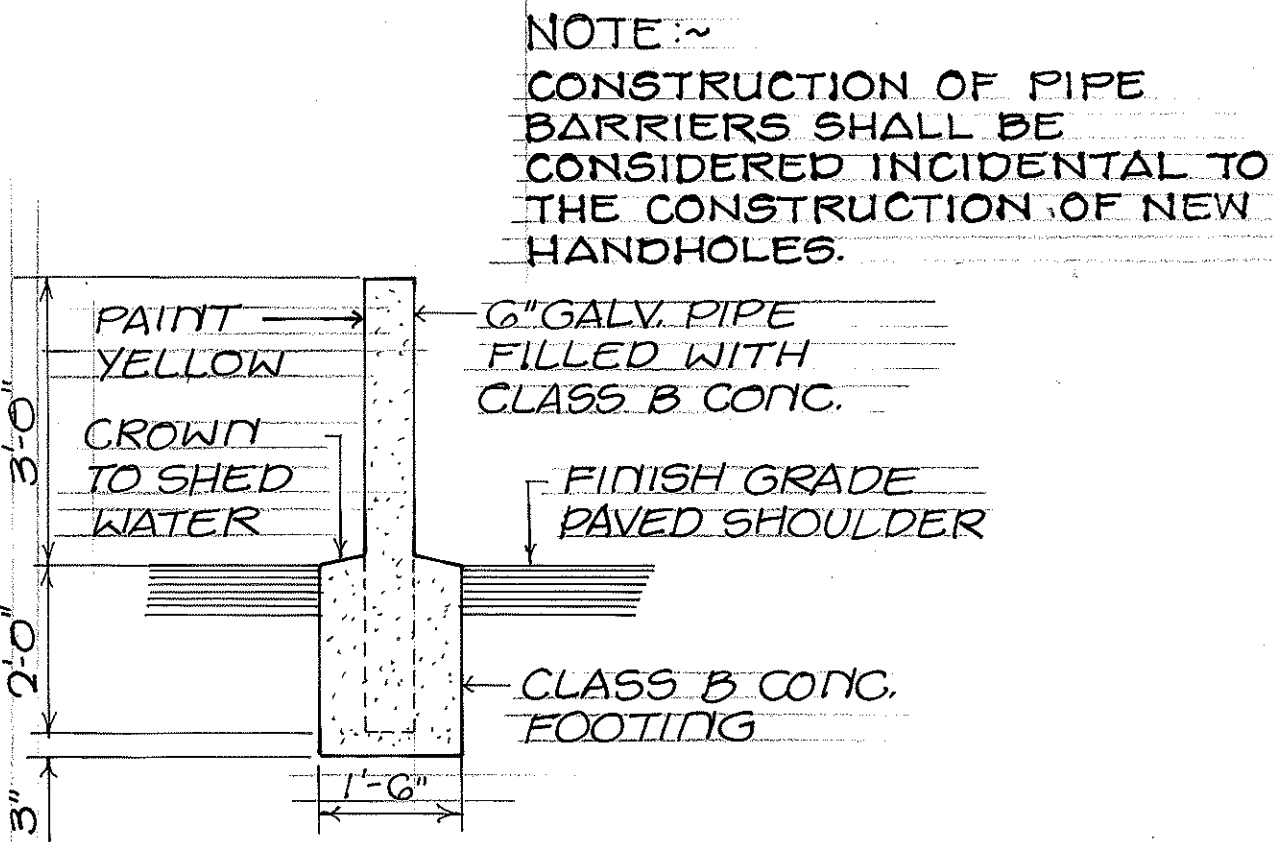
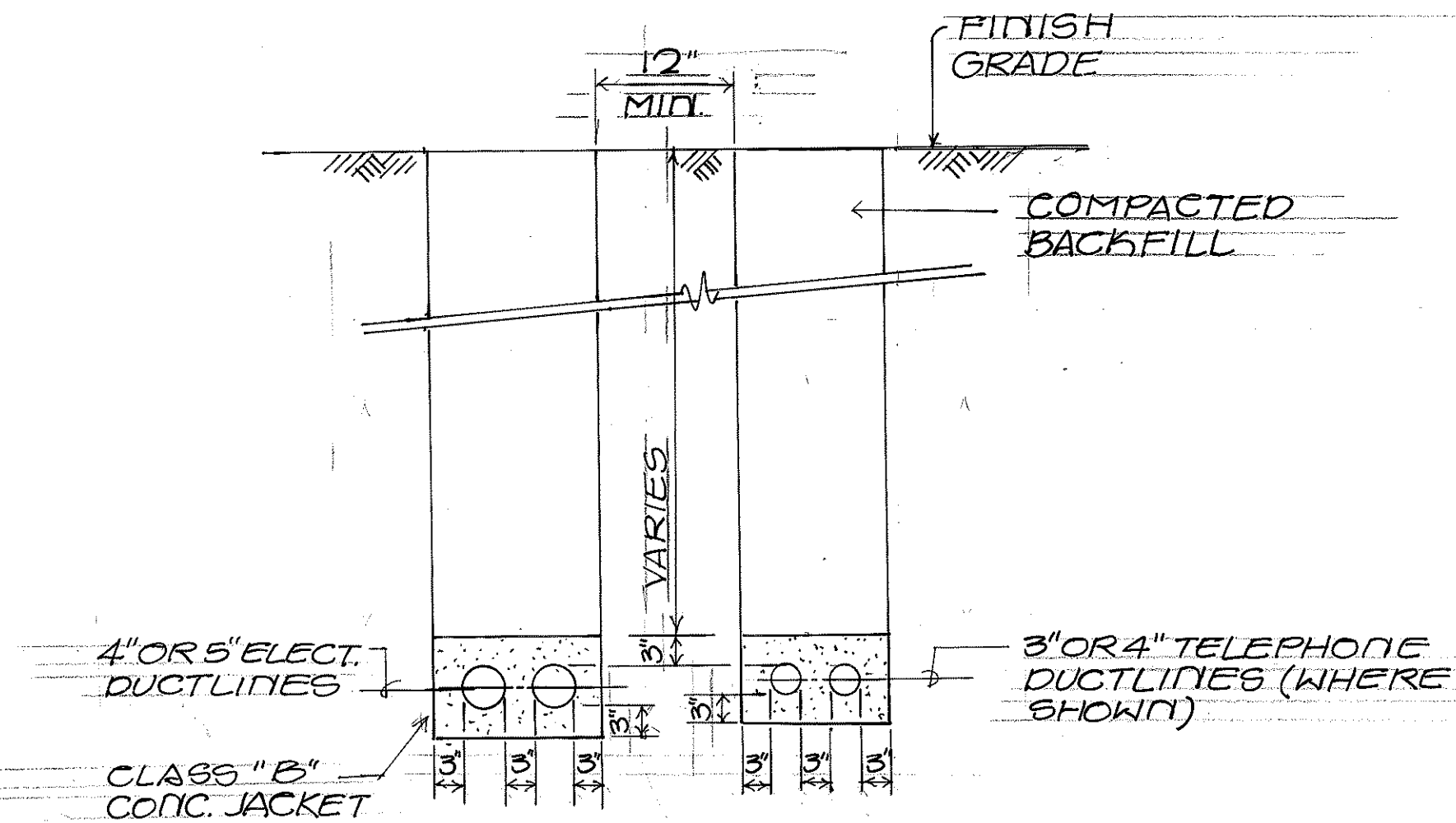


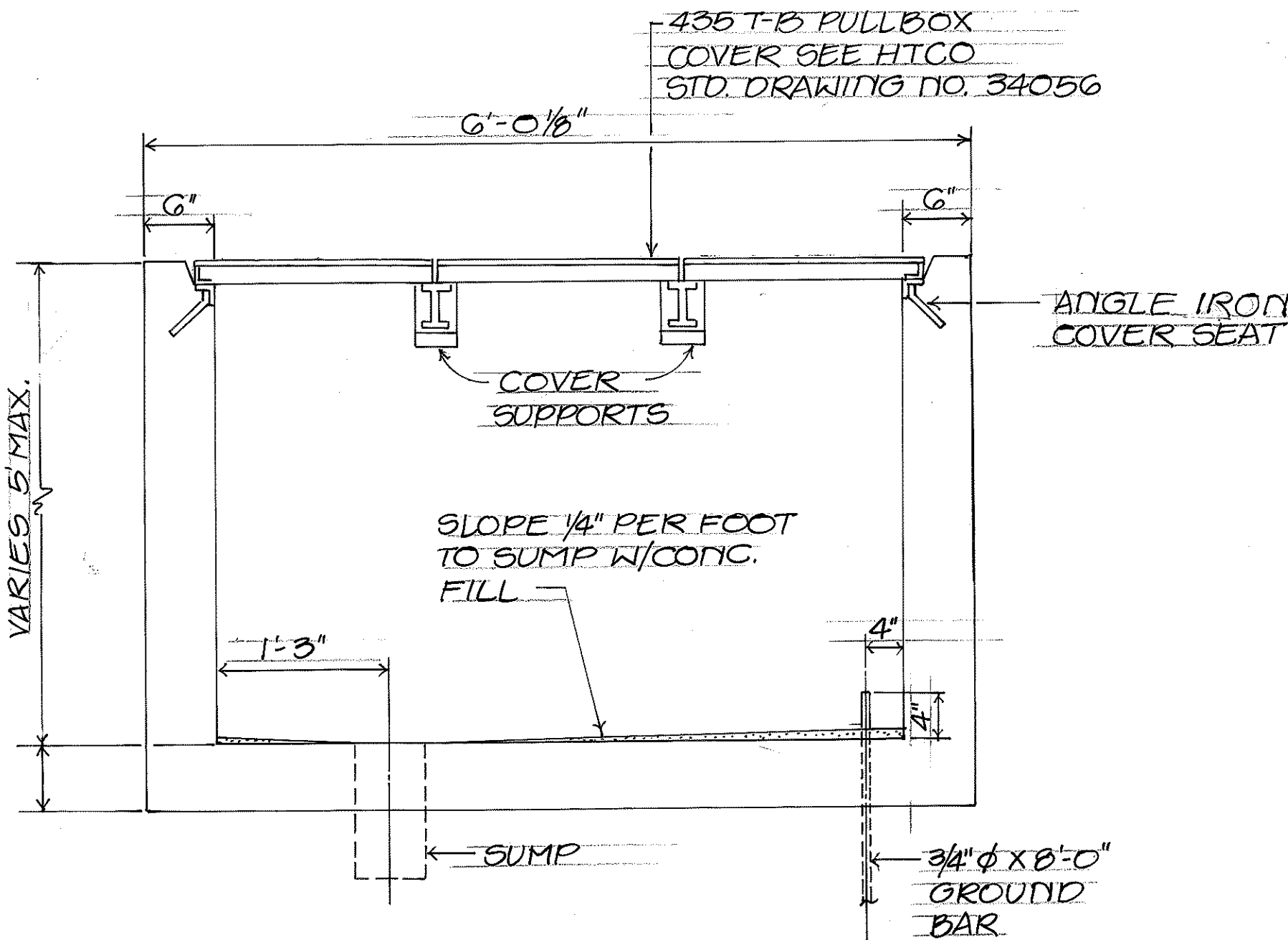
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-H-01-86	1987	44	115

ELECTRIC HANDHOLE REPLACEMENT SCHEDULE		
HANDHOLES (HH) OR HANDHOLE GROUP (HHG) NO.	EXISTING HH SIZE	NEW HANDHOLE SIZE
HH #35	4'x6'	6'x11' (REPLACES 2-4'x6')
HH #34	4'x6'	
HHG #32	3'x5'	5'x7'
HHG #31	3'x5'	5'x7'
HHG #28	3'x5'	5'x7'

- NOTES:
- NEW ELECTRIC HANDHOLES SHALL BE CONSTRUCTED IN ACCORDANCE WITH HELCO STANDARDS. FOR DETAILS, REFER TO THE FOLLOWING HELCO STANDARD DRAWING NOS:
18844 (6'x11' HANDHOLE)
18848 (5'x7' HANDHOLE)
16608 (MISCELLANEOUS HANDHOLE DETAILS)
21048 (DUCT ENTRANCES)
 - EXISTING 2'x4' COMMUNICATION HANDHOLES AT HH#33, HHG#30, HHG#31 AND HHG#28 SHALL BE REPLACED WITH NEW TYPE I HANDHOLES. SEE DETAIL BELOW.



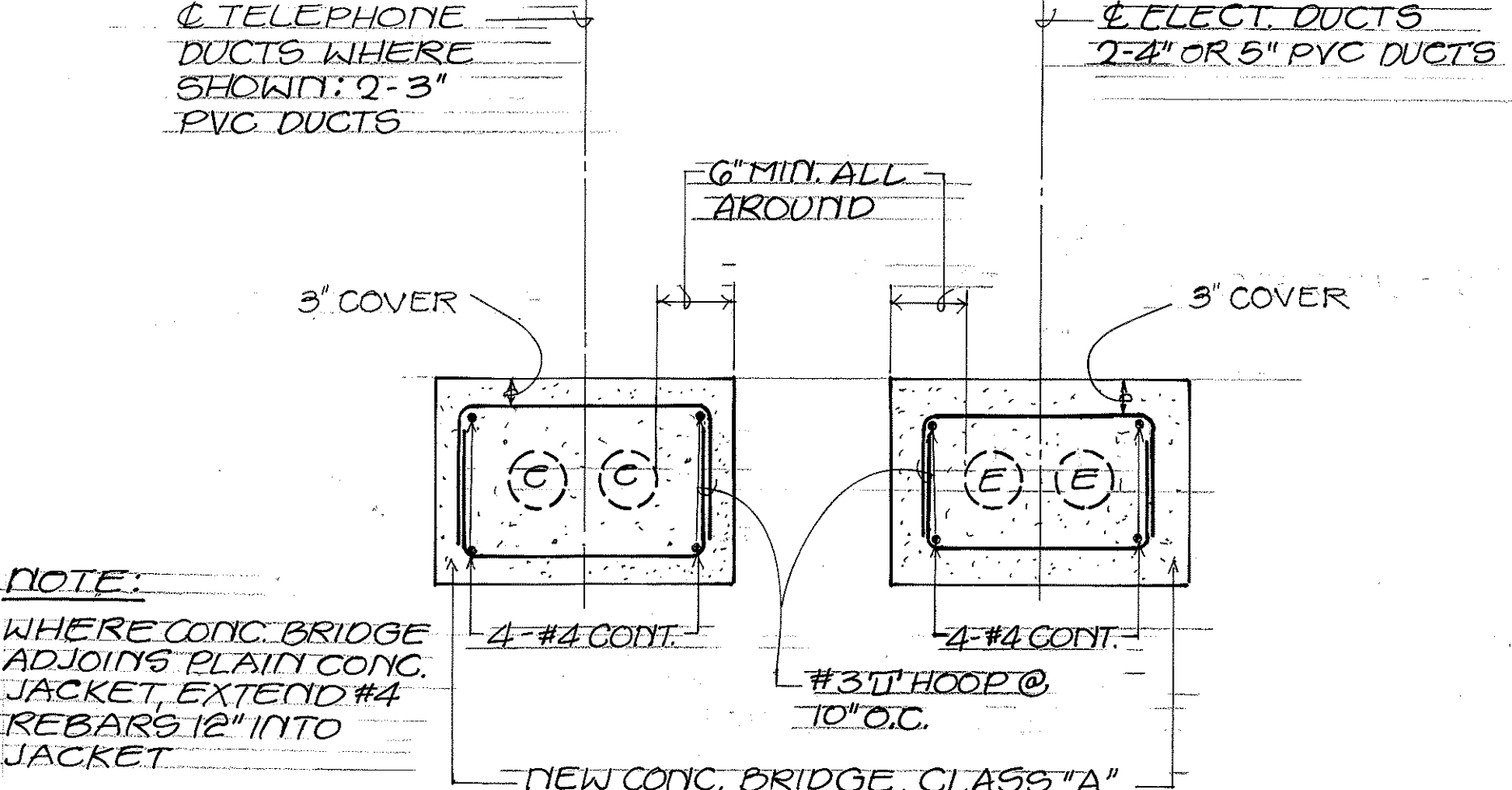
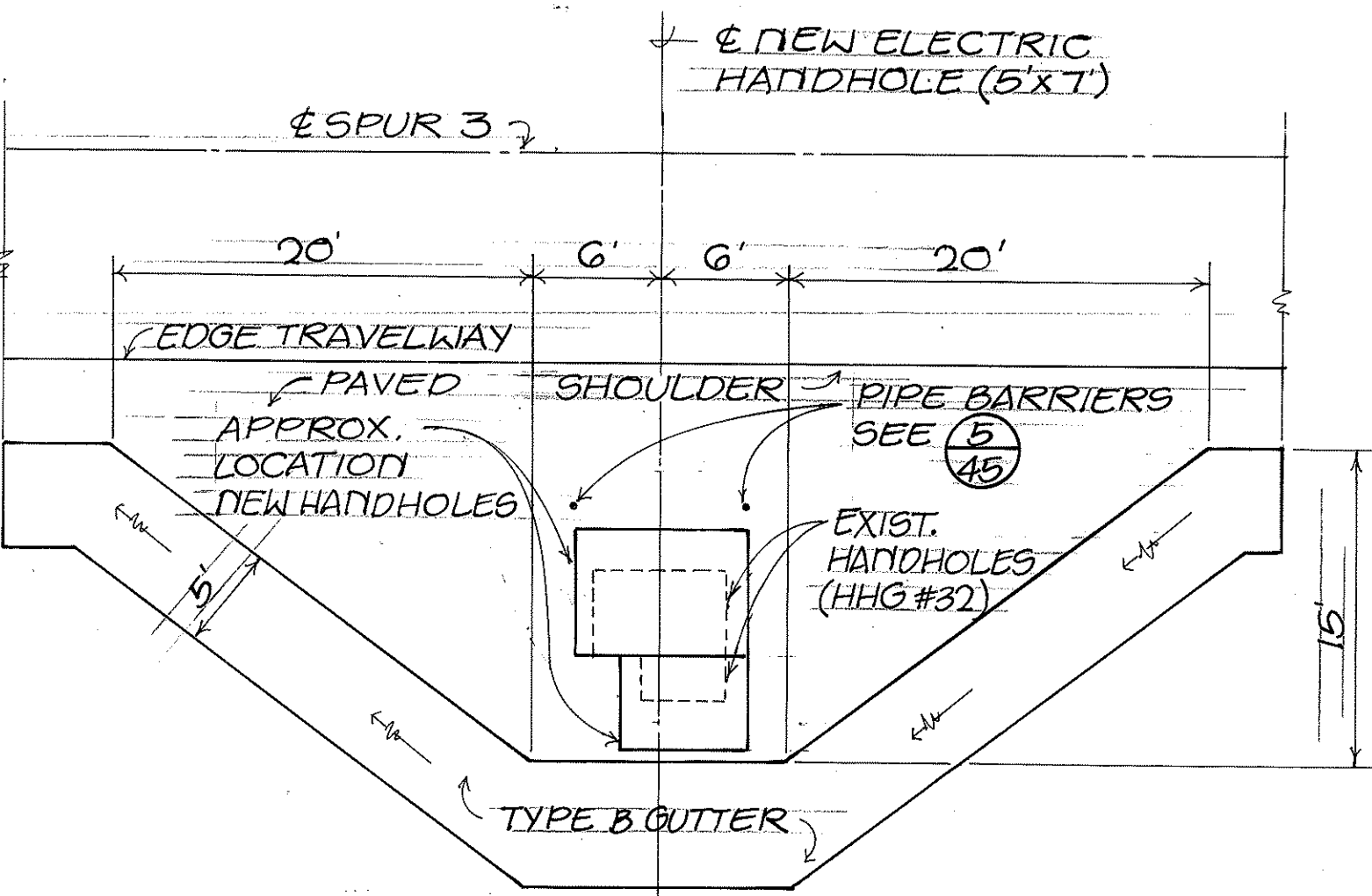
1 44 HANDHOLE REPLACEMENT SCHEDULE



- NOTES:
- EXIST. DUCTLINES CONTAIN ENERGIZED CABLES. CONTRACTOR SHALL EXERCISE EXTREME CAUTION WHILE TRENCHING AND EXPOSING DUCTLINES, AND WHILE PLACING CONCRETE. CONTACT HELCO'S DISTRIBUTION DEPARTMENT FOR STANDING SERVICE 12 HOURS PRIOR TO REQUIRING THIS SERVICE.
 - SEE PLANS FOR LOCATIONS OF CONC. JACKETS

5 44 PIPE BARRIER DETAIL

3 44 CONC. JACKET AND TRENCH BACKFILL DETAIL



6 44 DETAIL - CONC. BRIDGE FOR DUCTLINES

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

2 44 TYPE I TELEPHONE HANDHOLE DETAIL

4 44 GUTTER DEFLECTION DETAIL

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DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

HANDHOLE DETAILS

MAUNA KEA OBSERVATORY ACCESS ROAD
PHASE I

PROJECT NO. HWY-H-01-86

SCALE AS SHOWN

SHEET NO. 1 OF 2 SHEETS

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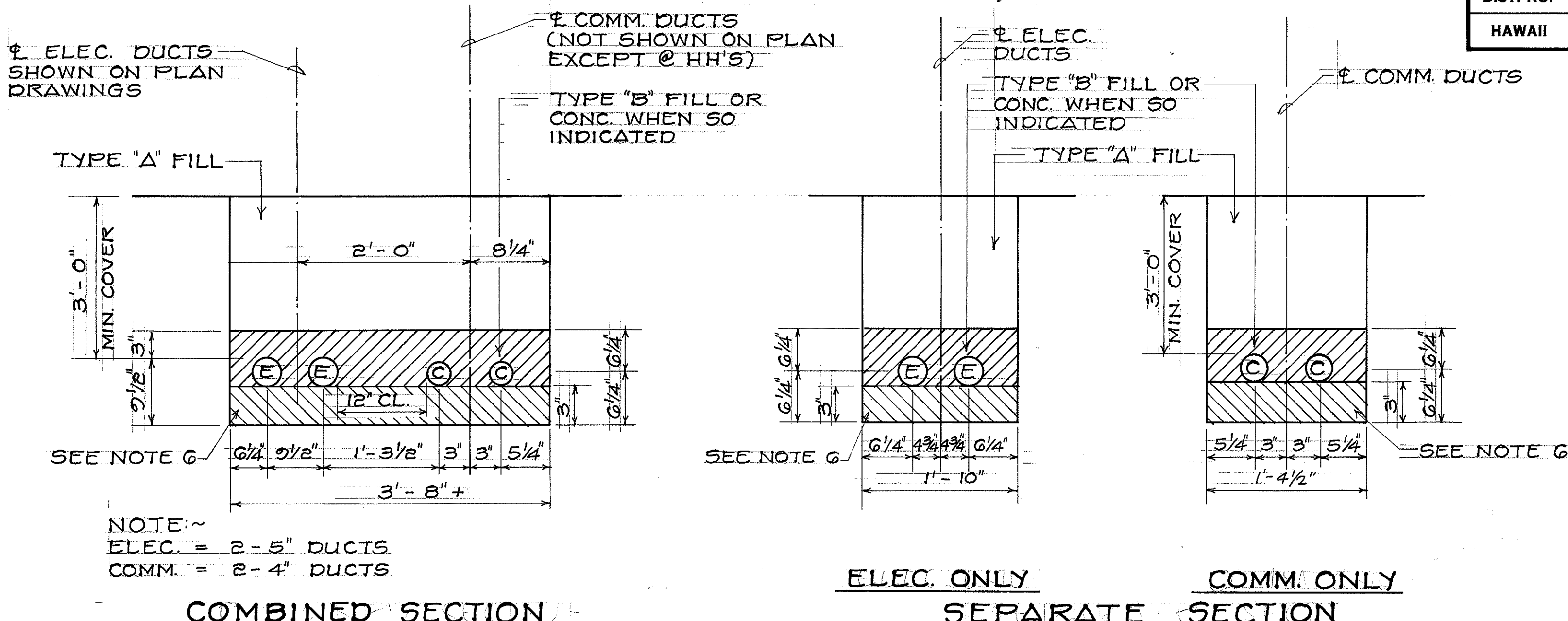
Wayne M. Nakamura

Royce S. Fukunaga

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY - H - 01-86	1987	45	115

HANDHOLE NOTES:

- EXISTING DUCTLINE'S CONTAIN ENERGIZED CABLES. CONTRACTOR SHALL EXERCISE EXTREME CAUTION WHILE BREAKING AND REMOVING EXISTING HANDHOLES. CONTACT HELCO'S DISTRIBUTION DEPARTMENT FOR STANDBY SERVICE 12 HOURS PRIOR TO REQUIRING THIS SERVICE.
- CONTRACTOR SHALL HAVE THE OPTION OF USING CAST-IN-PLACE CONCRETE OR PRECAST CONCRETE FOR HANDHOLE CONSTRUCTION. SHOP DRAWINGS SHALL BE SUBMITTED TO HELCO AND HTCO FOR APPROVAL PRIOR TO FABRICATION.
- HANDHOLE COVERS (REMOVABLE CONC. COVERS): MAXIMUM CLEARANCES BETWEEN REMOVABLE CONCRETE COVERS AND CONCRETE OPENINGS AT THE SUPPORTS MUST BE KEPT. 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 UNEVENNESS SHALL BE CORRECTED TO THE SATISFACTION OF THE ENGINEER AT THE CONTRACTOR'S EXPENSE.

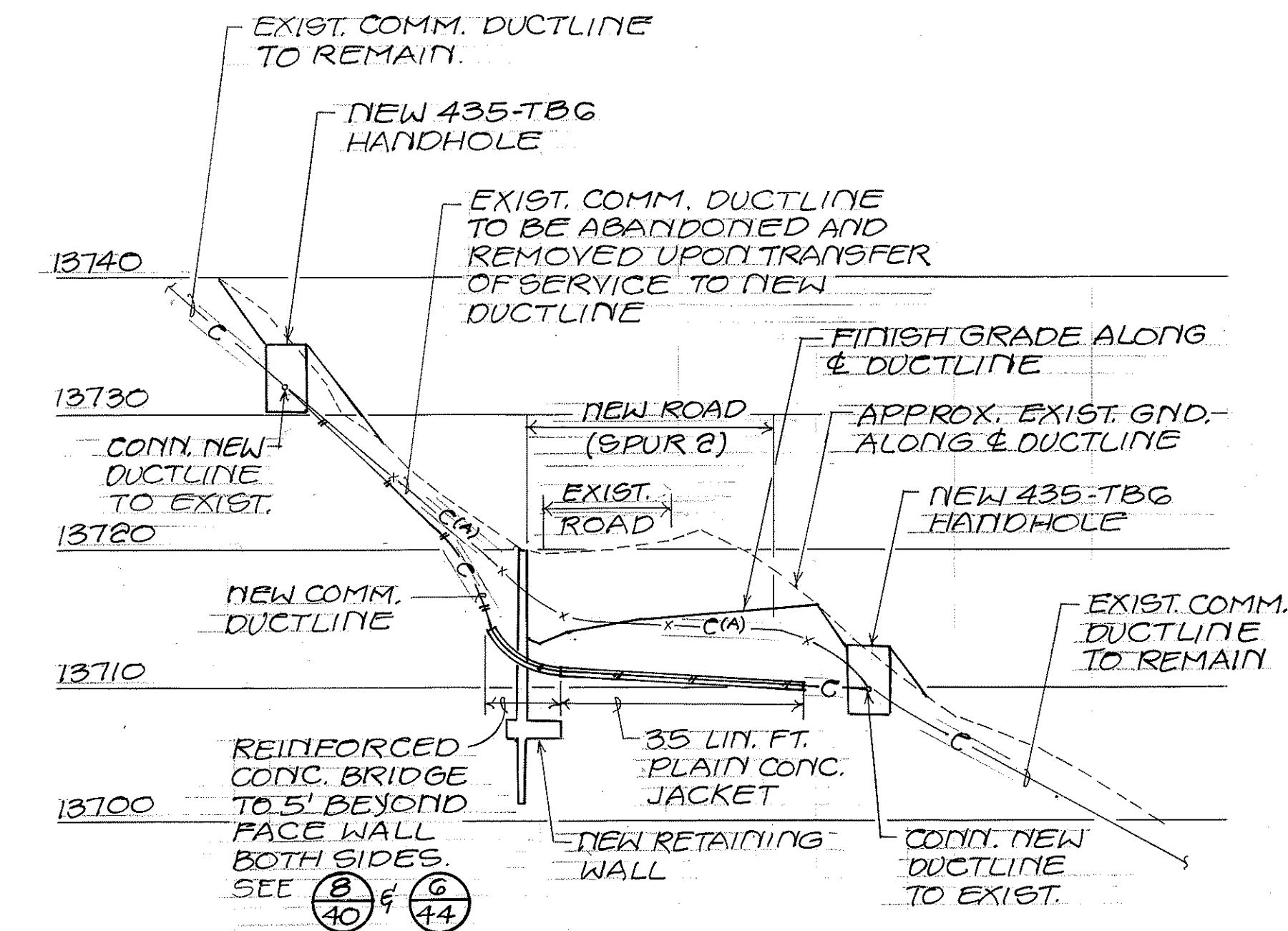


TYPICAL DIRECT BURIED DUCT SECTIONS

NO SCALE

DUCTLINE NOTES:

- 3'-0" MIN. COVER REQUIRED OVER DUCT EXCEPT AS NOTED OTHERWISE. COVER MAY NEED TO BE INCREASED AT SWALES AND OTHER ABRUPT VERTICAL TERRAIN CHANGES TO MAINTAIN SMOOTH VERTICAL TRANSITION.
- CONC. ENCASE DUCTLINE WHERE INDICATED. SEE 44.
- PROVIDE 12" MIN. CLEARANCE BETWEEN TEL. AND ELEC. DUCTS AT ALL TIMES.
- TRENCH BACKFILL:
 - TYPE "A" = BEACH SAND OR EARTH AND GRAVEL. IF EARTH AND GRAVEL USED, MAX. ROCK SIZE SHALL BE 1" AND MIXTURE SHALL CONTAIN NOT MORE THAN 50% BY VOLUME OF ROCK PARTICLES. TOP 18" OF BACKFILL SHALL MATCH ADJACENT MATERIAL.
 - TYPE "B" = SAME AS "A" EXCEPT THAT IF EARTH AND GRAVEL MIXTURE USED, THE MIXTURE MUST PASS A 1/2" MESH SCREEN AND CONTAIN NOT MORE THAN 20% BY VOLUME OF ROCK PARTICLES.
- REFERENCE DRAWINGS: REFER TO THE FOLLOWING STANDARD HELCO DRAWINGS FOR ADDITIONAL DETAILS: DRAWING NO. 30-1035 (SHT. 2) PLASTIC DUCTS INSTALLATION DETAILS DRAWING NO. 30-1035 (SHT. 3)
- FOR DIRECT-BURIED DUCTS: IF BOTTOM OF TRENCH IS NOT EQUAL TO TYPE "B" BACKFILL MATERIAL, EXCAVATE ADDITIONAL 3" AND BACKFILL WITH TYPE "B" MATERIAL AND COMPACT BEFORE PLACEMENT OF DUCTS. FOR CONC. ENCASED DUCTS: EXTEND CONC. ENCASEMENTS 3" BELOW BOTTOM OF DUCTS.



PROFILE - NEW COMMUNICATION DUCTLINE

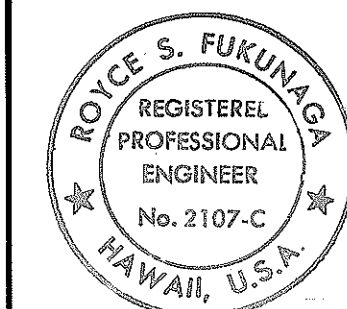
SCALE: HORIZ: 1"=20'-0"
VERT: 1"=10'-0"

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

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

HANDHOLE AND DUCTLINE DETAILS

MAUNA KEA OBSERVATORY ACCESS ROAD
PHASE I
PROJECT NO. HWY - H - 01-86

SHEET No. 2 OF 2 SHEETS