FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	M-7600(1)	1978	100	198

GENERAL UTILITY NOTES (ALL UTILITIES)

1. The Contractor shall be liable for damage to any existing utility and structure.
2. The existence and location of underground utilities, appurtenances and structures as shown on the plans are based on existing records of varying degrees of accuracy and completeness. They are not guaranteed as to the location shown or that other obstacles may not be encountered in the course of work. The Contractor shall assume that existing utilities may exist, although not shown.
3. Restoration of existing pavements and improvements unavoidably demolished due to work on utility reconstructions shall be incidental to the various contract items. Restoration shall be to original or better condition.
4. The Contractor shall give all property owners five (5) days notice before entering into their respective properties.

TELEPHONE NOTES
(HAWAIIAN TELEPHONE CO., LTD.)

1. The Contractor shall give HTCo., in writing, at least 20 working days advance notice of intent to commence work on the Telephone System.
2. Existing telephone facilities shown on these plans are approximate only. The Contractor shall verify their actual location and shall make adjustments to the proposed facility as directed by HTCo.
3. HTCo. will coordinate its work with the Contractor in such a manner as to expedite construction.
4. Stake-out of new manholes, pullboxes, ducts, poles and anchors shall be done by the Contractor.
5. All manholes, pullboxes and ducts shall be installed by the Contractor.
6. Telephone ducts encased in concrete jacket shall be inspected and approved by HTCo. before concrete placement. Advance notice of at least 24 hours shall be given before placing concrete.
7. Poles, anchors, and cables will be removed by HTCo.
8. HTCo. to furnish the Contractor for proper installation, all manhole frames and covers, all pullbox sections and covers, all pulling irons, cable racks, bolts, nuts, washers and ground rods for installation in manholes, pullboxes; all ducts, fittings and spreaders, except as shown on Plans.
9. Stations and Offsets to new manholes, pullboxes, and poles are to the center of the facilities.
10. All underground ducts shall be encased in plain concrete jacket for Telephone Lines "B", "D", "E" & "F" Telephone Lines "A" & "C" shall be direct burial.
11. Excavation and backfill for splice pits for the Wolfe Cable and Signal Corps Cable shall be incidental to excavation and backfill for the cables.

GAS NOTES (GASCO, INC.)

1. The Contractor shall give GASCo, Inc., in writing at least 14 calendar days advance notice of intent to commence work on the Gas System.
2. The Contractor shall verify the exact locations and depths of existing gas lines prior to start of construction operations. The Contractor shall call Gasco. Inc. a minimum of 48 hours before starting excavation to arrange for field location of all exist. gas pipe lines. The telephone number is 548-2126 during business hours, and 548-2123 after hours.
   The Contractor shall excavate and backfill around gas pipe lines in the presence of a Gasco. Inc. representative. All backfill within six inches of gas line shall be select cushion material approved by Gasco. Inc.
3. For relocation of any gas pipe line, the Contractor shall notify Gasco. Inc. 5 working days before starting work. The Contractor shall provide the necessary excavation and backfill, arrange for traffic permits and restore sidewalk pavement or other improvements. The Contractor shall perform all necessary excavation for new gas lines untill the new lines are in service.
4. The Contractor shall furnish all materials, labor and equipment for performing all necessary excavation, backfill, and concrete work necessary for the installation of new gas pipes in trench and adjustments to existing gas pipes and appurtenances. Gasco. will provide all materials, labor and equipment for the installation of the gas line in trenches, including fabrication, welding, and testing.
5. All existing gas facilities shall remain in place until all new facilities are installed and pressurized into service. All costs for temporary relocation required during construction shall be borne by the Contractor.
6. The Contractor shall be extremely careful when working near gas pipe lines.
7. The Contractor shall notify Gasco, Inc. immediately after any damage has been caused to exist. gas pipelines, their coatings or their cathodic protection devices. Repair work on this damage will be done by Gasco, Inc. with payment for this work to be borne by the Contractor.
8. Minimum vertical or horizontal clearance between gas pipe lines and other pipelines, conduits, or ductlines shall be 12 inches. Adequate support and protection for gas pipe lines exposed in the trench shall be provided. Such support and protection will be approved by Gasco, Inc. If this clearance cannot be attained, the gas line shall be protected with a Gasco, Inc. - Approved insulation material furnished and installed by the Contractor, and the work must be approved by Gasco, Inc.
9. The Contractor shall work in an expeditious manner in order to keep uncovered gas pipe lines exposed for as short a period of time as possible.

ELECTRIC NOTES
(HAWAIIAN ELECTRIC CO., INC.)

1. The Contractor shall give HECo. in writing at least 20 working days advance notice of intent to commence work on the Electric System.
2. All existing facilities shall remain in place until the proposed facilities are installed. Existing electric facilities shown on these plans are approximate only. The Contractor shall verify their actual locations and shall make adjustments to the proposed facility as directed by HECo.
3. HECo. will coordinate its work with the Contractor in such a manner as to expedite construction.
4. All materials required for the relocation and rearrangement of the HECo.'s overhead facilities will be furnished by HECo.
5. The Contractor shall furnish and install all materials to complete construction of the underground ductline system, including riser conduits. All electric ducts shall be encased in concrete jacket unless otherwise specified. All ducts and conduits shall be inspected and approved by HECo. prior to placing concrete. The Contractor shall notify HECo's Inspection Division (Phone 548-4428) at least 24 hours prior to placing concrete.
6. Location and depth of all handholes and manholes shall be verified and approved in the field by HECo. prior to excavation, construction or installation.
7. The Contractor is to mandrel test all ductlines in the presence of HECo's Inspector prior to acceptance.
8. Excavation of pole holes and anchors, installation of poles and anchors, and backfill of pole holes and anchors will be done by HECo. Stake out of wood pole and anchor locations to be done by the Contractor and verified by HECo.
9. Electric duct banks shall enter and leave manholes at zero percent slope for a minimum distance of ten feet.
10. For anchor stake out details see HECo. Project Dwg. No. 25503. HECo. to provide Contractor with HECo. Project Dwg No. 25503.
11. Stations and Offsets to new manholes, handholes and poles are to the center of the facilities.
12. Location and depth of Transformer Concrete Pad for Lighting System shall be verified and approved in the field by the State Engineer prior to excavation, construction and installation.

ANTHONY R. D'ALESSIO
REGISTERED PROFESSIONAL ENGINEER
No. 2934
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

Meig T. Kawamoto — 7/6/78
Hawaiian Electric Co., Inc. — Date

R S Yamada — 6/26/78
Hawaiian Telephone Co. — Date

Roy H. Yoshimoto — 4/12/78
Gas Co., Inc. — Date

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

GENERAL UTILITY NOTES

FORT WEAVER ROAD
ROUTE H-1 TO SOUTH OF
FARRINGTON HIGHWAY

DATE: AUG. 1978

SHEET No. 14 OF 334 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	M-7600(1)	1978	101	198

BOARD OF WATER SUPPLY

1. Unless otherwise specified, all materials and construction of the water system facilities and appurtenances shall be in accordance with the Standard Specifications for Road and Bridge Construction, dated 1976, and as amended, of the Hawaii Highways Division, Department of Transportation.
2. The Contractor shall give the Board of Water Supply in writting, at least one-week advance notice of intent to commence work on the water system.
3. Prior to excavating for other new utility lines, the Contractor shall verify in the field the location of existing water mains and appurtenances. Where other new 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.
4. Unless otherwise specified, concrete cylinder pipe class 150, shall be used for reconstructed 30-inch water main & ductile iron pipe class 52 or concrete cylinder pipe class 150 shall be used for 24-inch water Lines
5. The Contractor shall expose all existing underground utilities and structures prior to excavation of pipeline trench and manufacturing of pipe.
6. All shown information for connections to existing water mains shall be verified in the field by the Contractor and shall be adjusted as necessary.
7. Concrete cylinder pipe stored at the job site or at the Contractor's storeyard shall be additionally water cured untill installed and backfilled in the trench.
8. There shall be a minimum horizontal clearance of 3 feet, and a minimum vertical clearance of 6 inches, between water mains and other utilities.
9. Pipe test pressure is 150 psi.
10. 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.
11. Payment for all cleanouts shall be considered incidental to various contract items in the proposal.
12. Plans approved by the Board of Water Supply are based solely on the adequacy of the water supply. Discrepancies, if any, of alignments, grades, fittings, etc., are the responsibility of the Engineer who prepared the plans.
13. 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".
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. Connections to existing mains shall not be made during normal working hours.
16. The Contractor shall coordinate all work within the reservoir site with the representative of the Board of Water Supply.
17. Payment for Polyethylene Encasement will not be made directly but shall be included in the various items for the installation of water mains.

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

LEGEND FOR UTILITY DRAWINGS

New Facilities	———
Existing Facilities to remain	— — — —
Existing Facilities to be : Removed, demolished, abandoned or relocated when new lines are in service	- - - - - - - - - -
Telephone - Underground (HTCo.)	——TU——
Telephone - Aerial (HTCo.)	——TA——
Electric - Underground (HECo.)	——EU——
Electric - Aerial (HECo.)	——EA——
Water (BWS)	——W30"——
Gas (Gas Co. Inc.)	——G16"——
Oil Line (HIRI)	——Oil10"——
Lighting-Underground	——LU——
Pole Anchor	⟵
Telephone Manhole	TMH
Electric Manhole	EMH
Electric Pole & Pole Number (HECo)	HE105
Pull box	PB
Water Manhole	WMH
Water Valve Box	WV
Signal Corps	SC
Drain	D
Plan Detail of HECo Poles, Location & Size of Risers	Pole; Riser Size (inches)
Telephone Pole & Pole Number (HTCo.)	P36T
Electric Handhole	EHH

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

ANTHONY R. D'ALESSIO — REGISTERED PROFESSIONAL ENGINEER — No. 2934 — HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

GENERAL UTILITY NOTES AND LEGEND

FORT WEAVER ROAD
ROUTE H-1 TO SOUTH OF
FARRINGTON HIGHWAY

DATE: AUG. 1978

SHEET No. 24 OF 331 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	M-7600(1)	1978	102	198

E 489,500 N 80,250 N 80,000 N 79,750 N 79,500 E 489,250

Existing Wolfe Cable to remain

Existing Telephone Line (Aerial) to remain

P-4 ELEV. 153.3

P-7 ELEV. 115.24

P-2 ELEV. 204.6

EXISTING RAMP KE

HONOWAI STREET

SEE SHEET NO. 103

EXISTING KUNIA ROAD

C-3 ELEV. 1180

C-5 ELEV. 1324.4

C-2 ELEV. 1478.2

NORTHBOUND

SOUTHBOUND

KUNIA ROAD

FORT WEAVER ROAD

INTERSTATE ROUTE H-1

FORT WEAVER ROAD PROJECT NO. BEGIN RAMP KA-1 STA. 57+77.64

EXISTING RAMP KA

CONC. CURB

R/W Line

MATCH LINE

WAIPAHU ELEV. 205.39

P-3 ELEV. 149.7

P-6 ELEV. 103.54

HE 167
Sta. 67+51.74' Rt.

WATER LINE "A"
See sheet 108
for Plan & Profile

Begin Telephone Line "A"
FWR Sta. 63+52±,
77' Rt.
Excav. Splice Pit 5'x 7'

TELEPHONE LINE "A" (WOLFE)
3060 L.F.± (HTCo.)

E 488,000 E 487,750 E 488,750

N 79,750 N 79,500 N 79,250 N 79,000 N 78,750

ORIGINAL PLAN

SURVEY PLOTTED BY
DRAWN BY
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY
DATE

NOTE BOOK
No.

G.J. Yamada
Hawaiian Telephone Co.
4/26/78
Date

ANTHONY R. D'ALESSIO
REGISTERED PROFESSIONAL ENGINEER
No. 2934
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

UTILITIES PLAN
FORT WEAVER ROAD
STA. 57+77.64 TO STA. 70+00.00

FORT WEAVER ROAD
ROUTE H-1 TO SOUTH OF
FARRINGTON HIGHWAY

SCALE : AS SHOWN DATE : AUG. 1978

SHEET NO. 34 OF 331 SHEETS

102

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	M-7600(1)	1978	103	198

N.79,000 N.78,750 N.78,500 N.78,250 N.78,000 N.77,750

E.489,250 E.489,000 E.488,750 E.489,500 E.489,750

Existing Telephone to be relocated 1'-6" from R/W line to Center of Pole

Existing Telephone Poles to be relocated 1'-6" from R/W line to Center of Poles

Existing Telephone Line (Aerial) to remain

Existing Water Handholes & Manholes to be adjusted

Existing Water Handhole to be adjusted.

WAIPAHU STREET

LEOLUA STREET

PARKING

POOL CONC.

Pool Conc.

R/W Line

EXISTING KUNIA ROAD

Exist. 12" Water

New Type B Manhole over Existing 12" Valve (BWS, C&C Honolulu Std.)

NORTHBOUND

FORT WEAVER ROAD

SOUTHBOUND

KUNIA ROAD

RAMP D

SEE SHEET NO. 102

SEE SHEET NO. 105

MATCH LINE

MATCH LINE

HE 168
FWR Sta. 70+75, 74' Rt.

HE 169
Ramp D Sta. 10+25, 33' Rt.

HE 170
Ramp D Sta. 13+45, 28' Rt.

HE 171
Ramp D Sta. 16+30, 41' Rt.

HE 172
Ramp D Sta. 19+17, 42' Rt.

FWR Sta. 83+50
153' Rt.
Excav. Splice Pit 5'x7'

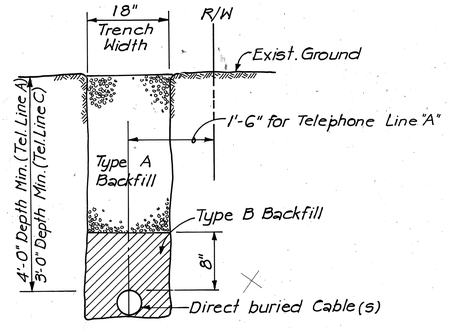
Existing Wolfe Cable to be abandoned.

FWR Sta. 73+42
77' ± Rt.
Excav. Splice Pit 5'x7'

WATER LINE "A"
See Sheet 108
for Plan & Profile

TELEPHONE LINE "A" (WOLFE)
3060 L.F. ± (HTCo.)

P-6 ELEV. 103.54
P-8 ELEV. 94.56
P-9 78.4 ELEV. 78.05
P-12 ELEV. 73.47
C-4 ELEV. 74.24



TYP. TRENCH DETAIL FOR TELEPHONE LINES "A" & "C"
N.T.S.

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

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.
G. K. D'Alessio

ANTHONY R. D'ALESSIO REGISTERED PROFESSIONAL ENGINEER No. 2934 HAWAII, U.S.A.

Chief, Planning & Engineering, BWS — 6/8/78 Date

Hawaiian Electric Co., Inc. — 12/11/78 Date

Hawaiian Telephone Co. — 6/26/78 Date

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

UTILITIES PLAN
FORT WEAVER ROAD
STA. 70+00.00 TO STA. 85+00.00

FORT WEAVER ROAD
ROUTE H-1 TO SOUTH OF FARRINGTON HIGHWAY

SCALE: AS SHOWN DATE: AUG. 1978

SHEET No. 40 OF 331 SHEETS

103

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	M-7600(1)	1978	104	198

Date	Revision
1-12-79	Revised 5" PVC to 5" G.S. as per Addendum No. 1.

NOTE:
16" Water Main installed by BWS Job No. 80-39 Part "A". For profile see Plan Sheet No. 1045-1. For additional details on water main installation see copy of BWS plans on file with this project.

*NOTE 'A': Provide minimum 3' cover for all Electric Duct Lines
Exist. Water Valve Boxes replaced with Type A Manhole
End 30" Water Line "B" Sta. 16+31 ±
= ℄ Ramp E Sta. 17+44, 10' Lt.
Connect to Exist. 30" Main.
1-30" 8° Bend
1-Conc. Block w/ Struct. Strut
1-Temp. Cleanout with Cap for Testing
1-30" Butt Strap
8 L.F. 30" Conc. Cyl. Pipe Class 150

WATER LINE "B"
30-inch. Conc. Cylinder Pipe

TMH #6, Corner Small Type Sta. 48+45, 87 Lt. ±
End Electric Line "C" Break 1-3"℄ 1-5" Ducts into EMH #4

EHH #3 (2'x4')
Farr. Sta. 48+73, 68' Lt.
5 L.F. - 3-4" Ducts
3-4" 90° Bend to Exist. Pole

EHH #1 (2'x4')
Farr. Sta. 50+73.5, 68' Rt.

EMH #808 Type 4 (7'x16')
Farr. Sta. 50+30, 51' Lt.

Permit required 48 hours prior to excavation in area of Exist. 10-inch Oil line from: Supt. of Maint. & Construction, Hawn. Independent Refinery Inc. (682-4505)

CAUTION
400# High Pressure Gas Line
Hand dig to expose Gas line before excavating w/ Machinery

Permit required 48 hours prior to excavation in area of exist. 10-inch Oil Line from: Supt. of Maintenance & Construction, Hawn. Independent Refinery Inc. (682-4505)

CAUTION
400# High Pressure Gas Line
Hand dig to expose Gas line before excavating w/ Machinery

30" WATER NOTES:
1. For Typical Thrust Block Plate Detail at Water Line "B" Sta. 16+31, See "Water System Standards" Figure 50, March 1977, BWS, C & C of Honolulu.
2. Other relevant Std. Details from "Water System Standards are Fig. 54 & 56.
3. Contractor shall excavate to determine exact location of connection points to exist. main prior to fabrication of pipe fittings.

Chief, Planning & Engineering, BWS — Date 6/5/78
Hawaiian Electric Co., Inc. — Date 12/1/78
Hawaiian Telephone Co. — Date 6/6/78
Gas Co., Inc. — Date 4/12/78

ANTHONY R. D'ALESSIO REGISTERED PROFESSIONAL ENGINEER No. 2934 HAWAII, U.S.A.
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

UTILITIES PLAN
FORT WEAVER ROAD
STA. 85+00.00 TO STA. 94+50.00
FARRINGTON HIGHWAY
STA. 34+00.00 TO STA. 51+00.00

FORT WEAVER ROAD
ROUTE H-1 TO SOUTH OF FARRINGTON HIGHWAY

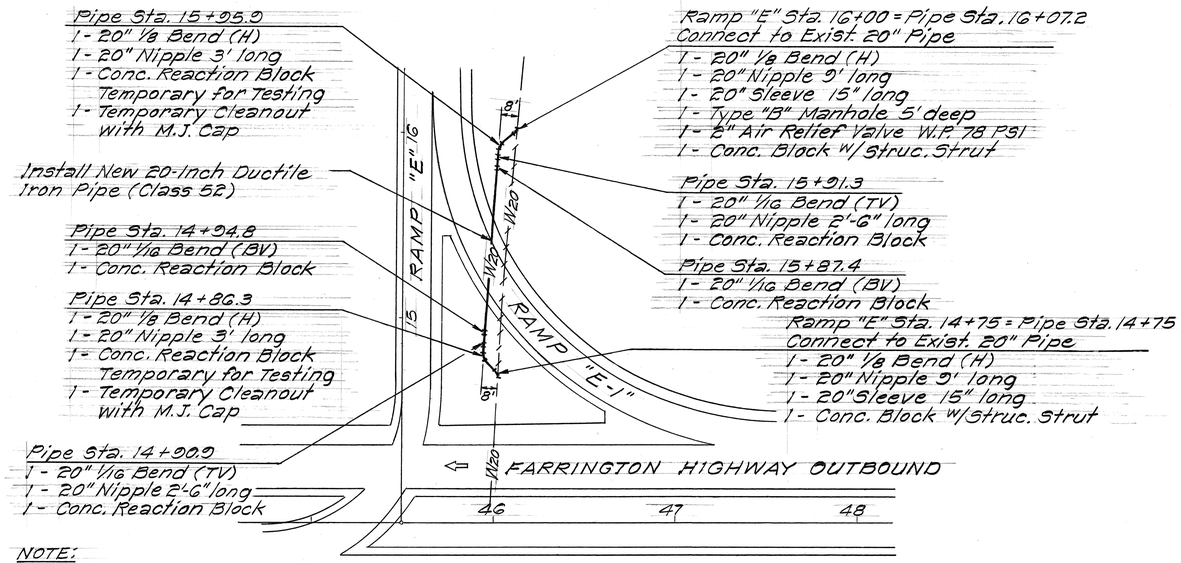
SCALE: 1" = 50' DATE: AUG. 1978

SHEET No. 50 OF 330 SHEETS

104R

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

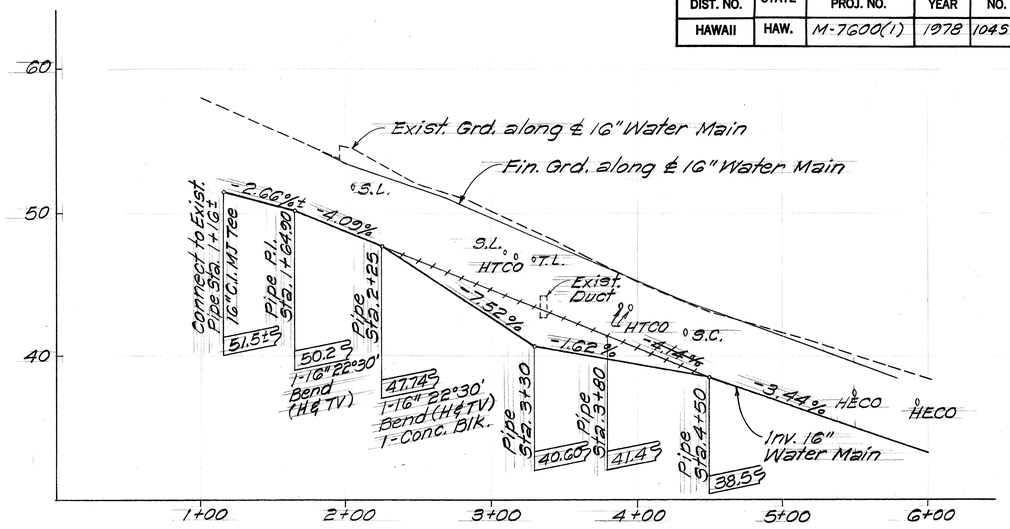
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	M-7600(1)	1978	1045-1	198



NOTE:
Pipe Stations are computed along the slope of the pipe

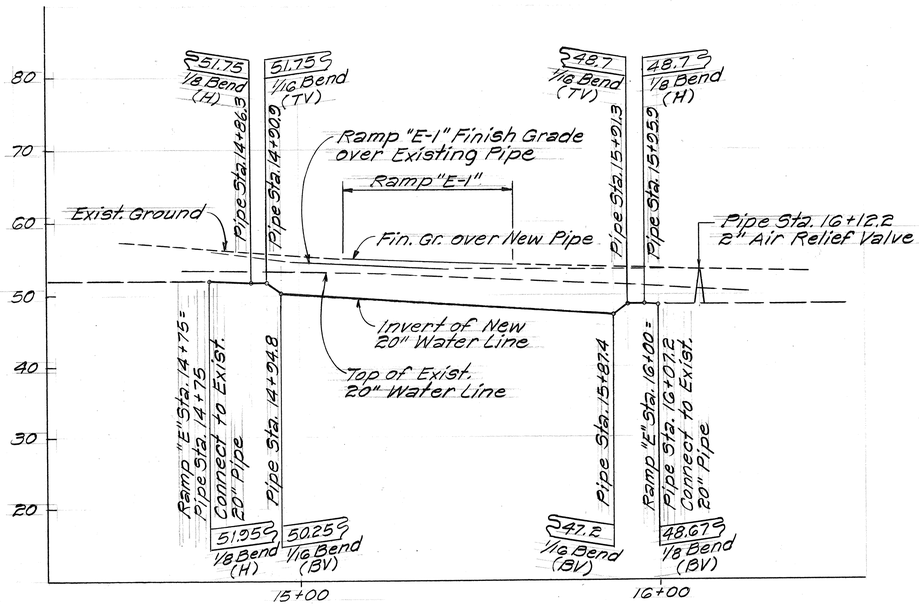
PLAN
LOWERING OF 20" WATER LINE
RAMP "E" STA. 14+75 TO 16+00

Scale: 1" = 40'



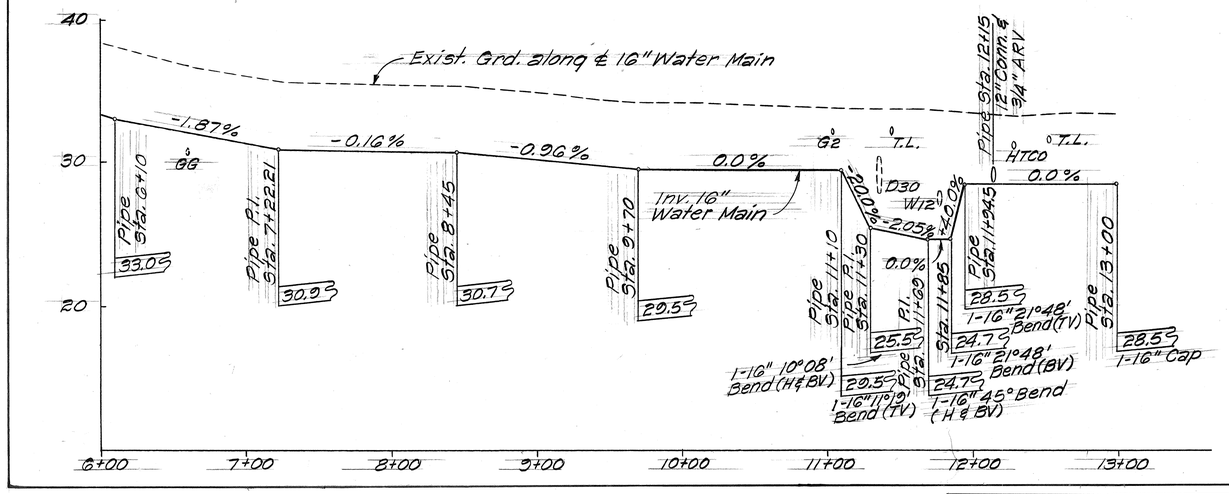
NEW 16" WATER MAIN
B.W.S. JOB NO. 80-39 PART "A"

Scale: Horiz. 1" = 50'
Vert. 1" = 5'



PROFILE OF NEW 20" WATER LINE

Scale: Horiz. 1" = 20'
Vert. 1" = 10'



THIS TRACING PREPARED DURING "AS-BUILT" POSTING

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION

UTILITIES PLAN

FORT WEAVER ROAD
ROUTE H-1 TO SOUTH OF FARRINGTON HIGHWAY

SCALE: As Shown DATE: August, 1981

SHEET No. OF SHEETS

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

104 S-1

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	M-7600(1)	1978	105	198

E. 488,000 E. 488,250 E. 488,500 E. 488,750

N. 76,250 N. 76,000 N. 75,750

N. 77,500 N. 77,250

E. 488,750 E. 489,000 E. 489,250

SUGAR CANE

FORT WEAVER ROAD

FARRINGTON HIGHWAY

DIRT ROAD

DITCH

CURB

GUTTER

SIGN

WMH

HTCo MH # 12

CONC. FLUME

FLUME, 8' HIGH ON WOODEN STAND

30" PIPE

HTCo CABLE MARKER

CABLE GATE

IRRIGATION VALVE

IRRIGATION VALVE BOX

BROKEN A.C. ROAD

R=250'

R=750'

C-3 ELEV. = 84.06

2-018 CONC. CATCH BASIN

Permit required 48 hours prior to excavation in area of exist. 10-inch Oil Line from : Supt. of Maintenance & Construction, Hawn. Independent Refinery Inc. (682-4505)

BEGIN PROJECT NO. FARRINGTON HIGHWAY STA. 33+00 (OUTBOUND)

Begin Telephone Line "B"
Farr. Sta. 25+17± (I.B.), 88' Rt.
Break into Exist. TMH w/2-4" Ducts

2-4" Ducts
478 L.F. (HTCo)

CAUTION
400# High Pressure Gas Line
Hand dig to expose Gas line before excavating w/Machinery

TELEPHONE LINE "B"

TMH # 1, Type A-3-G
Farr. Hwy Sta. 31+86± (I.B.), 15' Rt.
See Sheet 116 for Details
Demolish Existing TMH and Existing concrete envelope

6-4" Ducts
402 L.F. (HTCo.)

30' Energy Corridor

MATCH LINE - SEE SHEET NO. 104

Farrington Highway (O.B.)

Farrington Highway (I.B.)

BEGIN PROJECT NO. FARRINGTON HIGHWAY STA. 33+00 (INBOUND)

ANTHONY R. D'ALESSIO
REGISTERED PROFESSIONAL ENGINEER
No. 2934
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

R. Yamada
Hawaiian Telephone Co.

6/26/78
Date

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

UTILITIES PLAN
FARRINGTON HIGHWAY
STA. 33+00.00 TO STA. 34+00.00

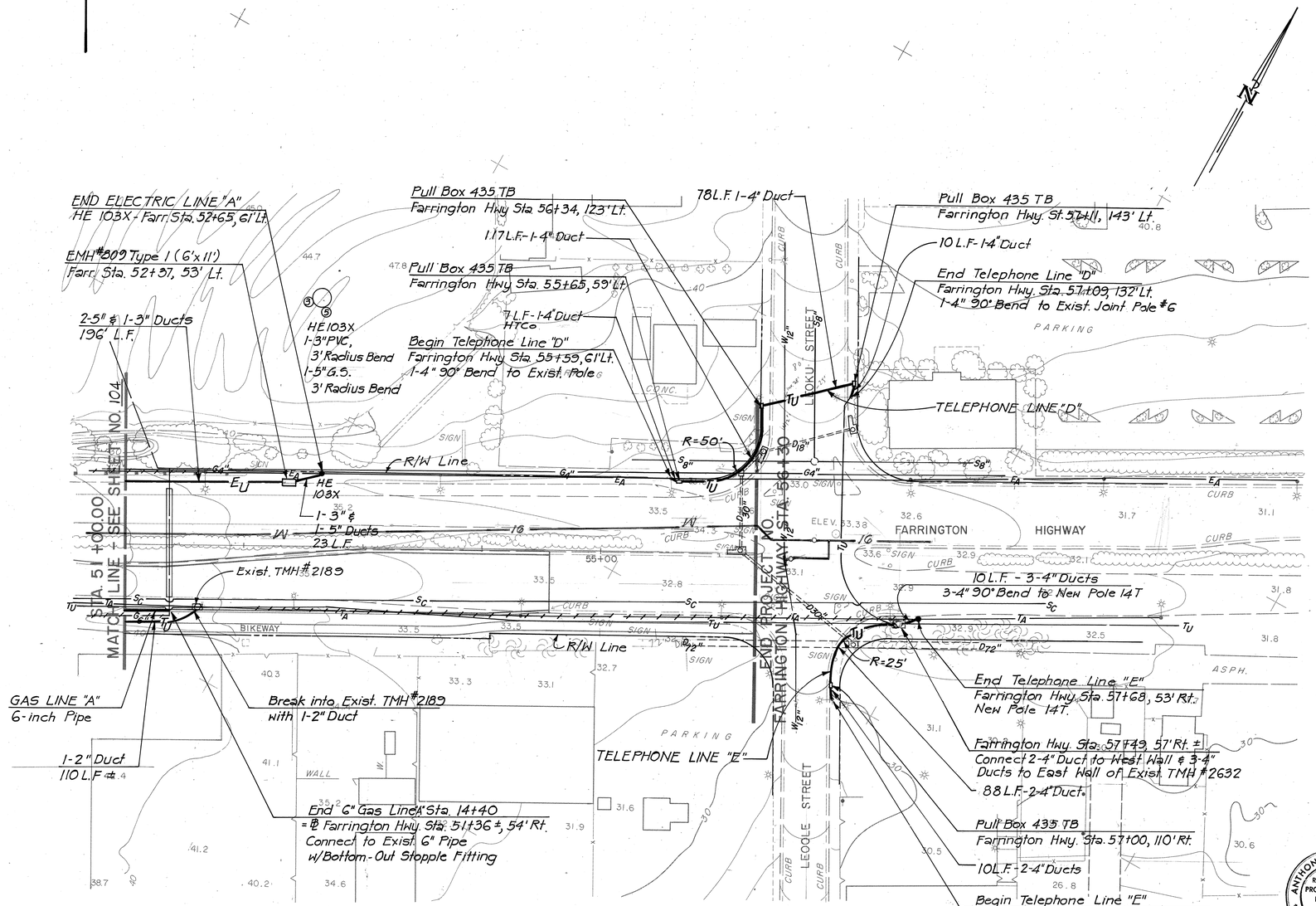
FORT WEAVER ROAD
ROUTE H-1 TO SOUTH OF FARRINGTON HIGHWAY

SCALE : 1" = 50' DATE: AUG. 1978

SHEET NO. 64 OF 334 SHEETS

Date	Revision
1-12-79	Revised EMH number and 5"PVC to 5" G.S. as per Addendum No. 1.

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	M-7600(1)	1978	106	198



NOTE:

16" Water Main installed by BWS Job No. 80-30 Part "A". For profile see Plan Sheet No. 104S-1. For additional details on water main installation see copy of BWS plans on file with this project.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

ANTHONY R. D'ALESSIO
REGISTERED PROFESSIONAL ENGINEER
No. 2934
HAWAII, U.S.A.

J Karamoto Hawaiian Electric Co., Inc.	7/6/78 Date
Hawaiian Telephone Co.	6/26/78 Date
Ray H. Yoshimoto Gas Co. Inc.	4/12/78 Date

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

UTILITIES PLAN
FARRINGTON HIGHWAY
STA. 51+00.00 TO STA. 56+30.00

FORT WEAVER ROAD
ROUTE H-1 TO SOUTH OF FARRINGTON HIGHWAY

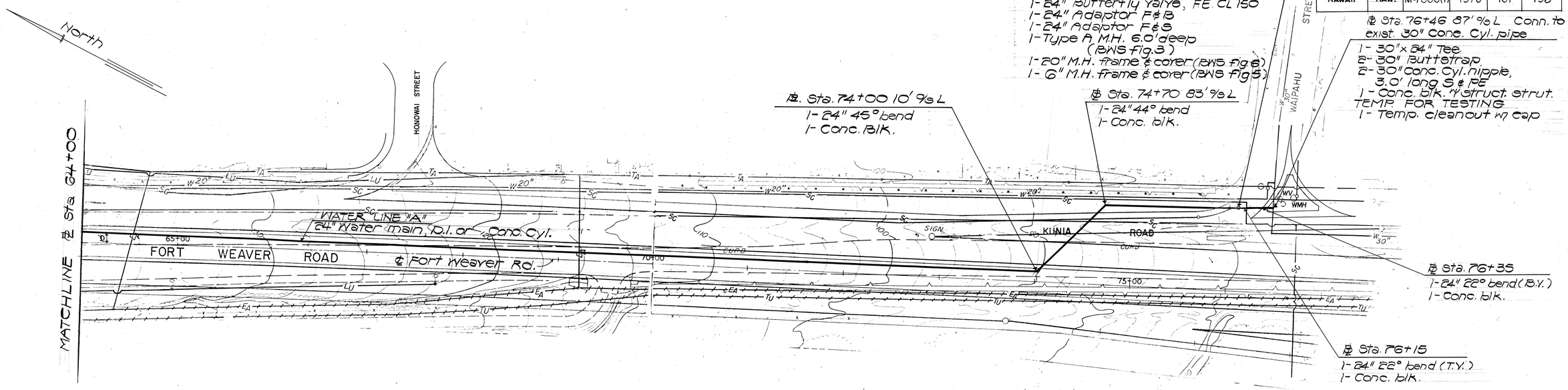
SCALE: 1" = 50' DATE: AUG. 1978

SHEET NO. 74 OF 331 SHEETS

106R

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	M-7600(1)	1978	107	198

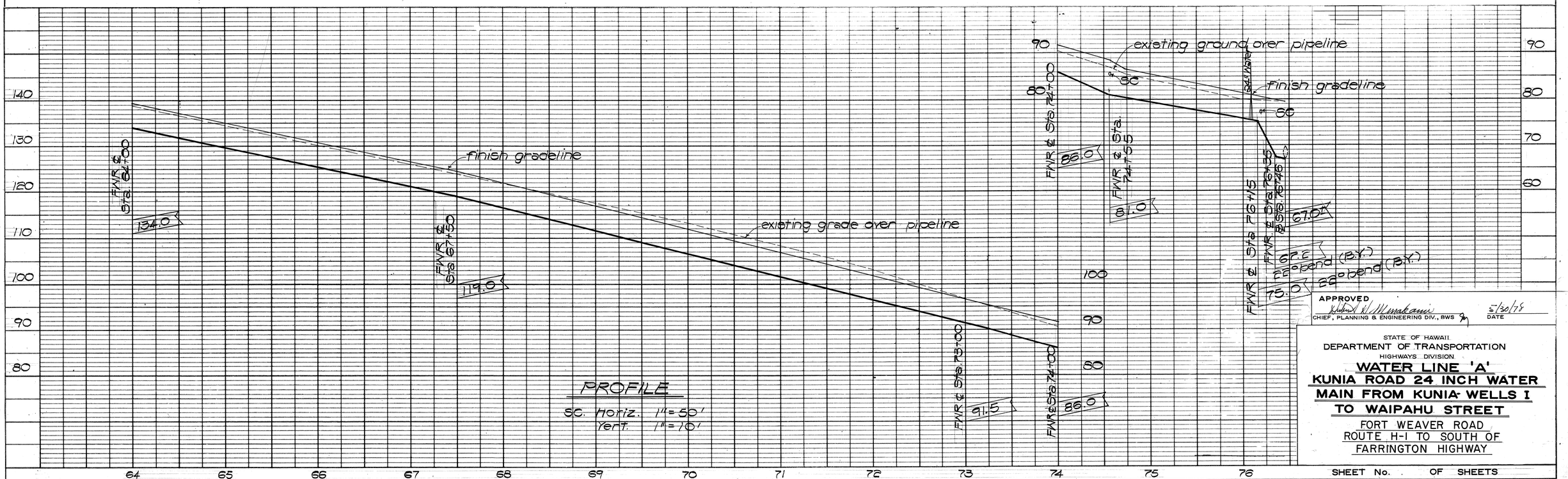
PLAN	DATE
SURVEYED	BY
PLOTTED	
ALIGNMENT CHECKED	
RE. BY MAT CHECKED	
NOTE BOOK	
NO.	



PLAN

Scale 1"=50'

PROFILE	DATE
SURVEYED	BY
PLOTTED	
GRADES CHECKED	
BE. BY MAT CHECKED	
NOTE BOOK	
NO.	STRUCTURE NOTATNS CK'KD.



PROFILE

Sc. Horiz. 1"=50'
Vert. 1"=10'

APPROVED

Nobumi K. Miwakami
CHIEF, PLANNING & ENGINEERING DIV., BWS

5/30/78
DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

WATER LINE 'A' KUNIA ROAD 24 INCH WATER MAIN FROM KUNIA WELLS I TO WAIPAHU STREET

FORT WEAVER ROAD
ROUTE H-1 TO SOUTH OF FARRINGTON HIGHWAY

SHEET No. OF SHEETS

107

PLATE I—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.	M-7600(1)	1978	108	198

Sta. 0+00
Conn. to exist. main

KUNIA RESERVOIR SITE

2- 20"x20" Tee
1- 20" Butterfly valve FE Cl. 150
1- 20" sleeve, 15" long
8- L.F. 20" D.I. pipe C.I. 52
1- Type A M.H. 9.0' deep (BWS Fig 3)
1- 20" M.H. frame & cover (BWS Fig 6)
1- 6" M.H. frame & cover (BWS Fig 5)
2- Conc. blk. (1'W strut strut)
2- 20" D.I. Adaptor F&B
1- 24"x20" Reducer S.S.
Bell end of 24" Conc. Cyl. pipe to fit D.I. pipe O.D. 25.80"
TEMP FOR TESTING
1- Temp. cleanout w/ M.J. cap

Pipeline Sta. (-) 0+17
1- 20" 1/32 bend (B.Y.)
1- Conc. Blk.

Check Valve Assembly
See Details Below

Sta. (-) 0+73
Connect to exist. 20" water

1 - 20"x20" Tee
1 - 20" Sleeve, 15" Long
8 - L.F. 20" D.I. Pipe, CL. 52
1 - Conc. Blk. w/ struct. strut
TEMP FOR TESTING
- Temp. cleanout w/ M.J. Cap

Pipeline Sta. (-) 0+35
1 - 20" 1/32 bend (TV)
1 - Conc. block
20" ductile iron pipe CL. 52

Pipeline Sta. 1+07.74
1-24" 45° bend
1-conc. blk.

Pipeline Sta. 1+89.86
Deflect Line

Pipeline Sta. 3+67.26
8.5 % L from ℄
Deflect Line

Water Line "A" Sta. 8+70 = FNR ℄ Sta. 57+77.74 8.5 %L
Deflect Line

℄ Sta. 61+00 10' % L
Deflect Line

North

MATCHLINE ℄ Sta. 64+00

WATER LINE "A"
24" Water main, D.I. or conc. cyl.

60+00 ℄ FT. Weaver Road

ROAD

KUNIA INTERCHANGE STRUCTURE

RAMP KA-1

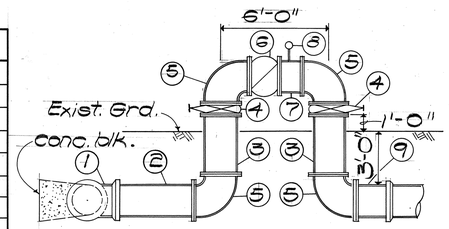
CRM WALL
CRM DITCH

S.C.M.H.

M.H.

Sign

No	Quan.	DESCRIPTION
1	1	20" 1/4 bend B.B.
2	1	20" Nipple F&S 4'-6" long
3	2	20" Nipple FE 3'-4" long
4	2	20" R.S. Butterfly Valve CL 150
5	4	20" 1/4 bend F.E.
6	1	20" Check Valve (Center-Guided)
7	1	20" Nipple FE 1'-3 3/8" long
8	1	2" Air Relief Valve Assembly
9	1	20" Nipple F&S 2'-0" long



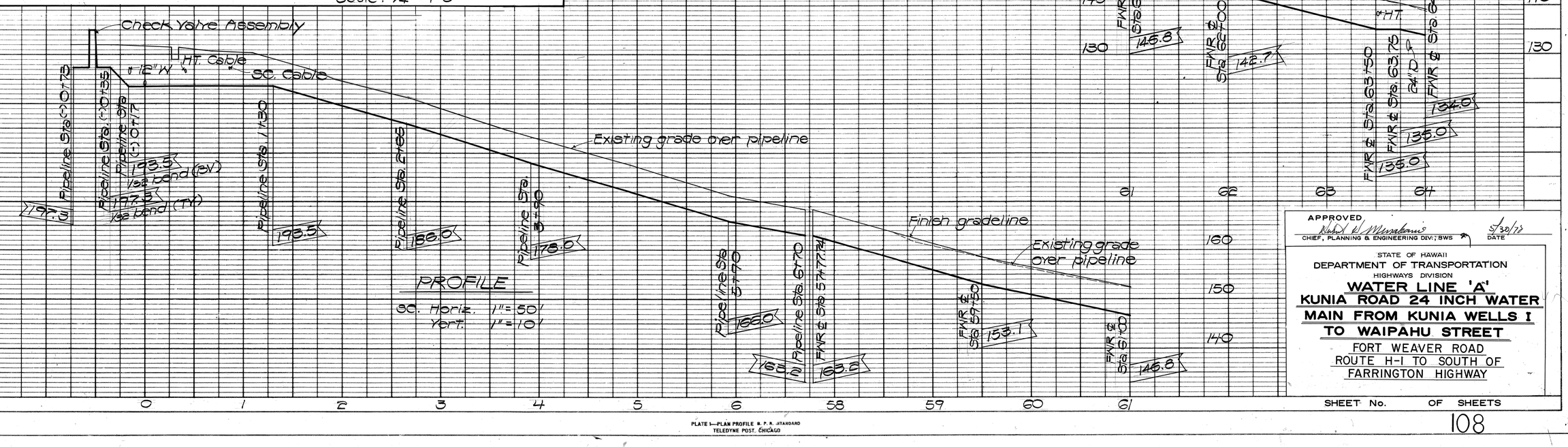
CHECK VALVE ASSEMBLY DETAILS
Scale: 1/4" = 1'-0"

PLAN
Sc: 1" = 50'

WATER NOTE

The Contractor shall restore the existing pavements, shoulders, fence, CRM wall and ditch and guardrail to its original condition or better from pipeline Sta. 0+00 to Sta. 6+70. Cost of restoration shall be considered incidental to the installation of the 24" water main.

The existing pavement consists of 12" inches aggregate subbase, 9 inches of aggregate base, 3 inches of asphalt concrete pavement, mix No. III and 1 1/2" inch asphalt concrete pavement, mix No. V



PROFILE
Sc. Horiz. 1" = 50'
Vert. 1" = 10'

APPROVED
Nadine W. Nakamura
CHIEF, PLANNING & ENGINEERING DIV., BWS
5/30/78
DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

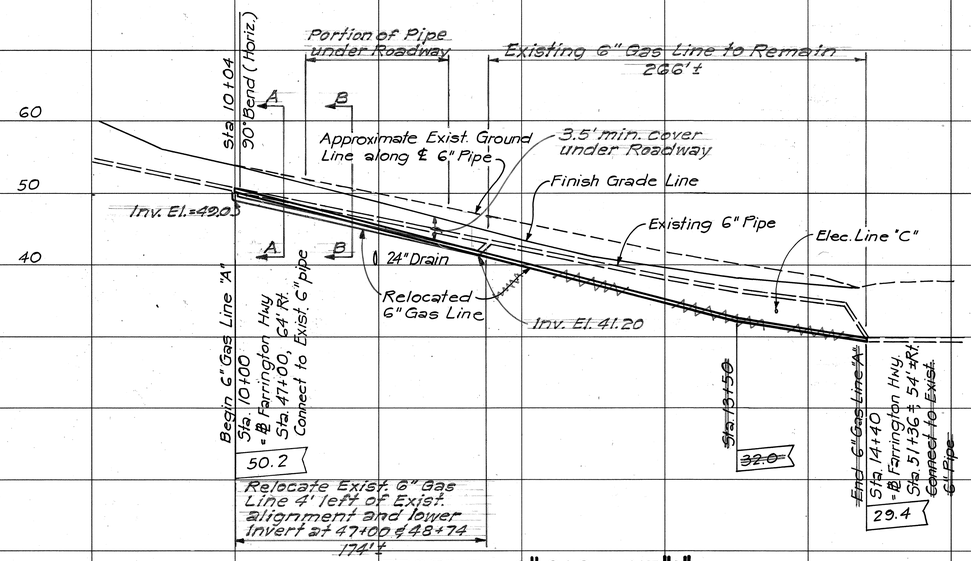
WATER LINE 'A'
KUNIA ROAD 24 INCH WATER MAIN FROM KUNIA WELLS I TO WAIPAHU STREET

FORT WEAVER ROAD
ROUTE H-1 TO SOUTH OF FARRINGTON HIGHWAY

SHEET No. OF SHEETS
108

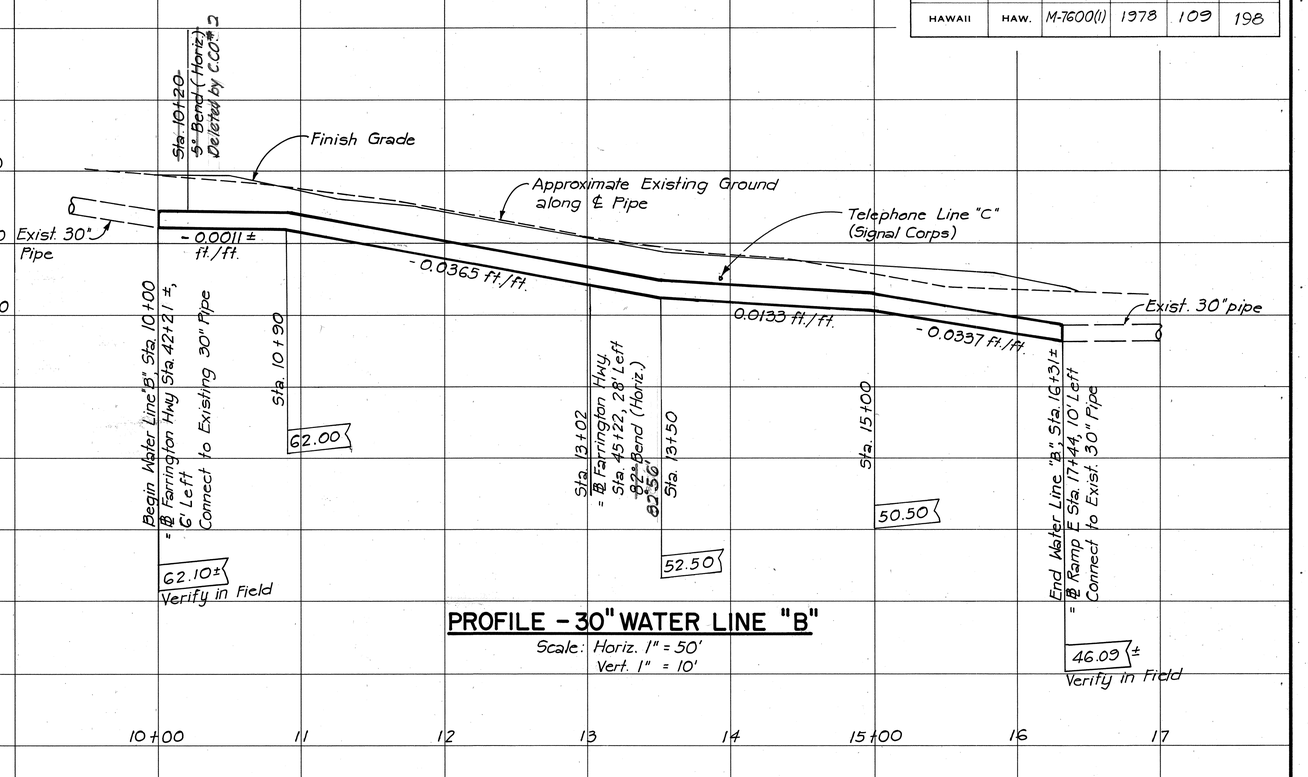
PLATE I—PLAN PROFILE S. P. R. STANDARD
TELEDYNE POST, CHICAGO

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	M-7600(1)	1978	109	198



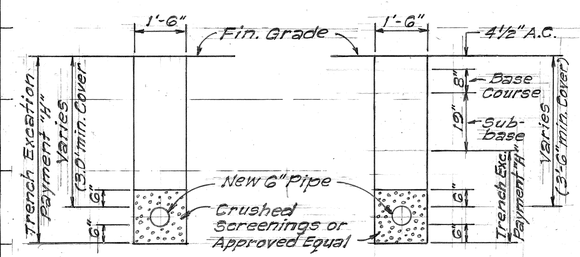
PROFILE – 6" GAS LINE "A"

Scale: Horiz. 1" = 50'
Vert. 1" = 10'



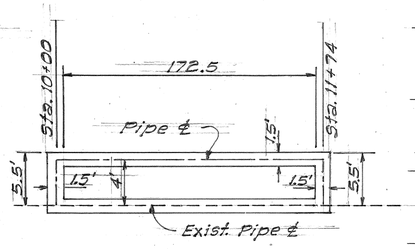
PROFILE – 30" WATER LINE "B"

Scale: Horiz. 1" = 50'
Vert. 1" = 10'



A-A
OTHER THAN UNDER ROADWAY
NTS

B-B
UNDER ROADWAY
NTS



TRENCH PLAN FOR VOLUME CALCULATION
NTS

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

Chief, Planning & Engineering, BWS — Date 6/15/78

Gas Co., Inc. — Date 4/12/78

ANTHONY R. D'ALESSIO
REGISTERED PROFESSIONAL ENGINEER
No. 2934
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

UTILITIES PROFILES

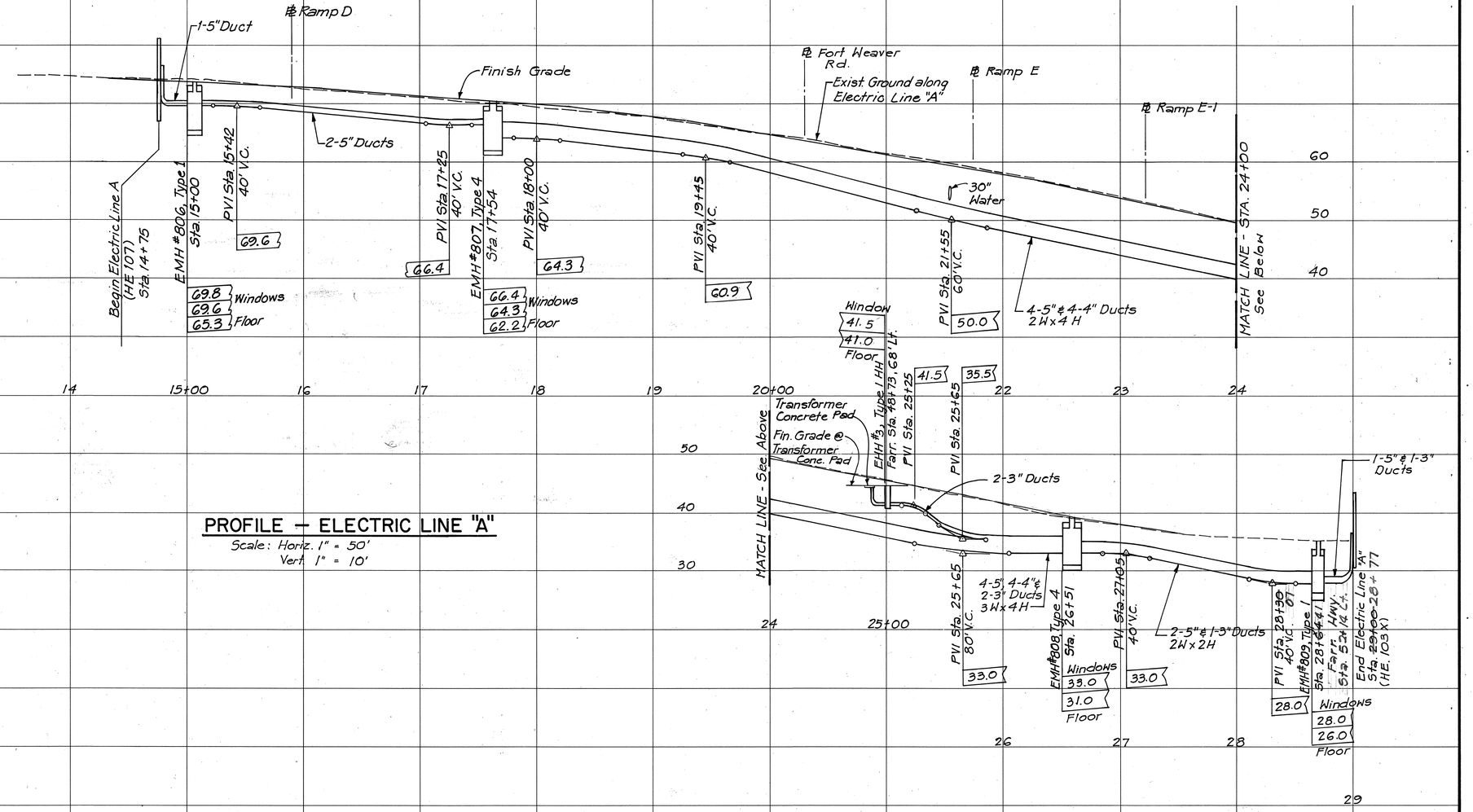
FORT WEAVER ROAD
ROUTE H-1 TO SOUTH OF FARRINGTON HIGHWAY

SCALE: AS SHOWN DATE: AUG. 1978

SHEET NO. 8U OF 33U SHEETS

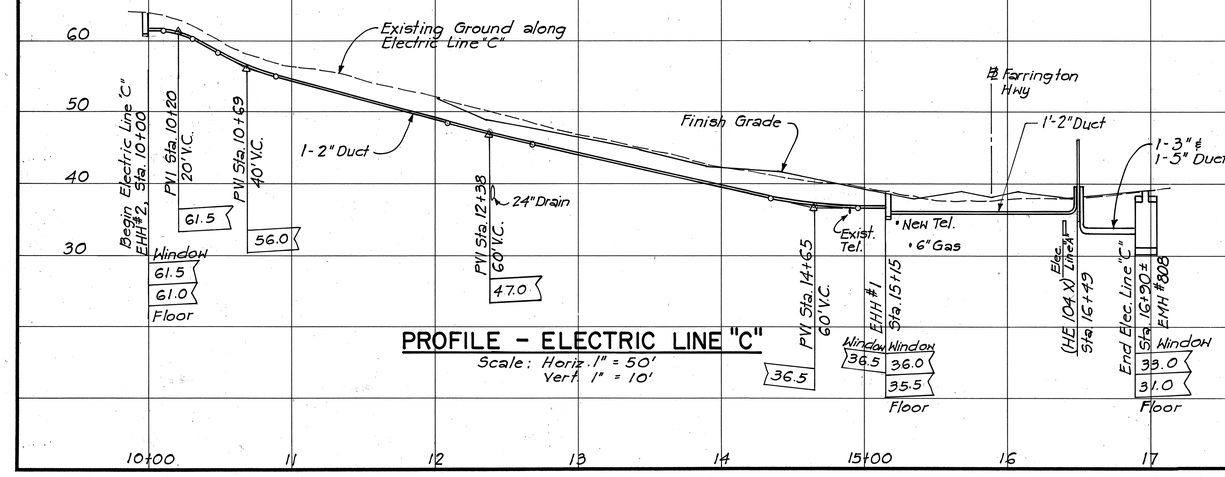
109

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	M-7600(1)	1978	110	198



PROFILE — ELECTRIC LINE "A"

Scale: Horiz. 1" = 50'
Vert. 1" = 10'



PROFILE — ELECTRIC LINE "C"

Scale: Horiz. 1" = 50'
Vert. 1" = 10'

NOTE: See Sheets 117 & 129 for Typical Duct Sections.

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

Hawaiian Electric Co., Inc.

12/1/78
Date

ANTHONY R. D'ALESSIO REGISTERED PROFESSIONAL ENGINEER No. 2934 HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

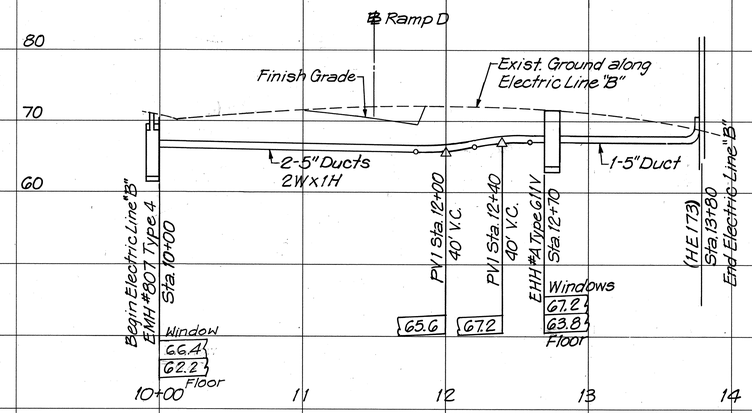
UTILITIES PROFILES

FORT WEAVER ROAD
ROUTE H-1 TO SOUTH OF FARRINGTON HIGHWAY

SCALE: AS SHOWN DATE: AUG. 1978

SHEET No. 30 OF 330 SHEETS

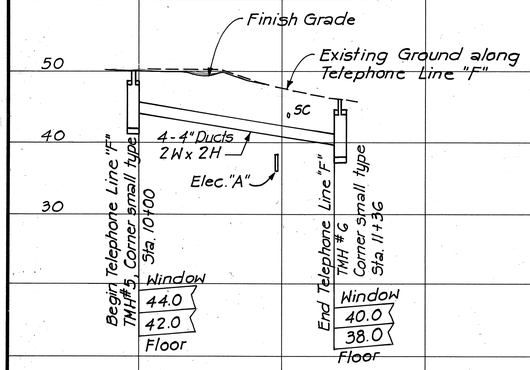
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	M-7600(1)	1978	111	198



PROFILE – ELECTRIC LINE "B"

Scale: Horiz. 1" = 50'
Vert. 1" = 10'

NOTE:
See Sheets 117 & 129 for Typical HECo. Duct Sections.



PROFILE – TELEPHONE LINE "F"

Scale: Horiz. 1" = 50'
Vert. 1" = 10'

ORIGINAL PLAN

SURVEY PLOTTED BY	DATE
DRAWN BY	
TRACED BY	
DESIGNED BY	
QUANTITIES BY	
CHECKED BY	

NOTE BOOK

No.

12/1/78 CLG
Hawaiian Electric Co., Inc. — Date

Hawaiian Telephone Co. — 6/26/78 Date

ANTHONY R. D'ALESSIO REGISTERED PROFESSIONAL ENGINEER No. 2934 HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

UTILITIES PROFILES

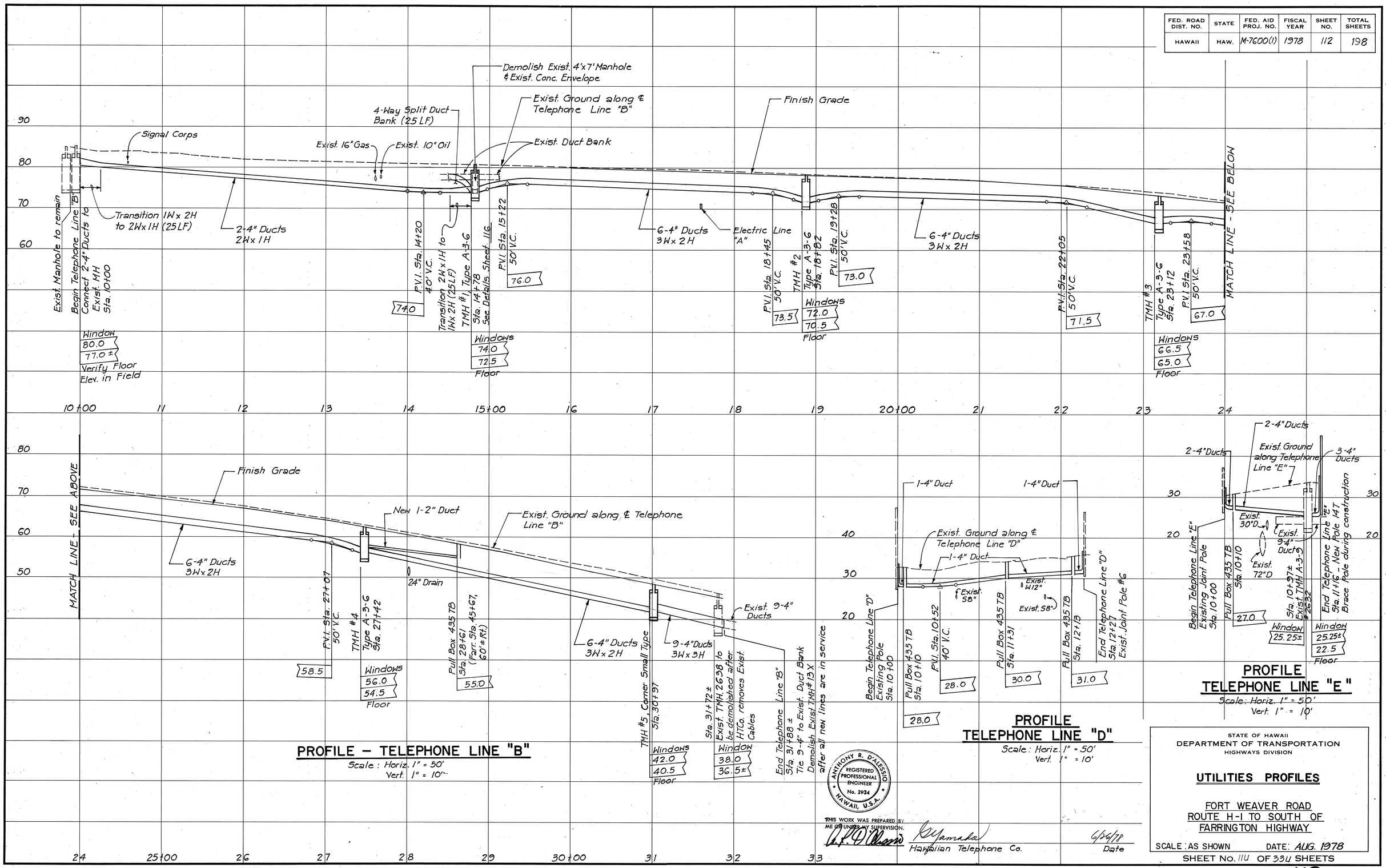
FORT WEAVER ROAD
ROUTE H-1 TO SOUTH OF FARRINGTON HIGHWAY

SCALE: AS SHOWN DATE: AUG. 1978

SHEET NO. 100 OF 330 SHEETS

111

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	M-7600(1)	1978	112	198



PROFILE — TELEPHONE LINE "B"
Scale: Horiz. 1" = 50'
Vert. 1" = 10'

PROFILE TELEPHONE LINE "D"
Scale: Horiz. 1" = 50'
Vert. 1" = 10'

PROFILE TELEPHONE LINE "E"
Scale: Horiz. 1" = 50'
Vert. 1" = 10'

ANTHONY R. D'ALESSIO REGISTERED PROFESSIONAL ENGINEER No. 2934 HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

Hawaiian Telephone Co.

6/26/78 Date

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

UTILITIES PROFILES

FORT WEAVER ROAD
ROUTE H-1 TO SOUTH OF FARRINGTON HIGHWAY

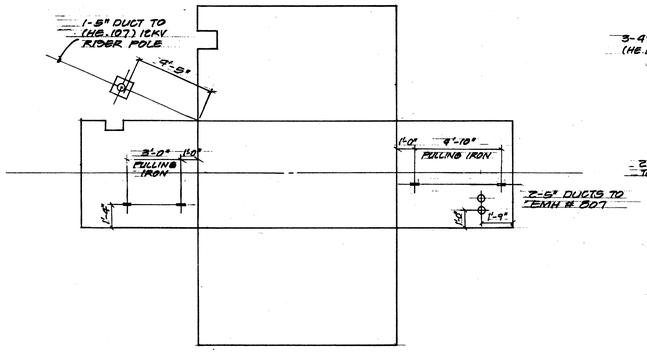
SCALE: AS SHOWN DATE: AUG. 1978

SHEET NO. 111 OF 334 SHEETS

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

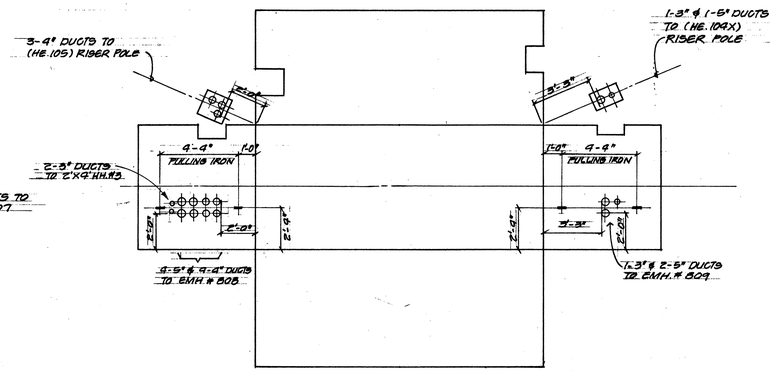
112

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	M-7600(1)	1978	113	198



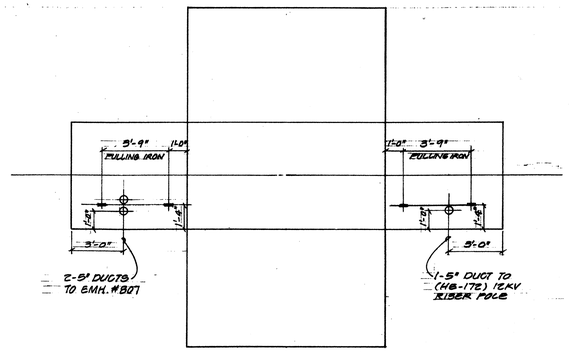
EMH. #806 (6'x11') TYPE 1

STA. 27+15 FARRINGTON HY. (O.B.)



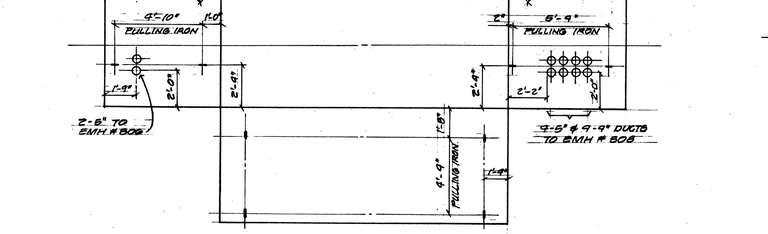
EMH. #808 (7'x16') TYPE 4

STA. 50+30 FARRINGTON HY.



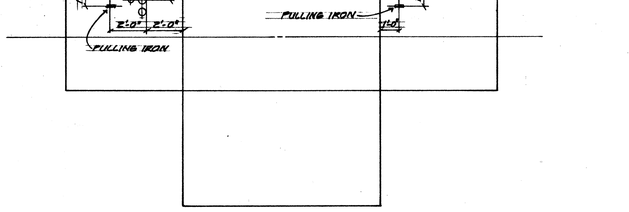
EHH. #A (6'x11') TYPE 6/1

STA. 22+44 RAMP "D"



EMH #807 (7'x16') TYPE 4

STA. 91+37 FARRINGTON HY. (I.B.)



EMH. #809 (6'x11') TYPE 1

STA. 52+37 FARRINGTON HY.

APPROVED :

12/15/78

CLS 1113 Hawaiian Electric Co., Inc. Date

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

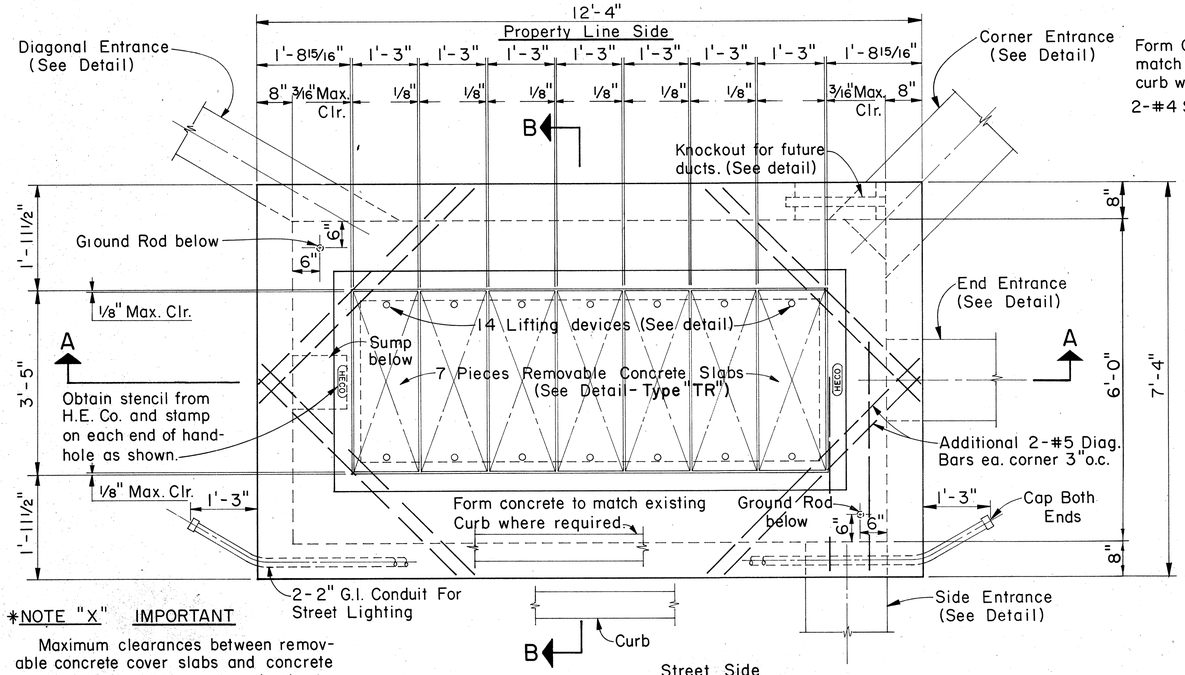
MANHOLE WALL ELEVATIONS - ELECTRIC

FORT WEAVER ROAD
ROUTE H-1 TO SOUTH OF FARRINGTON HIGHWAY

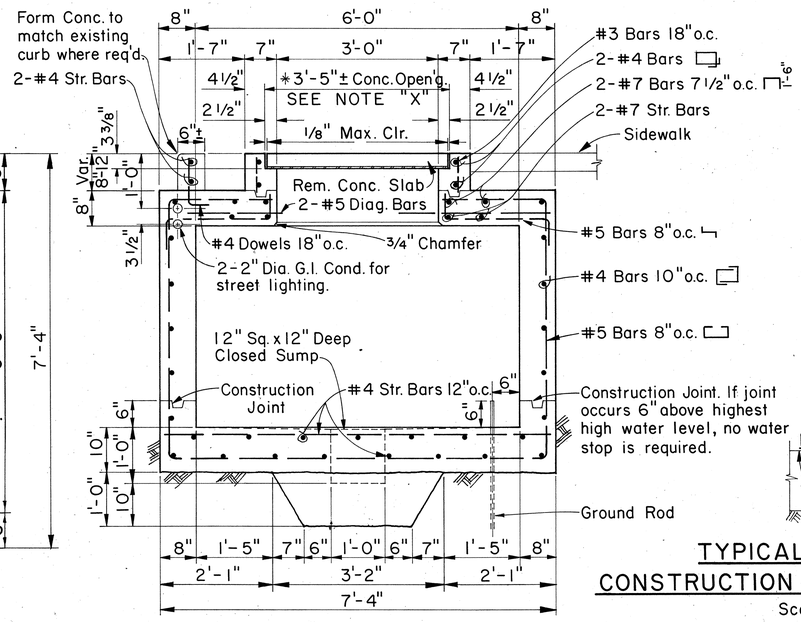
SCALE: N.T.S. DATE: AUG. 1978

SHEET No. 1 OF 1 SHEETS

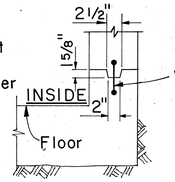
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	M-7600(1)	1978	114	198



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



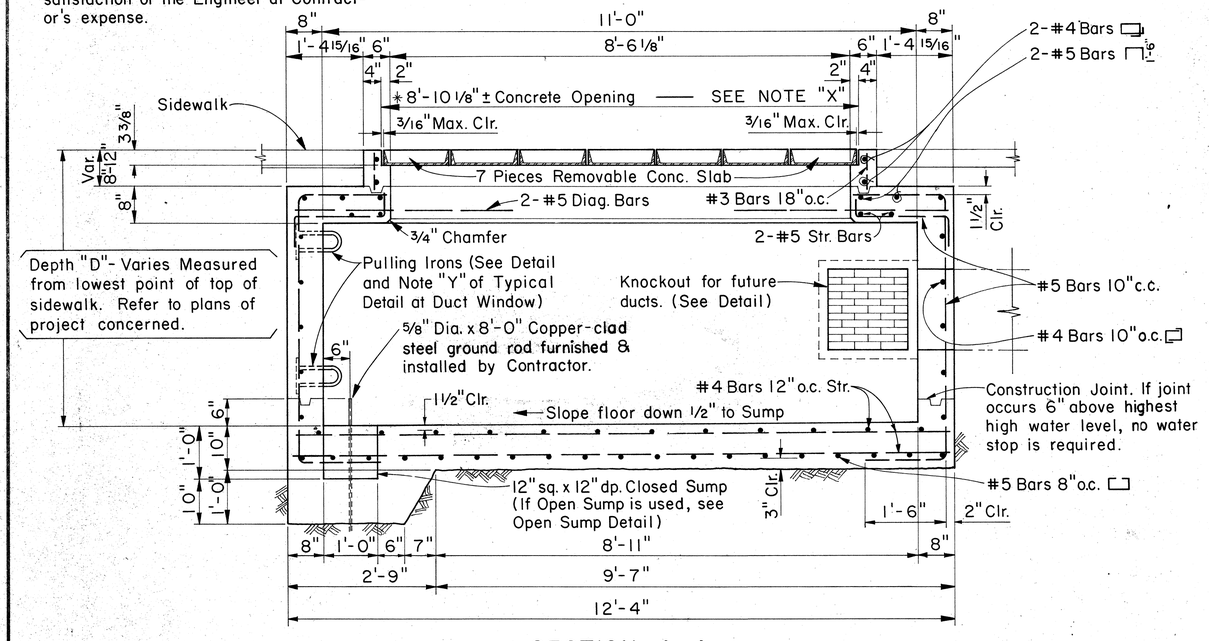
SECTION B-B
Scale: 3/4" = 1'-0"



TYPICAL DETAIL OF CONSTRUCTION JOINT AND KEYWAY
Scale: 1" = 1'-0"

*NOTE "X" IMPORTANT

Maximum clearances between removable concrete cover slabs and concrete opening at the supports must be kept. Concrete Contractor shall measure cover slab steel frame after fabrication to obtain proper clearances. Any variation in clearances shall be corrected to the satisfaction of the Engineer at Contractor's expense.



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

NOTE:

FOR DETAILS OF TYPE "TR" REMOVABLE CONCRETE COVERS, LIFTING DEVICE AND SPACER BAR, SEE HECo., INC. DRAWING NUMBER 16688, Sheet No. 1 of 2 Sheets.

REINFORCED CONCRETE QUANTITIES

QUANTITY OF MATERIALS FOR DEPTH "D" = 5'-0"

Total Concrete	=	8.5 Cu. Yds.
Total Rein. Steel	=	1,634 Lbs.
Total Misc. Steel	=	845 Lbs.

WEIGHT PER REMOVABLE CONCRETE SLAB

Concrete	=	149 Lbs.
Reinf. Steel	=	6 Lbs.
Misc. Steel	=	118 Lbs.
Total	=	273 Lbs.

MATERIALS FOR 6" DEPTH OF 8" THICK WALL

Concrete	=	0.45 Cu. Yds.
Reinf. Steel	=	56 Lbs.

APPROVED:

MJ CLG HAWAIIAN ELECTRIC Co., Inc. 12/17/78 DATE

FOR USE IN AREAS SUBJECT TO LIGHT VEHICULAR TRAFFIC.

18849-A SHEET No. 1 OF 2 SHEETS

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION

STANDARD DETAILS

HANDHOLE TYPE 611V (6'-0" x 11'-0")
UNDERGROUND STANDARDS

Scales: As Noted Date:

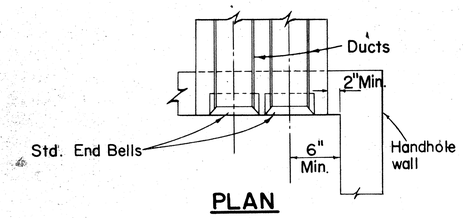
SHEET No. OF SHEETS

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

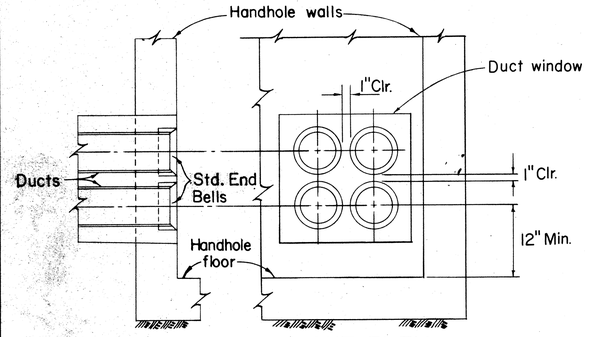
FED. AID DIST. NO.	STATE	FED. AID. PROJECT	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAWAII	M-7600(1)	1978	114-A	198

TYPICAL DUCT LINE ENTRANCE DETAILS

NOT TO SCALE



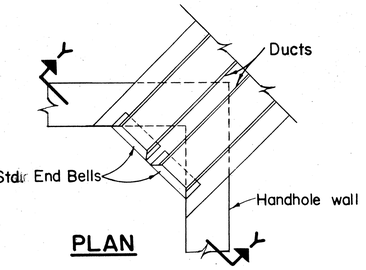
PLAN



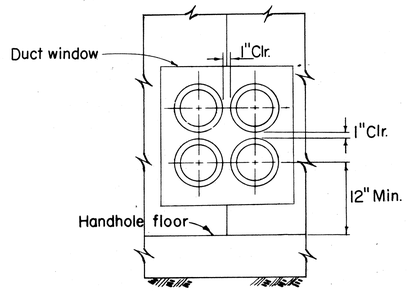
SIDE ELEV. FRONT ELEV.

END & SIDE ENTRANCES

(FOUR WAY DUCT)



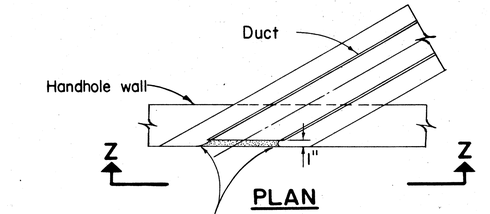
PLAN



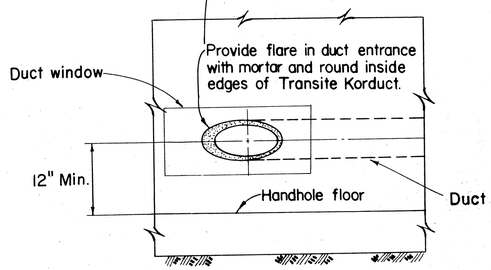
ELEV. Y-Y

CORNER ENTRANCE

(FOUR WAY DUCT)



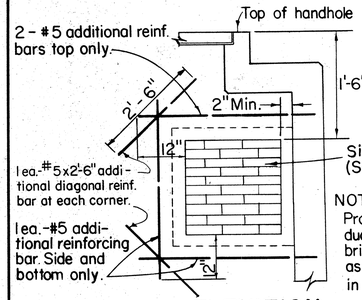
PLAN



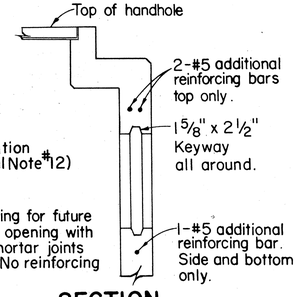
ELEV. Z-Z

DIAGONAL ENTRANCE

(ONE WAY DUCT)



ELEVATION

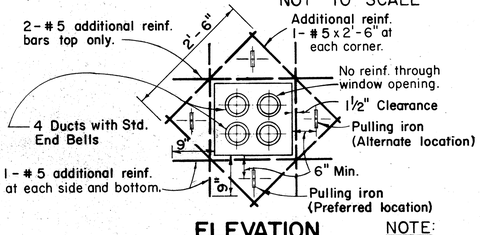


SECTION

NOTE: Provide opening for future duct line. Fill opening with bricks and mortar joints as required. No reinforcing in window.

KNOCKOUT FOR FUTURE DUCT LINE

NOT TO SCALE

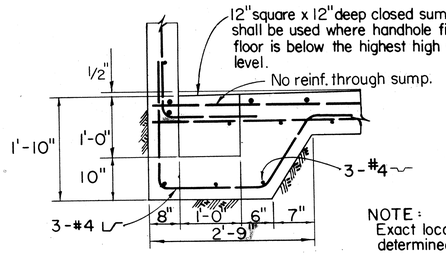


ELEVATION

TYPICAL DETAIL AT DUCT WINDOW

NOT TO SCALE

NOTE: Generally 2 Pulling Irons are required and located on opposite wall of each duct window unless otherwise shown or noted. H.E. Co. Engineer shall determine number required.

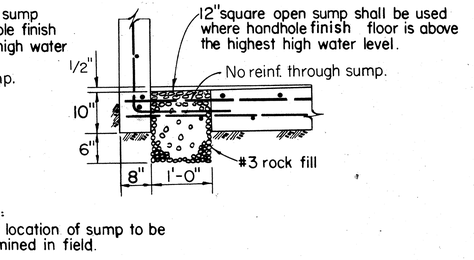


NOTE: Exact location of sump to be determined in field.

SECTION ELEV.

CLOSED SUMP

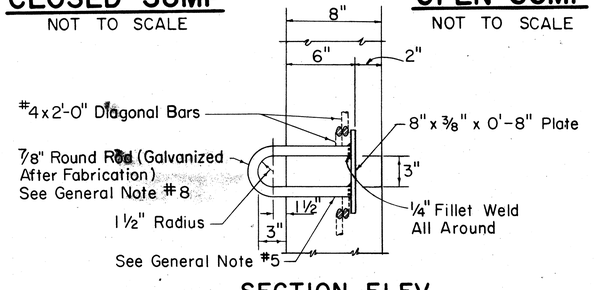
NOT TO SCALE



SECTION ELEV.

OPEN SUMP

NOT TO SCALE



SECTION ELEV.

PULLING IRON

NOT TO SCALE

GENERAL NOTES

1. Concrete to develop compressive cylinder strength of 3000 PSI in 28 days.
2. CONCRETE FINISH:
   Top of Handhole - Woodfloated (sidewalk finish) according to Highways Division, State of Hawaii or Division of Engineering, City and County of Honolulu specifications whichever Agency has authority over the work.
   Floor - Smooth metal trowelled.
   Exposed Wall Surfaces, and Edges - Smooth and free from defects.
   CONCRETE POURING:
   Notify the Hawaiian Electric Co. Contracting & Inspection Div. 24 hours before pouring any concrete. All concrete pouring shall be done in the presence of an H.E. CO. Engineer or Inspector.
3. REINFORCING: Round deformed bars, new billet stock grade 40, ASTM A615. All hooked bars shall have ACI std. hook unless otherwise shown.
4. FORMS: Form handhole to size and shape as shown. Exterior face of handhole wall shall be formed except:
   A) Excavation in solid material such as coral or rock, neat cut, no forms required.
   B) Excavation in solid material other than coral or rock, lining such as salvaged corrugated iron, canec etc. may be used.
5. PULLING IRONS:
   For location and number required, see duct entrance plan of project concerned.
6. DRAINAGE: Slope floor down ½" to sump.
7. For slope of top of handhole, see plan of project concerned.
8. FINISH STEEL WORK:
   Channel Iron frames for removable concrete slabs and pulling irons shall be HOT DIP GALVANIZED AFTER FABRICATION.
9. EXCAVATION:
   Excavate for handhole to accurate alignment, grades and dimensions as shown on drawing. All excavation must be approved by the Engineering Department, the Hawaiian Electric Co., Inc., before any concrete is poured. All excess cut shall be backfilled with concrete or rock.
10. BACKFILL: Remove all debris before backfilling. Backfill in accordance with latest specifications of and subject to approval of Highways Division State of Hawaii or Division of Engineering, City and County of Honolulu whichever Agency has authority over the work.
11. For duct line construction standards see H.E.CO. Dwgs. 18585 & 20191 and specification sheets CS 7001-0.
12. DUCTS: For number, size, and exact location of duct entrances, refer to project drawings.
13. ALL MATERIALS SHALL BE NEW AND SHALL BE MANUFACTURED IN THE UNITED STATES OF AMERICA.

FOR USE IN AREAS SUBJECT TO LIGHT VEHICULAR TRAFFIC

APPROVED:

MG CLG HAWAIIAN ELECTRIC Co., Inc. 12/15/78 DATE

18849-A SHEET No. 2 OF 2 SHEETS

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION

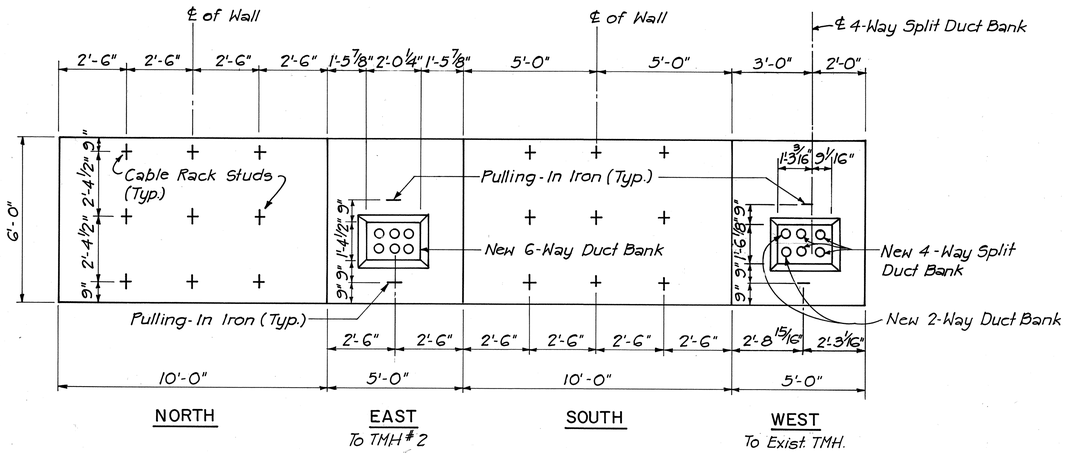
STANDARD DETAILS

HANDHOLE TYPE 611V (6'-0 x 11'-0)
UNDERGROUND STANDARDS

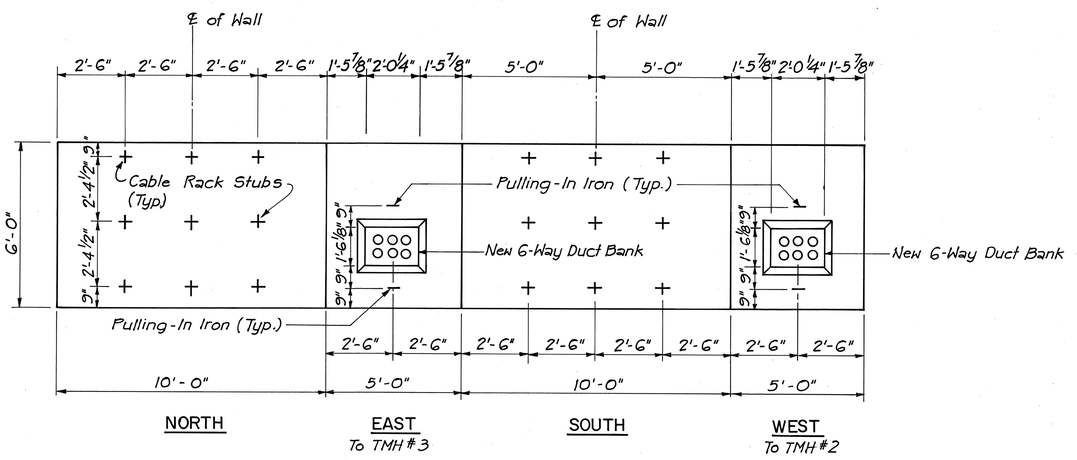
Scales: As Noted Date

SHEET NO. OF SHEETS

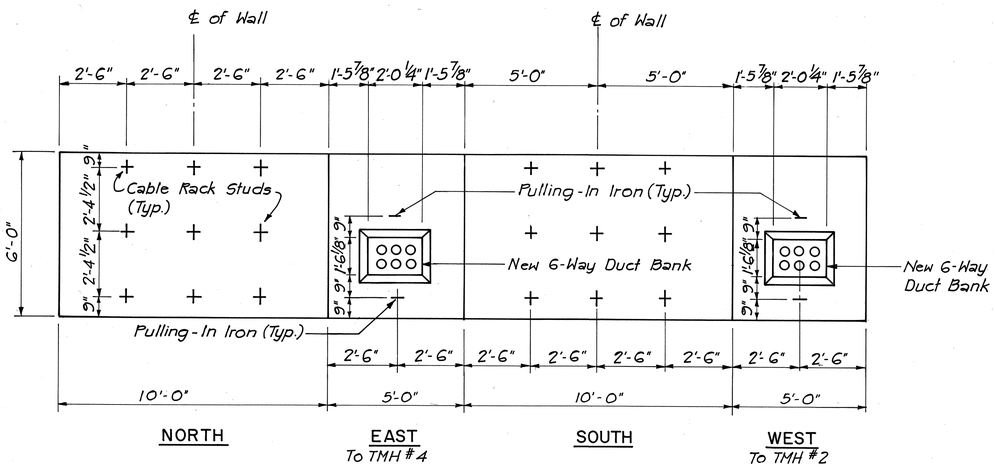
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	M-7600(1)	1978	115	198



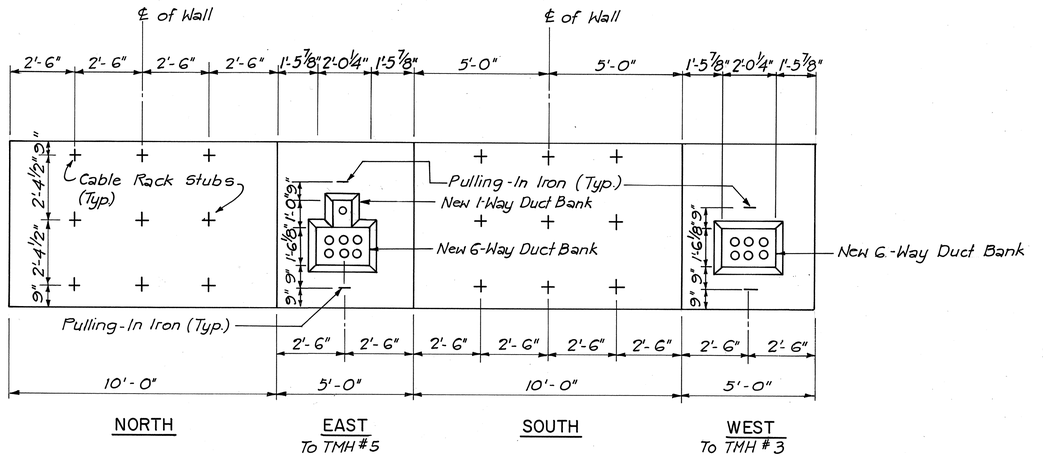
TYPE A-3-6 MANHOLE NO. 1



TYPE A-3-6 MANHOLE NO. 2



TYPE A-3-6 MANHOLE NO. 3



TYPE A-3-6 MANHOLE NO. 4

ANTHONY R. D'ALESSIO
REGISTERED PROFESSIONAL ENGINEER
No. 2934
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

Hawaiian Telephone Co.

6/26/78
Date

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

MANHOLE WALL ELEVATIONS - TELEPHONE

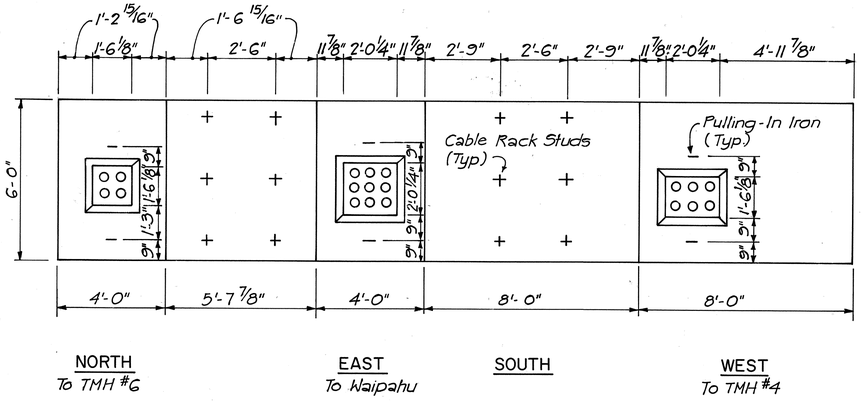
FORT WEAVER ROAD
ROUTE H-1 TO SOUTH OF FARRINGTON HIGHWAY

SCALE: N.T.S. DATE: AUG. 1978

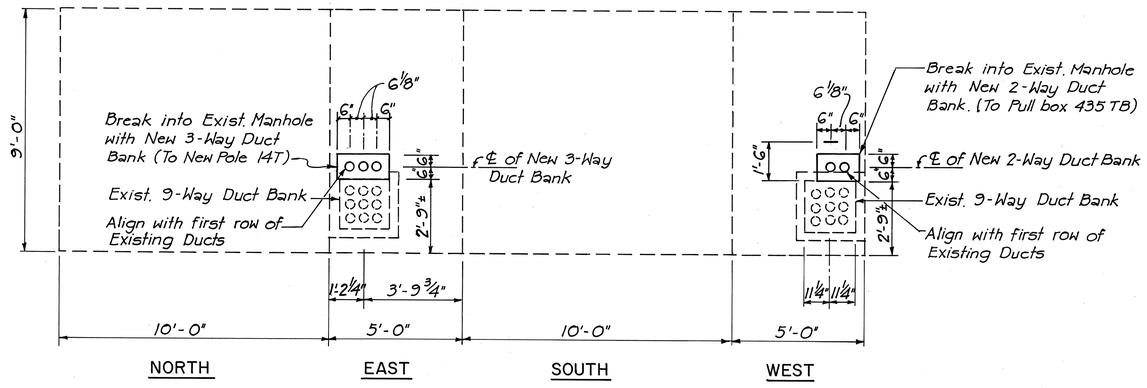
SHEET No. 140 OF 330 SHEETS

ORIGINAL PLAT | 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.	M-7600(1)	1978	116	198

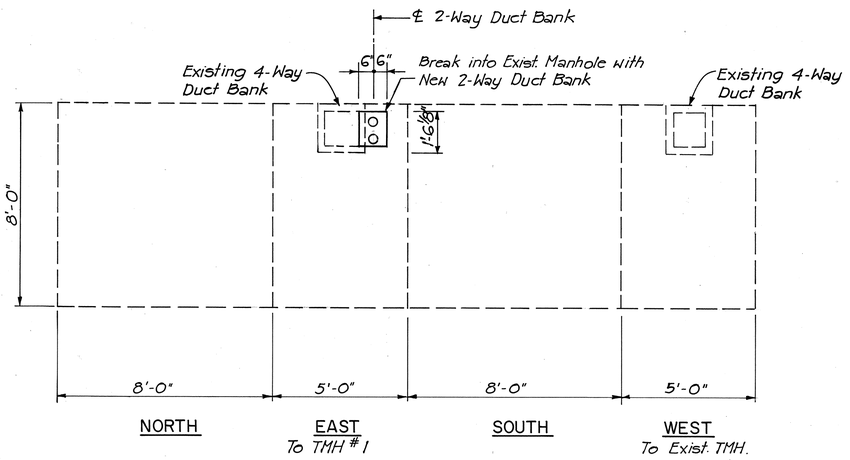


SMALL CORNER TYPE MANHOLE NO. 5



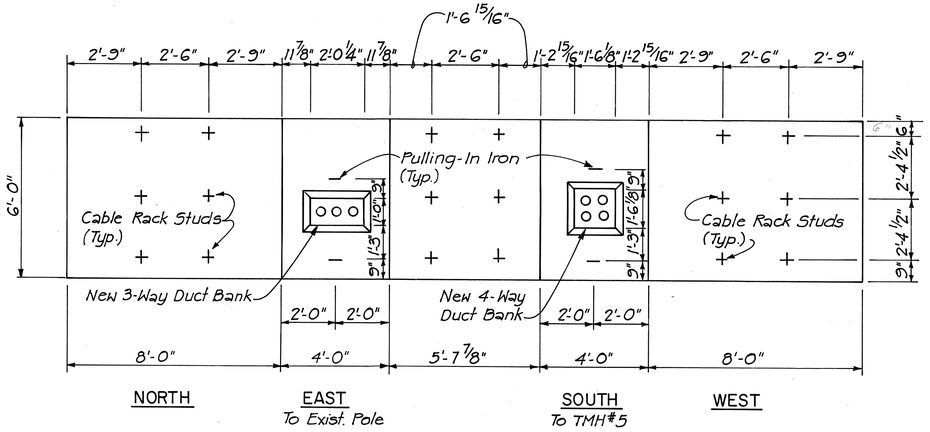
EXISTING MANHOLE # 2632

Farrington Hwy Sta. 57+43±



EXISTING MANHOLE

Farrington Hwy. Sta. 25+17±(1.B)



SMALL CORNER TYPE MANHOLE NO.6

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

ANTHONY R. D'ALESSIO REGISTERED PROFESSIONAL ENGINEER No. 2934 HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

K. Yamada
Hawaiian Telephone Co.

6/26/78
Date

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

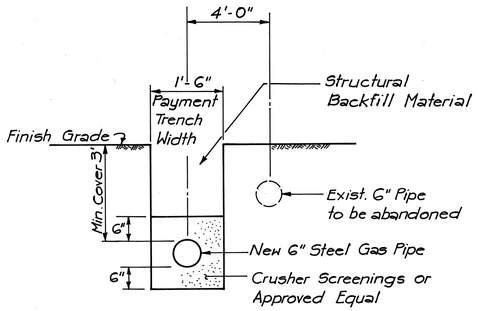
MANHOLE WALL ELEVATION - TELEPHONE

FORT WEAVER ROAD
ROUTE H-1 TO SOUTH OF FARRINGTON HIGHWAY

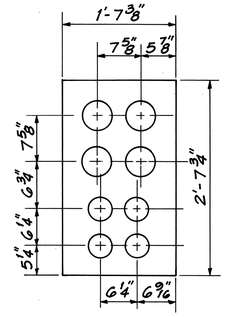
SCALE: N.T.S. DATE: AUG. 1978

SHEET No. 151 OF 331 SHEETS

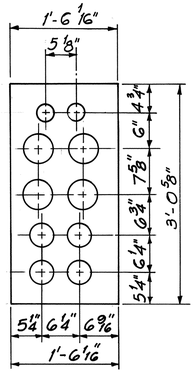
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	M-7600(1)	1978	117	198



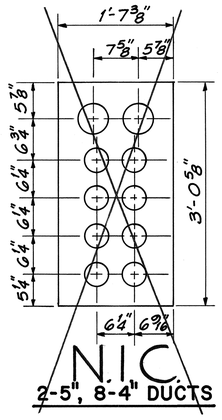
GAS TRENCH DETAIL
N.T.S.



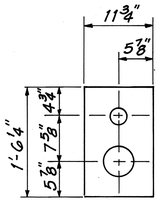
4-5", 4-4" DUCTS



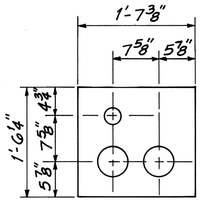
4-5", 4-4", 2-3" DUCTS



2-5", 8-4" DUCTS

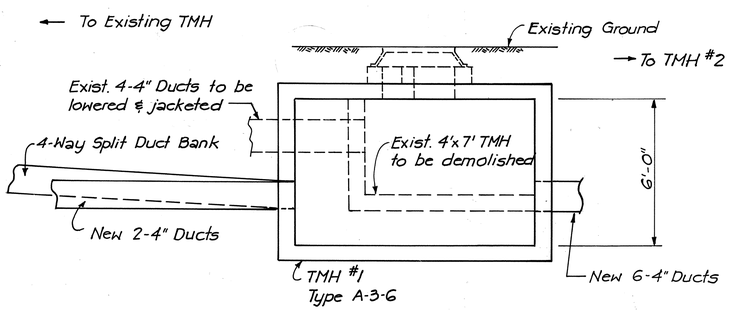


1-5", 1-3" DUCTS

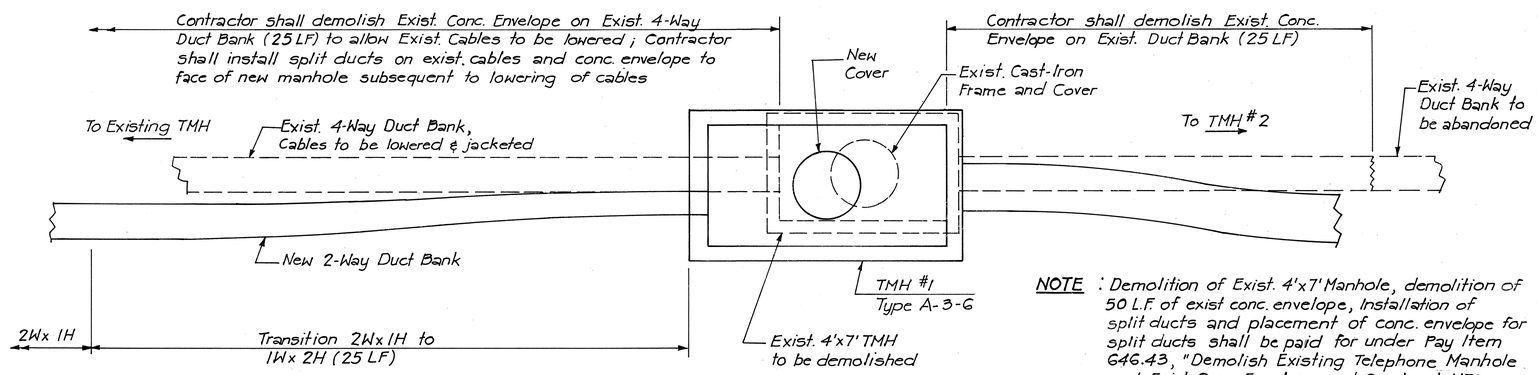


2-5", 1-3" DUCTS

HECO DUCT SECTIONS
SCALE: 1" = 1'-0"



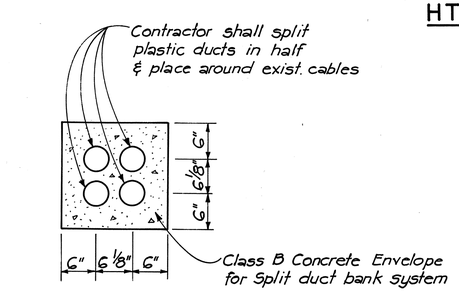
ELEVATION



PLAN

NOTE : Demolition of Exist. 4'x7' Manhole, demolition of 50 L.F. of exist conc. envelope, installation of split ducts and placement of conc. envelope for split ducts shall be paid for under Pay Item G46.43, "Demolish Existing Telephone Manhole and Exist. Conc. Envelope and Construct HTCo. Type A-3-6 Manhole".

HTCO. TYPE A-3-6 MANHOLE NO. 1
Farrington Hwy. Sta. 31+86 ±, 14' Rt.
N.T.S.



HTCO. SPLIT DUCT BANK DETAIL
N.T.S.

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

APPROVED:

C&S Mg. J Karumoto — Hawaiian Electric Co. Inc. — 12/1/78 Date

Hawaiian Telephone Co. Ltd. — 6/26/78 Date

Gas Co., Inc. — 4/12/78 Date

ANTHONY R. D'ALESSIO REGISTERED PROFESSIONAL ENGINEER No. 2934 HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

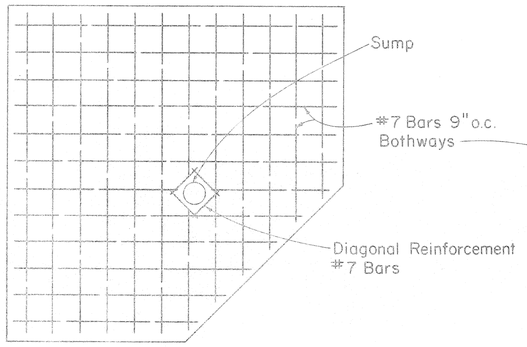
MISCELLANEOUS DETAILS

FORT WEAVER ROAD
ROUTE H-1 TO SOUTH OF FARRINGTON HIGHWAY

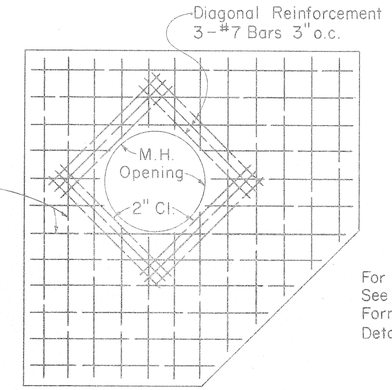
SCALE: AS SHOWN DATE: AUG. 1978

SHEET NO. OF SHEETS

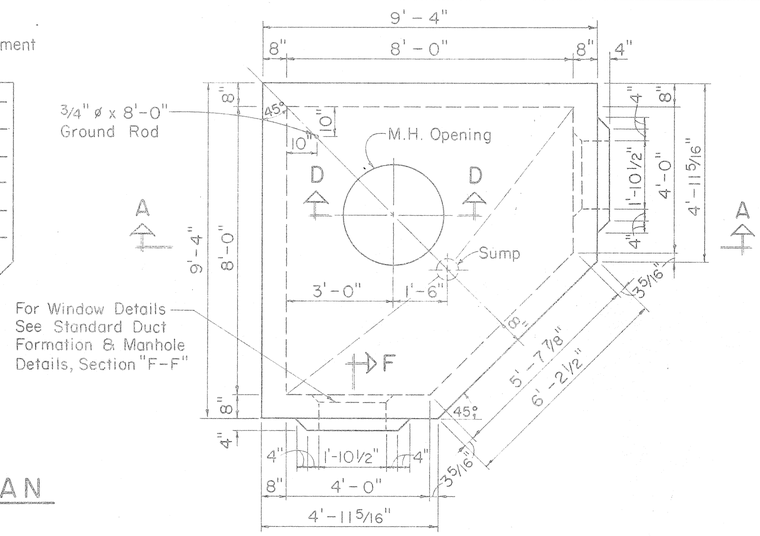
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	M-7600(4)	1978	117A	198



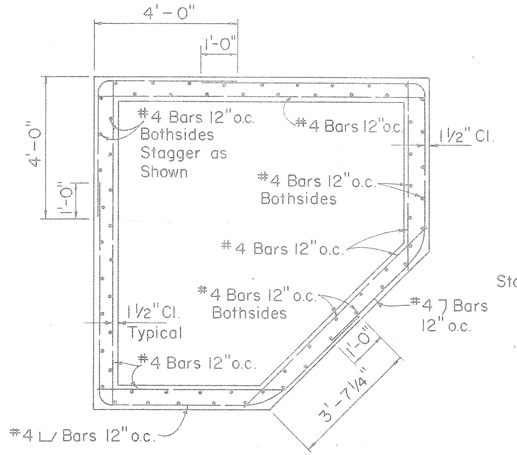
FLOOR SLAB REINF. PLAN



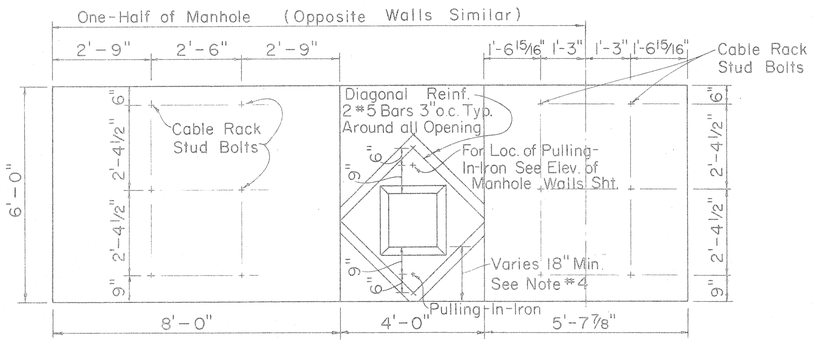
ROOF SLAB REINF. PLAN



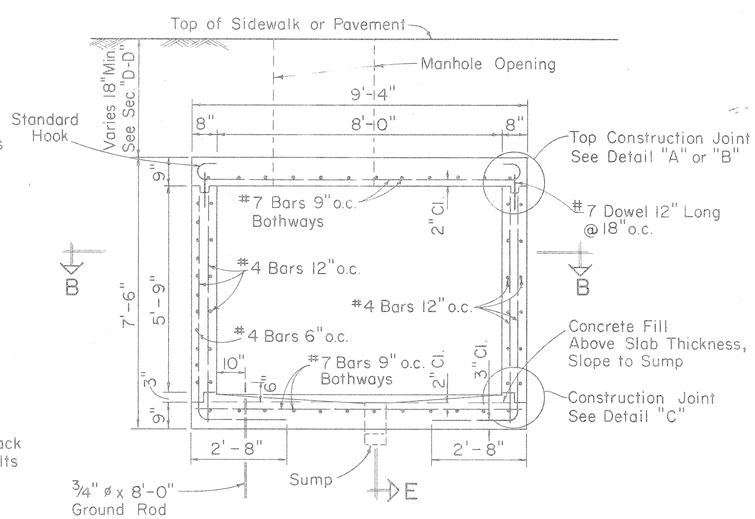
PLAN



SECTION "B-B"



ELEVATION OF INSIDE WALLS



SECTION "A-A"

GENERAL NOTES

1. Design Data
   fs = 20,000 psi
   f'c = 3,000 psi
   fc = 1,200 psi
   n = 10
   w = Equiv. fluid pressure 30 #/ft²
2. Concrete shall be Class A.
3. Reinforcing - Intermediate Grade deformed bars.
4. Unless otherwise indicated, for vertical location of Duct Windows see profile sheet.
5. Manhole Walls shall be doubled formed
6. All Concrete shall be cured by an Impervious Liquid Membrane Compound.
7. Concrete shall not be loaded, except by its own weight, until 28 days after placement.
8. All Construction Joints shall be waterproofed.
9. Plug all ducts in Manhole.
10. Concrete Admixture shall be 2½ Lbs. "Tricosol Normal" per cubic yard.
11. Apply Dampproofing to the surfaces of Reinforced Concrete that are in contact with the earth excluding the underside of the floor slab. Material and application shall be according to the 1969 edition of the "State" Highway Department's Standard Specifications for Road and Bridge Construction.
12. For Details "A", "B", "C", Sections "D-D", "E-E", "F-F", and other miscellaneous manhole construction details, see supplement sheet to Type "A-1", "A-2", and "A-3" Telephone Manholes.

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

APPROVED:

Hawaiian Telephone Co., Ltd. — Date 6/26/78

H. T. Co., Ltd. — Drawing No. 34030

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION

STANDARD CORNER SMALL TYPE MANHOLE

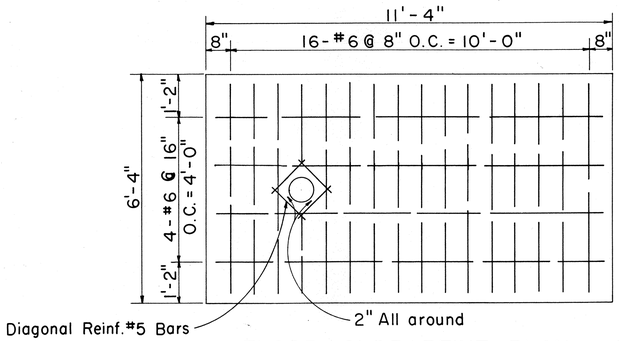
Scale: 1/2" = 1'-0" Date:

SHEET No. OF SHEETS

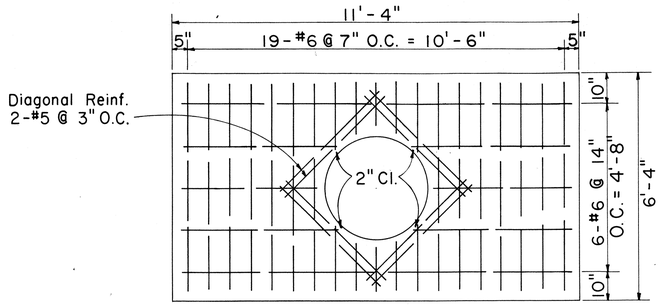
117A

HT-

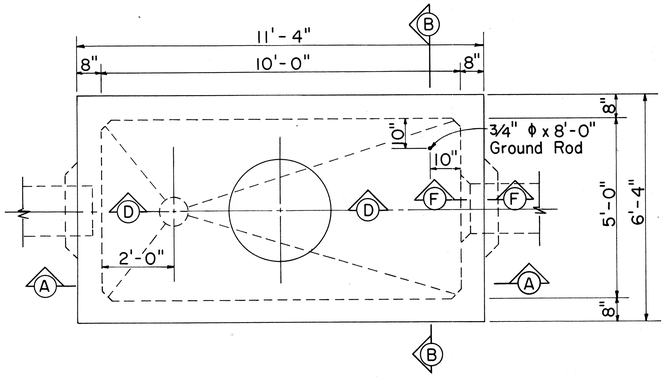
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	M-7600(1)	1978	118	198



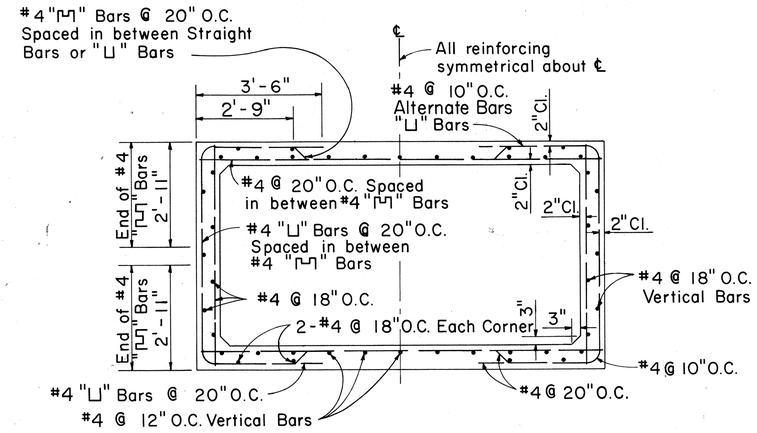
FLOOR SLAB REINF. PLAN
Scale: 1/2"=1'-0"



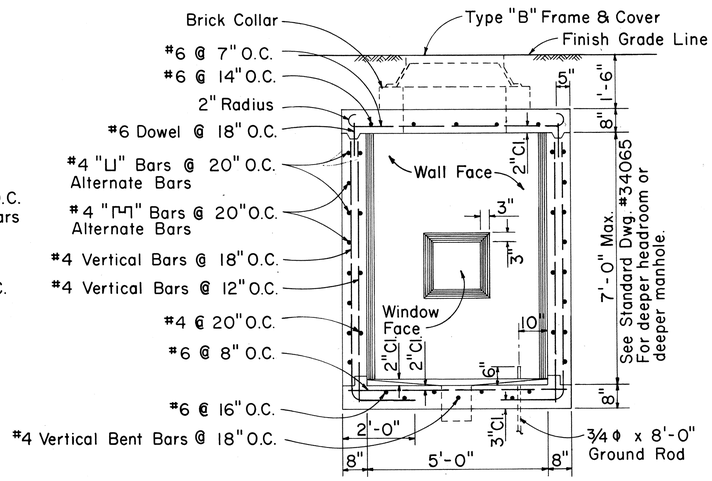
ROOF SLAB REINF. PLAN
Scale: 1/2"=1'-0"



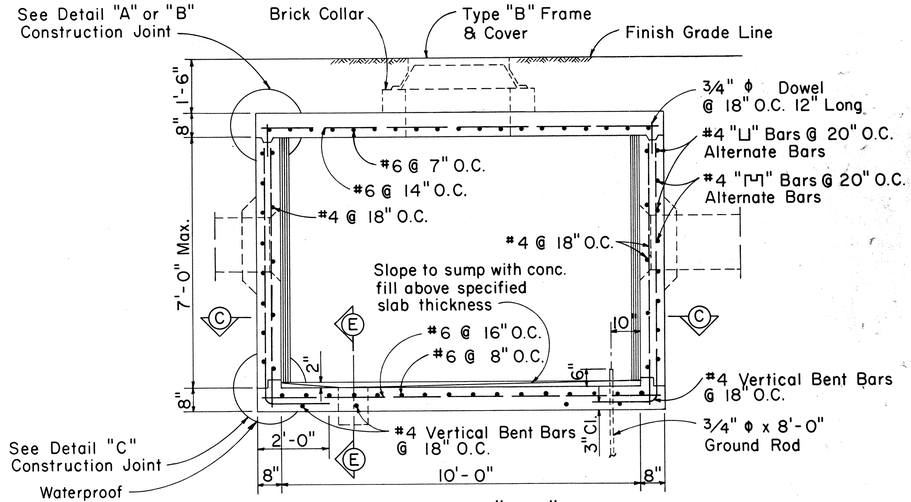
PLAN - M.H. TYPE "A-3" SERIES
FOR ROADWAY & SIDEWALK AREAS
Scale: 1/2"=1'-0"



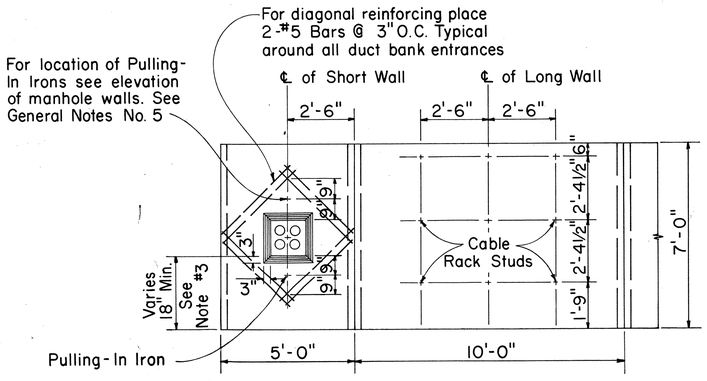
SECTION "C-C"
Scale: 1/2"=1'-0"



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



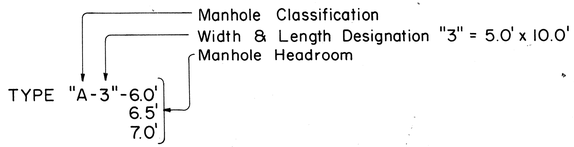
SECTION "A-A"
Scale: 1/2"=1'-0"



ELEVATION OF M.H. WALLS - TYPE "A-3" SERIES
(OPPOSITE FACES SIMILAR)
Scale: 3/8"=1'-0"

GENERAL NOTES:

1. Design Data:
   fs= 20,000 psi; f'c= 3,000 psi; fc= 1,350 psi; n=10
   w= Equivalent Fluid Pressure: 30#/ft²
2. All Construction Joints shall be waterproofed with two applications of Thoro Seal or equal.
3. For Duct Window location see Plan Profile Sheets for Elevations.
4. Duct Window to suit - See Plan & Profile & Standard Detail Sheets for Location & Details.
5. For Details "A", "B", "C," Sections "D-D", "E-E," "F-F" and other miscellaneous Manhole Construction Details see Supplement Sheet to Type "A-1", "A-2" and "A-3" Telephone Manholes.



APPROVED:

Hawaiian Telephone Co., Ltd. — Date 6/26/78

H.T. Co., Ltd. — Drawing No. 34064

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION

TYPE "A-3" MANHOLES FOR 6.0' TO 7.0' HEADROOM

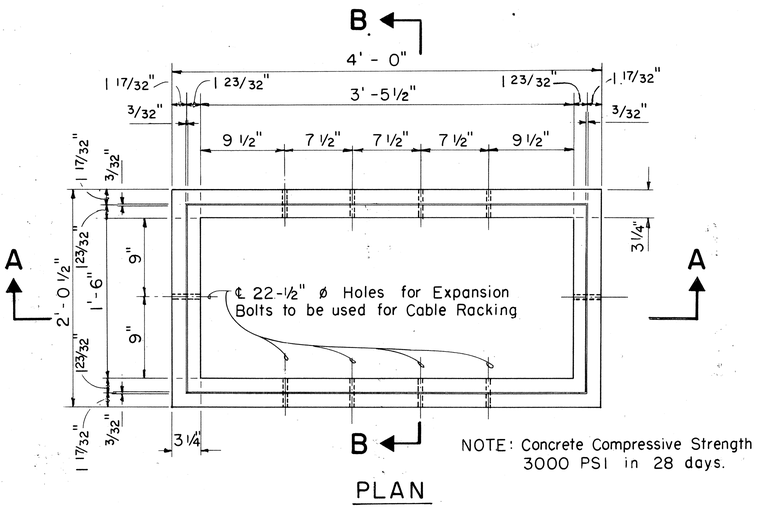
Scale: As Noted — Date:

SHEET No. 118 OF SHEETS

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

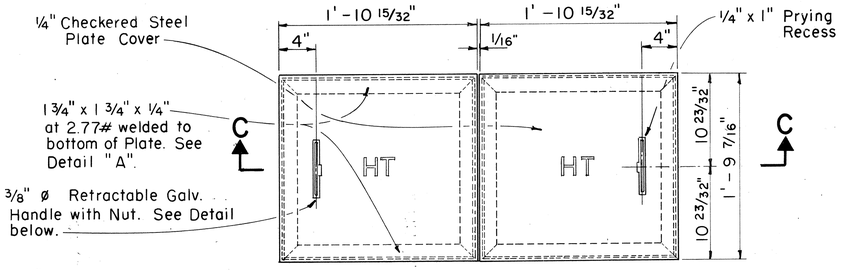
HT-11

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	M-7600(1)	1978	119	198

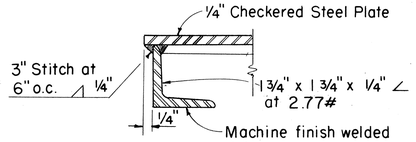


NOTE: Concrete Compressive Strength 3000 PSI in 28 days.

PLAN

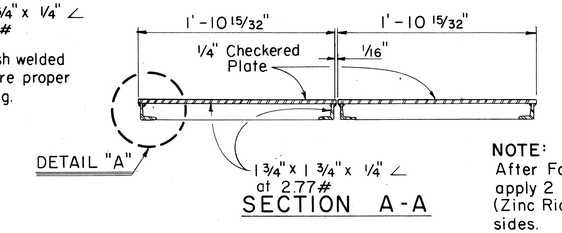


PLAN



DETAIL A

SCALE: 6" = 1'-0"



SECTION A-A

NOTE: After Fabrication of Cover, apply 2 coats of ZRC (Zinc Rich Coating) to both sides.

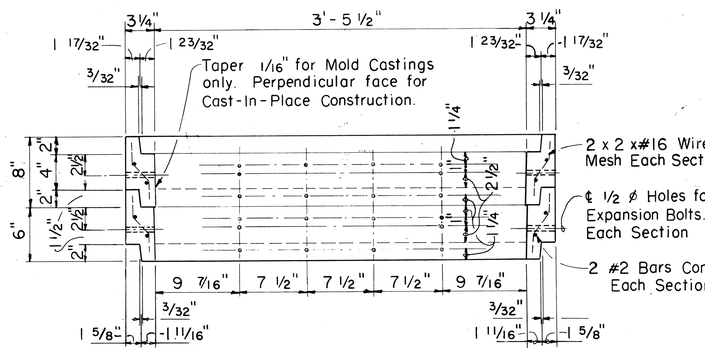
INSTALLATION NOTES:

1. A minimum of Two(2) Precast Sections must be used on all installations.
2. The minimum layers of Bricks to be used shall always be at least One (1) layer lower than the lowest Duct entering the Pullbox. At no time, however, shall there be less than Two (2) layers of Bricks on each installation.
3. At no time shall Cement Mortar, Wood or any other material be used between Precast Sections. Leveling or raising of Boxes to grade must be done at Brickwork Section using Cement Mortar. The permanent installation of Wooden Wedges to accomplish this purpose will not be accepted.
4. For 3-Cover P.B. join 435TB P.B. Half Section to Full Section using Strap and Bolts as shown in 3-Cover P.B. Section Plan.

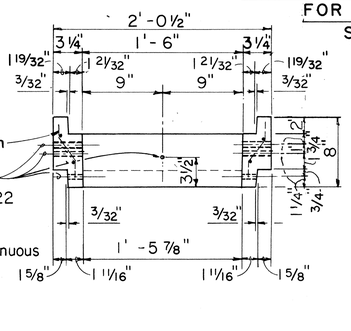
CHECKERED STEEL PLATE COVERS

FOR LIGHT LOADING AREAS - APPROX. WT. 55 LBS.

SCALE: 1 1/2" = 1'-0" (EXCEPT AS NOTED)



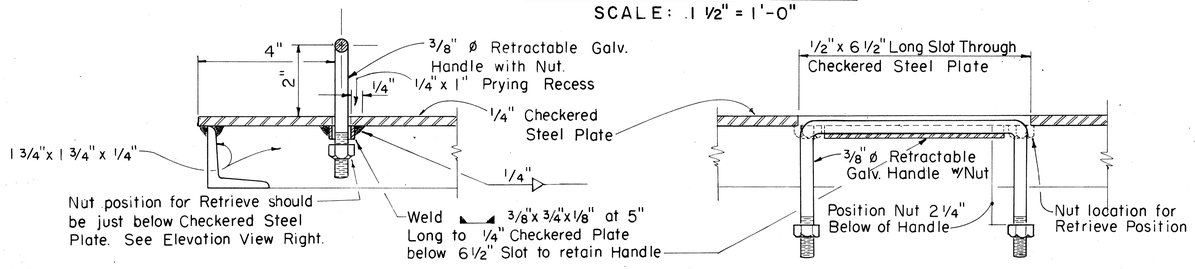
SECTION A-A



SECTION B-B

PULLBOX # 435 T-B

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

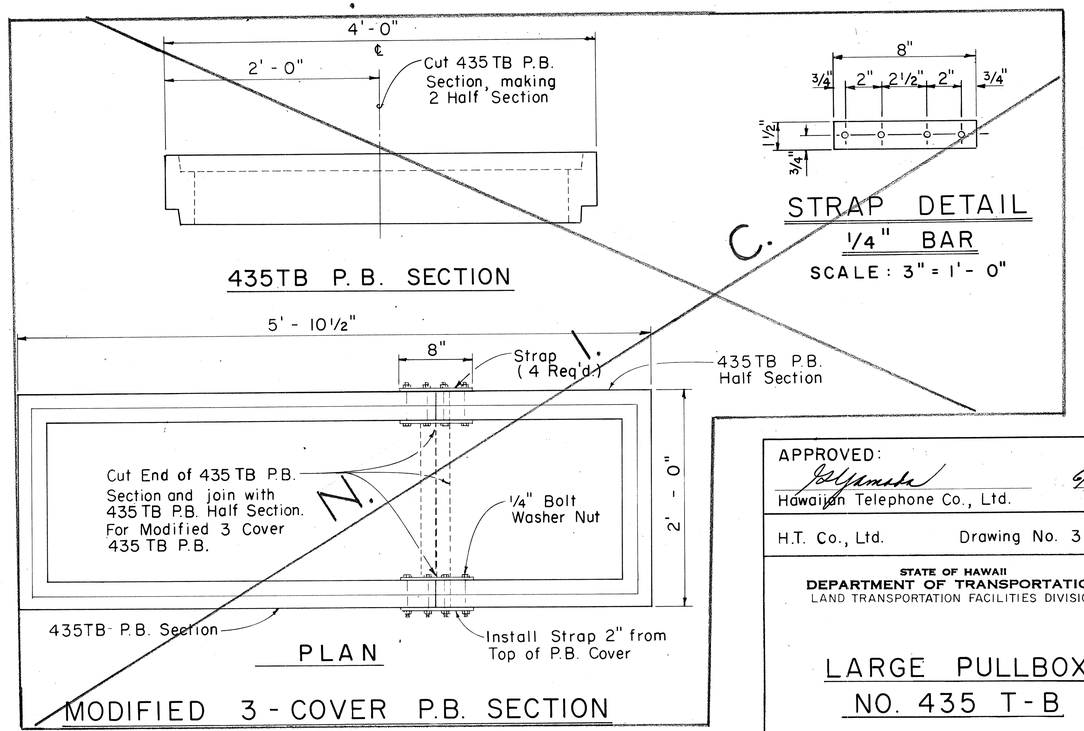


SECTION - RETRIEVE POSITION

ELEVATION - AT REST POSITION

RETRACTABLE HANDLE

SCALE: 6" = 1'-0"



APPROVED:

Hawaiian Telephone Co., Ltd. — Date 6/26/78

H.T. Co., Ltd. — Drawing No. 34056

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION

LARGE PULLBOX NO. 435 T-B

SHEET No. OF SHEETS

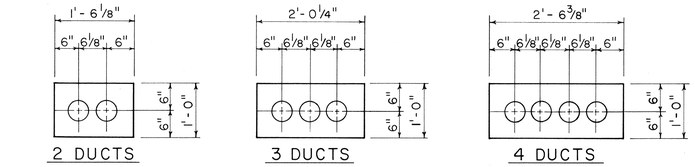
119

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

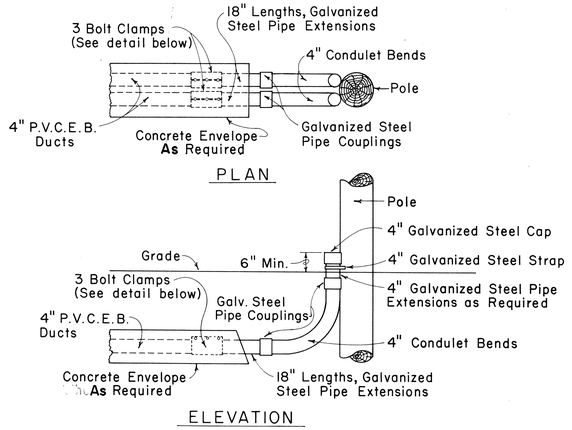
K&E IMPERIAL™ LA 3207

HT-5

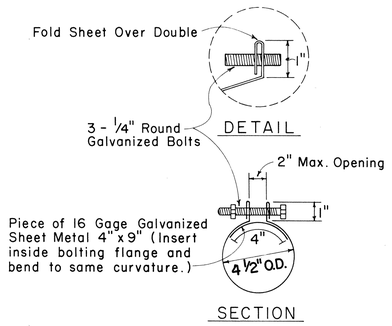
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	M-7600(1)	1978	120	198

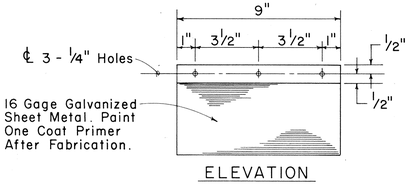


STANDARD DUCT FORMATIONS

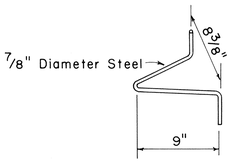


TYPICAL INSTALLATION DETAILS

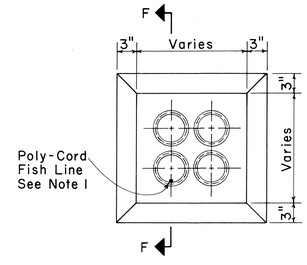




3-BOLT CLAMP ADAPTOR DETAIL

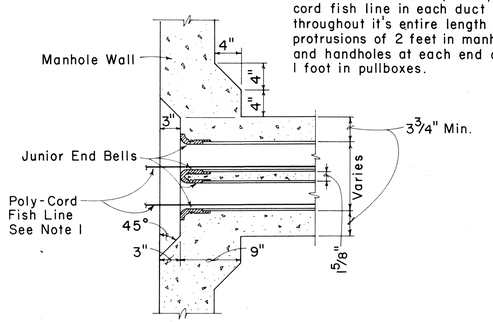


PULLING-IN IRON

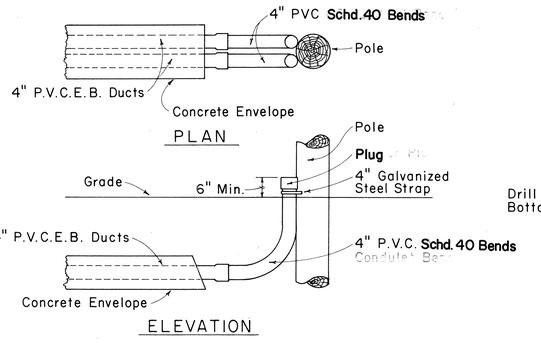


TYPICAL MANHOLE DUCT WINDOW

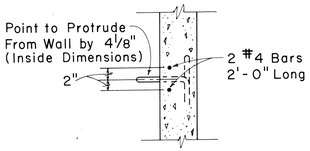
NOTE:
1. The contractor shall place poly-cord fish line in each duct throughout it's entire length with protrusions of 2 feet in manholes and handholes at each end and 1 foot in pullboxes.



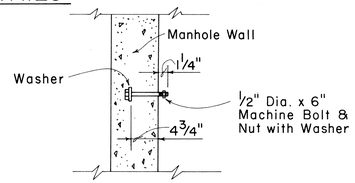
TYPICAL DUCT WINDOW DETAIL & JUNIOR END BELL



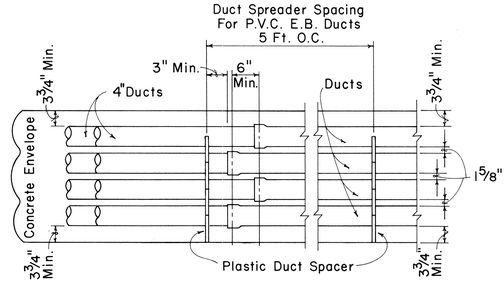
TYPICAL CONDULET BEND INSTALLATION DETAILS



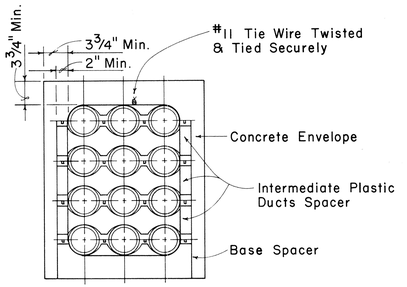
SECTIONAL VIEW OF PULLING-IN-IRON



CABLE RACK STUD BOLT DETAIL

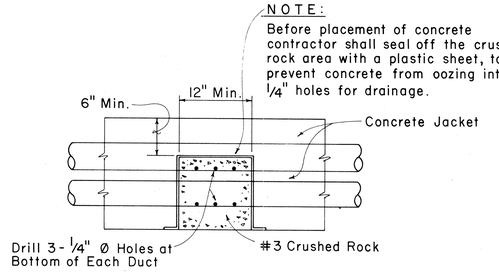


TYPICAL DUCT ENVELOPE ELEVATION ARRANGEMENT OF PLASTIC SPACERS



SECTION SHOWING INTER-LOCKING SPACERS

NOTE:
Before placement of concrete contractor shall seal off the crushed rock area with a plastic sheet, to prevent concrete from oozing into 1/4" holes for drainage.



ELEVATION VIEW OF DUCT DRAIN DETAIL

APPROVED:
B. Yamada
Hawaiian Telephone Co., Ltd.
6/26/78
Date

H.T. Co., Ltd. Drawing No. 34028

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION

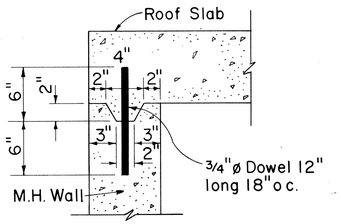
STANDARD DUCT FORMATIONS

Not to Scale

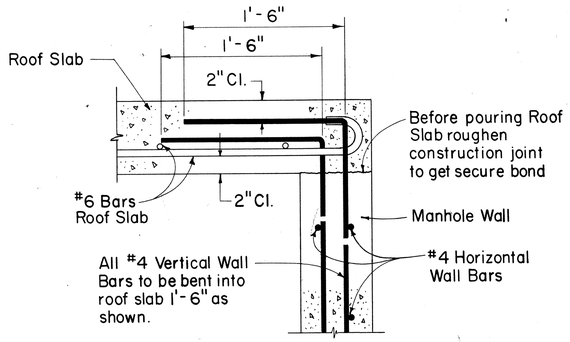
SHEET No. 120 OF SHEETS

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

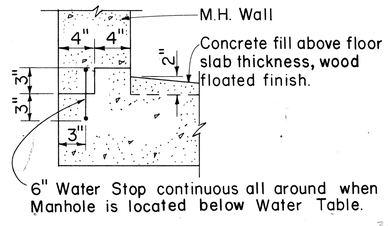
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	M-7600(1)	1978	121	198



DETAIL "A"
TOP CONSTRUCTION JOINT
Scale: 1 1/2" = 1'-0"
(Optional for cast-in-place construction
Required for precast construction)

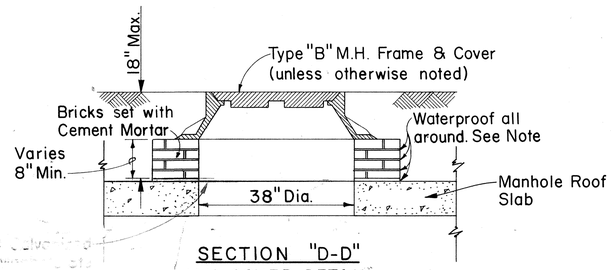


DETAIL "B"
(USED FOR CAST-IN-PLACE CONSTRUCTION)
Scale: 1 1/2" = 1'-0"

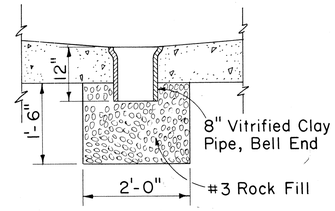


DETAIL "C"
BOTTOM CONSTRUCTION JOINT
Scale: 1 1/2" = 1'-0"

NOTE:
Corbel Bricks to suit Type A Frame & Cover.

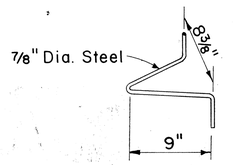


SECTION "D-D"
M.H. COVER DETAIL
Scale: 3/4" = 1'-0"

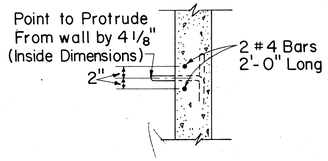


SECTION "E-E"
M.H. SUMP DETAIL
Scale: 3/4" = 1'-0"

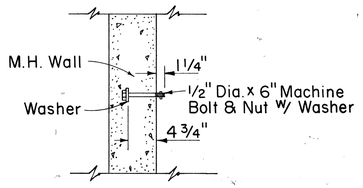
Note:
See Section "E_1-E_1" Below



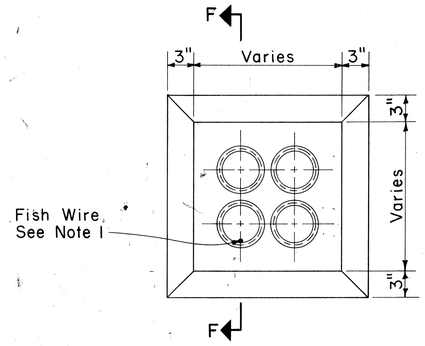
PULLING-IN IRON



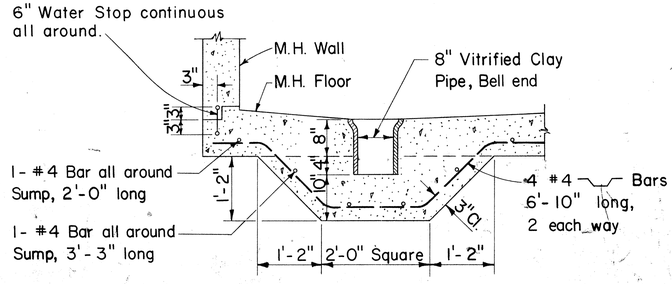
SECTIONAL VIEW OF PULLING-IN IRON
Scale: 3/4" = 1'-0"



CABLE RACK STUD BOLT DETAIL
Scale: 1" = 1'-0"

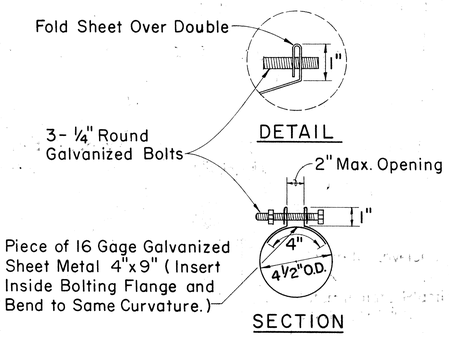


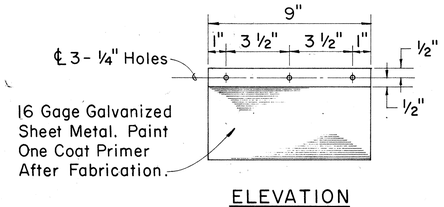
TYPICAL MANHOLE DUCT WINDOW
Scale: 1 1/2" = 1'-0"



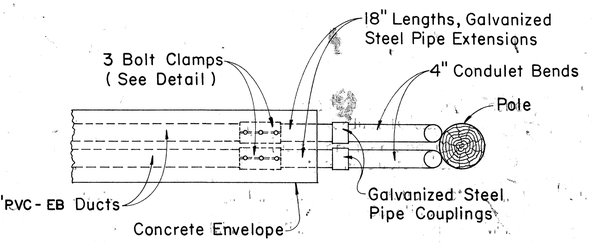
Note: Only for manholes located below water table

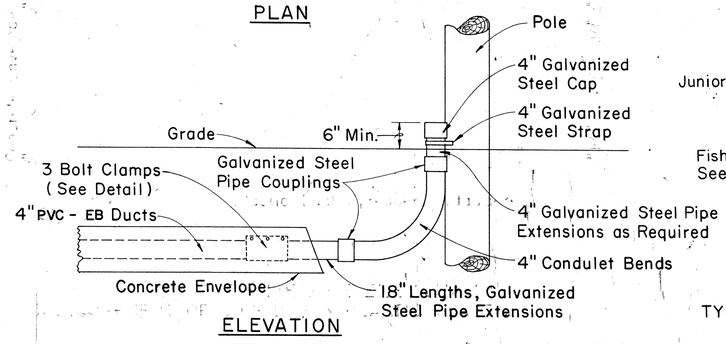
SECTION "E_1-E_1"
MANHOLE SUMP DETAIL
Scale: 3/4" = 1'-0"





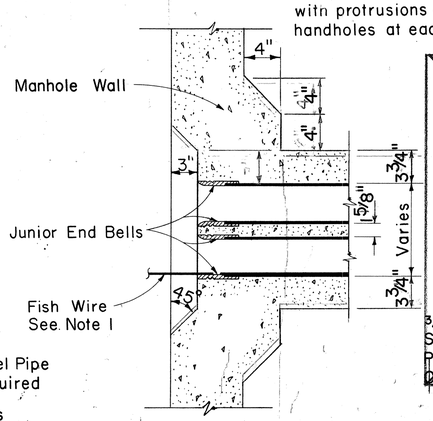
ELEVATION
3-BOLT CLAMP ADAPTOR DETAIL
Scale: 3" = 1'-0"



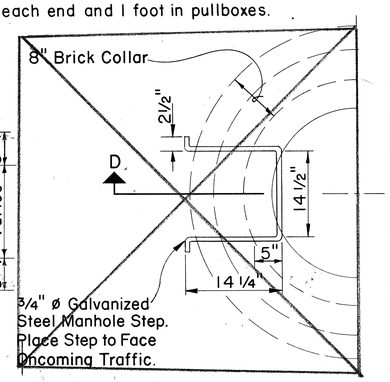


ELEVATION
TYPICAL INSTALLATION DETAILS
Scale: 3/4" = 1'-0"

NOTE
1. The Contractor shall place poly-cord each duct throughout its entire length with protrusions of 2 feet in manholes & handholes at each end and 1 foot in pullboxes.



SECTION "F-F"
TYPICAL WINDOW DETAIL & JUNIOR END BELL
Scale: 1 1/2" = 1'-0"



~~PART-PLAN~~
~~MANHOLE STEP~~
~~Scale: 1"=1'-0"~~

Supplement Sheet to Type "A-1" (Drawing Nos. 34060 & 34061), Type "A-2" (Drwg. Nos. 34062 & 34063) and Type "A-3" (Drwg. Nos. 34064 & 34065) Telephone M.H.

APPROVED:

Hawaiian Telephone Co., Ltd. — Date 6/26/78

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION

STANDARD DETAILS

TYPE "A" MANHOLE AND MISCELLANEOUS TELEPHONE DETAILS

Scale: As Noted Date:

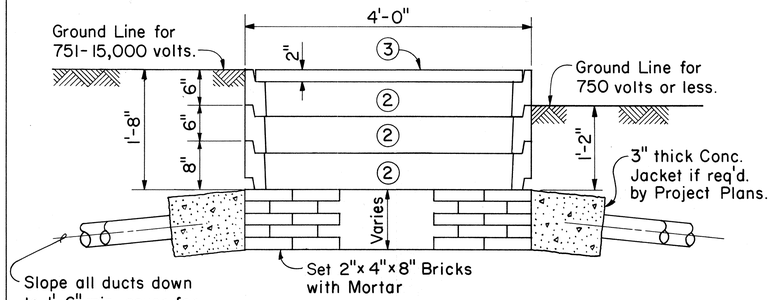
SHEET No. OF SHEETS

121

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.	M-7600(1)	1978	122	198

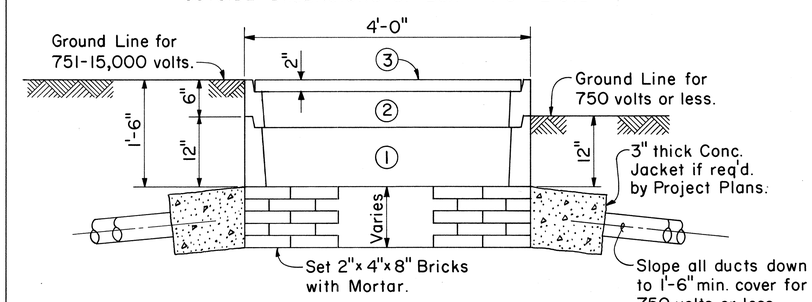
OUTSIDE DIMENSIONS OF BOX = 4'-0" x 2'-0½"



TYPICAL INSTALLATION USING SERVICE BOX EXTENSIONS

OPTIONAL ARRANGEMENT

OUTSIDE DIMENSIONS OF BOX = 4'-0" x 2'-0½"



TYPICAL INSTALLATION USING SERVICE BOX BODY AND EXTENSION

PREFERRED ARRANGEMENT

VOLTAGE CLASS	NO. OF UNITS REQUIRED	
	PREFERRED	OPTIONAL
750 volts or less	1 Body	2 Extensions
751 to 15,000 volts (See Note 1)	1 Body and 1 Extension	3 Extensions

ITEM NO.	DESCRIPTION	H.E. CODE NO.
1	Body	11310
2	Extension	11311
3	Cover, Non Traffic Type	11312

SERVICE BOX (1'-6" x 3'-6") INSTALLATION DETAILS UNDERGROUND

Scale : 1" = 1'-0"

NOTES:

1. Refer to "Guide for Handhole Applications-12 KV" for proper application of Service Box with type and size of 12 KV cable.
2. Contractor may either install the Preferred or Optional Arrangements of Service Box units.

APPROVED:

elg 11/9 J Kamimoto — 11/6/78

HAWAIIAN ELECTRIC Co., Inc. — DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION

STANDARD DETAILS

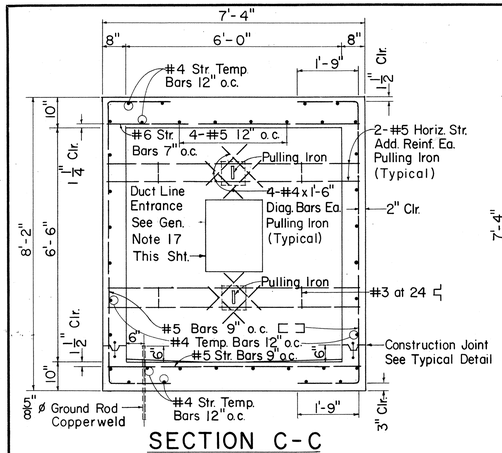
SERVICE BOX INSTALLATION DETAILS

SHEET No. 122 OF SHEETS

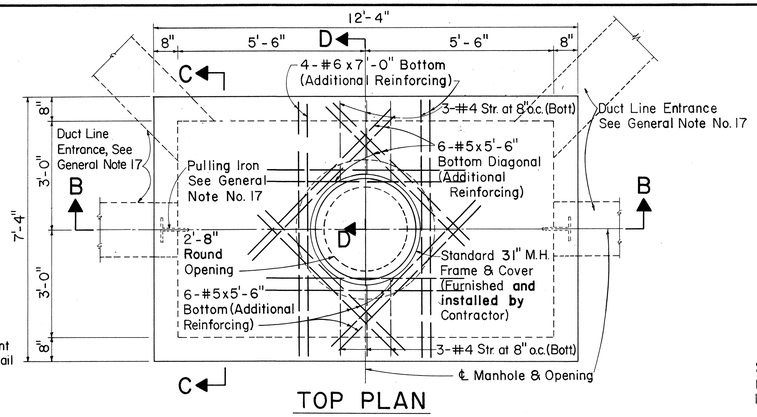
H. E. Co. DWG. NO. 30-2005

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

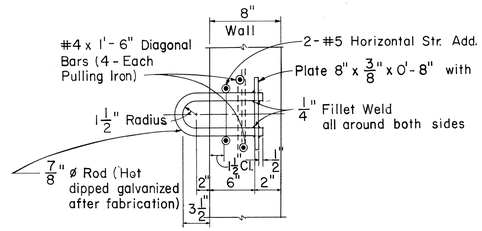
FED.ROAD DIST. NO.	STATE	FED. AID PROJ.NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAWAII	M-7600(1)	1978	123	198



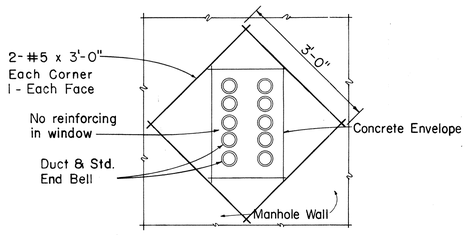
SECTION C-C



TOP PLAN



PULLING IRON DETAIL

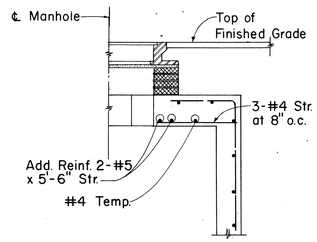


ELEVATION

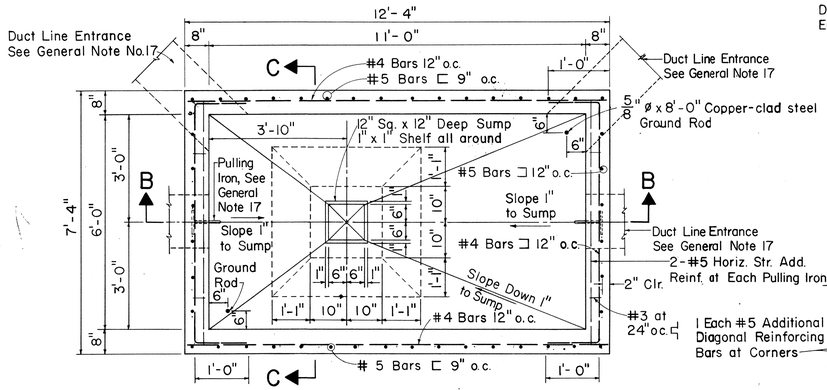
REINFORCING AT DUCT WINDOW

GENERAL NOTES

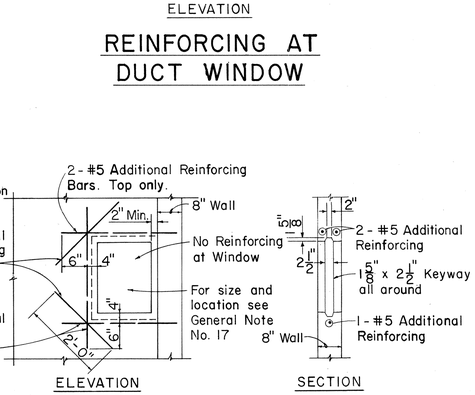
1. EXCAVATION : Excavate for manhole to accurate alignment, grades and dimensions as shown on drawings.
   All excavation must be approved by Engineering Dept. H.E. Co. before any concrete is poured.
   All excess cut shall be backfilled with concrete or approved aggregate.
2. BACKFILL : Remove all debris before backfilling. Backfill in accordance with latest specifications of Division of Highways, State of Hawaii.
3. All work to be done in dry.
4. Concrete shall be Class A **conforming to the requirements of Section 601 of the State Standard Specification.**
5. MIXING : Ready-Mixed A.S.T.M. C-94-47.
6. REINFORCING : Round deformed bars (clean and new).
   Grade 40 Billet Steel per ASTM A615.
7. **SPLICE : Lap 30 bar diameters unless otherwise shown.**
8. **CURING : Keep concrete moist at least 7 days after pouring (By approved method)**
9. FINISH : All surfaces smooth and free from defects.
   Top of manhole - wood floated. Manhole floor - steel troweled.
   Inside walls and ceiling - cement washed.
10. Install all inserts, including pulling irons, ground rods, etc, before pouring concrete.
11. POURING : Notify the H.E.Co. Contracting and Inspection Division, 24 hours before pouring any concrete. All concrete pouring shall be done in the presence of an H.E.Co. Engineer or Inspector.
12. FORMS : Make of good sound lumber, of sufficient strength, water tight and conforming to shape and dimensions indicated on drawings.
13. The Contractor to furnish and install for each manhole:
    a. 2-5/8" ø x 8'-0" copper-**clad steel ground rods.**
    b Standard **31"** manhole frame and cover. (H.E. Standard)
14. Slope manhole floor down 1" toward sump.
15. All work shall be subject to inspection by the Hawaiian Electric Co. Inc.; and/or Division of Highways, State of Hawaii; and/or Division of Engineering, City & County of Honolulu.
16. All materials shall be new and shall be manufactured in the United States **of America**
17. For number, size, and exact location of ducts entrances and pulling irons, refer to project drawings.
18. **Waterstop shall conform to the requirements of Section 705.07 of the State Standard Specifications for Road & Bridge Construction.**
19. The Contractor is to furnish all materials to complete the construction.



SECTION D-D



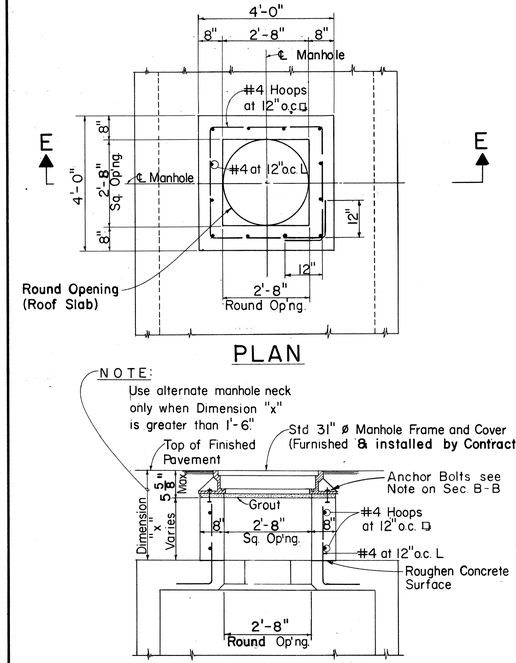
SECTIONAL PLAN A-A



ELEVATION SECTION

NOTE:
Provide opening for future duct line. Fill opening with bricks with mortar joints as required. (See project drawing).

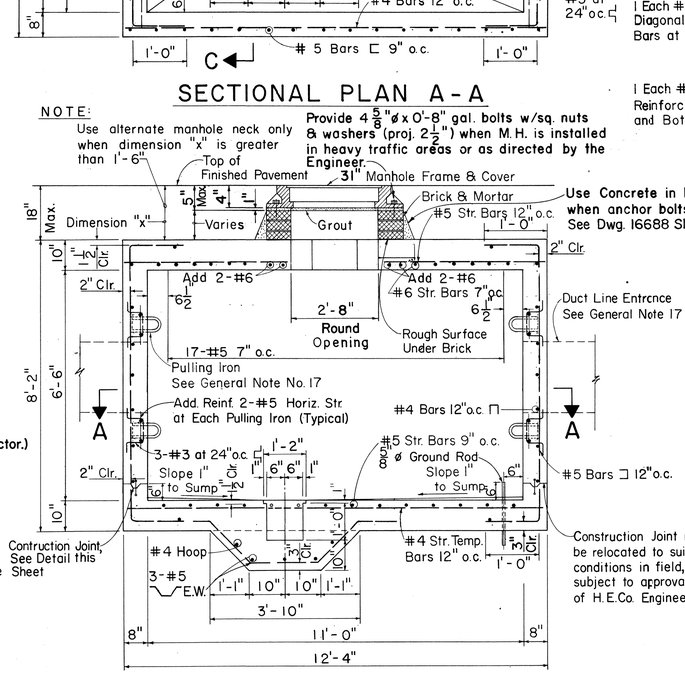
KNOCKOUT FOR FUTURE DUCT LINE



PLAN

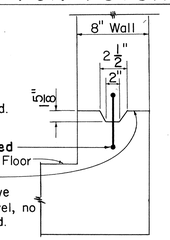
SECTION E-E

ALTERNATE MANHOLE NECK



SECTION B-B

TYPICAL DETAIL OF CONSTRUCTION JOINT AND KEYWAY



QUANTITY OF MATERIALS, (M.H. ONLY)

* Concrete	= 11.52 Cu. Yds.
Reinf. Steel	= 1444.61 lbs.
Misc. Steel (Pulling Irons, ea.	= 10.90 lbs.

ADDITIONAL QUANTITY OF MATERIALS FOR ALTERNATE NECK (Dim. "X" = 2'-0")

Concrete	= 0.50 Cu. Yds.
Reinf. Steel	= 40.0 lbs.

* NOTE: Conc. for M.H. necks when used in lieu of bricks (for dim "X" < 1'-6") for anchor bolt installation is not included in above totals.

REFERENCE DRAWINGS AND SPECIF.

011327 & 011328 - Standard H.E.Co. 31" **Manhole** Frame and Cover.
20191 & 30-1033 - Underground Ductline Construction Standards - Details.
CS 7001-0 - **Construction of Underground Facilities - Specification**

APPROVED :
HAWAIIAN ELECTRIC Co., Inc. — DATE 7/6/78

FOR USE IN AREAS SUBJECT TO VEHICULAR TRAFFIC

HECo., Inc. Drawing Number
18775

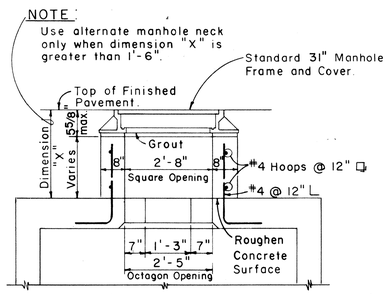
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION

STANDARD DETAILS
MANHOLE TYPE No. 1 (6'-0" x 11'-0")
UNDERGROUND STANDARDS

Scales: Not to Scale

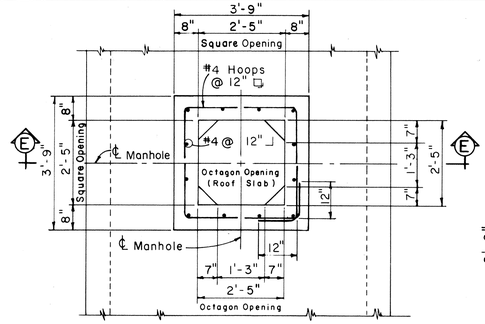
SHEET NO. 123 OF SHEETS

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



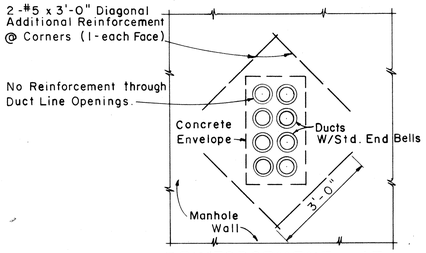
SECTION "E-E"

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



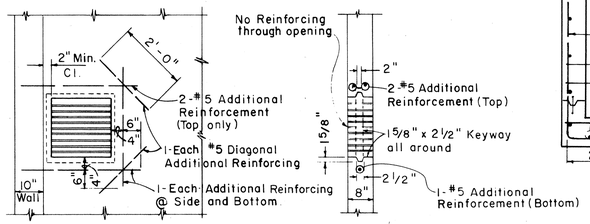
PLAN
ALTERNATE MANHOLE NECK

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



REINFORCEMENT AT DUCT LINE ENTRANCES

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

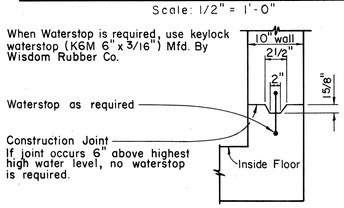


NOTE:
Provide opening for future duct line. Fill opening with bricks with mortar joints as required. (See Project Dwg. for Location)

PART ELEVATION SECTION

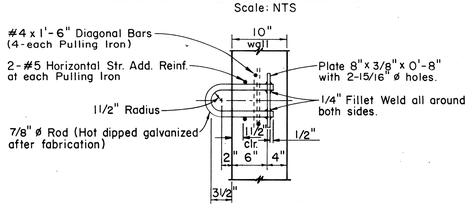
KNOCKOUT FOR FUTURE DUCT LINE

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



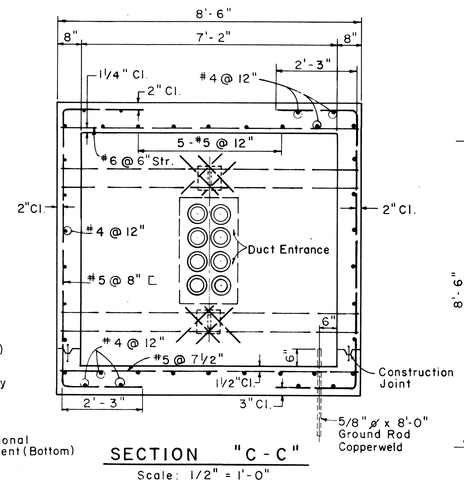
TYPICAL DETAIL OF CONSTRUCTION JOINT AND KEYWAY

Scale: NTS



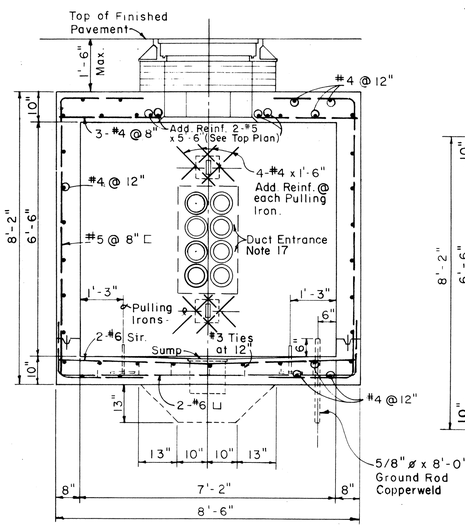
PULLING IRON DETAIL

Scale: NTS



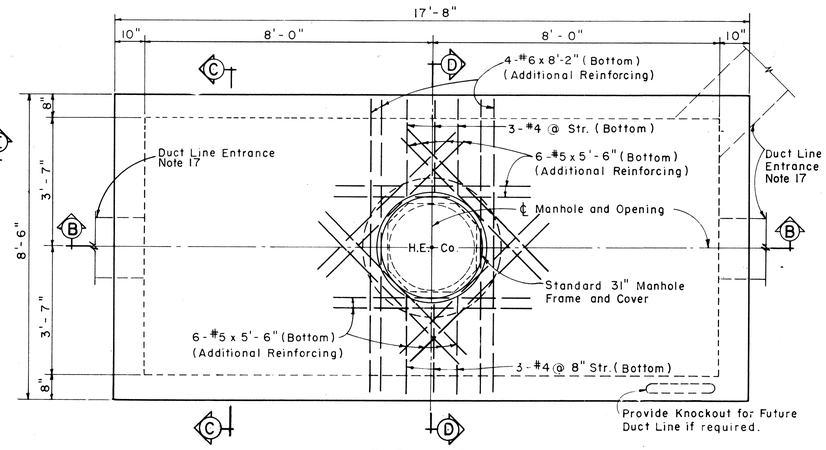
SECTION "C-C"

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



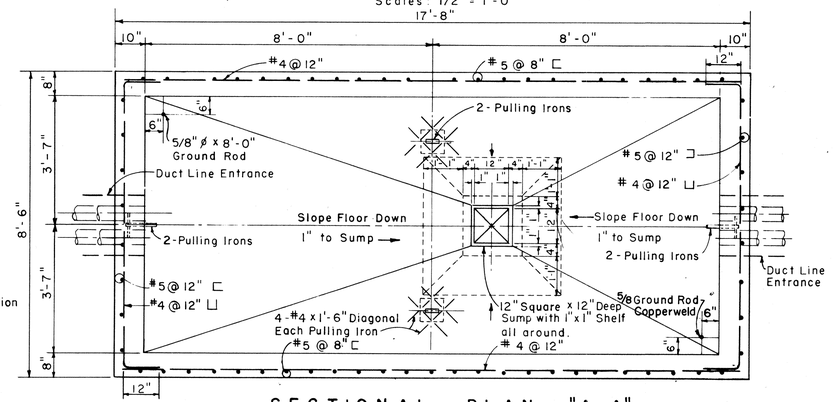
SECTION "D-D"

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



TOP PLAN

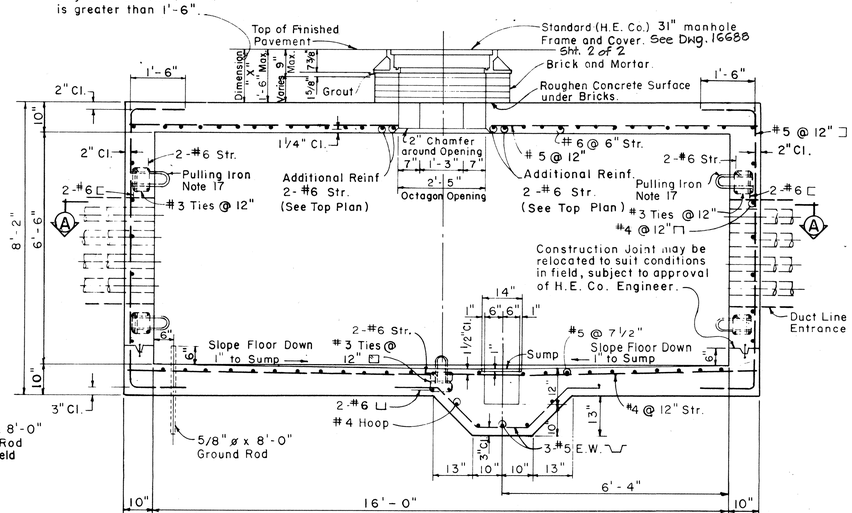
Scales: 1/2" = 1'-0"



SECTIONAL PLAN "A-A"

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

NOTE:
Use alternate manhole neck only when dimension "X" is greater than 1'-6"



SECTION "B-B"

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

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	M-7600(1)	1978	124	198

GENERAL NOTES

1. Excavation: Excavate for manhole to accurate alignment, grades and dimensions as shown on drawings. All excavation must be approved by the Engineering Dept., H.E. Co., before any concrete is poured. All excess cuts shall be backfilled with concrete or approved aggregate.
2. Backfill: Remove all debris before backfilling. Backfill in accordance with latest specifications of Division of Highways, State of Hawaii.
3. All work to be done in dry.
4. Concrete shall be Class A conforming to the requirements of Section 601 of the State Standard Specification.
5. Mixing: Ready-Mixed A.S.T.M. C-94-47.
6. Reinforcing: Round deformed bars. (Clean and new).
7. Splice: Lap 30 bar diameters unless otherwise shown.
8. Curing: Keep concrete moist at least 7 days after pouring. (By approved method).
9. Finish: All surfaces smooth and free from defects.
   Top of manhole - wood floated.
   Manhole floor - steel trowelled.
   Inside wall and ceiling - cement washed.
10. Install all inserts, including pulling irons, ground rods, and etc., before pouring concrete.
11. Pouring: Notify the H.E. Co., Contracting and Inspection Division, 24 hours before pouring any concrete. All concrete pouring shall be done in the presence of a H.E. Co., Engineer or Inspector.
12. Forms: Made of good sound lumber of sufficient strength, water tight and conforming to shape and dimensions indicated on drawings.
13. The Contractor shall furnish and install for each manhole:
    A. 2-5/8" ø x 8'-0" copperweld ground rods.
    B. Standard (H.E. Co.) 31" manhole frame and cover. (H.E.Co. Standard)
14. Slope manhole floor down 1" toward sump.
15. All work shall be subject to inspection by the H.E. Co. and/or Division of Highways, State of Hawaii, or Div. of Engineering, C & C of Honolulu.
16. All materials shall be new and manufactured in the United States of America.
17. For number, size, and exact location of duct entrances and pulling irons, refer to project drawings.
18. Water Stop shall conform to the requirements of Section 705.07 of the State Standard Specifications for Road and Bridge Construction.

REFERENCE DRAWINGS

011327 & 011328	Standard H.E. Co., 31" Manhole Frame and Cover.
20191 & 30-1033	U.G. Duct Line Construction Standards.
CS7001-0	Construction of Underground Facilities - Specifications

REINFORCED CONCRETE QUANTITIES

QUANTITY OF MATERIALS FOR DEPTH "D"

Total Concrete	=	18 Cu. Yds.
Total Reinforcing Steel	=	2,579 Lbs.

QUANTITY OF MATERIALS FOR ALTERNATE NECK "D" = 1'-0"

Concrete	=	0.29 Cu. Yds.
Reinforcing Steel	=	39 Lbs.

MATERIALS FOR 6" DEPTH OF 8" AND 10" THICK WALL

Concrete	=	0.66 Cu. Yds.
Reinforcing Steel	=	52.5 Lbs.

APPROVED:
HAWAIIAN ELECTRIC Co. Inc. — DATE 7/6/78

FOR USE IN AREAS SUBJECT TO PRESENT AND FUTURE VEHICULAR TRAFFIC.

HE Co., Inc. Drawing Number

15588

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION

STANDARD DETAILS

MANHOLE TYPE No. 4 (7'-2" x 16'-0") UNDERGROUND STANDARDS

SHEET No. OF SHEETS

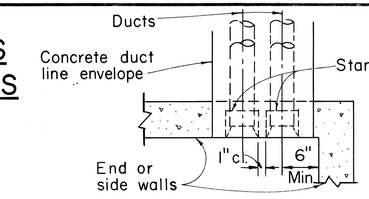
124

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

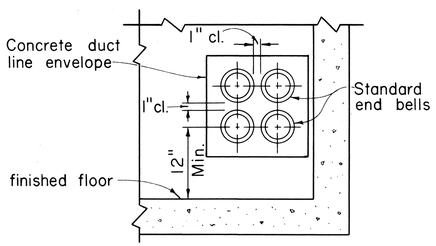
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	M-7600(1)	1978	125	198

GENERAL NOTES FOR MANHOLES & HANDHOLES STANDARD DETAILS

1. All work shall be subject to inspection by the Hawaiian Electric Co., Inc., Contracting & Inspection Division, City & County of Honolulu and/or Land Transportation Facilities Division, State of Hawaii, whichever Government has authority over the work.
2. Contractor shall notify the Hawaiian Electric Co., Inc., Contracting & Inspection Division, phone 548-4427 or 548-4428 24 hours before proceeding with any work on facilities owned by Hawaiian Electric Co., Inc..
3. Ducts: For number; size and exact location of Duct Entrances, refer to Project Drawings.
4. Pulling Irons: For number and locations, refer to Project Drawings.



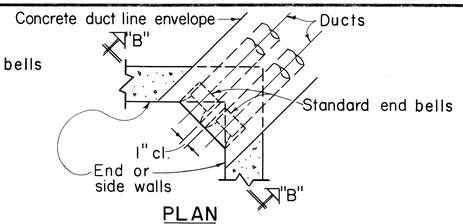
PLAN



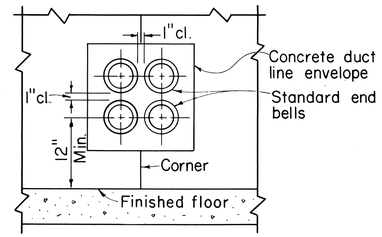
ELEVATION

END OR SIDE ENTRANCE

Scale: 1" = 1'-0"



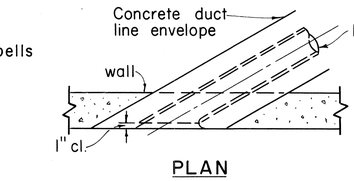
PLAN



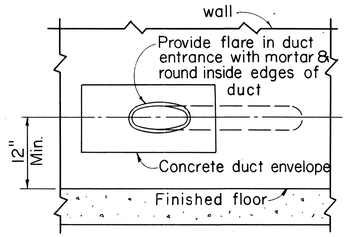
ELEVATION "B-B"

CORNER ENTRANCE

Scale: 1" = 1'-0"



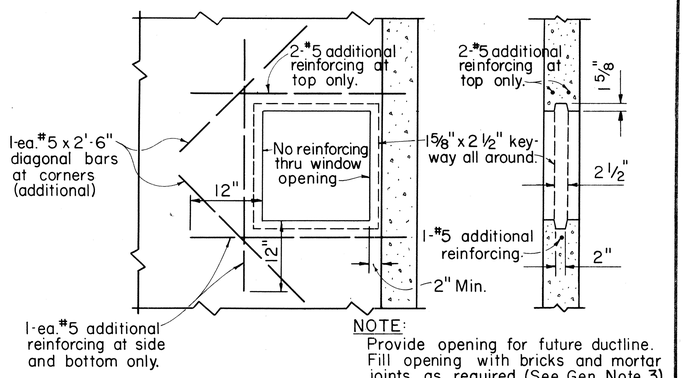
PLAN



ELEVATION

DIAGONAL ENTRANCE

Scale: 1" = 1'-0"



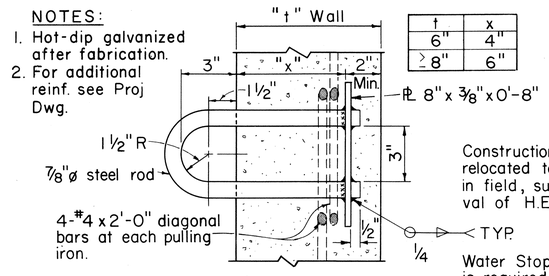
NOTE:
Provide opening for future ductline. Fill opening with bricks and mortar joints as required. (See Gen. Note 3)

ELEVATION SECTION

KNOCKOUT FOR FUTURE DUCT LINE

Scale: 1" = 1'-0"

NOTES:
1. Hot-dip galvanized after fabrication.
2. For additional reinf. see Proj Dwg.

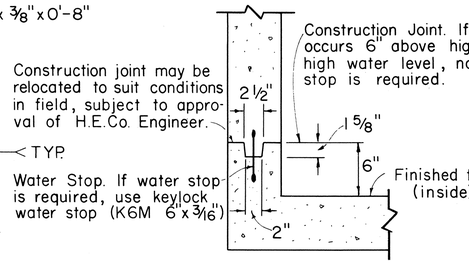


t	x
6"	4"
≥ 8"	6"

SECTION

PULLING IRON

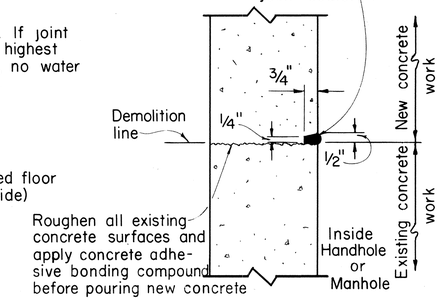
Scale: 3" = 1'-0"
TYPE II (OPTIONAL)



SECTION

TYPICAL CONSTRUCTION JOINT

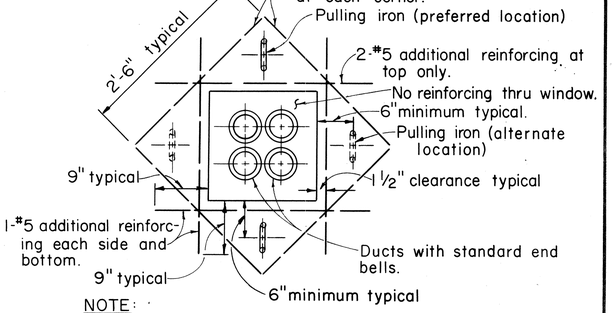
Scale: 1 1/2" = 1'-0"



SECTION

TYPICAL COLD JOINT

Scale: 3" = 1'-0"

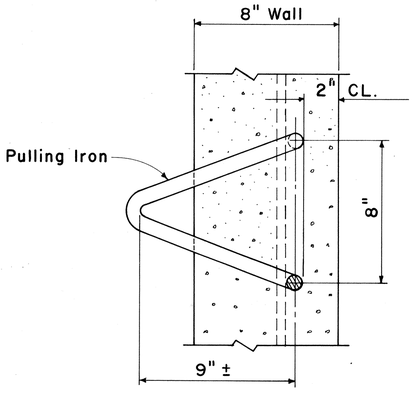


NOTE:
Generally 2 pulling irons are required and located on opposite wall of each duct window unless otherwise shown or noted. H.E.Co. Engineer shall determine number required.

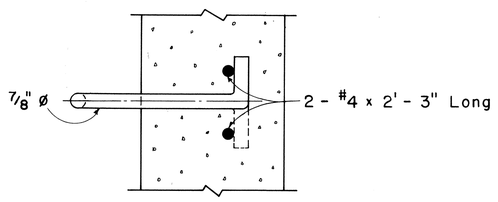
ELEVATION

TYPICAL DUCT WINDOW

Scale: 1" = 1'-0"



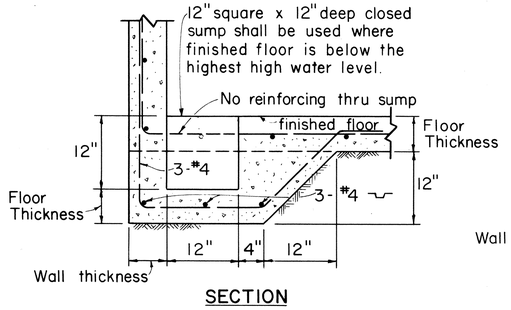
PLAN



SECTION

PULLING IRON FOR 8" WALL – TYPE I (PREFERRED)

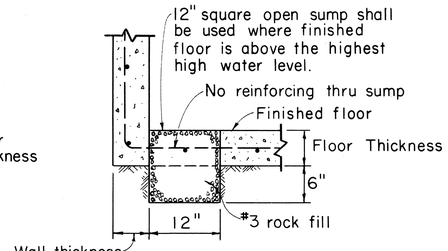
Scale: 3" = 1'-0"



SECTION

CLOSED SUMP

Scale: 1" = 1'-0"



SECTION

OPEN SUMP

Scale: 1" = 1'-0"

APPROVED:
Hawaiian Electric Co., Inc.
7/6/78
Date

HECo., Inc. Drawing Number
16688
SHEET NO. 1 OF 2 SHEETS

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION

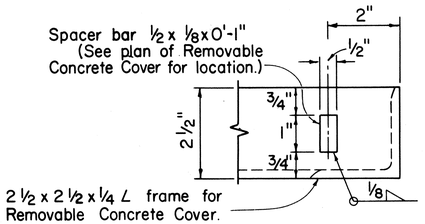
MISCELLANEOUS DETAILS HANDHOLES & MANHOLES UNDERGROUND STANDARDS

Scale as noted

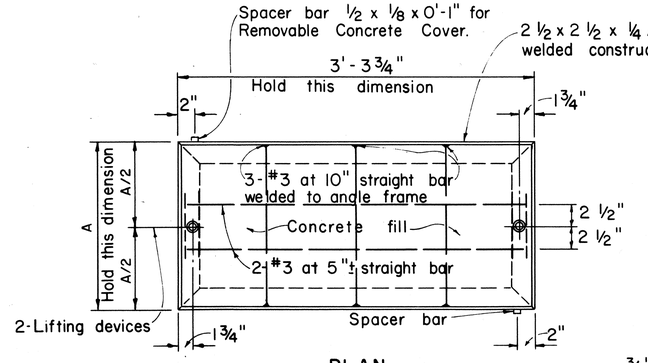
SHEET No. OF SHEETS
125

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

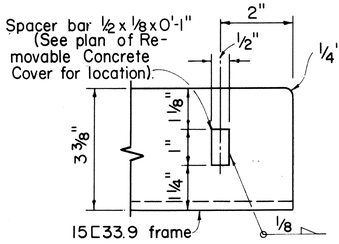
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	M-7600(1)	1978	126	198



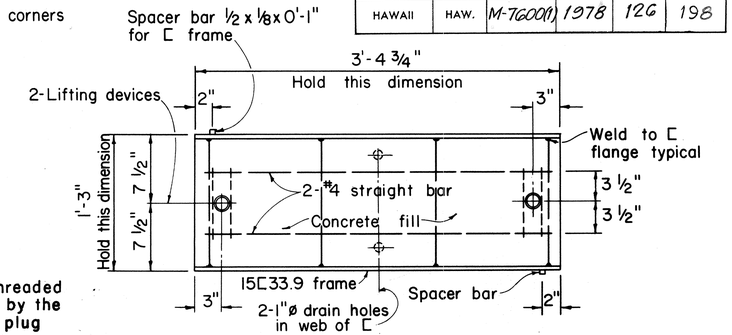
PART ELEVATION
SPACER BAR
Scale: ½ full size



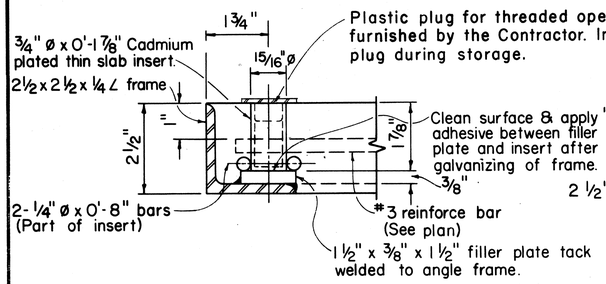
PLAN
Scale: 1½" = 1'-0"



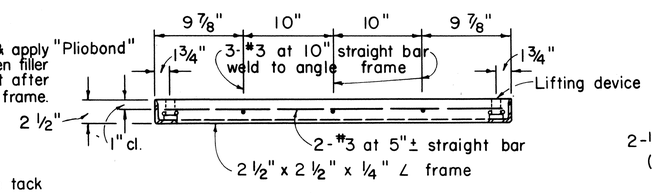
PART ELEVATION
SPACER BAR
Scale: ½ full size



PLAN
Scale: 1½" = 1'-0"



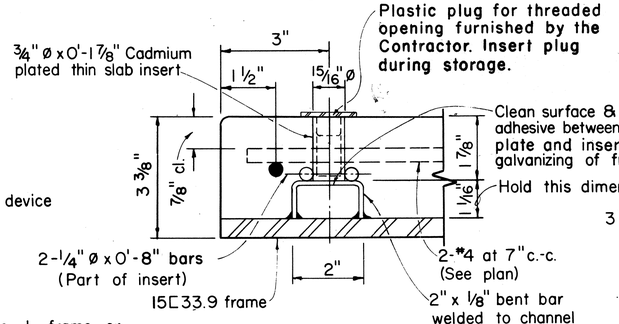
PART SECTION
LIFTING DEVICE
Scale: ½ full size



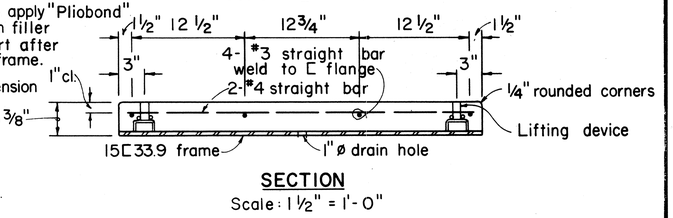
SECTION
Scale: 1½" = 1'-0"

TYPE	DIMENSIONS	
	A	A/2
"SW"	1'-6¾"	9⅜"
"SWI"	1'-2 13/16"	7 13/32"

NOTE: Galvanize □ frame or □ frame, steel rods, and spacer bars after fabrication.



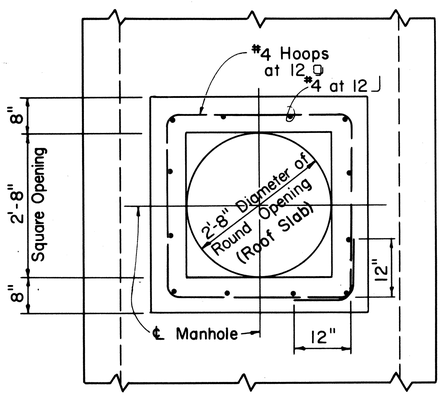
PART SECTION
LIFTING DEVICE
Scale: ½ full size



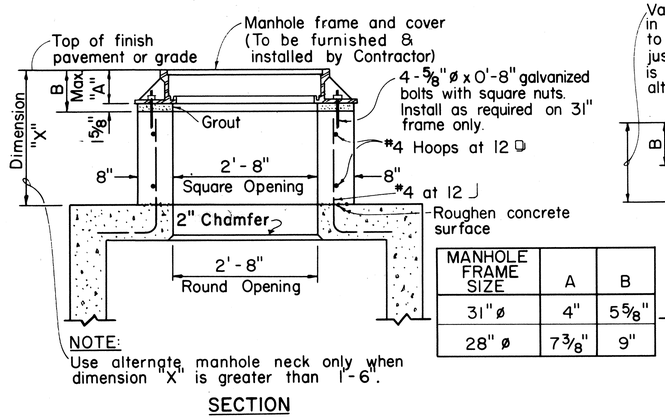
SECTION
Scale: 1½" = 1'-0"

TYPE "TR" REMOVABLE CONCRETE COVER

TYPE "SW" & "SWI" REMOVABLE CONCRETE COVER



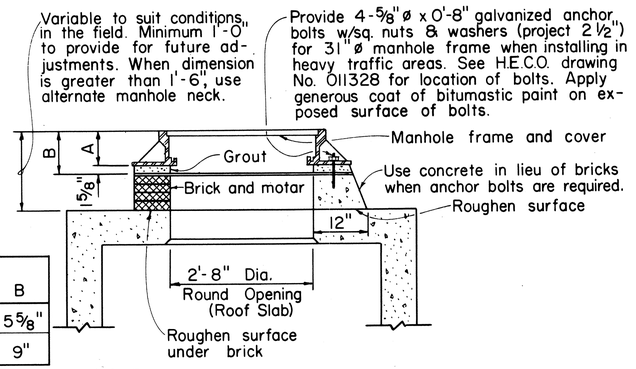
PLAN



NOTE:
Use alternate manhole neck only when dimension "X" is greater than 1'-6".

SECTION

MANHOLE FRAME SIZE	A	B
31" ø	4"	5⅝"
28" ø	7⅜"	9"



NOTE:
See table alternate manhole neck detail for dimension A and B.

ALTERNATE MANHOLE NECK

Scale: ¾" = 1'-0"

31" ø & 28" ø MANHOLE FRAME NECK DETAIL

Scale: ¾" = 1'-0"

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

APPROVED:
Hawaiian Electric Co., Inc.
7/6/78 Date

HECo., Inc. Drawing Number
16688
SHEET NO. 2 OF 2 SHEETS

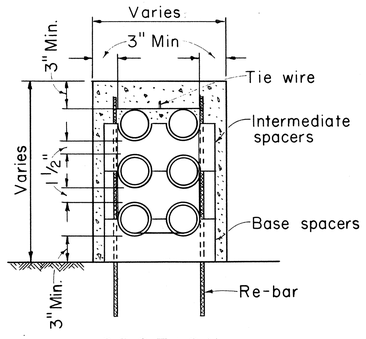
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION

MISCELLANEOUS DETAILS
HANDHOLES & MANHOLES
UNDERGROUND STANDARDS

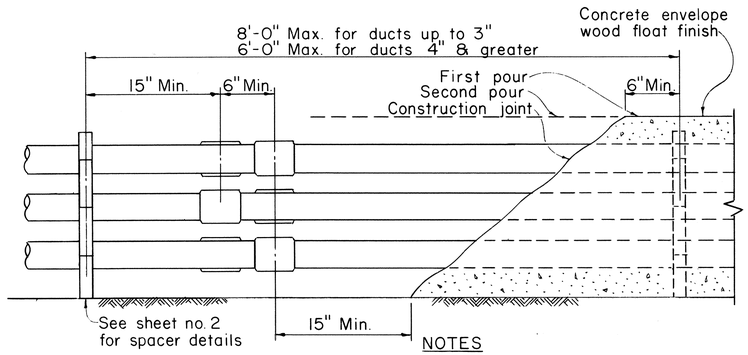
Scale as noted

SHEET No. OF SHEETS
126

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	M-7600(1)	1978	127	198



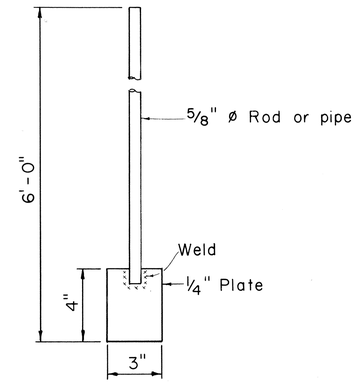
SECTION



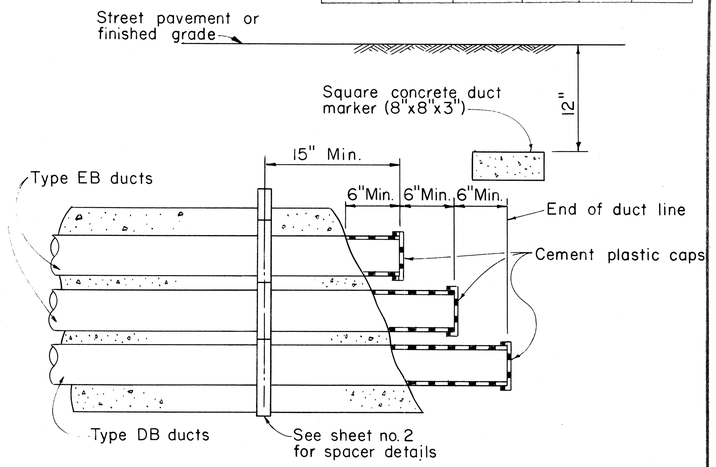
ELEVATION

TYPICAL DUCT LINE
(6-WAY DUCT SHOWN)
Scale: 1½" = 1'-0"

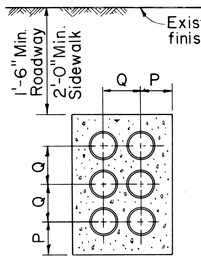
NOTES
1. Stagger couplings (or belled ends).
2. Anchor conduit with #14 steel tie wire & #4 reinforcing bars.
3. Cement all joints.
4. Avoid standing on conduit.



HAND SPADE
Scale: 3" = 1'-0"



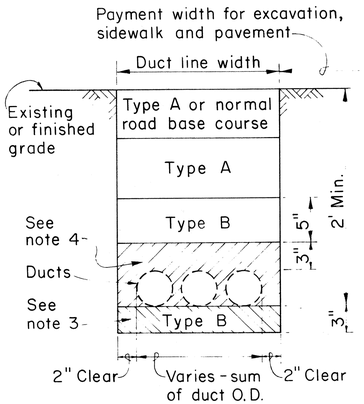
TYPICAL STUB OUT DETAIL
(6-WAY DUCT SHOWN)
Scale: 1½" = 1'-0"



DUCT SIZE	DIMENSIONS (INCHES) P	Q
2	4 1/4	4 1/8
3	4 3/4	5 1/8
4	5 1/4	6 1/4
5	5 7/8	7 5/8
6	6 5/16	8 5/8

NOTE:
1. Maintain 1½" minimum spacing between conduit; 3" minimum concrete envelope around top, bottom & sides.
2. Dimensions are minimum dimensions.
3. The bottom row in an encased duct bank of three or more layers shall be Type DB ducts. The remaining ducts shall be Type EB.

EB TYPICAL DUCT SECTION
(6-WAY DUCT SHOWN)
Scale: 1" = 1'-0"



NOTES:
1. Type A: Beach sand, earth or earth and gravel. If earth and gravel, the max. rock size shall be 1" and the mixture shall contain not more than 50%, by volume, of rock particles.
2. Type B: Beach sand, earth or earth and gravel. If earth and gravel, the mixture must pass a ½" mesh screen and contain not more than 20%, by volume, of rock particles.
3. When trench bottom is coarser than Type B material, provide 3" duct cushion.
4. Soil poison details: Use an aqueous solution of 2% chlordane, 1% dieldrin or 1% adlrin, when specified by engineer. Apply soil poison (1 gal. per 3 square feet) to trench floor and to layer of backfill from trench floor to 3" above conduit.

D.B. EXCAVATION & BACKFILL DETAILS (TYPICAL)
Scale 1½" = 1'-0"

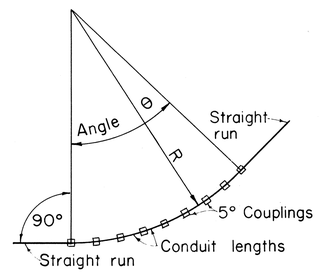


TABLE "A"	
APPROX. RADIUS OF BEND, R	LENGTH OF E.A. CONDUIT-FT USING 5° BEND AT COUPL.
11'-6"	1
17'-3"	1.5
23'-0"	2
28'-9"	2.5
34'-6"	3
40'-3"	3.5
46'-0"	4
51'-9"	4.5
57'-6"	5
69'-0"	6
80'-6"	7
92'-0"	8

TABLE "B"		
ANGLE OF BEND θ	NO. OF COUPLINGS	LENGTH OF CONDUIT
15°	3	2
30°	6	5
45°	9	8
60°	12	11
75°	15	14
90°	18	17

EXAMPLE:
Radius of bend (R) = 60'
Angle of bend (θ) = 45°

From Table A, the nearest value to 60' radius is 57'-6". Length of conduit = 5'.

From Table B, for 45° angle.
Number of couplings required = 9
Number of conduit lengths required = 8

METHOD OF FORMING CURVES:
There are 4 methods of forming curves with plastic conduit.
1. "Cold" bending: Limit trench formed radius sweeps to 25' minimum radius.
2. "Heat" bending: Do not heat bend conduit.
3. 5° angle couplings may be used as shown.
4. Factory made elbows and sweeps may be used only when specified by Engineer.

APPLICATION OF 5° COUPLING FOR LONG RADIUS BENDS

GENERAL NOTES

A. APPROVED CONDUIT MATERIALS	HECO PURCHASE SPECIFICATION NO.
1. Encased Burial (EB) Conduit	
a) Asbetos Cement, Type I	M7005
b) ABS (Acrylonitrile-Butadiene-Styrene) Plastic Conduit, Type EB	M7001
c) PVC (Polyvinyl Chloride) Plastic Conduit, Type EB	M7001
d) PVC Plastic Conduit, Schedule 40	116
See note 3 EB Typical Duct Section	
2. Direct Burial (DB) Conduit	
a) ABS Plastic Conduit, Type DB	M7001
b) PVC Plastic Conduit	M7001
c) PVC Plastic Conduit, Schedule 40	116

B. This drawing provides details for installing Plastic Ducts (ABS & PVC) only. Refer to drawing 30-1030 & 30-1033 for installing Asbestos Cement Ducts Encased Burial.

REFERENCE SPECIFICATION
- CS 7202 General Conditions
- CS 7001 Construction of U.G. Facilities
- CS 7003 Construction of Electrical Facilities

APPROVED:
Hawaiian Electric Co., Inc. — Date 7/6/78

HECo., Inc. Drawing Number
30-1035 SHEET No. 1 OF 2 SHEETS

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION

STANDARD DETAILS

PLASTIC DUCTS
INSTALLATION DETAILS
UNDERGROUND STRUCTURES

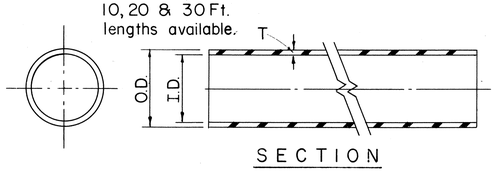
Scale as noted

SHEET No. 127 OF SHEETS

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

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	M-7600(1)	1978	128	198

10, 20 & 30 Ft. lengths available.

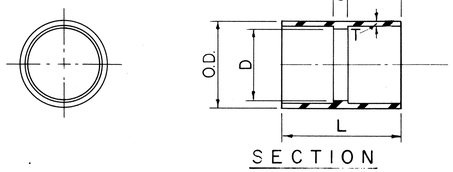


SECTION

CONDUIT

CONDUIT SIZE	EB (ENCASED BURIAL) HECO CODE	O.D.	I.D.	T (MIN.)	WEIGHT #/10² FT.	DB (DIRECT BURIAL) HECO CODE	O.D.	I.D.	T (MIN.)	WEIGHT #/10² FT.
2		2.375	2.25	.060	21	29010	2.375	2.15	.110	38
3		3.500	3.35	.075	39	29012	3.500	3.25	.125	64
4		4.500	4.31	.095	63	29014	4.500	4.18	.160	104
5		5.563	5.36	.100	82	29016	5.563	5.20	.180	146
6		6.625	6.375	.125	121		6.625	6.25	.190	182

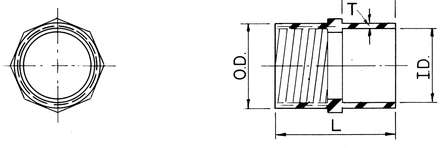
NOTE: Type EB & DB Conduits have same O.D. for a given size. All fittings which go over Conduits are DB type & fit both types of Conduits.



SECTION

COUPLING (ASTM D-2750)

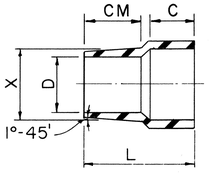
SIZE	HECO CODE	O.D.	D	L	C	S	T
2		2.620	2.255	2 7/16	1.16	.110	.110
3		3.780	3.350	3 3/8	1.63	.120	.125
4		4.855	4.310	3 11/16	1.78	.120	.160
5		5.965	5.363	4 3/32	1.97	.160	.180
6		7.050	6.375	4 15/32	2.16	.160	.190



SECTION

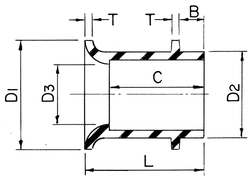
ADAPTER - PLASTIC TO STEEL

SIZE	HECO CODE	O.D.	I.D.	L	T	C
2				2 15/16	1 1/16	1.16
3				3 7/16	1 5/8	1.63
4				3 11/16	1 23/32	1.78
5				4 1/16	1 27/32	1.97
6				15 5/8	1 11/16	3.44



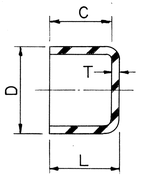
ADAPTER - PLASTIC TO ASBESTOS CEMENT

SIZE	HECO CODE	L	X	C.M.	D	C
2		3 1/16	2.580	1 3/4	2.18	1.16
3		3 19/32	3.620	1 3/4	3.09	1.63
4		4 1/32	4.620	2	4.03	1.78
5						



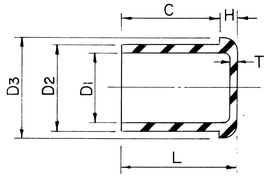
END BELL (ASTM D-2750)

SIZE	HECO CODE	D1	D2	D3	B	C	L	T
2		3.01	2.520	2.255	.50	1.16	1.54	.060
3		4.10	3.680	3.350	.75	1.63	2.00	.075
4		5.31	4.725	4.310	.75	1.78	2.28	.095
5		6.36	5.805	5.363	1.00	1.97	2.47	.100
6		7.38	6.920	6.375	1.00	2.16	2.66	.125



CAP (RIGID) - FOR SEMI-PERMANENT USE (ASTM D-2750)

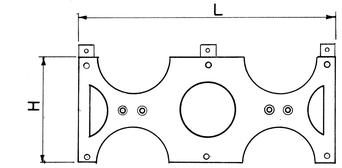
SIZE	HECO CODE	D	C	L	T
2		2.52	.59	.65	.060
3		3.68	.81	.89	.075
4		4.725	.91	1.01	.095
5		5.805	1.00	1.10	.100
6		6.920	1.13	1.25	.125



CAP (TEMPORARY) (ASTM D-2750)

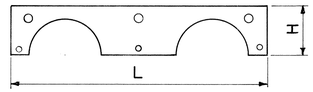
SIZE	HECO CODE	D1	D2	D3	C	H	L	T
2		2.260	2.375	2.500	.593	.125	.718	.060
3		3.360	3.500	3.656	.812	.156	.968	.075
4		4.320	4.500	4.687	.906	.187	1.092	.095
5		5.375	5.638	5.760	1.000	.218	1.218	.100
6		6.390	6.625	6.875	1.093	.250	1.343	.125

NOTE: Cap will go over conduit or "plug" the coupling.



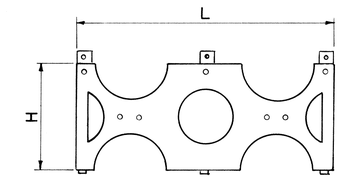
SIZE	HECO CODE	L	H	W
2		9.50	3.94	
3		11.25	5.06	
4		13.75	6.06	
5		15.97	7.06	
6		18.0	8.19	

INTERMEDIATE SPACER



SIZE	HECO CODE	L	H
2		9.50	1.75
3		11.25	2.25
4		13.75	3.13
5		15.87	3.63
6		18.0	4.25

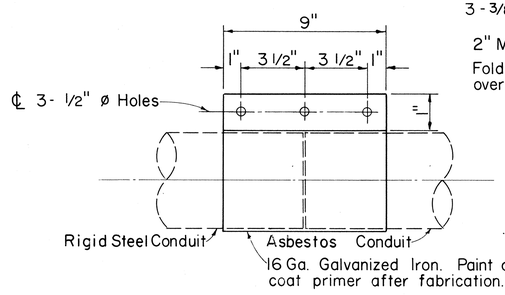
CAP SPACER



SIZE	HECO CODE	L	H
2		9.50	4.25
3		11.25	4.75
4		13.75	5.25
5		15.87	5.87
6		18.0	6.375

BASE SPACER

DUCT SPACER COMPONENTS (FORMEX SPACER OR EQUIVALENT)



SIZE	HECO CODE
2	13126
3	13128
4	13130
5	13132
6	

3 - BOLT CLAMP

GENERAL NOTES:

1. All dimensions in inches.
2. Spacers shown are different than that used for Asbestos Cement Type.
3. These accessories are to be used with ABS (Acrylonitrile-Butadiene - Styrene), or PVC (Poly-Vinyl Chloride) Plastic Conduit, per HECO purchase specification M7001-O.

APPROVED:
Hawaiian Electric Co., Inc. — Date 7/6/78

HECo., Inc. Drawing Number
30-1035
SHEET NO. 2 OF 2 SHEETS

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION

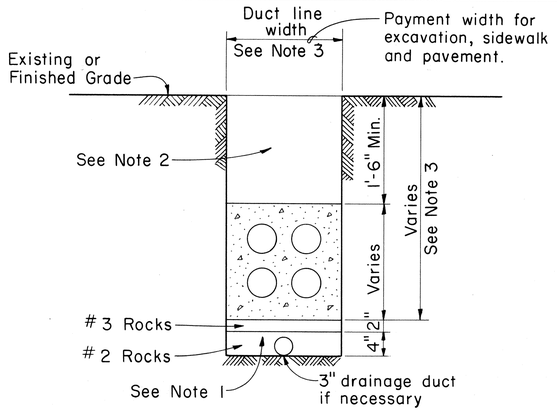
STANDARD DETAILS
PLASTIC DUCTS
INSTALLATION DETAILS
UNDERGROUND STRUCTURES

Scales: Not to Scale

SHEET No. 128 OF SHEETS

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.	M-7600(1)	1978	129	198



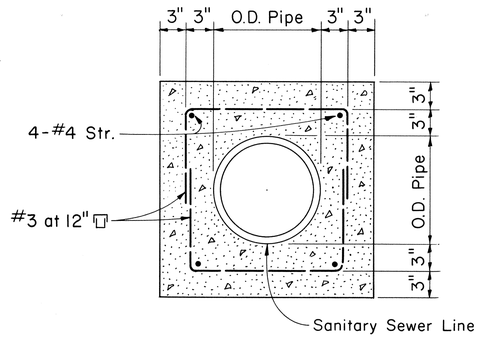
NOTES:

1. If drainage is necessary, install 6" rockfill as shown. In extremely watery areas, install 3" drainage duct.
2. Refer to H.E.Co. Specification CS7001-0 (or equivalent) for backfill material requirements.
3. Size of concrete envelope and depth of excavation to be determined by specific project.

EB EXCAVATION AND BACKFILL DETAILS

(TYPICAL)

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



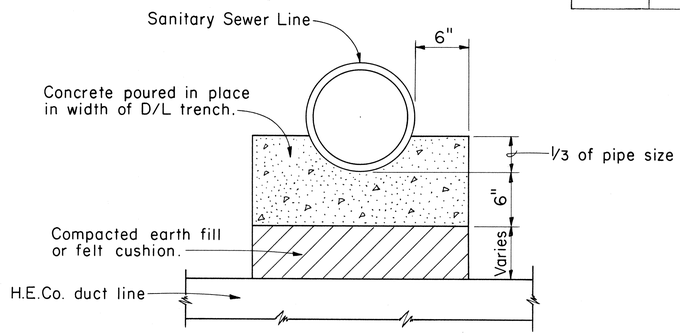
CROSS-SECTION OF SEWER LINE

NOTE:
Where duct line crosses sewer line, cover sewer line with concrete jacket as indicated in specification.

DUCT LINE WIDTH	LENGTH OF SEWER LINE TO BE COVERED
24" or less	5'
Greater than 24"	(Width of duct line) + (5')

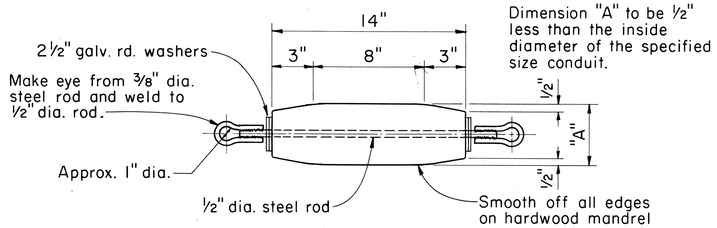
SANITARY SEWER LINE CROSSING DETAIL

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



CONCRETE CRADLE FOR SANITARY SEWER LINE CROSSING

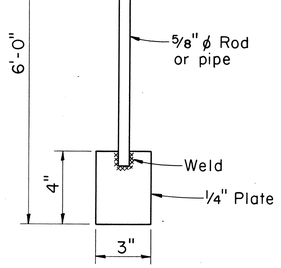
Scale: 1 1/2" = 1'-0"



Dimension "A" to be 1/2" less than the inside diameter of the specified size conduit.

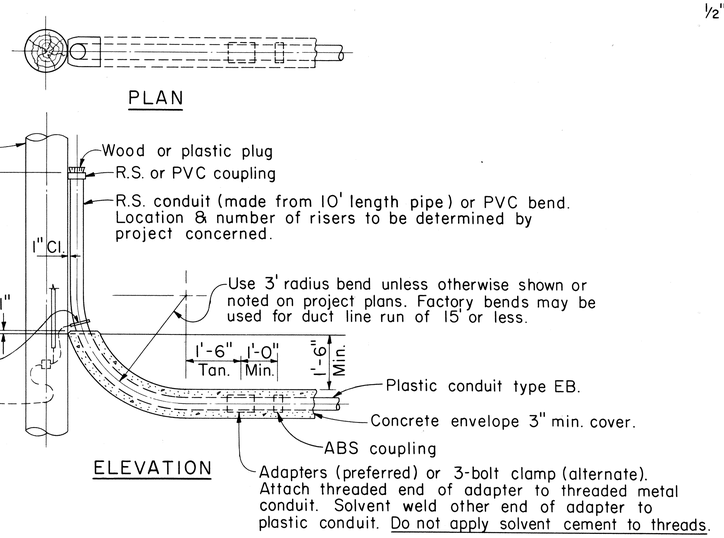
MANDREL DETAIL

Not To Scale



HAND SPADE

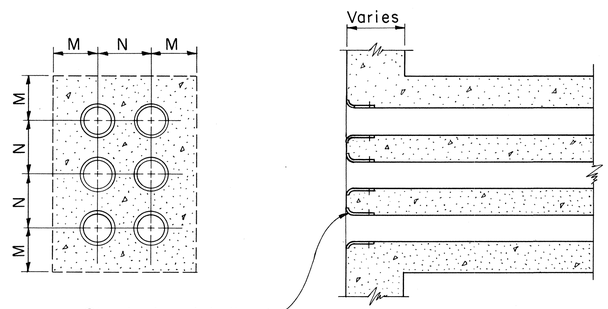
Scale: 3" = 1'-0"



TYPICAL RISER DETAIL

(POLE RISER SHOWN)

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



TYPICAL CONDUIT ENTRANCE INTO HANDHOLE, MANHOLE OR VAULT WALLS

(6 WAY DUCT LINE SHOWN)

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

DUCT SIZE	DIMENSIONS (INCHES) M	N
2	4	5
3	5	6
4	5 1/2	7
5	6	8
6	6 5/16	9

APPROVED:
Wm J Karnopp
Hawaiian Electric Co., Inc.
7/6/78
Date

HECo., Inc. Drawing Number
30-1030

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION

TYPICAL DUCT CONSTRUCTION INSTALLATION DETAILS UNDERGROUND DETAILS

Scale as noted

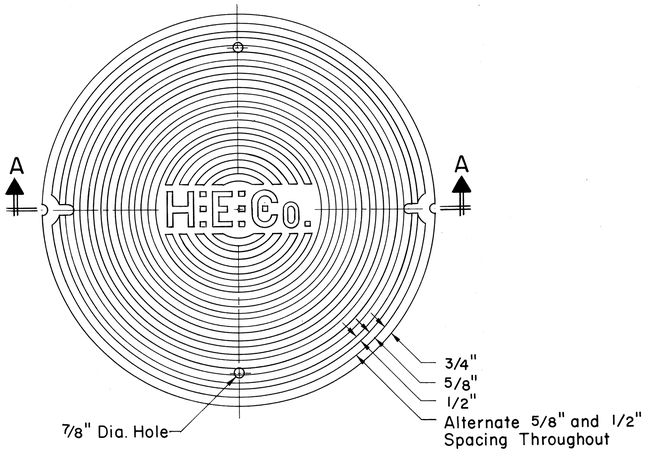
SHEET No. OF SHEETS

129

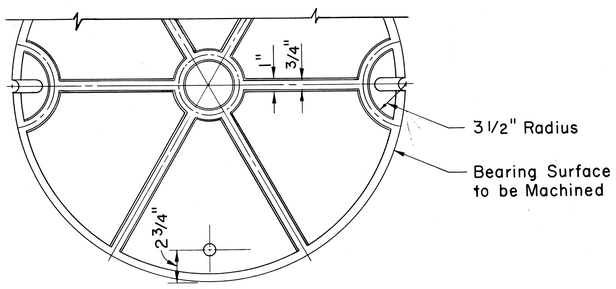
ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	" "
	TRACED BY	" "
NOTE BOOK	DESIGNED BY	" "
	QUANTITIES BY	" "
No.	CHECKED BY	" "

K+E IMPERIAL™ LA 3207

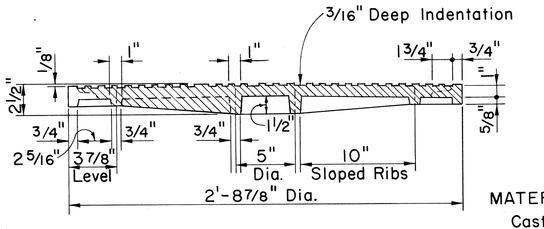
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	M-7600(1)	1978	130	198



TOP VIEW



BOTTOM VIEW



SECTION A-A

31" MANHOLE COVER

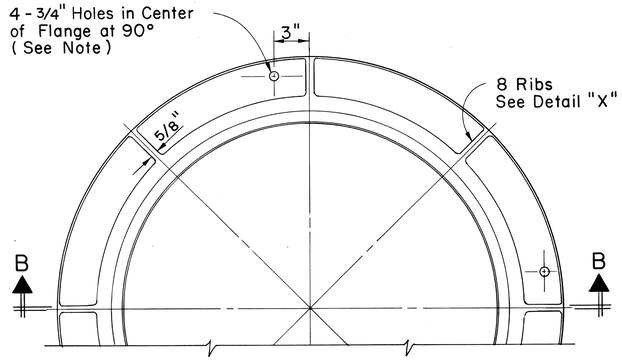
Scale: 2"= 1'-0"

MATERIAL:
Cast Iron per ASTM A48, Class 30.

WEIGHT:
Approx. 262 lbs.

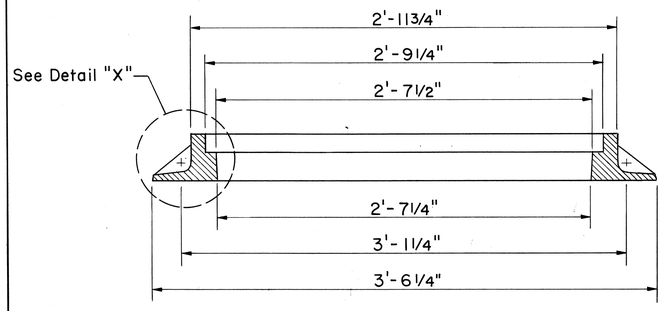
REFERENCE:
31" Manhole Frame - Dwg. 011328.

011327



PARTIAL PLAN

Scale: 2"= 1'-0"



SECTION B-B

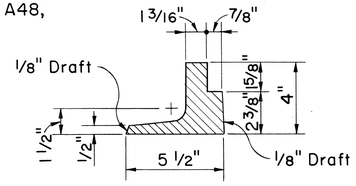
Scale: 2"= 1'-0"

INSTALLATION NOTE:
If frame is to be installed where heavy traffic will be on frame, insert 5/8" ϕ bolts thru holes in flange into concrete.

MATERIAL:
Cast Iron per ASTM A48, Class 30.

WEIGHT:
Approx. 300 lbs.

REFERENCE:
31" Manhole Cover - Dwg. 011327.



DETAIL "X"

Scale: 3"= 1'-0"

31" MANHOLE FRAME

Scale: As Shown

011328

APPROVED:

M. J. Karamoto 7/6/78

HAWAIIAN ELECTRIC Co., Inc. DATE

HECo., Inc. Drawing Numbers

011327 & 011328

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION

STANDARD DETAILS

31 INCH MANHOLE FRAME AND COVER

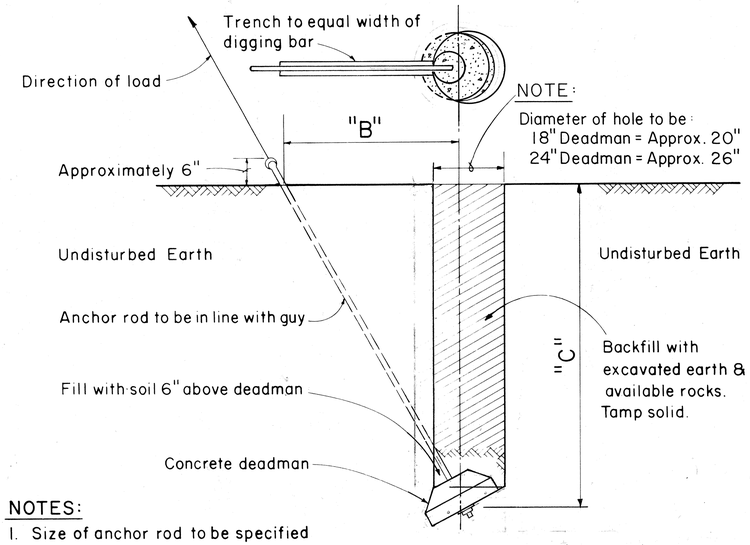
Scale: As Shown

SHEET No. 130 OF SHEETS

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

H&E IMPERIAL LA3207

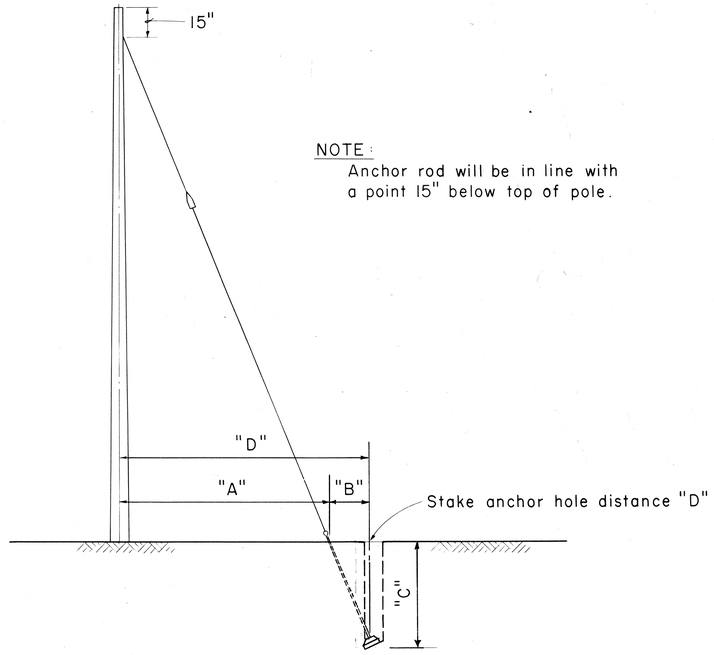
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAWAII	M-7600(1)	1978	131	198



NOTES:
1. Size of anchor rod to be specified by the Engineer
2. Use Anchoring Data.

GUY ANCHOR DEADMAN

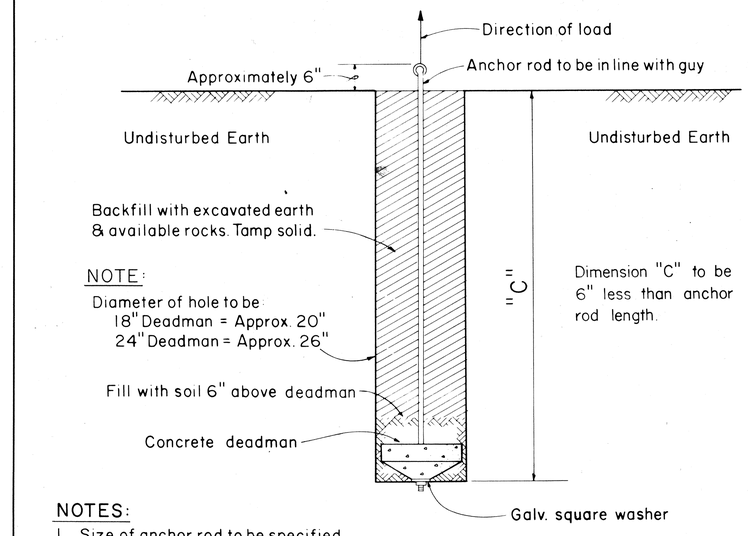
Scale: 3/4" = 1' - 0"



Not to Scale

FOR 25', & 30' POLES WITH 8'-0" ANCHOR RODS				
"A"	"B"	"C"		"D" = ("A" + "B")
LEAD-ANCHOR ROD TO ℄ OF POLE	ANCHOR ROD TO ℄ OF HOLE	VERTICAL DEPTH 18" D.M.	VERTICAL DEPTH 24" D.M.	TOTAL DISTANCE POLE TO HOLE
5'-0"	1'-8"	7'-1"	7'-4"	6'-8"
10'-0"	3'-0"	6'-7"	7'-0"	13'-0"
15'-0"	4'-0"	6'-1"	6'-6"	19'-0"
20'-0"	4'-8"	5'-6"	5'-10"	24'-8"
25'-0"	5'-2"	4'-11"	5'-4"	30'-2"
FOR 35' THRU 70' POLES WITH 8'-0" ANCHOR RODS				
5'-0"	1'-0"	7'-3"	7'-4"	6'-0"
10'-0"	1'-11"	7'-1"	7'-3"	11'-11"
15'-0"	2'-8"	6'-9"	7'-1"	17'-8"
20'-0"	3'-3"	6'-6"	6'-10"	23'-3"
25'-0	3'-10"	6'-2"	6'-7"	28'-10"
FOR 40' THRU 70' POLES WITH 11/4" x 10'-0" ANCHOR RODS				
5'-0"	1'-7"		9'-4"	6'-7"
10'-0"	3'-0"		9'-0"	13'-0"
15'-0"	4'-2"		8'-6"	19'-2"
20'-0"	5'-3"		7'-11"	25'-3"
25'-0"	6'-2"		7'-3"	31'-2"

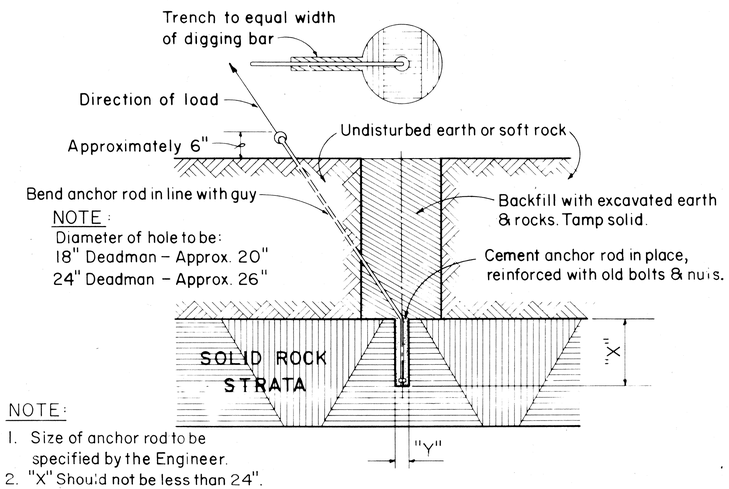
D.M. = Deadman



NOTES:
1. Size of anchor rod to be specified by the Engineer.
2. Use Anchoring Data.

SIDE - WALK ANCHOR

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



NOTE:
1. Size of anchor rod to be specified by the Engineer.
2. "X" Should not be less than 24". If "X" is less than 24" complete hole & install anchor.
3. "Y" 5/8" Anchor rod drill 2" hole
   3/4" Anchor rod drill 2" hole
   1" Anchor rod drill 2 1/2" hole
   1 1/4" Anchor rod drill 3" hole
4. Use Anchoring Data.

ROCK ANCHOR

Not to Scale

TABLE 2 ANCHOR ROD - ANCHOR SLUG - SQUARE WASHER COMBINATION

H.E. CODE NO.	ANCHOR ROD	WORKING TENSION 1/2 ULT (LBS.)	H.E. CODE NO.	CONC. ANC. (IN.)	H.E. CODE NO.	WASHER SIZE	QTY.
617	5/8" x 8'-0" Steel	8,000	518	18	2320	4" x 4" x 3/16"	2
615	5/8" x 8'-0" Cu Cov Stl	9,250	518	18	**	3" x 3" x 1/8"	2
618	3/4" x 8'-0" Steel	11,500	518	18	2330	6" x 6" x 3/8"	1
619	1" x 8'-0" Steel	18,000	524	24	2331	6" x 6" x 1/2"	1
616	1" x 8'-0" Cu Cov Stl	22,500	524	24	**	4" x 4" x 3/16"	2
613	1 1/4" x 10'-0" Steel	29,000	524	24	2330	6" x 6" x 3/8"	2

** Use bronze square washers included in anchor rod assembly on copper covered steel (Cu Cov Stl) anchor rods.

ANCHORING DATA

LOCATION & LENGTH OF ANCHORS			
POLE #	STATION	O/S	SIDE ANCHOR LEAD
106	37+93 O.B.	63' LT.	L= 12'-0"
107	36+26 O.B.	51' LT.	L= 12'-0"
108	34+61 O.B.	38' LT.	L= 10'-0"
109	32+96 O.B.	28' LT.	L= 10'-0"
109X	30+81 O.B.	29' LT.	L= 10'-0"
110	31+92 I.B.	29' RT.	
110X	32+81 I.B.	28' RT.	
111	EXISTING LOCATION		L= 10'-0"
112	" "		
110/R	76+76 O.B.	47' RT.	L= 5'-0"

APPROVED:

eas mg J. Kawamoto 7/6/78
HAWAIIAN ELECTRIC Co., Inc. DATE

K. Yamada 6/26/78
HAWAIIAN TELEPHONE Co. DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION

STANDARD DETAILS
H.E.Co. AND H.T.Co.
ANCHOR DETAILS AND ANCHORING DATA

Scales: As Noted Date

SHEET No. OF SHEETS

131

4/20 H-HT-1