FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(88):13	1971	190	457

GENERAL WATER NOTES (BOARD OF WATER SUPPLY)

1. The Contractor shall notify the Board of Water Supply in writing ten working days prior to commencing work on the water system.
2. Prior to excavating for new drain, sewer and other utility lines, the Contractor shall verify in the field the location of existing water mains and appurtenances.
3. Asterisk (*) indicates work to be performed by B.W.S. Materials to be furnished by the Contractor unless specified as "relocate."
4. All plans approved by the Board of Water Supply are based solely on the adequacy of the water system facilities. All other features of the water system such as lines, grades, fittings, etc., shall be the responsibility of the engineer who prepared the plans. Drainage and other features of the improvements shall not be the responsibility of the Board of Water Supply.
5. Items indicated as "relocate" on the plans shall be removed, cleaned, painted and reinstalled at the new location by the Contractor unless otherwise specified.
6. The minimum clearance between fire hydrant and utility poles or light standards shall be 3.0 feet.
7. Unless otherwise specified, all materials and construction of water system facilities and appurtenances shall be in accordance with the STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, dated 1969, as amended, of the Hawaii Highways Division, Department of Transportation.
8. Where the installation of new drain, sewer or other utility lines are to cross over or under existing water mains, the Contractor shall expose the existing water mains prior to trenching. Excavation around water mains shall be done by hand.
9. B.W.S. shall make all taps into the existing mains for the connection of service laterals. The Contractor shall perform all excavation and backfill and furnish appropriate sizes of corporation stops.
10. Location of proposed lines, unless otherwise noted, are to be considered diagrammatic. Upon verification in the field of the location of the existing lines, the final location of the proposed lines shall be determined subject to the approval of the Engineer and the Board of Water Supply.
11. Any adjustment to the water mains and appurtenances, whether shown on the construction plans or not shall be made a part of the project.

GENERAL ELECTRIC NOTES (H.E. Co.) (CONTINUED)

11. H.E. Co. and H.T. Co. shall be notified in writing twenty working days prior to commencing work on their respective utility system.
12. Existing electric and telephone facilities shown on these plans are approximate only. The Contractor shall verify their actual locations and shall make adjustments to any new or existing facility as directed by the Engineer.

GENERAL NOTE - NAVY

1. The Contractor shall notify the Navy in writing ten working days prior to commencing any work on Navy facilities and a minimum of 30 calendar days notice prior to the date the Contractor desires the Navy to proceed with the Navy's portion of the work.

GENERAL AVGAS NOTES (NAVY)

1. The Contractor shall coodinate all work on the Avgas line with the Navy Supply Center (Phone 43-5712B, Mr. Miller)

GENERAL NOTES (NAVY-ELECTRIC AND FIRE ALARM SYSTEM)

1. The Contractor shall coordinate all work on Navy utilities with the Navy Public Works Center (Phone extension 29102). All salvaged material is to be stockpiled, and the Navy Public Work Center notified when available for pickup.
2. Existing electric and telephone systems shown on these plans are located from the best sources available. The Contractor shall check and verify the exact location and depth of same prior to start of construction operations.
3. Contractor to stake out Navy ductlines, pole and anchor locations; Navy to check locations before Contractor undertakes excavation, installation and backfill.
4. For pole setting depth data, see sheet No. 29U.

GENERAL NOTES (NAVY-WATER AND SEWER)

1. Unless otherwise noted, details of proposed water and sanitary sewer facilities for the U.S. Navy shall conform to the standard details of the Board of Water Supply and the City and County of Honolulu respectively.
2. The Contractor shall coordinate all work on Navy utilities with the Navy Public Works Center (Phone extension 29102). All salvaged material is to be stockpiled, and the Navy Public Works Center is to be notified when available for pickup.
3. Gate valves and manhole frames and covers for proposed Navy water and sewer lines which are noted as relocated, are to be obtained from existing Navy lines to be removed.
4. All connections between existing and proposed water mains and cutting and plugging of lines to be accomplished by Navy personnel, which work shall be reimbursed by the State. All materials to be furnished by Contractor.
5. Restoration of existing streets and other improvements due to new utilities to be incidental.
6. The Contractor shall arrange with the Navy to cut-off existing unused service lateral, remove meter boxes and appurtenances, prior to commencement of clearing and grading operations. Contractor shall provide all necessary excavation.
7. All excavation and backfill shall be done by the Contractor, including excavation for the relocation of existing mains.
8. The location of existing water mains and appurtenances shown on the plans are approximate only and the Contractor shall verify the exact locations. Any adjustment to the water main and appurtenances whether shown on the construction plans or not shall be made a part of the project.
9. Materials and workmanship shall conform to the requirements of Sections 604 and 625 of the State of Hawaii Standard Specifications for Road and Bridge Construction, 1969.

GENERAL GAS NOTES (H.G.Co.)

1. All work required for the installation of the relocated gas main and facilities shall be done by the Contractor: Contractor shall furnish labor and equipment for handling and stringing gas piping, fabricating and welding the gas piping, and testing after relocation.
2. The Contractor shall notify the Honolulu Gas Co. Ltd. at least 10 working days in advance of relocation operations and shall coordinate his work with the Gas Co.
3. The Contractor shall check and verify the exact location and depth of existing gas line prior to start of construction operations.

GENERAL ELECTRIC NOTES (H.E. Co.) NOTES 4 THRU 12 ALSO FOR H.T. Co.

1. Pole and anchor locations to be staked out by the Contractor.
2. Stake out and installation of ducts and manholes by the Contractor.
3. Excavation of pole holes and anchors, installation of poles and anchors, and backfill of poles and anchors by others.
4. Poles and anchors are for H.E. Co. unless otherwise indicated.
5. Depth of poles and anchor holes are taken from finish grade.
6. For pole setting depth data, see sheet No. 29U.
7. All ducts and conduits called for installation in concrete jacket shall be inspected and approved by the respective Engineer of H.E. Co. or H.T. Co. or their representative before concrete placing. 24 hr.(min) notice shall be given before placing concrete.
8. Minimum depth of ductlines from finish grade to top of concrete jacket where ducts are concrete encased = 2'-0" unless otherwise shown. Within Interstate Route H-1 R/W, minimum depth shall be 3'-0".
9. Ducts encased in concrete jackets:
   a. Normal distance face of jacket to all ducts to be 3" minimum.
   b. Clear distance of 1½" minimum between ducts of same utility company.
   c. Clear distance of 3" minimum between H.E. Co. ducts and H.T. Co. ducts.
10. Location and depth of all pullboxes, service boxes, handholes, manholes, duct lines, poles and anchors to be verified and approved in the field by H.E. Co. & H.T. Co. prior to excavation, construction or installation.

(CONTINUED)

GENERAL TELEPHONE NOTES (H.T. Co.) ALSO SEE NOTES 4 THRU 12 FOR H.E. Co.

1. Excavation of poles and anchors and installation of anchors by the Contractor.
2. All manholes, handholes, pullboxes, conduits and C-bends to be installed by the Contractor.
3. All materials to be furnished by H.T. Co.
4. All work to be done in accordance with H.T. Co. standards.
5. H.T. Co. to remove poles and cables.

(CONTINUED)

APPROVED

J. Kawakami 8/18/70
Assist. Chief Engineer, B.W.S. Date

T. Iona 9-1-70
Chief, Div. of Sewers Date

F. Judd 9-15-70
Hawaiian Telephone Co. Ltd. Date

RN. SK 2/10/71
Hawaiian Electric Co. Inc. Date

Paul C Jony 8/28/70
Honolulu Gas Co. V.P. Date

GENERAL SEWER NOTES (CITY)

1. All construction shall be performed in accordance with the City's Standard Specifications, November 1968; the Dept. of Public Works Standard Details, July, 1965; and the Revised Ordinances of Honolulu, September 28, 1961.
2. The Contractor shall notify the Division of Sewers ten working days prior to commencement of sewer work.
3. Top of sewer manholes in easements shall be four (4) inches above ground unless otherwise directed by the Engineer.
4. Crushed rock cradle will be permitted where the soil is stable. In areas of unstable soil, the Engineer and the Sewer Engineer (C&C) will discuss to determine the pipe support required.
5. All frames and covers on existing sewer manholes to be demolished shall be cleaned and reused on new sewer manholes or stockpiled, and the City and County notified when available for pickup.
6. Location of proposed lines unless otherwise noted, are to be considered diagrammatic. Upon verification in the field of the location of existing lines, the final location of the proposed lines shall be determined subject to the approval of the Engineer and City and County of Honolulu.
7. Cutting and plugging of existing sewers and sewer laterals is to be considered incidental, except for channeling in existing manholes, which work is to be done by the Division of Sewers (C&C).
8. Restoration of existing streets and other improvements to be incidental.

GENERAL TELEPHONE NOTES (H.T. Co.) (CONTINUED)

6. For additional H.T. Co. construction see Sheet Nos. 75, 76, 79, 82, 83.
7. Existing Joint Trunking System cables to remain in place until relocated section is cut-over.
8. All trenching, backfilling and digging of Splice Pits by the contractor.
9. H.T. Co. to furnish, install and splice Joint Trunking System cables.

Notes 7 thru 9 pertain to Joint Trunking System Cable.

J. ANDREW SCHUCHARDT REGISTERED PROFESSIONAL ENGINEER No. 2229 HAWAII, U.S.A.

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J. Andrew Schuchardt

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

GENERAL UTILITY NOTES

HALAWA INTERCHANGE
PROJECT NO. I-HI-1(88):13

DATE: JULY 17, 1970

SHEET No. 10 OF 530 SHEETS

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

PRINTED ON NO. 1000H CLEARPRINT

190

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(88)13	1971	191	457

LEGEND

	Existing	New	Removed or Abandoned
Force Main			
San. Sewer			
Water (Fresh)			
Water (Hot)			

For profiles of proposed Sanitary Sewers See Sht. 208
For profiles of proposed Water Mains See Sht. 210
See detail Sht 193 for desirable location of proposed Utility Lines.

LEGEND

Buildings	Existing	Removed or Abandoned

HALAWA PARKING STATION

Sta. 37+66 Connect to existing manhole Inv. ~~90.50~~ 90.92

Sta. 36+74 1-8" 1/32 Bend 1-Conc. Block

New 8" Sanitary Sewer Force Main (Navy).

Sta. 35+58 1-8" 1/32 Bend 1-Conc. Blk.

12" Water Line (Navy) Cut & Plugged (by others)

SANITARY FORCE MAIN LINE E (Navy)

Cut & Plug

Sta. 10+28 Deflect as necessary.

Sta. 33+80 1-8" 1/32 Bend 1-Conc. Block

Cut & Plug

New SMH Inv. 83.91 Sta. 10+28 Frame & Cover (Relocated)

Exist. SMH Inv. 81.4±

Cut & Plugged (by others)

Outbound Temporary Connection

Inbound Temporary Connection

Sta. 10+00 Connect To Exist. 12" × 12" Tee 1-12" × 6" Reducer S.E.B.

Sta. 12+40 Cut & Connect to Exist. 1-6" 1/4 Bend 1-Conc. Block Temp. For Testing 1-6" Plug 1-2" Cleanout 1-Conc. Block

Exist. SMH Inv. 87.0±

WATER LINE E (Navy)

New SMH Inv. 84.40 Sta. 10+08 Frame & Cover (relocated)

6" CIP

6" VCP

Sta. 33+08 1-8" 1/32 Bend 1-Conc. Block

Sta. 34+22 1-8" 1/32 Bend 1-Conc. Block

8" C.I.P.

Exist. SMH Inv. 82.0±

Exist. SMH Inv. 87.5±

ARGONAUT AVENUE

ATLANTA STREET

New SMH Inv. 86.01 (Exist. 56") Inv. 83.08 (New 66") Sta. 12+27 Frame & Cover (relocated)

SANITARY SEWER & SANITARY FORCE MAIN LINE E (Navy)

6" VCP

UTILITY CORRIDOR

Cut & Plug

Temp. For Testing 1-6" Plug 1-2" Cleanout 1-Conc. Block

Sta. 10+00 Cut & Connect to Exist. 1-6" 1/4 Bend 1-Conc. Block

New SMH Inv. 81.40 Sta. 14+03 Frame & Cover (relocated)

New SMH Inv. 80.31 Sta. 16+80 Frame & Cover (relocated)

WATER LINE F (Navy)

6" CIP

6" VCP

Cut & Plug

Sta. 20+01 1-8" 1/64 Bend 1-Conc. Block

Sta. 24+67 1-8" 1/32 Bend 1-Conc. Blk.

Sta. 27+05 1-8" 1/64 Bend 1-Conc. Block

Exist. SMH Inv. 70.3±

New SMH Inv. 76.13 (New 8") Sta. 20+96 Frame & Cover (Relocated)

Exist. SMH Inv. 78.2±

8" VCP

8" CIP

12" VCP

WAHOO AVENUE

JUNEAU AVENUE

Sta. 12+60 Cut & Connect to Exist. 1-6" 1/16 Bend 1-6" 1/32 Bend 1-8" × 6" Reducer S.E.B. 2-Conc. Blocks

Exist. SMH Inv. 89.3±

Connect to Existing SMH Inv. 81.7± Sta. 18+06

Cut & Plug

SANITARY SEWER LINE E (Navy)

Sta. 9+32

LISCOMB BAY RD.

Existing Sanitary Sewer to be Maintained

Demolish existing Septic Tank

Existing SMH Inv. 78.0± (in) Inv. 76.2± (out)

SANITARY SEWER LINE E (Navy)

Existing SMH Inv. 67.1±

Package Lift Station See Sheet 237

Existing Right-of-Way

TRUE NORTH Scale: 1 in. = 50 ft.

Sta. 27+05 1-8" 1/64 Bend 1-Conc. Block

NCW SMH Inv. 78.87 Sta. 19+29 Frame & Cover (relocated)

RAMP D

RAMP G

RAMP E

HALAWA HEIGHTS

ROAD

INTERSTATE ROUTE H-1

OMIT FROM CONTRACT A

CHICAGO AVE.

COOLIDGE AVE.

12" San. Sewer

UTILITY CORRIDOR

Cut & Plug

Cut & Plugged (by others)

Cut & Plugged (by others)

Cut & Plug

Exist. SMH Inv. 81.4±

Exist. SMH Inv. 82.0±

Exist. SMH Inv. 87.5±

Exist. SMH Inv. 89.3±

Exist. SMH Inv. 70.3±

New SMH Inv. 76.13 (New 8") Sta. 20+96 Frame & Cover (Relocated)

Exist. SMH Inv. 78.2±

New SMH Inv. 78.87 Sta. 19+29 Frame & Cover (relocated)

J. ANDREW SCHUCHARDT REGISTERED PROFESSIONAL ENGINEER No. 2229 HAWAII, U.S.A.

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J. Andrew Schuchardt

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

NAVY WATER & SANITARY SEWER RELOCATIONS @ NORTH HALAWA HOMES

INTERSTATE ROUTE H1
PROJECT NO. I-H1-1(88)13

SCALE: 1"=50' DATE: JULY 17, 1970

SHEET No. 24 OF 530 SHEETS

191

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(88):13	1971	102	457

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J. Andrew Schuchardt

J. ANDREW SCHUCHARDT — REGISTERED PROFESSIONAL ENGINEER — No. 2229 — HAWAII, U.S.A.

LEGEND

Navy Facilities (Presently maintained by the Hawaii Housing Authority): Series Street Light, Fire Alarm &/or Electric Primary as Noted.

	As Existing	As Reconstructed	As Removed or Abandoned
Electric (H.E.Co.)			
Buildings			
Fire Alarm Manual Sta. (Navy)	⊠	⊠	⊠ REM
Street Light	☼	✷ REL	✷ REM
Transformer	△	▲	▲ REM
Telephone (H.T.Co.)			

Denotes Utility Ownership

TRUE NORTH
Scale: 1 in. = 50 ft.

NOTE:

Removal and stockpiling of existing State's series circuit street lighting equipment and the closing of the street lighting circuit loop to be incidental to construction.

DETAIL "5"
ONE LINE DIAGRAM OF SERVICE TO LIFT STATION

Relocated Overhead Distribution. Relocated Fused SW. — By H.E.Co.
Relocated Disc SW
New Transformer: 12,470 Y Volts - 240 Y x 480 Volts, 3 ϕ, 60 Hertz, ## KVA
New 3 #8 & 1" G.S.C.
New Service Entrance Switch, 30A, 3P — Per C.C.O. #78 — Delete, Per C.C.O. #92
New 3 #8 & 1" G.S.C. Riser
On Pole In Lift Station
New 3 #8 & 2" Asb. Cem. Duct
Pump Controller
ALT
1½ HP

Existing Signal Corps Cable (H.T.Co.)
Existing Electric (Navy) and 2 Wire Fire Alarm (Navy)
Install Relocated Electric (Navy) ~~and New 2-1/c Fire Alarm (Navy)~~ Overhead Lines. Connect into Existing Lines. Telephone to be Relocated by H.T.Co.] — Delete Per C.C.O. #14
Relocated Pole
Relocated Poles
Install New Street Light Overhead Lines & Connect into Existing Lines
Mau'ea Utility Corridor Easement Line
Existing Electric (Navy) & 2 Wire Fire Alarm (Navy)
Install Relocated Electric (Navy) ~~and New 2-1/c Fire Alarm (Navy)~~ Overhead Lines. Connect into Existing Lines. [Telephone to be Relocated by H.T.Co.] — Delete Per C.C.O. #14
Existing Pole
Install on existing Pole New Meter Socket & Relocated Switches. See Detail "5". — Per C.C.O. #7
Install Relocated Electric (Navy) Overhead Line & Connect into Existing Line & H.E.Co. Primary Meter.
New 2" Asb. Cem. Duct in Conc. Jacket with Conduit Bend Riser & Pole. New 600V, 2-3-1/c, #8 Wires.
Close Street Light Circuit loop downstream of light. See Detail, Sht. 237)
Primary By H.E.Co.
30 KVA
Install new Transformer and appurtenances for service to Lift Station. See Detail "5"
Remove Street Lighting Equipment.
Two Street Lighting Transformers, Booster Transformer, and Time Clock. Relocate one Transformer and Appurtenances and Connect into New Lines.
Existing H.T.Co.
Utility Corridor

ARGONAUT AVE. · WAHOO AVENUE · JUNEAU AVENUE · ATLANTA STREET · CHICAGO AVENUE · LANGLEY ST. · COOLIDGE AVE. · JISCOMB BAY · NEW LIFT STATION · HALAWA HEIGHTS ROAD

RAMP D · RAMP G · EW RAMP · RAMP E · RAMP A · OUTBOUND · INBOUND · TEMPORARY INTERSTATE CONNECTION · ROUTE H-1 · OMIT FROM RAMP CONTRACT · WE

#812 REM · #813 REM · #814 · #815 REL · #813 REL · #822 REL · #822 REM · #823 REM · #824 · #825 · Bldg. #432

APPROVED:

Hawaiian Electric Co., Inc. — RN JK 2/10/71 — Date

Hawaiian Telephone Co., Ltd. — 9-15-70 — Date

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

NAVY FACILITIES, TELEPHONE & CITY STREET LIGHTS RELOCATION @ NORTH HALAWA HOMES

INTERSTATE ROUTE H1
PROJECT NO. I-HI-1(88):13

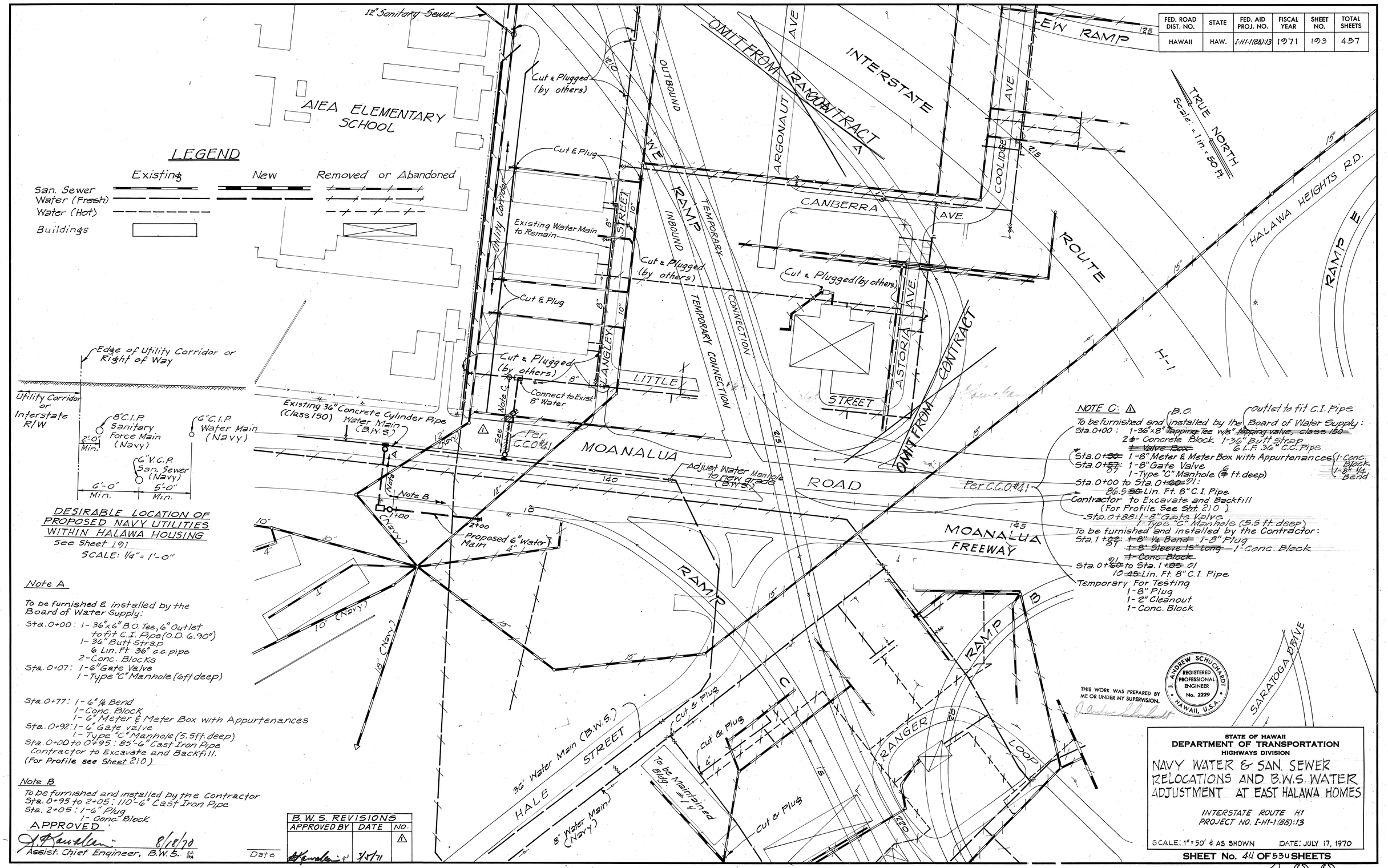
SCALE: 1"=50' — DATE: JULY 17, 1970

SHEET No. 3U OF 53U SHEETS

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

192

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(88):13	1971	193	457



DESIRABLE LOCATION OF PROPOSED NAVY UTILITIES WITHIN HALAWA HOUSING

See Sheet 191

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

Note A

To be furnished & installed by the Board of Water Supply:

Sta. 0+00 : 1-36"x6" B.O. Tee, 6" Outlet to fit C.I. Pipe (O.D. 6.90")
1-36" Butt Strap
6 Lin. Ft. 36" c.c. pipe
2-Conc. Blocks

Sta. 0+07 : 1-6" Gate Valve
1-Type "C" Manhole (6ft deep)

Sta. 0+77 : 1-6" 1/4 Bend
1-Conc. Block
1-6" Meter & Meter Box with Appurtenances

Sta. 0+92 : 1-6" Gate valve
1-Type "C" Manhole (5.5ft. deep)

Sta. 0+00 to 0+95 : 85'-6" Cast Iron Pipe
Contractor to Excavate and Backfill.
(For Profile see Sheet 210)

Note B

To be furnished and installed by the Contractor

Sta. 0+95 to 2+05 : 110'-6" Cast Iron Pipe

Sta. 2+05 : 1-6" Plug
1-Conc. Block

APPROVED

J. Kaneshiro 8/18/70
Assist. Chief Engineer, B.W.S. Date

B.W.S. REVISIONS		
APPROVED BY	DATE	NO.
J. Kaneshiro	3/5/71	1

NOTE C:

To be furnished and installed by the Contractor:
Sta. 0+00 : 1-36"x8" ~~Tapping Tee w/8" Tapping valve, class 150~~ B.O. Outlet to fit C.I. Pipe
2-Conc. Block 1-36" Butt Strap
~~1-Valve Box~~ 6 L.F. 36" C.C. Pipe

Sta. 0+~~50~~ 1-8" Meter & Meter Box with Appurtenances (1-Conc. Block 1-8" 1/4 Bend)
Sta. 0+~~57~~ 61 1-8" Gate Valve
1-Type "C" Manhole (~~7~~ ft. deep)

Sta. 0+00 to Sta. 0+~~60~~ 91 :
86.5 ~~50~~ Lin. Ft. 8" C.I. Pipe
Contractor to Excavate and Backfill
(For Profile See Sht. 210)

Sta. 0+88 : 1-8" Gate Valve
1-Type "C" Manhole (5.5 ft. deep)

To be furnished and installed by the Contractor:
Sta. 1+~~00~~ 01 ~~1-8" 1/4 Bend~~ 1-8" Plug
~~1-8" Sleeve 15" long~~ 1-Conc. Block
~~1-Conc. Block~~

Sta. 0+~~60~~ 90 to Sta. 1+~~25~~ 01
10 ~~45~~ Lin. Ft. 8" C.I. Pipe

Temporary For Testing
1-8" Plug
1-2" Cleanout
1-Conc. Block

ANDREW SCHUCHARDT REGISTERED PROFESSIONAL ENGINEER No. 2229 HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

J. Schuchardt

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

NAVY WATER & SAN. SEWER RELOCATIONS AND B.W.S. WATER ADJUSTMENT AT EAST HALAWA HOMES

INTERSTATE ROUTE H1
PROJECT NO. I-HI-1(88):13

SCALE: 1"=50' & AS SHOWN DATE: JULY 17, 1970

SHEET No. 44 OF 53 SHEETS

193

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(88):13	1971	104	457

Navy Facilities (Presently maintained by the Hawaii Housing Authority): Series Street Light, Fire Alarm &/or Electric Primary as Noted.

LEGEND

	As Existing	As Reconstructed	As Removed or Abandoned
Electric (H.E.Co.)			
Buildings			
Fire Alarm Manual Sta. (Navy)	⊠	⊠	⊠ REM.
Street Light	☼	✷ REL	✷ REM.
Transformer	△	▲	▲ REM.
Telephone (H.T.Co.)			

Denotes Utility Ownership

AIEA ELEMENTARY SCHOOL

Utility Corridor

LANGLEY STREET

LITTLE STREET

ASTORIA AVE.

CANBERRA AVE.

COOLIDGE AVENUE

OUTBOUND TEMPORARY CONNECTION

INBOUND TEMPORARY CONNECTION

RAMP WE

OMIT FROM RAMP CONTRACT A

OMIT FROM CONTRACT

INTERSTATE ROUTE H-1

EW RAMP

HALAWA HEIGHTS RD.

RAMP E

RAMP C

RAMP B

RANGER LOOP

SARATOGA DRIVE

MOANALUA ROAD

MOANALUA FREEWAY

HALE STREET

Existing H.T. Co.

Existing Fire Alarm to Remain

Remove Street Lighting Equipment

Remove Street Lighting Equipment & Poles.

New 1" Anchor 15' Lead (H.T.Co)

~~Install New 1/c fire alarm (Navy) Locate above H.T.Co.~~

To Be Maintained By Navy

Existing Pole PA3-6.1

~~New 35' pole 3' Deep See Sht 1196 for continuation~~

#812 REM REM

#921 REM

#744

#751

#753 REM

TRUE NORTH Scale: 1in = 50 ft.

APPROVED

Hawaiian Telephone Co., Ltd. — 9-15-70 Date

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

J. Andrew Schuchardt

J. ANDREW SCHUCHARDT REGISTERED PROFESSIONAL ENGINEER No. 2229 HAWAII, U.S.A.

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

NAVY FACILITIES, TELEPHONE & STREET LIGHTS RELOCATIONS AT MOANALUA ROAD

INTERSTATE ROUTE H1
PROJECT NO. I-HI-1(88):13

SCALE: 1" = 50' DATE: JULY 17, 1970

SHEET No. 5U OF 53U SHEETS

1941

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(88):13	1971	195	457

MATCH LINE (SEE BELOW)

10" 6" Cut & Plug

To Be Maintained Bldg. #13 Y

Cut & Plug 4" 4" 4" 8" 8" 6" 8" 8"

RAMP C

RANGER LOOP

RAMP B

Existing Boiler to be Removed

SARATOGA DRIVE

WE RAMP

MOANALUA FREEWAY

MOANALUA

INTERSTATE ROUTE H-1

HALAWA HEIGHTS ROAD

RAMP E

RAMP D

EW RAMP

ROAD

TRUE NORTH
Scale 1 in. = 50 ft.

MATCH LINE (SEE ABOVE)

SALT LAKE BOULEVARD

Sewer Sump House

SARATOGA DRIVE

LEXINGTON STREET

SHARK DRIVE

Existing Boiler (see Note A)

TRUE NORTH
Scale: 1 in. 50 ft.

LEGEND

	Existing	New	Removed or Abandoned
San. Sewer			
Water (Fresh)			
Water (Hot)			
Buildings			

Note A:
Existing Boiler to supply Hot Water Service to Buildings #1Y and #13Y.
Location of tap to existing Hot Water Main, location of New Mains and locations of connections of buildings to be serviced to be determined in the field. (Use 2½" pipe from tap in existing main and 1½" pipe for branch laterals to individual buildings.)

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

J. ANDREW SCHUCHART REGISTERED PROFESSIONAL ENGINEER No. 2229 HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

J. Andrew Schuchart

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

NAVY WATER & SANITARY SEWER ADJUSTMENTS @ SOUTH HALAWA HOMES

INTERSTATE ROUTE H1
PROJECT NO. I-H1-1(88):13

SCALE: 1"=50' DATE: JULY 17, 1970

SHEET No. 64 OF 530 SHEETS

195

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(88):13	1971	196	457

MATCH LINE (SEE BELOW)

~~New 35' Pole 5' Deep See Sht 194 for Continuation~~

To Be Maintained Bldg. #134

~~New 35' Pole 5' Deep 2-3/4" Anchors, 15' Lead, (N.Sw.)~~

~~Install New Hc Fire Alarm (N.Sw.)~~

#732 REM

#733 REM

RAMP B

RAMP C

RANGER LOOP

REM

SARATOGA DRIVE

NE RAMP

Existing H.T.Co.

MOANALUA FREEWAY

MOANALUA

INTERSTATE ROUTE H-1

Remove Street Lighting Equipment Existing H.T. Co.

Remove Street Lighting Equipment and Poles.

HALAWA HEIGHTS ROAD

RAMP D

RAMP E

EW RAMP

ROAD

Existing H.T.Co.

TRUE NORTH
Scale: 1in = 50ft.

SALT LAKE BOULEVARD

LEXINGTON STREET

#735

SHARK DRIVE

TRUE NORTH
Scale: 1in = 50ft.

MATCH LINE (SEE ABOVE)

~~Install New Hc Fire Alarm (N.Sw.)~~

Existing Fire Alarm to Remain

New 30' Pole, 5' Deep 3/4" Anchor, 5' Lead. (H.E.Co)

#734

#726

SARATOGA DRIVE

New 40' Pole 5.5' Deep. (H.E.Co.)

New 40' Pole 5.5' Deep, 1" Anchor, 15' Lead. (H.E.Co)

New 40' Pole 5.5' Deep, 3/4" Anchor, 10' Lead. (H.E.Co.)

Exist. Pole P-6 1" Anchor, 15' Lead. (H.E.Co.)

LEGEND

	As Existing	As Reconstructed	As Removed or Abandoned
Navy Facilities (Presently maintained by the Hawaii Housing Authority): Series Street Light, Fire Alarm &/or Electric Primary as noted.			
Electric (H.E.Co.)			
Buildings			
Fire Alarm Manual Sta. (Navy)	⊠	⊠	■ REM
Street Light	✲	✷ REL	✷ REM
Transformer	△	▲	▲ REM
Telephone (H.T.Co.)			

Denotes Utility Ownership

APPROVED

Hawaiian Telephone Co, Ltd. — Date 9-12-73

R.N. JK

Hawaiian Electric Co., Inc. — Date 9/6/71

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

J. ANDREW SCHUCHART REGISTERED PROFESSIONAL ENGINEER No. 2229 HAWAII, U.S.A.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

NAVY FACILITIES, ELECTRIC TELEPHONE & STREET LIGHTS RELOCATIONS AT SARATOGA DR.

INTERSTATE ROUTE H1
PROJECT NO. I-H1-1(88):13

SCALE: 1"=50' DATE: JULY 17, 1970

SHEET No. 7U OF 53U SHEETS

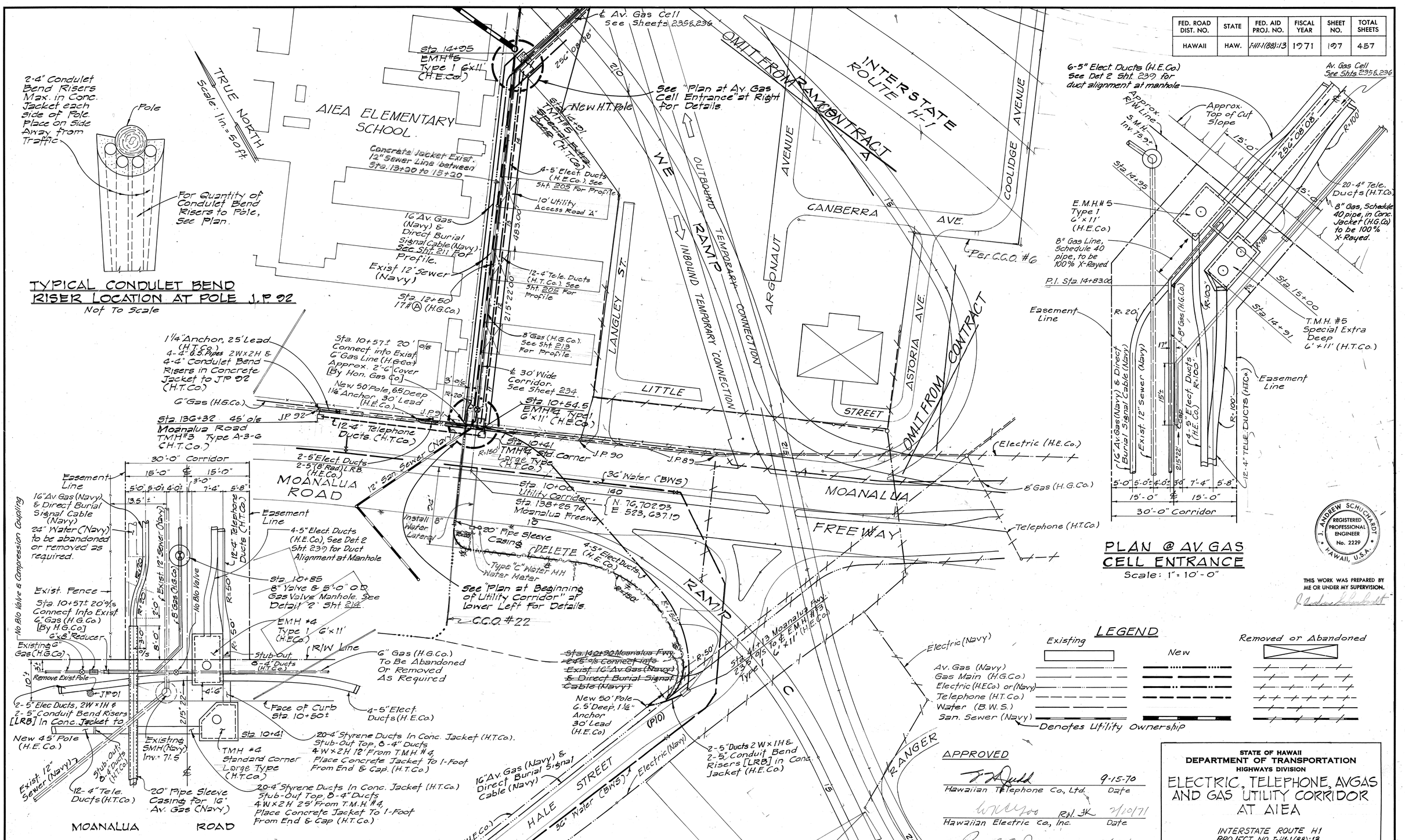
ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	"
	TRACED BY	"
NOTE BOOK	DESIGNED BY	"
No.	QUANTITIES BY	"
	CHECKED BY	"

196

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(88)::13	1971	107	457

TYPICAL CONDULET BEND RISER LOCATION AT POLE J.P 92
Not To Scale

PLAN AT BEGINNING OF UTILITY CORRIDOR
Scale: 1" = 10'-0"



PLAN @ AV. GAS CELL ENTRANCE
Scale: 1" = 10'-0"

APPROVED

Hawaiian Telephone Co., Ltd. — 9-15-70 Date

Hawaiian Electric Co., Inc. — 7/10/71 Date

Honolulu Gas Co. V.P. — 8/27/70 Date

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ELECTRIC, TELEPHONE, AVGAS AND GAS UTILITY CORRIDOR AT AIEA

INTERSTATE ROUTE H1
PROJECT NO. I-HI-1(88)::13

SCALE: 1" = 50' & AS SHOWN DATE: JULY 17, 1970

SHEET No. 8U OF 53U SHEETS

J. ANDREW SCHUCHARDT
REGISTERED PROFESSIONAL ENGINEER
No. 2229
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

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

107

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(88):13	1971	108	457

LEGEND

Existing — New — Removed or Abandoned

Buildings

Electric (H.E.Co)

Telephone (H.T.Co)

Av. Gas (Navy)

Gas (H.G.Co.)

Denotes Utility Ownership

Existing Signal Corps Cable

6-5" Elect. Ducts (H.E.Co) See Det 2, Sht. 239 for duct alignment at manhole

D.I. Sta 20+05.47

Sta 19+94.00

Approx. R/W Line

Approx. Top of Cut Slope

E.M.H. #G Type 1 6'x11' (H.E.Co.)

2-4" Tele. Ducts & 2-4" Conduit Bend Risers (H.T.Co.)

Sta. 20+30 ± Install 4" H.G.Co. Lateral Per C.C.O. #35

Easement Line

16" Av.Gas (Navy) & Direct Burial Signal Cable (Navy)

4-5" Elect. Ducts (H.E.Co.)

313°23'38"

R=100'

R=200'

112.4" Tele. Ducts (H.T.Co.)

8" Gas (H.G.Co.) 1.17"

Sta 20+00.00

Cap

R/W Line

T.M.H. #G 8'x10' (H.T.Co)

Sta 20+22 2-32" Ⓐ (H.G.Co.)

Av. Gas Cell See Sheets 235 & 236

256°08'08"

20-4" Telephone Ducts (H.T.Co.)

8" Gas, Schedule 40 pipe, in Conc. Jacket (H.G.Co.) to be 100% X-Rayed

8" Gas Line, Schedule 40 Pipe, in Conc. Jacket (H.G.Co.) to be 100% X-Rayed

ARGONAUT AVENUE

ATLANTA AVENUE

LANGLEY ST.

Exist. Pole (Navy) 1' Anchor, 15' Lead (H.T.Co.)

Sta 19+24 E.M.H. #G Type 1 6'x11' (H.E.Co.)

2-4" Tele. Ducts & 2-4" Conduit Bend Risers (H.T.Co.)

See "Plan @ Av. Gas Cell Exit" Above For Details.

Install 4" H.G. Co. Lateral Per C.C.O. #35

6-5" Elect. Ducts (H.E.Co.)

3/3°23'38"

378.45'

8" Gas (H.G.Co.) Schedule 40 pipe to be 100% X-Rayed in Av. Gas Cell

20-4" Tele. Ducts (H.T.Co.)

Sta 26+00 T.M.H. #6 8'x10' (H.T.Co.)

12-4" Tele. Ducts (H.T.Co.) See Sht. 205 for Profile.

10' Utility Access Road "B"

Sta 24+50 E.M.H. #7 Type 1, 6'x11' (H.E.Co.)

± 25' Wide Utility Corridor See Sheet 234

Sta 24+63 T.M.H. #7 Type A-3-6.5 (H.T.Co.)

Existing Pole (Navy) 1" Anchor, 15' Lead (H.T.Co.)

2-4" Tele. Ducts & 2-4" Conduit Bend Risers (H.T.Co.)

Pole "H"

H.T. Conn.

303°05'13"

342.55'

4-5" Elect. Ducts (H.E.Co.) See Sht. 205 For Profile.

Sta 27+15 E.M.H. #8 Type 1 6'x11' (H.E.Co.)

Sta 27+28 T.M.H. #8 Type A-3-6.5 (H.T.Co.)

2-4" Tele. Ducts & 2-4" Conduit Bend Risers (H.T.Co.)

Exist Pole (Navy) 1" Anchor, 15' Lead (H.T.Co.)

2-5" Elect. Ducts & 2-5" Conduit Bend Risers (LRB) (H.E.Co.)

16" Av. Gas (Navy) & Direct Burial Signal Cable (Navy) See Sht. 211 For Profile

314°38'21"

1010.48

8" Gas (H.G.Co.) See Sht. 230 For Profile

12-4" Tele. Ducts (H.T.Co.) See Sht. 205 For Profile.

Sta 25+00 32" Ⓐ (H.G.Co.)

Pole "G"

Sta 29+95 Av. Gas Cathodic Protection Test Post (Navy) See Det 6 Sheet 238

Per C.C.O. #6

Pole "E"

Pole "F"

Pole "D"

Pole "C"

Lead to Pole

WAHOO AVE.

LISCOMB BAY AVE.

CHICAGO AVENUE

COOLIDGE AVE.

HALAWA HEIGHTS ROAD

RAMP D

RAMP G

EW RAMP

H-1

INTERSTATE ROUTE H-1

OUTBOUND

INBOUND

Relocated Overhead Cable

TEMPORARY CONNECTION

OMIT FROM CONTRACT

New H.T. Pole

℄ 30' Wide Utility Corridor See Sheet 234

215°22'00" 483.00'

256°08'08" 522.47'

TRUE NORTH Scale: 1 in. = 50 ft.

T.M.H. #10 Remove Exist Pole New 50' Pole Type A-3-6 6.5' Deep (H.E.Co) (H.T.Co.) 1¼" Anc. 25' Lead (H.T.Co.)

9-4" Tele. Ducts (H.T.Co.) See Sht. 206 for Profile.

Stub-out 9-4" Ducts (H.T.Co.)

Highway Lighting Sub Station See Sheet 186

2-4" Elect. Duct (Hwy Ltg.) See Sht. 207

See Sheet 242 for Continuation

4-4" G.S. Pipes 2 W x 2 H 6-4-4" Conduit Riser Bends In Concrete Jacket (H.T.Co.)

PLAN @ AVGAS CELL EXIT

SCALE: 1"=10'

PLAN @ E.M.H. #9 & T.M.H. #9

SCALE: 1"=10'

2-5" Elect. Ducts (H.E.Co.)

Sta 30+05

Sta 30+18

9-4" Tele. Ducts (H.T.Co.)

24" Ducts in Conc. Jacket (Hwy Ltg.)

16" Av. Gas (Navy) & Direct Burial Signal Cable (Navy)

Easement Line

4-5" Elect Ducts (H.E.Co.)

314°38'21"

2.6'

R=150'

10-4" Tele Ducts (H.T.Co)

12.4" Tele. Ducts (H.T.Co.)

R=50'

E.M.H. #9 Type 1 6'x11' (H.E.Co.)

8" Gas (H.G.Co.)

T.M.H. #9 Type V-1 (H.T.Co.)

R/W Line

12'-6" Corridor

25'-0" Corridor

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

J. ANDREW SCHUCHARDT REGISTERED PROFESSIONAL ENGINEER No. 2229 HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

J. Andrew Schuchardt

APPROVED

T. F. Ingalls 9-15-70
Hawaiian Telephone Co., Ltd. Date

W.K.C. R.H. J.K. 9/10/71
Hawaiian Electric Co., Inc. Date

Paul C. Jay 8/27/70
Honolulu Gas Co. V.P. Date

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ELECTRIC, TELEPHONE, AVGAS AND GAS UTILITY CORRIDOR AT HALAWA HOMES

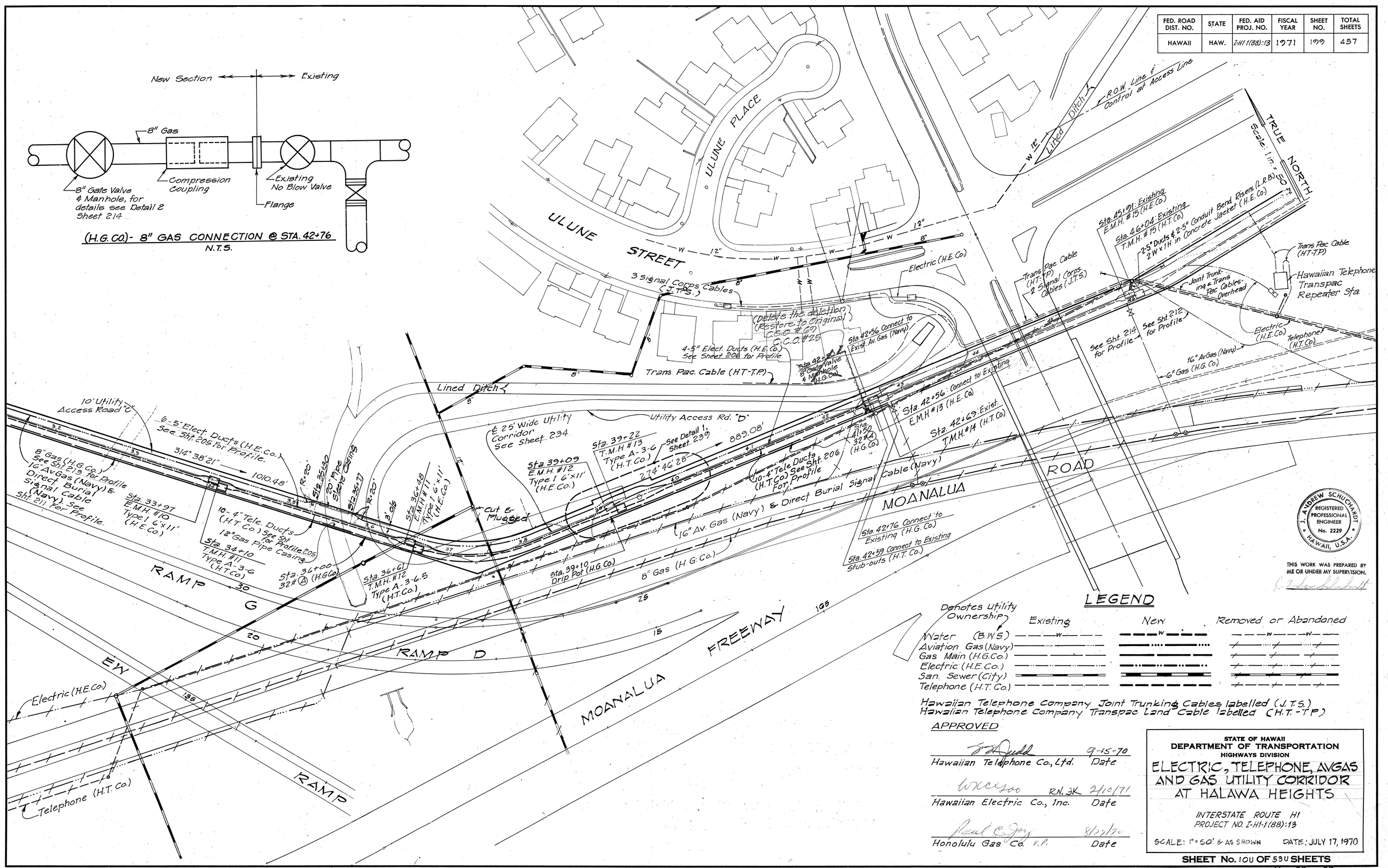
INTERSTATE ROUTE H1
PROJECT NO. I-H1-1(88):13

SCALE: 1"=50' & AS SHOWN DATE: JULY 17, 1970

SHEET No. 94 OF 530 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI 1(88):13	1971	199	457

(H.G.CO.)- 8" GAS CONNECTION @ STA. 42+76
N.T.S.



J. ANDREW SCHUCHARDT
REGISTERED PROFESSIONAL ENGINEER
No. 2229
HAWAII, U.S.A.

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LEGEND

Denotes Utility Ownership

	Existing	New	Removed or Abandoned
Water (B.W.S.)	W	W	W
Aviation Gas (Navy)			
Gas Main (H.G.Co.)			
Electric (H.E.Co.)			
San. Sewer (City)			
Telephone (H.T.Co.)			

Hawaiian Telephone Company Joint Trunking Cables labelled (J.T.S.)
Hawaiian Telephone Company Transpac Land Cable labelled (H.T.-T.P.)

APPROVED

F. L. Judd 9-15-70
Hawaiian Telephone Co., Ltd. Date

W.K.C. for R.N. JK 2/10/71
Hawaiian Electric Co., Inc. Date

Paul C. Jones 8/27/70
Honolulu Gas Co. V.P. Date

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ELECTRIC, TELEPHONE, AVGAS AND GAS UTILITY CORRIDOR AT HALAWA HEIGHTS

INTERSTATE ROUTE HI
PROJECT NO. I-HI-1(88):13

SCALE: 1"=50' & AS SHOWN DATE: JULY 17, 1970

SHEET No. 100 OF 530 SHEETS

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

199

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(88):13	1971	200	457

SIGN
90
89.0
POST
F.H.
LISCOMB BAY ROAD
81.0
POST
X73.5
90
TRUE NORTH
Scale: 1 in. = 20 ft.
GUARD RAIL
R=30'
R=5'
15'
R=30'
15'
Remove Existing Pavement
R=80'
X78.2
80
PROPOSED ACCESS ROAD
R=45'
R=20'
15'
R=20'
10'
Proposed Substation 18' x 15'2
HALAWA HEIGHTS ROAD
℄ Package Lift Sta. (Navy) See Sht. 237 For Details.
Electric Manhole
M.H.
R=30'
80
X82.2
X89.2
FOUNDATION
Elec. M.H.
LISCOMB BAY ROAD
R=200'
Telephone M.H.
FOUNDATION
Sta. 25+62.3
℄ 25' WIDE UTILITY CORRIDOR
Telephone Manhole
80
37
36
70
35
R=1600'
34
33
R=1600
27
26
25
RAMP G
RAMP D
24
70
28
23

J. ANDREW SCHLICHARDT
REGISTERED PROFESSIONAL ENGINEER
No. 2229
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ELECTRIC SUBSTATION AND NAVY LIFT STATION LOCATION PLAN

INTERSTATE ROUTE H1
PROJECT NO. I-HI-1(88):13

SCALE: 1"=20'
DATE: JULY 17, 1970

SHEET No. 111 OF 533 SHEETS

200

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(88):13	1971	201	467

LEGEND

Denotes Utility Ownership

	Existing	New	To Be Removed or To Be Abandoned
San. Sewer (CITY)	S	S	S
Water (B.W.S.)	W	W	W

NOTE A: New B/x includes Type X Meter Box (including cast iron cover) and 1¼ inch copper service lateral with Type B copper service connection off existing main and all appurtenance. The Board of Water Supply to make all connections. Contractor shall furnish all corporation stop and perform all excavation and backfill.

NOTE B: The frame and cover to be cleaned, painted and installed is available at the State's field office.

TRUE NORTH
SCALE: 1" = 50'

KAIMAKANI STREET

RAMP D

INTERSTATE ROUTE H-1

WE RAMP

H-1 OUTBOUND ⇦

H-1 INBOUND ⇨

195+00 200+00 205+00

New B/X (See Note A)

Cut & Plug

Cut & Plug House Connection

Cut & Plug at House Connection and Maintain House Connection

Demolish existing Sewer Manhole

Cut & Plug

Adjust M.H. Frame & Cover

Adjust M.H Frame & Cover

STREET A

SAN. SEWER LINE B (CITY)

Cut & Plug House Connection

PER C.C.O. #53 Demolish & Reconstruct Existing Water M.H.

New S.M.H. Inv. 46.00 (in) Inv. 45.9± (out) Sta. 1+85 Frame & Cover (See Note B) Cut & Plug Existing 8" Sewer within new Manhole. (To be done by the Div. of Sewers)

Connect to Existing S.M.H. Inv. 52.56 (in) Inv. 52.56 (Out) Sta. 0+00 Rechanneling of M.H. to be done by Div. of Sewers.

Cut & Plug House Connection

PUAKALA STREET

KULINA STREET

POOPAA PLACE

Cut & Plug

PROFILE - SANITARY SEWER LINE B (CITY)

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

Existing Ground @ ℄ of Pipe

STREET A

185' - 8" V.C.P. @ 3.55%

Exist. 58"

0+00 Exist. S.M.H. 52.50

1+85 NEW S.M.H. 46.00 / 45.9± Exist. 58"

60 50 40

0+00 1+00 2+00

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

APPROVED:

ASS'T. CHIEF ENGINEER, B.W.S. — DATE 12/18/70

CHIEF, DIV. OF SEWERS — DATE 12/22/70

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

UTILITIES
SANITARY SEWER & WATER

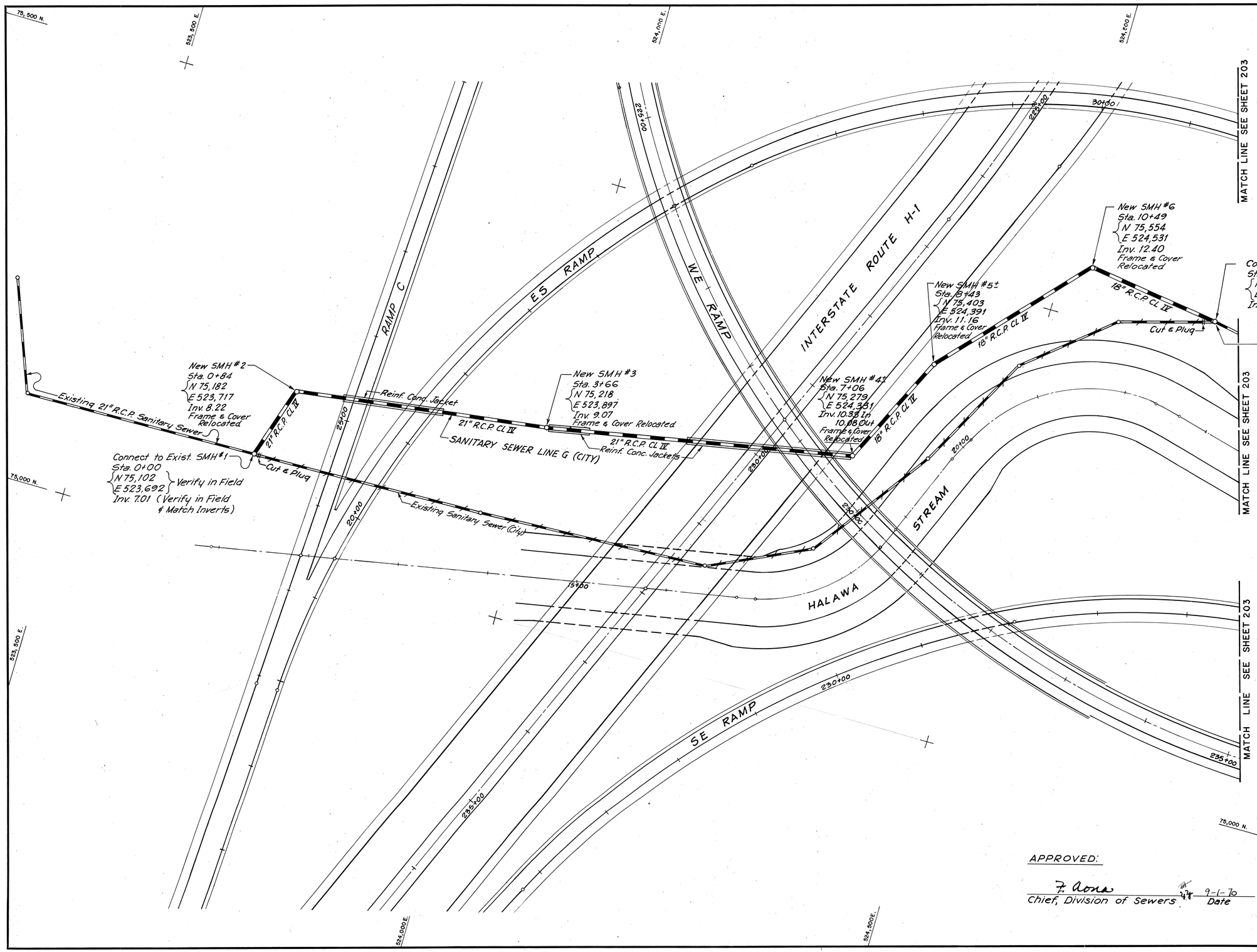
HALAWA INTERCHANGE
PROJECT No. I-HI-1(88):13

Scale as noted

SHEET No. 120 OF 530 SHEETS

201

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(88):13	1971	202	457



See Sheet 209 for Profile.

J. ANDREW SCHUCHARDT
REGISTERED PROFESSIONAL ENGINEER
No. 2229
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

J. Andrew Schuchardt

APPROVED:

7 Aona
Chief, Division of Sewers

9-1-70
Date

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

SANITARY SEWER RELOCATION (CITY)

INTERSTATE ROUTE H1
PROJECT NO. I-HI-1(88):13

SCALE: 1"=50'

DATE: JULY 17, 1970

SHEET No. 13U OF 53U SHEETS

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

202

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-H1-1(88):13	1971	203	457

MATCH LINE SEE SHEET 202

MATCH LINE SEE SHEET 202

MATCH LINE SEE SHEET 202

MATCH LINE SEE SHEET 202

525,000 E.

76,000 N.

525,500 E.

526,000 E.

75,500 N.

75,000 N.

155+00

35+00

25+00

295+00

160+00

140+00

165+00

15+00

40+00

30+00

240+00

MOANALUA FREEWAY

RAMP G

RAMP D

RAMP

ES

HALAWA HEIGHTS STREAM

EW RAMP

HALAWA STREAM

SE RAMP

WE RAMP

RAMP J

RAMP H

Exist. SMH #87
Sta. 14+25

Existing 18" R.C.P. Sanitary Sewer

Adjust Existing S.M.H. to Grade
Exist. Top El. 29.2±
Prop. Top El. 30.6

Exist. SMH #9
Sta. 0+00
N 75,450 } Verify in Field
E 525,148 }
Inv. 17.23 (Verify in Field & Match Inverts)

Cut & Plug

Adjust Existing S.M.H. to Grade
Exist. Top El. 31.0±
Prop. Top El. 31.3

18" R.C.P. Cl. IV

New SMH #10
Sta. 2+40
N 75,367
E 525,373
Inv. 18.19
Frame & Cover Relocated

Reinf. Conc. Jacket

18" R.C.P. Cl. IV

SANITARY SEWER LINE H (CITY)

New SMH #11
Sta. 4+84
N 75,283
E 525,202
Inv. 19.16
Frame & Cover Relocated

18" R.C.P. Cl. IV

Existing Sanitary Sewer (City)

MATCH LINE SEE SHEET 204

See Sheet 209 for Profile.

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

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

J. Andrew Schuchardt

J. ANDREW SCHUCHARDT
REGISTERED PROFESSIONAL ENGINEER
No. 2229
HAWAII, U.S.A.

APPROVED:

F. Aona
Chief, Division of Sewers

9-1-70
Date

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

SANITARY SEWER RELOCATION (CITY)

INTERSTATE ROUTE H1
PROJECT NO. I-H1-1(88):13

SCALE: 1"=50'

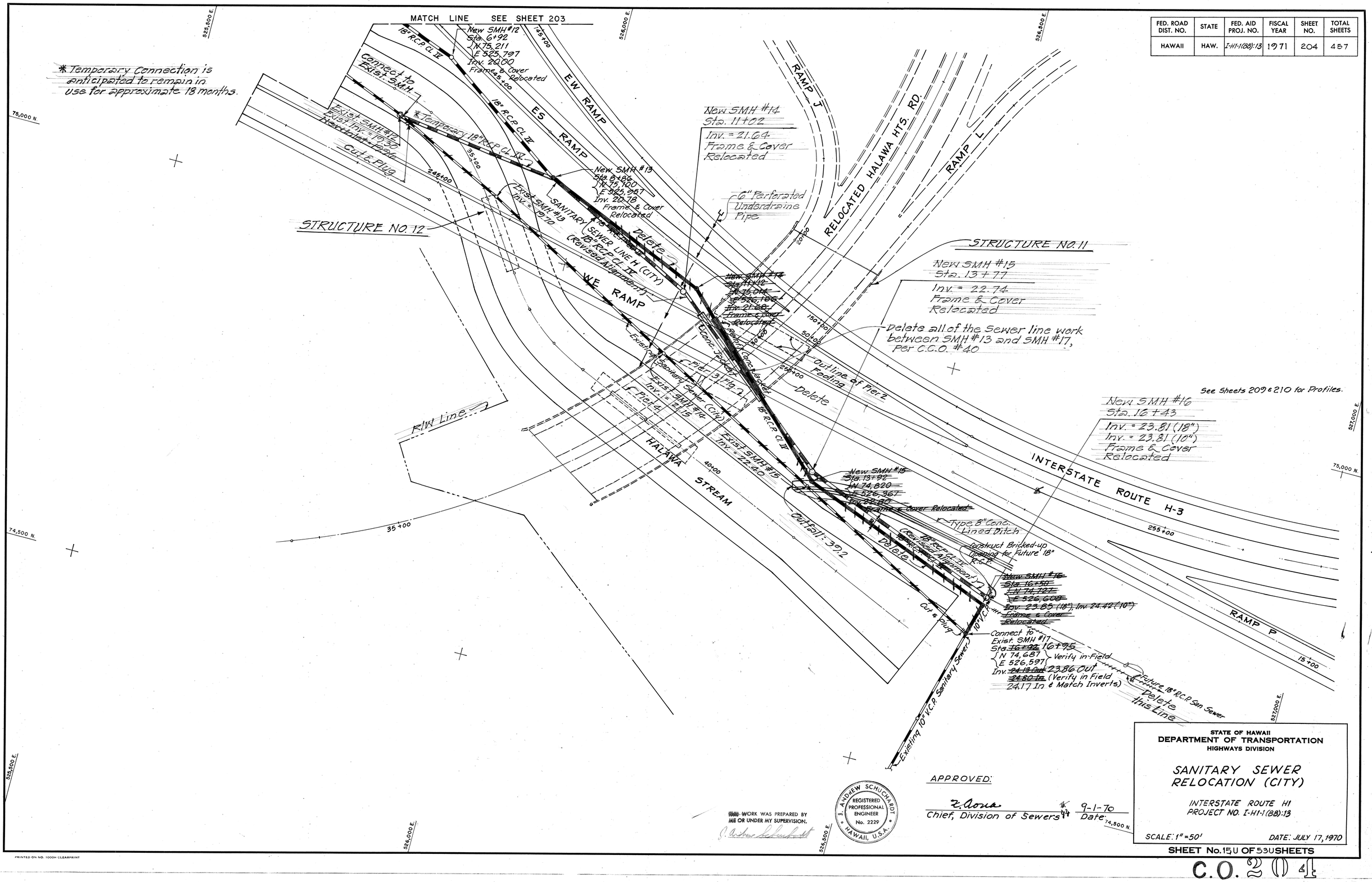
DATE: JULY 17, 1970

SHEET No. 14 U OF 53 U SHEETS

203

PRINTED ON NO. 1000H CLEARPRINT

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(88):13	1971	204	457



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

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

J. Andrew Schuchardt

J. ANDREW SCHUCHARDT REGISTERED PROFESSIONAL ENGINEER No. 2229 HAWAII, U.S.A.

APPROVED:

R. Aona
Chief, Division of Sewers

9-1-70
Date

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

SANITARY SEWER RELOCATION (CITY)

INTERSTATE ROUTE H1
PROJECT NO. I-H1-1(88):13

SCALE: 1" = 50'

DATE: JULY 17, 1970

SHEET No. 15U OF 53U SHEETS

C.O. 204

PRINTED ON NO. 1000H CLEARPRINT

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(88):13	1971	205	457

PROFILE OF ELECTRIC (H.E.Co.) AND TELEPHONE (H.T.Co.) DUCTS IN UTILITY CORRIDOR

Scale : Hor. 1" = 50'
Ver. 1" = 5'

Sta. 10+41 Corner 8.5' Deep Large Type Tel. M.H. #4
Sta. 10+54.5 Type 1 G'x11' Elec. M.H. #4
c/e Moanalua Road Sta. 138+25.74
Top of 12-4" Styrene Tel. Ducts in Conc. Jacket 4W x 3H Typical Unless Noted
2'-0" Min. Cover
3'-0" Min. Cover
1'-10½"
1'-7"
Elec. Ducts over Tel. Ducts only.
Added 8-4" Styrene Tel. Ducts in Conc. Jacket 4W x 2H Stub out 12 L.F. From T.M.H. #4
Top of 4-5" Elec. Ducts in Conc. Jacket 2W x 2H, Typical Unless Noted
Sta. 14+70 Elec. Ducts Top El. = 76.00
Tel. Ducts Top El. = 75.00
8" Gas (H.G.Co.) B.O.L. = 77.3±
16" Av. Gas (Navy) @ Elec. Ducts only. B.O.L. = 72.6±
Sta. 14+95 Type 1 G'x11' Elec. M.H. #5 ℄ 71 Headroom
Sta. 14+91 Special Extra Deep G'x11' Tel. M.H. #5
Exist. Ground
Tel. Ducts Top El. 74.62
100'R.
Tel. Sta. 15+23 El. = 72.70 Per C.C.O. #31
3'-0" Min. Cover
Elec. Ducts
Tel. Sta. 15+48 El. = 61.00
Interstate Route H-1
Tel. Ducts Top El. = 53.0
Tel. & Elec. Ducts Sta. 16+58 Top El. = 53.81
Tel. Sta. 16+50 El. = 51.00
2'-3"
2'-10½"
Av. Gas Cell See Sheets 45U & 46U
6-5" Elec. Ducts in Conc. Jacket 2W x 3H
20-4" Styrene Tel. Ducts in Conc. Jacket 4W x 5H
8" Gas (H.G.Co.) under Tel. Ducts only
Utility Access Road "BC"
Top of Elec. Ducts
2'-0" Min. Cover
1'-10½"
Elec. Ducts Top El. = 85.20
3'-0" Min. Cover
Top of Tel Ducts
1'-7"
Slope = +0.0025 Min., Typical
16" Av. Gas (Navy) @ Elec. Ducts only B.O.L. = 81.2±
12-4" Styrene Telephone Ducts in concrete Jacket 4W x 3H
Tel. Ducts under Elec Ducts only.
Tel. Ducts
Elec. Ducts
100'R
50'R
Tel. & Elec. Ducts Sta. 19+04 Top El. = 55.97
Sta. 19+94 Type 1 G'x11' Elec. M.H. #6
Sta. 20+00 8'x10' Tel. M.H. #6
Sta. 24+50 Type 1 G'x11' Elec. M.H. #7
Sta. 24+63 Type A-3-G.5 Tel. M.H. #7
Sta. 24+63 Type A-3-G.5 Tel. M.H. #7
Sta. 24+50 Type 1 G'x11' Elec. M.H. #7

APPROVED

Hawaiian Telephone Co., Ltd. Date
R.N. JK 7/10/71
Hawaiian Electric Co., Inc. Date

Top of Tel. Ducts
Existing Ground
3'-0" Min. Cover
1'-7"
2'-0" Min. Cover
1'-10½"
Tel. Ducts under Elec. Ducts only
12-4" Styrene Tel. Ducts in conc. Jacket 4W x 3H
All Tel. & Elec. Duct Windows at center of Manhole Unless Noted
Sta. 27+15 Type 1 G'x11' Elec. M.H. #8
Sta. 27+28 Type A-3-G.5 Tel. M.H. #8
Sta. 30+05 Type 1 G'x11' Elec. M.H. #9
Sta. 30+18 Type V-1 Tel. M.H. #9
Top of 10-4" Styrene Tel. Ducts in Conc. Jacket 5W x 2H, Typical Unless Noted
Top of 4'-5" Elec. Ducts in Conc. Jacket 2W x 2H, Typ. Unless Noted
1'-7"
2'-0" min. Cover
1'-4½"
Tel. Ducts under Elec. Ducts only.
Sta. 33+97 Type 1 G'x11' Elec. M.H. #10
Sta. 34+10 Type A-3-G Tel. M.H. #11
Top of G-5" Elect. Ducts in Concrete Jacket 2W x 3H
Exist. Conc. Lined Ditch
Utility Access Road "BC"
Sta. 36+48 Type 1 G'x11' Elec. M.H. #11
Sta. 36+67 Type A-3-G Tel. M.H. #12
Utility Access Road "D"
Top of Elec. Ducts
Top of Tel. Ducts
2'-0" Min. Cover
3'-0" Min. Cover
1'-4½"
1'-7"
10-4" Styrene Tel. Ducts in concrete Jacket 5W x 2H
12" Sanitary Sewer (City) Inv. = 48.6±
℄ 24" S.D.
Existing Ground
Sta. 39+09 Type 1 G'x11' Elec. M.H. #12
Sta. 39+22 Type A-3-G Tel. M.H. #13
For Continuation See Sht. 206

J. ANDREW SCHUCHARDT REGISTERED PROFESSIONAL ENGINEER No. 2229 HAWAII, U.S.A.

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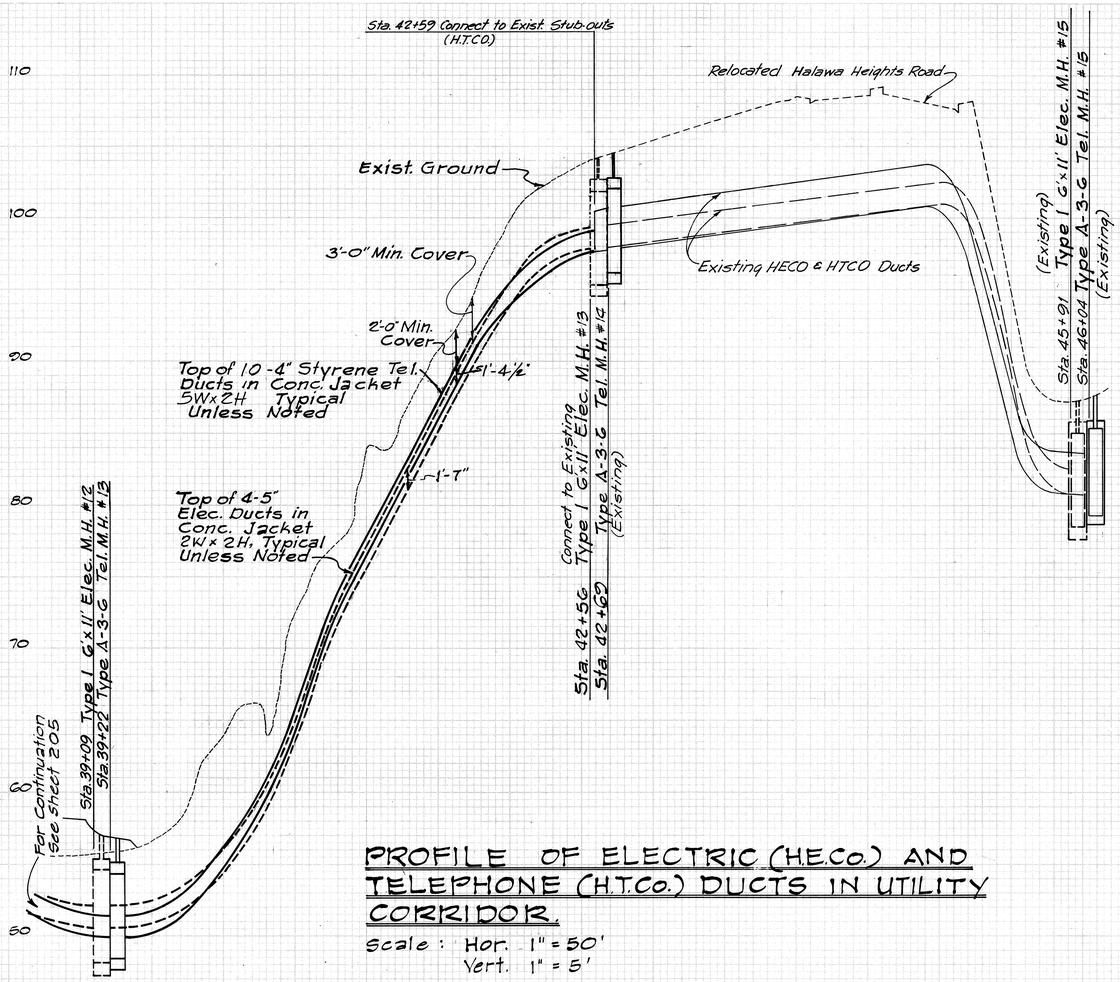
10+00 11+00 12+00 13+00 14+00 15+00 16+00 17+00 18+00 19+00 20+00 21+00 22+00 23+00 24+00 25+00
25+00 26+00 27+00 28+00 29+00 30+00 31+00 32+00 33+00 34+00 35+00 36+00 37+00 38+00 39+00 40+00
80 70 60 50

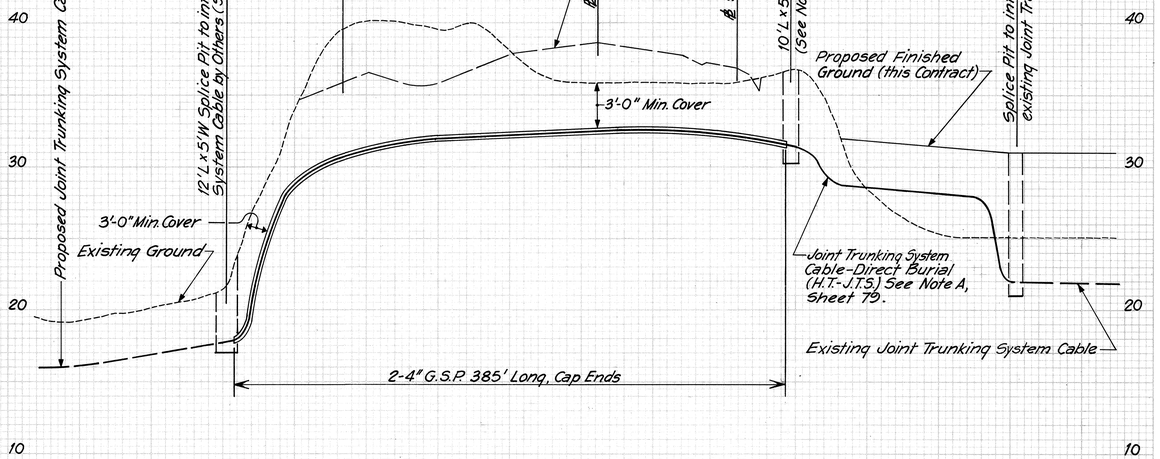
SHEET No. 16U OF 53U SHEETS

2115

PLATE 3 —CROSS SECTION O. P. R. & R. E. STANDARD THE FREDERICK POST CO., CHICAGO

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	THH-1(88)13	1971	206	457





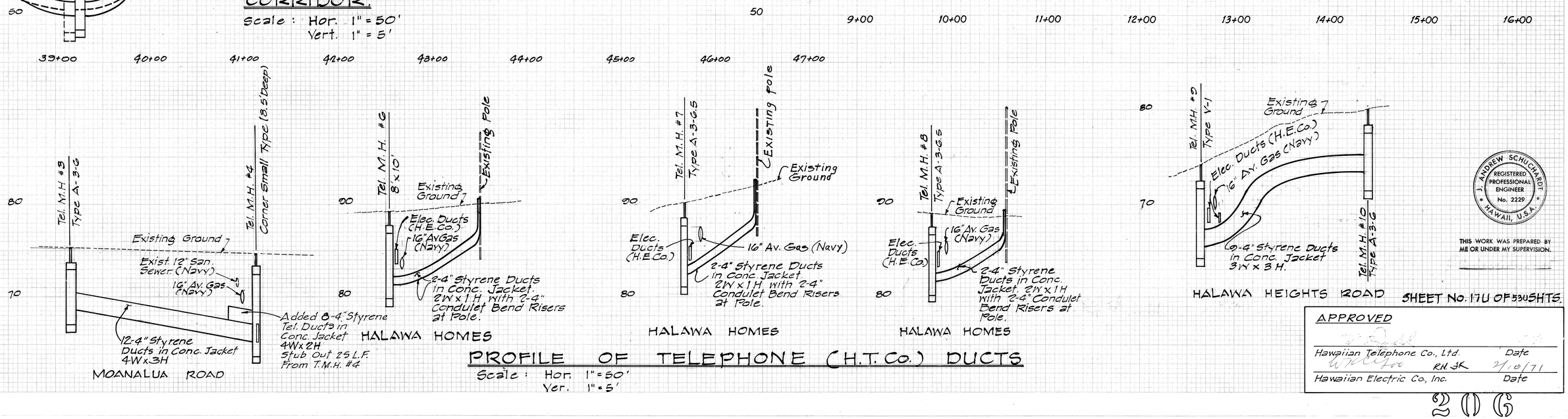
PROFILE OF ELECTRIC (H.E.Co.) AND TELEPHONE (H.T.Co.) DUCTS IN UTILITY CORRIDOR.

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

PROFILE - JOINT TRUNKING SYSTEM CABLE (H.T.-J.T.S.) UNDER ROUTE H-1 FREEWAY (STA. 237+40±)

(PERMANENT LOCATION)

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



PROFILE OF TELEPHONE (H.T. Co.) DUCTS

Scale: Hor. 1" = 50'
Ver. 1" = 5'

J. ANDREW SCHLICHARDT
REGISTERED PROFESSIONAL ENGINEER
No. 2229
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

SHEET No. 171 OF 533 SHTS.

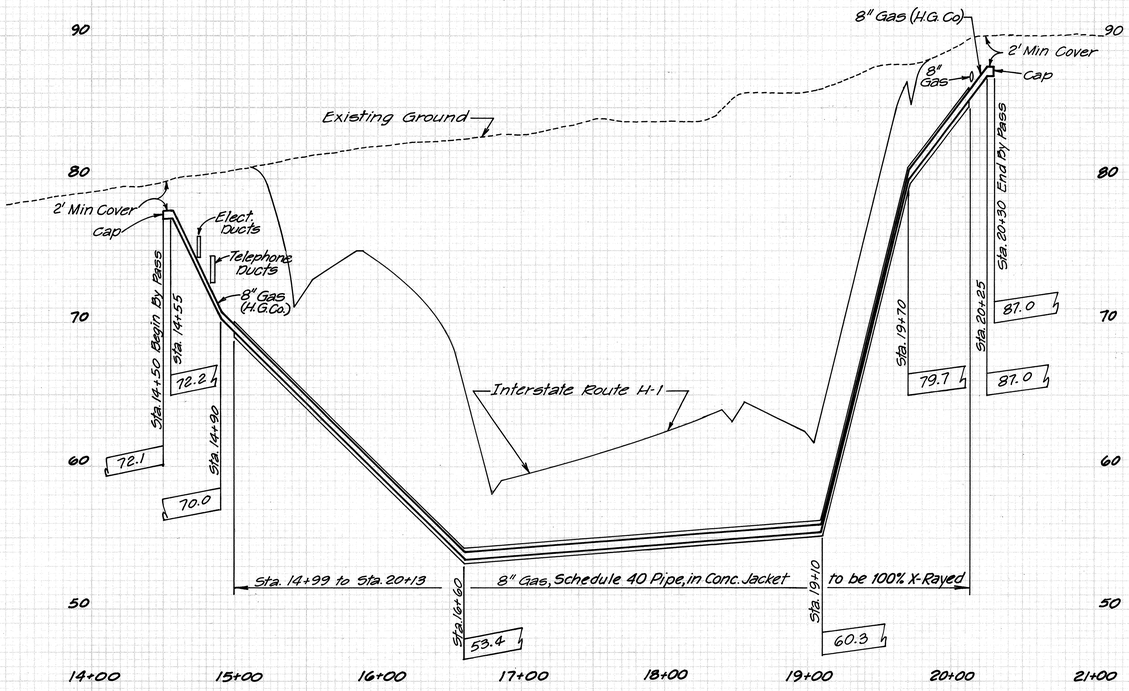
APPROVED

Hawaiian Telephone Co., Ltd. — Date 2/16/71
Hawaiian Electric Co., Inc. — Date

206

PLATE 3 —CROSS SECTION O. P. A. & A. R. STANDARDS
THE FREDERICK POST CO., CHICAGO

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(68):13	1971	207	457

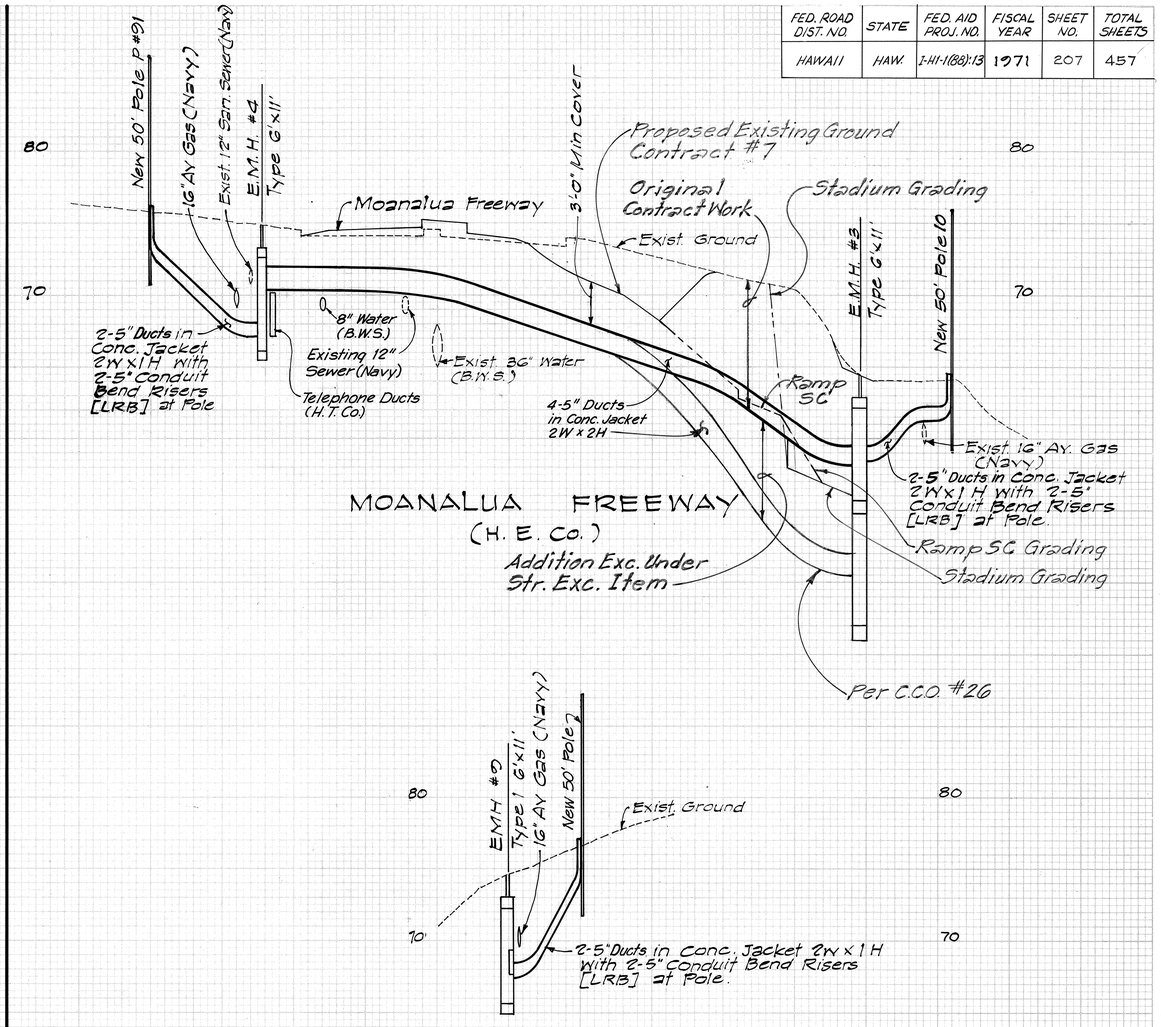


PROFILE OF 8" GAS BYPASS (H.G. CO.)

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

APPROVED

Paul C Joy 8/21/70
Honolulu Gas Co. V.P. Date



60 HALAWA HEIGHTS ROAD (H.E.Co.) 60

PROFILE OF ELECTRIC DUCTS

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

J. ANDREW SCHUCHARDT
REGISTERED PROFESSIONAL ENGINEER
No. 2229
HAWAII, U.S.A.

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SHEET No. 18U OF 53USHEETS

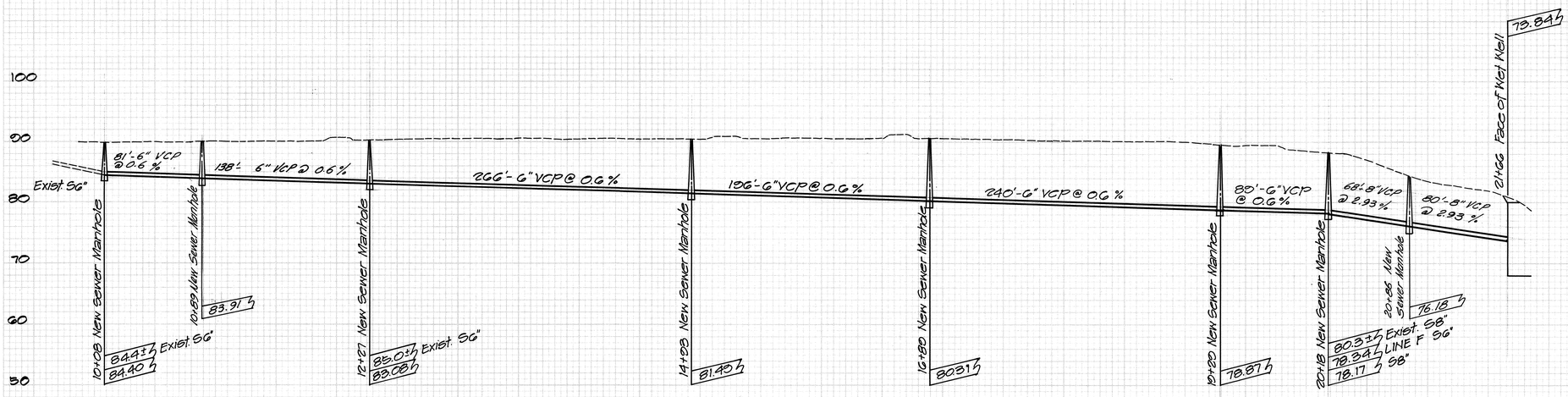
APPROVED

R.N. JK 7/10/71
Hawaiian Electric Co., Inc. Date

207

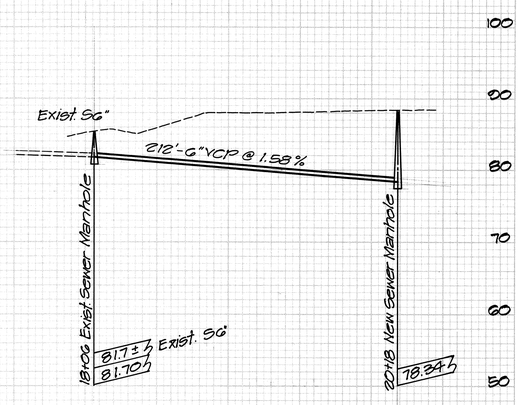
PLATE 3.—CROSS SECTION O. P. N. & R. E. STANDARD
THE FREDERICK POST CO., CHICAGO

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW	I-HI-1(88):13	1971	208	457



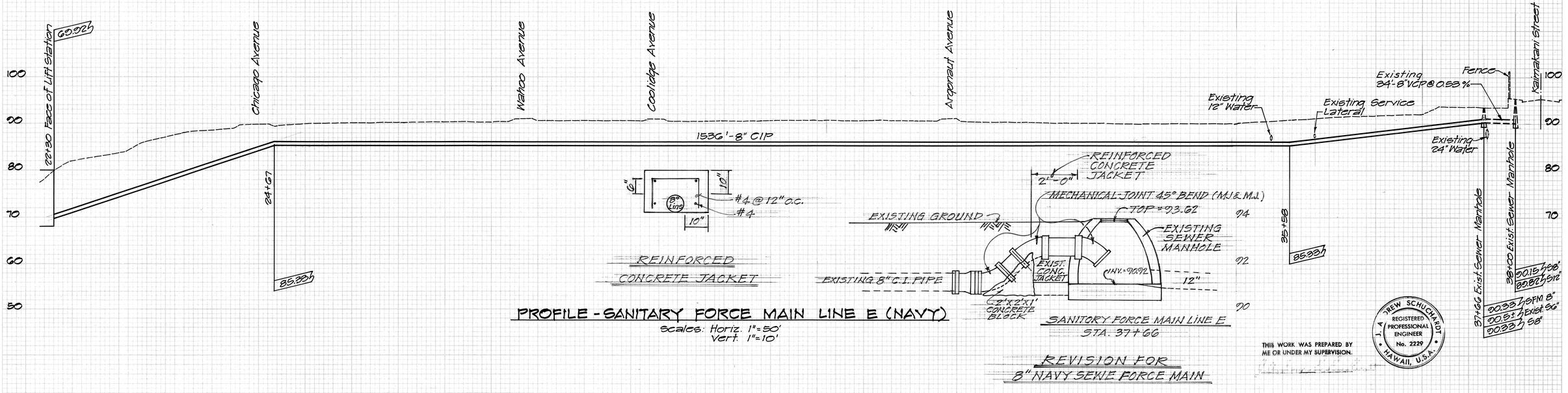
PROFILE - SANITARY SEWER LINE E (NAVY)

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



PROFILE - SANITARY SEWER LINE F (NAVY)

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



PROFILE - SANITARY FORCE MAIN LINE E (NAVY)

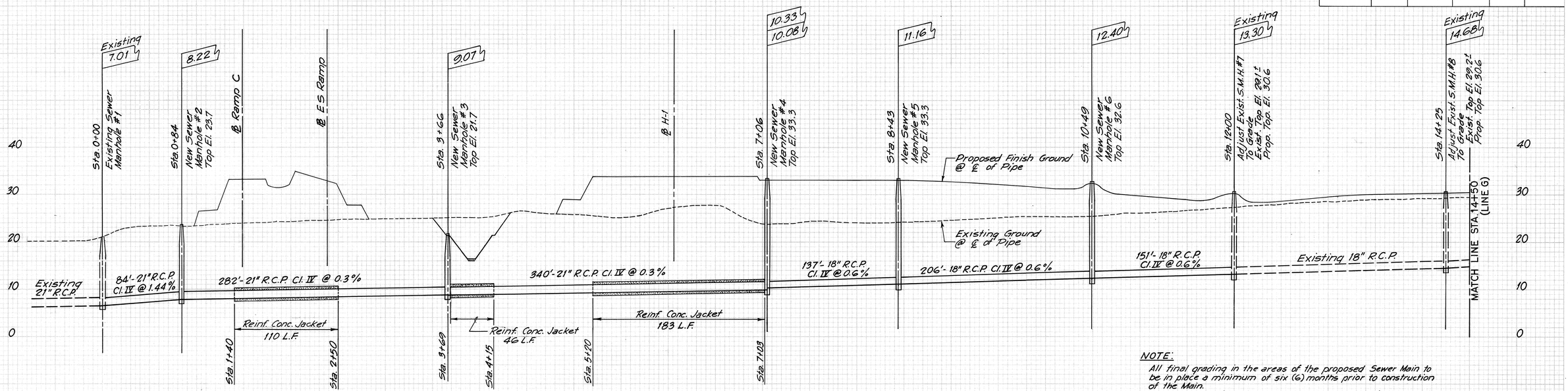
Scales: Horiz. 1"=50'
Vert. 1"=10'

SHEET No. 190 OF 530 SHEETS

208

PLATE 3 —CROSS SECTION G. F. & A. & E. STANDARD
THE FREDERICK POST CO., CHICAGO

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(88):13	1971	209	457

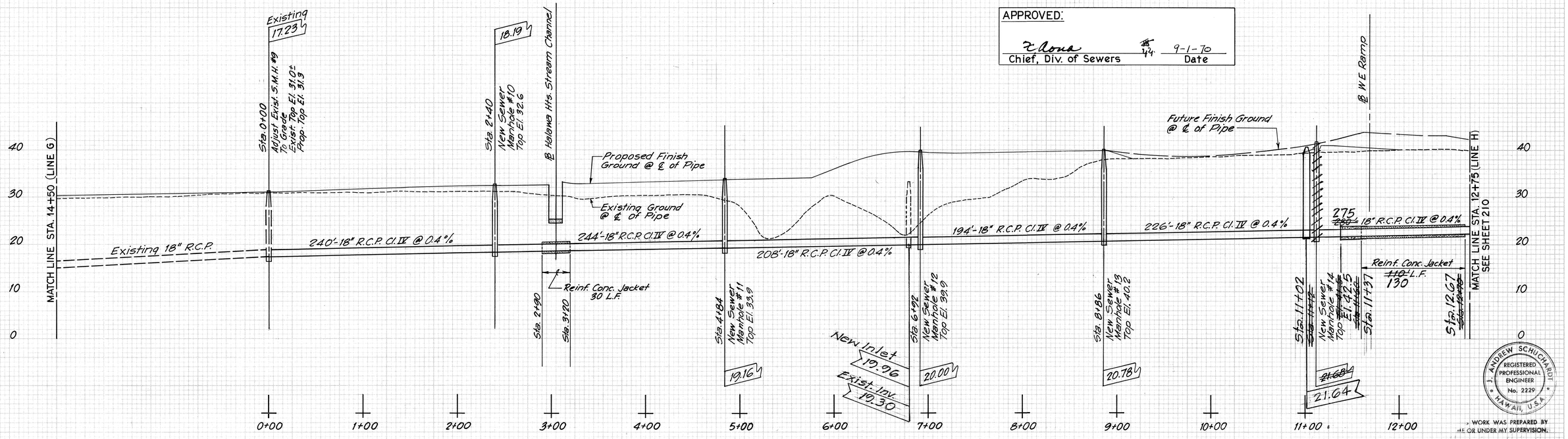


PROFILE - SANITARY SEWER LINE G (CITY)

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

NOTE:

All final grading in the areas of the proposed Sewer Main to be in place a minimum of six (6) months prior to construction of the Main.
No embankment or fill to be placed on the Existing Sewer Main prior to its relocation.
Excavate unsuitable material below bottom of sewer line trench and back fill with No. 2 Rock. (320 c.y.).



APPROVED:

R. Rona — 9-1-70
Chief, Div. of Sewers — Date

PROFILE-SANITARY SEWER LINE H (CITY)

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

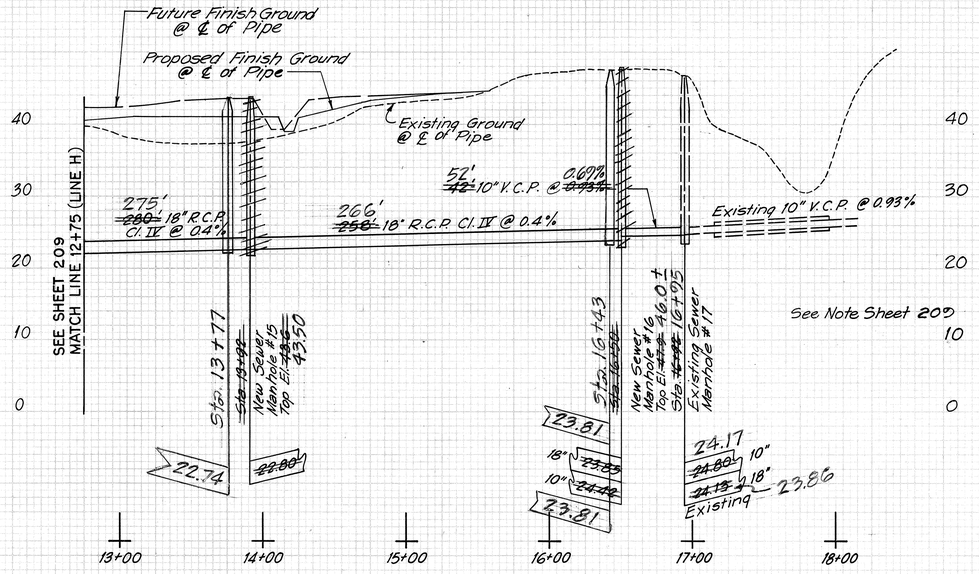
I, ANDREW SCHUCHARDT, REGISTERED PROFESSIONAL ENGINEER No. 2229, HAWAII, U.S.A., WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

SHEET NO. 20U OF 53U SHEETS

C.O. 209

PLATE 3 —CROSS SECTION O. F. N. & R. E. STANDARD
THE FREDERICK POST CO., CHICAGO

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(88):13	1971	210	457

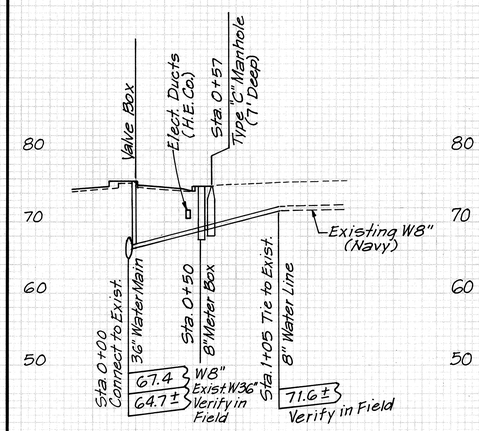


APPROVED

Chief, Div. of Sewers — 9-1-70 Date

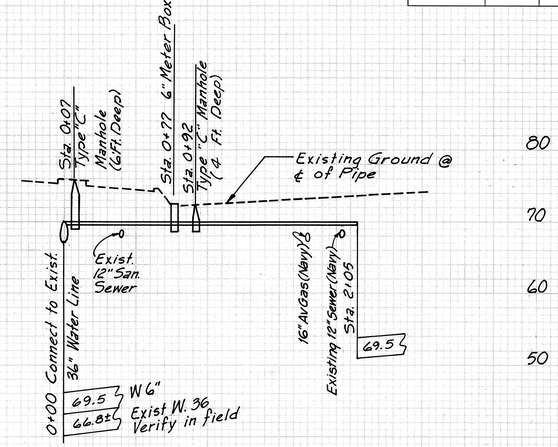
PROFILE - SANITARY SEWER LINE H (CITY)

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



⚠ PROFILE - 8" WATER LATERAL (MOANALUA FREEWAY STA. 138+68) B.W.S.

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



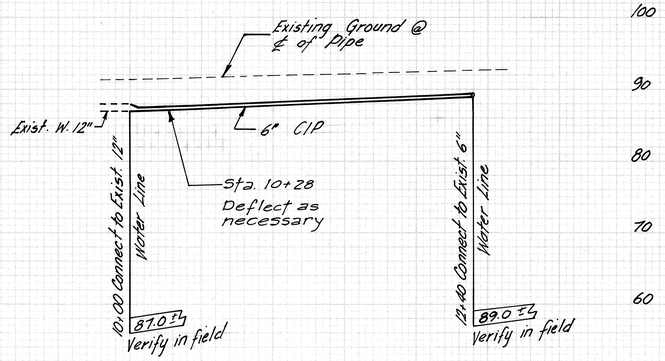
PROFILE - 6" WATER LATERAL (MOANALUA ROAD Sta. 137+22) B.W.S.

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

APPROVED

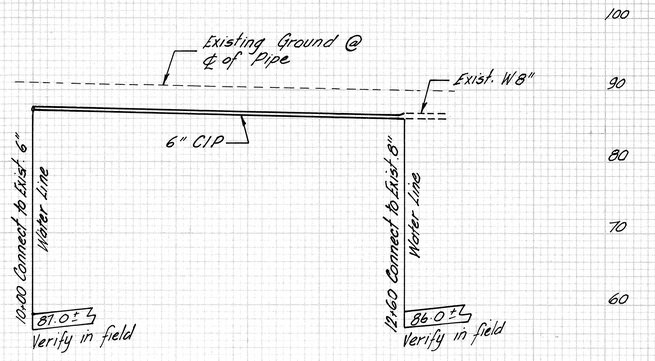
Assist. Chief Engineer, B.W.S. — 8/18/70 Date

B. W. S. REVISIONS		
APPROVED BY	DATE	NO.
	3/5/71	⚠



PROFILE - WATER LINE E (NAVY)

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



PROFILE - WATER LINE F (NAVY)

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

10+00 11 12 13

10+00 11 12 13

J. ANDREW SCHUCHARDT
REGISTERED PROFESSIONAL ENGINEER
No. 2229
HAWAII, U.S.A.

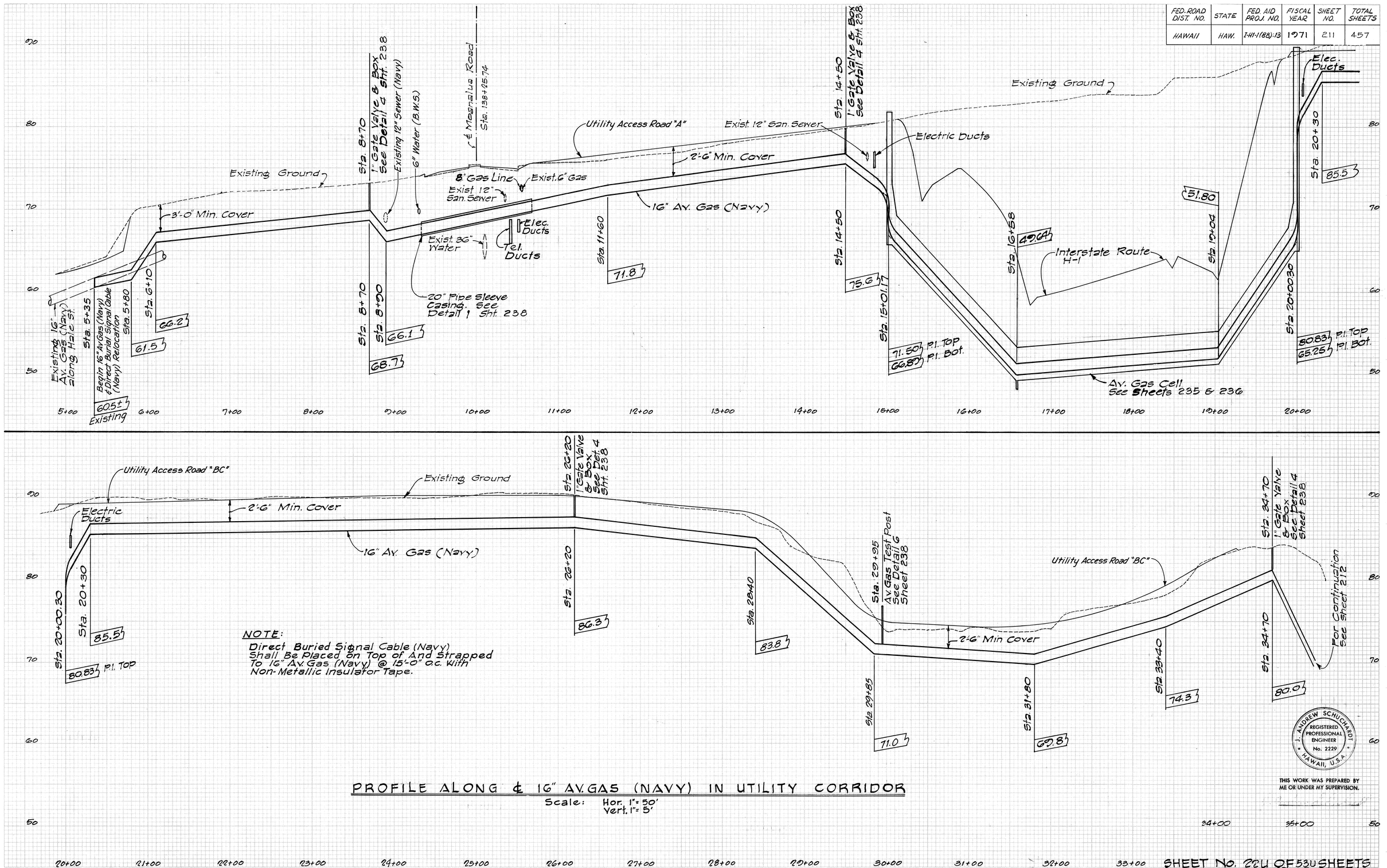
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

SHEET No. 210 OF 530 SHEETS

C.O. 210

PLATE 3.—CROSS SECTION U. S. R. & R. E. STANDARD
THE FREDERICK POST CO., CHICAGO

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(68)-13	1971	211	457



NOTE:
Direct Buried Signal Cable (Navy) Shall Be Placed on Top of And Strapped To 16" Av. Gas (Navy) @ 15'-0" o.c. With Non-Metallic Insulator Tape.

PROFILE ALONG ℄ 16" AV. GAS (NAVY) IN UTILITY CORRIDOR

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

J. ANDREW SCHUCHART
REGISTERED PROFESSIONAL ENGINEER
No. 2229
HAWAII, U.S.A.

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SHEET No. 211 OF 530 SHEETS

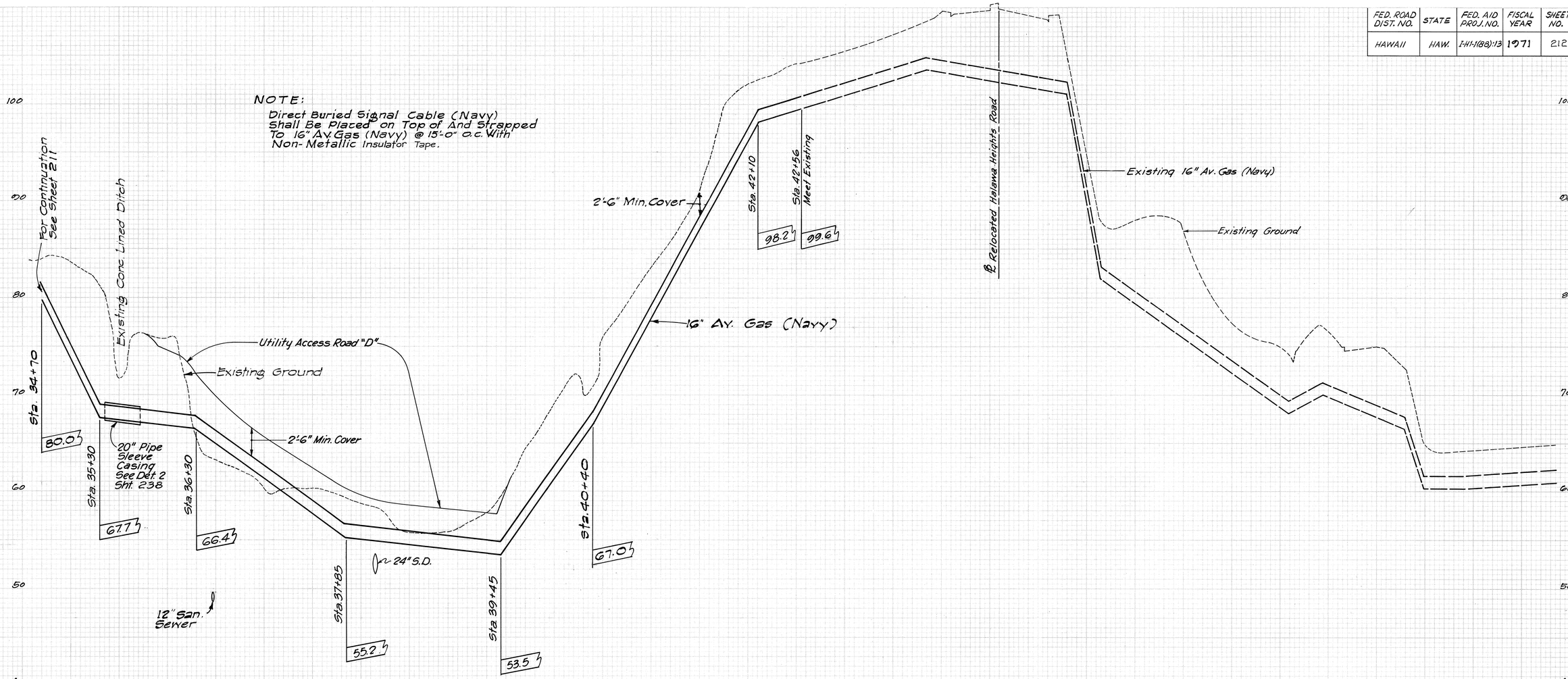
211

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

PLATE 3 —CROSS SECTION C, P. R. & R. E. STANDARD
THE FREDERICK POST CO., CHICAGO

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(88):13	1971	212	457

NOTE:
Direct Buried Signal Cable (Navy) Shall Be Placed on Top of And Strapped To 16" Av. Gas (Navy) @ 15'-0" o.c. With Non-Metallic Insulator Tape.



PROFILE ALONG ℄ 16" AV. GAS (NAVY) IN UTILITY CORRIDOR

Scale: Hor: 1"= 50'
Vert: 1"= 5'

ANDREW SCHUCHARDT
REGISTERED PROFESSIONAL ENGINEER
No. 2229
HAWAII, U.S.A.

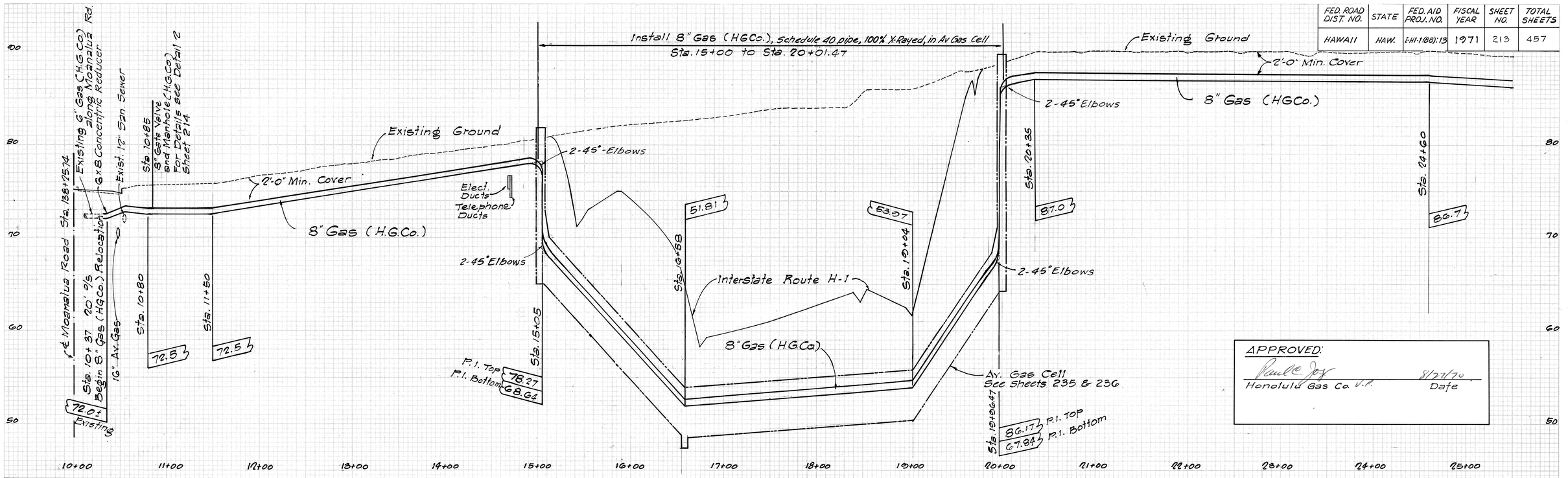
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

SHEET No. 23U OF 53U SHEETS

212

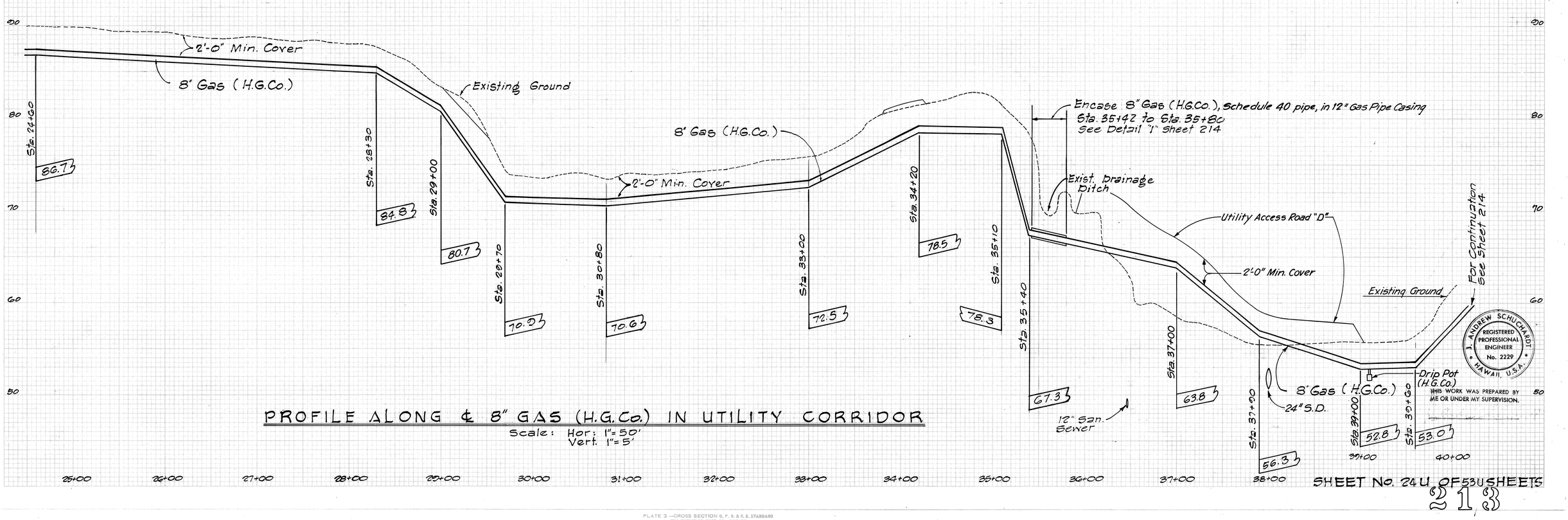
PLATE 3 —CROSS SECTION U. F. & A. & R. E. STANDARD
THE FREDERICK POST CO., CHICAGO

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(88):13	1971	213	457



APPROVED:

Honolulu Gas Co. V.P. — Date 8/27/70



J. ANDREW SCHUCHART
REGISTERED PROFESSIONAL ENGINEER
No. 2229
HAWAII, U.S.A.

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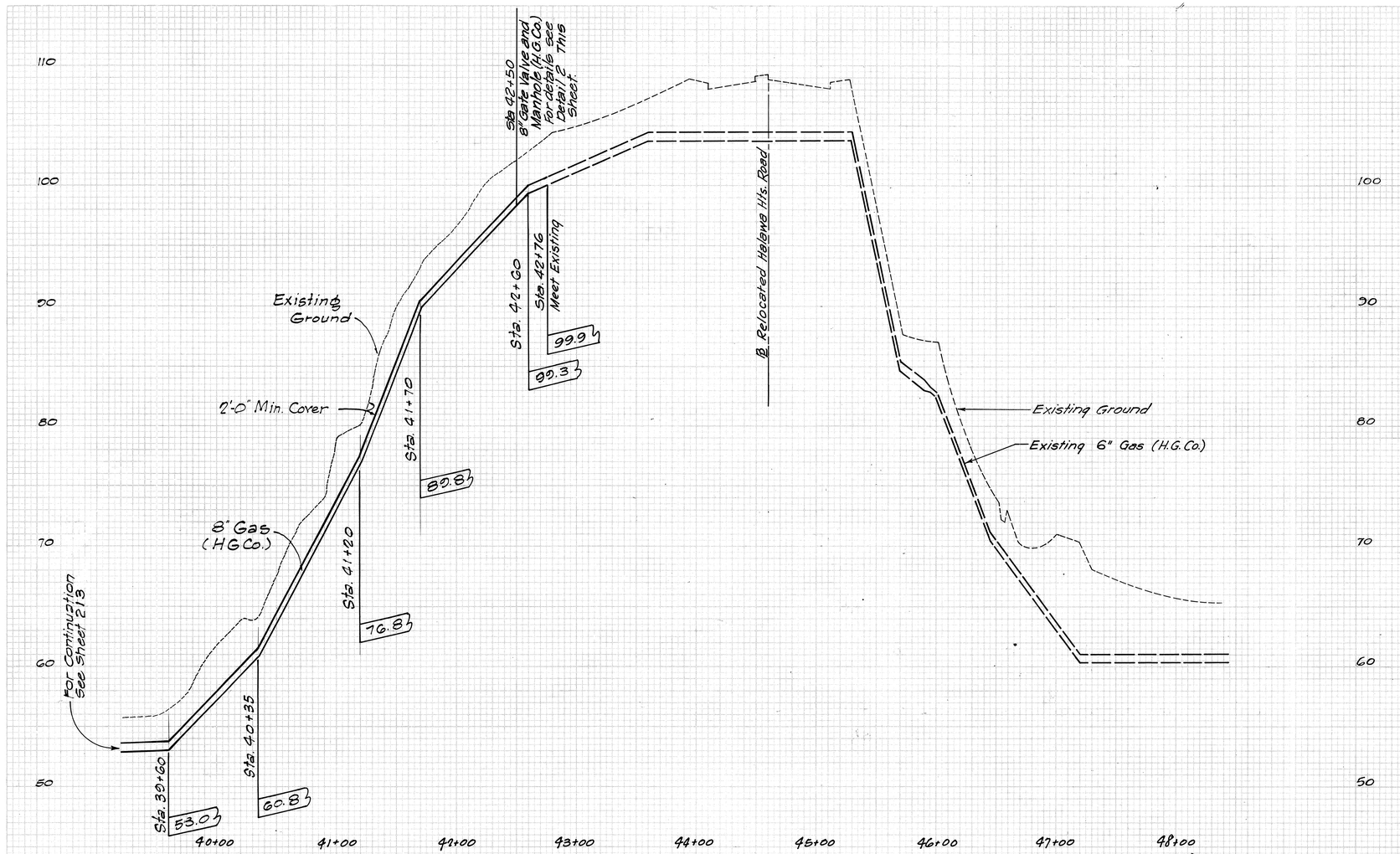
PROFILE ALONG ℄ 8" GAS (H.G.Co.) IN UTILITY CORRIDOR

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

SHEET No. 24U OF 53U SHEETS

213

PLATE 3.—CROSS SECTION U. P. R. & R. E. STANDARD
THE FREDERICK POST CO., CHICAGO



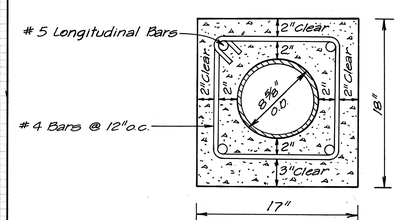
PROFILE ALONG ℄ 8" GAS (H.G.Co.) IN UTILITY CORRIDOR

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

APPROVED:

Paul C Jay — 8/27/70

Honolulu Gas Co. V.P. — Date

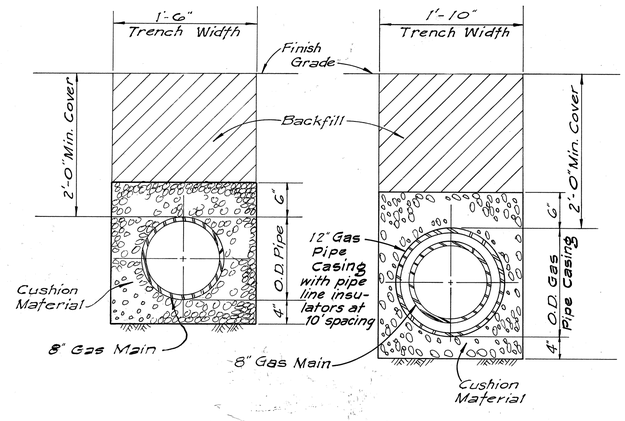


8" GAS LINE IN CONCRETE JACKET

N.T.S.

For additional H.G.Co. details see Sheet 239

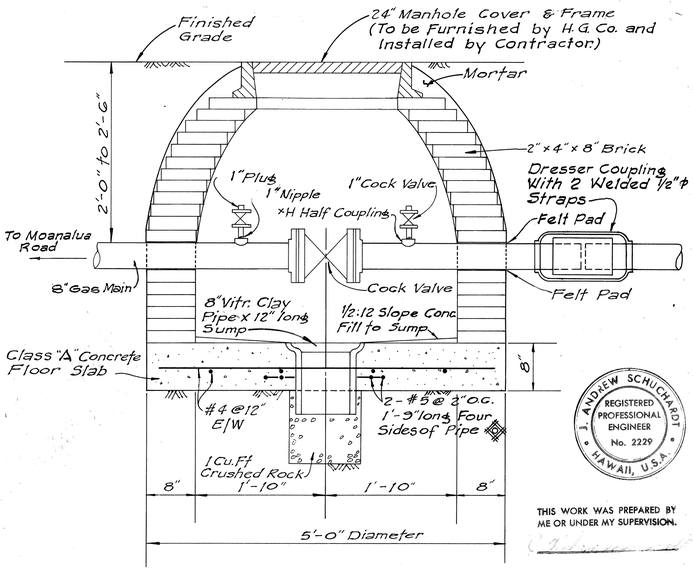
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(88)13	1971	214	457



TYPICAL IN PIPE SLEEVE

GAS MAIN SECTIONS - DETAIL "1"

Not to Scale



SECTION

NOTE: Gas Main & Valves shall be in place prior to construction of Manhole

GAS VALVE MANHOLE - DETAIL "2"

Not to Scale

J. ANDREW SCHUCHARDT
REGISTERED PROFESSIONAL ENGINEER
No. 2229
HAWAII, U.S.A.

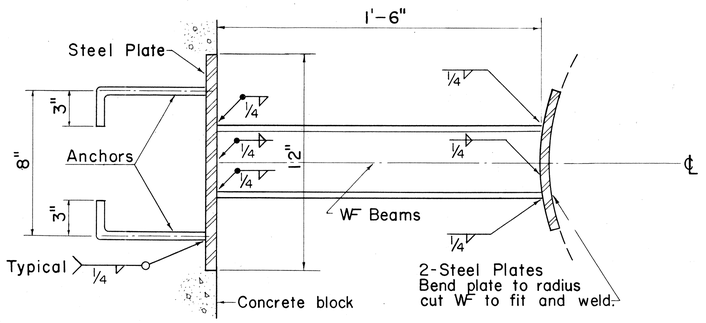
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

SHEET NO. 25U OF 53U SHEETS

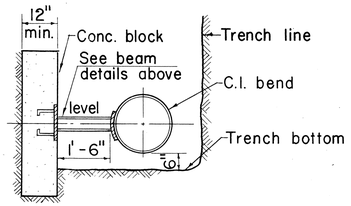
214

PLATE 3 —CROSS SECTION O, P. R. & R. E. STANDARD
THE FREDERICK POST CO., CHICAGO

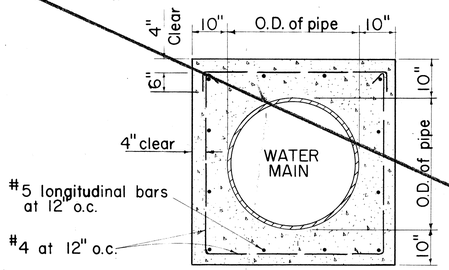
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-HI-1(68):13	1971	215	457



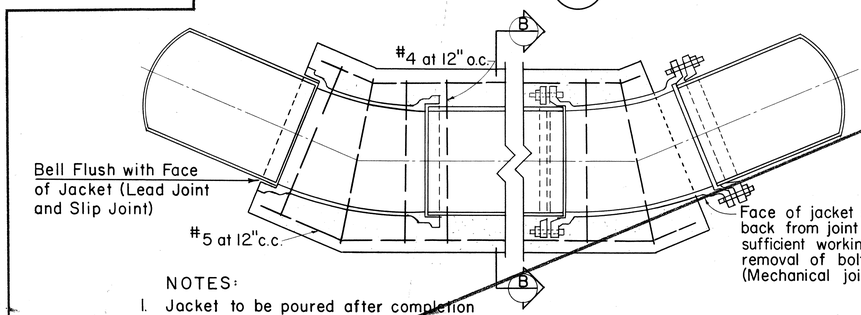
BEAM DETAIL
Scale: 3" = 1'-0"



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

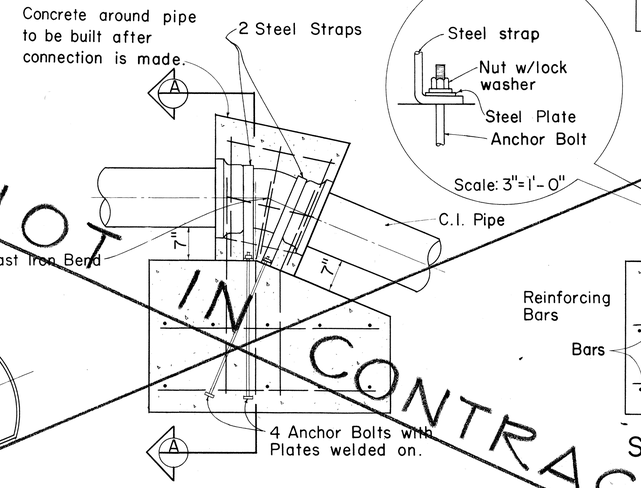


SECTION (B)

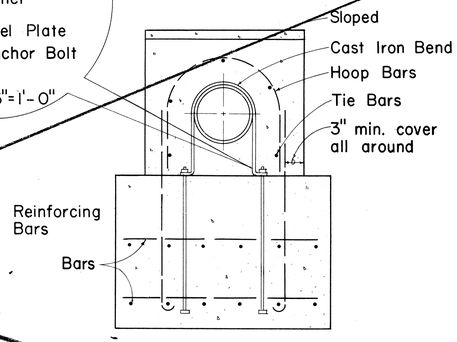


NOTES:
1. Jacket to be poured after completion of test unless otherwise approved by the Engineer.
2. 2 1/2" depth of lead for lead joint pipe required at all embedded joints.
3. Wherever construction joints are required, 6" rubber or neoprene waterstops shall be installed. Waterstops shall be of the type specified and manufactured by the Servicized Products Corporation, Gate Rubber Company or approved equal.

REINFORCED CONCRETE JACKET
Scale: Not to Scale



ELEVATION



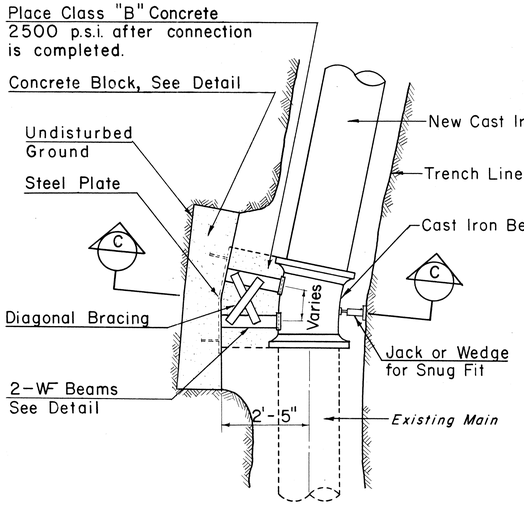
SECTION (A)

NOT IN CONTRACT

TYPICAL DETAIL OF CONCRETE REACTION BLOCK WITH STRAPS
Scale: 3/4" = 1'-0"

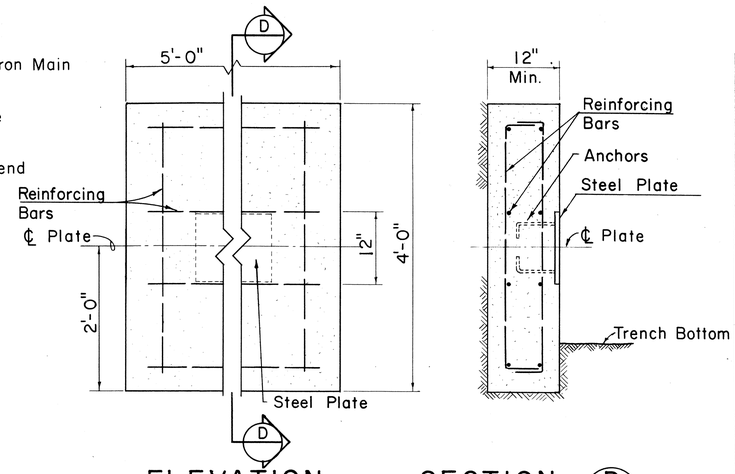
GENERAL NOTES:

1. Detail drawings of actual blocks to be used, shall be furnished during construction by B.W.S. and or State.
2. Steel straps, anchor bolts, nuts, washers, etc., furnished and installed by the Contractor will not be paid for directly, but shall be considered incidental to the various contract items for the water system.
3. Minimum cover over all reinforcing steel shall be 3 inches.



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

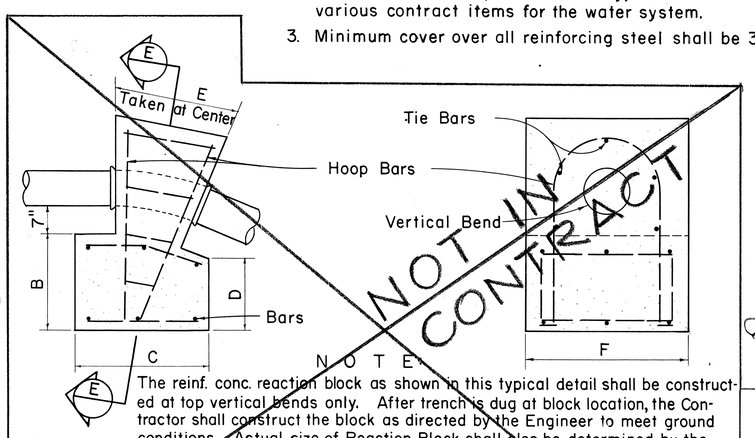
NOTE:
Concrete Block with structural strut shall be used for bends at connections or for tee connections.



ELEVATION SECTION (D)

DETAILS OF CONCRETE BLOCK
Scale: 1" = 1'-0"

TYPICAL DETAIL OF CONCRETE BLOCK WITH STRUCTURAL STRUT



NOTE:
The reinf. conc. reaction block as shown in this typical detail shall be constructed at top vertical bends only. After trench is dug at block location, the Contractor shall construct the block as directed by the Engineer to meet ground conditions. Actual size of Reaction Block shall also be determined by the Engineer.

ELEVATION SECTION (E)

TYPICAL DETAIL OF REINFORCED CONCRETE REACTION BLOCK FOR TOP VERTICAL BENDS
Scale: Not to Scale

NOT IN CONTRACT

APPROVED:
ASSIST. CHIEF ENGINEER, B.W.S.
8/18/70
DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
BOARD OF WATER SUPPLY
CITY & COUNTY OF HONOLULU
STANDARD DETAILS

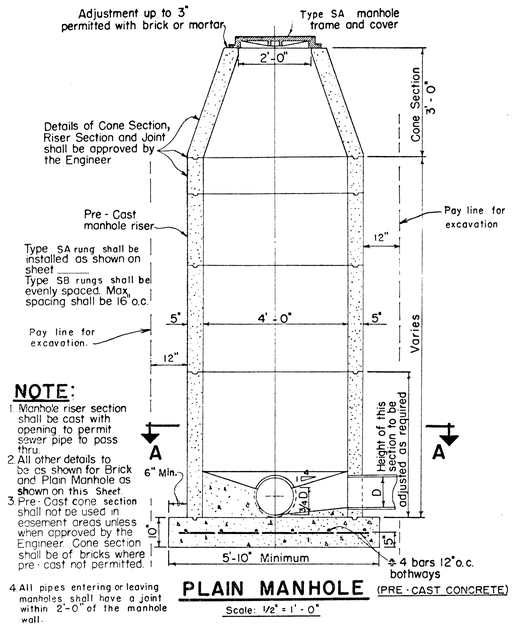
Scale: As Shown

SHEET No. 26U OF 53U SHEETS

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

215

FED ROAD DIST NO	STATE	FED AID PROJ NO	FISCAL YEAR	SHEET NO	TOTAL SHEETS
HAWAII	HAWAII	FHF-1(88):13	1971	216	457



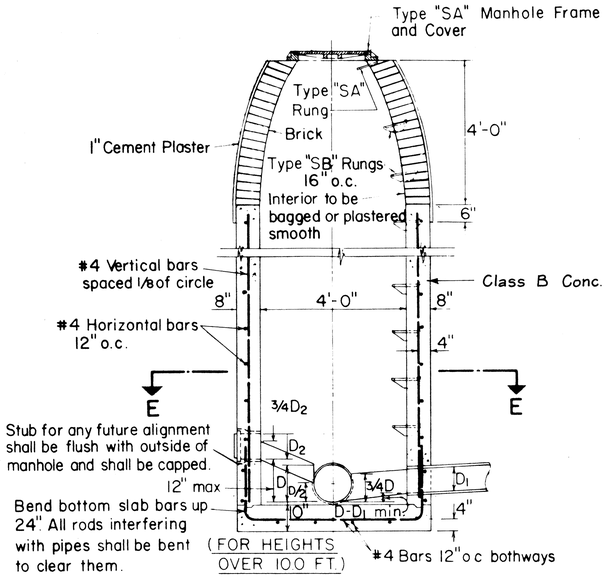
NOTE:

1. Manhole riser section shall be cast with opening to permit sewer pipe to pass thru.
2. All other details to be as shown for Brick and Plain Manhole as shown on this Sheet.
3. Pre-Cast cone section shall not be used in easement areas unless when approved by the Engineer. Cone section shall be of bricks where pre-cast not permitted.
4. All pipes entering or leaving manholes shall have a joint within 2'-0" of the manhole wall.

PLAIN MANHOLE (PRE-CAST CONCRETE)

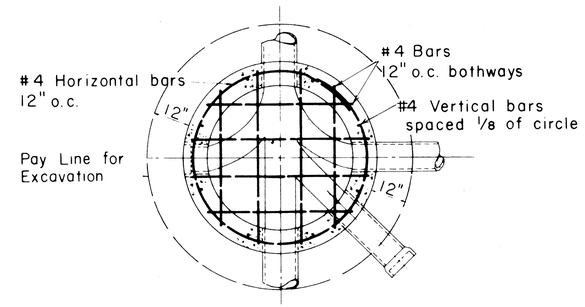
Scale: 1/2" = 1'-0"

Where sewer runs straight thru the manhole, the Contractor may lay pipe thru manhole with the manhole invert and base poured together. After concrete has hardened, the upper portion of pipe within the manhole shall be carefully broken out. All unevenness shall be patched with mortar.



PLAIN MANHOLE

Scale 1/2" = 1'-0"

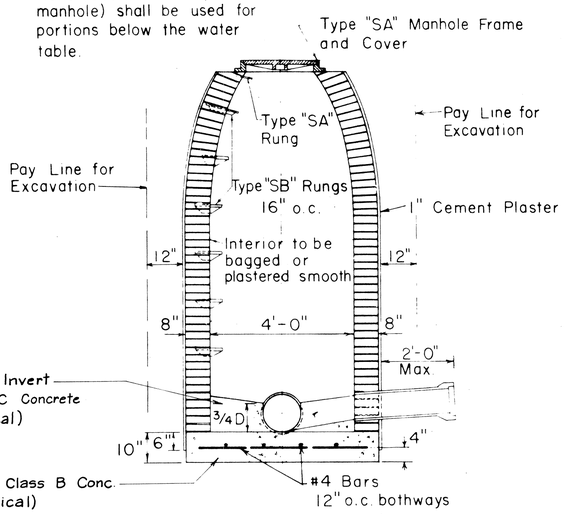


SECTION E-E

Scale 1/2" = 1'-0"

NOTE:

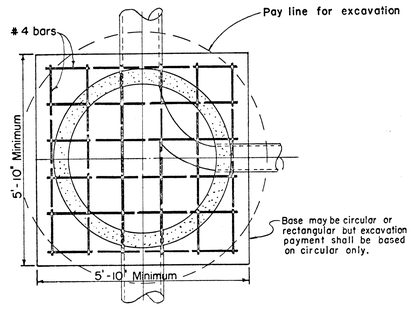
Reinforced concrete manhole walls (See detail of plain manhole) shall be used for portions below the water table.



(MAXIMUM HEIGHT - 10.0 FEET)

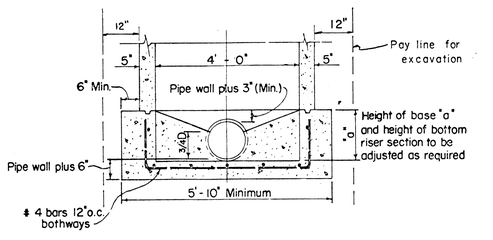
BRICK MANHOLE

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



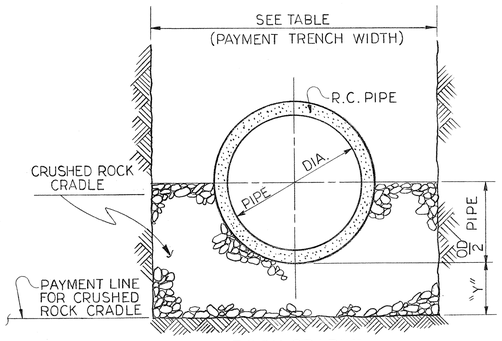
SECTION A-A

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



ALTERNATE BASE (PRE-CAST CONCRETE M.H.)

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



ROCK CRADLE

N.T.S.

PIPE SIZE	PAYMENT TRENCH WIDTH	CRUSHED ROCK CRADLE "Y"	CRUSHED ROCK CRADLE C.Y./L.F.
18"	41"	6"	.131
21"	45"	7"	.164

ROCK CRADLE FOR REINFORCED CONCRETE PIPE

NOTE

1. Manhole rungs shall not be aligned above any flow line except in drop manhole.
2. No rungs shall be installed in manholes less than 3' high.
3. When not otherwise noted, manhole stubs shall be sloped as follows:

Pipe Size	Rise Per Foot
6"	1/8"
8"	3/32"
10"	1/16"
12"	1/16"

4. All reinforcing rods interfering with pipes shall be bent to clear them.
5. Bar lap to be 40 diameters in length.
6. All Class C Concrete to be incidental to Class B Conc.
7. Manhole wall to be of reinforced concrete to height 1' above normal ground water table.
8. All pipes entering or leaving manholes shall have a joint within 2'-0" of the manhole wall.

Payment for excavation for manholes shall be made under the item "Structure Excavation other than at Bridges" and shall be measured to one foot outside of walls from original ground elevation to authorized bottom elevation.
Payment for manhole walls (brick, concrete, or cast-in-place concrete) shall include brick, mortar, concrete, reinforcing steel, cast-iron steps, galvanized wrought iron rungs, and plastering, and be paid for under the item "Walls for Sewer Manhole."
Payment for manhole bases shall be made under the items "Class B Concrete other than in Bridges" and "Reinforcing Steel other than in Bridges."

APPROVED

T. Arima — 9-1-70

CHIEF, DIVISION OF SEWERS — DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
DIVISION OF SEWERS
CITY & COUNTY OF HONOLULU

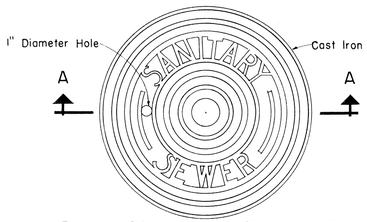
SEWERS: PRE-CAST, CAST-IN-PLACE AND BRICK MANHOLE DETAILS. CRUSHED ROCK CRADLE DETAILS.

Scales As Noted — Date: JULY 17, 1970

SHEET NO 27 OF 53 SHEETS

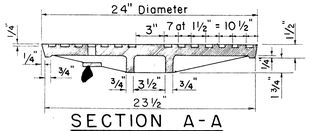
216

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO	TOTAL SHEETS
HAWAII	HAWAII	F-HI-1(88):13	1971	217	457



PLAN OF MANHOLE COVER

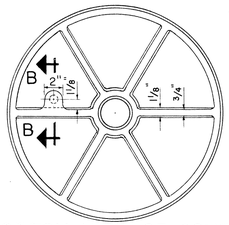
Scale: 1 1/2" = 1'-0"



SECTION A-A

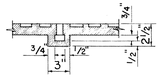
Scale: 1 1/2" = 1'-0"

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

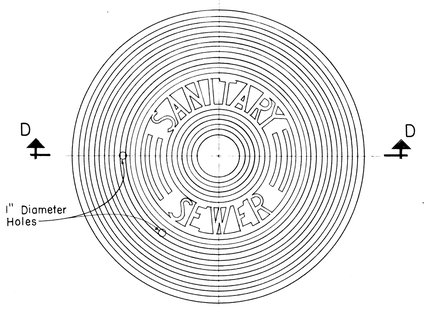


BOTTOM VIEW OF COVER

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



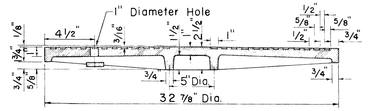
SECTION B-B



PLAN

SPECIAL MANHOLE COVER

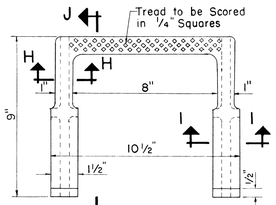
Scale: 1 1/2" = 1'-0"



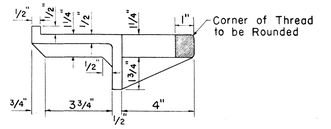
SECTION D-D

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

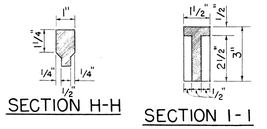
Approx. Weight 260 Pounds



PLAN

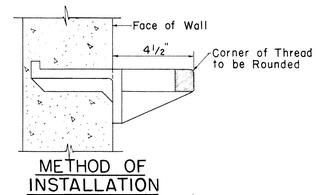


SECTION J-J



SECTION H-H

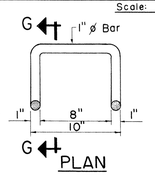
SECTION I-I



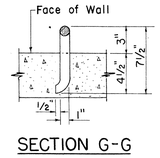
METHOD OF INSTALLATION

TYPE "SB" MANHOLE RUNGS (CAST IRON)

Scale: 3" = 1'-0"



PLAN



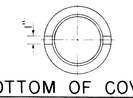
SECTION G-G

TYPE "SA" MANHOLE RUNGS (WROUGHT IRON)

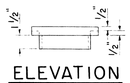
Scale: 1 1/2" = 1'-0"



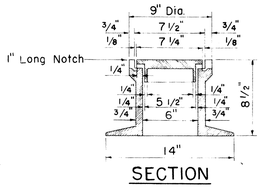
PLAN OF COVER



BOTTOM OF COVER



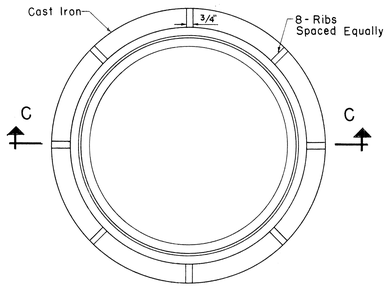
ELEVATION



SECTION

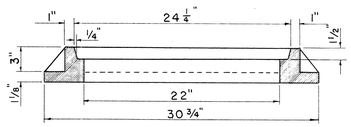
DROP MANHOLE CHIMNEY CASTINGS

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



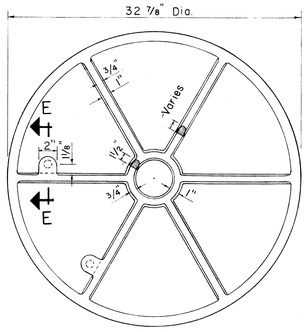
PLAN OF MANHOLE FRAME

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



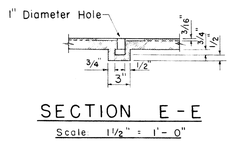
SECTION C-C

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



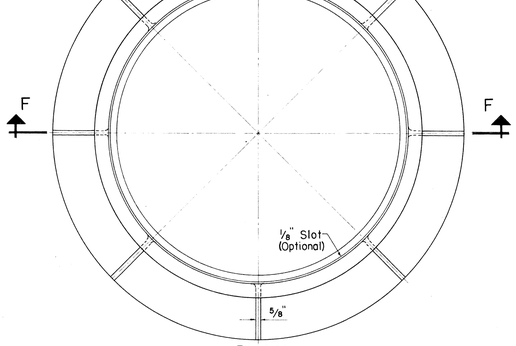
BOTTOM VIEW OF COVER

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



SECTION E-E

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

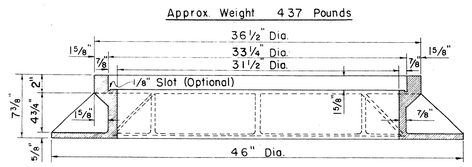


PLAN

SPECIAL MANHOLE FRAME

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

Approx. Weight 437 Pounds



SECTION F-F

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

TYPE "SA" SEWER MANHOLE FRAME AND COVER

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

TYPE "SB" SEWER MANHOLE FRAME AND COVER

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

APPROVED:

Z. Lowe — 9-1-70

CHIEF, DIV. OF SEWERS — DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
DIVISION OF SEWERS
CITY & COUNTY OF HONOLULU

STANDARD DETAILS

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

Scales: As Noted — Date: JULY 17, 1970

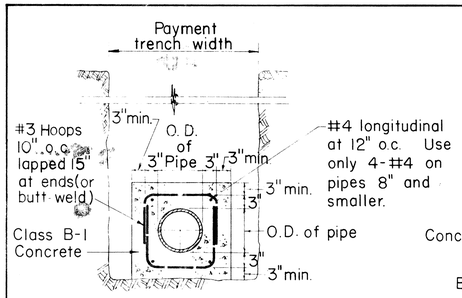
SHEET NO. 28U OF 53U SHEETS

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

125 IMPER'L TRACING CLOTH 10-62

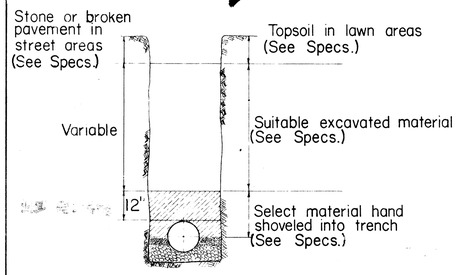
217

FED. ROAD DIST. NO	STATE	FED. AID PROJ. NO	FISCAL YEAR	SHEET NO	TOTAL SHEETS
HAWAII	HAWAII	I-HI-1(88);13	1971	218	457



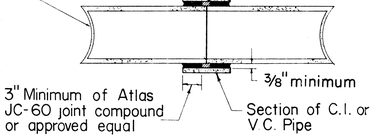
DETAIL OF CONCRETE JACKET

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



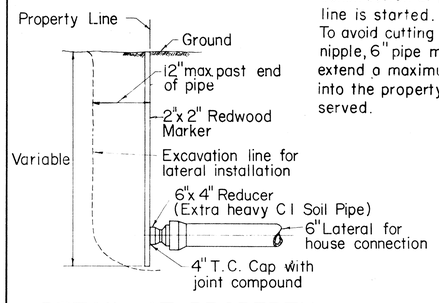
METHOD OF BACKFILL

Not To Scale



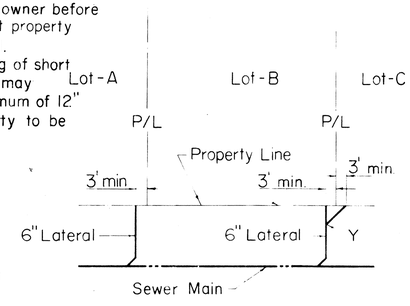
BUTT JOINT DETAIL

Scale: 1" = 1'-0"



NOTE: Permission is to be secured from property owner before construction at property line is started. To avoid cutting of short nipple, 6" pipe may extend a maximum of 12" into the property to be served.

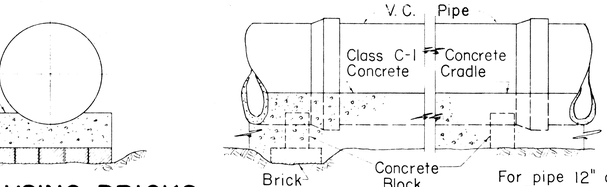
DETAIL AT PROPERTY LINE



LAYOUT

CONSTRUCTION OF LATERALS

Not To Scale



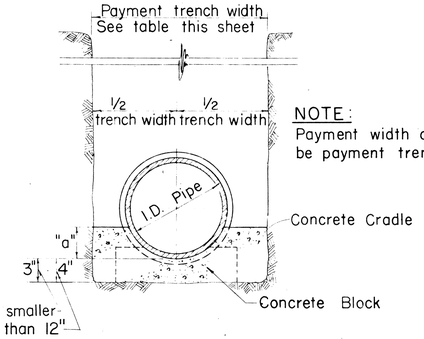
METHOD OF USING BRICKS UNDER CONCRETE BLOCKS

Not To Scale

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

ELEVATION SHOWING METHOD OF LAYING PIPE

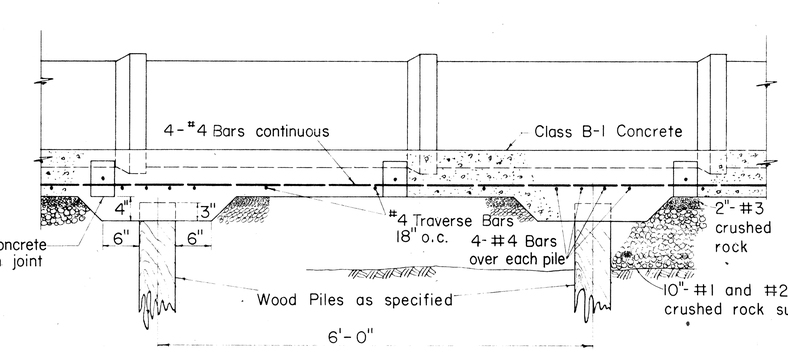
Not To Scale



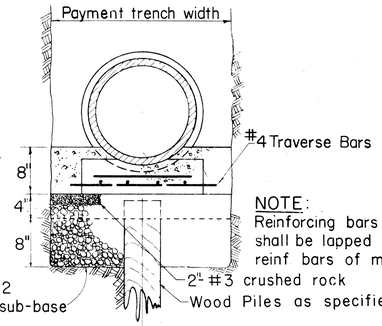
NOTE:
Payment width of cradle shall be payment trench width.

CONCRETE CRADLE FOR VITRIFIED CLAY PIPE

Not To Scale



Scale: 1" = 1'-0"

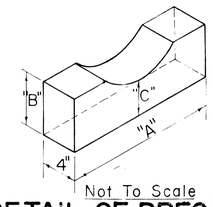


SECTION

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

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

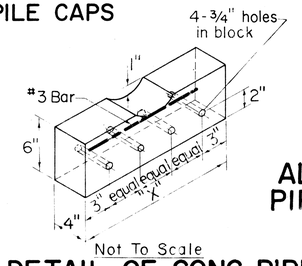
DETAIL OF REINFORCED CONCRETE CRADLE WITHOUT PILES SIMILAR EXCEPT FOR WOOD PILES AND PILE CAPS



Not To Scale

DETAIL OF PRECAST CONC. PIPE BLOCK

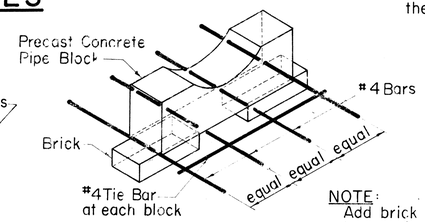
CONCRETE BLOCK DIMENSIONS			
PIPE SIZE	"A"	"B"	"C"
6"	1'-2"	6"	3"
8"	1'-5"	6"	3"
10"	1'-7"	6"	3"
12"	1'-7"	6"	3"
15"	1'-8"	6"	4"
18"	1'-9"	6"	4"
21"	1'-10"	6"	4"
24"	1'-11"	6"	4"
27"	2'-0"	6"	4"
30"	2'-3"	6"	4"



Not To Scale

DETAIL OF CONC. PIPE BLOCK FOR REINF. CRADLE

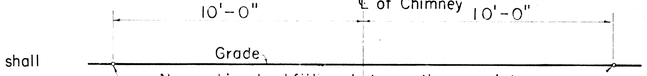
DIM. OF REINF. CONC. BLOCK	
PIPE SIZE	"X"
6"	1'-6"
8"	1'-6"
10"	1'-8"
12"	1'-8"
15"	1'-10"
18"	1'-10"
21"	1'-10"
24"	2'-0"
27"	2'-0"
30"	2'-0"

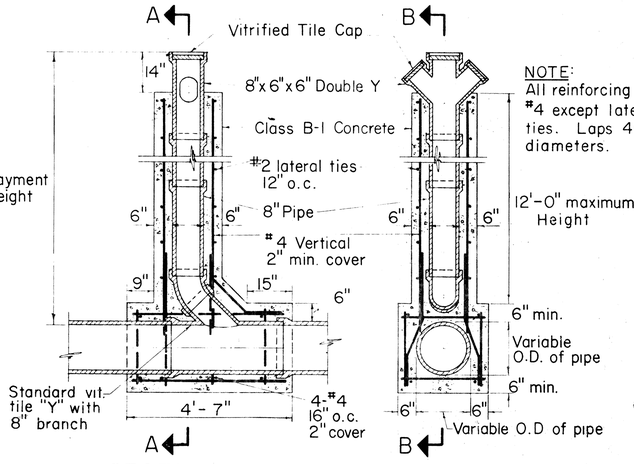


NOTE:
Add brick for larger size pipe

Not To Scale

ALTERNATE DETAIL OF CONC. PIPE BLOCK FOR REINF. CRADLE





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

DETAILS OF CHIMNEY

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

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

VITRIFIED CLAY PIPE TABLE

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

APPROVED:

CHIEF, DIV. OF SEWERS — DATE 9-1-70

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
DIVISION OF SEWERS
CITY & COUNTY OF HONOLULU

STANDARD DETAILS

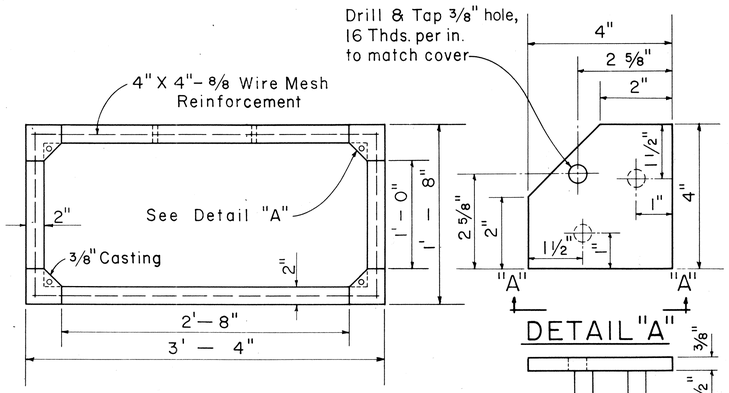
SEWERS - CONCRETE JACKET & MISCELLANEOUS DETAILS

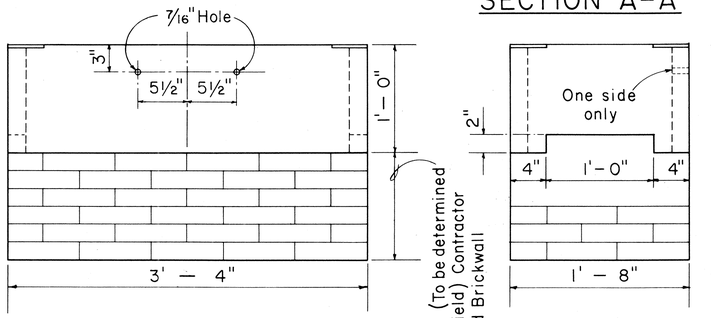
Scales: As Noted — Date: JULY 17, 1970

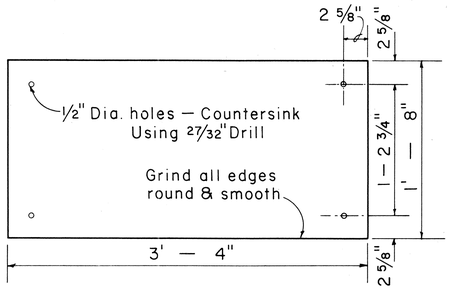
SHEET NO. 290 OF 530 SHEETS

IMPERIAL TM K & E CO., N.Y. TRADE MARK

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAWAII	I-HI-1(88):13	1971	219	457







NOTES:
Use 3/8" Plate for driveways.
Concrete Box 225 Lbs.
1/4" Checker Plate 62 Lbs.
Secure cover with 3/8" x 1" flat head brass machine screws.

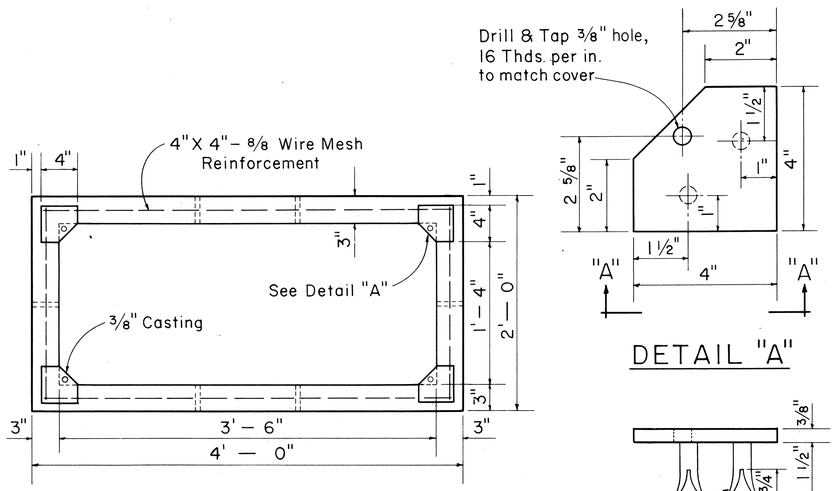
1/4" CHECKER PLATE COVER

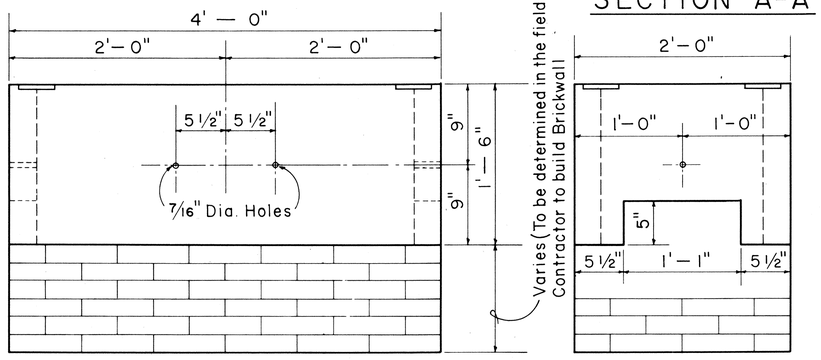
(Hot dip galvanize checkered plate after drilling, countersinking, and grinding edge)

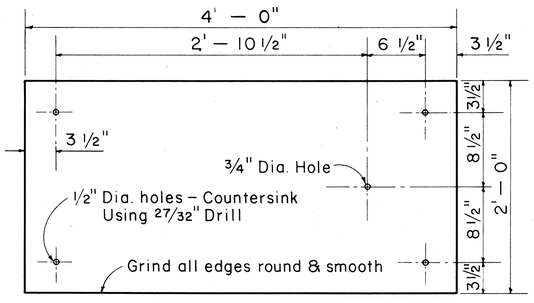
1'-4" X 3'-0" CONCRETE SERVICE BOX

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

011250







NOTES:
Use 3/8" Plate for driveway.
Concrete Box 575 Lbs.
1/4" Checker Plate 130 Lbs.
Secure cover with 3/8" x 1" flat head brass machine screws.

1/4" CHECKER PLATE COVER

(Hot dip galvanize checkered plate after drilling, countersinking, and grinding edge)

1'-6" X 3'-6" CONCRETE SERVICE BOX

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

011255

CREOSOTED DOUGLAS FIR & YELLOW PINE POLE DATA

LENGTH IN FEET	CLASS	APPROX. MINIMUM DIMENSIONS (INCHES) AT TOP DIA.	AT TOP CIR.	6' FROM BUTT DIA.	6' FROM BUTT CIR.	AVERAGE WEIGHT (LBS.) DOUGLAS FIR	POLE SETTING DEPTH (FT.) IN SOIL	IN ROCK	BREAKING LOAD 2'-0" BELOW TOP OF POLE (LBS.)
25	5	6.04	19	8.26	26	525	4.5	3	1900
30	3	7.32	23	10.32	32.5	810	5	3.5	3000
	5	6.04	19	8.90	28	600	5	3.5	1900
35	2	7.96	25	12.23	37.5	1260	5	3.5	3700
	5	6.04	19	9.55	30	770	5	3.5	1900
40	3	7.32	23	11.77	37	1320	5.5	3.5	3000
45	2	7.96	25	13.20	41.5	1845	6	4.	3700
	3	7.32	23	12.25	38.5	1575	6	4	3000
50	2	7.96	25	13.70	43.	2150	6.5	4	3700
	3	7.32	23	12.70	40	1850	6.5	4	3000
55	1	8.59	27	15.11	47.5	2860	7	4.5	4500
	2	7.96	25	14.15	44.5	2475	7	4.5	3700
	3	7.32	23	13.20	41.5	2145	7	4.5	3000
60	1	8.59	27	15.75	49.5	3360	7	4.5	4500
	2	7.96	25	14.62	46	2820	7	4.5	3700
65	1	8.59	27	16.20	51	3835	7.5	5	4500
	2	7.96	25	15.11	47.5	3250	7.5	5	3700
70	1	8.59	27	16.70	52.5	4340	7.5	5	4500
	2	7.96	25	15.60	49	3640	7.5	5	3700
75	1	8.59	27	17.20	54	4800	8	5.5	4500
	2	7.96	25	16.05	50.5	4050	8	5.5	3700
80	1	8.59	27	17.50	55	5240	8	6	4500
	2	7.96	25	16.40	51.5	4400	8	6	3700
85	1	8.59	27	18.00	56.5	5780	8.5	6.5	4500
	2	7.96	25	16.88	53	4930	8.5	6.5	3700
90	1	8.59	27	18.30	57.5	6300	8.5	6.5	4500
	2	7.96	25	17.20	54	5400	8.5	6.5	3700

NOTE:
The ultimate fiber stress for creosoted Southern Yellow Pine & Douglas Fir is 7,400 Lbs. per square inch.

Weights are for untreated poles. Add 5% as estimate of added weight of creosote treatment.

REFERENCES:
American Standards Association 05.4-1941, 05.6-1945.
Standard Handbook for Electrical Engineers, Eighth Edition
H. E. Co. Specification for Poles.

WOOD POLE DATA

APPROVED:

HAWAIIAN ELECTRIC Co., Inc. — DATE 7/16/71

HAWAIIAN TELEPHONE Co. — DATE 9-15-70

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS
H. E. Co. AND H. T. Co.
SERVICE BOX DETAILS AND WOOD POLE DATA

Scales: As Noted — Date: JULY 17, 1970

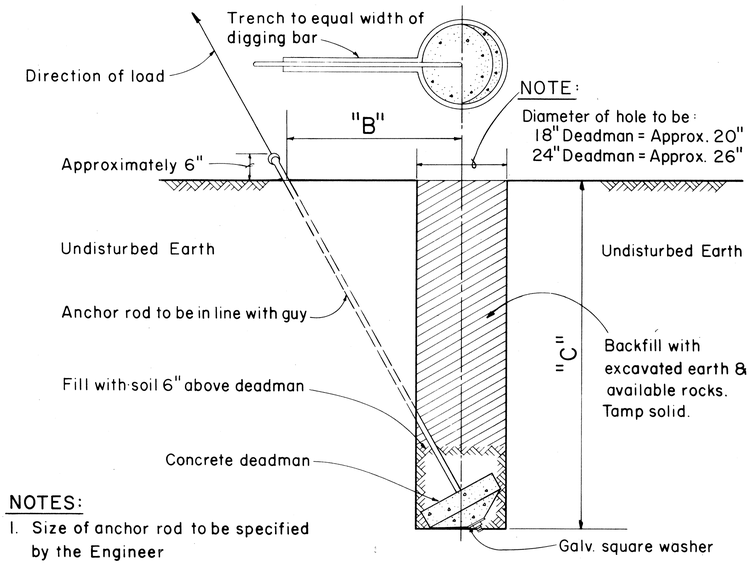
SHEET NO. 30U OF 53U SHEETS

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

219

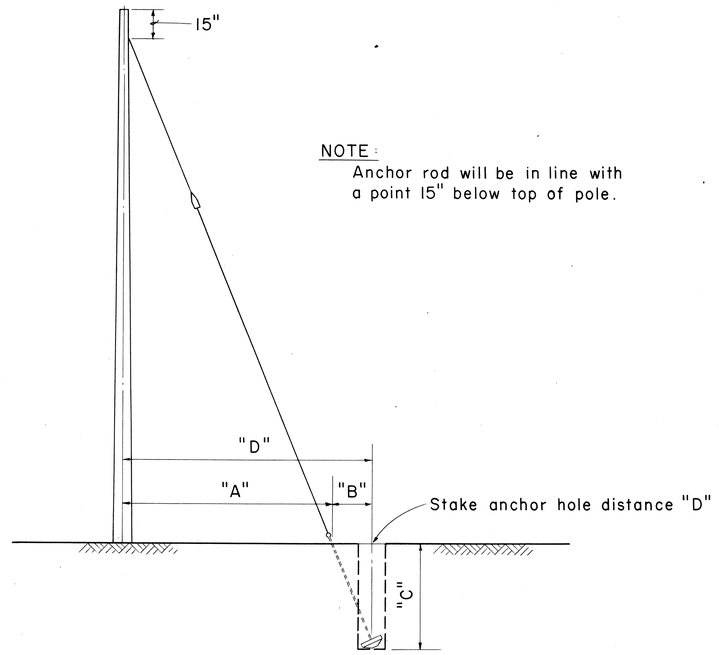
LIETZ 1103 ARKWRIGHT TRACING CLOTH 10-60 200P

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAWAII	F-HH-1(88);13	1971	220	457



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 1 1/4" 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"

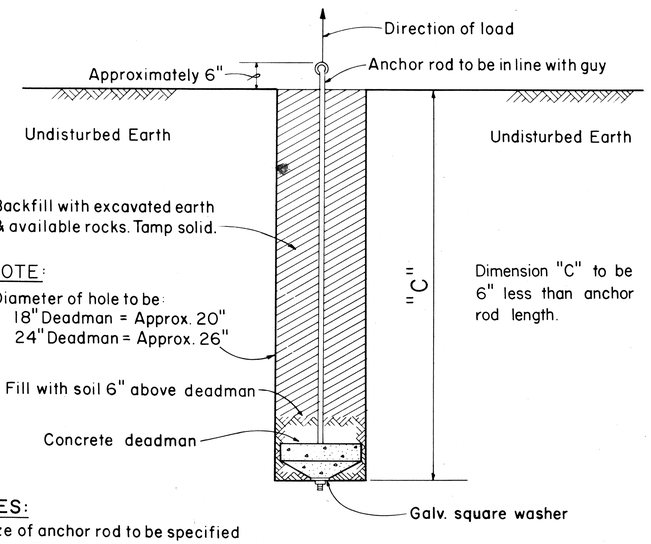
D. M. = Deadman

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

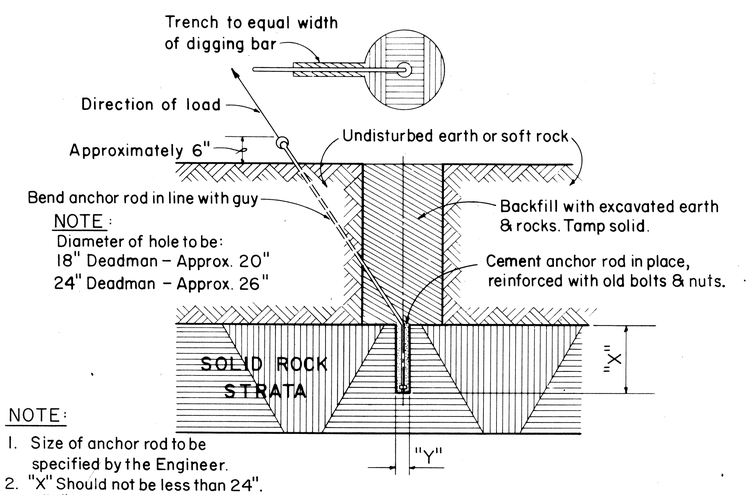
** Use bronze square washers included in anchor rod assembly on copper covered steel (Cu Cov Stl) anchor rods.

ANCHORING DATA



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

APPROVED:

HAWAIIAN ELECTRIC Co., Inc. — DATE 7/10/71

HAWAIIAN TELEPHONE Co. — DATE 9-15-70

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

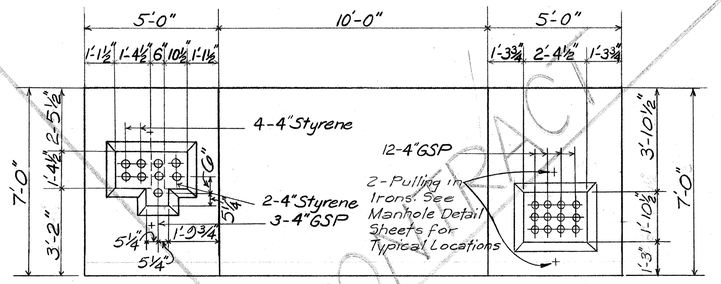
STANDARD DETAILS
H.E.Co. AND H.T.Co.
ANCHOR DETAILS AND ANCHORING DATA

Scales: As Noted — Date: JULY 17, 1970

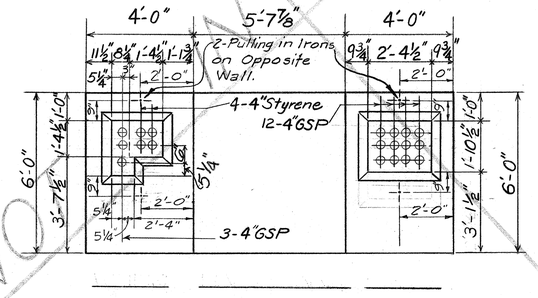
SHEET No. 31U OF 53U SHEETS

220

NOT A CONTRACT DRAWING



TMH NO.1
TYPE A-3-6.5 AT KAIMAKANI STREET



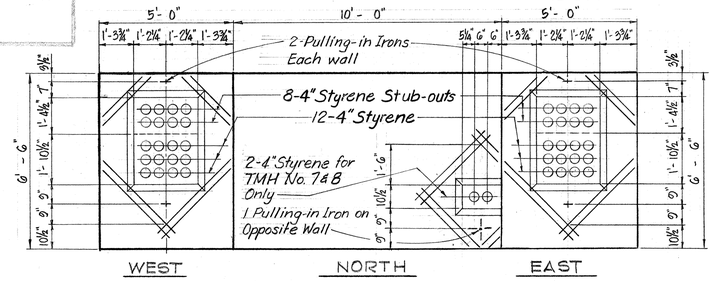
TMH NO.2
CORNER SMALL TYPE AT KAIMAKANI STREET

SEE SHEET NO. 35U

TMH NO.5
SPECIAL EXTRA DEEP 6'X11' IN UTILITY CORRIDOR

SEE SHEET NO. 33U

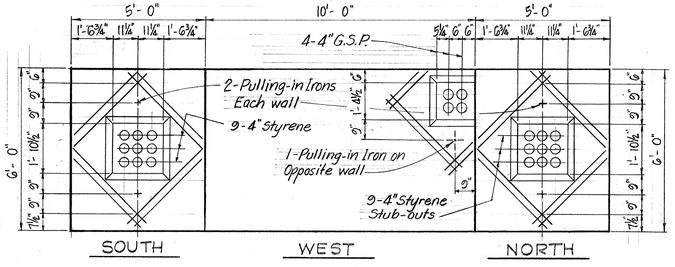
TMH NO.6
8'X10' MANHOLE IN UTILITY CORRIDOR



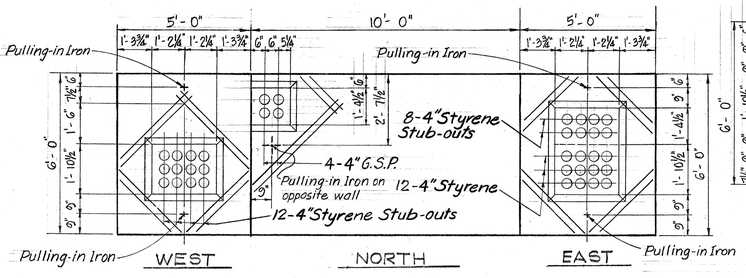
TMH NO.7, TMH NO.8
TYPE A-3-6.5 IN UTILITY CORRIDOR

SEE SHEET NO. 36U

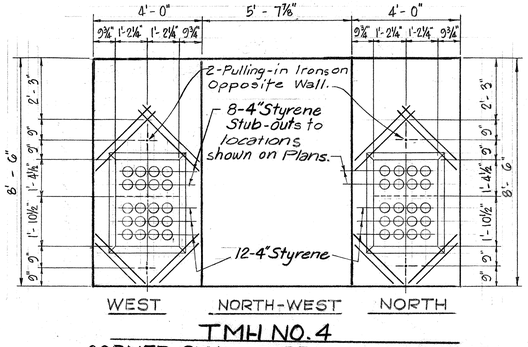
TMH NO.9
TYPE V-1 IN UTILITY CORRIDOR



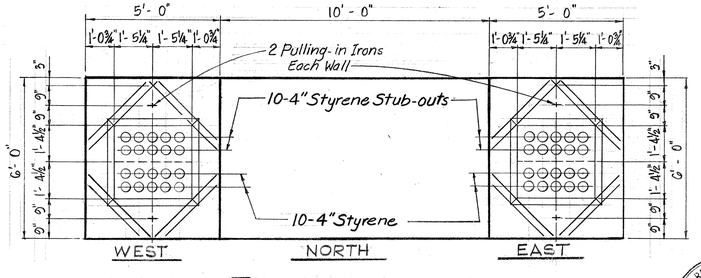
TMH NO.10
TYPE A-3-6 AT HALAWA HEIGHTS ROAD



TMH NO.3
TYPE A-3-6 AT MOANALUA ROAD



TMH NO.4
CORNER SMALL TYPE AT MOANALUA ROAD



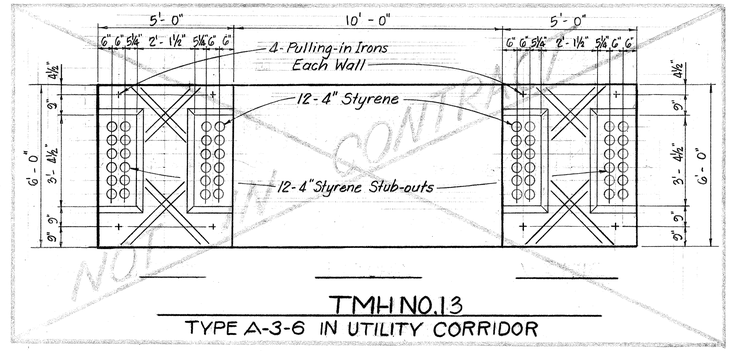
TMH NOS. 11, 12 & 13
TYPE A-3-6 IN UTILITY CORRIDOR

PULLING IN IRON SYMBOLS

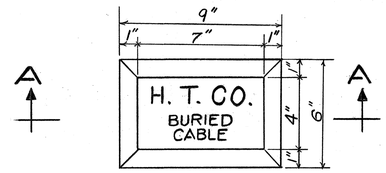
+ Pulling-in Iron to be Installed on Wall as Shown. See Manhole Detail Sheets for Typical Locations.

⊣ Pulling-in Iron to be Installed on Opposite Wall From Wall on Which Shown at Locations Shown.

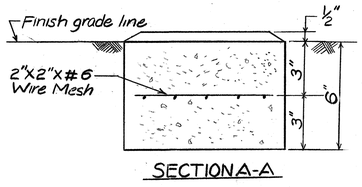
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(88)13	1971	221	457



TMH NO.13
TYPE A-3-6 IN UTILITY CORRIDOR



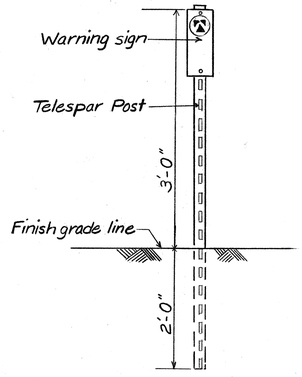
PLAN VIEW



SECTION A-A

DETAIL "1"
BURIED CONCRETE CABLE MARKER
SCALE: 3"=1'-0"

N.I.C.



DETAIL "2"
TELESPAR CABLE MARKER
NO SCALE

NOTE:
Buried Concrete Cable Marker & Telespar Cable Marker Shall be furnished by Hawaiian Telephone Company and installed by the Contractor.

APPROVED:

HAWAIIAN TELEPHONE COMPANY — DATE 9-15-70

J. ANDREW SCHUCHARDT REGISTERED PROFESSIONAL ENGINEER No. 2229 HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

H.T.Co. MANHOLE WALL ELEVATIONS & CABLE MARKER DETAILS

INTERSTATE ROUTE H1
PROJECT NO. I-HI-1(88)-13

SCALE: AS SHOWN — DATE: JULY 17, 1970

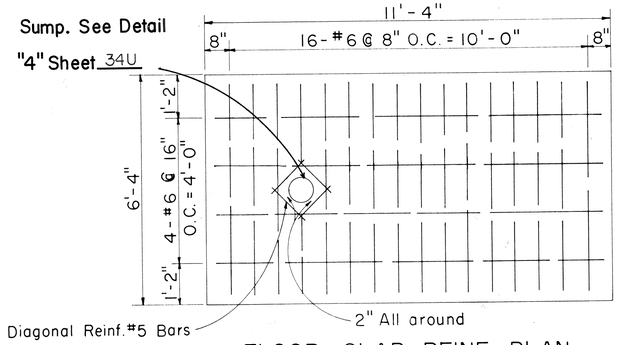
SHEET No. 32U OF 53U SHEETS

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

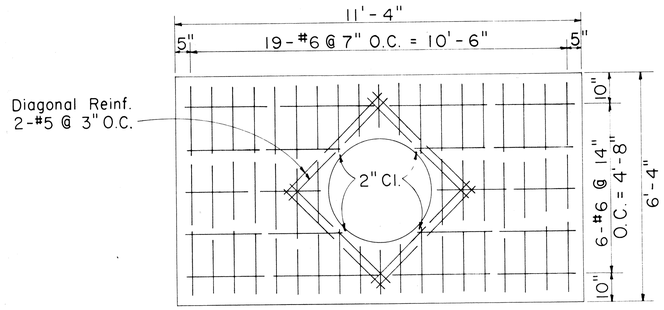
PRINTED ON NO. 1000H CLEARPRINT

221

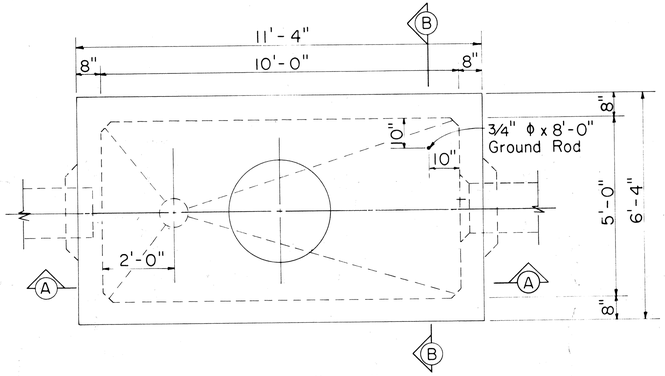
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(88):13	1971	222	457



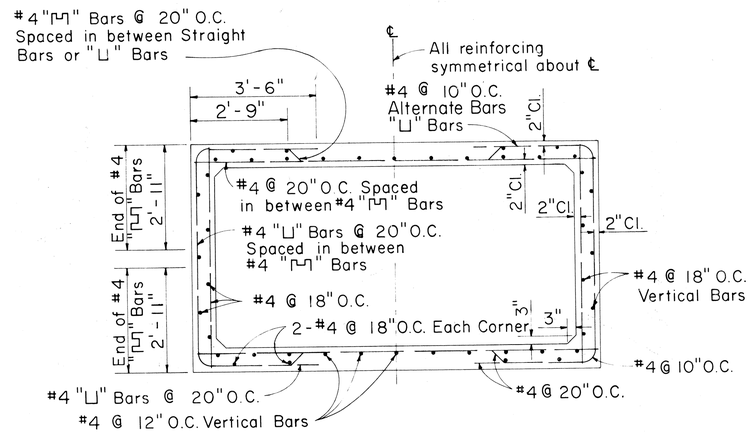
FLOOR SLAB REINF. PLAN
Scale: 1/2"=1'-0"



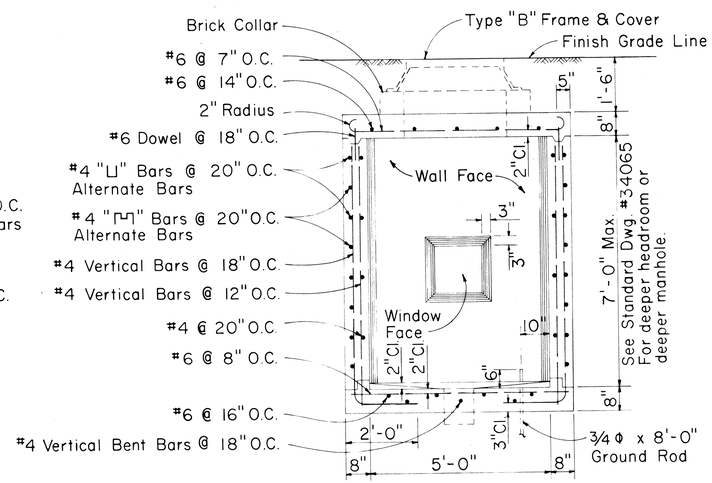
ROOF SLAB REINF. PLAN
Scale: 1/2"=1'-0"



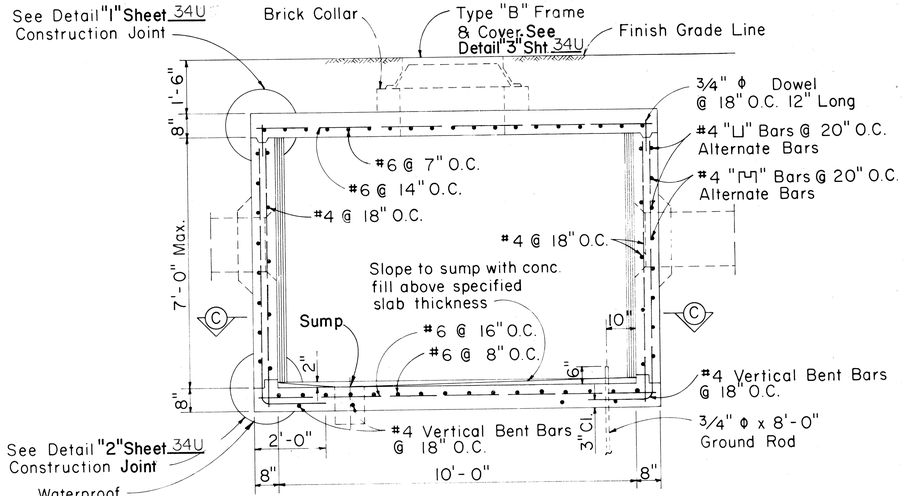
PLAN - M.H. TYPE "A-3" SERIES
FOR ROADWAY & SIDEWALK AREAS
Scale: 1/2"=1'-0"



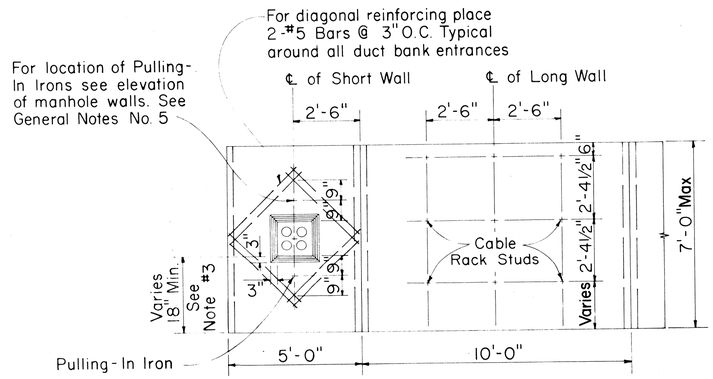
SECTION "C-C"
Scale: 1/2"=1'-0"



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 "1" thru "4" See Sheet 34U and for other miscellaneous Manhole Construction Details see Sheet 37U.



APPROVED:

J. T. Rudd 9-15-70
Hawaiian Telephone Co., Ltd. Date

H.T. Co., Ltd. Drawing No. 34064

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

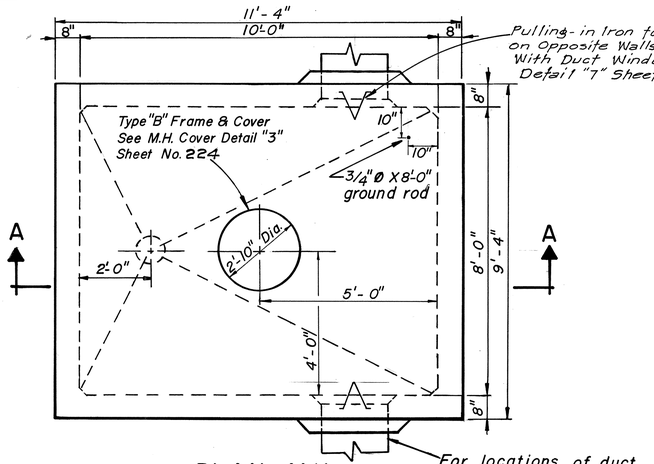
TYPE "A-3" MANHOLES FOR 6.0' TO 7.0' HEADROOM

Scale: As Noted Date: JULY 17, 1970

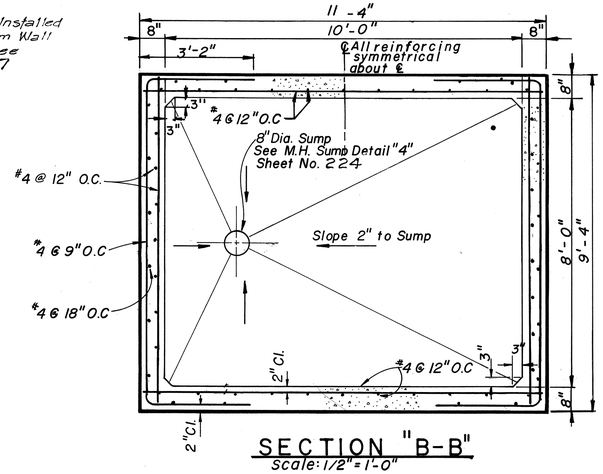
SHEET No. 33U OF 33U SHEETS

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

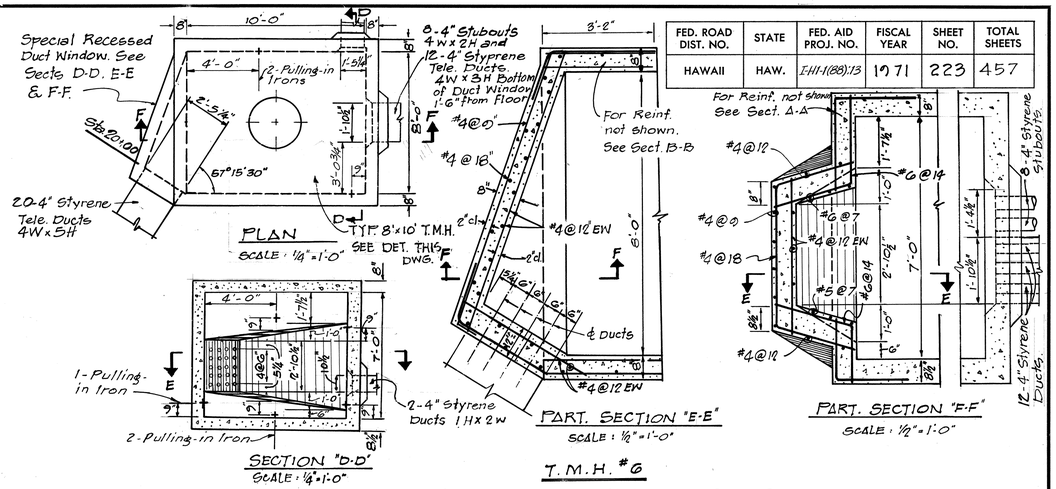
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(88):13	1971	223	457



PLAN M.H
Scale: 1/2" = 1'-0"

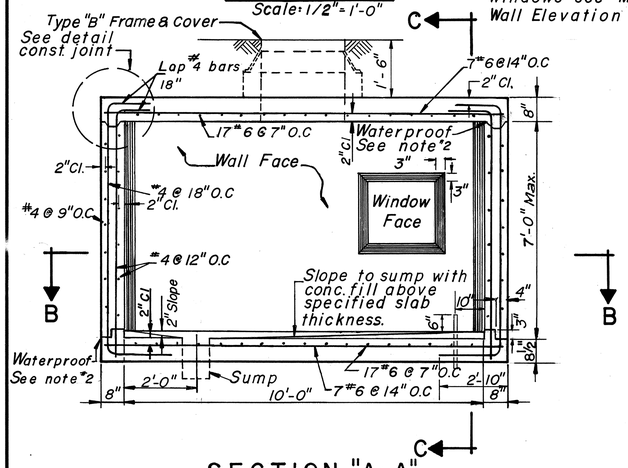


SECTION "B-B"
Scale: 1/2" = 1'-0"

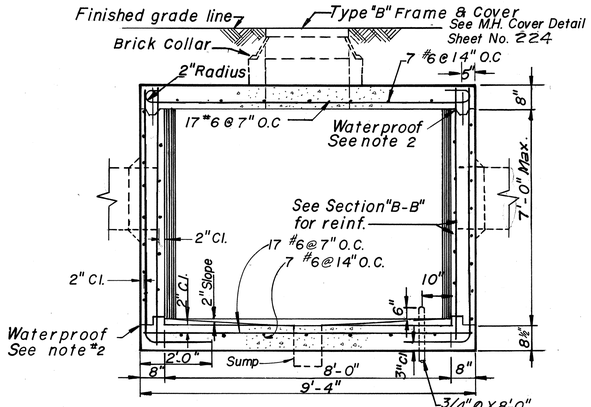


T.M.H. #6

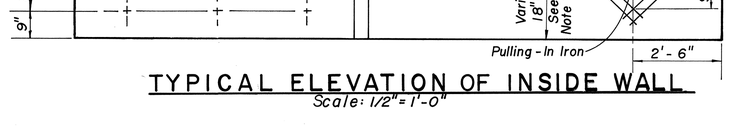
TELEPHONE MANHOLE AT STA. 20+00
SCALE: AS SHOWN



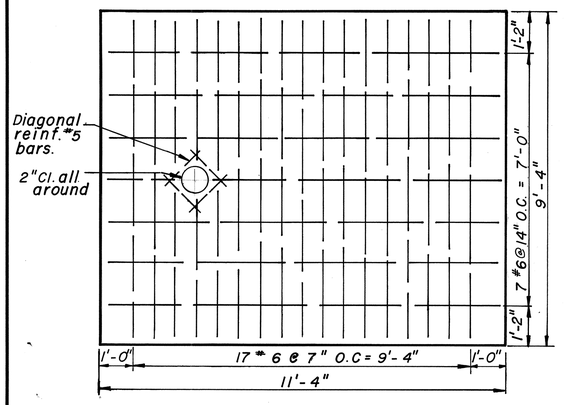
SECTION "A-A"
Scale: 1/2" = 1'-0"



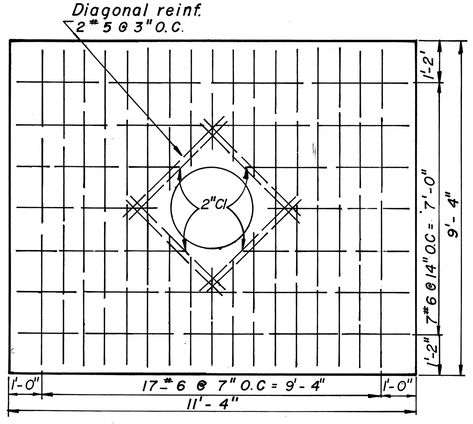
SECTION "C-C"
Scale: 1/2" = 1'-0"



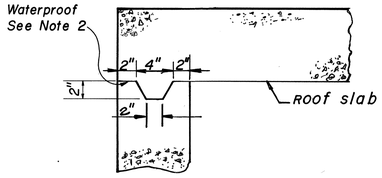
TYPICAL ELEVATION OF INSIDE WALL
Scale: 1/2" = 1'-0"



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



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



CONST. JOINT DETAIL
See Section A-A & B-B
Scale: 1 1/2" = 1'-0"

GENERAL NOTES:

1. Design Data:
   f_s = 20,000 psi
   f_c = 3,000 psi, f_c = 1,200 psi
   n = 10
   W = Equiv. fluid press = 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 Sheet for Elevation.
4. Duct Window to suit. See Plan & Profile & Standard Detail Sheets for Location & Details.

APPROVED

HAWAIIAN TELEPHONE CO, LTD DATE

J. ANDREW SCHUCHARDT REGISTERED PROFESSIONAL ENGINEER No. 2229 HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TELEPHONE MANHOLE 8'-0" x 10'-0"

INTERSTATE ROUTE HI
PROJECT NO. I-HI-1(88):13

SCALE: AS SHOWN DATE: JULY 17, 1970

SHEET No. 340 OF 530 SHEETS

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

223

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(88):13	1971	224	457

GENERAL NOTES:

1 Design Data
- fs = 20,000 psi
- f'c = 3,000 psi
- fc = 12,000 psi
- n = 10
- w = Equiv. Fluid Pressure 30 #/Ft²

2 Minimum overlap for a Lapped Splice shall be 24 Bar Dia. but not less than 12". Lap of Adjacent Bars shall not be in same location.

3 Unless otherwise indicated, for Vertical Location of Duct Windows see Profile Sheet.

4 Manhole Walls shall be Doubled Formed.

5 All Concrete shall be cured by an Impervious Liquid Membrane Compound.

6 Concrete shall not be loaded, except by its own weight, until 28 Days have passed since placement

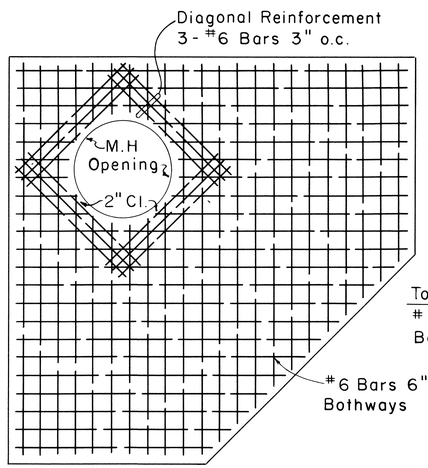
7 All Construction Joints shall be Waterproofed with Two Applications of Thoro-Seal or equal.

8 Cap all Ducts and Stubouts.

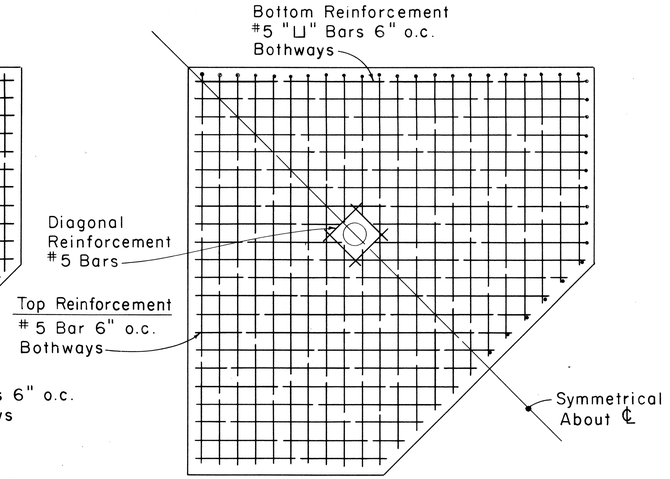
9 Concrete shall be Class A and shall have a Compressive Strength of 3000 psi in 28 Days with a Slump of 3".

10 Concrete Admixture shall be 2½ Lbs. "Tricosol Normal" per Cubic Yard.

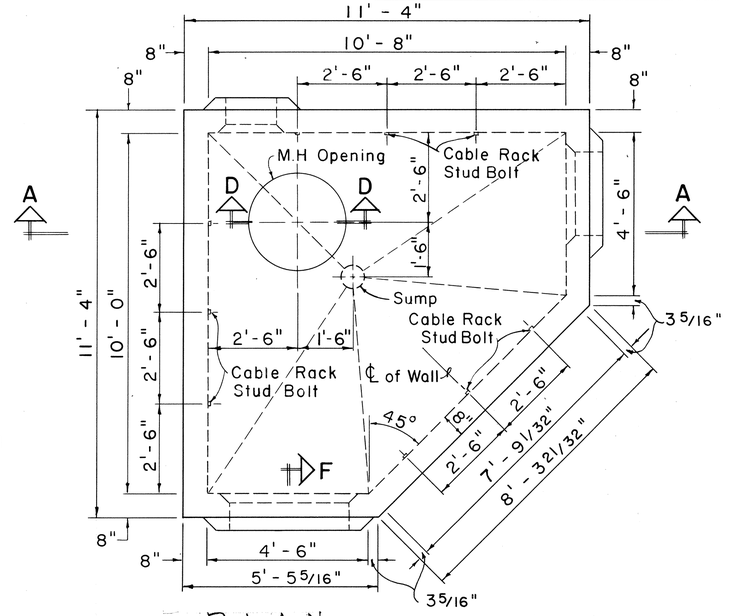
11 For Details "A", "B", "C", Sections "D-D", "E-E", "F-F" and other Miscellaneous Manhole Construction Details see Supplement Sheet to A-1, A-2, and A-3 Telephone Manholes.



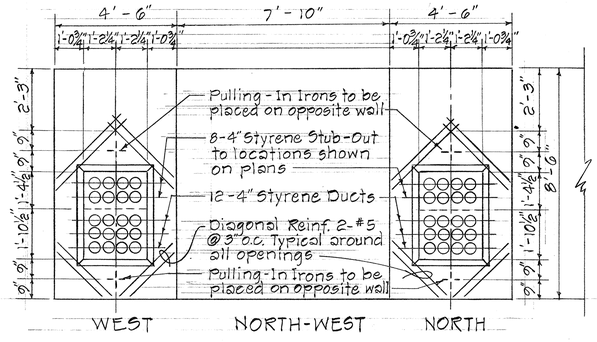
ROOF SLAB REINF. PLAN
Scale: 1/2" = 1'-0"



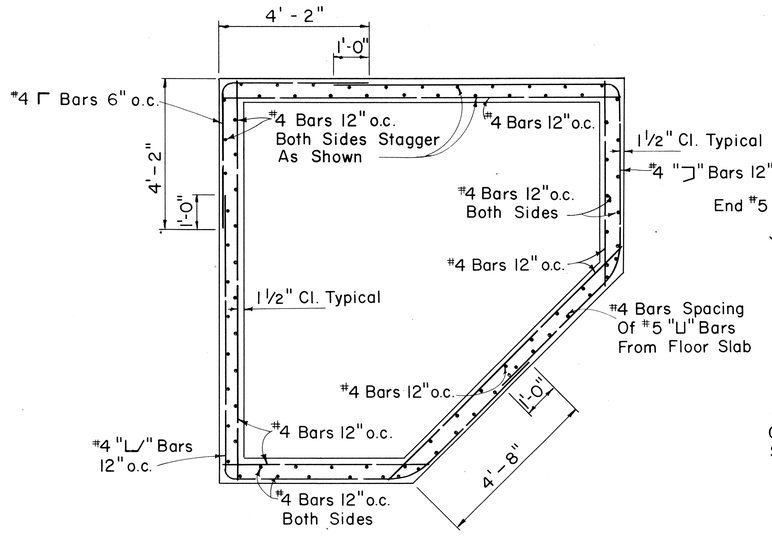
FLOOR SLAB REINF. PLAN
(Showing Top & Bottom Reinf.)
Scale: 1/2" = 1'-0"



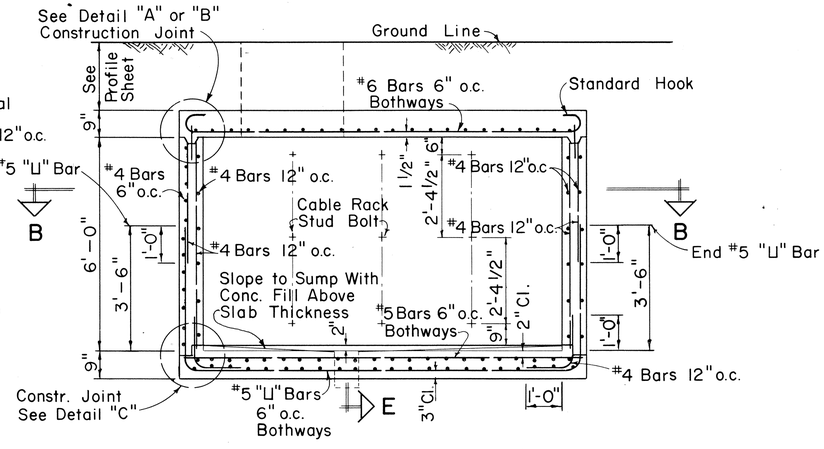
PLAN
Scale: 1/2"=1'-0"



ELEVATION T.M.H. NO.4 WALLS
Scale: 3/8"=1'-0"



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



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

APPROVED:

F. T. Judd 5-30-71

Hawaiian Telephone Co., Ltd. Date

H. T. Co., Ltd. Drawing No. 34034

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD CORNER LARGE TYPE MANHOLE

INTERSTATE ROUTE H-1
PROJECT NO. I-HI-1(88):13

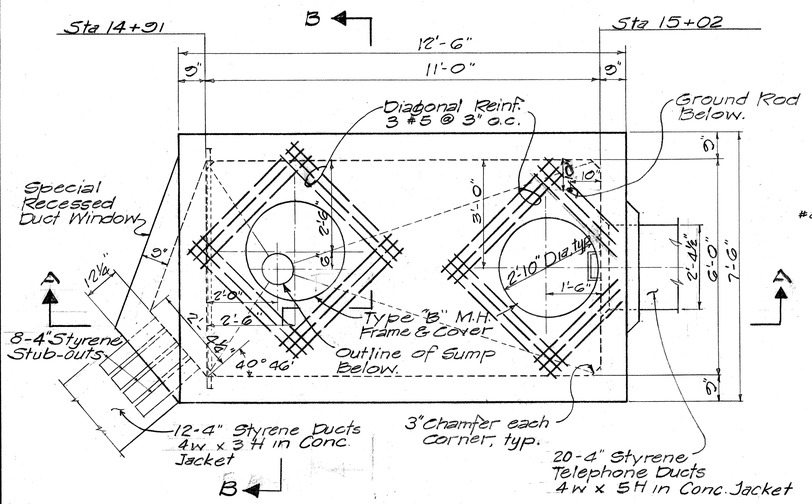
Scale: As Noted Date: Mar. 29, 1971

SHEET No. 35U OF 53U SHEETS

224

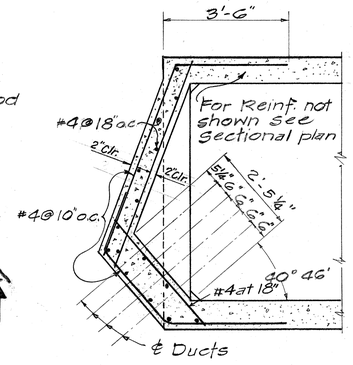
ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	"
	TRACED BY	"
NOTE BOOK	DESIGNED BY	"
	QUANTITIES BY	"
No.	CHECKED BY	"

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(88):13	1971	225	457



PLAN

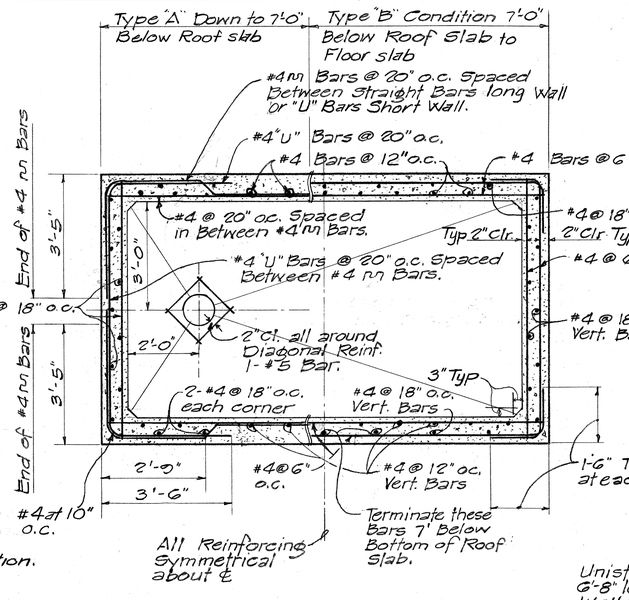
Scale: ½"=1'-0"



SECTIONAL PLAN AT UPPER DUCT WINDOW

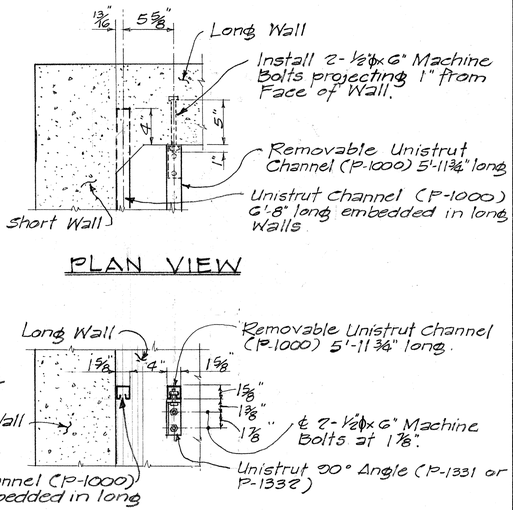
Scale: ½" =1'-0"

Note: Ladder rungs, cable rack studs Grade clamp assembly, Vertical racking channels, pulling in irons, etc. not shown on structural detail. See "Elevation M.H. Walls" for location.



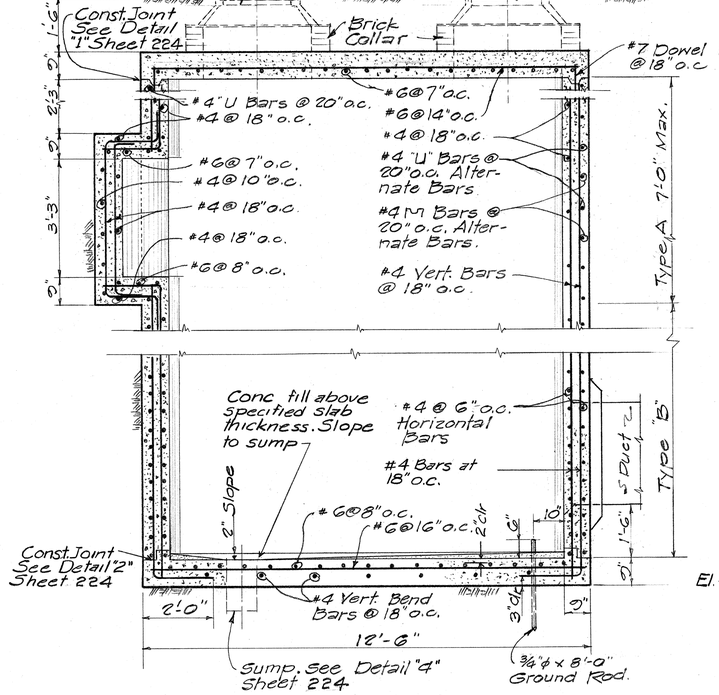
SECTIONAL PLAN

Scale: ½" =1'-0"



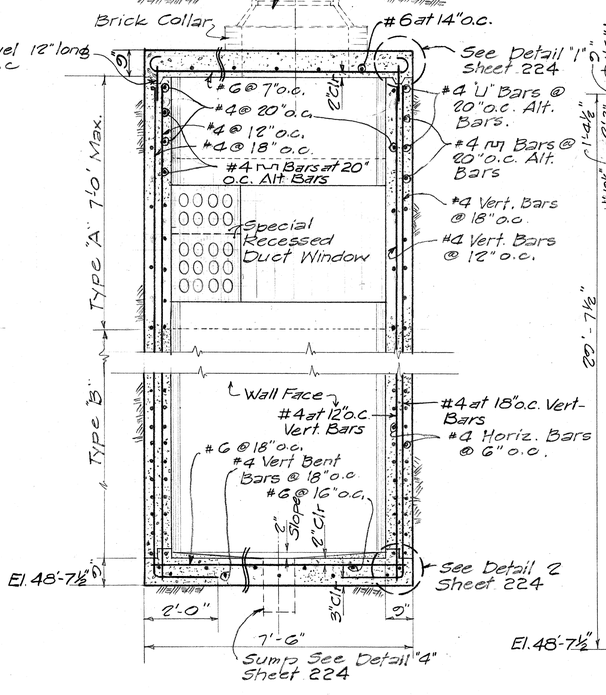
PLAN VIEW

SECTION



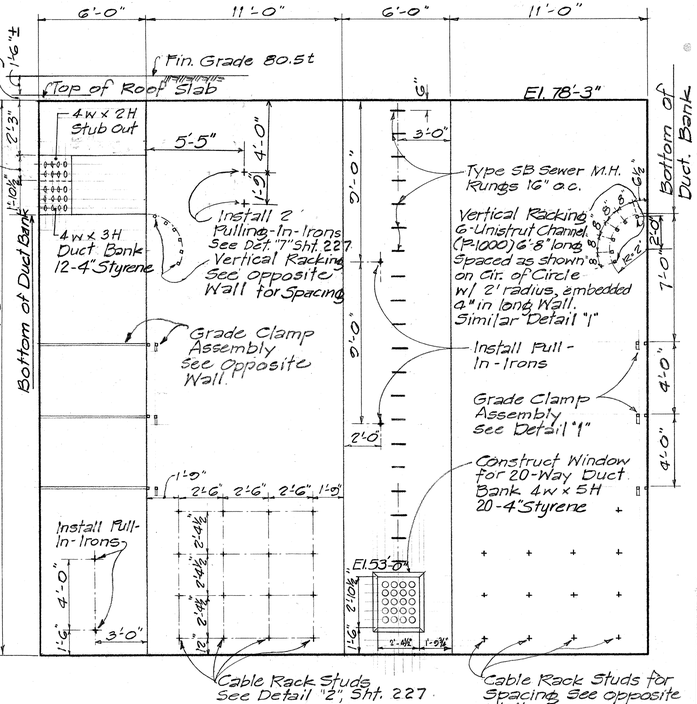
SECTION "A-A"

Scale: ½" = 1'-0"



SECTION "B-B"

Scale: ½" = 1'-0"



SOUTH WEST NORTH EAST

ELEVATION M.H. WALLS

Scale: ¼" = 1'-0"

DETAIL "1" GRADE CLAMP ASSEMBLY

Scale: 1½" = 1'-0"

GENERAL NOTES:

1. DESIGN DATA
   fs = 20,000 psi
   fc = 3,000 psi, fc = 1,350 psi
   N = 10
   W = Equiv. Fluid Press. 30 #/Ft.²
2. All Construction joints shall be waterproofed with two applications of "THORO SEAL" or equal.
3. Duct Window to suit - see Standard Detail Sheet 227 for Misc. Details.
4. Manhole Detailing shown for 6'x11' inside dimension.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

J. Andrew Schuchardt

J. ANDREW SCHUCHARDT REGISTERED PROFESSIONAL ENGINEER No. 2229 HAWAII, U.S.A.

APPROVED:

F. H. Judd
Hawaiian Telephone Company

9-15-70
Date

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TELEPHONE MANHOLE SPECIAL EXTRA DEEP 6'0"x11'-0"

INTERSTATE ROUTE HI
PROJECT NO. I-HI-1(88):13

SCALE: AS SHOWN DATE: JULY 17, 1970

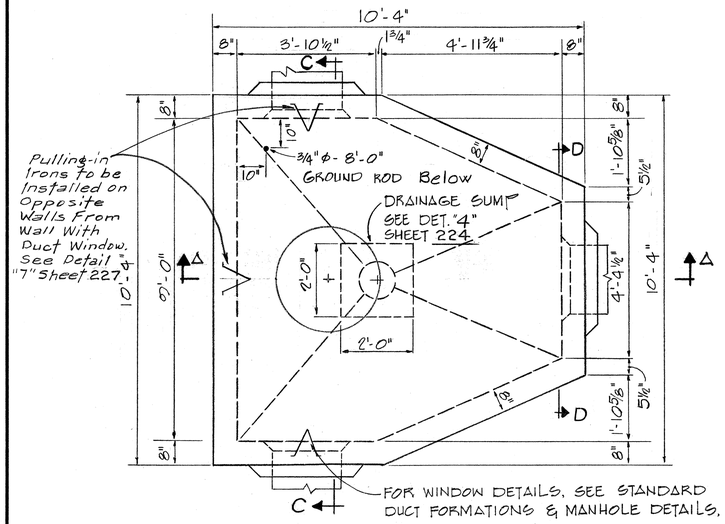
SHEET No. 36U OF 53U SHEETS

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

PRINTED ON NO. 1000H CLEARPRINT

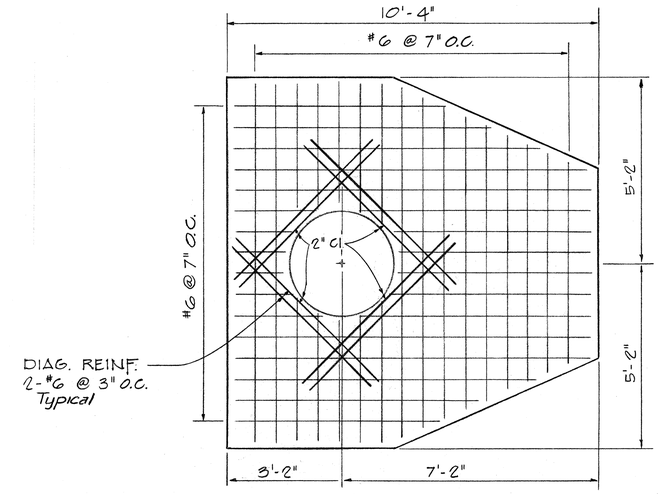
225

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(88):13	1971	226	457



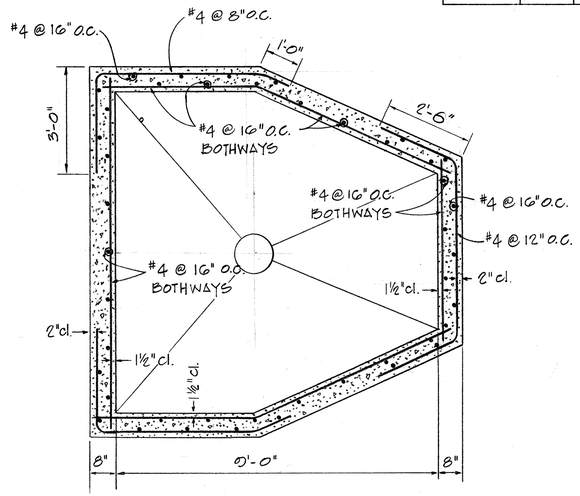
PLAN OF MANHOLE

SCALE: ½"=1'-0"



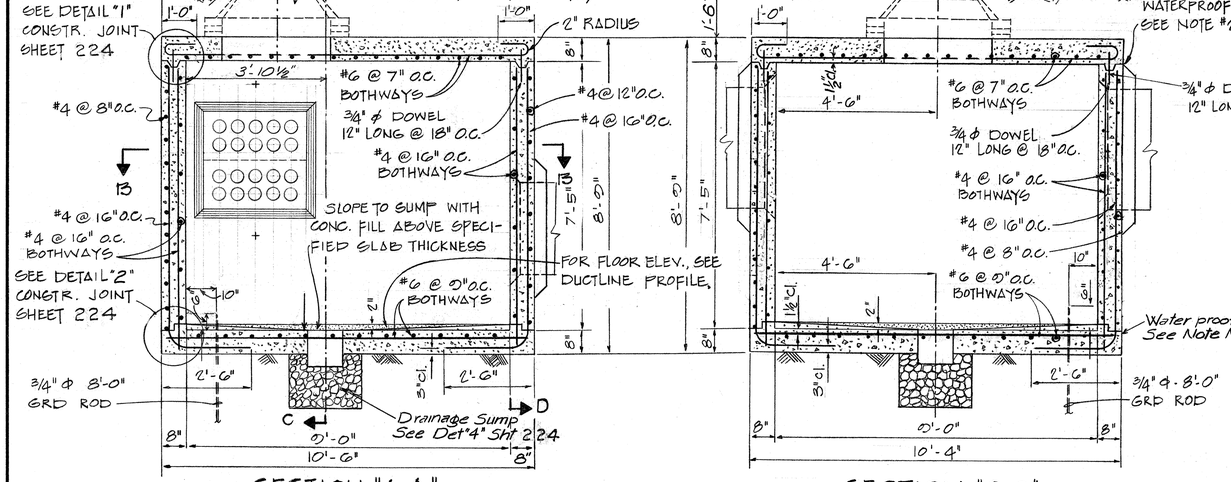
ROOF SLAB REINF. PLAN

SCALE: ½"=1'-0"



SECTION "B-B"

SCALE: ½"=1'-0"

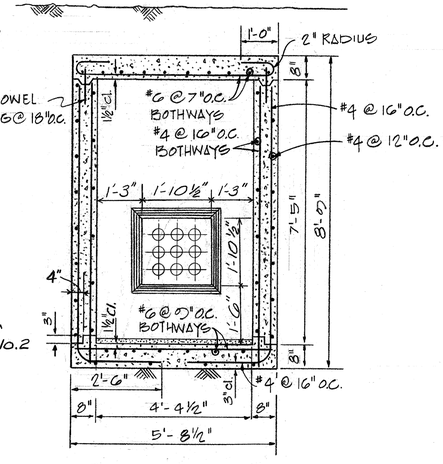


SECTION "A-A"

SCALE: ½"=1'-0"

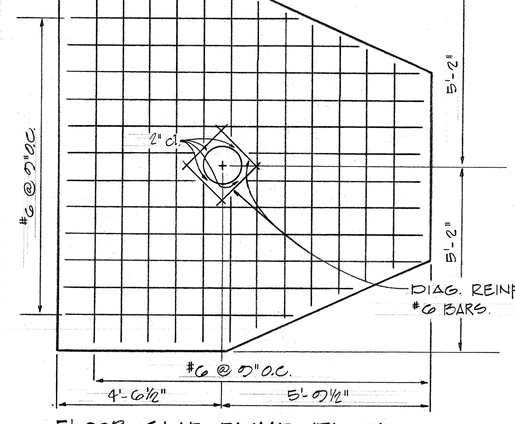
SECTION "C-C"

SCALE: ½"=1'-0"



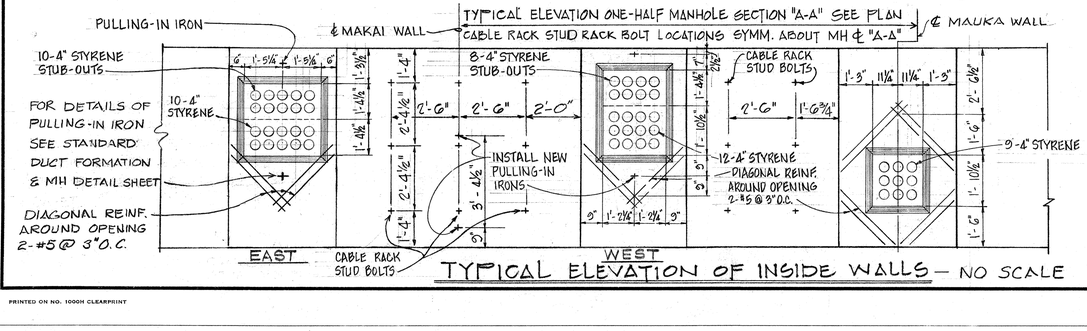
SECTION "D-D"

SCALE: ½"=1'-0"



FLOOR SLAB REINF. PLAN

SCALE: ½"=1'-0"



TYPICAL ELEVATION OF INSIDE WALLS — NO SCALE

NOTES

1. DESIGN DATA:
   f_s = 20,000 P.S.I.
   f'_c = 3,000 P.S.I. f_c = 1,350 P.S.I.
   n = 10
   W = EQUIV. FLUID PRESSURE = 30 P.S.F.
2. ALL CONSTRUCTION JOINTS SHALL BE WATERPROOF WITH TWO APPLICATIONS OF THORO SEAL OR EQUAL.
3. FOR DUCT WINDOW ELEVATIONS, SEE PLAN AND PROFILE SHEETS. FOR LOCATION OF DUCT WINDOW, SEE ELEVATION OF INSIDE WALLS.
4. PLACE # 12 FISH WIRE IN DESIGNATED DUCT THROUGHOUT ITS ENTIRE LENGTH WITH PROTRUSIONS OF 2 FEET IN MANHOLES AT EACH END.

APPROVED:

HAWAIIAN TELEPHONE COMPANY — 9-15-70 DATE

ANDREW SCHUCHARDT REGISTERED PROFESSIONAL ENGINEER No. 2229 HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

J. Andrew Schuchardt

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TELEPHONE MANHOLE TYPE V-1

INTERSTATE ROUTE H1
PROJECT NO. I-HI-1(88):13

SCALE: AS SHOWN — DATE: JULY 17, 1970

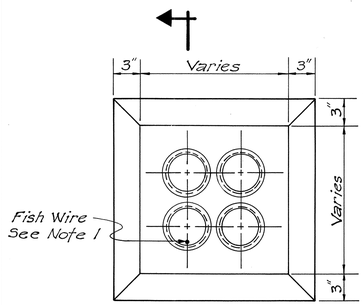
SHEET No. 37U OF 53U SHEETS

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	
	TRACED BY	
NOTE BOOK	DESIGNED BY	
No.	QUANTITIES BY	
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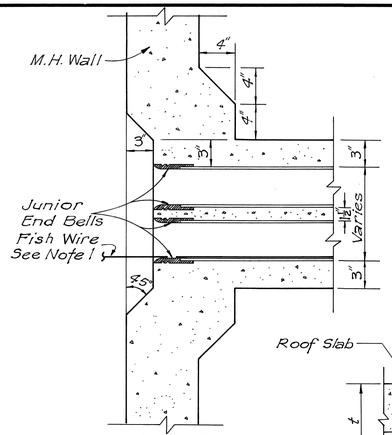
PRINTED ON NO. 1000H CLEARPRINT

226

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(88):13	1971	227	457

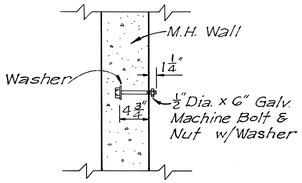


ELEVATION

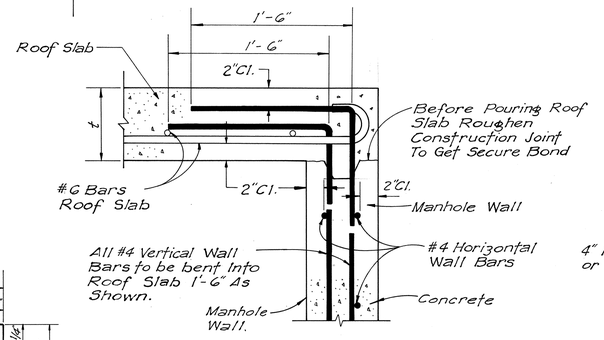


SECTION

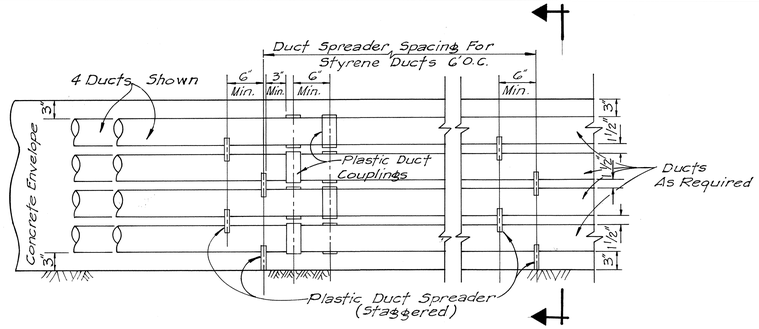
DETAIL "1"
TYPICAL MANHOLE DUCT WINDOW
SCALE 1 1/2" = 1'-0"



CABLE RACK STUD BOLT-DETAIL "2"
SCALE 1"=1'-0"

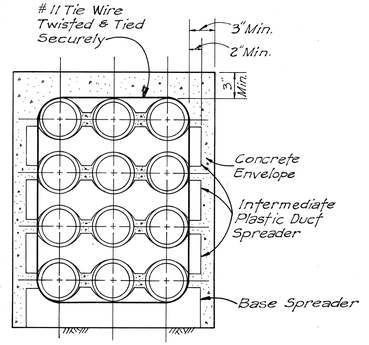


DETAIL "3"
CAST-IN-PLACE ROOF SLAB DETAIL
SCALE 1 1/2" = 1'-0"

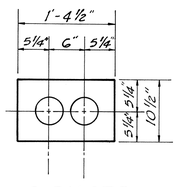


TYPICAL DUCT ENVELOPE ELEVATION
ARRANGEMENT OF COUPLING & PLASTIC SPACERS

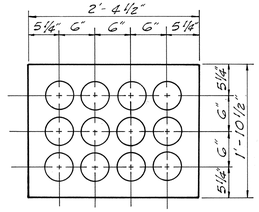
DETAIL "4"
TYPICAL H.T.Co. DUCTS
SCALE 1" = 1'-0"



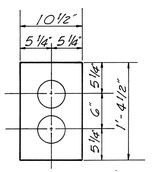
DUCT SECTION SHOWING SPACERS
NO SCALE



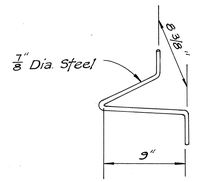
2 DUCTS



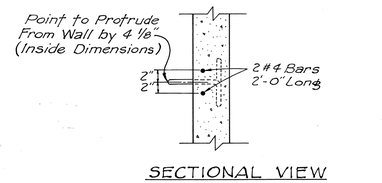
4 WIDE x 3 HIGH
12 DUCTS



2 DUCTS

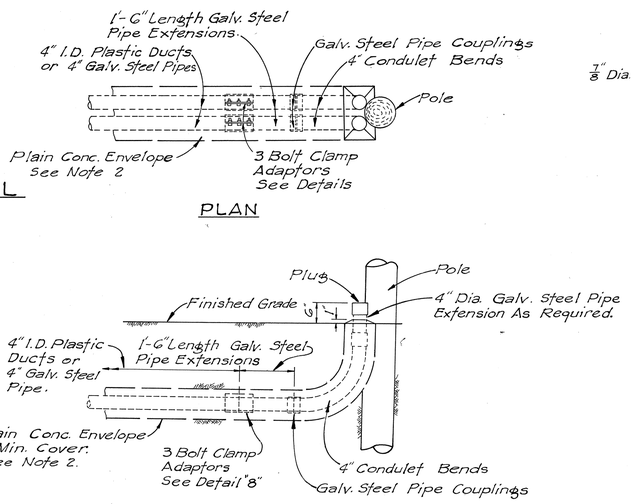


DETAIL

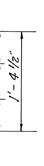


SECTIONAL VIEW

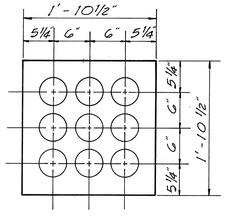
PULLING-IN-IRON-DETAIL "7"
SCALE 3/4" = 1'-0"



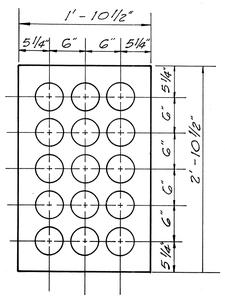
PLAN



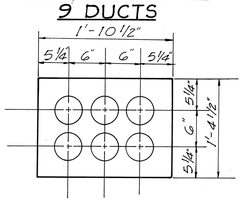
2 WIDE x 2 HIGH
4 DUCTS



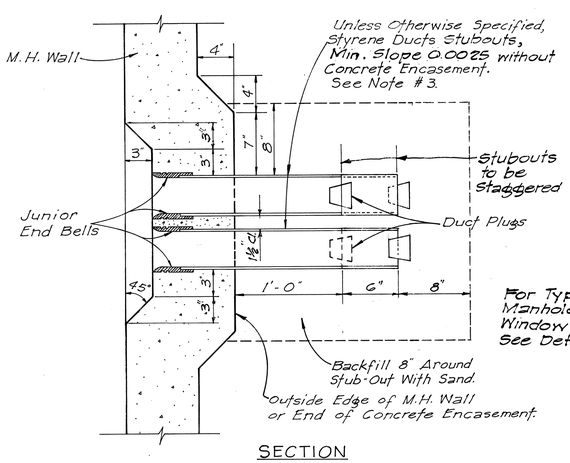
3 WIDE x 3 HIGH
9 DUCTS



3 WIDE x 5 HIGH
15 DUCTS

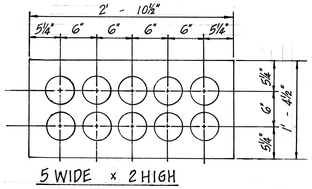


3 WIDE x 2 HIGH
6 DUCTS



SECTION

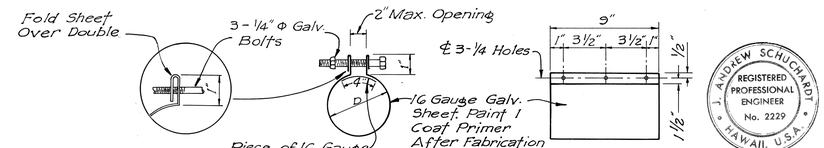
TYPICAL STUB-OUTS - DETAIL "5"



5 WIDE x 2 HIGH
10 DUCTS

ELEVATION

TYPICAL RISER - DETAIL "G"
SCALE 1/2" = 1'-0"



DETAIL SECTION ELEVATION

3 BOLT CLAMP ADAPTER DETAIL "8"

TYPICAL MANHOLE DETAILS
NO SCALE

NOTES:

1. The Contractor Shall Place #12 Fish Wire In Designated Duct Throughout It's Entire Length With Protrusions Of 2 Feet In Manholes & Handholes At Each End And 1 Foot In Pullboxes.
2. Plain Concrete Envelope Is Not Required For Temporary Galv. Steel Pipe Ducts Called For On The Plans.
3. Stub-Outs For Future Duct Lines Shall Be Installed So That 3" Minimum Concrete Envelope Can Be Provided For The Future Duct Lines. See Plans For Lengths of Stub Outs, 1' min. Unless Otherwise Specified.

APPROVED

Hawaiian Telephone Co. Ltd. Date

J. ANDREW SCHUCHARDT REGISTERED PROFESSIONAL ENGINEER No. 2229 HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

H.T.Co. STANDARD DUCT FORMATIONS & TYPICAL MANHOLE DETAILS

INTERSTATE ROUTE H1
PROJECT NO. I-HI-1(88):13

SCALE: AS SHOWN DATE: JULY 17, 1970

SHEET No. 38 OF 530 SHEETS

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

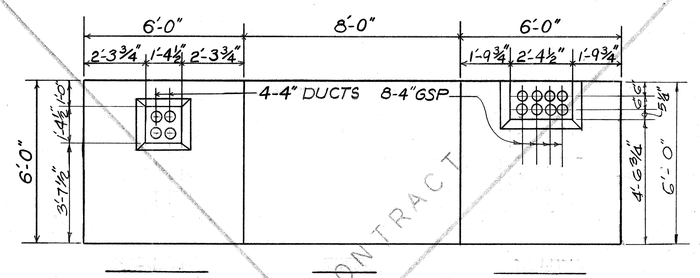
STANDARD DUCT FORMATIONS

6D 6D 7

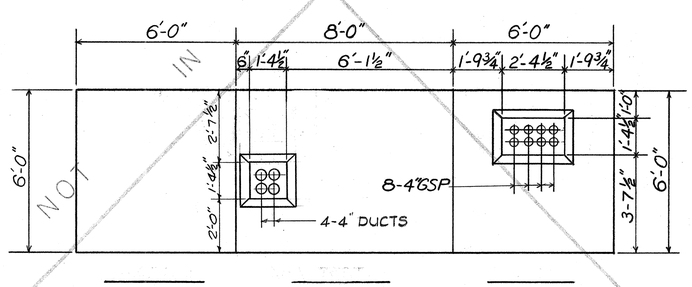
APPROVED

Hawaiian Electric Company, Inc. — Date: 7/10/71

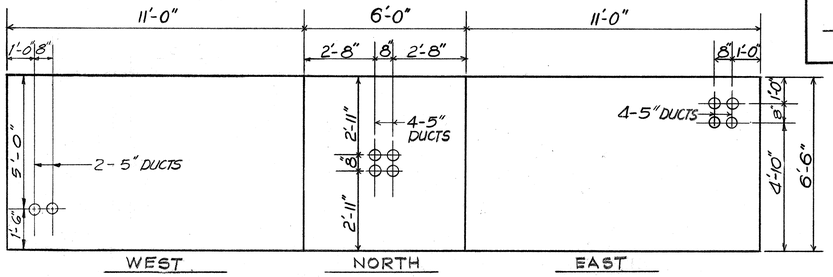
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(88):13	1971	228	457



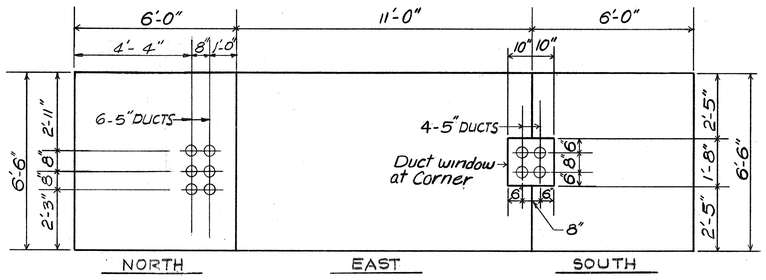
EMH NO.1 (NAVY)
6'X8' AT KAIMAKANI STREET



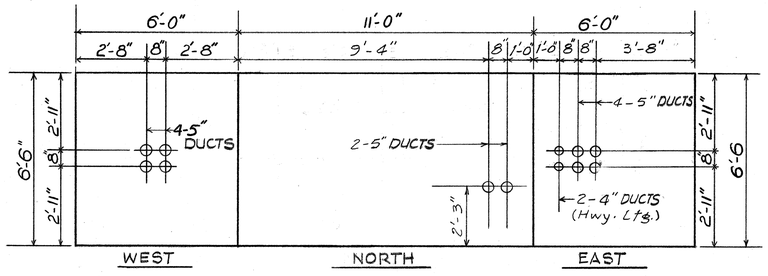
EMH NO.2 (NAVY)
6'X8' AT KAIMAKANI STREET



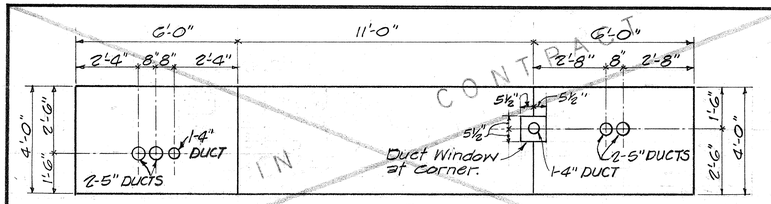
EMH NO.4 (HECo)
TYPE1 6'X11' IN UTILITY CORRIDOR



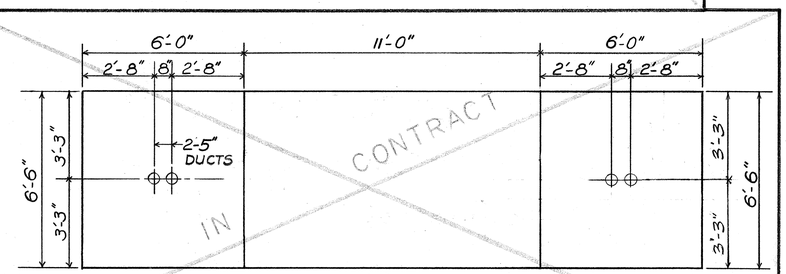
EMH NO.5 (HECo)
TYPE 1 6'X11' IN UTILITY CORRIDOR



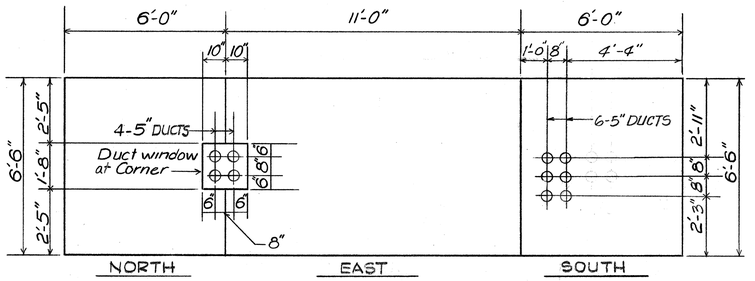
EMH NO.9 (HECo)
TYPE 1 6'X11' IN UTILITY CORRIDOR AT HALAWA HEIGHT ROAD



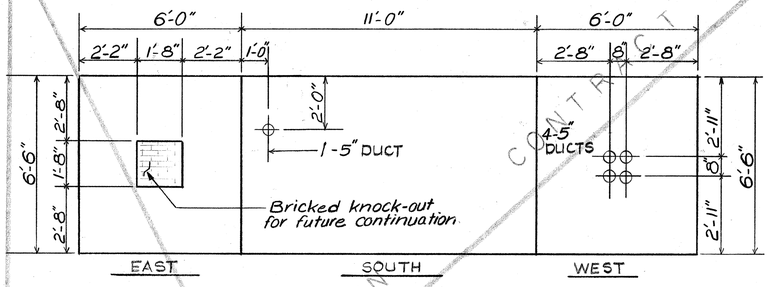
EHH NO. 2 (H.E. Co.)
TYPE G11V AT PUAKALA STREET



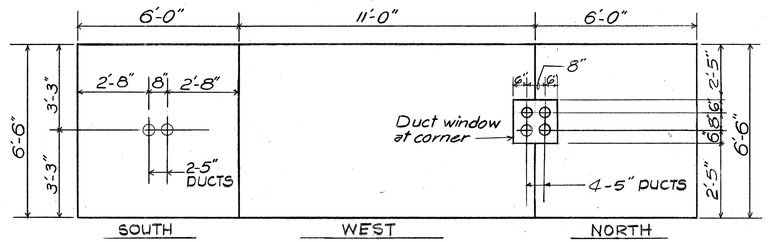
EMH NO.1 (HE Co)
TYPE 1 6'X11': EMH NO.1 AT ANOUNOU STREET



EMH NO.6 (HECo)
TYPE 1 6'X11' IN UTILITY CORRIDOR

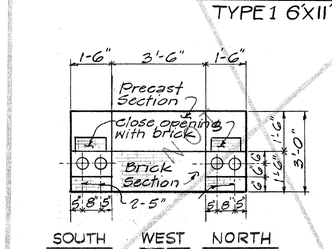


EMH NO.15 (HECo)
TYPE 1 6'X11' IN UTILITY CORRIDOR



EMH NOS.7,8,10,11 & 12 (HECo)
TYPE 1 6'X11' IN UTILITY CORRIDOR

EMH NO.3 (HECo)
TYPE 1 6'X11' AT HALE STREET



ESB NO.14 (H.E. Co.)
1'-6" x 3'-6" AT UTILITY CORRIDOR ACCESS RD. "D"

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

J. Andrew Schuchardt

J. ANDREW SCHUCHARDT — REGISTERED PROFESSIONAL ENGINEER — No. 2229 — HAWAII, U.S.A.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

H.E. Co. MANHOLE WALL ELEVATIONS

INTERSTATE ROUTE H1
PROJECT NO. I-HI-1(88):13

SCALE: 3/8"=1'-0" — DATE: JULY 17, 1970

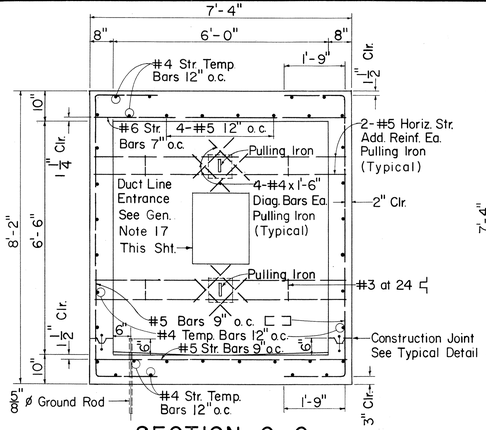
SHEET No. 39U OF 53U SHEETS

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

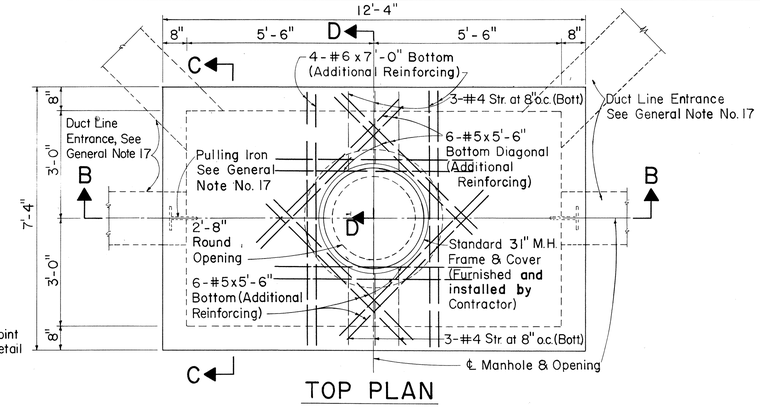
PRINTED ON NO. 1000H CLEARPRINT

228

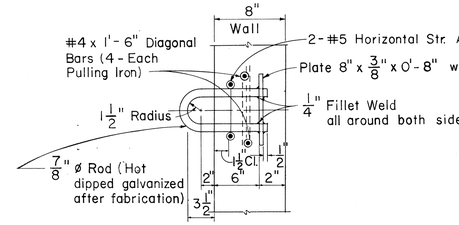
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAWAII	I-HI-1(88)13	1971	229	457



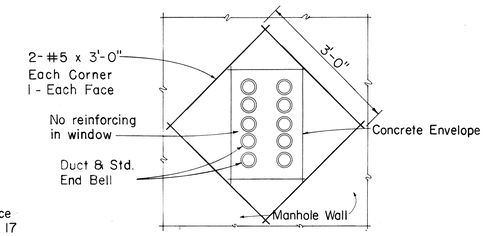
SECTION C-C



TOP PLAN



PULLING IRON DETAIL



ELEVATION

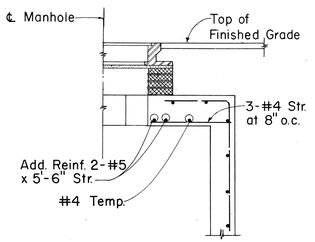
REINFORCING AT DUCT WINDOW

GENERAL NOTES

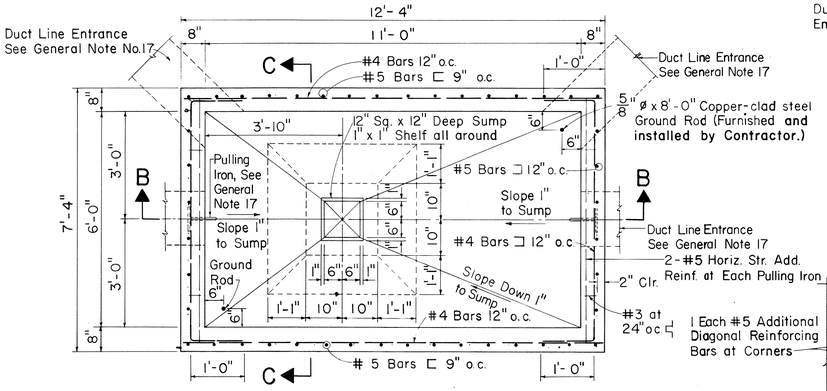
1. EXCAVATION : Excavate for manhole to accurate alignment, grades and dimensions as shown on drawings. **All excavation must be approved by Engineering Dept. H.E. Co. before any concrete is poured. All excess cut shall be backfilled with concrete or approved aggregate.**
2. BACKFILL : Remove all debris 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 Specificatiom.**
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. **Contractor to furnish and install, for each manhole:**

    (A) 2-5/8" ø x 8'-0" copper-clad steel ground rods.

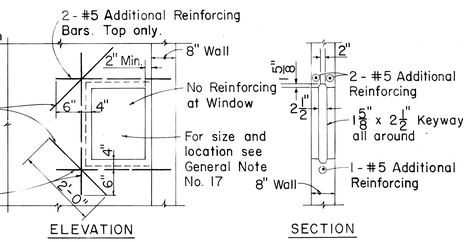
    (B) Standard 31" manhole frame and cover. (H.E. Standard)
14. Slope manhole floor down 1" toward sump.
15. All work shall be subject to inspection by the Hawaiian Electric Co. Inc.; and/or Division of Highways, State of Hawaii; and/or Division of Engineering, City & County of Honolulu.
16. All materials 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.**



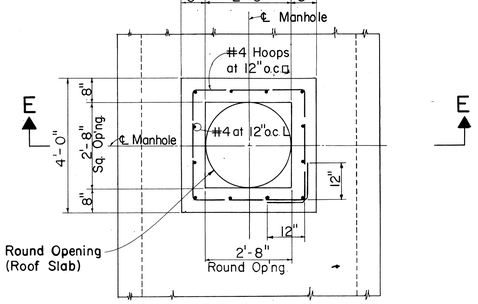
SECTION D-D



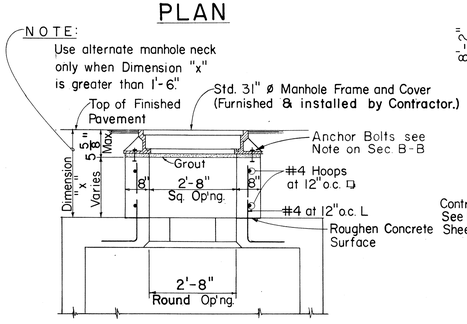
SECTIONAL PLAN A-A



ELEVATION SECTION

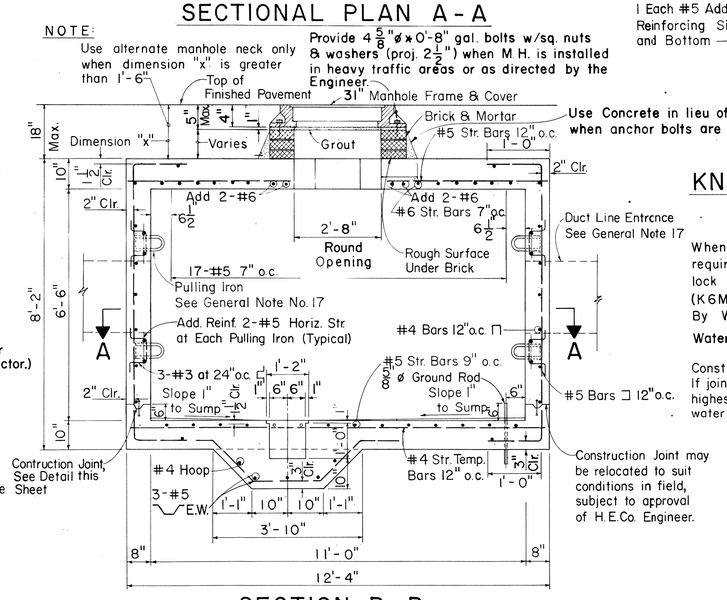


PLAN



SECTION E-E

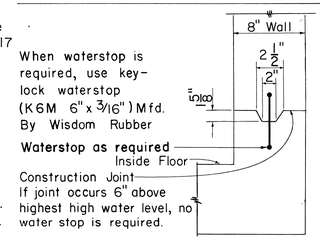
ALTERNATE MANHOLE NECK



SECTION B-B

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

KNOCKOUT FOR FUTURE DUCT LINE



TYPICAL DETAIL OF CONSTRUCTION JOINT AND KEYWAY

REFERENCE DRAWINGS AND SPECIF.

011327 & 011328 - Standard H. E. Co. 31" Manhole Frame and Cover.
20191 & 18585 - Underground Ductline Construction Standards - Details.
CS 7001-0 - Construction of Underground Facilities - Specification

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.

APPROVED :
HAWAIIAN ELECTRIC Co., Inc. — DATE 7/10/71

FOR USE IN AREAS SUBJECT TO VEHICULAR TRAFFIC

HECo., Inc. Drawing Number
18775

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

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

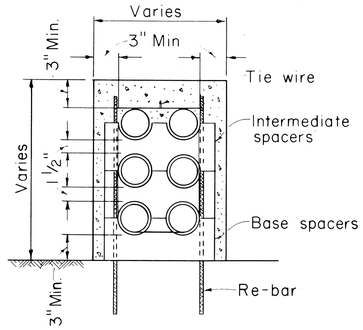
Scales: Not to Scale Date: JULY 17, 1970

SHEET NO. 40J OF 53U SHEETS

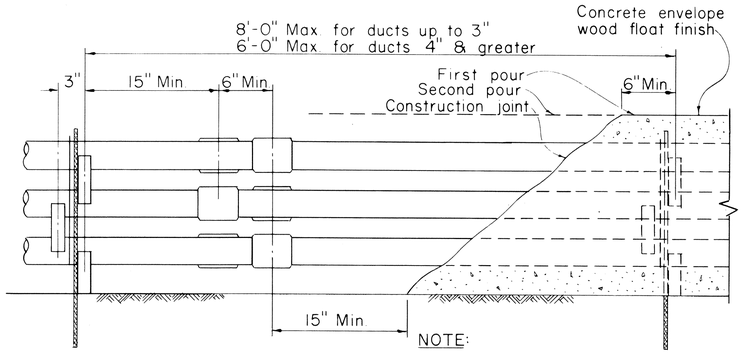
229

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

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-I(88)13	1971	230	457



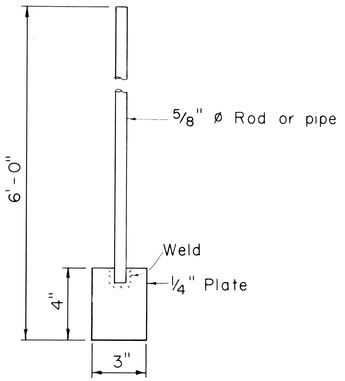
SECTION



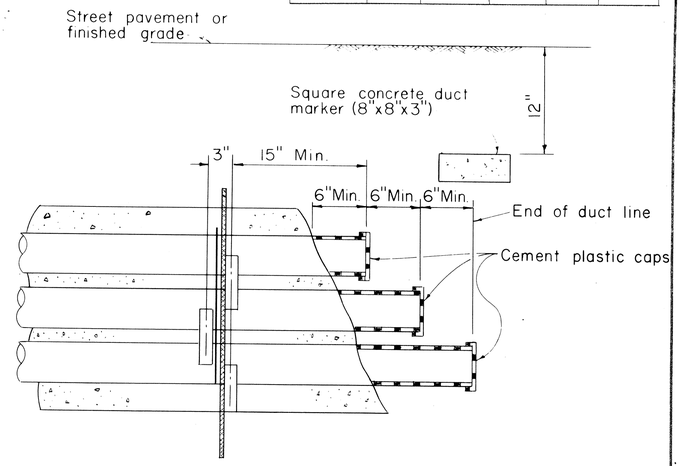
ELEVATION

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

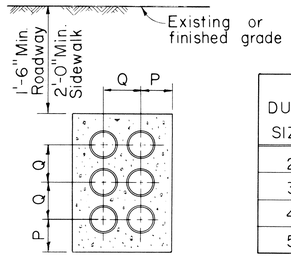
NOTE:
1. Stagger couplings (or belled ends).
2. Anchor conduit with #14 steel tie wire & #4 reinforcing bars.
3. Cement all joints.
4. Avoid standing on conduit.



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 ¼	4 ⅛
3	4¾	5 ⅛
4	5 ¼	6 ¼
5	5⅞	7⅝

NOTE:
1. Maintain 1½" minimum spacing between conduit; 3" minimum concrete envelope around top, bottom & sides.
2. Dimensions are minimum dimensions.

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

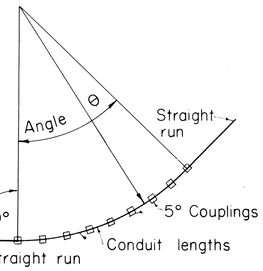


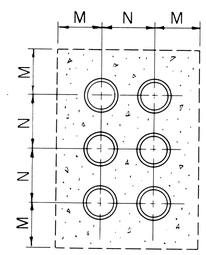
TABLE "A"	
APPROX. RADIUS OF BEND, R	LENGTH OF EA. CONDUIT-FT USING 5° BEND AT COUPL.
11'-6"	1
17'-3"	1.5
23'-0"	2
28'-9"	2.5
34'-6"	3
40'-3"	3.5
46'-0"	4
51'-9"	4.5
57'-6"	5
69'-0"	6
80'-6"	7
92'-0"	8

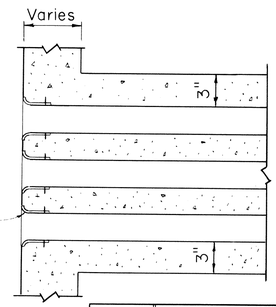
TABLE "B"		
ANGLE OF BEND θ	NO. OF COUPLINGS	LENGTH OF CONDUIT
15°	3	2
30°	6	5
45°	9	8
60°	12	11
75°	15	14
90°	18	17

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.

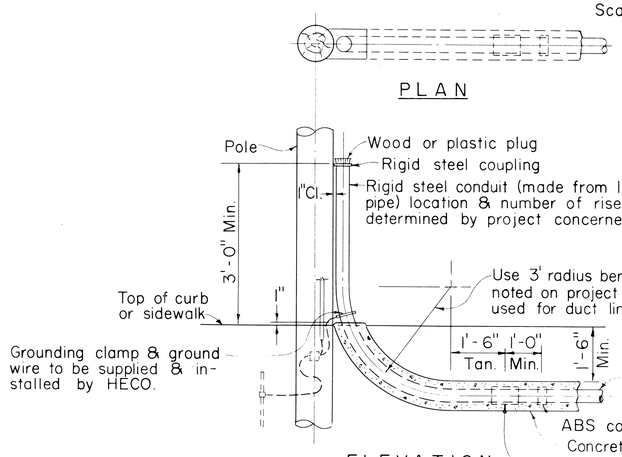
APPLICATION OF 5° COUPLING FOR LONG RADIUS BENDS





TYPICAL CONDUIT ENTRANCE INTO HANDHOLE, MANHOLE & VAULT WALLS
(6-WAY DUCT SHOWN)
Scale: 1½" = 1'-0"

DUCT SIZE	DIMENSIONS (INCHES) M	N
2	4	5
3	5	6
4	5 ½	7
5	6	8



ELEVATION

TYPICAL RISER DETAIL
(POLE RISER SHOWN)
Scale: ½" = 1'-0"

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

APPROVED:
Hawaiian Electric Co., Inc. — Date

HECo., Inc. Drawing Number
20191

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

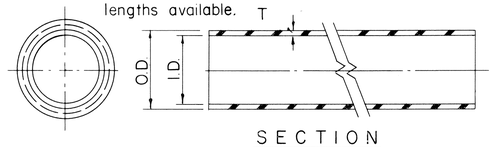
CONSTRUCTION STANDARDS
PLASTIC CONDUIT
UNDERGROUND DUCT LINES

Scale as noted

SHEET No. 410 OF 530 SHEETS

230

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(88)13	1971	231	457

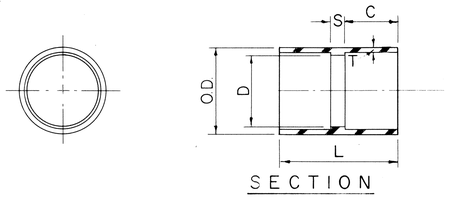


SECTION

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	29002	2.375	2.25	.060	21	29010	2.375	2.15	.110	38
3	29004	3.500	3.35	.075	39	29012	3.500	3.25	.125	64
4	29006	4.500	4.31	.095	63	29014	4.500	4.18	.160	104
5	29008	5.563	5.36	.100	82	29016	5.563	5.20	.180	146

CONDUIT

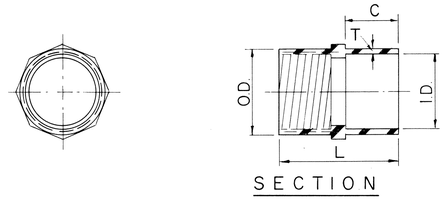
NOTE:
Type EB & DB Conduits have same O.D. for a given size.
All fittings which go over Conduits are DB type & fit both types of Conduits.



SECTION

SIZE	HECO CODE	O.D.	D	L	C	S	T
2	29018	2.620	2.255	2 7/16	1.16	.110	.110
3	29020	3.780	3.350	3 3/8	1.63	.120	.125
4	29022	4.855	4.310	3 11/16	1.78	.120	.160
5	29024	5.965	5.363	4 3/32	1.97	.160	.180

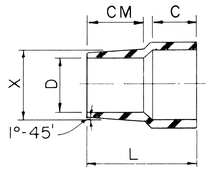
COUPLING



SECTION

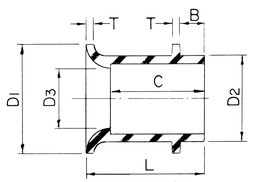
SIZE	HECO CODE	O.D.	D	L	T	C
2	29026			2 15/16	1 1/16	1.16
3	29028			3 7/16	1 5/8	1.63
4	29030			3 11/16	1 23/32	1.78
5	29032			4 1/16	1 27/32	1.97

ADAPTER - PLASTIC TO STEEL



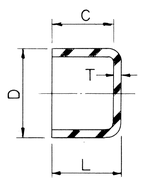
SIZE	HECO CODE	L	X	C.M.	D	C
2	29034	3 1/16	2.580	1 3/4	2.18	1.16
3	29036	3 19/32	3.620	1 3/4	3.09	1.63
4	29038	4 1/32	4.620	2	4.03	1.78
5	29040					

ADAPTER - PLASTIC TO TRANSITE (ASBESTOS-CEMENT)



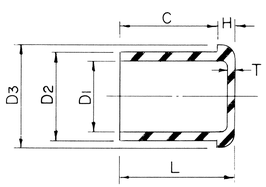
SIZE	HECO CODE	D1	D2	D3	B	C	L	T
2	29042	3.01	2.520	2.255	.50	1.16	1.54	.060
3	29044	4.10	3.680	3.350	.75	1.63	2.00	.075
4	29046	5.31	4.725	4.310	.75	1.78	2.28	.095
5	29048	6.36	5.805	5.363	1.00	1.97	2.47	.100

END BELL



SIZE	HECO CODE	D	C	L	T
2	29050	2.52	.59	.65	.060
3	29052	3.68	.81	.89	.075
4	29054	4.725	.91	1.01	.095
5	29056	5.805	1.00	1.10	.100

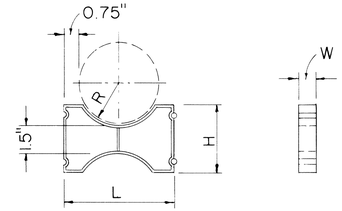
CAP (RIGID) - FOR SEMI-PERMANENT USE



SIZE	HECO CODE	D1	D2	D3	C	H	L	T
2	29058	2.260	2.375	2.500	.593	.125	.718	.060
3	29060	3.360	3.500	3.656	.812	.156	.968	.075
4	29062	4.320	4.500	4.687	.906	.187	1.092	.095
5	29064	5.375	5.638	5.760	1.000	.218	1.218	.100

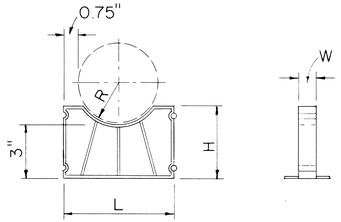
CAP (TEMPORARY)

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



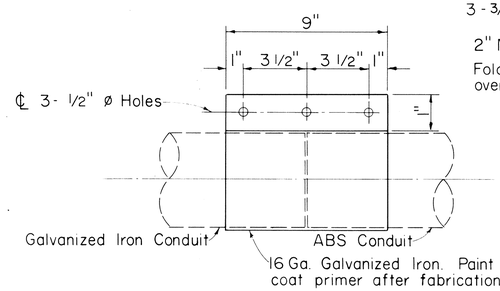
SIZE	HECO CODE	L	W	H	R
2	29066	4.00	1	2.75	1.188
3	29068	5.00	1	3.25	1.750
4	29070	6.13	1	3.75	2.250
5	29072	7.50	1	4.25	2.782

INTERMEDIATE SPACER



SIZE	HECO CODE	L	W	H	R
2	29074	4.00	1	3.63	1.188
3	29076	5.00	1	3.88	1.750
4	29078	6.13	1	4.13	2.250
5	29080	7.50	1	4.38	2.782

BASE SPACER



NOTE:
D = Duct I.D. + 1/2"

SIZE	HECO CODE
2	13126
3	13128
4	13130
5	13132

3 - BOLT CLAMP

NOTES:
1. All dimensions in inches.
2. Spacers shown are different than that used for transite.
3. These accessories are to be used with ABS (Acrylonitrile-Butadiene - Styrene), or PVC (Poly-Vinyl Chloride) Plastic Conduit, per HECO purchase specification M7001-0.

APPROVED:
Hawaiian Electric Co., Inc. — Date 7/10/71

HECo., Inc. Drawing Number
42276

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS
ACCESSORY DETAILS FOR PLASTIC CONDUIT UNDERGROUND DUCT LINES

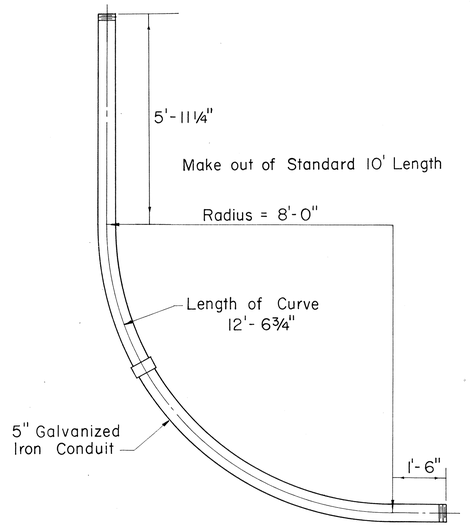
Scales Not to Scale

SHEET No. 42U OF 53U SHEETS

231

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

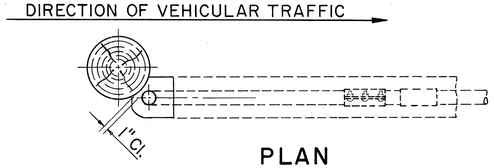
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAWAII	I-HI-1(88):13	1971	232	457



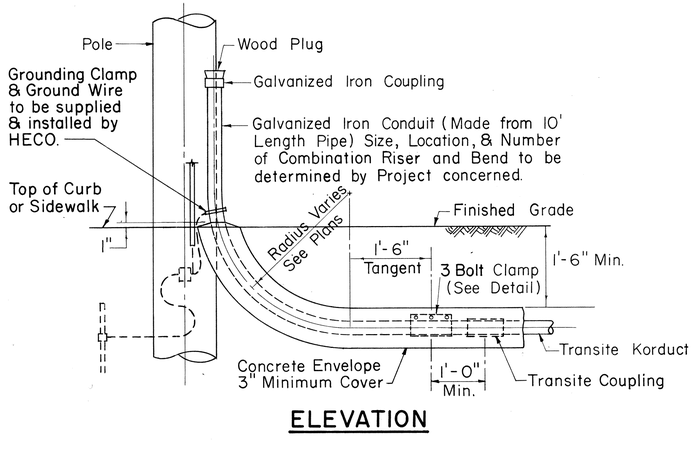
46 KV COMBINATION RISER AND BEND

(8'-0" RADIUS)

Not to Scale



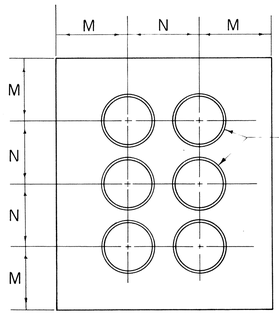
PLAN



ELEVATION

TYPICAL DETAIL COMBINATION RISER AND BEND

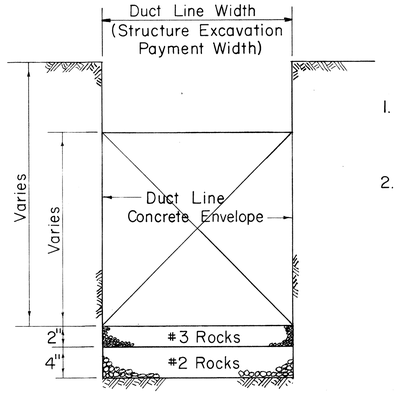
Scale: ¾" = 1'-0"



TYPICAL DUCT DETAIL AT MANHOLE WALL

Not to Scale

SIZE	M	N
3"	5"	6"
4"	5½"	7"
4½"	5½"	7½"
5"	6"	8"

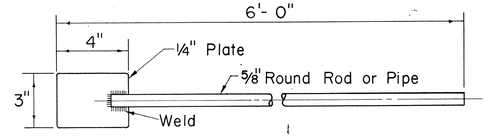


TYPICAL EXCAVATION DETAIL

Not to Scale

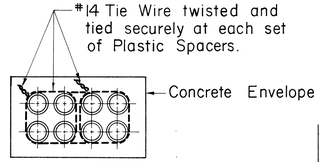
NOTES

1. Size of Concrete Envelope and Depth of Excavation to be determined by Project concerned.
2. Rock Foundation required only when Water is encountered



CONCRETE DUCT ENVELOPE TAMPING ROD

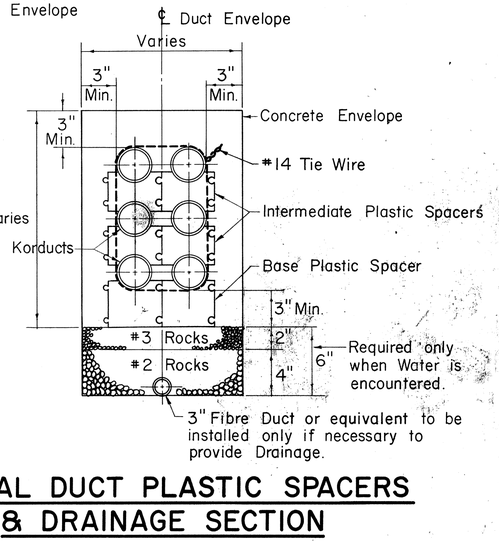
Scale: 3" = 1'-0"



TIE WIRE DETAIL

FOR DUCT LINE MORE THAN 4 DUCTS WIDE

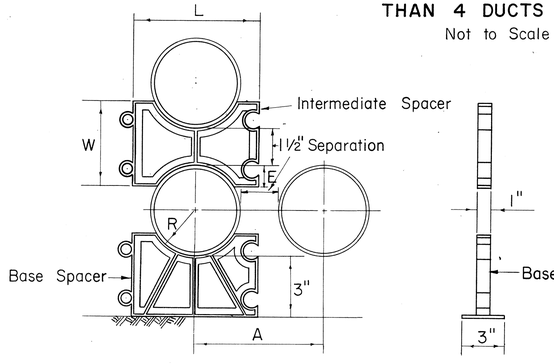
Not to Scale



TYPICAL DUCT PLASTIC SPACERS & DRAINAGE SECTION

(6 WAY DUCT SHOWN - 3 HIGH - 2 WIDE)

Not to Scale

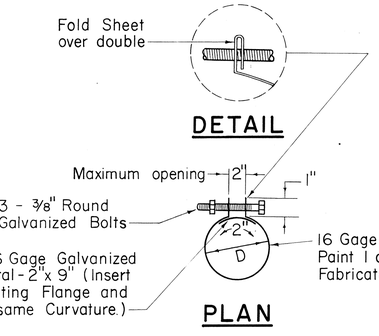


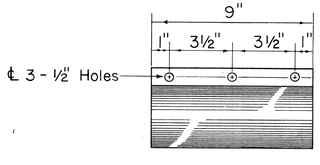
TYPICAL PLASTIC SPACERS

Not to Scale

SIZE	R	E	W	A	L
3"	1 27/32"	7/8"	3 1/4"	5 1/8"	5"
4"	2 13/32"	1 1/8"	3 3/4"	6 1/4"	6 1/8"
4½"	2 23/32"	1 1/4"	4"	6 7/8"	6 3/4"
5"	3 1/16"	1 3/8"	4 1/4"	7 5/8"	7 1/2"

For 1½" Separation





3 BOLT CLAMP DETAIL

Scale: 3" = 1'-0"

APPROVED:

HAWAIIAN ELECTRIC CO., INC. DATE 7/10/71

HECo., Inc. Drawing Number	
18585	SHEET No. 1 OF 2 SHEETS

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS

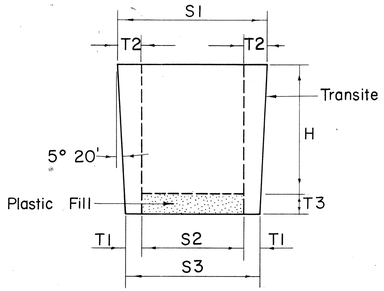
CONSTRUCTION STANDARDS
TRANSITE KORDUCTS
UNDERGROUND DUCT LINES

Scales: As Noted Date: JULY 17, 1970

SHEET NO. 43 OF 53 SHEETS

LIETZ 1103 ARKWRIGHT TRACING CLOTH 10-60 200P

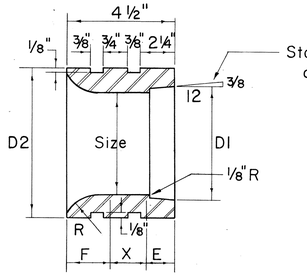
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAWAII	I-HI-1(88):13	1971	233	457



PLUGS FOR TRANSITE KORDUCTS

Not to Scale

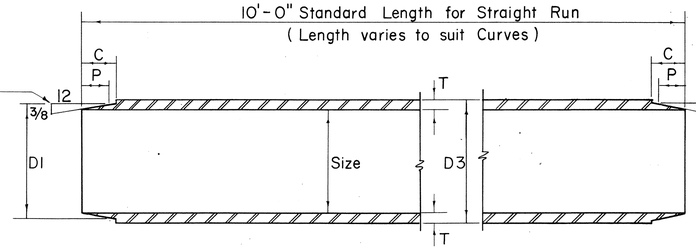
SIZE	H	S1	S2	S3	T1	T2	T3
3"	4"	3 3/8"	2"	2 5/8"	5/16"	11/16"	3/4"
4"	4 1/2"	4 27/64"	2 3/4"	3 37/64"	13/32"	27/32"	3/4"
4 1/2"	4 1/2"	4 59/64"	3"	4 5/64"	35/64"	31/32"	3/4"
5"	4 1/2"	5 27/64"	3 1/2"	4 37/64"	35/64"	31/32"	3/4"



STANDARD END BELLS

Not to Scale

SIZE	DI	D2	F	X	E	R
3"	3 25/64"	4 1/2"	1 11/32"	1 29/32"	1 1/4"	1 3/4"
4"	4 25/64"	5 3/4"	1 9/16"	1 9/16"	1 3/8"	2"
4 1/2"	4 57/64"	6 1/4"	1 9/16"	1 9/16"	1 3/8"	2"
5"	5 29/64"	7"	1 9/16"	1 7/16"	1 1/2"	2"



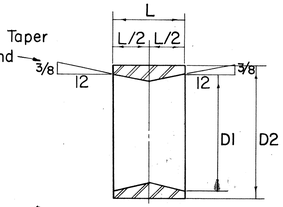
TRANSITE KORDUCTS

Not to Scale

SIZE	DI	D3	C	P	T
3"	3 25/64"	3 35/64"	1 1/8"	7/8"	17/64"
4"	4 25/64"	4 35/64"	1 1/4"	1"	17/64"
4 1/2"	4 57/64"	5 3/64"	1 1/4"	1"	17/64"
5"	5 29/64"	5 39/64"	1 25/64"	1 1/8"	19/64"

Note "X"

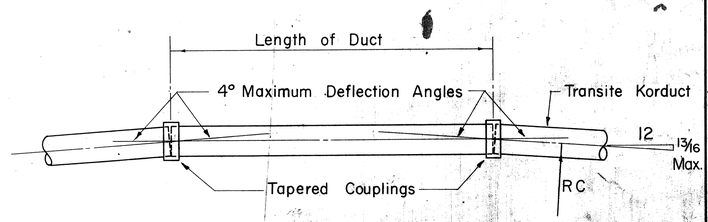
Provide one set of Spacers
(a) 10 Ft. straight run for 4 Ducts high or less.
(b) 5 Ft. straight run for 5 Ducts high or more.



SIZE	DI	D2	L
3"	3 25/32"	4 11/64"	2 1/4"
4"	4 25/64"	5 3/16"	2 1/2"
4 1/2"	4 57/64"	5 49/64"	2 1/2"
5"	5 29/64"	6 21/64"	2 3/4"

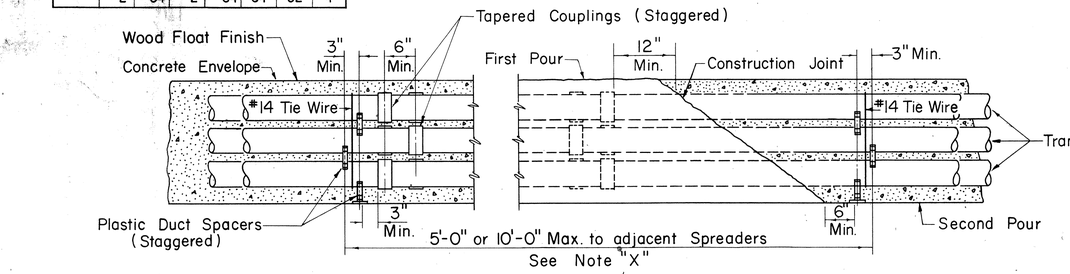
TAPERED COUPLINGS

Not to Scale



METHOD OF FORMING CURVES

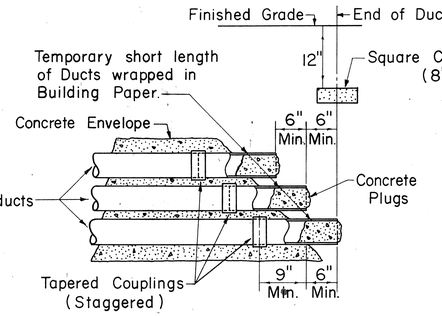
Not to Scale



TYPICAL DUCT ENVELOPE ELEVATION

(6 WAY DUCT LINE SHOWN)

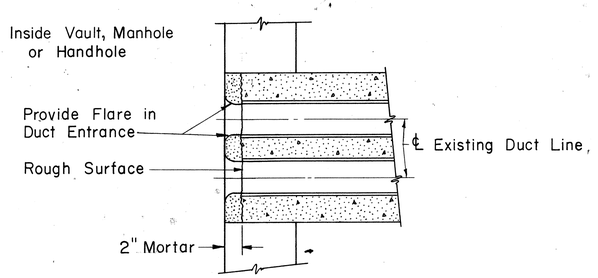
Not to Scale



TYPICAL STUB OUT DETAIL

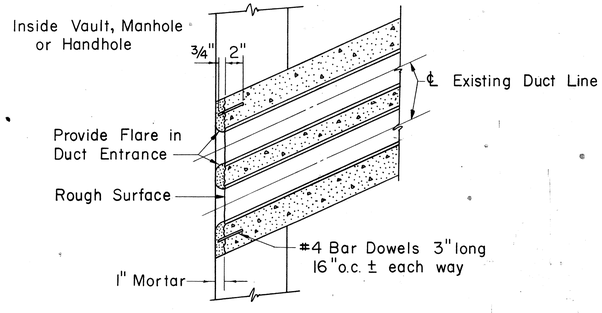
Not to Scale

MINIMUM RADIUS TO FORM CURVES										
LENGTH OF DUCT	1'-0"	1'-6"	2'-0"	2'-6"	3'-0"	3'-6"	4'-0"	4'-6"	5'-0"	5'-6"
MIN. RAD. RC	14'-4"	21'-6"	28'-8"	35'-10"	42'-11"	50'-1"	57'-3"	64'-5"	71'-7"	78'-9"
LENGTH OF DUCT	6'-0"	6'-6"	7'-0"	7'-6"	8'-0"	8'-6"	9'-0"	9'-6"	10'-0"	
MIN. RAD. RC	85'-11"	93'-1"	100'-3"	107'-5"	114'-7"	121'-8"	128'-10"	136'-0"	143'-2"	



DUCT LINE ENTRANCE AT EXISTING DUCT LINE

Scale: 1½" = 1'-0"



DUCT LINE DIAGONAL ENTRANCE

Scale: 1½" = 1'-0".

APPROVED:

HAWAIIAN ELECTRIC CO., INC. — DATE 7/10/71

HECo., Inc. Drawing Number 18585

SHEET No. 2 OF 2 SHEETS

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS

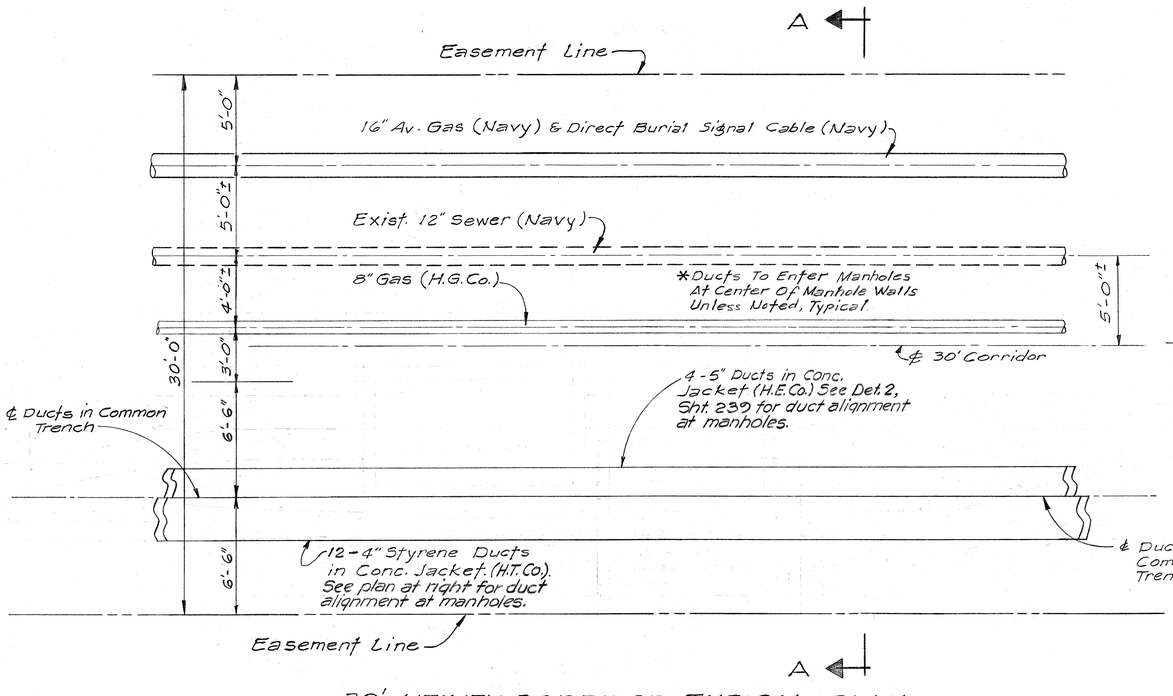
CONSTRUCTION STANDARDS
TRANSITE KORDUCTS
UNDERGROUND DUCT LINES

Scales: As Noted — Date: JULY 17, 1970

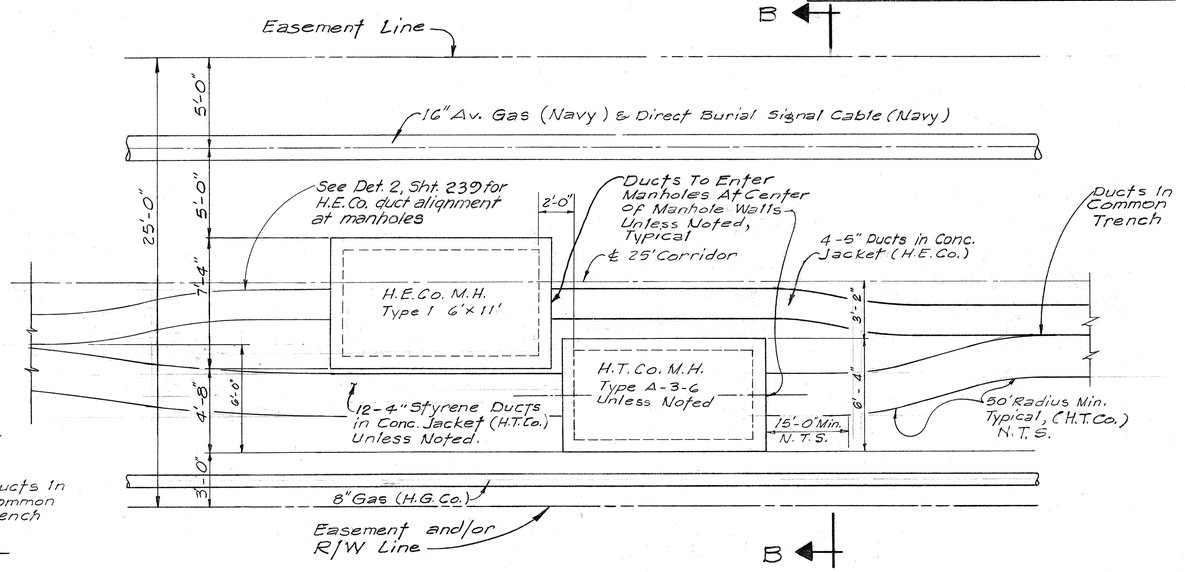
SHEET NO. 440 OF 531 SHEETS

LIETZ 1103 ARKWRIGHT TRACING CLOTH 10-60 200P

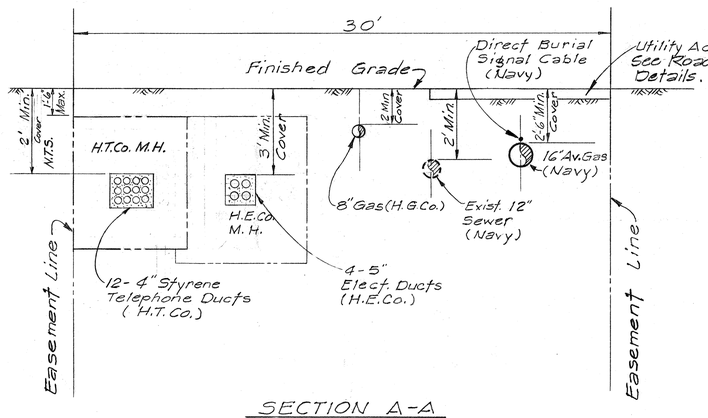
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(88):13	1971	234	457



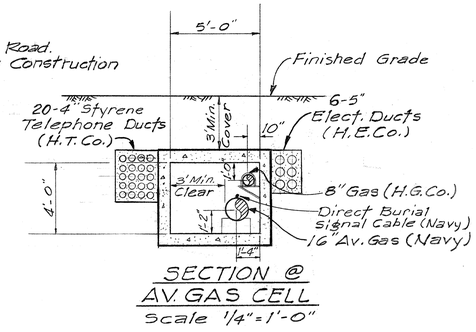
30' UTILITY CORRIDOR TYPICAL PLAN
Scale 1/4" = 1'-0"



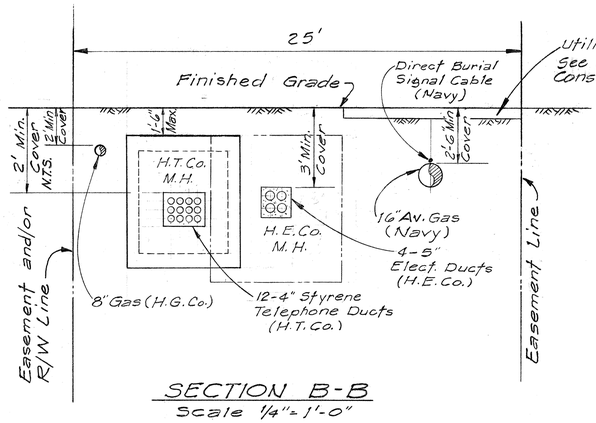
25' UTILITY CORRIDOR TYPICAL PLAN
Scale 1/4"=1'-0"



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



SECTION @ AV. GAS CELL
Scale 1/4"=1'-0"



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

APPROVED

Hawaiian Telephone Co., Ltd.	9-15-70 Date
Hawaiian Electric Co., Inc.	RN, JK 9/10/71 Date
Honolulu Gas Co. Ltd.	8/27/70 Date

J. ANDREW SCHUCHARDT REGISTERED PROFESSIONAL ENGINEER No. 2229 HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

J. Andrew Schuchardt

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ELECTRIC, TELEPHONE, AVGAS AND GAS UTILITY CORRIDOR TYPICAL LAYOUT

INTERSTATE ROUTE H1
PROJECT NO. I-H1-1(88):13

SCALE: 1/8"=1'-0" DATE: JULY 17, 1970

SHEET No. 45U OF 53U SHEETS

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

PRINTED ON NO. 1000H CLEARPRINT

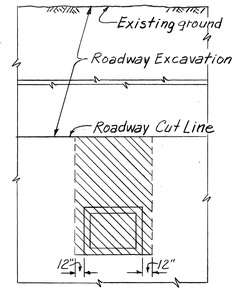
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(88):13	1971	235	457

ESTIMATED QUANTITIES

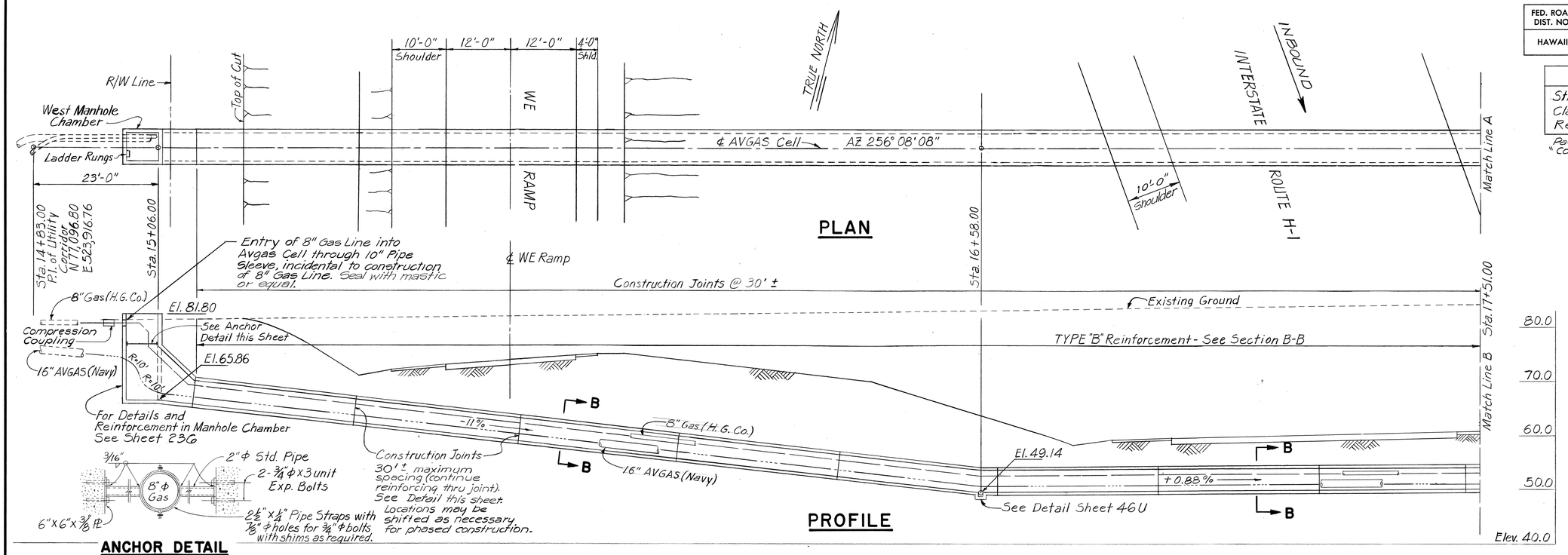
Structural Excavation	2360 c.y.
Class A Concrete	272 c.y.
Reinforcement	34,580 lb.

Payment to be made under item: "Construct Avgas Cell"

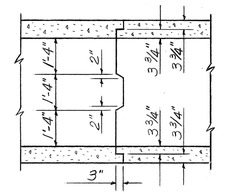
NOTE:
Hatched areas denote limits of structural excavation pay line. All other excavation shall be roadway excavation.



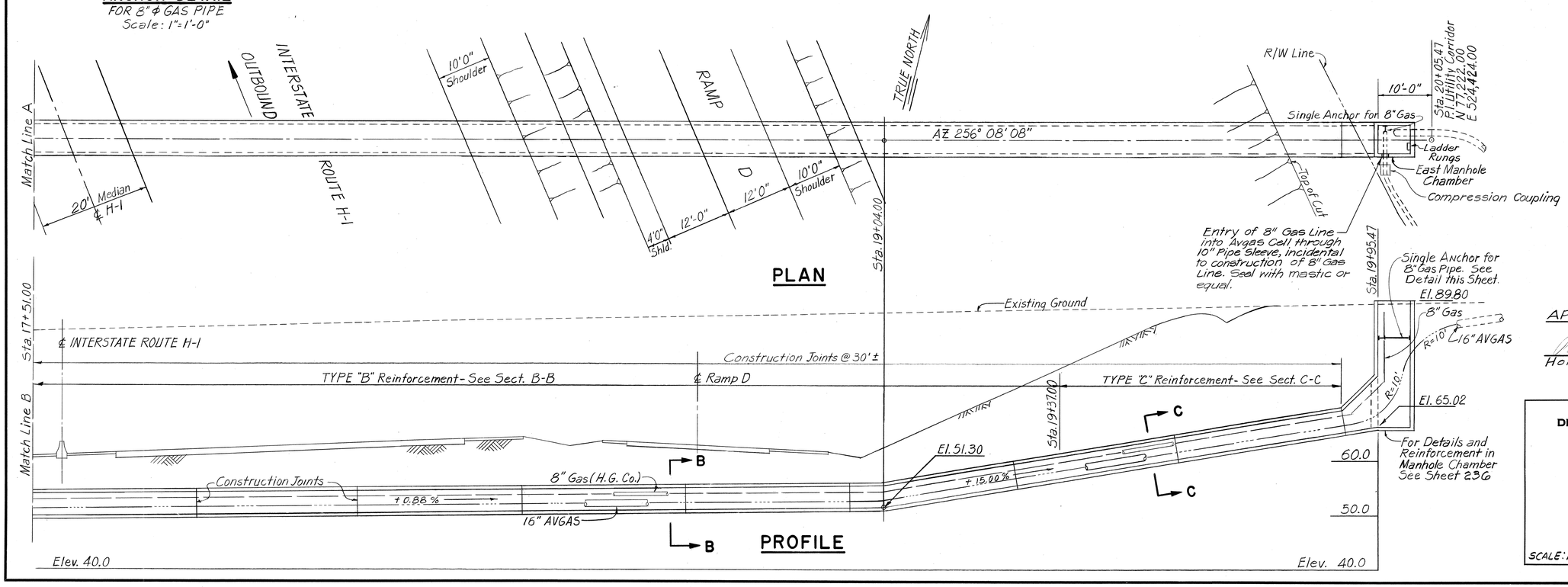
STRUCTURAL EXCAVATION LIMITS
Not to Scale



ANCHOR DETAIL
FOR 8" ℄ GAS PIPE
Scale: 1"=1'-0"



CONSTRUCTION JOINT DETAIL
Scale: 3/8"=1'-0"



THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.
Martin Rubin

MARTIN RUBIN
REGISTERED PROFESSIONAL ENGINEER
No. 1841
HAWAII, U.S.A.

APPROVED

Honolulu Gas Co. [illegible] 8/27/70
Date

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

AVGAS CELL
PLAN & PROFILE

INTERSTATE ROUTE H-1
PROJECT NO. I-HI-1(88):13

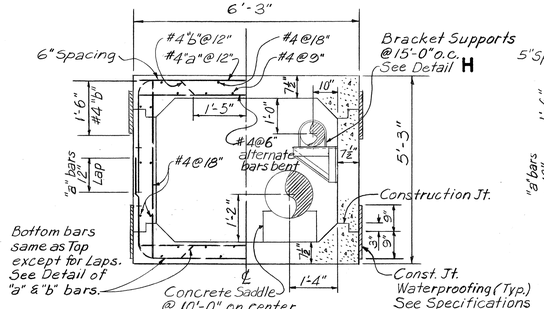
SCALE: 1"=10'-0" (Unless Noted) DATE: JULY 17, 1970

SHEET No. 46U OF 53U SHEETS

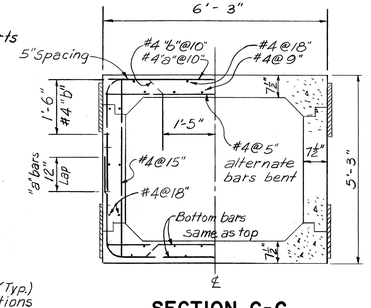
ORIGINAL PLAN		DATE
	SURVEY PLOTTED BY	
	DRAWN BY	" "
	TRACED BY	" "
NOTE BOOK	DESIGNED BY	" "
	QUANTITIES BY	" "
No.	CHECKED BY	" "

235

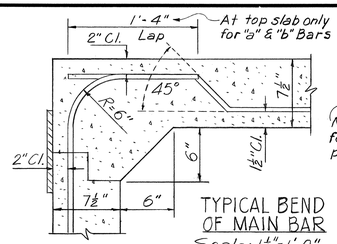
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(88):13	1971	236	457



SECTION B-B TYPE "B"

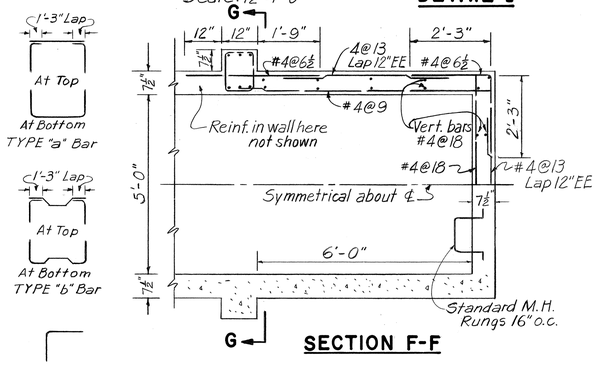


SECTION C-C TYPE "C"



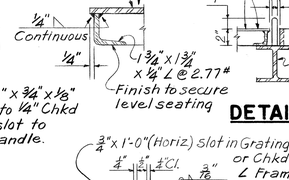
TYPICAL BEND OF MAIN BAR

Scale: 1½"=1'-0"

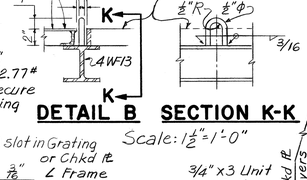


SECTION F-F

DETAIL I

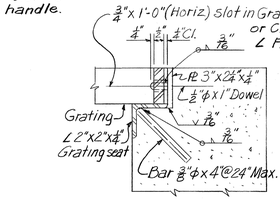


DETAIL B



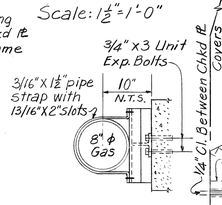
SECTION K-K

Scale: 1½"=1'-0"



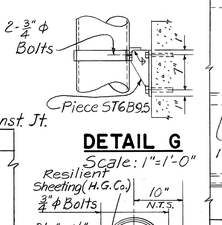
DETAIL C

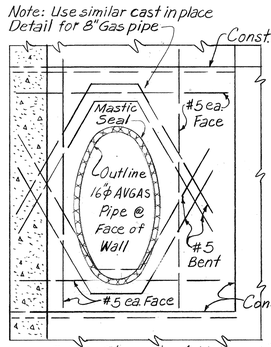
Scale: 3"=1'-0"



DETAIL G

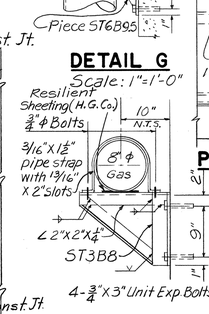
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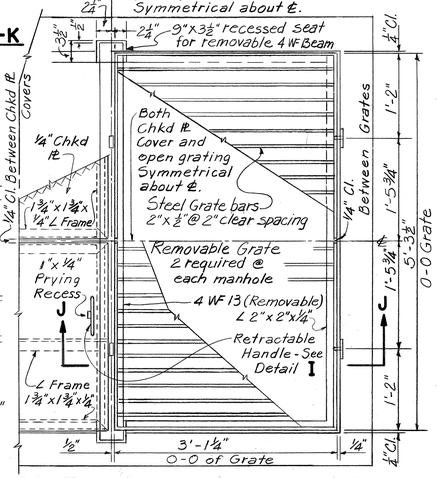




DETAIL H

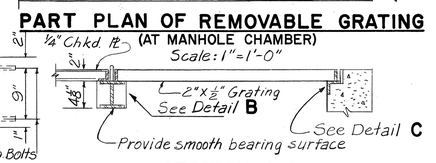
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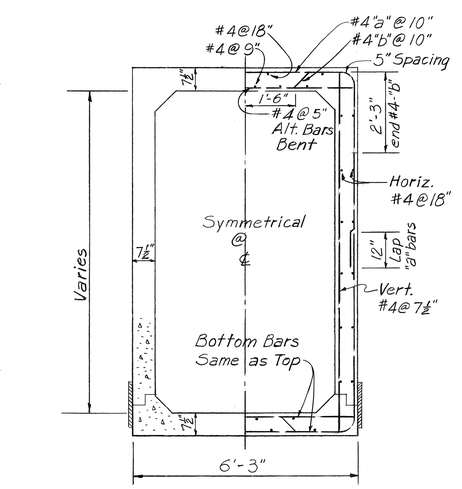


PART PLAN OF REMOVABLE GRATING (AT MANHOLE CHAMBER)

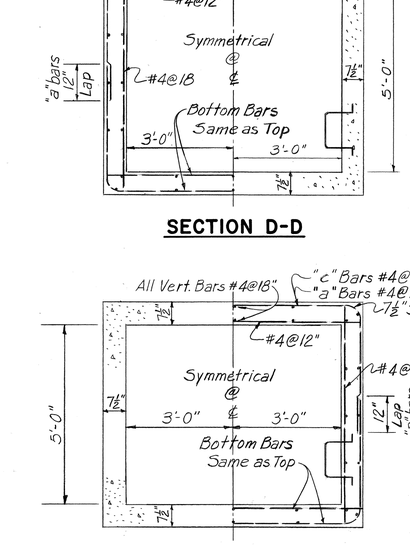
Scale: 1"=1'-0"



SECTION J-J

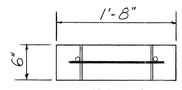


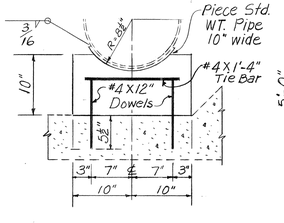
SECTION A-A



SECTION D-D

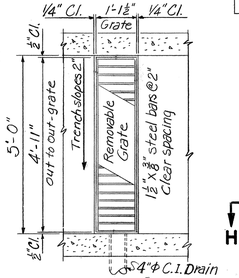
SECTION E-E



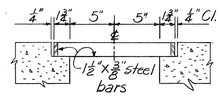


DETAIL E

Scale: 1"=1'-0"

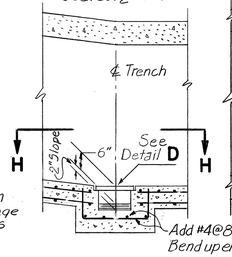


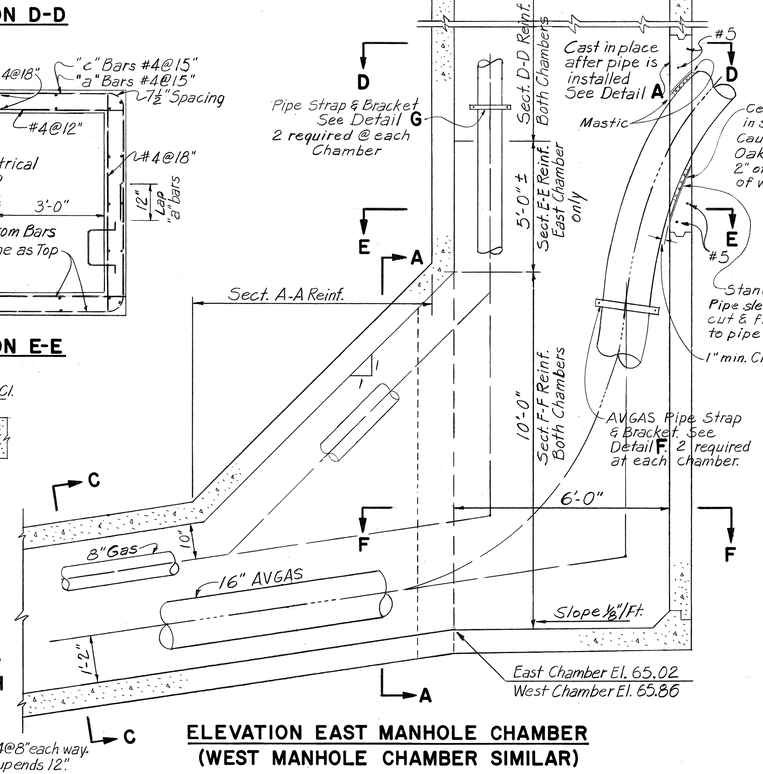
SECTION H-H



DETAIL D

Scale: 1½"=1'-0"



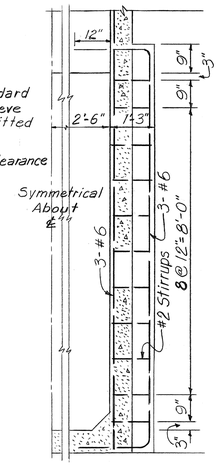


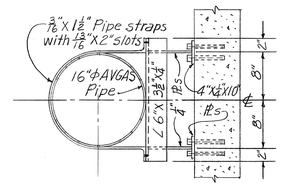
ELEVATION EAST MANHOLE CHAMBER (WEST MANHOLE CHAMBER SIMILAR)

HALF SECTION G-G

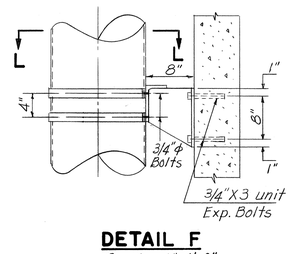
DETAIL A

Scale: ¾"=1'-0"





SECTION L-L



DETAIL F

Scale: 1"=1'-0"

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.
Martin Rubin

MARTIN RUBIN REGISTERED PROFESSIONAL ENGINEER No. 1841 HAWAII, U.S.A.

GENERAL NOTES

1. All steel shall be structural grade.
2. All connections shall be arc welded.
3. Grates and Frame shall be hot dip galvanized after fabrication in accordance with Section 44H of the Standard Specifications.
4. Standard M.H. Rungs to be incidental to Class A concrete. For details see Sheet
5. Concrete saddles to be Class A concrete.
6. Top slab of cell is not to be constructed until Avgas Pipe & 8" Gas Pipe have been installed and tested.
7. Wooden forms shall be removed from cell.

APPROVED

Paul C. Jay 8/20/70
Honolulu Gas Co. V.P. Date

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

AVGAS CELL SECTIONS

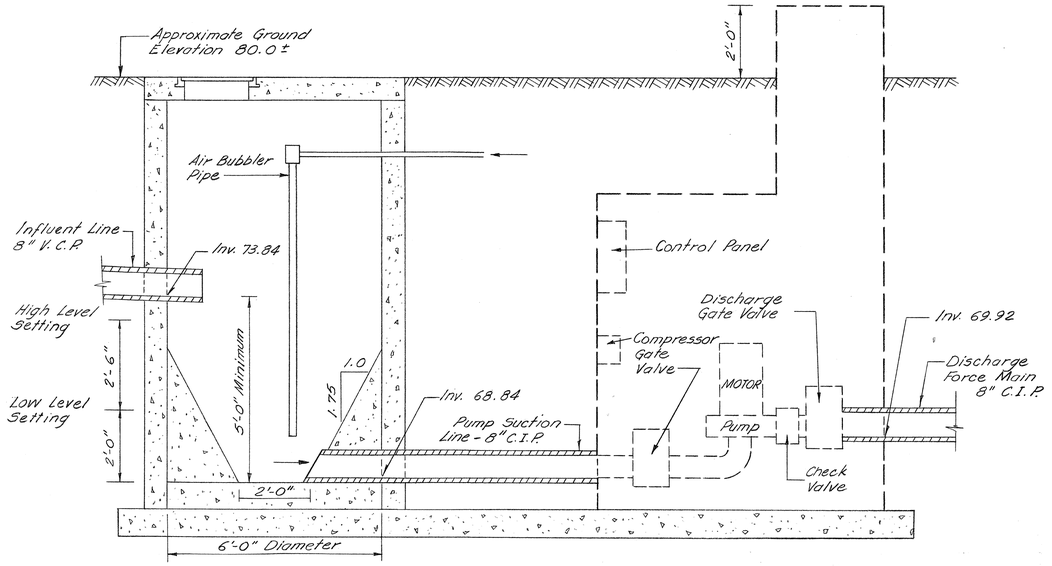
INTERSTATE ROUTE H1
PROJECT NO. I-HI-1(88)::13

SCALE: 1/2"=1'-0" (Unless Noted) DATE: JULY 17, 1970

SHEET No. 47 UOF 53U SHEETS

236

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(88):13	1971	237	457

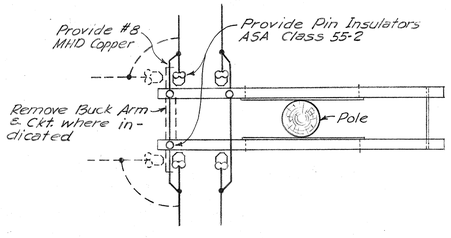


WET WELL
(No Scale)

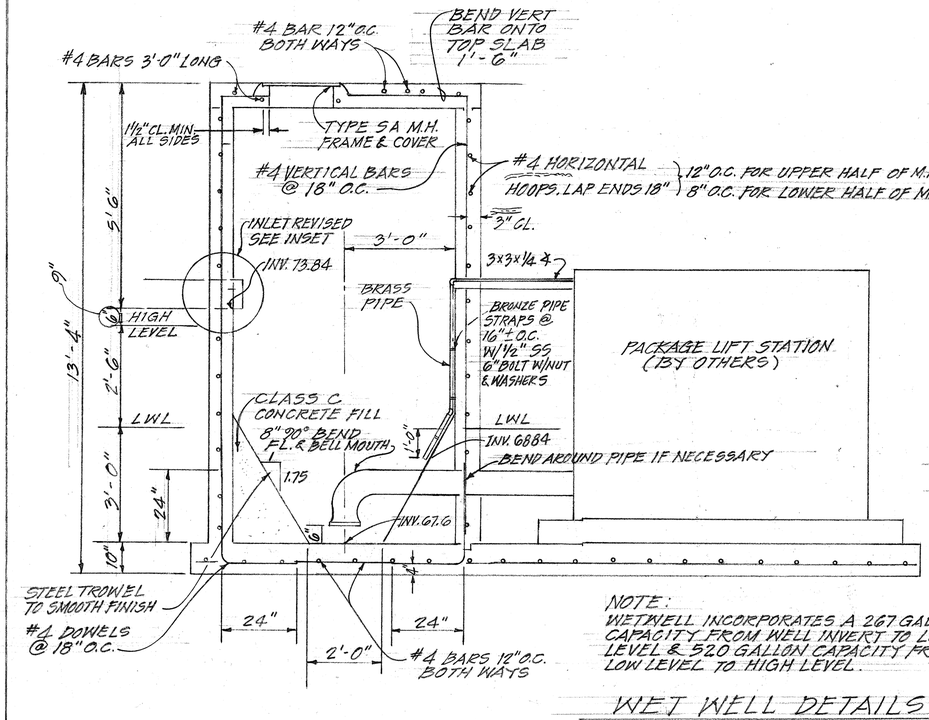
PACKAGE LIFT STATION
(Schematic)

GENERAL NOTES:

1. Wet Well as shown is to be considered a suggested method of construction. The contractor, with the approval of the Engineer, may use an alternative method of construction and may vary details as required.
2. Wet Well as shown incorporates a 267 gallon capacity from well invert to the Low Level Setting, and a 508 gallon capacity from Low Level Setting to High Level Setting. For proper operation the capacity between Low and High Level Settings shall not be less than 500 gallons nor more than 525 gallons.
3. Within the Wet Well a minimum elevation difference of six (6) inches shall be maintained from the influent line invert to the High Level Setting. Influent line invert may be adjusted with the approval of the Engineer.
4. The Package Lift Station shall may be constructed of either precast concrete, fibreglass, or epoxy coated metal with anode packs subject to the approval of the Engineer and the U.S. Navy.
5. It is to be noted that the type of Lift Station selected and approved will govern and control all the details of construction.
6. Contractor shall submit for approval details for the Package Lift Station and Wet Well.
7. See Sheet 200 for location.
8. Package Lift Station is to be constructed immediately adjacent to the Utility Corridor. Exact location and positioning to be approved by the Engineer.

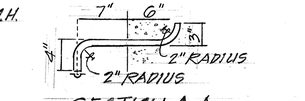


CLOSING SERIES CKT. LOOP
Scale: 1/2" = 1'-0"



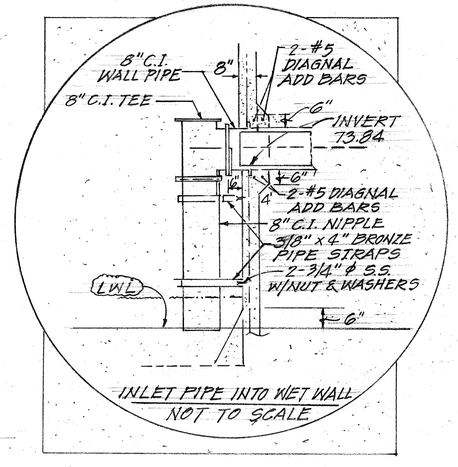
NOTE:
WETWELL INCORPORATES A 267 GALLON CAPACITY FROM WELL INVERT TO LOW LEVEL & 520 GALLON CAPACITY FROM LOW LEVEL TO HIGH LEVEL.

WET WELL DETAILS
NOT TO SCALE



SECTION A-A
SUMP LADDER RUNG

NOTE:
THIS TRACING/DETAIL PREPARED DURING "AS-BUILT" POSTING



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

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J. ANDREW SCHUCHARDT
REGISTERED PROFESSIONAL ENGINEER
No. 2229
HAWAII, U.S.A.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

PREFABRICATED SEWAGE LIFT STATION & WET WELL
STREET LIGHTING DETAIL

INTERSTATE ROUTE H1
PROJECT NO. I-HI-1(88):13

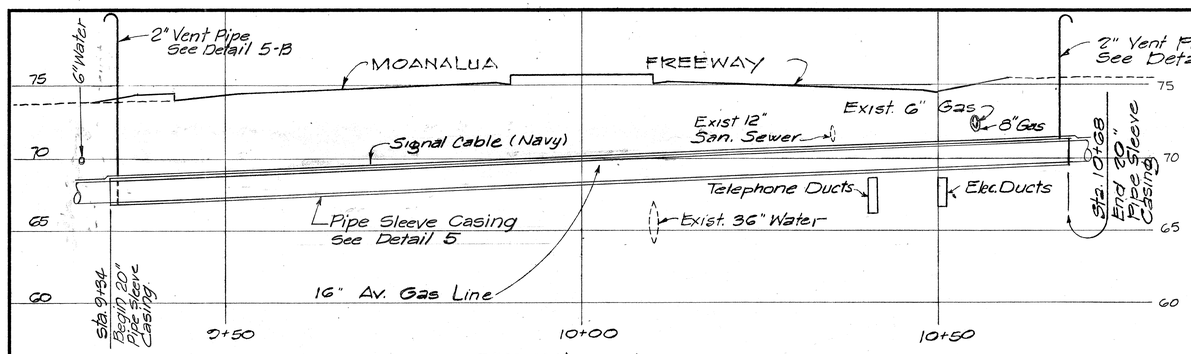
SCALE: AS SHOWN
DATE: JULY 17, 1970

SHEET No. 480 OF 530 SHEETS

PRINTED ON NO. 1000H CLEARPRINT

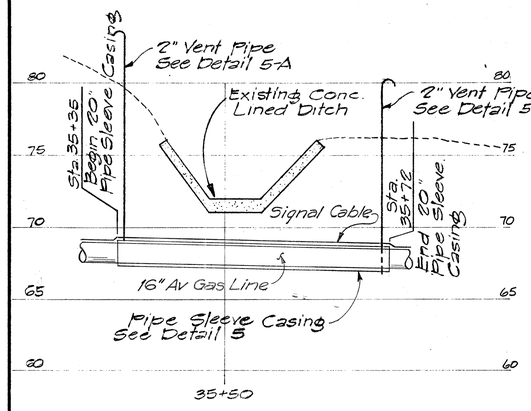
237

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(88):13	1971	238	457



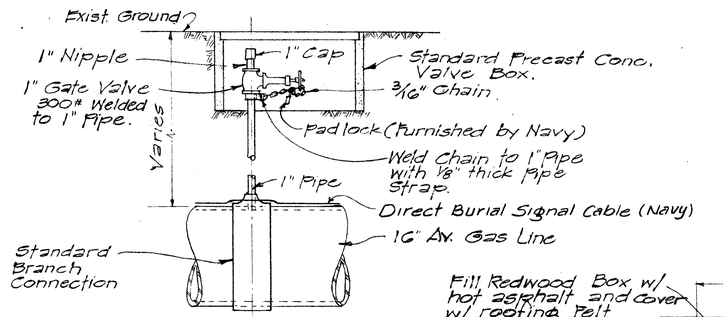
DETAIL 1

Scale: 1" = 10' Hor.
1" = 5' Ver.



DETAIL 2

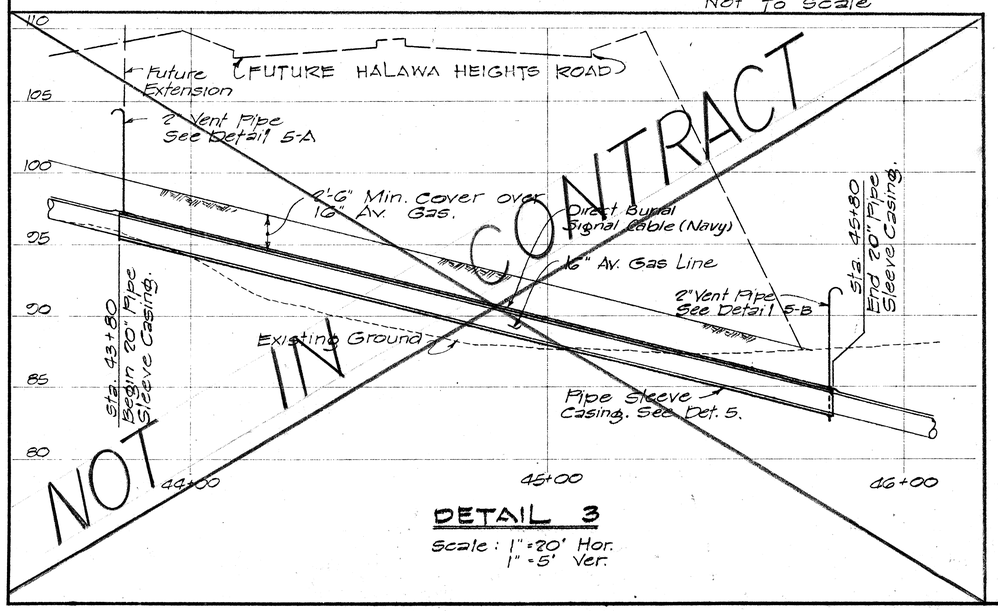
Scale: 1" = 10' Hor.
1" = 5' Ver.



DETAIL 4

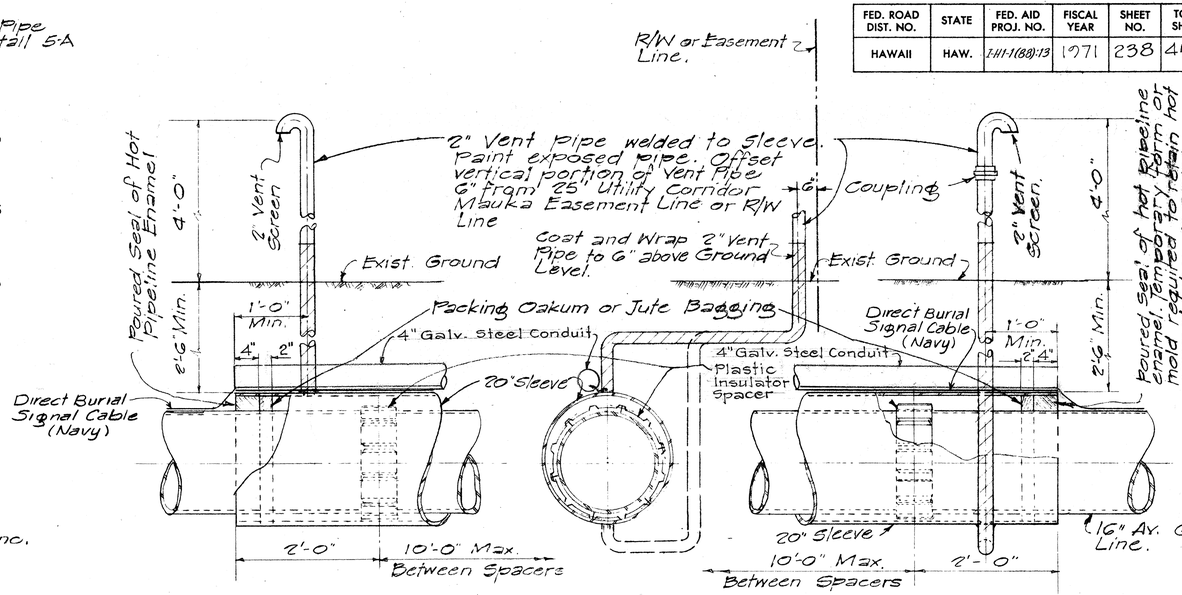
1" GATE VALVE

Not To Scale



DETAIL 3

Scale: 1" = 20' Hor.
1" = 5' Ver.



HIGH END
DETAIL 5-A

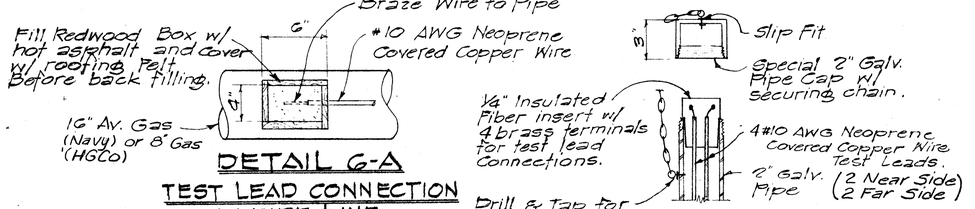
SECTION

DETAIL 5

20" PIPE SLEEVE CASING

Scale 1" = 1'-0"

LOW END
DETAIL 5-B



DETAIL 6-A

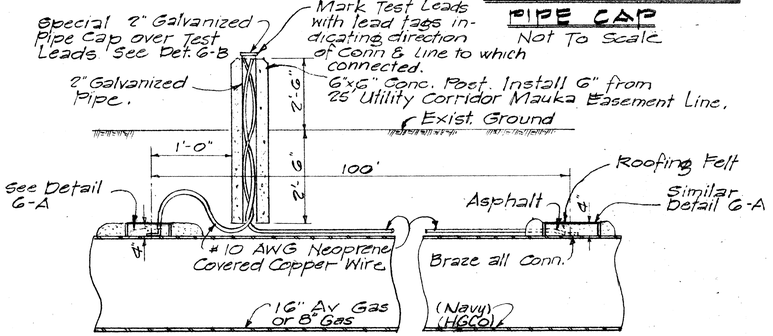
TEST LEAD CONNECTION AT PIPE LINE

Not To Scale

DETAIL 6-B

SPECIAL 2" GALV. PIPE CAP

Not To Scale



DETAIL 6

TEST POST

Not To Scale

Notes

1. Signal Cable (Navy) shall be installed along top of relocated 16" Av Gas line and connected to existing cable at beginning and end of project.
2. Direct Burial signal cable (Navy) shall be strapped to 16" Av Gas line with non-metallic insulator tape at 15'-0" O.C.

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

J. ANDREW SCHUCHARDT
REGISTERED PROFESSIONAL ENGINEER
No. 2229
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

J. Andrew Schuchardt

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

NAVY AVGAS LINE DETAILS & SECTIONS

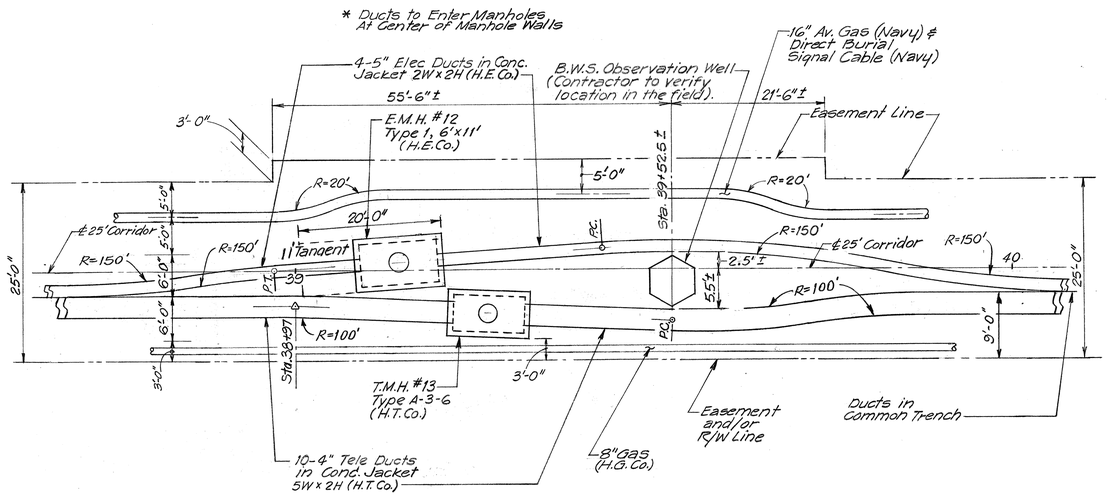
INTERSTATE ROUTE H1
PROJECT NO. I-HI-1(88):13

SCALE: AS SHOWN DATE: JULY 17, 1970

SHEET No. 490 OF 531 SHEETS

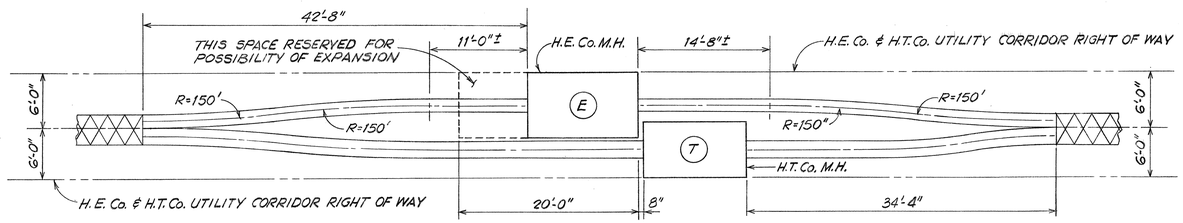
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FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(88):13	1971	230	457



DETAIL 1-PLAN @ B.W.S. OBSERVATION WELL

Scale: 1"=10'



NOTE: OPPOSITE HAND CONFIGURATION APPLIES ALSO. DIMENSIONS FOR H.E. CO.

DETAIL 2-TYPICAL INSTALLATION OF MANHOLES IN 25' UTILITY CORRIDOR

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

APPROVED:

Paul C. Joy Vice Pres. 1-19-71
Honolulu Gas Co. Date

F. T. Dudd 1-29-71
Hawaiian Telephone Co., Ltd. Date

W. K. C. Yee RN. JK 2/10/71
Hawaiian Electric Co., Inc. Date

T. ANDREW SCHUCHARDT REGISTERED PROFESSIONAL ENGINEER No. 2229 HAWAII, U.S.A.

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J. Andrew Schuchardt

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

UTILITY CORRIDOR
PLAN DETAILS

INTERSTATE ROUTE H-1
PROJECT NO. I-HI-1(88):13

SCALE: AS SHOWN DATE: JULY 17, 1970

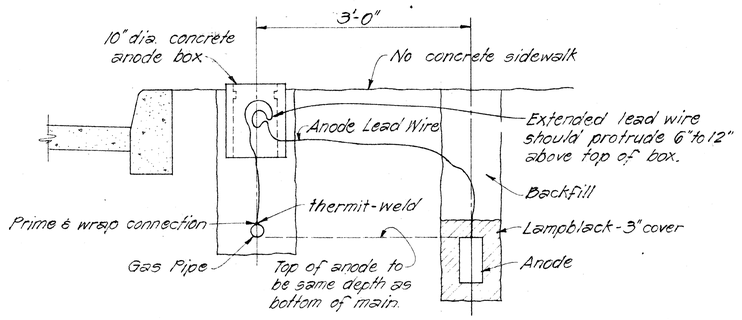
SHEET No. 50U OF 53U SHEETS

230

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

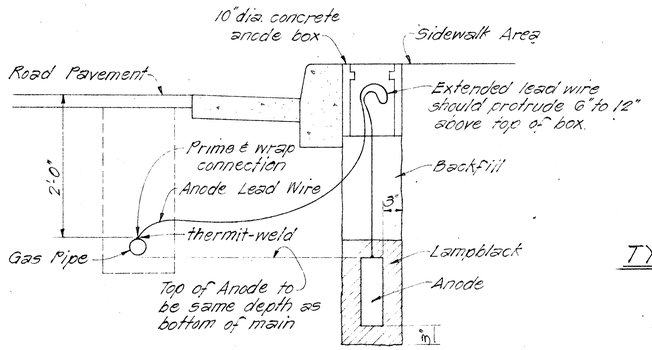
PRINTED ON NO. 1000H CLEARPRINT

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(38):13	1971	240	457



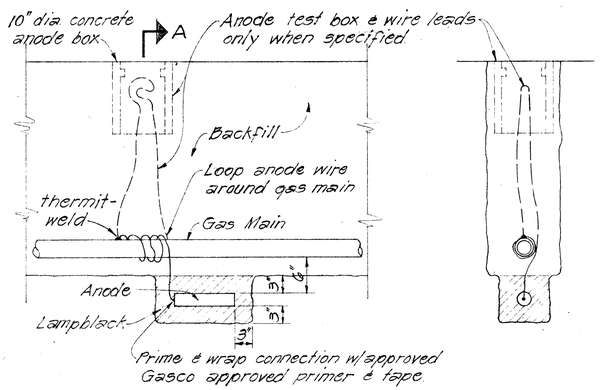
ANODE INSTALLATION ~ TYPE "A"

Not to Scale



ANODE INSTALLATION ~ TYPE "B"

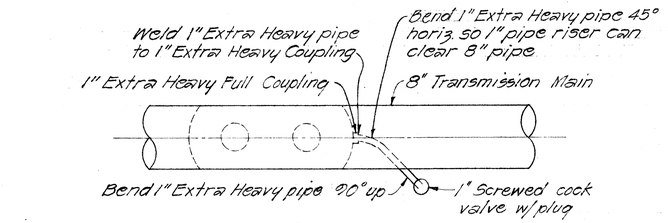
Not to Scale



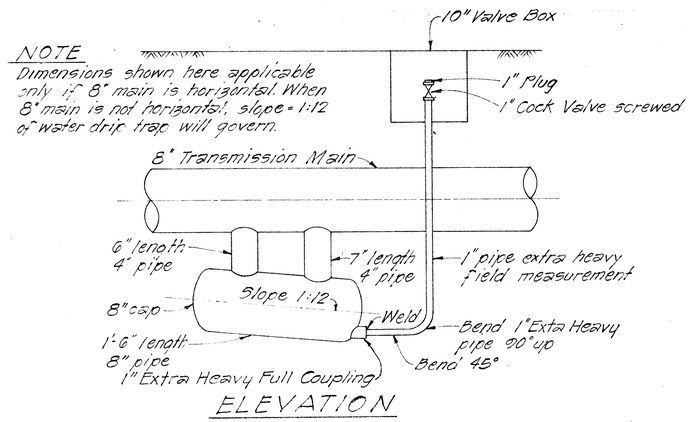
ELEVATION SECTION A

ANODE INSTALLATION ~ TYPE "C"

Not to Scale



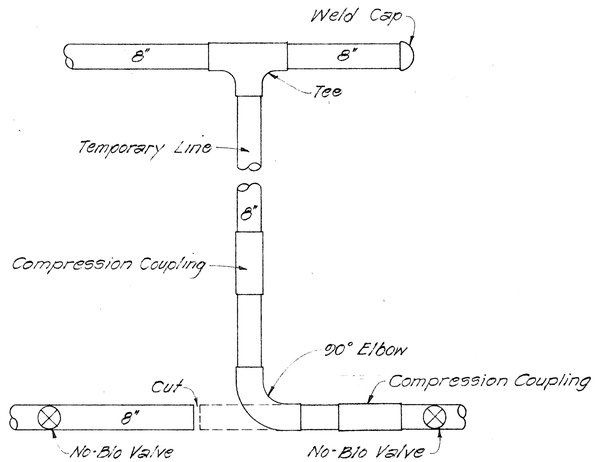
PLAN



ELEVATION

TYPICAL CONDENSATE DRIP POT ASSEMBLY

Not to Scale



TYPICAL TEMPORARY CONNECTION OF GAS MAIN AT ENDS OF PROJECT

Not to Scale

APPROVED:

Paul C. Jay Vice Pres. 1-19-71

HONOLULU GAS CO. DATE

J. ANDREW SCHUCHARDT REGISTERED PROFESSIONAL ENGINEER No. 2229 HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

J. Andrew Schuchardt

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

H. G. Co.

MISCELLANEOUS DETAILS

INTERSTATE ROUTE H-1
PROJECT NO. I-HI-1(88):13

SCALE: AS SHOWN DATE: JULY 17, 1970

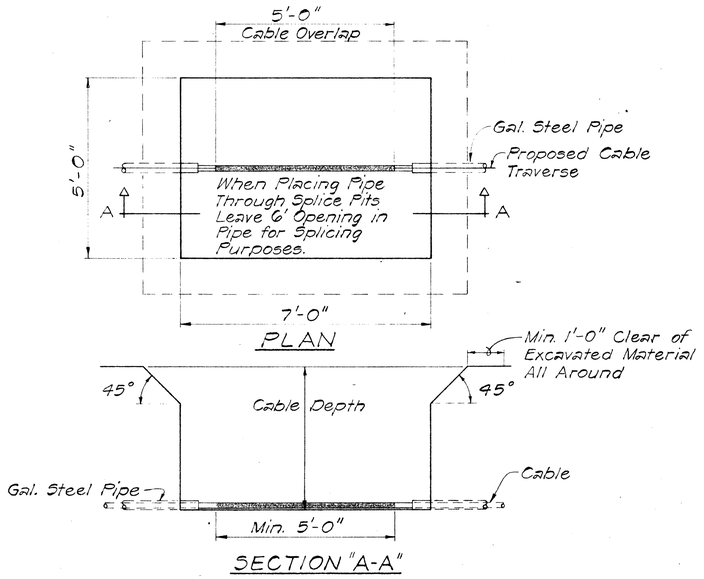
SHEET No. 51U OF 53U SHEETS

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

K+E CRYSTALENE® LA 2820 TRACING PAPER

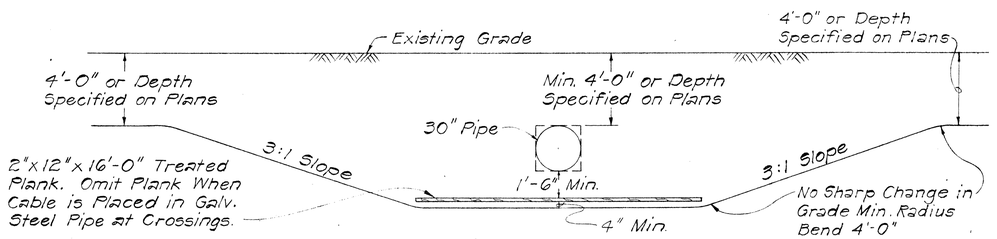
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(88)13	1971	241	457



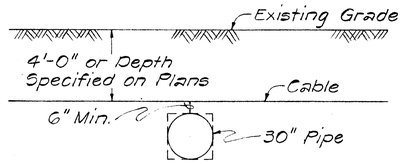
TYPICAL SPLICING PITS FOR BURIED CABLE

NOTES:

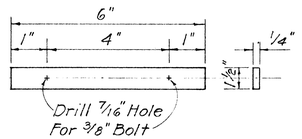
1. The Contractor shall dig pits at specified locations.
2. One face of pit shall be kept free of excavated material.
3. Where pits are located on sloping or irregular ground. The excavated material shall be placed in such a manner as to prevent surface water from draining into the pit.
4. Provide a fence around the pit at any location where stock have access to the route, and pits near farm homes to keep out small animals and pets.



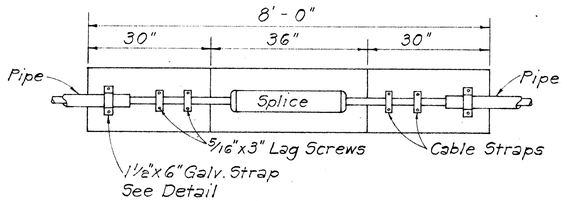
DETAIL OF CABLE CROSSINGS UNDER STORM CULVERTS - IRRIGATION PIPES, OTHER UTILITIES, OR FOREIGN PIPES



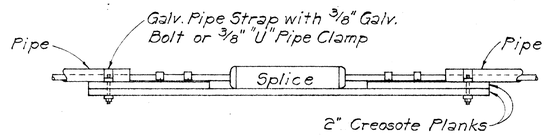
DETAIL OF CABLE CROSSINGS OVER STORM CULVERTS - IRRIGATION PIPES, OTHER UTILITIES, OR FOREIGN PIPES



GALVANIZED STRAP DETAIL



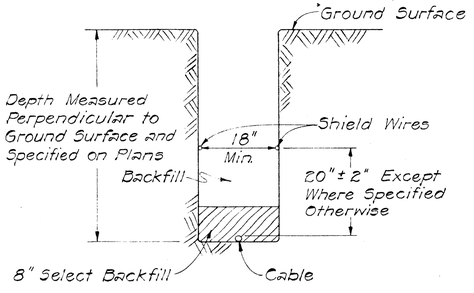
PLAN



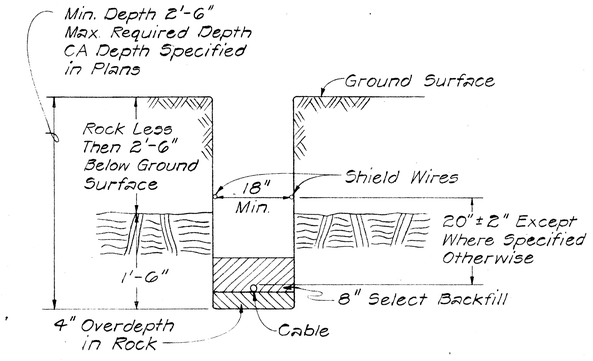
NOTE:
Galv. Strap may be substituted with pipe clamp.

ELEVATION

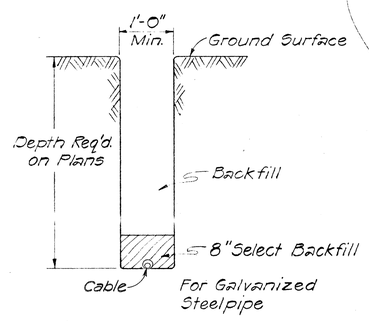
DETAIL OF SPLICE SUPPORT BETWEEN PIPE SECTIONS



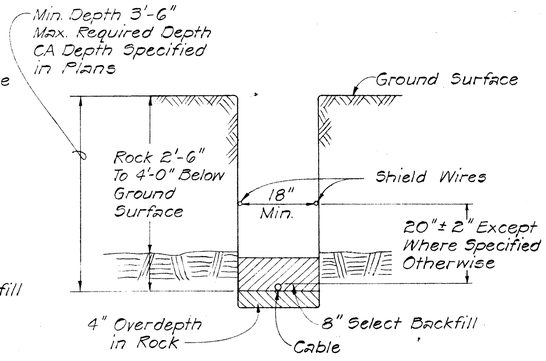
TYPICAL SECTION THROUGH NORMAL TRENCH



TYPICAL SECTION THROUGH TRENCH WITH ROCK LESS THAN 2'-6" BELOW SURFACE



TYPICAL SECTION FOR TRENCH WHERE NO SHIELD WIRE IS REQUIRED



TYPICAL SECTION THROUGH TRENCH WITH ROCK 2'-6" TO 4'-0" BELOW SURFACE

APPROVED:

Hawaiian Telephone Co., Ltd. — 2-5-71 Date

H. T. Co., Ltd. — Drawing Nos. 34047, 34048

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS SPLICING PITS AND STANDARD TRENCHING DETAILS FOR BURIED COAXIAL CABLE

Scale: Not to Scale Date:

SHEET No. 52U OF 53U SHEETS

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

K+E CRYSTALENE® LA 2920 TRACING PAPER

241

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(88):13	1971	242	457

525,500 E.

525,000 E.

77,000 N.

525,500 E.

TRUE NORTH
Scale: 1" = 50'

76,500 N.

77,000 N.

POHUE STREET

ULUNE

ROAD

HEIGHTS

HALAWA

STREET

PLACE

ULUNE

P1

P6

P7

P8

P9

P10

P16

P17

P18

P19

P20

P21

New 50' Pole w/
1-1¼"x10' Anc. & 20' Lead,
1-1"x8' S.W. Anc. & 15' Lead,
(H.E.Co.)

Remove Exist Pole

Remove Exist. Pole

New 50' Pole (H.E.Co.)

Remove Exist Pole

New 50' Pole (H.E.Co.)

New 50' Pole (H.E.Co.)

Remove Exist. Pole

Remove Exist. Pole

New 50' Pole (H.E.Co.)

Remove Exist. Pole

See Sheet 198
for continuation

New 50' Pole w/
1-1"x8' S.W. Anc.
& 15' Lead (H.E.Co)

Remove Exist. Pole

Remove Exist. Pole

New 50' Pole w/
1-1"x8' S.W. Anc.
& 6' Lead (H.E.Co)

New 50' Pole w/
1-1"x8' S.W. Anc.
& 6' Lead (H.E.Co)

Remove Exist. Pole

76,000 N.

525,500 E.

525,500 E.

76,000 N.

525,000 E.

76,500 N.

525,500 E.

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

LEGEND

Denotes Utility Ownership

	Existing	New	Removed or Abandoned
Electric (H.E.Co.)	——·——·——	——·——·——	—+——+——
Telephone (H.T.Co.)	——————	——————	—+——+——

APPROVED:

F. F. Judd — 2-16-71
Hawaiian Telephone Co., Ltd. — Date

W. K. Lee R.N. JK — 2/10/71
Hawaiian Electric Co., Inc. — Date

ANDREW SCHUCHARDT
REGISTERED PROFESSIONAL ENGINEER
No. 2229
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.
J. Andrew Schuchardt

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ELECTRIC & TELEPHONE AT ULUNE STREET

HALAWA INTERCHANGE
PROJECT NO I-HI-1(88):13

SCALE: 1"=50' DATE: JULY 17, 1970

SHEET No 53U OF 53U SHEETS

242