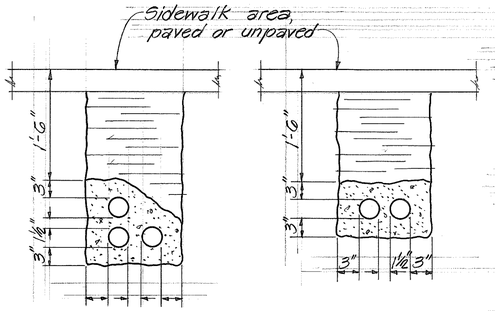
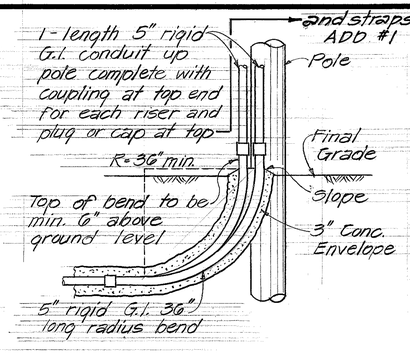
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-011-1(14)	1982	129	214



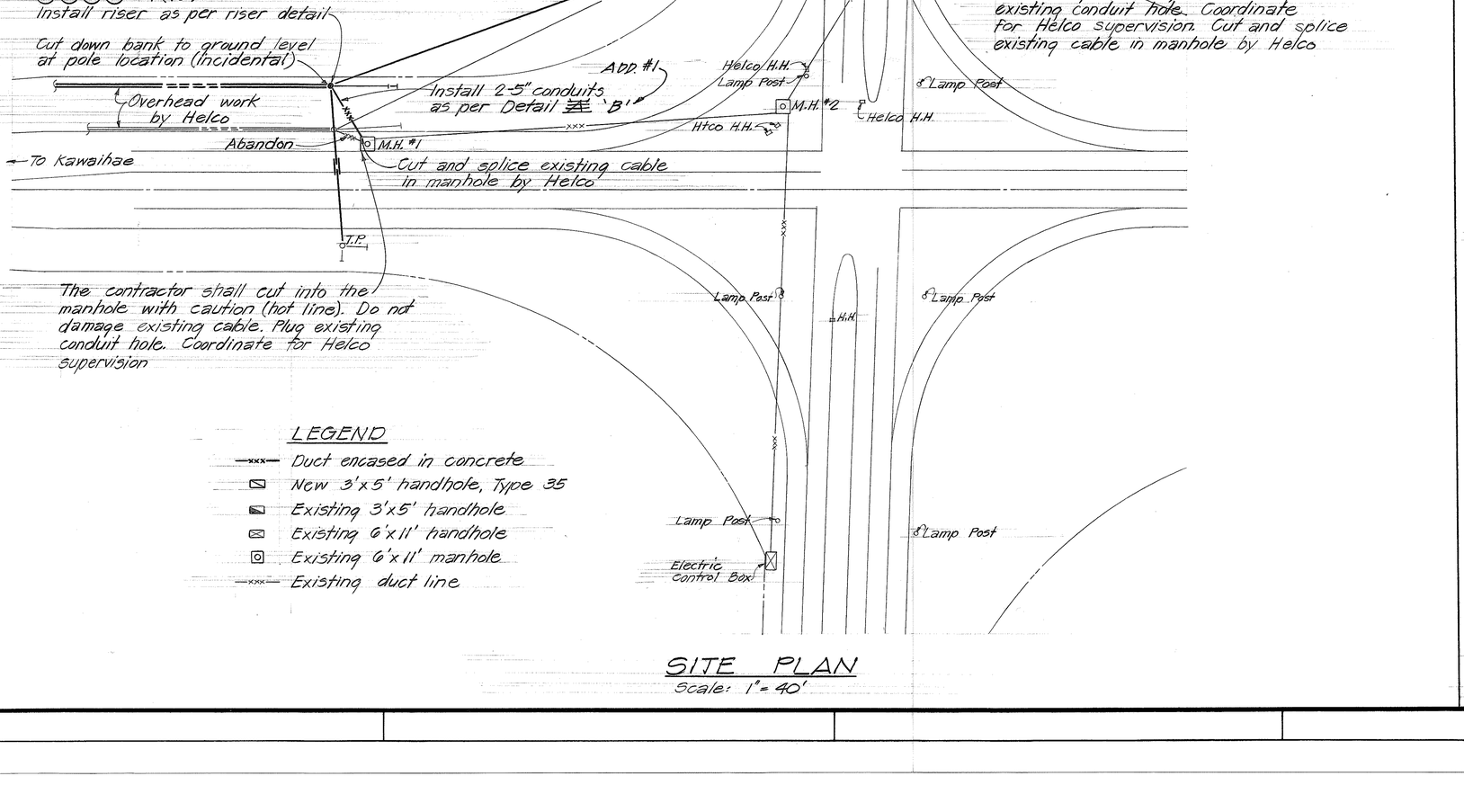
DETAIL 'A' DETAIL 'B'

DUCT LINE DETAIL
Not to Scale



ELEVATION

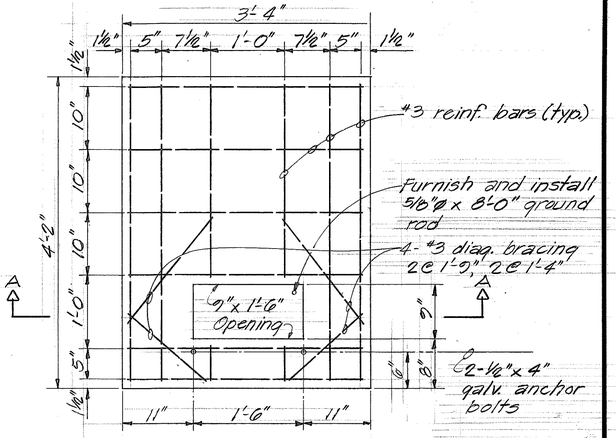
TYPICAL RISER DETAIL
Not to Scale



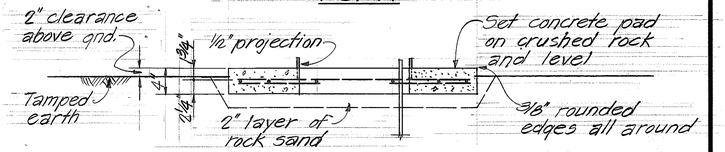
LEGEND

- —xxx— Duct encased in concrete
- New 3'x5' handhole, Type 35
- Existing 3'x5' handhole
- Existing 6'x11' handhole
- Existing 6'x11' manhole
- —xxx— Existing duct line

SITE PLAN
Scale: 1"=40'



PLAN



SECTION A-A

CONCRETE PAD FOR PADMOUNTED TRANSFORMER
Not to Scale

NOTES:

1. Grade and compact the pad site so that the higher front corner matches the concrete sidewalk grade. The lot shall have a slope not greater than ½ inch per ft. toward the sidewalk.
2. Grade sufficiently around the lot site to prevent future filling in of the lot.
3. Compact by rolling the lot site in accordance with State Standard Specifications.
4. Excavate a trench 4" wide and 2'-0" deep, from main trench to pad site. Trench shall be backfilled by the contractor after Helco installs cables.
5. Excavate an area 3'-8" x 4'-6" x 2" deep after lot is compacted. This area shall be filled with #4 lava rock.
6. Install concrete pad after Helco installs cables.
7. Compressive strength: 3,000 psi in 28 days.
8. Reinforcing: Clean and new round deformed bars.
9. Cure by approved method.
10. Top of concrete pad to be smooth, true, and level. Other exposed surfaces to be smooth and free from defects.

APPROVED:

C. Hughes 8/3/82
HAWAII ELECTRIC LIGHT CO. DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

HELCO POWERLINE RELOCATION PLAN

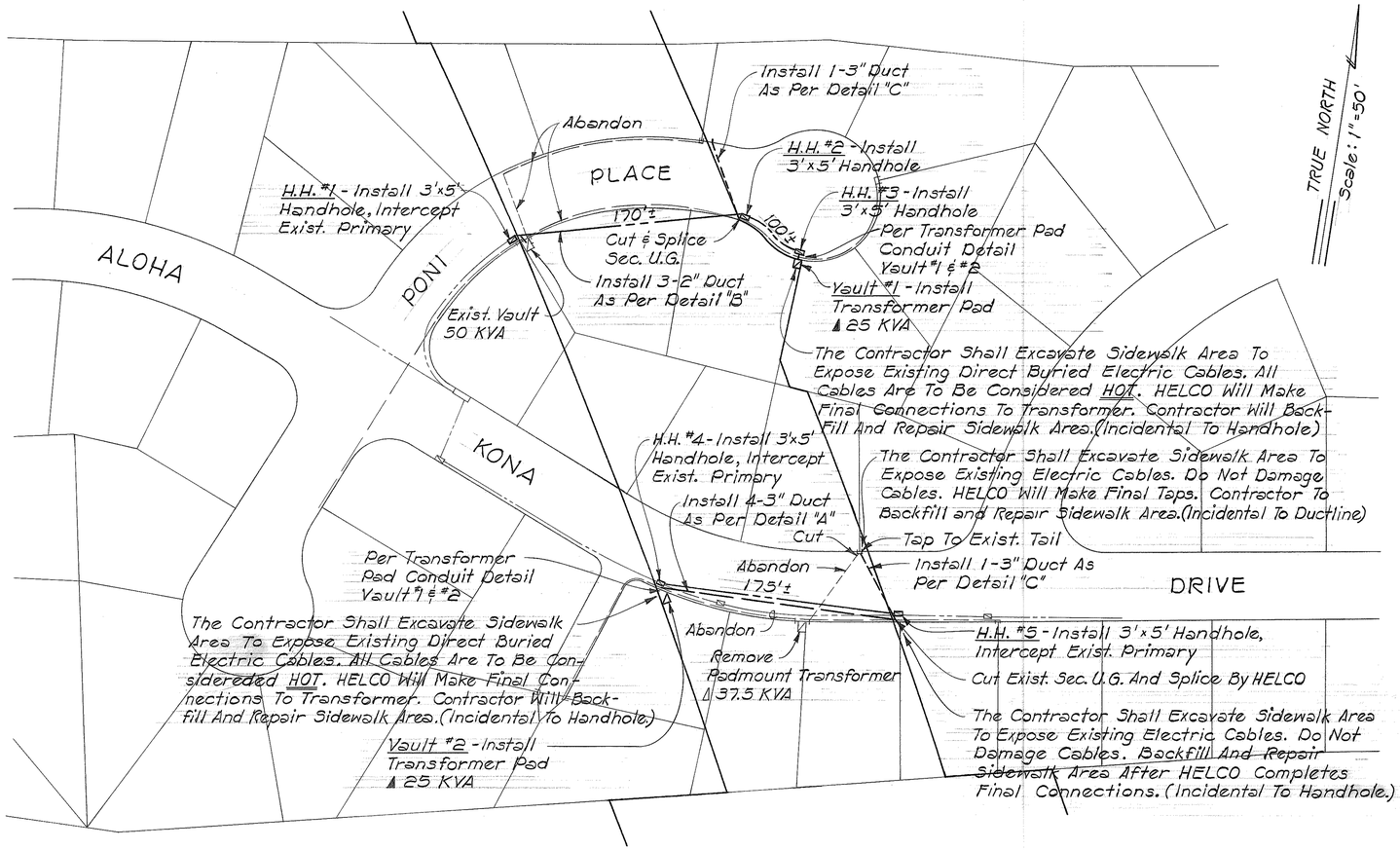
HBR FAP ROUTE 11
PALANI RD. TO KILOHANA SUBD.
PROJECT No. F-011-1(14)
NORTH, KONA, HAWAII

Scale: As Noted Date: Aug. 1982

SHEET No. 1 OF 5 SHEETS

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE 8/25/82
	DRAWN BY JMK	"
NOTE BOOK	TRACED BY	"
No.	DESIGNED BY	"
	QUANTITIES BY	"
	CHECKED BY	"

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-011-1(14)	1982	130	214



LEGEND

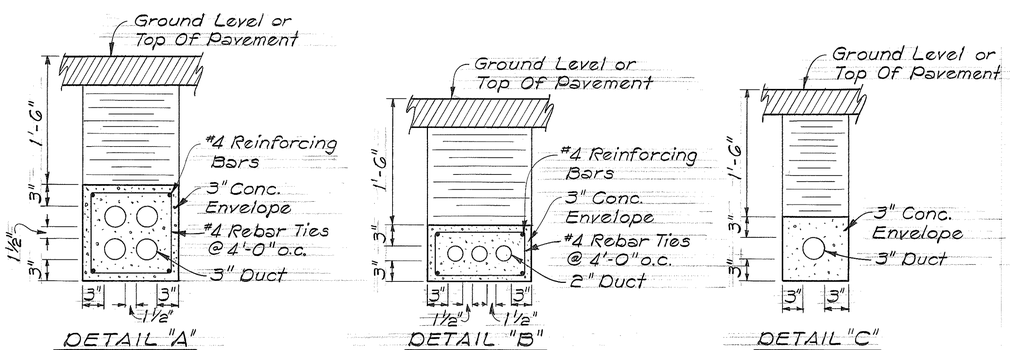
- 1 ϕ 7.2 KV Line
- Secondary Line
- Service Lateral
- Transformer Pad
- 3' x 5' Handhole

SITE PLAN

Scale: 1" = 50'

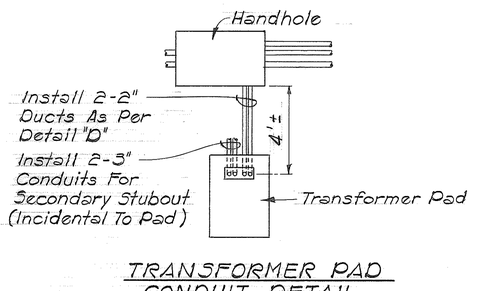
ELECTRIC NOTES

1. Do all necessary excavation and backfilling of duct lines as per details.
   TYPE "A" - Beach sand, earth or earth and gravel. If earth and gravel, the maximum rock size shall be 1" and the mixture shall contain not more than 50% by volume of rock particles.
   TYPE "B" - Beach sand, earth or earth and gravel, the mixture must pass a ½" mesh screen and contain not more than 20% by volume of rock particles. Coral or coral waste material will not be acceptable.
   If the normal material in the bottom of the trench is not TYPE "B", an additional 3" shall be excavated and the TYPE "B" backfill shall be provided.
   CONCRETE NOTES
   A) Concrete strength 3000 PSI in 28 days.
   B) Maximum aggregate for duct line concrete ¾".
   C) Do not drop concrete a distance of more than five (5) feet.
   D) Cure duct line for 72 hours.
   E) Cure concrete structures by keeping moist for a minimum of seven (7) days.
2. Furnish and install TYPE "DB" Acrylonitrile-Butadiene-Styrene (ABS) conduits or TYPE "DB" Polyvinyl Chloride (PVC) conduits or schedule 40 PVC pipes in 3" concrete encasement. Refer to duct line detail.
3. Furnish and install the concrete transformer pads as per plan details.
4. Furnish and install TYPE 35, 3'x5' handholes noted on this drawing as per plan details.
5. As the system design was made from preliminary project drawings, the contractor shall verify the grades and notify the Engineer of significant discrepacies, if any.
6. All duct lines shall contain a No. 12 AWG Steel pulling wire or a Polyolefin pull line, (Jet line Cat. No. 232 or equivalent).
7. All work shall be subject to HELCO inspection. Contractor shall give HELCO three (3) working days inspection notice prior to pouring of concrete or backfilling of trenches.
8. No permanent or temporary structure or object shall be erected or placed within the indicated clear space.
9. All conduits shall be reamed with a mandrel ½" smaller in diameter than the conduit. Ducts shall be swabbed and cleared of all burrs and foreign material.
10. All bends, due to change in grade, shall have a radius of not less than 20'-0".
11. Any questions as to the responsibility of any work specifically covered in these specifications shall be cleared with HELCO's Engineering Department.
12. HELCO shall have 24 hours vehicular access to all transformers for maintenance and repairs. The minimum G.V.W. of HELCO's line trucks is 24,000 lbs.
13. Coordinate for HELCO supervision while constructing handholes and trenches within live underground line.
14. Riser on Poles #1 and 385 as per "Riser Detail".
15. All work done by the contractors on HELCO's existing underground distribution system shall be performed with extreme caution. Contractor shall provide safeguards that will not compromise the safety of the general public or his employees.



DUCT LINE DETAIL

N.T.S.



TRANSFORMER PAD CONDUIT DETAIL VAULT #1 & #2

N.T.S.

APPROVED:
C. Wagata 8/30/82
HAWAII ELECTRIC LIGHT CO DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

HELCO POWERLINE RELOCATION PLAN

HBR FAP ROUTE 11
PALANI RD. TO KILOHANA SUB'D.
PROJECT NO. F-011-1(14)
NORTH KONA, HAWAII
Scale: As Noted Date: Aug. 1982

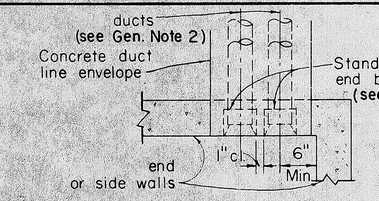
SHEET No. 2 OF 5 SHEETS

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

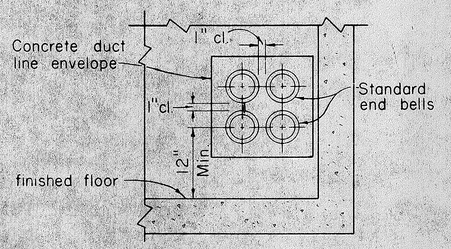
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-011-1(14)	1982	131	214

GENERAL NOTES

1. THE GENERAL CONDITIONS OF SPECIFICATIONS CS-7202 SHALL GOVERN THROUGHOUT THE ENTIRE WORK.
2. FOR CONSTRUCTION OF UNDERGROUND FACILITIES & DUCT LINES REFER TO SPECIFICATION CS-7001 AND CS-7003.
3. ALL WORK SHALL BE SUBJECT TO INSPECTION BY THE HAWAIIAN ELECTRIC CO., INC., DIVISION OF ENGINEERING, CITY & COUNTY OF HONOLULU AND/OR DIVISION OF HIGHWAYS, STATE OF HAWAII, WHICHEVER GOVERNMENT AGENCY HAS AUTHORITY OVER THE WORK.
4. DUCTS: FOR NUMBER, SIZE AND EXACT LOCATION OF DUCT ENTRANCES, REFER TO PROJECT DRAWINGS.
5. PULLING IRONS: FOR NUMBER & LOCATIONS, REFER TO PROJECT DRAWINGS.
6. HANDHOLE COVERS (REMOVABLE CONC. COVERS) MAXIMUM CLEARANCES BETWEEN REMOVABLE CONCRETE COVERS AND CONCRETE OPENINGS AT THE SUPPORTS MUST BE KEPT. CONCRETE CONTRACTOR SHALL MEASURE CONC. COVER STEEL FRAME AFTER FABRICATION TO OBTAIN PROPER CLEARANCES. ALL COVERS AFTER BEING INSTALLED SHALL BE SEATED FIRMLY AND EVENLY AND FREE FROM ROCKING. ANY VARIATION IN CLEARANCE AND UNEVENESS SHALL BE CORRECTED TO THE SATISFACTION OF THE ENGINEER AT THE CONTRACTOR'S EXPENSE.
7. CONCRETE POURING: NOTIFY THE HAWAIIAN ELECTRIC CO., INC. CONTRACTING & INSPECTION DIVISION, PHONE 548-4427 OR 548-4428 24 HOURS BEFORE POURING CONCRETE. ALL CONCRETE POURING SHALL BE DONE IN THE PRESENCE OF AN H.E.CO., INC., ENGINEER OR INSPECTOR.
8. ALL MATERIALS SHALL BE NEW AND MANUFACTURED IN THE UNITED STATES OF AMERICA.



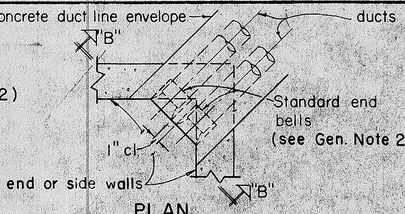
PLAN



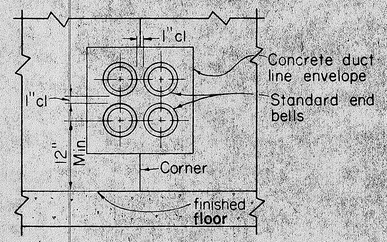
ELEVATION

END OR SIDE ENTRANCE

Scale 1" = 1'-0"



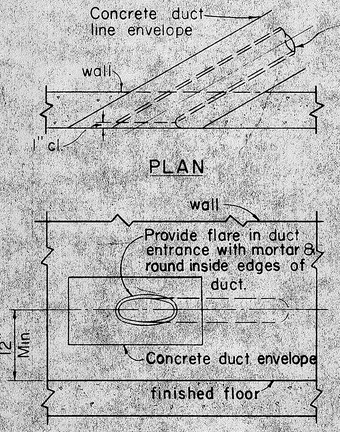
PLAN



ELEVATION "B-B"

CORNER ENTRANCE

Scale 1" = 1'-0"

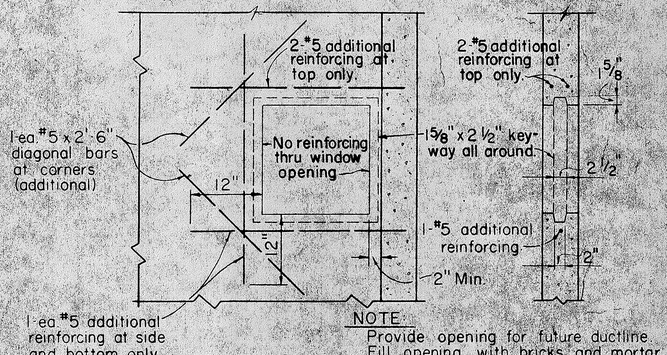


PLAN

ELEVATION

DIAGONAL ENTRANCE

Scale 1" = 1'-0"

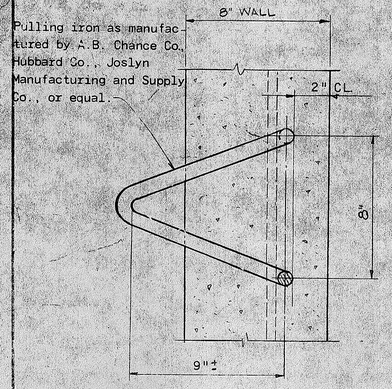


ELEVATION SECTION

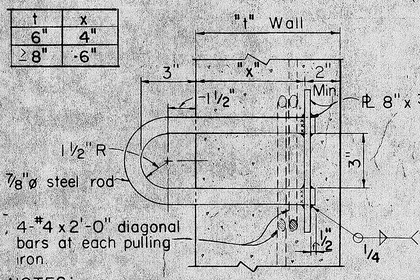
NOTE
Provide opening for future ductline. Fill opening with bricks and mortar joints as required (see Gen. Note 4)

KNOCKOUT FOR FUTURE DUCT LINE

Scale 1" = 1'-0"



PLAN



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

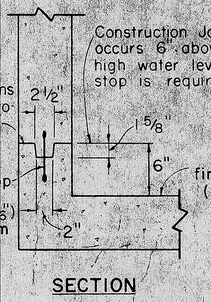
SECTION

PULLING IRON FOR 6" & 8" WALL

Scale: 3" = 1'-0"

Construction joint may be relocated to suit conditions in field, subject to approval of H.E.Co. Engineer.

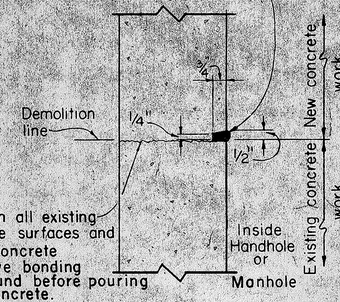
Water Stop. If water stop is required, use keylock water stop (K6M 6 x 3/16") Manufactured by Wisdom Rubber Mfg. Co.



SECTION

TYPICAL CONSTRUCTION JOINT

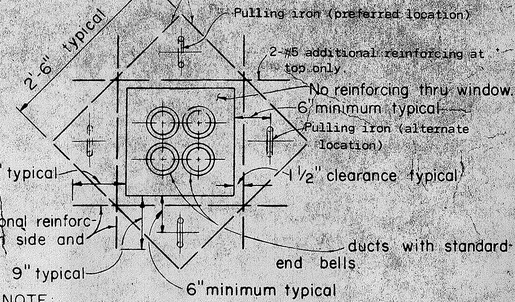
Scale 1 1/2" = 1'-0"



SECTION

TYPICAL COLD JOINT

Scale 3" = 1'-0"



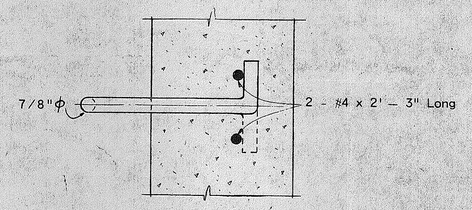
NOTE:
Generally 2 pulling irons are required and located on opposite wall of each duct window unless otherwise shown or noted. H.E.Co. Engineer shall determine number required.

ELEVATION

TYPICAL DUCT WINDOW

Scale 1" = 1'-0"

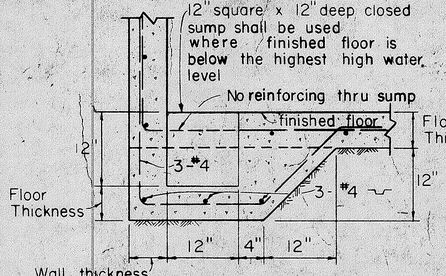
THIS IS A COPY FROM THE ORIGINAL DRAWING.



SECTION

PULLING IRON FOR 8" WALL

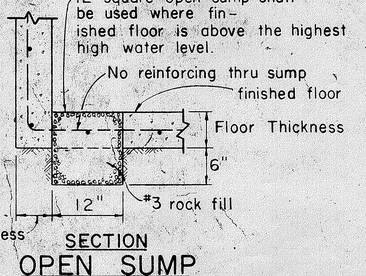
Scale: 3"=1'-0"



SECTION

CLOSED SUMP

Scale 1" = 1'-0"



SECTION

OPEN SUMP

Scale 1" = 1'-0"

APPROVED: C. Hagert
HAWAII ELECTRIC LIGHT CO. 8/20/82 DATE

SHEET 1 OF 2 SHEETS

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

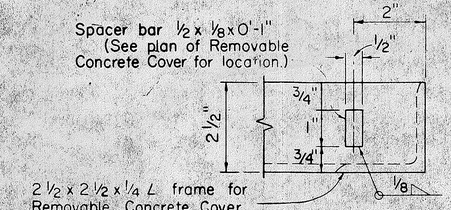
MISCELLANEOUS DETAILS
HANDHOLES & MANHOLES
UNDERGROUND STANDARDS

HBR FAP ROUTE 11
PALANI RD. TO KILOHANA SUB'D.
PROJECT NO. F-011-1(14)
NORTH KONA, HAWAII

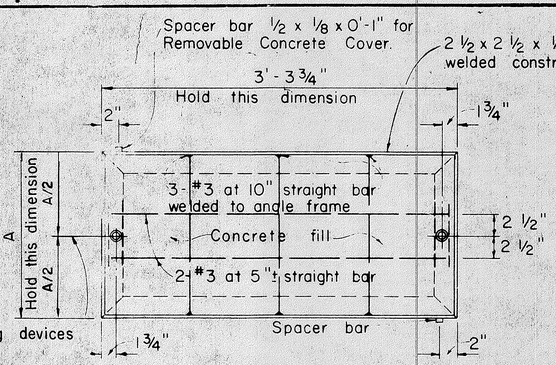
Scale: As Noted Date: Aug. 1982

SHEET No. 3 OF 5 SHEETS

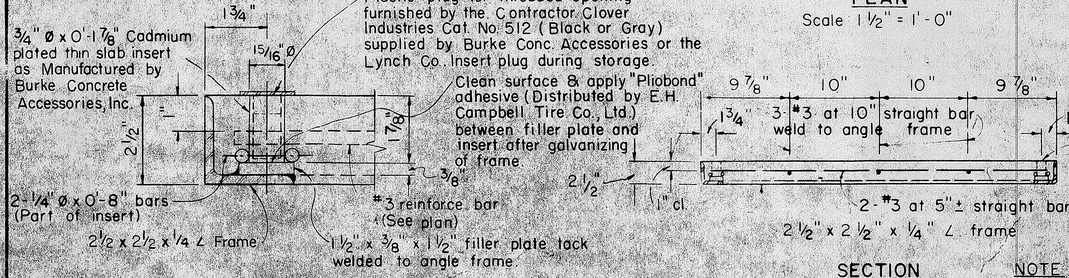
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-011-1(14)	1982	132	214



PART ELEVATION
SPACER BAR
Scale: 1/2 full size



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

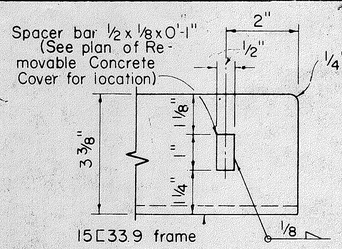


PART SECTION
LIFTING DEVICE
Scale: 1/2 full size

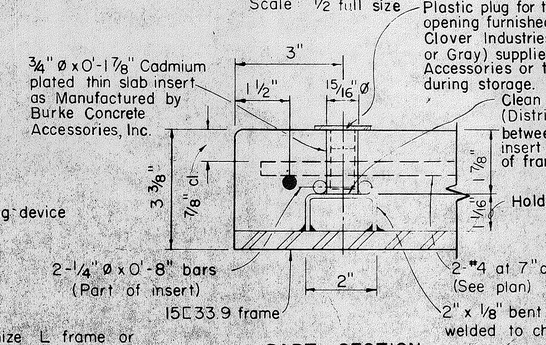
SECTION
Scale: 1 1/2" = 1'-0"

TYPE	DIMENSIONS	
	A	A/2
"SW"	1'-6 3/4"	9 3/8"
"SWI"	1'-2 13/16"	7 13/32"

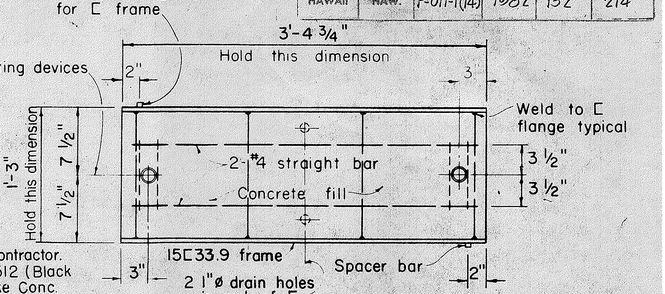
NOTE Galvanize ∠ frame or C frame, steel rods, and spacer bars after fabrication.



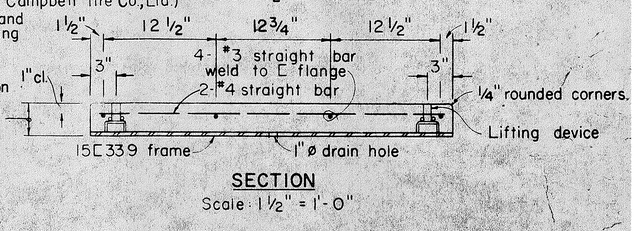
PART ELEVATION
SPACER BAR
Scale 1/2 full size



PART SECTION
LIFTING DEVICE
Scale 1/2 full size

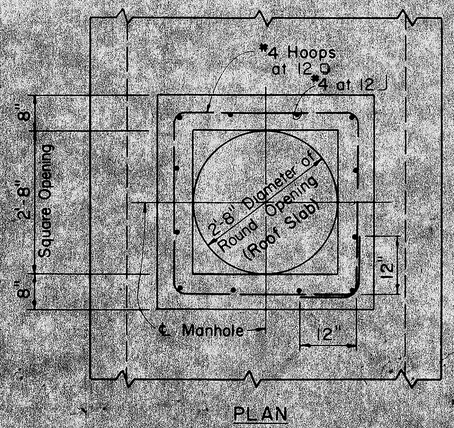


PLAN
Scale: 1 1/2" = 1'-0"

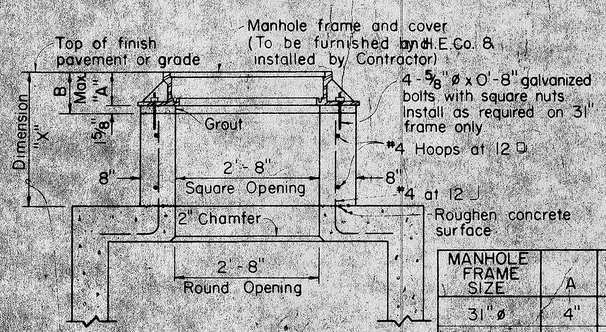


SECTION
Scale: 1 1/2" = 1'-0"

TYPE "SW" & "SWI" REMOVABLE CONCRETE COVER



PLAN



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

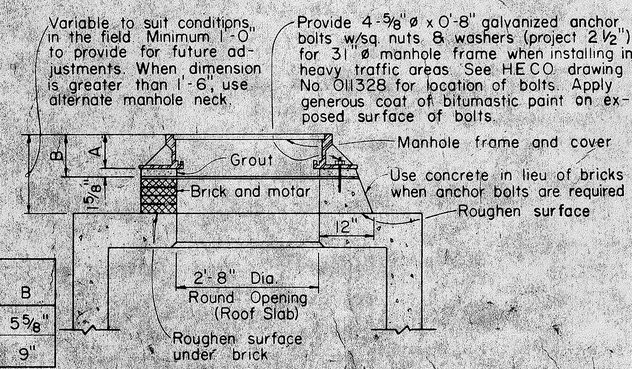
SECTION

MANHOLE FRAME SIZE	A	B
31" ø	4"	5 5/8"
28" ø	7 3/8"	9"

ALTERNATE MANHOLE NECK

Scale 3/4" = 1'-0"

TYPE "TR" REMOVABLE CONCRETE COVER



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

31" ø & 28" ø MANHOLE FRAME NECK DETAIL

Scale 3/4" = 1'-0"

THIS IS A COPY FROM THE ORIGINAL DRAWING.

SHEET 2 OF 2 SHEETS

APPROVED:
C. Magata
HAWAII ELECTRIC LIGHT CO.
8/30/82
DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

MISCELLANEOUS DETAILS
HANDHOLES & MANHOLES
UNDERGROUND STANDARDS

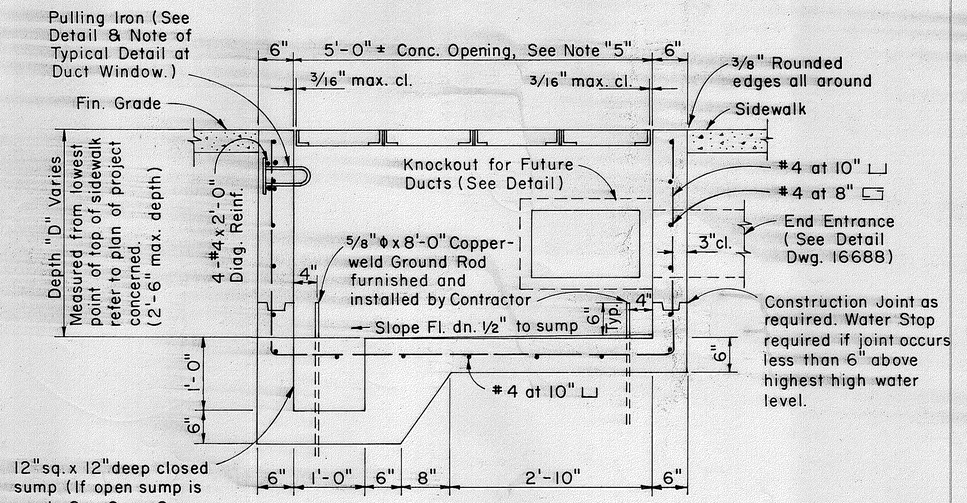
HBR FAP ROUTE 11
PALANI RD. TO KILOHANA SUBD.
PROJECT NO. F-011-1(14)
NORTH KONA, HAWAII

Scale: As Noted Date: Aug. 1982

SHEET No. 4 OF 5 SHEETS

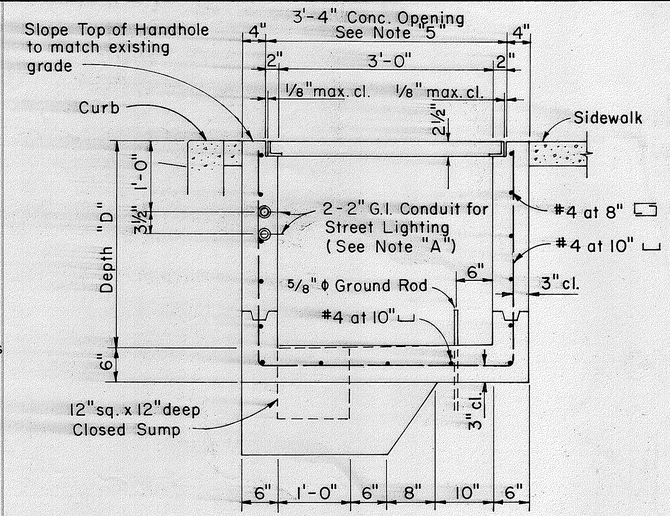
132

HELCO



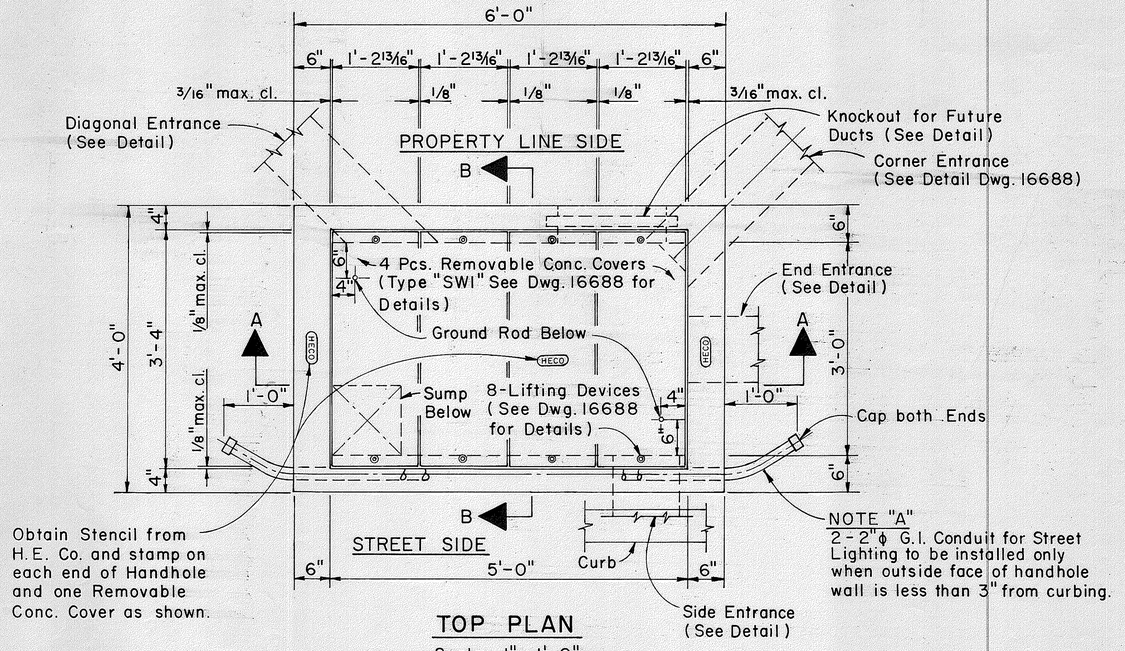
SECTION "A-A"

Scale : 1" = 1'-0"



SECTION "B-B"

Scale: 1"=1'-0"



TOP PLAN

Scale: 1" = 1'-0"

MATERIAL QUANTITIES

QUANTITY OF MATERIALS FOR DEPTH "D"= 2'-6" max.

Total concrete	= 2.05 cu. yds.
Total reinf. steel	= 300 lbs.
Total misc. steel	= 157 lbs.

WEIGHT PER REMOVABLE CONCRETE COVER

Concrete	= 118 lbs.
Reinf. steel	= 4 lbs.
Misc. steel	= 37 lbs.
Total	159 lbs.

MATERIALS FOR 6" DEPTH OF 6" THICK WALL,

Concrete	= 0.17 cu. yds.
Reinf. steel	= 19 lbs.

NOTES:

1. FOR GENERAL NOTES AND MISCELLANEOUS HANDHOLE DETAILS, SEE SHT. NO. 131 & 132 .
2. FOR DUCT ENTRANCES, DEPTH AND LOCATIONS OF PULLING IRONS, SEE HANDHOLE DEVELOPMENTS OF PROJECT CONCERNED.
3. SEE PROJECT DRAWINGS FOR LOCATION OF HANDHOLE CONCERNED.
4. TOP OF HANDHOLE SHALL MATCH NEW AND OR EXISTING GRADES UNLESS OTHERWISE SHOWN OR NOTED ON PLANS OF PROJECT CONCERNED.
5. MAXIMUM CLEARANCE BETWEEN REMOVABLE COVERS 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.

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-011-1(14)	1982	133	214

FOR USE IN AREAS NOT SUBJECT TO VEHICULAR TRAFFIC.

APPROVED:

C. Nagata 8/30/82

HAWAII ELECTRIC LIGHT CO. DATE

DD-630.011

HECo., Inc. Drawing Number	
18841	SHEET No. 1 OF 1 SHEET

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS

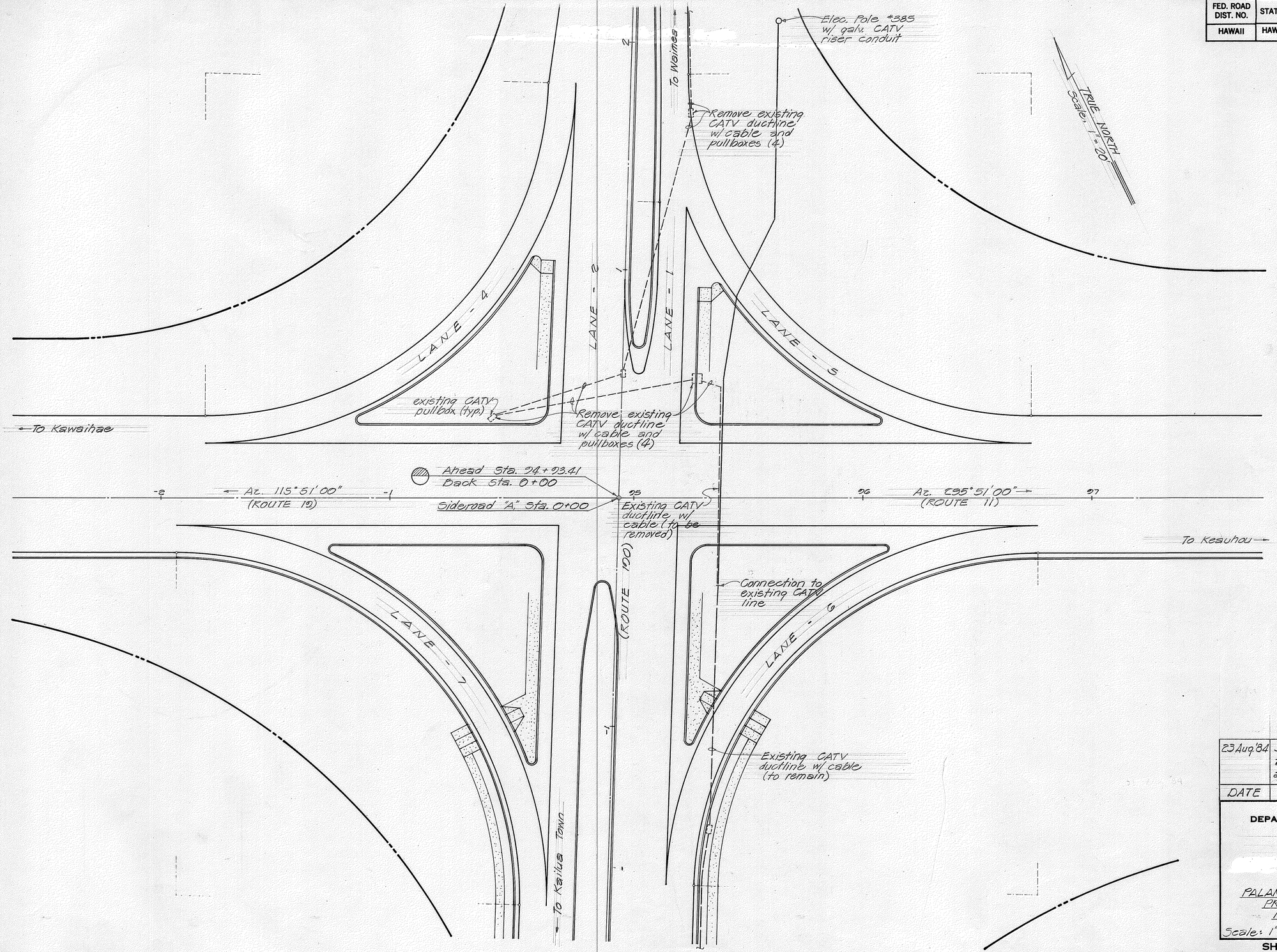
HANDHOLE TYPE 35 (3'-0" x 5'-0") UNDERGROUND STANDARDS

SCALE : AS NOTED

SHEET No. 5 OF 5 SHEETS

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

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



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

DATE	REVISION
23 Aug '84	Sheet Added to Contract Plan to Show Details of CATV Line at Sideroad "A".

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

"AS BUILT"

CATV LINE

HBR FAP ROUTE 11
PALANI RD. TO KILOHANA SUB'D.
PROJECT NO. F-011-1(14)
NORTH KONA, HAWAII

Scale: 1"=20' Date: July 1984

SHEET No. 1 OF 1 SHEETS

C.O. 133 S-1

C.O. 133 S-1