

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

Q 191561 STATION 1001
HAWAII
LATITUDE 19 ° 30' TO 20 ° 00'
LONGITUDE 156 ° 00' TO 156 ° 30'
DIAGRAM NE 5-1.5 HAWAII

Kailua Light (Hawaii Island, E. R. Hand, 1913).—On west coast of Hawaii, Kona District, on Kubailimoku Point, just west of Kailua Bay. The light, fixed red, is hoisted to top of pole, at the base of which is service house, white, trimmed in gray. Keeper's house is on northwest side, close by. It is white, trimmed with gray, and has dark red roof.

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: KAILUA LIGHT

STATE HAWAII

YEAR 1913

THIRD

—ORDER

SOURCE G-SP156

GEODETIC LATITUDE:	19 38 27.878	ELEVATION:	METERS
GEODETIC LONGITUDE:	156 00 12.656		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ HOR Δ G: ANGLE *
HI 1	5101	326,741.17	293,580.59	- 0 10 09

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

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

QD 256

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

Q 151561 STATION 1002
HAWAII
LATITUDE 15° 30' TO 20° 00'
LONGITUDE 156° 00' TO 156° 30'
DIAGRAM NE 5-1.5 HAWAII

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
Form 855
Rev. Aug. 1968

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: KAILUA LIGHT STATE: Hawaii COUNTY: Hawaii

CHIEF OF PARTY: W. R. Porter	YEAR: 1957	Described by: VVT	
NOTE:	HEIGHT OF TELESCOPE ABOVE STATION MARK METERS: 1	HEIGHT OF LIGHT ABOVE STATION MARK METERS:	
Surface-station mark, Underground-station mark	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: ° ' "

The Station is located on Kukailimoku Point on the North entrance to Kailua Bay. Station is a white pyramidal concrete tower 32 feet above the water.

RECOVERY NOTE, TRIANGULATION STATION INTERSECTION

NAME OF STATION: Kailua Light
ESTABLISHED BY: W.R. Porter YEAR: 1957 STATE: Hawaii BENCH MARK(S) ALSO ☐
RECOVERED BY: D.M. Whipp YEAR: 1967 COUNTY: Hawaii
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: Island: Hawaii

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

Station was recovered, and an angle check made at triangulation stations JUDD 1948 and WALAHA 1948 indicates that it is at the position listed, however this also checks the old 1928 position. On checking with the U.S. Coast Guard it was learned that when the lighthouse was rebuilt in 1951 it was built at the original old location of 1909. Since the light was at a different location when intersected in 1948 it was apparently at a temporary location at that time.

Station is the center of the white, pyramidal, concrete, light tower located on Kukailimoku Point, about 1/2-mile west of Kailua. The light on top of tower is about 33 feet above sea level.

RECOVERY NOTE, TRIANGULATION STATION INTERSECTION

NAME OF STATION: KAILUA LIGHT
ESTABLISHED BY: W.R.P. YEAR: 1957 STATE: Hawaii BENCH MARK(S) ALSO ☐
RECOVERED BY: C. L. Novak YEAR: 1977 COUNTY: Hawaii
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: At Kailua

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 and the 1957 description is adequate.

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: KAILUA LIGHT
STATE: HAWAII YEAR: 1957 THIRD ORDER

SOURCE: G-11589
NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE	19 38 27.03	ELEVATION:	METERS
GEODETIC LONGITUDE	156 00 13.19		FET

STATE COORDINATES (feet)				
STATE & ZONE	CODE	X	Y	# (OR Δ) ANGLE
HI 1	5101	326,689.87	293,495.20	- 0 10 10

* 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

QF 199

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

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
Old Hawaiian Datum

QUAD 191561 STATION 1003
HAWAII
LATITUDE 19° 30' TO 20° 00'
LONGITUDE 156° 00' TO 156° 30'
DIAGRAM NE S-1,5 HAWAII

NOAA FORM 76-39
12-70
FORMERLY C&GS FORM 1251

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

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: KAIWI STATE: Hawaii COUNTY: Hawaii
NEAREST TOWN: Kailua QUADRANGLE NO.: 191561
CHIEF OF PARTY: GEH YEAR: 1972 DESCRIBED BY: JRF

NOTE.	HEIGHT OF TELESCOPE ABOVE STATION MARK 1.5 METERS, 1		HEIGHT OF LIGHT ABOVE STATION MARK		METERS.	
	SURFACE-STATION MARK,	DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT				
	UNDERGROUND-STATION MARK	OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION				
	OBJECT	BEARING	DISTANCE		DIRECTION	
		FEET	METERS			
KEAHOLE 2, 1948				00	00 00.0	
RM 1	SW	13.58	4.140	232	23 10.1	
RM 2	ESE	18.85	5.740	129	16 20.3	

Detailed description:

Station is located approximately 2½ miles WNW of Kailua and 5 miles SSE of Keahole Point on the Kona Coast of Hawaii Island. Station is atop a low lava mound approximately 600 feet north of Kaiwi Point and 400 feet east of the high water line, approximately 20 feet above sea-level.

To reach station from post office in Kailua, drive easterly on State Hwy 19 for 0.1 mile to new Kona Airport road, turn left and proceed approximately 1.0 mile to the FAA Navigation Aid road on the left, turn left and proceed approximately 1.0 mile to the VORTAC structure and the end of truck travel. Pack NW approximately 0.4 mile to the station.

Station mark is a standard disk stamped KAIWI 1972, set in a drill hole near the top of a prominent lava mound. The mound is distinguished by a large crevasse, running NE-SW. The mark is approximately 3 feet SE of the crevasse and 15 feet south of the brush on the northern side of the mound.

Reference mark 1 is a standard disk stamped NO. 1 1972 set in a drill hole in the lava mound, approximately 2 feet lower than the station.

Reference mark 2 is a standard disk stamped NO. 2 1972 set in a crack near the center of the mound, approximately 2 feet lower than the station.

*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.

U.S. GOVERNMENT PRINTING OFFICE: 1971-760-031

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: KAIWI OBS BY NGS
STATE: HAWAII YEAR: 1972 SECOND ORDER

SOURCE: G-14950

GEODETIC LATITUDE:	19° 39' 40.35878	ELEVATION:	1 METERS
GEODETIC LONGITUDE:	156 02 03.26051	SCALED	FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	§ OR Δ § ANGLE *
HI 1	5101	316,191.97	300,924.67	- 0° 10' 47"

* 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
KEAHOLE 2	159° 16' 51.3	159° 27' 38"	5101

THESE DATA OBTAINED FROM ADJUSTMENT OF SEP 1979

RL 176

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
Old Hawaiian Datum

QUAD 191561 STATION 1004
HAWAII
LATITUDE 19° 30' TO 20° 00'
LONGITUDE 156° 00' TO 156° 30'
DIAGRAM NE 5-1.5 HAWAII

IOAA FORM 76-39
12-701
FORMERLY C&GS FORM 5251

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

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: KALIHI
NEAREST TOWN: Kailua
CHIEF OF PARTY: GEH
STATE: Hawaii
QUADRANGLE NO.: 191561
YEAR: 1972
COUNTY: Hawaii
DESCRIBED BY: RDB

NOTE *	HEIGHT OF TELESCOPE ABOVE STATION MARK SURFACE-STATION MARK UNDERGROUND-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	HEIGHT OF LIGHT ABOVE STATION MARK METERS.	
			FEET	METERS
	OBJECT	BEARING		
	R.M. No. 1	NNE	29.56'	9.010'
	R.M. No. 2	W	18.92'	5.765'

Station is located on western shore of Hawaii Island, about 7 miles northwest of Kailua, 1.3 miles southwest of the new Kona Airport beacon.

To reach station drive eastward on State Highway 19 from Kailua to new Kona Airport road and turn left. Drive 5.8 miles northwest along new Kona Airport road to jeep trail heading off the left towards the sea. Follow jeep trail 1.2 miles to beach, then turn right and north and follow jeep trail another .6 mile to a mounded lava flow pointing towards sea. Station is located on the mound about 100 ft. seaward of jeep trail. Station is a standard disk stamped "KALIHI 1972" set in the lava flow.

Reference mark number 1 is a standard disk stamped "NO. 1 1972" set in the lava flow.

Reference mark number 2 is a standard disk stamped "NO. 2 1972" set in the lava flow.

Detailed description:

*Refers to notes in manuals of triangulation and state publications of triangulation. 1 Direction-angle measured clockwise, referred to initial station
1 To nearest meter only, when no trigonometric leveling is being done.
* U.S. GOVERNMENT PRINTING OFFICE: 1971-760-03

ADJUSTED HORIZONTAL CONTROL DATA

ADJUSTMENT BY NGS

NAME OF STATION: KALIHI
STATE: HAWAII

YEAR: 1972

OBS BY NGS

SECOND ORDER

SOURCE: G-14950

GEODETIC LATITUDE:	19° 43' 27.93057	ELEVATION	1	METERS
GEODETIC LONGITUDE:	156° 03' 32.57219	SCALED		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	ρ OR Δ θ ANGLE
HI 1	5101	307,731.64	323,909.81	- 0 11' 19"

* 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 SEP 1979

RL 188

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

Q 191561 STATION 1005
HAWAII
LATITUDE 19 ° 30' TO 20 ° 00'
LONGITUDE 156 ° 30' TO 156 ° 30'
DIAGRAM NE 5-1,5 HAWAII

NO ORIGINAL TEXT

Keahole (Hawaii Island, Hawaiian Government Survey, 1882; E. R. Hand, 1913).—In North Kona District, on Keahole Point, the extreme western point of Hawaii, 470 meters S. 54° E. of lighthouse and about 90 meters inshore. Station is on a prominent mound of lava, which is between the sea and a pit of sunken lava which is about 12 meters wide, 50 meters long, and 15 feet below station mark. The seaward side of wall of a stone house, with one side torn out, bears N. 85° E. from the station, distant 16½ meters. Marked by a copper bolt in center of triangle cut in solid rock, and surrounded by three other triangles, also cut in rock, each 0.915 meter (3.00 feet) distant.

U. S. DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
FORM 558
(REV. FEB. 1965)

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: KEAHOLE
ESTABLISHED BY: H.G.S. YEAR: 1882 STATE: Hawaii
RECOVERED BY: L.C.Wilder YEAR: 1949 COUNTY: Hawaii

Detailed statement as to the fitness of the original description; including marks found, stampings, changes made, and other pertinent facts:
A copper bolt in drill hole in triangle cut in rock was not found. A drill hole was found and tied into. This mark may be one of the tie marks for the old station. The old station is most likely still in existence and could be found by calculating the tie from the new station KEAHOLE 2.

FORM 549
(11-8-55)

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

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: KEAHOLE
ESTABLISHED BY: H.G.S. YEAR: 1882 STATE: Hawaii
RECOVERED BY: U.S.G.S. YEAR: 1958 COUNTY: Hawaii

Detailed statement as to the fitness of the original description; including marks found, stampings, changes made, and other pertinent facts:
Station was not recovered but the three reference marks described were found and the old position could be recovered from the reference marks.

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: KEAHOLE
ESTABLISHED BY: HGS YEAR: 1882 STATE: Hawaii BENCH MARK(S) ALSO ☐
RECOVERED BY: R.C. Munson YEAR: 1968 COUNTY: Hawaii
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: Island:Hawaii

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, although two of the old reference triangles were recovered.

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: KEAHOLE

STATE: HAWAII

YEAR: 1882

THIRD

ORDER

SOURCE: G- 556

GEODETIC LATITUDE	19 ° 43 ' 39.958	ELEVATION	7	METERS
GEODETIC LONGITUDE	156 03 39.044	SCALED		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ OR ANGLE
HI 1	5101	307,117.36	325,125.15	- 0 11 22

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE $\theta = \Delta \sin \alpha$ FORMULA NEGLECTING THE SECOND TERM.

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

QF 047

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

Q 151561 STATION 1006
HAWAII
LATITUDE 15° 30' TO 20° 00'
LONGITUDE 156° 00' TO 156° 30'
DIAGRAM NE 5-1,5 HAWAII

ADJUSTED HORIZONTAL CONTROL DATA

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
Form 538
Rev. Aug. 1968

DESCRIPTION OF TRIANGULATION STATION-

NAME OF STATION: **KEAHOLE 2** STATE: **HAWAII** COUNTY: **HAWAII** NORTH KONA DISTRICT

CHIEF OF PARTY: **L. O. WILDER** YEAR: **1948** Described by: **C. J. HOEPEL**
HEIGHT OF TELESCOPE ABOVE STATION MARK **1.7** METERS. HEIGHT OF LIGHT ABOVE STATION MARK 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	BEARING	DISTANCE		DIRECTION
				feet	meters	
2	Surface-station mark, Underground-station mark					
		OBJECT				
12a		KEAHUOLU RM 1928	SSW	32.970	10.050	00 00 00 48 32 41
		R. M. 2	NW			160 12 50.2
		Keahole Lighthouse		15.119	4.609	164 42 31
		Drill Hole		34.918	10.643	311 18 56
12a		R. M. 1	ESE			

The station is located on the summit of a prominent, low, lava mound on Keahole Point, the extreme western point of the island of Hawaii, about 470 meters southeast of the Keahole Point Lighthouse, about 90 meters east of the beach, about 100 feet west of a pit of sunken lava and 36.5 feet west of the stone ruins of an old house.

The station is a standard disk, stamped KEAHOLE 2 1948, set into a drill hole in a rock outcrop.

Reference mark number 1 is a standard azimuth disk, stamped KEAHOLE 1 1948, set into a drill hole in lava bedrock which is flat but slopes slightly toward the south. It is about the same elevation as the station.

Reference mark number 2 is a standard azimuth disk, stamped KEAHOLE 2 1948, set into a drill hole in a flat lava bed which is about 3 feet lower than the station.

A drill hole, surrounded by a triangle which is carved in the rock, is believed to be one of the original three reference marks to the 1882 station. A large, whitewashed, cairn was found over this mark. It is about 1 1/2 inches in diameter and is about 2 inches deep. It is about the same elevation as the station, and 4.609 M. distant.

NAME OF STATION: **KEAHOLE 2**

STATE: **HAWAII**

YEAR: **1948**

SECOND ORDER

SOURCE **G- 9279**

GEODETIC LATITUDE	19° 43' 39.860	ELEVATION	6.8 METERS
GEODETIC LONGITUDE	156° 03' 38.925		22 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ BI ANGLE °
HI 1	5101	507,128.69	325,115.27	- 0 11' 22"

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH (From south)	CODE
KUILI	211 13 42.7	211 25 05	5101

QE 045

* Refer to notes in manuals of triangulation and state publications of triangulation. 1 Direction-angle measured clockwise, referred to initial station.
170 nearest meter only, when no trigonometric leveling is being done. 10-58872-1 U. S. GOVERNMENT PRINTING OFFICE

(continued on next page)

HORIZONTAL CONTROL DATA

by the
NATIONAL GEODETIC SURVEY
OLD HAWAIIAN DATUM

QUAD 191561 STATION 1006

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

KEAHOLE 2 (continued)

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: KEAHOLE 2
ESTABLISHED BY: L.C. Wilder YEAR: 1948 STATE: Hawaii
RECOVERED BY: R.C. Munson YEAR: 1967 COUNTY: Hawaii

HEIGHT OF TELESCOPE ABOVE STATION MARK 1.5 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	
KUILI (HGS) 1882 -----1948	DISTANCE			00 00 00.0
R.M. No. 1	ESE	34.918	10.643	77 46 18
R.M. No. 2	SSW	32.970	10.050	175 00 03
KUILI (HGS) 1882 -----1967	DISTANCE			00 00 00.0
R.M. No. 1	ESE	34.900	10.638	77 47 23
R.M. No. 2	SW	32.840	10.010	174 59 45
Drill Hole, 1967	NW	12.829	3.911	274 00 54
Keahole Point Light, 1928	NW			286 40 05.0
Drill Hole, 1948	NW	15.122	4.610	291 09 41

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

Station is located about 7 miles northwest of Kailua, 5 miles west of State Highway 19 and 1553 feet southeast of Keahole Point Lighthouse, near Keahole Point which is the westernmost point of the island, on a low lava knoll about 22 feet above sea level.

To reach station from the post office in Kailua, go northerly on

State Highway 19 for 3.8 miles to junction with State Highway 18; continue on State Highway 19 for 2.3 miles to house on left, between power poles 313 and 314. Turn left at north side of house and go downgrade on narrow track road, passing through several gates, for 5.2 miles to sand beach and T-intersection. Turn right and follow poor road over lava along beach for 0.9 mile to station on right.

Station mark is a standard disk stamped "KEAHOLE 1948", cemented in a drill hole in lava bedrock. It is 25 yards northeast of track road and 35 feet southwest of a 16 x 16-foot stone enclosure. The bedrock around station mark has been painted white.

Reference mark number one is a standard disk stamped "KEAHOLE 1 1948", cemented in a drill hole in bedrock, 14 feet south of the stone enclosure and 6 inches lower than station mark.

Reference mark number two is a standard disk stamped "KEAHOLE 2 1948", cemented in a drill hole in lava bedrock, 65 feet northeast from the track road and 2 feet lower than station mark.

Drill hole 1948 is a 1-inch drill hole, 1 inch deep, in the center of a 5-inch, chiseled triangle in bedrock.

Drill hole 1967 is a 1-inch drill hole, 1 inch deep, in the center of a 3-inch, chiseled triangle in bedrock.

Distance between the drill holes is 4.7 feet.

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: KEAHOLE 2
ESTABLISHED BY: L.C.W. YEAR: 1948 STATE: Hawaii BENCH MARK(S) ALSO ☐
RECOVERED BY: R.A.W. YEAR: 1970 COUNTY: Hawaii

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:

The station, both reference marks and both drill holes were recovered in good condition. Because of new construction in the area a new to reach follows.

To reach from the Post Office in Kailua-Kona go east on State Highway 19 for 0.1 mile to the junction of State Highways 19 and 11, continue on 19 for 0.4 mile to a paved road left (to Honokahau), turn left and go 2.3 miles to a T junction, continue straight ahead for 1.0 mile to a dirt road on the left, turn left and go 0.1 mile to a locked gate, continue through gate for 0.6 mile to a T junction, turn right and go 3.7 mile along the coast line to the station on the right.

NAME OF STATION: KEAHOLE 2
ESTABLISHED BY: L. C. Wilder YEAR: 1948 STATE: Hawaii BENCH MARK ALSO ☐
RECOVERED BY: R. H. Houlder YEAR: 1971 COUNTY: Hawaii
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: 5.5 miles northwest of Kailua-Kona
HEIGHT OF TELESCOPE ABOVE STATION MARK Tripod FEET. HEIGHT OF LIGHT ABOVE STATION MARK FEET.

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	
Keahole Point Lighthouse-1928				00 00 00.0
Aero Beacon, Ke-Ahole Airport	NE	1.2 MI		101 41 33.7
RM 1 (12a)	ESE	34.91	10.640	151 04 04
RM 2 (12a)	SSW	32.84	10.012	248 20 55
RM 1 to RM 2		50.88	(15.508)	

The station and reference marks were recovered in good condition as described in 1967. The following is a complete new description.

The station is 5.5 miles northwest of Kailua-Kona, 470 meters southeast of Keahole Point Lighthouse and on the summit of a prominent, low, lava mound.

To reach the station from the intersection of State Highways 11 and 19 in Kailua-Kona, go northeast on Highway 19 for 0.3 mile to a paved road on the right leading to Ke-Ahole Airport. Turn right and go northerly toward the airport for 5.75 miles to a dim 4-wheel drive jeep trail on the left. This trail is across the road from telephone pole 113. Turn left on the jeep trail and go westerly for 1.1 miles to a fork. Bear to the right passing a second fork 100 feet ahead. Here the road turns to the north. Continue, northerly, for 0.95 miles to the station on the right. The 2 miles of jeep trail take about 45 minutes to travel.

The station is a standard station disk, stamped KEAHOLE 1 1948, cemented in bedrock. It is 200 feet east of the shoreline, 100 feet east of the jeep trail at a point where the trail surface changes from sand to lava, and 36.5 feet west of the southeast corner of a ruined small rock house. The rock surrounding the station is painted white.

Reference mark 1 is a standard reference disk, stamped KEAHOLE 1 1948, cemented in bedrock. It is about the same elevation as the station.

Reference mark 2 is a standard reference disk, stamped KEAHOLE 2 1948, cemented in bedrock. It is about 2 feet lower than the station.

There is no azimuth mark.

* 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 CGCS-526a (11-68)

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

(continued on next page)

HORIZONTAL CONTROL DATA

by the
NATIONAL GEODETIC SURVEY
OLD HAWAIIAN DATUM

QUAD 191561 STATION 1006
LATITUDE ° ' TO ° '
LONGITUDE ° ' TO ° '
DIAGRAM

KEAHOLE 2 (continued)

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: KEAHOLE 2
ESTABLISHED BY: L. C. Wilder YEAR: 1948 STATE: Hawaii BENCH MARK ALSO ☐
RECOVERED BY: GEH YEAR: 1972 COUNTY: Hawaii
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: 7.5 miles NW of Kailua
HEIGHT OF TELESCOPE ABOVE STATION MARK FEET. HEIGHT OF LIGHT ABOVE STATION MARK FEET.

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	
KUILI (HGS) 1882				00 00 00.0
R.M. No. 1	ESE	34.900	10.638	77 47 03.6
R.M. No. 2	SW	32.840	10.010	175 00 57.0
Keahole Point Light, 1928	NW			286 40 07.5

Station, reference mark number 1, and reference mark number 2 were recovered and found in good condition. A complete description follows.

Station is located on western shore of Hawaii Island, about 7.5 miles northwest of Kailua and 1.3 miles southwest of the new Kona Airport beacon.

To reach station from the post office in Kailua, drive easterly on State Highway 19 to new Kona Airport road and turn left. Drive 5.8 miles northwest along new Kona Airport road to jeep trail heading off to the left towards the sea. A four wheel drive vehicle is mandatory for automobile travel over this road. Follow jeep trail 1.2 miles to beach, then turn right and north and follow jeep trail another .9 mile to prominent lava mound. Station is 25 yards northeast of jeep trail on top of the mound. An old coating of white paint on the bedrock still surrounds the station.

The station is a standard bronze triangulation disk stamped "KEAHOLE 1.1948" set in the lava bedrock. This stamping was checked after noting that it differed from the stamping described by R.C. Munson in the 1967 recovery note.

Reference mark number 1 is a standard bronze reference disk also stamped "KEAHOLE 1 1948" set in lava bedrock.

Reference mark number 2 is a standard bronze reference disk stamped "KEAHOLE 2 1948" set in lava bedrock.

U.S. DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
Form 9-1165
(Rev. 12-74)

REPORT ON PERMANENT SURVEY MARK

AREA OFFICE

STATE Hawaii COUNTY Hawaii QUADRANGLE 50
QUOTE PRIMARY REFERENCE The station is located on Keahole Point
(Direction and distance)

DESIGNATION { LISTED KEAHOLE 2
STAMPED TYPE OF MARK: BM TT TRIANG. X
Lat. 19 ° 43 ' 39.860 " CONDITION Disturbed ☐
Long. 156 ° 03 ' 38.925 " Destroyed ☐ ESTABLISHED BY USGS ☐ USBR ☐
Elev. 22 feet Not Found ☐ USNPS ☐ USNFS ☐
USGLO ☐ (Other) ☐
USBLM ☐

REMARKS OR REVISED DESCRIPTION:

Station was found as described and all marks were recovered in good condition. The 1967 description is adequate with the addition of the following to reach. To reach station from the junction on State Hwys. 19 & 190, go N. along Hwy. 19 for 4.95 mi to side road left, turn left and go W. along dirt rd. for 1.25 mi to T-rd., turn right and follow track rd. along beach 1.9 mi to small mound of lava and station site on right.

SUBMITTED BY Yukio Yamamoto
TITLE Cartographer DATE 1/26/78
AGENCY USGS

Marks found in good condition need not be reported.

FILL IN ALL AVAILABLE INFORMATION

GPO 16-54352-6

Please prepare in triplicate.

* 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

0 151561 STATION 1008
HAWAII
LATITUDE 19° 30' TO 20° 00'
LONGITUDE 156° 00' TO 156° 30'
DIAGRAM NE 5-1.5 HAWAII

KEAHOLE POINT LIGHTHOUSE

(Hawaii Island, T. J. Maher, 1928).—On the westernmost point of Hawaii Island, on the Kona coast. Light consists of a group flashing light mounted on a square concrete tower which tapers from about 6 feet at the base to about 2½ feet at its top. Light is 20 feet above ground, and 43 feet above high water. It is 3.18 meters (10.4 feet), N. 24° E. (true) from the location of the 1913 light, which is preserved by a concrete pier with iron bolt in center and is marked with the words "Light mast of 1913." An iron box mounted on a concrete base in the ruins of what was probably the old keeper's house stands 160 meters, east by north (true) of the light, while the present keeper's house is 565 meters northeast by east (true) of the light.

RECOVERY

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
PORTS 635
REV. AUG. 1958

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: **KEAHOLE POINT LIGHTHOUSE** STATE: **HAWAII** COUNTY: **HAWAII**
Established By: **T. J. Maher, 1928**
CHIEF OF PARTY: **L. O. WILDER** YEAR: **1948** Described by: **G. J. HOEPEL**

NOTE*	HEIGHT OF TELESCOPE ABOVE STATION MARK	METERS.†	HEIGHT OF LIGHT ABOVE STATION MARK	METERS.
	Surface-station mark, Underground-station mark	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 I #
This is an intersection station.				

The station is the center and top of the light on the top of the Keahole Lighthouse.

The lighthouse is constructed of concrete and is about 20 feet in height.

The lighthouse is located on Keahole Point about 100 yards east of the westernmost ground.

This is an automatic light and has no light tender.

(11-0-05)

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: **KEAHOLE POINT LIGHTHOUSE**
ESTABLISHED BY: **T. J. M.** YEAR: **1928** STATE: **Hawaii**
RECOVERED BY: **U. S. G. S.** YEAR: **1958** COUNTY: **Hawaii**

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

Station recovered as described. The lighthouse is 30.2 feet high instead of about 20 feet high.

RECOVERY NOTE, TRIANGULATION STATION INTERSECTION

NAME OF STATION: **Keahole Point Lighthouse,**
ESTABLISHED BY: **T. J. Maher** YEAR: **1928** STATE: **Hawaii** BENCH MARK(S) ALSO ☐
RECOVERED BY: **D. M. Whipp** YEAR: **1967** COUNTY: **Hawaii**
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: **Island: Hawaii**

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

Station was recovered. Located about 7 miles northwest of Kailua, on Keahole Point, the westernmost point of the island.

Station is the center of the U.S. Coast Guard light tower, a white concrete tower with white light on top.

(continued on next page)

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: **KEAHOLE POINT LIGHTHOUSE**

STATE: **HAWAII**

YEAR: **1928**

THIRD

ORDER

SOURCE: **G- 9279**

GEODETIC LATITUDE	19° 43' 51.283	ELEVATION	METERS
GEODETIC LONGITUDE	156° 03' 49.825		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ FOR Δ θ ANGLE *
HI 1	5101	306,051.20	326,271.09	- 0° 11' 25"

* 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

QE 203

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 191561

STATION 1008

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

KEAHOLE POINT LIGHTHOUSE (continued)

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: Keahole Point Lighthouse
ESTABLISHED BY: TJM YEAR: 1928 STATE: Hawaii BENCH MARK(S) ALSO ☐
RECOVERED BY: PDC YEAR: 1978 COUNTY: Hawaii

AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN:
Located on Ke-ahole point.

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

The station was recovered as described and in good condition.

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

Q 151561 STATION 1009
HAWAII
LATITUDE 19° 30' TO 20° 00'
LONGITUDE 156° 00' TO 156° 50'
DIAGRAM NE 5-1.5 HAWAII

NO ORIGINAL TEXT

Keahuolu (Hawaii Island, Hawaiian Government Survey, 1882; T. J. Maher, 1928).—In Kona District, west coast of Hawaii, 2 miles west-northwest from Kailua wharf, on a large wide rounding point, where the shore line turns from southeast and northwest toward northeast. Station is on highest lava mound, quite prominent, on this point; about 300 meters from the sea to the south and 350 meters from sea to west. A house in center of prominent cocoanut grove is 1,250 meters distant, S. 80° E. Station marked by an iron bolt let into the rock on a ledge in a crevice 2.5 feet below general surface of the flow. In 1928 a standard hydrographic disk was cemented in place above the bolt, the lug on the disk resting on the bolt. On each side of the fissure at a distance of 0.61 meter (2.0 feet) from the station a cross was cut in the rock, on bearings S. 51° E., and N. 51° W. In 1928 an arrow 18 inches long was cut in the rock, 5.6 meters (18.4 feet) south (mag.) from the station; and a standard reference disk was cemented in rock 7.93 meters (26.0 feet) from the station in range with cocoanut grove. In 1913 a small cairn was built over the station.

U. S. DEPARTMENT OF COMMERCE
N. O. CHART AND GEODETIC SURVEY
FORM 526

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: KEAHUOLU
ESTABLISHED BY: HAW. GOV. SURV. YEAR: 1882 STATE: HAWAII
RECOVERED BY: L. C. Wilder YEAR: 1948 COUNTY: HAWAII

Detailed statement as to the fitness of the original description: The station, reference mark number 1 and an arrow, carved in the rock, was recovered. A reference mark was established in the point of the arrow which was found carved in the rock and was stamped KEAHUOLU 1948. The station was not occupied at this time because a range marker, constructed of steel, 27 feet in height is now centered over the station. A new description follows—

The station is located on the summit of a prominent, low, lava mount on Keahuolu Point, about 2 miles south of Honokahau, about 2 miles west northwest of Kailua, about 0.1 mile east of the western end of Keahuolu Point and on a ledge about 3 feet down in a narrow fissure.

The station is a standard hydrographic disk, unstamped, set in an irregular mass of concrete. The disk tilts sharply to the eastward.

Reference mark number 2 is a standard disk, stamped KEAHUOLU 1948, set into a drill hole in the point of an arrow which was found carved in solid, bedrock, lava. It is located 10.514 meters, 34.495 feet southwest of reference mark number 1 and 2 feet south of a deep fissure.

Reference mark number 1 is a standard disk, stamped KEAHUOLU 1928, set into a drill hole in solid, bedrock, lava which is flush with the surrounding rock. It is located 7.894 meters, 25.898 feet east of the station and 7 feet east of the junction of two deep fissures. This mark was occupied instead of station.

Form 526
(11-8-66)

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: Keahuolu
ESTABLISHED BY: HAW. GOV. SURV. YEAR: 1882 STATE: Hawaii
RECOVERED BY: EPC YEAR: 1964 COUNTY: Hawaii

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 in 1948 by LCW. The station may now be more easily reached by taking the FAA navigational aid road leading N from Kona Airport for about 1.5 mi. From this point pack 0.3 mi. to the SE range marker and the station centered beneath.

(continued on next page)

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: KEAHUOLU

STATE: HAWAII

YEAR: 1882

SECOND

ORDER

SOURCE: G- 9279

NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	19 39 39.803	ELEVATION:	14	METERS
GEODETIC LONGITUDE:	156 01 42.202	SCALED		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	# OR Δ # ANGLE *
HI 1	5101	318,155.03	297,835.91	- 0 10 40

* 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

POSITION DETERMINED BY TRAVERSE FROM STATION KEAHUOLU RM 1

QE 259

HORIZONTAL CONTROL DATA

by the
NATIONAL GEODETIC SURVEY
OLD HAWAIIAN DATUM

QUAD 191561

STATION 1009

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

KEAHUOLU (continued)

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: KEAHUOLU
ESTABLISHED BY: HGS YEAR: 1882 STATE: Hawaii BENCH MARK(S) ALSO ☐
RECOVERED BY: D.M. Whipp YEAR: 1967 COUNTY: Hawaii
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: Island: Hawaii

R

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

Station was recovered and all marks found in good condition. Located about 2 miles west-northwest of Kailua, 3/4-mile west-northwest of the northwest end of the Kona Airport runway, 1/2-mile southwest of the Kona Airport VOR, and under the east 1 of 2 large range markers setting about 600 feet apart.

Station mark is a standard hydrographic disk, unstamped, cemented in a drill hole in bedrock down inside a deep, narrow crack 3-1/2 feet deep. The range marker centered over it is a 4-legged, angle-iron structure, with legs on a 4-foot-square base, which has a very large, 4-finned, pyramidal target on top, painted an orange and white checkered pattern.

Reference mark number one is a standard disk stamped "KEAHUOLU 1 1928", cemented in a drill hole in bedrock 6 feet east of a large fissure. It is 25.940 feet (7.907 m) east of station.

Reference mark number two is a standard disk stamped "KEAHUOLU 2 1948", cemented in a drill hole in bedrock. It is 18.228 feet (5.556 m) southwest of station.

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: KEAHUOLU
ESTABLISHED BY: HGS YEAR: 1882 STATE: Hawaii BENCH MARK(S) ALSO ☐
RECOVERED BY: GEH YEAR: 1972 COUNTY: Hawaii
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN:

R

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

Station and all marks recovered as described by D.M. Whipp (1967) in good condition.

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

0 191561 STATION 1010
HAWAII
LATITUDE 19 ° 30' TO 20 ° 00'
LONGITUDE 156 ° 00' TO 156 ° 30'
DIAGRAM NE 5-1.5 HAWAII

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

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: KEAHUOLU R. M. 1 STATE: HAWAII COUNTY: NORTH KONA DISTRICT

CHIEF OF PARTY: L. C. WILDER YEAR: 1948 Described by: G. J. HOEPEL
NOTE: HEIGHT OF TELESCOPE ABOVE STATION MARK 1.6 METERS, HEIGHT OF LIGHT ABOVE STATION MARK METERS.

NOTE*	OBJECT	BEARING	DISTANCE		DIRECTION
			feet	meters	
	KEAHOLE 2				00 00 00
	Kailua Lighthouse	ESE			139 09 51.4
	R. M. No. 2	SW	34.495	10.514	263 37 14
	KEAHUOLU	W	25.898	7.894	294 59 05
	Keahole Lighthouse	NNW			359 01 31.0

The station is located on the summit of a prominent, low, lava mound on Keahuolu Point, about 2 miles south of Honokahau, about 2 miles west northwest of Kailua, about 0.1 mile east of the western end of Keahuolu Point, 25.898 feet east of a steel range marker and 7 feet east of the junction of two deep fissures.

The station is a standard reference mark disk, stamped KEAHUOLU 1928, set into a drill hole in fragmented lava which is flush with the surrounding rock.

Reference mark number 2 is a standard disk, stamped KEAHUOLU 1948, set into a drill hole in solid lava which is flush with the surrounding rock. The arrow on this disk points to the triangulation station KEAHUOLU. It is located 2 feet south of a deep fissure.

To reach from the post office in Kailua; go westerly, through the lumber yard, for 0.1 mile; pass through a board gate and continue westerly for 0.25 mile; pass through the grounds of the Kailua Lighthouse and continue westerly, on the beach road, for 1.4 miles to the end of truck travel at a small shack. From this point pack westerly, keeping close to the beach, for about 0.7 mile to a low lava mound and the station.

Triangulation station KEAHUOLU is a standard hydrographic disk, set in cement on a small ledge in a deep fissure. It is about 3 feet below the surface of the general level of the surrounding lava. The disk is unstamped. A range marker 27 feet in height, constructed of steel, is centered over this mark.

Form 526
(11-8-68)

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

R

NAME OF STATION: Keahuolu R. M. 1
ESTABLISHED BY: LCW YEAR: 1948 STATE: Hawaii
RECOVERED BY: EPC YEAR: 1964 COUNTY: Hawaii

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

Station recovered as originally described. The station may now be more easily reached by taking the FAA navigational aid road leading N from Kona Airport for about 1.5 mi. From this point pack 0.3 mi. to the SE range marker and the station.

(continued on next page)

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: KEAHUOLU RM 1
STATE: HAWAII YEAR: 1948 SECOND ORDER

SOURCE: G- 5275

GEODETIC LATITUDE	19 39 09.791	ELEVATION	14.0 METERS
GEODETIC LONGITUDE	156 01 41.931		46 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ & ANGLE*
HI 1	5101	318,220.95	297,834.62	- 0 10 40

* 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
KEAHOLE 2	157 41 43.6	157 52 24	5101

QE 046

HORIZONTAL CONTROL DATA

by the
NATIONAL GEODETIC SURVEY
OLD HAWAIIAN DATUM

QUAD 191561

STATION 1010

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

KEAHUOLU RM 1 (continued)

FORM 526a
(9-18-69)

U.S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: KEAHUOLU R.M. 1
ESTABLISHED BY: L.C. Wilder YEAR: 1948 STATE: Hawaii
RECOVERED BY: D.M. Whipp YEAR: 1967 COUNTY: Hawaii
Island: Hawaii

HEIGHT OF TELESCOPE ABOVE STATION MARK 1.57 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	
KEAHOLE 2 -----1948 DISTANCE	and	DIRECTION		
R.M. No. 2	SW	34.495	10.514	00 00 00.0
KEAHUOLU	W	25.898	7.894	263 37 14
KEAHOLE 2 1948 -----1967 DISTANCE	and	DIRECTION		
R.M. No. 2	SW	34.409	10.489	00 00 00.0
KEAHUOLU (HGS) 1882	W	25.940	7.907	263 37 59
				294 58 09

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

Station is located about 2 miles west-northwest of Kailua-Kona, 3/4 mile west-northwest of the northwest end of the Kona Airport runway, 300 yards north of Keahuolu Point, 1/2-mile southwest of the Kona Airport VOR, and near the east 1 of 2 large range markers setting about 600 feet apart, on a low, lava mound.

To reach station from the post office in Kailua-Kona, go north on State Highway 19 for 0.4 mile to macadam side road left, at sign "HONO-

KAHAU". Turn left and go 0.85 mile to gravel side road left, with chain gate. Turn left and go 1.45 mile to the VOR site and end of truck travel. Pack southwest across lava field about 1/2-mile to station.

Station mark is a standard reference mark disk stamped "KEAHUOLU 1 1928", cemented in a drill hole in bedrock 6 feet east of a large fissure and 25.94 feet east of the center of the range marker tower.

Reference mark number two is a standard disk stamped "KEAHUOLU 2 1948", cemented in a drill hole in bedrock 3 feet south of a large fissure, 11 feet east-northeast of the anchor of the southwest guy-cable of the range tower, and 1.6 feet lower than station mark. The arrow of the disk points toward the center of the range marker tower and station KEAHUOLU 1882.

KEAHUOLU 1882 is marked with a standard hydrographic disk, unstamped, cemented in a drill hole in bedrock down inside a deep, narrow crack 3-1/2 feet deep. It is under the center of a range marker tower, a 4-legged, angle-iron structure, with legs on a 4-foot-square base, which has a very large, 4-finned, triangular target on top, painted an orange and white checkered design.

*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.

USCOMMA-DC 27173-P81

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: KEAHUOLU RM 1
ESTABLISHED BY: L.C. Wilder YEAR: 1948 STATE: Hawaii BENCH MARK(S) ALSO ☐
RECOVERED BY: GEH YEAR: 1972 COUNTY: Hawaii
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:

Station mark and Reference marks were recovered as described by D.M. Whipp (1967) in good condition.

The station can now best be reached by proceeding easterly on State Hwy 19 from the Kailua post office for 0.1 mile to the new Kona Airport road; turn left and proceed for approximately 1 mile to the FAA Navigation Aid road on the left; turn left and proceed approximately 1 mile to the VORTAC structure and the end of truck travel; pack SW across the lava field approximately 0.3 mile to the station.

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: KEAHUOLU RM 1
ESTABLISHED BY: L.C.W. YEAR: 1948 STATE: Hawaii BENCH MARK(S) ALSO ☐
RECOVERED BY: C. L. Novak YEAR: 1977 COUNTY: Hawaii
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: 2 miles northwest of Kailua

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

The station mark, reference mark 2, and triangulation station KEAHUOLU 1882 were recovered in good condition and the 1948 description is adequate.

HORIZONTAL CONTROL DATA

Q 191561 STATION 1011
HAWAII
LATITUDE 19 ° 30' TO 20 ° 00'
LONGITUDE 150 ° 00' TO 156 ° 30'
DIAGRAM NE 5-1.5 HAWAII

HAWAII COUNTY: NORTH KONA DISTRICT
HAWAII

NOTE.	HEIGHT OF TELESCOPE ABOVE STATION MARK		METERS.		HEIGHT OF LIGHT ABOVE STATION MARK		METERS.	
	Surface-station mark, Underground-station mark	DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION	BEARING	DISTANCE		DIRECTION : O I P		
				feet	meters			
	This is an intersection station.							

The total height of the target is 8.24 meters.

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

Station was recovered. Located on Nolo Point, about 3 miles northwest of Kailua-Kona, 1 mile northwest of the Kona Airport VOR, and 300 feet south-southeast of the sea. Station is the center of a very large, 4-finned, pyramidal target, constructed of corrugated iron and painted an orange and white checkered pattern, mounted on top of an angle-iron tower 4 feet square. Top of target is about 27 feet above ground.

NAME OF STATION: Keahuolu Point, N.E. Range Marker
ESTABLISHED BY: L.C. Wilder YEAR: 1948 STATE: Hawaii BENCH MARK(S) ALSO ☐
RECOVERED BY: GEH YEAR: 1972 COUNTY: Hawaii
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:

Station recovered as described by D.M. Whipp (1967) in good condition.

STATE HAWAII YEAR 1948 THIRD ORDER

SOURCE: G- 5275

GEODETIC LATITUDE: 19 40' 09.254 GEODETIC LONGITUDE: 156 01 54.221	ELEVATION: 100 METERS: 100 FEET: 328
---	--

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR $\Delta \theta$ ANGLE °
HI 1	5101	317,065.01	303,836.94	- 0° 10' 44"

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE ρ OR Δ 4 FORMULA NEGLECTING THE SECOND TERM

PLANE AZIMUTH HAS BEEN COMPUTED BY THE GEODETIC FORMULA REQUESTING THE SECOND FORM.			
TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE

QE 205

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

0 191561 STATION 1012
HAWAII
LATITUDE 15° 30' TO 20° 00'
LONGITUDE 156° 00' TO 156° 30'
DIAGRAM NE 5-1.5 HAWAII

DEPARTMENT OF COMMERCE
U.S. COAST AND GEODETIC SURVEY
Form 852
Rev. Aug. 1968

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: **KEAHUOLU POINT, S.W. RANGE MARKER** STATE: **HAWAII** COUNTY: **HAWAII** NORTH KONA DISTRICT

CHIEF OF PARTY: L. C. WILDER	YEAR: 1948	Described by: G. J. HOEPEL
NOTE:*	HEIGHT OF TELESCOPE ABOVE STATION MARK METERS.†	HEIGHT OF LIGHT ABOVE STATION MARK METERS.
Surface-station mark, Underground-station mark	DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION	
OBJECT	BEARING	DIRECTION: feet meters
This is an intersection station.		

The station is the southwesterly of four range markers which are located on Keahuolu Point.

The target is constructed of corrugated iron, is pyramidal in shape, has a base of 14 feet and is supported by steel frame work which is 4 feet square.

The total height of the target is 8.24 meters.

Form 526
(11-8-65)

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

Intersection

NAME OF STATION: **Keahuolu Point, S.W. Range Marker**
ESTABLISHED BY: **LCW** YEAR: **1948** STATE: **Hawaii**
RECOVERED BY: **EPC** YEAR: **1964** COUNTY: **Hawaii**

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

Station recovered as originally described. Station may be easily reached by FAA navigational aid road leading from Kona Airport.

RECOVERY NOTE, TRIANGULATION STATION INTERSECTION

NAME OF STATION: **Keahuolu Point, S.W. Range Marker**
ESTABLISHED BY: **L.C. Wilder** YEAR: **1948** STATE: **Hawaii** BENCH MARK(S) ALSO ☐
RECOVERED BY: **D.M. Whipp** YEAR: **1967** COUNTY: **Hawaii**
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: **Island: Hawaii**

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

Station was recovered. Located about 2 miles west-northwest of Kailua-Kona, 1/2-mile southwest of the Kona Airport VOR, on Keahuolu Point, 300 feet northeast of the sea, and 600 feet west of a similar structure. Station is the center of a very large, 4-finned, pyramidal target, constructed of corrugated iron and painted an orange and white checkered pattern, mounted on top of an angle-iron tower 4 feet square. Top of target is about 27 feet above ground.

(G.E.H., 1972)--Station was recovered as described by D.M. Whipp (1967) in good condition.

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: **KEAHUOLU PT SW RNG MARKER**

STATE: **HAWAII**

YEAR: **1948**

THIRD

SOURCE: **G- 9279**

GEODETIC LATITUDE	19 39 08.374	ELEVATION:	METERS
GEODETIC LONGITUDE	156 01 48.216		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ OR ANGLE
HI 1	510i	317,619.78	297,693.54	- 0 10 42

* 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

QE 207

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

Q 151561 STATION 1013
HAWAII
LATITUDE 19° 30' TO 20° 00'
LONGITUDE 156° 00' TO 156° 30'
DIAGRAM NE 5-1, HAWAII

NO ORIGINAL TEXT

Kuili (Hawaii Island, Hawaiian Government Survey, 1882;
K. T. Adams, 1928).—On the northwest coast of North Kona, in the land
of Awakee, 6 miles northeast of Keahole Point, the most westerly point of Hawaii;
about 3,800 meters north of the lava flow of 1801, on the summit of the well-
known Kuili Hill. Seen from Kawaihae this hill appears to be the extreme end
of the point; it is a symmetrical sugar-loaf hill, and is connected by a low saddle
to another hill to the southwest. Marked by a square hole inside a triangle
cut in a stone set flush with the surface of the ground. The underground mark
placed when the station was established, a copper triangle, was not searched for
in 1913. Reference mark is near edge of grave, white cement, bearing N. 50° W.
about 6 meters.

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
FORM 236

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: KUILI
ESTABLISHED BY: Hawaiian Govt. Year: 1882 STATE: HAWAII
RECOVERED BY: L. C. Wilder Year: 1948 COUNTY: HAWAII

Detailed statement as to the fitness of the original description: The station was recovered as described in
good condition. A standard disk was set in the center of the original drill
hole and one reference mark was established. A new description follows--

The station is located on the summit of a prominent hill, named
Kuili, about 11 miles north of Kailua, about 12 miles northwest of the summit
of Hualalai Volcano, about 7 miles southwest of Kiholo Bay, about 6 miles
north northwest of the Keahole Point Lighthouse and about 0.3 mile east of
the beach.

The station is best reached, by boat, from Kailua. A landing can
be made in a small cove at the foot of the hill. Water is available at a
cistern about 1 mile south of the station at Makalawena. This is about a
thirty minute pack.

The station is a standard disk, stamped KUILI 1 1948, set into a
drill hole in a boulder which is about 2 inches below the surface of the
ground.

Reference mark number 1 is a standard azimuth disk, stamped KUILI 1
1948, set in the top of a 2 inch pipe which projects about 4 inches and is
about the same elevation as the station.

Reference mark number 2 is a chiseled square in a flat rock which
is flush with the ground and is about 2 feet lower than the station.

Object	1882 Distance	1948 Distance	Direction
ANAHULU			00 00 00
Keahole Lighthouse SSW	6.0 miles		143 38 52.5
R. M. No. 2 NW	about 6 meters	7.175 m 23.536 ft	248 35 51
R. M. No. 1 ENE		6.754 m 22.155 ft	359 47 55

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: KUILI

STATE: HAWAII

YEAR: 1882

SECOND

ORDER

SOURCE: G- 9279

GEODETIC LATITUDE:	19° 48' 11.674	ELEVATION	104.1 METERS
GEODETIC LONGITUDE:	156 00 44.602		342 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ θ ANGLE °
HI 1	5101	323,846.25	352,483.68	- 0 10 25

* 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
KEAHOLE POINT LIGHTHOUSE	33 56 18.5	34 06 43	5101

QE 043

(continued on next page)

HORIZONTAL CONTROL DATA

by the
NATIONAL GEODETIC SURVEY
OLD HAWAIIAN DATUM

QUAD 191561 STATION 1013
LATITUDE ° ' TO ° '
LONGITUDE ° ' TO ° '
DIAGRAM

KUILI (continued)

FORM 326a
(9-18-69)

U.S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: KUILI
ESTABLISHED BY: HGS YEAR: 1882 STATE: Hawaii
RECOVERED BY: D.M. Whipp YEAR: 1967 COUNTY: Hawaii
Island: Hawaii

HEIGHT OF TELESCOPE ABOVE STATION MARK 1.7 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	
KAUPULEHU FLOW ----- 1948	DISTANCE	and	DIRECTION-----	00 00 00.0
R.M. No. 1	ENE	22.155	6.754	322 32 26
KAUPULEHU FLOW 1948 ----- 1967	DISTANCE	and	DIRECTION-----	00 00 00.0
Keahole Point Lighthouse, 1928	SW	1.06	23 28.1	
R.M. No. 3	WSW	11.564	3.526	152 33 09
R.M. No. 1	ENE	22.055	6.723	322 31 35

Station mark and reference mark number one were recovered in good condition. Reference mark number two, a chiseled square, was not found, and is believed destroyed. A new reference mark, number three, was established. A complete description follows:

Station is located about 11 miles north of Kailua-Kona, 6 miles northeast of Keahole Point Lighthouse, 1/3-mile southeast of the sea-coast, and 4 miles northwest of State Highway 19, on the summit of a bare hill of about 342 feet elevation, named Kuili.

To reach station from the post office in Kamuela, go south on State

Highway 19 for 6.4 miles to junction with State Highway 20; continue on State Highway 19 for 24.0 miles to track road right, at power pole 281, below the Hualalai Ranch garage. Turn right and go 1.0 mile to fork. Take left fork and follow rocky road downslope for 1.9 miles to fork. Take left fork, straight ahead, and go 1.5 miles to end of truck travel at west base of hill. Pack northeast uphill about 350 yards to station on north point of hill. A 4-wheel-drive vehicle should be used as the road leading from highway is very rough and rocky.

Station mark is a standard disk stamped "KUILI 1948", cemented in a drill hole in a rock 2 inches below ground level. There is a tall wooden target and cairn centered over the mark.

Reference mark number one is a standard disk stamped "KUILI 1 1948", cemented in a drill hole in the top of an 8-inch rock projecting 6 inches above ground. It is 0.65 foot higher than station mark.

Reference mark number three is a standard disk stamped "KUILI HGS 1882 NO 3 1967", cemented in a drill hole in a rock projecting 1 inch above ground. It is 0.46 foot lower than station mark.

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: KUILI
ESTABLISHED BY: H. G. S. YEAR: 1882 STATE: Hawaii BENCH MARK ALSO ☐
RECOVERED BY: R. H. Houlder YEAR: 1971 COUNTY: Hawaii
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: 9.5 miles north of Kailua-Kona.
HEIGHT OF TELESCOPE ABOVE STATION MARK tripod FEET. HEIGHT OF LIGHT ABOVE STATION MARK FEET.

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	
Keahole Point Lighthouse 1928				00 00 00.0
RM 3 (desc.)	WSW	11.63	3.545	46 06 52
RM 1 (desc.)	ENE	22.12	6.745	216 09 03
Aero Beacon, Ke-Ahole Airport	SSW	4.5 MI.		350 25 50.4

The station and reference marks were recovered in good condition. The distances and directions to RM 1 and RM 3 disagreed with the 1967 observations by +0.022m, +0.019m and -0'56", +2'49" respectively. The "to reach" has changed and the following is a complete new description.

The station is 9.5 miles north of Kailua-Kona and on the highest point of Puu Kuili.

To reach the station from the intersection of State Highways 11 and 19, in Kailua-Kona, go northeast on State Highway 19 for 7.5 miles to a one lane paved road on the left. This road leads to Kona Village Resort. Turn left and go north-northwest on the one lane road for 1.95 miles to a track road on the left. Turn left and go northwest for 2.6 miles to a locked cable gate. The key can be obtained from Mr. Kawahara of Wm. Kawahara Realty, Kailua-Kona (phone 329-2006). Continue westerly for 0.15 mile to a fork. Take the right fork and go 0.35 mile to the highest point of Puu Kuili and the station. This last 0.35 mile requires a 4-wheel drive vehicle.

The station mark is a standard triangulation disk, stamped KUILI 1 1948, cemented in a rock 2 inches below the ground. There is a red and white wooden target centered over the mark.

Reference mark 1 is a standard reference disk, stamped KUILI 1 1948, cemented in an 8 inch rock projecting 6 inches above ground level. It is 1/2 foot higher than the station.

Reference mark 3 is a standard reference disk, stamped KUILI HGS 1882 No. 3 1967, cemented in a rock projecting 1 inch above ground level. It is 1/2 foot lower than the station.

*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.

USCOMNAVDC 37173-P89

*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&GS-326a (12-68)

U.S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY

(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 191561 STATION 1013

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

KUILI (continued)

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: KUILI
ESTABLISHED BY: HGS YEAR: 1882 STATE: Hawaii BENCH MARK(S) ALSO ☐
RECOVERED BY: GER YEAR: 1972 COUNTY: Hawaii
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: 9.6 NM N of Kailua Kona

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

Station mark and Reference marks No. 1 and No. 3 were recovered as described by D.M. Whipp (1967) in good condition. A new to-reach follows:

To reach station from junction of State Hwys 19 and 18, travel north on Hwy 19 for about 3.8 miles to the entrance to Kona Village on the left. Turn left and travel northwest down the paved road toward the sea for about 2.4 miles to a lava track road on the left. Turn left and continue down slope to a locked gate approximately 0.2 mile before reaching the prominent Puu near the shore. Pass through gate and continue ahead for 0.1 mile to a fork. Take right fork and travel upgrade to the station on the northwestern knoll of the puu. A 4-wheel drive vehicle is required for travel over the lava track road.

U.S. DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
Form 9-1165
(Rev. 12-74)

REPORT ON PERMANENT SURVEY MARK

AREA OFFICE

STATE Hawaii COUNTY Hawaii QUADRANGLE 59
QUOTE PRIMARY REFERENCE Summit of a prominent hill, named Kuili, about 11 mi N. of Kailua.
(Direction and distance)

DESIGNATION LISTED KUILI
STAMPED KUILI 1 1948 TYPE OF MARK: BM ☐ TT ☐ TRIANG. ☒
CONDITION
Lat. 19 ° 48 ' 11.674 " Disturbed ☐
Long. 156 ° 00 ' 44.802 " Destroyed ☐
Elev. 342 feet Not Found ☐
ESTABLISHED BY
USGS ☐ USBR ☐
USC&GS ☒ State GS ☐
USNFS ☐ USNFS ☐
USGLO ☐ (Other) ☐
USBLM

REMARKS OR REVISED DESCRIPTION:

To reach from the intersection of Palani Rd. and Kuakini Hwy., go E. on Palani for 0.3 mi to junction of the Queen Kaahumanu Hwy. (19), turn left and go 11.6 mi N. along Hwy. 19 to a side rd. on left, turn left and go 0.3 mi to a locked gate (key may be obtained from Mr. Francis Young of Keauhou), continue 0.1 mi to a rd. fork, take right fork and go 0.2 mi up steep rd. to top of hill and station.
Rm. no 3 was recovered in good condition. Station mark could not be recovered as the State Survey Office has built a 7 ft triangular concrete platform, pier and metal target over the station mark.

SUBMITTED BY Yukio Yamamoto
TITLE Cartographer
AGENCY USGS

DATE 1/26/78

Marks found in good condition need not be reported.

FILL IN ALL AVAILABLE INFORMATION

GPO 16-64382-6

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

0 191561 STATION 1014
HAWAII
LATITUDE 19 ° 30' TO 20 ° 00'
LONGITUDE 156 ° 00' TO 156 ° 30'
DIAGRAM NE 5-1,5 HAWAII

Makalawena Church (Hawaii Island, E. R. Hand, 1913).—On west coast of Hawaii, 5 miles north-northeast of Keahole Point, at Makalawena village, the church just inside the beach. It has a red roof, red steeple, and is painted green with white trimmings.

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: MAKALAWENA CHURCH
STATE: HAWAII YEAR: 1913 THIRD ORDER

SOURCE: G-SP156
NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	19 ° 47' 39.91	ELEVATION:	METER
GEODETIC LONGITUDE:	156 01 45.60		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ FOR Δ θ ANGLE *
HI 1	5101	318,030.71	349,297.14	- 0 ° 10' 45"

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

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

QD 251

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

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
Old Hawaiian Datum

QUAD 191561 STATION 1015
HAWAII
LATITUDE 19° 30' TO 20° 00'
LONGITUDE 156° 00' TO 156° 30'
DIAGRAM NE 5-1.5 HAWAII

NOAA FORM 76-39
12-70
FORMERLY CGS FORM 5251

U.S. DEPARTMENT OF CO:
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL GEODETIC SURVEY

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: WAWA
NEAREST TOWN: Kailua
CHIEF OF PARTY: GEH
STATE: Hawaii
QUADRANGLE NO.: 191561
YEAR: 1972
COUNTY: Hawaii
DESCRIBED BY: KJB

NOTE	HEIGHT OF TELESCOPE ABOVE STATION MARK	METERS	HEIGHT OF LIGHT ABOVE STATION MARK	METERS
	SURFACE-STATION MARK, UNDERGROUND-STATION MARK		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
	K.M. No. 1	SW	44.94 13.690	
	K.M. No. 2	ESE	40.30 12.290	

Detailed description:

Station is located on western shore of Hawaii island, about 6.5 miles northwest of Kailua, 1.3 miles southwest of new Kona Airport beacon.

To reach station drive eastward on State Highway 19 from Kailua to new Kona Airport road and turn left. Drive 3.3 miles northwest along new Kona Airport road to jeep trail heading off to the left towards the sea. Follow jeep trail 1.2 miles to beach, thence turn right and north and follow jeep trail another 100 yards to a rectangular pile of rocks about 5 feet high on the right side of the jeep trail. Station is about 200 feet NNE of the rock pile on the seaward end of a grassy lava mound 10 feet higher than surrounding lava flow.

Station is a standard disk stamped WAWA 1972 set in lava rock. Reference mark number 1 is a standard disk stamped K.C. 1 1972 set in lava rock. Reference mark number 2 is a standard disk stamped K.C. 2 1972 set in lava rock.

ADJUSTED HORIZONTAL CONTROL DATA

ADJUSTMENT BY NGS

NAME OF STATION: WAWA
STATE: HAWAII

OBS BY NGS

YEAR: 1972

SECOND ORDER

SOURCE: G-14950

GEODETIC LATITUDE: 19° 43' 12.20775	ELEVATION 1 METERS
GEODETIC LONGITUDE: 156 03 09.18038	SCALED FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	# CH Δ & ANGLE
HI 1	5101	309,961.23	322,316.35	- 0° 11' 11"

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE $\phi \cos \Delta \theta$ FORMULA NEGLECTING THE SECOND TERM

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

THESE DATA OBTAINED FROM ADJUSTMENT OF SEP 1979

RL 187

*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.

U.S. GOVERNMENT PRINTING OFFICE: 1971-760-031