FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	RH-1(4)	1963	38	217

LUNALILO FREEWAY - F.A. INTERSTATE PROJECT NO. I-HI-1(4):24

DRAINAGE STRUCTURE LIST

STRUCTURE NUMBER	STRUCTURE C.B. TYPE	STRUCTURE S.D.M.H. TYPE	LOCATION ROAD	LOCATION STATION	LOCATION OFFSET	DETAIL SHT. NUMBER	ELEV. TOP OF CURB (Approx.)	ELEV. FLOOR INVERT	ESTIMATED QUANTITIES: Structure Excavation C.Y.	Class A-1 Concrete C.Y.	Class B-1 Concrete C.Y.	Reinforcing Steel Lbs.	Ditch & Channel Exc. C.Y.	C.I. Frame & Cover Each: Type A	Type B	Type C.I. Frame & Grating Ea.	Steel Frame & Grates Each: Type A	Type B	Type C	Type D	Salvage & Inst. C.I. Frame & Cover Each
1a	IC		℄ O.B.	54+95	75' Rt.	40	~~61.65~~ 61.1	54.00	~~9.6~~ 6.0	~~6.6~~ 3.9		~~309~~ 117		1							
1b	IF		℄ I.B.	54+95	45' Lt.	41	~~62.41~~ 61.9	52.00	~~14.5~~ 11	~~6.8~~ 3.4		~~47~~ 11						1			
1c		Special	℄ I.B.	54+95	45' Lt.	45	** 41.3	34.67	~~0~~ 14	~~3.6~~ 3.3		~~220~~ 183		1							
1d		Special	℄ I.B.	57+25	85' Lt.	46	** 53.0	35.09	~~22.1~~ 43	~~11.1~~ 10.2		~~1486~~ 1375		1							
(5) 2	C		2nd Ave.	11+19	14' Lt.	49	52.8	48.46	~~14.2~~ 16	~~4.7~~ 5.0		~~117~~ 156			1						
3	Special		℄ I.B.	58+92	75' Lt.	42	51.9	44.00	~~26.4~~ 17	~~10.0~~ 7.4		~~571~~ 486		1							
4	IF		℄ O.B.	58+92	4.5 Rt.	41	55.1	49.00	~~11.1~~ 18	~~3.0~~ 4.3		~~47~~ 50						1			
5		Special	℄ I.B.	60+50	73' Lt.	47	53.7	45.74	~~16.2~~ 21	~~4.9~~ 4.1		~~231~~ 277		1							
(5) 6	B		Beleser St.	11+74	19' Rt.	49	52.2	47.13	~~17.1~~ 18	~~4.8~~ 5.4		~~117~~ 156			1						
7	IA		℄ I.B.	62+40	75' Lt.	40	59.3	48.49	~~39.7~~ 49	~~11.6~~ 11.9		~~441~~ 591		1							
8	IF		℄ O.B.	62+40	4.5' Rt.	41	62.5	57.00	~~11.0~~ 16	~~3.8~~ 3.9		~~47~~ 59						1			
9		IS	℄ O.B.	~~63+35~~ ~~63+60~~	3' Rt.	44	66.2	~~55.50~~ 49.50	~~42.7~~ 51	~~6.1~~ 11.1		~~402~~ 796		1							
10	IF		℄ O.B.	66+50	4.5' Rt.	41	75.1	61.92	~~34.2~~ 41	~~8.9~~ 9.0		~~67~~ 76									1
11	IA		℄ I.B.	67+00	75' Lt.	40	75.1	64.08	~~42.8~~ 49	~~10.5~~ 12.0		~~386~~ 570		1							
(5) 12	D		4th Ave.	12+33	10' Lt.	49	82.5	76.00	~~13.4~~ 18	~~4.6~~ 5.0		~~79~~ 83			1						
13		C-1	℄ I.B.	68+20	72' Lt.	50	78.8	69.25	~~20.2~~ 27	~~5.2~~ 4.9		~~172~~ 373		1							
14	IE		℄ O.B.	68+80	71' Rt.	40	81.0	75.00	~~0.8~~ 15	~~3.6~~ 3.9		~~42~~ 26									1
15	IG		℄ I.B.	70+50	77' Lt.	41	86.1	77.00	~~22.6~~ 27	~~5.9~~ 6.3		~~177~~ 223								1	
(5) 16	B		Kikeke Ave.	12+20	16' Rt.	49	93.6	88.00	~~18.4~~ 19	~~5.4~~ 5.8		~~117~~ 159			1						
17	IA		℄ I.B.	71+25	60' Lt.	40	88.5	80.28	~~33.1~~ 39	~~10.2~~ 10.1		~~386~~ 570		1							
18		A	℄ O.B.	71+00	90' Rt.	50	87.7	81.60	~~5.4~~ 13	~~3.6~~ 3.3		~~125~~ 186		1							
19	A		℄ O.B.	~~71+92.51~~ 71+91	68' Rt.	49	90.4	84.09	~~7.5~~ 27	~~7.1~~ 7.5		~~156~~ 187			1						
20	IE		Ramp GA	3+25	20' Rt.	40	94.2	88.25	~~8.2~~ 15	~~3.8~~ 3.9		~~26~~ 26									1
(5) 21	B		5th Ave.	12+23	15' Rt.	49	100.1	95.35	~~12~~ 17	~~4.5~~ 5.2		~~117~~ 159			1						
22		C-1	℄ I.B.	73+23	60' Lt.	50	93.2	86.05	~~14.4~~ 19	~~4.9~~ 3.7		~~172~~ 288		1							
23	IA		℄ I.B.	75+94	63' Lt.	40	97.5	89.97	~~28.5~~ 37	~~8.6~~ 9.7		~~386~~ 570		1							
24	IA		℄ O.B.	77+29	63' Rt.	40	99.8	92.51	~~26.6~~ 34	~~9.0~~ 9.8		~~386~~ 550		1							
25	IA		℄ O.B.	80+85	63' Rt.	40	113.3	103.00	~~31.3~~ 41	~~11.1~~ 11.4		~~386~~ 547		1							
26	IA		℄ I.B.	81+90	63' Lt.	40	118.5	113.41	~~17.8~~ 24	~~6.4~~ 7.4		~~338~~ 467		1							
27		IS	℄ I.B.	~~87+82.5~~ ~~81+80~~	~~3.0~~ 1.5 Lt.	44	119.3	112.45	~~19.9~~ 22	~~5.6~~ 5.1		~~317~~ 491		1							
28		IS	℄ I.B.	85+86	~~3.0~~ 1 Lt.	44	139.5	132.56	~~18.4~~ 23	~~5.2~~ 5.1		~~317~~ 512		1							
29	A		℄ O.B.	86+20	67' Rt.		139.8	134.00	~~20.3~~ 26	~~6.6~~ 6.8		~~124~~ 156			1						

** Ground Elevation

STRUCTURE NUMBER	STRUCTURE C.B. TYPE	STRUCTURE S.D.M.H. TYPE	LOCATION ROAD	LOCATION STATION	LOCATION OFFSET	DETAIL SHT. NUMBER	ELEV. TOP OF CURB (Approx.)	ELEV. FLOOR INVERT	ESTIMATED QUANTITIES: Structure Excavation C.Y.	Class A-1 Concrete C.Y.	Class B-1 Concrete C.Y.	Reinforcing Steel Lbs.	Ditch & Channel Exc. C.Y.	C.I. Frame & Cover Each: Type A	Type B	Type C.I. Frame & Grating Ea.	Steel Frame & Grates Each: Type A	Type B	Type C	Type D	Salvage & Inst. C.I. Frame & Cover Each
30	B		℄ I.B.	86+20	67' Lt.	49	139.8	134.49	~~20~~ 21	~~5.3~~ 5.7		~~126~~ 187			1						
(4) (5) 31	D		8th Ave.	12+53	10' Lt.	49	142.4	136.50	~~16.9~~ 17	~~4.6~~ 4.8		~~83~~ 88			1						
32	IA		℄ I.B.	89+60	63' Lt.	40	156.7	151.61	~~6.8~~ 24	~~6.5~~ 7.5		~~338~~ 446		1							
33		Special	℄ I.B.	~~89+74~~ ~~89+75~~	1.5' Lt.	44	158.8	~~137.09~~ 138.31	~~45.3~~ 51	~~13.6~~ 12.4		~~2091~~ 2100		1							
34	A		℄ O.B.	~~90+27~~ ~~90+35~~	67' Rt.	49	160.4	145.60	~~42.1~~ 45	~~11.3~~ 12.0		~~124~~ 199						1			
(5) 35	D		9th Ave.	14+02	11' Rt.	49	158.2	154.13	~~10.8~~ 16	~~3.4~~ 3.7		~~78~~ 88			1						
36		Special	℄ I.B.	95+37	1' Lt.	48	179.2	~~149.29~~ 150.31	~~24.7~~ 27	~~20.2~~ 19.5		~~2018~~ 2340		1							
37	DG		℄ O.B.	95+37	63' Rt.	50	178.1	171.00	~~25~~ 17	~~4.3~~ 5.9		~~36~~ 46						1			
38	IE		℄ I.B.	95+48	63' Lt.	40	178.1	172.00	~~11.6~~ 15	~~3.9~~ 4.0		~~24~~ 26									1
39		IS	℄ I.B.	~~99+24~~ ~~99+25~~	1' Lt.	44	183.1	171.05	~~33.1~~ 37	~~7.6~~ 8.3		~~401~~ 693		1							
40	IA		℄ I.B.	100+15	51' Lt.	40	182.9	176.50	~~10.1~~ 28	~~7.6~~ 8.3		~~368~~ 446		1							
41	DG		℄ O.B.	99+75	63' Rt.	50	182.3	176.50	~~8.9~~ 15	~~3.8~~ 3.2		~~42~~ 67						1			
(5) 42	C		11th Ave.	14+04	17' Rt.	49	175.9	171.83	~~12.9~~ 15	~~4.5~~ 4.9		~~117~~ 156			1						
43		A	℄ O.B.	102+10	80' Rt.	50	184.5	178.92	~~9.5~~ 12	3.1		~~125~~ 156		1							
44	Special		℄ O.B.	102+89	60' Rt.	43	185.8	179.75	~~32.7~~ 34	9.5		~~324~~ 333			1						
(6) 45	IE		Ramp KO	4+03	19' Rt.	40	~~189.26~~ 189.0	181.00	~~14.0~~ 18	~~4.8~~ 4.9		~~24~~ 47									1
46	DG		12th Ave.	14+54	20' Rt.	50	199.3	192.00	~~16.0~~ 18	~~4.4~~ 4.0		~~36~~ 46						1			
47	Special		7th Ave.	11+87.5	13' Rt.	43	136.3	131.40	~~6.2~~ 7	1.7		~~57~~ 82							1		
(5) 48	D		7th Ave.	11+87.5	17' Lt.	49	136.7	130.00	~~18.6~~ 21	~~4.8~~ 5.5		~~78~~ 119			1						
49		Special	7th Ave.	12+40	24' Lt.	45	135.5	124.50	~~18.8~~ 20	5.1		~~246~~ 255		1							
(1) (2) 50	Conc. Drop Intake		℄ O.B.	~~92+40~~ ~~92+00~~	72' Rt.	42	149.3	~~148.00~~ 147.25	~~3.1~~ 4		0.9 1.0	~~0~~ 9	~~21.0~~ 27		1						
(3) (5) ~~51~~	~~D~~		~~5th Ave.~~	~~14+07~~	~~17' Lt.~~	~~49~~	~~97.1~~	~~93.96~~	10	3.0		~~89~~									1
									~~371.8~~ 635.4	~~130.0~~ 207.7	0.9	~~7,636~~ +8,311	21.0								
TOTALS									1,007.2	340	0.9	15,947	21.0								

NOTE: Explanations of encircled numbers as indicated in the Structure Number column, as follow:

(1) Quantity for Conc. Drop Intake includes Ditch & Channel Exc. for Swales No. 1 & 2.
(2) Invert of Swale = Top of Structure.
(3) Provision made for 18" Pipe entering side.
(4) For Special Throat detail, see Sht. No. 42
(5) Includes quantity for Cast-in-Place Curb sections adjacent to C.B.
(6) Top of Curb elevation = Top of Grate elevation.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
DRAINAGE STRUCTURE LIST
LUNALILO FREEWAY PROJ. NO. I-HI-1(4):24

SHEET NO. 38 OF SHEETS

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

LIETZ 1103 ARKWRIGHT TRACING CLOTH 10-60 200P

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(4)	1968	30	217

LUNALILO FREEWAY – F.A. INTERSTATE PROJECT NO. I-HI-1(4):24

CULVERT LIST

PIPE CULVERT ALTERNATES

LOCATION** STRUCTURE TO STRUCTURE	INVERT ELEVATION INLET	INVERT ELEVATION OUTLET	~~REINFORCED CONCRETE CULVERT PIPE (RCCP)~~ LENGTH IN LINEAR FEET ~~24" Cl. III~~	~~24" Cl. IV~~	~~30" Cl. IV~~	~~36" Cl. IV~~	~~42" Cl. IV~~	~~48" Cl. IV~~	CORRUGATED GALVANIZED METAL PIPE CULVERTS (CGMP) LENGTH IN LINEAR FEET 24" 14 Ga.	30" 14 Ga.	36" 12 Ga.	42" 12 Ga.	48" 12 Ga.	54" 12 Ga.	STRUC. EXC. C.Y.	G.R.P. SEAL C.Y.		
C.B.#1a — C.B.#1b	54.00	52.00		~~74~~					~~72.0~~ 74						~~48.3~~ 50			G8
C.B.#1b — M.H.#1c	52.00	~~37.21~~ 37.50		~~42~~					42						~~40.2~~ 30			36
C.B.#2 — C.B.#3	48.46	46.00	~~38*~~						~~36.0~~ 38*						~~30.4~~ 45	~~4.3~~		36
C.B.#4 — C.B.#3	49.00	44.50		~~70~~					~~71.4~~ 70						~~66.1~~ 60			35
C.B.#6 — M.H.#5	47.13	46.13	~~32~~						32						~~70.5~~ 35			35
C.B.#7 — M.H.#5	48.49	45.74						~~180~~						~~181.0~~ 180	~~285.5~~ 300			33
C.B.#8 — C.B.#7	57.00	54.00		~~70~~					~~72.6~~ 70						~~38.0~~ 45			35
M.H.#9 — C.B.#7	~~55.50~~ 49.50	~~51.00~~ 48.49						~~136~~						~~118.0~~ 136	~~239.3~~ 450			33
C.B.#10 — M.H.#9	61.92	~~58.00~~ 55.50						~~286~~						~~312.0~~ 286	~~709.5~~ 800			33
C.B.#11 — C.B.#10	64.08	61.92						~~86~~						~~90.5~~ 86	~~200.2~~ 230			33
C.B.#12 — M.H.#13	76.00	73.00	~~28*~~						28*						~~21.7~~ 25	~~3.3~~		72
M.H.#13 — C.B.#11	69.25	66.33						~~116~~					~~115.0~~ 116		~~204.5~~ 240			30
C.B.#14 — M.H.#13	75.00	73.00		~~146~~						~~151.8~~ 146					~~117.6~~ 100			34
C.B.#15 — M.H.#13	77.00	71.58						~~226~~					~~223.3~~ 226		~~361.2~~ 370			29.30
C.B.#16 — C.B.#15	88.00	81.00	~~24*~~						~~28*~~ 24						~~26.9~~ 30	~~2.8~~		36
C.B.#17 — C.B.#15	80.28	77.69						~~72~~					~~75.3~~ 72		~~113.7~~ 120			30
M.H.#18 — C.B.#14	81.60	75.00		~~218~~					~~216.0~~ 218						~~118.8~~ 110			35
C.B.#19 — M.H.#18	84.09	83.00		~~88~~					~~90.5~~ 88						~~52.1~~ 40			35
C.B.#20 — C.B.#19	88.25	84.50		~~50~~					~~48.0~~ 50						~~27.4~~ 40			35
C.B.#21 — M.H.#22	95.35	89.05	~~40*~~						~~44.0~~ 48*						~~36.6~~ 50	~~4.8~~		36
M.H.#22 — C.B.#17	86.05	80.28						~~196~~					~~193.8~~ 196		~~299.9~~ 320			30
C.B.#23 — M.H.#22	89.97	86.05						~~264~~					~~266.7~~ 264		~~381.8~~ 420			30
C.B.#24 — C.B.#23	92.51	89.97						~~186~~					~~181.0~~ 186		~~273.9~~ 310			30
C.B.#25 — C.B.#24	103.00	92.51				~~356~~							~~350.1~~ 356		~~530.9~~ 570			64
C.B.#26 — M.H.#27	113.41	113.15	~~56~~						~~58~~ 56						~~37.7~~ 50			70
M.H.#27 — C.B.#25	112.45	106.67				~~112~~					~~114~~ 112				~~154.6~~ 140			67
M.H.#28 — M.H.#27	132.56	112.45				~~404~~					400	c.o.#3 ~~404~~			~~526.6~~ 600			67
C.B.#29 — M.H.#28	134.00	133.00		~~74~~					~~76~~ 74						~~50.5~~ 45			70
C.B.#30 — M.H.#28	134.49	133.00		~~70~~					70						~~46.2~~ 45			68
C.B.#31 — C.B.#30	136.50	135.00	~~16*~~						~~18.0~~ 16*						~~7.9~~ 9	1.3		68
C.B.#32 — M.H.#33	151.61	149.50		~~58~~					~~60.3~~ 58						~~37.9~~ 44			35
M.H.#33 — M.H.#28	~~137.09~~ ~~138.31~~	132.56				~~388~~					~~383.9~~ 388				~~1031.4~~ 1000			67.24

** Inlet to Outlet of Pipe
* Pipe with GRP Seal. For Detail See Sht. 16

PIPE CULVERT ALTERNATES

LOCATION STRUCTURE TO STRUCTURE	INVERT ELEVATION INLET	INVERT ELEVATION OUTLET	~~REINFORCED CONCRETE CULVERT PIPE (RCCP)~~ LENGTH IN LINEAR FEET ~~24" Cl. III~~	~~24" Cl. IV~~	~~30" Cl. IV~~	~~36" Cl. IV~~	~~42" Cl. IV~~	~~48" Cl. IV~~	~~18" Cl. IV~~	CORRUGATED GALVANIZED METAL PIPE CULVERTS (CGMP) LENGTH IN LINEAR FEET 24" 14 Ga.	30" 14 Ga.	36" 12 Ga.	42" 12 Ga.	48" 12 Ga.	54" 12 Ga.	18" 14 Ga.	STRUC. EXC. C.Y.	G.R.P. SEAL C.Y.	Class B-1 Conc. C.Y.	Quantity BY #1 Pipe for CGMP
C.B.#34 — M.H.#33	145.60	145.00		~~80~~						~~82.0~~ 80							~~154.0~~ 160			36
C.B.#35 — C.B.#34	154.13	153.63	~~8~~							8							~~3.3~~ 5			68
M.H.#36 ① — M.H.#33	~~149.29~~ 150.31	~~137.09~~ 138.31				~~566~~						~~5559~~ 566					~~1375.4~~ 1000			24
C.B.#37 — M.H.#36	171.00	169.75		~~60~~						~~64.0~~ 60							~~31.0~~ 40			68
C.B.#38 — M.H.#36	172.00	169.75		~~50~~						~~56.0~~ 50							~~29.9~~ 40			68
M.H.#39 — M.H.#36	171.05	165.00			~~332~~							~~382.0~~ 392					~~371.4~~ 350			53
C.B.#40 — M.H.#39	176.50	175.50		~~100~~						100							~~51.4~~ 65			35
C.B.#41 — M.H.#39	176.50	175.70		~~80~~							~~84.0~~ 80						~~57.8~~ 50			34
C.B.#42 — M.H.#39	171.83	171.05		~~78*~~						~~82.0~~ 78*							~~40.3~~ 35			34
M.H.#43 ② — C.B.#41	178.92	176.50		~~234~~							~~232.0~~ 234						~~172.2~~ 120			34
C.B.#44 — M.H.#43	179.75	178.92		~~78~~						78							~~56.9~~ 55			68
C.B.#45 — C.B.#44	181.00	180.39		~~118~~						116							~~108.6~~ 95			35
C.B.#46 — C.B.#45	192.00	~~184.75~~ ~~185.75~~		NA						~~48.0~~ 50*							~~53.5~~ 85			70
C.B.#47 — C.B.#48	131.40	130.50		~~28~~						~~30.0~~ 28							~~23.2~~ 25			68
C.B.#48 — M.H.#49	130.00	129.00		~~50~~						50							~~44.3~~ 50			68
M.H.#49 — C.B.#26	124.50	115.25	~~34*~~							34							~~17.8~~ 45	~~4.2~~		70
D.I.#50 — C.B.#34	~~148.00~~ 147.25	~~146.99~~ 145.60							~~166~~							~~210.0~~ 166	~~204.4~~ 190			45
~~C.B.#51~~ ③ Exist. 5th Ave. M.H.	93.96	93.46							~~18~~							N.A.	10		2.0	
MH#1d to end Temporary drain C.O.#1													230							53
Total →										~~1762.8~~ NA 48	467.8	612.0		12 Gauge ~~897.9~~ 555.9 10 Gauge	1405.2	701.5	210.0			

BOX CULVERT (Replaced with 60" C.G.M.P.)

LOCATION STRUCTURE TO STRUCTURE	INVERT ELEVATION INLET	INVERT ELEVATION OUTLET	ESTIMATED QUANTITIES LENGTH LN. FT.	CLASS A-1 CONCRETE C.Y.	REINFORCING STEEL LBS.	STRUCTURAL EXCAVATION C.Y.	UNTREATED BASE FOR STRUCTURAL FOUNDATION C.Y.	Quantity BY #1 Pipe for CGMP
M.H.#1d ④ — BTA	35.09	31.71	135	~~61~~	~~7655~~	~~187.2~~ 180	~~5~~	4.3
C.B.#3 — M.H.#1d	44.00	40.00	~~157.9~~ 180	~~72~~	~~9053~~	~~398.8~~ 320	~~15~~	4.3
M.H.#5 — C.B.#3	45.74	44.00	~~149.3~~ 152	~~68~~	~~8600~~	~~284.9~~ 265	~~20~~	4.3
	Total 60" C.G.M.P.		442.2			1,010.9		
						9,012.7		
	Total Struc. Exc. Pipe Culvert					10,023.6 C.Y.		

NOTE: Explanation of the encircled numbers as indicated in the "LOCATION" column is as follows:

① 566 lin. ft. of CGMP is 42" 10 ga. instead of 42" 12 ga.
② Pipe to be aligned so that the minimum clearance between the pipe culvert and Wall No. 11 O.B. is two (2) feet.
③ Concrete jacket quantity for 18" Class IV RCCP is included in this line.
④ BTA = Box Terminal-A located at ℄ Sta. 55+89 (I.B.) Offset = 102 ft. left.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION

CULVERT LIST

LUNALILO FREEWAY — PROJ. NO. I-HI-1(4):24

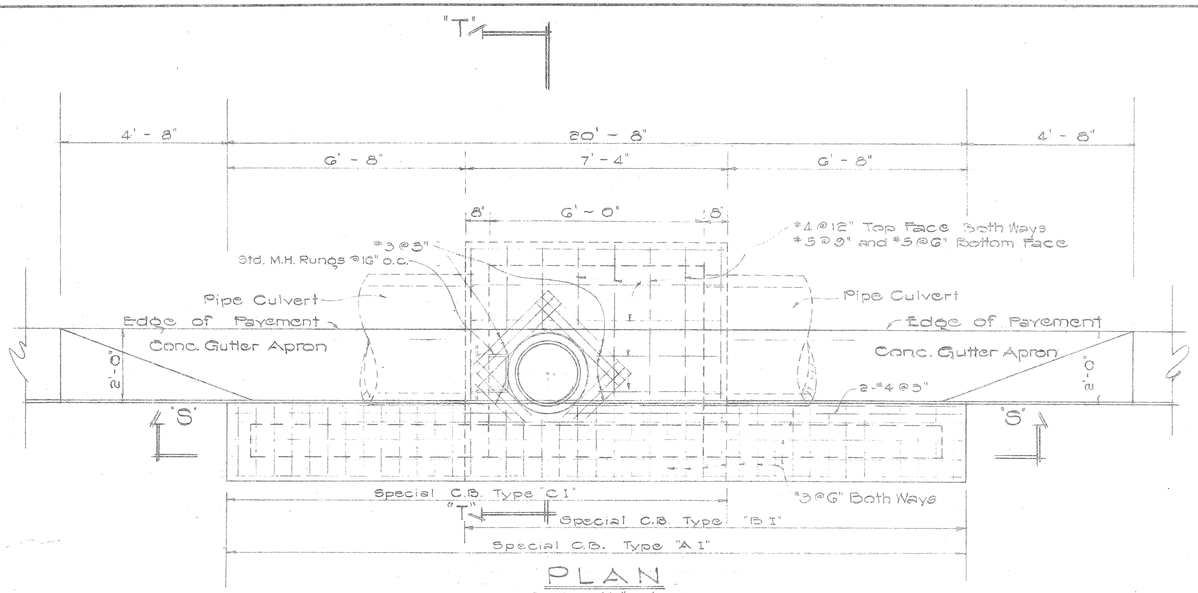
SHEET NO. OF SHEETS

33

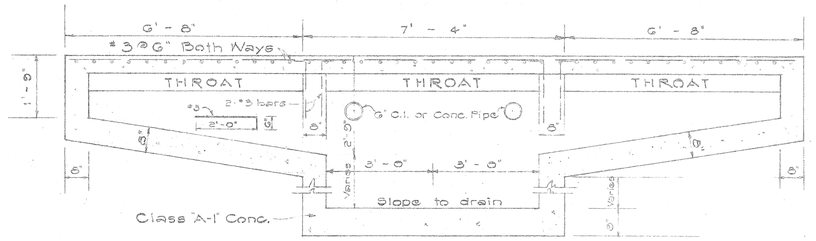
ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	
	TRACED BY	
	DESIGNED BY	
NOTE BOOK	QUANTITIES BY	
No.	CHECKED BY	

LIETZ 1153 ARKWRIGHT TRACING CLOTH 10-60 200P

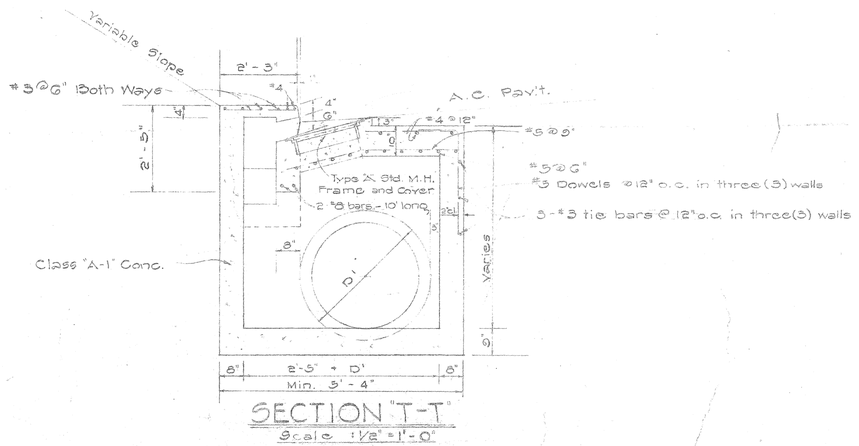
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(4)	1963	40	617



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

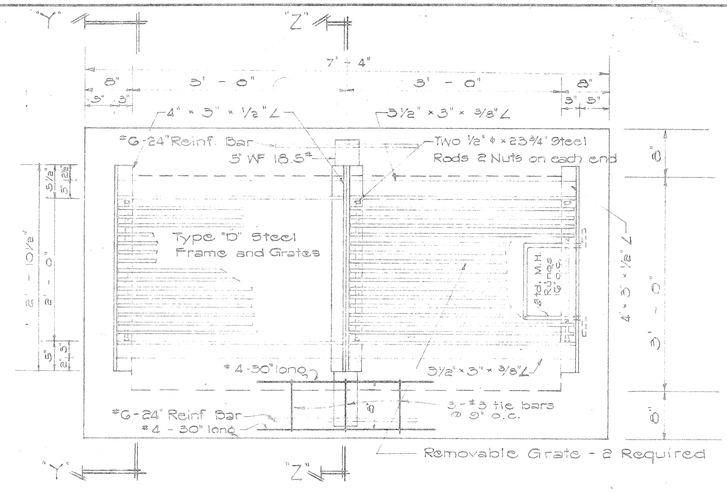


SECTION - "S-S"
Scale : 1/2" = 1'-0"



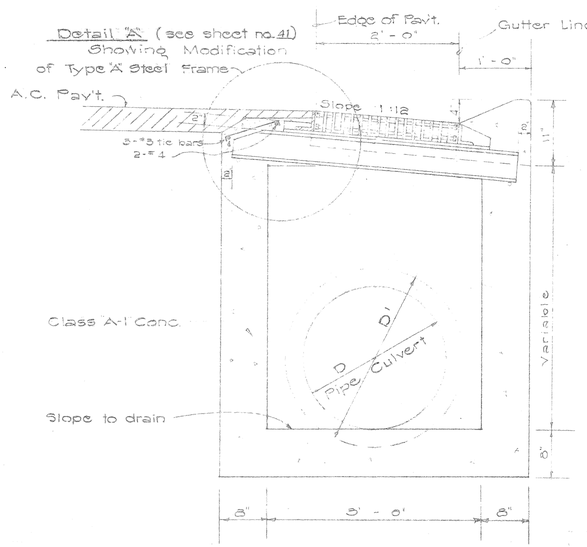
SECTION "T-T"
Scale : 1/2" = 1'-0"

CATCH BASIN TYPE "IA", "IB" & "IC"

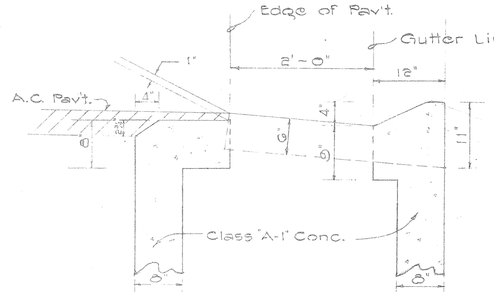


PLAN
Scale : 1" = 1'-0"

NOTE:
1. Location of Frame and Cover and/or Standard manhole runges for Catch Basins "IA", "IB", "IC" and "IE" to be determined by the Engineer.
2. Type "D" Steel frame and grates similar to Type "A" frame and grates except for modifications in frame dimensions as shown on the Plan View and in Detail "A".



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



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

CATCH BASIN TYPE "IE"
Scale : As Noted

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE STRUCTURE DETAILS
TYPE "IA", "IB", "IC" & "IE" CATCH BASINS

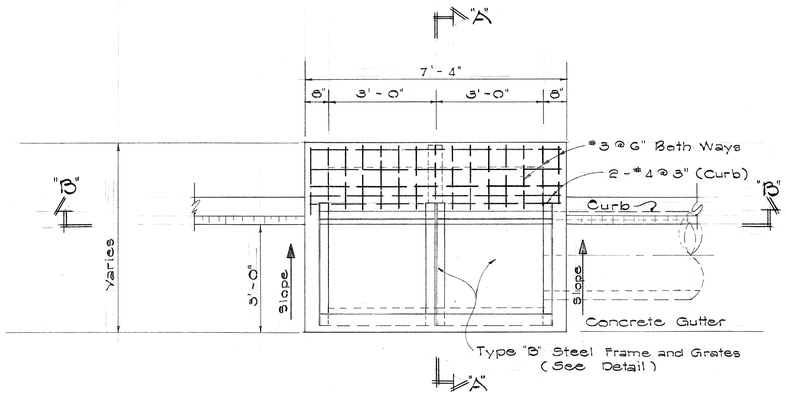
LUNALILO FREEWAY — PROJ. NO. I-HI-1(4):24

SCALE: AS SHOWN — DATE: APRIL, 1963

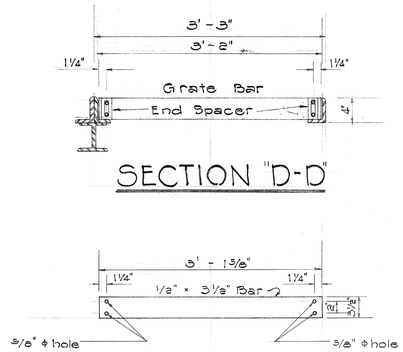
SHEET No. OF SHEETS

PRINTED ON CLEARPRINT 1000-H

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(4)	1963	41	217

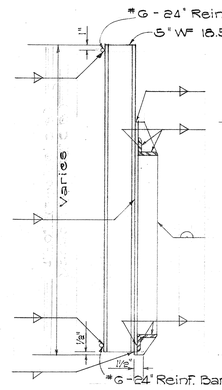


PLAN

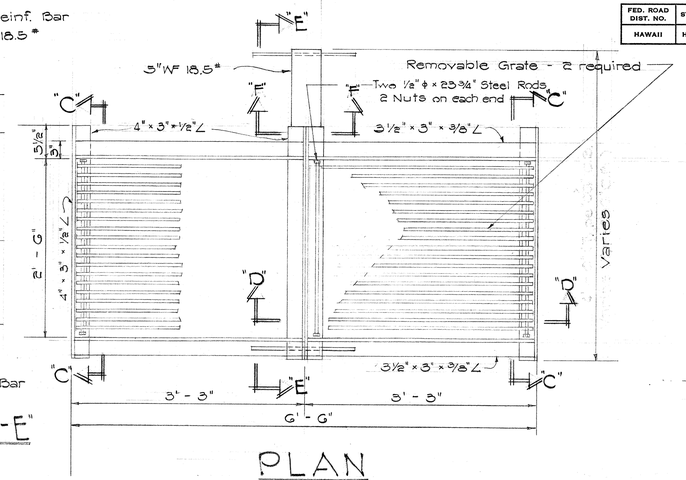


GRATE BARS

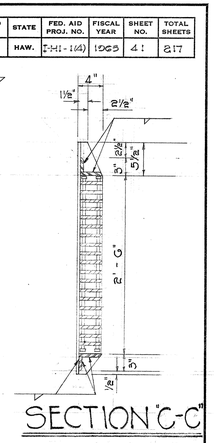
NOTE:
1. All welds ⅜" unless otherwise noted.
2. All steel shall be structural grade.
3. Grates and frame shall be hot dip galvanized after fabrication in accordance with Section 44(H) of the Standard Specifications.



SECTION "E-E"



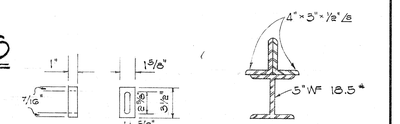
PLAN



SECTION "C-C"

DETAIL OF TYPE "B" STEEL FRAME AND GRATES

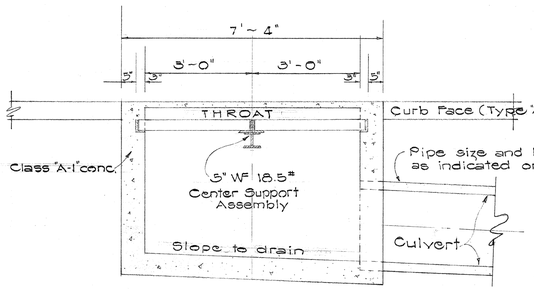
Scale : 1" = 1'-0"



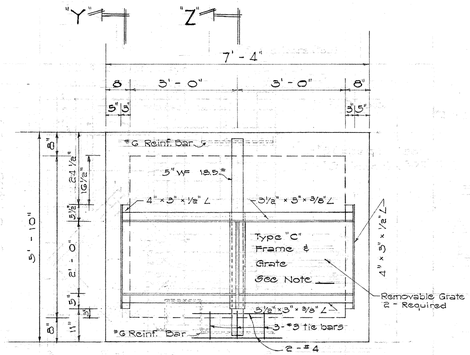
SECTION "F-F"

END SPACER

Scale : 1½" = 1'-0"



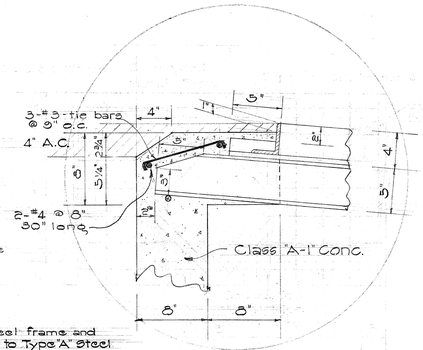
SECTION "B-B"



PLAN

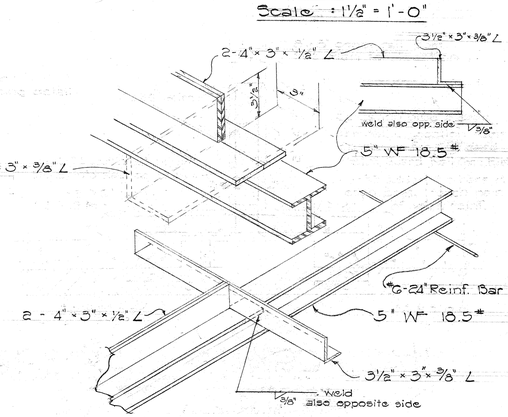
Scale: ⅛"=1'-0"

NOTE:
Type "C" Steel frame and grates similar to Type "A" Steel frame and grates except for centerpiece. For centerpiece details, see Detail "A" and View "X".



DETAIL "A"

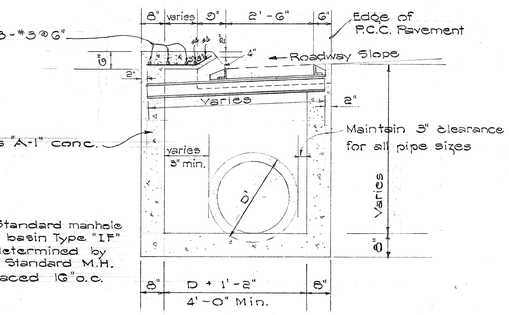
Scale : 1½" = 1'-0"



VIEW "X"

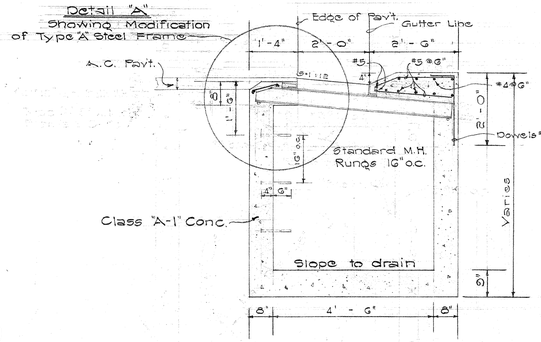
TYPE "C" FRAME

Not To Scale



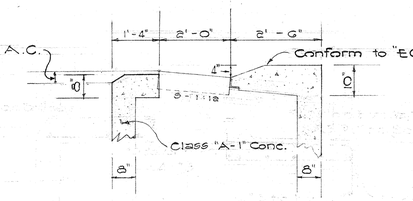
SECTION "A-A"

NOTE:
Location of Standard manhole rungs for catch basin Type "IF" and "IG" to be determined by the Engineer. Standard M.H. rungs to be spaced 16" o.c.



SECTION "Z-Z"

Scale: ½"=1'-0"



SECTION "Y-Y"
END SECTION

Scale : ⅛"=1'-0"

DETAIL OF TYPE "IF" CATCH BASIN

Scale : ½" = 1'-0"

DETAIL OF TYPE "IG" CATCH BASIN

Scale : As Noted

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE STRUCTURE DETAILS
TYPE "B" FRAME & GRATES
TYPE "IF" & "IG" CATCH BASINS

LUNALILO FREEWAY — PROJ. NO. I-HI-1(4):24

SCALE : AS SHOWN — DATE: APRIL, 1963

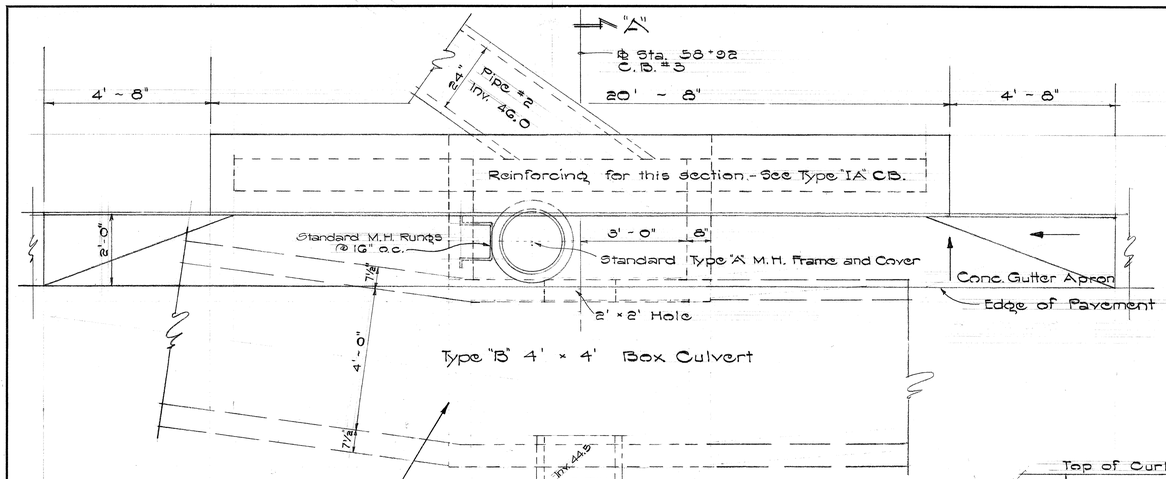
SHEET No. OF SHEETS

41 1

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	"
	TRACED BY	"
NOTE BOOK	DESIGNED BY E. Bodner	Feb. 1963
	QUANTITIES BY	"
No.	CHECKED BY	"

PRINTED ON CLEARPRINT 1000-H

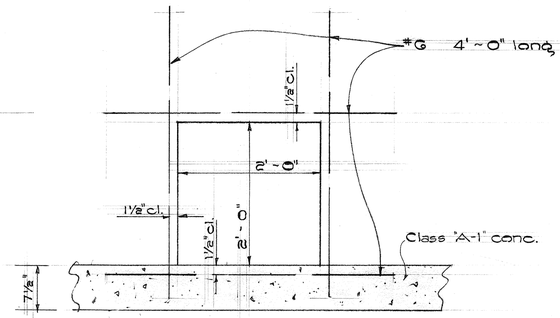
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(4)	1963	42	217



PLAN

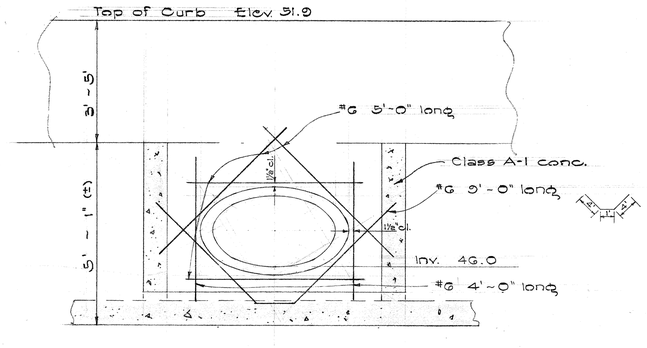
Scale: ½"=1'-0"

BOX CULVERT ELIMINATED
SEE PAGE 42-B



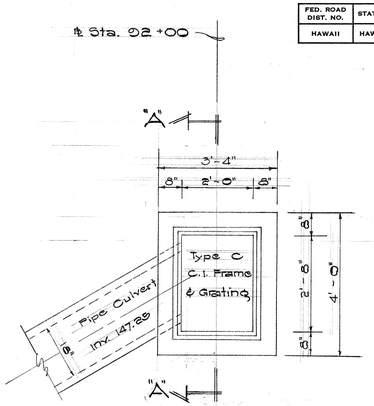
ADD'L. REINFORCEMENT
@ 2' x 2' OPENING

Scale: 1" = 1'-0"



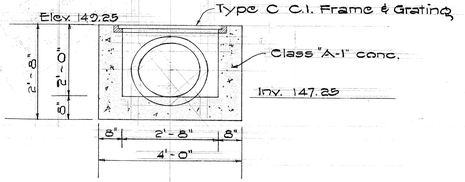
ADD'L. REINFORCEMENT @ PIPE #2

Scale: ½" = 1'-0"



PLAN

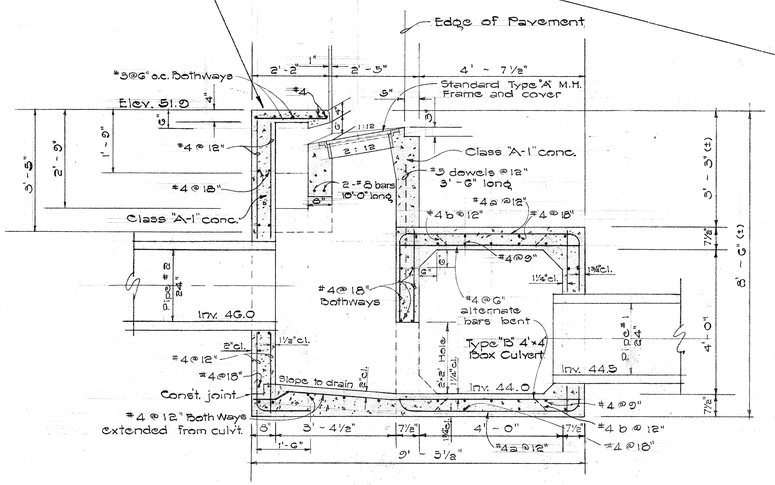
Scale: ½"=1'-0"



SECTION "A-A"

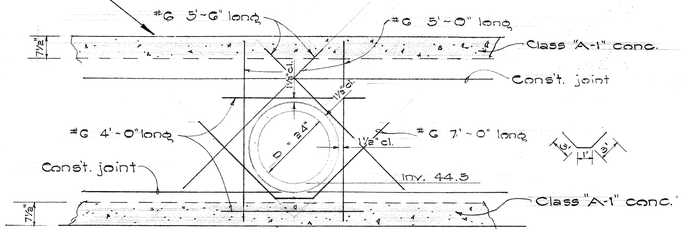
Scale: ½"=1'-0"

DROP INTAKE #50
℄ STA. 92+00 (O.B.)



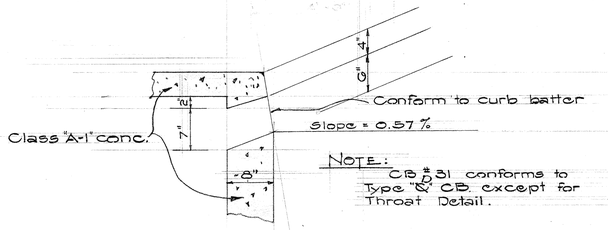
SECTION "A-A" THRU ℄ PIPES
#1 and #2 ALSO 2' x 2' HOLE

Scale: ½" = 1'-0"



ADD'L. REINFORCEMENT @ SECTION
PIPE #1 MEETS BOX CULVERT

Scale: ½" = 1'-0"



NOTE:
CB #31 conforms to Type "B" CB except for Throat Detail.

SPECIAL THROAT DETAIL
FOR C.B. #31 ~ 8th AVE. STA. 12+52

Scale: 1" = 1'-0"

SPECIAL CATCH BASIN
℄ STA. 58+92 (I.B.) C.B. #3

Scale: As Noted

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE STRUCTURE DETAILS

CATCH BASIN NO. 3
DROP INTAKE NO. 50
SPECIAL THROAT DETAIL FOR C.B. NO. 31

LUNALILO FREEWAY — PROJ. NO. I-HI-1(4):24

SCALE: AS SHOWN — DATE: APRIL, 1963

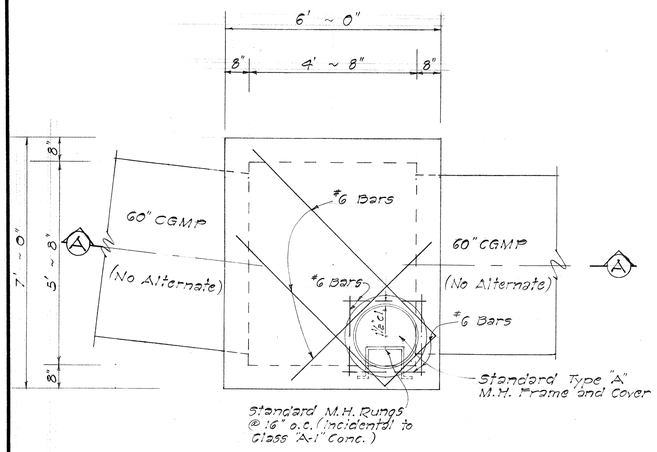
SHEET No. OF SHEETS

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

PRINTED ON CLEARPRINT 1000-H

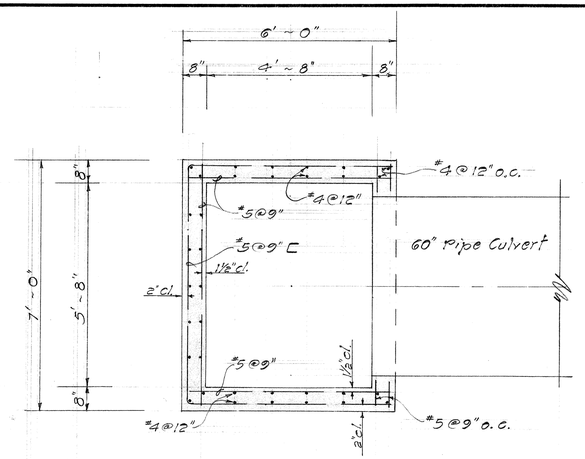
42

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	-	1963	42A	217



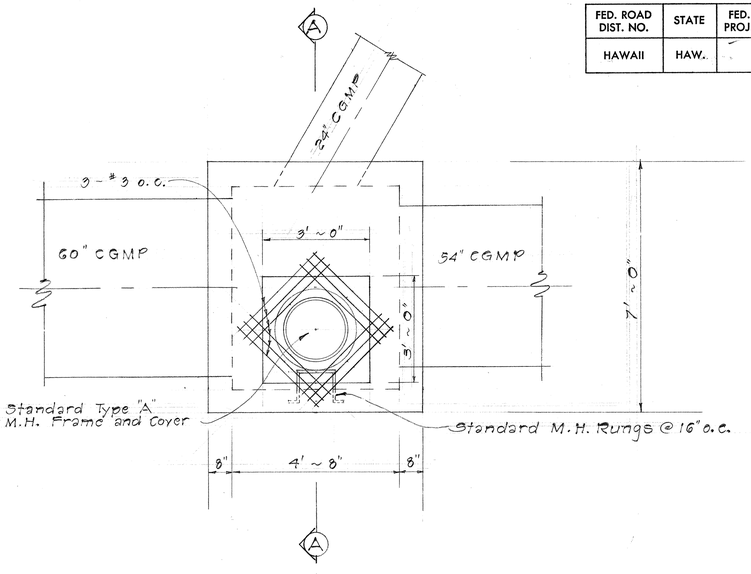
PLAN

Scale: ½" = 1'-0"



SECTION "B-B"

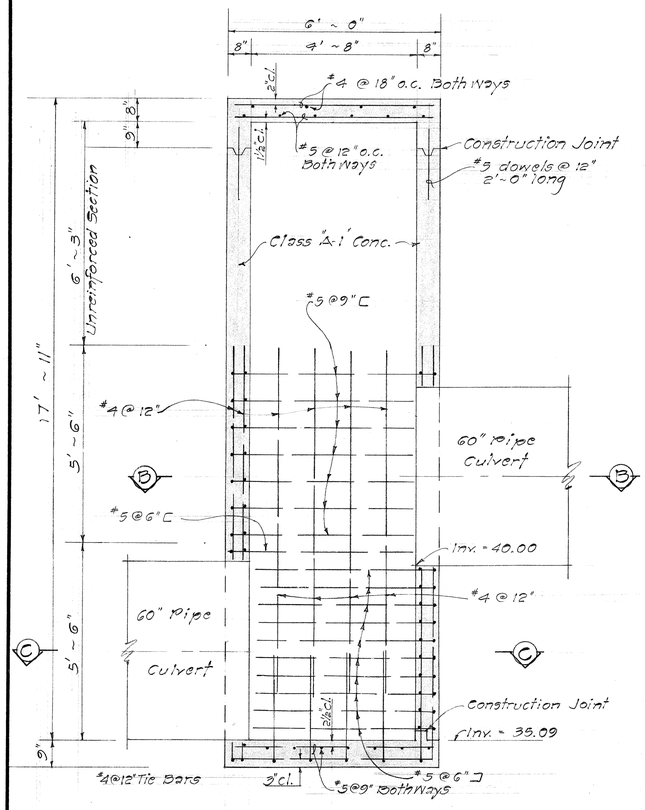
Scale: ½" = 1'-0"



PLAN

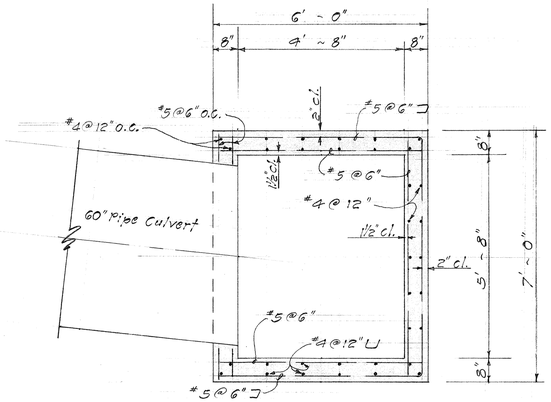
Scale: ½" = 1'-0"

NOTE:
Put Special Pipe Reinforcement (See Sht. B around all pipes.



SECTION "A-A"

Scale: ½" = 1'-0"



SECTION "C-C"

Scale: ½" = 1'-0"

SECTION "A-A"

Scale: ½" = 1'-0"

Supplements and Amends Sheets Nos. 46 and 47

SPECIAL STORM DRAIN MANHOLE
℄ STA. 57+25 S.D.M.H. #1d

SPECIAL STORM DRAIN MANHOLE
℄ STA. 60+50 S.D.M.H. #5

NOTE:
Put Typical Pipe Reinforcement (See Sht. No. 47 of the Original Plans) around all pipes.

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

DRAINAGE STRUCTURE DETAILS
SPECIAL S.D.M.H. #1d AND S.D.M.H. #5
LUNALILO FREEWAY
PROJ. No. I-HI-1(4):24

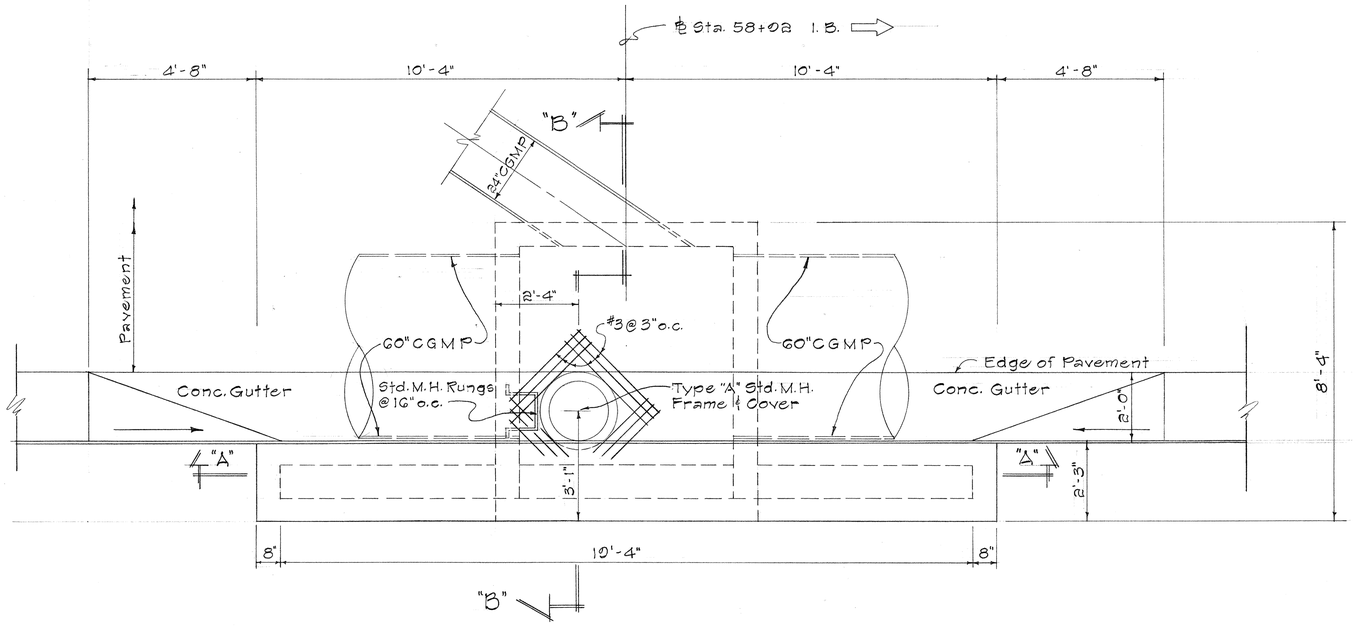
Scale: As Shown Date: Nov. 1963

SHEET No. OF SHEETS

42A

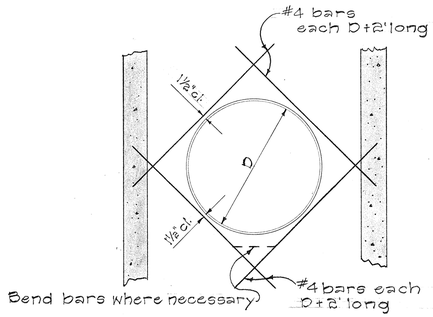
PRINTED ON NO. 1000H CLEARPRINT

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



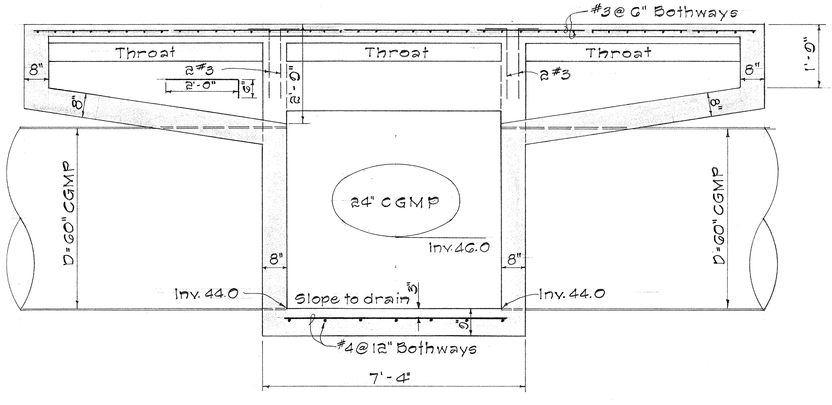
PLAN

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



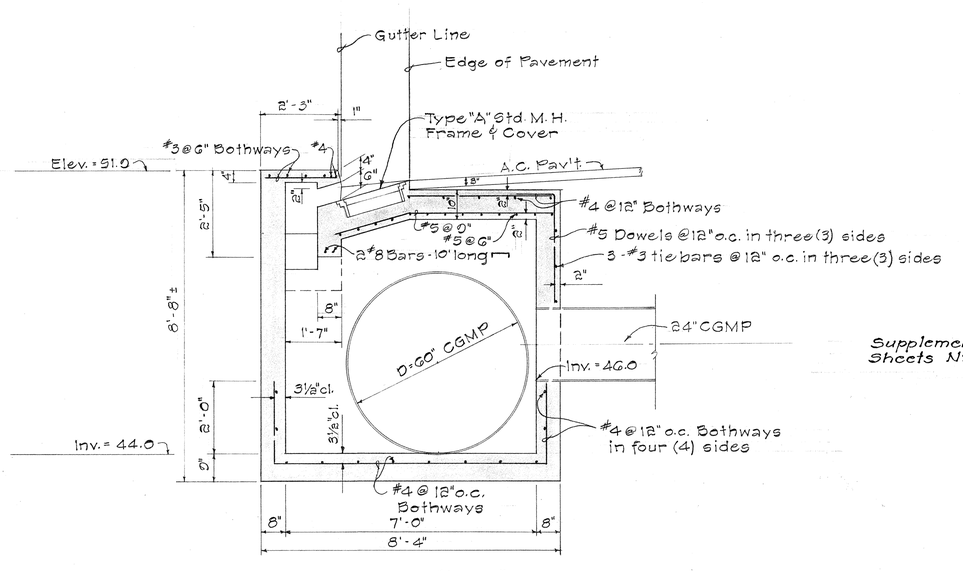
SPECIAL PIPE REINFORCEMENT

Not to Scale



SECTION "A-A"

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



SECTION "B-B"

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

Supplements and Amends Sheets No. 42, 46 and 47

NOTE:
Put Typical Pipe Reinforcement (See Sheet #47 of Original Plans) around all pipes at C.B.#3

SPECIAL CATCH BASIN ℄ STA. 58+02 (I.B.) C.B.#3

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

DRAINAGE STRUCTURE DETAILS
SPECIAL CATCH BASIN #3
& SPECIAL PIPE REINFORCEMENT

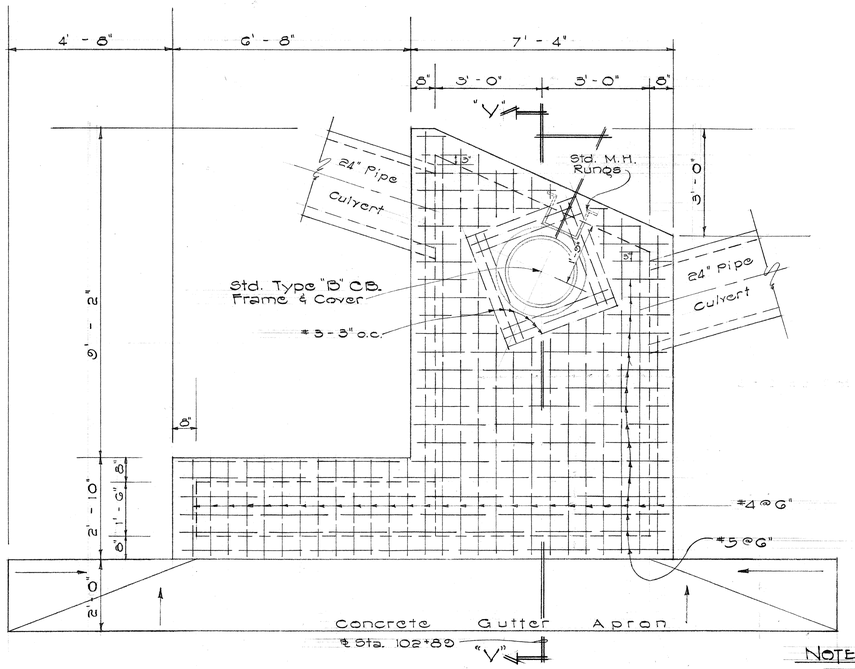
LUNALILO FREEWAY — PROJ. No. I-HI-1(4):24
Scale: As Shown — Date: Nov. 1963

SHEET No. OF SHEETS

42 43

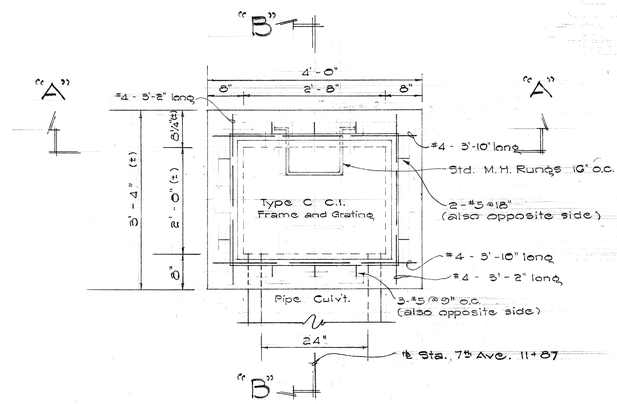
PRINTED ON NO. 1000H CLEARPRINT

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(4)	1963	43	217



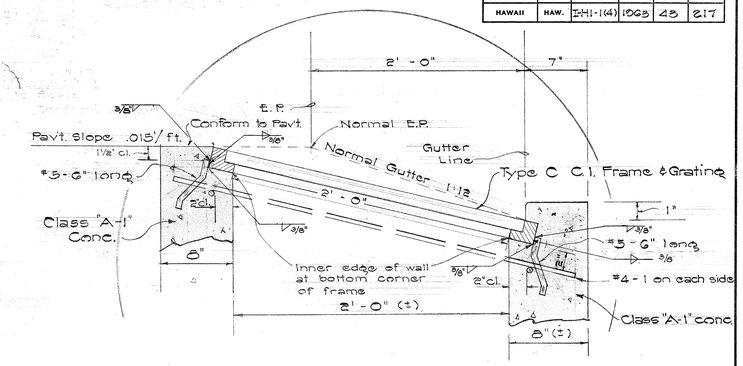
PLAN

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



PLAN

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

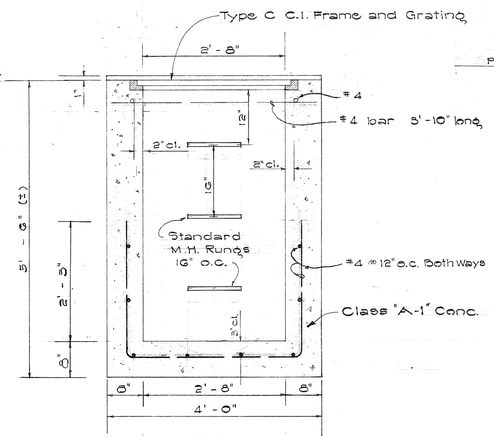


DETAIL "C"

Not To Scale

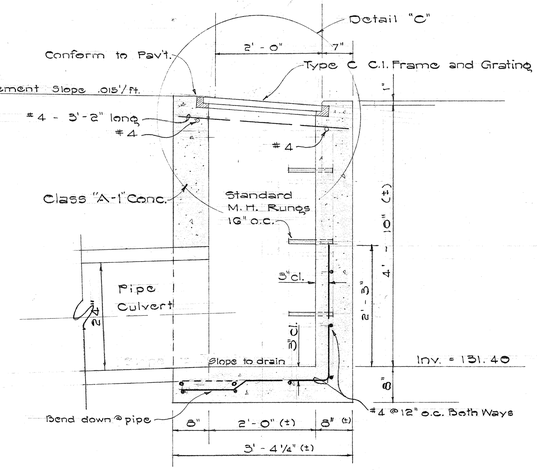
NOTE:

See Type "B" Catch Basin on Sheet no. 42 for Throat Section and Detail.



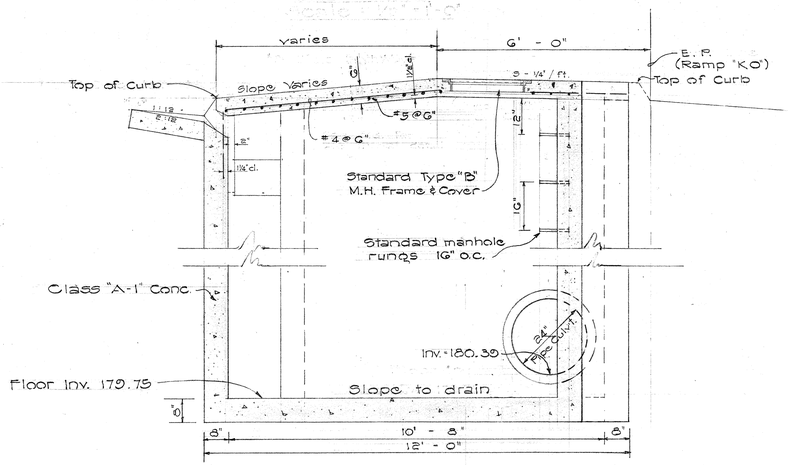
SECTION "A-A"

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



SECTION "B-B"

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



SECTION "V-V"

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

SPECIAL CATCH BASIN

℄ STA. 102+89 C.B. # 44

SPECIAL CATCH BASIN

7th AVE. STA. 11+87 C.B. # 47

Scale: As Noted

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE STRUCTURE DETAILS

CATCH BASINS NO. 44 & 47

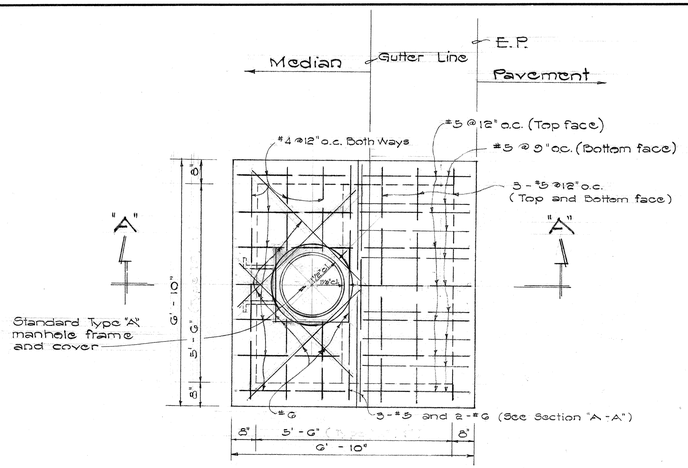
LUNALILO FREEWAY — PROJ. NO. I-HI-1(4):24

SCALE: AS SHOWN — DATE: APRIL, 1963

SHEET No. OF SHEETS

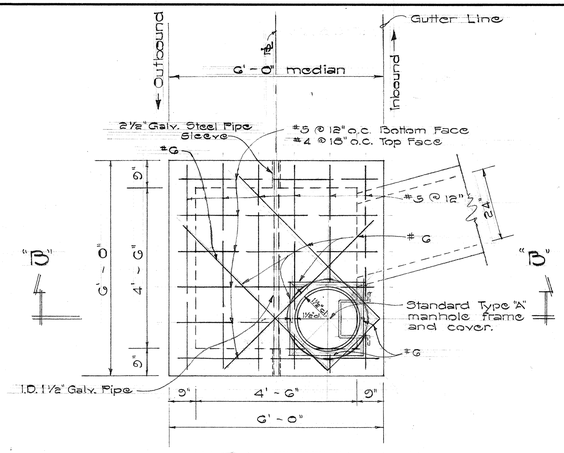
PRINTED ON CLEARPRINT 1000-H

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(4)	1963	44	217



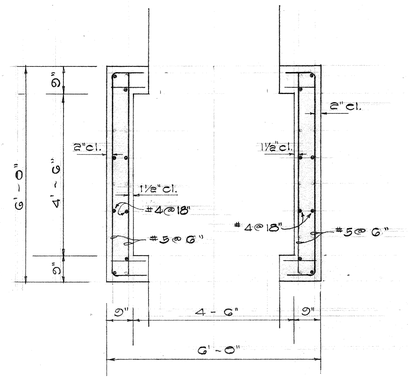
PLAN

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



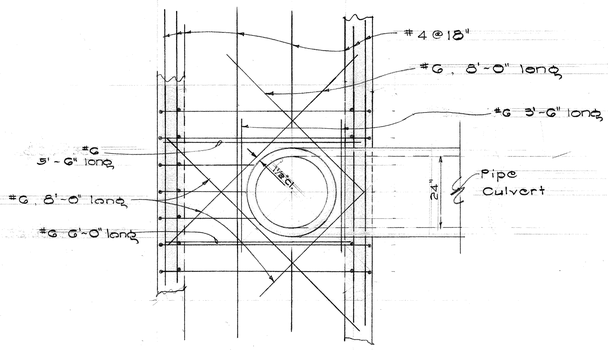
PLAN

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



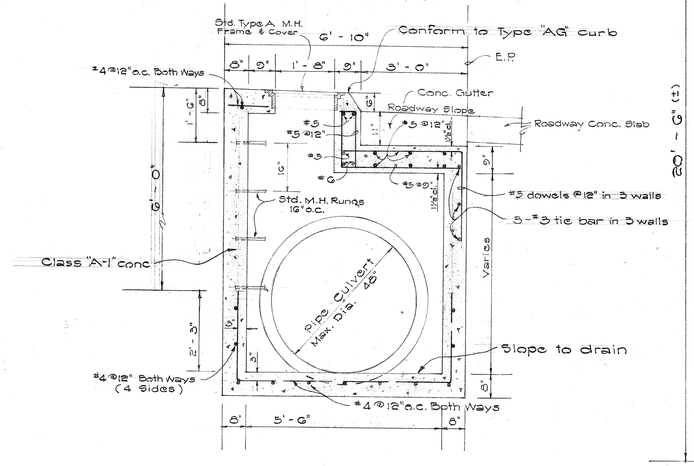
SECTION THRU M.H.
@ ℄ of PIPE #3

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



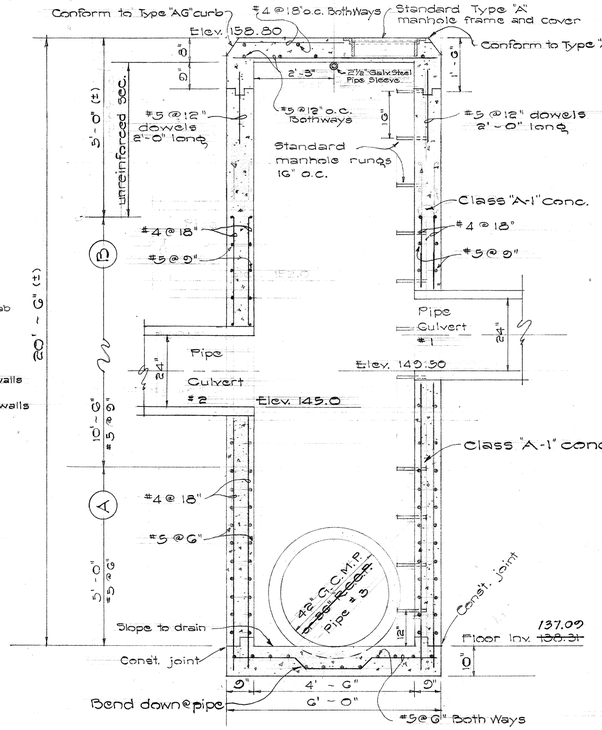
REINFORCEMENT @ SECTION
PIPE #1 & #2 MEETS S.D.M.H.

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



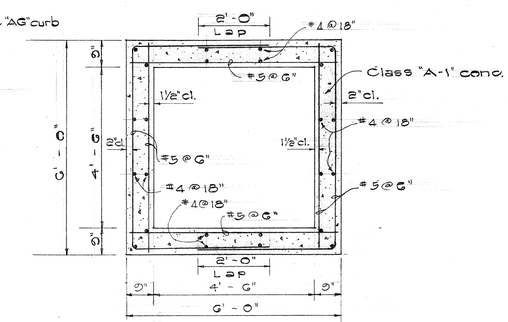
SECTION "A-A"

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



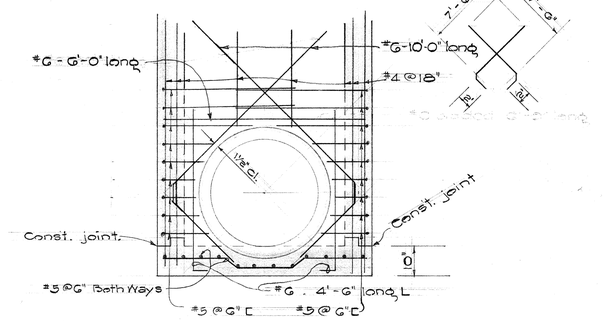
SECTION "B-B"

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



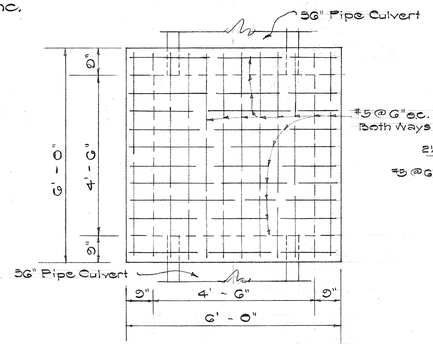
SECTION THRU M.H.
ABOVE PIPE #3

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



SECTION WHERE
PIPE #3 MEETS M.H.

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



REINFORCING FOR BOTTOM SLAB

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

SIDE VIEW

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

NOTE :

Location of Manhole frame and cover and manhole rungs of Type "IS" Storm Drain Manhole to be determined by the Engineer.

DETAIL OF TYPE "I S" STORMDRAIN MANHOLE

SPECIAL STORM DRAIN MANHOLE
℄ STA. 89+75 (I.B.) S.D.M.H. #33

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE STRUCTURE DETAILS

TYPE "IS" STORM DRAIN MANHOLE
STORM DRAIN MANHOLE NO. 33

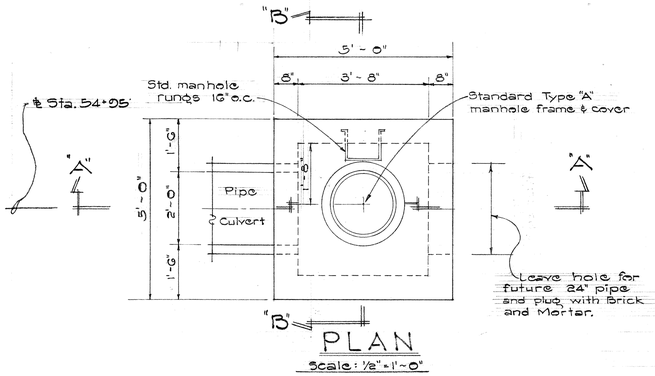
LUNALILO FREEWAY — PROJ. NO. I-HI-1(4): 24

SCALE: AS SHOWN — DATE: APRIL, 1963

SHEET No. OF SHEETS

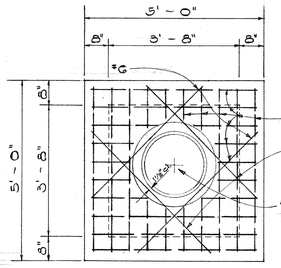
PRINTED ON CLEARPRINT 1000-H

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(4)	1963	45	217



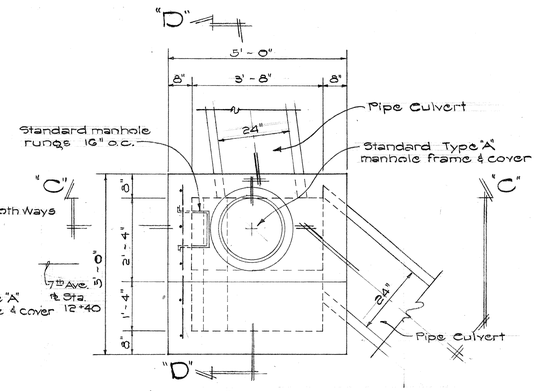
PLAN

Scale: ½"=1'-0"



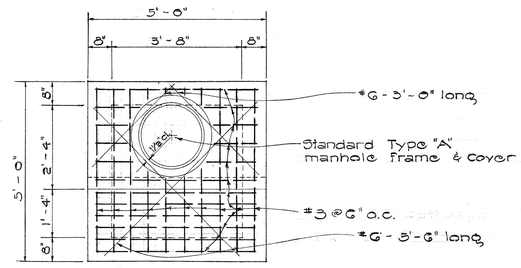
TOP SLAB
REINFORCING DETAIL

Scale: ½"=1'-0"



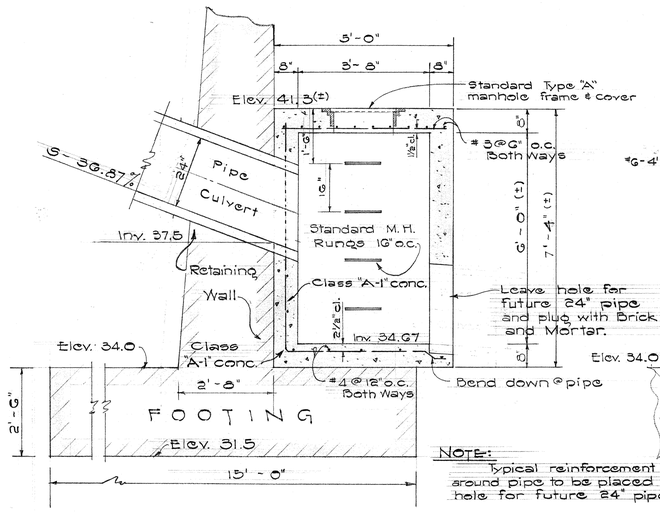
PLAN

Scale: ½"=1'-0"



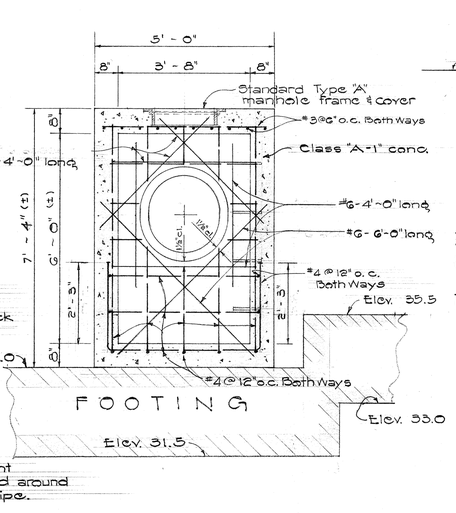
TOP SLAB
REINFORCING DETAIL

Scale: ½"=1'-0"



SECTION "A-A"

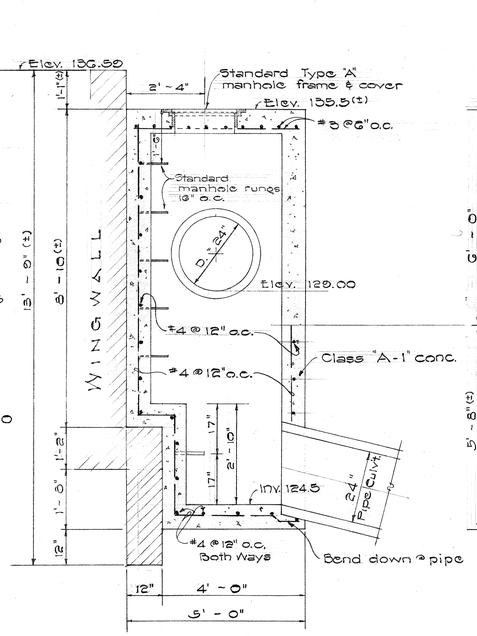
Scale: ½"=1'-0"



SECTION "B-B"

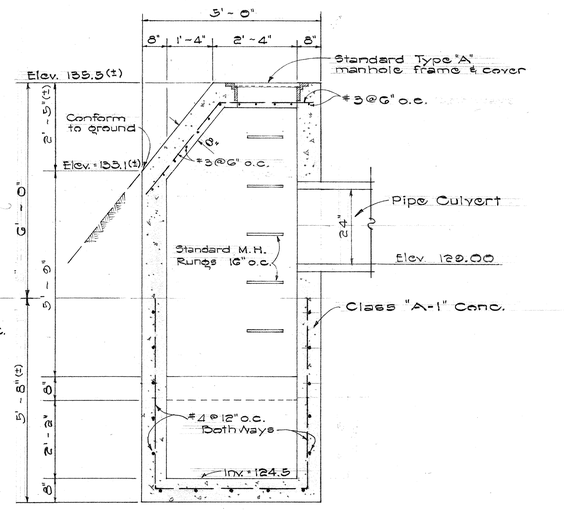
Scale: ½"=1'-0

NOTE:
Typical reinforcement around pipe to be placed around hole for future 24" pipe.



SECTION "C-C"

Scale: ½"=1'-0"



SECTION "D-D"

Scale: ½"=1'-0"

SPECIAL STORM DRAIN MANHOLE
℄ STA. 54+95 (I.B.) S.D.M.H. #1-c

SPECIAL STORM DRAIN MANHOLE
7th AVE. STA. 12+40 S.D.M.H. #49

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE STRUCTURE DETAILS
STORM DRAIN MANHOLES NO. 1-c & 49

LUNALILO FREEWAY — PROJ. NO. I-HI-1(4):24

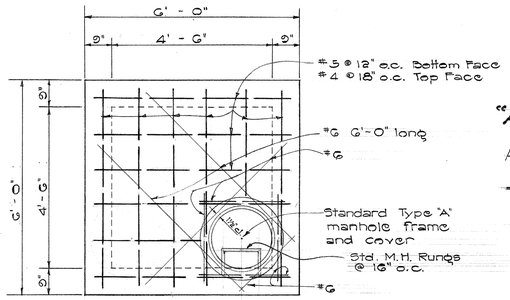
SCALE: AS SHOWN — DATE: APRIL, 1963

SHEET No. OF SHEETS

45

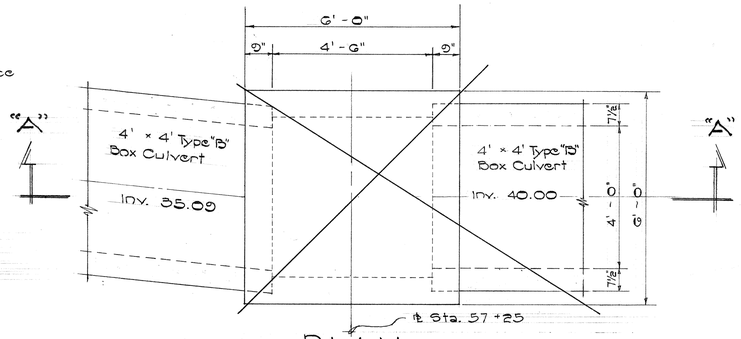
PRINTED ON CLEARPRINT 1000-H

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(4)	1963	40	517



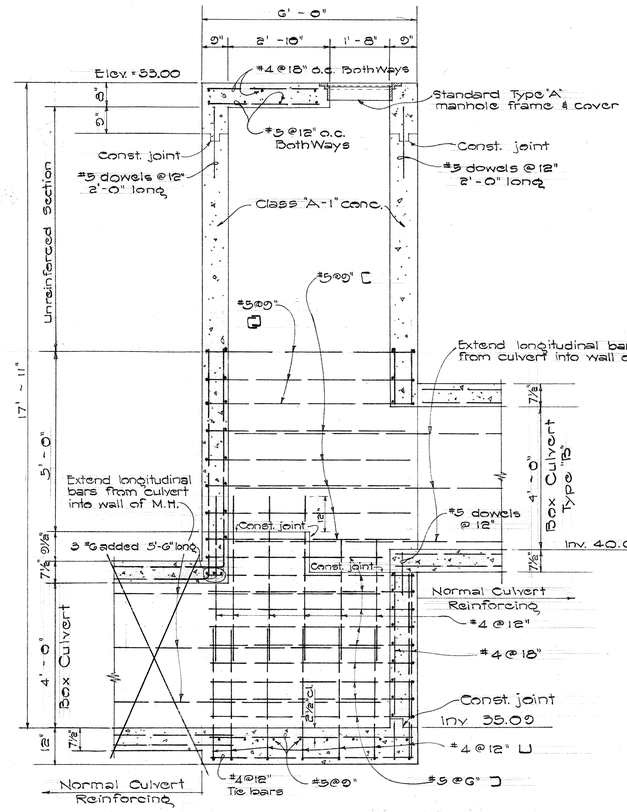
REINFORCING OF M.H. @ TOP SLAB

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



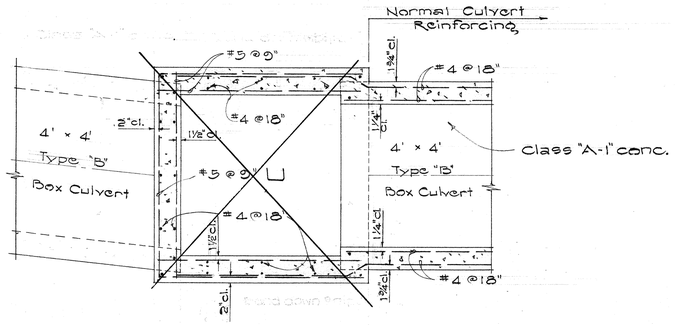
PLAN

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



SECTION "A-A"

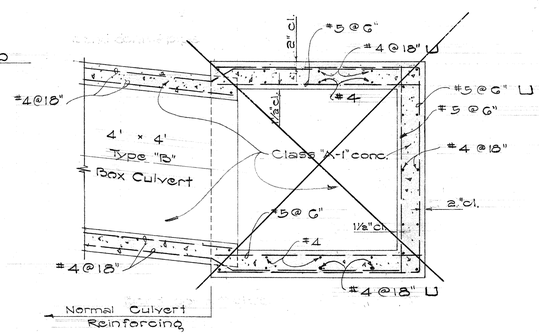
Scale: 1/2"=1'-0"



SECTION THRU M.H. @ ℄ OF UPPER 4'×4' BOX CULVERT

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

Note:
4'x4' Box Culvert replaced by 60" C.G.M. Pipe. See Sheet No. 42-A and 42-B for Manhole details.

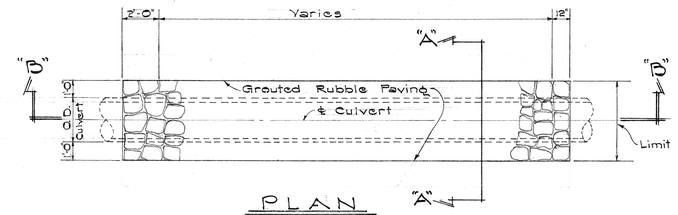


SECTION THRU M.H. @ ℄ OF LOWER 4'×4' BOX CULVERT

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

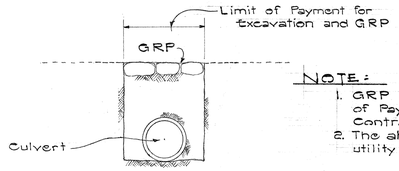
SPECIAL STORM DRAIN MANHOLE

℄ STA. 57+25 S.D.M.H. #1-d



PLAN

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

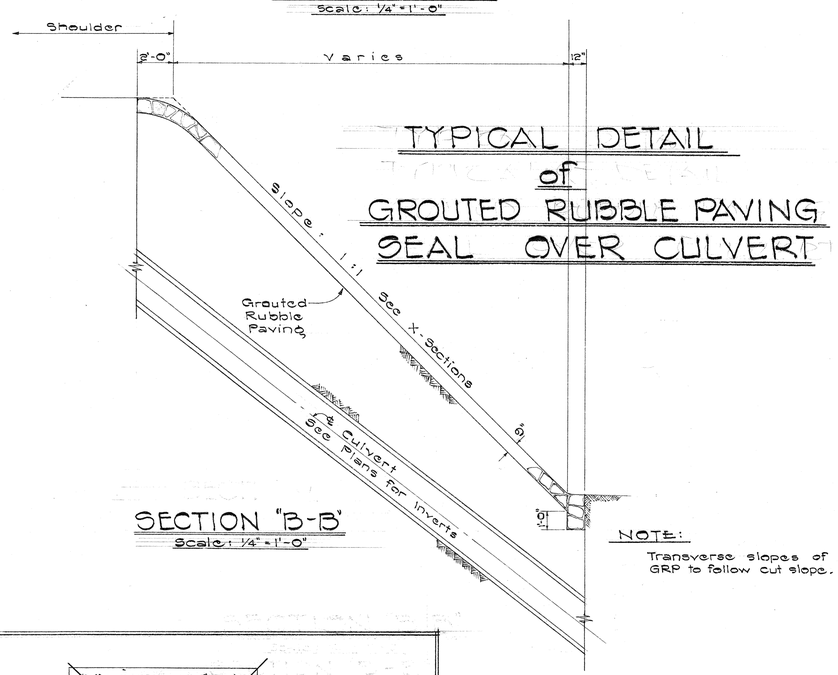


NOTE:

1. GRP required beyond the Limit of Payment shall be done at the Contractor's own expense.
2. The above shall also hold for utility pipes laid in cut slope.

SECTION "A-A"

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



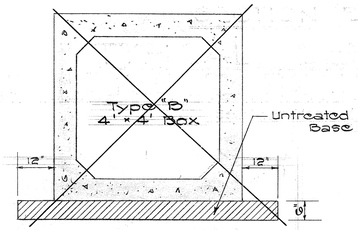
SECTION "B-B"

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

NOTE:

Transverse slopes of GRP to follow cut slope.

TYPICAL DETAIL of GROUTED RUBBLE PAVING SEAL OVER CULVERT



TYPICAL SECTION SHOWING UNTREATED BASE CUSHION FOR BOX CULVERT

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE STRUCTURE DETAILS

STORM DRAIN MANHOLE NO. I-d
TYPICAL G.R.P. SEAL
TYPICAL UNTREATED BASE CUSHION

LUNALILO FREEWAY — PROJ. NO. I-HI-1(4):24

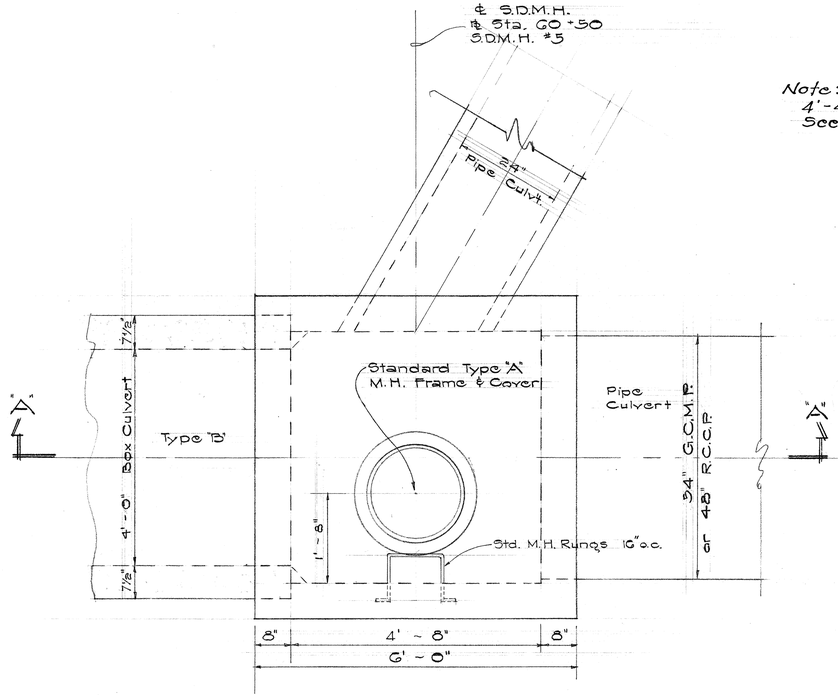
SCALE: AS SHOWN — DATE: APRIL, 1963

SHEET No. OF SHEETS

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

PRINTED ON CLEARPRINT 1000-H

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(4)	1963	47	217

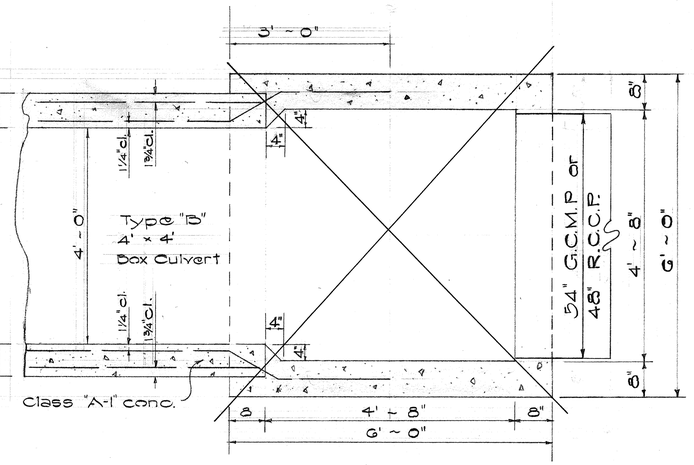


Note:
4'-4' Box Culvert replaced with 60" C.G.M. Pipe.
See Sheet No. 42-A and 42-B for Manhole details.

PLAN

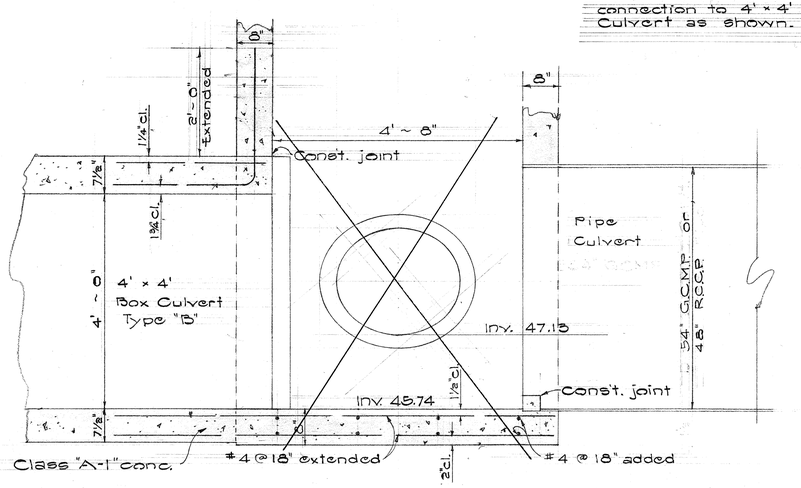
Scale: ¾" = 1'-0"

NOTE:
Manhole #5 same as Type C-1 Storm Drain Manhole except for connection to 4' × 4' Type "B" Box Culvert as shown.



SECTION THRU ℄ OF S.D.M.H. and 4' × 4' BOX CULVERT

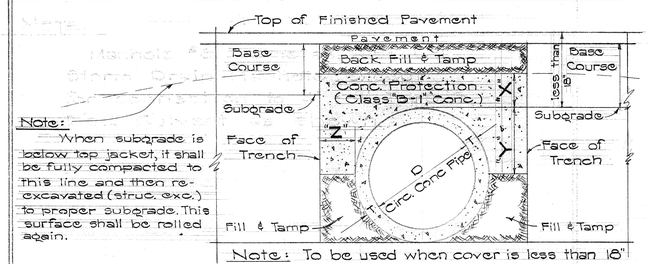
Scale: ¾" = 1'-0"



SECTION "A-A"

Scale: ¾" = 1'-0"

SPECIAL STORM DRAIN MANHOLE ℄ STA. 60+50 S.D.M.H. #5



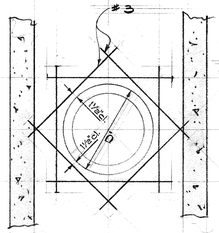
Note: When subgrade is below top jacket, it shall be fully compacted to this line and then re-excavated (struc. exc.) to proper subgrade. This surface shall be rolled again.

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 CONCRETE JACKET

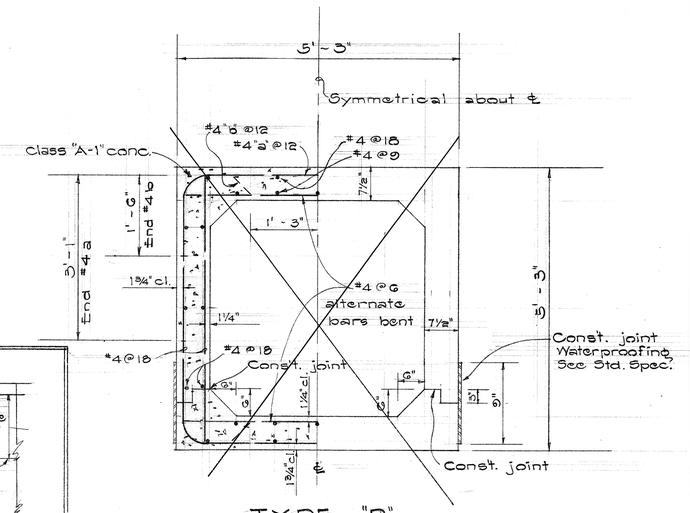
Scale: 1" = 1'-0"



NOTE:
#3 bars each 0'+12" long placed on both faces as shown in all walls unless otherwise noted.

TYPICAL REINFORCEMENT AROUND PIPE WHERE PIPE ENTERS WALL OF DRAINAGE STRUCTURES

Scale = ½" = 1'-0"



TYPE "B" 4' × 4' STANDARD BOX CULVERT

Scale: ¾" = 1'-0"

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE STRUCTURE DETAILS

STORM DRAIN MANHOLE NO. 5
TYPICAL REINFORCEMENT AROUND PIPE
TYPE "B" 4' x 4' STANDARD BOX CULVERT
SECTION OF CULVERT WITH CONCRETE JACKET

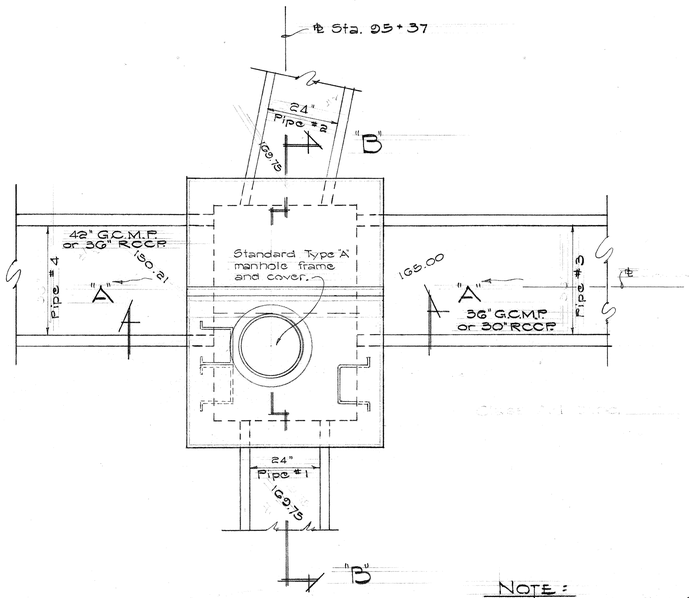
LUNALILO FREEWAY — PROJ. NO. I-HI-1(4):24
SCALE: AS SHOWN — DATE: APRIL, 1963

SHEET No. OF SHEETS

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

PRINTED ON CLEARPRINT 1000-H

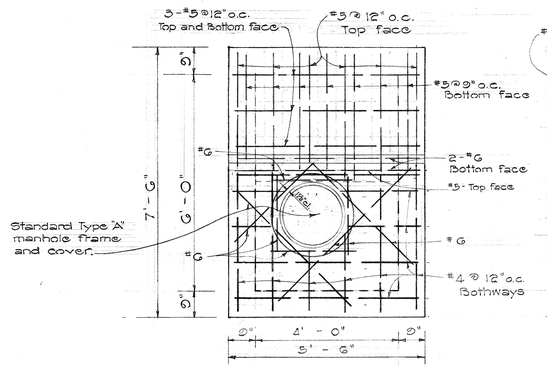
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(4)	1963	48	617



PLAN

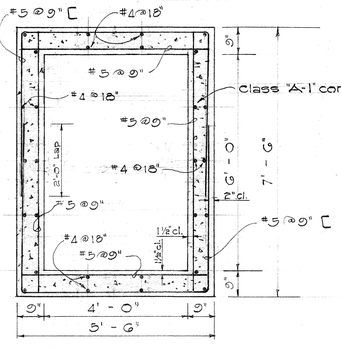
Scale: 1/8" = 1'-0"

NOTE:
Sections at (B) (C) and (D) similar to Section (A) except for bar sizes and spacings. See Section "A-A" for bar sizes and spacings.



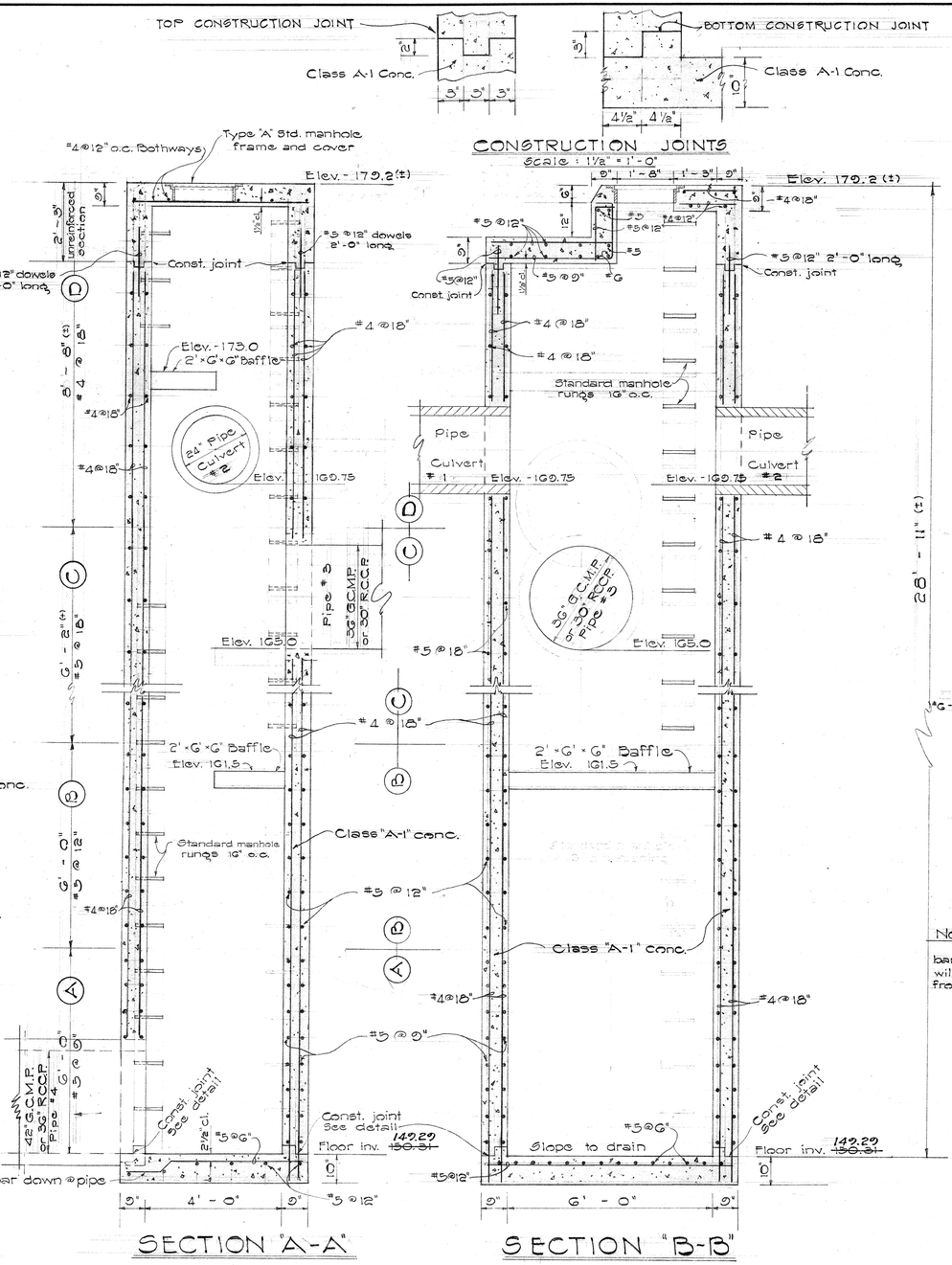
TOP SLAB REINFORCING

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



SECTION (A)

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

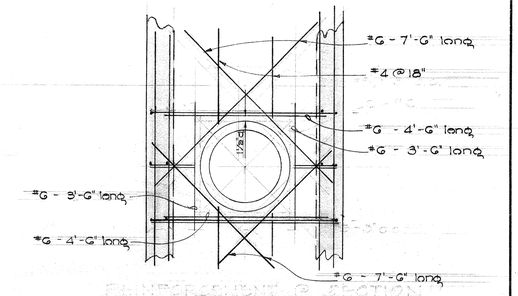


CONSTRUCTION JOINTS

Scale: 1½" = 1'-0"

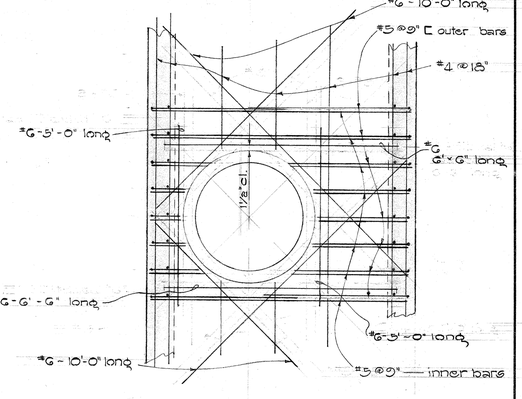
SECTION "A-A"

SECTION "B-B"



REINFORCEMENT @ SECTION PIPE #1 and #2 MEETS S.D.M.H.

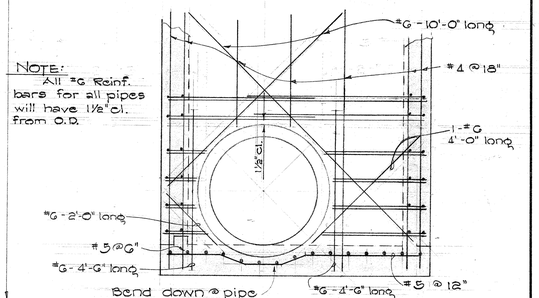
Scale: 1/2" = 1'-0"



REINFORCEMENT @ SECTION WHERE PIPE #3 MEETS S.D.M.H.

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

NOTE:
All #6 Reinf. bars for all pipes will have 1½" cl. from O.D.

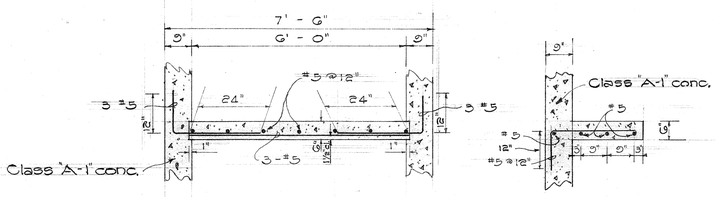


REINFORCEMENT @ SECTION WHERE PIPE #4 MEETS S.D.M.H.

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

SPECIAL S.D.M.H. STA. 95+37 ~ S.D.M.H. #36

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



FRONT VIEW

SIDE VIEW

BAFFLE REINFORCING

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE STRUCTURE DETAILS

STORM DRAIN MANHOLE NO. 36

LUNALILO FREEWAY — PROJ. NO. I-HI-1(4):24

SCALE: AS SHOWN — DATE: APRIL, 1963

SHEET No. OF SHEETS

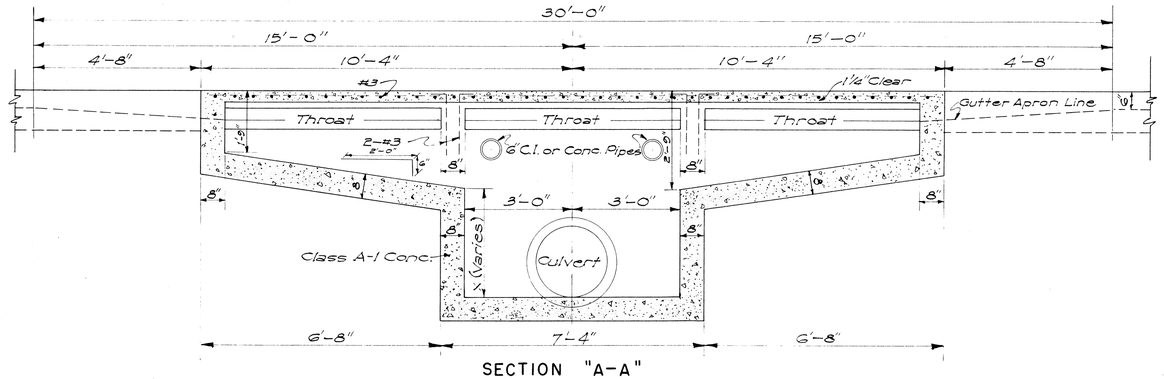
ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	
	TRACED BY	
NOTE BOOK	DESIGNED BY	
	QUANTITIES BY	
No.	CHECKED BY	

Special S.D.M.H. # 36 Sta 95+37 ~ S.D.M.H. # 36

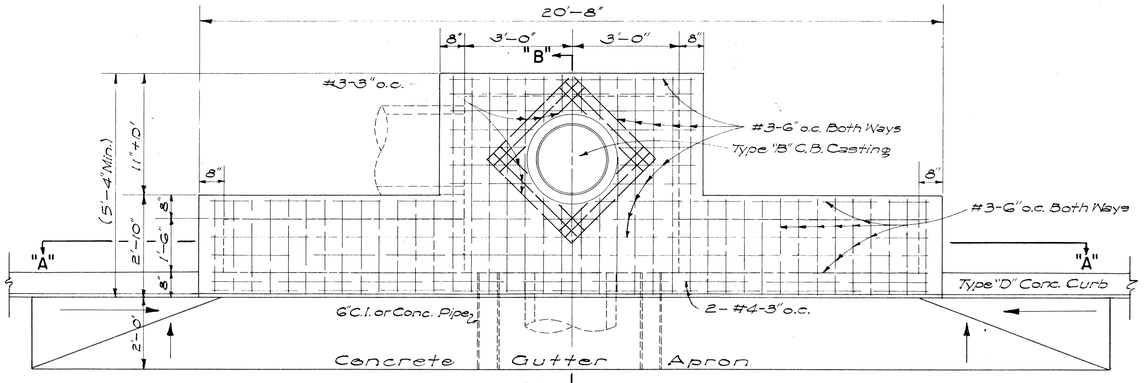
PRINTED ON CLEARPRINT 1000-H

2/17/59

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(4)	1963	40	217



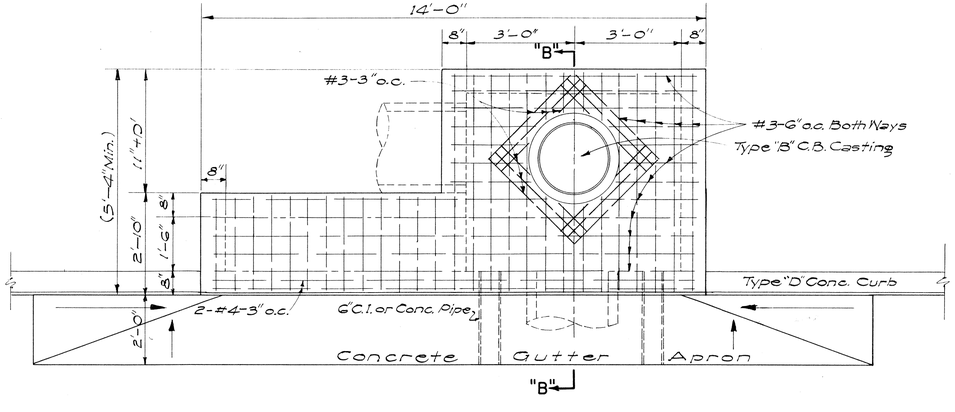
SECTION "A-A"



PLAN

DETAIL OF TYPE "A" CATCH BASIN

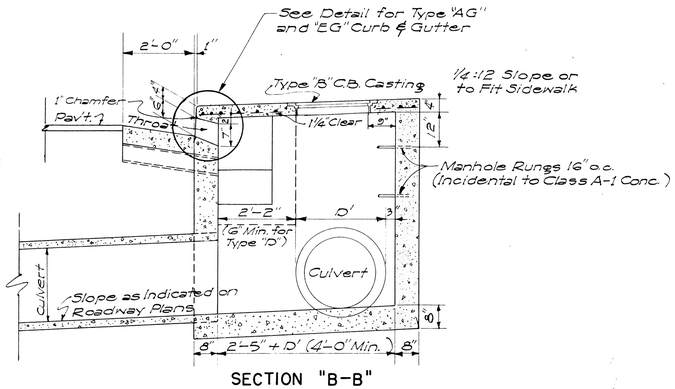
SCALE: 1/2" = 1'-0"



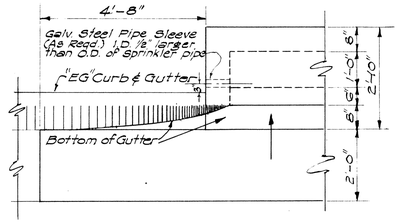
DETAIL OF TYPE "B" CATCH BASIN

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

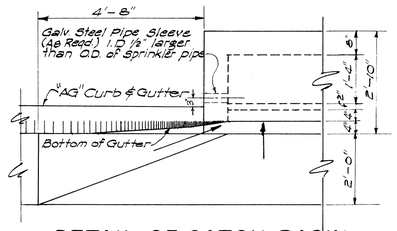
NOTE: TYPE "C" C.B. SIMILAR BUT OPPOSITE HAND



SECTION "B-B"

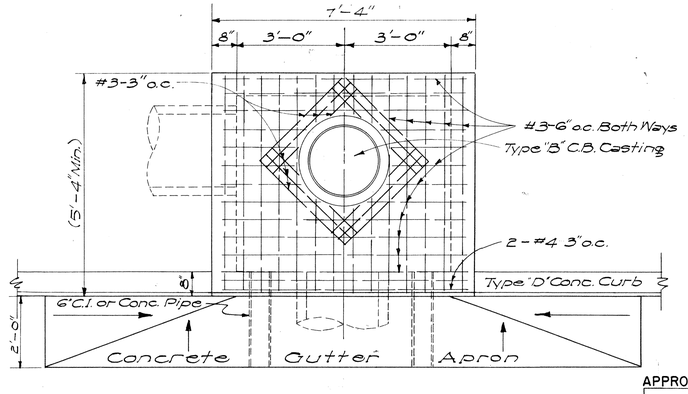


DETAIL OF CATCH BASIN WITH TYPE "EG" CURB & GUTTER



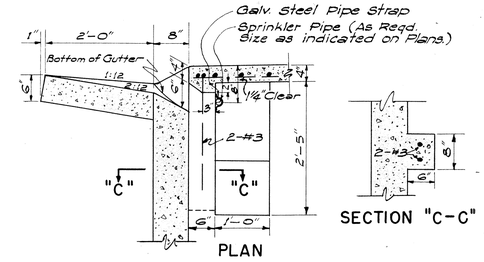
DETAIL OF CATCH BASIN WITH TYPE "AG" CURB & GUTTER

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



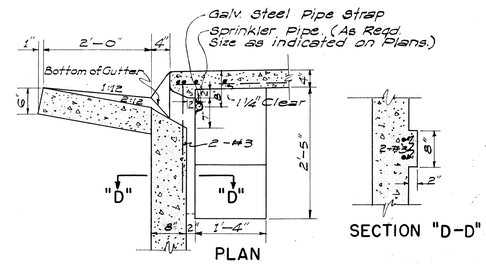
DETAIL OF TYPE "D" CATCH BASIN

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



THROAT DETAIL FOR TYPE "EG" CURB & GUTTER

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



THROAT DETAIL FOR TYPE "AG" CURB & GUTTER

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

ESTIMATED QUANTITIES

Type	Class A-1 Conc.	Struct. Exc.	Reinf. Steel	Gutter Length
"A"	7.5 c.y.	24.7 c.y.	145 lb.	30'-0"
"B"	6.0 c.y.	21.5 c.y.	108 lb.	23'-4"
"C"	6.0 c.y.	21.5 c.y.	108 lb.	23'-4"
"D"	4.9 c.y.	16.5 c.y.	77 lb.	16'-8"

NOTES:

1. Quantities based on X = 3'-0" and D' = 3'0"
2. Quantities do not include concrete for Gutter Apron.
3. The Contractor shall install 2-6" Cast Iron or Concrete Pipes as incidental to Class A-1 Concrete for Construction Drainage.
4. Culvert shall leave C.B. from any position and any direction indicated by plans or ordered by the Engineer. Culvert may both enter and leave C.B. so that C.B. will also act as Manhole.
5. The Contractor shall install Galvanized Steel Pipe Sleeves and Straps as incidental to Sprinkler System.

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

APPROVED: STATE HIGHWAY ENGINEER

DATE Aug. 26, 1959

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS

CONCRETE CATCH BASINS

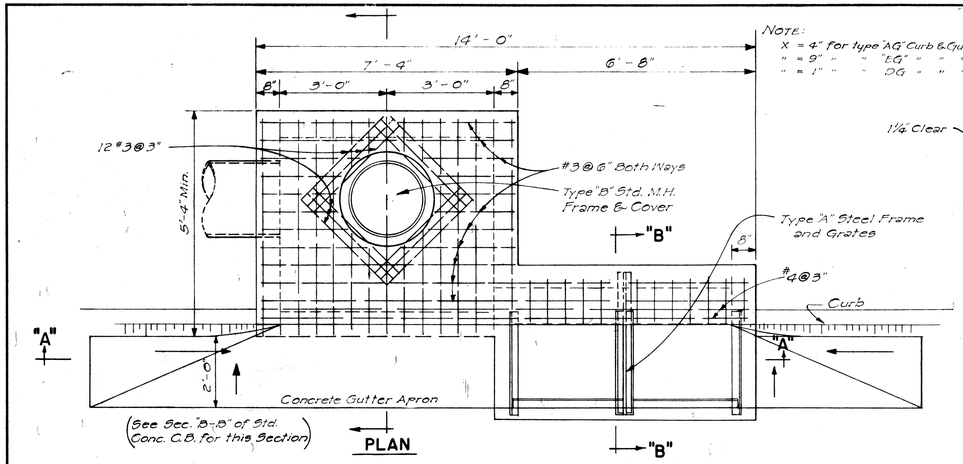
SCALES AS NOTED

SHEET Nº 41 OF 217 SHEETS

J. ARKWRIGHT 18406

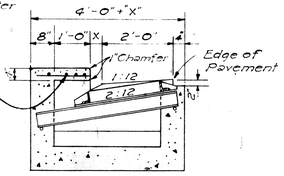
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW	I-HI-1(4)	1963	50	217

REVISED: SEPT. 1, 1961

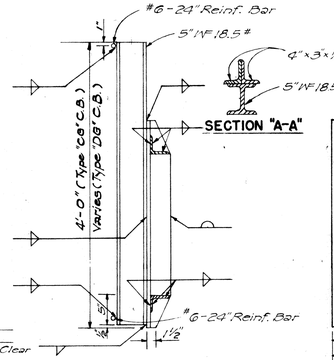


PLAN

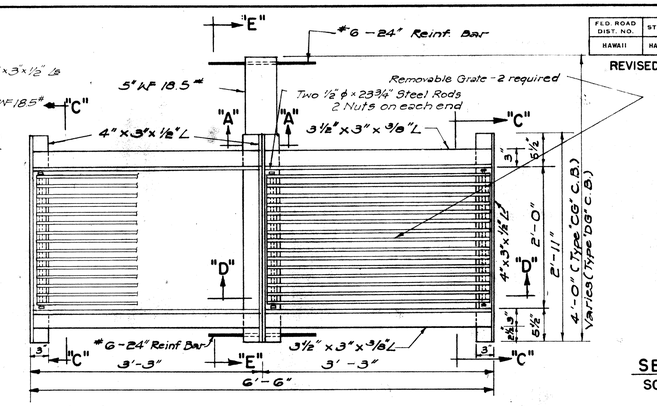
NOTE:
X = 4" for type "AG" Curb & Gutter
" = 9" " " "EG" " " "
" = 1" " " "DG" " " "

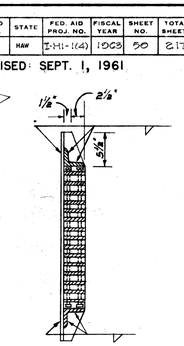


SECTION "B-B"
SCALE: 1/2"= 1'-0"

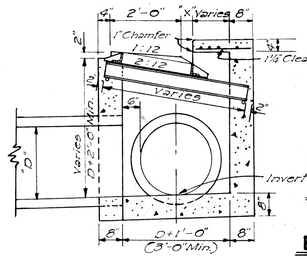


SECTION "E-E"
SCALE: 1"= 1'-0"

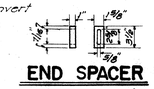




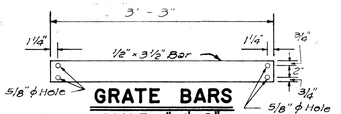
SECTION "C-C"
SCALE: 1" = 1'-0"



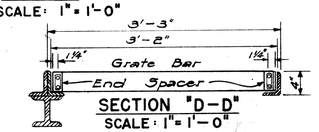
SECTION "G-G"
SCALE: 1/2"= 1'-0"



END SPACER
SCALE: 1" = 1'-0"



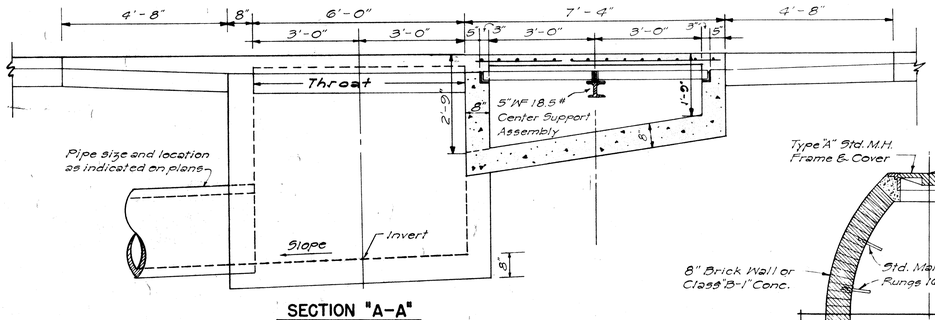
GRATE BARS
SCALE: 1"= 1'-0"



SECTION "D-D"
SCALE: 1"= 1'-0"

DETAIL OF TYPE "A" STEEL FRAME AND GRATES

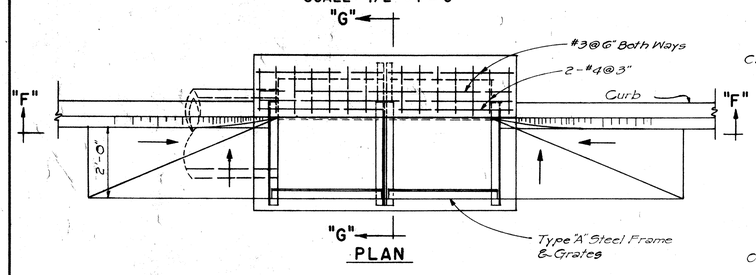
NOTE:
1. All welds ⅜" unless otherwise noted.
2. All steel shall be structural grade.
3. Grates and frame shall be hot dip galvanized after fabrication in accordance with Section 44(H) of the Standard Specifications.



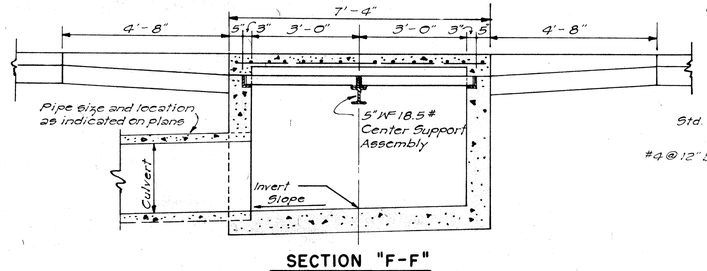
SECTION "A-A"

DETAIL OF TYPE "CG" CATCH BASIN

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



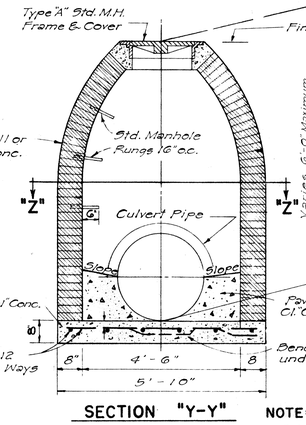
PLAN



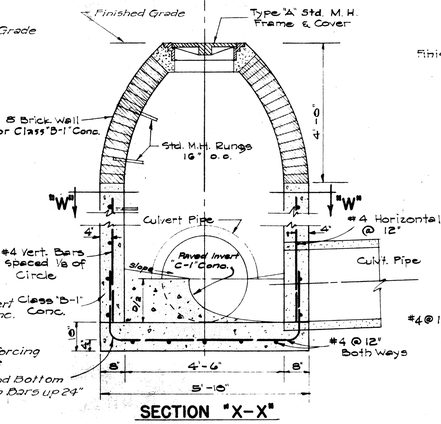
SECTION "F-F"

DETAIL OF TYPE "DG" CATCH BASIN

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

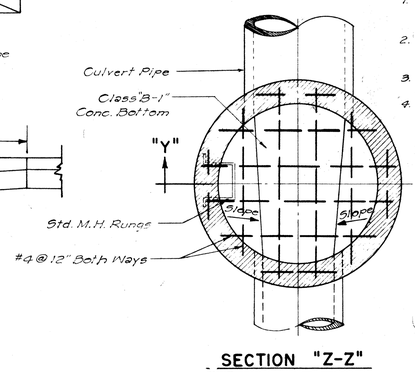


SECTION "Y-Y"



SECTION "X-X"

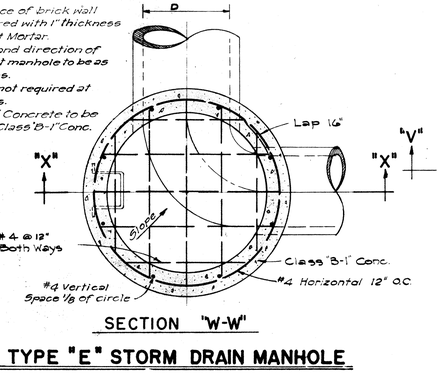
NOTE:
1. Exterior surface of brick wall shall be plastered with 1" thickness of 1:2 Cement Mortar.
2. Number size and direction of culvert pipes at manhole to be as shown on plans.
3. Paved invert not required at drop manholes.
4. All Class "C-1" Concrete to be incidental to Class "B-1" Conc.



SECTION "Z-Z"

TYPE "D" STORM DRAIN MANHOLE

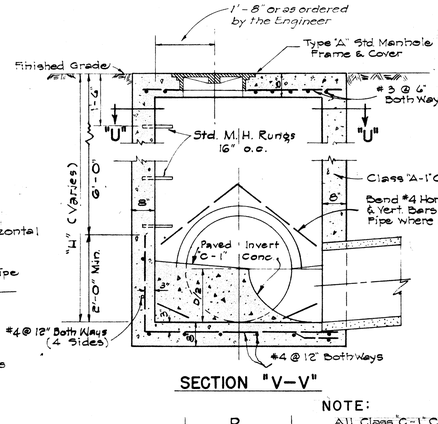
SCALE: 1/2"= 1'-0"



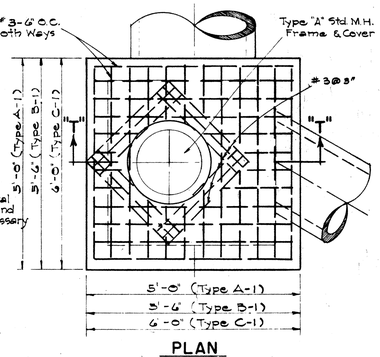
SECTION "W-W"

TYPE "E" STORM DRAIN MANHOLE

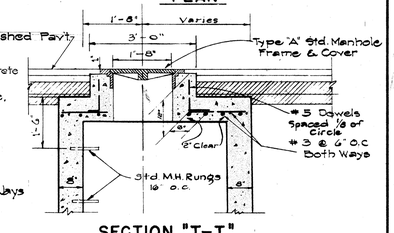
SCALE: 1/2"= 1'-0"



SECTION "V-V"

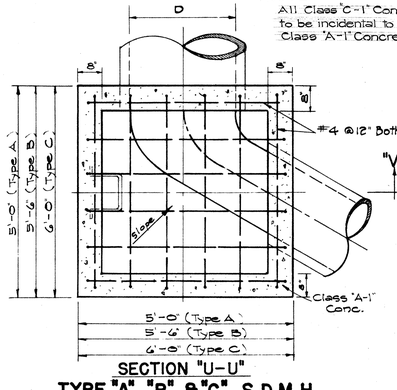


PLAN



SECTION "T-T"

NOTE:
All Class "C-1" Concrete to be incidental to Class "A-1" Concrete.



SECTION "U-U"

TYPE "A-1", "B-1", & "C-1" S.D.M.H.

TOP DETAIL UNDER PAVEMENT

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

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

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

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

APPROVED: DATE: Aug. 26, 1959

STATE HIGHWAY ENGINEER

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS

GRATED CATCH BASINS & STORM DRAIN MANHOLES

SCALES AS NOTED

SHEET Nº OF SHEETS

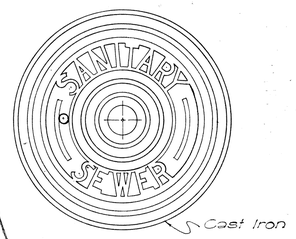
ORIGINAL PLAN	SURVEY PLOTTED BY	O.M.	DATE May '57
	DESIGNED BY	" "	May '57
	DRAWN BY	L.M.	
NOTE BOOK	TRACED BY		
No.	CHECKED BY	S.M.	June '57

5 0

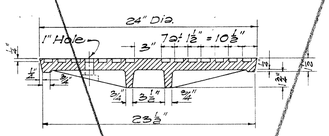
2/17/59
8/15/59

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(14)	1963	51	217

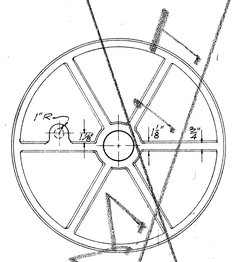
August 1957



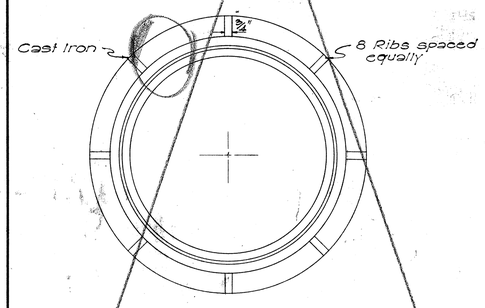
TOP VIEW OF COVER



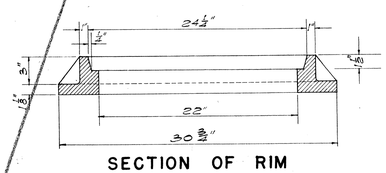
SECTION



BOTTOM VIEW OF COVER



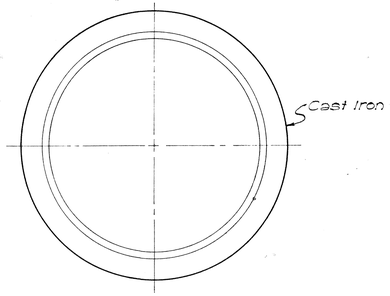
PLAN OF RIM



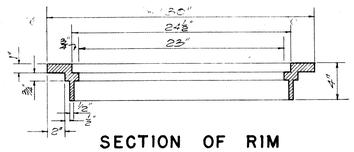
SECTION OF RIM

DETAILS OF TYPE "C" MANHOLE CASTINGS

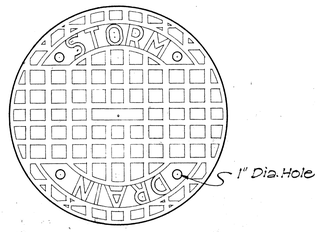
SCALE: 1-1/2" = 1'-0"



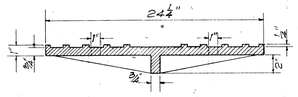
PLAN OF RIM



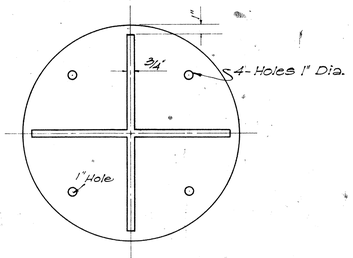
SECTION OF RIM



TOP VIEW OF COVER



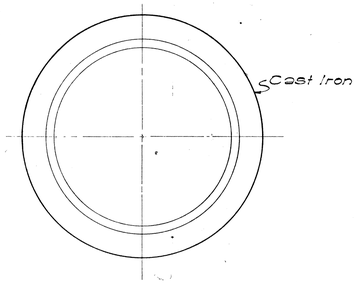
SECTION



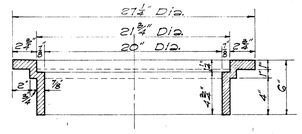
BOTTOM VIEW OF COVER

DETAILS OF TYPE "B" CATCH BASIN CASTINGS

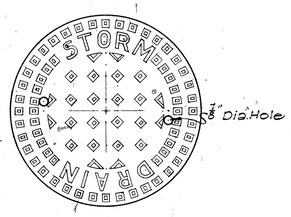
SCALE: 1-1/2" = 1'-0"



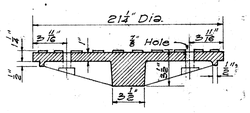
PLAN OF RIM



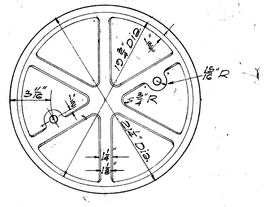
SECTION OF RIM



TOP VIEW OF COVER



SECTION

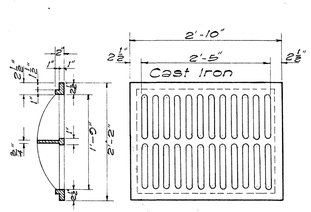


BOTTOM VIEW OF COVER

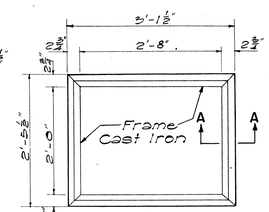
DETAILS OF TYPE "A" MANHOLE CASTINGS

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

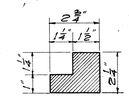
NOTE: Stock Pattern From Novelty Foundry ~ Honolulu



SECTION TOP VIEW



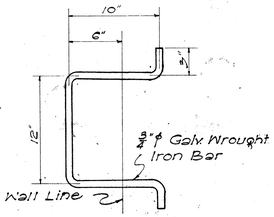
TOP VIEW.



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

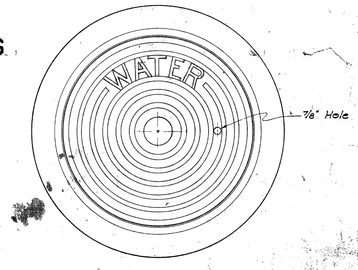
TYPE C C.I. FRAME AND GRATING

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

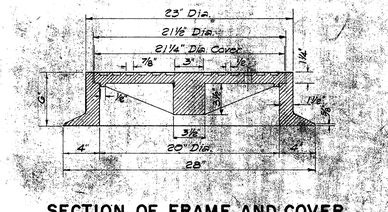


MANHOLE RUNG

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



PLAN OF FRAME AND COVER



SECTION OF FRAME AND COVER

BOTTOM VIEW OF COVER

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

SCALE: 1½" = 1'-0"

APPROVED: DATE Aug. 26, 1959

STATE HIGHWAY ENGINEER

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS

CATCH BASIN AND MANHOLE CASTINGS

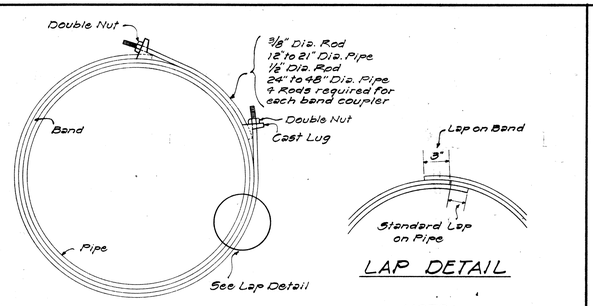
SCALES AS NOTED

SHEET Nº OF SHEETS

51

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DESIGNED BY	
	DRAWN BY	
	TYPED ORIG. BY J. Calistro	
NOTE BOOK	QUANTITIES BY	
No.	CHECKED BY	

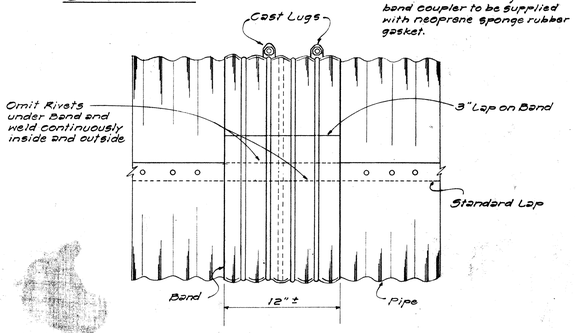
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(64)	1963	52	217



END VIEW

LAP DETAIL

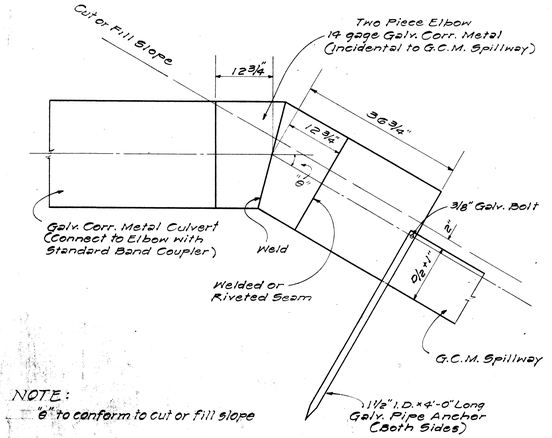
NOTE:
Each watertight band coupler to be supplied with neoprene sponge rubber gasket.



SIDE VIEW

DETAIL OF WATERTIGHT BAND COUPLER

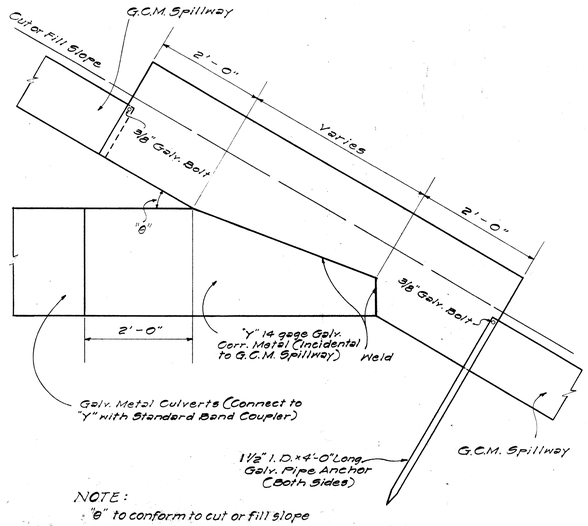
NOT TO SCALE



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

DETAIL OF CULVERT TO SPILLWAY CONNECTION

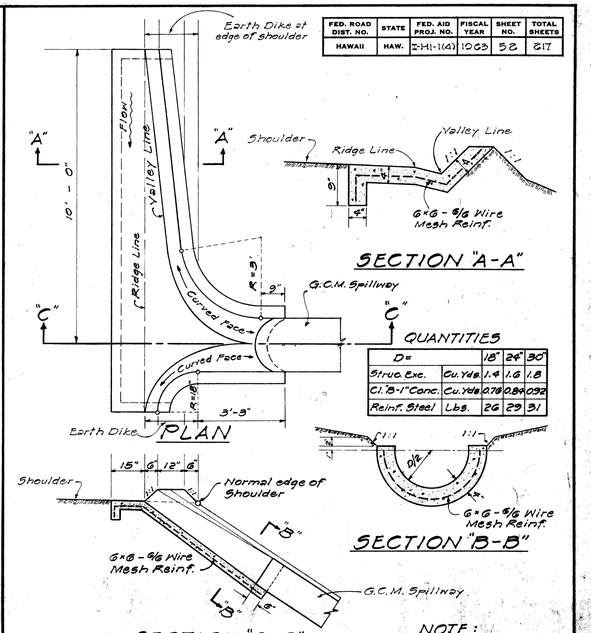
NOT TO SCALE



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

DETAIL OF CULVERT TO SPILLWAY "Y" CONNECTION

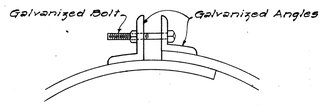
NOT TO SCALE



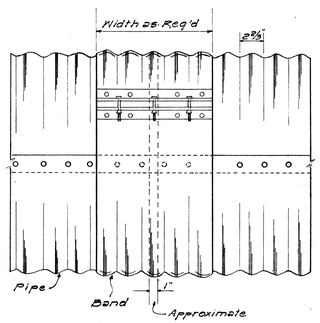
NOTE:
1. Reverse Plan View when Flow is in direction opposite to that shown.
2. All Conc. to be cl."B-1"

DETAIL OF SPILLWAY INLET

NOT TO SCALE



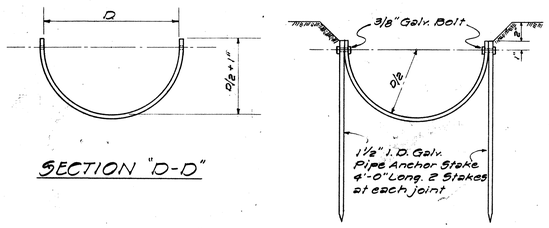
BAND DETAIL



SIDE VIEW

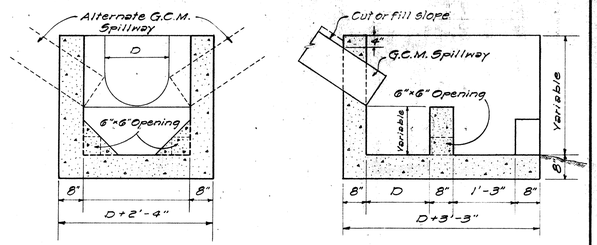
DETAIL OF STANDARD BAND COUPLER

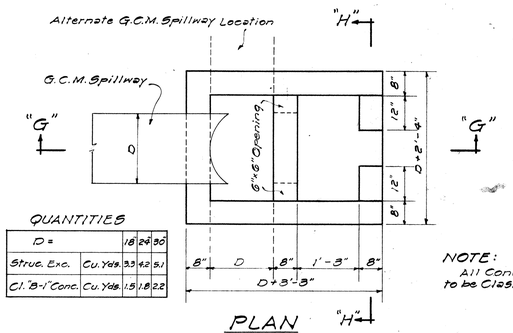
NOT TO SCALE



G. C. M. SPILLWAY

NOT TO SCALE





QUANTITIES

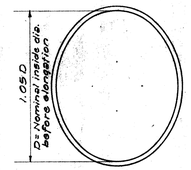
D=		18"	24"	30"
Struc. Exc.	Cu. Yds.	3.3	4.2	5.1
Cl. "B-1" Conc.	Cu. Yds.	1.5	1.8	2.2

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

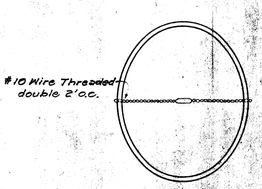
PLAN

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

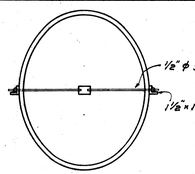
NOT TO SCALE



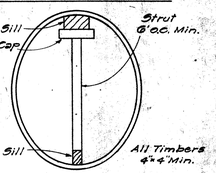
SPECIAL ELLIPTICAL FACTORY SHAPE (WITHOUT STRUTS)



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 8-14-63

DIRECTOR OF TRANSPORTATION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS

GALVANIZED CORRUGATED METAL CULVERTS, SPILLWAYS, AND SPECIAL DETAILS

SCALES AS NOTED

SHEET No. OF SHEETS

52

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE 5-24-63
	DRAWN BY R.Y.	
NOTE BOOK	TRACED BY	DATE 5-24-63
No.	QUANTITIES BY O.M.	
	CHECKED BY	

LIETZ 1103 ARKWRIGHT TRACING CLOTH 10-60 200P

24