

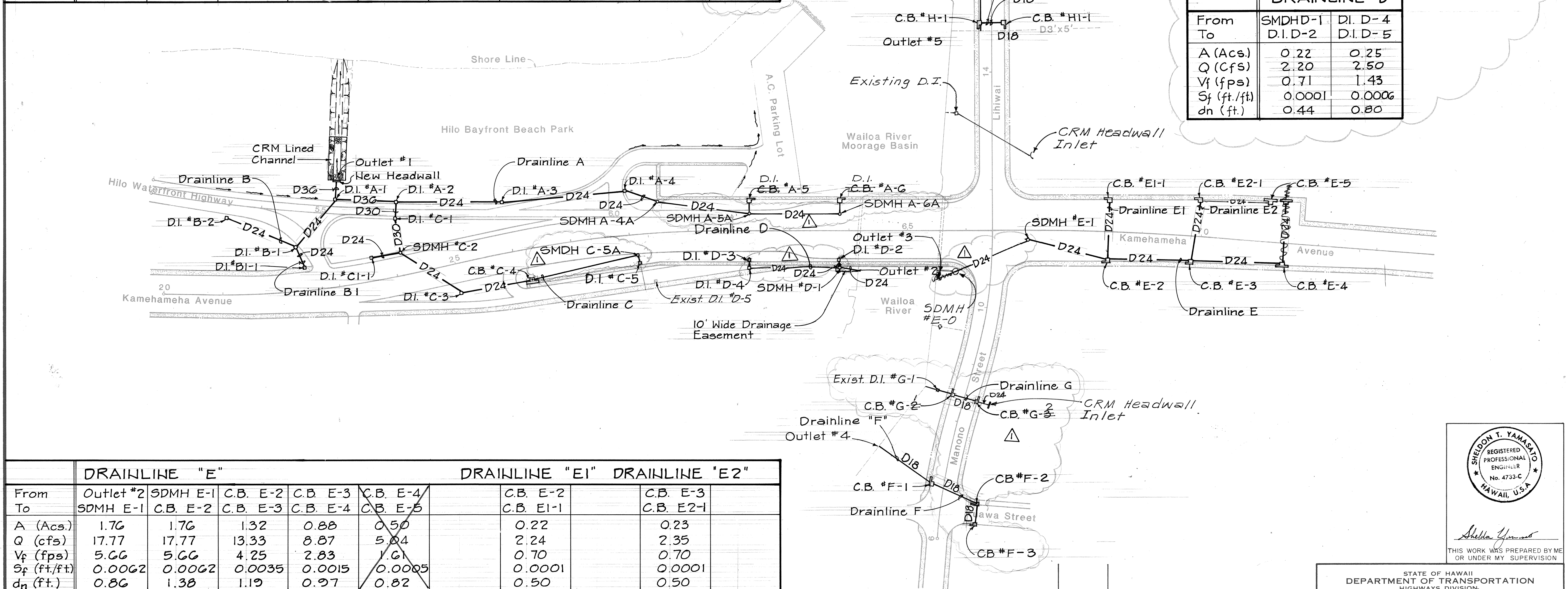
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-F-019-2(27)	1987	18	134

DRAINLINE "D"				
From To	Outlet #2	SDMH D-1	D.I. D-4	
A (Acs.)	0.79	0.57	0.20	
Q (cfs)	8.0	5.70	2.00	
V _f (fps)	2.54	1.83	0.64	
S _f (ft./ft)	0.0012	0.0006	0.0001	
d _n (ft.)	0.53	0.82	0.40	

DRAINLINE "D"		
From To	SDMH D-1	D.I. D-4
A (Acs.)	0.22	0.25
Q (cfs)	2.20	2.50
V _f (fps)	0.71	1.43
S _f (ft./ft)	0.0001	0.0006
d _n (ft.)	0.44	0.80

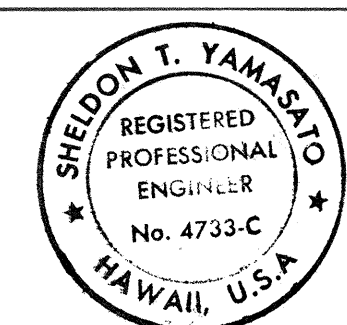
DRAINLINE "A"									DRAINLINE "B"	
From To	Outlet #1	D.I. A-1	D.I. A-2	D.I. A-3	D.I. A-4	SDMH A-4A	SDMH A-5A	SDMH A-6A	D.I. A-1	D.I. B-1
A (Acs.)	4.85	2.99	1.00	0.70	0.42	0.42	0.22	0.22	1.16	0.44
Q (cfs)	50.90	32.2	12.01	9.01	6.20	6.20	2.20	2.20	11.69	4.43
V _f (fps)	7.21	4.55	3.86	2.89	1.99	1.99	0.71	0.71	3.73	1.41
S _f (ft./ft)	0.0059	0.0023	0.0029	0.0016	0.0008	0.0008	0.0001	0.0001	0.0027	0.0004
d _n (ft.)	3.00	1.53	0.97	0.75	0.62	0.68	0.30	0.37	1.07	0.63

DRAINLINE "B"			DRAINLINE "C"			DRAINLINE "CI"		
From To	D.I. B-1	D.I. BI-1	D.I. A-2	D.I. C-1	SDMH C-2	D.I. C-3	C.B. C-4	SDMH C-2
A (Acs.)	0.37		1.82	1.54	1.04	0.52	0.25	0.50
Q (cfs)	3.73		18.34	15.52	10.48	5.24	2.52	5.04
V _f (fps)	1.19		3.74	3.17	3.34	1.67	0.80	1.60
S _f (ft./ft)	0.0003		0.0020	0.0014	0.0022	0.0005	0.0001	0.0005
d _n (ft.)	0.66		1.24	1.19	1.01	0.68	0.30	0.83



DRAINLINE "E"						DRAINLINE "EI"		DRAINLINE "E2"	
From To	Outlet #2	SDMH E-1	C.B. E-2	C.B. E-3	C.B. E-4	C.B. E-2	C.B. E-3	C.B. E-2	C.B. E-3
A (Acs.)	1.76	1.76	1.32	0.88	0.50	0.22	0.23	0.22	0.23
Q (cfs)	17.77	17.77	13.33	8.87	5.04	2.24	2.35	2.24	2.35
V _f (fps)	5.66	5.66	4.25	2.83	1.61	0.70	0.70	0.70	0.70
S _f (ft./ft)	0.0062	0.0062	0.0035	0.0015	0.0005	0.0001	0.0001	0.0001	0.0001
d _n (ft.)	0.86	1.38	1.19	0.97	0.82	0.50	0.50	0.50	0.50

DRAINLINE "F"			DRAINLINE "G"			DRAINLINE "H"			DRAINLINE "HI"	
From To	Outlet #4	C.B. F-1	Outlet	Exist. D.I. G-1	C.B. G-2	Outlet	C.B. H-1	C.B. H-2	C.B. H-1	C.B. HI-1
A (Acs.)	0.71	0.48	0.17	0.63	0.49	0.20	1.07	0.50	0.24	0.24
Q (cfs)	6.50	4.4	1.56	5.80	4.50	1.80	9.79	4.59	2.20	2.20
V _f (fps)	3.69	2.50	0.88	3.28	2.55	1.04	5.57	2.60	1.30	1.30
S _f (ft./ft)	0.0039	0.0018	0.0002	0.0030	0.0018	0.0003	0.0088	0.0019	0.0005	0.0004
d _n (ft.)	0.67	0.72	0.39	0.55	0.53	0.45	0.72	0.72	0.63	0.60



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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

GENERAL DRAINAGE PLAN

HAWAII BELT ROAD/KAMEHAMEHA AVENUE
Waioa Bridge Replacement And Approaches

FEDERAL AID PROJECT NO. BR-F-019-2(27)
SCALE: AS NOTED DATE SEPT., 1986
SHEET No. 18 OF 13 SHEETS

DATE	REVISION
11/1/88	Revised Drainlines "G" And "F" Plan And Table

DRAINAGE SUMMARY

PROJECT : HAWAII BELT ROAD/KAMEHAMEHA AVE. : Wailoa Bridge Replacement And Approaches

PROJECT NO.: BR-F-019-2(27)

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-F-019- 2(27)	1987	19	134
9/1/88 Δ	Added SDMH's And Drainline to Drainline "A"				
DATE	REVISIONS				

[illegible]

DRAINAGE SUMMARY

PROJECT: HAWAII BELT ROAD/KAMEHAMEHA AVE: Wailoa Bridge Replacement And Approaches

PROJECT NO.: BR-F-019-2(27)

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-F-019- 2(27)	1987		
9/2/88 △	Added SDMH's And Drain- lines To Drainline "C" And "D"				
DATE	REVISIONS				

[illegible]

DRAINAGE SUMMARY

PROJECT: HAWAII BELT ROAD/KAMEHAMEHA AVE: Wailoa Bridge Replacement And Approaches

PROJECT NO.: BR-F-019-2(27)

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-F-019- 2(27)	1987	21	134
9/2/88 Δ	Revised Drainline F, Inlets And Pipe Lengths				
DATE	REVISIONS				

[illegible]

October, 1970

DRAINAGE

S U M M A R Y

PROJECT: HAWAII BELT ROAD/ KAMEHAMEHA AVE: Wailoa Bridge Replacement And Approaches

PROJECT NO.: BR-F-019-2(27)

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-F-019- 2(27)	1987	22	134
9/1/88 △	Revised Height of Catch Basin G-1				
DATE	REVISIONS				

[illegible]

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-F-019-2(27)	1987	23	134

Sta. 53+43
o/s = 22' Rt.
Construct D.I. #B-2
Type G1G14
Top = 7.53
Inv. = 2.88 = 2.95

Sta. 54+63
o/s = 60' Rt.
Construct D.I. #B-1
Type G1G14
Top = 6.15
Inv. = 1.53

Sta. 55+24
o/s = 55' Lt.
Demolish & Remove Exist.
Headwall Structure
Construct New Outlet
Structure #1, See (D)
Inv. = 1.30

Sta. 55+24
o/s = 23' Lt.
Construct D.I. #A-1
Type "D", See Sht. D11
Top = 5.05
Inv. = 1.01 24" In
Inv. = 1.15

Sta. 55+24
o/s = 1' Rt.
Demolish & Remove
Exist. D.I. & 24"
Drain Line

HBR Sta. 55+24 Lt.
Furnish and Install 6'-ft.
Chain Link Fence
(w/ Top Rail and Concrete
Footings) (C.C.O. #16)

Sta. 56+25
o/s = 24' Lt.
Construct D.I. #A-2
Type G1214
Top = 4.71
Inv. = 0.15 24" & 30" In
Inv. = 0.63 36" Out

Sta. 56+25
o/s = 4' Rt.
Construct D.I. #C-1
Type G1214
Top = 5.25
Inv. = 0.00

Sta. 58+10
o/s = 25' Lt.
Construct D.I. #A-3
Type G1214
Top = 6.23
Inv. = 1.50

Sta. 60+26
o/s = 48' Lt.
Construct D.I. #A-4
Type G1G14
Top = 11.00
Inv. = 6.75

Sta. 62+30
o/s = 42' Lt.
Construct SDMH #A-5A
Type "A"
Inv. = 10.70
Sta. 60+36
o/s = 20' Lt.
Construct SDMH #A-4A
Type "A"
Inv. = 8.45

Sta. 62+30
Construct SDMH #A-5
Type "C-1" Modified
Inv. = 10.80
See Sht. D13

Sta. 62+34
o/s = 8' Lt.
& Sta. 62+54
o/s = 56' Lt.
Demolish & Remove
Exist. Drain Inlets

Sta. 60+26
End Phase I
Construction of
Drainline "A"

Sta. 0+00
Access Rd. =
Sta. 60+03
Hawaii Belt Rd.

TRUE NORTH
Scale: 1" = 40'

Wailoa River
Moorage Basin

D.I. #D-4 to D.I. #D-3
Install 18" RCP
CL. III, 12 L.F.
S = 0.0075 Ft./Ft.

Sta. 62+30
o/s = 64' Rt.
Construct D.I. #D-4
Over Exist. 18" Drain
Line
Type "E" See (G)
Top = 5.30
Inv. = 0.34

Sta. 62+40
o/s = 63' Rt.
Demolish & Remove
Exist. D.I. & 2'x2'
Box Culvert to Outlet

For Drainline "D"
Profile, See Sht. D10
Construct New
Exist. Drain

Sta. 62+30
Construct D.I. #D-3
Type "A-9B" Frame & Grate
Inv. = 0.43
See Sht. D12
Type "E" Box
See (N)
Sta. 28+40
o/s = 84' Rt.
Cut & Plug 18"
Drain Line At
Exist. D.I.

Sta. 28+13
Construct D.I. #C-5
Type "A-9B"
Inv. = 7.20
See Sht. D12
Type "E" Box
See (N)
Sta. 28+40
o/s = 84' Rt.
Cut & Plug 18"
Drain Line At
Exist. D.I.

Sta. 28+13
Construct SDMH #C-5A
Type "A"
Invert = 7.10
o/s = 39' Rt.

Sta. 24+19
Construct C.B. #C-4
Type "A-1" "B-1"
Inv. = 1.57
See Sht. D12
Type "E" Box
See (N)
Sta. 27+90
o/s = 25' Rt.
Demolish & Remove
Exist. D.I. & Drain
Line

Sta. 24+50
o/s = 10' Rt.
Temporary Plug
D24 For Phase
Construction.

Sta. 25+00
o/s = 52' Rt.
Construct D.I. #C-3
Type G1G14
Top = 5.50
Inv. = 0.97

Sta. 24+05
o/s = 38' Lt.
Construct SDMH #C-2
Type "A"
Top = 5.58
Inv. = 0.31

Sta. 23+61
o/s = 40' Lt.
Construct D.I. #C1-1
Type G1214
Top = 5.20
Inv. = 0.53

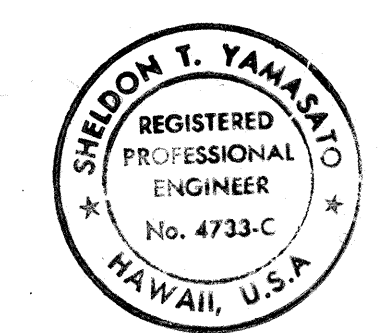
Sta. 22+42
o/s = 40' Lt.
Construct D.I. #B1-1
Type G1214
Top = 5.62
Inv. = 1.82
Sta. 23+14
o/s = 47' Rt.
Cut & Plug Exist.
12" Drain Line At
Exist. SDMH

Sta. 23+21
o/s = 16' Lt.
Demolish & Remove
Exist. D.I.

Sta. 23+16±, 48' Right (C.C.O. #69)
Demolish Existing D.I. and Abandon
Drainline. Remove SDMH Cover and
Install New Frame and Cover.

Sta. 20+00 to Sta. 63+00
Demolish Existing Curb And
Sidewalk And Construct New.

PLAN



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DATE	REVISION
11/1/88	Revised
	Revised Offset DI B1-1, DI C1-1 & DI C-1. Added Notes For Phase Cons- truction Of Drainlines "A" & "C". Added New location of Harbor Comfort Station Facility. Revised D.I.'s A, C, & D.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
DRAINAGE PLAN
B STA. 52+10.91 TO 63+00
HAWAII BELT ROAD/KAMEHAMEHA AVENUE
Wailoa Bridge Replacement And Approaches
FEDERAL AID PROJECT NO. BR-F-019-2(27)
SCALE: AS NOTED DATE: SEPT. 1986
SHEET No. D6 OF 13 SHEETS

C.O. 23

ORIGINAL	DATE
PLAN	
DRAWN BY	
DESIGNED BY	
CHECKED BY	
NO.	

53 54 55 56 57 58 59 60 61 62 63

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-F-019-2(27)	1987	24	134

20

10

0

20

10

0

20

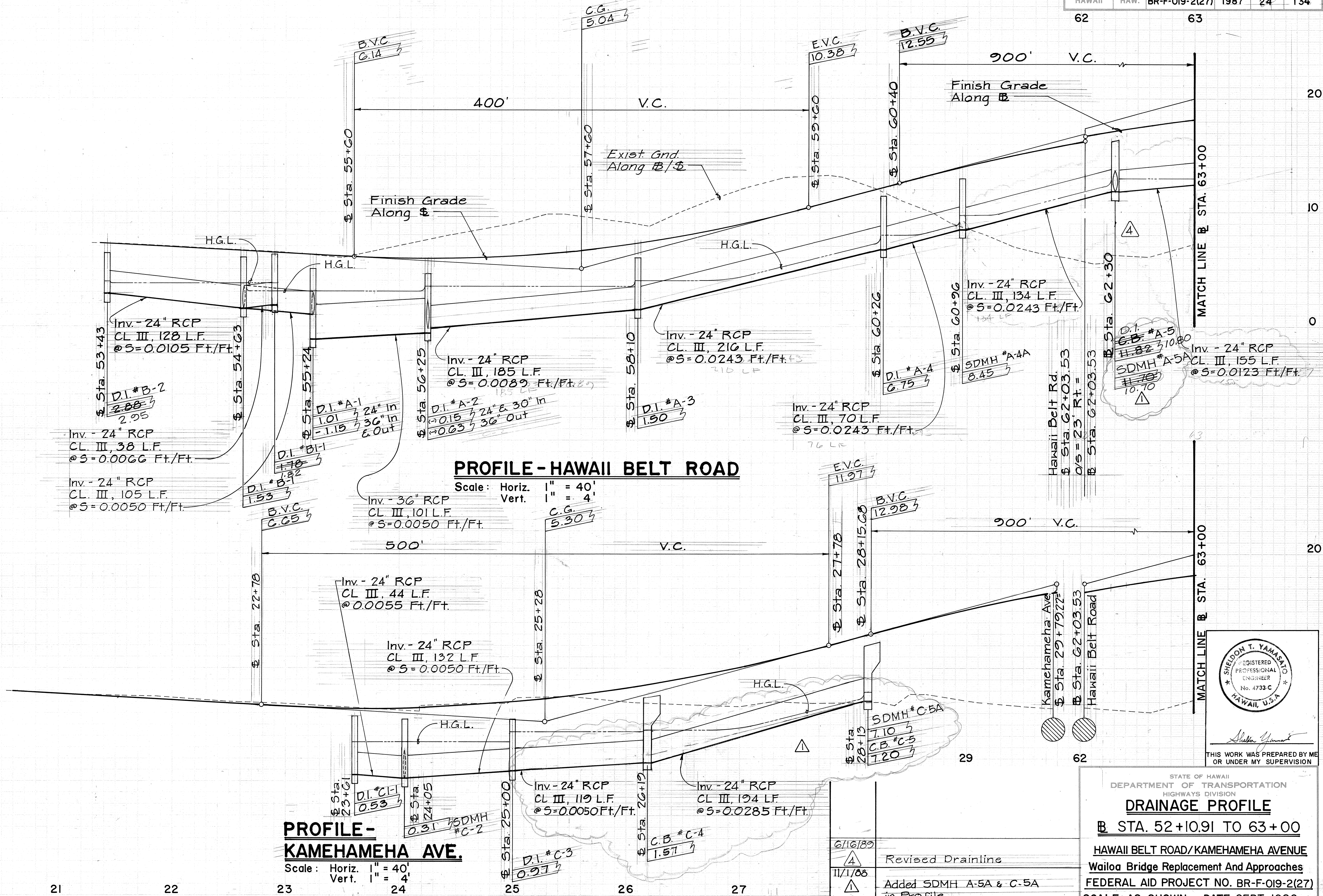
10

0

20

10

0



ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
DESIGNED BY	DRAWN BY	
CHECKED BY	NOTED BY	
NO.		

20

21

22

23

24

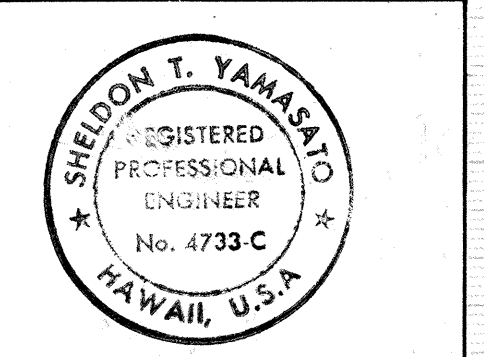
25

26

27

DATE	REVISION
6/16/89	Revised Drainline
11/1/88	Added SDMH A-5A & C-5A in Profile

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION DRAINAGE PROFILE Sta. 52+10.91 TO 63+00 HAWAII BELT ROAD/KAMEHAMEHA AVENUE Wailoa Bridge Replacement And Approaches FEDERAL AID PROJECT NO. BR-F-019-2(27) SCALE: AS SHOWN DATE: SEPT, 1986 SHEET No. 07 OF 13 SHEETS
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FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-F-019-2(27)	1987	25	134

B Sta. 63+85
Construct C.B. *A-G
Type "E-1" Modified
Inv. = 13.70
See Sht. D13

B Sta. 63+85
o/s = 40' Lt.
Construct SDMH "A-6A"
Type "A"
Inv. 13.60

B Sta. 68+43
Construct C.B. *E1-1 edge green
Type "B-1"
Inv. = 9.70

B Sta. 69+95
Construct C.B. *E2-1
Type "B-1"
Inv. = 7.80

B Sta. 71+40 = 70+82
Construct C.B. *E-5
Type "A-1"
Inv. = 8.13

C.B. *E1 to C.B. *E-2
Install 24" RCP
CL III, 100 L.F.
@S = 0.0050 Ft./Ft.

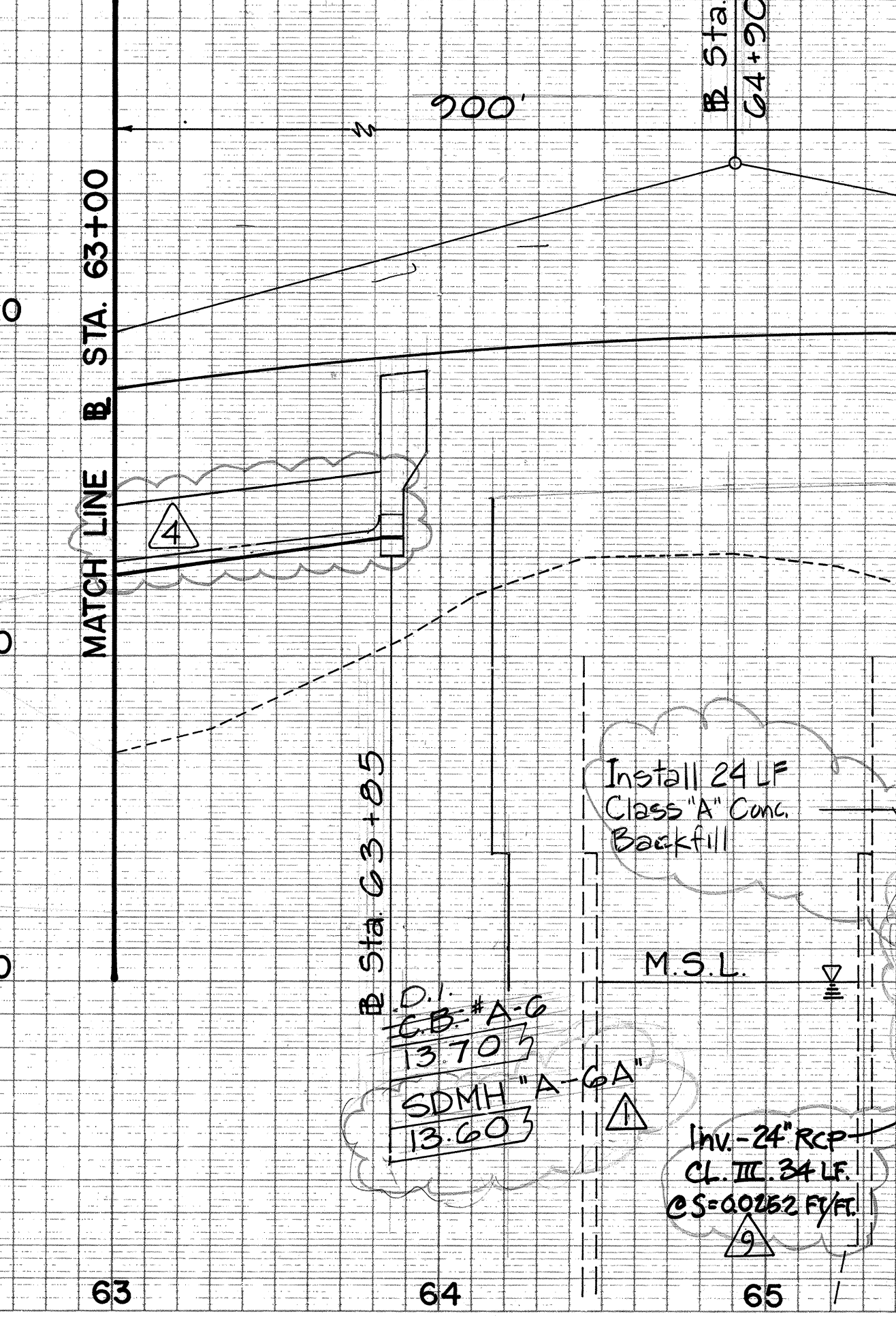
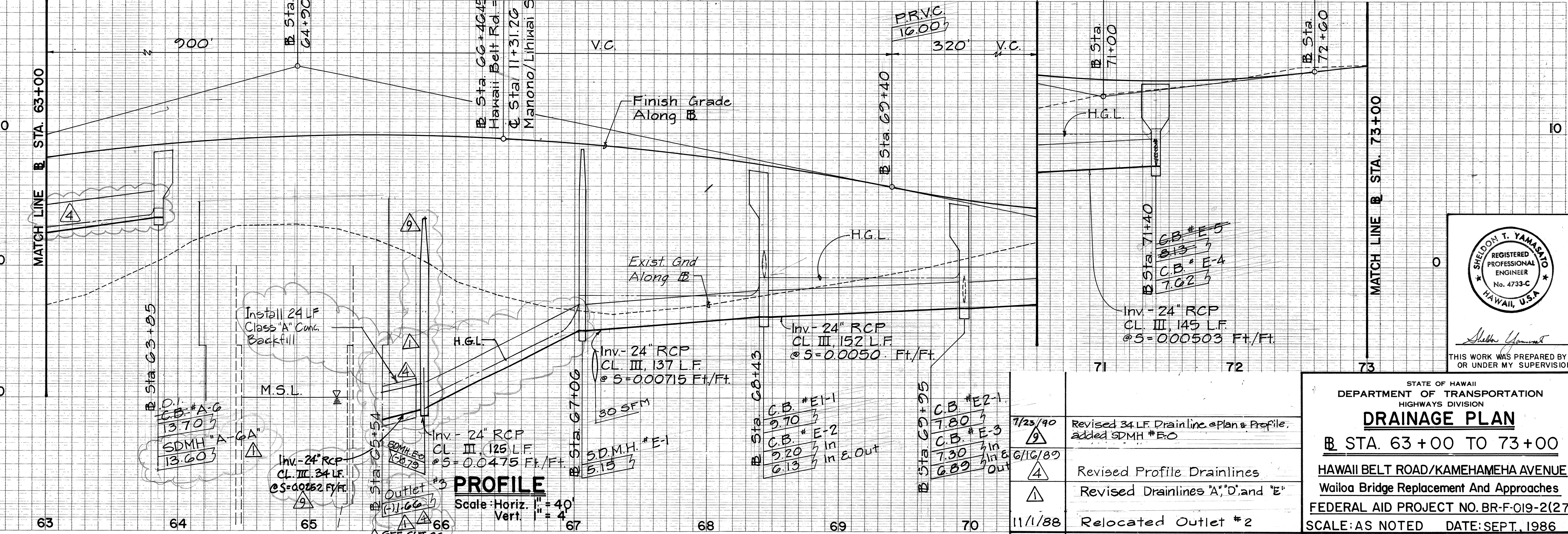
C.B. *E2-1 to C.B. *E-3
Install 24" RCP
CL III, 101 L.F.
@S = 0.0050 Ft./Ft.

C.B. *E-5 to C.B. *E-4 *E2-1
Install 24" RCP
CL III, 103 L.F. 88 L.F.
@S = 0.0050 Ft./Ft.
0.0024 Ft./Ft.

B Sta. 69+95
Construct C.B. *E-3
Type "C-1"
Inv. = 7.30 In
Inv. = 6.89 In & Out

B Sta. 71+40
Construct C.B. *E-4
Type "A-1"
Inv. = 7.62

PLAN



PROFILE

Scale: Horiz. 1" = 40'
Vert. 1" = 4'

DATE	REVISION
7/23/90	Revised 34 LF Drainline @ Plan & Profile, added SDMH *E-0
6/16/89	Revised Profile Drainlines
	Revised Drainlines "A", "D", and "E"
11/1/88	Relocated Outlet #2

SHELDON T. YAMASATO
REGISTERED PROFESSIONAL ENGINEER
No. 4733-C
HAWAII, U.S.A.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE PLAN

B STA. 63+00 TO 73+00
HAWAII BELT ROAD/KAMEHAMEHA AVENUE
Wailoa Bridge Replacement And Approaches
FEDERAL AID PROJECT NO. BR-F-019-2(27)
SCALE: AS NOTED DATE: SEPT. 1986
SHEET No. 08 OF 13 SHEETS

ORIGINAL PLAN	DATE
DRAWN BY	
DESIGNED BY	
NOTED BY	
CHECKED BY	
NO.	

TRUE NORTH
Scale: 1" = 40'

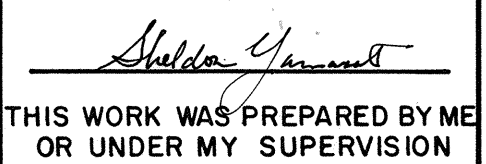


	Added Drainline
DATE	REVISION



11/1/88 ▲	Revised Locations Of Drainlines "G" And "F" Plan & Profile
DATE	REVISION

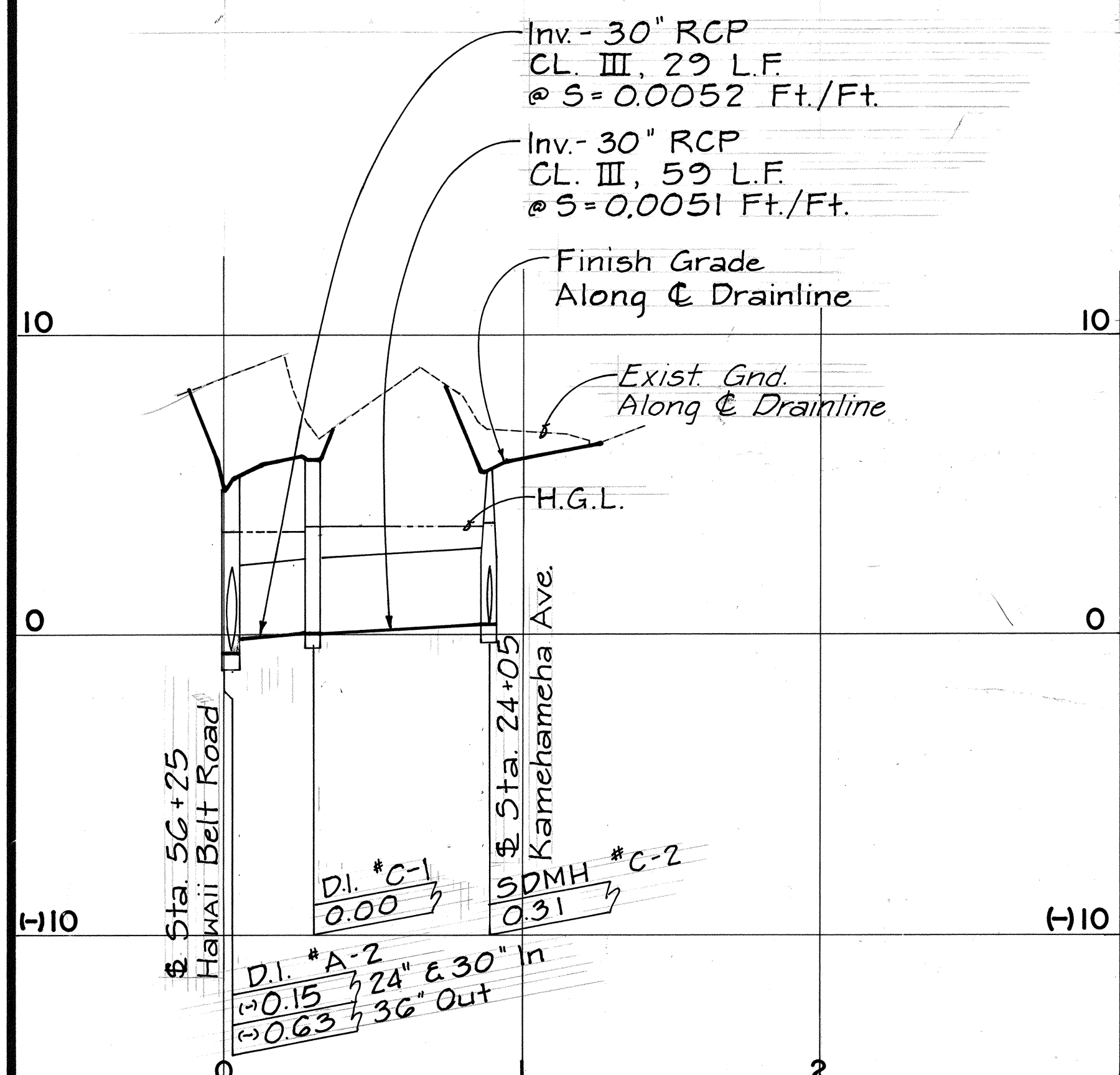
DRAINAGE PLAN
MANONO / LIHIWAI ST.
HAWAII BELT ROAD/KAMEHAMEHA AVENUE
Wailoa Bridge Replacement And Approaches
FEDERAL AID PROJECT NO. BR-F-019-2(27)
SCALE: AS NOTED DATE: SEPT., 1986
SHEET No. 09 OF 13 SHEETS



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

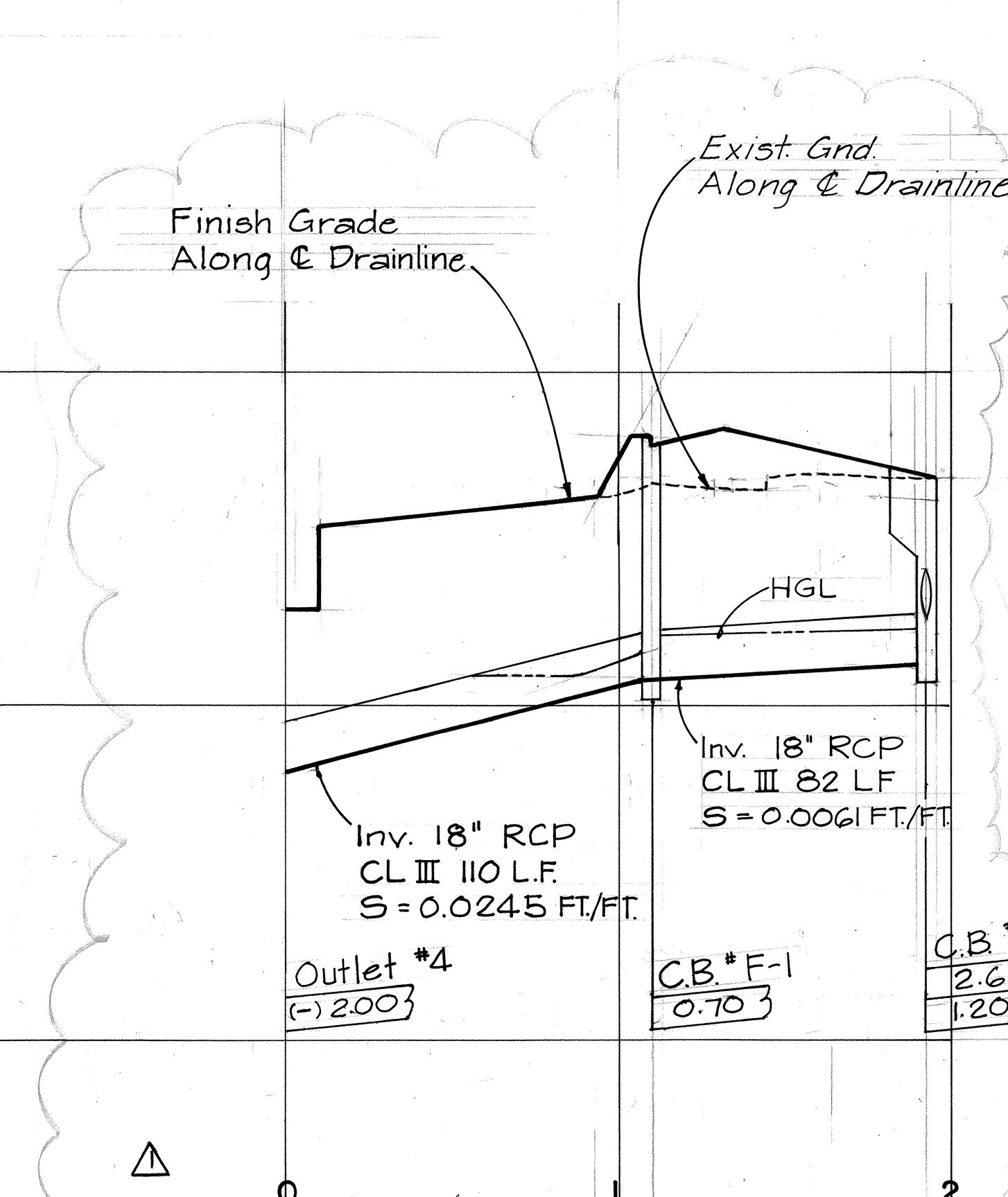
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-F-019-2(27)	1987	27	134

TRUE NORTH
Scale: 1" = 40'



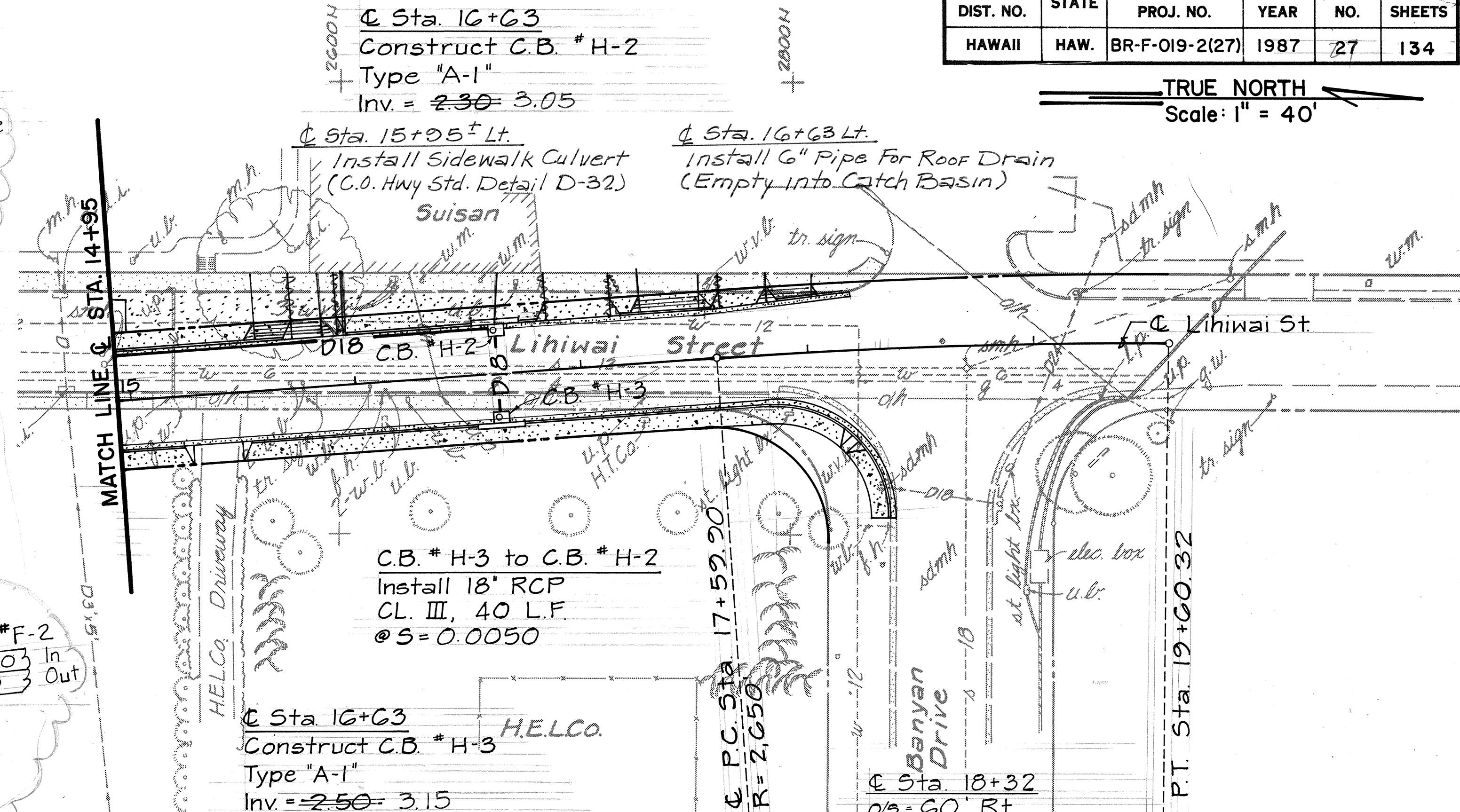
PROFILE - D.I. A-2 TO SDMH C-2

Scale: Horiz. 1" = 40'
Vert. 1" = 4'

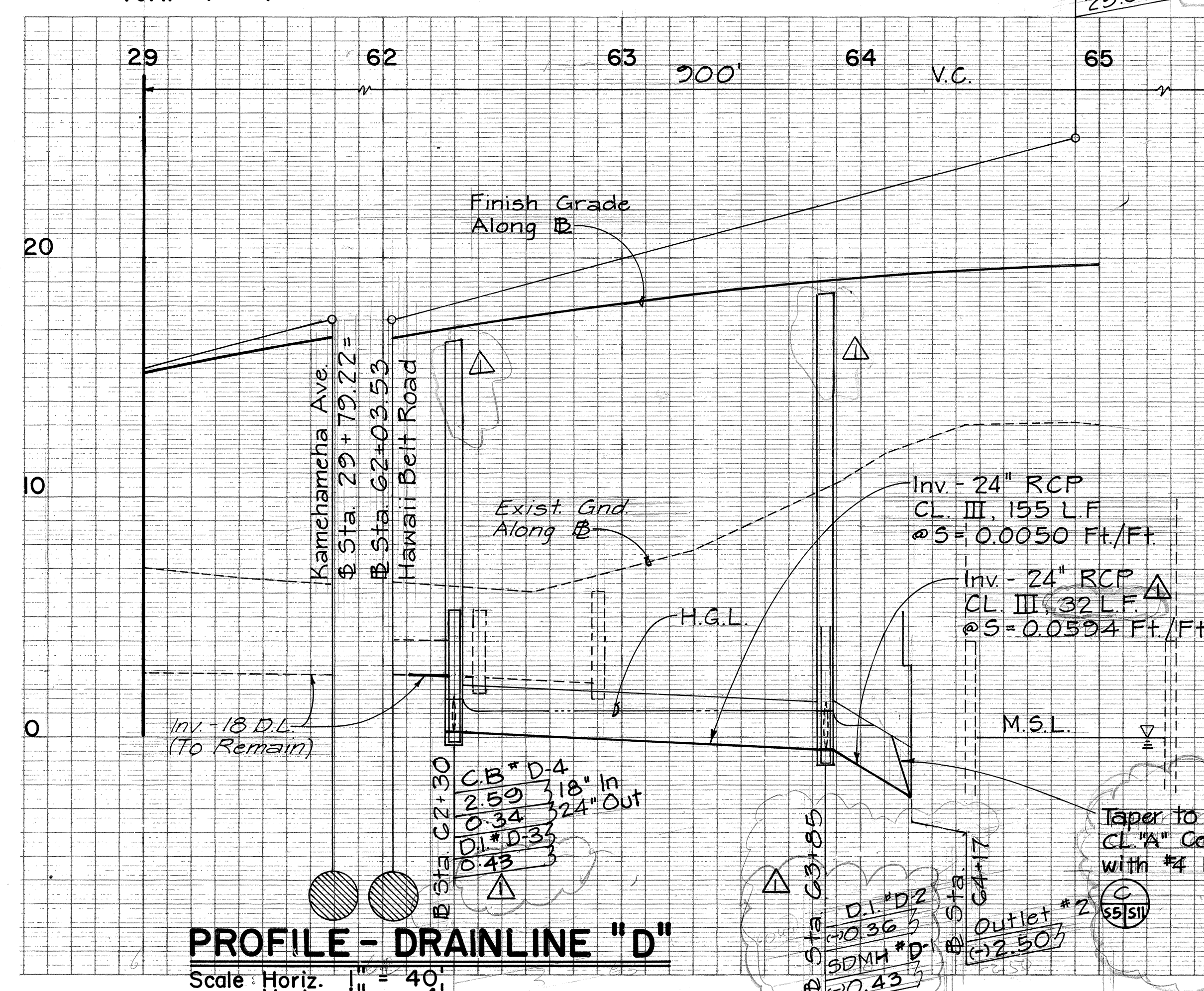


PROFILE - DRAINLINE "F"

Scale: Horiz. 1" = 40'
Vert. 1" = 4'

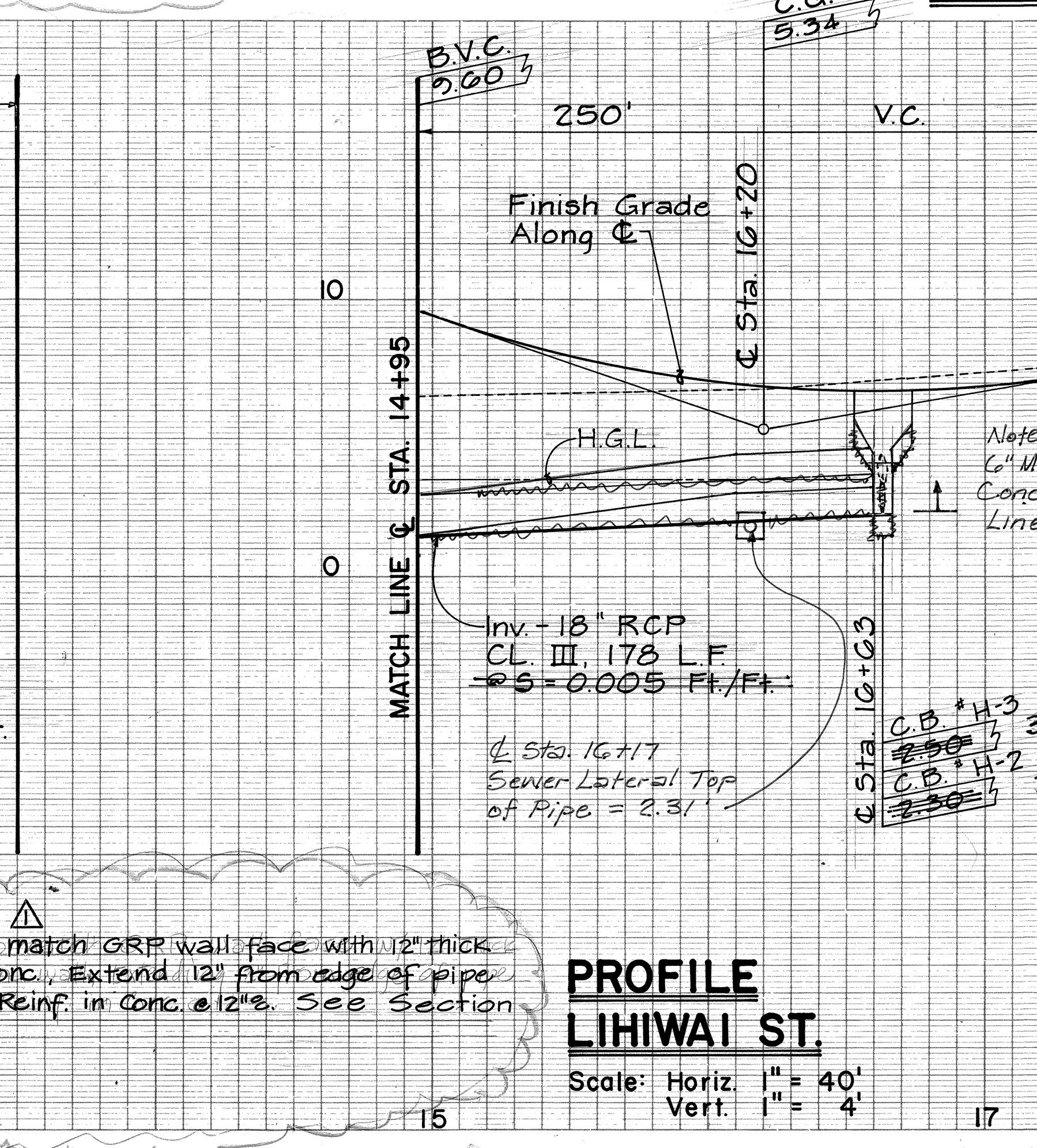


PLAN - LIHIKAI ST.



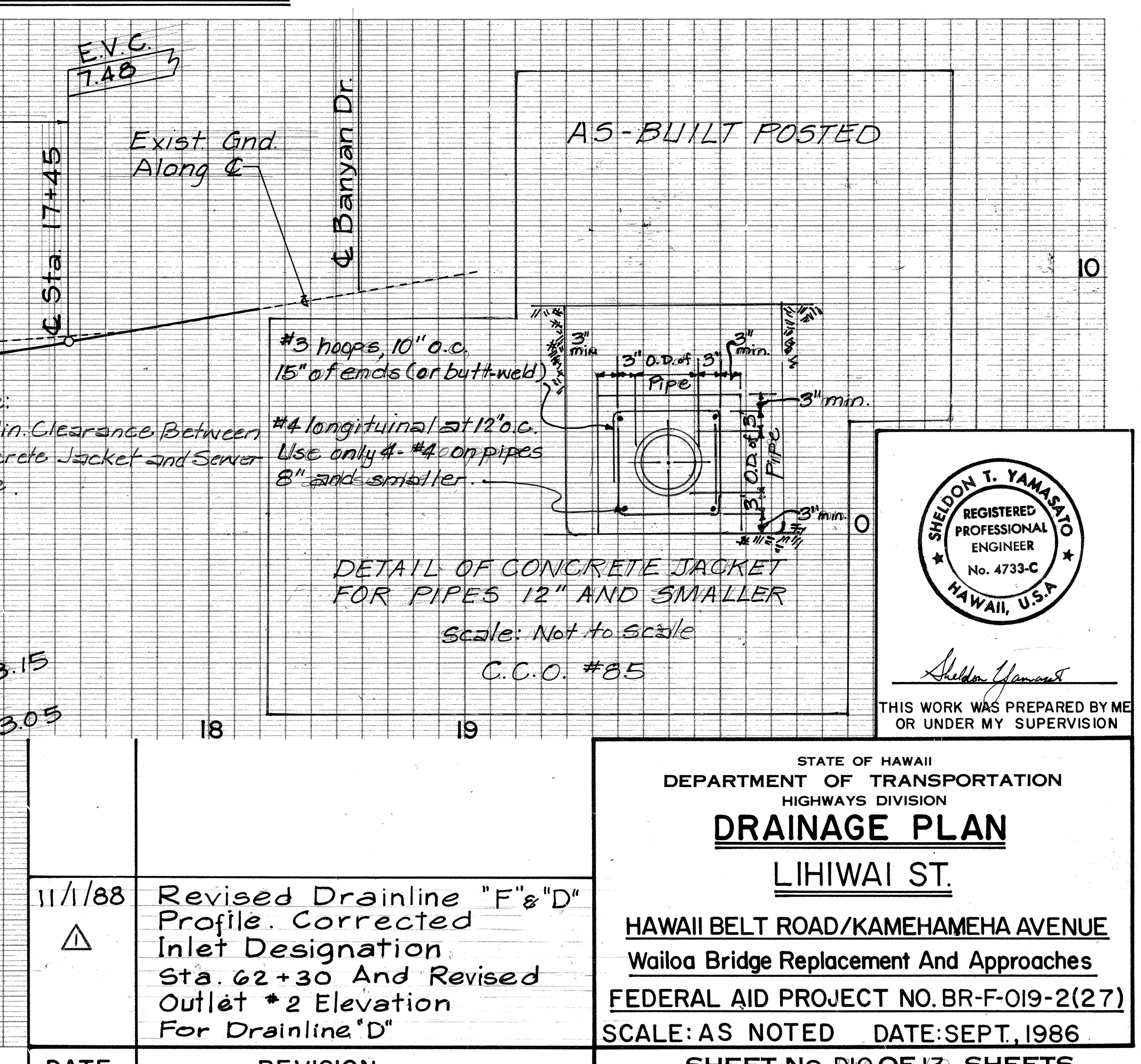
PROFILE - DRAINLINE "D"

Scale: Horiz. 1" = 40'
Vert. 1" = 4'



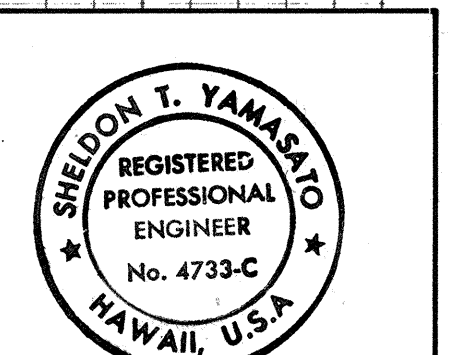
PROFILE - LIHIKAI ST.

Scale: Horiz. 1" = 40'
Vert. 1" = 4'



DETAIL OF CONCRETE JACKET FOR PIPES 12" AND SMALLER

Scale: Not to Scale
C.C.O. #85

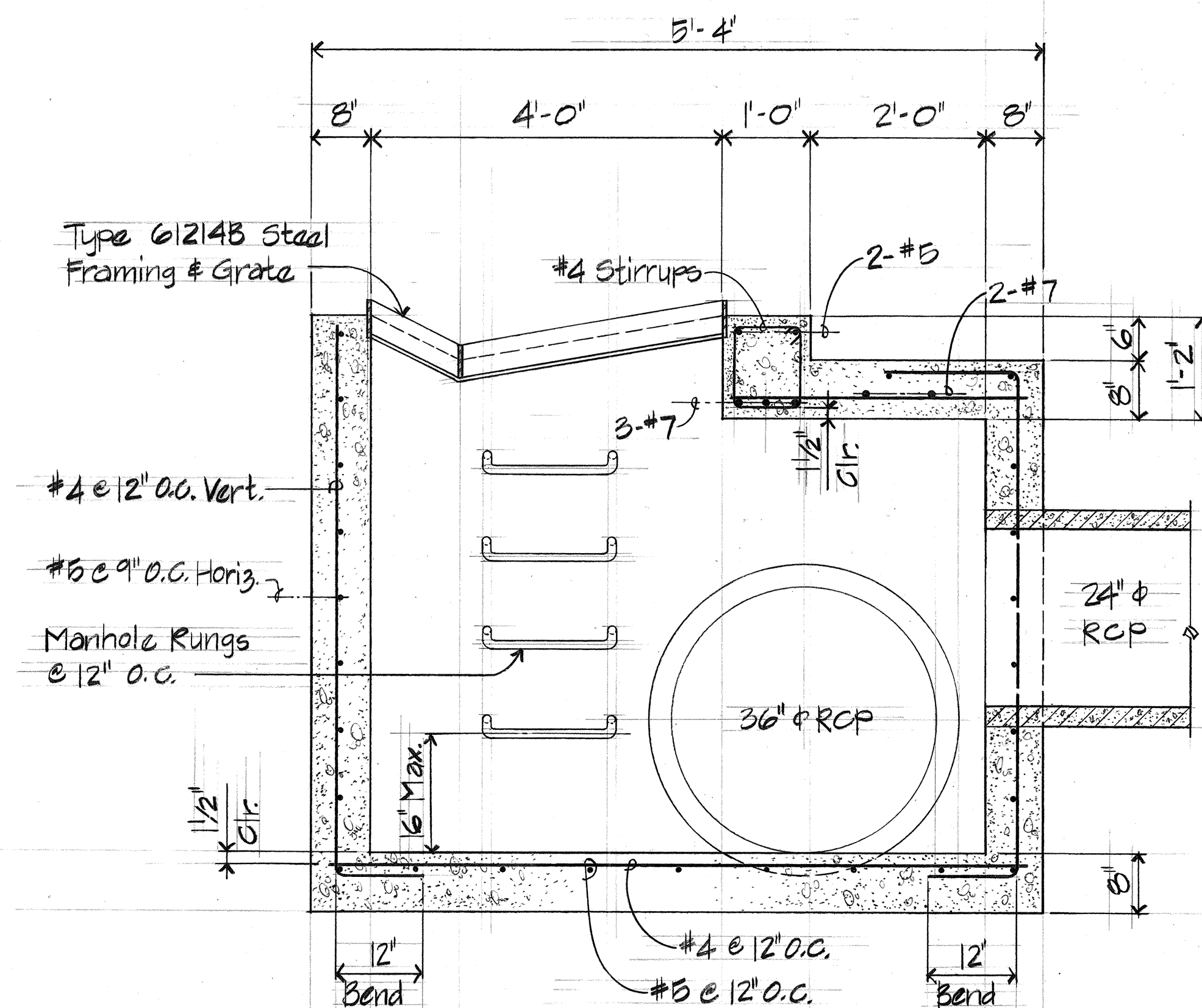


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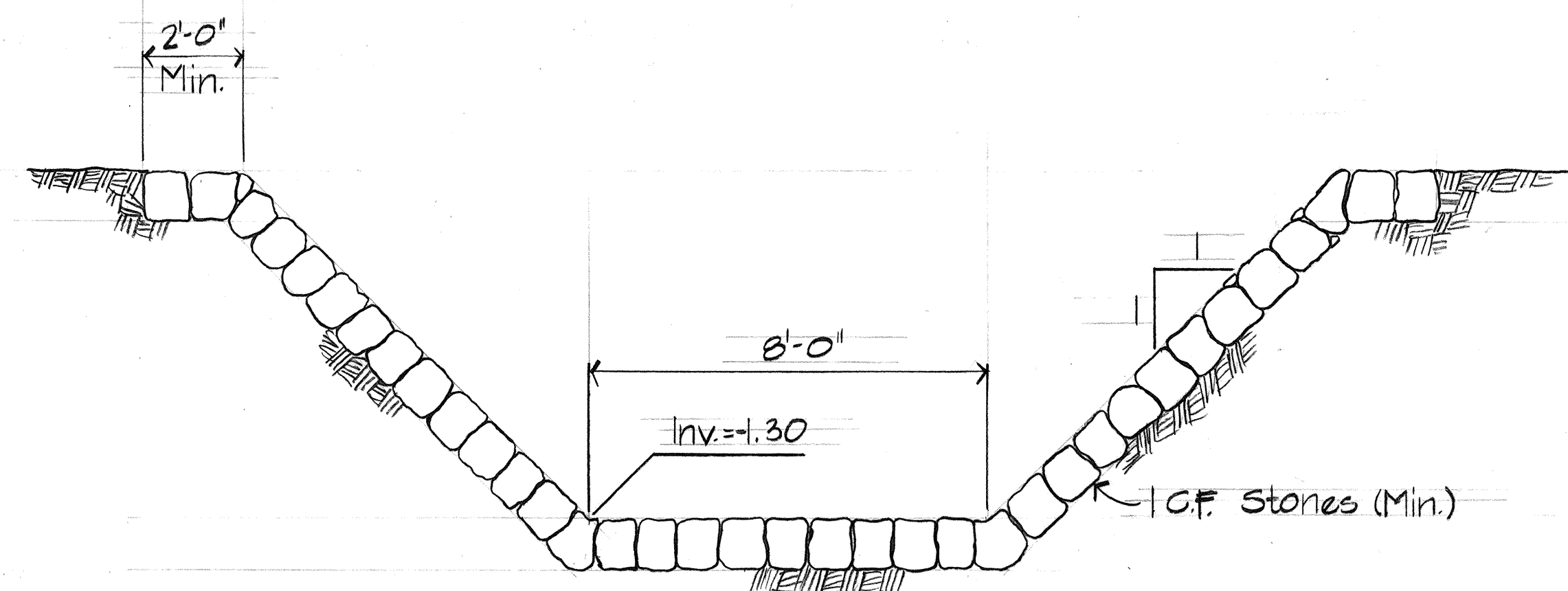
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION DRAINAGE PLAN LIHIKAI ST. HAWAII BELT ROAD/KAMEHAMEHA AVENUE Waioloa Bridge Replacement And Approaches FEDERAL AID PROJECT NO. BR-F-019-2(27) SCALE: AS NOTED DATE: SEPT. 1986 SHEET NO. D10 OF 13 SHEETS

DATE	REVISION
11/1/88	Revised Drainline "F" & "D" Profile. Corrected Inlet Designation Sta. 62+30 And Revised Outlet #2 Elevation For Drainline "D"

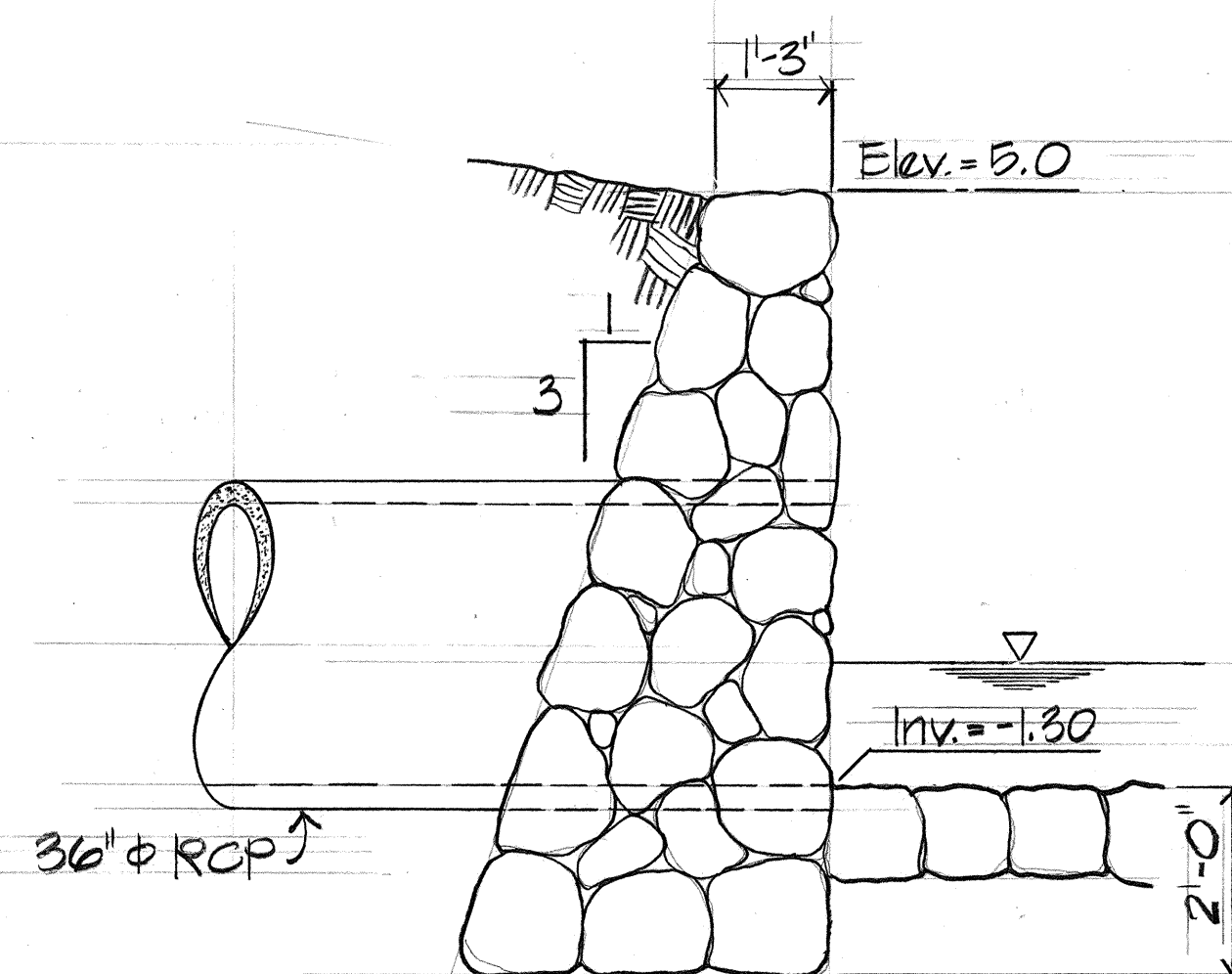
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-F-019-2(27)	1987	28	134



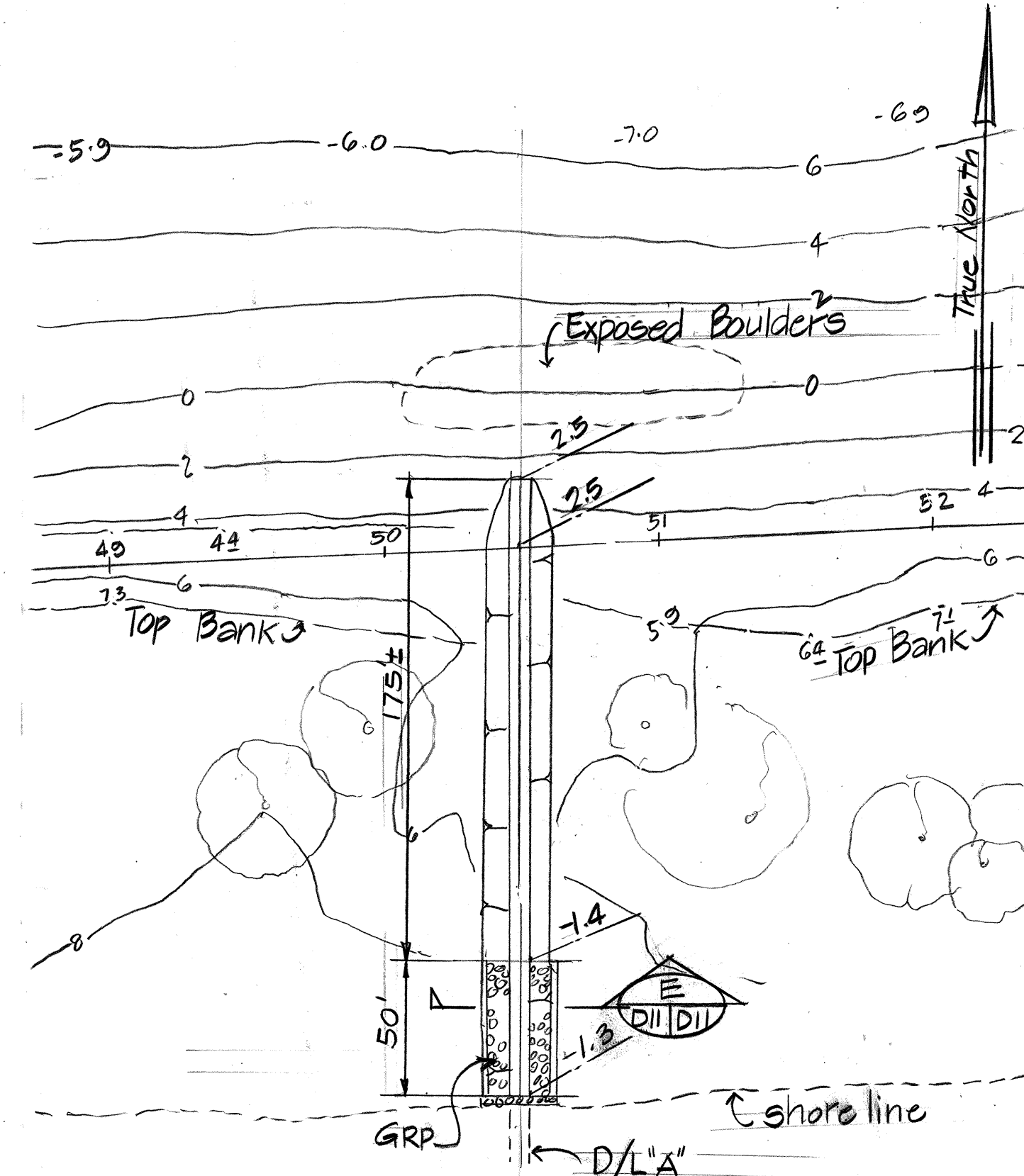
SECTION B
Scale: 3/4" = 1'-0"



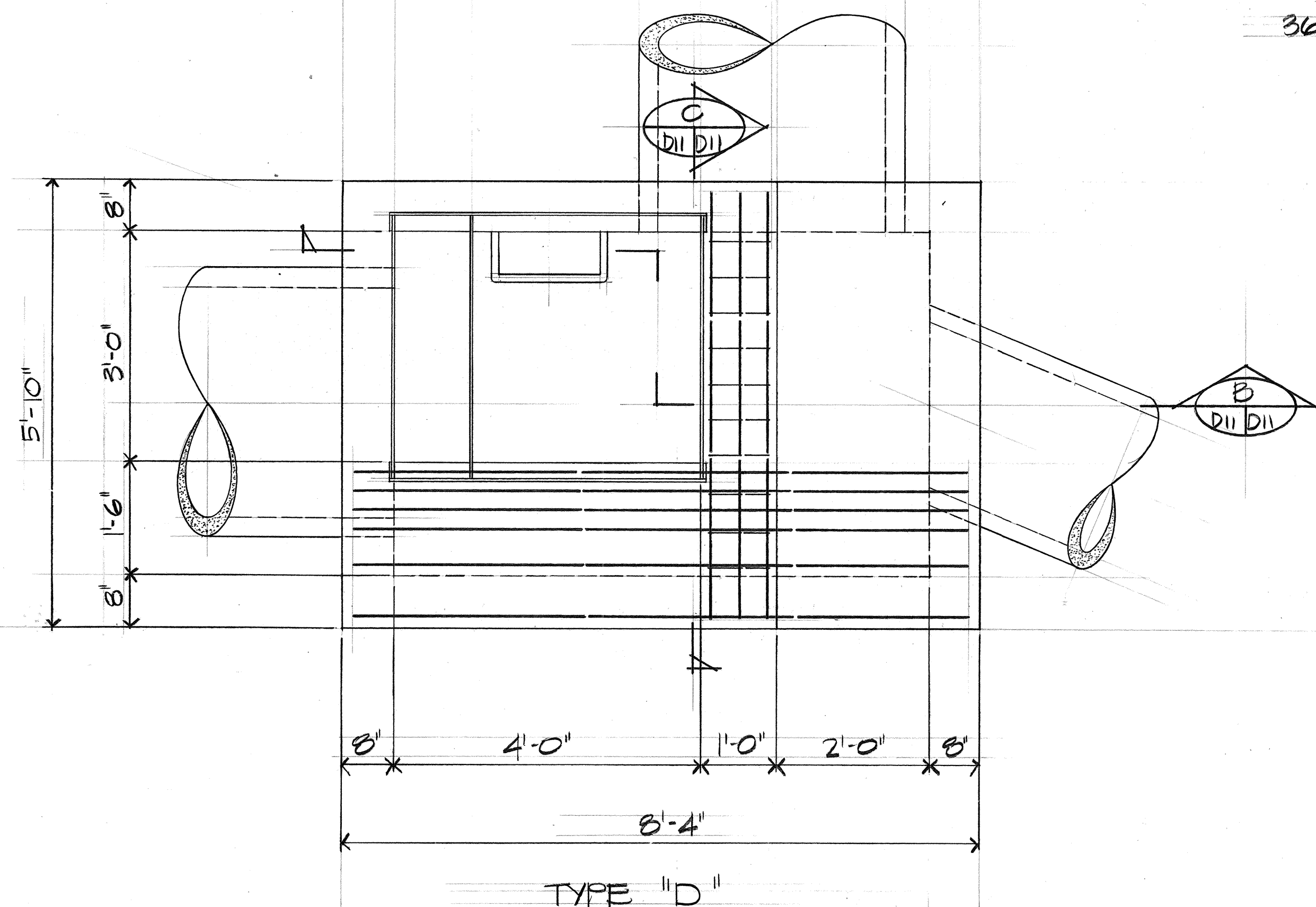
CRM CHANNEL SECTION E
Scale: 3/8" = 1'-0"



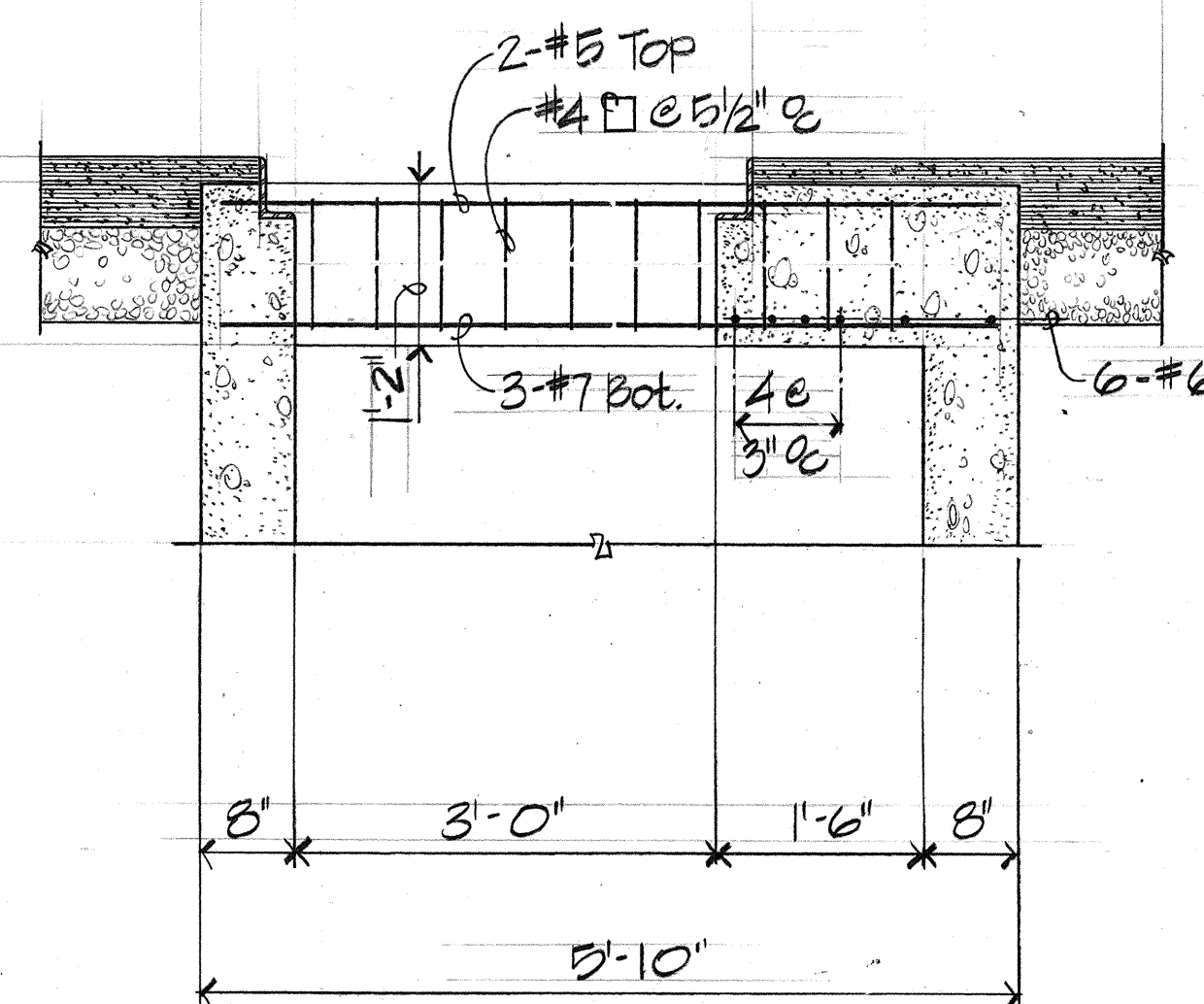
OUTLET #1 DET. D
Scale: 1/2" = 1'-0"



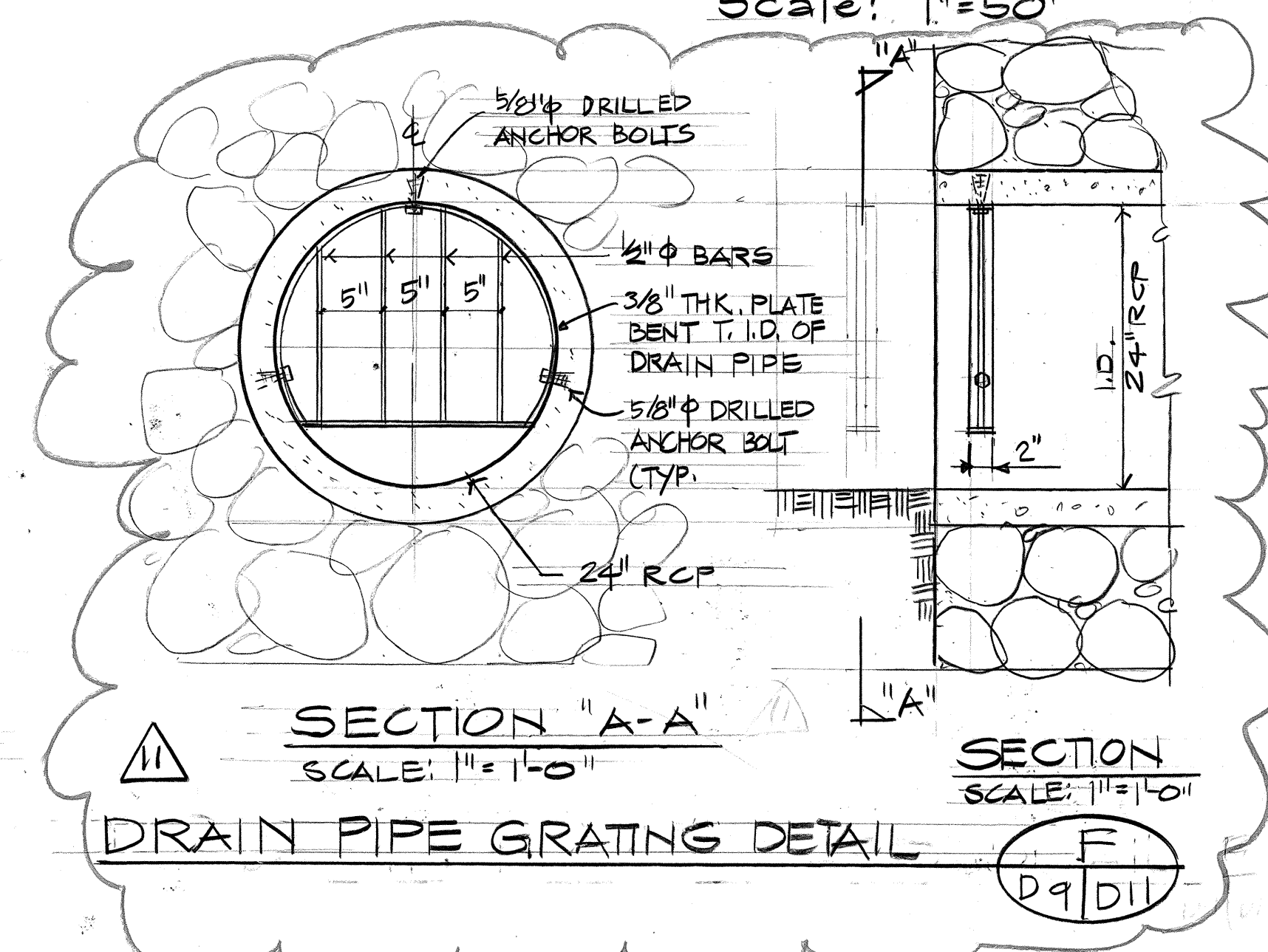
PLAN - D/L 'A' OUTLET #1
Scale: 1" = 50'



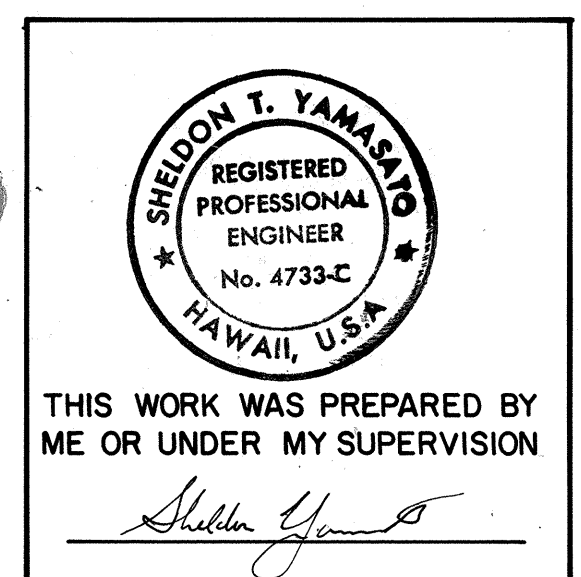
TYPE "D"
DRAIN INLET - PLAN A
Scale: 3/4" = 1'-0"



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



SECTION "A-A"
SCALE: 1" = 1'-0"
DRAIN PIPE GRATING DETAIL



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE DETAILS

HAWAII BELT ROAD/KAMEHAMEHA AVENUE
Wailoa Bridge Replacement and Approaches

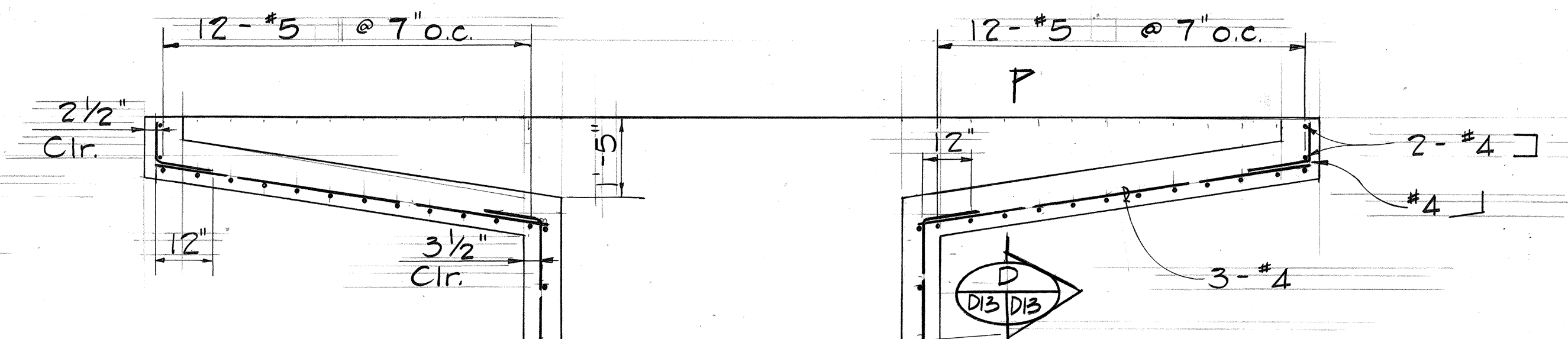
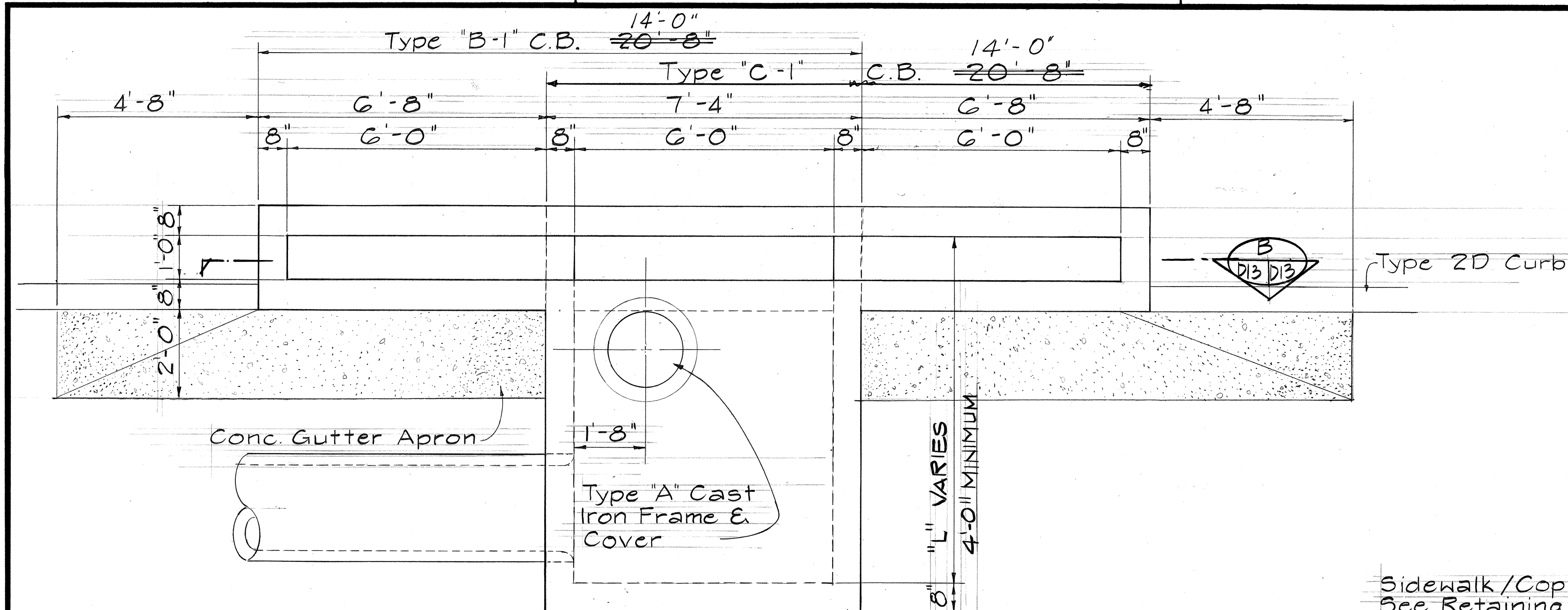
FEDERAL AID PROJECT NO. BR-F-019-2(27)

SCALE: AS NOTED DATE: SEPT. 1986

SHEET NO. DII OF 13 SHEETS

1/21/92	ADDED DETAIL
DATE	REVISION

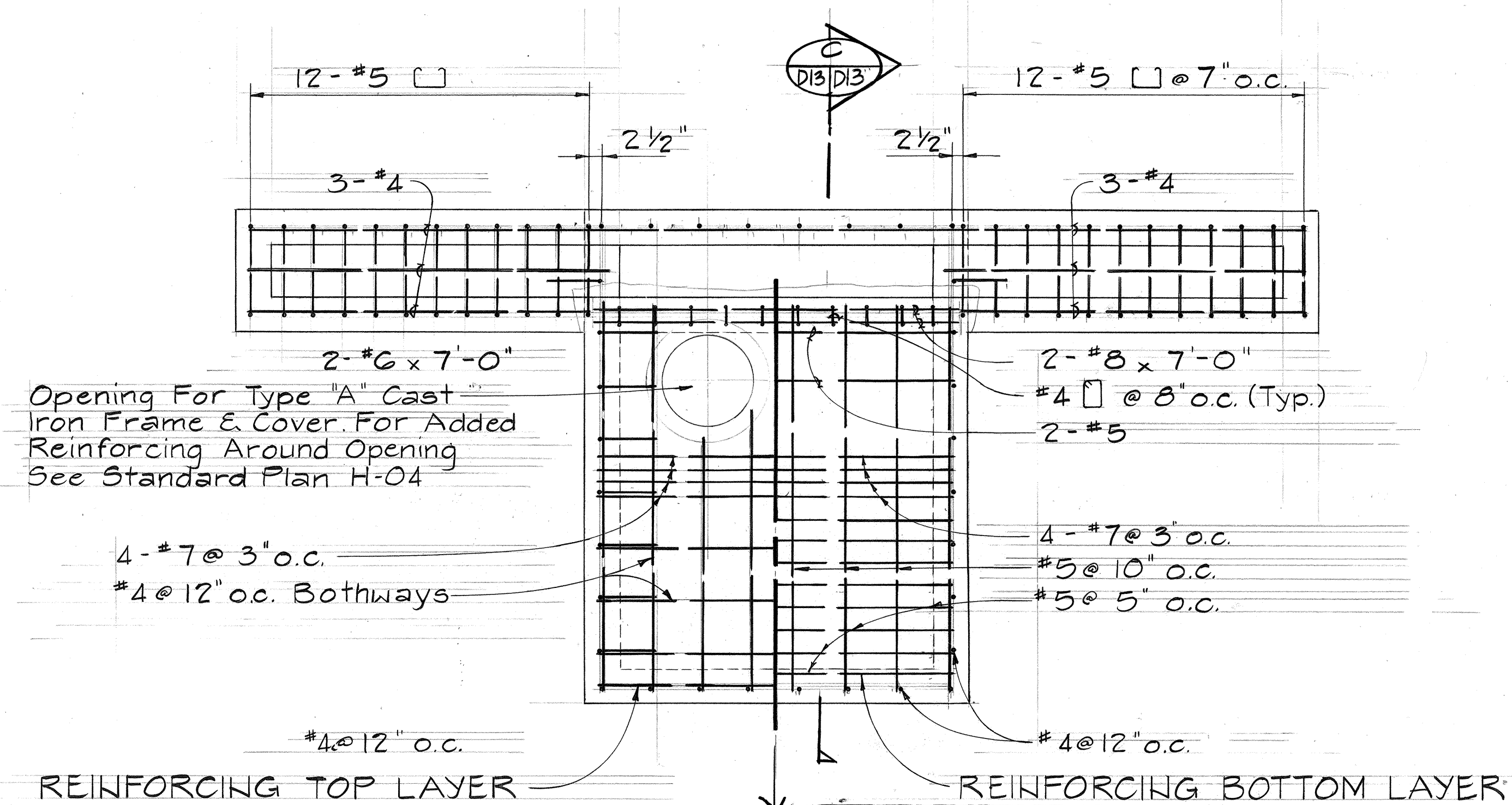
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-F-019-2(27)	1987	30	134



SECTION B
Scale: $\frac{1}{2}'' = 1'-0''$ D13 D13

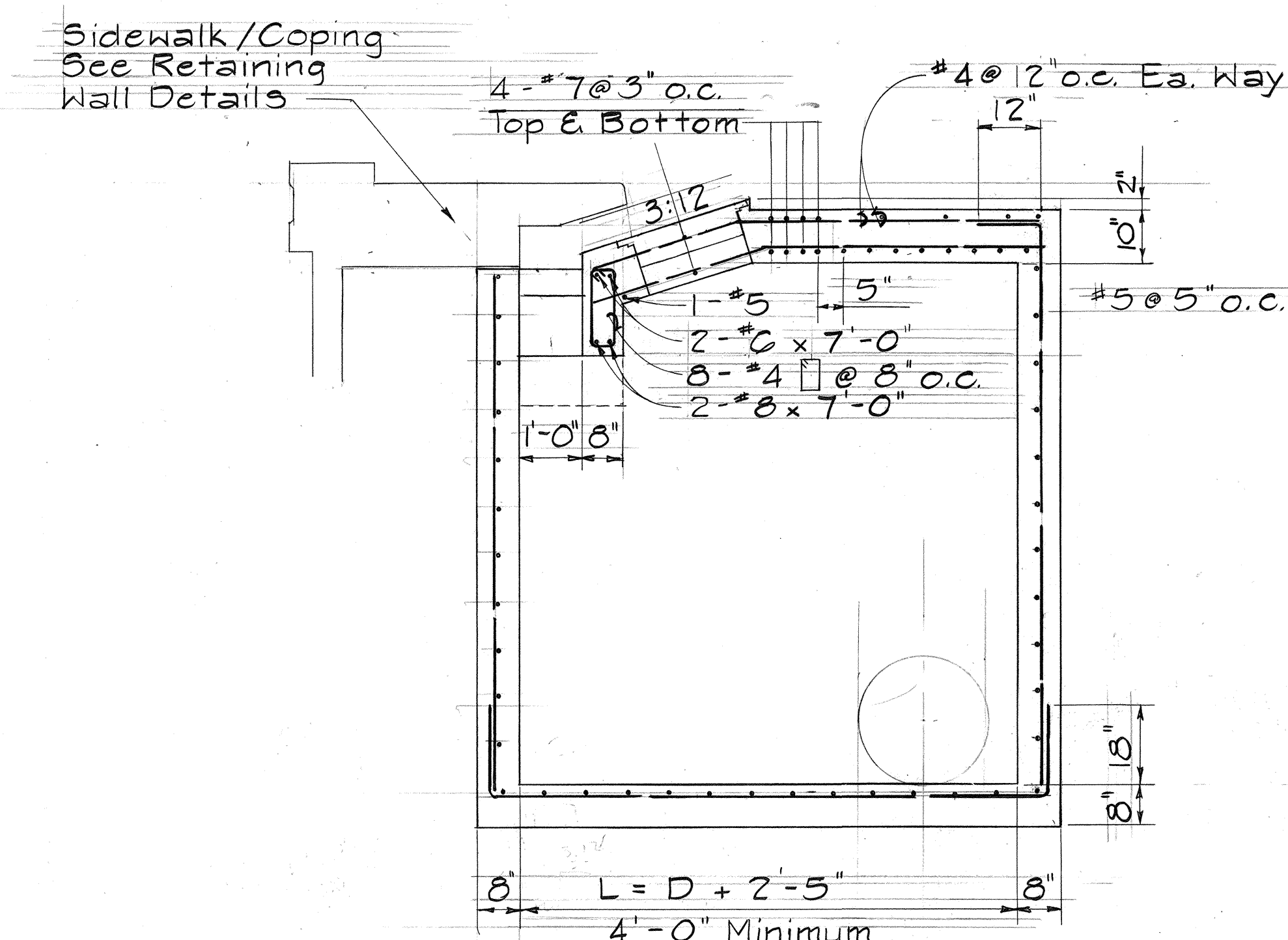
- Note
1. For Balance of Reinforcing See Std. Details.
2. For Reinforcing Around Culvert, Manhole & Culvert Seat See Std. Details.
3. For Rung Placement & Details See Std. Details.
4. D = Outside Diameter of Drainline.

PLAN
Scale: $\frac{1}{2}'' = 1'-0''$

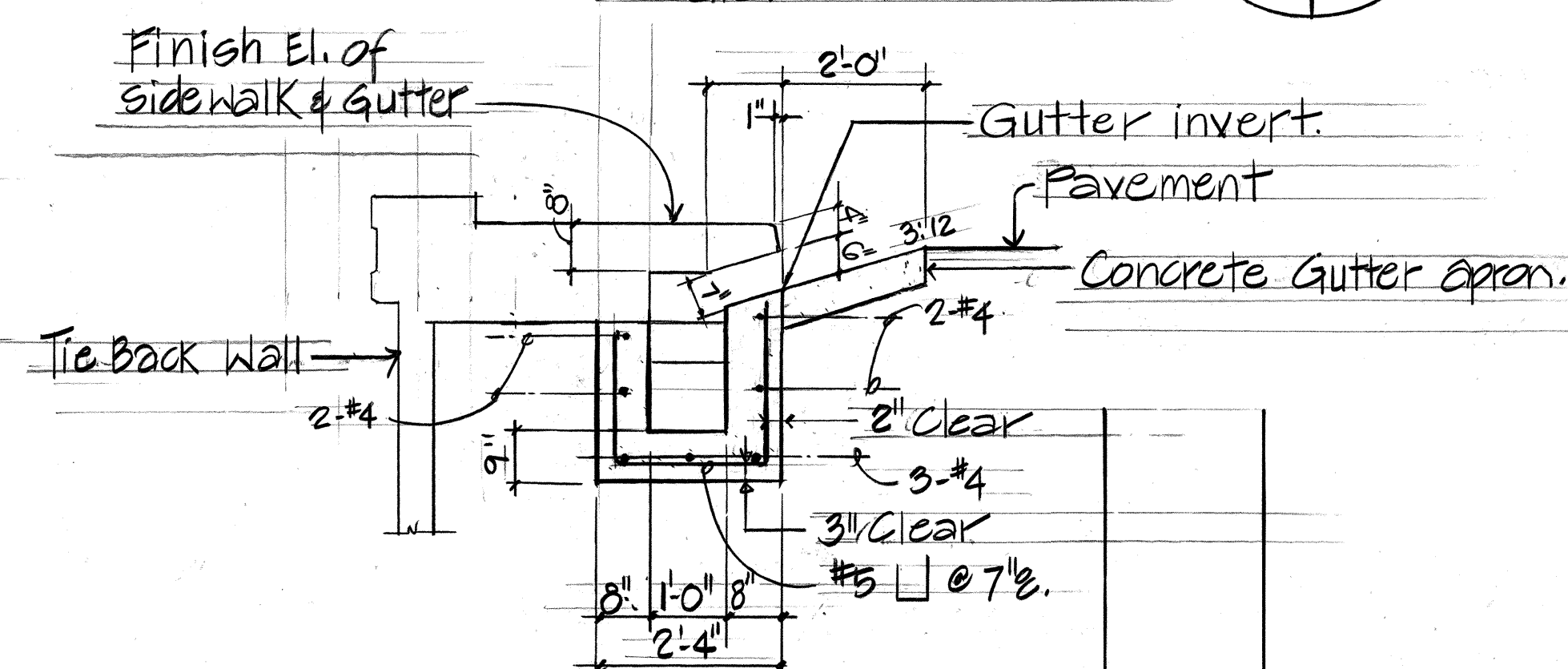


PLAN VIEW OF REINFORCING STEEL

TYPE "B" & "C" MODIFIED CATCH BASIN

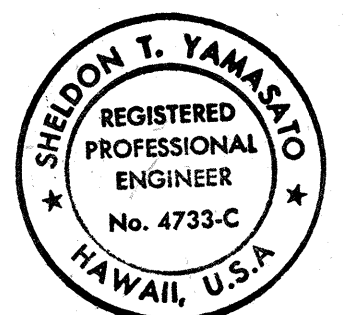


SECTION C
Scale: $\frac{1}{2}'' = 1'-0''$



SECTION D
Scale: $\frac{1}{2}'' = 1'-0''$

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



THIS WORK WAS PREPARED BY ME
OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE DETAILS

HAWAII BELT ROAD/KAMEHAMEHA AVENUE
Wailoa Bridge Replacement And Approaches
FEDERAL AID PROJECT NO. BR-F-019-2(27)
SCALE: AS NOTED DATE: SEPT., 1986
SHEET No. 13 OF 13 SHEETS