

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 211574 STATION 1001
 HAWAII
 LATITUDE 21° 30' TO 22° 00'
 LONGITUDE 157° 30' TO 158° 00'
 DIAGRAM NF 4-11 OAHU

FORM 525
 (6-18-65)

U.S. DEPARTMENT OF COMMERCE
 COAST AND GEODETIC SURVEY
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: **MOLII** STATE: **Hawaii** COUNTY: **Honolulu**
 CHIEF OF PARTY: **C.A. Annis** YEAR: **1969** DESCRIBED BY: **J.A. Tisdall**

NOTE	HEIGHT OF TELESCOPE ABOVE STATION MARK 1.7 METERS, HEIGHT OF LIGHT ABOVE STATION MARK 1.5 METERS.		DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION				
	1b SURFACE-STATION MARK	7a UNDERGROUND-STATION MARK	OBJECT	BEARING	DISTANCE		DIRECTION
					FEET	METERS	
11b			HEEIA 1872 1927				0 00 00.00
			R.M. # 2	NW	20.52	6.257	132 26 22
11b			R.M. # 1	NE	19.66	5.992	235 24 22

Station is located 7 1/2 miles north-northwest of Kaneohe, 2 3/4 miles south-southeast of Kaaawa and 0.4 mile south of an old Sugar Mill Chimney. On the southeast side of State Highway 83.

To reach the station from the post office in Kaneohe. Go northerly on State Highway 83 for 4.5 miles to a reverse fork on the left at the south edge of a small community. Continue northerly on State Highway 83 for 1.9 miles to a paved road on the left, at the Waiahole Poi Factory. Continue northerly on State Highway 83 for 3.35 miles to a board gate on the right. Continue northerly on State Highway 83 for 0.1 to a curve in the highway and the station on the right.

Station mark is a standard disk stamped MOLII 1969. Set in the top of a 12-inch concrete cylinder which is flush with the ground surface. It is 52 feet southeast of the center of the highway, 49.5 feet southwest of the southwest corner of a house, 41 feet southwest of the center one of three coconut trees, 35.5 feet east of a powerline pole number 162 and 27 feet northwest of a fence.

Reference mark 1, is a standard disk stamped MOLII NO 1 1969. Set in the top of a 12-inch concrete cylinder which projects 4 inches above the ground surface. It is 30 feet west of the southwest corner of a house and 27 feet west of the northwest corner of the fence.

Reference mark 2, is a standard disk stamped MOLII NO 2 1969. Set in the top of a 12-inch concrete cylinder which is flush with the ground surface. It is 31 feet southeast of the center of the highway and 18 feet northeast of the power line pole.

No measurement was made between reference marks due to dense brush on line.

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: **MOLII**
 ESTABLISHED BY: **C.A. Annis** YEAR: **1969** STATE: **Hawaii** BENCH MARK(S) ALSO
 RECOVERED BY: **G.M. Ward** YEAR: **1970** COUNTY: **Honolulu**

AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN:

7 1/2 miles north-northwest of Kaneohe, 2 3/4 miles south-southeast of Kaaawa

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

Station and Reference Marks No. 1 and No. 2 were recovered in good condition. The stamping on the station mark was corrected from MOLII to MOLII 1969. The description of C.A. Annis, 1969 is adequate with the correction that Reference Mark No. 1 is located 21 feet west of the northwest corner of the fence.

(C.K. Townsend, 1976)--The station was recovered in good condition as described.

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: **MOLII**
 STATE: **HAWAII** YEAR: **1969** FIRST ORDER

SOURCE: **G-14543**

GEODETIC LATITUDE:	21° 31' 15.40522	ELEVATION:	1.71 METERS
GEODETIC LONGITUDE:	157 50 19.67468		5.6 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	± IOR Δ ±1 ANGLE °
HI 3	5103	554,794.68	128,715.74	+ 0° 03' 33"

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From zenith)	PLANE AZIMUTH (From zenith)	CODE
HEE IA	350° 13' 15.3	350° 09' 42"	5103

QH 001

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 OLD HAWAIIAN DATUM

QUAD 211574 STATION 1002
 HAWAII
 LATITUDE 21 ° 30' TO 22 ° 00'
 LONGITUDE 157 ° 30' TO 158 ° 00'
 DIAGRAM NF 4-11 OAHU

DESCRIPTION OF BENCH MARK

Designation STATE SURVEY 4-30 State Hawaii County Honolulu
 Nearest town Kaaawa County Honolulu Chief of party C. Symms
 Distance and direction from nearest town 2.8 miles southeast Leveling date July 1969
 Character of mark SS disk Stamping 4-30 1969
 Established by State of Hawaii
 Detailed description Section ,T ,R

2.8 miles southeast along State Highway 83 from the post office at Kaaawa, across the highway from the historical site of the ruins of an old sugar mill, 15.5 feet east of the center line of the highway, 67.2 feet southeast and across the highway from power pole 173, 11.8 feet southwest of the southwest corner of a rock and mortar retaining wall for house No. 49-663, 51.5 feet south of the center line of a driveway to the house, about level with the highway, and set in the top of a concrete post 0.1 foot underground.

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: STATE SURVEY 4-30
 ESTABLISHED BY: G. Symms YEAR: 1969 STATE: Hawaii BENCH MARK(S) ALSO
 RECOVERED BY: C.K.I. YEAR: 1976 COUNTY: Honolulu
 AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: 2 3/4 miles SE of Kaaawa

Detailed statement as to the fitness of the original description, including marks found, stampings, changes made, and other pertinent facts:
 The station was recovered in good condition as described in 1969.

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: STATE SURVEY 4-30
 STATE: HAWAII YEAR: 1969 SECOND -ORDER

SOURCE: G-14543
 NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE: 21 31 32.75654	ELEVATION: 1.58 METERS
GEODETIC LONGITUDE: 157 50 16.58197	5.2 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ OR ANGLE *
HI 3	5103	555,084.88	130,466.82	+ 0 ° 03' 34"

* 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
MOL II	9 ° 28' 09.6"	9 ° 24' 35"	5103

POSITION DETERMINED BY TRAVERSE FROM STATION MOL II

QH 002

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 OLD HAWAIIAN DATUM

QUAD 211574 STATION 1003
 HAWAII
 LATITUDE 21° 30' TO 22° 00'
 LONGITUDE 157° 30' TO 158° 00'
 DIAGRAM NF 4-11 OAHU

NO ORIGINAL TEXT

Ohulehule (Oahu Island, Hawaiian Government Survey, 1875; L. G. Simmons, 1927).—On eastern coast of Oahu, on summit of prominent conical peak known as Puu Ohulehule, which is located about halfway between the sea and the Koolau Range, and is on the ridge which divides the Koolauloa and Koolaupoko districts. A very difficult climb, probably best made from the north side of the dividing ridge. Coming from Honolulu turn left off main road into dirt road just before crossing the concrete bridge at Kahana Bay. Follow this road up to a small settlement of laborers' houses and begin hike from there on road leading toward the peak. Station originally marked by iron stake and redwood post. This was later replaced by a 2-inch pipe embedded in concrete, the whole embedded in the ground. Pipe projects a few inches above ground. It supports a tall pipe signal which is at a slant necessitating correction for eccentricity. Re-marked according to note 14X in 1929.

OHULEHULE (Hawaii, Hawaiian Government Survey, 1875; H.A.P., 1933) --Recovered in good condition. Signal is about 15 feet tall. The approach from the S or Waikane side is thought to be less difficult than on the N side, as there is less brush.

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: OHULEHULE
 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:

Station was recovered as described. Top of peak has a growth of brush about 15 feet high which hides the target. A complete description follows:

Station is located about 3 miles southwest of Kaaawa on the top of Puu Ohulehule, a lone, sharp-topped peak of about 2265 feet elevation that lies about 1-3/4 mile northeast of the Koolau Mountain range.

To reach station from the post office in Kaneohe, go northerly on State Highway 83 for 6.5 miles to the Waiahole Poi Factory on the left. Continue on the highway for 0.7 mile to dirt side road left, at fire hydrant W888. Turn left and go 0.8 mile to fork. Take right fork, down into canyon and follow main road up canyon for 1.2 miles to fork. Take left fork, passing through a chain gate, and go 1.2 miles to the first cabin of 3 at the end of the road. Take trail across stream on right and follow it about 3/4-mile to saddle where trail crosses over ridge. Here leave trail, going to right, up onto very narrow top of ridge, and follow rough trail along ridge line north and east to top of peak and station. About a 3-hour pack; very rough and slow but believed to be best route.

Station is marked by a 1-1/2-inch iron pipe set solidly in concrete. The pipe projects about 15 feet above ground. A red and white, metal target has been slipped down over the station pipe. NOTE: It would be necessary to hacksaw the station pipe off in order to occupy the station.

(continued on next page)

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: OHULEHULE

STATE: HAWAII

YEAR: 1875

FIRST

ORDER

SOURCE: G-14543

GEODETIC LATITUDE:	21° 30' 56.47861	ELEVATION:	688	METERS
GEODETIC LONGITUDE:	157 52 41.31579	NO CHECK		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	§ 10R Δ § 1 ANGLE *
HI 3	5103	541,422.31	126,793.90	+ 0° 02' 41"

* 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
TURNOVER	200° 15' 46.7"	200° 13' 06"	5103

THESE DATA OBTAINED FROM ADJUSTMENT OF NOV 1970

QH 003

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 211574 STATION 1003

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

OHULEHULE (continued)

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: OHULEHULE
ESTABLISHED BY: HGS YEAR: 1875 STATE: Hawaii BENCH MARK(S) ALSO
RECOVERED BY: G.M. Ward YEAR: 1970 COUNTY: Honolulu

AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN:

7 miles northwest of Kaneohe

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

Station not visited, however the road was ridden out to trail up to the saddle ridge line, and the station was observed at close hand from an aircraft.

The station mark, a tall pipe with red and white metal target about one third up from the ground, was observed to exist. Pipe is bent near ground level and leans to the west at approximately a 30 degree angle from vertical.

The recovery description of D.G. Rushford, 1964 is adequate to reach with the note that only the foundations remain of the 3 cabins. The trail has been improved across the stream such that at the cabin foundations, turn west across the stream and go north on the road for 0.1 mile to the trail leading west to the saddle.

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 OLD HAWAIIAN DATUM

QUAD 211574 STATION 1004
 HAWAII
 LATITUDE 21° 30' TO 22° 00'
 LONGITUDE 157° 30' TO 158° 00'
 DIAGRAM NF 4-11 OAHU

Turnover (Oahu Island, L. G. Simmons, 1927).—In eastern part of Oahu, on top of a high ridge just south of Kahana Bay. To reach station, turn left (coming from Honolulu) off main road onto dirt road, just before crossing the concrete bridge at Kahana Bay. Follow this road to a little red church a few hundred yards distant, climb ridge directly behind church to top of main ridge; turn right (southwesterly) and follow main ridge to station, which is in a more or less open place just before ridge commences to drop down at its westerly end. Marked by United States Engineers with rectangular brass plate set in concrete in 5-inch iron pipe embedded in ground. Re-marked according to note 14X in 1929.

(11-9-55)

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: TURNOVER
 ESTABLISHED BY: L.G.S. YEAR: 1927 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 mark was re-covered and found in good condition, however it was found to be a Coast & Geodetic Survey disk instead of a brass plate as previously described. The guy-cables of the Type 14X signal have rusted away and the target was found laying by the station mark. A complete description follows:

Station is located about 1-1/4 miles southwest of Kaaawa, on the highest point (about 2076 feet elevation) along the rugged, timbered ridge that runs south from Puumahia Point.

To reach station from the post office in Kaaawa, go northwest on State Highway 83 for 1.5 miles to graveled side road left, just before reaching highway bridge at Kahana Bay. Go left for 0.15 mile to 2 old red buildings on left. From here pack on trail along right side of buildings to old cemetery. Climb up point of ridge and follow good trail up ridge to summit, then along main ridge line to highest hill and station. About a 2-hour pack.

Station mark is a standard disk stamped "TURNOVER 1927", set in the top of a 10-inch-square, concrete monument that projects 1 foot above ground. It is about 18 feet south-southwest of highest point of hill and about 4 feet lower, on a shoulder of the hill where it begins to drop down steeply.

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

OC 34314

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: TURNOVER

STATE: HAWAII

YEAR: 1927

FIRST

-ORDER

SOURCE: G-14543

GEODETIC LATITUDE:	21° 32' 28.60424	ELEVATION:	652.8 METERS
GEODETIC LONGITUDE:	157 52 04.96519		2076 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	§ 108 Δ 91 ANGLE*
HI 3	5103	544,846.83	136,092.32	+ 0° 02' 54"

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE § 108 Δ 91 FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH* (From south)	CODE
PUU KAUAI	346° 25' 05.1"	346° 22' 11"	5103

THESE DATA OBTAINED FROM ADJUSTMENT OF NOV 1970

QH 004

(continued on next page)

HORIZONTAL CONTROL DATA

by the
NATIONAL GEODETIC SURVEY
OLD HAWAIIAN DATUM

QUAD 211574

STATION 1004

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

TURNOVER (continued)

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: **TURNOVER**
ESTABLISHED BY: **L.G.S.** YEAR: **1927** STATE: **Hawaii** BENCH MARK ALSO
RECOVERED BY: **C.A. Annis** YEAR: **1969** COUNTY: **Honolulu**
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: **1 1/2 miles southwest of Kaaawa.**
HEIGHT OF TELESCOPE ABOVE STATION MARK **4** FEET. HEIGHT OF LIGHT ABOVE STATION MARK **4** FEET.

OBJECT	BEARING	DISTANCE		DIRECTION
		FEET	METERS	
PUU KAUAI 1957				
RM 1	N	15.10	4.605	0 00 00.0
RM 2	E	13.76	4.192	204 16 59
				281 19 07

The station mark was recovered and found in good condition. Reference marks 1 and 2 were established at this time. A new description follows.

The station is located about 1 1/2 miles southwest of Kaaawa, on a high rugged ridge and at a point where the ridge drops off sharply to the west.

It is possible to reach the station by backpacking for about 3 hours, however; the station was reached at this time via helicopter from a temporary heliport at Kahama Beach Park by flying a magnetic course of about 170 degrees for about 6 minutes to the station as described.

The station mark is a standard disk stamped TURNOVER 1927, set in the top of a square concrete post projecting about 1 foot. It is about 20 feet southwest and about 4 feet lower in elevation than the highest point of the hill.

Reference mark 1 is a standard disk stamped TURNOVER 1927 NO 1 1969, brazed to the top of a 2 inch soil pipe projecting about 6 inches. It is about 2 feet higher in elevation than the station mark.

Reference mark 2 is a standard disk stamped TURNOVER 1927 NO 2 1969, brazed to the top of a 2 inch soil pipe projecting about 4 inches. It is about the same elevation as the station mark.

No measurement was made between the reference marks due to the crest of the ridge on line.

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

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 OLD HAWAIIAN DATUM

QUAD 211574 STATION 1005
 HAWAII
 LATITUDE 21° 30' TO 22° 00'
 LONGITUDE 157° 30' TO 158° 00'
 DIAGRAM NF 4-11 OAHU

DESCRIPTION OF BENCH MARK

Designation STATE SURVEY 5-3 State Hawaii County Honolulu
 Nearest town Kaaawa County Honolulu Chief of party C. Symms
 Distance and direction from nearest town 4.35 miles northwest Leveling date July 1969
 Character of mark SS disk Stamping 5-3 1969
 Established by State of Hawaii
 Detailed description Section ,T ,R

4.35 miles northwest along State Highway 83 from the post office at Kaaawa, 17.6 feet northeast of the center line of the highway, 10 feet southeast of the extended center line of an asphalt road southwest, 28.8 feet west of a coconut tree which is in front of a hat stand, 50.2 feet east and across the highway from power pole 388, 53.2 feet east and across the highway from a fire hydrant, and set in the top of a concrete post 0.1 foot underground.

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: STATE SURVEY 5-3

STATE: HAWAII

YEAR: 1969

SECOND

ORDER

SOURCE: G-14543

NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE.	21° 35' 21.08239	ELEVATION.	2.01 METERS
GEODETIC LONGITUDE.	157 53 25.19009		6.6 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ FOR Δ θ1 ANGLE *
HI 3	5103	537,260.75	153,489.87	+ 0° 02' 25"

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE θ FOR Δ θ1 FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE
TURNOVER	336° 28' 51.7	336° 26' 26"	5103

POSITION DETERMINED BY TRAVERSE FROM STATION TURNOVER

QH 005

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 OLD HAWAIIAN DATUM

QUAD 211574 STATION 1006
 HAWAII
 LATITUDE 21° 30' TO 22° 00'
 LONGITUDE 157° 30' TO 158° 00'
 DIAGRAM NF 4-11 OAHU

Waiahilahila (Oahu Island, L. G. Simmons, 1927).—In northeastern part of Oahu, on summit of prominent hill of same name, about 1 mile south-southwest of Hauula railroad station. Hill comes to sharp peak at top with no room for placing reference marks. Station marked according to note 6a, a standard disk station mark set in concrete in top of tile which is embedded in ground. Re-marked according to note 14X in 1929.

(11-8-68)

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: **WAI AHILAHILA**
 ESTABLISHED BY: L.G.S. Year: 1927 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 mark was re-covered and found in good condition. The Type 14X signal was found laying by the station mark. They guy-wire cables have rusted away. A complete description follows:

Station is located about 1 mile southwest of the post office in Hauula and 1/2 mile northwest of a stockyard at the end of the Sacred Falls Road, at about 1264 feet elevation, on a small, prominent knob which is the highest point of Puu Waiahilahila.

To reach station from the post office in Hauula, go southeast on State Highway 83 for 0.8 mile; turn right at sign "TO SACRED FALLS RANCH" and go 0.6 mile to crossroad; turn right and go 0.05 mile; turn left on track road by sugar company pump house and go 0.05 mile to end of road. Pick way up through very dense brush for about 200 yards to base of ridge, then work up along ridge about 3/4 mile to top and station. A 1-1/2 hour pack.

Station mark is a standard disk stamped "WAI AHILAHILA 1927", set in concrete in the top of a 5-inch soil pipe that projects 2 inches above ground.

* 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 349 14

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: **WAI AHILAHILA**

STATE: **HAWAII**

YEAR: **1927**

FIRST

ORDER

SOURCE: **G-14543**

GEODETIC LATITUDE:	21° 35' 43.06749	ELEVATION:	389.0 METERS
GEODETIC LONGITUDE:	157 54 57.26329		1276 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	ϕ OR Δ OR ANGLE °
HI 3	5103	528,570.00	155,702.81	+ 0° 01' 51"

* 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
KAIPAPAU	161° 31' 26.6"	161° 29' 35"	5103

THESE DATA OBTAINED FROM ADJUSTMENT OF NOV 1970

QH 006

(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

QUAD 211574 STATION 1006

by the
NATIONAL GEODETIC SURVEY
OLD HAWAIIAN DATUM

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

WAIHAHILAHILA (continued)

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: WAIHAHILAHILA
ESTABLISHED BY: L.G.S. YEAR: 1927 STATE: Hawaii BENCH MARK ALSO
RECOVERED BY: C.A.A. YEAR: 1969 COUNTY: Honolulu
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: 1 mile southwest of Hauula
HEIGHT OF TELESCOPE ABOVE STATION MARK 5 1/2 FEET. HEIGHT OF LIGHT ABOVE STATION MARK 4 1/2 FEET.

OBJECT	BEARING	DISTANCE		DIRECTION
		FEET	METERS	
KAIPAPAU 1927				0 00 00.00
R.M. 1	NE	45.09	13.743	42 15 05
R.M. 2	SSE	10.68	3.259	159 26 44
KAHUKU MILL STACK 1927		(6 1/2 miles)		356 52 17.7

Station mark was recovered and in good condition, as described in 1964. Two reference marks were established. A complete description follows:

Station is located 1 mile southwest of the post office in Hauula and 1/2 mile northwest of a stockyard at the end of the Scared Falls Road. On a small prominent knob which is the highest point of Puu Waiahilahila.

To reach the station from the post office in Hauula, go southeast on State Highway 83 for 0.8 mile to a side road on the right and a sign "Scared Falls Ranch". Turn right, east, on a graded road for 0.6 mile to a crossroad. Turn right, north, on a graded road for 0.05 mile to a side road on the left, at a sugar company pump house. Turn left, east, on a graded road for 0.05 mile to a side road on the left and the end of truck travel. From here pick way through very dense brush for about 200 yards to the base of the ridge. Then work way up ridge for about 3/4 mile to the highest point and the station. A 2-hour pack.

Station is a standard disk stamped WAIHAHILAHILA 1927. Set in the top of a concrete filled soil pipe, which projects 3 inches above the ground surface and is 5-inches in diameter. On the highest point in the vicinity.

Reference mark 1 is a standard disk stamped WAIHAHILAHILA 1927 NO 1 1969. Cemented in a drill hole in an outcrop on the east side of the ridge. Flush with the surface of the ground. 1 foot west of the east edge of the ridge and about 20 feet lower than the station.

Reference mark 2 is a standard disk stamped WAIHAHILAHILA 1927 NO 2 1969. Cemented in a drill hole in an outcrop on the farthest southeast point of the hill.

No measurement was made between reference marks due to the rough terrain.

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

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 OLD HAWAIIAN DATUM

QUAD 211574 STATION 1007
 HAWAII
 LATITUDE 21° 30' TO 22° 00'
 LONGITUDE 157° 30' TO 158° 00'
 DIAGRAM NF 4-11 OAHU

DESCRIPTION OF BENCH MARK

Designation	STATE SURVEY 5-4	State	Hawaii	County	Honolulu
Nearest town	Hauula	County	Honolulu	Chief of party	C. Symms
Distance and direction from nearest town	1.8 miles southeast	Leveling date	July 1969	Stamping	5-4 1969
Character of mark	SS disk				
Established by	State of Hawaii				
Detailed description		Section		T	R

1.8 miles southeast along State Highway 83 from the post office at Hauula, across the highway from house No. 53-866, 13.1 feet northeast of the center line of the highway, 16.8 feet south of the west corner of a board fence around house No. 53-863, 100 feet southeast of the southeast end of the northeast concrete railing of Waimamana bridge, about level with the highway, and set in the top of a concrete post 0.1 foot underground.

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: STATE SURVEY 5-4

STATE: HAWAII YEAR: 1969 SECOND ORDER

SOURCE: G-14543
 NO OBSERVATION CHECK ON THIS POSITION

GEODEIC LATITUDE:	21° 36' 22.40818	ELEVATION:	2.27 METERS
GEODEIC LONGITUDE:	157° 54' 05.89691		7.4 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ OR ANGLE*
HI 3	5103	533,415.07	159,675.23	+ 0° 02' 10"

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

TO STATION OR OBJECT	GEODEIC AZIMUTH (From south)	PLANE AZIMUTH* (From south)	CODE
WAIAHILAHILA	50° 41' 17.8"	50° 39' 07"	5103

POSITION DETERMINED BY TRAVERSE FROM STATION WAIAHILAHILA

QH 007

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 211574 STATION 1008
 HAWAII
 LATITUDE 21° 30' TO 22° 00'
 LONGITUDE 157° 30' TO 158° 00'
 DIAGRAM NF 4-11 OAHU

Kaipapau (Oahu Island, L. G. Simmons, 1927).—Near the northeast coast of Oahu. Re-marked according to note 14A in 1929.

(11-8-55)

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: KAIPAPAU
 ESTABLISHED BY: L.G.S. YEAR: 1927 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 in good condition. A complete description follows:
 Station is located about 2 miles south of Laie and 2/3 mile west of Kaipapau Point, at about 628 feet elevation, on the extreme northeast end of the ridge and about 1/4 mile south of a point of the ridge that has an old army pillbox on it.
 To reach station from the post office in Hauula, go northwest on State Highway 83 for 1.6 miles; turn left into farmyard 50 yards before reaching the Laie Bridge; this is end of truck travel. Pack up through pasture to old tank and continue ahead on trail along old washed-out road up ridge to old pillbox, then work way around ridge line and across saddle to station. A 45-minute pack.
 Station mark is a standard disk stamped "KAIPAPAU 1927", set in concrete in the top of a 5-inch soil pipe that projects 6 inches above ground. It is 6 feet southwest from edge of hill. A "Type A" signal is centered over the mark. The concrete platform is 3 feet above ground and the red and white metal target extends about 8 feet above the platform.

* 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 rec.
 Note.—One of these forms must be used for every station recovered.

Form-DC 34314

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: KAIPAPAU
 STATE: HAWAII YEAR: 1927 FIRST ORDER

SOURCE: G-14543

GEODETIC LATITUDE: 21° 37' 14.41614	ELEVATION: 193 METERS
GEODETIC LONGITUDE: 157 55 29.90348	NO CHECK FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	∠ OR Δ OR ANGLE °
HI 3	5103	525,485.22	164,918.55	+ 0° 01' 40"

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH* (From south)	CODE
WAIHILAHILA	341° 31' 14.5	341° 29' 55"	5103

THESE DATA OBTAINED FROM ADJUSTMENT OF NOV 1970

QH 008

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 211574 STATION 1008

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

KAIPAPAU (continued)

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: KAIPAPAU
 ESTABLISHED BY: L.G.S. YEAR: 1927 STATE: Hawaii BENCH MARK ALSO
 RECOVERED BY: C.A. Amis YEAR: 1969 COUNTY: Honolulu
 AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: 3/4 mile northwest of Hauula
 HEIGHT OF TELESCOPE ABOVE STATION MARK 8 FEET. HEIGHT OF LIGHT ABOVE STATION MARK 8 FEET.

OBJECT	BEARING	DISTANCE		DIRECTION
		FEET	METERS	
WATAHILAHILA 1927	W	24.36	7.426	° 00 00
RM 2	SE	18.73	5.709	109 22 06
RM 1				343 03 53

The station mark was recovered as described and found in good condition. Reference marks 1 and 2 were established at this time.

A new description follows.

The station is located about 2 miles south of Laie, 3/4 mile northwest of Hauula, 3/4 mile west of Kaipapau Point and on a prominent knoll about 1/4 mile south of the most northeasterly point of a prominent ridge which has an old army pillbox on it.

To reach the station from the post office and shopping center in Hauula, go northerly on State Highway 83 for 0.5 mile to a driveway on the left, turn left and follow the driveway for 0.1 mile to a gate at the southwest corner of the yard and the end of truck travel. Pass through the gate and park westerly, following an old roadbed across a pasture to where the old roadbed enters a narrow wash, continue ahead southwesterly on the old roadbed to the summit of a ridge, bear right and go westerly along the ridge, passing the old army bunker to where the ridge starts downgrade and a saddle on the left, turn left down into the saddle and continue southerly to a gully, pass to the left of the gully, bear left and go easterly to the top of the knoll and the station.

The station mark is a standard disk stamped KAIPAPAU 1927, set in the top of a cement filled 5 inch soil pipe projecting 6 inches above the ground. There is "Type A" Hawaii Territorial Survey Signal constructed over the mark.

Reference mark 1 is a standard disk stamped KAIPAPAU 1927 NO 1 1969, brazed to the top of a 2 1/2 inch soil pipe projecting 8 inches above the ground. It is about 3 feet lower in elevation than the station mark.

Reference mark 2 is a standard disk stamped KAIPAPAU 1927 NO 2 1969, brazed to the top of a 2 1/2 inch soil pipe projecting 6 inches above the ground. It is about 4 feet lower in elevation than the station mark.

No measurement between the reference marks due to crest of knoll on line.

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

FORM C&G
 USCOMM-DL 44-11-108

AMERICA
 1958
 COAST AND GEODETIC SURVEY

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 211574 STATION 1009
 HAWAII
 LATITUDE 21° 30' TO 22° 00'
 LONGITUDE 157° 30' TO 158° 00'
 DIAGRAM NF 4-11 OAHU

DESCRIPTION OF BENCH MARK

Designation STATE SURVEY 5-5 State Hawaii County Honolulu
 Nearest town Hauula County Honolulu Chief of party C. Symms
 Distance and direction from nearest town At Hauula Leveling date July 1969
 Character of mark SS disk Stamping 5-5 1969
 Established by State of Hawaii
 Detailed description

Section T R
 At Hauula, 0.6 mile southeast along State Highway from the post office, across a concrete wall from the junction of Hauula Homestead Road, in the northwest corner of a lawn of the Hauula Beach Park, 38 feet northeast of the center line of the highway, 11.4 feet northeast of the concrete wall, and set in the top of a concrete post 0.2 foot underground.

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION STATE SURVEY 5-5
 STATE HAWAII YEAR 1969 SECOND ORDER

SOURCE: G-14543
 NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	21° 36' 58.78441	ELEVATION:	2.35 METERS
GEODETIC LONGITUDE:	157 54 53.27598		7.7 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ OR ANGLE °
HI 3	5103	528,942.11	163,343.05	+ 0 01' 53"

* 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
KAIAPAPAU	114° 31' 58.3	114° 30' 05"	5103

POSITION DETERMINED BY TRAVERSE FROM STATION KAIAPAPAU

QH 009

FORM CGS-638
 (6-78)
 USCOMM-DC 60256-P66

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

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 OLD HAWAIIAN DATUM

QUAD 211574 STATION 1010
 HAWAII
 LATITUDE 21° 30' TO 22° 00'
 LONGITUDE 157° 30' TO 158° 00'
 DIAGRAM NF 4-11 OAHU

DESCRIPTION OF BENCH MARK

Designation STATE SURVEY 5-6 State Hawaii County Honolulu
 Nearest town Hauula County Honolulu Chief of party C. Symms
 Distance and direction from nearest town 1.1 miles northwest Leveling date July 1969
 Character of mark SS disk Stamping 5-6 1969
 Established by State of Hawaii
 Detailed description Section ,T ,R

1.1 miles northwest along State Highway 83 from the post office at Hauula, 19.3 feet west of the center line of the highway, 60.3 feet northwest and across the highway from mail box No. 55-241, 114.4 feet north-northwest and across the highway from bench mark LIEA 2, 95.3 feet north of power pole 58T, 88.8 feet south of power pole 57T which is between two graveled driveways, about level with the highway, and set in the top of a concrete post flush with the ground.

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: STATE SURVEY 5-6
 STATE: HAWAII YEAR: 1969 SECOND ORDER

SOURCE: G-14543
 NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	21° 38' 10.83988	ELEVATION:	3.51 METERS
GEODETIC LONGITUDE:	157 55 26.46493		11.5 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	§ 10R Δ § 1 ANGLE °
HI 3	5103	525,806.89	170,612.02	+ 0° 01' 41"

* 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
KAIPAPAU	3° 15' 41.8	3° 14' 01"	5103

POSITION DETERMINED BY TRAVERSE FROM STATION KAIPAPAU

QH 010

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 OLD HAWAIIAN DATUM

QUAD 211582 STATION 1133
 HAWAII
 LATITUDE 21° 00' TO 21° 30'
 LONGITUDE 158° 00' TO 158° 30'
 DIAGRAM NF 4-11 OAHU

FORM 342
 (6-18-66)

U.S. DEPARTMENT OF COMMERCE
 COAST AND GEODETIC SURVEY

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: WHIPP STATE: Hawaii COUNTY: Honolulu
 CHIEF OF PARTY: P.C. Johnson YEAR: 1967 DESCRIBED BY: R.M.M.

NOTE*	HEIGHT OF TELESCOPE ABOVE STATION MARK METERS.†	HEIGHT OF LIGHT 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			
			BEARING	DISTANCE		DIRECTION‡
1b	SURFACE-STATION MARK,					
7a	UNDERGROUND-STATION MARK					
	OBJECT	BEARING	FEET	METERS	DIRECTION	
11b	KAPUAI NEW 1927	N	19.69	6.002	00 00 00	
11b	Reference Mark No. 2	NE	21.81	6.650	283 22 16	
11b	Reference Mark No. 1		21.96	6.693	347 00 46	
	RM 1 to RM 2					

The station is located 5.8 miles west of Waipahu, 4.6 miles north-west of Ewa, 4 miles north of the main gate at Barber's Point Naval Air Station, on the southeast slope of a low, bare hill, near a green concrete block building and two compounds enclosed by a chain-link fence.

To reach the station from the junction of State Highways 75 and 90 at the west edge of Waipahu, go west and southwest on State Highway 90 for 2.4 miles to a crossroad and sign, "TIMPERLINE". Turn right and go northwest on an oiled road for 0.7 mile to a fork. Take the left fork and follow the oiled road up the hill for 4.0 miles to a fork. Take the right fork and continue uphill for 0.6 mile to a road on the right. Turn right and go east, downhill, along a track road for 0.25 mile to the station as described.

The station mark, a standard disk stamped WHIPP 1967, is set in the top of a 12-inch round concrete monument which is set flush with the surface of the ground. It is 53 feet east of the southeast corner of the large fenced enclosure, 21 feet southwest of the southeast corner of the small fenced enclosure and 20 feet south of the southwest corner of the small enclosure.

Reference mark No. 1, a standard disk stamped WHIPP NO 1 1967, is set in the top of a 13-inch round concrete monument which projects 2 inches above the surface of the ground. It is 2.2 feet east of the southeast corner of the small fenced enclosure.

Reference mark No. 2, a standard disk stamped WHIPP NO 2 1967, is set in the top of a 13-inch round concrete monument which projects 2 inches above the surface of the ground. It is 1.7 feet west of the southwest corner of the small fenced enclosure.

*Refer to notes in manuals of triangulation and state publications of triangulation. †Direction-angle measured clockwise, referred to initial station. ‡To nearest meter only, when no trigonometric leveling is being done.

USCOMMA-DC 27171-098

(continued on next page)

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: WHIPP
 STATE: HAWAII YEAR: 1967 SECOND ORDER

SOURCE: G-13983

GEODETIC LATITUDE: 21° 22' 37.3327	ELEVATION: 510.2 METERS
GEODETIC LONGITUDE: 158 06 07.2592	1674 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	ϕ OR Δ ± ANGLE*
HI 3	5103	465,289.14	76,424.93	- 0° 02' 14"

* 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
KAPUAI NEW	264° 09' 42.3	264° 11' 56"	5103

QF 487

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 1133

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

WHIPP (continued)

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: WHIPP
ESTABLISHED BY: P.C. Johnson / YEAR: 1967 STATE: Hawaii BENCH MARK ALSO
RECOVERED BY: G.W. Peterkin YEAR: 1973 COUNTY: Honolulu
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: Approx. 2 miles NE of Makakilo
HEIGHT OF TELESCOPE ABOVE STATION MARK 1.67 Meters HEIGHT OF LIGHT ABOVE STATION MARK FEET.

OBJECT	BEARING	DISTANCE		DIRECTION
		FEET	METERS	
KAPUAI NEW 1927				80 00 00.00
R.M. 2	N	19.72	6.010	283 22 17.60
R.M. 1	ENE	21.815	6.649	347 59 35.07
R.M. 1 to R.M. 2		21.985	6.701	

The station and reference marks were recovered and found to be in good condition. No azimuth mark was found due to lack of old description for station. Because of the lack of an old description a new and complete description follows.

The station is located approximately 2.5 miles north of the town of Makakilo on a point of land about half way up the south face of the Waianai Mountain range, on property owned by the Tongg Ranch Inc. Phone No. 538-6781.

To reach from the junction of Highway 90 and Highway 75 at the west edge of Waipahu, go westerly on Highway 90 for 1.9 miles to a crossroads and a sign, Timberline. Turn right and go west on Timberline Road for 0.5 mile to a Y-fork. Take the left fork and go west for 0.15 mile to a crossroads and three locked gates. Pass thru the center locked gate, (combination to lock 9884), and continue ahead, westerly on a paved road for 3.85 miles to a fork and a sign, HQ'S HI Natl. Guard. Take the right fork, uphill, and go north for 0.65 mile to a fork. Take the right fork, and go east for 0.3 mile to the end of the road and the station as described.

Station mark is a standard disk stamped WHIPP 1967, set in the top of a 12-inch cylindrical concrete monument that is flush with the ground surface. It is 19.6 feet west-southwest of the southwest corner of a cyclone fence enclosure, 21 feet southwest of the southeast corner of the cyclone fence enclosure, and 53 feet south-southeast of a larger cyclone fence enclosure.

Reference mark 1, a standard disk stamped WHIPP NO 1 1967, is set in the top of a 12-inch cylindrical concrete monument that projects 3 inches above the ground surface. It is 2.2 feet southeast of the southeast corner of the cyclone fence enclosure, 27 feet southwest of the center of an oil surfaced road, and 71.5 feet east-southeast of the southeast corner of the larger cyclone fence enclosure.

Reference mark 2, a standard disk stamped WHIPP NO 2 1967, is set in the top of a 12-inch cylindrical concrete monument that projects 3 inches above the ground surface. It is 1.2 feet west of the southwest corner of the cyclone fence enclosure, 28.4 feet south-southwest of the center of the oil surfaced road, and 52 feet east of the southeast corner of the larger cyclone fence enclosure.

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

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 OLD HAWAIIAN DATUM

QUAD 211574 STATION 1011
 HAWAII
 LATITUDE 21° 30' TO 22° 00'
 LONGITUDE 157° 30' TO 158° 00'
 DIAGRAM NF 4-11 OAHU

FORM 523
 (6-16-64)

U.S. DEPARTMENT OF COMMERCE
 COAST AND GEODETIC SURVEY

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: LAIE POINT STATE: Hawaii COUNTY: Honolulu
 CHIEF OF PARTY: C.A. Amis YEAR: 1969 DESCRIBED BY: B.W. Miller

DESCR	SURFACE-STATION MARK, UNDERGROUND-STATION MARK	BEARING	DISTANCE		DIRECTION
			FEET	METERS	
None	WAIAHILAHILA				0 00 00.0
Desc.	R.M. NO 1	NE	29.89	9.110	202 17 09
Desc.	R.M. NO 2	SE	29.26	8.918	323 30 16

No measurement between reference marks due to pole on line.

The station is located about 5 miles south-southeast of the north side of the Island, 3/4 mile east of Laie and at the east end of Laie Point.

To reach from the Post Office and Shopping Center in Hauula, go northerly on State Highway 83 (Kamehameha Highway) for 2.3 miles to a side road on the right and sign on the left reading "LAIE POINT". Turn right and follow surfaced road east-northeast for 0.1 mile to a "T" intersection turn right and follow surfaced road easterly for 0.35 mile to the end of road, at a parking area and the station.

Station mark is a standard disk stamped LAIE POINT 1969, cemented in the top of a 3 inch pipe, which is 6 inches beneath a 6 inch street survey manhole cover. It is 28 feet south of the north edge of a surfaced parking area, 15 feet west of a telephone pole, 14 feet west of a culvert running northwest to southeast.

Reference mark 1 is a standard disk stamped LAIE POINT NO 1 1969, cemented in a drill hole set on top of culvert, set on the north end of culvert, culvert projecting 1 1/2 feet above the surface of road. It is 24.5 feet northwest of a telephone pole, 3.9 feet southeast of the north-west end of culvert.

Reference mark 2 is a standard disk stamped LAIE POINT NO 2 1969, cemented in a drill hole set on top of a culvert, on the south end of culvert, which projects 1 1/2 feet above the surface of the road. It is 27.3 feet southeast of a telephone pole, 4.4 feet northwest of the south-east end of culvert.

*Refer to notes in manuals of triangulation and state publications of triangulation. †Direction-angle measured clockwise, referred to initial s. line.
 ‡To nearest meter only, when no trigonometric leveling is being done.

USCOMS-DC 27171-P-69

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: LAIE POINT
 STATE: HAWAII YEAR: 1969 FIRST -ORDER

SOURCE: G-14543

GEODETIC LATITUDE: 21° 39' 05.87530	ELEVATION: 8.96 METERS
GEODETIC LONGITUDE: 157 55 01.85250	29.4 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	§ 10R Δ §1 ANGLE °
HI 3	5103	528,126.01	176,166.45	+ 0° 01' 50"

* 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
WAIAHILAHILA	358° 47' 15.3	358° 45' 25"	5103

QH 011

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 OLD HAWAIIAN DATUM

QUAD 211574 STATION 1012
 HAWAII
 LATITUDE 21° 30' TO 22° 00'
 LONGITUDE 157° 30' TO 158° 00'
 DIAGRAM NF 4-11 OAHU

NO ORIGINAL TEXT

ADJUSTED HORIZONTAL CONTROL DATA

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: State Survey 5-1
 ESTABLISHED BY: C.A. Annis YEAR: 1969 STATE: Hawaii BENCH MARK(S) ALSO
 RECOVERED BY: J.V. Teater YEAR: 1973 COUNTY: Honolulu
 AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: About .7 mile north of Kaaawa.

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

The station is located in Koolauloa District, on ridge just south of Puumahia Point, at the southeast extremity of Kahana Bay.
 The station mark is a standard State of Hawaii station disk stamped 5-1 1969 and set in a drill hole in about the middle of the top of a concrete "Pill-Box".
 To reach the station from the Kaaawa Post Office, go north along Kamehameha Highway for 0.80 mile, about 0.1 mile beyond "Crouching Lion Inn", to foot of ridge on the southwest side of the Highway. Pack up ridge on the trail between poles 279 & 280 to the second of two old army concrete "Pill-Boxes".

Note: The station was recovered and found to be in good condition.

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: STATE SURVEY 5-1
 ESTABLISHED BY: C.A. Annis YEAR: 1969 STATE: Hawaii BENCH MARK(S) ALSO
 RECOVERED BY: R. B. Melby YEAR: 1975 COUNTY: Honolulu
 AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: 3/4 mile northwest of Kaaawa

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

The station was recovered in good condition. It is located about 3/4 mile northwest of the town of Kaaawa, on Mahie Point, about 100 yards northwest of the Crouching Lion Inn, on the roof of the higher two, small, concrete observation posts, about 100 feet higher than the highway and on a sloping rocky ridge.

The station is a State of Hawaii Survey disk stamped 5-1 1969 set in a drill hole, about in the center of the roof of the observation post, 6.2 feet south of the north corner of the flat roof. The roof of the post measures about 7½ feet by 10½ feet.

NAME OF STATION: STATE SURVEY 5-1
 STATE: HAWAII YEAR: 1969 SECOND ORDER

SOURCE: G-14543
 NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	21° 33' 45.14491	ELEVATION:	49	METERS
GEODETIC LONGITUDE:	157 52 00.15398	NO CHECK		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ OR ANGLE °
HI 3	5103	545,294.44	143,815.82	+ 0° 02' 56"

* 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
LAI E POINT	152° 05' 39.3	152° 02' 43"	5103

POSITION DETERMINED BY TRAVERSE FROM STATION LAIE POINT

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 211574 STATION 1013
 HAWAII
 LATITUDE 21° 30' TO 22° 00'
 LONGITUDE 157° 30' TO 158° 00'
 DIAGRAM NF 4-11 OAHU

FORM 342
 (8-18-58)

U. S. DEPARTMENT OF COMMERCE
 COAST AND GEODETIC SURVEY

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: HINA STATE: Hawaii COUNTY: Honolulu
 CHIEF OF PARTY: C.A. Annis YEAR: 1969 DESCRIBED BY: L.B. Gittings

NOTE. DESC.	HEIGHT OF TELESCOPE ABOVE STATION MARK 4.8 METERS. HEIGHT OF LIGHT ABOVE STATION MARK 4.6 METERS.		DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION			
	SURFACE-STATION MARK, UNDERGROUND-STATION MARK		DISTANCE		DIRECTION	
	OBJECT	BEARING	FEET	METERS		
	GROVE				0	00 00.0
desc.	KAHUKU MILL STACK 1927	NE	(Approx. 4 miles)	146	31	56.4
desc.	R.M. 1	E	22.57	6.879	210	10 15 -
desc.	R.M. 2	SW	24.67	7.520	341	40 37 -

The station is located about 9 miles east-northeast of Haleiwa, 6 miles south of Kahuku and 4 1/4 miles west-southwest of Laie on a heavily-wooded ridge.

To reach the station from the junction of State Highways 83 and 821 at the north edge of Haleiwa, go northeast on State Highway 83 for 5.4 miles to a side road right at a small grocery store. Turn right following Pupukea Drive up steep slope for 2.3 miles to the end of the asphalt road. Continue ahead on the main road for 0.7 mile to the entrance to Camp Pupukea on the left. Continue ahead on main road for 2.0 miles to a side road on the left. Continue ahead for 0.7 mile to a fork. Keep right fork for 0.4 mile along rough track road to the end of the road and the end of truck travel. Pack around right side of hill, following foot trail for about ten minutes to a trail branching off to the right. Take the trail to the right uphill to the top of the ridge and then continue along trail to old buildings on the left. Continue along trail for about 30 minutes to a dim trail left. Follow dim trail to the left, uphill, for about 10 minutes to highest point and the station.

The station mark is a standard disk, stamped HINA 1969, welded to the top of a 2-inch pipe which projects 4 inches above the ground surface. It is surrounded by thick brush and trees.

Reference mark 1 is a standard disk, stamped HINA NO 1 1969, welded to the top of a 2-inch pipe which projects 1 foot above the ground surface. It is about the same elevation as the station.

Reference mark 2 is a standard disk, stamped HINA NO 2 1969, welded to the top of a 2-inch pipe which projects 1 foot above the ground surface. It is about 3 feet lower than the station.

No azimuth mark was established for this station because you need a 12- or 14-foot stand to see out over the trees and then you can see the Kahuku Mill Stack which can serve as an azimuth.

No measurement between reference marks due to thick vegetation.

*Refers to notes in manuals of triangulation and state publications of triangulation. †Direction-angle measured clockwise, referred to initial station.
 †To nearest meter only, when no trigonometric leveling is being done.

USCGM-DC 27171-P88

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: HINA
 STATE: HAWAII YEAR: 1969 FIRST ORDER

SOURCE: G-14543

GEODETIC LATITUDE: 21° 37' 50.71652	ELEVATION: 570.9 METERS
GEODETIC LONGITUDE: 157° 58' 57.14942	1873 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	# IOR Δ # ANGLE °
HI 3	5103	505,929.91	168,575.54	+ 0° 00' 23"

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH* (From south)	CODE
GROVE	61° 59' 48.2	61° 59' 25"	5103

QH 013

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 OLD HAWAIIAN DATUM

QUAD 211574 STATION 1014
 HAWAII
 LATITUDE 21 ° 30' TO 22 ° 00'
 LONGITUDE 157 ° 30' TO 158 ° 00'
 DIAGRAM NF 4-11 OAHU

FORM 525
 (6-18-65)

U. S. DEPARTMENT OF COMMERCE
 COAST AND GEODETIC SURVEY

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: GOLF STATE: Hawaii COUNTY: Honolulu
 CHIEF OF PARTY: C.A. Annis YEAR: 1969 DESCRIBED BY: L.B. Gittings

NOTE*	HEIGHT OF TELESCOPE ABOVE STATION MARK 1.7 METERS, HEIGHT OF LIGHT ABOVE STATION MARK 1.5 METERS.		DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION			
	SURFACE-STATION MARK	UNDERGROUND-STATION MARK	BEARING	DISTANCE		DIRECTION†
				FEET	METERS	
1b						
7a						
11b						
11b						

Detailed description:
 The station is located about 2 1/4 miles northwest of Laie at the southeast edge of Kahuku on the fourth tee of the Kahuku Golf Course. To reach the station from the Kahuku School, go southeast on State Highway 83 for 0.3 mile to a side road left. Turn left, northeast, for 0.1 mile to a fork. Leave the road and continue ahead, northeast, across the golf course to a point just below the number three green. Bear right, uphill, to the fourth tee and the station. The station mark is a standard disk, stamped GOLF 1969, set in the top of a 12-inch round concrete monument which is flush with the ground surface. It is located at the northeast corner of the fourth tee, 7 feet north of a cement and wood bench and 4 feet west of the east edge of the tee. Reference mark 1 is a standard disk, stamped GOLF NO 1 1969, set in the top of a 12-inch round concrete post which is flush with the ground surface. It is 35 feet north of the bench and about 5 feet lower than the station. Reference mark 2 is a standard disk, stamped GOLF NO 2 1969, set in the top of a 12-inch round concrete monument which is flush with the ground surface. It is 23 feet east-northeast of the bench and about 3 feet lower than the station. The sugar-mill stack will serve as an azimuth. No measurement between reference marks due to the vegetation of the golf course.

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: GOLF
 STATE: HAWAII YEAR: 1969 FIRST ORDER

SOURCE: G-14543

GEODETIC LATITUDE:	21 ° 40' 45.78048	ELEVATION:	17.57 METERS
GEODETIC LONGITUDE:	157 56 34.38916		57.6 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ † ANGLE *
HI 3	5103	519,392.77	186,245.27	+ 0 01 16

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE
PUUKI	82° 19' 23.3	82° 18' 07"	5103

QH 014

* Refers to notes in manuals of triangulation and state publications of triangulation. † Direction-angle measured clockwise, referred to initial station.
 † To nearest meter only, when no trigonometric leveling is being done.

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 OLD HAWAIIAN DATUM

QUAD 211574 STATION 1015
 HAWAII
 LATITUDE 21° 30' TO 22° 00'
 LONGITUDE 157° 30' TO 158° 00'
 DIAGRAM NF 4-11 OAHU

NO ORIGINAL TEXT

Puuki (Oahu Island, Hawaiian Government Survey, 1875; L. G. Simmons, 1927).—In northern part of Oahu, in land of Kahuku, on hill of same name, about 2 1/4 miles west of Kahuku Mill, and just north of a conical summit with rough rocks on top. It is the highest hill in the immediate neighborhood. Originally marked with redwood post and cairn of stones. In 1910 the mark recovered was concrete post with cross in top. In 1927 station re-marked according to note 1b, a standard disk station mark being set in center of cross in top of 10-inch concrete cylinder. Reference marks are as follows: No. 1, note 13a, standard reference disk in concrete in tile, 9.040 meters (29.66 feet) from station in azimuth 5° 30'; No. 2, note 12c, 9.952 meters (32.65 feet) from station in azimuth 213° 22'. Re-marked according to note 14A in 1929.

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: PUUKI
 ESTABLISHED BY: HGS YEAR: 1875 STATE: Hawaii
 RECOVERED BY: D.G. Rushford YEAR: 1964 COUNTY: Honolulu

HEIGHT OF TELESCOPE ABOVE STATION MARK 2.56 METERS, HEIGHT OF LIGHT 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				
OBJECT	BEARING	DISTANCE		DIRECTION
		FEET	METERS	
OPANA 1927				00 00 00.0
R.M. No. 2	NE	32.553	9.923	94 01 57
R.M. No. 3	WSW	27.206	8.293	322 36 30

Station mark and reference mark number two were recovered in good condition, however the stamping on both marks is incorrect. Reference mark number one was searched for by distance and angle but not found. The point where it was located is now a bare dirt area used by the military during maneuvers. A new reference mark, number three, was established. A complete description follows:

Station is located about 2 miles west of Kahuku on the summit of Puu Ki, a bare hill of about 653 feet elevation.

To reach station from the Kahuku Plantation Company office in Kahuku, go northwest on State Highway 83 for 1.0 mile to side road left at sign

(US ARMY TRAINING AREA-KAHUKU C). Turn left and go 0.3 mile; turn left and go 0.2 mile, passing 2 large buildings, to a fork. Take right fork up slope and follow road around hillside and then along a power line for 0.8 mile to edge of cane fields; keep ahead along power line for 0.7 mile to fork where main road jogs right across a culvert. Continue ahead on left fork along the power line for 0.1 mile to side road left. Take side road and go 0.2 mile up rough track road to station. (A 4-wheel-drive vehicle is required).

Station mark is a standard disk stamped "PUUKII 1927", set in the top of a 10-inch-diameter, concrete monument flush with the ground. A "Type A" signal, built by the Hawaii Territorial Survey in 1929 is centered over the mark. The concrete platform of the signal is 3-1/2 feet above ground and a red and white metal target extends 7 feet above the platform.

Reference mark number two is a standard disk stamped "PUU KII NO 2", cemented in a drill hole in a 3-foot-diameter boulder that projects 1 foot above ground. It is 4.6 feet lower than station mark.

Reference mark number three is a standard disk stamped "PUUKI 1875 1927 NO 3 1964", cemented in a drill hole in the 1 x 2-foot exposed section of a large boulder. The mark projects about 3 inches above ground and is 1.4 feet lower than station mark.

(continued on next page)

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: PUUKI
 STATE: HAWAII YEAR: 1875 FIRST ORDER

SOURCE: G-14543

GEODETIC LATITUDE: 21° 40' 27.41772	ELEVATION: 198.7 METERS
GEODETIC LONGITUDE: 157 58 59.98309	652 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	∠ OR ∠ BI ANGLE °
HI 3	5103	505,660.86	184,387.14	+ 0° 00' 22"

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH* (From south)	CODE
GOLF	262° 18' 29.5	262° 18' 07"	5103

THESE DATA OBTAINED FROM ADJUSTMENT OF NOV 1970

QH 015

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 211574

STATION 1015

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

PUUKI (continued)

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: PUUKI
ESTABLISHED BY: H.G.S. YEAR: 1875 STATE: Hawaii BENCH MARK(S) ALSO
RECOVERED BY: C.A. Annis YEAR: 1969 COUNTY: Honolulu
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: About 2 miles west of Kahuku

Detailed statement as to the fitness of the original description, including marks found, stampings, changes made, and other pertinent facts:
Station mark, reference marks 2 and 3 were recovered and found in good condition. The 1964 description by D.G.R. was checked and found to be correct.

OBJECT	BEARING	DISTANCE		DIRECTION
		FEET	METERS	
GOLF				0 00 00.0
RM NO 3	WSW	27.21	8.293	179 36 15
RM NO 2	NE	32.57	9.927	311 05 07

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 OLD HAWAIIAN DATUM

QUAD 211574 STATION 1016
 HAWAII
 LATITUDE 21° 30' TO 22° 00'
 LONGITUDE 157° 30' TO 158° 00'
 DIAGRAM NF 4-11 OAHU

DESCRIPTION OF BENCH MARK

Destination STATE SURVEY 5-7 State Hawaii County Honolulu
 Nearest town Kahuku County Honolulu Chief of party C. Symms
 Distance and direction from nearest town 2.05 miles southeast Levelling date July 1969
 Character of mark SS disk Stamping 5-7 1969
 Established by State of Hawaii
 Detailed description Section T R

2.05 miles southeast along State Highway 83 from the
 Kahuku Plantation Company Headquarters at Kahuku, at the northwest
 end of a curve, 24.6 feet northeast of the center line of the high-
 way, 8.1 feet north of power pole 51, 9.5 feet southeast of guy
 pole 221, 43 feet northwest of the center line of a graveled road
 northeast, about 2½ feet higher than the highway, and set in the
 top of a concrete post projecting 1.0 foot above the ground,
 3.2 miles northwest of Hauula.

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: STATE SURVEY 5-7
 STATE: HAWAII YEAR: 1969 SECOND ORDER

SOURCE: G-14543
 NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE: 21° 39' 36.12913	ELEVATION: 3.65 METERS
GEODETIC LONGITUDE: 157 56 00.99617	12.0 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ OR ANGLE °
HI 3	5105	522,545.33	179,216.47	+ 0° 01' 28"

* 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
PUUKI	107° 03' 03.9	107° 01' 36"	5103

POSITION DETERMINED BY TRAVERSE FROM STATION PUUKI

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 OLD HAWAIIAN DATUM

QUAD 211574 STATION 1017
 HAWAII
 LATITUDE 21° 30' TO 22° 00'
 LONGITUDE 157° 30' TO 158° 00'
 DIAGRAM NF 4-11 OAHU

DESCRIPTION OF BENCH MARK

Designation STATE SURVEY 5-8	State Hawaii	County Honolulu
Nearest town Kahuku	County Honolulu	Chief of party C. Symms
Distance and direction from nearest town At Kahuku		Leveling date July 1969
Character of mark SS disk		Stamping 5-8 1969
Established by State of Hawaii		
Detailed description	Section	T

At Kahuku, 0.25 mile southeast along State Highway 83 from Kahuku Plantation Company Headquarters, 22.8 feet east of the north corner of a fence around the school yard of Kahuku Elementary School, 24.0 feet southwest of the center line of the highway, on the extended center line of an asphalt road northeast, 15.5 feet north and across an asphalt walkway from power pole 15, along the northeast side of the walkway, about level with the highway, and set in the top of a concrete post 0.2 foot underground.

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: STATE SURVEY 5-8
 STATE: HAWAII YEAR: 1969 SECOND ORDER

SOURCE: G-14543
 NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE: 21° 40' 46.29075	ELEVATION: 2.72 METERS
GEODETIC LONGITUDE: 157 57 00.64394	8.9 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ FOR Δ θ ANGLE *
HI 3	5103	516,916.45	186,293.91	+ 0° 01' 06"

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE
PUUKI	80° 24' 12.4"	80° 23' 06"	5103

POSITION DETERMINED BY TRAVERSE FROM STATION PUUKI

QH 017

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 OLD HAWAIIAN DATUM

QUAD 211574 STATION 1018
 HAWAII
 LATITUDE 21° 30' TO 22° 00'
 LONGITUDE 157° 30' TO 158° 00'
 DIAGRAM NF 4-11 OAHU

DESCRIPTION OF BENCH MARK

Designation	STATE SURVEY 5-9	State	Hawaii	County	Honolulu
Nearest town	Kahuku	County	Honolulu	Chief of party	C. Symms
Distance and direction from nearest town	0.8 mile northwest	Leveling date	July 1969	Stamping	5-9 1969
Character of mark	SS disk				
Established by	State of Hawaii	Section	.T		.R
Detailed description	0.8 mile northwest along State Highway 83 from the Kahuku Plantation Company Headquarters at Kahuku, at the junction of a dirt road south, 16.6 feet northeast of the center line of the highway, 20 feet southeast of the extended center line of the road, 47.3 feet south of the south corner of a small building housing a water pump, 82.5 feet north and across the highway from power pole 116 8T, 76 feet east and across the highway from power pole 8A, about level with the highway, and set in the top of a concrete post 0.1 foot underground.				

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: STATE SURVEY 5-9

STATE: HAWAII

YEAR: 1969

SECOND

-ORDER

SOURCE: G-14543

NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	21° 41' 13.17875	ELEVATION:	7.19 METERS
GEODETIC LONGITUDE:	157 57 47.91119		23.6 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	# (OR Δ) ANGLE *
HI 3	5103	512,457.67	189,005.76	+ 0° 00' 49"

* 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
PUUKI	55° 48' 59.0	55° 48' 10"	5103

POSITION DETERMINED BY TRAVERSE FROM STATION PUUKI

QH 018

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 OLD HAWAIIAN DATUM

QUAD 211574 STATION 1019
 HAWAII
 LATITUDE 21° 30' TO 22° 00'
 LONGITUDE 157° 30' TO 158° 00'
 DIAGRAM NF 4-11 OAHU

ADJUSTED HORIZONTAL CONTROL DATA

Kahuku New (Oahu Island, L. G. Simmons, 1927).—On north point of Oahu, about 3 miles northwest of Kahuku Mill, about ¼ mile northwest of Radio Corporation of America power plant, and on a sand dune about 75 feet from water's edge. Marked with a United States Engineers' brass plate set in 8-inch square concrete block. Reference mark No. 1 is a standard disk cemented in the concrete anchor of the north guy of the third tower west of the power house of the Radio Corporation of America plant. It is 348.47 meters (1143.3 feet) from station in azimuth 14° 20'. Reference mark No. 2 is a standard disk cemented in concrete sewer outlet at water's edge east of station. It is 125.76 meters (412.6 feet) from station in azimuth 267° 56'. Re-marked according to note 14A in 1929.

KAHUKU NEW (Hawaii, L.G.S., 1927; H.A.P., 1932)
 --Recovered in good condition. High-

water line - 36 meters NNW.

KAHUKU NEW (Hawaii, L.G.S., 1927; G.A.N., 1952)

--Station mark and reference mark 1 destroyed by Tsunami of 1946. Reference mark 2 intact.

(11-8-88)

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: KAHUKU NEW

ESTABLISHED BY: L.G.S. YEAR: 1927 STATE: Hawaii
 RECOVERED BY: D.M. Whipp YEAR: 1965 COUNTY: Honolulu

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

The station mark and reference mark number one are gone. Reference mark number two was recovered in good condition. It is a standard disk, cemented in a drill hole in a large concrete sewer outlet that sets in edge of water.

The sand dunes in vicinity of station are gone and the ground level is about 5 feet lower than originally. The exact station point was determined by setting a theodolite on the old angles between stations WAIHILAHILA, PUUKI, and OPANA, and on the published distance from RM No. 2.

A mark, consisting of a 1-inch iron pipe set in the center of a 3-foot diameter boulder-and-concrete dome, with a 6-inch triangle chiseled into the concrete, was found nearby, however it is 417 feet from the reference mark, whereas the station was 412.6 feet from the reference mark. Angles measured with instrument set over this mark show it to be 18 minutes off in azimuth to the reference mark from that published for KAHUKU NEW.

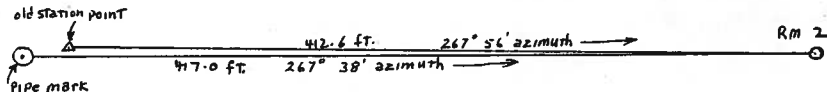
Inquiries were made of various agencies, but the history of this mark could not be learned, however it has been used in some cases on the assumption that it is KAHUKU NEW.

The angles measured with instrument set over the pipe mark are as follows:

PUUKI 1875-1927	00	00	00.0
OPANA 1927	45	14	57
RM No. 2	258	32	14

The check angle taken from 1927 observations at KAHUKU NEW for these points is as follows:

PUUKI	00	00	00.0
OPANA	45	14	08
RM No. 2	258	50	16



NAME OF STATION: KAHUKU NEW
 STATE: HAWAII YEAR: 1927 SECOND ORDER
 SOURCE: G-14543

GEODETIC LATITUDE:	21° 42' 46.288	ELEVATION	4	METERS
GEODETIC LONGITUDE:	157 58 36.206	SCALED		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	± HOR Δ ± ANGLE
HI 3	5103	507,901.44	198,399.93	+ 0° 00' 31"

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

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

QI 282

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 OLD HAWAIIAN DATUM

QUAD 211574 STATION 1020
 HAWAII
 LATITUDE 21° 30' TO 22° 00'
 LONGITUDE 157° 30' TO 158° 00'
 DIAGRAM NF 4-11 OAHU

U. S. DEPARTMENT OF COMMERCE
 NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
 NATIONAL OCEAN SURVEY
 FORM 76-1
 Rev. Aug. 1965

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: KAHUKU NEW 2 STATE: Hawaii COUNTY: Honolulu

CHIEF OF PARTY: D.M. Whipp YEAR: 1965 Described by: R.F. Hanson

NOTE*	HEIGHT OF TELESCOPE ABOVE STATION MARK METERS.†	HEIGHT OF LIGHT 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			
1a	Surface-station mark	1.5				
7a	Underground-station mark					
	OBJECT	BEARING	DISTANCE		DIRECTION‡	
			feet	meters		
11a	PUUKI 1875-1927					
	RM No. 2	WNW	21.312	6.496	109 54 16	
12a	RM No. 1	NNE	27.427	8.360	206 13 11	
	RM No. 2 (KAHUKU NEW 1927)	E	428.660	130.656	258 58 11.5	
	Land Survey Pipe Mark	E	11.812	3.601	272 35 51.0	

Station was established to replace KAHUKU NEW 1927 which was destroyed. Located about 2-1/2 miles northwest of Kahuku, on north shore of Oahu, on north side of old Kahuku Airfield, across airfield from old RCA Radio Corp. buildings. It is in a break, or gap, about 75 yards long, in the shoreline sand ridge, where sand has been removed, and is about 16 feet west of point where KAHUKU NEW 1927 was located.

To reach station from the Kahuku Plantation Office in Kahuku, go northwest on State Highway 85 for 2.1 miles; turn right on paved side road and go 0.7 mile; turn left, passing between quonset buildings, and follow old paved road for 0.4 mile to entrance to airfield. Continue ahead, northerly, crossing old hard-surfaced areas and runway, and then sand area, for 0.35 mile to shoreline and station.

Station mark is a standard disk stamped "KAHUKU NEW 2 1965", set in the top of a 12-inch-square, concrete monument that projects 8 inches. It is 58 feet east of end of sand ridge to west, 68 feet west of a prominent, lone bush, 124 feet south of the bedrock shoreline, 24 feet south of where sand beach slopes down to sea, and 5 feet west of a white witness post.

The underground mark is a standard disk stamped "KAHUKU NEW 2 1965", set in a mass of concrete 3-1/2 feet below ground level.

Reference mark number one is a standard disk stamped "KAHUKU NEW 2 NO 1 1965", cemented in a drill hole in the west end of a 4 x 7-foot bedrock outcrop that projects 8 inches. It is 75 feet west of the lone bush and about 1 foot lower than station mark.

Reference mark number two is a standard disk stamped "KAHUKU NEW 2 NO 2 1965", set in the top of a 12-inch-square, concrete monument that projects 6 inches. It is 37 feet east of end of sand ridge to west, 15 feet south of where sand beach slopes down to sea, and at same elevation as station mark.

Reference mark number two (KAHUKU NEW 1927) is a standard disk stamped "KAHUKU NEW 1927", cemented in a drill hole in the top, and near the south end, of a large, concrete, sewer outlet along shoreline. It is about 3 feet above water line.

Land Survey Pipe Mark is a 1-1/4-inch iron pipe, driven into the sand, and projecting 1/4-inch from the top of a dome-shaped mass of rock and concrete 3 feet in diameter and extending 16 inches above ground. A 6-inch triangle is chiseled into the concrete on the south side of the dome. The mark is 7 feet east of the witness post.

* Refers to notes in manuals of triangulation and state publications of triangulation. † Direction-angle measured clockwise, referred to initial station. ‡ To nearest meter only, when no trigonometric leveling is being done.

(continued on next page)

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: KAHUKU NEW 2

STATE: HAWAII

YEAR: 1965

FIRST

ORDER

SOURCE: G-14543

GEODETIC LATITUDE: 21° 42' 46.30767	ELEVATION: 3.8 METERS
GEODETIC LONGITUDE: 157 58 36.36953	12 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ OR ANGLE °
HI 3	5103	507,886.02	198,401.92	+ 0° 00' 31"

* 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
GOLF	316° 35' 11.3	316° 34' 40"	5103

THESE DATA OBTAINED FROM ADJUSTMENT OF NOV 1970

QH 020

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 211574

STATION 1020

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

KAHUKU NEW 2 (continued)

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: KAHUKU NEW 2
ESTABLISHED BY: D.M. Whipp YEAR: 1965 STATE: Hawaii BENCH MARK(S) ALSO
RECOVERED BY: G.A. Annis YEAR: 1969 COUNTY: Honolulu
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: 2 1/2 miles northwest of Kahuku.

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

The station mark and reference marks 1 and 2 were recovered as described in 1965 and found in good condition. Reference mark 2 (KAHUKU NEW 1927) was searched for but was not found and is believed destroyed. The 1965 to reach is adequate. The 1969 observations follow.

OBJECT	BEARING	FEET	METERS	DIRECTION
GOLF				0 00 00.0
RM 2	WNW	21.32	6.499	162 21 26
RM 1	NE	27.42	8.360	258 39 58
Land Survey Pipe Mark	NE	11.82	3.603	324 59 37
RM 1 to RM 2		36.55	11.140	

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: KAHUKU NEW 2
ESTABLISHED BY: D. M. Whipp YEAR: 1965 STATE: Hawaii BENCH MARK(S) ALSO
RECOVERED BY: R. C. Munson YEAR: 1970 COUNTY: Honolulu
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: 2 1/2 miles northwest of Kahuku

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

The station mark, reference marks 1 and 2, and the land survey pipe mark were found destroyed due to high surf from the Pacific storm of December 1969. The disks were removed by personnel from the Honolulu Field Office.

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 211574 STATION 1021
 HAWAII
 LATITUDE 21 ° 30' TO 22 ° 00'
 LONGITUDE 157 ° 30' TO 158 ° 00'
 DIAGRAM NF 4-11 OAHU

SEE STATION KAHUKU NEW 2

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: LAND SURV PIPE NR KAHUKU NEW 2

STATE: HAWAII

YEAR: 1965

SECOND

-ORDER

SOURCE G-14543

NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	21 ° 42' 46.28414	ELEVATION:	4	METERS
GEODETIC LONGITUDE:	157 58 36.24675	SCALED		FEET

STATE COORDINATES (FWS)				
STATE & ZONE	CODE	X	Y	θ FOR Δ θ ANGLE *
HI 3	5103	507,897.60	198,399.54	+ 0 ° 00' 31"

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

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

THESE DATA OBTAINED FROM ADJUSTMENT OF NOV 1970

POSITION DETERMINED BY TRAVERSE FROM STATION KAHUKU NEW 2

QH 021

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 OLD HAWAIIAN DATUM

QUAD 211574 STATION 1022
 HAWAII
 LATITUDE 21° 30' TO 22° 00'
 LONGITUDE 157° 30' TO 158° 00'
 DIAGRAM NF 4-11 OAHU

DEPARTMENT OF COMMERCE
 U. S. COAST AND GEODETIC SURVEY
 FORM 533
 Rev. Aug. 1963

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: RADIO STATE: Hawaii COUNTY: Honolulu

CHIEF OF PARTY: Walter R. Helm YEAR: 1962 Described by: A.K.R.
 HEIGHT OF TELESCOPE ABOVE STATION MARK 1 METERS. HEIGHT OF LIGHT ABOVE STATION MARK 1 METERS.

NOTE*	HEIGHT OF TELESCOPE ABOVE STATION MARK	DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION		DIRECTION
		feet	meters	
1a	Surface-station mark			
7a	Underground-station mark			
	OBJECT	BEARING	DISTANCE	DIRECTION
	MAUNA UNA 1874 1927			00 00 00.00
11a	Reference Mark No. 2	WSW	74.625 22.744	10 10 04
11a	Reference Mark No. 1	NNW	80.961 24.676	99 20 15
desc	Azimuth Mark	SSW	(0.4 mile)	325 36 45.8

The station is located at the U.S. Navy Communications Station about 2.4 miles east of the junction of State Highways 80, 82 and 809 and 1.7 miles northeast of Wahiawa.

To reach the station from the intersection of California Avenue and State Highway 80 in Wahiawa, go northwest on State Highway 80 for 0.8 miles to the junction with State Highway 804. Turn right and go northeast on State Highway 804 for 2.0 miles to the entrance to the U.S. Navy Communications Station. Continue straight ahead for 0.3 mile to intersection with Midway Drive*. Turn left and go northerly for 0.6 mile to a fork. Take the left fork for 0.05 mile to the station on left, as described.

*To reach the azimuth mark from this point, continue straight ahead for 0.15 mile to the mark on right, as described.

The station mark is a standard disk, stamped RADIO 1962, set in the top of a 12-inch square concrete post that projects 3 inches above the surface of the ground. It is centered within three white witness posts in a grassy area southwest of Building No. 79, 24 feet west of the west edge of a parking lot.

Reference mark No. 1 is a standard disk, stamped RADIO NO 1 1962, set in the top of a 12-inch square concrete post that projects 2 inches above the surface of the ground. It is about the same elevation as the station mark, set between two white witness posts, 46 feet south of a wire enclosure and 32 feet southwest of the center of a dirt road.

Reference Mark No. 2 is a standard disk, stamped RADIO NO 2 1962, set in the top of a 12-inch square concrete post that projects 2 inches above the surface of the ground. It is about the same elevation as the station mark, set between two white witness posts, and 30 feet north of a wooden antenna pole.

The azimuth mark is a standard disk, stamped RADIO 1962, cemented in a drill hole in the fourth step at the north entrance to the Administration Building. (Building No. 10)

* Refers to notes in manuals of triangulation and state publications of triangulation. † Direction-angle measured clockwise, referred to initial station.
 † To nearest meter only, when no trigonometric leveling is being done.

(continued on next page)

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: RADIO
 STATE: HAWAII YEAR: 1962 FIRST ORDER

SOURCE: G-14543

GEODETIC LATITUDE: 21° 31' 25.52155	ELEVATION: 386.88 METERS
GEODETIC LONGITUDE: 157° 59' 59.66219	1269.3 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	ϕ HOR Δ Δ' ANGLE*
HI 3	5103	500,031.89	129,708.22	+ 0° 00' 00"

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH* (From south)	CODE
AZIMUTH MARK	19° 41' 52.1"	19° 41' 52"	5103

THESE DATA OBTAINED FROM ADJUSTMENT OF NOV 1970

QH 022

HORIZONTAL CONTROL DATA

by the
 NATIONAL GEODETIC SURVEY
 OLD HAWAIIAN DATUM

QUAD 211574 STATION 1022

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

RADIO (continued)

RECOVERY NOTE, TRIANGULATION STATION

FORM 526a
 (1-18-68)

U.S. DEPARTMENT OF COMMERCE
 COAST AND GEODETIC SURVEY

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: RADIO
 ESTABLISHED BY: W.R.H. YEAR: 1962 STATE: Hawaii
 RECOVERED BY: W.R. Porter YEAR: 1963 COUNTY: Honolulu

NAME OF STATION: RADIO
 ESTABLISHED BY: W.R.H. YEAR: 1962 STATE: Hawaii BENCH MARK(S) ALSO
 RECOVERED BY: C.A. Annis YEAR: 1969 COUNTY: Honolulu
 AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: 2.0 miles northeast of Wahiawa.

Detailed statement as to the fitness of the original description; including marks found, stampings, changes made, and other pertinent facts:
 The station mark, reference marks 1 and 2 and the azimuth mark were recovered as described in the 1963 recovery note. The traverse to reach is adequate. A traverse was made to station ANTENNA 1962.

OBJECT	BEARING	DISTANCE		DIRECTION
		FEET	METERS	
1962 Distances and Directions				
MAUNA UNA 1874-1927				00 00 00.0
R.M. No. 2	WSW	74.625	22.744	10 10 04
R.M. No. 1	NNW	80.961	24.676	99 20 16
Azimuth Mark	SSW	0.4 mile		325 36 45.8

1963 Distances				
R.M. No. 2		74.620	22.745	
R.M. No. 1		80.943	24.672	

OBJECT	BEARING	FEET		METERS	DIRECTION
1969 OBSERVATIONS					
SCHOFFIELD WEST BASE 1927					0 00 00.0
R.M. 2	WSW	74.63	22.748		2 05 34
R.M. 1	NNW	80.94	24.672		91 15 51
ANTENNA 1962 (Traverse Dist.)	NNE	(139.99)	42.672		129 28 40.1
Azimuth Mark	SSW	(0.4 mile)			317 32 27.6
R.M. 2 to R.M. 1		109.29	(33.312)		

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

Station is located, airline, about 2 miles northeast of the center of Wahiawa and 1-1/2 miles east-northeast of Whitmore Village, on property of the U.S. Naval Communications Station.

To reach station from the intersection of California Avenue and State Highway 80 in Wahiawa, go northerly on State Highway 80 for 0.85 mile; turn right and go 2.0 miles on State Highway 804 to the entrance to the U.S. Naval Communications Station. Continue ahead for 0.3 mile; turn left and go 0.55 mile on Midway Drive; fork left onto Polaris Drive and go 0.05 mile to station on left.

Station mark is a standard disk, stamped "RADIO 1962", set in the top of a 12-inch-square, concrete monument that projects 3 inches. It is located in grassy area and centered between 3 white witness posts, 124 feet south-southwest of the southwest corner of building No. 79 and 22.3 feet southwest of the edge of Polaris Drive.

Reference mark number one is a standard disk stamped "RADIO 1 1962", set in the top of a 10-inch-square, concrete monument that projects about 1 inch. It is 35 feet southwest of the edge of Polaris Drive, 44.6 feet southeast of a wire enclosure, midway between 2 white witness posts that are 8 feet apart, and is about 1 foot higher than station mark.

Reference mark number two is a standard disk stamped "RADIO NO 2 1962", set in the top of a 10-inch-square, concrete monument that projects about 1 inch. It is 57.0 feet north of a wooden antenna pole, midway between two white witness posts that are 6 feet apart, and at about same elevation as station mark.

The azimuth mark is a standard disk stamped "RADIO 1962", cemented in a drill hole in the fourth step at the north entrance of building No. 10, the Administration Building. To reach from the main entrance of the U.S. Naval Communications Station, go easterly on the main street for 0.45 mile to the mark on the right.

*Name of recovery 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.

USCOMM-DC 37178-P68

FORM 526a-526 (1-68)
 USCOMM-DC 36498-P68

ENVIRONMENTAL SCIENCE SERVICES ADMINISTRATION
 COAST AND GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 OLD HAWAIIAN DATUM

QUAD 211574 STATION 1023
 HAWAII
 LATITUDE 21° 30' TO 22° 00'
 LONGITUDE 157° 30' TO 158° 00'
 DIAGRAM NF 4-11 OAHU

NO ORIGINAL TEXT

FORM 526
 (11-8-65)

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

R

NAME OF STATION: ANTENNA
 ESTABLISHED BY: W.R. Helm YEAR: 1962 STATE: Hawaii
 RECOVERED BY: W.R. Porter YEAR: 1963 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 found in good condition. A complete description follows:
 Station is located about 2 miles airline northeast of the center of Wahiawa, on property of the U.S. Naval Communications Station.

To reach from the intersection of California Avenue and State Highway 80 in Wahiawa, go northerly on State Highway 80 for 0.85 mile; turn right and go 2.0 miles on State Highway 804 to the entrance to the U.S. Naval Communications Station. Continue ahead for 0.3 mile; turn left and go 0.55 mile on Midway Drive; fork left onto Polaris Drive and go 0.05 mile to Building 79 and station.

Station mark is a flat-topped, bronze, 2-1/2-inch-diameter, disk. It has no pre-cast lettering on it, but is stamped "ANTENNA 1962", and is set in the top of a 10-inch-square, concrete monument flush with the ground. It is 12 feet west of the west side of Building 79, set under a Transit Antenna at the exact center of 4 wooden poles that support the antenna, and is 139,998 feet north of station RADIO 1962.

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: ANTENNA
 ESTABLISHED BY: W.R.H. YEAR: 1962 STATE: Hawaii BENCH MARK(S) ALSO
 RECOVERED BY: G.A.A. YEAR: 1969 COUNTY: Honolulu
 AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: 2 miles northeast of Wahiawa

R

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

The station mark was recovered as described in the 1963 recovery note and found to be in good condition. The "to reach" is adequate.

The station was not occupied at this time but a traverse was made to triangulation station RADIO 1962.

FORM C&GS-526 (8-66)
 USCOMM-DC 26486-P06

U.S. DEPARTMENT OF COMMERCE
 ENVIRONMENTAL SCIENCE SERVICES ADMINISTRATION
 COAST AND GEODETIC SURVEY

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: ANTENNA

STATE: HAWAII

YEAR: 1962

SECOND

-ORDER

SOURCE: G-14543

NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE: 21° 31' 26.88050	ELEVATION: 387.73 METERS
GEODETIC LONGITUDE: 157 59 59.36317	1272.1 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	± IOR Δ ± ANGLE °
HI 3	5103	500,060.13	129,845.34	+ 0° 00' 00"

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

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

THESE DATA OBTAINED FROM ADJUSTMENT OF OCT 1971
 POSITION DETERMINED BY TRAVERSE FROM STATION RADIO

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 OLD HAWAIIAN DATUM

QUAD 211574 STATION 1024
 HAWAII
 LATITUDE 21° 30' TO 22° 00'
 LONGITUDE 157° 30' TO 158° 00'
 DIAGRAM NF 4-11 OAHU

DESCRIPTION OF TRIANGULATION INTERSECTION STATION

NAME OF STATION: STATE SURVEY 5-10

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

Description, including sketch of object:

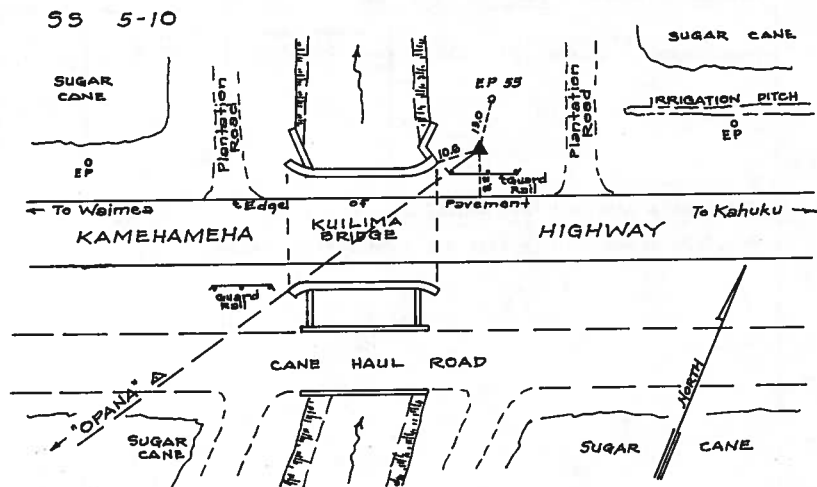
Station is located in the northern part of Oahu, in the land of Kawela, on the north side of Kamehameha Highway, 1.1 miles easterly from the entrance road to Kawela Bay and 200 ft. easterly from the proposed entrance to resort area.

Station mark is a standard State Survey disk stamped "5-10 1969" in concrete monument flush with ground level, adjoining the northeasterly side of Kuilima Bridge and a few feet north of metal guard rail. Ties from station are: N. 13.0 ft. to Elect. Pole No. 55, SE 8.2 ft. to edge pavement of highway and SW 10.6 ft. to northeast corner of bridge.

Sub-surface mark is identical, in concrete monument 2.3 ft. below ground level and separated from top monument with a layer of sand.

Geodimeter connection was made between "OPANA 1927" and State Survey "5-10".

This station is also Bench Mark 5-10 (SS) of the 1969 First Order Levels.



ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: STATE SURVEY 5-10

STATE: HAWAII YEAR: 1969

SECOND ORDER

SOURCE: G-14543
 NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	21° 42' 02.96206	ELEVATION:	4.53 METERS
GEODETIC LONGITUDE:	157 59 41.57099		14.2 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	± HOR Δ OF ANGLE*
HI 3	5103	501,737.92	194,027.62	+ 0° 00' 07"

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE ± HOR Δ OF ANGLE FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH* (From south)	CODE
OPANA	53° 59' 15.0"	53° 59' 08"	5103

POSITION DETERMINED BY TRAVERSE FROM STATION OPANA

QH 024

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 OLD HAWAIIAN DATUM

QUAD 211574 STATION 1025
 HAWAII
 LATITUDE 21° 30' TO 22° 00'
 LONGITUDE 157° 30' TO 158° 00'
 DIAGRAM NF 4-11 OAHU

NO ORIGINAL TEXT

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

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: Kahuku Mill Chimney STATE: Hawaii COUNTY: Honolulu
 ESTABLISHED BY: L.G.SIMONS YEAR: 1927 LOCALITY: Kahuku, Oahu
 RECOVERED BY: H.A.Paton YEAR: 1933

Detailed statement as to the fitness of the original description: At the north corner of a large red
 sugar mill, a concrete chimney about 200 feet tall.

FORM 526
 (11-8-65)

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

RECOVERY NOTE, TRIANGULATION STATION
 INTERSECTION

NAME OF STATION: Kahuku mill chimney
 ESTABLISHED BY: L.G.S. YEAR: 1927 STATE: Hawaii
 RECOVERED BY: D.M. Whipp YEAR: 1965 COUNTY: Honolulu

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

Station recovered and verified by the Kahuku Plantation Co. to
 still be in original location. The stack is 140 feet tall and is
 painted black

INTERSECTION
 RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: KAHUKU MILL CHIMNEY
 ESTABLISHED BY: L.G.S. YEAR: 1927 STATE: Hawaii BENCH MARK(S) ALSO
 RECOVERED BY: Carl A. Annis YEAR: 1969 COUNTY: Honolulu
 AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN:

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

Intersection station recovered in good condition as described
 by D. M. Whipp in 1965.

FORM C&GS-526 (9-65)
 USCOMM-OC 36389-Pee

U.S. DEPARTMENT OF COMMERCE
 ENVIRONMENTAL SCIENCE SERVICES ADMINISTRATION
 COAST AND GEODETIC SURVEY

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: KAHUKU MILL CHIMNEY
 STATE: HAWAII YEAR: 1927 THIRD ORDER

SOURCE: G-14543

GEODETIC LATITUDE: 21° 40' 55.54207	ELEVATION: METERS
GEODETIC LONGITUDE: 157° 57' 09.63817	FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	∠ OR Δ OR ANGLE °
HI 3	5105	516,067.85	187,227.15	+ 0° 01' 03"

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

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

THESE DATA OBTAINED FROM ADJUSTMENT OF OCT 1971

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 OLD HAWAIIAN DATUM

QUAD 211574 STATION 1026
 HAWAII
 LATITUDE 21 ° 30' TO 22 ° 00'
 LONGITUDE 157 ° 30' TO 158 ° 00'
 DIAGRAM NF 4-11 OAHU

ANCHOR (Hawaii, H.A.P., 1932) -- About 1.6 miles NW of the town of Kahuku, 0.9 mile SE of the Radio Corporation power plant, in the center of a large concrete block, 8 by 6 by 5 feet, formerly the middle anchor block of the E guy of the SE mast of a tall antenna. The mast has been removed.

Station mark is a standard station disk set in the top of the concrete block.

R.M. 2 is a standard reference-mark disk set in a similar block.

R.M. 1 is in range with the Kahuku Mill chimney. It is a standard reference-mark disk with the arrow pointing toward the station set in concrete in a depression in outcropping bedrock.

OBJECT	DISTANCE	DIRECTION
KEANA	meters	0°00'00"0
R.M. 1	28.21	15 15 40
R.M. 2	30.64	111 48 20
High-water line	164	268

Height of signal above station mark - 3 meters.

Height of instrument above station mark - 1.5 meters.

ANCHOR (Hawaii, H.A.P., 1932; G.A.N., 1952)

All marks in good condition. Station is 1.0 mi. SE of the intersection of the two runways of Kahuku airfield, 0.8 mi. NW of the C.A.A. Kahuku radio tower, and about 225 yd. NE of the edge of the S runway.

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: ANCHOR

STATE: HAWAII

YEAR: 1932

THIRD

ORDER

SOURCE: G- 9889

GEODETIC LATITUDE:	21 ° 42' 14.075	ELEVATION:	2	METERS
GEODETIC LONGITUDE:	157 57 43.823	SCALED		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ FOR Δ & ANGLE *
HI 3	5103	512,841.74	195,150.50	+ 0° 00' 50"

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From seab)	PLANE AZIMUTH * (From seab)	CODE
KEANA	322 33 25.4	322 32 35	5103

QF 161

(continued on next page)

HORIZONTAL CONTROL DATA

by the
 NATIONAL GEODETIC SURVEY
 OLD HAWAIIAN DATUM

QUAD 211574 STATION 1026

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

ANCHOR (continued)

FORM 526a
 (2-18-68)

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

R

NAME OF STATION: ANCHOR
 ESTABLISHED BY: H.A.P. YEAR: 1932 STATE: Hawaii
 RECOVERED BY: D.G. Rushford YEAR: 1964 COUNTY: Honolulu

OBJECT	BEARING	DISTANCE		DIRECTION
		FEET	METERS	
1932 DISTANCE & DIRECTION				
KEANA				0 00 00.0
R.M. 1			28.21	15 15 40
R.M. 2			30.64	111 45 20
-----1964 DISTANCE-----				
R.M. 1		92.450	28.179	
R.M. 2		100.478	30.626	

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

Station is located on the north end of Oahu, about 1-1/2 miles northwest of Kahuku, at east end of old Kahuku Airfield. It is 1 mile southeast of intersection of the two runways, 0.3 mile northwest of southeast end of the easterly runway and about 225 yards northeast of edge of the runway, about 150 yards southwest from seashore, about 650 yards southeast of the southeast end of the prominent sand dunes, in a low, flat area.

To reach station from the Kahuku Plantation office in Kahuku, go northwest on State Highway 83 for 2.1 miles; turn right on paved side road and go 0.5 mile to buildings on left. Turn right and follow track road (old railroad grade) for 0.75 mile to crossroad and gate on left. Pass through gate and follow track road across airfield for 0.3 mile to runway. Cross runway and continue on road, bearing right, for 0.15 mile to station.

Station mark is a standard disk stamped "ANCHOR 1932", cemented in a drill hole in the top and center of a large concrete block 6 x 7 feet in size and 5 feet high, with a sloping west side. It is the center one of 3 blocks in a row that were formerly anchors for the east guy cables of a radio mast now removed.

Reference mark number one is a standard disk stamped "ANCHOR 1", cemented in a drill hole in coral bedrock flush with ground and is about 5 feet lower than station mark.

Reference mark number two is a standard disk stamped "ANCHOR 2", cemented in a drill hole in the first concrete block in the row of east anchors. It is 100 feet east from the concrete base of the old radio mast. The mark is about 10 inches 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.

USCOMG-DC 37178-060

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 211574 STATION 1027
 HAWAII
 LATITUDE 21° 30' TO 22° 00'
 LONGITUDE 157° 30' TO 158° 00'
 DIAGRAM NF 4-11 OAHU

SEE STATION KAAAWA

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: Bench Mark F-4
 ESTABLISHED BY: H.A.P. YEAR: 1932 STATE: Hawaii
 RECOVERED BY: P.J. Tucker Jr 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.

NAME OF STATION: BENCH MARK F 4
 STATE: HAWAII YEAR: 1932 THIRD ORDER

SOURCE: G- 1372
 NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	21° 32' 42.28	ELEVATION:	1	METERS
GEODETIC LONGITUDE:	157 50 41.49	SCALED		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	# IOR Δ #1 ANGLE *
HI 3	5103	552,726.15	137,479.48	+ 0° 03' 25"

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE # IOR Δ #1 FORMULA NEGLECTING THE SECOND TERM.

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

POSITION DETERMINED BY TRAVERSE FROM STATION KAAAWA

* 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 94314

QF 196

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 211574 STATION 1028
 HAWAII
 LATITUDE 21° 30' TO 22° 00'
 LONGITUDE 157° 30' TO 158° 00'
 DIAGRAM NF 4-11 OAHU

SEE STATION RADIO

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: HUB NEAR STA RADIO
 STATE: HAWAII YEAR: 1962 THIRD -ORDER

SOURCE: G-12799
 NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	21° 31' 27.6655	ELEVATION:	METERS
GEODETIC LONGITUDE:	157 59 59.1481		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	ϕ OR Δ ϕ ANGLE *
HI 3	5103	500,080.43	129,924.55	+ 0° 00' 00"

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE
POSITION DETERMINED BY TRAVERSE FROM STATION RADIO			
QF 245			

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 OLD HAWAIIAN DATUM'

QUAD 211574 STATION 1029
 HAWAII
 LATITUDE 21 ° 30' TO 22 ° 00'
 LONGITUDE 157 ° 30' TO 158 ° 00'
 DIAGRAM NF 4-11 OAHU

KAAAWA (Hawaii, H.A.P., 1932)--Two miles N of Kaneohe Bay, about 1/2 mile SSE of Kaaawa School, near a group of 5 houses, 6 meters E of Kanehameha Highway, 1 foot E of a stone wall.

Station mark is a standard disk set in concrete. Under-ground mark is a standard disk set in a block of concrete 3 feet below the ground containing at the center of its upper surface a glass bottle with neck projecting a little above the concrete.

Witness mark 1 is Bench Mark F-4.

Witness mark 2 is doorway of "Maliahono" a dark red house trimmed in yellow.

Reference mark 1 is a standard reference disk set in edge of pavement.

OBJECT	DISTANCE	DIRECTION
MOKAPU	meters	0°00'00"0
W.M. 1	32.96	18 09 30
W.M. 2	26.80	77 17 00
R.M. 1	6.19	93 24 30
High-water line	3-1/2	290

Height of instrument above station mark - 1.7 meters.

(11-8-65)

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: KAAAWA
 ESTABLISHED BY: H.A.P. YEAR: 1932 STATE: Hawaii
 RECOVERED BY: P.J. Tucker YEAR: 1965 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. The concrete monument with station disk in it was found laying on the beach in 1959 by a Sgt. Hill of the USMC, and as indicated by correspondence on file in the Honolulu Field Office, the disk was turned in to the office.

Reference Mark number 1 could not be found and is probably covered over with new road surfacing. Bench mark F-4, used as witness mark 1, is also destroyed.

"Maliahono" house mentioned in original description could not be identified, and according to Mr. Eak Williams, who lives in one of the old houses and has been there for many years, there was no house of that name.

* 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 34314

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: KAAAWA

STATE: HAWAII

YEAR: 1932

THIRD

-ORDER

SOURCE: G- 1372

GEODETIC LATITUDE:	21 ° 32 ' 43.193	ELEVATION:	1 METERS
GEODETIC LONGITUDE:	157 50 42.092	SCALED	FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	# HOR Δ #1 ANGLE *
HI 3	5103	552,669.22	137,571.55	+ 0 ° 03 ' 25 "

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE # HOR Δ #1 FORMULA NEGLECTING THE SECOND TERM.

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

QF 195

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 OLD HAWAIIAN DATUM

QUAD 211574 STATION 1030
 HAWAII
 LATITUDE 21° 30' TO 22° 00'
 LONGITUDE 157° 30' TO 158° 00'
 DIAGRAM NF 4-11 OAHU

Kaunamakua (Oahu Island, L. G. Simmons, 1927).—About east of center of island of Oahu, on the summit of Puu Kaunamakua, on the divide of the Koolau Range. It is reached by the Schofield-Waikane trail and is about ¼ mile south of where the trail crosses the divide. Marked by standard disk station mark in tile, note 6a. Reference mark, a standard reference disk in tile, note 13a, is 3.55 meters (11.6 feet) from station in azimuth 145° 08'. Re-marked according to note 14X in 1929.

(11-2-55)

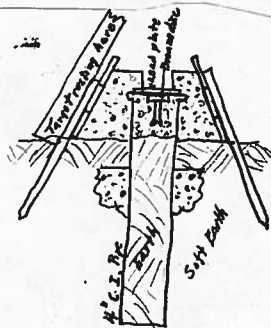
RECOVERY NOTE, TRIANGULATION STATION

R

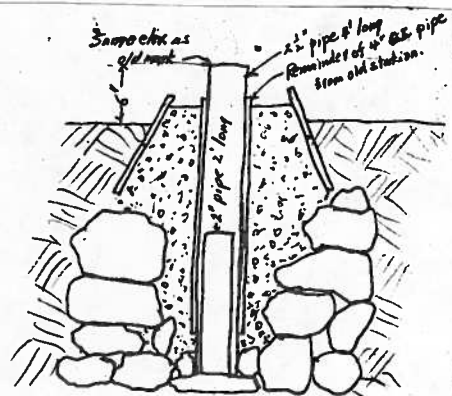
NAME OF STATION: KAAUMAKUA
 ESTABLISHED BY: L.G.S. YEAR: 1927 STATE: Hawaii
 RECOVERED BY: P.H.Kanahale YEAR: 1953 COUNTY: Honolulu

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

Cowboys of Mr. McCandless reported to Mr. W.A. Wall, that the target for the station was down and this in turn was communicated to this office. On account of the discrepancies of the triangulation in the vicinity of Waichole, an inspection of this station was necessary and hence the reconstruction of same. Target sheared off thru the loosening of guy wires. Found 2x4-inch braces pretty well rotted away. On removal of same, station became loose due to its being top heavy and in soft ground. Station remarked by 2½-inch pipe 4 feet long in tile in concrete, reference mark same as described above. Repainted target red and white. Elevation not changed.



Sta. as of June 4, 1923



Sta. as of June 5, 1953.

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: KAAUMAKUA

STATE: HAWAII

YEAR: 1927

THIRD

-ORDER

SOURCE: G-SP156

GEODETIC LATITUDE: 21° 30' 16.405	ELEVATION: 817 METERS
GEODETIC LONGITUDE: 157° 54' 02.268	SCALED FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	± (OR Δ) ANGLE °
HI-3	5103	533,781.04	122,745.00	+ 0° 02' 11"

* 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

Q1 414

(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 211574 STATION 1030

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

KAAUMAKUA (continued)

Form 528
(11-3-55)
U.S. DEPARTMENT OF COMMERCE - COAST AND GEODETIC SURVEY
RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: KAAUMAKUA
ESTABLISHED BY: L.G.S. YEAR: 1927 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 and reference mark were recovered. The reference mark was found in good condition, however the station was found in poor condition, being several inches out of position and not marked as originally described. It had been moved by wind after guy-cables supporting the large metal target had rusted away; the ground is quite soft due to rain. It was subsequently learned that the station had been re-marked in 1933, at which time the original mark was found moved in the same manner. A complete description follows:

Station is located about 8 miles east of Wahiawa, 4 miles southwest of Kahana Bay and 3/4-mile due west of Waikane Camp, on the divide of the Koolau Range, on the summit of Puu Kaaumakua, a peak of about 2681 feet elevation.

To reach station from the post office in Kaneohe, go northerly on State Highway 83 for 6.5 miles to the Waiahole Poi Factory on left; continue on the highway for 0.7 mile to dirt side road left at hydrant No. W888. Go left on the dirt road for 0.8 mile to fork. Take right fork, down into canyon, and go 1.2 miles to chain gate. Pass through and continue up canyon road for 1.2 miles to end of truck travel at the first one of the 3 cabins at Waikane Camp. Cross stream on right and pack on good trail (Schofield-Waikane Trail) about 1 mile to trail junction in saddle of divide. Turn back sharp left and follow trail up ridge about 1 mile to junction at trail sign and metal post, below top of divide. Turn back sharp left and follow trail about 300 yards, to where it crosses over the main divide. Continue on trail along south side of ridge for about 300 yards to where saddle in ridge line is only about 25 feet above trail. Leave trail, going up through dense brush to saddle, then easterly along rugged, brushy ridge line for about 250 yards to highest point and station.

The station is marked by a 2-1/2-inch, iron pipe projecting 4 inches from the top of a 10-inch-square, concrete monument that is flush with the ground. It is located in a small, open, grassy area.

The reference mark is a standard disk stamped "KAAMAKUA 1927" set in concrete in the top of a 4-inch soil pipe that projects 1 foot above ground. It is located at the northwest end of the open grassy area, just outside the dense brush.

NOTE: Since there is only one reference mark no attempt was made to re-position the station mark.

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 OLD HAWAIIAN DATUM

QUAD 211574 STATION 1031
 HAWAII
 LATITUDE 21° 30' TO 22° 30'
 LONGITUDE 157° 30' TO 158° 00'
 DIAGRAM NF 4-11 OAHU

NO ORIGINAL TEXT

Kahuku (Oahu Island, Hawaiian Government Survey, 1875; O. B. French, 1910).—On the summit of a sand dune near the north point of Oahu, in line with a long stone wall running due south. It is 200 feet from a Y cut in the rock north of station and 300 feet from a similar cut in the rock to the south; both marks being exactly in line with *Puuki* station. In 1910 recovered cylindrical concrete post with cross in top, on prominent sand dune. Brick latitude pier still in place. Concrete post marking triangulation station not in original position, having been replaced only approximately by J. S. Emmerson. Is probably some 8 or 9 feet out of position.

KAHUKU (Hawaii, Hawaiian Government Survey, 1875; H.A.P., 1932) --Station has been destroyed by erosion of sand dune. The "Y" in rock, 200 feet N of the station, was recovered. The "Y" S of station was searched for but not found. Latitude pier still in place and in good condition.

KAHUKU (Hawaii, Hawaiian Government Survey, 1875; G.A.N., 1952)

--All marks and the latitude destroyed when Kahuku airfield was built.

(11-8-55)

RECOVERY NOTE, TRIANGULATION STATION

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

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

The station is gone. The approximate location was determined by check angle; the sand has been removed from this area.
 The "Y" cut in rock, to north of station, was found. It about 14 inches long and is located at a right-angle bend in shoreline, at the south end of the rock, 6 feet west of a 6-foot-high, iron post.

* 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

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: **KAHUKU**
 STATE: **HAWAII** YEAR: **1875** THIRD ORDER
 SOURCE: **G-SP156**

GEODETIC LATITUDE:	21° 42' 44.844	ELEVATION:	6 METERS
GEODETIC LONGITUDE:	157 58 59.583	SCALED	FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	ϕ OR Δ OR ANGLE *
HI 3	5103	505,697.10	198,253.94	+ 0 00 22

* 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

QI 306

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 211574 STATION 1032
 HAWAII
 LATITUDE 21° 30' TO 22° 00'
 LONGITUDE 157° 30' TO 158° 00'
 DIAGRAM NF 4-11 OAHU

NO TEXT

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: KAHUKU
 STATE: HAWAII YEAR: 1887 SECOND ORDER

SOURCE: G-SP156

GEODETIC LATITUDE:	21°42'41.55	ELEVATION:	7 METERS
GEODETIC LONGITUDE:	157 58 59.79	SCALED	FEET

STATE COORDINATES (Ft)				
STATE & ZONE	CODE	X	Y	θ OR Δ OR ANGLE *
HI 3	5103	505,677.61	197,921.56	+ 0° 00' 22"

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

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

QD 356

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 OLD HAWAIIAN DATUM

QUAD 211574 STATION 1033
 HAWAII
 LATITUDE 21° 30' TO 22° 00'
 LONGITUDE 157° 30' TO 158° 00'
 DIAGRAM NF 4-11 OAHU

DEPARTMENT OF COMMERCE
 U. S. COAST AND GEODETIC SURVEY
 Form 528
 Rev. Aug. 1968

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: **KAHUKU RADIO BEACON** STATE: **Hawaii** COUNTY: **Honolulu**

CHIEF OF PARTY: **W.R. Porter** YEAR: **1957** Described by: **VVT**
 HEIGHT OF TELESCOPE ABOVE STATION MARK METERS.1 HEIGHT OF LIGHT ABOVE STATION MARK METERS.

NOTE*	HEIGHT OF TELESCOPE ABOVE STATION MARK METERS.1	DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION			
		OBJECT	BEARING	DISTANCE feet meters	DIRECTION: O / #
Surface-station mark, Underground-station mark					

The Station is located on the Northern end and Northeast coast of Oahu Island and lies approximately 1 mile Northwest of Kahuku. Station is the top of a red and white, 312 feet high (HHW) Radio Beacon Tower, which is in the center of 4 abandoned concrete tower foundations.
 The Station can be reached by going 0.8 miles Westerly on Kamehameha Highway from Kahuku, then Northeasterly 0.8 miles on dirt road to station site.

Form 528
 (11-8-55)

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

RECOVERY NOTE, TRIANGULATION STATION INTERSECTION

NAME OF STATION: **Kahuku Radio Beacon**
 ESTABLISHED BY: **W.R. Porter** YEAR: **1957** STATE: **Hawaii**
 RECOVERED BY: **D.G. Rushford** YEAR: **1964** COUNTY: **Honolulu**

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

Station was recovered. Located about 1 mile north-northwest of village of Kahuku and 2-1/2 miles southeast of the northernmost tip of Oahu. Station is a 4-legged, skeleton steel structure, 320 feet high, painted alternate red and white, with an off-center, red obstruction light on top. Center of tower was intersected.

* 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.

CGSS-DC 34314

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: **KAHUKU RADIO BEACON**

STATE: **HAWAII** YEAR: **1957**

SOURCE: **G-11589**

GEODETIC LATITUDE:	21° 41' 42.263	ELEVATION:	METERS
GEODETIC LONGITUDE:	157 57 22.181		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	ϕ OR Δ OR ANGLE *
HI 1	5101	334,051.72	1,045,948.75	- 0 54 30

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

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

State Plane Coord Wrong

QF 200

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 OLD HAWAIIAN DATUM

QUAD 211574 STATION 1034
 HAWAII
 LATITUDE 21° 30' TO 22° 00'
 LONGITUDE 157° 30' TO 158° 00'
 DIAGRAM NF 4-11 OAHU

Kapaka (Oahu Island, O. B. French, 1910).—On the most prominent point about 1/2 mile south of Hauula railway station, about 100 feet from the road and 50 feet from the beach. Marked by a short cross in top of an irregular-shaped stone, set with top just below surface of ground.

KAPAKA (Hawaii, O.B.F., 1910; H.A.P., 1933)

--Searched for but could not be found.

Distance and azimuth laid off from station WAIMANANA and found to be at edge of vegetation. Large hole dug but no mark found.

Recommend station be classified as lost.

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: KAPAKA
 STATE: HAWAII YEAR: 1910 THIRD ORDER
 SOURCE: G-SP156

(11-9-55)

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: KAPAKA
 ESTABLISHED BY: O.B.F. YEAR: 1910 STATE: Hawaii
 RECOVERED BY: D.G. Rushford YEAR: 1964 COUNTY: Honolulu

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

Station is believed to be destroyed. The area where it was located is now occupied by some houses..

GEODETIC LATITUDE:	21° 36' 20.404	ELEVATION	1	METERS
GEODETIC LONGITUDE:	157 54 02.994	SCALED		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	∠ OR ∆ ∠ ANGLE *
HI 3	5103	533,689.13	159,473.17	+ 0° 02' 12"

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE ∠ OR ∆ ∠ 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.

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 211574 STATION 1035
HAWAII
LATITUDE 21 ° 30' TO 22 ° 00'
LONGITUDE 157 ° 30' TO 158 ° 00'
DIAGRAM NF 4-11 OAHU

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: KEANA
STATE: HAWAII YEAR: 1927 SECOND ORDER

SOURCE: G-SP156

GEODETIC LATITUDE: 21 ° 40' 43.491	ELEVATION: 6 METERS
GEODETIC LONGITUDE: 157 56 29.620	SCALED FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	ϕ ° OR Δ ' θ ' ANGLE °
HI 3	5103	519,842.67	186,012.42	+ 0° 01' 18"

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

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

Keana (Oahu Island, L. G. Simmons, 1927).—On north coast of Oahu, about $\frac{3}{4}$ mile east-southeast from Kahuku sugar mill, in center of western edge of long sand dune directly behind Kahuku ball park, just east of Kahuku. Marked according to note 6a, a standard disk station mark set in concrete in top of tile. Reference marks, note 13a, standard reference disks in concrete in tiles, are at the following distances and azimuths from station: No. 1, 14.500 meters (47.57 feet), $51^{\circ} 50'$; No. 2, 39.432 meters (129.37 feet) $129^{\circ} 03'$. Re-marked according to note 14A in 1929.

(477th FA Obsn. Bn., 1948)--From road junction of Highways 1 and 141, proceed SE 0.2 mile on Highway 1 to a road junction, turn left and go N 0.12 mile to NW edge of Kahuku plantation village. There are three forks in the road, take the right-hand fork and go 0.2 mile E on this fork. Station is about 80 yards N of the road. It is on the top of a sand dune and there is a sand pit about 70 yards SE of the station.

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

(11-B-88)

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: KEANA
ESTABLISHED BY: L.G.S. YEAR: 1927 STATE: Hawaii
RECOVERED BY: D.M. Whipp YEAR: 1965 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. A report found in the files of the Hawaii State Survey Office, dated Nov. 15, 1954, states that the station was destroyed.

A search was made at the site but neither of the reference marks were recovered.

* 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.

FORM-DC 34814

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 OLD HAWAIIAN DATUM

QUAD 211574 STATION 1036
 HAWAII
 LATITUDE 21 ° 30' TO 22 ° 00'
 LONGITUDE 157 ° 30' TO 158 ° 00'
 DIAGRAM NF 4-11 OAHU

Kualoa (Oahu Island, L. G. Simmons, 1927).—On east coast of Oahu, about 2½ miles north-northeast of Waikane on the most easterly of the high peaks along the ridge dividing the Kualoa and Kaaawa districts, and about ¼ mile from shore. Marked according to note 6a, standard disk in tile. Reference mark is standard reference disk in tile, note 13a, set 5.785 meters (18.98 feet) from station in azimuth 32° 42'. Re-marked according to note 14E in 1929.

KUALOA (Hawaii, L.G.S., 1927; H.A.P., 1933)

--Recovered in good condition. Marked with 4"x4", 7 feet long, held in place with 4 guys, set on concrete block 12 by 12 inches extending 18 inches above ground with soil pipe set in center. The best route to reach the station is found 1/2 mile SE and follows the ridges.

(11-8-55)

RECOVERY NOTE, TRIANGULATION STATION INTERSECTION

R

NAME OF STATION: KUALOA
 ESTABLISHED BY: L.G.S. YEAR: 1927 STATE: Hawaii
 RECOVERED BY: D.M. Whipp YEAR: 1965 COUNTY: Honolulu

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

Station was not visited. It is located on a peak near the northeast end of Puu Kanehoalani, a very rugged ridge that is bordered by sheer cliffs and extremely steep ridges. The hill is composed of a type of soft, or rotten, rock, as are most of the mountains on Oahu, making climbing extremely hazardous.

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: KUALOA
 STATE: HAWAII YEAR: 1927 SECOND ORDER
 SOURCE: G-SP156

GEODETIC LATITUDE:	21 ° 31' 50.735	ELEVATION:	456 METERS
GEODETIC LONGITUDE:	157 50 44.267	SCALED	FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ 10R Δ 01 ANGLE *
HI 3	5103	552,469.13	132,278.23	+ 0° 03' 24"

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE θ 10R Δ 01 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.

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 OLD HAWAIIAN DATUM

QUAD 211574 STATION 1037
 HAWAII
 LATITUDE 21° 30' TO 22° 00'
 LONGITUDE 157° 30' TO 158° 00'
 DIAGRAM NF 4-11 OAHU

NO ORIGINAL TEXT

LAIE-LAIE 2 (Honolulu County, Hawaii, H.G.S., 1875;
 L. G. Simmons, 1927).—In the land of Laie, on a sandstone promontory, near a
 transverse dyke of harder rock. Station is east of highest part of ridge, but is
 on a commanding point. Marked by a concrete post with cross in top. In 1927
 station recovered as described, and called *Laie 2* in records.

FORM 526a
 (6-18-63)

U.S. DEPARTMENT OF COMMERCE
 COAST AND GEODETIC SURVEY

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: LAIE-LAIE 2
 ESTABLISHED BY: Haw. Govt. Surv. YEAR: 1875 STATE: Hawaii
 RECOVERED BY: D.M. Whipp YEAR: 1965 COUNTY: Honolulu

HEIGHT OF TELESCOPE ABOVE STATION MARK 1.52 METERS, HEIGHT OF LIGHT ABOVE STATION MARK METERS.

OBJECT	BEARING	DISTANCE		DIRECTION
		FEET	METERS	
		PUUKI 1875 1927 R.M. No. 2 R.M. No. 1	NW WNW	

The old mark, consisting of a cross in the top of a 6-inch square concrete post, flush with ground, was recovered. Station was re-marked with a standard disk and two reference marks established. A complete description follows:

Station is located on Laie Point, about 1/4-mile east of the town of Laie; along the crest of the point, behind the house at address 55-113.

To reach station from the post office in Hauula, go northerly on State Highway 83 for 2.9 miles to the Polynesian Cultural Center at Laie;

continue on the highway for 0.45 mile; turn right on Anemoku St. and go upgrade for 0.15 mile to T-intersection. Turn right and go 0.05 mile on Naupaka Street to house on left at address 55-113, and station about 45 yards north of street, just outside north property line of the home.

Station mark is a standard disk, stamped "LAIE 2 1875-1927 1965", set in the top of a 10-inch square, concrete monument that projects 6 inches above ground. It is 31.8 feet north of northeast corner of house, 1.8 feet west of a line extended from east side of house, and 17.2 feet northwest of the pipe marking northeast corner of lot.

Reference mark number one is a standard disk stamped "LAIE 2 1875-1927 NO 1 1965", cemented in a drill hole in a narrow, coral, bedrock outcropping that projects 1 inch above ground. It is in an open area along crest of bluff, 41.3 feet north of northwest corner of house, 43.0 feet east-northeast of pipe marking northwest corner of lot, 2-1/2 feet east of a line extended from west side of house, and about 16 inches higher than station mark.

Reference mark number two is a standard disk stamped "LAIE 2 1875-1927 NO 2 1965", cemented in a drill hole in a coral bedrock outcrop that projects 3 inches above ground. It is down on the north slope of the bluff, in line with a cutbank on next lot to east, and is 1 foot 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.

USCOM-DC 87179-P89

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: LAIE-LAIE 2

STATE: HAWAII

YEAR: 1875

THIRD

-ORDER

SOURCE: G-SP156

GEODETIC LATITUDE: 21° 39' 06.202	ELEVATION: 15 METERS
GEODETIC LONGITUDE: 157 55 16.418	SCALED FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	ϕ OR Δ ρ1 ANGLE °
HI 3	5103	526,751.94	176,198.70	+ 0° 01' 45"

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE
PUUKI	111° 14' 50.6"	111° 13' 06"	5103

QI 307

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 OLD HAWAIIAN DATUM.

QUAD 211574 STATION 1038
 HAWAII
 LATITUDE 21 ° 30' TO 22 ° 00'
 LONGITUDE 157 ° 30' TO 158 ° 00'
 DIAGRAM NF 4-11 OAHU

Lai 1 (Oahu Island, L. G. Simmons, 1927).—On the northeast coast of Oahu, near the outer end of Lai 1 Point, about ¼ mile from the old Lai 1 station (see description thereof), probably ¼ mile east-southeast from Lai 1 settlement. This station was established by the United States Engineers, and was marked by a United States Engineers' brass plate cemented in a 5-inch pipe. In 1927 this was covered with a cap of concrete and a standard disk station mark centered in top. Re-marked according to note 14A in 1929.

(477th FA Obsn. Bn., 1945)—Near the outer end of Lai 1 Point. From intersection of Highway 1 and railroad in Lai 1, proceed SE via Highway 1 for 0.6 mile to junction with dirt road leading NE, thence NE via dirt road for 0.35 mile to station site. Station is marked according to Note 14A. Structure is in fair condition. Mark is in good condition.

LAI 1 (Hawaii, L.G.S., 1927; G.A.N., 1952)

--Destroyed by Army during war years.

(11-8-55)

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: LAI 1
 ESTABLISHED BY: L.G.S. YEAR: 1927 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 reported destroyed by the army during WW 2. The site was visited and no marks could be found. There was a Type A, Territory of Hawaii survey signal over the mark but no trace of this structure could be found. Station is destroyed.

* 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 343 14

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION LAI 1
 STATE HAWAII YEAR 1927 SECOND -ORDER

SOURCE: G-SP156

GEODETIC LATITUDE:	21 ° 39' 06.507	ELEVATION	12	METERS
GEODETIC LONGITUDE:	157 55 06.203	SCALED		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ HOR Δ θ ANGLE *
HI 3	5103	527,715.56	176,229.97	+ 0 ° 01' 48 "

* 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

QI 284

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 OLD HAWAIIAN DATUM

QUAD 211574 STATION 1039
 HAWAII
 LATITUDE 21° 30' TO 22° 00'
 LONGITUDE 157° 30' TO 158° 00'
 DIAGRAM NF 4-11 OAHU

NO ORIGINAL TEXT

LARGE CHIMNEY (Hawaii, O.B.F., 1910; H.A.P., 1932)
 --Station is 0.8 mile N of Kualoa Point, 8 me-
 ters W of the paved highway, a square grey chimney 65 feet tall,
 near SE corner of ruins of rock wall building. Chimney is made
 of stone masonry for about 40 feet and remainder of grey bricks.
 Said to be first sugar mill on Oahu.

Form 528
 (11-6-55)

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

RECOVERY NOTE, TRIANGULATION STATION INTERSECTION

NAME OF STATION: Large Chimney
 ESTABLISHED BY: O.B.F. YEAR: 1910 STATE: Hawaii
 RECOVERED BY: W.R. Porter YEAR: 1963 COUNTY: Honolulu

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

Recovered and found in good condition. Station is about 2-1/4
 miles airline southeast of Kaaawa, 1 mile north of southeast tip of
 Kualoa Point and 0.3 mile north of point where highway reaches beach;
 29 feet west of center line of State Highway 83 and 6 feet west of
 fence line. It is 10 feet square at the base, and 57 feet high. The
 first 36 feet of the chimney is constructed of grey stone and the
 remainder is grey brick. It is located at the southeast corner of
 the ruins of a 120-foot-long, grey, stone building.

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: Large Chimney
 ESTABLISHED BY: O.B.F. YEAR: 1910 STATE: Hawaii BENCH MARK(S) ALSO
 RECOVERED BY: R. B. Melby YEAR: 1975 COUNTY: Honolulu
 AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: 2 1/2 miles SSE of Kaaawa

Detailed statement as to the fitness of the original description; including marks found, stampings, changes made, and other pertinent facts:
 Recovered as described in 1963. It is actually a stack, and at
 the site of an old sugar mill.

FORM 528-526 (9-65)
 USCOM-DC 26495-P56

U.S. DEPARTMENT OF COMMERCE
 ENVIRONMENTAL SCIENCE SERVICES ADMINISTRATION
 COAST AND GEODETIC SURVEY

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: LARGE CHIMNEY
 STATE: HAWAII YEAR: 1910 THIRD ORDER

SOURCE: G-SP156
 NO OBSERVATION CHECK ON THIS POSITION

GEODETTIC LATITUDE:	21° 31' 32.31"	ELEVATION:	METERS
GEODETTIC LONGITUDE:	157° 50' 17.19"		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	8 FIGURE ANGLE
HI 3	5103	555,027.52	130,421.71	+ 0° 03' 34"

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE 8 FIGURE ANGLE FORMULA NEGLECTING THE SECOND TERM.

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

QI 412

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 211574 STATION 1040
 HAWAII
 LATITUDE 21 ° 30' TO 22 ° 00'
 LONGITUDE 157 ° 30' TO 158 ° 00'
 DIAGRAM NF 4-11 OAHU

SEE STATION KAAAWA

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: MALIAHONO HOUSE DOORWAY
 STATE: HAWAII YEAR: 1932 THIRD ORDER

SOURCE: G- 1372
 NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	21 ° 32' 42.42"	ELEVATION:	METERS
GEODETIC LONGITUDE:	157 50 42.52		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	ϕ FOR Δ ϕ ANGLE *
HI 3	5103	552,628.90	137,493.51	+ 0 ° 03' 25"

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From secb)	PLANE AZIMUTH * (From secb)	CODE
POSITION DETERMINED BY TRAVERSE FROM STATION KAAAWA			
QF 197			

NOV 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 211574 STATION 1041
 HAWAII
 LATITUDE 21° 30' TO 22° 00'
 LONGITUDE 157° 30' TO 158° 00'
 DIAGRAM NF 4-11 OAHU

DESCRIPTION OF TRIANGULATION INTERSECTION STATION

NAME OF STATION: MOKOLII ISLAND 2

CHIEF OF PARTY: C.K. Townsend YEAR: 1976 STATE: Hawaii COUNTY: Honolulu

Description, including sketch of object:

Station is located on the highest part of Mokolii Island which is at the north end of Kaneohe Bay on the east coast of Oahu. Station is a NOS disk stamped MOKOLII ISLAND 2 1976, and is set in bedrock at the approximate location of MOKOLII ISLAND 1926. It was located by intersection.

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

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

ADJUSTED HORIZONTAL CONTROL DATA

ADJUSTMENT BY NGS

NAME OF STATION: MOKOLII ISLAND 2

OBS BY NGS

STATE: HAWAII

YEAR: 1976

THIRD

ORDER

SOURCE: 6-15809

GEODETIC LATITUDE: 21° 30' 45.90712	ELEVATION: 63.0 METERS
GEODETIC LONGITUDE: 157 49 56.05238	207 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ θ ANGLE*
HI 3	5103	557,028.31	125,741.68	+ 0° 03' 42"

* 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

THESE DATA OBTAINED FROM ADJUSTMENT OF AUG 1979

K9 029

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 211574 STATION 1042
 HAWAII
 LATITUDE 21° 30' TO 22° 00'
 LONGITUDE 157° 30' TO 158° 00'
 DIAGRAM NF 4-11 OAHU

Papau (Oahu Island, O. B. French, 1910).—More than a mile back from the shore, on the eastern brow of the last and highest summit, but one, of the Kaipapau ridge. It is the farthest summit to the west from which station *Puna* can be seen. Station is just off the top of the hill, avoiding bad brush on its top. Marked by ½-inch drill hole in a small stone set with top just above ground.

FORM 528
 (11-6-55)

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

R

NAME OF STATION: PAPAU
 ESTABLISHED BY: O.B.F. YEAR: 1910 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 is believed to be destroyed. A search was made but it could not be found. A road was bulldozed along the crest of the entire ridge during WW2 and since the top of the station hill is quite narrow it is believed that the mark was destroyed then.

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: PAPAU
 STATE: HAWAII YEAR: 1910 THIRD ORDER

SOURCE G-SP156

GEODETIC LATITUDE:	21° 36' 44.616	ELEVATION:	366 METERS
GEODETIC LONGITUDE:	157 55 59.682	SCALED	FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ OR ANGLE*
HI 3	5103	522,676.73	161,910.36	+ 0 01 29*

* 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

* 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 34914

QI 308

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 OLD HAWAIIAN DATUM

QUAD 211574 STATION 1043
 HAWAII
 LATITUDE 21° 30' TO 22° 00'
 LONGITUDE 157° 30' TO 158° 00'
 DIAGRAM NF 4-11 OAHU

Puna (Oahu Island, O. B. French, 1910).—On the north side of Kahana Bay, in a small opening of the low brush, some 40 feet from the road toward the sea. An angle in the fence which borders the land side of the road is in line with the lowest gap in the mountains toward the west, the point where the north slope of the near ridge cuts the south slope of the more distant mountains. Kahana Bay is open except for a small part of its northwest corner. Station marked by a small stone about 8 by 6 inches and 4 inches thick with cross cut in top set some 6 inches below surface of ground. Above this is an irregular stone with 1/4-inch drill hole in top, projecting some 3 or 4 inches above ground.

(11-8-65)

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: PUNA
 ESTABLISHED BY: O.B.F. YEAR: 1910 STATE: Hawaii
 RECOVERED BY: F.J. Tucker YEAR: 1965 COUNTY: Honolulu

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

Station was searched for but not found and is believed to be destroyed. There are now homes in this vicinity.

* 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

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: PUNA
 STATE: HAWAII YEAR: 1910 THIRD ORDER
 SOURCE: G-SP156

GEODETIC LATITUDE:	21 34 31.972	ELEVATION:	1 METERS
GEODETIC LONGITUDE:	157 52 40.329	SCALED	FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ HOR Δ ϕ ANGLE *
HI 3	5103	541,498.46	148,537.67	+ 0° 02' 42"

* 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

QI 309

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 OLD HAWAIIAN DATUM

QUAD 211574 STATION 1044
 HAWAII
 LATITUDE 21° 30' TO 22° 00'
 LONGITUDE 157° 30' TO 158° 00'
 DIAGRAM NF 4-11 OAHU

Station Z (Oahu Island, L. G. Simmons, 1927).—In central part of Oahu, about 3 miles east and a little north of Wahiawa. Best reached by driving up the road which lies just north of and parallels the first gulch north of Wahiawa. Follow this road to end (in an easterly direction), where there is a small house and garage. Follow the edge of the cliff to the south about 200 yards to the second point in the cliff, to the station. Established and marked by the United States Engineers, the mark being a rectangular brass plate cemented in a 5-inch iron pipe embedded in ground. In 1927 it was re-marked with standard disk station mark, note 1c, set in cement poured over old mark. Reference marks, note 13a, standard reference disks in concrete in tile, are at the following distances and azimuths from station: No. 1, 17.924 meters (58.81 feet), 18° 16'; No. 2, 11.470 meters (37.63 feet), 86° 17'. Re-marked according to note 14A in 1929.

STATION Z (Hawaii, L.G.S., 1927; 477th FA Obsn.Bn., 1945)
 -About 3 miles E and a little N of Wahiawa. Follow Highway 1 N from Wahiawa to junction with Highway 124, thence E on Highway 124 to Navy Radio Station, pass through station and follow Forest Service dirt road to point about 100 yards from ranger buildings. Station is to S on point of cliff. Brush and trees have grown up heavily about station, all lines will require clearing.

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

STATION Z (Hawaii, L.G.S., 1927; G.A.N., 1952)

--Recovered in good condition. Surrounded by 50- to 100-ft. eucalyptus trees.

(11-9-55)

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: STATION Z
 ESTABLISHED BY: L.G.S. YEAR: 1927 STATE: Hawaii
 RECOVERED BY: D.G. Rushford YEAR: 1964 COUNTY: Honolulu

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

Station was recovered and all marks found in good condition. Station is located in a dense grove of large eucalyptus trees up to about 100 feet high. Line of sight from station to reference marks is blocked by trees so the distances were not checked. A complete description follows:

Station is located about 2-3/4 miles east of Whitmore Village and 1-1/2 miles east of the Naval Radio Station, in heavy timber on rim of canyon, about 200 yards south of track road.

To reach from the Dole Corporation Offices in Whitmore Village, go east on State Highway 804 for 1.0 mile to entrance of Naval Radio Station; continue east, through the station on Center Street, for 0.75 mile to end of paved road at building No. 87; continue east, on dirt road, for 0.25 mile to locked gate. Pass through gate and continue on track road for 0.7 mile to end of road at old house. Pack southwest along rim of canyon for about 250 yards to station.

Station mark was previously described as being a standard disk, however it could not be examined because of a large iron yoke (which is part

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: STATION Z

STATE: HAWAII

YEAR: 1927

SECOND

ORDER

SOURCE: G-SP156

GEODETIC LATITUDE: 21° 31' 10.764	ELEVATION: 436.59 METERS
GEODETIC LONGITUDE: 157° 59' 05.134	1432.4 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	§ 10R Δ #1 ANGLE °
HI 3	5103	505,180.52	128,219.41	+ 0° 00' 20"

* 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

QI 278

(continued on next page)

HORIZONTAL CONTROL DATA

by the
NATIONAL GEODETIC SURVEY
OLD HAWAIIAN DATUM

QUAD 211574

STATION 1044

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

STATION Z (continued)

of the Type A signal) resting upon it. The concrete monument in which the mark is set is 14 inches square at the ground and tapers to 10 inches square about 1 foot above ground. The "Type A" signal, built in 1929 by the Hawaii Territorial Survey, has a 5-foot-square, concrete platform supported 4 feet above ground by 2 stone and mortar walls. A 2-1/2-inch iron pipe, supported by the iron yoke, extends up through center of platform and holds a red and white metal target that extends about 8 feet above the platform.

Reference mark number one is a standard disk stamped "STATION Z NO 1", set in cement in the top of a 4-inch soil pipe that projects 18 inches from the ground. It is 8 feet west of edge of canyon.

Reference mark number two is a standard disk stamped "STATION Z NO 2", set in cement in the top of a 4-inch soil pipe that projects 15 inches from the ground.

NOTE: Key to locked gate may be obtained at the Public Works Office on the Naval Radio Station.

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 OLD HAWAIIAN DATUM

QUAD 211574 STATION 1045
 HAWAII
 LATITUDE 21° 30' TO 22° 00'
 LONGITUDE 157° 30' TO 158° 30'
 DIAGRAM NF 4-11 OAHU

TIP (Hawaii, H.A.P., 1932) -- On the most N point of Oahu, on a low rocky neck. Station and R.M. 1 are standard disks set in concrete in depressions in outcropping bedrock.

R.M. 2 is a standard disk set on top of a solitary boulder.
 OBJECT DISTANCE DIRECTION
 LAK meters 0°00'00"0
 High-water line 25 47
 High-water line 14 169
 High-water line 18 220
 R.M. 1 12.57 253 06 45
 R.M. 2 35.69 339 21 10

Height of signal above station mark - 3 meters.
 Height of instrument above station mark - 1.5 meters.

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

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: TIP
 ESTABLISHED BY: H.A.P. YEAR: 1932 STATE: Hawaii
 RECOVERED BY: D.G. Rushford YEAR: 1964 COUNTY: Honolulu

HEIGHT OF TELESCOPE ABOVE STATION MARK 1.5 METERS, HEIGHT OF LIGHT ABOVE STATION MARK METERS.

OBJECT	BEARING	DISTANCE		DIRECTION
		FEET	METERS	
OPANA 1927				00 00 00.0
R.M. No. 1	E	41.165	12.548	228 56 22
R.M. No. 3	SSW	22.675	6.912	329 03 18

Station was recovered. Erosion had worn the coral rock away until the station disk projected about 1/2-inch. Reference mark number one was found in good condition. Reference mark number two is gone. The station mark was re-inforced with cement and a new reference mark, number three, was established. A complete description follows:

Station is located about 3 miles northwest of Kahuku, at the old Kahuku Airfield, on a low, rock point that is the northernmost point of Oahu.

To reach station from the Kahuku Plantation Office in Kahuku, go northwest on State Highway 83 for 2.1 miles; turn right, on paved side

road and go 0.5 mile; take left fork and follow paved road 0.5 mile to entrance to Kahuku Airfield. Bear left, crossing old runway and along its north side, for 0.4 mile; go right, on track road towards sand dune, for 0.25 mile; take right fork, passing around right side of dune, and go 0.15 mile to rock line and station about 75 yards north of dune.

Station mark is a standard disk stamped "TIP 1932", cemented in a drill hole in bedrock. It is 75 yards south-southeast of the tip of the rock point, 20 yards south of small cove, 62-1/2 feet southwest of end of a small inlet on east side of point, and about 2 feet lower than general level of the point.

Reference mark number one is a standard disk stamped "TIP 1", cemented in a drill hole in bedrock. It is 41 feet south of end of the small inlet and 0.7 foot lower than station mark. (NOTE: The arrow points off about 5 feet south of station mark.)

Reference mark number three is a standard disk stamped "TIP 1932 NO 3 1964", cemented in a drill hole in bedrock, about 1-1/2 feet higher than station mark.

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: TIP
 STATE: HAWAII YEAR: 1932 THIRD ORDER
 SOURCE: G- 9889

GEODETIC LATITUDE: 21° 42' 53.566	ELEVATION: 3 METERS
GEODETIC LONGITUDE: 157 59 12.356	SCALED FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	§ 10R Δ 01 ANGLE*
HI 3	5103	504,492.57	199,133.91	+ 0° 00' 18"

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE § 10R Δ 01 FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH* (From south)	CODE
LAK	18 20 54.0	18 20 36	5103

QF 162

*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.