FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.		1978	86	159

PROJECT NO. 93B-01-75

True North
Scale: 1" = 50'

HOMESTEAD RD.

LUALUALEI

PORKAI BAY ST.

MAKAHAE VALLEY RD.

BAYVIEW ST.

MATCH LINE STA. 13+00

Sta. 0+00
Connect W8 to W6
1-8" saddle tapped for 1 8"x 8 1/8" corp. stop
1-2 1/8" G.V.
1-G.V.V.B.
1-3"x 2 1/8" bell reducer
6 L.F. 2 1/8" copper pipe
1-3 1/4" 90° street elbow
0.9 C.Y. str. exc.
(CCO #15)
Furnish and Install one Type "A" Valve Box over an exist. Sewer Cleanout at R.P.

Demolish W.M.H.
Adjust G.V.B.
Adjust W.V.B. 0.5 C.Y. str. exc.

Cut & plug W8
1-3" plug
1.0 C.Y. str. exc.
1-Conc. block

W8 to be abandoned

Adjust G.V.B.

Sta. 0+94
Lower Type "B" W.M.H. F&C, 0.5'
3 L.F. Brickwall for Type "B" W.M.H.
3.6 C.Y. str. exc.
1-20" M.H. F&C (Relocated)

Sta. 2+40
Relocate F.H.
1-6" 1/16 bend
20 L.F. 6" D.I. pipe, cl. 52
3-Conc. block (H. & F.H.)
1-F.H., relocated
1-6" G.V., relocated
1-G.V.V.B.
1.8 C.Y. str. exc.
1-6" 1/4 bend

Sta. 4+80
Connect W8 to W16
1-G.V.V.B.
1-8" 1/8 bend (H.V.)
1-8"x 8" tee, tilt down
2-8" sleeve, 15" long
20 L.F. 8" D.I. pipe, cl. 52
2-Conc. block (H.)
4.4 C.Y. str. exc.
1-Conc. blk. (T.V.) w/ strap
1-16"x 8" tapping sleeve w/ 8" G.V., 150#
2-Temp. cleanout w/ MJ cap

Cut & plug W8
1-3" plug
1-Conc. block
1.0 C.Y. str. exc.

Sta. 4+93
Relocate G4
11 C.Y. str. exc.

(CCO #8 2nd. Supplement)
Construct Reinforced Concrete Jacket for 8-Inch Sewer Pipe at Sta. 4+67 due to Widened Pavement. (Jacket already exists only under Existing Roadway)

(CCO #21)
Raise 10 L.F. of HTCo. 4-Inch Ducts which interfere with 24" Drain Pipe Installation.

H.T. Ductline to be relocated.

Relocated Sprinkler Heads at Police Station. See Sheet 91.

Cut & plug W2
1.0 C.Y. str. exc.

W8 to be abandoned

Sta. 3+95
Reconstruct Special S.M.H. See Sheet 97

Sta. 4+80 to 5+92
(Relocate W16) Delete CCO #19
60 L.F. 16" D.I. pipe, cl. 52
2-16" 1/8 bend (B.V.)
2-16" sleeve, 15" long
4-Conc. block (2-TV, 2-BV)
1-3/4" A.V., 103 psi
1-A.V.V.B.
32.2 C.Y. str. exc.
2-Conc. block (H) w/ strute
2-16" 1/8 bend
2-16" 1/16 bend (1-HV)
2-Temp. cleanout w/ MJ cap

Sta. 5+35
Relocate F.H.
1-6" 1/16 bend
4 L.F. 6" D.I. pipe, cl. 52
2-Conc. block (H. & F.H.)
1-F.H., relocated
1.8 C.Y. str. exc.

Sta. 8+00
Relocate F.H.
1-6" 1/16 bend
4 L.F. 6" D.I. pipe, cl. 52
2-Conc. block (H. & F.H.)
1-F.H., relocated
1.8 C.Y. str. exc.

Sta. 9+00
Relocate G4
11 C.Y. str. exc.

Sta. 10+14
Lower Top of Std. S.M.H. (09)
3.6 C.Y. str. exc.
4 L.F. Brickwall for Std. S.M.H.
1-Type "SA" F&C (Relocated)

Sta. 10+17
Lower Top of Std. S.M.H. (0.8)
4 L.F. Brickwall for Std. S.M.H.
1-Type SA F&C (relocated)
7.1 C.Y. str. exc.

Sta. 10+22
Cut & plug exist. W6
Connect W8 to exist. 16" tee
30 L.F. 6" D.I. pipe, cl. 52
1-6" 1/4 bend
1-6" 1/8 bend
1-6"x 6" tee
2-6" sleeve, 12" long

1-6" G.V., 150#
1-G.V.V.B.
1-6"x 6" reducer
1-Conc. block (T.V.)
1-Conc. block (B.V.)
1-Conc. block (H) w/ struts
1-Conc. block (H)
12.6 C.Y. str. exc.

Existing Meter Box

Abandoned Existing 6" CI Waterline

Type B Lateral (Relocated 1" Waterline)

Sta. 10+32
Cut & plug W6
1-6" plug
1-6" hub clamp w/ strong back
1-Conc. block
1.0 C.Y. str. exc.

(CCO #4) See Plan Sht. No. 90S-1 for Adjustments

CCO #18

Sta. 10+30
Relocate F.H.
1-F.H., relocated
1-G.V.V.B.,
1-6" G.V., relocated
1-6" 11/4 bend
80 L.F. 6" D.I. pipe, cl. 52
2-Conc. block (H & FH)
2.6 C.Y. str. exc.

(CCO #14)
Adjust 6-Inch Water Line Sta. 10+22. See Plan Sht. No. 90S-1 for Adjustments.

Sta. 12+25
Relocate F.H.
1-F.H., relocated
1-Conc. block (F.H.)
0.3 C.Y. str. exc.

Adjust W.V.B.

Cut & plug W6
1-6" cap
1.0 C.Y. str. exc.

Demolish W.V.B.

Sta. 11+35 to 11+90
Relocate W16
70 L.F. 16" D.I. pipe, cl. 52
4-16" 1/16 bend
4-16" 1/8 bend
2-Conc. block (B.V.)
2-Conc. block (T.V.)
2-Conc. block (H)
2-Conc. block (H) w/ strute
2-16" sleeve
1-3/4" A.V., 103 psi
1-A.V.V.B.
2-Temp. cleanout w/ MJ cap

w/ 10 3/4" splice EPB
w/ 9" splice
w/ 10 3/4" splice

LEGEND FOR WATER LATERALS
B/X — Type of Lateral / Type of Meter Box or Boxes

NOTES:
1. See sheet 89 for Sewer Notes.
2. See sheet 89 for General Water Notes.
3. All work on the water system shall be in accordance with the Standard Details, sheets 1 to 62 incl., of the Board of Water Supply, City and County of Honolulu, dated March, 1977.
4. All pipes and fittings 3" and smaller shall be of copper conforming to Subsection 707.11-Copper Service Pipe and Appurtenances. Fittings, nipples, corporation stops, stopcocks and other related materials, 3" size and smaller will not be paid for directly but shall be incidental to copper pipe.
5. All work on the Gas System will be done by Gasco, Inc. except for excavation and backfill and adjustment of valve boxes which shall be done by the Contractor.
6. See sheets 89A to 89J for Plan and Profile of 20" Water Main.

UTILITIES

Sta. 10+80
Relocate G2
11 C.Y. str. exc.

Sta. 10+84
Relocate F.H.
Existing G2
Existing G4
Existing W16
Relocated W16
Relocated G2
New G2
Existing H.T. ducts
PROFILE OF RELOCATED W16 at STA. 10+82

PAUL T. TANIGUCHI
REGISTERED PROFESSIONAL ENGINEER
No. 864
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

George R. Layman 9/29/78
Chief, Div. of Wastewater Management Date

11/8/78
Chief, Planning and Engineering, BWS Date

PROFILE
SURVEYED
PLOTTED
DRAWN CHECKED
B. M.'S NOTED
STRUCTURE NOTATNS CHKD.
NOTE BOOK
NO.

PLAN
SURVEYED
PLOTTED
DRAWN CHECKED
ALIGNMENT CHECKED
RT. OF WAY CHECKED
NO.

BY | DATE

PLATE 1—PLAN PROFILE B. P. W. STANDARD
TELEDYNE POST, CHICAGO

SHEET No. 1 OF 17 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.		1978	87	159

PROJECT NO. 93B-01-75

True North
Scale 1"=50'

MATCH LINE STA. 15+00

MATCH LINE STA. 27+00

KAUPUNI ST.

GUARD ST.

ARMY ST.

Sta. 14+80
Relocate G4
11 C.Y. str. exc.

Sta. 13+97
Lower Top of Lined S.M.H. (0.8±)
4 L.F. P.C.C. wall for Lined S.M.H
1- Type 5B F&C (relocated)
0.7 C.Y. str. exc.

Sta. 10+45
Construct W2½
1-2"x2½" corp. stop
1-2½" G.V.
1-G.V.V.B.
1-3"x2½" bell reducer
40 L.F. 2½" copper pipe
3.0 C.Y. str. exc.
1-G" Double hub fitting
1-2½" Street Elbow
1-2½" 90° Elbow

CCO #26
Excavate to lower Existing Gas Line to clear way for new 6-Inch Waterline to Fire Hydrant Connection.

Sta. 19+15
Relocate G2
11 C.Y. str. exc.

Sta. 17+42
Lower Top of Lined S.M.H. (0.2±)
4 L.F. P.C.C. wall for Lined S.M.H.
1- Type 5B F&C (relocated)

Sta. 20+85
Construct W¾
65 L.F. ¾" copper pipe
1-¾"x¾" corp. stop
1-¾" G.V.
1-G.V.V.B.
1-3"x¾" bell reducer
4.8 C.Y. str. exc.

Sta. 20+33
Cut & Plug W2
1- 2" plug
1.0 C.Y. str. exc.

Sta. 20+37
Lower Top of Std. S.M.H. (0.4±)
1- Type 5A F&C (relocated)
1- Chimney F&C (relocated)
4 L.F. brickwall for Std. S.M.H.
3.6 C.Y. str. exc

Sta. 20+86
Lower Top of Lined Drop S.M.H. (1.0±)
1- Type 5B F&C (relocated)
1- Chimney F&C (relocated)
4 L.F. P.C.C. Wall for Lined Drop S.M.H
0.9 C.Y. str. exc.

Demolish 2-W.M.H.

Sta. 23+91
Lower Top of Lined Drop S.M.H. (0.5±)
1-Type 5B F&C (relocated)
1- Chimney F&C (relocated)
4 L.F. P.C.C. wall for Lined Drop S.M.H
0.8 C.Y. str. exc.

Sta. 25+10
Relocate G8
11 C.Y. str. exc.

Adjust Type "X" W.M. Box.

Adjust G.V.B.

Cut & plug W2
2.0 C.Y. str. exc.

Adjust Type "C" W.M.B.
1-20" F&C (Relocated)

W2 to be abandoned

Raise Type "A" W.M.H., 0.2'
2-L.F. Brickwall for Type "A" W.M.H.
2-6" F&C (Relocated)
1-20" F&C (Relocated)

Sta. 25+40 to 25+45
Relocate F.H.
Connect to exist. W8
1-F.H., relocated
1-6" G.V., relocated
2-G.V.V.B.
1-16"x8" cross
1-8"x6" reducer, S.E.B.
1-8" G.V., 150#
1-6" ¼ bend
12 L.F., 6" D.I. pipe, cl. 52
30 L.F., 8" D.I. pipe, cl. 52
3-Conc. block (H & F.H.)
1-8" ¼ bend
1-8" sleeve, 12" long
Temp. for testing:
1- Temp. cleanout w/ M.J cap
8.7 C.Y. str. exc.

Sta. 25+03 to 25+37
Relocate W16
60 L.F., 16" D.I. pipe, cl. 52
3-16" ½ bend
1-3¼" A.V., 103 psi
1-A.V.V.B.
2-Conc. block (B.V.)
2-Conc. block (T.V.)
2-Conc. block (H) w/strute
1-Conc. block (H)
4-16" ⅛ bend
2-16" sleeve, 15" long
18.0 C.Y. str. exc.
Temp. for testing:
2-Temp. cleanout w/ M.J cap

Lower Type "B" W.M.H. F&C, 0.4'
3 L.F. Brickwall for Type "B" W.M.H.
4.0 C.Y. str. exc.
1-20" F&C (Relocated)

Sta. 14+80 to 15+25
Relocate W16
Relocate F.H.
1-F.H., relocated
14 L.F., 6" D.I. pipe, cl. 52
45 L.F., 16" D.I. pipe, cl. 52
4-16" ⅛ bend (1-H.V.)
3-16" ⅛ bend (1-T.V.)
1-6" ¼ bend
1-¾" A.V., 103 psi
1-A.V.V.B.
1-6" G.V., relocated
1-G.V.V.B.
1-16"x6" tee
2-16" sleeve, 15" long
2-Conc. blk. (B.V.)
2-Conc. blk. (T.V.)
2-Conc. blk. (H) with struts
3-Conc. blk. (H)
1-Conc. blk. (F.H.)
13.8 C.Y. str. exc.
Temp. for testing:
2-Temp. cleanout w/ M.J cap

Sta. 13+07
Lower Top of Std. S.M.H. (0.1±)
4 L.F. P.C.C. wall for Std. S.M.H.
1-Type 5A F&C (relocated)
4.2 C.Y. str. exc.

Sta. 15+45
Lower Top of Std. S.M.H. (0.5±)
4 L.F. P.C.C. wall for Std. S.M.H.
1-Type 5A F&C (relocated)
5.2 C.Y. str. exc.

Sta. 15+68
Connect W8 to exist. 16"x8" tee
Cut & plug 8" line
1-8" G.V., 150"
1-G.V.V.B.
35 L.F., 8" D.I. pipe, cl. 52
2-8" sleeve, 12" long
2-8" ¼ bend
2-Conc. block (H)
11.7 C.Y. str. exc.
Temp. for testing =
2-Temp. cleanout w/ M.J cap

Sta. 16+62
Lower Type "B" W.M.H. F&C, 0.8'
3 L.F. Brickwall for Type "B" W.M.H.
4.7 C.Y. str. exc.
1-20" F&C (Relocated)

Sta. 16+70
Connect exist. F.H. to W16
65 L.F., 6" D.I. pipe, cl. 52
1-6"x6" tapping sleeve w/ 6" G.V., 150 #
1-G.V.V.B. RD.
1-6" sleeve, 12" long
6-Conc. block (2-T.V., 2-B.V.)
1-6" ¼ bend (H.V.)
3-6" ⅛ bend (T.V. & 2-B.V.)
16.3 C.Y. str. exc.
Temp. for testing =
2-Temp. cleanout w/ M.J cap

Cut & Plug W2
1-2" cap
1.0 C.Y. str. exc.

Cut & plug W6
1-6" plug
1-Conc. block
1.0 C.Y. str. exc.

Adjust Type "A" W.M.H.
Relocate F.H.
1-F.H., relocated
6 L.F., 6" D.I. pipe, cl. 52
1-6" ⅛ bend
8-Conc. block (H. & F.H.)
1.8 C.Y. str. exc.

Sta. 17+80

Lower Type "A" W.M.H., 0.3'
2-6" F&C (Relocated)
1-20" F&C (Relocated)

Sta. 10+80
1-A.V., 103 psi
1-A.V.V.B.

Sta. 10+43
1-16" 1/32 bend
1-Conc. block

Sta. 10+33
1-16" ⅛ bend (H.V.)
1-Conc. block (1-H.V.)

Sta. 10+27
Connect to W16
360 L.F. 16" D.I. pipe, cl. 52
1-16" ⅛ bend (H)
1-16" sleeve, 15" long
1-Conc. block (H) w/strut
1.0 C.Y. str. exc.
8 L.F., 16" D.I. pipe, cl. 52
Temp. for testing
1- temp. cleanout w/ M.J cap

Sta. 20+87.09 R270
Demolish exist. S.M.H. DELETE
Construct new Std. S.M.H. in exist. Site
Top = 7.72
Inv. = -2.13
10 L.F. P.C.C. wall for Std. S.M.H.
1-Type 5A F&C (Reused)
1.1 C.Y. class "B" conc.
70 Lbs. reinf. steel
10 L.F. 18" V.C. pipe
10 L.F. conc. jacket
36.3 C.Y. str. exc.
See A 8.7

Sta. 21+81
Relocate G6
11 C.Y. str. exc.
6" G.I.P.

Sta. 22+10
Connect to W16
1-16" ⅛ bend (H)
1-16" sleeve, 15" long
1-Conc. blk. (H) w/ strut
8 L.F., 16" D.I. pipe cl. 52
Temp. for testing:
1-Temp. cleanout w/ M.J cap

Sta. 22+55
1-A.V., 103 psi
1-A.V.V.B.

Sta. 22+64
1-16" ⅛ bend (H)
1-Conc. block (H)

Sta. 23+20
Relocate F.H.
1-F.H., relocated
6-L.F., 6" D.I. pipe, cl. 52
1-6" ⅛ bend
2-Conc. blk. (H & F.H.)
1.8 C.Y. str. exc.

Sta. 24+43
Cut & plug W3
1-3" plug
1-Conc. blk.
1.0 C.Y. str. exc.

Sta. 24+36
Connect W8 to W16
Cut & plug 8" pipe
1-8" G.V.B.
16-L.F., 8" D.I. pipe, cl. 52
1-16"x8" tapping sleeve w/ 8" G.V., 150#
2-8" sleeve, 12" long
2-8" ¼ bend
3-Conc. block (H)
3.6 C.Y. str. exc.
Temp. for testing
2-Temp. cleanout w/ M.J cap

Sta. 20+80
Lower Top of Existing S.M.H. and install (1) Pre-Cast Eccentric Manhole Cone and Riser Section as required. See Plan Sht. No. 92 for details.
CCO #24

Sta. 20+00
Relocate W16
Relocate F.H.
1-F.H., relocated
14 L.F., 6" D.I. pipe, cl. 52
1-6" ¼ bend
3-Conc. block (H. & F.H.)
4.2 C.Y. str. exc.
1-6" G.V., relocated
1-16"x6" Tee
1-G.V.V.B.

Sta. 18+15
Relocate G6
11 C.Y. str. exc.

Sta. 16+80
Relocate G4
11 C.Y. str. exc.

Sta. 20+80
Construct W¾
65 L.F. ¾" copper pipe
1-¾"x¾" corp. stop
1-¾" G.V.
1-G.V.V.B.
1-3"x¾" bell reducer
4.8 C.Y. str. exc.

Sta. 20+33
Cut & Plug W2
1- 2" plug
1.0 C.Y. str. exc.

Sta. 20+37
Lower Top of Std. S.M.H. (0.4±)
1- Type 5A F&C (relocated)
1- Chimney F&C (relocated)
4 L.F. brickwall for Std. S.M.H.
3.6 C.Y. str. exc

Sta. 20+86
Lower Top of Lined Drop S.M.H. (1.0±)
1- Type 5B F&C (relocated)
1- Chimney F&C (relocated)
4 L.F. P.C.C. Wall for Lined Drop S.M.H
0.9 C.Y. str. exc.

Demolish 2-W.M.H.

Sta. 23+91
Lower Top of Lined Drop S.M.H. (0.5±)
1-Type 5B F&C (relocated)
1- Chimney F&C (relocated)
4 L.F. P.C.C. wall for Lined Drop S.M.H
0.8 C.Y. str. exc.

Sta. 25+10
Relocate G8
11 C.Y. str. exc.

Adjust Type "X" W.M. Box.

Adjust G.V.B.

Cut & plug W2
2.0 C.Y. str. exc.

Adjust Type "C" W.M.B.
1-20" F&C (Relocated)

W2 to be abandoned

Raise Type "A" W.M.H., 0.2'
2-L.F. Brickwall for Type "A" W.M.H.
2-6" F&C (Relocated)
1-20" F&C (Relocated)

Sta. 25+40 to 25+45
Relocate F.H.
Connect to exist. W8
1-F.H., relocated
1-6" G.V., relocated
2-G.V.V.B.
1-16"x8" cross
1-8"x6" reducer, S.E.B.
1-8" G.V., 150#
1-6" ¼ bend
12 L.F., 6" D.I. pipe, cl. 52
30 L.F., 8" D.I. pipe, cl. 52
3-Conc. block (H. & F.H.)
1-8" ¼ bend
1-8" sleeve, 12" long
Temp. for testing:
1- Temp. cleanout w/ M.J cap
8.7 C.Y. str. exc.

Sta. 25+03 to 25+37
Relocate W16
60 L.F., 16" D.I. pipe, cl. 52
3-16" ½ bend
1-3¼" A.V., 103 psi
1-A.V.V.B.
2-Conc. block (B.V.)
2-Conc. block (T.V.)
2-Conc. block (H) w/strute
1-Conc. block (H)
4-16" ⅛ bend
2-16" sleeve, 15" long
18.0 C.Y. str. exc.
Temp. for testing:
2-Temp. cleanout w/ M.J cap

Lower Type "B" W.M.H. F&C, 0.4'
3 L.F. Brickwall for Type "B" W.M.H.
4.0 C.Y. str. exc.
1-20" F&C (Relocated)

Sta. 14+80 to 15+25
Relocate W16
Relocate F.H.
1-F.H., relocated
14 L.F., 6" D.I. pipe, cl. 52
45 L.F., 16" D.I. pipe, cl. 52
4-16" ⅛ bend (1-H.V.)
3-16" ⅛ bend (1-T.V.)
1-6" ¼ bend
1-¾" A.V., 103 psi
1-A.V.V.B.
1-6" G.V., relocated
1-G.V.V.B.
1-16"x6" tee
2-16" sleeve, 15" long
2-Conc. blk. (B.V.)
2-Conc. blk. (H) with struts
3-Conc. blk. (H)
1-Conc. blk. (F.H.)
13.8 C.Y. str. exc.
Temp. for testing:
2-Temp. cleanout w/ M.J cap

Sta. 13+07
Lower Top of Std. S.M.H. (0.1±)
4 L.F. P.C.C. wall for Std. S.M.H.
1-Type 5A F&C (relocated)
4.2 C.Y. str. exc.

Sta. 15+45
Lower Top of Std. S.M.H. (0.5±)
4 L.F. P.C.C. wall for Std. S.M.H.
1-Type 5A F&C (relocated)
5.2 C.Y. str. exc.

Sta. 15+68
Connect W8 to exist. 16"x8" tee
Cut & plug 8" line
1-8" G.V., 150"
1-G.V.V.B.
35 L.F., 8" D.I. pipe, cl. 52
2-8" sleeve, 12" long
2-8" ¼ bend
2-Conc. block (H)
11.7 C.Y. str. exc.
Temp. for testing =
2-Temp. cleanout w/ M.J cap

Sta. 16+62
Lower Type "B" W.M.H. F&C, 0.8'
3 L.F. Brickwall for Type "B" W.M.H.
4.7 C.Y. str. exc.
1-20" F&C (Relocated)

Sta. 16+70
Connect exist. F.H. to W16
65 L.F., 6" D.I. pipe, cl. 52
1-6"x6" tapping sleeve w/ 6" G.V., 150 #
1-G.V.V.B. RD.
1-6" sleeve, 12" long
6-Conc. block (2-T.V., 2-B.V.)
1-6" ¼ bend (H.V.)
3-6" ⅛ bend (T.V. & 2-B.V.)
16.3 C.Y. str. exc.
Temp. for testing =
2-Temp. cleanout w/ M.J cap

Cut & Plug W2
1-2" cap
1.0 C.Y. str. exc.

Cut & plug W6
1-6" plug
1-Conc. block
1.0 C.Y. str. exc.

Adjust Type "A" W.M.H.
Relocate F.H.
1-F.H., relocated
6 L.F., 6" D.I. pipe, cl. 52
1-6" ⅛ bend
8-Conc. block (H. & F.H.)
1.8 C.Y. str. exc.

Sta. 17+80

Lower Type "A" W.M.H., 0.3'
2-6" F&C (Relocated)
1-20" F&C (Relocated)

Sta. 10+80
1-A.V., 103 psi
1-A.V.V.B.

Sta. 10+43
1-16" 1/32 bend
1-Conc. block

Sta. 10+33
1-16" ⅛ bend (H.V.)
1-Conc. block (1-H.V.)

Sta. 10+27
Connect to W16
360 L.F. 16" D.I. pipe, cl. 52
1-16" ⅛ bend (H)
1-16" sleeve, 15" long
1-Conc. block (H) w/strut
1.0 C.Y. str. exc.
8 L.F., 16" D.I. pipe, cl. 52
Temp. for testing
1- temp. cleanout w/ M.J cap

Sta. 20+87.09 R270
Demolish exist. S.M.H. DELETE
Construct new Std. S.M.H. in exist. Site
Top = 7.72
Inv. = -2.13
10 L.F. P.C.C. wall for Std. S.M.H.
1-Type 5A F&C (Reused)
1.1 C.Y. class "B" conc.
70 Lbs. reinf. steel
10 L.F. 18" V.C. pipe
10 L.F. conc. jacket
36.3 C.Y. str. exc.
See A 8.7

Sta. 21+81
Relocate G6
11 C.Y. str. exc.
6" G.I.P.

Sta. 22+10
Connect to W16
1-16" ⅛ bend (H)
1-16" sleeve, 15" long
1-Conc. blk. (H) w/strut
8 L.F., 16" D.I. pipe cl. 52
Temp. for testing:
1-Temp. cleanout w/ M.J cap

Sta. 22+55
1-A.V., 103 psi
1-A.V.V.B.

Sta. 22+64
1-16" ⅛ bend (H)
1-Conc. block (H)

Sta. 23+20
Relocate F.H.
1-F.H., relocated
6-L.F., 6" D.I. pipe, cl. 52
1-6" ⅛ bend
2-Conc. blk. (H & F.H.)
1.8 C.Y. str. exc.

Sta. 24+43
Cut & plug W3
1-3" plug
1-Conc. blk.
1.0 C.Y. str. exc.

Sta. 24+36
Connect W8 to W16
Cut & plug 8" pipe
1-8" G.V.B.
16-L.F., 8" D.I. pipe, cl. 52
1-16"x8" tapping sleeve w/ 8" G.V., 150#
2-8" sleeve, 12" long
2-8" ¼ bend
3-Conc. block (H)
3.6 C.Y. str. exc.
Temp. for testing
2-Temp. cleanout w/ M.J cap

Sta. 20+80
Lower Top of Existing S.M.H. and install (1) Pre-Cast Eccentric Manhole Cone and Riser Section as required. See Plan Sht. No. 92 for details.
CCO #24

Sta. 20+00
Relocate W16
Relocate F.H.
1-F.H., relocated
14 L.F., 6" D.I. pipe, cl. 52
1-6" ¼ bend
3-Conc. block (H. & F.H.)
4.2 C.Y. str. exc.
1-6" G.V., relocated
1-16"x6" Tee
1-G.V.V.B.

Sta. 18+15
Relocate G6
11 C.Y. str. exc.

Sta. 16+80
Relocate G4
11 C.Y. str. exc.

W/ 3" splice
W/ 10¾" splice
W/ 5" splice
W/ 17" splice

Adjust G.V.B.

Demolish 2-W.M.H.

Cont. 12" Pipe & Reinf. Conc. Jacket

Connect to New Standard S.M.H.

New Conc. jacket

CONNECTION DETAIL A 8.7
Scale: ½"=1'0"

PROFILE OF NEW W8 at STA. 25+43

PROFILE OF NEW STD. S.M.H. @ STA. 20+87

PROFILE OF NEW W8 at STA. 16+70

Approx. inv. of exist. W16

H.T.Co. ductlines

Exist. W8

New W16

Exist. Gas Line

Exist. Sewer

Exist. Drain

Exist. Water

Exist. Gas

Exist. Size

Exist. S.M.H. to be demolished

New Std. S.M.H.

Relocated W16

New Size

New inv. = -2.15

Exist. inv. = -2.44

Exist. inv. = -2.18

New Conc. jacket

Exist. H.T.Co. ducts

New D42

Exist. W6

Exist. G2

Exist. W16

New W16

New W8

New D42

Exist. Sto plug

Approx. inv. of Pipe

Exist. W16 ductline

Exist. D42

Exist. D48

Exist. D24

Exist. D30

Exist. D18

Exist. W12

Exist. W24

Exist. W30

Exist. W36

Exist. W8

Exist. W6

Exist. W4

Exist. W2

Exist. W1½

Exist. W1

Exist. W¾

Exist. W½

Exist. W¼

Exist. W3

Exist. W5

Exist. W10

Exist. W20

Exist. W42

Exist. W48

Exist. W54

Exist. W60

Exist. W66

Exist. W72

Exist. W78

Exist. W84

Exist. W90

Exist. W96

Exist. W102

Exist. W108

Exist. W114

Exist. W120

Exist. W126

Exist. W132

Exist. W138

Exist. W144

Exist. W150

Exist. W156

Exist.

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.		1978	88	158

PROJECT NO. 93B-01-75

PLAN — SURVEYED: PLOTTED: CHECKED: ALIGNMENT CHECKED: NOTE BOOK: PG.: — BY: DATE:

Sta. 38+05
Lower 6" sewer lateral & connect to exist. sewers
Reconstruct chimney
See sheet 97.
120 L.F. 6" V.C. pipe
120 L.F. plain conc. cradle for V.C. pipe
1-Reconstructed chimney
1-House sewer connection
10 L.F. conc. jacket
88.9 C.Y. str. exc.

Adjust W.V.B.
05 C.Y. str. exc.

w/ 10 3/4" splice

w/ 8" splice

DELETE
Sta. 32+21 to 32+60
(Relocate W.G.) Delete 6"CO" I.P.
50 L.F. 16" D.I. pipe, cl. 52
2-16" 1/16 bend (T.V.)
2-16" 1/8 bend (H)
2-12" 1/32 bend (B.V.)
2-16" sleeve, 15" long
2-Conc. blk. (H) w/ struts
2-Conc. blk. (B.V.)
2-Conc. blk. (T.V.)
11.4 C.Y. str. exc.
Temp. for testing:
2-Temp. cleanout w/ M.J. cap

w/ 8" splice

Sta. 38+98
Relocate F.H.
1-F.H., relocated
6 L.F. 6" D.I. pipe, cl. 52
1-6" 1/16 bend
2-Conc. block (H. & F.H.)
1.8 C.Y. str. exc.

Sta. 33+75
Construct conc. jacket around 16" C.C. Pipe
25 L.F. conc. jacket
10.0 C.Y. str. exc.

w/ 8" splice

Adjust W.V.B.

w/ 10 3/4" splice

Sta. 27+30
Relocate W.G.
See sheet 90 for detail.
285 L.F. 16" D.I. pipe, cl. 52
2 + -16" 1/32 bend
4 S-16" 1/8 bend
3 B-16" 1/16 bend
1-3/4" A.V., 103 psi
1-A.V.V.B.
180 L.F. conc. jacket for 16" D.I. pipe

CCO # 19

2-Conc. blk. (T.V.)
1-Conc. blk. (H) w/ struts
199.4 C.Y. str. exc. under Channel
11 C.Y. Class "A" Conc. for Channel Lining.
2-16" Sleeve, 15" long
33.9 C.Y. str. exc.
Temp. for testing:
2-Temp. cleanout w/ M.J. cap

Adjust W.V.B.

w/ 10 3/4" splice

Lower Type "A" W.M.R.
F & C, 0.2'
2-6" F & C (Relocated)
1-20" F & C (Relocated)

Extend 21/2" lateral
1-Type III box
15 L.F. 2 1/2" pipe

Relocate Sprinkler Heads at Neighborhood Community Center. See Sheet 91.

Sta. 29+50
Relocate F.H.
1-F.H., relocated
6-L.F. 6" D.I. pipe, cl. 52
1-6" 1/16 bend
2-Conc. block (H. & F.H.)
1.8 C.Y. str. exc.

CCO # 25
Sta. 32+65 ± o/s 25' ± Left.
Demolish Existing Type C Air Valve Manhole. Construct in its place an Air Relief Valve Box in accordance with BWS Standard Details. See Plan Sht. No. 96 S-1.
Existing 20-Inch Cast Iron Frame and Cover shall be removed, cleaned, painted and reinstalled.

Sta. 33+02
Lower 6" Sewer lateral & connect to exist. sewers
Reconstruct Chimney, see sheet 97
100 L.F. 6" V.C. pipe
80 L.F. plain conc. cradle for V.C. pipe
1-Reconstructed chimney
1-House sewer connection
20 L.F. conc. jacket
9.4.3 C.Y. str. exc.

Sta. 35+20
Raise Top of Lined S.M.H. (1.4'±)
5 L.F. R.C.C. wall for Lined S.M.H.
1-Type 3B F & C (relocated)
4.9 C.Y. str. exc.

MATCHLINE STA. 27+00

MATCH LINE STA. 42+00

ACCESS ROAD TO REGIONAL PARK (E)

ACCESS ROAD TO WAIANAE INTERMEDIATE SCHOOL

ALA HEWA ST.

True North
Scale: 1" = 50'

PROFILE — SURVEYED: PLOTTED: CHECKED: ALIGNMENT CHECKED: NOTE BOOK: PG.: B.M.'S NOTED. STRUCTURE NOTATNS CK'KD. — BY: DATE:

PROFILE OF NEW Sa AT STA. 32+05

PROFILE OF NEW Sa AT STA. 33+02

See Sheet 90 for details

New Conc. Jacket around existing W/G

HTCo. Duct

UTILITIES

RANDY T. TANIGUCHI — REGISTERED PROFESSIONAL ENGINEER No. 864 — HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

DATE	REVISION
8/06/79	Revised End of Project Station.

G. Terpstra 9/6/79
Chief, Div. of Wastewater Management — Date

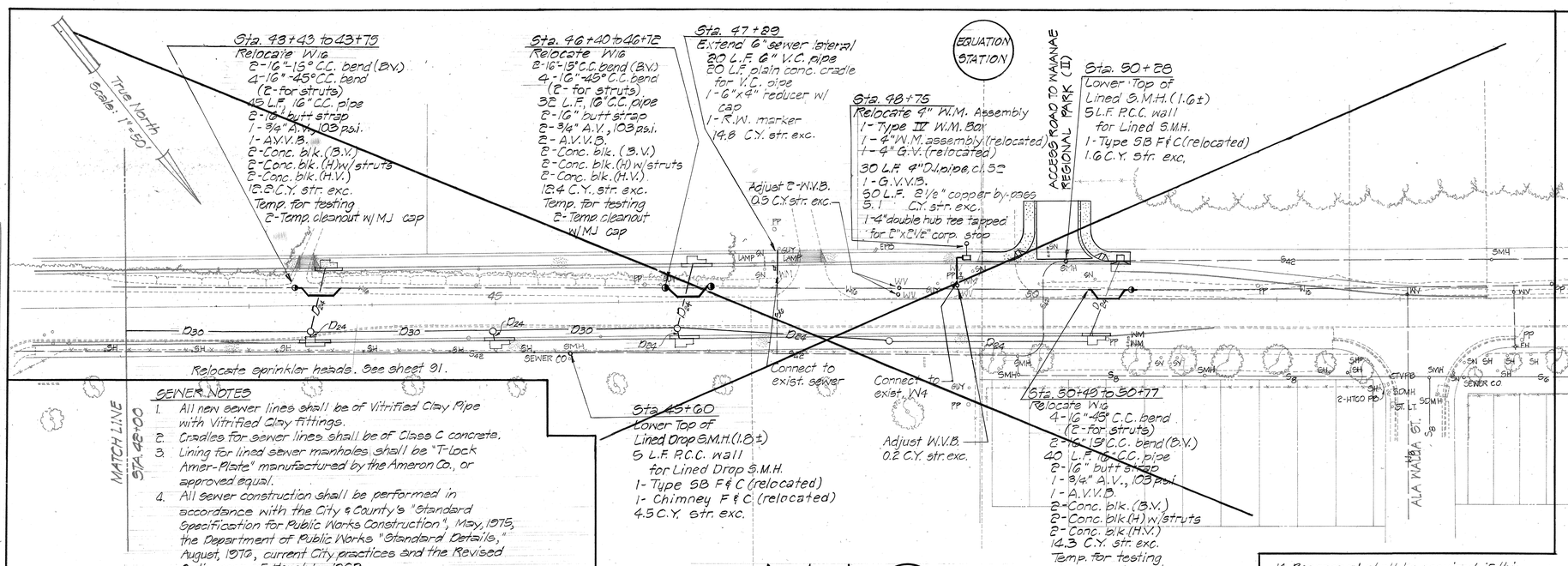
11/8/79
Chief, Planning and Engineering, BWS — Date

SHEET No. 3 OF 17 SHEETS C.O. 88

PLATE 1—PLAN PROFILE B. P. R. STANDARD TELEDYNE POST, CHICAGO

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.		1978	89	159

PROJECT NO. 93B-01-75



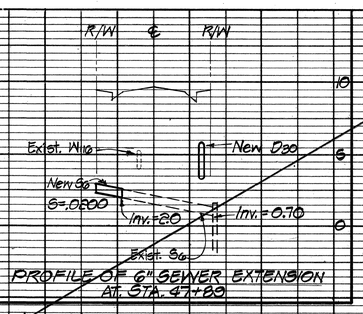
SEWER NOTES

1. All new sewer lines shall be of Vitrified Clay Pipe with Vitrified Clay fittings.
2. Cradles for sewer lines shall be of Class C concrete.
3. Lining for lined sewer manholes shall be "T-Lock Amer-Plate" manufactured by the Ameron Co., or approved equal.
4. All sewer construction shall be performed in accordance with the City & County's "Standard Specification for Public Works Construction", May, 1975, the Department of Public Works "Standard Details," August, 1972, current City practices and the Revised Ordinances of Honolulu, 1969.
5. The Contractor shall notify the Division of Wastewater Management seven (7) days prior to the construction of sewer work.
6. Crushed rock cradle is permitted. In areas of unstable soil, the maker of this plan and the Construction Engineer will discuss and determine the pipe support required.

GENERAL WATER NOTES

1. Unless otherwise specified, all materials and construction of water system facilities and appurtenances shall be in accordance with the Standard Specifications for Road And Bridge Construction, dated 1976, as amended, of the Hawaii Highways Division, Department of Transportation.
2. Prior to excavating for new drain, sewer and utility lines, the Contractor shall verify in the field the location of existing water mains and appurtenances.

   Where the installation of new drain, sewer or other utility lines are to cross over or under existing water mains, the Contractor shall expose the existing water mains prior to trenching. Excavation around water mains shall be done by hand.
3. Items indicated as "relocate" on the plans shall be removed, cleaned, painted and reinstalled at the new location by the Contractor unless otherwise specified.
4. The minimum clearance between fire hydrants and utility poles or light standards shall be 3.0 feet.
5. The Contractor shall notify the Board of Water Supply in writing one week prior to commencing work on the main.
6. Approval by the Board of Water Supply is based solely on the adequacy of the water supply. All other features of the water system such as lines, grades, fittings, etc., shall be the responsibility of the Engineer who prepared the plans.
7. The existence and location of underground utilities and structures as shown on the plans are from the latest available data but is not guaranteed as to the accuracy or the encountering of other obstacles during the course of the work. The Contractor shall be responsible and shall pay for all damages to existing utilities.
8. Pipes shall be ductile iron cl. 52 or concrete cylinder pipe cl. 150 as shown on the plans.
9. Pipe test pressure shall be 150#.
10. All cast iron (gray or ductile) pipes, fittings and valves shall be encased in plastic material in accordance with ANSI Specifications A21.5-1972 or AWWA Specifications C105-72 "Polyethylene Encasement for Gray and Ductile Cast Iron Piping for Water and Other Liquids."
11. Unless otherwise specified, connections to existing water mains and chlorination of new mains shall be done by the Contractor with the BWS Inspector coordinating the work. For details, contact BWS Engineering Division, Construction Section.
12. Valve ID tags shall be affixed to the underside of all new manhole and valve box covers. See details on sheet 94.
13. Water meter splice length shall be 7 1/2 inches unless otherwise noted.
14. Reapproval shall be required if this project is not under construction within a period of one year (See Rules and Regulations of the Board of Water Supply.
15. Water line connection work for mains 16 inches and larger shall not be done during normal working hours.
16. After installation of tapping sleeve and valve, the assembly shall be tested with prevailing line pressure prior to actual tapping operation.



PAUL T. TANIGUCHI
REGISTERED PROFESSIONAL ENGINEER
No. 864
HAWAII U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

UTILITIES

Gary M. Lagmay 5/10/78
for Chief, Div. of Wastewater Management — Date

Chief, Planning and Engineering, BWS — 4/5/78 Date

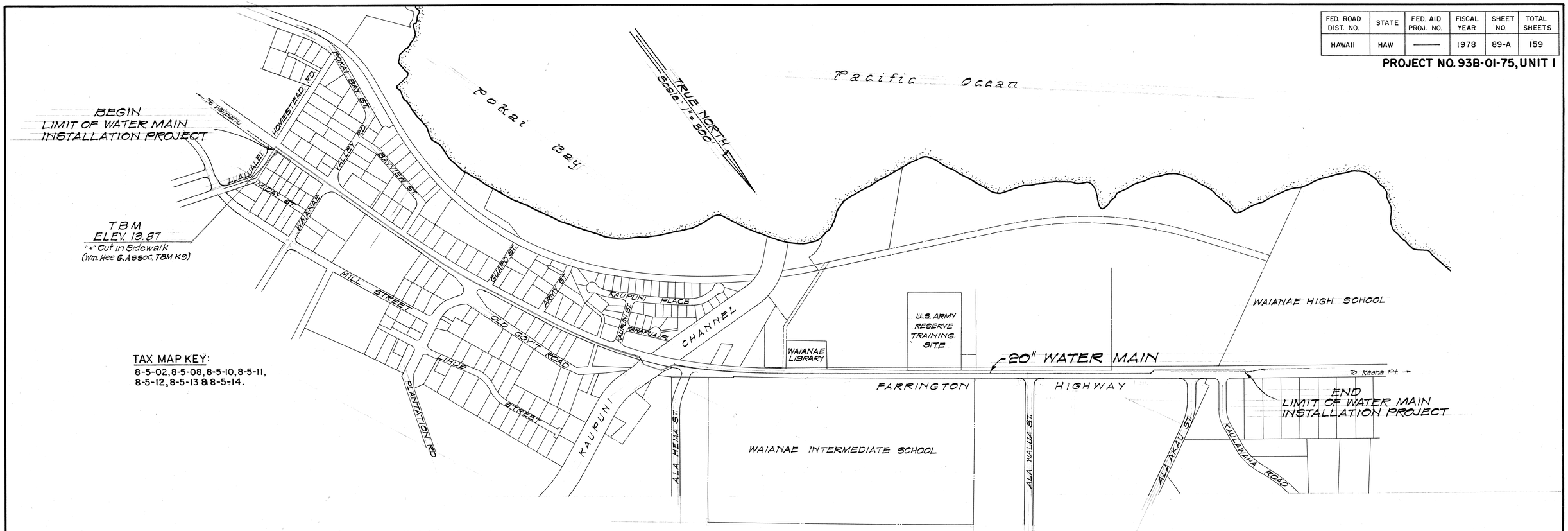
DATE	REVISION
8/06/79	Revised End of Project Station.

PLATE 1—PLAN PROFILE B. P. R. STANDARD
TELEDYNE POST, CHICAGO

SHEET No. 4 OF 17 SHEETS C.O.89

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW	———	1978	89-A	159

PROJECT NO. 93B-01-75, UNIT I



NOTES FOR CONSTRUCTION WITHIN STATE RIGHT-OF-WAY

1. The installation of the 20" water main beyond the end of the highway construction to Kaulawaha Road will be installed under this highway project.
2. Construction and restoration of all existing highway facilities within state right-of-way shall be done in accordance with all applicable sections of the Standard Specifications for Road and Bridge Construction, dated 1976 of the State Highways Division.
3. All lanes shall be opened to traffic during the morning peak hours from 6:30 a.m. to 8:30 a.m. and during the afternoon peak hours from 3:30 p.m. to 5:30 p.m., and during off-work hours. Only one lane of Farrington Highway shall be closed at any other time as directed and approved by the Engineer.

NOTES FOR CONSTRUCTION WITHIN KAUPUNI CHANNEL R/W:

1. All applicable construction work shall be done in accordance with the Standard Specifications for Public Works Construction, May 1975, and Standard Details for Public Works Construction, August 1976 of the Department of Public Works, City and County of Honolulu, and the Counties of Kauai, Maui, and Hawaii.

SEWER NOTES:

1. All sewer construction shall be performed in accordance with City and County Standard Specifications approved by the Chief Engineer on May 1975, and the Department of Public Works Standard Details, August 1976, and the revised Ordinances of Honolulu, 1969.
2. The Contractor shall notify the Division of Wastewater Management 7 days prior to commencement of work.

WATER NOTES:

1. Unless otherwise specified, all materials and construction of water system facilities and appurtenances shall be in accordance with the Standard Specifications for Road & Construction dated 1976 as amended, of Hawaii Highways Division, Department of Transportation.
2. Existing underground utilities and structures as shown on the plans are from the latest available data but are not guaranteed as to the location shown or that other obstacles may not be encountered in the course of the work.
3. Wherever connections to existing mains are shown on the plans, the Contractor shall expose the existing mains prior to excavation of the main trench. The remaining excavation for the connection shall be excavated after verification of the locations of the existing main and utilities in the immediate vicinity is made, required connection, pipes and fittings made available, ready for installation.
4. Prior to the start of excavation, the Contractor shall notify all agencies and have them locate their respective lines affected.
5. The Contractor shall be held responsible for any damage to and for the maintenance and protection of existing utilities.
6. The Contractor shall expose all existing underground utilities and structures prior to excavation of pipeline trench and/or manufacturing of concrete cylinder pipe.
7. Prior to installation of any concrete cylinder pipe or fitting in swamp, in areas where the invert grade of the pipe is at or lower than four-foot elevation, City and County datum or at locations shown on the plans, the Contractor shall apply by brushing or mopping a cement slurry, composed of sack portland cement to not more than five gallons of water, to the exterior coating of pipe or fitting. The slurry coat shall be applied at least 24 hours but not more than 48 hours before installation. Payment for this work shall be included in the various items in the bid.
8. Ductile iron pipe shall be Class 52.
9. All ductile iron water mains, fittings and valves shall be enclosed in plastic material, in accordance with ANSI Specifications A21.5-1972 or AWWA Specifications C105-72, "Polyethylene Encasement for Gray and Ductile Cast Iron Piping for Water and Other Liquids."
10. Valve I.D. tags shall be affixed on the underside of all new manhole and valve box covers. Payment shall be incidental to the valves.
11. Test pressure shall be 150 psi.
12. The Contractor shall notify the Board of Water Supply in writing, one week prior to commencing work on the main.
13. Unless otherwise specified, connections to existing water mains and chlorination of new mains shall be done by the Contractor with the BWS Inspector coordinating the work. For details, contact BWS Engineering Division, Construction Section.
14. The new 20-inch main shall be completed and placed in service prior to any work being done on the existing 16-inch main.
15. Pipe options:
    a. Ductile iron pipes shall be Class 52.
    b. All Class 150 concrete cylinders shall be designed according to Formula 1 in lieu of Formula 2, conforming to AWWA Specification.
16. After installation of tapping sleeve and valve, the assembly shall be tested with prevailing line pressure prior to actual tapping operations.

YASUO ARAKAKI
REGISTERED PROFESSIONAL ENGINEER
No. 654
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

APPROVED:

Manager and Chief Engineer, Board of Water Supply, City and County of Honolulu — 3/23/79 Date

Director and Chief Engineer, Department of Public Works, City and County of Honolulu — 2/28/79 Date

APPROVED:

Chief, Division of Engineering, DPW — 2/28/79 Date

Chief, Division of Wastewater Management, DPW — 2/28/79 Date

20" WATER MAIN ALONG FARRINGTON HIGHWAY

FARRINGTON HIGHWAY WIDENING PROJECT NO. 93B-01-75, UNIT I

SURVEYED BY: TRS
DRAWN BY: GM
TRACED BY: GM
ENGINEER: YA
CHECKED BY:

APPROVED: CHIEF, PLANNING & ENGINEERING — DATE 3/27/79

SCALE: As Noted

FILE: POCKET | FOLDER | NO.

BOARD OF WATER SUPPLY

HONOLULU, HAWAII

SHEET 1 OF 10 SHEETS | FIELD BOOK NO.

89-A

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW	———	1978	89-B	159

PROJECT NO. 93B-01-75, UNIT I

FARRINGTON HWY.
℄ CURVE DATA
Δ = 7°44'30"
½ = 3°52'15"
R = 5730.00
T = 387.70
Ch = 773.68
Lc = 774.22

POC Sta. 11+00.00 WL
= POC Sta. 10+86.10 Rd.

Sta. 10+23.83 WL
= Sta. 10+10.00 Rd.
1 - 20" 12° Bend, T.Y.
1 - Conc. Blk.

Provide 10 Lin. Ft Reinf. Conc. Jacket for 8" Sewer

20" WATER MAIN CURVE DATA
Sta. 10+86.10 to Sta. 11+00.00
Δ = 0°51'03"
½ = 0°25'31.5"
R = 5735.5'
T = 42.59'
Ch = 85.18'
Lc = 85.18'

Sta. 10+14.82 WL
= Sta. 10+01.00 Rd.
℄ Rd. %s = 5.50
1 - 20"45° Bend, H&BV
1 - Conc. Blk.

POT Sta. 8+28.58 WL
P.C. Sta. 8+84.08 Rd.

Sta. 9+14.52 WL
= Sta. 9+10.00 Rd.
℄ Rd. %s = 5.56
1 - 20"45° Bend, H&BV
1 - Conc. Blk.

Sta. 9+30.08 WL
= Sta. 9+21.00 Rd.
℄ Rd. %s = 16.50
1 - 20"45° Bend H&TV
1 - Conc. Blk.

Sta. 9+90.25 WL
= Sta. 9+90.00 Rd.
℄ Rd. %s = 16.60
1 - 20"45° Bend H&BV
1 - Conc. Blk.

Sta. 8+54.50 WL
= Sta. 8+50.00 Rd.
1 - 2" Air Valve
WP 103 psi
1 - Type "B" M.H.
5.7' Deep

Sta. 1+04.50 WL
= Sta. 1+00.00 Rd.
1 = 2" Air Valve
WP 101 psi
1 = Type "B" M.H.
5.5' Deep

P.I. Sta. 0+17.50 WL
- Sta. 0+13.00 Rd.
℄ Rd. %s = 5.50'
1 - 20" 20° Bend (1)
1 - Conc. Blk. (1)

BENCH MARK
Top of Mon. Pin
Elev. = 13.61

Monte
186°33'26" 14.12
(CCO # 20) FOUND 2" LINE INSTEAD, CANNOT ABANDON

EXISTING CONDITIONS AT CONNECTION SITE
Scale: 1" = 10'

Sta. 0+00 WL
Connect to existing 16" C.I. Main
See Schematic layout this sht.
1 - 16"x16" tapping sleeve w/16" tapping BGGV, 150#
2 - Valve boxes
1 - 20"x16" M.J. Reducer, LEB
6 - L.F. 20" D.I. pipe, Cl. 52 (1)
3 - L.F. 20" D.I. pipe, Cl. 52 (2)
1 - 20" M.J. Sleeve, 15" long (1)
1 - 20" 90° Bend (2)
9 - L.F. 20" C.C. pipe (2)
1 - 20" Adapter, B & PE, Bell to fit 20" DIP O.D. = 21.60" (2)
1 - 20" Buttstrap (2)
1 - Conc. Blk.
1 - Conc. Blk. w/Struct. struts (2)

Temporary for Testing
1 - 20" Cap tapped for 4" IPT
1 - 4" Cleanout
1 - Conc. Blk.

DUCTILE IRON PIPE OPTION

CONC. CYLINDER PIPE OPTION

SCHEMATIC LAYOUT
20" WATER MAIN CONNECTION
STA. 0+00

LEGEND
PIPE OPTION - DESIGNATION
(1) Ductile Iron Pipe
(2) Concrete Cylinder Pipe
NOTE: Payment for Connection Work shall be incidental to the various items in the Proposal.

PROFILE
Scales: Horiz. 1" = 40'
Vert. 1" = 4'

YASUO ARAKAKI
REGISTERED PROFESSIONAL ENGINEER
No. 654
HAWAII, U.S.A.
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

APPROVED:
Chief, Division of Wastewater Management DPW Date 2/15/79

SURVEYED BY: T&S
DRAWN BY: GM
TRACED BY: GM
ENGINEER: YA
CHECKED BY:

20" WATER MAIN ALONG FARRINGTON HIGHWAY
FARRINGTON HIGHWAY WIDENING
PROJECT NO. 93B-01-75, UNIT I

APPROVED: Robert O. Matsukawa CHIEF, PLANNING & ENGINEERING
SCALE: As Noted DATE: 3/19/79
FILE POCKET FOLDER NO.
BOARD OF WATER SUPPLY
HONOLULU, HAWAII
SHEET 2 OF 10 SHEETS FIELD BOOK NO.

89-B

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW	———	1978	89-C	159

PROJECT NO. 93B-01-75, UNIT I

Sta. 11+33.93 WL = Sta. 11+20.00 Rd.
1 - 20" BFV, FE 150#
1 - Type "A" BFV MH 6.1' Ft. Deep
2 - Adapters, F.E. 8.3 Long
1 - 2" Air Valve W.P. 103 psi

P.O.C. Sta. 11+00.00 W.L. = P.O.C. Sta. 10+86.10 Rd.

CCO #10
CONSTRUCT MH IN FARRINGTON HWY ACCORDANCE WITH BWS STANDARD DE-TAILS REVISED. SEE PLAN SHT. NO. 206-1 FOR DETAILS.

20" WATER MAIN CURVE DATA
Sta. 10+14.82 to Sta. 10+72.75
Δ = 6°34'21"
Δ/2 = 3°17'10.5"
R = 5735.5'
T = 329.33
Ch = 657.57
Lc = 657.93

20" WATER MAIN CURVE DATA
Sta. 11+00 To Sta. 16+72.75
Δ = 5°43'18"
Δ/2 = 2°51'39"
R = 5735.5'
T = 286.62
Ch = 572.52
Lc = 572.75

CCO #4
FOR ADJUSTING 6-INCH WATER LINE SEE PLAN SHT. NO. 205-1. (ALSO SEE SHTS. 72 & 86)

True North
Scale: 1" = 40'

GUARD ST.
Rd. 94.13 NE 86.50' to P.I. (Rd.)
P.I. (Rd.) to P.I. (M&M) 1,017.72' (Rd.)
P.I. (M&M) to P.I. (Rd.) 1,035.50' (Rd.)
Rd. 10.92 NW 95.00' to P.C. (Rd.)

ARMY ST.
Rd. 94.13 NE 86.50' to P.I. (Rd.)
P.I. (Rd.) to P.C. (Rd.) 1,035.50' (Rd.)

FARRINGTON HWY
E. CURVE DATA
Δ = 10°48'40"
Δ/2 = 5°24'20"
R = 3155.30
T = 300.42
Ch = 594.01
Lc = 594.86

Sta. 11+70 Type "E" DMH 30" Inv. 8.37 24" Inv. 8.50 18" Inv. 8.63
Sta. 11+58.06 Type "B" CB Inv. 4.00
Sta. 11+56 Type "B" CB Inv. 4.00
Sta. 11+58.06 WL = Sta. 11+45.00 Rd.
1 - 20" 12° Bend, T.V.
1 - Conc. Blk.
Sta. 11+72.07 WL = Sta. 11+50.00 Rd.
1 - 20" 12° Bend B.V.
1 - Conc. Blk.
Sta. 11+05.90 WL = Sta. 11+82.00 Rd.
1 - 20" 12° Bend T.V.
1 - Conc. Blk.
Sta. 11+82.08 WL = Sta. 11+60.00 Rd.
1 - 20" 12° Bend, B.V.
1 - Conc. Blk.
Sta. 18+20 Type "E" DMH Inv. 8.60
Sta. 13+14.11 WL = Sta. 13+00.00 Rd.
1 - 2" Air Valve W.P. 103 psi
1 - Type "B" MH 5.5' deep
Sta. 14+04 Type "D" CB Inv. 4.68
Sta. 15+02 Type "C-1" DMH 48" Inv. 2.11 24" Inv. 4.51 18" Inv. 4.50
Sta. 17+38 Type "C-1" DMH Inv. 1.66
Sta. 17+84.45 WL = Sta. 17+70.00 Rd.
1 - 2" Air Valve W.P. 103 psi
1 - Type "B" MH 5.5' deep
Sta. 19+43 Type "A" CB Inv. 4.10
Sta. 19+83 Type "C-1" DMH 48" Inv. 1.60 24" Inv. 3.06
Sta. 20+10.45 WL = Sta. 20+15.00 Rd.
1 - 2" Air Valve W.P. 103 psi
1 - Type "B" MH 5.5' deep
Sta. 22+12 Type "C-1" DMH 48" Inv. 0.70 24" Inv. 3.16 18" Inv. 4.15
Sta. 22+84 Type "C-1" DMH Inv. 0.55
P.O.C. Sta. 23+00.00 W.L. = P.O.C. Sta. 22+85.08 Rd.

BENCH MARK
Brass Plate 358-5C
Elev. 8.64

OLD GOVERNMENT ROAD

WAIALAE MARKET
WAIANAE SUPER
WAIANAE SPEED WASH
Service Station
Dwelling
Texaco's Sign
Telephone Booth
Lamp Pole
Water Meters
Approx. location of Signal Corp Cable
Existing 2" Water
Existing 4" Gas Line
Existing 10" Water
Existing 8" Water
Existing 12" Sewer
Existing 48" RCP Sewer
Existing 24" drain
Drain Box Inv. 4.30
Dress Shop
Elec. Box
Sign
W.Meter
E.P.
E.P. W/ Guywire
Pole
Manhole
Existing S.M.H. Inv. 3.45
Existing S.M.H. Inv. -(12.27)
Existing S.M.H. Inv. -(12.00)
S.M.H. Top 7.88 Inv.(-)12.78
S.M.H. Top 8.80 Inv.(-)12.44
Sewer Drop Connec. Top 8.40 Inv.(-)11.86
Drain Box Inv. 4.30
To be relocated
Existing 8" Water
Existing 6" Water
Existing 2" Gas
Existing 10" Sewer
Existing 8" Sewer
Existing HT Co. Cond. to be relocated Level
Signal Line Crossing
Existing 2" Gas
Existing 24" RCP Drain
Existing 12" Sewer
New 6" Water
42" RCP drain
24" RCP drain
Proposed ℄ Road Pv't Grade
Existing Ground along ℄ of 20" Water Main
℄ Invert 20" Water Main

20" WATER MAIN CURVE DATA
Sta. 20+36.01 To Sta. 23+00
Δ = 4°49'52"
Δ/2 = 2°24'56"
R = 3130.80'
T = 132.07
Ch = 263.91
Lc = 263.99

PROFILE
Scales: Horiz. 1" = 40'
Vert. 1" = 4'

YASUO ARAKAKI
REGISTERED PROFESSIONAL ENGINEER
No. 654
HAW. CH. U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

APPROVED:
Chief, Division of Wastewater Management, DPW Date 2/16/79

SURVEYED BY: TBS
DRAWN BY: GM
TRACED BY: GM
ENGINEER: YA
CHECKED BY:

20" WATER MAIN ALONG FARRINGTON HIGHWAY
FARRINGTON HIGHWAY WIDENING
PROJECT NO. 93B-01-75, UNIT I

APPROVED: CHIEF, PLANNING & ENGINEERING
SCALE: As Noted DATE: 5/24/78
FILE: POCKET | FOLDER | NO.

BOARD OF WATER SUPPLY
HONOLULU, HAWAII

SHEET 3 OF 10 SHEETS | FIELD BOOK NO.

89-C

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW	———	1978	89-D	159

PROJECT NO. 93B-01-75, UNIT I

CCO #10
Construct MH in accordance with BWS Standard Details Revised. See Plan Sht. No. 96 S-1.

P.O.C. Sta. 23+00.00 W.L.
=P.O.C. Sta. 22+86.08 Rd.

Sta. 23+95.08 W.L.
=Sta. 23+80.00 Rd.
1 - 2" Air Valve
WP 104 psi
1 - Type "B" MH
5.7' Deep

20" WATER MAIN
CURVE DATA
Sta. 23+00 To Sta. 27+20.65
Δ = 7°41'53"
Δ/2 = 3°50'56.5"
R = 3130.80
T = 210.64
Ch = 420.33
Lc = 420.65

Sta. 27+10.64 W.L.
=Sta. 26+95.00 Rd.
1 - 20" BFV, PE 150#
1 - Type "A" BFV MH
7.0' Deep
2 - 20" Adapters F&B, 3' long
1 - 2" Air Valve
WP 108 psi

Sta. 27+20.65 W.L.
=Sta. 27+05.00 Rd.
@ Rd. 0/s = 5.50
1 - 20" 1/16 Bend H&TV(1)
1 - 20" 1/32 Bend H&TV(1)
1 - 20" 38° Bend H&TV(2)
2 - Conc. Blks. (1)
1 - Conc. Blk. (2)
Comb.(+)

Sta. 27+07.35 W.L.
1 - 20" 1/16 Bend H (1)
1 - 20" 1/32 Bend H&BV(1)
1 - 20" 50° Bend H&BV(2)
2 - Conc. Blks. (1)
1 - Conc. Blk. (2)
Comb.(+)

20" WATER MAIN
CURVE DATA
Sta. 20+36.01 to Sta. 27+20.65
Δ = 12°31'46"
Δ/2 = 6°15'53"
R = 3130.80
T = 343.60
Ch = 683.28
Lc = 684.64

Sta. 20+69.15 W.L.
1 - 20" 12° Bend B.V.
1 - Conc. Blk.

BENCH MARK
Brass Plate
CSB-5D
Elev. = 10.02

Sta. 20+90
Type "D" C.B.
Inv. (-) 1.50

Sta. 20+07.35 W.L.
1 - 20" 12° Bend BV
1 - Conc. Blk.

Sta. 20+08.31 W.L.
= Sta. 20+59.50 Rd.
@ Rd. 0/s = 5.50
1 - 20" 1/8 Bend, H&TV(1)
1 - 20" 41° Bend, H&TV(2)
2 - Conc. Blks. (1)
1 - Conc. Blk. (2)

Sta. 20+20.63 W.L.
1 - 46° Bend H&TV
1 - Conc. Blk.

Sta. 30+54.88 W.L.
= Sta. 30+00.00 Rd.
1 - 2" Air Valve
WP 103 psi
1 - Type "B" MH.
6.5 Deep

Sta. 20+82
Type "C-1" DMH
Inv. (-) 1.54

Sta. 20+82
Type "C-1" DMH
Inv. (-) 1.54

Sta. 20+68
Type "C-1" DMH
Inv. (-) 0.29
Inv. 5.85

Sta. 25+30
Type "C-1" DMH
Inv. -0.29
Inv. 4.36

Sta. 25+16
Type "D" C.B.
Inv. 4.90

Sta. 27+27.00 W.L.
1 - 20" x 8" B.O. Tee
W/Outlet to F+8" D.I. Pipe
1 - 8" 1/4 Bend
1 - 8" Gate Valve, 150#
1 - Valve Box
60 L.F. 8" D.I. Pipe, Cl. 52
1 - 8" Flap Valve
1 - Discharge Apron
2 - Conc. Blks.

NOTE:
See Sht. 8 for Water Main Channel Crossing Details

P.O.C. Sta. 29+35.82
229.07.20" Rd.

Sta. 30+00.00 W.L.
= P.O.C. Sta. 34+44.44 Rd.

Sta. 32+57
Type "D" C.B.
Inv. 3.50

Sta. 33+65
10' x 2.5' Box Drain (New)
Inv. 3.00 (Level)

Sta. 34+70
Type "C-1" DMH
Inv. (-) 1.21

Sta. 32+35
Type "D" C.B.
48" Inv. (-) 1.33
18" Inv. 3.32

Sta. 30+08.31 W.L.
= Sta. 29+93.50 Rd.
1 - 20" 1/16 Bend H&TV
1 - 20" 41° Bend H&TV
2 - Conc. Blks.
1 - Conc. Blk.

Sta. 30+54.88 W.L.
= Sta. 30+00.00 Rd.
1 - 2" Air Valve
WP 103 psi
1 - Type "B" MH.
6.5 Deep

(CCO # 25)
See Note and attached Sketch on Sheet C.O. 88
Sta. 32+65 ±, o/s 25' ± Left.

Provide 24 Lin. Ft. Reinf. Conc. Jacket for 20" Water Main

Provide 10 Lin. Ft. Reinf. Conc. Jacket for lowered New 6" Sewer Lateral (See Hwy. Utility Plan for New Sewer)

Provide 10 Lin. Ft. Reinf. Conc. Jacket for lowered New 6" Sewer Lateral (see Hwy. Utility Plan for New Sewer)

20" WATER MAIN
CURVE DATA
Sta. 30+08.31 To Sta. 35+00
Δ = 7°48'49"
Δ/2 = 3°54'24.5"
R = 3605.50
T = 246.43
Ch = 491.31
Lc = 491.69

NOTE:
Comb.(+) - A combination bend (1/16 & 1/32) shall be paid for as ONE bend.

PARRINGTON HWY. & CURVE DATA
Δ = 11°33'24"
Δ/2 = 5°46'42"
R = 3600.00
T = 364.80
Ch = 724.00
Lc = 726.13

PARRINGTON HWY. & CURVE DATA
Δ = 16°48'40"
Δ/2 = 8°24'20"
R = 3125.39
T = 460.42
Ch = 911.01
Lc = 914.26

Existing Bridge
14'-0" x 30" = 248.87
19'-10 5/8" = 196.30

260 Lin. Ft. R.C. Jacket

36.28 Existing 42" Water Discharge Apron

Existing 42" Sewer

Existing 42" RCP Sewer

Chimney Conn. Hwy. 0.60 Existe. Inv. -3.60 New

Chimney Conn. Hwy. 0.60 Existe. Inv. -3.90 New

Existing 10' x 3' Box Drain

Existing 10' x 2.5' Box Drain

Existing 8" Water

Existing 6" Water

Existing 12" Water

Existing 16" Water

Existing 2" Water

Existing 2" x 5' Box Drain

Existing 24" Drain

Existing 8" Water Main to be abandoned

Existing 6" Water

Existing 6" Water

Existing 6" Water

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW	———	1978	89-E	159

PROJECT NO. 93B-01-75, UNIT I

True North
Scale: 1" = 40'

20" WATER MAIN
CURVE DATA
Sta. 30+08.31 to Sta. 37+17.84
Δ = 11°10'31"
Δ/2 = 5°38'15.5"
R = 3605.5'
T = 355.91
Ch = 708.38
Lc = 709.53

FARRINGTON HIGHWAY
CURVE DATA
Δ = 11°33'34"
Δ/2 = 5°46'42"
R = 3600.00
T = 364.30
Ch = 724.00
Lc = 726.18

P.O.C. Sta. 35+00.00 WL
= P.O.C. Sta. 34+44.44 Rd.

Fire Station

Waianae Branch Library

BENCH MARK
"+" Top of F.H.
Elev. = 9.75

Fire Alarm Pull Box

Existing 10'x 8' Box Drain

Existing SMH
Inv. = (-)0.47

Sta. 35+35.61 WL
= Sta. 34+80.00 Rd.
1 - 2" Air Valve
WP 104 psi
1 - Type "B" MH
5.5 Deep
1 - Adjust 20" C.I. F. & C. (CCO# 35)

20" WATER MAIN
CURVE DATA
Sta. 35+00 To Sta. 37+17.84
Δ = 3° 27' 42"
Δ/2 = 1° 43' 51"
R = 3605.5
T = 108.95
Ch = 217.81
Lc = 217.84

Provide 10 Lin Ft. Reinf. Conc. Jacket for New 6" Sewer (See Hwy Utility Plan for New Sewer)

Chimney Conn. Inv. (-) 1.90 Exist'g
Inv. (-) 3.50 New
Sta. 38+72
Type "C-1" DMH
42" Inv. (-) 0.21
24" Inv. 1.48 L
24" Inv. 0.78 R

Sta. 36+86
Type "D" CB
Inv. 1.85

Telephone Booth

Sta. 38+68
Type "C-1" DMH
Inv. 0.47

Proposed HTCo. MH
Type A-1-G

CCO# 10
Construct MH in accordance with BWS Standard Details Revised. See Plan Sht. No. 96 B-1.

Sta. 40+24
Type "C-1" DMH
Inv. 1.05

Existing 8" water main (To be abandoned)

Existing 6'x1' Box Drain

Existing 6" Water

Sta. 41+03.89 WL
= Sta. 40+48.00 Rd.
1 - 20" B.F. Valve 150# FF.
1 - Type "A" BFV MH 6.1 deep
2 - 20" Adapters, F & B, 3' Long
1 - 2" Air Valve
W.P. 104 psi

CCO# 35
1 - Adjust 20" C.I. F & C.
1 - Adjust 6" C.I. F & C.

Sta. 41+85.89 WL
Sta. 41+30.00 Rd.
1 - 20" 12° Bend T.V.
1 - Conc. Blk

Sta. 42+05.89 WL
= Sta. 41+50.00 Rd.
1 - 20" 12° Bend, B.V.
1 - Conc. Blk.

Provide 10 Lin. Ft. Reinf. Conc. Jacket for New 8" Sewer (See Hwy Utility Plan for New Sewer)

CCO #35
Sta. 41+60
1 - Adjust 20" C.I. F. & C.

Sta. 41+54
Type "D" CB
Inv. 2.30

Existing 8" Water (To be abandoned)

Sta. 41+44
Type "C-1" DMH
Inv. 1.48

Sta. 42+75.89 WL
= Sta. 42+20.00 Rd.
1 - 2" Air Valve
WP 104 psi
1 - Type "B" MH
5.7' Deep
1 - Adjust 20" C.I. F & C. (CCO #35)

Sta. 42+62
Type "C" CB
Inv. 3.50

Existing 16" Water

Sta. 42+82.89 WL
= Sta. 41+87.00 Rd.
1 - 20" 12° Bend T.V.
1 - Conc. Blk.

Sta. 42+22.89 WL
= Sta. 41+67.00 Rd.
1 - 20" 12° Bend B.V.
1 - Conc. Blk.

Sta. 43+42
Type "D" DMH
Inv. 2.22

Sta. 44+88
Type "D" DMH
Inv. 2.84

Existing 42" RCP Sewer

42" (Spk. in A.C. Walkway)

Existing A.C. Walk

Sta. 45+05.89 WL
= Sta. 45+40.00 Rd.
1 - 2" Air Valve
WP 109 psi
1 - Type "B" MH
5.9 Deep (CCO #35)
1 - Adjust 20" C.I. F & C.

Sta. 46+00
Type "C" CB
Inv. 5.00

Sta. 46+38
Type "D" DMH
Inv. 5.00

Existing SMH
Inv. = (-)0.68

Existing G.I. Pole W/Guy

Existing SMH
Inv. 1.01

Existing SMH
4" Inv. 0.29
8" Inv. 0.84 Exist'g
8" Inv. 0.70 New

Sta. 34+00
Sta. 35+00
Sta. 36+00
Sta. 37+00
Sta. 38+00
Sta. 39+00
Sta. 40+00
Sta. 41+00
Sta. 42+00
Sta. 43+00
Sta. 44+00
Sta. 45+00
Sta. 46+00

Existing Ground along ℄ of 20" water main
Proposed ℄ Road Pvmt Grade
Invert 20" Water Main
Existing 8" Water (To be abandoned)
Existing 8" Sewer (To be Lowered)
New 8" Sewer
New 8" Water
Fire Alarm / Duct Crossing
24" RCP Drain
42" RCP Drain
30" RCP Drain
Level
+9.20
-0.44%
-3.13%
+9.19%
+0.71%
-0.30%
-3.20%
+9.18%
+0.33%
-2.82%

35+35.61 WL = 34+80.00 Rd. 2" Air Valve
41+03.89 WL = 40+48.00 Rd. 20" BF Valve 2 Air Valve
42+75.89 WL = 42+20.00 Rd. 2" Air Valve
45+35.89 WL = 44+80.00 Rd. 2" Air Valve

PROFILE
Scales: Horiz. 1" = 40'
Vert. 1" = 4'

APPROVED:
2/15/79
Chief, Division of Wastewater Management DPW Date

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION
Yasuo Arakaki
YASUO ARAKAKI REGISTERED PROFESSIONAL ENGINEER No. 651 HAWAII, U.S.A.

20" WATER MAIN
ALONG FARRINGTON HIGHWAY
FARRINGTON HIGHWAY WIDENING
PROJECT NO. 93B-01-75, UNIT I

SURVEYED BY: T&S
DRAWN BY: GM
TRACED BY: GM
ENGINEER: YA
CHECKED BY:

APPROVED: CHIEF, PLANNING & ENGINEERING 2/19/79
FILE: POCKET | FOLDER | NO.
SCALE: As Noted
DATE 3/1/78

BOARD OF WATER SUPPLY
HONOLULU, HAWAII

SHEET 5 OF 10 SHEETS | FIELD BOOK NO.

89-E

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW	———	1978	89-F	159

PROJECT NO. 93B-01-75, UNIT I

FARRINGTON HWY. & CURVE DATA
Δ = 0°53'34"
Δ/2 = 0°26'47"
R = 12,000
T = 93.40
Ch = 186.08
Lc = 186.08

20" WATER MAIN CURVE DATA
Sta. 47+64.26 to Sta. 40+51.16
Δ = 0°53'34"
Δ/2 = 0°26'47"
R = 11994.50
T = 93.45
Ch = 186.90
Lc = 186.90

(℄ Rd. 0/s = 5.50')
P.C. Sta. 47+24.26 W.L.
= P.C. Sta. 47+08.97 Rd.

(℄ Rd. 0/s = 5.50')
P.T. Sta. 40+51.16 W.L.
Equation 47+55.35 W.L. (Rd.)
P.T. Sta. 48+55.35 W.L.
P.T. Sta. 40+50.56 Rd.

(℄ Rd. 0/s = 5.50')
Sta. 50+32.60 W.L.
= Sta. 50+16.80 Rd.
END OF PROJECT (UNIT I)
ROAD IMPROVEMENT

True North
Scale: 1" = 40'

(℄ Rd. 0/s = 5.50')
P.C. Sta. 52+42.66 W.L.
= P.C. Sta. 52+58.06 Rd.
218°27'30"

FARRINGTON HWY. & CURVE DATA
Δ = 1°06'30"
Δ/2 = 0°33'15"
R = 5729.08
T = 55.37
Ch = 110.74
Lc = 110.75

(℄ Rd. 0/s = 5.50')
P.T. Sta. 53+20.41 W.L.
= P.T. Sta. 53+06.70 Rd.
217°21'00"

20" WATER MAIN CURVE DATA
Sta. 56+40.66 to Sta. 53+20.41
Δ = 1°06'30"
Δ/2 = 0°33'15"
R = 5729.08
T = 55.37
Ch = 110.74
Lc = 110.75

BENCH MARK
Top of Mon. Pin
Elev. = 8.30

Blow-off Connection
Sta. 56+03.71 W.L.
= Sta. 57+02.00 Rd.
1 - 20"x8" B.O. Tee w/outlet to fit 8" D.I. pipe
1 - 8" 1/4 Bend
1 - 8" Gate Valve, 150#
1 - Valve Box
45 L.F. 8" D.I. pipe Cl. 52
1 - 8" M.J. Cap
3 - Conc. Blks.

Sta. 57+03.71 W.L.
= Sta. 57+12.00 Rd.
1 - 20" BFV, FE. 150#
1 - Type "A" BFV M.H. 6.3' Deep
2 - 20" Adapters, F&B, 3' long
1 - Adjust 20" C.I. F. & C.
1 - Adjust 12" C.I. F. & C.
} CCO # 35

CCO # 10
CONST. MH IN ACCORDANCE W/BWS ST'D DET. REV. SEE PLAN SHT. NO. 96 S-1.

Box Drain (New) Inv. 2.20 (Level) (Future Construction)

Sta. 57+44
Sta. 57+00
Type "D" DMH
Inv. 3.28

Sta. 54+60
Type "C-1" DMH
24" Inv. 3.86 L
24" Inv. 4.33 R

Sta. 56+00
Type "D" DMH
Inv. 3.40

Existing 42" RCP Sewer

Existing SMH Inv. = (8.72)

Existing SMH Inv. = (8.58)

Sta. 46+00
Type "C" CB
Inv. 5.00

Sta. 46+38
Type "D" DMH
Inv. 2.20

SMH Inv. = (0.63)

Chimney Conn. Inv. 0.76

Provide 10 Lin Ft. Reinf. Conc. Jacket for Exist'g 6" Sewer

Sta. 48+20
Type "D" DMH
Inv. 3.42

Sta. 48+55.85 W.L.
= Sta. 48+00.00 Rd.
1 - 2" Air Valve WP 103 psi
1 - Type "B" MH 6.5 Deep
1 - Adjust 20" C.I. F. & C. (CCO # 35)

Sta. 50+36
Type "D" CB
Inv. 4.20

Existing SMH Inv. = (0.50)

Existing SMH Inv. = (0.34)

Existing SMH

Sta. 50+40
Type "B" CB
Inv. 4.06

Existing 16" Water

Existing Conc. Walk

Sta. 51+61.60 W.L.
= Sta. 51+70.00 Rd.
1 - 2" Air Valve WP 103 psi
1 - Type "B" MH. 5.5 deep
1 - Adjust 20" C.I. F. & C. (CCO # 35)

20" WATER MAIN
127°54'15" → 110.74 (PC to PT)

Sta. 55+01.71 W.L.
= Sta. 55+10.00 Rd.
1 - 2" Air Valve WP 104 psi
1 - Type "B" M.H. 5.7 Deep
1 - Adjust 20" C.I. F. & C. (CCO # 35)

Prop. Line

Existing Conc. Walk

Sta. 54+50
Type "C" CB
Inv. 4.50

Sta. 56+83.71 W.L.
= Sta. 56+92.00 Rd.
1 - 20" BFV, FE. 150#
1 - Type "A" BFV. MH. 6.3 deep
2 - 20" Adapters, F&B, 3' long
1 - 2" Air Valve WP 104 psi
1 - Adjust 20" C.I. F. & C.
1 - Adjust 6" C.I. F. & C.
} CCO # 35

CCO # 10
Construct MH in accordance BWS Standard Details Revised. See Plan Sht. No. 96 S-1.

Sta. 57+14.71 W.L.
= Sta. 57+23.00 Rd.
1 - 20" 22°30' Bend, T.V.
1 - Conc. Blk.

Sta. 57+25.71 W.L.
= Sta. 57+34.00 Rd.
1 - 20" 22°30' Bend, B.V.
1 - Conc. Blk.

Provide 24 lin. ft. Reinf. Conc. Jacket for 20" Water Main.

Sta. 57+01.71 W.L.
= Sta. 58+00.00 Rd.
1 - 2" Air Valve WP 104 psi
1 - Type "B" MH. 5.5' deep
(CCO # 35) 1 - ADJ. 20" C.I. F. & C.

Sta. 57+55.71 W.L.
= Sta. 57+64.00 Rd.
1 - 20" 22°30' Bend, T.V.
1 - Conc. Blk.

Sta. 57+45.71 W.L.
= Sta. 58+54.00 Rd.
1 - 20" 22°30' Bend, B.V.
1 - Conc. Blk.

Sta. 47+05.89 W.L.
= Sta. 46+40.40 Rd.

Sta. 47+25.89 W.L.
= Sta. 47+30.40 Rd.

Sta. 47+73.89 W.L.
= Sta. 47+78.35 Rd.

Sta. 48+05.35 W.L.
= P.T. Sta. 48+00.00 Rd.

P.T. Sta. 40+51.16 W.L.
= P.T. Sta. 40+50.56 Rd.

Sta. 51+70.00 Rd.

Sta. 52+20.00 Rd.

Sta. 52+47.00 Rd.

Sta. 52+75.00 Rd.

Sta. 53+25.00 Rd.

Sta. 53+75.00 Rd.

Sta. 54+00.00 Rd.

Sta. 54+50.00 Rd.

Sta. 54+80.00 Rd.

Sta. 55+40.00 Rd.

Sta. 55+91.71 W.L.
= Sta. 56+00.00 Rd.

Sta. 56+22.00 Rd.

Sta. 56+42.00 Rd.

Sta. 56+65.00 Rd.

Sta. 56+76.71 W.L.
= Sta. 57+00.00 Rd.

Sta. 57+23.00 Rd.

Sta. 57+34.00 Rd.

Sta. 57+54.00 Rd.

Sta. 58+00.00 Rd.

Sta. 58+25.00 Rd.

Sta. 56+03.71 W.L.
= Sta. 56+12.00 Rd.
20" BFV & 2" Air Valve
Blow-off Connect.

Sta. 57+03.71 W.L.
= Sta. 57+12.00 Rd.
20" BFV

Sta. 57+57.00 Rd.
End of Blow-off

Sta. 57+80.71 W.L.
= Sta. 58+00.00 Rd.
2" Air Valve

6" W. 0.3

Existing Ground along ℄ of 20" Water Main

Proposed ℄ Road Pvmt Grade

24" RCP Drain

Invert Existing 16" Water

Exist'g 8" Water

Exist'g 6" Water

Future 10 ft. wide Box Drain Invert, exist. drain Level

Level

+3.29%
+3.12%
+3.24%
-3.00%
-0.20%
+1.17%
+3.00%
-3.00%
+3.17%
-3.10%

20" W. 1.0
20" W. 1.0
20" W. 3.8
20" W. 3.8
20" W. 1.4
20" W. 1.4
20" W. 3.6
20" W. 3.6
20" W. 1.2
20" W. 1.0
20" W. 1.7
20" W. 2.6
20" W. 2.6
20" W. 0.4
20" W. 0.4
20" W. 2.6
20" W. 2.4
20" W. 2.4

22°30' Bend T.V.
22°30' Bend T.V.
(-) 1.8 B.V. 22°30' Bend
(-) 1.8 B.V. 22°30' Bend
58

10
5
0
-10

47 48 49 50 51 52 53 54 55 56

PROFILE

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

YASUO ARAKAKI
REGISTERED PROFESSIONAL ENGINEER
No. 654
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

APPROVED:
Chief, Division of Wastewater Management, DPW
Date 2/15/79

SURVEYED BY: TRS
DRAWN BY: G.M.
TRACED BY: G.M.
ENGINEER: Y.A.
CHECKED BY:

20" WATER MAIN ALONG FARRINGTON HIGHWAY

FARRINGTON HIGHWAY WIDENING
PROJECT NO. 93B-01-75, UNIT I

APPROVED: CHIEF, PLANNING & ENGINEERING
SCALE: As Noted DATE: 4/77

FILE: POCKET | FOLDER | NO.

BOARD OF WATER SUPPLY
HONOLULU, HAWAII

SHEET 6 OF 10 SHEETS | FIELD BOOK NO.

89-F

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW	———	1978	89-G	159

PROJECT NO 93B-01-75, UNIT I

CCO # 10
CONSTRUCT MH IN ACCORDANCE WITH BWS STANDARD DETAILS REVISED. SEE PLAN SHT. NO. 96-5-1.

Sta. 50+21.71 WL = Sta. 60+00.00 Rd.
1 - 2" Air Valve WP 104 psi
1 - Type "B" MH 6.3' deep.
1 - ADJUST 20" C.I. F. & C. (CCO # 35)

Sta. 50+00 Type "D" DMH Inv. 9.28

Sta. 60+76 Type "D" DMH Inv. 3.62

Sta. 61+18.53 WL Sta. 61+17.50 Rd. & Rd. O/e = 17.00'
1 - 20" 45° Bend, H & B.V.
1 - Conc. Blk.

Sta. 64+31.03 WL = Sta. 64+30.00 Rd.
1 - 2" Air Valve WP 103 psi
1 - Type "B" M.H. 5.5' deep
1 - ADJUST 20" C.I. F. & C. (CCO # 35)

Sta. 60+86.71 WL = Sta. 60+85.00 Rd. & Rd. O/e = 5.50'
1 - 20" 45° Bend, H & B.V.
1 - Conc. Blk.

Sta. 61+00 Type "D" CB Inv. 3.80

Existing SMH 6" Inv. 3.06 8" Inv. -(0.58)

Shallow Drop Connection Inv. =(2.31)

Existing SMH Inv. =(2.81)

Existing 42" RCP Sewer

Property Line

20" WATER MAIN
127° 21' → 603.00

Existing 16" Water Main

308°48'20" (7.50)

M-2 (Nail)

Sta. 50 127° 21' → 726.30

Existing Conc. Walk

Existing 36" Drain

Prop. Line

F.H.

Pole

Pole W/ Guy

Sta. 63+85 Type "D" CB Inv. 4.00

227°08'20" 6.66 M-3 (Spk.)

Existing 24" CCP

Existing 8" Water

Sta. 66+15 Type "C-1" DMH Inv. 3.57

Sta. 67+33
Connect to existing 24" CCP Main
See Schematic Layout, this sht.
1 - 24"x 20" CC Tee, 20" Bell to fit 20" D.I. pipe, O.D = 21.60" (1)
1 - 24"x 20" CC Tee (2)
2 - 24" Buttstraps (1, 2)
6 L.F. 24" C.C. Pipe Cl. 150 (1, 2)
1 - 20" 90° CC Bend (2)
6 L.F. 20" D.I. Pipe, Cl. 52 (1)
10 L.F. 20" C.C. Pipe, Cl. 150 (2)
1 - 20" M.J. Sleeve, 15" long (1)
1 - 20" Buttstrap (2)
1 - Conc. Blk. W/Struct. Struts (1, 2)
1 - Conc. Blk. W/Struct. Strut (2)
Temporary for Testing
1 - 20" Cap tapped for 4" IPT
1 - 4" Cleanout
1 - Conc. Blk.

Lower Existing 8" Water Main
1 - 8" 1/8 Bend, H & T.V.
1 - 8" 1/8 Bend, H & B.V.
1 - 8" Sleeve, 12" long.
1 - 3/4" Air Valve (Relocate) WP 103 psi
1 - Air Valve Box
35 L.F. 8" D.I. Pipe, Cl. 52
2 - Conc. Blks. (1 - W/Struct. Strut)
Temporary for Testing
2 - 8" caps tapped for 2 1/2" IPT
2 - 2 1/2" cleanout
2 - Conc. Blks.
Salvage: 1 - 8" 1/8 Bend
1 - MH Frame & Cover

Sta. 66+98.00 Rd.
1 - 20" B & T Valve, 150# F.E.
1 - Type "A" B.F.V. M.H. 6.0' deep
2 - 20" Adapters F & B
1 - ADJUST 20" C.I. F. & C.
1 - ADJUST 6" C.I. F. & C.
(CCO # 35)

True North Scale: 1" = 40'

ALA AKAU ST.

KAULAWAHA ROAD

BENCH MARK
Top Pin P.I. Mon
Elev. 8.38

NOTE:
Existing road pavement between Rd. Sta. 50+65 to Rd. Sta. 61+00 removed due to water main installation work, shall be restored to its original or better condition.
Temporary trench surface pavement, Slow curing Asphalt (SC-4), 1/2" thick, properly compacted and maintained, shall be provided, prior to pavement restoration work. Width of pavement shall be trench width plus 6" on both sides of trench.
Traffic control signs, devices and work procedures, similar to that for water main installation shall be provided for trench repaving work.
Payment for this item of work shall be considered incidental to work for "Structure Excavation For 20" Water Main."

DUCTILE IRON PIPE OPTION

20" 90° Bend
20" Adapter F & B, 5' lg.
20" DIP Cl. 52
20" Sleeve
24"x 20" Tee
20" Bell to fit 20" DIP O.D. = 21.60"
24" Buttstrap
24" CCP
Existing 24" CCP

CONC. CYLINDER PIPE OPTION

20" Adapters F & B, 3' lg.
20" Buttstrap
20" CCP
20" 90° Bend
20" BF Valve W/Type "A" BFV MH
24"x 20" Tee
24" Buttstrap
24" CCP
Exist 24" CCP

SCHEMATIC LAYOUT 20" WATER MAIN CONNECTION STA. 67+33

Property Line
New Air Valve W/ A.V. Box
New Curb
Lowered 8" D.I.
Exist'd Air Valve W/M.H.
New 20" BF Valve W/Type "A" BFV MH
New 20" Water Main
20" 90° Bend
6.5' 4.3' 19.0'
Exist'd 16" CCP Water Main
Exist'd 16" C.I.
Exist'd 16" C.I. Sleeve
Exist'd 24"x 16" C.I. Reducer, 15°
New 24" Y 20" CCP Tee
Exist'd 24" CCP
Exist'd 16" BGV L.J. 150#

EXISTING CONDITION AT CONNECTION SITE

Scale: 1" = 10'

PROFILE

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

Sta. 50+21.71 WL = Sta. 50+25.00 Rd. = 3.28
Sta. 50+00 Rd. = 3.28
Sta. 50+76 Rd. = 3.62
Sta. 60+00.00 Rd. = 5.50
Sta. 60+76.71 WL = Sta. 60+85.00 Rd. = 5.50
Sta. 60+86.71 WL = Sta. 60+85.00 Rd. = 5.50
Sta. 61+00 Rd. = 3.80
Sta. 61+17.50 Rd. = 3.06
Sta. 61+18.53 WL = Sta. 61+17.50 Rd. = 3.06
Sta. 62+00.00 Rd. = 3.00
Sta. 62+00.69 Rd. = 3.00
Sta. 63+85 = 4.00
Sta. 64+00.00 Rd. = 3.60
Sta. 64+03.03 WL = Sta. 64+20.00 Rd. = 3.60
Sta. 64+31.03 WL = Sta. 64+30.00 Rd. = 3.60
Sta. 64+40.00 Rd. = 3.60
Sta. 65+03.03 WL = Sta. 65+00.00 Rd. = 3.20
Sta. 65+05.00 Rd. = 3.20
Sta. 66+00.00 Rd. = 1.20
Sta. 66+03.03 WL = Sta. 66+00.00 Rd. = 1.20
Sta. 66+40.00 Rd. = 3.30
Sta. 66+53.03 WL = Sta. 66+50.00 Rd. = 3.30
Sta. 67+21.53 WL = Sta. 67+20.50 Rd. = 3.30
Sta. 67+33 WL = 3.30
Sta. 67+38 WL = 3.70

10
5
0
-5
-10

30" RCP Drain
Existing 6" Waterline
24" RCP Drain
Existing 6" Water Main
Proposed ℄ Road Pv'mt. Grade
Existing Ground along ℄ of 20" Water Main
Existing Ground along ℄ of Road
Invert 20" Water Main
Level
-3.10%
+3.10%
-2.09%
+3.17%
-0.27%
-0.44%
-3.38%
+3.23%
Exist'd 8" Sewer
Exist. 8" Sewer
Exist'd 8" Water
Existing 8" Water
Existing 24" CCP
New 8" Water Main
Exist. 16" Water
New 20" Water
3/4 Air Valve
20" W.
2.4
0.2
0.2
2.4
2.4
0.4
3.6
45° Bend H & B.V.
45° Bend H & B.V.
3.0
3.6
3.6
3.2
1.2
1.2
3.3
3.3
8" W. 5.1 1/8 Bend, H.V.
8" W. 2.0 1/8 Bend, H.V.
Exist. 8" W. 2.0
68

℄ Road
30" RCP Drain
New 20" Water Main
Exist'd 24" CCP
24" CCP 3.7
1/4 Bend, H

59 60 61 62 63 64 65 66

APPROVED:
Chief, Division of Wastewater Management DPW Date 3/21/79

STA. 67+05
8" WATER MAIN RELOCATION

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

YASUO ARAKAKI
REGISTERED PROFESSIONAL ENGINEER
No. 654
HAWAII, U.S.A.

20" WATER MAIN ALONG FARRINGTON HIGHWAY

FARRINGTON HIGHWAY WIDENING
PROJECT NO. 93B-01-75, UNIT I

SURVEYED BY: T&S
DRAWN BY: GM
TRACED BY: GM
ENGINEER: YA
CHECKED BY:

APPROVED: CHIEF, PLANNING & ENGINEERING
SCALE: As Noted
DATE: 3/21/78
FILE POCKET FOLDER NO.

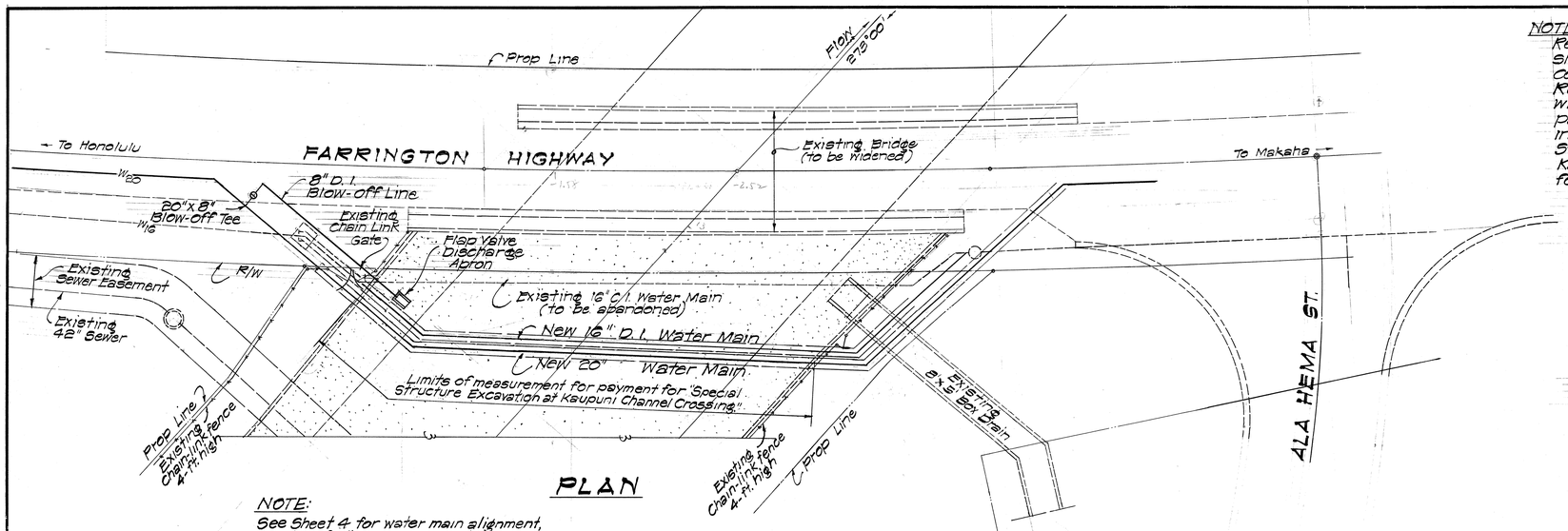
BOARD OF WATER SUPPLY
HONOLULU, HAWAII

SHEET 7 OF 10 SHEETS | FIELD BOOK NO.

89-G

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW	———	1978	89-H	159

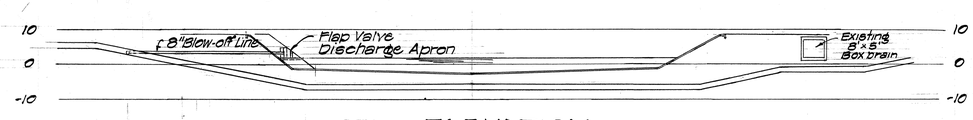
PROJECT NO. 93B-01-75, UNIT I



PLAN

NOTE:
See Sheet 4 for water main alignment, profile, fittings and appurtenances.

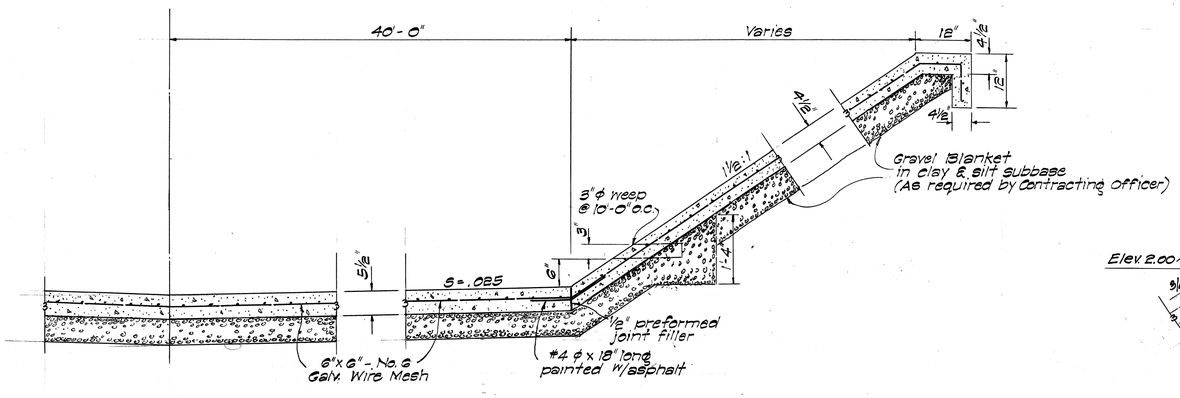
Existing chain link fencing and gates destroyed or damaged due to water main installation work shall be restored to their existing or better condition.



ELEVATION

KAUPUNI CHANNEL CROSSING

Scale: 1" = 20'

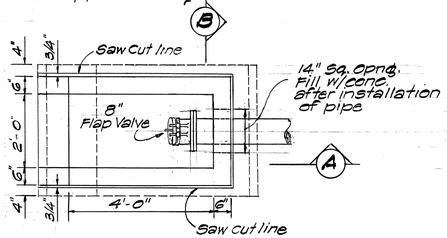


TYPICAL HALF SECTION

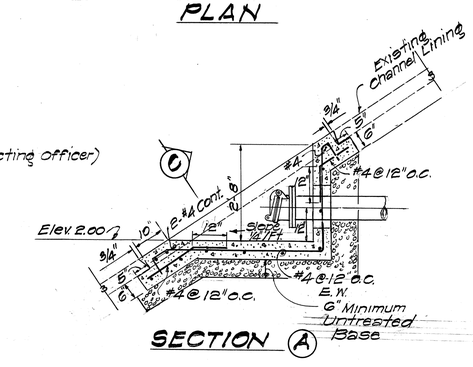
CHANNEL LINING

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

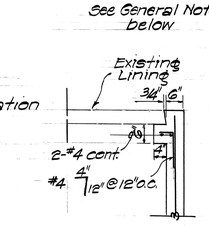
NOTE:
Flap Valve shall be MUELLER CO. CAT. NO. A-2540-6, CLOW CORP. CAT. NO. 5-3012 or approved equal.



PLAN



SECTION (A)



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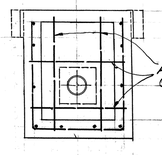


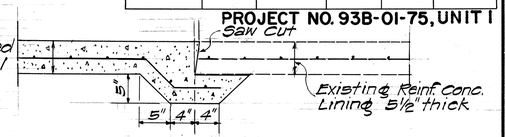
SECTION (B)

FLAP VALVE

DISCHARGE APRON

Scale: 1½" = 1'-0"

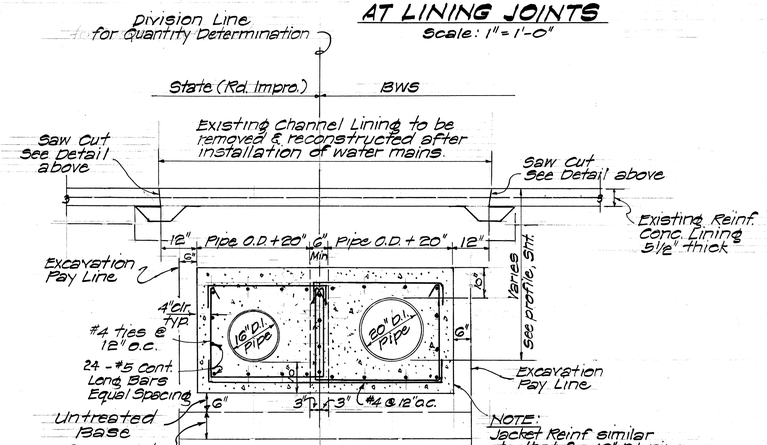
NOTE:
Reconstructed channel lining shall be City & County Class A concrete.
Reconstructed channel lining will not be measured for payment and shall be considered incidental to Item on "Special Structure Excavation at Kaupuni Channel Crossing for 20-inch Water Main."



TYPICAL DETAIL

AT LINING JOINTS

Scale: 1" = 1'-0"



TYPICAL SECTION

WATER MAINS AT

CHANNEL CROSSING

Scale: ½" = 1'-0"

GENERAL NOTES:

1. Cofferdams for Water Main Installation Work shall be carried well below the bottom of the water main and shall be well braced and as watertight as practicable. Sheathing shall be driven to such a depth that adjacent channel lining foundation material will not be removed due to trench dewatering operations. In the event of removal of channel lining foundation material due to trenching work, the voids thus created shall be filled with concrete at the Contractor's expense.
2. All mud or other similar undesirable materials, as determined by the Engineer, encountered in the bottom of the trench shall be removed for a depth of at least 30 inches below the pipe jacket, and replaced with untreated base, well compacted.
3. Entire trench backfill material from trench bottom to channel lining bottom shall be untreated base.
4. Dewatering effluent shall be discharged into constructed sediment basins and only clean silt free water shall be allowed to re-enter the channel.
5. Obstruction of channel flow due to cofferdam construction shall be kept to a minimum. Cofferdams shall be immediately removed upon completion of increment pipe laying work.

YASUO ARAKAKI
REGISTERED PROFESSIONAL ENGINEER
No. 654
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION
Yasuo Arakaki

APPROVED:
Chief, Division of Engineering, DPW
7/28/78
Date

SURVEYED BY: T&S
DRAWN BY: GM
TRACED BY: GM
ENGINEER: YA
CHECKED BY:

20" WATER MAIN ALONG FARRINGTON HIGHWAY

FARRINGTON HIGHWAY WIDENING
PROJECT NO. 93B-01-75, UNIT I

APPROVED: Richard L. Mayhew
CHIEF, PLANNING & ENGINEERING
FILE POCKET FOLDER NO.
SCALE: As Noted DATE: 3/17/78

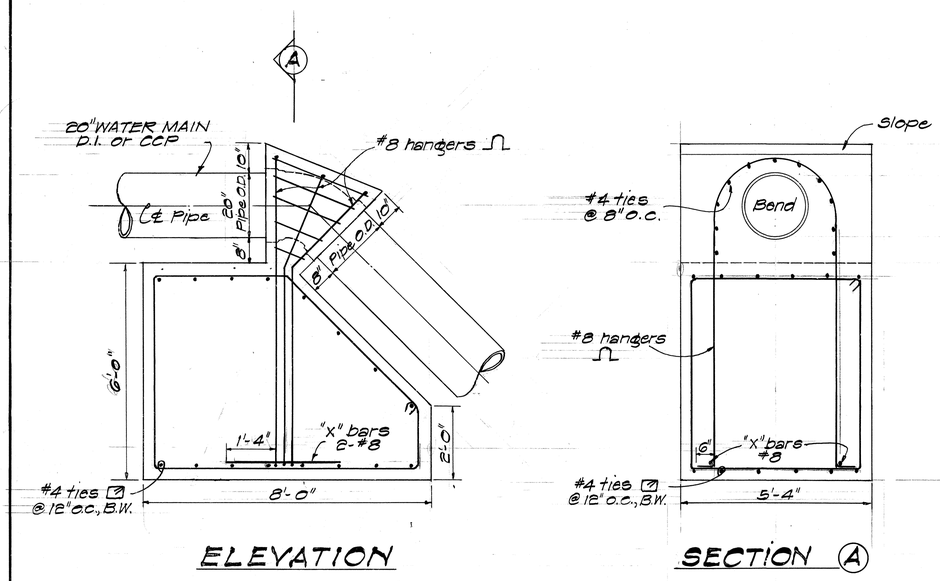
BOARD OF WATER SUPPLY
HONOLULU, HAWAII

SHEET 8 OF 10 SHEETS FIELD BOOK NO.

89-H

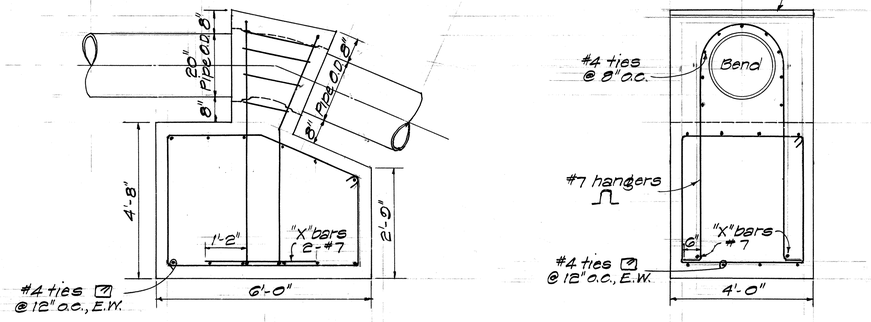
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW	———	1978	89-I	159

PROJECT NO. 938-01-75, UNIT I



ELEVATION SECTION (A)

1/8 VERTICAL BENDS



ELEVATION SECTION (B)

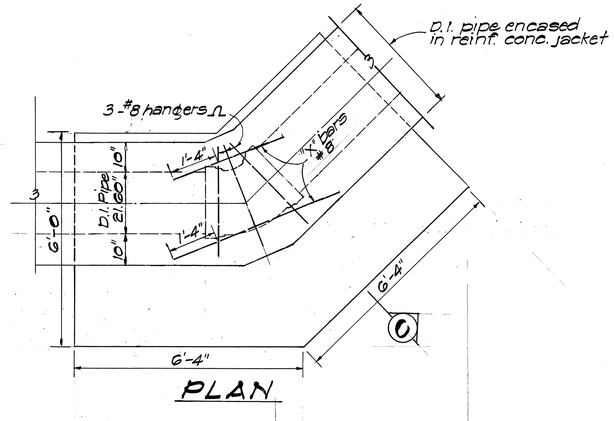
1/16 VERTICAL BENDS

TYPICAL THRUST BLOCKS FOR VERTICAL BENDS

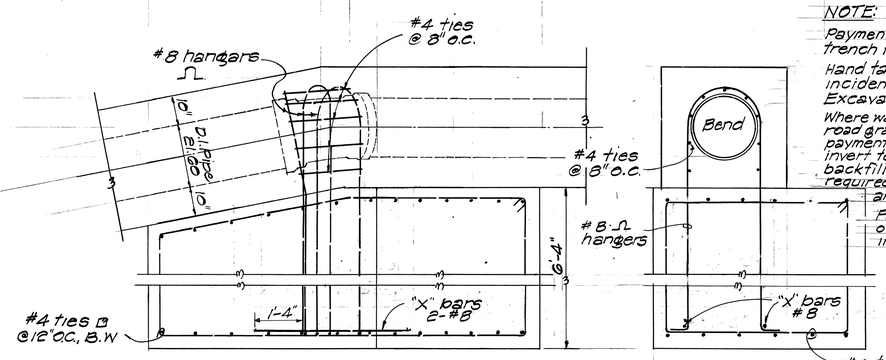
Scale: 1/2" = 1'-0"

NOTE FOR THRUST BLOCKS

Block dimensions shown are for estimating purposes only. Final block design shall be determined at time of construction.



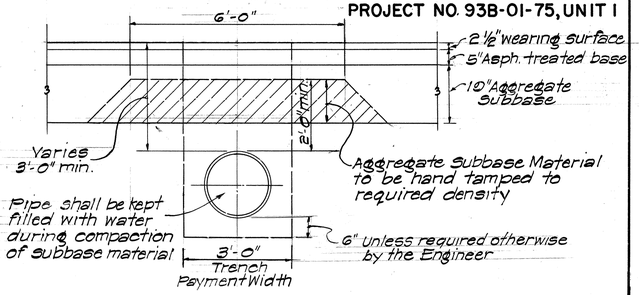
PLAN



ELEVATION SECTION (C)

SPECIAL THRUST BLOCK FOR 1/8 HORIZ.-VERT BEND AT CHANNEL CROSSING

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



WATER MAIN TRENCH BACKFILL DETAIL WHERE COVER OVER WATER MAIN IS LESS THAN 2-FT.

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

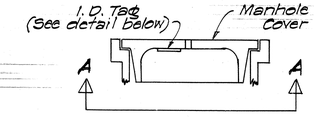
NOTE:

Payment depth for trench excavation shall be from trench invert to bottom of aggregate subbase line.

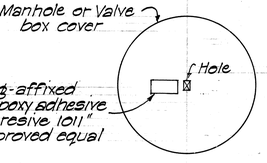
Hand tamping of subbase material shall be considered incidental to work required for Item, "Structure Excavation For Water System."

Where water main installation work is to be done prior to road grading work, as determined necessary by the Engineer, payment depth for trench excavation shall be from the trench invert to the top of existing ground. Hand tamping of trench backfill as detailed above shall be done where and when required within the limits of the road improvement work, and shall be considered incidental work.

Payment depth for trench excavation, beyond the limits of the road improvement work, shall be from the trench invert to the top of existing ground.



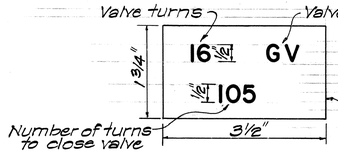
SECTION



SECTION A-A

NOTE:

1. The Contractor shall verify valve data with the valve manufacturer prior to stamping I.D. tag.
2. I.D. tag shall be installed on the underside of all new manhole or valve box cover.
3. Payment for the furnishing and installation of I.D. tags will not be made directly but shall be included in the price bids for valves.



VALVE TYPE ABBREVIATIONS

GATE VALVE	GV
BEVEL GEAR GATE VALVE	BGGV
BUTTERFLY VALVE	BV

18 gauge (B&S) Commercial Brass Plate. ASTM B-16 #260

TYPICAL TAG

IDENTIFICATION TAG FOR MANHOLE OR VALVE BOX COVER

YASUO ARAKAKI
REGISTERED PROFESSIONAL ENGINEER
No. 654
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

Yasuo Arakaki

20" WATER MAIN ALONG FARRINGTON HIGHWAY

FARRINGTON HIGHWAY WIDENING
PROJECT NO. 938-01-75, UNIT I

SURVEYED BY:
DRAWN BY:
TRACED BY:
ENGINEER:
CHECKED BY:

APPROVED: Richard H. Mitsuda
CHIEF, PLANNING & ENGINEERING
DATE 3/1/78

FILE: POCKET | FOLDER | NO.

SCALE:

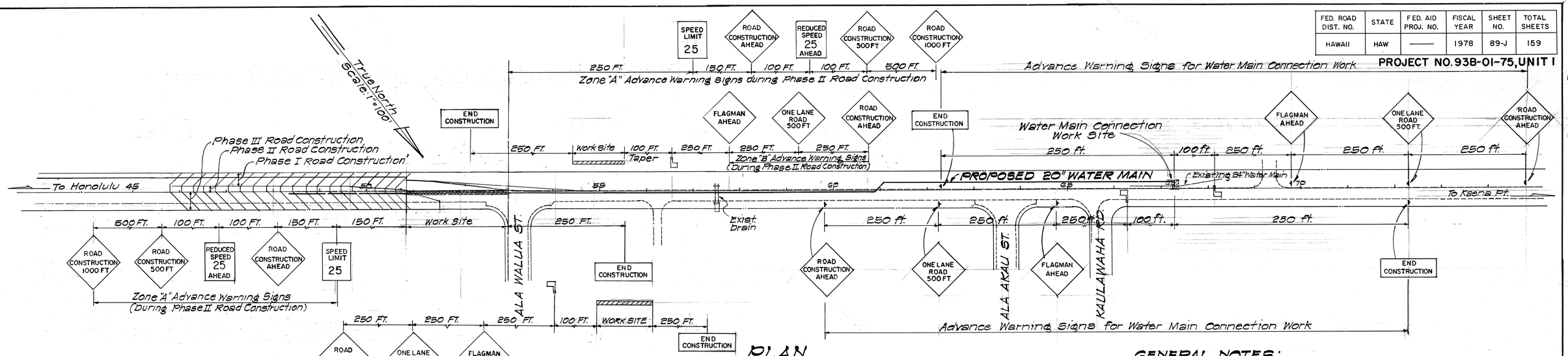
BOARD OF WATER SUPPLY
HONOLULU, HAWAII

SHEET 9 OF 10 SHEETS | FIELD BOOK NO.

89-I

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW	———	1978	89-J	159

PROJECT NO. 93B-01-75, UNIT I



PLAN
ADVANCE WARNING SIGNS - INSTALLATION

Ⓐ Exceptions may be permitted by local authority

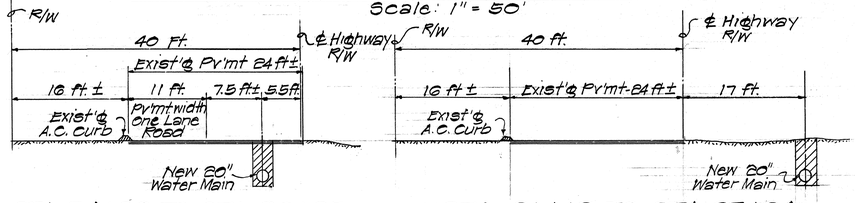
Ⓑ Mounting height may be 5 ft. where there are no pedestrians Mounting height shall be 7 ft. where there are pedestrians.

GENERAL NOTES:

1. All open trenches shall be covered with "non-skid" metal plates during peak traffic hours and during off work hours.
2. Police Officer shall be on duty to control traffic movements at road intersections and at work site during detour hours.
3. All traffic control devises and work not included in the Proposal Schedule shall be considered incidental to "Structure Excavation for 20-Inch Water Main."
4. Provide 10-Ft. wide (minimum) traffic lanes.

ZONE A
WORK AREA CONTROL
DURING PHASE II ROAD CONSTRUCTION
Scale: 1" = 50'

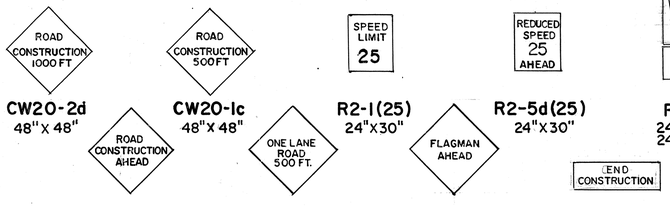
TYPICAL ZONE B
INCREMENT WORK AREA CONTROL
Scale: 1" = 50'



STA. 54+00 TO STA. 60+25 STA. 61+18 TO STA. 67+24

TYPICAL SECTIONS
Scale: 1" = 10'

TYPICAL SIGN INSTALLATION



REGULATORY & WARNING SIGNS

LEGEND

I Barricade - Type II.
○ Traffic Cone
Flagman

WATER MAIN CONNECTION
WORK AREA CONTROL
Scale: 1" = 50'

YASUO ARAKAKI
REGISTERED PROFESSIONAL ENGINEER
No. 654
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

20" WATER MAIN ALONG FARRINGTON HIGHWAY
FARRINGTON HIGHWAY WIDENING
PROJECT NO. 93B-01-75, UNIT I

SURVEYED BY:	T&S
DRAWN BY:	G.M.
TRACED BY:	G.M.
ENGINEER:	Y.A.
CHECKED BY:	

APPROVED: CHIEF, PLANNING & ENGINEERING
SCALE: As Noted DATE: 3/17/78

FILE		
POCKET	FOLDER	NO.

BOARD OF WATER SUPPLY
HONOLULU, HAWAII

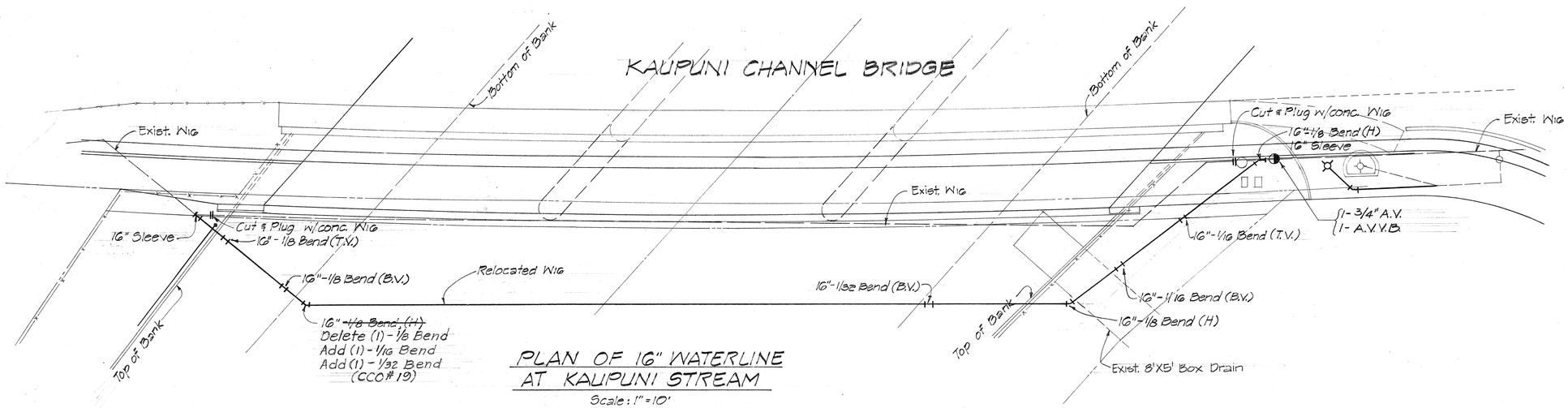
SHEET 10 OF 10 SHEETS FIELD BOOK NO.

89-J

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.		1978	90	159

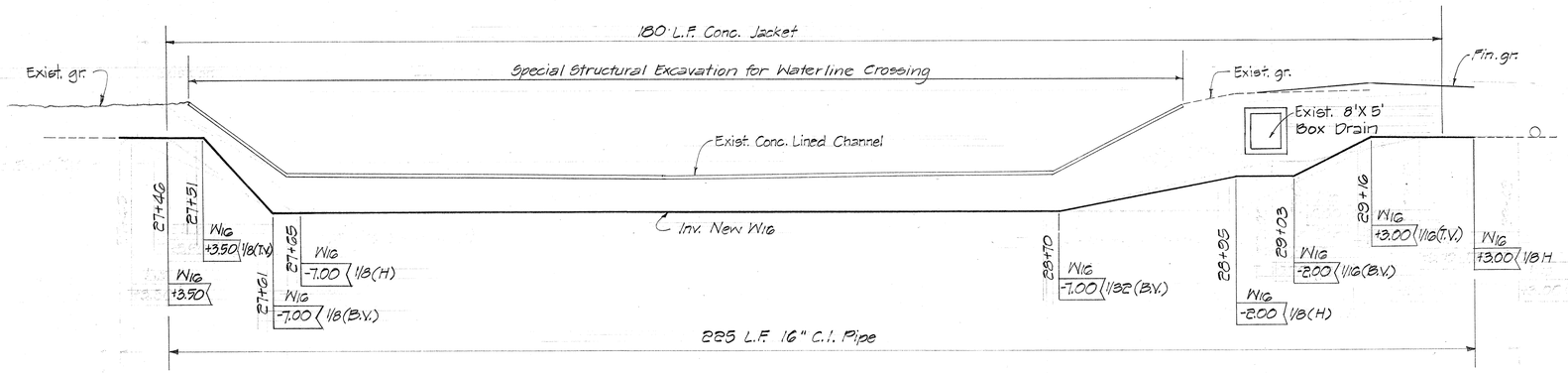
PROJECT NO. 93B-01-75

KAUPUNI CHANNEL BRIDGE



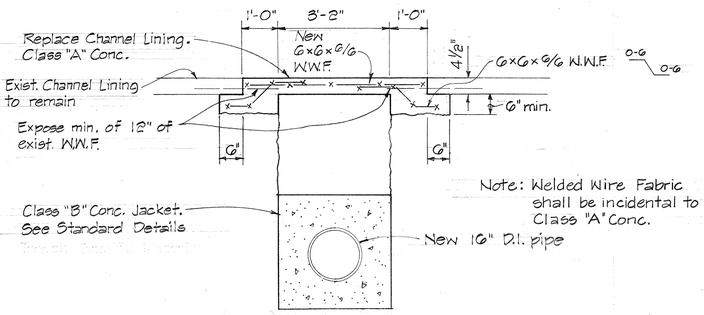
PLAN OF 16" WATERLINE AT KAUPUNI STREAM

Scale: 1"=10'



PROFILE OF 16" WATERLINE AT KAUPUNI STREAM

Scale: 1"=10'



TYPICAL TRENCH DETAIL

NO SCALE

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

APPROVED:

CHIEF, PLANNING & ENGINEERING — DATE
BOARD OF WATER SUPPLY

PAUL T. TANIGUCHI
REGISTERED PROFESSIONAL ENGINEER
No. 864
HAWAII U. S. A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

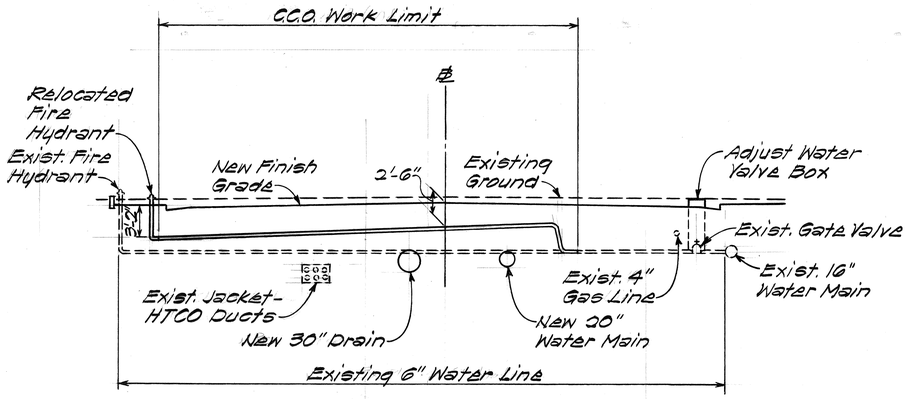
WATER SYSTEM DETAILS

FARRINGTON HIGHWAY WIDENING
LUALUALEI HOMESTEAD ROAD TO JADE STREET
PROJECT NO. 93B-01-75, UNIT I
SCALE: AS SHOWN — DATE:

SHEET No. 5 OF 17 SHEETS

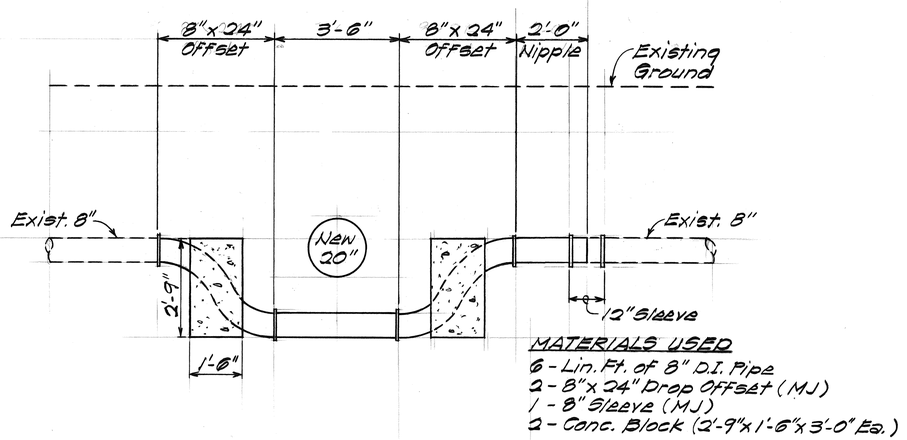
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	93B-01-75, UNIT I	1983	C.O. 90S-1	159

C.O. 90S-1



ADJUSTING 6" WATER LINE

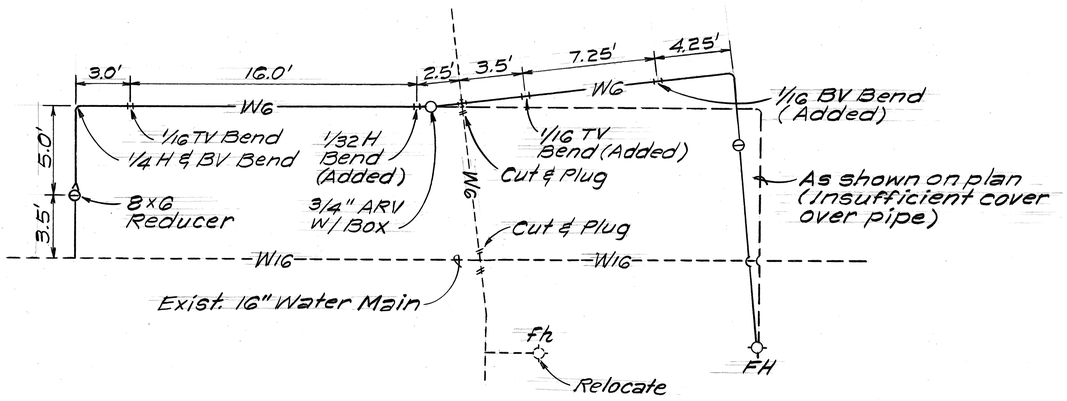
℄ STA. 12+25 ±
C.C.O. #4
Not to Scale



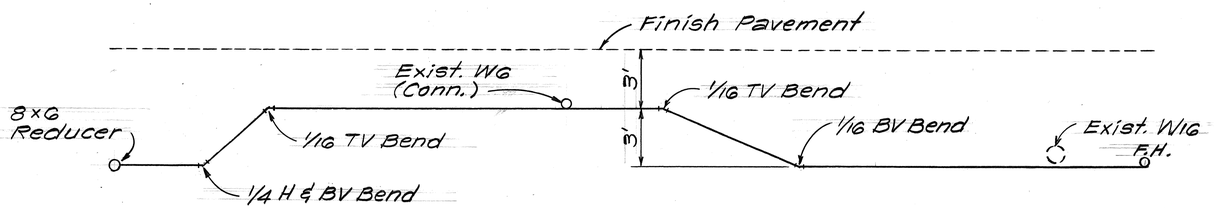
MATERIALS USED
6 - Lin. Ft. of 8" D.I. Pipe
2 - 8"x 24" Drop Offset (MJ)
1 - 8" Sleeve (MJ)
2 - Conc. Block (2'-9"x 1'-6"x 3'-0" Ea.)

LOWERING EXIST. 8" WATER LINE

STA. 0+00
C.C.O. #20
Scale: 1/2" = 1'-0"



PLAN



PROFILE

ADJUSTING 6" WATER LINE

℄ STA. 10+22
C.C.O. #14
Not to Scale

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

THIS TRACING PREPARED DURING "AS-BUILT" POSTING

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

WATER DETAILS

FARRINGTON HIGHWAY WIDENING
LUALUALEI HOMESTEAD RD. TO JADE ST.
PROJ. NO. 93B-01-75, UNIT I
SCALE: AS SHOWN DATE: SEPT., 1983

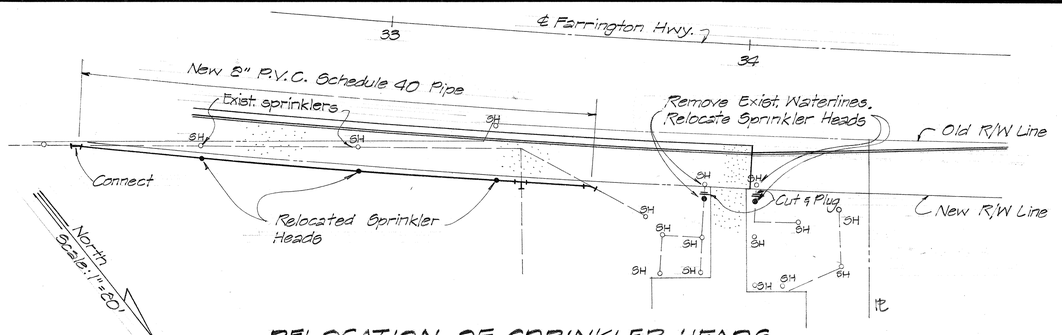
SHEET No. 5A OF 17 SHEETS

C.O. 90S-1

90 S-1

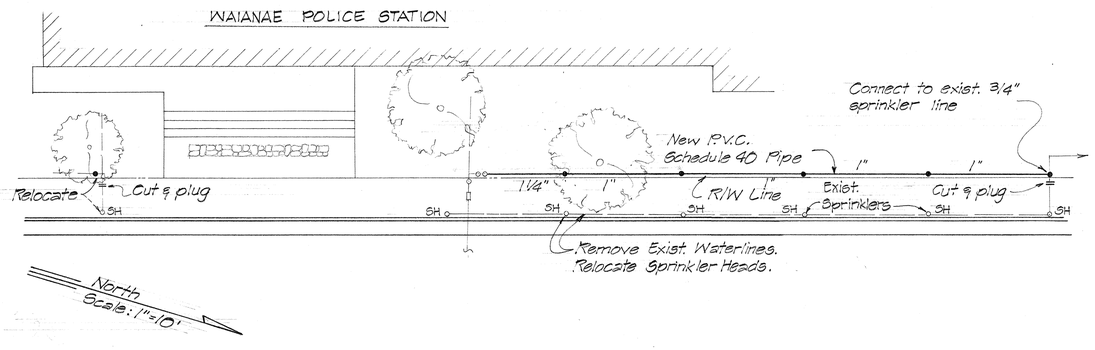
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.		1978	91	159

PROJECT NO. 93B-01-75



RELOCATION OF SPRINKLER HEADS AT WAIANAE NEIGHBORHOOD COMMUNITY CENTER

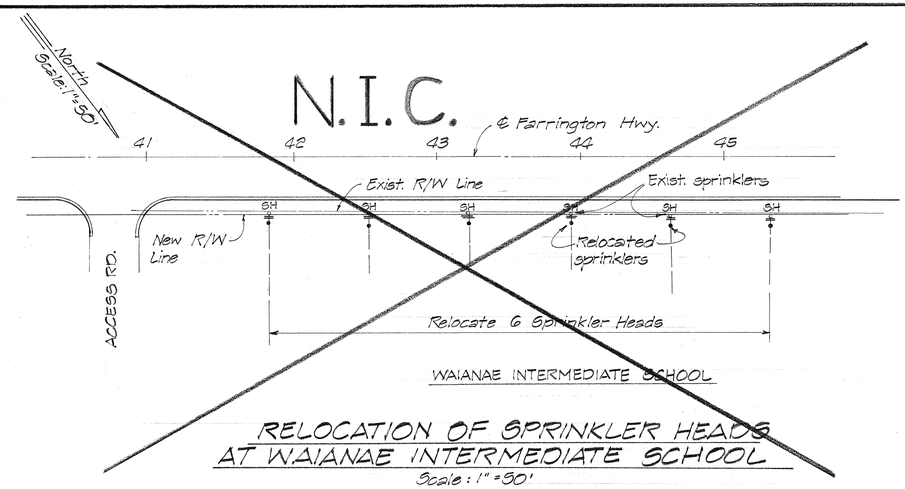
Scale: 1"=20'



6 ℄ Farrington Hwy.

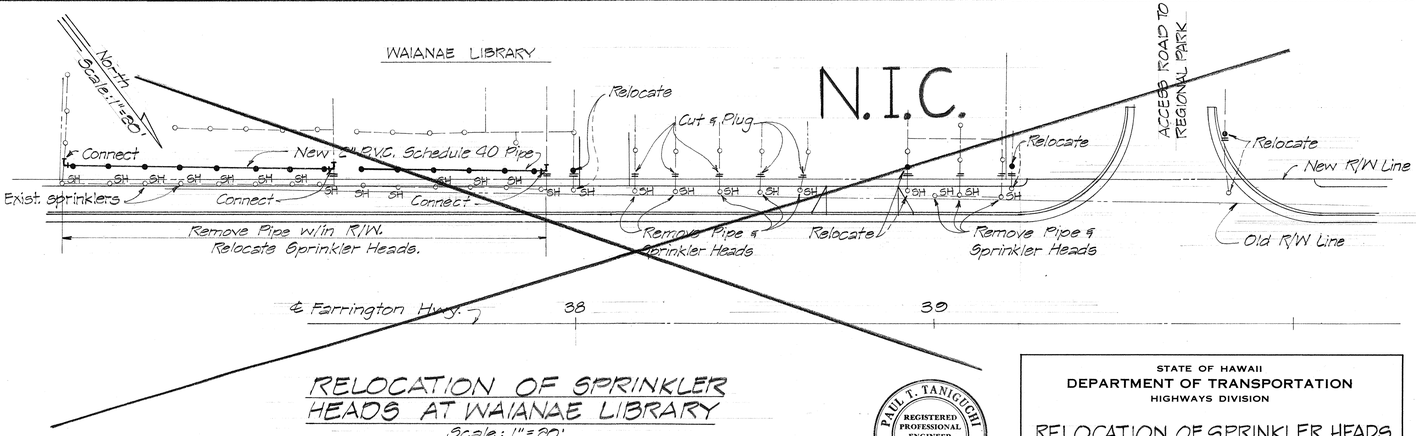
RELOCATION OF SPRINKLER HEADS AT WAIANAE POLICE STATION

Scale: 1"=10'



RELOCATION OF SPRINKLER HEADS AT WAIANAE INTERMEDIATE SCHOOL

Scale: 1"=50'



RELOCATION OF SPRINKLER HEADS AT WAIANAE LIBRARY

Scale: 1"=20'

DATE	REVISION
8/06/79	Revised End of Project Station. Deleted work beyond Sta. 34+00.

PAUL T. TANIGUCHI
REGISTERED PROFESSIONAL ENGINEER
No. 864
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

Paul T. Taniguchi

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

RELOCATION OF SPRINKLER HEADS

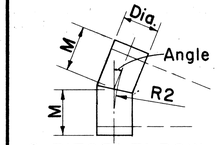
FARRINGTON HIGHWAY WIDENING
WAIALUALEI HOMESTEAD ROAD TO JADE STREET
PROJECT NO. 93B-01-75, UNIT I

SCALE: AS SHOWN DATE:

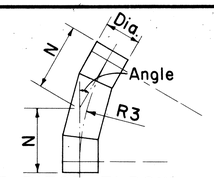
SHEET No. 6 OF 17 SHEETS

C.O. 91

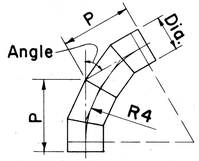
ORIGINAL PLAN
SURVEY PLOTTED BY: DATE
DRAWN BY
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY
NOTE BOOK
No.



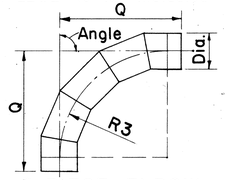
2 PIECE ELBOW
6° to 22 1/2° Inclusive



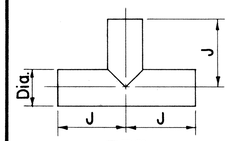
3 PIECE ELBOW
Over 22 1/2° to 45° Inclusive



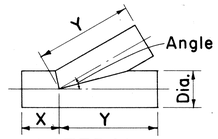
4 PIECE ELBOW
Over 45° to 67 1/2° Inclusive



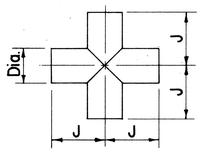
5 PIECE ELBOW
Over 67 1/2° to 90° Inclusive



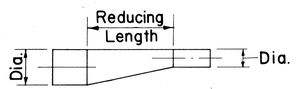
TEE



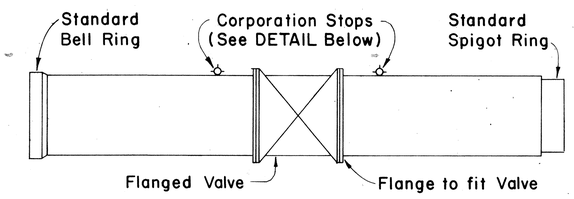
LATERAL
30° Minimum – 75° Maximum



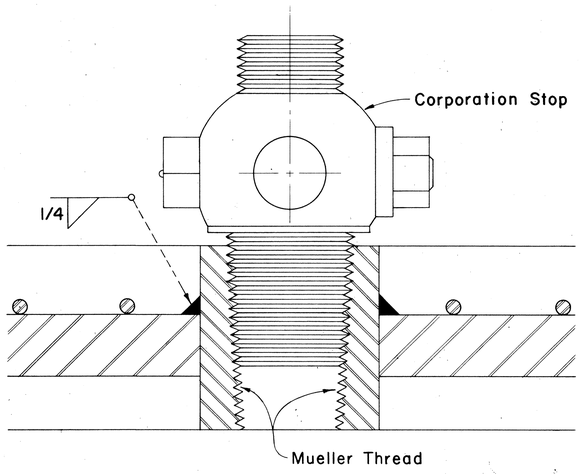
CROSS



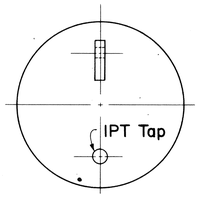
REDUCER



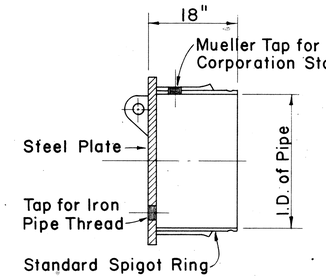
ELEVATION



TYPICAL SECTION THRU CONCRETE PIPE
AT CORPORATION STOP

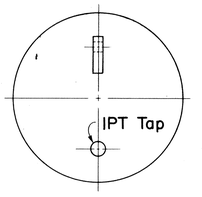


ELEV. OF STEEL PLATE

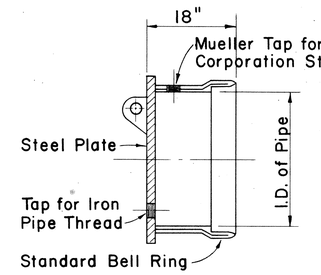


SECTION

DETAIL OF PLUG



ELEV. OF STEEL PLATE

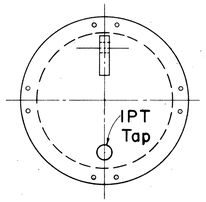


SECTION

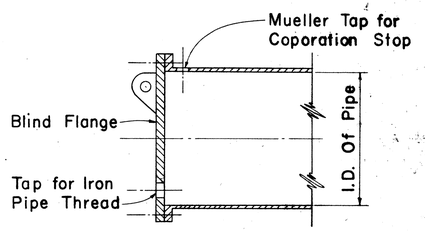
DETAIL OF CAP

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	~	1978	92	159

PROJECT NO. 93B-01-75

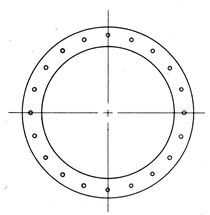


ELEV. OF BLIND FLANGE

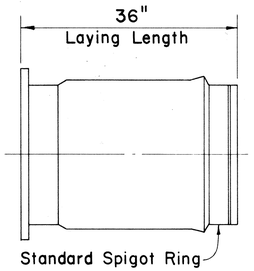


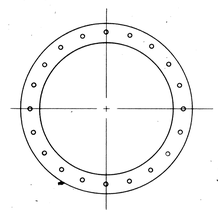
SECTION

DETAIL OF BLIND FLANGE

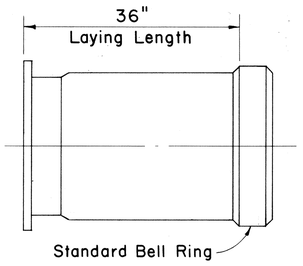


FLANGE
See Specs. for Flange Class

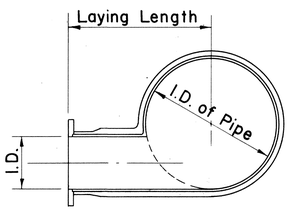




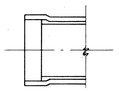
FLANGE
See Specs. for Flange Class



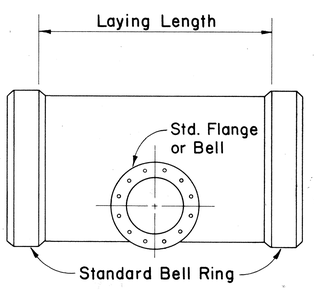
TYPICAL DETAIL OF ADAPTER



SECTION



BELL SECTION



TYPICAL DETAIL OF BLOW-OFF TEE

STANDARD FITTING DIMENSIONS

DIAMETER	TEE		CROSS (Both Ways)	LATERAL (30° to 75°)		ELBOWS (Center to End) 2 Piece (up to 22 1/2°)		3 Piece (22 1/2° to 45°)		4 Piece (45° to 67 1/2°)		5 Piece (67 1/2° to 90°)	
	Run J+J	Outlet J	J+J	Run X+Y	Outlet Y	M	R2	N	R3	P	R4	Q	R5
16"	34"	17"	34"	62"	52"	12"	60"	18"	44"	26"	39"	44"	40"
18"	36"	18"	36"	66"	56"	12"	60"	19"	47"	27"	41"	36"	32"
20"	38"	19"	38"	72"	60"	13"	65"	20"	49"	28"	42"	54"	50"
22"	40"	20"	40"	78"	66"	13"	65"	21"	51"	30"	45"	41"	37"
24"	42"	21"	42"	84"	72"	14"	70"	22"	54"	32"	48"	64"	60"
30"	60"	30"	60"	96"	84"	15"	75"	25"	61"	37"	51"	79"	75"
36"	66"	33"	66"	110"	96"	16"	80"	27"	66"	40"	60"	94"	90"
42"	72"	36"	72"	124"	108"	17"	85"	30"	71"	49"	69"	109"	105"

DIMENSIONS FOR ECCENTRIC REDUCER REDUCING SECTION

36" x 30" Eccentric Reducer – Length 66"
30" x 24" Eccentric Reducer – Length 66"
24" x 20" Eccentric Reducer – Length 26"
20" x 16" Eccentric Reducer – Length 26"
42" x 36" Eccentric Reducer – Length 66"
42" x 30" Eccentric Reducer – Length 66"

NOTE :

All dimensions shown are laying lengths.
All fittings and specials shall be fabricated independent from pipe sections and in accordance with the dimensions shown.
All fittings and specials shall be all bell unless otherwise noted.
All tees, wyes, crosses and reducers 16-inch in diameter and larger shall be reinforced with steel ribs or steel crotch plates welded continuously to the cylinder or by other methods to withstand the longitudinal crushing effect caused by the test pressure as called for in the plans.

APPROVED:

11/6/78
CHIEF, PLANNING & ENGINEERING DATE
BOARD OF WATER SUPPLY

SHEET NO. 1 OF 2 SHEETS

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION
BOARD OF WATER SUPPLY
CITY & COUNTY OF HONOLULU

CONCRETE CYLINDER PIPE MISCELLANEOUS DETAILS

Scale: No Scale Date:

SHEET No. 7 OF 17 SHEETS

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

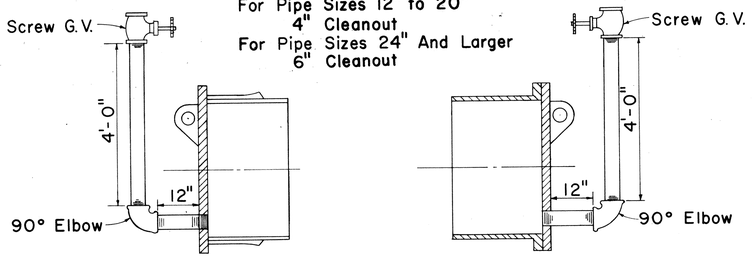
92

W9

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.		1978	93	159

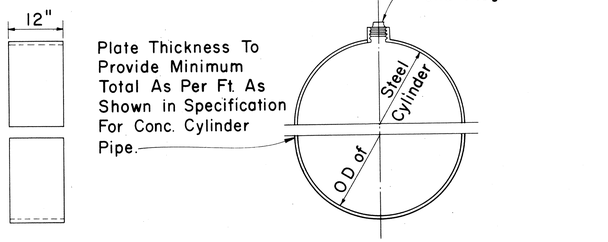
PROJECT NO. 93B-01-75

NOTE:
For Pipe Sizes 8" And Smaller
2 1/2" Cleanout
For Pipe Sizes 12" to 20"
4" Cleanout
For Pipe Sizes 24" And Larger
6" Cleanout

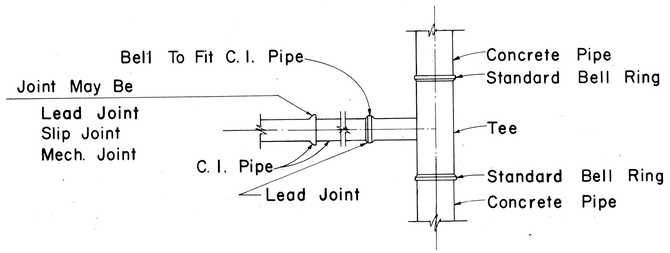


TYPICAL SECTION OF TEMPORARY CLEANOUT

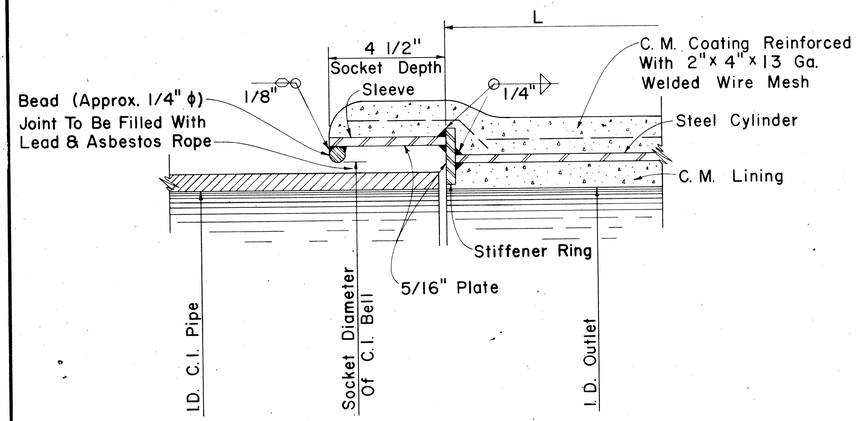
NOTE:
For Pipe Sizes 24" And
Larger 2 Handholes Required.



DETAIL OF SPLIT BUTT STRAP



TYPICAL CAST IRON PIPE CONNECTION
TO CONCRETE CYLINDER PIPE



DETAIL OF C.I. ADAPTER

APPROVED:

CHIEF, PLANNING & ENGINEERING
BOARD OF WATER SUPPLY

DATE

SHEET NO. 2 OF 2 SHEETS

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION
BOARD OF WATER SUPPLY
CITY & COUNTY OF HONOLULU

CONCRETE CYLINDER PIPE
MISCELLANEOUS DETAILS

Scale: No Scale Date:

SHEET No. 8 OF 17 SHEETS

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

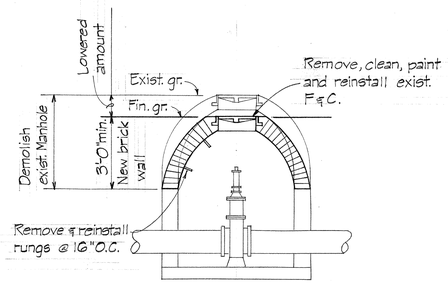
93

UNIT I

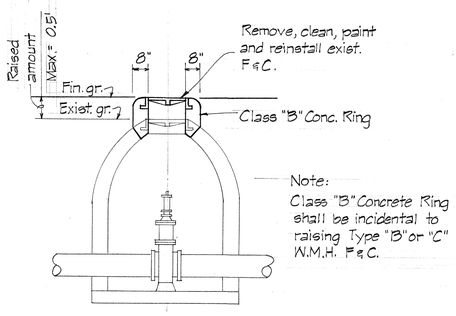
W1

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.		1978	94	159

PROJECT NO. 93B-01-75



LOWERING TYPE "B" OR "C"
W.M.H. F & C
No Scale



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W.M.H. F & C
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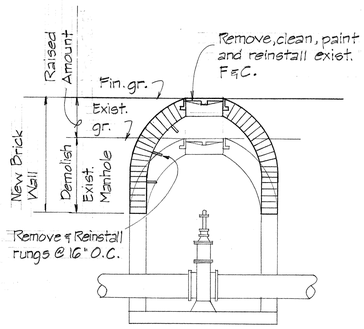

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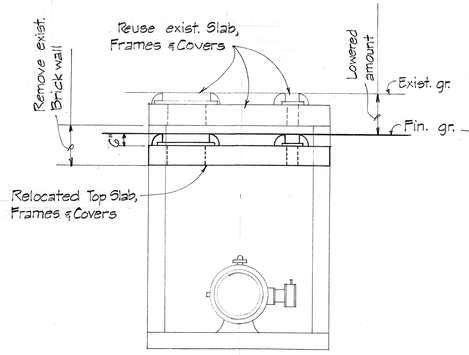
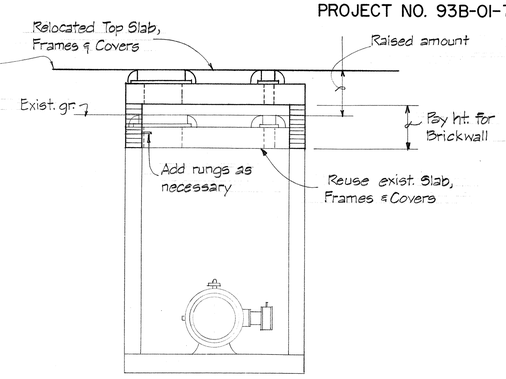
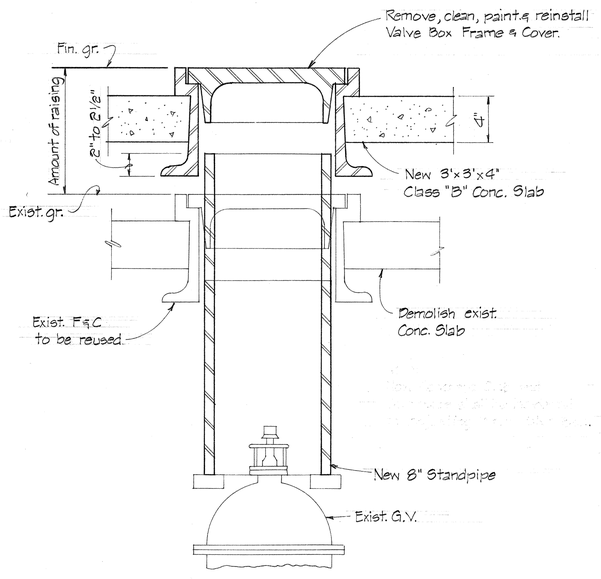


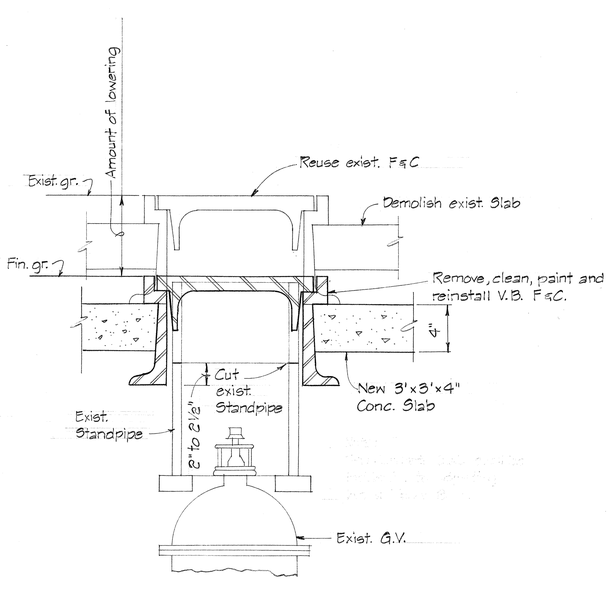
LOWERING TYPE "A"
W.M.H. SLAB
No Scale



RAISING TYPE "A"
W.M.H. SLAB
No Scale

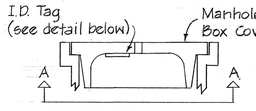


RAISING

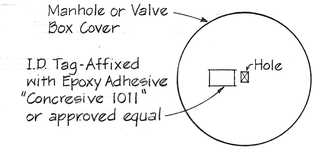


LOWERING

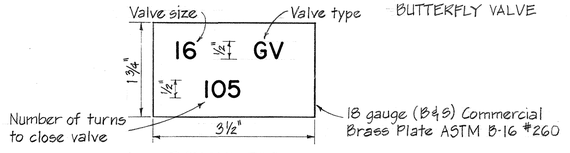
ADJUSTING W.V.B.



SECTION



SECTION A-A



TYPICAL TAG

IDENTIFICATION TAG FOR MANHOLE OR VALVE BOX COVER

Note:
1. The Contractor shall verify valve data with the valve manufacter prior to stamping ID tag.
2. ID tag shall be installed on undereide of all new Manhole or Valve Box Cover.
3. Payment for the furnishing and installation of ID tags will not be made directly but shall be included in the Unit Price Bids for valves.

VALVE TYPE ABBREVIATIONS

GATE VALVE	GV
BEVEL GEAR GATE VALVE	BGGV
BUTTERFLY VALVE	BV

APPROVED:

CHIEF, PLANNING & ENGINEERING — DATE
BOARD OF WATER SUPPLY

PAUL T. TANIGUCHI
REGISTERED PROFESSIONAL ENGINEER
No. 864
HAWAII, U. S. A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

WATER DETAILS

PROJECT NO. 93B-01-75, UNIT I
SCALE: NO SCALE DATE:

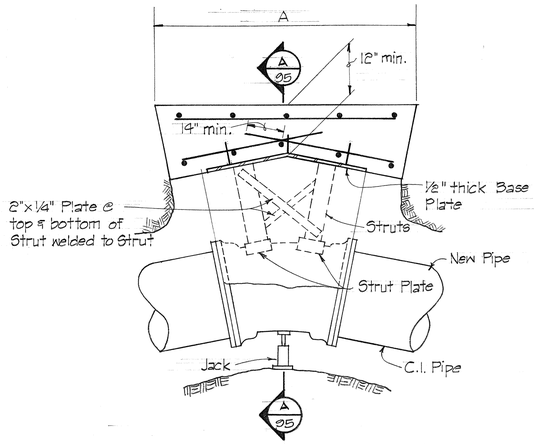
SHEET No. 9 OF 17 SHEETS

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

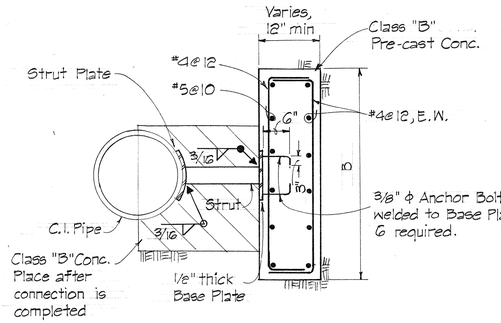
94

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.		1978	95	150

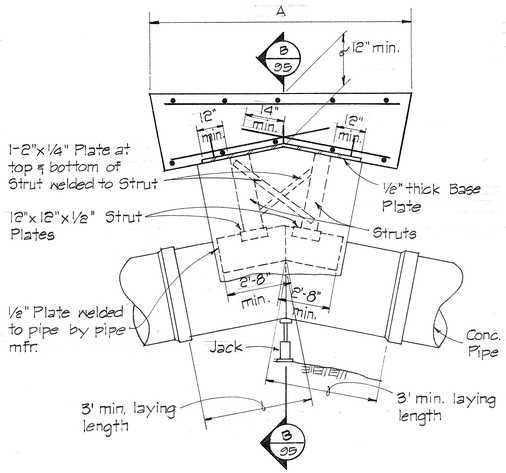
PROJECT NO. 93B-01-75



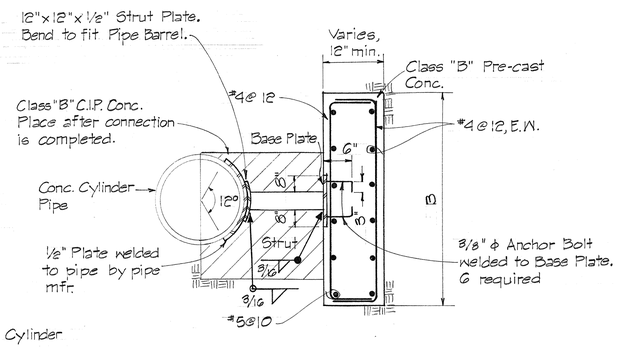
PLAN OF HORIZONTAL BLOCK (H) W/ STRUTS FOR C.I. PIPE



SECTION A 95



PLAN OF HORIZONTAL BLOCK (H) W/ STRUTS FOR CONCRETE CYLINDER PIPE

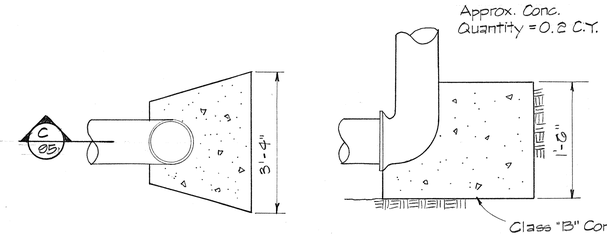


SECTION B 95

1. Pipe Struts shall conform to ASTM A-53
2. Structural Steel Plates and Struts shall conform to ASTM A-36.
3. Bolts shall conform to ASTM A-307.
4. Struts, Plates and Bolts will not be measured for payment but shall be incidental to Class "B" Concrete.

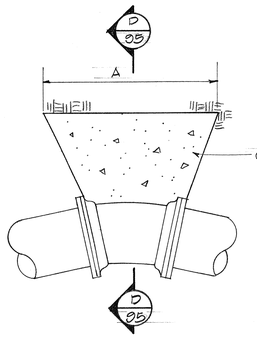
✱ HORIZONTAL BLOCKS (H) W/ STRUTS								
Pipe Size	Bend	A	B	Strut	Strut Plate	Base Plate	QUANTITIES Concrete	Re-bars
4" or less	Tee	1.33	1.33	2" ϕ	6x3/8x6	20"x1/2"x1'-0"	0.2	9
	1/4	2.00	1.33	"	"	20"x1/2"x2'-0"	0.2	13
	1/8	1.25	1.33	"	"	20"x1/2"x1'-0"	0.1	4
	1/16							
6"	Tee	1.75	2.00	"	6x3/8x6	20"x1/2"x1'-6"	0.2	14
	1/4	2.50	2.00	"	"	20"x1/2"x2'-6"	0.3	21
	1/8	2.00	1.50	"	"	20"x1/2"x1'-6"	0.2	14
	1/16	2.00	1.50	"	"	"	0.2	14
	1/32							
8"	Tee	2.67	2.50	2" ϕ	6x3/8x6	20"x1/2"x2'-0"	0.5	24
	1/4	3.00	3.00	"	"	20"x1/2"x2'-6"	0.7	27
	1/8	2.50	2.00	"	"	20"x1/2"x2'-0"	0.4	16
	1/16	2.00	1.67	"	"	"	0.3	11
	1/32							
12"	Tee	3.50	4.00	3" ϕ	9x3/8x9	20"x1/2"x2'-6"	0.9	43
	1/4	3.00	4.00			20"x1/2"x3'-0"	1.3	55
	1/8	3.50	3.25			20"x1/2"x2'-6"	0.8	33
	1/16	2.50	2.33				0.5	17
	1/32							
16"	Tee	3.75	4.00	3" ϕ	9x3/8x9	20"x1/2"x2'-6"	1.0	44
	1/4	5.50	4.00			20"x1/2"x3'-6"	1.7	56
	1/8	3.50	3.25			20"x1/2"x2'-6"	0.9	30
	1/16	2.50	2.33				0.6	15
	1/32	2.50	2.33				0.6	15
	15°	6.00	2.33	W4x13	12"x1/2"x12"	20"x1/2"x4'-8"	1.3	27
	10°	6.00	2.33				1.3	27
	5°	6.00	2.33				1.3	27
24"	Tee							
	15°	6.00	3.00	W14x13	12"x1/2"x12"	20"x1/2"x4'-8"	1.8	49
	10°	6.00	3.00				1.8	49
	5°	6.00	3.00				1.8	49

✱ Note: Dimensions and Details shown here are for quantity estimating purposes only. Actual construction shall conform to Details to be furnished at the time of construction.

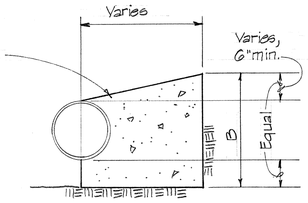


PLAN OF FIRE HYDRANT BLOCK (F.H.)

SECTION C 95



PLAN OF HORIZONTAL BLOCK (H) BOTTOM VERTICAL BLOCK (BV)



SECTION D 95

✱ HORIZONTAL BLOCKS (H) BOTTOM VERTICAL BLOCKS (BV)									
Pipe Size	Bend	A	B	Conc. Quantity	Pipe Size	Bend	A	B	Conc. Quantity
4" or less	Tee	1.33	1.33	0.1	16"	Tee	3.75	4.00	1.0
	1/4	2.00	1.33	0.1		1/4	5.50	4.00	1.0
	1/8	1.25	1.33	0.1		1/8	3.50	3.25	0.6
	1/16					1/16	2.50	2.33	0.2
6"	Tee	1.75	2.00	0.1		1/32	1.33	2.33	0.1
	1/4	2.50	2.00	0.1		1/64	1.00	2.33	0.1
	1/8	2.00	1.50	0.1		15°	1.83	2.33	0.2
	1/16	1.00	1.50	0.1		10°	1.25	2.33	0.1
	1/32					5°	1.00	2.33	0.1
8"	Tee	2.67	2.50	0.3	24"	Tee			
	1/4	3.00	3.00	0.4		15°	3.00	3.00	0.7
	1/8	2.50	2.00	0.2		10°	2.00	3.00	0.4
	1/16	1.50	1.67	0.1		5°	1.00	3.00	0.2
	1/32								
12"	Tee	3.50	4.00	0.8					
	1/4	5.00	4.00	0.9					
	1/8	3.50	3.25	0.6					
	1/16	2.50	2.33	0.2					
	1/32								

APPROVED:

CHIEF, PLANNING & ENGINEERING
BOARD OF WATER SUPPLY — DATE 11/8/77

PAUL T. TANIGUCHI REGISTERED PROFESSIONAL ENGINEER No. 864 HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

WATER DETAILS

PROJECT NO. 93B-01-75, UNIT I
SCALE: NO SCALE DATE:

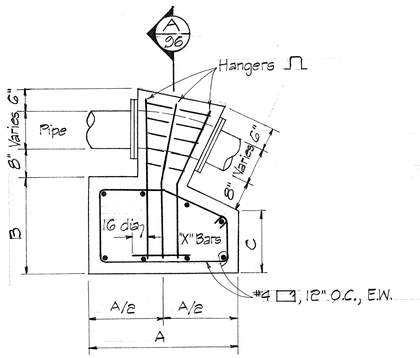
SHEET No. 10 OF 17 SHEETS

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

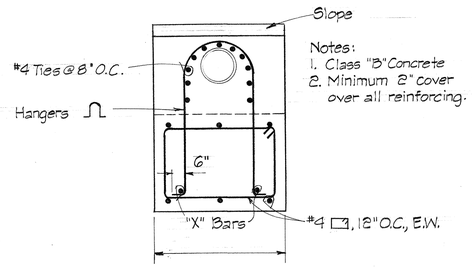
95

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.		1978	96	159

PROJECT NO. 93B-01-75



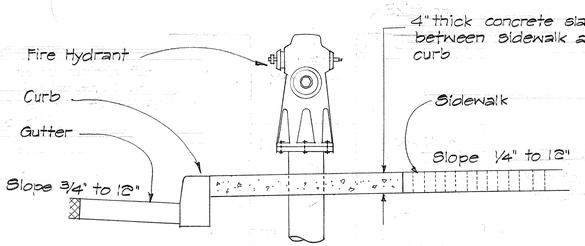
ELEVATION



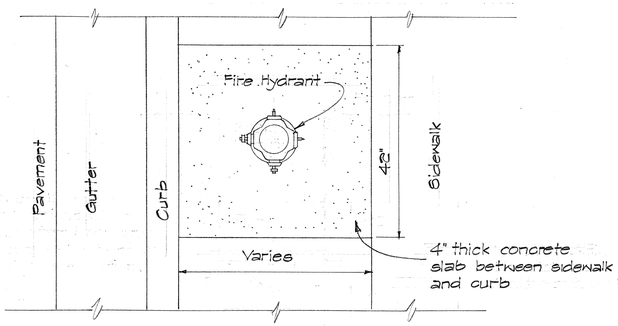
SECTION A 96

TOP VERTICAL BLOCK (TV)

* TOP VERTICAL (TV)									
Pipe Size	Bend	A	B	C	D	Hanger Bar	"X" Bar	QUANTITIES Conc.	Steel
4" or less	1/4	4'-0"	4'-0"	4'-0	2'-0"	2-#4	2-#4	1.3	56 LBS.
	1/8	3'-3"	3'-0"	1'-6"	2'-0"	2-#3	2-#3	0.7	39
	1/16	2'-0"	2'-2"	1'-9"	2'-0"	2-#3	2-#3	0.5	25
	1/32								
6"	1/4	4'-0"	4'-3"	4'-3"	4'-0"	2-#5	2-#5	2.7	106
	1/8	4'-6"	3'-9"	1'-6"	2'-6"	2-#4	2-#4	1.5	60
	1/16	3'-3"	3'-3"	2'-6"	2'-0"	2-#3	2-#3	0.9	45
	1/32								
8"	1/4	4'-9"	5'-0"	5'-0"	4'-9"	2-#6	2-#6	4.4	160
	1/8	4'-8"	4'-8"	2'-4"	3'-6"	2-#5	2-#5	2.7	122
	1/16	5'-2"	3'-6"	2'-6"	2'-0"	2-#4	2-#4	1.4	60
	1/32								
12"	1/4	6'-0"	6'-0"	6'-0"	4'-6"	2-#7	2-#7	6.9	215
	1/8	5'-0"	5'-3"	2'-9"	3'-9"	2-#6	2-#6	3.7	140
	1/16	6'-0"	4'-0"	2'9"	2'-0"	2-#4	2-#4	1.9	88
	1/32	4'-0"	3'-0"	2'-6"	2'-0"	2-#3	2-#3	1.1	50
16"	1/8								
	1/16	5'-3"	4'-6"	3'-6"	3'-0"	2-#6	2-#6	2.8	144
	1/32	4'-0"	2'-10"	2'-6"	3'-0"	"	"	1.5	113
	15°	5'-0"	2'-3"	1'-9"	3'-8"	"	"	2.1	133
	10°	4'-0"	2'-0"	1'-6"	3'-8"	"	"	1.6	110
	5°	3'-0"	1'-8"	1'-6"	3'-8"	"	"	1.3	82
84"	15°	5'-8"	4'-6"	3'-9"	4'-4"	2-#6	2-#6	4.8	182
	10°	5'-0"	3'-0"	2'-6"	4'-4"	"	"	3.2	148
	5°	3'-3"	2'-0"	1'-9"	4'-4"	"	"	1.9	108 LBS.

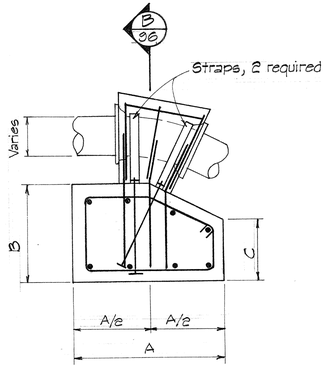


SECTION

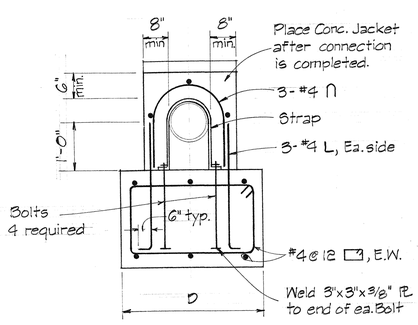


PLAN

DETAIL OF FIRE HYDRANT CONCRETE PAD



ELEVATION

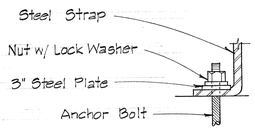


SECTION B 96

TOP VERTICAL BLOCK (TV) W/ STRAPS

* TOP VERTICAL (TV) W/ STRAPS									
Pipe Size	Bend	A	B	C	D	Straps	Bolts	Quantities Conc.	Steel
4" or less	1/4								
	1/8	3'-3"	3'-6"	2'-0"	2'-0"	2" x 1/4"	4 - 1/2"	0.8	50 LBS.
	1/16	3'-0"	2'-6"	2'-1"	2'-0"	2" x 1/4"	4 - 1/2"	0.6	31
	1/32								
6"	1/4								
	1/8	4'-6"	4'-3"	2'-0"	2'-6"	2 1/2 x 1/4"	4 - 1/2"	1.6	76
	1/16	3'-6"	3'-3"	2'-6"	2'-0"	2" x 1/4"	4 - 1/2"	0.9	48
	1/32								
8"	1/4								
	1/8	4'-8"	4'-8"	2'-4"	3'-6"	2 3/4" x 3/8"	4 - 3/4"	2.6	107
	1/16	5'-2"	3'-6"	2'-6"	2'-0"	2 1/2" x 1/4"	4 - 3/4"	1.4	70 LBS.
	1/32								
12"	1/4								
	1/8								
	1/16								
	1/32								
16"	1/8								
	1/16								
	1/32								
	15°								
	10°								
	5°								
84"	15°								
	10°								
	5°								

† For tilted tees, enter table with size and slope of branch.



STRAP DETAIL

Notes:
1. Straps shall conform to A.S.T.M. A-36.
2. Bolts shall conform to A.S.T.M. A-307.
3. Concrete shall be Class "B".
4. Straps, plates and bolts shall be incidental to Class "B" Concrete.

* Note: Dimensions and Details shown here are for quantity estimating purposes only. Actual construction shall conform to Details to be furnished at the time of construction.

APPROVED:

CHIEF, PLANNING & ENGINEERING BOARD OF WATER SUPPLY — DATE 11/8/78

PAUL T. TANIGUCHI REGISTERED PROFESSIONAL ENGINEER No. 864 HAWAII, U. S. A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

WATER DETAILS

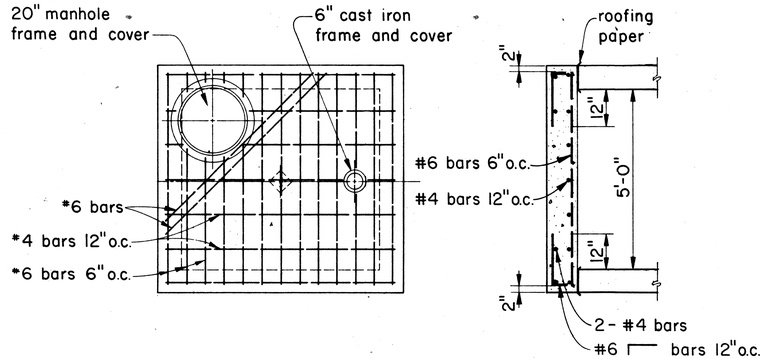
PROJECT NO. 93B-01-75, UNIT I
SCALE: NO SCALE DATE:

SHEET NO. 11 OF 17 SHEETS

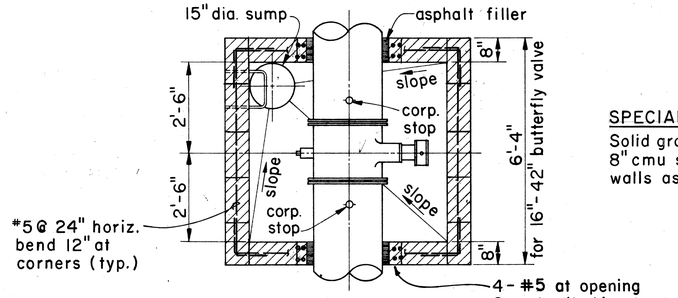
ORIGINAL PLAN | NOTE BOOK No. | SURVEY PLOTTED BY | DRAWN BY | TRACED BY | DESIGNED BY | QUANTITIES BY | CHECKED BY | DATE

96

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	93B-01-75, UNIT I	1983	96S-1	159

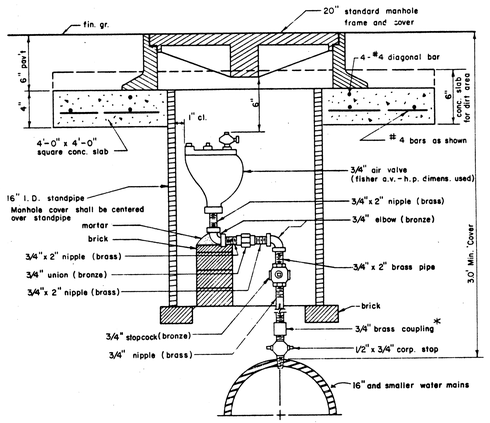


PLAN OF TOP SLAB



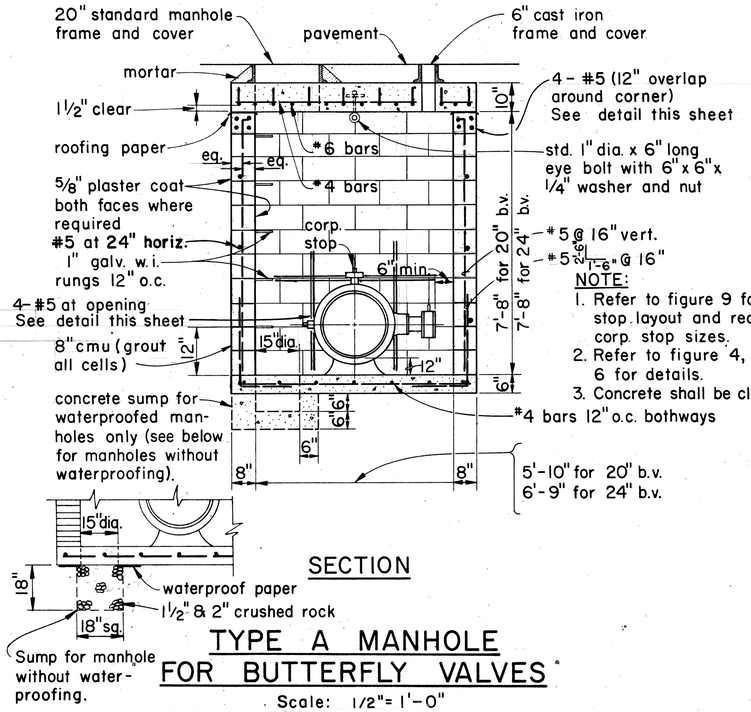
SECTION

SPECIAL NOTE:
Solid grouted and reinforced 8" cmu substituted for 8" brick walls as shown.



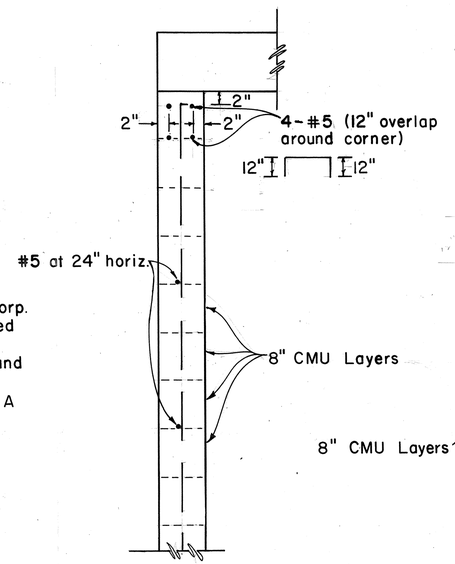
STANDARD CONNECTION FOR
3/4" AIR RELIEF VALVE AT VALVE BOX
NOT TO SCALE

NOTE:
See Figure 41 for installation in manholes.
* Vertical check valve shall be used in lieu of coupling when 3/4" stop cock is immersed in water.

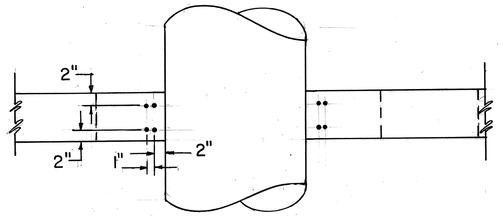


SECTION

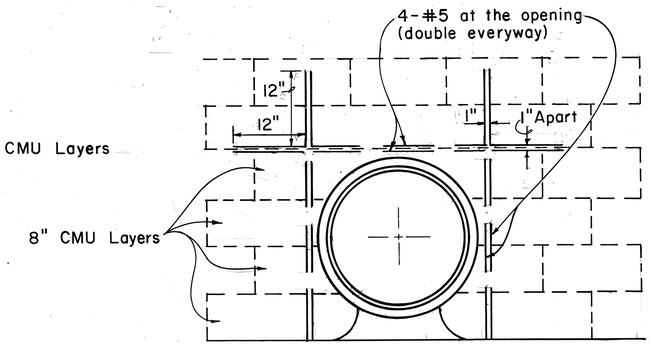
TYPE A MANHOLE
FOR BUTTERFLY VALVES
Scale: 1/2" = 1'-0"



DETAIL AT TOP SLAB
& WALL
Scale: 1" = 1'-0"



TOP VIEW



DETAIL AT PIPE OPENING
Scale: 1" = 1'-0"

THIS TRACING PREPARED DURING "AS-BUILT" POSTING

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

WATER DETAILS

FARRINGTON HIGHWAY WIDENING
LUALUALEI HOMESTEAD RD. TO JADE ST.
PROJ. NO. 93B-01-75, UNIT I

SCALE: AS SHOWN DATE: APRIL, 1983

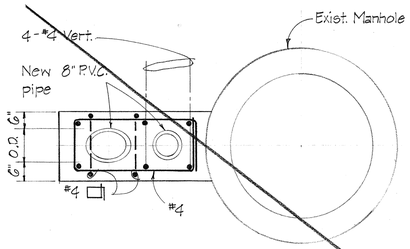
SHEET No. 11A OF 17 SHEETS

96S-1

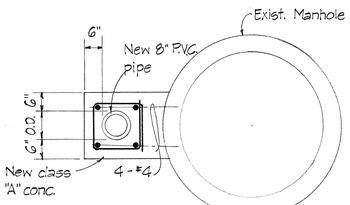
ORIGINAL PLAN | NOTE BOOK | SURVEY PLOTTED BY | DRAWN BY | TRACED BY | DESIGNED BY | QUANTITIES BY | CHECKED BY | DATE | No.

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.		1978	97	155

PROJECT NO. 93B-01-75

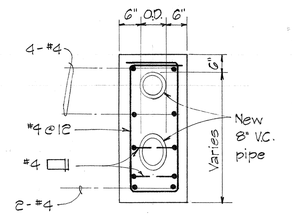


SECTION A 97

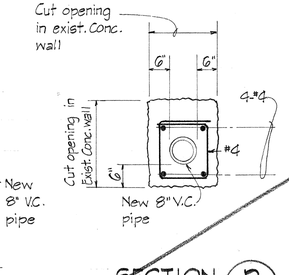


N. I. C.

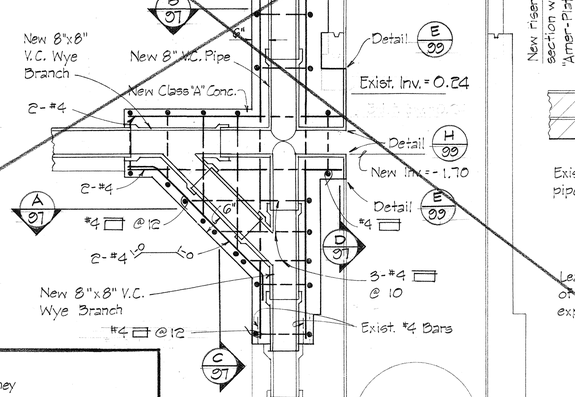
SECTION B 97

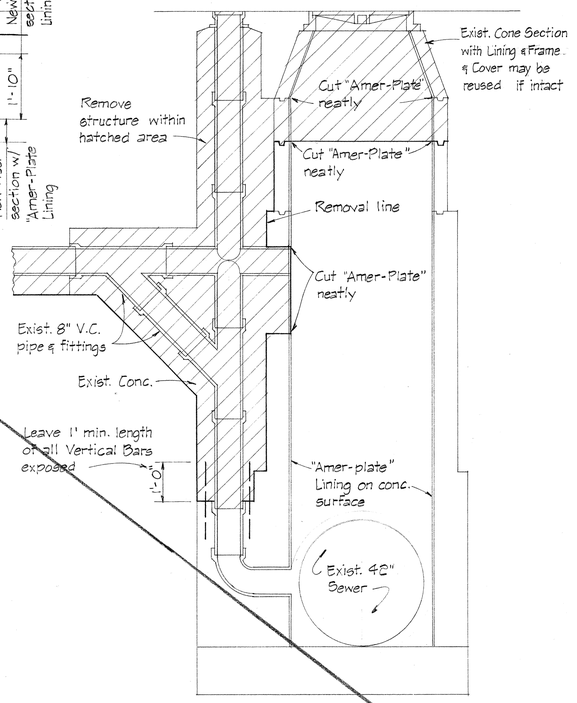


SECTION C 97



SECTION D 97



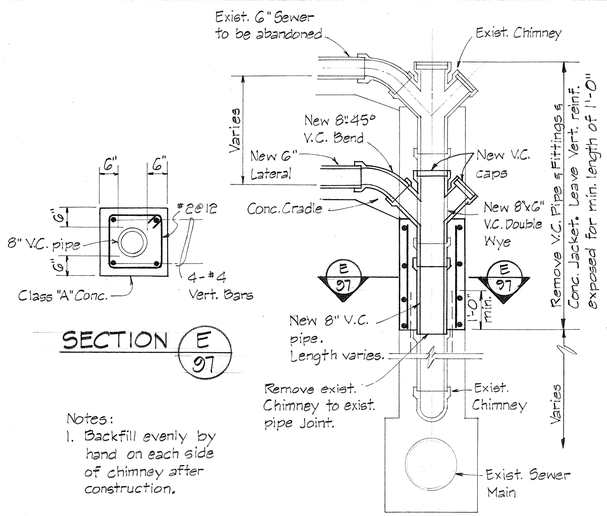


RECONSTRUCTION DETAIL

REMOVAL DETAIL

DETAIL OF RECONSTRUCTED S.M.H. AT STA. 40+40

Note: All work shall be incidental to Reconstructed S.M.H.

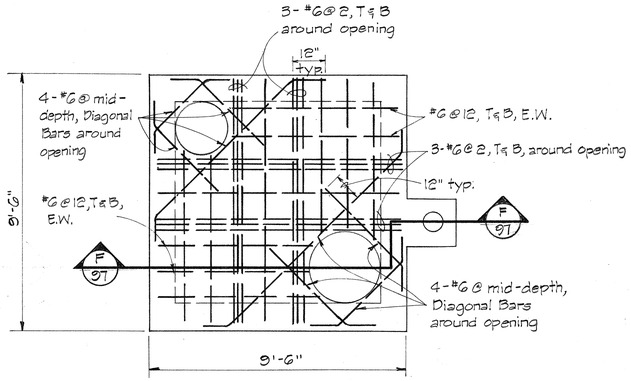


SECTION E 97

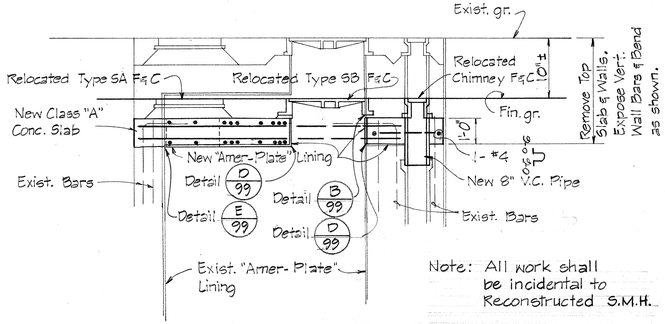
Notes:
1. Backfill evenly by hand on each side of chimney after construction.
2. All work and materials shown shall be incidental to Reconstructed Chimney.

RECONSTRUCTED SEWER CHIMNEY DETAIL

DATE	REVISION
8/06/79	Revised End of Project Station. Deleted Work beyond Sta. 34+00.



PLAN



Note: All work shall be incidental to Reconstructed S.M.H.

SECTION F 97

DETAIL OF RECONSTRUCTED S.M.H. AT STA. 9+95

APPROVED:

Deputy Director & Engineer 4/29/78
CHIEF, DIVISION OF WASTEWATER MANAGEMENT — DATE

PAUL T. TANIGUCHI REGISTERED PROFESSIONAL ENGINEER No. 864 HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

SEWER DETAILS

PROJECT NO. 93B-01-75, UNIT I
SCALE: NO SCALE DATE:

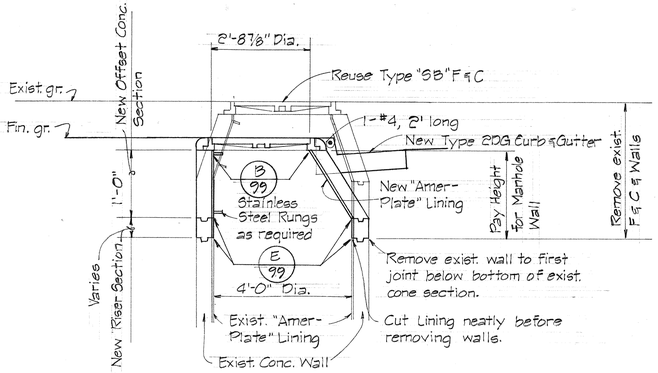
SHEET No. 12 OF 17 SHEETS

C.O. 97

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

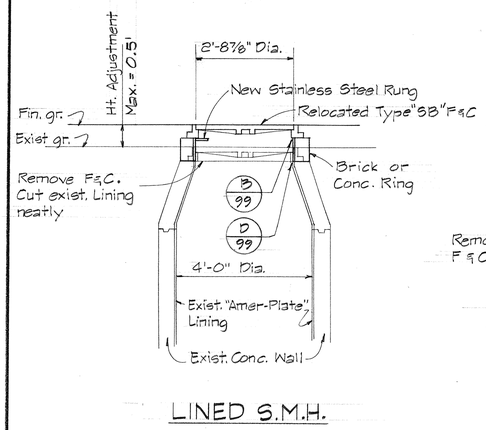
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.		1978	98	159

PROJECT NO. 93B-01-75

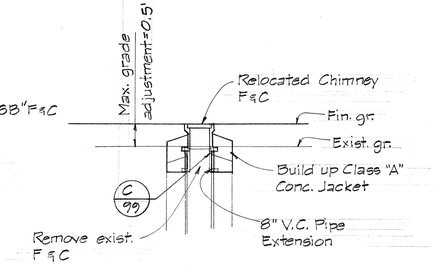


Note:
Details shows condition where manhole is offset and lowered. Detail where manhole is offset and raised shall be similar.

OFFSET LINED S.M.H. DETAILS

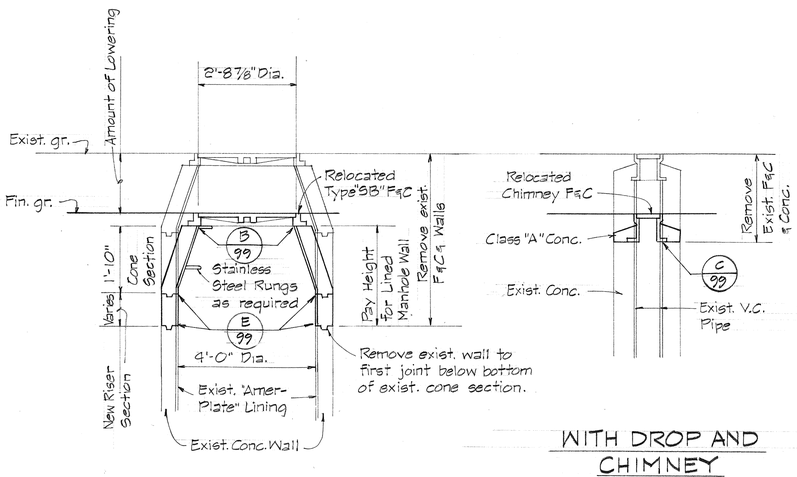


LINED S.M.H.



WITH DROP AND CHIMNEY

LINED S.M.H. ADJUSTMENT DETAILS

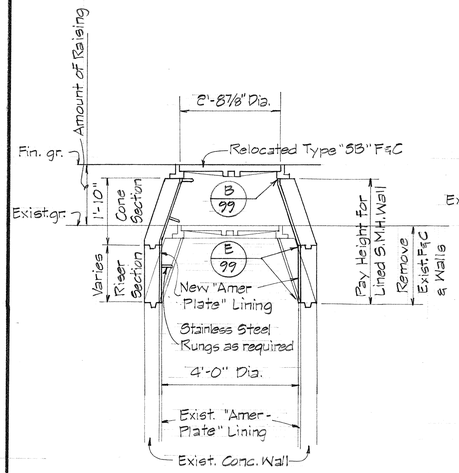


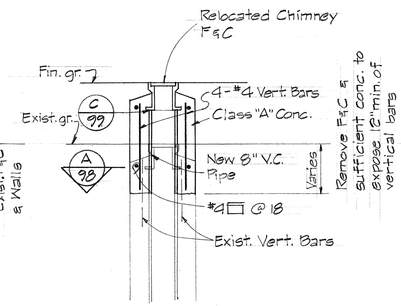
WITH DROP AND CHIMNEY

LINED S.M.H.

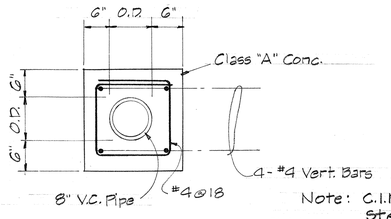
LOWERING

LOWERING LINED S.M.H. D'ETAILS





WITH DROP AND CHIMNEY



SECTION A 98

Note: C.I.P. Conc. & Reinforcing Steel in Chimney shall be incidental to P.C. Wall for Lined Dropped S.M.H.

RAISING

RAISING LINED S.M.H. DETAILS

APPROVED:

George M. Uyeno for 9/29/78
CHIEF, DIVISION OF WASTEWATER MANAGEMENT — DATE

PAUL T. TANIGUCHI REGISTERED PROFESSIONAL ENGINEER No. 864 HAWAII, U. S. A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

Paul T. Taniguchi

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

SEWER DETAILS

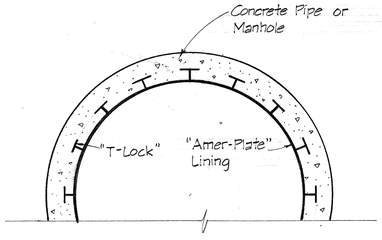
PROJECT NO. 93B-01-75, UNIT I
SCALE: NO SCALE DATE:

SHEET NO. 13 OF 17 SHEETS

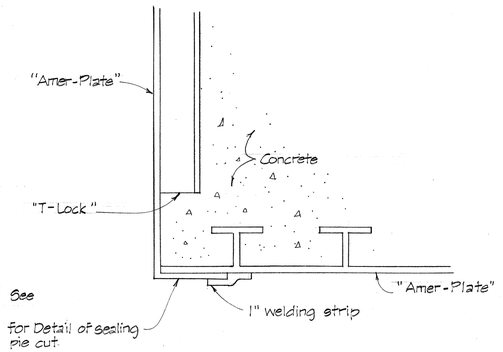
ORIGINAL PLAN | NOTE BOOK | SURVEY PLOTTED BY | DRAWN BY | TRACED BY | DESIGNED BY | QUANTITIES BY | CHECKED BY | DATE | NO.

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.		1978	99	159

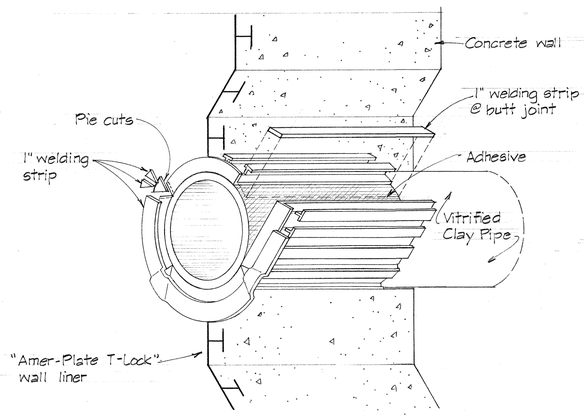
PROJECT NO. 93B-01-75



TYPICAL "AMER-PLATE" LINING
DETAIL A 99

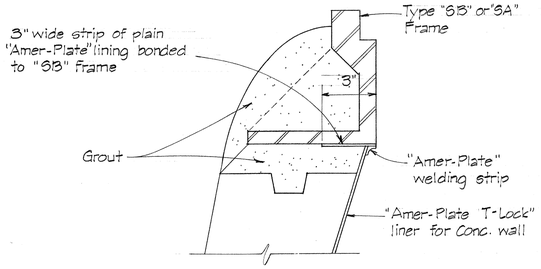


DETAIL D 99

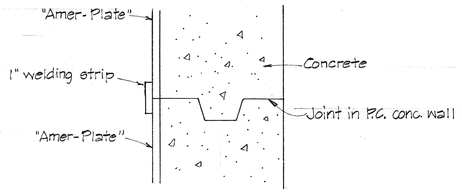


T-lock Amer-Plate lining with end stripped, projected bent and lapped with wall lining as shown. Adhesive bond 4" min. wide strip to V.C.P. for gas tight seal. Butt ends and fuse with welding strip.

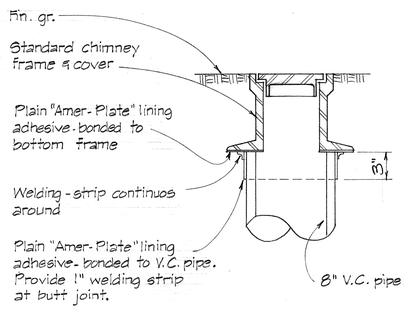
PIPE FLUSH W/ WALL FACE
DETAIL H 99



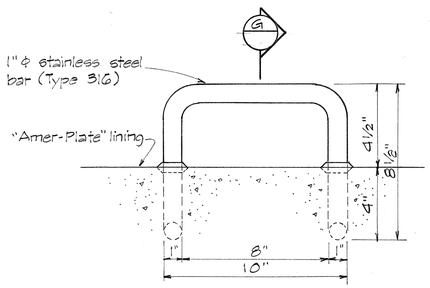
DETAIL B 99



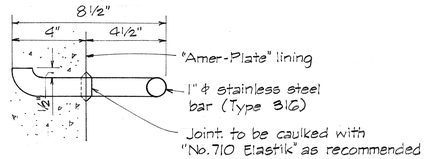
DETAIL E 99



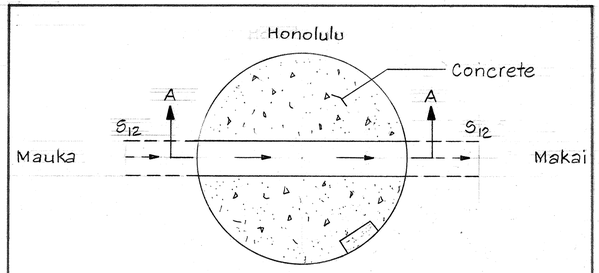
"AMER-PLATE" @ TOP CHIMNEY
DETAIL C 99



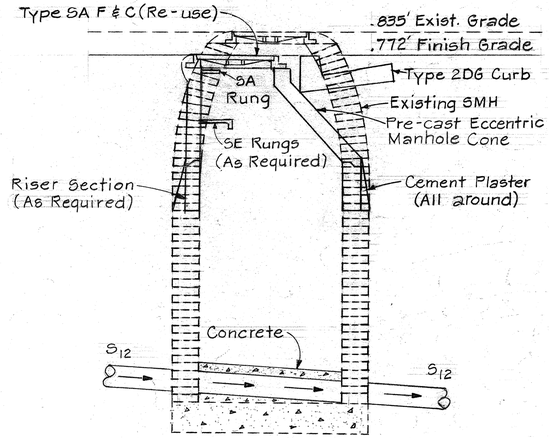
STAINLESS STEEL RUNG
DETAIL F 99



SECTION G 99



PLAN
Not to Scale



SECTION A-A
Scale: ½" = 1'-0"

LOWERING OF SMH AT STA. 20+87
(CCO # 24)

NOTE:
Break top of existing SMH as necessary to install Eccentric Cone and Riser sections and adjust to new finished grade.

APPROVED:

Dean Y. Uyema 9/29/78
CHIEF, DIVISION OF WASTEWATER MANAGEMENT — DATE

PAUL T. TANIGUCHI
REGISTERED PROFESSIONAL ENGINEER
No. 864
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.
Paul T. Taniguchi

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

SEWER DETAILS

PROJECT NO. 93B-01-75, UNIT I
SCALE: NO SCALE DATE:

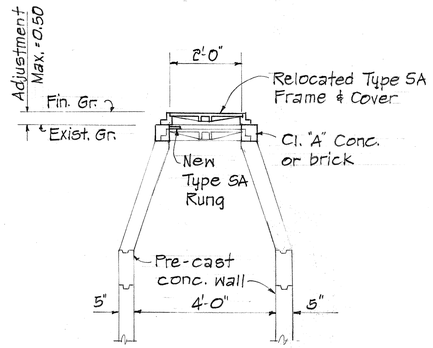
SHEET No. 14 OF 17 SHEETS

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

99

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.		1978	100	159

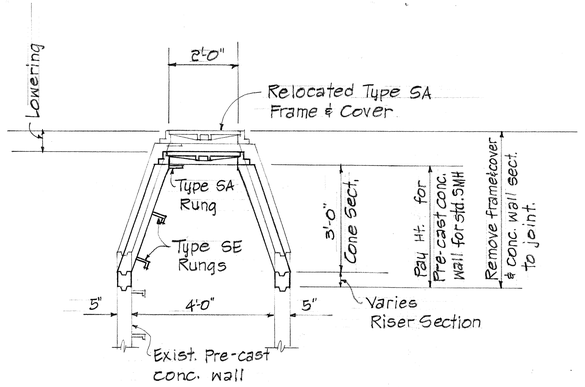
PROJECT NO. 93B-01-75



Note: Rungs shall be incidental to adjusting S.M.H.

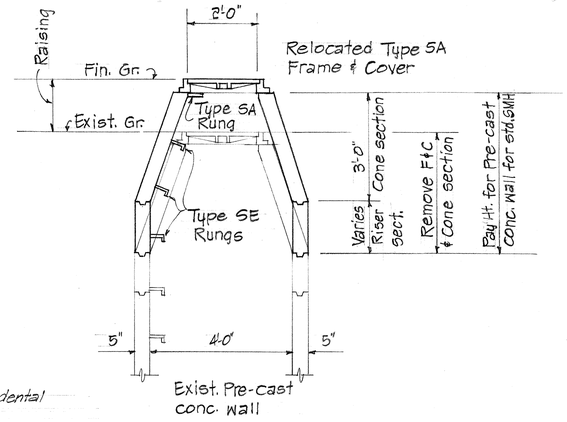
STANDARD PRE-CAST S.M.H. ADJUSTMENT DETAIL

NO SCALE



Note: Rungs shall be incidental to pre-caet concrete wall.

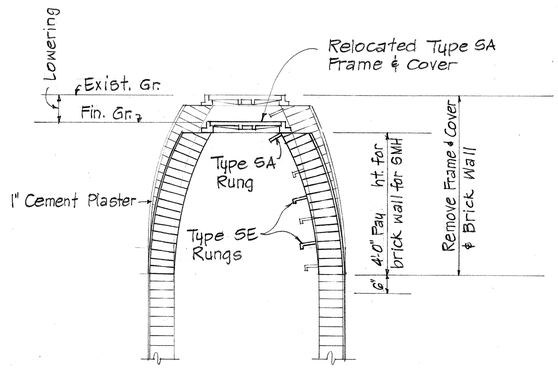
LOWERING



RAISING

STANDARD PRECAST S.M.H. LOWERING & RAISING DETAILS

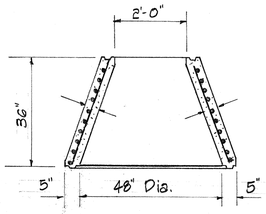
NO SCALE



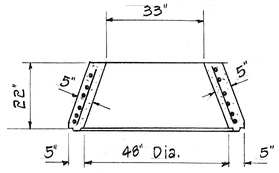
Note: Rungs shall be incidental to brickwall.

STANDARD BRICK S.M.H. LOWERING DETAIL

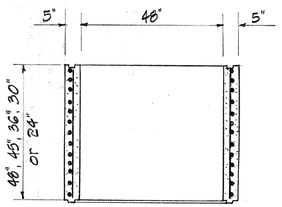
NO SCALE



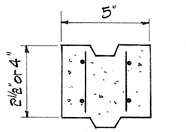
36" CONE



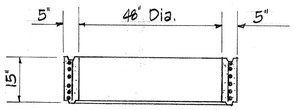
22" CONE



RISER



GRADE RING



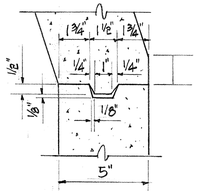
RISER

SECTION	As/L.F.
48"x48" Riser	0.15
45"x45" Riser	0.15
48"x36" Riser	0.15
48"x30" Riser	0.15
48"x24" Riser	0.15
48" x 15" Riser	0.15
48" x 12" Riser	0.15
48"x24"x36" Cone	0.16
48"x33"x22" Cone	0.16
22"x4" Grade Ring	0.12
22"x2 1/8" Grade Ring	0.12

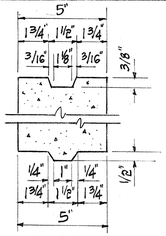
1. Pre-cast sections shall conform to ASTM C 478
2. Manufactures may submit to the Engineer for approval, prior to manufacturing, designs other than those shown above.
3. Where pre-cast sections are used for reconstructing Lined manholes, lining shall be cast integrally with the pre-cast concrete sections.

STANDARD PRE-CAST MANHOLE WALL

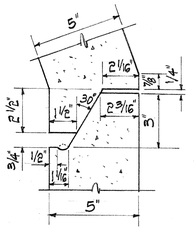
NO SCALE



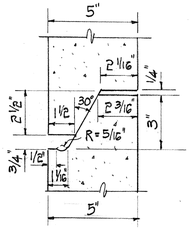
CONE SECTION



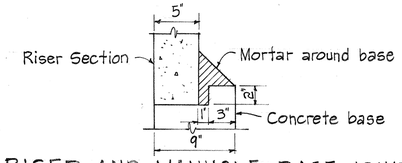
RISER SECTION



CONE SECTION
(Alternate Detail)



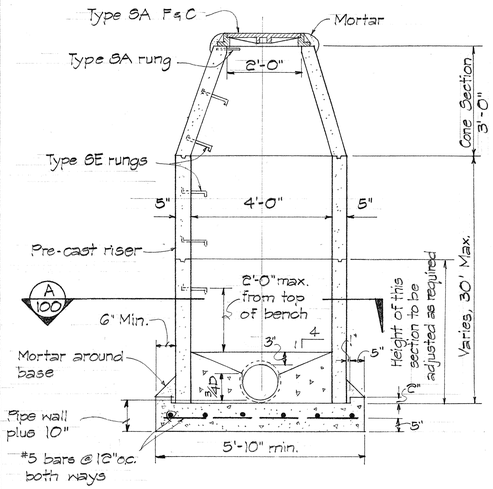
RISER SECTION
(Alternate Detail)

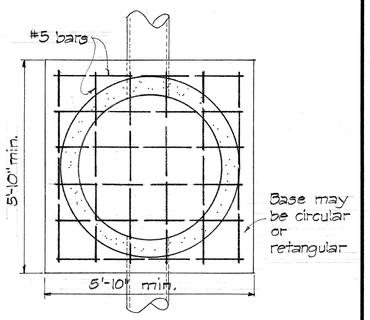


RISER AND MANHOLE BASE JOINT

STANDARD PRE-CAST MANHOLE WALL JOINTS

NO SCALE





SECTION A 100

APPROVED:

CHIEF, DIVISION OF WASTEWATER MANAGEMENT — DATE 9/29/78

STANDARD PRE-CAST MANHOLE

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

PAUL T. TANIGUCHI
REGISTERED PROFESSIONAL ENGINEER
No. 864
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

SEWER DETAILS

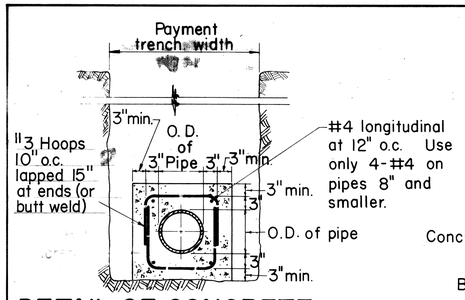
PROJECT NO. 93B-01-75, UNIT I
SCALE: AS SHOWN DATE:

SHEET No. 15 OF 17 SHEETS

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

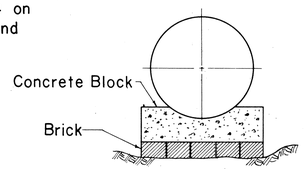
100

PROJECT NO. 93B-01-75	FED. ROAD DIST. NO.	STATE	FED AID PROJ NO	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
	HAWAII	HAWAII		1978	101	159



DETAIL OF CONCRETE JACKET FOR PIPES 12" AND SMALLER

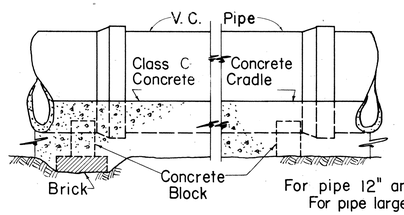
Scale: 3/4" = 1'-0"



METHOD OF USING BRICKS UNDER CONCRETE BLOCKS

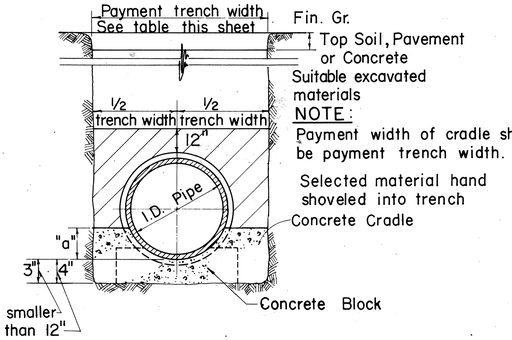
Not To Scale

Contractor shall set Concrete Blocks on undisturbed ground. Where ground is too low, the contractor shall not heap up dirt under the Concrete Block but use Concrete Bricks to take up the deficiency, scraping away beneath Concrete Block to give sufficient room for Brick.



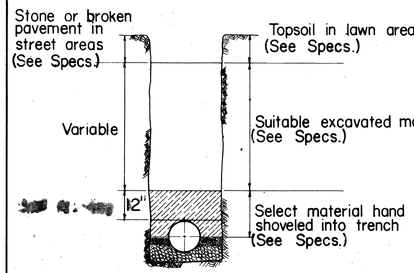
ELEVATION SHOWING METHOD OF LAYING PIPE

Not To Scale



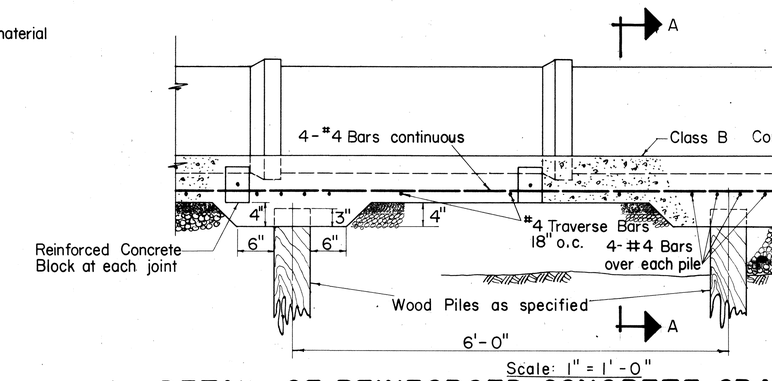
CONCRETE CRADLE FOR VITRIFIED CLAY PIPE

Not To Scale

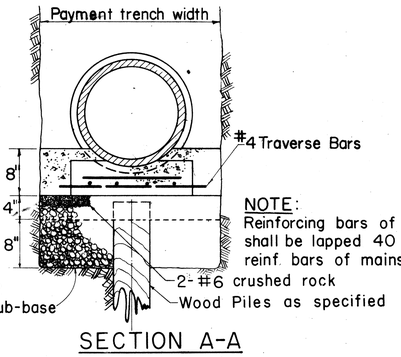


METHOD OF BACKFILL

Not To Scale



Scale: 1" = 1'-0"

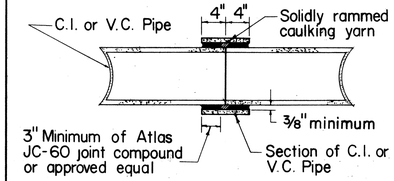


SECTION A-A

DETAIL OF REINFORCED CONCRETE CRADLE ON WOOD PILES (FOR 6, 8, 10 & 12 IN. V.C. PIPE)

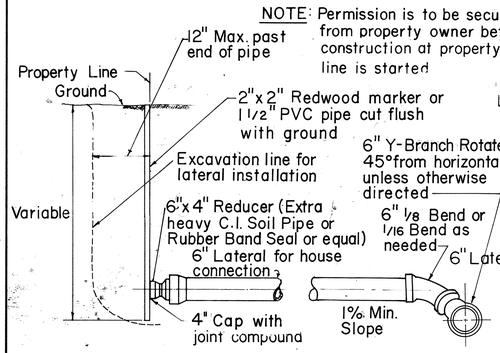
DETAIL OF REINFORCED CONCRETE CRADLE WITHOUT PILES SIMILAR EXCEPT FOR WOOD PILES AND PILE CAPS

NOTE:
Reinforcing bars of laterals shall be lapped 40 dia. to reinf. bars of mains.

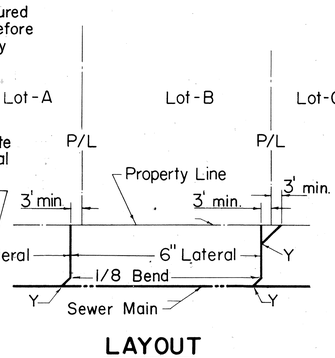


BUTT JOINT DETAIL

Scale: 1" = 1'-0"



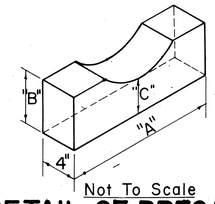
DETAIL AT PROPERTY LINE AND AT MAIN LINE



LAYOUT

CONSTRUCTION OF LATERALS

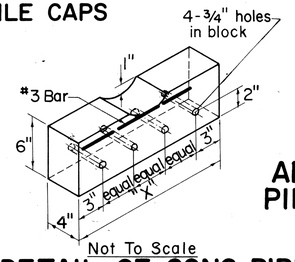
Not To Scale



Not To Scale

DETAIL OF PRECAST CONC. PIPE BLOCK

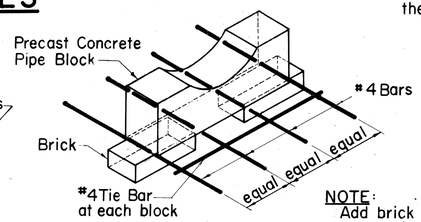
CONCRETE BLOCK DIMENSIONS			
PIPE SIZE	"A"	"B"	"C"
6"	1'-2"	6"	3"
8"	1'-5"	6"	3"
10"	1'-7"	6"	3"
12"	1'-7"	6"	3"
15"	1'-8"	6"	4"
18"	1'-9"	6"	4"
21"	1'-10"	6"	4"
24"	1'-11"	6"	4"
27"	2'-0"	6"	4"
30"	2'-3"	6"	4"



Not To Scale

DETAIL OF CONC. PIPE BLOCK FOR REINF. CRADLE

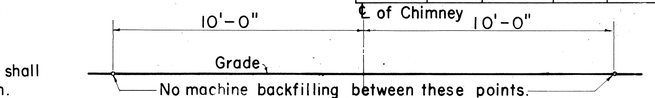
DIM. OF REINF. CONC. BLOCK	
PIPE SIZE	"X"
6"	1'-6"
8"	1'-6"
10"	1'-8"
12"	1'-8"
15"	1'-10"
18"	1'-10"
21"	1'-10"
24"	2'-0"
27"	2'-0"
30"	2'-0"



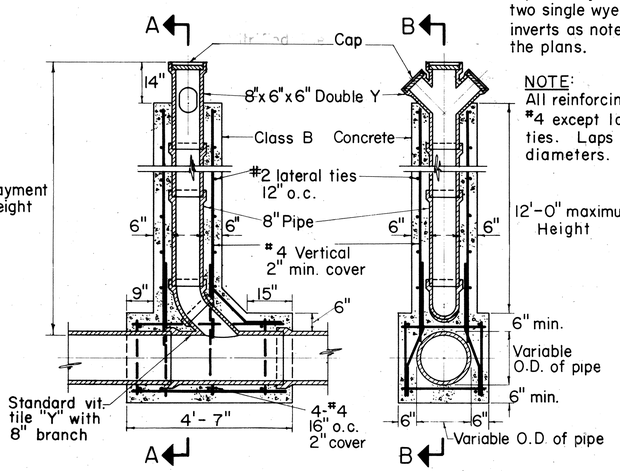
NOTE:
Add brick for larger size pipe

Not To Scale

ALTERNATE DETAIL OF CONC. PIPE BLOCK FOR REINF. CRADLE



Double "Y" may be replaced by one or two single wyes with inverts as noted on the plans.



NOTE:
All reinforcing rods #4 except lateral ties. Laps 40 diameters.

SECTION B-B

SECTION A-A

DETAILS OF CHIMNEY

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

Payment quantities for trench excavation, crushed rock fill, crushed rock cradle, and crushed rock sub-base shall be computed using payment trench widths as shown in the table of "Trench Widths". No payment shall be made for excess quantities resulting from trench widths greater than the payment trench widths shown.

VITRIFIED CLAY PIPE TABLE

TRENCH WIDTHS		DIM. OF CONC. CRADLE		
PIPE SIZE	PAY. WIDTH	PIPE SIZE	"a"	WIDTH
6"	24"	6"	3"	24"
8"	24"	8"	3"	24"
10"	24"	10"	3"	24"
12"	30"	12"	3"	30"
15"	38"	15"	4"	38"
18"	41"	18"	5"	41"
21"	45"	21"	5"	45"
24"	50"	24"	6"	50"
27"	53"	27"	7"	53"
30"	57"	30"	7"	57"

APPROVED:

George M. Lepma for 9/29/78

CHIEF, DIVISION OF SEWERS — DATE

WASTEWATER MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION
DIVISION OF SEWERS
CITY & COUNTY OF HONOLULU

STANDARD DETAILS

SEWERS - CONCRETE JACKET & MISCELLANEOUS DETAILS

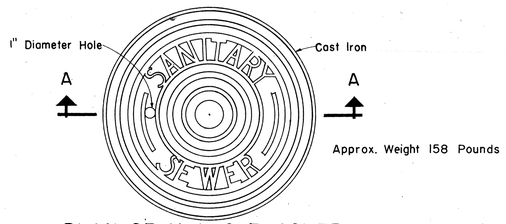
Scales: As Noted — Date:

SHEET NO. 16 OF 17 SHEETS

IMPERIAL 190 K & E CO., N.Y. ® TRADE MARK

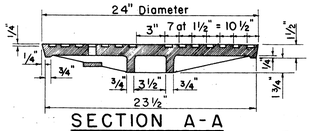
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO	TOTAL SHEETS
HAWAII	HAWAII		1978	102	159

PROJECT NO. 93B-01-75



PLAN OF MANHOLE COVER

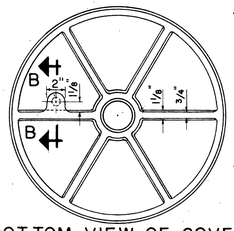
Scale: 1 1/2" = 1'-0"



SECTION A-A

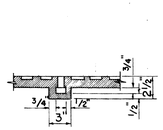
Scale: 1 1/2" = 1'-0"

NOTE:
This cover is used with the "SA" or "SD" frame

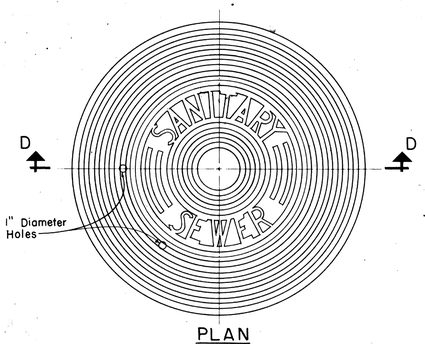


BOTTOM VIEW OF COVER

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



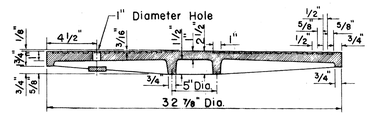
SECTION B-B



PLAN

SPECIAL MANHOLE COVER

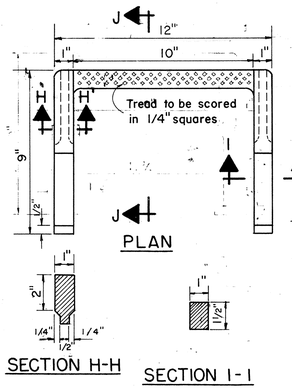
Scale: 1 1/2" = 1'-0"



SECTION D-D

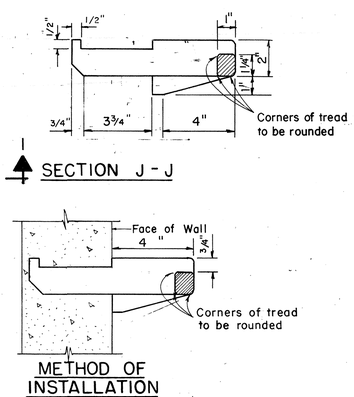
Scale: 1 1/2" = 1' 0"

Approx. Weight 260 Pounds



SECTION H-H

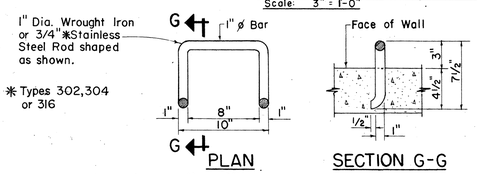
SECTION I-I



METHOD OF INSTALLATION

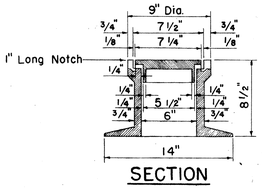
TYPE "SE" MANHOLE RUNGS (CAST IRON OR DUCTILE IRON)

Scale: 3" = 1'-0"



TYPE "SA" MANHOLE RUNGS

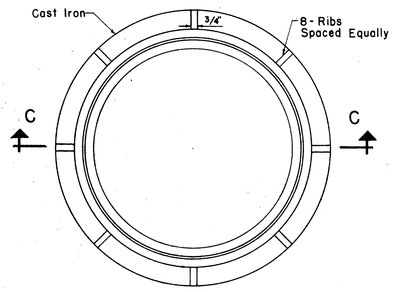
Scale: 1 1/2" = 1'-0"



SECTION

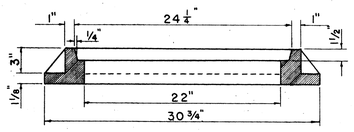
DROP MANHOLE CHIMNEY CASTINGS

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



PLAN OF MANHOLE FRAME

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

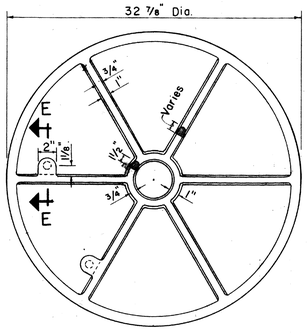


SECTION C-C

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

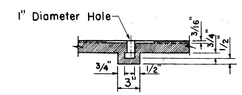
TYPE "SA" SEWER MANHOLE FRAME AND COVER

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



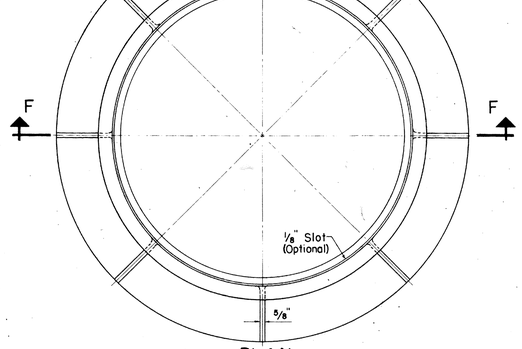
BOTTOM VIEW OF COVER

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



SECTION E-E

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

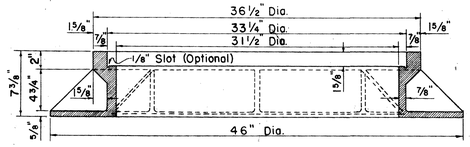


PLAN

SPECIAL MANHOLE FRAME

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

Approx. Weight 480 Pounds



SECTION F-F

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

TYPE "SB" SEWER MANHOLE FRAME AND COVER

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

APPROVED:

George Y. Uyeyama 9/29/78

CHIEF, DIVISION OF WASTEWATER MANAGEMENT — DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION
DIVISION OF SEWERS
CITY & COUNTY OF HONOLULU

STANDARD DETAILS

SEWERS - MANHOLE RUNGS, CHIMNEY CASTINGS AND FRAME AND COVER DETAILS

Scales: As Noted Date:

SHEET NO. 17 OF 17 SHEETS

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE 11-5-65
	DRAWN BY	
	TRACED BY	
NOTE BOOK	DESIGNED BY	
No.	QUANTITIES BY	
	CHECKED BY	

IMPERIAL TRACING CLOTH 10-68

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