

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 OLD HAWAIIAN DATUM

QUAD 211582 STATION 1102
 HAWAII
 LATITUDE 21° 00' TO 21° 30'
 LONGITUDE 158° 00' TO 158° 30'
 DIAGRAM NF 4-11 OAHU

NO ORIGINAL TEXT

Manawahua (Oahu Island, Hawaiian Government Survey, 1875;
L. G. Simmons, 1927).—In southwestern Oahu, at the southern end of the
 Waianae Range, on Puu Manawahua, on the bare central one of three rounded
 hills. Originally marked by redwood post and cairn of stones. This was later
 replaced by a concrete post 3 inches square and 18 inches long, with nail in top.
 The accuracy of this replacement is not known. In 1927 station was re-marked
 according to note 6a, a standard disk station mark set in concrete in tile. Reference
 marks, note 13a, standard reference disks in concrete in tiles, are at the
 following distances and azimuths from station: No. 1, 13,900 meters (45.60 feet),
 252° 36'; No. 2, 31,690 meters (103.97 feet), 93° 45'. *Manawahua (U. S. E.)*
 was established very closely in position of old station, and it is possible that it
 is the station recovered and remarked in 1927. Re-marked according to note
 14A in 1929.

MANAWAHUA (Honolulu Co., Hawaii, H.G.S., 1875; U.S.E., 1946)
 --This station was re-marked in
 1927 and again by U.S.E. in 1929. Each time there is no definite
 proof that the older station was recovered.

Station and reference marks were destroyed by the War Depart-
 ment in 1945 but reference marks for relocating the center mark
 were first established. These three pairs of temporary reference
 marks were inch pieces of steel bar imbedded in cement.
 The hill has been flattened by a cut to a depth of 25 feet and
 the center mark reestablished. It is a standard C.&G.S. mark
 stamped "MANAWAHUA 1929-1946," set in a 1-foot thick hexagonal con-
 crete base measuring 10 feet across the corners. The center por-
 tion is buried in an additional 3 feet of concrete. There is no
 subsurface mark and no reference marks other than the above tempo-
 rary steel reference marks.

Survey Section of District Engineers state that eventually
 they plan to erect a 52-foot steel tower over the station in order
 that the station can be occupied. At present there are buildings
 and installations obstructing observing in most directions.

MANAWAHUA (Honolulu Co., Hawaii, H.G.S., 1875; G.A.N., 1952)
 --Mark at present is set in a
 six-sided concrete slab. Buildings have been constructed by the
 Army, and visibility has been out down.

Form 526
 (11-8-55)

U. S. DEPARTMENT OF COMMERCE - COAST AND GEODETIC SURVEY
RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: MANAWAHUA
 ESTABLISHED BY: H.G.S. YEAR: 1875 STATE: Hawaii
 RECOVERED BY: D.G. Rushford YEAR: 1964 COUNTY: Honolulu

Detailed statement as to the fitness of the original description; including marks found, stampings, changes made, and other pertinent facts:

Station has been destroyed. There is now an Army radar station
 on this hill.

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: MANAWAHUA
 STATE: HAWAII YEAR: 1875 SECOND ORDER
 SOURCE: G-SP156

GEODETIC LATITUDE:	21° 23' 22.453	ELEVATION:	725 METERS
GEODETIC LONGITUDE:	158 06 28.701	SCALED	FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	∠ OR Δ ∠ ANGLE °
HI 3	5103	463,265.73	80,978.91	- 0 02 22

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE ∠ OR Δ ∠ FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH (From south)	CODE

QI 288

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 OLD HAWAIIAN DATUM

QUAD 211582 STATION 1103
 HAWAII
 LATITUDE 21° 00' TO 21° 30'
 LONGITUDE 158° 03' TO 158° 30'
 DIAGRAM NF 4-11 OAHU

NO ORIGINAL TEXT

Mauna Una (Oahu Island, Hawaiian Government Survey, 1874; L. G. Simmons, 1927).—On an eastern lateral ridge running off from Waianae Range, the first large ridge south of Schofield Barracks, and north of Kaua Peak. Station is near the eastern lower end of ridge and just above pineapple field. The old mark, a concrete post with cross in top was recovered in 1927 and a standard disk station mark, note 1a, centered over cross in top of large concrete pier which was built over and around the old station. Reference marks, note 13a, standard reference disks in concrete in tiles, are at the following distances and azimuths from station: No. 1, 3.997 meters (13.11 feet), 310° 22'; No. 2, 9.264 meters (30.39 feet), 238° 27'. Re-marked according to note 14A in 1929.

MAUNA UNA (Hawaii, Hawaiian Government Survey, 1874; 477th FA Obsn. Bn., 1945) —On an E lateral ridge running off from Waianae Range, the first large ridge S of Schofield Barracks. The E and lower end of this ridge is bare, the station being located in the timber about 400 to 500 yards up the ridge from the bare end. From crossing of railroad and Highway 3 in Wheeler Field-Schofield Barracks, proceed SE on Highway 3 through valley to a dirt road on right at crest on S side. Turn right on this road and follow dirt roads through pineapple fields to base of ridge nose. A jeep trail runs up the E side to crest of bare area, thence by pack trail up ridge to station.

Station is marked according to Note 14A. Marks are in good condition.

Clearing of timber and brush will be required on some lines.

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: MAUNA UNA

STATE: HAWAII

YEAR: 1874

SECOND

ORDER

SOURCE: G-SP156

GEODETIC LATITUDE:	21° 28' 08.522	ELEVATION	539	METERS
GEODETIC LONGITUDE:	158 04 50.075	SCALED		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ HOR Δ ϕ ANGLE *
HI 3	5103	472,601.24	105,837.79	- 0° 01' 46"

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE θ HOR Δ ϕ FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE
MAILI	165 27 55.6	165 29 42	5103

Q1 277

(continued on next page)

JUN 1978
 U.S. DEPARTMENT OF COMMERCE
 NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
 NATIONAL OCEAN SURVEY, NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
 NATIONAL GEODETIC SURVEY
 OLD HAWAIIAN DATUM

QUAD 211582 STATION 1103

LATITUDE ° ' TO ° '
 LONGITUDE ° ' TO ° '
 DIAGRAM

MAUNA UNA (continued)

FORM 526a
 (9-18-69)

U.S. DEPARTMENT OF COMMERCE
 COAST AND GEODETIC SURVEY

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: MAUNA UNA
 ESTABLISHED BY: Hawaiian Gov't Survey YEAR: 1874 STATE: Hawaii
 RECOVERED BY: Walter R. Helm YEAR: 1962 COUNTY: Honolulu

OBJECT	BEARING	DISTANCE		DIRECTION
		FEET	METERS	
		DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION		
MAILI 1874-1927				80 00 00.00
Reference Mark No. 2	NE	30.363	9.254	72 03 30-
Reference Mark No. 1	SW	13.182	4.017	144 59 50-

The station mark, reference mark No. 1 and reference mark No. 2 were recovered and found to be in good condition. The original description is no longer adequate to reach the station easily. A new and complete description follows:

The station is located on a heavily timbered point of about 1767 feet elevation known as Maunauna Mountain, about 9.1 miles northwest of Pearl City, 4.1 miles southwest of Wahiawa, 1.6 miles west of State Highway 75 and overlooking a large pineapple field to the east.

To reach the station from the intersection of State Highways 75 and 99 at Schofield Barracks, go southwest on State Highway 75 for 1.7

miles to powerline pole No. 12 and a dirt road leading westerly across a large pineapple field. Turn right and go westerly through field for 1.2 miles to end of road at the west edge of the pineapple field and the east slope of the ridge. Pack westerly up wide, deeply washed trail for about 45 minutes to the station, as described.

The station mark is a standard disk, stamped MAUNA UNA 1927, set in the top of an 8-inch square concrete post that projects 5 inches above the surface of the ground. It is 11 feet west of the trail and under a 5-foot square concrete slab that is supported along its north and south edges by two 4-foot high walls of rock and concrete.

Reference mark No. 1 is a standard disk, stamped MAUNAUNA 1927, set in the top of a 4-inch cast iron sewer pipe that projects about 18 inches above the surface of the ground. It is 1 foot east of the trail and about the same elevation as the station mark.

Reference mark No. 2 is a standard disk, stamped MAUNAUNA 1927, set in the top of a 4-inch cast iron sewer pipe that projects about 18 inches above the surface of the ground. It is 1 foot east of the trail and about 2 feet lower in elevation than the station mark.

Note: A rather large discrepancy was found in the direction to reference mark No. 2 as given in the 1927 description. The value given in the box data above was checked in the field and found to be correct.

*Name of chief of party should be inserted here. The officer who actually visited the station should sign his name at the end of the recovery note.

NOTE - One of these forms must be used for every station recovered.

USCGM-DC 27173-P99

FORM 526a
 (9-18-69)

U.S. DEPARTMENT OF COMMERCE
 COAST AND GEODETIC SURVEY

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: MAUNA UNA
 ESTABLISHED BY: HGS YEAR: 1874 STATE: Hawaii
 RECOVERED BY: W.R. Porter YEAR: 1963 COUNTY: Honolulu

OBJECT	BEARING	DISTANCE		DIRECTION
		FEET	METERS	
		DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION		
MAILI 1874-1927				00 00 00.0
R.M. No. 2	NE	30.336	9.247	72 02 48
R.M. No. 1	SE	13.165	4.013	145 00 37

Station was recovered and all marks found in good condition. A complete description follows:

Station is located, airline, about 4 miles southwest of Wahiawa, 1-1/4 miles west-northwest of Kunia post office, 1-1/2 miles south from the south boundary of Schofield Barracks, and 1-1/2 miles west-northwest of State Highway 75, on Maunauna Mountain, a heavily timbered point of 1769 feet elevation on a sharp topped ridge running southwest up to the main range of the Waianae Mountains.

To reach station from the junction of State Highways 75 and 99 at Schofield Barracks, go southwest on State Highway 75 for 1.7 miles to side road right, at top of grade, by pineapple loading area on right. Turn right and follow pineapple field roads westerly, towards base of hill and washed-out trail visible from highway, for 1.2 miles to end of fields and start of trail. Pack southwest up washed-out trail for about 45 minutes to station.

Station mark is a standard disk stamped "MAUNA UNA 1927", set in the top of an 8-inch-square, concrete monument that projects 5 inches above ground. A Hawaii Territory Survey, "Type A" signal is centered over the mark. The concrete floor of the signal is 4 feet above ground and the metal target extends 7 feet above the floor.

Reference mark number one is a standard disk stamped "MAUNA UNA NO 1", set in the top of a concrete-filled, 4-inch, iron pipe that projects 20 inches above ground. It sets at the east side of the ridge trail and at about the same elevation as station mark.

Reference mark number two is a standard disk stamped "MAUNA UNA NO 2", set in the top of a concrete-filled, 4-inch, iron pipe that projects 20 inches above ground. It sets at the east side of the ridge trail and is 3.1 feet lower than station mark.

*Name of chief of party should be inserted here. The officer who actually visited the station should sign his name at the end of the recovery note.

NOTE - One of these forms must be used for every station recovered.

USCGM-DC 27173-P99

JUN 1978
 U. S. DEPARTMENT OF COMMERCE
 NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
 NATIONAL OCEAN SURVEY, NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 OLD HAWAIIAN DATUM

QUAD 211582 STATION 1104
 HAWAII
 LATITUDE 21 ° 00' TO 21 ° 30'
 LONGITUDE 158 ° 00' TO 158 ° 30'
 DIAGRAM NF 4-11 OAHU

NO ORIGINAL TEXT

RECOVERY
~~RESECTION~~ OF TRIANGULATION INTERSECTION STATION
NANAKULI,
 NAME OF STATION: KAISER CEMENT PLANT WATER TANK
 Established By: D.G.Rushford Year: 1964
 CHIEF OF PARTY: C.A. Annis YEAR: 1969 STATE: Hawaii COUNTY: Honolulu

Description, including sketch of object:

Located 1.6 mile northeast of the intersection of highway 78 and Farrington highway in Nanakuli. Gray Tank on top of a 4 legged steel structure. Station is a ball in the center of the top of the tank that is 120 feet high.

FORM C&GS-525b (12-68)
 USCOMMA-DC 98290-P65

Described by .

U. S. DEPARTMENT OF COMMERCE
 SEA
 COAST AND GEODETIC SURVEY

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: NANAKULI KAISER CEMENT PLT TK
 STATE: HAWAII YEAR: 1964 THIRD ORDER

SOURCE: G-12664

GEODETIC LATITUDE:	21 ° 24' 28.766	ELEVATION	METERS
GEODETIC LONGITUDE:	158 05 43.934		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ HOR Δ θ ANGLE °
HI 3	5103	467,500.52	87,667.16	- 0 02 06

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE θ HOR Δ θ FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH* (From south)	CODE

QF 554

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 Old Hawaiian Datum

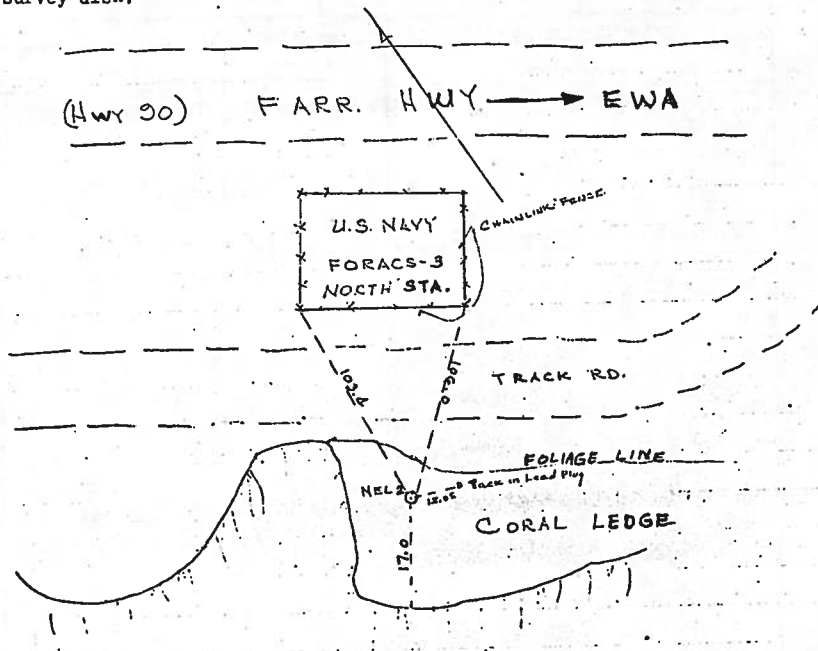
QUAD 211582 STATION 1105
 HAWAII
 LATITUDE 21° 00' TO 21° 30'
 LONGITUDE 158° 00' TO 158° 30'
 DIAGRAM NF 4-11 OAHU

DESCRIPTION OF SURVEY MARK

NAME OF STATION: NEL 2 STATE: Hawaii COUNTY: Honolulu
 NEAREST TOWN: Nanakuli
 ESTABLISHED BY: U.S. Navy DATE: 1970
 DESCRIBED BY: James T. Ishihara SURFACE MARK: 3/4" Brass Disk (Navy
 Triangulation Sta.)

To reach station, head 1.4 mile northwest along Highway 90 from the Post Office at Nanakuli, to the U.S. Navy FORACS 3, North Station tower, which is enclosed by a chain link fence on the southwest side of the highway.

Station mark is a 3/4" brass disk stamped NEL 2 set in concrete on a coral ledge. Ties to station are: 106.0 feet southwest from the south from the west corner post of chain link fence; 103.4 feet south from the west corner post of chain link fence; 17.0 feet north north-east from the edge of coral ledge. This mark is not a standard state survey disk.



ADJUSTED HORIZONTAL CONTROL DATA ADJUSTMENT BY NGS

NAME OF STATION: NEL 2 OBS BY: MIDT
 STATE: HAWAII YEAR: 1970 THIRD ORDER

SOURCE: G-15752

GEODETIC LATITUDE:	21° 24' 02.54435	ELEVATION	4 METERS
GEODETIC LONGITUDE:	158 10 18.36449	SCALED	FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ IOR Δ θ' ANGLE*
HI 3	5103	441,565.72	85,043.46	- 0' 03' 46"

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE θ IOR Δ θ' FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH* (From south)	CODE
STATE SURVEY 8-8	298° 05' 19.9	298° 09' 05"	5103

THESE DATA OBTAINED FROM ADJUSTMENT OF SEP 1979

RL 145

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 Old Hawaiian Datum

QUAD 211582 STATION 1106
 HAWAII
 LATITUDE 21° 00' TO 21° 30'
 LONGITUDE 158° 00' TO 158° 30'
 DIAGRAM NF 4-11 OAHU

DESCRIPTION OF SURVEY MARK

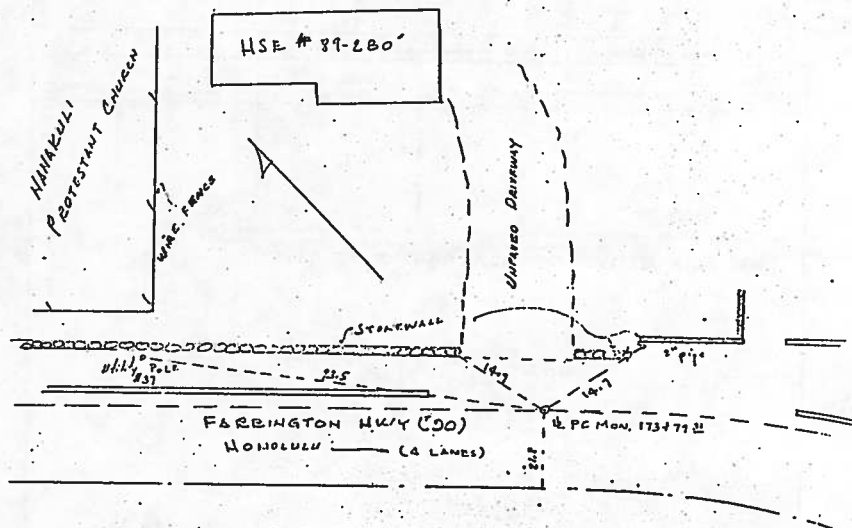
NAME OF STATION: PC MON 173+79.31 STATE: Hawaii COUNTY: Honolulu
 NEAREST TOWN: Nanakuli
 ESTABLISHED BY: State of Hawaii DATE: 1970
 DESCRIBED BY: J. Ishihara SURFACE MARK: 1/2 Inch Brass Pin

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: PC MON 173+79.31 OBS BY HMDT
 STATE: HAWAII YEAR: 1970 THIRD
 SOURCE: G-15752

To reach station from the U. S. Post Office, Nanakuli Branch, at the intersection of Highway 90 and Lualualei Naval Ammunition Depot Road, proceed 1.0 mile southeast along Highway 90 to station. Station is located on the northeast side of Highway 90, opposite a driveway of house #89-280, about the white line that denotes the limits of a four lane highway.

Station mark is a standard State Highway 1/2 inch brass pin set in concrete to mark the centerlines and baselines of highways. Ties to station are: S 14.9 ft. from the end of a stonewall, SE 93.5 ft. from the centerline of Highway 90.



GEODETIC LATITUDE:	21° 22' 52.42941	STATION	4	METERS
GEODETIC LONGITUDE:	158 08 40.15707	SCALED		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	ϕ OR Δ or ANGLE*
HI 3	5103	450,839.64	77,959.51	0° 03' 10"

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE ϕ OR Δ or FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH* (From south)	CODE
PT MON 188+95.88	322° 18' 36.3	322° 21' 46"	5103

THESE DATA OBTAINED FROM ADJUSTMENT OF SEP 1979

RL 147

DEC 1979
 U. S. DEPARTMENT OF COMMERCE
 NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
 NATIONAL OCEAN SURVEY , NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 Old Hawaiian Datum

QUAD 211582 STATION 1107
 HAWAII
 LATITUDE 21° 00' TO 21° 30'
 LONGITUDE 158° 00' TO 158° 30'
 DIAGRAM NF 4-11 OAHU

NO TEXT

ADJUSTED HORIZONTAL CONTROL DATA ADJUSTMENT BY NGS

NAME OF STATION: PC MON 208+85.08 OBS BY: HJD
 STATE: HAWAII YEAR: 1970 THIRD ORDER

SOURCE: G-15752

GEODETIC LATITUDE:	21° 22' 23.51694	ELEVATION:	3	METERS
GEODETIC LONGITUDE:	158 08 19.80988	SCALED		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ OR ANGLE *
HI 3	S103	452,760.09	75,040.52	- 0° 03' 02"

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE θ OR Δ OR ANGLE FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE
THESE DATA OBTAINED FROM ADJUSTMENT OF SEP 1979			
RL 148			

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 Old Hawaiian Datum

QUAD 211582 STATION 1108
 HAWAII
 LATITUDE 21° 00' TO 21° 30'
 LONGITUDE 158° 00' TO 158° 30'
 DIAGRAM NF 4-11 OAHU

DESCRIPTION OF SURVEY MARK

NAME OF STATION: PI Mon 1-A STATE: Hawaii COUNTY: Honolulu
 NEAREST TOWN: Nanakuli
 ESTABLISHED BY: State of Hawaii DATE: 1970
 DESCRIBED BY: J. Ishihara SURFACE MARK: 1/2 Inch Brass Pin

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: PI MON 1-A OBS BY: HIDT
 STATE: HAWAII YEAR: 1970 THIRD ORDER
 SOURCE: 6-15752

To reach station from the U. S. Post Office, Nanakuli Branch, at the intersection of Highway 90 and Lualualei Naval Ammunition Depot Road, proceed 0.4 mile southeast along Highway 90 to station. Station is located on the northeast edge of Highway 90, and in a southwesterly direction from Yuens' Grocery, Bldg. #87-2230, about the white line that denotes the limits of a four lane highway.

Station mark is a Standard State Highway 1/2 inch brass pin set in concrete to mark the centerlines and baselines of highways. Ties to station are: SE 47.2 ft. from the southwest corner of Bldg. #87-2230, SW 27.0 ft. from the south corner of Bldg. #87-2230, SW 6.8 ft. from utility pole #54, SW 8.9 ft. from the end of a stone-wall, and NE 22.3 ft. from the centerline of Highway 90.

GEODETIC LATITUDE:	21° 23' 12.10880	ELEVATION	4	METERS
GEODETIC LONGITUDE:	158 09 01.35691	SCALED		FEET

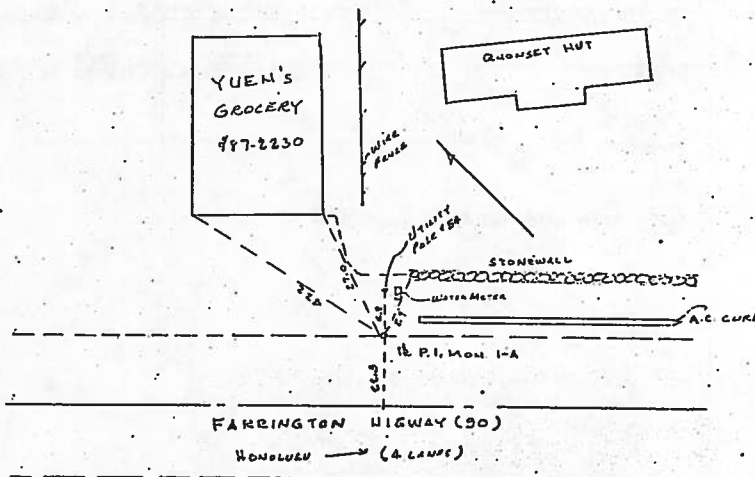
STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	ϕ IOR Δ ρ1 ANGLE*
HI 3	5103	448,837.93	79,947.04	- 0° 03' 17"

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE ϕ IOR Δ ρ1 FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH* (From south)	CODE
PC MON 173+79.31	314° 44' 29.3	314° 47' 47"	5103

THESE DATA OBTAINED FROM ADJUSTMENT OF SEP 1979

RL 149



HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 Old Hawaiian Datum

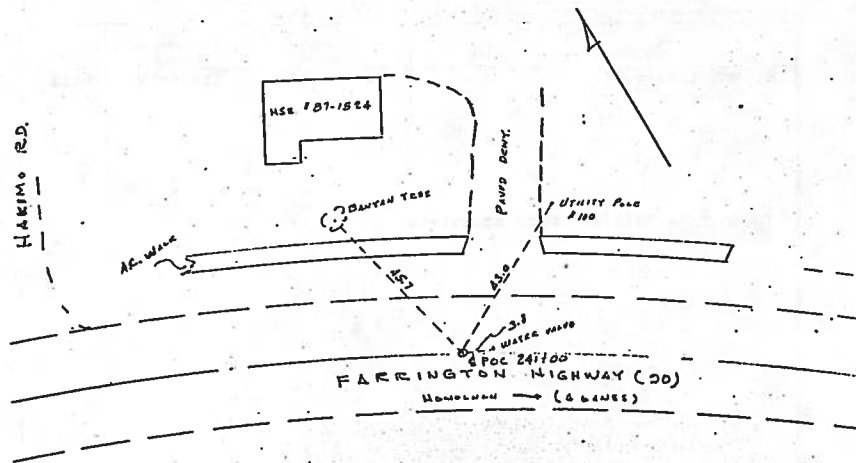
QUAD 211582 STATION 1109
 HAWAII
 LATITUDE 21° 00' TO 21° 30'
 LONGITUDE 158° 00' TO 158° 30'
 DIAGRAM NF 4-11 OAHU

DESCRIPTION OF SURVEY MARK

NAME OF STATION: POC 241+00 STATE: Hawaii COUNTY: Honolulu
 NEAREST TOWN: Nanakuli
 ESTABLISHED BY: State of Hawaii DATE: 1970
 DESCRIBED BY: J. Ishihara SURFACE MARK: Standard State Survey Disk

To reach station from the U. S. Post Office, Nanakuli Branch, at the intersection of Highway 90 and Lualualei Ammunition Depot Road, proceed 0.9 mile northwest along Highway 90 to station. Station is located on the centerline of Highway 90 opposite the driveway of house #87-524.

Station mark is a standard State Survey disk stamped "241+00" set in concrete and level with road. Ties to station are: SSE 45.7 ft. from banyan tree in lot #87-1524, SW 43.0 ft. from utility pole #100 and NW 3.8 ft. from water valve.



ADJUSTED HORIZONTAL CONTROL DATA

ADJUSTMENT BY NGS

NAME OF STATION: POC 241+00 OBS BY HIOT
 STATE: HAWAII YEAR: 1970 THIRD ORDER

SOURCE: G-15752

GEODETIC LATITUDE	21° 23' 58.44082	ELEVATION	3	METERS
GEODETIC LONGITUDE	158 09 55.89827	SCALED		FEET

STATE COORDINATES (Fwi)				
STATE & ZONE	CODE	X	Y	θ OR Δ θ ANGLE*
HI 3	5103	443,688.30	84,627.14	- 0° 03' 37"

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE θ OR Δ θ FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH* (From south)	CODE
253+00	302° 49' 51.6	302° 53' 29"	5103

THESE DATA OBTAINED FROM ADJUSTMENT OF SEP 1979

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 Old Hawaiian Datum

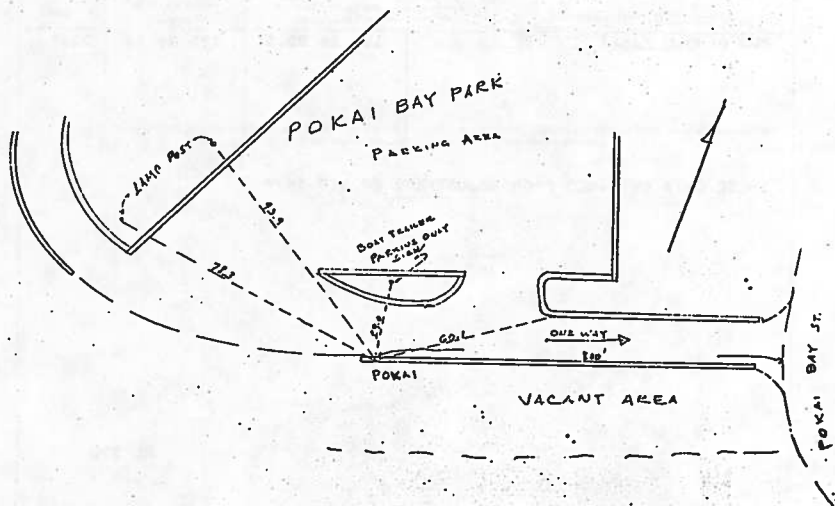
QUAD 211582 STATION 1110
 HAWAII
 LATITUDE 21° 00' TO 21° 30'
 LONGITUDE 158° 00' TO 158° 30'
 DIAGRAM NF 4-11 OAHU

DESCRIPTION OF SURVEY MARK

NAME OF STATION: Pokai STATE: Hawaii COUNTY: Honolulu
 NEAREST TOWN: Waianae
 ESTABLISHED BY: State of Hawaii DATE: 1970
 DESCRIBED BY: J. Ishihara SURFACE MARK: Standard State Survey Disk

To reach station from the Post Office at Waianae, proceed 0.1 mile northwest along Highway 90 to the intersection at Lualualei Homestead Road, then turn left and head 0.1 mile southwest along Lualualei Homestead Road to the intersection at Pokai Bay Street, continue across Pokai Bay St., 200 ft. in a southwesterly direction on the Southerly side of Pokai Bay Park roadway to station.

Station mark is a standard State Survey disk stamped "Pokai 1970" set on top of a concrete curb in Pokai Bay Park. Ties to station are: E 78.3 ft. from a lamp post, SE 93.9 ft. from another lamp post, S 29.0 ft. from a "Boat Trailer Only" parking sign on a medial strip, and SW 60.1 ft. from the P.C. point of a concrete curb.



ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: POKAI OBS BY: HIDT
 STATE: HAWAII YEAR: 1970 THIRD ORDER
 SOURCE: G-15752

GEODETIC LATITUDE:	21° 26' 38.34959	ELEVATION	3
GEODETIC LONGITUDE:	158 11 31.43897	SCALED	METERS FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	ϕ OR Δ ANGLE
HI 3	5103	434,679.55	100,772.31	= 0° 04' 13"

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE ϕ OR Δ FORMULA NEGLECTING THE SECOND TERM

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH* (From south)	CODE
PUU O HULU MAKAI	335° 29' 55.2	335° 34' 08"	5103

THESE DATA OBTAINED FROM ADJUSTMENT OF SEP 1979

RL 151

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 Old Hawaiian Datum

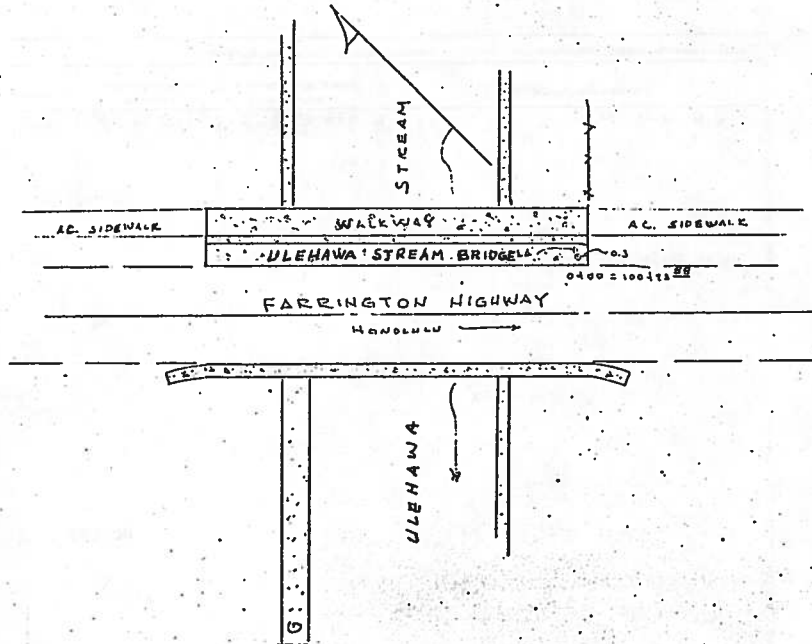
QUAD 211582 STATION 1111
 HAWAII
 LATITUDE 21° 00' TO 21° 30'
 LONGITUDE 158° 00' TO 158° 30'
 DIAGRAM NF 4-11 OAHU

DESCRIPTION OF SURVEY MARK

NAME OF STATION: POT 100+23.88 STATE: Hawaii COUNTY: Honolulu
 NEAREST TOWN: Nanakuli
 ESTABLISHED BY: State of Hawaii DATE: 1970
 DESCRIBED BY: J. Ishihara SURFACE MARK: Standard State Survey Disk

To reach station from the U.S. Post Office, Nanakuli Branch, at the intersection of Highway 90 and Lualualei Naval Ammunition Depot Road, proceed 0.5 mile northwest along Highway 90 to Ulehawa Stream Bridge. Station is located on the northeast concrete abutment on the southeast end of Ulehawa Stream Bridge.

Station mark is a standard State Survey disk stamped "0+00=100+23.88 1970" set on Ulehawa Stream Bridge concrete abutment and 0.75 foot above road level.



ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: POT 100+23.88 OBS BY HIOT
 STATE: HAWAII YEAR: 1970 THIRD -ORDER
 SOURCE: 6-15752

GEODETIC LATITUDE:	21° 23' 43.72750	ELEVATION:	3 METERS
GEODETIC LONGITUDE:	158 09 35.46507	SCALED	FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ θ' ANGLE °
HI 3	5103	445,617.71	83,140.56	- 0° 03' 30"

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE θ' OR Δ θ' FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH* (From south)	CODE
PUU O HULU MAKAI	125° 26' 20.5"	125° 29' 50"	5103

THESE DATA OBTAINED FROM ADJUSTMENT OF SEP 1979

RL 170

DEC 1979

U. S. DEPARTMENT OF COMMERCE
 NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
 NATIONAL OCEAN SURVEY, NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 Old Hawaiian Datum

QUAD 211582 STATION 1112
 HAWAII
 LATITUDE 21° 00' TO 21° 30'
 LONGITUDE 158° 00' TO 158° 30'
 DIAGRAM NF 4-11 OAHU

DESCRIPTION OF SURVEY MARK

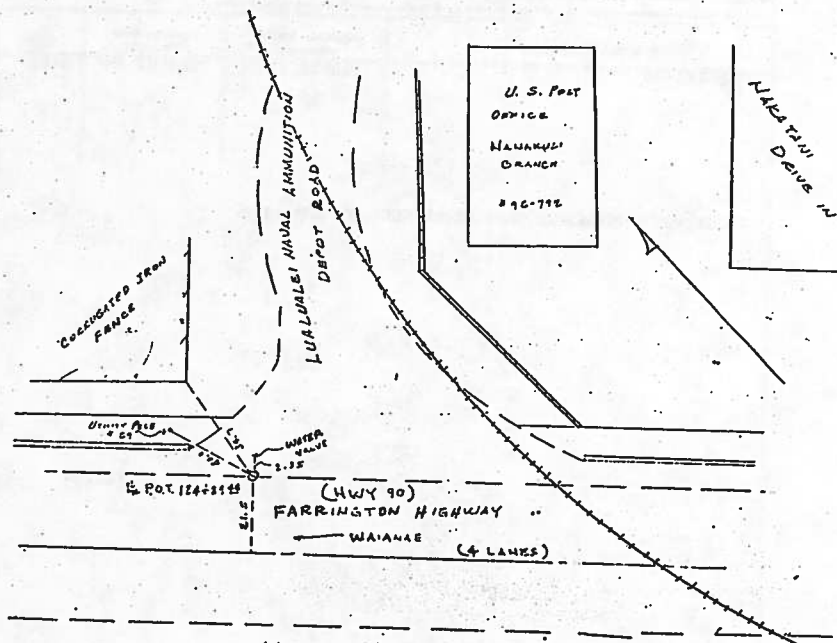
NAME OF STATION: POT 124+29.46 LUALUALEI STATE: Hawaii COUNTY: Honolulu
 NEAREST TOWN: Nanakuli
 ESTABLISHED BY: State of Hawaii DATE: 1970
 DESCRIBED BY: J. Ishihara SURFACE MARK: 1/2 Inch Brass Pin

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: POT 124+29.46 LUALUALEI OBS BY MIDT
 STATE: HAWAII YEAR: 1970 THIRO
 SOURCE: G-15752

Station is located on the Northwest side of the intersection of Highway 90 and Lualualei Naval Ammunition Depot Road, west of U. S. Post Office, Nanakuli Branch, about the white line that denotes the limits of a four lane highway.

Station mark is a standard State Highway 1/2 inch brass pin set in concrete to mark the centerlines and baselines of highways. Ties to station are: SE 40.0 ft. from utility pole #69, S 34.7 ft. from the corner of a corrugated iron fence, SW 2.85 ft. from water valve and NE 21.5 ft. from the centerline of Highway 90.



GEODETIC LATITUDE:	21° 23' 26.95285	ELEVATION	3	METERS
GEODETIC LONGITUDE:	158 09 17.36885	SCALED		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	ϕ OR Δ OR ANGLE*
HI 3	5103	447,326.16	81,446.28	- 0° 03' 23"

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE ϕ OR Δ OR ANGLE FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH* (From south)	CODE
PI MON 1-A	314° 42' 18.2	314° 45' 41"	5103

THESE DATA OBTAINED FROM ADJUSTMENT OF SEP 1979

RL 152

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 Old Hawaiian Datum

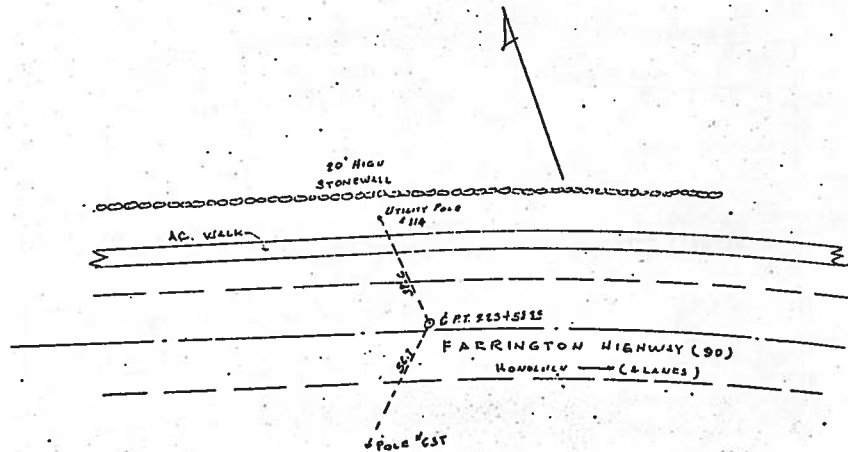
QUAD 211582 STATION 1113
 HAWAII
 LATITUDE 21° 00' TO 21° 30'
 LONGITUDE 158° 00' TO 158° 30'
 DIAGRAM NF 4-11 OAHU

DESCRIPTION OF SURVEY MARK

NAME OF STATION: PT 223+58.26 STATE: Hawaii COUNTY: Honolulu
 NEAREST TOWN: Manakuli
 ESTABLISHED BY: State of Hawaii DATE: 1970
 DESCRIBED BY: J. Ishihara SURFACE MARK: Standard State Survey Disk

To reach station from the U. S. Post Office, Manakuli Branch, at the intersection of Highway 90 and Lualualei Ammunition Depot Road, proceed 1.3 miles northwest along Highway 90 to station. Station is located slightly off the centerline divisional markings of Highway 90.

Station mark is a standard State Survey disk stamped "223+58.26" set in concrete and level with the road. Ties to station are: S 38.6 ft. from utility pole #114 and SW 56.7 ft. from pole #63T.



ADJUSTED HORIZONTAL CONTROL DATA

ADJUSTMENT BY NGS

NAME OF STATION: PT 223+58.26 OBS BY: HIDT
 STATE: HAWAII YEAR: 1970 THIRD ORDER

SOURCE: G-15752

GEODETIC LATITUDE:	21° 24' 03.85279 158 10 13.33196	ELEVATION:	7 METERS SCALED FEET
--------------------	-------------------------------------	------------	-------------------------

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ (OR Δ θ) ANGLE °
HI 3	5103	442,041.43	85,174.97	- 0° 03' 44"

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE θ (OR Δ θ) FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH* (From south)	CODE
POC 241+00	288° 20' 15.0	288° 23' 59"	5103

THESE DATA OBTAINED FROM ADJUSTMENT OF SEP 1979

RL 154

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 Old Hawaiian Datum

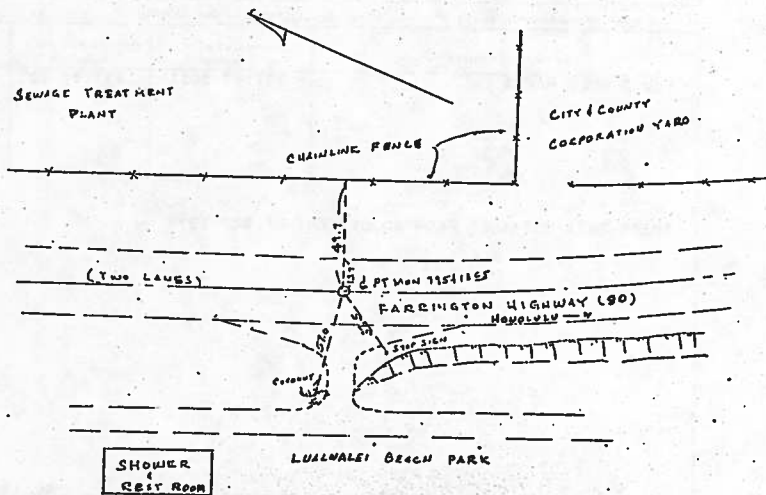
QUAD 211582 STATION 1114
 HAWAII
 LATITUDE 21° 00' TO 21° 30'
 LONGITUDE 158° 00' TO 158° 30'
 DIAGRAM NF 4-11 OAHU

DESCRIPTION OF SURVEY MARK

NAME OF STATION: PT 795+18.65 STATE: Hawaii COUNTY: Honolulu
 NEAREST TOWN: Waianae
 ESTABLISHED BY: State of Hawaii DATE: 1970
 DESCRIBED BY: J. Ishihara SURFACE MARK: 1/2 Inch Brass Pin

To reach station from the U. S. Post Office, at Waianae, proceed 0.65 mile southeast along Highway 90 to the entrance of Lualualei Beach Park. Station is located at the intersection of Highway 90 and the driveway into Lualualei Beach Park.

Station mark is a standard State Highway 1/2 inch brass pin set in concrete to mark the centerline and baselines of highways and level with the road. Ties to station are: SW 49.7 ft. from the chainlink fence on the northeast side of the highway, NE 37.5 ft. from a stop sign and ENE 57.0 ft. from a coconut tree in Lualualei Beach Park.



ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: PT 795+18.65 OBS BY: HIDT
 STATE: HAWAII YEAR: 1970 THIRD ORDER

SOURCE: G-15752

GEODEIC LATITUDE:	21° 26' 05.23724	ELEVATION	4	METERS
GEODEIC LONGITUDE:	158 11 09.51832	SCALED		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	δ FOR Δ ±1 ANGLE*
HI 3	5103	436,746.44	97,428.75	- 0' 04' 05"

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE δ FOR Δ ±1 FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODEIC AZIMUTH (From south)	PLANE AZIMUTH* (From south)	CODE
PUU O HULU MAKAI	337° 52' 02.4	337° 56' 07"	5103

THESE DATA OBTAINED FROM ADJUSTMENT OF SEP 1979

RL 155

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 Old Hawaiian Datum

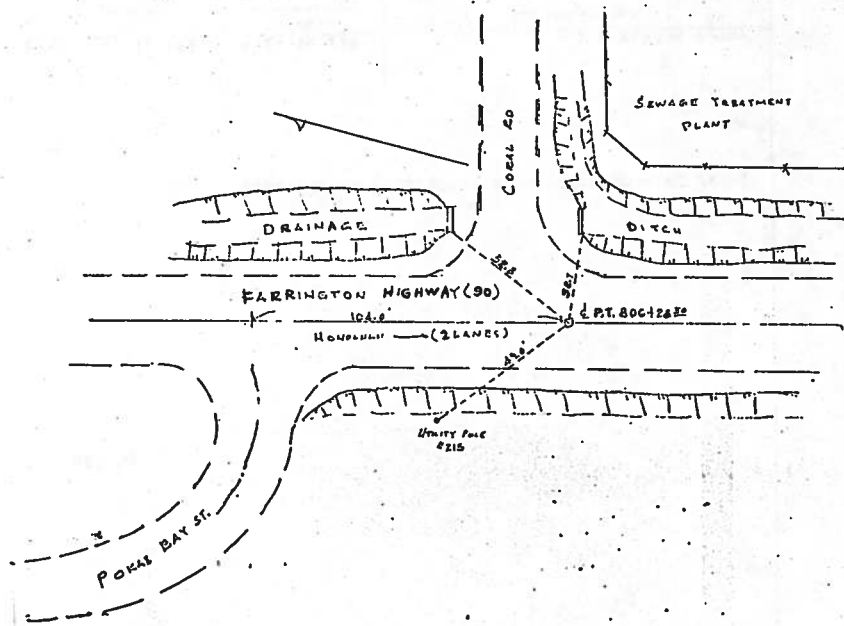
QUAD 211582 STATION 1115
 HAWAII
 LATITUDE 21° 00' TO 21° 30'
 LONGITUDE 158° 00' TO 158° 30'
 DIAGRAM NF 4-11 OAHU

DESCRIPTION OF SURVEY MARK

NAME OF STATION: PT 806+26.50 STATE: Hawaii COUNTY: Honolulu
 NEAREST TOWN: Waianae
 ESTABLISHED BY: State of Hawaii DATE: 1970
 DESCRIBED BY: J. Ishihara SURFACE MARK: ½ Inch Brass Pin

To reach station from the Post Office at Waianae, proceed 0.4 mile southeast along Highway 90 to the intersection of Highway 90 and Pokai Bay Street to station. Station is located on the centerline of Highway 90 about 104.0 ft. southeast from Pokai Bay St.

Station mark is a standard State Highway ½ inch brass pin set in concrete and level with road. Ties to station are: SW 52.3 ft. from the southwest corner of a concrete culvert on the northeast side of highway, W 32.7 ft. from the southwest corner of a concrete culvert on the easterly side of highway and SE 49.0 feet from utility pole #215.



ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: PT 806+26.50 OBS BY: HJDT
 STATE: HAWAII YEAR: 1970 THIRD ORDER
 SOURCE: 6-15752

GEODETIC LATITUDE:	21° 26' 15.33771	ELEVATION:	4 METERS
GEODETIC LONGITUDE:	158 11 14.08459	SCALED	FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	ϕ HOR Δ ρ ANGLE °
HI 3	5103	436,316.25	98,448.41	0° 04' 06"

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE ϕ HOR Δ ρ FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH (From south)	CODE
PUU O HULU MAKAI	337° 47' 56.1	337° 52' 02"	5103

THESE DATA OBTAINED FROM ADJUSTMENT OF SEP 1979

RL 156

OEC 1979

U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY ; NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
Old Hawaiian Datum

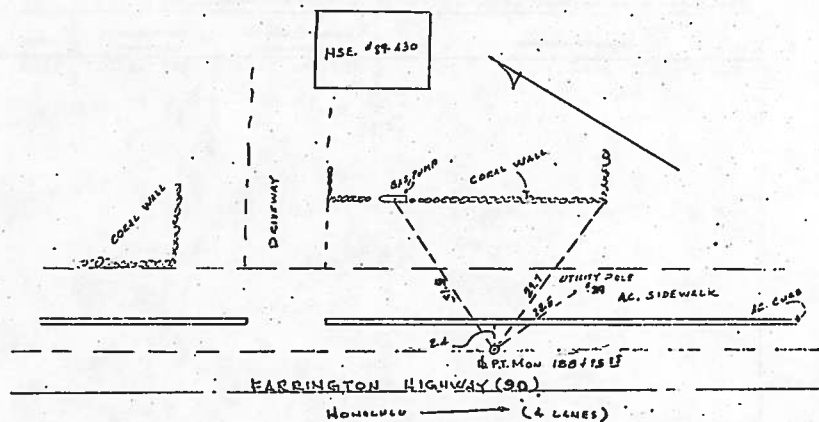
QUAD 211582 STATION 1116
HAWAII
LATITUDE 21° 00' TO 21° 30'
LONGITUDE 158° 00' TO 158° 30'
DIAGRAM NF 4-11 OAHU

DESCRIPTION OF SURVEY MARK

NAME OF STATION: PT MON 188+95.88 STATE: Hawaii COUNTY: Honolulu
NEAREST TOWN: Nanakuli
ESTABLISHED BY: State of Hawaii DATE: 1970
DESCRIBED BY: J. Ishihara SURFACE MARK: $\frac{1}{2}$ Inch Brass Pin

To reach station from the U. S. Post Office, Nanakuli Branch, at the intersection of Highway 90 and Lualualei Naval Ammunition Depot Road, proceed 1.3 miles southeast along Highway 90 to station. Station is located on the Northeast side of Highway 90 opposite house #89-430 about the white line that denotes the limits of a four lane highway.

Station mark is a standard State Highway $\frac{1}{2}$ inch brass pin set in concrete to mark the centerline and baselines of highways. Ties to station are: SW 31.5 ft. from a gas pump, W 29.7 ft. from the corner of a coral wall of house #89-430, NW 22.5 ft. from utility pole #29 and SW 2.4 ft. from the face of asphalt curb.



ADJUSTED HORIZONTAL CONTROL DATA

ADJUSTMENT BY NGS

NAME OF STATION: PT MON 188+95.88 OBS BY: HIDT
STATE: HAWAII YEAR: 1970 THIRD ORDER

SOURCE: G-15752

GEODETIC LATITUDE:	21° 22' 40.56778	ELEVATION:	5
GEODETIC LONGITUDE:	158 08 30.37344	SCALED	METERS FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	# OR Δ ° ANGLE
HI 3	5103	451,763.22	76,761.83	- 0° 03' 06"

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE # OR Δ ° FORMULA NEGLECTING THE SECOND TERM

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH* (From south)	CODE
HARRIET 8-9A	329° 51' 29.1	329° 54' 35"	5103

THESE DATA OBTAINED FROM ADJUSTMENT OF SEP 1979

RL 153

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 OLD HAWAIIAN DATUM

QUAD 211582 STATION 1117
 HAWAII
 LATITUDE 21 ° 00' TO 21 ° 30'
 LONGITUDE 158 ° 00' TO 158 ° 30'
 DIAGRAM NF 4-11 OAHU

NO ORIGINAL TEXT

ADJUSTED HORIZONTAL CONTROL DATA

Form 528
 (11-8-65)

U. S. DEPARTMENT OF COMMERCE - COAST AND GEODETIC SURVEY
 RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: PUU O HULU NORTH
 ESTABLISHED BY: HGS YEAR: 1875 STATE: Hawaii
 RECOVERED BY: D.G. Rushford YEAR: 1964 COUNTY: Honolulu

Detailed statement as to the fitness of the original description; including marks found, stampings, changes made, and other pertinent facts:

The station is gone.
 When station was searched for 2 crosses about 3 inches apart on a small, flat rock were found. Azimuths to adjacent stations were obtained by inverse computations and a check was made with a theodolite; the crosses proved to be several feet away from correct location of station. Because of the very soft type of rock on the ridge it is very unlikely that the crosses are more than a few years old.

NAME OF STATION: PUU O HULU NORTH
 STATE: HAWAII YEAR: 1875 THIRD ORDER

SOURCE: G- 558

GEODETIC LATITUDE:	21 ° 24' 25.313	ELEVATION:	METERS
GEODETIC LONGITUDE:	158 09 31.663		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	ϕ OR Δ OR ANGLE *
HI 3	5103	445,981.25	87,336.18	- 0° 03' 29"

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE ϕ OR Δ FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE

* Name of chief of party should be inserted here. The officer who actually visited the station should sign his name at the end of the recovery note.
 Note.—One of these forms must be used for every station recovered. COM-DC 34314

QF 019

JUN 1978
 U. S. DEPARTMENT OF COMMERCE
 NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
 NATIONAL OCEAN SURVEY, NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 OLD HAWAIIAN DATUM

QUAD 211582 STATION 1118
 HAWAII
 LATITUDE 21 ° 00' TO 21 ° 30'
 LONGITUDE 158 ° 00' TO 158 ° 30'
 DIAGRAM NF 4-11 OAHU

NO ORIGINAL TEXT

Form 526
 (11-8-55)

U. S. DEPARTMENT OF COMMERCE - COAST AND GEODETIC SURVEY
 RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: PUU O HULU SOUTH
 ESTABLISHED BY: HGS YEAR: 1875 STATE: Hawaii
 RECOVERED BY: W.R. Porter YEAR: 1964 COUNTY: Honolulu

Detailed statement as to the fitness of the original description; including marks found, stampings, changes made, and other pertinent facts:

Station is gone. It was 6.067 feet from station PUU O HULU MAKAI, in azimuth 336° 10' 54", and the hill in that vicinity has been cut down, apparently during construction of the military installations on the hilltop during WW2.

* Name of chief of party should be inserted here. The officer who actually visited the station should sign his name at the end of the recovery note.
 Note.—One of these forms must be used for every station recovered.

COMM-DC 94314

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: PUU O HULU SOUTH
 STATE: HAWAII YEAR: 1875 THIRD ORDER

SOURCE: G- 558

GEODETIC LATITUDE:	21 ° 24' 14.207	ELEVATION:	METERS
GEODETIC LONGITUDE:	158 10 21.314		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ OR ANGLE *
HI 3	5103	441,288.29	86,220.53	- 0° 03' 47"

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE θ OR Δ OR FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE

QF 020

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 OLD HAWAIIAN DATUM

QUAD 211582 STATION 1119
 HAWAII
 LATITUDE 21° 00' TO 21° 30'
 LONGITUDE 158° 00' TO 158° 30'
 DIAGRAM NF 4-11 OAHU

DEPARTMENT OF COMMERCE
 U. S. COAST AND GEODETIC SURVEY
 FORM 526
 Rev. Aug. 1968

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: RELAY (USN) STATE: Hawaii COUNTY: Honolulu

CHIEF OF PARTY: W.R. Porter YEAR: 1960 Described by: D.R. Tomlinson

NOTE*	HEIGHT OF TELESCOPE ABOVE STATION MARK METERS.	DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION	HEIGHT OF LIGHT ABOVE STATION MARK METERS.
Desc.	Surface-station mark, Underground-station mark		
		OBJECT BEARING DISTANCE DIRECTION	
		feet meters	0' 00" 00.0
Desc. 11a		WAIPIO UKA 1873 1927	
		HM 2	WNW 24.38 7.431 228 39 34
		HM 1	NE 64.73 19.728 332 07 45

The station is about 1/2 mile west and 1 mile north of Waipahu, on the Waianae Range, in the Honolulu Forest Reserve. Near the Mauna Kapu Mountain. On property owned by the Campbell Estate.

To reach from the Bank of Hawaii in Waipahu, go westerly on State Highway 90 for 3.7 miles to a side road right, turn right, northerly on black top road for 0.6 mile to a crossroad, continue ahead on black top road for 1.1 miles to a locked gate, pass through gate and continue on black top road up steep winding road for 3.6 miles to a locked gate, pass through gate and continue up hill for 1.6 miles to building 203 on the right, continue for 0.6 mile to a crossroad, turn left on black top road for 0.2 mile to building 202 and station.

Keys to the locked gates can be obtained at the Naval Shipyard, Building 9, corner of 7th and D Streets, second floor, in the Engineering office.

Station mark is a United States Navy bronze disk, cemented in a drill hole in concrete. The disk is stamped RELAY. It is 17.6 feet east of the north corner of building 202 and 12.56 feet north of the east corner of the building.

Reference mark 1 is a standard disk, stamped RELAY USN NO 1 1960, set in the top of an 11 inch square concrete post flush with the ground surface. It is 74 feet east of the east corner of the building and 12 feet south of the center of the driveway leading to building 202.

Reference mark 2 is a standard disk, stamped RELAY USN NO 2 1960, cemented in a drill hole in the northeast corner of a sidewalk. It is 7.5 feet north of the north corner of the building.

Form 526
 (11-8-55)

U. S. DEPARTMENT OF COMMERCE - COAST AND GEODETIC SURVEY
 RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: RELAY (USN)

ESTABLISHED BY: W. R. P. YEAR: 1960 STATE: HAWAII
 RECOVERED BY: H. J. S. YEAR: 1961 COUNTY: HONOLULU

Detailed statement as to the status of the original description; including marks found, stampings, changes made, and other pertinent facts:

The station and both reference marks were recovered in good condition as described. New directions for reaching the station follow:

From the junction of State Highways 76 and 90, about 1.8 miles west of Waipahu, go west on State Highway 90 for 2.0 miles to a blacktop road (Palehua Road) which turns right at sign "Sites 6 & 7". Turn right on blacktop road for 4.7 miles to the administrative office of the missile sites. Here secure key to gate 0.7 miles ahead on main road. From Missile site office, continue on main traveled road for 0.7 miles to locked gate. Pass through gate and go 0.2 miles to a fork. Take right fork and go 2.0 miles to a three pronged fork. Take extreme left fork for 0.2 miles to station site.

(continued on next page)

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: RELAY USN

STATE: HAWAII

YEAR: 1960

SECOND

ORDER

SOURCE G-12191

GEODETIC LATITUDE: 21° 23' 55.054	ELEVATION: 774 METERS
GEODETIC LONGITUDE: 158 06 17.574	SCALED FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	ϕ OR Δ OR ANGLE*
HI 3	5103	464,319.49	84,267.64	- 0° 02' 18"

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE ϕ OR Δ OR FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH* (From south)	CODE
WAIPIO UKA	238 45 29.0	238 47 47	5103

QF 229

JUN 1978
U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY, NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
NATIONAL GEODETIC SURVEY
OLD HAWAIIAN DATUM

QUAD 211582

STATION 1119

LATITUDE ° ' TO ° '
LONGITUDE ° ' TO ° '
DIAGRAM

RELAY USN (continued)

U.S. DEPARTMENT OF COMMERCE - COAST AND GEODETIC SURVEY
RECOVERY NOTE, TRIANGULATION STATION

Form used
(11-8-55)

R

NAME OF STATION: RELAY (USN)

ESTABLISHED BY: W.R.P.

YEAR: 1960

STATE: Hawaii

RECOVERED BY: D.G. Rushford

YEAR: 1964

COUNTY: Honolulu

Detailed statement as to the fitness of the original description: including marks found, stampings, changes made, and other pertinent facts:

Station was recovered and all marks found in good condition. A temporary, wooden shelter has been constructed over the station mark, blocking the reference marks, so the distance and angles to them was not checked. A complete description follows:

Station is located about 5-1/2 miles airline northwest of Ewa and 6 miles west of Waipahu, on a timbered point along the crest of Palikea Ridge, about midway between Mauna Kapu and the radar dome on Puu Manawahua. It is at the northeast side of building No. 204, a Naval communications building.

To reach station from the junction of State Highways 76 and 90, about 2 miles west of Waipahu, go west on State Highway 90 for 2.0 miles to a macadam side road right, at sign "NIKE SITE 63 and 78". Turn right and follow main road upgrade for 5.5 miles to fork. Take right fork and go 0.05 mile to locked gate. Pass through gate and continue for 2.0 miles to a 3-pronged fork at an F.A.A. building. Take extreme left fork and go 0.2 mile to end of road and station.

Station mark is a U.S. Navy bronze disk stamped "RELAY", set in the top of a 12-inch-square, concrete monument flush with surrounding macadam surface. It is 17.5 feet east of north corner of building, 12.5 feet north of east corner of building, and 7.5 feet northeast of northeast side of building. NOTE: Building is No. 204, not 202 as described in 1960.

Reference mark number one is a standard disk stamped "RELAY USN NO 1 1960", set in the top of a 12-inch-square, concrete monument that is flush with the ground. It is 2.3 feet northwest of the end post of a guardrail, 7 feet southeast of edge of road, 1 foot southeast of the elbow joint of a pipe that goes underground here, and about 4 feet lower than station mark.

Reference mark number two is a standard disk stamped "RELAY USN NO 2 1960", cemented in a drill hole in the northeast corner of the sidewalk running along northwest side of building. It is 7.5 feet north of north corner of building and at about same elevation as station.

NOTE: Key for locked gate was obtained at the office of Campbell Estate in Honolulu.

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 Old Hawaiian Datum

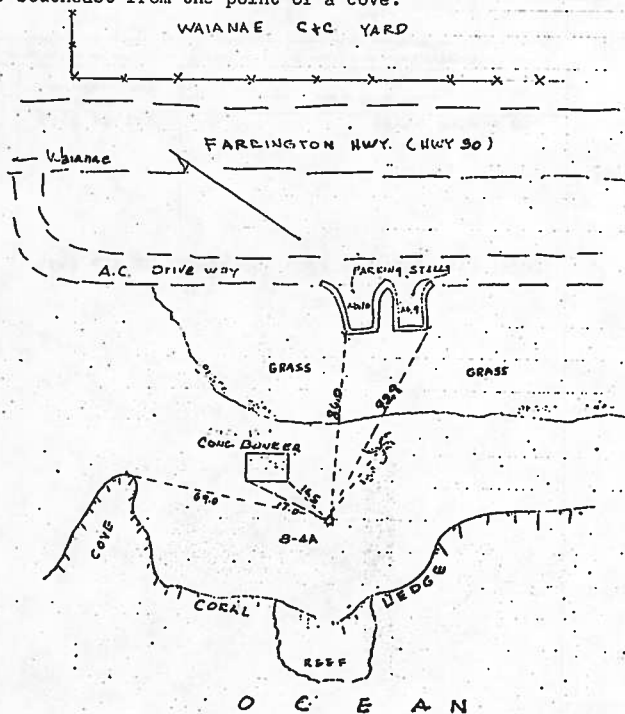
QUAD 211582 STATION 1120
 HAWAII
 LATITUDE 21° 00' TO 21° 30'
 LONGITUDE 158° 00' TO 158° 30'
 DIAGRAM NF 4-11 OAHU

DESCRIPTION OF SURVEY MARK

NAME OF STATION: STATE SURVEY 8-4A STATE: Hawaii COUNTY: Honolulu
 NEAREST TOWN: Waianae
 ESTABLISHED BY State of Hawaii, Highways Division DATE: 1970
 DESCRIBED BY: James T. Ishihara SURFACE MARK: Standard Survey Disk

To reach station, head 0.7 mile southeast along Highway 90 from the Post Office at Waianae to the entrance of Lualualei Park; thence turn right and proceed 0.1 mile in a southeasterly direction on park road to parking stall No. 10 to station.

Station mark is a standard State Survey disk stamped 8-4A - 1970 set in concrete in a coral hole. Ties to station are: 86.0 feet southwest from the west corner of parking stall No. 10; 92.9 feet southwest from the south corner of parking stall No. 9; 17.0 feet south from the northwest corner of a concrete bunker; 14.5 feet southwest from the south corner of concrete bunker and 69.0 feet southeast from the point of a cove.



ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: STATE SURVEY 8-4A OBS BY: HIDT
 STATE: HAWAII YEAR: 1970 THIRD ORDER
 SOURCE: G-15752

GEODETIC LATITUDE:	21° 25' 59.70016	SCALED	3	METERS
GEODETIC LONGITUDE:	158 11 08.09753			

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	ϕ FOR Δ ρ1 ANGLE
HI 3	5103	436,880.01	96,869.90	- 0° 04' 04"

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE ϕ FOR Δ ρ1 FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH* (From south)	CODE
PUU O HULU MAKAI	337° 26' 19.8	337° 30' 24"	5103

THESE DATA OBTAINED FROM ADJUSTMENT OF SEP 1979

RL 163

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 Old Hawaiian Datum

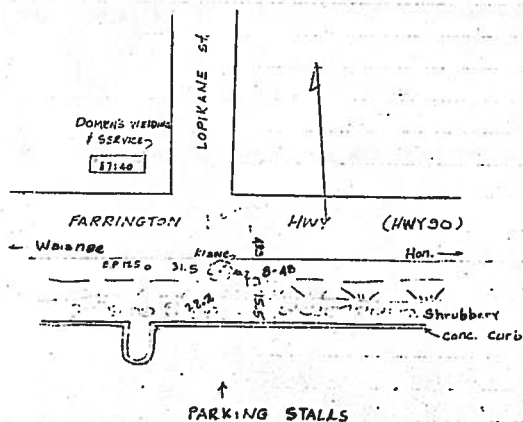
QUAD 211582 STATION 1121
 HAWAII
 LATITUDE 21° 00' TO 21° 30'
 LONGITUDE 158° 00' TO 158° 30'
 DIAGRAM NF 4-11 OAHU

DESCRIPTION OF SURVEY MARK

NAME OF STATION: STATE SURVEY 8-4B STATE: Hawaii COUNTY: Honolulu
 NEAREST TOWN: Waianae
 ESTABLISHED BY: State of Hawaii, Highways Division DATE: 1970
 DESCRIBED BY: James T. Ishihara SURFACE MARK: Standard Survey Disk

Station is located 1.3 miles southeast along Highway 90 from the Post Office at Waianae, at the intersection of Lopikane Street, on the southerly side of the highway about the toe of a sand embankment.

Station mark is a standard State Survey disk stamped 8-4B - 1970 set in a concrete monument. Ties to station are: 43.3 feet south from existing centerline of Highway 90; 10.7 feet southeast from a Kiawe tree; 31.5 feet southeast from power pole #125; 15.5 feet north from the edge of a concrete curb; 28.2 feet north from the corner of concrete curb.



ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: STATE SURVEY 8-4B OBS BY HIDT
 STATE: HAWAII YEAR: 1970 THIRD ORDER

SOURCE: G-15752

GEODETIC LATITUDE:	21° 25' 42.10610	ELEVATION:	3 METERS
GEODETIC LONGITUDE:	158 10 52.46980	SCALED	FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ 10R Δ θ 1 ANGLE
HI 3	5103	438,354.43	95,092.92	0° 03' 58"

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE θ 10R Δ θ 1 FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH (From south)	CODE
PUU O HULU MAKAI	341° 37' 57.9"	341° 41' 56"	5103

THESE DATA OBTAINED FROM ADJUSTMENT OF SEP 1979

RL 164

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 Old Hawaiian Datum

QUAD 211582 STATION 1122
 HAWAII
 LATITUDE 21° 00' TO 21° 30'
 LONGITUDE 158° 00' TO 158° 30'
 DIAGRAM NF 4-11 OAHU

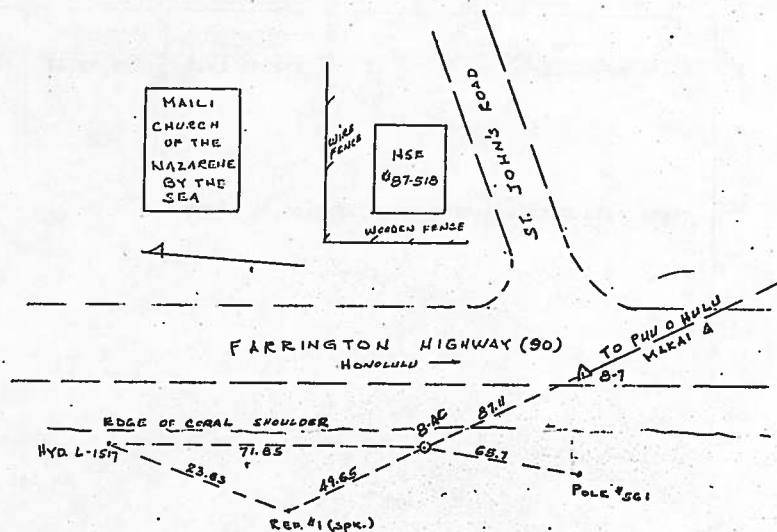
DESCRIPTION OF SURVEY MARK

NAME OF STATION: STATE SURVEY 8-4C STATE: Hawaii COUNTY: Honolulu
 NEAREST TOWN: Waianae
 ESTABLISHED BY State of Hawaii, Highways Division DATE: 1971
 DESCRIBED BY: James T. Ishihara SURFACE MARK: Standard State Survey Disk

To reach station, from the Post Office at Nanakuli, head 2.0 miles southeast along State Highway 90 to the intersection at St. John's Road. Station is located on the westerly side of Highway 90 about the edge of a coral shoulder.

Station mark is a standard State Survey disk stamped "8-4C 1971" set in a concrete monument and about 0.2 ft. below ground level. Ties to station are: S 71.85 ft. from fire Hydrant #11517, SE 49.65 ft. from a reference spike and NNE 65.7 ft. from pole #561.

This station was established to replace SS 8-7, due to the widening of Highway 90.



ADJUSTED HORIZONTAL CONTROL DATA ADJUSTMENT BY NGS

NAME OF STATION: STATE SURVEY 8-4C OBS BY HIOT
 STATE: HAWAII YEAR: 1970 THIRD ORDER

SOURCE: G-15752

GEODETIC LATITUDE:	21° 25' 07.63105	ELEVATION SCALED 4 METERS FEET
GEODETIC LONGITUDE:	158 10 46.95823	

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	∠ OR Δ ∠ ANGLE °
HI 3	5103	438,871.18	91,613.76	- 0° 03' 56"

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE ∠ OR Δ ∠ FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH* (From south)	CODE
PUU O HULU MAKAI	335° 46' 42.1	335° 50' 38"	5103

THESE DATA OBTAINED FROM ADJUSTMENT OF SEP 1979

RL 165

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 Old Hawaiian Datum

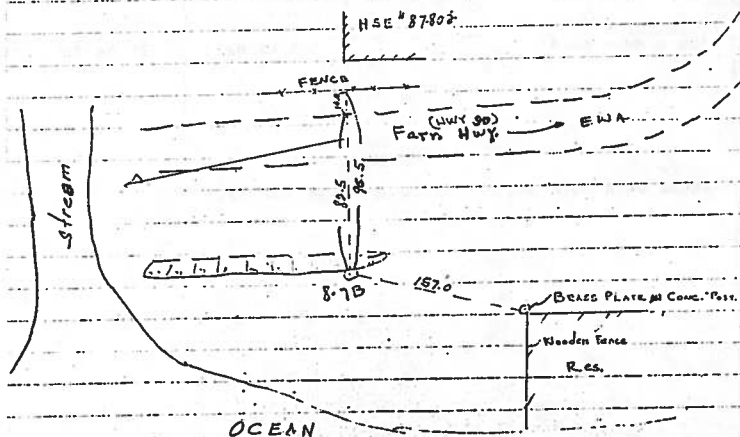
QUAD 211582 STATION 1123
 HAWAII
 LATITUDE 21° 00' TO 21° 30'
 LONGITUDE 158° 00' TO 158° 30'
 DIAGRAM NF 4-11 OAHU

DESCRIPTION OF SURVEY MARK

NAME OF STATION: STATE SURVEY 8-7B STATE: Hawaii COUNTY: Honolulu
 NEAREST TOWN: Nanakuli
 ESTABLISHED BY: State of Hawaii, Highways Division DATE: 1970
 DESCRIBED BY: James T. Ishihara SURFACE MARK: Standard Survey Disk

Station is located 2.45 miles northwest from the Post Office at Nanakuli along Highway 90 in a westerly direction from house #87-802 in a sandy area.

Station mark is a standard State Survey disk stamped 8-7B - 1970 set in a concrete monument. Ties to station are: 96.5 feet west northwest from a chain link fence in line with the north side of house #87-802 and 159.0 feet northeast from a boundary brass disk set in a concrete post.



ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: STATE SURVEY 8-7B OBS BY: HDT
 STATE: HAWAII YEAR: 1970 THIRD ORDER

SOURCE: G-15752

GEODETIC LATITUDE:	21° 24' 40.04347	ELEVATION:	2 METERS
GEODETIC LONGITUDE:	158 10 48.72237	SCALED	FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ OR ANGLE
HI 3	5103	438,701.29	88,830.35	- 0° 03' 57"

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE θ OR Δ OR FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH (From south)	CODE
STATE SURVEY 8-7C	353° 39' 19.9	353° 43' 17"	5103

THESE DATA OBTAINED FROM ADJUSTMENT OF SEP 1979

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 Old Hawaiian Datum

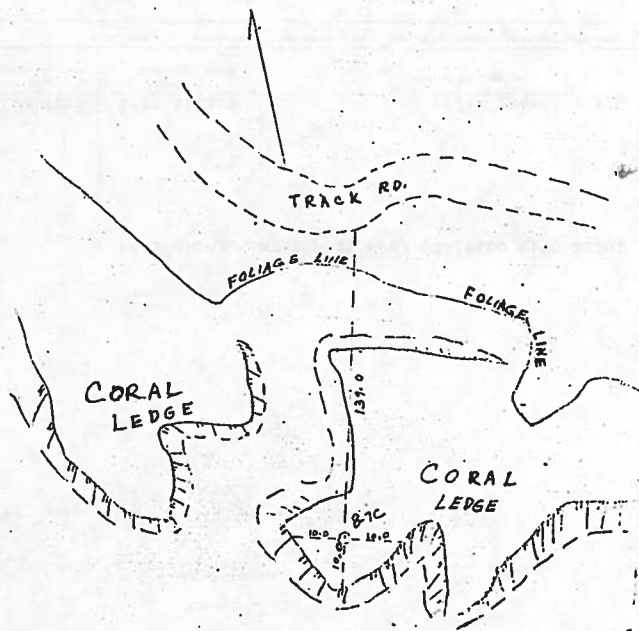
QUAD 211582 STATION 1124
 HAWAII
 LATITUDE 21° 00' TO 21° 30'
 LONGITUDE 158° 00' TO 158° 30'
 DIAGRAM NF 4-11 OAHU

DESCRIPTION OF SURVEY MARK

NAME OF STATION: STATE SURVEY 8-7C STATE: Hawaii COUNTY: Honolulu
 NEAREST TOWN: Nanakuli
 ESTABLISHED BY: State of Hawaii, Highways Division DATE: 1970
 DESCRIBED BY: James T. Ishihara SURFACE MARK: Standard Survey Disk

To reach station, head 1.75 miles northwest along Highway 90 from the Post Office at Nanakuli and turn left in a southwesterly direction to a track road; thence right 0.2 mile northwest along track road to station. Station is located on the southerly side of track road on the southeast coral ledge that forms a small cove.

Station mark is a standard State Survey disk stamped 8-7C - 1970 set in concrete on a coral ledge. Ties to station are: 139.0 feet southwest from the south edge of track road; 10.0 feet northeast from the south edge of coral ledge; 10.0 feet east from edge of coral ledge and 10.0 feet west from edge of coral ledge.



ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: STATE SURVEY 8-7C OBS BY: MIDT
 STATE: HAWAII YEAR: 1970 THIRD ORDER

SOURCE: G-15752

GEODETIC LATITUDE:	21° 24' 18.24477	ELEVATION:	3	METERS
GEODETIC LONGITUDE:	158 10 46.13436	SCALED		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ θ ANGLE*
HI 3	5103	488,943.32	86,630.58	- 0° 03' 56"

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE θ OR Δ θ FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH* (From south)	CODE
KAHE	317° 35' 21.1	317° 39' 17"	5103

THESE DATA OBTAINED FROM ADJUSTMENT OF SEP 1979

RL 167

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 Old Hawaiian Datum

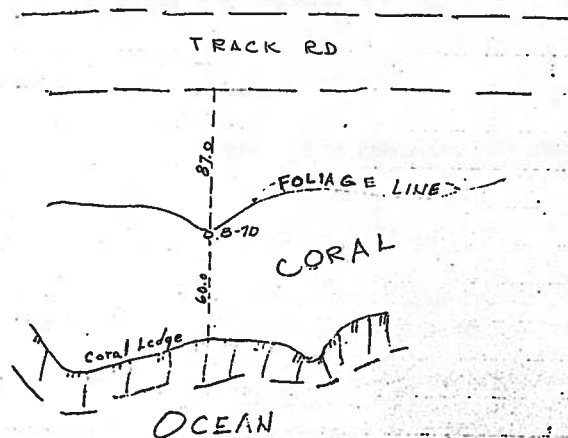
QUAD 211982 STATION 1125
 HAWAII
 LATITUDE 21° 00' TO 21° 30'
 LONGITUDE 158° 00' TO 158° 30'
 DIAGRAM NF 4-11 OAHU

DESCRIPTION OF SURVEY MARK

NAME OF STATION: STATE SURVEY 8-7D STATE: Hawaii COUNTY: Honolulu
 NEAREST TOWN: Nanakuli
 ESTABLISHED BY: State of Hawaii, Highways Division DATE: 1970
 DESCRIBED BY: James T. Ishihara SURFACE MARK: Standard Survey Disk

To reach station, head 1.75 miles northwest along Highway 90 from the Post Office at Nanakuli, thence turn left in a southwesterly direction to a track road; thence right about 260 feet on track road to station on the edge of the foliage line.

Station mark is a standard State Survey disk stamped 8-7D - 1970 set in cement on top of coral. Ties to station are: 87.0 feet south southwest from the south edge of track road, 60.0 feet north northeast from the edge of coral ledge.



ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: STATE SURVEY 8-7D OBS BY: HIDT
 STATE: HAWAII YEAR: 1970 THIRD ORDER

SOURCE: G-15752

GEODETIC LATITUDE:	21° 24' 12.95024	ELEVATION:	4	METERS:
GEODETIC LONGITUDE:	158 10 40.88197	SCALED		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ (OR Δ OR ANGLE)
HI 3	5103	439,439.04	86,095.79	- 0° 03' 54"

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE θ (OR Δ OR) FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH* (From south)	CODE
STATE SURVEY 8-7E	301° 16' 12.5	301° 20' 06"	5103

THESE DATA OBTAINED FROM ADJUSTMENT OF SEP 1979

RL 168

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 Old Hawaiian Datum

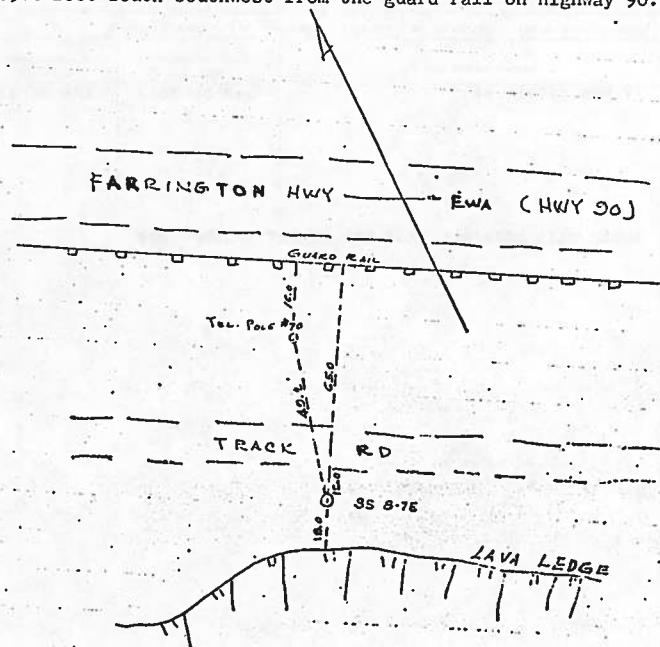
QUAD 211582 STATION 1126
 HAWAII
 LATITUDE 21° 00' TO 21° 30'
 LONGITUDE 158° 00' TO 158° 30'
 DIAGRAM NF 4-11 OAHU

DESCRIPTION OF SURVEY MARK

STATE SURVEY 8-7E SLIM REF 19
 NAME OF STATION: STATE: Hawaii COUNTY: Honolulu
 NEAREST TOWN: Nanakuli
 ESTABLISHED BY: State of Hawaii, Highways Division DATE: 1970
 DESCRIBED BY: James T. Ishihara SURFACE MARK: Standard Survey Disk

To reach station, head 1.15 miles northwest along Highway 90 from the Post Office at Nanakuli; thence turn left in a southwesterly direction to track road and proceed 0.35 mile northwest along track road passing the U.S. NAVY FORAGS station #3 to station on the southerly side of track road on a lava ledge overlooking the ocean.

Station mark is a standard State Survey disk stamped 8-7E = Slim Ref 19 - 1970 set in concrete on a lava ledge. Ties to station are: 49.2 feet south from telephone pole #70; 12.0 feet in a south southwesterly direction from the south edge of track road; 18.0 feet northeast from the edge of lava ledge and 65.0 feet south southwest from the guard rail on Highway 90.



ADJUSTED HORIZONTAL CONTROL DATA

ADJUSTMENT BY NGS
 NAME OF STATION: STATE SURVEY 8-7E SLIM REF 19 OBS BY HI DT
 STATE: HAWAII YEAR: 1970 THIRD ORDER
 SOURCE: 6-15752

GEODETIC LATITUDE: 21° 24' 05.19756	ELEVATION: 7 METERS
GEODETIC LONGITUDE: 158 10 27.25141	SCALED FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ RI ANGLE*
HI 3	5103	440,726.22	85,312.10	- 0° 03' 49"

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE θ OR Δ θ FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH* (From south)	CODE
KAHE	318° 41' 09.3	318° 44' 58"	5103

THESE DATA OBTAINED FROM ADJUSTMENT OF SEP 1979

RL 169

DEC 1979
 U. S. DEPARTMENT OF COMMERCE
 NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
 NATIONAL OCEAN SURVEY, NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 Old Hawaiian Datum

QUAD 211582 STATION 1128
 HAWAII
 LATITUDE 21° 00' TO 21° 30'
 LONGITUDE 158° 00' TO 158° 30'
 DIAGRAM NF 4-11 OAHU

DESCRIPTION OF SURVEY MARK
 STATE SURVEY 8-9B HILL REF 2
 NAME OF STATION: STATE: Hawaii COUNTY: Honolulu
 NEAREST TOWN: Nanakuli
 ESTABLISHED BY: State of Hawaii, Highways Division DATE: 1970
 DESCRIBED BY: James T. Ishihara SURFACE MARK: Standard Survey Disk

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: STATE SURVEY 8-9B HILL REF 2 OBS BY: HIDT
 STATE: HAWAII YEAR: 1970 THIRD ORDER

SOURCE: G-15752

GEODETIC LATITUDE: 21° 22' 14.44822	ELEVATION: 16 METERS
GEODETIC LONGITUDE: 158 08 16.92000	SCALED FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ OR ANGLE*
HI 3	5103	453,032.43	74,125.24	- 0° 03' 01"

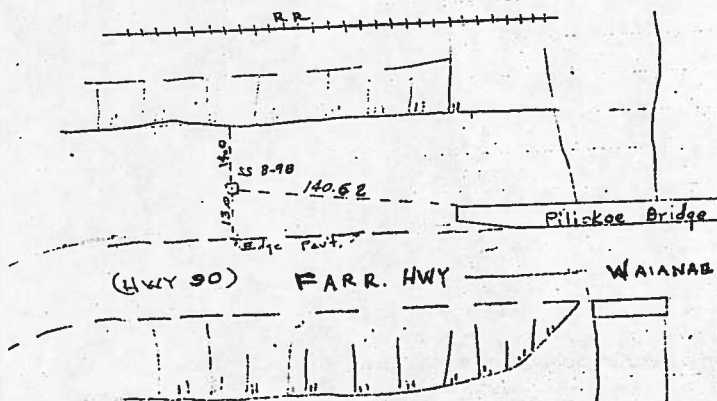
* PLANE AZIMUTH HAS BEEN COMPUTED BY THE θ OR Δ OR FORMULA NEGLECTING THE SECOND TERM

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH* (From south)	CODE
KAHE	336° 10' 21.7	336° 13' 23"	5103

THESE DATA OBTAINED FROM ADJUSTMENT OF SEP 1979

Station is located 2.45 miles southeast along Farrington Hwy. from the Post Office at Nanakuli near the Pilikoe Bridge at the outskirts of Nanakuli Town.

Station mark is a standard survey disk stamped 8-9B (Hill Ref 2) 1970 set in concrete and level with the highway. Ties to station are: 13.0 feet southwest from the south edge of highway; 140.62 feet southeast from the southeast concrete abutment of Pilikoe Bridge; 13.0 feet northeast from the edge of a railroad embankment.



RL 157

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 OLD HAWAIIAN DATUM

QUAD 211582 STATION 1129
 HAWAII
 LATITUDE 21° 00' TO 21° 30'
 LONGITUDE 158° 00' TO 158° 30'
 DIAGRAM NF 4-11 OAHU

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: **TIDAL BENCH MARK R 3** STATE: **Hawaii** COUNTY: **Honolulu**
 CHIEF OF PARTY: **P.C. Johnson** YEAR: **1967** DESCRIBED BY: **A.K.R.**

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: **TIDAL BENCH MARK R 3**
 STATE: **HAWAII** YEAR: **1967** SECOND - ORDER

SOURCE: **G-13983**

GEODETIC LATITUDE:	21° 19' 49.1110	ELEVATION:	15.5 METERS
GEODETIC LONGITUDE:	158° 05' 52.8192		51 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	β FOR Δ θ ANGLE*
HI 3	5105	477,988.53	55,444.71	- 0° 01' 25"

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE β FOR Δ θ FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH* (From south)	CODE
PALAILAI	116° 45' 19.0	116° 46' 44"	5103

QF 488

OBJECT	BEARING	DISTANCE		DIRECTION
		FEET	METERS	
PALAILAI 1873 1927				00 00 00.00
12c Reference Mark No. 2	NNW	22.85	6.966	48 34 27
11b Reference Mark No. 1	WSW	61.74	18.819	314 46 36

The station is located near the southern end of the island of Oahu, about 6.0 miles west of the entrance channel to Pearl Harbor, 3.6 miles northeast of the Barbers Point Lighthouse and 1.9 miles southwest of Ewa.

To reach the station from the main gate of the Barbers Point Naval Air Station, go northwest on the main road for about 100 feet to a paved road on the right. Turn right and go northeast along the paved road for 0.45 mile to the station mark on the right.

The station mark is a standard Coast & Geodetic Survey tidal bench mark disk, stamped R 3 1927, set in concrete about 1 foot below ground level. The disk was center-punched to mark the point occupied. It is 69.7 feet east of telephone pole No. 225 T, 43 feet south of the center of a paved road and 13.3 feet south of the south rail of a narrow gauge railroad.

Reference mark No. 1 is a standard disk, stamped R 3 NO 1 1967, set in the top of a round concrete post that projects 7 inches above the surface of the ground. It is 41 feet south of the center of a paved road, 11.6 feet south of the south rail of a narrow gauge railroad, 1.9 feet east of an abandoned telephone pole and about 0.9 foot higher in elevation than the station mark.

Reference mark No. 2 is a standard disk, stamped R 3 NO 2 1967, cemented in a drill hole in the top of a buried boulder that is flush with the surface of the ground. It is 19.2 feet south of the center of a paved road, 5.9 feet north of the north rail of a narrow gauge railroad and about the same elevation as the station mark.

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: **TIDAL BENCH MARK R 3**
 ESTABLISHED BY: **P.C. Johnson** YEAR: **1967** STATE: **Hawaii** BENCH MARK(S) ALSO
 RECOVERED BY: **C. Symms** YEAR: **1969** COUNTY: **Honolulu**
 AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: about 2 mile southwest of Ewa.

R

Detailed statement as to the fitness of the original description; including marks found, stampings, changes made, and other pertinent facts:
 The station, reference marks 1 and 2 were recovered in good condition and all leveled over in 1969.

To reach from the post office at Ewa, go 2.1 miles southwest along Renton Road.

The station is a C&GS bench mark disk, stamped R 3 1927. 1½ pole west of a power transformer station, 13.3 feet south of the south rail of a railroad track, 40.5 feet south and across the track from the center line of the road, 73 feet west of power pole 214, R.M. 1 is a C&GS reference mark disk, stamped R 3 NO 1 1967. 61.8 feet west of the station, 11.6 feet south of the south rail, and in the top of a concrete post.

R.M. 2 is a C&GS reference mark disk, stamped R 3 NO 2 1967. 22.8 feet north and across the track from the station, 65.6 feet east of power pole 225T, in the top of a 5- by 3-foot coral boulder projecting about 1 foot above the ground.

NOTE: The station is in the top of a concrete post about 1 foot underground.

JUN 1978
 U.S. DEPARTMENT OF COMMERCE
 NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
 NATIONAL OCEAN SURVEY, NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
 NATIONAL GEODETIC SURVEY
 OLD HAWAIIAN DATUM

QUAD 211582 STATION 1132
 HAWAII
 LATITUDE 21°00' TO 21°30'
 LONGITUDE 158°00' TO 158°30'
 DIAGRAM NF 4-11 OAHU

DESCRIPTION OF TRIANGULATION INTERSECTION STATION

NAME OF STATION: WHEELER AFB S REC MAST

CHIEF OF PARTY: Carl A. Annis YEAR: 1969 STATE: Hawaii COUNTY: Honolulu

Description, including sketch of object:

The station is the two red lights on top of the mast, which is located on the Wheeler Air Force Base at the south end of the old runway. It is the center and highest one of three masts with a spreader bar on the west side. It is painted green and is 150 feet high.

FORM C&GS-525b (12-68)

Described by _____
 U.S. DEPARTMENT OF COMMERCE
 NGA
 COAST AND GEODETIC SURVEY

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: WHEELER AFB S REC MAST

STATE: HAWAII YEAR: 1969

THIRD -ORDER

SOURCE: G-14543
 NO OBSERVATIONAL CHECK ON THIS POSITION

GEODETIC LATITUDE:	21 28 29.95551	ELEVATION:	METERS
GEODETIC LONGITUDE:	158 02 10.77928		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	§ 10R Δ §1 ANGLE*
HI 3	5103	487,647.87	111,994.83	- 0 00 48

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE § 10R Δ §1 FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH* (From south)	CODE