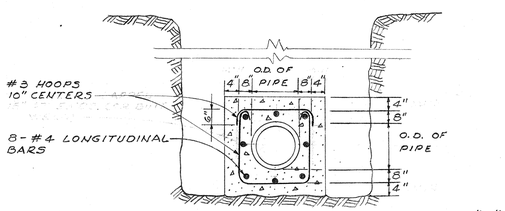
FED. ROAD DIST. No.	STATE	FED. AID PROJ. No.	FISCAL YEAR	SHEET No.	TOTAL SHEETS
HAWAII	HAW.	BUGI-1(3) UNIT (3)	1960	36	176

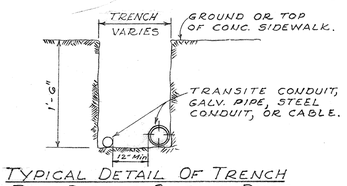
GENERAL NOTES FOR WATER SYSTEM

1. BOTH THE HORIZONTAL AND VERTICAL LOCATIONS OF EXISTING WATER LINES SHOWN ON THE PLANS ARE BASED ON EXISTING RECORDS OF VARYING DEGREES OF ACCURACY AND COMPLETENESS, VERIFIED WHEREVER POSSIBLE BY FIELD SURVEYS. THE CONTRACTOR SHALL VERIFY ACTUAL LOCATIONS OF EXISTING LINES, AND SHALL BE REQUIRED TO MAKE ADJUSTMENT TO ANY NEW OR EXISTING WATER SYSTEM WHEREVER DIRECTED BY THE ENGINEER.
2. FOR LOCATIONS OF STORM DRAINS, SEE DETAIL PLANS OF ROADWAY.
3. ALL WATER SERVICES SHALL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION.
4. ALTERATIONS AND ADJUSTMENTS TO WATER SERVICE LINES SHALL BE DONE WITH THE LEAST AMOUNT OF DISTURBANCE TO THE EXISTING SERVICES TO THE VARIOUS HOUSES.
5. ALL TREES, LAWNS, SHRUBBERY, FENCES, ETC., DISTURBED IN THE PROCESS OF PERFORMING WORK ON WATER SERVICE LINES, SHALL BE RESTORED BY THE CONTRACTOR TO THE SATISFACTION OF THE ENGINEER. SUCH RESTORATION WORK WILL NOT BE PAID FOR SEPARATELY, BUT SHALL BE CONSIDERED AS INCIDENTAL TO THE VARIOUS CONTRACT ITEMS FOR THE WATER SYSTEM.
6. ALL EXISTING MANHOLE FRAMES AND COVERS WHICH ARE NOT AT REQUIRED GRADES SHALL BE ADJUSTED TO THE FINISHED ROADWAY GRADE, OR AS DIRECTED BY THE ENGINEER.
7. ALL WORK TO BE PERFORMED ON WATER LINES SHALL CONFORM TO CURRENT STANDARDS AND SPECIFICATIONS OF THE BOARD OF WATER SUPPLY.
8. THE CONTRACTOR SHALL NOTIFY THE BOARD OF WATER SUPPLY IN WRITING ONE WEEK PRIOR TO COMMENCING WORK ON THE WATER SYSTEM.
9. TEMPORARY CLEANOUTS OR PLUGS SHALL BE FURNISHED AND/OR INSTALLED BY THE CONTRACTOR WHEREVER NECESSARY AND THE COST THEREOF SHALL BE INCIDENTAL TO THE VARIOUS CONTRACT ITEMS FOR THE WATER SYSTEM.
10. CONNECTIONS TO EXISTING WATER SUPPLY SYSTEM WILL BE DONE BY THE BOARD OF WATER SUPPLY CREW.
11. ALL NECESSARY EXCAVATION SHALL BE DONE BY THE CONTRACTOR.
12. ALL VALVES, FITTINGS, PIPES, MANHOLE FRAMES AND COVERS, RUNGS, METER BOX FRAMES AND COVERS WHICH ARE REMOVED AND NOT REUSED, SHALL BE ACCOUNTED FOR WITH THE BWS ENGINEER, AND THEN CLEANED AND RETURNED BY THE CONTRACTOR TO THE BWS KALIHI YARD.
13. WHEREVER WATER LINES ARE INSTALLED ALONG CUT BANKS OF ROADWAY, SURFACES OF SUCH TRENCHES SHALL BE PROTECTED WITH GROUTED RUBBLE PAVING TO PREVENT EROSION OF BACKFILL MATERIALS.
14. ALL UNUSED WATER SERVICE LATERALS SHALL BE CUT AND PLUGGED. CONTRACTOR TO EXCAVATE AND BACKFILL.
15. CUTTING AND PLUGGING OF WATER LINES SHALL BE DONE PRIOR TO ROADWAY GRADING.
16. ALL DISCONNECTING OF WATER METERS WILL BE DONE BY THE BOARD OF WATER SUPPLY CREW.
17. FOR WATER CONNECTION TO SPRINKLER SYSTEM, SEE SHEET NOS. 8147.74 TO 8147.76.
18. THE CONTRACTOR SHALL ARRANGE WITH THE B.W.S. TO CUT OFF EXISTING UNUSED WATER LATERALS, REMOVE METER BOXES AND APPURTENANCES PRIOR TO COMMENCEMENT OF CLEARING AND GRADING OPERATIONS. CONTRACTOR TO PERFORM ALL NECESSARY EXCAVATION.



CONCRETE FOR JACKETS SHALL BE CLASS "B-1"

DETAIL OF CONC. JACKET FOR WATER
NO SCALE



TYPICAL DETAIL OF TRENCH FOR DIRECT BURIAL DUCT
NO SCALE

NOTE: ALL WORK INVOLVING GAS LINES WILL BE DONE BY OTHERS.

CITY AND COUNTY GAMEWELL SYSTEM NOTE

UNDERGROUND CONDUITS AND PULL BOXES FOR CITY AND COUNTY GAMEWELL SYSTEM WILL BE INSTALLED BY THE CITY AND COUNTY STREET LIGHTING DIVISION AT CERTAIN LOCATIONS IN THE PROJECT. THE CONTRACTOR SHALL NOTIFY THE ABOVE DIVISION IN ADVANCE TO ENABLE THE DIVISION'S INSTALLATION OF CITY AND COUNTY CONDUITS IN THE TRENCHES AS SHOWN ON THE PLANS.
THE CONTRACTOR SHALL COOPERATE WITH THE CITY AND COUNTY STREET LIGHTING DIVISION IN WHATEVER MANNER POSSIBLE FOR THE DIVISIONS INSTALLATION OF CITY AND COUNTY GAMEWELL SYSTEM.

LEGEND

—— G2 ——O—	NEW HON. GAS CO. MAIN & VALVE M.H. (SIZES INDICATED).
—— G2 ——O—	EXIST. HON. GAS CO. MAIN & VALVE M.H. (SIZES INDICATED).
+++ G2 +++O++	EXIST. HON. GAS CO. MAIN & VALVE M.H. TO BE ABANDONED OR REMOVED.
—— Sa ——O—	NEW SEWER MAIN & M.H. (SIZES INDICATED).
—— Sa ——O—	EXIST. SEWER MAIN & M.H. (SIZES INDICATED).
+++ Sa +++O++	EXIST. SEWER MAIN & M.H. TO BE ABANDONED OR REMOVED. (AS DIRECTED BY ENGINEER)
—— W12 ——O—	NEW WATER MAIN & M.H. (SIZES INDICATED).
—— W12 ——O—	EXIST. WATER MAIN & M.H. (SIZES INDICATED).
+++ W12 +++O++	EXIST. WATER MAIN & M.H. TO BE ABANDONED OR REMOVED. (AS DIRECTED BY ENGINEER)
—— EC ——E——□—	NEW ELEC. DUCT & BOX (DUCT SIZES INDICATED IN CROSS SECTIONS).
—— EC ——□—	EXIST. ELEC. DUCT & BOX.
+++ EC +++□++	EXIST. ELEC. DUCT & BOX TO BE ABANDONED OR REMOVED. (AS DIRECTED BY ENGINEER)
—— TC ——E——□—	NEW TELEPHONE DUCT & BOX (DUCT SIZES INDICATED IN CROSS SECTIONS)
—— TC ——□—	EXIST. TELEPHONE DUCT & BOX.
+++ TC +++□++	EXIST. TELEPHONE DUCT & BOX TO BE ABANDONED OR REMOVED. (AS DIRECTED BY ENGINEER)
○ WVMH	TYPE "B" OR "C" WATER MANHOLE.
[2a] WVMH	TYPE "A" WATER MANHOLE.
□ W.M.	WATER METER.
G.V.	GATE VALVE (FOR WATER)
BGGV	BEVEL GEARED GATE VALVE (FOR WATER)
—⊥O FH.	FIRE HYDRANT
○ SMH	SEWER MANHOLE
○ DSMH	DROP SEWER MANHOLE
○ GVMH	GAS VALVE MANHOLE
○ EMH	ELECTRIC MANHOLE
○ TMH	TELEPHONE MANHOLE
✦ PP	EXIST. POWER POLE
◇ P	NEW POWER POLE (LENGTH AS NOTED)
⊢—● LP	EXIST. LAMP POLE
⊢—○ LP	NEW LAMP POLE
⟷ TS	EXIST. TRAFFIC SIGNAL STANDARD
REM.	REMOVE
DEM.	DEMOLISH COMPLETELY
ADJ.	ADJUST FRAME & COVER
AB.	ABANDON
T.P. BOX	TELEPHONE PULL BOX
E.H. HOLE	ELECTRIC HANDHOLE
SW ANCHOR	SIDEWALK ANCHOR
LRB	LONG RADIUS BEND (H.E. CO. - G.I., H.T. CO. - C.I.)
SRB	STANDARD RADIUS BEND (H.E. CO. - GI., H.T. CO. - C.I.)
⊢	ANCHORS
—//	CUT & CAP OR PLUG
▭	STANDARD CONC. JACKET
H.E. CO.	HAWAIIAN ELECTRIC CO.
H.T. CO.	HAWAIIAN TELEPHONE CO.

POLE SETTING DEPTH DATA

POLE LENGTH	DEPTH FROM FINISHED GRADE		APPROX. HOLE DIA.
	IN SOIL	IN ROCK	
25'	4' - 6"	3' - 0"	1' - 4"
30'	5' - 0"	3' - 0"	1' - 4"
35'	5' - 0"	3' - 6"	1' - 4"
40'	5' - 6"	3' - 6"	1' - 6"
45'	6' - 0"	4' - 0"	1' - 8"
50'	6' - 6'	4' - 0"	1' - 8"
55'	7' - 0"	4' - 6"	1' - 10"
60'	7' - 0"	4' - 6"	1' - 10"
70'	7' - 6"	5' - 0"	2' - 2"

ANCHOR SETTING DATA
REFER TO THE FOLLOWING STANDARDS

ANCHORING DATA	05-101
GUY ANCHOR 18" DEADMAN	05-102
GUY ANCHOR 24" DEADMAN	05-103
SIDEWALK ANCHOR	05-104
ROCK ANCHOR	05-105

SPECIAL WATER NOTES

1. ALL VERTICAL BENDS TO BE L.P. (LONG PATTERN)
2. ALL BELL JOINTS EMBEDDED IN CONCRETE TO HAVE 2½" OF LEAD.
3. CONTRACTOR SHALL PROVIDE ACCESSIBILITY TO EXISTING METERS AND BOXES TO THE BWS FOR READING AND REMOVAL.
4. WATER LINES DESIGNATED THUS (#) TO BE CUT ARE TO BE EXPOSED AT MAIN BY THE CONTRACTOR AND TO BE CUT BY BOARD OF WATER SUPPLY CREW.
5. WHERE C.R.M. WALLS OR MASONRY WALLS ARE TO BE CONSTRUCTED ALONG ℄ OF W. LINES FRONTING PRIVATE PROPERTY, THE CONTRACTOR SHALL PROVIDE PROPER SIZE SLEEVE INSERTIONS WHERE NECESSARY AND SATISFACTORY TO THE BWS ENGINEER FOR WATER SERVICE RECONNECTIONS TO THE PROPERTY PIPE.
6. "BWS" DENOTES BWS SHARE.

GENERAL NOTES FOR ELECTRIC AND TELEPHONE

1. DEPTH OF DUCT LINES FROM FINISHED GRADE TO:
   (a) TOP OF CONCRETE JACKET WHERE DUCTS ARE CONCRETE ENCASED = MIN=18" MAX.=30"
   (b) TOP OF DUCTS NOT ENCASED IN CONCRETE (DIRECT BURIAL) = MIN 18" MAX. 24"
   (c) BOTTOM OF STEEL CONDUITS (DIRECT BURIAL) MIN.=18" MAX.=24"
   (d) LIMITS MAY BE EXCEEDED ONLY WHEN DIRECTED BY THE UTILITY COMPANY ENGINEER.
2. INSTALLATION OF AND BACKFILL FOR POLES BY H.E. CO. OR H.T. CO.
3. BACKFILL OF ANCHOR HOLES BY THE GENERAL CONTRACTOR.
4. POLES AND ANCHORS NOT NOTED H.E. OR H.T. ARE FOR BOTH UTILITIES.
5. FOR POLE SETTING DEPTH DATA, SEE THIS SHEET.
6. CITY AND COUNTY CONDUITS AND PULL BOXES (NOT SHOWN ON PLANS) SHARING TRENCHES WITH H.E. CO. AND/OR H.T. CO. WILL BE INSTALLED BY CITY AND COUNTY STREET LIGHTING DIVISION.
7. DUCTS ENCASED IN CONCRETE JACKETS:
   (a) NORMAL DISTANCE FROM FACE OF CONCRETE JACKET TO ALL DUCTS TO BE 3" MINIMUM.
   (b) CLEAR DISTANCE OF 1½" MINIMUM BETWEEN DUCTS OF SAME UTILITY CO.
   (c) CLEAR DISTANCE OF 3" MINIMUM BETWEEN H.E. DUCTS AND H.T. DUCTS.
8. EXISTING ELECTRIC AND TELEPHONE SYSTEMS SHOWN ON THESE PLANS ARE LOCATED FROM THE BEST SOURCES AVAILABLE. THE CONTRACTOR SHALL CHECK AND VERIFY THE EXACT LOCATION AND DEPTH OF SAME.
9. ADJUST EXISTING TELEPHONE MANHOLES AND MANHOLE FRAMES AND COVERS WITHIN PROPOSED ROADWAY TO FIT NEW ROADWAY FINISHED GRADES.
10. ADJUSTING H.E. CO. MANHOLES TO BE DONE BY H.E. CO.
11. ALL DUCTS AND CONDUITS CALLED FOR INSTALLATION IN CONCRETE ENCASEMENT SHALL BE INSPECTED AND APPROVED BY THE ENGINEER BEFORE CONCRETE PLACING.
12. FOR DUCT SECTIONS SEE SHEET 6.8147.43
13. DEPTH OF ALL PULL BOXES, SERVICE BOXES, AND H.E. HANDHOLES TO BE DETERMINED IN FIELD.
14. DEPTH OF POLES AND ANCHOR HOLES ARE TAKEN FROM FINISHED GRADE.

APPROVED:

ENGR. HAWN ELEC. CO.	9/18/59 DATE
ENGR. HON. TEL. CO.	10/16/59 DATE
ASSIST. CHIEF ENGINEER, B.W.S.	11/16/59 DATE
ENGR. DIV. OF SEWERS	9-3-59 DATE

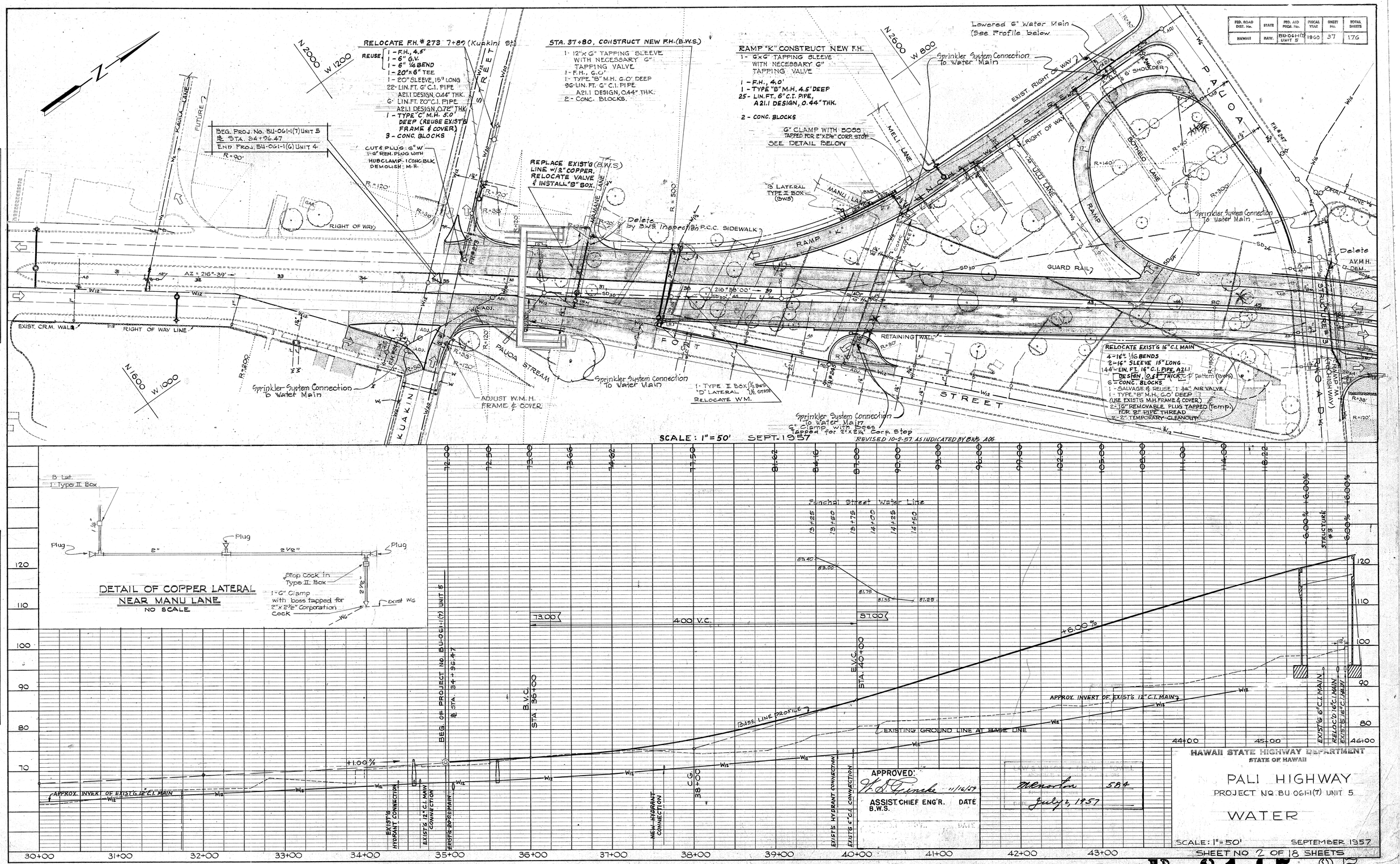
HAWAII STATE HIGHWAY DEPARTMENT
STATE OF HAWAII
PALI HIGHWAY
PROJECT NO. BU-061-1(7) UNIT 5
GENERAL NOTES & DETAILS
WATER & UTILITIES
F.E.B. 1959

SHEET No. 1 OF 18 SHEETS

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

B.8147.36

FED. ROAD DIST. No.	STATE	FED. AID PROJ. No.	FISCAL YEAR	SHEET No.	TOTAL SHEETS
HAWAII	HAW.	BU-061-1(7) UNIT 5	1960	37	176



PLAN — SURVEYED, DRAWN, NOTE BOOK, NO., ALIGNMENT CHECKED, RT. OF WAY CHECKED, BY B.A. A06, DATE 12/5/57

PROFILE — SURVEYED, DRAWN, NOTE BOOK, NO., GRADES CHECKED, B. M.'S NOTED, STRUCTURE NOTAT'NS CH'KD., BY B.A. A06, DATE 12/5/57

PLATE 1 — PLAN-PROFILE O. P. R. & R. E. STANDARD
KEUFFEL & ESSER CO., NEW YORK.
K & E Co. No. 346-1CA

B.S147.37

FED. ROAD DIST. No.	STATE	FED. AID PROJ. No.	FISCAL YEAR	SHEET No.	TOTAL SHEETS
HAWAII	HAW.	BU-061-1(7) UNIT 5	1960	38	176

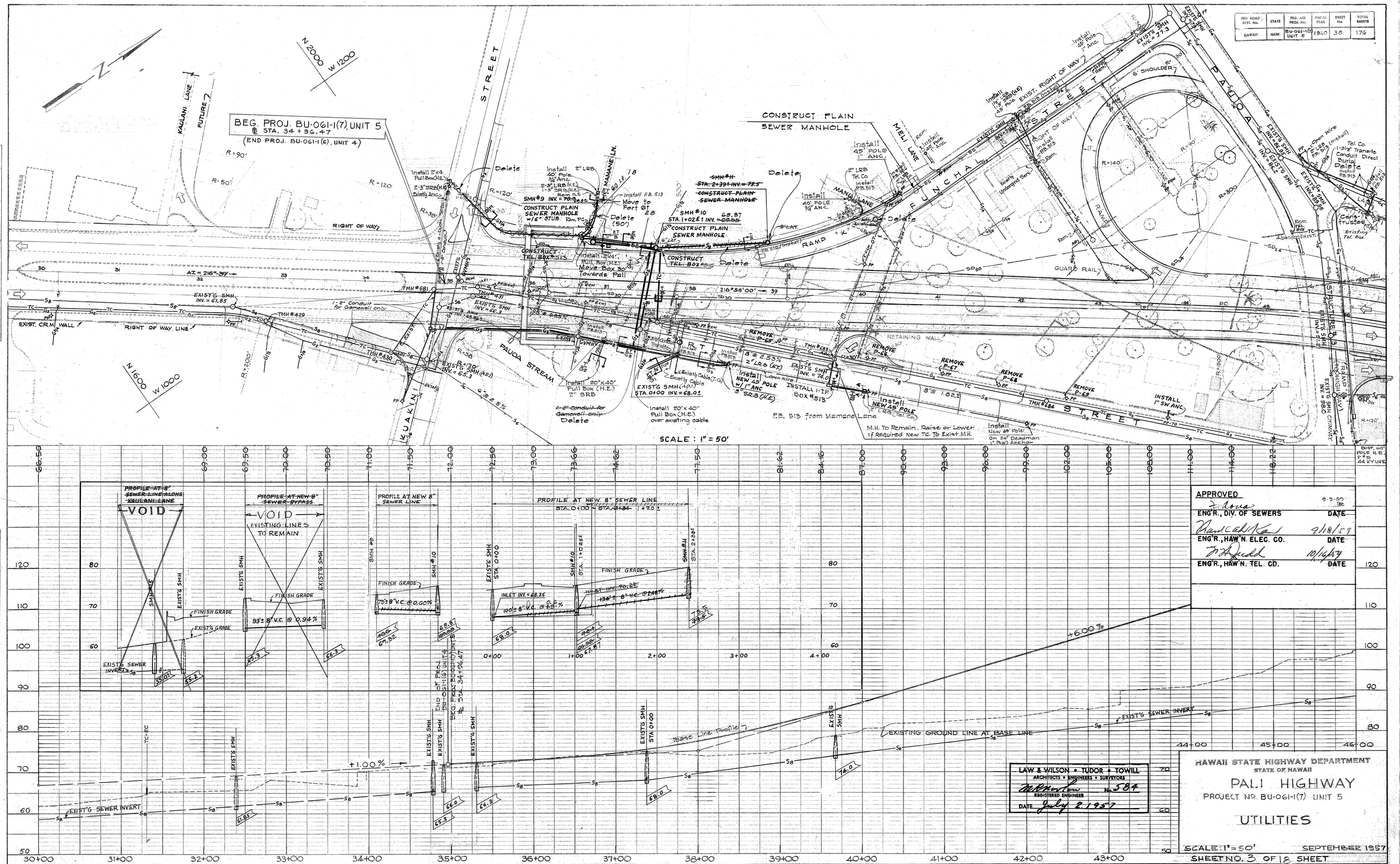
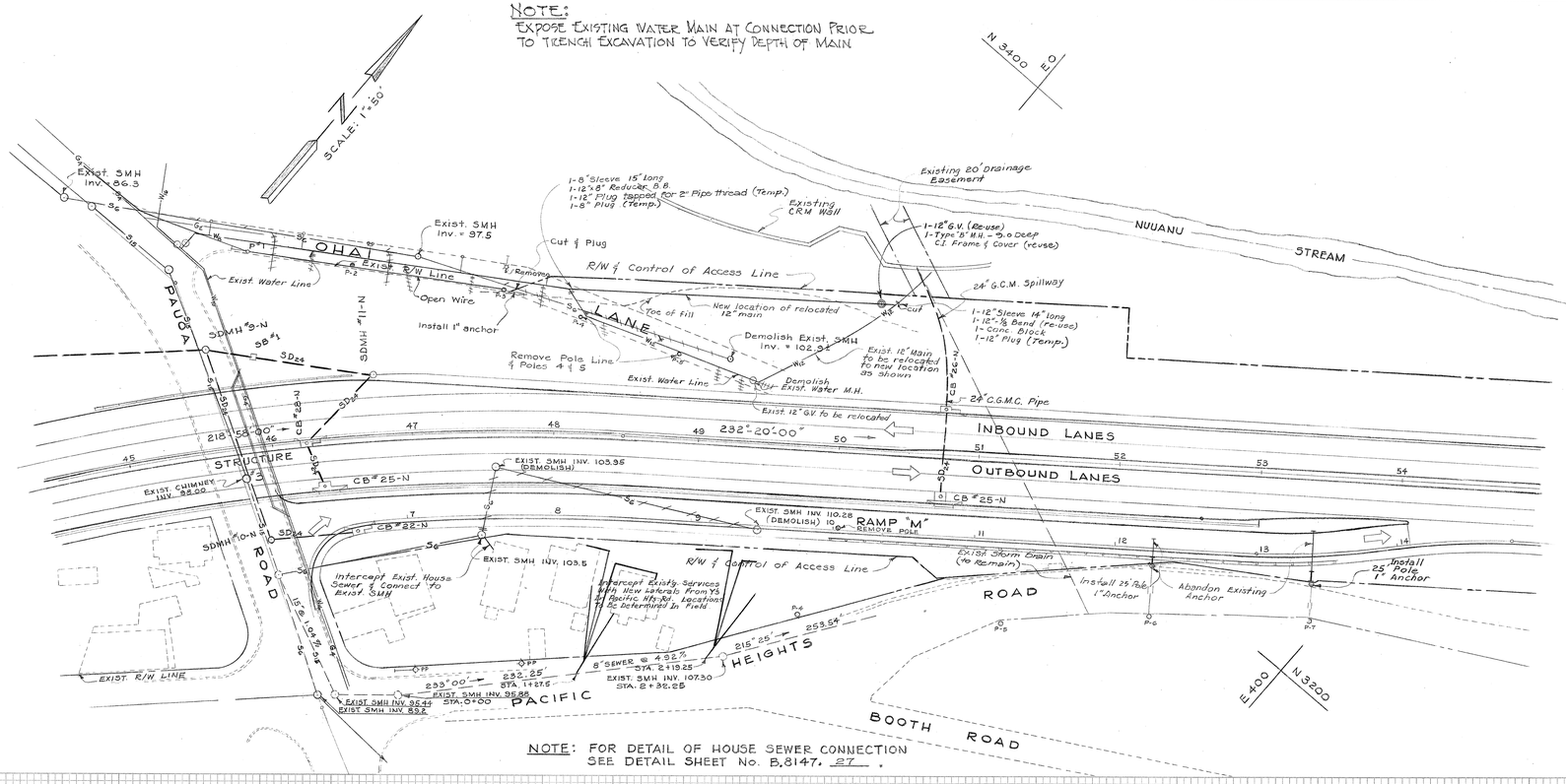


PLATE 1 – PLAN-PROFILE © P. R. & P. E. STANDARD
KEUFFEL & ESSER CO., NEW YORK.
K & E Co. No. 348-1CA

B.S147.3S

FED. ROAD DIST. No.	STATE	FED. AID PROJ. No.	FISCAL YEAR	SHEET No.	TOTAL SHEETS
HAWAII	HAW.	BU-061-1(7) UNIT 5	1960	39	176

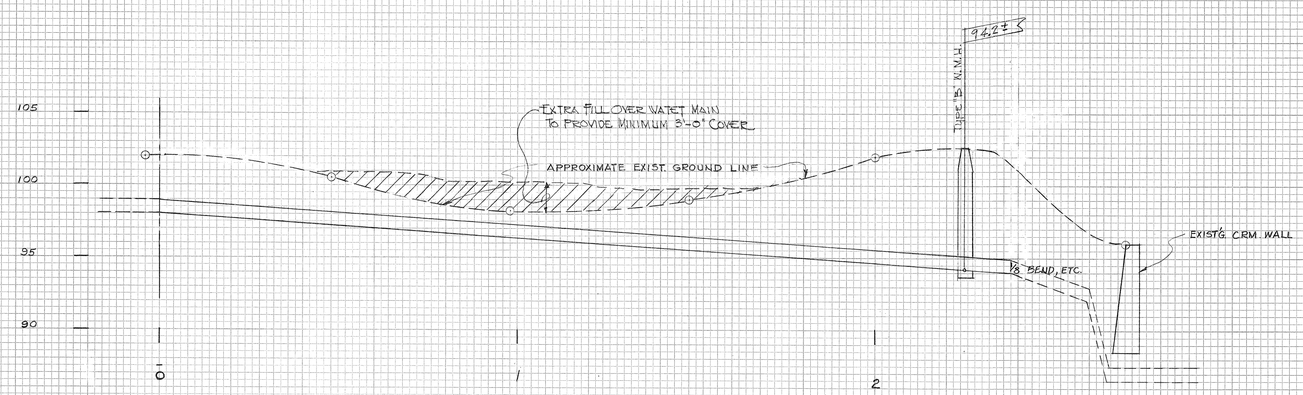
NOTE:
EXPOSE EXISTING WATER MAIN AT CONNECTION PRIOR TO TRENCH EXCAVATION TO VERIFY DEPTH OF MAIN



NOTE: FOR DETAIL OF HOUSE SEWER CONNECTION SEE DETAIL SHEET No. B.8147. 27 .

GENERAL NOTES FOR SEWER SYSTEM

1. EXISTING SEWER LINES SHOWN ON THE PLANS ARE BASED ON EXISTING RECORDS OF VARYING DEGREES OF ACCURACY AND COMPLETENESS, VERIFIED WHEREVER POSSIBLE BY FIELD SURVEYS. THE CONTRACTOR SHALL VERIFY ACTUAL LOCATION AND INVERTS OF EXISTING LINES, AND SHALL BE REQUIRED TO MAKE ADJUSTMENT TO ANY NEW OR EXISTING SEWER SYSTEM WHEREVER DIRECTED BY THE ENGINEER.
2. ADJUST EXISTING SEWER MANHOLES AND M.H. FRAMES AND COVERS WITHIN PROPOSED ROADWAY TO FIT NEW ROADWAY FINISHED GRADES.
3. IF LATERALS OTHER THAN THOSE SHOWN ON THE PLANS ARE EXPOSED DURING CONSTRUCTION, THE SAME SHALL BE CUT AND PLUGGED, OR EXTENDED AND RECONNECTED AS REQUIRED.
4. ALL SERVICES CONNECTED TO EXISTING SEWER MAINS, WHICH MAINS ARE TO BE ABANDONED OR REMOVED, SHALL BE RECONNECTED TO NEW SEWER MAINS AS REQUIRED.
5. SEWER LATERALS TO BE EXTENDED SHALL BE RECONNECTED AS SHOWN ON TYPICAL HOUSE SEWER CONNECTION DETAIL.
6. LOCATION OF LATERALS AND WYES ON NEW SEWER LINES SHALL BE AS DESIGNATED BY THE ENGINEER.
7. ALL WORK INVOLVED IN INSTALLATION OF NEW SEWER MAINS, CONNECTION OF EXISTING HOUSE SEWERS TO NEW SEWER LINE, CONSTRUCTION OF CONCRETE JACKETS AROUND SEWER MAINS, EXTENSION OF LATERALS TO NEW PROPERTY LINE, AND CUTTING AND PLUGGING OF ABANDONED SEWER LINES AND LATERALS SHALL BE PERFORMED IN ACCORDANCE WITH THE LATEST CITY AND COUNTY STANDARD SEWER DETAILS AND SPECIFICATIONS AND UNDER THE SUPERVISION OF AN INSPECTOR OR REPRESENTATIVE OF THE DIV. OF SEWERS, C&C OF HONOLULU.
8. CONCRETE BLOCKS AND CRADLES SHALL BE PLACED FOR ALL SEWER MAINS AND LATERALS.
9. CONCRETE JACKETS SHALL BE CONSTRUCTED MINIMUM OF ONE FOOT BEYOND THE EDGES OF FOOTINGS, PIERS, BOX CULVERTS, ETC., OR AS DIRECTED BY THE ENGINEER.
10. ALL SERVICES SHALL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION. ALTERATIONS TO SERVICE LINES SHALL BE DONE WITH THE LEAST AMOUNT OF DISTURBANCE TO THE EXISTING SERVICES TO THE VARIOUS HOUSES.
11. ALL TREES, LAWNS, SHRUBBERY, FENCES, ETC., DISTURBED IN THE PROCESS OF PERFORMING WORK ON SEWER SERVICE LINES, SHALL BE RESTORED BY THE CONTRACTOR TO THE SATISFACTION OF THE ENGINEER. SUCH RESTORATION WORK WILL NOT BE PAID FOR SEPARATELY, BUT SHALL BE CONSIDERED AS INCIDENTAL TO THE VARIOUS CONTRACT ITEMS FOR THE SEWER SYSTEM.



PROFILE - RELOCATED 12" WATERLINE
SCALE: HOR. 1" = 20'
VERT. 1" = 5'

APPROVED:

T. Iwata	9-3-59 DATE
ENGINEER, DIV. OF SEWERS	
Ernest Cobb Kay	9/18/59
ENGINEER, HAWN. ELEC. CO.	DATE
W. A. Dudd	10/16/59
ENGINEER, HONN. TEL. CO.	DATE
W. S. Gimeke	11/16/59
ASSIST. CHIEF ENGINEER, B.W.S.	DATE

HAWAII STATE HIGHWAY DEPARTMENT
STATE OF HAWAII

PALI HIGHWAY
PROJ. NO. BU-061-1 (7) UNIT 5

UTILITIES

SCALE: 1" = 50' AUGUST, 1959

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

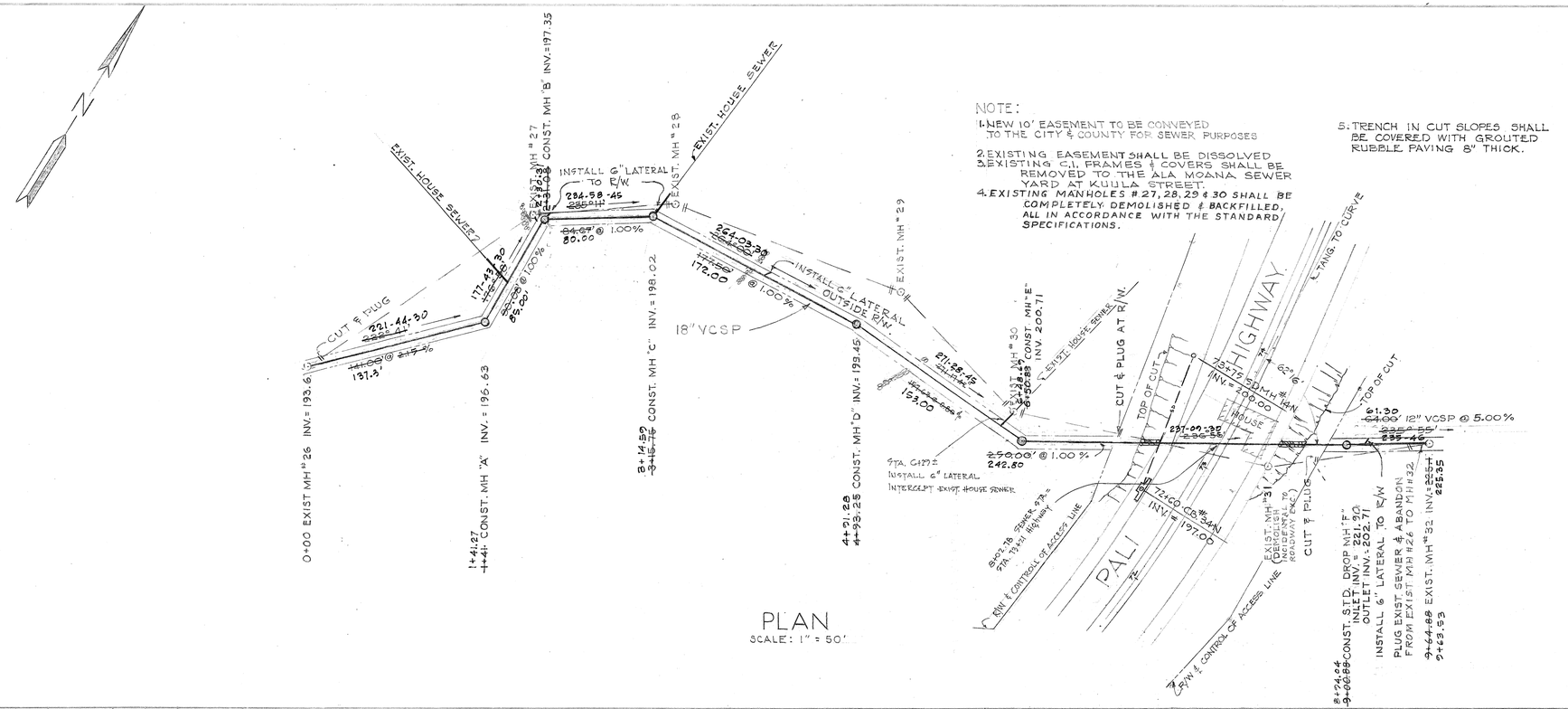
ORIGINAL SURVEY — SURVEYED, PLOTTED, TEMPLATE, AREAS, AREAS CHECKED — NOTE BOOK NO. — BY — DATE

B.8147.39

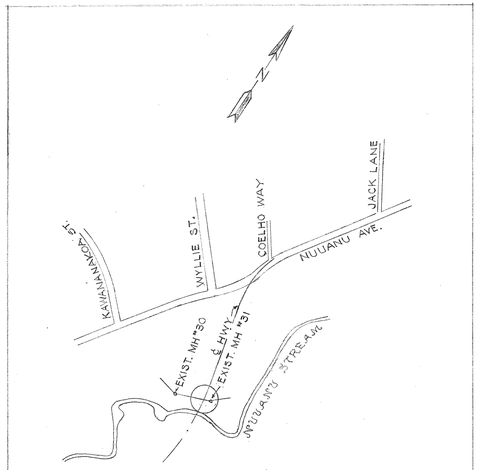
FED. ROAD PROJ. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAN A11	HAW.	BUOGI-1(7) UNIT 5	1960	40	176

NOTE:

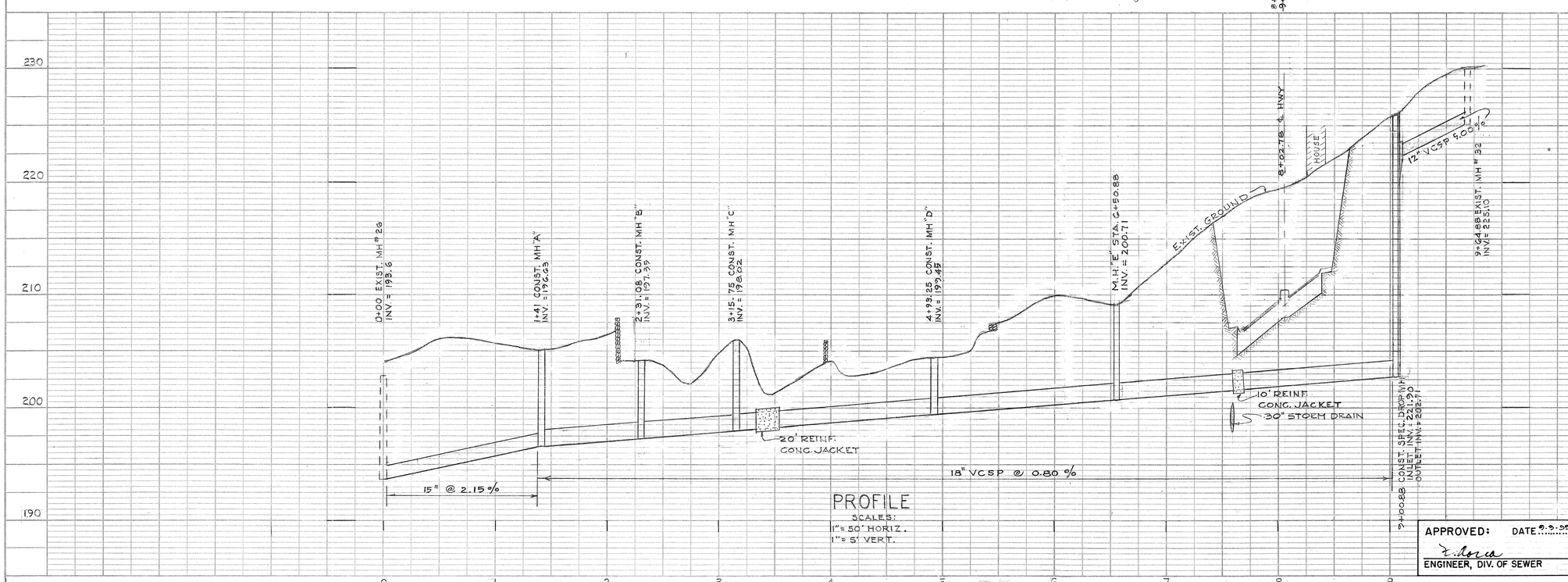
1. NEW 10' EASEMENT TO BE CONVEYED TO THE CITY & COUNTY FOR SEWER PURPOSES
2. EXISTING EASEMENT SHALL BE DISSOLVED
3. EXISTING C.I. FRAMES & COVERS SHALL BE REMOVED TO THE ALA MOANA SEWER YARD AT KUULA STREET.
4. EXISTING MANHOLES # 27, 28, 29 & 30 SHALL BE COMPLETELY DEMOLISHED & BACKFILLED, ALL IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.
5. TRENCH IN CUT SLOPES SHALL BE COVERED WITH GROUTED RUBBLE PAVING 8" THICK.



PLAN
SCALE: 1" = 50'



VICINITY MAP
SCALE: 1" = 500'



PROFILE
SCALES:
1" = 50' HORIZ.
1" = 5' VERT.

PLAN		BY	DATE
SURVEYED			
PLOTTED			
NOTE BOOK	ALIGNMENT CHECKED	PLB	12/25/57
NO.	RT. OF WAY CHECKED	ACG	

PROFILE		BY	DATE
SURVEYED			
PLOTTED			
NOTE BOOK	GRADES CHECKED	PLB	12/26/57
NO.	B.M. & NOTED	ACG	
	STRUCTURES: WATTS & DYCK		

LAW & WILSON • TUDOR • TOWILL
ARCHITECTS • ENGINEERS • SURVEYORS
REGISTERED ENGINEER No. 584
DATE July 2, 1957

HAWAII STATE HIGHWAY DEPARTMENT
STATE OF HAWAII

PALI HIGHWAY
PROJECT No. BU 061-1(7) UNIT 5
TRUNK SEWER RELOCATION
UTILITIES

SCALE: 1" = 50' JUNE 1959

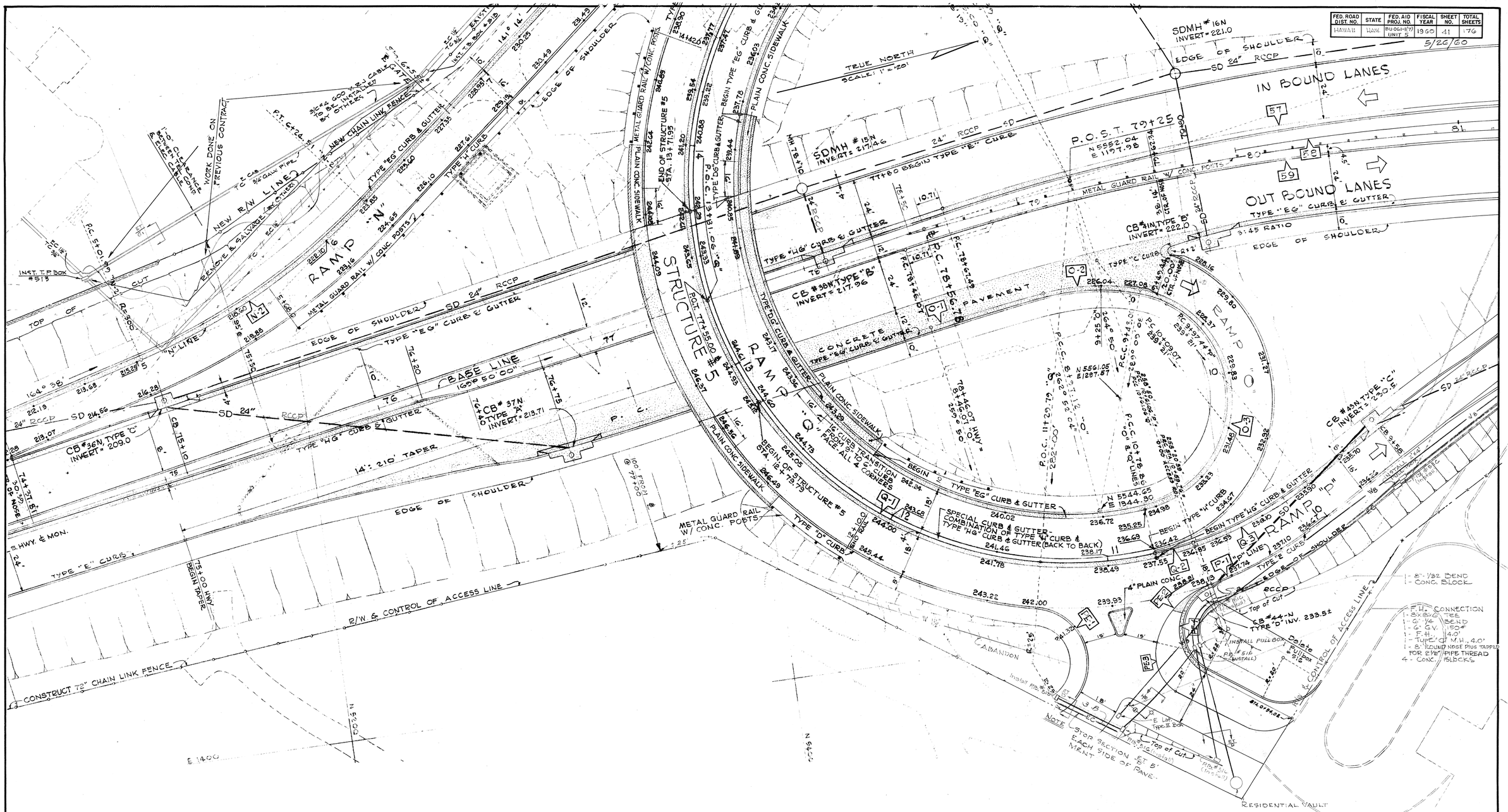
APPROVED: DATE 9-9-59
ENGINEER, DIV. OF SEWER

SHEET NO. 5 OF 18 SHEETS

B.S147.40

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BU-061-1(7) UNIT 5	1960	41	176

5/26/60



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

APPROVED:

ASSISTANT CHIEF ENGINEER, B.W.S. — DATE 11/16/59

APPROVED:

ENGINEER, HAW'N ELEC. CO. — DATE 9/18/59

ENGINEER, HAW'N TEL. CO. — DATE 10/16/59

HAWAII STATE HIGHWAY DEPARTMENT
STATE OF HAWAII

PALI HIGHWAY
PROJ. NO. BU-061-1 (7) UNIT 5

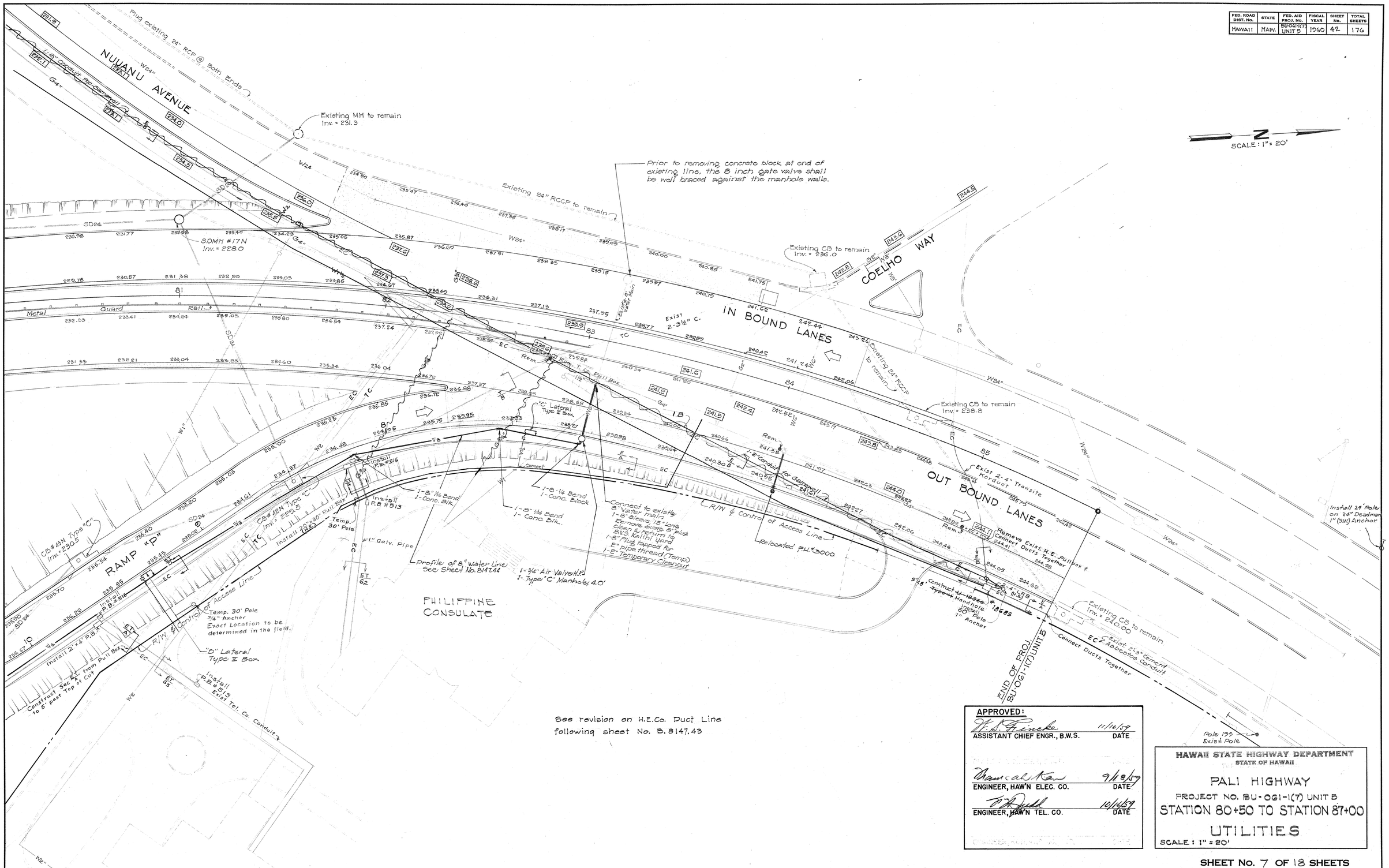
UTILITIES

SCALE: 1" = 20' 1959

SHEET No. 6 OF 18 SHEETS

B.S147.41

FED. ROAD DIST. No.	STATE	FED. AID PROJ. No.	FISCAL YEAR	SHEET No.	TOTAL SHEETS
HAWAII	HAW.	BUGG-1(7) UNIT 5	1960	42	176



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

APPROVED:

H. S. Heinecke — 11/16/59
ASSISTANT CHIEF ENGR., B.W.S. — DATE

Thomas A. Kern — 9/18/59
ENGINEER, HAW'N ELEC. CO. — DATE

F. R. Rudd — 10/14/59
ENGINEER, HAW'N TEL. CO. — DATE

HAWAII STATE HIGHWAY DEPARTMENT
STATE OF HAWAII

PALI HIGHWAY

PROJECT NO. BU-061-1(7) UNIT 5

STATION 80+50 TO STATION 87+00

UTILITIES

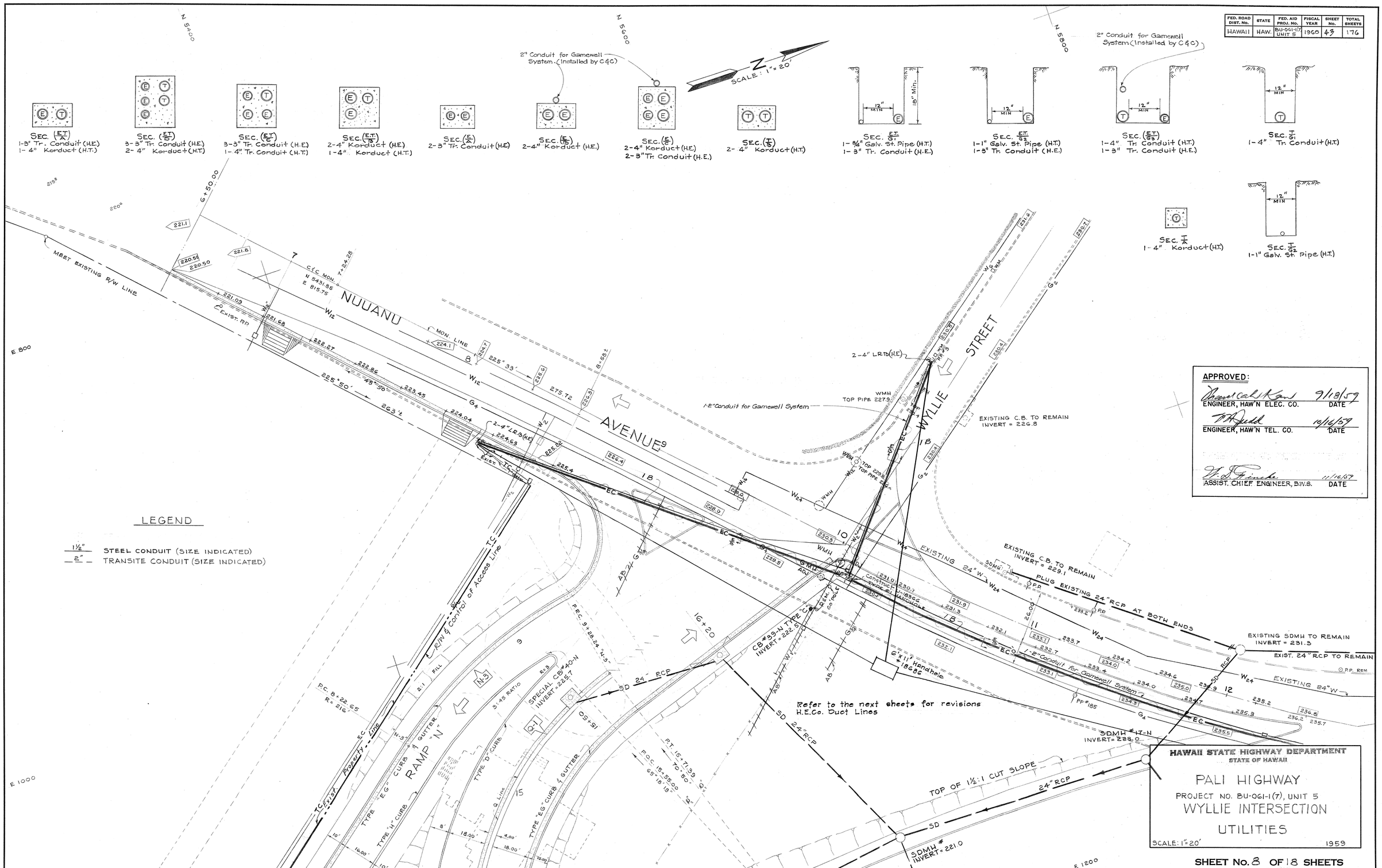
SCALE : 1" = 20'

SHEET No. 7 OF 18 SHEETS

B.8147.42

PRINTED ON DIEPO 1000H CLEARPRINT

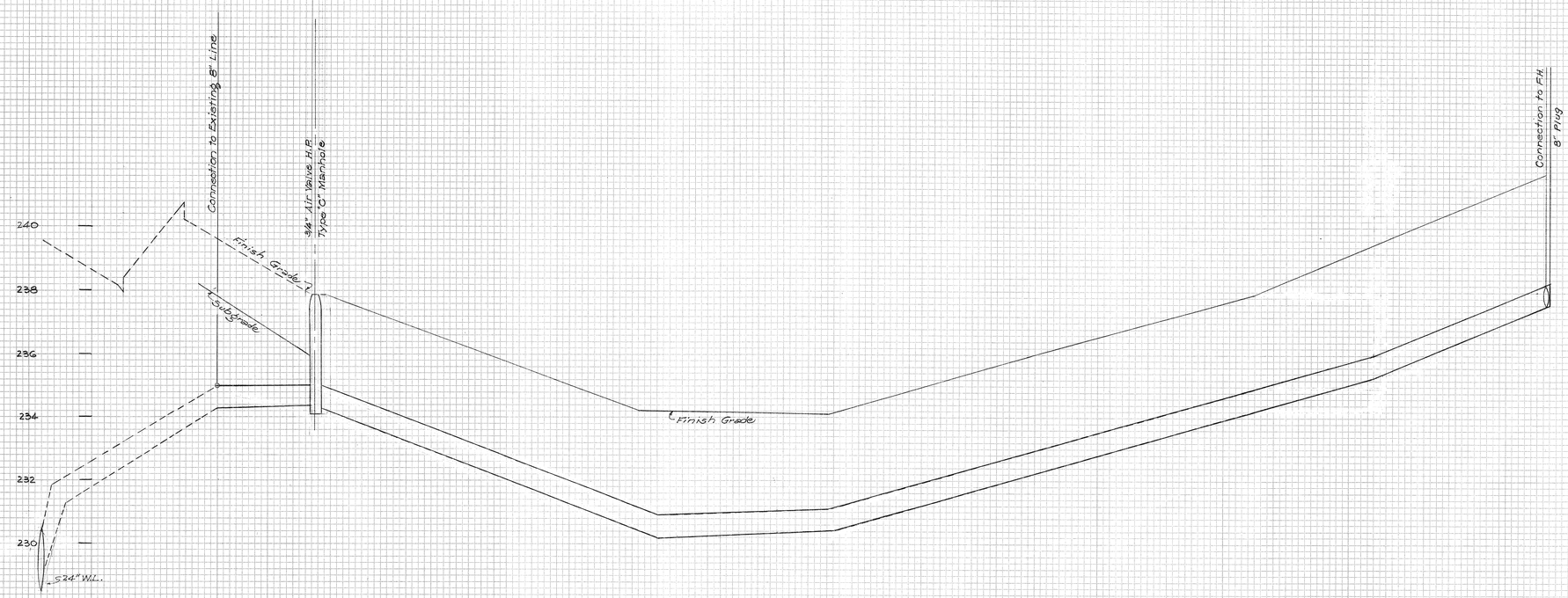
FED. ROAD DIST. No.	STATE	FED. AID PROJ. No.	FISCAL YEAR	SHEET No.	TOTAL SHEETS
HAWAII	HAW.	BU-061-(7) UNIT 5	1960	43	176



B.S147.43

PRINTED ON DIEPO 1000H CLEARPRINT

PED. ROAD DIST. No.	STATE	FED. AID PROJ. No.	FISCAL YEAR	SHEET No.	TOTAL SHEETS
HAWAII	HAW.	BU-061-1(7) UNIT 5	1960	44	176



PROFILE OF 8" WATER LINE ALONG RAMP "P"

Horizontal Scale: 1" = 20'
Vertical Scale: 1" = 2'

0+00 1+00 2+00 3+00

APPROVED:
W. S. Grinda 11/16/59
ASSIST. CHIEF ENGINEER, B.W.S. DATE

HAWAII STATE HIGHWAY DEPARTMENT
STATE OF HAWAII

PALI HIGHWAY
PROJECT NO. BU-061-1(7) UNIT 5
WATER

Scale as Noted
August 1959

SHEET 44 OF 18 SHEETS

B.S147.44

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

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

REV. NO.	DATE	STAFF	REV. NO.	SCALE	SHEET	TOTAL SHEETS
			BUGH-1(7) Unit 5	1960	45	176

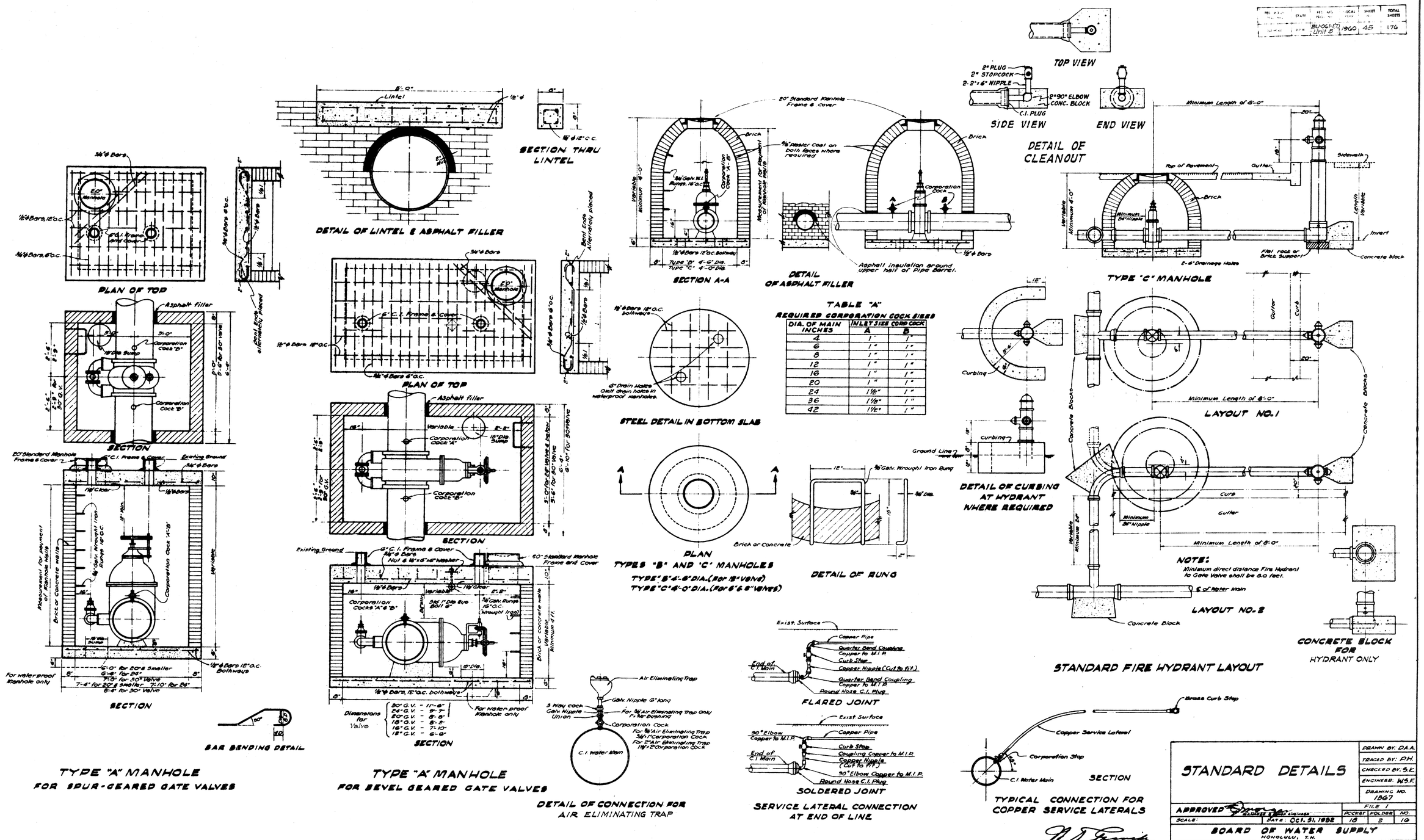


TABLE "A"

REQUIRED CORPORATION COCK SIZES

DIA. OF MAIN INCHES	INLET SIZE CORP COCK A	B
4	1"	1"
6	1"	1"
8	1"	1"
12	1"	1"
16	1"	1"
20	1"	1"
24	1½"	1"
36	1½"	1"
42	1½"	1"

STANDARD DETAILS

DRAWN BY: D.A.A.	
TRACED BY: P.H.	
CHECKED BY: S.K.	
ENGINEER: W.S.F.	
DRAWING NO. 1367	
APPROVED: Supervising Sanitary Engineer	FILE 1
SCALE:	DATE: Oct. 31, 1952
POCKET 18	FOLDER 2	NO. 19

BOARD OF WATER SUPPLY
HONOLULU, T.H.

HAWAII STATE HIGHWAY DEPARTMENT
STATE OF HAWAII

PALI HIGHWAY
PROJECT NO. BU-061-1(7) UNIT 5

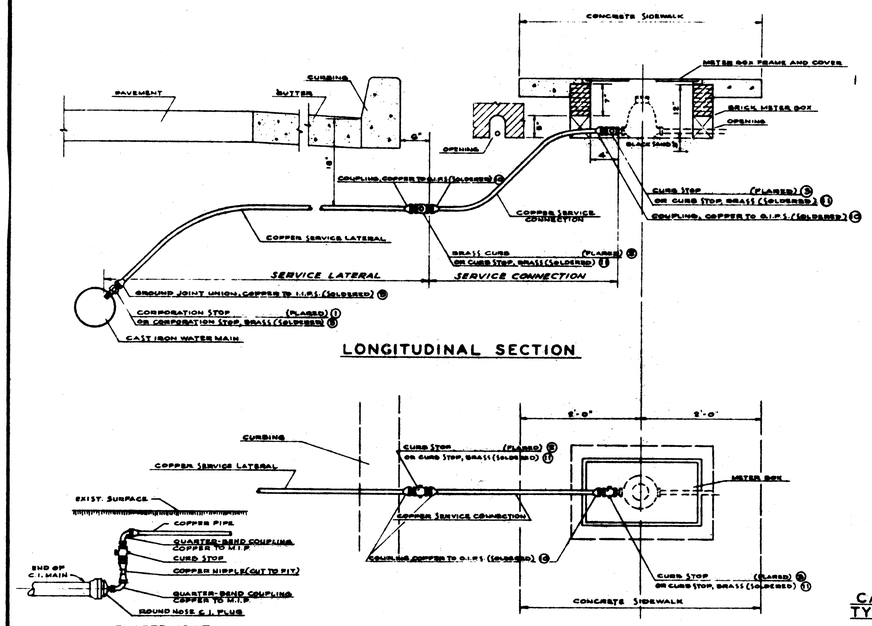
Division Engineer

SHEET 10 OF 18 SHEETS

B.S147.45

						TOTAL SHEETS
HAWAII	HAW	BU-061-1(7) Unit 5	1960	46		176

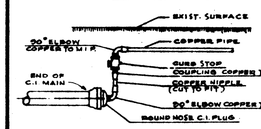
Revised 3-12-58



LONGITUDINAL SECTION

SINGLE SERVICE CONNECTION

FLARED JOINT

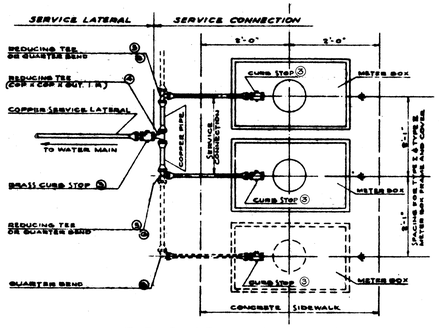


SOLDERED JOINT

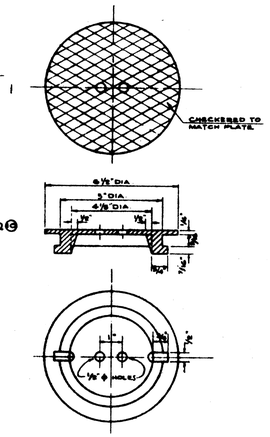
SERVICE LATERAL CONNECTION AT END OF LINE

SCHEDULE OF COPPER FITTINGS
(FLARED JOINT)

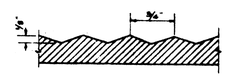
ITEM NO.	DESCRIPTION	SINGLE SERVICE CONN.	MULTIPLE SERV CONN. TWO SERVICES	MULTIPLE SERV CONN. THREE SERVICES
1	CORPORATION STOP WITH STRAIGHT COUPLING NUT	1	1	1
2	BRASS CURB STOP	1	–	–
3	CURB STOP WITH TUBE NUT COPPER TO INSIDE I. P.	1	3	4
4	REDUCING TEE WITH TUBE NUTS - COPPER TO COPPER TO OUTSIDE I. P.	–	1	1
5	REDUCING TEES WITH TUBE NUTS - COPPER TO COPPER TO COPPER	–	–	1
6	1/4 BEND UNION COUPLING WITH TUBE NUTS - COPPER TO COPPER	–	2	2
7	THREE PART UNION COUPLING OR SOLDER COUPLING.	TO BE USED IN SPLICING ODD LENGTHS OF COPPER PIPE.		



MULTIPLE SERVICE CONNECTION
FLARED JOINTS



READING COVER

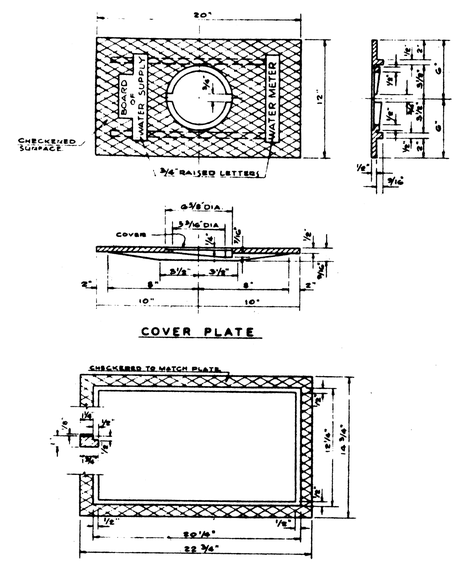


CHECKERED PATTERN

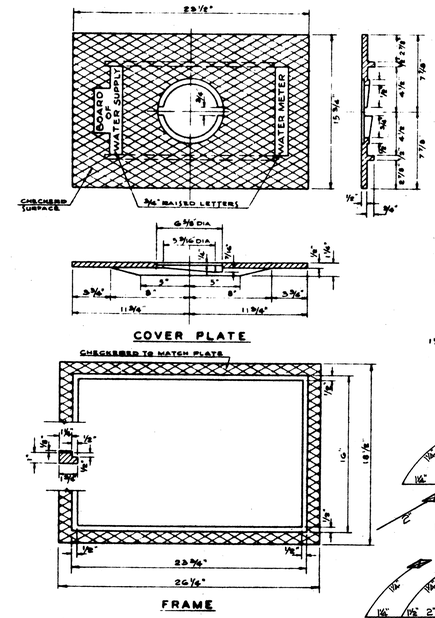
CAST IRON COVER FOR TYPE I & TYPE II FRAMES

SCHEDULE OF COPPER FITTINGS
(SOLDERED JOINT)

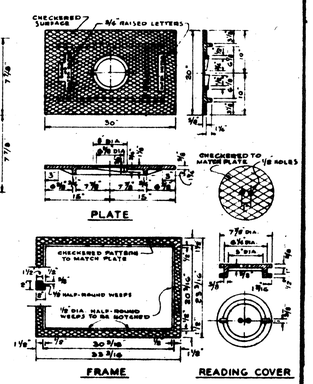
ITEM NO.	DESCRIPTION	SINGLE SERVICE CONN.	MULTIPLE SERV. CONN. TWO SERVICES	MULTIPLE SERV. CONN. THREE SERVICES
8	CORPORATION STOP, BRASS	1	1	1
9	GROUND JOINT UNION COPPER TO I.I.P.S.	1	1	1
10	COUPLING, COPPER TO O.I.P.S.	2	1	1
11	CURB STOP, BRASS (D.W.S. STANDARD)	1	1	1
12	FITTING ADAPTER, FITTING TO O.I.P.S.	–	1	1
13	TEE, COPPER TO COPPER TO COPPER.	–	1	1
14	BUSHINGS, FITTING TO COPPER	–	2	2
15	90° ELBOW, COPPER TO COPPER	–	2	2
16	COUPLING, COPPER TO O.I.P.S.	1	2	3
17	CURB STOP, BRASS (D.W.S. STANDARD)	1	2	3
18	REDUCING TEE, COPPER TO COPPER TO COPPER (SUBSTITUTE FOR ITEMS NUMBER 13 & 14).	–	1	1
19	TEE, COPPER TO COPPER TO COPPER	–	–	1
20	BUSHING, FITTING TO COPPER	–	–	1
21	REDUCING TEE, COPPER TO COPPER TO COPPER (SUBSTITUTE FOR ITEMS NUMBER 19 & 20	–	–	1



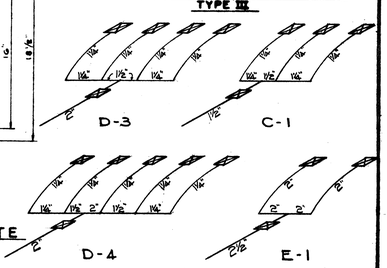
CAST IRON FRAME AND PLATE
TYPE I

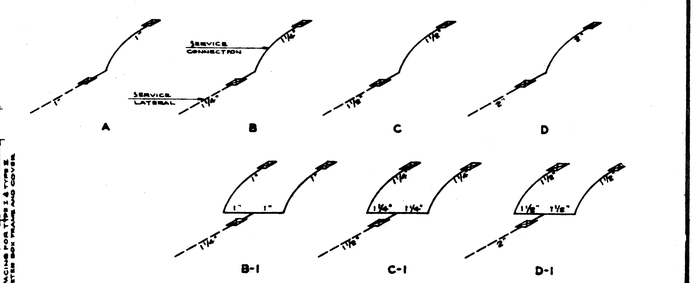


CAST IRON FRAME AND PLATE
TYPE II

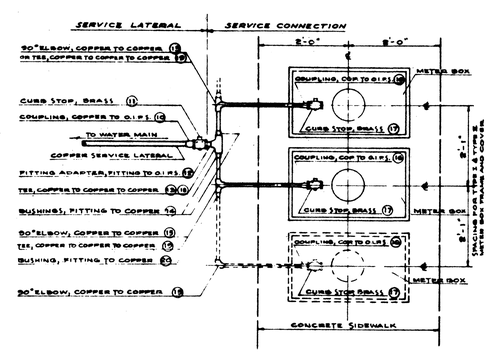


CAST IRON FRAME, PLATE & COVER
TYPE III





TYPICAL LAYOUT OF
SERVICE LATERALS AND CONNECTIONS



MULTIPLE SERVICE CONNECTION
SOLDERED JOINTS

NOTE:

USE OF COPPER PIPE AND FITTINGS WITH "SOLDERED" JOINTS OPTIONAL UNTIL FURTHER NOTICE.

STANDARD DETAILS COPPER SERVICE LATERALS AND CONNECTIONS C. I. METER BOX FRAME AND COVER	DRAWN BY R.O.
	TRACED BY R.O.
	CHECKED BY T.I.
	ENGINEER T.I.
	DRAWING NO.
APPROVED Thomas SUPERVISING MAINTENANCE ENGINEER	FILE 2
SCALE: DATE: Jan. 27, 1953	POCKET 8 / FOLDER / NO. 24 b

BOARD OF WATER SUPPLY
HONOLULU, T. H.

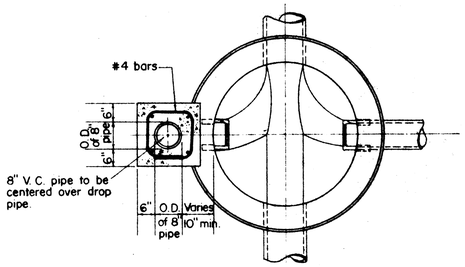
HAWAII STATE HIGHWAY DEPARTMENT
STATE OF HAWAII

PALI HIGHWAY

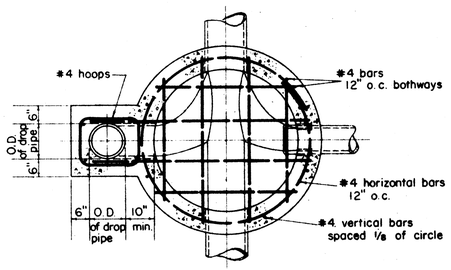
PROJECT NO. BU-061-1(7) UNIT 5

B.S147.4b(6)

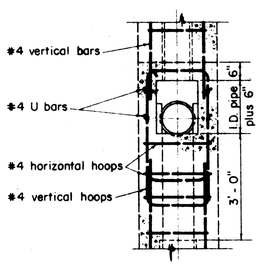
FED. ROAD DIST. No.	STATE	FED. AID PROJ. No.	FISCAL YEAR	SHEET No.	TOTAL SHEETS
HAWAII	HAW	BU-061-1(7) UNIT B	1960	47	176



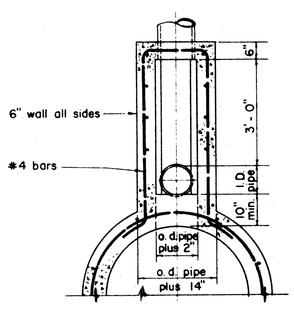
SECTION A-A



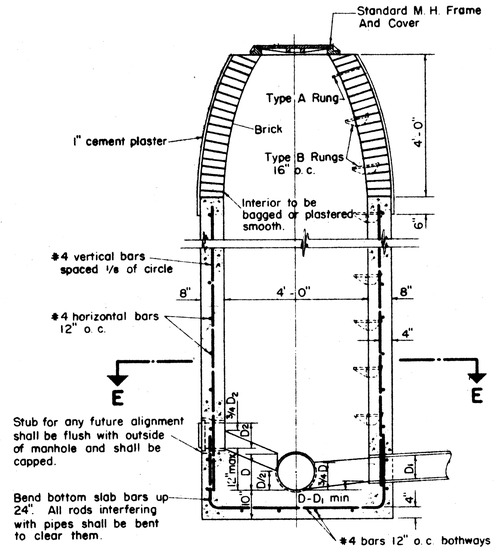
SECTION B-B



SECTION C-C

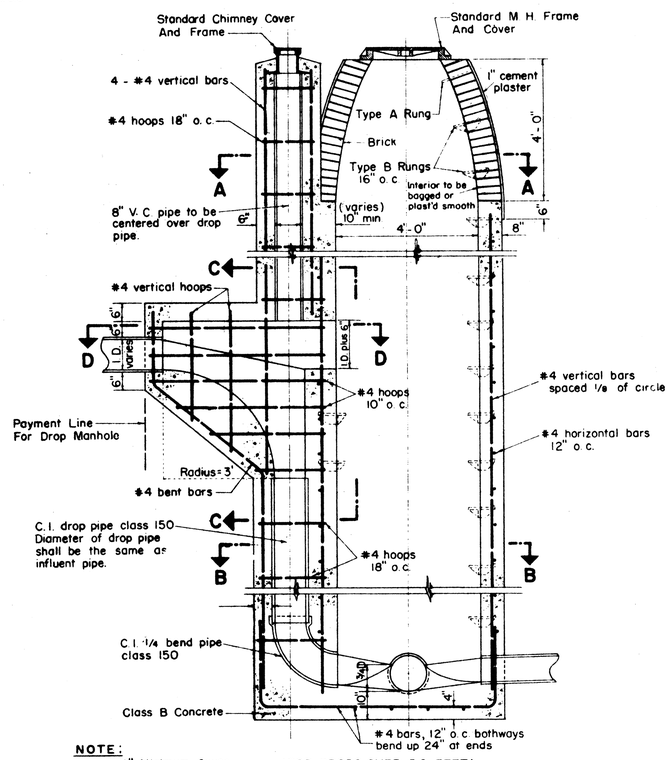


SECTION D-D



PLAIN MANHOLE

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

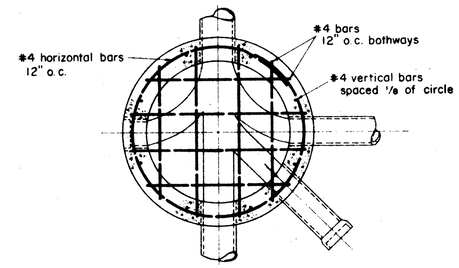


NOTE:
2" Minimum Cover On Reinforcing Steel

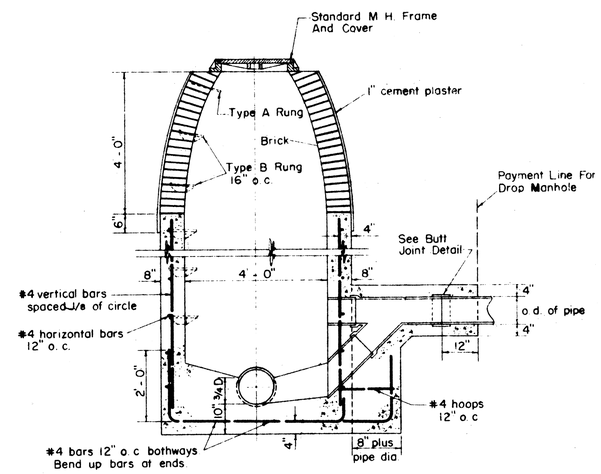
(FOR DROPS OVER 5.0 FEET)

DROP MANHOLE

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



SECTION E-E



(FOR DROPS UNDER 5.0 FEET)

(SHALLOW) DROP MANHOLE

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

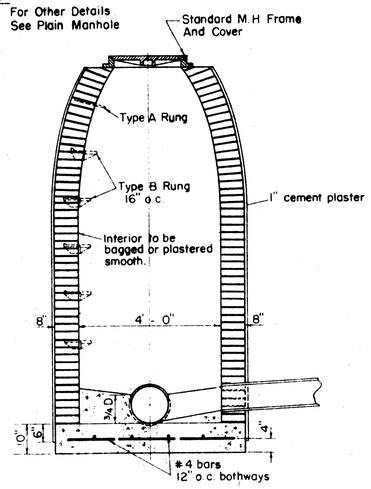
NOTE:

1. Manhole rungs shall not be aligned above any flow line.
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 laps to be 40 diameters in length.
6. Data for special manholes not shown shall be similar to that for plain manholes.
7. Size of drop pipe in all Drop Manholes shall be same as influent line.
8. Manhole wall to be of reinforced concrete to height 1' above normal ground water table

NOTE:
For Other Details See Plain Manhole



(MAXIMUM HEIGHT - 10.0 FEET)

BRICK MANHOLE

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

Payment for excavation for manholes shall be made under unit price for Structure excavation and shall be measured to one foot outside of walls from original ground elevation to authorized bottom elevation

HAWAII STATE HIGHWAY DEPARTMENT
STATE OF HAWAII
PALI HIGHWAY
PROJECT NO. BU-061-1(7) UNIT 5

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU
DIVISION OF SEWERS

REVISED
STANDARD DETAILS
(SUPERSEDES STANDARD DATED 11-1-54)

ENGINEER: A. Tampo
DRAFTSMAN: E. Nishida
SCALE: 1/2" = 1'-0"
APPROVED: CHIEF ENGINEER
DATE: October 4, 1957
CHECKED BY: H. Finley
TRACER: K. Tu
APPROVED: DIVISION ENGINEER

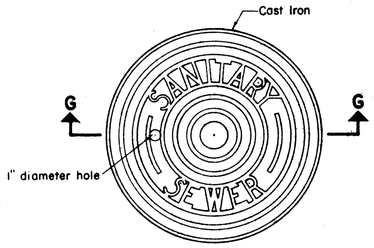
W. B.	PROFILE	C. B.
CR. SEC.	F. B.	S. B.
W. M. BY:	P. W. BY:	B. BY:

SHEET 12 OF 18 SHEETS

B.S147.47

48-G-5

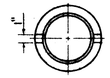
FED. ROAD DIST. No.	STATE	FED. AID PROJ. No.	FISCAL YEAR	SHEET No.	TOTAL SHEETS
HAWAII	HAW.	BU-061-1(7) Unit 5	1960	48	176



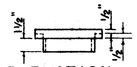
PLAN OF MANHOLE COVER

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

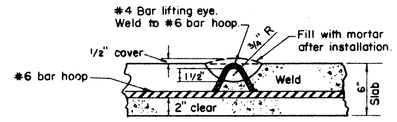
PLAN OF COVER



BOTTOM OF COVER

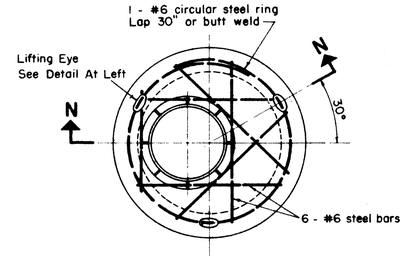


ELEVATION



SECTION OF LIFTING EYE

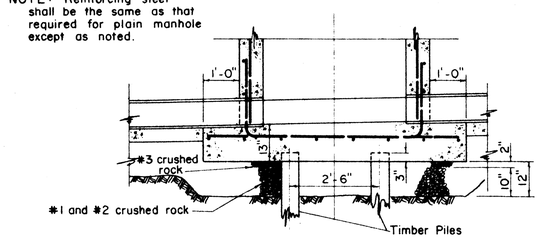
Scale: 1 1/2" = 1'-0"



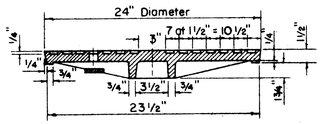
PLAN
PRECAST MANHOLE

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

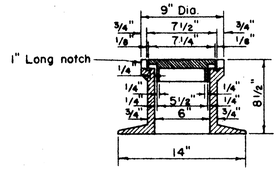
NOTE: Reinforcing steel shall be the same as that required for plain manhole except as noted.



SECTION F - F



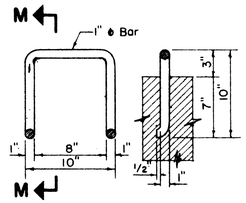
SECTION G - G



SECTION

DROP MANHOLE CHIMNEY CASTINGS

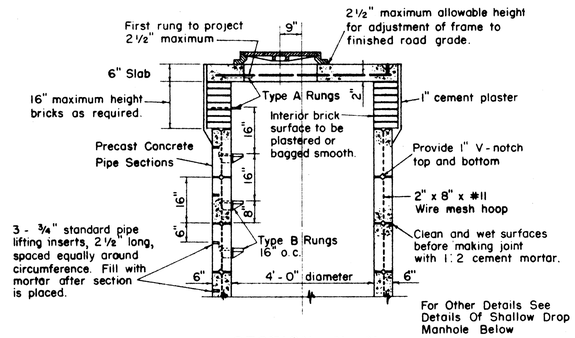
Scale: 1 1/2" = 1'-0"



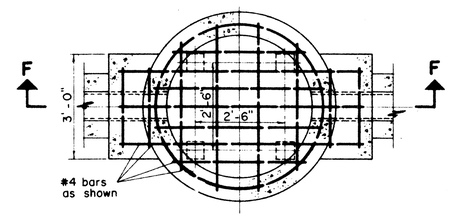
PLAN SECTION M - M

TYPE A MANHOLE RUNGS WROUGHT IRON

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

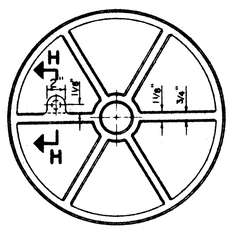


SECTION N - N



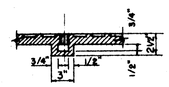
PLAN
DETAIL OF PILES UNDER MANHOLES

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

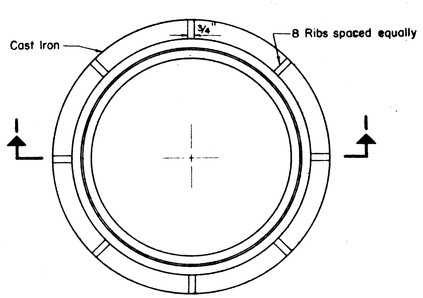


BOTTOM VIEW OF COVER

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

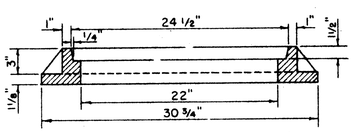


SECTION H-H

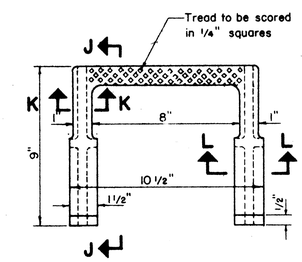


PLAN OF MANHOLE FRAME

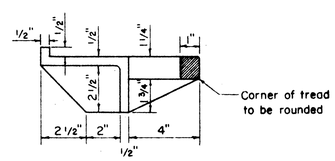
Scale: 1 1/2" = 1'-0"



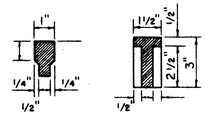
SECTION I-I



PLAN

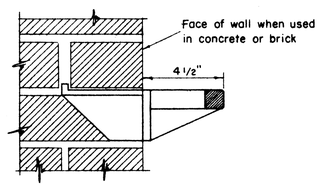


SECTION J-J



SECTION K-K

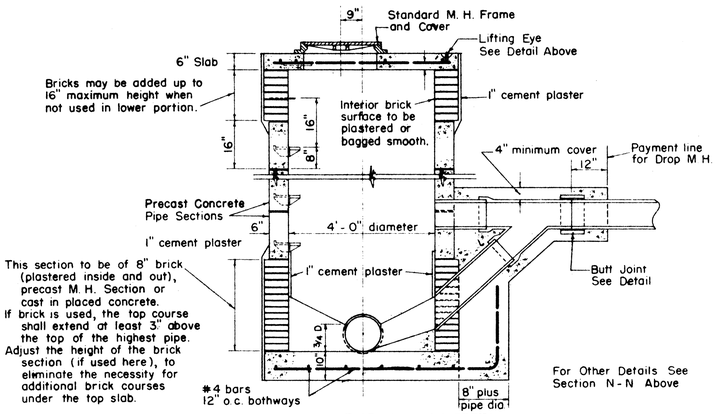
SECTION L-L



METHOD OF INSTALLATION

TYPE B MANHOLE RUNGS (CAST IRON)

Scale: 3" = 1'-0"



SHALLOW DROP MANHOLE
USING PRECAST CONCRETE PIPE SECTIONS

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

NOTE:

1. When backfilling around Precast Manhole, material shall be deposited in such a manner that the difference in elevation on one side of the manhole shall not exceed the elevation on the other side by more than 5 feet.
2. Pipe Sections may be made in heights other than 16 inches if desired.
3. Size of drop pipe shall be same as influent pipe.

HAWAII STATE HIGHWAY DEPARTMENT
STATE OF HAWAII
PALI HIGHWAY
PROJECT NO. BU-061-1(7) UNIT 5

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU
DIVISION OF SEWERS

REVISED
STANDARD DETAILS
(SUPERSEDES STANDARD DATED 11-1-54)

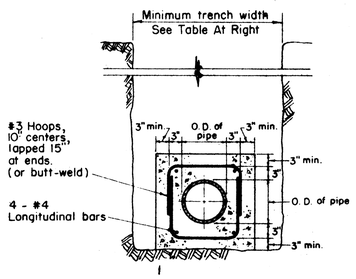
ENGINEER A. Tanji	DATE October 4, 1957
DRAFTSMAN T. Mizuta	CHECKED BY W. Finley
SCALE As Shown	TRACER Pm
APPROVED: Acting CHIEF ENGINEER	APPROVED: DIVISION ENGINEER

W. S.	PROFILE	C. B.
CR. SEC.	F. B.	S. B.
W. M. BY:	F. W. BY:	B. BY:

SHEET 13 OF 18 SHEETS

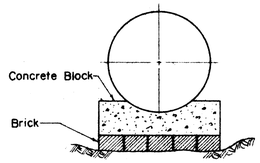
B.S147.4S
48-G-5

FED. ROAD DIST. No.	STATE	FED. AID PROJ. No.	FISCAL YEAR	SHEET No.	TOTAL SHEETS
HAWAII	HAW.	BU-061-1(7) UNIT 5	1960	49	176



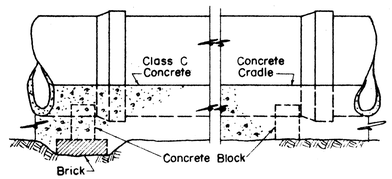
DETAIL OF CONCRETE JACKET

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



METHOD OF USING BRICKS UNDER CONCRETE BLOCKS

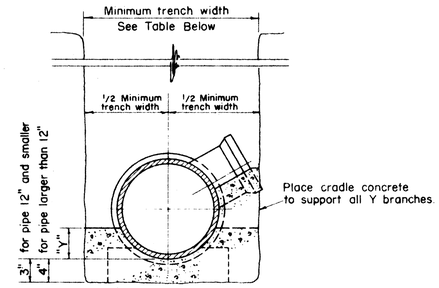
NOTE: Minimum width of cradle shall be minimum trench width.



ELEVATION SHOWING METHOD OF LAYING PIPE

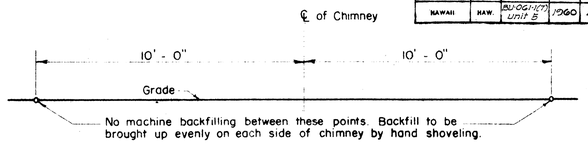
Not To Scale

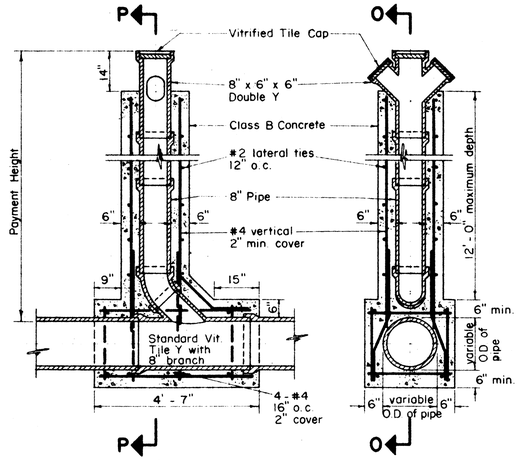
Contractor shall set Concrete Blocks on undisturbed ground. Where ground is too low, the contractor shall not heap up dirt under the Concrete Block but use Concrete Bricks to take up the deficiency, scraping away beneath Concrete Block to give sufficient room for Brick.



TRENCH WIDTHS	
Pipe Size	Min. Width
6"	24"
8"	24"
10"	24"
12"	30"
15"	30"
18"	36"
21"	36"
24"	45"
27"	45"
30"	50"

DIMENSIONS OF CONC. CRADLE		
Pipe Size	"Y"	Width
6"	3"	24"
8"	3"	24"
10"	3"	24"
12"	3"	30"
15"	4"	30"
18"	5"	36"
21"	5"	36"
24"	6"	45"
27"	7"	45"
30"	7"	50"



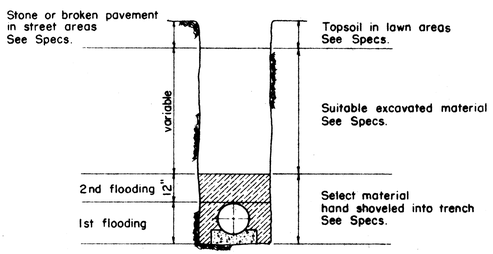


SECTION O-O SECTION P-P

DETAILS OF CHIMNEY

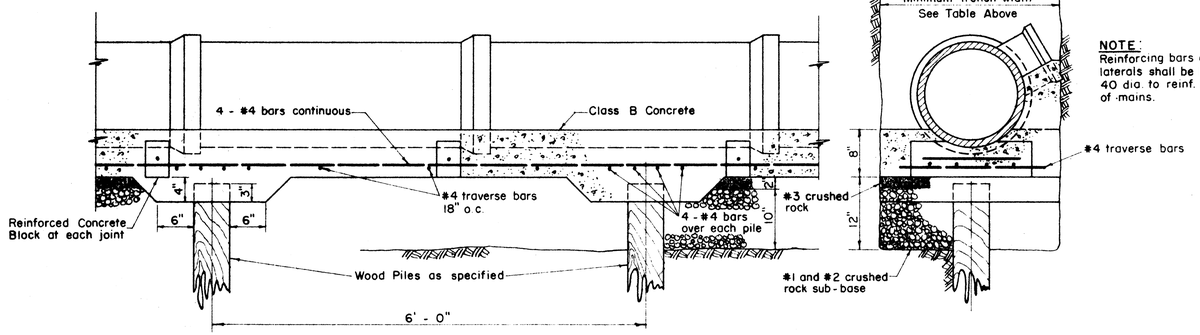
Scale: 1/2" = 1'-0"

NOTE: All Reinforcing Rods #4 Except Lateral Ties. Laps - 40 Diameters



METHOD OF BACKFILL

Not To Scale



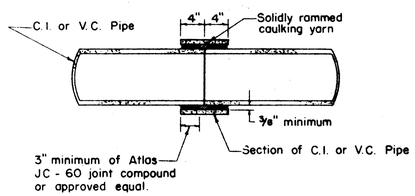
NOTE: Reinforcing bars of laterals shall be lapped 40 dia. to reinf. bars of mains.

Scale: 1" = 1'-0"

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

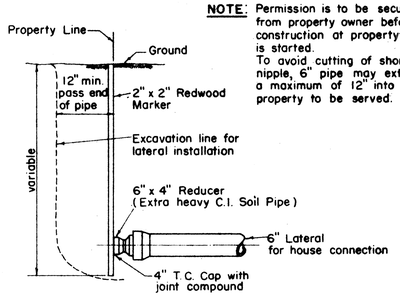
Payment quantities for trench excavation, crushed rock fill, crushed rock cradle, and crushed rock sub-base shall be computed using minimum trench widths as shown in the table of "Trench Widths" No payment shall be made for excess quantities resulting from trench widths greater than the minimum shown.



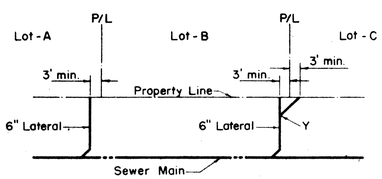
BUTT JOINT DETAIL

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.



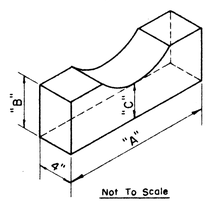
DETAIL AT PROPERTYLINE



LAYOUT

CONSTRUCTION OF LATERALS

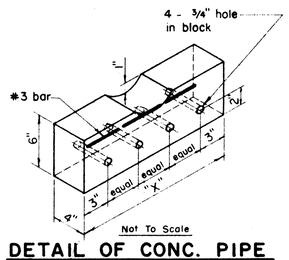
Not To Scale



Not To Scale

DETAIL OF PRECAST CONCRETE PIPE BLOCK

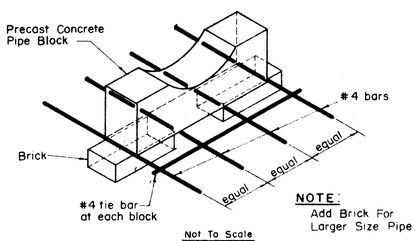
CONCRETE BLOCK DIMENSIONS			
Pipe Size	"A"	"B"	"C"
6"	1' - 2"	6"	3"
8"	1' - 5"	6"	3"
10"	1' - 7"	6"	3"
12"	1' - 7"	6"	3"
15"	1' - 8"	6"	4"
18"	1' - 9"	6"	4"
21"	1' - 10"	6"	4"
24"	1' - 11"	6"	4"
27"	2' - 0"	6"	4"
30"	2' - 3"	6"	4"



Not To Scale

DETAIL OF CONC. PIPE BLOCK FOR REINF. CRADLE

DIM. OF REINF. CONCRETE 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

HAWAII STATE HIGHWAY DEPARTMENT
STATE OF HAWAII
PALI HIGHWAY
PROJECT NO. BU-061-1(7) UNIT 5

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU
DIVISION OF SEWERS

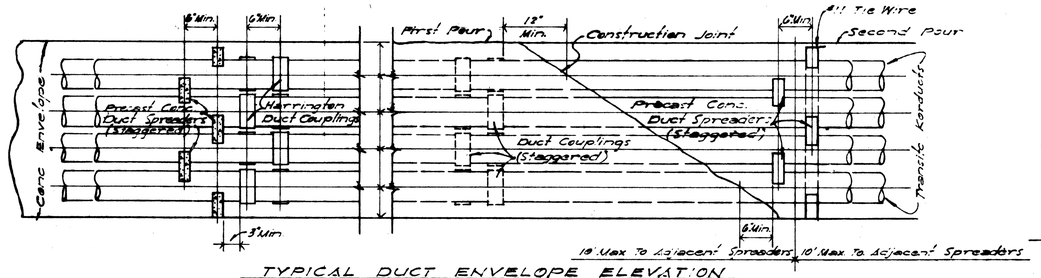
REVISED
STANDARD DETAILS
(SUPERSEDES STANDARD DATED 11-1-54)

ENGINEER: A. Tanaya — DATE: October 4, 1957
DRAFTSMAN: K. Inada — CHECKED BY: H. K. Wong
SCALE: As Shown — TRACER: S.M.
APPROVED: Y. Yuen, CHIEF ENGINEER — APPROVED: Z. Doue, DIVISION ENGINEER
Actg.

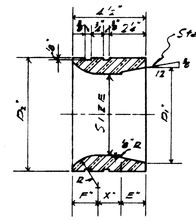
W. B. | PROFILE | C. B.
CR. SEC. | F. B. | S. B.
W. M. BY: | F. W. BY: | B. BY:

B.S147.49

FED. ROAD DIST. No.	STATE	FED. AID PROJ. No.	FISCAL YEAR	SHEET No.	TOTAL SHEETS
HAWAII	HAW	BU-061-1(7) UNIT 5	1960	50	176

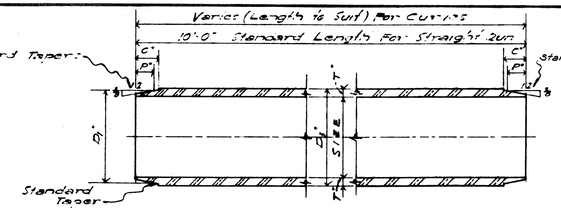


TYPICAL DUCT ENVELOPE ELEVATION
(8 WAY DUCT SHOWN)
1" = 1'-0"



JUNIOR END BELLS
3'-1'-6"

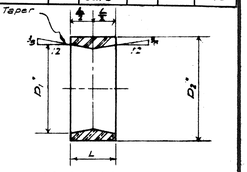
SIZE	D_1"	D_2"	F"	X"	E"	R"
3"	3 33/64	4 1/2	1 11/32	1 23/32	1 1/4	1 3/4
4"	4 43/64	5 3/4	1 7/16	1 7/16	1 3/8	2
4½"	4 57/64	6 1/2	1 9/16	1 9/16	1 3/8	2
5"	5 29/32	7	1 9/16	1 9/16	1 1/2	2



TRANSITE KORDUCT
3"-1'-0"

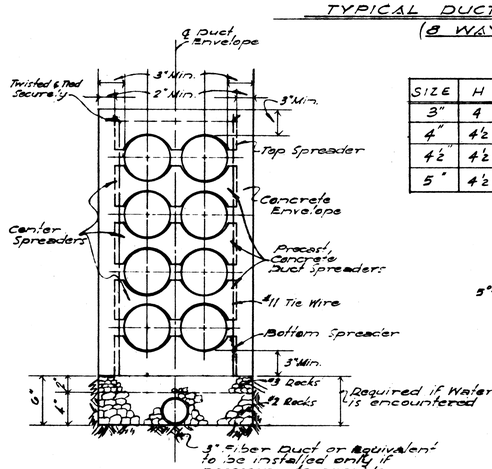
STANDARD TAPERS

SIZE	D_1"	D_2"	C"	P"	T"
3"	3 33/64	3 33/64	1 1/8	7/8	17/64
4"	4 43/64	4 43/64	1 1/2	1	17/64
4½"	4 57/64	5 1/2	1 1/2	1	17/64
5"	5 29/32	5 29/32	1 1/2	1 1/8	17/64



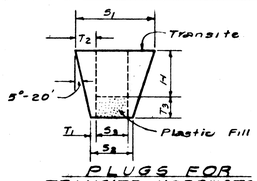
HARRINGTON COUPLINGS
3"-1'-5"

SIZE	D_1"	D_2"	L"
3"	3 33/32	4 11/64	2 1/4
4	4 33/32	5 7/16	2 1/4
4½"	4 57/32	5 49/64	2 1/4
5"	5 29/32	6 21/64	2 1/4



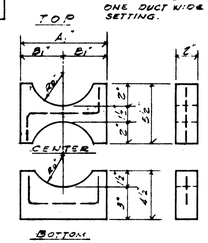
TYPICAL DUCT SPREADERS & DRAINAGE SECTION
(8 WAY DUCT SHOWN)
1½" = 1'-0"

SIZE	H	S_1	S_2	S_3	T_1	T_2	T_3
3"	4	3 3/8	2 5/8	2	5/16	11/16	3/4
4"	4½	4 57/64	3 37/64	2 3/4	15/32	27/32	3/4
4½"	4½	4 57/64	4 5/64	3	31/64	31/32	3/4
5"	4½	5 27/64	4 37/64	3 1/8	33/64	31/32	3/4

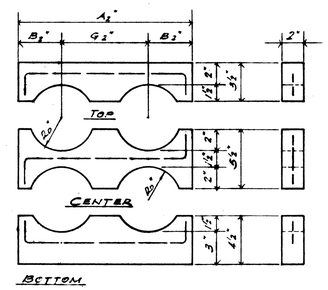


PLUGS FOR TRANSITE KORDUCTS
No Scale

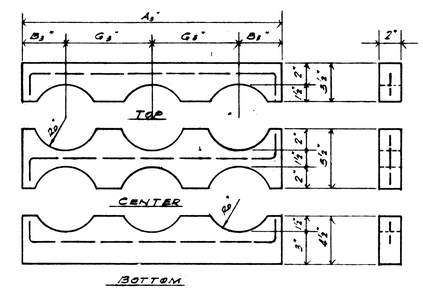
NOTE
TOP SPREADER IS NOT REQUIRED IN ONE DUCT WIDE SETTING.



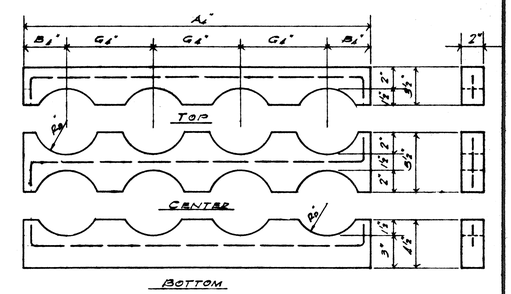
1 DUCT WIDE



2 DUCTS WIDE



3 DUCTS WIDE

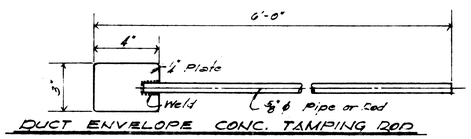


4 DUCTS WIDE

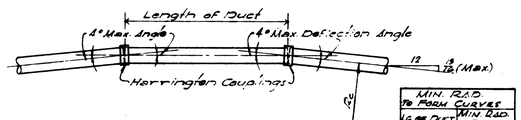
PRECAST CONCRETE DUCT SPREADER DETAILS
2"-1'-0"

		1 DUCT WIDE		2 DUCTS WIDE			3 DUCTS WIDE			4 DUCTS WIDE		
SIZE	R0"	A1"	B1"	A2"	D2"	G2"	A3"	B3"	G3"	A4"	D4"	G4"
3"	2	6	3	12	3 1/4	5 1/2	17 1/2	3 1/4	5 1/2	23	3 1/4	5 1/2
4"	2½	7	3½	14	3 3/4	6½	20½	3 3/4	6½	27	3 3/4	6½
4½"	2½	8	4	15	4	7	22	4	7	29	4	7
5"	3	8½	4½	16	4½	7½	23½	4½	7½	31	4½	7½

NOTES: DUCT SPREADERS
Reinforcing
1 - ½" ϕ Bar each Spreader
Concrete Mix
One Part Cement
Two Parts Beach Sand
Two Parts Gravel ¾" (Fine)
Measurements by Weight

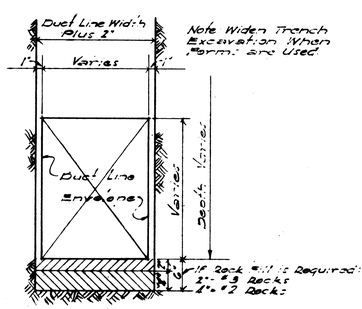


DUCT ENVELOPE CONC. TAMPING ROD
3"-1'-0"



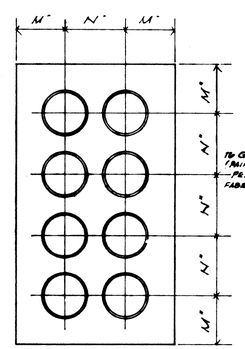
NETHOD OF FORMING CURVES
½" = 1'-0"

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

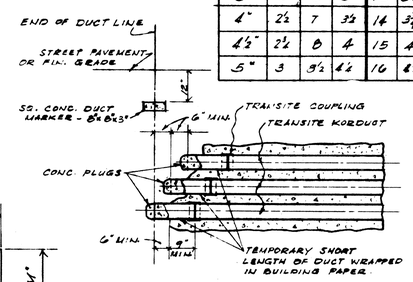


TYPICAL EXCAVATION DETAIL
N.T.S.

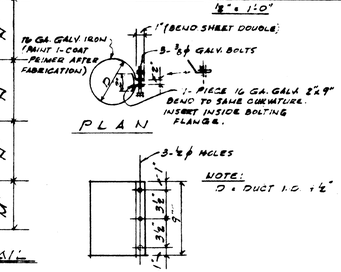
SIZE	M"	N"
3"	5	6
4"	5½	7
4½"	5½	7½
5"	6	8



TYPICAL DUCT DETAIL AT MANHOLE WALL
(8 WAY DUCT SHOWN)
1½" = 1'-0"



STUB OUT DETAIL
½" = 1'-0"



PLAN

ELEVATION

3-BOLT CLAMP-DETAIL
½" = 1'-0"

HAWAII STATE HIGHWAY DEPARTMENT
STATE OF HAWAII

HAWAIIAN ELECTRIC CO.
STANDARD DETAILS

PALI HIGHWAY
PROJECT No. BU-061-1(7) UNIT (5)

Scale: As Noted — Feb. 28, 1958

SHEET No. 15 OF 18 SHEETS

No	Date	Revision	Initials
1	5-2-56	ADDED 3" DUCT. CENTER SPREADER ADD 1-DUCT WIDE 1" FOR SLEEVE	R.T.
2	1-9-57	REVISED DEFLECTION INSIDE 2° TO 4°	R.Y.

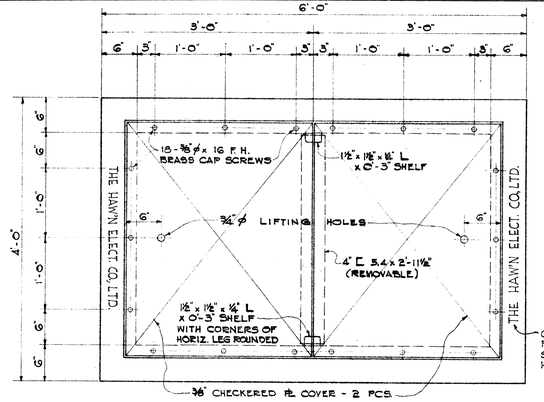
Scale: As Shown — Date: 2-27-56
Drawn: JP — Checked: L. M. H.
Approved: [signature]
Engr.: [signature]
Approval: [signature]

CONSTRUCTION STANDARDS
TRANSITE KORDUCTS
UNDERGROUND DUCTLINES

Engineering Department
The Hawaiian Electric Company, Ltd.
Honolulu, T.H.

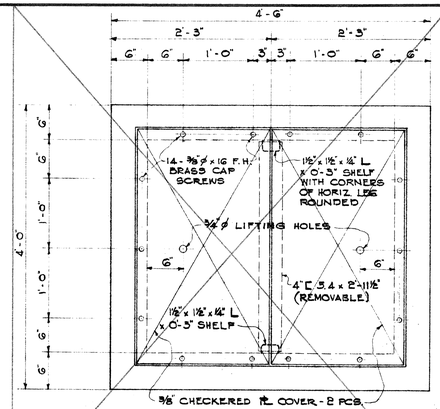
U-18264

FED. ROAD DIST. No.	STATE	FED. AID PROJ. No.	FISCAL YEAR	SHEET No.	TOTAL SHEETS
Hawaii	HAW.	BU-061-1(7) UNIT 5	1960	51	176



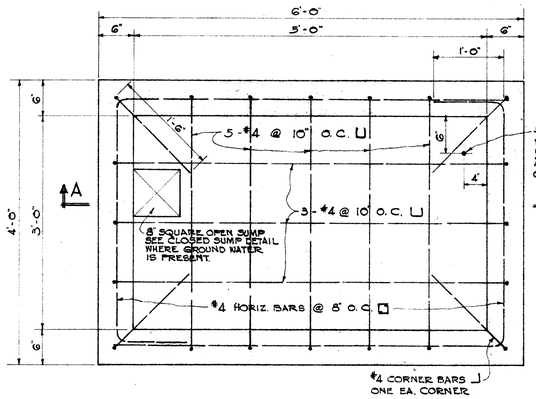
OBTAIN H.E. CO. STAMP FROM U.G. DEPT. AND STAMP ON EACH END OF HANDHOLE AS SHOWN.

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



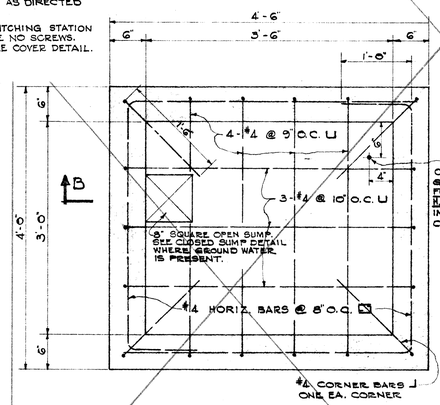
TOP PLAN
Scale: 1" = 1'-0"

NOTE:
1. SIZE & LOCATION OF DUCTS AS SHOWN ON PLANS OR AS DIRECTED BY THE ENGINEER.
2. COVER PLATE FOR SWITCHING STATION AND SUBSTATION HAVE NO SCREWS. SEE SPECIAL HANDHOLE COVER DETAIL.



3/8"ø x 8'-0" COPPER-WELD GROUND ROD FURNISHED BY H.E. CO. AND INSTALLED BY CONTRACTOR

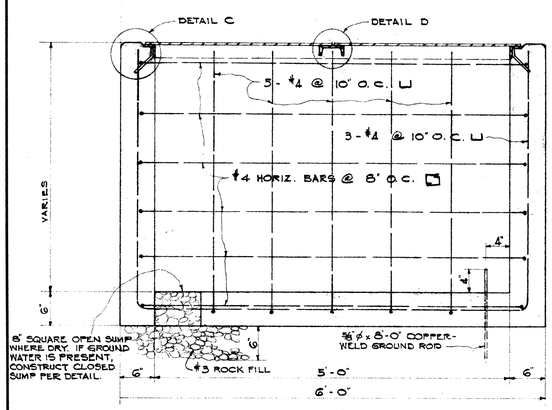
SECTIONAL PLAN
Scale: 1" = 1'-0"



3/8"ø x 8'-0" COPPER-WELD GROUND ROD FURNISHED BY H.E. CO. AND INSTALLED BY CONTRACTOR.

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

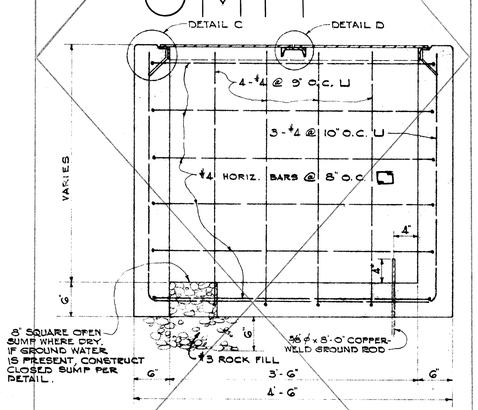
OMIT



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

U-18366

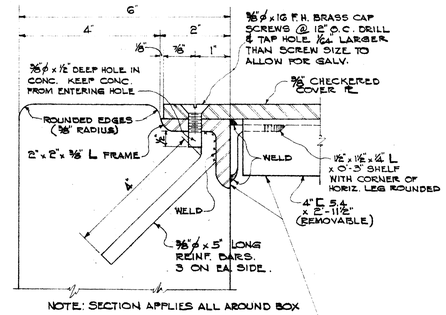
HANDHOLE TYPE #1
(3'-0" x 5'-0" INSIDE)



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

U-18366

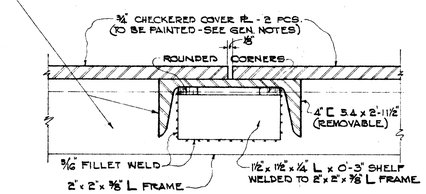
HANDHOLE TYPE #2
(3'-0" x 3'-6" INSIDE)



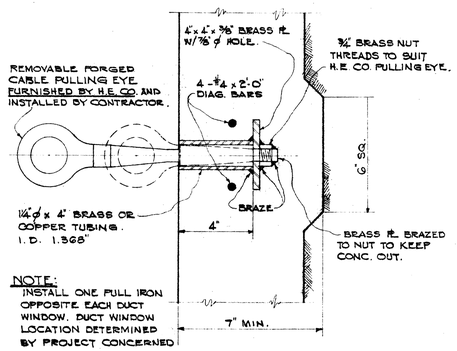
NOTE: SECTION APPLIES ALL AROUND BOX

DETAIL C
½ SIZE

HOT DIP GALVANIZED AFTER FABRICATION

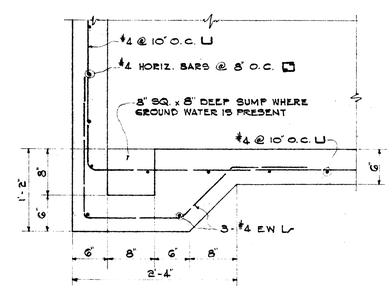


DETAIL D
½ SIZE

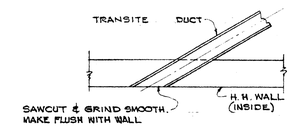


NOTE:
INSTALL ONE PULL IRON OPPOSITE EACH DUCT WINDOW. DUCT WINDOW LOCATION DETERMINED BY PROJECT CONCERNED

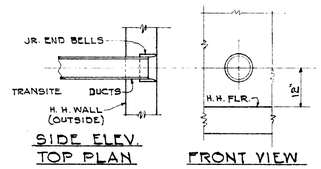
PULL IRON DETAIL
Scale: 3" = 1'-0"



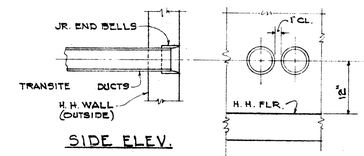
DETAIL OF CLOSED SUMP
Scale: 1" = 1'-0"



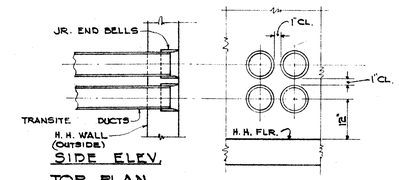
DIAGONAL ENTRANCE



1 - DUCT



2 - DUCTS



4 - DUCTS

DUCT ENTRANCE DETAILS
NOT TO SCALE

NOTE:
SIZE & LOCATION OF DUCTS AS SHOWN ON PLANS OR AS DIRECTED BY THE ENGINEER.

GENERAL NOTES:

1. CONCRETE FINISH:
   FLOORS - SMOOTH METAL TROWELLED.
   EXPOSED WALL SURFACES & EDGES - SMOOTH AND FREE FROM DEFECTS.
2. CONCRETE TO DEVELOP COMPRESSIVE STRENGTH OF 3000 P.S.I. IN 28 DAYS.
3. FINISH STEEL WORK AS FOLLOWS:
   A. 2" ANGLE FRAME, 4" CHANNEL, CHECKERED PLATE COVERS U-BOLT HANDLE. SHALL BE HOT DIP GALVANIZED AFTER FABRICATION.
4. DRAINAGE - SLOPE FLOOR DOWN ½" TO SUMP.
5. FOR DUCT LINE CONSTRUCTION STANDARDS, SEE H.E. CO. DWG. U-18244
6. THESE HANDHOLES ARE DESIGNED FOR INSTALLATION IN AREAS OTHER THAN ROADWAYS.
7. CONTRACTOR TO FURNISH & INSTALL ALL MATERIALS FOR HANDHOLE EXCEPT ITEMS AS SHOWN ON DRAWING.

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

HAWAII STATE HIGHWAY DEPARTMENT
STATE OF HAWAII

DETAILS OF HAWAIIAN ELECTRIC CO. HANDHOLES
UNDERGROUND STANDARD U-18366

PALI HIGHWAY
PROJECT No. BU-061-1(7) UNIT (5)

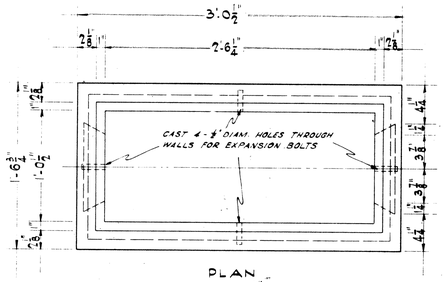
SCALE: AS NOTED — JAN. 27, 1958

H.E. CO. APPROVED: Frank A. Kerr
TITLE: Distr. Eng. — DATE: 4/17/58

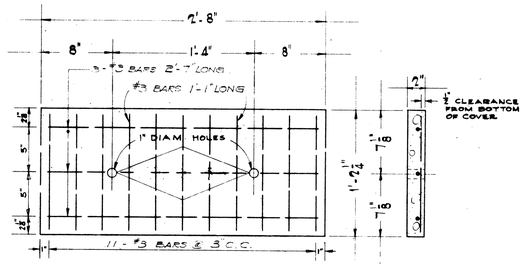
SHEET No. 16 OF 18 SHEETS

B.S147.51

FED. ROAD DIST. No.	STATE	FED. AID PROJ. No.	FISCAL YEAR	SHEET No.	TOTAL SHEETS
HAWAII	HAW.	BU-061-(7) UNIT 5	1960	52	176



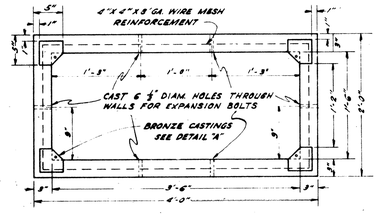
PLAN
SCALE 1/8" = 1"



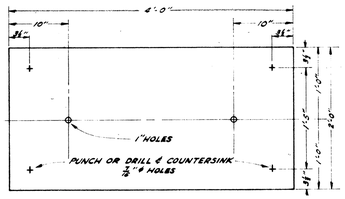
PLAN OF COVER
SCALE 1/8" = 1"

NOTE:

1. THE PULL BOXES SHOWN ON THIS SHEET ARE TO BE USED BY BOTH THE HAWAIIAN TELEPHONE CO. AND THE HAWAIIAN ELECTRIC CO.
2. PULL BOXES TO BE FURNISHED BY THE UTILITY COMPANIES.
3. CONTRACTOR TO FURNISH BRICKS AND CONSTRUCT WALLS (INCIDENTAL TO ITEM OF "INSTALLING PRECAST CONCRETE PULL BOXES.")
4. BRICKS TO BE PLACED UNDER BOX TO BRING TOP OF BOX TO GRADE.



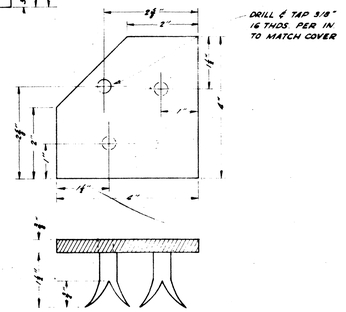
TOP VIEW



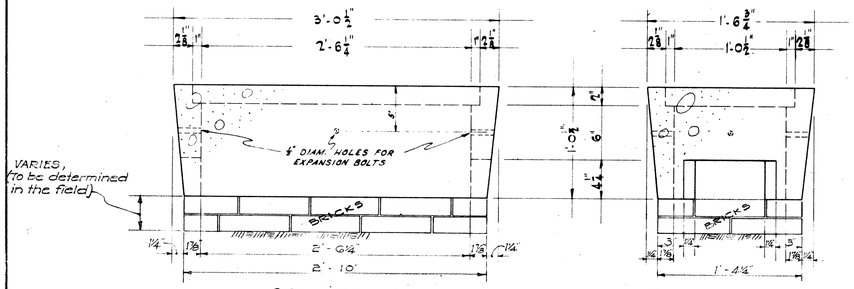
1/4" CHECKERED PLATE COVER
3/8" FOR DRIVEWAYS

NOTE:

CHECKERED PLATE COVER SHALL BE 1/4" THICK AT SIDEWALK AREAS AND 3/8" THICK AT DRIVEWAYS.



DETAIL "A"
MANGANESE BRONZE CASTING CORNER PLATES
SCALE: 6"=1'-0"

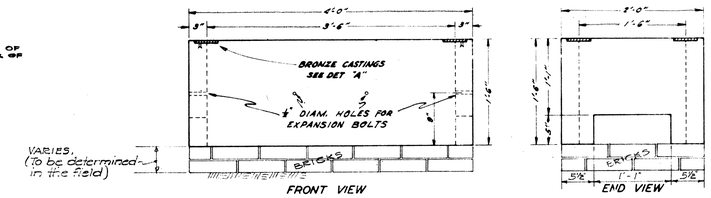


SIDE ELEVATION
SCALE 1/8" = 1"

END ELEVATION
SCALE 1/8" = 1"

H.T. CO. PULLBOX Nº 513
H.E. CO. PULLBOX 20" x 40"

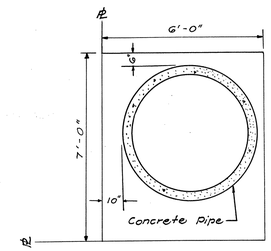
NOTE
REINFORCING BARS TO BE OF INTERMEDIATE GRADE & FREE OF SCALE AND OIL



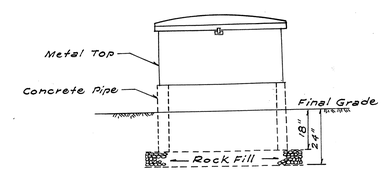
FRONT VIEW

END VIEW

H.E. CO. PULLBOX 2' x 4'
H.T. CO. PULLBOX Nº 516

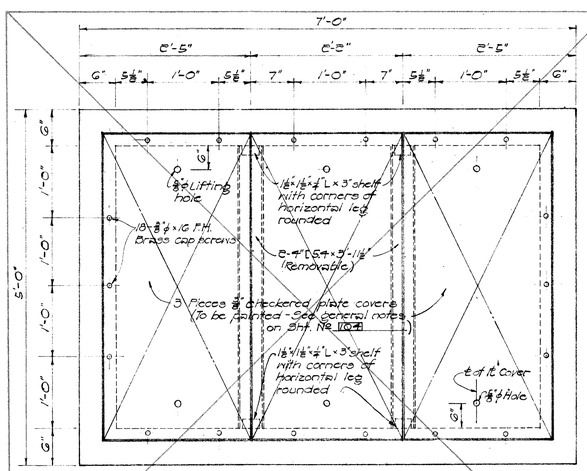


VAULT & HANDHOLE DETAIL
Scale: 3/8" = 1'-0"



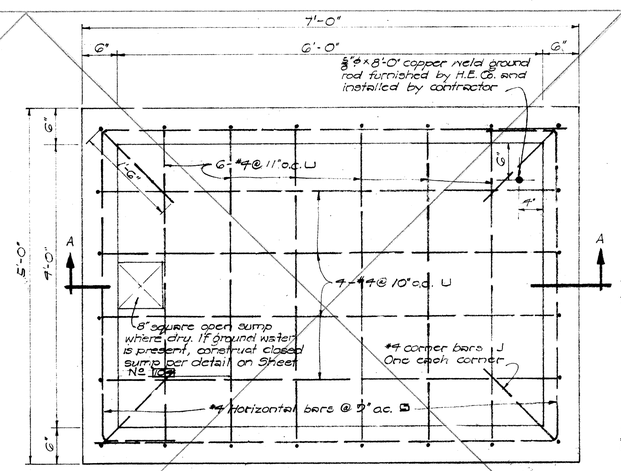
STANDARD ROUND RESIDENTIAL TRANSFORMER VAULT
Scale: 3/8" = 1'-0"

NOTE: For Detail C & Detail D see Sht. Nº 107

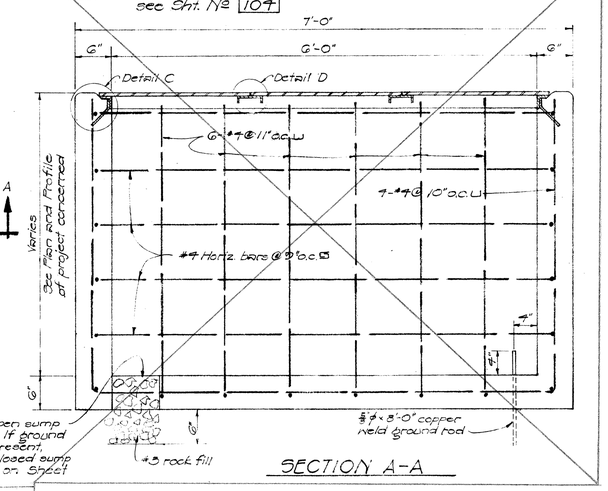


PLAN

OMIT



SECTIONAL PLAN



SECTION A-A

H. E. CO. HANDHOLE TYPE #3
(4'-0" x 6'-0" INSIDE)
Scale: 1" = 1'-0"

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

APPROVED:

PRINCPL. ELEC. ENGR., H.E. CO., LTD.	DATE 1/13/59
DISTR. ENGR., H.E. CO., LTD.	DATE 1/13/59
PLANT ENG'G. SUPV., H.T. CO., LTD.	DATE 1-13-59

JAMES B. WILSON REGISTERED PROFESSIONAL ENGINEER No. 379 HAWAII, U.S.A.

LAW & WILSON • TUDOR • TOWILL
ARCHITECTS • ENGINEERS • SURVEYORS
REGISTERED ENGINEER No.
DATE JUL 3 1957

HAWAII STATE HIGHWAY DEPARTMENT
STATE OF HAWAII

DETAIL OF HAW'N ELEC. CO. HANDHOLE, & HAW'N ELEC. CO. & HAWN TEL. CO. PULLBOXES.

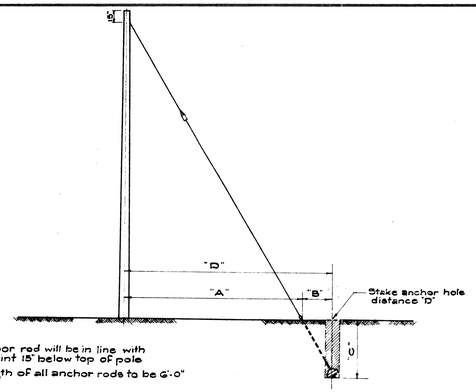
PALI HIGHWAY
PROJECT No. BU-061-1(7) UNIT (5)

SCALE: AS SHOWN

SHEET No. 17 OF 18 SHEETS

B.S147.52

PRINTED ON DIEPO 1000H CLEARPRINT



NOTES:

1. Anchor rod will be in line with a point 15" below top of pole
2. Length of all anchor rods to be 6'-0"

For 35', 40', 45', 50' & 55' Poles				
Lead Anchor Rod to ℄ of Pole "A"	Anchor Rod to ℄ of Hole "B"	Vertical Depth "C" 18" D.M.	Vertical Depth "C" 24" D.M.	Total Distance Pole to Hole "D" (A+B)
5'-0"	1'-0"	7'-5"	7'-4"	6'-0"
10'-0"	1'-11"	7'-1"	7'-3"	11'-11"
15'-0"	2'-8"	6'-5"	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 25' & 30' Poles				
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"

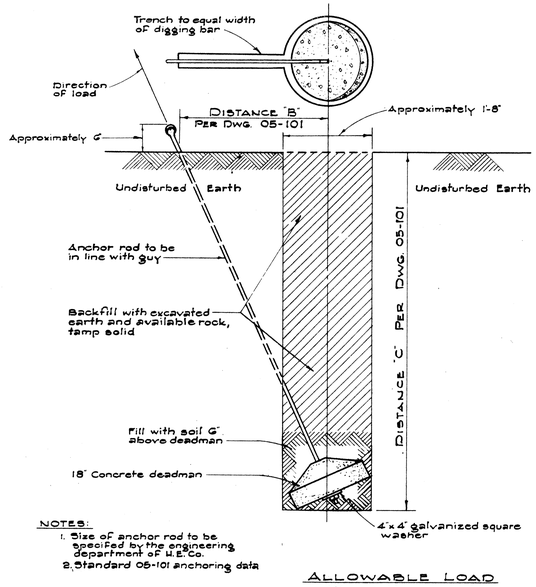
D.M. = DEADMAN

Lead (Dimension "A") for H.T.Co. anchors (H.T.Co. ONLY) shown on plan.

ANCHORING DATA

Not to Scale

05-101



NOTES:

1. Size of anchor rod to be specified by the engineering department of H.E. Co.
2. Standard 05-101 anchoring data

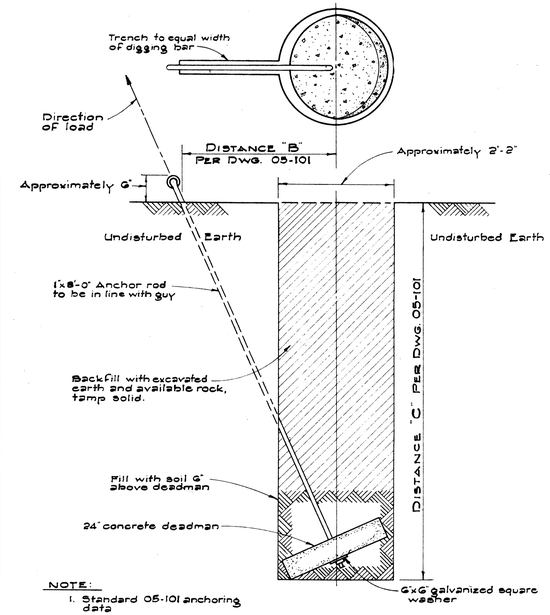
ALLOWABLE LOAD
(1/2 OF ULTIMATE)

5/8" Anchor rod	8,000 lbs.
3/4" Anchor rod	12,500 lbs.
5/8" Copperweld anchor rod	5,200 lbs.

GUY ANCHOR, 18" DEADMAN

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

05-102



NOTE:

1. Standard 05-101 anchoring data

ALLOWABLE LOAD
(1/2 OF ULTIMATE)

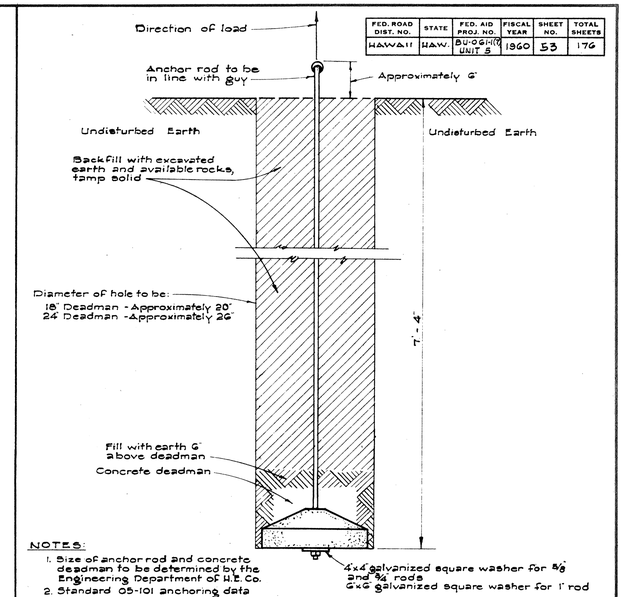
1" Anchor rod	20,000 lbs.
5/8" Copperweld anchor rod	5,250 lbs.

GUY ANCHOR, 24" DEADMAN

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

05-103

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BU-061(7) UNIT 5	1960	53	176



NOTES:

1. Size of anchor rod and concrete deadman to be determined by the Engineering Department of H.E. Co.
2. Standard 05-101 anchoring data

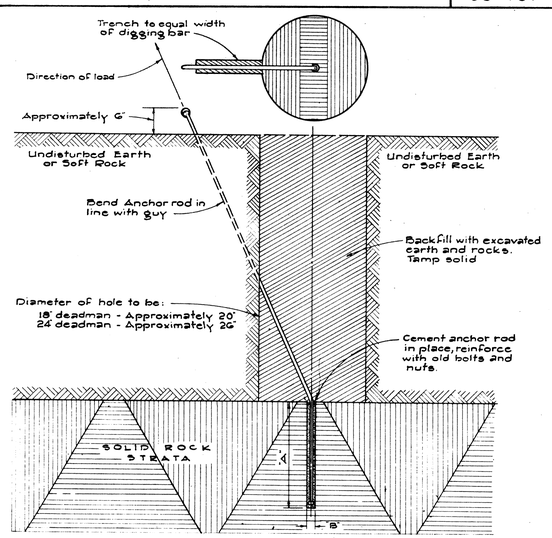
ALLOWABLE LOAD
(1/2 OF ULTIMATE)

5/8" Anchor rod	8,000 lbs.
3/4" Anchor rod	12,500 lbs.
1" Anchor rod	20,000 lbs.
5/8" Copperweld anchor rod	5,250 lbs.

SIDE-WALK ANCHOR

Scale: 1" = 1'-0"

05-104



NOTES:

1. Size of anchor rod to be specified by the Engineering Department of H.E. Co.
2. "A" should not be less than 24". If "A" is less than 24", complete hole and install anchor per O.H. Standard 05-102, 103, or 104.
3. "B" 5/8" anchor rod drill 2" hole. 3/4" anchor rod drill 2" hole. 1" anchor rod drill 2 1/2" hole.
4. Standard 05-101 anchoring data.

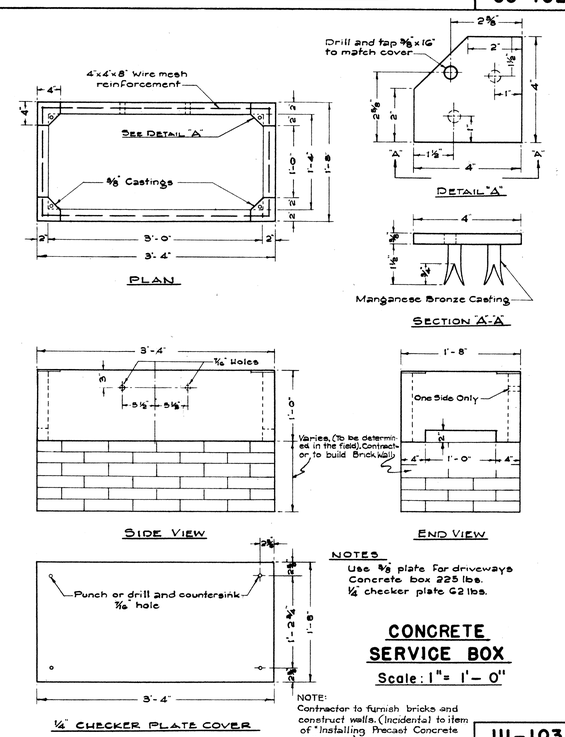
ALLOWABLE LOAD
(1/2 OF ULTIMATE)

5/8" anchor rod	8,000 lbs.
3/4" anchor rod	12,500 lbs.
1" anchor rod	20,000 lbs

ROCK ANCHOR

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

05-105



NOTES

Use 5/8" plate for driveways
Concrete box 225 lbs.
1/4" checker plate 62 lbs.

CONCRETE SERVICE BOX

Scale: 1" = 1'-0"

NOTE:
Contractor to furnish bricks and construct walls. (Incidental to item of "Installing Precast Concrete Pull Boxes")

U1-103

SOUTHERN PINE & DOUGLAS FIR 8lb. CREOSOTED TREATMENT										
LENGTH IN FEET	CLASS	APPROXIMATE MINIMUM DIMENSIONS — INCHES: AT TOP DIA.	AT TOP CIR.	6'0" FROM BUTT DIA.	6'0" FROM BUTT CIR.	AVERAGE WEIGHT IN POUNDS: S.P.	D.F.	POLE SETTING DEPTH: DEPTH IN SOIL	DEPTH IN ROCK	BREAKING LOAD 2'-0" BELOW TOP OF POLE (LBS.)
JOINT POLES (J.P. POLES)										
25	5	6.05	19	8.28	26.0	491	525	4'-6"	3'-0"	1,900
30	5	6.05	19	8.92	28.0	660	600	5'-0"	3'-0"	1,900
35	5	6.05	19	9.55	30.0	862	770	5'-0"	3'-6"	1,900
40	3	7.32	23	11.79	37.0	1403	1320	5'-6"	3'-6"	3,000
45	3	7.32	23	12.26	38.5	1664	1575	6'-0"	4'-0"	3,000
50	3	7.32	23	12.73	40.0	1925	1850	6'-6"	4'-0"	3,000
55	3	7.32	23	13.23	41.5	2200	2145	7'-0"	4'-6"	3,000
TRANSMISSION POLES (T POLES)										
45	2	7.96	25	13.23	41.5	1911	1845	6'-0"	4'-0"	3,700
50	2	7.96	25	13.69	43.0	2214	2150	6'-6"	4'-0"	3,700
60	1	8.59	27	15.77	49.5	3451	3360	7'-0"	4'-6"	4,500

S. P. — SOUTHERN YELLOW PINE
D. F. — DOUGLAS FIR

NOTE:

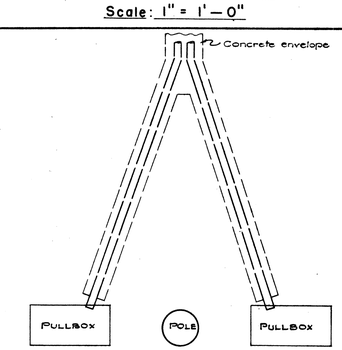
THE ULTIMATE FIBER STRESS FOR CREOSOTED SOUTHERN YELLOW PINE & DOUGLAS FIR IS 7,400 lbs. PER SQUARE INCH.

REFERENCES:

AMERICAN STANDARDS ASSOCIATION 05.4-1941, 05.6-1945
STANDARD HANDBOOK FOR ELECTRICAL ENGINEERS, EIGHTH EDITION
H. E. CO. SPECIFICATIONS FOR POLES.

WOOD POLE DATA

05-501



TYPICAL BOX AND DUCT DETAIL

Scale: 5/8" = 1'-0"

NOTE:
Exact location of pullboxes to be determined in the field

Thos. A. Kay, Jr.

HAWAII STATE HIGHWAY DEPARTMENT
STATE OF HAWAII

HAWAIIAN ELECTRIC &
HAWAIIAN TELEPHONE

STANDARD DETAILS

PALI HIGHWAY
PROJECT NO. BU-061-1(7) UNIT (5)
Scale: As Noted — Oct. 17, 1957
SHEET Nº 18 OF 18 SHEETS

B.S147.53

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