FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(87):13	1970	121	244

GENERAL WATER NOTES (BOARD OF WATER SUPPLY)

1. The Contractor shall notify the Board of Water Supply in writing one week 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 to 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 SEWER NOTES (CITY)

1. 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.
2. The Contractor shall notify the Division of Sewers 2 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. Existing laterals shown are from best sources available. The Contractor shall verify the exact locations as required. Any existing laterals exposed during construction shall be extended and reconnected to new mains if services are required or cut & plugged.
5. All frames and covers on existing sewer manholes to be demolished shall be cleaned and reused on new sewer manholes or returned to the City and County as directed by the Engineer.
6. 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 City and County of Honolulu.
7. Cutting and plugging of existing sewers and sewer laterals, as well as connections to existing sewer manholes is to be considered incidental.
8. Restoration of existing streets and other improvements to be incidental.

GENERAL AVGAS NOTES (NAVY)

1. The Contractor shall coordinate all work on the Avgas line with the Navy Public Works Center (Phone extension 29102)
2. The Contractor shall notify the Navy ten (10) working days prior to commencing work on the Avgas line, and a minimum of thirty (30) calendar days notice prior to the date the Contractor desires the Navy to proceed with the Navy's portion of the work.

GENERAL GAS NOTES (H. G. Co.)

1. All work required for the installation of the relocated gas main & facilities shall be done by the Contractor. Honolulu Gas Co. & personnel shall furnish, fabricate, weld and test the relocated gas main and facilities.
2. The Contractor shall notify the Honolulu Gas Co. Ltd. at least 10 calendar days in advance of relocation operations and shall coordinate his work with the Gas Co.

GENERAL STREET LIGHTING NOTES (CITY)

1. The Contractor shall notify the City and County Division of Street Lighting at least one week prior to doing any work on the C & C System.
2. Relocated C & C luminaires shall be mounted at the same height as the existing C & C luminaires.
3. All street lighting equipment removed and not reused shall be stockpiled for pickup by the City and County. Existing cable removed shall become the Contractor's property.

GENERAL ELECTRIC NOTES (H.E. Co.) - NOTES 4 THRU 10 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 pole holes and anchors by others.
4. Poles & anchors are for H.E. Co. or H.T. Co. unless otherwise indicated.
5. Depth of poles & anchor holes are taken from finish grade.
6. For pole setting depth data, see Sht. No. 23 U .
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. 72 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 and manholes to be verified and approved in the field by H.E. Co. and H.T. Co. prior to construction or installation.
11. Construct all manhole necks per detail "C-C" Dwg. 16688.
12. H.E. Co. to supply Plastic (ABS) ducts.

GENERAL TELEPHONE NOTES (H.T. Co.) - ALSO SEE NOTES 4 THRU 10 FOR H.E. Co.

A. H.T. Co. Cables:
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. standard drawings.
5. H.T. Co. to remove poles and cables.

B. Transpacific Land Cables:
1. Existing Transpacific Land cables to remain in place until relocated section is cut-over.
2. All trenching, backfilling, digging of splice pits and installation of the 4" galvanized steel pipe by the Contractor. H.T. Co. to furnish materials.
3. H.T. Co. to furnish, install and splice Transpacific Land cables.
4. Contractor to trench and backfill the length of the Utility Corridor for permanent relocation of the Transpacific Land cables.

C. Joint Trunking System Cables:
1. Existing Joint Trunking System cables to remain in place until relocated section is cut-over.
2. All trenching, backfilling and digging of splice pits by the Contractor.
3. H.T. Co. to furnish, install and splice Joint Trunking System cables.

APPROVED

Roy Parker Deputy Traffic Engineer City and County of Honolulu	6/25/70 Date
A. Kawakami Chief, Engineering Div. B.W.S.	7/8/70 Date
T. Arima for Chief, Div of Sewers	6/16/70 Date
P.H. Yamada for Judd Hawaiian Telephone Co. Ltd.	7/30/70 Date
W.W.C. Soo HHO Hawaiian Electric Co. Inc. JK	8/28/70 Date
Paul C. Jay VP Honolulu Gas Co. Ltd.	6/18/70 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

GENERAL UTILITY NOTES

HALAWA INTERCHANGE
PROJECT NO I-HI-1(87):13

DATE: 6/8/70

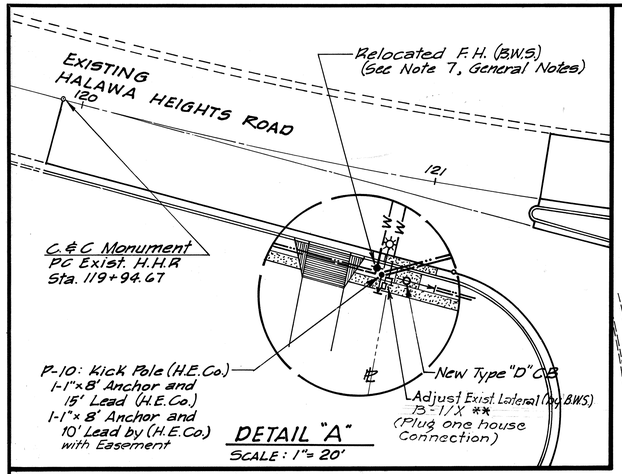
SHEET No. 10 OF 40U SHEETS

121

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTE BOOK	DRAWN BY	
No.	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(87):13	1970	122	244



Street Lighting Notes

The existing systems shall be modified and adjusted as follows:

A. State System (Halawa Heights Road)
1. Relocate existing luminaire from existing pole (P-11) to new H.E.Co. pole (P-11).
2. Adjust as required street lighting equipment and appurtenances on existing H.E.Co. pole (P-10) after it has been Kicked to new location.

B. City System (Ulune Street)
1. Relocate existing luminaire from existing poles (P-20, P-21) to new H.E.Co. poles (P-20, P-21).

See Sheet 17U for detail.

APPROVED

Deputy Traffic Engineer, City & County of Honolulu	6/25/70 Date
Chief, Division of Sewers	6/6/70 Date
Chief, Engineering Div., BWS	7/8/70 Date
Hawaiian Telephone Co., Ltd.	7-30-70 Date
Hawaiian Electric Co., Inc.	8/28/70 Date
Honolulu Gas Co. Ltd.	6/8/70 Date

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

Buildings To Be Removed

LEGEND

Existing Street Light on Wood Pole

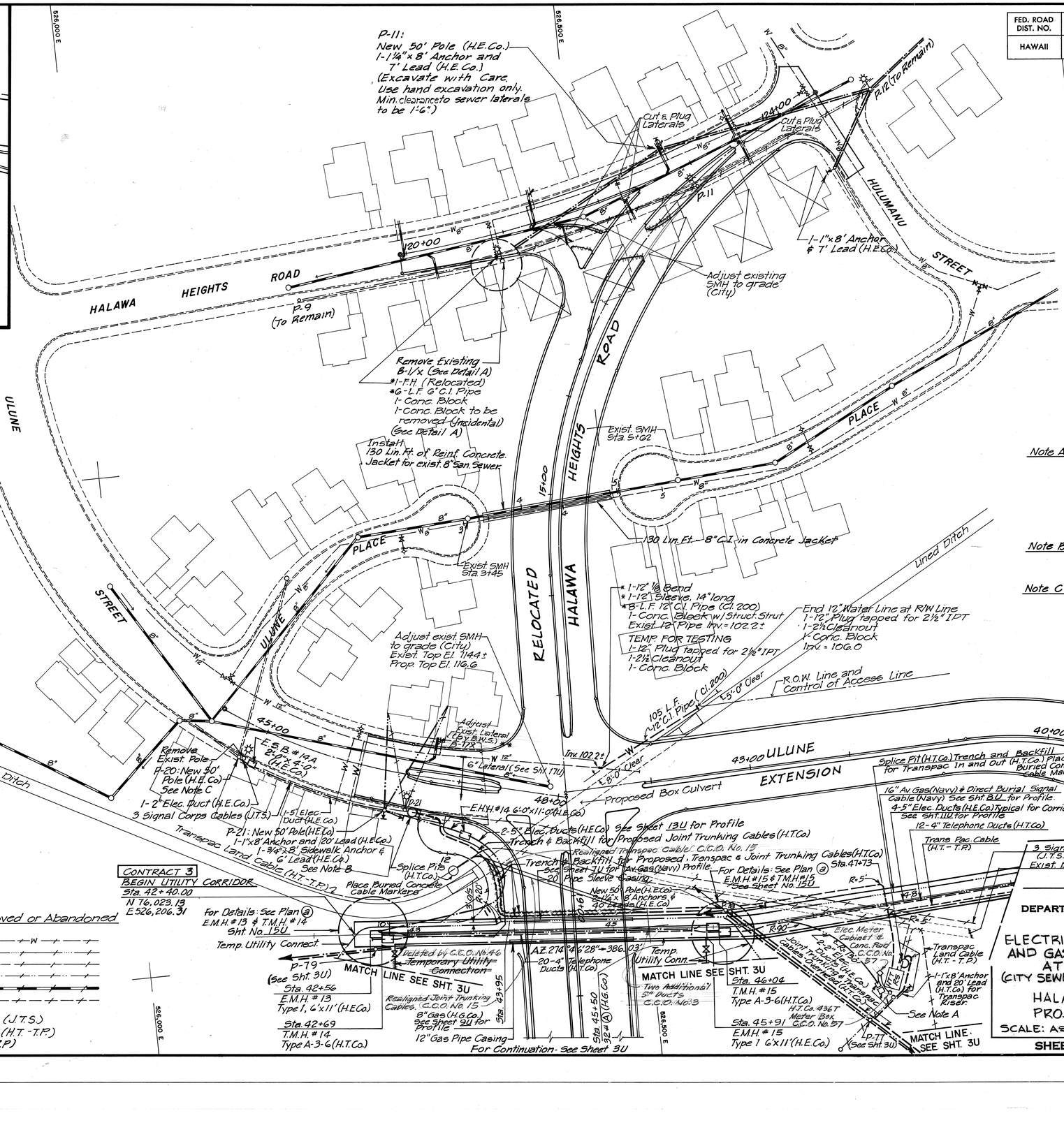
* To be installed by the Board of Water Supply. (See Note #3)

** Meter Boxes to be furnished and installed by the Contractor.

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.)
Hawaiian Telephone Transpac Repeater Station Labelled (HTTRP)



Note A: 2-2" Conduit Bend Riser (8' Rad., LRB) in Concrete Jacket (H.E.Co.); Standard Transformer Installation by Others (H.E.Co.), Standard Pad, Dwg. 011249 and E.S.B. # 15A, 2'-0" x 4'-0", Dwg. 011310, 011311, 011312, and Installation Detail Dwg. 13-5010 (H.E.Co.)

Note B: At Pole P.21: 1-5" ABS # 1-5" Conduit Bend Riser (8' Rad., LRB) in Concrete Jacket (H.E.Co.)

Note C: At Pole P.20: 1-2" ABS # 1-2" Conduit Bend Riser (LRB) in Concrete Jacket (H.E.Co.); E.S.B. #14A, 2'-0"x 4'-0", Dwg. 011310, 011311, 011312, and Installation Detail Dwg. 13-5010 (H.E.Co.)

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

ELECTRIC, TELEPHONE, AV GAS AND GAS-UTILITY CORRIDOR AT HALAWA HEIGHTS (CITY SEWER & B.W.S. ADJUSTMENTS)

HALAWA INTERCHANGE
PROJECT NO I-HI-1(87):13
SCALE: AS SHOWN DATE: 6/8/70

SHEET No. 2U OF 40U SHEETS

PRINTED ON NO. 1000H CLEARPRINT

1 2

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(87)-13	1970	123	244

MATCH LINE A-A

Lined Ditch

525,000 E

Electric (H.E.Co.)

8" Gas (H.G.Co.)

Telephone (H.T.Co.)

16" Aviation Gas (Navy) and direct burial Signal Cable (Navy)

76,000 N

P.82 P.81 P.80

EXISTING MOANALUA ROAD

10+00

New Guy

New 50' Pole (H.E.Co.) 1-1"x 8' Anchor and 20' Lead (H.E.Co.)

(To Remain)

New 60' Pole (H.E.Co.)

P.79

MATCH LINE SEE SHT. 2U

Temporary Utility Connections

R=20'

Δ=22°34'28"

R=200'

6" Gas (H.G.Co.) Deleted by C.C.O. No. 96

DETOUR "D"

DETOUR "E"

DETOUR "C"

& Future Moanalua Freeway

165+00

160+00

Sta. 41+48.65'± o/s Connect into Exist. 16" Av. Gas (Navy) & Direct Burial Signal Cable (Navy) See Sht. 7U for Profile

DETOUR "B"

15+00

10+00

2 New-1"x 8' Anchors & 20' Leads (H.T.Co.)

Electric (H.E.Co.)

P.83

EXIST. MOANALUA ROAD

8" Gas (H.G.Co.)

Telephone (H.T.Co.)

2 New-1"x 8' Anchors & 20' Leads (H.T.Co.)

MATCH LINE A-A

75,500 N

Existing H.T.Co. aerial cables and poles to be removed by H.T.Co.

~~Sta. 42+76.117'± o/s Connect into Existing 8" Gas (H.G.Co.) [By H.G.Co.] See Sht. 9U for Profile~~

HALAWA HEIGHTS ROAD RELOCATED

20+00

P.78

P.79

P.78 (See Sht. 2U)

For Continuation (See Sheet 2U)

MATCH LINE SEE SHT. 2U

Temporary Utility Connections

6" Gas (H.G.Co)

20" Pipe Sleeve Casing

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

Δ=32°46'28"

R=20'

Sta. 45+00

P.77

MATCH LINE SEE SHEET 2U

Transpac Land Cable (H.T.-T.P)

Joint Trunking & Transpac Cables - overhead (H.T.Co.)

Hawaiian Telephone Transpac Repeater Station (See Sht 2U)

RAMP "A"

15+00

Red 35' Pole C.C.O. No. 97

New 35' Pole (H.E.Co.)

New 1"x 8' Anchors & 30' Lead (H.E.Co.) See Note A

Electric (H.E.Co.)

R=20'

P.76 (To remain)

8" Gas (H.G.Co.)

New Guy

Telephone (H.T.Co.)

MATCH LINE SEE SHEET 4U

16" Aviation Gas (Navy) and direct burial Signal Cable (Navy)

170+00

Sta. 47+98.239'± o/s Connect into Exist. 16" Av. Gas (Navy) & Direct Burial Signal Cable (Navy) See Sht. 7U for Profile

New 35' Pole (H.E.Co.) 1-9¼"x 8' Anchor & 25' Lead (H.E.Co.)

Trench and Backfill for Proposed Transpac Cable (H.T.Co.) Place 2-4" G.S.P. 38' Long, 4' Min. Cover

Splice Pit (H.T.Co.) Place Buried Concrete Cable Marker

Sta. 45+91.180'± o/s Connect into Existing 8" Gas (H.G.Co.) [By H.G.Co.] See Sht. 9U for Profile

75,500 N

TRUE NORTH

Scale: 1" = 50'

525,000 E

75,000 N

RAMP "H"

RAMP "I"

RAMP "J"

RAMP "L"

15+00

10+00

20+00

12+00

Note A: At Pole P-76: New 1" x 8' Anchor and 20' Lead (H.T.Co.) as Transpac Riser.

APPROVED

Hawaiian Telephone Co., Ltd. — Date 7-30-70

Hawaiian Electric Co., Inc. — Date 8/28/70

Honolulu Gas Co. Ltd. — Date 6/18/70

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

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.)

ORIGINAL PLAN

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ELECTRIC, TELEPHONE, AV GAS AND GAS ADJUSTMENTS AT STRUCTURE #10
HALAWA INTERCHANGE
PROJECT NO I-HI-1(7):13

SCALE: 1" = 50' DATE: 6/18/70

SHEET No. 3U OF 40U SHEETS

123

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(87)1-3	1970	124	244

TRUE NORTH
Scale: 1" = 50'

Sta. 52+77
E.M.H. #17
Type 1, 6'x11'
(H.E.Co.)

Sta. 52+80
T.M.H. #17
Type A-3-10
(H.T.Co.)

For Details See "Plan @ E.M.H. #17 & T.M.H. #17" Sheet 15U.

MATCH LINE SEE SHEET 2U

20" Pipe Sleeve Casing

ULUNE EXTENSION

SERVICE ROAD

RAMP "G"

15+00 DETOUR A

Sta. 49+37
E.M.H. #16
Type 1, 6'x11'
(H.E.Co.)

Sta. 49+50
T.M.H. #16
Type A-3-8.5

Sta. 50+95
32" Ⓐ (H.G.Co)
E.Cond. Drip Valve
(By H.G. Co.)

3 Signal Corps Cables (J.T.S.)

Two Additional 5" Ducts C.C.O. No. 3

Sta. 56+05
32" Ⓐ (H.G.Co)

Sta. 56+43
E.M.H. #18
Type 1, 6'x11'
(H.E.Co.)

Sta. 56+56
T.M.H. #18
Type A-3-8
(H.T.Co.)

16" Av. Gas (Navy) & Direct Burial Signal Cable (Navy) See Sht. 8U for Profile.
4-5" Elec. Ducts (H.E.Co.) See Sht. 11U for Profile.
12-4" Telephone Ducts (H.T.Co.) See Sht. 11U for Profile.
Transpac Cable (H.T.-T.P.) See Sht. 12U for Profile.
8" Gas (H.G.Co.) See Sht. 10U for Profile.

Remove Pole not in use

2-4" Elec. Ducts (H.E.Co.) See Sht. 13U for Profile

Sta. 60+30
32" Ⓐ (H.G.Co)

Sta. 60+20 18" ø
T.M.H. #19
Type "A-3-6"
(H.T.Co.)

Sta. 60+39
E.M.H. #19
Type 1, 6'x11' (H.E.Co.)

Sta. 60+52
T.M.H. #20
Type A-3-9.5 (H.T.Co.)

New 45' Pole (H.E.Co.)
1-3/4" x 8' Anchor and 10' Lead (H.E.Co.)
1-3/4" x 8' Anchor and 15' Lead (H.E.Co.)
2-4" Ducts & 2-4" Conduit Bend Riser (L.R.B.) in Concrete Jacket (H.E.Co.)

Remove - P-33

Construct Bricked up opening for future 18" R.C.P.

New S.M.H. #2 - S.R. Sta. 26+90.00, 74.35' Left
Inv. 35.63 (City)
(See Note A)

Remove Navy Poles not in Use. (Incidental to Roadway Excavation)

P-33
E5B
19A
2'-0"x4'-0"
(H.E.Co.)

115 Lin. Ft. 18" R.C.P. Cl. IV San Sewer, encased in Conc. (City)

Future 18" R.C.P. San Sewer

Two Additional "5" Ducts C.C.O. No. 8

Construct Bricked up opening for future 18" R.C.P.

Haw. Gas Co. Gas Valve M.H. C.C.O. No. 50

Remove P-1/72

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

New 30' Pole (H.T.Co.)
2-4" Conduit Bend Riser 2'W x 1'H (H.T.Co.)

Service Road
Sta. 28+35, 23'o/s
Elec. Sta. 64+33
E.M.H. #20
Type 1, 6'x11' (H.E.Co.)

Service Road
Sta. 26+99, 22'o/s
T.M.H. #21
Type 1 (H.T.Co.)

Sta. 64+45
Av. Gas Cathodic Protection Test Post (Navy) See Det. G Sheet 16U.

Aviation Gas
Sta. 64+51.30
N 75,444.99
E 528,209.71

2-4" Tele. Ducts, Az. 205°34' See Sht. 10U for Profile

Service Road Open Channel

DAIRY ROAD

P-2/2/72

HALAWA

END UTILITY CORRIDOR
Sta. 60+75.00
N 75,520.55
E 527,847.46

Transpac Cable Sta. 60+52 to 64+60 (H.T.-T.P.) Deleted by C.C.O. No. 49

Place Buried Concrete Cable Marker

New S.M.H. #1 - S.R. Sta. 26+60.11, 36.10' Right Inv. 55.40 (City) (See Note A)

Adjust Halawa Dairy Road as necessary to facilitate construction & protect traffic. (Incidental to 18" R.C.P.)

P-1/2/72

20" Pipe Sleeve Casing on

Telephone (H.T.Co.) P-1/72

Electric (H.E.Co.) ?

P-2/72

16" Aviation Gas (Navy) and direct burial Signal Cable (Navy)

8" Gas (H.G.Co.)

& Future Moanalua Freeway

EXISTING MOANALUA ROAD

MATCH LINE SEE SHEET 3U

2 New - 1½" x 10' Anchors and 20' Leads (H.T.Co.)
Joint Trunking Cables - Overhead (H.T.Co.)
Electric (H.E.Co.) ?

P-75 (To Remain)

Remove P-74

New 45' Pole (H.E.Co.) P-74

P-73

P-72

Transpac Land Cable (H.T.-T.P.)

Telephone (H.T.Co.) ?

2-New - 1½" x 10' Anchors and 20' Leads (H.T.Co.)
New 40' Pole (H.T.Co.) Existing 30' Pole to be removed by H.T.Co.

New 30' Pole (H.T.Co.) Existing 30' Pole to be removed by H.T.Co.

Joint Trunking Cables - Overhead (H.T.Co.)

New 1" x 8' Anchor and 20' Lead
2-4" G.S.P. Conduit Bend Risers (L.R.B.) H.T.Co.

Splice Pit
Place Telespar Cable Marker

Trench and Backfill for Proposed Joint Trunking Cables (H.T.Co.)

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

Hawaiian Telephone Co, Ltd. — 7-30-70 Date

Hawaiian Electric Co, Inc. — 8/28/70 Date

Honolulu Gas Co. Ltd. — 6/19/70 Date

APPROVED

T. Arona
Chief, Div. of Sewers — 6/19/70 Date

Note A
Walls for Sewer Manholes #1 & 2 to be cast-in-place reinforced concrete.

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, AV GAS AND GAS-UTILITY CORRIDOR

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

SCALE: 1" = 50' DATE: 6/8/70

SHEET No. 4U OF 40U SHEETS

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

PRINTED ON No. 1000H CLEARPRINT

124

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(87):13	1970	125	244

RAMP E

RAMP E

MOANALUA

RAMP E

HALAWA HEIGHTS ROAD

LEGEND

Existing — New — Removed or Abandoned

San. Sewer (City) — For profiles see Shf. 6U

N 76,120
E 525,244
New SMH #4
Inv. 41.62
Sta. 7+44.4±
Frame & Cover relocated

Frame & Cover relocated

RAMP E

SANITARY SEWER LINE C (CITY)
18" V.C.P.
Reinf. Conc. Jacket

SANITARY SEWER LINE C (CITY)
18" V.C.P.
Reinf. Conc. Jacket

Existing 18" R.C.P. Sanitary Sewer

SANITARY SEWER LINE C (CITY)
18" V.C.P.
Reinf. Conc. Jacket

New SMH #3
Inv. 36.72
Sta. 5+01.4±
Frame & Cover relocated
N 75,878
E 525,222

New SMH #2
Inv. 34.2
Sta. 2+48.8±
Frame & Cover relocated
N 75,681
E 525,064

Connect to SMH #1 Existing and relocated
Inv. 14.68 (verify in field invert)
Sta. 0+00
N 75,495
E 524,901
Verify in Field

Existing Sanitary 18" R.C.P. Sewer

HALAWA STREAM

Cut & Plug

ES RAMP

MOANALUA FREEWAY

RAMP G

RAMP J

RAMP D

RAMP WE

SE RAMP

New SMH #5
Inv. 45.52 (in)
Inv. 45.02 (out)
Sta. 10+84.4±
Frame & Cover relocated
N 76,125
E 525,584

12" V.C.P. Cut & Plug

Utility Corridor (Future)

ROAD

N 76,167
E 525,733
Connect to SMH #6
Existing and relocated
Inv. 50.80 (in)
Inv. 50.30 (out)
Sta. 12+39.4±
Verify in Field

SMH #6

Existing 12" V.C.P. Sanitary Sewer

Existing SMH Inv. 52.8

Lined Ditch

ULUNE STREET

SECTION SMH #6
Not to Scale
C.C.O. No. 97

Fin. Gr. = 63.0

6:1

6:1

Scale: 1 in. = 5 Ft.

TRUE NORTH

Remove & Reinstall Exist. Frame & Cover

Exist'g Brick Wall

Remove Exist. Conc. Section (Incl. in Exc.)

Inv. = 50.8

57.8

60.0 ± 62.0 ±

½ TRENCH WIDTH | ½ TRENCH WIDTH

CRUSHED ROCK CRADLE (#35 FINE)

O.D. Pipe

Y

ROCK CRADLE FOR VITRIFIED CLAY PIPE
Not to Scale

NOTE: Ultimate Interchange Geometrics Shown For Reference Only.

PIPE SIZE	PAYMENT TRENCH WIDTH		CRUSHED ROCK CRADLE "Y" (MIN.)	C.Y./L.F.
12"	40	30"	5"	.073
18"		41"	6"	.130

APPROVED
R. Done
Chief, Div. of Sewers
6/16/70
Date

ORIGINAL PLAN	
NOTE BOOK	No.

SURVEY PLOTTED BY: DATE
DRAWN BY:
TRACED BY:
DESIGNED BY:
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.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

SANITARY SEWER RELOCATION (CITY) @ MOANALUA ROAD
HALAWA INTERCHANGE
PROJECT NO I-HI-1(7):13

SCALE: 1"=50' DATE: 6/8/70

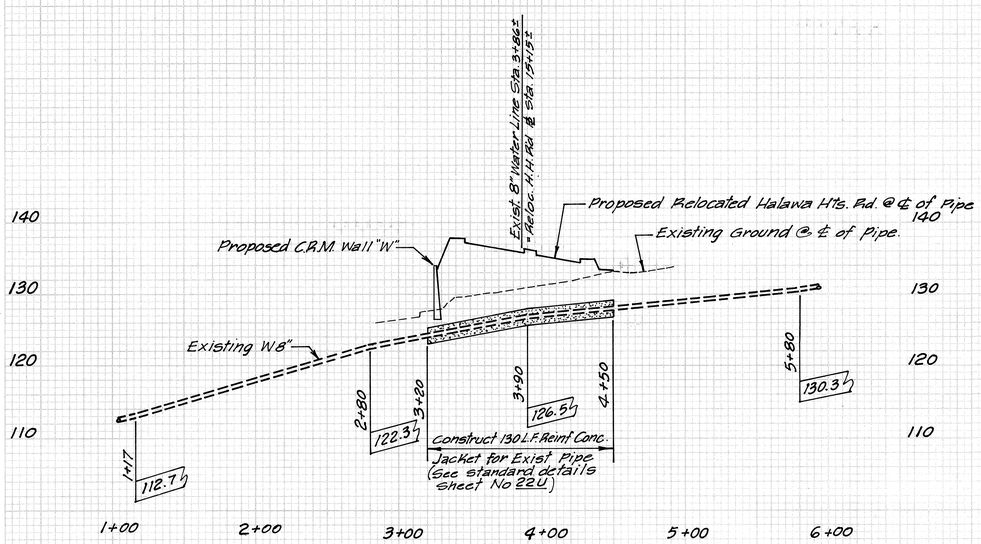
SHEET No. 5 U OF 4U SHEETS

125

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(87):13	1970	126	244

APPROVED

Chief, Engineering Division B.W.S. — 7/8/70 Date

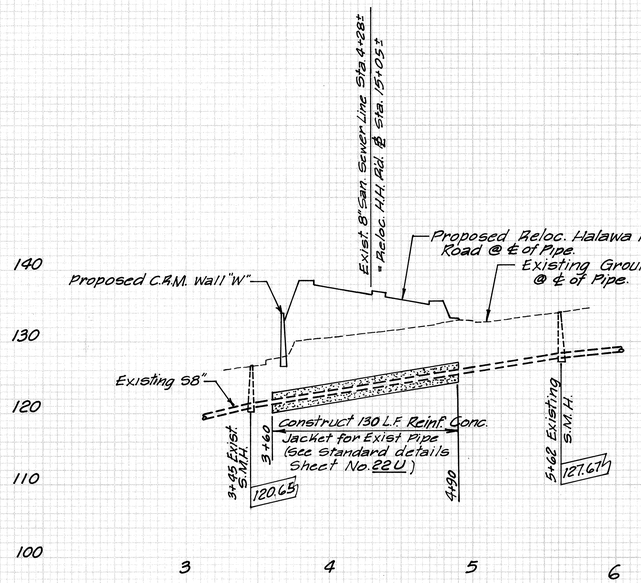


PROFILE - EXISTING WATER MAIN UNDER RELOCATED HALAWA HEIGHTS ROAD (BWS)

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

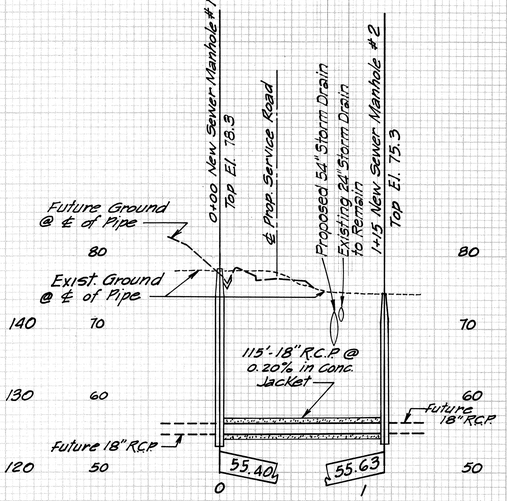
APPROVED

Chief, Div. of Sewers — 6/16/70 date



PROFILE - EXISTING SANITARY SEWER UNDER HALAWA HIEGHTS ROAD (CITY)

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



PROFILE - PROPOSED SANITARY SEWER UNDER SERVICE ROAD (Sta. 26+70±) (CITY)

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

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

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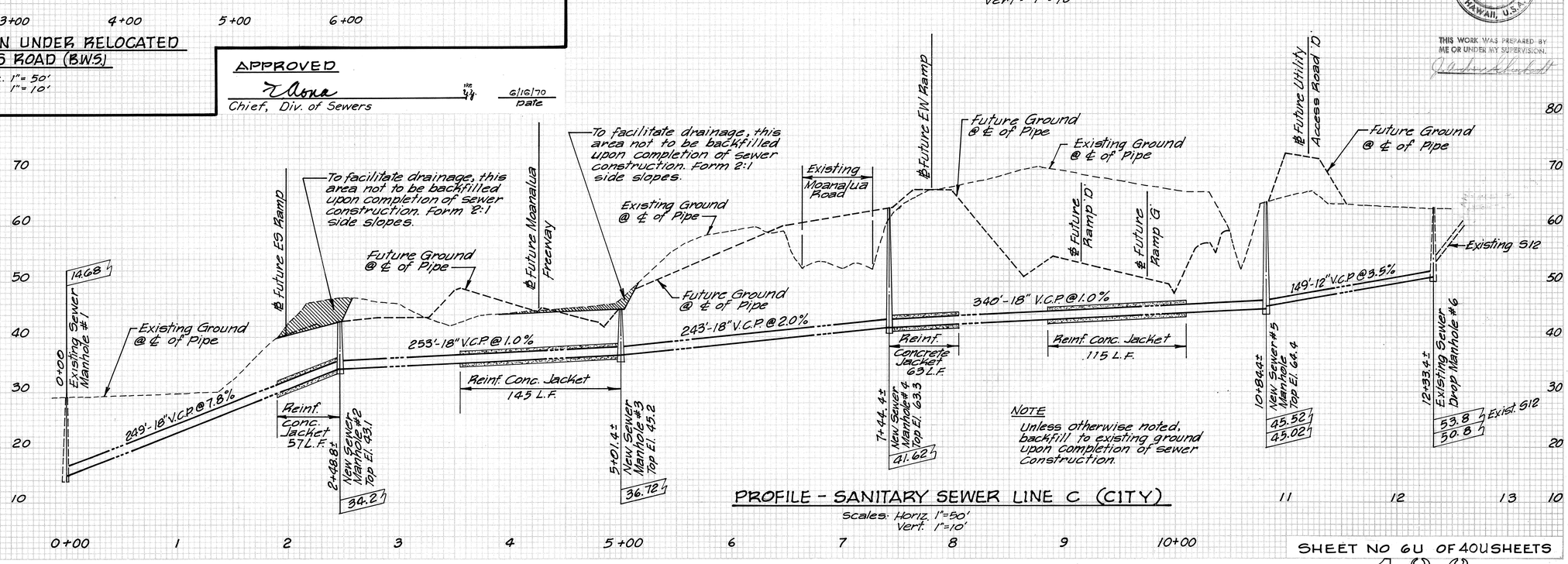


PROFILE - SANITARY SEWER LINE C (CITY)

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

SHEET NO 6U OF 40U SHEETS

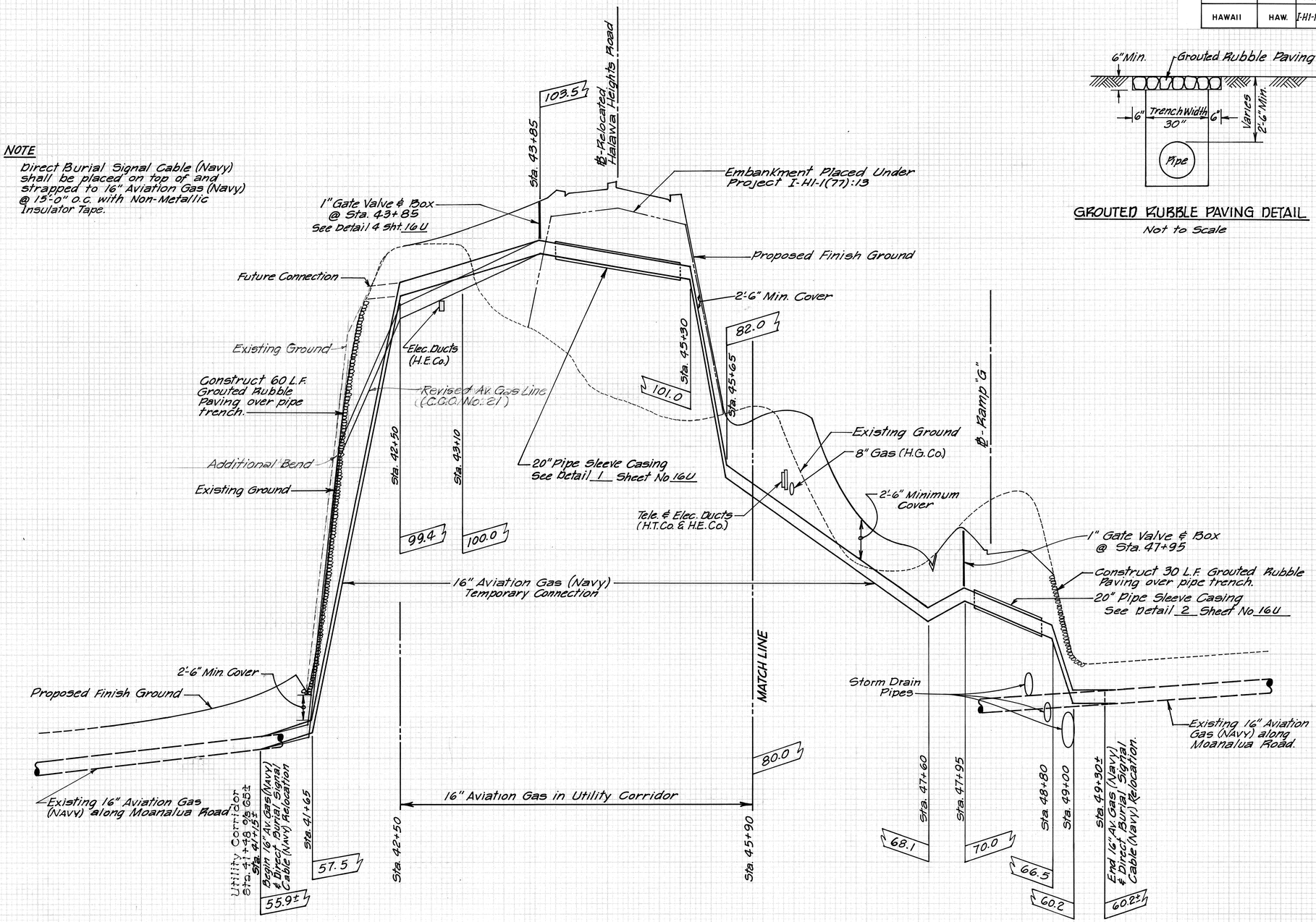
126

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.	I-HI-1(87):13	1970	127	244

NOTE

Direct Burial Signal Cable (Navy) shall be placed on top of and strapped to 16" Aviation Gas (Navy) @ 15'-0" o.c. with Non-Metallic Insulator Tape.



GROUTED RUBBLE PAVING DETAIL

Not to Scale

PROFILE - 16" AVIATION GAS (NAVY) IN UTILITY CORRIDOR WITH TEMPORARY TIE-INS

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

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

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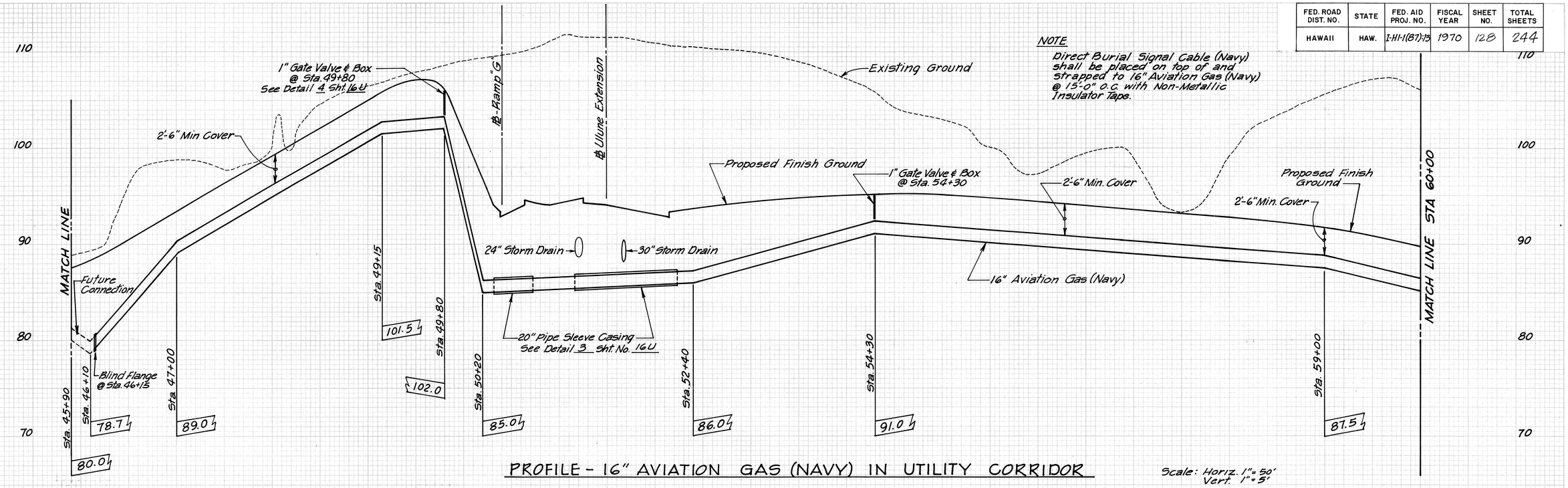
J. Andrew Schuchardt

SHEET NO. 7U OF 40U SHEETS

127

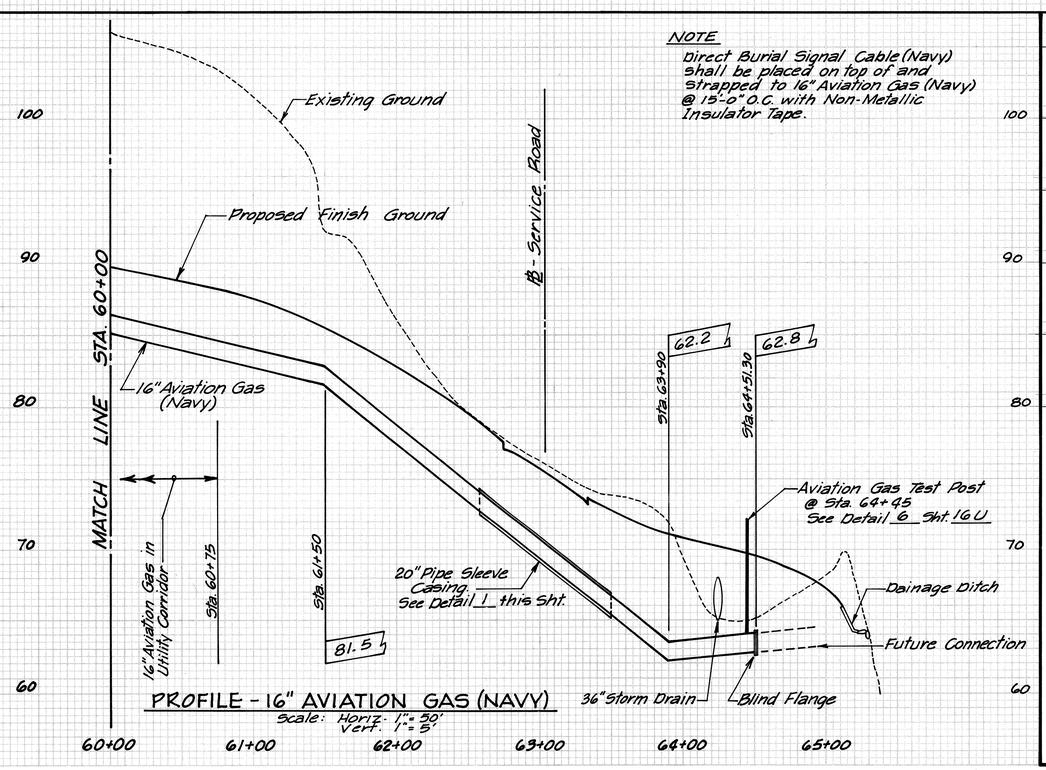
PLATE 3 —CROSS SECTION O. P. R. & R. E. STANDARD
THE FREDERICK POST CO., CHICAGO

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(87)-13	1970	128	244



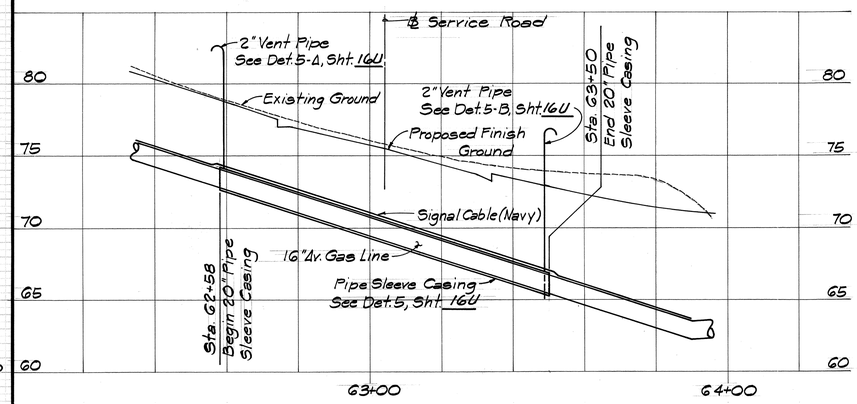
PROFILE - 16" AVIATION GAS (NAVY) IN UTILITY CORRIDOR

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



PROFILE - 16" AVIATION GAS (NAVY)

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



DETAIL 1

Scale: Horiz. 1"= 20'
Vert. 1"= 5'

J. ANDREW SCHUCHARDT
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No. 2229
HAWAII, U.S.A.

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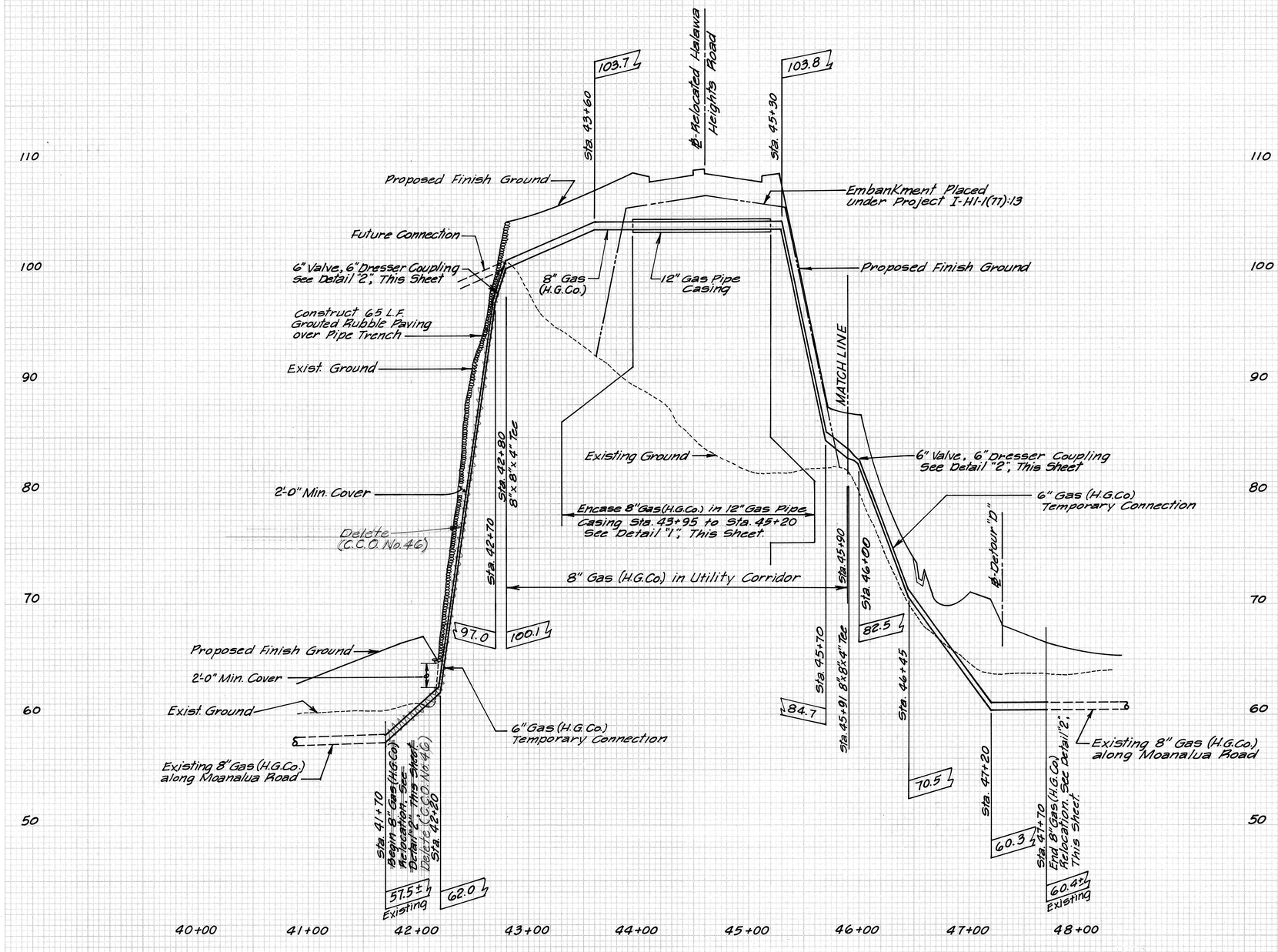
SHEET NO. 81U OF 401U SHEETS

128

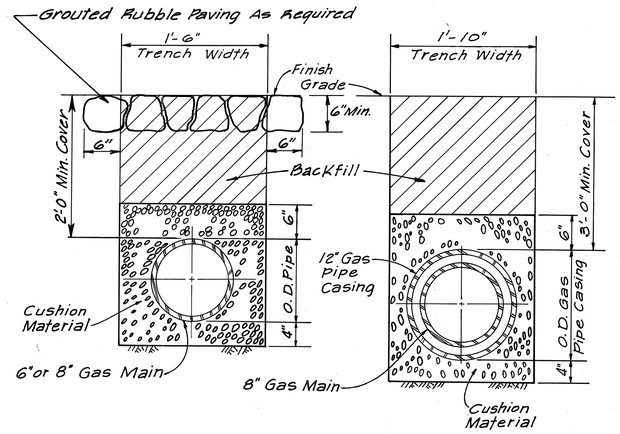
PLATE 3 —CROSS SECTION 6, P. R. & R. E. STANDARD
THE FREDERICK POST CO., CHICAGO

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(87):13	1970	129	244



PROFILE - 8" GAS (H.G.Co.) IN UTILITY CORRIDOR WITH TEMPORARY TIE-INS

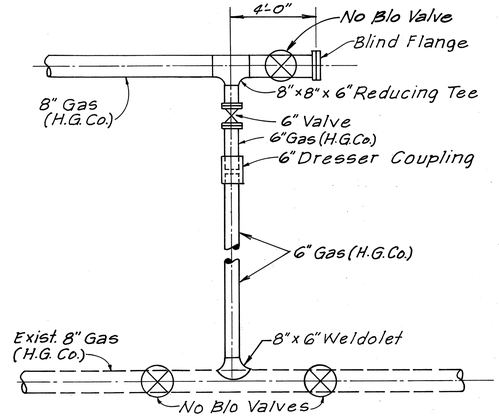
Scale: Horiz. 1" = 50'
Vert. 1" = 5'



TYPICAL IN PIPE SLEEVE

GAS MAIN SECTIONS - DETAIL "1"

Not to Scale



TEMPORARY GAS TIE-IN DETAIL "2"

Not to Scale
(Schematic)

APPROVED:

Paul E. Joy
HONOLULU GAS CO. LTD.

4/1/70
DATE

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

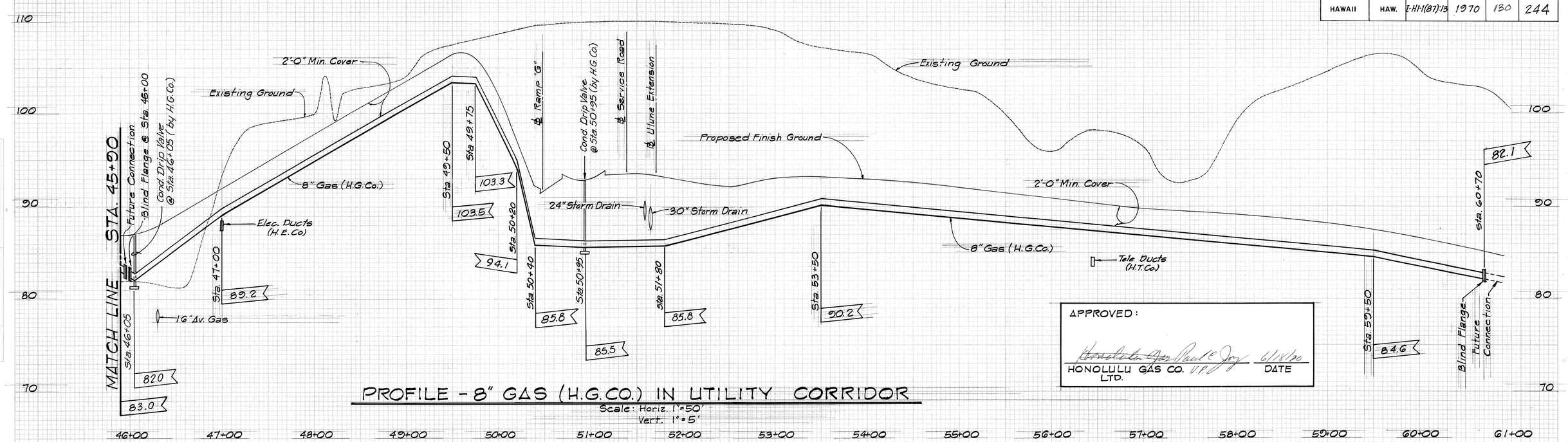
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.
J. Andrew Schuchardt

SHEET NO. 90 OF 400 SHEETS

129

PLATE 3 —CROSS SECTION G. 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(87):13	1970	130	244



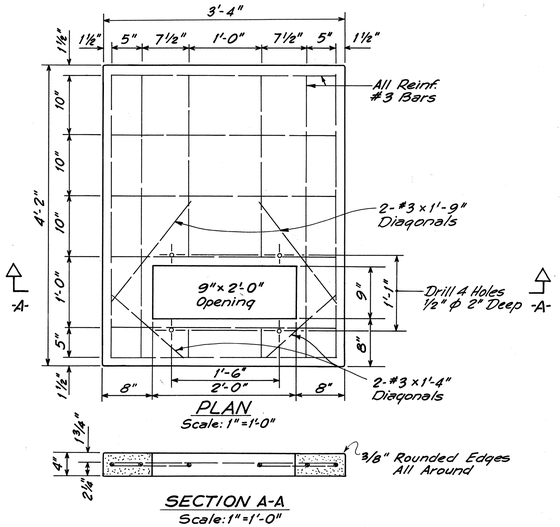
APPROVED:

Honolulu Gas Co. Ltd. by Paul C. Jay 6/18/70

HONOLULU GAS CO. LTD. DATE

PROFILE - 8" GAS (H.G.CO.) IN UTILITY CORRIDOR

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



CONCRETE PAD FOR PADMOUNTED TRANSFORMER

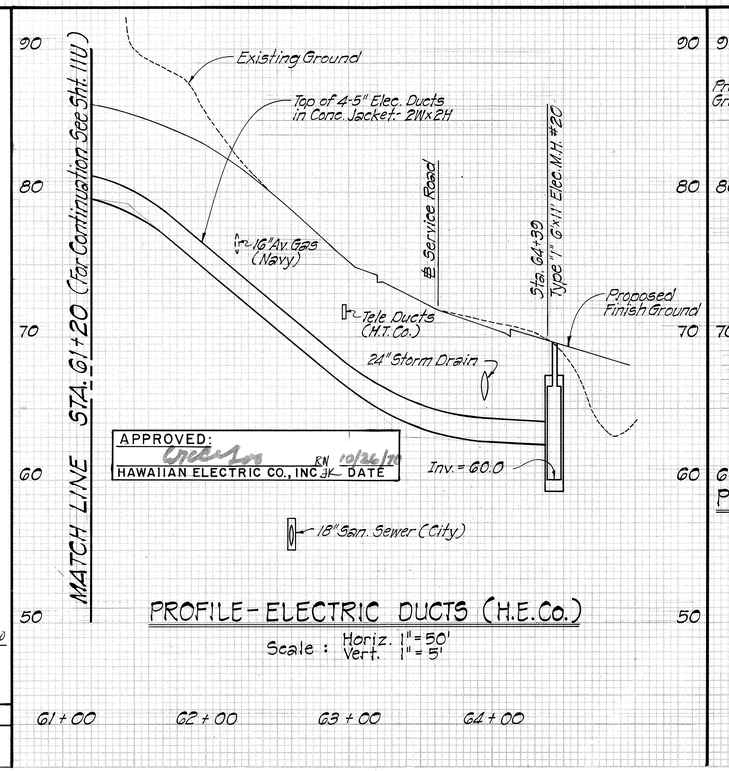
APPROVED:

Hawaiian Electric Co, Inc. JK HHD 8/28/70

Hawaiian Electric Co, Inc. JK Date

As per HECO, Inc. Drawing No.

011249



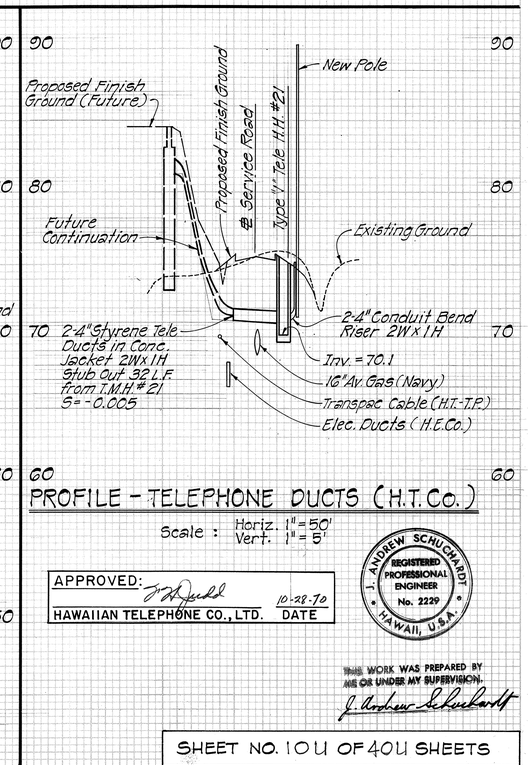
APPROVED:

Hawaiian Electric Co., Inc. JK 10/26/70

HAWAIIAN ELECTRIC CO., INC. JK DATE

PROFILE - ELECTRIC DUCTS (H.E.Co.)

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



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

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

APPROVED:

10-28-70

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.

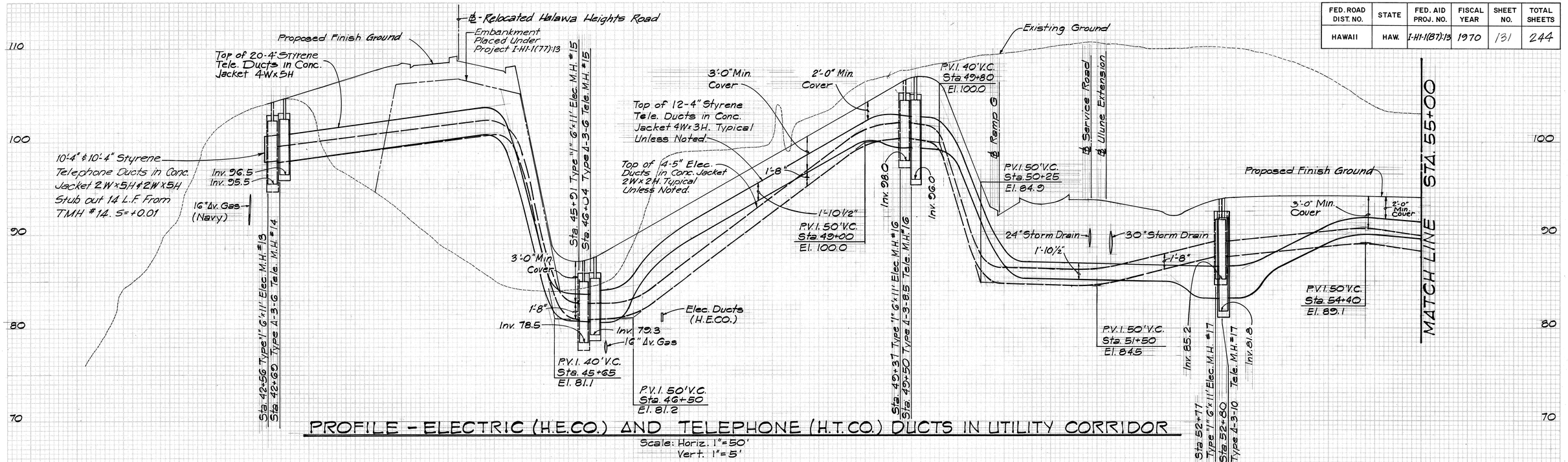
J. Andrew Schuchardt

SHEET NO. 104 OF 404 SHEETS

130

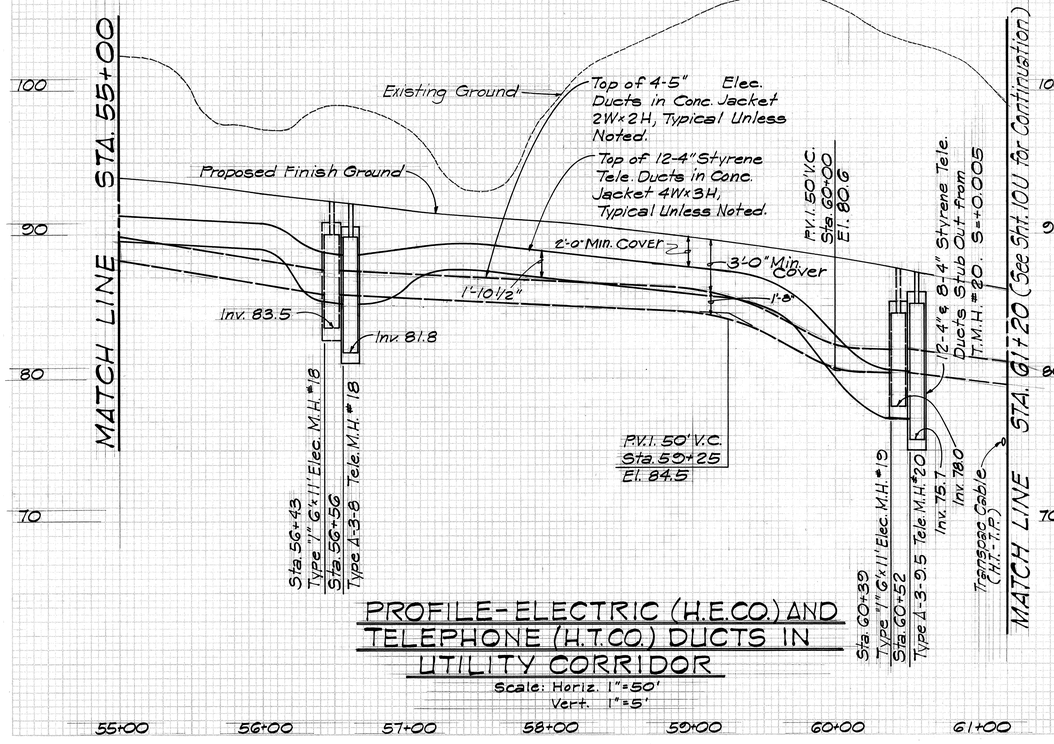
PLATE 3 —CROSS SECTION O. P. R. & E. STANDARD
THE FREDERICK POST CO., CHICAGO

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(87):13	1970	131	244



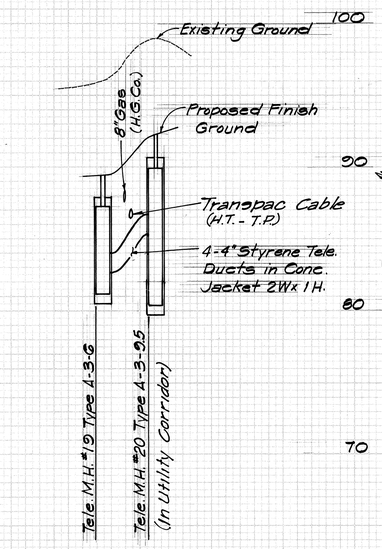
PROFILE - ELECTRIC (H.E.CO.) AND TELEPHONE (H.T.CO.) DUCTS IN UTILITY CORRIDOR

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



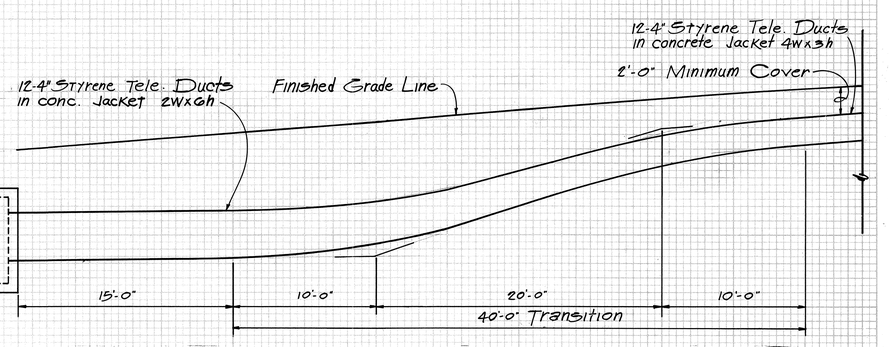
PROFILE - ELECTRIC (H.E.CO.) AND TELEPHONE (H.T.CO.) DUCTS IN UTILITY CORRIDOR

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



PROFILE - TELEPHONE DUCTS (H.T.CO.)

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



TYPICAL 40' TRANSITION ELEVATION

Scale: 1"=5'

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

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J. Andrew Schuchardt

APPROVED:

HAWAIIAN ELECTRIC CO., INC. — DATE 8/28/70

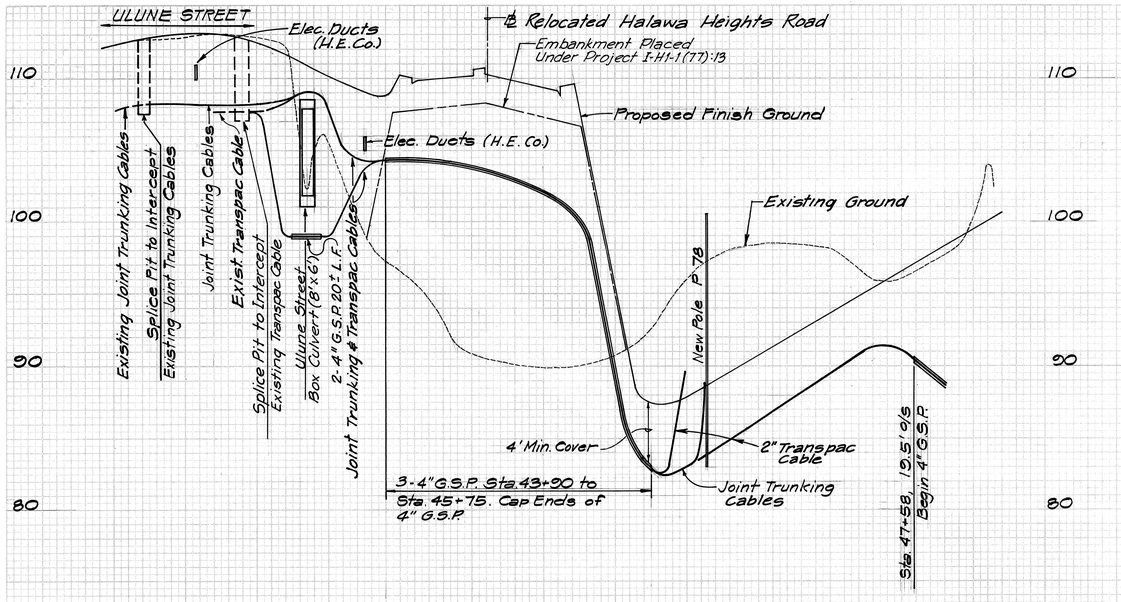
HAWAIIAN TELEPHONE CO, LTD. — DATE 7-30-70

SHEET NO. 111U OF 400 SHEETS

131

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

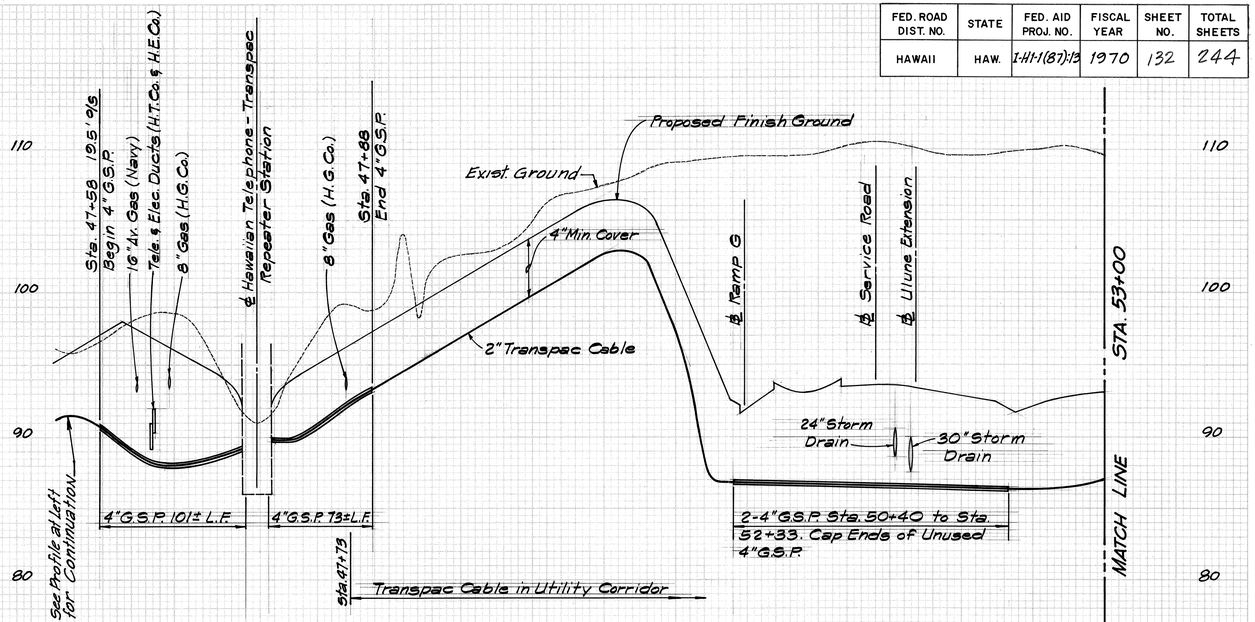
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(87):13	1970	132	244



PROFILE - JOINT TRUNKING AND TRANSPAC CABLES (H.T.-T.P. & J.T.S.) UNDER RELOCATED HALAWA HEIGHTS ROAD

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

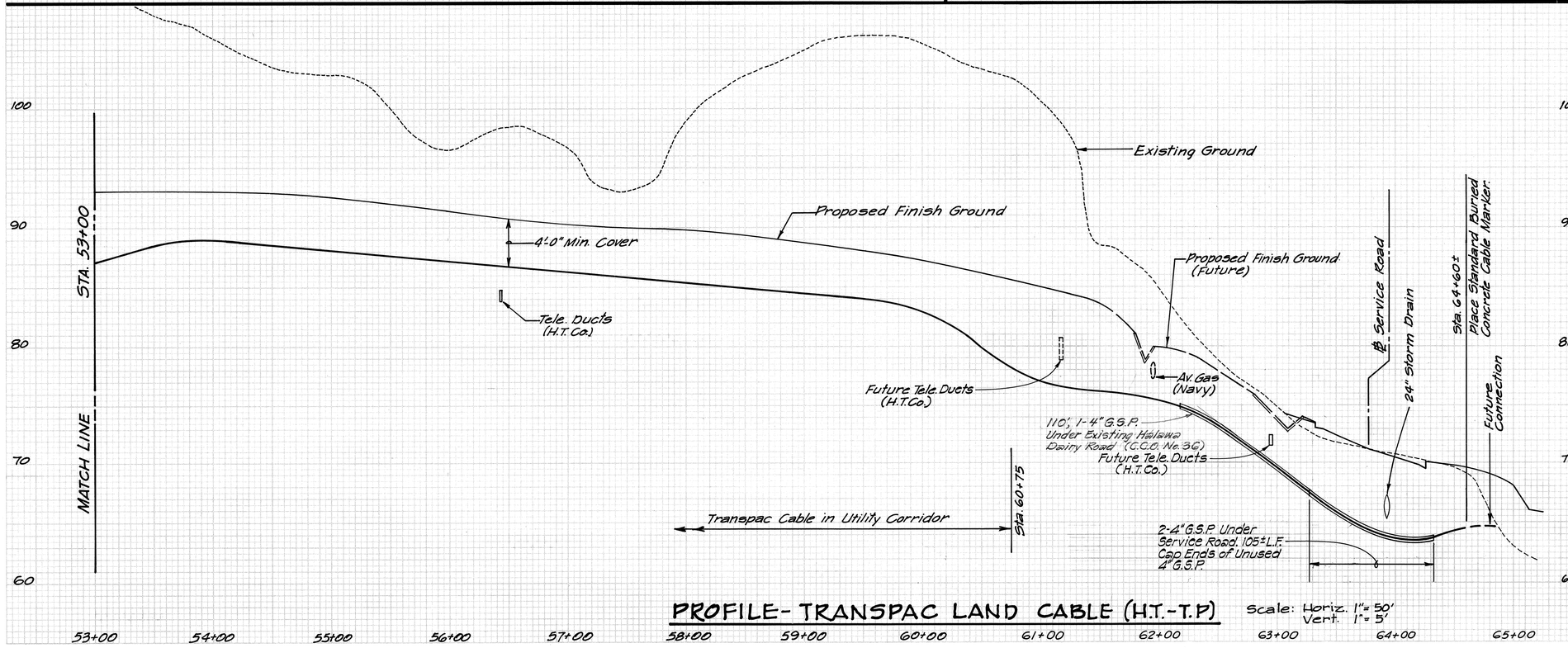
43+00 44+00 45+00 46+00 47+00 48+00



PROFILE- TRANSPAC LAND CABLE (H.T.-T.P.)

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

48+00 49+00 50+00 51+00 52+00 53+00



PROFILE- TRANSPAC LAND CABLE (H.T.-T.P.)

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

53+00 54+00 55+00 56+00 57+00 58+00 59+00 60+00 61+00 62+00 63+00 64+00 65+00

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

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J. Andrew Schuchardt

APPROVED:

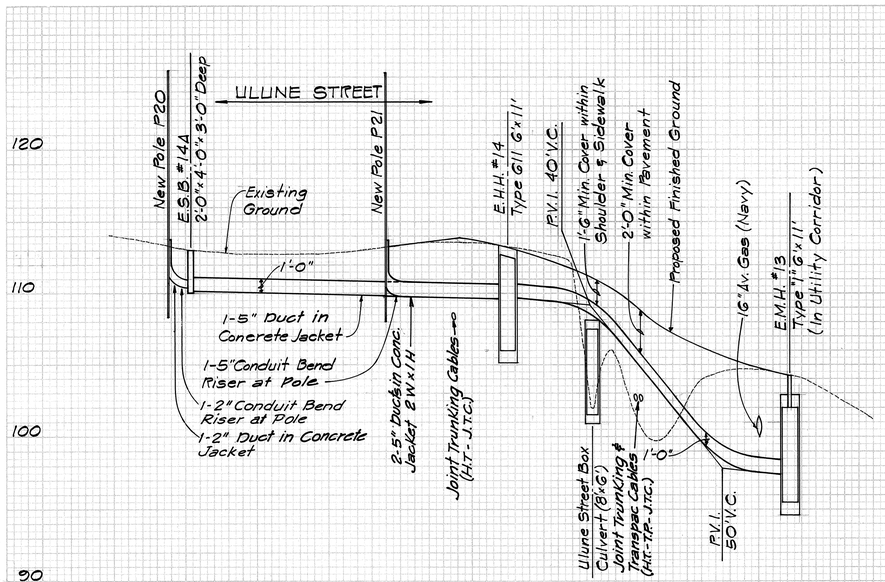
HAWAIIAN TELEPHONE CO., LTD. — DATE 7-30-70

SHEET NO. 124 OF 404 SHEETS

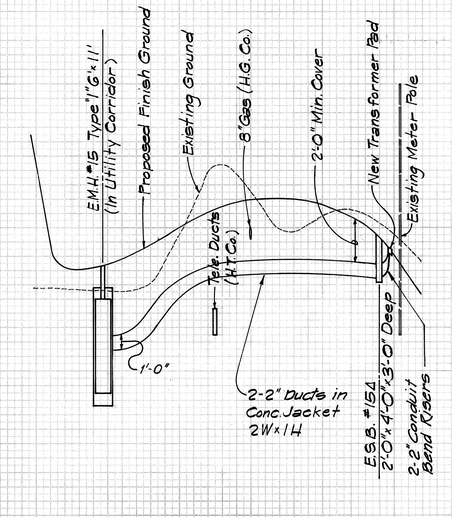
132

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

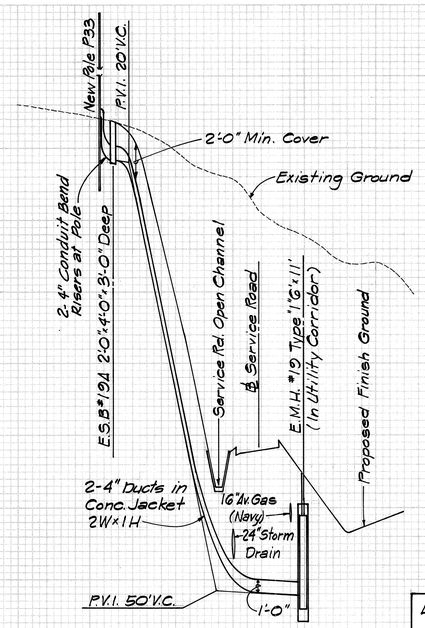
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(87):13	1970	133	244



UTILITY CORRIDOR ACCESS ROAD "D"



RAMP "G" INFIELD AREA



HALAWA PARK

PROFILE - ELECTRIC DUCTS (H.E.CO.)

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

APPROVED:

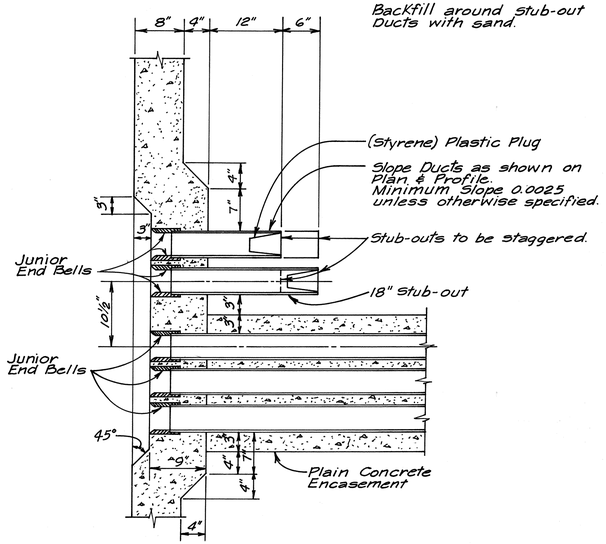
HAWAIIAN ELECTRIC CO. INC. — DATE 8/28/70

APPROVED:

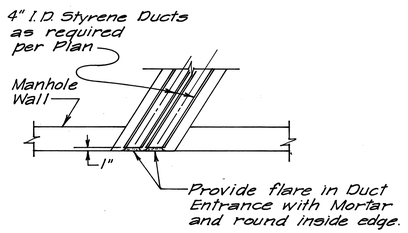
HAWAIIAN TELEPHONE LTD. — DATE 7-30-70

NOTES:

Stub-outs to be incidental to manhole.
Backfill around stub-out Ducts with sand.

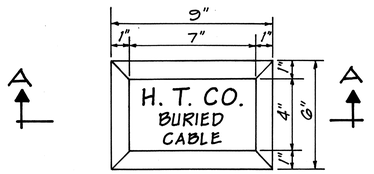


TYPICAL STUB-OUT DETAIL
Scale: 1"=1'-0"

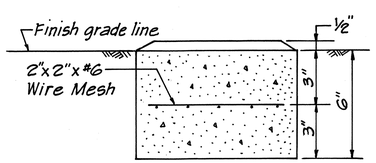


PLAN

TYPICAL DIAGONAL DUCT ENTRANCE DETAIL
Scale: ½"=1'-0"



PLAN VIEW



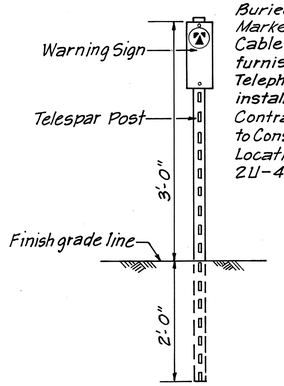
SECTION A-A

DETAIL "1"

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

NOTE:

Buried Concrete Cable Marker & Telespar Cable Marker shall be furnished by Hawaiian Telephone Company and installed by the Contractor. (Incidental to Construction) For Locations See Sheets 21U-41U.



DETAIL "2"

TELESPAR CABLE MARKER
No Scale

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

H.T.CO. MISCELLANEOUS DETAILS

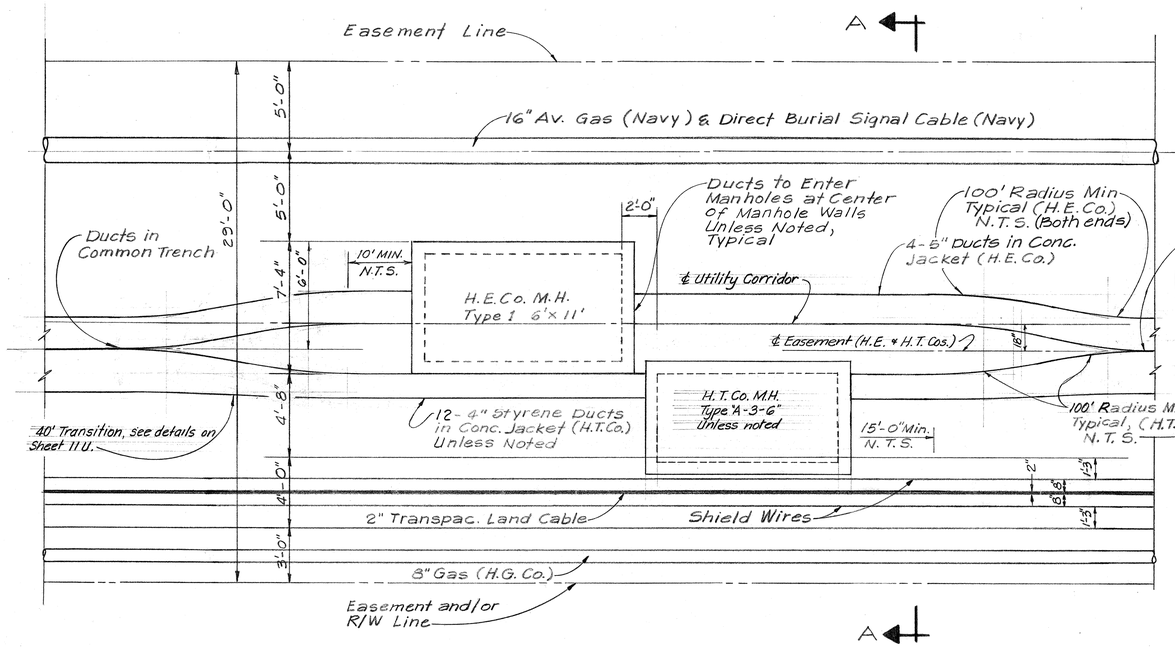
SCALE: AS SHOWN

SHEET NO. 13U OF 40U SHEETS

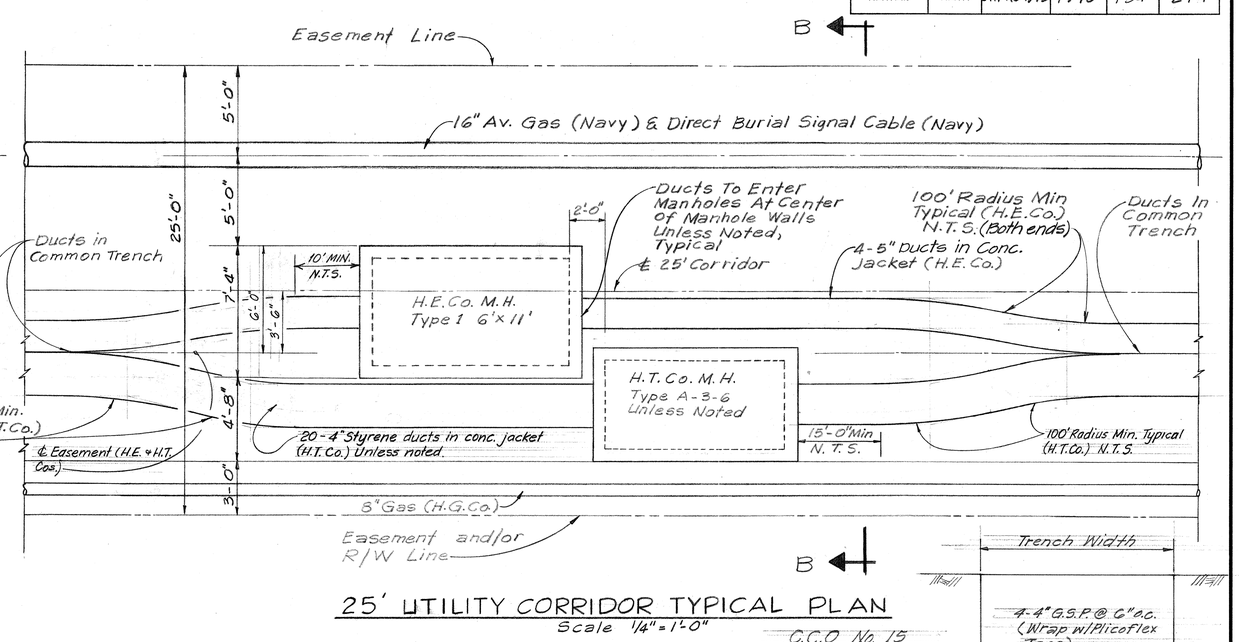
133

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.	I-HI-1(87)-13	1970	134	244

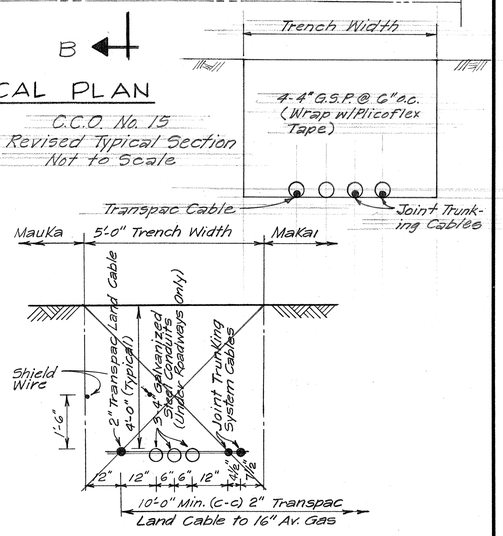


29' UTILITY CORRIDOR TYPICAL PLAN
Scale 1/4" = 1'-0"

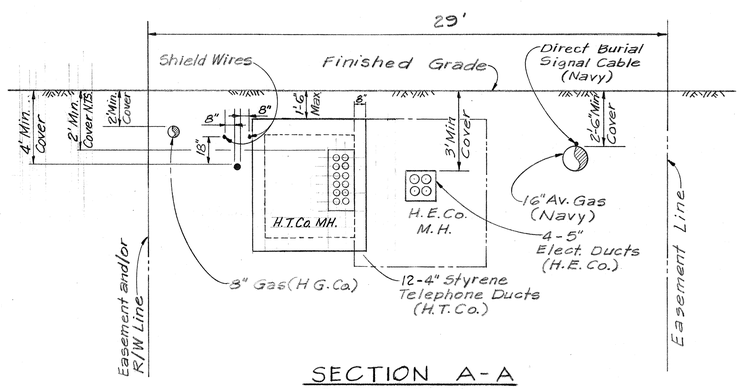


25' UTILITY CORRIDOR TYPICAL PLAN
Scale 1/4" = 1'-0"

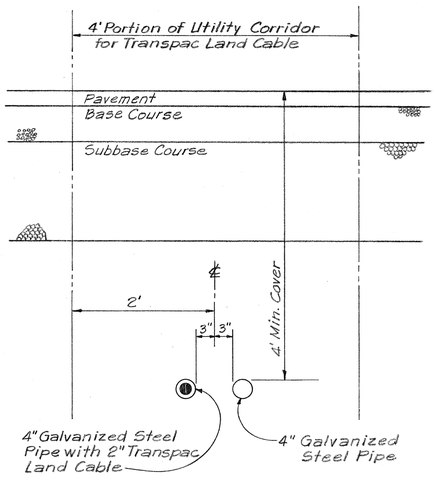
C.C.O. No. 15
Revised Typical Section
Not to Scale



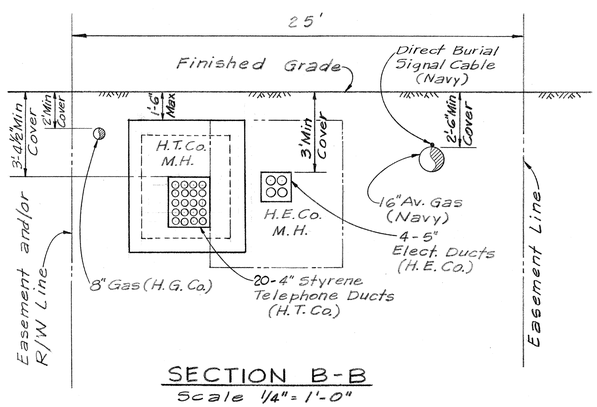
TYPICAL SECTION
TRANSPAC LAND CABLE & JOINT TRUNKING SYSTEM CABLES IN DIRECT BURIAL
Scale: 1/2" = 1'-0"



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



TYPICAL SECTION
TRANSPAC LAND CABLE UNDER PAVEMENT
Scale: 1" = 1'-0"



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

APPROVED

G.Yamada for Judd — 7-30-70
Hawaiian Telephone Co., Ltd. — Date

Wiess — 8/28/70
Hawaiian Electric Co., Inc. — Date

Paul C Jay V.P. — 6/18/70
Honolulu Gas 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.
J. Andrew Schuchardt

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ELECTRIC, TELEPHONE, AVGAS AND GAS UTILITY CORRIDOR TYPICAL LAYOUT

HALAWA INTERCHANGE
PROJECT NO I-HI-1(7):13

SCALE: As Shown DATE:

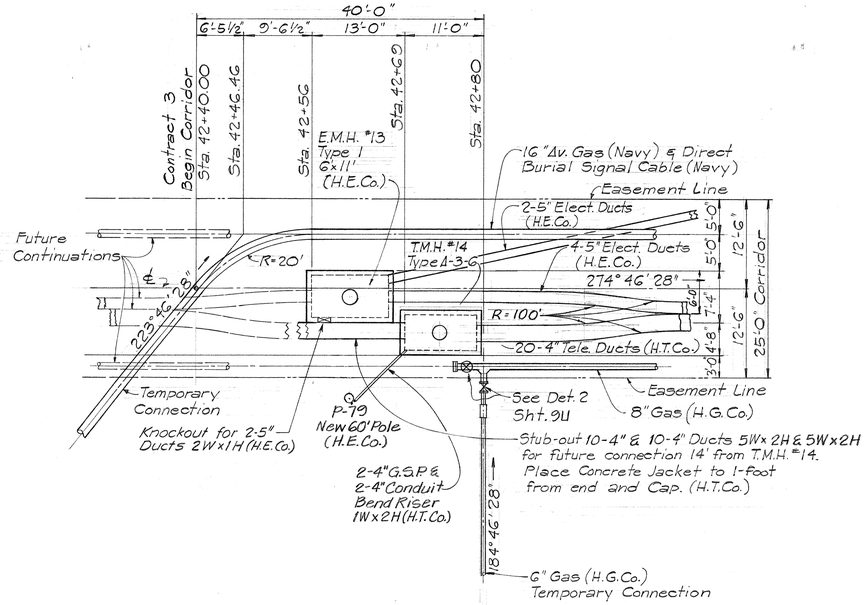
SHEET No. 134 OF 400 SHEETS

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

PRINTED ON NO. 1000H CLEARPRINT

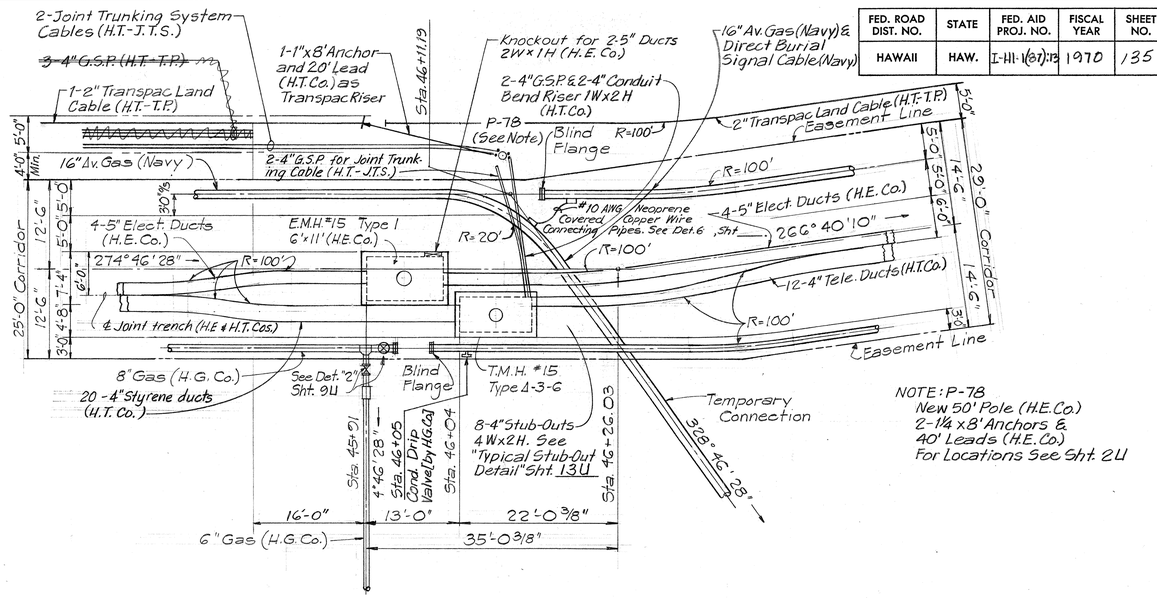
134

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(87):13	1970	135	244



PLAN @ E.M.H. #13 & T.M.H. #14

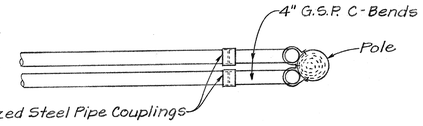
Scale: 1"=10'



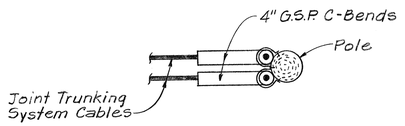
NOTE: P-78
New 50' Pole (H.E.Co.)
2-1¼ x 8' Anchors &
40' Leads (H.E.Co.)
For Locations See Sht. 2U

PLAN @ E.M.H. #15 & T.M.H. #15

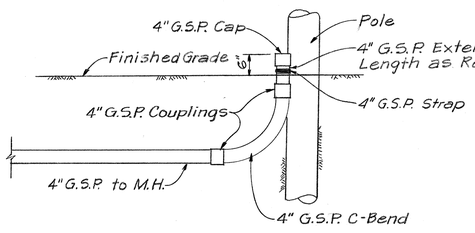
Scale: 1"=10'



PLAN



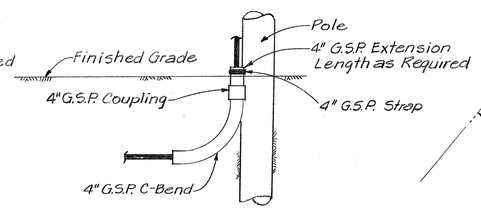
PLAN



ELEVATION

TYPICAL RISER-(H.T.Co.)

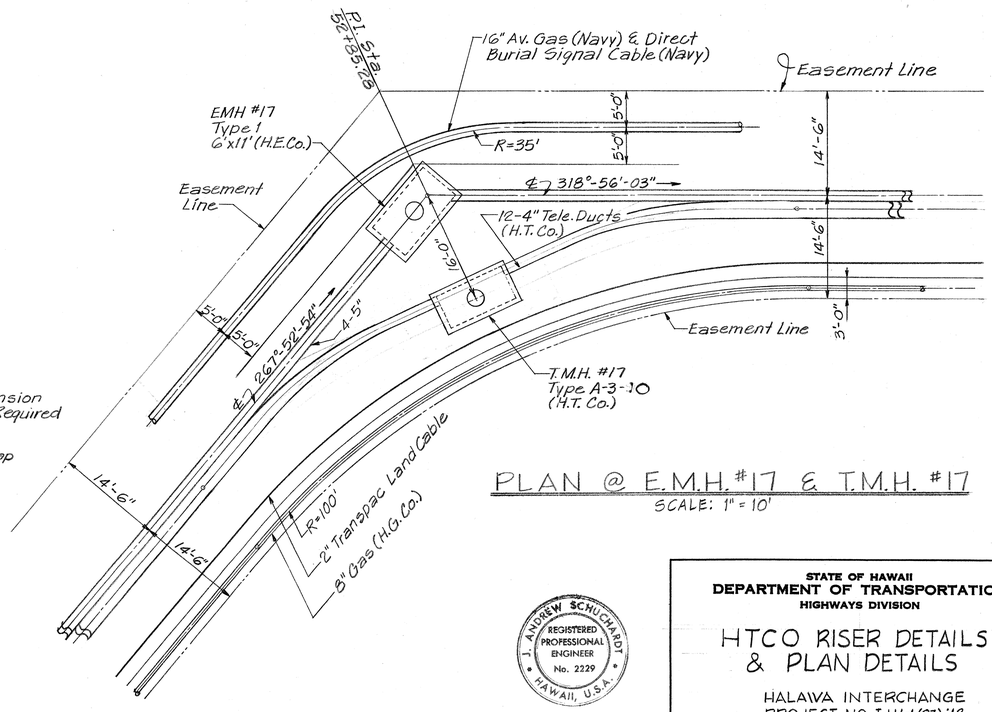
SCALE: ½"=1'-0"



ELEVATION

TYPICAL RISER-(J.T.S.)

SCALE: ½"=1'-0"



PLAN @ E.M.H. #17 & T.M.H. #17

SCALE: 1" = 10'

APPROVED

H. Yamada for Judd — 7-30-70
Hawaiian Telephone Co., Ltd. — Date

WHC — 8/28/70
Hawaiian Electric Co., Inc. — Date

Richard Jones — 6/8/70
Honolulu Gas Co. Ltd. — Date

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

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

HTCO RISER DETAILS & PLAN DETAILS

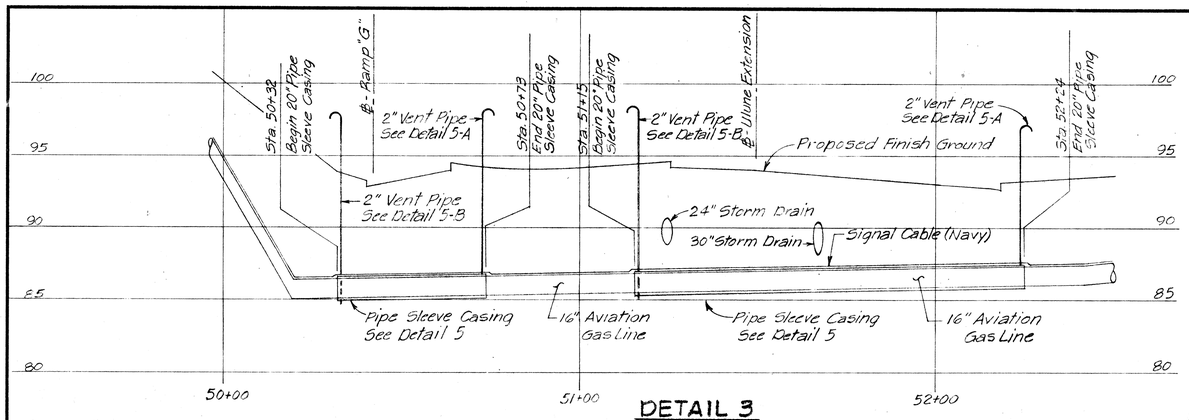
HALAWA INTERCHANGE
PROJECT NO. I-HI-1(87):13

SCALE: AS SHOWN DATE: 6/8/70

SHEET No. 15U OF 40U SHEETS

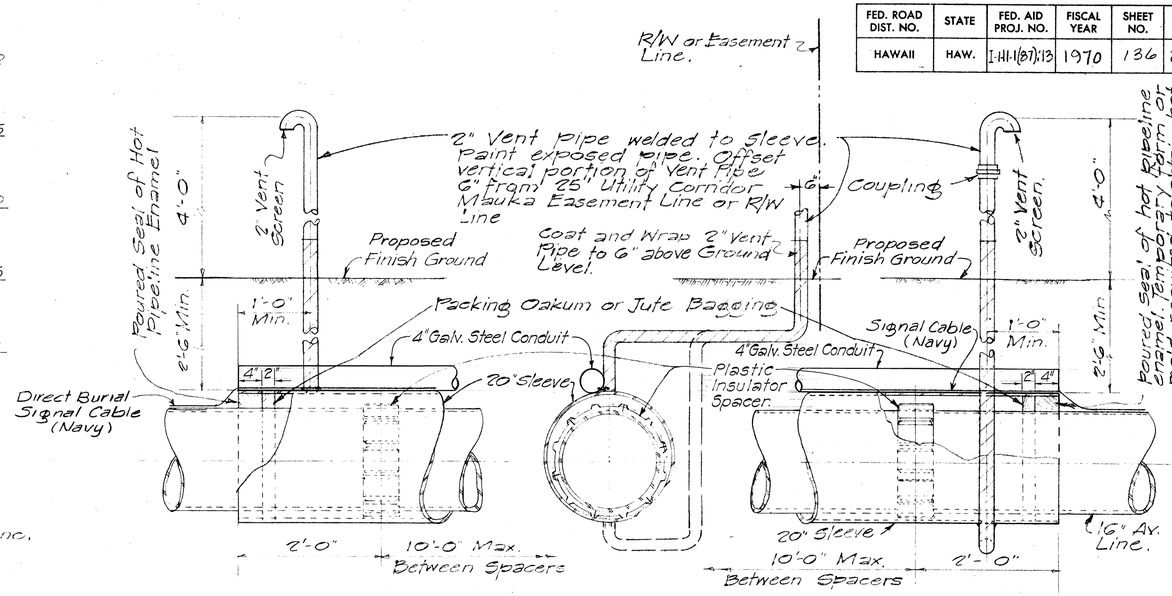
PRINTED ON NO. 1000H CLEARPRINT

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(87):13	1970	136	244



DETAIL 3

Scale: Horiz. 1" = 20'
Vert. 1" = 5'



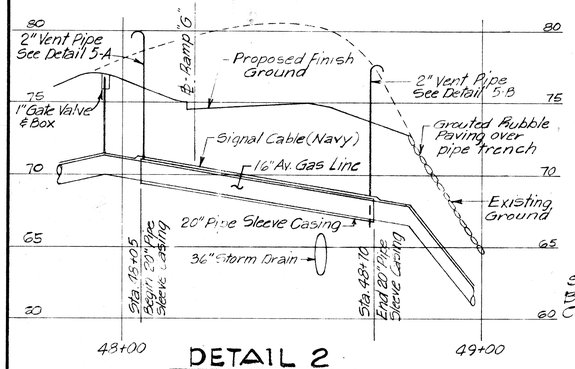
HIGH END
DETAIL 5-A

SECTION

DETAIL 5
20" PIPE SLEEVE CASING

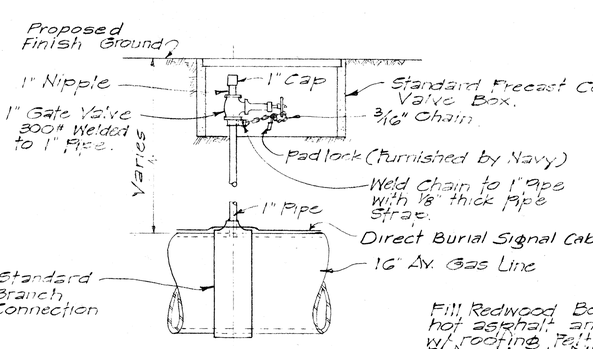
Scale 1" = 1'-0"

LOW END
DETAIL 5-B



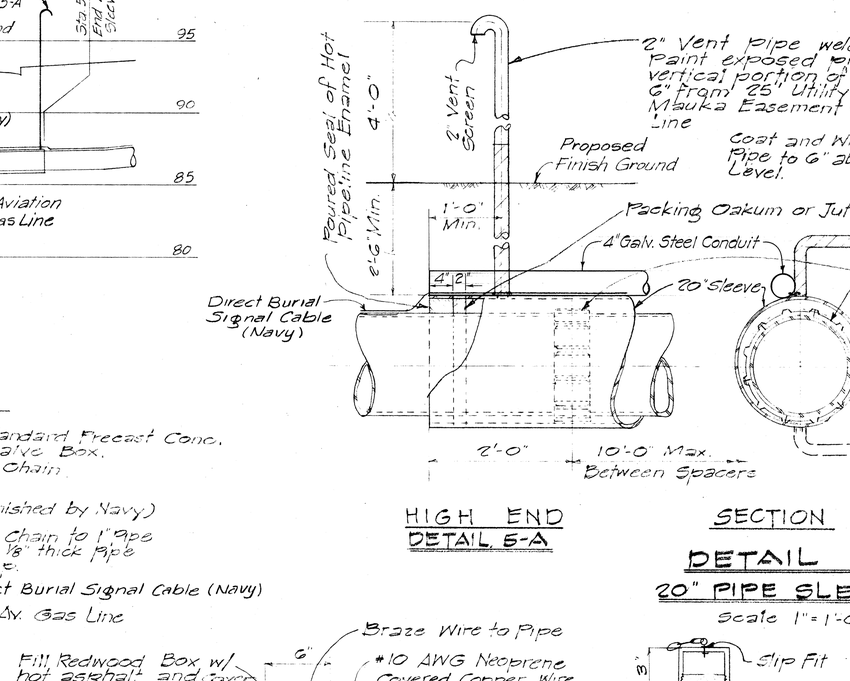
DETAIL 2

Scale: Horiz. 1" = 20'
Vert. 1" = 5'



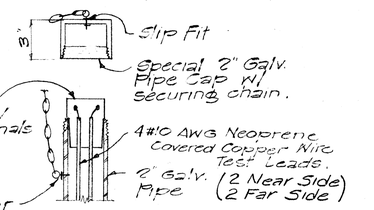
DETAIL 4
1" GATE VALVE

Not to Scale



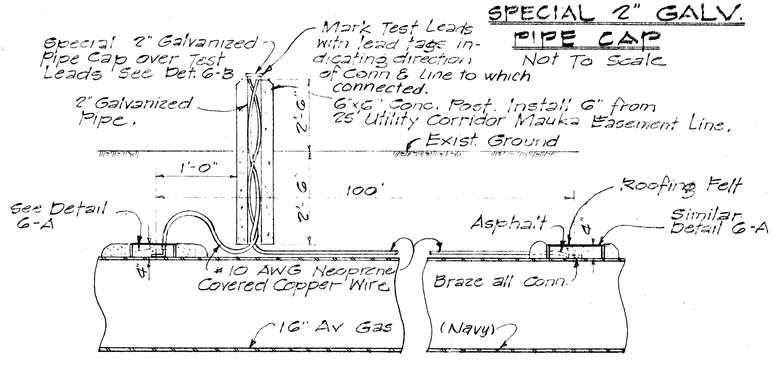
DETAIL 6-A
TEST LEAD CONNECTION AT PIPE LINE

Not To Scale



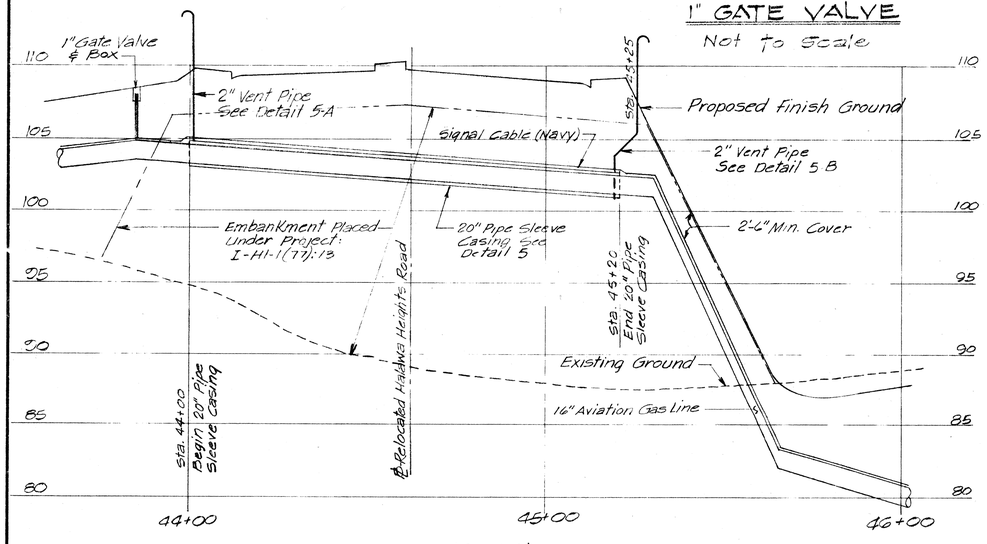
DETAIL 6-B
SPECIAL 2" GALV. PIPE CAP

Not To Scale



DETAIL 6
TEST POST

Not To Scale



DETAIL 1

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

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	
No.	DESIGNED BY	
	QUANTITIES BY	
	CHECKED BY	

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

NAVY AVGAS LINE DETAILS & SECTIONS

HALAWA INTERCHANGE
PROJECT NO I-HI-1(87):13

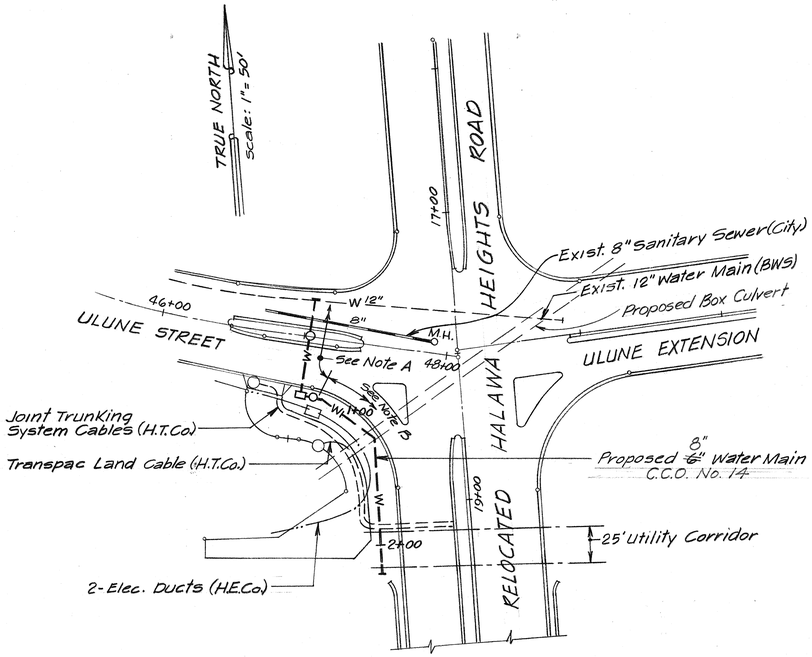
SCALE: AS SHOWN DATE: 6/8/70

SHEET No. 136 OF 244 SHEETS

136

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(87):13	1970	137	244

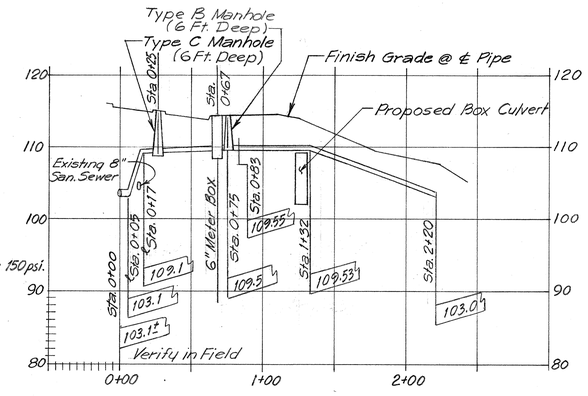


PLAN
Scale: 1" = 50'

NOTE A
To be furnished & Installed by the Board of Water Supply:

Sta. 0+00 : 1-12"x12"x6" Tee, 1-6" Sleeve 15' Long, 8'-12" Cast Iron Pipe (Class 200)
1-Concrete Block
Sta. 0+05 : 1-6" 1/16 Bend
1-Concrete Block
Sta. 0+17 : 1-6" 1/16 Bend
1-Concrete Block
Sta. 0+25 : 1-6" Gate Valve
1-Type "C" Manhole (6 ft. deep)
Sta. 0+67 : 1-6" 1/4 Bend
1-Concrete Block
1-6" Meter & Meter Box with Appurtenances
Sta. 0+75 : 1-6" Gate Valve
1-Type "B" Manhole (6 ft. deep)
Sta. 0+00 to 0+80 : 70'-6" Cast Iron Pipe
Contractor to Excavate & Backfill

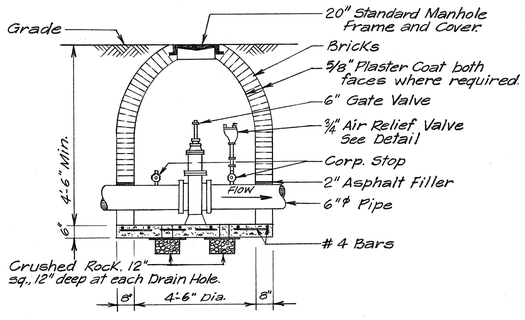
NOTE B
To be furnished and Installed by the Contractor:
Sta. 0+75 : 1-3/4" Air Relief Valve, Min. Working Pressure 150 psi.
Sta. 0+83 : 1-6" 1/8 Bend
1-Concrete Block
Sta. 1+28 : 1-6" 1/8 Bend
1-Concrete Block
Sta. 1+32 : 1-6" 1/64 Bend
Sta. 2+20 : 1-6" Plug
Sta. 0+80 to 2+20 : 130'-8" Cast Iron Pipe C.C.O. No. 14



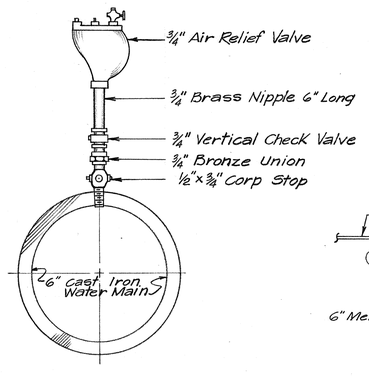
PROFILE - WATER LINE
Scales: Horiz. 1" = 50'
Vert. 1" = 10'

APPROVED:

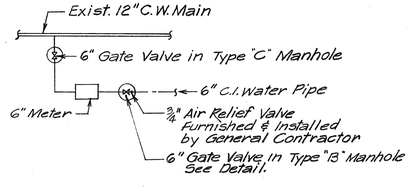
A. Kawaken 7/8/70
Chief, Engineering Div., B.W.S. Man Date



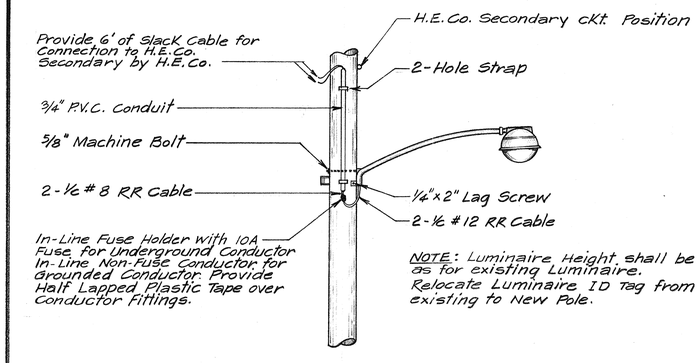
TYPE "B" MANHOLE
N.T.S.



AIR RELIEF VALVE DETAIL
N.T.S.



SCHEMATIC
N.T.S.



DETAIL "B"
MULTIPLE STREET LIGHT MOUNTING DETAIL
N.T.S.

APPROVED:

R. Parker 6/25/70
Deputy Traffic Engineer Date
City and County of Honolulu

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

SPRINKLER SYSTEM WATER LATERAL
STREET LIGHTING DETAIL
HALAWA INTERCHANGE
PROJECT NO I-HI-1(87):13

SCALE: AS SHOWN DATE: 6/8/70

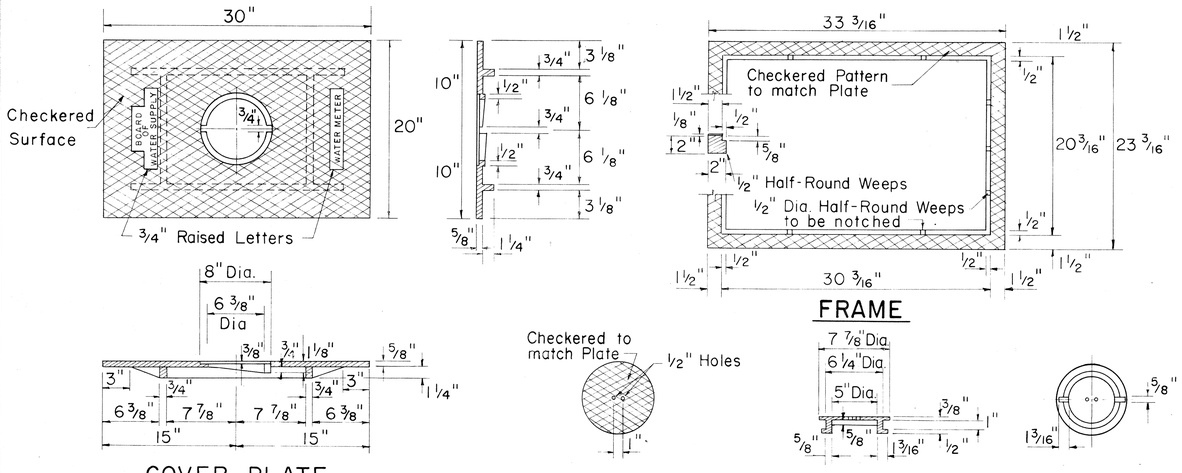
SHEET No. 174 OF 400 SHEETS

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

PRINTED ON NO. 1000H CLEARPRINT

137

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(87):13	1970	138	244

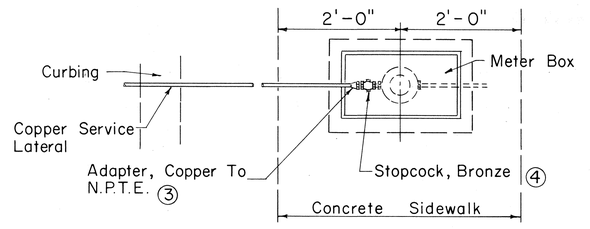


COVER PLATE

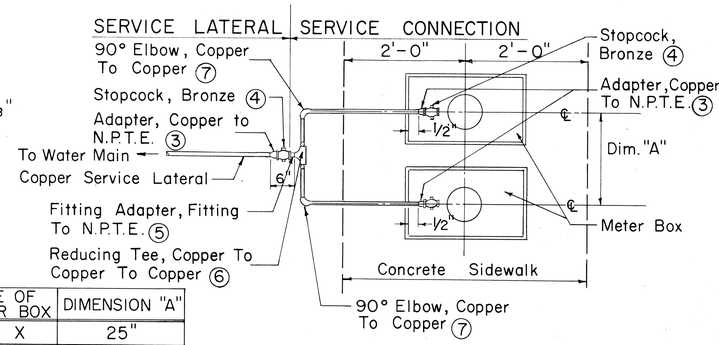
FRAME

READING COVER

CAST IRON FRAME, PLATE AND COVER TYPE III



SINGLE SERVICE CONNECTION

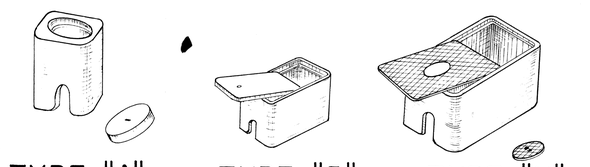


TYPE OF METER BOX	DIMENSION "A"
Type X	25"
Type III	29"

MULTIPLE SERVICE CONNECTION SOLDERED JOINTS

SCHEDULE OF COPPER FITTINGS (SOLDERED JOINT)

ITEM NO.	DESCRIPTION	SINGLE SERVICE CONN.	MULTIPLE SERVICE CONN.
1	Corporation Stop Bronze (H-10003)	1	1
2	Ground Joint Union Copper To N.P.T.I.	1	1
3	Adapter, Copper To N.P.T.E.	1	3
4	Stopcock, Bronze	1	3
5	Fitting Adapter, Fitting To N.P.T.E.	–	1
6	Reducing Tee, Copper To Copper To Copper	–	1
7	90° Elbow, Copper To Copper	–	2

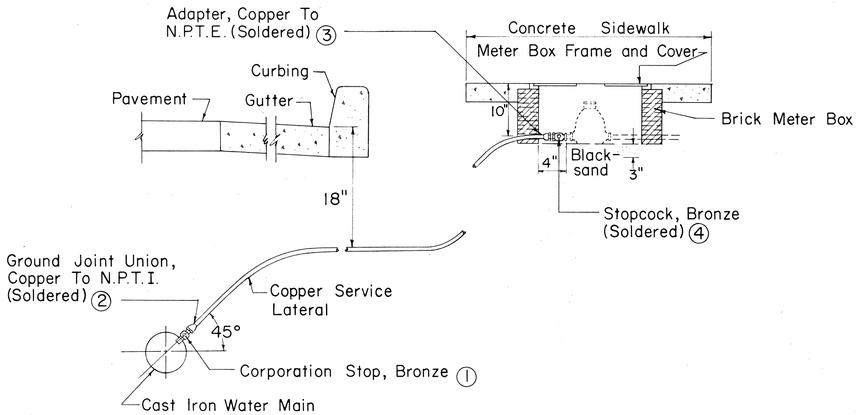


TYPE "A" METER BOX

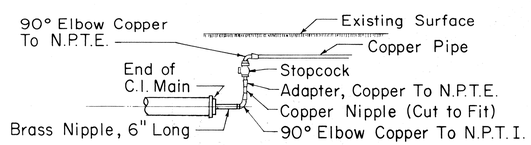
TYPE "B" METER BOX

TYPE "X" METER BOX

METER BOX DATA					
TYPE METER BOX	METER SIZES	OVERALL DIMENSIONS AT BOTTOM	OVERALL DIMENSIONS AT TOP	COMPLETE WEIGHT	OVERALL DIMENSIONS OF LID
A	5/8" or 3/4" Without Valve	7 1/4" x 7 1/4"	10" x 10"	45 lbs.	7 3/8" Dia.
B	5/8" or 3/4"	9 1/2" x 16"	12 1/4" x 18 3/8"	82 lbs.	8 3/4" x 14 1/2"
X		14 1/2" x 23 1/2"	16" x 25"	143 lbs.	13 1/8" x 22 1/8"

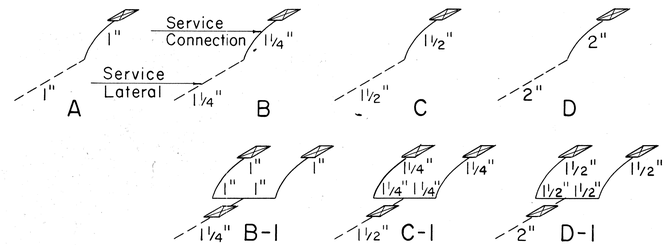


LONGITUDINAL SECTION



SOLDERED JOINT

SERVICE LATERAL CONNECTION AT END OF LINE



TYPICAL LAYOUT OF SERVICE LATERALS AND CONNECTIONS

Not to Scale

APPROVED:

CHIEF, ENGINEERING DIVISION
BOARD OF WATER SUPPLY

7/8/70
DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BOARD OF WATER SUPPLY
CITY & COUNTY OF HONOLULU

HALAWA INTERCHANGE
PROJECT NO I-HI-1(87):13

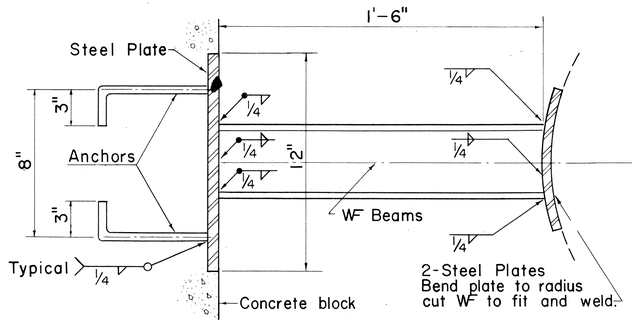
Not to Scale

DATE: 6/8/70

SHEET No. 18 OF 40 SHEETS

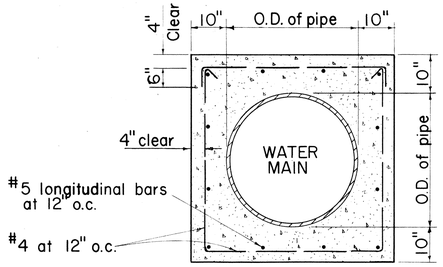
ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	"
	TRACED BY	"
NOTE BOOK	DESIGNED BY	"
	QUANTITIES BY	"
No.	CHECKED BY	"

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(87):13	1970	139	244

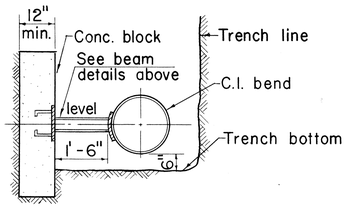


BEAM DETAIL

Scale: 3" = 1'-0"

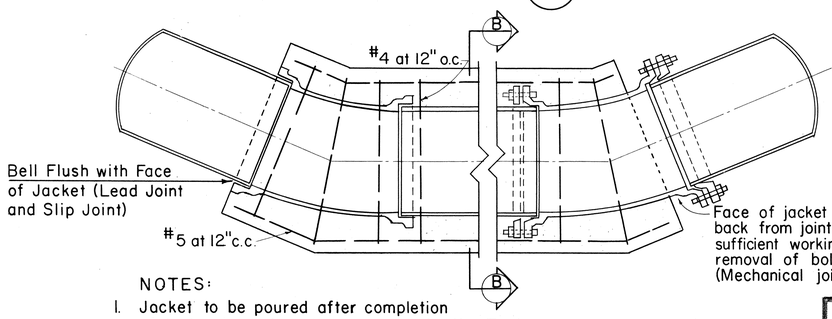


SECTION B



SECTION C

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

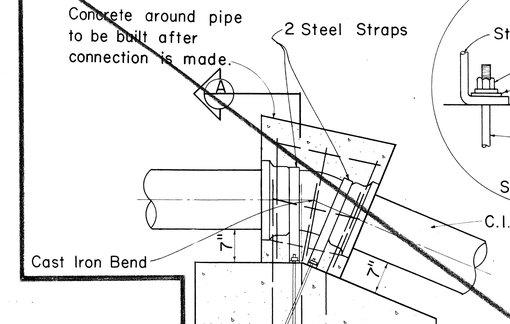


NOTES:

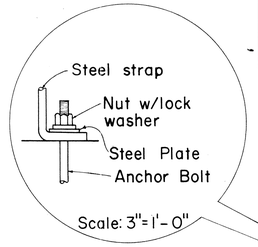
1. Jacket to be poured after completion of test unless otherwise approved by the Engineer.
2. 2 1/2" depth of lead for lead joint pipe required at all embedded joints.
3. Wherever construction joints are required, 6" rubber or neoprene waterstops shall be installed. Waterstops shall be of the type specified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

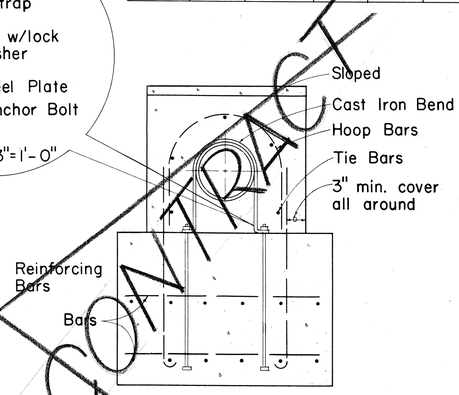
REINFORCED CONCRETE JACKET

Scale: Not to Scale



ELEVATION





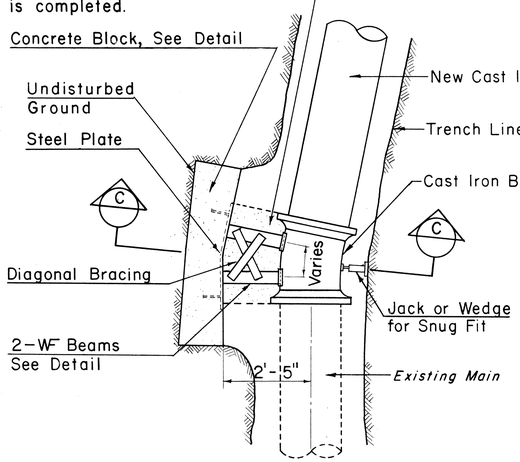
SECTION A

NOT IN CONTRACT

TYPICAL DETAIL OF CONCRETE REACTION BLOCK WITH STRAPS

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

Place Class "B" Concrete 2500 p.s.i. after connection is completed.

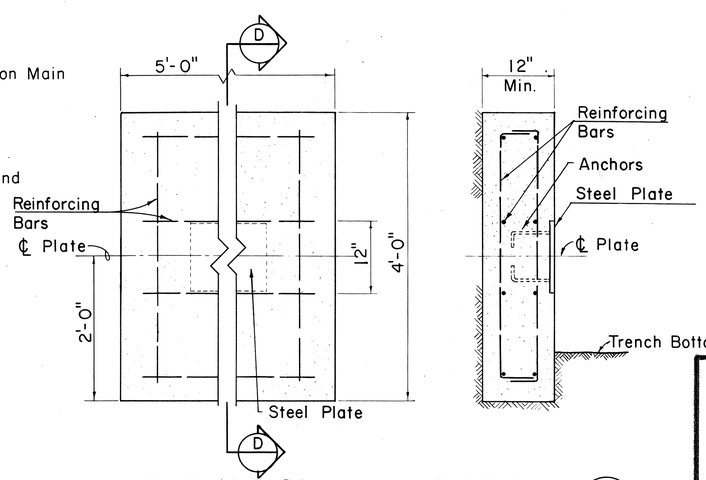


PLAN

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

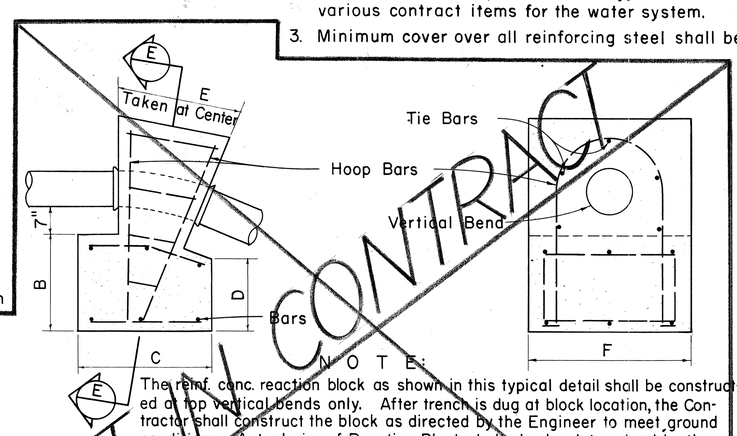
DETAILS OF CONCRETE BLOCK

Scale: 1" = 1'-0"

TYPICAL DETAIL OF CONCRETE BLOCK WITH STRUCTURAL STRUT

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.



NOT CONTRACT

ELEVATION SECTION E

TYPICAL DETAIL OF REINFORCED CONCRETE REACTION BLOCK FOR TOP VERTICAL BENDS

Scale: Not to Scale

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.

APPROVED:

A. Kawahara 7/8/70

CHIEF, ENGINEERING DIVISION DATE
BOARD OF WATER SUPPLY

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BOARD OF WATER SUPPLY
CITY & COUNTY OF HONOLULU

STANDARD DETAILS

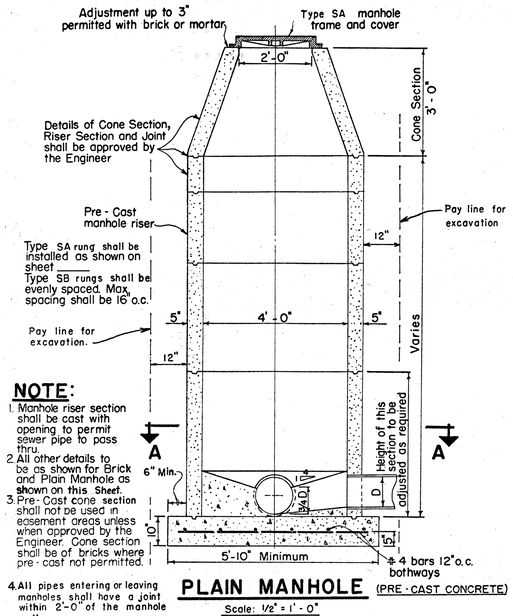
HALAWA INTERCHANGE
PROJECT NO I-HI-1(87):13

Scale: As Shown DATE: 6/8/70

SHEET No. 120 OF 400 SHEETS

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

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAWAII	I-HI-1(87):13	1970	140	244



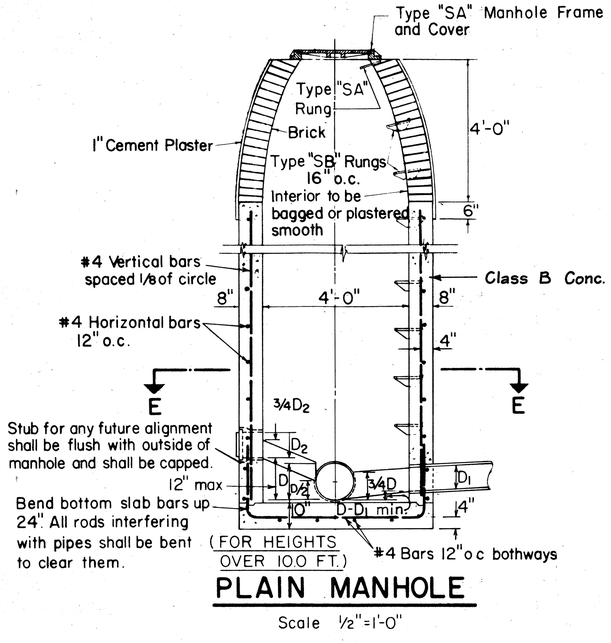
NOTE:

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)

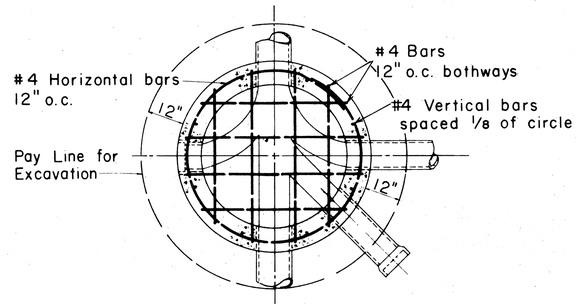
Scale: 1/2" = 1'-0"

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"

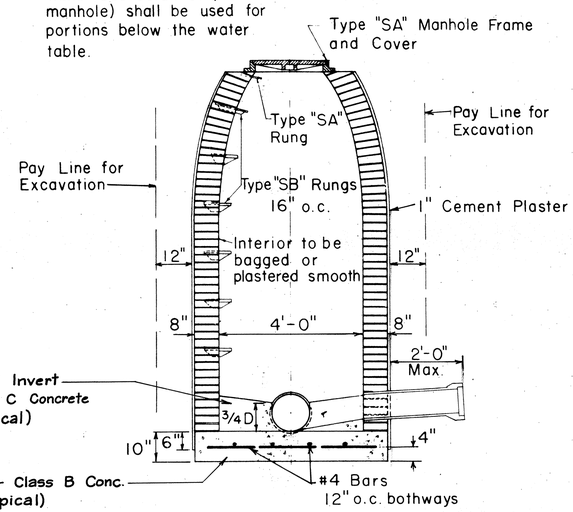


SECTION E-E

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

NOTE:

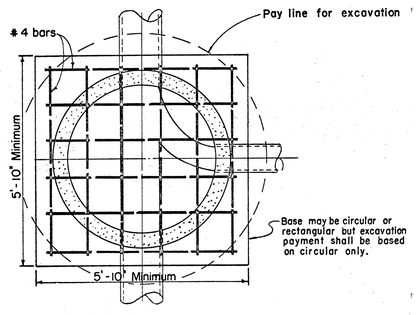
Reinforced concrete manhole walls (See detail of plain manhole) shall be used for portions below the water table.



(MAXIMUM HEIGHT - 10.0 FEET)

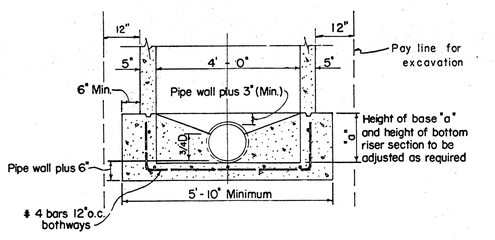
BRICK MANHOLE

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"

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."

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.

APPROVED:

R. Ilona — 6/16/70

CHIEF, DIVISION OF SEWERS — DATE

J. ANDREW SCHUBERT REGISTERED PROFESSIONAL ENGINEER No. 2220 HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

J. Andrew Schubert

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

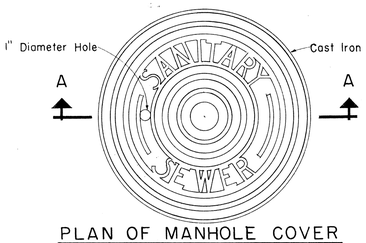
SEWERS: PRE-CAST AND BRICK MANHOLE DETAILS

Scales As Noted — Date: 6/8/70

SHEET NO. 20 UOF 40 U SHEETS

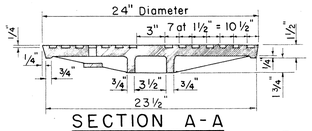
H.L. 178 K & E CO., N.Y. MADE

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO	TOTAL SHEETS
HAWAII	HAWAII	I-HI-I(87):13	1970	141	244



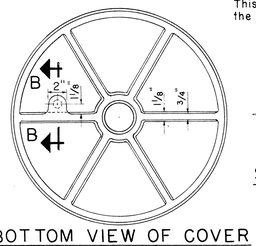
PLAN OF MANHOLE COVER

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



SECTION A-A

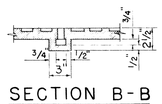
Scale: 1 1/2" = 1'-0"



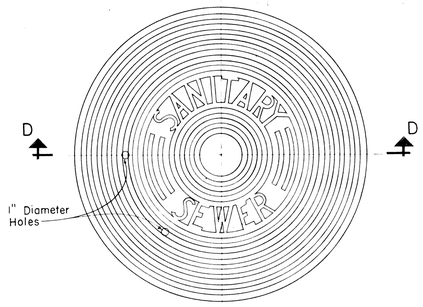
BOTTOM VIEW OF COVER

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

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



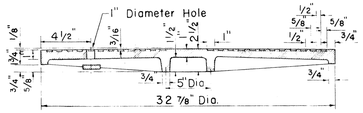
SECTION B-B



PLAN

SPECIAL MANHOLE COVER

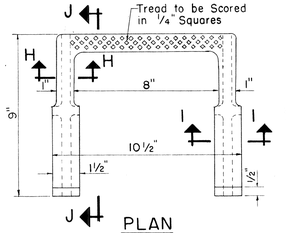
Scale 1 1/2" = 1'-0"



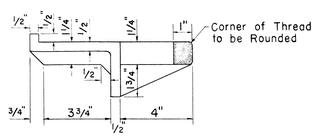
SECTION D-D

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

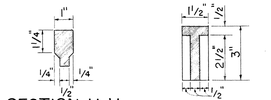
Approx. Weight 260 Pounds



PLAN

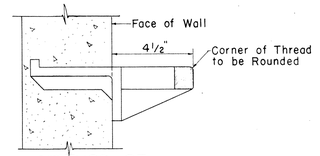


SECTION J - J



SECTION H-H

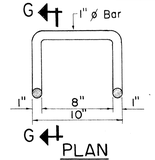
SECTION I-I



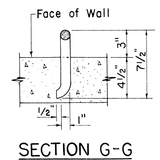
METHOD OF INSTALLATION

TYPE "SB" MANHOLE RUNGS (CAST IRON)

Scale: 3" = 1'-0"



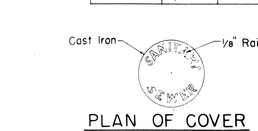
PLAN



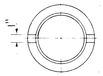
SECTION G-G

TYPE "SA" MANHOLE RUNGS (WROUGHT IRON)

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

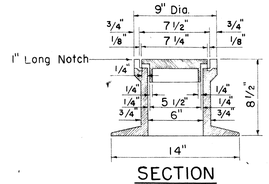


PLAN OF COVER



BOTTOM OF COVER

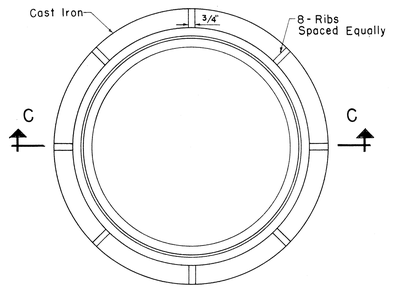
ELEVATION



SECTION

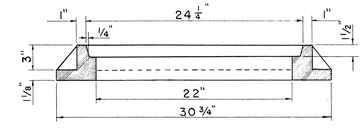
DROP MANHOLE CHIMNEY CASTINGS

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



PLAN OF MANHOLE FRAME

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

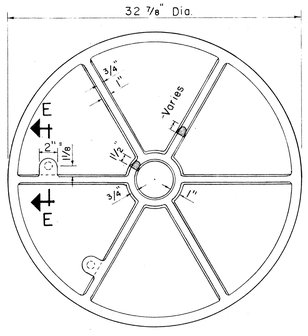


SECTION C-C

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

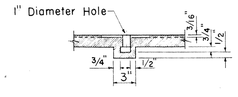
TYPE "SA" SEWER MANHOLE FRAME AND COVER

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



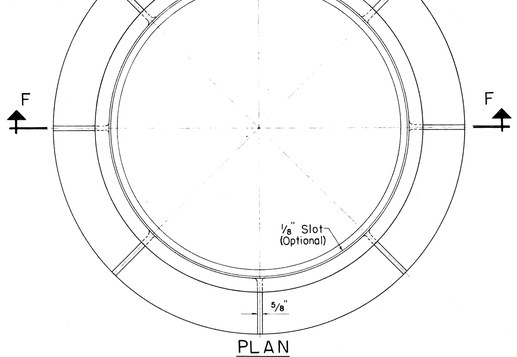
BOTTOM VIEW OF COVER

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



SECTION E-E

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

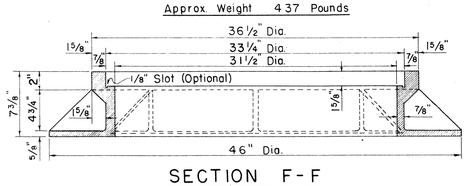


PLAN

SPECIAL MANHOLE FRAME

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

Approx. Weight 437 Pounds



SECTION F-F

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

TYPE "SB" SEWER MANHOLE FRAME AND COVER

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

APPROVED:

CHIEF, DIVISION OF SEWERS

6/16/70
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: 6/8/70

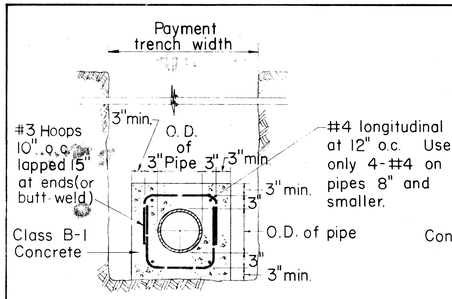
SHEET NO. 211 OF 401 SHEETS

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE 11-5-68
	DRAWN BY	11-5-68
NOTE BOOK	TRACED BY	
	DESIGNED BY	
No.	CHECKED BY	

141

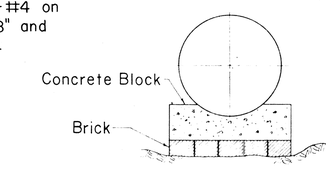
KEUFFEL & ESSER CO. NO. 125 IMPERIAL TRACING CLOTH 10-62

FED ROAD DIST NO	STATE	FED AID PROJ NO	FISCAL YEAR	SHEET NO	TOTAL SHEETS
HAWAII	HAWAII	I-HI-1(87)13	1970	142	244



DETAIL OF CONCRETE JACKET

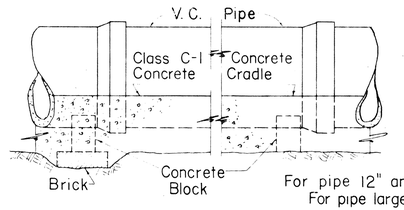
Scale: 3/4" = 1'-0"



METHOD OF USING BRICKS UNDER CONCRETE BLOCKS

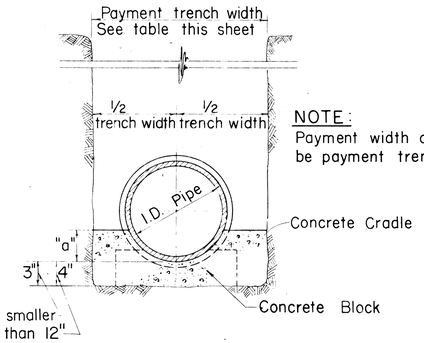
Not To Scale

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



ELEVATION SHOWING METHOD OF LAYING PIPE

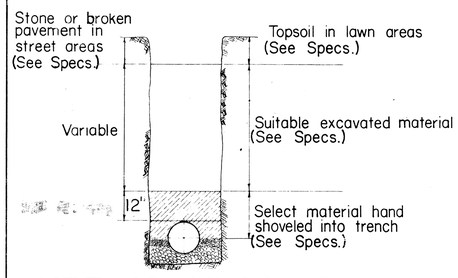
Not To Scale



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

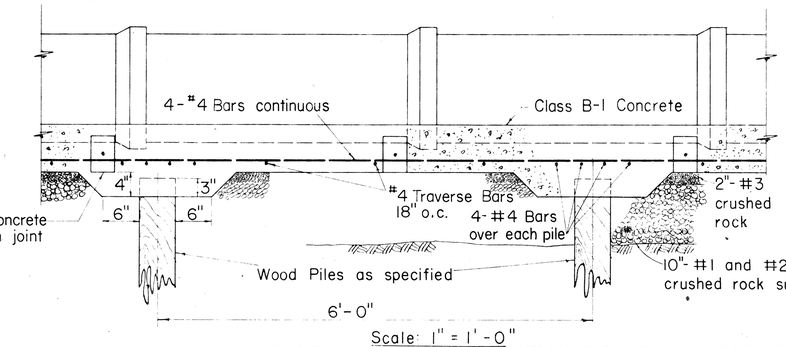
CONCRETE CRADLE FOR VITRIFIED CLAY PIPE

Not To Scale

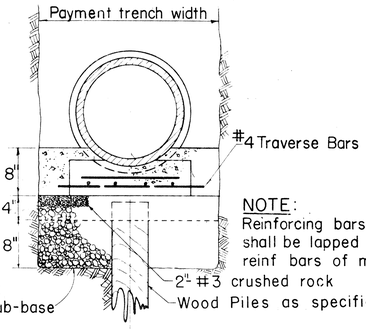


METHOD OF BACKFILL

Not To Scale



Scale: 1" = 1'-0"

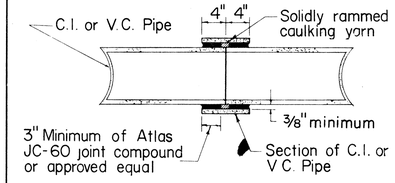


SECTION

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

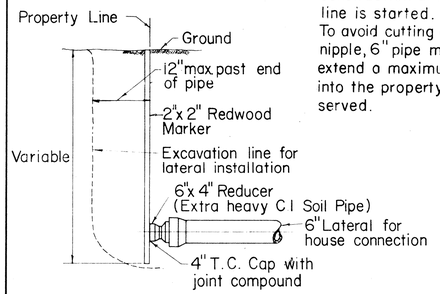
DETAIL OF REINFORCED CONCRETE CRADLE ON WOOD PILES (FOR 6, 8, 10 & 12 IN. V.C. PIPE)

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



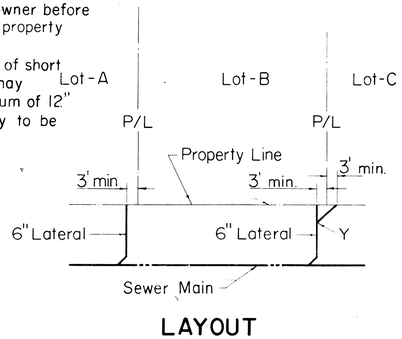
BUTT JOINT DETAIL

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.

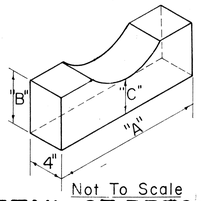
DETAIL AT PROPERTY LINE



LAYOUT

CONSTRUCTION OF LATERALS

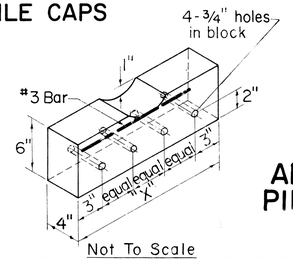
Not To Scale



Not To Scale

DETAIL OF PRECAST CONC. PIPE BLOCK

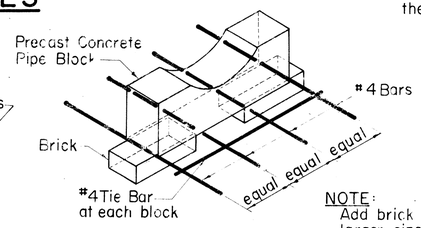
CONCRETE BLOCK DIMENSIONS			
PIPE SIZE	"A"	"B"	"C"
6"	1'-2"	6"	3"
8"	1'-5"	6"	3"
10"	1'-7"	6"	3"
12"	1'-7"	6"	3"
15"	1'-8"	6"	4"
18"	1'-9"	6"	4"
21"	1'-10"	6"	4"
24"	1'-11"	6"	4"
27"	2'-0"	6"	4"
30"	2'-3"	6"	4"



Not To Scale

DETAIL OF CONC. PIPE BLOCK FOR REINF. CRADLE

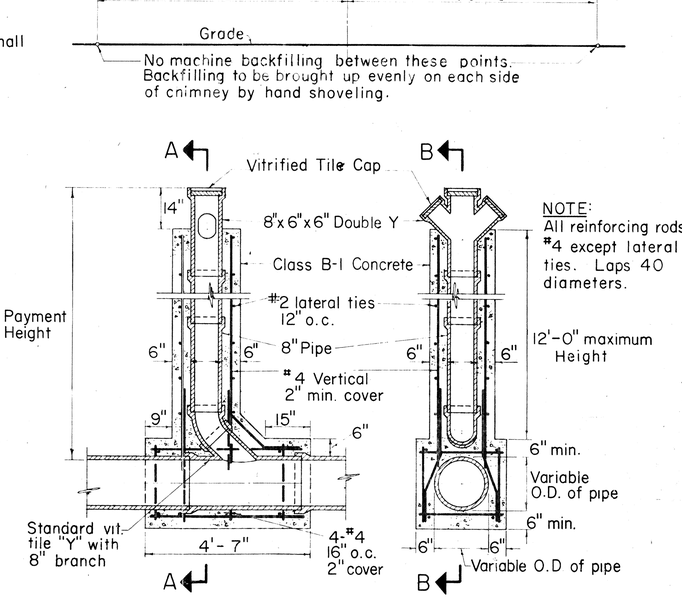
DIM. OF REINF. CONC. BLOCK	
PIPE SIZE	"X"
6"	1'-6"
8"	1'-6"
10"	1'-8"
12"	1'-8"
15"	1'-10"
18"	1'-10"
21"	1'-10"
24"	2'-0"
27"	2'-0"
30"	2'-0"



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.

SECTION B-B SECTION A-A

DETAILS OF CHIMNEY

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

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

VITRIFIED CLAY PIPE TABLE

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

APPROVED:

F. Nosa
CHIEF, DIVISION OF SEWERS

6/16/70
DATE

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: 6/8/70

SHEET NO. 22 OF 40 SHEETS

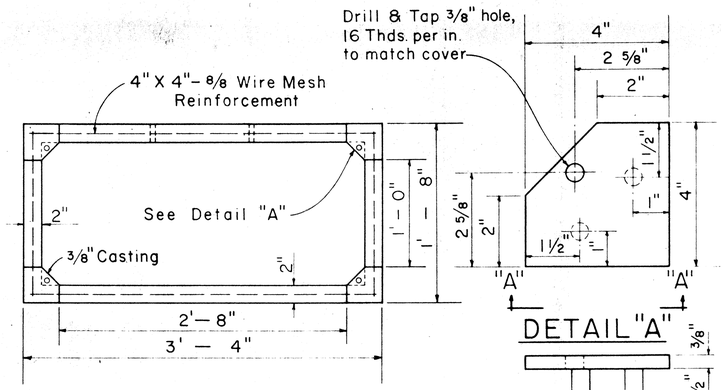
Revised Oct 1965

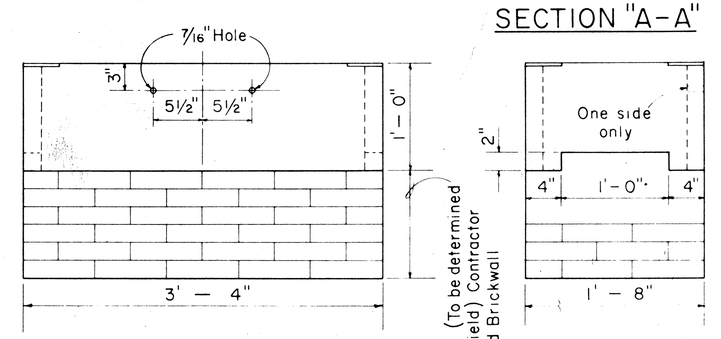
30

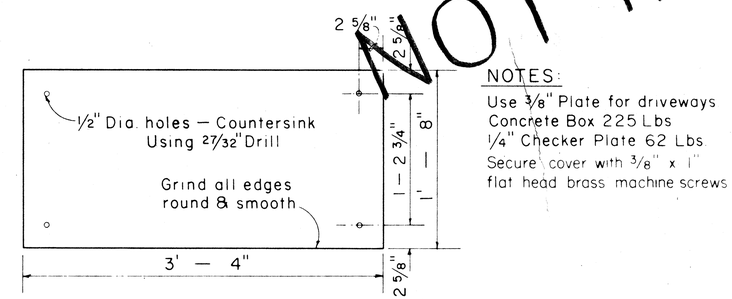
IMPERIAL TM K & E CO., N.Y. TRADE MARK

142

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAWAII	F-HH-1(81)113	1970	143	244







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

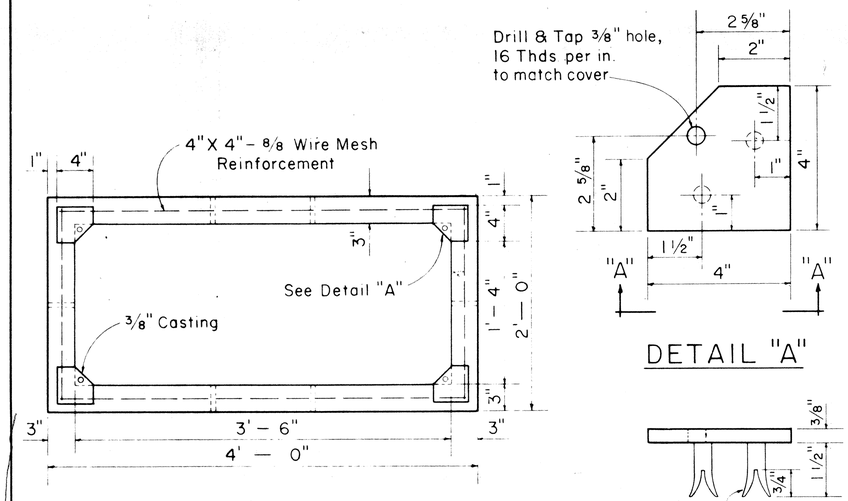
1/4" CHECKER PLATE COVER

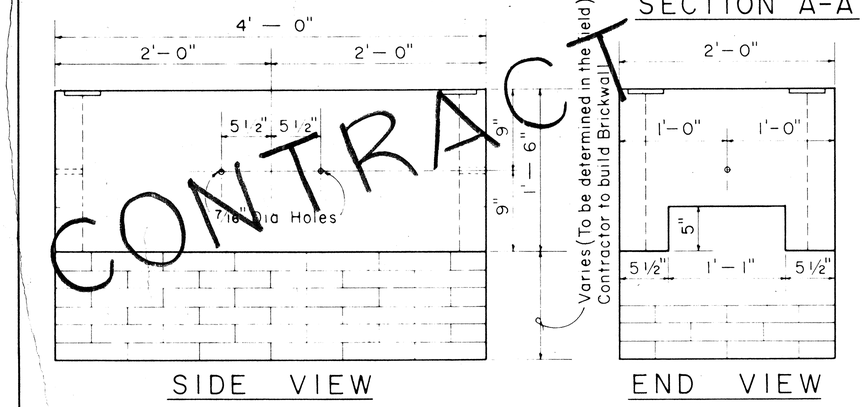
(Hot dip galvanize checkered plate after drilling, countersinking, and grinding edge)

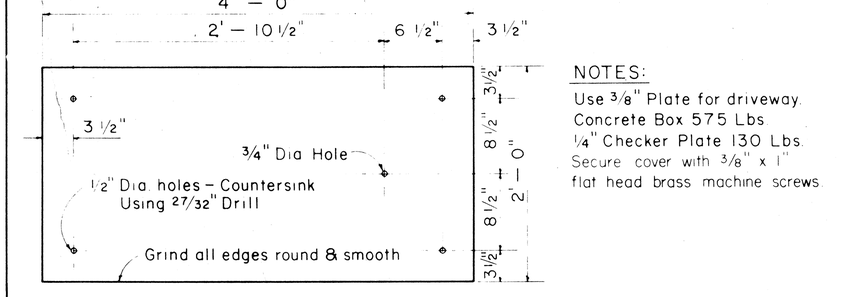
1'-4" X 3'-0" CONCRETE SERVICE BOX

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

CONTRACT

NOT IN

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:

Wacson for HHD 8/28/70
HAWAIIAN ELECTRIC Co., Inc. JK DATE

L.L. Thomas for Judd 7-30-70
HAWAIIAN TELEPHONE Co. DATE

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 Nov. 28, 1969

SHEET NO. 23 OF 40 SHEETS

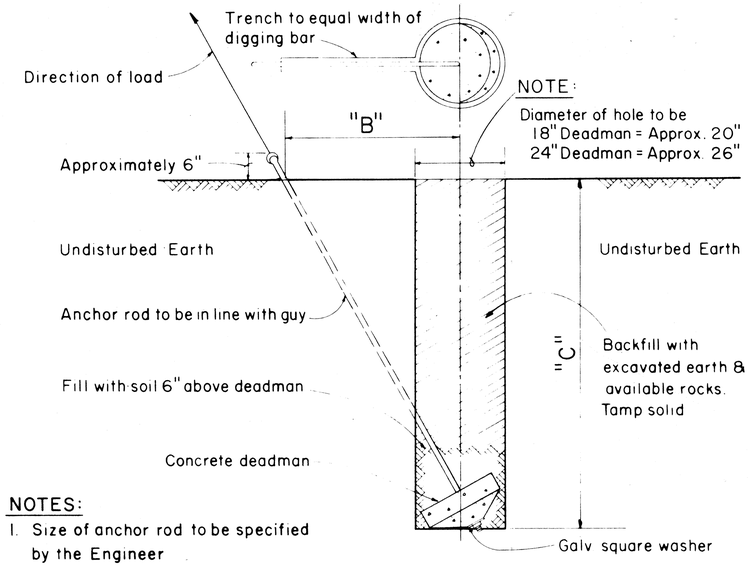
143 83

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

34

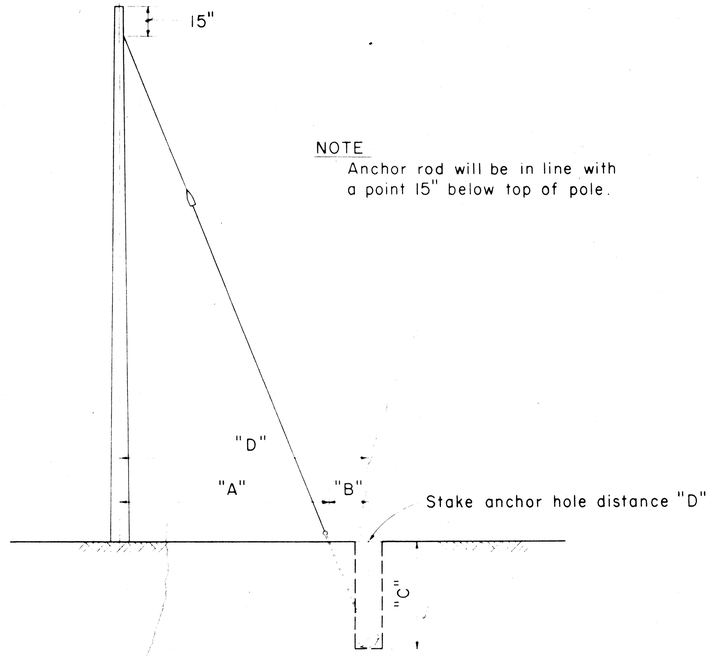
LIETZ 1103 ARKWRIGHT TRACING CLOTH 10-60 200P

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAWAII	I-HI-1(27);13	1970	144	244



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

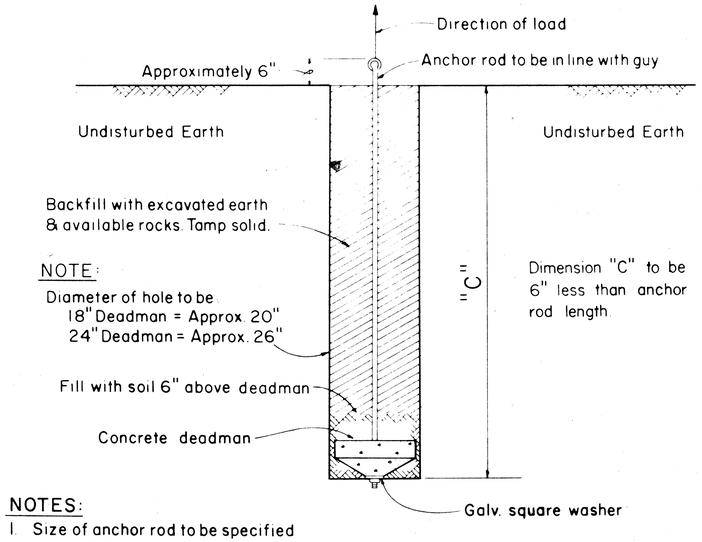
GUY ANCHOR DEADMAN
Scale: 3/4" = 1' – 0"



Not to Scale

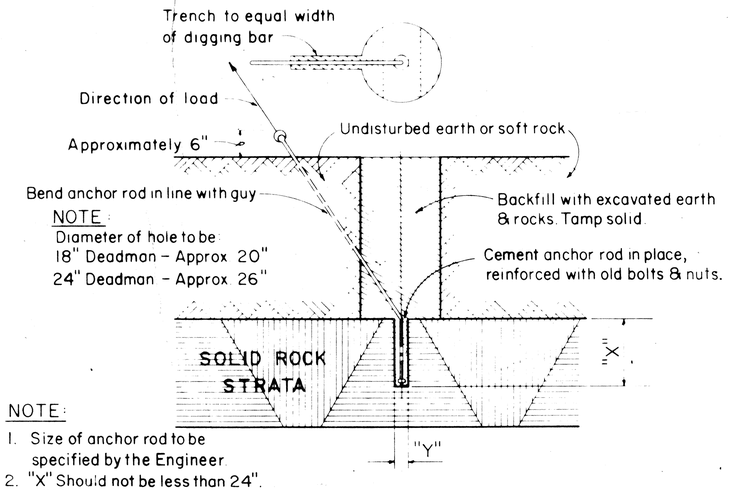
FOR 25', & 30' POLES WITH 8'-0" ANCHOR RODS				
"A"	"B"	"C"		"D" = ("A" + "B")
LEAD-ANCHOR ROD TO ℄ OF POLE	ANCHOR ROD TO ℄ OF HOLE	VERTICAL DEPTH 18" D.M.	VERTICAL DEPTH 24" D.M.	TOTAL DISTANCE POLE TO HOLE
5'-0"	1'-8"	7'-1"	7'-4"	6'-8"
10'-0"	3'-0"	6'-7"	7'-0"	13'-0"
15'-0"	4'-0"	6'-1"	6'-6"	19'-0"
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



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

SIDE – WALK ANCHOR
Scale: 3/4" = 1' – 0"



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

ROCK ANCHOR
Not to Scale

TABLE 2 ANCHOR ROD - ANCHOR SLUG - SQUARE WASHER COMBINATION

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

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

ANCHORING DATA

APPROVED:

HAWAIIAN ELECTRIC Co., Inc. — DATE 8/28/70

HAWAIIAN TELEPHONE Co. — DATE 7-30-70

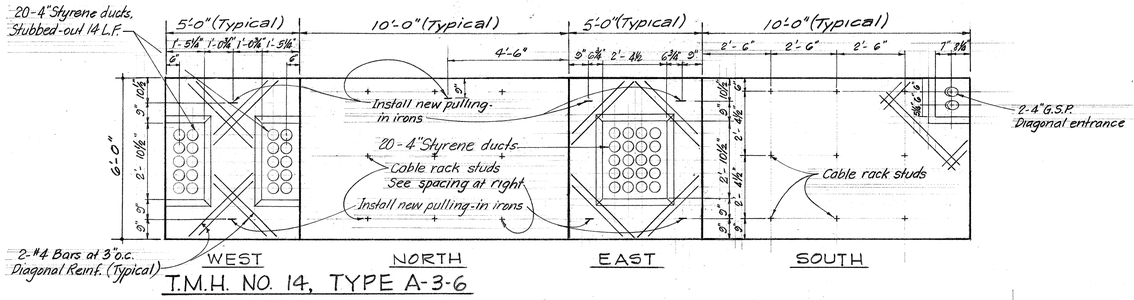
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

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

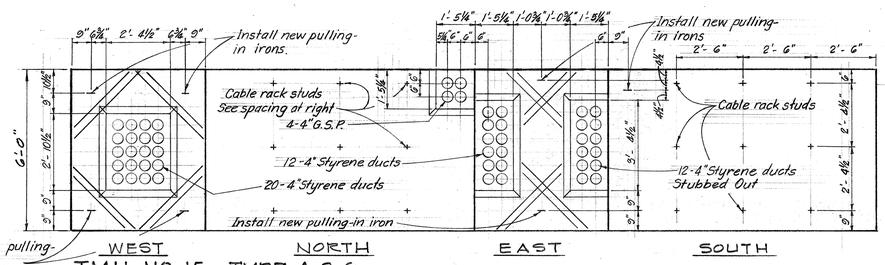
Scales As Noted — Date Nov. 28, 1969

144

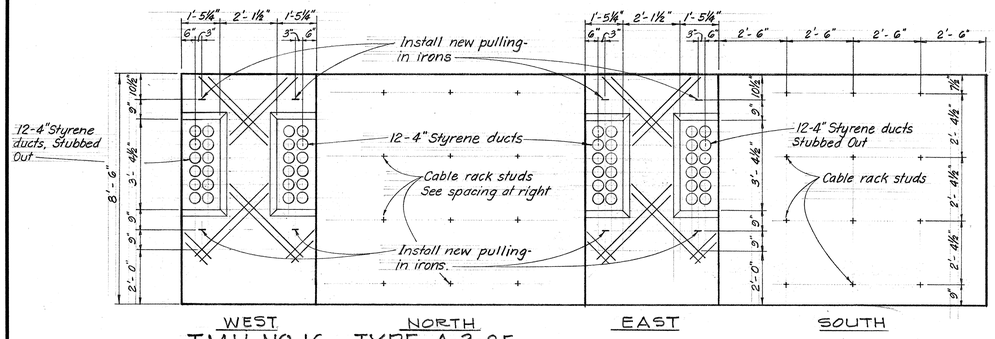
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(87):13	1970	145	244



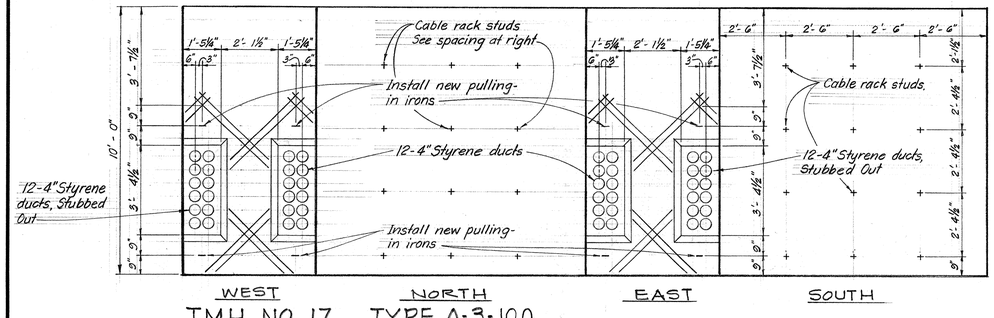
T.M.H. NO. 14, TYPE A-3-6



T.M.H. NO. 15, TYPE A-3-6



T.M.H. NO. 16, TYPE A-3-8.5



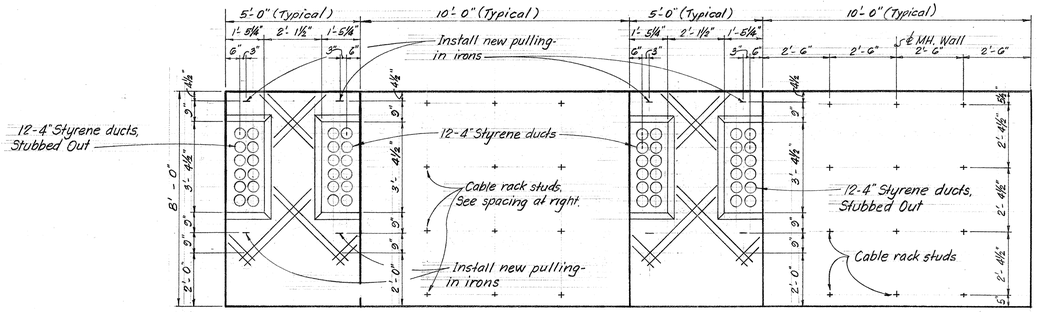
T.M.H. NO. 17, TYPE A-3-10.0

LEGEND

— = Pulling in iron to be installed on wall as shown. See Detail "7" Sht. 28U

NOTE:

For stub-out and Diagonal Entrance Details see Sht. 13U



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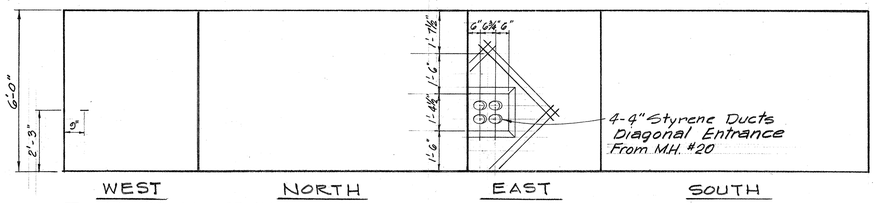

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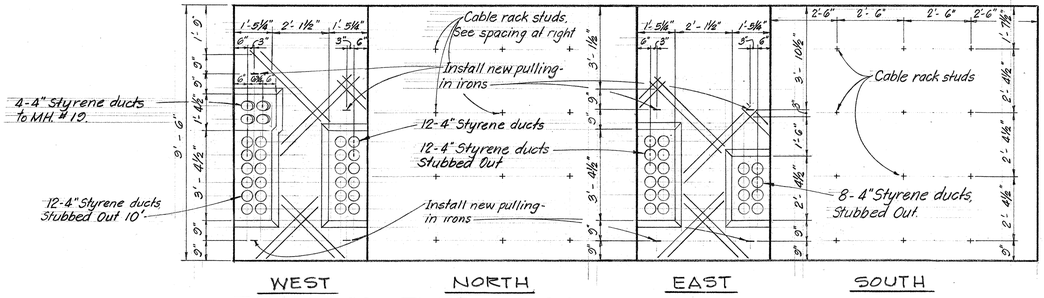

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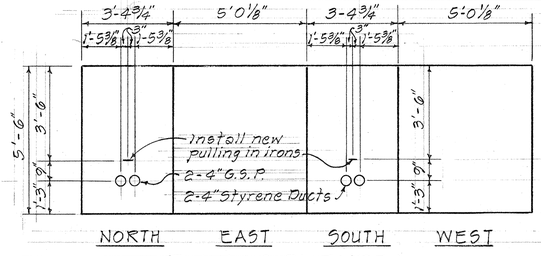


T.H.H. NO. 21, TYPE 1

TELEPHONE MANHOLES IN UTILITY CORRIDOR

APPROVED:

H.L. Yamada for Judd — 7-30-70

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.

J. Andrew Schuchardt

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

H.T.CO. MANHOLE WALL ELEVATIONS

HALAWA INTERCHANGE
PROJECT NO I-HI-1(87):13

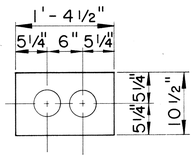
SCALE: 3/8"=1'-0" DATE: 6/8/70

SHEET No. 25U OF 40U SHEETS

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

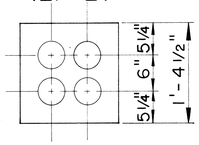
PRINTED ON NO. 1000H CLEARPRINT

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(37)13	1970	146	244



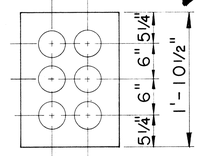
2 DUCTS

$\left(\frac{T}{2F-2}\right)$



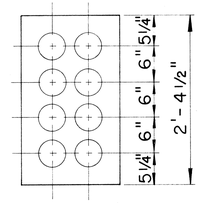
2 WIDE X 2 HIGH

$\left(\frac{T}{4F-2}\right)$



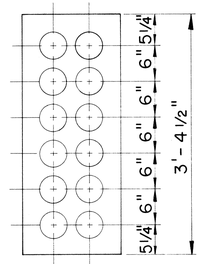
2 WIDE X 3 HIGH

$\left(\frac{T}{6F-2}\right)$



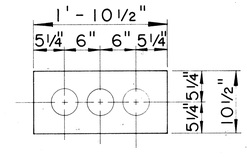
2 WIDE X 4 HIGH

$\left(\frac{T}{8F-2}\right)$



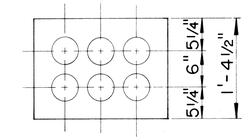
2 WIDE X 6 HIGH

$\left(\frac{T}{12F-2}\right)$



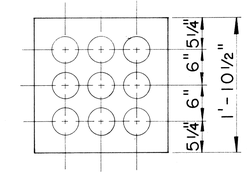
3 DUCTS

$\left(\frac{T}{3F-3}\right)$



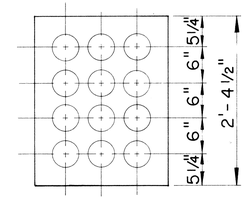
3 WIDE X 2 HIGH

$\left(\frac{T}{6F-3}\right)$



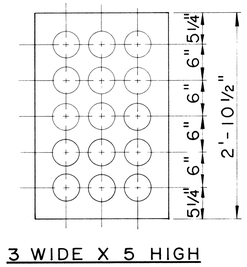
3 WIDE X 3 HIGH

$\left(\frac{T}{9F-3}\right)$



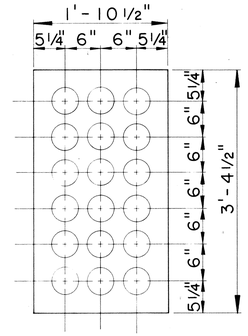
3 WIDE X 4 HIGH

$\left(\frac{T}{12F-3}\right)$



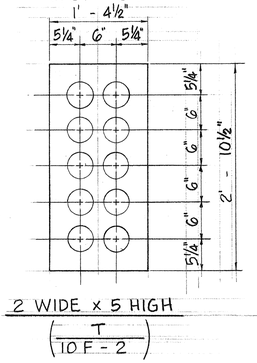
3 WIDE X 5 HIGH

$\left(\frac{T}{15F-3}\right)$



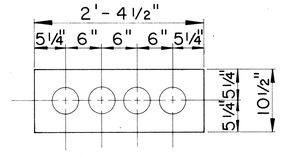
3 WIDE X 6 HIGH

$\left(\frac{T}{18F-3}\right)$



2 WIDE X 5 HIGH

$\left(\frac{T}{10F-2}\right)$



4 DUCTS

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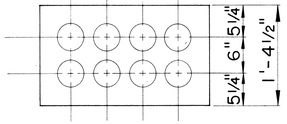
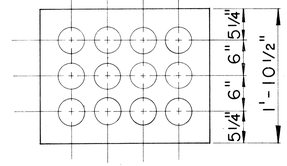


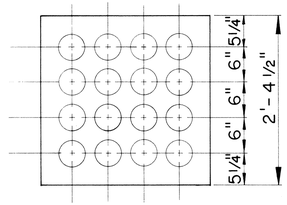
4 WIDE X 2 HIGH

$\left(\frac{T}{8F-4}\right)$



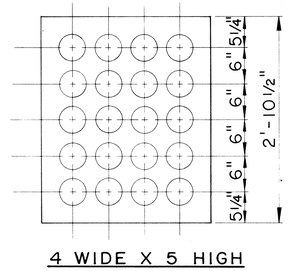
4 WIDE X 3 HIGH

$\left(\frac{T}{12F-4}\right)$



4 WIDE X 4 HIGH

$\left(\frac{T}{16F-4}\right)$

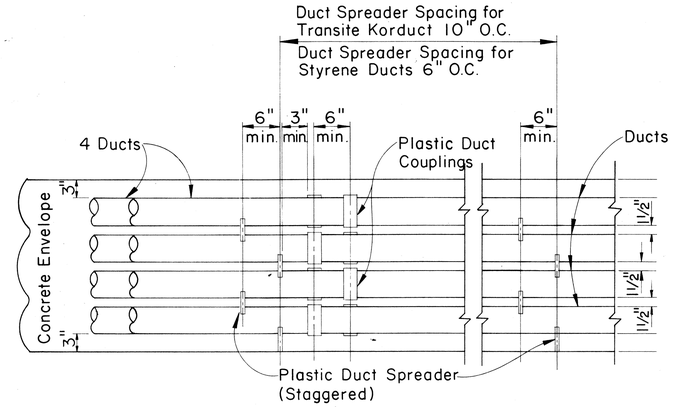


4 WIDE X 5 HIGH

$\left(\frac{T}{20F-4}\right)$

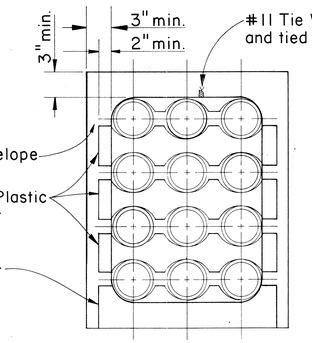
STANDARD DUCT FORMATIONS

Scale: 1"= 1'-0"



TYPICAL DUCT ENVELOPE ELEVATION ARRANGEMENT OF COUPLING & PLASTIC SPACERS

Scale: 1"= 1'-0"



NOTE:

1. The Contractor shall place #12 Fish Wire in designated duct throughout its entire length with protrusions of 2 feet in manholes & handholes at each end and 1 foot in pullboxes.

SECTION SHOWING SPACERS

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

$\left(\frac{T}{20F-4}\right)$

- Denotes H.T. Co.
- Denotes Number of ducts bottom layer
- Denotes 4 inch ducts
- Denotes Total Number Of Ducts

SYMBOL IDENTIFICATION

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

APPROVED:
Y. Yamada for Judd 7-30-70
Hawaiian Telephone Co., Ltd. Date

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

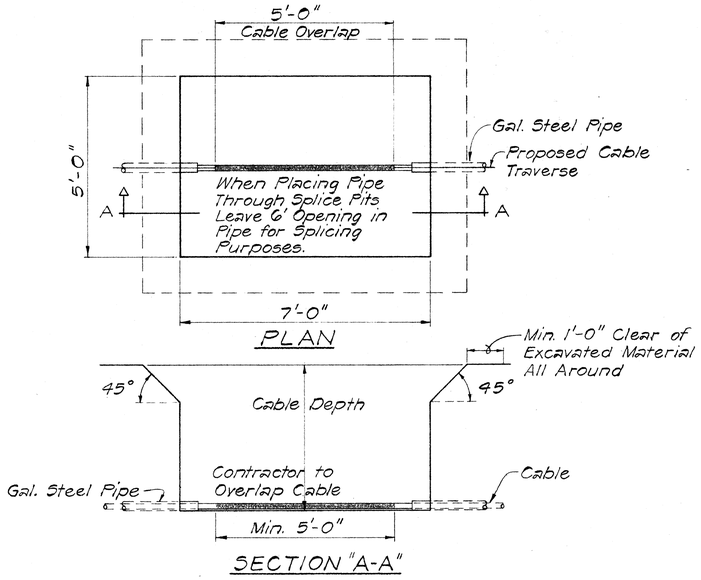
STANDARD DUCT FORMATIONS

Scale: As Shown Date: 6/8/70

SHEET No. 26 OF 40 SHEETS

146

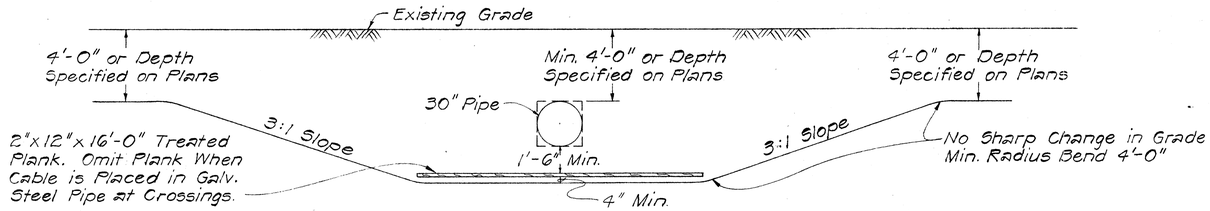
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(87);13	1970	147	244



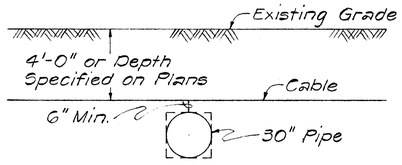
TYPICAL SPLICING PITS FOR BURIED CABLE

NOTES:

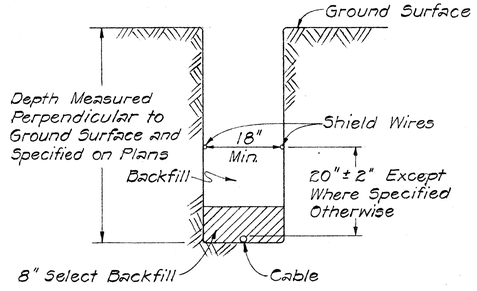
1. The Contractor shall dig pits at specified locations.
2. One face of pit shall be kept free of excavated material.
3. Where pits are located on sloping or irregular ground. The excavated material shall be placed in such a manner as to prevent surface water from draining into the pit.
4. Provide a 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.



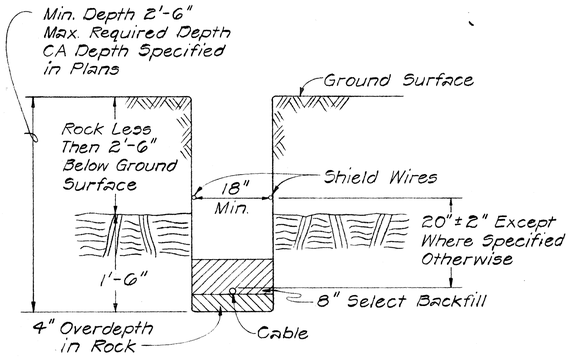
DETAIL OF CABLE CROSSINGS UNDER STORM CULVERTS - IRRIGATION PIPES, OTHER UTILITIES, OR FOREIGN PIPES



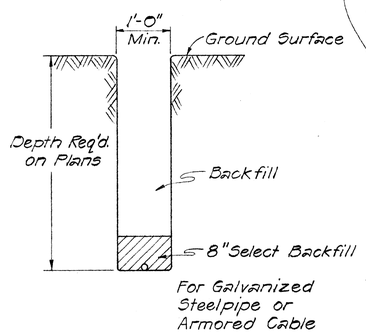
DETAIL OF CABLE CROSSINGS OVER STORM CULVERTS - IRRIGATION PIPES, OTHER UTILITIES, OR FOREIGN PIPES



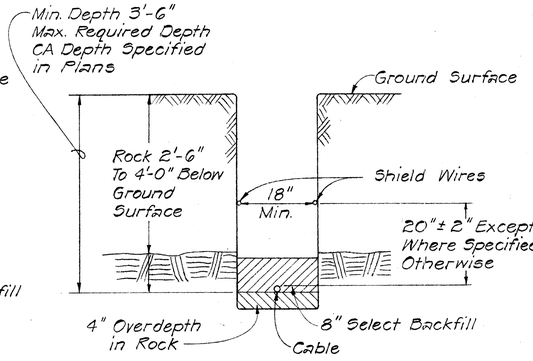
TYPICAL SECTION THROUGH NORMAL TRENCH



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

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

APPROVED:
G. Yamada for Judd 7-30-70
Hawaiian Telephone Co., Ltd. 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

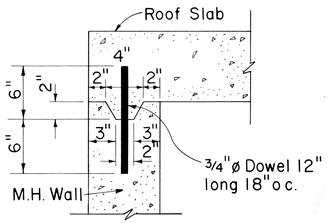
Scale: Not to Scale Date: 6/8/70

SHEET No. 270 OF 400 SHEETS

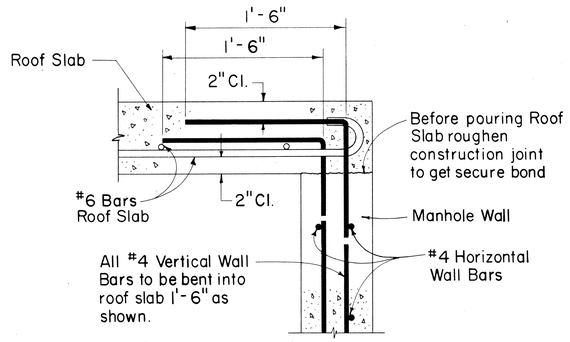
147

K+E CRYSTALENS® LA 2920 TRACING PAPER

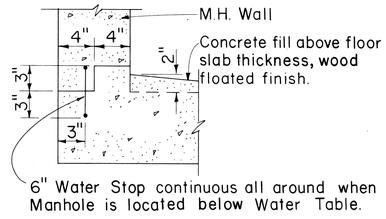
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(87)13	1970	148	244



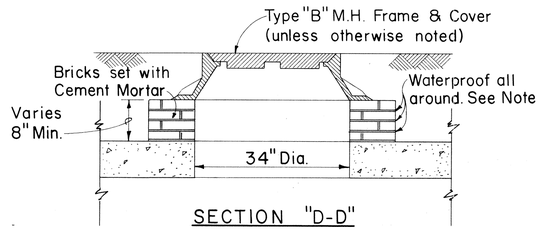
DETAIL "A"
TOP CONSTRUCTION JOINT
Scale: 1 1/2" = 1'-0"
(Optional for cast-in-place construction
Required for precast construction)



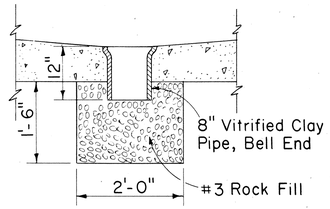
DETAIL "B"
(USED FOR CAST-IN-PLACE CONSTRUCTION)
Scale: 1 1/2" = 1'-0"



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

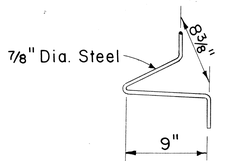


SECTION "D-D"
M.H. COVER DETAIL
Scale: 3/4" = 1'-0"

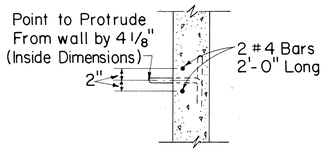


SECTION "E-E"
M.H. SUMP DETAIL
Scale: 3/4" = 1'-0"

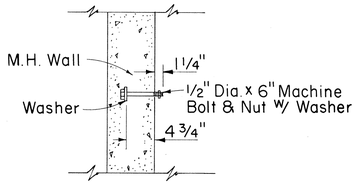
Note:
See Section "E1-E1" Below



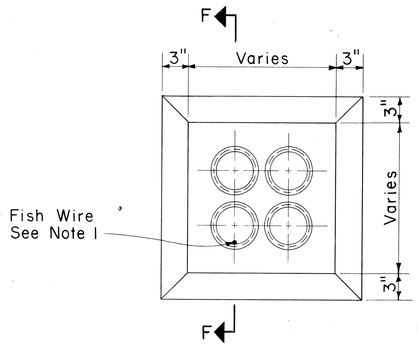
PULLING-IN IRON



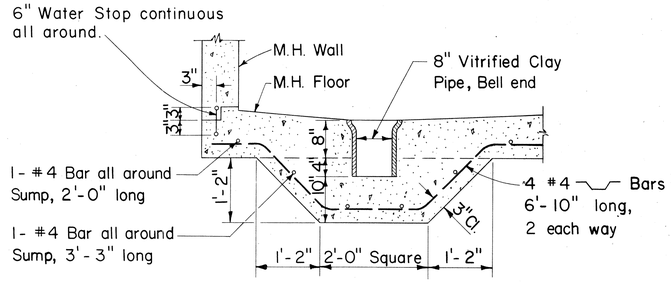
SECTIONAL VIEW OF PULLING-IN IRON
Scale: 3/4" = 1'-0"



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



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

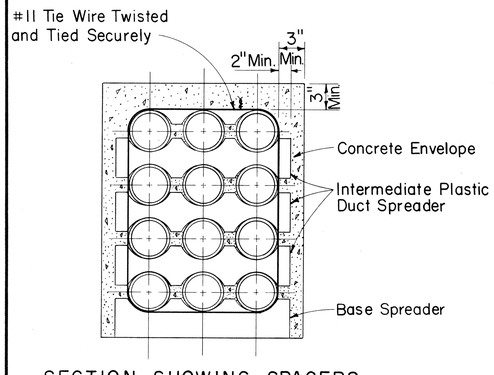


Note: Only for manholes located below water table

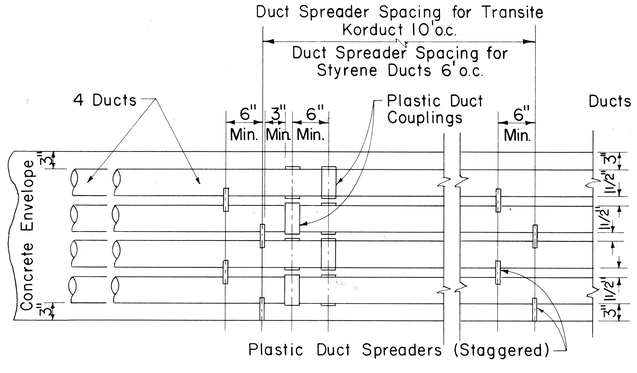
SECTION "E1-E1"
MANHOLE SUMP DETAIL
Scale: 3/4" = 1'-0"

NOTE

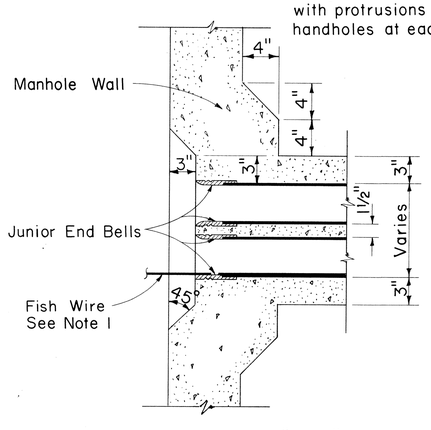
1. The Contractor shall place #12 Fish Wire in designated duct throughout its entire length with protrusions of 2 feet in manholes & handholes at each end and 1 foot in pullboxes.



SECTION SHOWING SPACERS



TYPICAL DUCT ENVELOPE ELEVATION
ARRANGEMENT OF COUPLING & PLASTIC SPACERS
Scale: 1" = 1'-0"



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

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

APPROVED:

H. Yamada for Judd — 7-30-70
Hawaiian Telephone Co., Ltd. — Date

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS

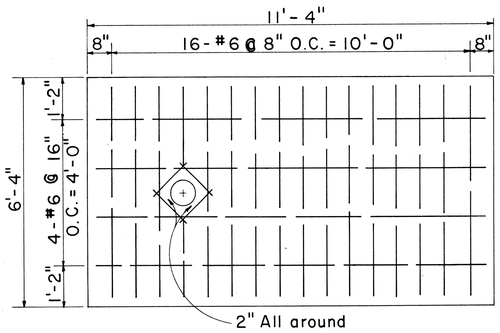
TYPE "A" MANHOLE AND MISCELLANEOUS TELEPHONE DETAILS

Scale: As Noted — Date: 6/8/70

SHEET No. 28 OF 40 SHEETS

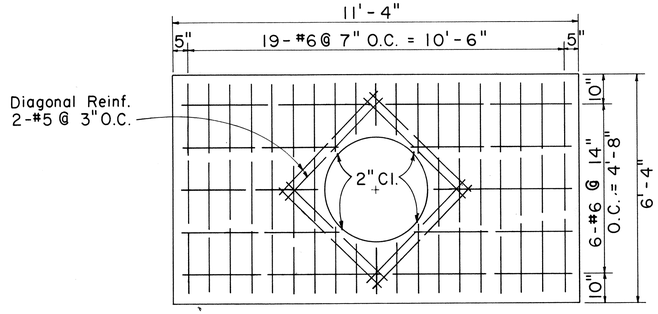
ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	" "
	TRACED BY	" "
NOTE BOOK	DESIGNED BY	
	QUANTITIES BY	
No.	CHECKED BY	

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(67);13	1970	149	244



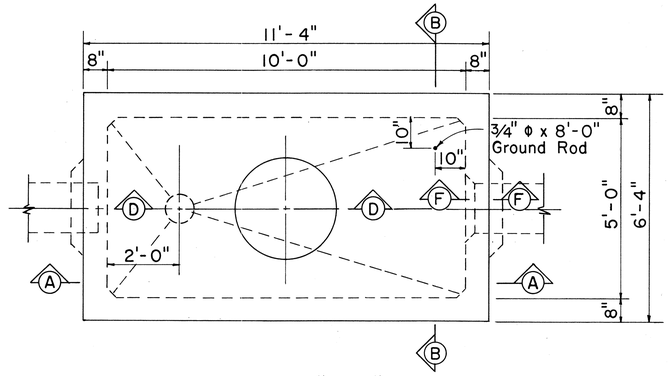
FLOOR SLAB REINF. PLAN

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



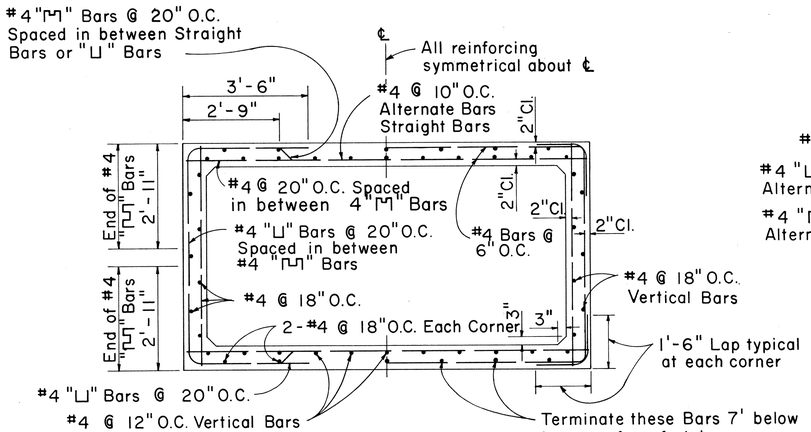
ROOF SLAB REINF. PLAN

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



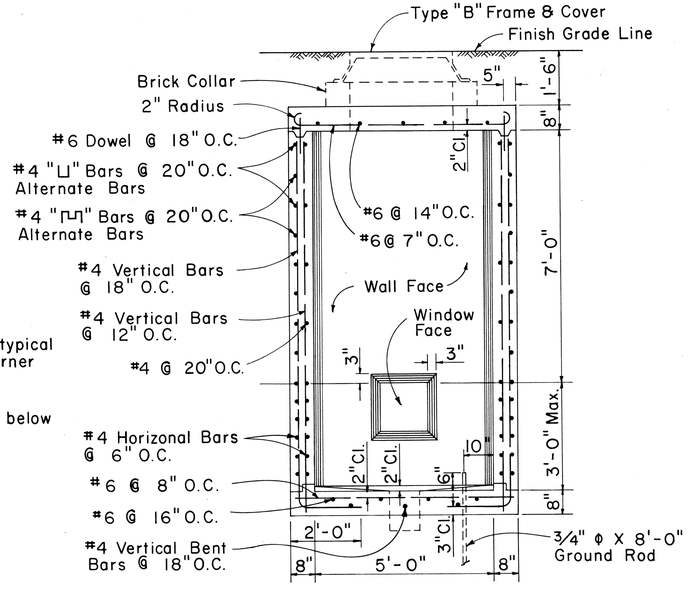
PLAN - M.H. TYPE "A-3" SERIES FOR ROADWAY & SIDEWALK AREAS

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



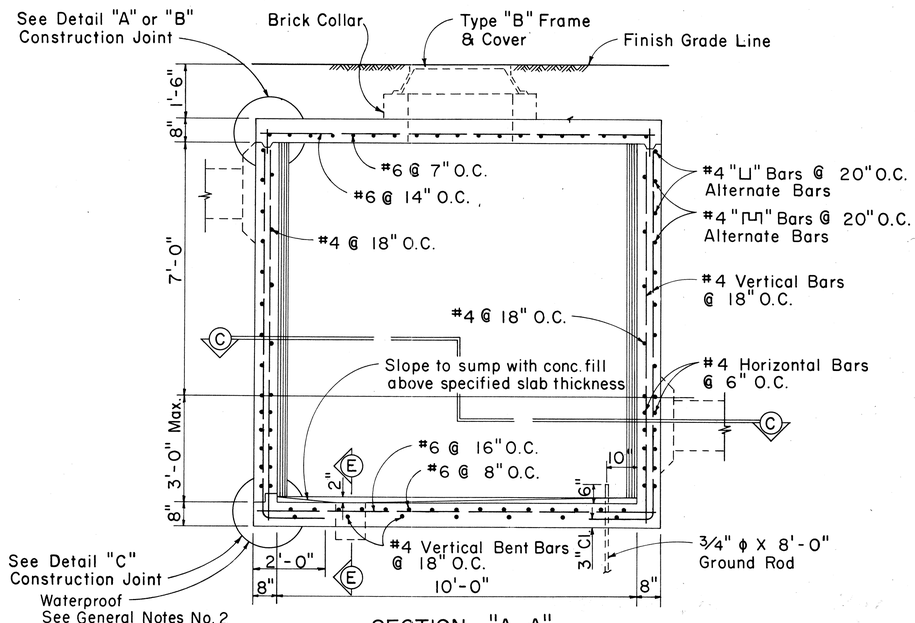
SECTION "C-C"

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



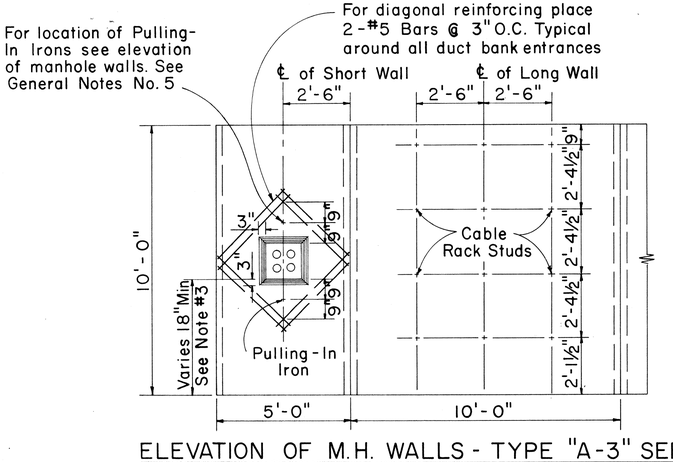
SECTION "B-B"

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



SECTION "A-A"

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



ELEVATION OF M.H. WALLS - TYPE "A-3" SERIES

(OPPOSITE FACES SIMILAR)

Scale: 3/8"=1'-0"

GENERAL NOTES:

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

Manhole Classification
Width & Length Designation "3" = 5.0' x 10.0'
Manhole Headroom

TYPE "A-3"-7.5'
8.0
8.5
9.0
9.5
10.0

APPROVED:

Y. Yamada for Judd 7-30-70

Hawaiian Telephone Co., Ltd. Date

H.T. Co., Ltd. Drawing No. 34065

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

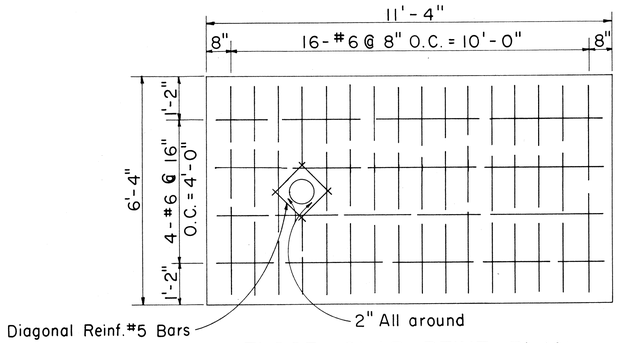
TYPE "A-3" MANHOLES FOR 7.5' TO 10.0' HEADROOM

Scale: As Noted Date: 6/8/70

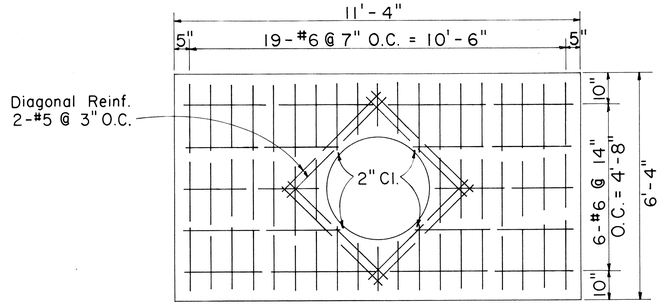
SHEET No. 29U OF 40U SHEETS

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

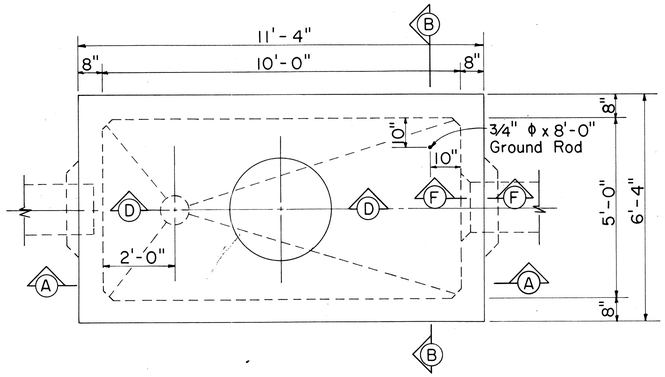
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(87):13	1970	150	244



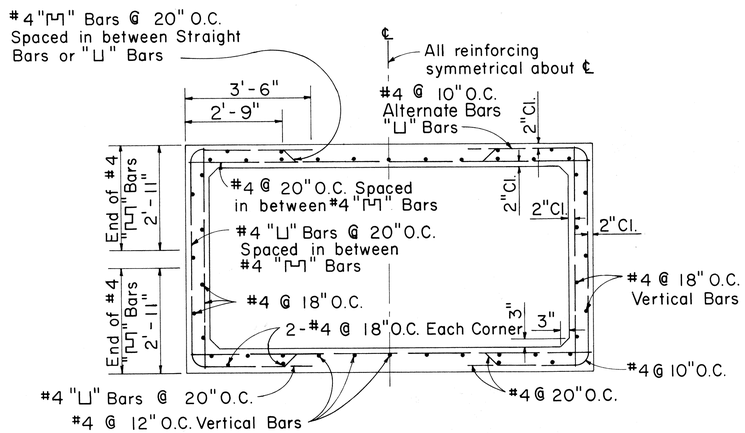
FLOOR SLAB REINF. PLAN
Scale: 1/2"=1'-0"



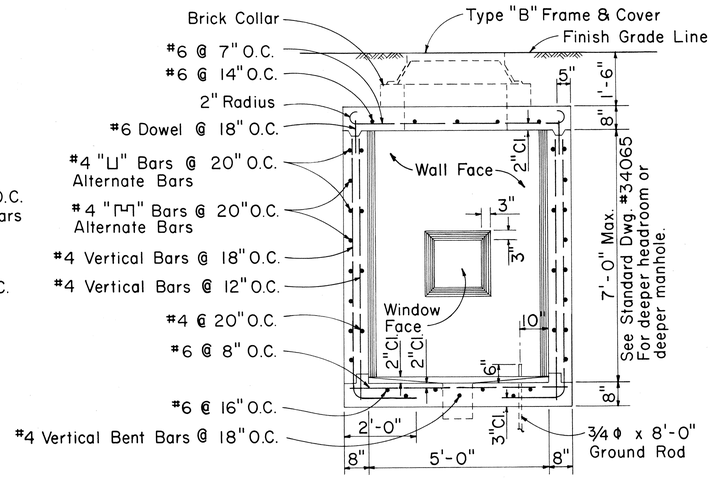
ROOF SLAB REINF. PLAN
Scale: 1/2"=1'-0"



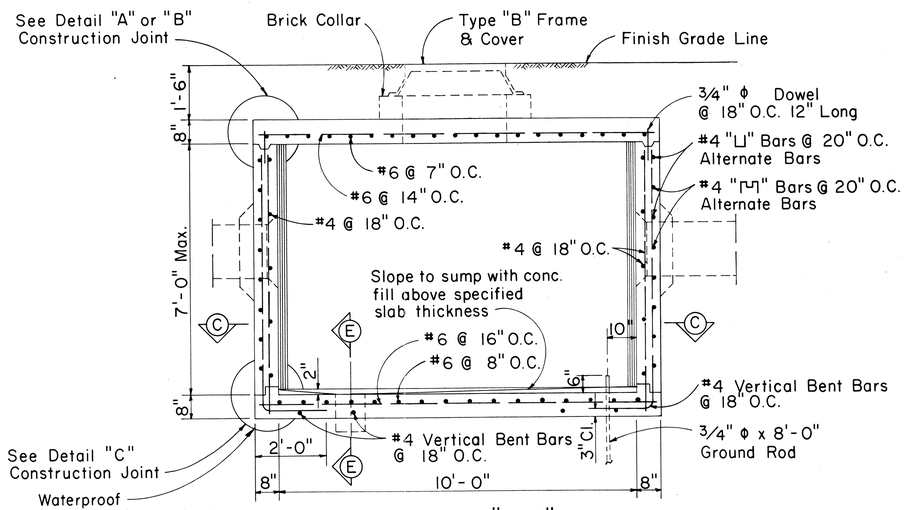
PLAN - M.H. TYPE "A-3" SERIES
FOR ROADWAY & SIDEWALK AREAS
Scale: 1/2"=1'-0"



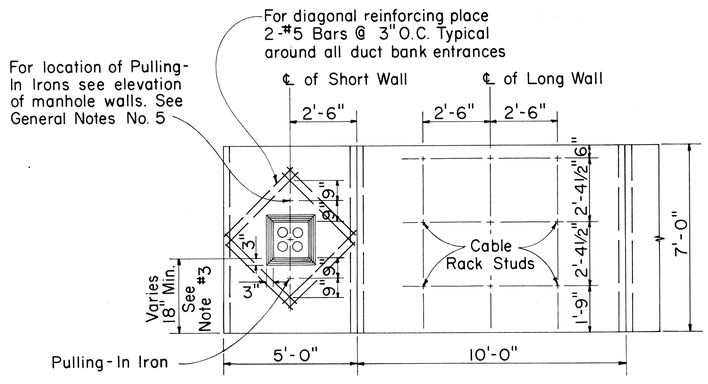
SECTION "C-C"
Scale: 1/2"=1'-0"



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



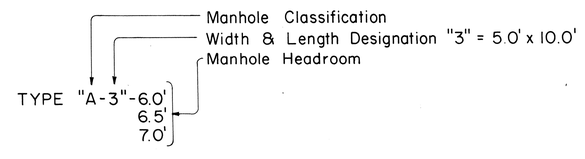
SECTION "A-A"
Scale: 1/2"=1'-0"



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

GENERAL NOTES:

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



APPROVED:

H.J. Yamada for Judd 7-30-70
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

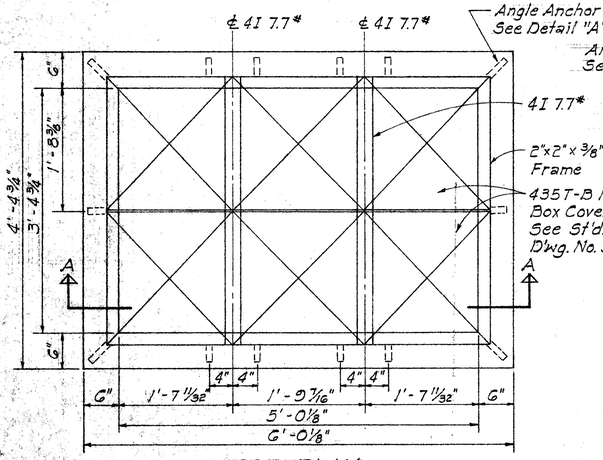
Scale: As Noted Date:

SHEET No. 30U OF 40U SHEETS

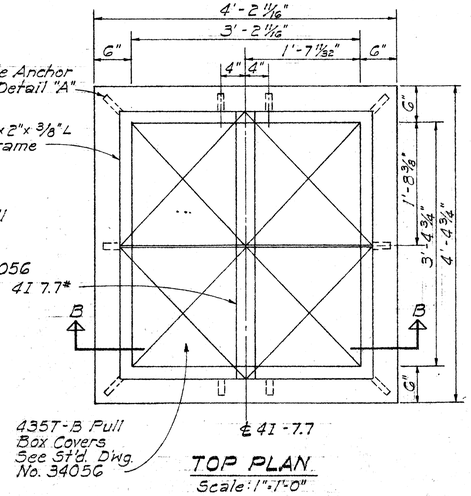
ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	
	TRACED BY	
NOTE BOOK	DESIGNED BY	
	QUANTITIES BY	
No.	CHECKED BY	

150

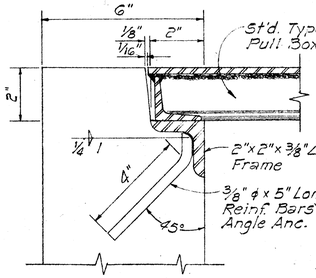
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(87)17	1970	150A	244



TOP PLAN
Scale: 1"=1'-0"

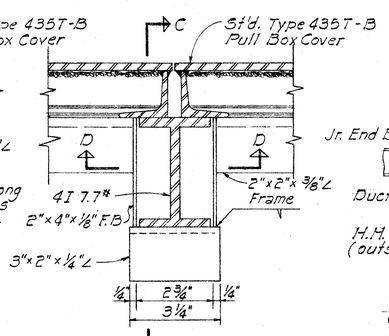


TOP PLAN
Scale: 1"=1'-0"

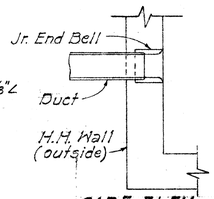


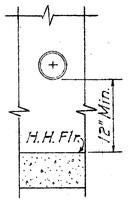
NOTE:
Section is typical

DETAIL "A"
Scale: 3/8"=1"



DETAIL "B"
Scale: 3/8"=1"

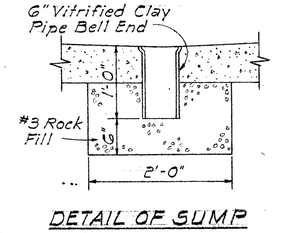




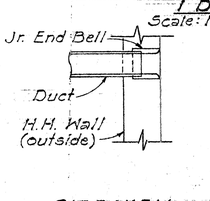
SIDE ELEV. OR TOP PLAN

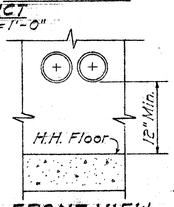
FRONT VIEW

1 DUCT
Scale: 1"=1'-0"



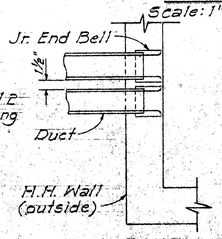
DETAIL OF SUMP
Scale: 1"=1'-0"

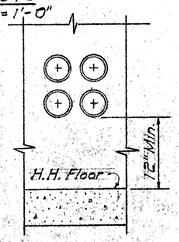




SIDE VIEW FRONT VIEW

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

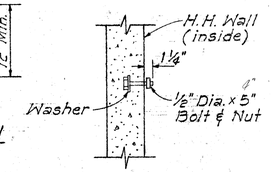




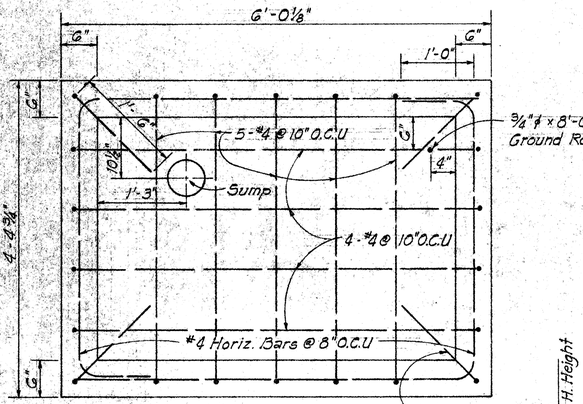
SIDE VIEW OR TOP PLAN

FRONT VIEW

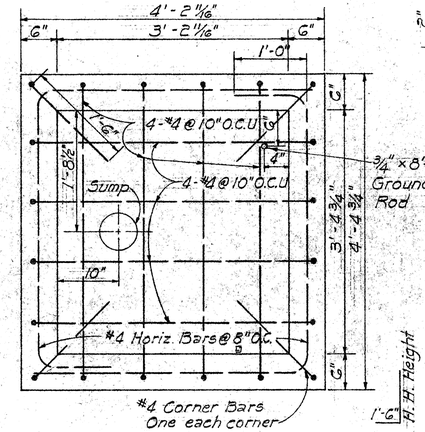
4 DUCTS
Scale: 1"=1'-0"



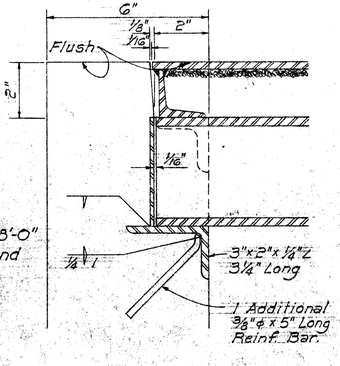
CABLE RACK STUD BOLT DETAIL
Scale: 1"=1'-0"



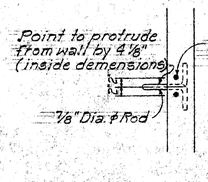
FLOOR PLAN
Scale: 1"=1'-0"



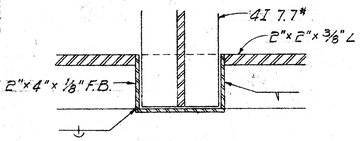
FLOOR PLAN
Scale: 1"=1'-0"



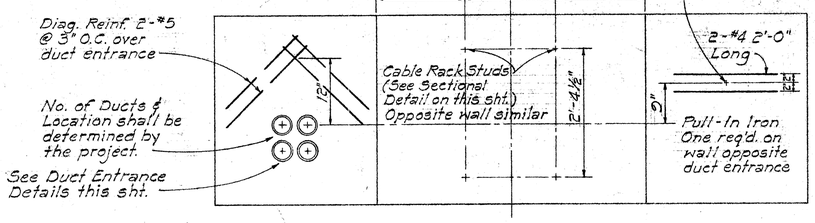
SECTION "C-C"
Scale: 3/8"=1"



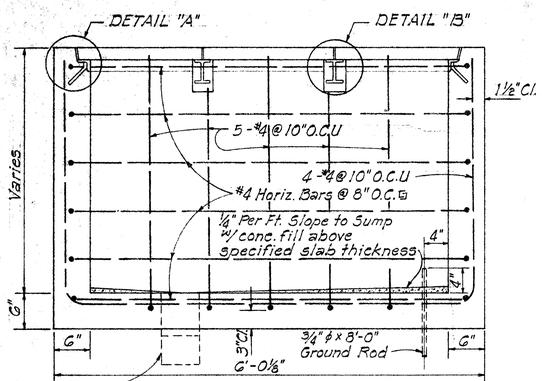
SECTIONAL ELEV. OF PULL-IN IRON
Scale: 3/4"=1'-0"



SECTION "D-D"
Scale: 3/8"=1"

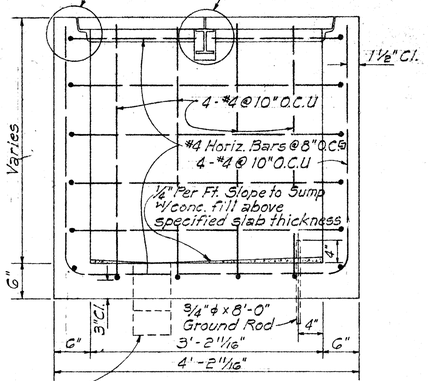


DUCT ENTRANCE DETAILS



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

HANDHOLE TYPE #1
(3'-4 3/4" x 5'-0 1/8" inside)



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

HANDHOLE TYPE #2
(3'x4 3/4" x 3'-2 1/16" inside)

GENERAL NOTES:

1. Concrete finish: floors - wood floated finish - exposed wall surfaces and edges - smooth and free from defects.
2. Concrete to develop compressive strength - 3000 p.s.i in 28 days.
3. Steel work all structural steel shall be hot dip galvanized after fabrication.
4. For duct line construction standards, see std. dwg. No. 34028.
5. These handholes are designed for installation in areas other than roadways.

ELEV. OF INSIDE WALLS - H.H. TYPE 1 & 2
Scale: 3/4"=1'-0"

APPROVED:
HAWAIIAN TELEPHONE CO, LTD.
10-28-70
DATE

H.T. Co., Ltd. Drawing No. 34029

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD HANDHOLE TYPE #1 & 2 USING TYPE 435T-B PULLBOX COVERS

Scale: As Shown Date:

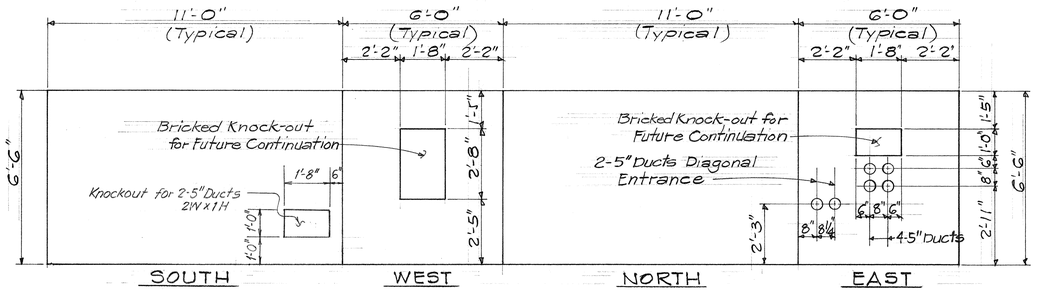
SHEET No. OF SHEETS

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

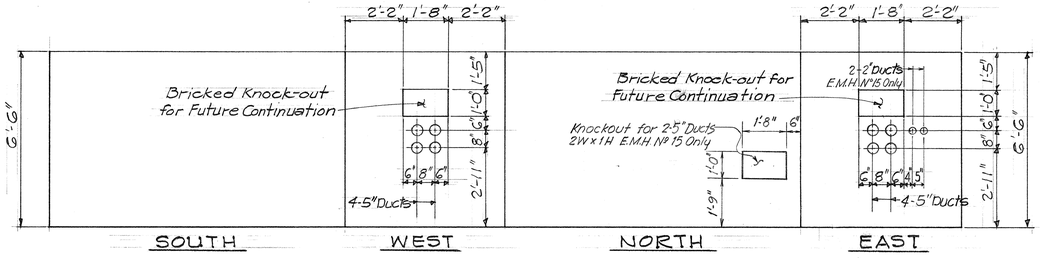
PRINTED ON NO. 1000H CLEARPRINT

150A

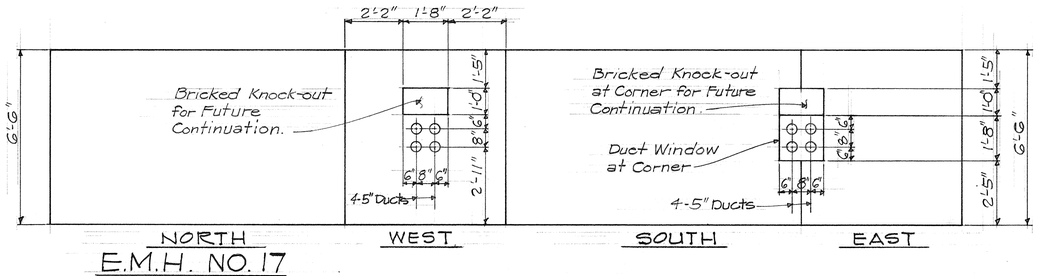
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(81):13	1970	151	244



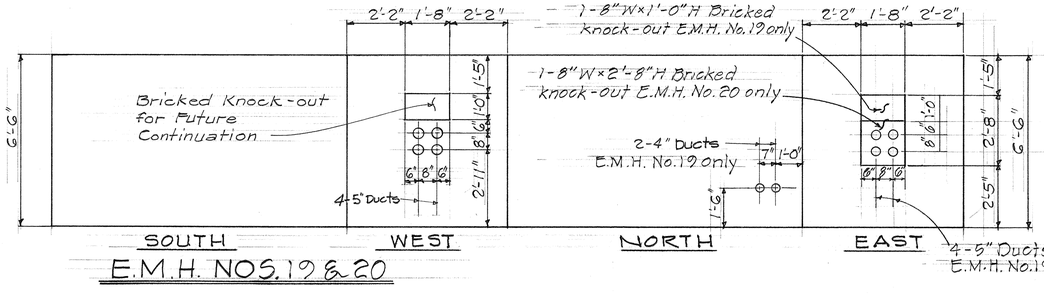
E.M.H. NO.13



E.M.H. NOS. 15, 16 & 18

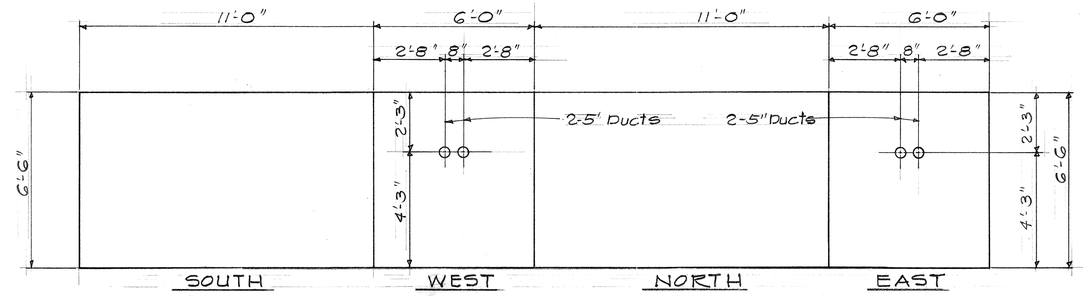


E.M.H. NO. 17

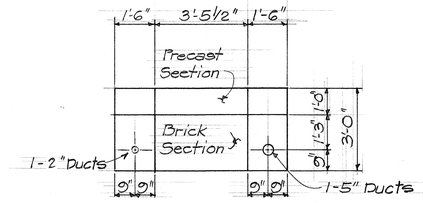


E.M.H. NOS. 19 & 20

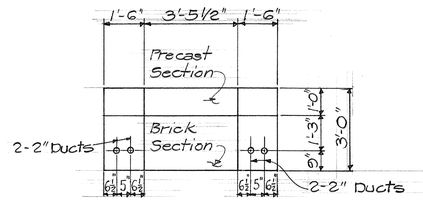
TYPE I (6'-0" x 11'-0") MANHOLES IN UTILITY CORRIDOR



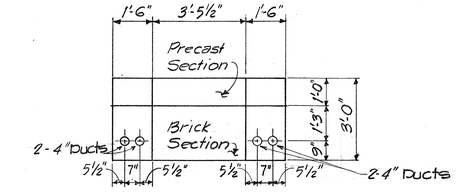
E.H.H. NO.14 AT ULUNE STREET TYPE G11 (6'-0" x 11'-0")



E.S.B. NO. 14A AT ULUNE STREET



E.S.B. 15A AT H.T.-T.P. REPEATER STATION



E.S.B. NO. 19A AT HALAWA PARK

APPROVED:

HAWAIIAN ELECTRIC CO. JK — DATE 8/28/70

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.E.CO. MANHOLE WALL ELEVATIONS

Scale: 3/8" = 1'-0" Date:

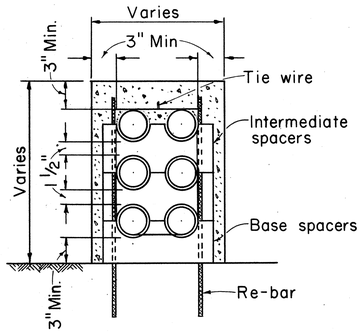
SHEET No. 31U OF 40U SHEETS

151

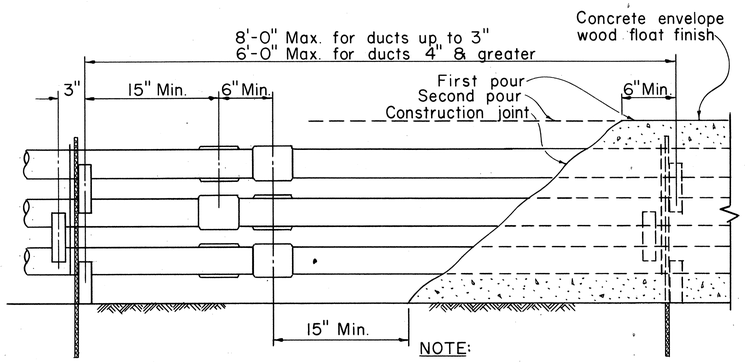
ORIGINAL PLAN	DATE
	SURVEY PLOTTED BY
	DRAWN BY
	TRACED BY
NOTE BOOK	DESIGNED BY
No.	QUANTITIES BY
	CHECKED BY

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(67);13	1970	152	244



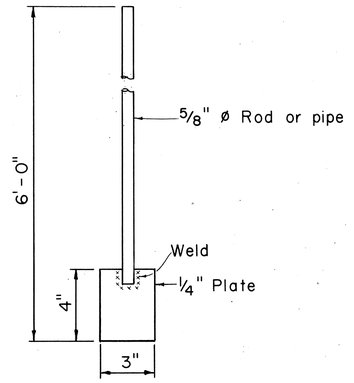
SECTION



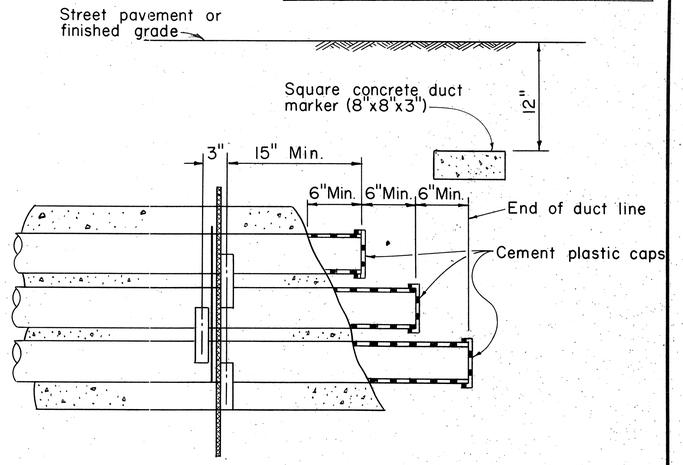
ELEVATION

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.

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

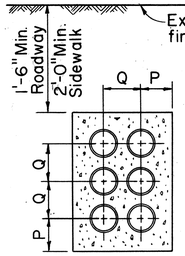


HAND SPADE
Scale: 3" = 1'-0"



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

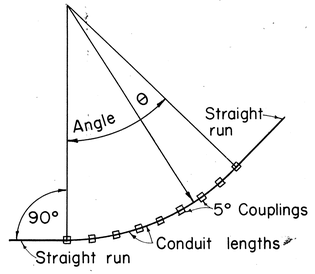
NOTE:
1. Maintain 1½" minimum spacing between conduit; 3" minimum concrete envelope around top, bottom & sides.
2. Dimensions are minimum dimensions.



DUCT SIZE	DIMENSIONS (INCHES) P	Q
2	4 ¼	4 ⅛
3	4¾	5 ⅛
4	5 ¼	6 ¼
5	5⅞	7⅝

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

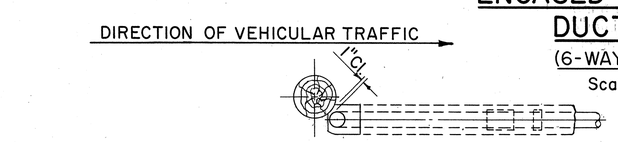


EXAMPLE:
Radius of bend (R) = 60'
Angle of bend (θ) = 45°
From Table A, the nearest value to 60' radius is 57'-6". Length of conduit = 5'.
From Table B, for 45° angle.
Number of couplings required = 9
Number of conduit lengths required = 8

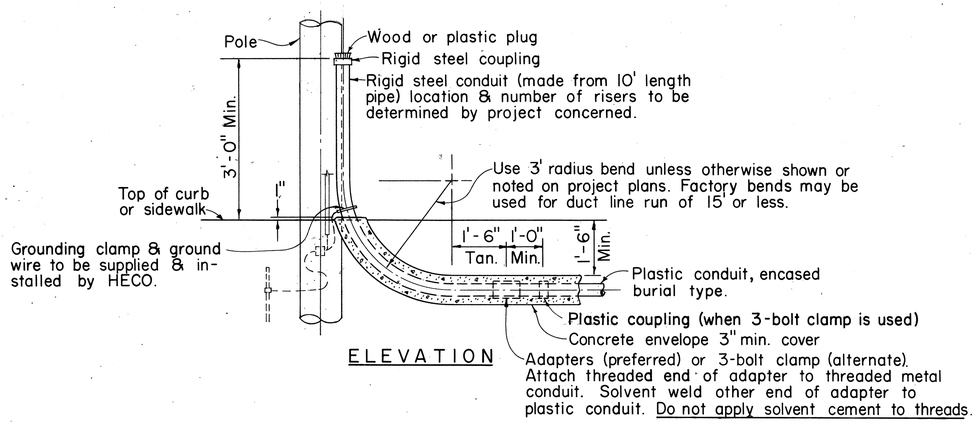
TABLE "B"		
ANGLE OF BEND θ	NO. OF COUPLINGS	LENGTH OF CONDUIT
15°	3	2
30°	6	5
45°	9	8
60°	12	11
75°	15	14
90°	18	17

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

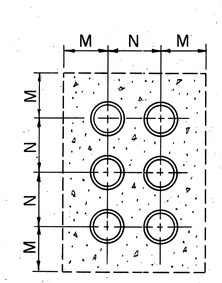


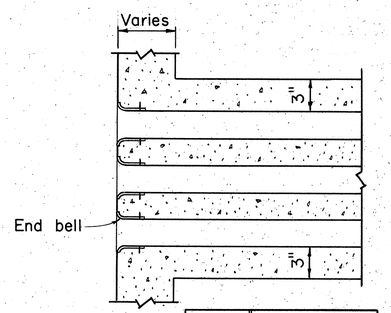
PLAN



ELEVATION

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





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

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

APPROVED:
Hawaiian Electric Co., Inc. 9/15/70 Date

HECo., Inc. Drawing Number
20191

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

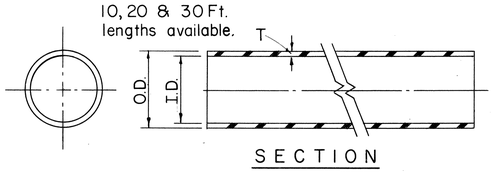
CONSTRUCTION STANDARDS
PLASTIC CONDUIT
UNDERGROUND DUCT LINES

Scale as noted

SHEET No. 32U OF 40U SHEETS

152

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-(87)-12	1970	153	244

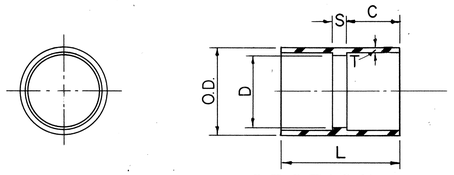


SECTION

CONDUIT

CONDUIT SIZE	EB (ENCASED BURIAL) HECO CODE	O.D.	I.D.	T (MIN.)	WEIGHT #/10² FT.	DB (DIRECT BURIAL) HECO CODE	O.D.	I.D.	T (MIN.)	WEIGHT #/10² FT.
2	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

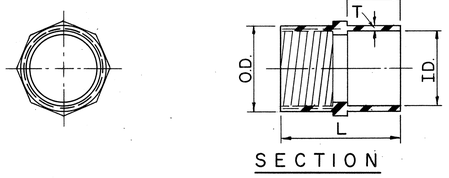
NOTE:
Type EB & DB Conduits have same O.D. for a given size. All fittings which go over Conduits are DB type & fit both types of Conduits.



SECTION

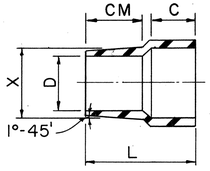
COUPLING

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



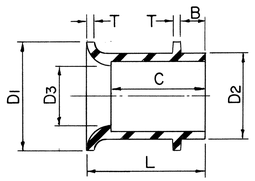
SECTION

ADAPTER - PLASTIC TO STEEL



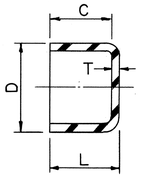
SIZE	HECO CODE	L	X	C.M.	D	C
2	29034	3 1/16	2.580	1 3/4	2.18	1.16
3	29036	3 19/32	3.620	1 3/4	3.09	1.63
4	29038	4 1/32	4.620	2	4.03	1.78
5	29040					

ADAPTER - PLASTIC TO TRANSITE (ASBESTOS-CEMENT)



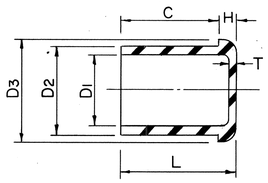
SIZE	HECO CODE	D1	D2	D3	B	C	L	T
2	29042	3.01	2.520	2.255	.50	1.16	1.54	.060
3	29044	4.10	3.680	3.350	.75	1.63	2.00	.075
4	29046	5.31	4.725	4.310	.75	1.78	2.28	.095
5	29048	6.36	5.805	5.363	1.00	1.97	2.47	.100

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

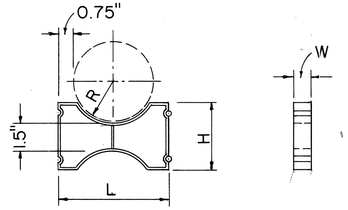
CAP (RIGID) - FOR SEMI-PERMANENT USE



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

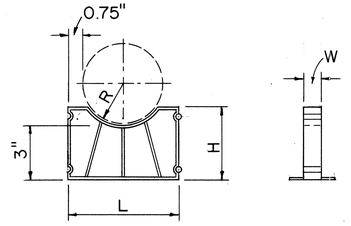
CAP (TEMPORARY)

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



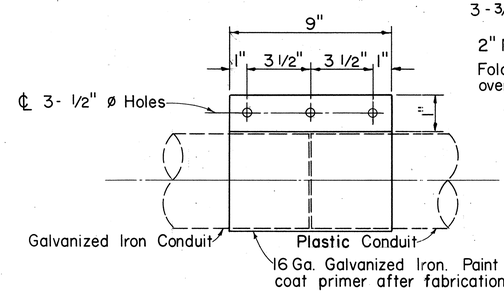
SIZE	HECO CODE	L	W	H	R
2	29066	4.00	1	2.75	1.188
3	29068	5.00	1	3.25	1.750
4	29070	6.13	1	3.75	2.250
5	29072	7.50	1	4.25	2.782

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:
WKC 1500 9/15/70
Hawaiian Electric Co., Inc. Date

HECo., Inc. Drawing Number
42276

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS
ACCESSORY DETAILS FOR PLASTIC CONDUIT UNDERGROUND DUCT LINES

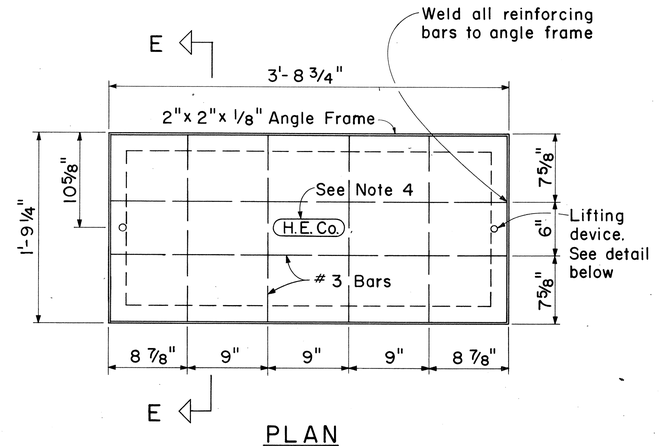
Scales: Not to Scale

SHEET No. 330 OF 400 SHEETS

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

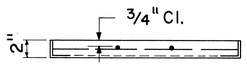
153

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(87):13	1970	154	244



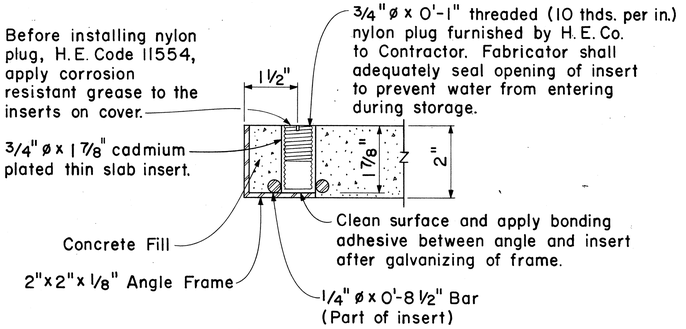
PLAN

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



SECTION E-E

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



LIFTING DEVICE DETAIL

Scale: 1/2 Actual Size

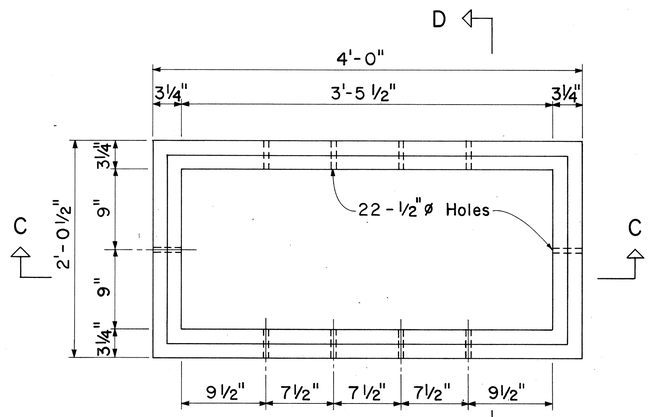
CONCRETE COVER FOR 1'-6" x 3'-5 1/2" SERVICE BOX

NOTES:

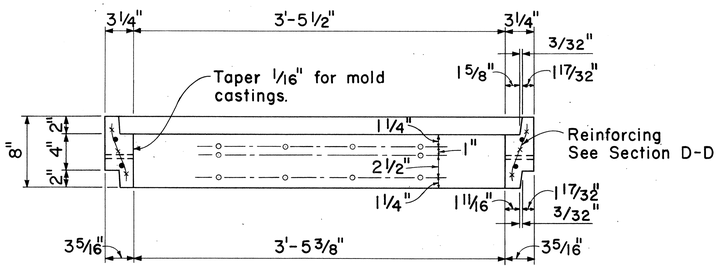
1. Galvanize Angle Frame per ASTM 153 (as amended to date) after fabrication.
2. Concrete compressive strength = 3,000 psi in 28 days.
3. Finished surface shall be broomed or roughened per City & County or State Standards for sidewalks.
4. Company identification marking stamped on Cover.
5. "Contractor Furnished" item.

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

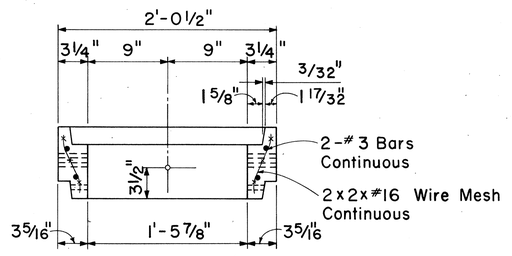
H.E. Co. DWG. NO. 011312



PLAN



SECTION C-C



SECTION D-D

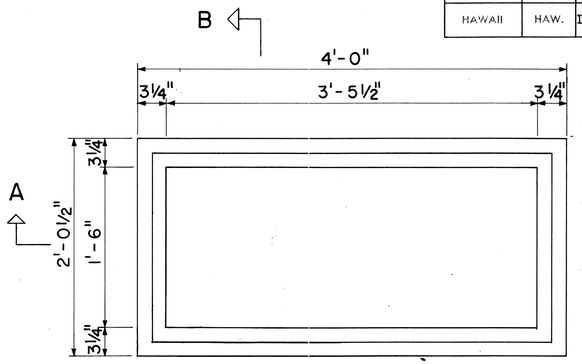
CONCRETE SERVICE BOX EXTENSION 1'-6" x 3'-5 1/2" x 0'-8" DEPTH

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

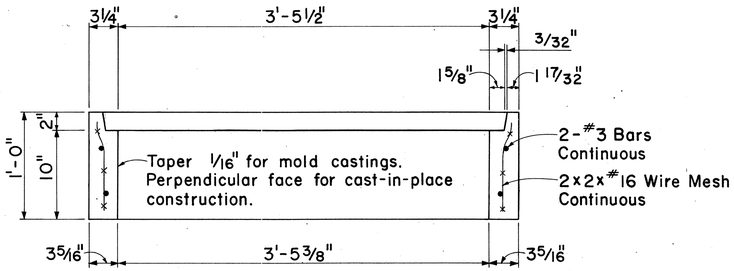
NOTES:

1. Concrete compressive strength = 3,000 psi in 28 days.
2. Weight per section = 200 lbs. ±.
3. See Drawing 011312 for Concrete Cover.
4. "Contractor Furnished" item.

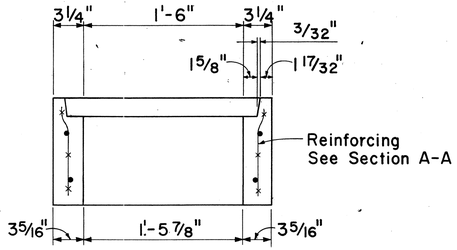
H.E. Co. DWG. NO. 011311



PLAN



SECTION A-A



SECTION B-B

CONCRETE SERVICE BOX BODY 1'-6" x 3'-5 1/2" x 1'-0" DEPTH

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

NOTES:

1. Concrete compressive strength = 3,000 psi in 28 days.
2. Weight of box = 412 lbs. ±
3. See Drawing 011312 for Concrete Cover.
4. "Contractor Furnished" item.

APPROVED:

HAWAIIAN ELECTRIC Co., Inc. HMO JK — 9/15/70 DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS
CONCRETE SERVICE BOX BODY, EXTENSION AND COVER

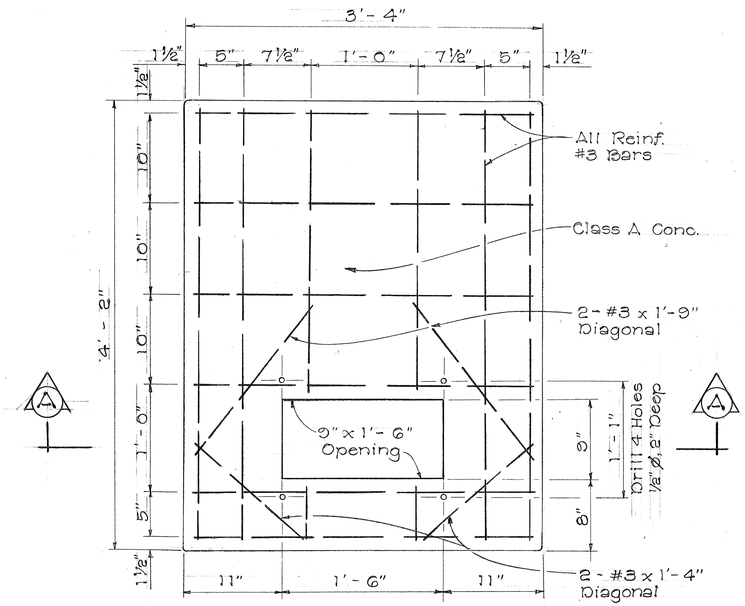
Scale: As Noted Date:

SHEET No. 34U OF 40U SHEETS

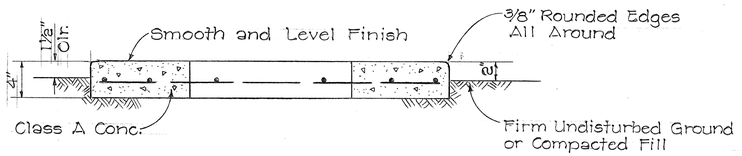
H.E. Co. DWG. NO. 011310

154

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(87)13	1970	155	244



PLAN



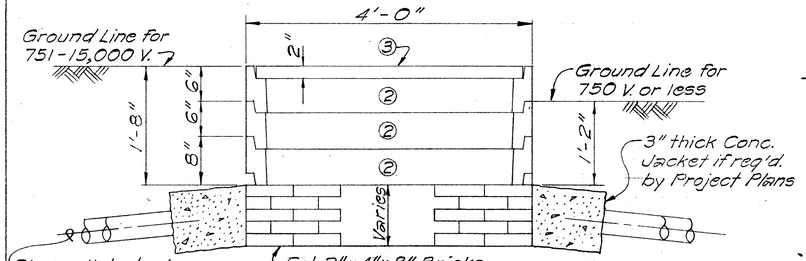
SECTION "A-A"

CONCRETE PAD FOR PADMOUNTED TRANS

Scale: 1½" = 1'-0"

(H.E. Co. CODE No. 11249)

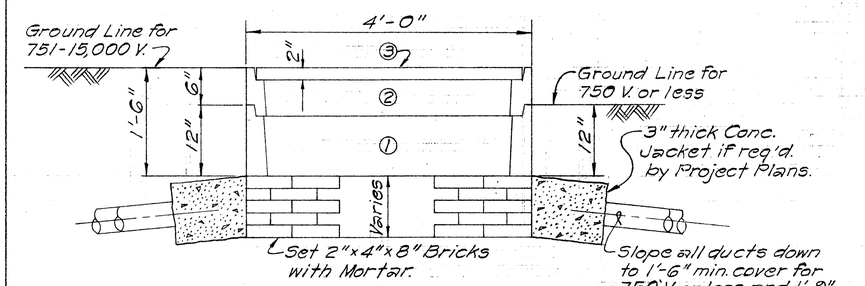
OUTSIDE DIMENSIONS OF BOX = 4'-0" x 2'-0½"



TYPICAL INSTALLATION USING SERVICE BOX EXTENSIONS

OPTIONAL ARRANGEMENT

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



TYPICAL INSTALLATION USING SERVICE BOX BODY & EXTENSION

PREFERRED ARRANGEMENT

NOTES:

1. Refer to Specification #1803532 (Construction of Standard Underground Facilities) sheets 1 and 2.
2. Refer to "Guide for Handhole Applications - 12 KV" for proper application of Service Box with type and size of 12 KV cable.
3. Contractor may either install the Preferred or Optional arrangements of Service Box units.

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

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

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

Scale: 1" = 1'-0"

APPROVED:

W K Sloo 9/15/70

Hawaiian Electric Co., Inc. Mgr. Date

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS

SERVICE BOX INSTALLATION

Scale: As Noted Date:

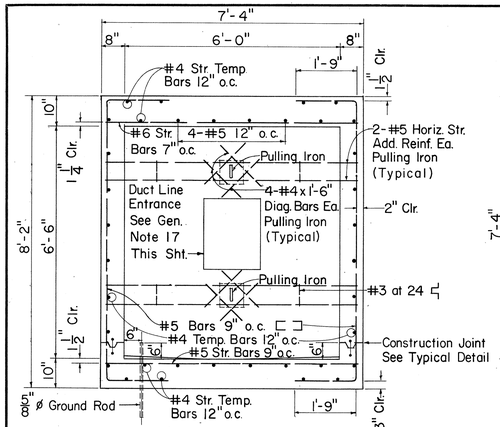
SHEET No. 35U OF 40U SHEETS

H.E. Co. DWG. NO. 011249

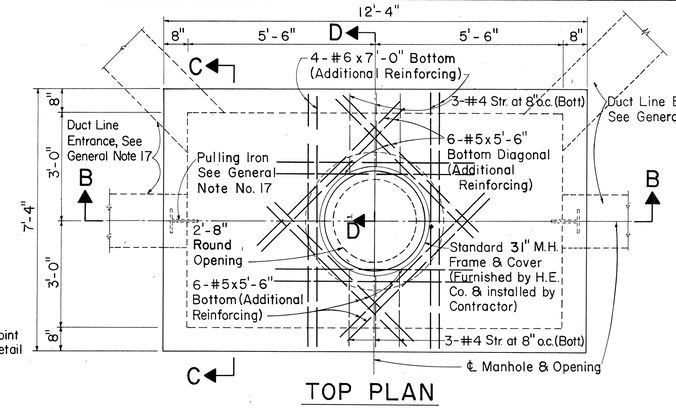
H.E. CO. DWG. NO. 13-5010

155

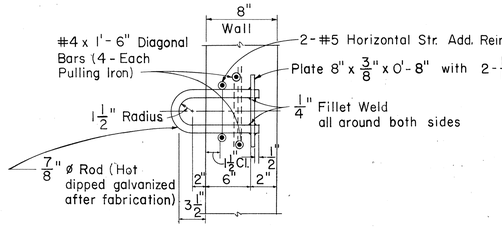
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAWAII	I-HI-(67):3	1970	156	244



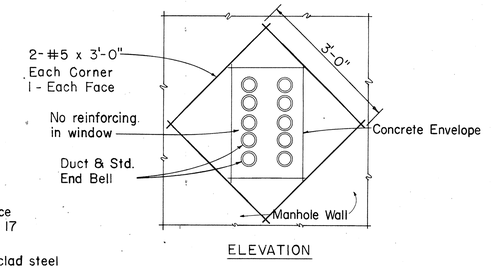
SECTION C-C



TOP PLAN



PULLING IRON DETAIL

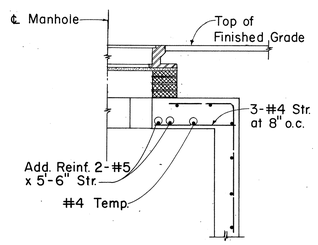


ELEVATION

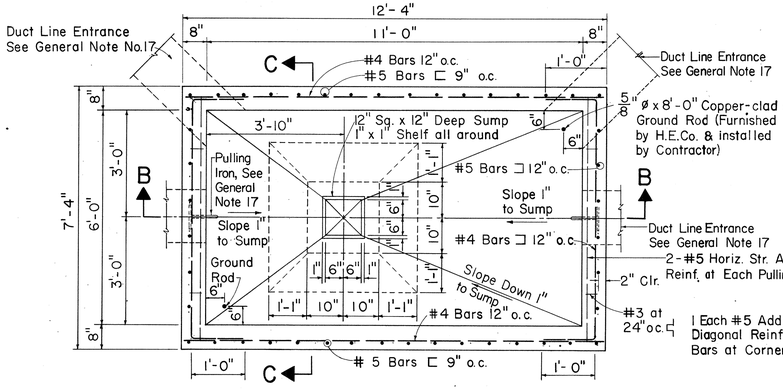
REINFORCING AT DUCT WINDOW

GENERAL NOTES

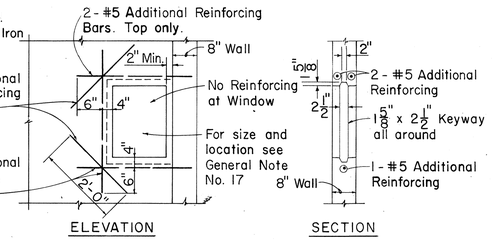
1. EXCAVATION : Excavate for manhole to accurate alignment, grades and dimensions as shown on drawings.
   All excavation must be approved by Engineering Dept. H.E. Co. before any concrete is poured.
   All excess cut shall be backfilled with concrete or approved aggregate.
2. BACKFILL : Remove all debris before backfilling. Backfill in accordance with latest specifications of Division of Highways, State of Hawaii.
3. All work to be done in dry.
4. Concrete shall be Class A **conforming to the requirements of Section 601 of the State Standard Specification.**
5. MIXING : Ready-Mixed A.S.T.M. C-94-47.
6. REINFORCING : Round deformed bars (clean and new).
   Grade 40 Billet Steel per ASTM A615.
7. **SPLICE : Lap 30 bar diameters unless otherwise shown.**
8. **CURING : Keep concrete moist at least 7 days after pouring (By approved method)**
9. FINISH : All surfaces smooth and free from defects.
   Top of manhole - wood floated. Manhole floor - steel troweled.
   Inside walls and ceiling - cement washed.
10. Install all inserts, including pulling irons, ground rods, etc, before pouring concrete.
11. POURING : Notify the H.E.Co. Contracting and Inspection Division, 24 hours before pouring any concrete. All concrete pouring shall be done in the presence of an H.E.Co. Engineer or Inspector.
12. FORMS : Make of good sound lumber, of sufficient strength, water tight and conforming to shape and dimensions indicated on drawings.
13. The Hawaiian Electric Co. Inc. to furnish and Contractor to 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

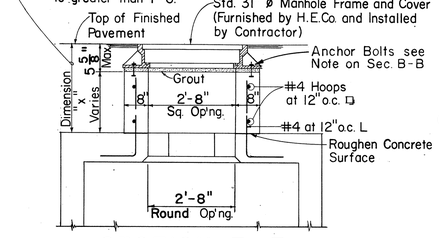


SECTIONAL PLAN A-A



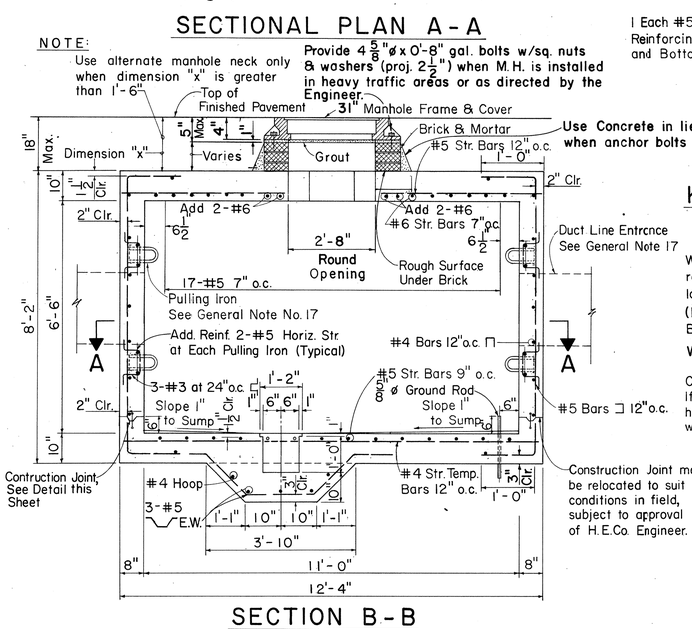
ELEVATION SECTION

PLAN



SECTION E-E

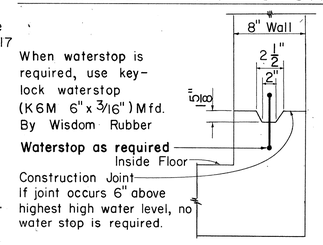
ALTERNATE MANHOLE NECK



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. 9/15/70 DATE

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

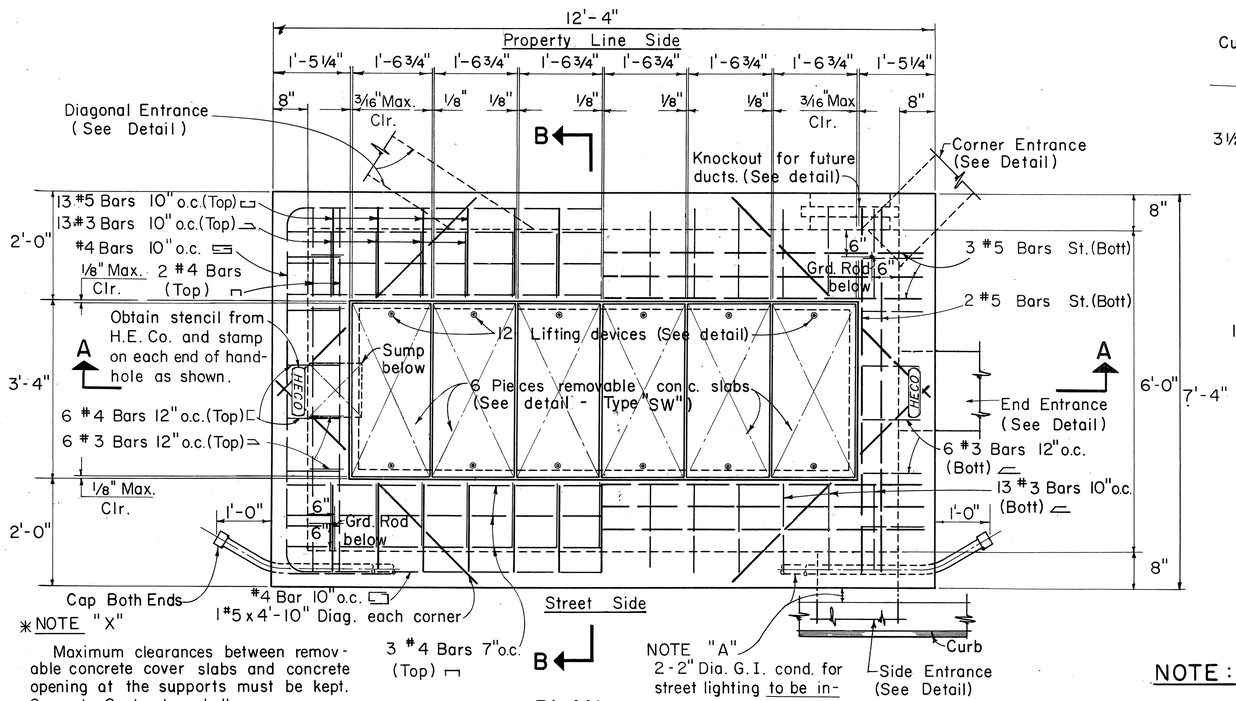
Scales: Not to Scale

SHEET NO. 36 OF 40 SHEETS

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

156

FED. AID DIST. NO.	STATE	FED AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAWAII	I-HI-I(87):13	1970	157	244



PLAN

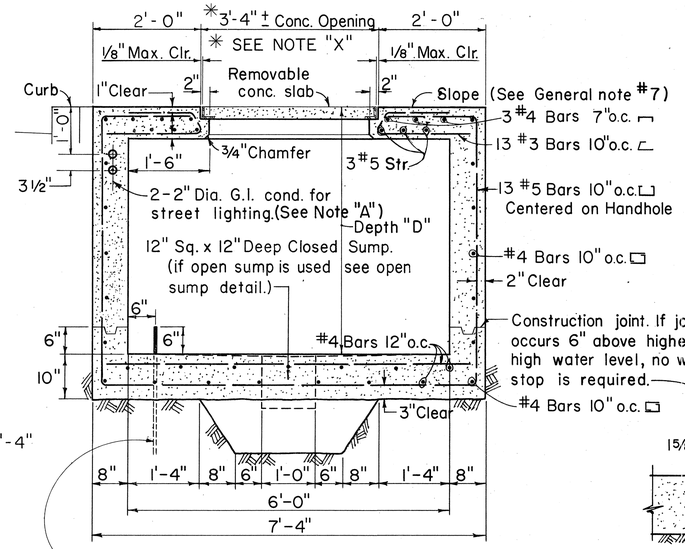
Scale: 3/4" = 1'-0"

✳NOTE "X"

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

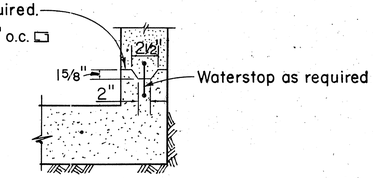
NOTE "A"

2-2" Dia. G.I. cond. for street lighting to be installed only when outside face of H.H. is less than 3" from curbing.



SECTION B-B

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

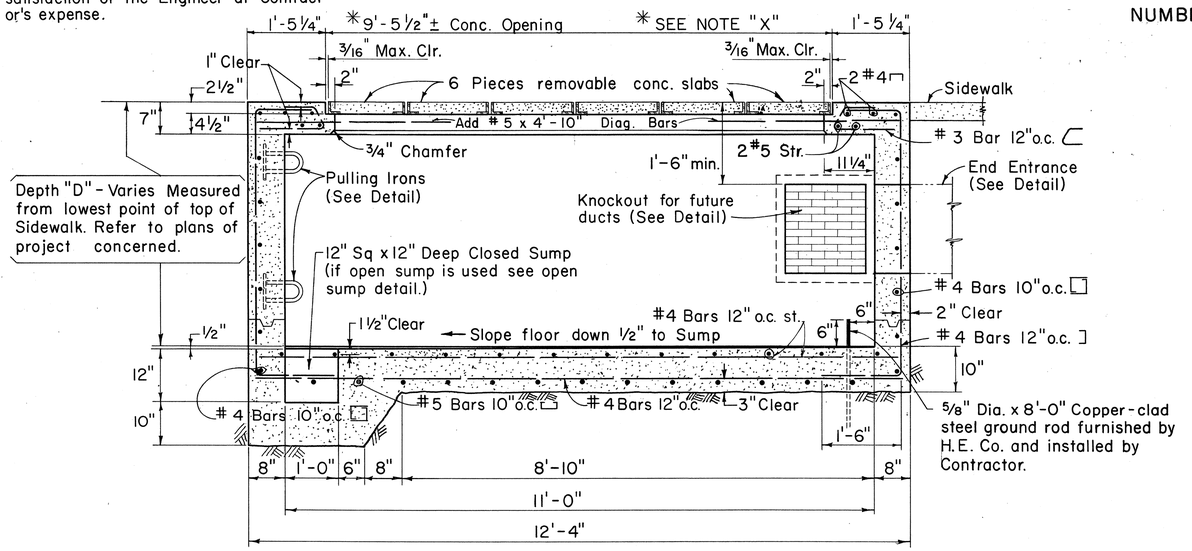


TYPICAL DETAIL OF CONSTRUCTION JOINT AND KEYWAY

Scale: 1"=1'-0"

NOTE:

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



SECTION A-A

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

REINFORCED CONCRETE QUANTITIES

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

Total Concrete	= 8.51 Cu. Yds.
Total Reinf. Steel	= 1,094 Lbs.
Total Misc. Steel	= 291 Lbs.

WEIGHT PER REMOVABLE CONCRETE SLAB

Concrete	= 150 Lbs.
Reinf. Steel	= 7 Lbs.
Misc. Steel	= 42 Lbs.
	Total 199 Lbs.

MATERIALS FOR 6" DEPTH OF 8" THICK WALL

Concrete	= 0.45 Cu. Yds.
Reinf. Steel	= 45 Lbs.

APPROVED:

WKCesao 9/15/70

HAWAIIAN ELECTRIC Co., Inc. Date

FOR USE IN AREAS NOT SUBJECT TO VEHICULAR TRAFFIC.

HECo., Inc. Drawing Number

18844 SHEET No. 1 OF 2 SHEETS

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS

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

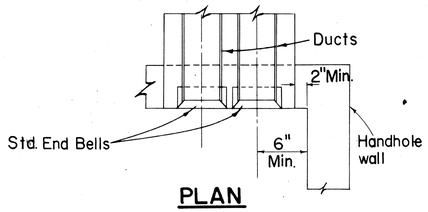
Scales: As Noted Date

SHEET NO. 37 OF 40 SHEETS

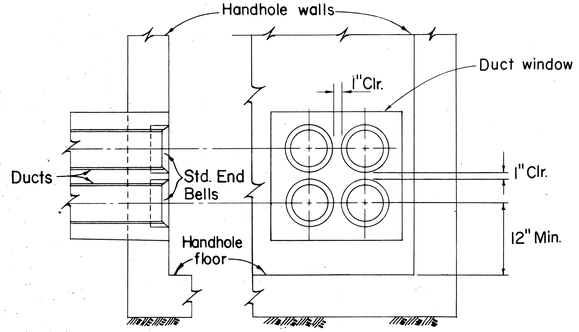
157

LIETZ 1103 ARKWRIGHT TRACING CLOTH 10-60 200P

FED. AID DIST. NO.	STATE	FED. AID. PROJECT	FISCAL YEAR	SHEET N	TOTAL SHEETS
HAWAII	HAWAII	[illegible]	1970	158	244



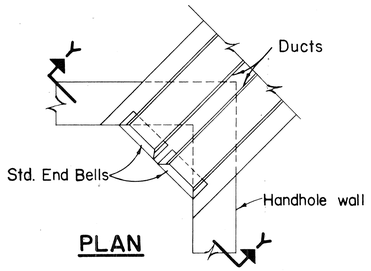
PLAN



SIDE ELEV. FRONT ELEV.

END & SIDE ENTRANCES

(FOUR WAY DUCT)



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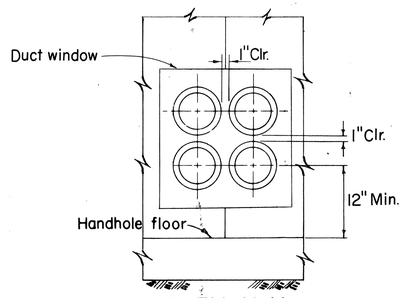
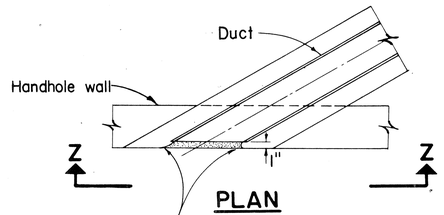


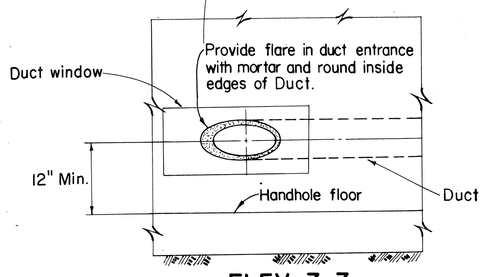
ELEV. Y-Y

CORNER ENTRANCE

(FOUR WAY DUCT)



PLAN



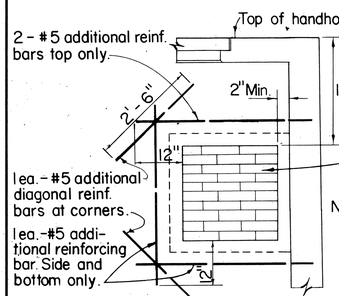
ELEV. Z-Z

DIAGONAL ENTRANCE

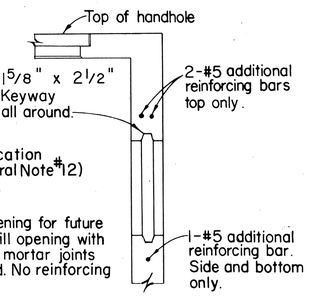
(ONE WAY DUCT)

TYPICAL DUCT LINE ENTRANCE DETAILS

NOT TO SCALE



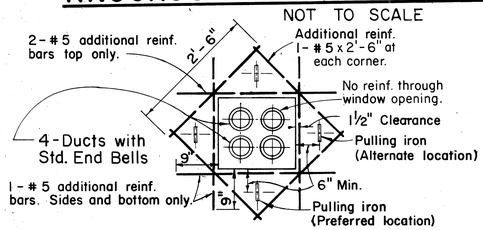
ELEVATION



SECTION

KNOCKOUT FOR FUTURE DUCT LINE

NOT TO SCALE

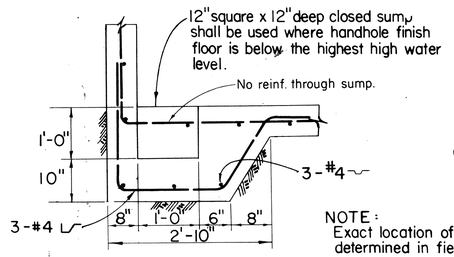


ELEVATION

TYPICAL DETAIL AT DUCT WINDOW

NOT TO SCALE

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

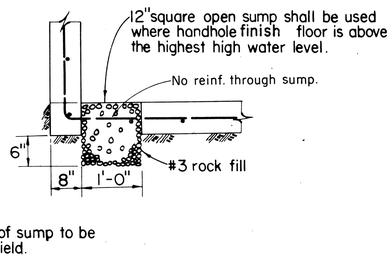


NOTE:
Exact location of sump to be determined in field.

SECTION ELEV.

CLOSED SUMP

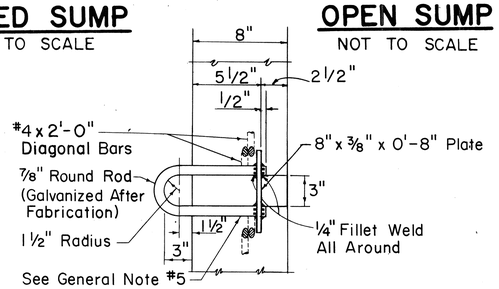
NOT TO SCALE



SECTION ELEV.

OPEN SUMP

NOT TO SCALE



SECTION ELEV.

PULLING IRON

NOT TO SCALE

GENERAL NOTES

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

FOR USE IN AREAS NOT SUBJECT TO VEHICULAR TRAFFIC.

APPROVED:

WKC 9/15/70

HAWAIIAN ELECTRIC Co., Inc. [illegible] DATE

HECo., Inc. Drawing Number	
18844	SHEET No. 2 OF 2 SHEETS

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS

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

Scales: As Noted Date

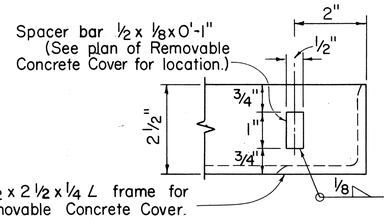
SHEET NO. 38 U OF 40 U SHEETS

155

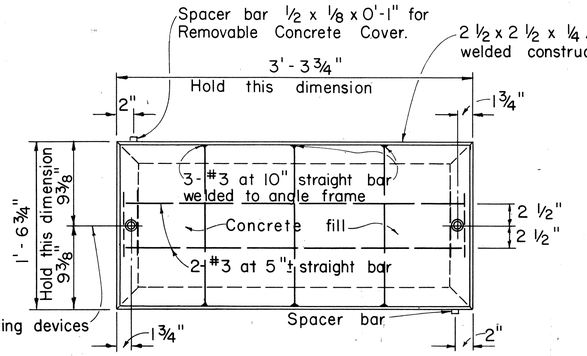
E-3-B 18844

LIETZ 1103 ARKWRIGHT TRACING CLOTH 10-60 200P

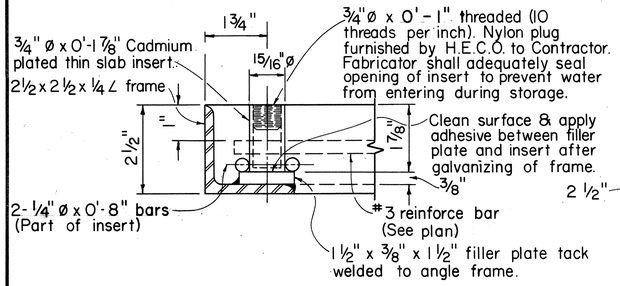
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(87):13	1970	159	244



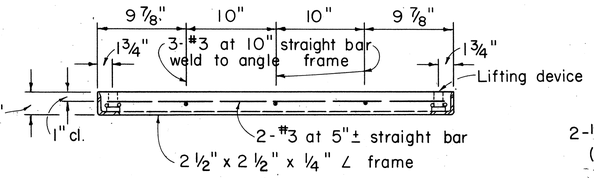
PART ELEVATION
SPACER BAR
Scale: ½ full size



PLAN
Scale: 1½" = 1'-0"

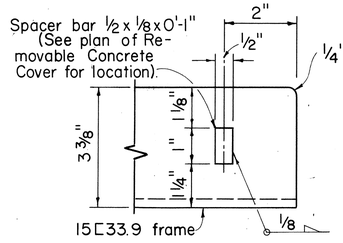


PART SECTION
LIFTING DEVICE
Scale: ½ full size

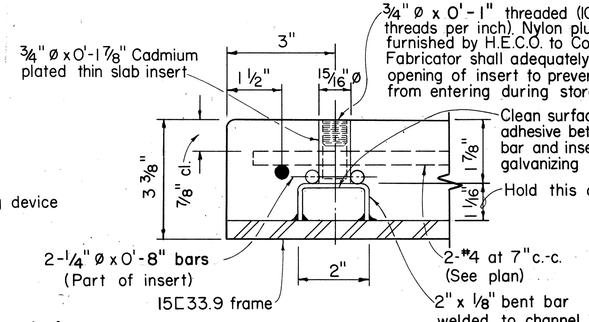


SECTION
Scale: 1½" = 1'-0"

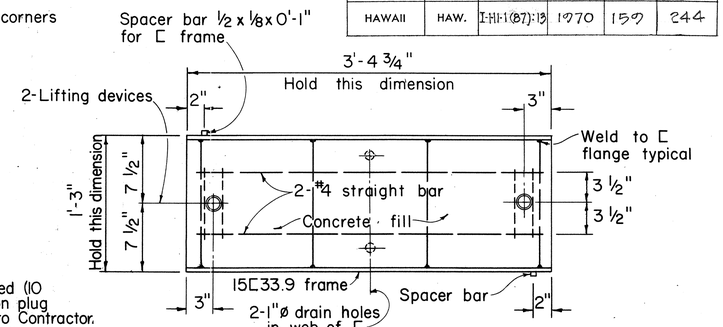
NOTE: Galvanize ∟ frame or ⊏ frame, steel rods, and spacer bars after fabrication.



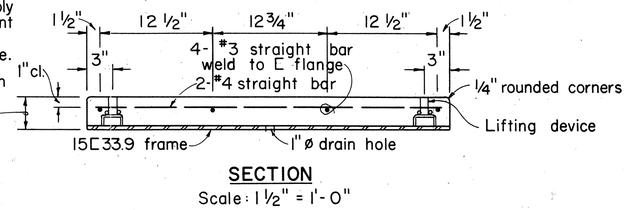
PART ELEVATION
SPACER BAR
Scale: ½ full size



PART SECTION
LIFTING DEVICE
Scale: ½ full size



PLAN
Scale: 1½" = 1'-0"



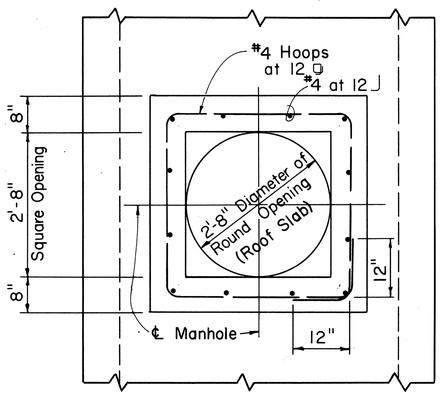
SECTION
Scale: 1½" = 1'-0"

TYPE "SW" REMOVABLE CONCRETE COVER

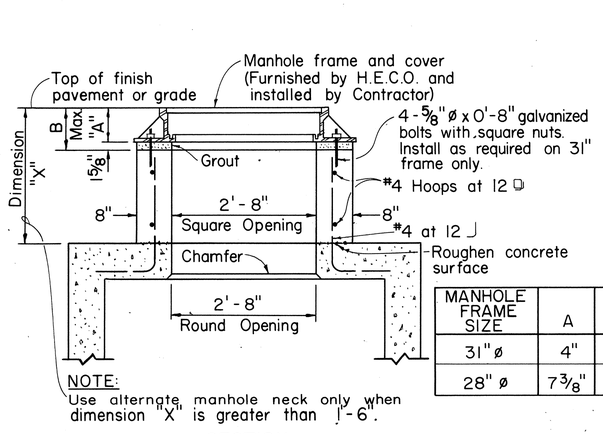
TYPE "TR" REMOVABLE CONCRETE COVER

GENERAL NOTES

1. On handhole covers, maximum clearances must be kept between removable concrete cover slabs and concrete openings at the supports. Contractor shall measure cover slabs steel frame after fabrication to obtain proper clearances. All covers after being installed shall be seated firmly and evenly and be free from rocking. Any variation in clearances and unevenness shall be corrected to the satisfaction of the Engineer at the Contractor's expense.
2. Concrete Pouring: Notify the Hawaiian Electric Co., Inc. Contracting & Inspection Division, 24 hours before pouring concrete. All concrete pouring shall be done in the presence of an Hawaiian Electric Co., Inc. Engineer or Inspector.
3. All materials shall be new and manufactured in the United States of America.



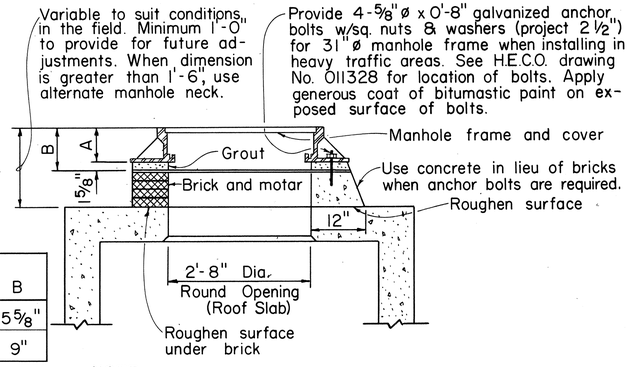
PLAN



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

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

SECTION



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

ALTERNATE MANHOLE NECK

Scale: ¾" = 1'-0"

31" ø & 28" ø MANHOLE FRAME NECK DETAIL

Scale: ¾" = 1'-0"

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

APPROVED:
WKC 9/15/70
Hawaiian Electric Co., Inc. Title JK Date

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

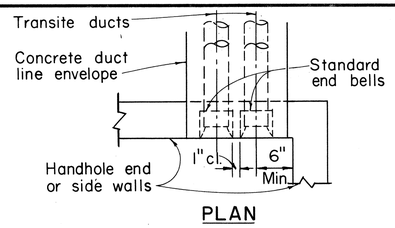
MISCELLANEOUS DETAILS
HANDHOLES & MANHOLES
UNDERGROUND STANDARDS

Scale as noted

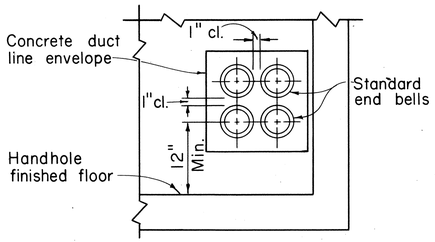
SHEET No. 39U OF 40U SHEETS

159

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(87):13	1970	160	244



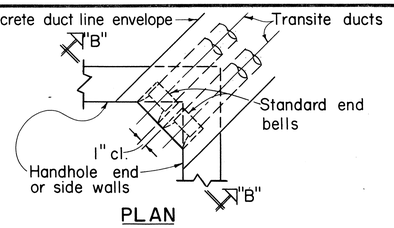
PLAN



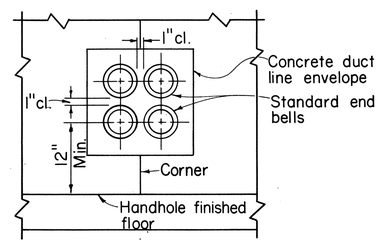
ELEVATION

END OR SIDE ENTRANCE

Scale: 1" = 1'-0"



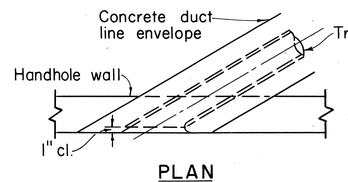
PLAN



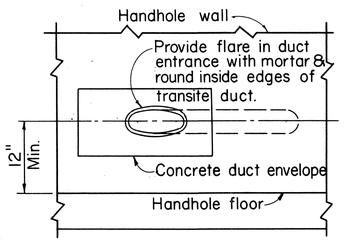
ELEVATION "B-B"

CORNER ENTRANCE

Scale: 1" = 1'-0"



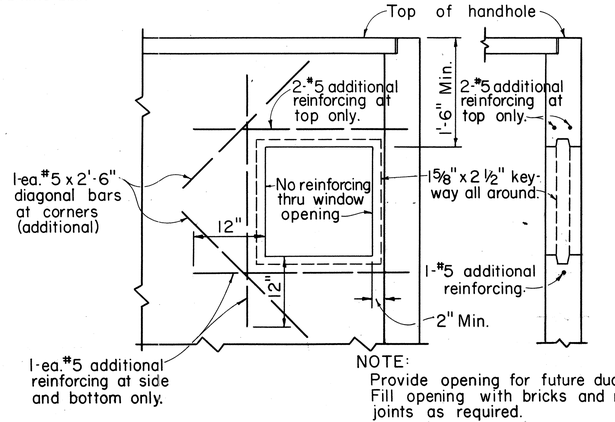
PLAN



ELEVATION

DIAGONAL ENTRANCE

Scale: 1" = 1'-0"

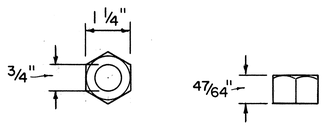


NOTE:
Provide opening for future ductline. Fill opening with bricks and mortar joints as required.

ELEVATION SECTION

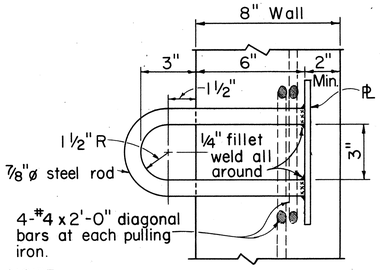
KNOCKOUT FOR FUTURE DUCT LINE

Scale: 1" = 1'-0"



3/4" ø AMERICAN STANDARD HEAVY BRASS HEXAGON NUT

Scale: 1/2 full size

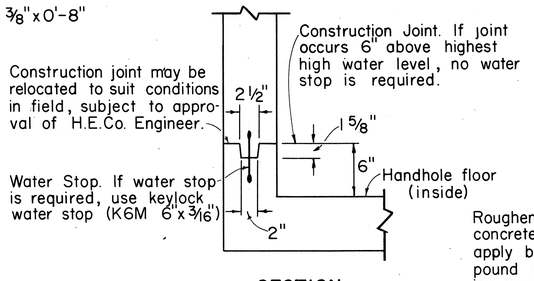


NOTE:
Hot-dip galvanized after fabrication.

SECTION

PULLING IRON

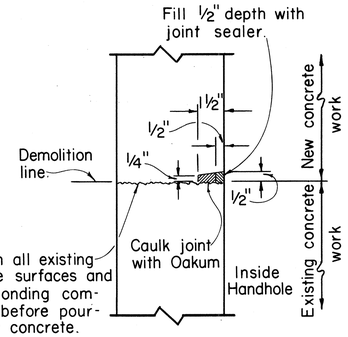
Scale: 3" = 1'-0"



SECTION

TYPICAL CONSTRUCTION JOINT

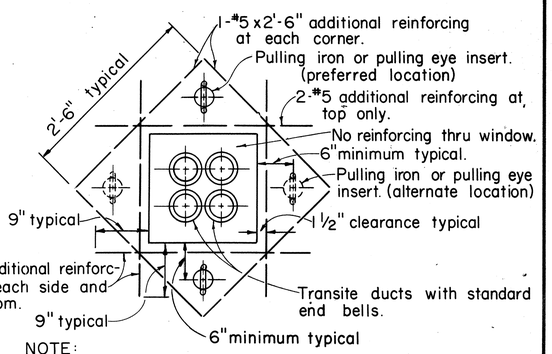
Scale: 1 1/2" = 1'-0"



SECTION

TYPICAL COLD JOINT

Scale: 3" = 1'-0"

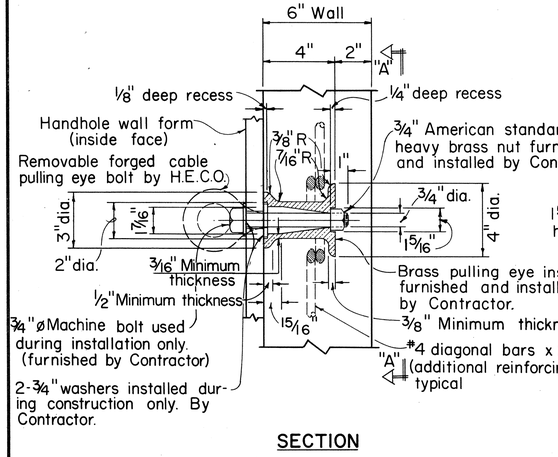


NOTE:
Generally 2 pulling irons or pulling eye inserts are required and located on opposite wall of each duct window unless otherwise shown or noted. H.E.Co. Engineer shall determine number required.

ELEVATION

TYPICAL DUCT WINDOW

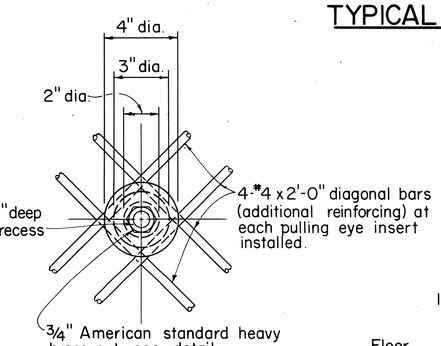
Scale: 1" = 1'-0"



SECTION

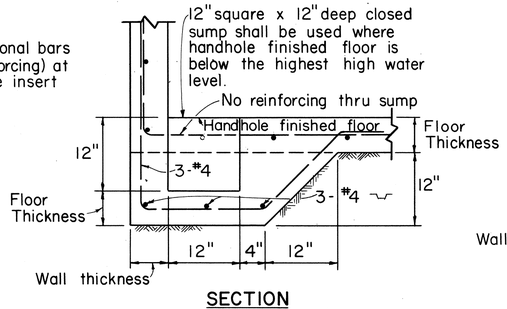
BRASS PULLING EYE INSERT

Scale: 3" = 1'-0"



NOTE:
Contractor shall place advance orders for cast brass pulling eye inserts.

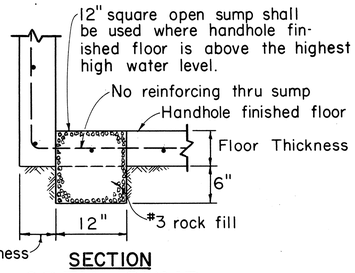
SECTION "A-A"



SECTION

CLOSED SUMP

Scale: 1" = 1'-0"



SECTION

OPEN SUMP

Scale: 1" = 1'-0"

APPROVED:

WKCJas 9/15/70

Hawaiian Electric Co., Inc. Title Date

HECo., Inc. Drawing · Number

16688 SHEET NO. 2 OF 2 SHEETS

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

MISCELLANEOUS DETAILS HANDHOLES & MANHOLES UNDERGROUND STANDARDS

Scale as noted

SHEET No. 40u OF 40u SHEETS

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

160