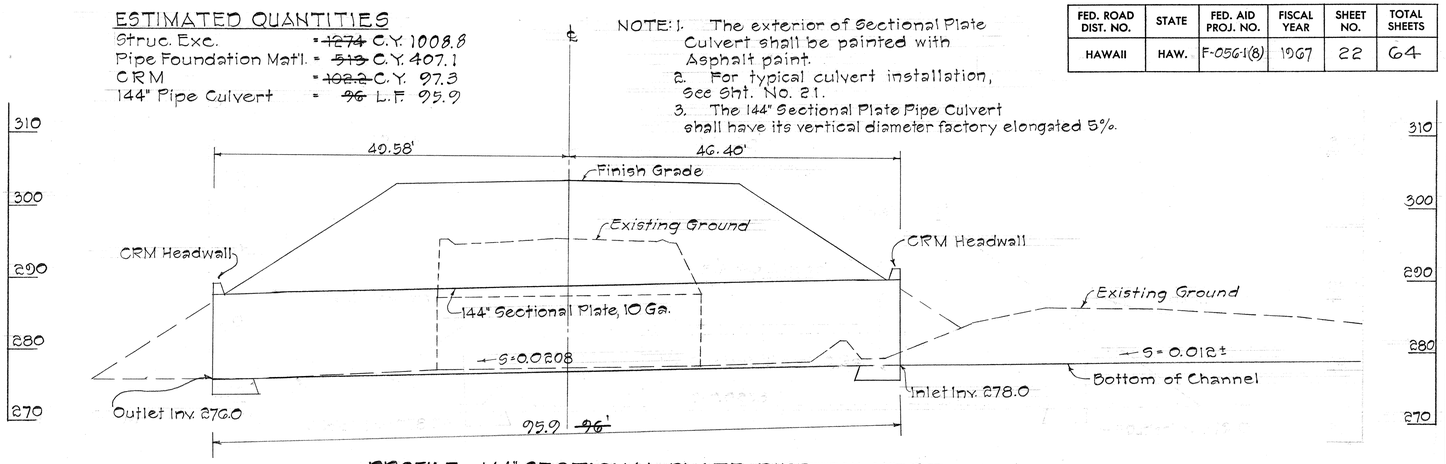
PLAN ~ 144" SECTIONAL PLATE PIPE CULVERT AT STA. 15+47

Scale: 1" = 20'

ESTIMATED QUANTITIES

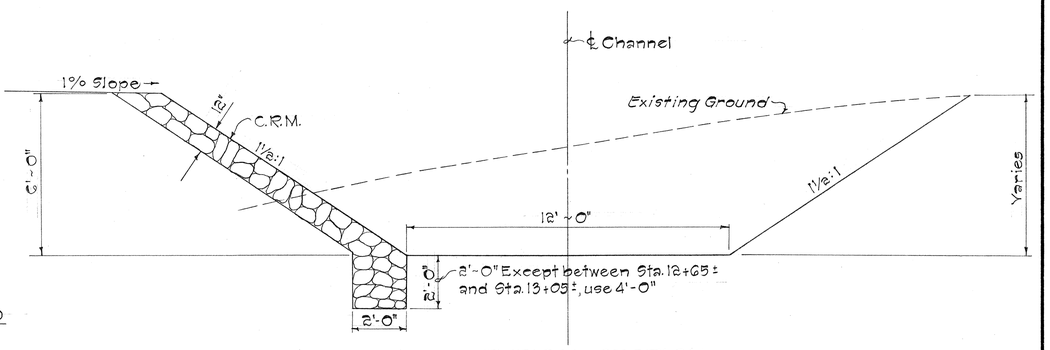
Struc. Exc.	= ~~1274~~	C.Y. 1008.8
Pipe Foundation Mat'l.	= ~~513~~	C.Y. 407.1
C R M	= ~~108.2~~	C.Y. 97.3
144" Pipe Culvert	= ~~96~~	L.F. 95.9

NOTE: 1. The exterior of Sectional Plate Culvert shall be painted with Asphalt paint.
2. For typical culvert installation, See Sht. No. 21.
3. The 144" Sectional Plate Pipe Culvert shall have its vertical diameter factory elongated 5%.



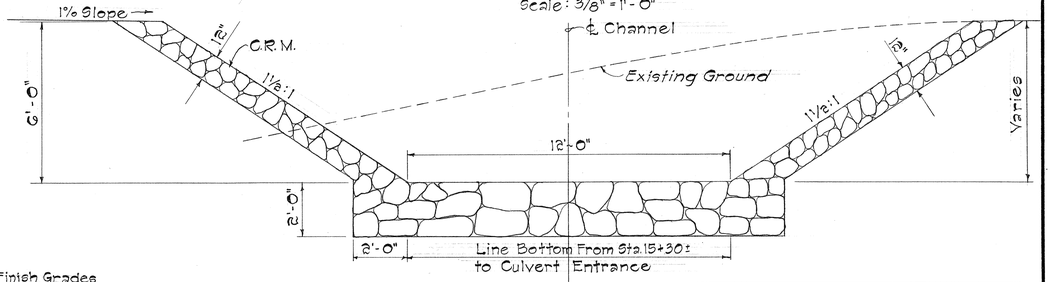
PROFILE ~ 144" SECTIONAL PLATE PIPE CULVERT

Scale: 1" = 10'



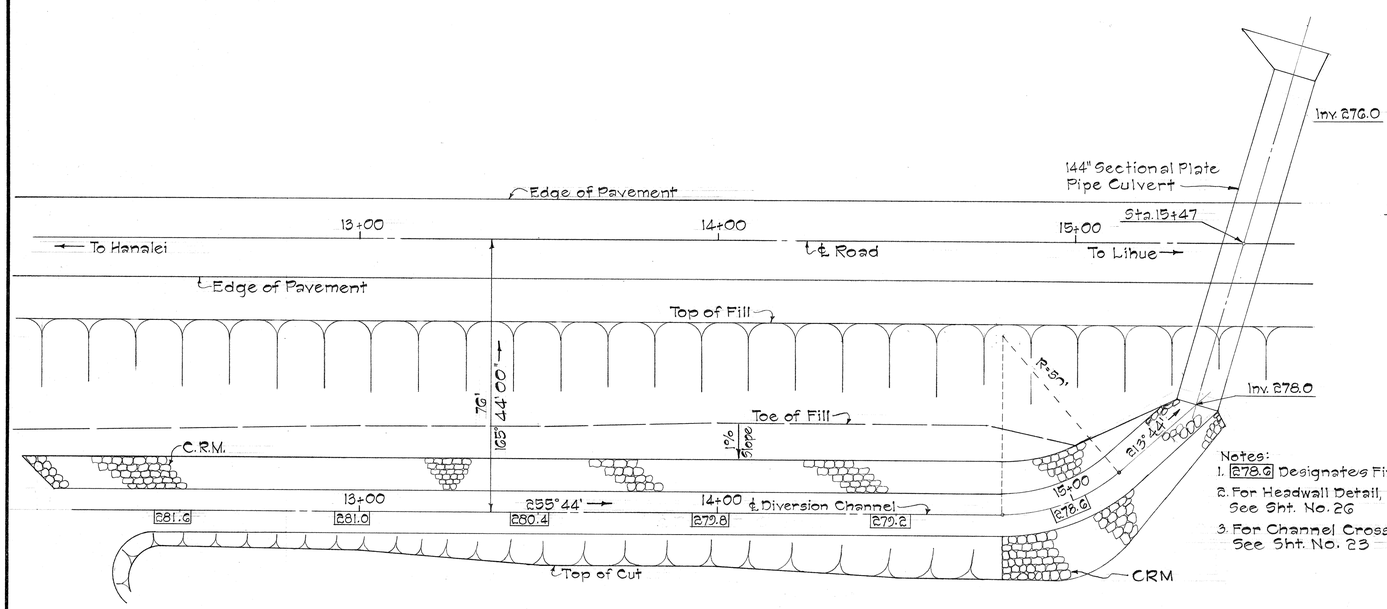
TYPICAL SECTION STA. 12+10± TO STA. 14+80±

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



TYPICAL SECTION STA. 14+80± TO STA. 15+44±

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



DETAIL OF CHANNEL REALIGNMENT

Scale: 1" = 20'

Notes:
1. 278.6 Designates Finish Grades
2. For Headwall Detail, See Sht. No. 26
3. For Channel Cross Section, See Sht. No. 23

ESTIMATED QUANTITIES

Struc. Exc.	= ~~60~~	c.y. 136.8
Ditch & Channel Exc.	= ~~732~~	c.y. 906.9
CRM	= ~~277~~	c.y. 222.5

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

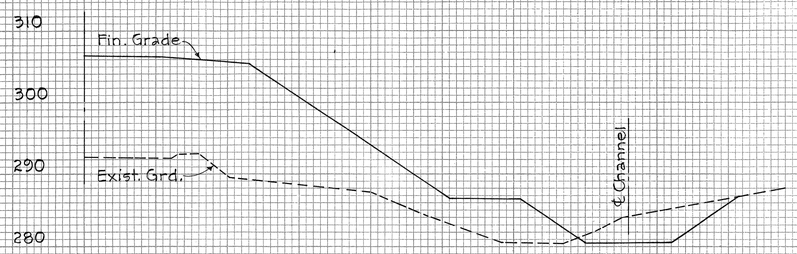
CULVERT & CHANNEL DETAIL
KAUAI BELT ROAD
PROJ. NO. F-056-1(8)
KAHILI TO PILAA

Scale: As Shown Date: July, 1967

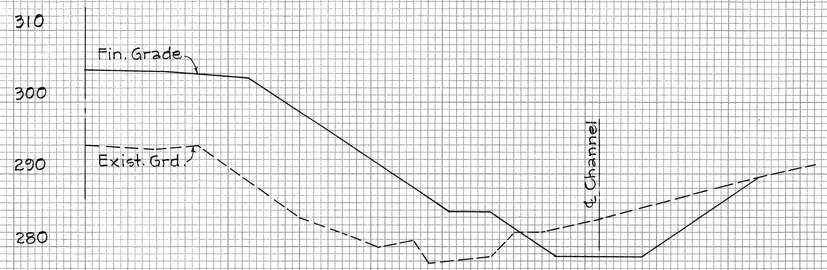
SHEET No. 9 OF 18 SHEETS

22

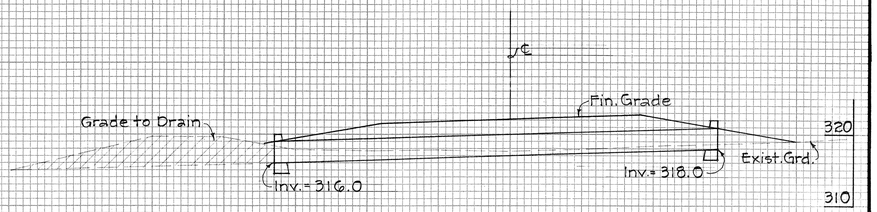
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-056-1(8)	1967	23	64



13 + 50

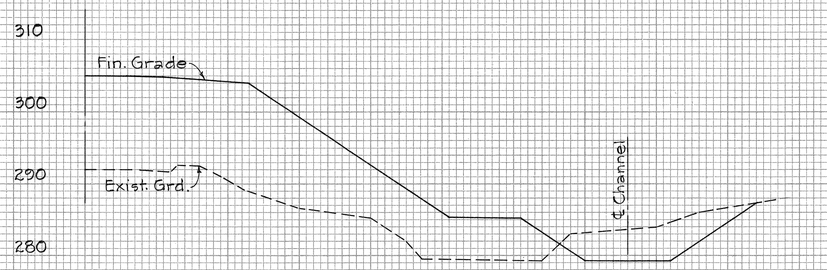


15 + 00

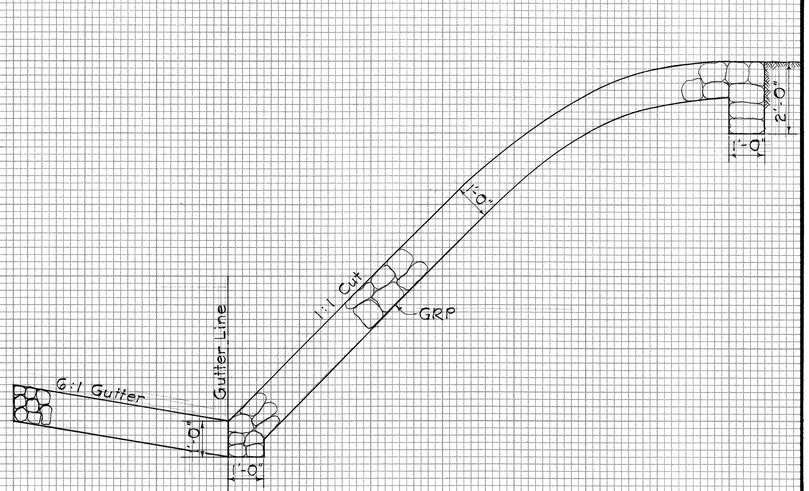


STA. 58 + 93

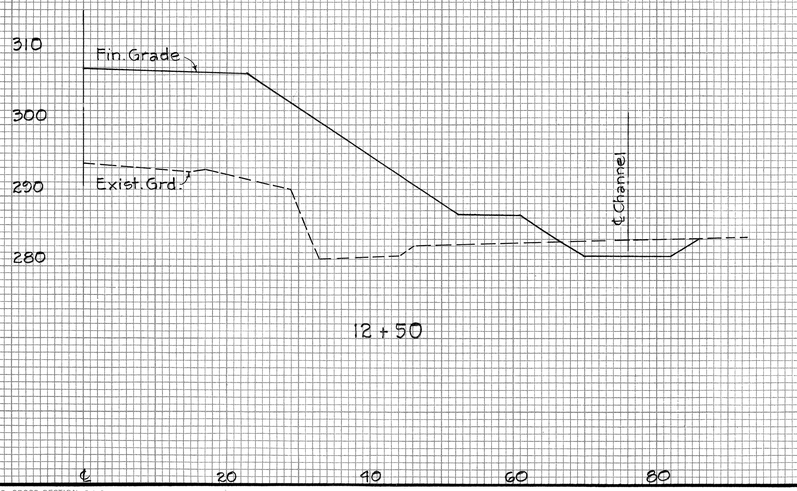
13 + 00



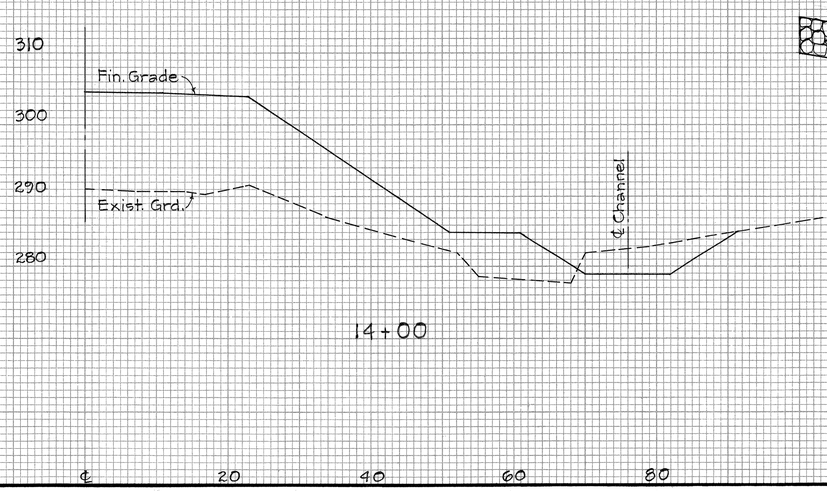
14 + 50



STA. 33 + 85 TO STA. 33 + 95 RT.
Scale : ½"=1'-0"



12 + 50



14 + 00

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

CHANNEL CROSS SECTION DETAIL

KAUAI BELT ROAD
PROJ. NO. F-056-1(8)
KAHILI TO PILAA

Scale: As Shown Date: July, 1967

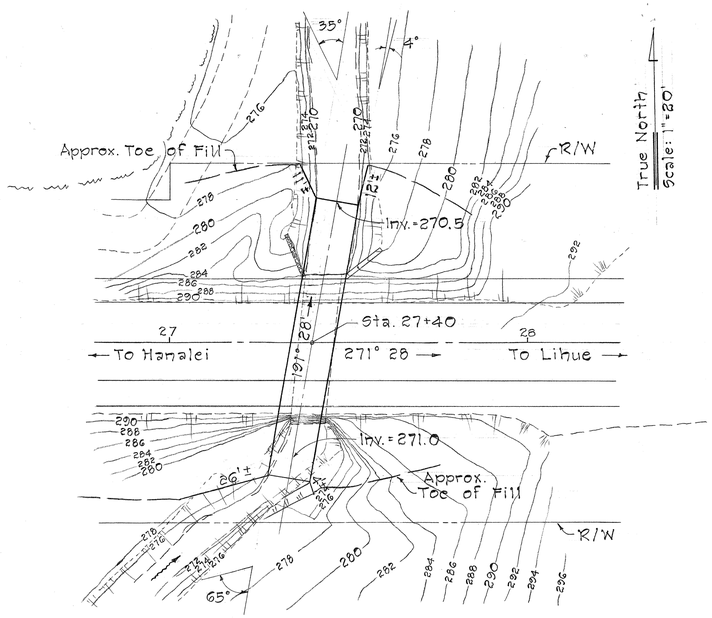
SHEET No. 10 OF 18 SHEETS

FINAL SURVEY — SURVEYED, PLOTTED, TEMPLATE, AREAS, AREAS CHECKED, NOTE BOOK, NO., BY, DATE

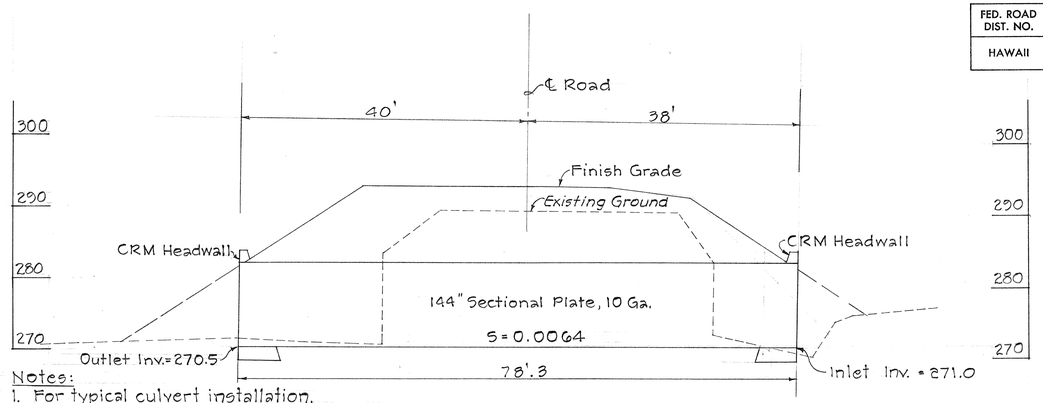
ORIGINAL SURVEY — SURVEYED, PLOTTED, TEMPLATE, AREAS, AREAS CHECKED, NOTE BOOK, NO., BY, DATE

PLATE 3 - CROSS SECTION, F. A. S.
CLEARPRINT PAPER CO., S. F. CAL. NO. 1000H-3

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-056-1(8)	1967	24	64



PLAN



Notes:
1. For typical culvert installation, See Sheet No. 21
2. For CRM Headwall Detail, See Sheet No. 26
3. The exterior of Sectional Plate Culvert shall be painted with Asphalt paint.

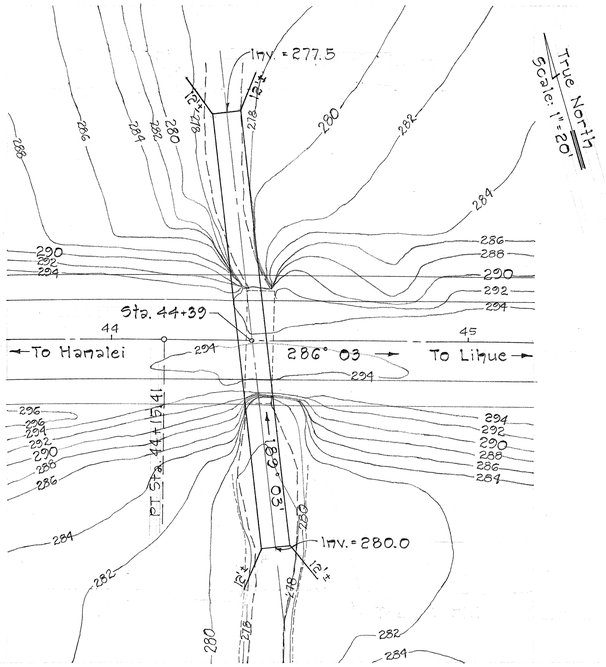
PROFILE
Scale: 1" = 10'

144" SECTIONAL PLATE CULVERT AT STA. 27+40

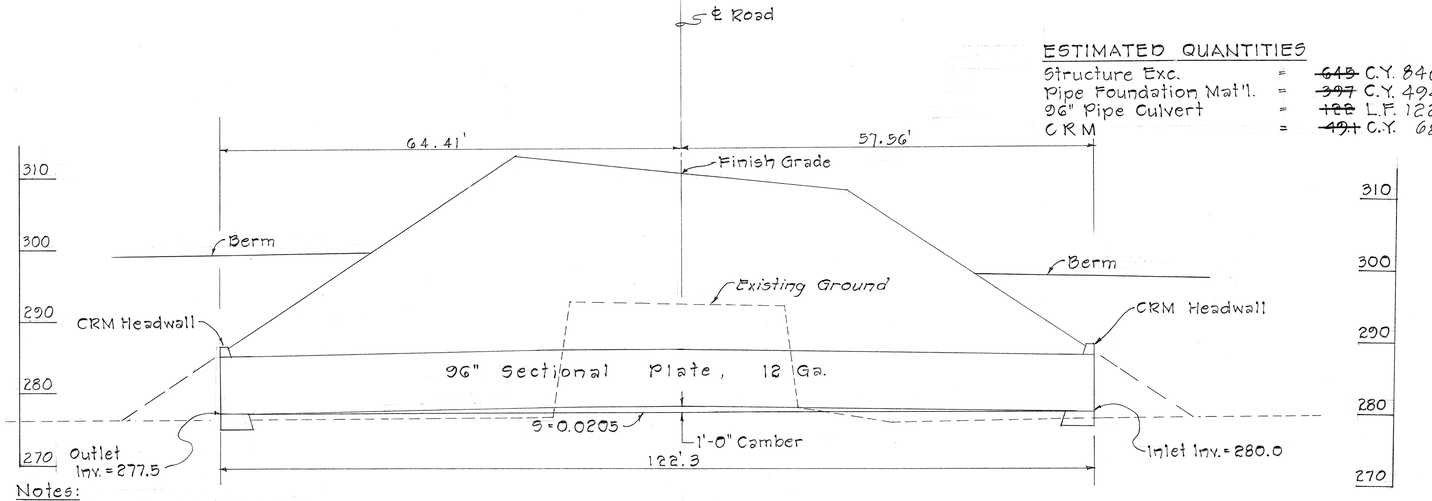
ESTIMATED QUANTITIES

Structure Exc.	=	~~854~~ C.Y. 941.8
Pipe Foundation Mat'l.	=	~~325~~ C.Y. 335.5
144" Pipe Culvert	=	~~78~~ L.F. 78.3
C R M	=	~~95.8~~ C.Y. 136.9
Ditch & Channel Exc.	=	~~9~~ C.Y. 0

GENERAL NOTE: The 144" and 96" Sectional Plate Culvert shall have its vertical diameter factory elongated 5%



PLAN



Notes:
1. For typical culvert installation, See Sheet No. 21.
2. For CRM Headwall Detail, See Sheet No. 26
3. The exterior of Sectional Plate Culvert shall be painted with Asphalt paint.

PROFILE
Scale: 1" = 10'

96" SECTIONAL PLATE CULVERT AT STA. 44+39

ESTIMATED QUANTITIES

Structure Exc.	=	~~645~~ C.Y. 846.3
Pipe Foundation Mat'l.	=	~~397~~ C.Y. 494.4
96" Pipe Culvert	=	~~122~~ L.F. 122.3
C R M	=	~~49.1~~ C.Y. 68.1

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

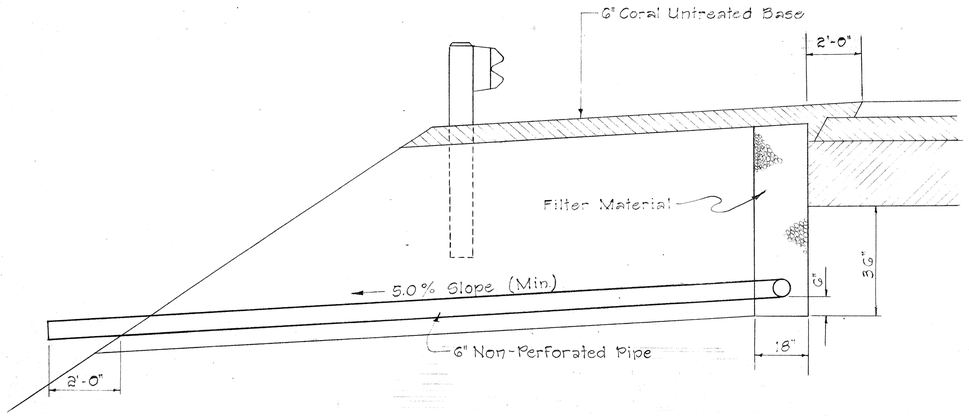
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

CULVERT DETAIL
KAUAI BELT ROAD
PROJ. NO. F-056-1(8)
KAHILI TO PILAA

Scale: As Shown Date: July, 1967

SHEET No. 11 OF 18 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-056-1(8)	1967	25	64



TYPICAL LONGITUDINAL UNDERDRAIN OUTLET SECTION

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

LONGITUDINAL UNDERDRAIN LOCATION

STA.~ LEFT			LENGTH	STA.~ RIGHT			LENGTH
~~0+50~~*	to	~~10+75~~*	~~1078~~	~~0+63~~*	to	~~12+55~~*	~~1192~~
~~22+08~~	to	~~25+00~~*	~~292~~	~~0+96~~	to	~~13+22~~*	~~976~~
~~23+00~~	to	~~24+75~~	~~175~~	16+00	to	24+76*	867.5
28+00*	to	36+00	~~800~~	~~16+50~~	to	~~24+75~~	~~825~~
47+75*	to	~~57+50~~	975	28+00*	to	41+50	1350
59+50	to	~~67+00~~*	~~741~~	47+60			141
72+50	to	80+00*	~~748~~	~~47+75~~*	to	49+00	~~125~~
~~101+08~~			~~1150~~	49+25*			868
~~101+25~~*	to	108+00	~~695~~	92+50	to	~~99+80~~*	~~630~~
			~~675~~	101+25*	to	108+00	676
TOTAL			~~5175~~				~~4600~~
			5393				4796.5

-0+78 to 11+02*

*Location of Longitudinal Underdrain Outlet (See Detail this sheet.)

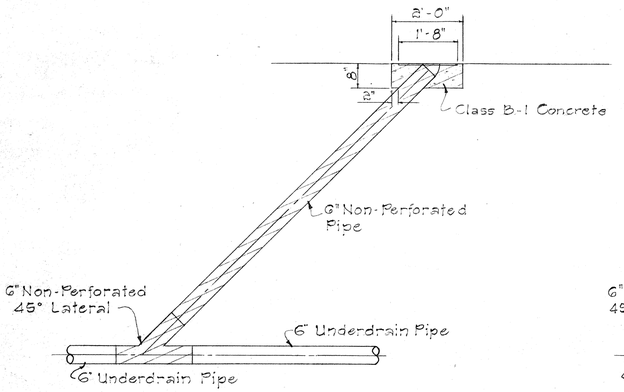
TRANSVERSE UNDERDRAIN LOCATION

STA.~ LEFT	LENGTH	STA.~ RIGHT	LENGTH
~~11+00~~	~~18~~	~~10+50~~	~~20~~
11+50	18.8	11+00	18.7
12+00	18.3	11+50	~~18~~17.8
12+50	18.7	12+00	18.3
13+00	18.8	12+50	18.4
13+50	18.9	13+00	18.7
14+00	18.9	13+50	18.6
14+50	~~18~~19.3	14+00	~~18~~19.0
15+00	~~18~~20.0	14+50	~~18~~19.8
15+50	~~18~~20.4	15+00	~~18~~19.0
16+00	~~24~~20.2	15+50	~~18~~20.6
~~25+00~~	~~18~~	~~16+00~~	~~24~~
25+50	~~18~~17.7	25+00	~~18~~20.5
26+00	~~18~~16.9	25+50	~~18~~17.4
26+50	~~18~~17.5	26+00	18.6
27+00	~~18~~17.2	26+50	18.0
27+50	~~18~~20.1	27+00	18.5
46+50	~~18~~17.9	27+50	18 20.1
47+00	~~18~~19.4	42+00	~~18~~17.4
~~67+50~~	~~22~~	42+50	~~18~~16.4
68+00	~~20~~19.2	43+00	~~18~~16.9
68+50	~~18~~19.8	43+50	~~18~~16.3
69+00	~~18~~19.0	44+00	~~18~~17.4
69+50	18.6	44+50	~~18~~17.7
70+00	~~18~~16.8	45+00	18.0
70+50	~~18~~17.6	45+50	~~18~~19.0
71+00	~~18~~17.5	46+00	~~18~~19.2
71+50	~~18~~17.6	46+50	~~18~~17.7
80+50	~~18~~17.9	47+00	18.1
81+00	~~18~~17.2	~~47+50~~	~~18~~
81+50	~~18~~17.3	70+50	~~18~~19.4
82+00	18.0	71+00	~~24~~19.5
~~99+00~~	~~18~~23.3	81+50	~~18~~19.1
~~99+50~~	~~18~~21.4	82+00	~~22~~18.8
100+50	~~20~~18.6	~~99+00~~	~~18~~
~~101+00~~	~~20~~	99+50	~~18~~19.0
		100+50	~~18~~16.8
		~~101+00~~	~~18~~
TOTAL	~~664~~		~~705~~
	599.2		608.7

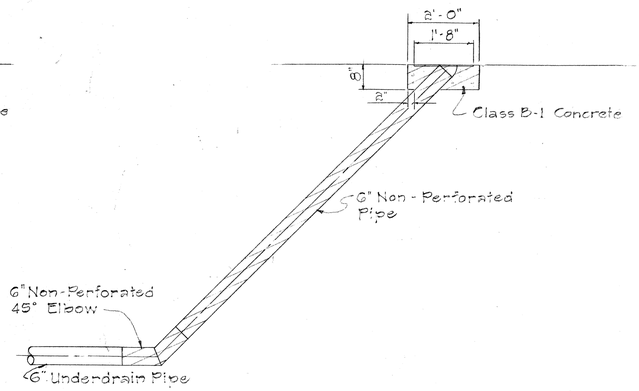
98+46
99+25

CLEANOUTS FOR LONGITUDINAL UNDERDRAINS

STA.	SIDE
2+50	BOTH
4+48	"
4+52	"
7+60	"
16+50	RT.
19+25	"
22+00	"
23+00	LT.
30+70	BOTH
33+30	"
36+00	"
38+75	RT.
41+50	"
49+00	"
50+20	LT.
52+60	"
55+10	"
59+50	"
62+10	"
64+70	"
72+50	"
57+50 ~~75+00~~	"
77+30	"
92+30	RT.
~~95+75~~	"
103+60	BOTH
108+00	"



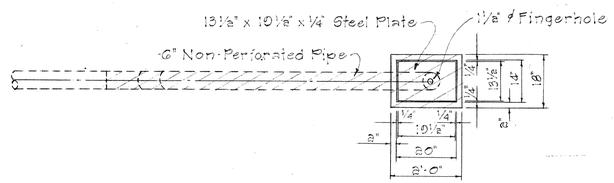
CLEANOUT AT INTERMEDIATE POINTS



CLEANOUT AT END OF PIPE

ELEVATIONS

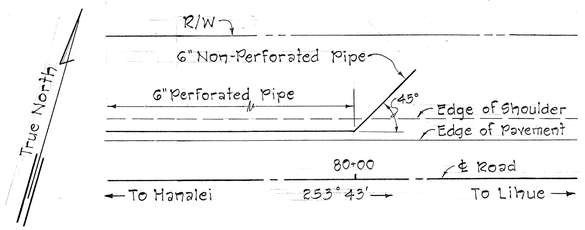
NOTES:
1. Steel plate shall be thoroughly cleaned and painted with one coat of high grade asphaltum.
2. Hatched area denotes limit of payment for cleanouts.



PLAN

DETAIL OF CLEANOUT AND CONCRETE BLOCKS FOR UNDERDRAINS

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



LAYOUT OF LONGITUDINAL UNDERDRAIN OUTLET

Scale: 1" = 20'

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

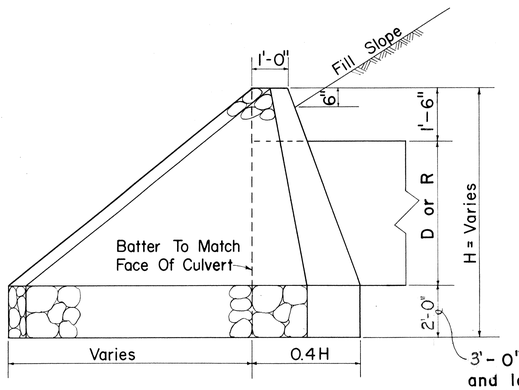
DRAINAGE DETAIL
KAUAI BELT ROAD
Proj. No. F-056-1(8)
KAHILI TO PILAA

Scale: As Shown Date: July, 1967

SHEET No. 12 OF 18 SHEETS

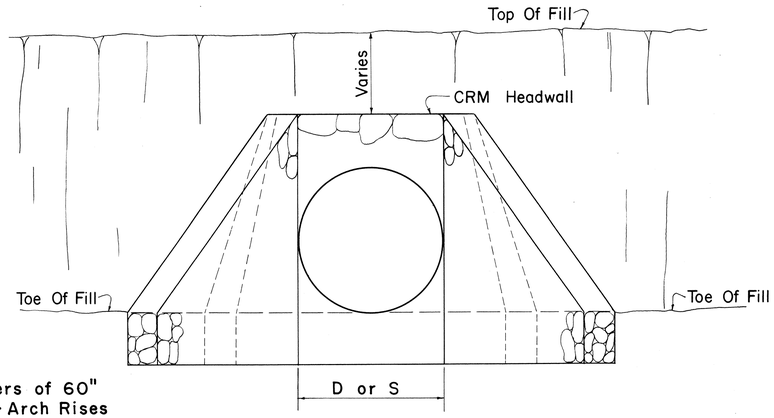
25

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-056(8)	1967	26	64



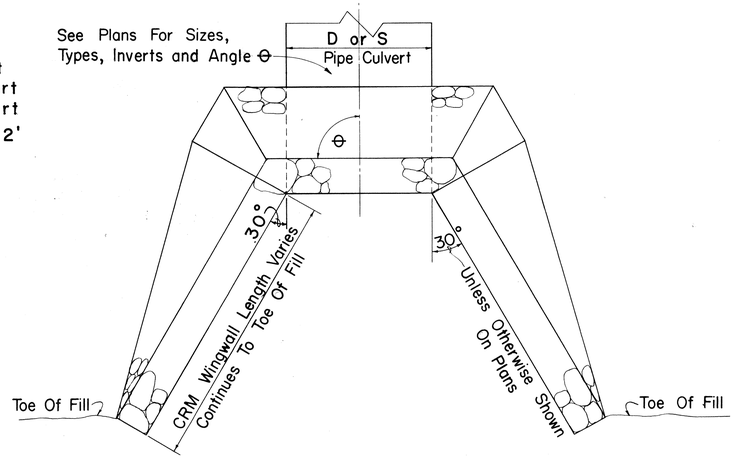
SIDE ELEVATION

3'-0" for Pipe Diameters of 60" and larger, or for Pipe-Arch Rises of 60" and higher.



FRONT ELEVATION

NOTE:
1. D = Diameter of Pipe Culvert
   R = Rise of Pipe-Arch Culvert
   S = Span of Pipe-Arch Culvert
2. Headwall to be constructed on 2' of Pipe Foundation Material.



PLAN VIEW

DETAILS OF CRM INLET AND OUTLET STRUCTURES

Scale: 1/2" = 1'-0

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE DETAILS

KAUAI BELT ROAD
PROJ. NO. F-056-1(8)
KAHILI TO PILAA

Scale: As Shown Date: July, 1967

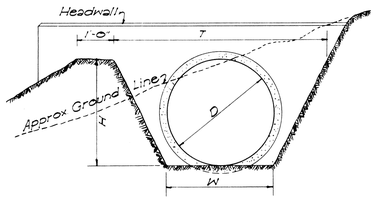
SHEET No. 13 OF 18 SHEETS

26

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F056(18)	1967	27	64

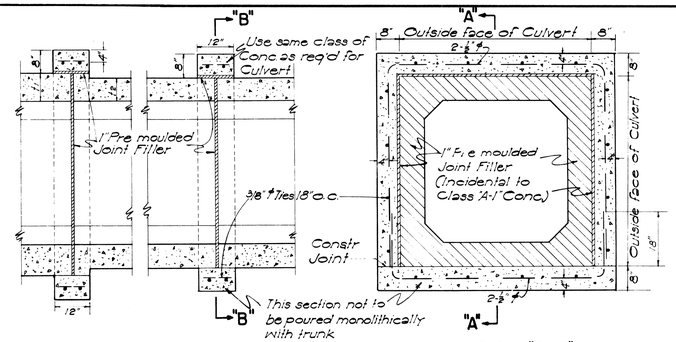
Revised : June, 1965

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"



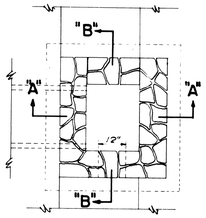
SECTION "A-A" SECTION "B-B"

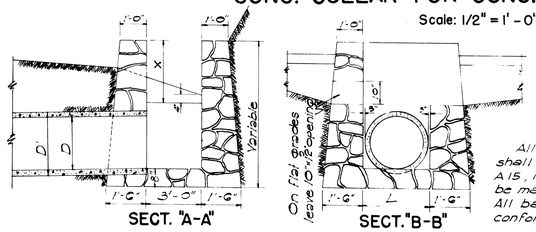
CONC. COLLAR FOR CONC. BOX CULVERT

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

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.



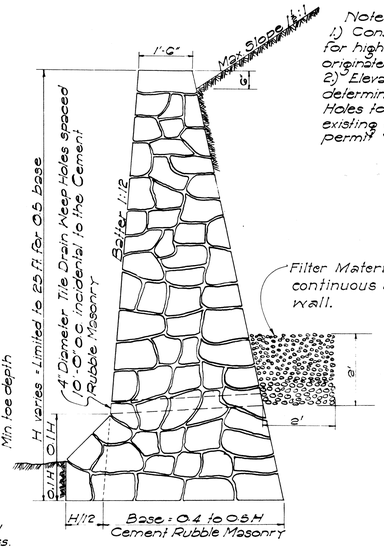


REINFORCING BARS

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

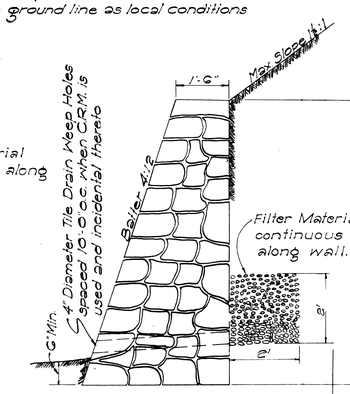
DETAIL OF MASONRY DROP INTAKE

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



SECTION OF HIGH CEMENT RUBBLE MASONRY RETAINING WALL OR SEAWALL

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

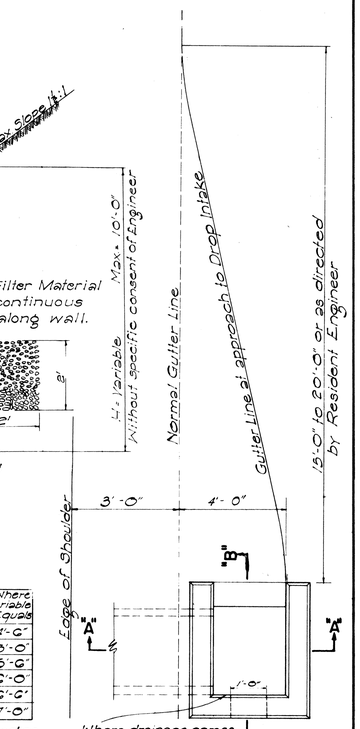


C.R.M. or D.R.M. as required by plans or as ordered

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"	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

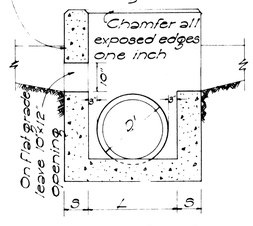


Where drainage comes from both sides lower this wall to same e/e- PLAN
elevation as shown for opposite wall.

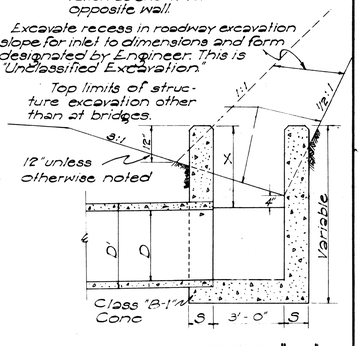
Note: This type of structure shall also be used for the Drop Intakes of Syphons connected with Irrigation Ditches or Flumes with appropriate changes to dimensions. In this case all joints must be made water tight.

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.



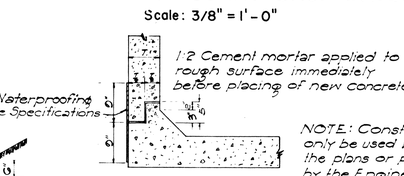
SECTION "B-B"



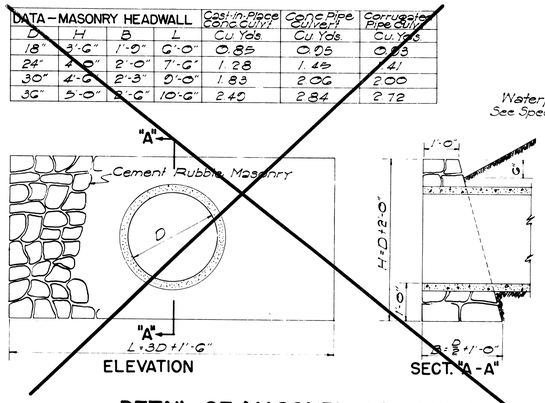
SECTION "A-A"

DETAIL OF CONCRETE DROP INTAKE

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



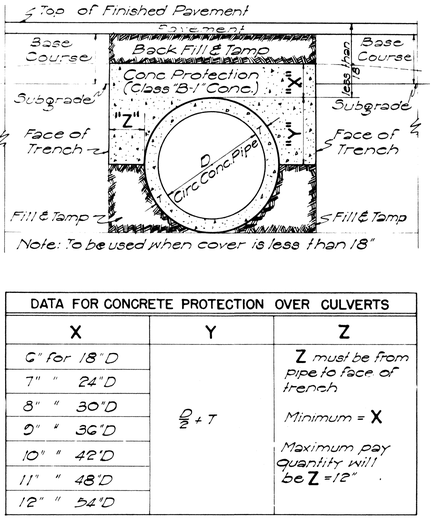
CONSTR. JOINT DETAILS



DETAIL OF MASONRY HEADWALL

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

DATA - MASONRY HEADWALL				Cast-in-Place Conc. Culvt.	Conc. Pipe Culvert	Corrugated Pipe Culvert
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



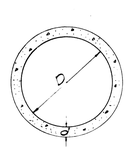
Note: To be used when cover is less than 18"

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.

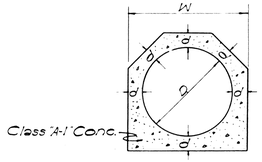
DATA FOR CONCRETE PROTECTION OVER CULVERTS		
X	Y	Z
6" for 18" D	$\frac{D}{2}+T$	Z must be from pipe to face of trench
7" " 24" D		
8" " 30" D		Minimum = X
9" " 36" D		
10" " 42" D		Maximum pay quantity will be Z = 12"
11" " 48" D		
12" " 54" D		

SECT. OF CULVERT WITH CONC. PROTECTION

Scale: 1" = 1'-0"



SECTION



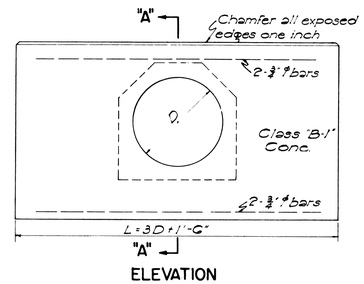
SECTION

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"	5⅝"	3'-11"	0.26

CAST-IN-PLACE CONC. CULVERT



DETAIL OF CONCRETE HEADWALL

Not to Scale

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'-9"	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"	1.95	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

ORIGINAL TRACED BY | DESIGNED BY | DRAWN BY | TRACED BY | QUANTITIES BY | CHECKED BY | CHECKED BY | DATE

L. Calisto

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS

DROP INTAKES, RETAINING WALLS, HEADWALLS, CONSTRUCTION JOINTS

SCALES AS NOTED

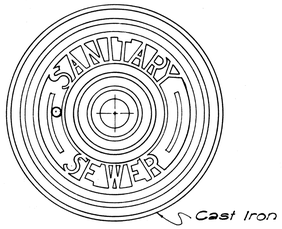
SHEET No 14 OF 18 SHEETS

27

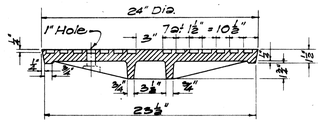
2/17/59
8:42:50

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW	F056-(18)	1967	28	64

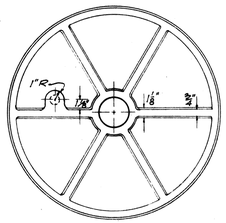
August 1957



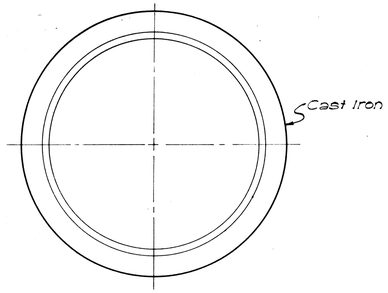
TOP VIEW OF COVER



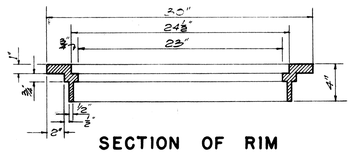
SECTION



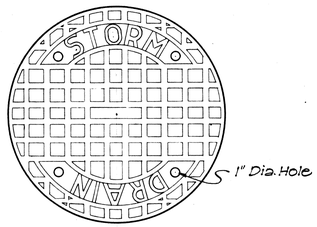
BOTTOM VIEW OF COVER



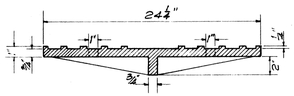
PLAN OF RIM



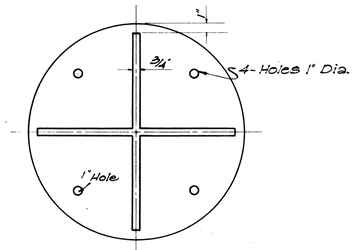
SECTION OF RIM



TOP VIEW OF COVER



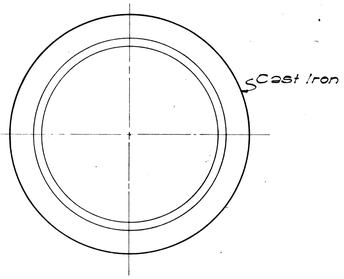
SECTION



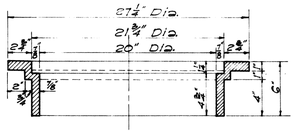
BOTTOM VIEW OF COVER

DETAILS OF TYPE "B" CAST IRON FRAME AND COVER

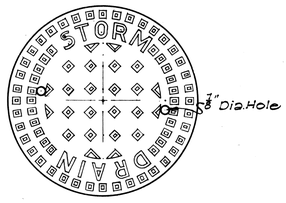
SCALE: 1-1/2" = 1'-0"



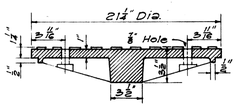
PLAN OF RIM



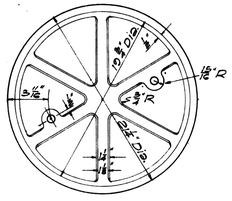
SECTION OF RIM



TOP VIEW OF COVER



SECTION

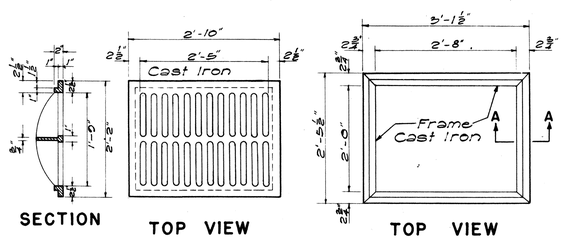


BOTTOM VIEW OF COVER

DETAILS OF TYPE "A" CAST IRON FRAME AND COVER

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

NOTE: Stock Pattern From Novelty Foundry ~ Honolulu

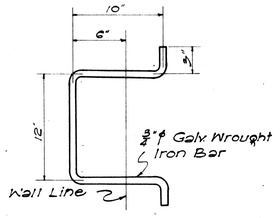


SECTION TOP VIEW TOP VIEW

TYPE C C.I. FRAME AND GRATING

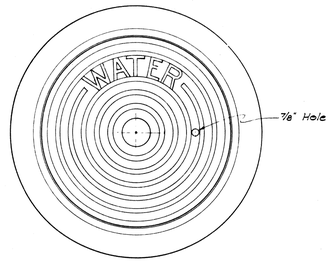
SCALE: 3/4" = 1'-0"

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

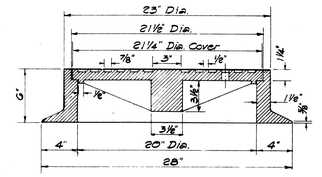


MANHOLE RUNG

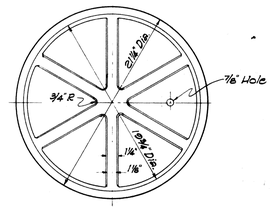
SCALE: 1-1/2" = 1'-0"



PLAN OF FRAME AND COVER



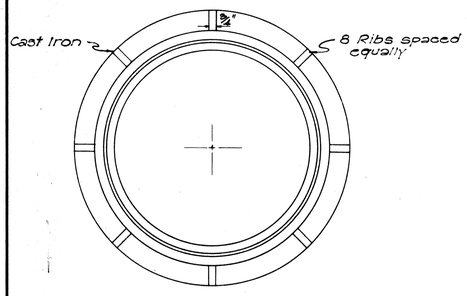
SECTION OF FRAME AND COVER



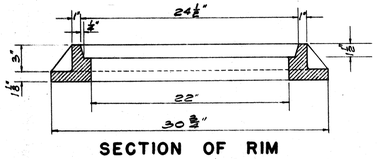
BOTTOM VIEW OF COVER

DETAILS OF TYPE "W" CAST IRON FRAME AND COVER

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



PLAN OF RIM



SECTION OF RIM

DETAILS OF TYPE "S" CAST IRON FRAME AND COVER

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

NOTE:

THE TYPE "S" CAST IRON FRAME AND COVER SHOWN ON THIS SHEET IS EQUIVALENT TO THE CITY AND COUNTY OF HONOLULU, DIVISION OF SEWERS' TYPE "A" CAST IRON MANHOLE FRAME AND COVER.

THE TYPE "W" CAST IRON FRAME AND COVER SHOWN ON THIS SHEET IS EQUIVALENT TO THE CITY AND COUNTY OF HONOLULU, BOARD OF WATER SUPPLY'S CAST IRON MANHOLE FRAME AND COVER, 20" SIZE.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS
CATCH BASIN AND MANHOLE CASTINGS

SCALES AS NOTED

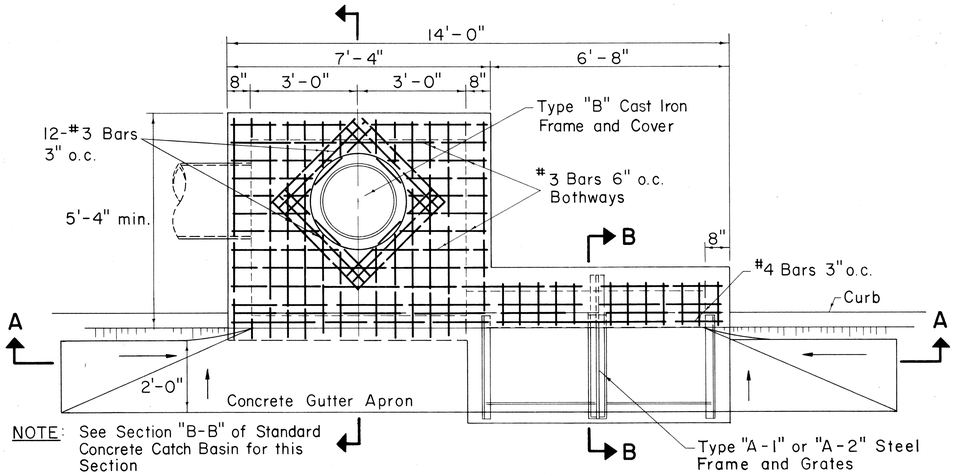
SHEET Nº 15 OF 18 SHEETS

28

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

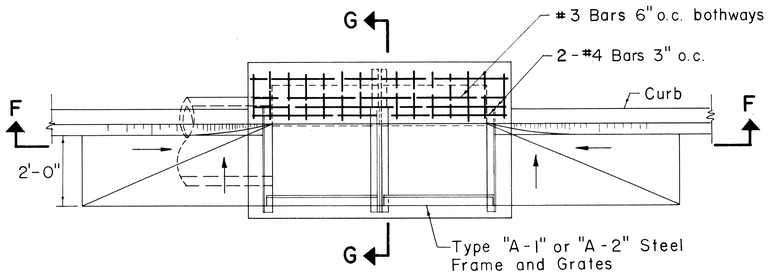
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAWAII	F-056-1(8)	1967	29	64

Revised: Jan. 25, 1967

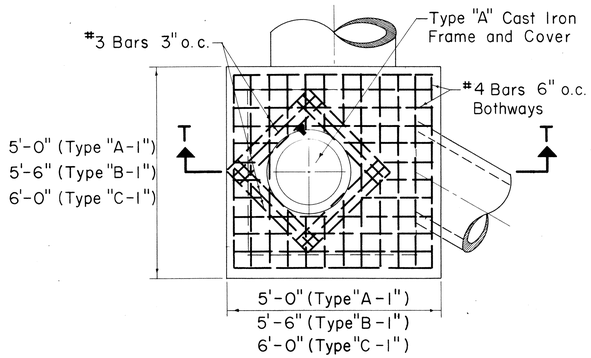


NOTE: See Section "B-B" of Standard Concrete Catch Basin for this Section

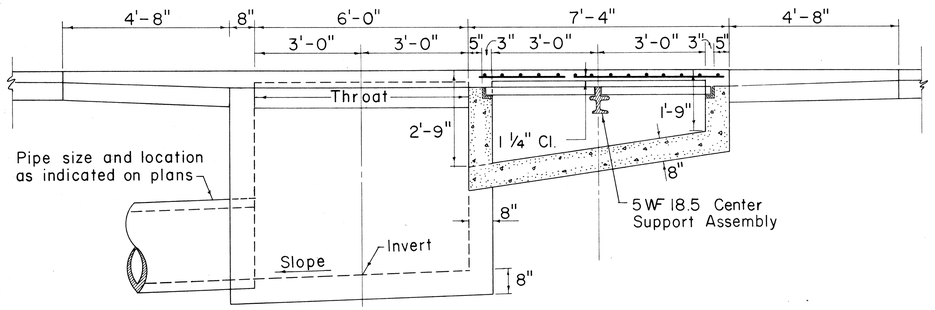
PLAN



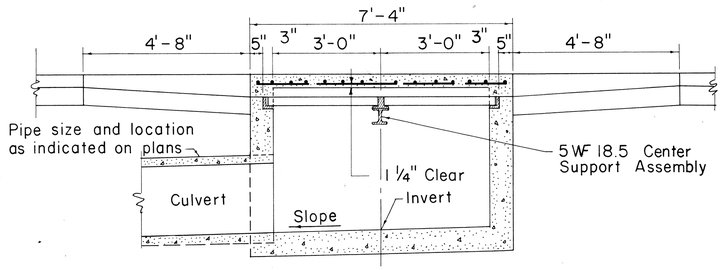
PLAN



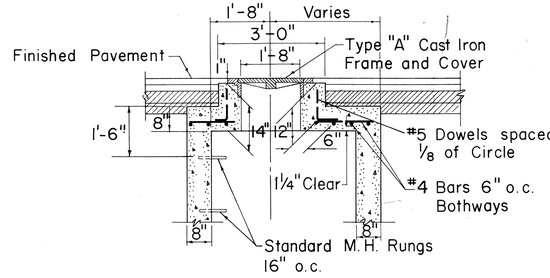
PLAN



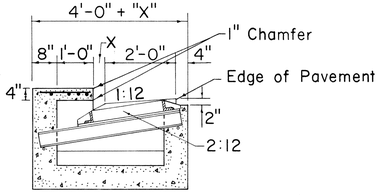
SECTION A-A



SECTION F-F

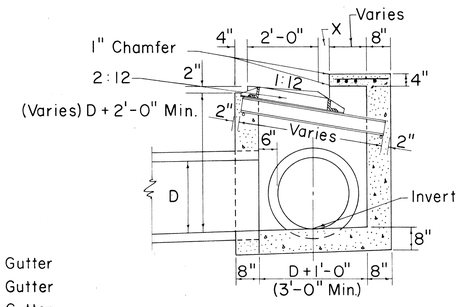


SECTION T-T



SECTION B-B

NOTE:
X = 4" For Type "AG" Curb and Gutter
X = 9" For Type "EG" Curb and Gutter
X = 1" For Type "DG" Curb and Gutter



SECTION G-G

TYPE "A-1", "B-1", & "C-1" STORM DRAIN MANHOLE

TOP DETAIL UNDER PAVEMENT

(BOTTOM DETAIL SIMILAR TO TYPE "A", "B", & "C")

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

DETAIL OF TYPE "CG" CATCH BASIN

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

DETAIL OF TYPE "DG" CATCH BASIN

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS

CATCH BASINS AND STORM DRAIN MANHOLES

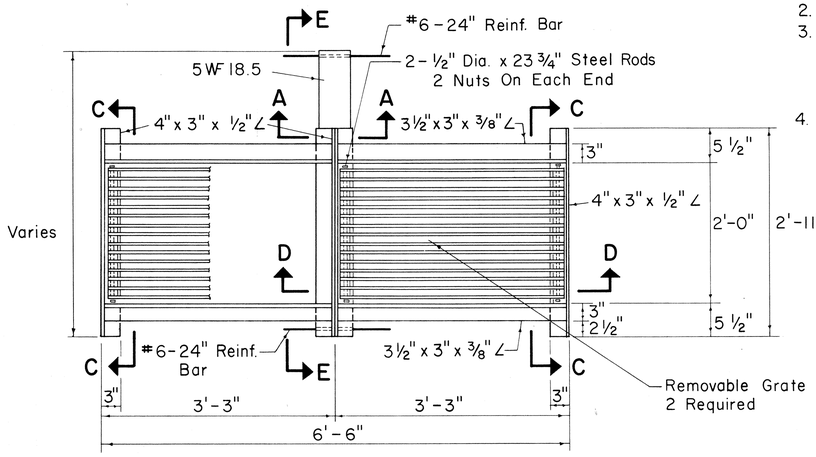
Scales: As Noted Date: July, 1967

SHEET NO. 16 OF 18 SHEETS

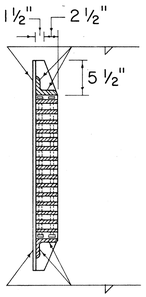
FED. ROAD DIST. NO.	STATE	FED. AID. PROJECT	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAWAII	F-036-1(8)	1967	30	64

Revised: Jan. 25, 1967

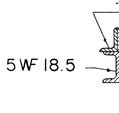
NOTE:
1. All welds $\frac{3}{8}$" unless otherwise noted.
2. All steel shall be structural grade.
3. Grates and Frame shall be hot dip galvanized after fabrication in accordance with Section 44(H) of the Standard Specifications.
4. Detail of Types "A-1" and "A-2" Steel Frame and Grates are identical except for the thickness of end spacers and number of grate bars. See Table of End Spacer Thickness.



PLAN



SECTION C-C



SECTION A-A

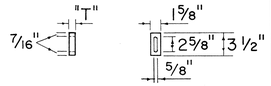
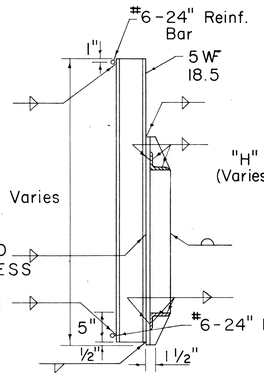


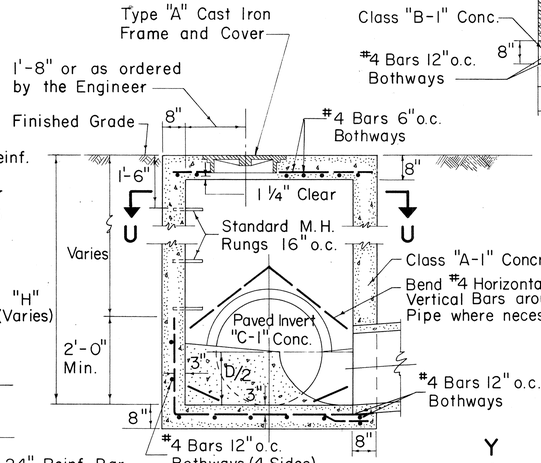
TABLE OF END SPACER THICKNESS

TYPE FRAME & GRATES	"T" (in.)
A-1	1
A-2	1⅜

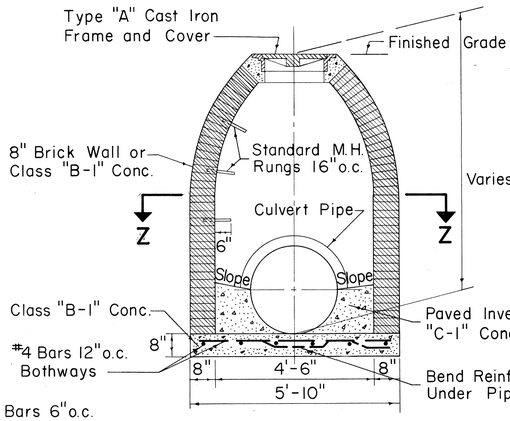
END SPACER



SECTION E-E

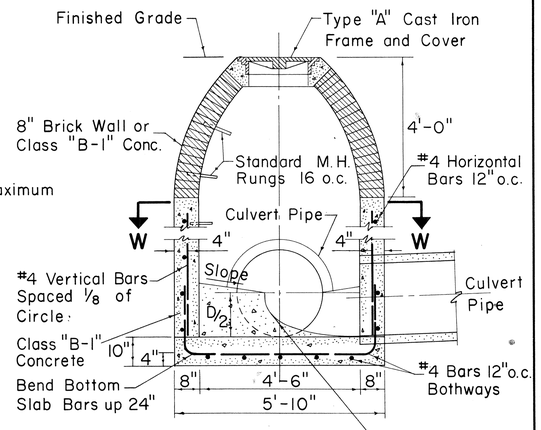


SECTION V-V

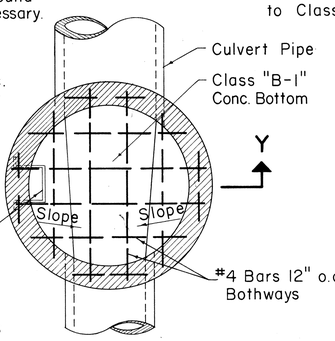


SECTION Y-Y

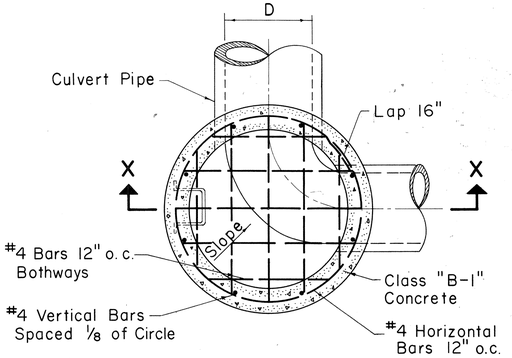
NOTE:
1. Exterior surface of brick wall shall be plastered with 1" thickness of 1:2 Cement Mortar.
2. Number size and direction of culvert pipes at manhole to be as shown on plans.
3. Paved invert not required at drop manholes.
4. All Class "C-1" Concrete to be incidental to Class "B-1" Concrete.



SECTION X-X



SECTION Z-Z



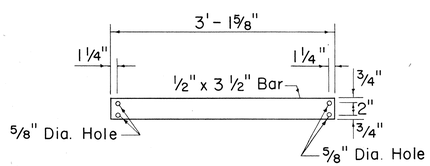
SECTION W-W

TYPE "D" STORM DRAIN MANHOLE

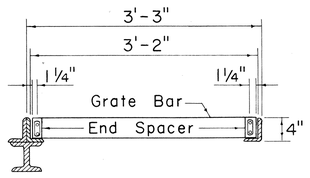
Scale: ½"= 1'-0"

TYPE "E" STORM DRAIN MANHOLE

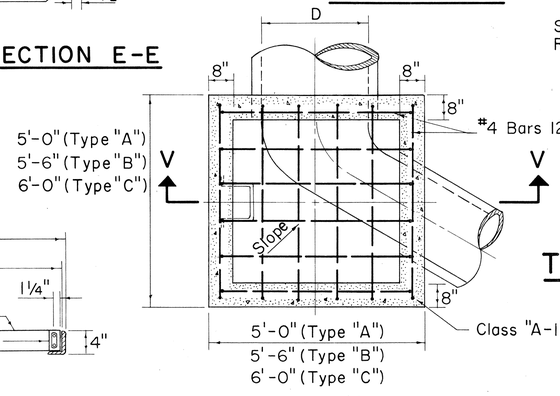
Scale: ½"= 1'-0"



GRATE BARS



SECTION D-D



SECTION U-U

TYPE "A", "B", & "C" S.D.M.H.

Scale: ½"= 1'-0"

DETAIL OF TYPE "A-1" & "A-2" STEEL FRAME AND GRATES

Scale: 1"= 1'-0"

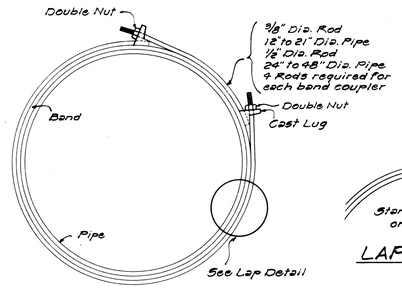
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS

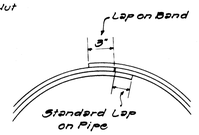
STEEL FRAME AND GRATES AND STORM DRAIN MANHOLES

Scales: As Noted Date: July, 1967

SHEET NO. 17 OF 18 SHEETS

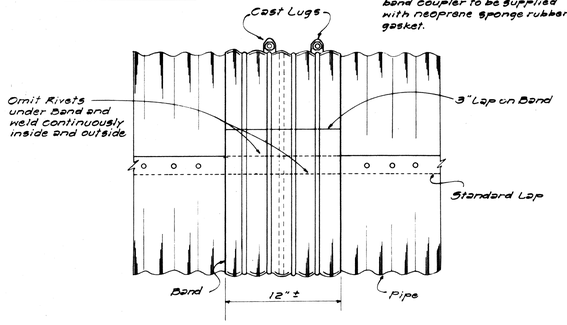


END VIEW



LAP DETAIL

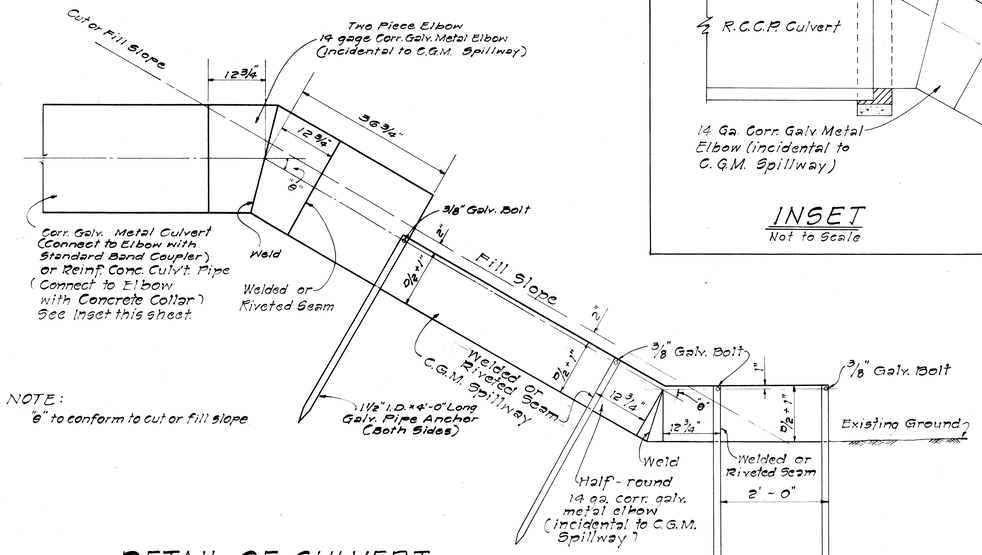
NOTE:
Each watertight band coupler to be supplied with neoprene sponge rubber gasket.



SIDE VIEW

DETAIL OF WATERTIGHT BAND COUPLER

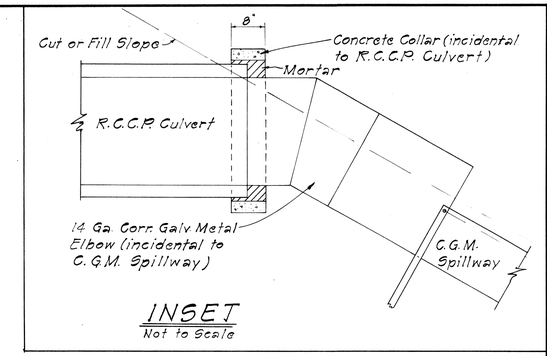
NOT TO SCALE



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

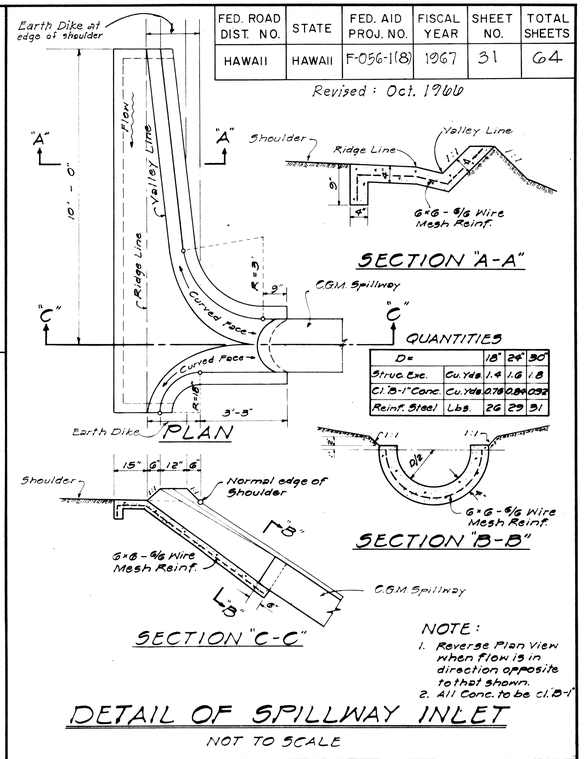
DETAIL OF CULVERT TO SPILLWAY CONNECTION

Not to Scale



INSET

Not to Scale



SECTION "A-A"

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

SECTION "B-B"

SECTION "C-C"

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

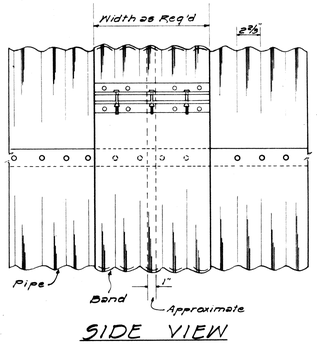
DETAIL OF SPILLWAY INLET

NOT TO SCALE

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAWAII	F-056-1(8)	1967	31	64

Revised : Oct. 1960

BAND DETAIL

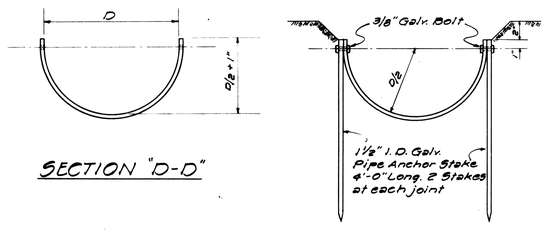


SIDE VIEW

DETAIL OF STANDARD BAND COUPLER

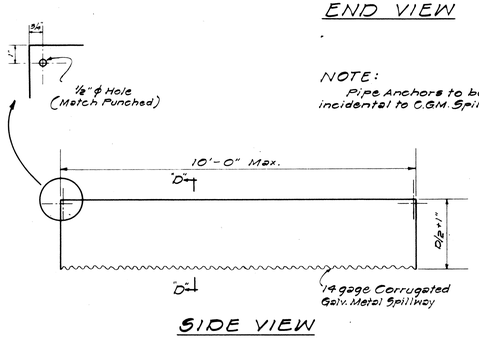
NOT TO SCALE

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	



SECTION "D-D"

END VIEW

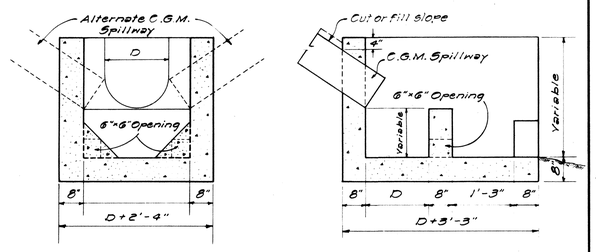


NOTE:
Pipe Anchors to be incidental to C.G.M. Spillway

SIDE VIEW

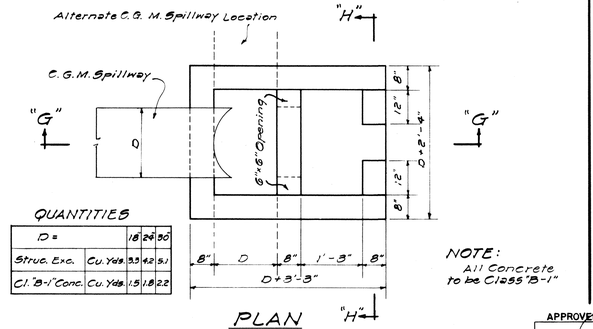
C.G.M. SPILLWAY

NOT TO SCALE



SECTION "H-H"

SECTION "G-G"



QUANTITIES

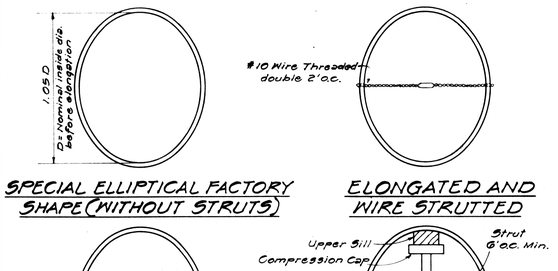
D=		18"	24"	30"
Struc. Exc.	Cu. Yds.	33	42	51
Cl. "B-1" Conc.	Cu. Yds.	15	18	22

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

APPROVED: DATE 8-14-67

DIRECTOR OF TRANSPORTATION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS

CORRUGATED GALVANIZED METAL CULVERTS, SPILLWAYS, AND SPECIAL DETAILS

SCALES AS NOTED

SHEET No. 18 OF 18 SHEETS